NEXT-GENERATION LIGHT DUTY PICKUP

2027 SILVERADO & SIERRA

ELECTRICAL BODY BUILDERS MANUAL



Pre-production model shown Actual production model may vary.
GM is not responsible for the safety or quality of independent supplier alterations.

gm Fleet

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Section 0

General Information

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General Information

General Information

Introduction

RPO Code List

The following table provides the description of the Regular Production Option (RPO) codes that are available on the vehicle. The vehicle's RPO list is printed on the Service Parts Identification Label.

RPO	Description
04Q	IDENTIFICATION - NOT EQUIPPED WITH LANE CENTERING ASSIST(UJE) AND DRV ATTENTION ASSIT(ULM) (MY27 LD ONLY)
1CX	PACKAGE - CX OPTION 1
1LT	PACKAGE - LT OPTION 1
1WT	PACKAGE - WT OPTION 1
2CX	PACKAGE - CX OPTION 2
2FL	PACKAGE - FL OPTION 2
2LT	PACKAGE - LT OPTION 2
3LT	PACKAGE - LT OPTION 3
3LZ	PACKAGE - LZ OPTION 3
42E	INTERIOR TRIM - BACKEN BLACK / DK GALVANIZED
42H	INTERIOR TRIM - BACKEN BLACK / OREGON
4BB	INTERIOR TRIM - BACKEN BLACK / ENOKI
4NK	INTERIOR TRIM - BACKEN BLACK
4PB	INTERIOR TRIM - BACKEN BLACK / GIDEON
57N	WHEEL - 18 X 8.5, J, ALUMINUM, DESIGN 13
5JL	ACCESSORY - BRAKE UPGRADE PKG 1 - COMPLETE
5JY	ACCESSORY - TONNEAU - RR COMPT - SOFT FOLDING
5W4	SALES PACKAGE - ACTIVE SAFETY 2
5W4	SALES PACKAGE - SKID PLATE, "OFF ROAD" SPORT
5W4	TRANSFER CASE - ACTIVE, TWO SPEED, SWITCH ACTIVATED, ALUM
5WI	ACCESSORY - TIE DOWN RINGS - CARGO AREA, MOVEABLE
5WL	ACCESSORY - LOCK - SPARE WHEEL
63G	ACCESSORY - TAILGATE ASSIST LIGHTING
65C	LABEL, WARNING - CALIFORNIA, PROP 65 COMPLIANT
6K9	ACCESSORY - HANGING BED DIVIDER BRACKET
9C1	SALES PACKAGE - POLICE VEHICLE
A2V	ADJUSTER DRIVER SEAT - 6WAY, DISCONT MAN RECLINE, MAN FORE/AFT, MAN HEIGHT
A2X	ADJUSTER DRIVER SEAT - 8WAY, PWR RECLINE, PWR FORE/AFT, PWR HEIGHT, PWR TILT
A45	MEMORY - SEAT ADJUSTER, MIRROR, POWER, DRIVER, PERSONALIZATION
A48	WINDOW RR - FULL WIDTH, SLIDING, POWER
A50	SEAT - FRT BKT
A68	SEAT RR - SPLIT, FOLDING
A6E	SEAT RR - FIXED SEAT BACK, W/ ARMREST, PASS THROUGH
A7E	ADJUSTER PASS ST - 4WAY, DISCONT MAN RECLINE, MAN FORE/AFT
A7K	ADJUSTER PASS ST - 8WAY, PWR RECLINE, PWR FORE/AFT, PWR HEIGHT, PWR TILT
A91	LOCK CONTROL RR CMPT - TAILGATE, REM CONT ELEC OPEN/CLOSE
AF6	CONTROL - SEAT, MASSAGE, DRIVER
AHE	BOLSTER DRVR - SEAT, POWER
AHH	BOLSTER PASS - SEAT, POWER
AKE	CONTROL - SEAT, MASSAGE, PASSENGER
AKO	WINDOW TYPE - PRIVACY
AKP	WINDOW TYPE - SOLAR ABSORBING
AL0	SENSOR INDICATOR - INFLATABLE RESTRAINT, FRT PASS/CHILD PRESENCE DETECTOR
AMF	LOCK CONTROL - ADDITIONAL, PROGRAMMABLE, REMOTE ENTRY, MULTIPLE UNITS
AQQ	LOCK CONTROL, ENTRY - REMOTE ENTRY, EXTENDED RANGE (MY 09 AND FUTURE)
AS1	SALES PACKAGE - ACTIVE SAFETY 1
AS2	SALES PACKAGE - ACTIVE SAFETY 2
AS3	SALES PACKAGE - ACTIVE SAFETY 3
ASV	EQUIPMENT - SENSOR AIR MOISTURE & W/S TEMP
ATH	LOCK CONTROL, ENTRY - REMOTE ENTRY, EXTENDED RANGE, PASSIVE ENTRY, ALL DOORS
AU7	KEY - COMMON, FLEET
AVI	RESTRAINT PROVISIONS - ADJUSTABLE GUIDE LOOP
AVK	LUMBAR DRIVER - SEAT, POWER, 4 WAY
AVU	LUMBAR PASSENGER - SEAT, POWER, 4-WAY
AXK	VEHICLE TYPE - TRUCK

RPO	Description
AYH	RESTRAINT SYSTEM - DRVR (SINGLE, ADAPTIVE) & PASS (DUAL) FRT, SEAT SIDE, ROOF SIDE
AZ3	SEAT - FRT SPLIT, DRIVER, PASS, FULL FEATURE CENTER
B1J	LINER - RR WHEELHOUSE
B30	COVERING FLOOR - CARPET
B3L	STEPS, RUNNINGBOARD - SIDE, RETRACTABLE, POWER, BLACK
B4J	COVERING REAR - FLOOR MATS, RUBBER
B55	ACCESSORY - PUBX RUBBER MAT
B55	ACCESSORY - WHEEL LOCKS
BAQ	SALES PACKAGE - STYLE VAR 1
BG9	COVERING FLOOR - RUBBER
BKU	COVERING FRT - FLOOR MATS, RUBBER
BOY	VEHICLE INTERFACE - SMARTPHONE, UPLEVEL, RETAIL
BPH	APPEARANCE PACKAGE - CHEVROLET "OFF ROAD"
BTV	REMOTE START - VEHICLE
BVS	STEPS, RUNNINGBOARD - SIDE, BLACK, WHEEL TO WHEEL
C32	HEATER AIR SYSTEM - HEATING/ DEFROSTER SYSTEM, REINFORCED, ELECTRIC
C49	DEFOGGER - RR WINDOW, ELECTRIC
C59	VENT - AIR, CONSOLE, RR
C68	HVAC SYSTEM - AIR CONDITIONER FRT, AUTO, ELECTRONIC CONTROLS
C70	LAMP - INTR, AMBIENT, UPLEVEL
C85	LAMP - INTR, AMBIENT, PREMIUM
CAJ	ROOF - SUN, DUAL GLASS, OTR SLIDING, ELEC SUNSHADE
CE1	WIPER SYS WINDSHIELD - PULSE, MOISTURE SENSITIVE
CGN	LINER - PUBX, SPRAY ON
CJ2	HVAC SYSTEM - AIR CONDITIONER FRT, AUTO TEMP CONT, AUX TEMP CONT
CTB	CROSS TRAFFIC ASSIST - INTERSECTION ALERT, BRAKING
CW6	COUNTRY - GUAM
CWB	SALES PACKAGE - CHROME EXTERIOR
CWF	ACCESSORY - FLOOR LINER - CONTOURED
CWL	ACCESSORY - LAMPS - PERIMETER ILLUMINATION
CWM	SALES PACKAGE - TECHNOLOGY
CXH	SALES PACKAGE - INTERIOR LEATHER PACKAGE

RPO	Description
D07	CONSOLE - FRT COMPT, FLOOR, CUSTOM
D31	MIRROR I/S R/V - TILT
D4J	COUNTRY - US VIRGIN ISLAND
D4V	TRAY - REAR SEAT, STOWAGE
D72	HANDLE O/S DOOR - BLACK
D75	HANDLE O/S DOOR - BODY COLOR
DBD	MIRROR O/S - MAN EXT, PWR ADJ, HEATED, MAN FOLD, FLAT/DRVR, FLAT/ PASS, WFOV DRVR/PASS
DD8	MIRROR I/S R/V - LT SENSITIVE
DEG	SUNSHADE - DRIVER, MIRROR, COVER, ILLUM, SLIDING, PASS, MIRROR, COVER, ILLUM, SLIDING
DEZ	MIRROR O/S - LH & RH, ELEC REMOTE, POWER FOLD, HEAT, PERM LIGHT, LT SENSITIVE DRVR, FLAT/DRVR, CNVX/ PASS
DLF	MIRROR O/S - LH & RH, RC, ELEC, HEAT, MAN FOLD, FLAT/DRVR, CNVXPASS
DME	MIRROR O/S - LH & RH, PWR ADJUST, HEAT, PWR FOLD, FLAT/DRVR, CNVX/ PASS
DNS	EQUIPMENT - SUPPLIER INSTALLED
DP5	MIRROR PROVISIONS - HOUSING, MOLDED W/COLOR
DRZ	MIRROR I/S R/V - LT SENSITIVE, FULL VIDEO DISPLAY
E4V	INTERIOR TRIM CONFIG - VINYL, LEVEL 4, BACKEN BLACK
E5J	INTERIOR TRIM CONFIG - CLOTH/VINYL, LEVEL 2, BACKEN BLACK
E5P	INTERIOR TRIM CONFIG - CLOTH / VINYL, LEVEL 2, BACKEN BLACK / OREGON
E63	BODY EQUIPMENT - FLEETSIDE PICK-UP BOX
E6J	COUNTRY - PUERTO RICO
E6Y	INTERIOR TRIM CONFIG - CLOTH/VINYL, LEVEL 3, BACKEN BLACK / GIDEON
E7V	INTERIOR TRIM CONFIG - VINYL, LEVEL 3, BACKEN BLACK / DARK GALVANIZED
EF7	COUNTRY - UNITED STATES OF AMERICA (USA)
EKV	INTERIOR TRIM CONFIG - CLOTH, LEVEL 1, BACKEN BLACK
EM9	INTERIOR TRIM CONFIG - CLOTH/VINYL, LEVEL 3, BACKEN BLACK
ENL	ENG CONTROL DISABLE - STOP/START, NON-LATCHING
EPH	TRANS RANGE SEL SYS - ELECTRONIC
EWE	MIRROR PROVISIONS - MIRROR PROVISIONS HOUSING, HIGH GLOSS BLACK PAINTED

RPO	Description
F48	CHASSIS DRIVE LINE - ALL WHEEL DRIVE (AWD)/FOUR WHEEL DRIVE(4WD), DRIVER SELECT
FE9	CERTIFICATION - EMISSION, FEDERAL
FHX	VEHICLE FUEL - DIESEL B20
FJW	VEHICLE FUEL - GASOLINE E15
FWI	PLANT CODE - FT WAYNE, IN, USA
G42	PRIMARY COLOR - EXTERIOR, WHITE SANDS SOLID (234L)
G4J	PRIMARY COLOR - EXTERIOR, POLAR WHITE TRI MET-1 (241L)
G4M	PRIMARY COLOR - EXTERIOR, SARGENT MET-1 (243L)
G7C	PRIMARY COLOR - EXTERIOR, PULL ME OVER RED SOLID (130X)
G80	AXLE POSITRACTION - LIMITED SLIP
G93	AXLE - FRT ELECTRONIC LOCKING DIFFERENTIAL, DRIVER SELECT
G94	AXLE - RR ELECTRONIC LOCKING DIFFERENTIAL, DRIVER SELECT
GAS	PRIMARY COLOR - EXTERIOR, APEX RED SOLID (227K)
GAZ	PRIMARY COLOR - EXTERIOR, SUMMIT WHITE (G) 8624
GBA	PRIMARY COLOR - EXTERIOR, BLACK (G) 8555
GEY	HANDLING CHARGE - FROM FT WAYNE ASM, TO GROUND EFFECTS LTD., FT WAYNE, IN, BACK TO FT WAYNE ASM.
GF2	TRIM PACKAGE - CUSTOM
GF3	TRIM PACKAGE - LT
GF4	TRIM PACKAGE - TRAIL BOSS LT
GF5	TRIM PACKAGE - WORK TRUCK
GFD	TRIM PACKAGE - HIGH COUNTRY
GG0	TRIM PACKAGE - LT-L
GJV	PRIMARY COLOR - EXTERIOR, RIP TIDE MET-1 (121J)
GPZ	TRIM PACKAGE - TRAIL BOSS CUSTOM
GRZ	TRIM PACKAGE - ZR2
GTM	PRIMARY COLOR - EXTERIOR, TRILLIUM MET-1 (380M)
GU5	AXLE REAR - 3.23 RATIO
GU6	AXLE REAR - 3.42 RATIO
GXD	PRIMARY COLOR - EXTERIOR, SHARKSKIN MET-1 (130H)
H9F	INTERIOR TRIM CONFIG - VINYL, LEVEL 1, BACKEN BLACK
HS1	ALERT - SAFETY HAPTIC SEAT
HSD	INTERIOR TRIM CONFIG - VINYL, LEVEL 4, BACKEN BLACK / ENOKI
I27	ENGINEERING YEAR - 2027

RPO	Description
IKP	VEH CONTENT BASIS - US
IVE	INFOTAINMENT - VIRTUAL COCKPIT SYS - HIGH
JBP	BRAKE LINING WEAR SY - LIFE SPAN PROGNOSTIC INDICATOR
JFC	BRAKE SYSTEM - 17" FRT FIXED CALIPER DISC, 17" RR FIXED CALIPER DISC
JFV	BRAKE SYSTEM - 20" FRT FIXED CALIPER DISC, 17" RR SLIDING CALIPER DISC
JHD	BRK APL CTRL FEATURE - HILL DESCENT, GEAR HOLD
JL1	BRK APL CTRL FEATURE - INTEGRATED TRAILER BRAKE
K05	HEATER ENG - BLOCK
K47	AIR CLEANER - HIGH CAPACITY
K7A	CHARGER FRT ROW - PORTABLE DEVICE, INDUCTIVE, SINGLE
K7B	CHARGER FRT ROW - PORTABLE DEVICE, INDUCTIVE, DUAL
KAM	HEATER SEAT FRT - CUSHION & BACK, DUAL MODE
KC9	RECEPTACLE PUBX - ELECTRICAL, 120 VOLT, TYPE B
KCB	HEATER SEAT 2ND ROW - CUSHION, SINGLE MODE
KFG	RECEP FRT CNSL FRT - ELECTRICAL, 120 VOLT, TYPE B
KGU	MODULE - UPFITTER, SERIAL DATA GATEWAY
KI3	STEERING WHEEL HEAT - AUTOMATIC
KI4	RECEPTACLE I/P - ELECTRICAL, 120 VOLT, TYPE B
KL9	ENG CONTROL - STOP/START SYS, CONVENTIONAL AT, CONVENTIONAL MT OR BRAKE RELEASE LATE RESTART
KLF	ENG CONTROL - STOP/START SYS, DISABLE FUNCTION
KSG	CRUISE CONTROL - AUTOMATIC, ADAPTIVE, WITH STOP/GO
KU9	VENTILATED SEAT FRT - DRVR & PASS
KW5	GENERATOR - 220 AMP
KX4	GENERATOR - 250 AMP
L4B	ENGINE - GAS, 4 CYL, 2.7L, L4, DI, DOHC, DICP, HEAT & DVCV, TURBO, ALUM, GEN 1
L76	ENGINE - 8 CYL, 5.7L, V8, DI, PFI, DFM, ALUM, GEN 6
L78	ENGINE - 8 CYL, 6.6L, V8, DI, PFI, DFM, ALUM, GEN 6
LZ0	ENGINE - DIESEL, 6 CYL, 3.0L, CRI, L6, DOHC, TURBO, VGT, ALUM, CSS50V, VAR. 2
MAH	MARKETING AREA - US, PUERTO RICO/ USVI

RPO	Description
MHS	TRANSMISSION - AUTO 10 SPD, 10L80, GRX, GEN 1, ATSS, ETRS, VAR 1
MHU	TRANSMISSION - AUTO 10 SPD, 10L80, GRX, GEN 1, ETRS, VAR 1
MQC	TRANSMISSION - AUTO 10 SPD, 10L80, ATSS, ETRS, CPA, GEN 2
MSL	PLANT CODE - SILAO, MEXICO
N10	EXHAUST SYSTEM - DUAL
N37	STEERING COLUMN - TILT, TELESCOPING
N38	STEERING COLUMN - TILT, TELESCOPING, POWER
N5G	STEERING WHEEL - SYNTHETIC, 4 SPOKE, SPORT, ROUND
N5J	STEERING WHEEL - SYNTHETIC, 4 SPOKE, SPORT, FLAT BOTTOM
N5W	STEERING WHEEL - URETHANE, 4 SPOKE, THIN, ROUND
NAM	NAVIGATION - APPS
NC2	EXHAUST SYSTEM - SINGLE HORIZONTAL
NE1	CERTIFICATION - EMISSION, GEOGRAPH-ICALLY RESTRICTED REGISTRATION
NHT	COOLING SYSTEM - EXTRA CAPACITY
NHT	SALES PACKAGE - TRAILER TECHNOLOGY
NHT	PERFORMANCE PACKAGE - ENHANCED TOWING
NKD	NOISE CONTROL - SOUND ENHANCEMENT
NL3	EMISSION SYSTEM - ULEV70/BIN70: FED TIER3, 0K-8.5K GVW LDV & > 8.5K MDPV
NL8	EMISSION SYSTEM - ULEV50/BIN50: FED TIER3, 0K-8.5K GVW LDV & > 8.5K MDPV
NLA	FUEL TANK - 128L, 34 GAL
NLB	EMISSION SYSTEM - SULEV30/BIN30: FED TIER3, 0K-8.5K GVW LDV & > 8.5K MDPV
NP0	TRANSFER CASE - ACTIVE, SINGLE SPEED,SWITCH ACTIVATED,ALUM
NPP	EXHAUST SYSTEM - PERFORMANCE
NQH	TRANSFER CASE - ACTIVE, TWO SPEED, SWITCH ACTIVATED, ALUM
NZJ	WHEEL - 20 X 9.0, J, ALUMINUM, DESIGN 9
NZM	WHEEL - 20 X 9.0, J, ALUMINUM, DESIGN 10
NZZ	SALES PACKAGE - SKID PLATE, "OFF ROAD" SPORT
ORN	PLANT CODE - ORION, MI, USA
PPW	PHONE PROJECTION - PHONE PROJECTION WIRELESS
PXT	WHEEL - 20 X 9.0, J, STEEL, DESIGN 1
PZ8	IMAGE ADJUSTMENT - HITCH VIEW

RPO	Description
PZ9	PLATE - SKID, FUEL TANK
PZG	PLATE - SKID FRT
PZL	PLATE - SKID RR DIFFERENTIAL
PZN	PLATE - SKID TRANSFER CASE
PZZ	PLATE - FRT UNDERBODY, SKID
Q5U	WHEEL - 17 X 8.0, J, ALUMINUM, DESIGN 2
Q81	WHEEL - 18 X 8.5, J, ALUMINUM, DESIGN 17
QAB	TIRE ALL - 275/60R20 SL 115S BW AL2
QAE	TIRE ALL - 275/60R20 SL 115S BW AT
QAQ	TIRE SPARE - 255/80R17 SL 115S BW SPR
QBN	TIRE ALL - 255/70R17 SL 112S BW ALS VAR 1
QK1	GATE TYPE - PUBX END STANDARD
QK2	GATE TYPE - PUBX END ENHANCED
QRG	TIRE ALL - 275/65R20 SL 116S BW AT
QSM	TIRE ALL - LT285/70R18 C 117/114Q BW OOR
QT2	GATE FUNCTION - MANUAL
QT5	GATE FUNCTION - MANUAL ASSIST POWER RELEASE
QT6	GATE FUNCTION - POWER
QTK	TIRE ALL - LT285/75R18 C 119/116Q BW OOR VAR1
R3O	TIRE ALL - LT275/65R18 C 113/110Q BW OOR, VAR1
R88	ACCESSORY - ILLUMINATED EMBLEM - EXTERIOR - DESIGN 2
RBR	WHEEL - 22 X 9.0, J, STEEL, DESIGN 1
RC5	TIRE ALL - LT265/70R17 C 112Q BW AT
RD6	WHEEL - 17 X 8.0, J, STEEL, DESIGN 2
REG	WHEEL - 18 X 8.5, J, ALUMINUM, DESIGN 7
RHM	TIRE SPARE - LT265/70R17 C 112Q BW AT
RIA	ACCESSORY - FLOOR LINER - CONTOURED
RIK	ACCESSORY - BADGE - EXTERIOR, PACKAGE, DESIGN 1
RIN	ACCESSORY - BADGE - EXTERIOR, PACKAGE, DESIGN 2
RIS	ACCESSORY - SECOND ROW HYBRID FLOOR LINER
RIT	ACCESSORY - BADGE - EXTERIOR, PACKAGE DESIGN 3
RM7	WHEEL SPARE - 17 X 8.0, J, STEEL, DESIGN 1
RMW	TIRE SPARE - 275/60R20 SL 115S BW AT
RNQ	WHEEL SPARE - 20 X 9.0, J, STEEL, DESIGN 1

RPO	Description
RPP	WHEEL - 17 X 8.0, J, STEEL, DESIGN 4
RSI	ACCESSORY - CARGO AREA ORGANIZER - RECONFIGURABLE
RSR	OCCUPANT DETECT SYS - REAR SEAT, DOOR ACTIVATED
RVP	ACCESSORY - ASSIST STEPS - REMOVABLE
RVQ	ACCESSORY - ASSIST STEPS - TUBULAR - OVAL - BLACK
RVS	ACCESSORY - ASSIST STEPS - TUBULAR - ROUND - BLACK
RVY	ACCESSORY - PUBX CARGO DIVIDER
RWL	CHASSIS DRIVE LINE - REAR WHEEL DRIVE (RWD)
RXH	ACCESSORY - CENTER CAP - WHEEL - DESIGN 1
RXQ	ACCESSORY - CONVENIENCE NET - BED MOUNTED
RY6	ACCESSORY - ASSIST STEPS -TUBULAR-BLACK
RZU	ACCESSORY - LAMPS-AUX OFF ROAD
S0M	ACCESSORY - ILLUMINATED DOOR SILLS
S1H	ACCESSORY - OFF-ROAD RECOVERY KIT
S1O	ACCESSORY - CONTAINER - LOCKABLE STORAGE - INTERIOR
S2E	WHEEL SPARE - 18 X 8.5, J, ALUMINUM, DESIGN 3
S3I	ACCESSORY - LAMPS - PERIMETER ILLUMINATION
S3U	ACCESSORY - LAMP KIT - FRONT FOG
S47	ACCESSORY - LUG NUTS
S4C	WHEEL SPARE - 18 X 8.5, J, ALUMINUM, DESIGN 4
S4K	ACCESSORY - CARGO STRAP - FLEXIBLE ORGANIZER - RR COMPT
S4X	ACCESSORY - MIRROR COVERS/SKULL CAPS - ALTERNATE FINISH - PAINTED
S4Z	ACCESSORY - MIRRORS - TRAILER EXTENSION
S6L	ACCESSORY - PROTECTOR - ROCKER PANEL
S6W	ACCESSORY - SEAT COVER - MUDDER (PROTECTIVE)
SAD	ACCESSORY - CENTER CONSOLE - COOLER POWERED
SAX	ACCESSORY - SPEAKER KIT - LEVEL 1
SBK	RESTRAINT - SEAT BELT PRETENSIONER, RR
SBZ	ACCESSORY - SPORT PEDAL KIT
SD5	ACCESSORY - TIRE PRESSURE MONITOR
SDA	ACCESSORY - TOW HOOKS

RPO	Description
SDT	ACCESSORY - TRAILOR HITCH - HOLDER
SES	ACCESSORY - WHEEL - 22 X 9.0 - J - ALUMINUM - DESIGN 1
SEV	ACCESSORY - WHEEL - 22 X 9.0 - J - ALUMINUM - DESIGN 3
SEW	ACCESSORY - WHEEL - 22 X 9.0 - J - ALUMINUM - DESIGN 4
SEZ	ACCESSORY - WHEEL - 22 X 9.0 - J - ALUMINUM - DESIGN 6
SF1	ACCESSORY - WHEEL - 22 X 9.0 - J - ALUMINUM - DESIGN 8
SF6	ACCESSORY - WHEEL FLARES - ALTERNATE DESIGN - PAINTED
SF8	ACCESSORY - DECAL PACKAGE - DESIGN 3
SFE	ACCESSORY - WHEEL LOCKS
SFJ	ACCESSORY - WINDOW SHADES - REFLECTIVE
SFZ	ACCESSORY - EMBLEM - EXTERIOR - DESIGN 1
SIR	ACCESSORY - SKID PLATES - REAR DESIGN 1
SIY	WHEEL - 22 X 9.0, J, ALUMINUM, DESIGN 9
SJA	ACCESSORY - GRILLE / GRILLE INSERTS - ALTERNATE FINISH 2
SJS	ACCESSORY - UTILITY WALL - FRONT
SKB	WHEEL - 20 X 9.0, J, ALUMINUM, DESIGN 26
SKZ	ACCESSORY - WHEEL - 18 X 8.5 - J - ALUMINUM - DESIGN 2
SMI	WHEEL - 22 X 9.0, J, ALUMINUM, DESIGN 17
SMZ	ACCESSORY - OFF ROAD DRIVE SHAFT
SNS	ACCESSORY - DECAL PACKAGE - DESIGN 28
SPY	ACCESSORY - LUG NUTS - ALT FINISH
SPZ	ACCESSORY - WHEEL LOCKS - ALT FINISH
SQI	ACCESSORY - SUSPENSION LIFT KIT
ST1	SALES PACKAGE - PREMIUM EDITION
SUR	ACCESSORY - TRAILER TIRE PRESSURE MONITOR
T3U	LAMP FRT FOG - FRT FOG
T4Z	SEAT BELT SAFETY SYS - SHIFTER INTERLOCK, GEN 1, NON-CUSTOMIZABLE
T8Z	SEAT BELT SAFETY SYS - SHIFTER INTERLOCK, GEN 3, INFOTAINMENT CUSTOMIZABLE
TDM	MODE DRIVER SETTINGS - TEEN DRIVER, INFOTAINMENT
TGH	HANDLE - ASSIST, PUBX

RPO	Description
TQ5	HEADLAMP HIGH BEAM - AUTO CONTROL
TRG	VISION TRAILER - INSIDE VIEW, REAR VIEW
TRO	ACCESSORY - CAMERA PKG - TRAILERING AUX MOUNTED
U05	HORN - DUAL
U12	LAMP - EXTR, OSRV MIRROR, TASK
U2K	DIGITAL AUDIO SYSTEM - S-BAND
U5G	COMMUNICATION EQUIP - INTERNET CONNECTIVITY, 5G
UBD	RECPT USB FLR CNSL F - DUAL, CHARGE, DATA
UBI	RECPT USB FLR CNSL R - DUAL, CHARGE
UBJ	RECPT USB IP LWR - DUAL, CHARGE, DATA
UCV	CONNECTED CAMERA - EXTERIOR, INTERIOR
UD5	PARK ASSIST - FRONT AND REAR
UE1	COMMUNICATION SYSTEM - VEHICLE, ONSTAR
UET	INDICATOR - SMART TRAILER INTEGRATION
UEU	SENSOR INDICATOR - FORWARD COLLISION ALERT
UF2	LAMP - CARGO
UFB	REAR CROSS TRAFFIC - ALERT, BRAKING
UG1	OPENER - GARAGE DOOR, UNIVERSAL
UGA	HOOK - TOW, RED
UGN	COLL IMMINENT BRK - ALL SPEED, VEH FWD MOVEMENT, BRAKE PREFILL, INTEGRATED BRAKE ASSIST
UH5	INDICATOR - SEAT BELT WARNING, REAR SEAT
UIT	ALERT DISPLAY - REFLECTED, SINGLE COLOR
UJE	LANE ACTIVE SAFETY - DEPARTURE WARNING, KEEP ASSIST, HANDS ON LANE FOLLOWING (ENTIRE SPEED RANGE)
UKI	SIDE ACTIVE SAFETY - OBSTACLE DETECTION ENHANCED, STEERING ASSIST
UKK	SENSOR INDICATOR - PEDESTRIAN DETECTION - REAR
UKL	LANE ACTIVE SAFETY - KEEP ASSIST, HANDS FREE LANE FOLLOWING(ENTIRE SPEED RANGE)
UKM	LANE ACTIVE SAFETY - KEEP ASSIST (OPTIMAL RETURN)
UKT	PED DETECTION FRT - ENHANCED, PEDESTRIANS AND BICYLISTS

RPO	Description
UKW	SIDE ACTIVE SAFETY - OBSTACLE DETECTION ENHANCED, STEERING ASSIST, EXTENDED TRAILER VIEW
ULK	ACCESSORY - TOW HOOKS - RED
ULM	DRVR MONITORING SYS - DROWSINESS WARNING
ULV	SALES PACKAGE - CHEVROLET BISON
UMN	SPEEDOMETER - INST, MILES & KILO, MILES ODOMETER
UNW	ACCESSORY - UTILITY WALL U-NUT
UOW	DETECTION SIDE - DOOR OPENING WARNING, PEDESTRIANS/BICYLISTS/ VEHICLE
UPL	DISPLAY INSTRUMENT - DRIVE INFO, DISPLAY, FAMILY D, 12.2", 2362X630, HIGH CONTRAST
UQ3	SPEAKER SYSTEM - ENHANCED AUDIO
UQA	SPEAKER SYSTEM - PREMIUM AUDIO, BRANDED AMPLIFIER
UQF	SPEAKER SYSTEM - STANDARD AUDIO
URC	SWITCH - FLEXRIDE MODE SYSTEM
USN	INFOTAINMENT PASS - FAMILY D, 11.5", 2560X1080, HIGH CONTRAST
USP	INFOTAINMENT DISPLAY - FAMILY D, 16.3", 2992X1299, HIGH CONTRAST
UTJ	THEFT DETERENT - ELECTRICAL, UNAUTHORIZED ENTRY
UUA	DISPLAY AOS - OCCUPANT SENSING, MVSS
UV2	VISION - 360 VIEW, MONO, HD DIGITAL
UV6	HEAD UP DISPLAY - WINDSHIELD
UVB	VISION - REAR VIEW, MONO, HD DIGITAL
UVN	VISION AUXILIARY - CARGO BED
UVX	SENSOR INDICATOR - TRAFFIC SIGN RECOGNITION ENHANCED
UVZ	SENSOR - COLLISION AVOIDANCE & MITIGATION, VEHICLE REVERSE MOVEMENT
UXA	VISION UNDERBODY - FORWARD AND REARWARD FACING
V03	COOLING SYSTEM - EXTRA CAPACITY
V46	BUMPER FRT - CHROME
V76	HOOK - TOW
V8D	VEHICLE STATEMENT - VEHICLE LABEL CONTENT - U.S. FMVSS
VBJ	ACCESSORY - UNDERSEAT STORAGE
VBN	ACCESSORY - PUBX CARPET
VBP	ACCESSORY - POWER DISTRIBUTION BOX
VBR	ACCESSORY - PUBX RUBBER MAT
VFC	BUMPER FRT - ANDERSON METALLIC

RPO	Description
VFE	BUMPER RR - ANDERSON METALLIC
VGC	PROTECTOR - FILM, PAINT ETCH PREVENTIVE
VH6	BUMPER FRT - BLACK
VHU	BUMPER FRT - SPORT
VJG	BUMPER RR - BLACK
VJH	BUMPER RR - CHROME
VK3	LICENSE PLATE FRONT - FRT MOUNTING PKG
VNI	ACCESSORY - REAR FASCIA APPLIQUE - ALTERNATIVE FINISH 1
VOZ	ACCESSORY - TONNEAU - RR COMPT - HARD FOLDING - ALT DESIGN
VP0	HOOK - TOW, CLOSED TYPE
VPB	ACCESSORY - TONNEAU - RR COMPT - VINYL W/ INTEGRAL CROSSBOW SUPPORTS
VPS	BUMPER RR - SPORT
VQK	ACCESSORY - SPLASH GUARDS - CUSTOM MOLDED
VQO	ACCESSORY - ASSIST STEPS - BLACK
VSX	LABEL - TOWING
VTI	SHUTTERS - FRONT GRILLE, ACTIVE, UPR
VV4	COMMUNICATION EQUIP - MOBILE INTERNET CONNECTIVITY
VWD	ACCESSORY - CENTER CAP - WHEEL - DESIGN 4
VXH	ACCESSORY - ASSIST STEPS - TUBULAR - CHROME - OVAL
VXW	ACCESSORY - ASSIST STEPS - MOLDED
VYN	ACCESSORY - WHEEL TRIM RING DESIGN 1
VYP	ACCESSORY - WHEEL TRIM RING DESIGN 2
VYU	PROVISIONS - SNOW PLOW PREP
VZ2	CALIBRATION - SPEEDOMETER A
VZT	ACCESSORY - ASSIST STEPS - OFF ROAD
VZX	ACCESSORY - PUBX BEDLINER
W2D	ACCESSORY - CARGO NET
WBC	ACCESSORY - EXHAUST UPGRADE
WBP	SALES PACKAGE - CONVENIENCE
WJE	SALES PACKAGE - SUN AND TECHNOLOGY
WLM	WINDOW CONTROL - REMOTE EXPRESS DOWN, ALL WINDOWS, EXPRESS UP DRVR
WLN	WINDOW CONTROL - REMOTE EXPRESS DOWN, ALL WINDOWS, EXPRESS UP DRVR/PASS
WMI	SHUTTERS - FRONT GRILLE, ACTIVE, UPR AND LWR
WNS	VIN MODEL YEAR - 2027
WPC	SALES PACKAGE - COMFORT AND CONVENIENCE
WPQ	SALES PACKAGE - PROTECTION
X88	MARKET BRAND - CHEVROLET
XCE	TIRE ALL - 275/50R22 SL 111T BW AL2 VAR 1
XCK	TIRE ALL - 265/65R18 SL 114T BW AT VAR1
XCQ	TIRE SPARE - 265/70R17 SL 115S BW SPR VAR1
XD5	ACCESSORY TIRE - TIRE ALL-275/50R22 SL 111T BW AL2
XEV	SALES PACKAGE - AEV VARIANT
YD9	LEAF SPRING - COMPOSITE MONO LEAF
YF5	CERTIFICATION - EMISSION, CALIFORNIA
Z45	CHASSIS PACKAGE - CONTINUOUS DAMPING CONTROL
Z60	CHASSIS PACKAGE - HIGH PERFORMANCE
Z65	SALES PACKAGE - POWER
Z6X	SALES PACKAGE - OFF ROAD PERFORMANCE
Z71	CHASSIS PACKAGE - "OFF ROAD"
Z7X	CHASSIS PACKAGE - "OFF ROAD" 2 INCH LIFT
Z82	TRAILER PROVISIONS - SPECIAL EQUIPMENT, H.D.
Z85	CHASSIS PACKAGE - INCREASED CAPACITY
ZBM	TIRE SPARE - LT285/75R18 C 119/116Q BW OOR
ZL3	SALES PACKAGE - CONVENIENCE
ZLB	SALES PACKAGE - TRAILER TECHNOLOGY
ZRX	CHASSIS PACKAGE - HIGH PERFORMANCE LIFTED

Section 1

Body Systems

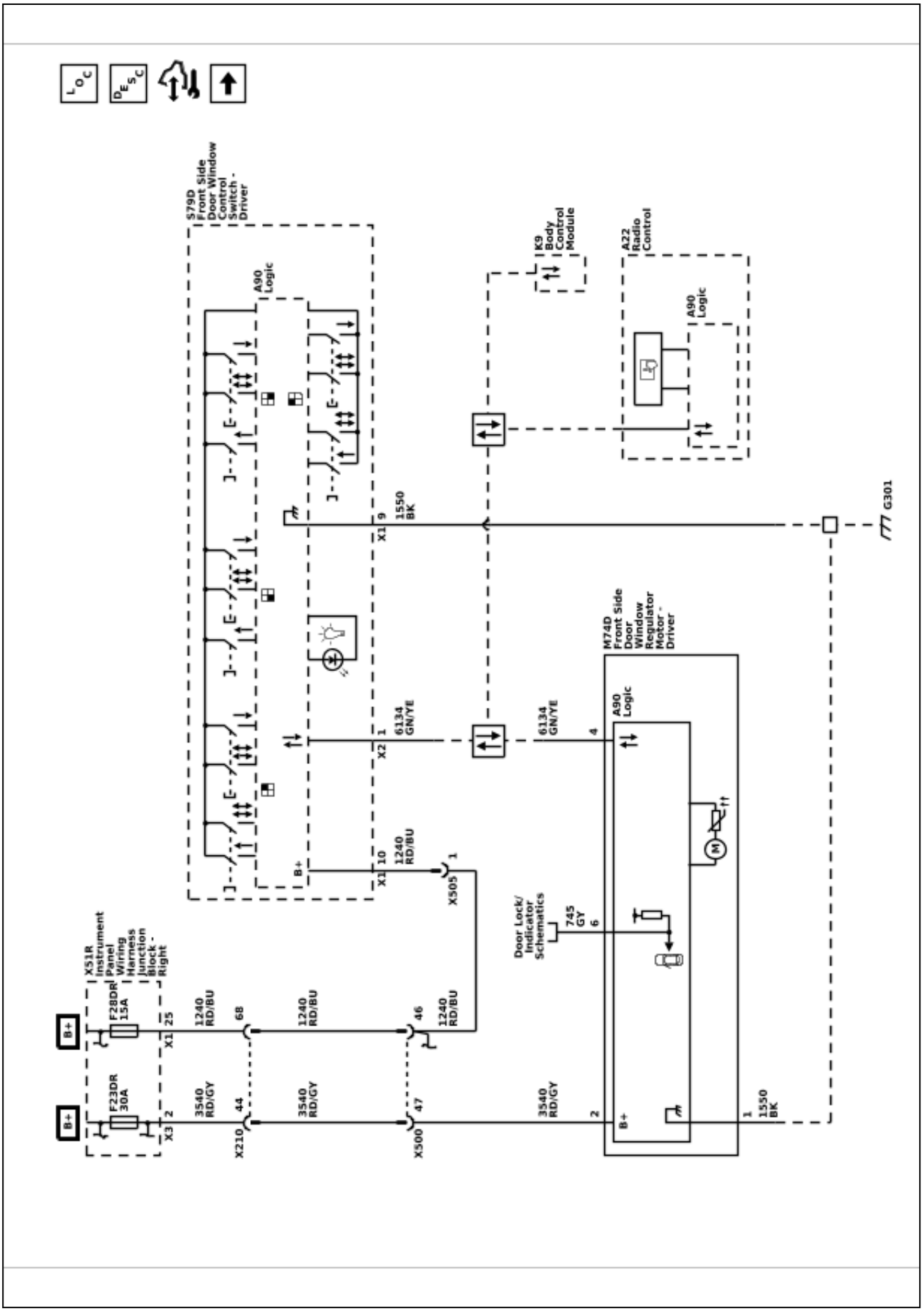
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Body Systems

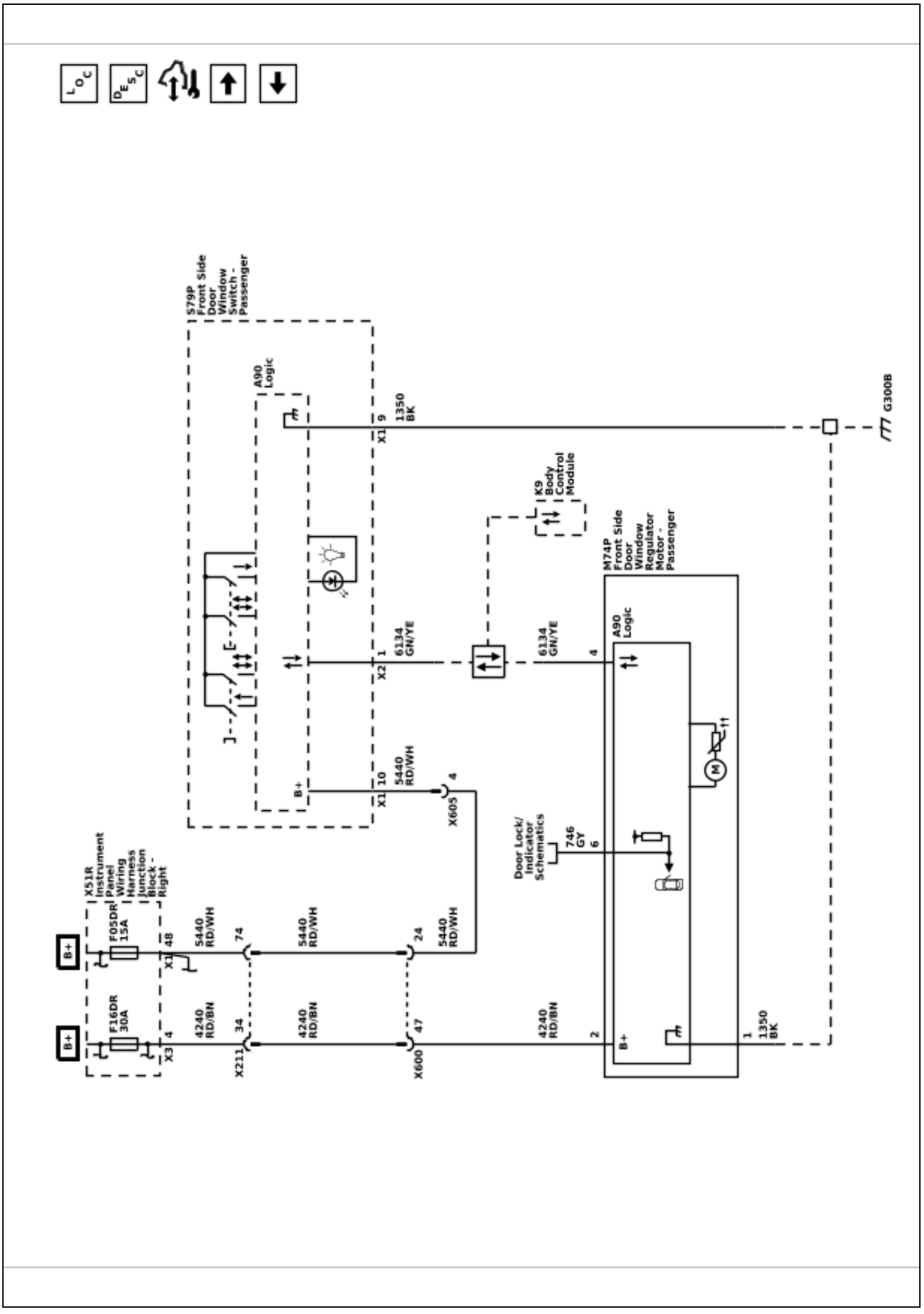
Fixed and Moveable Windows

Schematic and Routing Diagrams

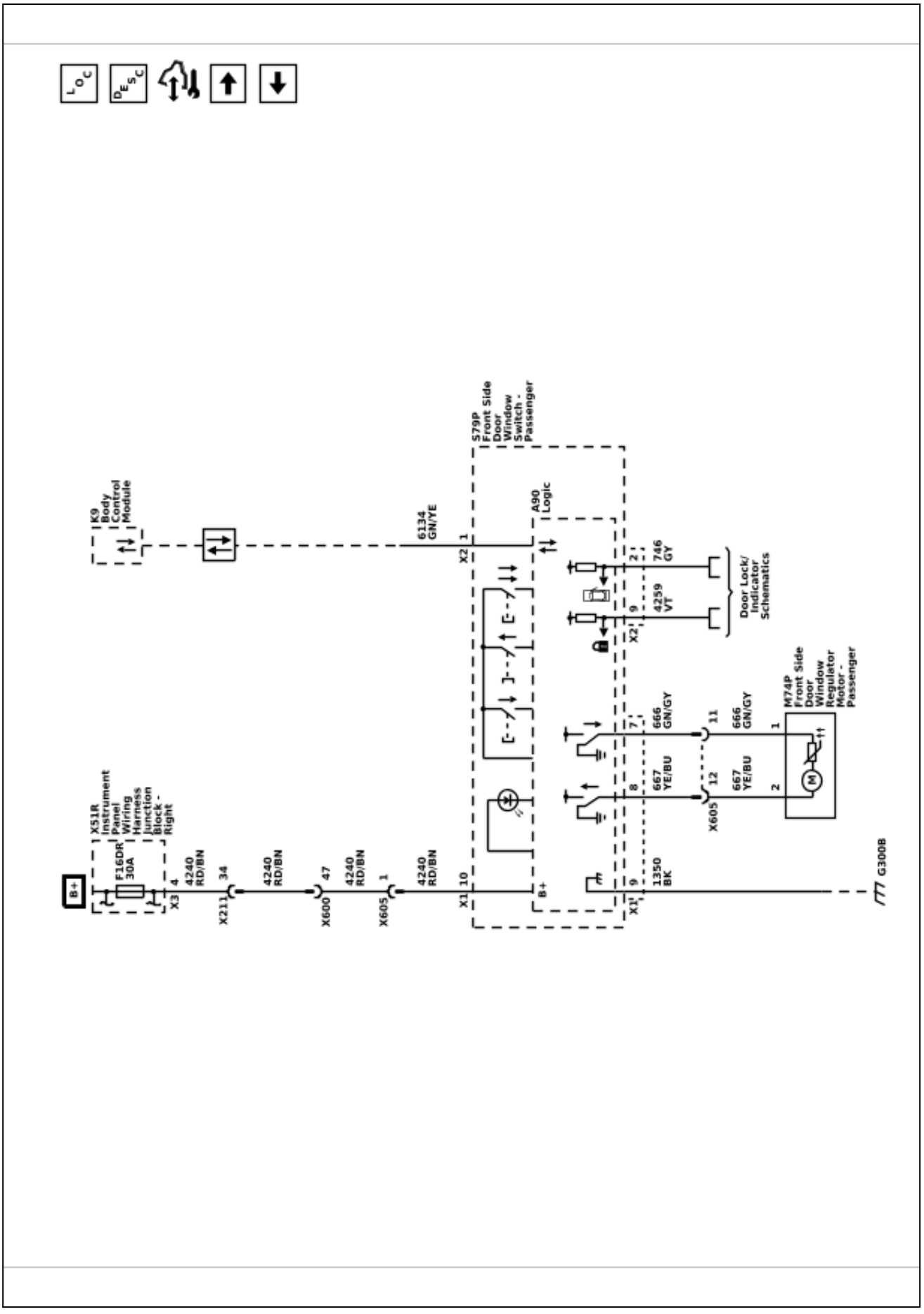
Moveable Window Schematics (Driver Window)



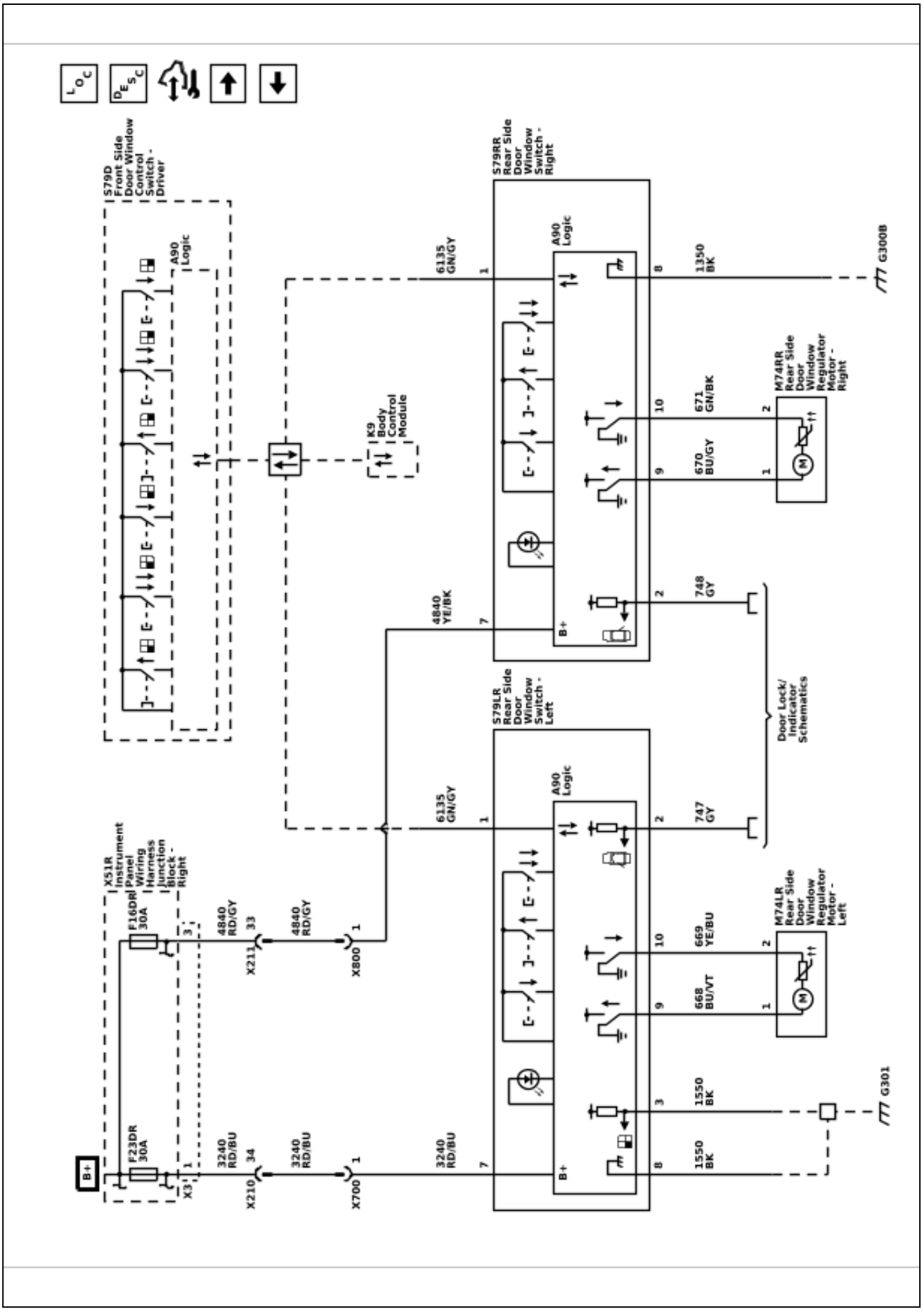
Moveable Window Schematics (Passenger Window (WLN))



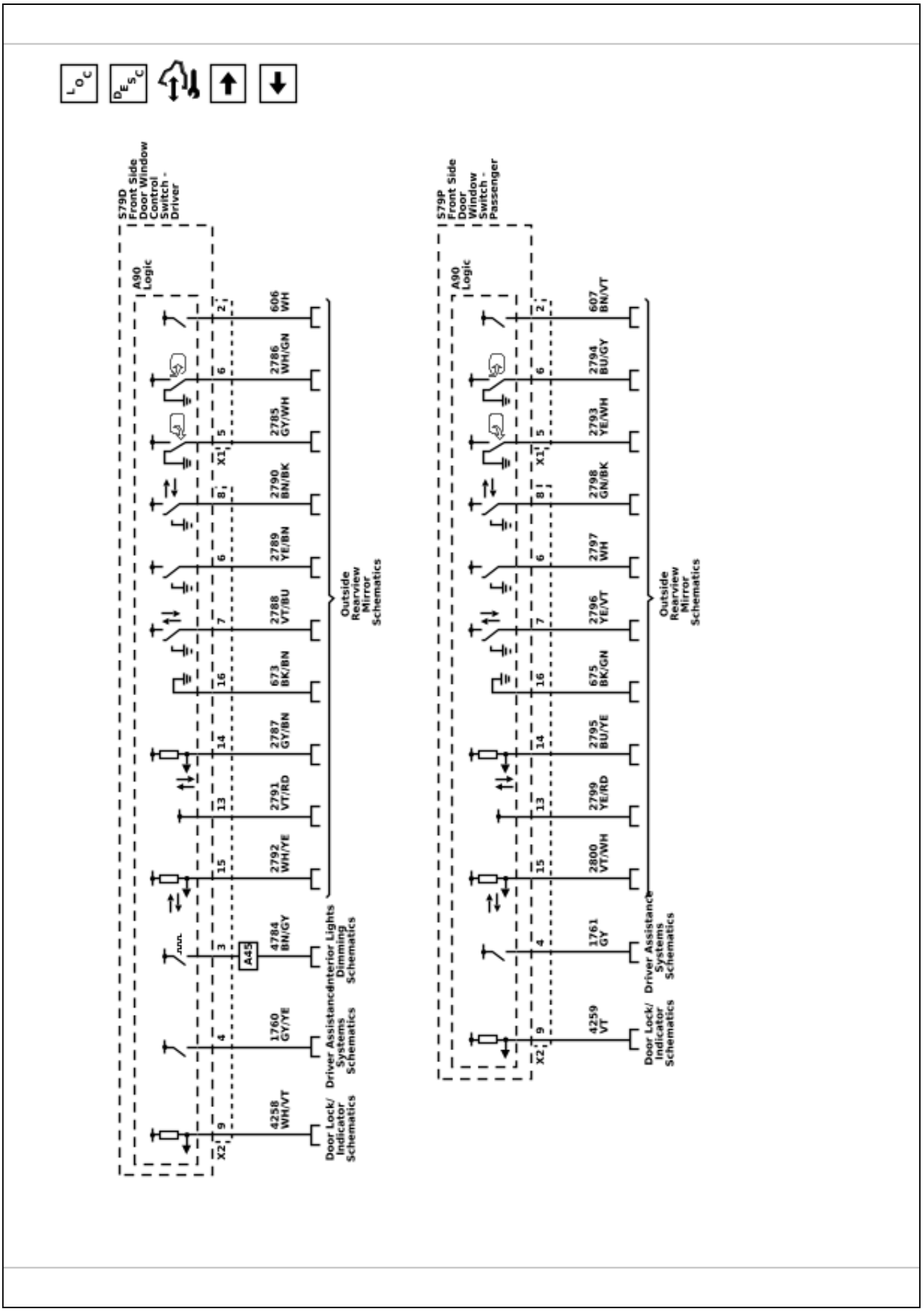
Moveable Window Schematics (Passenger Window (WLM))



Moveable Window Schematics (Rear Windows - 4-Door)

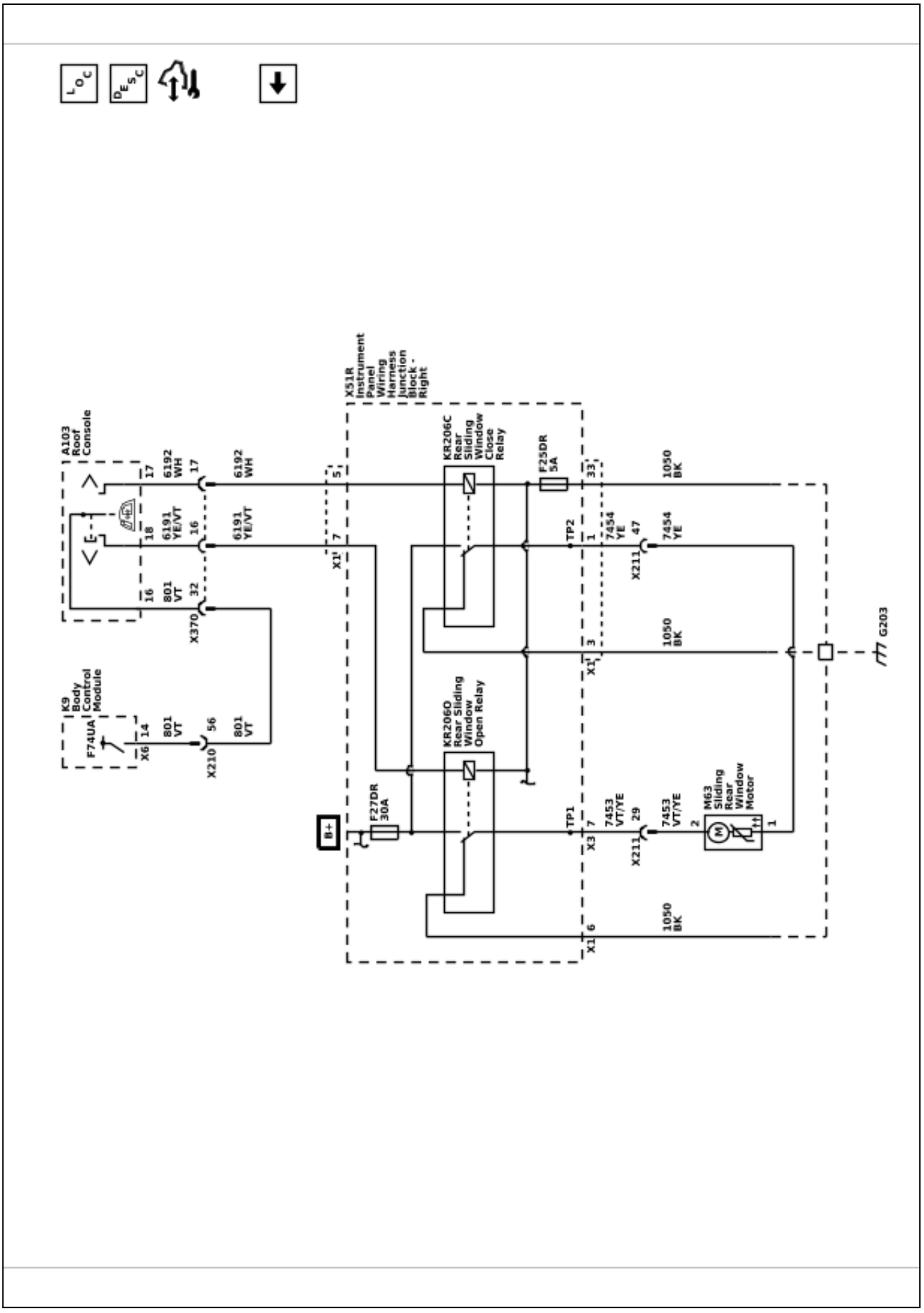


Moveable Window Schematics (Front Window Switches - Subsystem References)

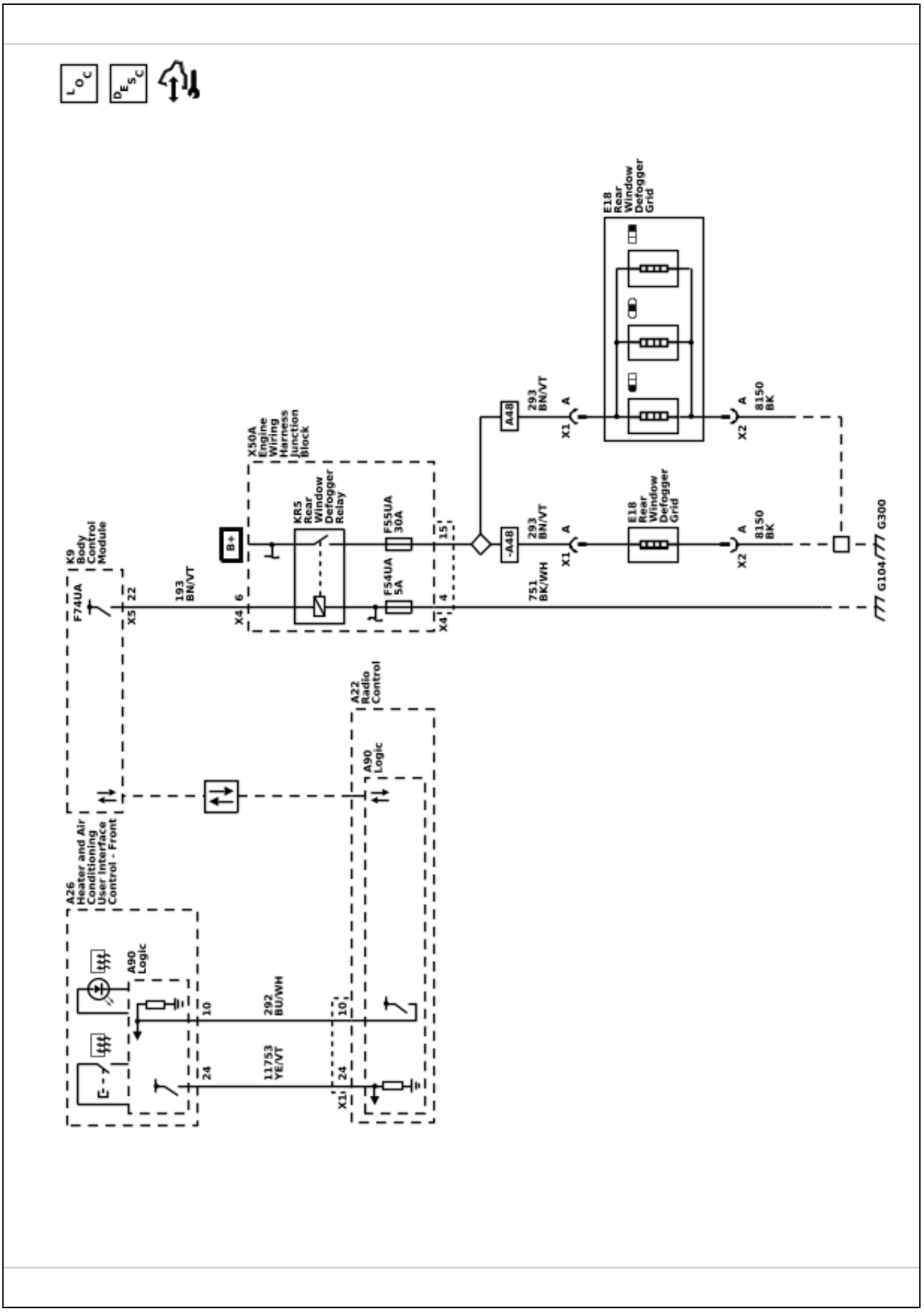


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Moveable Window Schematics (Rear Sliding Window (A48))



Defogger Schematics (Defogger)



Description and Operation

Power Windows Description and Operation

Power Windows System Components

The power window system consists of the following components:

- Driver front side door window control switch
- Passenger front side door window control switch
- Left rear side door window switch
- Right rear side door window switch
- Window motors in each of the doors
- Body control module (BCM)

Driver and Passenger Express Up and Express Down Power Window Motors

The driver and passenger doors contain a smart window motor that will detect excessive resistance while performing the express up function and automatically reverse direction to prevent injury to any occupants that may become trapped between the closing window and the door frame. The automatic reverse safety feature can be overridden by pulling and holding the window switch.

The logic circuits within the window motor monitor the up, down and express signal circuits which are normally equal to B+ voltage. When a switch is used on the front side door window control switch, the contacts close causing a voltage drop within the appropriate signal circuit. The window motor will detect the voltage drop and will command the window to move in the direction requested.

The driver front side door window control switch communicates to the BCM by a serial data circuit. When the driver wishes to control the passenger window, the driver will use the appropriate switch on the driver front side door window control switch. When this switch is used, a serial data message is sent to the BCM requesting the passenger window motor command, the BCM will then send a serial data message to the passenger window motor which will then move in the direction requested.

Left Rear, Right Rear Express Down Window Motors

For the left rear and right rear doors, when their window switch is pressed in the down position, battery positive voltage is applied to their respective window motor control circuit and ground to the other window motor control circuit causing that window to open. When the individual window switch is pulled in the up position, voltage and ground is applied to the window motor in the opposite direction causing that window to close. The return path to ground is supplied through the inactive control circuit being normally grounded through the window switch.

Each rear side door window switch communicates to the BCM by a serial data circuit. When the driver wishes to control the left rear or right rear window, the driver will use the appropriate switch on the driver front side door window control switch. When this switch is used, a serial data message is sent to the BCM requesting a window motor command, the BCM will then send a serial data message to the appropriate rear side door window switch which will then command that window to move in the direction requested.

Lockout Switch Feature

The driver front side door window control switch contains a window lockout switch, when the driver presses the window lockout switch, a serial data message is sent to the BCM which will send a disable command to the rear side door window switches, deactivating them. The rear windows will still function normally from the switches on the driver front side door window control switch.

Rear Window Defogger Description and Operation

Rear Window Defogger System Components

The rear window defogger system consists of the following components:

- Body Control Module
- Front Heater and Air Conditioning User Interface Control
- Rear Body Wiring Harness Junction Block (Contains PCB Rear Defogger Relay
- Rear Defogger Grid
- 40A Fuse

Rear Window Defogger Operation

The rear defog control system utilizes a single zone backlight design, driven with a single relay configuration. A switch for the customer to control the system is provided within the front heater and air conditioning user interface control. Also included in the front heater and air conditioning user interface control is an indicator to inform the customer with the current state of the system. The system is only operational when engine is running or during remote start.

Pressing the heated rear window switch causes the front heater and air conditioning user interface control to send a serial data message to the body control module requesting rear window defog operation. The body control module upon receipt of the serial data message will provide voltage to the coil side of the rear defogger relay, this will energize the relay causing the relay switch contacts to close allowing B+ voltage to flow through the rear defogger grid control circuit to the rear defogger grid.

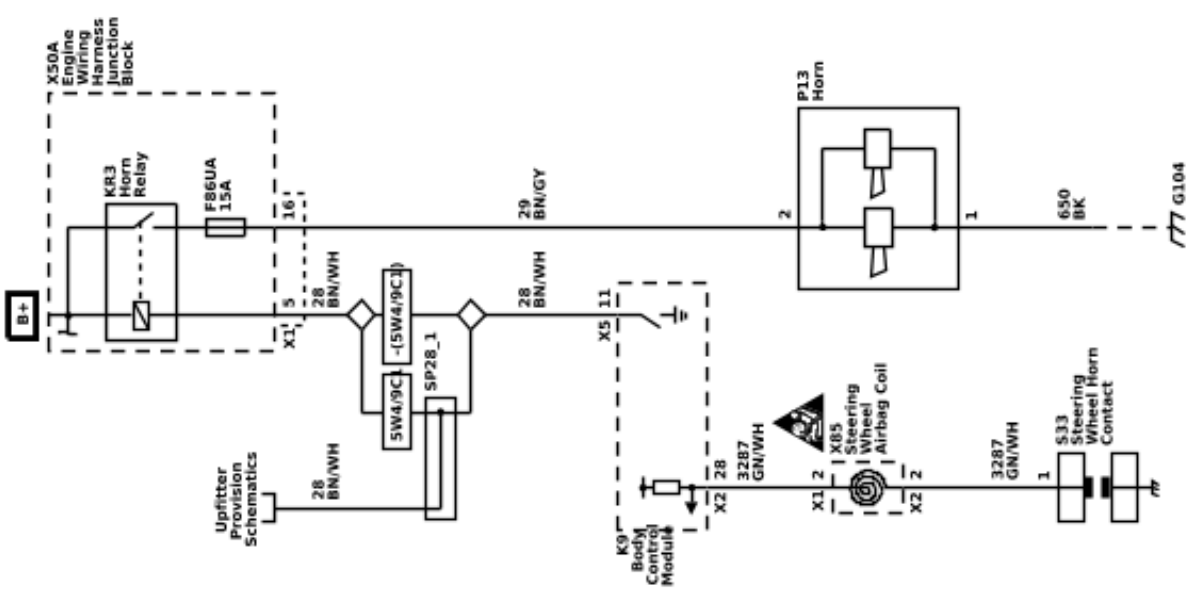
When the rear heated rear window switch is pressed and the engine is running, the rear window defogger grid will activate and will turn off automatically depending upon the vehicle speed (refer to owner's manual for rear window defogger operation cycles)

Horns and Pedestrian Alerts

Schematic and Routing Diagrams

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Horn Schematics (Horn)



Description and Operation

Horns System Description and Operation

System Description

The horn system consists of the following components:

- HORN fuse
- Engine wiring harness junction block (contains horn PCB relay)
- Steering wheel horn contact
- Steering wheel airbag coil
- Horn
- Body control module (BCM)

System Operation

The vehicle horn system is activated under the following conditions:

- When the horn switch is depressed
- The BCM commands the horns ON under any of the following conditions:
  - When the content theft deterrent system detects a vehicle intrusion.
  - When the panic button is depressed on the remote control door lock transmitter—For further information refer to *Keyless Entry System Description and Operation 10-58*.
  - When the keyless entry system is used to lock the vehicle, a horn chirp may sound to notify the driver that the vehicle has been locked. The notification feature may be enabled or disabled through personalization. For further information refer to *Keyless Entry System Description and Operation 10-58*.
  - When the OnStar® system is used to sound the horns if equipped—For further information, refer to *OnStar Description and Operation 5-21*.

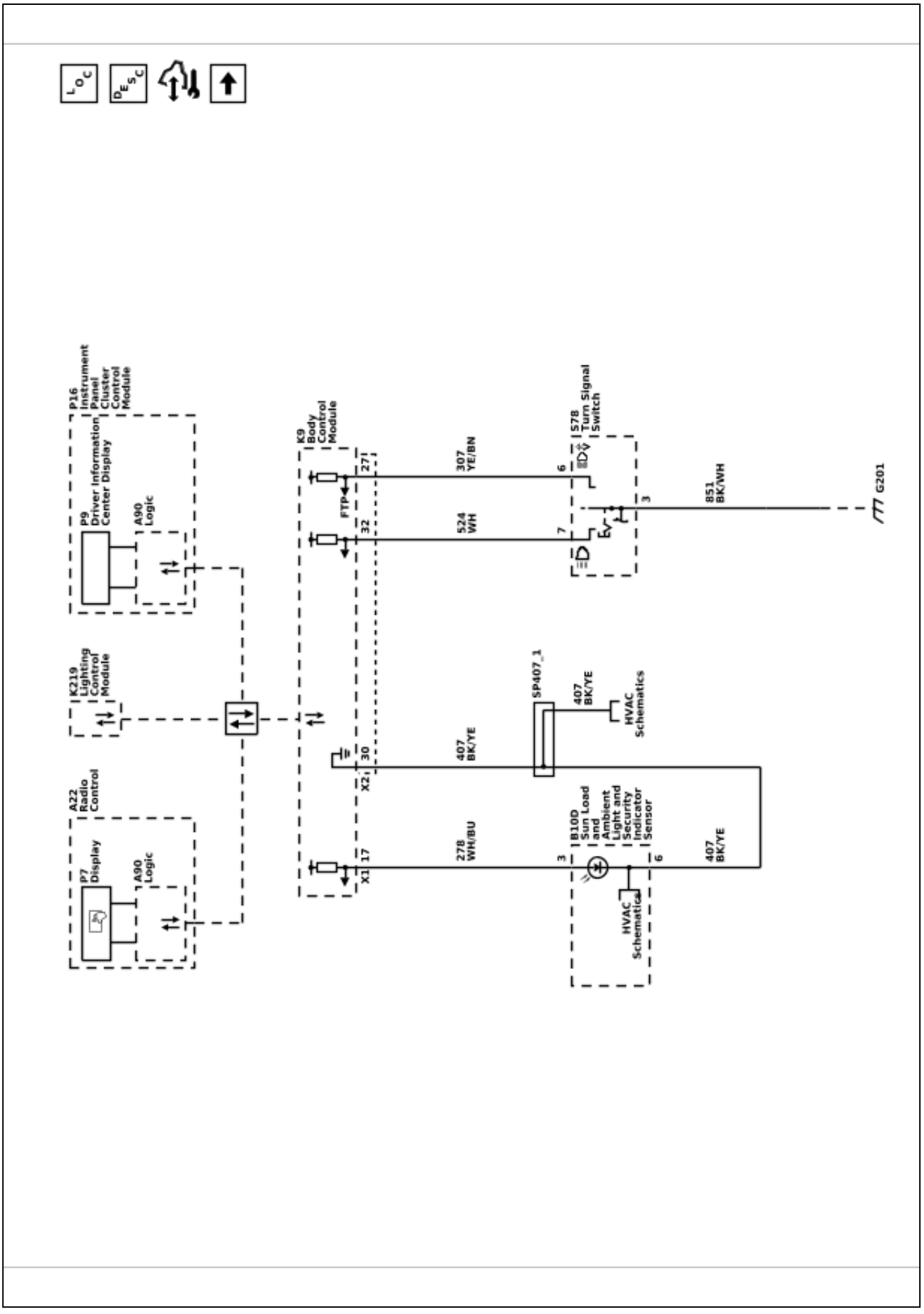
Circuit Operation

Battery positive voltage is applied at all times to the horn relay coil and the horn relay switch. Pressing either of the horn switches applies ground to the horn relay control circuit. The BCM may also apply ground to the horn relay control circuit as described above. When the horn relay control circuit is grounded, the horn relay is energized and battery positive voltage is applied to the horns through the horn control circuit. The horns sound as long as ground is applied to the horn relay control circuit.

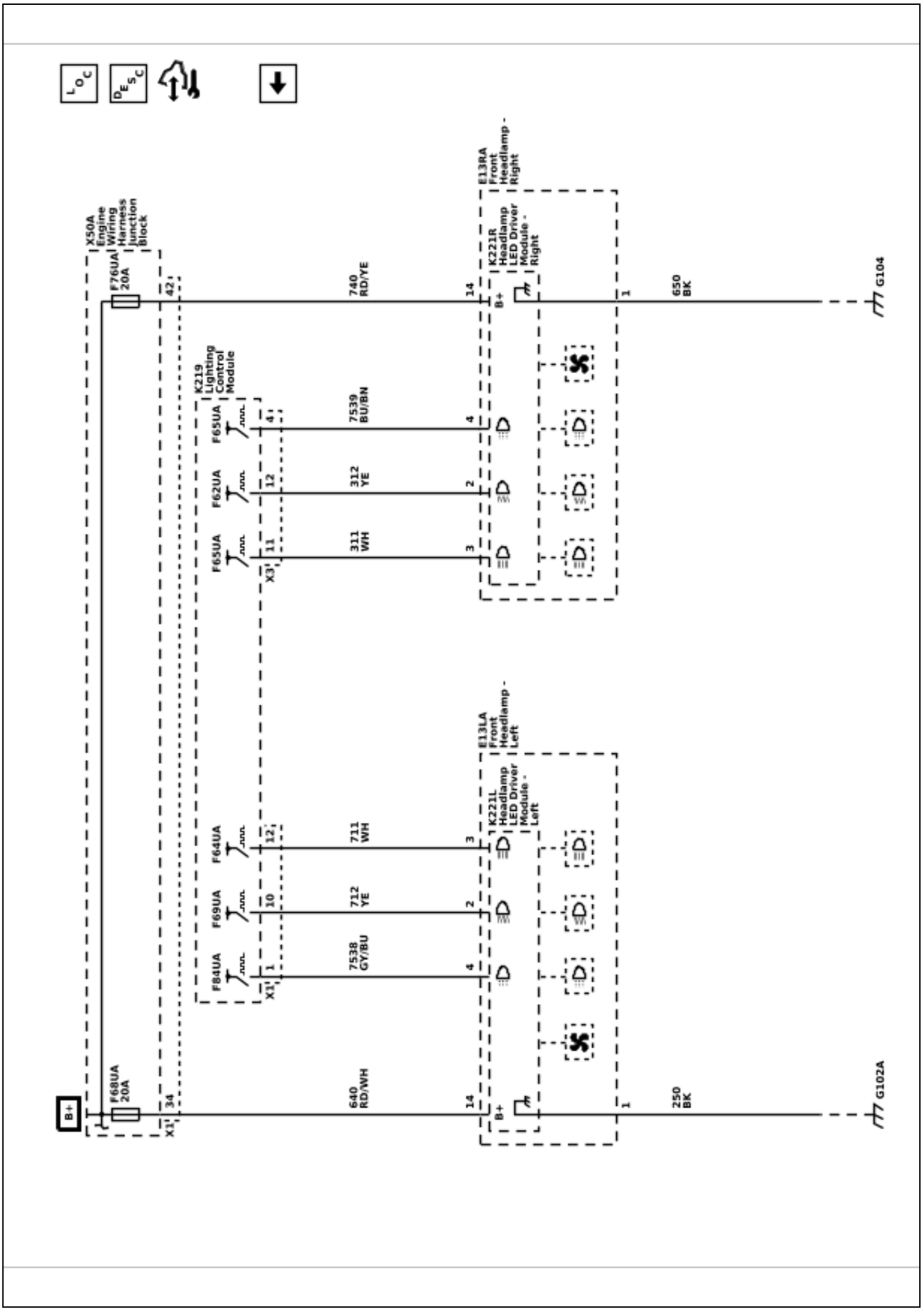
Lighting

Schematic and Routing Diagrams

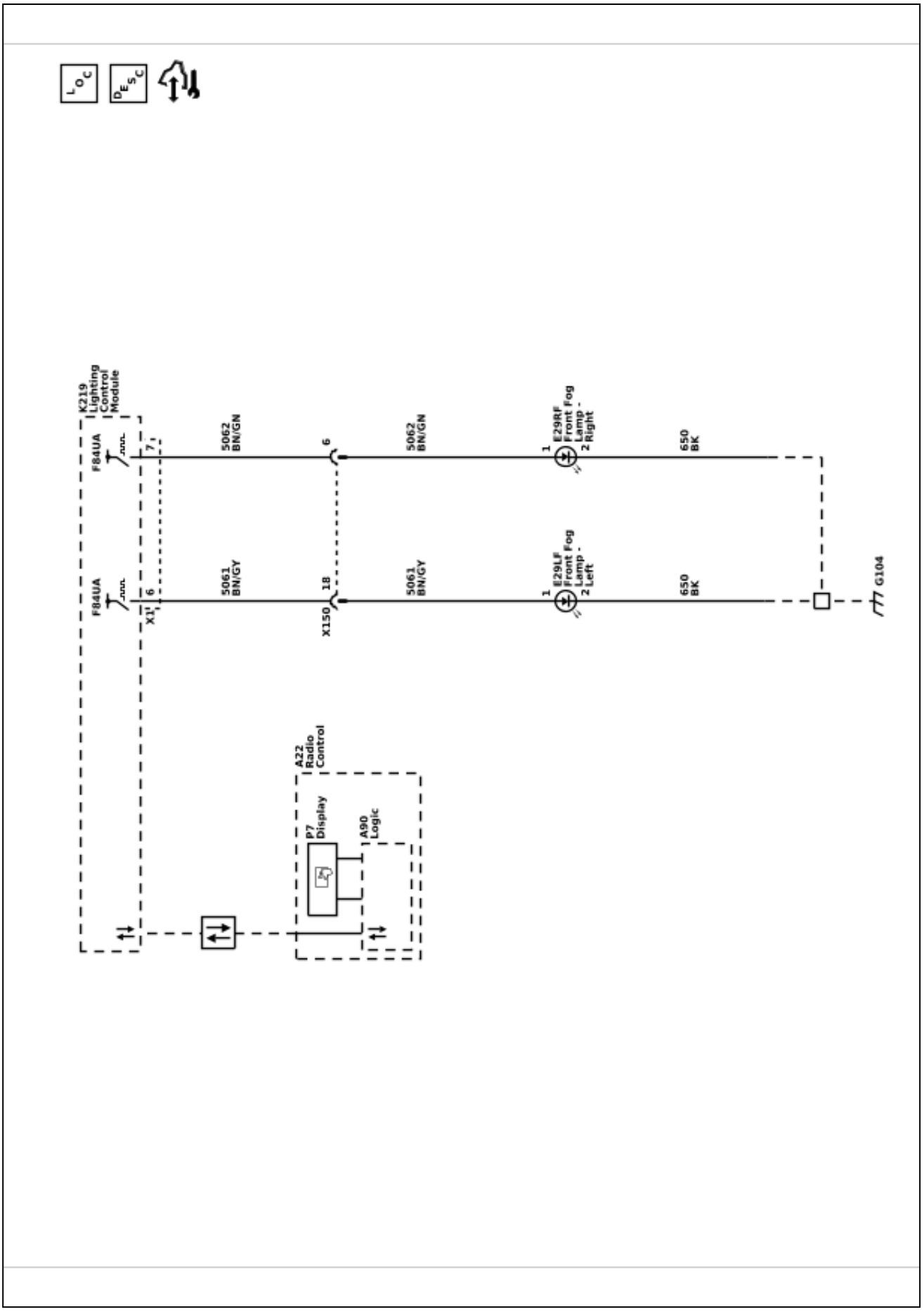
Headlights/Daytime Running Lights (DRL) Schematics (Controls and Indicators)



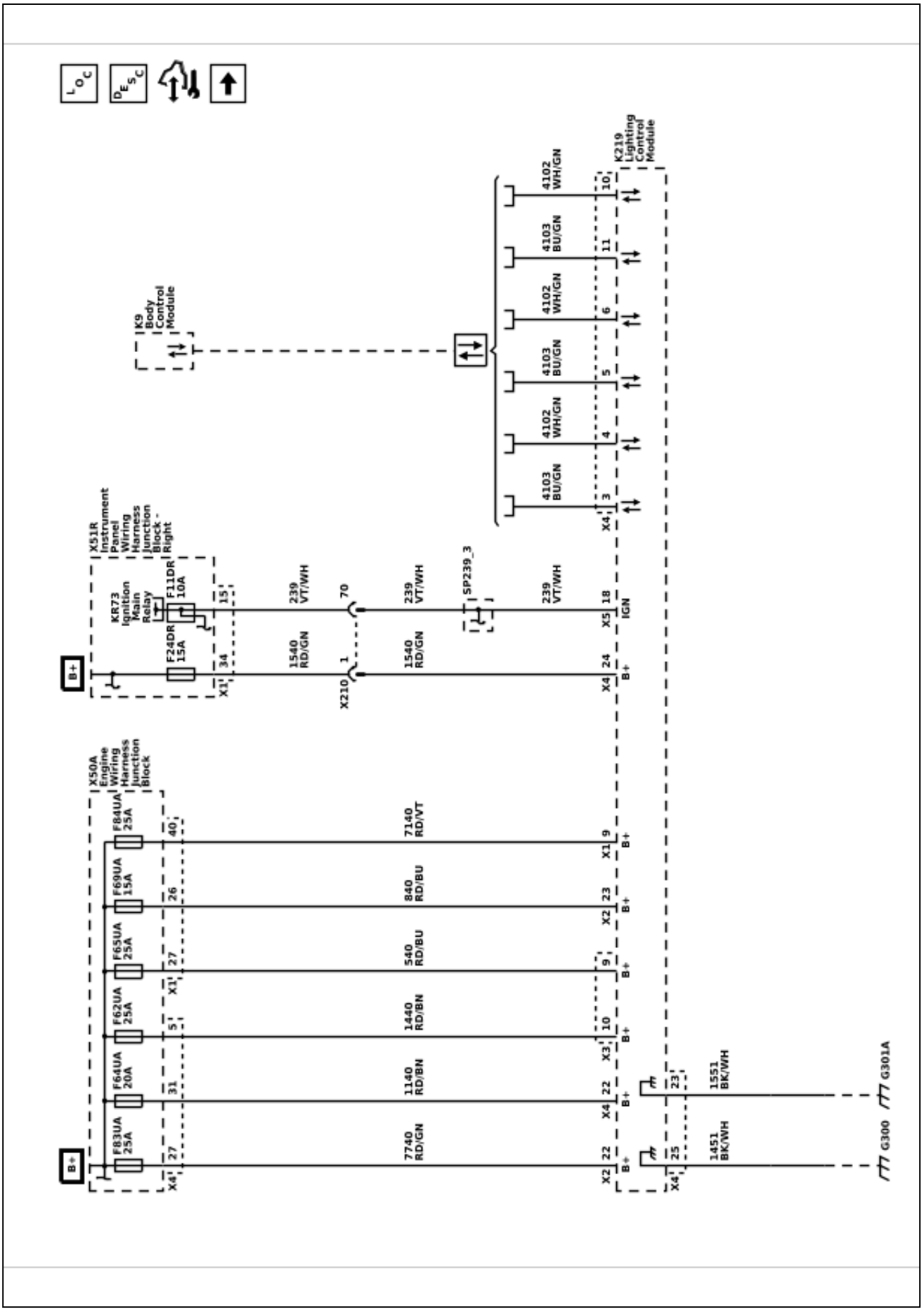
Headlights/Daytime Running Lights (DRL) Schematics (Low Beam, High Beam, and Daytime Running Lights)



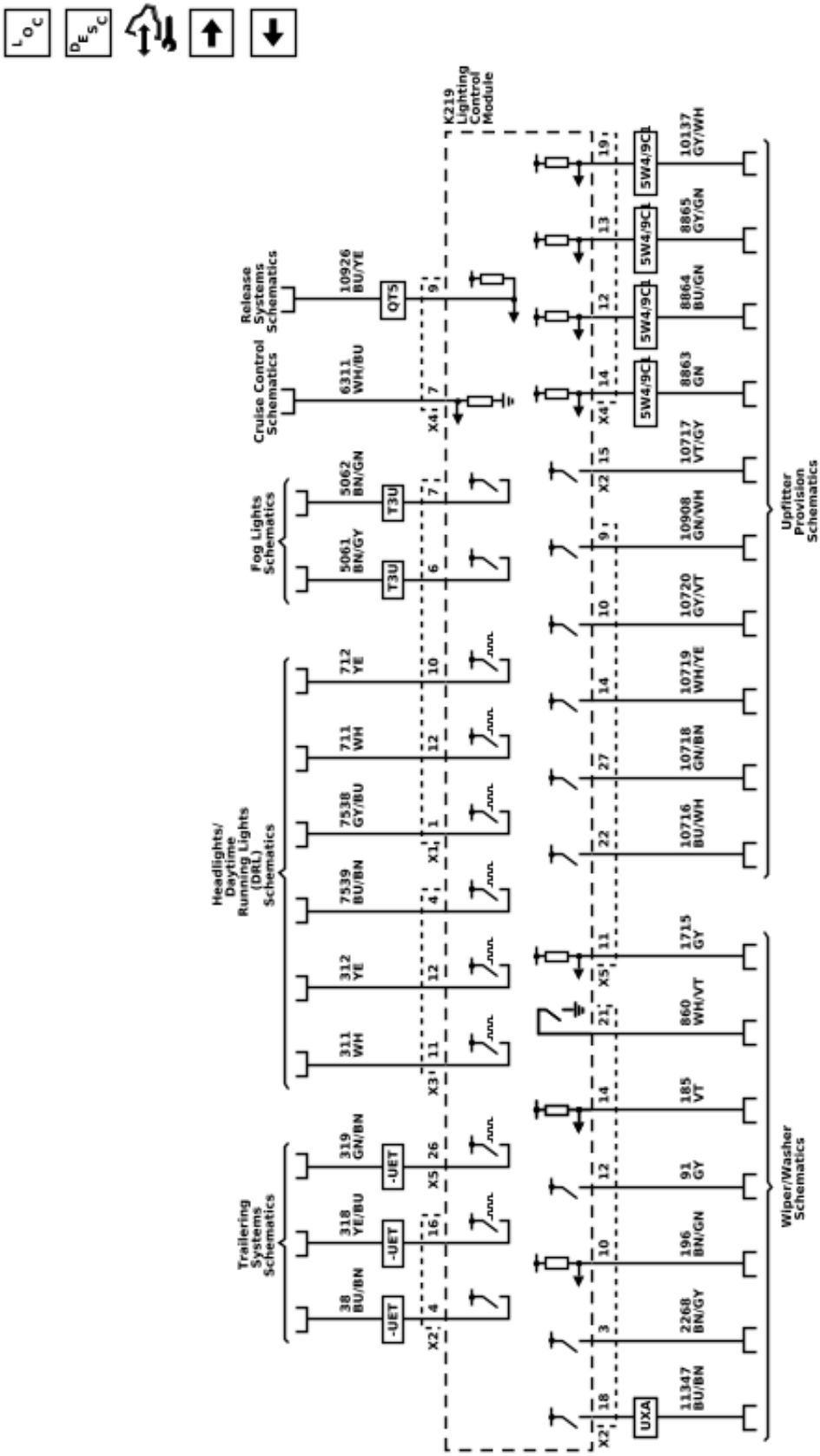
Fog Lights Schematics (Fog Lamps)



Exterior Lights Schematics (Lighting Control Module Power, Ground, and Serial Data)

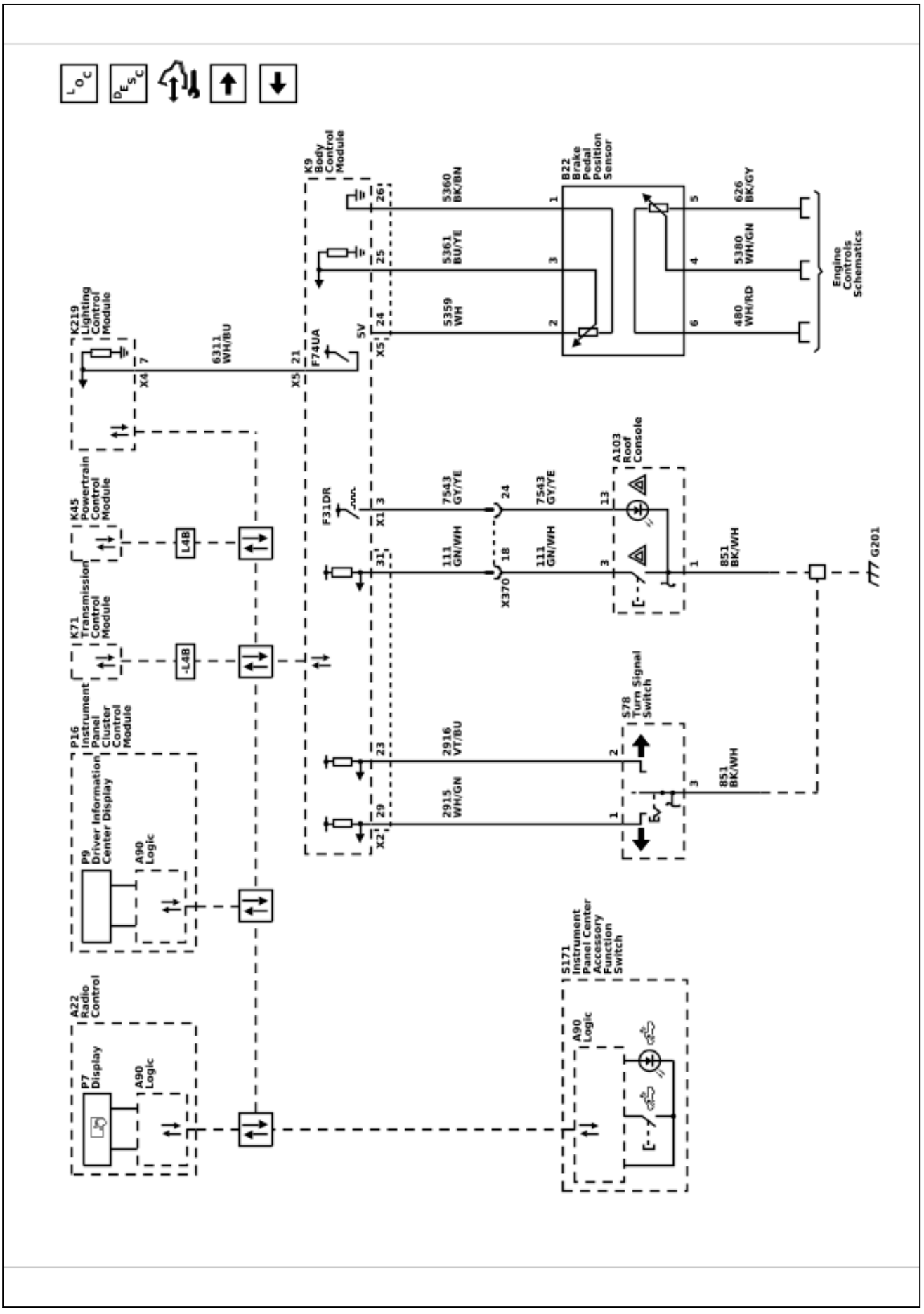


Exterior Lights Schematics (Lighting Control Module Subsystem References)

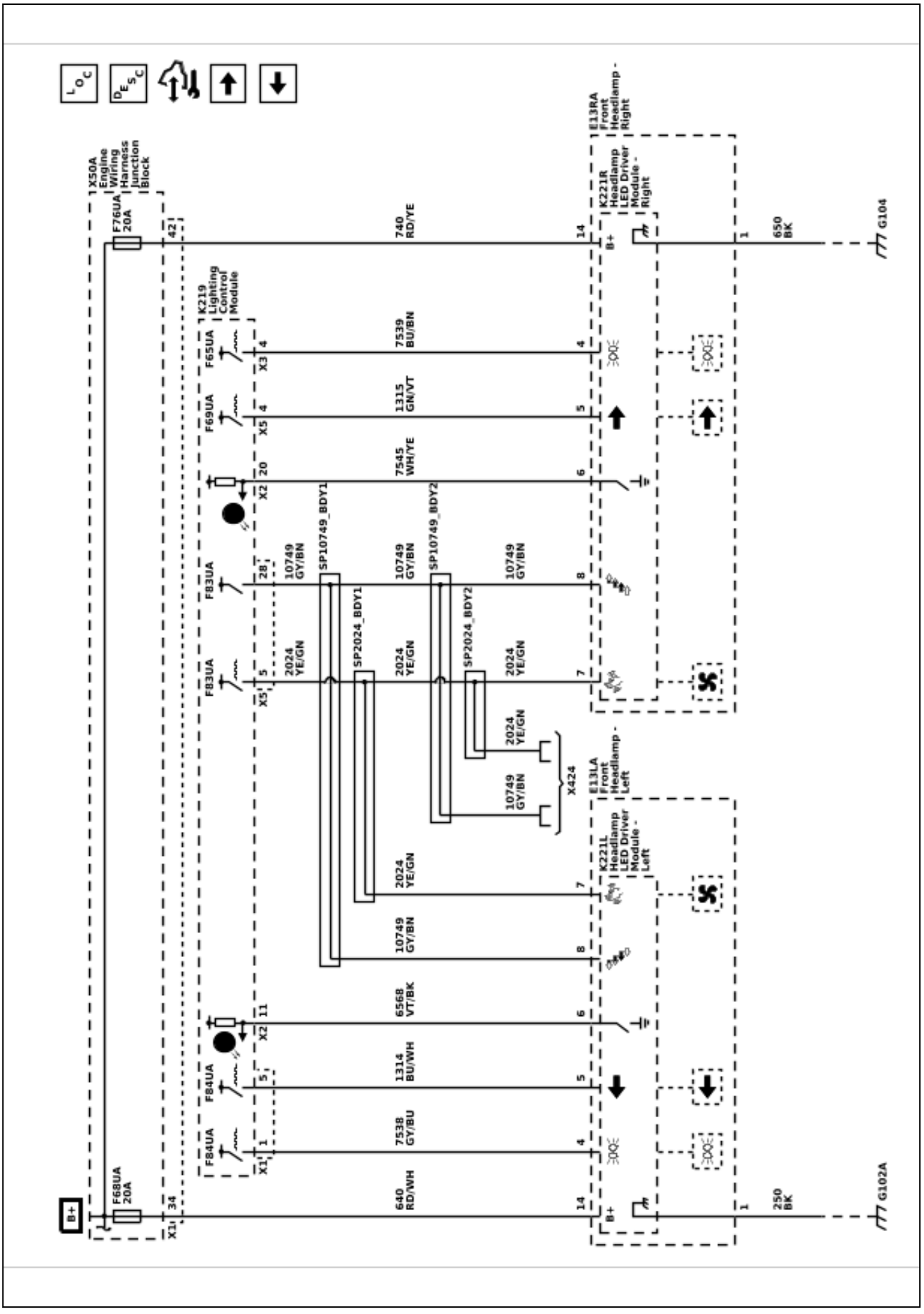


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Exterior Lights Schematics (Controls and Indicators)

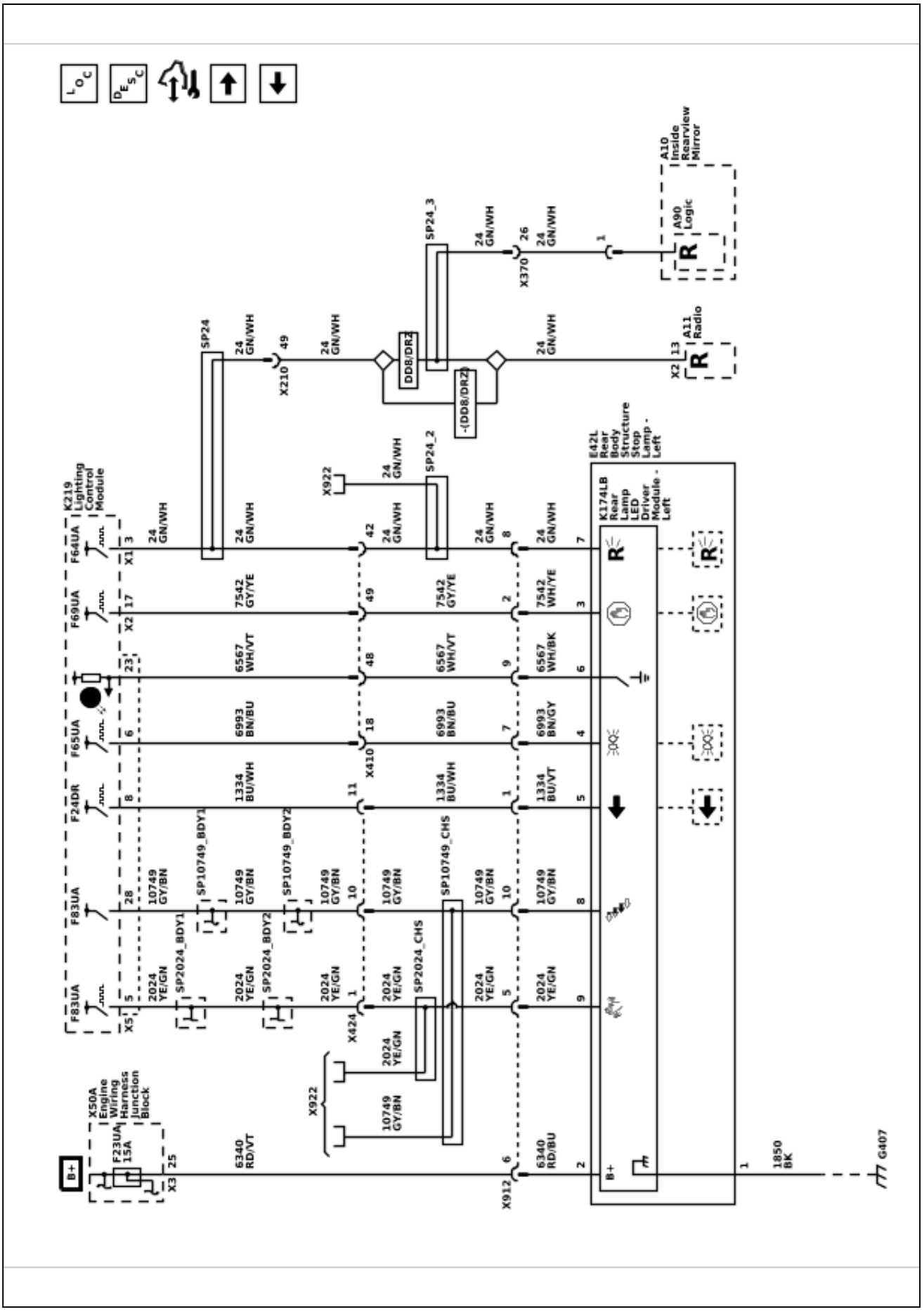


Exterior Lights Schematics (Front Lights)

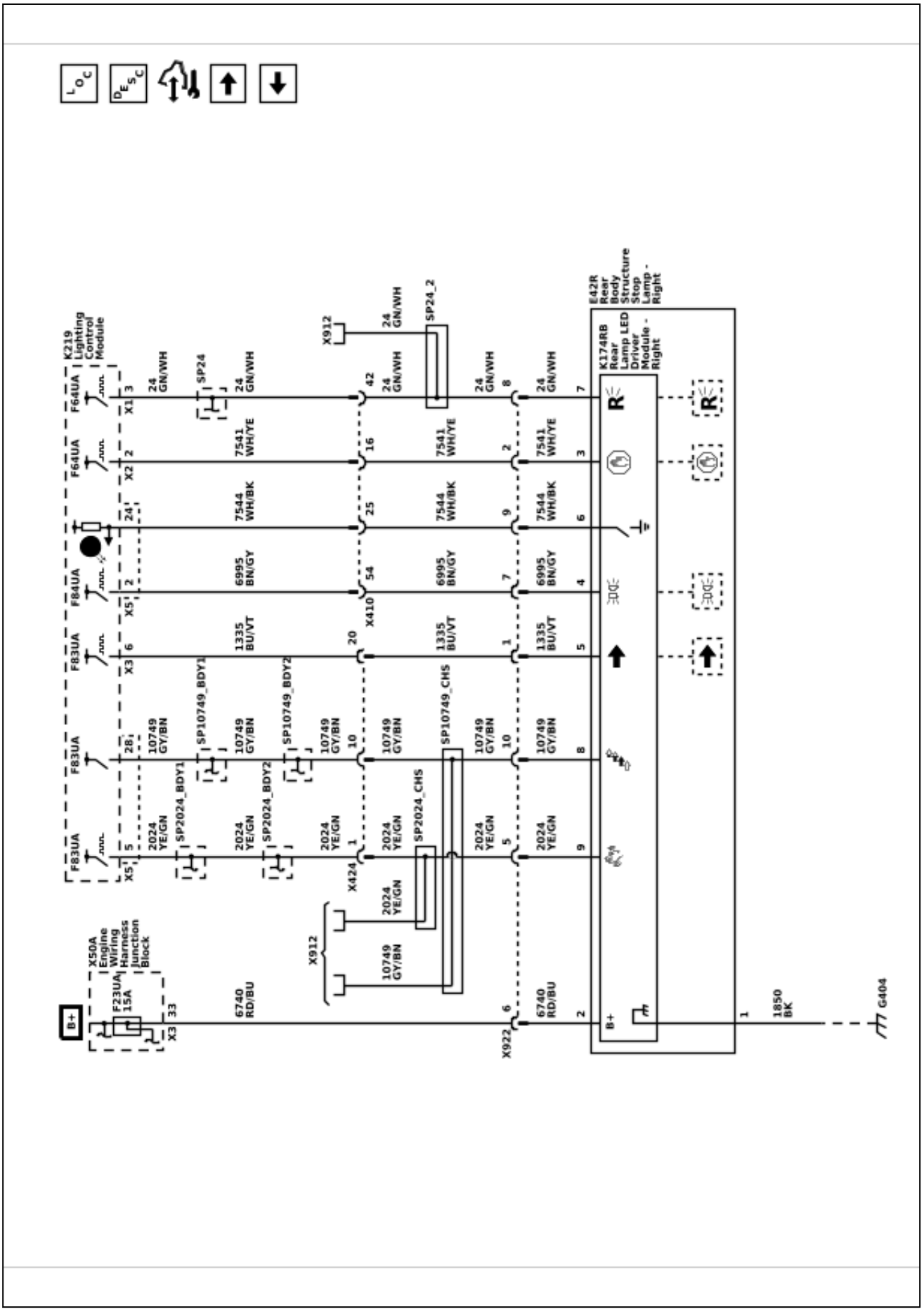


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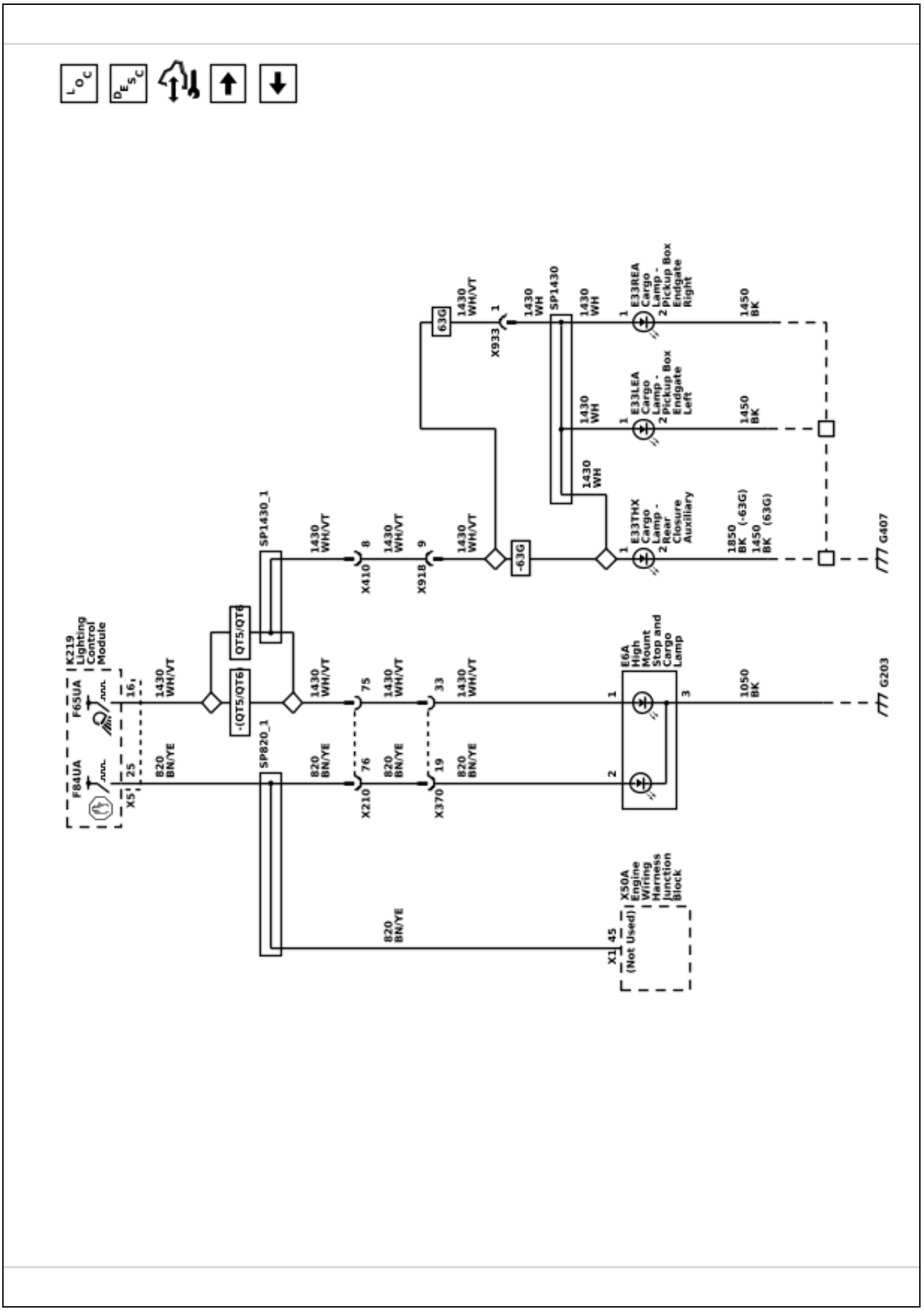
Exterior Lights Schematics (Reverse and Left Tail Lamp)



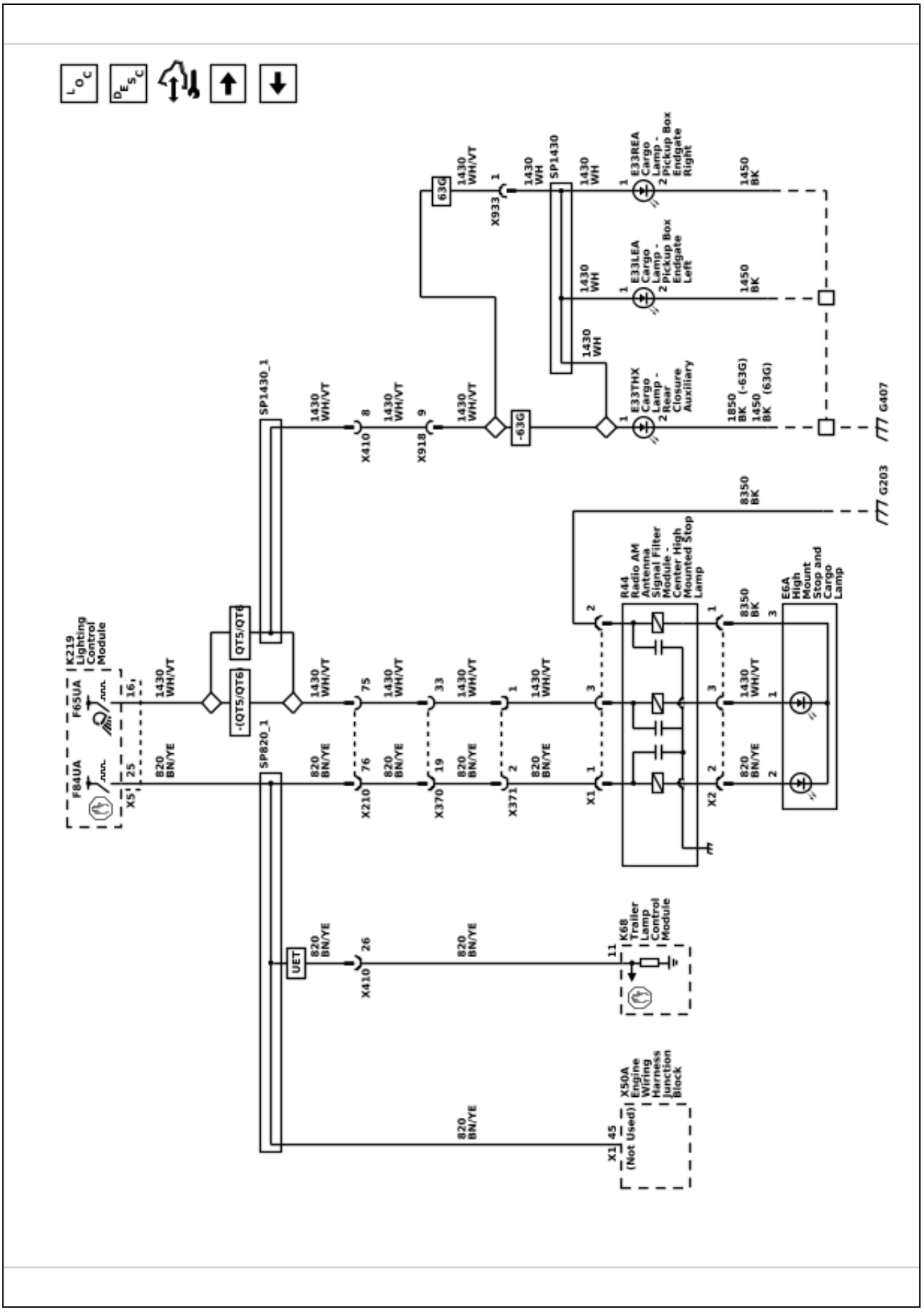
Exterior Lights Schematics (Right Tail Lamp)



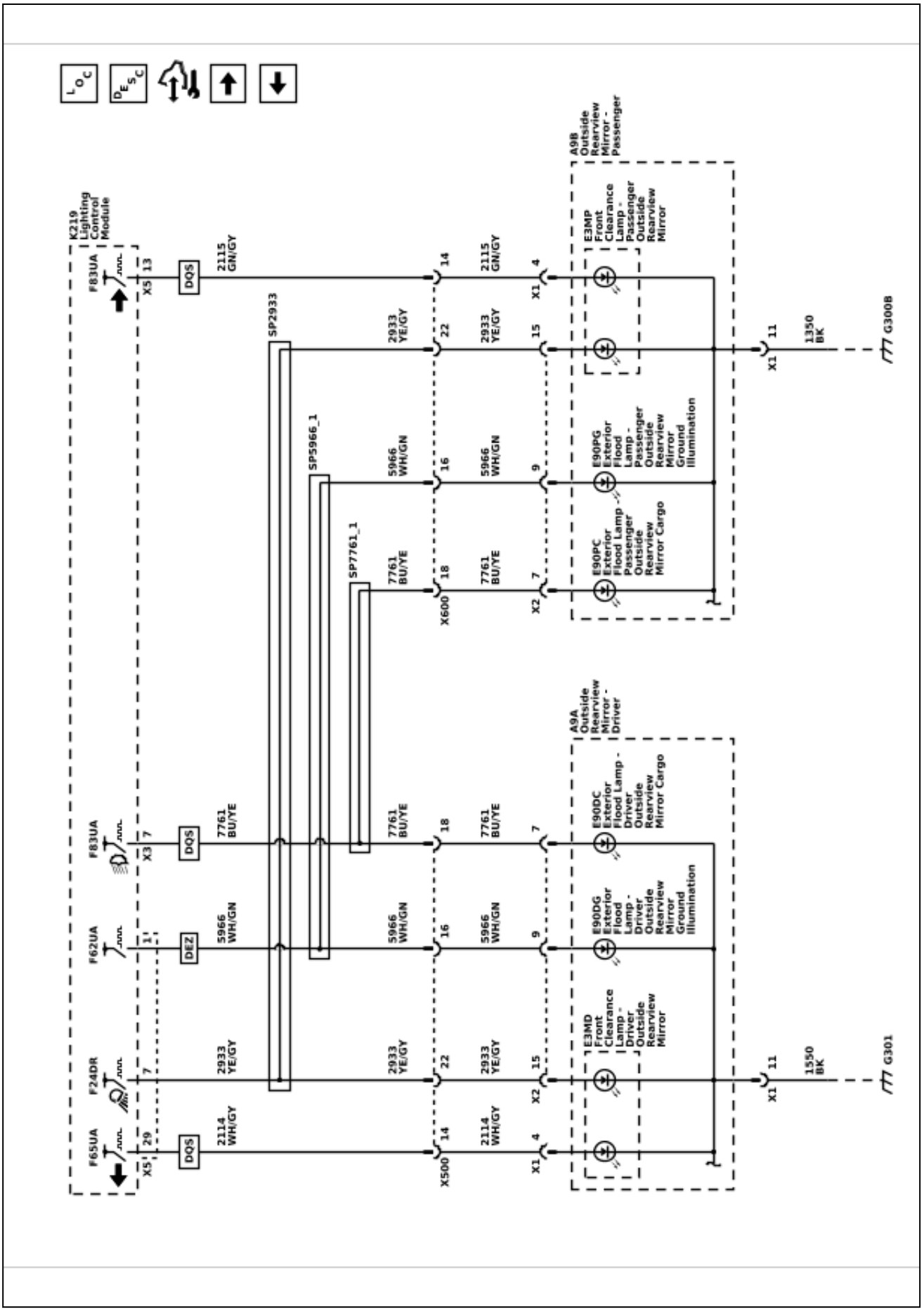
Exterior Lights Schematics (Center High Mount Stop and Exterior Courtesy Lights - 2-Door)



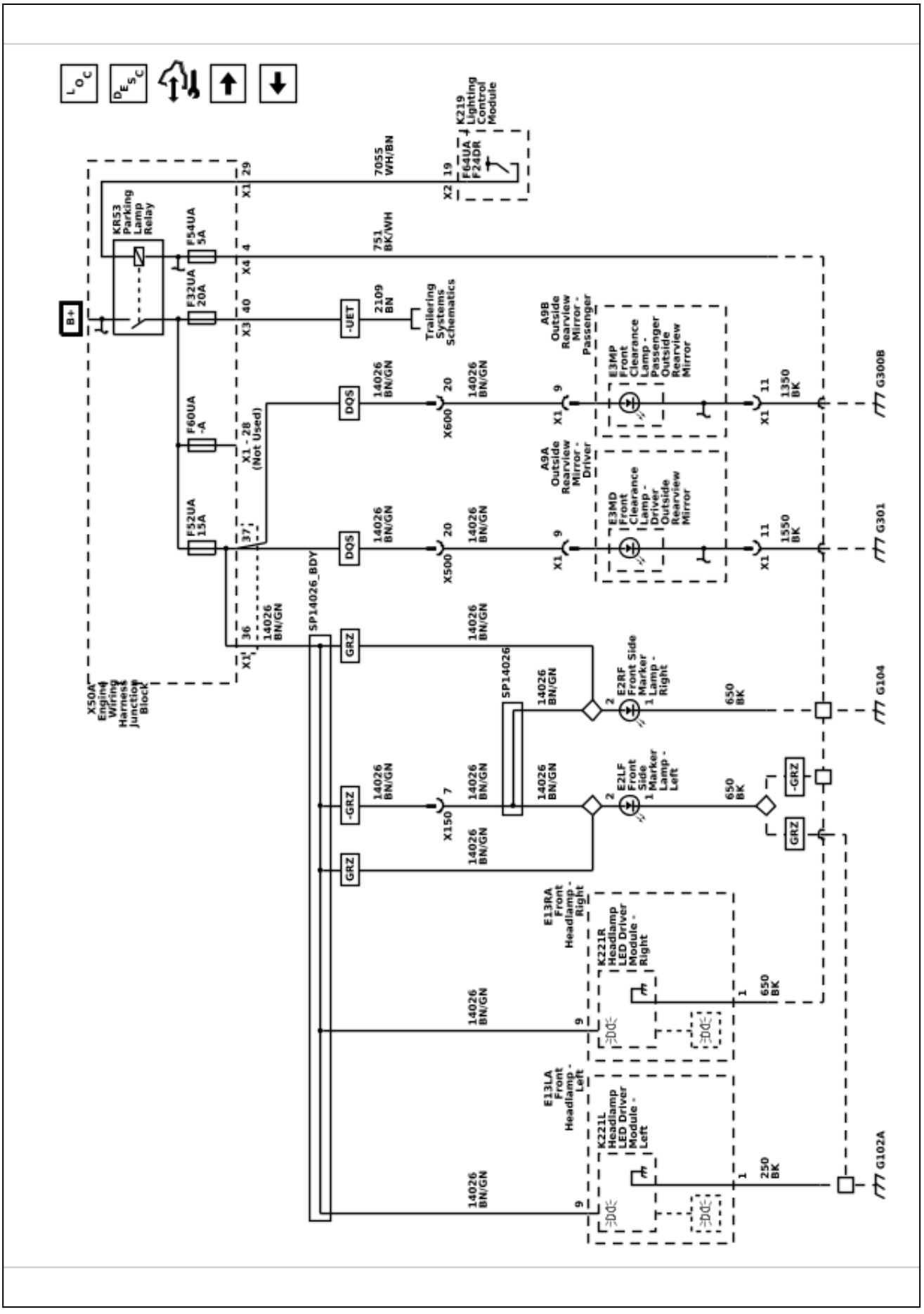
Exterior Lights Schematics (Center High Mount Stop and Exterior Courtesy Lights - 4-Door)



Exterior Lights Schematics (Outside Rearview Mirror - Approach, Cargo, Task, and Turn Lights (DBC / DEZ / DME / DQS))

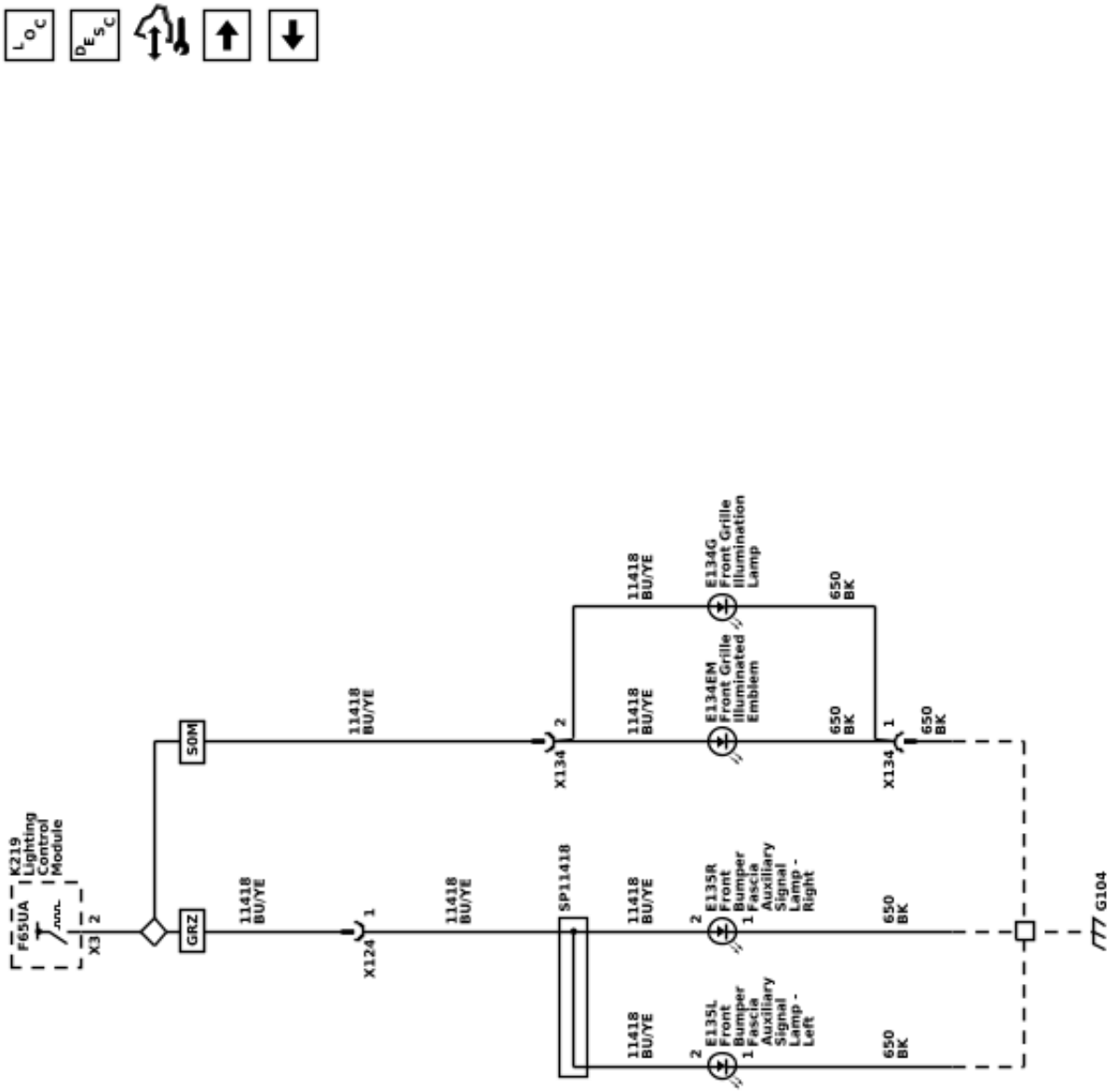


Exterior Lights Schematics (Identification Lights)

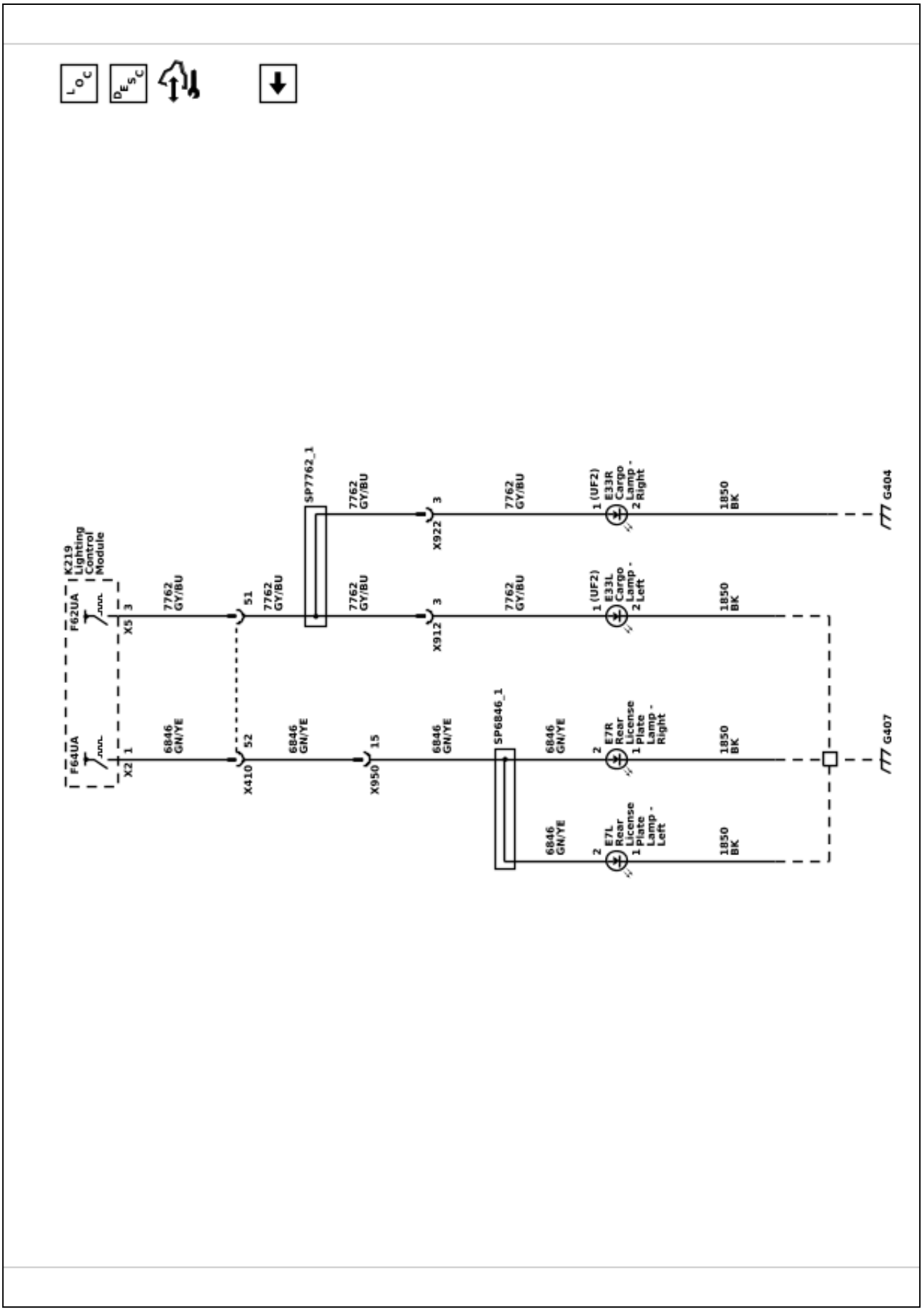


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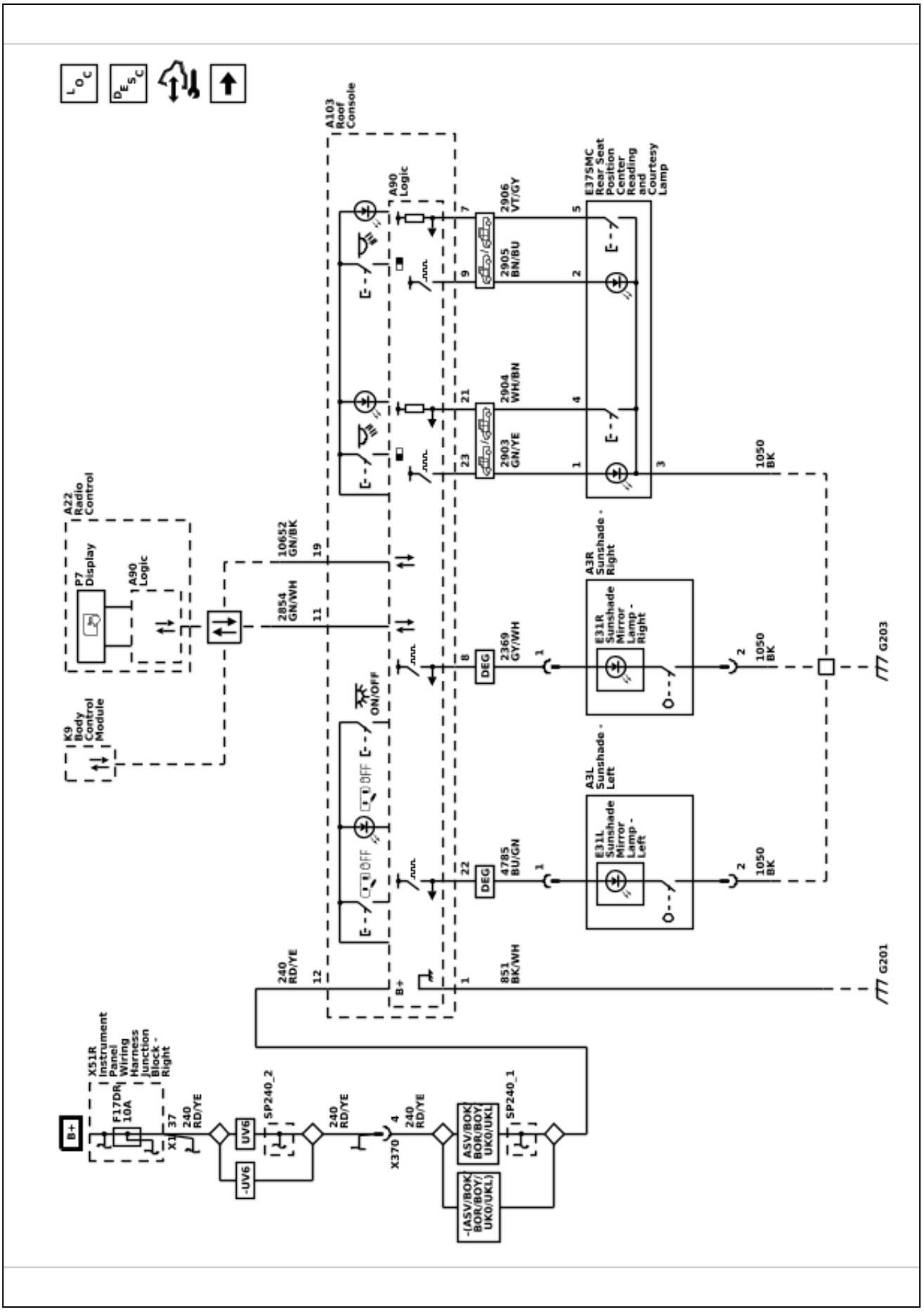
Exterior Lights Schematics (Grille Lights (GRZ / S0M))



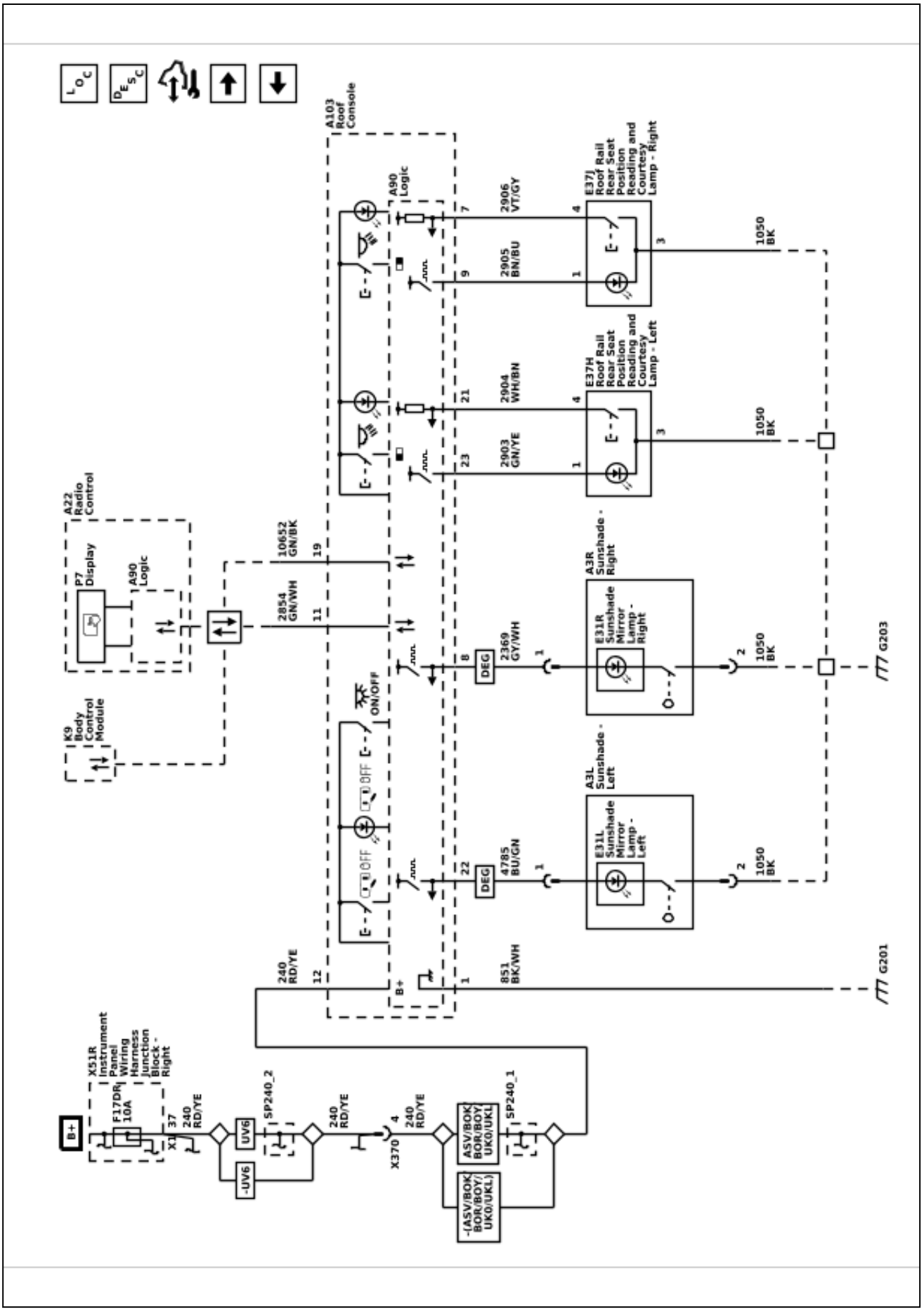
Exterior Lights Schematics (Cargo Box and License Plate Lamps)



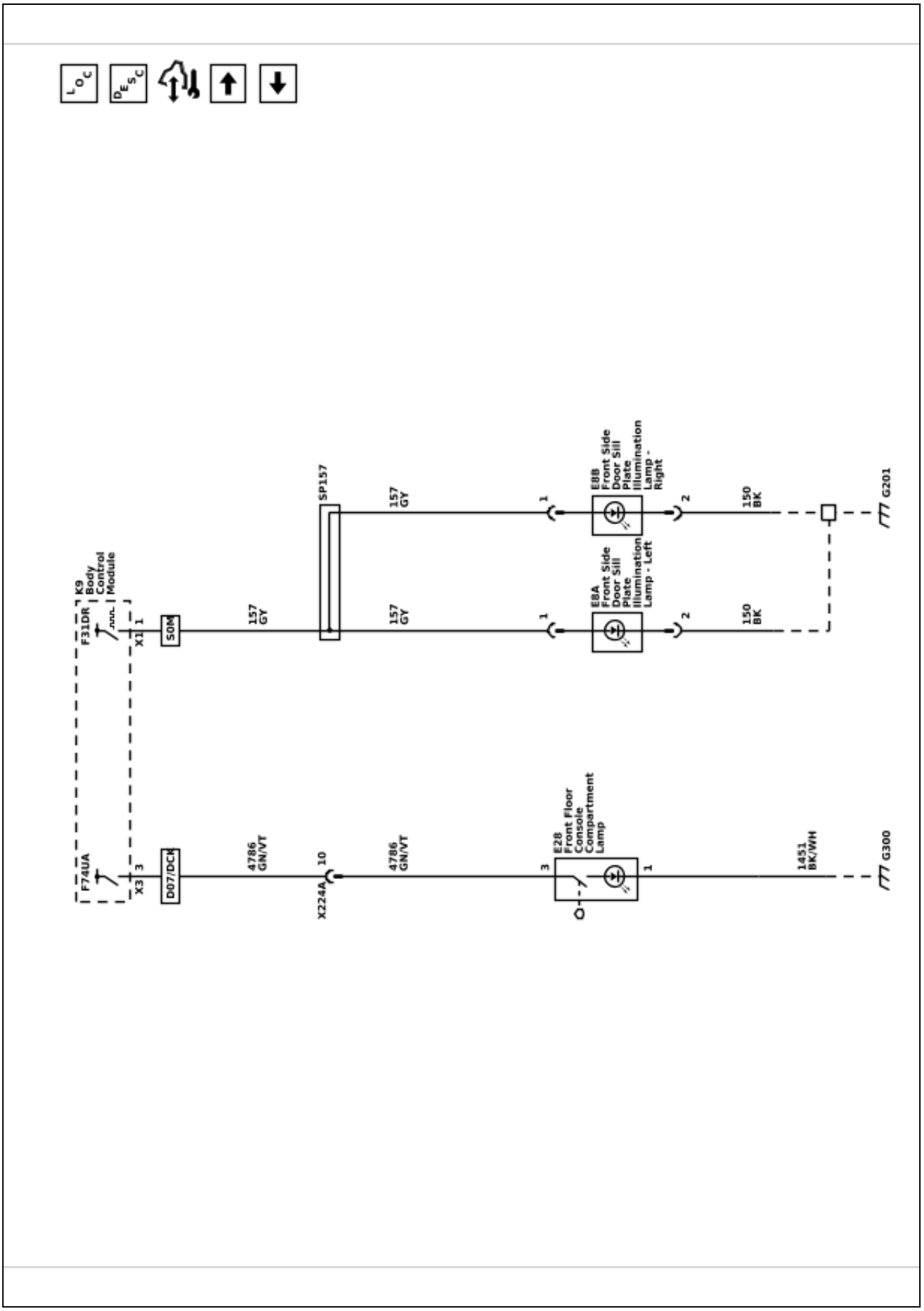
Interior Lights Schematics (Controls, Dome/Reading and Sunshade Lamps (- CAJ))



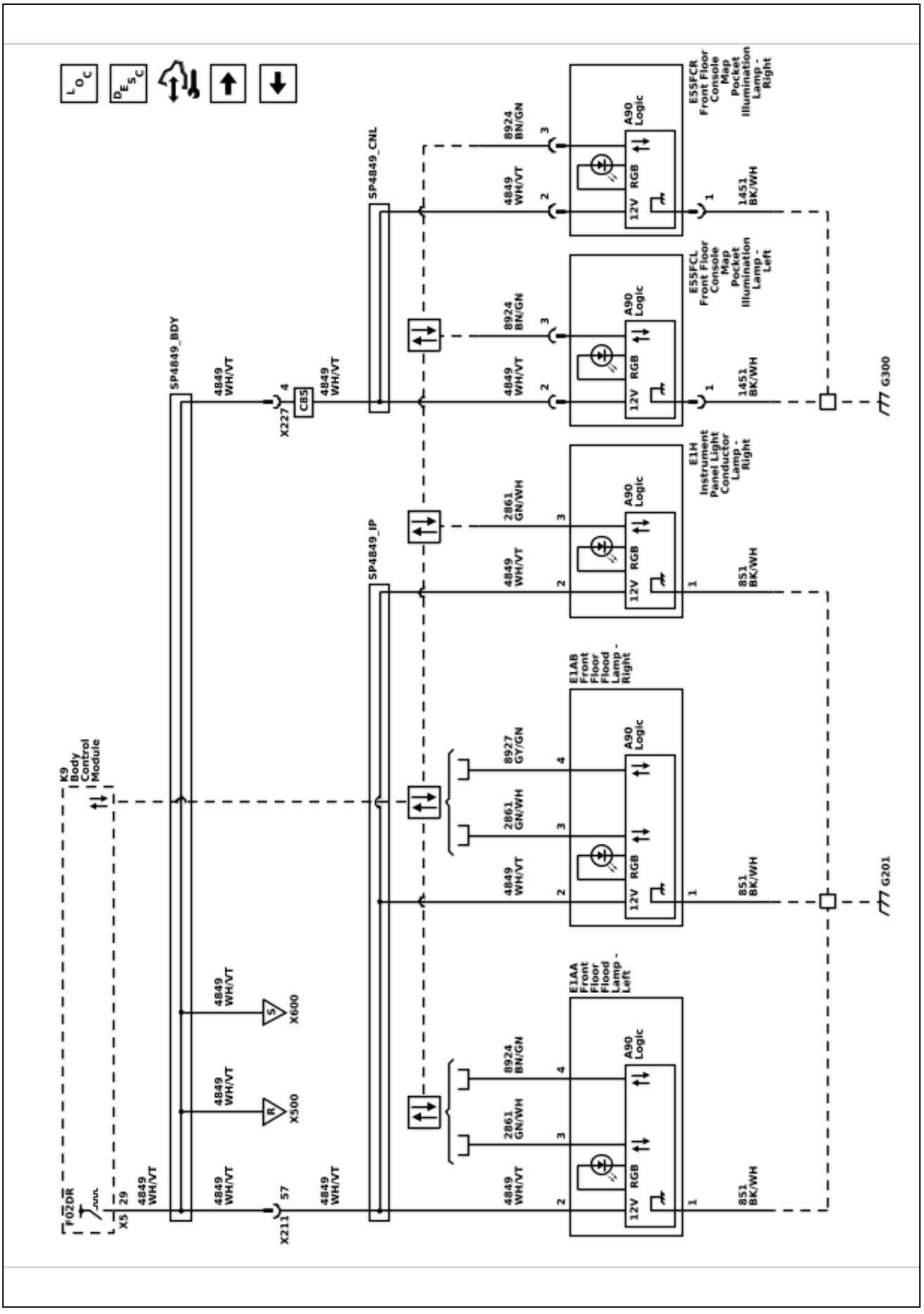
Interior Lights Schematics (Controls, Dome/Reading and Sunshade Lamps (CAJ))



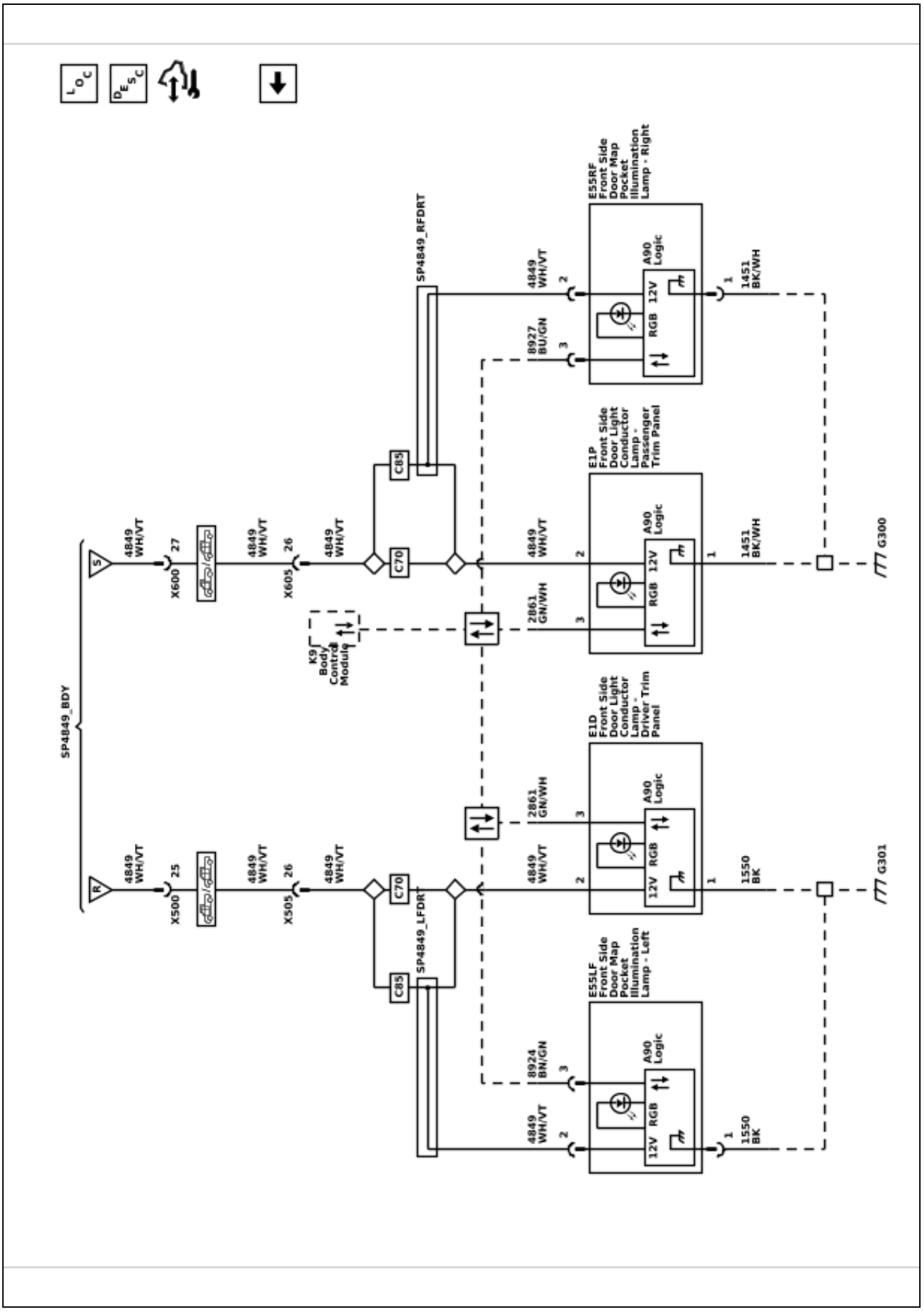
Interior Lights Schematics (Center Console and Sill Plate Lamps)



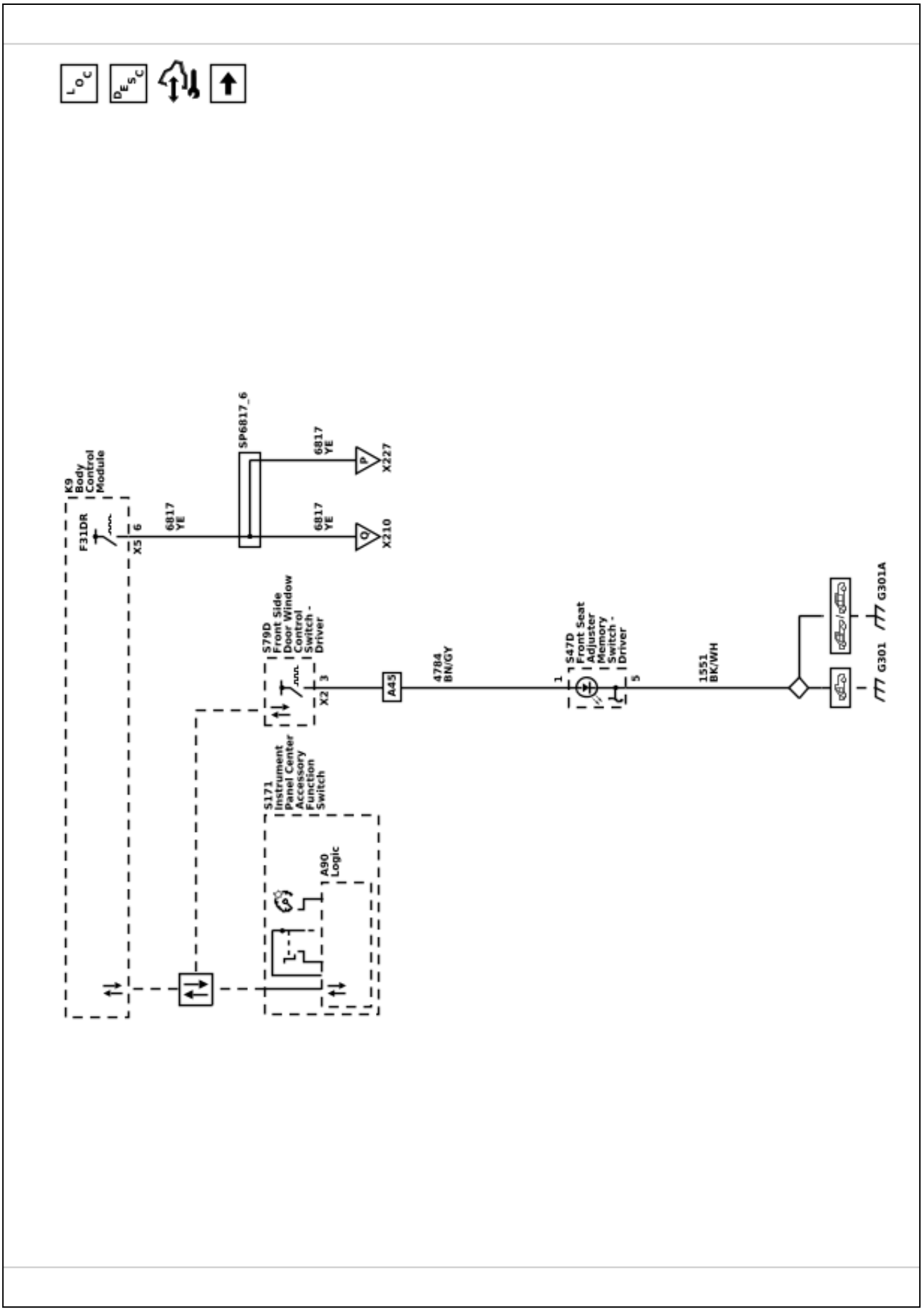
Interior Lights Schematics (Ambient Lighting - Instrument Panel and Floor Console (C70 / C85))



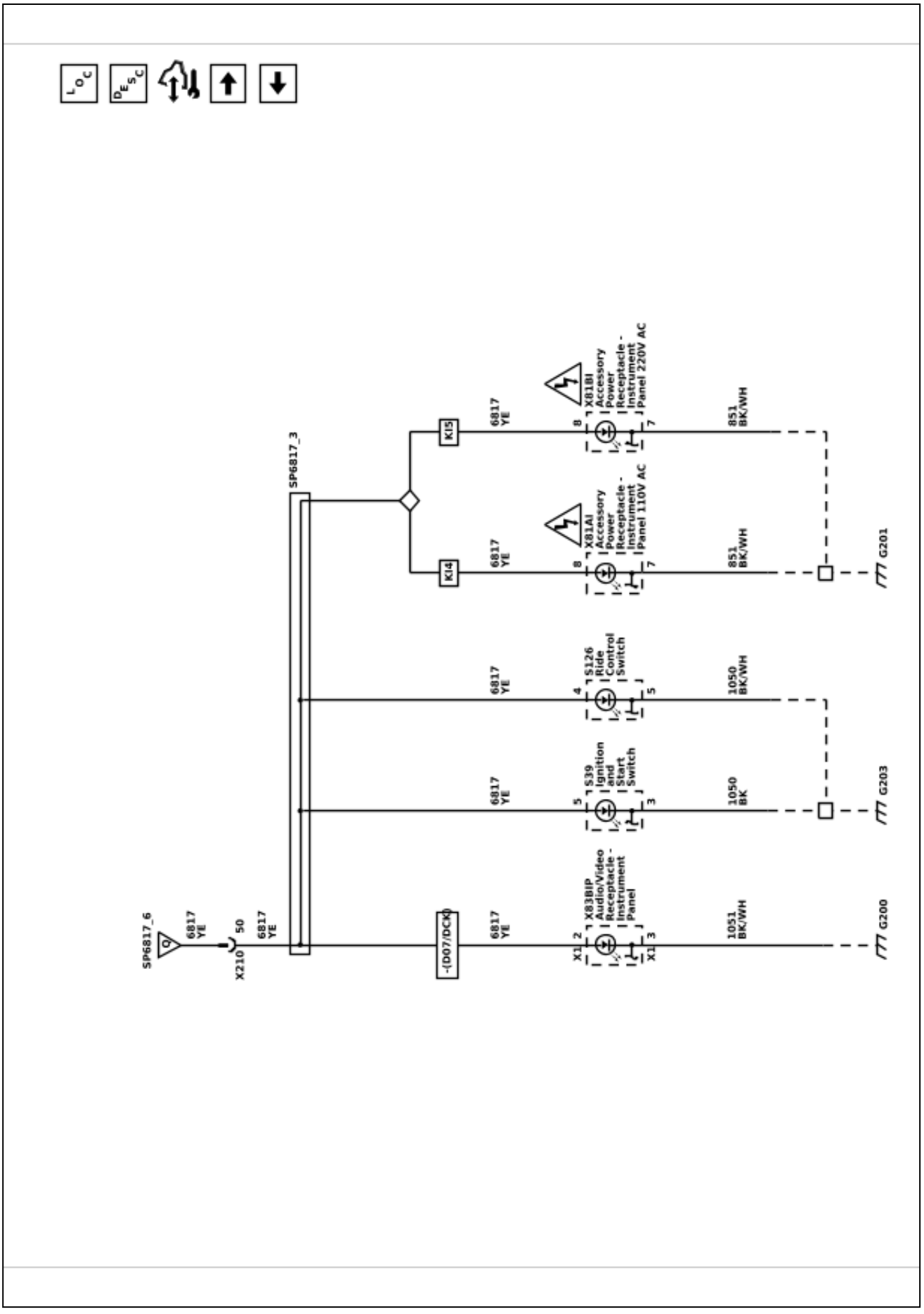
Interior Lights Schematics (Ambient Lighting - Front Doors (C70 / C85))



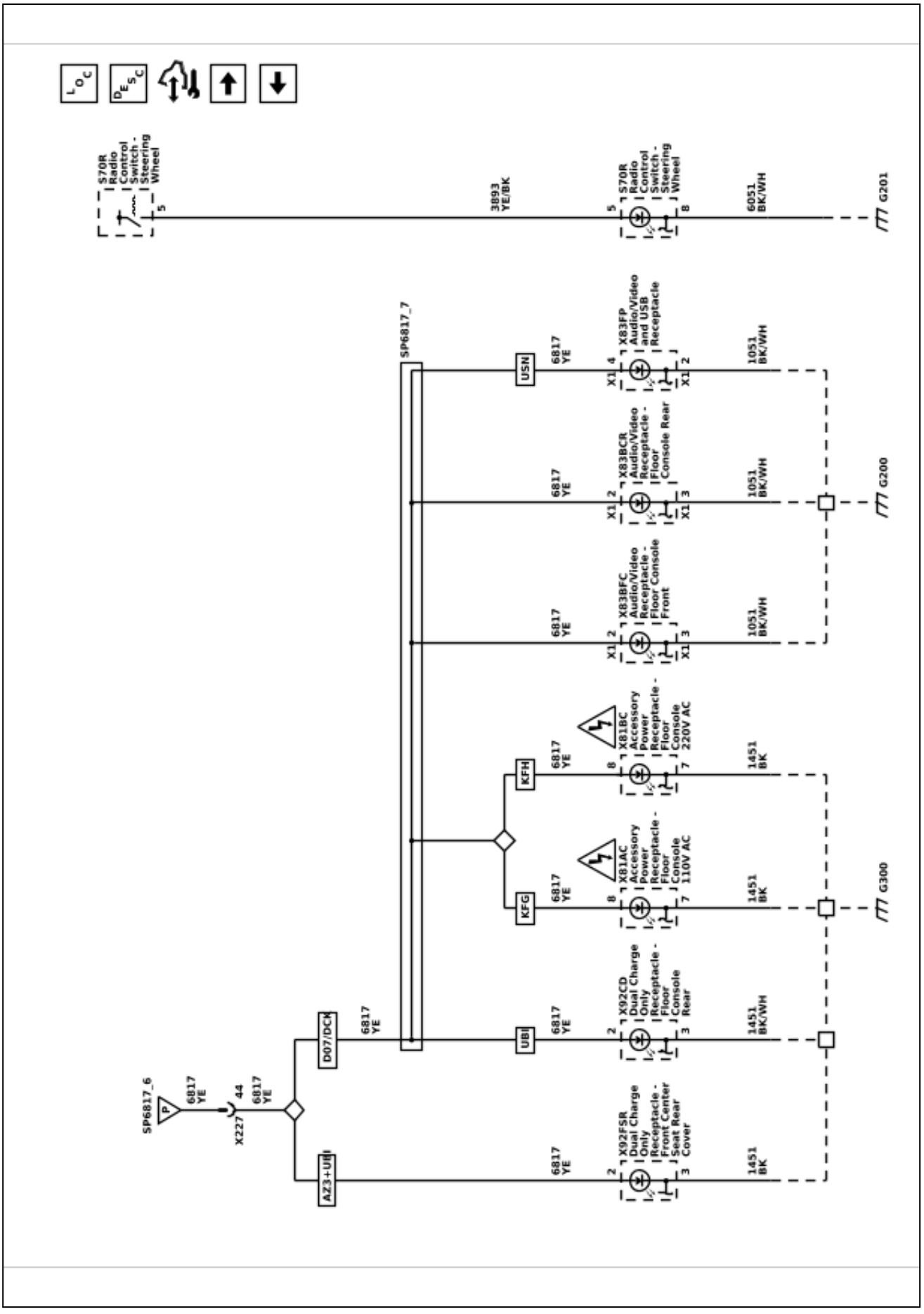
Interior Lights Dimming Schematics (Controls and Front Door Backlights)



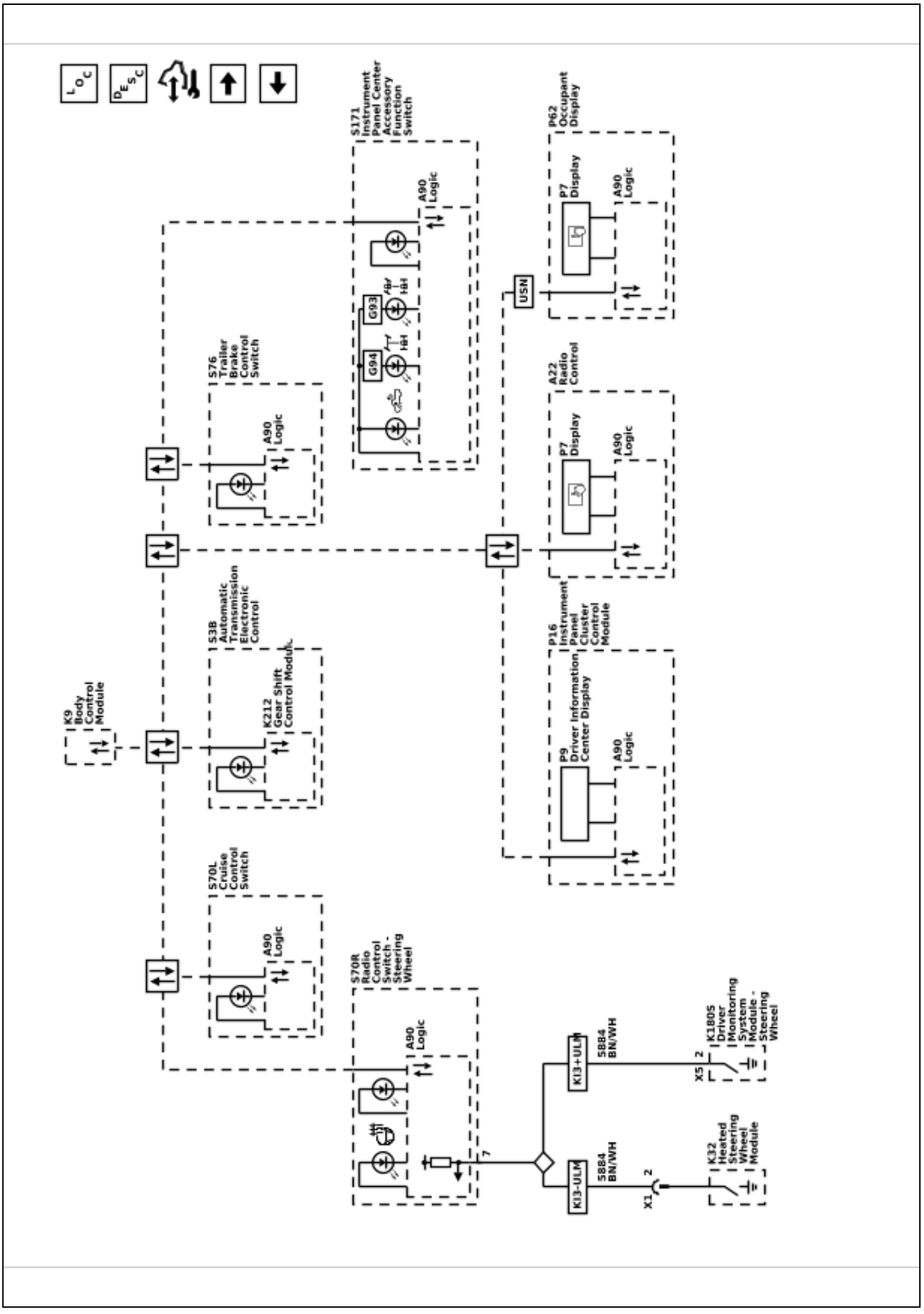
Interior Lights Dimming Schematics (Instrument Panel Backlights)



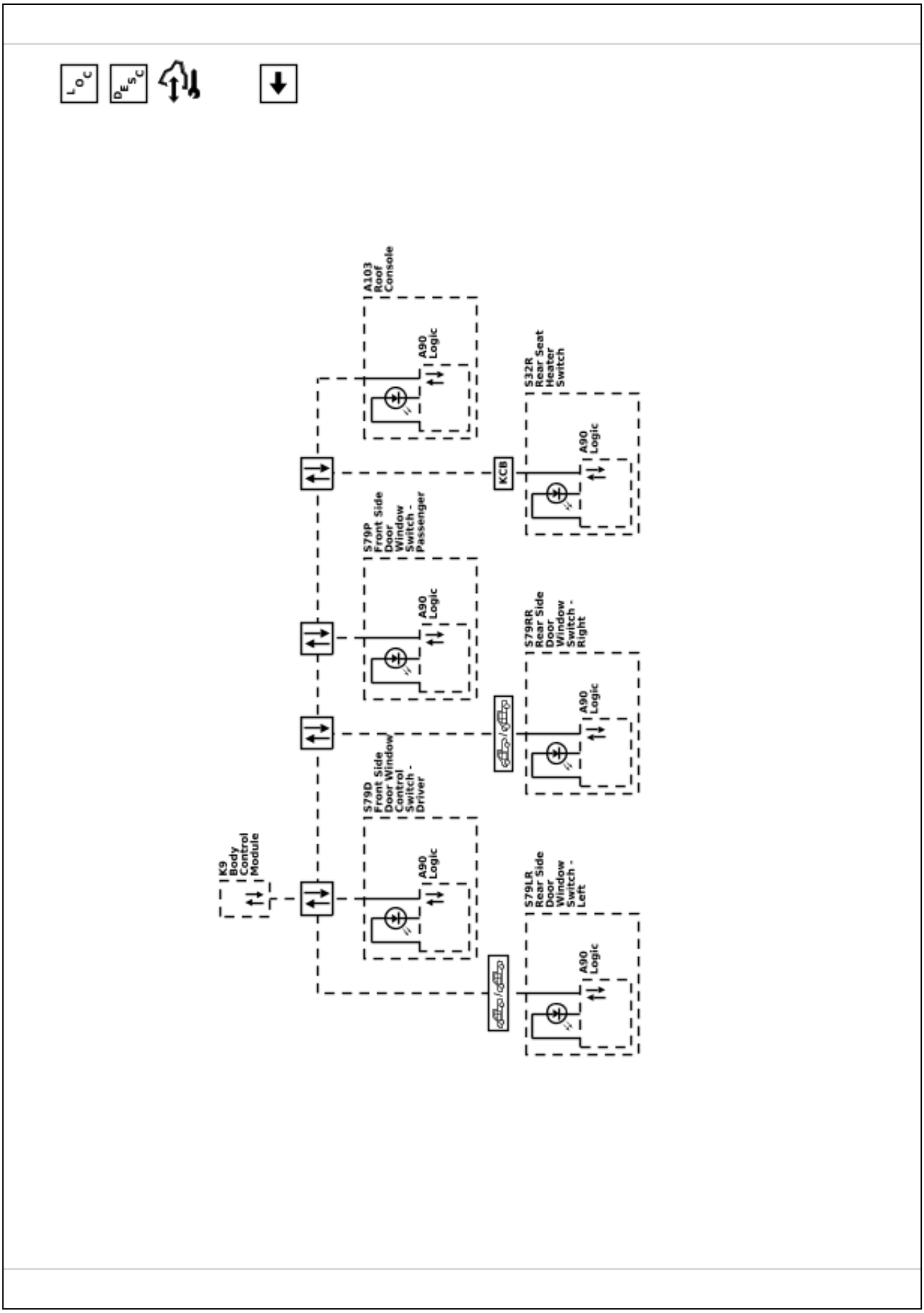
Interior Lights Dimming Schematics (Steering Wheel, Floor Console, and Center Seat Backlights)



Interior Lights Dimming Schematics (Serial Data Dimming - Instrument Panel)



Interior Lights Dimming Schematics (Serial Data Dimming - Doors, Roof, and Floor Console)



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Description and Operation

Exterior Lighting Systems Description and Operation

The exterior lighting system consist of the following lamps:

- Backup lamps
- Cargo lamps
- Daytime running lamps (DRL)
- Exterior courtesy lamps
- Hazard warning lamps
- Headlamps
- Park, tail, license, and marker lamps
- Front fog lamps (T3U)
- Stop lamps
- Task lamps
- Turn signal lamps
- Trailer lighting, refer to *Trailering Description and Operation 1-64* for more information.

Low Beam Headlamps

The headlamps may be turned ON in 3 different ways:

- When the headlamp switch is placed in the ON position, for normal operation
- When the headlamp switch is placed in the AUTO position, for automatic lamp control during low ambient light conditions
- When the headlamp switch is placed in the AUTO position, with the windshield wipers ON in daylight conditions, after a 6 second delay

The K9 Body Control Module (BCM) monitors a serial data message from the S171 Instrument Panel Center Accessory Function Switch. When the headlamp switch is in the AUTO position, the three signal circuits are unaffected (open) and the BCM relies on the B10D Sun Load and Ambient Light and Security Indicator Sensor input to determine if headlamps are required or if daytime running lamps will be activated based on outside lighting conditions. When the headlamp switch is placed in the headlamp OFF position, the headlamp switch headlamps OFF signal circuit is grounded, indicating to the BCM that the exterior lamps should be turned OFF. With the headlamp switch in the PARK LAMPS position, the headlamp switch park lamps ON signal circuit is grounded, indicating that the park lamps have been requested. When the headlamp switch is in the HEADLAMP position, both the headlamp switch park lamps ON signal circuit and the headlamps ON signal circuit are grounded. The BCM responds to these inputs by sending a serial data message to the K219 Lighting Control Module. The Lighting Control Module responds by applying pulse width modulated (PWM) voltage to both headlamp low beam control circuits, illuminating the low beam headlamps. When the Lighting Control Module commands the low beam headlamps ON, the operator will notice the interior backlighting for the instrument cluster and the various other switches dim to the level of brightness selected by the instrument panel dimmer switch.

High Beam Headlamps

The high beam and flash to pass (FTP) functions are contained within the S78 Turn Signal Switch. The K9 Body Control Module (BCM) provides the turn signal/multifunction switch with two signal circuits, the high beam signal circuit and the FTP signal circuit. When the low beam headlamps are ON, and the turn signal/multifunction switch is placed in either the high beam position or FTP position, ground is applied to the BCM through the high beam/FTP signal circuit. The BCM responds to the high beam request by sending a serial data message to the K219 Lighting Control Module. The Lighting Control Module responds by applying pulse width modulated (PWM) voltage to both headlamp high beam control circuits, illuminating the high beam headlamps. The status of the high beam lamps is shown by a blue indicator located on the instrument cluster. When high beams are commanded on, the indicator will be illuminated continuously. If the driver turns the high beams off, the indicator will also turn off.

Flash to Pass

When the S78 Turn Signal Switch is momentarily placed in the flash to pass position, ground is applied to the turn signal/multifunction switch. The turn signal/multifunction switch applies ground to the K9 Body Control Module (BCM) through the flash to pass switch signal circuit. The BCM responds to the flash to pass request by sending a serial data message to the K219 Lighting Control Module. The Lighting Control Module responds by applying pulse width modulated (PWM) voltage to both headlamp high beam control circuits, illuminating the high beam headlamps. This causes the high beam headlamps to illuminate at full brightness until the turn signal/multifunction switch is returned to the at rest position.

Automatic Headlamp Control

The K9 Body Control Module (BCM) monitors a serial data message from the S171 Instrument Panel Center Accessory Function Switch. When the headlamp switch is in the AUTO position, the three signal circuits are unaffected (open) and the BCM relies on the B10D Sun Load and Ambient Light and Security Indicator Sensor input to determine if headlamps are required or if daytime running lamps will be activated based on outside lighting conditions. During automatic lamp control, the headlamps will be off during daylight conditions but will turn on when the ambient light sensor detects low ambient light conditions. The ambient light sensor is a light sensitive transistor that varies the voltage signal to the BCM. The BCM provides a 5 volt reference signal and a low reference ground to the ambient light sensor. During low light conditions the BCM will request the low beam headlamps ON by sending a serial data message to the K219 Lighting Control Module. The Lighting Control Module responds by applying pulse width modulated (PWM) voltage to both headlamp low beam control circuits, illuminating the low beam headlamps.

Intellibeam – Automatic High Beam Assist (TQ5)

The IntelliBeam system is activated by pressing the auto high beam assist button on the turn signal switch while the exterior lamp control is in AUTO or ON mode and the engine running. The IntelliBeam system consists of a front camera module that detects light, and is able to identify approaching vehicles on an even, straight road at a distance of greater than 0.4 km (0.25 mi). The front camera module analyzes light color, intensity, and movement. The IntelliBeam system will turn OFF the high beam headlamps when approaching vehicle headlamps or preceding vehicle taillights are detected by the front camera module. On vehicles equipped with Side Blind Zone Alert, IntelliBeam will proactively turn OFF the high beam headlamps when a vehicle is passing on the left or right side. The IntelliBeam system is turned off anytime the headlamp switch is moved out of the AUTO position.

IntelliBeam System Activation

- Vehicle ON
- Headlamp switch placed in the AUTO or ON position
- Outside lighting conditions must be dark
- Vehicle speed greater than 25 mph (40 km/h)

IntelliBeam System Operation

The following are conditions that the IntelliBeam system will turn the high beam headlamps off during operation:

- The system detects approaching traffic headlamps
- The system detects preceding traffic tail lamps
- The system detects a vehicle passing to the right or left (SBZA equipped only)
- Ambient light level too high due to towns or twilight situations
- The vehicle’s speed drops below 13 mph (22 km/h)
- Delay

Note: IntelliBeam may not operate properly if any of the following conditions exist:

- Approaching and preceding vehicles lamps are undetectable due to dirt, snow, road spray, smoke, fog, or any other airborne conditions.
- The front camera and/or side object sensor module(s) is covered with ice, dirt, snow, haze, or is obstructed.
- The vehicle is being driven on winding or hilly road conditions which would make any on coming vehicle headlamps undetectable by the IntelliBeam.

IntelliBeam System Deactivation

- Manually operating the headlamp switch from neutral to high beam position
- IntelliBeam is deactivated automatically when the front or rear fog lamps are turned ON

IntelliBeam System Indicator
The status of the IntelliBeam system is shown by a green indicator located on the instrument panel cluster. When IntelliBeam is active, the indicator will be illuminated continuously. If the operator deactivates the IntelliBeam system, the indicator will turn off.

Daytime Running Lamps

The daytime running lamps (DRL) will illuminate continuously when the following conditions are met:

- Engine running
- The headlamp switch is in the AUTO position
- Ambient light conditions are daytime conditions

The B10D Sun Load and Ambient Light and Security Indicator Sensor is used to monitor outside lighting conditions. The ambient light sensor provides a voltage signal that will vary between 0.2 and 4.9 volts depending on outside lighting conditions. The K9 Body Control Module (BCM) provides a 5 volt reference signal and a low reference ground to the ambient light sensor. The BCM monitors the ambient light sensor signal circuit to determine if outside lighting conditions are correct for either daytime running lamps (DRL) or automatic lamp control when the headlamp switch is in the AUTO position. In daylight conditions the BCM will send a serial data message to the K219 Lighting Control Module to command the DRLs ON, the Lighting Control Module responds by applying pulse width modulated (PWM) voltage to both DRL control circuits, illuminating the DRLs. During low light conditions the Lighting Control Module will command the low beam headlamps ON.

Hazard Lamps

The hazard flashers may be activated in any power mode. The Hazard Warning Switch signal circuit is momentarily grounded when the hazard switch is pressed. The K9 Body Control Module (BCM) responds to the hazard switch signal input by sending a serial data message to the K219 Lighting Control Module. The Lighting Control Module responds by supplying battery voltage to all turn signal lamps in an ON and OFF duty cycle. When the hazard switch is activated, the BCM also sends a serial data message to the instrument cluster requesting both turn signal indicators to be cycled ON and OFF.

Park, Tail, and License Lamps

When the S171 Instrument Panel Center Accessory Function Switch is placed in the HEAD or PARK position, ground is applied to the park lamp switch ON signal circuit to the K9 Body Control Module (BCM). The BCM responds to the park lamp switch signal input by sending a serial data message to the K219 Lighting Control Module. The Lighting Control Module responds by applying battery voltage to the park lamps, tail lamps, and license lamps control circuits illuminating the park, tail, and license lamps.

Stop Lamps

The B22 Brake Pedal Position Sensor is used to sense the action of the driver application of the brake pedal. The K9 Body Control Module (BCM) provides the brake pedal position sensor with low reference, signal, and 5 volt reference circuits. When the variable signal reaches a voltage threshold indicating the brakes have been applied, the BCM will respond by sending a serial data message to the K219 Lighting Control Module requesting the stop lamps to be turned ON. The Lighting Control Module responds by applying battery voltage to the left and right stop lamp control circuits as well as the center high mounted stop lamp control circuit illuminating the left and right stop lamps and the center high mounted stop lamp. If serial data communication is lost between the BCM and the Lighting Control Module, the Lighting Control Module will receive a serial data message from the Electronic Brake Control Module indicating that the brakes have been applied. If serial data communication is lost between all three modules, the Lighting Control Module also receives a hard wired voltage signal from the BCM to signal the brake lamps ON.

Turn Signal Lamps

Turn Signals
The K9 Body Control Module (BCM) provides the S78 Turn Signal Switch with left and right turn signal switch signal circuits. Ground is applied at all times to the turn signal/multifunction switch. The turn signal lamps may only be activated with the ignition switch in the ON or START positions. When the turn signal/multifunction switch is placed in either the turn right or turn left position, ground is applied to the BCM through either the right turn or left turn signal switch signal circuit. The BCM responds to the turn signal switch input by sending a serial data message to the K219 Lighting Control Module. The Lighting Control Module responds by applying a pulsating voltage to the turn signal lamps through there respective control circuits. When a turn signal request is received by the BCM, a serial data message is also sent to the instrument cluster requesting the respective turn signal indicator be pulsed ON and OFF.

Turn Signal Outage Detection
Vehicles with LED turn signals require additional turn signal outage detection circuits that provide turn signal feedback to the K219 Lighting Control Module. The Lighting Control Module uses the feedback information to send a serial data message to the instrument cluster to alert the driver anytime a turn signal fault is detected. If a fault is detected on a turn signal circuit or a turn signal feedback circuit, the turn signals will flash in a rapid manner to alert the driver of the fault.

Turn Signal Animation
When the K219 Lighting Control Module receives a serial data message from the K9 Body Control Module (BCM) that the turn signals are being commanded on, the lighting control module responds by applying a pulsating voltage to the front, mirror, and rear turn signal lamps through there respective control circuits. Both front turn signal control circuits are connected to each headlamp assembly, this is for animation purposes. When a headlamp assembly only receives one turn signal input, an animation effect takes place as a “swiping” motion for the front turn signals. When a headlamp assembly receives both turn signal inputs as part of the hazard lamps becoming active, the turn signals do not exhibit the animation effect and will flash without the “swiping” motion.

Backup Lamps

With the engine running and the transmission in the reverse position, the transmission control module (TCM) sends a serial data message to the multiple control modules. The message indicates that the gear selector is in the reverse position. The K9 Body Control Module (BCM) responds to the reverse position message by sending a serial data message to the K219 Lighting Control Module to request the backup lamps on. The Lighting Control Module responds by applying battery voltage to the backup lamps control circuit(s) illuminating the backup lamps. The applied voltage is also sent to the A11 Radio and A10 Inside Rearview Mirror for rearview camera purposes. Once the driver moves the gear selector out of the reverse position, a serial data message is sent by the TCM that the transmission is no longer in the reverse position. The BCM responds to the reverse position message by sending a serial data message to the Lighting Control Module to request the backup lamps off. The Lighting Control Module responds by removing battery voltage from the backup lamp circuits. The engine must be running for the backup lamps to operate.

Cargo Lamps

Cargo Lamps
When the K9 Body Control Module (BCM) receives a task lamp switch input from the S171 Instrument Panel Center Accessory Function Switch, the BCM responds by sending a serial data message to the K219 Lighting Control Module. The lighting control module responds by applying pulse width modulated (PWM) voltage to the cargo lamp control circuits illuminating the cargo lamps. In the event that the cargo lamps were to remain illuminated for more than 10 minutes with the ignition switch in the OFF position, the lighting control module will deactivate the cargo lamp control circuits to prevent total battery discharge.

Task Lamps
When the K9 Body Control Module (BCM) receives a task lamp switch input from the S171 Instrument Panel Center Accessory Function Switch, the BCM responds by sending a serial data message to the K219 Lighting Control Module. The lighting control module responds by applying pulse width modulated (PWM) voltage to the task lamp control circuits illuminating the task lamps in each outside rearview mirror assembly. When the task lamp switch is pressed a second time, the left task lamp control circuit will stay illuminated while the right side will be turned off. When the task lamp switch is pressed a third time, the left task lamp control circuit will be turned off while the right side will be turned back on. When the task lamp switch is pressed a fourth time, both task lamps will be turned off. In the event that the task lamps were to remain illuminated for more than 10 minutes with the ignition switch in the OFF position, the lighting control module will deactivate the cargo lamp control circuit to prevent total battery discharge.

Approach Lighting

Approach lighting is commanded ON when the unlock button is pressed on the keyless entry transmitter during dark ambient light conditions. When the keyless entry transmitter unlock button is pressed, a serial data message is sent by the K9 Body Control Module (BCM) that the vehicle is being unlocked. The K219 Lighting Control Module responds to the serial data message by applying voltage to the approach lamp control circuit illuminating the LED lighting located under each outside rearview mirror as part of approach lighting.

Battery Run Down Protection/Inadvertent Power

To provide battery run down protection, the exterior lamps will be deactivated automatically under certain conditions. The K9 Body Control Module (BCM) monitors the state of the S171 Instrument Panel Center Accessory Function Switch. If the headlamp switch is in the park or headlamp position when the ignition switch is ON and then the ignition switch is placed in the OFF position, the BCM initiates a 10 minutes timer. At the end of the 10 minutes, the BCM will send a serial data message to the K219 Lighting Control Module to deactivate the exterior lamps to prevent total battery discharge. This feature will be cancelled if any power mode other than OFF becomes active.

The BCM will disable battery run down protection if any of the following conditions exist:

- The park or headlamp switch is changed from the ON to OFF position, and back to the ON position during battery run down protection.
- The BCM determined that the park or headlamp switch was not active when the ignition was turned OFF.

Interior Lighting Systems Description and Operation

Interior Lamps

Dome Lamps

The dome lamps are controlled by door ajar inputs to the K9 Body Control Module (BCM). When any door is opened, the door ajar switch contacts close and the BCM receives a door-open input. The BCM responds by sending a serial data message to the A103 Roof Console. The Roof Console responds by applying battery voltage to the dome lamps illuminating the dome lamps. The BCM will also send a serial data message to request the dome lamps on when a door lock/unlock request is activated with the key fob. After all doors have been closed, the dome lamp will remain illuminated approximately 3 seconds after the last door closes. In the event that the dome lamp were to remain illuminated for more than 10 minutes with the ignition switch in the OFF position, the BCM will deactivate the dome lamp control circuit to prevent total battery discharge. The dome lamps will turn OFF using the theater dimming feature when controlled by the BCM.

Center Console Compartment Lamp

The K9 Body Control Module (BCM) supplies battery voltage to the center console lamp through control circuit 4786 anytime the ignition/vehicle is turned on or the dome lamps are requested on through the dome lamp control switch on the A103 Roof Console. In the event that the center console lamp were to remain illuminated for more than 10 minutes with the ignition/vehicle off, the BCM will deactivate the courtesy lamp control circuit to prevent total battery discharge.

Keyless Entry Interior Illumination

When the operator uses the keyless entry transmitter in order to unlock the doors, the K9 Body Control Module (BCM) receives a door-unlock signal. The BCM must receive inputs from various systems that indicate that the ignition switch is OFF, the courtesy lamp switch is OFF, and all doors are closed before the BCM will activate the interior lamps. After all doors have been closed, the courtesy lamps will turn OFF immediately if the ignition switch is turned to the ON position, the door locks are LOCKED, or approximately 20 seconds after the last door closes. The BCM will turn off the courtesy lamps through the theater dimming feature. The BCM keeps the courtesy lamps on for 40 seconds after an alarm event is completed.

Reading Lamps

When a reading lamp button is pressed, the switch contacts close providing a path to ground for the signal circuit from the A103 Roof Console. The roof console responds by applying battery voltage to the appropriate reading lamp control circuit illuminating the reading lamp. If the operator inadvertently leaves a reading lamp ON, the BCM will send a serial data message to turn all interior lighting off after 10 minutes has passed to prevent total battery discharge.

Sunshade Mirror Lamp

The inadvertent power supply voltage circuit from the K9 Body Control Module (BCM) provides battery voltage to the passenger side sunshade mirror lamp. When the sunshade mirror cover is opened, a switch closes providing ground and the sunshade lamp illuminates. If the operator inadvertently leaves the sunshade mirror cover open with the lamp ON, the BCM will turn all interior lamps OFF after 10 minutes has passed to prevent total battery discharge.

Interior Lamps Dimming

With the headlamp mode in the PARK or HEAD position, the K9 Body Control Module (BCM) responds by applying voltage to the backlight dimming control circuits illuminating all components with interior backlighting. All interior backlighting turns on at the dimming level set by the dimmer switch. The dimmer switch is used to increase and decrease the brightness of the interior backlighting components. The BCM provides a signal circuit and a low reference circuit to the dimmer switch for backlight dimming. When a dimming setting is selected, the signal circuit becomes grounded through the variable resistor internal to the dimmer switch and voltage from the BCM will decrease accordingly. The BCM interprets the signal and responds in two ways. The BCM applies a pulse width modulated (PWM) voltage through the LED dimming control circuits illuminating the interior backlighting to the requested level of brightness. The BCM also sends a serial data message to the appropriate control modules requesting all dimming components to be illuminated to the same level of brightness.

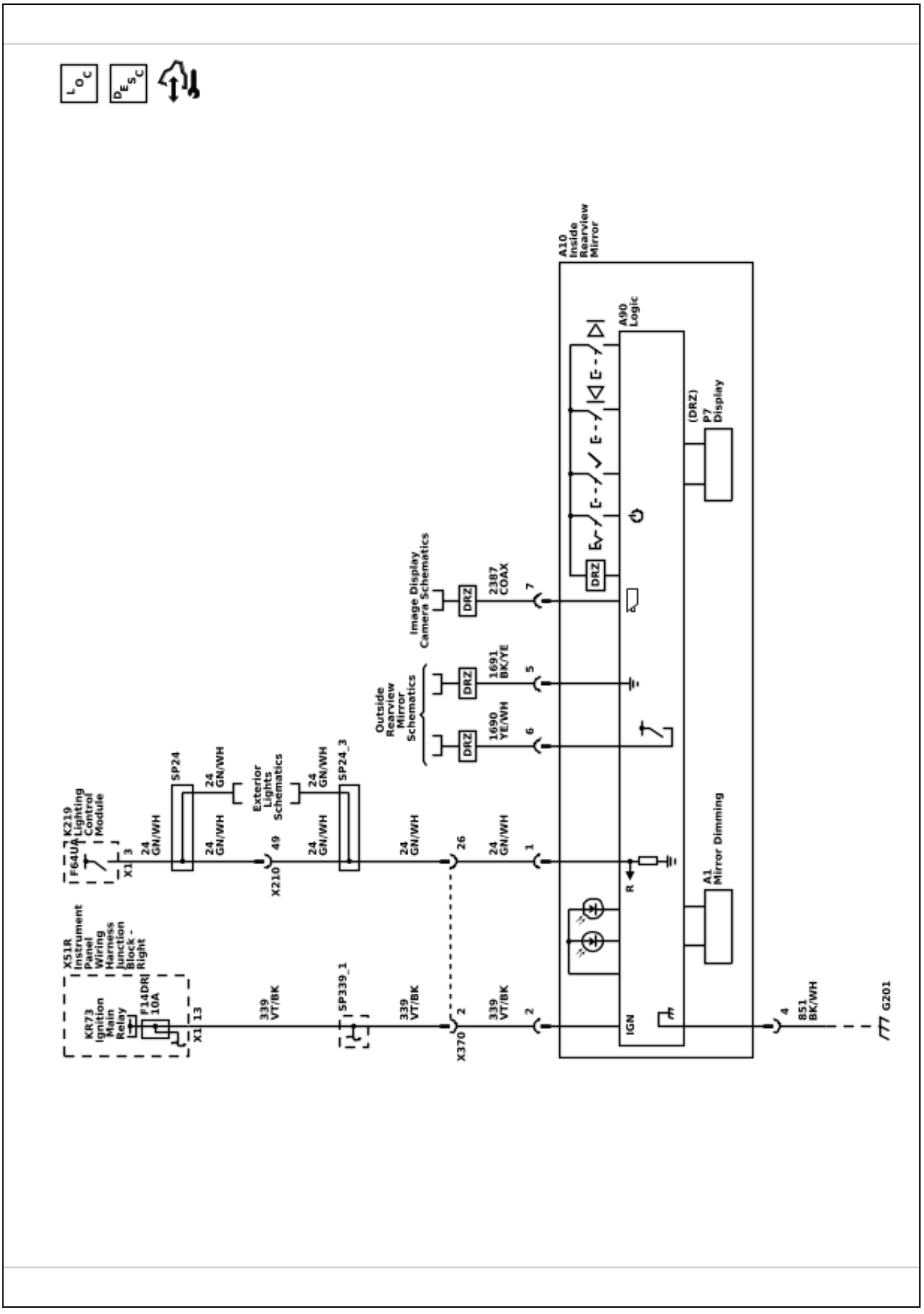
Battery Rundown Protection/Inadvertent Power

The K9 Body Control Module (BCM) inadvertent power supply voltage circuit provides battery voltage to all of the interior courtesy lamps. In the event that any of these lamps were to remain illuminated for a period of more than 10 minutes with the ignition switch in the OFF position, the BCM will deactivate the inadvertent power supply voltage circuit to prevent total battery discharge. If the ignition switch is turned to any position other than OFF, or if a lamp switch is activated during this 10 minute period, the timer resets for another 10 minutes.

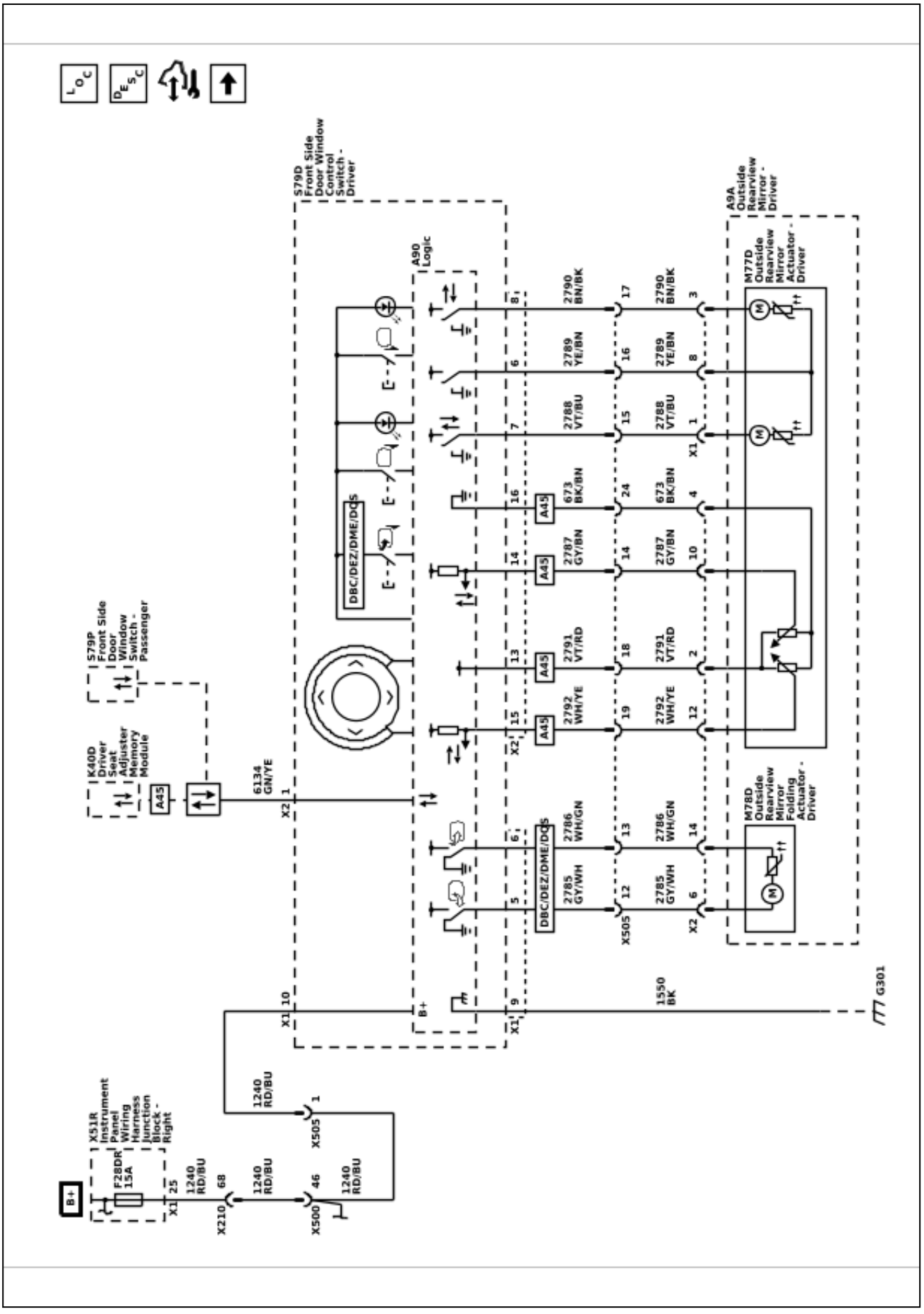
Mirrors

Schematic and Routing Diagrams

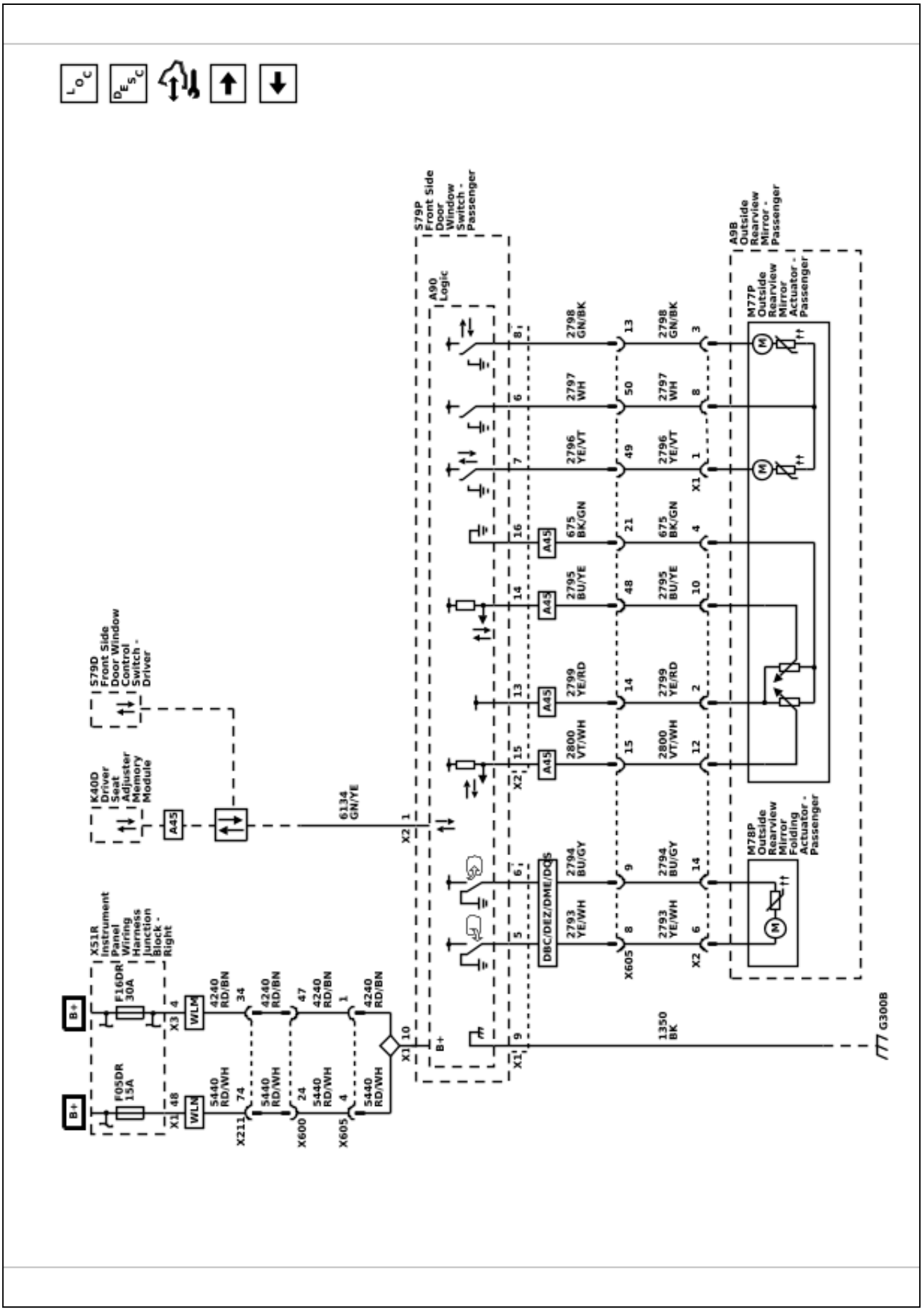
Inside Rearview Mirror Schematics (Inside Rearview Mirror)



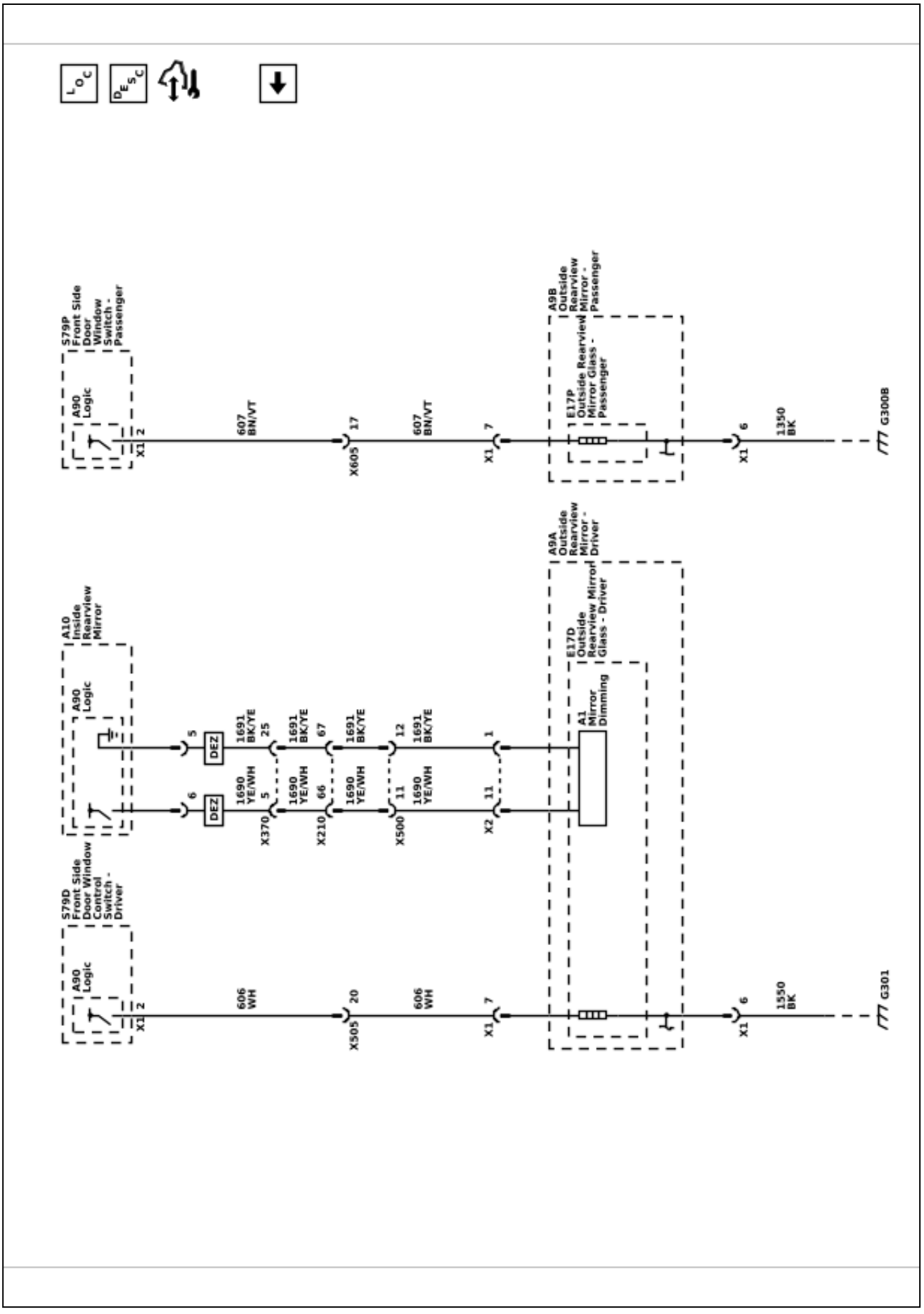
Outside Rearview Mirror Schematics (Controls, Driver Position, and Folding)



Outside Rearview Mirror Schematics (Passenger Position and Folding)



Outside Rearview Mirror Schematics (Dimming and Heating)



Description and Operation

Automatic Day-Night Mirror Description and Operation

Inside Rearview Mirror with the Automatic Day-Night Feature System Operation

The inside rearview mirror uses 2 photocell sensors. One sensor is the headlight sensor, located on the face side of the mirror. The headlight sensor is used to determine light conditions present at the mirror face. The other sensor is the ambient light sensor, located on the rear of the mirror or windshield side. The ambient light sensor is used to determine the exterior light conditions. With a low exterior light condition detected, and a high light condition from behind the car at the headlight sensor, the inside rearview mirror will automatically darken the face of the mirror.

In the daytime, the mirror is in a normal state because of the high exterior light condition that is indicated by the ambient light sensor. With the gear selector lever in the REVERSE position and the Ignition ON/Vehicle in Service Mode, backup lamp supply voltage is supplied as an input to the inside rearview mirror. The mirror monitors this input to disable the automatic day-night feature. This allows the driver to see objects in the mirror clearly when backing up, even during the night.

Driver Outside Rearview Mirror with Automatic Day-Night System Operation (If Equipped)

The automatic day-night feature of the driver outside rearview mirror is controlled by the inside rearview mirror. The inside rearview mirror supplies control and low reference to the driver outside rearview mirror. At night, with the automatic day-night feature enabled, the driver outside rearview mirror will automatically darken with the inside rearview mirror to reduce glare from headlamps behind the vehicle.

Inside Rearview Camera Full Display Mirror System Operation

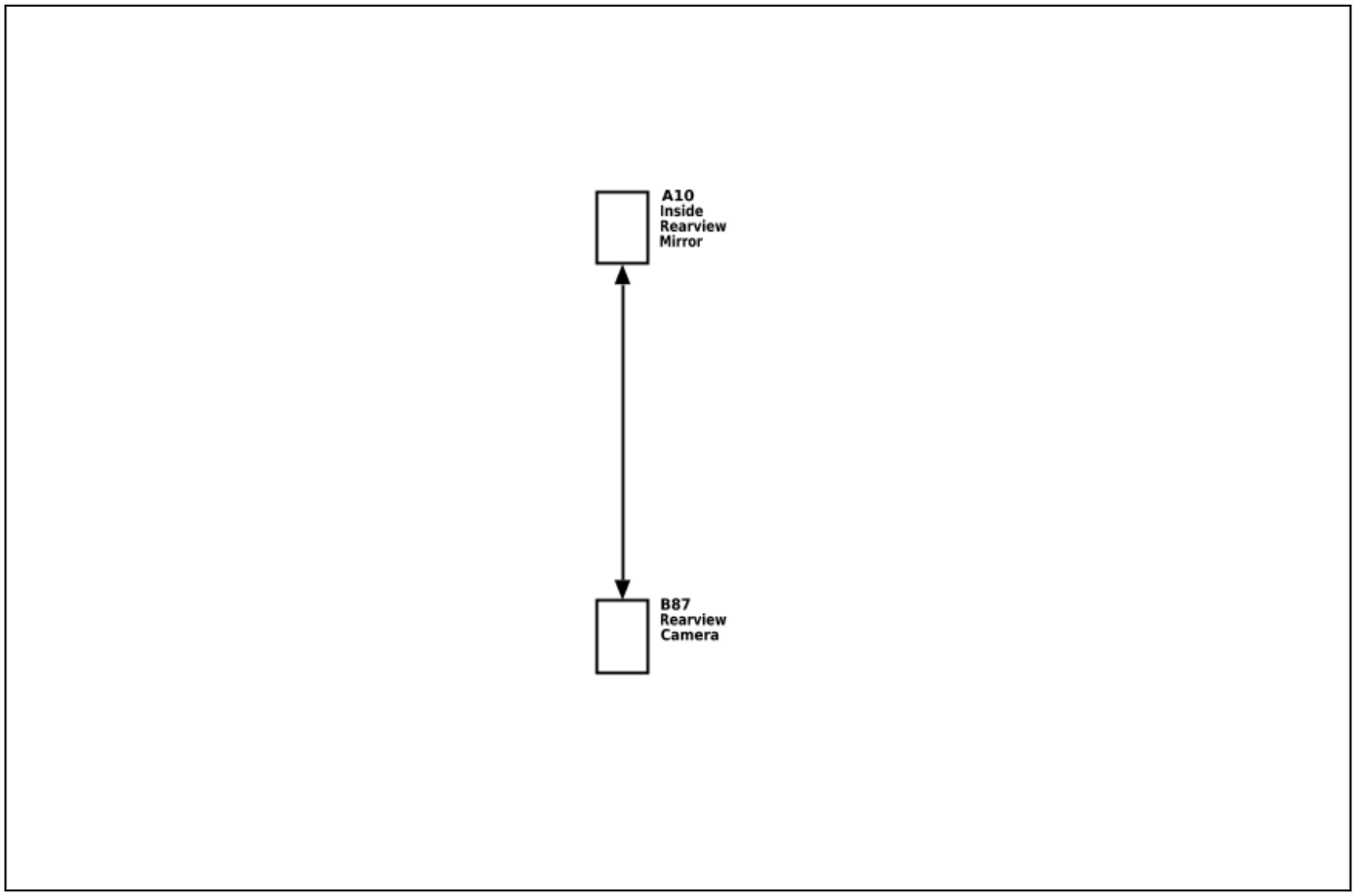
The A10 Inside Rearview Mirror is connected to the B352 Video Display inside Rearview Mirror Camera via a shielded coaxial cable. When the tab under the inside rearview mirror is pulled rearward, a view of the area behind the vehicle displays on the mirror. Adjust the rearview mirror for a clear view of the area behind the vehicle before turning on full display mirror. Use the button on the back of the mirror to adjust the brightness of the display. Make sure the light sensor is not covered when adjusting the brightness.

The inside rearview camera full display mirror may not work properly or display a clear image if:.

- It is dark.
- The sun or the beam of headlamps are shining directly into the camera lens.
- Ice, snow, mud, or anything else builds up on the camera lens. Clean the lens, rinse it with water, and wipe it with a soft cloth.

When the mirror detects that the camera is not sending a valid video signal, it “blue screens” with a “no video” decal for 3 seconds, then reverts back to the mirror.

Rearview Camera Full Display Mirror Block Diagram



4433072

Hard-Wired

A10 Inside Rearview Mirror

B87 Rearview Camera

Outside Mirror Description and Operation

Power Mirror System Components

The power mirror system consists of the following components:

- Body Control Module
- Driver Seat Adjuster Memory Module
- Outside Mirror Switch
- Passenger Window Switch
- Left Outside Rearview Mirror
- Right Outside Rearview Mirror

Power Mirror System Controls

The outside rearview mirror switch is part of the S79D Driver Front Side Door Window Control Switch and uses serial data to control the passenger mirror through the S79P Passenger Front Side Door Window Control Switch. Each S79 Side Door Window Control Switch has it own 12V, ground and data communications circuit along with mirror directional control and mirror fold circuits.

Driver Mirror Controls

The S79D Driver Front Side Door Window Control Switch has internal connections for the driver mirror. When the mirror position switch is active the driver mirror is commanded to move through bi-directional motor control circuits. The motor control circuits are floating while in an inactive state and the switches will apply power and ground to the control circuits as necessary to move the mirror in the commanded direction.

Passenger Mirror Controls

The S79D Driver Front Side Door Window Control Switch uses serial data circuits to communicate the active states for the passenger mirror switch to the S79P Passenger Front Side Door Window Control Switch. The S79P Passenger Front Side Door Window Control Switch has internal connections for the passenger mirror. When the mirror position switch is active the passenger mirror is commanded to move through bi-directional motor control circuits. The motor control circuits are floating while in an inactive state and the switches will apply power and ground to the control circuits as necessary to move the mirror in the commanded direction.

Mirror Position

Mirror position is determined by both horizontal and vertical position sensors in each of the power mirrors. Each S79 Front Side Door Window Control Switch supplies a 5 V reference, low reference, and horizontal and vertical position signal circuits to these sensors. The signal circuits are referenced from 5 V by the S79 Front Side Door Window Control Switch and the signal circuit voltage levels represent the mirror positions. The mirror positions are stored in each S79 Front Side Door Window Control Switch for memory mirror operation. When the memory seat module receives a memory recall command, the memory seat control module will send the go to position to the S79 Front Side Door Window Control Switch. The S79 Front Side Door Window Control Switches will then drive the appropriate mirror motors to the commanded position sensor settings.

Mirror Select

The S79D Driver Front Side Door Window Control Switch has internal connections for the mirror select switch. When the mirror select switch is active the S79 Front Side Door Window Control Switch will either control the driver mirror or send a serial data message to control the passenger mirror.

Folding Mirrors

The S79D Driver Front Side Door Window Control Switch sends the mirror fold/unfold inputs to the K9 Body Control Module (BCM) through serial data. When the BCM receives a fold/unfold signal it will send a fold/unfold command to the S79 Driver Front Side Door Window Control Switch which will send a serial data message to the S79P Passenger Front Side Door Window Control Switch. The outside mirrors will fold or unfold depending on their current state. The BCM will also send a serial data message to unfold the mirrors when the vehicle reaches 20 km/h (12 mph) unless equipped with camper/trailer mirrors. The S79 Front Side Door Window Control Switches control the fold/unfold motors through bi-directional control circuits

Heated Mirrors

The heated mirrors are controlled through each S79 Front Side Door Window Control Switch. When the vehicle is running and the HVAC control module receives a rear window defog request from the radio/HVAC controls, the HVAC control module will send a serial data message to the S79D Driver Front Side Door Window Control Switch and S79P Passenger Front Side Door Window Control Switch. Each S79 Front Side Door Window Control Switch provide B+ voltage to the driver and passenger outside rearview mirror heating elements.

Memory Mirror System

Memory Mirror System Controls

The S79D Front Side Door Window Control Switch – Driver is capable of storing mirror positions and controlling the mirrors to these positions to the preferred settings of 2 different drivers. Each driver will be able to personalize the memory system by positioning the mirrors and seats to their preferred settings. Then press and hold the memory 1 or memory 2 button until an audible chime is heard and the current mirror positions will be stored into memory of the S79D Front Side Door Window Control Switch – Driver. Mirror positions are stored in the S79D Front Side Door Window Control Switch – Driver, while memory seat presets are stored locally in its respective module. Once the mirror positions have been stored into memory, a momentary memory 1 or memory 2 switch activation will supply the S79D Front Side Door Window Control Switch – Driver a battery voltage signal. The S79D Front Side Door Window Control Switch – Driver, upon receipt of the memory switch signal, with the transmission in park or neutral, will then drive the driver mirror to the corresponding stored memory position. The S79D Front Side Door Window Control Switch – Driver will also send a message to the S79P Front Side Door Window Switch – Passenger and K40D Driver Seat Adjuster Memory Module indicating that a memory switch activation occurred. The S79P Front Side Door Window Switch – Passenger will then drive the passenger mirror to the corresponding stored memory position. The memory system can also be controlled by any of the following, if programmed to enable/disable the features:

- Auto exit/entry seat positioning
- Mirror and seat position recall on a keyless entry unlock activation
- Mirror and seat position recall on ignition key insertion
- Mirror tilt in reverse

Memory Mirror System Operation

Mirror position is determined by both horizontal and vertical position sensors in each of the power mirrors.

The S79D Front Side Door Window Control Switch — Driver and S79P Front Side Door Window Switch — Passenger supplies a reference voltage and a low reference to these sensors and determines mirror position through the horizontal and vertical position signal circuits.

The memory switch receives power from the S79D Front Side Door Window Control Switch – Driver through the battery supply voltage circuit and the S79D Front Side Door Window Control Switch – Driver fuse. The S79D Front Side Door Window Control Switch – Driver upon receipt of a memory switch signal input or an appropriate message from the K40D Driver Seat Adjuster Memory Module, the S79D Front Side Door Window Control Switch – Driver and S79P Front Side Door Window Switch – Passenger will then supply battery voltage and ground to the appropriate power mirror motors through the mirror motor control circuits to move the mirrors to the predetermined positions.

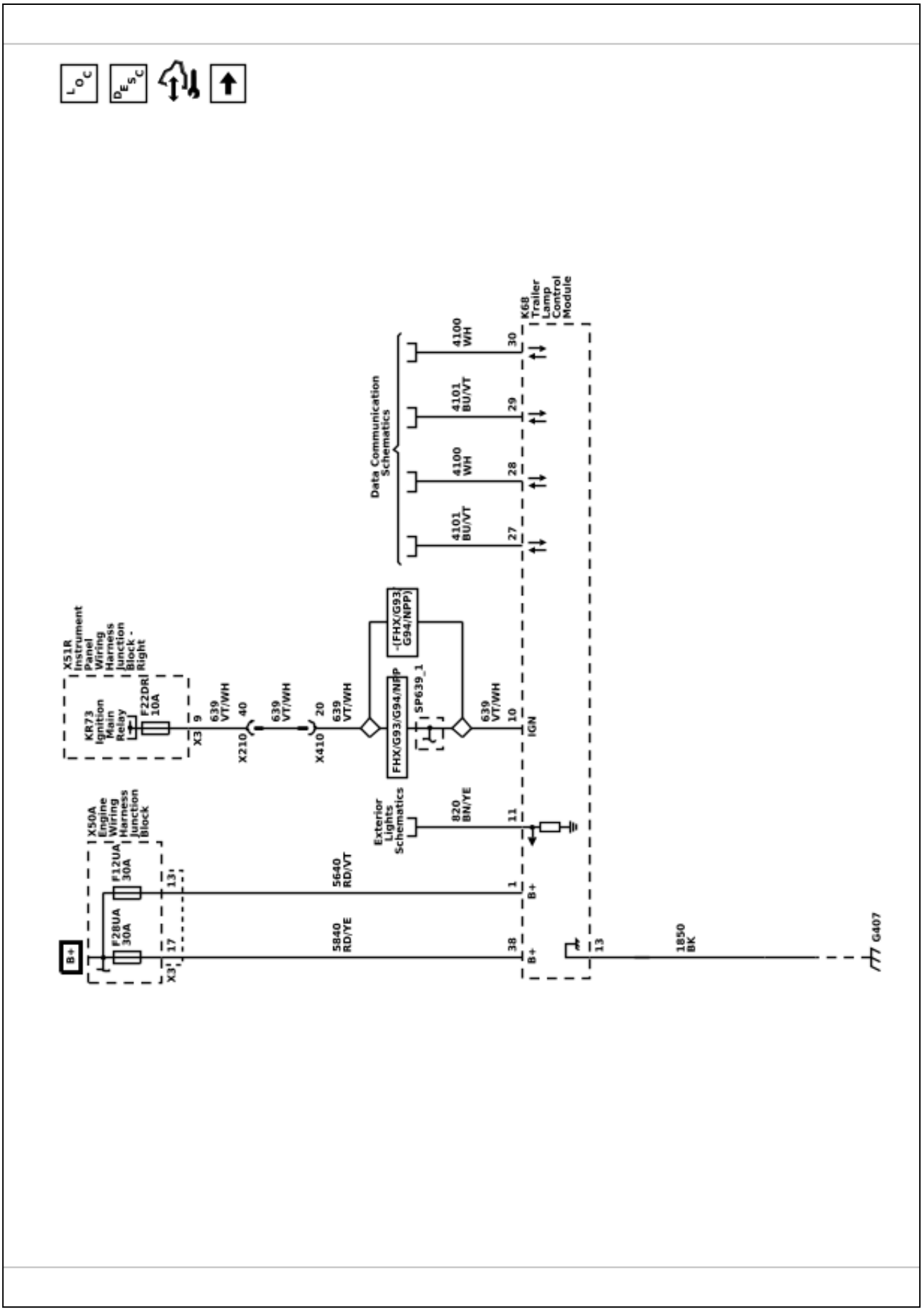
Mirror Tilt in Reverse Controls
This feature is capable of tilting the left, right or both power mirrors when the transmission is placed in reverse to provide enhanced visibility during parking or backing maneuvers. This feature can be personalized to the needs of 2 different drivers.

Mirror Tilt in Reverse Operation
When the vehicle is placed in reverse and the appropriate message from the K40D Driver Seat Adjuster Memory Module and K20 Engine Control Module is received by the S79D Front Side Door Window Control Switch — Driver and S79P Front Side Door Window Switch — Passenger, the S79D Front Side Door Window Control Switch — Driver and S79P Front Side Door Window Switch — Passenger will then supply battery voltage to the appropriate power mirror motors through the mirror motor control circuits to move the mirrors to the predetermined positions. The positions that are stored can be altered by starting the engine, applying the brake, placing the vehicle in reverse and controlling both the left and right mirrors to the desired positions and shifting the vehicle out of reverse. These new positions will be stored for the last memory recall that happened.

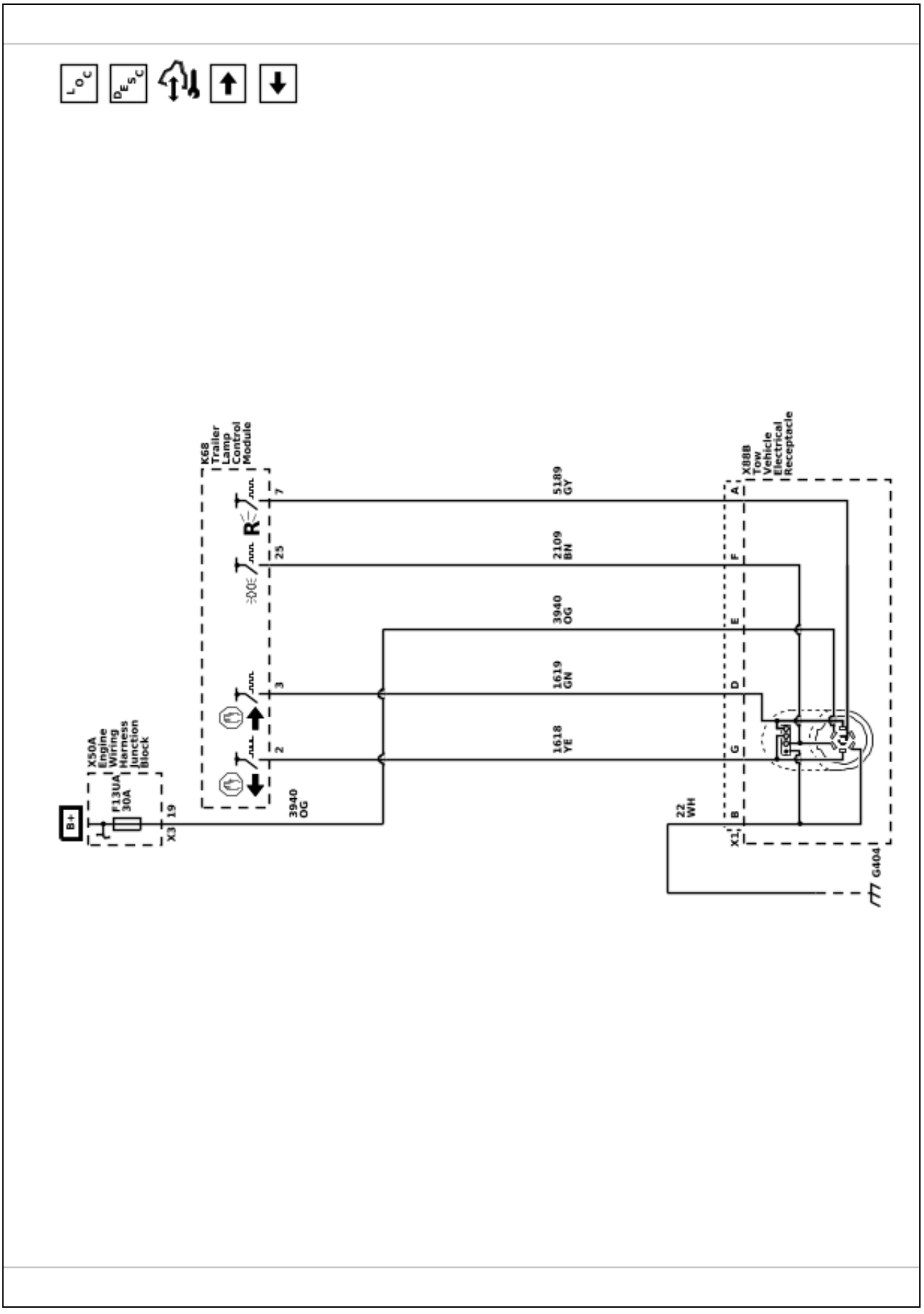
Trailering Systems

Schematic and Routing Diagrams

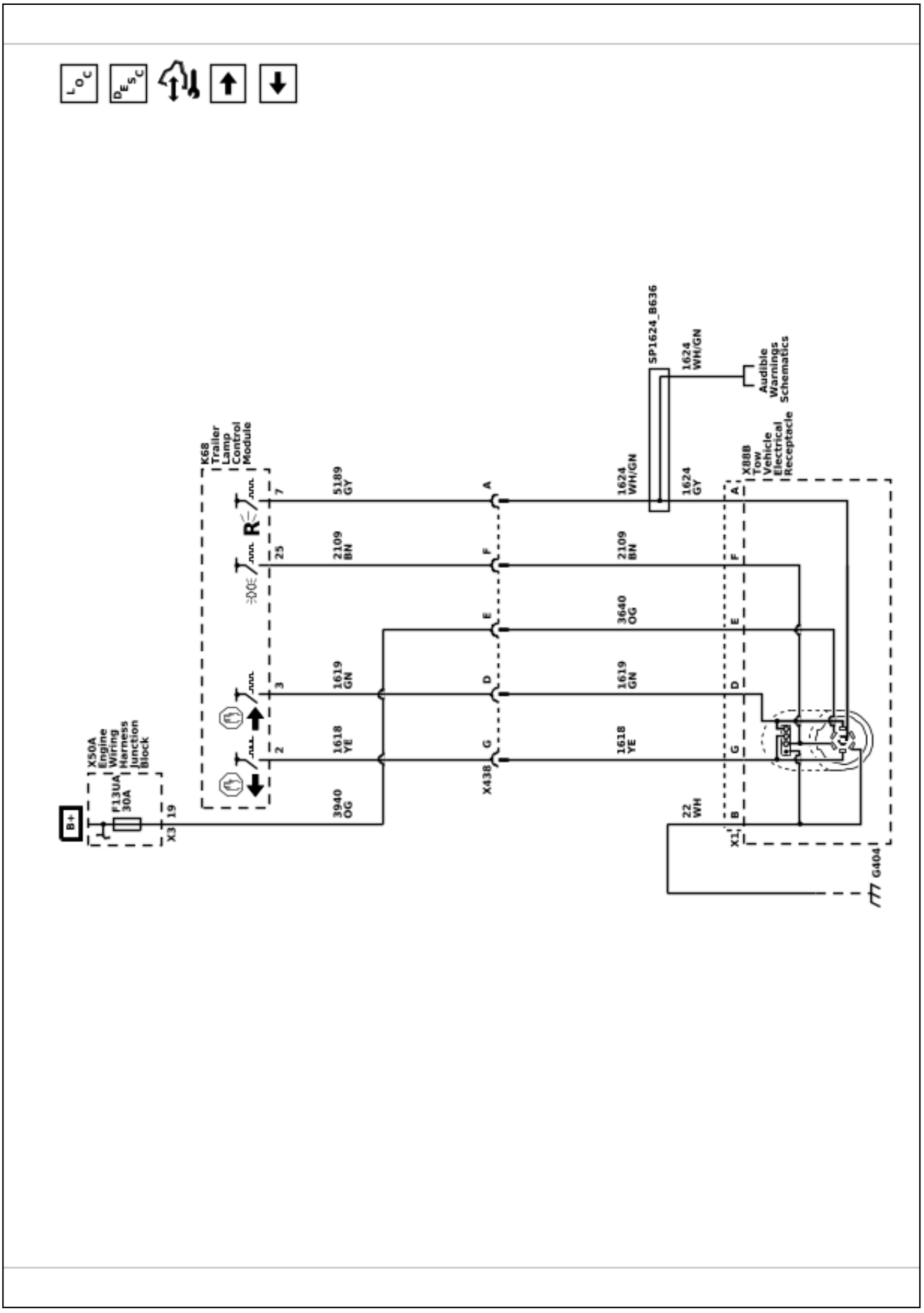
Trailering Systems Schematics (Trailer Lighting Control Module - Power, Ground, Serial Data, and Inputs (UET))



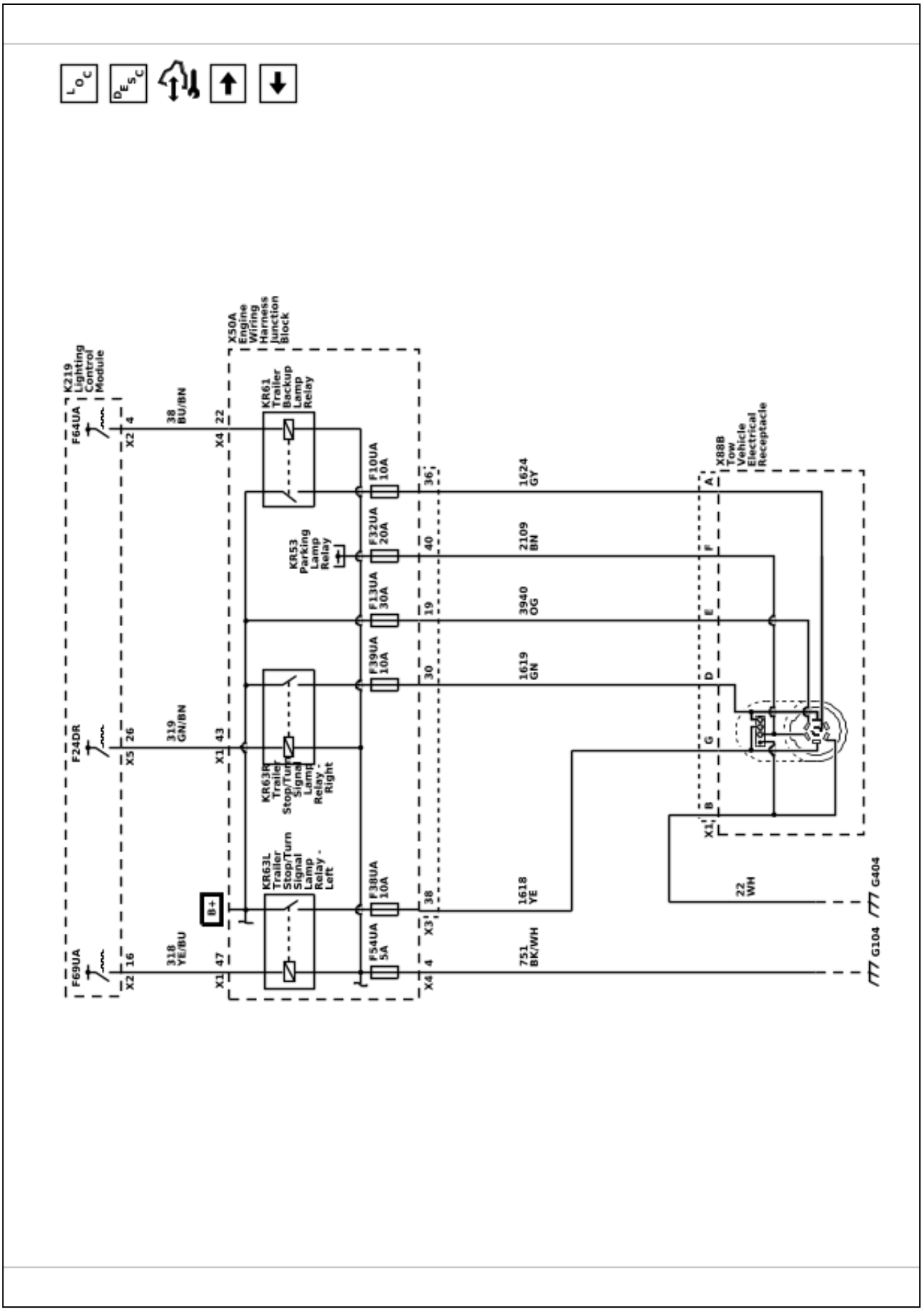
Trailering Systems Schematics (Trailer Connector Pins: A, B, D, E, F, G (UET - 8S3))



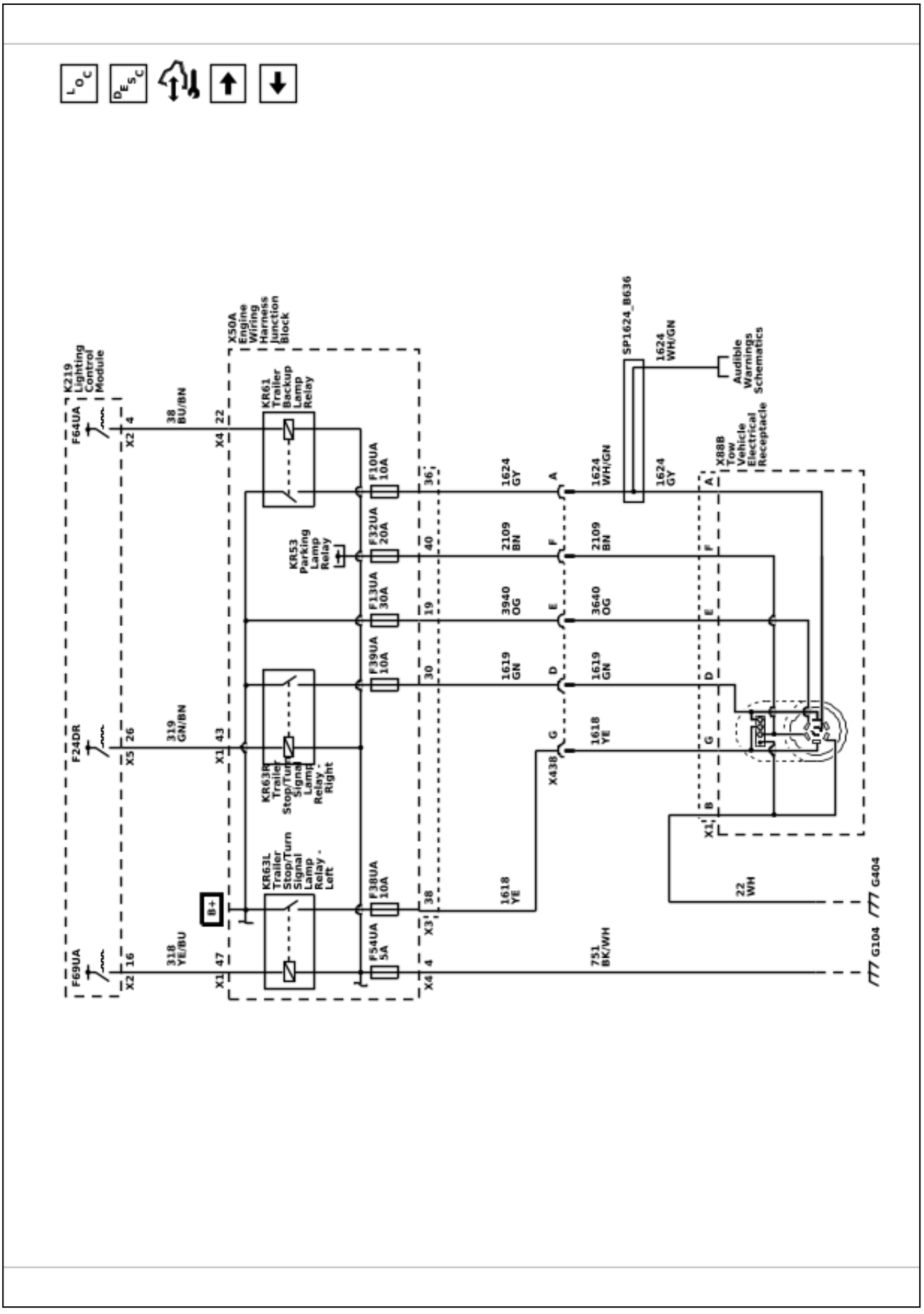
Trailering Systems Schematics (Trailer Connector Pins: A, B, D, E, F, G (UET and 8S3))



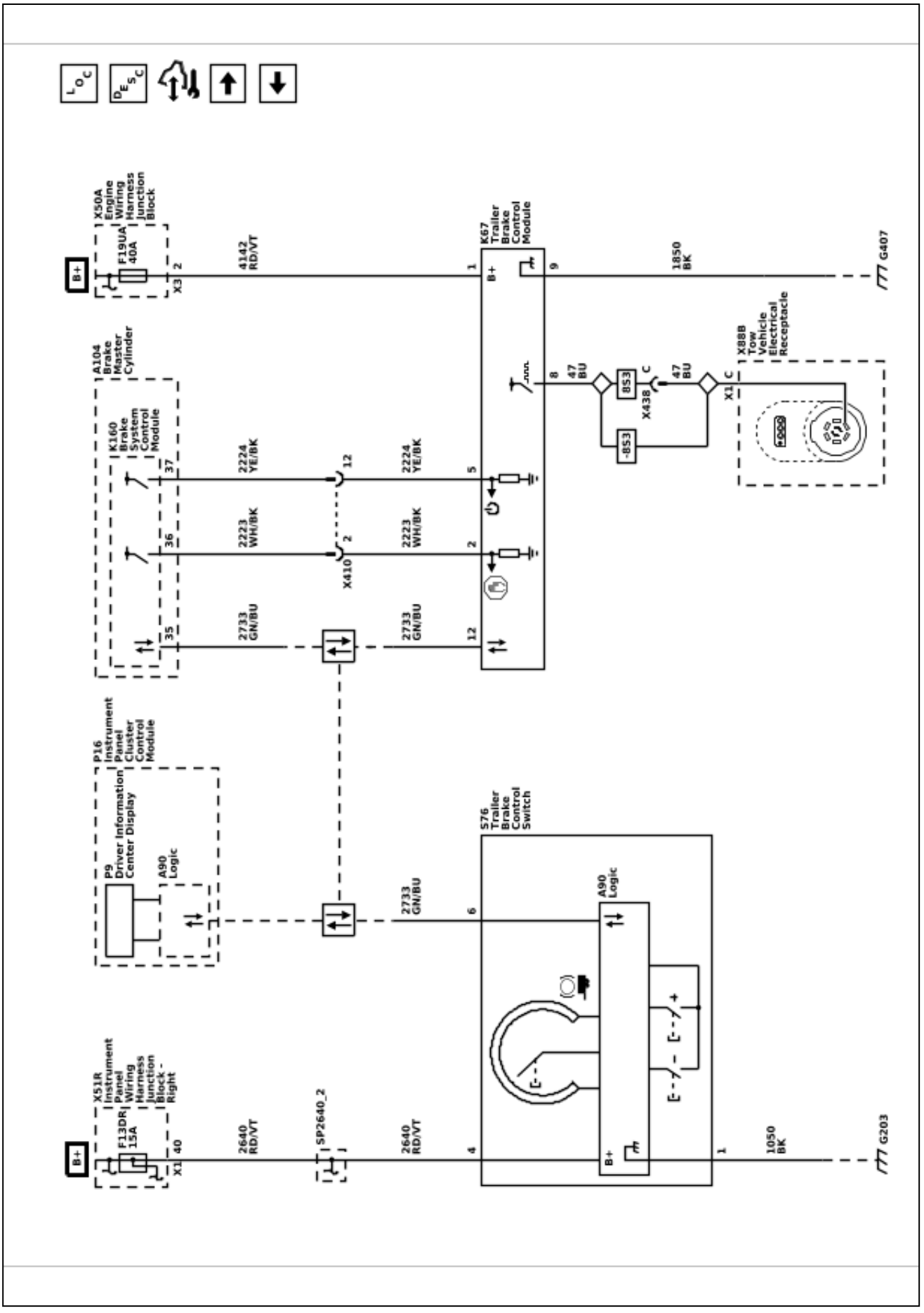
Trailering Systems Schematics (Trailer Connector Pins: A, B, D, E, F, G (- (UET / 8S3)))



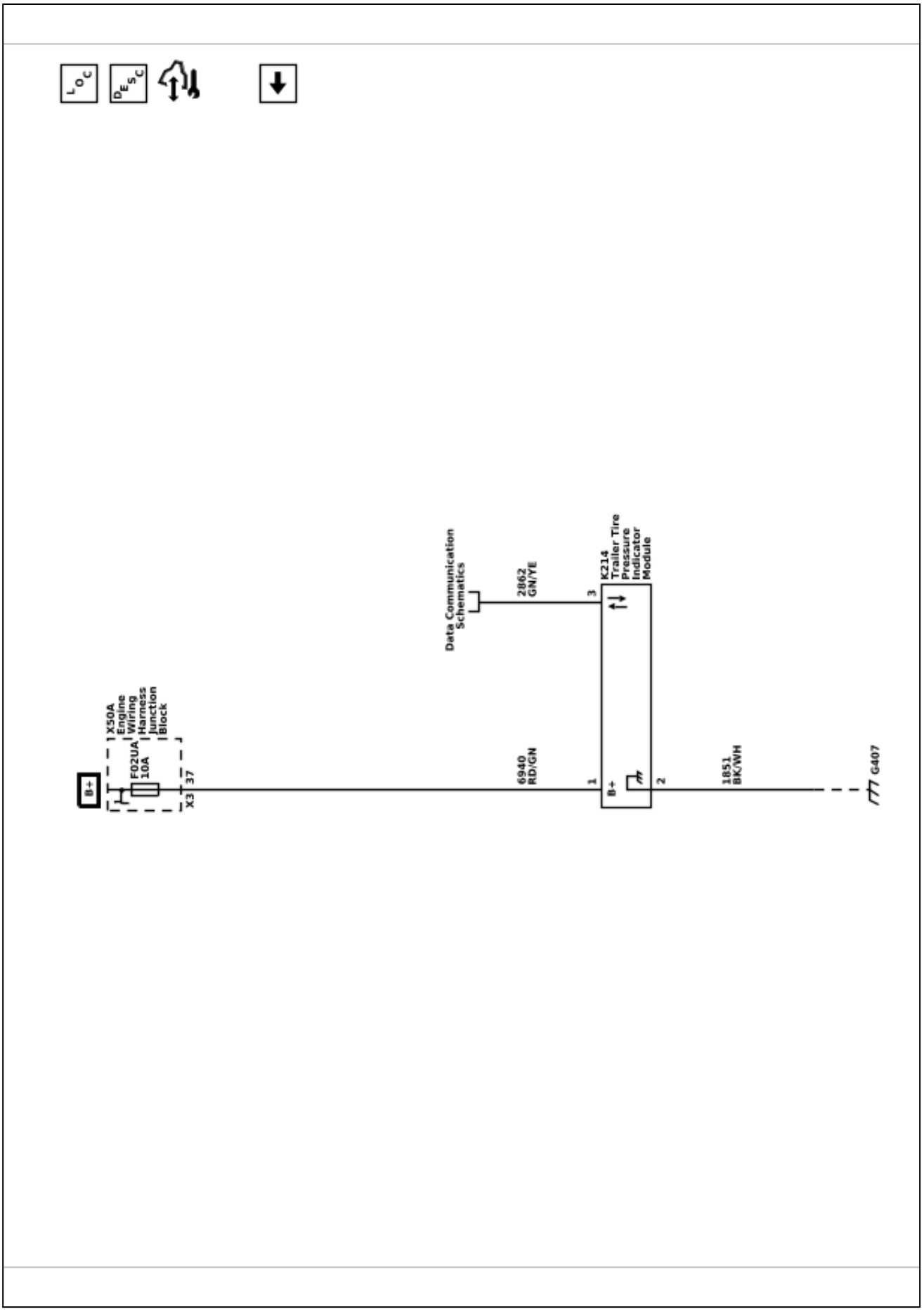
Trailering Systems Schematics (Trailer Connector Pins: A, B, D, E, F, G (8S3 - UET))



Trailering Systems Schematics (Trailer Brake Control and Trailer Connector Pin: C)



Trailering Systems Schematics (Trailer Tire Pressure (UET))



Description and Operation

Trailering Description and Operation

Trailering System Overview

Begin the trailering system diagnosis with [Link target (target-id 325938-) not found] . The Diagnostic System Check - Trailering will provide a complete strategy to locate and repair a vehicle trailering electrical fault. Not following this strategy may cause additional diagnostic time and/or misdiagnosis.

The trailering system consists of the following:

- Trailer Lighting, refer to [Link target (target-id 326023-) not found] for additional diagnostic information.
- {JL1} Trailer Brakes, refer to [Link target (target-id 326020-) not found] for additional diagnostic information.
- Trailer Battery Charging System, refer to [Link target (target-id 326019-) not found] for additional diagnostic information.
- Trailer Detection, refer to [Link target (target-id 326022-) not found] for additional diagnostic information.
- Trailer Tire Pressure Monitoring System, refer to [Link target (target-id 326024-) not found] for additional diagnostic information.
- Trailer Theft Detection.

7–Terminal Tow Vehicle Electrical Receptacle Pinout

- Terminal A – Trailer Backup Lamp Control
- Terminal B – Ground
- Terminal C – Trailer Brake Control
- Terminal D – Right Trailer Stop/Turn Signal Lamp Control
- Terminal E – B+
- Terminal F – Trailer Park Lamp Control
- Terminal G – Left Trailer Stop/Turn Signal Lamp Control

Connecting Aftermarket Accessories

- Some aftermarket accessories that connect to the X88B Tow Vehicle Electrical Receptacle will be recognized by the vehicle as a trailer connected, even if the accessory is not a trailer. As a result, side blind zone detection, rear park assist, and/or rear cross traffic alert will be turned off anytime the vehicle detects a trailer/accessory is connected.
- Vehicles equipped with U1D/UET have trailer theft detection that constantly monitors trailer connected status when enabled. This is done by randomly pulsing the lighting circuits of the trailer when the vehicle is parked. As a result, some aftermarket accessories may be turned ON/OFF when connected to the vehicle with theft detection enabled.
- Vehicles equipped with U1D/UET use pulse width modulation voltage (PWM) for trailer lighting functions. Some aftermarket accessories are incompatible with PWM and may not function correctly when connected to the trailer lighting circuits of the vehicle.

Trailer Battery Charging System

Trailer battery charging is accomplished through constant battery voltage from the X50A Engine Wiring Harness Junction Block to the X88B Tow Vehicle Electrical Receptacle. Battery voltage is supplied to terminal E at the X88B Tow Vehicle Electrical Receptacle at all times. If equipped, the trailer battery will constantly be charged by the vehicle's electrical system anytime the trailer is connected. Some trailers require the B+ circuit to the X88B Tow Vehicle Electrical Receptacle for the trailer brakes to function.

Trailer Lighting and Detection With U1D/UET

Note:

- Some trailers utilize a trailer mounted control module to operate some or all of the trailer lights. These trailers may use the B+ circuit from the trailer connector to power the trailer lighting circuits. These trailers may not always be detected by the Trailer Lighting Control Module and may set faults.
- When a trailer is detected on a vehicle equipped with side blind zone detection, rear park assist, and/or rear cross traffic alert, the vehicle will automatically turn these features off. These features are turned off to prevent false detections due to the trailer obstructing the view of the sensors.
- Vehicles equipped with IOR/1FL do not come equipped with the trailering APP however may still be equipped with a K68 trailer Lamp Control Module.

The K68 Trailer Lamp Control Module is responsible for controlling the trailer lighting on vehicles with U1D/UET. The combined trailer stop/turn signal lamps of the trailer must draw at least 55mA of total current to be detected as a trailer or the Trailer Lamp Control Module will not control the lighting circuits. The Trailer Lamp Control Module receives serial data messages from the K9 Body Control Module (BCM) indicating what lamps have been activated on the vehicle. The Trailer Lamp Control Module responds by applying pulse width modulated voltage (PWM) to the appropriate control circuits for the requested lamps illuminating the lamps on the attached trailer. The Trailer Lamp Control Module constantly monitors for trailer connection status, trailer lighting faults, and trailer theft deterrent purposes. This is accomplished through the lighting circuits of the trailer to determine if a trailer is connected. When a trailer is connected, the Trailer Lamp Control Module senses the trailer connection and alerts the driver by requesting a trailer profile setup through the Trailering App, which is displayed on the infotainment screen. If a trailer is disconnected with the ignition ON, the vehicle will display multiple trailer lighting messages until a trailer is reconnected or the message is dismissed by the user. With the key OFF, the Trailer Lamp Control Module will periodically pulse the lighting circuits of the trailer to verify it is still connected. The lights on the trailer may flash at different intervals with the key OFF depending on which type of lights the trailer is built with. If a trailer is disconnected with the key ON, the vehicle will display a trailer disconnected message until a trailer is reconnected or the ignition is cycled.

Trailer Lighting Without U1D/UET

The K219 Lighting Control Module is responsible for controlling the trailer lighting on vehicles without U1D/UET. The lighting control module receives serial data messages from the K9 Body Control Module (BCM) indicating what lamps have been activated on the vehicle. The lighting control module responds by applying voltage to the appropriate relay control circuits for the requested lamps anytime the vehicle lamps are commanded ON. With the relay coil energized, the relay contacts close and allow voltage to flow through the relay illuminating the appropriate lamps on the attached trailer.

Trailering Messages

The Infotainment Display may display one or more of the following messages to the user related to trailering:

Trailering Messages

Trailering Message	Description
Check Trailer Left Turn Signal Lamp	The K68 Trailer Lighting Control Module detects a fault on the left trailer stop/turn lamp control circuit
Check Trailer Right Turn Signal Lamp	The K68 Trailer Lighting Control Module detects a fault on the right trailer stop/turn lamp control circuit
Check Trailer Rear Lamp	The K68 Trailer Lighting Control Module detects a fault on the trailer park lamp control circuit.
Check Trailer Reversing Lamp	The K68 Trailer Lighting Control Module detects a fault on the trailer backup lamp control circuit.
Check Trailer Brake Lamps	The K68 Trailer Lighting Control Module detects a fault on the left and/or right trailer stop/turn lamp control circuits
{JL1} Check Trailer Wiring	The K67 Trailer Brake Control Module detects a fault on the trailer brake control circuit or the trailer was disconnected.
Lane Change Alert Off	Reminder to the user that lane change alerts are turned off anytime a trailer is detected.
Rear Cross Traffic Alert Off	Reminder to the user that rear cross traffic alerts are turned off anytime a trailer is detected.
Rear Park Assist Off	Reminder to the user that rear park assist is turned off anytime a trailer is detected.
Remember to turn On Tow/Haul Mode	Reminder to the user to turn ON Tow/Haul Mode when towing.
{JL1} Service Trailer Brake System	The K67 Trailer Brake Control Module detects a fault on the trailer brake control circuit.
Service Trailer Tire Monitor System	The K214 Trailer Tire Pressure Indicator Module detects one or more issues with the trailer tire pressure monitoring system.
Trailer Detected	The K68 Trailer Lighting Control Module detects a trailer has been connected to the X88B Tow Vehicle electrical Receptacle.

Trailering Message	Description
{JL1} Trailer Brakes Detected	The K67 Trailer Brake Control Module detects a trailer with trailer brakes has been connected to the X88B Tow Vehicle electrical Receptacle.
Trailer Disconnected Check Connection	The K68 Trailer Lighting Control Module detects a trailer has been disconnected from the X88B Tow Vehicle electrical Receptacle.
Trailer Tire Pressure High	The K214 Trailer Tire Pressure Indicator Module detects one or more of the trailer tire pressures is high.
Trailer Tire Pressure Low	The K214 Trailer Tire Pressure Indicator Module detects one or more of the trailer tire pressures is low.
Trailer Tire Sensor Fault	The K214 Trailer Tire Pressure Indicator Module detects one or more of the trailer tire pressure sensors has a fault.
Trailer Tire Temperature High	The K214 Trailer Tire Pressure Indicator Module detects one or more of the trailer tire temperatures is too high.

Trailer Theft Detection (With U1D/UET Only)

Trailer theft monitoring can be turned ON and OFF through the vehicle Trailer App. When enabled, any time the trailer theft deterrent system is armed, the trailer lighting circuits are constantly monitored to determine if a trailer is connected for trailer theft deterrent purposes. With the key OFF, the K68 Trailer Lamp Control Module will randomly pulse the lighting circuits of the trailer to verify it is still connected by monitoring the voltage drop of the circuit. Depending on the configuration of the trailer lights, the trailer lights may randomly flash as part of the trailer theft deterrent function. These flashes correspond to when the K68 Trailer Lamp Control Module pulses the lighting circuits to ensure the trailer is still connected and is considered normal. If the trailer is disconnected while the trailer theft deterrent system is armed, the vehicle will flash the exterior lights and cycle the horn to alert of a trailer theft event. Refer to *Theft Systems Description and Operation 10-78* for more information on the content theft deterrent system.

Trailer Brakes (JL1)

The vehicle is equipped with the following trailer braking components:

- K160 Brake System Control Module
- K67 Trailer Brake Control Module
- S76 Trailer Brake Control Switch
- Trailer Brake Driver Information Center Display

Trailer Brake Circuits

- Circuit 2223 is the trailer brake apply signal circuit. The K160 Brake System Control Module receives vehicle braking force data and/or data from the application of the manual trailer brake slide lever. The brake system control module responds by applying the appropriate amount of pulse width modulated (PWM) voltage based on the amount of trailer brake application desired. The K67 Trailer Brake Control Module responds to the signal circuit by applying the appropriate amount of PWM voltage to the trailer auxiliary control circuit 47.
- Circuit 2224 is the trailer brake enable signal circuit. The K160 Brake System Control Module applies voltage to the enable circuit anytime a LIN data communication fault is not present, a trailer is connected, and the vehicle brakes are being applied. The enable circuit must have voltage applied to it before the K67 Trailer Brake Control Module applies the appropriate amount of pulse width modulated (PWM) voltage to the trailer auxiliary control circuit 47.
- Circuit 2733 is the brake system control module LIN bus 2 circuit. The K160 Brake System Control Module, K67 Trailer Brake Control Module, and the S76 Trailer Brake Control Switch all communicate through the brake system control module LIN bus 2 circuit. If the LIN bus has a fault on the circuit, trailer braking will be disabled until the fault is repaired.
- Circuit 47 is the trailer auxiliary control circuit. The K67 Trailer Brake Control Module responds to signal circuit 2223 and enable circuit 2224 by applying the appropriate amount of PWM voltage to the trailer auxiliary control circuit. A properly functioning trailer will apply the appropriate amount of braking force to the brakes of the trailer.

The Trailer Brake Control System is compatible with two types of Trailer Brake Systems as listed below:

1. **Electric Brakes** A controlled electrical output signal energizes an electric-magnet/lever arm assembly that directly actuates the brake mechanism. The GDS name for this system is “Electromagnetic Brakes”.
2. **Electric Over Hydraulic Brakes** A controlled electrical output signal energizes a remote, trailer mounted hydraulic pump to build brake pressure in a closed hydraulic system on the trailer. The

hydraulic fluid pressure actuates the brake mechanism. The GDS name for this system is “Electrohydraulic Brakes”.

Trailer Brake Output Versus Trailer Brake Type

- The trailer brake system characterizes the trailer brakes as either Electric Brake or Electric Over Hydraulic Brake automatically. This characterization may be affected by the number, type, and age of the trailer brake magnets, as well as any other devices installed on the trailer brakes (i.e. adapters for Electric Over Hydraulic brake functionality).
- The trailer brake system is fully operational with either characterization.
- Sliding the manual trailer brake apply lever will produce output at zero speed for either characterization.

The user gain allows the driver to adjust the amount of trailer brake output to match the trailer load and road surface. The controller determines the desired trailer brake output and provides a control signal to the K67 Trailer Brake Control Module (TBPM). The K67 Trailer Brake Control Module amplifies the signal and provides the output required to activate the Electric or Electric Over Hydraulic trailer brakes.

The trailer brake control can support up to a maximum of four axles with electric trailer brakes (8 brake magnets).

Connecting a trailer that is not compatible with the trailer brake system may result in reduced or complete loss of trailer braking. There may be an increase in stopping distance or trailer instability which could result in personal injury or damage to the vehicle, trailer or other property. An aftermarket controller may be available for use with incompatible trailer brake systems.

To determine the type of brakes on your trailer and the availability of controllers, check with your trailer manufacturer or dealer. Do not power up an aftermarket controller with the factory brake controller at the same time.

Trailer Brake Control Panel

The S76 Trailer Brake Control Switch contains the trailer gain and manual apply switches. It is located in the vehicle center stack. Refer to the owner’s manual for more information on the location. The control panel and switches allows you to adjust the amount of output, referred to as trailer gain, available to the Electric or Electric Over Hydraulic brakes. It also allows you to manually apply the trailer brakes. The trailer brake control switch is used along with the trailer brake display page on the driver information center to adjust and display power output to the trailer brakes.

Manual Trailer Brake Apply

The manual trailer brake apply lever is located on the S76 Trailer Brake Control Switch and is used to apply the trailer’s Electric or Electric Over Hydraulic brakes independent of the vehicle’s brakes. This lever is used in the trailer gain adjustment procedure to properly adjust the power output to the trailer brakes.

Sliding the lever will apply only the trailer brakes. The power output to the trailer is indicated in the trailer brake display page in the Driver Information Center (DIC). If the vehicle’s service brakes are applied while using the manual trailer brake apply lever, the trailer brake control output power will be the greater of the two.

The trailer and the vehicle’s brake lamps will come on when either the vehicle’s braking or manual trailer brakes are applied.

Trailer Brake Gain Adjustment

Trailer gain should be set for a specific trailering condition and must be adjusted any time vehicle loading, trailer loading or road surface conditions change. It is important to re-adjust trailer gain any time the tow vehicle, trailer loading or road surface conditions change or if you notice trailer wheel lock-up at any time while you are towing.

Setting the trailer gain properly is needed for the best trailer stopping performance. A trailer that is over-gained may result in locked trailer brakes. A trailer that is under-gained may result in not enough trailer braking. Both of these conditions may result in poor stopping and stability of the vehicle and trailer.

Trailer Gain Adjustment Procedure

- Adjust trailer gain in 0.5 step increments up to 10 gain setting by using the gain adjustment +/− buttons on the trailer brake control panel switch. Pressing and holding a gain button will cause the trailer gain to continuously increment or decrement. To turn the output to the trailer off, set the gain to zero.
- Drive the tow vehicle and trailer combination on a level surface representative of the towing condition and free of traffic at approximately 32–40 km/h (20–25 mph) and fully apply the manual trailer brake apply lever mechanism located on the trailer brake control panel switch. Adjusting the trailer gain at slower speeds may result in an incorrect gain setting.
- Adjust the trailer gain to just below the threshold of trailer wheel lock-up . Trailer wheel lock-up may not occur if towing a heavily loaded trailer. In this case, adjust the trailer gain to the highest allowable setting for the towing condition.

Trailer Brake Gain and Output Display
This display menu can be accessed by scrolling through the DIC menu, or any time the trailer gain +/− button is depressed, or the manual trailer brake apply lever is actuated. The trailer output is displayed from 0 to full output and indicates the output power provided to the trailer brakes, relative to the gain setting.

After the electrical connection is made to a trailer equipped with electric brakes or electric over hydraulic brakes, the TRAILER CONNECTED message will be displayed momentarily on the DIC. The Trailer Brake Display Page can be selected on the DIC showing TRAILER GAIN and OUTPUT, after all vehicle related service messages are acknowledged by the driver. Depending on which instrument panel cluster is in the vehicle, the DIC may display dashed lines, a greyed out display, or it may be blank signifying a disconnected trailer or a trailer brake fault condition.

Tow/Haul Mode

Tow/Haul mode is selected through the Ride Control Switch for hauling heavy loads to provide increased performance and vehicle control. Tow/Haul Mode adjusts the transmission shift pattern, steering, and Electronic Stability Contol (ESC) performance.

If the vehicle is turned off with Tow/Haul mode active and then restarted within four hours or less Tow/Haul will remain active. Otherwise, the vehicle will start in Normal mode.

If equipped with a diesel engine, exhaust braking is automatically activated when Tow/Haul mode is selected. The system will command down shifts to reduce vehicle speed when the brake is applied. The normal tow/haul shift pattern will return once the vehicle is on a low grade or when the accelerator pedal is pressed.

Trailer Brake Driver Information Center Indicators and Messages

Trailer Brake Detection
The K67 Trailer Brake Control Module constantly monitors the trailer auxiliary control circuit from Terminal C at the X88B Tow Vehicle electrical Receptacle. When a trailer is connected with trailer brakes, the K67 Trailer Brake Control Module senses the connection and alerts the driver with a Trailer Connected message. If the K67 Trailer Brake Control Module senses a fault, or the trailer becomes disconnected, the vehicle will alert the driver with a Check Trailer Wiring message.

The following indicators are used to inform the driver of several different conditions:

Trailer Connected
This message will be briefly displayed when a trailer with Electric or Electric Over Hydraulic brakes is first connected to the vehicle. This message will automatically turn off in about ten seconds. The driver can also acknowledge this message before it automatically turns off.

Check Trailer Wiring
This message will be displayed if:

- The system detects that a trailer with Electric or Electric Over Hydraulic brakes is connected to the vehicle and then the trailer harness becomes disconnected from the vehicle.
- The trailer connection is recognized initially and then a disconnect occurs while the vehicle is stationary. This message will automatically turn off in about thirty seconds. This message will also turn off if the driver selects to turn this message off or if the trailer harness is reconnected.
- A disconnect of the trailer wiring harness occurs while the vehicle is moving. The Check Trailer Wiring message will continue until the ignition is turned off. The message will also turn off if the driver selects to turn this message off or it the trailer harness is re-connected.
- There is an electrical fault in the wiring to the electric trailer brakes. The Check Trailer Wiring message will continue as long as there is an electrical fault in the trailer wiring. This message will also turn off if the driver acknowledges this message off.
- A poor connection at the 7–way connector may cause the Check Trailer Wiring message. Some aftermarket 7–way trailer side connector adapters or plugs may cause deformation or excessive wear to the vehicle’s trailer terminals. It is recommended that you use an OEM or Pollak heavy duty 7–way trailer side connector adapter.

Service Trailer Brake System
This message will be displayed when there is a problem with the trailer brake control system. The trailer brake system may not be fully functional, or may not be functioning at all. The trailer brake system is designed to provide trailer braking, if possible, even when faults prevent it from being fully functional. This reduced functionality includes:

1. Providing trailer braking when the master cylinder pressure or brake pedal switch are faulted.
2. Providing trailer braking when hill start assist and trailer sway control communication is faulted.
3. Providing trailer braking when certain manual trailer brake apply lever faults are present.

Trailer Tire Pressure Monitoring

Special Tools

- *EL-46079/J-46079* Tire Pressure Monitor Diagnostic Tool
- *EL-50448* Tire Pressure Monitor Sensor Activation Tool
- *EL-52641* Trailer Presence Simulator Tool

For equivalent regional tools, refer to [Link target (target-id 59410-) not found] .

The Trailer Tire Pressure Monitor System is designed to monitor the pressure of the trailer tires, and warn the driver when a low pressure condition exists. Four Trailer Tire Pressure Monitor System sensors may be provided in the vehicle's glove box as an accessory when equipped. The system can accommodate a trailer with up to (6) tires if additional sensors are purchased from the dealership. Also, the system can be paired with up to (5) individual trailers. The sensors must be mounted onto each tire and wheel assembly, and the sensors must be learned by the vehicle by following the learning procedure as shown in the Trailering App section of this manual. For sensor installation assistance, please contact your trailer service center or tire service center. The Trailer Tire Pressure Monitor System sensors monitor the air pressure in the trailer tires and transmit the trailer tire pressure readings to a receiver located in the vehicle. The trailer tire pressure sensors can transmit up to 23 feet (7 meters) from the hitch receiver of the vehicle. The tire pressure values can be viewed in the trailering app in the vehicle's center stack.

Trailering Diagnostic Tools

In some situations when diagnosing trailer tire pressure monitoring, trailer lighting, or integrated trailer brakes, it may be necessary to connect the vehicle to a trailer to confirm proper operation. Performing this activity may prove difficult in the service environment since trailers are not often available for diagnostic use, may have existing electrical issues outside of the issues a technician is attempting to diagnose, or simply may be too unwieldily to connect for diagnosis.

With all this in mind, it may be helpful to build or create a tool that can be plugged into the vehicle's trailer connector and simulate a connected trailer. This tool would include park lamps, stop lamps, and a reverse lamp for lighting and trailer tire pressure monitoring diagnosis. It can be expanded to include trailer brake magnets to diagnose integrated trailer brake concerns. Also, an additional lamp can be included to diagnose the B+ circuit to the trailer.

Trailer issues are NOT covered under warranty, but these tools may be used to verify the vehicle is functioning properly and to help the customer understand and correct any trailer related issues if they so choose.

Available Trailer Presence Simulator Tool

Illustration	Tool Number/Description
 5166189	*EL-52641* Trailer Presence Simulator Tool

Simulated Trailer Lighting

Creating a tool to simulate a connected trailer can be used to diagnose issues with trailer lighting, trailer brake (if equipped), the Trailering App (if equipped), and trailer tire pressure monitoring system (if equipped).

If the vehicle is equipped with a K68 Trailer Lamp Control Module (U1D/UET), the module monitors the current on the lighting circuits to determine a trailer has been connected. The Trailer Lamp Control Module pulses current on the trailer lighting circuits every 42 minutes to monitor for a connected trailer. If a current draw greater than 55mA is detected, the Trailer Lamp Control Module recognizes this as a connected trailer. This will enable any trailer lighting controlled by the Trailer Lamp Control Module. The Center Stack Module will also use this trailer detection as a cue to enable the Trailering App and trailer tire pressure monitoring functions.

Creating a Simulated Trailer Lighting Tool
Parts needed:

- 7-way RV trailer connector Qty: 1

Note: The combination trailer stop/turn, and backup lamps must draw at least 55mA of total current to be detected as a trailer. Some LED combination lamps will not draw enough current. If an LED combination lamp is used, make sure it draws at least 55mA. A load resistor can be added to the circuit if necessary to obtain the correct load.

- Combination trailer park/stop/turn lamp (greater than 55mA drawn when on) Qty: 2
- Reverse lamp Qty: 1

- 12 gauge wire and terminals/connectors Qty: As needed
- 18 gauge wire and terminals/connectors Qty: As needed
- Mounting board Qty: 1

1. Connect a 12 gauge wire to the ground terminal of the 7-way trailer connector and the ground circuit of each combination trailer park/stop/turn lamp and the reverse lamp in parallel.
2. Connect an 18 gauge wire between the park lamp terminal of the 7-way trailer connector and the park lamp circuit of each combination trailer park/stop/turn lamp in parallel.
3. Connect an 18 gauge wire between the left turn/stop lamp terminal of the 7-way trailer connector and the turn/stop lamp circuit of left trailer park/stop/turn lamp.
4. Connect an 18 gauge wire between the right turn/stop lamp terminal of the 7-way trailer connector and the turn/stop lamp circuit of right trailer park/stop/turn lamp.
5. Connect an 18 gauge wire between the reverse lamp terminal of the 7-way trailer connector and the reverse lamp.

Note: A combination trailer lighting and trailer brake tool can be created on the same mounting board.

6. Mount the left combination trailer park/stop/turn lamp, right combination trailer park/stop/turn lamp, and reverse lamp to the mounting board.
7. Plug the 7-way RV trailer connector to the vehicle and verify functionality.

Simulated Trailer Brakes

Creating a tool to simulate trailer brakes can be used to diagnose trailer brake issues.

The trailer brake control system is compatible with two types of trailer brake systems: electromagnetic or electro-over hydraulic trailer brakes. The Brake System Control Module must determine which type of brakes the trailer is equipped with so the system can output correctly for the trailer's brake system. Because the Brake System Control Module has to determine the type of trailer brake system that is being used, it can be sensitive to a variety of trailer wiring issues.

The Trailer Brake Control Module continuously sends a test pulse out on the trailer brake control circuit (circuit 47) to determine if a trailer with trailer brakes has been connected. How the pulse reacts when a trailer is connected is how the Trailer Brake Control Module determines which type of braking system the trailer is equipped with.

Even after the system detects the trailer, Trailer Brake Control Module will continue to send this test pulse on the trailer brake control circuit, which now is monitoring both the truck and trailer circuitry. The trailer brake control circuit continues to be monitored for any faults so the driver can be notified of any issues that may occur within the truck or trailer, as well as, to determine when the trailer is disconnected from the truck.

Creating a Simulated Trailer Brake Tool
Parts needed:

- 7-way RV trailer connector Qty: 1
- Electric trailer brake magnets Qty: 2, 4, 6, or 8
- Reverse lamp Qty: 1
- Mounting board Qty: 1
- 12 gauge wire and terminals/connectors Qty: As needed

1. Connect a 12 gauge wire to the ground terminal of the 7-way trailer connector.
2. Connect a 12 gauge wire to the brake controller output terminal of the 7-way trailer connector.

Note: The trailer brake magnets must be connected in parallel. Connecting in series will create an excessive current draw and disable the trailer brake system.

3. Connect the trailer brake magnets to the 12 gauge wires from the 7-way trailer connector in parallel.

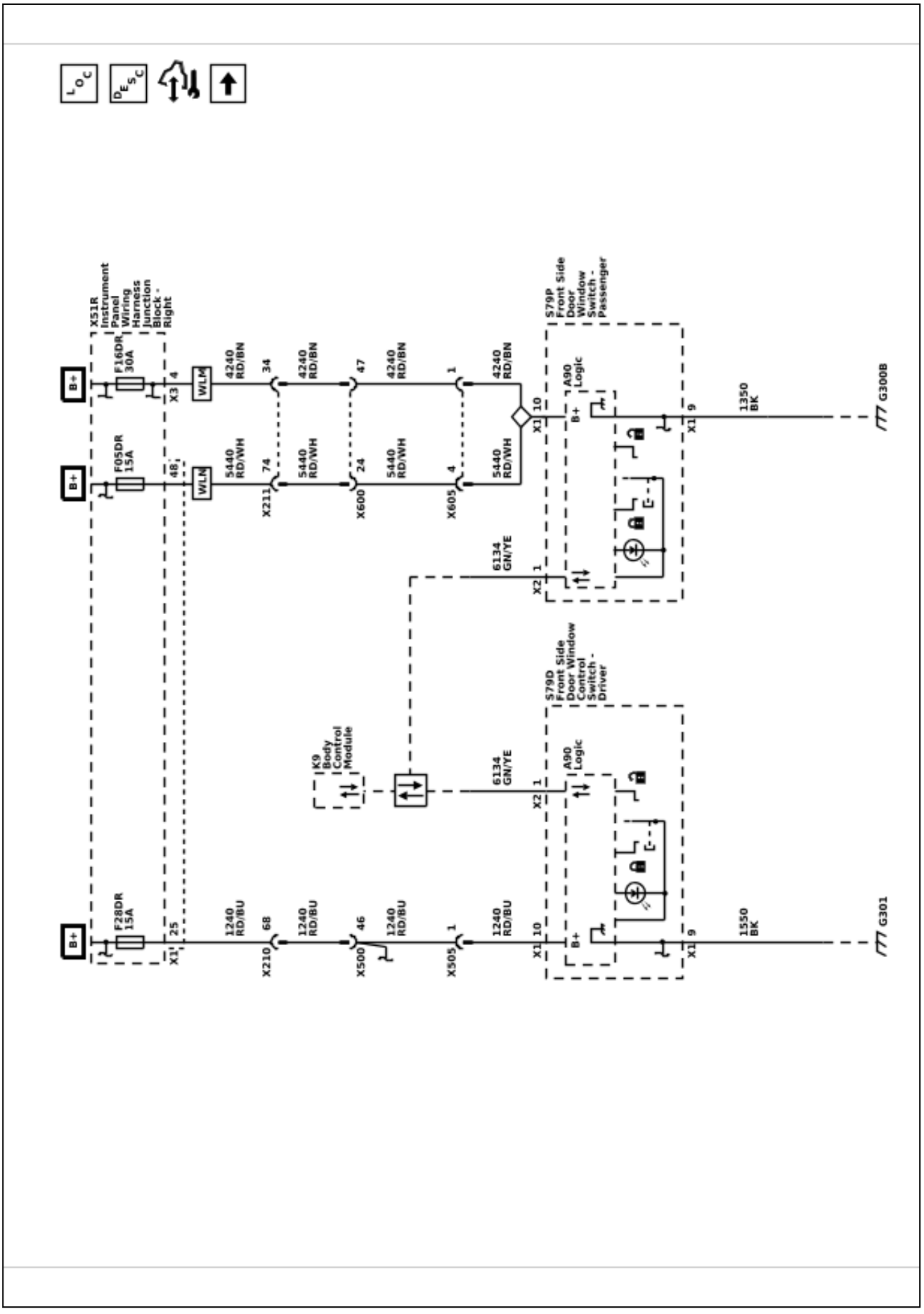
Note: A combination trailer lighting and trailer brake tool can be created on the same mounting board.

4. Mount the trailer brake magnets to the mounting board.
5. Plug the 7-way RV trailer connector to the vehicle and verify functionality.

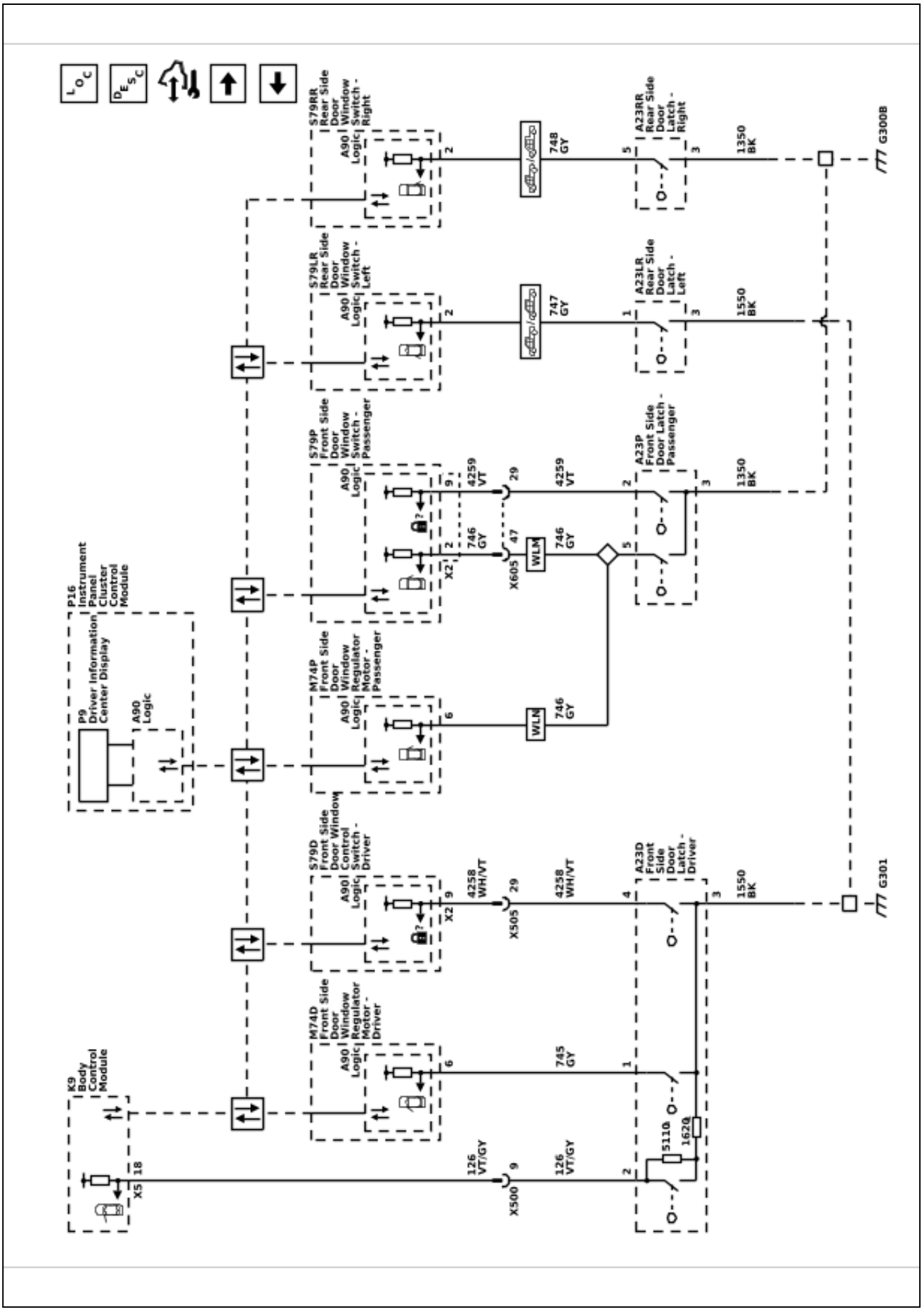
Vehicle Access

Schematic and Routing Diagrams

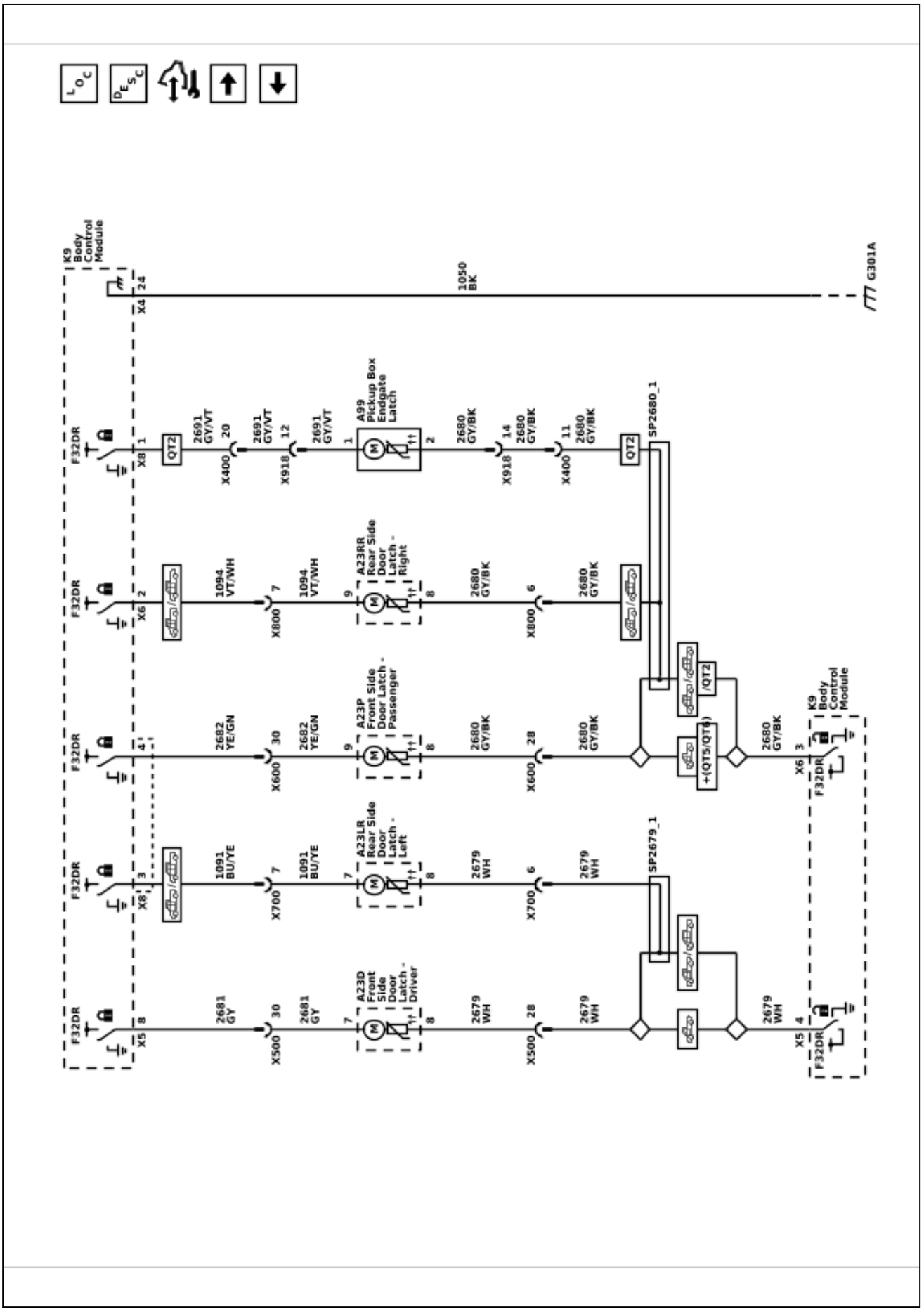
Door Lock/Indicator Schematics (Door Lock Switches and Indicators)



Door Lock/Indicator Schematics (Ajar Switches and Lock Status)

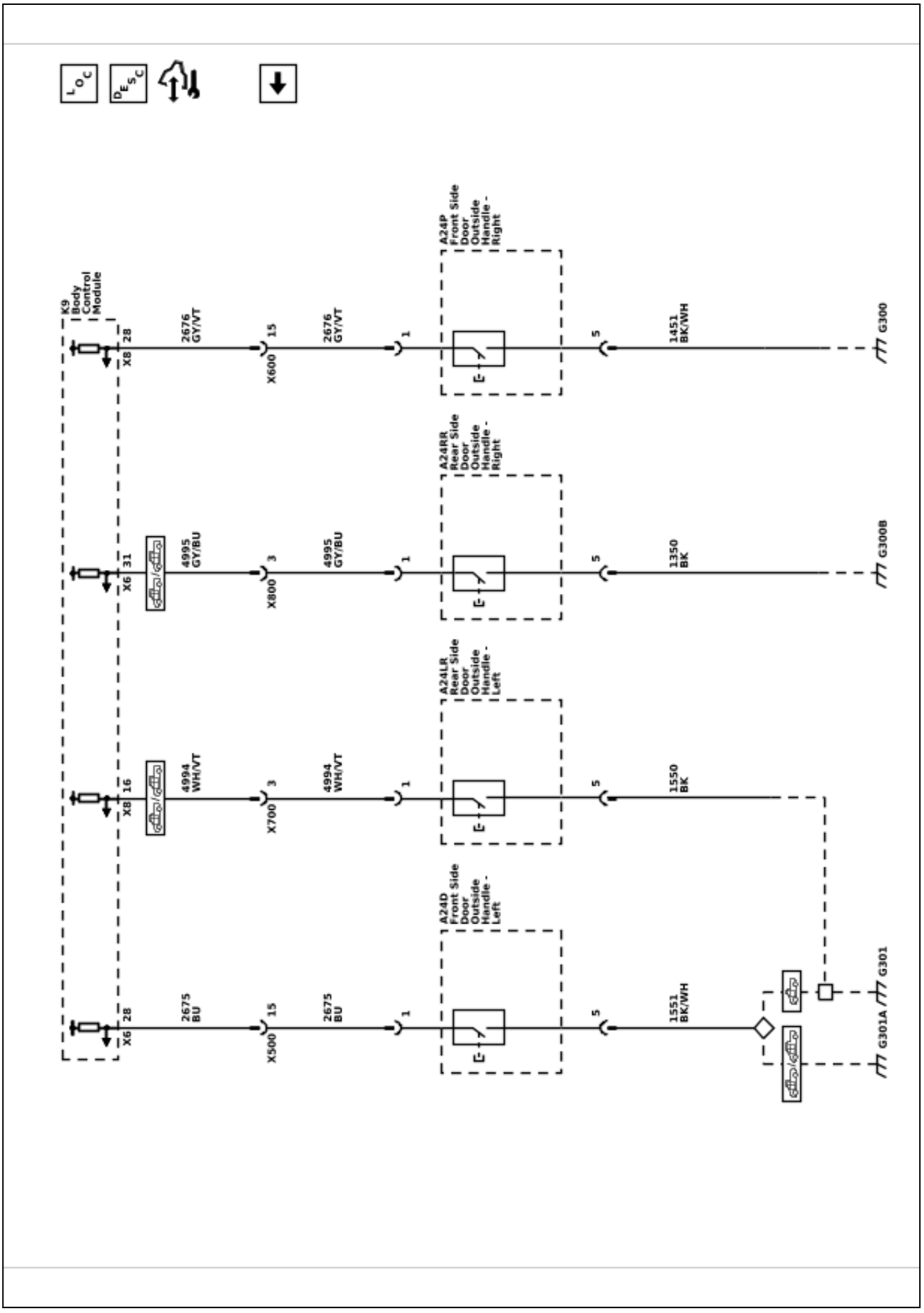


Door Lock/Indicator Schematics (Actuators)

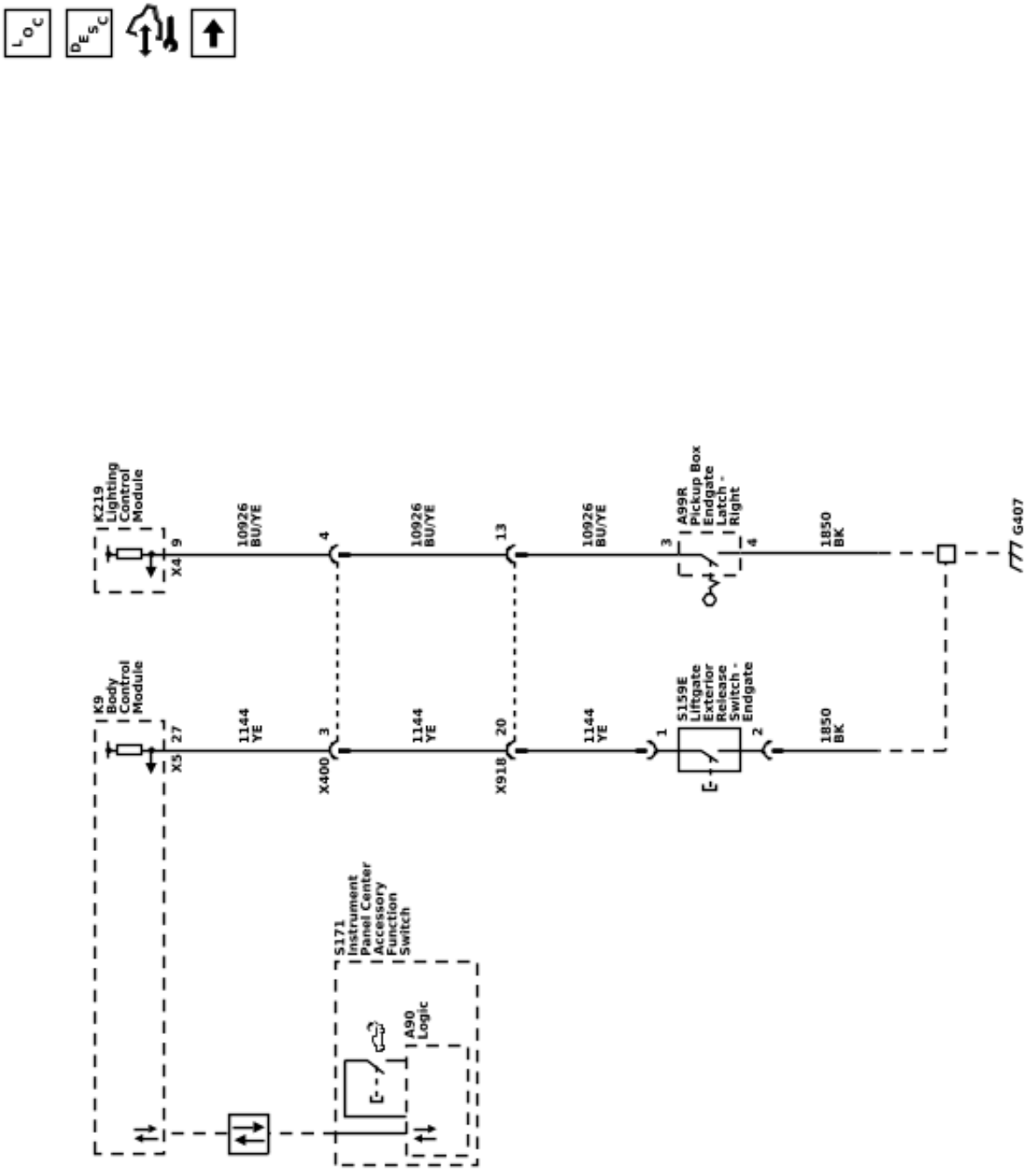


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Door Lock/Indicator Schematics (Door Handle Switches)

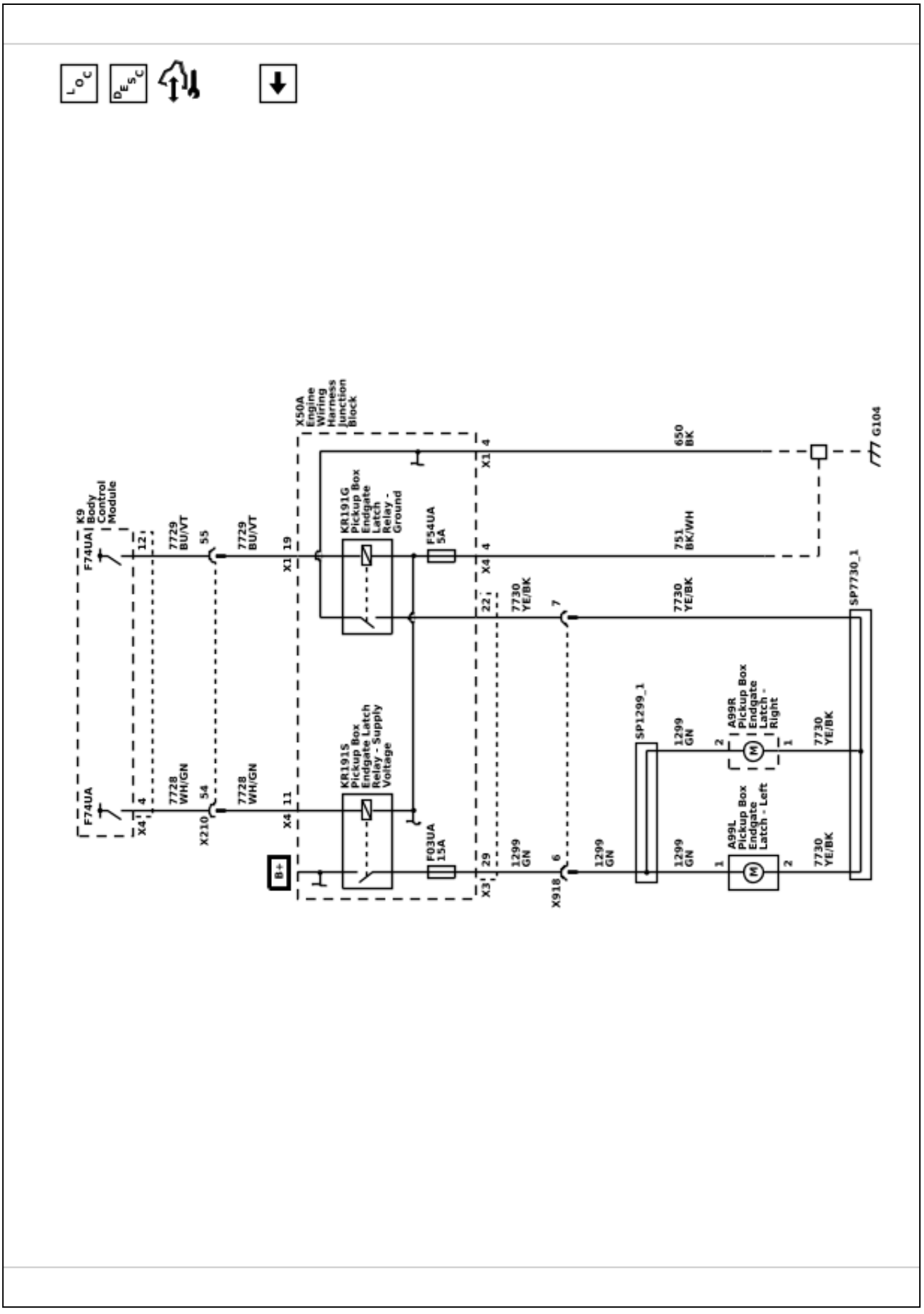


Release Systems Schematics (Endgate Switches)

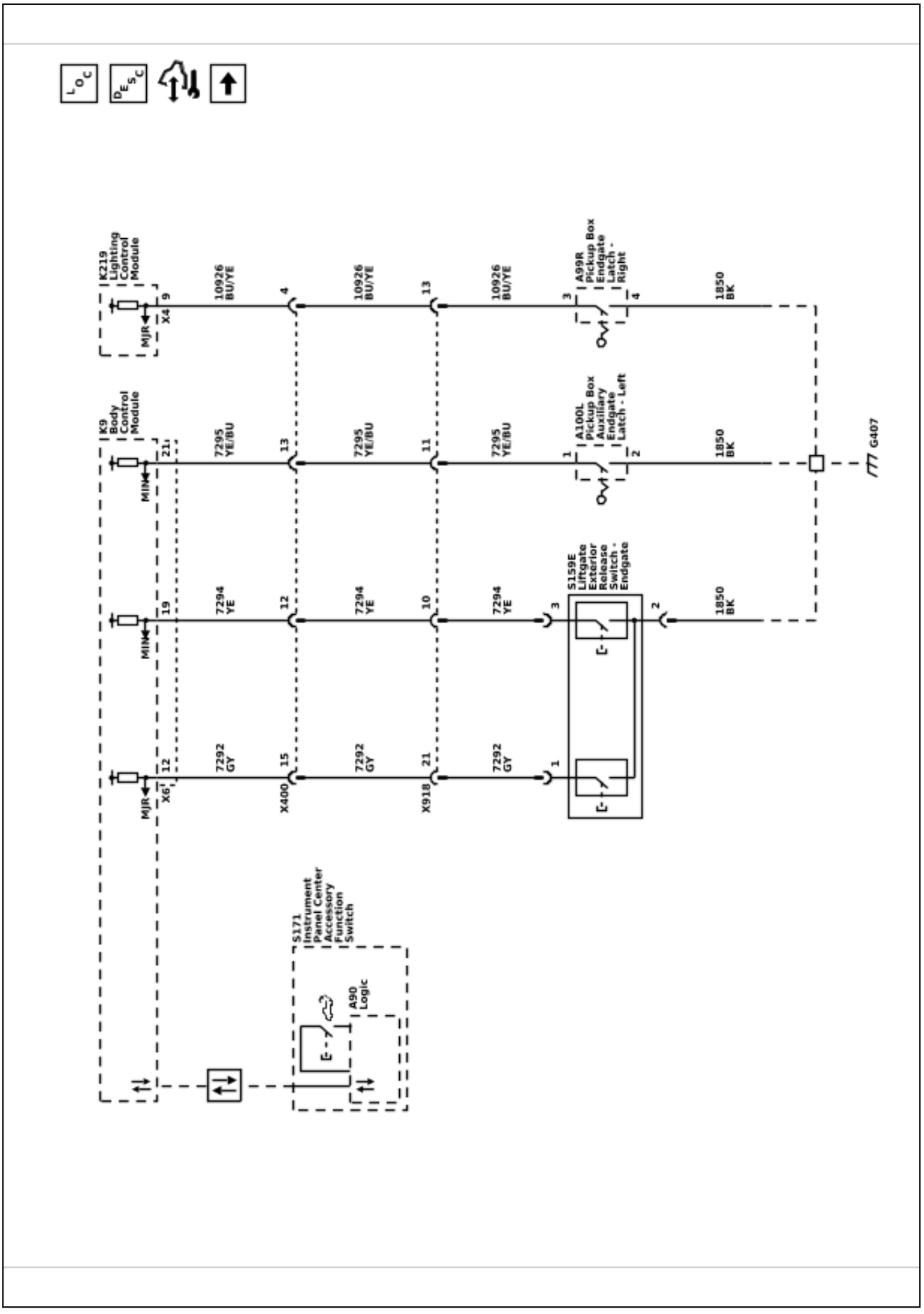


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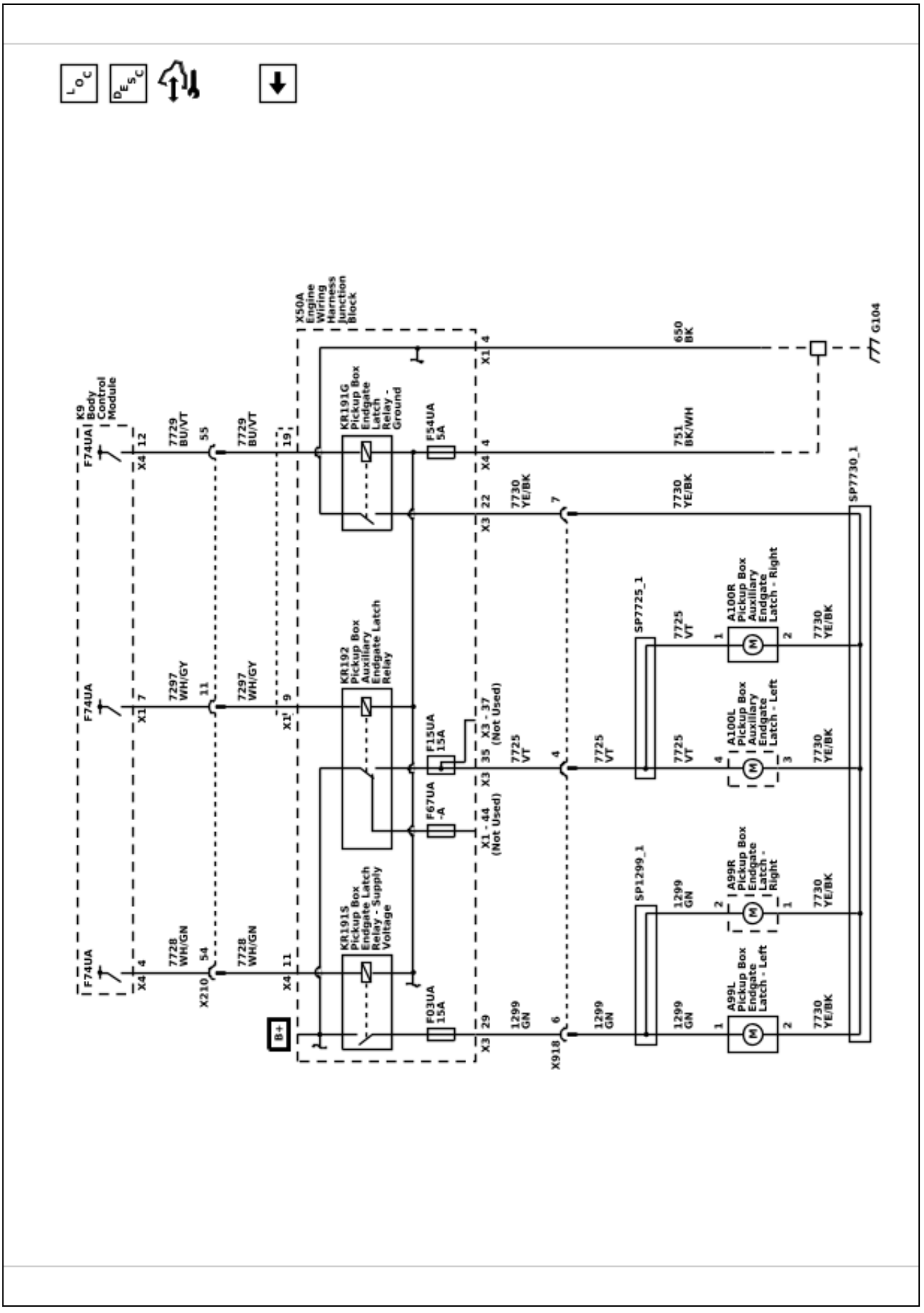
Release Systems Schematics (Endgate and Auxiliary Endgate Release)



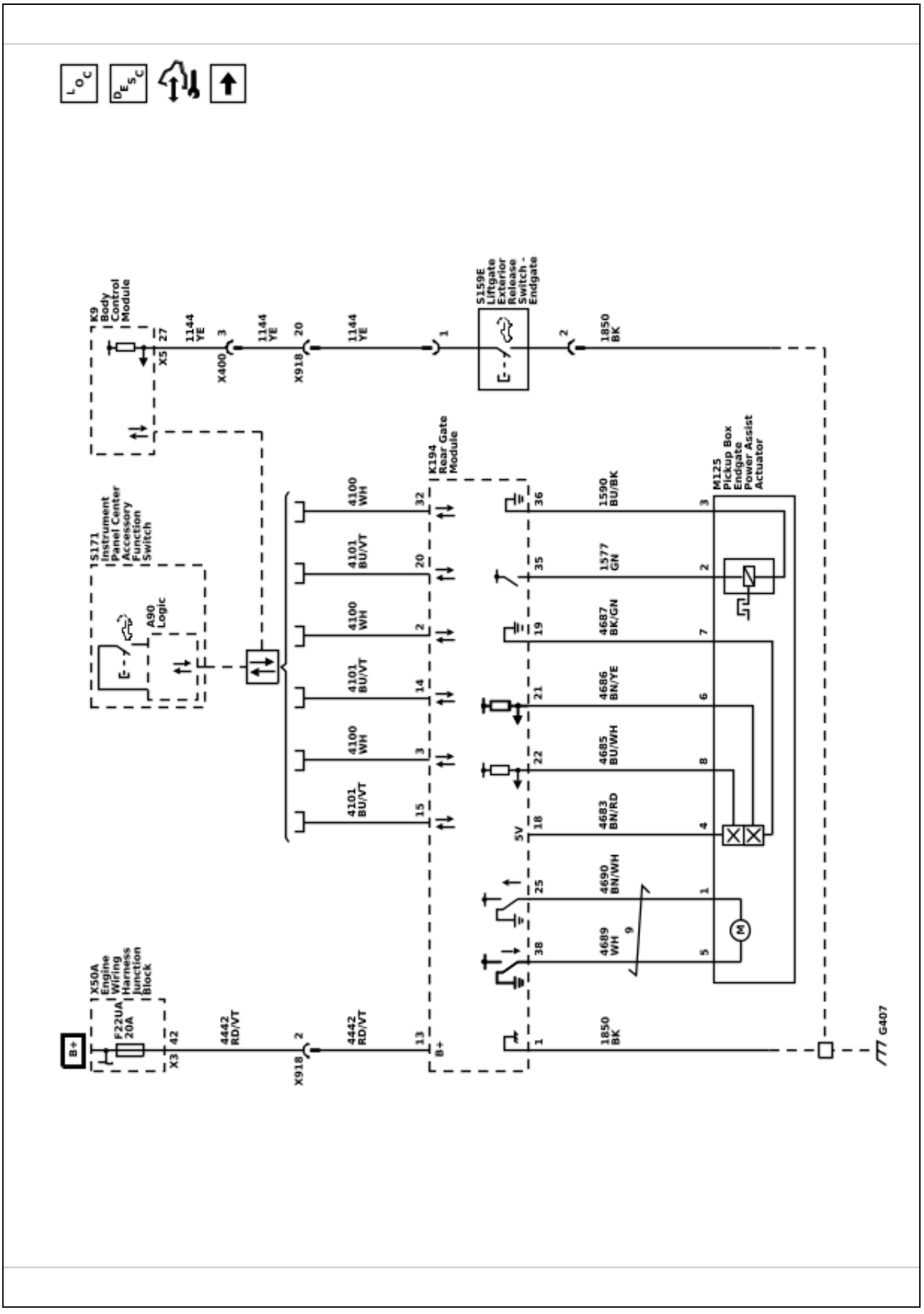
Release Systems Schematics (Endgate Switches)



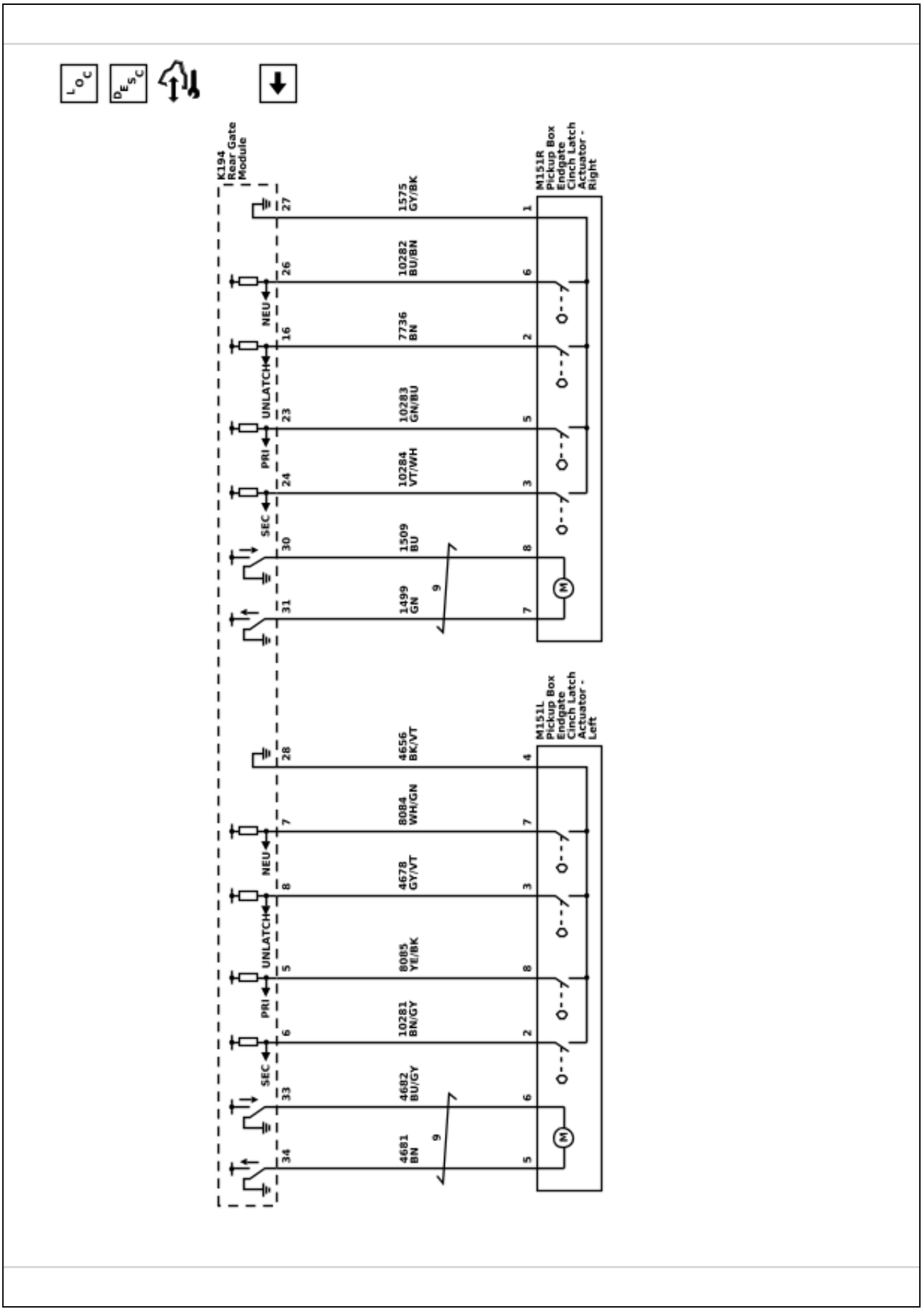
Release Systems Schematics (Endgate and Auxiliary Endgate Release)



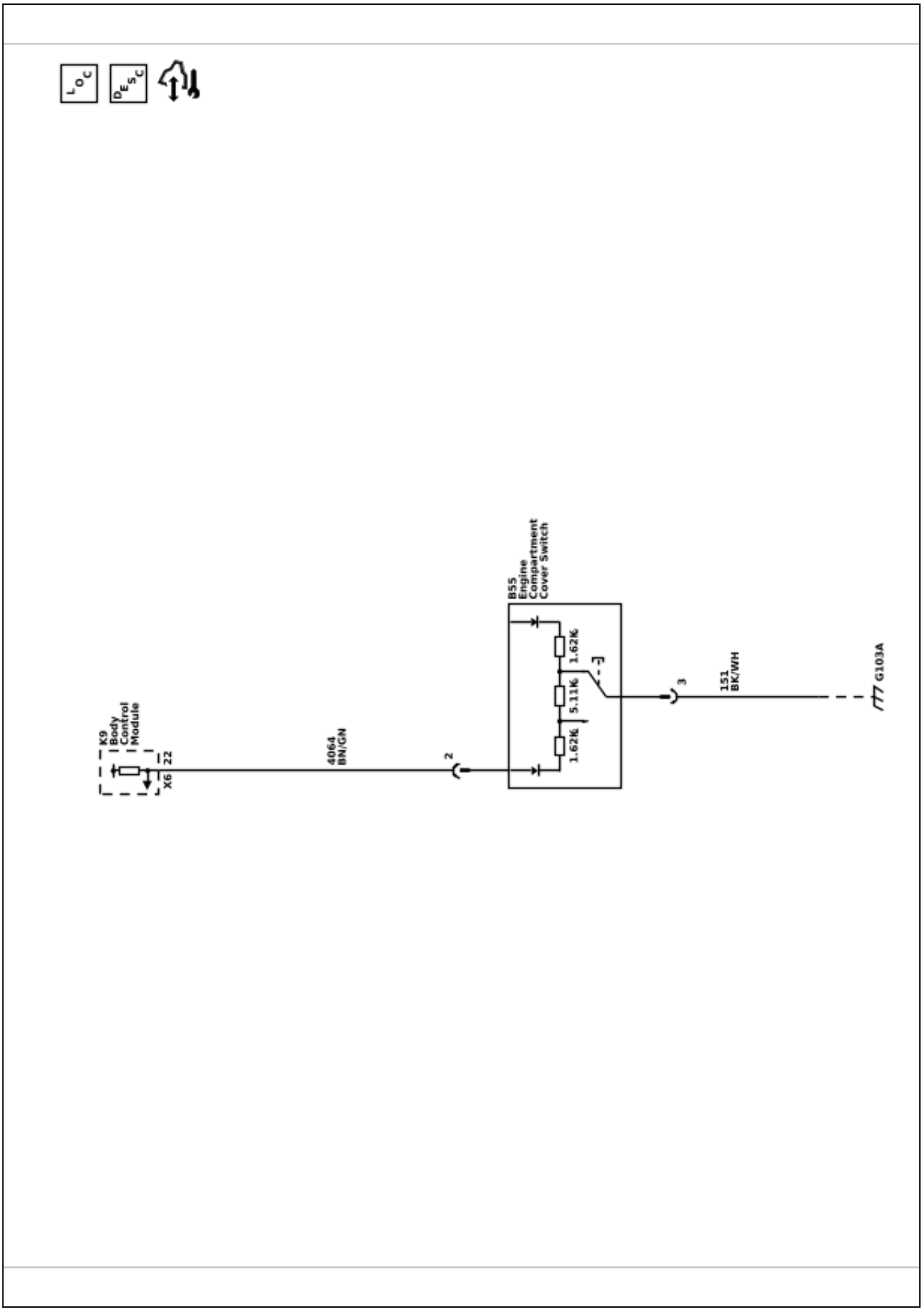
Endgate Schematics (Power Endgate Controls (QT6))



Endgate Schematics (Power Endgate Latches (QT6))



Hood Latch Schematics (Engine Compartment Cover Switch)



Description and Operation

Door Ajar Indicator Description and Operation

Door Ajar Indicator System Components

The door ajar indicator system consists of the following components:

- Body control module (BCM)
- Instrument cluster
- Driver door latch
- Passenger door latch
- Left rear door latch
- Right rear door latch
- Driver window motor
- Passenger window motor
- Left rear side door window switch
- Right rear side door window switch

Driver and Passenger Door Ajar

The window motor supplies a 12V signal to the door ajar switch within the door latch, when a door is open the door ajar switch closes pulling the 12V signal low. When the window motor detects the drop in the 12V signal circuit, it will then communicate this status to the BCM via local interconnect network (LIN) bus. The BCM communicates with the instrument cluster via serial data message. The instrument cluster, upon receipt of this serial data message, will illuminate the door ajar indicator and also send a serial data message to the radio to activate the door ajar audible warning when the vehicle speed is greater then 8 km/h (5 mph).

Rear Doors Ajar

The rear side door window switches each provide a 12V signal to their respective door ajar switch signal circuits. The rear door ajar switches are integral to each rear door latch assembly. When a rear door is opened, the normally open door ajar switch closes. With the door ajar switch closed, ground is provided to the door ajar switch signal circuit and the voltage within the signal circuit drops. The rear side door window switches will detect the voltage drop and will send a serial data message to the body control module which will then send a message to the instrument cluster to command the door ajar message

Endgate Description and Operation (QT6)

System Description

The power endgate system consists of the following components:

- Rear gate module
- Pickup box endgate power assist actuator
- Pickup box endgate position sensor (part of the power assist actuator)
- Interior pickup box endgate control switch (Part of the Instrument panel multifunction switch)
- Exterior pickup box endgate control switch
- Right pickup box endgate latch assembly
- Left pickup box endgate latch assembly
- Keyless entry transmitter
- Remote control door lock receiver

Operation

The power endgate can be commanded to power open by the following methods:

- Pressing the interior pickup box endgate control switch on the center stack
- Pressing the touch pad on the exterior endgate handle (vehicle doors must be unlocked)
- Pressing the endgate button on the RKE transmitter twice and holding until the endgate latches release

The power endgate can be commanded to power close by the following methods:

- Pressing and holding the interior pickup box endgate control switch on the center stack until the endgate is fully closed and latched
- Pressing the touch pad on the exterior endgate handle
- Pressing the endgate button on the RKE transmitter twice and holding until the endgate is fully closed and latched
- Lifting the tailgate at least 10 cm (4 in) above the full close position and holding momentarily

The vehicle must be in Park for any of the power tailgate functions to operate.

The rear gate module will respond to a request by commanding the left and right pickup box endgate latches to release the endgate and activate the pickup box endgate power assist actuator and lower the endgate or to raise and cinch the endgate closed.

Power Latch

The rear gate module continuously monitors power endgate operation and calculates its location and direction of travel from an endgate position sensor (part of the power assist actuator). One input returns the position of the endgate relative to the x-axis and y-axis. The rear gate module then uses these 2 inputs together to calculate its angle relative to the endgate.

The left and right pickup box endgate latches are bi-directional motors and latch or unlatch operation is the result of the direction of the motor rotation. The rear gate module controls the left and right pickup box endgate latches through the control circuits by supplying power and ground in the appropriate polarity. The motor control circuits are monitored by the rear gate module prior to activation for a high or low condition and during motor operation for an insufficient current flow condition. The ratchet, pawl and sector switches are part of the left and right pickup box endgate latches and are used by the rear gate module to determine the state of the latch during the process of latching or unlatching. Each of the latch switch signal circuits are supplied battery voltage and monitored within the rear gate module. The latch switches share a common low reference circuit from the rear gate module and when the switch contacts close the signal circuit goes low and the rear gate module determines the switch to be active. The ratchet, pawl and unlatch switches are inactive when the endgate is closed and will transition to active as the endgate is opened. The sector switch will be inactive when the endgate is closed, during opening of the endgate the sector switch will change to active and back to inactive when the endgate is in the fully open position.

The exterior pickup box endgate control switch signal circuit is supplied battery voltage by the rear gate module. When the switch is pressed the contacts close and the signal circuit goes low, the rear gate module will detect the voltage drop and will command the endgate to release and lower or to power raise the endgate to the closed position.

For vehicles without the optional passive keyless entry, when the exterior pickup box endgate control switch is pressed, the rear gate module will check the status of the vehicle door locks by sending a serial data message to the body control module requesting the door lock status. If the vehicle doors are locked, the rear gate module will ignore the signal from the exterior pickup box endgate control switch. If the vehicle doors are unlocked, the rear gate module will permit the endgate to unlatch and power open when the exterior pickup box endgate control switch is pressed.

For vehicles with the optional passive keyless entry system, the keyless entry control module monitors the proximity of the keyless entry transmitter. If the exterior pickup box endgate control switch is pressed and the keyless entry transmitter is within range, the keyless entry control module will send a serial data message to the rear gate module indicating the presence of the keyless entry transmitter and the rear gate module will permit the endgate to unlatch and power open. If the doors are locked and the keyless entry transmitter is not within range, the rear gate module will ignore the signal from the exterior pickup box endgate control switch.

Manual Endgate Operation

The endgate can be manually closed from the full-open position when the endgate is lifted in a continuous motion. If the endgate motion is stopped between the full-open and half-closed positions, the lift to close feature can engage and power close the endgate. If the touch pad is pressed during power operation, the endgate will stop and allow manual operation. The endgate must be held after stopping, or it will continue to open

Tailgate Release Unavailable Driver Information Center Message

Power Endgate Functions Disabled Without Setting DTCs

The driver information center displays Tailgate Release Unavailable when a thermal inhibit occurs in the latch or drive unit or the position count is out of range.

The power endgate functions will be restored by performing the following actions:

- Closing the endgate which will reset the position counts
- Closing the endgate and removing the F20DL fuse for greater than 5 minutes

Power Endgate Functions Disabled With DTCs Current

The driver information center displays Tailgate Release Unavailable when the rear gate module control module detects a malfunction in the power endgate system and the system is disabled.

Endgate Description and Operation (QT5 Without MultiPro Tailgate)

Endgate Release System Components

- Body control module (BCM)
- Pickup box endgate control switch-interior (Part of the instrument panel multifunction switch)
- Pickup box endgate control switch-exterior
- Pickup box endgate unlatch actuator
- Pickup box endgate unlatch relay

Endgate Release Operation (Without MutiPro Tailgate Option)

Interior Endgate Release Switch
The body control module monitors the voltage level of the endgate unlatch signal circuit so that when the switch is pressed contacts within the switch closes providing a ground path for the endgate unlatch signal circuit, the voltage within the signal circuit is pulled low, the body control module will detect the voltage drop and if the passenger doors are unlocked, will energize the pickup box endgate unlatch relay.

Exterior Endgate Release Switch
The body control module monitors the status of the vehicle doors, if the doors are locked the body control module will ignore the request from the exterior pickup box endgate control switch. If the passenger doors have been commanded to unlock, pressing the exterior pickup box endgate control switch will close contacts within the switch and provide a ground path for the endgate unlatch signal circuit, the body control module will detect the voltage drop and will energize the pickup box endgate unlatch relay.

If the vehicle has been equipped with the passive keyless entry system and the keyless entry transmitter is within 3 feet (1 meter) of the endgate, pressing the exterior pickup box endgate control switch will also function in the same manner but without unlocking the passenger doors. Refer to *Keyless Entry System Description and Operation 10-58* for more information on the passive keyless entry system.

Pickup Box Endgate Unlatch actuator
When body control module receives a endgate release command from the exterior pickup box endgate control switch, the body control module applies brief pulse of voltage to the pickup box endgate unlatch relay control circuit, which energizes the coil side of the relay. The switch side of the pickup box endgate unlatch relay then momentarily closes, supplying a brief pulse of battery positive voltage to the pickup box endgate unlatch actuator. The pickup box endgate unlatch actuator is continuously grounded and when it receives the voltage pulse, it will become energized and the latch will activate releasing the endgate so that it may be manually lowered to an open position.

Endgate Description and Operation (QT5 With MultiPro Tailgate)

Endgate Release System Components

- Body control module (BCM)
- Pickup box endgate control switch-interior (Part of the instrument panel multifunction switch)
- Pickup box endgate control switch-exterior
- Left pickup box endgate latch
- Right pickup box endgate latch
- Left pickup box auxiliary endgate latch
- Right pickup box auxiliary endgate latch
- Left pickup box endgate latch relay
- Right pickup box endgate latch relay
- Left pickup box auxiliary endgate latch relay
- Right pickup box auxiliary endgate latch relay

Endgate Release Operation (With MutiPro Tailgate Option)

Key Fob Liftgate Release Switch
Press twice to open the major endgate. Refer to *Keyless Entry System Description and Operation 10-58* for more information on the passive keyless entry system.

Interior Endgate Release Switch
The body control module monitors the voltage level of the endgate unlatch signal circuit so that when the switch is pressed contacts within the switch closes providing a ground path for the endgate unlatch signal circuit, the voltage within the signal circuit is pulled low. The body control module will detect the voltage drop and if the passenger doors are unlocked, will energize the left pickup box endgate latch relay and right pickup box endgate latch relay which will cause the major endgate to release. When the switch is pressed the body control module will also send a serial data message to the lighting control module to pulse the tail lamps three times.

Exterior Endgate Release Switch
The body control module monitors the status of the vehicle doors, if the passenger doors have been commanded to unlock, pressing the appropriate exterior pickup box endgate control switch will close contacts within the switch and provide a ground path for the major or minor endgate unlatch signal circuit, the body control module will detect the voltage drop and will energize the appropriate pickup box endgate latch relays. When either switch is pressed the body control module will also send a serial data message to the lighting control module to pulse the tail lamps three times. If the vehicle doors are locked an exterior switch press will be ignored.

If the vehicle has been equipped with the passive keyless entry system and the keyless entry transmitter is within 3 feet (1 meter) of the endgate, pressing the exterior pickup box endgate control switch will also function in the same manner but without unlocking the passenger doors. If the vehicle doors are locked the first switch press will just pulse the tail lamps two times, the second switch press will release the gate and pulse the tail lamps three times. Refer to *Keyless Entry System Description and Operation 10-58* for more information on the passive keyless entry system.

Major Pickup Box Endgate
Note: The auxiliary pickup box endgate must be in the latched position before commanding the major pickup box endgate to release. The body control module will disable the major pickup box endgate release function if the auxiliary pickup box endgate is open or ajar.

When body control module receives a major endgate release command from the exterior pickup box endgate control switch, the body control module applies brief pulse of voltage to the left and right pickup box endgate latch relay control circuits, which energizes the coil side of the relays. The switch side of the left and right pickup box endgate latch relay then momentarily closes, supplying a brief pulse of battery positive voltage to the left and right pickup box endgate latches. The left and right pickup box endgate latches will become energized and the latches will activate releasing the major endgate so that it may be manually lowered to an open position.

Minor Pickup Box Endgate
When body control module receives a minor endgate release command from the exterior pickup box endgate control switch, the body control module applies brief pulse of voltage to the left and right pickup box auxiliary endgate latch relay control circuits, which energizes the coil side of the relays. The switch side of the left and right pickup box auxiliary endgate latch relay then momentarily closes, supplying a brief pulse of battery positive voltage to the left and right pickup box auxiliary endgate latches. The left and right pickup box auxiliary endgate latches will become energized and the latches will activate releasing the minor endgate so that it may be manually lowered to an open position.

The minor endgate may be equipped with an enable/disable feature to prevent the auxiliary endgate from being opened when a hitch or other equipment is installed that could damage the auxiliary endgate.

To disable the auxiliary endgate from opening: ensure that the remote key is within 1 meter (3 ft) of the rear bumper and then hold the minor endgate release switch at engate handle until the tail lamps flash. The tail lamps will flash to alert you that the auxiliary gate has been disabled. The major endgate can still be operated, but the auxiliary gate will not be able to be opened alone.

To enable the auxiliary endgate function, hold the upper touchpad on the handle for until the tail lamps flash. The auxiliary endgate can now be opened separately from the major tailgate.

Hood Ajar Indicator Description and Operation

Hood Ajar Switch

The hood ajar switch contains a multiplexed resistor. This resistor will vary the voltage seen by the engine control module by pulling down the applied voltage based on the position of the switch.

- The K9 Body Control Module (BCM) applies 5V to the Hood Status B Signal circuit and monitors the voltage to determine the position of the hood. When the hood is open, the switch is open and voltage remains high. When the hood is closed, the switch is closed and the voltage is pulled low.

The BCM uses the hood ajar switch as a content theft deterrent alarm trigger.

Hood Ajar Indicator/Message

When the hood is ajar, a message is displayed on the DIC or the hood ajar indicator will be illuminated.

Power Door Locks Description and Operation

Door Lock System Components

The power door lock system consists of the following components:

- Driver door lock switch
- Passenger door lock switch
- Left rear door lock switch
- Right rear door lock switch
- Driver front side door window control switch
- Passenger front side door window switch
- Driver front side door latch
- Passenger front side door latch
- Left rear side door latch
- Right rear side door latch
- Exterior door handle switches
- Body control module
- Lighting control module

Door Lock System Controls

The power door lock system can be controlled by any of the following:

- Power door lock switch activation
- Keyless entry lock or unlock command
- Delayed locking command
- Automatic door lock command
- When the OnStar® system is used to unlock the driver door

Door Lock and Unlock Operation

The driver or passenger front side door window control switch will monitor the voltage of their respective door lock switches, when the driver or passenger door lock switch is activated in the lock or unlock position the signal voltage will be pulled low, the corresponding front side door window control switch will detect the voltage drop in the signal circuit and will send a serial data message to the body control module requesting the door lock or unlock command.

The lighting control module will monitor the voltage of the left rear and right rear door lock switches, when the left rear or right rear door lock switch is activated in the lock or unlock position the signal voltage will be pulled low, the lighting control module will detect the voltage drop in the signal circuit and will send a serial data message to the body control module requesting the door lock or unlock command.

The body control module powers the reversible door latch actuators by providing battery positive voltage and ground to the appropriate lock and unlock control circuits of the door latches. Transitioning of the lock actuators to the lock or unlocked position depends upon which control circuits receive voltage and which control circuits receive ground. When the interior door lock switch is pressed, the body control module disables the functions of exterior door handle unlock switches preventing the unlatching of the vehicle doors until an the interior door unlock switch has been pressed or the appropriate button has been pressed on the keyless entry transmitter.

The body control module provides the driver and left rear door latches and fuel filler door lock actuator (If equipped with RPO N08) with the Unlatch Low Reference Circuit 1.

The body control module provides the passenger and right rear door latches and the liftgate latch (If equipped with RPO TB4) with the Unlatch Low Reference Circuit 2.

Each door latch, the fuel filler door lock actuator (If equipped with RPO N08), and the liftgate latch (If equipped with RPO TB4) is provided an Unlatch Control Circuit by the body control module.

When the drivers door is commanded to unlock the body control module will pull the Unlatch Low Reference Circuit 1 low and will pull the driver door and fuel filler lock actuator Unlatch/Unlock Control Circuits will be pulled high causing the driver door latch and fuel filler lock actuator to transition to the unlocked/unlatched state.

When all doors have been commanded to unlock the body control module will pull the Unlatch Low Reference Circuit 1 and Unlatch Low Reference Circuit 2 low and each door latch and the fuel filler lock actuator Unlatch/Unlock Control Circuits will be pulled high causing the doors and fuel filler lock actuator to transition to the unlocked/unlatched state.

When the TB4 liftgate is commanded to open the body control module, if the vehicle doors are unlocked, will pull the Unlatch Low Reference Circuit 2 low and the Rear Closure Unlatch Actuator Unlatch Control Circuit will be pulled high causing the TB4 liftgate Latch to activate and release the liftgate.

When the lock actuators are inactive the circuits are disconnected from power and ground and the circuits will have a floating voltage.

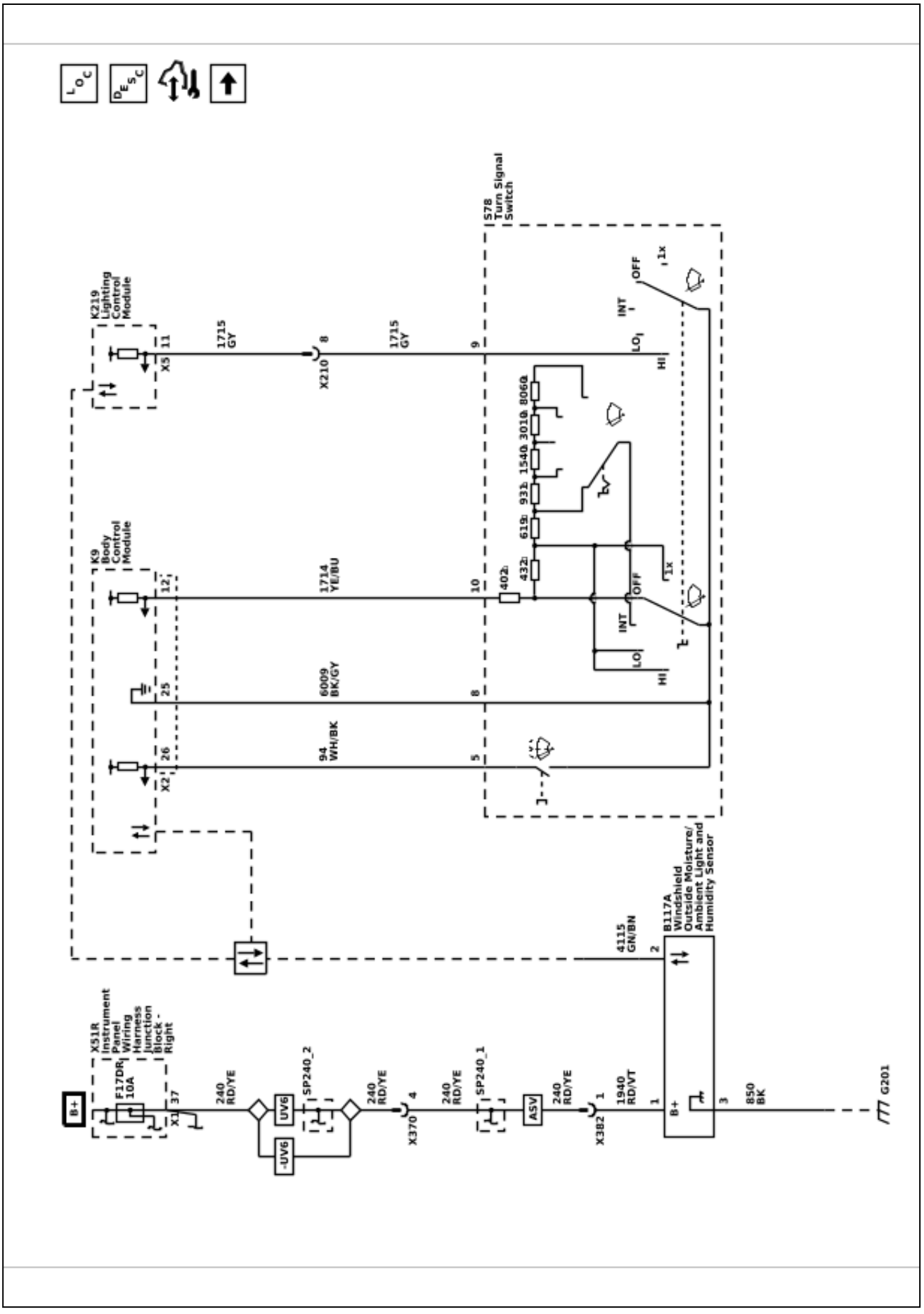
Passive Door Lock/Unlock Operation

The exterior door handle switch signal circuits provide inputs to the body control module when the exterior door handle switches are activated. These inputs allow the body control module to detect a door lock or a door unlock request. The body control module provides a 7 V signal to each exterior door handle switch via the door handle switch signal circuits. When a door handle switch is pressed, the switch closes and the voltage signal within the signal circuit is pulled to ground. The body control module will detect the voltage drop and a low frequency antenna will transmit a challenge to the keyless entry transmitter. If the challenge is met, the keyless entry transmitter will respond, and the body control module will command the door(s) to be locked or unlocked

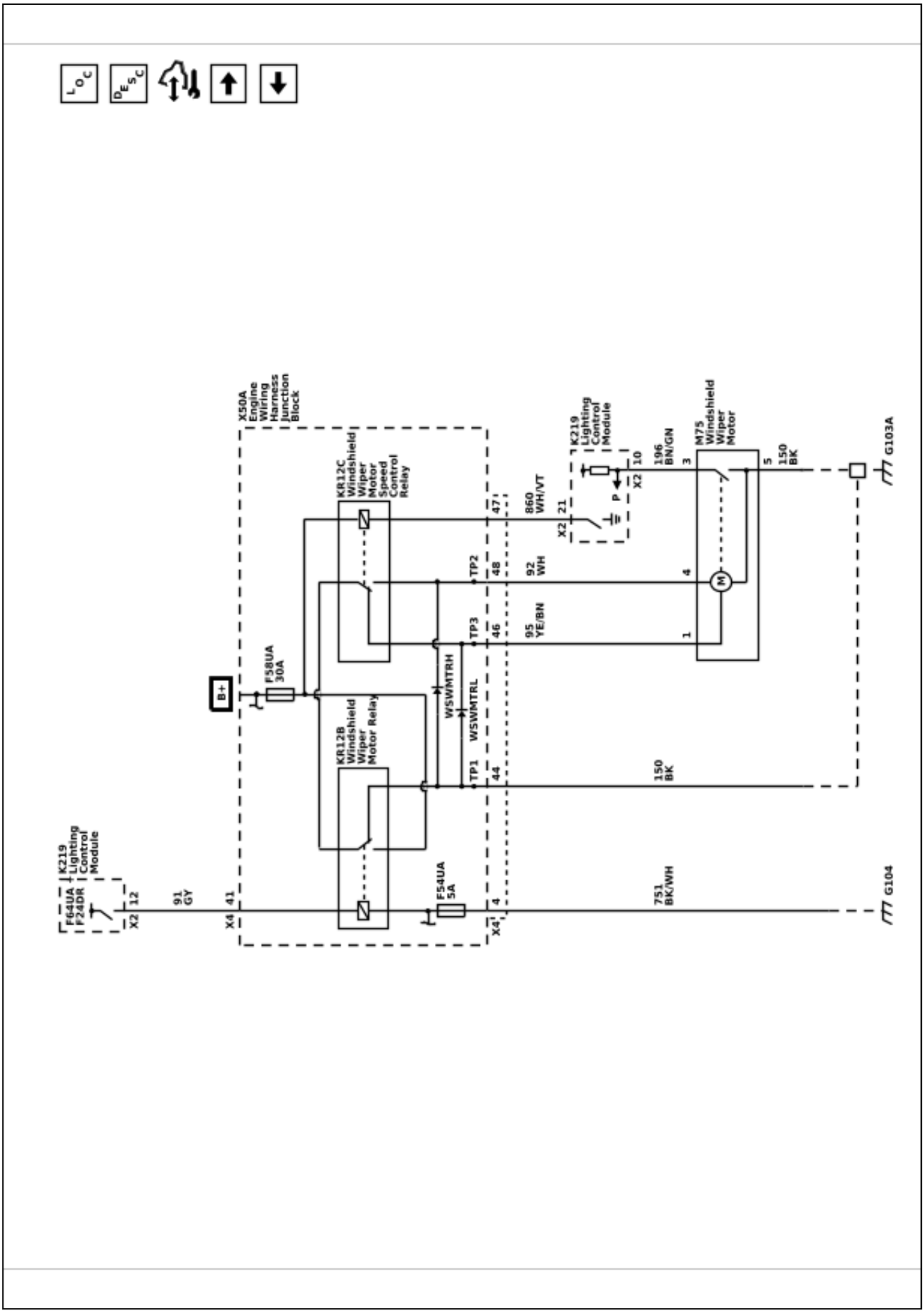
Wipers and Washers

Schematic and Routing Diagrams

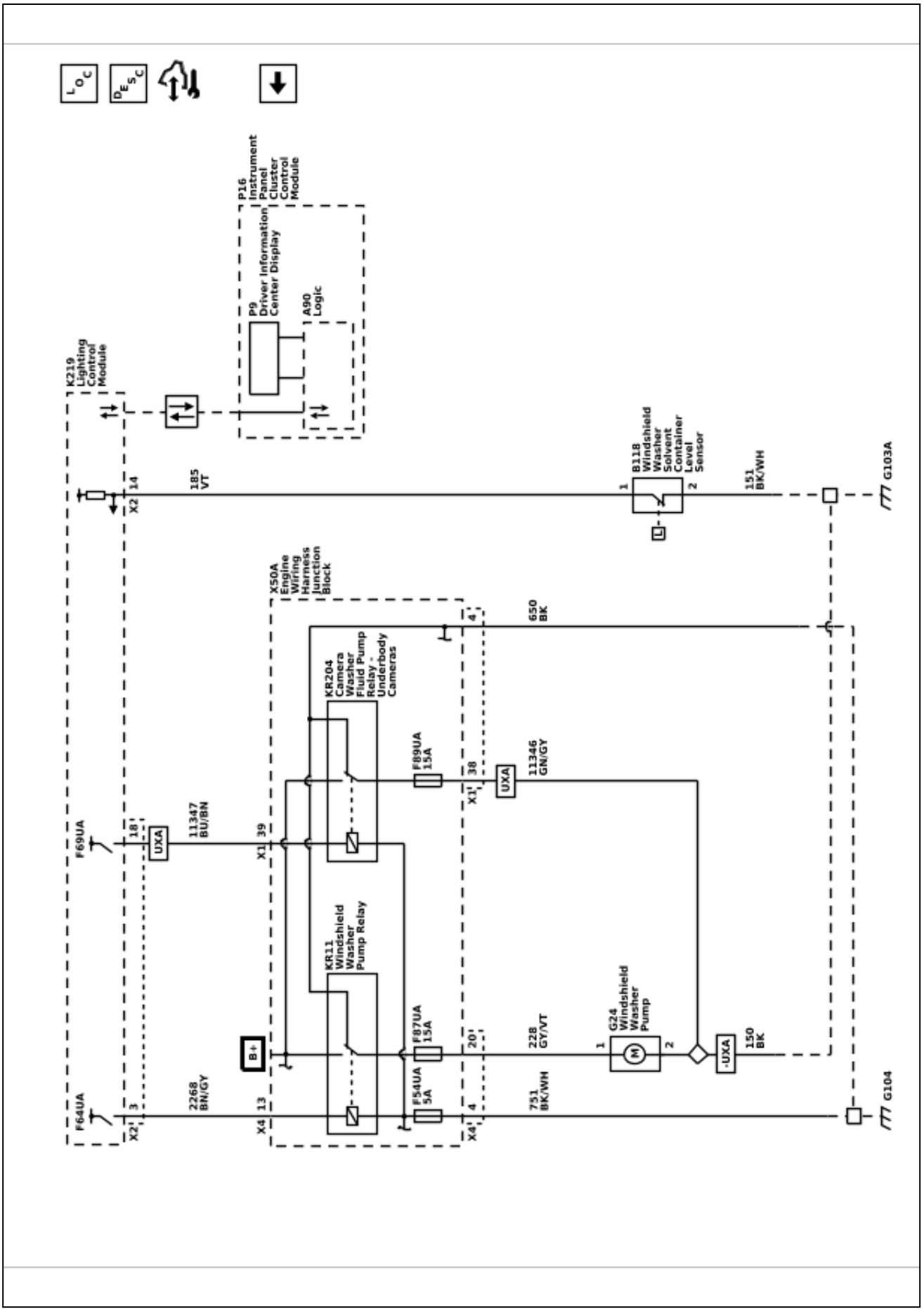
Wiper/Washer Schematics (Wiper/Washer Controls)



Wiper/Washer Schematics (Wiper Motor)



Wiper/Washer Schematics (Washer Pump)



Description and Operation

Wiper/Washer System Description and Operation

Front Windshield Wiper Operation

The windshield wipers system allows the driver to clear the vehicle's windshield using a discrete switch or through an automatic rain sensing system (if equipped with RPO CE1). The windshield wiper system functions through a primary control, but also allows redundant high speed-only operation in the event of a system fault. The wiper systems uses the S78 Turn Signal Switch as the primary means of driver control, along with the B117A Windshield Outside Moisture/Ambient Light and Humidity Sensor to modulate intermittent wiper operation if equipped with rain sense wipers (RPO CE1). The S78 Turn Signal Switch is a discrete input to the K9 Body Control Module. The K9 Body Control Module communicates with the K219 Lighting Control Module over CAN, and with the B117A Windshield Outside Moisture/Ambient Light and Humidity Sensor over LIN, to control wiper activation.

Low Speed Wiper Operation
With the S78 Turn Signal Switch in the low speed position, the discrete signal circuit to the K9 Body Control Module is pulled down through two resistors in a resistor ladder to a low reference provided by the K9 Body Control Module. The K9 Body Control Module communicates with the K219 Lighting Control Module over CAN, requesting consistent low speed wiping operation. To initiate low speed operation, the K219 Lighting Control Module energizes the KR12B Windshield Wiper Relay. This allows battery voltage from the wiper fuse to be applied through the switched contacts of the KR12B Windshield Wiper Relay, through the normally closed contacts of the KR12C Windshield Wiper Speed Control Relay, to the windshield wiper low speed control circuit of the M75 Windshield Wiper Motor.

Intermittent Wiper Operation
With the S78 Turn Signal Switch in the intermittent position, the discrete signal circuit to the K9 Body Control Module is pulled down through a number of resistors within a resistor ladder to a low reference provided by the K9 Body Control Module. The number of resistors the signal travels through is dependent on the intermittent selection made on the S78 Turn Signal Switch. The K9 Body Control Module interprets this range of voltage pull-down as a request for intermittent wiper activation, with each pull-down voltage value equating an intermittent delay (sensitivity) level. If the rain sense is enabled the K9 Body Control Module communicates with the B117A Windshield Outside Moisture/Ambient Light and Humidity Sensor via LIN. If equipped with rain sense wipers (RPO CE1) the B117A Windshield Outside Moisture/Ambient Light and Humidity Sensor utilizes windshield optics to determine the amount of water on the windshield and will communicate this info to the K9 Body Control Module, which will vary wiping cadence based on the intermittent sensitivity selection on the S78 Turn Signal Switch and the amount of water on the windshield. If the rain sense is disabled the K9 Body Control will vary the wiping cadence based on a preset amount of time determined by the intermittent delay selection on the S78 Turn Signal Switch. To initiate wiper operation, the K219 Lighting Control Module energizes the KR12B Windshield Wiper Relay. This allows battery voltage from the wiper fuse to be applied through the switched contacts of the KR12B Windshield Wiper Relay, through the normally closed contacts of the KR12C Windshield Wiper Speed Control Relay, to the low speed control circuit of the M75 Windshield Wiper Motor.

High Speed Wiper Operation
With the S78 Turn Signal Switch in the high speed position, the discrete signal circuit to the K9 Body Control Module is pulled down through two resistors in a resistor ladder to a low reference provided by the K9 Body Control Module. The K9 Body Control Module interprets this specific voltage pull-down as a request for wiper activation. In addition to this pull-down signal, a second switch in the S78 Turn Signal Switch is also pulled down to low reference. This signal is a discrete input to the K219 Lighting Control Module. The K219 Lighting Control Module requests wiping operation. To initiate high speed operation, the K219 Lighting Control Module energizes the KR12B Windshield Wiper Relay and grounds the KR12C Windshield Wiper Speed Control Relay. This allows battery voltage from the wiper fuse to be applied through the switched contacts of the KR12B Windshield Wiper Relay, through the switched contacts of the KR12C Windshield Wiper Speed Control Relay, to the windshield wiper motor high speed control circuit of the M75 Windshield Wiper Motor.

Mist (Single Wipe) Operation
The mist (single wipe) position is a momentary switch position that will return the S78 Turn Signal Switch to the off position as soon as the switch is released. With the S78 Turn Signal Switch in the mist (single wipe) position, the discrete signal circuit to the K9 Body Control Module is pulled down through two resistors in a resistor ladder to a low reference provided by the K9 Body Control Module. The K9 Body Control Module interprets this specific voltage pull-down as a request for wiper activation. The K9 Body Control Module communicates with the K219 Lighting Control Module via CAN, requesting consistent low speed wiping operation as long as the S78 Turn Signal Switch is held in the mist (single wipe) position. If the mist (single wipe) position is only briefly selected, the K9 Body Control Module will request only a single wipe.

Wiper Park Operation
With the S78 Turn Signal Switch in the off position, the discrete signal circuit to the K9 Body Control Module is pulled down through one resistor in a resistor ladder to a low reference provided by the K9 Body Control Module. The K9 Body Control Module interprets this specific voltage pull-down as a request to stop wiper activation. The K9 Body Control Module communicates with the K219 Lighting Control Module via CAN, requesting wiper operation stop. At this time, the K219 Lighting Control Module will deactivate the KR12B Windshield Wiper Relay and KR12C Windshield Wiper Speed Control Relay. The relay contacts will switch back to their normally closed position and will apply ground to the wiper motor power inputs through the normally closed contacts of the wiper relays. This deactivates and dynamically brakes the wiper motor in the park position. When the wiper switch is turned to the OFF position while the wiper motor is somewhere in mid-cycle, the K219 Lighting Control Module will continue to operate the motor until the wipers reach the park position. If the ignition is turned OFF while the wipers are in mid-cycle, the wipers will stop immediately, regardless of position. The K219 Lighting Control Module will park the wipers next time the ignition is turned ON.

The windshield wiper system consists of the following electrical components:

- S78 Turn Signal Switch
- K9 Body Control Module
- K219 Lighting Control Module
- KR12B Windshield Wiper Relay
- KR12C Windshield Wiper Speed Control Relay
- B117A Windshield Outside Moisture/Ambient Light and Humidity Sensor
- M75 Windshield Wiper Motor

Front Windshield Wiper Components

S78 Turn Signal Switch
The S78 Turn Signal Switch is the primary input to the K9 Body Control Module for the driver to control windshield wiper operation. The S78 Turn Signal Switch also provides discrete input to the K219 Lighting Control Module and M75 Windshield Wiper Motor during high speed wiper operation.

The S78 Turn Signal Switch contains three individual internal switch. One switch changes between mist (single wipe), off, intermittent, low speed, and high speed selection. The second switch changes with differing intermittent sensitivity selection. The third switch is only active when high speed wiper operation is selected. A resistor ladder is also used to determine switch selection and intermittent sensitivity selection. The high speed switch does not utilize the resistor ladder.

The K9 Body Control Module provides the S78 Turn Signal Switch with ground through a single low reference circuit and monitors the switch position through a single signal circuit. Voltage is applied by the K9 Body Control Module to this signal circuit and voltage drop is monitored to determine switch selection. This voltage drop will vary depending on the number of resistors in the resistor ladder, which changes depending on switch position. In the off position, current flows through a single resistor. In the mist (single wipe), low speed, and high speed position, current flows through two resistors. In the intermittent position, current flows through three or more resistors, depending on the intermittent sensitivity selected.

The S78 Turn Signal Switch provides a discrete switch input to the K219 Lighting Control Module during high speed wiper operation. Voltage is applied by the K219 Lighting Control Module to this signal circuit and voltage drop is monitored to determine switch selection. When high speed operation is selected, the signal circuit is pulled to ground (low reference).

K9 Body Control Module
The K9 Body Control Module will send a CAN message to the K219 Lighting Control Module to request wiper operation. The K9 Body Control Module responds to input requests from the S78 Turn Signal Switch. The K9 Body Control Module provides a constant ground for the S78 Turn Signal Switch and monitors a signal circuit to determine the requested windshield wiper position.

The K9 Body Control Module communicates with the B117A Windshield Outside Moisture/Ambient Light and Humidity Sensor via LIN. Messages are received from the B117A Windshield Outside Moisture/Ambient Light and Humidity Sensor to indicate the amount of water on the windshield.

K219 Lighting Control Module
The K219 Lighting Control Module controls the wiper motor via two PCB relays (KR12B Windshield Wiper Relay and KR12C Windshield Wiper Speed Control Relay). The K219 Lighting Control Module receives a message from K9 Body Control Module over CAN to determine what type of wiper operation is requested.

KR12B Windshield Wiper Relay
The KR12B Windshield Wiper Relay supplies B+ to the M75 Windshield Wiper Motor and is controlled by the K219 Lighting Control Module. The coil side of the relay receives a constant chassis ground and the switch side receives a constant B+. When wiper operation is requested, the K219 Lighting Control Module will provide voltage to the coil side of the relay. This will energize the relay, closing the high current contact, and

supply B+ to the M75 Windshield Wiper Motor through the KR12C Windshield Wiper Speed Control Relay, enabling wiper operation.

KR12C Windshield Wiper Speed Control Relay
The KR12C Windshield Wiper Speed Control Relay controls B+ to the M75 Windshield Wiper Motor and is controlled by the K219 Lighting Control Module. The coil side of the relay receives a ground controlled by the K219 Lighting Control Module. The switch side of the relay receives B+ through the KR12B Windshield Wiper Relay. When high speed wiper operation is requested, the K219 Lighting Control Module will provide ground to the coil side of the relay. This will energize the relay, closing the high current contact, and supply the B+ to the M75 Windshield Wiper Motor high speed control, enabling high speed wiper operation.

B117A Windshield Outside Moisture/Ambient Light and Humidity Sensor
Note: Due to the sensitivity of the sensor, the wipers may swipe once upon start up or rapid lighting changes.

The B117A Windshield Outside Moisture/Ambient Light and Humidity Sensor utilizes an internal infrared LED and an optic sensor to determine the amount of water on the windshield. The infrared LED bounces infrared light against the inside of the windshield. The optic sensor measures the amount of light returned after bouncing off the windshield. With a dry windshield, all light bounced off the windshield is returned to the optic sensor. As water accumulates on the windshield, the light input to the optic sensor is diffused and reduced. The amount of light reduction corresponds directly to the amount of water on the windshield. The B117A Windshield Outside Moisture/Ambient Light and Humidity Sensor interprets the amount of light returned and communicates this info to the K9 Body Control Module, which will control intermittent wiper operation based on the sensitivity selection of the S78 Turn Signal Switch and the amount of water on the windshield.

M75 Windshield Wiper Motor
The M75 Windshield Wiper Motor receives a constant chassis ground. B+ is controlled by the KR12B Windshield Wiper Relay and KR12C Windshield Wiper Speed Control Relay being operated by the K219 Lighting Control Module.

The M75 Windshield Wiper Motor includes a DC motor and an internal position switch to indicate the wiper park position. When wiper operation is requested, the DC motor spins. The spinning motor is directed to a wiping motion through the windshield wiper transmission. When wiper operation is no longer required, the M75 Windshield Wiper Motor will continue spinning until the internal position switch indicates it is in the park position.

Windshield Washer Operation

The windshield washer system allows the driver to clean the vehicle's windshield using a discrete switch. The washer system uses the S78 Turn Signal Switch as the primary means of driver control. The S78 Turn Signal is a discrete input to the K9 Body Control Module. The K9 Body Control Module communicates with the K219 Lighting Control Module over CAN to control G24 Windshield Washer Pump activation. The K9 Body Control Module also communicates with the K219 Lighting Control Module to control B+ to the M75 Windshield Wiper Motor during operation.

The windshield wiper system consists of the following electrical components:

- S78 Turn Signal Switch
- K9 Body Control Module
- K219 Lighting Control Module
- KR12B Windshield Wiper Relay
- KR11 Windshield Washer Pump Relay
- G24 Windshield Washer Pump
- M75 Windshield Wiper Motor
- B118B Windshield Washer Fluid Level Switch

Windshield Washer Components

S78 Turn Signal Switch
The S78 Turn Signal Switch is the primary input to the K9 Body Control Module for the driver to control windshield washer operation.

The K9 Body Control Module provides the S78 Turn Signal Switch with ground through a single low reference circuit and monitors the switch position through a single signal circuit. Voltage is applied by the K9 Body Control Module to this signal circuit and voltage drop is monitored to determine switch selection. The S78 Turn Signal Switch contains an internal switch dedicated to windshield washer operation. When the switch is closed, the signal circuit is pulled to ground, indicating washer operation is requested.

K9 Body Control Module
The K9 Body Control Module responds to input requests from the S78 Turn Signal Switch. The K9 Body Control Module provides a constant ground for the S78 Turn Signal Switch and monitors a signal circuit to determine the requested windshield wiper position.

When washer operation is requested, the K9 Body Control Module will send a CAN message to the K219 Lighting Control Module to enable the G24 Windshield Washer Pump, as well as supply B+ to the M75 Windshield Wiper Motor. The K9 Body Control Module communicates with the M75 Windshield Wiper Motor

via LIN. When washers are requested, the K9 Body Control Module will request low speed wiper activation from the M75 Windshield Wiper Motor.

K219 Lighting Control Module
The K219 Lighting Control Module controls B+ to the G24 Windshield Washer Pump. When washer operation is requested from a CAN message from the K9 Body Control Module, the K219 Lighting Control Module will apply voltage via a high side driver to the KR11 Windshield Washer Pump Relay. The K219 Lighting Control Module also controls B+ to the M75 Windshield Wiper Motor. When washer operation is requested, the K219 Lighting Control Module will apply voltage via a high side driver to the KR12B Windshield Wiper Relay.

The K219 Lighting Control Module also monitors the B118B Windshield Washer Fluid Level Switch through a discrete signal circuit.

KR12B Windshield Wiper Relay
The KR12B Windshield Wiper Relay supplies B+ to the M75 Windshield Wiper Motor and is controlled by the K219 Lighting Control Module. The coil side of the relay receives a constant chassis ground and the switch side receives a constant B+. When wiper operation is requested, the K219 Lighting Control Module will provide voltage to the coil side of the relay. This will energize the relay, closing the high current contact, and supply B+ to the M75 Windshield Wiper Motor, enabling wiper operation.

KR11 Windshield Washer Pump Relay
The KR11 Windshield Washer Pump Relay supplies B+ to the G24 Windshield Washer Pump and is controlled by the K219 Lighting Control Module. The coil side of the relay receives a constant chassis ground and the switch side receives a constant B+. When wiper operation is requested, the K219 Lighting Control Module will provide voltage to the coil side of the relay. This will energize the relay, closing the high current contact, and supply B+ to the G24 Windshield Washer Pump, enabling washer pump operation.

G24 Windshield Washer Pump
The G24 Windshield Washer Pump receives a constant chassis ground. B+ is controlled by the KR11 Windshield Washer Pump Relay. With voltage applied, a DC motor spins, connecting and pressurizing washer fluid from the washer fluid reservoir. The pressurized washer fluid is deposited on the windshield through a series of lines and nozzles.

M75 Windshield Wiper Motor
The M75 Windshield Wiper Motor receives a constant chassis ground. B+ is controlled by the KR12B Windshield Wiper Relay and KR12C Windshield Wiper Speed Control Relay being operated by the K219 Lighting Control Module.

The M75 Windshield Wiper Motor includes a DC motor and an internal position switch to indicate the wiper park position. When wiper operation is requested, the DC motor spins. The spinning motor is directed to a wiping motion through the windshield wiper transmission. When wiper operation is no longer required, the M75 Windshield Wiper Motor will continue spinning until the internal position switch indicates it is in the park position.

B118B Windshield Washer Fluid Level Switch
The B118B Windshield Washer Fluid Level Switch receives a constant chassis ground. A signal circuit is monitored by the K219 Lighting Control Module. The K219 Lighting Control Module applies voltage to the signal circuit. When the B118B Windshield Washer Fluid Level Switch is closed, voltage on the signal circuit is pulled to ground, indicating fluid in the washer fluid reservoir.

Section 2

Brakes

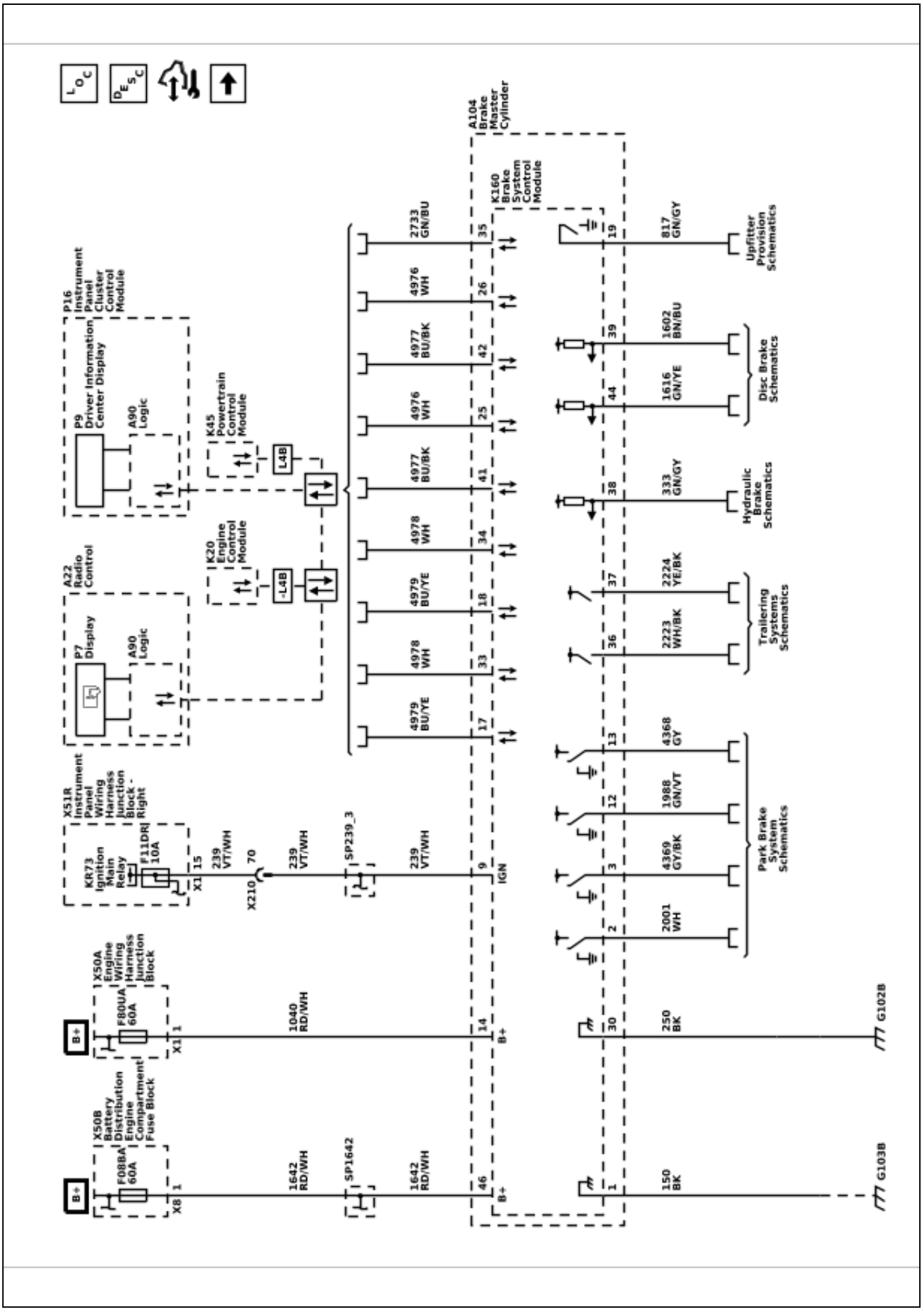
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Brakes

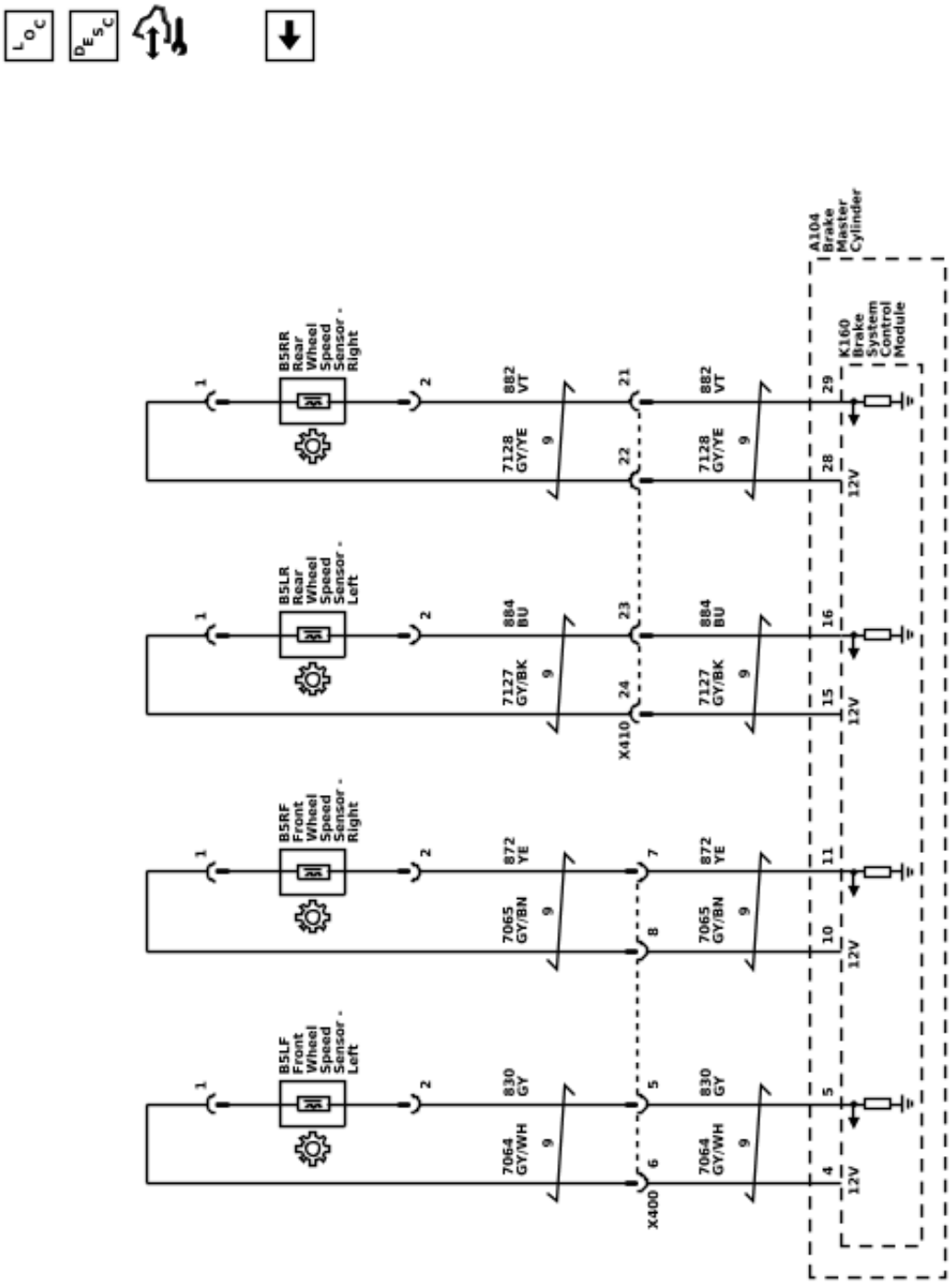
Antilock Brake System

Schematic and Routing Diagrams

Antilock Brake System Schematics (Module Power, Ground, Serial Data, Indicators, and Subsystem References)



Antilock Brake System Schematics (Wheel Speed Signals)



7157797

Description and Operation

ABS Description and Operation

Description and Operation

This vehicle is equipped with a Integrated Brake Control (IBC), also known as Brake System Control Module.

The Integrated Brake Control is an electromechanical device that interprets and converts driver input and provides a corresponding hydraulic pressure output to activate a standard brake system according to the drivers demand. The electro-hydraulic boost system replaces the conventional vacuum-based power assist brake system, which provides an advantage in efficiency. The electro-hydraulic brake system supplies "on-demand" power when the driver presses the brake pedal. In an event of no electrical energy or failure condition the drivers input is mechanically converted to a hydraulic pressure output.

Depending on options, the following vehicle performance enhancement systems are provided.

- ABS
- Traction Control
- Stability Control
- Brake Pad Life Monitoring
- Dynamic Rear Proportioning
- Panic Brake Assist
- Teen Mode Support
- Trailer Sway Control
- Engine Drag Control
- Brake Drying/Cleaning
- Extended Hill Hold Start Assist
- Hill Descent Control
- Collision Imminent Braking
- Full Speed Range Adaptive Cruise Control Braking
- Trailer Brake Control
- Park Brake Control Motor on Caliper/Drum (with Push/Push)
- Unidirectional WSS
- CAN messages:
  - Chassis System Total Brake Axle Torque
  - DIC message during ABS (no pedal feedback)
  - Switch based ESC disable
  - Switch based Traction disable
  - ESC enable
  - OBDII - Rough Road Wheel Speed Usage

- The Body control module (BCM) monitors the brake pedal position sensor signal when the brake pedal is applied and sends a high speed serial data message to the Brake System Control Module indicating the brake pedal position.
- Instrument cluster - The instrument cluster displays the vehicle speed based on the information from the engine control module. The engine control module sends the vehicle speed information via a high speed serial data to the body control module. The body control module then sends the vehicle speed information via serial data to the instrument cluster in order to display the vehicle speed, either in kilometers or miles, based on the vehicle requirements.
- Multi-axis acceleration sensor - The yaw rate, lateral acceleration and longitudinal acceleration sensors are combined into one multi-axis acceleration sensor, internal to the inflatable restraint sensing and diagnostic module. The Brake System Control Module receives serial data message inputs from the yaw rate, lateral acceleration and longitudinal acceleration sensor and activates stability control and hill hold start assist function depending on multi-axis acceleration sensor input.
- Multifunction switch - The traction control switch is a multifunction momentary switch. The body control module monitors the signal circuit from the traction control switch and sends a high speed serial data message to the Brake System Control Module indicating the switch position. The traction control and stability control are manually disabled or enabled by pressing the traction control switch.
- Steering wheel angle sensor - The Brake System Control Module receives serial data message inputs from the steering angle sensor. The steering wheel angle sensor signal is used to calculate the intended driving direction. The steering wheel angle sensor is installed as an internal part of the power steering gear.
- Transmission control module - The Brake System Control Module receives high speed serial data message inputs from the transmission control module indicating the gear position of the transmission for hill start assist or hill hold functions.
- Wheel speed sensors – This vehicle is equipped with unique directional wheel speed sensors that can detect wheel direction as well as zero wheel speed. The wheel speed sensors are Active sensors that receive a 12 V power supply voltage from the Brake System Control Module and provide an output signal to the module. As the wheel spins, the wheel speed sensor sends the Brake System Control Module a DC square wave signal. The Brake System Control Module uses the

frequency of the square wave signal to calculate the wheel speed.

Power-Up-Self Test

The Brake System Control Module is able to detect many malfunctions whenever the ignition is ON. However, certain failures cannot be detected unless active diagnostic tests are performed on the components. Shorted solenoid coil or motor windings, for example, cannot be detected until the components are commanded ON by the Brake System Control Module. Therefore, a power-up self-test is performed to verify correct operation of system components. The Brake System Control Module performs the first phase of the power-up self-test when the ignition is first turned ON. This phase consists of internal self-testing of the Brake System Control Module along with electrical checks of system sensors and circuits.

Antilock Brake System (ABS) Features

The active control/modulation of brake fluid hydraulic modulates pressure to the front and/or rear brake corner subsystems (brake torque control) to preclude wheel lock-up and enhance tire-to-road longitudinal braking traction. Wheel lock-up (sliding wheel, not rolling wheel) occurs when the wheel brake torque exceeds the available tire-to-road traction. Avoidance of wheel lock-up provides the driver with the ability to maintain vehicle stability and steer-ability. Improved tire-to-road longitudinal braking traction minimizes vehicle stopping distance.

Brake Assist Features

The Brake Assist provides additional brake pressure over the pressure provided by the conventional brake apply system.

Panic Brake Assist

This feature will apply brakes more quickly when a panic brake situation is determined. Panic Brake Assist detects that the driver intent is to stop the vehicle as quickly as possible, but does not apply sufficient brake pressure to do so. The feature will detect the driver intent then actively apply brake pressure to maximum pressure, thus activating the ABS system and stopping the vehicle as quickly as possible.

Hydraulic Fade Compensation

Based on a brake disc/pad temperature estimate, driver applied master cylinder pressure and vehicle deceleration rate, Hydraulic Fade Compensation will increase brake system pressure above driver applied brake pressure when the brake system determines a gross fade condition.

The goal of providing additional brake system pressure is to reduce stopping distance during high deceleration requests from the driver. The driver will experience fading brakes while using low or medium brake pedal force application. The Hydraulic Fade Compensation will only activate during high brake pedal force application.

Rear Brake Boost

The Rear Brake Boost function provides rear hydraulic brake assist to ensure that all four corners are achieving maximum braking during ABS. When vehicle loading is heavily rear axle biased the rear brakes may not utilize all of the available road adhesion. The hydraulic Rear Brake Boost feature is designed to provide additional pressure to the rear brakes when the front brakes ABS are activated and the rear wheels have low slip.

Electronic Brake Pre-Fill

This feature is used to reduce the brake response time when the driver quickly releases the accelerator pedal. This will also be used to support the use of low drag calipers.

Motor on Caliper Torque Overlay

This feature is used to reduce the driver's braking effort when in backup (no power) mode. Torque is applied with the Electric Park Brake motors on the front or rear calipers, preferably isolating that hydraulic circuit, to provide assist. When in this mode, the Electric Park Brake motors are controlled to apply torque in accordance with the driver's commanded deceleration, instead of clamping to a certain force.

Electronic Stability Control (ESC) Features

Roll Over Mitigation / Preemptive ESC

Using the standard ESC sensor set, Roll Over Mitigation will detect driving situations that could cause a vehicle rollover. After detection, ESC brake control will be modified to reduce the chance of vehicle rollover.

Trailer Sway Control

Trailer Sway Control uses the ESC system to detect trailer instability and apply differential braking to dampen out trailer oscillation and instability. Trailer Sway Control will detect the vehicle dynamic characteristics associated with trailer sway and actuate the vehicle’s brakes and reduce engine torque, if required, to dampen or eliminate trailer oscillations. Trailer Sway Control shall recognize repeated trailer instability and communicate to the display device to warn a driver of unsafe trailer setup.

Torque Vectoring by Brakes

Torque Vectoring by Brakes enhances vehicle agility by using active brake applies and engine torque requests

to maximize traction on drive wheels. While cornering, brakes are applied to the inside drive wheels, thus allowing more torque to the outside wheels without slipping the inside wheels. Increasing the engine torque, above driver request, gives more torque to outer wheels. Torque Vectoring by Brakes is designed for all around performance, while this feature is solely designed for high cornering maneuvers.

Flat Tire ESC Enable
If flat tire is detected, ESC system shall not be allowed to be disabled by the driver (ESC shall be re-enabled if driver has already disabled). The traction control system will be allowed to be disabled by the driver.

ESC Control With Vehicle Weight Estimation
Brake System Control Module shall have the capability to estimate vehicle weight while the vehicle is being driven. This feature shall modify ESC control based on estimated vehicle weight when a compact spare tire is detected on the rear axle.

Traction Control System (TCS) Features

Vehicle Stuck Control
The traction control system shall recognize a vehicle “stuck” condition by monitoring excessive wheel slip for greater than 5 seconds with a vehicle reference velocity of less than 3 kph. Once detected, TCS will allow additional wheel slip of 5% to “dig” the vehicle out. This feature does not guarantee the vehicle to get unstuck, only to assist the driver.

Power Hop Control
Power hop is defined as an oscillation of the driven wheels due to acceleration on high coefficient surfaces. This wheel oscillation causes the vehicle to bounce resulting in driver discomfort, failure of driveline components and potentially other damage to the vehicle. This feature will be detected using Wheel speed sensor signal when TCS is “ ON”. In case TCS is “ OFF”, Brake System Control Module and ECM will be required to mitigate power hop. If the vehicle is exhibiting this signature, the traction control system will attenuate power hop by reducing engine torque and applying brake pressure.

Engine Drag Control
This feature is designed to mitigate drop-throttle-oversteer/understeer.

On a rear-wheel-drive vehicle during maximum cornering while applying throttle, the vehicle could exhibit oversteer when the driver quickly releases the throttle. This feature will slowly reduce the engine torque in order to maintain vehicle stability.

The Enabling Conditions include: Engine is required to be running, Clutch is released for Manual Trans , Vehicle speed is above 18kph (12mph) and the Powertrain is engaged through fault message from ECM/TCM/PCM

Enhanced Off Road Control (Rock Crawling)
This feature is intended to maximize rock crawling capability while in Offroad mode or 4 Low transfer case mode**.** This feature shall be enabled when in Offroad mode (if available) or when transfer case is in 4 Low. The traction control calibration shall be biased towards low speed, active capability through the use of more brake control with less wheel slip.

Brake System Control Module Features

Brake Drying/Cleaning

Brake Drying/Cleaning autonomously applies a small amount of brake pressure during long driving on wet roads in order to remove water from the rotor surface. The brake application is unperceivable to the driver, but should result in improved brake feel and performance. Conditions to enable Brake Drying/Cleaning.

- Wipers need to be ON
- If Cruise is Active, Brake Drying/Cleaning will not function as minimum pedal position is required
- If driver brakes, the distance counter will be reset
- Brake pressure needs to build up to 3 bar at all 4 wheels

Hill Start Assist

Hill Start Assist is a feature that will temporarily hold the vehicle while on a grade. This feature will hold the vehicle 2-5 seconds after the driver has removed their foot from brake pedal and the vehicle is on a grade exceeding 7%. The design is to prevent the vehicle from rolling down the hill before the driver has an opportunity to apply accelerator pedal. The brakes will automatically release when the accelerator pedal is applied. It will not activate if the vehicle is in a drive gear and facing downhill, or if the vehicle is facing uphill and in Reverse.

Driveline Damping

Driveline Damping is required on vehicles with ESC, Stop/Start functionality and an automatic transmission. This feature holds brake pressure to dampen driveline acceleration disturbance as engine is restarted and holds brake pressure to retard or prevent the vehicle from rolling. It is used for driver comfort and has also been used to extend vehicle hold on a steep grade.

Extended Hold Hill Start Assist
Extended Hold Hill Start Assist will function the same as Hill Start Assist except there will be an indefinite vehicle hold instead of a temporary vehicle hold. The vehicle will be held by the Brake System Control Module for up to five minutes, and then will transfer the hold to Electronic Park Brake when necessary. This

feature is required for all Stop/Start variants to prevent vehicle rollback when the engine shuts off. All of the driver exit strategies of Hill Start Assist with Electronic Park Brake will also apply to this feature.

Hill Descent Control
Hill Descent Control provides autonomous braking when the vehicle is descending a very steep incline in either forward or reverse transmission gear. The grade activation minimum threshold is 10%. Typical vehicle speeds while using this feature are 5-30kph (6–19mph). This feature can provide convenience and comfort for steep offroad driving.

Hill Descent Control is enabled by the driver activating the Hill Descent Control switch at a vehicle speed below the maximum enabling vehicle speed.

Hill Descent Control is disabled if vehicle speed exceeds 60 km/h for 30 seconds or immediately if vehicle speed exceeds 80km/h. Cruise control will not be allowed to activate when Hill Descent Control is enabled by the driver.

Automatic Vehicle Hold
Automatic Vehicle Hold is a driver enabled feature that holds the vehicle at a standstill for an indefinite amount of time. This feature is similar to the Extended Hold Hill Start Assist except it will function on all road grades. It must be enabled by the driver and will revert to a disabled state upon key-up. The brake System Control Module will hold vehicle, then transfer hold to Electric Park Brake (EPB) when necessary.

The Automatic Vehicle function requires the vehicle to have an electronic parking brake which will allow the brake pressure hold time to increase up to 5 minutes before engaging the electronic park brake. Automatic Vehicle is available on vehicles with automatic transmissions and only available on vehicles with manual transmissions if equipped with a neutral gear position indicator (start/stop engines have neutral gear position indicator).

Vehicle Moding
The Brake System Control Module shall use ‘Driver Selected Mode Status signals to determine what mode the vehicle is in. The Brake System Control Module shall use the supported Driving modes to indicate to the customer what mode they are in. Mode 0 that is correspond to “ Tour or Normal” mode shall always be supported and will be considered the default. Other supported modes are: Sport, Offroad, Track, Snow/Ice and Tow Haul.

Electric Park Brake Features

Park Rollaway EPB Apply

This feature applies the EPB autonomously when vehicle motion is detected while in Park. The most likely scenario for activation of this feature is a vehicle on a split-mu grade and an open differential. The low mu wheel can spin in the opposite direction from the vehicle motion, and so the high mu wheel may allow the vehicle to roll. Applying the EPB to both rear wheels prevents vehicle motion by preventing the high mu wheels from rotating.

Steep Grade Apply:

This feature autonomously applies the EPB when the vehicle is on a steep grade. The Steep Grade apply can be enabled if Park Rollaway Detection apply is enabled. It can also be enabled on its own.

Interface with Other Features

The features set below are systems that will be controlled (to various degrees) by the Brake System Control Module by sending out performance requests to each system which should be arbitrated in the sub-system for execution. The idea is that the Brake System Control Module request should override normal sub-system control and these requests should not override diagnostic, failure, or other special or overriding control.

Steering Torque Overlay (for both ABS and TCS)

This feature provides haptic feedback by increasing or decreasing steering assist to encourage appropriate course correction. This feature functions in combination with ESC or ABS

4WD Interface

Brake Controls send front and rear torque requests to the transfer case system while ABS/TCS/ESC is activating.

4WD w/4Low Interface

Brake Controls send front and rear torque requests to the transfer case system while ABS/TCS/ESC is activating

Trailer Braking Control Interface

The Brake System Control Module shall be able to independently use the trailer brake activation request to stabilize and decelerate the vehicle**.** The Brake System Control Module can use Trailer Braking Force Output and Trailer Braking Gain Setting as feedback to know how much braking the Integrated Trailer Brake Control is currently doing

Dynamic Braking with EPB

Dynamic Braking with EPB provides autonomous braking when the EPB switch is pressed when the vehicle is in motion. With the use of this feature, if the EPB switch is pressed while the vehicle is moving, the Brake System Control Module will apply braking at all 4 corners until the vehicle is stopped, then the EPB will apply and Brake System Control Module will release pressure.

Electronic Transmission Range Select (ETRS) Autonomous Apply

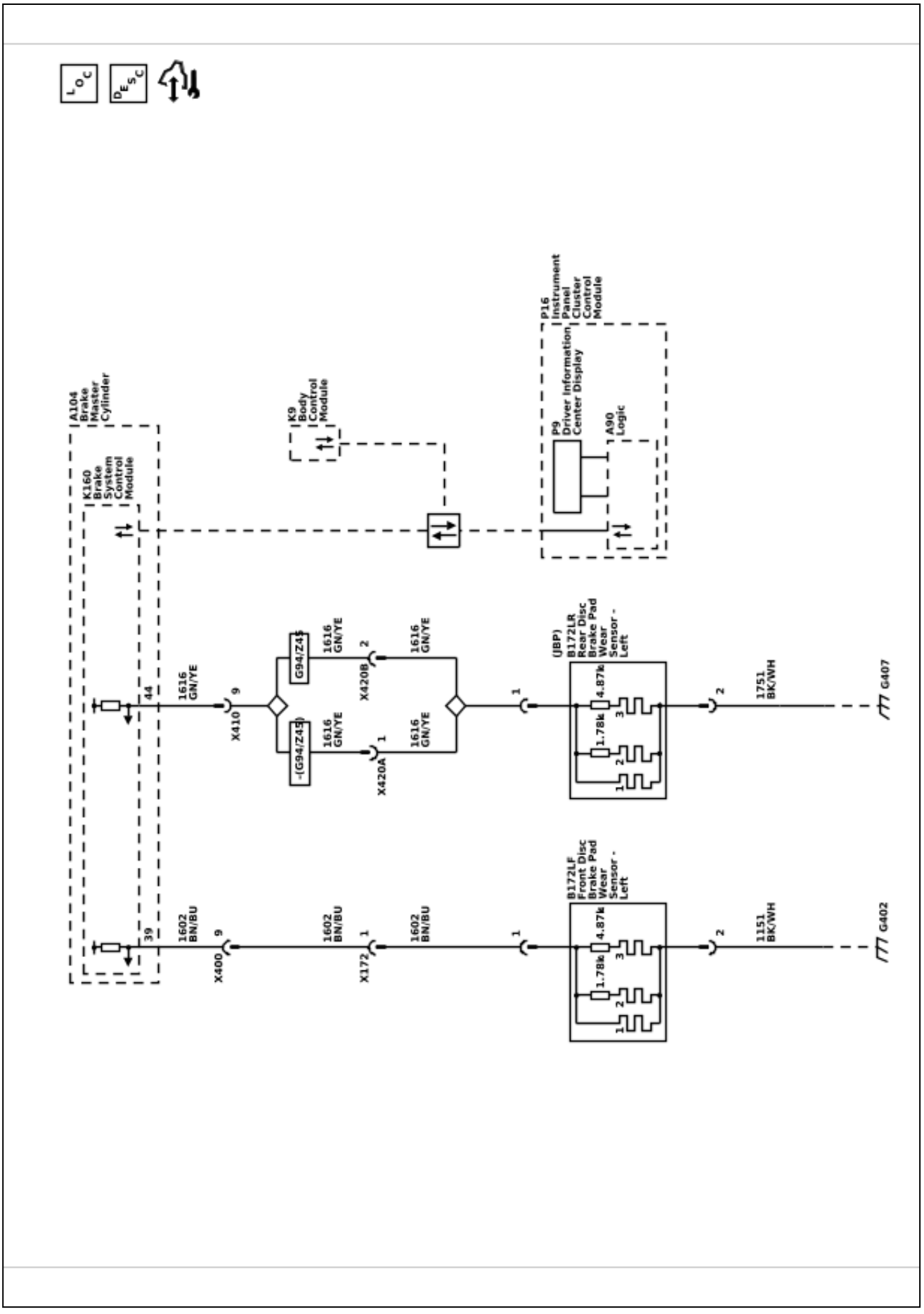
This feature applies brake pressure on a request from ETRS. This is done temporarily until the EPB can apply, using the ETRS EPB Apply feature.

The Brake Control System shall provide a short service brake hold to prevent the vehicle from rolling between when the ETRS commands a hold and the electronic park brake is applied. The primary purpose of the ETRS/Brakes interface is to apply the park brake when ETRS has a failure that prevents the transmission from achieving park; or if the driver shifts to park on a grade, EPB will reduce the load on the park pawl by applying (ETRS calculates and calibrates this grade).

Disc Brakes

Schematic and Routing Diagrams

Disc Brake Schematics (Brake Pad Wear Sensors)



Description and Operation

Brake Pad Life Monitoring Description and Operation

This vehicle has a system that estimates the remaining life of the front and rear brake pads. When the feature is active, brake pad life is displayed in the Driver Information Center (DIC) as a percentage.

When the system has determined that the brake pads need to be replaced, a message will display, which may include mileage remaining.

Customers can use this information to plan their vehicle maintenance. A prognostic indicator of life remaining, especially in distance remaining, enables customers to arrange brake pad replacement at a convenient time.

The system will display a percent pad life on the DIC at all time just like oil life monitoring. When you approach end of pad life, the messaging will change to a distance parameter (i.e. 2000 miles remaining, etc.) and it will start to actively remind the driver to take action at ignition cycle intervals.

If the feature has malfunctioned, fault messaging will be provided. The customer will be able to disable the feature display if desired, and the display will confirm this.

The Brake System Control Module has one signal input for a front axle brake pad wear sensor and one signal input for a rear axle brake pad wear sensor. The brake system control module supply voltage to the brake pad wear sensor and the sensor is grounded to the vehicle ground. The brake system control module diagnose any issues with the power supply for the sensors and set “ invalid” if there is a failure detected in the supply voltage system.

When the brake pads are new, the scan tool parameter Brake Pad Wear Sensors will be near 0 volts. The brake pad wear sensor consists of breakable wire resistors. As the brake pad sensor wears, it causes the breakable sensor wire resistors to wear away, causing the scan tool parameter Brake Pad Wear Sensors voltage to increase. The brake system algorithm along with the remaining wear sensors will determine the amount of wear and display this as a percentage of brake pad life remaining and is displayed on the DIC.

After replacing the brake pads, the Axle Brake Pad Life Monitor Reset Learn must be performed.

The brake pad life system can be turned off. This may be necessary if aftermarket brake pads without wear sensors are installed. When the system is turned off, the front and rear brake pad life percentages will not display.

Disc Brake System Description and Operation

System Component Description

The disc brake system consists of the following components:

Disc Brake Pads: Applies mechanical output force from the hydraulic brake calipers to friction surfaces of brake rotors.

Disc Brake Rotors: Uses mechanical output force applied to friction surfaces from the disc brake pads to slow speed of tire and wheel assembly rotation.

Disc Brake Pad Hardware: Secures disc brake pads firmly in proper relationship to the hydraulic brake calipers. Enables a sliding motion of brake pads when mechanical output force is applied.

Disc Brake Caliper Hardware (Floating Caliper): Provides mounting for hydraulic brake caliper and secures the caliper firmly in proper relationship to caliper bracket. Enables a sliding motion of the brake caliper to the brake pads when mechanical output force is applied.

System Operation (Floating Caliper)

Mechanical output force is applied from the hydraulic brake caliper pistons to the inner brake pads. As the pistons press the inner brake pads outward, the caliper housings draw the outer brake pads inward. This allows the output force to be equally distributed. The brake pads apply the output force to the friction surfaces on both sides of the brake rotors, which slows the rotation of the tire and wheel assemblies. The correct function of both the brake pad and brake caliper hardware is essential for even distribution of braking force.

System Operation (Fixed Caliper)

Mechanical output force is applied from the hydraulic brake caliper inboard and outboard pistons to the inner and outer brake pads. The brake calipers are a fixed, opposed-piston design, allowing the output force to be equally distributed through the distribution of the pressurized brake fluid within the caliper. The brake pads apply the output force to the friction surfaces on both sides of the brake rotors, which slows the rotation of the tire and wheel assemblies. The correct function of the brake pad hardware and of the brake caliper inboard and outboard pistons is essential for even distribution of braking force.

System Characteristics

Brake Noise

Brake noise can occur and to a degree, some brake noise is normal. Variations in driving conditions such as the weather, environment, driving patterns, differences in vehicle loading, and type or style of driving, can affect brake wear. Any one of these variations can cause brake noise to become apparent. Inspect and verify that all metal-to-metal contact areas of the brake pads, brake pad guides or springs, brake caliper

housing, caliper bracket and/or suspension knuckle, as applicable, are clean and free of corrosion and scale.

Brake noise is a “slip-stick” vibration of disc brake components and, if it occurs intermittently, can be considered normal. Most brake noise may be eliminated or temporarily reduced by performing 3 or 4 aggressive brake applications. If the brake noise persists or consistently recurs, application of a damping compound to the brake pad mounting plate where it contacts the caliper can lessen the vibration as the components move relative to each other. Refer to [Link target (target-id 176959-) not found] in this section for recommended compounds.

The following brake noises are characteristic of all brake systems. These noises cannot be avoided, and may not indicate improper operation of the brake system.

Squeak/Squeal Noise
A squeak or squeal noise can occur on vehicles with front semi-metalic brake pads during light to medium brake pedal application at low to moderate vehicle speeds. Occasionally this noise may appear from the front or rear brakes after a period of non-use such as overnight, or cold brakes and/or in high humidity conditions.

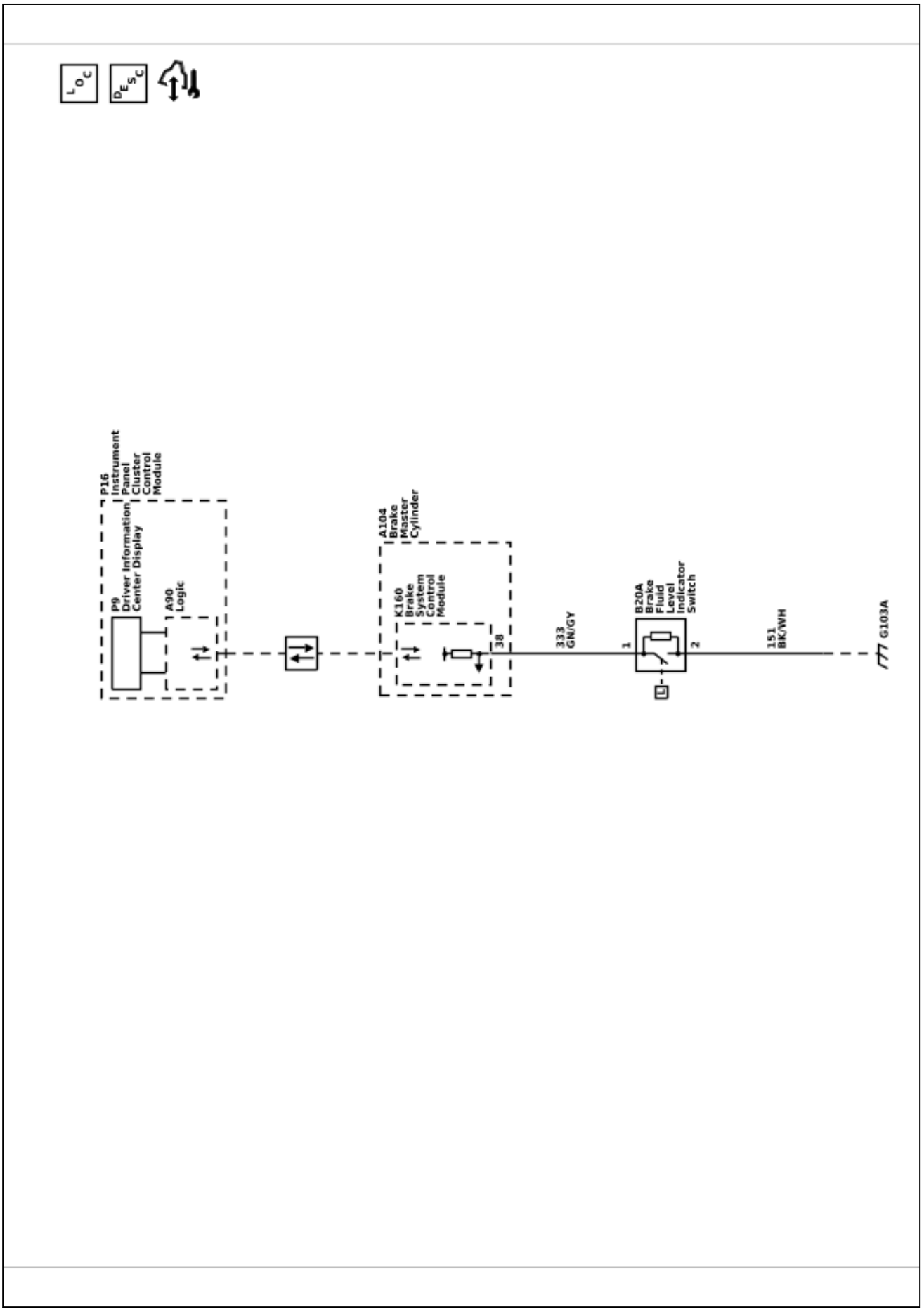
Grinding Noise
Common occurrence for rear brakes and some front disc brakes during initial brake applications after the vehicle has been parked overnight. Caused by light corrosion forming on the metal brake component friction surfaces during vehicle non-use. Typically disappears after the first few brake applications.

Groan Noise
A groan type noise may be heard during a quick stop, or when slowly moving forward from a complete stop. On vehicles equipped with antilock brake systems (ABS), a groan or moan noise may occur during heavy brake application or on road surfaces with compromised traction such as loose gravel, or on wet or icy roads. This is a normal function of ABS activation.

Hydraulic Brakes

Schematic and Routing Diagrams

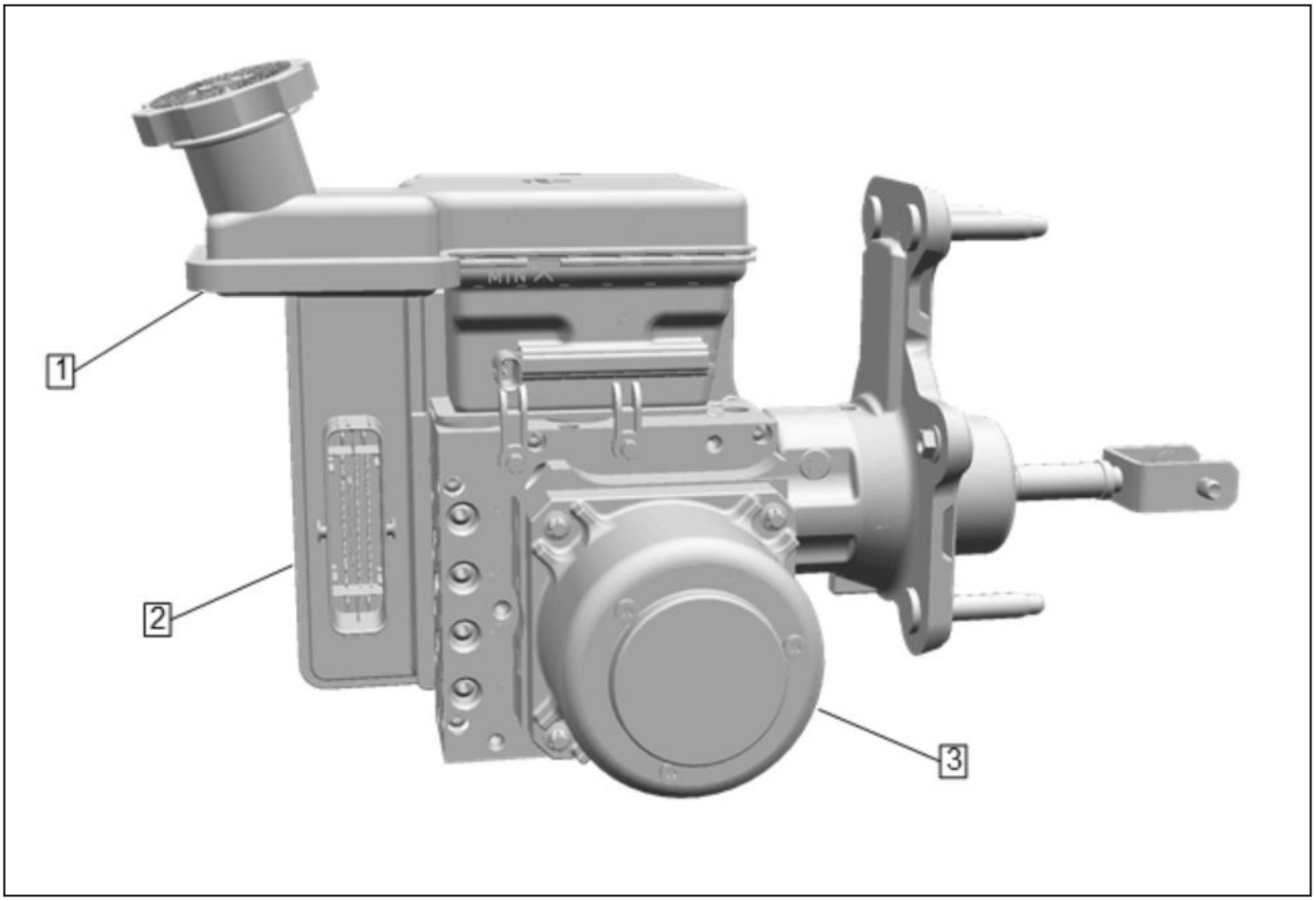
Hydraulic Brake Schematics (Hydraulic Brakes)



Description and Operation

Brake Assist System Description and Operation

System Component Description



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Note: The above graphic may not be an exact representation for every vehicle configuration.

The brake assist system is an electro - hydraulic brake booster that replaces a vacuum booster including its vacuum supply. The brake booster unit takes the driver applied brake demand and transforms this into an amplified brake pressure and does not rely on vacuum to function. The brake booster unit is designed to operate together with an electronic stability control module which is normally responsible for ABS, traction control and stability control.

The master cylinder and power brake booster unit consists of a brake master cylinder reservoir (1), an electronic brake booster control module (2), pedal coupling unit/pushrod, and the brake master cylinder (3) with integrated brake pressure modulator valve.

System Operation

Brake system input force is multiplied by the brake pedal and transferred by the pedal pushrod to the hydraulic brake master cylinder. Effort required to apply the brake system is reduced by the electronic brake booster.

Shutdown Test

The brake master cylinder performs a self-test 2 minutes after ignition off. The self-test consists of an internal hydraulic test of the brake master cylinder and an external hydraulic compliance test and hydraulic leak test of the brake lines and calipers. The brake master cylinder will take the appropriate actions based on the test results at the next startup. The self-test will not run again until the vehicle has been driven 0.804 Km (0.5 mile), 40.23 kph (25 mph) minimum.

Brake Assist System Description and Operation

Brake Assist Operating Mode	Description	Vehicle Braking Behavior	Vehicle Speed limited to XXX kph/mph	Red Brake Telltale	DIC	Other Displays
Full Brake Assist	• - Normal hydraulic brake assist. • - Brake pedal travel and force (pressure) measured. • - Pedal feel indicates the relation of the pedal travel to the pedal force. • - Brake system applies brake pressure to the wheels to achieve deceleration that makes driver effort comfortable.	• - Pedal feel: Normal (force to travel of brake pedal). • - Brake pedal effort to decel: Normal. • - Pedal Travel restricted to 80 mm due to pedal simulator.	No	No	None	None
Full Brake Assist with warning	• - Normal hydraulic brake assist. • - Driver warned with DIC message only of detected failure. • - There may be a small brake assist or pedal feel degradation depending on if/where the air is in the system or what component is overheated.	• - Pedal feel: Normal. • - Brake pedal effort to deceleration: Normal. • - Pedal Travel restricted to 80 mm due to pedal simulator.	No	No	Service Brake Assist	None

Brake Assist Operating Mode	Description	Vehicle Braking Behavior	Vehicle Speed limited to XXX kph/mph	Red Brake Telltale	DIC	Other Displays
Reduced Brake Assist	• - Normal hydraulic brake assist available • - Driver warned with DIC message but due to nature of failure, engineering determined more warning needed. • - Brake assist gain reduced in a noticeable fashion at low pedal travel (not alarming). • - Full braking available as pedal is depressed further.	• - Pedal feel: Normal • - Brake Pedal effort to decel: More effort required for low decel values (noticeable). Full braking capability for increased effort. • - Pedal Travel restricted to 80 mm due to pedal simulator.	No	No	Service Brake Assist	None
Reduced Brake Assist	• - Normal hydraulic brake assist on 2 wheels. • - Performed when brake system detects and isolates a leak in one of the two brake circuits.	• - Pedal feel: Normal. • - Brake pedal effort to deceleration: Same deceleration requires double the effort. Can only achieve 50% deceleration. • - Vehicle will pull slightly to the side with the Front Brake active. • - Pedal Travel restricted to 80 mm due to pedal simulator.	Yes	Yes	Brake System Failure XXX kph/mph Top Speed Low Brake Fluid (Potentially)	ABS, ESC, and Engine Telltales Service Traction and ESC DIC Vehicle Speed Limited display from ECM
Two Wheel Brake Assist	• - Normal hydraulic brake assist on 2 wheels. • - Performed when brake system detects and isolates a leak in one of the two brake circuits.	• - Pedal feel: Normal. • - Brake pedal effort to deceleration: Same deceleration requires double the effort. Can only achieve 50% deceleration. • - Vehicle will pull slightly to the side with the Front Brake active. • - Pedal Travel restricted to 80 mm due to pedal simulator.	Yes	Yes	Brake System Failure XXX kph/mph Top Speed Low Brake Fluid (Potentially)	ABS, ESC, and Engine Telltales Service Traction and ESC DIC Vehicle Speed Limited display from ECM

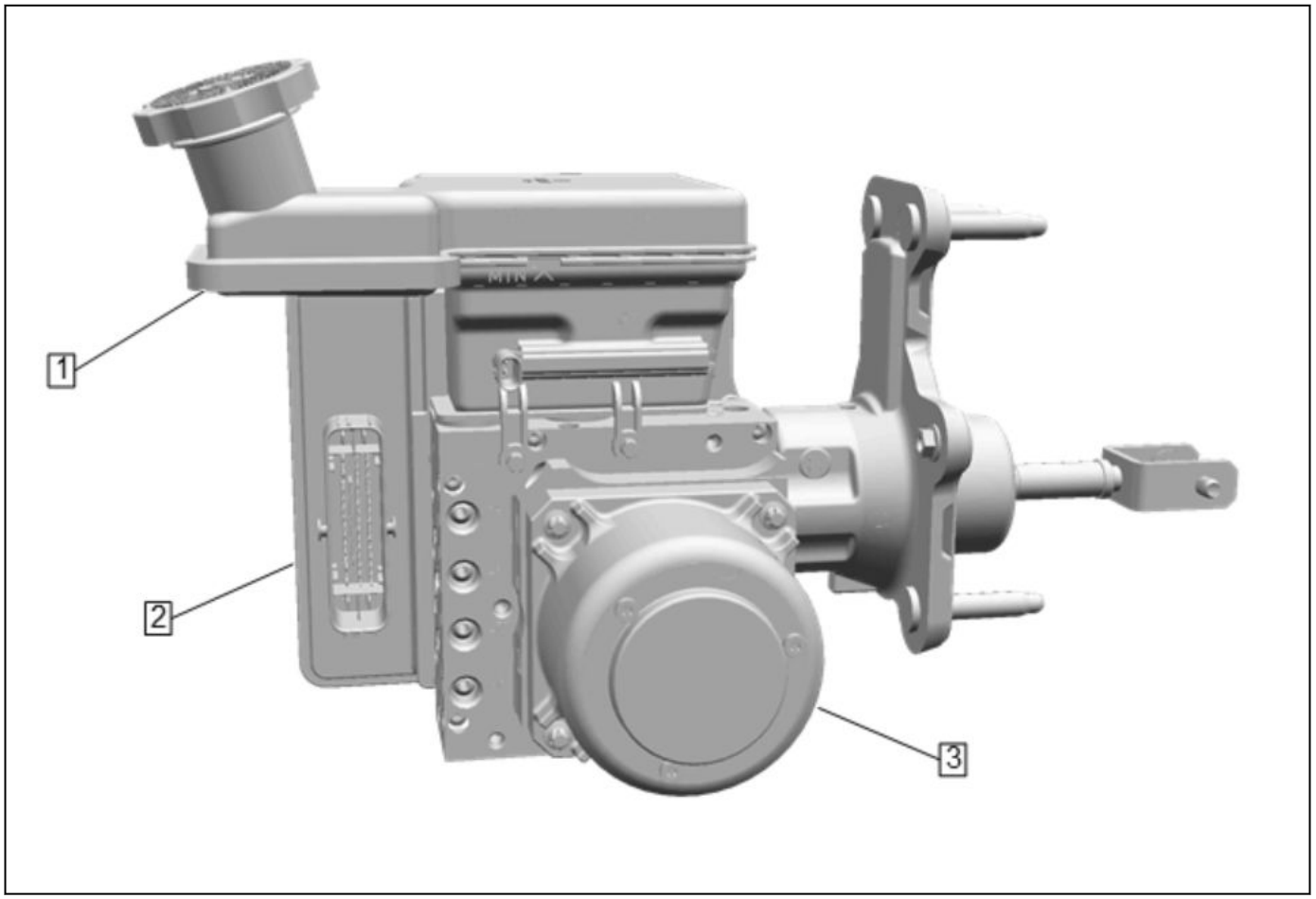
Brake Assist Operating Mode	Description	Vehicle Braking Behavior	Vehicle Speed limited to XXX kph/mph	Red Brake Telltale	DIC	Other Displays
No Brake Assist with Electric Park Brake Assist	• - Hydraulic brake assist not available. • - Brake System uses Electric Park Brake to assist driver braking.	• - Pedal feel: Slightly stiffer than normal. • - Brake pedal effort to deceleration: Onset of braking is similar but more force required to achieve same deceleration compared with Full Brake Assist. • - Minimal non linearities in deceleration due to use of Electric Park Brake. • - Pedal travel's almost to the floor with high effort.	Yes	Yes	Brake System Failure XXX kph/mph Top Speed	ABS, ESC, and Engine Telltales Service Traction and ESC DIC Vehicle Speed Limited display from ECM
No Brake Assist (Push Thru)	• - No hydraulic or Electric Park brake assist available. • - Driver pedal force distributes equal pressure to all 4 wheels	• - Pedal feel: Slightly softer than normal. • - Brake pedal effort to deceleration: Onset of braking requires more travel AND more force required to achieve same deceleration compared with No Brake Assist with Electric Park Brake Assist. • - Pedal Travel's almost to the floor with high effort.	Yes	Yes	Brake System Failure XXX kph/mph Top Speed (Not displayed for full power loss or critical micro failures)	ABS, ESC, and Engine Telltales Service Traction and ESC DIC Vehicle Speed Limited display from ECM
Two Wheel No Brake Assist (2 Wheel Push Thru)	• - Hydraulic brake assist not available. • - Brake system applies and releases Electric Park Brake proportional to driver pedal force to assist driver braking.	• - Pedal feel: Significantly softer than normal. • - Brake Pedal effort to deceleration: Onset of braking requires more travel AND more force required to achieve same deceleration compared with No Brake Assist. • - Vehicle will pull slightly to the side with the Front Brake active. • - Pedal Travel's almost to the floor with high effort.	Yes	Yes	Brake System Failure XXX kph/mph Top Speed	ABS, ESC, and Engine Telltales Service Traction and ESC DIC Vehicle Speed Limited display from ECM

Brake Assist Operating Mode	Description	Vehicle Braking Behavior	Vehicle Speed limited to XXX kph/mph	Red Brake Telltale	DIC	Other Displays
Brake Fade Detected Level 1	• - Normal hydraulic brake assist available. • - Brakes system estimates brake temps of 500 - 600 deg C. • - Driver warned with DIC display. • - Brake assist gain reduced in a noticeable fashion at low pedal travel (not alarming). • - If brake assist gain was not changed, the brake overtemp would not be as noticeable as on vacuum brake system.	• - Pedal feel: Normal • - Brake Pedal effort to deceleration: Not significantly changed • - Pedal Travel restricted to 80 mm due to pedal simulator.	No	No	Reduce Braking to Avoid Overheating	None
Brake Fade Detected Level 2	• - Same as Level 1 but brake temperature 700 - 900 deg C. • - Degradation in brake lining output may become noticeable. • - Degradation in response time may become noticeable. • - Far better performance than a vacuum system.	• - Pedal feel: Normal. • - Brake Pedal effort to deceleration: Increase in effort required based on temperature of brake which decreases brake pad output. • - Pedal Travel restricted to 80 mm due to pedal simulator.	Yes	Yes	Brakes Overheated Service Now	None

Hydraulic Brake System Description and Operation

System Component Description

The hydraulic brake system consists of the following:

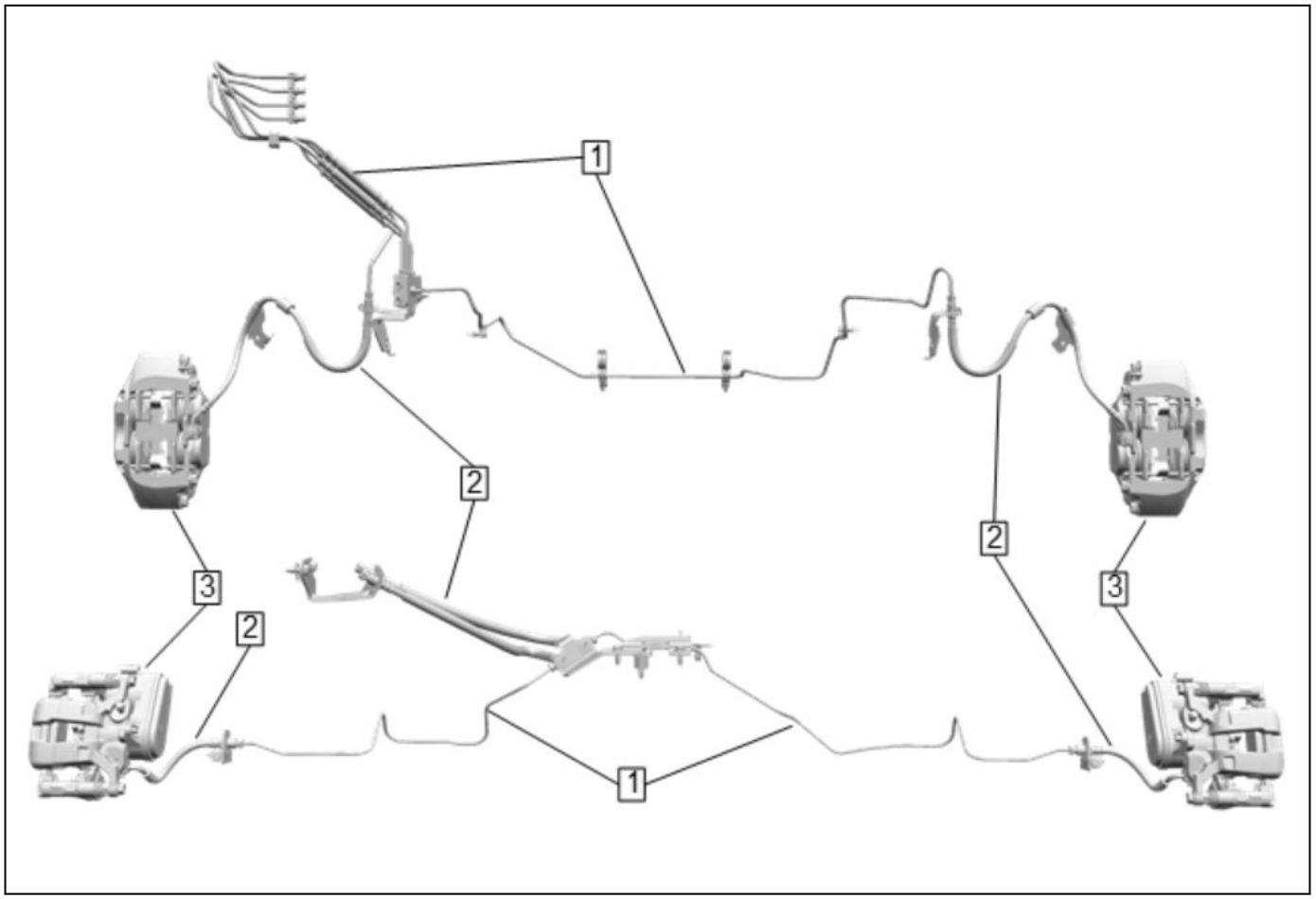


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Note: The above graphic may not be an exact representation for every vehicle configuration.

Brake Master Cylinder Fluid Reservoir (1): Contains supply of brake fluid for the hydraulic brake system.

Electronic Brake Booster Control Module (2) and Brake Master Cylinder (3): The brake master cylinder and the electronic brake booster control module take the driver applied brake demand and transforms this into an amplified brake pressure. The integrated brake pressure modulator valve controls hydraulic pressure to each wheel independently and can be responsible for ABS, traction control, and stability control.



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Note: The above graphic may not be an exact representation for every vehicle configuration.

Hydraulic Brake Pipes (1) and Flexible Brake Hoses (2): Carries brake fluid to and from hydraulic brake system components.

Brake Calipers (3): Converts hydraulic input pressure into mechanical output force.

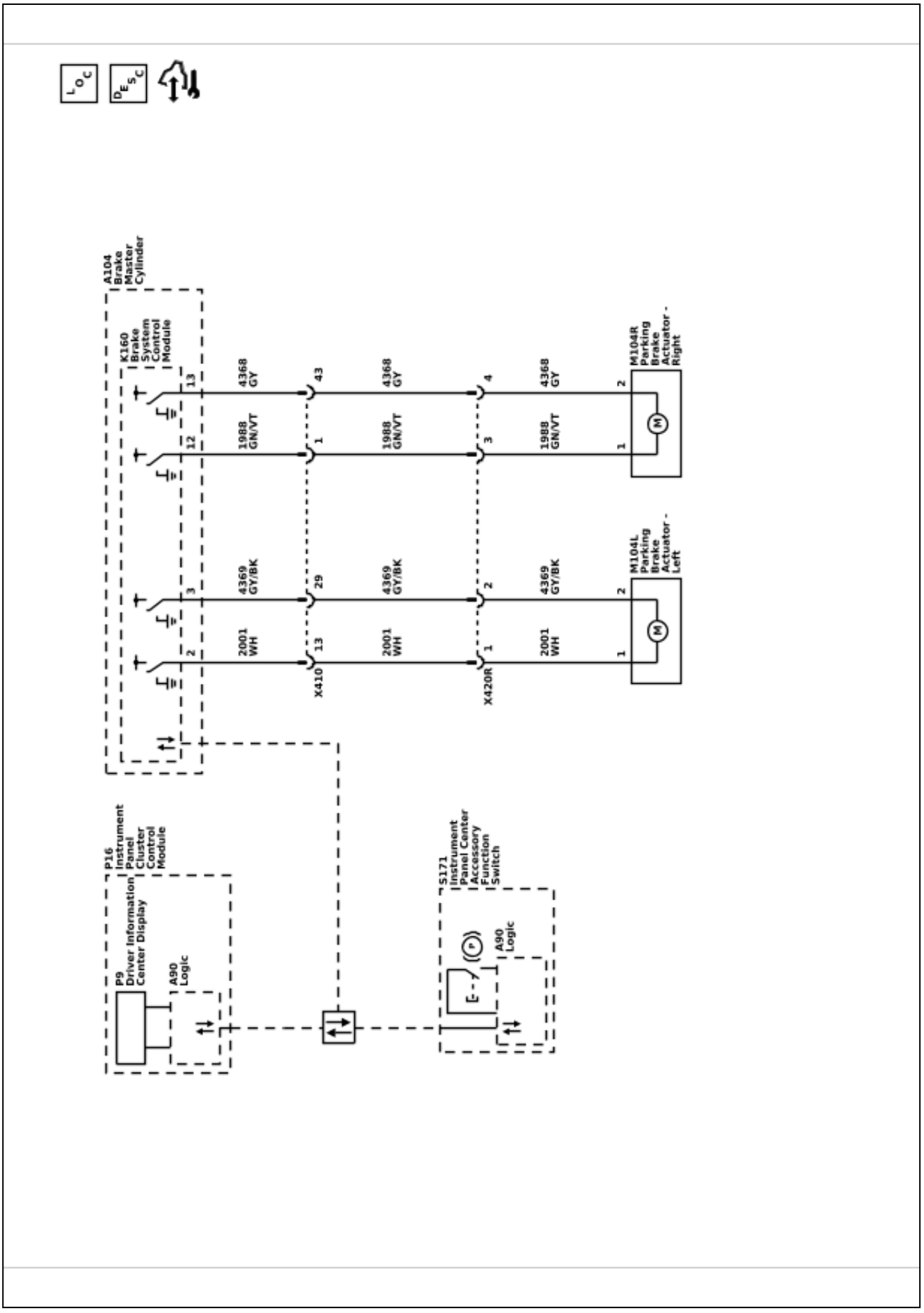
System Operation

Mechanical force is converted into hydraulic pressure by the master cylinder, regulated to meet braking system demands by the pressure balance control system, and delivered to the hydraulic brake wheel circuits by the pipes and flexible hoses. The wheel apply components then convert the hydraulic pressure back into mechanical force which presses linings against rotating brake system components.

Park Brake

Schematic and Routing Diagrams

Park Brake System Schematics (Park Brake System Schematics)



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Description and Operation

Electronic Parking Brake Description

Vehicles with the electric parking brake have a switch in the center console or on the dash, which takes the place of the manual parking brake system, the foot pedal and release handle. In case of insufficient electrical power, the electric parking brake cannot be applied or released.

Electronic Brake Control Module/Brake System Control Module

The parking brake function is integrated into the Electronic Brake Control Module/Brake System Control Module. The module contains the logic for applying and releasing the parking brake when commanded by the Park Brake Switch.

When the Park Brake Switch is pulled, a signal is sent to the Electronic Brake Control Module/Brake System Control Module which will supply 12 V to the apply control circuits and ground to the release control circuits which will cause the left and right park brake actuators to activate causing the park brakes to engage. When the Park Brake Switch is pressed, a signal is sent to the Electronic Brake Control Module/ Brake System Control Module which will supply 12 V to the released control circuits and ground to the apply control circuits which will cause the left and right park brake actuators to activate causing the park brakes to release. In some vehicles, the Park Brake Switch is a push-button style switch. When the switch is pressed, the park brakes are commanded to either apply or release based off of their current position.

The Electronic Brake Control Module/Brake System Control Module will diagnose the park brake motor circuits to verify that they are functioning properly. The park brake motor circuits are used to command actuator motor operation, which will apply and release the parking brake. These circuits are used to activate the actuator, which applies or releases pressure on the caliper pistons, ultimately applying and releasing the park brake.

The Park Brake Motor Position Sensor is an internal sensor to the park brake actuator. This sensor is used to monitor the park brake motor position.

Electric Parking Brake Apply

The electric parking brake can be applied any time the vehicle is stopped or in motion. The electric parking brake is applied by momentarily operating the park brake control switch. The red park brake light will momentarily flash while the parking brake is being applied. Once fully applied, the red park brake light will turn on. If the electric parking brake is applied while the vehicle is in motion, the vehicle will decelerate as long as the switch is being operated. If the switch is operated until the vehicle comes to a stop, the park brake will remain applied.

If the red park brake light is flashing, the electric parking brake is only partially applied or released, or there is a problem with the electric parking brake. A DIC message will display.

The vehicle may automatically apply the electric parking brake in some situations when the vehicle is not moving. This is normal, and is done to periodically check the correct operation of the electric parking brake system.

Electric Parking Brake Release

To release the electric parking brake, turn the ignition switch to the ON or RUN position, apply, and hold the brake pedal, and push down momentarily on the park brake control switch. When the electric parking brake is released the red park brake light turns off.

Automatic Electric Parking Brake Release

The parking brake will automatically release if the vehicle is running, placed into gear, and an attempt is made to drive away. Avoid rapid acceleration when the parking brake is applied to preserve parking brake lining life.

Section 3

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K20	Engine Control Module	• *Engine Controls Schematics 6-33* – 2.7L (L4B) engine • *Engine Controls Schematics 6-11* – 3.0L (LZ0) Diesel engine • *Engine Controls Schematics 6-54* – 5.7L (L76) or 6.6L (L78) engine	[Link target (target-id 305929-) not found] – 2.7L (L4B) engine [Link target (target-id 307247-) not found] – 3.0L (LZ0) Diesel engine [Link target (target-id 369397-) not found] – 5.7L (L76) or 6.6L (L78) engine	*K20 Engine Control Module: Programming and Setup 3-24*
K29FV	*K29FV Front Seat Heater Vent Control Module: Scan Tool Information 3-240*	*Heated/Cooled Seat Schematics 11-22*	[Link target (target-id 271038-) not found]	*K29FV Front Seat Heater Vent Control Module: Programming and Setup 3-26*
K36	*K36 Restraints Control Module: Scan Tool Information 3-241*	*SIR Schematics 10-67*	[Link target (target-id 57768-) not found]	*K36 Restraints Control Module: Programming and Setup 3-26*
K38	*K38 Chassis Control Module: Scan Tool Information 3-245*	*Differential Lock Schematics 4-6*	[Link target (target-id 345039-) not found]	*K38 Chassis Control Module: Programming and Setup 3-28*
K40	• *K40D Driver Seat Adjuster Memory Module: Scan Tool Information 3-250* • *K40P Passenger Seat Adjuster Memory Module: Scan Tool Information 3-254*	• *Driver Seat Schematics 11-3* • *Passenger Seat Schematics 11-9*	[Link target (target-id 168604-) not found]	• *K40D Driver Seat Adjuster Memory Module: Programming and Setup 3-29* • *K40P Passenger Seat Adjuster Memory Module: Programming and Setup 3-31*
K43	*K43 Power Steering Control Module: Scan Tool Information 3-256*	*Power Steering Schematics 12-3*	[Link target (target-id 119400-) not found]	*K43 Power Steering Control Module: Programming and Setup 3-34*
K56	Serial Data Gateway Module	*Data Communication Schematics 8-3*	[Link target (target-id 148099-) not found]	*K56 Serial Data Gateway Module: Programming and Setup 3-36*
K56U	Special Purpose Vehicle Module	*Data Communication Schematics 8-3*	[Link target (target-id 351765-) not found]	*K56U Special Purpose Vehicle Module: Programming and Setup 3-38*
K60	*K60 Column Lock Module: Scan Tool Information 3-314*	*Column Lock Schematics 12-8*	[Link target (target-id 129581-) not found]	*K60 Column Lock Module: Programming and Setup 3-39*
K61	Sunroof Control Module	*Sunroof Schematics 9-3*	[Link target (target-id 69302-) not found]	*K61 Sunroof Control Module: Programming and Setup 3-41*
K67	Trailer Brake Control Module	*Trailering Systems Schematics 1-57*	[Link target (target-id 327489-) not found]	*K67 Trailer Brake Control Module: Programming and Setup 3-42*
K68	*K68 Trailer Lighting Control Module: Scan Tool Information 3-315*	*Trailering Systems Schematics 1-57*	[Link target (target-id 327487-) not found]	*K68 Trailer Lighting Control Module: Programming and Setup 3-42*

Code	Control Module/Scan Tool Information	Schematic	Repair Instruction	Programming and Setup
K69	[Link target (target-id 292549-) not found]	• *Transfer Case Control Schematics 14-18* – MP 3010/3015 (NP0) transfer case • *Transfer Case Control Schematics 14-22* – MP 3023/3024/3025 (NQH) transfer case	[Link target (target-id 192307-) not found] – MP 3010/3015 (NP0) transfer case [Link target (target-id 162319-) not found] – MP 3023/3024/3025 (NQH) transfer case	*K69 Transfer Case Control Module: Programming and Setup 3-42*
K71	*K71 Transmission Control Module: Scan Tool Information (10L80 (MHS, MQC)) 3-315*	*Automatic Transmission Controls Schematics 14-3 Automatic Transmission Controls Schematics 14-8*	[Link target (target-id 284331-) not found]	*K71 Transmission Control Module: Programming and Setup (10L80 (MHS, MQC)) 3-43*
K73	*K73 Telematic Control Module: Scan Tool Information 3-323*	*OnStar/Telematics Schematics (2-Door) 5-14 OnStar/Telematics Schematics (4-Door) 5-16*	[Link target (target-id 328020-) not found]	*K73 Telematic Control Module: Programming and Setup (UE1) 3-44 K73 Telematic Control Module: Programming and Setup (UESUER) 3-46 K73 Telematic Control Module: Programming and Setup (UDA) 3-48*
K85P	*K85P Restraints Occupant Classification System Module - Passenger: Scan Tool Information 3-325*	*SIR Schematics 10-67*	[Link target (target-id 188211-) not found]	*K85P Restraints Occupant Classification System Module - Passenger: Programming and Setup 3-48*
K99	Steering Column Tilt Wheel and Telescope Control Module	*Tilt/Telescoping Steering Column Schematics 12-9*	[Link target (target-id 59054-) not found]	*K99 Steering Column Control Module: Programming and Setup 3-50*
K111	Fuel Pump Power Control Module	• *Engine Controls Schematics 6-33* – 2.7L (L4B) engine • *Engine Controls Schematics 6-11* – 3.0L (LZ0) Diesel engine • *Engine Controls Schematics 6-54* – 5.7L (L76) or 6.6L (L78) engine	[Link target (target-id 305911-) not found] – 2.7L (L4B) engine [Link target (target-id 307189-) not found] – 3.0L (LZ0) Diesel engine [Link target (target-id 369363-) not found] – 5.7L (L76) or 6.6L (L78) engine	*K111 Fuel Pump Power Control Module: Programming and Setup 3-50*
K115	Reductant Control Module	*Engine Controls Schematics 6-11* – 3.0L (LZ0) Diesel engine	[Link target (target-id 307748-) not found]	*K115 Reductant Control Module: Programming and Setup 3-50*
K124	*K124 Image Processing Module: Scan Tool Information (UGN) 3-326 K124 Image Processing Module: Scan Tool Information (UKL) 3-330*	*Driver Assistance Systems Schematics 10-4*	[Link target (target-id 335121-) not found]	*K124 Image Processing Module: Programming and Setup (without UKL) 3-51 K124 Image Processing Module: Programming and Setup (UKL) 3-52*
K160	*K160 Brake System Control Module: Scan Tool Information 3-333*	*Antilock Brake System Schematics 2-3*	[Link target (target-id 324093-) not found]	*K160 Brake System Control Module: Programming and Setup 3-54*
K180	*K180 Driver Monitoring System Control Module: Scan Tool Information 3-340*	*Driver Monitoring Schematics 10-27*	[Link target (target-id 58813-) not found]	*K180 Driver Monitoring System Control Module: Programming and Setup 3-57*

Code	Control Module/Scan Tool Information	Schematic	Repair Instruction	Programming and Setup
K182	*K182 Parking Assist Control Module: Scan Tool Information 3-340*	*Parking Assistance Systems Schematics 10-36*	[Link target (target-id 283577-) not found]	*K182 Parking Assist Control Module: Programming and Setup 3-58*
K183	*K183 UHF Short Range Low Energy Remote Control Access Transceiver: Scan Tool Information 3-344*	*Remote Function Schematics 10-49*	[Link target (target-id 282270-) not found]	*K183 UHF Short Range Low Energy Remote Control Access Transceiver: Programming and Setup 3-59*
K212	Gear Shift Control Module	*Electronic Transmission Range Selector Schematics 14-14*	[Link target (target-id 335605-) not found]	*K212 Gear Shift Control Module: Programming and Setup 3-60*
K219	*K219 Lighting Control Module: Scan Tool Information 3-238*	*Exterior Lights Schematics 1-19*	[Link target (target-id 321424-) not found]	*K219 Lighting Control Module: Programming and Setup 3-60*
K234	Rear Seat Heater Vent Control Module	*Heated/Cooled Seat Schematics 11-22*	[Link target (target-id 327143-) not found]	*K234 Rear Seat Heater Vent Control Module: Programming and Setup 3-62*
K299	*K299 Audio/Video Interface Module: Scan Tool Information 3-346*	*Video System Schematics 5-18*	[Link target (target-id 46985-) not found]	*K299 Audio/Video Interface Module: Programming and Setup 3-62*
T1	Accessory AC and DC Power Control Module	*Cigar Lighter/Power Outlet Schematics 8-993*	[Link target (target-id 342939-) not found]	*T1 Accessory AC and DC Power Control Module: Programming and Setup 3-65*
T3	*T3 Audio Amplifier: Scan Tool Information 3-347*	*Radio/Navigation System Schematics 5-3*	[Link target (target-id 343162-) not found]	*T3 Audio Amplifier: Programming and Setup 3-65*
T22	*T22 Wireless Accessory Charging Module: Scan Tool Information 3-347*	*Cigar Lighter/Power Outlet Schematics 8-993*	[Link target (target-id 355843-) not found] [Link target (target-id 355844-) not found]	*T22 Wireless Accessory Charging Module: Programming and Setup 3-66*

Repair Instructions

A11 Radio: Programming and Setup

Note:

- Always verify the module has the newest software available before replacing the module.
- Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. Check the 12–volt battery with a digital multimeter and ensure the voltage is above 12.5 volts. Install a battery maintainer or power supply that provides a steady and stable voltage. Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programing. If a battery maintainer is not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply.
- Turn OFF or disable systems that may put a load on the vehicles battery such as; interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- Programming must begin with the Ignition/Vehicle OFF. Programming will direct the appropriate control module(s) to change power mode as needed during the procedure, independent of the vehicle's power mode.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to NO.

Diagnostic Aids

- Check for Preliminary information or Technical Service bulletins before programming.

- During programming you may be required to select multiple calibrations depending upon vehicle equipment. Have the vehicle build/RPO information available during the following procedure to ensure the correct calibrations are selected.
- If Vehicle Wide Programming is available, USB file transfer may not be required, depending on the current software level, or the release of updates.
- Begin with the vehicle in the vehicle OFF power mode. The Service Programming System will power mode the vehicle.
- The vehicle can be moved to an alternate location when performing the USB portion of the programming steps which could allow the possibility of working on another vehicle while the USB programming event is taking place.
- When transferring a large file (>1GB) from the Techline Connect server to the PC then to a USB stick, below are some useful tips:
  - A wired connection to the network is the quickest, most stable way to download the file.
  - Wireless connections can be used, however slower connection speeds may increase the likelihood of errors to occur during file download.
  - Once the file is downloaded to the PC, it will reside in cache unless the cache is cleared. Any additional USB sticks made from that PC will be copied from cache and take a much shorter time compared to downloading from the server.
  - Never take a USB stick directly to a vehicle for updating without starting a Techline Connect session for that particular VIN. If software is already on the stick, Techline Connect will take only seconds to confirm software on the stick is the latest and correct for that vehicle. Failure to perform this step will result in no warranty claim code indicating a USB programming event was completed.
- The display may go black several times during the programming event.

Reference Information

Special Tools

- Use a USB C type flash drive for the vehicle, it is not recommended to use an adapter as this may cause the programming event to fail.
- USB 3.0 & above with NTFS format.
- Minimum size 32GB.
- EL-52100 Multiple Diagnostic Interface 2 (MDI 2)

For equivalent regional tools, refer to *Special Tools 3-85*.

Reprogram Control Module

To program an existing control module, perform the following procedure:

Note: The vehicle must remain in PARK and the driver's door closed during the programming procedure.

1. Before proceeding with Prepare for Delta Programming/USB File Transfer in SPS check for any Info Sys OTA updates under Settings>Updates on the vehicles infotainment screen. If an update is available, it is more efficient to install the OTA update. If the OTA will not install and Delta/USB programming is necessary, then before attempting Delta/USB programming you should first decline the update by selecting Details and then the Decline Update option, followed by confirming the Decline Update. If an Info Sys OTA update is not available, proceed with Delta/USB programming.

Note: For instructions on passive power moding, refer to *Power Mode Description and Operation 8-1220*

2. Ignition/vehicle OFF
3. On the SPS Supported Controllers screen, select A11 Radio – Prepare for Delta Programming/USB File Transfer and follow the on–screen instructions.
4. Connect a USB drive to the computer.
5. Perform a Quick Format on the USB drive to NTFS.

Note: If USB File Transfer is blocked, the software is the latest version. Programming is complete. Proceed to step 15

6. On the SPS Supported Controllers screen, select A11 Radio – USB File Transfer and follow the on–screen instructions.
7. Upon completion of the file transfer, properly eject the USB drive from the computer.
8. Ignition ON, infotainment system ON

Note: This step is not required and only needed when the radio screen is blank and monitoring USB update status is desired.

9. On the SPS Supported Controllers screen, select A11 Radio – USB File Download Status. This shows the status of the USB update on the SPS screen as the radio screen may go black during the update process.
10. Connect the USB drive to the USB port in the vehicle.
11. The infotainment system will recognize that updated files are available. Follow the infotainment display on-screen instructions and select Update when prompted. If no instructions immediately appear on the infotainment display, select the following menu options:
    - Home

- Settings
- System
- Updates

Note:
- If you receive an Update Failed screen, remove the USB, turn the vehicle OFF, and return to step 8. The update should continue where it stopped.
- The radio may display “Recovery Mode. Please Calibrate Device.”

12. Upon completion of programming, remove the USB drive.

Note: Programming will automatically turn the vehicle OFF.

13. On the SPS Supported Controllers screen, select A11 Radio – Programming and then follow the on-screen instructions.

Note: Failure to complete the following step may result in the radio software not being fully up to date.

14. Return to step 2 to continue updating the radio until step 6 on-screen instruction blocks USB File Transfer
15. Clear DTCs.
16. Ignition OFF, Retained Accessory Power (RAP) OFF, remove the key fob from range of the vehicle, and let the vehicle sit for five minutes. Retest system operation to verify the repair.

Replace and Program Control Module

To program a replacement control module, perform the following procedure:

Note: The vehicle must remain in PARK and the driver’s door closed during the programming procedure.

Note: For instructions on passive power moding, refer to *Power Mode Description and Operation 8-1220*

1. Ignition/vehicle OFF
2. On the SPS Supported Controllers screen, select A11 Radio – Prepare for Delta Programming/USB File Transfer and follow the on–screen instructions.
3. Perform the Serial Data Authentication Configuration.
4. Connect a USB drive to the computer.
5. Perform a Quick Format on the USB drive to NTFS.

Note: If USB File Transfer is blocked, the software is the latest version. Programming is complete. Proceed to step 15

6. On the SPS Supported Controllers screen, select A11 Radio – USB File Transfer and follow the on–screen instructions.
7. Upon completion of the file transfer, properly eject the USB drive from the computer.
8. Ignition ON, infotainment system ON

Note: This step is not required and only needed when the radio screen is blank and monitoring USB update status is desired.

9. On the SPS Supported Controllers screen, select A11 Radio – USB File Download Status. This shows the status of the USB update on the SPS screen as the radio screen may go black during the update process.
10. Connect the USB drive to the USB port in the vehicle.
11. The infotainment system will recognize that update files are available. Follow the infotainment display on-screen instructions and select Update when prompted. If no instructions immediately appear on the infotainment display, select the following menu options:
    - Home
    - Settings
    - System
    - Updates

Note:
- If you receive an Update Failed screen, remove the USB, turn the vehicle OFF, and return to step 8. The update should continue where it stopped.
- The radio may display “Recovery Mode. Please Calibrate Device.”

12. Upon completion of programming, remove the USB drive.

Note: Programming will automatically turn the vehicle OFF.

13. On the SPS Supported Controllers screen, select A11 Radio – Programming and then follow the on-screen instructions.

Note: Failure to complete the following step may result in the radio software not being fully up to date.

14. Return to step 1 to continue updating the radio until step 6 on-screen instruction blocks USB File Transfer

Note: If Setup fails, check for DTC U1962. If this DTC is set, perform the Serial Data Authentication Configuration. Then clear the DTC and repeat 13

15. On the SPS Supported Controllers screen, select A11 Radio – Setup and follow the on screen instructions.
16. Clear DTC’s
17. Ignition OFF, Retained Accessory Power (RAP) OFF, remove the key fob from range of the vehicle,

and let the vehicle sit for five minutes. Retest system operation to verify the repair.

XM Activation (If Equipped)

Important: On the radio being replaced, record the XM ID from the radio parts label or before removal tune to XM channel 0. This will be used during the call to XM radio to deactivate the receiver that has been removed from the vehicle.

1. Turn the replacement radio ON, tune to the XM channel 0, and record the radio ID. The radio ID will be needed for activation of the receiver.
2. Contact SiriusXM Dealer Support at (800) 852–9696 to activate the new receiver.
3. Park the vehicle outside in an area with an unobstructed view of the southern sky.
4. Leave the vehicle outside with the ignition switch in the ACC position and the radio on for 30 minutes to activate XM service.
5. Once activated, the radio will receive the remaining XM channels.

Unsuccessful Programming Recovery

Note:

- Ensure the *EL-52100* (MDI 2) is used when programming the vehicle. Using the EL-47955 (MDI) will result in a programming failure.
- It may be necessary to use another *EL-52100* (MDI 2) and/or cables to verify proper operation to eliminate the possibility of faulty equipment.
- If Ethernet programming fails, ensure there is no fault in the Ethernet circuits between the X84 Data Link Connector and K56 Serial Data Gateway Module. Refer to [Link target (target-id 300812-) not found] to diagnose these Ethernet circuits.

In the event of an interrupted or unsuccessful programming event, perform the following steps:

1. Exit Service Programming System (SPS) and disconnect all programming equipment from the vehicle.
2. Disconnect all battery voltage or ignition voltage sources from the control module.

Note: All voltage sources must be removed for a minimum of 10 min. This can be done several ways and should be completed by using the least intrusive way. This can vary depending on vehicle and control module location and can be done by one of the options listed below:

- Removing all fuses supplying battery voltage and ignition voltage to the control module.
- Disconnecting all harness connectors from the control module.
- Performing a 12 V battery disconnect by disconnecting the battery negative cable. Refer to [Link target (target-id 37733-) not found] .

3. Reconnect all battery voltage and ignition voltage sources to the control module.
4. Close down the current session of Techline Connect and reopen a new session.
5. Verify the control module, data link connector, and programming tool connections are secure and the tool software is up to date.
6. Ignition/Vehicle OFF, ensure that the key fob is inside the vehicle and not moved for the duration of the programming to prevent an inadvertent power mode change during programming.
7. Access the Service Programming System (SPS) and follow the on-screen instructions for the control module.
8. Verify the control module can be programmed.

⇒ **If the control module can not be programmed**

8.1. Ignition ON/Vehicle in Service Mode for 1 min.

8.2. Ignition/Vehicle OFF.

8.3. Access SPS and follow the on-screen instructions for Replace and Program Control Module above.

Note: If programming is still not successful after the second programming attempt, check the following:

- For facilities using an internet firewall, ensure firewall settings are not blocking file downloads and/or require elevated rights.
- For United States and Canada GM dealers, the appropriate firewall settings can be found in the GM DEALER INFRASTRUCTURE & SECURITY GUIDELINES (DISG) section 2.d.vii.

8.4. Verify the control module can be programmed.

⇒ If the control module can not be programmed, replace the control module.

⇓ If the control module can be programmed

8.5. Clear DTCs.

⇓ **If the control module can be programmed**

9. Clear DTCs.

Repair Instructions

Perform the *Diagnostic Repair Verification 3-421* after completing the repair.

Control Module References 3-4 for control module replacement, programming, and setup.

B174W Front View Camera - Windshield: Programming and Setup

Note:

- Always verify the module has the newest software available and all applicable bulletins are performed before replacing the module.
- Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. When required install the *EL-49642* SPS Programming Support Tool to maintain system voltage. If not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply. DO NOT connect a battery charger.
- Turn OFF or disable systems that may put a load on the vehicles battery such as; interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- During the programming procedure, follow the SPS prompts for the correct ignition switch position.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to NO.
- Anytime the B174W Frontview Camera - Windshield is removed from its mount, it must follow the Frontview Camera Module Learn procedure.
- If reprogramming an existing module that was previously calibrated, calibration is not required. The module retains its calibration settings during reprogramming. If a new module was programmed the module alignment must be calibrated. Using a scantool, initiate the learn procedure for B174W Frontview Camera - Windshield . The scan tool must remain connected and on the calibration screen during the entire process.

  Refer to [Link target (target-id 297673-) not found] .

Following Replacement of Windshield

The B174W Frontview Camera - Windshield must be calibrated, refer to [Link target (target-id 297673-) not found] .

Programming a New Control Module

To program a newB174W Frontview Camera - Windshield , perform the following procedure:

1. Ignition/Vehicle OFF
2. Connect the *EL-52100 MDI 2* Multiple Diagnostic Interface 2 to the computer using a USB cable. Wireless or Bluetooth connections may cause an interruption in the data transfer.
3. Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
4. Access the Service Programming System (SPS) and follow the on-screen instructions.
5. On the SPS Supported Controllers screen, select B174W Frontview Camera - Windshield – Programming and follow the on-screen instructions.
6. On the SPS Supported Controllers screen, select B174W Frontview Camera - Windshield – Setup **(if this option is available)** and follow the on-screen instructions.
7. Clear DTCs.
8. Perform the B174W Frontview Camera - Windshield learn procedure. Refer to [Link target (target-id 297673-) not found] .

Programming an Existing Control Module

Note: Due to continuous improvements, the on screen selections may vary from instructions below.

To program an existing B174W Frontview Camera - Windshield , perform the following procedure:

1. Ignition/Vehicle OFF
2. Connect the *EL-52100 MDI 2* Multiple Diagnostic Interface 2 to the computer using a USB cable. Wireless or Bluetooth connections may cause an interruption in the data transfer.
3. Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
4. Access the Service Programming System (SPS) and follow the on-screen instructions.
5. On the SPS Supported Controllers screen, select B174W Frontview Camera - Windshield – Programming and follow the on-screen instructions.
6. On the SPS Supported Controllers screen, select B174W Frontview Camera - Windshield – Setup **(if this option is available)** and follow the on-screen instructions.
7. Clear DTCs.

Unsuccessful Programming Recovery

In the event of an interrupted or unsuccessful programming event, perform the following steps:

Note: Unsuccessful programming attempts may be caused by a weak, slow, or unstable WiFi connection. Connecting computer to facility network via wired connection may resolve module programming issues.

1. DO NOT turn the ignition OFF. Ensure that all B174W Frontview Camera - Windshield , DLC and programming tool connections are secure and the TIS terminal operating software is up to date.
2. Attempt to reprogram the B174W Frontview Camera - Windshield .
3. If the B174W Frontview Camera - Windshield can still not be programmed, turn the ignition OFF for at least one minute.
4. Turn the ignition ON and attempt to reprogram the B174W Frontview Camera - Windshield . The B174W Frontview Camera - Windshield should program.

   ⇒ If the B174W Frontview Camera - Windshield still cannot be programmed, replace the B174W Frontview Camera - Windshield .

B233B Forward Range Radar Sensor - Long Range: Programming and Setup

Note:

- DO NOT program a control module unless directed to by a service procedure or a service bulletin. If the Long Range Radar Sensor Module is not properly configured with the correct calibration software, the Long Range Radar Sensor Module will not control all of the vehicle features properly.
- Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming or programming failure, Long Range Radar Sensor Module damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. When required install the *EL-49642* SPS Programming Support Tool to maintain system voltage. If not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply. DO NOT connect a battery charger.
- Turn OFF or disable systems that may put a load on the vehicles battery such as; interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- During the programming procedure, follow the SPS prompts for the correct ignition switch position.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to NO.

Reprogram Radar Sensor Module - Long Range

To reprogram an existing Long Range Radar Sensor Module, perform the following procedure:

1. Ignition/Vehicle OFF.
2. Access the Service Programming System (SPS) and follow the on-screen instructions.
3. On the SPS Supported Controllers screen, select B233B Radar Sensor Module - Long Range – Programming and follow the on-screen instructions.
4. Ignition OFF and all vehicle systems OFF. It may take up to 2 minutes for all vehicle systems to power down.

Replace and Program Radar Sensor Module - Long Range

To program a replacement Long Range Radar Sensor Module, perform the following procedure:

1. Ignition/Vehicle OFF.
2. Access the Service Programming System (SPS) and follow the on-screen instructions.
3. On the SPS Supported Controllers screen, select B233B Radar Sensor Module - Long Range – Programming and follow the on-screen instructions.
4. Ignition OFF and all vehicle systems OFF. It may take up to 2 minutes for all vehicle systems to power down.
5. Following programming, the module alignment must be calibrated.

   Refer to [Link target (target-id 283687-) not found] .

Unsuccessful Programming Recovery

In the event of an interrupted or unsuccessful programming event, perform the following steps:

1. Ignition ON. Ensure the control module, DLC and programming tool connections are secure and the SPS software is up to date.
2. Verify the control module can be reprogrammed.

⇒ **If the control module cannot be reprogrammed**

2.1. Ignition OFF for one minute, ignition ON.

2.2. Verify the control module can be reprogrammed.

⇒ If the control module cannot be reprogrammed, replace the control module.

⇓ If the control module can be reprogrammed.

2.3. All OK.

⇓ **If the control module can be reprogrammed**

3. All OK.

Repair Instructions

Perform the *Diagnostic Repair Verification 3-421* after completing the repair.

Control Module References 3-4 for control module replacement, programming and setup.

B233LF Short Range Radar Sensor - Left Front: Programming and Setup

Note:

- Always verify the module has the newest software available before replacing the module.
- Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. When required install the *EL-49642* SPS Programming Support Tool to maintain system voltage. If not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply. DO NOT connect a battery charger.
- Turn OFF or disable systems that may put a load on the vehicles battery such as; interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- During the programming procedure, follow the SPS prompts for the correct ignition switch position.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to NO.

Diagnostic Aids

Note: This programming document applies to the B233 Radar Sensor Module – Short Range. For B218 Side Object Sensor Module (if equipped) refer to Side Object Sensor Programming and Setup.

Replace and Program Control Module or Reprogram Control Module

To program a replacement or an existing control module, perform the following procedure:

1. Ignition/Vehicle OFF
2. Access the Service Programming System (SPS) and follow the on-screen instructions.
3. On the SPS Supported Controllers screen, select B233 Radar Sensor Module – Short Range - Programming and follow the on-screen instructions.
4. Ignition/vehicle ON. Run Clear Short Range Radar Sensor Vehicle Position located in the scan tool (GDS2) under Configuration/Reset Functions in the B233 Short Range Radar Sensor.
5. Ignition/Vehicle OFF
6. Ignition/Vehicle ON
7. Clear DTCs.

Unsuccessful Programming Recovery

In the event of an interrupted or unsuccessful programming event, perform the following steps:

1. Ignition ON. Ensure the control module, DLC and programming tool connections are secure and the SPS software is up to date.
2. Verify the control module can be reprogrammed.

⇒ **If the control module cannot be reprogrammed**

2.1. Ignition OFF for one minute, ignition ON.

2.2. Verify the control module can be reprogrammed.

⇒ If the control module cannot be reprogrammed, replace the control module.

⇓ If the control module can be reprogrammed.

2.3. All OK.

⇓ **If the control module can be reprogrammed**

3. All OK.

Repair Instructions

Perform the *Diagnostic Repair Verification 3-421* after completing the repair.

Control Module References 3-4 for Control Module replacement, programming and setup

B233LR Short Range Radar Sensor - Left Rear: Programming and Setup

Note:

- Always verify the module has the newest software available before replacing the module.
- Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. When required install the *EL-49642* SPS Programming Support Tool to maintain

system voltage. If not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply. DO NOT connect a battery charger.

- Turn OFF or disable systems that may put a load on the vehicles battery such as; interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- During the programming procedure, follow the SPS prompts for the correct ignition switch position.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to NO.

Diagnostic Aids

Note: This programming document applies to the B233 Radar Sensor Module – Short Range. For B218 Side Object Sensor Module (if equipped) refer to Side Object Sensor Programming and Setup.

Replace and Program Control Module or Reprogram Control Module

To program a replacement or an existing control module, perform the following procedure:

1. Ignition/Vehicle OFF.
2. Access the Service Programming System (SPS) and follow the on-screen instructions.
3. On the SPS Supported Controllers screen, select B233 Radar Sensor Module – Short Range - Programming and follow the on-screen instructions.
4. Ignition/vehicle ON. Run Clear Short Range Radar Sensor Vehicle Position located in the scan tool (GDS2) under Configuration/Reset Functions in the B233 Short Range Radar Sensor.
5. Ignition/Vehicle OFF.
6. Ignition/Vehicle ON.
7. Clear DTCs.

Unsuccessful Programming Recovery

In the event of an interrupted or unsuccessful programming event, perform the following steps:

1. Ignition/Vehicle ON. Ensure the control module, DLC and programming tool connections are secure and the SPS software is up to date.
2. Verify the control module can be reprogrammed.

⇒ **If the control module cannot be reprogrammed**

2.1. Ignition OFF for one minute, ignition ON.

2.2. Verify the control module can be reprogrammed.

⇒ If the control module cannot be reprogrammed, replace the control module.

⇓ If the control module can be reprogrammed.

2.3. All OK.

⇓ **If the control module can be reprogrammed**

3. All OK.

Repair Instructions

Perform the *Diagnostic Repair Verification 3-421* after completing the repair.

Control Module References 3-4 for Control Module replacement, programming and setup

B233RF Short Range Radar Sensor - Right Front: Programming and Setup

Note:

- Always verify the module has the newest software available before replacing the module.
- Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. When required install the *EL-49642* SPS Programming Support Tool to maintain system voltage. If not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply. DO NOT connect a battery charger.
- Turn OFF or disable systems that may put a load on the vehicles battery such as; interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- During the programming procedure, follow the SPS prompts for the correct ignition switch position.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to NO.

Diagnostic Aids

Note: This programming document applies to the B233 Radar Sensor Module – Short Range. For B218 Side Object Sensor Module (if equipped) refer to Side Object Sensor Programming and Setup.

Replace and Program Control Module or Reprogram Control Module

To program a replacement or an existing control module, perform the following procedure:

1. Ignition/Vehicle OFF
2. Access the Service Programming System (SPS) and follow the on-screen instructions.

3. On the SPS Supported Controllers screen, select B233 Radar Sensor Module – Short Range - Programming and follow the on-screen instructions.
4. Ignition/vehicle ON. Run Clear Short Range Radar Sensor Vehicle Position located in the scan tool (GDS2) under Configuration/Reset Functions in the B233 Short Range Radar Sensor.
5. Ignition/Vehicle OFF
6. Ignition/Vehicle ON
7. Clear DTCs.

Unsuccessful Programming Recovery

In the event of an interrupted or unsuccessful programming event, perform the following steps:

1. Ignition ON. Ensure the control module, DLC and programming tool connections are secure and the SPS software is up to date.
2. Verify the control module can be reprogrammed.

⇒ **If the control module cannot be reprogrammed**

2.1. Ignition OFF for one minute, ignition ON.

2.2. Verify the control module can be reprogrammed.

⇒ If the control module cannot be reprogrammed, replace the control module.

⇓ If the control module can be reprogrammed.

2.3. All OK.

⇓ **If the control module can be reprogrammed**

3. All OK.

Repair Instructions

Perform the *Diagnostic Repair Verification 3-421* after completing the repair.

Control Module References 3-4 for Control Module replacement, programming and setup

B233RR Short Range Radar Sensor - Right Rear: Programming and Setup

Note:

- Always verify the module has the newest software available before replacing the module.
- Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. When required install the *EL-49642* SPS Programming Support Tool to maintain system voltage. If not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply. DO NOT connect a battery charger.
- Turn OFF or disable systems that may put a load on the vehicles battery such as; interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- During the programming procedure, follow the SPS prompts for the correct ignition switch position.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to NO.

Diagnostic Aids

Note: This programming document applies to the B233 Radar Sensor Module – Short Range. For B218 Side Object Sensor Module (if equipped) refer to Side Object Sensor Programming and Setup.

Replace and Program Control Module or Reprogram Control Module

To program a replacement or an existing control module, perform the following procedure:

1. Ignition/Vehicle OFF.
2. Access the Service Programming System (SPS) and follow the on-screen instructions.
3. On the SPS Supported Controllers screen, select B233 Radar Sensor Module – Short Range - Programming and follow the on-screen instructions.
4. Ignition/vehicle ON. Run Clear Short Range Radar Sensor Vehicle Position located in the scan tool (GDS2) under Configuration/Reset Functions in the B233 Short Range Radar Sensor.
5. Ignition/Vehicle OFF.
6. Ignition/Vehicle ON.
7. Clear DTCs.

Unsuccessful Programming Recovery

In the event of an interrupted or unsuccessful programming event, perform the following steps:

1. Ignition/Vehicle ON. Ensure the control module, DLC and programming tool connections are secure and the SPS software is up to date.
2. Verify the control module can be reprogrammed.

⇒ **If the control module cannot be reprogrammed**

2.1. Ignition OFF for one minute, ignition ON.

2.2. Verify the control module can be reprogrammed.

⇒ If the control module cannot be reprogrammed, replace the control module.

⇓ If the control module can be reprogrammed.

2.3. All OK.

⇓ **If the control module can be reprogrammed**

3. All OK.

Repair Instructions

Perform the *Diagnostic Repair Verification 3-421* after completing the repair.

Control Module References 3-4 for Control Module replacement, programming and setup

B233SL Short Range Radar Rear Side Sensor - Left: Programming and Setup

Note:

- Always verify the module has the newest software available before replacing the module.
- Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. When required install the *EL-49642* SPS Programming Support Tool to maintain system voltage. If not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply. DO NOT connect a battery charger.
- Turn OFF or disable systems that may put a load on the vehicles battery such as; interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- During the programming procedure, follow the SPS prompts for the correct ignition switch position.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to NO.

Diagnostic Aids

Note: This programming document applies to the B233 Radar Sensor Module – Short Range. For B218 Side Object Sensor Module (if equipped) refer to Side Object Sensor Programming and Setup.

Replace and Program Control Module or Reprogram Control Module

To program a replacement or an existing control module, perform the following procedure:

1. Ignition/Vehicle OFF.
2. Access the Service Programming System (SPS) and follow the on-screen instructions.
3. On the SPS Supported Controllers screen, select B233 Radar Sensor Module – Short Range - Programming and follow the on-screen instructions.
4. Ignition/vehicle ON. Run Clear Short Range Radar Sensor Vehicle Position located in the scan tool (GDS2) under Configuration/Reset Functions in the B233 Short Range Radar Sensor.
5. Ignition/Vehicle OFF.
6. Ignition/Vehicle ON.
7. Clear DTCs.

Unsuccessful Programming Recovery

In the event of an interrupted or unsuccessful programming event, perform the following steps:

1. Ignition/Vehicle ON. Ensure the control module, DLC and programming tool connections are secure and the SPS software is up to date.
2. Verify the control module can be reprogrammed.

⇒ **If the control module cannot be reprogrammed**

2.1. Ignition OFF for one minute, ignition ON.

2.2. Verify the control module can be reprogrammed.

⇒ If the control module cannot be reprogrammed, replace the control module.

⇓ If the control module can be reprogrammed.

2.3. All OK.

⇓ **If the control module can be reprogrammed**

3. All OK.

Repair Instructions

Perform the *Diagnostic Repair Verification 3-421* after completing the repair.

Control Module References 3-4 for Control Module replacement, programming and setup

B233SR Short Range Radar Rear Side Sensor - Right: Programming and Setup

Note:

- Always verify the module has the newest software available before replacing the module.
- Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. When required install the *EL-49642* SPS Programming Support Tool to maintain

system voltage. If not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply. DO NOT connect a battery charger.

- Turn OFF or disable systems that may put a load on the vehicles battery such as; interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- During the programming procedure, follow the SPS prompts for the correct ignition switch position.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to NO.

Diagnostic Aids

Note: This programming document applies to the B233 Radar Sensor Module – Short Range. For B218 Side Object Sensor Module (if equipped) refer to Side Object Sensor Programming and Setup.

Replace and Program Control Module or Reprogram Control Module

To program a replacement or an existing control module, perform the following procedure:

1. Ignition/Vehicle OFF.
2. Access the Service Programming System (SPS) and follow the on-screen instructions.
3. On the SPS Supported Controllers screen, select B233 Radar Sensor Module – Short Range - Programming and follow the on-screen instructions.
4. Ignition/vehicle ON. Run Clear Short Range Radar Sensor Vehicle Position located in the scan tool (GDS2) under Configuration/Reset Functions in the B233 Short Range Radar Sensor.
5. Ignition/Vehicle OFF.
6. Ignition/Vehicle ON.
7. Clear DTCs.

Unsuccessful Programming Recovery

In the event of an interrupted or unsuccessful programming event, perform the following steps:

1. Ignition/Vehicle ON. Ensure the control module, DLC and programming tool connections are secure and the SPS software is up to date.
2. Verify the control module can be reprogrammed.

⇒ **If the control module cannot be reprogrammed**

2.1. Ignition OFF for one minute, ignition ON.

2.2. Verify the control module can be reprogrammed.

⇒ If the control module cannot be reprogrammed, replace the control module.

⇓ If the control module can be reprogrammed.

2.3. All OK.

⇓ **If the control module can be reprogrammed**

3. All OK.

Repair Instructions

Perform the *Diagnostic Repair Verification 3-421* after completing the repair.

Control Module References 3-4 for Control Module replacement, programming and setup

K4 Assist Step Control Module: Programming and Setup

Note:

- DO NOT program a control module unless directed to by a service procedure or a service bulletin. If the ECU is not properly configured with the correct calibration software, the ECU will not control all of the vehicle features properly.
- Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or ECU damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. When required, install a battery maintainer or power supply that provides a steady and stable voltage. Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programing. If a battery maintainer is not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply.
- Turn OFF or disable systems that may put a load on the vehicles battery such as; interior lights, exterior lights (including daytime running lights), HVAC, , etc.
- During the programming procedure, follow the SPS prompts for the correct ignition switch position.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to NO.

Assist Step Learn

If service was performed in which the assist steps were put into the service position, it is necessary to perform the Self Test learn. Refer to: [Link target (target-id 328895-) not found]

Programming a New Control Module

1. Ignition/Vehicle OFF. Ensure that the key fob is inside the vehicle an not moved for the duration of the programming to prevent an inadvertent power mode change during programming. If the key fob is not inside the vehicle, the serial data authentication configuration procedure which runs automatically at the end of the programming step will fail even though the programming appears to run successfully. If the serial data authentication configuration procedure fails, DTC U1962 will set and / or the setup step will fail or be incomplete.
    1.1. Disconnect Wi-Fi dongle from MDI 2. Install EL-52100 (MDI 2) using wired USB Connection from MDI 2 to computer / laptop. Using the EL-49755 (MDI) will result in a programming failure.
    1.2. Install an approved battery maintainer or power supply that provides a steady and stable voltage to support the 12V system during SPS programming events.
2. Access the Service Programming System (SPS) and follow the on-screen instructions.
3. On the SPS Supported Controllers screen, under Select Controller, select K4 Assist Step Control Module.
4. On the SPS Supported Controllers screen, under Select Function / Sequence, select Programming and follow the on-screen instructions.

Note: If the Setup step fails and DTC U1962 sets in the K4 Assist Step Control Module, perform the Serial Data Authentication Configuration procedure and then repeat the Setup step again. Refer to: *Serial Data Authentication Configuration 3-66*

6. Following the completion of the programming event, perform the Self Test learn. Refer to: [Link target (target-id 328895-) not found]

Programming an Existing Control Module

To program an existing K4 Assist Step Control Module, perform the following procedure.

1. Ignition/Vehicle OFF. Ensure that the key fob is inside the vehicle an not moved for the duration of the programming to prevent an inadvertent power mode change during programming. If the key fob is not inside the vehicle, the serial data authentication configuration procedure which runs automatically at the end of the programming step will fail even though the programming appears to run successfully. If the serial data authentication configuration procedure fails, DTC U1962 will set and / or the setup step will fail or be incomplete.
    1.1. Disconnect Wi-Fi dongle from MDI 2. Install EL-52100 (MDI 2) using wired USB Connection from MDI 2 to computer / laptop. Using the EL-49755 (MDI) will result in a programming failure.
    1.2. Install an approved battery maintainer or power supply that provides a steady and stable voltage to support the 12V system during SPS programming events.
2. Access the Service Programming System (SPS) and follow the on-screen instructions.
3. On the SPS Supported Controllers screen, under Select Controller, select K4 Assist Step Control Module.
4. On the SPS Supported Controllers screen, under Select Function / Sequence, select Programming and follow the on-screen instructions.
5. Following the completion of the programming event, perform the Self Test learn. Refer to: [Link target (target-id 328895-) not found]

Unsuccessful Programming Recovery

Note:

- Ensure the *EL-52100* (MDI 2) is used when programming the vehicle. Using the EL-47955 (MDI) will result in a programming failure.
- It may be necessary to use another *EL-52100* (MDI 2) and/or cables to verify proper operation to eliminate the possibility of faulty equipment.
- If Ethernet programming fails, ensure there is no fault in the Ethernet circuits between the X84 Data Link Connector and K56 Serial Data Gateway Module.

In the event of an interrupted or unsuccessful programming event, perform the following steps:

1. Exit Service Programming System (SPS) and disconnect all programming equipment from the vehicle.
2. Disconnect all battery voltage or ignition voltage sources from the K4 Assist Step Control Module. All voltage sources must be removed for a minimum of 10 min. This can be done several ways and should be completed by using the least intrusive way. This can vary depending on vehicle and control module location and can be done by one of the options listed below:
    - Removing all fuses supplying battery voltage and ignition voltage to the control module.
    - Disconnecting all harness connectors from the control module.
    - Performing a 12 V battery disconnect by disconnecting the battery negative cable. Refer to [Link target (target-id 37733-) not found] .

3. Reconnect all battery voltage and ignition voltage sources to the K4 Assist Step Control Module.
4. Close down the current session of Techline Connect and reopen a new session.
5. Verify the K4 Assist Step Control Module, X84 Data Link Connector, and programming tool connections are secure and the tool software is up to date.
6. Ignition/Vehicle OFF, ensure that the key fob is inside the vehicle and not moved for the duration of the programming to prevent an inadvertent power mode change during programming.
7. Access the Service Programming System (SPS) and follow the on-screen instructions for the K4 Assist Step Control Module.
8. Verify the K4 Assist Step Control Module can be programmed.

⇒ **If the control module cannot be reprogrammed**

8.1. Ignition OFF for one minute, ignition ON.

8.2. Ignition ON/Vehicle OFF.

8.3. Access SPS and follow the on-screen instructions for the K4 Assist Step Control Module.

Note: If programming is still not successful after the second programming attempt, check the following:

- For facilities using an internet firewall, ensure firewall settings are not blocking file downloads and/or require elevated rights.
- For United States and Canada GM dealers, the appropriate firewall settings can be found in the GM DEALER INFRASTRUCTURE & SECURITY GUIDELINES (DISG) section 2.d.vii.
- For optimal consistency during the reprogramming session, we recommend connecting the computer/laptop to a hardwired Ethernet cable, as the large software file size may affect stability.

8.5. Verify the K4 Assist Step Control Module can be reprogrammed.

⇒ If the control module cannot be reprogrammed, replace the K4 Assist Step Control Module.

⇓ If the K4 Assist Step Control Module can be reprogrammed

⇓ **If the control module can be reprogrammed**

9. Following the completion of the programming event, perform the Self Test learn. Refer to: [Link target (target-id 328895-) not found]

K9 Body Control Module: Programming and Setup

Note:

- Always verify the module has the newest software available before replacing the module.
- Do NOT program a control module unless directed to by a service procedure or a service bulletin. If the control module is not properly configured with the correct calibration software, the control module will not control all of the vehicle features properly.
- Verify the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Turn OFF or disable systems that may put a load on the vehicle's battery such as interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- Programming must begin with the Vehicle OFF. Programming will direct the appropriate control module(s) to change power mode as needed during the procedure, independent of the vehicle's power mode.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/Maintenance (I/M) system status indicators to No.

Reference Information

Special Tools

- *EL-52545* Tire Pressure Monitor Sensor and RF Diagnostic Tool or *EL-50448* Tire Pressure Monitor Sensor Activation Tool
- *EL-52100* Multiple Diagnostic Interface 2 (MDI 2)

For equivalent regional tools, refer to *Special Tools 3-85*.

Programming a New Control Module

To program a replacement K9 Body Control Module (BCM), perform the following procedure:

Note: Verify all control modules are connected and communicating before attempting to program the K9 Body Control Module.

1. Vehicle OFF, ensure that the key fob is inside the vehicle and not moved for the duration of the programming to prevent an inadvertent power mode change during programming. *If the key fob is not inside the vehicle, the serial data authentication configuration procedure which runs automatically at the end of the programming step will fail even though the programming appears to run successfully. If this procedure fails, the setup step will fail or be incomplete.*
2. Disconnect **Wi-Fi dongle** if it is currently connected to *EL-52100* Multiple Diagnostic Interface 2 (MDI 2).

3. Install **EL-52100 (MDI 2)** using wired USB Connection from MDI 2 to computer and verify it is working properly to prevent programming failure due to unintended wireless drops. *Using the EL-47955 (MDI) will result in a programming failure.*
4. Install an approved battery maintainer or power supply that provides a steady and stable voltage to support the 12V system during SPS programming events. *Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programming. If a battery maintainer is not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply.*
5. Access the **Techline Connect (TLC)** system and select **Service Programming System (SPS)**.
6. Select **Replace and Reprogram** option from **Selected Programming Process** field on the upper right of the SPS screen and then click on **Next** button in the lower right of the SPS screen.
7. On the SPS Supported Controllers screen, under **Select Controller**, select **K9 Body Control Module**.

Note: If unable to power mode vehicle as instructed by the SPS screen prompt during programming process, press Next on the SPS screen prompt. Then the driver door must be opened/closed continuously until the vehicle enters power mode.

8. On the SPS Supported Controllers screen, under **Select Function/Sequence**, select **Programming** and follow the on-screen instructions.
9. Place the keyless entry transmitter in the programming pocket prior to proceeding with the next step. All additional transmitters must be at least 3 m (9.8 ft) away from the vehicle. Refer to the Remote Keyless Entry (RKE) System Operation document in the owner manual for the exact pocket location. This document is located in the Keys, Doors, and Windows > Keys and Locks category.

Note:
- To prevent errors or immobilizer learn failure, the vehicle must be in Park (for automatic transmission) or Neutral with park brake applied (for manual transmission).
- If DTC B1987 set immediately after programming a replacement K9 Body Control Module, the Immobilizer Learn procedure was not properly completed. The Immobilizer Learn procedure needs to be performed again.
- The Immobilizer Learn process may take between 10-12 min and progress will appear to have stopped during this process. This is a normal security timer response and a restart should not be performed.

10. On the SPS Supported Controllers screen, select **Z1 Immobilizer Learn**. On the next screen, select **Body Control Module IMMO Learn with Existing Transponder or Remote Key** and follow the on-screen instructions. When Immobilizer Learn is complete, press the **Unlock** button on the keyless entry transmitter to allow the keyless entry transmitter to exit the Immobilizer Learn mode.

Note:
- When performing the Tire Pressure Monitor Sensor Learn during K9 Body Control Module setup, the *EL-52545* Tire Pressure Monitor Sensor and RF Diagnostic Tool must be used to activate each tire pressure sensor.
- If the Setup step fails and DTC U1962 or U19A3 is set in the K9 Body Control Module, perform the Serial Data Authentication Configuration procedure and then repeat the Setup step again. Refer to: *Serial Data Authentication Configuration 3-66*.

11. On the SPS Supported Controllers screen, under **Select Function/Sequence**, select **Setup** and follow the on-screen instructions.
12. Check the driver information center display for additional messages regarding further calibration instructions. If there are no additional driver information center instructions present, programming is complete.
13. Clear DTCs.

Programming an Existing Control Module

To program an existing K9 Body Control Module, perform the following procedure:

1. Vehicle OFF, ensure that the key fob is inside the vehicle and not moved for the duration of the programming to prevent an inadvertent power mode change during programming.
2. Disconnect **Wi-Fi dongle** if it is currently connected to *EL-52100* Multiple Diagnostic Interface 2 (MDI 2).
3. Install **EL-52100 (MDI 2)** using wired USB Connection from MDI 2 to computer and verify it is working properly to prevent programming failure due to unintended wireless drops. *Using the EL-47955 (MDI) will result in a programming failure.*
4. Install an approved battery maintainer or power supply that provides a steady and stable voltage to support the 12V system during SPS programming

events. *Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programming. If a battery maintainer is not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply.*

5. Access the **Techline Connect (TLC)** system and select **Service Programming System (SPS)**.
6. Select **Reprogram** option from **Selected Programming Process** field on the upper right of the SPS screen and then click on **Next** button in the lower right of the SPS screen.
7. On the SPS Supported Controllers screen, under **Select Controller**, select **K9 Body Control Module**.
8. On the SPS Supported Controllers screen, under **Select Function/Sequence**, select **Programming** and follow the on-screen instructions.
9. Check the driver information center display for additional messages regarding further calibration instructions. If there are no additional driver information center instructions present, programming is complete.
10. Clear DTCs.

Unsuccessful Programming Recovery

Note:

- **For Serial Data Authentication Configuration error/failure, refer to the Troublshooting section of the** *Serial Data Authentication Configuration 3-66* **procedure.**
- Ensure the *EL-52100* (MDI 2) is used when programming the vehicle. Using the EL-47955 (MDI) will result in a programming failure.
- It may be necessary to use another *EL-52100* (MDI 2) and/or cables to verify proper operation to eliminate the possibility of faulty equipment.
- If Ethernet programming fails, ensure there is no fault in the Ethernet circuits between the X84 Data Link Connector and K56 Serial Data Gateway Module.

In the event of an interrupted or unsuccessful programming event, perform the following steps:

1. Exit Service Programming System (SPS) and disconnect all programming equipment from the vehicle.
2. Disconnect all battery voltage or ignition voltage sources from the control module. All voltage sources must be removed for a minimum of 10 min. This can be done several ways and should be completed by using the least intrusive way. This can vary depending on vehicle and control module location and can be done by one of the options listed below:
   - Removing all fuses supplying battery voltage and ignition voltage to the control module.
   - Disconnecting all harness connectors from the control module.

Warning: Always ensure the Battery Maintenance Mode is inactive before disconnecting the low voltage 12 volt battery (or batteries). This mode can be active with the ignition off, regardless of whether the vehicle charging cord is plugged in or not. When this mode is active, the on-board high voltage battery charger(s) will energize the 12 volt battery cables and charge the 12 volt battery (or batteries). Disconnecting any battery cables while this mode is active may result in an electrical shock or a burn from hot battery cable leads.

   - **For electric vehicle (EV):** Check the 12 V battery voltage with a digital multimeter before disconnecting any battery cables leads. If the voltage is 13.5 V or above, the Battery Maintenance Mode is active. The technician must wait for the T18 Battery Charger to deactivate before disconnecting the battery negative cable. For more information, refer to *Charging System Description and Operation 6-184* . With Battery Maintenance Mode inactive, perform a 12 V battery disconnect by disconnecting the battery negative cable. Refer to [Link target (target-id 37733-) not found] .
   - **For internal combustion engine vehicle (ICE):** Performing a 12 V battery disconnect by disconnecting the battery negative cable. Refer to [Link target (target-id 37733-) not found] .
3. Reconnect all battery voltage and ignition voltage sources to the control module.
4. Close down the current session of Techline Connect and reopen a new session.
5. Verify the control module, X84 Data Link Connector, and programming tool connections are secure and the tool software is up to date.
6. Vehicle OFF, ensure that the key fob is inside the vehicle and not moved for the duration of the programming to prevent an inadvertent power mode change during programming.
7. Access the Service Programming System (SPS) and follow the on-screen instructions for the control module.
8. Verify the control module can be programmed.

⇒ **If the control module can not be programmed**

8.1. Vehicle in Service Mode for 1 min.

8.2. Vehicle OFF.

8.3. Access SPS and follow the on-screen instructions for the control module.

Note: If programming is still not successful after the second programming attempt, check the following:

- For facilities using an internet firewall, ensure firewall settings are not blocking file downloads and/or require elevated rights.
- For United States and Canada GM dealers, the appropriate firewall settings can be found in the GM DEALER INFRASTRUCTURE & SECURITY GUIDELINES (DISG).
- For optimal consistency during the reprogramming session, we recommend connecting the computer/ laptop to a hardwired Ethernet cable, as the large software file size may affect stability.

8.4. Verify the control module can be programmed.

⇒ If the control module can not be programmed, replace the control module.

⇓ If the control module can be programmed

8.5. Clear DTCs.

⇓ **If the control module can be programmed**

9. Clear DTCs.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair: *Diagnostic Repair Verification 3-421*.

For control module replacement, programming, and setup, refer to: *Control Module References 3-4*.

K19 Suspension Control Module: Programming and Setup

Note:

- Always verify the module has the newest software available before replacing the module.
- Do NOT program a control module unless directed to by a service procedure or a service bulletin. If the control module is not properly configured with the correct calibration software, the control module will not control all of the vehicle features properly.
- Verify the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Turn OFF or disable systems that may put a load on the vehicle's battery such as interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- Programming must begin with the Vehicle OFF. Programming will direct the appropriate control module(s) to change power mode as needed during the procedure, independent of the vehicle's power mode.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to No.

Reference Information

Special Tools
EL-52100 Multiple Diagnostic Interface 2 (MDI 2)

Programming an Existing or New Control Module

This control module does not require SPS programming or any setup procedures.

This control module does not require SPS programming but does require the following setup procedures after a new control module is installed:

Programming a New Control Module

To program a new control module, perform the following procedure:

Note: Verify all control modules are connected and communicating before attempting to program the K19 Suspension Control Module.

1. Vehicle OFF, ensure that the key fob is inside the vehicle and not moved for the duration of the programming to prevent an inadvertent power mode change during programming. *If the key fob is not inside the vehicle, the serial data authentication configuration procedure which runs automatically at the end of the programming step will fail even though the programming appears to run successfully. If this procedure fails, the setup step will fail or be incomplete.*
2. Disconnect **Wi-Fi dongle** if it is currently connected to *EL-52100* Multiple Diagnostic Interface 2 (MDI 2).
3. Install **EL-52100 (MDI 2)** using wired USB Connection from MDI 2 to computer and verify it is working properly to prevent programming failure due to unintended wireless drops. *Using the EL-47955 (MDI) will result in a programming failure.*
4. Install an approved battery maintainer or power supply that provides a steady and stable voltage to support the 12V system during SPS programming events. *Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programming. If a battery maintainer is not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply.*

5. Access the **Techline Connect (TLC)** system and select **Service Programming System (SPS)**.
6. Select **Replace and Reprogram** option from **Selected Programming Process** field on the upper right of the SPS screen and then click on **Next** button in the lower right of the SPS screen.
7. On the SPS Supported Controllers screen, under **Select Controller**, select **K19 Suspension Control Module**.
8. On the SPS Supported Controllers screen, under **Select Function/Sequence**, select **Programming** and follow the on-screen instructions.
9. Clear DTCs.

Programming an Existing Control Module

To program an existing control module, perform the following procedure:

1. Vehicle OFF, ensure that the key fob is inside the vehicle and not moved for the duration of the programming to prevent an inadvertent power mode change during programming.
2. Disconnect **Wi-Fi dongle** if it is currently connected to *EL-52100* Multiple Diagnostic Interface 2 (MDI 2).
3. Install **EL-52100 (MDI 2)** using wired USB Connection from MDI 2 to computer and verify it is working properly to prevent programming failure due to unintended wireless drops. *Using the EL-47955 (MDI) will result in a programming failure.*
4. Install an approved battery maintainer or power supply that provides a steady and stable voltage to support the 12V system during SPS programming events. *Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programming. If a battery maintainer is not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply.*
5. Access the **Techline Connect (TLC)** system and select **Service Programming System (SPS)**.
6. Select **Reprogram** option from **Selected Programming Process** field on the upper right of the SPS screen and then click on **Next** button in the lower right of the SPS screen.
7. On the SPS Supported Controllers screen, under **Select Controller**, select **K19 Suspension Control Module**.
8. On the SPS Supported Controllers screen, under **Select Function/Sequence**, select **Programming** and follow the on-screen instructions.
9. Clear DTCs.

Unsuccessful Programming Recovery

Note:

- **For Serial Data Authentication Configuration error/failure, refer to the Troublshooting section of the** *Serial Data Authentication Configuration 3-66* **procedure.**
- Ensure the *EL-52100* (MDI 2) is used when programming the vehicle. Using the EL-47955 (MDI) will result in a programming failure.
- It may be necessary to use another *EL-52100* (MDI 2) and/or cables to verify proper operation to eliminate the possibility of faulty equipment.
- If Ethernet programming fails, ensure there is no fault in the Ethernet circuits between the X84 Data Link Connector and K56 Serial Data Gateway Module.

In the event of an interrupted or unsuccessful programming event, perform the following steps:

1. Exit Service Programming System (SPS) and disconnect all programming equipment from the vehicle.
2. Disconnect all battery voltage or ignition voltage sources from the control module. All voltage sources must be removed for a minimum of 10 min. This can be done several ways and should be completed by using the least intrusive way. This can vary depending on vehicle and control module location and can be done by one of the options listed below:
   - Removing all fuses supplying battery voltage and ignition voltage to the control module.
   - Disconnecting all harness connectors from the control module.

Warning: Always ensure the Battery Maintenance Mode is inactive before disconnecting the low voltage 12 volt battery (or batteries). This mode can be active with the ignition off, regardless of whether the vehicle charging cord is plugged in or not. When this mode is active, the on-board high voltage battery charger(s) will energize the 12 volt battery cables and charge the 12 volt battery (or batteries). Disconnecting any battery cables while this mode is active may result in an electrical shock or a burn from hot battery cable leads.

   - **For electric vehicle (EV):** Check the 12 V battery voltage with a digital multimeter before disconnecting any battery cables leads. If the voltage is 13.5 V or above, the Battery Maintenance Mode is active. The technician must wait for the T18 Battery Charger to deactivate before disconnecting the battery negative cable. For more information, refer to *Charging System Description and Operation 6-*

184 . With Battery Maintenance Mode inactive, perform a 12 V battery disconnect by disconnecting the battery negative cable. Refer to [Link target (target-id 37733-) not found] .

- **For internal combustion engine vehicle (ICE):** Performing a 12 V battery disconnect by disconnecting the battery negative cable. Refer to [Link target (target-id 37733-) not found] .

3. Reconnect all battery voltage and ignition voltage sources to the control module.
4. Close down the current session of Techline Connect and reopen a new session.
5. Verify the control module, X84 Data Link Connector, and programming tool connections are secure and the tool software is up to date.
6. Vehicle OFF, ensure that the key fob is inside the vehicle and not moved for the duration of the programming to prevent an inadvertent power mode change during programming.
7. Access the Service Programming System (SPS) and follow the on-screen instructions for the control module.
8. Verify the control module can be programmed.

⇒ **If the control module can not be programmed**

8.1. Vehicle in Service Mode for 1 min.

8.2. Vehicle OFF.

8.3. Access SPS and follow the on-screen instructions for the control module.

Note: If programming is still not successful after the second programming attempt, check the following:

- For facilities using an internet firewall, ensure firewall settings are not blocking file downloads and/or require elevated rights.
- For United States and Canada GM dealers, the appropriate firewall settings can be found in the GM DEALER INFRASTRUCTURE & SECURITY GUIDELINES (DISG).
- For optimal consistency during the reprogramming session, we recommend connecting the computer/ laptop to a hardwired Ethernet cable, as the large software file size may affect stability.

8.4. Verify the control module can be programmed.

⇒ If the control module can not be programmed, replace the control module.

⇓ If the control module can be programmed

8.5. Clear DTCs.

⇓ **If the control module can be programmed**

9. Clear DTCs.

Repair Instructions

Perform the *Diagnostic Repair Verification 3-421* after completing the repair.

Control Module References 3-4 for control module replacement, programming, and setup.

K20 Engine Control Module: Programming and Setup

Note:

- Always verify the module has the newest software available before replacing the module.
- Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector (DLC). If there is an interruption during programming, programming failure or control module damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. When required, install a battery maintainer or power supply that provides a steady and stable voltage. Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programing. If a battery maintainer is not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply.
- Turn OFF or disable systems that may put a load on the vehicles battery such as; interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- During the programming procedure, follow the SPS prompts for the correct ignition switch position.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to Incomplete.
- Note the engine oil life remaining percentage.
- If over 14k GVW, program the engine serial number with the scan tool.
- If unable to complete programming or have questions contact Techlline 1–800–828–6860

Programming a New Control Module

Note:

- The Prepare Control Module for Removal function can only be performed when communication with the old control module is still possible.
- Instances may occur where data is not transferred during the Prepare Control Module for Removal Function

1. Ignition » On / Vehicle » In Service Mode

2. Perform the scan tool function: Create Report
   - Air Cleaner Life Remaining— If equipped
   - Engine Oil Life Remaining
   - Fuel Filter Life Remaining— If applicable
   - Fuel Injector Flow Characteristic Identification — If applicable
3. Prepare the component for replacement.

   Select: Prepare Control Module for Reprogramming or Removal— If available
4. Ignition/Vehicle & All vehicle systems » Off
5. Replace the component: K20 Engine Control Module
6. Ignition » On / Vehicle » In Service Mode

Note:
- If both controller options below are listed, select K20 Engine and K71 Transmission Control Modules.
- Refer to: *Control Module References 3-4*— K71 Control Module Programing
- If the programming is not successful Refer to: *Control Module References 3-4*— K56 Control Module Programing

7. Access SPS and follow the on-screen instructions for the control module: K20 Engine Control Module
   - Perform the SPS function: K20 Engine and K71 Transmission Control Modules
   - Perform the SPS function: K20 Engine Control Module
8. Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to No.
9. Perform the SPS function: Immobilizer Learn— If equipped .

   Refer to: [Link target (target-id 158692-) not found]

Note: If both controller options below are listed, select K20 Engine Control Module.

10. Perform the scan tool function: Select Controller— K20 Engine Control Module— Select Function / Sequence— Setup
    - Select: Refresh Characterization Data
    - Select: Replace— Control Valve Body
    - Select: Replace— Transmission
11. Perform the scan tool function: Clear DTCs
12. Perform the scan tool configuration/reset function:
    - Configuration/Reset Functions - Engine — If applicable
    - Configuration/Reset Functions - Transmission — If applicable
13. Perform the scan tool function: Clear DTCs

Programming an Existing Control Module

1. Perform all necessary programming and setup procedures for the control module: K20 Engine Control Module
2. Ignition » On / Vehicle » In Service Mode

Note:
- If both controller options below are listed, select K20 Engine and K71 Transmission Control Modules.
- Refer to: *Control Module References 3-4*— K71 Control Module Programing

3. Select ControllerReprogram the control module:
   - K20 Engine and K71 Transmission Control Modules — Follow the on-screen instructions.
   - K20 Engine Control Module— Follow the on-screen instructions.
4. Perform the scan tool function: Clear DTCs
5. Select Controller— K20 Engine Control Module— Select Function / Sequence— Setup
6. Select: Refresh Characterization Data
7. Perform the scan tool configuration/reset function:
   - Configuration/Reset Functions - Engine — If applicable
   - Configuration/Reset Functions - Transmission — Transmission Service Fast Learn— If applicable
8. Perform the scan tool function: Clear DTCs
9. Ignition/Vehicle & All vehicle systems » Off
10. Ignition » On / Vehicle » In Service Mode
11. Operate the vehicle within the conditions of the customer's concern.

Unsuccessful Programming Recovery

If programming a control module is not successful, perform the following procedure:

1. Verify the control module, data link connector and programming tool connections are secure and the tool software is up to date.
2. Ignition » On / Vehicle » In Service Mode
3. Access the Service Programming System and follow the on-screen instructions for the control module: K20 Engine Control Module

Note: If both controller options below are listed, select K20 Engine and K71 Transmission Control Modules.

4. Perform the SPS function:
   - K20 Engine and K71 Transmission Control Modules — Follow the on-screen instructions.
   - K20 Engine Control Module— Follow the on-screen instructions.
5. Perform the scan tool function: Clear DTCs

6. Ignition/Vehicle » Off — For greater than 1 min
7. Ignition » On / Vehicle » In Service Mode
8. Verify the control module programming is successful.

⇒ **If the programming is not successful**

8.1. Ignition/Vehicle » Off — For greater than 1 min

8.2. Ignition » On / Vehicle » In Service Mode

Note: If both controller options below are listed, select K20 Engine and K71 Transmission Control Modules.

8.3. Perform the SPS function:

- K20 Engine and K71 Transmission Control Modules — Follow the on-screen instructions.
- K20 Engine Control Module— Follow the on-screen instructions.

⇒ If the programming is not successful Replace the appropriate component: K20 Engine Control Module orK71 Transmission Control Module

⇓ If the programming is successful

8.4. All OK.

⇓ **If the programming is successful**

9. All OK.

Repair Instructions

Perform the *Diagnostic Repair Verification 3-421* after completing the repair.

Control Module References 3-4 for control module replacement, programming and setup.

K29FV Front Seat Heater Vent Control Module: Programming and Setup

This device does not require programming or setup.

K36 Restraints Control Module: Programming and Setup

Diagnostic Instructions

- Perform the *Diagnostic System Check - Vehicle 3-358* prior to using this diagnostic procedure.
- Review the description of *Strategy Based Diagnosis 3-348*

Note:

- Always verify the module has the newest software available before replacing the module.
- Do NOT program a control module unless directed to by a service procedure or a service bulletin. If the control module is not properly configured with the correct calibration software, the control module will not control all of the vehicle features properly.
- Verify the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Turn OFF or disable systems that may put a load on the vehicle's battery such as interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- Programming must begin with the Vehicle OFF. Programming will direct the appropriate control module(s) to change power mode as needed during the procedure, independent of the vehicle's power mode.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to No.

Reference Information

Special Tools
EL-52100 Multiple Diagnostic Interface 2 (MDI 2)

Programming a New Control Module

To program a new control module, perform the following procedure:

1. Place the vehicle on level ground (the vehicle must be level or the Inertia Measurement Unit setup may fail)

Note: Verify all control modules are connected and communicating before attempting to program the K36 Restraints Control Module.

2. Vehicle OFF, ensure that the key fob is inside the vehicle and not moved for the duration of the programming to prevent an inadvertent power mode change during programming. *If the key fob is not inside the vehicle, the serial data authentication configuration procedure which runs automatically at the end of the programming step will fail even though the programming appears to run successfully. If this procedure fails, the setup step will fail or be incomplete.*
3. Disconnect **Wi-Fi dongle** if it is currently connected to *EL-52100* Multiple Diagnostic Interface 2 (MDI 2).
4. Install **EL-52100 (MDI 2)** using wired USB Connection from MDI 2 to computer and verify it is working properly to prevent programming failure due to unintended wireless drops. *Using the EL-47955 (MDI) will result in a programming failure.*
5. Install an approved battery maintainer or power supply that provides a steady and stable voltage to support the 12V system during SPS programming

events. *Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programming. If a battery maintainer is not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply.*

6. Access the **Techline Connect (TLC)** system and select **Service Programming System (SPS)**.
7. Select **Replace and Reprogram** option from **Selected Programming Process** field on the upper right of the SPS screen and then click on **Next** button in the lower right of the SPS screen.
8. On the SPS Supported Controllers screen, under **Select Controller**, select **K36 Restraints Control Module**.
9. Do not depress the brake pedal during programming or Serial Data Authentication Configuration .
10. On the SPS Supported Controllers screen, under **Select Function/Sequence**, select **Programming** and follow the on-screen instructions.

Note: If the Setup step fails and DTC U1962 or U19A3 is set in the K36 Restraints Control Module, perform the Serial Data Authentication Configuration procedure and then repeat the Setup step again. Refer to: *Serial Data Authentication Configuration 3-66*.

11. On the SPS Supported Controllers screen, under **Select Function/Sequence**, select **Setup** and follow the on-screen instructions.
12. Clear DTCs.

Programming an Existing Control Module

To program an existing control module, perform the following procedure:

1. Place the vehicle on level ground (the vehicle must be level or the IMU setup may fail)
2. Vehicle OFF, ensure that the key fob is inside the vehicle and not moved for the duration of the programming to prevent an inadvertent power mode change during programming.
3. Disconnect **Wi-Fi dongle** if it is currently connected to *EL-52100* Multiple Diagnostic Interface 2 (MDI 2).
4. Install **EL-52100 (MDI 2)** using wired USB Connection from MDI 2 to computer and verify it is working properly to prevent programming failure due to unintended wireless drops. *Using the EL-47955 (MDI) will result in a programming failure.*
5. Install an approved battery maintainer or power supply that provides a steady and stable voltage to support the 12V system during SPS programming events. *Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programming. If a battery maintainer is not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply.*
6. Access the **Techline Connect (TLC)** system and select **Service Programming System (SPS)**.
7. Select **Reprogram** option from **Selected Programming Process** field on the upper right of the SPS screen and then click on **Next** button in the lower right of the SPS screen.
8. On the SPS Supported Controllers screen, under **Select Controller**, select **K36 Restraints Control Module**.
9. Do not depress the brake pedal during programming or Serial Data Authentication Configuration .
10. On the SPS Supported Controllers screen, under **Select Function/Sequence**, select **Programming** and follow the on-screen instructions.
11. On the SPS Supported Controllers screen, under **Select Function/Sequence**, select **Setup** and follow the on-screen instructions.
12. Clear DTCs.

Unsuccessful Programming Recovery

Note:

- **For Serial Data Authentication Configuration error/failure, refer to the Troublshooting section of the** *Serial Data Authentication Configuration 3-66* **procedure.**
- Ensure the *EL-52100* (MDI 2) is used when programming the vehicle. Using the EL-47955 (MDI) will result in a programming failure.
- It may be necessary to use another *EL-52100* (MDI 2) and/or cables to verify proper operation to eliminate the possibility of faulty equipment.
- If Ethernet programming fails, ensure there is no fault in the Ethernet circuits between the X84 Data Link Connector and K56 Serial Data Gateway Module.

In the event of an interrupted or unsuccessful programming event, perform the following steps:

1. Exit Service Programming System (SPS) and disconnect all programming equipment from the vehicle.
2. Disconnect all battery voltage or ignition voltage sources from the control module. All voltage sources must be removed for a minimum of 10

min. This can be done several ways and should be completed by using the least intrusive way. This can vary depending on vehicle and control module location and can be done by one of the options listed below:

- Removing all fuses supplying battery voltage and ignition voltage to the control module.
- Disconnecting all harness connectors from the control module.

Warning: Always ensure the Battery Maintenance Mode is inactive before disconnecting the low voltage 12 volt battery (or batteries). This mode can be active with the ignition off, regardless of whether the vehicle charging cord is plugged in or not. When this mode is active, the on-board high voltage battery charger(s) will energize the 12 volt battery cables and charge the 12 volt battery (or batteries). Disconnecting any battery cables while this mode is active may result in an electrical shock or a burn from hot battery cable leads.

- **For electric vehicle (EV):** Check the 12 V battery voltage with a digital multimeter before disconnecting any battery cables leads. If the voltage is 13.5 V or above, the Battery Maintenance Mode is active. The technician must wait for the T18 Battery Charger to deactivate before disconnecting the battery negative cable. For more information, refer to *Charging System Description and Operation 6-184* . With Battery Maintenance Mode inactive, perform a 12 V battery disconnect by disconnecting the battery negative cable. Refer to [Link target (target-id 37733-) not found] .
- **For internal combustion engine vehicle (ICE):** Performing a 12 V battery disconnect by disconnecting the battery negative cable. Refer to [Link target (target-id 37733-) not found] .

3. Reconnect all battery voltage and ignition voltage sources to the control module.
4. Close down the current session of Techline Connect and reopen a new session.
5. Verify the control module, data link connector, and programming tool connections are secure and the tool software is up to date.
6. Vehicle OFF, ensure that the key fob is inside the vehicle and not moved for the duration of the programming to prevent an inadvertent power mode change during programming.
7. Access the Service Programming System (SPS) and follow the on-screen instructions for the control module.
8. Verify the control module can be programmed.

⇒ **If the control module can not be programmed**

8.1. Vehicle in Service Mode for 1 min.

8.2. Vehicle OFF.

8.3. Access SPS and follow the on-screen instructions for the control module.

Note: If programming is still not successful after the second programming attempt, check the following:

- For facilities using an internet firewall, ensure firewall settings are not blocking file downloads and/or require elevated rights.
- For United States and Canada GM dealers, the appropriate firewall settings can be found in the GM DEALER INFRASTRUCTURE & SECURITY GUIDELINES (DISG).

8.4. Verify the control module can be programmed.

⇒ If the control module can not be programmed, replace the control module.

⇓ If the control module can be programmed

8.5. Clear DTCs.

⇓ **If the control module can be programmed**

9. Clear DTCs.

Repair Instructions

Perform the *Diagnostic Repair Verification 3-421* after completing the repair.

Control Module References 3-4 for control module replacement, programming, and setup.

K38 Chassis Control Module: Programming and Setup

Note:

- DO NOT program a control module unless directed to by a service procedure or a service bulletin. If the control module is not properly configured with the correct calibration software, the control module will not control all of the vehicle features properly.
- Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. When required, install a battery maintainer or power supply that provides a steady and stable voltage. Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programming. If a battery maintainer is not available, connect a fully charged 12 V jumper or booster pack disconnected form the AC voltage supply.

- Turn OFF or disable systems that may put a load on the vehicles battery such as; interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- During the programming procedure, follow the SPS prompts for the correct ignition switch position.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to NO.

Replace and Program Control Module or Reprogram Control Module

To program a replacement or an existing control module, perform the following procedure:

1. Access the Service Programming System (SPS) and follow the on-screen instructions.
2. On the SPS Supported Controllers screen, select K38 Chassis Control Module - Programming and follow the on-screen instructions.
3. Clear DTCs.
4. With a scan tool, perform the Suspension Sensor Trim Height Calibration, if applicable.

Unsuccessful Programming Recovery

In the event of an interrupted or unsuccessful programming event, perform the following steps:

1. Ignition ON. Ensure the control module, DLC and programming tool connections are secure and the SPS software is up to date.
2. Verify the control module can be reprogrammed.

⇒ **If the control module cannot be reprogrammed**

2.1. Ignition OFF for one minute, ignition ON.

2.2. Verify the control module can be reprogrammed.

⇒ If the control module cannot be reprogrammed, replace the control module.

⇓ If the control module can be reprogrammed.

2.3. All OK.

⇓ **If the control module can be reprogrammed**

3. All OK.

Repair Instructions

Perform the *Diagnostic Repair Verification 3-421* after completing the repair.

Control Module References 3-4 for Control Module replacement, programming and setup.

K40D Driver Seat Adjuster Memory Module: Programming and Setup

Diagnostic Instructions

- Perform the *Diagnostic System Check - Vehicle 3-358* prior to using this diagnostic procedure.
- Review the description of *Strategy Based Diagnosis 3-348*

Note:

- Always verify the module has the newest software available before replacing the module.
- Do NOT program a control module unless directed to by a service procedure or a service bulletin. If the control module is not properly configured with the correct calibration software, the control module will not control all of the vehicle features properly.
- Verify the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Turn OFF or disable systems that may put a load on the vehicle's battery such as interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- Programming must begin with the Vehicle OFF. Programming will direct the appropriate control module(s) to change power mode as needed during the procedure, independent of the vehicle's power mode.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to No.

Reference Information

Special Tools
EL-52100 Multiple Diagnostic Interface 2 (MDI 2)

Programming a New Control Module

To program a new control module, perform the following procedure:

Note: Verify all control modules are connected and communicating before attempting to program the K40D Driver Seat Adjuster Memory Module.

1. Vehicle OFF, ensure that the key fob is inside the vehicle and not moved for the duration of the programming to prevent an inadvertent power mode change during programming. *If the key fob is not inside the vehicle, the serial data authentication configuration procedure which runs automatically at the end of the programming step will fail even though the programming appears to run successfully. If this procedure fails, the setup step will fail or be incomplete.*

2. Disconnect **Wi-Fi dongle** if it is currently connected to *EL-52100* Multiple Diagnostic Interface 2 (MDI 2).
3. Install **EL-52100 (MDI 2)** using wired USB Connection from MDI 2 to computer and verify it is working properly to prevent programming failure due to unintended wireless drops. *Using the EL-47955 (MDI) will result in a programming failure.*
4. Install an approved battery maintainer or power supply that provides a steady and stable voltage to support the 12V system during SPS programming events. *Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programming. If a battery maintainer is not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply.*
5. Access the **Techline Connect (TLC)** system and select **Service Programming System (SPS)**.
6. Select **Replace and Reprogram** option from **Selected Programming Process** field on the upper right of the SPS screen and then click on **Next** button in the lower right of the SPS screen.
7. On the SPS Supported Controllers screen, under **Select Controller**, select **K40D Driver Seat Adjuster Memory Module**.
8. On the SPS Supported Controllers screen, under **Select Function/Sequence**, select **Programming** and follow the on-screen instructions.

Note: If the DTC U1962 or U19A3 is set in the K40D Driver Seat Adjuster Memory Module after programming, perform the Serial Data Authentication Configuration procedure and then repeat the Setup step again. Refer to: *Serial Data Authentication Configuration 3-66*.

10. Clear DTCs.
11. Move the seat to a central, middle range position, then perform the memory store operation for memory “1”, “2”, and “Exit” or “3” if equipped. Refer to the Owner Manual for storing memory seat positions.

Programming an Existing Control Module

To program an existing control module, perform the following procedure:

1. Vehicle OFF, ensure that the key fob is inside the vehicle and not moved for the duration of the programming to prevent an inadvertent power mode change during programming.
2. Disconnect **Wi-Fi dongle** if it is currently connected to *EL-52100* Multiple Diagnostic Interface 2 (MDI 2).
3. Install **EL-52100 (MDI 2)** using wired USB Connection from MDI 2 to computer and verify it is working properly to prevent programming failure due to unintended wireless drops. *Using the EL-47955 (MDI) will result in a programming failure.*
4. Install an approved battery maintainer or power supply that provides a steady and stable voltage to support the 12V system during SPS programming events. *Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programming. If a battery maintainer is not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply.*
5. Access the **Techline Connect (TLC)** system and select **Service Programming System (SPS)**.
6. Select **Reprogram** option from **Selected Programming Process** field on the upper right of the SPS screen and then click on **Next** button in the lower right of the SPS screen.
7. On the SPS Supported Controllers screen, under **Select Controller**, select **K40D Driver Seat Adjuster Memory Module**.
8. On the SPS Supported Controllers screen, under **Select Function/Sequence**, select **Programming** and follow the on-screen instructions.
9. Clear DTCs.
10. Move the seat to a central, middle range position, then perform the memory store operation for memory “1”, “2”, and “Exit” or “3” if equipped. Refer to the Owner Manual for storing memory seat positions.

Unsuccessful Programming Recovery

Note:

- **For Serial Data Authentication Configuration error/failure, refer to the Troublshooting section of the** *Serial Data Authentication Configuration 3-66* **procedure.**
- Ensure the *EL-52100* (MDI 2) is used when programming the vehicle. Using the EL-47955 (MDI) will result in a programming failure.
- It may be necessary to use another *EL-52100* (MDI 2) and/or cables to verify proper operation to eliminate the possibility of faulty equipment.
- If Ethernet programming fails, ensure there is no fault in the Ethernet circuits between the X84 Data Link Connector and K56 Serial Data Gateway Module.

In the event of an interrupted or unsuccessful programming event, perform the following steps:

1. Exit Service Programming System (SPS) and disconnect all programming equipment from the vehicle.
2. Disconnect all battery voltage or ignition voltage sources from the control module. All voltage sources must be removed for a minimum of 10 min. This can be done several ways and should be completed by using the least intrusive way. This can vary depending on vehicle and control module location and can be done by one of the options listed below:
   - Removing all fuses supplying battery voltage and ignition voltage to the control module.
   - Disconnecting all harness connectors from the control module.

Warning: Always ensure the Battery Maintenance Mode is inactive before disconnecting the low voltage 12 volt battery (or batteries). This mode can be active with the ignition off, regardless of whether the vehicle charging cord is plugged in or not. When this mode is active, the on-board high voltage battery charger(s) will energize the 12 volt battery cables and charge the 12 volt battery (or batteries). Disconnecting any battery cables while this mode is active may result in an electrical shock or a burn from hot battery cable leads.

   - **For electric vehicle (EV):** Check the 12 V battery voltage with a digital multimeter before disconnecting any battery cables leads. If the voltage is 13.5 V or above, the Battery Maintenance Mode is active. The technician must wait for the T18 Battery Charger to deactivate before disconnecting the battery negative cable. For more information, refer to *Charging System Description and Operation 6-184* . With Battery Maintenance Mode inactive, perform a 12 V battery disconnect by disconnecting the battery negative cable. Refer to [Link target (target-id 37733-) not found] .
   - **For internal combustion engine vehicle (ICE):** Performing a 12 V battery disconnect by disconnecting the battery negative cable. Refer to [Link target (target-id 37733-) not found] .
3. Reconnect all battery voltage and ignition voltage sources to the control module.
4. Close down the current session of Techline Connect and reopen a new session.
5. Verify the control module, data link connector, and programming tool connections are secure and the tool software is up to date.
6. Vehicle OFF, ensure that the key fob is inside the vehicle and not moved for the duration of the programming to prevent an inadvertent power mode change during programming.
7. Access the Service Programming System (SPS) and follow the on-screen instructions for the control module.
8. Verify the control module can be programmed.

⇒ **If the control module can not be programmed**

   8.1. Vehicle in Service Mode for 1 min.

   8.2. Vehicle OFF.

   8.3. Access SPS and follow the on-screen instructions for the control module.

Note: If programming is still not successful after the second programming attempt, check the following:

- For facilities using an internet firewall, ensure firewall settings are not blocking file downloads and/or require elevated rights.
- For United States and Canada GM dealers, the appropriate firewall settings can be found in the GM DEALER INFRASTRUCTURE & SECURITY GUIDELINES (DISG).

   8.4. Verify the control module can be programmed.

⇒ If the control module can not be programmed, replace the control module.

⇓ If the control module can be programmed

   8.5. Clear DTCs.

⇓ **If the control module can be programmed**

9. Clear DTCs.

Repair Instructions

Perform the *Diagnostic Repair Verification 3-421* after completing the repair.

Control Module References 3-4 for Control Module replacement, programming and setup

K40P Passenger Seat Adjuster Memory Module: Programming and Setup

Diagnostic Instructions

- Perform the *Diagnostic System Check - Vehicle 3-358* prior to using this diagnostic procedure.
- Review the description of *Strategy Based Diagnosis 3-348*

Note:

- Always verify the module has the newest software available before replacing the module.
- Do NOT program a control module unless directed to by a service procedure or a service bulletin. If the control module is not properly configured with

the correct calibration software, the control module will not control all of the vehicle features properly.

- Verify the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Turn OFF or disable systems that may put a load on the vehicle's battery such as interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- Programming must begin with the Vehicle OFF. Programming will direct the appropriate control module(s) to change power mode as needed during the procedure, independent of the vehicle's power mode.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to No.

Reference Information

Special Tools
EL-52100 Multiple Diagnostic Interface 2 (MDI 2)

Programming a New Control Module

To program a new control module, perform the following procedure:

Note: Verify all control modules are connected and communicating before attempting to program the K40P Passenger Seat Adjuster Memory Module.

1. Vehicle OFF, ensure that the key fob is inside the vehicle and not moved for the duration of the programming to prevent an inadvertent power mode change during programming. *If the key fob is not inside the vehicle, the serial data authentication configuration procedure which runs automatically at the end of the programming step will fail even though the programming appears to run successfully. If this procedure fails, the setup step will fail or be incomplete.*
2. Disconnect **Wi-Fi dongle** if it is currently connected to *EL-52100* Multiple Diagnostic Interface 2 (MDI 2).
3. Install **EL-52100 (MDI 2)** using wired USB Connection from MDI 2 to computer and verify it is working properly to prevent programming failure due to unintended wireless drops. *Using the EL-47955 (MDI) will result in a programming failure.*
4. Install an approved battery maintainer or power supply that provides a steady and stable voltage to support the 12V system during SPS programming events. *Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programming. If a battery maintainer is not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply.*
5. Access the **Techline Connect (TLC)** system and select **Service Programming System 2 (SPS2)**.
6. Select **Replace and Reprogram** option from **Selected Programming Process** field on the upper right of the SPS screen and then click on **Next** button in the lower right of the SPS screen.
7. On the SPS Supported Controllers screen, under **Select Controller**, select **K40P Passenger Seat Adjuster Memory Module**.
8. On the SPS Supported Controllers screen, under **Select Function/Sequence**, select **Programming** and follow the on-screen instructions.

Note: If the DTC U1962 or U19A3 is set in the K40P Passenger Seat Adjuster Memory Module, perform the Serial Data Authentication Configuration procedure and then repeat the Setup step again. Refer to: *Serial Data Authentication Configuration 3-66*.

10. Clear DTCs.
11. Move the seat to a central, middle range position, then perform the memory store operation for memory "1", "2", and "Exit" or "3" if equipped. Refer to the Owner Manual for storing memory seat positions.

Programming an Existing Control Module

To program an existing control module, perform the following procedure:

1. Vehicle OFF, ensure that the key fob is inside the vehicle and not moved for the duration of the programming to prevent an inadvertent power mode change during programming.
2. Disconnect **Wi-Fi dongle** if it is currently connected to *EL-52100* Multiple Diagnostic Interface 2 (MDI 2).
3. Install **EL-52100 (MDI 2)** using wired USB Connection from MDI 2 to computer and verify it is working properly to prevent programming failure due to unintended wireless drops. *Using the EL-47955 (MDI) will result in a programming failure.*
4. Install an approved battery maintainer or power supply that provides a steady and stable voltage to support the 12V system during SPS programming events. *Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programming. If a battery maintainer is not*

available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply.

5. Access the **Techline Connect (TLC)** system and select **Service Programming System 2 (SPS2)**.
6. Select **Reprogram** option from **Selected Programming Process** field on the upper right of the SPS screen and then click on **Next** button in the lower right of the SPS screen.
7. On the SPS Supported Controllers screen, under **Select Controller**, select **K40P Passenger Seat Adjuster Memory Module**.
8. On the SPS Supported Controllers screen, under **Select Function/Sequence**, select **Programming** and follow the on-screen instructions.
9. Clear DTCs.
10. Move the seat to a central, middle range position, then perform the memory store operation for memory “1”, “2”, and “Exit” or “3” if equipped. Refer to the Owner Manual for storing memory seat positions.

Unsuccessful Programming Recovery

Note:

- **For Serial Data Authentication Configuration error/failure, refer to the Troublshooting section of the** *Serial Data Authentication Configuration 3-66* **procedure.**
- Ensure the *EL-52100* (MDI 2) is used when programming the vehicle. Using the EL-47955 (MDI) will result in a programming failure.
- It may be necessary to use another *EL-52100* (MDI 2) and/or cables to verify proper operation to eliminate the possibility of faulty equipment.
- If Ethernet programming fails, ensure there is no fault in the Ethernet circuits between the X84 Data Link Connector and K56 Serial Data Gateway Module.

In the event of an interrupted or unsuccessful programming event, perform the following steps:

1. Exit Service Programming System (SPS) and disconnect all programming equipment from the vehicle.
2. Disconnect all battery voltage or ignition voltage sources from the control module. All voltage sources must be removed for a minimum of 10 min. This can be done several ways and should be completed by using the least intrusive way. This can vary depending on vehicle and control module location and can be done by one of the options listed below:
   - Removing all fuses supplying battery voltage and ignition voltage to the control module.
   - Disconnecting all harness connectors from the control module.

Warning: Always ensure the Battery Maintenance Mode is inactive before disconnecting the low voltage 12 volt battery (or batteries). This mode can be active with the ignition off, regardless of whether the vehicle charging cord is plugged in or not. When this mode is active, the on-board high voltage battery charger(s) will energize the 12 volt battery cables and charge the 12 volt battery (or batteries). Disconnecting any battery cables while this mode is active may result in an electrical shock or a burn from hot battery cable leads.

   - **For electric vehicle (EV):** Check the 12 V battery voltage with a digital multimeter before disconnecting any battery cables leads. If the voltage is 13.5 V or above, the Battery Maintenance Mode is active. The technician must wait for the T18 Battery Charger to deactivate before disconnecting the battery negative cable. For more information, refer to *Charging System Description and Operation 6-184* . With Battery Maintenance Mode inactive, perform a 12 V battery disconnect by disconnecting the battery negative cable. Refer to [Link target (target-id 37733-) not found] .
   - **For internal combustion engine vehicle (ICE):** Performing a 12 V battery disconnect by disconnecting the battery negative cable. Refer to [Link target (target-id 37733-) not found] .
3. Reconnect all battery voltage and ignition voltage sources to the control module.
4. Close down the current session of Techline Connect and reopen a new session.
5. Verify the control module, data link connector, and programming tool connections are secure and the tool software is up to date.
6. Vehicle OFF, ensure that the key fob is inside the vehicle and not moved for the duration of the programming to prevent an inadvertent power mode change during programming.
7. Access the Service Programming System (SPS) and follow the on-screen instructions for the control module.
8. Verify the control module can be programmed.

⇒ **If the control module can not be programmed**

8.1. Vehicle in Service Mode for 1 min.

8.2. Vehicle OFF.

8.3. Access SPS and follow the on-screen instructions for the control module.

Note: If programming is still not successful after the second programming attempt, check the following:

- For facilities using an internet firewall, ensure firewall settings are not blocking file downloads and/or require elevated rights.
- For United States and Canada GM dealers, the appropriate firewall settings can be found in the GM DEALER INFRASTRUCTURE & SECURITY GUIDELINES (DISG) section 2.d.vii.

8.4. Verify the control module can be programmed.

⇒ If the control module can not be programmed, replace the control module.

⇓ If the control module can be programmed

8.5. Clear DTCs.

⇓ **If the control module can be programmed**

9. Clear DTCs.

Repair Instructions

Perform the *Diagnostic Repair Verification 3-421* after completing the repair.

Control Module References 3-4 for Control Module replacement, programming and setup

K43 Power Steering Control Module: Programming and Setup

Note:

- Always verify the module has the newest software available before replacing the module.
- Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. When required, install a battery maintainer or power supply that provides a steady and stable voltage. Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programing. If a battery maintainer is not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply.
- Turn OFF or disable systems that may put a load on the vehicles battery such as; interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- During the programming procedure, follow the SPS prompts for the correct ignition switch position.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to NO.

Diagnostic Aids

The Electric Power Steering Control Module is part of the power steering assist motor assembly and is electronically paired with the steering gear's sensors.

Replace and Program or Reprogramming Control Module

To program a replacement control module, perform the following procedure:

1. Ignition/Vehicle OFF, ensure that the key fob is inside the vehicle and not moved for the duration of the programming to prevent an inadvertent power mode change during programming.
2. Access the Service Programming System (SPS) and follow the on-screen instructions.
3. On the SPS Supported Controllers screen, select K43 Power Steering Control Module - Programming and follow the on-screen instructions.
4. On the SPS Supported Controllers screen, select K43 Power Steering Control Module - Setup and follow the on-screen instructions.
5. If the Setup fails, check for DTC U1962. If this DTC is set, perform the Serial Data Authentication Configuration procedure. Then repeat the Setup step.
6. Clear DTCs.

Unsuccessful Programming Recovery

In the event of an interrupted or unsuccessful programming event, perform the following steps:

1. Ignition/Vehicle ON. Ensure the control module, DLC and programming tool connections are secure and the SPS software is up to date.
2. Verify the control module can be reprogrammed.

⇒ **If the control module cannot be reprogrammed**

2.1. Ignition/Vehicle OFF for one minute, Ignition/ Vehicle ON.

2.2. Verify the control module can be reprogrammed.

⇒ If the control module cannot be reprogrammed, replace the control module.

⇓ If the control module can be reprogrammed.

2.3. All OK.

⇓ **If the control module can be reprogrammed**

3. All OK.

Repair Instructions

Perform the *Diagnostic Repair Verification 3-421* after completing the repair.

Control Module References 3-4 for control module replacement, programming and setup

K45 Powertrain Control Module: Programming and Setup

Note:

- Always verify the module has the newest software available before replacing the module.
- Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector (DLC). If there is an interruption during programming, programming failure or control module damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. When required, install a battery maintainer or power supply that provides a steady and stable voltage. Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programing. If a battery maintainer is not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply.
- Turn OFF or disable systems that may put a load on the vehicles battery such as; interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- During the programming procedure, follow the SPS prompts for the correct ignition switch position.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to Incomplete.
- To prevent programming failure due to unintended wireless drops, it is recommended that a wired MDI 2 connection be used when programming the control module.
- Note the engine oil life remaining percentage.
- If over 14k GVW, program the engine serial number with the scan tool.
- If unable to complete programming or have questions contact GM Techline

Programming a New Control Module

Note:

- The Prepare Control Module for Removal function can only be performed when communication with the old control module is still possible.
- Instances may occur where data is not transferred during the Prepare Control Module for Removal Function

1. Ignition » On / Vehicle » In Service Mode
2. Perform the scan tool function: Create Report
   - Air Cleaner Life Remaining
   - Engine Oil Life Remaining
   - Fuel Filter Life Remaining
   - Injector Flow Identifier
3. Prepare the component for replacement.

   Select: Prepare Control Module for Reprogramming or Removal— If available
4. Ignition/Vehicle » Off
5. Replace the component: K45 Powertrain Control Module
6. Ignition » On / Vehicle » In Service Mode

Note: If the programming is not successful Refer to: *Control Module References 3-4*— K56 Control Module Programing

7. Access SPS and follow the on-screen instructions for the control module: K45 Powertrain Control Module
8. Perform the SPS function: K45 Powertrain Control Module — Program
9. Perform the SPS function: Immobilizer Learn— If equipped .

   Refer to: [Link target (target-id 158692-) not found]
10. Perform the scan tool function: Select Controller— K45 Powertrain Control Module — Select Function / Sequence— Setup
    - Select: Refresh Characterization Data
    - Select: Replace— Control Valve Body
    - Select: Replace— Transmission
11. Perform the scan tool function: Clear DTCs
12. Perform the scan tool configuration/reset function:
    - Configuration/Reset Functions - Engine — If applicable
    - Configuration/Reset Functions - Transmission — If applicable
13. Perform the scan tool function: Clear DTCs

Programming an Existing Control Module

Perform all necessary programming and setup procedures for the control module: K45 Powertrain Control Module

1. Ignition » On / Vehicle » In Service Mode
2. Reprogram the control module: K45 Powertrain Control Module
3. Select Controller— K45 Powertrain Control Module — Select Function / Sequence— Setup
   - Select: Refresh Characterization Data
   - Select: Replace— Control Valve Body
   - Select: Replace— Transmission
4. Perform the scan tool function: Clear DTCs

5. Perform the scan tool configuration/reset function:
   - Configuration/Reset Functions - Engine — If applicable
   - Configuration/Reset Functions - Transmission — If applicable
6. Perform the scan tool function: Clear DTCs

Unsuccessful Programming Recovery

Note:
- If programming is still not successful after the second programming attempt, check the following:
- For facilities using an internet firewall, ensure firewall settings are not blocking file downloads and/or require elevated rights.
- For United States and Canada GM dealers, the appropriate firewall settings can be found in the GM DEALER INFRASTRUCTURE & SECURITY GUIDELINES (DISG) section 2.d.vii.

1. Verify the control module, data link connector and programming tool connections are secure and the tool software is up to date.
2. Ignition » On / Vehicle » In Service Mode
3. Verify the control module programming is successful.

⇒ **If the programming is not successful**

3.1. Ignition/Vehicle » Off — For greater than 3 min

3.2. Ignition » On / Vehicle » In Service Mode

3.3. Access SPS and follow the on-screen instructions for the control module: K45 Powertrain Control Module

3.4. Perform the necessary programming and setup procedures:
- Select: Refresh Characterization Data
- Select: Replace— Control Valve Body
- Select: Replace— Transmission

⇒ If the programming is not successful

Replace the component: K45 Powertrain Control Module

⇓ If the programming is successful

3.5. All OK.

⇓ **If the programming is successful**

4. All OK.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair: *Diagnostic Repair Verification 3-421*

For control module replacement, programming, and setup refer to: *Control Module References 3-4*

K56 Serial Data Gateway Module: Programming and Setup

Note:
- Always verify the module has the newest software available before replacing the module.
- Do NOT program a control module unless directed to by a service procedure or a service bulletin. If the control module is not properly configured with the correct calibration software, the control module will not control all of the vehicle features properly.
- Verify the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Turn OFF or disable systems that may put a load on the vehicle's battery such as interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- Programming must begin with the Vehicle OFF. Programming will direct the appropriate control module(s) to change power mode as needed during the procedure, independent of the vehicle's power mode.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to No.

Reference Information

Special Tools
EL-52100 Multiple Diagnostic Interface 2 (MDI 2)

Programming a New Control Module

To program a replacement K56 Serial Data Gateway Module, perform the following procedure:

Note: Verify all control modules are connected and communicating before attempting to program the K56 Serial Data Gateway Module.

1. Vehicle OFF, ensure that the key fob is inside the vehicle and not moved for the duration of the programming to prevent an inadvertent power mode change during programming. *If the key fob is not inside the vehicle, the serial data authentication configuration procedure which runs automatically at the end of the programming step*

will fail even though the programming appears to run successfully. If this procedure fails, the setup step will fail or be incomplete.

2. Disconnect **Wi-Fi dongle** if it is currently connected to *EL-52100* Multiple Diagnostic Interface 2 (MDI 2).
3. Install **EL-52100 (MDI 2)** using wired USB Connection from MDI 2 to computer and verify it is working properly to prevent programming failure due to unintended wireless drops. *Using the EL-47955 (MDI) will result in a programming failure.*
4. Install an approved battery maintainer or power supply that provides a steady and stable voltage to support the 12V system during SPS programming events. *Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programming. If a battery maintainer is not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply.*
5. Access the **Techline Connect (TLC)** system and select **Service Programming System (SPS)**.
6. Select **Replace and Reprogram** option from **Selected Programming Process** field on the upper right of the SPS screen and then click on **Next** button in the lower right of the SPS screen.
7. On the SPS Supported Controllers screen, under **Select Controller**, select **K56 Serial Data Gateway Module**.
8. On the SPS Supported Controllers screen, under **Select Function/Sequence**, select **Programming** and follow the on-screen instructions.

Note: If the Setup step fails and DTC U1962 or U19A3 is set in the K56 Serial Data Gateway Module, perform the Serial Data Authentication Configuration procedure and then repeat the Setup step again. Refer to: *Serial Data Authentication Configuration 3-66*.

9. On the SPS Supported Controllers screen, under **Select Function/Sequence**, select **Setup** and follow the on-screen instructions.

Note: If an error message indicates that a module is missing after the Setup procedure is complete, diagnose that module to make sure that it's connected and communicating and then perform the Programming and Setup procedures again.

10. Clear DTCs.

Programming an Existing Control Module

To program an existing K56 Serial Data Gateway Module, perform the following procedure:

1. Vehicle OFF, ensure that the key fob is inside the vehicle and not moved for the duration of the programming to prevent an inadvertent power mode change during programming.
2. Disconnect **Wi-Fi dongle** if it is currently connected to *EL-52100* Multiple Diagnostic Interface 2 (MDI 2).
3. Install **EL-52100 (MDI 2)** using wired USB Connection from MDI 2 to computer and verify it is working properly to prevent programming failure due to unintended wireless drops. *Using the EL-47955 (MDI) will result in a programming failure.*
4. Install an approved battery maintainer or power supply that provides a steady and stable voltage to support the 12V system during SPS programming events. *Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programming. If a battery maintainer is not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply.*
5. Access the **Techline Connect (TLC)** system and select **Service Programming System (SPS)**.
6. Select **Reprogram** option from **Selected Programming Process** field on the upper right of the SPS screen and then click on **Next** button in the lower right of the SPS screen.
7. On the SPS Supported Controllers screen, under **Select Controller**, select **K56 Serial Data Gateway Module**.
8. On the SPS Supported Controllers screen, under **Select Function/Sequence**, select **Programming** and follow the on-screen instructions.
9. Clear DTCs.

Unsuccessful Programming Recovery

Note:

- **For Serial Data Authentication Configuration error/failure, refer to the Troublshooting section of the** *Serial Data Authentication Configuration 3-66* **procedure.**
- Ensure the *EL-52100* (MDI 2) is used when programming the vehicle. Using the EL-47955 (MDI) will result in a programming failure.
- It may be necessary to use another *EL-52100* (MDI 2) and/or cables to verify proper operation to eliminate the possibility of faulty equipment.

- If Ethernet programming fails, ensure there is no fault in the Ethernet circuits between the X84 Data Link Connector and K56 Serial Data Gateway Module.

In the event of an interrupted or unsuccessful programming event, perform the following steps:

1. Exit Service Programming System (SPS) and disconnect all programming equipment from the vehicle.
2. Disconnect all battery voltage or ignition voltage sources from the control module. All voltage sources must be removed for a minimum of 10 min. This can be done several ways and should be completed by using the least intrusive way. This can vary depending on vehicle and control module location and can be done by one of the options listed below:
   - Removing all fuses supplying battery voltage and ignition voltage to the control module.
   - Disconnecting all harness connectors from the control module.

Warning: Always ensure the Battery Maintenance Mode is inactive before disconnecting the low voltage 12 volt battery (or batteries). This mode can be active with the ignition off, regardless of whether the vehicle charging cord is plugged in or not. When this mode is active, the on-board high voltage battery charger(s) will energize the 12 volt battery cables and charge the 12 volt battery (or batteries). Disconnecting any battery cables while this mode is active may result in an electrical shock or a burn from hot battery cable leads.

   - **For electric vehicle (EV):** Check the 12 V battery voltage with a digital multimeter before disconnecting any battery cables leads. If the voltage is 13.5 V or above, the Battery Maintenance Mode is active. The technician must wait for the T18 Battery Charger to deactivate before disconnecting the battery negative cable. For more information, refer to *Charging System Description and Operation 6-184* . With Battery Maintenance Mode inactive, perform a 12 V battery disconnect by disconnecting the battery negative cable. Refer to [Link target (target-id 37733-) not found] .
   - **For internal combustion engine vehicle (ICE):** Performing a 12 V battery disconnect by disconnecting the battery negative cable. Refer to [Link target (target-id 37733-) not found] .
3. Reconnect all battery voltage and ignition voltage sources to the control module.
4. Close down the current session of Techline Connect and reopen a new session.
5. Verify the control module, X84 Data Link Connector, and programming tool connections are secure and the tool software is up to date.
6. Vehicle OFF, ensure that the key fob is inside the vehicle and not moved for the duration of the programming to prevent an inadvertent power mode change during programming.
7. Access the Service Programming System (SPS) and follow the on-screen instructions for the control module.
8. Verify the control module can be programmed.

⇒ **If the control module can not be programmed**

   8.1. Vehicle in Service Mode for 1 min.

   8.2. Vehicle OFF.

   8.3. Access SPS and follow the on-screen instructions for the control module.

Note: If programming is still not successful after the second programming attempt, check the following:

- For facilities using an internet firewall, ensure firewall settings are not blocking file downloads and/or require elevated rights.
- For United States and Canada GM dealers, the appropriate firewall settings can be found in the GM DEALER INFRASTRUCTURE & SECURITY GUIDELINES (DISG).
- For optimal consistency during the reprogramming session, we recommend connecting the computer/ laptop to a hardwired Ethernet cable, as the large software file size may affect stability.

   8.4. Verify the control module can be programmed.

⇒ If the control module can not be programmed, replace the control module.

⇓ If the control module can be programmed

   8.5. Clear DTCs.

⇓ **If the control module can be programmed**

9. Clear DTCs.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair: *Diagnostic Repair Verification 3-421*.

For control module replacement, programming, and setup, refer to: *Control Module References 3-4*.

K56U Special Purpose Vehicle Module: Programming and Setup

Note:

- Always verify the module has the newest software available before replacing the module.

- Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. When required, install a battery maintainer or power supply that provides a steady and stable voltage. Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programming. If a battery maintainer is not available, connect a fully charged 12 V jumper or booster pack disconnected form the AC voltage supply.
- Turn OFF or disable systems that may put a load on the vehicles battery such as; interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- During the programming procedure, follow the SPS prompts for the correct ignition switch position.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to NO.

Replace and Program Control Module or Reprogram Control Module

To program a replacement or an existing control module, Refer to*https://www.gmupfitter.com/*Then proceed to the following procedures:

1. Access the Service Programming System (SPS) and follow the on-screen instructions.
2. On the SPS Supported Controllers screen, select K56U Special Vehicle Purpose Module - Programming and follow the on-screen instructions.
3. Clear DTCs.

Unsuccessful Programming Recovery

In the event of an interrupted or unsuccessful programming event, perform the following steps:

1. Ignition ON. Ensure the control module, DLC and programming tool connections are secure and the SPS software is up to date.
2. Verify the control module can be reprogrammed.

⇒ **If the control module cannot be reprogrammed**

2.1. Ignition OFF for one minute, ignition ON.

2.2. Verify the control module can be reprogrammed.

⇒ If the control module cannot be reprogrammed, replace the control module.

⇓ If the control module can be reprogrammed.

2.3. All OK.

⇓ **If the control module can be reprogrammed**

3. All OK.

Repair Instructions

Perform the *Diagnostic Repair Verification 3-421* after completing the repair.

Control Module References 3-4 for control module replacement, programming and setup.

K60 Column Lock Module: Programming and Setup

Note:

- Always verify the module has the newest software available before replacing the module.
- Do NOT program a control module unless directed to by a service procedure or a service bulletin. If the control module is not properly configured with the correct calibration software, the control module will not control all of the vehicle features properly.
- Verify the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Turn OFF or disable systems that may put a load on the vehicle's battery such as interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- Programming must begin with the Vehicle OFF. Programming will direct the appropriate control module(s) to change power mode as needed during the procedure, independent of the vehicle’s power mode.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to No.

Reference Information

Special Tools
EL-52100 Multiple Diagnostic Interface 2 (MDI 2)

Programming a New Control Module

To program a new control module, perform the following procedure:

Note: Verify all control modules are connected and communicating before attempting to program the K60 Column Lock Module.

1. Vehicle OFF, ensure that the key fob is inside the vehicle and not moved for the duration of the programming to prevent an inadvertent power

mode change during programming. *If the key fob is not inside the vehicle, the serial data authentication configuration procedure which runs automatically at the end of the programming step will fail even though the programming appears to run successfully. If this procedure fails, the setup step will fail or be incomplete.*

2. Disconnect **Wi-Fi dongle** if it is currently connected to *EL-52100* Multiple Diagnostic Interface 2 (MDI 2).
3. Install **EL-52100 (MDI 2)** using wired USB Connection from MDI 2 to computer and verify it is working properly to prevent programming failure due to unintended wireless drops. *Using the EL-47955 (MDI) will result in a programming failure.*
4. Install an approved battery maintainer or power supply that provides a steady and stable voltage to support the 12V system during SPS programming events. *Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programming. If a battery maintainer is not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply.*
5. Access the **Techline Connect (TLC)** system and select **Service Programming System (SPS)**.
6. Select **Replace and Reprogram** option from **Selected Programming Process** field on the upper right of the SPS screen and then click on **Next** button in the lower right of the SPS screen.
7. On the SPS Supported Controllers screen, under **Select Controller**, select **K60 Column Lock Module**.
8. On the SPS Supported Controllers screen, under **Select Function/Sequence**, select **Programming** and follow the on-screen instructions.
9. Clear DTCs.

Programming an Existing Control Module

To program an existing control module, perform the following procedure:

1. Vehicle OFF, ensure that the key fob is inside the vehicle and not moved for the duration of the programming to prevent an inadvertent power mode change during programming.
2. Disconnect **Wi-Fi dongle** if it is currently connected to *EL-52100* Multiple Diagnostic Interface 2 (MDI 2).
3. Install **EL-52100 (MDI 2)** using wired USB Connection from MDI 2 to computer and verify it is working properly to prevent programming failure due to unintended wireless drops. *Using the EL-47955 (MDI) will result in a programming failure.*
4. Install an approved battery maintainer or power supply that provides a steady and stable voltage to support the 12V system during SPS programming events. *Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programming. If a battery maintainer is not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply.*
5. Access the **Techline Connect (TLC)** system and select **Service Programming System (SPS)**.
6. Select **Reprogram** option from **Selected Programming Process** field on the upper right of the SPS screen and then click on **Next** button in the lower right of the SPS screen.
7. On the SPS Supported Controllers screen, under **Select Controller**, select **K60 Column Lock Module**.
8. On the SPS Supported Controllers screen, under **Select Function/Sequence**, select **Programming** and follow the on-screen instructions.
9. Clear DTCs.

Unsuccessful Programming Recovery

Note:

- **For Serial Data Authentication Configuration error/failure, refer to the Troublshooting section of the** *Serial Data Authentication Configuration 3-66* **procedure.**
- Ensure the *EL-52100* (MDI 2) is used when programming the vehicle. Using the EL-47955 (MDI) will result in a programming failure.
- It may be necessary to use another *EL-52100* (MDI 2) and/or cables to verify proper operation to eliminate the possibility of faulty equipment.
- If Ethernet programming fails, ensure there is no fault in the Ethernet circuits between the X84 Data Link Connector and K56 Serial Data Gateway Module.

In the event of an interrupted or unsuccessful programming event, perform the following steps:

1. Exit Service Programming System (SPS) and disconnect all programming equipment from the vehicle.
2. Disconnect all battery voltage or ignition voltage sources from the control module. All voltage sources must be removed for a minimum of 10 min. This can be done several ways and should be

completed by using the least intrusive way. This can vary depending on vehicle and control module location and can be done by one of the options listed below:

- Removing all fuses supplying battery voltage and ignition voltage to the control module.
- Disconnecting all harness connectors from the control module.

Warning: Always ensure the Battery Maintenance Mode is inactive before disconnecting the low voltage 12 volt battery (or batteries). This mode can be active with the ignition off, regardless of whether the vehicle charging cord is plugged in or not. When this mode is active, the on-board high voltage battery charger(s) will energize the 12 volt battery cables and charge the 12 volt battery (or batteries). Disconnecting any battery cables while this mode is active may result in an electrical shock or a burn from hot battery cable leads.

- **For electric vehicle (EV):** Check the 12 V battery voltage with a digital multimeter before disconnecting any battery cables leads. If the voltage is 13.5 V or above, the Battery Maintenance Mode is active. The technician must wait for the T18 Battery Charger to deactivate before disconnecting the battery negative cable. For more information, refer to *Charging System Description and Operation 6-184* . With Battery Maintenance Mode inactive, perform a 12 V battery disconnect by disconnecting the battery negative cable. Refer to [Link target (target-id 37733-) not found] .
- **For internal combustion engine vehicle (ICE):** Performing a 12 V battery disconnect by disconnecting the battery negative cable. Refer to [Link target (target-id 37733-) not found] .

3. Reconnect all battery voltage and ignition voltage sources to the control module.
4. Close down the current session of Techline Connect and reopen a new session.
5. Verify the control module, X84 Data Link Connector, and programming tool connections are secure and the tool software is up to date.
6. Vehicle OFF, ensure that the key fob is inside the vehicle and not moved for the duration of the programming to prevent an inadvertent power mode change during programming.
7. Access the Service Programming System (SPS) and follow the on-screen instructions for the control module.
8. Verify the control module can be programmed.

⇒ **If the control module can not be programmed**

8.1. Vehicle in Service Mode for 1 min.

8.2. Vehicle OFF.

8.3. Access SPS and follow the on-screen instructions for the control module.

Note: If programming is still not successful after the second programming attempt, check the following:

- For facilities using an internet firewall, ensure firewall settings are not blocking file downloads and/or require elevated rights.
- For United States and Canada GM dealers, the appropriate firewall settings can be found in the GM DEALER INFRASTRUCTURE & SECURITY GUIDELINES (DISG).
- For optimal consistency during the reprogramming session, we recommend connecting the computer/ laptop to a hardwired Ethernet cable, as the large software file size may affect stability.

8.4. Verify the control module can be programmed.

⇒ If the control module can not be programmed, replace the control module.

⇓ If the control module can be programmed

8.5. Clear DTCs.

⇓ **If the control module can be programmed**

9. Clear DTCs.

Repair Instructions

Perform the *Diagnostic Repair Verification 3-421* after completing the repair.

Control Module References 3-4 for control module replacement, programming, and setup.

K61 Sunroof Control Module: Programming and Setup

Diagnostic Instructions

- Perform the *Diagnostic System Check - Vehicle 3-358* prior to using this diagnostic procedure.
- Review the description of *Strategy Based Diagnosis 3-348*

Note:

- Always verify the module has the newest software available before replacing the module.
- Verify the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. When required, install a battery maintainer or power supply that provides a steady

and stable voltage. Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programming. If a battery maintainer is not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply.

- Turn OFF or disable systems that may put a load on the vehicle's battery such as interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- Programming must begin with the Ignition/Vehicle OFF. Programming will direct the appropriate control module(s) to change power mode as needed during the procedure, independent of the vehicle's power mode.
- To prevent programming failure due to unintended wireless drops, it is recommended that a wired MDI 2 connection be used when programming the control module.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to No.

Reference Information

Special Tools
EL-52100 Multiple Diagnostic Interface 2 (MDI 2)

Programming an Existing or New Control Module

This control module does not require SPS programming or any setup procedures.

Please refer to: [Link target (target-id 130156-) not found] for programming and setup.

Repair Instructions

Perform the *Diagnostic Repair Verification 3-421* after completing the repair.

Control Module References 3-4 for control module replacement, programming, and setup.

K67 Trailer Brake Control Module: Programming and Setup

Replace and Program ECU or Reprogram ECU

This ECU does not require SPS programming or any setup procedures.

K68 Trailer Lighting Control Module: Programming and Setup

The K68 Trailer Lamp Control Module does not require programming, but does require serial data authentication. Refer to: *Serial Data Authentication Configuration 3-66*.

K69 Transfer Case Control Module: Programming and Setup

Note:

- Always verify the module has the newest software available before replacing the module.
- Verify the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. When required, install a battery maintainer or power supply that provides a steady and stable voltage. Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programming. If a battery maintainer is not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply.
- Turn Off or disable systems that may put a load on the vehicle's battery. For example, interior lights, daytime running lights, HVAC, and radio.
- During the programming procedure, follow the Service Programming System (SPS) prompts for the correct ignition switch position.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to No.

Programming an Existing or New Control Module

To program an existing or new control module, perform the following procedure:

1. Access SPS and follow the on-screen instructions for the control module: K69 Transfer Case Control Module
2. Perform the SPS function: K69 Transfer Case Control Module — Programming
3. Select Serial Data Authentication Configuration button (located to the left of the SPS supported controllers list or to the bottom right of the Techline Connect) and follow the on-screen instructions.
4. Perform the SPS function: K69 Transfer Case Control Module — Setup
5. Clear DTCs.
6. Perform the scan tool function: Range Actuator Learn

   Refer to: [Link target (target-id 304015-) not found]

Unsuccessful Programming Recovery

If programming a control module is not successful, perform the following procedure:

1. Verify the control module, data link connector and programming tool connections are secure and the tool software is up to date.
2. Perform the SPS function: K69 Transfer Case Control Module — Programming

   Verify the control module programming is successful.

⇒ **If the programming is not successful**

   2.1. Disconnect the battery.

   2.2. Wait 60 s before proceeding to the next step.

   2.3. Connect the battery.

   2.4. Perform the SPS function: K69 Transfer Case Control Module — Programming

⇒ If the programming is not successful » Replace the component: K69 Transfer Case Control Module

⇓ If the programming is successful

   2.5. Select Serial Data Authentication Configuration button (located to the left of the SPS supported controllers list or to the bottom right of the Techline Connect) and follow the on-screen instructions.

   2.6. Perform the SPS function: K69 Transfer Case Control Module — Setup

⇒ If the programming is not successful » Replace the component: A16 Transfer Case Four Wheel Drive Actuator

   Perform the SPS function: K69 Transfer Case Control Module — Setup

⇓ If the procedure was successful

   2.7. Perform the scan tool function: Range Actuator Learn

   Refer to: [Link target (target-id 304015-) not found]

   2.8. All OK.

⇓ **If the programming is successful**

3. Select Serial Data Authentication Configuration button (located to the left of the SPS supported controllers list or to the bottom right of the Techline Connect) and follow the on-screen instructions.
4. Perform the SPS function: K69 Transfer Case Control Module — Setup
5. Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to No.
6. Perform the scan tool function: Range Actuator Learn

   Refer to: [Link target (target-id 304015-) not found]

7. All OK.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair: *Diagnostic Repair Verification 3-421*

For control module replacement, programming, and setup refer to: *Control Module References 3-4*

K71 Transmission Control Module: Programming and Setup (10L80 (MHS, MQC))

Diagnostic Instructions

- Perform the Diagnostic System Check prior to using this diagnostic procedure: *Diagnostic System Check - Vehicle 3-358*
- Review the description of Strategy Based Diagnosis: *Strategy Based Diagnosis 3-348*

Note:

- Always verify the module has the newest software available before replacing the module.
- Verify the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. When required, install a battery maintainer or power supply that provides a steady and stable voltage. Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programming. If a battery maintainer is not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply.
- Turn Off or disable systems that may put a load on the vehicle's battery. For example, interior lights, daytime running lights, HVAC, and radio.
- During the programming procedure, follow the Service Programming System (SPS) prompts for the correct ignition switch position.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to No.

Programming an Existing or New Control Module

1. Ignition » On / Vehicle » In Service Mode

Note:

- If both controller options below are listed, select K20/K71 Engine and Transmission Control Modules.
- If the programming is not successful Refer to: *Control Module References 3-4*— K56 Control Module Programing

2. Perform the SPS function:
   - K20/K71 Engine and Transmission Control Modules and follow the on-screen instructions.
   - K71 Transmission Control Module and follow on-screen instructions.
   - 2.1. Select» Programming
   - 2.2. Select» MCVM Operations— If applicable
   - 2.3. Ignition/Vehicle » Off — For greater than 2 min
   - 2.4. Select» Setup— Follow the on-screen instructions.
3. Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to No.
4. Perform the scan tool configuration/reset function: Transmission Service Fast Learn— If available
5. All OK.

Unsuccessful Programming Recovery

Note:
- If programming is still not successful after the second programming attempt, check the following:
- For facilities using an internet firewall, ensure firewall settings are not blocking file downloads and/or require elevated rights.
- For United States and Canada GM dealers, the appropriate firewall settings can be found in the GM DEALER INFRASTRUCTURE & SECURITY GUIDELINES (DISG) section 2.d.vii.

1. Verify the control module, data link connector and programming tool connections are secure and the tool software is up to date.
2. Ignition » On / Vehicle » In Service Mode
3. Perform one of the following SPS Programming functions:

Note: If both controller options below are listed, select K20/K71 Engine and Transmission Control Modules.

- K20/K71 Engine and Transmission Control Modules and follow the on-screen instructions.
- K71 Transmission Control Module and follow on-screen instructions.

4. Verify the control module programming is successful.

⇒ If the programming is not successful » Replace the component: K71 Transmission Control Module

⇓ If the programming is successful

- 4.1. Select» MCVM Operations— If applicable
- 4.2. Ignition/Vehicle » Off — For greater than 2 min
- 4.3. Select» Setup— Follow the on-screen instructions.

  If setup is not an available option — Perform the appropriate learn/reset procedure with the scan tool

⇓ **If the programming is successful**

5. Select» MCVM Operations— If applicable
6. Ignition/Vehicle » Off — For greater than 2 min
7. Select» Setup— Follow the on-screen instructions.

   If setup is not an available option — Perform the appropriate learn/reset procedure with the scan tool
8. Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to No.
9. Perform the scan tool configuration/reset function: Transmission Service Fast Learn— If available
10. All OK.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair: *Diagnostic Repair Verification 3-421*

For control module replacement, programming, and setup refer to: *Control Module References 3-4*

K73 Telematic Control Module: Programming and Setup (UE1)

Note:
- Always verify the module has the newest software available before replacing the module.
- Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. When required, install a battery maintainer or power supply that provides a steady and stable voltage. Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programing. If a battery maintainer is not available,

connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply.

- Turn OFF or disable systems that may put a load on the vehicles battery such as; interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- Programming must begin with the Ignition/Vehicle OFF. Programming will direct the appropriate control module(s) to change power mode as needed during the procedure, independent of the vehicle's power mode.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to NO.

Diagnostic Aids

Note: Check for Preliminary Information or Technical Service Bulletins before programming.

- It is critical to use the service replacement K73 Telematic Control Module only in the vehicle for which it was ordered.
- Failure to perform the following procedures will result in a red LED, DTC(s) being set, and limited or incomplete OnStar® services.
- An OnStar® button press to the OnStar® call center is required to complete the module replacement procedure.
- To fully activate an OnStar® module, both the setup and activation request procedures must be completed on all vehicles with and without an active OnStar® subscription to insure the unit has been setup properly for the vehicle it has been installed into and also to update the OnStar® with the correct unit information.
- To initialize the Turn-by-Turn feature (if equipped), the vehicle must first be driven In open sky condition at speeds greater than 10 mph (16 kph) or more for a minimum of 5 miles (8 km) , and perform at least 2 left and 2 right 90 degree turns coming to complete stops prior to each turn.
- On vehicles up fitted with TTY capabilities, it is necessary to perform a power cycle of the OnStar® Interface Module (OTIM), and toggle the TTY mode after completing the Communication Interface Module installation and setup procedures.

Reference Information

Special Tools

- EL-52100 Multiple Diagnostic Interface 2 (MDI 2)

For equivalent regional tools, refer to *Special Tools 3-85*.

Replace and Program Control Module

To program a replacement control module, perform the following procedure:

Note: Begin with the vehicle in the vehicle OFF power mode. The Service Programming System will power mode the vehicle.

Note: When the control module is replaced the correct order MUST be followed: Delta Programming then Programming and Service Activation.

1. Ignition/Vehicle OFF, hazard warning flashers ON, ensure that the key fob is inside the vehicle and not moved for the duration of the programming to prevent an inadvertent power mode change during programming..
2. Access the Service Programming System (SPS) and follow the on-screen instructions.
3. Check and follow Preliminary Information or Technical Service Bulletins before programming. If control module software updates are available, in the SPS Supported Controllers screen, select K73 Telematic Control Module – Delta Programming and follow the on-screen instructions.

Note: Refer to and follow the Preliminary Information or Service Bulletin to successfully program this control module.

Note: Failure to complete the following step may result in the module software not being fully up to date.

4. Return to step 3 to continue updating the module until step 3 on-screen instructions blocks programming.

Note: If the Service Activation step fails and DTC U1962 or U19A3 is set in the K73 Telematic Control Module, perform the Serial Data Authentication Configuration procedure and then repeat the Service Activation step again. Refer to: *Serial Data Authentication Configuration 3-66*.

5. To properly calibrate, activate and configure the control module, in the SPS Supported Controllers screen, select K73 Telematic Control Module – Programming and Service Activation and follow the on-screen instructions.
6. Clear DTCs, hazard warning flashers OFF.
7. Ignition/Vehicle ON.
8. Press the OnStar® Blue Button to call OnStar®, inform the advisor a new module has been installed and to verify the module is fully configured, registered, and activated.

Note: An OnStar® button press to the OnStar® call center is required to complete the module replacement procedure.

Programming Control Module for an Update

To program an existing control module for an update, perform the following procedure:

Note: Begin with the vehicle in the vehicle OFF power mode. The Service Programming System will power mode the vehicle.

1. Ignition/Vehicle OFF, hazard warning flashers ON, ensure that the key fob is inside the vehicle and not moved for the duration of the programming to prevent an inadvertent power mode change during programming..
2. Access the Service Programming System (SPS) and follow the on-screen instructions.
3. Check and follow Preliminary Information or Technical Service Bulletins before programming. If control module software updates are available, in the SPS Supported Controllers screen, select K73 Telematic Control Module – Delta Programming and follow the on-screen instructions.

Note: For programming an existing module, you only need to perform “Software Update or Delta Programming”.

Note: Failure to complete the following step may result in the module software not being fully up to date.

4. Return to step 3 to continue updating the module until step 3 on-screen instructions blocks programming.
5. Clear DTCs, hazard warning flashers OFF.

Unsuccessful Programming Recovery

In the event of an interrupted or unsuccessful programming event, perform the following steps:

Note: Begin with the vehicle in the vehicle OFF power mode. The Service Programming System will power mode the vehicle.

1. Ignition/Vehicle OFF
2. Ensure the control module, DLC and programming tool connections are secure and the SPS software is up to date.
3. Verify the control module can be reprogrammed.

⇒ **If the control module cannot be reprogrammed**

4. Ignition OFF for one minute.
   - 4.1. Verify the control module can be reprogrammed.

⇒ **If the control module cannot be reprogrammed**

⇒ Replace the control module.

⇓ **If the control module can be reprogrammed**

- 4.2. Clear DTCs.
- 4.3. All OK.

Repair Instructions

Perform the *Diagnostic Repair Verification 3-421* after completing the repair procedure.

Refer to *Control Module References 3-4* for control module replacement, programming and setup.

K73 Telematic Control Module: Programming and Setup (UESUER)

Note:

- Always verify the module has the newest software available before replacing the module.
- Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. When required, install a battery maintainer or power supply that provides a steady and stable voltage. Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programing. If a battery maintainer is not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply.
- Turn OFF or disable systems that may put a load on the vehicles battery such as; interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- Programming must begin with the Ignition/Vehicle OFF. Programming will direct the appropriate control module(s) to change power mode as needed during the procedure, independent of the vehicle’s power mode.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to NO.

Diagnostic Aids

Note: Check for Preliminary Information or Technical Service Bulletins before programming.

- It is critical to use the service replacement K73 Telematic Control Module only in the vehicle for which it was ordered.
- To fully activate an OnStar® module, both the setup and activation request procedures must be completed on all vehicles with and without an active OnStar® subscription to insure the unit has been setup properly for the vehicle it has been installed into and also to update the OnStar® with the correct unit information.

- To initialize the Turn-by-Turn feature (if equipped), the vehicle must first be driven In open sky condition at speeds greater than 10 mph (16 kph) or more for a minimum of 5 miles (8 km) , and perform at least 2 left and 2 right 90 degree turns coming to complete stops prior to each turn.
- On vehicles up fitted with TTY capabilities, it is necessary to perform a power cycle of the OnStar® Interface Module (OTIM), and toggle the TTY mode after completing the Communication Interface Module installation and setup procedures.

Reference Information

Special Tools

- EL-52100 Multiple Diagnostic Interface 2 (MDI 2)

For equivalent regional tools, refer to *Special Tools 3-85*.

Replace and Program Control Module

To program a replacement control module, perform the following procedure:

Note: Begin with the vehicle in the vehicle OFF power mode. The Service Programming System will power mode the vehicle.

Note: When the control module is replaced the correct order MUST be followed: Software Update then Programming and Service Activation.

1. Ignition/Vehicle OFF.
2. Access the Service Programming System (SPS) and follow the on-screen instructions.
3. Check and follow Preliminary Information or Technical Service Bulletins before programming. If control module software updates are available, in the SPS Supported Controllers screen, select K73 Telematic Control Module – Software Update or Delta Programming and follow the on-screen instructions.

Note: Refer to and follow the Preliminary Information or Service Bulletin to successfully program this control module.

4. To properly calibrate, activate and configure the control module, in the SPS Supported Controllers screen, select K73 Telematic Control Module – Programming and Service Activation and follow the on-screen instructions.
5. Clear DTCs.

Programming Control Module for an Update

To program an existing control module for an update, perform the following procedure:

Note: Begin with the vehicle in the vehicle OFF power mode. The Service Programming System will power mode the vehicle.

1. Ignition/Vehicle OFF.
2. Access the Service Programming System (SPS) and follow the on-screen instructions.
3. Check and follow Preliminary Information or Technical Service Bulletins before programming. If control module software updates are available, in the SPS Supported Controllers screen, select K73 Telematic Control Module – Software Update or Delta Programming and follow the on-screen instructions.

Note: For programming an existing module, you only need to perform “Software Update or Delta Programming”.

4. Clear DTCs.

Unsuccessful Programming Recovery

In the event of an interrupted or unsuccessful programming event, perform the following steps:

Note: Begin with the vehicle in the vehicle OFF power mode. The Service Programming System will power mode the vehicle.

1. Ignition/Vehicle OFF
2. Ensure the control module, DLC and programming tool connections are secure and the SPS software is up to date.
3. Verify the control module can be reprogrammed.

⇒ **If the control module cannot be reprogrammed**

4. Ignition OFF for one minute.
   4.1. Verify the control module can be reprogrammed.

⇒ **If the control module cannot be reprogrammed**

⇒ Replace the control module.

⇓ **If the control module can be reprogrammed**

4.2. Clear DTCs.

4.3. All OK.

Repair Instructions

Perform the *Diagnostic Repair Verification 3-421* after completing the repair procedure.

Refer to *Control Module References 3-4* for control module replacement, programming and setup.

K73 Telematic Control Module: Programming and Setup (UDA)

Note:

- Always verify the module has the newest software available before replacing the module.
- Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. When required, install a battery maintainer or power supply that provides a steady and stable voltage. Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programing. If a battery maintainer is not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply.
- Turn OFF or disable systems that may put a load on the vehicles battery such as; interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- Programming must begin with the Ignition/Vehicle OFF. Programming will direct the appropriate control module(s) to change power mode as needed during the procedure, independent of the vehicle's power mode.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to NO.

Reference Information

Special Tools

- EL-52100 Multiple Diagnostic Interface 2 (MDI 2)

For equivalent regional tools, refer to *Special Tools 3-85*.

Replace and Program Control Module or Reprogram Control Module

To program a replacement or an existing control module, perform the following procedure:

Note: Begin with the vehicle in the vehicle OFF power mode. The Service Programming System will power mode the vehicle.

1. Ignition/Vehicle OFF
2. Access the Service Programming System (SPS) and follow the on-screen instructions.
3. In the SPS Supported Controllers screen, select K73 Telematic Control Module and Service Activation and follow the on-screen instructions.
4. Clear DTCs.

Unsuccessful Programming Recovery

In the event of an interrupted or unsuccessful programming event, perform the following steps:

Note: Begin with the vehicle in the vehicle OFF power mode. The Service Programming System will power mode the vehicle.

1. Ignition/Vehicle OFF
2. Ensure the control module, DLC and programming tool connections are secure and the SPS software is up to date.
3. Verify the control module can be reprogrammed.

⇒ **If the control module cannot be reprogrammed**

3.1. Ignition OFF for one minute.

3.2. Verify the control module can be reprogrammed.

⇒ If the control module cannot be reprogrammed, replace the control module.

⇓ If the control module can be reprogrammed.

3.3. All OK.

⇓ **If the control module can be reprogrammed**

4. All OK.

K85P Restraints Occupant Classification System Module - Passenger: Programming and Setup

Diagnostic Instructions

- Perform the *Diagnostic System Check - Vehicle 3-358* prior to using this diagnostic procedure.
- Review the description of *Strategy Based Diagnosis 3-348*

Note:

- Always verify the module has the newest software available before replacing the module.

- Verify the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. When required, install a battery maintainer or power supply that provides a steady and stable voltage. Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programming. If a battery maintainer is not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply.
- Turn OFF or disable systems that may put a load on the vehicle's battery such as interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- Programming must begin with the Ignition/Vehicle OFF. Programming will direct the appropriate control module(s) to change power mode as needed during the procedure, independent of the vehicle's power mode.
- To prevent programming failure due to unintended wireless drops, it is recommended that a wired MDI 2 connection be used when programming the control module.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to No.

Reference Information

Special Tools

EL-52100 Multiple Diagnostic Interface 2 (MDI 2)

Programming an Existing or New Control Module

To program an existing or new control module, perform the following procedure:

Note:

- Ensure the *EL-52100* (MDI 2) is used when programming the vehicle and verify it is working properly. Using the EL-47955 (MDI) will result in a programming failure.
- Verify all control modules are connected and communicating before attempting to program the K85P Restraints Occupant Classification System Module.
- Verify the key fob is inside the vehicle. If the key fob is not inside the vehicle, the serial data authentication configuration procedure which runs automatically at the end of the programming step will fail even though the programming appears to run successfully. If the serial data authentication configuration procedure fails, DTC U1962 will set and/or the setup step will fail or be incomplete.
- Before ROCSM Programing and Setup can be conducted, the front passenger seat must be completely empty of all items. The presence of any liquid or items on the front passenger seat will affect the calibration and operation of the ROCSM.
- DTC U3000.99 will set if the re-zero system test is performed with:
  - An aftermarket seat heater located too close to the sensor mat
  - A scan tool, laptop or other electronic device is in the seat.
  - The seat is damp or wet
  - An object or person is in the seat

1. Ignition/Vehicle OFF, ensure that the key fob is inside the vehicle and not moved for the duration of the programming to prevent an inadvertent power mode change during programming.
2. Verify that the temperature is between 32°F (0°C) to 100°F (38 °C).
3. Verify the seat is completely dry.
4. Empty the front outboard passenger seat.
5. Verify that all SIR and ROCSM components, connectors, and connector position assurances are properly connected and mounted.
6. Access the Service Programming System (SPS) and follow the on-screen instructions for the K85P Restraints Occupant Classification System Module.
7. Perform the SPS function: **Programming** and follow the on-screen instructions.
8. Perform the SPS function: **Setup** and follow the on-screen instructions.
9. Clear DTCs.

Unsuccessful Programming Recovery

Note:

- Ensure the *EL-52100* (MDI 2) is used when programming the vehicle. Using the EL-47955 (MDI) will result in a programming failure.
- It may be necessary to use another *EL-52100* (MDI 2) and/or cables to verify proper operation to eliminate the possibility of faulty equipment.
- If Ethernet programming fails, ensure there is no fault in the Ethernet circuits between the X84 Data

Link Connector and K56 Serial Data Gateway Module. Refer to [Link target (target-id 300812-) not found] to diagnose these Ethernet circuits.

In the event of an interrupted or unsuccessful programming event, perform the following steps:

1. Exit Service Programming System (SPS) and disconnect all programming equipment from the vehicle.
2. Disconnect all battery voltage or ignition voltage sources from the control module.

Note: All voltage sources must be removed for a minimum of 10 min. This can be done several ways and should be completed by using the least intrusive way. This can vary depending on vehicle and control module location and can be done by one of the options listed below:

- Removing all fuses supplying battery voltage and ignition voltage to the control module.
- Disconnecting all harness connectors from the control module.
- Performing a 12 V battery disconnect by disconnecting the battery negative cable. Refer to [Link target (target-id 37733-) not found] .

3. Reconnect all battery voltage and ignition voltage sources to the control module.
4. Close down the current session of Techline Connect and reopen a new session.
5. Verify the control module, data link connector, and programming tool connections are secure and the tool software is up to date.
6. Ignition/Vehicle OFF, ensure that the key fob is inside the vehicle and not moved for the duration of the programming to prevent an inadvertent power mode change during programming.
7. Access the Service Programming System (SPS) and follow the on-screen instructions for the control module.
8. Verify the control module can be programmed.

⇒ **If the control module can not be programmed**

8.1. Ignition ON/Vehicle in Service Mode for 1 min.

8.2. Ignition/Vehicle OFF.

8.3. Access SPS and follow the on-screen instructions for the control module.

Note: If programming is still not successful after the second programming attempt, check the following:

- For facilities using an internet firewall, ensure firewall settings are not blocking file downloads and/or require elevated rights.
- For United States and Canada GM dealers, the appropriate firewall settings can be found in the GM DEALER INFRASTRUCTURE & SECURITY GUIDELINES (DISG) section 2.d.vii.

8.4. Verify the control module can be programmed.

⇒ If the control module can not be programmed, replace the control module.

⇓ If the control module can be programmed

8.5. Clear DTCs.

⇓ **If the control module can be programmed**

9. Clear DTCs.

Repair Instructions

For module replacement, refer to: [Link target (target-id 188211-) not found]

K99 Steering Column Control Module: Programming and Setup

When replacing the steering column tilt wheel and telescope control module, steering column tilt motor, or steering column telescope motor, the steering column tilt wheel and telescope control module learn procedure must be followed. Refer to [Link target (target-id 225575-) not found] steering column tilt wheel and telescope control module learn procedure.

K111 Fuel Pump Power Control Module: Programming and Setup

This control module does not require SPS programming but does require the following setup procedures after a new control module is installed: [Link target (target-id 328904-) not found]

K115 Reductant Control Module: Programming and Setup

Diagnostic Instructions

- Perform the Diagnostic System Check prior to using this diagnostic procedure: *Diagnostic System Check - Vehicle 3-358*
- Review the description of Strategy Based Diagnosis: *Strategy Based Diagnosis 3-348*

Note:

- Always verify the module has the newest software available before replacing the module.
- Verify the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.

- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. When required, install a battery maintainer or power supply that provides a steady and stable voltage. Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programming. If a battery maintainer is not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply.
- Turn Off or disable systems that may put a load on the vehicle's battery. For example, interior lights, daytime running lights, HVAC, and radio.
- During the programming procedure, follow the Service Programming System (SPS) prompts for the correct ignition switch position.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to No.

Programming an Existing or New Control Module

To program an existing or new control module, perform the following procedure:

1. Ignition » On / Vehicle » In Service Mode
2. Access SPS and follow the on-screen instructions for the control module: K115 Reductant Control Module

Unsuccessful Programming Recovery

If programming a control module is not successful, perform the following procedure:

1. Verify the control module, data link connector and programming tool connections are secure and the tool software is up to date.
2. Ignition » On / Vehicle » In Service Mode
3. Access SPS and follow the on-screen instructions for the control module: K115 Reductant Control Module

   Verify the control module programming is successful.

⇒ **If the programming is not successful**

   3.1. Ignition/Vehicle » Off — For greater than 1 min

   3.2. Ignition » On / Vehicle » In Service Mode

   3.3. Access SPS and follow the on-screen instructions for the control module: K115 Reductant Control Module

⇒ If the programming is not successful » Replace the component: K115 Reductant Control Module

⇓ If the programming is successful

   3.4. All OK.

⇓ **If the programming is successful**

4. All OK.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair: *Diagnostic Repair Verification 3-421*

For control module replacement, programming, and setup refer to: *Control Module References 3-4*

K124 Image Processing Module: Programming and Setup (without UKL)

Note:

- DO NOT program a control module unless directed to by a service procedure or a service bulletin. If the image processing module is not properly configured with the correct calibration software, the image processing module will not control all of the vehicle features properly.
- Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming or programming failure, image processing module damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. Install the *EL-49642* SPS Programming Support Tool to maintain system voltage. If not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply.
- Turn OFF or disable systems that may put a load on the vehicles battery such as; interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- During the programming procedure, follow the SPS prompts for the correct ignition switch position.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to NO.

Replace and Program K124 Image Processing Module or Reprogram K124 Image Processing Module

Note: Due to continuous improvements, the on screen selections may vary from instructions below.

To program a replacement or an existing K124 Image Processing Module, perform the following procedure:

1. Ignition/Vehicle OFF

2. Connect the *EL-52100 MDI 2* Multiple Diagnostic Interface 2 to the computer using a USB cable. Wireless or Bluetooth connections may cause an interruption in the data transfer.
3. Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
4. Access the Service Programming System (SPS) and follow the on-screen instructions.
5. On the SPS Supported Controllers screen, select K124 Image Processing Module – Programming and follow the on-screen instructions.
6. Clear DTCs.

Unsuccessful Programming Recovery

In the event of an interrupted or unsuccessful programming event, perform the following steps:

Note: Unsuccessful programming attempts may be caused by a weak, slow, or unstable WiFi connection. Connecting computer to facility network via wired connection may resolve module programming issues.

1. Ensure the Image Processing Module, DLC and programming tool connections are secure and the SPS software is up to date.
2. Ignition/Vehicle ON for 5 minutes.
3. Ignition/Vehicle OFF.
4. Verify the K124 Image Processing Module can be reprogrammed.

⇒ **If the K124 Image Processing Module cannot be reprogrammed**

4.1. Ignition OFF for one minute, ignition ON.

4.2. Verify the K124 Image Processing Module can be reprogrammed.

⇒ If the image processing module cannot be reprogrammed, replace the K124 Image Processing Module.

⇓ If the K124 Image Processing Module can be reprogrammed.

4.3. All OK.

⇓ **If the K124 Image Processing Module can be reprogrammed**

5. All OK.

K124 Image Processing Module: Programming and Setup (UKL)

Note:

- Stable battery voltage is critical during setup. Any fluctuation, spiking, over voltage or loss of voltage will interrupt process. Install the *EL-49642* SPS Programming Support Tool to maintain system voltage. If not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply.
- Turn OFF or disable systems that may put a load on the vehicles battery such as; interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- During setup, follow the SPS prompts for the correct ignition mode.
- Clear DTCs after setup is complete. Clearing powertrain DTCs will set the Inspection/Maintenance (I/M) system status indicators to NO.

Diagnostic Aids

There is one K124 Image Processing Module with two internal processors with UKL. Both processors must be at the same level of software. To ensure this, programming processors individually is prohibited.

Reprogram Image Processing Module

Note: DO NOT reprogram a control module unless directed to by a service procedure or a service bulletin. If the control module is not properly configured with the correct calibration software, the control module will not control all of the vehicle features properly.

Note: Due to continuous improvements, the on screen selections may vary from instructions below.

To reprogram an existing K124 Image Processing Module, perform the following procedure:

1. Install the *EL-49642 SPS* Programming Support Tool to maintain system voltage.
2. Connect the *EL-52100 MDI 2* Multiple Diagnostic Interface 2 to the computer using a USB cable. Wireless or Bluetooth connections may cause an interruption in the data transfer.
3. Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
4. Ignition/Vehicle OFF.
5. Access the Service Programming System (SPS) and follow the on-screen instructions.
6. On the SPS Supported Controllers screen, select K56 Serial Data Gateway Module and confirm K56

Serial Data Gateway Module is updated with the latest software.

7. On the SPS Supported Controllers screen, select K124 Image Processing Module – Programming and follow the on-screen instructions.
8. Clear DTCs.

Replace and Program Image Processing Module

Note: Due to continuous improvements, the on screen selections may vary from instructions below.

Upon replacement of the K124 Image Processing Module, perform the following procedures:

1. Install the *EL-49642 SPS* Programming Support Tool to maintain system voltage.
2. Connect the *EL-52100 MDI 2* Multiple Diagnostic Interface 2 to the computer using a USB cable. Wireless or Bluetooth connections may cause an interruption in the data transfer.
3. Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
4. Ignition/Vehicle OFF.
5. Access the Service Programming System (SPS) and follow the on-screen instructions.
6. Perform Serial Data Authentication Configuration. *Serial Data Authentication Configuration 3-66*
7. On the SPS Supported Controllers screen, select K56 Serial Data Gateway Module and confirm K56 Serial Data Gateway Module is updated with the latest software.
8. On the SPS Supported Controllers screen, select K124 Image Processing Module – Programming and follow the on-screen instructions.
9. Perform Vehicle Dynamic Sensor Offset Calibration. [Link target (target-id 330157-) not found]
10. Perform All Cameras Alignment Learn. [Link target (target-id 327188-) not found]

Unsuccessful Programming Recovery

In the event of an interrupted or unsuccessful setup event, perform the following steps:

Note: Unsuccessful programming attempts may be caused by a weak, slow, or unstable WiFi connection. Connecting computer to facility network via wired connection may resolve module programming issues.

1. Ignition/Vehicle OFF.
2. Disconnect the negative battery cable for two minutes. Refer to [Link target (target-id 37733-) not found]
3. Ensure the Image Processing Module, DLC and programming tool connections are secure and the SPS software is up to date.
4. Ignition/Vehicle ON for 5 minutes.
5. Ignition/Vehicle OFF.
6. Attempt to reprogram the K124 Image Processing Module

⇒ **If K124 Image Processing Module programs successfully**

All OK.

⇓ **If K124 Image Processing Module fails to program successfully**

7. Unplug the IPM (Image Processing Module) for 30 min, then plug the IPM back in. Using ethernet hard wired from the laptop to the MDI run Serial Data Authentication Configuration (SDAC) then attempt reprogramming. Use the following steps for setting up ethernet connection to the MDI:
   - 7.1. Plug in the USB cable into the PC and the MDI 2.
   - 7.2. Plug in a RJ45 (Ethernet) cable between MDI 2 and PC.
   - 7.3. If your PC does not have an ethernet port, a USB-Ethernet adapter can be used instead.
   - 7.4. Apply 12 volts to the tester via the self-test adapter or by connecting to the vehicle Data Link Connector to power MDI 2.
   - 7.5. Start the MDI Manager software by clicking the MDI Manager icon.
   - 7.6. On the MDI Explorer tab, select the MDI 2 and click the Connect button. A check mark appears over the MDI 2 icon to indicate that the connection has been made (connection by default is over USB.)
   - 7.7. Select "Network Setup" tab.
   - 7.8. Choose wired connection sub-tab.
   - 7.9. Click "enable wired connection"
   - 7.10. Click the "use following address"
   - 7.11. Input the following:
     - IP Address 169.254.1.100
     - Subnet Mask 255.255.0.0
   - 7.12. Click Apply (It will also want you to save the changes, select Yes).
   - 7.13. Return to the MDI explorer tab.
   - 7.14. Hover the mouse over the MDI and it should show both USB and ethernet connections.
   - 7.15. Disconnect USB cable.

7.16. The MDI 2 should now be configured for use via Ethernet. You may need to disconnect and reconnect the MDI 2 via the MDI Manager for these changes to take effect.

8. Attempt to reprogram the K124 Image Processing Module

⇒ **If K124 Image Processing Module programs successfully**

All OK.

⇓ **If K124 Image Processing Module fails to program successfully**

9. Contact Techline Customer Support Center (TCSC).

Repair Instructions

Perform the *Diagnostic Repair Verification 3-421* after completing the repair.

Control Module References 3-4 for Control Module replacement, programming and setup

K160 Brake System Control Module: Programming and Setup

Note:

- Always verify the module has the newest software available before replacing the module.
- Do NOT program a control module unless directed to by a service procedure or a service bulletin. If the control module is not properly configured with the correct calibration software, the control module will not control all of the vehicle features properly.
- Verify the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Turn OFF or disable systems that may put a load on the vehicle's battery such as interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- Programming must begin with the Vehicle OFF. Programming will direct the appropriate control module(s) to change power mode as needed during the procedure, independent of the vehicle's power mode.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to No.

Reference Information

Special Tools
EL-52100 Multiple Diagnostic Interface 2 (MDI 2)

Prepare Module for Removal

This process will capture Brake Pad Life Monitor data from the original K160 Brake System Control Module prior to replacement. Failure to run this procedure on a vehicle with rpo JBP prior to replacing the module will cause the NEW replacement module to have the incorrect brake pad life data.

Perform the following procedures to capture the data. After the new K160 Brake System Control Module is replaced, follow the procedure for "Programming a New Control Module".

1. Access the **Techline Connect (TLC)** system and select **Service Programming System (SPS)**.
2. Select **Replace and Reprogram** option from **Selected Programming Process** field on the upper right of the SPS screen and then click on **Next** button in the lower right of the SPS screen.
3. On the SPS Supported Controllers screen, under **Select Controller**, select **K160 Brake System Control Module**.

Note: The same PC used to run the SPS application must be used when retrieving the data from the original module and then installing the data into the new replacement module. Data is stored on the PC running the SPS application.

4. If equipped with Brake Pad Life Monitor (JBP), on the SPS Supported Controllers screen, under **Select Function/Sequence**, select **Prepare Module for Removal** and follow the on-screen instructions.

Programming a New Control Module (K160 Brake System Control Module with or without A104 Brake Master Cylinder)

To program a new control module, perform the following procedure:

Note: Verify all control modules are connected and communicating before attempting to program the K160 Brake System Control Module.

1. Vehicle OFF, ensure that the key fob is inside the vehicle and not moved for the duration of the programming to prevent an inadvertent power mode change during programming. *If the key fob is not inside the vehicle, the serial data authentication configuration procedure which runs automatically at the end of the programming step will fail even though the programming appears to run successfully. If this procedure fails, the setup step will fail or be incomplete.*
2. Disconnect **Wi-Fi dongle** if it is currently connected to *EL-52100* Multiple Diagnostic Interface 2 (MDI 2).

3. Install **EL-52100 (MDI 2)** using wired USB Connection from MDI 2 to computer and verify it is working properly to prevent programming failure due to unintended wireless drops. *Using the EL-47955 (MDI) will result in a programming failure.*
4. Install an approved battery maintainer or power supply that provides a steady and stable voltage to support the 12V system during SPS programming events. *Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programming. If a battery maintainer is not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply.*
5. Access the **Techline Connect (TLC)** system and select **Service Programming System (SPS)**.
6. Select **Replace and Reprogram** option from **Selected Programming Process** field on the upper right of the SPS screen and then click on **Next** button in the lower right of the SPS screen.
7. On the SPS Supported Controllers screen, under **Select Controller**, select **K160 Brake System Control Module**.
8. If equipped with Brake Pad Life Monitor (JBP), on the SPS Supported Controllers screen, under **Select Function/Sequence**, select **Prepare Module for Removal** and follow the on-screen instructions.
9. On the SPS Supported Controllers screen, under **Select Function/Sequence**, select **Programming** and follow the on-screen instructions.

Note: If the Setup step fails and DTC U1962 or U19A3 is set in the K160 Brake System Control Module, perform the Serial Data Authentication Configuration procedure and then repeat the Setup step again. Refer to: *Serial Data Authentication Configuration 3-66*.

10. On the SPS Supported Controllers screen, under **Select Function/Sequence**, select **Setup** and follow the on-screen instructions.
11. If Setup is successful, go to step 14.

Note: Do not perform the Brake System Plunger Pressure Rise Starting Point learn procedure at this time.

12. If any of the Configuration/Reset procedures are unsuccessful, perform the appropriate GDS2 Configuration/Reset procedure:
    - Brake Pressure Sensor Calibration
    - Brake Pedal Travel Sensor Learn
    - Brake System Plunger Motor Position Sensor Learn
    - Park Brake Calibration Command
13. If the Setup Procedures did not complete and a Device Control Limits Exceeded message is displayed refer to [Link target (target-id 316903-) not found]
14. Perform the Hydraulic Brake System Bleeding procedure refer to [Link target (target-id 50160-) not found]
15. Clear DTCs.
16. If ABS, Traction Control and/or Stabilitrak indicators or Brake Related Messages are ON after performing programming and setup, do the following:
    - Disconnect the scan tool from the X84 Data Link Connector.
    - Ignition/Vehicle OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 m (9.8 ft) away from the vehicle. It may take up to 10 min to power down.
    - Ignition ON/Vehicle In Service Mode, verify ABS, Traction Control and/or Stabilitrak indicators or Brake Messsages are Off. If not, repeat the above step to make sure the vehicle is in sleep mode.
    - Clear DTCs.

Programming an Existing Control Module

To program an existing control module, perform the following procedure:

1. Vehicle OFF, ensure that the key fob is inside the vehicle and not moved for the duration of the programming to prevent an inadvertent power mode change during programming.
2. Disconnect **Wi-Fi dongle** if it is currently connected to *EL-52100* Multiple Diagnostic Interface 2 (MDI 2).
3. Install **EL-52100 (MDI 2)** using wired USB Connection from MDI 2 to computer and verify it is working properly to prevent programming failure due to unintended wireless drops. *Using the EL-47955 (MDI) will result in a programming failure.*
4. Install an approved battery maintainer or power supply that provides a steady and stable voltage to support the 12V system during SPS programming events. *Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programming. If a battery maintainer is not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply.*
5. Access the **Techline Connect (TLC)** system and select **Service Programming System (SPS)**.

6. Select **Reprogram** option from **Selected Programming Process** field on the upper right of the SPS screen and then click on **Next** button in the lower right of the SPS screen.
7. On the SPS Supported Controllers screen, under **Select Controller**, select **K160 Brake System Control Module**.
8. On the SPS Supported Controllers screen, under **Select Function/Sequence**, select **Programming** and follow the on-screen instructions.
9. If the Programming Procedure did not complete and a Device Control Limits Exceeded message is displayed refer to [Link target (target-id 316903-) not found]
10. Clear DTCs.
11. If ABS, Traction Control and/or Stabilitrak indicators or Brake Related Messages are ON after performing programming and setup, do the following:
    - Disconnect the scan tool from the X84 Data Link Connector.
    - Ignition/Vehicle OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 m (9.8 ft) away from the vehicle. It may take up to 10 min to power down.
    - Ignition ON/Vehicle In Service Mode, verify ABS, Traction Control and/or Stabilitrak indicators or Brake Messsages are Off. If not, repeat the above step to make sure the vehicle is in sleep mode.
    - Clear DTCs.

Unsuccessful Programming Recovery

Note:

- **For Serial Data Authentication Configuration error/failure, refer to the Troublshooting section of the** *Serial Data Authentication Configuration 3-66* **procedure.**
- Ensure the *EL-52100* (MDI 2) is used when programming the vehicle. Using the EL-47955 (MDI) will result in a programming failure.
- It may be necessary to use another *EL-52100* (MDI 2) and/or cables to verify proper operation to eliminate the possibility of faulty equipment.
- If Ethernet programming fails, ensure there is no fault in the Ethernet circuits between the X84 Data Link Connector and K56 Serial Data Gateway Module.

In the event of an interrupted or unsuccessful programming event, perform the following steps:

1. Exit Service Programming System (SPS) and disconnect all programming equipment from the vehicle.
2. Disconnect all battery voltage or ignition voltage sources from the control module. All voltage sources must be removed for a minimum of 10 min. This can be done several ways and should be completed by using the least intrusive way. This can vary depending on vehicle and control module location and can be done by one of the options listed below:
    - Removing all fuses supplying battery voltage and ignition voltage to the control module.
    - Disconnecting all harness connectors from the control module.

Warning: Always ensure the Battery Maintenance Mode is inactive before disconnecting the low voltage 12 volt battery (or batteries). This mode can be active with the ignition off, regardless of whether the vehicle charging cord is plugged in or not. When this mode is active, the on-board high voltage battery charger(s) will energize the 12 volt battery cables and charge the 12 volt battery (or batteries). Disconnecting any battery cables while this mode is active may result in an electrical shock or a burn from hot battery cable leads.

    - **For electric vehicle (EV):** Check the 12 V battery voltage with a digital multimeter before disconnecting any battery cables leads. If the voltage is 13.5 V or above, the Battery Maintenance Mode is active. The technician must wait for the T18 Battery Charger to deactivate before disconnecting the battery negative cable. For more information, refer to *Charging System Description and Operation 6-184* . With Battery Maintenance Mode inactive, perform a 12 V battery disconnect by disconnecting the battery negative cable. Refer to [Link target (target-id 37733-) not found] .
    - **For internal combustion engine vehicle (ICE):** Performing a 12 V battery disconnect by disconnecting the battery negative cable. Refer to [Link target (target-id 37733-) not found] .
3. Reconnect all battery voltage and ignition voltage sources to the control module.
4. Close down the current session of Techline Connect and reopen a new session.
5. Verify the control module, X84 Data Link Connector, and programming tool connections are secure and the tool software is up to date.
6. Vehicle OFF, ensure that the key fob is inside the vehicle and not moved for the duration of the programming to prevent an inadvertent power mode change during programming.
7. Access the Service Programming System (SPS) and follow the on-screen instructions for the control module.

8. Verify the control module can be programmed.

⇒ **If the control module can not be programmed**

8.1. Vehicle in Service Mode for 1 min.

8.2. Vehicle OFF.

8.3. Access SPS and follow the on-screen instructions for the control module.

Note: If programming is still not successful after the second programming attempt, check the following:

- For facilities using an internet firewall, ensure firewall settings are not blocking file downloads and/or require elevated rights.
- For United States and Canada GM dealers, the appropriate firewall settings can be found in the GM DEALER INFRASTRUCTURE & SECURITY GUIDELINES (DISG).
- For optimal consistency during the reprogramming session, we recommend connecting the computer/ laptop to a hardwired Ethernet cable, as the large software file size may affect stability.

8.4. Verify the control module can be programmed.

⇒ If the control module can not be programmed, replace the control module.

⇓ If the control module can be programmed

8.5. Clear DTCs.

⇓ **If the control module can be programmed**

9. Clear DTCs.

Repair Instructions

Perform the *Diagnostic Repair Verification 3-421* after completing the repair.

Control Module References 3-4 for control module replacement, programming, and setup.

K180 Driver Monitoring System Control Module: Programming and Setup

Note:

- Always verify the module has the newest software available before replacing the module.
- Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Turn OFF or disable systems that may put a load on the vehicles battery such as; interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- During the programming procedure, follow the SPS prompts for the correct ignition switch position.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to NO.

Reference Information

Special Tools

EL-49642 SPS Programming Support Tool

For equivalent regional tools, refer to *Special Tools 3-85*.

Replace and Program Control Module or Reprogram Control Module

To program a replacement or an existing control module, perform the following procedure:

1. Ignition/Vehicle OFF
2. Access the Service Programming System (SPS) and follow the on-screen instructions.
3. On the SPS Supported Controllers screen, select K180 Driver Monitoring System Control Module - Programming and follow the on-screen instructions.
4. On the SPS Supported Controllers screen, select K180 Driver Monitoring System Control Module - Setup (If Applicable) and follow the on-screen instructions.
5. On the SPS Supported Controllers screen, select K180 Driver Monitoring System Control Module - Configuration (If Applicable) and follow the on-screen instructions.

Unsuccessful Programming Recovery

In the event of an interrupted or unsuccessful programming event, perform the following steps:

1. Ignition ON. Ensure the control module, DLC and programming tool connections are secure and the SPS software is up to date.

2. Verify the control module can be reprogrammed.

⇒ **If the control module cannot be reprogrammed**

2.1. Ignition OFF for one minute, ignition ON.

2.2. Verify the control module can be reprogrammed.

⇒ If the control module cannot be reprogrammed, replace the control module.

⇓ If the control module can be reprogrammed.

2.3. All OK.

⇓ **If the control module can be reprogrammed**

3. All OK.

Repair Instructions

Perform the *Diagnostic Repair Verification 3-421* after completing the repair.

Control Module References 3-4 for Control Module replacement, programming and setup

K182 Parking Assist Control Module: Programming and Setup

Note:

- Always verify the module has the newest software available before replacing the module.
- Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. When required install the *EL-49642* SPS Programming Support Tool to maintain system voltage. If not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply. DO NOT connect a battery charger.
- Turn OFF or disable systems that may put a load on the vehicles battery such as; interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- During the programming procedure, follow the SPS prompts for the correct ignition switch position.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to NO.

Replace and Program Control Module

To program a replacement control module, perform the following procedure:

1. Ignition/Vehicle OFF
2. Access the Service Programming System (SPS) and follow the on-screen instructions.
3. On the SPS Supported Controllers screen, under Select Controller, select K182 Parking Assist Control Module.
4. On the SPS Supported Controllers screen, under Select Function / Sequence, select Programming and follow on screen instructions.
5. Clear DTCs.

Reprogram Control Module

Do not reprogram the parking assist control module, unless directed by a service procedure, or a service bulletin.

To reprogram an existing control module, perform the following procedure:

1. Access the Service Programming System (SPS) and follow the on-screen instructions.
2. On the SPS Supported Controllers screen, under Select Controller, select K182 Parking Assist Control Module.
3. On the SPS Supported Controllers screen, under Select Function / Sequence, select Programming and follow on screen instructions.
4. Clear DTCs.

Unsuccessful Programming Recovery

In the event of an interrupted or unsuccessful programming event, perform the following steps:

1. Ignition ON. Ensure the K182 Parking Assist Control Module, DLC and programming tool connections are secure and the SPS software is up to date.
2. Verify the parking assist control module can be reprogrammed.

⇒ **If the K182 Parking Assist Control Module cannot be reprogrammed**

2.1. Ignition OFF for one minute, ignition ON.

2.2. Verify the parking assist control module can be reprogrammed.

⇒ If the K182 Parking Assist Control Module cannot be reprogrammed, replace the parking assist control module.

⇓ If the K182 Parking Assist Control Module can be reprogrammed.

2.3. All OK.

⇓ **If the K182 Parking Assist Control Module can be reprogrammed**

3. All OK.

Repair Instructions

Perform the *Diagnostic Repair Verification 3-421* after completing the repair.

Control Module References 3-4 for control module replacement, programming and setup

K183 UHF Short Range Low Energy Remote Control Access Transceiver: Programming and Setup

Special Tools
EL-49642 SPS Programming Support Tool

For equivalent regional tools, refer to *Special Tools 3-85*.

Note:
- DO NOT program a control module unless directed to by a service procedure or a service bulletin. If the Control Module is not properly configured with the correct calibration software, the control module will not control all of the vehicle features properly.
- Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or Control Module damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. Install the *EL-49642* SPS programming support tool to maintain system voltage. If not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply. DO NOT connect a battery charger.
- Turn OFF or disable systems that may put a load on the vehicles battery such as; interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- During the programming procedure, follow the SPS prompts for the correct power mode.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to NO.

Replace and Program Control Module or Reprogram Control Module

Note: Unpair the key card prior to replacing the control module. Failure to do so will result in the key card to become unusable on the new control module.

To program a replacement or an existing control module, perform the following procedure:

1. Install *EL-49642* SPS programming support tool.
2. Access the Service Programming System (SPS) and follow the on-screen instructions.
3. On the SPS Supported Controllers screen, select K183 UHF Short Range Low Energy Remote Control Access Transceiver – Programming and follow the on-screen instructions.
4. On the SPS Supported Controllers screen, select K183 UHF Short Range Low Energy Remote Control Access Transceiver – Setup and follow the on-screen instructions.
5. At the end of programming, choose the “Clear All DTCs” function on the SPS screen.

Unsuccessful Programming Recovery

In the event of an interrupted or unsuccessful programming event, perform the following steps:

Note: Programming may fail due to a fault in the serial data circuits between the K183 UHF Short Range Low Energy Remote Control Access Transceiver and the B342x UHF Low Energy Remote Control Access Sensor Transceivers.

1. DO NOT turn the vehicle OFF. Ensure that all control module, DLC and programming tool connections are secure and the TIS terminal operating software is up to date.
2. Attempt to reprogram the control module.
3. If the Control Module can still not be programmed, turn the vehicle OFF for at least one minute.
4. Put the vehicle in SERVICE MODE and attempt to reprogram the control module. The control module should program.
   ⇒ If the control module still cannot be programmed, replace the control module.

K194 Rear Gate Module: Programming and Setup

Note:
- Always verify the module has the newest software available before replacing the module.
- Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.

- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. When required, install a battery maintainer or power supply that provides a steady and stable voltage. Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programing. If a battery maintainer is not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply.
- Turn OFF or disable systems that may put a load on the vehicles battery such as; interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- During the programming procedure, follow the SPS prompts for the correct ignition switch position.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to NO.

Replace and Program Control Module

Note: The endgate must be completely closed and latched, if the endgate is open or ajar during programming, the power endgate system may become inoperative without any DTCs indicated

To program a replacement control module, perform the following procedure:

1. Access the Service Programming System (SPS) and follow the on-screen instructions.
2. On the SPS Supported Controllers screen, select K194 Rear Gate Module - Programming and follow the on-screen instructions.
3. At the end of programming, choose the “Clear All DTCs” function on the SPS screen.

Reprogram Control Module

Note: The endgate must be completely closed and latched, if the endgate is open or ajar during programming, the power endgate system may become inoperative without any DTCs indicated

To reprogram an existing control module, perform the following procedure:

1. Access the Service Programming System (SPS) and follow the on-screen instructions.
2. On the SPS Supported Controllers screen, select K194 Rear Gate Module - Programming and follow the on-screen instructions.
3. At the end of programming, choose the “Clear All DTCs” function on the SPS screen.

Repair Instructions

Perform the *Diagnostic Repair Verification 3-421* after completing the repair.

Control Module References 3-4 for rear gate module replacement, programming and setup

K212 Gear Shift Control Module: Programming and Setup

This device does not require programming or setup.

K219 Lighting Control Module: Programming and Setup

Note:

- Always verify the module has the newest software available before replacing the module.
- Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. When required install the *EL-49642* SPS Programming Support Tool to maintain system voltage. If not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply. DO NOT connect a battery charger.
- Turn OFF or disable systems that may put a load on the vehicles battery such as; interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- During the programming procedure, follow the SPS prompts for the correct ignition switch position.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to NO.

Replace and Program Control Module

To program a replacement control module, perform the following procedure:

1. Access the Service Programming System (SPS) and follow the on-screen instructions.
2. On the SPS Supported Controllers screen, under Select Controller, select K219 Lighting Control Module.
3. On the SPS Supported Controllers screen, under Select Function / Sequence, select Programming and follow on screen instructions.

Note: If the Setup step fails and DTC U1962 or U19A3 is set in the K219 Lighting Control Module, perform the Serial Data Authentication Configuration procedure and then repeat the Setup step again. Refer to: *Serial Data Authentication Configuration 3-66*.

4. On the SPS Supported Controllers screen, under Select Function / Sequence, select Setup and follow the on-screen instructions.
5. Clear All DTCs.

Reprogram Control Module

Do not reprogram the lighting control module, unless directed by a service procedure, or a service bulletin.

To reprogram an existing control module, perform the following procedure:

1. Access the Service Programming System (SPS) and follow the on-screen instructions.
2. On the SPS Supported Controllers screen, under Select Controller, select K219 Lighting Control Module.
3. On the SPS Supported Controllers screen, under Select Function / Sequence, select Programming and follow on screen instructions.
4. Clear All DTCs.

Unsuccessful Programming Recovery

Note:

- Ensure the *EL-52100* (MDI 2) is used when programming the vehicle. Using the EL-47955 (MDI) will result in a programming failure.
- It may be necessary to use another *EL-52100* (MDI 2) and/or cables to verify proper operation to eliminate the possibility of faulty equipment.
- If Ethernet programming fails, ensure there is no fault in the Ethernet circuits between the X84 Data Link Connector and K56 Serial Data Gateway Module. Refer to [Link target (target-id 300812-) not found] to diagnose these Ethernet circuits.

In the event of an interrupted or unsuccessful programming event, perform the following steps:

1. Exit Service Programming Systems and disconnect all programming equipment from the vehicle.
2. Disconnect all battery voltage or ignition voltage sources from the control module. All voltage sources must be removed for a minimum of 10 min. This can be done several ways and should be completed by using the least intrusive way. This can vary depending on vehicle and control module location and can be done by one of the options listed below:
   - Removing all fuses supplying battery voltage and ignition voltage to the control module.
   - Disconnecting all harness connectors from the control module.

Warning: Always ensure the Battery Maintenance Mode is inactive before disconnecting the low voltage 12 volt battery (or batteries). This mode can be active with the ignition off, regardless of whether the vehicle charging cord is plugged in or not. When this mode is active, the on-board high voltage battery charger(s) will energize the 12 volt battery cables and charge the 12 volt battery (or batteries). Disconnecting any battery cables while this mode is active may result in an electrical shock or a burn from hot battery cable leads.

   - Check the 12 V battery voltage with a digital multimeter before disconnecting any battery cables leads. If the voltage is 13.5 V or above, the Battery Maintenance Mode is active. The technician must wait for the T18 Battery Charger to deactivate before disconnecting the battery negative cable. For more information, refer to *Charging System Description and Operation 6-184* . With Battery Maintenance Mode inactive, perform a 12 V battery disconnect by disconnecting the battery negative cable. Refer to [Link target (target-id 37733-) not found] .
3. Reconnect all Battery voltage and Ignition voltage sources to the Control Module.
4. Close down the current session of Techline Connect and reopen a new session.
5. Verify the control module, data link connector, and programming tool connections are secure and the tool software is up to date.
6. Ignition/Vehicle OFF, ensure that the key fob is inside the vehicle and not moved for the duration of the programming to prevent an inadvertent power mode change during programming.
7. Access the Service Programming System (SPS) and follow the on-screen instructions for the K219 Lighting Control Module.
8. Verify the control module can be programmed.

⇒ **If the control module can not be programmed**

8.1. Ignition ON/Vehicle in Service Mode for 1 min.

8.2. Ignition/Vehicle OFF.

8.3. Access SPS and follow the on-screen instructions for the K219 Lighting Control Module.

Note: If programming is still not successful after the second programming attempt, check the following:

- For facilities using an internet firewall, ensure firewall settings are not blocking file downloads and/or require elevated rights.
- For United States and Canada GM dealers, the appropriate firewall settings can be found in the GM DEALER INFRASTRUCTURE & SECURITY GUIDELINES (DISG) section 2.d.vii.

8.4. Verify the control module can be programmed.

⇒ If the control module can not be programmed, replace the K219 Lighting Control Module.

⇓ If the control module can be programmed

8.5. Clear DTCs.

⇓ **If the control module can be programmed**

9. Clear DTCs.

Repair Instructions

Perform the *Diagnostic Repair Verification 3-421* after completing the repair.

Control Module References 3-4 for control module replacement, programming and setup

K234 Rear Seat Heater Vent Control Module: Programming and Setup

This device does not require programming or setup.

K299 Audio/Video Interface Module: Programming and Setup

Note:

- Always verify the module has the newest software available before replacing the module.
- Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. When required, install a battery maintainer or power supply that provides a steady and stable voltage. Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programing. If a battery maintainer is not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply.
- Turn OFF or disable systems that may put a load on the vehicles battery such as; interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- Programming must begin with the Ignition/Vehicle OFF. Programming will direct the appropriate control module(s) to change power mode as needed during the procedure, independent of the vehicle's power mode.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to NO.

Reference Information

Special Tools

- EL-52100 Multiple Diagnostic Interface 2 (MDI 2)

For equivalent regional tools, refer to *Special Tools 3-85*.

Replace and Program or Reprogram Control Module

To program an existing control module or a replacement control module perform the following procedure:

Note: If equipped with both K299 Audio/Video Interface Module and K299R Audio/Video Interface Rear Module. start at step 1 and complete all steps. If equipped with just the K299R Audio/Video Interface Rear Module start at step 7.

1. Ignition/Vehicle OFF
2. Access the Service Programming System (SPS) and follow the on-screen instructions.
3. On the SPS Supported Controllers screen, select K299 – Front Module Programming (Step 1) and follow the on-screen instructions.
4. On the SPS Supported Controllers screen, select K299 – Front Module Delta (Step 2) and follow the on-screen instructions.

Note: For SPS to recognize the new software level installed, the module must go into sleep mode first.

5. Repeat steps 3 and 4 until the SPS screen displays a programming blocked message for both programming events.
6. At the end of programming, clear DTCs
7. Ignition/Vehicle OFF
8. Access the Service Programming System (SPS) and follow the on-screen instructions.

9. On the SPS Supported Controllers screen, select K299 – Rear Module Programming (Step 1) and follow the on-screen instructions.
10. On the SPS Supported Controllers screen, select K299 – Rear Module Delta (Step 2) and follow the on-screen instructions.

Note: For SPS to recognize the new software level installed, the module must go into sleep mode first.

11. Repeat steps 9 and 10 until the SPS screen displays a programming blocked message for both programming events.
12. At the end of programming, clear DTCs

Unsuccessful Programming Recovery

In the event of an interrupted or unsuccessful programming event, perform the following steps:

1. Ensure the control module, DLC and programming tool connections are secure and the SPS software is up to date.
2. Verify the control module can be reprogrammed.

Note: If Ethernet programming fails, ensure the module is communicating over Ethernet properly. Refer to [Link target (target-id 300812-) not found]

Note: If Ethernet programming passes on the first programming step but fails on the second programming step, try USB programming.

⇒ **If the control module cannot be reprogrammed**

2.1. Ignition OFF for one minute.

2.2. Verify the control module can be reprogrammed.

⇒ If the control module cannot be reprogrammed, replace the control module.

⇓ If the control module can be reprogrammed.

2.3. All OK.

⇓ **If the control module can be reprogrammed**

3. All OK.

Repair Instructions

Perform the *Diagnostic Repair Verification 3-421* after completing the repair.

Control Module References 3-4 for control module replacement, programming and setup

K313 Occupant Presence Module: Programming and Setup

Note:

- Always verify the module has the newest software available before replacing the module.
- Verify the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. When required, install a battery maintainer or power supply that provides a steady and stable voltage. Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programming. If a battery maintainer is not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply.
- Turn OFF or disable systems that may put a load on the vehicle's battery such as interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- Programming must begin with the Ignition/Vehicle OFF. Programming will direct the appropriate control module(s) to change power mode as needed during the procedure, independent of the vehicle’s power mode.
- To prevent programming failure due to unintended wireless drops, it is recommended that a wired MDI 2 connection be used when programming the control module.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to No.

Reference Information

Special Tools
EL-52100 Multiple Diagnostic Interface 2 (MDI 2)

For equivalent regional tools, refer to *Special Tools 3-85*.

Programming a New Control Module

To program a replacement K313 Occupant Presence Module, perform the following procedure:

Note:

- Ensure the *EL-52100* (MDI 2) is used when programming the vehicle and verify it is working properly. Using the EL-47955 (MDI) will result in a programming failure.
- Verify all control modules are connected and communicating before attempting to program the control module.
- Verify the key fob is inside the vehicle. If the key fob is not inside the vehicle, the serial data authen-

tication configuration procedure which runs automatically at the end of the programming step will fail even though the programming appears to run successfully. If the serial data authentication configuration procedure fails, DTC U1962 will set and/or the setup step will fail or be incomplete.

- Begin with the vehicle in vehicle OFF power mode. The Service Programming System will power mode the vehicle.

1. Ignition/Vehicle OFF, ensure that the key fob is inside the vehicle and not moved for the duration of the programming to prevent an inadvertent power mode change during programming.
2. Access the Service Programming System (SPS) and follow the on-screen instructions.
3. On the SPS Supported Controllers screen, select K313 Occupant Presence Module - Programming and follow the on-screen instructions.
4. On the SPS Supported Controllers screen, select K313 Occupant Presence Module - Setup and follow the on-screen instructions.
5. Clear DTCs.

Programming an Existing Control Module

To program an existing K313 Occupant Presence Module, perform the following procedure:

Note:

- Ensure the *EL-52100* (MDI 2) is used when programming the vehicle and verify it is working properly. Using the EL-47955 (MDI) will result in a programming failure.
- Verify all control modules are connected and communicating before attempting to program the control module.
- Verify the key fob is inside the vehicle. If the key fob is not inside the vehicle, the serial data authentication configuration procedure which runs automatically at the end of the programming step will fail even though the programming appears to run successfully. If the serial data authentication configuration procedure fails, DTC U1962 will set and/or the setup step will fail or be incomplete.
- Begin with the vehicle in vehicle OFF power mode. The Service Programming System will power mode the vehicle.

1. Ignition/Vehicle OFF, ensure that the key fob is inside the vehicle and not moved for the duration of the programming to prevent an inadvertent power mode change during programming.
2. Access the Service Programming System (SPS) and follow the on-screen instructions.
3. On the SPS Supported Controllers screen, select K313 Occupant Presence Module - Programming and follow the on-screen instructions.
4. On the SPS Supported Controllers screen, select K313 Occupant Presence Module - Setup and follow the on-screen instructions.
5. Clear DTCs.

Unsuccessful Programming Recovery

Note:

- Ensure the *EL-52100* (MDI 2) is used when programming the vehicle. Using the EL-47955 (MDI) will result in a programming failure.
- It may be necessary to use another *EL-52100* (MDI 2) and/or cables to verify proper operation to eliminate the possibility of faulty equipment.
- If Ethernet programming fails, ensure there is no fault in the Ethernet circuits between the X84 Data Link Connector and K56 Serial Data Gateway Module. Refer to [Link target (target-id 300812-) not found] to diagnose these Ethernet circuits.

In the event of an interrupted or unsuccessful programming event, perform the following steps:

1. Exit Service Programming System (SPS) and disconnect all programming equipment from the vehicle.
2. Disconnect all battery voltage or ignition voltage sources from the K313 Occupant Presence Module. All voltage sources must be removed for a minimum of 10 min. This can be done several ways and should be completed by using the least intrusive way. This can vary depending on vehicle and control module location and can be done by one of the options listed below:
   - Removing all fuses supplying battery voltage and ignition voltage to the control module.
   - Disconnecting all harness connectors from the control module.
   - Performing a 12 V battery disconnect by disconnecting the battery negative cable. Refer to [Link target (target-id 37733-) not found] .
3. Reconnect all battery voltage and ignition voltage sources to the K313 Occupant Presence Module.
4. Close down the current session of Techline Connect and reopen a new session.
5. Verify the K313 Occupant Presence Module, X84 Data Link Connector, and programming tool connections are secure and the tool software is up to date.
6. Ignition/Vehicle OFF, ensure that the key fob is inside the vehicle and not moved for the duration of the programming to prevent an inadvertent power mode change during programming.

7. Access the Service Programming System (SPS) and follow the on-screen instructions for the K313 Occupant Presence Module.
8. Verify the K313 Occupant Presence Module can be programmed.

⇒ **If the K313 Occupant Presence Module can not be programmed**

8.1. Ignition ON/Vehicle in Service Mode for 1 min.

8.2. Ignition/Vehicle OFF.

8.3. Access SPS and follow the on-screen instructions for the K313 Occupant Presence Module.

Note: If programming is still not successful after the second programming attempt, check the following:

- For facilities using an internet firewall, ensure firewall settings are not blocking file downloads and/or require elevated rights.
- For United States and Canada GM dealers, the appropriate firewall settings can be found in the GM DEALER INFRASTRUCTURE & SECURITY GUIDELINES (DISG) section 2.d.vii.

8.4. Verify the K313 Occupant Presence Module can be programmed.

⇒ If the K313 Occupant Presence Module can not be programmed, replace the K313 Occupant Presence Module.

⇓ If the K313 Occupant Presence Module can be programmed

8.5. Clear DTCs.

⇓ **If the K313 Occupant Presence Module can be programmed**

9. Clear DTCs.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair: *Diagnostic Repair Verification 3-421*.

For control module replacement, programming, and setup, refer to: *Control Module References 3-4*.

T1 Accessory AC and DC Power Control Module: Programming and Setup

This device does not require programming or setup.

T3 Audio Amplifier: Programming and Setup

Note:

- DO NOT program a control module unless directed to by a service procedure or a service bulletin. If the ECU is not properly configured with the correct calibration software, the ECU will not control all of the vehicle features properly.
- Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or ECU damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. When required, install a battery maintainer or power supply that provides a steady and stable voltage. Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programing. If a battery maintainer is not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply.
- Turn OFF or disable systems that may put a load on the vehicles battery such as; interior lights, exterior lights (including daytime running lights), HVAC, , etc.
- During the programming procedure, follow the SPS prompts for the correct ignition switch position.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to NO.

Diagnostic Aids

During programming you may be required to select multiple calibrations dependent upon vehicle equipment. Have the vehicle build/RPO information available during the following procedure to ensure the correct calibrations are selected.

Replace and Program Control Module or Reprogram Control Module

To program a replacement or an existing control module, perform the following procedure:

1. Ignition OFF, Vehicle OFF
2. Access the Service Programming System (SPS) and follow the on-screen instructions.
3. On the SPS Supported Controllers screen, select T3 Audio Amplifier – Programming and follow the on-screen instructions.
4. Clear DTCs.

Unsuccessful Programming Recovery

In the event of an interrupted or unsuccessful programming event, perform the following steps:

1. Ignition ON. Ensure the control module, DLC and programming tool connections are secure and the SPS software is up to date.
2. Verify the control module can be reprogrammed.

⇒ **If the control module cannot be reprogrammed**

2.1. Ignition OFF for one minute, ignition ON.

2.2. Verify the control module can be reprogrammed.

⇒ If the control module cannot be reprogrammed, replace the control module.

⇓ If the control module can be reprogrammed.

2.3. All OK.

⇓ **If the control module can be reprogrammed**

3. All OK.

T22 Wireless Accessory Charging Module: Programming and Setup

Note:

- Always verify the module has the newest software available before replacing the module.
- Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. When required, install a battery maintainer or power supply that provides a steady and stable voltage. Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programing. If a battery maintainer is not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply.
- Turn OFF or disable systems that may put a load on the vehicles battery such as; interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- During the programming procedure, follow the SPS prompts for the correct ignition switch position.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to NO.

Replace and Program Control Module

1. Access the Service Programming System (SPS) and follow the on-screen instructions.
2. On the SPS Supported Controllers screen, select T22 Wireless Accessory Charging Module - Programming and follow the on-screen instructions.
3. Clear DTCs.

Reprogram Control Module

1. Access the Service Programming System (SPS) and follow the on-screen instructions.
2. On the SPS Supported Controllers screen, select T22 Wireless Accessory Charging Module - Programming and follow the on-screen instructions.
3. Clear DTCs.

Unsuccessful Programming Recovery

In the event of an interrupted or unsuccessful programming event, perform the following steps:

1. Ignition ON. Ensure the control module, DLC and programming tool connections are secure and the SPS software is up to date.
2. Verify the control module can be reprogrammed.

⇒ **If the control module cannot be reprogrammed**

2.1. Ignition OFF for one minute, ignition ON.

2.2. Verify the control module can be reprogrammed.

⇒ If the control module cannot be reprogrammed, replace the control module.

⇓ If the control module can be reprogrammed.

2.3. All OK.

⇓ **If the control module can be reprogrammed**

3. All OK.

Repair Instructions

Perform the *Diagnostic Repair Verification 3-421* after completing the repair.

Control Module References 3-4 for Control Module replacement, programming and setup

Serial Data Authentication Configuration

General Information

Serial Data Authentication Configuration ensures secure communication between control modules over different channels by encrypting sensitive data. Secret keys are written to the control modules, allowing messages on the bus to be encrypted.

- During the process, control module data is retrieved from the vehicle to generate unique cryptographic keys.
- These keys are then written to each control module, allowing secure communication between control modules.
- In the case of control module replacement, re-running the configuration is required to introduce the new control module to the network; otherwise, communication will fail due to unrecognized messages.

Reference Information

Special Tools
EL-52100 Multiple Diagnostic Interface 2 (MDI 2)

Serial Data Authentication Configuration

Note: Before attempting to perform the Serial Data Authentication Configuration procedure,

- Make sure all CAN control modules are connected and communicating.
- Diagnose the following communication DTCs first: DTC U0073-U007E, U0100-U02FF, U1100-U12FF, U1600-U17FF, U1977, U1978, U2200-U23FF, and U2400-U25FF.
- Diagnose the following programming DTCs: U3000 51, U3000 52, U3000 53, U3000 56, and U3000 57.
- If DTC U1962 is stored only as a history DTC and not retrieved as a current DTC, do not perform the Serial Data Authentication Configuration procedure.
- DO NOT perform the Serial Data Authentication Configuration procedure unless directed to by a service procedure or a service bulletin.
- Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. Check the 12 V battery with a digital multimeter and ensure the voltage is above 12.5 V. When required, install a battery maintainer or power supply that provides a steady and stable voltage. DO NOT use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programing. If a battery maintainer is not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply.

1. Ignition/Vehicle OFF, keep the key inside the vehicle.
2. Access the Service Programming System (SPS) and follow the on-screen instructions.

Note: The Serial Data Authentication Configuration button is located in the lower right corner of the SPS Supported Controllers screen in the Techline Connect system.

3. On the SPS Supported Controllers screen, select Serial Data Authentication Configuration button and follow the on-screen instructions.
4. Ignition/Vehicle OFF, disconnect the scan tool from the vehicle, all access doors closed, all vehicle systems OFF, and all keys at least 3 m (9.8 ft) away from vehicle. Allow the vehicle to go into sleep mode.
5. Ignition ON/Vehicle In Service Mode.
6. Using a scan tool, clear DTCs.

Troubleshooting

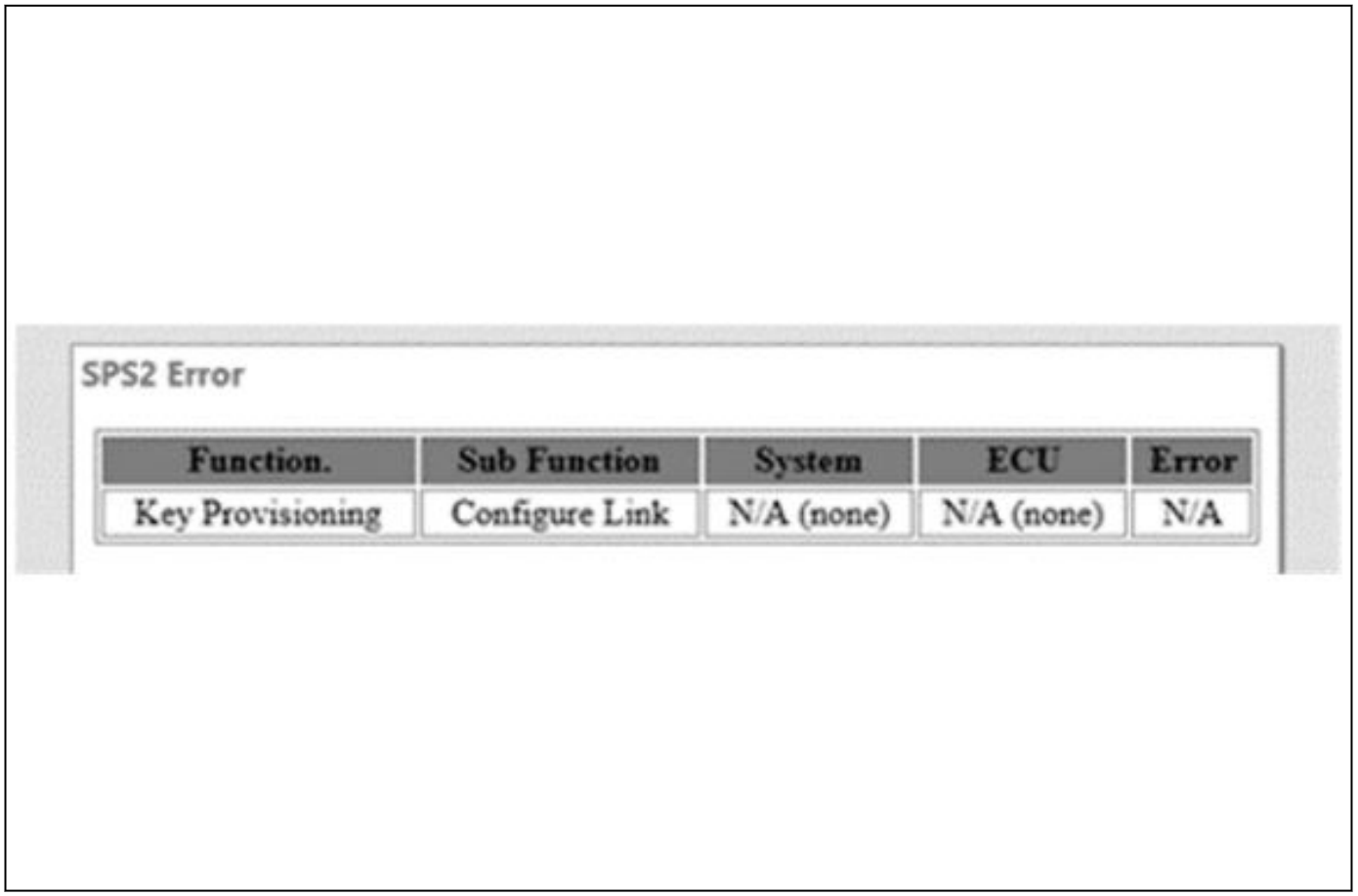
Serial Data Authentication Configuration can fail for several reasons. After confirming all control modules are fully programmed and that no underlying issues exist, follow these steps to attempt a successful configuration:

1. **Verify X84 Data Link Connector (DLC) Connection:** Ensure the X84 Data Link Connector is securely attached to the vehicle.
2. **Use a Direct MDI 2 Connection:** Connect the scan tool directly to the computer via a wired connection instead of using wireless connection (Techline Connect may need to be reset to change the connection type).
3. **Disconnect the 12 V Battery:** Reset the vehicle systems by disconnecting the 12 V battery negative cable for 1 min. **For electric vehicles, check the 12 V battery voltage with a digital multimeter before disconnecting any battery cables leads. If the voltage is 13.5 V or above, the Battery Maintenance Mode is active. The technician must wait for the T18 Battery Charger to deactivate before disconnecting the battery negative cable.** Follow the appropriate steps in the Battery Negative Cable Disconnection and Connection procedure located under the Starting, Charging, and Low Voltage Energy Storage category (or 12 V Starting and Charging category).
4. **Perform the Serial Data Authentication Configuration procedure.** If the procedure still fails, inspect the X84 Data Link Connector for contamination, corrosion, and terminal tension and inspect the wiring between the X84 Data Link Connector and K56 Serial Data Gateway Module for any faults.

In the case of a Serial Data Authentication Configuration failure, the SPS error window should point to which control module is failing:

- Function: “Key Provisioning” refers to Serial Data Authentication Configuration.
- Sub Function: refers to which step in the process failed.
- ECU: refers to the failing control module if that is the case.

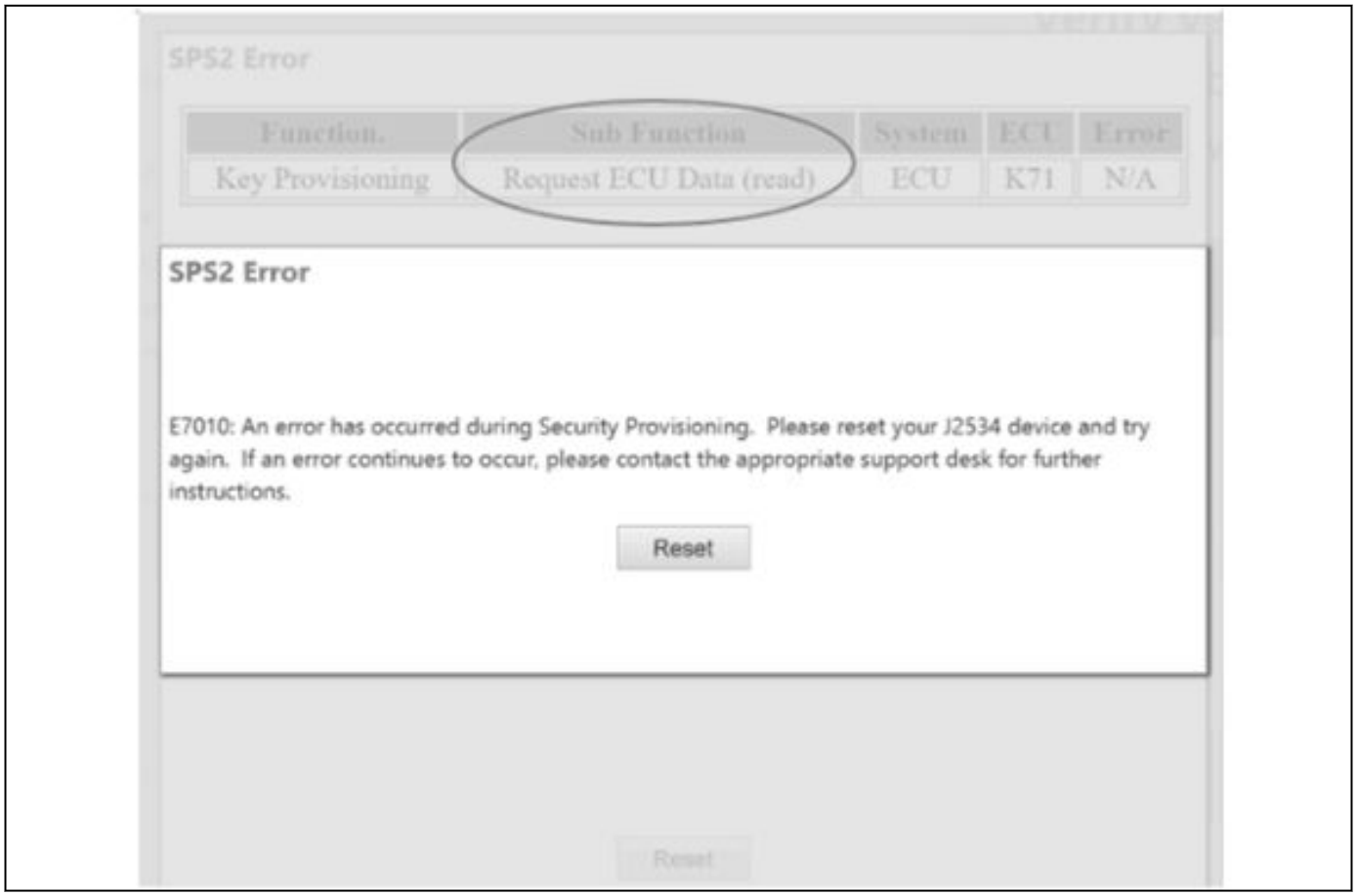
If the Sub Function column in SPS error window points to a “Configure Link” error, run through the trouble shooting steps 1-4 above. If the Serial Data Authentication Configuration still fails, perform a Vehicle Wide Programming event to ensure all control module software is up to date. Verify that the K56 Serial Data Gateway Module and K9 Body Control Module software are up to date before performing the Serial Data Authentication Configuration procedure again.



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If no SPS error window is displayed, but the SPS screen indicates that Serial Data Authentication Configuration has Failed, run through the trouble shooting steps 1-4 above. If the Serial Data Authentication Configuration still fails, perform a Vehicle Wide Programming event to ensure all control module software is up to date before performing the Serial Data Authentication Configuration procedure again.

If the Sub Function column in SPS error window points to a “Request ECU Data (Read)” error, verify the vehicle power mode is off and brake pedal is not pressed. Then perform the Serial Data Authentication Configuration procedure again. *If the same issue exists, perform a Battery Global Reset by following troubleshooting step 3 above.*

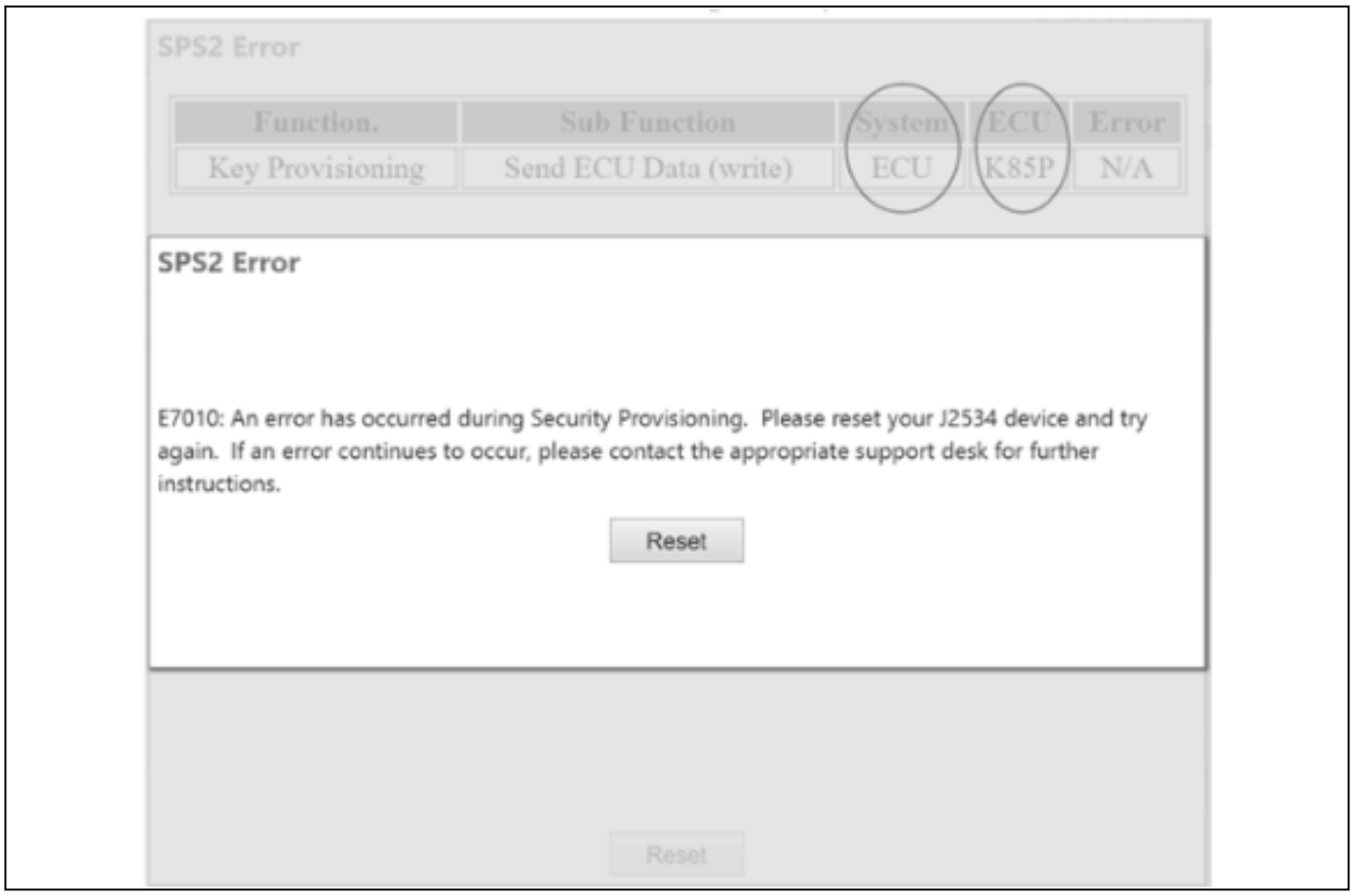


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If the Sub Function column in SPS error window points to “Unlock” or “Get KeyProv Payload”, perform the Serial Data Authentication Configuration procedure again. *If Techline Connect has been open for hours, close the current Techline Connect session and start a new Techline Connect session before performing the Serial Data Authentication Configuration procedure again.*

If the System column in SPS error window points to a “ECU” error, and the ECU column point to a controller, verify the followings:

- The identified/failed control module (ECU) shall be fully programmed. A failed programming event prior to the Serial Data Authentication Configuration event will cause the Serial Data Authentication Configuration procedure to fail.



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- The identified/failed control module (ECU) shall have the latest software. For example, the K89P Restraints Occupant Classification System Module - Passenger need to be updated to the latest software to avoid Serial Data Authentication Configuration failure.

If the Serial Data Authentication Configuration procedure passes and all controller setup procedures complete successfully, but the loss of communication DTCs and invalid data DTCs mentioned in Note #2 above are still set as current, contact the Technical Assistant Center (TAC) for support.

Service Programming System (SPS)

For step-by-step control module programming instructions, please refer to the techline information system (TIS) terminal.

Review the information below to ensure proper programming protocol.

Note:

- DO NOT program a control module unless you are directed by a service procedure or you are directed by a General Motors service bulletin. Programming a control module at any other time will not permanently correct a customers concern.
- It is essential that the TIS terminal, MDI/MDI2, and/or Scan Tool, is equipped with the latest software before performing service programming.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. When required, install a battery maintainer or power supply that provides a steady and stable voltage. Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programing. If a battery maintainer is not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply.
- Some modules will require additional programming/setup events to be performed before or after programming.
- Some vehicles may require the use of a CANDi or MDI/MDI2 module for programming.
- Review the appropriate service information for these procedures.
- DTCs may set during programming. Clear DTCs after programming is complete.
- Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to NO.

Ensure the following conditions are met before programming a control module:

1. Vehicle system voltage:
   - There is not a charging system concern. All charging system concerns must be repaired before programming a control module.
   - Battery voltage is greater than 12 volts but less than 16 volts. The battery must be fully charged before programming the control module.
   - Turn OFF or disable any system that may put a load on the vehicles battery, such as the following components:
     - Interior lights
     - Exterior lights including daytime running lights (DRL)—Applying the parking brake, on most vehicles, disables the DRL system
     - Heating, ventilation, and air conditioning (HVAC) systems
     - Engine cooling fans
     - Radio, etc.
2. The ignition switch must be in the proper position. SPS prompts you to turn ON the ignition, with the engine OFF. DO NOT change the position of the ignition switch during the programming procedure, unless instructed to do so.
3. Make certain all tool connections are secure, including the following components and circuits:
   - Scan Tool
     - The RS-232 communication cable port
     - The connection at the data link connector (DLC)
     - The voltage supply circuits
   - MDI/MDI2
     - The USB, Ethernet or Wireless communication port
     - The connection at the data link connector (DLC)
4. DO NOT disturb the tool harnesses while programming. If an interruption occurs during the programming procedure, programming failure or control module damage may occur.

In the event of an interrupted or unsuccessful programming event, perform the following steps:

1. DO NOT turn the ignition OFF. Ensure that all control module and DLC connections are secure and the TIS terminal operating software is up to date.
2. Attempt to reprogram the control module.
3. If the control module can still not be programmed, turn the ignition OFF for at least one minute.
4. Turn the ignition ON and attempt to reprogram the control module. The control module should program.
   ⇒ If the control module still cannot be programmed, replace the control module.

After successfully programming the control module, ensure that all post programming procedures are performed; refer to *Control Module References 3-4* for the appropriate control module Programming and Setup document for any required procedures.

Q77 Transmission Control Solenoid Valve Characterization Programming

The solenoids in this transmission require unique performance characteristic data in order to function at maximum efficiency. This data is programmed and stored in the vehicle's transmission control module (TCM). When a transmission assembly, TCM, or solenoids are replaced during service, the performance characteristic data for the solenoids must be retrieved from a web server "cloud" repository and reprogrammed into the TCM.

Reprogramming also ensures that the characteristic data relationship is properly matched between the solenoids, valve body, and transmission.

Solenoid characterization reprogramming is performed using the Service Programming System (SPS).

Solenoid Reprogramming Procedure

Perform solenoid characterization reprogramming after one of the following service procedures:

Note: Select "Replace Transmission" at the MCVM Characterization selection screen.

- Replace transmission assembly

Note: Select "Replace Control Valve Solenoid Body" at the MCVM Characterization selection screen.

- Replace control valve solenoid body

Note: Select "Replace Solenoid" at the MCVM Characterization selection screen.

- Replace solenoid (currently not an available Service Procedure)

Note: Select "Refresh Characterization Data" at the MCVM Characterization selection screen.

- Replace TCM

To perform solenoid characterization after a transmission component replacement:

1. Document the new Transmission Unique Number (TUN). The TUN location may be found here: [Link target (target-id 278357-) not found] . Since the TUN can be difficult to access when the trans-

mission is installed in the vehicle, ensure you document the 16-digit TUN prior to installing the transmission in the vehicle.

2. Use a generically available QR Code/data matrix scanner to obtain the 16-digit Part Unique Number (PUN). The PUN location may be found here: [Link target (target-id 285256-) not found] . Before installing the control valve solenoid body onto the transmission, scan the data matrix.
3. Log into SPS.
4. Type the vehicle identification number (VIN).
5. Perform the SPS Transmission Control Module programming event.
   - Select “Transmission Control Module - Programming” to update TCM calibrations and Solenoid Characterization data.

     OR
   - Select “Transmission Control Module - MCVM Operations” to update Solenoid Characterization data only.
6. From the “MCVM (Mechanical Characterization and Virtual Matching) Operation Selection” screen, select the applicable service procedure to be performed. You will be prompted to provide the necessary Transmission Unique Number (TUN) when replacing a transmission part.
7. After Solenoid Characterization Reprogramming has completed, turn the ignition OFF for at least 30 seconds and then turn back ON in order to reset the controller.

At this point, the system will read the VIN from the engine control module (ECM) using the multiple diagnostic interface (MDI) and then retrieve the applicable genealogy data tree from the cloud. This data tree accesses the original characterization data so that it may be updated with the new component information. The system acquires characterization data for the given TUN/PUN via the cloud and updates the genealogy tree. The TCM is updated with the correct solenoid characterization data, and the cloud is updated with the new genealogy relationship.

Vehicle Wide Programming and Setup

Important:

- If ANY module is replaced, program the single module first prior to Vehicle Wide Programming.
- Verify the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Before downloading the update files, be sure the computer is connected to the internet through a network cable (hardwired). DO NOT DOWNLOAD or install the files wirelessly. If there is an interruption during programming, programming failure or control module damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. When required, install a battery maintainer or power supply that provides a steady and stable voltage. Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programming. If a battery maintainer is not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply.
- Turn OFF or disable systems that may put a load on the vehicle's battery such as interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.

Description

Vehicle Wide Programming (VWP) is a new process to update software on GM Vehicles. It provides the ability via a single selection within Techline Connect to first identify which modules need updating and then proceed to updating affected modules (with some exceptions). The updating of modules is completed in parallel instead of forcing the technician to update one module at a time. This allows a more streamlined approach, reducing technician time and number of required steps.

Diagnostic Aids

Note: Vehicle Wide Programming will only work with a wired MDI2 connection. It is also necessary to remove any wireless dongles from the computer being used as these will not allow the Vehicle Wide Programming to be selectable. If the Vehicle Wide Programming is not selectable with a wired MDI2, confirm it shows disconnected in SPS2 and then (if needed) exit out of TLC and log-in again.

- Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. Install a GM Authorized Programming Support Tool to maintain system voltage. Refer to www.gmdesolutions.com

for further information. If not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply. DO NOT connect a battery charger.

- Ensure a strong and reliable internet connection is present prior to performing VWP.
- Prior to starting any programming, all aftermarket devices should be removed from the DLC and USB devices disconnected from the USB ports.
- Follow the on-screen prompts regarding ignition power mode but ensure that anything that drains excessive power (exterior lights, HVAC blower motor, etc) is off.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/ Maintenance (I/M) system status indicators to NO.
- For the TLC application, service technicians need to always ensure that the power mode (ignition) is “ON” before reading the VIN from the vehicle’s VIN master module and that they do not select a VIN that is already in the TLC application memory from a previous vehicle.
- If the VIN that shows up in the TLC top center window after correctly reading the VIN from the vehicle does not match the VIN plate of the vehicle, manually type in the VIN characters from the vehicle VIN plate into the TLC top center window and use these for programming or reprogramming the subject module with the correct vehicle VIN and software and/or calibrations.
- Check for Preliminary information or Technical Service bulletins before programming.
- During programming you may be required to select multiple calibrations depending upon vehicle equipment. Have the vehicle build/RPO information (available through Investigate Vehicle History) available during the following procedure to ensure the correct calibrations are selected.

Note: Verify that the VIN displayed in the TLC left side drop down menu and the top center window match the VIN plate of the vehicle to be programmed prior to using Service Programming System 2 (SPS2) for programming or reprogramming a module.

Reference Information

Special Tools

- EL-52100 Multiple Diagnostic Interface 2 (MDI 2)

For equivalent regional tools, refer to *Special Tools 3-85*.

Service Procedure

Note:

- Vehicle Wide Programming will only work with a wired MDI2 connection. It is also necessary to remove any wireless dongles from the computer being used as these will not allow the Vehicle Wide Programming to be selectable. If the Vehicle Wide Programming is not selectable with a wired MDI2, confirm it shows disconnected in SPS2 and then (if needed) exit out of TLC and log-in again.
- The screenshots below are an example of module programming and may not be indicative of the specific module that is being programmed. Module selection and VIN information have been blacked out.

1. Start and leave the Ignition/Vehicle OFF unless otherwise directed by a power mode prompt on the SPS screen.
2. Prior to starting any programming, all aftermarket devices should be removed from the DLC and USB devices disconnected from the USB ports. Open SPS2 and enter the job card number, then click next.
3. To begin a Vehicle Wide Programming event, click on the blue button on the right side. If unable to select, verify the wired MDI2 connection and that there are no wireless dongles in the computer as stated above.



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4. An SPS3 page will open, and a vehicle software status routing will begin.



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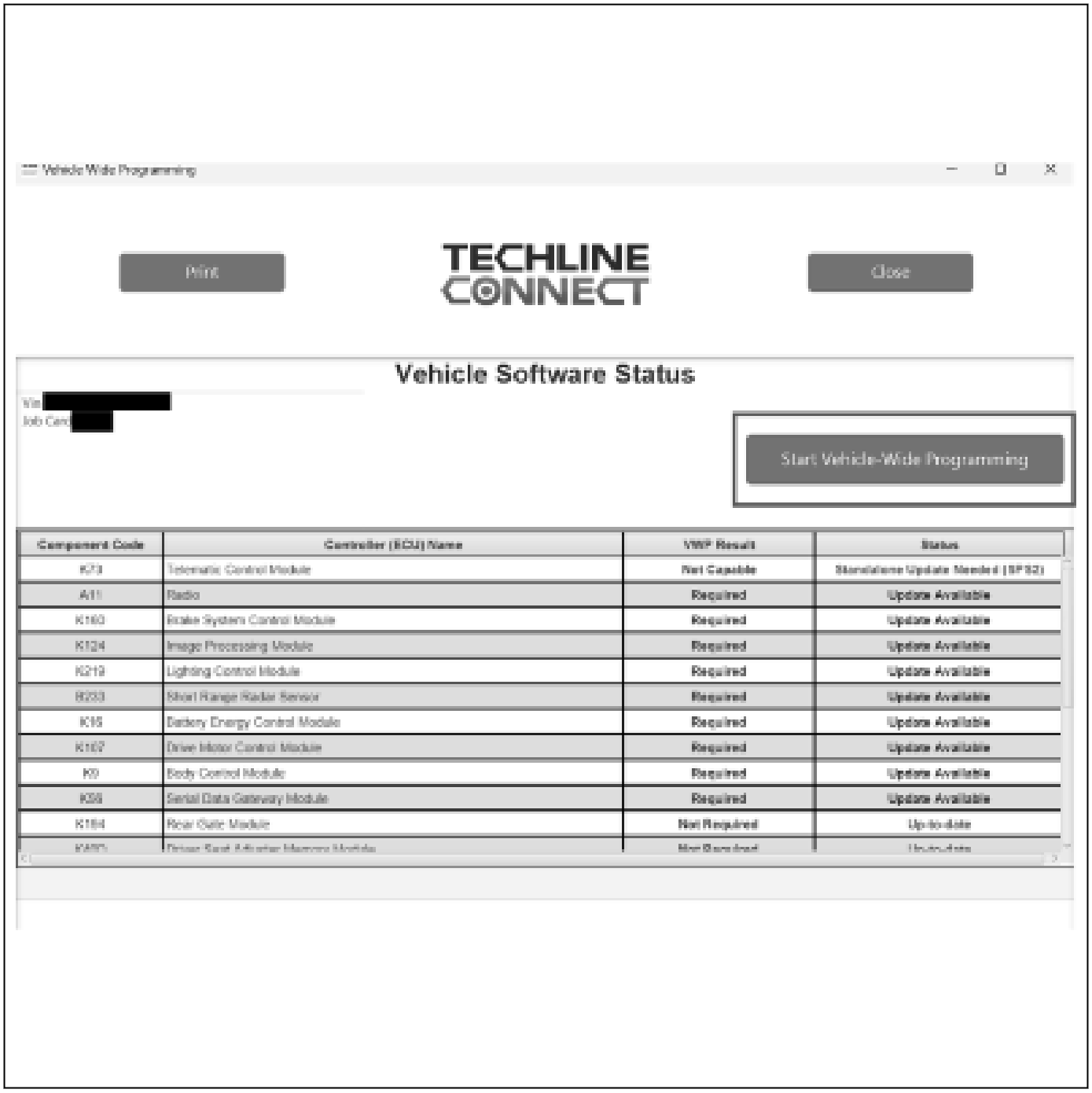
6864804

Below is a description of each Techline Connect bar.

- **Retrieving Data From Vehicle:** During this step, Techline Connect is retrieving current software information from the vehicle.
- **Retrieving Data From Sever:** Utilizing the VIN information, Techline Connect is retrieving the latest software information from General Motors.

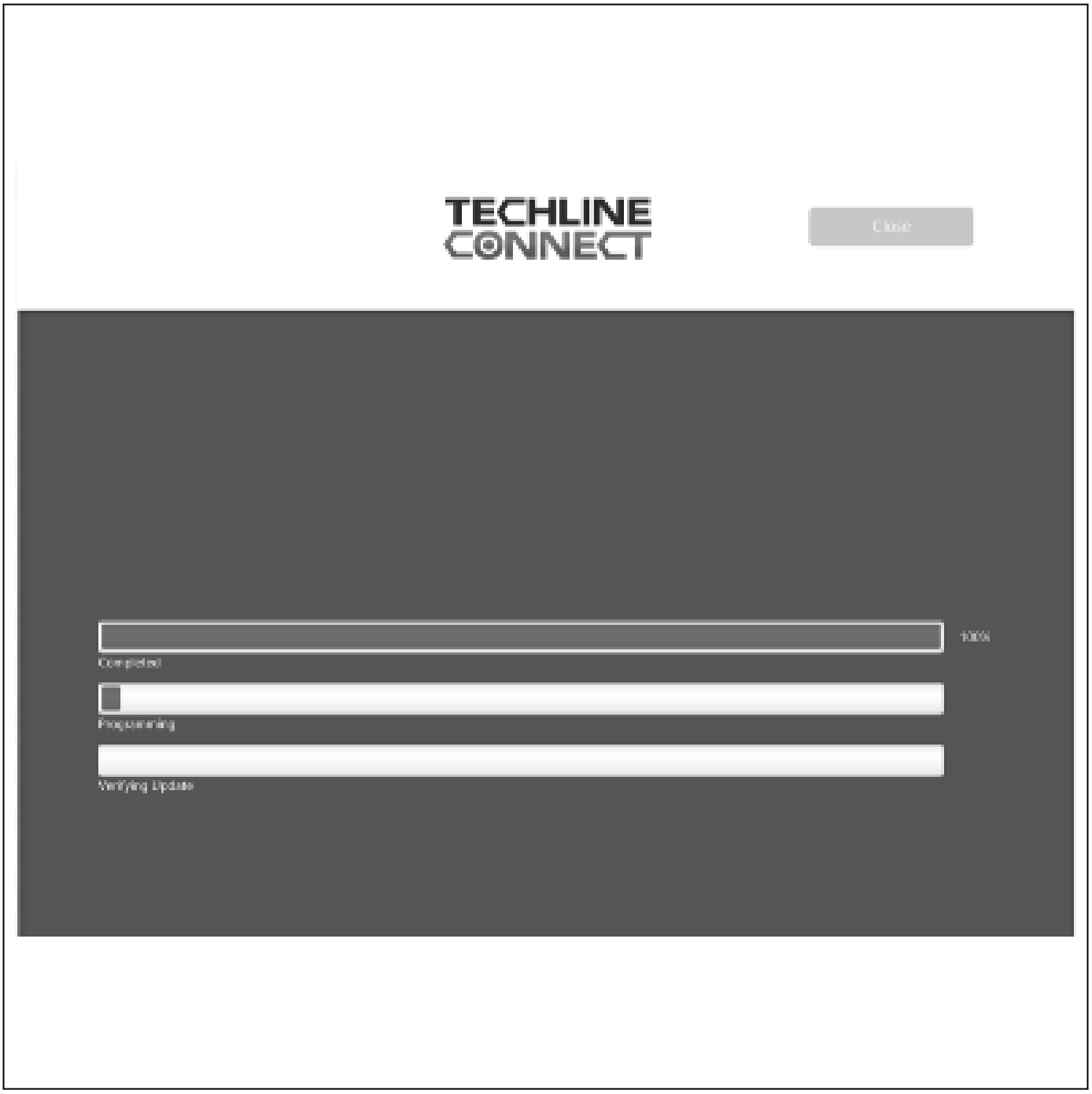
Note: While it is saved automatically, it is recommended for the tech to print/capture anything noted as failed or out of date before exiting the screen.

5. Once complete, a Software Status Summary Screen will appear. This will list all modules that are up to date or may require manual update. It will also advise of any failures. To complete a VWP event, click on the blue button on the right side.

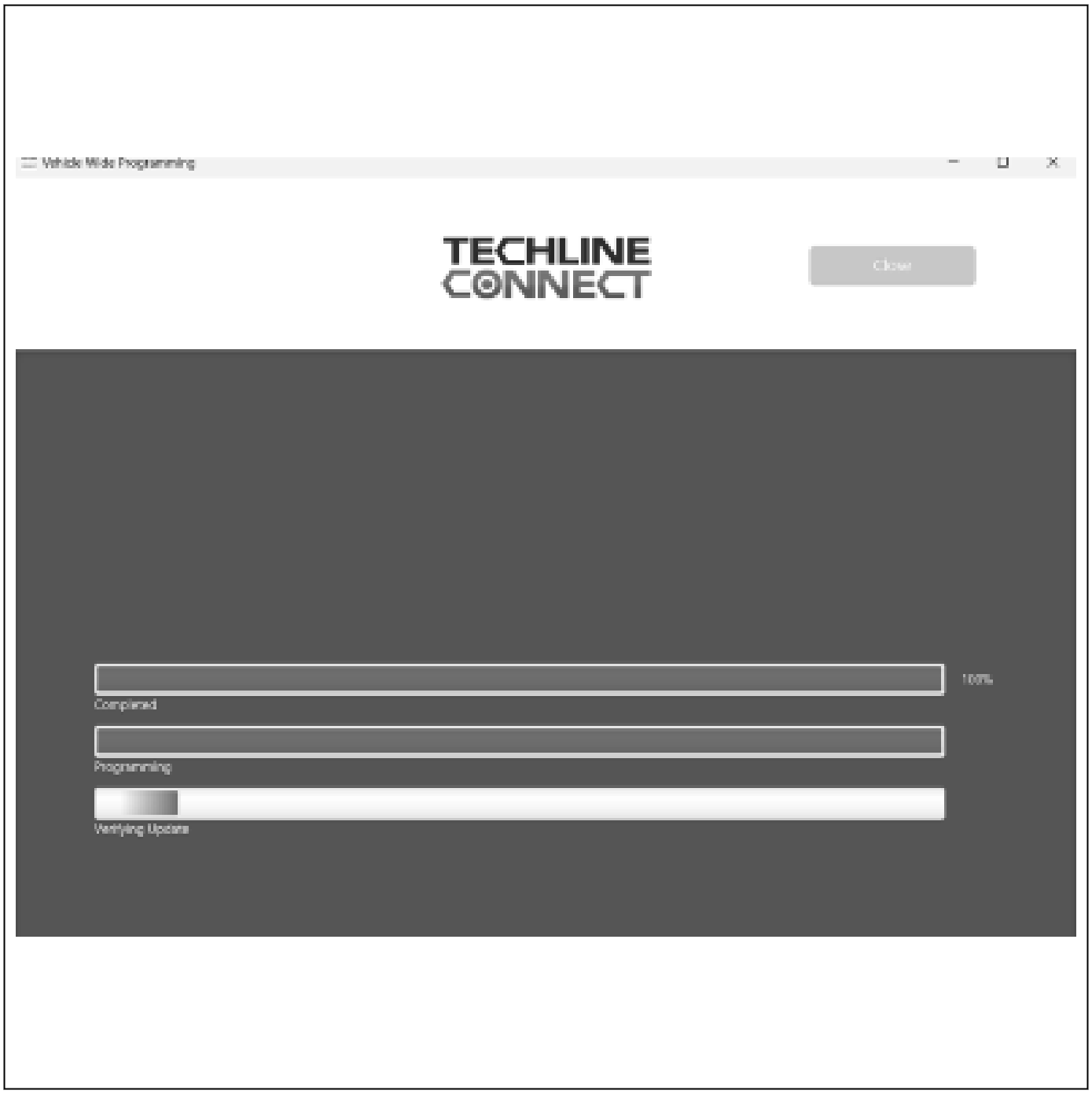


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6. A VWP progress page will open and a VWP event will begin. Below is a description of each Techline Connect bar.
   - **Downloading:** Downloads required files for installation.
   - **Programming:** Installing updated software into the modules
   - **Verifying Update:** Performs final part comparison to verify programming completion.

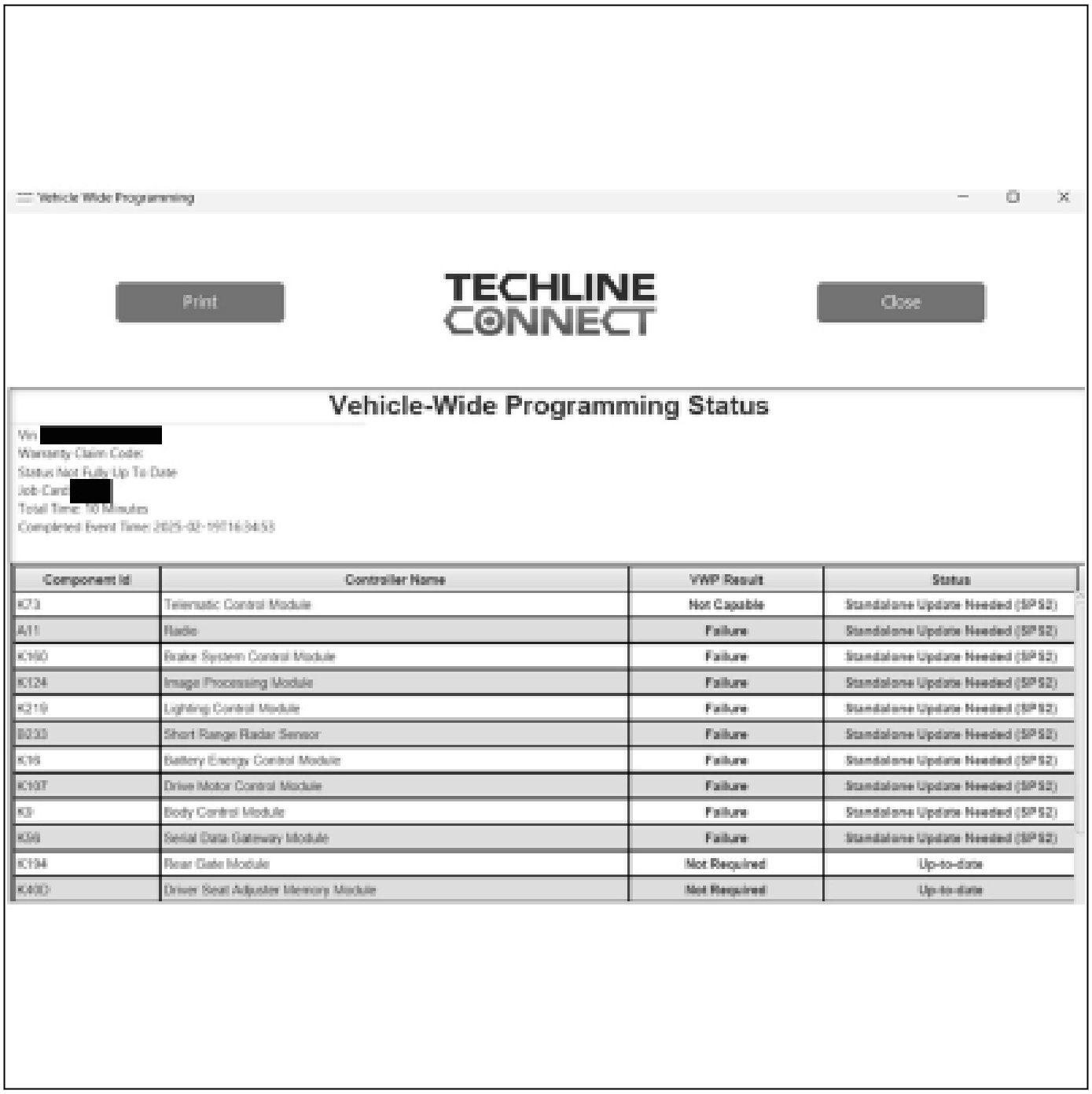

TECHLINE
CONNECT
Close
100%
Completed
Programming
Verifying Update

6864806



6864808

7. Once complete, a Vehicle-Wide Programming Summary screen will appear, and a warranty claim code will populate. This will list all modules that are up to date or may be required to be updated still. Any failures will be shown at the top highlighted in red. The summary screen will also advise of any failures. While it is saved automatically, it is recommended for the tech to print/capture anything noted as failed or out of date before exiting the screen



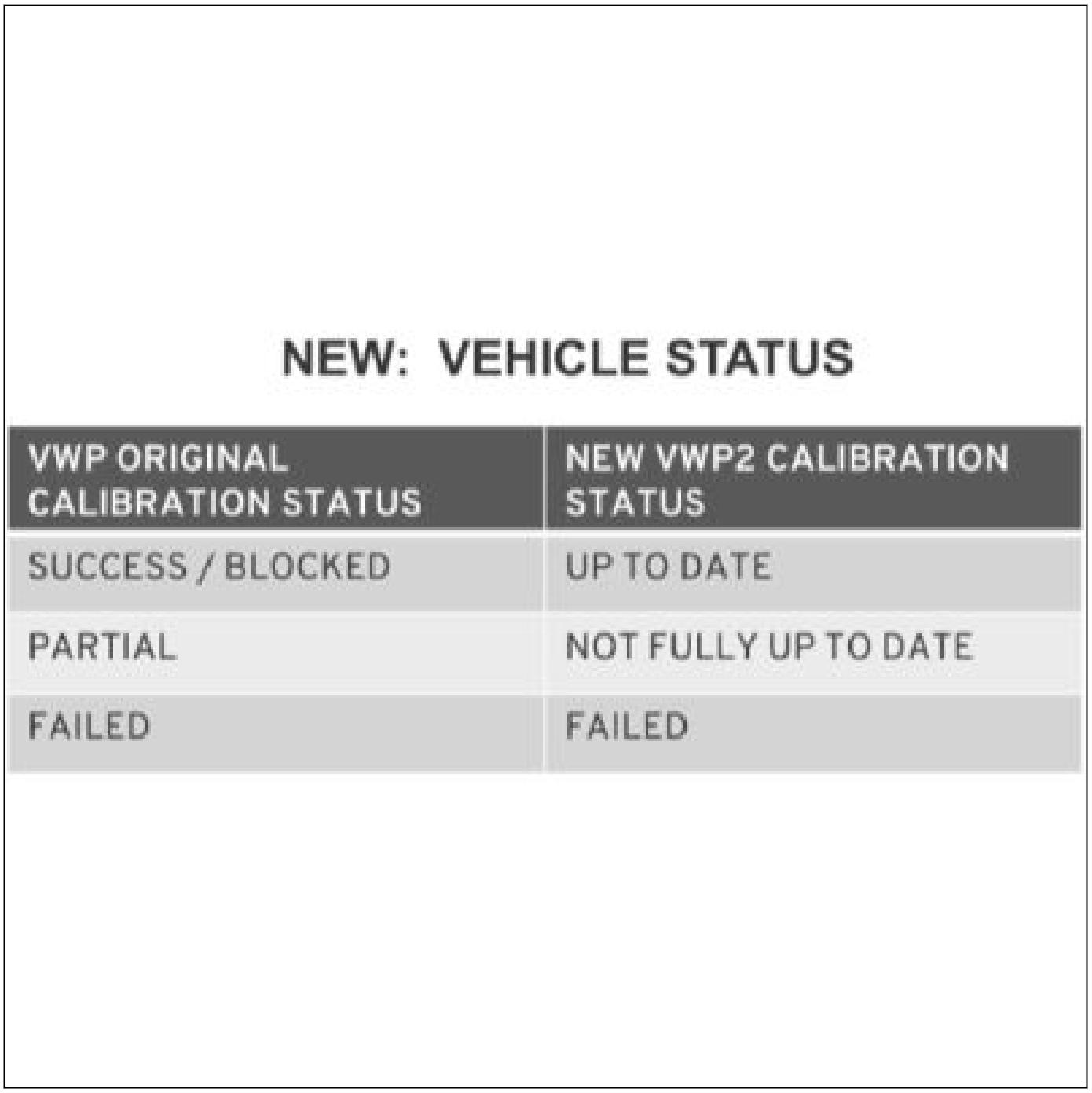
Component Id	Controller Name	VWP Result	Status
K73	Telematic Control Module	Not Capable	Standalone Update Needed (SPS2)
A11	Radio	Failure	Standalone Update Needed (SPS2)
K160	Brake System Control Module	Failure	Standalone Update Needed (SPS2)
K124	Image Processing Module	Failure	Standalone Update Needed (SPS2)
K219	Lighting Control Module	Failure	Standalone Update Needed (SPS2)
B233	Short Range Radar Sensor	Failure	Standalone Update Needed (SPS2)
K16	Battery Energy Control Module	Failure	Standalone Update Needed (SPS2)
K107	Drive Motor Control Module	Failure	Standalone Update Needed (SPS2)
K3	Body Control Module	Failure	Standalone Update Needed (SPS2)
K99	Serial Data Gateway Module	Failure	Standalone Update Needed (SPS2)
K194	Rear Gate Module	Not Required	Up-to-date
K40D	Driver Seat Adjuster Memory Module	Not Required	Up-to-date

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8. If the status is “Failed” or “Not Fully Up To Date”, please refer to “Unsuccessful Vehicle Wide Programming” section below.



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9. Use GDS2 to clear any DTCs after successfully programming

Note: The screenshots above are an example of module programming and may not be indicative of the specific modules that is being programmed. Module section and VIN information have been blacked out.

Important: To avoid warranty transaction rejections, you MUST record the warranty claim code provided on the Warranty Claim Code (WCC) screen shown below on the job card.

Unsuccessful Vehicle Wide Programming

Note:

- Ensure the *EL-52100* (MDI 2) is used when programming the vehicle. Using the EL-47955 (MDI) will result in a programming failure.
- It may be necessary to use another *EL-52100* (MDI 2) and/or cables to verify proper operation to eliminate the possibility of faulty equipment.
- If Ethernet programming fails, ensure there is no fault in the Ethernet circuits between the X84 Data Link Connector and K56 Serial Data Gateway Module. Refer to [Link target (target-id 300812-) not found] to diagnose these Ethernet circuits.

In the event of an interrupted or unsuccessful programming event, perform the following steps:

1. Attempt to perform Vehicle Wide Programming a second time.
2. Attempt to perform Vehicle Wide Programming a third time.
3. Verify no modules have failed programming during the VWP event.

⇒ **If ANY single module fails Vehicle Wide Programming:**

3.1. Attempt to program the applicable module again. Refer to: *Control Module References 3-4*

3.2. If the module still cannot be programmed, contact Techline Customer Support Center (TCSC) for programming instructions.

⇒ **If ALL modules fail Vehicle Wide Programming**

If the module still cannot be programmed, contact Techline Customer Support Center (TCSC) for programming instructions.

⇓ **If all applicable modules pass Vehicle Wide Programming:**

Clear DTCs.

4. If a Vehicle Wide Programming blocked or successful Warranty Claim Code is required, Vehicle Wide Programming may be required to be performed again to receive an “Up to Date” status and obtain a Warranty Claim Code.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair: *Diagnostic Repair Verification 3-421*.

Control Module References 3-4 for control module replacement, programming, and setup.

Description and Operation

Over The Air Description and Operation

Each item in the list below represents topics covered in detail below.

- Over The Air (OTA) Description
- OTA Software Download
- Installing an Update
- Deferring or Declining an Update
- Unable to Complete
- Proper Battery Charging

Over The Air (OTA) Description

The Over The Air (OTA) feature was designed to install vehicle software updates remotely. Remote software update is an in-vehicle feature that enables the installation of a software package to update certain modules without requiring service test equipment to be physically connected to the vehicle. Remote software updates will utilize a long range or short range connection from the host module to a remote IT system. There must be an active 4G LTE or WiFi connection to download and install vehicle software updates. The customer does not need an active OnStar subscription but they do need to accept the vehicle Terms and Conditions to be eligible to receive OTA vehicle software updates.

Note: Fleet vehicles must be activated as a Fleet account (not a business account) and require a separate Terms and Conditions agreement to be completed. Please see your fleet administrator for assistance with completing this agreement.

OTA software updates that are pushed to vehicles remotely continue to expand in frequency and use on GM models. Vehicles using the Global A electrical architecture can support three modules for OTA updates, such as the radio, OnStar, and Serial Data Gateway modules.

The new Vehicle Intelligence Platform (VIP) electrical architecture, introduced on some 2020 vehicles and beyond, powers a new electronic system that is capable of managing up to 4.5 terabytes of data processing power per hour, which is a fivefold increase in capability over the previous Global A electrical architecture. On vehicles using the VIP architecture, virtually all modules can support OTA updates, which means that the OTA software is not only for the infotainment system.

When an OTA update has been downloaded to a vehicle and is available to be installed, a message is displayed on the infotainment screen notifying the driver of the impending update. The message to accept and install an OTA update will not appear until the minimum values for the battery State of Charge (SOC) and Outside Ambient Temperature (OAT) are met.

OTA Software Download

An OTA update can be pushed to a vehicle while the vehicle is parked or being driven. There is an option for notification to the driver that the software update is being downloaded to the vehicle, the default setting is set to off. Battery SOC and OAT values are not checked before a download. These checks are only performed once the software update is downloaded and ready to be installed.

The OTA software download can occur in increments. Download will not be paused while the vehicle is being driven, it continues in the background. If the vehicle is turned off the download will continue for a maximum of 10 minutes. If the download did not complete it will continue on the next ignition cycle from where it stopped.

Installing an Update

Once the OTA software is downloaded, a message on the infotainment screen will display a prompt to accept the installation. The customer does not need to remain in the vehicle during the installation of the software. However, the vehicle cannot be driven during the installation and certain vehicle features may not be available. It's not required for the ignition to be ON for the installation to begin.

Installation time will vary based on the size of the update. The average installation will take approximately 15 minutes. Depending on the module, it may take longer to complete. The "Accept" message on the infotainment screen will provide an estimation of the approximate installation time. The customer may also comment that the radio appears to stay on after exiting the vehicle.

Deferring or Declining an Update

When an OTA update is downloaded, customers have the option to defer or decline the installation. The standard policy for OTA software updates is to set the customer notifications to 30 ignitions cycles. If the customer does not act upon the prompts within this counter, the update package is removed from the vehicle.

If a customer ignores the notification, the ignition cycle counter decreases by one immediately.

If the customer defers the installation by selecting the "Remind Me Later" option, the ignition cycle counter decreases by one, but it will not decrease again until after the customer-selected "Remind Me Later" period, regardless of the number of ignition cycles that occur during that period. For example, if 24 hours is selected for the next remind me time frame and 20 ignition cycles occurred, those 20 ignition cycles do not decrease the ignition cycle counter.

Note: For customer use case, standard operating procedure for campaign is to set the notifications to 30 ignitions cycles. If the Customer does not act upon the prompts within this counter, the package / invite is removed from the vehicle. In this scenario, we will wait 2 weeks and re-enroll back into the campaign. FYI: this counter can be selected from 1 to 999 ignition cycles when setting up the campaign.

If the OTA update installation is deferred by the customer, it can be installed at a later date through the Vehicle Software menu under Settings > System on the infotainment screen.

If the customer selects the "Decline Update" option, the update package is immediately removed from the vehicle. In this case, the vehicle will not be re-enrolled to receive the OTA update at a later date, unless the update is a Field Action. OTA updates will not be installed in a vehicle without a customer's consent. One exception with Constraint Consent use case there is a "May day" counter set in the vehicle, typically 10 ignition cycles. The Customer has that many ignition cycles to complete the update. Upon using all notifications, the installation will take place once this counter has expired. This use case is only for Cyber Critical recall Field Actions and requires Global Safety Field Investigations approval to utilize this use case. To date, this use case has not been used for any field actions.

Unable to Complete

There are a number of criteria that must be met in order to successfully complete the software update installation on a vehicle. The most common cause of being unable to complete an installation is the State of Charge (SOC) of the 12V battery. If the 12V battery does not meet the minimum SOC requirement of 70 percent or greater along with an Outside Ambient Temperature (OAT) greater than 14°F (-10°C), the OTA update installation will not occur. The colder the ambient air temperature is, the higher the target SOC becomes. To determine the battery SOC for VIP vehicles, go to BCM/12V Battery/Battery Sensor Module – State of Charge in GDS 2.

There may be other conditions that will affect an OTA update installation. If any of these conditions are present, a "Vehicle Conditions Not Ideal" message may display on the infotainment screen stating that conditions are not ideal to proceed with the update installation. These conditions do not indicate a failure; only that the vehicle does not meet all the criteria necessary to complete the OTA update installation.

Some customers may comment that the radio appears to stay on or is backlit after exiting the vehicle. If this occurs, it's a telltale sign that an OTA update is in progress.

If an OTA fails to update ensure there is no 3rd party dongle connected to the DLC of the vehicle. This could block an OTA from completing.

Proper Battery Charging

If a low battery SOC is preventing the OTA update installation, the 12V battery should be charged to meet the target SOC of 70 percent.

On some GM models, connecting the battery charger directly to the 12V battery posts will bypass the Battery Sensor Module, resulting in a default SOC value of 65 percent and a “Conditions Not Met” message.

Note: The Battery Sensor Module is attached directly to the battery negative terminal. It determines the battery condition by calculating the battery SOC, functions, and state of health, which is used to help determine if the 12V Stop/Start system will allow an Auto Stop when the vehicle has come to a stop. To properly charge the battery, the negative lead of the charger must be connected to chassis ground, and not directly to the negative battery post. Connecting to chassis ground allows current to flow through the Battery Sensor Module during charging as well as be monitored. The current cannot be monitored by the Battery Sensor Module if the negative lead of the charger is directly connected to the negative battery post.If a battery is improperly charged, the Battery Sensor Learn will be required to calibrate the Battery Sensor Module. With the ignition off, let the vehicle rest for a minimum of four hours without any interruptions (opening a door, using the key fob, etc.). Verify if the battery SOC is 70 percent or greater using GDS 2 before attempting to continue with an OTA update.

Special Tools and Equipment

Special Tools

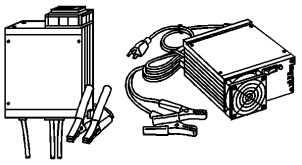
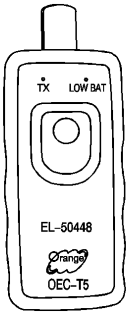
Illustration	Tool Number/ Description
 2223727	EL 49642 SPS Programming Support Tool
 2563769	EL 50448 Tire Pressure Monitor Sensor Activation Tool
 5443144	EL 52100 Multi Diagnostic Interface 2 (MDI 2)

Illustration	Tool Number/ Description
 5331982	EL 52545 Tire Pressure Monitor Sensor and RF Diagnostic Tool
 5608151	EL 52800 Battery Charger/Tester

Vehicle Diagnostic Information

Specifications

A11 Radio: Scan Tool Information

A11 Radio: Scan Tool Information

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON			
Data Display			
• Infotainment System Status	—	Run	Indicates the status of the infotainment system.
• Rearview Camera Supply Current	—	Varies	Indicates the rearview camera supply current
• Rearview Camera Supply Voltage	—	10V	Indicates the rearview camera supply voltage..
• Control Module Temperature Sensor 1	—	Varies	This displays the temperature reading of the control module temperature sensor 1.
• Control Module Temperature Sensor 2	—	Varies	This displays the temperature reading of the control module temperature sensor 2.
• Control Module Operation Mode	—	Run	This displays the current operational mode of the control module.
• Battery Saver Mode	—	On/Off	Indicates if battery saver mode is active.
Ethernet Bus Data			
• Ethernet Bus Master Clock	—	Yes/No	Ethernet Bus Master Clock
• Rear Seat Infotainment Module to Radio Ethernet Data Received	—	Yes/No	Indicates if the radio has received data from the rear seat infotainment module.
• Telematics Control Module to Radio Ethernet Data Ready To Transmit	—	Yes/No	Indicates if the telematics control module ethernet data is ready to transmit to the radio.
• Ethernet Port 0 Receive Failure Count	—	Varies	Displays failures in counts (Rear Seat Infotainment)
• Ethernet Port 0 Transmit Failure Count	—	Varies	Displays failures in counts (Rear Seat Infotainment)
• Ethernet Port 1 Receive Failure Count	—	Varies	Displays failures in counts (Audio Amplifier)
• Ethernet Port 1 Transmit Failure Count	—	Varies	Displays failures in counts (Audio Amplifier)
• Ethernet Port 2 Receive Failure Count	—	Varies	Displays failures in counts (Central Gateway Module)
• Ethernet Port 2 Transmit Failure Count	—	Varies	Displays failures in counts (Central Gateway Module)
• Ethernet Port 3 Receive Failure Count	—	Varies	Displays failures in counts (Telematics Control Module)
• Ethernet Port 3 Transmit Failure Count	—	Varies	Displays failures in counts (Telematics Control Module)

Parameter	System State	Expected Value	Description
• Ethernet Port 4 Receive Failure Count	—	Varies	Displays failures in counts
• Ethernet Port 4 Transmit Failure Count	—	Varies	Displays failures in counts
• Ethernet Port 5 Receive Failure Count	—	Varies	Displays failures in counts
• Ethernet Port 5 Transmit Failure Count	—	Varies	Displays failures in counts
• Ethernet Port 6 Receive Failure Count	—	Varies	Displays failures in counts
• Ethernet Port 6 Transmit Failure Count	—	Varies	Displays failures in counts
• Ethernet Port 0 IP Address	—	Varies	Displays ethernet IP address
• Ethernet Port 1 IP Address	—	Varies	Displays ethernet IP address
• Ethernet Port 2 IP Address	—	Varies	Displays ethernet IP address
• Ethernet Port 3 IP Address	—	Varies	Displays ethernet IP address
• Ethernet Port 4 IP Address	—	Varies	Displays ethernet IP address
• Ethernet Port 5 IP Address	—	Varies	Displays ethernet IP address
• Ethernet Port 6 IP Address	—	Varies	Displays ethernet IP address
Configuration Data			
• Manufacturer Enable Counter	—	Varies	Displays in counts
Bluetooth Data			
• Number of Bluetooth Devices Connected	—	Varies 1–10	Indicates the number of Bluetooth paired to the vehicle.
• Bluetooth Device 1: Connection Status	—	Varies	Indicates the device status. (0) Unconnected, (1) Connected / Idle, (2) Call active, (3) 3-way calling active
• Bluetooth Device 1: Friendly Name	—	Varies	The scan tool displays a decimal value between 0 and 255.
• Bluetooth Device 2: Connection Status	—	Varies	Indicates the device status. (0) Unconnected, (1) Connected / Idle, (2) Call active, (3) 3-way calling active
• Bluetooth Device 2: Friendly Name	—	Varies	Displays the bluetooth phone to telematics communication interface control module status.
• Bluetooth Device 3: Connection Status	—	Varies	Indicates the device status. (0) Unconnected, (1) Connected / Idle, (2) Call active, (3) 3-way calling active
• Bluetooth Device 3: Friendly Name	—	Varies	Indicates the name given to the paired device
• Bluetooth Device 4: Connection Status	—	Varies	Indicates the device status. (0) Unconnected, (1) Connected / Idle, (2) Call active, (3) 3-way calling active

Parameter	System State	Expected Value	Description
• Bluetooth Device 4: Friendly Name	—	Varies	Indicates the name given to the paired device
• Bluetooth Device 5: Connection Status	—	Varies	Indicates the device status. (0) Unconnected, (1) Connected / Idle, (2) Call active, (3) 3-way calling active
• Bluetooth Device 5: Friendly Name	—	Varies	Indicates the name given to the paired device
• Bluetooth Device 6: Connection Status	—	Varies	Indicates the device status. (0) Unconnected, (1) Connected / Idle, (2) Call active, (3) 3-way calling active
• Bluetooth Device 6: Friendly Name	—	Varies	Indicates the name given to the paired device
• Bluetooth Device 7: Connection Status	—	Varies	Indicates the device status. (0) Unconnected, (1) Connected / Idle, (2) Call active, (3) 3-way calling active
• Bluetooth Device 7: Friendly Name	—	Varies	Indicates the name given to the paired device
• Bluetooth Device 8: Connection Status	—	Varies	Indicates the device status. (0) Unconnected, (1) Connected / Idle, (2) Call active, (3) 3-way calling active
• Bluetooth Device 8: Friendly Name	—	Varies	Indicates the name given to the paired device
• Bluetooth Device 9: Connection Status	—	Varies	Indicates the device status. (0) Unconnected, (1) Connected / Idle, (2) Call active, (3) 3-way calling active
• Bluetooth Device 9: Friendly Name	—	Varies	Indicates the name given to the paired device
• Bluetooth Device 10: Connection Status	—	Varies	Indicates the device status. (0) Unconnected, (1) Connected / Idle, (2) Call active, (3) 3-way calling active
• Bluetooth Device 10: Friendly Name	—	Varies	Indicates the name given to the paired device
GPS Data			
Longitude at Last GPS Fix	—	Varies	Indicates the longitude coordinates at the last GPS signal reveived
Latitude at Last GPS Fix	—	Varies	Indicates the latitude coordinates at the last GPS signal reveived
Audio Data			
Left Rear Audio Output	—	Active/Not Active	Indicates the status of the audio output
Right Front Audio Output	—	Active/Not Active	Indicates the status of the audio output
Left Front Audio Output	—	Active/Not Active	Indicates the status of the audio output
Right Rear Audio Output	—	Active/Not Active	Indicates the status of the audio output
Current AM Frequency	—	Varies	Indicates the current frequency the radio is set to
Current FM Frequency	—	Varies	Indicates the current frequency the radio is set to
Auxiliary Input Data			
Infotainment Control Switch, Switch 1	—	Yes/No	Indicates if the switch is pressed
Infotainment Control Switch, Switch 2	—	Yes/No	Indicates if the switch is pressed
Infotainment Control Switch, Switch 3	—	Yes/No	Indicates if the switch is pressed
Infotainment Control Switch, Switch 4	—	Yes/No	Indicates if the switch is pressed

Parameter	System State	Expected Value	Description
Infotainment Control Switch, Switch 5	—	Yes/No	Indicates if the switch is pressed
Infotainment Control Switch, Switch 6	—	Yes/No	Indicates if the switch is pressed
Infotainment Control Switch, Switch 7	—	Yes/No	Indicates if the switch is pressed
Infotainment Control Switch, Switch 8	—	Yes/No	Indicates if the switch is pressed
Infotainment Control Switch, Knob 1 Push Switch	—	Yes/No	Indicates if the switch is pressed
Infotainment Control Switch, Knob 1 Rotary Position	—	Varies	Displays the counts when the knob is turned
Infotainment Control Switch, Knob 2 Push Switch	—	Yes/No	Indicates if the switch is pressed
Infotainment Control Switch, Knob 2 Rotary Position	—	Varies	Displays the counts when the knob is turned

A11 Radio: Scan Tool Output Controls

Output Control	Description
Display Check	
Info Display Dimming	Allows control of the info display dimming
Backlight Dimming	Allows control of the backlight dimming
Rearview Camera Display	Allows the rearview camera to be turned on and off
Radio Controls	
Radio Tuner AM Frequency	Allows control of the AM tuner frequency
Radio Tuner FM Frequency	Allows control of the FM tuner frequency

B174W Front View Camera - Windshield: Scan Tool Information (with UGN)

Identification Information

Parameter	System State	Expected Value	Definition
Operating Conditions: Ignition ON			
Module Diagnostic Address	–	Varies	The scan tool displays the Software Module 1 Identifier
Base Model Part Number	–	Varies	The scan tool displays the Base Model Part Number
End Model Part Number	–	Varies	The scan tool displays the End Model Part Number
Date Programmed	–	Varies	The scan tool displays the Date Programmed
Adaptive Cruise Control Disengage Hisotry Data	–	–	Refer to: Driver Assistance Systems Disable History Conditions
Adaptive Cruise Control Disengage Hisotry Data	–	–	Refer to: Driver Assistance Systems Disable History Conditions
Front Impact Mitigation Disable History Data	–	–	Refer to: Driver Assistance Systems Disable History Conditions
Lane Keep Assist Disable History	–	–	Refer to: Driver Assistance Systems Disable History Conditions
Parking Assist Disable History Data	–	–	Refer to: Parking Assist Systems Disable History Conditions
Rear Impact Mitigation Disable History Data	–	–	Refer to: Driver Assistance Systems Disable History Conditions

Parameter	System State	Expected Value	Definition
Trailer System Induced Disable History Data	–	–	Refer to: Driver Assistance Systems Disable History Conditions
Vehicle Dynamic System Disable History Data	–	–	Refer to: Driver Assistance Systems Disable History Conditions

B174W Front View Camera - Windshield: Scan Tool Information (without UGN)

Identification Information

Parameter	System State	Expected Value	Definition
Operating Conditions: Ignition ON			
Module Diagnostic Address	–	Varies	The scan tool displays the Software Module 1 Identifier
Base Model Part Number	–	Varies	The scan tool displays the Base Model Part Number
End Model Part Number	–	Varies	The scan tool displays the End Model Part Number
Date Programmed	–	Varies	The scan tool displays the Date Programmed

Note: Depending on vehicle options and content, all of the following parameters may not be available.

Data Display

Parameter	System State	Expected Value	Definition
Operating Conditions: Ignition ON			
Automatic High Beam Activation Status	–	Off/ disabled/ Not Ready to Assist/ Camera Blocked/	The scan tool displays the current high beam status.
Frontview Camera Calibration Status	–	Not Calibrated/ Calibrated/ Dynamically Calibrated/ Unknown	The scan tool displays the current calibration status of the B174W Frontview Camera - Windshield
Frontview Camera Learn Mode Progress	–	100%	The scan tool displays the current learn progress of the B174W Frontview Camera - Windshield as a percentage
Frontview Camera Learn Mode Status	–	Learn Successful	The scan tool displays the current learn status of the B174W Frontview Camera - Windshield
Frontview Camera System Status	–	Varies	The scan tool displays the current system status of the B174W Frontview Camera - Windshield
Glare Free High Beam Assist Status	–	Off/ disabled/ Not Ready to Assist/ Camera Blocked/	The scan tool displays the current glare free high beam status.
Power Mode	–	Off/ Accessory/ Run/ Start/ Propulsion Active	The scan tool displays current vehicle power mode
Sensor Supply Voltage	–	Volts	The scan tool displays the measured sensor supply voltage level
Yaw Rate	–	Varies	The scan tool displays the yaw offset of the B174W Frontview Camera - Windshield
Traffic Sign Memory	–	Varies	The scan tool displays if traffic sign memory is Active or Off

B218L Side Obstacle Detection Control Module - Left: Scan Tool Information

Identification Information

Parameter	System State	Expected Value	Definition
Operating Conditions: Ignition ON			
Vehicle Identification Number (VIN)	–	Varies	The scan tool displays the vehicle VIN number
Last Dealer Code or Scan Tool Serial Number	–	Varies	The scan tool displays the Last Dealer Code or Scan Tool Serial Number
Date Programmed	–	Varies	The scan tool displays the Date Programmed
Diagnostic Data Identifier	–	Varies	The scan tool displays the Diagnostic Data Identifier
Manufacturer Enable Counter	–	Varies	The scan tool displays the Manufacturer Enable Counter
Module Diagnostic Address	–	Varies	The scan tool displays the Software Module 1 Identifier
Manufacturer's Traceability Number	–	Varies	The scan tool displays the Manufacturer's Traceability Number
Application Software Part Number 1	–	Varies	The scan tool displays the Application Software Part Number 1
Calibration Part Number 1	–	Varies	The scan tool displays the Calibration Part Number 1
End Model Part Number	–	Varies	The scan tool displays the End Model Part Number
Base Model Part Number	–	Varies	The scan tool displays the Base Model Part Number
Application Software Part Number 1 Alpha Code	–	Varies	The scan tool displays the Application Software Part Number 1 Alpha Code
Calibration Part Number 1 Alpha Code	–	Varies	The scan tool displays the Calibration Part Number 1 Alpha Code
End Model Part Number Alpha Code	–	Varies	The scan tool displays the End Model Part Number Alpha Code
Base Model Part Number Alpha Code	–	Varies	The scan tool displays the Base Model Part Number Alpha Code

B218R Side Obstacle Detection Control Module - Right: Scan Tool Information

Identification Information

Parameter	System State	Expected Value	Definition
Operating Conditions: Ignition ON			
Vehicle Identification Number (VIN)	–	Varies	The scan tool displays the vehicle VIN number
Last Dealer Code or Scan Tool Serial Number	–	Varies	The scan tool displays the Last Dealer Code or Scan Tool Serial Number
Date Programmed	–	Varies	The scan tool displays the Date Programmed
Diagnostic Data Identifier	–	Varies	The scan tool displays the Diagnostic Data Identifier
Manufacturer Enable Counter	–	Varies	The scan tool displays the Manufacturer Enable Counter
Module Diagnostic Address	–	Varies	The scan tool displays the Software Module 1 Identifier
Manufacturer's Traceability Number	–	Varies	The scan tool displays the Manufacturer's Traceability Number
Application Software Part Number 1	–	Varies	The scan tool displays the Application Software Part Number 1
Calibration Part Number 1	–	Varies	The scan tool displays the Calibration Part Number 1

Parameter	System State	Expected Value	Definition
End Model Part Number	–	Varies	The scan tool displays the End Model Part Number
Base Model Part Number	–	Varies	The scan tool displays the Base Model Part Number
Application Software Part Number 1 Alpha Code	–	Varies	The scan tool displays the Application Software Part Number 1 Alpha Code
Calibration Part Number 1 Alpha Code	–	Varies	The scan tool displays the Calibration Part Number 1 Alpha Code
End Model Part Number Alpha Code	–	Varies	The scan tool displays the End Model Part Number Alpha Code
Base Model Part Number Alpha Code	–	Varies	The scan tool displays the Base Model Part Number Alpha Code

B233B Forward Range Radar Sensor - Long Range: Scan Tool Information

Identification Information

Parameter	System State	Expected Value	Definition
Operating Conditions: Ignition ON			
Last Dealer Code or Scan Tool Serial Number	–	Varies	The scan tool displays the Last Dealer Code or Scan Tool Serial Number
Application Software Part Number 1	–	Varies	The scan tool displays the Application Software Part Number 1
Application Software Part Number 1 Alpha Code	–	Varies	The scan tool displays the Application Software Part Number 1 Alpha Code
Calibration Part Number 1 Alpha Code	–	Varies	The scan tool displays the Calibration Part Number 1 Alpha Code
Manufacturer's Traceability Number	–	Varies	The scan tool displays the Manufacturer's Traceability Number
Diagnostic Data Identifier	–	Varies	The scan tool displays the Diagnostic Data Identifier
Module Diagnostic Address	–	Varies	The scan tool displays the Software Module 1 Identifier
Base Model Part Number	–	Varies	The scan tool displays the Base Model Part Number
Vehicle Identification Number (VIN)	–	Varies	The scan tool displays the vehicle VIN number
Manufacturer Enable Counter	–	Varies	The scan tool displays the Manufacturer Enable Counter
Calibration Part Number 1	–	Varies	The scan tool displays the Calibration Part Number 1
End Model Part Number	–	Varies	The scan tool displays the End Model Part Number
Base Model Part Number Alpha Code	–	Varies	The scan tool displays the Base Model Part Number Alpha Code
Date Programmed	–	Varies	The scan tool displays the Date Programmed
End Model Part Number Alpha Code	–	Varies	The scan tool displays the End Model Part Number Alpha Code

Data Display

Parameter	System State	Expected Value	Definition
Operating Conditions: Ignition ON			
Learn Status	–	Complete	The scan tool displays the current learn status of the B233B Forward Range Radar Sensor – Long Range

Configuration/Reset Functions

Parameter	Definition
Operating Conditions: Ignition ON	
Long Range Radar Sensor Module Learn	The scan tool will being B233B Forward Range Radar Sensor – Long Range learn

B233LF Short Range Radar Sensor - Left Front: Scan Tool Information

Identification Information

Parameter	System State	Expected Value	Definition
Operating Conditions: Ignition ON			
Last Dealer Code or Scan Tool Serial Number	–	Varies	The scan tool displays the Last Dealer Code or Scan Tool Serial Number
Application Software Part Number 1	–	Varies	The scan tool displays the Application Software Part Number 1
Application Software Part Number 1 Alpha Code	–	Varies	The scan tool displays the Application Software Part Number 1 Alpha Code
Calibration Part Number 1 Alpha Code	–	Varies	The scan tool displays the Calibration Part Number 1 Alpha Code
Manufacturer's Traceability Number	–	Varies	The scan tool displays the Manufacturer's Traceability Number
Module Diagnostic Address	–	Varies	The scan tool displays the Software Module 1 Identifier
Base Model Part Number	–	Varies	The scan tool displays the Base Model Part Number
Manufacturer Enable Counter	–	Varies	The scan tool displays the Manufacturer Enable Counter
Calibration Part Number 1	–	Varies	The scan tool displays the Calibration Part Number 1
End Model Part Number	–	Varies	The scan tool displays the End Model Part Number
Base Model Part Number Alpha Code	–	Varies	The scan tool displays the Base Model Part Number Alpha Code
Date Programmed	–	Varies	The scan tool displays the Date Programmed
End Model Part Number Alpha Code	–	Varies	The scan tool displays the End Model Part Number Alpha Code
Diagnostic Data Identifier	–	Varies	The scan tool displays the Diagnostic Data Identifier
Vehicle Identification Number (VIN)	–	Varies	The scan tool displays the vehicle VIN number

B233LR Short Range Radar Sensor - Left Rear: Scan Tool Information

Identification Information

Parameter	System State	Expected Value	Definition
Operating Conditions: Ignition ON			
Last Dealer Code or Scan Tool Serial Number	–	Varies	The scan tool displays the Last Dealer Code or Scan Tool Serial Number
Application Software Part Number 1	–	Varies	The scan tool displays the Application Software Part Number 1
Application Software Part Number 1 Alpha Code	–	Varies	The scan tool displays the Application Software Part Number 1 Alpha Code

Parameter	System State	Expected Value	Definition
Calibration Part Number 1 Alpha Code	–	Varies	The scan tool displays the Calibration Part Number 1 Alpha Code
Manufacturer's Traceability Number	–	Varies	The scan tool displays the Manufacturer's Traceability Number
Module Diagnostic Address	–	Varies	The scan tool displays the Software Module 1 Identifier
Base Model Part Number	–	Varies	The scan tool displays the Base Model Part Number
Manufacturer Enable Counter	–	Varies	The scan tool displays the Manufacturer Enable Counter
Calibration Part Number 1	–	Varies	The scan tool displays the Calibration Part Number 1
End Model Part Number	–	Varies	The scan tool displays the End Model Part Number
Base Model Part Number Alpha Code	–	Varies	The scan tool displays the Base Model Part Number Alpha Code
Date Programmed	–	Varies	The scan tool displays the Date Programmed
End Model Part Number Alpha Code	–	Varies	The scan tool displays the End Model Part Number Alpha Code
Diagnostic Data Identifier	–	Varies	The scan tool displays the Diagnostic Data Identifier
Vehicle Identification Number (VIN)	–	Varies	The scan tool displays the vehicle VIN number

B233RF Short Range Radar Sensor - Right Front: Scan Tool Information

Identification Information

Parameter	System State	Expected Value	Definition
Operating Conditions: Ignition ON			
Last Dealer Code or Scan Tool Serial Number	–	Varies	The scan tool displays the Last Dealer Code or Scan Tool Serial Number
Application Software Part Number 1	–	Varies	The scan tool displays the Application Software Part Number 1
Application Software Part Number 1 Alpha Code	–	Varies	The scan tool displays the Application Software Part Number 1 Alpha Code
Calibration Part Number 1 Alpha Code	–	Varies	The scan tool displays the Calibration Part Number 1 Alpha Code
Manufacturer's Traceability Number	–	Varies	The scan tool displays the Manufacturer's Traceability Number
Module Diagnostic Address	–	Varies	The scan tool displays the Software Module 1 Identifier
Base Model Part Number	–	Varies	The scan tool displays the Base Model Part Number
Manufacturer Enable Counter	–	Varies	The scan tool displays the Manufacturer Enable Counter
Calibration Part Number 1	–	Varies	The scan tool displays the Calibration Part Number 1
End Model Part Number	–	Varies	The scan tool displays the End Model Part Number
Base Model Part Number Alpha Code	–	Varies	The scan tool displays the Base Model Part Number Alpha Code
Date Programmed	–	Varies	The scan tool displays the Date Programmed
End Model Part Number Alpha Code	–	Varies	The scan tool displays the End Model Part Number Alpha Code
Diagnostic Data Identifier	–	Varies	The scan tool displays the Diagnostic Data Identifier
Vehicle Identification Number (VIN)	–	Varies	The scan tool displays the vehicle VIN number

B233RR Short Range Radar Sensor - Right Rear: Scan Tool Information

Identification Information

Parameter	System State	Expected Value	Definition
Operating Conditions: Ignition ON			
Last Dealer Code or Scan Tool Serial Number	–	Varies	The scan tool displays the Last Dealer Code or Scan Tool Serial Number
Application Software Part Number 1	–	Varies	The scan tool displays the Application Software Part Number 1
Application Software Part Number 1 Alpha Code	–	Varies	The scan tool displays the Application Software Part Number 1 Alpha Code
Calibration Part Number 1 Alpha Code	–	Varies	The scan tool displays the Calibration Part Number 1 Alpha Code
Manufacturer's Traceability Number	–	Varies	The scan tool displays the Manufacturer's Traceability Number
Module Diagnostic Address	–	Varies	The scan tool displays the Software Module 1 Identifier
Base Model Part Number	–	Varies	The scan tool displays the Base Model Part Number
Manufacturer Enable Counter	–	Varies	The scan tool displays the Manufacturer Enable Counter
Calibration Part Number 1	–	Varies	The scan tool displays the Calibration Part Number 1
End Model Part Number	–	Varies	The scan tool displays the End Model Part Number
Base Model Part Number Alpha Code	–	Varies	The scan tool displays the Base Model Part Number Alpha Code
Date Programmed	–	Varies	The scan tool displays the Date Programmed
End Model Part Number Alpha Code	–	Varies	The scan tool displays the End Model Part Number Alpha Code
Diagnostic Data Identifier	–	Varies	The scan tool displays the Diagnostic Data Identifier
Vehicle Identification Number (VIN)	–	Varies	The scan tool displays the vehicle VIN number

B233SL Short Range Radar Rear Side Sensor - Left: Scan Tool Information

Identification Information

Parameter	System State	Expected Value	Definition
Operating Conditions: Ignition ON			
Last Dealer Code or Scan Tool Serial Number	–	Varies	The scan tool displays the Last Dealer Code or Scan Tool Serial Number
Application Software Part Number 1	–	Varies	The scan tool displays the Application Software Part Number 1
Application Software Part Number 1 Alpha Code	–	Varies	The scan tool displays the Application Software Part Number 1 Alpha Code
Calibration Part Number 1 Alpha Code	–	Varies	The scan tool displays the Calibration Part Number 1 Alpha Code
Manufacturer's Traceability Number	–	Varies	The scan tool displays the Manufacturer's Traceability Number
Module Diagnostic Address	–	Varies	The scan tool displays the Software Module 1 Identifier
Base Model Part Number	–	Varies	The scan tool displays the Base Model Part Number

Parameter	System State	Expected Value	Definition
Manufacturer Enable Counter	–	Varies	The scan tool displays the Manufacturer Enable Counter
Calibration Part Number 1	–	Varies	The scan tool displays the Calibration Part Number 1
End Model Part Number	–	Varies	The scan tool displays the End Model Part Number
Base Model Part Number Alpha Code	–	Varies	The scan tool displays the Base Model Part Number Alpha Code
Date Programmed	–	Varies	The scan tool displays the Date Programmed
End Model Part Number Alpha Code	–	Varies	The scan tool displays the End Model Part Number Alpha Code
Diagnostic Data Identifier	–	Varies	The scan tool displays the Diagnostic Data Identifier
Vehicle Identification Number (VIN)	–	Varies	The scan tool displays the vehicle VIN number

B233SR Short Range Radar Rear Side Sensor - Right: Scan Tool Information

Identification Information

Parameter	System State	Expected Value	Definition
Operating Conditions: Ignition ON			
Last Dealer Code or Scan Tool Serial Number	–	Varies	The scan tool displays the Last Dealer Code or Scan Tool Serial Number
Application Software Part Number 1	–	Varies	The scan tool displays the Application Software Part Number 1
Application Software Part Number 1 Alpha Code	–	Varies	The scan tool displays the Application Software Part Number 1 Alpha Code
Calibration Part Number 1 Alpha Code	–	Varies	The scan tool displays the Calibration Part Number 1 Alpha Code
Manufacturer’s Traceability Number	–	Varies	The scan tool displays the Manufacturer’s Traceability Number
Module Diagnostic Address	–	Varies	The scan tool displays the Software Module 1 Identifier
Base Model Part Number	–	Varies	The scan tool displays the Base Model Part Number
Manufacturer Enable Counter	–	Varies	The scan tool displays the Manufacturer Enable Counter
Calibration Part Number 1	–	Varies	The scan tool displays the Calibration Part Number 1
End Model Part Number	–	Varies	The scan tool displays the End Model Part Number
Base Model Part Number Alpha Code	–	Varies	The scan tool displays the Base Model Part Number Alpha Code
Date Programmed	–	Varies	The scan tool displays the Date Programmed
End Model Part Number Alpha Code	–	Varies	The scan tool displays the End Model Part Number Alpha Code
Diagnostic Data Identifier	–	Varies	The scan tool displays the Diagnostic Data Identifier
Vehicle Identification Number (VIN)	–	Varies	The scan tool displays the vehicle VIN number

K4 Assist Step Control Module: Scan Tool Information

Scan Tool Data Parameters

Parameter	Expected Value	Description
Operating Conditions: Ignition ON		
Manual Deploy Status	Normal	Scan tool displays Unknown, Off, Extend to Passenger Position - Left and Right, or Extend to Cargo Position - Left and Right.
Left Assist Step Motor Current	0 A	Scan tool displays the current amperage of the left assist step motor.
Left Assist Step Position	Retracted Position - Left	Scan tool displays Retracted Position - Left, Extend to Passenger Position - Left, Extend to Cargo Position - Left, or Extend to Service Position - Left.
Left Assist Step Position	Count Value	Scan tool displays the current left step position count.
Left Assist Step System Status	Retracted Position - Left	Scan tool displays Retracted Position - Left, Extend to Passenger Position - Left, Extend to Cargo Position - Left, or Extend to Service Position - Left.
Left Assist Step Learn Status	Yes	Scan tool displays Learned if the left step learn has been completed.
Left Front Door Ajar Switch	Inactive	Scan tool displays Inactive if the door is shut, and Active if the door is open.
Left Rear Door Ajar Switch	Inactive	Scan tool displays Inactive if the door is shut, and Active if the door is open.
Right Assist Step Motor Current	0 A	Scan tool displays the current amperage of the right assist step motor.
Right Assist Step Position	Retracted Position - Right	Scan tool displays Retracted Position - Right, Extend to Passenger Position - Right, Extend to Cargo Position - Right, or Extend to Service Position - Right.
Right Assist Step Position	Count Value	Scan tool displays the current right step position count.
Right Assist Step System Status	Retracted Position - Right	Scan tool displays Retracted Position - Right, Extend to Passenger Position - Right, Extend to Cargo Position - Right, or Extend to Service Position - Right.
Right Assist Step Learn Status	Yes	Scan tool displays Learned if the right step learn has been completed.
Right Front Door Ajar Switch	Inactive	Scan tool displays Inactive if the door is shut, and Active if the door is open.
Right Rear Door Ajar Switch	Inactive	Scan tool displays Inactive if the door is shut, and Active if the door is open.
Headlamp Switch Signal	Off	Scan tool displays Unknown, Off, Auto, Park Lamps, Headlamp.
Exterior Lighting	Inactive	Scan tool displays Inactive or Active
System Power Mode	Varies	Scan tool displays Off, Accessory, Run, Start Request, or Propulsion Active.
Battery Voltage	Varies	Current voltage of battery.

Scan Tool Output Controls

Output Control	Description
Assist Step Courtesy Lamp	Turns the assist step courtesy lamp ON and OFF.
Extend to Passenger Position - Right	Commands the right assist step to the deployed position.
Extend to Service Position - Right	Commands the right assist step to the fully extended service position.
Retracted Position - Right	Commands the right assist step to the retracted position.
Extend to Passenger Position - Left	Commands the Left assist step to the deployed position.

Output Control	Description
Extend to Service Position - Left	Commands the Left assist step to the fully extended service position.
Retracted Position - Left	Commands the Left assist step to the retracted position.

K9 Body Control Module: Scan Tool Information

Body Control Module — 12V Battery Data — Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Vehicle in Service Mode, Vehicle in Park, All Doors Closed			
Battery Capacity	—	Varies	The scan tool displays Ah (Amp hr). Ah/20 is the amount of current a battery can supply for 20hrs until the voltage drops to 10.5V.
Battery Current	—	Varies	The scan tool displays Amps. This is the current flowing through the Battery Sensor Module.
Battery Current During Autostop	—	Varies	The scan tool displays Amps. This is the amperage flowing out of battery to maintain vehicle systems during an autostop.
Battery Sensor Internal Temperature Sensor	—	Varies	The scan tool displays temperature in Celsius.
Battery Sensor Module - Battery Nominal Resistance	—	Varies	The scan tool displays mOhm. This is the internal impedance of the 12V battery as measured by the Battery Sensor Module.
Battery Sensor Module - Battery Voltage	—	Varies	The scan tool displays Volts. This is the actual 12V battery voltage as measured by the Battery Sensor Module.
Battery Sensor Module - Data Received	—	Yes	The scan tool displays Yes or No. This value indicates that information has been received by the Body Control Module from the Battery Sensor Module.
Battery Sensor Module - Ignition Off Minimum Battery State of Charge	—	Varies	The scan tool displays percentage (%).
Battery Sensor Module - Ignition Off Minimum Battery Voltage	—	Varies	The scan tool displays battery voltage in volts (V). This is the lowest 12V battery voltage recorded during key off.
Battery Sensor Module - Maximum Cranking Current	—	Varies	The scan tool displays maximum cranking current in amperes (A). This is the actual peak value of amps measured by the Battery Sensor Module on the previous engine crank event.
Battery Sensor Module - Minimum Cranking Voltage	—	Varies	The scan tool displays minimum cranking voltage in volts (V). This is the actual lowest voltage measured by the Battery Sensor Module on the previous engine crank event.

Parameter	System State	Expected Value	Description
Battery Sensor Module - Open Circuit Voltage	—	Varies	The scan tool displays Volts.
Battery Sensor Module - Predicted Minimum Crank Voltage	—	Varies	The scan tool displays Volts. This is a value calculated by the Battery Sensor Module that predicts the minimum voltage during the next engine crank event.
Battery Sensor Module - State of Charge	—	Varies	The scan tool displays percentage (%). This is a measurement of the charge level compared to a fully charged 12V battery as measured by the Battery Sensor Module.
Battery Sensor Module State of Charge Error	—	Varies	The scan tool displays percentage (%).
Battery Sensor Module - State of Charge Status OK	—	—	—
Battery Sensor Module - State of Charge Variance	—	Varies	The scan tool displays percentage (%).
Battery Sulfation Protection Mode	—	—	—
Battery Type	—	Default	The scan tool displays Default, Flooded Battery, AGM Battery, Enhanced Flooded Battery, or Lithium Battery.
Battery Voltage Too Low	—	No	The scan tool displays Yes or No.
Charge Recovery Mode Active - Battery Saver Mode	—	0	The scan tool displays a numeric value. This indicates the level that battery saver mode is operating at. This provides an indication of what actions are being taken.
Charge Recovery Mode Active - Battery Disconnected	—	—	—
Charge Recovery Mode Active - Charge Efficiency Off	—	—	—
Charge Recovery Mode Active - Service Tool Request	—	—	—
Charge Recovery Mode Active - State of Charge Loss	—	—	—
Charge Recovery Mode Active - Vehicle Inactive Too Long	—	—	—
Low-Voltage Battery Previous State of Charge	—	Varies	The scan tool displays percentage (%).
Low-Voltage Battery State of Charge	—	Varies	The scan tool displays percentage (%).
Low-Voltage Battery Temperature	—	Varies	The scan tool displays temperature in Celsius (°C).
Net Battery Amp Hours	—	Varies	The scan tool displays Ah. This is the sum of Amp per hour as measured through the Battery Sensor Module.
Net Battery Amp Hours Charged	—	Varies	The scan tool displays Ah.

Parameter	System State	Expected Value	Description
Net Battery Amp Hours Discharged	—	Varies	The scan tool displays Ah.
Parasitic Current Greater than 0mA Counter	—	Varies	The scan tool displays min. This is a counter that tracks if the current during ignition off is within a particular range.
Parasitic Current -5.0A to -10.0A Counter	—	Varies	The scan tool displays min. This is a counter that tracks if the current during ignition off is within a particular range.
Parasitic Current 0mA to -10mA Counter	—	Varies	The scan tool displays min. This is a counter that tracks if the current during ignition off is within a particular range.
Parasitic Current -1.25A to -2.5A Counter	—	Varies	The scan tool displays min. This is a counter that tracks if the current during ignition off is within a particular range.
Parasitic Current -10mA to -20mA Counter	—	Varies	The scan tool displays min. This is a counter that tracks if the current during ignition off is within a particular range.
Parasitic Current -40mA to -80mA Counter	—	Varies	The scan tool displays min. This is a counter that tracks if the current during ignition off is within a particular range.
Parasitic Current -20mA to -40mA Counter	—	Varies	The scan tool displays min. This is a counter that tracks if the current during ignition off is within a particular range.
Parasitic Current -80mA to -160mA Counter	—	Varies	The scan tool displays min. This is a counter that tracks if the current during ignition off is within a particular range.
Parasitic Current -10.0A or less Counter	—	Varies	The scan tool displays min. This is a counter that tracks if the current during ignition off is within a particular range.
Parasitic Current -2.5A to -5.0A Counter	—	Varies	The scan tool displays min. This is a counter that tracks if the current during ignition off is within a particular range.
Parasitic Current -640mA to -1.25A Counter	—	Varies	The scan tool displays min. This is a counter that tracks if the current during ignition off is within a particular range.
Parasitic Current -160mA to -320mA Counter	—	Varies	The scan tool displays min. This is a counter that tracks if the current during ignition off is within a particular range.
Parasitic Current -320mA to -640mA Counter	—	Varies	The scan tool displays min. This is a counter that tracks if the current during ignition off is within a particular range.
Stop/Start Mode	—	—	—
Voltage Drop During Autostop	—	Varies	The scan tool displays Volts. This is a measurement of the amount that the battery voltage has dropped during an autostop.

Body Control Module — Brake Pedal Position Data — Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Vehicle in Service Mode, Vehicle in Park, All Doors Closed			
Brake Pedal Position Sensor Fully Released Learn Status	—	Yes	The scan tool displays Yes or No.
Brake Pedal Initial Travel Position Achieved	—	No	The scan tool displays Yes or No.
Brake Pedal Position Switch Circuit Signal	—	—	—
Extended Travel Brake Pedal Position Signal	—	—	—
Extended Travel Brake Pedal Position Switch	—	Inactive	The scan tool displays Active or Inactive.
Torque Converter Clutch/ Cruise Control Brake Pedal Position Switch	—	Inactive	The scan tool displays Active or Inactive.

Body Control Module — Chassis Control Data — Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Vehicle in Service Mode, Vehicle in Park, All Doors Closed			
Drive Mode Select Switch 1	—	Inactive	The scan tool displays Inactive, Switch 1, Switch 2, Switch 3, Switch 4, Switch 5, Switch 6, Switch 7, Switch 8, Open/Short to Battery, Short to Ground, or Invalid. This is the primary bank of switches which the vehicle operator interfaces with for different selectable vehicle operating modes such as Sport Mode, Fuel Economy Mode...
Drive Mode Select Digital Switch 1	—	Inactive	The scan tool displays Active or Inactive. This is a discrete switch the vehicle operator interfaces with to select vehicle operating modes such as Sport Mode, Fuel Economy Mode...
Driver Shift Control Mode Switch	—	Inactive	The scan tool displays Upshift, Downshift, Inactive, or Invalid.
Hill Descent Control Switch	—	Inactive	The scan tool displays Active or Inactive.
Traction Control Switch	—	Inactive	The scan tool displays Active or Inactive. This indicates the state of the input that enables or disables the traction control system, which is a system designed to prevent loss of traction (and therefore the control of the vehicle) when excessive throttle or steering is applied by the driver.

Body Control Module — Content Theft Deterrent Alarm Trigger — Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Vehicle in Service Mode, Vehicle in Park, All Doors Closed			
Content Theft Deterrent Alarm Status	—	Has Not Alarmed - No Alarm	The scan tool displays Has Not Alarmed - No Alarm, Alarming - Alarm, or Has Alarmed - Alarm Active. This indicates if the vehicle content theft deterrent system is in alarm mode or not.
Content Theft Deterrent Indicator	—	Off	The scan tool displays Off, On, Flashing Slow, or Flashing Fast. This is the illuminating lamp on the instrument cluster that indicates if the vehicle security system is active or not.
Current Content Theft Deterrent Trigger	—	No Information/None	This indicates what factor led to the activation of the content theft deterrent system.
Content Theft Deterrent Trigger History 1	—	No Information/None	This indicates the factor that led to the first history reason for activation of the content theft deterrent system.
Content Theft Deterrent Trigger History 2	—	No Information/None	This indicates the factor that led to the second history reason for activation of the content theft deterrent system.
Content Theft Deterrent Trigger History 3	—	No Information/None	This indicates the factor that led to the third history reason for activation of the content theft deterrent system.
Glass Breakage	—	Not Detected	The scan tool displays Not Detected or Detected. This parameter indicates the damage to glass as a result to breaking. Glass divides into pieces as a result of a sudden or violent action.
Horn Relay Command	—	Inactive	The scan tool displays Active or Inactive. This refers to a request to initiate the sound for a vehicle's loud warning signal. This is used to display whether the Body Control Module is commanding the horn relay to be on or off.
Liftglass	—	Inactive	The scan tool displays Active or Inactive. The liftglass ajar warning light will be illuminated when the liftglass is not properly closed. This parameter indicates if the liftglass active or inactive.
Power Sounder Content Theft Deterrent Alarm Module Command	—	No Alarm	The scan tool displays No Alarm or Alarm Active. The power sounder is part of the vehicle's theft deterrent system. This parameter shows if the power sounder is commanded active (monitoring for vehicle theft attempt) or not.

Parameter	System State	Expected Value	Description
Power Sounder Content Theft Deterrent Alarm Module Internal Battery State of Charge	—	OK	The scan tool displays OK or Not OK. This parameter describes the internal battery state of charge in the Power Sounder Content Theft Deterrent Alarm Module.
Rear Closure Unlock Command	—	Inactive	The scan tool displays Active or Inactive. This parameter for the rear closure unlock relay or unlock actuator will display On/Off upon the door being commanded to unlock. Commanded ON is when the Body Control Module energizes the rear closure unlock relay/actuator to unlock the door.
Security Indicator Command	—	Inactive	The scan tool displays Active or Inactive. Security Indicator Command refers to the command that is sent out by the module to turn the lamp (symbolic icon) on which acts as an indicator for the active state of the security system.
Security Siren Command	—	Not Requested	The scan tool displays Not Requested or Disarmed. This is the serial data command to activate the output circuit for the alarm siren. Alarm siren is like a horn, but will activate during a theft event to warn away intruders.
Ultrasonic Intrusion Sensor	—	Disarmed	The scan tool displays Armed or Disarmed. The rear integration module supplies a low side drive output interface to the Intrusion and Inclination Sensor.
Ultrasonic Intrusion Sensor Disable Switch Signal	—	Inactive	The scan tool displays Active or Inactive. This is the switch which enables/disables the Ultrasonic Intrusion Sensor of the vehicle.
Ultrasonic Intrusion Sensor Malfunction	—	No	The scan tool displays Yes or No. This sensor detects an unauthorized opening of the vehicle's cabin by sending and receiving ultrasonic waves. This indicates the state of the sensor to fail to operate normally.

Body Control Module — Electric Power Management Data — Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Vehicle in Service Mode, Vehicle in Park, All Doors Closed			
Battery Current	—	Varies	The scan tool displays Amps. This is the current flowing through the Battery Sensor Module.

Parameter	System State	Expected Value	Description
Battery Saver Mode	—	Off	The scan tool displays Off, Assembly Plant Mode, Transport Mode, or Storage Mode.
Battery Saver Mode Ignition Off - Battery Voltage less than 11.6V	—	False	The scan tool displays True or False. This will set with key off if battery voltage drops below 11.6V
Battery Saver Mode Ignition Off - Battery Voltage less than 12.0V	—	False	The scan tool displays True or False. This will set with key off if battery voltage drops below 12.0V.
Battery Saver Mode Ignition Off - Parasitic Current 100mA or greater	—	False	The scan tool displays True or False. This will set with key off if parasitic current is greater than 100mA.
Battery Saver Mode Ignition Off - Parasitic Current 1A or greater	—	False	The scan tool displays True or False. This will set with key off if parasitic current is greater than 1A.
Fuel Economy Mode	—	Active	The scan tool displays Active or Inactive.
Generator Regulator Setpoint	—	—	The scan tool displays Volts.
Load Shed Reason	—	Varies	The scan tool displays Amp Hour Demand Too High, Regulated Voltage Control, Hybrid/EV Battery State of Charge Low, Low Voltage, Service Tool Request, Battery Save Mode, or None. This provides indication of what is causing vehicle loads to be turned off in an attempt to prolong 12V battery life.
Load Shed Requested	—	—	—
Low-Voltage Battery Previous State of Charge	—	Varies	The scan tool displays percentage (%).
Low-Voltage Battery State of Charge	—	Varies	The scan tool displays percentage (%).
Low-Voltage Battery Temperature	—	Varies	The scan tool displays temperature in Celsius (°C).
Requested Idle Boost Level	—	Varies	The scan tool displays Assembly Plant Mode, Low Temperature, Ah, HVAC Request, Low Voltage, Remote Start, Service Tool Request, or None.
Regulated Voltage Control Mode	—	Varies	The scan tool displays Remote Start, Fuel Economy Mode, Normal, Charge Recovery Mode, Assembly Plant Mode, or Ignition and Start Switch Start.
Stop/Start Mode	—	—	—

Body Control Module — Front Exterior Lighting Data — Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Vehicle in Service Mode, Vehicle in Park, All Doors Closed			
Headlamp Leveling Function	—	Inactive	The scan tool displays Active or Inactive.
Headlamp Leveling Sensor Learn	—	Learn Not Enabled	The scan tool displays Learn Not Enabled, Learning, Learn Successful, or Learn Failed. This parameter indicates the headlamp learns suspension trim position.
Left Headlamp Vertical Motor Command	—	Inactive	This scan tool displays Active or Inactive.
Right Headlamp Vertical Motor Command	—	Inactive	This scan tool displays Active or Inactive.
Left Auxiliary Daytime Running Lamps	—	Off	The scan tool displays On or Off.
Right Auxiliary Daytime Running Lamps	—	Off	The scan tool displays On or Off.
Left Daytime Running Lamps	—	Off	The scan tool displays On or Off.
Right Daytime Running Lamps	—	Off	The scan tool displays On or Off.
Left Front Auxiliary Park Lamp Command	—	Off	The scan tool displays On or Off.
Right Front Auxiliary Park Lamp Command	—	Off	The scan tool displays On or Off.
Left Low Beam Command	—	Inactive	The scan tool displays Active or Inactive.
Right Low Beam Command	—	Inactive	The scan tool displays Active or Inactive.
Left Front Turn Signal Lamp Command	—	Off	The scan tool displays On or Off.
Right Front Turn Signal Lamp Command	—	Off	The scan tool displays On or Off.
Left Front Fog Lamp Command	—	Off	The scan tool displays On or Off.
Right Front Fog Lamp Command	—	Off	The scan tool displays On or Off.
Left Park Lamps Command	—	Off	The scan tool displays On or Off.
Right Park Lamps Command	—	Off	The scan tool displays On or Off.
Left Turn Signal Repeater Lamp Command	—	Off	The scan tool displays On or Off.
Right Turn Signal Repeater Lamp Command	—	Off	The scan tool displays On or Off.
Surround View Exterior Courtesy Lamps Command	—	Off	The scan tool displays On or Off.

Body Control Module — Heated Steering Wheel Data — Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Vehicle in Service Mode, Vehicle in Park, All Doors Closed			
Heated Steering Wheel Indicator	—	Off	The scan tool displays Off, Low, Medium, or High.
Heated Steering Wheel Request Source	—	Switch	The scan tool displays Switch or Remote Vehicle Start.
Heated Steering Wheel Command	—	Off	The scan tool displays Off, Low, Medium, or High.
Heated Steering Wheel Relay	—	Inactive	The scan tool displays Active or Inactive.
Heated Steering Wheel Switch	—	Inactive	The scan tool displays Active or Inactive.
Service Heated Steering Wheel Indicator	—	Inactive	The scan tool displays Active or Inactive.
Heated Steering Wheel Load Reduction	—	Inactive	The scan tool displays Active or Inactive.
Heated Steering Wheel Mode	—	Off	The scan tool displays Off, Remote Vehicle Start, Automatic, or Switch.
Heated Steering Wheel Diagnostic Fault Active - Stuck Switch	—	Inactive	The scan tool displays Active or Inactive.
Heated Steering Wheel	—	Inactive	The scan tool displays Active or Inactive.
Heated Steering Wheel Internal Temperature	—	Off	The scan tool displays Off, Low, Medium, or High.

Body Control Module — HVAC Sensor Data — Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Vehicle in Service Mode, Vehicle in Park, All Doors Closed			
A/C Evaporator Temperature	—	Varies	The scan tool displays temperature in Celsius (°C) or Fahrenheit (°F). This parameter refers to the sensor used to determine the temperature of the air conditioning system's evaporator. The temperature is displayed with a low level of detail.
A/C Evaporator Temperature	—	Varies	The scan tool displays temperature in Celsius (°C) or Fahrenheit (°F). This parameter indicates the temperature (degrees of heat) of the air conditioning system's evaporator.
Ambient Air Temperature	—	Varies	The scan tool displays temperature in Celsius (°C) or Fahrenheit (°F). This parameter indicates the temperature of the air surrounding the vehicle.

Parameter	System State	Expected Value	Description
Humidity Level at the Windshield	—	Varies	The scan tool displays percentage (%). This is the measurement of the amount of moisture near the windshield that is used by the heating, ventilation, air conditioning (HVAC) system to prevent fogging.
Left Front HVAC Mode Status	—	Not Determined	The scan tool displays Not Determined, Off, Auto, Floor, Floor and Vent, Vent, Vent and Windshield, Windshield, Floor and Windshield, or Floor and Vent and Windshield, or Max Defrost. This parameter describes what state the heating, ventilation, air conditioning system is in for the front left area of the vehicle cabin.
Left Front Passenger Compartment Air Temperature	—	Varies	The scan tool displays the amount of heat in the air in the left front area of the interior cabin of the vehicle in Celsius (°C) or Fahrenheit (°F).
Left Rear HVAC Mode Status	—	Not Determined	The scan tool displays Not Determined, Off, Auto, Floor, Floor and Vent, Vent, Vent and Roof, Roof, Roof and Floor, or Floor and Vent and Roof. This parameter describes what state the heating, ventilation, air conditioning system is in for the rear left area of the vehicle cabin.
Passenger Compartment Air Temperature Sensor Voltage	—	Varies	The scan tool displays the voltage of the passenger compartment air temperature sensor in mV.
Passenger Compartment Humidity	—	Varies	The scan tool displays percentage (%). The parameter indicates the amount of water in the air in the passenger compartment.
Rear Lower Duct Air Temperature Sensor Voltage	—	Varies	The scan tool displays Volts. This is a temperature sensor used to monitor the air temperature from the rear floor ducts.
Right Front HVAC Mode Status	—	Not Determined	The scan tool displays Not Determined, Off, Auto, Floor, Floor and Vent, Vent, Vent and Windshield, Windshield, Floor and Windshield, or Floor and Vent and Windshield, or Max Defrost. This parameter describes what state the heating, ventilation, air conditioning system is in for the front right area of the vehicle cabin.
Right Front Passenger Compartment Air Temperature	—	Varies	The scan tool displays the amount of heat in the air in the right front area of the interior cabin of the vehicle in Celsius (°C) or Fahrenheit (°F).

Parameter	System State	Expected Value	Description
Right Rear HVAC Mode Status	—	Not Determined	The scan tool displays Not Determined, Off, Auto, Floor, Floor and Vent, Vent, Vent and Roof, Roof, Roof and Floor, or Floor and Vent and Roof. This parameter describes what state the heating, ventilation, air conditioning system is in for the rear right area of the vehicle cabin.
Sunload Sensor Voltage	—	Varies	The scan tool displays Volts. This is a sensor that detects how warm the sun is shining.
Windshield Temperature	—	Varies	The scan tool displays temperature in Celsius (°C) or Fahrenheit (°F). This parameter detects the temperature of the front window (windshield).

Body Control Module — HVAC System Data — Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Vehicle in Service Mode, Vehicle in Park, All Doors Closed			
A/C Compressor Refrigerant Solenoid Valve Command	—	Varies	The scan tool displays percentage (%).
A/C Compressor Displacement	—	Ready	The scan tool displays Ready, Ramp up, Running, or Ramp down. A variable displacement air conditioning compressor has the ability to change the amount of refrigerant that is pumped into the system (output) while it is running by way of a pulse width modulated (PWM) solenoid. A PWM solenoid will vary the compressor output by using a DC supply voltage that is switched on and off at a given frequency for a modulated period of time (duty cycle). The duty cycle is the “on” time of the voltage and is expressed as a percentage of the time period. This parameter describes the condition in which a variable displacement air conditioning compressor is increasing displacement, holding steady, or decreasing displacement.
A/C Switch	—	Compressor Off	The scan tool displays Compressor Off, Compressor On, or Compressor In Econ. This parameter is used to indicate the status of the signal being sent to the Engine Control Module to turn the A/C on.
Air Quality Sensor	—	Varies	The scan tool displays percentage (%). This is a sensor that measures the amount of contamination, pollution, dirt, odor in the ambient air.

Parameter	System State	Expected Value	Description
Air Quality Recirculation Control	—	Inactive	The scan tool displays Active or Inactive. The recirculation door in an air conditioning system has the ability to either allow fresh air into the vehicle or to pass the existing cabin air back through the air conditioning system. The recirculation door will be closed if the Air Quality Sensor detects oxidizing, reducing, or ammonia gasses and reopens the door when these gasses are no longer detected.
Auxiliary Blower Motor Speed Command	—	Varies	This parameter shows the value (counts) being sent to command the rear blower from the Auxiliary Blower switch on the front panel. This describes the rear blower motor for the HVAC system. This is supplemental to the primary blower fan.
Auxiliary Coolant Pump	—	Inactive	The scan tool displays Active or Inactive. The Auxiliary Coolant Pump refers to a second engine cooling pump that may be devoted to a different function other than for purposes of engine cooling.
Auxiliary Coolant Pump Dry	—	Inactive	The scan tool displays Active or Inactive. This parameter contains the fault information that is communicated by the Electric Auxiliary Coolant Pump over Local Interconnect Network (LIN) to the engine controller. An electric coolant pump circulates engine coolant. This indicates whether the pump was operated without coolant.
Auxiliary Coolant Pump Internal Status	—	Inactive	The scan tool displays Active or Inactive. This parameter contains the fault information that is communicated by the Electric Auxiliary Coolant Pump over Local Interconnect Network (LIN) to the engine controller. An electric coolant pump circulates engine coolant. This indicates whether the pump indicates an internal error.
Auxiliary Coolant Pump Motor Stalled	—	Inactive	The scan tool displays Active or Inactive. This parameter contains the fault information that is communicated by the Electric Auxiliary Coolant Pump over Local Interconnect Network (LIN) to the engine controller. An electric coolant pump circulates engine coolant. This indicates whether the pump has stopped running.

Parameter	System State	Expected Value	Description
Auxiliary Heater Enable Signal	—	Inactive	The scan tool displays Active or Inactive.
Blower Motor Feedback Signal	—	Varies	The scan tool displays percentage (%). The Blower Motor passes air through the heater core and circulates air throughout the passenger compartment. The Blower Motor is controlled by a module. This parameter indicates the Blower Motor operation Feedback Signal received by the module.
Blower Motor Speed	—	Varies	This parameter indicates the commanded HVAC Blower Motor Speed, displayed in percent, that the blower is turning. The blower motor is a motor with a cage attached to force the air through ducts such as heater, ventilation and defrost ducts.
Blower Motor Speed Command	—	Varies	This parameter indicates the commanded HVAC Blower Motor Speed, displayed in percent, that the blower is turning. The blower motor is a motor with a cage attached to force the air through ducts such as heater, ventilation and defrost ducts.
Blower Motor Speed Feedback Signal	—	Normal Function	The scan tool displays Out of Range Low, Stall, Partial Stall, Voltage Out of Range, Normal Function, Motor Over Temperature, Not Used, Mechanical Malfunction, or Out of Range High. The Blower Motor passes air through the heater core and circulates air throughout the passenger compartment. The Blower Motor is controlled by a module. This parameter indicates the Blower Motor operation Feedback Signal received by the module.
Blower Motor Speed Request	—	—	This parameter shows the current state of the switch that turns on the front blower (device that produces a current of air).

Parameter	System State	Expected Value	Description
Calculated A/C Evaporator Air Temperature	—	Varies	The scan tool displays temperature in Celsius (°C). This parameter indicates the calculated temperature (degrees of heat) of the air that is flowing through the evaporator. The temperature is calculated by the HVAC controller using parameters such as outside air temperature, evaporator temperature and compressor status. An evaporator is a device in a process used to turn the liquid form of a chemical substance into its gaseous-form/vapor.
Coolant Heater Control Module Inlet Coolant Temperature	—	Varies	The scan tool displays this parameter Identifier as a value between -40°C and 150°C approximately to reflect Inlet Coolant Temperature into Coolant Heater Control Module, reported by Coolant Heater Control Module.
Coolant Heater Control Module LIN Bus	—	True	The scan tool displays this parameter identifier as False or True. This parameter identifier is indicative of a Signal State of Coolant Heater Operation Enable from Electronic Climate Control to Coolant Heater Control Module on Local Interconnect Network Bus that allows Coolant Heater to Start Diagnostics whether or not Heating is commanded.
Coolant Heater Control Module Status	—	Normal Function	The scan tool displays Normal Function, Temporarily Limited, Recoverable Malfunction, or Non-Recoverable Malfunction. This parameter is used to determine whether the Coolant Heater Control Module is operating normally (Normal Operation) or if there is a problem with a) the Coolant Heater Control Module (scan tool displays only Limited Operation) or b) there is a blockage or restriction in coolant flow (scan tool switches between Normal Running and Limited Operation).
Coolant Heater Control Module Temperature	—	Varies	The scan tool displays temperature in Celsius (°C). This is the temperature inside the coolant heater control module.
Coolant Heater Current	—	Varies	The scan tool displays the present electric current flow value of the coolant heater in amps.

Parameter	System State	Expected Value	Description
Desired Engine Coolant Bypass Valve Position	—	Not Requested	The scan tool displays Not Requested, Bypass, or Connected. This parameter displays the requested target position of the Coolant Bypass Valve.
Engine Coolant Heater Command	—	Varies	The scan tool displays in kW. This is the serial data command to control the device to heat up the coolant in case the engine does not produce enough heat.
Front Blower Motor State	—	Varies	The scan tool displays Not Determined, Off, Auto, Manual, or Manual Max. This parameter indicates the current mode or condition of the front blower motor.
Heater Pump Speed	—	Varies	The scan tool displays the heater pump speed in RPM. This is a coolant pump which circulates heat through the heater core to maintain cabin temperature. While the vehicle is in Autostop, the pump can interrupt the Autosop timing, if the cabin temperature is too low.
HVAC Afterblow	—	Inactive	The scan tool displays Active or Inactive. This parameter displays whether the afterblow function is in a functioning state or not. The afterblow function temporarily turns on the fan after the vehicle is off to dry the evaporator core which will reduce microbial growth and odors. An evaporator is a device in a process used to turn the liquid form of a chemical substance into its gaseous-form/vapor.
HVAC Afterblow - Blower Motor Speed	—	Varies	This parameter displays how fast the fan is running while in an afterblow condition. The fan speed is displayed as steps from 0 to 12 with 0 being off and 12 being the fastest speed. The afterblow function temporarily turns on the fan after the vehicle is off to dry the evaporator core which will reduce microbial growth and odors. An evaporator is a device in a process used to turn the liquid form of a chemical substance into its gaseous-form/vapor.
HVAC Afterblow Configuration	—	—	—

Parameter	System State	Expected Value	Description
HVAC System Heater Core Coolant Flow Rate Feedback	—	Varies	The scan tool displays the coolant flowing rate in L/min. The HVAC System Heater Core contains coolant that flows though the core to heat the vehicle passenger compartment. The system is controlled by a module. This parameter indicates the coolant flow rate through the heater core requested by the module.
HVAC System Heater Core Coolant Flow Rate Request	—	Varies	The scan tool displays the coolant flowing rate in L/s. The HVAC System Heater Core contains coolant that flows though the core to heat the vehicle passenger compartment. The system is controlled by a module. This parameter indicates the coolant flow rate through the heater core requested by the module.
Rear Defogger Activated by Automatic	—	Yes	The Auto Rear Defogger (heating wires in the glass) can automatically activate if the ambient temperature is below 5°C. This parameter has the states Yes/No.
Rear Defogger Command	—	—	—
Rear Defogger Deactivation Reason	—	—	—
Rear Defogger Indicator	—	—	—
Rear Defogger Mode	—	—	—
Rear Defogger On Time Remaining	—	—	—
Rear Defogger Relay Command	—	—	—
Rear Defogger Status	—	—	—
Rear Defogger Switch	—	—	—
Sun Azimuth	—	—	—
Sun Elevation	—	—	—

Body Control Module — HVAC Door Position Data 1 — Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Vehicle in Service Mode, Vehicle in Park, All Doors Closed			
Air Recirculation Door Actuator Command	—	Varies	This is the serial data command to move the flap of the Recirculation Door, in counts or pulses, for a HVAC system door. Recirculation is using inside air for the HVAC system, instead of outside fresh air.

Parameter	System State	Expected Value	Description
Left Temperature Door Position Command	—	Varies	The scan tool displays percentage (%). This is the serial data command to control the actual position (angle) of the flap that controls the air flow (and therefore the air temperature) through the left heater core.
Low Speed Pollution Taking Recirc Action	—	—	—

Body Control Module — HVAC Door Position Data 2 — Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Vehicle in Service Mode, Vehicle in Park, All Doors Closed			
Right Temperature Door Position Command	—	Varies	The scan tool displays percentage (%). This is the serial data command to move the position (angle) of the flap that controls the air flow (and therefore the air temperature) through the right heater core.

Body Control Module — HVAC Faceplate Data — Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Vehicle in Service Mode, Vehicle in Park, All Doors Closed			
Air Recirculation Door Position	—	Varies	The scan tool displays the command status of the HVAC control module recirculation switch: Not Determined, Auto, Fresh Air, or Recirc. The mode of recirculation means the air inside the vehicle is recirculated rather than drawn from outside.
Air Quality Sensor Switch	—	Off	The scan tool displays Off, Low Sensitivity, or Hi Sensitivity. This parameter describes the switch state of the Air Quality Sensor on the HVAC Faceplate.
Auxiliary Blower Motor Switch	—	Off	The scan tool displays Not Determined, Off, Auto, Manual, or Manual Max. This parameter reflects the current state of the switch in the rear of the vehicle that controls the rear blower. This describes the rear blower motor for the HVAC system. This is supplemental to the primary blower fan.

Parameter	System State	Expected Value	Description
Desired Left Temperature	—	Varies	The scan tool displays Temp Set Off, Temp Set Normal, Temp Set Low, or Temp Set Hi. This parameter displays the setting of left temperature.
Desired Right Temperature	—	Varies	The scan tool displays Temp Set Off, Temp Set Normal, Temp Set Low, or Temp Set Hi. This parameter displays the setting of right temperature.

Body Control Module — Hybrid/EV Data — Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Vehicle in Service Mode, Vehicle in Park, All Doors Closed			
Coolant Heater Control Module Temperature	—	Varies	The scan tool displays temperature in Celsius (°C). This is the temperature inside the coolant heater control module.

Body Control Module — Indicator Data — Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Vehicle in Service Mode, Vehicle in Park, All Doors Closed			
Child Security Lock Indicator command	—	Off	The scan tool displays On or Off.
Lane Departure Warning Indicator Status	—	Off	The scan tool displays On or Off.
Security Indicator Command	—	Off	The scan tool displays On or Off.

Body Control Module — Interior Lighting Data — Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Vehicle in Service Mode, Vehicle in Park, All Doors Closed			
Cargo Lamp Command	—	Inactive	The scan tool displays Active or Inactive.
Cargo Lamp Indicator	—	Inactive	The scan tool displays Active or Inactive.
Cargo Mirror Lamp	—	Inactive	The scan tool displays Active or Inactive.
Dome Lamp Command	—	Off	The scan tool displays On or Off.
Door Ambient Lighting Command	—	Off	The scan tool displays On or Off.
Front Courtesy Lamps	—	Inactive	The scan tool displays Active or Inactive.
Front Footwell Ambient Lighting Command	—	Off	The scan tool displays On or Off.
Instrument Panel Ambient Lighting Command	—	Off	The scan tool displays On or Off.
Interior Courtesy Lamps Command	—	Inactive	The scan tool displays Active or Inactive.

Parameter	System State	Expected Value	Description
Left Turn Signal Switch	—	Inactive	The scan tool displays Active or Inactive.
Right Turn Signal Switch	—	Inactive	The scan tool displays Active or Inactive.
Overhead Ambient Lighting Command	—	Off	The scan tool displays On or Off.
Park Lamps Indicator	—	Inactive	The scan tool displays Active or Inactive.
Rear Footwell Ambient Lighting Command	—	Off	The scan tool displays On or Off.
Welcome Lighting	—	Off	The scan tool displays On or Off.

Body Control Module — Keyless Entry Data — Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Vehicle in Service Mode, Vehicle in Park, All Doors Closed			
Current Number of Key Fobs Programmed	—	Varies	This parameter indicates how many transmitters have been learned to the Body Control Module currently.
Key Fob Identifier	—	Varies	This parameter refers to the part number of key fob or transmitter being placed in the backup pocket location that uses the radio transmitter inside a vehicle key used to control the central door locking via button presses.
Key Fob 1 Malfunction	—	No	The scan tool displays Yes or No. This parameter indicates a fault in transmitter # 1.
Key Fob 2 Malfunction	—	No	The scan tool displays Yes or No. This parameter indicates a fault in transmitter # 2.
Key Fob 3 Malfunction	—	No	The scan tool displays Yes or No. This parameter indicates a fault in transmitter # 3.
Key Fob 4 Malfunction	—	No	The scan tool displays Yes or No. This parameter indicates a fault in transmitter # 4.
Key Fob 5 Malfunction	—	No	The scan tool displays Yes or No. This parameter indicates a fault in transmitter # 5.
Key Fob 6 Malfunction	—	No	The scan tool displays Yes or No. This parameter indicates a fault in transmitter # 6.
Key Fob 7 Malfunction	—	No	The scan tool displays Yes or No. This parameter indicates a fault in transmitter # 7.
Key Fob 8 Malfunction	—	No	The scan tool displays Yes or No. This parameter indicates a fault in transmitter # 8.
Number of Key Fobs Learned	—	Varies	This parameter indicates how many transmitters have been programmed to the Keyless Entry Control Module.

Parameter	System State	Expected Value	Description
Total Key Fobs Erased	—	Off	This parameter indicates the number of transmitters erased from the Body Control Module memory.
Passive Entry Disabled Due to Lack of Motion Counter	—	Varies	This parameter indicates the count value of the passive entry inhibited due to no key fob or transmitter movement.
Passive Start Disabled Due to Excessive Motion Counter	—	Varies	This parameter indicates the count value of the passive start inhibited due to large key fob or transmitter movement.
Passive Start Diabled Due to Lack of Motion Counter	—	Varies	This parameter indicates the count value of the passive start inhibited due to no key fob or transmitter movement.

Body Control Module — Outside Rear View Mirror Data — Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Vehicle in Service Mode, Vehicle in Park, All Doors Closed			
Mirror Folding	—	Inactive	The scan tool displays Inactive, Fold, or Unfold.
Mirror Select Switch	—	Not Active	The scan tool displays Active or Inactive.

Body Control Module — Power Mode Data — Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Vehicle in Service Mode, Vehicle in Park, All Doors Closed			
Accessory/Retained Accessory Power Relay Command	—	Inactive	The scan tool displays Active or Inactive.
Backup Run/Crank Relay Command	—	Inactive	The scan tool displays Active or Inactive.
Backup System Power Mode	—	Off	The scan tool displays Off, Accessory, Run, Start, or Propulsion Active. This parameter indicates Power Mode determined by Serial Data Gateway Module.
Battery Saver Mode	—	Off	The scan tool displays Off, Assembly Plant Mode, Transport Mode, or Storage Mode.
Ignition Switch Status	—	Varies	The scan tool displays Short to Ground, Active, Inactive, or Open/Short to Battery.
Power Mode	—	Varies	The scan tool displays Off, Accessory, Run, Start, or Propulsion Active. This parameter indicates the current power mode of the module.

Parameter	System State	Expected Value	Description
Power Mode Timeout	—	Disable	The scan tool displays Enable or Disable. This parameter disables or enables the power mode timeout function (not whether timer is active or inactive) and indicates whether or not the power mode timeout function has been disabled allowing to stay in power mode indefinitely (not whether timer is active or inactive).
Run/Crank Relay Command	—	Inactive	The scan tool displays Active or Inactive.
Run Relay Command	—	Inactive	The scan tool displays Active or Inactive.

Body Control Module — Rear Exterior Lighting Data — Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Vehicle in Service Mode, Vehicle in Park, All Doors Closed			
Backup Lamps	—	Off	The scan tool displays On or Off.
Center High Mounted Stop Lamp	—	Off	The scan tool displays On or Off.
Hands-Free Liftgate Sensor Lamp	—	Off	The scan tool displays On or Off.
Left Stop Lamp Command	—	Off	The scan tool displays On or Off.
Right Stop Lamp Command	—	Off	The scan tool displays On or Off.
Left Tail Lamp	—	Off	The scan tool displays On or Off.
Right Tail Lamp	—	Off	The scan tool displays On or Off.
Left Auxiliary Tail Lamp	—	Off	The scan tool displays On or Off.
Right Auxiliary Tail Lamp	—	Off	The scan tool displays On or Off.
Left Rear Turn Signal Lamp Command	—	Off	The scan tool displays On or Off.
Right Rear Turn Signal Lamp Command	—	Off	The scan tool displays On or Off.
Left Trailer Turn Signal/Stop Lamp Command	—	Off	The scan tool displays On or Off.
Right Trailer Turn Signal/Stop Lamp Command	—	Off	The scan tool displays On or Off.
License Plate Lamps Command	—	Off	The scan tool displays On or Off.
Rear Fog Lamp Command	—	Off	The scan tool displays On or Off.
Tail Lamps	—	Off	The scan tool displays On or Off.
Trailer Backup Lamps Command	—	Off	The scan tool displays On or Off.

Body Control Module — Rear HVAC Data — Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Vehicle in Service Mode, Vehicle in Park, All Doors Closed			
Lower Rear Duct Temperature	—	Varies	The scan tool displays temperature in Celsius (°C). This is the temperature reading in the HVAC air routing system.
Upper Rear Duct Temperature	—	Varies	The scan tool displays temperature in Celsius (°C). This is the temperature reading in the HVAC air routing system.

Body Control Module — Remote Vehicle Start Data — Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Vehicle in Service Mode, Vehicle in Park, All Doors Closed			
Engine Stalled During Remote Vehicle Start Mode	—	Varies	This parameter indicates the number of times the engine was stalled or unexpectedly stops running. This is part of the Remote Vehicle Start subsystem that disables remote start.
Park Lamps Request	—	No	The scan tool displays Yes or No. This parameter refers to the state (on or off) of the electronic request to illuminate the lamps located on the exterior four corners of the vehicle.
Remote Vehicle Start Disabled By Driver	—	Varies	This parameter determines if remote vehicle start was turned off by the driver. Remote start is activated by pressing a button on the key fob which allows the engine to start when the key fob is several yards from the vehicle.
Remote Vehicle Start Request	—	No	The scan tool displays Yes or No. This parameter displays the On / Off position or status for the remote start functionality.
Remote Vehicle Start Source	—	None	The scan tool displays None, Key Fob 1, Key Fob 2, Key Fob 3, Enhanced Services, or Virtual Key. This parameter indicates which key fob was used for Remote Vehicle Start such as husband, wife, child, Onstar, bluetooth, etc...
Remote Vehicle Start Status	—	Inactive	The scan tool displays Yes or No. This parameter indicates the state of remote start which is activated by pressing a button on the key fob which allows the engine to start when the key fob is several yards from the vehicle. States are active or inactive.

Parameter	System State	Expected Value	Description
Remote Vehicle Start Timer	—	Varies	This parameter indicates the amount of time the engine will run after a remote start request. One additional request is allowed which will reset the timer once. The scan tool displays time remaining in seconds.
Run/Crank Relay Command	—	None	The scan tool displays None, Active, or Deactive. This parameter indicates the state (off or on) of command for an ignition relay control circuit. "Run" means engine is started and keeps going, and "crank" engages the starter when the key in the ignition switch turns making engine turn over.
Turn Signal Lamps Request	—	No	The scan tool displays Yes or No. This parameter indicates the request for the turn signal lamps to flash during a remote start request and remain on for visual confirmation the remote start is functioning.

Body Control Module — Remote Vehicle Start Disable History Data — Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Vehicle in Service Mode, Vehicle in Park, All Doors Closed			
Remote Vehicle Start Disable History 1	—	Varies	The scan tool displays Valet Mode, Run Abort, Ignition Switch Status, Hood Open Switch Signal Invalid, Hood Open Switch, Hazard Lamps Switch, Key Fob in Vehicle, Crank Abort, Brake Transmission Shift Interlock Solenoid Actuator, Content Theft Deterrent Mode, Power Mode Incorrect, Battery Voltage, Remote Vehicle Start Crank Time, or Folding Top Position. This parameter indicates one of the last eight reasons the powertrain has disabled the remote vehicle start.

Parameter	System State	Expected Value	Description
Remote Vehicle Start Disable History 2	—	Varies	The scan tool displays Valet Mode, Run Abort, Ignition Switch Status, Hood Open Switch Signal Invalid, Hood Open Switch, Hazard Lamps Switch, Key Fob in Vehicle, Crank Abort, Brake Transmission Shift Interlock Solenoid Actuator, Content Theft Deterrent Mode, Power Mode Incorrect, Battery Voltage, Remote Vehicle Start Crank Time, or Folding Top Position. This parameter indicates one of the last eight reasons the powertrain has disabled the remote vehicle start.
Remote Vehicle Start Disable History 3	—	Varies	The scan tool displays Valet Mode, Run Abort, Ignition Switch Status, Hood Open Switch Signal Invalid, Hood Open Switch, Hazard Lamps Switch, Key Fob in Vehicle, Crank Abort, Brake Transmission Shift Interlock Solenoid Actuator, Content Theft Deterrent Mode, Power Mode Incorrect, Battery Voltage, Remote Vehicle Start Crank Time, or Folding Top Position. This parameter indicates one of the last eight reasons the powertrain has disabled the remote vehicle start.

Body Control Module — Seat Heating/Venting/Cooling Data — Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Vehicle in Service Mode, Vehicle in Park, All Doors Closed			
Seat Heating/Venting/Cooling Load Shed	—	Inactive	The scan tool displays Active or Inactive. When this parameter is active, it indicates the Heating/Venting/Cooling system is shutdown to reduce strain on the vehicle electrical system which is experiencing too high of a current draw.
Left Front Seat Heating/Venting/Cooling Operating Conditions	—	Varies	The scan tool displays Remote Vehicle Start, Automatic, Manual, or Autostop Request. The functional behavior of heated seats is dependent on its determined operational state. This parameter indicates the defined state which it is operating in.

Parameter	System State	Expected Value	Description
Left Front Seat Heating/ Venting/Cooling Requested Mode	—	Varies	The scan tool displays Off, Seat Back Heating, Seat Back and Cushion Heating, or Seat Venting/Cooling. This parameter indicates the type of Heated/Vented Seat function being requested, as determined by the Body Control Module tracking various inputs.
Left Front Seat Heating/ Venting/Cooling Requested Level	—	Varies	The scan tool displays Off, High, Medium, or Low. This parameter indicates the type of Heated/Vented Seat level of intensity being requested as determined by the Body Control Module tracking various inputs.
Left Front Seat Heating/ Venting/Cooling Mode	—	Varies	The scan tool displays Off, Seat Back Heating, Seat Back and Cushion Heating, or Seat Venting/Cooling. This parameter indicates the type of Heated/Vented Seat function being applied as commanded by the Body Control Module software based on a number of factors.
Left Front Seat Heating/ Venting/Cooling Level	—	Varies	The scan tool displays Off, High, Medium, or Low. This parameter indicates the type of Heated/Vented Seat level of intensity being applied as commanded by the Body Control Module software based on a number of factors.
Left Front Seat Blower Command	—	Inactive	The scan tool displays Active or Inactive. This parameter can be used for setting various blower speeds but service tool will only turn on high to verify module outputs and fan operation.
Right Front Seat Heating/ Venting/Cooling Operating Conditions	—	Varies	The scan tool displays Remote Vehicle Start, Automatic, Manual, or Autostop Request. The functional behavior of heated seats is dependent on its determined operational state. This parameter indicates the defined state which it is operating in.
Right Front Seat Heating/ Venting/Cooling Requested Mode	—	Varies	The scan tool displays Off, Seat Back Heating, Seat Back and Cushion Heating, or Seat Venting/Cooling. This parameter indicates the type of Heated/Vented Seat function being requested, as determined by the Body Control Module tracking various inputs.

Parameter	System State	Expected Value	Description
Right Front Seat Heating/ Venting/Cooling Requested Level	—	Varies	The scan tool displays Off, High, Medium, or Low. This parameter indicates the type of Heated/Vented Seat level of intensity being requested as determined by the Body Control Module tracking various inputs.
Right Front Seat Heating/ Venting/Cooling Mode	—	Varies	The scan tool displays Off, Seat Back Heating, Seat Back and Cushion Heating, or Seat Venting/Cooling. This parameter indicates the type of Heated/Vented Seat function being applied as commanded by the Body Control Module software based on a number of factors.
Right Front Seat Heating/ Venting/Cooling Level	—	Varies	The scan tool displays Off, High, Medium, or Low. This parameter indicates the type of Heated/Vented Seat level of intensity being applied as commanded by the Body Control Module software based on a number of factors.
Right Front Seat Blower Command	—	Inactive	The scan tool displays Active or Inactive. This parameter can be used for setting various blower speeds but service tool will only turn on high to verify module outputs and fan operation.

Body Control Module — Sunroof Data — Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Vehicle in Service Mode, Vehicle in Park, All Doors Closed			
Sunroof Closed	—	Yes	The scan tool displays Yes or No. This parameter indicates that sunroof is not open. The sunroof is a fixed or operable opening in an automobile roof which allows light and/or fresh air to enter the passenger compartment.
Sunroof Open	—	Yes	The scan tool displays Yes or No. This parameter indicates the sunroof state that it is not closed. The sunroof is a fixed or operable opening in an automobile roof which allows light and/or fresh air to enter the passenger compartment.
Sunroof Switch	—	Varies	The scan tool displays Inactive, Open, Close, or Stop. This is the switch to move the sunroof.
Sunroof Switch Fault	—	Varies	The scan tool displays Short to Ground, Short to Battery, Stuck, or None.

Parameter	System State	Expected Value	Description
Sunroof Not Learned	—	No	The scan tool displays Yes or No. This parameter indicates that the control module has not learned the sunroof (the glass) home position.
Sunroof Motor Overtemperature	—	No	The scan tool displays Yes or No. This parameter indicates that the motor that operates the sunroof motor is too hot to operate properly.
Sunroof Obstruction	—	No	The scan tool displays Yes or No. This parameter indicates that an obstruction is detected which prevents the movement of the sunroof.
Sunroof System Voltage Low	—	No	The scan tool displays Yes or No. This parameter indicates the sunroof performance is degraded due to voltage being below a certain threshold.
Sunroof Vent	—	No	The scan tool displays Yes or No. This parameter indicates the sunroof is partially open.
Sunshade Closed	—	Yes	The scan tool displays Yes or No.
Sunshade Open	—	Yes	The scan tool displays Yes or No.
Sunshade Switch	—	Varies	The scan tool displays Inactive, Open, Close, or Stop. This is the switch to move the sunshade (the non-transparent cover below the sunroof).
Sunshade Switch Fault	—	Varies	The scan tool displays Short to Ground, Short to Battery, Stuck, or None.
Sunshade Not Learned	—	No	The scan tool displays Yes or No. This parameter indicates that the sunshade position is not learned.
Sunshade Motor Overtemperature	—	Inactive	The scan tool displays Active or Inactive. This parameter indicates that the motor that operates the sunshade is too hot to operate properly.
Sunshade Obstruction	—	No	The scan tool displays Yes or No. This parameter indicates that an obstruction is detected which prevents the movement of the sunshade.
Sunshade System Voltage Low	—	No	The scan tool displays Yes or No. This parameter indicates that the sunshade performance is degraded due to voltage being below a certain threshold.

Body Control Module — Tire Pressure Monitoring Sensor Data — Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Vehicle in Service Mode, Vehicle in Park, All Doors Closed			
Left Front Tire Pressure Sensor Identification	—	Varies	This parameter refers to the part number of the electronic device that measures the force of air on the interior surface of the left, front tire.
Left Front Tire Pressure Sensor Battery Status	—	Normal (or Okay)	The scan tool displays Okay/ Normal or Not Okay/ Low Voltage. This parameter displays the state of the power supply (battery) for the left front tire pressure sensor which is an electronic device that measures the force of air on the interior surface of the tire.
Left Front Tire Pressure Sensor Status	—	Okay	The scan tool displays Okay or Not Okay. This parameter displays different types of sensor faults. The tire pressure sensors are mounted inside a tire assembly on valve stems or wheel rims.
Left Front Tire Pressure Sensor Signal Strength	—	Varies	The tire pressure monitoring system detects a pressure loss at the tires. Each wheel is equipped with a pressure sensor to measure the pressure and temperature. This parameter displays the signal strength of the sensor as a numeric value between 0 and 1023.
Left Front Tire Pressure Sensor Timer	—	Varies	This parameter provides the diagnostic timers for the tire pressure sensors on 4 corners. The timer for a tire pressure sensor at a particular corner/location increments when the Body Control Module has not received a transmission from that sensor and the vehicle speed is above 40 km/h. Once the Body Control Module receives a transmission from a tire pressure sensor at a particular corner/location, the timer for that sensor resets to 0 ms. Once the timer reaches 1020000 ms (or 1020 s), a “too few pulses” DTC for that sensor will be set.
Left Front Tire Pressure Signal Frame Count	—	Varies	This is the number of data frames the tire pressure sensor is transmitting while driving.
Left Front Tire Pressure Signal Packet Count	—	Varies	This is the number of packet counts the tire pressure sensor is transmitting while driving.

Parameter	System State	Expected Value	Description
Left Front Tire Sensor Status	—	Normal Function	The scan tool displays Normal Function, Internal Malfunction, Too Few Pulses, or Battery Voltage Too Low. This parameter displays different types of sensor faults. The tire pressure sensors are mounted inside a tire assembly on valve stems or wheel rims.
Left Rear Tire Pressure Sensor Identification	—	Varies	This parameter refers to the part number of the electronic device that measures the force of air on the interior surface of the left, rear tire.
Left Rear Tire Pressure Sensor Battery Status	—	Normal (or Okay)	The scan tool displays Okay/ Normal or Not Okay/ Low Voltage. This parameter displays the state of the power supply (battery) for the left rear tire pressure sensor which is an electronic device that measures the force of air on the interior surface of the tire.
Left Rear Tire Pressure Sensor Status	—	Okay	The scan tool displays Okay or Not Okay. This parameter displays different types of sensor faults. The tire pressure sensors are mounted inside a tire assembly on valve stems or wheel rims.
Left Rear Tire Pressure Sensor Signal Strength	—	Varies	The tire pressure monitoring system detects a pressure loss at the tires. Each wheel is equipped with a pressure sensor to measure the pressure and temperature. This parameter displays the signal strength of the sensor as a numeric value between 0 and 1023.
Left Rear Tire Pressure Sensor Timer	—	Varies	This parameter provides the diagnostic timers for the tire pressure sensors on 4 corners. The timer for a tire pressure sensor at a particular corner/location increments when the Body Control Module has not received a transmission from that sensor and the vehicle speed is above 40 km/h. Once the Body Control Module receives a transmission from a tire pressure sensor at a particular corner/location, the timer for that sensor resets to 0 ms. Once the timer reaches 1020000 ms (or 1020 s), a “too few pulses” DTC for that sensor will be set.
Left Rear Tire Pressure Signal Frame Count	—	Varies	This is the number of data frames the tire pressure sensor is transmitting while driving.

Parameter	System State	Expected Value	Description
Left Rear Tire Pressure Signal Packet Count	—	Varies	This is the number of packet counts the tire pressure sensor is transmitting while driving.
Left Rear Tire Sensor Status	—	Normal Function	The scan tool displays Normal Function, Internal Malfunction, Too Few Pulses, or Battery Voltage Too Low. This parameter displays different types of sensor faults. The tire pressure sensors are mounted inside a tire assembly on valve stems or wheel rims.
Right Front Tire Pressure Sensor Identification	—	Varies	This parameter will display the six digit identification number of the sensor indicated which is an electronic device that measures the force of air on the interior surface of the tire.
Right Front Tire Pressure Sensor Battery Status	—	Normal (or Okay)	The scan tool displays Okay/ Normal or Not Okay/ Low Voltage. This parameter displays the state of the power supply (battery) for the right front tire pressure sensor which is an electronic device that measures the force of air on the interior surface of the tire.
Right Front Tire Pressure Sensor Status	—	Okay	The scan tool displays Okay or Not Okay. This parameter displays different types of sensor faults. The tire pressure sensors are mounted inside a tire assembly on valve stems or wheel rims.
Right Front Tire Pressure Sensor Signal Strength	—	Varies	The tire pressure monitoring system detects a pressure loss at the tires. Each wheel is equipped with a pressure sensor to measure the pressure and temperature. This parameter displays the signal strength of the sensor as a numeric value between 0 and 1023.
Right Front Tire Pressure Sensor Timer	—	Varies	This parameter provides the diagnostic timers for the tire pressure sensors on 4 corners. The timer for a tire pressure sensor at a particular corner/location increments when the Body Control Module has not received a transmission from that sensor and the vehicle speed is above 40 km/h. Once the Body Control Module receives a transmission from a tire pressure sensor at a particular corner/location, the timer for that sensor resets to 0 ms. Once the timer reaches 1020000 ms (or 1020 s), a “too few pulses” DTC for that sensor will be set.

Parameter	System State	Expected Value	Description
Right Front Tire Pressure Signal Frame Count	—	Varies	This is the number of data frames the tire pressure sensor is transmitting while driving.
Right Front Tire Pressure Signal Packet Count	—	Varies	This is the number of packet counts the tire pressure sensor is transmitting while driving.
Right Front Tire Sensor Status	—	Normal Function	The scan tool displays Normal Function, Internal Malfunction, Too Few Pulses, or Battery Voltage Too Low. This parameter displays different types of sensor faults. The tire pressure sensors are mounted inside a tire assembly on valve stems or wheel rims.
Right Rear Tire Pressure Sensor Identification	—	Varies	This parameter will display the six digit identification number of the sensor indicated which is an electronic device that measures the force of air on the interior surface of the tire.
Right Rear Tire Pressure Sensor Battery Status	—	Normal (or Okay)	The scan tool displays Okay/ Normal or Not Okay/ Low Voltage. This parameter displays the state of the power supply (battery) for the right rear tire pressure sensor which is an electronic device that measures the force of air on the interior surface of the tire.
Right Rear Tire Pressure Sensor Status	—	Okay	The scan tool displays Okay or Not Okay. This parameter displays different types of sensor faults. The tire pressure sensors are mounted inside a tire assembly on valve stems or wheel rims.
Right Rear Tire Pressure Sensor Signal Strength	—	Varies	The tire pressure monitoring system detects a pressure loss at the tires. Each wheel is equipped with a pressure sensor to measure the pressure and temperature. This parameter displays the signal strength of the sensor as a numeric value between 0 and 1023.

Parameter	System State	Expected Value	Description
Right Rear Tire Pressure Sensor Timer	—	Varies	This parameter provides the diagnostic timers for the tire pressure sensors on 4 corners. The timer for a tire pressure sensor at a particular corner/location increments when the Body Control Module has not received a transmission from that sensor and the vehicle speed is above 40 km/h. Once the Body Control Module receives a transmission from a tire pressure sensor at a particular corner/location, the timer for that sensor resets to 0 ms. Once the timer reaches 1020000 ms (or 1020 s), a “too few pulses” DTC for that sensor will be set.
Right Rear Tire Pressure Signal Frame Count	—	Varies	This is the number of data frames the tire pressure sensor is transmitting while driving.
Right Rear Tire Pressure Signal Packet Count	—	Varies	This is the number of packet counts the tire pressure sensor is transmitting while driving.
Right Rear Tire Sensor Status	—	Normal Function	The scan tool displays Normal Function, Internal Malfunction, Too Few Pulses, or Bat-tery Voltage Too Low. This parameter displays different types of sensor faults. The tire pressure sensors are mounted inside a tire assembly on valve stems or wheel rims.

Body Control Module — Tire Pressure Monitoring System Data — Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Vehicle in Service Mode, Vehicle in Park, All Doors Closed			
Left Front Tire Pressure	—	Varies	Tire pressure is a measure of the amount of air in a vehicle's tires, in pounds per square inch (PSI). This parameter is the amount of pressure present in the front of the vehicle on the left side.
Left Front Tire Pressure Sensor Mode	—	Varies	The scan tool displays Learn Mode - Remotely Triggered, Undefined, Re-Measure, Drive Mode, Power Down, Wake-Up, or Learn Mode - Pressure Triggered. This parameter refers to the operational level of the electronic device that measures the force of air on the interior surface of the left front tire.
Left Front Tire Pressure Status	—	Varies	The scan tool displays Unknown, Nominal, Very Low Pressure, Low, Weak Signal, or High. This parameter indicates the state of the tire based on tire pressure.

Parameter	System State	Expected Value	Description
Left Front Tire Temperature	—	Varies	The tire pressure monitoring system detects a pressure loss at the tires. Each wheel is equipped with a pressure sensor to measure the pressure and temperature. This parameter displays the temperature of the tire.
Left Rear Tire Pressure	—	Varies	Tire pressure is a measure of the amount of air in a vehicle's tires, in pounds per square inch (PSI). This parameter is the amount of pressure present in the rear of the vehicle on the left side.
Left Rear Tire Pressure Sensor Mode	—	Varies	The scan tool displays Learn Mode - Remotely Triggered, Undefined, Re-Measure, Drive Mode, Power Down, Wake-Up, or Learn Mode - Pressure Triggered. This parameter refers to the operational level of the electronic device that measures the force of air on the interior surface of the left rear tire.
Left Rear Tire Pressure Status	—	Varies	The scan tool displays Unknown, Nominal, Very Low Pressure, Low, Weak Signal, or High. This parameter identifies status of left rear tire pressure.
Left Rear Tire Temperature	—	Varies	The tire pressure monitoring system detects a pressure loss at the tires. Each wheel is equipped with a pressure sensor to measure the pressure and temperature. This parameter displays the temperature of the tire.
Right Front Tire Pressure	—	Varies	Tire pressure is a measure of the amount of air in a vehicle's tires, in pounds per square inch (PSI). This parameter is the amount of pressure present in the front of the vehicle on the right side.
Right Front Tire Pressure Sensor Mode	—	Varies	The scan tool displays Learn Mode - Remotely Triggered, Undefined, Re-Measure, Drive Mode, Power Down, Wake-Up, or Learn Mode - Pressure Triggered. This parameter refers to the operational level of the electronic device that measures the force of air on the interior surface of the right front tire.
Right Front Tire Pressure Status	—	Varies	The scan tool displays Unknown, Nominal, Very Low Pressure, Low, Weak Signal, or High. This parameter indicates the state of the tire based on tire pressure.

Parameter	System State	Expected Value	Description
Right Front Tire Temperature	—	Varies	The tire pressure monitoring system detects a pressure loss at the tires. Each wheel is equipped with a pressure sensor to measure the pressure and temperature. This parameter displays the temperature of the tire.
Right Rear Tire Pressure	—	Varies	Tire pressure is a measure of the amount of air in a vehicle's tires, in pounds per square inch (PSI). This parameter is the amount of pressure present in the rear of the vehicle on the right side.
Right Rear Tire Pressure Sensor Mode	—	Varies	The scan tool displays Learn Mode - Remotely Triggered, Undefined, Re-Measure, Drive Mode, Power Down, Wake-Up, or Learn Mode - Pressure Triggered. This parameter refers to the operational level of the electronic device that measures the force of air on the interior surface of the right rear tire.
Right Rear Tire Pressure Status	—	Varies	The scan tool displays Unknown, Nominal, Very Low Pressure, Low, Weak Signal, or High. This parameter indicates the state of the tire based on tire pressure.
Right Rear Tire Temperature	—	Varies	The tire pressure monitoring system detects a pressure loss at the tires. Each wheel is equipped with a pressure sensor to measure the pressure and temperature. This parameter displays the temperature of the tire.
Last Tire Fill Alert Notification	—	Varies	The scan tool displays Left Rear Inner, Left Rear Outer, Right Rear Outer, Left Front, Right Rear Inner, Spare, Unknown, or Right Front. Tire Fill Alert is a software feature that indicates when a predetermined pressure level is reached performed on the last tire.
Tire Fill Alert System State - Current	—	Varies	The scan tool displays Non Monitor, Monitoring, Active, or Achieved. Tire Fill Alert is software feature in the Tire Pressure Module system. Basically, the Tire Pressure Module system enables the High Pressure Warnings when the air pressure level goes higher than target pressure level. This parameter indicates the immediate status of the system in the present power cycle.

Parameter	System State	Expected Value	Description
Tire Fill Alert System State - Previous	—	Varies	The scan tool displays Non Monitor, Monitoring, Active, or Achieved. Tire Fill Alert is software feature in the Tire Pressure Module System. Basically, the Tire Pressure Module system enables the High Pressure Warnings when the air pressure level goes higher than target pressure level. This parameter indicates the status in the former power cycle.
Self Auto Learn Status - Left Front Sensor	—	Inactive	The scan tool displays Active or Inactive. For vehicles with Self Auto Learn capable sensors, this parameter is used to define transmission during rolling Self Auto Learn state. A value of 1 means Self Auto Learn rolling state is Active and a value of 0 sets for all other non Self Auto Learn transmissions.
Self Auto Learn Status - Left Rear Sensor	—	Inactive	The scan tool displays Active or Inactive. For vehicles with Self Auto Learn capable sensors, this parameter is used to define transmission during rolling Self Auto Learn state. A value of 1 means Self Auto Learn rolling state is Active and a value of 0 sets for all other non Self Auto Learn transmissions.
Self Auto Learn Status - Right Front Sensor	—	Inactive	The scan tool displays Active or Inactive. For vehicles with Self Auto Learn capable sensors, this parameter is used to define transmission during rolling Self Auto Learn state. A value of 1 means Self Auto Learn rolling state is Active and a value of 0 sets for all other non Self Auto Learn transmissions.
Self Auto Learn Status - Right Rear Sensor	—	Inactive	The scan tool displays Active or Inactive. For vehicles with Self Auto Learn capable sensors, this parameter is used to define transmission during rolling Self Auto Learn state. A value of 1 means Self Auto Learn rolling state is Active and a value of 0 sets for all other non Self Auto Learn transmissions.

Body Control Module — Windows Data — Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Vehicle in Service Mode, Vehicle in Park, All Doors Closed			
All Windows Up/Down	—	Close	The scan tool displays Open or Close.
Driver Window Learned	—	Yes	The scan tool displays Yes or No.

Parameter	System State	Expected Value	Description
Driver Window Motor Relay Fault Status	—	OK	This scan tool displays OK or Malfunction.
Left Front Window Express Down	—	Inactive	The scan tool displays Active or Inactive.
Left Front Window Express Up	—	Inactive	The scan tool displays Active or Inactive.
Left Front Window Learned Indicator	—	Not Active	The scan tool displays Active or Not Active.
Left Front Window Lockout Status	—	Inactive	The scan tool displays Active or Inactive.
Left Front Window Motor Current	—	Varies	The scan tool displays left front window motor current in amperes (A).
Left Front Window Switch	—	Inactive	The scan tool displays Inactive, Up, Express Up, Down, Express Down, or Stop.
Left Rear Window Express Up	—	Inactive	The scan tool displays Active or Inactive.
Left Rear Window Express Down	—	Inactive	The scan tool displays Active or Inactive.
Left Rear Window Learned	—	Yes	The scan tool displays Yes or No.
Left Rear Window Learned Indicator	—	Not Active	The scan tool displays Active or Not Active.
Left Rear Window Lockout Status	—	Inactive	The scan tool displays Active or Not Active.
Left Rear Window Motor Current	—	Varies	The scan tool displays left rear window motor current in amperes (A).
Left Rear Window Motor Relay Fault Status	—	OK	This scan tool displays OK or Malfunction.
Left Rear Window Switch	—	Inactive	The scan tool displays Inactive, Up, Express Up, Down, Express Down, or Stop.
Passenger Window Learned	—	Yes	The scan tool displays Yes or No.
Passenger Window Motor Relay Fault Status	—	OK	This scan tool displays OK or Malfunction.
Right Front Window Express Up	—	Inactive	The scan tool displays Active or Inactive.
Right Front Window Express Down	—	Inactive	The scan tool displays Active or Inactive.
Right Front Window Learned Indicator	—	Not Active	The scan tool displays Active or Not Active.
Right Front Window Lockout Status	—	Inactive	The scan tool displays Active or Inactive.
Right Front Window Motor Current	—	Varies	The scan tool displays right front window motor current in amperes (A).
Right Front Window Switch	—	Inactive	The scan tool displays Inactive, Up, Express Up, Down, Express Down, or Stop.
Right Rear Window Express Up	—	Inactive	The scan tool displays Active or Inactive.

Parameter	System State	Expected Value	Description
Right Rear Window Express Down	—	Inactive	The scan tool displays Active or Inactive.
Right Rear Window Learned	—	Yes	The scan tool displays Yes or No.
Right Rear Window Learned Indicator	—	Not Active	The scan tool displays Active or Not Active.
Right Rear Window Lockout Status	—	Inactive	The scan tool displays Active or Inactive.
Right Rear Window Motor Current	—	Varies	The scan tool displays right rear window motor current in amperes (A).
Right Rear Window Motor Relay Fault Status	—	OK	This scan tool displays OK or Malfunction.
Right Rear Window Switch	—	Inactive	The scan tool displays Inactive, Up, Express Up, Down, Express Down, or Stop.
Window Lockout Indicator	—	Inactive	The scan tool displays Active or Inactive.

Body Control Module — Wiper/Washer Data — Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Vehicle in Service Mode, Vehicle in Park, All Doors Closed			
Windshield Washer Switch	—	Off	This parameter is used to display the state of the windshield washer switch. The states are On or Off. This is the electrical connection that controls the input to the motor that causes washer fluid to be dispensed on the front windshield.
Windshield Wiper Switch	—	Off	The scan tool displays Off, Sensitivity 1, Sensitivity 2, Sensitivity 3, Sensitivity 4, Sensitivity 5, Low, or High. This is the electrical connection that controls the input to the motor that causes movement of the wiper arm to clear the front windshield.
Windshield Wiper Mode	—	Varies	The scan tool displays Low, High, Delay 1, Delay 2, Delay 3, Delay 4, Delay 5, Suspended Due to Engine Crank, Parked, Service Park, Depressed Park, or Winter Park. This parameter displays the windshield wiper mode status.
Windshield Wiper Auto Mode Switch	—	—	—
Windshield Wiper Motor Protection Mode	—	—	—

Body Control Module — Tire Pressure Monitoring System Data – Front — Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Vehicle in Service Mode, Vehicle in Park, All Doors Closed			
Selected Front Tire Type	—	Standard Load	The scan tool displays No Tire Type, Standard Load, Extra Load, Load Range C, Load Range D, or Load Range E. This parameter displays the front tire type.
Front Tire Pressure on Placard	—	Varies	This parameter reads the tire pressures selected for the front of the vehicle during programming / vehicle setup. Placard is the label printed on the driver side door. The recommended tire inflation pressures are listed on that label. The purpose of this parameter is to monitor for vehicles which have for some reason cleared the placard values to zero.
Front Tire Pressure on Placard (Eco)	—	Varies	This parameter shows the tire pressure printed on the label (placard) in the driver side door. There are 3 pressures given on the label for Comfort, Eco, Fully Loaded.
Front Tire Pressure on Placard (Comfort)	—	Varies	This parameter shows the tire pressure printed on the label (placard) in the driver side door. There are 3 pressures given on the label for Comfort, Eco, Fully Loaded.
Front Tire Pressure on Placard (Fully Loaded)	—	Varies	This parameter shows the tire pressure printed on the label (placard) in the driver side door. There are 3 pressures given on the label for Comfort, Eco, Fully Loaded.
Tire Pressure Monitoring System Regulation Type	—	Varies	The scan tool displays FMVSS, China, ECER64, or None. The Tire Pressure Monitoring System can be built to follow different legal standards. This parameter shows the name of the regulation (law giving entity), like Federal Motor Vehicle Safety Standards or Economic Comission for Europe.

Body Control Module — Tire Pressure Monitoring System Data – Rear — Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Vehicle in Service Mode, Vehicle in Park, All Doors Closed			
Selected Rear Tire Type	—	Standard Load	The scan tool displays No Tire Type, Standard Load, Extra Load, Load Range C, Load Range D, or Load Range E. This parameter is used to display the type of tire selected (Load Range) for rear of the vehicle. The load range of the tire is generally how much weight or load the tire is capable performing.
Rear Tire Pressure on Placard	—	Varies	This parameter reads the tire pressures selected for the rear of the vehicle during programming / vehicle setup. Placard is the label printed on the driver side door. The recommended tire inflation pressures are listed on that label. The purpose of this parameter is to monitor for vehicles which have for some reason cleared the placard values to zero.
Rear Tire Pressure on Placard (Eco)	—	Varies	This parameter shows the tire pressure printed on the label (placard) in the driver side door. There are 3 pressures given on the label for Comfort, Eco, Fully Loaded.
Rear Tire Pressure on Placard (Comfort)	—	Varies	This parameter shows the tire pressure printed on the label (placard) in the driver side door. There are 3 pressures given on the label for Comfort, Eco, Fully Loaded.
Rear Tire Pressure on Placard (Fully Loaded)	—	Varies	This parameter shows the tire pressure printed on the label (placard) in the driver side door. There are 3 pressures given on the label for Comfort, Eco, Fully Loaded.
Tire Pressure Monitoring System Regulation Type	—	Varies	The scan tool displays FMVSS, China, ECER64, or None. The Tire Pressure Monitoring System can be built to follow different legal standards. This parameter shows the name of the regulation (law giving entity), like Federal Motor Vehicle Safety Standards or Economic Comission for Europe.

Body Control Module — Vehicle Access Data — Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Vehicle in Service Mode, Vehicle in Park, All Doors Closed			
Child Security Lock - Lock Command	—	Inactive	The scan tool displays Inactive or Lock.

Parameter	System State	Expected Value	Description
Child Security Lock - Unlock Command	—	Inactive	The scan tool displays Inactive or Unlock.
Driver Door Open Switch	—	Inactive	This scan tool displays Active or Inactive.
Fuel Fill Door Lock	—	Inactive	The scan tool displays Inactive or Lock.
Fuel Fill Door Unlock	—	Inactive	The scan tool displays Inactive or Unlock.
Glove Box Unlatch Switch	—	Locked	The scan tool displays Locked or Unlocked.
Left Front Door Ajar Switch	—	Inactive	The scan tool displays Active or Inactive.
Left Front Door Lock Command	—	Inactive	The scan tool displays Inactive or Lock.
Left Front Door Lock Indicator Command	—	Off	The scan tool displays On or Off.
Left Front Door Lock Switch	—	Inactive	The scan tool displays Active or Inactive.
Left Front Door Unlock Command	—	Inactive	The scan tool displays Inactive or Unlock.
Left Rear Door Ajar Switch	—	Inactive	The scan tool displays Active or Inactive.
Left Rear Door Lock Command	—	Inactive	The scan tool displays Inactive or Lock.
Left Rear Door Lock Indicator Command	—	Off	The scan tool displays On or Off.
Left Rear Door Unlock Command	—	Inactive	The scan tool displays Inactive or Unlock.
Passenger Door Open Switch	—	Inactive	The scan tool displays Active or Inactive.
Right Front Door Ajar Switch	—	Inactive	The scan tool displays Active or Inactive.
Right Front Door Lock Command	—	Inactive	The scan tool displays Inactive or Lock.
Right Front Door Lock Indicator Command	—	Off	The scan tool displays On or Off.
Right Front Door Unlock Command	—	Inactive	The scan tool displays Inactive or Unlock.
Right Rear Door Ajar Switch	—	Inactive	The scan tool displays Active or Inactive.
Right Rear Door Lock Command	—	Inactive	The scan tool displays Inactive or Lock.
Right Rear Door Lock Indicator Command	—	Off	The scan tool displays On or Off.
Rear Door Unlock Indicator Command	—	Off	The scan tool displays On or Off.
Right Rear Door Unlock Command	—	Inactive	The scan tool displays Inactive or Unlock.
Rear Closure Release	—	Inactive	The scan tool displays Inactive or Unlock.
Rear Closure Lock Command	—	Inactive	The scan tool displays Inactive or Lock.
Rear Closure Unlock Command	—	Inactive	The scan tool displays Inactive or Unlock.

Parameter	System State	Expected Value	Description
Theft Deterrent Lock Command	—	Inactive	The scan tool displays Inactive or Lock.
Theft Deterrent Unlock Command	—	Inactive	The scan tool displays Inactive or Unlock.

Body Control Module — Content Theft Deterrent Alarm Trigger — Scan Tool Output Controls

Output Control	Description
Horn Relay Command	This output control refers to a request to initiate the sound for a vehicle's loud warning signal. This output control is used to command the horn relay on and off.

Body Control Module — Exterior Lighting — Scan Tool Output Controls

Output Control	Description
Center High Mounted Stop Lamp	This output control is used to activate the center high mounted stop lamp when selecting On. The center high mounted stop lamp should illuminate until commanded Off.
Left Stop Lamp	This output control is used to activate the left stop lamp when selecting On. The left stop lamp should illuminate until commanded Off.
Right Stop Lamp	This output control is used to activate the right stop lamp when selecting On. The right stop lamp should illuminate until commanded Off.
License Plate Lamps	This output control is used to activate the license plate lamps when selecting On. The license plate lamps should illuminate until commanded Off.
Backup Lamps	This output control is used to activate the backup lamps when selecting On. The backup lamps should illuminate until commanded Off.
Left Park Lamps	This output control is used to activate the left park lamps when selecting On. The left park lamps should illuminate until commanded Off.
Right Park Lamps	This output control is used to activate the right park lamps when selecting On. The right park lamps should illuminate until commanded Off.
Left Daytime Running Lamps	This output control is used to activate the left daytime running lamps when selecting On. The left daytime running lamps should illuminate until commanded Off.
Right Daytime Running Lamps	This output control is used to activate the right daytime running lamps when selecting On. The right daytime running lamps should illuminate until commanded Off.
Left Auxiliary Daytime Running Lamps	This output control is used to activate the left auxiliary daytime running lamps when selecting On. The left auxiliary daytime running lamps should illuminate until commanded Off.
Right Auxiliary Daytime Running Lamps	This output control is used to activate the right auxiliary daytime running lamps when selecting On. The right auxiliary daytime running lamps should illuminate until commanded Off.
Left Front Auxiliary Park Lamp Command	This output control is used to activate the left front auxiliary park lamp when selecting On. The left front auxiliary park lamp should illuminate until commanded Off.
Right Front Auxiliary Park Lamp Command	This output control is used to activate the right front auxiliary park lamp when selecting On. The right front auxiliary park lamp should illuminate until commanded Off.
Left Front Turn Signal Lamp Command	This output control is used to activate the left front turn signal lamp when selecting On. The left front turn signal lamp should illuminate until commanded Off.
Right Front Turn Signal Lamp Command	This output control is used to activate the right front turn signal lamp when selecting On. The right front turn signal lamp should illuminate until commanded Off.
Left Turn Signal Repeater Lamp Command	This output control is used to activate the left turn signal repeater lamp when selecting On. The left turn signal repeater lamp should illuminate until commanded Off.
Right Turn Signal Repeater Lamp Command	This output control is used to activate the right turn signal repeater lamp when selecting On. The right turn signal repeater lamp should illuminate until commanded Off.
Rear Fog Lamp(s)	This output control is used to activate the rear fog lamp(s) when selecting On. The rear fog lamp(s) should illuminate until commanded Off.

Body Control Module — HVAC Controls — Scan Tool Output Controls

Output Control	Description
Blower Motor	This output control commands the HVAC blower motor speed, displayed in percent. The blower should be turning. The blower motor is a motor with a cage attached to force the air through ducts such as heater, ventilation and defrost ducts.

Body Control Module — Interior Lighting — Scan Tool Output Controls

Output Control	Description
Child Security Lock Indicator	This output control is used to activate the child security lock indicator when selecting On. The child security lock indicator should illuminate until commanded Off.
Dome/Reading Lamps Front Overhead Console	This output control is used to activate the dome/reading lamps when selecting On. The dome/reading lamps should illuminate until commanded Off.
Lane Departure Warning Indicator	This output control is used to activate the lane departure warning indicator when selecting On. The lane departure warning indicator should illuminate until commanded Off.
Security Indicator	This output control is used to activate the security indicator when selecting On. The security indicator should illuminate until commanded Off.

Body Control Module — Power Mode — Scan Tool Output Controls

Output Control	Description
Run/Crank Relay Command	This output control is used to command run/crank relay active or inactive.
Accessory/Retained Accessory Power Relay Command	This output control is used to command accessory/retained accessory power relay active or inactive.
Run Relay Command	This output control is used to command run relay active or inactive.
Power Mode Timeout	This output control is used to disable or enable the power mode timeout function (not whether timer is active or inactive).
Battery Saver Mode	This output control is used to enable or disable the transport mode state.

Body Control Module — Seat Heating/Venting/Cooling — Scan Tool Output Controls

Output Control	Description
Left Front Seat Heating	This output control is used to turn on/off all outputs for heating elements for the left front seat.
Right Front Seat Heating	This output control is used to turn on/off all outputs for heating elements for the right front seat.
Driver Seat Blower	This output control can be used for setting various blower speeds, but service tool will only turn on high to verify module outputs and fan operation.
Passenger Seat Blower	This output control can be used for setting various blower speeds, but service tool will only turn on high to verify module outputs and fan operation.

Body Control Module — Configuration/Reset Functions — Scan Tool Output Controls

Output Control	Description
Brake Pedal Position Sensor Learn	
Brake Pedal Position Sensor Learn	This output control is used to activate the brake pedal position sensor learn when selecting Learn. The brake pedal position sensor learn procedure should start.
HVAC Actuators Learn	
HVAC Actuators Learn	This output control is used to activate the HVAC actuators learn when selecting Learn. The HVAC actuators learn procedure should start.

K19 Suspension Control Module: Scan Tool Information

The suspension control module scan tool data parameters list contains all suspension control related parameters that are available on the scan tool. A given parameter may appear in any one of the data lists.

Suspension Control Module Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON			
Power Mode	—	Off Accessory Run Start Propulsion	The scan tool displays the power mode of the vehicle.
Vehicle Level Trim Height Status	—	Not Learnd In Progresss Learned Learn Failed	The scan tool displays the learned status of the vehicle trim height.
Left Front Suspension Position Sensor Trim Height	—	varies	The scan tool displays in percentage the height of left front suspension.
Right Front Suspension Position Sensor Trim Height	—	varies	The scan tool displays in percentage the height of right front suspension.
Left Rear Suspension Position Sensor Trim Height	—	varies	The scan tool displays in percentage the height of left rear suspension.
Left Front Damper Actuator Actual Current	—	varies	The scan tool displays in A the current applied to the Left Front shock absorber actuator.
Right Front Damper Actuator Actual Current	—	varies	The scan tool displays in A the current applied to the Right Front shock absorber actuator.
Left Rear Damper Actuator Actual Current	—	varies	The scan tool displays in A the current applied to the Left Rear shock absorber actuator.
Right Rear Damper Actuator Actual Current	—	varies	The scan tool displays in A the current applied to the Left Front shock absorber actuator.
Left Front Vertical Body Acceleration	—	varies	The scan tool displays in meters per second the vertical speed of the vehicle body at the left front suspension.
Right Front Vertical Body Acceleration	—	varies	The scan tool displays in meters per second the vertical speed of the vehicle body at the right front suspension.
Left Rear Vertical Body Acceleration	—	varies	The scan tool displays in meters per second the vertical speed of the vehicle body at the left rear suspension.
Right Rear Vertical Body Acceleration	—	varies	The scan tool displays in meters per second the vertical speed of the vehicle body at the right rear suspension.
Left Front Vertical Wheel Acceleration	—	varies	The scan tool displays in Volts the vertical speed of the wheel as measaured at the left front suspension.
Left Rear Vertical Wheel Acceleration	—	varies	The scan tool displays in Volts the vertical speed of the wheel as measaured at the left rear suspension.
Right Front Vertical Wheel Acceleration	—	varies	The scan tool displays in Volts the vertical speed of the wheel as measaured at the right front suspension.
Right Rear Vertical Wheel Acceleration	—	varies	The scan tool displays in Volts the vertical speed of the wheel as measaured at the right rear suspension.

Suspension Control Module Scan Tool Output Controls

Output Control	Description
Left Front Shock Absorber Actuator	Commands the current applied to the left front shock absorber actuator Increase or Decrease.
Left Rear Shock Absorber Actuator	Commands the current applied to the left rear shock absorber actuator Increase or Decrease.
Right Front Shock Absorber Actuator	Commands the current applied to the right front shock absorber actuator Increase or Decrease.
Right Rear Shock Absorber Actuator	Commands the current applied to the right rear shock absorber actuator Increase or Decrease.

K20 Engine Control Module: Scan Tool Information (L4B/L76/L78)

Engine Control Module Scan Tool Data

Parameter	System State	Expected Value	Description
This is a comprehensive list. Not all parameters listed are available for all applications. **Base Operating Conditions:** Engine Idling/Radiator Hose Hot/Park or Neutral/Closed Loop/Accessories OFF			
4WD Low Signal	—	Enabled/Disabled/ Invalid	This parameter displays the status of the four wheel drive system.
5-V Reference 1	—	5 Volts	This parameter displays the voltage sensed on the 5-volt reference 1 circuit at the control module. The scan tool will display a higher value at higher voltage. The scan tool will display a lower value at lower voltage.
5-V Reference 1–4	—	5 Volts	This parameter displays the voltage sensed on the 5-volt reference circuit at the control module. The scan tool will display a higher value at higher voltage. The scan tool will display a lower value at lower voltage.
5-V Reference 1–4 Circuit Status	—	OK	This parameter will display OK if the circuit is good or Malfunction if a short to ground, short to B+ or open circuit is present.
A/C Compressor Clutch Relay Command	—	Off	This parameter displays the current command of the A/C compressor clutch relay.
A/C Compressor Clutch Relay Control Circuit High Voltage Test Status	—	OK	This parameter displays the state of the A/C compressor clutch relay control circuit. The parameter displays Malfunction if the A/C compressor clutch relay control circuit is shorted to voltage.
A/C Compressor Clutch Relay Control Circuit Low Voltage Test Status	—	OK	This parameter displays the state of the A/C compressor clutch relay control circuit. The parameter displays Malfunction if the A/C compressor clutch relay control circuit is shorted to ground.
A/C Compressor Clutch Relay Control Circuit Open Test Status	—	OK	This parameter displays the state of the A/C compressor clutch relay control circuit. The parameter displays Malfunction if the A/C compressor clutch relay control circuit is open.
A/C Disable - A/C Pressure Out of Range	—	No	This parameter displays YES if the A/C is disabled due to A/C pressure out of range.
A/C Disengage History 1–8	—	Varies	This parameter displays one of the last eight reasons that powertrain has disengaged the air conditioning compressor.
A/C High side Pressure Sensor	A/C OFF	1.43 Volts	This parameter displays 0–5 volts. The voltage applied to the ECM input for the A/C refrigerant pressure sensor.
	A/C ON	2.39 Volts	
A/C High side Pressure Sensor	A/C OFF	300–1220 kPa (43–174 psi)	This parameter displays 0–3450 kPa (0–500 psi). The voltage applied to the ECM input from the A/C refrigerant pressure sensor is converted to a pressure value.
	A/C ON	500–2,220 kPa (72–319 psi)	

Parameter	System State	Expected Value	Description
A/C Off for WOT	—	No	This parameter displays if the A/C compressor is disabled due to a wide open throttle.
A/C Request Signal	—	Yes	This parameter displays YES if the A/C is requested on.
Accelerator Pedal Position	—	0%	This parameter displays the accelerator pedal position in percentage.
Accelerator Pedal Position When Engine Overspeed Detected	—	%	This parameter displays the accelerator pedal position in percentage when the engine overspeed was detected.
Air/Fuel Equivalence Ratio Command	—	1.0	This parameter contains the commanded equivalence ratio. The equivalence ratio should be reported as 1.0 when the vehicle is in closed loop.
Ambient Air Temperature	—	Varies °C/°F	This parameter displays the outside temperature at any given altitude expressed in degrees.
Ambient Air Temperature When Recommended Maximum Fuel Alcohol Content Exceeded	—	°C (°F)	This parameter displays the estimated ambient air temperature at the most recent time that the recommended ethanol concentration was exceeded.
Ambient Humidity	—	Varies	This parameter displays the current ambient humidity in percentage.
APP Sensors	—	Varies	This parameter displays the average of the APP sensors as calculated by the throttle actuator control (TAC) module. The APP average is a range of values indicating a low number when the accelerator pedal is not depressed to a high number when the accelerator pedal is fully depressed. This value is listed in counts.
APP Sensor 1 and 2	Accelerator pedal not actuated	0.7–1.2 Volts	This parameter displays the voltage signal sent to the control module from APP sensor 1 of the APP sensor assembly. APP sensor 1 is a range of values indicating a low voltage when the accelerator pedal is not depressed to a high voltage when the accelerator pedal is fully depressed.
	Accelerator pedal fully actuated	4.2–4.5 Volts	
APP Sensor 1 and 2	—	Agree	This parameter displays the results of a control module test that compares the signals from the APP sensors 1 and 2 . The scan tool will display Agree or Disagree. Agree indicates that APP sensor 1 and APP sensor 2 voltages correspond to the same accelerator pedal position. Disagree indicates that APP sensor 1 and APP sensor 2 voltages correspond to different accelerator pedal positions.
APP Sensor 1-2 Circuit Status	—	OK	This parameter displays that the sensed accelerator pedal position 1 or 2 sensor value is currently out of range or that a Malfunction has been detected based upon the sensed accelerator pedal position 1 or 2 sensor value being out of range
APP Sensor 1-2 Learned Applied Position	—	%	This parameter displays the learned maximum (fully applied) accelerator pedal position.
APP Sensor 1-2 Learned Released Position	—	Volts	This parameter displays the accelerator pedal sensor 1 or 2 signal at its minimum learned position (pedal released) as a percentage of its reference voltage.
APP Sensor 1-2 Position	Accelerator pedal not actuated	0%	This parameter displays the angle of the APP sensor 1 as calculated by the control module using the signal from the APP sensor 1. APP sensor 1 is a range of values indicating a low percentage when the accelerator pedal is not depressed to a high percentage when the accelerator pedal is fully depressed.

Parameter	System State	Expected Value	Description
APP Sensor 1-3	Accelerator pedal not actuated	0.7–0.2 Volts	This parameter displays the voltage signal sent to the control module from APP sensor 1 of the APP sensor assembly. APP sensor 1 is a range of values indicating a low voltage when the accelerator pedal is not depressed to a high voltage when the accelerator pedal is fully depressed.
APP Sensor 1 Indicated Position	Accelerator pedal not actuated	0%	This parameter displays the angle of the APP sensor 1 as calculated by the control module using the signal from the APP sensor 1. APP sensor 1 is a range of values indicating a low percentage when the accelerator pedal is not depressed to a high percentage when the accelerator pedal is fully depressed.
	Accelerator pedal fully actuated	100%	
APP Sensor 2	Accelerator pedal not actuated	0.3–0.5 Volts	This parameter displays the voltage signal sent to the control module from APP sensor 2 of the APP sensor assembly. APP sensor 2 is a range of values indicating a low voltage when the accelerator pedal is not depressed to a high voltage when the accelerator pedal is fully depressed.
	Accelerator pedal fully actuated	2.2–2.5 Volts	
APP Sensor 2 Position	Accelerator pedal not actuated	0%	This parameter displays the angle of the APP sensor 2 as calculated by the control module using the signal from the APP sensor 2. APP sensor 2 is a range of values indicating a low percentage when the accelerator pedal is not depressed to a high percentage when the accelerator pedal is fully depressed.
	Accelerator pedal fully actuated	100%	
APP Sensor 1 and 2	—	Agree	This parameter displays the results of a control module test that compares the signals from the APP sensors 1 and 2 . The scan tool will display Agree or Disagree. Agree indicates that APP sensor 1 and APP sensor 2 voltages correspond to the same accelerator pedal position. Disagree indicates that APP sensor 1 and APP sensor 2 voltages correspond to different accelerator pedal positions.
BARO	—	Varies with altitude	This parameter displays the barometric pressure as calculated by the control module using the signal from the MAP sensor measured when the ignition is turned ON with the engine not running. The control module will update the barometric pressure during wide-open throttle (WOT) conditions.
BARO Sensor	—	Volts	This parameter displays the barometric pressure sensor in volts.
Battery Sensor Module Battery State Information	Ignition ON	Available / Not Available	This parameter indicates if Battery State Information is Available or Not Available. Battery State Information is Not Available when there is a battery drain such as a parasitic draw.
Brake Pedal Position Circuit Signal	—	Closed	This parameter displays the state of the brake pedal position switch as determined by the brake pedal switch. The scan tool will display Open when the brake pedal is depressed, and Closed when the brake pedal is not depressed.
Brake Pedal Position Sensor	—	Volts	This parameter displays the brake pedal position as indicated by the analog sensor as a percentage of its reference voltage.
Brake Pedal Position Sensor	—	%	This parameter displays the displacement of the brake pedal, where 0% corresponds to the brake pedal being released and 100% corresponds to the brake pedal being fully applied.
Brake Pedal Position Sensor Fully Released Learn Status	—	Complete	This parameter displays the brake pedal fully released learn position status.
Brake Pedal Position Sensor Learned Released Position	—	Volts	This parameter displays the position learned for the brake pedal position sensor when the brake pedal is fully released.

Parameter	System State	Expected Value	Description
Brake Pedal Position Sensor Signal	—	Released	This parameter displays the status of the brake pedal as determined by the ECM.
Brake Pedal Position Signal	—	Released	This parameter displays the state of the brake pedal position switch as determined by the brake pedal switch. The scan tool will display Applied when the brake pedal is depressed, and Released when the brake pedal is not depressed.
Calculated Air Flow	—	Varies g/s	This parameter displays the air flow as calculated by the control module.
Calculated BARO	—	Varies kPa	This parameter displays the barometric pressure as calculated by the control module.
Calculated Catalyst Temperature Bank 1 or 2	—	Varies °C/°F	This parameter displays the catalyst temperature in bank 1 or 2 as calculated by the control module.
Calculated Engine Oil Temperature	—	Varies °C/°F	This parameter displays the estimated (modeled) engine oil temperature (as a function of engine coolant temperature and other parameters).
Camshaft Position	—	Varies °	This parameter displays the position of the intake camshaft for bank 1 in terms of degrees of camshaft rotation (advance) from the park position (a value of zero represents the park position).
Camshaft Position Active Counter	—	Counts	This parameter displays a rolling count of the number of primary cam position sensor pulses. A change in the value of this parameter indicates primary camshaft position sensor activity
Camshaft Position Actuator Solenoid Control Circuit High Voltage Test Status	—	OK	This parameter displays the state of the camshaft position actuator solenoid control circuit. The parameter displays Malfunction if the camshaft position signal circuit is shorted to voltage.
Camshaft Position Actuator Solenoid Control Circuit Low Voltage Test Status	—	OK	This parameter displays the state of the camshaft position actuator solenoid control circuit. The parameter displays Malfunction if the camshaft position signal circuit is shorted to ground.
Camshaft Position Actuator Solenoid Control Circuit Open Test Status	—	OK	This parameter displays the state of the camshaft position actuator solenoid control signal circuit. The parameter displays Malfunction if the camshaft position signal circuit is open.
Camshaft Position Command	—	Percentage	This parameter displays the commanded duty cycle from the engine control module for the intake camshaft phase of the Throttle Position for bank 1.
Camshaft Position Sensor	—	Engine Idle Speed	This parameter displays the engine speed as calculated by the control module using the signal from the CMP sensor.
Camshaft Position Variance	—	degrees	This parameter displays the absolute difference between the desired and actual positions of the intake camshaft for bank 1 in terms of degrees of camshaft rotation.
Catalyst Monitor Complete	—	Yes/No	This parameter indicates the status of the Catalyst. The scan tool displays YES when the diagnostic is complete. And NO if the diagnostic has Not ran or a malfunction is detected in the Catalyst.
Catalyst Monitor Complete This Ignition Cycle	—	Yes/No	This parameter indicates the status of the catalyst monitor diagnostic. Catalyst Monitor Test Running indicates YES or NO when the catalyst monitor diagnostic is actively running a test.
Catalyst Monitor Enabled	—	Yes/No	The scan tool displays YES when the Catalyst Monitor is Enabled. If the scan tool displays NO this could indicate a malfunction in the Catalyst Monitor circuit.

Parameter	System State	Expected Value	Description
Catalyst Monitor Enabled This Ignition Cycle	—	Yes/No	This parameter indicates the status of the catalyst monitor diagnostic. Catalyst Monitor Test Running indicates YES or NO when the catalyst monitor diagnostic is actively running a test.
Catalyst Monitor Not At Idle Test Conditions Met	—	Yes/No	This parameter indicates if the off idle conditions for the catalyst monitor diagnostic have been met.
Catalyst Monitor Test Counter Bank 1 or 2	—	Counts	This parameter contains the number of iterations of the catalyst monitor diagnostic test that have been performed since a code clear for bank 1 or 2.
Catalyst Monitor Test Result Bank 1 or 2	—	No Decision	This parameter indicates the status of the catalyst monitor diagnostic for bank 1 or 2. Multiple tests may run before the diagnostic reports a Passed or Failed result.
Catalyst Monitor Test State	—	Inactive	This parameter indicates the current state of the catalyst monitor test.
Change Engine Oil Indicator Command	—	No	This parameter displays the state of the change engine oil lamp control circuit as commanded by the control module.
Clutch Pedal Starter Inhibit Switch	—	Off	This parameter displays the current state of the clutch pedal starter inhibit switch.
Clutch Pedal Switch	—	Applied	This parameter displays the current state of the clutch pedal.
Cold Startup	—	Yes/No	This parameter displays whether the engine meets the conditions for a cold startup during the present ignition cycle. The scan tool displays YES when the conditions for a cold startup are met during this ignition cycle. The scan tool displays NO when the conditions for a cold startup are not met during the present ignition cycle. Conditions for a cold startup require the coolant temperature and the intake air temperature to be below a predetermined temperature and within a certain range of each other. These conditions must occur after the engine was warmed up to a specific temperature during the previous ignition cycle.
Component Monitor Complete	—	Yes/No	This parameter displays Yes when the Component Monitor is Complete. The engine control module looks at many input and output components to make this determination. If a malfunction is detected the scan tool will display NO.
Component Monitor Complete This Ignition Cycle	—	Yes/No	This parameter displays Yes when the Component Monitor has completed this ignition cycle. The engine control module looks at many input and output components to make this determination. If a malfunction is detected the scan tool will display NO.
Component Monitor Enabled	—	Yes/No	This parameter displays Yes when Component Monitor is Enabled. And No when it is not Enabled.
Component Monitor Enabled This Ignition Cycle	—	Yes/No	This parameter displays Yes when Component Monitor is Enabled this ignition cycle. And No when it is not Enabled this ignition cycle.
Cooling Fan Command	—	%	This parameter displays the cooling fan duty cycle.
Cooling Fan Relay 1, Relay 2, or Relay 2 and 3 Control Circuit High Voltage Test Status	—	OK	This parameter displays the state of the cooling fan control circuit. The parameter displays Malfunction if the cooling fan control circuit is shorted to voltage.
Cooling Fan Relay 1, Relay 2, or Relay 2 and 3 Control Circuit Low Voltage Test Status	—	OK	This parameter displays the state of the cooling fan control circuit. The parameter displays Malfunction if the cooling fan control circuit is shorted to ground.
Cooling Fan Relay 1, Relay 2, or Relay 2 and 3 Control Circuit Open Test Status	—	OK	This parameter displays the state of the cooling fan control circuit. The parameter displays Malfunction if the cooling fan control circuit is open.

Parameter	System State	Expected Value	Description
Cooling Fan Relay 1, Relay 2, or Relay 2 and 3 Command	—	On/Off	This parameter displays the current cooling fan relay 1 command.
Cooling Fan Speed	—	RPM	This parameter displays the current fan speed in RPMs.
CPP Learned Apply Position	—	V	This parameter displays the position learned for the clutch pedal position sensor when the clutch pedal is fully applied during the associated learn procedure.
CPP Learned Release Position	—	V	This parameter displays the position learned for the clutch pedal position sensor when the clutch pedal is released.
CPP Sensor	—	V	This parameter displays the clutch pedal position sensor analog input as a percentage of its reference voltage.
CPP Sensor	—	%	This parameter displays the position learned for the clutch pedal position sensor when the clutch pedal is fully applied during the associated learn procedure.
Crank Request Signal	—	No	This parameter displays the state of the crank request input to the control module from the ignition switch. The scan tool will display Yes when the ignition switch is in the Crank position. The scan tool will display No when the ignition switch is in any other position.
Crankshaft Position Active Counter	—	Incrementing	This parameter displays an incrementing counter when the control module receives a signal from the crankshaft position (CKP) sensor.
Crankshaft Position Signal Output Circuit High Voltage Test Status	—	OK	This parameter displays the state of the crankshaft position signal output circuit. The parameter displays Malfunction if the crankshaft position signal output circuit is shorted to voltage.
Crankshaft Position Signal Output Circuit Low Voltage Test Status	—	OK	This parameter displays the state of the crankshaft position signal output circuit. The parameter displays Malfunction if the crankshaft position signal output circuit is shorted to ground.
Crankshaft Position Signal Output Circuit Open Test Status	—	OK	This parameter displays the state of the crankshaft position signal output circuit. The parameter displays Malfunction if the crankshaft position signal output circuit is open.
Crankshaft Position Variation Learn	—	Learn in Progress / Learning Not Enabled	This parameter displays the crankshaft position variation learn status. The scan tool shows Learn in Progress until the learn is completed. The ECM learns the new variation values at each ignition cycle.
Crankshaft Position Variation Learn Attempts	—	Counts	This parameter displays the crankshaft position variation learn attempts. The ECM learns the new variation values at each ignition cycle.
Crankshaft Position Variation Learn Required Engine Speed	—	In Range / Out Of Range	This parameter displays if the crankshaft position variation learn has reached the required engine speed.
Crankshaft Position Variation Learn Status	—	Complete / Not Complete	This parameter displays the status of the crank angle sensing error learn algorithm.
Crankshaft Position Resync Counter	—	Varies	This parameter displays the number of times the control module has to synchronize the CKP sensor.
Crankshaft Position Sensor	—	Engine Idle Speed	This parameter displays the engine speed as calculated by the control module using the signal from the CKP sensor.
Cruise Control	—	Inactive	This parameter displays the status of the cruise control system as determined by the control module. The scan tool will display Yes when the cruise control system is in control of vehicle speed. The scan tool will display No when the cruise control system is not operating.

Parameter	System State	Expected Value	Description
Cruise Control Cancel Switch	—	Active	This parameter displays the status of the cruise control cancel switch as determined by the control module. The scan tool will display Active when the cruise control cancel switch is on. The scan tool will display Inactive when the cruise control cancel switch is off.
Cruise Control Inhibit Reason	—	Varies	The parameter displays the reason the cruise control system cannot engage.
Cruise Control On/Off Switch	—	Off	This parameter displays the state of the On/Off switch input to the control module . The scan tool will display On when the cruise On/Off switch is On. The scan tool will display Off when the cruise On/Off switch is Off.
Cruise Control Resume/ Acceleration Switch	—	Inactive	This parameter displays the state of the Resume/Accel switch input to the control module When the cruise control switch is in the On position and the Resume/ Accel switch is activated, the scan tool displays Active. When the Resume/Accel switch is released the scan tool displays Inactive.
Cruise Control Set/Coast Switch	—	Inactive	This parameter displays the state of the Set/Coast switch input to the control module from the cruise control system. When the cruise control switch is in the on position and the Set/Coast switch is activated, the scan tool displays Active. When the Set/Coast switch is released the scan tool displays Inactive.
Cruise Disengage 1–8 History	Cruise ON	None	The Scan tool displays the last 8 cruise control disengages in order from 1 to 8. There are 20 possible causes for the cruise control to disengage.
Cruise Resume/Acceleration Switch	—	Invalid	This parameter displays the state of the Resume/Accel switch input to the control module When the cruise control switch is in the ON position and the Resume/ Accel switch is activated, the scan tool displays ON. When the Resume/Accel switch is released the scan tool displays OFF.
Current Gear	—	#	This parameter contains the current measured, or ‘active’ forward gear in the transmission as interpreted or determined in the Engine Control Module.
Current Gear When Engine Overspeed Detected	—	#	This parameter contains the transmission actual gear observed upon initial detection of an overspeed condition. This value will be updated upon each subsequent overspeed condition.
Cycles of Misfire Data	—	Incrementing 0–100	This parameter displays the number of cylinder firing events recorded by the control module
Cyl. 1,4,6,7 Deactivation Solenoid Valve Command	—	Off	This parameter displays On when V4 mode is commanded or Off when V8 mode is commanded.
Cyl. 1 - 8 Deactivation Solenoid Command	—	Cyl. On/Cyl. Off	This parameter displays Cyl. On when V4 mode is commanded or Cyl. Off when V8 mode is commanded.
Cyl. Deactivation Disable - Disable 1–8 History	—	Varies	This parameter shows the reason the Active Fuel Management system changed from V4 mode to V8 mode, for the last 8 occurrences. • Ignition Voltage • Engine Oil Pressure • Engine Oil Temperature • ECT • Engine Speed • Transmission Gear • Transmission Range • Transmission Shifting • Control Function Active • Minimum Time On All Cylinders

Parameter	System State	Expected Value	Description
			• Maximum Deactivation Time Exceeded • Oil Aeration • Deceleration Fuel Cut-Off • Injector Stable Time • Heater Performance • MAP Sensor DTC • Brake Booster Pressure Sensor DTC • TAC System DTC • Engine Oil Pressure Sensor DTC • ECT Sensor DTC • IAT Sensor DTC • VSS DTC • Cylinder Deactivation Solenoid Valve DTC • Misfire DTC • Crankshaft Position Sensor DTC • Camshaft Position Sensor DTC • Engine Controls Ignition Relay DTC • Torque Reduction • Axle Torque Limiting • Engine Overtemperature Protection Active • Catalyst Overtemperature Protection • Piston Protection • Hot Coolant Mode • Engine Overspeed Protection Active • A/C Compressor Clutch On • HO2S 2 Test • 4WD Low Engaged • Vehicle Speed Too Low • Acceleration Request • Catalyst Temperature Low • Cylinder Deactivation System DTC • Calculated Torque • 4WD Low State Invalid • Minimum Time After TAC DTC • Hybrid/EV Powertrain Control Module Request • Fuel Alcohol Content Learn In Progress • Fuel Alcohol Content Too High • Maximum Throttle Exceeded
Cylinder Deactivation Performance Test	—	OK	This parameter displays OK if all the Active Fuel Management enabling conditions are met. The parameter displays Fault if one or more enabling conditions are out of range.
Cylinder Deactivation System Command	—	All Cylinder	This parameter displays several signals associated with the status of the Active Fuel Management system.

Parameter	System State	Expected Value	Description
Cylinder Deactivation Cycles	—	Counts	This parameter displays the number of times the engine switches between V8 mode, and V4 mode during each ignition cycle. The counter will reset to zero and increment again, if the count reaches 255 during the current ignition cycle.
Cylinder 1, 4, 6, 7 Current Misfire Counter	—	Counts	This parameter displays the number of misfires detected for cylinder's 1–8 within the current 100 engine cycle test interval. The set of misfire counters for the individual cylinders are maintained such that if a single misfire is detected over an engine cycle.
Cylinder 1, 4, 6, 7 Deactivation Solenoid Valve Control Circuit High Voltage Test Status	—	OK	This parameter displays the state of the deactivation solenoid valve control circuit. The parameter displays Malfunction if the deactivation solenoid valve control circuit is shorted to voltage.
Cylinder 1, 4, 6, 7 Deactivation Solenoid Valve Control Circuit Low Voltage Test Status	—	OK	This parameter displays the state of the deactivation solenoid valve control circuit. The parameter displays Malfunction if the deactivation solenoid valve control circuit is shorted to ground.
Cylinder 1–8 History Misfire Counter	—	Counts	This parameter displays the number of misfires detected for cylinder's 1–8 since a misfire failure has been reported.
Cylinder 1–8 Injector Control Circuit Status	—	OK	This parameter displays the status of the fuel injector's 1–8 output malfunction for Short circuit from injector high side to ground or system voltage, Short circuit from injector low side to injector low side, Short circuit from injector low side to ground or system voltage, Short circuit from injector high side to low side and Injector open circuit.
Cylinder 1–8 Injector Disabled - Misfire Detected	—	No	This parameter displays when an injector is disabled in a specific engine cylinder due to a misfire being detected.
Cylinder 1–8 Knock Detected	—	No	This parameter indicates if a knock has been detected over a calibratable sample period.
Cylinder Deactivation Cycles	—	Counts	This parameter displays the number of times the engine switches between V8 mode, and V4 mode during each ignition cycle.
Cylinder Deactivation Inhibit Reason	—	Yes/No	This parameter displays Yes if one of the following Deactivation Inhibit Reasons is detected. • Engine Coolant • Temperature Out of Range • Engine Oil Temperature Out of Range • Engine Oil Pressure Out of Range • Ignition Voltage Out of Range • Accelerator Pedal Position High • Accelerator Pedal Position Increase High • Brake Vacuum Pressure Low • Engine Manifold Vacuum Pressure Low • Engine Oil Aeration Present • Maximum Deactivation Time Exceeded • Minimum Time with All Cylinders Activated Not Met • All Cylinders Activated via Device Control • Transmission Gear Shift in Progress • Transmission Range Incorrect • Transmission Gear Incorrect • Engine Speed Out of Range

Parameter	System State	Expected Value	Description
			• Tip In Bump Active • Vehicle Speed Too Low • In 4WD Low State • POSD Intrusive Active • AC Clutch Being Engaged • Heater Performance • Fuel Shut-Off Stability Timer Active • Decel Fuel Cutoff Active • Maximum Throttle Exceeded • Ethanol Concentration Too High • Ethanol Learn In Progress • ETC Disable Time • Catalyst Temperature Low • Displacement on Demand Solenoid Driver Fault • Vehicle Speed Fault • Intake Air Temperature Sensor Fault • Engine Coolant Temperature Sensor Fault • Engine Oil Pressure Sensor Fault • Electronic Throttle Control Reduced Engine Power Active • Brake Vacuum Pressure Sensor Fault • Manifold Absolute Pressure Sensor Fault • Catalyst Converter Overtemperature Protection Active • Engine Metal Overtemperature Protection Active • Axle Torque Limiting Active (Obsolete) • Brake Torque Management Active (Obsolete) • Powertrain Relay Fault • Cam Sensor Fault • Crank Sensor Fault • Engine Misfire Detected • Invalid 4WD Low State • Torque Model Inaccurate Fault • Cylinder Deactivation System Fault • Engine Overspeed Protection Active • Hot Coolant Mode Active • Piston Protection Active
Cylinder Deactivation Performance Test	—	OK	This parameter displays OK if all the Active Fuel Management enabling conditions are met. The parameter displays Malfunction if one or more enabling conditions are out of range.
Cylinder Deactivation Performance Test	—	OK	This parameter displays if the commanded cylinder deactivation failed. This indicates that one or more cylinders failed to deactivate when commanded to do so by displacement by demand.
Cylinder Deactivation System Command	—	All Cylinder	This parameter displays several signals associated with the status of the Active Fuel Management system.

Parameter	System State	Expected Value	Description
Deceleration Fuel Cut-Off	—	Inactive	This parameter displays the status of the operating mode used to turn OFF the fuel injectors during certain deceleration conditions. When the scan tool displays Active, the control module has turned OFF the fuel injectors. When the scan tool displays Inactive, the fuel system is operating normally.
Desired Camshaft Position	—	0 degrees	This parameter displays the set point for the position of the intake camshaft for bank 1 in terms of degrees of camshaft rotation (advance) from the park position.
Desired Fuel Rail Pressure	—	MPa / PSI	This parameter displays the desired fuel rail pressure at the engine.
Desired Idle Speed	—	RPM	This parameter displays the desired idle engine speed after the application of all limits and corrections.
Desired Intake Camshaft Position	—	°	This parameter displays the set point for the position of the intake camshaft for bank 1 in terms of degrees of camshaft rotation (advance) from the park position.
Desired Throttle Position	—	%	This parameter displays the desired throttle position used to control the throttle motor, which is determined from the arbitration of the various requests for the authority to control the throttle, including remedial actions.
Distance Since DTC Cleared	—	km / miles	This parameter displays the distance accumulated since an emission diagnostic trouble code was cleared. The scan tool will display increasing distance as the vehicle is driven.
Distance Since First Malfunction	—	Varies	This parameter displays the distance accumulated when the emission diagnostic trouble code first failed.
Distance Since Last Malfunction	—	km / miles	The parameter displays the distance driven since the last engine controls malfunction.
Distance Since Last Oil Level Warning	—	km / miles	This parameter displays the distance driven since the last oil level warning.
Distance Since Last Oil Pressure Warning	—	km / miles	This parameter displays the distance driven since the last oil pressure warning.
Distance Since Recommended Maximum Fuel Alcohol Content Exceeded	—	km / miles	This parameter displays the accumulated distance driven since the most recent time that the recommended ethanol concentration was exceeded.
Distance with Cylinder Activated	—	km/miles	This parameter displays the accumulated distance driven with all of the engine's cylinders activated during the current Ignition key cycle.
Distance with Cylinder Deactivated	—	km/miles	This parameter displays the accumulated distance driven with the engine's cylinders deactivated during the current Ignition key cycle.
Drag Control Status	—	Active / Inactive	This parameter displays Active when the requested torque signal is above the driver requested value while the traction control system signal input is active.
Driver Requested Axle Torque	—	N•m	This parameter displays a (desired) output value after comparing engine load as an input to the hybrid control processor and engine control module. **Note:** Comparing this parameter to the Engine Torque Actual parameter can be useful in diagnosing a concern. The values between these 2 parameter should be similar.
Drop-Throttle Detected while Traction Control Active	—	No	This parameter displays if a drop-throttle was detected while the traction control was active.
Drop-Throttle Status	—	Inactive	This parameter displays the status of a drop-throttle.

Parameter	System State	Expected Value	Description
Engine Controls Ignition Relay Feedback Signal	—	Battery Voltage	This parameter displays the voltage signal sent to the control module from the engine control ignition relay. The scan tool will display battery voltage when the engine is running. The scan tool will display no voltage when the relay is OFF.
ECM Challenge Status	—	Valid	This parameter shows the immobilizer system status of the ECM challenge. This indicates whether the currently calculated ECM challenge is valid.
ECM in Immobilizer Fail Enable	—	No	This parameter displays whether or not the engine control module (ECM) is in failure enable mode for the vehicle theft deterrent (VTD) system.
ECT Sensor	—	Varies °C/°F	This parameter displays the temperature of the engine coolant based on the input from the engine coolant temperature (ECT) sensor. When the coolant temperature is low, the scan tool will display a low temperature. When the coolant temperature is high, the scan tool will display a high temperature.
EGR/Camshaft Position Monitor Complete	—	Yes/No	This parameter displays the status of the EGR/ Camshaft Position Monitor. The parameter will display Yes when the EGR/Camshaft Position Monitor is complete.
EGR/Camshaft Position Monitor Complete This Ignition Cycle	—	Yes/No	This parameter displays the status of the EGR/ Camshaft Position Monitor for this Ignition Cycle. The parameter will display Yes when the EGR/Camshaft Position Monitor is complete this Ignition Cycle.
EGR/Camshaft Position Monitor Enabled	—	Yes/No	This parameter displays the status of the EGR/ Camshaft Position Monitor. The parameter will display Yes when the EGR/Camshaft Position Monitor is Enabled.
EGR/Camshaft Position Monitor Enabled This Ignition Cycle	—	Yes/No	This parameter displays the status of the EGR/ Camshaft Position Monitor for this Ignition Cycle. The parameter will display Yes when the EGR/Camshaft Position Monitor is Enabled this Ignition Cycle.
Electric Power Management Inhibit Reason	—	None	This parameter displays the reason of the Regulated Voltage Control (RVC) override command. RVC lowers system operating voltage to reduce system electrical load and improve fuel economy performance.
Engine Controls Ignition Relay Command	—	On/Off	This parameter displays the state of the control circuit for the engine control module power relay as commanded by the engine control module.
Engine Controls Ignition Relay Control Circuit High Voltage Test Status	—	OK	This parameter displays the state of the engine controls ignition relay control circuit. The parameter displays Malfunction if the engine controls ignition relay control circuit is shorted to voltage.
Engine Controls Ignition Relay Control Circuit Low Voltage Test Status	—	OK	This parameter displays the state of the engine controls ignition relay control circuit. The parameter displays Malfunction if the engine controls ignition relay control circuit is shorted to grounded.
Engine Controls Ignition Relay Control Circuit Open Test Status	—	OK	This parameter displays the state of the engine controls ignition relay control circuit. The parameter displays Malfunction if the engine controls ignition relay control circuit is open.
Engine Controls Ignition Relay Feedback Signal	—	Battery Voltage	This parameter displays the voltage of the powertrain relay feedback to the controller.
Engine Load	—	25–30%	This parameter displays the engine load in percent based on inputs to the control module from various engine sensors. The scan tool will display a low percentage when the engine is at idle with little or no load. The scan tool will display a high percentage when the engine is running at a high RPM under a heavy load.

Parameter	System State	Expected Value	Description
Engine Load During Misfire History 1 - 5	—	%	This parameter displays the specific engine speed and load in which the engine was operating for one of the last five misfire events immediately prior to Misfire Test Failed This Key On (TFTKO) = True.
Engine Off Time	—	hh:mm:ss	This parameter displays the time elapsed since the engine turned OFF. The scan tool will display the time in hours, minutes and seconds. The engine OFF time will reset to zero when the engine starts.
Engine Oil Level Switch	—	OK	This parameter displays the status of the engine oil level switch as determined by the control module. The control module uses this information to turn on the low engine oil lamp if the engine oil level remains approximately 1 quart low for a sufficient amount of time. The scan tool will display Low when the engine oil level is low. The scan tool will display OK when the engine oil level is correct.
Engine Oil Life Remaining	—	%	This parameter displays the amount engine oil life remaining before requiring an oil change based on calculations by the control module. The scan tool will display lower values as the engine oil life approaches 0 miles.
Engine Oil Pressure Sensor	—	kPa/PSI	This parameter displays the actual engine oil pressure measured by a sensor.
Engine Oil Pressure Switch	—	OK	This parameter displays the state of the engine oil pressure (EOP) as determined by the control module. The control module monitors the EOP switch to determine if the EOP is sufficient. The scan tool will display low when the EOP is below a predetermined value.
Engine Oil Temperature Sensor	—	Varies °C/°F	This parameter displays the engine oil temperature.
Engine Oil Temperature When Engine Overspeed Detected	—	Varies °C/°F	This parameter displays the engine oil temperature when the engine overspeed was detected.
Engine Overspeed	—	Not Present	This parameter displays if an engine overspeed is detected. The scan tool will display Present when an engine overspeed is detected.
Engine Run Time	—	hh:mm:ss	This parameter displays the time elapsed since the engine was started. The scan tool will display the time in hours, minutes and seconds. The engine run time will reset to zero when the engine stops running.
Engine Serial Number	—	#	This parameter displays the engine serial number.
Engine Shutdown Counter	—	Counts	This parameter displays the engine shutdown counts for specific reasons including excessive idle, high coolant temperature, low coolant level, or low oil level.
Engine Speed	—	600 RPM	This parameter displays the speed of the crankshaft as determined by the control module using an input from the CKP sensor. The scan tool will display a high value at high engine speeds and a low value at low engine speeds.
Engine Speed During Misfire History 1 - 5	—	RPM	This parameter displays the speed of the crankshaft as determined by the control module using an input from the CKP sensor at the time of engine misfire.
Engine Speed When Engine Overspeed Detected	—	RPM	This parameter displays the speed of the crankshaft as determined by the control module using an input from the CKP sensor at the time of engine overspeed.
EVAP Malfunction History	—	Varies	This parameter contains the result of the most recently completed evaporative emissions diagnostic test.
EVAP Monitor Complete	—	Yes/No	This parameter displays if the most recent evaporative emissions diagnostic test is complete.

Parameter	System State	Expected Value	Description
EVAP Monitor Complete This Ignition Cycle	—	Yes/No	This parameter displays if the most recent evaporative emissions diagnostic test has completed this ignition cycle.
EVAP Monitor Enabled	—	Yes/No	This parameter displays if the evaporative emissions diagnostic test is enabled.
EVAP Monitor Enabled This Ignition Cycle	—	Yes/No	This parameter displays if the evaporative emissions diagnostic test is enabled this ignition cycle.
EVAP Purge Solenoid Valve Command	—	%	This parameter displays the on-time or duty cycle of the EVAP purge solenoid commanded by the control module expressed as a percent. The scan tool will display a high percentage when the control module is commanding the EVAP purge solenoid to be open a large amount . The scan tool will display a low percentage when the control module is commanding the EVAP purge solenoid to be open a small amount. The scan tool will display 0 when the control module is commanding the EVAP purge solenoid closed.
EVAP Purge Solenoid Valve Control Circuit High Voltage Test Status	—	OK	This parameter displays the EVAP purge solenoid valve control circuit. The parameter displays Malfunction if the EVAP purge solenoid valve circuit is shorted to voltage.
EVAP Purge Solenoid Valve Control Circuit Low Voltage Test Status	—	OK	This parameter displays the EVAP purge solenoid valve control circuit. The parameter displays Malfunction if the EVAP purge solenoid valve circuit is shorted to ground.
EVAP Purge Solenoid Valve Control Circuit Open Test Status	—	OK	This parameter displays the EVAP purge solenoid valve control circuit. The parameter displays Malfunction if the EVAP purge solenoid valve circuit is open.
EVAP Vent Solenoid Valve Command	—	Venting	This parameter displays the state of the EVAP vent solenoid commanded by the control module. The scan tool will display venting when the control module is commanding the EVAP vent solenoid to be open. The scan tool will display a not venting when the control module is commanding the EVAP vent solenoid to be closed.
EVAP Vent Solenoid Valve Control Circuit High Voltage Test Status	—	OK	This parameter displays the EVAP vent solenoid valve control circuit. The parameter displays Malfunction if the EVAP vent solenoid valve circuit is shorted to voltage.
EVAP Vent Solenoid Valve Control Circuit Low Voltage Test Status	—	OK	This parameter displays the EVAP vent solenoid valve control circuit. The parameter displays Malfunction if the EVAP vent solenoid valve circuit is shorted to ground.
EVAP Vent Solenoid Valve Control Circuit Open Test Status	—	OK	This parameter displays the EVAP vent solenoid valve control circuit. The parameter displays Malfunction if the EVAP vent solenoid valve circuit is open.
Extended Travel Brake Pedal Position Circuit Signal	—	Applied / Released	This parameter displays that no failures have been detected in the determination of the Brake Pedal Moderate Travel Achieved signal within the platform brake sensing module as received over serial communication.
Extended Travel Brake Pedal Position Signal	—	Applied, Released, Invalid	This parameter displays the undefaulted determination of brake pedal travel beyond a moderate/extended travel threshold by the platform brake sensing module and is received over serial communication.
Extended Travel Brake Pedal Switch	—	Applied / Released	This parameter displays that no failures have been detected in the determination of the Brake Pedal Moderate Travel Achieved signal within the platform brake sensing module as received over serial communication.

Parameter	System State	Expected Value	Description
Freeze Frame DTC	—	#	This parameter displays the diagnostic trouble code (DTC) that caused the freeze frame to be stored.
Fuel Alcohol Content	—	%	This parameter indicates the percentage of alcohol contained in ethanol or methanol fuels.
Fuel Alcohol Content When Recommended Maximum Fuel Alcohol Content Exceeded	—	%	This parameter displays the actual fuel alcohol percentage at the most recent time that the recommended ethanol concentration was exceeded.
Fuel Composition Learn	—	Active / Inactive	This parameter indicates if the fuel composition learn status is active.
Fuel Composition Sensor	—	Hz	This parameter displays the frequency of the fuel composition sensor.
Fuel Composition Sensor	—	Ms	This parameter displays the fuel composition sensor on time.
Fuel Consumed Since Recommended Maximum Fuel Alcohol Content Exceeded	—	Liters	This parameter displays the amount of fuel consumed since the most recent time that the recommended ethanol concentration was exceeded.
Fuel Control Loop Status	—	Closed	This parameter displays the fuel system loop status.
Fuel Economy	—	L/h	This parameter displays the instantaneous fuel consumption rate of the engine in liters per hour.
Fuel Enrichment - Hot Catalyst	—	Yes/No	This parameter displays Yes when fuel is being added to cool the catalytic converter.
Fuel Enrichment - Hot Coolant	—	Active / Inactive	This parameter displays Active when the conditions to enable hot coolant enrichment are active and that a richer than stoichiometric air/fuel ratio is being commanded in order to help cool the engine when a system malfunction is causing the engine to run at extreme temperatures.
Fuel Level Sensor	—	0–5 Volts	This parameter displays the voltage signal received by the control module from the fuel level sensor.
Fuel Level Sensor Left Tank	—	0–5 Volts	This parameter displays the voltage signal received by the control module from the fuel level sensor for the left tank.
Fuel Level Sensor Right Tank	—	0–5 Volts	This parameter displays the voltage signal received by the control module from the fuel level sensor for the right tank.
Fuel Pressure Regulator 1 Control Circuit Command	—	On/Off	This parameter displays the commanded state of the fuel pressure regulator 1 low side output.
Fuel Pressure Regulator 1 Control Circuit High Voltage Test Status	—	OK	This parameter displays the diagnostic state of the fuel pressure regulator control circuit as determined by the control module. The scan tool will display OK, Malfunction or Not Run. The scan tool will display OK if the circuit is operating correctly.
Fuel Pressure Regulator 1 Control Circuit Low Voltage Test Status	—	OK	This parameter displays the diagnostic state of the fuel pressure regulator control circuit as determined by the control module. The scan tool will display OK, Malfunction or Not Run. The scan tool will display OK if the circuit is operating correctly.
Fuel Pressure Regulator 1 Control Circuit Open Test Status	—	OK	This parameter displays the diagnostic state of the fuel pressure regulator control circuit as determined by the control module. The scan tool will display OK, Malfunction or Not Run. The scan tool will display OK if the circuit is operating correctly.
Fuel Pressure Regulator 1 High Control Circuit Command	—	%	This parameter displays the commanded duty cycle for the fuel pressure regulator 1 solenoid output.
Fuel Pressure Regulator 1 High Control Circuit Command	—	On/Off	This parameter displays the commanded state of the fuel pressure regulator 1 high side output.

Parameter	System State	Expected Value	Description
Fuel Pressure Regulator 1 High Control Circuit High Voltage Test Status	—	OK, Malfunction, Not Run	This parameter displays the state of the fuel pressure regulator circuit voltage. The parameter displays Malfunction if the fuel pressure regulator circuit voltage is shorted to voltage.
Fuel Pressure Regulator 1 High Control Circuit Low Voltage Test Status	—	OK, Malfunction, Not Run	This parameter displays the state of the fuel pressure regulator circuit voltage. The parameter displays Malfunction if the fuel pressure regulator circuit voltage is shorted to ground.
Fuel Pressure Regulator 1 High Control Circuit Open Test Status	—	OK, Malfunction, Not Run	This parameter displays the state of the fuel pressure regulator circuit voltage. The parameter displays Malfunction if the fuel pressure regulator circuit voltage is open.
Fuel Pressure Sensor	—	kPa / PSI	This parameter displays fuel rail pressure at the engine when the reading is referenced to atmosphere (gauge pressure).
Fuel Pump Enable Circuit High Voltage Test Status	—	OK	This parameter displays the state of the fuel pump enable circuit voltage. The parameter displays Malfunction if the fuel pump enable circuit voltage is shorted to voltage.
Fuel Pump Enable Circuit Low Voltage Test Status	—	OK	This parameter displays the state of the fuel pump enable circuit voltage. The parameter displays Malfunction if the fuel pump enable circuit voltage is shorted to grounded.
Fuel Pump Enable Circuit Open Test Status	—	OK	This parameter displays the state of the fuel pump enable circuit voltage. The parameter displays Malfunction if the fuel pump enable circuit voltage is open.
Fuel Pump Enabled Command	—	On	This parameter displays the commanded state of the Fuel Pump control circuit. The fuel pump should be On when the scan tool indicates the Fuel Pump Enable command is On. The fuel pump should be OFF when the scan tool indicates the Fuel Pump Enable +-*+Command is Off.
Fuel Pump Trim	Engine Running	0–4 %	This parameter displays the adjustments for the fuel pump duty cycle control. This is calculated by comparing the estimated fuel rail pressure to the desired fuel rail pressure. If the short term fuel pump trim consistently deviates from 0, the long term fuel pump trim is adjusted accordingly.
Fuel Rail Pressure Sensor	—	Volts	This parameter displays the fuel rail pressure analog input as a percentage of its reference voltage.
Fuel System Monitor Complete	—	Yes/No	This parameter displays the enable and completion status during the current driving / monitoring cycle of each continuous legislated emission related monitor and non-continuous legislated emission related monitor.
Fuel System Monitor Complete This Ignition Cycle	—	Yes/No	This parameter displays the enable and completion status during the current driving / monitoring cycle of each continuous legislated emission related monitor and non-continuous legislated emission related monitor.
Fuel System Monitor Enabled	—	Yes/No	This parameter displays the enable and completion status during the current driving / monitoring cycle of each continuous legislated emission related monitor and non-continuous legislated emission related monitor.
Fuel System Monitor Enabled This Ignition Cycle	—	Yes/No	This parameter displays the enable and completion status during the current driving / monitoring cycle of each continuous legislated emission related monitor and non-continuous legislated emission related monitor.

Parameter	System State	Expected Value	Description
Fuel Tank Pressure Sensor	—	1.5 Volts	This parameter displays the voltage signal sent to the control module from the sensor used to monitor the pressure inside the fuel tank. The scan tool will display a low voltage when the pressure in the fuel tank is high. The scan tool will display a high voltage when the pressure in the fuel tank is low or in a vacuum.
Fuel Tank Pressure Sensor	—	0 inches H2O (0 mm Hg)	This parameter displays the fuel tank pressure as calculated based on a signal sent to the control module from the fuel tank pressure (FTP) sensor. The scan tool will display a low value when the pressure in the fuel tank is low or a vacuum. The scan tool will display a high value when the pressure in the fuel tank is high.
Fuel Tank Rated Capacity	—	Varies	This parameter displays the rated maximum quantity of fuel the fuel tank will hold. This is calibrated in the control module to match the vehicle. See Owner's Manual-Capacities and Specifications.
Fuel Trim Cylinder Balance Test Bank 1 or 2	—	Active/Inactive	This parameter displays the current state of the AFIM. A value of “Active” indicates that the monitor is currently performing an evaluation of the specified bank. A value of “Inactive” indicates that the monitor is NOT currently performing an evaluation of the specified bank.
Fuel Trim Cylinder Balance Test Counter Bank 1 or 2	—	Counts	This parameter displays the number of Air Fuel Imbalance Monitor tests that have been performed since a code clear or NVM reset for bank 1 or 2.
Fuel Trim Learn	—	Enabled	This parameter indicates if the control module is adjusting long term fuel trim in response to the short term fuel trim. The scan tool displays Enabled or Disabled. When conditions are appropriate for enabling long term fuel trim corrections, the scan tool displays Enabled.
Fuel Trim Memory Cell	—	#	This parameter displays the index of the entry within the array of long term fuel corrections that is active based upon the current operating conditions (MAP, engine speed, purge duty cycle, A/C compressor state, and transmission range).
Fuel Trim System Test State	—	Monitoring	This parameter indicates the status of the Fuel Trim System Test. The scan tool will display Disabled, Enabled, Monitoring, or Run Purge Test.
Fuel Volatility	—	Varies	This parameter indicates the rate the fuel can be vaporized in the cylinder as calculated by the control module. The scan tool displays Low, Moderate, or High. The scan tool will display High when the fuel volatility is high. The scan tool will display Low when the fuel volatility is low.
Generator F-Terminal Signal	—	%	This parameter displays the filtered generator F-terminal duty cycle.
Generator Indicator Command	—	On/Off	This parameter displays signals associated with the status of the generator.
Generator L-Terminal Circuit High Voltage Test Status	—	OK	This parameter displays the state of the generator l-terminal circuit voltage. The parameter displays Malfunction if the generator l-terminal circuit voltage is shorted to voltage.
Generator L-Terminal Circuit Low Voltage Test Status	—	OK	This parameter displays the state of the generator l-terminal circuit voltage. The parameter displays Malfunction if the generator l-terminal circuit voltage is shorted to ground.
Generator L-Terminal Circuit Open Test Status	—	OK	This parameter displays the state of the generator l-terminal circuit voltage. The parameter displays Malfunction if the generator l-terminal circuit voltage is open.

Parameter	System State	Expected Value	Description
Generator L-Terminal Command	—	%	This parameter displays the commanded state of generator L-terminal duty cycle in percentage.
Generator L-Terminal Signal Command	—	On/Off	This parameter displays the commanded state of the generator L-terminal output
Heated Catalyst Monitor Complete	—	Yes	This parameter indicates the status of the heated catalyst. The scan tool displays Yes when the diagnostic is complete. And No if the diagnostic has not ran or a malfunction is detected in the heated catalyst.
Heated Catalyst Monitor Enabled	—	Yes	This parameter indicates the status of the heated catalyst monitor diagnostic. Catalyst Monitor Test Running indicates Yes or No when the heated catalyst monitor diagnostic is actively running a test.
HO2S Bank 1 or 2 Sensor 1 or Sensor 2	—	Volts	This parameter indicates the heated oxygen sensor (HO2S) bank 1 or bank 2, sensor 1 output voltage as measured by the control module. The scan tool value fluctuates constantly while operating in Closed Loop. The scan tool will display a higher value during rich running conditions, and a lower value during leaner running conditions.
HO2S Heater Bank 1 or 2 Sensor 1 or 2	—	mA	This parameter displays the current through the control module when the bank 1 or bank 2, sensor 1 HO2S heater is commanded ON by the control module. HO2S Heater Bank 1 Sen. 1 is a range of values indicating a low current when the heater circuit resistance is high to a high current when the heater circuit resistance is low.
HO2S Heater Command Bank 1 - 2 Sensor 1 - 2	—	0–99%	This parameter displays the commanded state of the Bank 1 Sensor 2 heater by the control module. The scan tool will display a higher value as the heater command is increased, and a lower value if the heater is not commanded ON.
HO2S Heater Command Bank 1 - 2 Sensor 1 - 2	—	On/Off	This parameter displays the commanded state of the Bank 1 Sensor 2 heater by the control module. The scan tool will display ON if the heater is commanded on.
HO2S Heater Control Circuit High Voltage Test Status Bank 1 - 2 Sensor 1 - 2	—	OK	This parameter displays the state of the HO2S heater control circuit. The parameter displays Malfunction if the HO2S heater control circuit is shorted to voltage.
HO2S Heater Control Circuit Low Voltage Test Status Bank 1 - 2 Sensor 1 - 2	—	OK	This parameter displays the state of the HO2S heater control circuit. The parameter displays Malfunction if the HO2S heater control circuit is shorted to ground.
HO2S Heater Control Circuit Open Test Status Bank 1 - 2 Sensor 1 - 2	—	OK	This parameter displays the state of the HO2S heater control circuit. The parameter displays Malfunction if the HO2S heater control circuit is shorted to open.
HO2S Heater Monitor Complete	—	Yes/No	This parameter displays the enable and completion status during the current driving / monitoring cycle of each continuous legislated emission related monitor and non-continuous legislated emission related monitor.
HO2S Heater Monitor Complete This Ignition Cycle	—	Yes/No	This parameter displays the enable and completion status during the current driving / monitoring cycle of each continuous legislated emission related monitor and non-continuous legislated emission related monitor.
HO2S Heater Monitor Enabled	—	Yes/No	This parameter displays the enable and completion status during the current driving / monitoring cycle of each continuous legislated emission related monitor and non-continuous legislated emission related monitor.

Parameter	System State	Expected Value	Description
HO2S Heater Monitor Enabled This Ignition Cycle	—	Yes/No	This parameter displays the enable and completion status during the current driving / monitoring cycle of each continuous legislated emission related monitor and non-continuous legislated emission related monitor.
IAT Sensor	—	Varies °C/°F	This parameter displays the temperature of the air entering the engine as calculated by the control module based on the input from the intake air temperature (IAT) sensor. The scan tool will display a low value when the air temperature is low, and a high value when the air temperature is high.
Ignition Accessory Signal	—	On	This parameter displays the state of the ignition 0 input to the control module from the ignition switch. The scan tool will display ON when the ignition switch is in the ignition accessory position. The scan tool will display OFF when the ignition switch is in any other position.
Ignition Coil 1 - 8 Control Circuit High Voltage Test Status	—	OK	This parameter displays the state of the ignition coil control circuit voltage. The parameter displays Malfunction if the ignition coil control circuit voltage is shorted to voltage.
Ignition Coil 1 - 8 Control Circuit Low Voltage Test Status	—	OK	This parameter displays the state of the ignition coil control circuit voltage. The parameter displays Malfunction if the ignition coil control circuit voltage is shorted to ground.
Ignition Coil 1 - 8 Control Circuit Open Test Status	—	OK	This parameter displays the state of the ignition coil control circuit voltage. The parameter displays Malfunction if the ignition coil control circuit voltage is open.
Ignition Coil Supply Voltage Bank 1 - 2	—	On/Off	This parameter displays indicates that the feedback hardwire input to the controller for the ignition module power supply is active on the bank containing cylinder 1 or 2.
Ignition Cycles Since Recommended Maximum Fuel Alcohol Content Exceeded	—	Counts	This parameter displays the number of ignitions cycles since the most recent time that the recommended ethanol concentration was exceeded.
Ignition Cycles with Malfunction Since 1st Malfunction	—	Counts	This parameter displays the number of ignition cycles with a failure reported since the first ignition cycle with a failure reported.
Ignition Cycles without Completed Test Since 1st Malfunction	—	Counts	This parameter displays the number of ignition cycles without a pass or a failure reported since the first ignition cycle with a failure reported.
Ignition Cycles without Malfunction Since Last Malfunction	—	Counts	This parameter displays the number of ignition cycles with a pass reported and no failures reported since the first ignition cycle with a failure reported.
Ignition Timing	—	°	This parameter displays the final spark advance in terms of crankshaft angle.
Ignition 1 Signal	—	Battery Voltage	This parameter displays the voltage measured at the ignition 1 circuit of the control module. Voltage is applied to the control module when the ignition switch is in the ignition 1 position. The scan tool will display a low value when the voltage is low. The scan tool will display a high value, such as battery voltage, when the voltage is higher.
Immobilizer Auto Learn Counter	—	Counts	The scan tool displays the count value when using the 30-minute reprogramming procedure. Three 10-minute cycles, or three counts, are required to complete the 30-minute auto learn reprogramming procedure.

Parameter	System State	Expected Value	Description
Immobilizer Automatic Learn Timer	—	hh:mm:ss	This parameter indicates that either the auto learn timer (used in the auto learn procedure to enable VTD password learning) or the seed and key timer (used in the seed and key procedure to enable VTD password learning) is active.
Immobilizer Automatic Learn Timer	—	Inactive	This parameter indicates that either the auto learn timer (used in the auto learn procedure to enable immobilizer password learning) or the seed and key timer (used in the seed and key procedure to enable immobilizer password learning) is active.
Immobilizer Fuel Disable	—	Inactive	This parameter indicates the immobilizer system has disabled fuel.
Immobilizer Fuel Disable Until Ignition Off	—	Inactive	The parameter indicates the immobilizer system has disabled fuel for the remainder of the ignition cycle.
Immobilizer Fuel Enable	—	Yes	This parameter indicates the immobilizer system has enabled fuel.
Immobilizer Password Learn	—	Yes/No	This parameter indicates that the security password has been learned.
Immobilizer Password Learn Scan Tool Delay	—	Active / Inactive	This parameter indicates that the security code has been accepted but the scan tool delay is active.
Immobilizer Security Code Accepted	—	Yes/No	This parameter indicates that the received immobilizer system security code is correct.
Immobilizer Security Code Function	—	Present / Not Present	This parameter indicates if the ECU supports the immobilizer security code strategy
Immobilizer Security Code Lockout	—	Active / Inactive	This parameter displays Active or Inactive. Security Code Lockout Active indicates that the security code has not passed and lockout is active.
Immobilizer Security Code Lockout Active Timer	—	ms	This parameter displays the time elapsed since the immobilizer security code lockout has been activated either due to a battery disconnect or an incorrect immobilizer security code being entered.
Immobilizer Security Code Programmed	—	Yes/No	This parameter indicates if the immobilizer system security code has been programmed.
Immobilizer Security Code Programming Counter	—	Counts	This parameter displays the number of times a new immobilizer security code has been programmed through secure access.
Immobilizer Security Code Reset Counter	—	Counts	This parameter displays the number of times the immobilizer security code has been reset to the default value through secure access.
Immobilizer System Status	—	Varies	This parameter displays the current state of the immobilizer algorithm.
Immobilizer Valid Response Received Time	—	ms	This parameter displays the actual time observed for a valid immobilizer response.
Initialized Fuel Alcohol Content	—	%	This parameter displays the initialized fuel composition to be used as a starting point for the fuel composition algorithm.
Injector Duty Cycle Bank 1 or 2	—	ms	This parameter displays the fuel injector pulse width (on-time) commanded to each cylinder on bank 1 or 2.
Inspection/Maintenance Drive Cycle Complete	—	Yes/No	This parameter displays that all required components of the standard drive cycle have completed.
Inspection/Maintenance Drive Cycle Idle Time Complete	—	Yes/No	This parameter displays that the internal combustion engine (ICE) idle time requirement is complete.
Inspection/Maintenance Drive Cycle Idle Timer	—	hh:mm:ss	This parameter displays the accumulated amount of contiguous time after the first internal combustion engine (ICE) start in which both pedal position and vehicle speed are zero.

Parameter	System State	Expected Value	Description
Inspection/Maintenance Drive Cycle Propulsion System Active Time Complete	—	Yes/No	This parameter displays that the vehicle propulsion system has been active for the required amount of time.
Inspection/Maintenance Drive Cycle Vehicle Speed Time Complete	—	Yes/No	This parameter displays that the vehicle speed or load has been above a calibratable threshold for five minutes.
Inspection/Maintenance Drive Cycle Vehicle Speed Timer	—	hh:mm:ss	This parameter displays the total accumulated time in which the vehicle speed has been > 25 mph or the load has been above a calibratable threshold after the 1st time the internal combustion engine (ICE) is started each key on.
Intake Air Humidity Sensor	—	%	This parameter displays the raw duty cycle signal from the relative humidity sensor electronics, which represents the relative humidity of the intake air.
Intake Camshaft Position	—	°	This parameter displays the position of the intake camshaft for bank 1 in terms of degrees of camshaft rotation (advance) from the park position (a value of zero represents the park position).
Intake Camshaft Position Active Counter	—	Counts	This parameter displays a rolling count of the number of intake cam position sensor pulses for bank 1.
Intake Camshaft Position Actuator Solenoid Valve Control Circuit High Voltage Test Status	—	OK	This parameter displays the state of the camshaft position actuator solenoid control circuit voltage. The parameter displays Malfunction if the camshaft position actuator solenoid control circuit voltage is shorted to voltage.
Intake Camshaft Position Actuator Solenoid Valve Control Circuit Low Voltage Test Status	—	OK	This parameter displays the state of the camshaft position actuator solenoid control circuit voltage. The parameter displays Malfunction if the camshaft position actuator solenoid control circuit voltage is shorted to ground.
Intake Camshaft Position Actuator Solenoid Valve Control Circuit Open Test Status	—	OK	This parameter displays the state of the camshaft position actuator solenoid control circuit voltage. The parameter displays Malfunction if the camshaft position actuator solenoid control circuit voltage is open.
Intake Camshaft Position Command	—	%	This parameter displays the commanded duty cycle for the intake cam phase output for bank 1.
Intake Camshaft Position Variance	—	°	This parameter displays the absolute difference between the desired and actual positions of the intake camshaft for bank 1 in terms of degrees of camshaft rotation.
Intake Manifold Pressure	—	70–75 kPa / 10–11 PSI	This parameter displays the pressure difference between the MAP and the barometric pressure (BARO) as calculated by the control module. The scan tool will display a higher value during high vacuum conditions, such as idle or deceleration. The scan tool will display a lower value during low vacuum conditions, such as wide open throttle or low load cruising.
Knock Retard	—	°	This parameter indicates the amount of spark advance the control module removes from the ignition control (IC) spark advance in response to the signal from the knock sensors. The scan tool displays a high value for a large amount of spark retard, and a low value for a small amount of spark retard.

Parameter	System State	Expected Value	Description
Long Term Fuel Trim Bank 1 or Bank 2	—	0% ± 10%	This parameter is calculated by the control module based on the Short Term FT value. The Long Term FT bank 1 is used for the long term correction of the fuel delivery in bank or bank 2. The scan tool will a high value for a large amount of long term fuel correction, and 0 percent for no long term fuel trim correction. The scan tool will display a negative value when fuel system is running too rich and fuel is being removed from the combustion event. The scan tool will display a positive value if the fuel system is running lean and fuel is being added to the combustion event.
Long Term Fuel Trim Average Bank 1 or Bank 2	—	1%	This parameter is calculated by the control module based on an intrusive test by the control module. The Long Term FT test average used for the long term correction of the fuel delivery in each bank. The scan tool will a high value for a large amount of long term fuel correction, and 0 percent for no long term fuel trim correction. The scan tool will display a negative value when fuel system is running too rich and fuel is being removed from the combustion event. The scan tool will display a positive value if the fuel system is running lean and fuel is being added to the combustion event.
Long Term Fuel Trim Average Bank 1 or Bank 2 without Purge	—	%	This parameter is calculated by the control module based on the Short Term FT value. The Long Term FT bank 1 is used for the long term correction of the fuel delivery in bank 1. The scan tool will display a high value for a large amount of long term fuel correction, and 0 percent for no long term fuel trim correction. The scan tool will display a negative value when fuel system is running too rich and fuel is being removed from the combustion event. The scan tool will display a positive value if the fuel system is running lean and fuel is being added to the combustion event.
Long Term Fuel Trim Test Average Bank 1	—	%	This parameter displays the filtered long term closed loop fuel correction for bank 1 (accumulated while the excess purge vapor test is inhibited), which is filtered using a first-order lag filter, also known as an exponentially weighted moving average (EWMA). This value is compared to thresholds to determine if the fuel adjustment system diagnostic is passing or failing or if an excess purge vapor test should be executed.
Long Term Fuel Trim Test Average Bank 2	—	%	This parameter displays the filtered long term closed loop fuel correction for bank 2 (accumulated while the excess purge vapor test is inhibited), which is filtered using a first-order lag filter, also known as an exponentially weighted moving average (EWMA). This value is compared to thresholds to determine if the fuel adjustment system diagnostic is passing or failing or if an excess purge vapor test should be executed.
Long Term Fuel Trim Test Average without Purge Bank 1	—	%	This parameter displays the filtered non purge long term closed loop fuel correction for bank 1 (accumulated while purge is off), which is filtered using a first-order lag filter, also known as an exponentially weighted moving average (EWMA). This value is compared to thresholds to determine if the fuel adjustment system diagnostic is passing, failing, or indeterminate during normal purge-off operation as well as during the intrusive excess purge vapor test.
Long Term Fuel Trim Test Average without Purge Bank 2	—	%	This parameter displays the filtered non purge long term closed loop fuel correction for bank 2 (accumulated while purge is off), which is filtered using a first-order lag filter, also known as an exponentially weighted moving average (EWMA). This value is compared to thresholds to determine if the fuel adjustment system diagnostic is passing, failing, or indeterminate during normal purge-off operation as well as during the intrusive excess purge vapor test.

Parameter	System State	Expected Value	Description
Low Engine Oil Level Indicator Command	—	On/Off	This parameter displays that the low engine oil level indication is being requested on over serial communication in order to inform the driver of a low engine oil level condition.
Low Engine Oil Pressure Indicator Command	—	On/Off	This parameter displays that the change engine oil indication is being requested on over serial communication in order to inform the driver that the engine oil needs to be changed. This signal is based upon either the engine oil life algorithm or the engine oil condition sensor.
MAF Performance Test	—	OK	This parameter displays the status of the mass air flow (MAF) performance test by the control module. The scan tool will display OK if no Malfunction is found. The scan tool will display Malfunction if the control module detects a Malfunction during the test.
MAF Sensor	Engine Idling	3.4–6.5 g/s	This parameter indicates the quantity calculated by the control module based on a signal from the MAF sensor. The scan tool will display a high value at high engine speeds, and a low value at low engine speeds.
MAF Sensor	—	1510–3224 Hz	This parameter indicates the frequency signal received from the MAF sensor by the control module. The scan tool will display a high value at high engine speeds, and a low value at low engine speeds.
MAF Sensor Supply Voltage Command	—	On/Off	This parameter displays the commanded state of the mass air flow sensor supply voltage output.
MAF Sensor Supply Voltage Control Circuit High Voltage Test Status	—	OK	This parameter displays the state of the mass air flow supply voltage control circuit. The parameter displays Malfunction if the mass air flow supply voltage control circuit is shorted to voltage.
MAF Sensor Supply Voltage Control Circuit Low Voltage Test Status	—	OK	This parameter displays the state of the mass air flow supply voltage control circuit. The parameter displays Malfunction if the mass air flow supply voltage control circuit is shorted to ground.
MAF Sensor Supply Voltage Control Circuit Open Test Status	—	OK	This parameter displays the state of the mass air flow supply voltage control circuit. The parameter displays Malfunction if the mass air flow supply voltage control circuit is open.
MAF When Engine Overspeed Detected	—	g/s	This parameter indicates the quantity calculated by the control module based on a signal from the MAF sensor at the time an overspeed was detected.
MAP Performance Test 1	—	OK	This parameter displays the status of the MAP performance test 1 by the control module. The scan tool will display OK if no Malfunction is found. The scan tool will display Malfunction if the control module detects a Malfunction during the test.
MAP Performance Test 2	—	OK	This parameter displays the status of the MAP performance test 2 by the control module. The scan tool will display OK if no Malfunction is found. The scan tool will display Malfunction if the control module detects a Malfunction during the test.
MAP Sensor	—	30–38 kPa / 4–6 PSI	This parameter indicates the manifold absolute pressure inside the engine as calculated by the control module based on the signal from the MAP sensor. The scan tool will display a higher value wide open throttle, and a lower value at idle.
MAP Sensor	—	0.75–1.40 Volts	This parameter indicates the voltage signal received by the control module from the MAP sensor. The scan tool displays a low voltage at idle, and a high voltage at wide open throttle. Barometric pressure and altitude can effect these values.
Maximum Engine Speed When Engine Overspeed Detected	—	RPM	This parameter displays the engine peak speed when the overspeed condition was observed.

Parameter	System State	Expected Value	Description
Malfunction Indicator Lamp (MIL) Command	—	Off	This parameter displays the commanded state of the MIL control circuit. The MIL should be ON when the scan tool indicates the MIL Command is ON. The malfunction indicator lamp should be OFF when the scan tool indicates the MIL Command is OFF. The control module will command the MIL ON when the ignition is ON with the engine OFF in order to perform a bulb check.
MIL Control Circuit High Voltage Test Status	—	OK	This parameter displays the state of the malfunction indicator lamp voltage control circuit. The parameter displays Malfunction if the malfunction indicator lamp voltage control circuit is shorted to voltage.
MIL Control Circuit Low Voltage Test Status	—	OK	This parameter displays the state of the malfunction indicator lamp voltage control circuit. The parameter displays Malfunction if the malfunction indicator lamp voltage control circuit is shorted to ground.
MIL Control Circuit Open Test Status	—	OK	This parameter displays the state of the malfunction indicator lamp voltage control circuit. The parameter displays Malfunction if the malfunction indicator lamp voltage control circuit is open.
MIL Requested	—	Yes/No	This parameter displays the commanded state of the malfunction indicator lamp (MIL) output.
MIL Requested by DTC	—	No	This parameter indicates the reason the control module illuminated the MIL. The scan tool will display YES when the MIL is requested as a result of an A or B type DTC. The scan tool will display NO if the MIL is illuminated for another reason, such as transmission DTCs.
Misfire Diagnostic Engine Load	—	%	This parameter displays the engine load used within the misfire diagnostic (calculated as the ratio of the mass of air predicted to be in the cylinder two firing events into the future to the maximum possible mass of air in the cylinder based on the current ambient air pressure and charge temperature).
Misfire Diagnostic Engine Speed	—	RPM	This parameter displays the engine speed used within the misfire diagnostic. This engine speed is the maximum engine speed observed over the previous engine cycle.
Misfire Monitor Complete	—	Yes/No	This parameter displays the status of the catalyst monitor diagnostic. Multiple tests may run before the diagnostic reports a Pass or Fail. When a determination has been made, the diagnostic is complete for the current trip and will not attempt any further tests.
Misfire Monitor Complete This Ignition Cycle	—	Yes/No	This parameter displays the status of the catalyst monitor diagnostic. Multiple tests may run before the diagnostic reports a Pass or Fail. When a determination has been made, the diagnostic is complete for the current trip and will not attempt any further tests.
Misfire Monitor Enabled	—	Yes/No	This parameter displays the status of the catalyst monitor diagnostic. Multiple tests may run before the diagnostic reports a Pass or Fail. When a determination has been made, the diagnostic is complete for the current trip and will not attempt any further tests.
Misfire Monitor Enabled This Ignition Cycle	—	Yes/No	This parameter displays the status of the catalyst monitor diagnostic. Multiple tests may run before the diagnostic reports a Pass or Fail. When a determination has been made, the diagnostic is complete for the current trip and will not attempt any further tests.

Parameter	System State	Expected Value	Description
O2S/HO2S Monitor Complete	—	Yes/No	This parameter displays the status of the catalyst monitor diagnostic. Multiple tests may run before the diagnostic reports a Pass or Fail. When a determination has been made, the diagnostic is complete for the current trip and will not attempt any further tests.
O2S/HO2S Monitor Complete This Ignition Cycle	—	Yes/No	This parameter displays the status of the catalyst monitor diagnostic. Multiple tests may run before the diagnostic reports a Pass or Fail. When a determination has been made, the diagnostic is complete for the current trip and will not attempt any further tests.
O2S/HO2S Monitor Enabled	—	Yes/No	This parameter displays the status of the catalyst monitor diagnostic. Multiple tests may run before the diagnostic reports a Pass or Fail. When a determination has been made, the diagnostic is complete for the current trip and will not attempt any further tests.
O2S/HO2S Monitor Enabled This Ignition Cycle	—	Yes/No	This parameter displays the status of the catalyst monitor diagnostic. Multiple tests may run before the diagnostic reports a Pass or Fail. When a determination has been made, the diagnostic is complete for the current trip and will not attempt any further tests.
Oil Level Warning Counter City	—	Counts	This parameter displays a rolling count of oil level debounce events for the city calibration.
Oil Level Warning Counter Country Road	—	Counts	This parameter displays a rolling count of oil level debounce events for the country road calibration.
Oil Level Warning Counter Highway	—	Counts	This parameter displays a rolling count of oil level debounce events for the highway calibration.
Output Shaft Speed Sensor	—	0.00 RPM	This parameter displays the transmission output speed measured by the transmission output speed (TOS) sensor.
Park/Neutral Position Switch	—	Park	This parameter indicates the range selection of the automatic transmission as calculated by the control module based on input from the PNP switch. The scan tool will display, In Gear, Park, or Neutral depending on the PNP switch position.
Power Enrichment	—	Inactive	This parameter indicates if the control module has detected conditions appropriate to operate in Power Enrichment mode. The scan tool will display Active if the mode is in operation, and Inactive if the mode is not in operation. The control module enters Open Loop operation and increases injector pulse width when in power enrichment mode.
Power Mode	—	Off/ Accessory/Run/ Crank	This parameter displays the state of the system power mode. This signal is based upon the state of the system power mode received over serial communication from the platform electronics.
Recommended Maximum Fuel Alcohol Content Exceeded	—	No	This parameter displays that the fuel alcohol percentage has exceeded the recommended value for vehicle conditions.
Recommended Maximum Fuel Alcohol Content When Recommended Maximum Fuel Alcohol Content Exceeded	—	%	This parameter displays the recommended fuel alcohol percentage for vehicle conditions at the most recent time that the recommended ethanol concentration was exceeded.
Reduced Engine Power	—	Inactive	This parameter indicates if the control module has detected that a TAC system Malfunction has occurred. The scan tool will display Active if the mode is in operation, and Inactive if the mode is not in operation. The control module limits engine power when this mode is Active.

Parameter	System State	Expected Value	Description
Reduced Engine Power History	—	Varies	This parameter displays the last reason that powertrain has illuminated the Reduced Engine Power (REP) indication.
Refueling Events Since Recommended Maximum Fuel Alcohol Content Exceeded	—	Counts	This parameter displays the number of times the vehicle has been refueled since the most recent time that the recommended ethanol concentration was exceeded.
Remaining Fuel in Tank	—	%	This parameter displays the total fuel level as a percentage of the rated capacity of the fuel tank(s).
Remaining Fuel in Tank	—	Liters	This parameter displays the total fuel volume contained in the fuel tank(s).
Remote Vehicle Start Disable History 1–8	—	Varies	This parameter displays one of the last eight reasons that powertrain has disabled remote vehicle start (RVS).
Remote Vehicle Start Request Signal	—	Off	This parameter displays the state of the remote vehicle start request signal. The scan tool displays ON when a remote start signal is requested.
Reverse Inhibit Solenoid Actuator Command	—	Allowed/Inhibit	Reverse Inhibit Active indicates that the driver is inhibited from shifting into reverse.
Reverse Inhibit Solenoid Actuator Control Circuit High Voltage Test Status	—	OK	This parameter displays the state of the reverse inhibit solenoid actuator control circuit. The parameter displays Malfunction if the reverse inhibit solenoid actuator control circuit is shorted to voltage.
Reverse Inhibit Solenoid Actuator Control Circuit Low Voltage Test Status	—	OK	This parameter displays the state of the reverse inhibit solenoid actuator control circuit. The parameter displays Malfunction if the reverse inhibit solenoid actuator control circuit is shorted to ground.
Reverse Inhibit Solenoid Actuator Control Circuit Open Test Status	—	OK	This parameter displays the state of the reverse inhibit solenoid actuator control circuit. The parameter displays Malfunction if the reverse inhibit solenoid actuator control circuit is open.
Secondary Air Injection Monitor Complete	—	Yes	This parameter displays the status of the secondary air injection monitor. The parameter will display Yes when the secondary air injection monitor is complete.
Secondary Air Injection Monitor Enabled	—	Yes	The scan tool displays Yes when the secondary air injection monitor is enabled. If the scan tool displays No, this could indicate a malfunction in the secondary air injection monitor circuit.
Short Term Fuel Trim Bank 1 or Bank 2	—	0% ± 10%	This parameter displays the short term correction to fuel delivery for bank 1 or bank 2 by the control module in response to the amount of time the oxygen sensor voltage spends above or below the 450 mV threshold. The scan tool will display 0 percent if no adjustments are required. The scan tool will display a higher positive value if fuel has to be added, and a higher negative value if fuel has to be removed.
Skip Shift Indicator Command	—	Off	This parameter indicates that the transmission skip shift indicator is being requested On over serial communication in order to inform the driver that shifting up to one of the next highest hears is inhibited.
Skip Shift Solenoid Actuator Command	—	Disabled	This parameter indicates that the skip shift solenoid is commanded On, inhibiting the driver from shifting up to one of the next highest gears.
Skip Shift Solenoid Actuator Control Circuit High Voltage Test Status	—	OK	This parameter displays the state of the skip shift solenoid actuator control circuit. The parameter displays Malfunction if the skip shift solenoid actuator control circuit is shorted to voltage.
Skip Shift Solenoid Actuator Control Circuit Low Voltage Test Status	—	OK	This parameter displays the state of the skip shift solenoid actuator control circuit. The parameter displays Malfunction if the skip shift solenoid actuator control circuit is shorted to ground.

Parameter	System State	Expected Value	Description
Skip Shift Solenoid Actuator Control Circuit Open Test Status	—	OK	This parameter displays the state of the skip shift solenoid actuator control circuit. The parameter displays Malfunction if the skip shift solenoid actuator control circuit is open.
Specific Humidity	—	%	This parameter displays the ratio of water vapor to dry air shown in a percentage.
Short Term Fuel Trim Test Average Bank 1 or Bank 2	—	3%	This parameter is calculated by the control module based on an intrusive test by the control module. The Short Term FT Test Average used for the short term correction of the fuel delivery in each bank. The scan tool will display a high value for a large amount of short term fuel correction, and 0% for no short term fuel trim correction. The scan tool will display a negative value when fuel system is running too rich and fuel is being removed from the combustion event. The scan tool will display a positive value if the fuel system is running lean and fuel is being added to the combustion event.
Start Up ECT	—	Varies °C/°F	This parameter Indicates the engine coolant temperature at engine start up as calculated by the control module based on the signal from the ECT sensor. The scan tool will display a higher value on a warmer engine, and a lower value on a colder engine.
Start Up IAT	—	Varies °C/°F	This parameter Indicates the intake air temperature at engine start up as calculated by the control module based on the signal from the IAT sensor. The scan tool will display a higher value during warmer under hood temperatures, and a lower value during colder under hood temperatures.
Starter Relay Command	—	Off	This parameter displays the current starter relay command. The scan tool displays ON when the starter relay is commanded on.
Starter Relay Control Circuit High Voltage Test Status	—	OK	This parameter displays the state of the starter relay control circuit. The parameter displays Malfunction if the starter relay control circuit is shorted to voltage.
Starter Relay Control Circuit Low Voltage Test Status	—	OK	This parameter displays the state of the starter relay control circuit. The parameter displays Malfunction if the starter relay control circuit is shorted to ground.
Starter Relay Control Circuit Open Test Status	—	OK	This parameter displays the state of the starter relay control circuit. The parameter displays Malfunction if the starter relay control circuit is shorted to open.
TAC Forced Engine Shutdown	—	No	This parameter indicates the status of TAC control by the control module. The scan tool will display YES if the engine has been shut down due to a throttle control Malfunction. The scan tool will display NO if the engine has not been shut down by a throttle control Malfunction.
TAC Motor	—	Enabled	This parameter indicates the status of the TAC motor driver by the ECM. The scan tool will display Enabled if TAC motor operation is allowed. The scan tool will display disabled if the TAC motor is disabled.
TAC Motor Command	—	15–25%	This parameter indicates the required duty cycle to maintain a desired throttle position. The scan tool will display a higher value if more effort is required to move the throttle to the desired position, such as physical resistance. The scan tool will display a lower value if less effort is required to move the throttle to the desired position.
TCC/Cruise Control Brake Pedal Switch	—	Applied / Released	This parameter displays the status of the brake pedal system
Throttle Body Idle Air Flow Compensation	—	%	This parameter displays the percent compensation of the learned airflow variation algorithm. This value indicates the current amount of airflow compensation in response to engine intake airflow restrictions.

Parameter	System State	Expected Value	Description
Throttle Position	—	%	This displays the throttle position resulting directly from the arbitration of the (corrected) throttle position sensors.
Throttle Position Performance Test	—	OK	This parameter displays the status of the Throttle Position performance test by the control module. The scan tool will display OK if no Malfunction is found. The scan tool will display Malfunction if the control module detects a Malfunction during the test.
Throttle Position Sensor 1	—	4.1–4.5 Volts	This parameter displays the voltage signal sent to the control module from Throttle Position sensor 1 of the throttle assembly. The Throttle Position sensor 1 is a range of values indicating a high voltage when the throttle is closed to a low voltage when the throttle plate is fully open.
Throttle Position Sensor 1 Position	—	8%	This parameter displays the angle of the throttle position (Throttle Position) sensor 1 as calculated by the control module using the signal from the Throttle Position sensor 1. The Throttle Position sensor 1 is a range of values indicating a low percentage when the throttle is closed to a high percentage when the throttle is fully open.
Throttle Position Sensor 1 Learned Minimum	—	0-0.6 Volts	This parameter displays the learned minimum value of throttle position (Throttle Position) sensor 1 as recorded by the control module during the last learn procedure.
Throttle Position Sensor 2	—	0.5–0.8 Volts	This parameter displays the voltage signal sent to the control module from Throttle Position sensor 2 of the throttle assembly. The Throttle Position sensor 2 is a range of values indicating a low voltage when the throttle is closed to a high voltage when the throttle plate is fully open.
Throttle Position Sensor 2 Position	—	4%	This parameter displays the angle of the Throttle Position sensor 2 as calculated by the control module using the signal from the Throttle Position sensor 2. The Throttle Position sensor 2 is a range of values indicating a low percentage when the throttle is closed to a high percentage when the throttle is fully open.
Throttle Position Sensor 2 Learned Minimum	—	5.0-3.7 Volts	This parameter displays the learned minimum value of throttle position (Throttle Position) sensor 2 as recorded by the control module during the last learn procedure.
Throttle Position Sensors 1 and 2	—	Agree	This parameter displays the results of a control module test that compares the signals from the Throttle Position sensors 1 and 2 . The scan tool will display Agree or Disagree. Agree indicates that Throttle Position sensor 1 and Throttle Position sensor 2 voltages correspond to the same throttle position. Disagree indicates that Throttle Position sensor 1 and Throttle Position sensor 2 voltages correspond to different throttle positions.
Tire Size	—	Rev/km	This parameter displays the vehicle tire circumference in centimeters.
Torque Delivered Signal	—	Varies lbs ft N•m	This parameter displays the PWM signal which indicates the percent of available torque the engine is delivering to the drive wheels. The EBTCM monitors the Traction Control Torque signal to ensure that the PCM is responding properly to the Traction Control Desired Torque signal.
Torque Management Ignition Timing Retard	—	0°	This parameter indicates how much the ignition spark timing is being retarded to control torque by the control module. The scan tool will display a higher value under extreme torque control conditions such as spinning wheels. The scan tool will display a lower value under low torque control conditions such as light driving.

Parameter	System State	Expected Value	Description
Torque Management Spark Retard	—	0°	This parameter indicates how much the ignition spark timing is being retarded to control torque by the control module. The scan tool will display a higher value under extreme torque control conditions such as spinning wheels. The scan tool will display a lower value under low torque control conditions such as light driving.
Torque Request Inhibit Fuel	—	No	This parameter displays the reason the ECM would be causing the transmission torque request to be limited, and if the condition is currently present.
Torque Request Inhibit - Ignition Timing	—	No	This parameter indicates if the transmission torque request is limited due to ignition timing.
Torque Request Inhibit Minimum Idle Inhibit	—	No	This parameter displays the reason the ECM would be causing the transmission torque request to be limited, and if the condition is currently present.
Torque Request Inhibit Minimum Torque	—	No	This parameter displays the reason the ECM would be causing the transmission torque request to be limited, and if the condition is currently present.
Torque Request Inhibit Spark	—	No	This parameter displays the reason the ECM would be causing the transmission torque request to be limited, and if the condition is currently present.
Torque Request Inhibit Spark Advance	—	No	This parameter displays the reason the ECM would be causing the transmission torque request to be limited, and if the condition is currently present.
Torque Request Inhibit TAC	—	No	This parameter displays the reason the ECM would be causing the transmission torque request to be limited, and if the condition is currently present.
Torque Request Inhibit TAC Limit	—	No	This parameter displays the reason the ECM would be causing the transmission torque request to be limited, and if the condition is currently present.
Total Engine Overspeed Time	—	ms	This parameter displays the total duration of the engine overspeed time in milliseconds.
Total Knock Retard	—	0°	This parameter indicates how much ignition spark timing is being retarded due to all control systems monitored by the control module. The scan tool will display a high value during extreme conditions such as high temperatures and antilock braking. The scan tool will display a lower value during lighter driving conditions.
Total Misfire	—	0	This parameter displays the number of possible misfires during the last 200 cylinder firing events detected on all cylinders as calculated by the control module. The misfires are calculated based on engine crankshaft rotation speed variations. The scan tool displays an incrementing counter.
Traction Control Status	—	Inactive	This parameter displays when the traction control system (TCS) is activated.
Transfer Case Gear Ratio (If Equipped)	—	1	This parameter displays the estimated transfer case ratio for applications that are equipped with a transfer case capable of providing range selection (e.g., four wheel drive low).
Transfer Case OSS	—	RPM	This parameter displays the transfer case output speed (the speed at the output of the transfer case) determined from the speed measured by the transfer case speed sensor (TCSS).
Upshift Indicator Command	—	Off	This parameter indicates that the transmission upshift indication is being requested On over serial communication in order to recommend that the driver shift up to a higher gear to improve fuel economy.
Vehicle Speed Output Circuit 2 High Voltage Test Status	—	OK	This parameter displays the state of the vehicle speed output circuit 2. The parameter displays Malfunction if the vehicle speed output circuit 2 is shorted to voltage.

Parameter	System State	Expected Value	Description
Vehicle Speed Output Circuit 2 Low Voltage Test Status	—	OK	This parameter displays the state of the vehicle speed output circuit 2. The parameter displays Malfunction if the vehicle speed output circuit 2 is shorted to ground.
Vehicle Speed Output Circuit 2 Open Test Status	—	OK	This parameter displays the state of the vehicle speed output circuit 2. The parameter displays Malfunction if the vehicle speed output circuit 2 is open.
Vehicle Speed Sensor	—	0 km/h / MPH	This parameter indicates the vehicle speed as calculated by the control module based on a signal from the vehicle speed sensor (VSS). The scan tool will display a higher value at higher vehicle speeds, and a lower value at lower vehicle speeds.
Vehicle Speed When Engine Overspeed Detected	—	km/h / MPH	This parameter displays the peak engine speed observed during all overspeed conditions.
VIN Programming Counter	—	Counts	This parameter displays the number of times the VIN has been programmed.
Warm-ups Since DTC Cleared	—	#	This parameter indicates the number of warm up cycles that have occurred Since DTCs were cleared. The scan tool will display a higher counts as more warm up cycles have occurred since the DTCs were cleared.
Warm-ups Without Emission Malfunctions	—	#	This parameter indicates the number of warm up cycles that have occurred without an emission Malfunction present. The scan tool will display a 0 if a Malfunction has occurred. The scan tool will display a higher count if a number of warm up cycles have occurred without an emission Malfunction.
Warm-ups Without Non-Emission Malfunctions	—	#	This parameter indicates the number of warm up cycles that have occurred without a non-emission Malfunction present. The scan tool will display a 0 if a Malfunction has occurred. The scan tool will display a higher count if a number of warm up cycles have occurred without a non-emission Malfunction.
Wide Open Throttle	—	No	This parameter indicates the throttle status commanded by the control module. The scan tool will display YES if the vehicle throttle is commanded to wide open. The scan tool will display NO if the vehicle throttle is commanded to an amount less than 100%.

Output Control

Parameter	Description
This is a comprehensive list. Not all output controls listed are available for all applications.	
A/C Compressor Clutch Relay	This device control is used to override the state of the air conditioning compressor output.
A/C Relay	The engine must be running and the ECM must receive an A/C request from the HVAC control module in order to enable the output control. The ECM de-energizes the A/C compressor clutch relay when you select OFF. The relay remains de-energized until you select ON.
Ambient Air Temperature Reset	This device control resets the environmental temperature (ENVT) model. This device control is to be used to force the ENVT model to update for service of different monitors.
Brake Pedal Position Sensor Learn	This device control is used to reset the brake pedal fully released learned position to its initialized value after a brake system repair.
CAC Coolant Pump	This function activates the charge air cooler (CAC) coolant pump relay. The normal commanded state is OFF. When commanded ON or OFF, the engine control module (ECM) turns the relay ON or OFF. The system remains in the commanded state until cancelled by the scan tool.
Clutch Pedal Position Learn	This device control is used to trigger the procedure to learn the clutch pedal fully applied position.
Cooling Fan Relay 1, Relays 2 and 3, Relays 1, 2 and 3	This device control is used to override the state of the cooling fan control output.

Parameter	Description
Crankshaft Position Reluctor Wheel Learn	This device control is used to reset the crank wheel adaptation values in case of an ECM or crank wheel replacement.
Crankshaft Position Variation Learn	This device control is used to activate the crankshaft position variation learn algorithm which calculates the reference pulse correction factors for the misfire diagnostic.
Cylinder 1, 3, 4, 6, 7	This device control is used to deactivate one of the engine's cylinders with the engine running by commanding the appropriate displacement on demand solenoid output on.
Cylinder Deactivation System	This device control is used to deactivate half of the engine's cylinders by commanding all of the displacement on demand solenoid outputs on.
Cylinder Power Balance	This device control is used to override the state of the fuel injector outputs. This device control is used to disable injectors in order to cut off fuel to the associated cylinders.
Depressurize Fuel System	When the low pressure fuel pump is used in conjunction with a separate high pressure fuel pump for direct injection (DI) engines, this device control can be used to reduce the high fuel pressure to a low working level.
Engine Controls Ignition Relay	This device control is used to override the state of the powertrain relay.
Engine Oil Life Reset	This device control may be used to reset the engine oil remaining life to 100% after an oil change or to any other value when replacing a control module.
Engine Oil Pressure Control Solenoid Valve	This device control is used to override the state of the variable displacement oil pump. When the variable displacement oil pump is turned on, the oil pump will be commanded to a low pressure state.
Engine Serial Number	This device control displays the engine serial number.
Engine Speed	This device control is used to override the idle engine speed.
Engine Speed Control	Activates the idle air control (IAC) valve to change engine RPM. The normal commanded state is NONE. To enable the RPM control, all instruction on the scan tool must be completed. The system will Increase or Decrease the engine speed. The SET STEP VALUE changes the engine speed by increments of 25 RPM, 100 RPM, and 500 RPM. The system remains in the commanded state until cancelled by the tool.
EVAP Purge/Seal	This control enables 2 functions. One function increases or decreases the amount of purge by changing the duty cycle of the purge valve and commanding the vent ON (non-venting). The normal commanded state of both valves is NONE. The system will Increase or Decrease the amount of EVAP purge valve opening by 10 percent increments within a range of 0–100 percent. The second function seals the system after using the purge function to obtain a specific amount of fuel tank pressure (FTP). When activated the purge valve is commanded to 0 percent and the vent valve is commanded ON (non-venting). Both functions remain in the commanded state until cancelled by the tool or the FTP exceeds 24 mm Hg (12 in H2O).
EVAP Purge Solenoid	Activates the EVAP Purge Valve. The normal commanded state is OFF. The system will Increase or Decrease the amount of EVAP purge valve opening by 10 percent increments within a range of 0–100 percent. The system remains in the commanded state until cancelled by the tool or the fuel tank pressure exceeds 24 mm Hg (12 in H2O).
EVAP Purge Solenoid Valve	This device control is used to verify functionality of the fuel vapor purge system by allowing the canister purge output to be commanded to a specific duty cycle.
EVAP Service Test	Activates the on-board EVAP diagnostic test.
EVAP Test	This device control is used to activate the evaporative emissions service bay test.
EVAP Vent Solenoid	Activates the EVAP vent solenoid. The normal commanded state is OFF. When commanded ON, the vent valve switches to non-venting. The system remains in the commanded state unless one of the following conditions occurs: • Cancelled by the tool • Purge is greater than 0 percent, and the fuel tank pressure exceeds 24 mm Hg (12 in H2O).
EVAP Vent Solenoid Valve	This device control is used to either open or close the canister vent.
Fuel Composition Reset	This device control is used to reset the learned ethanol content of the fuel to a default calibration value.
Fuel Control Loop Status	This device control is used to enable or disable closed loop fuel.
Fuel Injector Balance	This device control is used to override the state of the fuel injector outputs. This device control is used to trigger a single injector to be commanded on for a short duration in order to test the flow of the injector to the associated cylinders.

Parameter	Description
Fuel Pump Enable	This device control is used to override the state of the fuel pump output discrete hardwire between the ECM and the fuel pump control module (FPCM) or the fuel pump driver module.
Fuel Pump Relay	Controls the fuel pump relay. The normal commanded state is NONE. When commanded ON/OFF, the PCM turns the fuel pump ON/OFF. If the engine is running, and the fuel pump is commanded OFF, the engine will stall. The system remains in the commanded state until cancelled by the scan tool.
Fuel Pump Speed	This device control is used to override the normal control of the fuel pump output. The device control is a service diagnostic aid that is used to determine if the fuel pump system is functioning properly.
Fuel Rail Pressure Relief Valve Reset	This device control is used to trigger a reset of the learned offset value for the high pressure fuel pump relief valve.
Fuel System Pressure Test	This device control is used to charge the fuel rail on a high pressure direct injection system before completing the assembly of the engine in order to check for fuel leaks. This feature will allow the technician to inspect the fuel system for leaks after servicing the fuel system or after any other service procedure that required disconnection or removal of fuel system components. The starter relay is commanded on to crank the engine. Spark (SIDI) and fuel injection are inhibited to prevent the engine from starting. The high pressure fuel pump/regulator(s) are controlled to ensure maximum fuel system pressure is achieved while the engine is cranking and fuel pressure maintained after the engine stops rotating.
Fuel System Reset	This device control is used to trigger a reset of the fuel set-point adaptation (FSA) learning adaptive map.
Fuel Trim Enable	This device control is used to enable or disable fuel trim learning.
Fuel Trim Reset	This device control is used to reset the learned fuel trim values to their initial values.
Generator L-Terminal	This device control is used to override the state of the generator L terminal output.
High Pressure Fuel Pump Learn	This device control is used to start (trigger) and run the high fuel pressure learn process in order to fine tune the high pressure fuel pump after a high pressure component replacement.
HO2S Heater Bank 1 or 2 Sensor 1 or 2	This device control is used to override the duty cycle of the oxygen sensor heaters.
HO2S Heater Bank 1 Sensor 1 Command	Activates the HO2S bank 1 sensor 1 heater. The commanded states include ON and OFF. The normal commanded state is OFF. Commanding the HO2S bank 1 sensor 1 heater ON turns on the heater driver. The system remains in the commanded state until cancelled by the tool.
HO2S Heater Bank 1 Sensor 2 Command	Activates the HO2S bank 1 sensor 2 heater. The commanded states include ON and OFF. The normal commanded state is OFF. Commanding the HO2S bank 1 sensor 2 heater ON turns on the heater driver. The system remains in the commanded state until cancelled by the tool.
HO2S Heater Bank 2 Sensor 1 Command	Activates the HO2S bank 2 sensor 1 heater. The commanded states include ON and OFF. The normal commanded state is OFF. Commanding the HO2S bank 2 sensor 1 heater ON turns on the heater driver. The system remains in the commanded state until cancelled by the tool.
HO2S Heater Learn	This device control is used to trigger a service bay procedure to learn the oxygen sensor heater resistance following a sensor replacement in service.
HO2S Reset	This device control is used to trigger a reset of the oxygen sensor drift compensation value, in case of an oxygen sensor replacement.
HO2S Test	This device control is used to trigger a service bay procedure to execute the oxygen sensor response test following a sensor replacement in service.
Idle Ignition Timing	This device control is used to disable the portion of the spark control algorithm that adjusts spark angle to correct the difference between commanded idle engine speed and actual idle engine speed.
Idle Learn	This device control is used to reset the learned airflow adaptive values to their initial values.
Ignition Timing Retard	This device control is used to retard the spark angle from the software calculated spark angle. For example, if the software calculated spark angle was 15 degrees advanced and this device control requested a 3 degree retard, the commanded spark angle that would be delivered would be 12 degrees advanced.
Intake Camshaft Position Actuator	This device control is used to override the state of the intake cam phase output. The commanded camshaft position is expressed in terms of degrees of camshaft rotation (advance for intake camshafts) from the park position (a camshaft position of zero represents the park position).
Intake Camshaft Position Actuator Solenoid Valve	This device control is used to override the state of the intake cam phase solenoid output.

Parameter	Description
MAF Sensor Supply Voltage	This device control is used to override the state of the mass air flow sensor supply voltage output.
Malfunction Indicator Lamp (MIL)	This device control is used to either turn the malfunction indicator lamp (MIL) on or off.
Misfire Graphic	Graphs the accumulated misfires occurring in each cylinder. The scan tool allows for a reset of the misfire graph.
Remote Vehicle Start Disable History Reset	This device control is used to trigger the reset of the last eight reasons that powertrain has disabled remote vehicle start (RVS).
Reverse Inhibit	This device control is used to override the state of the Reverse Inhibit output.
RVS Disable History Reset	This output control is used to trigger the reset of the last 8 reasons the ECM has disabled remote vehicle start (RVS).
Skip Shift Solenoid	Activates the Skip Shift Solenoid
Starter Relay	This device control is used to override the state of the starter relay output. Fuel and spark are disabled to prevent the engine from starting if the starter relay output is commanded on.
Throttle Position	This device control is used to override the commanded throttle position.
Throttle Sweep	This device control is used to automatically command the throttle blade from 0% to 100% and then back to 0%
Tire Size Selection	This function is used for correcting vehicle speed and odometer calculations when tire size is changed.

K20 Engine Control Module: Scan Tool Information (LZ0)

Engine Control Module Scan Tool Data

Parameter	System State	Expected Value	Description
This is a comprehensive list. Not all parameters listed are available for all applications. **Base Operating Conditions:** Engine Idling/Radiator Hose Hot/Park or Neutral/Closed Loop/Accessories OFF			
Air Conditioning Compressor Clutch Command	----	On / Off	This parameter displays the commanded state of the air conditioning (A/C) compressor output.
Air Conditioning Disable - Air Conditioning Pressure Out of Range	----	Yes / No	This parameter indicates if the A/C compressor was disengaged due to pressure out of range.
Air Conditioning Disengage History 1-8	----	Varies	This parameter indicates the last 8 A/C disengage history reasons.
Air Conditioning High Side Pressure Sensor	Air Conditioning OFF	Varies	The scan tool displays 0–5 volts. The voltage applied to the ECM input for the A/C refrigerant pressure sensor.
	Air Conditioning ON	Varies	
Air Conditioning High Side Pressure Sensor	Air Conditioning OFF	Varies	The scan tool displays 0–3450 kPa (0–500 psi). The voltage applied to the ECM input from the A/C refrigerant pressure sensor is converted to a pressure value.
	Air Conditioning ON	Varies	
Air Conditioning Request Signal	A/C ON	Yes	The scan tool displays Yes/No. The HVAC module receives an input request when the HVAC module is turned On.
	A/C OFF	No	

Parameter	System State	Expected Value	Description
Accelerator Pedal Position	Accelerator pedal not actuated	0%	This parameter displays the angle of the accelerator pedal as calculated by the control module using the signals from the accelerator pedal position sensors. The accelerator pedal position (APP) indicated angle is a range of values indicating a low percentage when the accelerator pedal is not depressed to a high percentage when the accelerator pedal is fully depressed.
	Accelerator pedal fully actuated	100%	
Accelerator Pedal Position Sensor	Accelerator pedal not actuated	0.7–1.2 Volts	This parameter displays the voltage signal sent to the control module from Accelerator Pedal Position Sensor of the assembly. A range of values indicating a low voltage when the accelerator pedal is not depressed to a high voltage when the accelerator pedal is fully depressed.
	Accelerator pedal fully actuated	4.2–4.5 Volts	
Accelerator Pedal Position Sensor and Sensor 2	—	Agree	This parameter displays Disagree if the control module detects the signal voltage from the Accelerator Pedal Position Sensor is not in correct relationship to Accelerator Pedal Position Sensor 2. The scan tool displays Agree under the normal operating conditions.
Accelerator Pedal Position Sensor Circuit Status	—	Okay	Indicates the Accelerator Pedal Position Sensor circuit is currently out of range or that a Malfunction has been detected.
Accelerator Pedal Position Sensor Learned Released Position	—	Volts	This Parameter indicates the accelerator pedal position sensor signal at its minimum learned position (pedal released) as a percentage of its reference voltage. (The minimum learned position is automatically updated periodically as determined by the engine control module (ECM).
Accelerator Pedal Position Sensor Position	Accelerator pedal not actuated	0.0%	This parameter displays the angle of the Accelerator Pedal Position Sensor as calculated by the control module Accelerator Pedal Position Sensor ranges from a low percentage when the accelerator pedal is not depressed to a high percentage when the accelerator pedal is fully depressed.
	Accelerator pedal fully actuated	100%	
Accelerator Pedal Position Sensor 2 Position	Accelerator pedal at rest position	0.3–0.5 Volts	This parameter displays the angle of the Accelerator Pedal Position Sensor 2 as calculated by the control module Accelerator Pedal Position Sensor 2 ranges from a low percentage when the accelerator pedal is not depressed to a high percentage when the accelerator pedal is fully depressed.
	Accelerator pedal at WOT	2.0–2.5 Volts	
Accelerator Pedal Position Sensor 2 Circuit Status	—	Okay	Indicates that the sensed Accelerator Pedal Position Sensor 2 value is currently out of range or that a malfunction has been detected.

Parameter	System State	Expected Value	Description
Accelerator Pedal Position Sensor 2 Learned Released Position	—	Volts	This Parameter indicates the Accelerator Pedal Position Sensor 2 signal at its minimum learned position (pedal released) as a percentage of its reference voltage. (The minimum learned position is automatically updated periodically as determined by the engine control module (ECM).
Accelerator Pedal Position Sensor 2 Position	Accelerator pedal at rest position	0.0%	This parameter displays the angle of the Accelerator Pedal Position Sensor 2 as calculated by the control module. Indicates a low percentage when the accelerator pedal is not depressed to a high percentage when the accelerator pedal is fully depressed.
	Accelerator pedal at WOT	100%	
Accelerator Pedal Position Sensors	—	%	This Parameter contains the accelerator pedal position resulting directly from the settling of differences of the accelerator pedal position sensors (prior to any compensation to determine driver intent).
Ambient Air Temperature	—	Varies °C (°F)	Outside temperature expressed in degrees
Ambient Air Temperature Sensor	—	Varies °C (°F)	Ambient temperature expressed in degrees
Ambient Humidity	—	Varies %	Outside humidity expressed in a percentage.
Autostop Disable Reason - Particulate Filter Test in Progress	—	Yes / No	This parameter displays Yes if Autostop is disabled because a particulate filter test is in progress.
Average Distance Between Particulate Filter Regenerations	—	km/miles	This parameter contains the mean distance between particulate filter regenerations.
Average Reductant Consumption	—	g/km	This parameter displays the average reductant consumption in gallons per kilometer.
Average Particulate Filter Regeneration Duration	—	hh:mm:ss	This parameter contains the mean duration of the diesel particulate filter regenerations. The value in this parameter shall be updated after every diesel particulate filter regeneration attempt.
Average Particulate Filter Inlet Temperature During Regeneration	—	ºC (ºF)	This parameter contains the mean diesel particulate filter inlet temperature, during the diesel particulate filter regenerations.
Barometric Pressure Sensor	—	kPa (PSI) Varies with altitude	This parameter displays the barometric pressure in kPa.
Barometric Pressure Sensor 2	—	kPa (PSI) Varies with altitude	This parameter displays the barometric pressure in volts.
Battery Voltage	Ignition ON	Volts	This parameter displays the battery voltage.
Boost System Monitor - This Ignition Cycle	—	Disabled, Enabled, Complete	The scan tool displays Enabled when the Boost System Monitor is enabled for this ignition cycle.
Boost System Monitor - Since Diagnostic Trouble Codes Cleared	—	Not Supported, Complete, Incomplete	The scan tool displays Complete when the Boost System Monitor is complete.

Parameter	System State	Expected Value	Description
Brake Pedal Position Sensor	—	Volts	This parameter displays the brake pedal position sensor in volts.
Brake Pedal Position Sensor	—	%	This parameter displays the brake pedal position sensor in percentage applied.
Brake Pedal Position Sensor Fully Released Learn Status	—	Complete / Incomplete	This parameter displays the brake pedal release position learned status.
Brake Pedal Position Sensor Learned Released Position	—	Volts	This parameter displays the brake pedal learned released position in volts.
Brake Pedal Position Sensor Signal	Released	Applied / Released / Invalid	This parameter displays the status of the brake pedal as determined by the ECM.
Brake Pedal Position Switch Circuit Signal	Released	Applied / Released	This parameter displays the status of the brake pedal position circuit.
Calculated Nitrogen Oxides Catalytic Converter Efficiency Gross Error Test	—	%	This parameter displays the estimated average Selective Catalyst Reduction (SCR) efficiency for urea quality determination during the gross error test.
Calculated Nitrogen Oxides Catalytic Converter 2 Efficiency	—	%	This parameter displays the estimated average Selective Catalyst Reduction 2 (SCR2) efficiency.
Calculated Nitrogen Oxides Catalytic Converter 2 Efficiency During Particulate Filter Regeneration	—	Okay / Malfunction	This parameter displays the SCR2 efficiency monitor estimated average efficiency during particulate filter regeneration.
Calculated Nitrogen Oxides Emissions Monitor Efficiency	—	%	This parameter displays the estimated average nitrogen oxides emissions monitor efficiency.
Calculated Particulate Filter Flow Resistance	—	kPa / (liter/s)	This parameter displays the filtered flow resistance of the Diesel Particulate FIlter.
Calibration History Buffer	—	Locked / Unlocked	This parameter displays when the calibration buffer has been locked against further updates due to detection of a non-production calibration.
Calibration Verification Number History 1 – 10	—	#	This parameter displays the history of calibration verification from 1–10.
Camshaft Position Signal Output Circuit High Test Status	Engine Idling	Okay	This parameter displays the state of the Camshaft Position Signal Output Circuit. The parameter displays Malfunction if the Camshaft Position Signal Output Circuit is shorted to voltage.
Camshaft Position Signal Output Circuit Low Test Status	Engine Idling	Okay	This parameter displays the state of the Camshaft Position Signal Output Circuit. The parameter displays Malfunction if the Camshaft Position Signal Output Circuit is shorted to ground.
Camshaft Position Signal Output Circuit Open Test Status	Engine Idling	Okay	This parameter displays the state of the Camshaft Position Signal Output Circuit. The parameter displays Malfunction if the Camshaft Position Signal Output Circuit is open.

Parameter	System State	Expected Value	Description
Catalytic Converter Monitor - Since Diagnostic Trouble Codes Cleared	—	Not Supported / Complete / Incomplete	This parameter indicates the status of the catalyst monitor diagnostic. Monitor Test indicates Complete when the catalyst monitor diagnostic has been run since DTCs have been cleared.
Charge Air Cooler Temperature Sensor	—	ºC (ºF)	This parameter displays the charge air cooler temperature measured by a sensor located first in the charge air cooler stream.
Charge Air Cooler Temperature Sensor 2	—	ºC (ºF)	This parameter displays the charge air cooler temperature measured by a sensor located first in the charge air cooler stream.
Charge Air Cooler Coolant Inlet Temperature Sensor	—	ºC (ºF)	This parameter contains the undefaulted charge air cooler temperature measured by a sensor located first in the charge air cooler stream in relationship to any other charge air cooler temperature sensors in the system.
Control Module Voltage Signal	—	B+	This parameter displays the voltage of the power input to the engine control module. Since battery voltage is not directly measured by engine control module, switched battery voltage from the Run/Crank input to the engine control module is displayed.
Cooling Fan Command	—	%	This parameter displays the cooling fan duty cycle.
Cooling Fan Speed	Ignition ON	Varies	This parameter displays the current state of the cooling fan speed. (For example OFF, Low, Medium, or High) rather than rotational speed.
Crank Request Signal	—	Yes	This parameter displays the state of the crank request input to the control module from the ignition switch. The scan tool will display Yes when the ignition switch is in the Crank position. The scan tool will display No when the ignition switch is in any other position.
Crankshaft Position Active Counter	—	Counts	This parameter displays an incrementing counter when the control module receives a signal from the crankshaft position sensor (CKP).
Crankshaft Position Sensor	Engine Idling	RPM	This parameter displays engine speed.
Crankshaft Position Signal Output Circuit High Test Status	Ignition ON	Okay	This parameter displays the state of the Crankshaft Position Signal Output Circuit. The parameter displays Malfunction if the Crankshaft Position Signal Output Circuit is shorted to voltage.
Crankshaft Position Signal Output Circuit Low Test Status	Ignition ON	Okay	This parameter displays the state of the Crankshaft Position Signal Output Circuit. The parameter displays Malfunction if the Crankshaft Position Signal Output Circuit is shorted to ground.

Parameter	System State	Expected Value	Description
Crankshaft Position Signal Output Circuit Open Test Status	Ignition ON	Okay	This parameter displays the state of the Camshaft Position Signal Output Circuit. The parameter displays Malfunction if the Crankshaft Position Signal Output Circuit is open.
Crankshaft Position Variation Learn	Ignition ON	Learn In Progress / Learning Not Enabled	This parameter displays if the crank angle learned this key cycle.
Crankshaft Position Variation Learn Status	Ignition ON	Complete	This parameter displays the status of the crank angle sensing error (CASE) learn algorithm.
Cruise Control	—	Enabled / Disabled	This parameter displays the status of the cruise control system as determined by the control module. The scan tool will display Enabled when the cruise control system is able to control vehicle speed. The scan tool will display Disabled when the cruise control system is not operating.
Cruise Control Cancel Switch	—	Inactive	This parameter displays the status of the cruise control cancel switch
Cruise Control Disengage History 1–8	Cruise ON	Reason for Cruise Disengagement	These parameters indicate the last 8 reasons the ECM disengaged the cruise control. History 1 contains the most recent reason.
Cruise Control Inhibit Reason	—	None	The parameter displays the reason the cruise control system cannot engage.
Cruise Control On/Off Switch	—	Off	This parameter displays the state of the On/Off switch input to the control module . The scan tool will display On when the cruise On/Off switch is ON. The scan tool will display Off when the cruise ON/OFF switch is OFF.
Cruise Control Resume/ Accelerate Switch	—	Inactive	This parameter displays the state of the Resume/Accel switch input to the control module When the cruise control switch is in the On position and the Resume/Accel switch is activated, the scan tool displays On. When the Resume/Accel switch is released the scan tool displays Off.
Cruise Control Set/Coast Switch	—	Inactive	This parameter displays the state of the Set/Coast switch input to the control module from the cruise control system. When the cruise control switch is in the on position and the Set/Coast switch is activated, the scan tool displays Active. When the Set/Coast switch is released the scan tool displays Inactive.
Cruise Control Switch	—	Varies	This parameter displays the cruise control/speed limiter raw switch states.

Parameter	System State	Expected Value	Description
Cylinder 1, 2, 3, 4, 5, or 6 Balancing Rate	—	Varies	These parameters display the adjustment in fuel volume for each cylinder as calculated by the control module. The scan tool will display a negative balancing rate if the fuel volume is lowered. The scan tool will display a positive balancing rate if the fuel volume is increased.
Cylinder 1, 2, 3, 4, 5, or 6 Current Misfire Counter	—	Counts	This parameter displays the number of misfires detected for cylinder's 1–6 within the current 100 engine cycle test interval. The set of misfire counters for the individual cylinders are maintained such that if a single misfire is detected over an engine cycle.
Cylinder 1, 2, 3, 4, 5, or 6 History Misfire Counter	—	Counts	This parameter displays the number of misfires detected for cylinder's 1–6 since a misfire failure has been reported.
Cylinder 1, 2, 3, 4, 5, or 6 Fuel Injection Timing	—	°	This parameter displays the start point of the main injection in degrees crank shaft (°CS) relative to Top Dead Center (TDC) of cylinder's 1–6.
Cylinder 1, 2, 3, 4, 5, or 6 Fuel Injector Command	—	ms	This parameter displays the total injection time of cylinder's 1–6. Total injection time includes all pilot injections, main injections and post injections.
Cylinder 1, 2, 3, 4, 5, or 6 Fuel Injector Control Circuit Status	—	Okay	This parameter displays the status of the fuel injector's 1–6 output malfunction for Short circuit from injector high side to ground or system voltage, Short circuit from injector low side to injector low side, Short circuit from injector low side to ground or system voltage, Short circuit from injector high side to low side and Injector open circuit.
Cylinder 1, 2, 3, 4, 5, or 6 Fuel Injector Flow Identifier	—	#	This parameter is used to correct the injected quantity of each injector When injectors are replaced or exchanged, the Injector Quantity adjustment values of the replaced or exchanged injectors have to be entered into the ECM to ensure acceptable engine performance regarding emissions
Cylinder Head Temperature Sensor	—	°C (°F)	This parameter displays the cylinder head temperature in °C (°F).
Cylinder Head Temperature Sensor 2	—	°C (°F)	This parameter displays the cylinder head temperature in °C (°F).
Deceleration Fuel Cut-Off	—	Inactive	Decel Fuel Cut Off Active indicates that the conditions to enable deceleration fuel cut-off (DFCO) are active and that torque is being reduced by turning off one or more fuel injectors

Parameter	System State	Expected Value	Description
Desired Exhaust Gas Recirculation Valve Position	—	%	This parameter displays the position of the exhaust gas recirculation (EGR) valve commanded by the control module. The scan tool will display 0 percent when the control module is commanding the EGR valve closed. The scan tool will display a higher percentage when the EGR valve is commanded open.
Desired Fuel Pressure	Ignition ON	kPa (PSI)	This parameter displays the desired fuel supply pressure.
Desired Fuel Rail Pressure	—	MPa/PSI	This parameter displays the desired fuel rail pressure as calculated by the control module. This value is calculated based on engine speed, engine load, and sensor inputs. The scan tool will display a higher value at higher engine speeds and loads, and a lower value at idle.
Desired Idle Speed	—	600–825 RPM	This parameter displays the engine idle speed in RPM as commanded by the control module. The control module compensates for various engine loads in order to maintain the desired engine speed at idle. This parameter is not valid unless the engine is running.
Desired Intake Air Flow Control Valve Position	—	%	This parameter will display the position of the intake air flow control valve as a percentage.
Desired Nitrogen Oxides Catalytic Converter Reductant Load	—	g	This parameter contains the NH3 (Ammonia) storage setpoint value for the Selective Catalyst Reduction (SCR) system in terms of grams.
Desired Reductant Injector Command	—	ms	This parameter contains the desired injection time of the reductant dosing valve.
Desired Reductant Pressure	—	kPa (PSI)	This parameter contains the desired reductant system pressure.
Desired Turbocharger/ Supercharger Boost Control Position	—	%	This parameter displays the position of the turbocharger vane position sensor as the turbocharger vane position is commanded by the control module. The scan tool will display 0 percent when the control module is commanding the vanes open. The scan tool will display a higher percentage when the vanes are commanded closed.
Desired Turbocharger/ Supercharger Boost Pressure	—	kPa (PSI)	This parameter displays the Turbocharger Boost pressure as commanded by the control module. This parameter shows the turbocharger boost pressure in kPa (PSI).
Distance Driven from Diagnostic Trouble Code Clear to First Malfunction	—	km/miles	This parameter displays the distance accumulated since DTC Clear to first occurrence of a DTC malfunction. This parameter is only meaningful within the context of a failure record or freeze frame.

Parameter	System State	Expected Value	Description
Distance Driven from Diagnostic Trouble Code Clear to Last Malfunction	—	km/miles	This parameter displays the distance accumulated since DTC Clear to last occurrence of a DTC malfunction. This parameter is only meaningful within the context of a failure record or freeze frame.
Distance Since Last Particulate Filter Regeneration	—	km/miles	This parameter will display the amount of vehicle travel after a Particulate Filter regeneration. This parameter will be displayed in km/miles.
Distance This Driving Cycle	—	km/miles	This parameter displays the distance a vehicle has traveled in the current driving cycle.
Distance Since Last Particulate Filter Regeneration	—	km/miles	This parameter will display the distance since the last particulate filter regeneration event.
Drag control Status	—	Active/Inactive	EDC Active (Drag Active) control mode is indicated when the requested torque signal is above the driver requested value while the traction control system signal input is active.
Driver Demanded Engine Torque	—	%	This parameter displays the requested torque output of the engine by the driver.
Drop Throttle Detected while Traction Control Active	—	No	Drop Throttle Control Mode is indicated when this parameter displays Yes.
Drop Throttle Status	—	Inactive	This parameter provides an indication when the controller software determines a condition is present where the vehicle operator has abruptly released the accelerator pedal (drop-throttle) after a period of acceleration.
ECM Authentication Status	—	Valid	Authentication Status indicates the result of the comparison between the last received immobilizer response and the expected response calculated by the engine control module (ECM).
ECM Challenge Status	—	Valid	This parameter displays the condition of the ECM code challenge to the BCM.
ECM Requested Particulate Matter Mass Concentration Measurement	—	No	This parameter indicates the ECM has requested a measurement of particulate matter mass from the particulate matter sensor.
ECM Requested Particulate Matter Sensor Initialization	—	No	This parameter displays Yes when the particulate matter sensor is initialized by the ECM.
ECM Response Source	—	Normal Start	This parameter displays ECM response source.
ECT Sensor	—	85–105°C/185–220°F	This parameter displays the temperature of the engine coolant based on the input from the engine coolant temperature (ECT) sensor. When the coolant temperature is low, the scan tool will display a low temperature. When the coolant temperature is high, the scan tool will display a high temperature.

Parameter	System State	Expected Value	Description
EGR/Camshaft Position Monitor Complete	—	Yes/No	This parameter displays the status of the EGR/Camshaft Position Monitor. The parameter will display Yes when the EGR/Camshaft Position Monitor is complete.
EGR/Camshaft Position Monitor Complete This Ignition Cycle	—	Yes/No	This parameter displays the status of the EGR/Camshaft Position Monitor for this Ignition Cycle. The parameter will display Yes when the EGR/Camshaft Position Monitor is complete this Ignition Cycle.
EGR/Camshaft Position Monitor Enabled	—	Yes/No	This parameter displays the status of the EGR/Camshaft Position Monitor. The parameter will display Yes when the EGR/Camshaft Position Monitor is Enabled.
EGR/Camshaft Position Monitor Enabled This Ignition Cycle	—	Yes/No	This parameter displays the status of the EGR/Camshaft Position Monitor for this Ignition Cycle. The parameter will display Yes when the EGR/Camshaft Position Monitor is Enabled this Ignition Cycle.
EGR Command	—	%	This parameter displays the commanded duty cycle for the exhaust gas recirculation (EGR) output.
EGR Control Circuit 1 High Voltage Status	—	OK	This parameter displays the state of the EGR Control circuit 1. The parameter displays Malfunction if the EGR Control circuit 1 is shorted to voltage.
EGR Control Circuit 1 Low Voltage Status	—	OK	This parameter displays the state of the EGR Control circuit 1. The parameter displays Malfunction if the EGR Control circuit 1 is shorted to ground.
EGR Control Circuit 2 High Voltage Status	—	OK	This parameter displays the state of the EGR Control circuit 2. The parameter displays Malfunction if the EGR Control circuit 2 is shorted to voltage.
EGR Control Circuit 2 Low Voltage Status	—	OK	This parameter displays the state of the EGR Control circuit 2. The parameter displays Malfunction if the EGR Control circuit 2 is shorted to ground.
EGR Control Circuit Open Test Status	—	OK	This parameter displays the state of the EGR Control circuit. The parameter displays Malfunction if the EGR Control circuit is open.
EGR Control Circuit Shorted Test Status	—	OK	This parameter displays the state of the EGR Control circuit. The parameter displays Malfunction if the EGR Control circuit is shorted.
EGR Control Driver Overcurrent	—	No	This parameter displays the state of the EGR Control circuit. The parameter displays Yes if the EGR Control Driver Overcurrent is detected.

Parameter	System State	Expected Value	Description
EGR Control Driver Overtemperature	—	No	This parameter displays the state of the EGR Control circuit. The parameter displays Yes if Over Temperature is Detected and that the driver circuit has been shut OFF.
EGR Control Driver Temperature Dependent Overcurrent	—	No	This parameter displays the state of the EGR Control circuit. The parameter displays Yes if Temperature Dependent over Current Detected and that the driver circuit has been shut OFF.
EGR Control Driver Undervoltage	—	No	This parameter displays the state of the EGR Control circuit. The parameter displays Yes when the Under Voltage Detected indicates that the entire system voltage is low.
EGR Cooler Bypass Valve Command	—	%	This parameter displays the commanded duty cycle for the Exhaust Gas Recirculation Cooler Bypass Valve actuator output.
EGR Cooler Bypass Valve Control Circuit High Voltage Test Status	—	OK	This parameter displays the state of the EGR Cooler Bypass Valve Control circuit. The parameter displays Malfunction if the EGR Cooler Bypass Valve Control circuit is shorted to voltage.
EGR Cooler Bypass Valve Control Circuit Low Voltage Test Status	—	OK	This parameter displays the state of the EGR Cooler Bypass Valve Control circuit. The parameter displays Malfunction if the EGR Cooler Bypass Valve Control circuit is shorted to ground.
EGR Cooler Bypass Valve Control Circuit Open Test Status	—	OK	This parameter displays the state of the EGR Cooler Bypass Valve Control circuit. The parameter displays Malfunction if the EGR Cooler Bypass Valve Control circuit is open.
EGR Cooler Bypass Valve Control Circuit Shorted Test Status	—	OK, Malfunction, Not Run	This parameter contains the control circuit status of the exhaust gas recirculation cooler bypass valve output
EGR Cooler Bypass Valve Control Driver Overcurrent	—	No	This parameter displays the state of the EGR Cooler Bypass Valve Control circuit. The parameter displays Yes if the EGR Cooler Bypass Valve Control Driver Overcurrent is detected.
EGR Cooler Bypass Valve Control Driver Overtemperature	—	No	This parameter displays the state of the EGR Cooler Bypass Valve Control circuit. The parameter displays Yes if Over Temperature is Detected and that the driver circuit has been shut OFF.
EGR Cooler Bypass Valve Control Driver Temperature Dependant Overcurrent	—	No	This parameter displays the state of the EGR Cooler Bypass Valve Control circuit. The parameter displays Yes if Temperature Dependent over Current Detected and that the driver circuit has been shut OFF.

Parameter	System State	Expected Value	Description
EGR Cooler Bypass Valve Control Driver Undervoltage	—	No	This parameter displays the state of the EGR Cooler Bypass Valve Control circuit. The parameter displays Yes when the Under Voltage Detected indicates that the entire system voltage is low.
EGR Cooler Bypass Valve Learned Closed Position	—	OK, Malfunction, Not Run	This parameter contains the control circuit status of the exhaust gas recirculation cooler bypass valve output
EGR Cooler Bypass Valve Learned Open Position	—	OK, Malfunction, Not Run	This parameter contains the control circuit status of the exhaust gas recirculation cooler bypass valve output
EGR Cooler Bypass Valve Position	—	%	This parameter contains the actual exhaust gas recirculation (EGR) cooler bypass valve displacement determined by a position sensor (corrected based upon its learned minimum position).
EGR Cooler Bypass Valve Position Sensor	—	Volts	This parameter contains the Exhaust Gas Recirculation Cooler Bypass Valve position sensor analog input as a percentage of its reference voltage
EGR Cooler Temperature Sensor 1	—	°C (°F)	This parameter will display the exhaust temperature entering the EGR Cooler. The EGR Temp Sensor 1 temperature will be warmer than the EGR Temp Sensor 2.
EGR Cooler Temperature Sensor 2	—	°C (°F)	This parameter will display the exhaust temperature exiting the EGR Cooler. The EGR Temp Sensor 2 temperature will be cooler than the EGR Temp Sensor 1.
EGR Temperature Sensor 1	—	ºC (ºF)	This parameter contains the undefaulted exhaust gas recirculation cooler temperature measured by a sensor that is located before the inlet of the EGR heat exchanger.
EGR Temperature Sensor 2	—	ºC (ºF)	This parameter contains the undefaulted exhaust gas recirculation cooler temperature measured by a sensor that is located on the outlet of the EGR heat exchanger.
EGR Learned Minimum Position	—	Volts	This parameter displays the learned minimum position of the EGR valve as calculated by the control module. The scan tool will display a low value if the current closed EGR position is the same as the last ignition cycle. The scan tool will display a higher value if the EGR valve has closed at a new position.
EGR Learned Minimum Position This Ignition Cycle	—	%	This parameter displays the Exhaust Gas Recirculation Sensor Learned Minimum Position.

Parameter	System State	Expected Value	Description
EGR Position Sensor	—	%	This parameter displays the EGR valve position as calculated by the control module based on an input from the EGR valve position sensor. The scan tool will display a lower value when the EGR valve is closed, and a higher value when the EGR valve is open.
EGR Position Sensor	—	1.75 Volts	This parameter displays the voltage signal received from the EGR valve position sensor by the control module. The scan tool will display a lower value when the EGR valve is closed, and a higher value when the EGR valve is open.
EGR Position Variance	—	%	This parameter displays the EGR position variance from the last learned position.
EGR System Malfunction Warning Indicator Command	—	Off	This parameter indicates when the EGR system malfunction warming indicator is commanded ON.
Electric Power management Inhibit reason	—	None	This parameter displays the reason of the Regulated Voltage Control (RVC) override command. RVC lowers system operating voltage to reduce system electrical load and improve fuel economy performance.
Engine Calibration Monitoring	—	Not Present	This parameter displays Present when Incorrect Engine Calibration Detected.
Engine Calibration Monitoring Identifier	—	Programmed / Not Programmed	This parameter contains status bits associated with the Engine Upgrade Protection strategy.
Engine Calibration Part Number History 1–10	—	#	This parameter displays the part number of the 10 most recent calibrations.
Engine Calibration Part Number History 1–10 Counter	—	Counts	This parameter displays the current count of engine calibrations.
Engine Controls Ignition Relay Command	—	On	This parameter displays the state of the control circuit for engine control module power relay as commanded by the engine control module.
Engine Controls Ignition Relay Feedback 2 Signal	Ignition ON	Volts	This parameter indicates the signal voltage from the second input to the controller from the powertrain relay.
Engine Controls Ignition Relay Feedback 3 Signal	Ignition ON	Volts	This parameter indicates the signal voltage from the third input to the controller from the powertrain relay.
Engine Controls Ignition Relay Control Circuit High Voltage Test Status	—	OK	This parameter displays the state of the Engine Controls Ignition Relay control circuit. The parameter displays Malfunction if the Engine Controls Ignition Relay control circuit is shorted to voltage.
Engine Controls Ignition Relay Control Circuit Low Voltage Test Status	—	OK	This parameter displays the state of the Engine Controls Ignition Relay control circuit. The parameter displays Malfunction if the Engine Controls Ignition Relay control circuit is shorted to ground.

Parameter	System State	Expected Value	Description
Engine Controls Ignition Relay Control Circuit Open Test Status	—	OK	This parameter displays the state of the Engine Controls Ignition Relay control circuit. The parameter displays Malfunction if the Engine Controls Ignition Relay control circuit is open.
Engine Controls Ignition Relay Feedback Signal	—	12.0-14.9 V	This parameter displays the voltage available at the Engine Controls Ignition Relay pin of the engine control module.
Engine Load	—	Varies	This parameter displays the engine load in percent based on inputs to the control module from various engine sensors. The scan tool will display a low percentage when the engine is at idle with little or no load. The scan tool will display a high percentage when the engine is running at a high RPM under a heavy load.
Engine Load During Misfire History 1-10	Ignition ON	%	This parameter displays the engine load during the last misfire event.
Engine Off Time	—	0:00:00 Seconds – Varies	This parameter displays the amount of time that has elapsed since the engine was last cycled OFF.
Engine Oil Absolute Pressure Sensor	—	kPa/PSI	This parameter displays the absolute pressure of the engine oil in kPa and psi.
Engine Oil Level Switch	—	OK/Low	This parameter displays the status of the engine oil level switch as determined by the control module. The control module uses this information to turn on the low engine oil lamp if the engine oil level remains approximately 1 quart low for a sufficient amount of time. The scan tool will display Low when the engine oil level is low. The scan tool will display OK when the engine oil level is correct.
Engine Oil Life Remaining	—	Varies	This parameter displays the amount engine oil life remaining before requiring an oil change based on calculations by the control module. The scan tool will display lower values as the engine oil life approaches 0 miles.
Engine Oil Pressure	—	kPa/PSI	This parameter displays the pressure of the engine oil as calculated by the control module using a signal from the engine oil pressure (EOP) sensor. The scan tool will display oil pressure when the engine is running. The engine oil pressure sensor has a range of values indicating a low value when the oil pressure is low to a high value when the oil pressure is high.
Engine Oil Pressure Control Solenoid Valve Command	—	High Pressure/Low Pressure	This parameter displays the current command of the oil pressure solenoid valve.

Parameter	System State	Expected Value	Description
Engine Oil Pressure Control Solenoid Valve Control Circuit High Voltage Test Status	—	OK	This parameter displays the status of the output driver for the engine oil pressure control solenoid circuit. The parameter displays Malfunction if the engine oil pressure control solenoid circuit is shorted to voltage.
Engine Oil Pressure Control Solenoid Valve Control Circuit Low Voltage Test Status	—	OK	This parameter displays the status of the output driver for the engine oil pressure control solenoid circuit. The parameter displays Malfunction if the engine oil pressure control solenoid circuit is shorted to ground.
Engine Oil Pressure Control Solenoid Valve Control Circuit Open Voltage Test Status	—	OK	This parameter displays the status of the output driver for the engine oil pressure control solenoid circuit. The parameter displays Malfunction if the engine oil pressure control solenoid circuit is open.
Engine Oil Pressure Sensor	—	Volts	This parameter displays the actual engine oil pressure measured by a sensor in volts.
Engine Oil Pressure Switch	—	OK	This parameter displays the state of the EOP as determined by the control module. The control module monitors the engine oil pressure (EOP) switch to determine if the EOP is sufficient. The scan tool will display low when the EOP is below a predetermined value.
Engine Run Time	—	Varies	This parameter displays the time elapsed since the engine was started. The scan tool will display the time in hours, minutes and seconds. The engine run time will reset to zero when the engine stops running.
Engine Run Time Since Last Particulate Filter Regeneration	—	hh:mm:ss	This parameter displays the total of time since the last regeneration. This parameter will be displayed in hours, minutes and seconds.
Engine Serial Number	—	#	This parameter displays the current engine serial number.
Engine Speed	—	600–800 RPM	This parameter displays the speed of the crankshaft as determined by the ECM using an input from the CKP sensor. The scan tool will display a high value at high engine speeds and a low value at low engine speeds.
Engine Speed During Misfire History 1–5	Ignition ON	RPM	This parameter displays the last 5 engine speeds during misfire events.
Engine Speed When Engine Overspeed Detected	Engine Idling	RPM	This parameter displays the engine speed observed upon initial detection of an overspeed condition. This value will be updated after each overspeed condition.

Parameter	System State	Expected Value	Description
Engine Torque	—	Varies	This parameter displays the estimated amount of torque that is delivered from the engine. The scan tool displays engine torque in newtonm (lb-ft). The ECM sends the engine torque information to the TCM via the high speed GMLAN serial data line.
{ If equipped } Exhaust Aftertreatment Fuel Injection System	—	Inactive	This parameter displays the state of the Exhaust Aftertreatment Fuel Injection System command.
{ If equipped } Exhaust Aftertreatment Fuel Injector Test Abort Reasons	—	None, Fuel Pressure Out of Range, Vehicle Speed Detected, Incorrect Power Mode, Exhaust Gas Temperature Too High, DTC Present, Diesel Particulate Filter Regeneration Active, Engine Must Be Running, Transmission Must Be in Park or Neutral, Exhaust Gas Temperature Too Low	This parameter contains the abort reason for the Exhaust Aftertreatment Fuel Injector Tip Cleaning Trigger Device Control and Exhaust Aftertreatment Fuel Injector Flow Test Trigger
{ If equipped } Exhaust Aftertreatment Fuel Injector Test Status	—	Not Requested, Flow Test Active, Flow Test Complete, Flow Test Aborted, Cleaning Procedure Active, Cleaning Procedure Complete, Cleaning Procedure Aborted	This parameter contains the status of the Exhaust Aftertreatment Fuel Injector Tip Cleaning and Flow Test device controls.
{ If equipped } Exhaust Aftertreatment Fuel Injector Command	—	%	This parameter displays the state of the Exhaust Aftertreatment Fuel Injection System command in percentage.
{ If equipped } Exhaust Aftertreatment Fuel Injector Control Circuit Command	—	Off	This parameter displays the state of the Exhaust Aftertreatment Fuel Injection Control Circuit command.
{ If equipped } Exhaust Aftertreatment Fuel Injector Control Circuit High Voltage Test Status	—	OK	This parameter displays the status of the exhaust aftertreatment fuel injector control circuit. The parameter displays Malfunction if the exhaust aftertreatment fuel injector circuit is shorted to voltage.
{ If equipped } Exhaust Aftertreatment Fuel Injector Control Circuit Low Voltage Test Status	—	OK	This parameter displays the status of the exhaust aftertreatment fuel injector control circuit. The parameter displays Malfunction if the exhaust aftertreatment fuel injector control circuit is shorted to ground.
{ If equipped } Exhaust Aftertreatment Fuel Injector Control Circuit Open Test Status	—	OK	This parameter displays the status of the exhaust aftertreatment fuel injector control circuit. The parameter displays Malfunction if the exhaust aftertreatment fuel injector control circuit is open.
{ If equipped } Exhaust Aftertreatment Fuel Injector Control Circuit Shorted Test Status	—	OK	This parameter displays the status of the exhaust aftertreatment fuel injector control circuit. The parameter displays Malfunction if the exhaust aftertreatment fuel injector control circuit is shorted.
{ If equipped } Exhaust Aftertreatment Fuel Injector Control Driver Overtemperature	—	No	This parameter displays if the Exhaust Aftertreatment Fuel Injector Control Driver (low side) has reached an overtemperature condition.

Parameter	System State	Expected Value	Description
{ If equipped } Exhaust Aftertreatment Fuel Injector High Control Circuit High Voltage Test Status	—	OK	This parameter displays the status of the exhaust aftertreatment fuel injector high control circuit. The parameter displays Malfunction if the exhaust aftertreatment fuel injector high control circuit is shorted to voltage.
{ If equipped } Exhaust Aftertreatment Fuel Injector High Control Circuit Low Voltage Test Status	—	OK	This parameter displays the status of the exhaust aftertreatment fuel injector high control circuit. The parameter displays Malfunction if the exhaust aftertreatment fuel injector high control circuit is shorted to ground.
{ If equipped } Exhaust Aftertreatment Fuel Injector High Control Driver Over-temperature	—	No	This parameter displays if the Exhaust Aftertreatment Fuel Injector High Control Driver (high side) has reached an overtempera-ture condition.
{ If equipped } Exhaust Aftertreatment Monitor Complete	—	No	This parameter displays the state of Exhaust Aftertreatment Monitor. The parameter displays Yes when the Exhaust Aftertreatment Monitor is complete.
{ If equipped } Exhaust Aftertreatment Monitor Complete This Ignition Cycle	—	No	This parameter displays the state of Exhaust Aftertreatment Monitor Complete This Ignition Cycle. The parameter displays Yes when the Exhaust Aftertreatment Monitor is Complete This Ignition Cycle.
{ If equipped } Exhaust Aftertreatment Monitor Enabled	—	No	This parameter displays the status of the Exhaust Aftertreatment Monitor. The parameter will display Yes when the Exhaust Aftertreat-ment Monitor is Enabled.
{ If equipped } Exhaust Aftertreatment Monitor Enabled This Ignition Cycle	—	No	This parameter displays the status of the Exhaust Aftertreatment Monitor Enabled This Ignition Cycle. The parameter will display Yes when the Exhaust Aftertreat-ment Monitor is Enabled This Ignition Cycle.
Exhaust Brake Switch	—	Off	This parameter displays the status of the Exhaust Brake Switch. The parameter will display On when the Exhaust Brake Switch is enabled.
Exhaust Gas Sensor Monitor Complete	—	Yes/No	This parameter displays the state of Exhaust Gas Sensor Monitor. The parameter displays Yes when the Exhaust Gas Sensor Monitor is complete.
Exhaust Gas Sensor Monitor Complete This Ignition Cycle	—	Yes/No	This parameter displays the state of Exhaust Gas Sensor Monitor Complete This Ignition Cycle. The parameter displays Yes when the Exhaust Gas Sensor Monitor is Complete This Ignition Cycle.
Exhaust Gas Sensor Monitor Enabled	—	Yes/No	This parameter displays the status of the Exhaust Gas Sensor Monitor. The parameter will display Yes when the Exhaust Gas Sensor Monitor is Enabled.

Parameter	System State	Expected Value	Description
Exhaust Gas Sensor Monitor Enabled This Ignition Cycle	—	Yes/No	This parameter displays the status of the Exhaust Gas Sensor Monitor Enabled This Ignition Cycle. The parameter will display Yes when the Exhaust Gas Sensor Monitor is Enabled This Ignition Cycle.
Exhaust Gas Temperature Sensor 1, 2, 3, 4, or 5	—	°C (°F)	This parameter will display the exhaust temperature before the DPF. When the exhaust temperature is low, the scan tool will display a low temperature. When the exhaust temperature is high, the scan tool will display a high temperature.
Exhaust Nitrogen Oxides Concentration High - Low Reductant Consumption Malfunction	—	Yes / No	This parameter displays Yes when excessive Nitrogen Oxides (NOx) are present in the exhaust, indicated by low reagent consumption.
Extended Travel Brake Pedal Position Signal	—	Released	This parameter displays the status of the Extended Travel Brake Pedal Position sensor.
Four Wheel Drive Crawl Mode	-—	Active / Inactive / Not Available	This parameter contains several signals associated with the status of the four wheel drive system.
Frozen Reductant – Diagnostic Inhibit	—	No	This parameter displays Yes if the reductant diagnostic is inoperative due to frozen reductant.
Frozen Reductant – Injection Inhibit	—	No	This parameter displays Yes if the reductant injection is inoperative due to frozen reductant.
Frozen Reductant – Refill Recognition Inhibit	—	No	This parameter displays Yes if the reductant refill monitor is inoperative due to frozen reductant.
Fuel Consumed Since Last DPF Regeneration	—	Liters/Gallons	This parameter displays the amount of fuel consumed since the last DPF regeneration.
Fuel Consumed Since Last DPF Replacement	—	Liters	This parameter displays the amount of Fuel Consumed Since Last DPF Replacement.
Fuel Consumption Rate	—	L/H	This parameter displays the amount of fuel consumed by engine per unit of time in liters per hour. NOTE: Engine Fuel Rate shall indicate zero L/H when the engine is not running.
Fuel Economy Mode Switch	Ignition ON	OK	This parameter displays the state of the fuel economy mode switch circuit. The parameter displays Malfunction if the fuel economy mode switch circuit is open.
Fuel Economy Mode Switch	Ignition ON	Volts	This parameter displays the economy mode switch refer-ence voltage.
Fuel Filter Life Remaining	—	%	This parameter displays the fuel filter life remaining before requiring an fuel filter change. This number is calculated by the control module based on many inputs and is displayed as a percent. The lower the percentage, the sooner the next fuel filter change will be required.

Parameter	System State	Expected Value	Description
Fuel Filter Pressure Switch	—	OK	This parameter displays the status of the fuel filter pressure switch.
Fuel Heater Relay Command	—	Off	This parameter displays the status of the fuel relay heater command.
Fuel Heater Relay Control Circuit High Voltage Test Status	—	OK	This parameter displays the status of the output driver for the fuel heater relay control circuit. The parameter displays Malfunction if the fuel heater relay control circuit is shorted to voltage.
Fuel Heater Relay Control Circuit Low Voltage Test Status	—	OK	This parameter displays the status of the output driver for the fuel heater relay control circuit. The parameter displays Malfunction if the fuel heater relay control circuit is shorted to ground.
Fuel Heater Relay Control Circuit Open Test Status	—	OK	This parameter displays the status of the output driver for the fuel heater relay control circuit. The parameter displays Malfunction if the fuel heater relay control circuit is open.
Fuel Injection Mode	—	Normal, Homogeneous Combustion Mode, Particulate Filter Regeneration with High Oxygen Concentration, Fuel Injection Small Quantity Learn, Fuel Injection Small Quantity Learn, Particulate Filter Regeneration with Low Oxygen Concentration, NOx Adsorber Catalyst Regeneration, Lean SOx Adsorber Catalyst Regeneration, Rich SOx Adsorber Catalyst Regeneration, Inhomogeneous Combustion Mode, NOx Catalyst Heating Mode 1, NOx Catalyst Heating Mode 2, Park or Neutral Gear DPF Regeneration, Rich Idle DPF Regeneration, Engine Protection High Oxygen Concentration DPF Regeneration, Engine Protection Low Oxygen Concentration DPF Regeneration, Engine Protection SOx Adsorber Catalyst Regeneration, NOx Catalyst Heating Mode 3, Fuel Injection Small Quantity Learn Combustion Mode, Hydrocarbon Purge Combustion Mode, Park or Neutral Gear Hydrocarbon Purge Combustion Mode, Reductant System Malfunction Warning Service Bay Test Warm Up Combustion Mode, Reductant System Malfunction Warning Service Bay Test Combustion Mode, SOx Purge Combustion Mode, Emissions Combustion Mode, Fast Exhaust System Warm-Up, Exhaust System Warm-Up	This parameter indicates which of the injection modes that currently is active.
Fuel Level Sensor	—	Volts	This parameter displays the voltage from the sensor used to monitor the fuel level inside the fuel tank.

Parameter	System State	Expected Value	Description
Fuel Level Sensor Rear Tank	—	Volts	This parameter contains the unfiltered fuel level sensor analog input for the secondary fuel tank as a percentage of its reference voltage.
Fuel Pressure Sensor	—	kPa (PSI)	For Port Fuel Injected (PFI) systems, this parameter displays undefaulted fuel rail pressure at the engine. For high pressure fuel systems, this parameter indicates the undefaulted low side fuel pressure before the high pressure pump.
Fuel Pressure Sensor	—	Volts	This parameter contains the fuel supply pressure sensor analog input as a percentage of its reference voltage.
Fuel Pressure Regulator 1 Command	—	%	This parameter displays the Fuel Pressure Regulator 1 duty cycle as commanded by the engine control module.
Fuel Pressure Regulator 1 Control Circuit Command	—	On/Off	This parameter displays the current command of the fuel pressure regulator 1.
Fuel Pressure Regulator 1 Control Circuit High Voltage Test Status	—	OK	This parameter displays the status of the output driver for the Fuel Pressure Regulator 1 Control Circuit High. The parameter displays Malfunction if the Fuel Pressure Regulator 1 Control Circuit High is shorted to voltage.
Fuel Pressure Regulator 1 Control Circuit Low Voltage Test Status	—	OK	This parameter displays the status of the output driver for the Fuel Pressure Regulator 1 Control Circuit High. The parameter displays Malfunction if the Fuel Pressure Regulator 1 Control Circuit High is shorted to ground.
Fuel Pressure Regulator 1 Control Circuit Open Test Status	—	OK	This parameter displays the status of the output driver for the Fuel Pressure Regulator 1 Control Circuit High. The parameter displays Malfunction if the Fuel Pressure Regulator 1 Control Circuit High is open.
Fuel Pressure Regulator 1 Control Circuit Shorted Test Status	—	OK	This parameter displays the status of the output driver for the Fuel Pressure Regulator 1 Control Circuit. The parameter displays Malfunction if the Fuel Pressure Regulator 1 Circuit is shorted.
Fuel Pressure Regulator 1 Control Driver Overtemperature	—	No	This parameter displays the state of the Fuel Pressure Regulator 1 Control Driver circuit. The parameter displays Yes if the Fuel Pressure Regulator 1 Control Driver Overtemperature is detected.
Fuel Pressure Regulator 1 Current	—	mA	This parameter displays the actual current for the Fuel Pressure Regulator 1.

Parameter	System State	Expected Value	Description
Fuel Pressure Regulator 1 High Control Circuit Command	—	On	This parameter displays the status of the Fuel Pressure Regulator 1 High Control Circuit Command. The parameter displays ON when the Fuel Pressure Regulator 1 High Control Circuit is Commanded ON by the engine control module.
Fuel Pressure Regulator 1 High Control Circuit High Voltage Test Status	—	OK	This parameter displays the state of the Fuel Pressure Regulator 1 High Control Circuit. The parameter displays Malfunction if the Fuel Pressure Regulator 1 High Control Circuit is shorted to voltage.
Fuel Pressure Regulator 1 High Control Circuit Low Voltage Test Status	—	OK	This parameter displays the state of the Fuel Pressure Regulator 1 High Control Circuit. The parameter displays Malfunction if the Fuel Pressure Regulator 1 High Control Circuit is shorted to ground.
Fuel Pressure Regulator 1 High Control Driver Overtemperature	—	No	This parameter displays the state of the Fuel Pressure Regulator 1 High Control Driver circuit. The parameter displays Yes if the Fuel Pressure Regulator 1 High Control Driver Overtemperature is detected.
Fuel Pressure Regulator 2 Command	—	%	This parameter displays the Fuel Rail Pressure Regulator 2 duty cycle.
Fuel Pressure Regulator 2 Control Circuit Command	—	On	This parameter displays the current command of the fuel pressure regulator 2.
Fuel Pressure Regulator 2 Control Circuit High Voltage Test Status	—	OK	This parameter displays the state of the Fuel Pressure Regulator 2 Control Circuit. The parameter displays Malfunction if the Fuel Pressure Regulator 2 Control Circuit is shorted to voltage.
Fuel Pressure Regulator 2 Control Circuit Low Voltage Test Status	—	OK	This parameter displays the state of the Fuel Pressure Regulator 2 Control Circuit. The parameter displays Malfunction if the Fuel Pressure Regulator 2 Control Circuit is shorted to ground.
Fuel Pressure Regulator 2 Control Circuit Open Test Status	—	OK	This parameter displays the state of the Fuel Pressure Regulator 2 Control Circuit. The parameter displays Malfunction if the Fuel Pressure Regulator 2 Control Circuit is open.
Fuel Pressure Regulator 2 Control Circuit Shorted Test Status	—	OK	This parameter displays the state of the Fuel Pressure Regulator 2 Control Circuit. The parameter displays Malfunction if the Fuel Pressure Regulator 2 Control Circuit is shorted.
Fuel Pressure Regulator 2 Control Driver Overtemperature	—	No	This parameter displays the state of the Fuel Pressure Regulator 2 High Control Driver circuit. The parameter displays Yes if the Fuel Pressure Regulator 2 High Control Driver Overtemperature is detected.

Parameter	System State	Expected Value	Description
Fuel Pressure Regulator 2 High Control Circuit Command	—	On/Off	This parameter displays the status of the Fuel Pressure Regulator 2 High Control Circuit Command. The parameter displays On when the Fuel Pressure Regulator 2 High Control Circuit is Commanded ON by the engine control module.
Fuel Pressure Regulator 2 High Control Circuit High Voltage Test Status	—	OK	This parameter displays the state of the Fuel Pressure Regulator 2 High Control Circuit. The parameter displays Malfunction if the Fuel Pressure Regulator 2 High Control Circuit is shorted to voltage.
Fuel Pressure Regulator 2 High Control Circuit Low Voltage Test Status	—	OK	This parameter displays the state of the Fuel Pressure Regulator 2 High Control Circuit. The parameter displays Malfunction if the Fuel Pressure Regulator 2 High Control Circuit is shorted to ground.
Fuel Pressure Regulator 2 High Control Driver Overtemperature	—	No	This parameter displays the state of the Fuel Pressure Regulator 2 High Control Driver circuit. The parameter displays Yes if the Fuel Pressure Regulator 2 High Control Driver Overtemperature is detected.
Fuel Pressure Sensor	Engine Idling	kPa/PSI	For Port Fuel Injected (PFI) systems, this Parameter displays fuel rail pressure at the engine. For high pressure fuel systems, this Parameter indicates the low side fuel pressure before the high pressure pump.
Fuel Pressure Sensor	Ignition ON	Volts	This parameter displays the fuel supply pressure sensor analog input as a percentage of its reference voltage.
Fuel Pump 2 Relay Command	Ignition ON	On / Off	This parameter contains several signals associated with the status of the fuel system
Fuel Pump 2 Relay Command	Ignition ON	On / Off	This parameter contains the commanded state of the secondary fuel pump output along with the status of its associated short to ground, open circuit, and short to power tests
Fuel Pump 2 Relay Control Circuit High Voltage Test Status	Ignition ON	OK, Malfunction, Not Run	This parameter contains the commanded state of the secondary fuel pump output along with the status of its associated short to ground, open circuit, and short to power tests
Fuel Pump 2 Relay Control Circuit Low Voltage Test Status	Ignition ON	OK, Malfunction, Not Run	This parameter contains the commanded state of the secondary fuel pump output along with the status of its associated short to ground, open circuit, and short to power tests
Fuel Pump 2 Relay Control Circuit Open Test Status	Ignition ON	OK, Malfunction, Not Run	This parameter contains the commanded state of the secondary fuel pump output along with the status of its associated short to ground, open circuit, and short to power tests

Parameter	System State	Expected Value	Description
Fuel Pump Driver Control Module Battery Voltage	Ignition ON	Volts	This parameter contains the Fuel Tank Zone Module's (FTZM) sensed battery voltage that's being transmitted from FTZM to the ECM over serial data
Fuel Pump Driver Control Module Voltage Signal	Ignition ON	Volts	This parameter contains the Fuel Tank Zone Module's (FTZM) sensed Run/Crank voltage that's being transmitted from FTZM to the ECM over serial data.
Fuel Pump Enable Circuit High Voltage Test Status	Ignition ON	OK	This parameter displays the status of the output driver for the fuel pump control circuit. The scan tool will display OK if the circuit is operating correctly or Not Run if a diagnosis has not been made. The scan tool will display Malfunction if there is an short to voltage in the circuit.
Fuel Pump Enable Circuit Low Voltage Test Status	Ignition ON	OK	This parameter displays the status of the output driver for the fuel pump control circuit. The scan tool will display OK if the circuit is operating correctly or Not Run if a diagnosis has not been made. The scan tool will display Malfunction if there is an short to ground in the circuit.
Fuel Pump Enable Command	Ignition ON	On	This parameter displays the commanded state of the fuel pump output (the output is considered to be commanded ON if its duty cycle is not zero).
Fuel Pump Phase U-V-W Circuits High Voltage Test Status	Ignition ON	OK, Malfunction, Not Run	This parameter contains the Fuel Tank Zone Module's (FTZM) reported status of short to ground, open circuit, short to power and phase-to-phase short tests
Fuel Pump Phase U-V-W Circuits Low Voltage Test Status	Ignition ON	OK, Malfunction, Not Run	This parameter contains the Fuel Tank Zone Module's (FTZM) reported status of short to ground, open circuit, short to power and phase-to-phase short tests
Fuel Pump Phase U-V-W Circuits Open Test Status	Ignition ON	OK, Malfunction, Not Run	This parameter contains the Fuel Tank Zone Module's (FTZM) reported status of short to ground, open circuit, short to power and phase-to-phase short tests
Fuel Pump Phase U-V-W Circuits Shorted Test Status	Ignition ON	OK, Malfunction, Not Run	This parameter contains the Fuel Tank Zone Module's (FTZM) reported status of short to ground, open circuit, short to power and phase-to-phase short tests
Fuel Pump Relay Command	—	On	This parameter displays the commanded state of the fuel pump relay control circuit. The fuel pump relay should be On when the scan tool indicates the Fuel Pump Relay Command is ON. The fuel pump relay should be Off when the scan tool indicates the Fuel Pump Relay Command is OFF.

Parameter	System State	Expected Value	Description
Fuel Pump Relay Control Circuit High Voltage Test Status	—	OK	This parameter displays the state of the Fuel Pump Relay Control Circuit. The parameter displays Malfunction if the Fuel Pump Relay Control Circuit is shorted to voltage.
Fuel Pump Relay Control Circuit Low Voltage Test Status	—	OK	This parameter displays the state of the Fuel Pump Relay Control Circuit. The parameter displays Malfunction if the Fuel Pump Relay Control Circuit is shorted to ground.
Fuel Pump Relay Control Circuit Open Test Status	—	OK	This parameter displays the state of the Fuel Pump Relay Control Circuit. The parameter displays Malfunction if the Fuel Pump Relay Control Circuit is open.
Fuel Pump Speed	Ignition ON	RPM	This parameter contains the fuel pump speed as sensed by the FTZM (Fuel Tank Zone Module).
Fuel Pump Speed Command	Ignition ON	RPM	This parameter contains the fuel pump commanded speed determined by the ECM and the speed to which the FTZM (Fuel Tank Zone Module) electronically commutates the brushless fuel pump.
Fuel Pump Speed Too High	Ignition ON	Yes / No	This parameter contains signals used within the Fuel Pump Speed Rationality Diagnostic (PSRD).
Fuel Pump Speed Too Low	Ignition ON	Yes / No	This parameter contains signals used within the Fuel Pump Speed Rationality Diagnostic (PSRD).
Fuel Pump Trim	Engine Running	0–4 %	This parameter displays the adjustments for the fuel pump duty cycle control. This is calculated by comparing the estimated fuel rail pressure to the desired fuel rail pressure. If the short term fuel pump trim consistently deviates from 0, the long term fuel pump trim is adjusted accordingly.
Fuel Rail Pressure Regulator 1 Command	Ignition ON	%	This parameter contains the commanded duty cycle for the fuel pressure regulator 1 solenoid output.
Fuel Rail Pressure Sensor	—	35–40 MPa (5076–5801 psi)	This parameter displays the fuel rail pressure as calculated by the control module. This value is calculated based on engine speed, engine load, and sensor inputs. The scan tool will display a higher value at higher engine speeds and loads, and a lower value at idle.
Fuel Rail Pressure Sensor	—	Volts	This parameter displays the voltage signal sent to the control module from the sensor used to measure the fuel rail pressure. The scan tool will display a low voltage at idle and high voltage when pressure demands are high.
Fuel Rail Temperature Sensor	—	°C (°F)	This parameter displays the current fuel rail temperature.

Parameter	System State	Expected Value	Description
Fuel System Monitor Complete	—	Yes	This parameter displays the status of the Fuel System Monitor. The scan tool displays Yes when test is completed.
Fuel System Monitor Complete This Ignition Cycle	—	Yes	This parameter displays the state of the Fuel System Monitor Complete This Ignition Cycle. The parameter displays Yes when the Fuel System Monitor is Complete This Ignition Cycle.
Fuel System Monitor Enabled	—	Yes	This parameter displays the status of the Fuel System Monitor. The parameter will display Yes when the Fuel System Monitor is Enabled.
Fuel System Monitor Enabled This Ignition Cycle	—	Yes/No	This parameter displays the status of the Fuel System Monitor Enabled This Ignition Cycle. The parameter will display Yes when the Fuel System Monitor is Enabled This Ignition Cycle.
Fuel Tank Rated Capacity	—	Liters	This parameter displays the capacity of the fuel tank in liters or gallons. The rated capacity displayed by the scan tool will vary with vehicle type.
Fuel Temperature Sensor	—	°C (°F)	This parameter displays the current fuel temperature as calculated by the control module based on input from the fuel temperature sensor. The scan tool will display a higher value at higher fuel temperatures. The scan tool will display a lower value at lower fuel temperatures.
Fuel Trim	—	Mm3/stk	This parameter displays the Fuel Mass Observer (FMO) correction value.
Fuel Trim	—	Allowed	This parameter displays the status of the Fuel Mass Observer (FMO) system.
Fuel Trim Enabled	—	Yes	This parameter indicates that the fuel mass observer functionality is enabled.
Fuel Trim Learn	—	Enabled	This parameter displays the status of the Fuel Mass Observer (FMO) system.
Fuel Used Since Last DPF Regeneration	—	Liters/Gallons	This parameter will display the amount of fuel used since last regeneration of the exhaust particulate filter.
Generator F-Terminal Signal	—	0–100%	This parameter indicates the generator field duty cycle as commanded by the voltage regulator or control module. The scan tool will display a higher value for a higher commanded generator output, and a lower value for a lower commanded generator output.

Parameter	System State	Expected Value	Description
Generator L-Terminal Circuit High Voltage Test Status	—	OK	This parameter displays the diagnostic state of the Generator L-Terminal circuit. The scan tool will display OK, Incomplete, Short B+/ Open, Short Gnd. The scan tool will display OK if the circuit is operating correctly.
Generator L-Terminal Circuit Low Voltage Test Status	—	OK	This parameter displays the diagnostic state of the Generator L-Terminal circuit. The scan tool will display OK, Incomplete, Short B+/ Open, Short Gnd. The scan tool will display OK if the circuit is operating correctly.
Generator L-Terminal Circuit Open Test Status	—	OK	This parameter displays the diagnostic state of the Generator L-Terminal circuit. The scan tool will display OK, Incomplete, Short B+/ Open, Short Gnd. The scan tool will display OK if the circuit is operating correctly.
Generator L-Terminal Command	—	0–100%	This parameter displays the control modules commanded state of the voltage regulator on the generator.
Generator L-Terminal Signal Command	—	On/Off	This parameter displays the signal command of the Generator L-Terminal.
Glow Plug Command	—	On/Off	This parameter displays the voltage supply to the glow plugs as measured by the control module. The scan tool will display a higher value at high voltages, or a lower value at lower voltages.
High Idle Speed	—	Enabled/Disabled	This parameter displays the current state of the High Idle Speed.
HO2S 1	—	Lambda	This parameter displays the actual lambda signal measured by wide range oxygen sensor 1 bank 1.
H02S 1 Heater Command	—	On/Off	This parameter displays the current command of the oxygen sensor heater control.
H02S 1 Heater Command	—	%	This parameter displays the current command of the oxygen sensor heater control in percentage.
H02S 1 Heater Control Circuit High Voltage Test Status	—	OK	This parameter displays the state of the oxygen sensor heater control circuit. The parameter displays Malfunction if the oxygen sensor heater control circuit is shorted to voltage.
H02S 1 Heater Control Circuit Low Voltage Test Status	—	OK	This parameter displays the state of the oxygen sensor heater control circuit. The parameter displays Malfunction if the oxygen sensor heater control circuit is shorted to ground.
H02S 1 Heater Control Circuit Open Test Status	—	OK	This parameter displays the state of the oxygen sensor heater control circuit. The parameter displays Malfunction if the oxygen sensor heater control circuit is open.

Parameter	System State	Expected Value	Description
H02S 1 Module Signal	—	Volts	This parameter displays the current voltage of the oxygen sensor heater module signal circuit.
IAT Sensor 1	—	°C (°F)	This parameter displays the temperature of the air entering the engine as calculated by the control module based on the input from the intake air temperature (IAT) sensor. The scan tool will display a low value when the air temperature is low, and a high value when the air temperature is high.
IAT Sensor 2	—	°C (°F)	This parameter displays the temperature of the air entering the engine as calculated by the control module based on the input from the intake air temperature (IAT) sensor 2. The scan tool will display a low value when the air temperature is low, and a high value when the air temperature is high.
IAT Sensor 2	—	Hz	This parameter displays the frequency of the humidity sensors' intake air temperature (IAT) sensor input to the engine control module.
IAT Sensor 3	—	°C (°F)	This parameter displays the temperature of the air entering the engine as calculated by the control module based on the input from the intake air temperature (IAT) sensor 3. The scan tool will display a low value when the air temperature is low, and a high value when the air temperature is high.
Ignition 1 Signal	—	On/Off	This parameter displays On when the control module detects B+ voltage at the ignition 1 input terminal.
Ignition Accessory Signal	—	Off	This parameter displays the state of the ignition 0 input to the control module from the ignition switch. The scan tool will display On when the ignition switch is in the ignition accessory position. The scan tool will display Off when the ignition switch is in any other position.
Ignition Cycles with Malfunction Since 1st Malfunction	—	Counts	This parameter displays the number of ignition cycles with a malfunction detected since the first ignition cycle with a malfunction detected.
Ignition Cycles without Completed Test Since 1st Malfunction	—	Counts	This parameter displays the number of ignition cycles without a pass or a malfunction reported since the first ignition cycle with a malfunction reported.
Ignition Cycles without Malfunction Since Last Malfunction	—	Counts	This parameter displays the number of ignition cycles with a pass reported and no malfunctions reported since the first ignition cycle with a malfunction reported.
Immobilizer Auto Learn Counter	—	Counts	This parameter displays the number of auto learn cycles that have been successfully completed within the immobilizer system.

Parameter	System State	Expected Value	Description
Immobilizer Automatic Learn Timer	—	hh:mm:ss	This parameter indicates that either the auto learn timer (used in the auto learn procedure to enable VTD password learning) or the seed and key timer (used in the seed and key procedure to enable VTD password learning) is active.
Immobilizer Password Learn	—	Disabled	This indicates learning of the Immobilizer password received from the platform electronics is enabled. Immobilizer password learning is first enabled in assembly plant (prior to the manufacturer's enable counter being set to zero) may be re-enabled using 1 of 2 procedures.
Immobilizer Password Learn Scan Tool Delay	—	Active/Inactive	Scan Tool Learn Delay Active indicates that the security code has been accepted but the scan tool learn delay is active and will not allow learning enabled, programming security code, or resetting security code.
Immobilizer Security Code Accepted	—	Yes	This parameter displays if the Immobilizer Security code was accepted by the ECM.
Immobilizer Security Code Function	—	Present	This parameter displays if the immobilizer security code was supported by the ECM.
Immobilizer Security Code Lockout	—	Inactive	This parameter displays if the Immobilizer Security code is locked out of the ECM.
Immobilizer Security Code Programmed	—	Yes	This parameter displays if the Immobilizer Security code is currently being programmed in the ECM.
Immobilizer Security Information Programmed	—	Yes	This parameter displays if the Immobilizer Security code has been programmed in the ECM.
Immobilizer System Status	—	Varies	This parameter displays the Immobilizer System status in the BCM.
Immobilizer Valid Response Received Time	—	ms	This parameter displays the actual time observed for a valid immobilizer response.
Induction System Leak Indication	—	:1	This parameter contains the ratio of desired intake air flow and the actual intake air flow as determined by the mass air flow (MAF) sensor.
Injector Timing	—	°	Indicates the current timing of the main injection pulse as calculated by the control module. The scan tool will display a higher value for a main injection event farther from top dead center (TDC). The Scan tool will display a lower value for a main injection event closer to TDC.
Inspection/Maintenance Drive Cycle Complete	—	No	Inspection/Maintenance Drive Cycle Complete means that all required components of the standard drive cycle have completed.

Parameter	System State	Expected Value	Description
Inspection/Maintenance Drive Cycle Idle Time Complete	—	No	Inspection/Maintenance Drive Cycle Idle Time Complete indicates that the engine idle time requirement is complete.
Inspection/Maintenance Drive Cycle Idle Timer	—	hh:mm:ss	This parameter displays the Inspection/Maintenance Drive Cycle Idle Timer.
Inspection/Maintenance Drive Cycle Propulsion System Active Time Complete	—	No	This parameter displays the Inspection/Maintenance Drive Cycle Propulsion System Active Time Complete. The parameter displays Yes when the Inspection/ Maintenance Drive Cycle Propulsion System Active Time is Complete.
Inspection/Maintenance Drive Cycle Propulsion System Active Timer	—	hh:mm:ss	This parameter displays the total accumulated time in which the propulsion system has been active after the 1st time the engine is started.
Inspection/Maintenance Drive Cycle Vehicle Speed Time Complete	—	No	This parameter displays Yes when the Vehicle Speed Time Complete indicates that the vehicle has been above 25 mph for five minutes.
Inspection/Maintenance Drive Cycle Vehicle Speed Timer	—	hh:mm:ss	This parameter displays the total accumulated time in which the vehicle speed has been greater than 25 mph after the 1st time the engine is started.
Intake Air Flow Valve Control Circuit 1 High Voltage Test Status	—	OK	This parameter displays the status of the Intake Air Flow Valve Control Circuit 1 output driver. The scan tool will display OK if the circuit is operating correctly or Not Run if a diagnosis has not been made. The scan tool will display Malfunction if there is a short to voltage in the circuit.
Intake Air Flow Valve Control Circuit 1 Low Voltage Test Status	—	OK	This parameter displays the status of the Intake Air Flow Valve Control Circuit 1 output driver. The scan tool will display OK if the circuit is operating correctly or Not Run if a diagnosis has not been made. The scan tool will display Malfunction if there is a short to ground in the circuit.
Intake Air Flow Valve Control Circuit 2 High Voltage Test Status	—	OK	This parameter displays the status of the Intake Air Flow Valve Control Circuit 2 output driver. The scan tool will display OK if the circuit is operating correctly or Not Run if a diagnosis has not been made. The scan tool will display Malfunction if there is a short to voltage in the circuit.
Intake Air Flow Valve Control Circuit 2 Low Voltage Test Status	—	OK	This parameter displays the status of the Intake Air Flow Valve Control Circuit 2 output driver. The scan tool will display OK if the circuit is operating correctly or Not Run if a diagnosis has not been made. The scan tool will display Malfunction if there is a short to ground in the circuit.

Parameter	System State	Expected Value	Description
Intake Air Flow Valve Control Circuit Open Test Status	—	OK	This parameter displays the status of the Intake Air Flow Valve Control Circuit. The scan tool will display OK if the circuit is operating correctly or Not Run if a diagnosis has not been made. The scan tool will display Malfunction if there is an open in the circuit.
Intake Air Flow Valve Control Circuit Shorted Test Status	—	OK	This parameter displays the status of the Intake Air Flow Valve Control Circuit. The scan tool will display OK if the circuit is operating correctly or Not Run if a diagnosis has not been made. The scan tool will display Malfunction if there is a short in the circuit.
Intake Air Flow Valve Control Driver Overcurrent	—	No	This parameter displays the status of the Intake Air Flow Valve Control driver. The scan tool will display Yes when an overcurrent is detected.
Intake Air Flow Valve Control Driver Overtemperature	—	No	This parameter displays the status of the Intake Air Flow Valve Control driver. The scan tool will display Yes when overtemperature is detected.
Intake Air Flow Valve Control Driver Temperature Dependent Overcurrent	—	No	This parameter displays the status of the Intake Air Flow Valve Control driver. The scan tool will display Yes when Temperature Dependent Overcurrent is detected.
Intake Air Flow Valve Control Driver Undervoltage	—	No	This parameter displays the status of the Intake Air Flow Valve Control driver. The scan tool will display Yes when Undervoltage is detected.
Intake Air Flow Valve Learned Closed Position	—	%	This parameter displays the minimum position learned for Intake Air Flow Valve position sensor when the Intake Air Flow Valve is closed.
Intake Air Flow Valve Motor Command	—	%	This parameter displays the commanded duty cycle for the Intake Airflow Valve output.
Intake Air Flow Valve Position	—	%	This parameter displays the position determined from Intake Air Flow Valve position sensor (corrected based upon its learned minimum position).
Intake Air Flow Valve Position Sensor	—	Volts	This parameter displays the Intake Air Flow Valve position sensor voltage input.
Intake Air Heater Command	—	On/Off	This parameter displays the current status of the Intake Air Heater.
Intake Air Heater Command	—	%	This parameter displays the current status of the Intake Air Heater in percentage.
Intake Air Humidity Sensor	—	%	This parameter displays the percentage of humidity at the intake air sensor.

Parameter	System State	Expected Value	Description
Intake Manifold Pressure	—	kPa	This parameter displays the engine intake manifold vacuum pressure calculated as the difference between ambient air pressure (barometric pressure) and intake manifold absolute pressure (MAP).
Intake Manifold Runner Control Valve Command	—	%	This parameter displays the current command in percentage of the intake manifold runner control valve.
Intake Manifold Runner Control Valve Diagnostic Test Status	—	Varies	This parameter displays the current phase of the intake manifold runner control valve diagnostic test.
Intake Manifold Runner Control Valve Feedback Signal	—	%	This parameter displays the current command in percentage of the intake manifold runner control valve feedback signal.
Intake Manifold Runner Control Valve Position	—	Open, Intermediate, Closed	This parameter displays the current position of the intake manifold runner control valve.
Intake/Single Camshaft Position Active Counter	—	Counts	This parameter displays an incrementing counter when the control module receives a signal from the camshaft position sensor.
Intake/Single Camshaft Position Sensor	Engine Idling	0 RPM	This parameter displays the speed of the engine as calculated by the signal from a camshaft position (CMP) sensor. This parameter will always display 0 unless a condition with the CKP sensor or CKP reluctor exists. If a CKP condition exists the control module will use a valid CMP sensor signal to determine engine speed and crank/camshaft position.
Lost Communication with NOX Sensor - Engine Malfunction	—	Yes / No	This parameter displays Yes if the engine controller lost serial data communication with NOx Sensor A.
Lost Communication with NOX Sensor - Post Catalytic Converter Malfunction	—	Yes / No	This parameter displays Yes if the engine controller lost serial data communication with NOx Sensor B (post catalyst NOx sensor)
Lost Communication with NOX Sensor - Post Catalytic Converter 2 Malfunction	—	Yes / No	This parameter displays Yes if the engine controller lost serial data communication with NOx Sensor C.
Low Engine Oil Level Indicator Command	—	Off	This parameter displays the Engine Oil Level Low Indicator Command. The scan tool displays ON in order to inform the driver of a low engine oil level condition.
Low Engine Oil Pressure Indicator Command	—	Off	This parameter displays the Low Engine Oil Indicator Command. The scan tool displays ON in order to inform the driver of a low engine oil pressure condition.
MAF Sensor	Engine Idling	6–20 g/s	This parameter indicates the quantity calculated by the control module based on a signal from the MAF sensor. The scan tool will display a high value at high engine speeds, and a low value at low engine speeds.
	Engine speed at 2,500 RPM	130–150 g/s	

Parameter	System State	Expected Value	Description
MAF Sensor	—	2300–3100 Hz	This parameter indicates the frequency signal received from the MAF sensor by the control module. The scan tool will display a high value at high engine speeds, and a low value at low engine speeds.
MAF When Engine Overspeed Detected	Engine Idling	g/s	This parameter indicates the quantity calculated by the control module based on a signal from the MAF sensor at the time an overspeed was detected.
Main-Injection	—	Inactive	Main Injection Active indicates that main injection is active.
MAP Sensor	—	0.95–1.06 Volts	This parameter indicates the voltage signal received by the control module from the MAP sensor. The scan tool displays a low voltage at idle, and a high voltage at wide open throttle. Barometric pressure and altitude can affect these values.
MAP Sensor	—	kPa/PSI	This parameter displays the actual engine intake manifold absolute pressure (MAP).
MIL Command	—	Off	This parameter displays the commanded state of the malfunction indicator lamp (MIL) control circuit by the engine control module.
MIL Control Circuit High Voltage Test Status	—	OK	This parameter displays the state of the MIL control circuit. The parameter displays Malfunction if the MIL control circuit is shorted to voltage.
MIL Control Circuit Low Voltage Test Status	—	OK	This parameter displays the state of the MIL control circuit. The parameter displays Malfunction if the MIL control circuit is shorted to ground.
MIL Control Circuit Open Test Status	—	OK	This parameter displays the state of the MIL control circuit. The parameter displays Malfunction if the MIL control circuit is open.
MIL Requested	—	No	This parameter displays the commanded state of the malfunction indicator lamp (MIL) control circuit by the engine control module.
MIL Requested by DTC	—	No	This parameter indicates the reason the control module illuminated the MIL. The scan tool will display Yes when the MIL is requested as a result of an A or B type DTC. The scan tool will display No if the MIL is illuminated for another reason, such as transmission DTCs.
Misfire Diagnostic Engine Speed	Engine Idling	RPM	This parameter displays the engine speed used within the misfire diagnostic. This engine speed is the maximum engine speed observed over the previous engine cycle.

Parameter	System State	Expected Value	Description
Misfire Monitor Complete	—	No	This parameter displays the status of the Misfire Monitor. The parameter will display Yes when the Misfire Monitor is Complete.
Misfire Monitor Complete This Ignition Cycle	—	Varies	This parameter displays the diagnostic monitor enable status during the current driving/ monitoring cycle.
Misfire Monitor Enabled	—	No	This parameter displays the status of the Misfire Monitor. The parameter will display Yes when the Misfire Monitor is Enabled.
Misfire Monitor Enabled This Ignition Cycle	—	Varies	This parameter displays the diagnostic monitor enable status during the current driving/ monitoring cycle.
Neutral Position Sensor	—	%	This parameter displays the current state of the neutral position sensor in degrees.
Nitrogen Oxides Catalytic Converter Efficiency Gross Error Test	—	%	This parameter displays the measured average Selective Catalyst Reduction (SCR) efficiency for urea quality determination during the gross error test.
Nitrogen Oxides Catalytic Converter Efficiency Small Error Test Variation	—	%	This parameter displays the Selective Catalyst Reduction (SCR) efficiency urea quality deviation during the small error test.
Nitrogen Oxides Catalytic Converter Efficiency Small Error Test Threshold	—	%	This parameter displays the Selective Catalyst Reduction (SCR) efficiency urea quality deviation threshold which triggers fast adaptation.
Nitrogen Oxides Catalytic Converter Reductant Load	—	g	This parameter contains the NH3 (Ammonia) storage in the Selective Catalyst (SCR) Reduction system in terms of grams.
Nitrogen Oxides Catalytic Converter Reductant-Load Adaptive Value	—	#	This parameter displays the SCR long term adaptation factor.
Nitrogen Oxides Catalytic Converter System Malfunction Warning Indicator Command	—	Warning Level 1–7	This parameter displays the Non-Tamper Selective Catalyst Reduction (SCR) warning command.
Nitrogen Oxides Sensor Circuit Malfunction	—	Yes / No	This parameter displays the state of the Nitrogen Oxides (NOx) Sensor 1 Circuit. The parameter displays Malfunction if the Bank 1 Sensor 1 circuit is open or shorted.
Nitrogen Oxides Sensor Heater Control Circuit Malfunction	—	Yes / No	This parameter displays the state of the Nitrogen Oxides (NOx) Sensor 1 Heater Control Circuit. The parameter displays Malfunction if the Heater Circuit is open or shorted.
Nitrogen Oxides Sensor Heater Feedback Circuit Malfunction	—	Yes / No	This parameter displays the state of the Nitrogen Oxides (NOx) Sensor 1 Heater Feedback Circuit. The parameter displays Malfunction if the heater feedback circuit is open or shorted.

Parameter	System State	Expected Value	Description
Nitrogen Oxides Sensor Heater Ground Circuit Malfunction	—	Yes / No	This parameter displays the state of the Nitrogen Oxides (NOx) Sensor 1 Heater Ground Circuit. The parameter displays Malfunction if the heater ground circuit is open or shorted.
Nitrogen Oxides Sensor Heater Supply Voltage Circuit Malfunction	—	Yes / No	This parameter displays the state of the Nitrogen Oxides (NOx) Sensor 1 Heater Supply Voltage Circuit. The parameter displays Malfunction if the heater supply voltage circuit is open or shorted.
Nitrogen Oxides Emissions Monitor Efficiency	—	%	This parameter displays the measured nitrogen oxides emissions monitor efficiency.
Nitrogen Oxides Emissions Warning Indicator	—	0–15	This parameter displays the nitrogen oxides emissions too high warning level.
Nitrogen Oxides Sensor Heater Control Circuit High Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the nitrogen oxides sensor heater supply circuit is shorted high.
Nitrogen Oxides Sensor Heater Control Circuit Low Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the nitrogen oxides sensor heater supply circuit is shorted low.
Nitrogen Oxides Sensor Heater Control Circuit Open Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the nitrogen oxides sensor heater supply circuit is shorted open.
Nitrogen Oxides Sensor Heater Feedback Circuit High Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the nitrogen oxides sensor temperature circuit is shorted high.
Nitrogen Oxides Sensor Heater Feedback Circuit Low Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the nitrogen oxides sensor temperature circuit is shorted low.
Nitrogen Oxides Sensor Heater Feedback Circuit Open Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the nitrogen oxides sensor temperature circuit is open.
Nitrogen Oxides Sensor Heater Ground Circuit High Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the nitrogen oxides sensor heater feedback circuit is shorted high.
Nitrogen Oxides Sensor Heater Ground Circuit Low Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the nitrogen oxides sensor heater feedback circuit is shorted low.
Nitrogen Oxides Sensor Heater Ground Circuit Open Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the nitrogen oxides sensor heater feedback circuit is open.
Nitrogen Oxides Sensor Heater Mode	—	Varies	This parameter displays the status of the nitrogen oxides sensor heater.
Nitrogen Oxides Sensor Heater Operation	—	Allowed / Not Allowed	This parameter displays the state of the nitrogen oxides sensor heater operation. The parameter displays Allowed when commanded by the engine control module.
Nitrogen Oxides Sensor Heater Resistance	—	Ω	This parameter displays the resistance value of the nitrogen oxides sensor 1 heater.
Nitrogen Oxides Sensor Nitrogen Oxides Concentration	—	ppm	This parameter displays the concentration of nitrogen oxides in the exhaust gas detected by nitrogen oxides sensor 1.

Parameter	System State	Expected Value	Description
Nitrogen Oxides Sensor Signal Circuit High Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the nitrogen oxides sensor signal circuit is shorted high.
Nitrogen Oxides Sensor Signal Circuit Low Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the nitrogen oxides sensor signal circuit is shorted low.
Nitrogen Oxides Sensor Signal Circuit Malfunction	—	Yes / No	This parameter displays the state of the Nitrogen Oxides (NOx) Sensor Signal Circuit. The parameter displays Malfunction if the sensor signal circuit is open or shorted.
Nitrogen Oxides Sensor Signal Circuit Open Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the nitrogen oxides sensor signal circuit is open.
Nitrogen Oxides Sensor Oxygen Concentration	—	%	This parameter displays the concentration of Oxygen in the exhaust gas from nitrogen oxides sensor 1.
Nitrogen Oxides Catalytic Converter 2 Efficiency	—	%	This parameter displays the measured Selective Catalyst Reduction 2 (SCR2) efficiency.
Nitrogen Oxides Catalytic Converter 2 Efficiency During Particulate Filter Regeneration	—	%	This parameter displays the Selective Catalyst Reduction 2 (SCR2) efficiency monitor estimated average efficiency during particulate filter regeneration.
Nitrogen Oxides Sensor 2 Circuit Malfunction	—	Yes / No	This parameter displays the state of the Nitrogen Oxides (NOx) Sensor 2 Circuit. The parameter displays Malfunction if the Bank 1 Sensor 2 circuit is open or shorted.
Nitrogen Oxides Sensor 2 Heater Control Circuit High Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the nitrogen oxides sensor 2 heater supply circuit is shorted high.
Nitrogen Oxides Sensor 2 Heater Control Circuit Low Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the nitrogen oxides sensor 2 heater supply circuit is shorted low.
Nitrogen Oxides Sensor 2 Heater Control Circuit Malfunction	—	Yes / No	This parameter displays the state of the Nitrogen Oxides (NOx) Sensor 2 Heater Control Circuit. The parameter displays Malfunction if the heater control circuit is open or shorted.
Nitrogen Oxides Sensor 2 Heater Control Circuit Open Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the nitrogen oxides sensor 2 heater supply circuit is shorted open.
Nitrogen Oxides Sensor 2 Heater Feedback Circuit High Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the nitrogen oxides sensor 2 temperature circuit is shorted high.
Nitrogen Oxides Sensor 2 Heater Feedback Circuit Low Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the nitrogen oxides sensor 2 temperature circuit is shorted low.
Nitrogen Oxides Sensor 2 Heater Feedback Circuit Malfunction	—	Yes / No	This parameter displays the state of the Nitrogen Oxides (NOx) Sensor 2 Heater Feedback Circuit. The parameter displays Malfunction if the heater feedback circuit is open or shorted.

Parameter	System State	Expected Value	Description
Nitrogen Oxides Sensor 2 Heater Feedback Circuit Open Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the nitrogen oxides sensor 2 temperature circuit is open.
Nitrogen Oxides Sensor 2 Heater Ground Circuit High Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the nitrogen oxides sensor 2 heater feedback circuit is shorted high.
Nitrogen Oxides Sensor 2 Heater Ground Circuit Low Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the nitrogen oxides sensor 2 heater feedback circuit is shorted low.
Nitrogen Oxides Sensor 2 Heater Ground Circuit Malfunction	—	Yes / No	This parameter displays the state of the Nitrogen Oxides (NOx) Sensor 2 Heater Ground Circuit. The parameter displays Malfunction if the heater ground circuit is open or shorted.
Nitrogen Oxides Sensor 2 Heater Ground Circuit Open Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the nitrogen oxides sensor 2 heater feedback circuit is open.
Nitrogen Oxides Sensor 2 Heater Mode	—	Varies	This parameter displays the status of the nitrogen oxides sensor 2 heater.
Nitrogen Oxides Sensor 2 Heater Operation	—	Allowed / Not Allowed	This parameter displays the state of the nitrogen oxides sensor 2 heater operation. The parameter displays Allowed when commanded by the engine control module.
Nitrogen Oxides Sensor 2 Heater Resistance	—	Ω	This parameter displays the resistance value of the nitrogen oxides sensor 2 heater.
Nitrogen Oxides Sensor 2 Heater Supply Voltage Circuit Malfunction	—	Yes / No	This parameter displays the state of the Nitrogen Oxides (NOx) Sensor 2 Heater Supply Voltage Circuit. The parameter displays Malfunction if the heater supply voltage circuit is open or shorted.
Nitrogen Oxides Sensor 2 Nitrogen Oxides Concentration	—	ppm	This parameter displays the concentration of nitrogen oxides in the exhaust gas detected by nitrogen oxides sensor 2.
Nitrogen Oxides Sensor 2 Signal Circuit High Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the nitrogen oxides sensor 2 signal circuit is shorted high.
Nitrogen Oxides Sensor 2 Signal Circuit Low Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the nitrogen oxides sensor 2 signal circuit is shorted low.
Nitrogen Oxides Sensor 2 Signal Circuit Malfunction	—	Yes / No	This parameter displays the state of the Nitrogen Oxides (NOx) Sensor 2 Signal Circuit. The parameter displays Malfunction if the signal circuit is open or shorted.
Nitrogen Oxides Sensor 2 Signal Circuit Open Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the nitrogen oxides sensor 2 signal circuit is open.
Nitrogen Oxides Sensor 2 Oxygen Concentration	—	%	This parameter displays the concentration of Oxygen in the exhaust gas from nitrogen oxides sensor 2.

Parameter	System State	Expected Value	Description
Nitrogen Oxides Sensor 3 Heater Control Circuit High Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the nitrogen oxides sensor 3 heater supply circuit is shorted high.
Nitrogen Oxides Sensor 3 Heater Control Circuit Low Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the nitrogen oxides sensor 3 heater supply circuit is shorted low.
Nitrogen Oxides Sensor 3 Heater Control Circuit Malfunction	—	Yes / No	This parameter displays the state of the Nitrogen Oxides (NOx) Sensor 3 Heater Control Circuit. The parameter displays Malfunction if the heater control circuit is open or shorted.
Nitrogen Oxides Sensor 3 Heater Control Circuit Open Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the nitrogen oxides sensor 3 heater supply circuit is shorted open.
Nitrogen Oxides Sensor 3 Heater Feedback Circuit High Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the nitrogen oxides sensor 3 temperature circuit is shorted high.
Nitrogen Oxides Sensor 3 Heater Feedback Circuit Low Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the nitrogen oxides sensor 3 temperature circuit is shorted low.
Nitrogen Oxides Sensor 3 Heater Feedback Circuit Malfunction	—	Yes / No	This parameter displays the state of the Nitrogen Oxides (NOx) Sensor 3 Heater Feedback Circuit. The parameter displays Malfunction if the heater feedback circuit is open or shorted.
Nitrogen Oxides Sensor 3 Heater Feedback Circuit Open Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the nitrogen oxides sensor 3 temperature circuit is open.
Nitrogen Oxides Sensor 3 Heater Ground Circuit High Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the nitrogen oxides sensor 3 heater feedback circuit is shorted high.
Nitrogen Oxides Sensor 3 Heater Ground Circuit Low Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the nitrogen oxides sensor 3 heater feedback circuit is shorted low.
Nitrogen Oxides Sensor 3 Heater Ground Circuit Malfunction	—	Yes / No	This parameter displays the state of the Nitrogen Oxides (NOx) Sensor 3 Heater Ground Circuit. The parameter displays Malfunction if the heater ground circuit is open or shorted.
Nitrogen Oxides Sensor 3 Heater Ground Circuit Open Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the nitrogen oxides sensor 3 heater feedback circuit is open.
Nitrogen Oxides Sensor 3 Heater Mode	—	Varies	This parameter displays the status of the nitrogen oxides sensor 3 heater.
Nitrogen Oxides Sensor 3 Heater Operation	—	Allowed / Not Allowed	This parameter displays the state of the nitrogen oxides sensor 3 heater operation. The parameter displays Allowed when commanded by the engine control module.
Nitrogen Oxides Sensor 3 Heater Resistance	—	Ω	This parameter displays the resistance value of the nitrogen oxides sensor 3 heater.

Parameter	System State	Expected Value	Description
Nitrogen Oxides Sensor 3 Heater Supply Voltage Circuit Malfunction	—	Yes / No	This parameter displays the state of the Nitrogen Oxides (NOx) Sensor 3 Heater Supply Voltage Circuit. The parameter displays Malfunction if the heater supply voltage circuit is open or shorted.
Nitrogen Oxides Sensor 3 Nitrogen Oxides Concentration	—	ppm	This parameter displays the concentration of nitrogen oxides in the exhaust gas detected by nitrogen oxides sensor 3.
Nitrogen Oxides Sensor 3 Oxygen Concentration	—	%	This parameter displays the concentration of oxygen in the exhaust gas detected by nitrogen oxides sensor 3.
Nitrogen Oxides Sensor 3 Signal Circuit High Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the nitrogen oxides sensor 3 signal circuit is shorted high.
Nitrogen Oxides Sensor 3 Signal Circuit Low Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the nitrogen oxides sensor 3 signal circuit is shorted low.
Nitrogen Oxides Sensor 3 Signal Circuit Malfunction	—	Yes / No	This parameter displays the state of the Nitrogen Oxides (NOx) Sensor 3 Signal Circuit. The parameter displays Malfunction if the signal circuit is open or shorted.
Nitrogen Oxides Sensor 3 Signal Circuit Open Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the nitrogen oxides sensor 3 signal circuit is open.
Number of Completed Particulate Filter Regenerations	—	Counts	This parameter displays the number of successful particulate filter regenerations.
Number of DTC(s)	—	Counts	This parameter displays the number of emission related DTCs stored in the ECM.
Odometer When Engine Overspeed Detected	Engine Idling	km/miles	This parameter displays the kilometers or miles of the Odometer When Engine Overspeed Detected.
Output Shaft Speed Sensor	Engine Idling	RPM	This parameter displays the transmission output speed.
Oxygen Low Reference Circuit (Nitrogen Oxides Sensor) Malfunction	—	Yes / No	This parameter displays the state of the Nitrogen Oxides (NOx) Sensor 1 Oxygen Low Reference Circuit. The parameter displays Malfunction if the low reference circuit is open or shorted.
Oxygen Low Reference Circuit (Nitrogen Oxides Sensor 2) Malfunction	—	Yes / No	This parameter displays the state of the Nitrogen Oxides (NOx) Sensor 2 Oxygen Low Reference Circuit. The parameter displays Malfunction if the low reference circuit is open or shorted.
Oxygen Low Reference Circuit (Nitrogen Oxides Sensor 3) Malfunction	—	Yes / No	This parameter displays the state of the Nitrogen Oxides (NOx) Sensor 3 Oxygen Low Reference Circuit. The parameter displays Malfunction if the low reference circuit is open or shorted.
Oxygen Low Reference Circuit (Nitrogen Oxides Sensor) Open Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the oxygen low reference circuit for NOx sensor 1 is open.

Parameter	System State	Expected Value	Description
Oxygen Low Reference Circuit (Nitrogen Oxides Sensor 2) Open Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the oxygen low reference circuit for NOx sensor 2 is open.
Oxygen Low Reference Circuit (Nitrogen Oxides Sensor 3) Open Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the oxygen low reference circuit for NOx sensor 3 is open.
Oxygen Low Reference Circuit High (Nitrogen Oxides Sensor) Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the oxygen low reference circuit for NOx sensor 1 is shorted high.
Oxygen Low Reference Circuit High (Nitrogen Oxides Sensor 2) Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the oxygen low reference circuit for NOx sensor 2 is shorted high.
Oxygen Low Reference Circuit High (Nitrogen Oxides Sensor 3) Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the oxygen low reference circuit for NOx sensor 3 is shorted high.
Oxygen Low Reference Circuit Low (Nitrogen Oxides Sensor) Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the oxygen low reference circuit for NOx sensor 1 is shorted low.
Oxygen Low Reference Circuit Low (Nitrogen Oxides Sensor 2) Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the oxygen low reference circuit for NOx sensor 2 is shorted low.
Oxygen Low Reference Circuit Low (Nitrogen Oxides Sensor 3) Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the oxygen low reference circuit for NOx sensor 3 is shorted low.
Oxygen Pump Current Control Circuit (Nitrogen Oxides Sensor) Malfunction	—	Yes / No	This parameter displays the state of the Nitrogen Oxides (NOx) Sensor 1 Oxygen Pump Current Control Circuit. The parameter displays Malfunction if the pump current control circuit is open or shorted.
Oxygen Pump Current Control Circuit (Nitrogen Oxides Sensor 2) Malfunction	—	Yes / No	This parameter displays the state of the Nitrogen Oxides (NOx) Sensor 2 Oxygen Pump Current Control Circuit. The parameter displays Malfunction if the pump current control circuit is open or shorted.
Oxygen Pump Current Control Circuit (Nitrogen Oxides Sensor 3) Malfunction	—	Yes / No	This parameter displays the state of the Nitrogen Oxides (NOx) Sensor 3 Oxygen Pump Current Control Circuit. The parameter displays Malfunction if the pump current control circuit is open or shorted.
Oxygen Pump Current Control Circuit (Nitrogen Oxides Sensor) Open Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the oxygen pump current control circuit for NOx sensor 1 is open.
Oxygen Pump Current Control Circuit (Nitrogen Oxides Sensor 2) Open Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the oxygen pump current control circuit for NOx sensor 2 is open.
Oxygen Pump Current Control Circuit (Nitrogen Oxides Sensor 3) Open Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the oxygen pump current control circuit for NOx sensor 3 is open.
Oxygen Pump Current Control Circuit High (Nitrogen Oxides Sensor) Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the oxygen pump current control circuit for NOx sensor 1 is shorted high.
Oxygen Pump Current Control Circuit High (Nitrogen Oxides Sensor 2) Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the oxygen pump current control circuit for NOx sensor 2 is shorted high.

Parameter	System State	Expected Value	Description
Oxygen Pump Current Control Circuit High (Nitrogen Oxides Sensor 3) Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the oxygen pump current control circuit for NOx sensor 3 is shorted high.
Oxygen Pump Current Control Circuit Low (Nitrogen Oxides Sensor) Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the oxygen pump current control circuit for NOx sensor 1 is shorted low.
Oxygen Pump Current Control Circuit Low (Nitrogen Oxides Sensor 2) Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the oxygen pump current control circuit for NOx sensor 2 is shorted low.
Oxygen Pump Current Control Circuit Low (Nitrogen Oxides Sensor 3) Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the oxygen pump current control circuit for NOx sensor 3 is shorted low.
Oxygen Reference Circuit (Nitrogen Oxides Sensor) Open Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the oxygen reference circuit for NOx sensor 1 is open.
Oxygen Reference Circuit (Nitrogen Oxides Sensor 2) Open Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the oxygen reference circuit for NOx sensor 2 is open.
Oxygen Reference Circuit (Nitrogen Oxides Sensor 3) Open Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the oxygen reference circuit for NOx sensor 3 is open.
Oxygen Reference Circuit High (Nitrogen Oxides Sensor) Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the oxygen reference circuit for NOx sensor 1 is shorted high.
Oxygen Reference Circuit High (Nitrogen Oxides Sensor 2) Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the oxygen reference circuit for NOx sensor 2 is shorted high.
Oxygen Reference Circuit High (Nitrogen Oxides Sensor 3) Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the oxygen reference circuit for NOx sensor 3 is shorted high.
Oxygen Reference Circuit Low (Nitrogen Oxides Sensor) Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the oxygen reference circuit for NOx sensor 1 is shorted low.
Oxygen Reference Circuit Low (Nitrogen Oxides Sensor 2) Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the oxygen reference circuit for NOx sensor 2 is shorted low.
Oxygen Reference Circuit Low (Nitrogen Oxides Sensor 3) Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the oxygen reference circuit for NOx sensor 3 is shorted low.
Oxygen Reference Voltage Circuit (Nitrogen Oxides Sensor) Malfunction	—	Yes / No	This parameter displays the state of the Nitrogen Oxides (NOx) Sensor 1 Oxygen Reference Voltage Circuit. The parameter displays Malfunction if the reference voltage circuit is open or shorted.
Oxygen Reference Voltage Circuit (Nitrogen Oxides Sensor 2) Malfunction	—	Yes / No	This parameter displays the state of the Nitrogen Oxides (NOx) Sensor 2 Oxygen Reference Voltage Circuit. The parameter displays Malfunction if the reference voltage circuit is open or shorted.
Oxygen Reference Voltage Circuit (Nitrogen Oxides Sensor 3) Malfunction	—	Yes / No	This parameter displays the state of the Nitrogen Oxides (NOx) Sensor 3 Oxygen Reference Voltage Circuit. The parameter displays Malfunction if the reference voltage circuit is open or shorted.

Parameter	System State	Expected Value	Description
Oxygen Sensor Signal Circuit (Nitrogen Oxides Sensor) Malfunction	—	Yes / No	This parameter displays the state of the Nitrogen Oxides (NOx) Sensor 1 Oxygen Sensor Signal Circuit. The parameter displays Malfunction if the sensor signal circuit is open or shorted.
Oxygen Sensor Signal Circuit (Nitrogen Oxides Sensor 2) Malfunction	—	Yes / No	This parameter displays the state of the Nitrogen Oxides (NOx) Sensor 2 Oxygen Sensor Signal Circuit. The parameter displays Malfunction if the sensor signal circuit is open or shorted.
Oxygen Signal Circuit (Nitrogen Oxides Sensor 3) Malfunction	—	Yes / No	This parameter displays the state of the Nitrogen Oxides (NOx) Sensor 3 Oxygen Signal (Lambda Linear Signal) Circuit. The parameter displays Malfunction if the signal circuit is open or shorted.
Oxygen Signal Circuit (Nitrogen Oxides Sensor) Open Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the Oxygen Signal (Lambda Linear Signal) circuit for NOx sensor 2 is open.
Oxygen Signal Circuit (Nitrogen Oxides Sensor 2) Open Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the Oxygen Signal (Lambda Linear Signal) circuit for NOx sensor 2 is open.
Oxygen Signal Circuit (Nitrogen Oxides Sensor 3) Open Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the Oxygen Signal (Lambda Linear Signal) circuit for NOx sensor 3 is open.
Oxygen Signal Circuit High (Nitrogen Oxides Sensor) Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the Oxygen Signal (Lambda Linear Signal) circuit for NOx sensor 1 is shorted high.
Oxygen Signal Circuit High (Nitrogen Oxides Sensor 2) Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the Oxygen Signal (Lambda Linear Signal) circuit for NOx sensor 2 is shorted high.
Oxygen Signal Circuit High (Nitrogen Oxides Sensor 3) Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the Oxygen Signal (Lambda Linear Signal) circuit for NOx sensor 3 is shorted high.
Oxygen Signal Circuit Low (Nitrogen Oxides Sensor) Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the Oxygen Signal (Lambda Linear Signal) circuit for NOx sensor 1 is shorted low.
Oxygen Signal Circuit Low (Nitrogen Oxides Sensor 2) Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the Oxygen Signal (Lambda Linear Signal) circuit for NOx sensor 2 is shorted low.
Oxygen Signal Circuit Low (Nitrogen Oxides Sensor 3) Test Status	—	Okay / Malfunction / Not Run	The parameter displays Malfunction if the Oxygen Signal (Lambda Linear Signal) circuit for NOx sensor 3 is shorted low.
PTO	—	Active / Inactive	This parameter contains an indication that power take off (PTO) is active
PTO Engine Shutdown Signal	—	Yes / No	This parameter contains several signals associated with the status of the power take off (PTO) and fast idle systems.

Parameter	System State	Expected Value	Description
Park/Neutral Position Switch	—	Park/Neutral/In Gear	This parameter indicates the range selection of the automatic transmission as calculated by the control module based on input from the park/neutral position (PNP) switch. The scan tool will display, In Gear, Park, or Neutral depending on the PNP switch position.
Particulate Filter Monitor - Since Diagnostic Trouble Codes Cleared	—	Not Supported / Complete / Incomplete	This parameter displays the status of the Particulate Filter monitor, the parameter displays Complete when the monitor has completed since DTCs Cleared.
Particulate Filter Monitor - This Ignition Cycle	—	Disabled / Enabled / Complete	This parameter displays Complete if completion status during the current driving / monitoring cycle of the Particulate Filter Monitor is complete.
Particulate Filter Pressure	—	kPa (PSI)	This parameter contains the diesel particulate filter pressure calculated as the difference between ambient air pressure (barometric pressure) and the exhaust gas pressure
Particulate Filter Pressure Sensor	—	Volts	This parameter will display the voltage differential between the front and rear pressures at the DPF as calculated by the ECM. This will be displayed in volts. As the DPF becomes restricted the differential pressure increases and the voltage will get higher.
Particulate Filter Pressure Sensor Circuit High Malfunction	—	Yes / No	This parameter will display Yes if the particulate filter pressure sensor circuit is malfunctioning.
Particulate Filter Regeneration Inhibit - Battery Voltage Low	—	Yes / No	This parameter displays Yes when regeneration is inhibited due to battery in under voltage conditions.
Particulate Filter Regeneration Inhibit - Catalytic Converter Inlet Temperature Too High	—	Yes / No	This parameter displays Yes when regeneration is inhibited due to diesel oxidation catalyst inlet temperature too high.
Particulate Filter Regeneration Inhibit - Catalytic Converter Outlet Temperature Too High	—	Yes / No	This parameter displays Yes when regeneration is inhibited due to diesel oxidation catalyst outlet temperature too high.
Particulate Filter Regeneration Inhibit - Deceleration Fuel Cut-Off	—	Yes / No	This parameter displays Yes when regeneration is inhibited due to extended engine cutoff.
Particulate Filter Regeneration Inhibit - Engine Coolant Temperature Too High	—	Yes / No	This parameter displays Yes when regeneration is inhibited due to engine coolant temperature too high.
Particulate Filter Regeneration Inhibit - Engine Off	—	Yes / No	This parameter displays Yes when regeneration is inhibited due to engine stopped.
Particulate Filter Regeneration Inhibit - Excessive Idle Time	—	Yes / No	This parameter displays Yes when regeneration is inhibited due to extended engine low-idle.
Particulate Filter Regeneration Inhibit - Fuel Temperature Too High	—	Yes / No	This parameter displays Yes when regeneration is inhibited due to fuel temperature too high.

Parameter	System State	Expected Value	Description
Particulate Filter Regeneration Inhibit - Insufficient Time Since Last Regeneration Attempt	—	Yes / No	This parameter displays Yes when regeneration is inhibited due to regeneration time lock.
Particulate Filter Regeneration Inhibit - Low Fuel Level	—	Yes / No	This parameter displays Yes when regeneration is inhibited due to too low fuel tank level.
Particulate Filter Regeneration Inhibit - Maximum Post-Fuel Injection Time Exceeded	—	Yes / No	This parameter displays Yes when regeneration is inhibited due to post-injection maximum enabling time expired.
Particulate Filter Regeneration Inhibit - Maximum Steady State Time Exceeded	—	Yes / No	This parameter displays Yes when regeneration is inhibited due to diesel particulate filter regeneration steady-state maximum entering time expired.
Particulate Filter Regeneration Inhibit - Maximum Time Exceeded	—	Yes / No	This parameter displays Yes when regeneration is inhibited due to diesel particulate regeneration duration too long.
Particulate Filter Regeneration Inhibit - Nitrogen Oxides Catalytic Converter Outlet Temperature Too High	—	Yes / No	This parameter displays Yes when regeneration is inhibited due to Selective Catalytic Reduction (SCR) outlet temperature too high.
Particulate Filter Regeneration Inhibit - Particulate Filter Inlet Temperature Too High	—	Yes / No	This parameter displays Yes when regeneration is inhibited due to diesel particulate filter inlet temperature too high.
Particulate Filter Regeneration Inhibit - Particulate Filter Outlet Temperature Too High	—	Yes / No	This parameter displays Yes when regeneration is inhibited due to diesel particulate filter outlet temperature too high.
Particulate Filter Regeneration Inhibit - Particulate Matter Sensor Regeneration Active	—	Yes / No	This parameter displays Yes when regeneration is inhibited due to particulate matter sensor regeneration.
Particulate Filter Regeneration Inhibit - Power Takeoff is Enabled	—	Yes / No	This parameter displays Yes when regeneration is inhibited due to deactivated by Power Takeoff (PTO).
Particulate Filter Regeneration Inhibit - Reductant Injector Cooling Disabled	—	Yes / No	This parameter displays Yes when regeneration is inhibited due to reductant injector (DEFMV) cooling not possible.
Particulate Filter Regeneration Inhibit - Regeneration Already Completed	—	Yes / No	This parameter displays Yes when regeneration is inhibited due to diesel particulate filter regeneration completed.
Particulate Filter Regeneration Inhibit - System Malfunction	—	Yes / No	This parameter displays Yes when regeneration is inhibited for a system fault or a DTC present.
Particulate Filter Regeneration Inhibit - Turbocharger Inlet Temperature Too High	—	Yes / No	This parameter displays Yes when regeneration is inhibited due to turbo charger inlet temperature too high.
Particulate Filter Regeneration Inhibit - Vehicle Speed or Engine Load Too Low	—	Yes / No	This parameter displays Yes when regeneration is inhibited due to vehicle speed below a threshold or the engine load below a minimum.
Particulate Filter Regeneration Reason	—	Varies	This parameter displays the regeneration demand and completion status.

Parameter	System State	Expected Value	Description
Particulate Filter Regeneration Status	—	Not Required / Active—Varied Stages / Inhibited	This parameter displays the status of the Diesel Particulate regeneration activity.
Particulate Filter Service Regeneration Status	—	Not Requested / Active / Completed / Failed	This parameter displays the status of the Diesel Particulate Service Regeneration procedure.
Particulate Filter Soot Accumulation Calculated From Other Engine Data	—	%	This parameter displays the estimated percentage of soot in the Diesel Particle Filter using the available engine data.
Particulate Filter Soot Accumulation Calculated From Particulate Filter Pressure Sensor	—	%	This parameter displays the estimated percentage of soot in the Diesel Particle Filter using the particulate filter pressure sensor.
Particulate Matter Sensor	—	Mg/m3	This parameter displays the mass concentration of exhaust particulate matter measured by the particulate matter sensor.
Particulate Matter Sensor	—	uA	This parameter displays the measured current from the sensing element of the particulate matter sensor.
Particulate Matter Sensor Control Unit Communication Status	—	Ready	This parameter displays the communication status of the particulate matter sensor control unit.
Particulate Matter Sensor Identifier	—	#	This parameter displays the value sent from the sensor control unit to engine control module to provide sensor build information in order for the software to compensate for sensor variations.
Particulate Matter Sensor Measurement	—	Active	This parameter displays the status of the particular matter sensor.
Particulate Matter Sensor Operation	—	Allowed	This parameter displays if the exhaust temperature dew point is reached to allow the particulate matter sensor to operate.
Particulate Matter Sensor Regeneration	—	Inactive	This parameter displays Active when the particulate matter sensor is regenerating.
Particulate Matter Sensor Soot Accumulation	—	%	This parameter displays Particulate Matter (PM) Sensor normalized output in percent.
Particulate Matter Sensor Status	—	Ready	This parameter displays the status of the particulate matter sensor.
Particulate Matter Sensor Temperature	—	°C (°F)	This parameter displays the current temperature of the particulate matter sensor in Celsius and Fahrenheit.
Pilot Injection	—	Inactive	Pilot Injection Active indicates that pilot injections are active.
Positive Crankcase Ventilation Heater Command	—	On/Off	This parameter displays the current command of the positive crankcase ventilation heater.
Positive Crankcase Ventilation Heater Control Circuit High Voltage Test Status	—	OK	This parameter displays the state of the positive crankcase heater control circuit. The parameter displays Malfunction if the positive crankcase heater control circuit is shorted to voltage.

Parameter	System State	Expected Value	Description
Positive Crankcase Ventilation Heater Control Circuit Low Voltage Test Status	—	OK	This parameter displays the state of the positive crankcase heater control circuit. The parameter displays Malfunction if the positive crankcase heater control circuit is shorted to ground.
Positive Crankcase Ventilation Heater Control Circuit Open Test Status	—	OK	This parameter displays the state of the positive crankcase heater control circuit. The parameter displays Malfunction if the positive crankcase heater control circuit is open.
Post Injection	—	Inactive	Post Injection Active indicates that post injections is active
Power Mode	—	Off	This parameter displays the state of the System Power Mode. This signal is based upon the state of the system power mode received over serial communication from the vehicle electronics.
Radiator Coolant Temperature Sensor	—	°C (°F)	This parameter displays the radiator coolant temperature measured by a sensor located in the coolant outlet of the radiator.
Reduced Engine Power	—	Inactive	This parameter will display the fuel system status as commanded by the ECM.
Reduced Engine Power History	—	Varies	This parameter displays the last reason that the engine control module has illuminated the Reduced Engine Power (REP) indication.
Reductant Absolute Pressure	—	kPa	This parameter displays the absolute pressure of the reductant.
Reductant Control Module Sensor Communication Ground Circuit High Malfunction	—	Yes / No	The parameter displays Yes if the Nitrogen Oxides (NOx) reductant control module sensor/switch communication ground circuit A is faulted high.
Reductant Control Module Sensor Reference Circuit High Malfunction	—	Yes / No	The parameter displays Yes if the Nitrogen Oxides (NOx) reductant control module sensor/switch communication 5V supply circuit A is faulted high.
Reductant Control Module Sensor Reference Circuit Low Malfunction	—	Yes / No	The parameter displays Yes if the Nitrogen Oxides (NOx) reductant control module sensor/switch communication 5V supply circuit A is faulted low.
Reductant Control Module Sensor Serial Communication Circuit High Malfunction	—	Yes / No	The parameter displays Yes if the Nitrogen Oxides (NOx) reductant control module sensor/switch communication circuit A is faulted high.
Reductant Control Module Sensor Serial Communication Circuit Low Malfunction	—	Yes / No	The parameter displays Yes if the Nitrogen Oxides (NOx) reductant control module sensor/switch communication circuit A is faulted low.

Parameter	System State	Expected Value	Description
Reductant Control Module Sensor Serial Communication Circuit Performance Malfunction	—	Yes / No	The parameter displays Yes if the Nitrogen Oxides (NOx) reductant control module sensor/switch communication circuit A faulty performance.
Reductant Consumption During Drive Cycle	—	L (gal)	This parameter displays the amount of reductant (DEF) used during the current drive cycle.
Reductant Fluid Quality Gross Error Test	—	Complete / Incomplete	This parameter displays the test completion state of the Selective Catalyst Reduction (SCR) gross error quality check procedure.
Reductant Fluid Quality Gross Error Test Diagnostic	—	Active / Inactive	This parameter displays the monitoring status of the Selective Catalyst Reduction (SCR) gross error quality check procedure.
Reductant Fluid Quality Gross Error Test Diagnostics	—	Varies	This parameter displays the phases of the Selective Catalyst Reduction (SCR) gross error quality check procedure.
Reductant Fluid Quality Gross Error Test Performed This Ignition Cycle	—	Yes / No	This parameter displays the test completion state of the Selective Catalyst Reduction (SCR) gross error quality check procedure during the most recent ignition cycle.
Reductant Fluid Quality Gross Error Test Requested Warning	—	Yes / No	This parameter displays the warning requested as a result of the of the Selective Catalyst Reduction (SCR) gross error quality check procedure.
Reductant Fluid Quality Small Error Test	—	Complete / Incomplete	This parameter displays the test completion state of the Selective Catalyst Reduction (SCR) small error quality check procedure.
Reductant Fluid Quality Small Error Test Diagnostic	—	Active / Inactive	This parameter displays the monitoring status of the Selective Catalyst Reduction (SCR) small error quality check procedure.
Reductant Fluid Quality Small Error Test Performed This Ignition Cycle	—	Yes / No	This parameter displays the test completion state of the Selective Catalyst Reduction (SCR) small error quality check procedure during the most recent ignition cycle.
Reductant Fluid Quality Test	—	Completed with success	This parameter displays the phases of the SCR (Selective Catalyst Reduction) service quality check procedure.
Reductant Fluid Quality Test Diagnostic	—	Varies	This parameter displays the phases of the Selective Catalyst Reduction (SCR) service quality check procedure.
Reductant Fluid Quality Warning Indicator Command	—	None	This parameter displays the control module Nitrogen Oxides (NOx) reductant quality warning indicator command.
Reductant Heater Command	—	On / Off	This parameter displays the commanded state of the Nitrogen Oxides (NOx) reductant heater 1 output (the output is considered to be commanded On if the duty cycle is not zero)

Parameter	System State	Expected Value	Description
Reductant Heater Control Circuit High Malfunction	—	Yes / No	The parameter displays Yes if the Nitrogen Oxides (NOx) reductant tank heater circuit is shorted to voltage.
Reductant Heater Control Circuit High Test Status	—	OK, Malfunction, Not Run	The parameter displays Malfunction if the low-side control circuit for Nitrogen Oxides (NOx) reductant tank heater 1 is shorted to voltage.
Reductant Heater Control Circuit Low Malfunction	—	Yes / No	The parameter displays Yes if the Nitrogen Oxides (NOx) reductant tank heater circuit is shorted to ground.
Reductant Heater Control Circuit Low Test Status	—	OK, Malfunction, Not Run	The parameter displays Malfunction if the low-side control circuit for Nitrogen Oxides (NOx) reductant heater 1 is shorted to ground.
Reductant Heater Control Circuit Malfunction	—	Yes / No	The parameter displays Yes if the Nitrogen Oxides (NOx) reductant tank heater circuit is open.
Reductant Heater Control Circuit Open Test Status	—	OK, Malfunction, Not Run	The parameter displays Malfunction if the low-side control circuit for Nitrogen Oxides (NOx) reductant heater 1 is open.
Reductant Heater Current	—	Amps	This parameter displays the Nitrogen Oxides (NOx) reductant heater 1 current.
Reductant Heater Driver Temperature Too High Malfunction	—	Yes / No	The parameter displays Yes if the Nitrogen Oxides (NOx) reductant tank heater driver temperature is too high.
Reductant Heater Feedback Circuit Low Malfunction	—	Yes / No	The parameter displays Yes if the Nitrogen Oxides (NOx) reductant tank heater supply undervoltage fault check fails.
Reductant Heater High Control Circuit High Test Status	—	OK, Malfunction, Not Run	The parameter displays Malfunction if the high-side circuit for Nitrogen Oxides (NOx) reductant heater 1 is shorted to voltage.
Reductant Heater High Control Circuit Low Test Status	—	OK, Malfunction, Not Run	The parameter displays Malfunction if the high-side circuit for Nitrogen Oxides (NOx) reductant heater 1 is shorted to ground.
Reductant Heater Performance Malfunction	—	Yes / No	The parameter displays Yes if reductant tank heater fails a plausibility check.
Reductant Heater 2 Command	—	On / Off	This parameter displays the commanded state of the Nitrogen Oxides (NOx) reductant heater 2 output (the output is considered to be commanded On if the duty cycle is not zero)
Reductant Heater 2 Control Circuit High Malfunction	—	Yes / No	The parameter displays Yes if the Nitrogen Oxides (NOx) reductant line heater circuit is shorted to voltage.
Reductant Heater 2 Control Circuit High Test Status	—	OK, Malfunction, Not Run	The parameter displays Malfunction if the low-side control circuit for Nitrogen Oxides (NOx) reductant heater 2 is shorted to voltage.

Parameter	System State	Expected Value	Description
Reductant Heater 2 Control Circuit Low Malfunction	—	Yes / No	The parameter displays Yes if the Nitrogen Oxides (NOx) reductant line heater circuit is shorted to ground.
Reductant Heater 2 Control Circuit Low Test Status	—	OK, Malfunction, Not Run	The parameter displays Malfunction if the low-side control circuit for Nitrogen Oxides (NOx) reductant heater 2 is shorted to ground.
Reductant Heater 2 Control Circuit Malfunction	—	Yes / No	The parameter displays Yes if the Nitrogen Oxides (NOx) reductant line heater circuit is open.
Reductant Heater 2 Control Circuit Open Test Status	—	OK, Malfunction, Not Run	The parameter displays Malfunction if the low-side control circuit for Nitrogen Oxides (NOx) reductant heater 2 is open.
Reductant Heater 2 Current	—	Amps	This parameter displays the Nitrogen Oxides (NOx) reductant heater 2 current.
Reductant Heater 2 Driver Temperature Too High Malfunction	—	Yes / No	The parameter displays Yes if the Nitrogen Oxides (NOx) reductant line heater driver temperature is too high.
Reductant Heater 2 Feedback Circuit Low Malfunction	—	Yes / No	The parameter displays Yes if the Nitrogen Oxides (NOx) reductant line heater supply undervoltage fault check fails.
Reductant Heater 2 High Control Circuit High Test Status	—	OK, Malfunction, Not Run	The parameter displays Malfunction if the high-side control circuit for Nitrogen Oxides (NOx) reductant heater 2 is shorted to voltage.
Reductant Heater 2 High Control Circuit Low Test Status	—	OK, Malfunction, Not Run	The parameter displays Malfunction if the high-side control circuit for Nitrogen Oxides (NOx) reductant heater 2 is shorted to ground.
Reductant Heater 2 Performance Malfunction	—	Yes / No	The parameter displays Yes if reductant line heater fails a plausibility check.
Reductant Heater Request	—	On / Off	This parameter displays the commanded state of the Reductant Heater 1. The Reductant Heater 1 should be On when the scan tool indicates the Reductant Heater 1 Command is ON.
Reductant Heater 2 Request	—	On / Off	This parameter displays the commanded state of the Reductant Heater 2. The Reductant Heater 2 should be On when the scan tool indicates the Reductant Heater 2 Command is ON.
Reductant Heater 3 Request	—	On / Off	This parameter displays the commanded state of the Reductant Heater 3. The Reductant Heater 3 should be On when the scan tool indicates the Reductant Heater 3 Command is ON.
Reductant Heater Supply Voltage	—	Okay / Out of Range	This parameter displays Out of Range if reductant tank/pipe heaters voltage is out of range.
Reductant High Pressure Malfunction	—	Yes / No	The parameter displays Yes if the Nitrogen Oxides (NOx) reductant pressure control governor deviation is high.

Parameter	System State	Expected Value	Description
Reductant Low Pressure Malfunction	—	Yes / No	The parameter displays Yes if the Nitrogen Oxides (NOx) reductant pressure control governor deviation is low.
Reductant Injection Control Extreme Pressure Test	—	Passed	This parameter displays the test status of the NOx reductant dosing system extreme pressure test.
Reductant Injection Control Low Pressure Test	—	Passed	This parameter displays the test status of the NOx reductant dosing system low pressure test.
Reductant Injection Control Overpressure Test Status	—	Passed	This parameter displays the test status of the NOx reductant closing system overpressure test.
Reductant Injection Control Pressure Build-Up Test Status	—	Passed	This parameter displays the test status of the NOx reductant dosing system test.
Reductant Injection Inhibit Reason	—	Varies	This parameter displays the reason why the Nitrogen Oxides (NOx) Reductant system has been inhibited from operation.
Reductant Injection Inhibit Requested	—	Yes / No	This parameter displays Yes if the Nitrogen Oxides (NOx) Reductant system has been inhibited from operation.
Reductant Injection Quantity Test Abort Reason	—	Varies	This parameter displays the reductant injector quantity flow test abort reason.
Reductant Injection Quantity Test Status	—	Varies	This parameter displays the reductant injector quantity flow test status.
Reductant Injector Command	—	%	This parameter displays the commanded duty cycle for the NOx reductant dosing valve output.
Reductant Injector Control Circuit High Malfunction	—	Yes / No	The parameter displays Yes if the Nitrogen Oxides (NOx) reductant injector low-side control circuit is shorted to voltage.
Reductant Injector Control Circuit High Test Status	—	Okay, Malfunction, Not Run	This parameter displays the state of the reductant injector 1 control circuit. The parameter displays Malfunction if the low-side control circuit is shorted to voltage.
Reductant Injector Control Circuit Low Malfunction	—	Yes / No	The parameter displays Yes if the Nitrogen Oxides (NOx) reductant injector low-side control circuit is shorted to ground.
Reductant Injector Control Circuit Low Test Status	—	Okay, Malfunction, Not Run	This parameter displays the state of the reductant injector 1 control circuit. The parameter displays Malfunction if the low-side control circuit is shorted to ground.
Reductant Injector Control Circuit Malfunction	—	Yes / No	The parameter displays Yes if the Nitrogen Oxides (NOx) reductant injector control circuit is open.
Reductant Injector Control Circuit Open Test Status	—	Okay, Malfunction, Not Run	This parameter displays the state of the reductant injector 2 control circuit. The parameter displays Malfunction if the low-side control circuit is open.

Parameter	System State	Expected Value	Description
Reductant Injector Control Circuit Status	—	No Malfunction Present	This parameter displays the status of the Reductant Injection Control Circuit output.
Reductant Injector High Control Circuit High Malfunction	—	Yes / No	The parameter displays Yes if the Nitrogen Oxides (NOx) reductant injector high-side control circuit is shorted to voltage.
Reductant Injector High Control Circuit High Test Status	—	Okay, Malfunction, Not Run	This parameter displays the state of the reductant injector 1 high-side control circuit. The parameter displays Malfunction if the high-side control circuit is shorted to voltage.
Reductant Injector High Control Circuit Low Malfunction	—	Yes / No	The parameter displays Yes if the Nitrogen Oxides (NOx) reductant injector high-side control circuit is shorted to ground.
Reductant Injector High Control Circuit Low Test Status	—	Okay, Malfunction, Not Run	This parameter displays the state of the reductant injector 1 high-side control circuit. The parameter displays Malfunction if the high-side control circuit is shorted to ground.
Reductant Injector Performance Malfunction	—	Yes / No	The parameter displays Yes if a Nitrogen Oxides (NOx) reductant injector circuit is out of range.
Reductant Injector 2 Control Circuit High Test Status	—	Okay, Malfunction, Not Run	This parameter displays the state of the reductant injector 2 control circuit. The parameter displays Malfunction if the low-side control circuit is shorted to voltage.
Reductant Injector 2 Control Circuit Low Test Status	—	Okay, Malfunction, Not Run	This parameter displays the state of the reductant injector 2 control circuit. The parameter displays Malfunction if the low-side control circuit is shorted to ground.
Reductant Injector 2 Control Circuit Open Test Status	—	Okay, Malfunction, Not Run	This parameter displays the state of the reductant injector 2 control circuit. The parameter displays Malfunction if the low-side control circuit is open.
Reductant Injector 2 High Control Circuit High Test Status	—	Okay, Malfunction, Not Run	This parameter displays the state of the reductant injector 2 high-side control circuit. The parameter displays Malfunction if the high-side control circuit is shorted to voltage.
Reductant Injector 2 High Control Circuit Low Test Status	—	Okay, Malfunction, Not Run	This parameter displays the state of the reductant injector 2 high-side control circuit. The parameter displays Malfunction if the high-side control circuit is shorted to ground.
Reductant Injector 2 Quantity Test Abort Reason	—	Varies	This parameter displays the reductant injector 2 quantity flow test abort reason.
Reductant Injector 2 Quantity Test Status	—	Varies	This parameter displays the reductant injector 2 quantity flow test status.
Reductant Level	—	%	This parameter displays the total Reductant level as a percentage of the rated capacity of the tank.

Parameter	System State	Expected Value	Description
Reductant Level Sensor 1	—	Inactive	This parameter displays the individual Reductant Level Switch states. Active indicates that the level switch is detecting fluid in regards to its position in the reductant reservoir.
Reductant Level Sensor Circuit Low Malfunction	—	Yes / No	The parameter displays Yes if the Nitrogen Oxides (NOx) reductant level sensor circuit voltage is low.
Reductant Level Sensor 1 Circuit Status	—	No Malfunction	This parameter displays the circuit status of each reductant level sensor.
Reductant Level Sensor 2	—	Inactive	This parameter displays the individual Reductant Level Switch states. Active indicates that the level switch is detecting fluid in regards to its position in the reductant reservoir.
Reductant Level Sensor 2 Circuit Status	—	No Malfunction	This parameter displays the circuit status of each reductant level sensor.
Reductant Level Sensor 3	—	Inactive	This parameter displays the individual Reductant Level Switch states. Active indicates that the level switch is detecting fluid in regards to its position in the reductant reservoir.
Reductant Level Sensor 3 Circuit Status	—	No Malfunction	This parameter displays the circuit status of each reductant level sensor.
Reductant Level Warning Indicator Command	—	None	This parameter displays the engine control module (ECM) requested reductant fluid level warning indicator state.
Reductant Pressure	—	kPa (PSI)	This parameter displays the engine Reductant pressure from the sensor.
Reductant Pressure Sensor	—	Volts	This parameter contains the reductant pressure analog input as a percentage of its reference voltage.
Reductant Pressure Sensor Circuit High Malfunction	—	Yes / No	The parameter displays Yes if the Nitrogen Oxides (NOx) reductant tank pressure sensor signal circuit is shorted high.
Reductant Pressure Sensor Circuit Low Malfunction	—	Yes / No	The parameter displays Yes if the Nitrogen Oxides (NOx) reductant tank pressure sensor signal circuit is shorted low.
Reductant Pressure Sensor Performance Malfunction	—	Yes / No	The parameter displays Yes if Nitrogen Oxides (NOx) reductant pressure sensor fails a plausibility check.
Reductant Pump Command	—	%	This parameter displays the commanded duty cycle for the Nitrogen Oxides (NOx) reductant pump.
Reductant Pump Control Circuit High Malfunction	—	Yes / No	The parameter displays Yes if the Nitrogen Oxides (NOx) reductant pump control circuit is shorted to voltage.

Parameter	System State	Expected Value	Description
Reductant Pump Control Circuit High Test Status	—	Okay, Malfunction, Not Run	The parameter displays Malfunction if a Nitrogen Oxides (NOx) reductant pump motor phase control circuit is shorted high.
Reductant Pump Control Circuit Low Malfunction	—	Yes / No	The parameter displays Yes if the Nitrogen Oxides (NOx) reductant pump control circuit is shorted to ground.
Reductant Pump Control Circuit Low Test Status	—	Okay, Malfunction, Not Run	The parameter displays Malfunction if a Nitrogen Oxides (NOx) reductant pump motor phase control circuit is shorted to ground.
Reductant Pump Control Circuit Malfunction	—	Yes / No	The parameter displays Yes if the Nitrogen Oxides (NOx) reductant pump control circuit is open.
Reductant Pump Control Circuit Open Test Status	—	Okay, Malfunction, Not Run	The parameter displays Malfunction if a Nitrogen Oxides (NOx) reductant pump motor phase control circuit is open.
Reductant Pump Control Circuit Overcurrent Test Status	—	Okay, Malfunction, Not Run	The parameter displays Malfunction if a Nitrogen Oxides (NOx) reductant pump current is too high.
Reductant Pump Control Circuit Shorted Malfunction	—	Yes / No	The parameter displays Yes if the Nitrogen Oxides (NOx) reductant pump motor circuits are shorted.
Reductant Pump Control Circuit Shorted Test Status	—	Okay, Malfunction, Not Run	The parameter displays Malfunction if the Nitrogen Oxides (NOx) reductant pump motor phase control circuits are shorted.
Reductant Pump Current Too High Malfunction	—	Yes / No	The parameter displays Malfunction if the Nitrogen Oxides (NOx) reductant pump motor current is too high.
Reductant Pump Driver Temperature Too High Malfunction	—	Yes / No	The parameter displays Yes if the Nitrogen Oxides (NOx) reductant pump motor temperature is too high.
Reductant Pump Heater Command	—	On / Off	This parameter displays the commanded state of the Nitrogen Oxides (NOx) reductant pump heater.
Reductant Pump Driver Temperature Too High Malfunction	—	Yes / No	The parameter displays Yes if the Nitrogen Oxides (NOx) reductant pump motor temperature is too high.
Reductant Pump Low Speed Malfunction	—	Yes / No	The parameter displays Malfunction if a Nitrogen Oxides (NOx) reductant pump motor speed is low or rotor is stalled.
Reductant Pump Output Circuit High Malfunction	—	Yes / No	The parameter displays Yes if the Nitrogen Oxides (NOx) reductant pump output circuit is shorted to voltage.
Reductant Pump Output Circuit Low Malfunction	—	Yes / No	The parameter displays Yes if the Nitrogen Oxides (NOx) reductant pump output circuit is shorted to ground.
Reductant Pump Output Circuit Low Test Status	—	Okay, Malfunction, Not Run	The parameter displays Malfunction if a Nitrogen Oxides (NOx) reductant pump motor output circuit is shorted to ground.

Parameter	System State	Expected Value	Description
Reductant Pump Output Circuit Malfunction	—	Yes / No	The parameter displays Yes if the Nitrogen Oxides (NOx) reductant pump output circuit is open.
Reductant Pump Output Circuit Open Test Status	—	Okay, Malfunction, Not Run	The parameter displays Malfunction if a Nitrogen Oxides (NOx) reductant pump motor phase control circuit is open.
Reductant Pump Overcurrent	—	Yes / No	The parameter displays Yes if a Nitrogen Oxides (NOx) reductant pump current is too high.
Reductant Pump Speed	—	RPM	This parameter contains the actual reductant pump motor speed.
Reductant Pump Voltage Performance Malfunction	—	Yes / No	The parameter displays Yes if a Nitrogen Oxides (NOx) reductant pump motor and heater drivers supply voltage is out of range.
Reductant Purge Solenoid Valve Command	—	On/Off	This parameter displays the commanded state of the reductant line purge solenoid valve. The scan tool displays On when the reductant line purge solenoid valve is commanded ON.
Reductant Purge Solenoid Valve Control Circuit Status	—	No Malfunction Present	This parameter displays the status of the Reductant Purge Solenoid Valve Control Circuit.
Reductant Quality Sensor	—	%	This parameter displays the reductant (DEF) concentration in percent.
Reductant Range	—	km (miles)	This parameter displays the remaining distance that can be driven before the reductant tank needs to be refilled.
Reductant Sensor Module Supply Voltage	—	Okay / Out of Range	This parameter displays Out of Range if Selective Catalyst Reduction (SCR) control module supply voltage is out of range.
Reductant System Adaption	—	Active / Inactive	This parameter displays the Active if the Selective Catalyst Reduction (SCR) fast adaptation is active and running.
Reductant System Adaption Requested Warning	—	Yes / No	This parameter displays the Yes if the Selective Catalyst Reduction (SCR) warning strategy activation is requested.
Reductant System Adaption Steps	—	Counts	This parameter displays the count of the Selective Catalyst Reduction (SCR) fast adaptation steps.
Reductant System Command	—	%	This parameter displays the commanded reductant (DEF) dosing of the Selective Catalyst Reduction (SCR) system.
Reductant System Malfunction Warning Indicator Command	—	None	This parameter displays the Nitrogen Oxides (NOx) reductant system malfunction warning.
Reductant System Malfunction Warning Service Bay Test	—	Varies	This parameter displays a malfunction warning for the reductant system during a service bay test.

Parameter	System State	Expected Value	Description
Reductant System Malfunction Warning Service Bay Test Abort Reason	—	Varies	This parameter displays status of a malfunction warning abort from the reductant system during a service bay test.
Reductant System Malfunction Warning Service Bay Test Status	—	Varies	This parameter displays status of a malfunction warning from the reductant system during a service bay test.
Reductant System Malfunction Warning Service Bay Test Calculated Nitrogen Oxides Emissions Monitor Efficiency	—	%	This parameter displays Selective Catalyst Reduction (SCR) estimated average efficiency for the reductant system during a service bay test.
Reductant System Malfunction Warning Service Bay Test Nitrogen Oxides Emissions Monitor Efficiency	—	%	This parameter displays Selective Catalyst Reduction (SCR) measured average efficiency for the reductant system during a service bay test.
Reductant System Priming Test Status	—	Varies	This parameter displays Selective Catalyst Reduction (SCR) system priming and leak test status.
Reductant System Tamper Warning Service Bay Test Abort Reason	—	Not Requested, In Progress, Passed, Failed, Interrupted	This parameter contains the status of the SCR Tamper/No Tamper service bay test procedure.
Reductant System Tamper Warning Service Bay Test Result	—	Reductant System Tamper Warning Service Bay Test Result	This parameter holds the most recent abort reason for the SCR Tamper/No Tamper service bay test algorithm
Reductant Tank Temperature Sensor	—	ºC (ºF)	This parameter contains the undefaulted reductant temperature measured by a sensor that is located within the holding tank.
Reductant Tank Temperature Sensor Circuit Erratic Malfunction	—	Yes / No	The parameter displays Yes if the Nitrogen Oxides (NOx) reductant tank temperature sensor self correlated fault check failed.
Reductant Tank Temperature Sensor Circuit High Malfunction	—	Yes / No	The parameter displays Yes if the Nitrogen Oxides (NOx) reductant tank temperature sensor circuit is shorted high.
Reductant Tank Temperature Sensor Circuit Low Malfunction	—	Yes / No	The parameter displays Yes if the Nitrogen Oxides (NOx) reductant tank temperature sensor circuit is shorted low.
Reductant Tank Status	—	Full / OK / Warning / Empty	The parameter displays the state of Nitrogen Oxides (NOx) reductant holding tank.
Reductant Tank Temperature Sensor 2	—	ºC (ºF)	This parameter contains the undefaulted reductant (DEF) temperature measured by a sensor that is part of the reductant quality sensor
Reductant Tank Temperature Sensor 2 Circuit Erratic Test Status	—	Yes / No	This parameter contains the all monitors that trigger the SCR Tamper/Not Tamper Warning Strategy.
Reductant Tank Temperature Sensor 2 Circuit High Voltage Test Status	—	Yes / No	This parameter contains the all monitors that trigger the SCR Tamper/Not Tamper Warning Strategy.

Parameter	System State	Expected Value	Description
Reductant Tank Temperature Sensor 2 Circuit Low Voltage Test Status	—	Yes / No	This parameter contains the all monitors that trigger the SCR Tamper/Not Tamper Warning Strategy.
Reductant Tank Temperature Sensor 2 Circuit Performance Test Status	—	Yes / No	This parameter contains the all monitors that trigger the SCR Tamper/Not Tamper Warning Strategy.
Reductant Tank Temperature Sensor Circuit Erratic Test Status	—	Yes / No	This parameter contains the all monitors that trigger the SCR Tamper/Not Tamper Warning Strategy.
Reductant Tank Temperature Sensor Circuit High Voltage Test Status	—	Yes / No	This parameter contains the all monitors that trigger the SCR Tamper/Not Tamper Warning Strategy.
Reductant Tank Temperature Sensor Circuit Low Voltage Test Status	—	Yes / No	This parameter contains the all monitors that trigger the SCR Tamper/Not Tamper Warning Strategy.
Reductant Temperature	—	°C (°F)	This parameter displays the Reductant temperature measured by a sensor that is located within the holding tank.
Remaining Reductant in Tank	—	g	This parameter displays the current reductant remaining in the holding tank.
Redundant Odometer Memory	—	Present/Not Present	This parameter displays if there is a reductant odometer reading present in the control module.
Remaining Fuel in Tank	—	%	This parameter displays the total fuel level as a percentage of the rated capacity of the fuel tank.
Remaining Fuel in Tank	—	Liters	This parameter displays the actual total fuel volume contained in the fuel tank.
Remote Vehicle Start Disable History 1–8	—	Reason for RVS Disable	These parameters display the last eight reasons the control module disabled remote vehicle start (RVS).
Remote Vehicle Start Request Signal	—	Off	Remote Vehicle Start Request indicates the state of the request received over serial communication from the remote vehicle start (RVS) system to start the vehicle in remote mode.
Replicated Transmission OSS Signal	—	RPM	This parameter displays the Replicated Transmission Output Speed (Replicated TOS) received from the Transmission Control Module.
Sensor Reference Circuit Status Sensor Reference Circuit Status 2–4	——	Okay	This parameter will display OK if the circuit is good or Malfunction if a short to ground, short to B+ or open circuit is present.
Sensor Reference Sensor Reference 2–5	Ignition/Vehicle » On	5 V	This parameter displays the voltage sensed on the 5 V reference circuits at the control module. The scan tool will display a higher value at higher voltage. The scan tool will display a lower value at lower voltage.

Parameter	System State	Expected Value	Description
Sensor Supply Voltage Relay Command	—	On / Off	This parameter contains the exhaust gas recirculation cooler temperature at power-up (Run/ Crank transition from low to high) from a sensor that is located before the inlet of the exhaust gas recirculation cooler heat exchanger.
Soot Mass Correction	—	#	This parameter displays the soot mass correction value caused by Continuous Regenerating Trap (CRT) effect.
Specific Humidity	—	%	This parameter displays the current specific humidity in percentage.
Start-Up Charge Air Cooler Temperature	—	°C (°F)	This parameter displays the current start-up charge air cooler temperature.
Start-Up Charge Air Cooler Inlet Temperature	—	ºC (ºF)	This parameter contains the charge air temperature (measured by a sensor that is located first in the charge air cooler stream in relationship to any other charge air cooler temperature sensors in the system.) recorded at power-up.
Start-Up Charge Air Cooler Outlet Temperature	—	ºC (ºF)	This parameter contains the charge air temperature (measured by a sensor that is located second in the charge air cooler stream in relationship to any other charge air cooler temperature sensors in the system.) recorded at power-up.
Start-Up Temperature EGR Cooler Temperature Sensor 1	—	ºC (ºF)	This parameter contains the exhaust gas recirculation cooler temperature at power-up (Run/ Crank transition from low to high) from a sensor that is located before the inlet of the exhaust gas recirculation cooler heat exchanger.
Start-Up Temperature EGR Cooler Temperature Sensor 2	—	ºC (ºF)	This parameter contains the exhaust gas recirculation cooler temperature at power-up (Run/ Crank transition from low to high) from a sensor that is located on the outlet of the exhaust gas recirculation cooler heat exchanger.
Start-Up ECT	—	°C (°F)	This parameter Indicates the engine coolant temperature at engine start up as calculated by the control module based on the signal from the ECT sensor. The scan tool will display a higher value on a warmer engine, and a lower value on a colder engine.
Start-Up Exhaust Gas Temperature Sensor 1, 2, 3, or 4	—	°C (°F)	This parameter displays the current start-up exhaust gas temperature for sensor 4.
Start-Up Fuel Temperature	—	°C (°F)	This parameter Indicates the fuel temperature at engine start up as calculated by the control module based on the signal from the fuel temperature sensor. The scan tool will display a higher value on a warmer fuel, and a lower value on a colder fuel.

Parameter	System State	Expected Value	Description
Start-Up IAT Sensor 1–3	—	°C (°F)	This parameter indicates the intake air temperature at engine start up as calculated by the control module based on the signal from the IAT sensor. The scan tool will display a higher value during warmer under hood temperatures, and a lower value during colder under hood temperatures.
Start-Up Particulate Matter Sensor Temperature	—	°C (°F)	This parameter displays the start-up particulate matter temperature in Celsius and Fahrenheit.
Starter Relay Command	—	Off	The scan tool displays ON/OFF. The scan tool displays Off until the ignition is placed into the CRANK position, then it reads On.
Starter Relay Control Circuit High Voltage Test Status	—	OK	This parameter displays the state of the starter relay control circuit. The parameter displays Malfunction if the starter relay control circuit is shorted to voltage. This parameter may not change if the scan tool is used to command the relay control circuit ON.
Starter Relay Control Circuit Low Voltage Test Status	—	OK	This parameter displays the state of the starter relay control circuit. The parameter displays Malfunction if the starter relay control circuit is shorted to ground. This parameter may not change if the scan tool is used to command the relay control circuit ON.
Starter Relay Control Circuit Open Test Status	—	OK	This parameter displays the state of the starter relay control circuit. The parameter displays Malfunction if the starter relay control circuit is open. This parameter may not change if the scan tool is used to command the relay control circuit ON.
Starter Motor Relay Control Circuit High Voltage Test Status	—	OK, Malfunction, Not Run	This parameter contains the commanded state of the starter relay output along with the status of its associated short to ground, open circuit, and short to power tests
Starter Motor Relay Control Circuit Low Voltage Test Status	—	OK, Malfunction, Not Run	This parameter contains the commanded state of the starter relay output along with the status of its associated short to ground, open circuit, and short to power tests
Starter Motor Relay Control Circuit Open Test Status	—	OK, Malfunction, Not Run	This parameter contains the commanded state of the starter relay output along with the status of its associated short to ground, open circuit, and short to power tests
TCC Control	—	Disengaged	This parameter displays the current state of the TCC.
Torque Delivered Signal	—	N•m	This parameter displays the engine torque based upon the airflow through the engine and the torque losses due to fuel shutoff. Since this is a steady state engine torque, it does not include the inertial component of engine torque.

Parameter	System State	Expected Value	Description
Total Fuel Consumed	—	Liters	This parameter displays the fuel consumed in the current drive cycle in liters.
Total Misfire	—	Counts	This parameter displays the total number of cylinder firing events that the control module detected as misfires for the last 200 crankshaft revolution sample period.
Tow/Haul Mode	—	Active / Inactive / Not Available	This parameter contains signals associated with Tow Haul Mode as selected by the driver mode determination (DMD) switches
Traction Control Status	—	Inactive	This parameter displays Active if the electronic brake and traction control module (EBTCM) is commanding traction control.
Traction Control Torque Delivered Signal	—	%	This parameter displays the estimated engine torque delivered by the powertrain, as a percentage of maximum engine torque that is provided to the ABS/TCS module.
Traction Control Torque Request Signal	—	%	This parameter displays the engine torque requested by the traction control system, as a percentage of maximum engine torque.
Transmission Inhibiting Engine Cranking	—	Yes / No	This parameter contains several signals associated with the status of the power mode and starter systems
Turbocharger Control Module Supply Voltage	—	Volts	This parameter contains the unde-faulted voltage applied to the turbocharger actuator power supply pins.
Turbocharger Vane Learned Closed Position	—	%	This is the learned position of the blades that control the airflow into the turbo charger. This parameter displays the learned closed position.
Turbocharger Van Learned Closed Position	—	Volts	This parameter displays the minimum position learned for Turbo Charger Vane position sensor when the Turbo Charger Vanes are closed.
Turbocharger Vane Learned Open Position	—	%	This is the learned position of blades that control the airflow into the turbo charger. This parameter displays the learned open position.
Turbocharger Vane Learned Open Position	—	Volts	This parameter displays the minimum position learned for Turbo Charger Vane position sensor when the Turbo Charger Vanes are open.
Turbocharger Vane Position Learn Status	—	Learned	This parameter indicates the status of the control module in learning the turbocharger vane position. The scan tool will display No if the turbocharger vane position has not been learned since the last DTC clear.
Turbocharger Vane Position Initial Learned Value	—	Counts	This parameter contains the end of line (EOL) learn span in commutation counts

Parameter	System State	Expected Value	Description
Turbocharger Vane Position Learned Value	—	Counts	This parameter contains the full span learn (FSL) in commutation counts that occurs at ignition off.
Turbocharger Vane Position Sensor	—	%	This parameter displays the current commanded state of the turbocharger vane position control solenoid valve by the control module. The scan tool will display a higher value as the solenoid is commanded open. The scan tool will display a lower value as the solenoid is commanded closed.
Turbocharger Vane Position Sensor	—	Volts	This parameter displays the voltage signal sent to the control module from the sensor. The scan tool will display a higher value as the solenoid is commanded open. The scan tool will display a lower value as the solenoid is commanded closed.
Turbocharger Vane Position Solenoid Valve Circuit High Voltage Test Status	—	OK	This parameter displays the state of the Turbocharger Vane Position Solenoid Valve circuit. The parameter displays Malfunction if the Turbocharger Vane Position Solenoid valve circuit is shorted to voltage.
Turbocharger Vane Position Solenoid Valve Circuit Low Voltage Test Status	—	OK	This parameter displays the state of the Turbocharger Vane Position Solenoid Valve circuit. The parameter displays Malfunction if the Turbocharger Vane Position Solenoid valve circuit is shorted to ground.
Turbocharger Vane Position Solenoid Valve Circuit Open Test Status	—	OK	This parameter displays the state of the Turbocharger Vane Position Solenoid Valve circuit. The parameter displays Malfunction if the Turbocharger Vane Position Solenoid valve circuit is open.
Turbocharger Vane Position Solenoid Valve Circuit Shorted Test Status	—	OK	This parameter displays the state of the Turbocharger Vane Position Solenoid Valve Circuit. The parameter displays Malfunction if the Turbocharger Vane Position Solenoid valve circuit is shorted.
Turbocharger Vane Position Solenoid Valve Command	—	%	This parameter displays the commanded duty cycle for the solenoid on variable geometry turbocharger.
Turbocharger Vane Position Solenoid Valve Control Circuit Command	—	Off	This parameter displays the commanded state of the turbocharger solenoid valve.
Turbocharger Vane Position Solenoid Valve Control Driver Overtemperature	—	No	This parameter displays the state of the turbocharger vane position solenoid valve control driver.
Turbocharger Vane Position Solenoid Valve High Control Circuit Command	—	Off	This parameter displays the commanded state of the turbocharger solenoid valve high control circuit.

Parameter	System State	Expected Value	Description
Turbocharger Vane Position Solenoid Valve High Control Circuit High Voltage Test Status	—	OK	This parameter displays the state of the Turbocharger Vane Position Solenoid Valve high control circuit. The parameter displays Malfunction if the Turbocharger Vane Position Solenoid valve high control circuit is shorted to voltage.
Turbocharger Vane Position Solenoid Valve High Control Circuit Low Voltage Test Status	—	OK	This parameter displays the state of the Turbocharger Vane Position Solenoid Valve high control circuit. The parameter displays Malfunction if the Turbocharger Vane Position Solenoid valve high control circuit is shorted to ground.
Turbocharger Vane Position Solenoid Valve High Control Circuit Open Test Status	—	OK	This parameter displays the state of the Turbocharger Vane Position Solenoid Valve high control circuit. The parameter displays Malfunction if the Turbocharger Vane Position Solenoid valve high control circuit is open.
Vehicle Speed Output Circuit 2 High Voltage Test Status	—	OK	This parameter displays the state of the Vehicle Speed Output circuit 2 control circuit. The parameter displays Malfunction if the Vehicle Speed Output circuit 2 control circuit is shorted to voltage.
Vehicle Speed Output Circuit 2 Low Voltage Test Status	—	OK	This parameter displays the state of the Vehicle Speed Output circuit 2 control circuit. The parameter displays Malfunction if the Vehicle Speed Output Circuit 2 control circuit is shorted to ground.
Vehicle Speed Output Circuit 2 Open Test Status	—	OK	This parameter displays the state of the Vehicle Speed Output circuit 2 control circuit. The parameter displays Malfunction if the Vehicle Speed Output circuit 2 control circuit is open.
Vehicle Speed Sensor	—	km/h/MPH	This parameter indicates the vehicle speed as calculated by the control module based on a signal from the vehicle speed sensor (VSS). The scan tool will display a higher value at higher vehicle speeds, and a lower value at lower vehicle speeds.
Vehicle Speed When Engine Overspeed Detected	Engine Idling	Km/h mph	This parameter displays the Vehicle Speed When Engine Overspeed Detected.
Wait to Start Indicator Command	—	On / Off	This parameter displays On when a glow plug indication request is active, and the wait-to-start lamp is commanded on. The wait to start indicator will not illuminate during post-start glow plug operation.
Wait to Start Indicator Control Circuit High Test Status	—	Okay, Malfunction, Not Run	This parameter displays the state of the wait to start indicator control circuit. The parameter displays Malfunction if the wait to start indicator control circuit is shorted to voltage.

Parameter	System State	Expected Value	Description
Wait to Start Indicator Control Circuit Low Test Status	—	Okay, Malfunction, Not Run	This parameter displays the state of the wait to start indicator control circuit. The parameter displays Malfunction if the wait to start indicator control circuit is shorted to ground.
Wait to Start Indicator Control Circuit Open Test Status	—	Okay, Malfunction, Not Run	This parameter displays the state of the wait to start indicator control circuit. The parameter displays Malfunction if the wait to start indicator control circuit is open.
Warm-ups Since DTC Cleared	—	Counts	This parameter indicates the number of warm up cycles that have occurred Since DTCs were cleared. The scan tool will display a higher counts as more warm up cycles have occurred since the DTCs were cleared.
Warm-ups without Emission Malfunctions	—	Counts	This parameter indicates the number of warm up cycles that have occurred without an emission fault present. The scan tool will display a 0 if a malfunction has occurred. The scan tool will display a higher count if a number of warm up cycles have occurred without an emission malfunction.
Warm-ups without Non-emission Malfunctions	—	Counts	This parameter indicates the number of warm up cycles that have occurred without a non-emission fault present. The scan tool will display a 0 if a malfunction has occurred. The scan tool will display a higher count if a number of warm up cycles have occurred without a non-emission malfunction.
Water in Fuel	—	No	This parameter indicates if there is water in the fuel.
Water in Fuel Indicator Command	—	Off	This parameter indicates if water in the fuel indicator is On or Off.
Water in Fuel Sensor	—	Volts	This parameter displays the water in fuel sensor voltage input.

Output Control

Parameter	Description
This is a comprehensive list. Not all output controls listed are available for all applications.	
A/C Compressor Clutch Relay	This device control is used to override the state of the air conditioning compressor output.
Ambient Air Temperature Calculation Reset	This device control is used to reset the estimated ambient air temperature value to the current sensor value following a service repair.
BARO Sensor Reset	This device control is used to reset learned barometric pressure values in case of either an ECU or barometric pressure sensor replacement.
Brake Pedal Position Sensor Learn	This device control is used to reset the initialized values for the brake pedal fully released learned position.
Catalyst Reset	This device control is used to reset learned values in case of a diesel oxidation catalyst replacement. The engine must be OFF and Ignition ON.
Compression Test Starter Relay	This device control is used to set up the internal combustion engine for a compression test.
Coolant Fill	This device control is used to start an automatic coolant fill service routine that will ensure proper fill and de-aeration of the cooling system.

Parameter	Description
Cooling Fan Motor	This device control is used to override the state of cooling fan duty cycle control output.
Crankshaft Position Reluctor Ring Learned Values Reset	This device control is used to reset the crank wheel adaptation values in case of an ECU or crank wheel replacement.
Crankshaft Position Variation Learn	This device control is used to activate the crankshaft position variation learn (CASE) algorithm which calculates the reference pulse correction factors for the misfire diagnostic.
Cylinder 1–8 Fuel Injector Correction Value Reset	This device control is to be used to reset the NVC and ZFC values to zero if one or more of the fuel injectors have been replaced.
Cylinder 1–8 Injector Flow Identifier	This device control contains the data that the Engine Control Module will need in order to do proper Injector Fuel Quantity adjustments. If a new ECM is being installed, this data shall be read from the old ECM and transferred to the new ECM. If an injector is replaced, the injector code must be downloaded to the ECM
Cylinder Balance Rate Monitor	This device control is used to enable or disable Cylinder Fuel Balancing.
Cylinder Power Balance	This device control disables each fuel injector at any engine or vehicle speed. The device control will not change unless changed or cancelled by the scan tool.
DPF Pressure Sensor Reset	This device control is used to reset learned values in case of a diesel particulate filter pressure sensor replacement.
DPF Regeneration Enable	This function enables a DPF Regeneration when the vehicle meets the conditions for running. This function will by-pass the normal soot model, so the next time the vehicle is under the conditions for an active regeneration to take place, the ECM will go ahead and initiate the regeneration event. This device control is used to Force the Diesel Particulate Filter to perform regeneration. The Device Control sets an indication in the ECU that the controller shall perform regeneration, the next time the driving condition are met. The Regeneration shall be performed even if the tool is no longer connected to the vehicle.
DPF Regeneration Inhibit	This device control is used to inhibit the Diesel Particulate Filter to perform regeneration, even if the driving conditions are met. The inhibit function shall only work when the tool is connected to the vehicle.
DPF Reset	This device control is used to reset learned values in case of a diesel particulate filter replacement.
DPF Service Regeneration	This device control enables a DPF Regeneration. The engine coolant must be greater than 70–115°C (158–239°F). Vehicle must be in Park. Ambient temperature must be greater than −30°C (−22°F). Brake pedal and accelerator must be in the released position. The scan tool will display all inhibit reasons. The scan tool must remain connected until test is complete. This function takes approximately 35 minutes to complete. During this procedure the RPM will slowly increase to 2,500 RPM and remain there for approximately 25 minutes.
EGR	This device control is used to verify functionality of the Exhaust Gas Recirculation Valve by allowing the Exhaust Gas Recirculation Valve output to be commanded to a specific duty cycle.
EGR Cooler Bypass Motor	This device control is used to verify functionality of the Exhaust Gas Recirculation (EGR) Cooler Bypass Valve system by allowing the EGR Cooler Bypass Valve output to be commanded to a specific position.
EGR Cooler Bypass Valve	This device control is used to verify functionality of the Exhaust Gas Recirculation (EGR) Cooler Bypass Valve system by allowing the EGR Cooler Bypass Valve output to be commanded to a specific position
EGR Valve	This device control is used to verify functionality of the Exhaust Gas Recirculation (EGR) system by allowing the Exhaust Gas Recirculation output to be commanded to a specific lift.
Engine Compression Quick Test	This device control is used to initiate the semi-automatic compression test on Diesel engines.
Engine Controls Ignition Relay	This device control is used to override the state of the Powertrain Relay.
Engine Oil Life Reset	This device control contains the engine oil remaining life determined from a calibration based upon the effective engine revolutions and the distance driven since the last oil change. This device control may be used to reset the engine oil remaining life to 100% after an oil change or to any other value when replacing an engine control module.
Engine Oil Pressure Control Solenoid Valve	This device control is used to override the state of the variable displacement oil pump. When the variable displacement oil pump is turned ON, the oil pump will be commanded to a low pressure state.
Engine Speed	This device control is used to override the idle engine speed.

Parameter	Description
Exhaust Aftertreatment Data Reset	This device control is used to reset the exhaust aftertreatment fuel injector OEM data in case of a replacement.
Exhaust Aftertreatment Fuel Injector	This device control is used to verify functionality of the Exhaust Aftertreatment Fuel Injector by allowing Exhaust Aftertreatment Fuel Injector output to be commanded to a specific duty cycle.
Exhaust Aftertreatment Fuel Injector Cleaning Procedure	This device control is used to trigger the Exhaust Aftertreatment Fuel Injector tip cleaning procedure.
Exhaust Aftertreatment Fuel Injector Flow Test	This device control is used to trigger the Exhaust Aftertreatment Fuel Injector to be commanded on for a calibrateable duration and a calibrateable HC injection quantity in order to test the flow of the injector.
Exhaust Gas Recirculation	This device control is used to verify functionality of the Exhaust Gas Recirculation (EGR) system by allowing the Exhaust Gas Recirculation output to be commanded to a specific lift.
Exhaust Gas Temperature Sensor Reset	This device control is used to reset the SCR (Selective Catalytic Reduction) Temperature Sensor data in case of a replacement.
Fuel Filter Life Reset	This device control resets the fuel filter life remaining to 100%.
Fuel Injection Small Quantity Data Reset	This device control is used to reset the learned values of the small quantity adjustment (SQA) map in case of a fuel rail pressure sensor replacement.
Fuel Injection Small Quantity Learning Odometer Reset	This device control is used to initialize small quantity learn internal odometer to a default value.
Fuel Heater Relay	This device control is used to override the state of the Fuel Filter Heater output.
Fuel Injector Balance	This feature will allow the technician to inspect the fuel system for leaks after servicing the fuel system or after any other service procedure that required disconnection or removal of fuel system components.
Fuel Injector Correction Value Preset	This device control resets all injector NVC and ZFC values to the default value. This device control is to be used if the old ECM values cannot be transferred to the new ECM after replacement.
Fuel Pressure Regulator 1	This device control is intended for use on a Direct Injection (DI) high pressure fuel supply system to activate the fuel pressure regulator 1 at ignition ON, engine OFF. Both the low side and high side of the regulator are controlled together. Commanding the regulator to ON will modulate the high side driver to a calibratible “maximum” duty cycle. (Note: As this is an electrical circuit test, a regulator solenoid commanded to ON does not necessarily equate to the regulator state at maximum fuel pressure.)
Fuel Pressure Regulator 2	This device control is intended for use on a Direct Injection (DI) high pressure fuel supply system to activate the fuel pressure regulator 2 at ignition ON, engine OFF. Both the low side and high side of the regulator are controlled together. Commanding the regulator to ON will modulate the high side driver to a calibratible “maximum” duty cycle. (Note: As this is an electrical circuit test, a regulator solenoid commanded to ON does not necessarily equate to the regulator state at maximum fuel pressure.)
Fuel Pump Relay	This device control is used to override the state of the fuel pump output.
Fuel Pump 2 Relay	This device control is used to override the state of the electric secondary transfer pump output.
Fuel Rail Pressure	This device control is intended for use on a Direct Injection (DI) high pressure fuel supply system to override the commanded fuel high pressure output from the powertrain controller.
Fuel Trim Enable	This device control is used to deactivate the Fuel Mass Observer (FMO).
Fuel Trim Reset	This device control is used to reset the Fuel Mass Observer data in case of a replacement.
Generator L-Terminal	The commanded states are ON and OFF. Selecting OFF commands the ECM to turn OFF the generator and stop generating an output voltage.
High Side Driver 1	This device control is used to override the state of the Shared High Side Driver 1 output.
High Side Driver 2	This device control is used to override the state of the Shared High Side Driver 2 output.
HO2S Heater Sensor 1	This device control is used to override the duty cycle of the oxygen sensor heaters.
Intake Air Flow Valve Motor	This function increases or decreases the position of the IAF valve.
Intake Air Flow Valve Position	This parameter displays the actual position of the intake air flow valve.
Intake Manifold Runner Control Valve	This device control is used to override the state of the intake manifold runner control output.

Parameter	Description
Malfunction Indicator Lamp (MIL)	This device control is used to either turn the Malfunction Indicator Lamp (MIL) on or off.
Misfire Graphic	This device control produces a misfire graphic while the engine is running.
NOx Catalyst Reductant Loading Reset	This device control is used to reset the adaptive values for the SCR (Selective Catalytic Reduction) data.
NOx Catalyst Reset	This device control is used to reset the Selective Catalytic Reduction (SCR) data in case of a replacement.
NOx Sensor 1 Heater- Engine Running	This device control is used to control the duty cycle of the NOx Sensor 1 Heater with the engine running. The Duty Cycle is fixed at a predetermined value and is controlled for a predetermined amount of time.
NOx Sensor 1 Reset	This device control is used to reset the NOx Sensor 1 data in case of a replacement. The engine must be Off and the Ignition On.
NOx Sensor 2 Heater- Engine Running	This device control is used to control the duty cycle of the NOx Sensor 2 Heater with the engine running. The Duty Cycle is fixed at a predetermined value and is controlled for a predetermined amount of time.
NOx Sensor 2 Reset	This device control is used to reset the NOx Sensor 2 data in case of a replacement. The engine must be OFF and the Ignition ON.
Particulate Matter Sensor Service Regeneration	This device control is used to force a particulate matter sensor measurement cycle, consisting of a particulate sensor probe regeneration and subsequent soot accumulation measurement. The system will return to normal control after one measurement cycle is successfully completed. One full measurement cycle can take 15 minutes or more to complete depending up the particulate filter state of health.
Pilot Injection Balance Procedure	This device control disables each fuel injector pilot injection. Device Control can be changed at any engine or vehicle speed. The device control will not change unless changed or cancelled by the scan tool.
Positive Crankcase Ventilation Heater	This device control is used to turn the crankcase ventilation heater output ON or OFF.
Prime Fuel Pump	This device control is used to override the state of the fuel pump output.
Programming History	This device control is used to view the history buffer entries for the primary calibration part in the controller.
Reductant Fluid Quality Test	This device control is used to force a Selective Catalyst Reduction (SCR) Service Quality Check.
Reductant Fluid Tank Level Reset	This device control is used to Reset the Reductant Fluid Tank Level.
Reductant Heater 1	This device control is used to override the state of the Reductant Heater 1. The scan tool disables the test when the following control limits are exceeded. • Reductant System DTC is set. • The exhaust temperature is too low. • Ignition voltage is too low. • Ignition voltage is too high.
Reductant Heater 2	This device control is used to override the state of the Reductant Heater 2.
Reductant Heater 3	This device control is used to override the state of the Reductant Heater 3.
Reductant Injection Quantity Test	This device control is used to inject a specific amount of reductant from the reductant injector. A system purge will be required once the test is complete.
Reductant Injector	This device control is used to verify functionality of the NOx Reductant Injector by allowing NOx Reductant Injector output to be commanded to a specific duty cycle.
Reductant Injector Reset	This device control is used to reset the Reductant Injector variables after the Injector is replaced.
Reductant Pump	This device control is used to verify functionality of the NOx Reductant Pump by allowing NOx Reductant Pump output to be commanded to a specific duty cycle.
Reductant Purge	This device control is used to purge the reductant lines of fluid.
Reductant Purge Valve	This device control is used to command the state of the NOx Reductant Line Purge valve.
Reductant System Tamper Warning Service Bay Test	This device control is used to force a SCR (Selective Catalyst Reduction) service bay test.

Parameter	Description
Reductant System Data Reset	This device control is used to reset the ECM data in case of a replacement.
Reductant System Leak Test	This device control is used to pressurize the reductant system in order to perform a visual inspection for leaks. A system purge will be required once the test is complete.
Reductant System Malfunction Warning Service Bay Test	This device control triggers the Selective Catalytic Reduction (SCR) Tamper Service Bay Test.
Reductant System Reset	This device control is used to reset the Reductant Module data in case of a replacement.
Remote Vehicle Start Disable History Reset	This device control is used to trigger the reset of the last eight reasons that powertrain has disabled remote vehicle start (RVS).
Sensor Supply Voltage Relay	This device control is used to control the sensor bus supply relay.
Starter Relay	This device control is used to override the state of the Starter Relay output. Fuel is disabled to prevent the engine from starting if the starter relay output is commanded On.
Total Fuel Consumed Reset	This device control contains the after treatment related data parameter that needs to be transferred in case of an ECM replacement.
Turbocharger Learn	This device control is used when the Turbocharger assembly, Vane position control solenoid valve, Vane position sensor is replaced, or repairs that disturb turbocharger components.
Turbocharger Vane Position	This device control adjusts the turbocharger vane position in 5 percent increments from 0–100 percent. The device control will be aborted if engine speed is above idle or if the coolant temperature is too cold.
Turbocharger Vane Position Actuator	This device control is used to control the duty cycle for a variable geometry turbocharger .
Turbocharger Vane Position Learn	This device control triggers the Variable Geometry Turbo (VGT) Actuator Learn in the event of a turbocharger or actuator replacement.
Turbocharger Vane Position Solenoid Valve	This device control cycles the turbocharger vane position solenoid to 100 percent boost and back to 0 percent boost. The device control is limited to engine speeds less than 1,500 RPM and will be disabled if DTC P0047 or P0048 are set.
Wait to Start Indicator	This device control is used to turn the Glow Plug (Wait to start) Lamp ON/OFF.

K219 Lighting Control Module: Scan Tool Information

Lighting Control Module — Data Display — Front Exterior Lighting Data

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Vehicle in Service Mode, Vehicle in Park, All Doors Closed			
Left Daytime Running Lamps	—	Off	The scan tool displays On or Off.
Right Daytime Running Lamps	—	Off	The scan tool displays On or Off.
Left Low Beam Command	—	Inactive	The scan tool displays Active or Inactive.
Right Low Beam Command	—	Inactive	The scan tool displays Active or Inactive.
Left Front Turn Signal Lamp Command	—	Off	The scan tool displays On or Off.
Right Front Turn Signal Lamp Command	—	Off	The scan tool displays On or Off.
Left Park Lamps Command	—	Off	The scan tool displays On or Off.
Right Park Lamps Command	—	Off	The scan tool displays On or Off.

Lighting Control Module — Data Display — Rear Exterior Lighting Data

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Vehicle in Service Mode, Vehicle in Park, All Doors Closed			
Left Turn Signal Lamps	—	Off	The scan tool displays On or Off.
Right Turn Signal Lamps	—	Off	The scan tool displays On or Off.
Left Tail Lamp Driver	—	Off	The scan tool displays On or Off.
Right Tail Lamp Driver	—	Off	The scan tool displays On or Off.
Center High Mounted Stop Lamp Driver	—	Off	The scan tool displays On or Off.
License Plate Lamp Circuit Driver	—	Off	The scan tool displays On or Off.

Lighting Control Module — Data Display — Side Exterior Lighting Data

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Vehicle in Service Mode, Vehicle in Park, All Doors Closed			
Left Side Marker Lamp Command	—	Off	The scan tool displays On or Off.
Right Side Marker Lamp Command	—	Off	The scan tool displays On or Off.
Left Turn Signal Repeater Lamp Command	—	Off	The scan tool displays On or Off.
Right Turn Signal Repeater Lamp Command	—	Off	The scan tool displays On or Off.

Lighting Control Module — Data Display — Indicator Data

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Vehicle in Service Mode, Vehicle in Park, All Doors Closed			
Daytime Running Lamps Indicator	—	Off	The scan tool displays On or Off.
Front Park Lamps Indicator	—	Off	The scan tool displays On or Off.
Headlamp High Beam Indicator	—	Inactive	The scan tool displays Active or Inactive.
Left Turn Signal Indicator	—	Off	The scan tool displays On or Off.
Right Turn Signal Indicator	—	Off	The scan tool displays On or Off.
Left Front Turn Signal Lamp Malfunction Indicator	—	Off	The scan tool displays On or Off.
Left Rear Turn Signal Lamp Malfunction Indicator	—	Off	The scan tool displays On or Off.
Right Front Turn Signal Lamp Malfunction Indicator	—	Off	The scan tool displays On or Off.
Right Rear Turn Signal Lamp Malfunction Indicator	—	Off	The scan tool displays On or Off.

Lighting Control Module — Exterior Lighting — Scan Tool Output Controls

Output Control	Description
Center High Mounted Stop Lamp	This output control is used to activate the center high mounted stop lamp when selecting On. The center high mounted stop lamp should illuminate until commanded Off.
Left Stop Lamp	This output control is used to activate the left stop lamp when selecting On. The left stop lamp should illuminate until commanded Off.
Right Stop Lamp	This output control is used to activate the right stop lamp when selecting On. The right stop lamp should illuminate until commanded Off.
License Plate Lamps	This output control is used to activate the license plate lamps when selecting On. The license plate lamps should illuminate until commanded Off.
Backup Lamps	This output control is used to activate the backup lamps when selecting On. The backup lamps should illuminate until commanded Off.
Left Front Park Lamp Status	This output control is used to activate the left park lamps when selecting On. The left park lamps should illuminate until commanded Off.
Right Front Park Lamp Status	This output control is used to activate the right park lamps when selecting On. The right park lamps should illuminate until commanded Off.
Left Daytime Running Lamps	This output control is used to activate the left daytime running lamps when selecting On. The left daytime running lamps should illuminate until commanded Off.
Right Daytime Running Lamps	This output control is used to activate the right daytime running lamps when selecting On. The right daytime running lamps should illuminate until commanded Off.
Left Auxiliary Daytime Running Lamps	This output control is used to activate the left auxiliary daytime running lamps when selecting On. The left auxiliary daytime running lamps should illuminate until commanded Off.
Right Auxiliary Daytime Running Lamps	This output control is used to activate the right auxiliary daytime running lamps when selecting On. The right auxiliary daytime running lamps should illuminate until commanded Off.
Left Front Auxiliary Park Lamp Command	This output control is used to activate the left front auxiliary park lamp when selecting On. The left front auxiliary park lamp should illuminate until commanded Off.
Right Front Auxiliary Park Lamp Command	This output control is used to activate the right front auxiliary park lamp when selecting On. The right front auxiliary park lamp should illuminate until commanded Off.
Left Front Turn Signal Lamp Command	This output control is used to activate the left front turn signal lamp when selecting On. The left front turn signal lamp should illuminate until commanded Off.
Right Front Turn Signal Lamp Command	This output control is used to activate the right front turn signal lamp when selecting On. The right front turn signal lamp should illuminate until commanded Off.
Left Turn Signal Repeater Lamp Command	This output control is used to activate the left turn signal repeater lamp when selecting On. The left turn signal repeater lamp should illuminate until commanded Off.
Right Turn Signal Repeater Lamp Command	This output control is used to activate the right turn signal repeater lamp when selecting On. The right turn signal repeater lamp should illuminate until commanded Off.
Left Rear Turn Signal Lamp	This output control is used to activate the left rear turn signal lamp when selecting On. The left rear turn signal lamp should illuminate until commanded Off.
Right Rear Turn Signal Lamp	This output control is used to activate the right rear turn signal lamp when selecting On. The right rear turn signal lamp should illuminate until commanded Off.

K29FV Front Seat Heater Vent Control Module: Scan Tool Information

Front Seat Heating Control Module Scan Tool Data Parameters

Parameter	Expected Values	Description
Operating Conditions: Engine Running		
Seat Heating/Venting/Cooling Load Shed	Inactive / Active	When this parameter is active it indicates the Heating/Venting/ System is shutdown to reduce strain on the vehicle electrical system which is experiencing too high of a current draw
Left Front Seat Heating/Venting/ Cooling Operating Conditions	Remote Vehicle Start / Automatic / Manual / Autostop Request	The functional behavior of heated seats is dependent on its determined operational state. This parameter indicates the defined state which it is operating in.

Parameter	Expected Values	Description
Left Front Seat Heating/Venting/ Cooling Switch	Inactive / Active	The Heated/Vented switch assembly contains a number of switches affecting the operation of the Heated Vented Seats. This parameter indicates when any one of the switches is active and is persistent as long as the switch is pressed.
Left Front Seat Heating/Venting/ Cooling Requested Mode	Off / Seat Back Heating / Seat Back and Cushion Heating / Seat Venting/ Cooling	This parameter indicates the type of Heated/Vented Seat function being requested , as determined by the BCM tracking various inputs
Left Front Seat Heating/Venting/ Cooling Requested Level	Off / High / Medium / Low	This parameter indicates the type of Heated/Vented Seat level of intensity being requested as determined by the BCM tracking various inputs
Left Front Seat Heating/Venting/ Cooling Mode	Off / Seat Back Heating / Seat Back and Cushion Heating / Seat Venting/ Cooling	This parameter indicates the type of Heated/Vented Seat function being applied as commanded by the BCM software based on a number of factors
Left Front Seat Heating/Venting/ Cooling Level	Off / High / Medium / Low	This parameter indicates the type of Heated/Vented Seat level of intensity being applied as commanded by the BCM software based on a number of factors.
Right Front Seat Heating/Venting/ Cooling Operating Conditions	Remote Vehicle Start / Automatic / Manual / Autostop Request	The functional behavior of heated seats is dependent on its determined operational state. This parameter indicates the defined state which it is operating in.
Right Front Seat Heating/Venting/ Cooling Switch	Inactive / Active	The Heated/Vented switch assembly contains a number of switches affecting the operation of the Heated Vented Seats. This parameter indicates when any one of the switches is active and is persistent as long as the switch is pressed.
Right Front Seat Heating/Venting/ Cooling Requested Mode	Off / Seat Back Heating / Seat Back and Cushion Heating / Seat Venting/ Cooling	This parameter indicates the type of Heated/Vented Seat function being requested, as determined by the BCM tracking various inputs
Right Front Seat Heating/Venting/ Cooling Requested Level	Off / High / Medium / Low	This parameter indicates the type of Heated/Vented Seat level of intensity being requested as determined by the BCM tracking various inputs
Right Front Seat Heating/Venting/ Cooling Mode	Off / Seat Back Heating / Seat Back and Cushion Heating / Seat Venting/ Cooling	This parameter indicates the type of Heated/Vented Seat function being applied as commanded by the BCM software based on a number of factors
Right Front Seat Heating/Venting/ Cooling Level	Off / High / Medium / Low	This parameter indicates the type of Heated/Vented Seat level of intensity being applied as commanded by the BCM software based on a number of factors.

Front Seat Heating Control Module Scan Tool Output Controls

Control Functions	Description
Operating Conditions: Engine Running	
Left Front Seat Heating	This output control is used to command the left front seat heater elements On.
Right Front Seat Heating	This output control is used to command the right front seat heater elements On.
Left Front Seat Blower Command	This output control is used to command the left front seat blower On.
Right Front Seat Blower Command	This output control is used to command the right front seat blower On.

K36 Restraints Control Module: Scan Tool Information

Note: Some parameters and values in the table below may not apply to every vehicle.

Restraints Control Module Scan Tool Data Parameters

Parameter	Expected Value	Definition
Operating Conditions: Ignition ON		
2nd Row Left Seat Belt Reminder Sensor Pad Enable Status	Disabled/Enabled	The scan tool displays if the left rear seat belt reminder sensor pad is enabled to the RCM.
2nd Row Left Seat Belt Reminder Sensor Pad Learn Status	Learned/Not Learned	The scan tool displays Learned or Not Learned. Learned is displayed if the left rear seat belt reminder sensor pad has been learned by the RCM.
2nd Row Left Seat Belt Status	Buckled/Unbuckled	The scan tool displays Buckled or Unbuckled. This is the state of the left rear seat belt switch when the seat belt is buckled or unbuckled.
2nd Row Middle Seat Belt Reminder Sensor Pad Enable Status	Disabled/Enabled	The scan tool displays if the rear middle seat belt reminder sensor pad is enabled to the RCM.
2nd Row Middle Seat Belt Reminder Sensor Pad Learn Status	Learned/Not Learned	The scan tool displays Learned or Not Learned. Learned is displayed if the rear middle seat belt reminder sensor pad has been learned by the RCM.
2nd Row Middle Seat Belt Status	Buckled/Unbuckled	The scan tool displays Buckled or Unbuckled. This is the state of the middle rear seat belt switch when the seat belt is buckled or unbuckled.
2nd Row Middle Seat Belt Reminder Sensor Pad Enable Status	Disabled/Enabled	The scan tool displays if the rear right seat belt reminder sensor pad is enabled to the RCM.
2nd Row Middle Seat Belt Reminder Sensor Pad Learn Status	Learned/Not Learned	The scan tool displays Learned or Not Learned. Learned is displayed if the rear right seat belt reminder sensor pad has been learned by the RCM.
2nd Row Right Seat Belt Status	Buckled/Unbuckled	The scan tool displays Buckled or Unbuckled. This is the state of the right rear seat belt switch when the seat belt is buckled or unbuckled.
Air Bag Malfunction Indicator	On/Off/Flashes	The scan tool will display On or Flashes if there is a problem with the SIR system. Any problems within the SIR system will illuminate the air bag indicator. The indicator will either flash or stay on.
Base Model Part Number	Varies, 8 Digit Number	The scan tool displays the part number of the RCM which is stored in non volatile memory.
Calibration Part Number	Varies, 8 Digit Number	The scan tool displays the part number of the calibration file in the RCM.
Deployment Loop 1-18 Enable Status	Enabled/Disabled	The scan tool displays Enabled or Disabled. This is the status of the air bag or pretensioner.
Deployment Loop 1-18 Learn Status	Learned/Not Learned	The scan tool displays Learned or Not learned. Learned is displayed if the RCM has defined the number loop programmed from an air bag or pretensioner.
Deployment Loop 1-18 Resistance	1.44–4.25 Ohms	The scan tool displays the resistance of the learned loop of the air bag or pretensioner when connected to the RCM.
Deployment Loop 1-18 Type	Varies	The scan tool displays the name of the air bag or pretensioner associated with the loop type 1–18.
Driver Seat Belt Reminder Indicator	On/Off	The scan tool displays On if this indicator is on. If the indicator is on it means the seat belt has not been buckled.
Driver Seat Belt Sensor Enable Status	Enabled/Disabled	The scan tool displays if the seat belt sensor in the seat belt buckle is enabled to the RCM.
Driver Seat Belt Sensor Learn Status	Learned/Not learned	The scan tool displays Learned or Not Learned. Learned is displayed if the driver seat belt sensor has been learned by the RCM.
Driver Seat Belt Status	Buckled/Unbuckled	The scan tool displays Buckled or Unbuckled. This is the state of the driver seat belt switch when the seat belt is buckled or unbuckled.

Parameter	Expected Value	Definition
Driver Seat Position Sensor	Rearward/Forward	The scan tool will display if the driver seat is forward or rearward of the sensor set position.
Driver Seat Position Sensor Enable Status	Enabled/Disabled	The scan tool displays if the seat position sensor is enabled to the RCM.
Driver Seat Position Sensor Learn Status	Learned/Not Learned	The scan tool displays Learned or Not Learned. Learned is displayed if the driver seat position sensor has been learned by the RCM.
End Model Part Number	Varies, 8 Digit Number	The scan tool displays the part number of the RCM in production.
Impact Sensor 1-8 Enable Status	Enabled/Disabled	The scan tool displays Enabled or Disabled This is the status of the impact sensor.
Impact Sensor 1-8 Learn Status	Learned/Not Learned	The scan tool displays Learned or Not learned. Learned is displayed if the RCM has learned and has assigned a number to that impact sensor.
Impact Sensor 1-8 Type	Equipped/Not Equipped	The scan tool displays the name of the impact sensor associated with the type 1–8.
Restraint Control Module Module Primary Key	Hex Value	The scan tool indicates the primary key Hex value.
Manufacturer's Traceability Number	Varies, 16 Digit Number	The scan tool displays the 16 digit traceability number in the RCM.
Module Setup	Incomplete/Complete	The scan tool indicates if the RCM is set up.
Passenger Air Bag Disabled Switch	On/Off	The scan tool displays Off when the customer manually turns the passenger airbag off with this switch.
Passenger Air Bag Off Indicator	On/Off	The scan tool displays Off when the passenger indicator is not illuminated. This indicator is off when the disable switch is in the off position or no one is sitting in the passenger seat.
Passenger Air Bag On Indicator	On/Off	The scan tool displays On when the passenger indicator is illuminated. This indicator is on when the disable switch is in the on position and someone is sitting in the passenger seat.
Passenger Air Bag Status	Enabled/Disabled	The scan tool displays if the passenger air bag is enabled to the RCM.
Passenger Air Bag Disable Indicator Enable Status	Enabled/Disabled	The scan tool displays if the passenger air bag disable indicator is enabled to the RCM.
Passenger Air Bag Disable Indicator Learn Status	Learned/Not Learned	The scan tool displays Learned or Not Learned. Learned is displayed if the RCM has learned the status of the passenger air bag disable indicator.
Passenger Air Bag Disable Switch Enable Status	Enabled/Disabled	The scan tool displays if the passenger air bag disable switch is enabled to the RCM.
Passenger Air Bag Disable Switch Learn Status	Learned/Not Learned	The scan tool displays Learned or Not Learned. Learned is displayed if the RCM has learned the status of the passenger air bag disable switch.
Passenger Air Bag Enable Indicator Enable Status	Enabled/Disabled	The scan tool displays if the passenger air bag enable indicator is enabled to the RCM.
Passenger Air Bag Enable Indicator Learn Status	Learned/Not Learned	The scan tool displays Learned or Not Learned. Learned is displayed if the RCM has learned the status of the passenger air bag enable indicator.
Passenger Classification	00–07	The scan tool will display what type of individual is sitting in the passenger seat.
Passenger Presence Detection System Enable Status	Enabled/Disabled	The scan tool displays if the restraint occupation classification system is enabled to the RCM.
Passenger Presence Detection System Learn Status	Learned/Not Learned	The scan tool displays Learned or Not Learned. Learned is displayed if the RCM has learned the passenger presence system.
Passenger Presence Detection System Reporting DTC(s)	Yes/No	The RCM will report if there are DTCs set in the passenger presence module.

Parameter	Expected Value	Definition
Passenger Seat Belt Reminder Indicator	On/Off	The scan tool displays On if this indicator is on. If the indicator is on it means the seat belt has not been buckled.
Passenger Seat Belt Reminder Indicator Enable Status	Disabled/Enabled	The scan tool displays if the passenger seat belt reminder indicator is enabled to the RCM.
Passenger Seat Belt Reminder Indicator Learn Status	Learned/Not Learned	The scan tool displays Learned or Not Learned. Learned is displayed if the passenger seat belt reminder indicator has been learned by the RCM.
Passenger Seat Belt Reminder Sensor Pad Enable Status	Disabled/Enabled	The scan tool displays if the passenger seat belt reminder sensor pad is enabled to the RCM.
Passenger Seat Belt Reminder Sensor Pad Learn Status	Learned/Not Learned	The scan tool displays Learned or Not Learned. Learned is displayed if the passenger seat belt reminder sensor pad has been learned by the RCM.
Passenger Seat Belt Sensor Enable Status	Enabled/Disabled	The scan tool displays if the seat position sensor is enabled to the RCM.
Passenger Seat Belt Sensor Learn Status	Learned/Not learned	The scan tool displays Learned or Not Learned. Learned is displayed if the passenger seat belt sensor has been learned by the RCM.
Passenger Seat Belt Status	Buckled/Unbuckled	The scan tool displays Buckled or Unbuckled. This is the state of the passenger seat belt switch when the seat belt is buckled or unbuckled.
Passenger Seat Occupancy Status	Empty Seat/Occupied	The scan tool displays Occupied if someone is sitting in the passenger seat.
Passenger Seat Position Sensor	Rearward/Forward	The scan tool will display if the passenger seat is forward or rearward of the sensor set position.
Passenger Seat Position Sensor Enable Status	Disabled/Enabled	The scan tool displays if the passenger seat position sensor pad is enabled to the RCM.
Passenger Seat Position Sensor Learn Status	Learned/Not Learned	The scan tool displays Learned or Not Learned. Learned is displayed if the passenger seat position sensor has been learned by the RCM.
Power Mode	Off/Accessory/Run/Crank Request	The scan tool will display the power mode of the vehicle.
Primary Key Status	Valid/Invalid	The scan tool displays Valid if the primary key matches what is stored to memory in the RCM.
Primary Key Status Last Ignition Cycle	Invalid/Valid	The RCM checks to see if the primary key data received is valid.
Received Primary Key	Hex Value	The scan tool displays a Hex value indicating the RCM received primary key data.
Rollover Sensor Enable Status	Disabled/Enabled	The scan tool displays if the rollover sensor is enabled to the RCM.
Rollover Sensor Learn Status	Learn/Unlearn	The scan tool displays Learned or Not Learned. Learned is displayed if the rollover sensor has been learned by the RCM.
Security Code Accepted	Yes/No	The RCM either accepts the security code or it does not. The scan tool displays Yes if the security code has been accepted by the RCM.
Security Code Lockout	Yes/No	The scan tool displays Yes if the RCM has been locked out because of the security code not being accepted.
Security Code Lockout Active Timer	Random Value	The RCM uses a timer before the security code is locked in the RCM.
Security Code Programmed	Yes/No	The scan tool displays Yes if the RCM has been programmed with the security code.
Security Code Programming Counter	Random Value	The RCM uses a counter for the value of the security code programming.
Security Code Reset Counter	Random Value	The RCM uses a counter to reset the value of the security code.
Software Part Number	Varies, 8 Digit Number	The scan tool displays the software part number in the RCM.

Parameter	Expected Value	Definition
Vehicle Identification Number	Varies, 17 Digit Number	The VIN number of the vehicle programmed into the RCM.
VIN Programmed	Yes/No	The scan tool displays Yes if the VIN has been programmed into the RCM.
VIN Programming Counter	Random Value	The RCM uses this counter while programming the VIN.

K38 Chassis Control Module: Scan Tool Information

Chassis Control Module (CCM) Scan Tool Data Parameters for Fuel System

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Engine Idling at Normal Operating Temperature/Vehicle is in Park or Neutral			
Desired Fuel Pressure	—	306.8 kPa (44.5 psi)	This displays kPa (psi). This is the desired fuel pressure.
Fuel Pump Command	—	On	The scan tool displays On or Off. This is the current state of the fuel pump command.
Fuel Pump Signal Command	—	Varies	This displays %. This is the commanded fuel pump signal measured in percentage.
Fuel Pressure Sensor	—	296.4–310.3 kPa (43–45 psi)	This displays kPa (psi). This is the current pressure at the fuel pressure sensor.
Fuel Pressure Sensor	—	2.00–3.00 Volts	This voltage can vary depending on the engine application, engine load, operating conditions and other factors. This display is in Volts. This is the fuel pressure sensor voltage.
Ignition 1 Signal	—	Varies	This displays Volts. This is the current ignition 1 signal.
LT Fuel Pump Trim	—	Varies	This displays a numeric value. This is the long term (LT) fuel pump trim.
ST Fuel Pump Trim	—	Varies	This displays a numeric value. This is the short term (ST) fuel pump trim.

Chassis Control Module (CCM) Scan Tool Output Controls for Fuel System

Output Control	Description
Fuel Pressure Control	This output control is used to control the fuel pressure.
Fuel Pump	This output control is used to command the fuel pump ON and OFF.
Fuel Pump Trim Reset	This output control is used to reset the fuel pump trim.

CCM Scan Tool Parameters for Active Grille Air Shutters (If Equipped)

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Engine Idling at Normal Operating Temperature / Vehicle is in Park or Neutral			
Active Grille Air Shutter Position Command (Single Shutter System)	—	Varies	This displays %. This is the commanded active grille air shutter position.
Active Grille Air Shutter Position (Single Shutter System)	—	Varies	This displays %. This is the actual active grille air shutter position.

Parameter	System State	Expected Value	Description
Active Grille Air Shutter 1 Position Command (Dual Shutter System)	—	Varies	This displays %. This is the commanded active grille air shutter position.
Active Grille Air Shutter 1 Position (Dual Shutter System)	—	Varies	This displays %. This is the actual active grille air shutter position.
Active Grille Air Shutter 2 Position Command (Dual Shutter System)	—	Varies	This displays %. This is the commanded active grille air shutter position.
Active Grille Air Shutter 2 Position (Dual Shutter System)	—	Varies	This displays %. This is the actual active grille air shutter position.

CCM Scan Tool Output Controls for Active Grille Air Shutters (If Equipped)

Output Control	Description
Active Grille Air Shutter System (Single Shutter System)	This output control is used to perform the Active Grille Air Shutter Actuator test. It is used to cycle the active grille air shutter open and closed. The test result will display pass or fail based on the ability of the louvers to cycle open and closed.
Active Grille Air Shutter 1 (Dual Shutter System)	This output control is used to perform the Active Grille Air Shutter Actuator test. It is used to cycle the active grille air shutter open and closed. The test result will display pass or fail based on the ability of the louvers to cycle open and closed.
Active Grille Air Shutter 2 (Dual Shutter System)	This output control is used to perform the Active Grille Air Shutter Actuator test. It is used to cycle the active grille air shutter open and closed. The test result will display pass or fail based on the ability of the louvers to cycle open and closed.

CCM Scan Tool Parameters for Active Engine Mounts (If Equipped)

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Engine Idling at Normal Operating Temperature / Vehicle is in Park or Neutral			
Engine Mount Actuator Output 1	—	On/Off	The scan tool will display On/Off. This is the engine mount actuator commanded state.
Engine Mount Actuator Output 2	—	On/Off	The scan tool will display On/Off. This is the engine mount actuator commanded state.
Engine Mount Actuator Control Circuit 1 Status (2014 model year only)	—	Passed	The scan tool displays Passed/Short to Battery/Short to Ground/Open This is the engine mount actuator control circuit 1 condition.
Engine Mount Actuator Control Circuit 2 Status (2014 model year only)	—	Passed	The scan tool displays Passed/Short to Battery/Short to Ground/Open This is the engine mount actuator control circuit 2 condition.

CCM Scan Tool Output Controls for Active Engine Mounts (If Equipped)

Output Control	Description
Engine Mount Actuator Output 1	This output control is used to turn the engine mount actuator 1 On and Off.
Engine Mount Actuator Output 2	This output control is used to turn the engine mount actuator 2 On and Off.

CCM Scan Tool Parameters for Exhaust Flow Control Valves (If Equipped)

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Engine Idling at Normal Operating Temperature / Vehicle is in Park or Neutral			
Exhaust Flow Control Valve Command	—	Open/Closed	Exhaust Flow Valve Commanded State
Exhaust Flow Control Valve Command	—	%	Exhaust Flow Valve Commanded Duty Cycle (0%-100%)
Exhaust Flow Control Valve Performance Mode	—	Active/Inactive	Exhaust Flow Valve Control Status
Exhaust Flow Control Valve Rumble Mode	—	Active/Inactive	Exhaust Flow Valve Control Status
Exhaust Flow Control Valve	—	Active/Inactive	Exhaust Flow Valve Control Status
Cylinder Deactivation Exhaust Flow Valve Command	—	Open/Closed/Disabled	Exhaust Flow Valve Commanded State
Cylinder Deactivation Exhaust Flow Control Valve	—	Active/Inactive	Exhaust Flow Valve Control Status
Cylinder Deactivation Exhaust Flow Control Valve 1 Position	—	Open range is 4 - 28 degrees Closed range is 64 - 93 degrees	Cylinder Deactivation Exhaust Flow Control Valve 1 actual position in degrees
Cylinder Deactivation Exhaust Flow Control Valve 2 Position	—	Open range is 4 - 28 degrees Closed range is 64 - 93 degrees	Cylinder Deactivation Exhaust Flow Control Valve 2 actual position in degrees

CCM Scan Tool Output Controls for Exhaust Flow Control Actuators (If Equipped)

Output Control	Description
Exhaust Flow Control Valve Command	This output control is used to cycle the exhaust flow control valve open and closed.
Cylinder Deactivation Exhaust Flow Valve Command	This output control is used to cycle the cylinder deactivation exhaust flow control valve open and closed.

Chassis Control Module (CCM) Scan Tool Data Parameters for Fuel System

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Engine Idling at Normal Operating Temperature/Vehicle is in Park or Neutral			
Desired Fuel Pressure	—	306.8 kPa (44.5 psi)	This displays kPa (psi). This is the desired fuel pressure.
Fuel Pump Command	—	On	The scan tool displays On or Off. This is the current state of the fuel pump command.
Fuel Pump Signal Command	—	Varies	This displays %. This is the commanded fuel pump signal measured in percentage.
Fuel Pressure Sensor	—	296.4–310.3 kPa (43–45 psi)	This displays kPa (psi). This is the current pressure at the fuel pressure sensor.
Fuel Pressure Sensor	—	2.00–3.00 Volts	This voltage can vary depending on the engine application, engine load, operating conditions and other factors. This display is in Volts. This is the fuel pressure sensor voltage.

Parameter	System State	Expected Value	Description
Ignition 1 Signal	—	Varies	This displays Volts. This is the current ignition 1 signal.
LT Fuel Pump Trim	—	Varies	This displays a numeric value. This is the long term (LT) fuel pump trim.
ST Fuel Pump Trim	—	Varies	This displays a numeric value. This is the short term (ST) fuel pump trim.

Chassis Control Module (CCM) Scan Tool Output Controls for Fuel System

Output Control	Description
Fuel Pressure Control	This output control is used to control the fuel pressure.
Fuel Pump	This output control is used to command the fuel pump ON and OFF.
Fuel Pump Trim Reset	This output control is used to reset the fuel pump trim.

CCM Scan Tool Parameters for Differential Lock (If Equipped)

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Engine Idling at Normal Operating Temperature / Vehicle is in Park or Neutral			
Front/Rear Differential Lock Switch Status	—	Varies	The scan tool will display Differential Lock Switch Status display Active, Inactive, Front/ Rear Switch Active, Short to ground, Short to battery, Invalid and Disable. Signal serial data message to the chassis control module
Rear Axle Differential Lock Switch Status	—	Active / Inactive	The scan tool displays Active/ Inactive.
Differential Lock Switch Voltage	—	0–20V	The scan tool displays a number in Voltage
Both Axle Differential Lock Indicator Status	—	Active / Inactive	The scan tool displays Active/ Inactive.
Rear Axle Differential Lock Indicator Command	—	Active / Inactive	The scan tool displays Rear Axle Differential Lock Indicator Command Request signal message from the Body Chassis Control Module
Front Axle Differential Lock Diagnostic Status	—	Initializing / Normal / Failed	The scan tool displays Front Axle Differential Lock Diagnostic Status. Request signal message from the Body Chassis Control Module
Front Axle Differential Lock Status	—	Active / Inactive	The scan tool displays Front Axle Differential Lock Status.
Rear Axle Differential Lock Diagnostic Status	—	Initializing / Normal / Failed	The scan tool displays Rear Axle Differential Lock Diagnostic Status request signal message from the Body Chassis Control Module.
Rear Axle Differential Lock Status	—	Active / Inactive	The scan tool displays Rear Axle Differential Lock Status.
Virtual Rear Locking Differential Status	—	Varies	The scan tool displays Off / On / Unavailable

Chassis Control Module (CCM) Scan Tool Output Controls for Differential Lock (If Equipped)

Output Control	Description
Front Axle Differential Lock Indicator	This output control is used to cycle the Front Axle Differential
Rear Axle Differential Lock Indicator	This output control is used to cycle the Rear Axle Differential
Front Axle Differential Lock Low Control	This output control is used to cycle the Front Axle Differential Low Control
Front Axle Differential Lock High Control	This output control is used to cycle the Front Axle Differential High Control
Rear Axle Differential Lock Low Control	This output control is used to cycle the Rear Axle Differential Low Control
Rear Axle Differential Lock High Control	This output control is used to cycle the Rear Axle Differential High Control

CCM Scan Tool Parameters for Vehicle Level Control (If Equipped)

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON			
Left Rear Vehicle Level Position Sensor	—	.25–4.75 Volts	This displays Volts. This is the level position sensor voltage.
Right Rear Vehicle Level Position Sensor	—	.25–4.75 Volts	This displays Volts. This is the level position sensor voltage.
Vehicle Level Control Compressor Over Temperature	—	No	This displays Yes or No. This will display Yes if the compressor is overheated.
Excessive Compressor Activity	—	No	This displays Yes or No. This will display Yes if the compressor activity is excessive.
Vehicle Level Control Status	—	Normal	This displays Normal/Uneven Surface or Hoisted/ Overloaded/Failed.
Vehicle Level Control Compressor	—	Varies	This displays On or Off. This will display if the compressor is on or off.
Vehicle Level Control Exhaust Valve	—	Varies	This displays Open or Closed. This will display if the exhaust valve is open or closed.
Vehicle Level Control Pressure Sensor	—	.4–4.8 Volts	This displays Volts. This is the level control pressure sensor voltage.
Vehicle Leveling Sensors Supply Voltage	—	4.9–5.1 Volts	This displays Volts. This is the leveling sensors supply voltage.
Vehicle Level Control Pressure Sensor Supply Voltage	—	4.9–5.1 Volts	This displays Volts. This is the level control pressure sensor supply voltage.
Vehicle Level Trim Height Status	—	Learned/Not Learned	This displays if the level trim height status

CCM Scan Tool Output Controls for Vehicle Level Control (If Equipped)

Output Control	Description
Suspension Position Sensor Trim Height	This output control is used to learn the trim height.
Vehicle Level Control Compressor Relay	This output control is used to command the compressor ON and OFF.
Vehicle Level Control Exhaust Valve	This output control is used to command the exhaust valve ON and OFF.

CCM Scan Tool Parameters for Transmission Cooling Fan (If Equipped)

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Engine Idling at Normal Operating Temperature / Vehicle is in Park or Neutral			
Transmission Cooling Fan Circuit High Voltage Test Status	—	OK	Malfunction/Not Run/OK
Transmission Cooling Fan Circuit Open Test Status	—	OK	Malfunction/Not Run/OK
Transmission Cooling Fan Circuit Low Voltage Status	—	OK	Malfunction/Not Run/OK
Transmission Cooling Fan Command	—	Yes/No	The scan tool displays Yes/No. This shows if the transmission cooling fan is being commanded ON.
Transmission Cooling Fan Duty Cycle	—	0 – 100%	The scan tool displays a percentage. This is the transmission cooling fan ON duty cycle.

CCM Scan Tool Output Controls for Transmission Cooling Fan (If Equipped)

Output Control	Description
Transmission Cooling Fan Duty Cycle	This output control is used to control the transmission cooling fan.

K40D Driver Seat Adjuster Memory Module: Scan Tool Information

Seat Position Scan Tool Data Parameters

Parameter	Expected Value	Definition
Operating Conditions: Ignition ON		
Driver Seat Back Switch	Inactive	The scan tool displays Inactive, Forward, or Rearward. When the seat recline switch is pressed, the scan tool displays the direction for which the switch is pressed.
Driver Seat Back Direction Command	Inactive	The scan tool displays Inactive, Forward, or Rearward. When the seat recline switch is pressed or when a memory recall occurs, the scan tool displays the direction the memory control module is commanding the seat recline motor.
Driver Seat Back Position	Varies	The scan tool displays 0–65,535 counts. The module counts the number of pulse signals with each rotation of the motor that the scan tool displays as counts. High count values indicate that the seat back is in the forward position, while low count values indicate that the seat back is in the rearward position.
Driver Seat Cushion Front Vertical Direction Command	Inactive	The scan tool displays Inactive, Up or Down. When the seat front vertical switch is pressed or when a memory recall occurs, the scan tool displays the direction the memory control module is commanding the seat front vertical motor.

Parameter	Expected Value	Definition
Driver Seat Cushion Front Vertical Position	Varies	The scan tool displays 0–65,535 counts. The module counts the number of pulse signals with each rotation of the motor that the scan tool displays as counts. High count values indicate that the seat front vertical is in the up position, while low count values indicate that the seat front vertical is in the down position.
Driver Seat Cushion Front Vertical Switch	Inactive	The scan tool displays Inactive, Up or Down. When the seat front vertical switch is pressed, the scan tool should display the direction for which the switch is pressed.
Driver Seat Cushion Rear Vertical Direction Command	Inactive	The scan tool displays Inactive, Up or Down. When the seat rear vertical switch is pressed or when a memory recall occurs, the scan tool displays the direction the memory control module is commanding the seat rear vertical motor.
Driver Seat Cushion Rear Vertical Position	Varies	The scan tool displays 0–65,535 counts. The module counts the number of pulse signals with each rotation of the motor that the scan tool displays as counts. High count values indicate that the seat rear vertical is in the up position, while low count values indicate that the seat rear vertical is in the down position.
Driver Seat Cushion Rear Vertical Switch	Inactive	The scan tool displays Inactive, Up or Down. When the seat rear vertical switch is pressed, the scan tool should display the direction for which the switch is pressed.
Driver Seat Horizontal Direction Command	Inactive	The scan tool displays Inactive, Forward, or Rearward. When the seat horizontal switch is pressed or when a memory recall occurs, the scan tool displays the direction the memory control module is commanding the seat horizontal motor.
Driver Seat Horizontal Position	Varies	The scan tool displays 0–65,535 counts. The module counts the number of pulse signals with each rotation of the motor that the scan tool displays as counts. High count values indicate that the seat horizontal position is forward, while low count values indicate that the seat horizontal position is rearward.
Driver Seat Horizontal Switch	Inactive	The scan tool displays Inactive, Forward, or Rearward. When the seat horizontal switch is pressed, the scan tool should display the direction for which the switch is pressed.
Driver Seat Lumbar Support Horizontal Switch	Inactive	The scan tool displays Inactive, Forward, or Rearward. When the seat lumbar horizontal switch is pressed, the scan tool should display the direction for which the switch is pressed.
Driver Seat Lumbar Support Horizontal Direction Command	Inactive	The scan tool displays Inactive, Forward, or Rearward. When the seat lumbar horizontal switch is pressed, the scan tool displays the direction the memory control module is commanding the seat lumbar horizontal motor.
Lumbar Support Horizontal Position	Varies	The module stores the pressure information for lumbar position.
Driver Seat Lumbar Support Vertical Switch	Inactive	The scan tool displays Inactive, Up, or Down. When the seat lumbar vertical switch is pressed, the scan tool should display the direction for which the switch is pressed.
Driver Seat Lumbar Support Vertical Direction Command	Inactive	The scan tool displays Inactive, Up, or Down. When the seat lumbar vertical switch is pressed, the scan tool displays the direction the memory control module is commanding the seat lumbar vertical motor.
Driver Seat Memory Recall Switches	Inactive	The scan tool displays Inactive, Memory 1, Memory 2, or Exit. When a memory function switch is pressed, the scan tool should momentarily display the function selected.
Driver Seat Memory Set Switch	Inactive	The scan tool displays Inactive/Active. When the memory SET switch is pressed, the scan tool should display Active.
Driver Seat Back Side Bolster Direction Command	Inactive	The scan tool displays Inactive, Inflate, or Deflate. When the seat back side bolster switch is pressed, the scan tool displays the function the memory control module is commanding the seat lumbar/bolster pump.
Driver Seat Back Side Bolster Switch	Inactive	The scan tool displays Inactive, Inflate, or Deflate. When the seat back side bolster switch is pressed, the scan tool should display the function for which the switch is pressed.

Parameter	Expected Value	Definition
Driver Seat Cushion Side Bolster Direction Command	Inactive	The scan tool displays Inactive, Inflate, or Deflate. When the seat back side bolster switch is pressed, the scan tool displays the function the memory control module is commanding the seat lumbar/bolster pump.
Driver Seat Cushion Side Bolster Switch	Inactive	The scan tool displays Inactive, Inflate, or Deflate. When the seat back side bolster switch is pressed, the scan tool should display the function for which the switch is pressed.
Seat Massage Switch	Inactive	The scan tool displays Inactive/Active. When the seat massage switch s pressed, the scan tool should display Active.

Mirror Memory Scan Tool Data Parameters

Parameter	Expected Value	Definition
Operating Conditions: Ignition ON		
Mirror Select Switch	None	The scan tool displays None, Driver Door, or Passenger Door. The scan tool displays the current state of the mirror select switch.
Mirror Direction Switch	Inactive	The scan tool displays Inactive/Up/Down/Left/Right/Folding/ Extending. The scan tool displays the current state of the power mirror switch as pressed.
Driver Mirror Direction Command	Inactive	The scan tool displays Inactive/Up/Down/Left/Right. When the power mirror switch is being used or when a memory recall occurs, the scan tool displays the direction the memory control module is commanding the driver mirror motors.
Driver Mirror Vertical Position	Varies	The scan tool displays 0–5 V. The voltage displayed represents the position of the driver vertical motor. High voltage values indicate the mirror position is up, while low count values indicate the mirror position is down.
Driver Mirror Horizontal Position	Varies	The scan tool displays 0–5 V. The voltage displayed represents the position of the driver horizontal motor. High voltage values indicate the mirror position is to the right or in, while low count values indicate the mirror position is to the left or out.
Passenger Mirror Direction Command	Inactive	The scan tool displays Inactive/Up/Down/Left/Right. When the power mirror switch is being used or when a memory recall occurs, the scan tool displays the direction the memory control module is commanding the passenger mirror motors.
Passenger Mirror Vertical Position	Varies	The scan tool displays 0–5 V. The voltage displayed represents the position of the passenger vertical motor. High voltage values indicate the mirror position is up, while low count values indicate the mirror position is down.
Passenger Mirror Horizontal Position	Varies	The scan tool displays 0–5 V. The voltage displayed represents the position of the passenger horizontal motor. High voltage values indicate the mirror position is to the right or in, while low count values indicate the mirror position is to the left or out.

Steering Column Scan Tool Data Parameters

Parameter	Expected Value	Definition
Operating Conditions: Ignition ON		
Steering Column Direction Switch	Varies	The scan tool displays Inactive, Forward, Rearward, Up, or Down. When the steering column switch is pressed, the scan tool should display the direction for which the switch is pressed.
Steering Column Direction Command	Varies	The scan tool displays Inactive, Forward, Rearward, Up, or Down. When the module is commanding movement of the column, the scan tool should display the direction the module is commanding the column to move in.

Parameter	Expected Value	Definition
Steering Column Vertical Position	Varies	The scan tool displays 0–255 in counts. The module counts the number of pulse signals with each rotation of the motor that the scan tool displays as counts. High count values indicates the steering wheel position is up while lower count values indicate the steering wheel position is down.
Steering Column Horizontal Position	Varies	The scan tool displays 0–255 in counts. The module counts the number of pulse signals with each rotation of the motor that the scan tool displays as counts. Low count values indicates the steering wheel position is forward toward the front of the vehicle or away from the driver while higher count values indicate the steering wheel position is rearward toward the driver.

Seat Memory Scan Tool Control Functions

Control Functions	Description
Driver Seat Back Horizontal Movement	This output control is used to command the driver seat back recline position Forward and Rearward.
Driver Seat Cushion Front Vertical Movement	This output control is used to command the driver seat cushion front vertical position Up and Down.
Driver Seat Cushion Rear Vertical Movement	This output control is used to command the driver seat cushion rear vertical position Up and Down.
Driver Seat Horizontal Movement	This output control is used to command the driver seat horizontal position Forward and Rearward.
Driver Seat Back Side Bolster Movement	This output control is used to command the driver seat back side bolster support to Inflate or Deflate.
Driver Seat Lumbar Support Horizontal Movement	This output control is used to command the driver seat lumbar horizontal position Forward and Rearward.
Driver Seat Lumbar Support Vertical Movement	This output control is used to command the lumbar vertical position Up and Down.

Mirror Memory Scan Tool Control Functions

Control Functions	Description
Driver Mirror Fold	This output control is used to command the driver mirror to fold and unfold.
Driver Mirror Movement	This output control is used to command the driver mirror up and down or left and right.
Passenger Mirror Fold	This output control is used to command the passenger mirror to fold and unfold.
Passenger Mirror Movement	This output control is used to command the passenger mirror up and down or left and right.

Adjustable Steering Column Scan Tool Control Functions

Control Functions	Description
Steering Column Tilt Up Command	This output control is used to command the steering column to the up position.
Steering Column Tilt Down Command	This output control is used to command the steering column to the down position.
Steering Column Telescope Forward Command	This output control is used to command the steering column to the forward position.
Steering Column Telescope Rearward Command	This output control is used to command the steering column to the rearward position.

Seat Cushion Haptic Motors Scan Tool Control Functions

Control Functions	Description
Driver Seat Cushion Left Rear Haptic Movement	This output control is used to Enable and Disable the driver seat cushion left rear haptic motor function.
Driver Seat Cushion Right Rear Haptic Movement	This output control is used to Enable and Disable the driver seat cushion right rear haptic motor function.

K40P Passenger Seat Adjuster Memory Module: Scan Tool Information

Seat Memory Control Module Scan Tool Data Display Parameters

Parameter	Expected Value	Definition
Operating Conditions: Ignition ON		
Passenger Seat Back Switch	Inactive	The scan tool displays Inactive, Forward, or Rearward. When the seat recline switch is pressed, the scan tool displays the direction for which the switch is pressed.
Passenger Seat Back Direction Command	Inactive	The scan tool displays Inactive, Forward, or Rearward. When the seat recline switch is pressed or when a memory recall occurs, the scan tool displays the direction the memory control module is commanding the seat recline motor.
Passenger Seat Back Position	Varies	The scan tool displays 0–65,535 counts. The module counts the number of pulse signals with each rotation of the motor that the scan tool displays as counts. High count values indicate that the seat back is in the forward position, while low count values indicate that the seat back is in the rearward position.
Passenger Seat Cushion Front Vertical Direction Command	Inactive	The scan tool displays Inactive, Up or Down. When the seat front vertical switch is pressed or when a memory recall occurs, the scan tool displays the direction the memory control module is commanding the seat front vertical motor.
Passenger Seat Cushion Front Vertical Position	Varies	The scan tool displays 0–65,535 counts. The module counts the number of pulse signals with each rotation of the motor that the scan tool displays as counts. High count values indicate that the seat front vertical is in the up position, while low count values indicate that the seat front vertical is in the down position.
Passenger Seat Cushion Front Vertical Switch	Inactive	The scan tool displays Inactive, Up or Down. When the seat front vertical switch is pressed, the scan tool will display the direction for which the switch is pressed.
Passenger Seat Cushion Rear Vertical Direction Command	Inactive	The scan tool displays Inactive, Up or Down. When the seat rear vertical switch is pressed or when a memory recall occurs, the scan tool displays the direction the memory control module is commanding the seat rear vertical motor.
Passenger Seat Cushion Rear Vertical Position	Varies	The scan tool displays 0–65,535 counts. The module counts the number of pulse signals with each rotation of the motor that the scan tool displays as counts. High count values indicate that the seat rear vertical is in the up position, while low count values indicate that the seat rear vertical is in the down position.
Passenger Seat Cushion Rear Vertical Switch	Inactive	The scan tool displays Inactive, Up or Down. When the seat rear vertical switch is pressed, the scan tool will display the direction for which the switch is pressed.
Passenger Seat Horizontal Direction Command	Inactive	The scan tool displays Inactive, Forward, or Rearward. When the seat horizontal switch is pressed or when a memory recall occurs, the scan tool displays the direction the memory control module is commanding the seat horizontal motor.
Passenger Seat Horizontal Position	Varies	The scan tool displays 0–65,535 counts. The module counts the number of pulse signals with each rotation of the motor that the scan tool displays as counts. High count values indicate that the seat horizontal position is forward, while low count values indicate that the seat horizontal position is rearward.

Parameter	Expected Value	Definition
Passenger Seat Horizontal Switch	Inactive	The scan tool displays Inactive, Forward, or Rearward. When the seat horizontal switch is pressed, the scan tool will display the direction for which the switch is pressed.
Passenger Seat Lumbar Support Horizontal Switch	Inactive	The scan tool displays Inactive, Forward, or Rearward. When the seat lumbar horizontal switch is pressed, the scan tool will display the direction for which the switch is pressed.
Passenger Seat Lumbar Support Horizontal Direction Command	Inactive	The scan tool displays Inactive, Forward, or Rearward. When the seat lumbar horizontal switch is pressed, the scan tool displays the direction the memory control module is commanding the seat lumbar horizontal motor.
Passenger Seat Lumbar Support Horizontal Position	Varies	
Passenger Seat Lumbar Support Vertical Switch	Inactive	The scan tool displays Inactive, Up, or Down. When the seat lumbar vertical switch is pressed, the scan tool will display the direction for which the switch is pressed.
Passenger Seat Lumbar Support Vertical Direction Command	Inactive	The scan tool displays Inactive, Up, or Down. When the seat lumbar vertical switch is pressed, the scan tool displays the direction the memory control module is commanding the seat lumbar vertical motor.
Passenger Seat Back Side Bolster Switch	Inactive	The scan tool displays Inactive, In, or Out. When the seat back side bolster switch is pressed, the scan tool will display the function for which the switch is pressed.
Passenger Seat Back Side Bolster Direction	Inactive	The scan tool displays Inactive, In or Out. When the seat back side bolster switch is pressed, the scan tool displays the function the memory control module is commanding the seat lumbar/ bolster pump.
Seat Cushion Side Bolster Switch	Inactive	The scan tool displays Inactive, In, or Out. When the seat back side bolster switch is pressed, the scan tool will display the function for which the switch is pressed.
Seat Cushion Side Bolster Direction Command	Inactive	The scan tool displays Inactive, In or Out. When the seat back side bolster switch is pressed, the scan tool displays the function the memory control module is commanding the seat lumbar/ bolster pump.
Passenger Seat Memory Recall Switches	Inactive	The scan tool displays Inactive, Memory 1, Memory 2, or Exit. When a memory function switch is pressed, the scan tool should momentarily display the function selected.
Passenger Seat Memory Set Switch	Inactive	The scan tool displays Inactive/Active. When the memory SET switch is pressed, the scan tool should display Active.
Seat Massage Switch	Inactive	The scan tool displays Inactive/Active. When the massage switch is pressed, the scan tool should display Active.

Seat Memory Control Module Scan Tool Control Functions

Control Functions	Description
Seat Back Direction Command	This output control is used to command the seat back recline position Forward and Rearward.
Seat Back Side Bolster Direction Command	This output control is used to command the seat back side bolster position In or Out.
Seat Cushion Side Bolster Direction Command	This output control is used to command the seat cushion side bolster position In or Out.
Seat Cushion Front Vertical Direction Command	This output control is used to command the seat cushion front vertical position Up and Down.
Seat Cushion Rear Vertical Direction Command	This output control is used to command the seat cushion rear vertical position Up and Down.

Control Functions	Description
Seat Horizontal Directional Command	This output control is used to command the seat horizontal position Forward and Rearward.
Lumbar Support Horizontal Direction Command	This output control is used to command the seat lumbar horizontal position Forward and Rearward.
Lumbar Support Vertical Direction Command	This output control is used to command the seat lumbar vertical position Up and Down.

K43 Power Steering Control Module: Scan Tool Information

Power Steering Control Module Scan Tool Data Parameters

Parameter	Expected Value	Description
Operating Conditions: Ignition ON		
Steering Wheel Input Torque	Varies	This displays the current steering input torque in N•m
Power Steering System Status	No Assist No Assist – Auto Stop Active Full Assist Limp Home Mode Limp Aside Mode	This displays the current status of the power steering system. When no faults are present, the status should be Full Assist.
Power Steering System Assist Status	Normal Maximum Assist - Level 1 Maximum Assist - Level 2 Minimum Assist - Level 1 Minimum Assist - Level 2	This displays the current performance mode of the power steering assist.
Advanced Parking Assist Status	Temporarily Inhibited Available Active Malfunction	This displays the current status of the advance parking assist system.
Power Steering Softstops Learn Status	Not Learned Learned	This displays whether the power steering rack softstops have been learned.
Battery Voltage	Varies	This displays Volts. This is the current battery voltage.
Ignition On Time	Varies	This displays seconds. This is the amount of time the current ignition cycle has been active.
Vehicle Speed	0 Km/h (0 MPH)	This displays km/h (mph). This is the current vehicle speed.
Electric Power Steering Motor Current Commanded	Varies	This displays amps (A). This displays the amount of current requested by the power steering assist motor.
Electric Power Steering Motor Current Feedback	Varies	This displays amps (A). This displays the Electric Power Steering Motor Current Feedback.
Calculated Steering Gear Rack Travel	Varies	This displays mm. This is the amount of rack travel in either direction from center.
Power Steering Output Torque	Varies	This displays N•m . This displays the current value of the Output Torque of the Electric Power Steering.
Calculated System Temperature	Varies	This displays ° C. This is the current system temperature.

Parameter	Expected Value	Description
Power Steering Level 1 Malfunction Ignition Cycle Counter	Varies	This displays counts. This is the number of ignition cycles performed while the vehicle is in a state of Power Steering Level 1 Malfunction.
Power Steering Motor Overload Protection Counter	Varies	This displays counts. This displays the Electric Power Steering Motor Overload Protection Incidents counter.
Ignition Cycle Counter	Varies	This displays counts. This number of ignition cycles performed.
Steering Wheel Angle Sensor Calibration Status	Unknown Estimated Calibrated	This displays the current calibration status of the steering wheel angle sensor.
Power Steering Assist Request from other Vehicle Device	Unknown Temporarily Inhibited Inactive Active Temporarily Limited Malfunction	Displays the current state of requests to the power steering control module for assist from other vehicle devices.
Power Steering Assist Inhibited - Motor Over Temperature	Yes/No	Indicates if the power steering assist motor is experiencing an over temperature condition and is reducing assist.
Power Steering Motor Assist Status	Normal Reduced Unavailable	This displays the current status of the power steering assist motor.
Power Steering Assist Mode	None Normal Sport Mode Comfort Track Mode Tow/Haul City Mode Performance	This displays the currently selected assist mode.
System Power Mode	Off Accessory Run Start Propulsion Active	This displays the current ignition power mode of the vehicle.
System Logistic Setting	Off Assembly Plant Mode Transport Mode Storage Mode	This displays the currently selected logistic setting of the vehicle system.

Power Steering Control Module Scan Tool Output Controls

Output Control	Description
Steering Wheel Angle Sensor Learn	Command to relearn the center position of the power steering system.
Power Steering Active Pull/Drift Compensation Learn	Clear active pull compensation learned limits. Command to reset the active pull compensation learned values.

K45 Powertrain Control Module: Engine Scan Tool Information

Powertrain Control Module Scan Tool Data

Parameter	System State	Expected Value	Description
This is a comprehensive list. Not all parameters listed are available for all applications. **Base Operating Conditions:** Engine Idling/Radiator Hose Hot/Park or Neutral/Closed Loop			
5 V Reference 1, 2, 3, 4 or 5	Engine Idling	5 Volts	This parameter displays the voltage sensed on the 5 V reference circuits at the control module. The scan tool will display a higher value at higher voltage. The scan tool will display a lower value at lower voltage.
5 V Reference 1, 2, 3, 4 or 5 Circuit Status	Engine Idling	OK	This parameter will display OK if the circuit is good or Malfunction if a short to ground, short to B+ is present.
A/C Compressor Clutch Inhibit Reason History 1 or 2	Ignition ON	None	This parameter displays one of the following if an A/C Compressor Clutch Inhibit reasons is detected. High Side Fluid Pressure, Engine Speed, Battery Voltage, Engine Stall, Engine Speed Stabilization, Wide Open Throttle, Vehicle Launch Performance, High Coolant Temperature, AC Relay Fault, Hybrid Request, AutoStop Request, High Power Electronics Coolant Temperature, High Transmission Fluid Temperature, Full Pedal Power Limit Applied, Airbag deployed, Battery Power Limit Exceeded, Powertrain Diagnostics, AC Compressor Fault, Serial Communication Fault, or Low Brake Vacuum.
A/C Compressor Clutch Relay Command	Engine Idling	Off	This parameter displays when the A/C Compressor Clutch relay is commanded ON or OFF.
A/C Compressor Clutch Relay Control Circuit High Voltage Test Status	Engine Idling	OK	This parameter displays the status of the relay control circuit. It can display OK, Malfunction or Not Run.
A/C Compressor Clutch Relay Control Circuit Low Voltage Test Status	Engine Idling	OK	This parameter displays the status of the relay control circuit. It can display OK, Malfunction or Not Run.
A/C Compressor Clutch Relay Control Circuit Open Test Status	Engine Idling	OK	This parameter displays the status of the relay control circuit. It can display OK, Malfunction or Not Run.
A/C Disabled – A/C Pressure Out of Range	A/C ON	No	This parameter displays whether the A/C pressure is out of range for normal operation as determined by the control module.
A/C Disengage 1–8 History	A/C ON	Reason for A/C Disengagement	The parameter displays reason for the last 8 air conditioning (A/C) compressor disengagements in order from 1 to 8 with 8 being the most recent. There are 8 possible causes for the A/C compressor to disengage.
A/C High Side Pressure Sensor	A/C OFF	0.75–1.5 Volts*	This parameter displays the voltage signal from the A/C high side pressure sensor input to the control module. * Varies with temperature, humidity, and altitude.
	A/C ON	1.3–2.5 Volts*	
A/C High Side Pressure Sensor	A/C OFF	450–827 kPa (65–120 psi)*	This parameter displays the pressure from the A/C high side pressure sensor signal circuit to the control module. * Varies with temperature, humidity, and altitude.
	A/C ON	827–2,350 kPa (120–341 psi)*	
A/C OFF for WOT	A/C ON	No	This parameter displays whether the control module is commanding the A/C compressor clutch relay OFF for wide open throttle (WOT).

Parameter	System State	Expected Value	Description
A/C Request Signal	A/C ON	No	This parameter displays the state of the A/C request input to the control module from the heating, ventilation, and air conditioning (HVAC) controls.
Accelerator Pedal Position	Engine Idling	0–100 %	This parameter displays the angle of the accelerator pedal position (APP) as calculated by the control module using the signals from the APP sensors.
Accelerator Pedal Position When Engine Overspeed Detected	Engine Idling	0–100 %	This parameter displays the accelerator pedal position (APP) observed upon initial detection of an overspeed condition. This value will be updated upon each overspeed condition.
Active Grille Air Shutter Ambient Air Temperature	Ignition ON	ºC (ºF)	This parameter displays the temperature detected and used by the Active Air Shutter system.
Active Grille Air Shutter Control	Ignition ON	Active / Inactive	This parameter indicates if the Active Grille Air Shutter Control is Active or Inactive.
Active Grille Air Shutter Control Status	Ignition ON	ON/OFF	This parameter displays the control status of the active air shutter.
Active Grille Air Shutter Desired Position Achieved	Ignition ON	Yes / No	This parameter indicates if the Active Grille Air Shutter Desired Position is Achieved.
Active Grille Air Shutter Diagnostic Control	Ignition ON	Active / Inactive	This parameter indicates if the control system is attempting to move the Active Grille Air Shutter for diagnostic purposes. Displays Active or Inactive.
Active Grille Air Shutter Ice Protection Mode	Ignition ON	Active / Inactive	This parameter indicates whether or not the Shutter control algorithm is in Ice Mode, which attempts to park the shutter and prohibit further operation. Displays Active or Inactive.
Active Grille Air Shutter Initialization Status	Ignition ON	Complete / Incomplete	This parameter displays the initialization status of the Active Grille Air Shutter.
Active Grille Air Shutter Position	Ignition ON	0–100 %	This parameter displays the position of the active grill air shutter. 0% = fully closed, 100% = fully open.
Active Grille Air Shutter Status	Ignition ON	Moving / Stationary	This parameter indicates if the Active Grille Air Shutter is Moving or Stationary.
Active Grille Air Shutter Supply Voltage	Ignition ON	Volts	This parameter indicates the Active Grille Air Shutter Supply Voltage.
Active Grille Air Shutter Torque Command	Ignition ON	Counts	This parameter displays the commanded torque level for the active air shutter. 0 = Nominal Torque.
Air/Fuel Equivalence Ratio Command	Engine Idling	Varies:1	This parameter should display 1.0 when in Closed Loop fuel control.
Alternative Fuel Injector 1, 2, 3, 4, 5, 6, 7 or 8 Command	Ignition ON	On / Off	This parameter contains the commanded state of the alternative fuel injector 1 output (the output is considered to be commanded on if the injector is enabled while the engine is running or cranking).
Alternative Fuel Injector 1 Control Circuit High Voltage Test Status	Ignition ON	OK, Malfunction, Not Run	This parameter displays the state of the Alternative Fuel Injector 1 control circuit. The parameter displays Malfunction if the Alternative Fuel Injector 1 control circuit is shorted to voltage.
Alternative Fuel Injector 1 Control Circuit Low Voltage Test Status	Ignition ON	OK, Malfunction, Not Run	This parameter displays the state of the Alternative Fuel Injector 1 control circuit. The parameter displays Malfunction if the Alternative Fuel Injector 1 control circuit is shorted to ground.

Parameter	System State	Expected Value	Description
Alternative Fuel Injector Pulse Width Bank 1	Ignition ON	ms	This parameter displays the alternative fuel injector pulse width (on time) commanded to each cylinder on bank 1.
Alternative Fuel Injector Pulse Width Bank 2	Ignition ON	ms	This parameter displays the alternative fuel injector pulse width (on time) commanded to each cylinder on bank 2.
Alternative Fuel Rail Pressure	Ignition ON	kPa / PSI	This parameter displays the fuel rail pressure calculated as the difference between alternative fuel rail absolute pressure and ambient air pressure (barometric pressure). This measurement is a "gauge pressure." (Gauge = Absolute − Ambient) Range 0 to 2048 kPa.
Alternative Fuel Rail Pressure	Ignition ON	Volts	This parameter displays the alternative fuel rail pressure sensor analog input as a percentage of its reference voltage.
Alternative Fuel Rail Pressure Sensor	Ignition ON	kPa	This parameter displays an ‘undefaulted’ fuel rail pressure relative to manifold vacuum. This is intended for gaseous fuel injection alternative fuel applications (CNG/LPG Mono-Fuel and Bi-Fuel).
Alternative Fuel Rail Temperature	Ignition ON	°C (°F)	This parameter displays the undefaulted alternative fuel rail temperature measured by a sensor. Range is −40 to 215°C.
Alternative Fuel Shutoff Valve 1 or 2 Control Circuit Command	Ignition ON	On / Off	This parameter displays the commanded state of the alternative fuel shutoff valve 1 output (the output is considered to be commanded on if the shutoff valve is enabled while the engine is running or cranking).
Alternative Fuel Shutoff Valve 1 or 2 Control Circuit High Voltage Test Status	Ignition ON	OK, Malfunction, Not Run	This parameter displays the state of the Alternative Fuel Shutoff Valve 1 or 2 control circuit. The parameter displays Malfunction if the Alternative Fuel Shutoff Valve is shorted to voltage.
Alternative Fuel Tank Pressure	Ignition ON	Volts	This parameter displays the alternative fuel tank pressure sensor analog input as a percentage of its reference voltage.
Ambient Air Temperature	Engine Idling	Varies	This parameter displays temperature from the input of the Intake Air Temperature Sensor.
Ambient Air Temperature	Ignition ON	°C (°F) Varies	This parameter displays the outside air temperature as calculated by the control module.
Ambient Air Temperature When Recommended Maximum Fuel Alcohol Content Exceeded	—	°C (°F)	This parameter displays the ambient air temperature when the recommended maximum fuel alcohol content was exceeded.
Ambient Humidity	Ignition ON	0–100 %	This parameter displays the current ambient humidity level.
APP Sensor 1	Accelerator pedal not actuated	0.98 Volts	This parameter displays the actual voltage on the accelerator pedal position (APP) sensor 1 signal circuit as measured by the control module.
	Accelerator pedal fully actuated	4.25 Volts	
APP Sensor 1 and 2	Ignition ON	Agree	This parameter displays Disagree if the control module detects the signal voltage from APP sensor 1 is not in correct relationship to APP sensor 2. The scan tool displays Agree under the normal operating conditions.

Parameter	System State	Expected Value	Description
APP Sensor 1 Circuit Status	Engine Idling	OK	APP Sensor 1 Out of Range indicates that the sensed accelerator pedal position 1 sensor value is currently out of range or that a Malfunction has been detected based upon the sensed accelerator pedal position 1 sensor value being out of range
APP Sensor 1 Learned Applied Position	Ignition ON	78 %	This parameter contains the learned maximum (fully applied) accelerator pedal position relating to absolute accelerator pedal position (no correction or normalization based upon learned minimum or maximum positions) from accelerator pedal position sensor 1.
APP Sensor 1 Learned Released Position	Ignition ON	0.98 Volts	This parameter indicates the accelerator pedal sensor 1 signal at its minimum learned position (pedal released) as a percentage of its reference voltage. (The minimum learned position is automatically updated periodically as determined by the calibration.
APP Sensor 1 Position	Pedal Released	0 %	This parameter contains the displacement determined from accelerator pedal position sensor 1 (corrected and normalized based upon its learned minimum and maximum positions).
	Pedal Fully Applied	99 %	
APP Sensor 2	Ignition ON	Volts	This parameter contains the accelerator pedal position sensor 2 analog input as a percentage of its reference voltage
APP Sensor 2	Accelerator pedal not actuated	0.49 Volts	This parameter displays the actual voltage on the accelerator pedal position (APP) sensor 2 signal circuit as measured by the control module.
	Accelerator pedal fully actuated	2.14 Volts	
APP Sensor 2 Circuit Status	Ignition ON	OK	APP Sensor 2 Out of Range indicates that the sensed accelerator pedal position 2 sensor value is currently out of range or that a malfunction has been detected (and latched) based upon the sensed accelerator pedal position 2 sensor value being out of range
APP Sensor 2 Learned Applied Position	Ignition ON	78 %	This parameter contains the learned maximum (fully applied) accelerator pedal position relating to absolute accelerator pedal position (no correction or normalization based upon learned minimum or maximum positions) from accelerator pedal position sensor 2.
APP Sensor 2 Learned Released Position	Ignition ON	0.49 Volts	This parameter indicates the accelerator pedal sensor 2 signal at its minimum learned position (pedal released) as a percentage of its reference voltage. (The minimum learned position is automatically updated periodically as determined by the powertrain control module.
APP Sensor 2 Position	Pedal Released	0 %	This parameter contains the displacement determined from accelerator pedal position sensor 2 (corrected and normalized based upon its learned minimum and maximum positions).
	Pedal Fully Applied	100 %	
APP Sensors	Pedal Released	0 %	This parameter contains the accelerator pedal position resulting directly from the settling of differences of the accelerator pedal position sensors (prior to any compensation to determine driver intent).
	Pedal Fully Applied	99 %	
Autostop/Autostart Disable Mode	—	Active	This parameter displays “Active” when all conditions for allowing the autostop/autostart mode are present (no inhibit conditions exist), this parameter displays "Inactive" when all conditions for allowing the autostop/autostart mode are not present.

Parameter	System State	Expected Value	Description
Autostart Inhibit Reason Autostop/Autostart Malfunction	Engine Idling	No	This parameter displays that a immediate stop was commanded due to a Autostop/Autostart malfunction.
Autostart Inhibit Reason	Engine Idling	No	The scan tool displays Yes if one of the following Autostart Inhibit Reason is detected. Control Function Active, Crank Abort, Driver Exited Vehicle, PCM Malfunction, PCM Request, Engine Coolant Temperature Out of Range, Hood Ajar, Hybrid/EV Power Conditions, Hybrid/EV Battery Pack Contactor Open, Hybrid/EV Battery Pack Power Low, Hybrid/EV Battery Pack State of Charge Low, Hybrid/EV Battery Pack Voltage Low, Hybrid/EV Propulsion System Inactive, Not Commanded, Run/Crank Not Active, System Malfunction, Transmission Range.
Autostart Reason	Engine Idling	No	This parameter displays Yes if one of the following Autostart Reason is detected. A/C Request, Acceleration Request, Accelerator Pedal Pressed, Auxiliary Transmission Fluid Pump Not Available, Brake Booster Weak Vacuum, Brake Pedal Released, Clutch Pedal Applied, Control Function Active, Drive Motor Inverter Temperature High, Drive Motor Temperature High, Driver Exited Vehicle, PCM Request, Engine Coolant Temperature Out of Range, Hood Ajar, Hybrid/EV Battery Module Voltage Low, Hybrid/EV Battery Pack Power Low, Hybrid/EV Battery Pack State of Charge Low, Hybrid/EV Battery Pack Temperature, Hybrid/EV Battery Pack Voltage Low, Hybrid/EV Propulsion System Inactive, Ignition Switch Start, Inclination, Invalid Data Received, Low Voltage Battery Discharge Current High, Low Voltage Battery State of Function Low, Low Voltage Battery State of Health Low, Low Voltage Battery Voltage Low, Maximum Autostop Time Exceeded, Minimum Engine Run Time Not met, Reduced Engine Power Active, Remote Vehicle Start Request, Stop/Start Select Switch, System Malfunction, System Optimization, System Voltage Low, TCM Demand, Tow/Haul Mode Switch ON, Transmission Fluid Temperature Out of Range, Transmission In Reverse, Transmission Range, Vehicle Speed Too High.

Parameter	System State	Expected Value	Description
Autostop Disable Reason	Engine Idling	No	The scan tool displays Yes if one of the following Autostop Disable Reason is detected. 12 V Start Counter Exceeded, A/C Request, Acceleration Request, Accelerator Pedal Pressed, Auxiliary Transmission Fluid Pump Not Available, Brake Booster Weak Vacuum, Brake Pedal Released, Clutch Pedal Applied, Control Function Active, Drive Motor Inverter Temperature High, Drive Motor Temperature High, PCM Request, Engine Coolant Temperature Out of range, Engine Speed High, Generator Load High, Hood Ajar Hybrid/EV Battery Module Voltage Low, Hybrid/EV Battery Pack Power Low, Hybrid/EV Battery Pack State of Charge Low, Hybrid/EV Battery Pack Temperature, Hybrid/EV Battery Pack Voltage Low, Hybrid/EV Propulsion System Inactive, Idle Boost Mode Active, Ignition Switch Start, Intake Manifold Weak Vacuum, Invalid Data Received, Low Voltage Battery Discharge Current High, Low Voltage Battery State of Charge Low, Low Voltage Battery State of Function Low, Low Voltage Battery State of Health Low, Low Voltage Battery Temperature Out of Range, Low Voltage Battery Voltage Low, Maximum Vehicle Stop Time Exceeded, Minimum Engine Run Time Not Met, Reduced Engine Power Active, Remote Vehicle Start Request, Run/Crank Not Active, Stop/Start Select Switch, System Optimization, System Voltage Low, TCM Request, Tow/Haul Mode Switch ON, Transmission Fluid Temperature Out of Range, Transmission in Reverse, Transmission Range, Vehicle Inclination, Vehicle Speed Threshold Not Reached, Vehicle Speed Too High, Wheel Slip Detected.
Auxiliary Coolant Pump Relay Command	Ignition ON	On / Off	This parameter displays the command status of the Auxiliary Coolant Pump Relay.
Auxiliary Coolant Pump Relay Control Circuit High Voltage Test Status	Ignition ON	OK, Malfunction, Not Run	This parameter displays the status of the Auxiliary Coolant Pump Relay Control Circuit High Voltage Test. Can display OK, Malfunction, or Not Run.
Auxiliary Coolant Pump Relay Control Circuit Low Voltage Test Status	Ignition ON	OK, Malfunction, Not Run	This parameter displays the status of the Auxiliary Coolant Pump Relay Control Circuit Low Voltage Test. Can display OK, Malfunction, or Not Run.
Auxiliary Coolant Pump Relay Control Circuit Open Test Status	Ignition ON	OK, Malfunction, Not Run	This parameter displays the status of the Auxiliary Coolant Pump Relay Control Circuit Open Circuit Test. Can display OK, Malfunction, or Not Run.
Average Fuel Age	Ignition ON	Days	This parameter displays the average fuel age in days.
Axle Torque	Engine Idling	N•m	This parameter displays the Axle Torque value sent from the hybrid control processor (HCP) to the PCM and anti-lock brake system (ABS) module.
Axle Torque Command	Ignition ON	N•m (lb ft)	This parameter displays the commanded Axle Torque value.
BARO	Engine Idling	65–104 kPa (8–16 psi)	This parameter displays the barometric pressure. The control module uses the barometric pressure sensor input for fuel control to compensate for altitude differences.
BARO Sensor	Engine Idling	2.5–4.0 Volts	This parameter displays the barometric pressure sensor voltage.

Parameter	System State	Expected Value	Description
Barometric Pressure Sensor Bank 1	Ignition ON	kPa (PSI)	This parameter displays the ambient air pressure.
Barometric Pressure Sensor Bank 2	Ignition ON	Volts	This parameter displays the signal voltage of the barometric pressure sensor
Base Model Part Number	Ignition ON	#	This parameter displays information which is used during programming to identify unique combinations of hardware and software.
Battery Capacity	Ignition ON	Ah	This parameter displays the capacity of the battery in Amp-hours.
Battery Sensor Module Battery State Information	Ignition ON	Available / Not Available	This parameter indicates if Battery State Information is Available or Not Available. Battery State Information is Not Available when there is a battery drain such as a parasitic draw.
Battery Sensor Module Reset Occurred - Using Estimated State of Charge	Ignition ON	Yes / No	This parameter indicates if the current battery State of Charge is estimated. This occurs when the BSM has been reset.
Battery State of Charge	Ignition ON	0–100 %	This parameter displays the Battery State of Charge (SOC). SOC is a calculated value provided by an intelligent battery sensor (IBS).
Battery State of Health	Ignition ON	0–100 %	This parameter displays the Battery State of Health (SOH). SOH is a calculated value provided by an intelligent battery sensor (IBS).
Battery Type	Ignition ON	N/A	This parameter displays the battery type.
Battery Voltage	Ignition ON	Volts	This parameter displays the battery voltage.
Battery Voltage High Resolution	Ignition ON	Volts	This parameter displays the high resolution battery voltage value.
Boost Pressure	Engine Idling	kPa	This parameter shows the Turbocharger boost pressure in kPa.
Boost Pressure Sensor	Engine Idling	kPa	This parameter shows the Turbocharger boost pressure in kPa.
Boost Pressure Sensor	—	Volts	This parameter displays the turbocharger boost pressure sensor in voltage.
Brake Booster Pressure Sensor	Engine Idling	Volts	This parameter displays the brake booster vacuum pressure analog input as a percentage of its reference voltage.
Brake Booster Pressure Sensor	Engine Idling	kPa	This parameter displays the undefaulted, unfiltered brake booster vacuum pressure measured by a sensor.
Brake Pedal Position Circuit Signal	Ignition ON	Closed	This parameter displays the serial data message of the brake signal from the electronic brake and traction control module (EBTCM).
Brake Pedal Position Circuit Signal	—	Released	This parameter displays the displacement of the brake pedal.
Brake Pedal Position Sensor	Ignition ON	0–100 %	This parameter displays the displacement of the brake pedal, where 0% corresponds to the brake pedal being released and 100% corresponds to the brake pedal being fully applied.
Brake Pedal Position Sensor	Ignition ON	Volts	This parameter displays the brake pedal position as indicated by the analog sensor as a percentage of its reference voltage.
Brake Pedal Position Sensor Fully Released Learn Status	Ignition ON	Complete	This parameter displays the brake pedal fully released learn position status.

Parameter	System State	Expected Value	Description
Brake Pedal Position Sensor Learned Released Position	Ignition ON	Volts	This parameter displays the position learned for the brake pedal position sensor when the brake pedal is fully released.
Brake Pedal Position Sensor Signal	Ignition ON	Released	This parameter displays the serial data message of the brake position sensor signal from the electronic brake and traction control module (EBTCM).
Calculated Air Flow	Engine Idling	G/S	This parameter contains the mass airflow determined from the speed density (MAP based) calculation of air mass per cylinder.
Calculated BARO	Engine Idling	kPa/psi 97.2 kPa/14.1 psi at idle	This parameter contains an estimate of barometric pressure, used to correlate with sensed ambient air pressure in the Barometric Pressure Correlation Diagnostic.
Calculated Catalyst Temperature or Calculated Catalyst Temperature Bank 1 or Bank 2	Engine Idling	Approximately 552°C (1,026°F)	This parameter contains the estimated catalyst temperature (as a function of engine speed, engine airflow, and fuel ethanol percentage) for use in the oxygen sensor and catalyst monitor diagnostic algorithms.
Calculated Engine Oil Pressure	Engine Idling	kPa (PSI)	This parameter displays the filtered value for the engine oil pressure.
Calculated Engine Oil Temperature	Engine Idling	105°C (221°F)	This parameter displays the estimated engine oil temperature (as a function of engine coolant temperature and other parameters).
Calibration History Buffer	Ignition ON	Unlocked	This parameter displays locked when the buffer has been locked against further updates due to detection of a non-production calibration.
Calibration Verification Number History 1–10	Ignition ON	#	This parameter displays the history entries for the primary calibration part in the controller.
Camshaft Position Active Counter	Ignition ON	Counts	This parameter displays a rolling count of the number of primary cam position sensor pulses.
Camshaft Position Sensor	Engine Idling	0 RPM	This parameter displays the speed of the engine as calculated by the signal from a camshaft position (CMP) sensor. This parameter will always display 0 unless a condition with the CKP sensor or CKP reluctor exists. If a CKP condition exists the control module will use a valid CMP sensor signal to determine engine speed and crank/camshaft position.
Camshaft Position Signal Output Circuit High Voltage Test Status	Engine Idling	OK	This parameter displays the state of the Camshaft Position Signal Output Circuit. The parameter displays Malfunction if the Camshaft Position Signal Output Circuit is shorted to voltage.
Camshaft Position Signal Output Circuit Low Voltage Test Status	Engine Idling	OK	This parameter displays the state of the Camshaft Position Signal Output Circuit. The parameter displays Malfunction if the Camshaft Position Signal Output Circuit is shorted to ground.
Camshaft Position Signal Output Circuit Open Test Status	Engine Idling	OK	This parameter displays the state of the Camshaft Position Signal Output Circuit. The parameter displays Malfunction if the Camshaft Position Signal Output Circuit is open.
Catalyst Monitor Complete	Engine Idling	Yes/No	This parameter indicates the status of the Catalyst. The scan tool displays YES when the diagnostic is complete. And NO if the diagnostic has not run, or a malfunction is detected in the catalyst.

Parameter	System State	Expected Value	Description
Catalyst Monitor Complete This Ignition Cycle	Engine Idling	Yes/No	This parameter indicates the status of the catalyst monitor diagnostic. Catalyst Monitor Test Running indicates yes or no when the catalyst monitor diagnostic is actively running a test.
Catalyst Monitor Enabled	Engine Idling	Yes/No	The scan tool displays YES when the Catalyst Monitor is Enabled. If the scan tool displays NO this could indicate a malfunction in the Catalyst Monitor circuit.
Catalyst Monitor Enabled this Ignition Cycle	Engine Idling	Yes/No	This parameter displays the monitor enable status during the current driving/monitoring cycle.
Catalyst Monitor Not At Idle Test Conditions Met	Engine Idling	Yes/No	This parameter indicates the status of the catalyst monitor diagnostic. Catalyst Monitor Test Running indicates yes or no when the catalyst monitor diagnostic is actively running a test.
Catalyst Monitor Test Counter or Catalyst Monitor Test Counter Bank 1 or 2	Engine Idling	Counts	This parameter contains the number of repeated results of the catalyst monitor diagnostic test that have been performed since a code clear (used to determine if a sufficient number of tests have run to report a passing condition).
Catalyst Monitor Test Result or Catalyst Monitor Test Result Bank 1 or 2	Engine Idling	No Decision/Failed/ Passed	This parameter indicates the status of the catalyst monitor diagnostic. Multiple tests may run before the diagnostic reports a “Pass” or “Fail” and will be tracked by Catalyst Monitor Diagnostic Test Counter. When this Parameter reports a “Pass” or “Fail”, the diagnostic is complete for the current trip and will not attempt any further tests.
Catalyst Monitor Test State	Engine Idling	Active/Inactive	This parameter indicates the status of the catalyst monitor diagnostic by displaying active or inactive. This test will only run with the engine at idle.
Change Engine Oil Indicator Command	Ignition ON	Off	This parameter sends a signal through the serial communication to inform the driver to change the engine oil. It is based on a calibrated amount of time.
Charge Air Cooler Coolant Pump Relay Command	Ignition ON	Off	This parameter displays the commanded state of the intercooler pump relay command.
Charge Air Cooler Coolant Pump Relay Control Circuit High Voltage Test Status	Ignition ON	OK	This parameter displays the state of the charge air cooler coolant pump control circuit. The parameter displays Malfunction if the charge air cooler coolant pump control circuit is shorted to voltage.
Charge Air Cooler Coolant Pump Relay Control Circuit Low Voltage Test Status	Ignition ON	OK	This parameter displays the state of the charge air cooler coolant pump control circuit. The parameter displays Malfunction if the charge air cooler coolant pump control circuit is shorted to ground.
Charge Air Cooler Coolant Pump Relay Control Circuit Open Test Status	Ignition ON	OK	This parameter displays the state of the charge air cooler coolant pump control circuit. The parameter displays Malfunction if the charge air cooler coolant pump control circuit is open.
Clutch Pedal Starter Inhibit Switch (If Equipped)	Engine Idling	On	This parameter displays ON when the clutch pedal is released.
Clutch Pedal Switch (If Equipped)	Engine Idling	Released	This parameter displays the state of the clutch pedal as determined by the control module from the clutch pedal switch.

Parameter	System State	Expected Value	Description
Cold Startup	Ignition ON	No	This parameter displays whether the engine meets the conditions for a cold startup during the present ignition cycle. The scan tool displays Yes when the conditions for a cold startup are met during the ignition cycle. The scan tool displays No when the conditions for a cold startup are not met during the present ignition cycle. Conditions for a cold startup require the coolant temperature and the intake air temperature to be below a predetermined temperature and within a certain range of each other. These conditions must occur after the engine was warmed up to a specific temperature during the previous ignition cycle.
Component Monitor Complete	Ignition ON	Yes/No	This parameter displays Yes when the Component Monitor is Complete. The powertrain control module looks at many input and output components to make this determination. If a malfunction is detected the scan tool will display No.
Component Monitor Enabled	Ignition ON	Yes/No	This parameter displays Yes when Component Monitor is Enabled. And No when it is not Enabled.
Component Monitor - This Ignition Cycle	Ignition ON	Disabled, Enabled, Complete	This parameter displays the status of the Component Monitor during this ignition cycle. Can display Disabled, Enabled, or Complete.
Cooling Fan Command	—	0–100 %	This parameter displays the amount of fan power commanded as a percentage of the total fan power available.
Cooling Fan Motor Command	—	0–100 %	This parameter displays the commanded duty cycle for the cooling fan.
Cooling Fan Control Circuit High Voltage Test Status	Ignition ON	OK, Malfunction, Not Run	This parameter displays the status of the Cooling Fan Control Circuit High Voltage Test. Can display OK, Malfunction, or Not Run.
Cooling Fan Control Circuit Low Voltage Test Status	Ignition ON	OK, Malfunction, Not Run	This parameter displays the status of the Cooling Fan Control Circuit Low Voltage Test. Can display OK, Malfunction, or Not Run.
Cooling Fan Control Circuit Open Test Status	Ignition ON	OK, Malfunction, Not Run	This parameter displays the status of the Cooling Fan Control Circuit Open Circuit Test. Can display OK, Malfunction, or Not Run.
Cooling Fan Relay 1 Command	Ignition ON	On	This parameter displays the commanded state of the fan relay 1 control circuit. The cooling fan relay 1 should be ON when the scan tool indicates the FC Relay 1 Command is ON. The cooling fan relay 1 should be OFF when the scan tool indicates the FC Relay 1` Command is OFF.
Cooling Fan Relays 2 and 3 Command	Ignition ON	On	This parameter displays the commanded state of the fan relay 2 output.
Cooling Fan Relay 1 Control Circuit Open Test Status	Ignition ON	OK	This parameter displays the state of the cooling fan relay control circuit. The parameter displays Malfunction if the cooling fan relay control circuit is open.
Cooling Fan Relay 1, or 2 and 3 Control Circuit High Voltage Test Status	Ignition ON	OK	This parameter displays the state of the cooling fan relay control circuit. The parameter displays Malfunction if the cooling fan relay control circuit is shorted to voltage.
Cooling Fan Relay 1, or 2 and 3 Control Circuit Low Voltage Test Status	Ignition ON	OK	This parameter displays the state of the cooling fan relay control circuit. The parameter displays Malfunction if the cooling fan relay control circuit is shorted to ground.

Parameter	System State	Expected Value	Description
Cooling Fan Solenoid Valve Command	Ignition ON	0–100 %	This parameter displays the commanded duty cycle for the PWM fan system.
Cooling Fan Speed	Ignition ON	Varies	This parameter displays the current state of the cooling fan speed. (For example OFF, Low, Medium, or High) rather than rotational speed.
CPP Learn Status	Ignition ON	Learned	This parameter displays the status of the procedure used to learn the clutch pedal fully applied position.
CPP Learned Apply Position	Ignition ON	Volts	This parameter displays the position learned for the clutch pedal position sensor when the clutch pedal is fully applied during the associated learn procedure.
CPP Learned Release Position	Ignition ON	Volts	This parameter displays the position learned for the clutch pedal position sensor when the clutch pedal is released.
CPP Sensor	Ignition ON	Volts	This parameter displays the clutch pedal position sensor analog input as a voltage.
CPP Sensor	Ignition ON	0–100 %	This parameter displays the displacement of the clutch pedal (corrected and normalized based upon its learned released and fully applied positions), where 0% corresponds to the clutch pedal being released and 100% corresponds to the clutch pedal being fully applied.
Crank Request Signal	Ignition switch not in the crank position	No	This parameter displays whether the ignition switch has been cycled to the crank position requesting the control module to activate the starter relay.
	Ignition switch in the crank position	Yes	
Crankshaft Position Active Counter	Engine Idling	0–255 Counts	This parameter displays an incrementing counter when the control module receives a signal from the crankshaft position sensor (CKP).
Crankshaft Position Learned Apply Position	Ignition ON	Volts	This parameter displays the position learned for the clutch pedal position (CPP) sensor when the clutch pedal is fully applied during the associated learn procedure.
Crankshaft Position Learned Release Position	Ignition ON	Volts	This parameter displays the position learned for the clutch pedal position sensor when the clutch pedal is released.
Crankshaft Position Resync Counter	Engine Idling	0 Counts	This parameter displays the number of times the control module has to resynchronize with the CKP sensor. The parameter will begin to increment if the control module does not detect a CKP reference pulse. The parameter will reset to 0 after the ignition is switched OFF.
Crankshaft Position Sensor	Engine Idling	RPM	This parameter displays engine speed.
Crankshaft Position Signal Output Circuit High Voltage Test Status	Ignition ON	OK	This parameter displays the state of the crankshaft position signal output circuit. The parameter displays Malfunction if the crankshaft position signal output circuit is shorted to voltage.
Crankshaft Position Signal Output Circuit Low Voltage Test Status	Ignition ON	OK	This parameter displays the state of the crankshaft position signal output circuit. The parameter displays Malfunction if the crankshaft position signal output circuit is shorted to ground.

Parameter	System State	Expected Value	Description
Crankshaft Position Signal Output Circuit Open Test Status	Ignition ON	OK	This parameter displays the state of the crankshaft position signal output circuit. The parameter displays Malfunction if the crankshaft position signal output circuit is open.
Crankshaft Position Variation Learn	Ignition ON	Not Learned	This parameter displays if the crank angle learned this key cycle.
Crankshaft Position Variation Learn Attempts	Ignition ON	Counts	This parameter displays the number of attempts to learn the crank angle sensing error (CASE) during current key cycle.
Crankshaft Position Variation Learn Crank Pulse to Cylinder Count	Ignition ON	Counts	This parameter displays the number of attempts to learn the crank angle sensing error (CASE) during the current key cycle.
Crankshaft Position Variation Learn Crank Pulse to Cylinder Count	Ignition ON	Agree	This parameters displays the number of crank pulses observed over an engine cycle did not equal the number of cylinders for the engine at some point during the CASE learn cycle.
Crankshaft Position Variation Learn Cylinder Compensation Factors	Engine Running	In Range / Out Of Range	This parameter indicates if one or more compensation factors calculated for individual cylinders is out of range.
Crankshaft Position Variation Learn Data Collected	Ignition ON	Sufficient / Insufficient	This parameter indicates if the CASE learn algorighm has collected sufficient data.
Crankshaft Position Variation Learn Opposing Cylinder Compensation Factors	Ignition ON	In Range / Out Of Range	This parameter indicates if the difference in the compensation factors calculated for one or more pairs of opposing cylinders is out of range.
Crankshaft Position Variation Learn Reluctor Ring Tooth Spacing Factors	Ignition ON	In Range / Out Of Range	This parameter indicates if one or more of the compensation factors calculated for the individual tooth spacing is out of range.
Crankshaft Position Variation Learn Required Engine Speed	Ignition ON	In Range	This parameter displays that the engine speed required to complete the CASE learn process has not been achieved.
Crankshaft Position Variation Learn Status	Ignition ON	Complete	This parameter displays the status of the crank angle sensing error (CASE) learn algorithm.
Crankshaft Position Variation Learn Sum of Cylinder Compensation Factors	Ignition ON	In Range / Out Of Range	This parameter indicates if the sum of the compensation factors calculated for the individual cylinders is too large.
Cruise Control	Cruise ON	Active	This parameter displays the status of the cruise control system as determined by the control module.
Cruise Control Acceleration Switch	Ignition ON	Active, Inactive, Invalid	This parameter Indicates the state of the cruise control speed ACCEL switch. This signal is based upon the state of the cruise control speed ACCEL switch received over serial communication from the platform electronics.
Cruise Control Cancel Switch	Cruise ON	Inactive	This parameter displays the status of the cruise control cancel switch.
Cruise Control Switch 2	Cruise ON	N/A	This parameter indicates the state of the secondary Cruise Control Switch.
Cruise Control Disengage 1-8 History	Cruise ON	Reason for Cruise Disengagement	The parameter displays the last 8 cruise control disengages in order from 1 to 8, with 8 being the most recent. There are approximately 30 possible causes for the cruise control to disengage.

Parameter	System State	Expected Value	Description
Cruise Control Inhibit Reason	Cruise OFF	Off	The parameter displays the reason the cruise control system cannot engage.
	Cruise ON	Park/Neutral	
Cruise Control ON/OFF Switch	Cruise ON	On	The powertrain control module (PCM) monitors the signal circuit of the cruise control switch. A closed switch is displayed as ON.
Cruise Control Resume/ Accelerator Switch	Cruise ON	On	The scan tool displays ON, when the cruise ON/OFF switch is ON and the resume/accel (+) button is pressed, the PCM detects a pre-determined voltage value for the resume/accel. switch.
Cruise Control Set/Coast Switch	Cruise ON	On	The scan tool displays ON, when the cruise ON/OFF switch is ON and the PCM detects a predetermined voltage value for the set/coast (−) switch.
Cruise Control Switch	Cruise ON	Inactive	The powertrain control module (PCM) monitors the signal circuit of the cruise control switch. A closed switch is displayed as Active.
Current Fuel Type	Ignition ON	Varies	This parameter displays the current fuel type such as Not available, Gasoline/petrol, Methanol, Ethanol, Diesel, Liquefied Petroleum Gas, Compressed Natural Gas, Propane, Battery/electric, Bi-fuel, or Hybrid.
Current Gear	Transmission in Park/ Neutral	P/N	This parameter displays the transmission gear commanded by the transmission control module.
	Transmission not in Park/ Neutral	Reverse/1st-5th	
Current Gear When Engine Overspeed Detected	Engine Idling	Varies	This parameter displays the transmission actual gear observed upon initial detection of an overspeed condition.
Cycles of Misfire Data	Engine Running	0–3,000 counts	This parameter displays the number of cylinder firing events recorded by the control module.
Cylinder Deactivation Disable History 1-8	Engine Running	—	This parameter displays one of the last eight reasons for the reactivation of all engine cylinders.

Parameter	System State	Expected Value	Description
Cylinder Deactivation Inhibit	Engine Running	Yes / No	A/C Compressor Clutch On, Acceleration Request, APP High, APP Rate High, Axle Torque Limiting, Brake Booster Pressure Sensor DTC, Brake Booster Weak Vacuum, Calculated Torque, Camshaft Position Actuator DTC, Camshaft Position Sensor DTC, Catalyst Overtemperature Protection, Catalyst Temperature Low, Crankshaft Position Sensor DTC, Cylinder Deactivation Solenoid Valve DTC, Cylinder Deactivation System DTC, Deceleration Fuel Cut-Off, ECT, ECT Sensor DTC, Engine Controls Ignition Relay DTC, Engine Oil Pressure, Engine Oil Pressure Control Solenoid Valve Stuck Off, Engine Oil Pressure Control Test Active, Engine Oil Pressure Sensor DTC, Engine Oil Temperature, Engine Overtemperature Protection, Engine Speed, Engine Stall Prevention, Exiting Deceleration Fuel Cut-Off, Fuel Trim Cylinder Balance DTC, Heater Performance, HO2S 2 Test, Hot Coolant Mode, IAT Sensor DTC, Ignition Voltage, Injector Stable Time, Insufficient Torque Capacity, Intake Manifold Weak Vacuum, MAP Sensor DTC, Maximum Deactivation Time Exceeded, Maximum Throttle Exceeded, Minimum Time After TAC DTC, Minimum Time On All Cylinders, Misfire DTC, Oil Aeration, Panic Brake Assist Active, Piston Protection, RPM Limit, Scan Tool Override, TAC System DTC, Torque Reduction, Transmission Gear, Transmission Range, Transmission Shifting, Vehicle Speed Too Low, VSS DTC
Cylinder Deactivation Performance Test	Engine Running	OK / Malfunction	This parameter indicates if one or more cylinders failed to deactivate when commanded.
Cylinder Deactivation System Command	Engine Running	All Cylinder / Cylinder Deactivation	This parameter indicates the status of the Cylinder Deactivation System Command.
Cylinder 1,2,3,4,5,6,7,8 Current Misfire Counter	Engine Idling	Counts	The scan tool displays a range of 0–255 counts. This parameter displays the number of misfires that have been detected during the last 255 cylinder firing events. The counters may normally display some activity, but the activity should be nearly equal for all of the cylinders, and in low numbers.
Cylinder 1–4 Exhaust Camshaft Profile Sleeve Position	Engine Running	Fixed Lift / Low Lift / High Lift / Cylinder Deactivation / Undetermined	The scan tool displays the position of the Exhaust Camshaft Profile Sleeve as commanded by the control module.
Cylinder 1,2,3,4,5,6,7, or 8 History Misfire Counter	Engine Running	Counts	The scan tool displays a range of 0–65,535 counts. The misfire history counters display the total level of misfire that has been detected on each cylinder. The misfire history counters will not update or show any activity until a misfire DTC P0300 has become active. The misfire history counters will update every 255 cylinder firing events.
Cylinder 1, 2, 3, 4, 5, 6, 7 or 8 Injector Control Circuit High Voltage Test Status	Ignition ON	OK	This parameter displays the state of the injector control circuit. The parameter displays Malfunction if the injector control circuit is shorted to voltage.
Cylinder 1, 2, 3, 4, 5, 6, 7 or 8 Injector Control Circuit Low Voltage Test Status	Ignition ON	OK	This parameter displays the state of the injector control circuit. The parameter displays Malfunction if the injector control circuit is shorted to ground.

Parameter	System State	Expected Value	Description
Cylinder 1, 2, 3, 4, 5, 6, 7 or 8 Injector Control Circuit Open Test Status	Ignition ON	OK	This parameter displays the state of the injector control circuit. The parameter displays Malfunction if the injector control circuit is open.
Cylinder 1, 2, 3, 4, 5, 6, 7 or 8 Injector Flow Identifier	Ignition ON	OK	This parameter displays the End of Line Injector Adjustment (EIA) for the fuel injector. This value shall be used by the PCM for adjustment to actual fuel injected quantity compared to nominal for the injector.
Cylinder 1-6 Injector Control Circuit Status	Engine Idling	OK	This parameter displays the state of the fuel injector control circuit.
Cylinder 1-6 Injector Disabled Misfire Detected	Engine Idling	No	This parameter displays the injector that has been disabled by the misfire catalyst converter protection calibration.
Cylinder 1–4 Intake Camshaft Profile Sleeve Position	Engine Running	Fixed Lift / Low Lift / High Lift / Cylinder Deactivation / Undetermined	The scan tool displays the position of the IntakeCamshaft Profile Sleeve as commanded by the control module.
Cylinder 1–6 Knock Detected	Engine Idling	No	This parameter displays yes if a knock has been detected in an individual cylinder.
DC/DC Converter Ignition 1 Signal	Engine Running	On / Off	This parameter indicates if the DC/DC Converter Ignition 1 Signal is On or Off.
DC/DC Converter Output Voltage 1 Variance - Engine Cranking	Engine Cranking	Volts	This parameter indicates the DC/DC Converter Output Voltage 1 Variance with the engine cranking.
DC/DC Converter Output Voltage 1 Variance - Engine Running / Off	Engine Running/Off	Volts	This parameter indicates the DC/DC Converter Output Voltage 1 Variance with the engine running or Off.
DC/DC Converter Output Voltage 2 Variance - Engine Cranking	Engine Cranking	Volts	This parameter indicates the DC/DC Converter Output Voltage 2 Variance with the engine cranking.
DC/DC Converter Output Voltage 2 Variance - Engine Running / Off	Engine Running/Off	Volts	This parameter indicates the DC/DC Converter Output Voltage 2 Variance with the engine running or Off.
DC/DC Converter Output Voltage Sensor Circuit 1	Engine Running	Volts	This parameter measures voltage at the DC/DC Converter Output Voltage Sensor Circuit 1.
DC/DC Converter Output Voltage Sensor Circuit 2	Engine Running	Volts	This parameter measures voltage at the DC/DC Converter Output Voltage Sensor Circuit 2.
Deceleration Fuel Cut-Off	Engine Running	Inactive	This parameter displays the status of the operating mode of the control module used to turn OFF the fuel injectors and the EVAP canister purge valve during certain deceleration conditions.
Desired Active Grille Air Shutter Position	Ignition ON	0–100 %	This parameter displays the commanded position for the active grille air shutter. 0%=fully closed, 100%=fully open.
Desired Boost Pressure	Engine Running	kPa	This parameter displays the desired turbocharger boost pressure.
Desired Cooling Fan Speed	Ignition ON	RPM	This parameter displays the desired fan speed.
Desired ECT	Ignition ON	°C (°F)	This parameter displays the desired engine coolant temperature in degrees.

Parameter	System State	Expected Value	Description
Desired Exhaust Camshaft Position or Desired Exhaust Camshaft Position Bank 1 or 2	Engine Idling	0 Degrees	This parameter displays the desired exhaust camshaft angle as commanded by the control module.
	Engine speed at 2000 RPM	10 Degrees	
Desired Fuel Pressure	Ignition ON	kPa (PSI)	This parameter displays the desired fuel supply pressure.
Desired Fuel Rail Pressure	Engine Idling	Varies 3.4 mPa to 5.5 mPa (500 to 800 psi)	This parameter displays the desired Fuel Rail Pressure commanded by the control module.
Desired Idle Speed	Engine Idling	Approximately 650 RPM	This parameter displays the desired engine idle speed as commanded by the control module. The desired idle speed varies depending on engine load.
Desired Intake Camshaft Position or Desired Intake Camshaft Position Bank 1 or 2	Engine Idling	0 Degrees	This parameter displays the desired intake camshaft angle as commanded by the control module.
	Engine speed at 2000 RPM	10 Degrees	
Desired Throttle Position	Engine Idling	0–100 %	Commanded Throttle Actuator Control.
Distance Since DTC Cleared	Engine Idling	0 Km/mi	This parameter displays in kilometers or miles the distance traveled since a DTC was cleared.
Distance Since First Malfunction	Engine Idling	0 Km/mi	This parameter displays in kilometers or miles the distance traveled since a Malfunction occurred.
Distance Since Last Malfunction	Engine Idling	0 Km/mi	This parameter displays the distance accumulated since last malfunction was captured. This parameter is only meaningful within the context of a failure record or freeze frame.
Distance Since Last Oil Level Warning	Engine Idling	0 Km/mi	This parameter displays in kilometers or miles the distance traveled since the last oil level warning Malfunction occurred.
Distance Since Last Oil Pressure Warning	Engine Idling	0 Km/mi	This parameter displays in kilometers or miles the distance traveled since the last oil pressure warning Malfunction occurred.
Distance Since Recommended Maximum Fuel Alcohol Content Exceeded	Engine Idling	0 Km/mi	This parameter displays in kilometers or miles the distance Since Recommended Maximum Fuel Alcohol Content Exceeded.
Distance This Driving Cycle	Ignition ON	km / miles	This parameter displays the distance a vehicle has traveled in the current driving cycle.
Distance with MIL On	Ignition ON	km / miles	This parameter displays the accumulated distance driven with the malfunction indicator lamp (MIL) on.
Drag Control Status	Vehicle Moving	Active/Inactive	EDC Active (Drag Active) control mode is indicated when the requested torque signal is above the driver requested value while the traction control system signal input is active.
Driver Requested Axle Torque	Engine Idling	N•m	This parameter displays a (desired) output value after comparing engine load as an input to the hybrid control processor and powertrain control module.
Drop-Throttle Detected while Traction Control Active	Engine Idling	No	This parameter displays if the Drop Throttle Control Mode is active while the Traction Control System Data Control Signal input is active.

Parameter	System State	Expected Value	Description
Drop-Throttle Status	Engine Idling	Inactive	This parameter displays the Drop Throttle Control Mode is active when the Requested Torque Signal indicates greater than 90 percent duty cycle while the Traction Control System Data Control Signal input is active.
PCM Authentication Status	Ignition ON	Valid	PCM Authentication Status indicates the result of the comparison between the last received immobilizer response and the expected response calculated into the PCM.
PCM Challenge Status	Ignition ON	Valid	This parameter displays the immobilizer system status of the PCM challenge. This indicates whether the currently calculated PCM challenge is valid.
PCM in Immobilizer Fail Enable Mode	Ignition ON	Yes / No	This parameter displays that a serial communication failure has been detected after the receipt of the correct VTD password.
PCM Odometer	Ignition ON	km (miles)	This parameter displays the odometer reading of the vehicle.
PCM Response Source	Ignition ON	Ignition Switch Start	PCM Response Source indicates the source used to calculate the PCM response.
Economy Mode Indicator Command	Ignition ON	Off	This parameter indicates the status of the serial data signal used to illuminate the economy mode indicator lamp.
ECT Sensor	Ignition ON	88 to 105°C (190 to 221°F)	This parameter displays the temperature of the engine coolant based on input to the control module from the engine coolant temperature (ECT) sensor.
ECT vs. IAT Sensor Temperature at Last ECT vs. RCT Malfunction Detection	Ignition ON	Agree	This parameter displays that the temperature values of the ECT and IAT sensors did not agree at the time of the most recent failure of the ECT/RCT rationality diagnostic.
EGR/Camshaft Position Monitor Complete	Ignition ON	Yes/No	This parameter displays the status of the EGR/Camshaft Position Monitor. The parameter will display Yes when the EGR/Camshaft Position Monitor is complete.
EGR/Camshaft Position Monitor Complete This Ignition Cycle	Engine Idling	Yes/No	This parameter displays Yes or No of the completion status during the current driving/monitoring cycle of emission related monitors.
EGR/Camshaft Position Monitor Enabled	Ignition ON	Yes/No	This parameter displays the status of the EGR/Camshaft Position Monitor. The parameter will display Yes when the EGR/Camshaft Position Monitor is Enabled.
EGR/Camshaft Position Monitor Enabled This Ignition Cycle	Engine Idling	Yes/No	This parameter displays Yes or No of the completion status during the current driving/monitoring cycle of emission related monitors.
Electric Power Management Inhibit Reason	Engine Idling	None	This parameter displays the reason for the source of the Regulated Voltage Control (RVC) override command. RVC lowers system operating voltage to reduce system electrical load and improve fuel economy performance. The following is a list of possible reasons: • None • Control Function • Active/Fuel System • On-board Diagnostic System • Air Flow Measurement System • Cylinder Deactivation System • System Transmission Control Module

Parameter	System State	Expected Value	Description
End Model Part Number	—	#	This parameter identifies the part number that represents the combination of hardware, software, and calibrations present in the ECU.
Engine Autostopped	—	No	This parameter displays the status of the internal combustion engine (ICE) in vehicles incorporating ICE autostart/stop functionality.
Engine Calibration Part Number History 1-10	Ignition ON	#	This parameter displays the engine calibration part number history.
Engine Calibration Part Number History 1-10 Counter	Ignition ON	#	This parameter displays the number of times the engine controller had been calibrated.
Engine Controls Ignition Relay Command	Ignition ON	Off	This parameter displays the state of the control circuit for control module power relay as commanded by the control module.
Engine Controls Ignition Relay Control Circuit High Voltage Test Status	Ignition ON	OK	This parameter displays the state of the Engine Controls Ignition Relay control circuit. The parameter displays Malfunction if the Engine Controls Ignition Relay control circuit is shorted to voltage.
Engine Controls Ignition Relay Controls Circuit Low Voltage Test Status	Ignition ON	OK	This parameter displays the state of the Engine Controls Ignition Relay control circuit. The parameter displays Malfunction if the Engine Controls Ignition Relay control circuit is shorted to ground.
Engine Controls Ignition Relay Controls Circuit Open Test Status	Ignition ON	OK	This parameter displays the state of the Engine Controls Ignition Relay control circuit. The parameter displays Malfunction if the Engine Controls Ignition Relay control circuit is open.
Engine Controls Ignition Relay Feedback 2 Signal	Ignition ON	Volts	This parameter indicates the signal voltage from the second input to the controller from the powertrain relay.
Engine Controls Ignition Relay Feedback 3 Signal	Ignition ON	Volts	This parameter indicates the signal voltage from the third input to the controller from the powertrain relay.
Engine Controls Ignition Relay Feedback Signal	Ignition ON	12.0–14.9 Volts	This parameter displays the voltage available at the engine controls ignition relay terminal of the powertrain control module.
Engine Coolant Pump Clutch Relay Command	Ignition ON	Flow / No Flow	This parameter displays the commanded state of the engine coolant pump clutch.
Engine Coolant Thermostat Heater Command	Ignition ON	0–100 %	This parameter displays the commanded duty cycle for the engine coolant thermostat.
Engine Coolant Thermostat Heater Control Circuit High Voltage Test Status	Ignition ON	OK	This parameter displays the state of the engine coolant thermostat heater control circuit. The parameter displays Malfunction if the engine coolant thermostat heater control circuit is shorted to voltage.
Engine Coolant Thermostat Heater Control Circuit Low Voltage Test Status	Ignition ON	OK	This parameter displays the state of the engine coolant thermostat heater control circuit. The parameter displays Malfunction if the engine coolant thermostat heater control circuit is shorted to ground.
Engine Coolant Thermostat Heater Control Circuit Open Test Status	Ignition ON	OK	This parameter displays the state of the engine coolant thermostat heater control circuit. The parameter displays Malfunction if the engine coolant thermostat heater control circuit is open.
Engine Crank Command	Ignition ON	Yes / No	This parameter indicates if the engine is being commanded to crank or not.

Parameter	System State	Expected Value	Description
Engine Crank Time	Ignition ON	0:00:00 Seconds – Varies	This parameter indicates the time between the start of engine cranking to when the engine reaches an operating RPM.
Engine Load	Engine Idling	25–45 %	This parameter displays the calculated engine load in percent based on inputs to the control module from various engine sensors.
	Engine speed at 2,500 RPM	40–60 %	
Engine Load During Misfire History 1-10	Ignition ON	0–100 %	This parameter displays the engine load during the last misfire event.
Engine Off	—	No	This parameter displays the status of the internal combustion engine (ICE) in vehicles incorporating ICE autostop/autostart functionality.
Engine OFF Time	Engine Idling	0:00:00 Seconds – Varies	This parameter displays the amount of time that has elapsed since the engine was last cycled OFF.
Engine Oil Absolute Pressure Sensor	Engine Idling	kPa/PSI	This parameter displays the undefaulted, unfiltered measured engine oil pressure read by an oil absolute pressure sensor.
Engine Oil Level Switch	Engine Idling	OK	This parameter displays the status of the engine oil level switch as determined by the control module. The control module uses this information to turn on the low engine oil lamp if the engine oil level remains approximately 1 quart low for a sufficient amount of time. The scan tool will display Low when the engine oil level is low. The scan tool will display OK when the engine oil level is correct.
Engine Oil Life Remaining	Engine Idling	0–100 %	This parameter displays the percent of engine oil life remaining. The controller calculates the engine oil life by monitoring engine load, coolant temperature, and engine speed.
Engine Oil Pressure	Engine Idling	kPa/PSI	This parameter displays the actual engine oil pressure measured by a sensor.
Engine Oil Pressure Control Disable History 1 or 2	Ignition ON	—	This parameter indicates one of the last two reasons that powertrain has disengaged oil control.
Engine Oil Pressure Control Solenoid Valve Command	Ignition ON	High Pressure/Low Pressure	This parameter displays the commanded state of the variable displacement oil pump output.
Engine Oil Pressure Control Solenoid Valve Control Circuit High Voltage Test Status	Ignition ON	OK	This parameter displays the state of the engine oil pressure control solenoid valve control circuit. The parameter displays Malfunction if the engine oil pressure control solenoid valve control circuit is shorted to voltage.
Engine Oil Pressure Control Solenoid Valve Control Circuit Low Voltage Test Status	Ignition ON	OK	This parameter displays the state of the engine oil pressure control solenoid valve control circuit. The parameter displays Malfunction if the c engine oil pressure control solenoid valve control circuit is shorted to ground.
Engine Oil Pressure Control Solenoid Valve Control Circuit Open Test Status	Ignition ON	OK	This parameter displays the state of the engine oil pressure control solenoid valve control circuit. The parameter displays Malfunction if the engine oil pressure control solenoid valve control circuit is open.
Engine Oil Pressure Control Test Counter	Ignition ON	Counts	This parameter displays the number of times that the Engine Oil Pressure Control test has been activated during the current key cycle.
Engine Oil Pressure Control Test Inhibit History 1 or 2	Ignition ON	—	This parameter indicates one of the last two reasons that powertrain has inhibited oil pressure intrusive diagnostic test.

Parameter	System State	Expected Value	Description
Engine Oil Pressure Sensor	Engine Idling	OK	This parameter displays the engine oil pressure as determined by engine oil pressure sensor.
Engine Oil Pressure Switch	Engine Idling	OK / Low	This parameter displays the status of the engine oil pressure sensor.
Engine Oil Temperature Sensor	Ignition ON	C° (°F)	This parameter displays engine oil temperature as measured by a sensor connected to the PCM.
Engine Oil Temperature When Engine Overspeed Detected	Engine Idling	Temperature	This parameter displays the temperature of the engine oil as determined by the control module.
Engine Oil Type	Ignition ON	Conventional / Synthetic	This parameter indicates whether the engine oil type is conventional or synthetic oil.
Engine Overspeed	Engine Idling	Not Present	This parameter displays if an Engine Overspeed is Present or Not Present.
Engine Overspeed Counter	Ignition ON	Counts	This parameter displays the accumulated number of engine overspeed detection events.
Engine Run Time	Engine Idling	0:00:00 Increments when the engine is operating	This parameter displays the time elapsed since the engine was started.
Engine Running	—	No	This parameter displays the status of the internal combustion engine (ICE) in vehicles incorporating ICE autostop/autostart functionality.
Engine Serial Number	Ignition ON	#	This parameter displays the engine serial number.
Engine Shutdown Counter – Excessive Idle Time	Ignition ON	Counts	This parameter displays the count of engine shutdowns due to excessive idle time.
Engine Shutdown Counter – High Coolant Temperature	Ignition ON	Counts	This parameter displays the count of engine shutdowns due to high coolant temperature.
Engine Shutdown Counter – Low Coolant Level	Ignition ON	Counts	This parameter displays the count of engine shutdowns due to low coolant level.
Engine Shutdown Counter – Low Oil Level	Ignition ON	Counts	This parameter displays the count of engine shutdowns due to low oil level.
Engine Speed	Engine Cranking	Greater than 60 RPM	This parameter displays the speed of the engine crankshaft rotation from information received from the crankshaft position (CKP) sensor. If there is a CKP sensor DTC, the PCM calculates the engine speed from one of the camshaft position (CMP) sensors.
	Engine Idling	550–700 RPM	
Engine Speed During Misfire History 1–5	Ignition ON	RPM	This parameter displays the last 5 engine speeds during misfire events.
Engine Speed When Engine Overspeed Detected	Engine Idling	RPM	This parameter displays the engine speed observed upon initial detection of an overspeed condition. This value will be updated after each overspeed condition.
Engine Stalled	Ignition ON	No	This parameter displays that the internal combustion engine has stopped running unintentionally.
Engine Starting	Ignition ON	No	This parameter displays that the internal combustion engine is being started (in transition from engine OFF to engine running).

Parameter	System State	Expected Value	Description
Engine Stopping	Ignition ON	No	Engine Stopping indicates that the internal combustion engine is stopping (in transition from engine running to engine off, OR in transition from engine running to engine failed).
Engine Torque	Engine Running	0–100 %	This parameter indicates the current indicated torque as a percent of engine reference torque.
Engine Torque Command	Engine Idling	N•m	This parameter displays the commanded predicted engine torque value, which is the torque request for the slow response air path (control of the throttle).
EVAP Malfunction History	Engine Running	None	This parameter displays the result of the evaporative emission (EVAP) system as determined by the control module. The scan tool will display the following: None Excess Vacuum Purge Valve Leak Small Leak Weak Vacuum No Test Result
EVAP Monitor Complete	Engine Running	Yes/No	This parameter displays if the most recent evaporative emissions diagnostic test is complete.
EVAP Monitor Complete This Ignition Cycle	Engine Running	Yes/No	This parameter displays the diagnostic monitor completion status during the current driving/ monitoring cycle.
EVAP Monitor Enabled	Engine Running	Yes/No	This parameter displays if the evaporative emissions diagnostic test is enabled.
EVAP Monitor Enabled This Ignition Cycle	Engine Running	Yes/No	This parameter displays the diagnostic monitor enable status during the current driving/ monitoring cycle.
EVAP Purge Solenoid Valve Command	Engine Idling	0–100 %	This parameter displays the commanded duty cycle for the canister purge output.
EVAP Purge Solenoid Valve Control Circuit High Voltage Test Status	Ignition ON	OK	This parameter displays the state of the evaporative emission (EVAP) purge solenoid control circuit. The parameter displays Malfunction if the EVAP purge solenoid control circuit is shorted to voltage.
EVAP Purge Solenoid Valve Control Circuit Low Voltage Test Status	Ignition ON	OK	This parameter displays the state of the evaporative emission (EVAP) purge solenoid control circuit. The parameter displays Malfunction if the EVAP purge solenoid control circuit is shorted to ground.
EVAP Purge Solenoid Valve Control Circuit Open Test Status	Ignition ON	OK	This parameter displays the state of the evaporative emission (EVAP) purge solenoid control circuit. The parameter displays Malfunction if the EVAP purge solenoid control circuit is open.
EVAP System Fuel Tank Pressure Sensor to Fuel Tank Restriction Detected	Ignition ON	Yes / No	This parameter indicates if the Fuel Tank Pressure Sensor detects a blockage in the fuel system.
EVAP Vent Solenoid Command	Engine Idling	Not Venting	This parameter displays the state of the control circuit for evaporative emission (EVAP) vent solenoid as commanded by the control module.

Parameter	System State	Expected Value	Description
EVAP Vent Solenoid Valve Control Circuit High Voltage Test Status	Ignition ON	OK	This parameter displays the state of the EVAP vent solenoid control circuit. The parameter displays Malfunction if the EVAP vent solenoid control circuit is shorted to voltage. This parameter may not change if the scan tool is used to command the EVAP vent solenoid ON.
EVAP Vent Solenoid Valve Control Circuit Low Voltage Test Status	Ignition ON	OK	This parameter displays the state of the EVAP vent solenoid control circuit. The parameter displays Malfunction if the EVAP vent solenoid control circuit is shorted to ground. This parameter may not change if the scan tool is used to command the EVAP vent solenoid ON.
EVAP Vent Solenoid Valve Control Circuit Open Test Status	Ignition ON	OK	This parameter displays the state of the EVAP vent solenoid control circuit. The parameter displays Malfunction if the EVAP vent solenoid control circuit is open. This parameter may not change if the scan tool is used to command the EVAP vent solenoid ON.
Exhaust Camshaft Position	Engine Idling	°	This parameter displays the position of the exhaust camshaft in terms of degrees of camshaft rotation (retard) from the park position (a value of zero represents the park position).
Exhaust Camshaft Position Active Counter or Exhaust Camshaft Position Active Counter Bank 1 or 2	Engine Idling	0–255	This parameter displays an incrementing counter when the control module receives a signal from the exhaust camshaft position (CMP) sensor.
Exhaust Camshaft Position Actuator Solenoid Valve Control Circuit High Voltage Test Status or Exhaust Camshaft Position Actuator Solenoid Valve Control Circuit High Voltage Test Status Bank 1 or 2	Engine Idling	OK	This parameter displays the state of the exhaust camshaft actuator solenoid control circuit. The parameter displays Malfunction if the camshaft actuator solenoid control circuit is shorted to voltage.
Exhaust Camshaft Position Actuator Solenoid Valve Control Circuit Low Voltage Test Status or Exhaust Camshaft Position Actuator Solenoid Valve Control Circuit Low Voltage Test Status Bank 1 or 2	Engine Idling	OK	This parameter displays the state of the exhaust camshaft actuator solenoid control circuit. The parameter displays Malfunction if the camshaft actuator solenoid control circuit is shorted to ground.
Exhaust Camshaft Position Actuator Solenoid Valve Control Circuit Open Test Status or Exhaust Camshaft Position Actuator Solenoid Valve Control Circuit Open Test Status Bank 1 or 2	Engine Idling	OK	This parameter displays the state of the exhaust camshaft actuator solenoid control circuit. The parameter displays Malfunction if the camshaft actuator solenoid control circuit is open.

Parameter	System State	Expected Value	Description
Exhaust Camshaft Position or Exhaust Camshaft Position Bank 1 or 2	Engine Idling	0 Degrees	This parameter displays the actual exhaust camshaft position in degrees.
	Engine speed at 2000 RPM	10 Degrees	
Exhaust Camshaft Position Command or Exhaust Camshaft Position Command Bank 1 or 2	Engine Idling	20 %	This parameter displays the on-time or duty cycle of the exhaust camshaft position (CMP) actuator solenoid valve as commanded by the control module.
	Engine speed at 2000 RPM	50 %	
Exhaust Camshaft Position Variance or Exhaust Camshaft Position Variance Bank 1 or 2	Engine Idling	0 Degrees	This parameter displays in degrees, the difference between the desired exhaust camshaft position and the actual exhaust camshaft position.
	Engine speed at 2000 RPM	0 Degrees	
Exhaust Camshaft Profile Actuator 1–4 Command	Ignition ON	On / Off	This parameter displays the commanded state of the Exhaust Camshaft Profile Actuator output.
Exhaust Camshaft Profile Actuator 1–4 Control Circuit High Voltage Test Status	Ignition ON	OK, Malfunction, Not Run	This parameter displays the state of the Exhaust Camshaft Profile Actuator control circuit per cylinder. The parameter displays Malfunction if the Exhaust Camshaft Profile Actuator control circuit is shorted to voltage.
Exhaust Camshaft Profile Actuator 1–4 Control Circuit Low Voltage Test Status	Ignition ON	OK, Malfunction, Not Run	This parameter displays the state of the Exhaust Camshaft Profile Actuator control circuit per cylinder. The parameter displays Malfunction if the Exhaust Camshaft Profile Actuator control circuit is shorted to ground.
Exhaust Camshaft Profile Actuator 1–4 Control Circuit Open Test Status	Ignition ON	OK, Malfunction, Not Run	This parameter displays the state of the Exhaust Camshaft Profile Actuator control circuit per cylinder. The parameter displays Malfunction if the Exhaust Camshaft Profile Actuator control circuit is open.
Exhaust Camshaft Profile Actuator Position Sensor 1–4	Ignition ON	0–100 %	This parameter displays the commanded duty cycle for the Exhaust Camshaft Profile Actuator.
Exhaust Camshaft Profile Actuator Position Sensor 1–4	Ignition ON	mm	This parameter displays the commanded duty cycle for the Exhaust Camshaft Profile Actuator.
Exhaust Camshaft Profile Sleeve Position Sensor 1, 2	Engine Idling	Counts	This parameter displays the number of times that the Exhaust Camshaft Profile Sleeve test has been activated during the current key cycle.
Extended Travel Brake Pedal Position Signal	Engine Idling	Released	This parameter displays the status of the Extended Travel Brake Pedal Position sensor.
Extended Travel Brake Pedal Switch	Ignition ON	Released	This parameter displays the undebounced / undefaulted state of the extended travel brake switch input to the PCM
Filtered System Voltage	Ignition ON	Volts	This parameter indicates the filtered voltage of the system.
Filtered System Voltage Prior to Engine Crank	Ignition ON	Volts	This parameter displays the filtered system voltage just before an engine cranking event.
Freeze Frame DTC	Ignition ON	#	This parameter displays the diagnostic trouble code (DTC) that caused the freeze frame to be stored.

Parameter	System State	Expected Value	Description
Fuel Alcohol Content	Engine Idling	0–100 %	This parameter displays the percentage of alcohol in the fuel. The value is calculated by the PCM using the fuel composition sensor input.
Fuel Alcohol Content When Recommended Maximum Fuel Alcohol Content Exceeded	Engine Idling	0–100 %	This parameter displays a percentage of Fuel Alcohol Content When Recommended Maximum Fuel Alcohol Content Exceeded.
Fuel Composition Learn	Engine Idling	Inactive	This parameter displays Active or Inactive. Active will be displayed if the PCM is learning the alcohol content of the fuel.
Fuel Composition Sensor	Engine Idling	Hz	This parameter displays the frequency of the fuel composition sensor input. This value can be used to determine fuel composition or sensor malfunction.
Fuel Consumed Since Recommended Maximum Fuel Alcohol Content Exceeded	Engine Idling	Liters	This parameter displays in Liters the Fuel Consumed Since Recommended Maximum Fuel Alcohol Content Exceeded.
Fuel Control Loop Status	Engine Idling	Closed	Fuel Closed Loop Active indicates that oxygen sensor 1 of each bank is being used as feedback to adjust the amount of fuel delivered to the engine.
Fuel Economy	Engine Idling	Liters per Hour	This parameter displays the instant fuel consumption rate of the engine in liters per hour.
Fuel Economy Mode	Ignition ON	Inactive	This parameter indicates if the economy mode algorithm has activated economy mode.
Fuel Economy Mode Request	Ignition ON	Off	This parameter indicates if the driver of the vehicle has requested economy mode by pressing the economy mode switch.
Fuel Economy Mode Switch	Ignition ON	OK	This parameter displays the state of the fuel economy mode switch circuit. The parameter displays Malfunction if the fuel economy mode switch circuit is shorted to voltage.
Fuel Economy Mode Switch	Ignition ON	OK	This parameter displays the state of the fuel economy mode switch circuit. The parameter displays Malfunction if the fuel economy mode switch circuit is shorted to ground.
Fuel Economy Mode Switch	Ignition ON	OK	This parameter displays the state of the fuel economy mode switch circuit. The parameter displays Malfunction if the fuel economy mode switch circuit is open.
Fuel Economy Mode Switch	Ignition ON	Volts	This parameter displays the economy mode switch reference voltage.
Fuel Enrichment-Hot Catalyst	Engine Running	Inactive	Fuel Enrichment Catalyst Protection Active indicates fuel is being added to cool the catalytic converter.
Fuel Enrichment-Hot Coolant	Engine Running	Inactive	Hot Coolant Enrichment Active indicates that the conditions to enable hot coolant enrichment are active and that a richer than stoichiometric air/fuel ratio is being commanded in order to help cool the engine when a system malfunction is causing the engine to run at extreme temperatures.
Fuel Injector Driver Supply Voltage	Ignition ON	Volts	This parameter displays the injector driver circuit boost supply voltage.
Fuel Level Sensor	Ignition ON	Volts	This parameter displays the unfiltered fuel level sensor analog input for the primary fuel tank as a percentage of its reference voltage.

Parameter	System State	Expected Value	Description
Fuel Level Sensor Left Tank (If Equipped)	Ignition ON	0–5 Volts	This parameter displays the voltage signal received by the control module from the secondary fuel level sensor in the left side of the fuel tank.
Fuel Level Sensor Reference Command	Engine Idling	0–100 %	This parameter displays the percentage of time that the power supply for the fuel level sensor is on. This percentage is minimized when the fuel has high ethanol content and is maximized when the fuel has low ethanol content.
Fuel Level Sensor Right Tank (If Equipped)	Ignition ON	0–5 Volts	This parameter displays the voltage signal received by the control module from the primary fuel level sensor in the right side of the fuel tank.
Fuel Maintenance Mode	Ignition ON	Active / Inactive	This parameter displays if the Fuel Maintenance Mode is currently active.
Fuel Maintenance Mode Counter	Ignition ON	Counts	This parameter displays the cumulative number of fuel maintenance mode events over the life of the controller.
Fuel Mode Active	Ignition ON	Gaseous, Gasoline	This parameter displays if the fuel mode algorithm has activated the alternative fuel mode.
Fuel Mode Driver Request	Ignition ON	Gaseous, Gasoline	This parameter displays if the driver of the vehicle has selected one of the two specific fuel modes (alternative fuel, or petrol fuel)
Fuel Mode Indication On	Ignition ON	Gaseous, Gasoline	This parameter displays the status of the signal used to illuminate the fuel mode indicator lamp.
Fuel Mode Indicator Lamp Command	Ignition ON	On / Off	This parameter displays the commanded state of the fuel mode indicator lamp.
Fuel Mode Indicator Lamp Control Circuit High Voltage Test Status	Ignition ON	OK, Malfunction, Not Run	This parameter displays the state of the Fuel Mode Indicator Lamp control circuit. The parameter displays Malfunction if the Fuel Mode Indicator Lamp control circuit is shorted to voltage.
Fuel Mode Indicator Lamp Control Circuit Low Voltage Test Status	Ignition ON	OK, Malfunction, Not Run	This parameter displays the state of the Fuel Mode Indicator Lamp control circuit. The parameter displays Malfunction if the Fuel Mode Indicator Lamp control circuit is shorted to ground.
Fuel Mode Indicator Lamp Control Circuit Open Test Status	Ignition ON	OK, Malfunction, Not Run	This parameter displays the state of the Alternative Fuel Injector 1 control circuit. The parameter displays Malfunction if the Alternative Fuel Injector 1 control circuit is open.
Fuel Mode Switch	Ignition ON	mV	This parameter displays the Fuel Mode Switch circuit in voltage.
Fuel Mode Switch Both States Latched	Ignition ON	True, False	This parameter displays true once both the on and off switch states are observed and will remain latched for the current ignition cycle.
Fuel Mode Switch State	Ignition ON	Fault Low, On, Indeterminate, Off, Fault High	This parameter displays the raw fuel mode switch state information.
Fuel Pressure Drop - Cylinder 1-8 Injector	Engine Running	—	This parameter contains the result of the Fuel Injector Flow Device Control (Direct and Gaseous Fuel Injected Engines). The fuel or alternative fuel rail pressure sensor value after the injection event is subtracted from the fuel rail or alternative fuel pressure sensor value before the injection event and reported as the pressure drop for the appropriate injector.

Parameter	System State	Expected Value	Description
Fuel Pressure Regulator Control Circuit Command	Engine Cranking or Running	On	This parameter displays the commanded state of the fuel pressure regulator 1 low side output (the output is considered to be commanded ON if the regulator is enabled while the engine is running or cranking).
Fuel Pressure Regulator Control Circuit Command	Engine Cranking or Running	0–100 %	This parameter displays the commanded state of the fuel pressure regulator 1 low side output (the output is considered to be commanded ON if the regulator is enabled while the engine is running or cranking).
Fuel Pressure Regulator Control Circuit High Voltage Test	Ignition ON	OK	This parameter displays the status of the output driver for the fuel pressure regulator control circuit. The scan tool will display OK if the circuit is operating correctly or Not Run if a diagnosis has not been made. The scan tool will display Malfunction if there is an short to voltage in the circuit.
Fuel Pressure Regulator Control Circuit Low Voltage Test	Ignition ON	OK	This parameter displays the status of the output driver for the fuel pressure regulator control circuit. The scan tool will display OK if the circuit is operating correctly or Not Run if a diagnosis has not been made. The scan tool will display Malfunction if there is an short to ground in the circuit.
Fuel Pressure Regulator Control Circuit Open Test Status	Ignition ON	OK	This parameter displays the status of the output driver for the fuel pressure regulator control circuit. The scan tool will display OK if the circuit is operating correctly or Not Run if a diagnosis has not been made. The scan tool will display Malfunction if there is an open in the circuit.
Fuel Pressure Regulator High Control Circuit Command	Engine Idling	On / Off	This parameter displays the commanded duty cycle for the fuel pressure regulator 1 solenoid output.
Fuel Pressure Regulator High Control Circuit High Voltage Test Status	Ignition ON	OK	This parameter displays the status of the output driver for the fuel pressure regulator high control circuit. The scan tool will display OK if the circuit is operating correctly or Not Run if a diagnosis has not been made. The scan tool will display Malfunction if there is an short to voltage in the circuit.
Fuel Pressure Regulator High Control Circuit Low Voltage Test Status	Ignition ON	OK	This parameter displays the status of the output driver for the fuel pressure regulator high control circuit. The scan tool will display OK if the circuit is operating correctly or Not Run if a diagnosis has not been made. The scan tool will display Malfunction if there is an short to ground in the circuit.
Fuel Pressure Regulator High Control Circuit Open Test Status	Ignition ON	OK	This parameter displays the status of the output driver for the fuel pressure regulator high control circuit. The scan tool will display OK if the circuit is operating correctly or Not Run if a diagnosis has not been made. The scan tool will display Malfunction if there is an open in the circuit.
Fuel Pressure Sensor	Engine Idling	kPa/PSI	For Port Fuel Injected (PFI) systems, this Parameter displays fuel rail pressure at the engine. For high pressure fuel systems, this Parameter indicates the low side fuel pressure before the high pressure pump.
Fuel Pressure Sensor	Ignition ON	Volts	This parameter displays the fuel supply pressure sensor analog input as a percentage of its reference voltage.

Parameter	System State	Expected Value	Description
Fuel Pump Enable Command	Ignition ON	On	This parameter displays the commanded state of the fuel pump output (the output is considered to be commanded ON if its duty cycle is not zero).
Fuel Pump Enable Circuit High Voltage Test Status	Ignition ON	OK	This parameter displays the status of the output driver for the fuel pump control circuit. The scan tool will display OK if the circuit is operating correctly or Not Run if a diagnosis has not been made. The scan tool will display Malfunction if there is an short to voltage in the circuit.
Fuel Pump Enable Circuit Low Voltage Test Status	Ignition ON	OK	This parameter displays the status of the output driver for the fuel pump control circuit. The scan tool will display OK if the circuit is operating correctly or Not Run if a diagnosis has not been made. The scan tool will display Malfunction if there is an short to ground in the circuit.
Fuel Pump Enable Circuit Open Test Status	Ignition ON	OK	This parameter displays the status of the output driver for the fuel pump control circuit. The scan tool will display OK if the circuit is operating correctly or Not Run if a diagnosis has not been made. The scan tool will display Malfunction if there is an open in the circuit.
Fuel Pump Relay Control Circuit High Voltage Test Status	Ignition ON	OK	This parameter displays the state of the fuel pump relay control circuit. The parameter displays Malfunction if the fuel pump relay control circuit is shorted to voltage.
Fuel Pump Relay Control Circuit Low Voltage Test Status	Ignition ON	OK	This parameter displays the state of the fuel pump relay control circuit. The parameter displays Malfunction if the fuel pump relay control circuit is shorted to ground.
Fuel Pump Relay Control Circuit Open Test Status	Ignition ON	OK	This parameter displays the state of the fuel pump relay control circuit. The parameter displays Malfunction if the fuel pump relay control circuit is open.
Fuel Pump Speed Output Circuit High Voltage Test Status	Engine Running	OK, Malfunction, Not Run	This parameter displays the Fuel Pump Speed Output Circuit High Voltage Test Status. Can display OK, Malfunction, or Not Run.
Fuel Pump Speed Output Circuit Low Voltage Test Status	Engine Running	OK, Malfunction, Not Run	This parameter displays the Fuel Pump Speed Output Circuit Low Voltage Test Status. Can display OK, Malfunction, or Not Run.
Fuel Pump Speed Output Circuit Open Test Status	Engine Running	OK, Malfunction, Not Run	This parameter displays the Fuel Pump Speed Output Circuit Open Circuit Test Status. Can display OK, Malfunction, or Not Run.
Fuel Pump Trim	Engine Running	0–4 %	This parameter displays the adjustments for the fuel pump duty cycle control. This is calculated by comparing the estimated fuel rail pressure to the desired fuel rail pressure. If the short term fuel pump trim consistently deviates from 0, the long term fuel pump trim is adjusted accordingly.
Fuel Rail Pressure Regulator Command (If Equipped)	Engine idling	36 Degrees	The scan tool displays in degrees, the Fuel Rail Pressure Regulator ON time as commanded by the control module.
Fuel Rail Pressure Sensor	Engine Idling	1.9–5.0 MPa/279–725 PSI	This parameter displays the high side fuel pressure after the high pressure pump.
Fuel Rail Pressure Sensor	Engine Idling	0 to 5 Volts	This parameter displays the voltage signal received by the control module from the fuel rail pressure (FRP) sensor.

Parameter	System State	Expected Value	Description
Fuel Rail Pressure Sensor Initial Learn	—	Complete	This parameter displays the if the Fuel Rail Pressure Sensor First Time Adaptation is Complete
Fuel Rail Pressure Sensor Learn	—	Active	This parameter displays the current state of the fuel rail pressure sensor learn condition.
Fuel Rail Pressure Sensor Learn Inhibit	—	No	This parameter displays the reason for the fuel rail pressure sensor learn to be inhibited. These include: Assembly Plant Mode Counter Not Programmed, Assembly Plant Suspension, Barometric Pressure Sensor DTC, Barometric Pressure Too Low, Clutch Pedal Applied, Clutch Pedal Position Sensor DTC, Desired Fuel Rail Pressure Too Low, DTC Present, Engine in Catalyst Warm-Up Mode, Engine Not Synchronized, Engine Stopped, Fuel Pressure Spike, Fuel Level Too Low, Fuel Pressure Regulator Control Circuit DTC, Fuel Pump Control Function Active, Fuel Pump is Off, Fuel Rail Pressure Control Function Active, Fuel Rail Pressure Sensor DTC, Fuel System in Open Loop Operation, Fuel Temperature Out of Range, Idle Test Failed, Injector Flow Test in Progress, Intake Air Temperature Too Low, Low Pressure Fuel System Malfunction, Low Pressure Fuel System Pressure Too Low, Minimum Engine Run Time Not Met, Minimum Normal Fuel Pressure Control Time Not Met, Minimum Run Time, Time After New Engine Mode Not Met, Minimum Time After Drive Not Met, Minimum Time for Released Accelerator Pedal Not Met, New Engine Mode, Not in Control of Idle Speed, Other Diagnostics Active, Sensor Reading Too High Test Failed, Some Cylinders Are Turned Off, Stuck Sensor Test Failed, Vehicle Speed Too High
Fuel Rail Pressure Sensor Learn Status	—	Complete	This parameter displays several signals associated with the status of the power mode and starter systems.
Fuel Rail Pressure Sensor Learned Value	—	kPa	This parameter displays the fuel rail pressure learned value at the fuel rail pressure sensor.
Fuel Rail Temperature Sensor 1	Ignition ON	ºC (ºF)	This parameter indicates the fuel rail temperature measured by the first sensor on the rail.
Fuel Rail Temperature Sensor 2	Ignition ON	ºC (ºF)	This parameter indicates the fuel rail temperature measured by the second sensor on the rail.
Fuel System Monitor Complete	Engine Idling	Yes/No	This parameter displays the enable and completion status during the current driving/ monitoring cycle of each continuous legislated emission related monitor and noncontinuous legislated emission related monitor.
Fuel System Monitor Complete This Ignition Cycle	Ignition ON	No	This parameter displays the completion status of the fuel system monitor during the current driving / monitoring cycle.
Fuel System Monitor Enabled	Engine Idling	Yes/No	This parameter displays the enable and completion status during the current driving/ monitoring cycle of each continuous legislated emission related monitor and noncontinuous legislated emission related monitor.
Fuel System Monitor Enabled This Ignition Cycle	Ignition ON	No	This parameter displays the enable status of the fuel system monitor during the current driving / monitoring cycle.

Parameter	System State	Expected Value	Description
Fuel Tank Pressure Sensor	Ignition ON, engine OFF	kPa/psi	This parameter displays the pressure/vacuum inside the fuel tank. A negative value indicates a vacuum, while a positive value indicates a pressure.
Fuel Tank Pressure Sensor	—	mmHg / in H2O	This parameter displays the fuel tank pressure in mmHg/in H2O at the fuel tank pressure sensor.
Fuel Tank Pressure Sensor	Ignition ON, engine OFF	0–5 Volts	This parameter displays the voltage signal received by the control module from the fuel tank pressure (FTP) sensor.
Fuel Tank Rated Capacity	Ignition ON	Varies	This parameter displays the capacity of the fuel tank in liters or gallons. The rated capacity displayed by the scan tool will varies with vehicle type.
Fuel Trim Cylinder Balance Test or Fuel Trim Cylinder Balance Test Bank 1–2	Ignition ON	Inactive	This parameter indicates the current state of the fuel trim cylinder balance test.
Fuel Trim Cylinder Balance Test Counter or Fuel Trim Cylinder Balance Test Counter Bank 1-2	Ignition ON	Counts	This parameter displays the number of Air Fuel Imbalance Monitor tests that have been performed since a code clear or non volatile memory (NVM) reset.
Fuel Trim Cylinder Balance Test Status Bank 1-2	Ignition ON	No Result	This parameter indicates the current state of the fuel trim cylinder balance test.
Fuel Trim Learn	Engine Idling	Enabled	This parameter displays Enabled when conditions are appropriate for enabling long term fuel trim corrections. This indicates that the long term fuel trim is adapting continuing amounts of short term fuel trim. If the scan tool displays Disabled, then long term fuel trim will not respond to changes in short term fuel trim.
Fuel Trim Learn	—	Enabled	This parameter displays if the fuel trim learn is enabled.
Fuel Trim Memory Cell	Engine Idling	Counts 0–250	This parameter displays long term fuel corrections that is active based upon the current operating conditions (MAP, engine speed, purge duty cycle, A/C compressor state, and transmission range).
Fuel Trim Memory Cell	—	#	This parameter displays the intake air temperature (measured by a sensor located near the throttle body) recorded at power-up (Run/Crank transition from low to high).
Fuel Trim System Test State	Engine Idling	Complete	This parameter displays the current state of the fuel adjustment system diagnostic.
Fuel Trim System Test State	—	Complete	This parameter displays the state of the fuel trim system test.
Fuel Volatility	Engine Idling	Varies	This parameter indicates the rate the fuel can be vaporized in the cylinder as calculated by the control module. The scan tool will display HIGH when the fuel volatility is high. The scan tool will display LOW when the fuel volatility is low.
Generator F Terminal Signal	Engine Idling	0–100 %	This parameter displays the amount of generator ON-time as commanded by the control module. The higher the percentage the greater the generator output.

Parameter	System State	Expected Value	Description
Generator Indicator Command	Engine Idling	On	This parameter displays On or Off associated with the status of the generator.
Generator L Terminal Circuit High Voltage Test Status	Engine Idling	OK	This parameter displays the state of the generator L circuit terminal. The parameter displays Malfunction if the generator L circuit is shorted to voltage.
Generator L Terminal Circuit Low Voltage Test Status	Engine Idling	OK	This parameter displays the state of the generator L circuit terminal. The parameter displays Malfunction if the generator L circuit is shorted to ground.
Generator L Terminal Circuit Open Test Status	Engine Idling	OK	This parameter displays the state of the generator L circuit terminal. The parameter displays Malfunction if the generator L circuit is open.
Generator L-Terminal Command	Engine Idling	0–100 %	This parameter displays the control modules commanded state of the voltage regulator on the generator.
Generator L-Terminal Signal Command	Ignition ON	On / Off	This parameter displays the commanded state of the generator L-terminal output.
Heated Catalyst Monitor Complete	Engine Idling	Yes	This parameter indicates the status of the heated catalyst. The scan tool displays Yes when the diagnostic is complete. And No if the diagnostic has not ran or a malfunction is detected in the heated catalyst.
Heated Catalyst Monitor Enabled	Engine Idling	Yes	This parameter indicates the status of the heated catalyst monitor diagnostic. Catalyst Monitor Test Running indicates Yes or No when the heated catalyst monitor diagnostic is actively running a test.
Heater Coolant Pump Relay Command	Ignition ON	On / Off	This parameter indicates if the heater core pump relay is commanded On or Off.
Heater Coolant Pump Relay Control Circuit High Voltage Test Status	Ignition ON	OK, Malfunction, Not Run	This parameter displays the Heater Coolant Pump Relay Control Circuit High Voltage Test Status. Can display OK, Malfunction, or Not Run.
Heater Coolant Pump Relay Control Circuit Low Voltage Test Status	Ignition ON	OK, Malfunction, Not Run	This parameter displays the Heater Coolant Pump Relay Control Circuit Low Voltage Test Status. Can display OK, Malfunction, or Not Run.
Heater Coolant Pump Relay Control Circuit Open Test Status	Ignition ON	OK, Malfunction, Not Run	This parameter displays the Heater Coolant Pump Relay Control Circuit Open Circuit Test Status. Can display OK, Malfunction, or Not Run.
High Side Driver 1 Circuit High Voltage Test Status	Ignition ON	OK, Malfunction, Not Run	This parameter displays the High Side Driver 1 Circuit High Voltage Test Status. Can display OK, Malfunction, or Not Run.
High Side Driver 1 Circuit Low Voltage Test Status	Ignition ON	OK, Malfunction, Not Run	This parameter displays the High Side Driver 1 Circuit Low Voltage Test Status. Can display OK, Malfunction, or Not Run.
High Side Driver 1 Circuit Open Test Status	Ignition ON	OK, Malfunction, Not Run	This parameter displays the High Side Driver 1 Circuit Open Circuit Test Status. Can display OK, Malfunction, or Not Run.
High Side Driver 1 Command	Ignition ON	On / Off	This parameter indicates if the High Side Driver 1 is being commanded On or Off.
High Side Driver 2 Circuit High Voltage Test Status	Ignition ON	OK, Malfunction, Not Run	This parameter displays the High Side Driver 2 Circuit High Voltage Test Status. Can display OK, Malfunction, or Not Run.
High Side Driver 2 Circuit Low Voltage Test Status	Ignition ON	OK, Malfunction, Not Run	This parameter displays the High Side Driver 2 Circuit Low Voltage Test Status. Can display OK, Malfunction, or Not Run.

Parameter	System State	Expected Value	Description
High Side Driver 2 Circuit Open Test Status	Ignition ON	OK, Malfunction, Not Run	This parameter displays the High Side Driver 2 Circuit Open Circuit Test Status. Can display OK, Malfunction, or Not Run.
High Side Driver 2 Command	Ignition ON	On / Off	This parameter indicates if the High Side Driver 2 is being commanded On or Off.
Hood Position	Ignition ON	Closed, Ajar, Open, Invalid	This parameter indicates the Position of the Hood.
Hood Position Switch	Ignition ON	Closed	This parameter displays the current position of the hood.
HO2S Sensor 1 or HO2S Bank 1 Sensor 1 or Bank 2 Sensor 1	Engine Idling	0.00–1.00 Volts	This parameter displays the voltage output from the HO2S to the control module. A lower voltage indicates a lean exhaust, while a higher voltage indicates a rich exhaust.
HO2S Sensor 1 or HO2S Bank 1 Sensor 1 or Bank 2 Sensor 1	Engine Idling	Lambda 0.8–1.1	This parameter displays the voltage output as a lambda value. When the fuel system is lean, the oxygen level will be high and the lambda signal will be high or more than 1. When the fuel system is rich, the oxygen level will be low, and the lambda signal will be low or less than 1. The PCM uses this information to maintain the correct air/fuel ratio
HO2S Sensor 2 or HO2S Bank 1 Sensor 2 or Bank 2 Sensor 2	Engine Idling	0.00–1.00 Volts	This parameter displays the voltage output from the HO2S to the control module. A lower voltage indicates a lean exhaust, while a higher voltage indicates a rich exhaust.
HO2S Heater Sensor 1 or HO2S Heater Bank 1 Sensor 1 or Bank 2 Sensor 1	Engine Idling	Amps	This parameter display the current feedback for the oxygen sensor heater output for sensor 1.
HO2S Heater Sensor 2 or HO2S Heater Bank 1 Sensor 2 or Bank 2 Sensor 2	Engine Idling	Amps	This parameter display the current feedback for the oxygen sensor heater output for sensor 2.
HO2S Heater Command or HO2S Heater Command Bank 1 or 2 Sensor 1 or 2	Engine Idling	Off	This parameter display the state of the HO2S heater control circuit as commanded by the control module.
HO2S Heater Command Bank 1 or 2 Sensor 1 or 2 Heater Command	Engine Idling	0–100 %	This parameter displays the HO2S heater ON time in percentage, as commanded by the control module.
HO2S Heater Control Circuit High Voltage Test Status or HO2S Heater Control Circuit High Voltage Test Status Bank 1 Sensor 1 or Bank 2 Sensor 1	Engine Idling	OK	This parameter displays the state of the oxygen sensor heater control circuit. The parameter displays Malfunction if the oxygen sensor heater control circuit is shorted to voltage.
HO2S Heater Control Circuit High Voltage Test Status or HO2S Heater Control Circuit High Voltage Test Status Bank 1 Sensor 2 or Bank 2 Sensor 2	Engine Idling	OK	This parameter displays the state of the oxygen sensor heater control circuit. The parameter displays Malfunction if the oxygen sensor heater control circuit is shorted to voltage.

Parameter	System State	Expected Value	Description
HO2S Heater Control Circuit Low Voltage Test Status or HO2S Heater Control Circuit Low Voltage Test Status Bank 1 Sensor 1 or Bank 2 Sensor 1	Engine Idling	OK	This parameter displays the state of the oxygen sensor heater control circuit. The parameter displays Malfunction if the oxygen sensor heater control circuit is shorted to ground.
HO2S Heater Control Circuit Low Voltage Test Status or HO2S Heater Control Circuit Low Voltage Test Status Bank 1 Sensor 2 or Bank 2 Sensor 2	Engine Idling	OK	This parameter displays the state of the oxygen sensor heater control circuit. The parameter displays Malfunction if the oxygen sensor heater control circuit is shorted to ground.
HO2S Heater Control Circuit Open Test Status or HO2S Heater Control Circuit Open Test Status Bank 1 Sensor 1 or Bank 2 Sensor 1	Engine Idling	OK	This parameter displays the state of the oxygen sensor heater control circuit. The parameter displays Malfunction if the oxygen sensor heater control circuit is open.
HO2S Heater Control Circuit Open Test Status or HO2S Heater Control Circuit Open Test Status Bank 1 Sensor 2 or Bank 2 Sensor 2	Engine Idling	OK	This parameter displays the state of the oxygen sensor heater control circuit. The parameter displays Malfunction if the oxygen sensor heater control circuit is open.
HO2S/Heater Monitor Complete This Ignition Cycle	Engine Idling	Yes/No	This parameter displays the diagnostic monitor completion status during the current driving/ monitoring cycle.
HO2S Heater Monitor Enabled	Ignition ON	No	This parameter displays the current state of the H02S heater monitor.
HO2S/Heater Monitor Enabled This Ignition Cycle	Engine Idling	Yes/No	This parameter displays the diagnostic monitor enable status during the current driving/ monitoring cycle.
Humidity Sensor Intake Air Temperature Signal	Ignition ON	Hz	This parameter displays the frequency of the humidity sensor’s intake air temperature (IAT) sensor input.
IAT Sensor 1	Ignition ON	−39° to 140°C (−38° to 284°F)	This parameter displays the temperature of the air entering the air induction system based on input to the control module from the intake air temperature (IAT) sensor.
IAT Sensor 2	Engine Idling	Hz	This parameter displays the frequency of the humidity sensor’s intake air temperature (IAT) sensor input to the powertrain control module.
IAT Sensor 2	—	°C (°F)	This parameter displays the temperature of the air entering the engine as calculated by the control module based on the input from the intake air temperature (IAT) sensor 2. The scan tool will display a low value when the air temperature is low, and a high value when the air temperature is high.

Parameter	System State	Expected Value	Description
IAT Sensor 3	—	°C (°F)	This parameter displays the temperature of the air entering the engine as calculated by the control module based on the input from the intake air temperature (IAT) sensor 3. The scan tool will display a low value when the air temperature is low, and a high value when the air temperature is high.
Idle Speed Correction	Ignition ON	RPM	This parameter displays the engine idle speed correction within a restricted range to address complaints of vehicle vibration.
Ignition 1 Signal	Ignition ON	B+	This parameter displays B+ when the control module detects a voltage at the ignition 1 input terminal.
Ignition Accessory Signal	Ignition ON	On	This parameter displays On when the control module detects a voltage at the ignition accessory input terminal.
Ignition Coil 1,2,3,4,5,6,7, or 8 Control Circuit High Voltage Test Status	Engine Running	OK	This parameter displays the state of the Ignition control circuit. The parameter displays Malfunction if the Ignition control circuit is shorted to voltage.
Ignition Coil 1,2,3,4,5,6,7, or 8 Control Circuit Low Voltage Test Status	Engine Idling	OK	This parameter displays the state of the Ignition control circuit. The parameter display Malfunctions if the Ignition control circuit is shorted to ground.
Ignition Coil 1,2,3,4,5,6,7, or 8 Control Circuit Open Test Status	Engine Idling	OK	This parameter displays the state of the Ignition control circuit. The parameter displays if Malfunction the Ignition control circuit is open.
Ignition Coil Supply Voltage or Ignition Coil Supply Voltage Bank 1 or 2	Engine Idling	On	This parameter displays ON when voltage is supplied to the Ignition coil.
Ignition Cycles Since Recommended Maximum Fuel Alcohol Content Exceeded	Engine Idling	Counts	This parameter displays the number of Ignition Cycles since Recommended Maximum Fuel Alcohol Content Exceeded.
Ignition Cycles with Malfunction Since 1st Malfunction	Ignition ON	Counts	This parameter contains the number of ignition cycles with a failure reported since the first ignition cycle with a failure reported.
Ignition Cycles Without Completed Test Since 1st Malfunction	Engine Idling	Counts	This parameter displays the number of ignition cycles without a pass or a failure reported since the first ignition cycle with a failure reported.
Ignition Cycles Without Malfunction Since Last Malfunction	Engine Idling	Counts	This parameter displays the number of ignition cycles with a pass reported and no malfunctions reported since the first ignition cycle with a malfunction reported.
Ignition Cycles without Malfunction Since Last Malfunction	Ignition ON	Counts	This parameter contains the number of ignition cycles with a pass reported and no failures reported since the first ignition cycle with a failure reported.
Ignition Off Time	Ignition ON	hh:mm:ss	This parameter displays the time that the ignition has been OFF.
Ignition Timing	Engine Idling	Degrees	This parameter displays the final spark advance in terms of a crankshaft angle.
Immobilizer Auto Learn Counter	Ignition ON	Counts	This parameter displays the number of auto-learn cycles that have been successfully completed within the immobilizer system.

Parameter	System State	Expected Value	Description
Immobilizer Automatic Learn Timer	Ignition ON	h/m/s	This parameter displays the time elapsed within the current auto-learn cycle within the immobilizer system.
Immobilizer PCM Identifier	Ignition ON	OK	This parameter displays that the immobilizer control module (ICM) has received the correct powertrain identifier.
Immobilizer Environment Device 1-4	Ignition ON	OK	This parameter displays that the associated device is OK or unknown or its identification is pending to the immobilizer control module (ICM).
Immobilizer Fuel Disable	Ignition ON	Inactive	This parameter displays if the vehicle is immobilized by the PCM.
Immobilizer Module Environment Identification	Ignition ON	Inactive	This parameter displays that the ICM has not received the powertrain identifier or has received the wrong powertrain identifier.
Immobilizer Module Fuel Disable	Ignition ON	Inactive	This parameter displays if the vehicle is immobilized by the ICM.
Immobilizer Module Identification	Ignition ON	Complete	This parameter indicates that the ICM has not received the powertrain identifier or has received the wrong powertrain identifier.
Immobilizer Module Security Code Programmed	Ignition ON	Yes	This parameter indicates that the ICM security code has been programmed (i.e., the immobilizer device is locked).
Immobilizer Password Learn	Ignition ON	Active/Inactive	Learning Enabled indicates that learning of immobilizer code information is enabled.
Immobilizer Password Learn Scan Tool Delay	Engine Idling	Active/Inactive	Scan tool Learn Delay Active indicates that the security code has been accepted but the scan tool learn delay is active and will not allow learning enabled, programming security code, or resetting security code.
Immobilizer Password Programmed	Ignition ON	Yes	This parameter indicates that the ICM password has been programmed.
Immobilizer Post-Release Passive State	Ignition ON	Active / Inactive	This parameter displays that the immobilizer algorithm is in the post release passive state.
Immobilizer Post-Release State	Ignition ON	Active / Inactive	This parameter displays that the immobilizer algorithm is in the post release passive state.
Immobilizer Pre-Release State	Ignition ON	Active / Inactive	This parameter displays that the immobilizer algorithm is in the pre release active state.
Immobilizer Release State	Ignition ON	Active / Inactive	This parameter displays that the immobilizer algorithm is in the release active state.
Immobilizer Security Code Accepted	Engine Idling	Yes/No	Security Code Accepted displaying Yes indicates' that the received security code is correct.
Immobilizer Security Code Function	Engine Idling	Present/Not Present	This parameter indicates if the ECU supports the immobilizer security code strategy.
Immobilizer Security Code Lockout	Engine Idling	Yes/No	Security Code Lockout Active indicates that the security code has not passed and lockout is active.
Immobilizer Security Code Lockout Active Timer	Engine Idling	ms	This parameter displays the time elapsed since the immobilizer security code lockout has been activated either due to a battery disconnect or an incorrect immobilizer security code being entered.
Immobilizer Security Code Programmed	Ignition ON	Yes/No	Security Code Programmed indicates that the security code has been programmed.

Parameter	System State	Expected Value	Description
Immobilizer Security Code Programming Counter	Ignition ON	Counts	This parameter displays the number of times a new immobilizer security code has been programmed through secure access. This counter can only be incremented.
Immobilizer Security Code Reset Counter	Ignition ON	Counts	This parameter displays the number of times the immobilizer security code has been reset to the default value through secure access. This counter can only be incremented.
Immobilizer Security Information Programmed	Ignition ON	Yes/No	This parameter displays the status of the immobilizer system.
Immobilizer Security Level	Ignition ON	#	This parameter displays the current immobilizer security level. If the correct security code is entered, the security level will remain at or be reset to a level of 10. If an incorrect security code is entered, the security level will be set to a level of 9.
Immobilizer Transponder Identification	Ignition ON	Active / Inactive	This parameter displays that the transponder identification process is active within the ICM.
Immobilizer Transponder Key	Ignition ON	OK	This parameter displays that the transponder key is correct for the ICM.
Immobilizer Transponder Key Identification	Ignition ON	OK	This parameter displays that the transponder key identification process is active within the ICM.
Immobilizer System Status	Ignition ON	Varies	This parameter displays the status of the immobilizer system, the following maybe displayed. Standby, Immobilized at Startup, Immobilized, No Response, Immobilized Negative Response, Immobilized, Incorrect Response, Post-Release State, Pre-Release State, Release State.
Immobilizer Valid Response Received Time	Ignition ON	ms	This parameter displays the actual time observed for a valid immobilizer response.
Initialized Fuel Alcohol Content	Ignition ON	0–100 %	This parameter displays the initialized fuel composition to be used as a starting point for the fuel composition algorithm.
Injector Duty Cycle or Injector Duty Cycle Bank 1 or 2	Engine idling	0.82−1.50 ms	This parameter displays the amount of fuel injector ON time or pulse width as commanded by the control module.
Inspection/Maintenance Drive Cycle Complete	Engine Idling	Yes/No	Inspection/Maintenance Drive Cycle Complete means that all required components of the standard drive cycle have completed.
Inspection/Maintenance Drive Cycle Idle Time Complete	Engine Idling	Yes/No	Inspection/Maintenance Drive Cycle Idle Time Complete indicates that the engine idle time requirement is complete.
Inspection/Maintenance Drive Cycle Idle Timer	Engine Idling	hh:mm:ss	This parameter displays the Inspection/ Maintenance Drive Cycle Idle Timer.
Inspection/Maintenance Drive Cycle Propulsion System Active Time Complete	Engine Idling	Yes/No	This parameter displays the Inspection/ Maintenance Drive Cycle Propulsion System Active Time Complete. The parameter displays Yes when the Inspection/Maintenance Drive Cycle Propulsion System Active Time is Complete.
Inspection/Maintenance Drive Cycle Propulsion System Active Timer	Engine Idling	hh:mm:ss	This parameter displays the total accumulated time in which the propulsion system has been active after the 1st time the engine is started.

Parameter	System State	Expected Value	Description
Inspection/Maintenance Drive Cycle Vehicle Speed Time Complete	Engine Idling	Yes/No	This parameter displays Yes when the Vehicle Speed Time Complete indicates that the vehicle has been above 25 mph for five minutes.
Inspection/Maintenance Drive Cycle Vehicle Speed Timer	Engine Idling	hh:mm:ss	This parameter displays the total accumulated time in which the vehicle speed has been greater than 25 mph after the 1st time the engine is started.
Intake Air Humidity Sensor	Engine Idling	0–100 %	This parameter displays the raw duty cycle signal from the relative humidity sensor electronics, which represents the relative humidity of the intake air.
Intake Camshaft Position	Engine Idling	°	This parameter displays the position of the intake camshaft for bank 1 in terms of degrees of camshaft rotation (advance) from the park position (a value of zero represents the park position).
Intake Camshaft Position Active Counter or Intake Camshaft Position Active Counter Bank 1 or 2	Engine Idling	0–255	This parameter displays an incrementing counter when the control module receives a signal from the intake camshaft position (CMP) sensor.
Intake Camshaft Position Actuator Oil Pressure	Engine Idling	kPa	This parameter displays the oil pressure at the intake camshaft position actuator.
Intake Camshaft Position Actuator Oil Pressure Sensor	Engine Idling	Volts	This parameter displays the intake camshaft position actuator pressure sensor in voltage.
Intake Camshaft Position Actuator Park Lock Solenoid Valve Command Bank 1	Ignition ON	Locked / Unlocked	This parameter indicates if the Intake Camshaft Position Actuator Park Lock Solenoid Valve for Bank 1 is Locked or Unlocked.
Intake Camshaft Position Actuator Park Lock Solenoid Valve Command Bank 2	Ignition ON	Locked / Unlocked	This parameter indicates if the Intake Camshaft Position Actuator Park Lock Solenoid Valve for Bank 2 is Locked or Unlocked.
Intake Camshaft Position Actuator Park Lock Solenoid Valve Control Circuit High Voltage Test Status Bank 1	Ignition ON	OK, Malfunction, Not Run	This parameter displays the Intake Camshaft Position Actuator Park Lock Solenoid Valve Control Circuit High Voltage Test Status Bank 1. Can display OK, Malfunction, or Not Run.
Intake Camshaft Position Actuator Park Lock Solenoid Valve Control Circuit High Voltage Test Status Bank 2	Ignition ON	OK, Malfunction, Not Run	This parameter displays the Intake Camshaft Position Actuator Park Lock Solenoid Valve Control Circuit High Voltage Test Status Bank 2. Can display OK, Malfunction, or Not Run.
Intake Camshaft Position Actuator Park Lock Solenoid Valve Control Circuit Low Voltage Test Status Bank 1	Ignition ON	OK, Malfunction, Not Run	This parameter displays the Intake Camshaft Position Actuator Park Lock Solenoid Valve Control Circuit Low Voltage Test Status Bank 1. Can display OK, Malfunction, or Not Run.
Intake Camshaft Position Actuator Park Lock Solenoid Valve Control Circuit Low Voltage Test Status Bank 2	Ignition ON	OK, Malfunction, Not Run	This parameter displays the Intake Camshaft Position Actuator Park Lock Solenoid Valve Control Circuit Low Voltage Test Status Bank 2. Can display OK, Malfunction, or Not Run.
Intake Camshaft Position Actuator Park Lock Solenoid Valve Control Circuit Open Test Status Bank 1	Ignition ON	OK, Malfunction, Not Run	This parameter displays the Intake Camshaft Position Actuator Park Lock Solenoid Valve Control Circuit Open Circuit Test Status Bank 1. Can display OK, Malfunction, or Not Run.

Parameter	System State	Expected Value	Description
Intake Camshaft Position Actuator Park Lock Solenoid Valve Control Circuit Open Test Status Bank 2	Ignition ON	OK, Malfunction, Not Run	This parameter displays the Intake Camshaft Position Actuator Park Lock Solenoid Valve Control Circuit Open Circuit Test Status Bank 2. Can display OK, Malfunction, or Not Run.
Intake Camshaft Position Actuator Park Lock Test Abort Reason Bank 1	Ignition ON	N/A	This parameter indicates the reason why the Intake Camshaft Actuator Park Lock Pin Test for Bank 1 was aborted.
Intake Camshaft Position Actuator Park Lock Test Abort Reason Bank 2	Ignition ON	N/A	This parameter indicates the reason why the Intake Camshaft Actuator Park Lock Pin Test for Bank 2 was aborted.
Intake Camshaft Position Actuator Park Lock Test Status Bank 1	Ignition ON	N/A	This parameter indicates the status of the intake camshaft actuator park lock pin test for bank 1.
Intake Camshaft Position Actuator Park Lock Test Status Bank 2	Ignition ON	N/A	This parameter indicates the status of the intake camshaft actuator park lock pin test for Bank 2.
Intake Camshaft Position Actuator Solenoid Valve Control Circuit High Voltage Test Status or Intake Camshaft Position Actuator Solenoid Valve Control Circuit High Voltage Test Status Bank 1 or 2	Engine Idling	OK	This parameter displays the state of the intake camshaft actuator solenoid control circuit. The parameter displays Malfunction if the camshaft actuator solenoid control circuit is shorted to voltage.
Intake Camshaft Position Actuator Solenoid Valve Control Circuit Low Voltage Test Status or Intake Camshaft Position Actuator Solenoid Valve Control Circuit Low Voltage Test Status Bank 1 or 2	Engine Idling	OK	This parameter displays the state of the intake camshaft actuator solenoid control circuit. The parameter displays Malfunction if the camshaft actuator solenoid control circuit is shorted to ground.
Intake Camshaft Position Actuator Solenoid Valve Control Circuit Open Test Status or Intake Camshaft Position Actuator Solenoid Valve Control Circuit Open Test Status Bank 1 or 2	Engine Idling	OK	This parameter displays the state of the intake camshaft actuator solenoid control circuit. The parameter displays Malfunction if the camshaft actuator solenoid control circuit is open.
Intake Camshaft Position or Intake Camshaft Position Bank 1 or 2	Engine Idling	0 Degrees	This parameter displays the actual intake camshaft position in degrees.
	Engine speed at 2000 RPM	10 Degrees	
Intake Camshaft Position Commanded or Intake Camshaft Position Commanded Bank 1 or 2	Engine Idling	20 %	This parameter displays the ON-time or duty cycle of the intake camshaft position (CMP) actuator solenoid valve as commanded by the control module.
	Engine speed at 2000 RPM	50 %	
Intake Camshaft Position Variance or Intake Camshaft Position Variance Bank 1 or 2	Engine Idling	0 Degrees	This parameter displays in degrees, the difference between the desired intake camshaft position and the actual intake camshaft position.
	Engine speed at 2000 RPM	0 Degrees	

Parameter	System State	Expected Value	Description
Intake Camshaft Profile Actuator 1–8 Command	Ignition ON	On / Off	This parameter displays the commanded state of the Intake Camshaft Profile Actuator output.
Intake Camshaft Profile Actuator 1–8 Control Circuit High Voltage Test Status	Ignition ON	OK, Malfunction, Not Run	This parameter displays the state of the Intake Camshaft Profile Actuator control circuit per cylinder. The parameter displays Malfunction if the Intake Camshaft Profile Actuator control circuit is shorted to voltage.
Intake Camshaft Profile Actuator 1–8 Control Circuit Low Voltage Test Status	Ignition ON	OK, Malfunction, Not Run	This parameter displays the state of the Intake Camshaft Profile Actuator control circuit per cylinder. The parameter displays Malfunction if the Intake Camshaft Profile Actuator control circuit is shorted to ground.
Intake Camshaft Profile Actuator 1–8 Control Circuit Open Test Status	Ignition ON	OK, Malfunction, Not Run	This parameter displays the state of the Intake Camshaft Profile Actuator control circuit per cylinder. The parameter displays Malfunction if the Intake Camshaft Profile Actuator control circuit is open.
Intake Camshaft Profile Actuator Position Sensor 1–4	Ignition ON	0–100 %	This parameter displays the commanded duty cycle for the Intake Camshaft Profile Actuator.
Intake Camshaft Profile Actuator Position Sensor 1–4	Ignition ON	mm	This parameter displays the commanded duty cycle for the Intake Camshaft Profile Actuator.
Intake Camshaft Profile Sleeve Position Sensor 1, 2	Engine Idling	Counts	This parameter displays the number of times that the Intake Camshaft Profile Sleeve test has been activated during the current key cycle.
Intake Manifold Pressure	Engine Idling	kPa/psi	This parameter displays the engine intake manifold vacuum pressure calculated as the difference between ambient air pressure (barometric pressure) and intake manifold absolute pressure (MAP).
Intake Manifold Tuning Control Valve Control Circuit Command	Ignition ON	On	This parameter displays the commanded state of the intake manifold tuning valve output.
Intake Manifold Tuning Control Valve Control Circuit High Voltage Test Status	Ignition ON	OK	This parameter displays the state of the intake manifold tuning control valve control circuit. The parameter displays Malfunction if the intake manifold tuning control valve control circuit is shorted to voltage.
Intake Manifold Tuning Control Valve Control Circuit Low Voltage Test Status	Ignition ON	OK	This parameter displays the state of the skip shift solenoid actuator control circuit. The parameter displays Malfunction if the skip shift solenoid actuator control circuit is shorted to ground.
Intake Manifold Tuning Control Valve Control Circuit Open Test Status	Ignition ON	OK	This parameter displays the state of the skip shift solenoid actuator control circuit. The parameter displays Malfunction if the skip shift solenoid actuator control circuit is open.
Intake Manifold Tuning Control Valve Feedback Signal	Ignition ON	0–100 %	This parameter displays the duty cycle of the PWM feedback from the intake manifold tuning electronics, which represents the position of the intake manifold tuning valve.
Intake Manifold Tuning Control Valve Learn	Ignition ON	Inactive	This parameter displays that the intake manifold tuning electronics are currently learning the hard stop position for the intake manifold tuning valve.
Intake Manifold Tuning Control Valve Position	Ignition ON	Closed	This parameter displays whether the intake manifold tuning valve is in an open, closed, or intermediate position based upon the PWM feedback from the intake manifold tuning electronics.

Parameter	System State	Expected Value	Description
Intake Rocker Arm Solenoid Valve 1–2 Command	Engine Idling	Off	This parameter displays the intake rocker arm solenoid valve command ON/OFF status.
Intake Rocker Arm Solenoid Valve 1–2 Command	Engine Idling	High Lift/Low Lift	This parameter displays the intake rocker arm solenoid valve command status.
Intake Rocker Arm Solenoid Valve 1–2 Control Circuit High Voltage Test Status	Engine Idling	OK	This parameter displays the state of the intake rocker arm solenoid valve control circuit. The parameter displays Malfunction if the intake rocker arm solenoid valve circuit is shorted to voltage.
Intake Rocker Arm Solenoid Valve 1–2 Control Circuit Low Voltage Test Status	Engine Idling	OK	This parameter displays the state of the intake rocker arm solenoid valve control circuit. The parameter displays Malfunction if the intake rocker arm solenoid valve control circuit is shorted to ground.
Intake Rocker Arm Solenoid Valve 1–2 Control Circuit Open Test Status	Engine Idling	OK	This parameter displays the state of the intake rocker arm solenoid valve control circuit. The parameter displays Malfunction if the intake rocker arm solenoid valve control circuit is open.
ISS/OSS Supply Voltage	Engine Idling	OK	This parameter displays the state of the ISS/OSS Supply Voltage circuit.
Knock Retard	Engine Idling	0 Degrees	This parameter indicates the amount of spark advance the control module removes from the ignition control (IC) spark advance in response to the signal from the knock sensors.
Long Term Fuel Pump Trim	—	#	This parameter displays a numeric value. This is the long term (LT) fuel pump trim.
Long Term Fuel Trim or Long Term Fuel Trim Bank 1 or 2	Engine Idling	0 %	This parameter displays the commanded Long Term Fuel Trim correction by the control module for cruise and acceleration conditions.
Long Term Fuel Trim Test Average or Long Term Fuel Trim Test Average Bank 1 or 2	Engine Idling	0 %	This parameter displays the filtered long term closed loop fuel correction. This value is compared to thresholds to determine if the fuel adjustment system diagnostic is passing or failing or if an excess purge vapor test should be executed.
Long Term Fuel Trim Test Average without Purge or Long Term Fuel Trim Test Average without Purge Bank 1 or 2	Engine Idling	0 %	This parameter displays the filtered non purge long term closed loop fuel correction. This value is compared to thresholds to determine if the fuel adjustment system diagnostic is passing, failing, or indeterminate during normal purge-OFF operation as well as during the intrusive excess purge vapor test.
Long Term Secondary O2 Sensor Fuel Trim Bank 1 or 2	Ignition ON	0–100 %	This parameter displays the Long Term Secondary O2 Sensor Fuel Trim for Bank 1 or 2.
Lost Communication with Active Grille Air Shutter Actuator Test Status	Ignition ON	OK, Malfunction, Not Run	This parameter indicates the status of the Active Grille Air Shutter actuator diagnostic test.
Low Engine Oil Level Indicator Command	Engine Idling	Off	The scan tool displays On or Off. This is the state of the low engine oil level indicator as monitored by the PCM.
Low Engine Oil Pressure Indicator Command	Engine Idling	Off	This parameter displays the commanded state of the low EOP lamp control circuit by the control module.
Low-Voltage Battery Current	Ignition ON	Amps	This parameter displays the battery current.

Parameter	System State	Expected Value	Description
Low-Voltage Battery State of Charge	Ignition ON	Volts	This parameter indicates the percentage of the battery charge remaining.
Low-Voltage Battery State of Function	Ignition ON	Volts	This parameter displays the predicted minimum voltage of the next crank event.
Low-Voltage Battery State of Health	Ignition ON	Volts	This parameter indicates the available capacity of the battery if it were fully charged, relative to the capacity when the battery was new.
Low-Voltage Battery Temperature	Ignition ON	ºC (ºF)	This parameter indicates the temperature of the battery.
MAF Performance Test	Engine Idling	OK	This parameter displays the status of the MAF performance test by the powertrain control module. The scan tool will display OK if no malfunction is found. The scan tool will display malfunction if the powertrain control module detects a malfunction during the test.
MAF Sensor	Engine Idling	3.0–8.3 g/s	This parameter displays in grams per second, the measured quantity of air flowing into the engine during all operating conditions.
	Engine speed at 2,500 RPM	11.88 g/s	
MAF Sensor	Engine Idling	2,000–2,500 Hz	The scan tool displays a range of 0-65,555 hertz. This parameter displays the frequency signal input to the control module, and represents measured quantity of air flowing into the engine during all operating conditions.
MAF Sensor Supply Voltage Command	Ignition ON	On / Off	This parameter indicates if the mass air flow sensor supply voltage is commanded On or Off.
MAF Sensor Supply Voltage Control Circuit High Voltage Test Status	Ignition ON	OK, Malfunction, Not Run	This parameter displays the mass air flow sensor supply voltage Control Circuit High Voltage Test Status. Can display OK, Malfunction, or Not Run.
MAF Sensor Supply Voltage Control Circuit Low Voltage Test Status	Ignition ON	OK, Malfunction, Not Run	This parameter displays the mass air flow sensor supply voltage Control Circuit Low Voltage Test Status. Can display OK, Malfunction, or Not Run.
MAF Sensor Supply Voltage Control Circuit Open Test Status	Ignition ON	OK, Malfunction, Not Run	This parameter displays the mass air flow sensor supply voltage Control Circuit Open Circuit Test Status. Can display OK, Malfunction, or Not Run.
MAF When Engine Overspeed Detected	Engine Idling	g/s	This parameter indicates the quantity calculated by the control module based on a signal from the MAF sensor at the time an overspeed was detected.
MAP Performance Test 1	Engine Idling	OK	MAP Test 1 Residual Out of Tolerance indicates that the filtered MAP Test 1 residual (the difference between the measured intake manifold pressure and the intake manifold pressure predicted from the intake manifold model using the mass airflow predicted from the throttle model) exceeds a failure threshold.
MAP Performance Test 2	Engine Idling	OK	MAP Test 2 Residual Out of Tolerance indicates that the filtered MAP Test 2 residual (the difference between the measured intake manifold pressure and the intake manifold pressure predicted from the intake manifold model using the measured mass airflow) exceeds a failure threshold.
MAP Sensor	Engine Idling	kPa/psi	This parameter displays the actual engine intake manifold absolute pressure (MAP).

Parameter	System State	Expected Value	Description
MAP Sensor	Engine Idling	0.4–2.0 Volts	The parameter displays The MAP sensor voltage as it measures the change in the intake manifold pressure which results from engine load and speed changes. As the intake manifold pressure increases, the air density in the intake also increases and additional fuel is required.
Maximum Engine Speed When Engine Overspeed Detected	Engine Idling	RPM	This parameter displays the Maximum Engine Speed When Engine Overspeed Detected.
MIL Command	Engine Idling	Off	This parameter displays the commanded state of the malfunction indicator lamp (MIL) control circuit by the control module.
MIL Control Circuit High Voltage Test Status	Ignition ON	OK	This parameter displays the state of the MIL control circuit. The parameter displays Malfunction if the MIL control circuit is shorted to voltage.
MIL Control Circuit Low Voltage Test Status	Ignition ON	OK	This parameter displays the state of the MIL control circuit. The parameter displays Malfunction if the MIL control circuit is shorted to ground.
MIL Control Circuit Open Test Status	Ignition ON	OK	This parameter displays the state of the MIL control circuit. The parameter displays Malfunction if the MIL control circuit is open.
MIL Requested	Engine Idling	No	This parameter displays the reason the powertrain control module illuminated the MIL. The scan tool will display Yes when the MIL is requested as a result of an A or B type DTC. The scan tool will display No if the MIL is illuminated for another reason, such as transmission DTCs.
MIL Requested by DTC	Engine Idling	No	This parameter indicates the reason the control module illuminated the MIL. The scan tool will display YES when the MIL is requested as a result of an A or B type DTC. The scan tool will display NO if the MIL is illuminated for another reason, such as transmission DTCs.
Minimum DC/DC Converter Output Voltage on Circuit 1 - Last Engine Crank	Ignition ON	Volts	This parameter indicates the minimum DC/DC Converter Output Voltage on Circuit 1 on the last engine crank.
Minimum DC/DC Converter Output Voltage on Circuit 2 - Last Engine Crank	Ignition ON	Volts	This parameter indicates the minimum DC/DC Converter Output Voltage on Circuit 2 on the last engine crank.
Misfire Diagnostic Engine Load	Engine Idling	0–100 %	This parameter displays the engine load used within the misfire diagnostic (calculated as the ratio of the mass of air predicted to be in the cylinder two firing events into the future to the maximum possible mass of air in the cylinder based on the current ambient air pressure and charge temperature).
Misfire Diagnostic Engine Speed	Engine Idling	RPM	This parameter displays the engine speed used within the misfire diagnostic. This engine speed is the maximum engine speed observed over the previous engine cycle.
Misfire Engine Load History 1–5	Engine Idling	0–100 %	This parameter displays the specific engine load when the engine was operating for one of the last five misfire events .
Misfire Engine Speed History 1–5	Engine Idling	RPM	This parameter displays the specific engine speed when the engine was operating for one of the last five misfire events .

Parameter	System State	Expected Value	Description
Misfire Monitor Complete	Engine Idling	Yes/No	This parameter displays the status of the Misfire Monitor. The parameter will display Yes when the Misfire Monitor is Complete.
Misfire Monitor Complete This Ignition Cycle	Ignition ON	No	This parameter displays the completion status of the misfire monitor during the current driving / monitoring cycle.
Misfire Monitor Enabled	Engine Idling	Yes/No	This parameter displays the status of the Misfire Monitor. The parameter will display Yes when the Misfire Monitor is Enabled.
Misfire Monitor Enabled This Ignition Cycle	Ignition ON	No	This parameter displays the enable status of the misfire monitor during the current driving / monitoring cycle.
Neutral Position Sensor	—	°	This parameter displays the current state of the neutral position sensor in degrees.
Number of Calibration History Events Stored	Ignition ON	Counts	This parameter displays the history entries for the primary calibration in the controller.
Number of DTC(s)	Engine Idling	0	This parameter indicates the number of diagnostic trouble codes (DTCs).
O2S/HO2S Monitor Complete	Engine Idling	Yes/No	This parameter displays the enable and completion status during the current driving/ monitoring cycle of each continuous legislated emission related monitor and non continuous legislated emission related monitor.
O2S/HO2S Monitor Complete This Ignition Cycle	Engine Idling	Yes/No	This parameter displays the enable and completion status during the current driving/ monitoring cycle of each continuous legislated emission related monitor and non continuous legislated emission related monitor.
O2S/HO2S Monitor Enabled	Engine Idling	Yes/No	This parameter displays the enable and completion status during the current driving/ monitoring cycle of each continuous legislated emission related monitor and non continuous legislated emission related monitor.
O2S/HO2S Monitor Enabled This Ignition Cycle	Engine Idling	Yes/No	This parameter displays the enable and completion status during the current driving/ monitoring cycle of each continuous legislated emission related monitor and non continuous legislated emission related monitor.
Odometer at Engine Shutdown – Excessive Idle Time	Ignition ON	km / miles	This parameter displays the odometer reading at an engine shutdown due to excessive idle time.
Odometer at Engine Shutdown – High Coolant Temperature	Ignition ON	km / miles	This parameter displays the odometer reading at an engine shutdown due to high coolant temperature.
Odometer at Engine Shutdown – Low Coolant Level	Ignition ON	km / miles	This parameter displays the odometer reading at an engine shutdown due to low coolant level.
Odometer at Engine Shutdown – Low Oil Level	Ignition ON	km / miles	This parameter displays the odometer reading at an engine shutdown due to low oil level.
Odometer When Engine Overspeed Detected	Engine Idling	km/miles	This parameter displays the kilometers or miles of the Odometer When Engine Overspeed Detected.
Oil Level Warning Counter City	Ignition ON	Counts	This parameter displays a rolling count of oil level debounce events for the city calibration.
Oil Level Warning Counter Country Road	Ignition ON	Counts	This parameter displays a rolling count of oil level debounce events for the country road calibration

Parameter	System State	Expected Value	Description
Oil Level Warning Counter Highway	Ignition ON	Counts	This parameter displays a rolling count of oil level debounce events for the highway calibration.
Output Shaft Speed Sensor	Engine Idling	RPM	This parameter displays the transmission output speed.
Park/Neutral Position Switch (If Equipped)	Engine Idling	Park/Neutral	This parameter indicates the range selection of the automatic transmission as calculated by the control module based on input from the PNP switch. The scan tool will display, In Gear, Park, or Neutral depending on the PNP switch position.
Park/Neutral Position Switch (RPO=MO5)	Engine Idling	Active/Inactive	This parameter indicates the status of the Park/Neutral Position (PNP) Switch. When in Park, the PNP Switch is closed and the scan tool will display active. When in Reverse, Neutral, or Drive, the PNP Switch is open and the scan tool will display inactive.
Power Enrichment	Engine Idling	Inactive	This parameter indicates if the control module has detected conditions appropriate to operate in Power Enrichment mode. The scan tool will display Active if the mode is in operation, and Inactive if the mode is not in operation. The control module enters Open Loop operation and increases injector pulse width when in power enrichment mode.
Power Mode	Engine Idling	Run	This parameter displays the state of the System Power Mode. This signal is based upon the state of the system power mode received over serial communication from the vehicle electronics. If the serial data signal not received, the Parameter will display Off.
Radiator Coolant Temperature Sensor	—	Varies C° (F°)	This parameter displays the undefaulted radiator coolant temperature measured by a sensor located in the coolant outlet of the radiator.
RCT vs. IAT Sensor Temperature at Last ECT vs. RCT Malfunction Detection	Engine Idling	Agree	This parameter displays that the temperature values of the RCT and IAT sensors did not agree at the time of the most recent failure of the ECT/RCT rationality diagnostic.
Recommended Maximum Fuel Alcohol Content	Engine Idling	0–100 %	This parameter displays the percentage of the Recommended Maximum Fuel Alcohol Content.
Recommended Maximum Fuel Alcohol Content Exceeded	Engine Idling	No	This parameter displays Yes or No if the Recommended Maximum Fuel Alcohol Content Exceeded.
Recommended Maximum Fuel Alcohol Content When Recommended Maximum Fuel Alcohol Content Exceeded	Engine Idling	%	This parameter displays the percentage of the Recommended Maximum Fuel Alcohol Content When Recommended Maximum Fuel Alcohol Content Exceeded.
Reduced Engine Power	Engine Idling	Inactive	This parameter displays Active if the control module is commanding reduced engine power due to a throttle actuator control (TAC) system condition.

Parameter	System State	Expected Value	Description
Reduced Engine Power History	Engine Idling	Throttle Malfunction, Cooling Fan Malfunction, Engine Over-temperature Protection Active, Engine Oil Temperature Too High, Remote Vehicle Speed Limiting, Engine Calibration Malfunction, Engine Oil Life, High Pressure Fuel System Malfunction	This parameter displays the last reason that Powertrain has illuminated the Reduced Engine Power (REP) indication.
Redundant Odometer Memory	Engine Idling	Present	ECU Odometer Programmed indicates if the ECU odometer value has been programmed.
Refueling Events Since Recommended Maximum Fuel Alcohol Content Exceeded	Engine Idling	Counts	This parameter displays the number Refueling Events Since Recommended Maximum Fuel Alcohol Content Exceeded.
Remaining Fuel in Tank	Engine Idling	0–100 %	This parameter displays the total fuel level as a percentage of the rated capacity of the fuel tank.
Remaining Fuel in Tank	Engine Idling	Liters/Gallons	This parameter displays the actual total fuel volume contained in the fuel tank.
Remote Vehicle Start Disable History 1–8	Engine Cranking	Reason for RVS Disable	These parameters displays the last eight reasons the control module disabled remote vehicle start (RVS).
Remote Vehicle Start Request Signal	Ignition ON	Off	Remote Vehicle Start Request indicates the state of the request received over serial communication from the remote vehicle start (RVS) system to start the vehicle in remote mode.
Replicated Transmission OSS Signal	Ignition ON	RPM	This parameter displays the Replicated Transmission Output Speed (Replicated TOS) received from the Transmission Control Module.
Reverse Inhibit Solenoid Actuator Command	Ignition ON	Allowed	This parameter displays that the driver is inhibited from shifting into reverse.
Reverse Inhibit Solenoid Actuator Control Circuit High Voltage Test Status	Ignition ON	OK	This parameter displays the state of the reverse inhibit solenoid actuator control circuit. The parameter displays Malfunction if the reverse inhibit solenoid actuator control circuit is shorted to voltage.
Reverse Inhibit Solenoid Actuator Control Circuit Low Voltage Test Status	Ignition ON	OK	This parameter displays the state of the reverse inhibit solenoid actuator control circuit. The parameter displays Malfunction if the reverse inhibit solenoid actuator control circuit is shorted to ground.
Reverse Inhibit Solenoid Actuator Control Circuit Open Test Status	Ignition ON	OK	This parameter displays the state of the reverse inhibit solenoid actuator control circuit. The parameter displays Malfunction if the reverse inhibit solenoid actuator control circuit is open.
Reverse Position Switch	Engine Idling	Off	This parameter displays if the manual transmission shifter is in reverse.
Secondary Air Injection Monitor Enabled	Engine Idling	Yes	This parameter displays the status of the secondary air injection monitor.
Secondary Air Injection Pressure	Engine Idling	kPa	This parameter displays the normalized secondary air injection system pressure.
Secondary Air Injection Pressure Sensor	Engine Idling	kPa	This parameter displays the unfiltered secondary air injection system pressure.

Parameter	System State	Expected Value	Description
Secondary Air Injection Pressure Sensor	Engine Idling	Volts	This parameter displays the secondary air injection system pressure analog input as a percentage of its reference voltage.
Secondary Air Injection Pressure Sensor Variance	Engine Idling	kPa	This parameter displays the weighted average pressure error (difference between the predicted and actual secondary air injection system pressure) during the secondary air injection on test (phase 1).
Secondary Air Injection Pump Relay Command	Engine Idling	Off	This parameter displays the commanded state of the secondary air injection pump output.
Secondary Air Injection Pump Relay Control Circuit High Voltage Test Status	Engine Idling	OK	This parameter displays the state of the secondary air injection pump relay control circuit. The parameter displays Malfunction if the secondary air injection pump relay control circuit is shorted to voltage.
Secondary Air Injection Pump Relay Control Circuit Low Voltage Test Status	Engine Idling	OK	This parameter displays the state of the secondary air injection pump relay control circuit. The parameter displays Malfunction if the secondary air injection pump relay control circuit is shorted to ground.
Secondary Air Injection Pump Relay Control Circuit Open Test Status	Engine Idling	OK	This parameter displays the state of the secondary air injection pump relay control circuit. The parameter displays Malfunction if the secondary air injection pump relay control circuit is open.
Secondary Air Injection Solenoid Valve Command	Engine Idling	Off	This parameter displays the commanded state of the secondary air injection valve output.
Secondary Air Injection Solenoid Valve Control Circuit High Voltage Test Status	Engine Idling	OK	This parameter displays the state of the secondary air injection solenoid valve control circuit. The parameter displays Malfunction if the secondary air injection solenoid valve control circuit is shorted to voltage.
Secondary Air Injection Solenoid Valve Control Circuit Low Voltage Test Status	Engine Idling	OK	This parameter displays the state of the secondary air injection solenoid valve control circuit. The parameter displays Malfunction if the secondary air injection solenoid valve control circuit is shorted to ground.
Secondary Air Injection Solenoid Valve Control Circuit Open Test Status	Engine Idling	OK	This parameter displays the state of the secondary air injection solenoid valve control circuit. The parameter displays Malfunction if the secondary air injection solenoid valve control circuit is open.
Short Term Fuel Pump Trim	—	#	This parameter displays a numeric value. This is the short term (ST) fuel pump trim.
Short Term Fuel Trim or Short Term Fuel Trim Bank 1 or Bank 2	Engine Idling	−5 % to +5 %	This parameter displays the short-term correction to the fuel delivery by the control module in response to oxygen sensor 1 or 2. If the oxygen sensor indicates a lean air/fuel mixture, the control module will add fuel increasing the short term fuel trim above 0. If the oxygen sensor indicates a rich air/fuel mixture, the control module will reduce fuel decreasing the short term fuel trim below 0.
Short Term Fuel Trim Test Average or Short Term Fuel Trim Test Average Bank 1 or Bank 2	Engine Idling	0–100 %	This parameter display's the filtered short term closed loop fuel correction. This value is compared to thresholds to determine if the fuel adjustment system diagnostic is passing or failing or if an excess purge vapor test should be executed.

Parameter	System State	Expected Value	Description
Short Term Secondary O2 Sensor Fuel Trim Bank 1 or 2	Ignition ON	0–100 %	This parameter displays the Short Term Secondary O2 Sensor Fuel Trim for Bank 1 or 2.
Skip Shift Solenoid Actuator Command	Ignition ON	No Skip	This parameter indicates that the skip shift solenoid is commanded on, inhibiting the driver from shifting up to one of the next highest gears.
Skip Shift Solenoid Actuator Control Circuit High Voltage Test Status	Ignition ON	OK	This parameter displays the state of the skip shift solenoid actuator control circuit. The parameter displays Malfunction if the skip shift solenoid actuator control circuit is shorted to voltage.
Skip Shift Solenoid Actuator Control Circuit Low Voltage Test Status	Ignition ON	OK	This parameter displays the state of the skip shift solenoid actuator control circuit. The parameter displays Malfunction if the skip shift solenoid actuator control circuit is shorted to ground.
Skip Shift Solenoid Actuator Control Circuit Open Test Status	Ignition ON	OK	This parameter displays the state of the skip shift solenoid actuator control circuit. The parameter displays Malfunction if the skip shift solenoid actuator control circuit is open.
Specific Humidity	Ignition ON	0–100 %	This parameter shows the current specific humidity level.
Starter Pinion Solenoid Actuator Relay Command	Engine Cranking	On / Off	This parameter indicates the commanded state of the Starter Pinion Solenoid Actuator relay.
Starter Pinion Solenoid Actuator Relay Control Circuit High Voltage Test Status	Engine Cranking	OK, Malfunction, Not Run	This parameter displays the Starter Pinior Solenoid Actuator Relay Control Circuit High Voltage Test Status. Can display OK, Malfunction, or Not Run.
Starter Pinion Solenoid Actuator Relay Control Circuit Low Voltage Test Status	Engine Cranking	OK, Malfunction, Not Run	This parameter displays the Starter Pinior Solenoid Actuator Relay Control Circuit Low Voltage Test Status. Can display OK, Malfunction, or Not Run.
Starter Pinion Solenoid Actuator Relay Control Circuit Open Test Status	Engine Cranking	OK, Malfunction, Not Run	This parameter displays the Starter Pinior Solenoid Actuator Relay Control Circuit Open Circuit Test Status. Can display OK, Malfunction, or Not Run.
Starter Relay Command	Ignition switch not in the crank position	Off	This parameter indicates whether the control module is commanding the starter relay to go On or Off.
	Ignition switch in the crank position	On	
Starter Relay Control Circuit High Voltage Test Status	Ignition ON	OK	This parameter displays the state of the starter relay control circuit. The parameter displays Malfunction if the starter relay control circuit is shorted to voltage. This parameter may not change if the scan tool is used to command the relay control circuit On.
Starter Relay Control Circuit Low Voltage Test Status	Ignition ON	OK	This parameter displays the state of the starter relay control circuit. The parameter displays Malfunction if the starter relay control circuit is shorted to ground. This parameter may not change if the scan tool is used to command the relay control circuit On.

Parameter	System State	Expected Value	Description
Starter Relay Control Circuit Open Test Status	Ignition ON	OK	This parameter displays the state of the starter relay control circuit. The parameter displays Malfunction if the starter relay control circuit is open. This parameter may not change if the scan tool is used to command the relay control circuit On.
Start-Up ECT	Ignition ON	−39° to 140°C (−38° to 284°F)	This parameter displays the temperature of the engine coolant on start-up based on input to the control module from the ECT sensor.
Start-Up Fuel Rail Temperature	Engine Idling	ºC (ºF)	This parameter indicates the fuel rail temperature when the engine was started from the first sensor located on the fuel rail.
Start-Up Fuel Rail Temperature 1	Engine Idling	ºC (ºF)	This parameter indicates the fuel rail temperature when the engine was started from the first sensor located on the fuel rail.
Start-Up Fuel Rail Temperature 2	Engine Idling	ºC (ºF)	This parameter indicates the fuel rail temperature when the engine was started from the second sensor located on the fuel rail.
Start-Up IAT Sensor or Start-Up IAT Sensor 1 or 2	Ignition ON	−39° to 140°C (−38° to 284°F)	This parameter displays the temperature of the intake air at start in the air induction system based on input to the control module from the IAT sensor.
Start-Up IAT Sensor 3	Engine Idling	ºC (ºF)	This parameter indicates the intake air temperature when the engine was started.
Stop/Start Disable Mode	Ignition ON	Active / Inactive / Not Available	This parameter indicates the status of the Stop/Start Disable Mode.
Supercharger Bypass Solenoid Valve Command	Ignition ON	0–100 %	This parameter displays the commanded duty cycle for the supercharger boost solenoid output.
Supercharger Bypass Solenoid Valve Control Circuit High Voltage Test Status	Ignition ON	OK	This parameter displays the state of the supercharger bypass solenoid valve control circuit. The parameter displays Malfunction if the supercharger bypass solenoid valve control circuit is shorted to voltage.
Supercharger Bypass Solenoid Valve Control Circuit Low Voltage Test Status	Ignition ON	OK	This parameter displays the state of the supercharger bypass solenoid valve control circuit. The parameter displays Malfunction if the supercharger bypass solenoid valve control circuit is shorted to ground.
Supercharger Bypass Solenoid Valve Control Circuit Open Test Status	Ignition ON	OK	This parameter displays the state of the supercharger bypass solenoid valve control circuit. The parameter displays Malfunction if the supercharger bypass solenoid valve control circuit is open.
Supercharger Inlet Pressure	Engine Idling	kPa	This parameter displays the supercharger inlet vacuum pressure calculated as the difference between ambient air pressure (barometric pressure) and supercharger inlet absolute pressure (SCIAP).
Supercharger Inlet Pressure Sensor	Engine Idling	kPa	This parameter displays the unfiltered supercharger inlet absolute pressure (SCIAP).
Supercharger Inlet Pressure Sensor	Engine Idling	Volts	This parameter displays the supercharger inlet absolute pressure (SCIAP) analog input as a percentage of its reference voltage.
SVS Indicator Command	Ignition ON	Off	This parameter displays that the Service Vehicle Soon lamp is being commanded on due to the failure of a non emission related diagnostic test.

Parameter	System State	Expected Value	Description
System Off	Ignition ON	No	This parameter displays that the vehicle is waiting for a key crank to happen (key crank not done yet).
TAC Forced Engine Shutdown	Ignition ON	No	This parameter indicates the status of the TAC motor by the control module. The scan tool will display Yes if the engine has been shut down due to a throttle control fault.
TAC Motor	Ignition ON	Enabled	This parameter indicates the status of the throttle actuator control (TAC) motor driver in the control module. The scan tool will display Enabled if TAC motor operation is allowed. The scan tool will display Disabled if the control module detects a condition that affects TAC motor operation.
TAC Motor Command	Ignition ON	0–100 %	This parameter displays the commanded duty cycle for the throttle actuator output.
TCC/Cruise Control Brake Pedal Switch	Ignition ON	Applied / Released	This parameter indicates the state of the TCC/ Cruise Control Brake Pedal Switch.
Throttle Body Idle Air Flow Compensation	Engine Idling	0–100 %	This parameter displays the percent compensation of the Learned Airflow Variation Calibration. This value indicates the current amount of airflow compensation in response to engine intake airflow restrictions. It can also be used as feedback for the Learned Airflow Adapts Reset Trigger Device Control.
Throttle Position	Ignition ON	0–100 %	This parameter displays the desired throttle position angle commanded by the control module.
Throttle Position Performance Test	Engine Idling	OK	Throttle Position Residual Out of Tolerance indicates that the filtered throttle position residual (the product of the MAF residual and the MAP Test 1 residual) exceeds a failure threshold.
Throttle Position Sensor 1	Ignition ON	3.7–4.3 Volts	This parameter displays the actual voltage on the TP sensor 1 signal circuit as measured by the control module.
Throttle Position Sensor 1 Learned Minimum	Ignition ON	0.51 Volts	This parameter displays the learned minimum value of throttle position (TP) sensor 1 as recorded by the control module during the last learn procedure.
Throttle Position Sensor 1 or 2 Position	Ignition ON	0–100 %	This parameter displays the actual voltage on the TP sensor 2 signal circuit as measured by the control module.
Throttle Position Sensor 2	Ignition ON	0.5–0.8 Volts	This parameter displays the voltage signal sent to the control module from TP sensor 2 of the throttle assembly. The TP sensor 2 is a range of values indicating a low voltage when the throttle is closed to a high voltage when the throttle plate is fully open.
Throttle Position Sensor 2 Learned Minimum	Ignition ON	0.51 Volts	This parameter displays the learned minimum value of TP sensor 2 as recorded by the control module during the last learn procedure.
Throttle Position Sensors 1 and 2	Ignition ON	Agree	This parameter displays Disagree when the control module detects that TP sensor 1 voltage signal is not within the correct relationship to TP sensor 2. The scan tool displays Agree under the normal operating conditions.
Tire Size	Ignition ON	Rev/km	This parameter displays the vehicle tire circumference in centimeters.

Parameter	System State	Expected Value	Description
Torque Delivered Signal	Vehicle Moving	N•m /Lb/Ft	This parameter displays the engine torque based upon the airflow through the engine and the torque losses due to spark retard and fuel shutoff. Since this is a steady state engine torque, it does not include the inertial component of engine torque.
Torque Management Ignition Timing Retard	Engine Idling	Degrees	This parameter displays the total spark retard (in terms of a crankshaft angle).
Torque Request Inhibit – Fuel	Engine Idling	No	This parameter displays the existing condition in the PCM causing the transmission torque request to be limited.
Torque Request Inhibit – Ignition Timing	Engine Idling	No	This parameter displays the existing condition in the PCM causing the transmission torque request to be limited.
Torque Request Inhibit – Ignition Timing Advance	Engine Idling	No	This parameter displays the existing condition in the PCM causing the transmission torque request to be limited.
Torque Request Inhibit – Minimum Idle	Engine Idling	No	This parameter displays the existing condition in the PCM causing the transmission torque request to be limited.
Torque Request Inhibit – Minimum Torque	Engine Idling	No	This parameter displays the existing condition in the PCM causing the transmission torque request to be limited.
Torque Request Inhibit – TAC	Engine Idling	No	This parameter displays the existing condition in the PCM causing the transmission torque request to be limited.
Torque Request Inhibit – TAC Limit	Engine Idling	No	This parameter displays the existing condition in the PCM causing the transmission torque request to be limited.
Total Alternative Fuel Level Percentage	Ignition ON	0–100 %	This parameter displays the undefaulted, total alternative fuel level as a percentage of the rated (advertised) capacity of the alternative fuel tank(s).
Total Engine Mass Air Flow	Engine Idling	g/s	This parameter indicates the engine mass airflow.
Total Engine Overspeed Time	Engine Idling	ms	This parameter displays the Total Engine Overspeed Time.
Total Knock Retard	Engine Idling	0°	This parameter displays how much ignition spark timing is being retarded due to all control systems monitored by the control module.
Total Misfire	Engine Idling	0	This parameter displays the total number of cylinder firing events that the control module detected as misfires for the last 200 crankshaft revolution sample period.
Traction Control Axle Torque Request Signal	Vehicle Moving	N•m (lb ft)	This parameter indicates the axle torque requested by the traction control module.
Traction Control Status	Vehicle Moving	Inactive	This parameter displays Active if the electronic brake and traction control module (EBTCM) is commanding traction control.
Transmission Fluid Pressure Accumulator Solenoid Valve Command	Ignition ON	On/Off	This parameter displays the position of the Transmission Fluid Pressure Accumulator Solenoid Valve Control.
Transmission Fluid Pressure Accumulator Solenoid Valve Control Circuit High Voltage Test Status	Ignition ON	OK, Malfunction, Not Run	This parameter displays the state of the Transmission Fluid Pressure Accumulator Solenoid Valve Control Circuit. The parameter displays Malfunction if the Transmission Fluid Pressure Accumulator Solenoid Valve Control Circuit is shorted to voltage.

Parameter	System State	Expected Value	Description
Transmission Fluid Pressure Accumulator Solenoid Valve Control Circuit Low Voltage Test Status	Ignition ON	OK, Malfunction, Not Run	This parameter displays the state of the Transmission Fluid Pressure Accumulator Solenoid Valve Control Circuit. The parameter displays Malfunction if the Transmission Fluid Pressure Accumulator Solenoid Valve Control Circuit is shorted to ground.
Transmission Fluid Pressure Accumulator Solenoid Valve Control Circuit Open Test Status	Ignition ON	OK, Malfunction, Not Run	This parameter displays the state of the Transmission Fluid Pressure Accumulator Solenoid Valve Control Circuit. The parameter displays Malfunction if the Transmission Fluid Pressure Accumulator Solenoid Valve Control Circuit is open.
Transmission Fluid Temperature Sensor	Ignition ON	°C (°F)	This parameter displays the undefaulted, unfiltered transmission oil / fluid temperature measured by a sensor.
Turbocharger 1 Turbine Inlet Valve Control Circuit High Voltage Test Status	Ignition ON	OK	This parameter displays the state of the turbocharger 1 turbine inlet valve control circuit. The parameter displays Malfunction if the turbocharger 1 turbine inlet valve control circuit is shorted to voltage.
Turbocharger 1 Turbine Inlet Valve Control Circuit Open Test Status	Ignition ON	OK	This parameter displays the state of the turbocharger 1 turbine inlet valve control circuit. The parameter displays Malfunction if the turbocharger 1 turbine inlet valve control circuit is open.
Turbocharger 1 Turbine Inlet Valve Duty Cycle	Ignition ON	0–100 %	This parameter displays the commanded duty cycle for the turbocharger 1 turbine inlet valve in a percentage.
Turbocharger Bypass Solenoid Valve Command	Ignition ON	0–100 %	This parameter displays the commanded duty cycle for the turbocharger bypass solenoid valve in a percentage.
Turbocharger Bypass Solenoid Valve Control Circuit High Voltage Test Status	Ignition ON	OK	This parameter displays the state of the turbocharger bypass solenoid valve control circuit. The parameter displays Malfunction if the turbocharger bypass solenoid valve control circuit is shorted to voltage.
Turbocharger Bypass Solenoid Valve Control Circuit Low Voltage Test Status	Ignition ON	OK	This parameter displays the state of the turbocharger bypass solenoid valve control circuit. The parameter displays Malfunction if the turbocharger bypass solenoid valve control circuit is shorted to ground.
Turbocharger Bypass Solenoid Valve Control Circuit Open Test Status	Ignition ON	OK	This parameter displays the state of the turbocharger bypass solenoid valve control circuit. The parameter displays Malfunction if the turbocharger bypass solenoid valve control circuit is open.
Turbocharger Wastegate Solenoid Valve Command	Ignition ON	0–100 %	This parameter displays the commanded duty cycle for the turbocharger wastegate solenoid valve in a percentage.
Turbocharger Wastegate Solenoid Valve Control Circuit High Voltage Test Status	Ignition ON	OK	This parameter displays the state of the turbocharger wastegate solenoid valve control circuit. The parameter displays Malfunction if the turbocharger wastegate solenoid valve control circuit is shorted to voltage.
Turbocharger Wastegate Solenoid Valve Control Circuit Low Voltage Test Status	Ignition ON	OK	This parameter displays the state of the turbocharger wastegate solenoid valve control circuit. The parameter displays Malfunction if the turbocharger wastegate solenoid valve control circuit is shorted to ground.

Parameter	System State	Expected Value	Description
Turbocharger Wastegate Solenoid Valve Control Circuit Open Test Status	Ignition ON	OK	This parameter displays the state of the turbocharger wastegate solenoid valve control circuit. The parameter displays Malfunction if the turbocharger wastegate solenoid valve control circuit is open.
Upshift Indicator Command	Vehicle Moving	Off	This parameter displays On when commanded by the powertrain control module.
Variable Valve Lift Low Lift Disable History 1–8	Engine Idling	Varies	This parameter displays the reason for the last 8 variable valve lift disable history reasons.
Variable Valve Lift Low Lift Inhibit – Reason	Engine Idling	Varies	This parameter lists the reason the variable valve lift low lift may be inhibited. These include; 4WD Low State Invalid, A/C Compressor Clutch On, Acceleration Request, Brake Booster Pressure Sensor DTC, Brake Booster Weak Vacuum, Calculated Torque, Camshaft Position Sensor DTC, Control Function Active, Crankshaft Position Sensor DTC, ECT, ECT Sensor DTC, Engine Controls Ignition Relay DTC, Engine Not Synchronized, Engine Off, Engine Oil Pressure, Engine Oil Pressure Control Solenoid Valve Stuck Off, Engine Oil Pressure Control Test Active, Engine Oil Pressure Sensor DTC, Engine Oil Temperature, Engine Overtemperature Protection, Engine Power Not Requested, Engine Speed, Engine Torque Capacity, Fuel Alcohol Content Learn In Progress, Fuel Alcohol Content Too High, Fuel System Disabled, Green Engine Mode, HO2S 2 Test, Hot Coolant Mode, Hybrid/EV Powertrain Control Module Request, IAT Sensor DTC, Ignition Voltage, MAP Sensor DTC, Maximum Throttle Exceeded, Minimum Time After TAC DTC, Misfire DTC, Oil Aeration. On-Board Diagnostic System, Rocker Arm Solenoid Valve DTC, RPM Limit, TAC System DTC, Transmission Gear, Transmission Range, Transmission Shifting, Vehicle Speed Too Low, VSS DTC.
Variable Valve Lift System Command	—	Low Lift	This parameter displays the current state of the variable valve lift system command.
Vehicle Speed Sensor	Vehicle Moving	Km/h mph	This parameter displays the speed of the vehicle as calculated by the transmission control module (TCM) from information received from the vehicle speed sensor (VSS).
Vehicle Speed When Engine Overspeed Detected	Engine Idling	Km/h mph	This parameter displays the Vehicle Speed When Engine Overspeed Detected.
VIN Programming Counter	Ignition ON	Counts	This parameter displays the number of times the VIN has been programmed. This counter can only be incremented.
Warm Ups Since DTC Cleared	Engine Idling	Counts	This parameter indicates the number of warm up cycles that have occurred Since DTCs were cleared. The scan tool will display a higher counts as more warm up cycles have occurred since the DTCs were cleared.
Warm Ups without Emission Malfunctions	Engine Idling	Counts	This parameter displays the number of OBD defined warm up cycles since the last emissions related (fault type A or B) fail report or MIL request. Emissions related DTCs are cleared from memory when this counter reaches 40.

Parameter	System State	Expected Value	Description
Warm Ups without Non Emission Malfunctions	Engine Idling	Counts	This parameter displays the number of OBD defined warm up cycles since the last non emissions related (fault type C) fail report. Non emissions related DTCs are cleared from memory when this counter reaches 40.
Weight Percent Water in Air	Engine Idling	0–100 %	This parameter displays the calculated value of weight per cent water (specific humidity) in the intake air.
Wide Open Throttle	Engine Idling	No	This parameter displays the throttle status commanded by the control module. The scan tool will display Yes if the vehicle throttle is commanded to 100 percent.
Wide Open Throttle	Ignition ON	No	This parameter displays the desired throttle position exceeds a WOT threshold (selected specifically for service).

Powertrain Control Module (PCM) Scan Tool Output Controls

Output Control	Description
This is a comprehensive list. Not all output controls listed are available for all applications.	
A/C Compressor Clutch Relay	This device control is used to override the state of the air conditioning compressor output.
Active Grill Air Shutter 1 or 2 Commanded Position	This device control is used to command the position of the active grill air shutter 1 or 2 output. 0% equals fully closed, 100% equals fully open.
Alternative Fuel High Pressure Shutoff Valve Control	This device control is used to override the state of the alternative fuel shutoff valve 1 output.
Alternative Fuel Injector Disable Control	This device control is used with the engine running to override the state of the alternative fuel injector outputs. This device control is used to disable alternative fuel injectors in order to cut off alternative fuel to the associated cylinders.
Alternative Fuel Injector Flow Control	This device control is used to trigger a single Alternative fuel injector to be commanded on for a calibrated number of pulses (e.g. 25) in order to test the flow of the Alternative fuel injector.
Alternative Fuel Low Pressure Shutoff Valve Control	This device control is used to verify functionality of the Alternative Fuel Low Pressure Fuel Shutoff Valve system by allowing the Alternative Fuel Low Pressure Fuel Shutoff Valve output to be commanded to a specific Alternative Fuel Rail Pressure.
Alternative Fuel System Leak Test – Service Bay Test	This device control will signal the PCM to begin the Alternative Fuel System Leak Test.
Autostop/Autostart	This device control is used to override the internal combustion engine (ICE) running state.
BiFuel System – Fuel Mode Selection	When this CPID is active, the fuel mode is commanded to the selection made in “Fuel Mode Selection.”
Brake Pedal Position Learn	This device control is used to reset the brake pedal fully released learned position to its initialized value after a brake system repair.
Camshaft Profile Actuator Stuck On Reset	This device control is used to reset a latched default action when the camshaft profile actuator control is stuck on. The device control will work in conjunction with the vehicle diagnostics to ensure a proper system check before allowing normal vehicle operation.
Camshaft Profile Actuator System	This device control is used to override the state
Compression Test	This device control is used to set up the internal combustion engine for a compression test. The fuel pump, fuel injectors, and spark are all disabled. The throttle is opened to a Wide Open Throttle (WOT) position. For conventional engine vehicles, the extended crank feature is not active, and for strong hybrid vehicles, the Hybrid Powertrain Control Module is configured to crank at the speed specified in the device control command. Engine cranking is completely controlled by the technician either through the ignition key or through a remote starter switch as applicable. The device control limits and rejects will apply normally upon entry to the device control. Once the device control is active, the limits will be monitored (to prevent unwanted starter operation, for example), but in the case of a limit exceeded or a tester disconnect, device control of the fuel and spark will not be released until the Power Mode switches to Accessory or OFF. This will prevent unexpected fuel and spark operation in the case of a device control abort.

Output Control	Description
Coolant Fill	This device control is used to start an automatic coolant fill service routine that will ensure proper fill and de-aeration of the cooling system.
Cooling Fan Relay 1	This function activates the cooling fan relay 1. The normal commanded state of the fan relay is NONE. The relay command status can also be monitored on the scan tool data parameter Cooling Fan Relay 1 Command. The control module allows cooling fan relay control when the following conditions are met: • The Ignition is ON or the engine is running. • A/C compressor operation is not requested. • The engine coolant temperature is less than 106°C (224°F).
Cooling Fan Relay 1,2 and 3	This function activates the cooling fan relay 1, 2 and 3. The normal commanded state of the fan relays is NONE. The relay command status can also be monitored on the scan tool data parameters Cooling Fan Relay 1 Command and Cooling Fan Relays 2 and 3 Command. The control module allows cooling fan relay control when the following conditions are met: • The Ignition is ON or the engine is running. • A/C compressor operation is not requested. • The engine coolant temperature is less than 106°C (224°F).
Cooling Fan 2 and 3	This function activates the cooling fan relay 2 and relay 3. The normal commanded state of the fan relays is NONE. The relay command status can also be monitored on the scan tool data parameter 2 and 3 Command. The control module allows cooling fan relay control when the following conditions are met: • The Ignition is ON or the engine is running. • A/C compressor operation is not requested. • The engine coolant temperature is less than 106°C (224°F).
Crankshaft Position Variation Learn	This device control is used to activate the crankshaft position variation learn algorithm which calculates the reference pulse correction factors for the misfire diagnostic.
Cylinder Power Balance	**Note:** The Misfire Current and Misfire History parameters may not increment when using this function. This function disables the selected fuel injector. The normal commanded state is None. The scan tool initiates the test when the following conditions are met: • The engine is operating and the engine idle is stable. • The vehicle speed is 0 km/h (0 mph). • There are no DTCs set for the vehicle speed sensor. If the fuel injector was disabled for 30 seconds, fuel injector control is not allowed again on the same fuel injector for 60 seconds.
Cylinder 1–4 Exhaust Camshaft Profile Sleeve	This device control is used to override the state. In order to command Deactivate on the B camshaft, the A camshaft profile for the same cylinder must be commanded to Deactivate.
Cylinder 1–4 Intake Camshaft Profile Sleeve	This device control is used to override the state. Upon return to normal control, the system shall actuate the camshaft profile control sleeve as necessary to the system desired position.
Depressurize Fuel System	When the low pressure fuel pump is used in conjunction with a separate high pressure fuel pump for Direct Injection (DI) engines, this device control can be used to reduce the high fuel pressure to a low working level. The high fuel pressure control shall monitor the low pressure “Fuel Pump Device Control with Engine Running” such that when the low pressure pump is commanded OFF the high pressure pump will be controlled to a low pressure value. This combination shall be held until either the FPMR device control is released, or the engine stalls.
Engine Controls Ignition Relay	This device control is used to override the state of the Powertrain Relay.
Engine Coolant Thermostat Heater	This device control is used to override the state of the Engine Coolant Thermostat Heater.
Engine Oil Life Reset	This DID contains the engine oil remaining life determined from an algorithm based upon the effective engine revolutions and the distance driven since the last oil change. This DID may be used to reset the engine oil remaining life to 100 % after an oil change or to any other value when replacing a control module.
Engine Oil Pressure Control Solenoid Valve	This device control is used to override the state of the variable displacement oil pump. When the variable displacement oil pump is turned on, the oil pump will be commanded to a low pressure state.

Output Control	Description
Engine Speed	This function controls the idle speed override in 25 RPM, 100 RPM, and 500 RPM increments, from the base idle speed to 1,400 RPM. The scan tool initiates the test when the following conditions are met: • The transmission is in park or neutral. • The engine speed is less than 1,000 RPM. The engine speed will remain in the commanded state until cancelled by the scan tool.
EVAP Purge/Seal	**Note:** The EVAP Purge and Vent Solenoid Command parameters may not change states when using this output control. This function activates both the EVAP purge solenoid valve and EVAP vent solenoid to seal the EVAP system. When activated, the purge valve is commanded to 0 percent and the vent valve is commanded ON, Not-venting. The normal commanded state for both solenoids is None. Both of the solenoids remain in the commanded state until cancelled by the scan tool or the FTP sensor exceeds −24 mm Hg (−12 inch H20).
EVAP Purge Solenoid Valve	**Note:** The EVAP Purge Solenoid Command parameter may not change states when using this output control. This function controls the evaporative emission (EVAP) purge solenoid valve. The normal commanded state is NONE. The system will increase or decrease the amount of purge by changing the duty cycle of the purge valve in 10 percent increments within a range of 0–100 percent. The system remains in the commanded state until cancelled by the scan tool or the fuel tank pressure (FTP) sensor exceeds −24 mm Hg (−12 inch H20).
EVAP Test	This device control is used to activate the evaporative emissions service bay test.
EVAP Vent Solenoid Valve	**Note:** The EVAP Vent Solenoid Command parameter may not change states when using this output control. This function controls the EVAP vent solenoid. The normal commanded state is NONE. When commanded ON, the vent valve switches to Not-venting. The system remains in the commanded state unless one of the following conditions occur: • Cancelled by the scan tool • The EVAP canister purge solenoid is more than 0 percent, and the FTP sensor exceeds −24 mm Hg (−12 inch H20).
Excessive Clutch Slip Data Reset	This device control is used to reset all clutch slip detection values.
Exhaust Camshaft Position Actuator or Exhaust Camshaft Position Actuator Bank 1	This device control is used to override the state of the exhaust cam phase output. The commanded camshaft position is expressed in terms of degrees of camshaft rotation (retard for exhaust camshaft) from the park position (a camshaft position of zero represents the park position).
Exhaust Camshaft Position Actuator or Exhaust Camshaft Position Actuator Bank 2	This device control is used to override the state of the exhaust cam phase output. The commanded camshaft position is expressed in terms of degrees of camshaft rotation (retard for exhaust camshaft) from the park position (a camshaft position of zero represents the park position).
Exhaust Camshaft Position Actuator Solenoid Valve or Exhaust Camshaft Position Actuator Solenoid Valve Bank 1	This device control is used to override the state of the exhaust cam phase solenoid output.
Exhaust Camshaft Position Actuator Solenoid Valve or Exhaust Camshaft Position Actuator Solenoid Valve Bank 2	This device control is used to override the state of the exhaust cam phase solenoid output.
Exhaust Camshaft Profile Actuator	This device control is used to override the state of the B camshaft profile actuator control outputs. The device control is intended as an electrical test and is only allowed with the actuator connector disconnected. This is confirmed by having the open circuit fault active for the camshaft profile actuator position sensor and at least one of the two camshaft profile actuator control outputs on the actuator assembly the device control is being requested for.
Fuel Composition Reset	**Note:** Do not use this output control unless the actual alcohol content of the fuel in the tank is 10 percent or less. This will reset the learned alcohol composition to 0 percent in the powertrain control module (PCM).

Output Control	Description
Fuel Control Loop Status	This function controls the heated oxygen sensor (HO2S) loop status. The commanded states include NONE, OPEN, and CLOSED. The normal commanded state is NONE. The loop status changes as commanded, OPEN or CLOSED. The system remains in the commanded state until cancelled by the scan tool.
Fuel Injector Balance Test (If Available)	This function enables the fuel injector in order to verify the correct fuel injector flow. The PCM will pulse the selected fuel injector when the following conditions are met: • All instruction on the scan tool is complete. • A fuel injector is selected. • The ignition is ON with the engine OFF. The selected fuel injector can only be flowed/pulsed once per ignition cycle.
Fuel Mode Indicator Lamp System	This device control is used to verify the functionality of the Fuel Mode Indicator Lamp.
Fuel Pressure	This function allows control of the fuel rail pressure (FRP) regulator which is integral to the high pressure fuel pump. The system will Increase or Decrease the fuel rail pressure in increments, as commanded within an approximate range of 1862–17,237 kPa (270–2500 psi). The scan tool initiates the test when the following conditions are met: • The engine is operating • The ignition voltage is 10–18 V • The vehicle speed is 0 mph • DTC P0700 is not set The system remains in the commanded state for about 30 seconds or until cancelled by the scan tool or the PCM detects a vehicle speed.
Fuel Pressure Regulator	**Note:** As this is an electrical circuit test, a regulator solenoid commanded to ON does not necessarily equate to the regulator state at maximum fuel pressure. This device control is intended for use on a Direct Injection (DI) high pressure fuel supply system to activate the fuel pressure regulator at ignition ON, engine OFF. Both the low side and high side of the regulator are controlled together. Commanding the regulator to ON will modulate the high side driver to a calibratible Maximum Duty Cycle.
Fuel Pump Enable	This function controls the fuel pump. The normal commanded state is NONE. The scan tool initiates the test when the following conditions are met: • There are no vehicle speed sensor DTCs set. • The vehicle speed is 0 km/h (0 mph). When commanded ON/OFF, the powertrain control module (PCM) turns the fuel pump ON/OFF. If the engine is running and the fuel pump is commanded OFF, the engine will stall. The system remains in the commanded state for about 2 seconds or until cancelled by the scan tool or the PCM detects a vehicle speed.
Fuel Pump Speed	This device control is used to override the normal control of the fuel pump output. The device control is a service diagnostic aid that is used to determine if the fuel pump system is functioning properly. Different limit checks are used when the engine is and is not running for the operation of the fuel pump.
Fuel Rail Pressure	This device control is intended for use on a Direct Injection (DI) high pressure fuel supply system to override the commanded fuel high pressure output from the powertrain controller.
Fuel Trim Enable	This function disables the control modules ability to learn new fuel trim parameters. The commanded states are NONE, ENABLED, DISABLED. The normal commanded state is NONE. The system remains in the commanded state until cancelled by the scan tool.
Fuel Trim Reset	This function is used to reset the learned fuel trim values to their initial values.
Generator L-Terminal	Commands the generator L terminal ON and OFF.
Heater Coolant Pump	This device control is used to override the state of the heater core pump relay output.
HO2S Heater Sensor 1 or HO2S Heater Bank 1 Sensor 1	This device control is used to override the duty cycle of the oxygen sensor heaters. With the engine OFF, this device control is intended to be used as a discrete control for circuit diagnosis. With the engine OFF, none of the oxygen sensor heaters can be commanded ON for more than 3.0 seconds, after which the selected oxygen sensor heater must be disabled for a limited duration (typically 60 seconds) before it may be enabled again. With the engine running, this device control is used to operate the oxygen sensor heaters at the various duty cycles available to the engine controller.

Output Control	Description
HO2S Heater Sensor 2 or HO2S Heater Bank 1 Sensor 2	This device control is used to override the duty cycle of the oxygen sensor heaters. With the engine OFF, this device control is intended to be used as a discrete control for circuit diagnosis. With the engine OFF, none of the oxygen sensor heaters can be commanded ON for more than 3.0 seconds, after which the selected oxygen sensor heater must be disabled for a limited duration (typically 60 seconds) before it may be enabled again. With the engine running, this device control is used to operate the oxygen sensor heaters at the various duty cycles available to the engine controller.
HO2S Heater Bank 2 Sensor 1	This device control is used to override the duty cycle of the oxygen sensor heaters. With the engine OFF, this device control is intended to be used as a discrete control for circuit diagnosis. With the engine OFF, none of the oxygen sensor heaters can be commanded ON for more than 3.0 seconds, after which the selected oxygen sensor heater must be disabled for a limited duration (typically 60 seconds) before it may be enabled again. With the engine running, this device control is used to operate the oxygen sensor heaters at the various duty cycles available to the engine controller.
HO2S Heater Bank 2 Sensor 2	This device control is used to override the duty cycle of the oxygen sensor heaters. With the engine OFF, this device control is intended to be used as a discrete control for circuit diagnosis. With the engine OFF, none of the oxygen sensor heaters can be commanded ON for more than 3.0 seconds, after which the selected oxygen sensor heater must be disabled for a limited duration (typically 60 seconds) before it may be enabled again. With the engine running, this device control is used to operate the oxygen sensor heaters at the various duty cycles available to the engine controller.
HO2S Heater Learn	This device control is used to trigger the reset of the learned resistances for the oxygen sensor heaters following a replacement in service. The learned resistances are reset to a calibration used to prevent overheating of the sensors until more accurate resistances may be learned following an extended engine OFF time (typically 12 or more hours).
Idle Ignition Timing	Disables and enables idle spark advance with the engine running.
Idle Learn	This function allows the throttle position and the idle speed to be relearned by the PCM, once the following conditions have been met. • The ignition is ON with the engine OFF. • The ECT is between 5–85°C (41–185°F). • No throttle actuator control (TAC) system DTCs are set.
Ignition Timing Retard	This device control is used to retard the spark angle from the software calculated spark angle. For example, if the software calculated spark angle was 15 degrees advanced and this device control requested a 3 degree retard, the commanded spark angle that would be delivered would be 12 degrees advanced.
Intake Air Heater	This device control is used to override the state of the intake air heater.
Intake Camshaft Position Actuator or Intake Camshaft Position Actuator Bank 1	This device control is used to override the state of the intake cam phase output. The commanded camshaft position is expressed in terms of degrees of camshaft rotation (advance for intake camshafts) from the park position (a camshaft position of zero represents the park position).
Intake Camshaft Position Actuator or Intake Camshaft Position Actuator Bank 2	This device control is used to override the state of the intake cam phase output. The commanded camshaft position is expressed in terms of degrees of camshaft rotation (advance for intake camshafts) from the park position (a camshaft position of zero represents the park position).
Intake Camshaft Position Actuator Solenoid Valve or Intake Camshaft Position Actuator Solenoid Valve Bank 1	This device control is used to override the state of the intake cam phase solenoid output.
Intake Camshaft Position Actuator Solenoid Valve or Intake Camshaft Position Actuator Solenoid Valve Bank 2	This device control is used to override the state of the intake cam phase solenoid output.
Intake Camshaft Profile Actuator	This device control is used to override the state of the A camshaft profile actuator control outputs. The device control is intended as an electrical test and is only allowed with the actuator connector disconnected. This is confirmed by having the open circuit fault active for the camshaft profile actuator position sensor and at least one of the two camshaft profile actuator control outputs on the actuator assembly the device control is being requested for.

Output Control	Description
Intake Rocker Arm Solenoid Valve 1–2 or 1 and 2	When the engine is running, this device control may be used to command intake valve opening to low or high (high being default when the solenoid is not energized) valve lift mode either in cylinder pairs or as a system.
Malfunction Indicator Lamp (MIL)	This function controls the malfunction indicator lamp (MIL). The normal commanded state is NONE. When commanded ON/OFF, the PCM turns the MIL ON/OFF. The system remains in the commanded state until cancelled by the scan tool.
Mass Air Flow Sensor Supply Voltage	This device control is used to override the state of the mass air flow sensor supply voltage output.
Misfire Graphic	This function clears the misfire graphics from the scan tool.
Oil Life Reset	This output control is used to reset the engine oil life monitor from 0 to 100 %.
Remote Vehicle Start Disable History Reset	This function clears the remote vehicle start (RVS) disable history. When RESET is selected the reason the control module did not allow RVS in the last 8 attempts is cleared.
Secondary Air Injection Pump Relay	This device control is used to turn the AIR Pump ON or OFF.
Secondary Air Injection Solenoid Valve	This device control is used to turn the AIR Valve ON or OFF.
Secondary Air Injection Test	This device control is used to trigger the secondary air injection (SAI) diagnostic service bay test, which causes the on board SAI diagnostic to execute until it is completed or aborted.
Starter Relay (If Available)	Commands the starter relay ON and OFF.
Throttle Position	This device control is used to override the commanded throttle position.
Throttle Sweep	This function moves the Throttle plate slowly from a closed position to wide open position, aiding diagnosis of TAC motor.
Transmission Fluid Pressure Accumulator Solenoid Valve	This device control is used to override the state of the Transmission Fluid Pressure Accumulator Solenoid Valve.
Turbocharger Bypass Solenoid Valve	This device control is used to control the duty cycle for the turbocharger A compressor bypass.
Turbocharger Wastegate Solenoid Valve	This device control is used to control the duty cycle for the turbocharger A wastegate.

K60 Column Lock Module: Scan Tool Information

Scan Tool Data Parameters

Parameter	Expected Value	Description
Operating Conditions: Ignition ON		
Column Lock Status	Locked Invalid Unlocked Unknown	The scan tool displays Failed, Unknown, Locked and Unlocked. The scan tool displays the current state of the column lock.
Turn Steering Wheel, Start Vehicle Again Display Message	Inactive Active	The scan tool displays Active/Inactive. If the wheels are against a curb, the lock pin may not be able to pull out. A message for the driver that is displayed on the Driver Information Center. The scan tool displays the need to turn the steering wheel, turn off the vehicle and then restart the vehicle.
Steering Column Lock Indicator	Inactive Active	The scan tool displays Active/Inactive. The scan tool displays the current state of the column lock.

K68 Trailer Lighting Control Module: Scan Tool Information

Body Control Module Scan Tool Data Parameters

Parameter	System State	Expected Value	Definition
Operating Conditions: Ignition ON, Vehicle in Park.			
Battery Voltage	—	Varies	The scan tool displays the current battery voltage.
Brake Pedal Switch Status	—	Active/Inactive	The scan tool displays the status of the brake pedal
State of Charge	—	Varies	The scan tool displays percentage. This parameter displays state of charge status.
System Voltage	—	Varies	The scan tool displays the current system voltage.
Trailer Connection Status	—	Connected/Not Connected	The scan tool displays the trailer connected status.

Body Control Module Scan Tool Output Controls

Scan Tool Output Control	Description
Left Trailer Turn Signal/ Stop Lamp Command	The Trailer Lighting Control Module activates the left trailer turn signal/stop lamp control circuit when you select Active. B+ should be applied to terminal G at the X88 Trailer Connector.
Right Trailer Turn Signal/ Stop Lamp Command	The Trailer Lighting Control Module activates the right trailer turn signal/stop lamp control circuit when you select Active. B+ should be applied to terminal D at the X88 Trailer Connector.
Left Trailer Tail Lamp	The Trailer Lighting Control Module activates the trailer park lamp control circuit when you select Active. B+ should be applied to terminal F at the X88 Trailer Connector.
Right Trailer Tail Lamp	The Trailer Lighting Control Module activates the trailer park lamp control circuit when you select Active. B+ should be applied to terminal F at the X88 Trailer Connector.
Trailer Backup Lamps	The Trailer Lighting Control Module activates the trailer backup lamp control circuit when you select Active. B+ should be applied to terminal A at the X88 Trailer Connector.

K71 Transmission Control Module: Scan Tool Information (10L80 (MHS, MQC))

K71 Transmission Control Module — Scan Tool Parameter

Parameter	Expected Value	Units
Note: The following scan tool parameter values were taken from a normally operating vehicle. The parameter values on a different vehicle will vary slightly which depends on the following operating conditions: • Altitude • Ambient Air Temperature • Ambient Humidity • Engine Coolant Temperature **Operating Conditions:** Ignition= On— Accessories= Off		
Accelerator Pedal Position	Varies	%
Automatic Transmission Auxiliary Fluid Pump Command	On Off	—
Automatic Transmission Auxiliary Fluid Pump Control Circuit Low Test Status	Not RunorOkay	—
Automatic Transmission Auxiliary Fluid Pump Control Circuit Open Test Status	Not RunorOkay	—
Automatic Transmission Auxiliary Fluid Pump Control Circuit High Test Status	Not RunorOkay	—
Brake Pedal Position Switch	Brake Pedal Released= Released Brake Pedal Applied= Applied	—

Parameter	Expected Value	Units
Calculated Line Pressure	Ignition On - Engine Off= 550 /80 Ignition On - Engine Running= 550 /80 48 km/h (30 MPH) = 500 /73 80 km/h (50 MPH) = 524 /76	kPa / PSI
Calculated Throttle Position	0 km/h (0 MPH) = 0 48 km/h (30 MPH) = 10 80 km/h (50 MPH) = 13	%
Control Module Voltage Signal	Ignition On - Engine Off= 12.60 Ignition On - Engine Running= 14.40	V
Current Gear	P = Park R = Reverse N = Neutral D = 1–10 L = 1–10	—
Distance Since Diagnostic Trouble Code Cleared	Varies	km / mi
Driver Requested Axle Torque	Varies	N·m
Driver Shift Control Mode	S3 Transmission Shift Lever — P, R, N, D = Inactive S3 Transmission Shift Lever — L, M, S = Active	—
Electronic Transmission Range Select Actual Range	Park Neutral Low Neutral High Drive Reverse Neutral Shift	—
Engine Coolant Temperature	Ignition On - Engine Off= 41 /105 Ignition On - Engine Running= 52 /126 48 km/h (30 MPH) = 87 /189 80 km/h (50 MPH) = 94 /201	°C/°F
Engine Speed	Ignition On - Engine Off= 0 Ignition On - Engine Running= 582 48 km/h (30 MPH) = 1173 80 km/h (50 MPH) = 1277	RPM
Engine Torque	Ignition On - Engine Off= −41 /−30 Ignition On - Engine Running= 15 /11 48 km/h (30 MPH) = 58 /43 80 km/h (50 MPH) = 136 /100	N·m/lb ft
Gear Command	P = Park R = Reverse N = Neutral D = 1–10 L = 1–10	—
Gear Ratio	1 = 4.70:1 2 = 2.99:1 3 = 2.15:1 4 = 1.77:1 5 = 1.52:1 6 = 1.28:1 7 = 1.00:1 8 = 0.85:1	—

Parameter	Expected Value	Units
	9 = 0.69:1 10 = 0.64:1 R = 4.87:1	
High Side Driver Circuit High Test Status	Okay	—
High Side Driver Circuit Low Test Status	Okay	—
High Side Driver Circuit Open Test Status	Not Run	—
High Side Driver Command	Engine ≠Running= Disabled Engine — Running= Enabled	—
High Side Driver 2 Circuit High Test Status	Okay	—
High Side Driver 2 Circuit Low Test Status	Okay	—
High Side Driver 2 Circuit Open Test Status	Not Run	—
High Side Driver 2 Command	Engine ≠Running= Off Engine — Running= On	—
Ignition and Start Switch Accessory Signal	On	—
Ignition and Start Switch Signal	On	—
Ignition and Start Signal	Ignition On - Engine Off= 12.6 Ignition On - Engine Running= 14.4	V
Input Shaft Speed Sensor	Ignition On - Engine Off= 0 Ignition On - Engine Running= 551 48 km/h (30 MPH) = 1166 80 km/h (50 MPH) = 1184	RPM
Input Speed Sensor Direction	Forward Reverse	—
Input Speed Sensor Direction Signal	Forward= 0.05 Reverse= 0.18	ms
Intermediate Speed Sensor	0 km/h (0 MPH) = 0 48 km/h (30 MPH) = 1170 80 km/h (50 MPH) = 2754	RPM
Intermediate Speed Sensor Direction	Forward Reverse	—
Intermediate Speed Sensor Direction Signal	Forward= 0.05 Reverse= 0.18	ms
Intermediate Speed Sensor 2	0 km/h (0 MPH) = 0 48 km/h (30 MPH) = 1166 80 km/h (50 MPH) = 2754	RPM
Intermediate Speed Sensor 2 Direction	Forward Reverse	—
Intermediate Speed Sensor 2 Direction Signal	Forward= 0.05 Reverse= 0.18	ms
Last Shift Time	0.12	[s]
Output Shaft Speed Sensor	0 km/h (0 MPH) = 0 48 km/h (30 MPH) = 1159 80 km/h (50 MPH) = 1720	RPM
Output Speed Sensor Direction	Forward Reverse	—
Output Speed Sensor Direction Signal	Forward= 0.05 Reverse= 0.18	ms

Parameter	Expected Value	Units
Park System Status	P = Park R, N, D, L, S = Out of Park	—
Power Mode	Off Accessory Run Crank Request	—
Propulsion System Status	Engine Running= Active Engine Off= Inactive	Active
Shift Limiting Active Reason	None	—
Sensor Supply Circuit Status	Okay	—
Sensor Supply 2 Circuit Status	Okay	—
Torque Converter Clutch Pressure Command	0.00	kPa / PSI
Torque Converter Clutch Desired Slip Speed	0.0	RPM
Torque Converter Clutch Slip Speed	Ignition On - Engine Off= 0 Ignition On - Engine Running= 30 48 km/h (30 MPH) = 1 80 km/h (50 MPH) = 47	RPM
Tow/Haul Mode	Inactive Active	—
Transmission Clutch 1-6 Return Spring Learn Status	Inactive Learn Inhibited - Transmission Fluid Temperature Too Low Learn Inhibited - Transmission Fluid Temperature Too High Learn inhibited — malfunction present Learn Inhibited - Throttle Position/Engine Torque Unstable Learn Inhibited - Accelerator Pedal Angle Too Small Learn Inhibited - Accelerator Pedal Angle Too Large Learn Inhibited - Engine Speed Too Low Learn Inhibited - Engine Speed Too High Learn Inhibited - Rough Road Learn in Progress	—
Transmission Clutch 1-6 Return Spring Learn Required	Yes No	—
Transmission Clutch 1-6 Return Spring Learn Driving Maneuver Required	None 1-2 Upshift 2-3 Upshift 2-4 Upshift 3-4 Upshift 4-5 Upshift 5-6 Upshift 6-7 Upshift 7-8 Upshift 8-9 Upshift 9-10 Upshift 10-9 Downshift 9-8 Downshift 8-7 Downshift	

Parameter	Expected Value	Units
	7-6 Downshift 6-5 Downshift 5-4 Downshift 4-3 Downshift 3-2 Downshift 3-1 Downshift 2-1 Downshift 1st Gear 2nd Gear 3rd Gear 4th Gear 5th Gear 6th Gear 7th Gear 8th Gear 9th Gear 10th Gear	
Transmission Clutch 1-6 Return Spring Learn Progress Counter	Varies	Counts
Transmission Clutch 1-6 Volume Learn Status	Inactive Learn Inhibited - Transmission Fluid Temperature Too Low Learn Inhibited - Transmission Fluid Temperature Too High Learn inhibited — malfunction present Learn Inhibited - Throttle Position/Engine Torque Unstable Learn Inhibited - Accelerator Pedal Angle Too Small Learn Inhibited - Accelerator Pedal Angle Too Large Learn Inhibited - Engine Speed Too Low Learn Inhibited - Engine Speed Too High Learn Inhibited - Rough Road Learn in Progress	—
Transmission Clutch 1-6 Volume Learn Required	Yes No	—
Transmission Clutch 1-6 Volume Learn Progress Counter	Varies	Counts
Transmission Clutch 1-6 Volume Learn Driving Maneuver Required	None 1-2 Upshift 2-3 Upshift 2-4 Upshift 3-4 Upshift 4-5 Upshift 5-6 Upshift 6-7 Upshift 7-8 Upshift 8-9 Upshift 9-10 Upshift 10-9 Downshift 9-8 Downshift 8-7 Downshift 7-6 Downshift	—

Parameter	Expected Value	Units
	6-5 Downshift 5-4 Downshift 4-3 Downshift 3-2 Downshift 3-1 Downshift 2-1 Downshift 1st Gear 2nd Gear 3rd Gear 4th Gear 5th Gear 6th Gear 7th Gear 8th Gear 9th Gear 10th Gear	
Transmission Control Solenoid Valve 1–9 Calibration Data	Valid	—
Transmission Control Solenoid Valve 1-9 Control Circuit High Test Status	Not RunorOkay	—
Transmission Control Solenoid Valve 1-9 Control Circuit Low Test Status	Not RunorOK	—
Transmission Control Solenoid Valve 1–9 Control Circuit Open Test Status	Not RunorOkay	—
Transmission Control Solenoid Valve 1 Current	Ignition On - Engine Off= 0.75 Ignition On - Engine Running= 0.98 48 km/h (30 MPH) = 0.99 80 km/h (50 MPH) = 0.98	A
Transmission Control Solenoid Valve 1 Current Command	Ignition On - Engine Off= 0.76 Ignition On - Engine Running= 0.98 48 km/h (30 MPH) = 1.02 80 km/h (50 MPH) = 0.97	A
Transmission Control Solenoid Valve 1 Pressure Command	Ignition On - Engine Off= 0.00 /0.00 Ignition On - Engine Running= 136 /20 48 km/h (30 MPH) = 0.00 /0.00 80 km/h (50 MPH) = 0.00 /0.00	kPa / PSI
Transmission Control Solenoid Valve 2 Current	Ignition On - Engine Off= 0.82 Ignition On - Engine Running= 0.98 48 km/h (30 MPH) = 0.99 80 km/h (50 MPH) = 0.92	A
Transmission Control Solenoid Valve 2 Current Command	Ignition On - Engine Off= 0.83 Ignition On - Engine Running= 0.98 48 km/h (30 MPH) = 1.02 80 km/h (50 MPH) = 0.92	A
Transmission Control Solenoid Valve 2 Pressure Command	Ignition On - Engine Off= 0.00 /0.00 Ignition On - Engine Running= 2,206 /320 48 km/h (30 MPH) = 0.00 /0.00 80 km/h (50 MPH) = 2,206 /320	kPa / PSI

Parameter	Expected Value	Units
Transmission Control Solenoid Valve 3 Current	Ignition On - Engine Off= 0.75 Ignition On - Engine Running= 1.01 48 km/h (30 MPH) = 1.05 80 km/h (50 MPH) = 0.88	A
Transmission Control Solenoid Valve 3 Current Command	Ignition On - Engine Off= 0.76 Ignition On - Engine Running= 1.02 48 km/h (30 MPH) = 1.06 80 km/h (50 MPH) = 0.89	A
Transmission Control Solenoid Valve 3 Pressure Command	Ignition On - Engine Off= 0.00 /0.00 Ignition On - Engine Running= 0.00 /0.00 48 km/h (30 MPH) = 2,206 /320 80 km/h (50 MPH) = 2,206 /320	kPa / PSI
Transmission Control Solenoid Valve 4 Current	Ignition On - Engine Off= 1.20 Ignition On - Engine Running= 0.89 48 km/h (30 MPH) = 0.69 80 km/h (50 MPH) = 0.88	A
Transmission Control Solenoid Valve 4 Current Command	Ignition On - Engine Off= 1.20 Ignition On - Engine Running= 0.89 48 km/h (30 MPH) = 0.70 80 km/h (50 MPH) = 0.89	A
Transmission Control Solenoid Valve 4 Pressure Command	Ignition On - Engine Off= 0.00 /0.00 Ignition On - Engine Running= 0.00 /0.00 48 km/h (30 MPH) = 2,206 /320 80 km/h (50 MPH) = 173 /25	kPa / PSI
Transmission Control Solenoid Valve 5 Current	Ignition On - Engine Off= 0.04 Ignition On - Engine Running= 0.04 48 km/h (30 MPH) = 0.46 80 km/h (50 MPH) = 0.58	A
Transmission Control Solenoid Valve 5 Current Command	Ignition On - Engine Off= 0.04 Ignition On - Engine Running= 0.04 48 km/h (30 MPH) = 0.47 80 km/h (50 MPH) = 0.59	A
Transmission Control Solenoid Valve 5 Pressure Command	Ignition On - Engine Off= 0.00 /0.00 Ignition On - Engine Running= 0.00 /0.00 48 km/h (30 MPH) = 2,206 /320 80 km/h (50 MPH) = 173 /25	kPa / PSI
Transmission Control Solenoid Valve 6 Current	Ignition On - Engine Off= 0.57 Ignition On - Engine Running= 0.54 48 km/h (30 MPH) = 0.53 80 km/h (50 MPH) = 1.20	A
Transmission Control Solenoid Valve 6 Current Command	Ignition On - Engine Off= 0.57 Ignition On - Engine Running= 0.54 48 km/h (30 MPH) = 0.54 80 km/h (50 MPH) = 1.20	A
Transmission Control Solenoid Valve 6 Pressure Command	Ignition On - Engine Off= 0.00 /0.00 Ignition On - Engine Running= 2,206 /320 48 km/h (30 MPH) = 2,206 /320 80 km/h (50 MPH) = 2,206 /320	kPa / PSI

Parameter	Expected Value	Units
Transmission Control Solenoid Valve 7 Current	Ignition On - Engine Off= 0.01 Ignition On - Engine Running= 0.78 48 km/h (30 MPH) = 0.54 80 km/h (50 MPH) = 1.20	A
Transmission Control Solenoid Valve 7 Current Command	Ignition On - Engine Off= 0.01 Ignition On - Engine Running= 0.78 48 km/h (30 MPH) = 0.54 80 km/h (50 MPH) = 0.51	A
Transmission Control Solenoid Valve 8 Current	Ignition On - Engine Off= 0.00 Ignition On - Engine Running= 0.00 48 km/h (30 MPH) = 0.52 80 km/h (50 MPH) = 0.50	A
Transmission Control Solenoid Valve 8 Current Command	Ignition On - Engine Off= 0.00 Ignition On - Engine Running= 0.78 48 km/h (30 MPH) = 0.54 80 km/h (50 MPH) = 1.20	A
Transmission Control Solenoid Valve 9	OfforOn	—
Transmission Fluid Temperature Sensor	Ignition On - Engine Off= 33 /91 Ignition On - Engine Running= 42 /108 48 km/h (30 MPH) = 49 /120 80 km/h (50 MPH) = 63 /145	°C/°F
Transmission Hot Mode	No	—
Transmission Park Valve Lock Solenoid Actuator	Park= Off Out of Park= On	—
Transmission Park Valve Position Sensor	Park= 2.00 Out of Park= 0.80	V
Transmission Park Valve Position Sensor Status	Park Out of Park	—
Transmission Park Valve Position Sensor 2	Park= 0.80 Out of Park= 1.98	V
Transmission Park Valve Position Sensor 2 Status	Park Out of Park	—
Transmission Range Control Valve Position Sensor	Park= 0.80 Out of Park= 1.98	V
Transmission Range Control Valve Position Sensor Status	Park= Complete Out of Park= Failed	—
Transmission Range Sensor	P = 13 R = 47 N = 61 D = 75 L = 86	%
Transmission Range Sensor 2	P = 87 R = 53 N = 39 D = 25 L = 14	%

Parameter	Expected Value	Units
Up and Down Shift Switch	No Button Pressed= None Upshift» Pressed= Upshift Downshift» Pressed= Downshift	—
Vehicle Speed	Varies	km/h/MPH

Scan Tool Control Function

Control Function	Description
Automatic Transmission Auxiliary Fluid Pump	Overrides the state of the auxiliary transmission pump relay output
High Side Driver& High Side Driver 2	Overrides the state of the High Side Driver Output
Shift Transmission Gear	Overrides the commanded gear output
Torque Converter Clutch	Overrides the state of the Torque Converter Clutch Enable and/or Torque Converter Clutch Control Solenoid
Transmission Control Solenoid Valve 1–9	Overrides the state of the Transmission Control Solenoid Valve — On or Off
Transmission Control Solenoid Valve 1–8 Current	Overrides the current of the Transmission Control Solenoid Valve — 0–1.2 A

Configuration/Reset Functions

Control Function	Description
Transmission Adaptive Pressure Reset	Triggers the reset of the transmission adaptive parameters
Transmission Service Fast Learn	This test executes a procedure in the TCM software to re-learn a variety of inputs.
Vehicle Speed Detected When Park Range Selected Reset	Triggers the reset of the park at speed detection values

K73 Telematic Control Module: Scan Tool Information

Telematic Control Module Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON			
GPS Data			
• Dead Reckoning Calibration Status	—	Calibrated or Not Calibrated	Indicates the dead reckoning calibration status.
• Position Calibration Method	—	Varies	Indicates the method used to determine current location. (0) GPS, (1) Wheel Speed Dead Reckoning only, (2) Combined Wheel Speed and GPS, (3) Gyro only, (4) Combined Gyro and GPS, (5) No Fix
• Month	—	MM	This displays the current month.
• Day	—	DD	This displays the current day of the month.
• Year	—	YY	This displays the current year.
• Hour	—	HH	This displays the GPS current hour (24 hour format – GMT).
• Minute	—	MM	This displays the GPS current minute.
• Second	—	SS	This displays the GPS current second.

Parameter	System State	Expected Value	Description
• Number of Satellites Tracked	—	Varies	The scan tool displays the number of satellites being tracked by the Telematic Control Module.
Signal Strength Data			
• GSM Signal Strength	—	Varies	The scan tool displays 0–127. This is the Telematic Control Module signal strength.
• Current Public Land Mobile Network	—	Varies	Identifies the cellular communications network currently in use by the Telematic Control Module. Each network has a unique decimal number assigned to it for identification.
Bluetooth Data			
• Bluetooth	—	Enabled	Indicates if the Bluetooth system is enabled or disabled.
• Bluetooth Link Status	—	Varies	Indicates the current link status. (0) Unconnected, (1) Connected / Idle, (2) Call active, (3) 3-way calling active
• Bluetooth Link Quality	—	Varies	The scan tool displays a decimal value between 0 and 255.
• Bluetooth Phone to Telematic Control Module Authentication Status	—	Active or Inactive	Displays the bluetooth phone to Telematic Control Module authentication status.
• Bluetooth Phone to Telematic Control Module Communication Status	—	Active or Inactive	Displays the bluetooth phone to Telematic Control Module status.
• Bluetooth Phone Voice Recognition Status	—	Active or Inactive	Displays the bluetooth phone to voice recognition status.
WLAN Device Data			
Off-Board Navigation	—	Enabled or Disabled	Indicates if Off-Board Navigation is enabled or disabled
Wireless LAN	—	Enabled or Disabled	Indicates the capability of the wireless communication of the Telematic Control Module
Number of WLAN Devices	—	Varies	Indicates the number of Wireless devices present
Active WLAN 2.4GHz Chennel	—	Varies	Indicates the active Wireless channel being used on the 2.4 GHz frequency
WLAN Link Status	—	Radio System – Never, Remembered but Not Associated or Associated	Indicates the link status of the Telematic Control Module and Infotainment system
GSM Signal Strength	—	Varies	State for Received Signal Strength Indicator
Mobile Communication Standard	—	2G, 3G, 4G or 4G LTE	State for Cellular Data Connection. Indicates the currently used data rate speed
WLAN Password	—	Varies	Indicates the Telematic Control Module Wireless Password
WLAN SSID (Service Set Identifier)	—	Varies	Indicates the Telematic Control Module Wireless Service Name
WLAN Encryption – WPA (Wi–Fi Protected Access)	—	Active or Inactive	Indicates if the WLAN Encryption – WPA (Wi–Fi Protected Access) is Active or Inactive
WLAN Encryption – WPA2 (Wi–Fi Protected Access II)	—	Active or Inactive	Indicates if the WLAN Encryption – WPA2 (Wi–Fi Protected Access II) is Active or Inactive
WLAN Encryption – AES (Advanced Encryption Standard)	—	Active or Inactive	Indicates if the WLAN Encryption – AES (Advanced Encryption Standard) is Active or Inactive
WLAN Encryption – TKIP (Temporal Key Intergrity Protocol)	—	Active or Inactive	Indicates if the WLAN Encryption – TKIP (Temporal Key Integrity Protocol) is Active or Inactive

Telematic Control Module Scan Tool Output Controls

Output Control	Description
B1000 Information	This shows the data recorded when DTC B1000 was set in the Telematic Control Module.
Green Indicator	The Telematic Control Module illuminates the green LED when ON is selected.
Phone Call Test	When ON is selected, Telematic Control Module commands OnStar to connect to the OnStar Center.
Red Indicator	The Telematic Control Module illuminates the red LED when ON is selected.
Preferred Roaming List Update	The Telematic Control Module performs a preferred roaming list (PRL) update when this is selected.
Remote Vehicle Speed Limiting Reset	This function resets the speed limiting feature.

K85P Restraints Occupant Classification System Module - Passenger: Scan Tool Information

Restraint Occupant Classification System Module Scan Tool Data Parameters

Parameter	Expected Value	Definition
Operating Conditions: Ignition ON		
Base Model Part Number	Varies, 8 Digit Number	The scan tool displays the part number of the ROCSM which is stored in non volatile memory.
Battery Voltage	Volts	The scan tool will display battery voltage.
Calibration Part Number	Varies, 8 Digit Number	The scan tool displays the part number of the calibration file in the ROCSM.
End Model Part Number	Varies, 8 Digit Number	The scan tool displays the part number of the ROCSM in production.
Manufacturer's Traceability Number	Varies, 16 Digit Number	The scan tool displays the 16 digit traceability number in the ROCSM.
Passenger Air Bag Enable/Disable Request by Restraint Occupant Classification System Module	Disable	The scan tool displays the Passenger Air Bag Enable/ Disable Request by Restraint Occupant Classification System Module.
Restraint Occupant Classification Module Primary Key	Hex Value	The scan tool indicates the primary key Hex value.
Restraint Occupant Classification System Reporting DTC(s)	Yes/No	The ROCSM will report if there are DTCs set in the Restraint Occupant Classification module.
Passenger Seat Occupancy Status	Empty Seat	The scan tool displays Undefined, Empty Seat, Occupied, or Invalid. This is the state of the passenger seat if it is occupied or empty and monitored by the Restraint Occupant Classification System.
Power Mode	Off / Accessory / Run / Crank Request	The scan tool will display the power mode of the vehicle.
Primary Key Status	Valid/Invalid	The scan tool displays Valid if the primary key matches what is stored to memory in the ROCSM.
Received Primary Key	Hex Value	The scan tool displays a Hex value indicating the ROCSM received primary key data.
Software Part Number	Varies, 8 Digit Number	The scan tool displays the software part number in the ROCSM.

K124 Image Processing Module: Scan Tool Information (UGN)

Image Processing Module Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
Operating Conditions: Vehicle in Run power mode, engine off.			
Steering Wheel Angle Sensor Learn Status	—	Learned	This displays the current learn status of the steering wheel angle sensor
Lane Keep Assist Malfunction Detection Status	—	OK	This displays whether or not there is a current malfunction detected in the Lane Keep Assist system.
Frontview Camera - Windshield Lane Detection Status	—	OK	This displays the current lane detection status of the Frontview Camera.
Power Steering System Assist Status	—	OK	This displays the current readiness status of the power steering assist system.
Power Steering System Status	—	OK	This displays the current status of the power steering system.
Active Rear Steering System Status	—	OK	This displays the current status of the active rear steering system
Lane Keep Assist Disabled By External Input	—	No	This displays whether or not there is an external input disabling the Lane Keep Assist system.
Lane Keep Assist Disabled By Switch Input	—	No	This displays whether or not there is a switch input disabling the Lane Keep Assist system.
Trailer Detected	—	No	This displays whether or not there is a trailer detected by the system.
Emergency Braking Active	—	No	This displays whether or not emergency braking is active.
Traction Control Active	—	No	This displays whether or not traction control is active.
Vehicle Stability Control Active	—	No	This displays whether or not the vehicle stability control is active.
ABS Active	—	No	This displays whether or not the ABS system is active.
Vehicle Speed Too High or Low	—	No	This displays whether or not the vehicle speed is too high or too low.
Power Mode Set to Run	—	Yes	This displays whether or not the vehicle power mode is set to RUN.
Vehicle Stability Control System Status	—	Ready to Assist	This displays the readiness status of the vehicle stability control system.
Unreliable Lane Markings - Right Side	—	No	This displays if the driver assist system is detecting unreliable lane markings to the right side of the vehicle.
Unreliable Lane Markings - Left Side	—	No	This displays if the driver assist system is detecting unreliable lane markings to the left side of the vehicle.
Lane Curvature Right too High	—	No	This displays if the driver assist system is detecting a curve that is too tight on the right side of the vehicle.
Lane Curvature Left too High	—	No	This displays if the driver assist system is detecting a curve that is too tight on the left side of the vehicle.
Rural Road	—	Not Detected	This displays whether or not a rural road is detected.
Construction Area	—	Not Detected	This displays whether or not a construction zone is detected.
Hands-Free Steering Wheel Driving Detected	—	No	This displays whether or not the drivers hand is detected on the steering wheel.
Excessive Lateral Acceleration Detected	—	No	This displays whether or not the vehicle detects an excessive lateral movement.
Lane Curvature Error - Right Side	—	No	This displays whether or not the driver assist system detects an error while following a right curving road.

Parameter	System State	Expected Value	Description
Lane Curvature Error - Left Side	—	No	This displays whether or not the driver assist system detects an error while following a left curving road.
Lane Marking Width Error - Right Side	—	No	This displays whether or not the driver assist system detects an error with the size of lane markings on the right side of the vehicle.
Lane Marking Width Error - Left Side	—	No	This displays whether or not the driver assist system detects an error with the size of lane markings on the left side of the vehicle.
Lane Marking Position Error - Right Side	—	No	This displays whether or not the driver assist system detects an error with the positioning of lane markings on the right side of the vehicle.
Lane Marking Position Error - Left Side	—	No	This displays whether or not the driver assist system detects an error with the positioning of lane markings on the left side of the vehicle.
Lane Marking Quality - Right Side	—	OK	This displays whether the quality of lane markings on the right side of the vehicle are adequate.
Lane Marking Quality - Left Side	—	OK	This displays whether the quality of lane markings on the left side of the vehicle are adequate.
Lane Width	—	OK	This displays whether the width of the current road lane is adequate.
Lane Keep Assist Switch Status	—	OK	This displays the current status of the lane keep assist switch.
Left and Right Lane Markings	—	Detected	This displays the detection status of lane markings on the left and right side of the vehicle.
Lane Curvature Not Plausible	—	No	This displays the plausibility of expected road curvature vs observed by the system.
Lane Curvature Rate - Right	—	OK	This displays the curvature to the right as either OK or Excessive
Lane Curvature Rate - Left	—	OK	This displays the curvature to the left as either OK or Excessive
Look Ahead Distance Further Than View Range - Right	—	No	This displays whether or not the vehicle distance to an object on the right side of the vehicle is greater than the frontview camera’s field of view.
Look Ahead Distance Further Than View Range - Left	—	No	This displays whether or not the vehicle distance to an object on the left side of the vehicle is greater than the frontview camera’s field of view.
Brake Pedal Position Signal Invalid	—	No	This displays the validity of the brake pedal position sensor signal.
Accelerator Pedal Position Signal Invalid	—	No	This displays the validity of the accelerator pedal position sensor signal.
Transmission Gear Status Invalid	—	No	This displays the validity of the transmission gear status.
Yaw Rate Signal Invalid	—	No	This displays the validity of the yaw rate signal.
Lateral Acceleration Rate Signal Invalid	—	No	This displays the validity of the lateral acceleration rate signal.
Driver Applied Steering Torque Signal Invalid	—	No	This displays the validity of the driver applied steering torque signal.
Hands-Free Steering Wheel Detection Signal Invalid	—	No	This displays the validity of the hands-free steering wheel detection signal.
Steering Torque Overlay Signal Invalid	—	No	This displays the validity of the steering torque overlay signal.
ABS Status	—	Ready to Assist	This displays the readiness status of the ABS system.
Teen Driver Signal Invalid	—	No	This displays the validity of the teen driver signal.

Parameter	System State	Expected Value	Description
Traction Control System Status Signal Invalid	—	No	This displays the validity of the traction control system status signal.
Traction Control Status	—	Ready to Assist	This displays the readiness status of the traction control system.
Vehicle Stability Control System Status Signal Invalid	—	No	This displays the validity of the vehicle stability control system status signal.
Steering Wheel Angle Sensor Signal Invalid	—	No	This displays the validity of the steering wheel angle sensor signal.
Vehicle Speed Signal Invalid	—	No	This displays the validity of the vehicle speed signal.
Vehicle Stability Control System Disabled by Driver	—	No	This displays whether or not the vehicle stability control system has been disabled by the driver.
Super Cruise Engaged	—	No	This displays whether or not the Super Cruise system is engaged.
Side Object Detection Status	—	OK	This displays the current status of the Side Object Detection system.
Construction Zone Detection Signal Invalid	—	No	This displays the validity of the construction zone detection signal.
Power Mode Signal Status Invalid	—	No	This displays the validity of the vehicle power mode signal.
Turn Signal Switch Signal Invalid	—	No	This displays the validity of the turn signal switch signal.
Trailer Connected Signal Invalid	—	No	This displays the validity of the trailer connection signal.
Time to Collision Signal Invalid	—	No	This displays the validity of the time to collision signal.
ABS Status Signal Invalid	—	No	This displays the validity of the ABS status signal.
Power Mode	—	Run	This displays the current power mode of the vehicle. This can read OFF, Accessory, RUN, Start, or Propulsion Active.

Drivers Assist System Disable History Conditions

Refer to [Link target (target-id 331106-) not found] for a list of all available conditions that can cause the driver assist systems functions to be inhibited or disabled.

Lane Keep Assist Event History

Control Module	Parameter Name	Normal Value	Unit	Description
Image Processing Module	Lane Keep Assist Event History 1-8 - Status	Blank	Blank	The status of the diagnostic
Image Processing Module	Lane Keep Assist Event History 1-8	Blank	Blank	
Image Processing Module	Lane Keep Assist Event History 1-8 - Ignition Cycles Since Last Diagnostic Event	Blank	Counts	Ignition Cycles Since Last Diagnostic Event
Image Processing Module	Lane Keep Assist Event History 1-8 - Malfunction Counter	Blank	Counts	Number of malfunctions

Control Module	Parameter Name	Normal Value	Unit	Description
Image Processing Module	Lane Keep Assist Event History 1-8 Odometer at First Malfunction	Blank	km	Odometer at First Malfunction/failure
Image Processing Module	Lane Keep Assist Event History 1-8 Odometer at Last Malfunction	Blank	km	Odometer at Last Malfunction/failure

Front Impact Mitigation Event History

Control Module	Parameter Name	Normal Value	Unit	Description
Image Processing Module	Front Impact Mitigation Event History 1-8 - Status	Blank	Blank	The status of the diagnostic
Image Processing Module	Front Impact Mitigation Event History 1-8	Blank	Blank	
Image Processing Module	Front Impact Mitigation Event History 1-8 - Ignition Cycles Since Last Diagnostic Event	Blank	Counts	Ignition Cycles Since Last Diagnostic Event
Image Processing Module	Front Impact Mitigation Event History 1-8 - Malfunction Counter	Blank	Counts	Number of malfunctions
Image Processing Module	Front Impact Mitigation Event History 1-8 - Odometer at First Malfunction	Blank	km	Odometer at First Malfunction/failure
Image Processing Module	Front Impact Mitigation Event History 1-8 - Odometer at Last Malfunction	Blank	km	Odometer at Last Malfunction/failure

Adaptive Cruise Control Disengage History

Control Module	Parameter Name	Normal Value	Unit	Description
Image Processing Module	Adaptive Cruise Control Disengage History 1-8 - Status	Blank	Blank	The status of the diagnostic
Image Processing Module	Adaptive Cruise Control Disengage History 1-8	Blank	Blank	
Image Processing Module	Adaptive Cruise Control Disengage History 1-8 - Ignition Cycles Since Last Diagnostic Event	Blank	Counts	Ignition Cycles Since Last Diagnostic Event
Image Processing Module	Adaptive Cruise Control Disengage History 1-8 - Malfunction Counter	Blank	Counts	Number of malfunctions

Control Module	Parameter Name	Normal Value	Unit	Description
Image Processing Module	Adaptive Cruise Control Disengage History 1-8 Odometer at First Malfunction	Blank	km	Odometer at First Malfunction/failure
Image Processing Module	Adaptive Cruise Control Disengage History 1-8 Odometer at Last Malfunction	Blank	km	Odometer at Last Malfunction/failure

Adaptive Cruise Control Inhibit History

Control Module	Parameter Name	Normal Value	Unit	Description
Image Processing Module	Adaptive Cruise Control Inhibit History 1-8 - Status	Blank	Blank	The status of the diagnostic
Image Processing Module	Adaptive Cruise Control Inhibit History 1-8	Blank	Blank	
Image Processing Module	Adaptive Cruise Control Inhibit History 1-8 - Ignition Cycles Since Last Diagnostic Event	Blank	Counts	Ignition Cycles Since Last Diagnostic Event
Image Processing Module	Adaptive Cruise Control Inhibit History 1-8 - Malfunction Counter	Blank	Counts	Number of malfunctions
Image Processing Module	Adaptive Cruise Control Inhibit History 1-8 Odometer at First Malfunction	Blank	km	Odometer at First Malfunction/failure
Image Processing Module	Adaptive Cruise Control Inhibit History 1-8 Odometer at Last Malfunction	Blank	km	Odometer at Last Malfunction/failure

K124 Image Processing Module: Scan Tool Information (UKL)

Note: Due to software and hardware variations, not all information may be applicable.

Image Processing Module Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
Operating Conditions: Vehicle in Run power mode, engine off.			
Lane Keep Assist Status	—	Enabled	This displays the current status of the Lane Keep Assist system.
Super Cruise Status	—	OFF	This displays the current status of the Super Cruise system.
Adaptive Cruise Control Status	—	OFF	This displays the current status of the Adaptive Cruise Control system.
Heated Steering Wheel Auto Command	—	OFF	This displays the current status of the automatic heated steering wheel system.

Parameter	System State	Expected Value	Description
Vehicle Dynamic Sensor Orientation Calibration Status	—	Calibrated	This displays the current calibration status as either “Calibrated”, “In Progress”, or “Not Calibrated”
Vehicle Dynamic Sensor Offset Calibration Status	—	Calibrated	This displays the current calibration status as either “Calibrated”, “In Progress”, or “Not Calibrated”
Steering Wheel Touch Sensing	—	Inactive	This displays the current calibration status as either “Calibrated” or “Not Calibrated”
Steering Wheel Light Bar Color Command	—	OFF	This displays the current status of the steering wheel LED light bar color..
Power Mode	—	ACCESSORY	This displays the current power mode of the vehicle as “OFF”, “ACCESSORY”, “RUN”, or “START REQUEST”

Drivers Assist System Disable History Conditions

Refer to [Link target (target-id 331106-) not found] for a list of all available conditions that can cause the driver assist systems functions to be inhibited or disabled.

Environmentally Induced Disengagement Event History

Control Module	Parameter Name	Normal Value	Unit	Description
Image Processing Module - Processor 1 and Processor 2	Environmentally Induced Disengagement Event History 1-8 - Status	Blank	Blank	The status of the diagnostic
Image Processing Module - Processor 1 and Processor 2	Environmentally Induced Disengagement Event History 1-8	Blank	Blank	Disable reason
Image Processing Module - Processor 1 and Processor 2	Environmentally Induced Disengagement Event History 1-8 - Ignition Cycles Since Last Diagnostic Event	Blank	Counts	Ignition Cycles Since Last Diagnostic Event
Image Processing Module - Processor 1 and Processor 2	Environmentally Induced Disengagement Event History 1-8 - Malfunction Counter	Blank	Counts	Number of malfunctions
Image Processing Module - Processor 1 and Processor 2	Environmentally Induced Disengagement Event History 1-8 Odometer at First Malfunction	Blank	km	Odometer at First Malfunction/failure
Image Processing Module - Processor 1 and Processor 2	Environmentally Induced Disengagement Event History 1-8 Odometer at Last Malfunction	Blank	km	Odometer at Last Malfunction/failure

Automatically Induced Disengagement Event History

Control Module	Parameter Name	Normal Value	Unit	Description
Image Processing Module - Processor 1 and Processor 2	Automatically Induced Disengagement Event History 1-8 - Status	Blank	Blank	The status of the diagnostic
Image Processing Module - Processor 1 and Processor 2	Automatically Induced Disengagement Event History 1-8	Blank	Blank	Disable reason
Image Processing Module - Processor 1 and Processor 2	Automatically Induced Disengagement Event History 1-8 - Ignition Cycles Since Last Diagnostic Event	Blank	Counts	Ignition Cycles Since Last Diagnostic Event
Image Processing Module - Processor 1 and Processor 2	Automatically Induced Disengagement Event History 1-8 - Malfunction Counter	Blank	Counts	Number of malfunctions
Image Processing Module - Processor 1 and Processor 2	Automatically Induced Disengagement Event History 1-8 - Odometer at First Malfunction	Blank	km	Odometer at First Malfunction/failure
Image Processing Module - Processor 1 and Processor 2	Automatically Induced Disengagement Event History 1-8 - Odometer at Last Malfunction	Blank	km	Odometer at Last Malfunction/failure

Driver Induced Disengagement Event History

Control Module	Parameter Name	Normal Value	Unit	Description
Image Processing Module - Processor 1 and Processor 2	Driver Induced Disengagement Event History 1-8 - Status	Blank	Blank	The status of the diagnostic
Image Processing Module - Processor 1 and Processor 2	Driver Induced Disengagement Event History 1-8	Blank	Blank	Disable reason
Image Processing Module - Processor 1 and Processor 2	Driver Induced Disengagement Event History 1-8 - Ignition Cycles Since Last Diagnostic Event	Blank	Counts	Ignition Cycles Since Last Diagnostic Event
Image Processing Module - Processor 1 and Processor 2	Driver Induced Disengagement Event History 1-8 - Malfunction Counter	Blank	Counts	Number of malfunctions
Image Processing Module - Processor 1 and Processor 2	Driver Induced Disengagement Event History 1-8 Odometer at First Malfunction	Blank	km	Odometer at First Malfunction/failure
Image Processing Module - Processor 1 and Processor 2	Driver Induced Disengagement Event History 1-8 Odometer at Last Malfunction	Blank	km	Odometer at Last Malfunction/failure

Lane Change on Demand Inhibited Event History

Control Module	Parameter Name	Normal Value	Unit	Description
Image Processing Module - Processor 1 and Processor 2	Lane Change on Demand Inhibited Event History 1-8 - Status	Blank	Blank	The status of the diagnostic
Image Processing Module - Processor 1 and Processor 2	Lane Change on Demand Inhibited Event History 1-8	Blank	Blank	Inhibit reason
Image Processing Module - Processor 1 and Processor 2	Lane Change on Demand Inhibited Event History 1-8 - Ignition Cycles Since Last Diagnostic Event	Blank	Counts	Ignition Cycles Since Last Diagnostic Event
Image Processing Module - Processor 1 and Processor 2	Lane Change on Demand Inhibited Event History 1-8 - Malfunction Counter	Blank	Counts	Number of malfunctions
Image Processing Module - Processor 1 and Processor 2	Lane Change on Demand Inhibited Event History 1-8 Odometer at First Malfunction	Blank	km	Odometer at First Malfunction/failure
Image Processing Module - Processor 1 and Processor 2	Lane Change on Demand Inhibited Event History 1-8 Odometer at Last Malfunction	Blank	km	Odometer at Last Malfunction/failure

Image Processing Module Output Controls

Output Control	Description
Vehicle Dynamic Sensor Offset Calibration	Learns the initial bias values for roll, yaw, and pitch rate for the multi-axis acceleration sensor.
Steering Wheel Light Bar	Requests the steering wheel light bar LED color and flash rate.

K160 Brake System Control Module: Scan Tool Information

The Electronic Brake Control Module (EBCM) scan tool data parameters list contains all ABS related parameters that are available on the scan tool. The list is arranged in alphabetical order. A given parameter may appear in any one of the data lists.

Brake System Control Module Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON			
ABS Active SIgnal		OK/Malfunction	Determine the state of the ABS system
ABS Pump Motor Voltage		0 V	The scan tool displays the commanded pump motor voltage.
Actual Brake System Plunger Motor Torque		Varies	The scan tool displays the motor torque feedback.
Actual Brake System Plunger Position		Varies	The scan tool displays Plunger Position Feedback
Actual Brake System Plunger Speed		Varies	The scan tool displays Plunger Speed Feedback

Parameter	System State	Expected Value	Description
All Wheel Drive		Active/Inactive	The scan tool displays when in four wheel drive (if equipped).
Antilock Braking System		OK/Malfunction	The scan tool displays OK or Malfunction. Malfunction is displayed if there is an ABS malfunction.
Automatic Brake Control Gain Request from Brake System Control Module		Varies	The scan tool displays a percentage of Autonomous Control Gain Request from BSCM
Automatic Braking Event		Detected/Not Detected	The scan tool displays Automatic Trailer Braking Event
Automatic Brake Request from Brake System Control Module		Yes/No	The scan tool displays Trailer Brake Autonomous Control Status
Automatic Braking Active Signal		Okay/ Malfunction	ABS Active Malfunction indicates invalid protected ABS active data received from Automatic Brake System Control Module
Automatic Braking Torque Signal		Okay/ Malfunction	The scan tool displays Automatic Brake Torque Signal Failure
Autonomous Braking Request Signal		Okay/ Malfunction	Autonomous Signal malfunction indicates invalid autonomous braking data received from Automatic Brake System Control Module
Brake Fluid Level Sensor		Okay/Low	The scan tool displays OK when the brake fluid is at correct level and Low when the brake fluid is low.
Brake Fluid Reservoir Seperating Solenoid Valve		Active/Inactive	The scan tool displays Eboost System Internal Valves Feedback Status Reservoir Seperation Valve Commanded
Brake Master Cylinder Separating Solenoid Valve 1		Active/Inactive	The scan tool displays Eboost System Internal Valves Feedback Status Circuit Seperating Valve 1 Commanded.
Brake Master Cylinder Separating Solenoid Valve 2		Active/Inactive	The scan tool displays Eboost System Internal Valves Feedback Status Circuit Seperating Valve 2 Commanded
Brake Pad Wear Malfunction Signal		None Propulstion Active, Vehicle Speed, Malfunction, Reset	The scan tool displays the Brake Pad Life Monitoring Axle Reset Reject Reason
Brake Pad Wear Signal		Low/High	The scan tool displays Brake Pad Wear Input Status
Brake Pedal Position Sensor	Brake pedal released	Inactive	The scan tool displays Inactive or Active depending on the state of the brake pedal.
	Brake pedal applied	Active	
Brake Pedal Simulator Separating Solenoid Valve		Active/Inactive	System Internal Valves Feedback Status Simulator Separating Valve Commanded
Brake Pressure Signal		Okay/ Malfunction	The scan tool displays Brake Pressure Signal Failure
Brake System		Active/Inactive	The scan tool displays the boost status.
Brake System Plunger Motor Resistance		Varies	The scan tool displays the calculated Motor Resistance
Brake System Plunger Motor Temperature 1		Varies	The scan tool displays the Module Motor Driver Temperature CH1
Brake System Plunger Motor Temperature 2		Varies	The scan tool displays the Module Motor Driver Temperature CH2

Parameter	System State	Expected Value	Description
Brake System Plunger Separating Solenoid Valve 1		Active/Inactive	The scan tool displays System Internal Valves Feedback Status Plunger Separating Valve 1 Commanded.
Brake System Plunger Separating Solenoid Valve 2		Active/Inactive	System Internal Valves Feedback Status Plunger Separating Valve 2 Commanded
Brake Pressure		Varies	The scan tool displays brake apply pressure.
Brake Pressure Created by Applying Brake Pedal		Varies	The scan tool displays Brake Pedal Driver Applied Pressure
Brake Pressure Sensor	Brake pedal released	0–1 V	The scan tool displays 0–5 V depending on the applied hydraulic brake pressure.
	Brake pedal applied	1–5 V	
Brake Pressure Sensor	Brake pedal released	2000–3000 kPa	The scan tool displays the actual pressure applied to the brake pedal.
Brake Pressure Test		Incomplete, Active, Complete, Failed	The scan tool displays the Wheel Pressure Control Feedback Test Status
Brake System Plunger Motor Current Limitation		Active/Inactive	Eboost Motor Current Limitation
Brake System Plunger Motor Status		Active/Inactive	The scan tool displays if the Eboost Motor Status has limitations.
Brake System Plunger Motor Temperature Limitation		Active/Inactive	Eboost Motor Temperature Limitation
Brake System Plunger Motor Torque Limitation		Active/Inactive	Eboost Motor Torque Limitation
Brake System Plunger Travel		Varies	The scan tool displays the plunger travel.
Calculated Input rod Position		Varies	The scan tool displays the EBoost Input Rod Stroke - Calculated
Delivered Torque		Varies	The scan tool displays 0–100% depending on the how much torque the engine is delivering.
Desired Trailer Brake Control Duty Cycle		OK/Malfunction	The banded trailer brake duty cycle sent to the Trailer Brake Module. It represents the requested duty cycle as transformed to allow diagnostics on the transmission line
Desired Brake System Plunger Position		Varies	The scan tool displays the command Plunger Position
Desired Brake System Plunger Speed		Varies	The scan tool displays the commanded Plunger Speed.
Desired Brake System Plunger Motor Torque		Varies	The scan tool displays the commanded Motor Torque.
Deviation Between Manual Trailer Brake Apply Request Signal 1 and 2		Varies	The scan tool displays Trailer Brake Manual Apply Switch Position Error
Diagnostic Mode		Active/Inactive	Diagnostic Mode Status
Driver Initiated Brake Event		Not Detected/ Detected	The scan tool displays Brake Event Detected
Dynamic Rear Proportioning Status		Okay/ Malfunction	The scan tool displays Dynamic Rear Proportioning System Failure Status
Engine Drag Control Status		Okay/ Malfunction	The scan tool displays Engine Drag Control Status
Front Brake Pad Wear Sensors		Varies	The scan tool displays Front Axle Brake Pad Wear Sensor Voltage

Parameter	System State	Expected Value	Description
Induced Voltage by Trailer Brake Coil		Varies	The scan tool displays Inductance Measurement Voltage
Input Rod Position 1		Varies	The scan tool display the position of the Input Rod Stroke 1
Input Rod Position 2		Varies	The scan tool display the position of the Input Rod Stroke 2
Input Rod Position Sensors 1 and 2 Supply Voltage		Varies	The scan tool display the Brake Pedal Postion Sensor Reference Voltage
Lateral Acceleration		Varies	The scan tool displays 0–5 V depending on the vehicle's lateral acceleration.
Left Front Inlet Solenoid Valve Feedback		Inactive/Active	Active is displayed when the left front inlet solenoid valve is commanded ON.
Left Front Outlet Solenoid Valve Feedback		Inactive/Active	Active is displayed when the left front outlet solenoid valve is commanded ON.
Left Front Wheel Speed		0 km/h (0 MPH)	The scan tool displays km/h (MPH) depending on the current speed of the left front wheel speed sensor.
Left Front Brake Pressure		Varies	The scan tool displays the left front wheel pressure
Left Park Brake Actuator Force		Varies	The scan tool displays the Left Park Brake Actuator force
Left Park Brake Actuator Status		Released, Applied, Malfunction, Service Release, Releasing, Applying, Unknown	The scan tool displays the Left Park Brake Actuator Status
Left Park Brake Actuator Voltage		Varies	The scan tool displays the Left Park Brake Actuator voltage
Left Rear Brake Pressure		Varies	The scan tool displays the left rear wheel pressure
Left Rear Inlet Solenoid Valve Feedback		Inactive	The scan tool displays Inactive or Active. Active is displayed when the left rear inlet solenoid valve is commanded ON.
Left Rear Outlet Solenoid Valve Feedback		Inactive	The scan tool displays Inactive or Active. Active is displayed when the left rear outlet solenoid valve is commanded ON.
Left Rear Wheel Speed		0 km/h (0 MPH)	The scan tool displays km/h (MPH) depending on the current speed of the left rear wheel speed sensor.
Limited Brake Function - Only Limited Brake Pressure Available		Active/Inactive	The scan tool displays Partial Boost status
Limited Brake Function - Low Voltage Condition		Active/Inactive	The scan tool displays Low Voltage Boost Status
Limited Brake Function - Only One Brake Circuit Available		Active/Inactive	The scan tool displays half system boost status.
Longitudinal Acceleration		Varies	The scan tool displays the vehicle's longitudinal acceleration.
Manual Trailer Brake		Released/ Applied	Trailer Braking Signals Status Manual Trailer Brake Applied
Manual Trailer Brake Apply Request Signal 1		OK/Malfunction	Trailer Brake Primary Manual Apply Switch Position
Manual Trailer Brake Apply Request Signal 2		OK/Malfunction	Trailer Brake Redundant Manual Apply Switch Position
Module Temperature		Varies	The scan tool displays the Bake System Control Module Temperature.

Parameter	System State	Expected Value	Description
Normal Braking Mode		Active/Inactive	The scan tool displays if the vehicle is in normal braking mode.
Park Brake Actuator		Active/Inactive	The scan tool displays the Electric Park Brake Motor Status
Park Brake Actuator Direction		Released/ Applied	The scan tool displays the Electric Park Brake Motor Status
Panic Brake Assist Status		OK	The scan tool displays OK or Malfunction. Malfunction is displayed if the EBCM disables the panic brake assist due to a fault.
Park Brake Mode		Active/Inactive	The scan tool displays if in Shut Down Boost status
Park Brake Switch		Active/Inactive	The scan tool displays the status of the Electric Park Brake Switch
Pump Motor Relay Feedback		Inactive	The scan tool displays Inactive or Active. Active is displayed when the pump motor is commanded ON.
Primary Isolation Solenoid Valve Feedback		Inactive	The scan tool displays Inactive or Active. Active is displayed when the isolation solenoid valve is commanded ON.
Primary Prime Solenoid Valve Feedback		Inactive	The scan tool displays Inactive or Active. Active is displayed when the prime solenoid valve is commanded ON.
Rear Brake Pad Wear Sensors		Varies	The scan tool displays the remaining percentage of brake pad.
Redundant Trailer Brake Manual Apply Slider		Varies	The scan tool displays Manual Apply Switch Voltage.
Regenerative Braking Axle Torque Request		Varies	The scan tool displays Regenerative Braking Axle Torque Request
Regenerative Braking, Stability or Traction Control Disable History 1		Varies	The scan tool displays Regenerative Braking, Stability or Traction Control Disabling ECU History 1
Regenerative Braking, Stability or Traction Control Disable History 2		Varies	The scan tool displays Regenerative Braking, Stability or Traction Control Disabling ECU History 2
Regenerative Braking, Stability or Traction Control Disable History 3		Varies	The scan tool displays Regenerative Braking, Stability or Traction Control Disabling ECU History 3
Regenerative Braking, Stability or Traction Control Disable History 4		Varies	The scan tool displays Regenerative Braking, Stability or Traction Control Disabling ECU History 4
Regenerative Braking, Stability or Traction Control Disable History 5		Varies	The scan tool displays Regenerative Braking, Stability or Traction Control Disabling ECU History 5
Regenerative Braking, Stability or Traction Control Disable History 6		Varies	The scan tool displays Regenerative Braking, Stability or Traction Control Disabling ECU History 6
Regenerative Braking, Stability or Traction Control Disable History 7		Varies	The scan tool displays Regenerative Braking, Stability or Traction Control Disabling ECU History 7
Regenerative Braking, Stability or Traction Control Disable History 8		Varies	The scan tool displays Regenerative Braking, Stability or Traction Control Disabling ECU History 8
Regenerative Braking, Stability or Traction Control Disable History 9		Varies	The scan tool displays Regenerative Braking, Stability or Traction Control Disabling ECU History 9
Regenerative Braking, Stability or Traction Control Disable History 10		Varies	The scan tool displays Regenerative Braking, Stability or Traction Control Disabling ECU History 10
Requested Torque		Varies	The scan tool displays 0–100% depending on the how much torque is requested.
Right Front Brake Pressure		Varies	The scan tool displays the right front wheel pressure.
Right Front Inlet Solenoid Valve Feedback		Inactive	The scan tool displays Inactive or Active. Active is displayed when the right front inlet solenoid valve is commanded ON.

Parameter	System State	Expected Value	Description
Right Front Outlet Solenoid Valve Feedback		Inactive	The scan tool displays Inactive or Active. Active is displayed when the right front outlet solenoid valve is commanded ON.
Right Front Wheel Speed		0 km/h (0 MPH)	The scan tool displays km/h (MPH) depending on the current speed of the right front wheel speed sensor.
Right Park Brake Actuator Force		Varies	Scan tool displays the Right Park Brake Actuator force
Right Park Brake Actuator Status		Released, Applied, Malfunction, Service Release, Releasing, Applying, Unknown	Scan tool displays the Right Park Brake Actuator Status
Right Park Brake Actuator Voltage		Varies	Scan tool displays the Right Park Brake Actuator voltage
Right Rear Brake Pressure		Varies	The scan tool displays the right rear wheel pressure.
Right Rear Inlet Solenoid Valve Feedback		Inactive	The scan tool displays Inactive or Active. Active is displayed when the right rear inlet solenoid valve is commanded ON.
Right Rear Outlet Solenoid Valve Feedback		Inactive	The scan tool displays Inactive or Active. Active is displayed when the right rear outlet solenoid valve is commanded ON.
Right Rear Wheel Speed		0 km/h (0 MPH)	The scan tool displays km/h (MPH) depending on the current speed of the right rear wheel speed sensor.
Roller Test Stand Mode		Active/Inactive	The scan tool displays dyno mode status
Secondary Isolation Solenoid Valve Feedback		Active/Inactive	The scan tool displays Inactive or Active. Active is displayed when the isolation solenoid valve is commanded ON.
Secondary Prime Solenoid Valve Feedback		Active/Inactive	The scan tool displays Inactive or Active. Active is displayed when the prime solenoid valve is commanded ON.
Shutdown Mode		Active/Inactive	The scan tool displays if in shutdown mode
Stop Lamp Signal		Not Requested/ Requested	The scan tool displays Brake Lights Requested
Steering Wheel Angle	Steering wheel in straight position	−5 to +5°	The scan tool displays °. This is the current position of the steering angle sensor.
	Steering wheel turned left until stop	450–550°	
	Steering wheel turned right until stop	−550 to −450°	
System Voltage	—	11–14 V	The scan tool displays V. This is the current battery voltage.
Traction Control Switch	Traction control switch released	Inactive	The scan tool displays Inactive or Active depending on the traction control switch status.
	Traction control switch pressed	Active	
Traction Control System		OK	The scan tool displays OK or Malfunction. Malfunction is displayed if there is a traction control malfunction.

Parameter	System State	Expected Value	Description
Trailer Brake Automatic Control State		Normal, Active, Temporarily Limited, Permanently Failed, Communication Failed, Off, No Signal	Trailer Brake Autonomous Control Status Autonomous Control Feedback State
Trailer Brake Control		Disabled, Inactive, Normal Brake Mode, High Brake Mode, Manual Apply Brake Mode, Brake in Autonomous Mode, Undefined	The Scan tool displays Trailer Braking Arbitration State
Trailer Brake Control Output Circuit		Indeterminate, Voltage too High, Voltage too Low, Okay	The Scan tool displays Trailer Brake Control Output State
Trailer Brake Manual Apply Slider		Varies	The scan tool displays the trailer brake slider position as a percentage
Trailer Brake Power Control Module		De-Energized/ Energized	Trailer Brake Control Status Energized
Trailer Brake Power Control Module Battery Voltage		Varies	The scan tool displays Trailer Brake Power Control Module Battery Voltage.
Trailer Brake Sensitivity		Varies	The scan tool displays Trailer Brake User Gain
Trailer Brake Sensitivity Switch Up Button		Active/Inactive	The scan tool displays Trailer Brake Control Switch User Gain Button States
Trailer Brake Type		Unknown, Electrical, Electrohydraulic	The scan tool displays Trailer Connection Status
Vehicle Stability System		OK	The scan tool displays OK or Malfunction. Malfunction is displayed if there is a stability control malfunction.
Vehicle Stability Enhancement System Signal			
Vehicle Stability Enhancement System Switch	Traction control switch released	Inactive	The scan tool displays Inactive or Active depending on the traction control switch status.
	Traction control switch pressed	Active	
Wheel Speed Signal		Okay/ Malfunction	The scan tool displays Wheel Speed Signal Failure
Yaw Rate Signal		Varies	The scan tool displays 0–5 V depending on the vehicle's yaw rate.

Brake System Control Module Scan Tool Output Controls

Output Control	Description
Automated Brake Bleed	This is used in order to bleed ABS hydraulics.
Brake Hydraulics Test	This is used to check for leaks or air in the system.
Brake System Hydraulic Corner Test	Commands brake hydraulic pressure to each corner.
Deactivate Brake Boost System	This is used to deactivate brake boost system before performing certain functions.
Left Park Brake Actuator	Commands the left park brake actuator ON or OFF.
Right Park Brake Actuator	Commands the right park brake actuator ON or OFF.
Deactivate Rear Park Brake Service Position	Commands the caliper piston back into position after servicing the rear brakes,
Activate Rear Park Brake Service Position	Retracts the caliper piston to service the rear brakes.
Trailer Brake Control Signal	Commands the trailer brakes on and off
Trailer Brake Duty Cycle	Controls the battery output voltage to the trailer brakes.
Trailer Brake Switch Indicator	Conmands the Trailer Brake Switch Indicator on or off

K180 Driver Monitoring System Control Module: Scan Tool Information

Note: Due to software and hardware variations, not all information may be applicable.

K180 Driver Monitoring System Control Module Scan Tool Data Parameters

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON			
Vehicle Identification Number (VIN)	—	Varies	The scan tool displays the learned VIN
End Model Part Number	—	Varies	End Model Part Number is the part number for the hardware of the control module with software and calibrations.
Base Model Part Number	—	Varies	Base Model Part Number is the part number for the hardware without software and calibrations.
Manufacturer’s Traceability Number	—	Varies	
Diagnostic Data Identifier	—	Varies	The scan tool displays the 4 character alphanumeric device ID.
Manufacturer Enable Counter	—	Varies	
Boot Software Part Number 1 Alpha Code	—	Varies	
Application Software Part Number 1 Alpha Code	—	Varies	
Calibration Part Number 1	—	Varies	

K182 Parking Assist Control Module: Scan Tool Information

Note: Due to software and hardware variations, not all information may be applicable.

Parking Assist Control Module Scan Tool Data Parameters – Identification Information

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Engine OFF/Parking Assist ON			
Vehicle Identification Number (VIN)	—	Varies	The scan tool displays the Vehicle Identification Number
Diagnostic Data Identifier	—	Varies	The scan tool displays the Diagnostic Data Identifier
XML Configuration Compatibility Identifier	—	Varies	The scan tool displays the XML Configuration Compatibility Identifier
XML Data File Part Number	—	Varies	The scan tool displays the XML Data File Part Number
XML Data File Alpha Code	—	Varies	The scan tool displays the XML Data File Alpha Code
Module Diagnostic Address	—	Varies	The scan tool displays the Module Diagnostic Address
Manufacturer's Traceability Number	—	Varies	The scan tool displays the Manufacturer's Traceability Number
Software Part Number	—	Varies	The scan tool displays the Software Part Number
Calibration Part Number 2	—	Varies	The scan tool displays the Calibration Part Number 2
End Model Part Number	—	Varies	The scan tool displays the End Model Part Number
Base Model Part Number	—	Varies	The scan tool displays the Base Model Part Number
Software Module 1 Identifier Alpha Code	—	Varies	The scan tool displays the Software Module 1 Identifier Alpha Code
End Model Part Number Alpha Code	—	Varies	The scan tool displays the End Model Part Number Alpha Code
Base Model Part Number Alpha Code	—	Varies	The scan tool displays the Base Model Part Number Alpha Code
GMLAN Identification Data - Bus 1 Type	—	Varies	The scan tool displays the GMLAN Identification Data - Bus 1 Type
GMLAN Identification Data - Data Dictionary 1 Version	—	Varies	The scan tool displays the GMLAN Identification Data - Data Dictionary 1 Version
GMLAN Identification Data - GMLAN Kernel 1 Version	—	Varies	The scan tool displays the GMLAN Identification Data - GMLAN Kernel 1 Version
Date Programmed	—	Varies	The scan tool displays the date the module was programmed

Parking Assist Control Module Scan Tool Data Parameters – Park Assist System Data

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Engine OFF/Parking Assist ON			
Power Mode	—	Run	The scan tool displays Off, Accessory, Run or Crank. This is the state of the ignition switch.
Battery Voltage	—	11–14 V	The scan tool displays V. This is the current battery voltage.
Parking Assist System Status	—	Enable	The scan tool displays Disable, Enable, Inhibited or Failed. This is the state of the parking assist system.
Parking Assist Chime	—	Varies	The scan tool displays On or Off. On is displayed if there is an object within the measuring range of the object sensors.
Parking Assist Sensors	—	ON	The scan tool displays On or Off.
Calculated Transmission Range	Transmission in reverse	Park	The scan tool displays Park, Reverse, Neutral, Drive or Unknown depending on the state of the commanded gear.

Parameter	System State	Expected Value	Description
Parking Assist Switch	—	Active/Inactive	The scan tool displays Active or Inactive depending on the state of the parking assist switch.
Advanced Parking Assist Switch	—	Active/Inactive	The scan tool displays Active or Inactive depending on the state of the advanced parking assist switch.
Parking Assist Sensors Reference Voltage	—	7.3–12.1 V	The scan tool displays V. This is the amount of voltage being sent to the object sensors.
Parking Assist Switch LED	—	Varies	The scan tool displays On or Off depending on the state of the parking assist switch LED.
Right Side Object Detection Indicator	—	Varies	The scan tool displays a blank, On or Off depending on the state of the right side object detection indicator command status.
Left Side Object Detection Indicator	—	Varies	The scan tool displays a blank, On or Off depending on the state of the left side object detection indicator command status.
Advanced Parking Assist Status	—	Standby	The scan tool displays Standby, Active, or Inactive depending on the state of the advanced parking assist.

Parking Assist Control Module Scan Tool Data Parameters – Parking Assist Sensor Data

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Engine OFF/Parking Assist ON			
Parking Assist Sensors	—	ON	The scan tool displays On or Off.
Parking Assist Sensors Reference Voltage	—	7.3–12.1 V	The scan tool displays V. This is the voltage being sent to the object sensors.
Left Front Advanced Parking Assist Side Object Sensor	—	32767 mm	The scan tool displays mm. This is the distance between the parking assist sensor and the nearest object.
Left Front Outer Object Sensor Distance to Object	—	32767 mm	The scan tool displays mm. This is the distance between the parking assist sensor and the nearest object.
Left Front Inner Object Sensor Distance to Object	—	32767 mm	The scan tool displays mm. This is the distance between the parking assist sensor and the nearest object.
Right Front Advanced Parking Assist Side Object Sensor	—	32767 mm	The scan tool displays mm. This is the distance between the parking assist sensor and the nearest object.
Right Front Outer Object Sensor Distance to Object	—	32767 mm	The scan tool displays mm. This is the distance between the parking assist sensor and the nearest object.
Right Front Inner Object Sensor Distance to Object	—	32767 mm	The scan tool displays mm. This is the distance between the parking assist sensor and the nearest object.
Left Rear Advanced Parking Assist Side Object Sensor	—	32767 mm	The scan tool displays mm. This is the distance between the parking assist sensor and the nearest object.
Left Rear Outer Object Sensor Distance to Object	—	32767 mm	The scan tool displays mm. This is the distance between the parking assist sensor and the nearest object.
Left Rear Inner Object Sensor Distance to Object	—	32767 mm	The scan tool displays mm. This is the distance between the parking assist sensor and the nearest object.
Right Rear Advanced Parking Assist Side Object Sensor	—	32767 mm	The scan tool displays mm. This is the distance between the parking assist sensor and the nearest object.

Parameter	System State	Expected Value	Description
Right Rear Outer Object Sensor Distance to Object	—	32767 mm	The scan tool displays mm. This is the distance between the parking assist sensor and the nearest object.
Right Rear Inner Object Sensor Distance to Object	—	32767 mm	The scan tool displays mm. This is the distance between the parking assist sensor and the nearest object.

Parking Assist Control Module Scan Tool Data Parameters – Parking Assist Disable History 1–4 Data

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Engine OFF/Parking Assist ON			
Parking Assist Disable History 1	—	Varies	The scan tool displays None, Manual Disable, Park Brake Applied, Trailer or Other Attached Object, Excessive Speed in Reverse, No or Invalid Sensor Signals, Sensor Disturbance, Sensors Dirty, Sound Signal Return Time Not Plausible. This is the state of the park assist disable history.
Parking Assist Disable History 2	—	Varies	The scan tool displays None, Manual Disable, Park Brake Applied, Trailer or Other Attached Object, Excessive Speed in Reverse, No or Invalid Sensor Signals, Sensor Disturbance, Sensors Dirty, Sound Signal Return Time Not Plausible. This is the state of the park assist disable history.
Parking Assist Disable History 3	—	Varies	The scan tool displays None, Manual Disable, Park Brake Applied, Trailer or Other Attached Object, Excessive Speed in Reverse, No or Invalid Sensor Signals, Sensor Disturbance, Sensors Dirty, Sound Signal Return Time Not Plausible. This is the state of the park assist disable history.
Parking Assist Disable History 4	—	Varies	The scan tool displays None, Manual Disable, Park Brake Applied, Trailer or Other Attached Object, Excessive Speed in Reverse, No or Invalid Sensor Signals, Sensor Disturbance, Sensors Dirty, Sound Signal Return Time Not Plausible. This is the state of the park assist disable history.

Parking Assist Control Module Scan Tool Data Parameters – Parking Assist Disable History 5–7 Data

Parameter	System State	Expected Value	Description
Operating Conditions: Ignition ON/Engine OFF/Parking Assist ON			
Parking Assist Disable History 5	—	Varies	The scan tool displays None, Manual Disable, Park Brake Applied, Trailer or Other Attached Object, Excessive Speed in Reverse, No or Invalid Sensor Signals, Sensor Disturbance, Sensors Dirty, Sound Signal Return Time Not Plausible. This is the state of the park assist disable history.

Parameter	System State	Expected Value	Description
Parking Assist Disable History 6	—	Varies	The scan tool displays None, Manual Disable, Park Brake Applied, Trailer or Other Attached Object, Excessive Speed in Reverse, No or Invalid Sensor Signals, Sensor Disturbance, Sensors Dirty, Sound Signal Return Time Not Plausible. This is the state of the park assist disable history.
Parking Assist Disable History 7	—	Varies	The scan tool displays None, Manual Disable, Park Brake Applied, Trailer or Other Attached Object, Excessive Speed in Reverse, No or Invalid Sensor Signals, Sensor Disturbance, Sensors Dirty, Sound Signal Return Time Not Plausible. This is the state of the park assist disable history.

Parking Assist Control Module Scan Tool Output Controls

Output Control	Description
Park Assist Switch LED	The parking assist control module illuminates the advanced park assist LED of the when commanded from the scan tool.
Clear Disable History Data	The parking assist control module clears the Parking Assist Disable History data when commanded from the scan tool.
Clear Side Object Detection Disable History	The parking assist control module clears the Side Object Detection Disable History data when commanded from the scan tool.
CAN Bus Configuration Learn	The parking assist control module learns the CAN Bus configuration when commanded from the scan tool.
Parking Assist Sensor Learn	The parking assist control module learns the Parking Assist Sensor configuration when commanded from the scan tool.

K183 UHF Short Range Low Energy Remote Control Access Transceiver: Scan Tool Information

K183 UHF Short Range Low Energy Remote Control Access Transceiver Scan Tool Data Parameters

Parameter	Expected Value	Definition
Operating Conditions: Ignition ON/Vehicle in SERVICE MODE		
Mobile Device Presence in Short Range Zone	Yes/No	Detecting the presence of the mobile device within a short range zone around the vehicle where the mobile device would be be able to interact with your vehicle to activate welcome lights of the vehicle with HIGH probability of success.
Mobile Device Left Entry Allowed	Yes/No	Indicates if you can enter the vehicle from any door located on the left side by using your mobile device.
Mobile Device Right Entry Allowed	Yes/No	Indicates if you can enter the vehicle from any door located on the right side by using your mobile device.
Mobile Device Front Entry Allowed	Yes/No	Indicates if you have an access to frunk of the vehicle by using your mobile device.
Mobile Device Rear Entry Allowed	Yes/No	Indicates if you have an access to rear closure of the vehicle by using your mobile device.
Mobile Device Left Side Count	Counts	Indicates the numbers of mobile devices detected in the LEFT side of the vehicle.
Mobile Device Right Side Count	Counts	Indicates the numbers of mobile devices detected in the RIGHT side of the vehicle.
Mobile Device Interior Count	Counts	Indicates the numbers of mobile devices detected INSIDE the vehicle.
Mobile Device Front Compartment Count	Counts	Indicates the numbers of mobile devices detected inside frunk of the vehicle.
Mobile Device Rear Compartment Count	Counts	Indicates the numbers of mobile devices detected inside rear closure/ trunk of the vehicle.

Parameter	Expected Value	Definition
Mobile Device Rear Side Count	Counts	Indicates the numbers of mobile devices detected in the REAR side of the vehicle.
Mobile Device Front Side Count	Counts	Indicates the numbers of mobile devices detected in the FRONT side of the vehicle.
Mobile Device Short Range Zone Count	Counts	Indicates the numbers of mobile devices detected in welcome zone of the vehicle. Welcome zone is approximately 10ft (3m) embrace area around the vehicle where the mobile device can interact with the vehicle to activate welcome lights of the vehicle with HIGH density of detection.
Mobile Device Connected Count	Counts	Indicates number of mobile devices connected to the vehicle.
Mobile Device Status	[0] Unpaired - Learn Mode Inactive [1] Pairing - Learning [2] Paired - Learned [3] Blocked - Learn Failed or Not Learned	Indicates the status of the vehicle virtual key state.
Mobile Device Interior Count with Starting Access	Counts	Indicates the number of mobile devices inside the vehicle with access to start the vehicle.
Mobile Device 1 Bluetooth Ranging Session	Active/Inactive	This parameter indicates if the system is currently searching for the mobile device using bluetooth.
Mobile Device 2 Bluetooth Ranging Session	Active/Inactive	This parameter indicates if the system is currently searching for the mobile device using bluetooth.
Mobile Device 3 Bluetooth Ranging Session	Active/Inactive	This parameter indicates if the system is currently searching for the mobile device using bluetooth.
Mobile Device 4 Bluetooth Ranging Session	Active/Inactive	This parameter indicates if the system is currently searching for the mobile device using bluetooth.
Mobile Device 5 Bluetooth Ranging Session	Active/Inactive	This parameter indicates if the system is currently searching for the mobile device using bluetooth.
Mobile Device 6 Bluetooth Ranging Session	Active/Inactive	This parameter indicates if the system is currently searching for the mobile device using bluetooth.
Mobile Device Interior Count with Entry Access	Counts	Indicates the number of mobile devices key fobs detected inside the vehicle you can use to enter the vehicle.
Total Valid Stored Mobile Devices	Counts	Indicates the total number of stored mobile devices up to 32 mobile devices.

K194 Rear Gate Module: Scan Tool Information

Rear Gate Module Scan Tool Data Parameters

Parameter	System State	Expected Value	Definition
Operating Conditions: Ignition ON			
Rear Closure	—	Inactive/Active	Displays active when the power endgate is operating.
Rear Gate Latch Unlatch Switch	—	Inactive/Active	Inactive when endgate is closed. Changes to active once the endgate opens.
Rear Gate Latch Primary Switch	—	Inactive/Active	Inactive when endgate is closed. Changes to active as soon as the endgate unlatches.
Rear Gate Latch Neutral Switch	—	Inactive/Active	Inactive when endgate is closed. Changes briefly to active once endgate unlatches then goes back to inactive.
Rear Gate Travel	—	Percentage	Calculated percentage of endgate travel. 0% = Full Close, 100% = Full Open.

Parameter	System State	Expected Value	Definition
Rear Gate Obstacle Detection Zone 1	—	Counts	Displays a counter for each fault detection zone, if an obstruction or excessive resistance is seen by the RGM while power opening or closing the count number will go up for the respective detection zone.
Rear Gate Obstacle Detection Zone 2	—	Counts	Displays a counter for each fault detection zone, if an obstruction or excessive resistance is seen by the RGM while power opening or closing the count number will go up for the respective detection zone.
Rear Gate Obstacle Detection Zone 3	—	Counts	Displays a counter for each fault detection zone, if an obstruction or excessive resistance is seen by the RGM while power opening or closing the count number will go up for the respective detection zone.
Rear Gate Obstacle Detection Zone 4	—	Counts	Displays a counter for each fault detection zone, if an obstruction or excessive resistance is seen by the RGM while power opening or closing the count number will go up for the respective detection zone.
Rear Gate Obstacle Detection Zone 5	—	Counts	Displays a counter for each fault detection zone, if an obstruction or excessive resistance is seen by the RGM while power opening or closing the count number will go up for the respective detection zone.
Rear Gate Obstacle Detection Zone 6	—	Counts	Displays a counter for each fault detection zone, if an obstruction or excessive resistance is seen by the RGM while power opening or closing the count number will go up for the respective detection zone.
Rear Gate Obstacle Detection Zone 7	—	Counts	Displays a counter for each fault detection zone, if an obstruction or excessive resistance is seen by the RGM while power opening or closing the count number will go up for the respective detection zone.
Rear Gate Latch Secondary Switch - Left	—	Inactive/Active	Inactive when endgate is closed. Changes to active as soon as the endgate unlatches.
Rear Gate Latch Secondary Switch - Right	—	Inactive/Active	Inactive when endgate is closed. Changes to active as soon as the endgate unlatches.
Rear Gate Latch Primary Switch - Right	—	Inactive/Active	Inactive when endgate is closed. Changes to active as soon as the endgate unlatches.
Rear Gate Latch Unlatch Switch - Right	—	Inactive/Active	Inactive when endgate is closed. Changes to active once the endgate opens.
Rear Gate Latch Neutral Switch - Left	—	Inactive/Active	Inactive when endgate is closed. Changes briefly to active once endgate unlatches then goes back to inactive.

K299 Audio/Video Interface Module: Scan Tool Information

Audio/Video Interface Module Scan Tool Data Parameters

Parameter	Expected Value	Definition
Operating Conditions: Ignition ON		
Vehicle Power Mode	Enumeration	0=Off, 1=Accessory, 2=Run, 3=Start/Request, 4=Propulsion
Vehicle Power Mode Invalidity	True or False	The scan tool displays an invalid power mode.
Diagnostic Data Identifier	Unsigned Numeric	Identifies a supplier and system specific data stream used by diagnostic testers to interpret a diagnostic data stream.
Manufacture’s Traceability Characters	Varies	The scan tool displays the Manufacture’s Traceability Characters.
ECU ID	Varies	The scan tool displays the ECU ID.
Application Software Identification Data Identifier	Varies	The scan tool displays the Application Software Identification Data Identifier.

Parameter	Expected Value	Definition
Vehicle Identification Number	Varies	The scan tool displays the vehicle identification number.
Repair Shop Code or Tester Serial Number	Varies	The scan tool displays the Repair Shop Code or Tester Serial Number.
Programming Date	Varies	The scan tool displays the date the module was programmed.
Manufacturers Enable Counter	Varies	The scan tool displays the Manufacturers Enable Counter.
ECU Diagnostic Address	Varies	The scan tool displays the ECU Diagnostic Address.
GM End Model Part Number	Varies	The scan tool displays the GM End Model Part Number.
GM Base Model Part Number	Varies	The scan tool displays the GM Base Model Part Number.
GM Base Model Part Number Alpha Code	Varies	The scan tool displays the GM Base Model Part Number Alpha Code.
GM End Model Part Number Alpha Code	Varies	The scan tool displays the GM End Model Part Number Alpha Code.

T3 Audio Amplifier: Scan Tool Information

Amplifier Scan Tool Data Parameters

Parameter	Expected Value	Definition
Operating Conditions: Ignition ON		
Power Mode	Off ACC Crank Run	The scan tool displays Off, Accessory, Run or Crank Request. This is the vehicle power mode status as received via serial data.
Active Noise Cancellation	On Off	The scan tool displays On or Off. This indicates if the Active Noise Cancellation feature is available and capable of operating.
Engine Sound Enhancement	On Off	The scan tool displays On or Off. This is the status of the engine sound enhancement function.
Battery Voltage	Varies	The scan tool displays volts. This is the voltage at the input to the amplifier.
Vehicle Speed	0 km/h	The scan tool displays the vehicle speed received by the amplifier in km/h or mph.
Engine Speed	0 RPM	The scan tool displays the current engine speed received by the amplifier in RPM .
Calculated System Temperature	Varies	The scan tool displays the calculated temperature of the amplifier in °C or °F.
Microphone Status	Normal	The scan tool displays Normal, Clipped, or Malfunction.
Microphone 1 Input Level	Varies	The scan tool displays counts from 0 to 65,535. This is the sound level currently being received by the microphone 1, with higher numbers indicating louder sounds.
Microphone 2 Input Level	Varies	The scan tool displays counts from 0 to 65,535. This is the sound level currently being received by the microphone 2, with higher numbers indicating louder sounds.
Microphone 3 Input Level	Varies	The scan tool displays counts from 0 to 65,535. This is the sound level currently being received by the microphone 3, with higher numbers indicating louder sounds.
Door Status	Varies	The scan tool displays All Closed or One or More Open. This is the current status of the vehicle access door latches as received via serial data.

T22 Wireless Accessory Charging Module: Scan Tool Information

The T22 Wireless Accessory Charging Module scan tool data parameters list contains all automatic level control related parameters that are available on the scan tool. The list is arranged in alphabetical order. A given parameter may appear in any one of the data lists.

Wireless Accessory Charging Module Scan Tool Data Parameters

Parameter	System State	Expected Value	Description (Range)
Operating Conditions: Ignition ON			
Alignment Status	—	Varies	The scan tool displays the current condition of Radar Alignment.
Charging Current Level	—	Varies	The scan tool displays the state or energy level of charging device being energized by inductive charging coil located under the cup holder (None, Low, Medium, High).
Charging Current Value	—	Varies	The scan tool displays the current in mA being energized by inductive charging coil located under cup holder (0–1000mA).
Wireless Charging Disable History - 1	—	Varies	Indicates why the wireless charging system was disabled.
Wireless Charging Disable History - 2	—	Varies	Indicates why the wireless charging system was disabled.
Wireless Charging Disable History - 3	—	Varies	Indicates why the wireless charging system was disabled.
Wireless Charging Disable History - 4	—	Varies	Indicates why the wireless charging system was disabled.
Wireless Charging Disable History - 5	—	Varies	Indicates why the wireless charging system was disabled.
Wireless Charging Disable History - 6	—	Varies	Indicates why the wireless charging system was disabled.
Wireless Charging Disable History - 7	—	Varies	Indicates why the wireless charging system was disabled.
Wireless Charging Disable History - 8	—	Varies	Indicates why the wireless charging system was disabled.

K111 Fuel Pump Power Control Module Scan Tool Information (L76/L78/LZ0)

Refer to: *K20 Engine Control Module: Scan Tool Information (L4B/L76/L78) 3-142* *K20 Engine Control Module: Scan Tool Information (LZ0) 3-174*.

K111 Fuel Pump Power Control Module Scan Tool Information (L4B)

Refer to: *K45 Powertrain Control Module: Engine Scan Tool Information 3-258*.

Diagnostic Information and Procedures

Strategy Based Diagnosis

The goal of Strategy Based Diagnosis is to provide guidance when you create a plan of action for each specific diagnostic situation. Following a similar plan for each diagnostic situation, you will achieve maximum efficiency when you diagnose and repair vehicles. Although each of the Strategy Based Diagnosis steps are numbered, you are not required to complete every step in order to successfully diagnose a customer concern. The first step of your diagnostic process should always be Understand and Verify the Customer's Concern. The final step of your diagnostic process should be to Repair and verify the Fix. Refer to the steps listed below for the correct Strategy Based Diagnosis.

Note: For additional information on the following steps refer to the corresponding numbered paragraphs listed below.

1. Understand and verify the customers concern.
2. Verify the vehicle is not operating as designed:

⇒ **If the vehicle is operating as designed review the suggestions listed below:**

- Check Identical Vehicle
- Customer Misunderstanding of System – Explain operation to customer or refer to owners or service manual
- Customer dissatisfaction – Submit a Field Product Report

⇓ **If the vehicle is not operating as designed**

3. Perform preliminary checks – Visual inspections and operational

⇒ **If the customers concern is found, refer to step 5**

⇓ **If the customers concern is not found**

4. Perform the Diagnostic System Check – Vehicle, determine the diagnostic service category to perform.

⇒ **If the customers concern is found, refer to step 5**

⇓ **If the customers concern is not found**

5. Check for related Bulletins, Recalls and Preliminary Information.

⇒ **If the customers concern is found, refer to step 7**

⇓ **If the customers concern is not found**

Note: If a diagnostic procedure indicates to replace a programmable control module, the control module must be reprogrammed with the latest available software and retested before replacement:

- If updated control module software is available, reprogram the control module and re-test to verify if updated software has corrected the concern. If the updated software has corrected the concern, no further action is required; Do not replace the control module. If the concern persists after programming the control module with the latest software, continue following the diagnostic instructions.
- If updated control module software is not available, continue following the diagnostic instructions.
- If the scan tool is unable to communicate with the suspected control module, attempt to reestablish communication by removing and reconnecting power to the control module. This may be performed by removing the fuse or fuses powering the control module or by disconnecting the electrical connector(s) at the control module. If communication with the control module is reestablished after removing and reconnecting power, reprogram the control module with the latest software (if available) and re-examine the concern.

6. Follow the diagnostic path listed below:
   - 6.1. Current DTC – Follow DTC Diagnostics
   - 6.2. Symptom no DTC – Follow Symptom Diagnostics
   - 6.3. No published diagnostic – Analyze and develop diagnostics or call Technical Assistance
   - 6.4. Intermittent/History DTC – See diagnostic detail below
7. Isolate the root cause then repair and verify the fix.
8. Re-examine the concern.

⇒ **If the vehicle is not repaired, refer to step 1**

⇓ **If the vehicle is repaired**

9. All OK.

Additional Information

1. Understand and Verify the Customer Concern: The first part of this step is to obtain as much information as possible from the customer. Are there aftermarket accessories on the vehicle? When does the condition occur? Where does the condition occur? How long does the condition last? How often does the condition occur? In order to verify the concern, the technician should be familiar with the normal operation of the system and refer to the owner or service manual for any information needed.
2. Vehicle Operating as Designed: This condition exists when the vehicle is found to operate normally. The condition described by the customer may be normal. Compare with another like vehicle that is operating normally under the same conditions described by the customer. Explain your findings and the operation of the system to the customer. If the customer is dissatisfied submit a Field Product Report.
3. Preliminary Checks: Conduct a thorough visual inspection. Review the service history. Detect unusual sounds or odors. Gather diagnostic trouble code (DTC) information in order to achieve an effective repair.
4. Perform Published Diagnostic System Check-Vehicle: The *Diagnostic System Check - Vehicle 3-358* verifies the proper operation of the system. This will lead the technician in an organized approach to diagnostics and identify what category of diagnostic to perform.
5. Check for related Bulletins, Recalls and Preliminary Information (PI).

Note: When diagnosing DTCs and symptoms that involve a control module, updated software may be available. Before replacing a control module, first determine if any software updates are available. If new software is available, reprogram the control module and reevaluate the concern. In many instances, reprogramming the control module with the latest software

may correct a software-related fault and resolve the concern without replacement of the control module.

6. Diagnostic categories:
   6.1. Current DTC: Follow the designated DTC diagnostic in order to make an effective repair. Refer to *Diagnostic Trouble Code (DTC) List - Vehicle 3-364*.
   6.2. Symptom - No DTC: Select the appropriate symptom diagnostic. Follow the diagnostic steps or suggestions in order to complete the repair. Refer to *Symptoms - Vehicle 3-420*.
   6.3. No Published Diagnostics: Analyze the Concern. Develop a plan for the diagnostics. The service manual schematics will help you to see system power, ground, input, and output circuits. You can also identify splices and other areas where multiple circuits are tied together. Look at component locations to see if components, connectors or harnesses may be exposed to extreme temperature, moisture, or corrosives (road salt, battery acid, oil or other fluids). Utilize the wiring diagrams, system description and operation, and system circuit description.
   6.4. Intermittent/History DTC: An intermittent condition is one that does not occur continuously, may be difficult to duplicate, and will only occur when certain conditions are met. Generally, an intermittent is caused by faulty electrical connections and wiring, malfunctioning components, electromagnetic/radio frequency interference, driving conditions, or aftermarket equipment. The following approaches/tools may prove to be beneficial in locating and repairing an intermittent condition or history DTC.
      - Combining technicians knowledge with the available service information.
      - Evaluate the symptoms and conditions described by the customer.

        North America – The GM Customer Concern Verification Sheets have been designed to improve communications between the service customer and the technician. The more clearly the technician understands the concern and its symptoms, the more likely the concern will be fixed right the first time. The blank CCVS can be found in GM Global Connect under Service, Service Forms.
      - Follow the suggestions on [Link target (target-id 62112-) not found] .
      - Use a tool with data capturing capabilities like scan tool, digital multi-meter, or (if available) a vehicle data recorder.
7. Isolate the Root Cause then Repair and Verify Fix: After isolating the root cause, make the repairs and validate for the correct operation by performing the *Diagnostic Repair Verification 3-421*. Verifying that the DTC or symptom has been corrected may involve road testing the vehicle.
8. Re-examine the Concern: If a technician cannot successfully find or isolate the concern, a re-evaluation is necessary. Re-verify the concern. The concern could be an intermittent or normal condition.

Diagnostic Procedure Instructions

The following is an instructional overview of all categories which may be included in a diagnostic procedure.

Diagnostic Instructions

- A link to the *Diagnostic System Check - Vehicle 3-358* is provided here. This procedure should be performed prior to performing other diagnostic procedures, as this prevents misdiagnosis where there are integrated system dependencies.
- A link to the *Strategy Based Diagnosis 3-348* is provided here. This provides an overview on how a technician should diagnose a vehicle.
- A link to the *Diagnostic Procedure Instructions 3-350* is provided here. This information is an instructional overview of all categories which may be included in a diagnostic procedure.

DTC Descriptor

Lists all DTCs and descriptors that are diagnosed within the procedure.

If the DTC supports symptom bytes they will either be listed with the DTC or there will be a link to the symptom byte list.

Diagnostic Fault Information

The Diagnostic Fault Information table identifies each circuit that makes up an electrical subsystem and the associated circuit faults. DTCs and symptoms are listed in the table for all circuit fault modes. This information can be used to diagnose an electrical fault, or as a quick visual aid showing how the different DTCs and symptoms apply for the subsystem being diagnosed.

All DTCs and symptoms shown in this table are not necessarily diagnosed during this procedure.

An example table from an engine coolant temperature (ECT) procedure:

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Signal	P0117	P0118, P0119	P0118*, P0119	P0128, P111E
Low Reference	—	P0118, P0119	—	P0128
* Internal control module or component damage may occur if the circuit shorts to B+.				

Typical Scan Tool Data

The Typical Scan Tool Data table identifies a scan tool data parameter and its value in reference to potential circuit faults.

An example table from an ECT procedure:

ECT Sensor

Circuit	Short to Ground	Open	Short to Voltage
Operating Conditions: Engine = Idling— At normal operating temperature. **Parameter Normal Range:** 88 to 105°C (190 to 221°F)			
Signal	140°C (248°F)	−40°C (−40°F)	−40°C (−40°F)
Low Reference	—	−40°C (−40°F)	—

Circuit/System Description

Circuit/System Description identifies circuits, components, and describes how the circuit/system normally functions.

Conditions for Running the DTC

Conditions for Running the DTC, identifies what conditions must be present to allow the diagnostic to run.

Conditions for Setting the DTC

Conditions for Setting the DTC, identifies the conditions that must be present in order to fail the diagnostic and when to set the DTC.

Actions Taken When the DTC Sets

Actions Taken When the DTC sets, identifies the default actions taken when a control module sets a DTC.

Conditions for Clearing the DTC

Conditions for Clearing the DTC, identifies the conditions that must be met in order to clear the DTC.

Diagnostic Aids

Diagnostic Aids are suggestions which explain other methods to diagnose the condition. It also provides unique information about the system to assist the technician in finding and repairing a vehicle condition.

Reference Information

Reference Information includes links providing additional information to be used with the diagnostic procedure.

For example:

- Schematic Reference
- Connector End View Reference
- Component View Reference
- Description and Operation
- Electrical Information Reference
- DTC Type Reference
- Scan Tool Reference
- Special Tools

Circuit/System Verification

The Circuit/System Verification, when supported, needs to be performed prior to the Circuit/System Testing. It will determine the following conditions:

- If a higher priority concern needs to be addressed first (E.g. other DTCs)
- If other conditions are present (E.g. low fluid level)
- If the condition is current
- If the condition is intermittent
- If the system is all Ok

Note: Any diagnostic step that asks if a DTC is “set” refers to a Set, Current, Present, Active DTC status. This does not include any other DTC status. For example History, Not Run, Passed and Failed.

Circuit/System Verification is a non-intrusive procedure outlining how to verify that a system or a portion of a system is functioning correctly. During the verification process, the vehicle is kept intact and tested as a complete system. The verification is used to assist the technician in determining whether a condition is current, intermittent, or not present (All Ok). When a condition is determined to be intermittent a technician can use the [Link target (target-id 62112-) not found] link in Electrical Information Reference for additional testing information.

The technician should be able to identify if the fault is occurring on the input (signal) circuit or on the output (control) circuit when applicable.

Component Codes
The component codes are a language independent method of identifying a common component between different areas in the service information. The component codes work regardless on how the actual component name was translated.

The component codes used on the schematics will have the base code with an extension to identify location or quantity. For example the ABS wheel speed sensors are identified on the schematic with a base code (B5) and a location extension (LF, RF, LR, and RR) as seen below:

- B5LF Wheel Speed Sensor - Left Front
- B5RF Wheel Speed Sensor - Right Front
- B5LR Wheel Speed Sensor - Left Rear
- B5LR Wheel Speed Sensor - Left Rear

The diagnostic procedures will use the base code (B5) for a wheel speed sensor but may or may not use the extension identifying location (LF, RF, LR, and RR).

Example:
Disconnect the harness connector at the appropriate B5 Wheel Speed Sensor.

Or

Disconnect the appropriate electrical connector: B5 Wheel Speed Sensor

This is done so the diagnostic procedure can be common for all four wheel speed sensors and not have to take into account part location or quantity.

When the diagnostic states “the appropriate” it is up to the technician to identify which component is being diagnosed either by the symptom (Driver’s door lock is inoperative) or the DTC descriptor (DTC C0585 04: Left Rear Door Latch Circuit Open).

Circuit/System Testing

Note: Performing the Circuit/System Verification category first will aid in determining if a vehicle condition currently exists.

Circuit/System Testing is a step by step, positive-flow, testing sequence which allows the technician to perform each test step, in sequence, until a fault is detected. If the result of a numbered test step is NOT achieved, the Right Repair Arrow below the failed test will identify what actions need to take place. If the result of a numbered test step is achieved, the normal flow is to proceed to the next numbered test step, as indicated by the Down Pass Arrow.

Intrusive diagnostics are performed to locate the system fault. System harness connections are disconnected from the component or control module to test individual circuit functions. The component or control module will be used to assist in verifying the circuit function. When a test does not pass, the repair steps (Right Repair Arrow) will indicate what circuit faults to test. For example a short to voltage, short to ground, or open/high resistance.

When testing for individual circuit faults, the technician is expected to perform terminal inspections such as connection surfaces and terminal tension at both the harness and the component or control module. When a condition is determined to be intermittent a technician can use the [Link target (target-id 62112-) not found] or [Link target (target-id 62194-) not found] link in Electrical Information Reference for additional information.

The component and control module will also be diagnosed during the test steps. A retest of a component or control module should always be performed before replacement. For example, reconnect all components and control modules and retest the system to verify the condition still exists before replacing components or control modules.

Component Testing

Component Testing may offer a static and/or dynamic component tests. These tests can be used to verify if a component is operating correctly to avoid unnecessary replacement.

Testing control modules in this category will not be offered. In most cases, the control module is used to verify the harness circuits in the Circuit/System Testing category and a retest of the control module should always be performed before replacement.

Repair Instructions

Repair Instructions provides a link to *Diagnostic Repair Verification 3-421*. This link describes how to verify the vehicle is repaired.

All links to repair, replacement, or programming procedures are located here.

Repair Verification

Repair Verification describes how to verify the vehicle is repaired when additional instructions are needed beyond what is in the Diagnostic Repair Verification.

Diagnostic System Check Instructions

The following is an overview of instructions for the general information and 14 step System Verification included in the Diagnostic System Check - Vehicle procedure.

Diagnostic Instructions

A link to *Strategy Based Diagnosis 3-348* is provided as an overview on how a technician should diagnose a vehicle.

A link to the Diagnostic System Check Instructions is provided. This provides an overview of instructions and examples for the general information and 14 step System Verification included in the Diagnostic System Check - Vehicle procedure. The examples in this document are intended to give the technician a general idea of what the test step is referring to. They are not intended to list every possible condition or situation.

Diagnostic Systems Check steps are listed by priority to guide the technician to the appropriate diagnostic procedure to correct the customer concern. There are many ways to determine the priority of diagnosing a vehicle concern. Some faults can cause customer perceived symptoms in areas unrelated to the fault. Using an example from the System Check, after reading DTCs, the technician is asked to verify there are no Electronic Control Unit Internal Performance Faults present. It is important that any internal performance issues are addressed prior to continuing through the System Check. There is no benefit addressing other DTCs that could be set due to an internal fault to a control module. If the fault is present, performing the diagnostic procedure for that fault will likely correct the customer perceived concern and possibly eliminate other DTCs that may be set.

Not all steps of the Diagnostic System Check have to be performed. The Diagnostic System Check tries to prioritize the test steps with the highest priority faults first. The technician is then lead to another document to do the actual diagnosis or repair. The strategy is to repair higher level faults that may be the cause of other system or component level symptoms. Additionally, the Diagnostic System Check can only be used for a single fault at a time. If additional faults are present, the technician must perform the diagnostic system check for each concern until all customer concerns are corrected.

Once a repair has been completed, General Motors diagnostic strategy is to always have the technician verify that the customer concern has been corrected. This is to prevent comebacks and to ensure customer satisfaction with their dealership experience. Therefore a link has been provided to *Diagnostic Repair Verification 3-421* procedure for the technician to verify the customer concern has been corrected.

There are some assumptions made when General Motors prepares service information. They include the following areas which are presumed to function as designed:

- The 12-volt battery is fully charged. General Motors assumes the majority of vehicles brought in for repair will be able to start and be driven into the service stall. If the vehicle has a dead battery, it is slow cranking or for any other reason the technician feels the customer concern may be battery related, a link is provided to [Link target (target-id 37781-) not found] . This procedure will guide the technician through inspecting and verifying the battery functions properly.
- Fuses should not be open. General Motors does not call out in diagnostic procedures to verify a fuse. The technician is expected to find an open fuse when the diagnostic test step states to check for an open circuit condition. Therefore a link has been provided to *Power Distribution Schematics 8-1049* and *Electrical Center Identification Views 8-40* for technicians to reference power sources and fuse locations if they feel there may be loss of power due to an open fuse condition.
- Ground circuits are clean, tight, and in the correct location. General Motors assumes that the original ground circuits have not been compromised. The technician is expected to find a poor ground connection when the diagnostic test step states to test the ground circuit for an open/high resistance. Therefore a link has been provided to *Ground Distribution Schematics 8-1101* and *Harness Routing Views 8-785* for technicians to reference ground locations and which ground circuits may be related to the customer concern.

- All connectors/terminals fully seated in the area of concern. General Motors assumes that all connections are properly installed. The technician is expected to find an open or poor connection when the diagnostic test step asks to test the circuit for an open/high resistance. Therefore a link has been provided to *Master Electrical Component List 8-1143* for technicians to reference which connections may be related to the customer concern.
- There are no aftermarket devices that affect the operation of the system. General Motors can only author diagnostic and repair information for vehicle systems and components that are original equipment or genuine GM Accessories. Aftermarket equipment can negatively affect original equipment operation and lead a technician's diagnosis of a concern in the wrong direction. Therefore a link has been provided to [Link target (target-id 310488-) not found] that guides a technician through the possible causes of vehicle problems related to aftermarket accessories.
- The scan tool powers up. General Motors assumes that power is available at the Data Link Connector and the scan tool will power on. Therefore a link has been provided to [Link target (target-id 148078-) not found] if the technician finds that the scan tool does not power on.

Updating Control Module Software

Control module software is an integral part of the operation and function of the control module. More than just the physical component, numerous corrections and enhancements can be changed in the software that will resolve many different faults. Service Information generally uses the term “software” as an indicator of a portion of the control module soft part that can be changed or updated; More specifically, this may be a boot loader, firmware, software, calibration, or other soft part.

As an overall strategy, reprogramming a control module with the most up-to-date software available is the correct diagnostic operation before replacing the control module. If a diagnostic procedure instructs to replace a control module, first determine if updated software is available. If it is, reprogram the control module with the latest software and retest the vehicle to determine if the fault is still present. Simply updating the software in a control module may resolve the concern without the cost or labor of replacing the control module. If programming the control module with the latest software corrects the concern, take no further action. If new software does not resolve the concern or if the control module already has the latest and most up-to-date software, continue with the corrective action identified in the diagnostic procedure.

Diagnostic System Check

1. VERIFY CUSTOMER CONCERN — This step is to obtain as much information as possible from the customer. Are there aftermarket accessories on the vehicle? When does the condition occur? Where does the condition occur? How long does the condition last? How often does the condition occur? Review the service history of the vehicle for previous repairs that could help diagnose the current concern.

   Now that the technician understands the customer concern, they should validate the concern on the vehicle. In order to verify the concern, the technician should be familiar with the normal operation of the system and refer to the owner or service manual for any information needed. Inspect the visible system components for obvious damage or conditions that could cause the concern. Conduct a thorough visual inspection. Detect unusual sounds or odors.

   The condition described by the customer may be normal. If the technician finds the vehicle to operate normally, compare with another like vehicle that is operating normally, under the same conditions described by the customer. If this is the case, explain your findings and the operation of the system to the customer. If the customer is dissatisfied, submit a Field Product Report.
2. BULLETIN SEARCH — By searching for related bulletins, recall/field actions and preliminary information documents, a procedure for a known field issue may resolve the customer concern with little or no diagnosis necessary saving the technician diagnostic time.
3. MECHANICAL CONCERNS — This step is designed to take the technician directly to a list of symptom diagnostic procedures. The technician is asked to verify the symptoms exhibited by the system are mechanical in nature and not related to an electrical system, see some examples below. If the technician feels the concern could be related to an electrical system, they should continue through the Diagnostic System Check to verify the electrical functionality of vehicle. If the technician feels the concern is exclusively related to a mechanical system, a link to *Symptoms - Vehicle 3-420* is provided to select the appropriate symptom diagnostic procedure for the customer concern.

   Examples:

   - Brake noise or diagnosing irregular pad wear
   - Water leak diagnosis
   - Engine or transmission fluid leak diagnosis
   - Manual window or door lock diagnosis

- Vehicle vibration diagnosis
- Exhaust noise or leak diagnosis

4. VEHICLE POWER UP VERIFICATION — The technician is asked in this step to verify the vehicle powers up. The technician should look for clues that multiple vehicle systems are receiving vehicle power mode messages, such as the cluster waking up, the radio powers on, the HVAC blower is operational, windshield wipers turn on, etc, with the ignition On. This would be a rare condition as both the power mode master and back-up power mode master would have to be inoperable, however, if the vehicle does not power up, a link to [Link target (target-id 148321-) not found] is provided.
5. CONTROL MODULE COMMUNICATION and DTC CHECK — The technician is asked in this step to record the following three pieces of data on the Repair Order; any control module that the scan tool determined is not communicating, any DTC and symptom byte set current or history, and the control module that has set the DTC.

   This is considered a setup step for the rest of the Diagnostic System Check. The technician is not expected to do anything other than record the three pieces of data provided by the scan tool on the Repair Order. This provides the information needed to complete the rest of the diagnostic system check.

   To complete this step, the technician is asked to utilize the scan tool Vehicle DTC Information function. This function will query every possible control module on the vehicle requesting all DTCs. During the DTC query, the scan tool will try to establish communication with each control module. If the scan tool can communicate with the control module during the DTC request, it will display PRESENT and provide the number of DTCs set in the control module. If the scan tool cannot communicate with a control module, it will only display NOT COMMUNICATING. Since the scan tool cannot determine if a given control module should be present or not, the technician is asked in a future step to verify that the vehicle was not built with control modules listed as NOT COMMUNICATING.

   If the scan tool cannot establish communications with ALL of the vehicles control modules, a link to [Link target (target-id 148085-) not found] is provided. A faulty control module or fault with the serial data circuit can cause no communication with all of the control modules on the vehicle. If any control module communicates on the serial data circuit, continue through the Diagnostic System check, as a future step will address any specific non communicating or group of non communicating control modules.

   Once the scan tool has completed the routine, the technician should review each control module that has set a DTC and document them on the Repair Order. When reviewing the DTCs, the technician should take notice if any DTCs are powertrain related, and if so, navigate in the scan tool to the Powertrain area and utilize the Capture Info function. This will upload any Freeze Frame/Failure Records stored in the control module to the scan tool in case the data is lost from the control module. As an example, if the technician commands a Clear DTCs function on a powertrain controller, all diagnostic information stored in the controller is erased. This includes Freeze Frame/ Failure Records and Inspection/Maintenance System Status indicators, if required for your region.
6. CONTROL MODULE INTERNAL PERFORMANCE FAULTS — The technician is asked to review the DTCs recorded in step 5 and verify there are no control module internal performance faults set current. This type of fault may be the cause of other symptoms or DTCs displayed by the vehicle. By addressing this fault first, the technician may find the other concerns are resolved. The technician should always follow the diagnostic procedure for these types of faults prior to replacing any control module. If the technician finds a control module has an internal performance fault, a link is provided to *Diagnostic Trouble Code (DTC) List - Vehicle 3-364* to select the appropriate DTC diagnostic procedure.

   Examples:

Note: DTC U3000 is used for both high level control module faults and lower level faults. The fault level is determined by the symptom byte set with the DTC. Examples of some DTC U3000 internal performance fault symptoms are shown below.

- U3000 04 Control Module System Internal Malfunction
- U3000 41 Control Module General Checksum Malfunction
- U3000 49 Control Module Internal Malfunction
- P0606 Control Module Internal Performance
- P0607 Control Module Performance

7. CONTROL MODULE COMMUNICATION VERIFICATION — This step is used to ensure the control modules that are NOT COMMUNICATING were not built on the vehicle. If the technician determines that a control module that is NOT COMMUNICATING should be present, the technician is asked to follow the appropriate diagnostic procedure listed in the [Link target (target-id 148085-) not found] document.

8. COMMUNICATION and POWER MODE FAULTS — This step is asking the technician to look for communication DTCs or DTCs related to control modules powering up based on power mode, communication enable or wake-up circuits. See in the below table some examples of the DTCs the technician should diagnose prior to continuing through the Diagnostic System Check. The technician should review the list of DTCs recorded in step 5 and verify that none of these type of DTCs are present. If so, the technician is referred to the *Diagnostic Trouble Code (DTC) List - Vehicle 3-364* to select the appropriate DTC diagnostic procedure.

   Examples:

Note: DTC U3000 is used for both high level control module faults and lower level faults. The fault level is determined by the symptom byte set with the DTC. Examples of some DTC U3000 communication and power mode faults are shown below.

- U3000 04 Control Module System Internal Malfunction
- U0140 Lost Communication with Body Control Module
- U0164 Lost Communication with Heater and Air Conditioning User Interface Control - Front
- U0184 Lost Communication with Radio
- U0402 Invalid Data Received from Transmission Control Module
- U0452 Invalid Data Received from Restraints Control Module
- U001B Gear Shift Control Module Powertrain Sensor Bus Enable
- U300D Ignition Input On/Start
- B1AA3 Run/Crank Relay Coil Control

9. POWER MODE VERIFICATION — This step verifies the Power Mode Master is receiving the proper output state of the ignition switch/push button switch. The technician should use the main power mode input, this being either the ignition key or, on vehicles equipped with Passive Entry Passive Start, the push button switch. The test should not be performed using a key fob, if the MIL is illuminated the powertrain controller may disable this input. The technician is asked to perform the test with the driver door open. This ensures the retained accessory power mode is inactive during this test which could result in different scan tool readings. The technician is only asked to verify the current Power Mode parameter in the power mode data display list. If the parameter does not match the actual ignition switch position, a link is provided to perform the [Link target (target-id 148321-) not found] diagnostic procedure.
10. SERIAL DATA AUTHENTICATION FAULTS — This step verifies that control modules are able to authenticate and verify the legitimacy of certain critical messages on in-vehicle networks. The technician should review the list of DTCs recorded in step 4 and verify that none of these DTCs are present. If so, the technician is referred to the *Diagnostic Trouble Code (DTC) List - Vehicle 3-364* to select the appropriate DTC diagnostic procedure.

    Examples:

    - U1960 Message Authentication Keys Missing or Incomplete
    - U1961 Control Module Security Hardware Internal Malfunction
    - U1962 Unable to Authenticate Serial Data Message
    - U3034 Message Authentication Keys Missing or Incomplete
    - U3035 Unable to Authenticate Serial Data Message
11. PROACTIVE ALERT IDENTIFIERS— The technician is asked in this step to verify there are no Proactive Alert Identifiers set. These identifiers are displayed on the scan tool and will only appear when the OnStar subscription is active and the customer has opted into the Proactive Alert service.
12. ENGINE CRANK and RUN VERIFICATION — Here the technician is asked to verify that the engine cranks and runs. The technician should use the main power mode input, this being either the ignition key or, on vehicles equipped with Passive Entry Passive Start, the push button switch, to complete this step. The test should not be performed using a key fob, if the MIL is illuminated the powertrain controller may disable this input. The technician should know at this point whether the engine cranks and runs without having to actually performing this test step. One of the follow has probably already occurred and this step can be skipped: The technician drove the vehicle into the stall or verified when checking the Crank and Run parameter in step 8. If the technician has not already somehow verified the engine cranks in previous steps, the technician should perform this test step. Regardless of how this step was performed, if the engine does not crank, a link is provided to *Engine Does Not Crank 3-421* or if the engine cranks but does not run, a link is provided to *Engine Cranks But Does Not Run 3-421* for the technician to choose the correct diagnostic procedure for the actual engine application being used.

13. REMAINING DTC REVIEW — Here the technician is asked to review any remaining DTCs that were not addressed in previous steps. The technician is asked first to verify there are no control module supply voltage, system voltage or 5 V circuit DTCs present. Control modules, systems or components with insufficient or zero voltage can cause one or multiple symptoms to exist on the vehicle. Control module voltage issues could also be the cause of failures during a programming event. The technician should correct voltage issues prior to addressing any programming or configuration DTCs. The technician should then check for any ECU programming, setup or configuration DTCs. By programming software or configuring a control module, the technician could correct the customer concern unobtrusively. The remaining DTCs, which are usually specific system or component faults, are diagnosed last. They can include ECU input and output circuit DTCs or individual circuit faults that usually cause single symptoms or failure modes on the vehicle and can be fixed following the proper DTC diagnostic procedure. In general, the technician should think about what DTCs or faults could be caused by another DTC or fault. A failed sensor may set a component DTC and then the system may set a DTC indicating the system cannot operate properly. By correcting the sensor fault, the system may now operate properly and the system level DTC will transition to history. Refer to the examples within each category below to understand the differences between these DTCs. If DTCs of these type are current, the technician is referred to *Diagnostic Trouble Code (DTC) List - Vehicle 3-364* to choose the correct DTC diagnostic procedure.

    13.1. Voltage DTCs

Note: DTC U3000 is used for both high level control module faults and lower level faults. The fault level is determined by the symptom byte set with the DTC. Examples of some DTC U3000 voltage faults are shown below.

- U3000 16 Control Module Circuit Low Voltage
- U3000 17 Control Module Circuit High Voltage
- B19F4 Vehicle 12V Charging System
- P0560 System Voltage
- P0651 Sensor Reference 2 Circuit
- U3006 Control Module Power 1 Circuit

    13.2. Programming, Setup, Configuration or Software Performance DTCs

Note: DTC U3000 is used for both high level control module faults and lower level faults. The fault level is determined by the symptom byte set with the DTC. Examples of some DTC U3000 programming, setup, configuration, or software faults are shown below.

- U3000 51 Control Module Not Programmed
- U3000 54 Control Module Missing Calibration
- U3000 55 Control Module Not Configured
- C05D4 Brake Master Cylinder Piston Position Sensor Calibration Not Learned
- P0602 Control Module Not Programmed
- P0630 VIN Not Programmed or Mismatched - Powertrain Control Module (PCM)

    13.3. Component related DTCs

Note: DTC U3000 is used for both high level control module faults and lower level faults. The fault level is determined by the symptom byte set with the DTC. Examples of some DTC U3000 component faults are shown below.

- U3000 4A Control Module Incorrect Component Installed
- B0013 Co-Driver Knee Module High Control
- B15A7 Instrument Panel Accent Lighting Control
- C0502 Left Front Wheel Speed Sensor Circuit Low Input
- P0535 Air Conditioning Evaporator Temperature Sensor Circuit
- P0131 Heated Oxygen Sensor Circuit Low
- P0712 Transmission Fluid Temperature Sensor Circuit Low

    13.4. System related DTCs

Note: DTC U3000 is used for both high level control module faults and lower level faults. The fault level is determined by the symptom byte set with the DTC. Examples of some DTC U3000 system related faults are shown below.

- U3000 9A Control Module Incorrect Component or System Operating Conditions Exceeded
- B1A04 Front View Camera - Windshield
- C003F Wheel Speed Sensors Direction Correlation
- C2A21 Park Brake Actuator Position Unknown
- P0101 Mass Airflow Sensor Performance
- P175E Transmission Control System - Shift Limiting Active

13.5. Any other remaining DTCs — The technician should diagnose and correct any other DTCs that are left that were not from the categories above.

14. EMISSION RELATED INSPECTION/MAINTENANCE TESTING CONCERNS — Several regions require that a vehicle pass on-board diagnostic system tests and the inspection/maintenance emission tests in order to renew license plates or vehicle registration. This is accomplished by viewing the Inspection/Maintenance System Status display on a scan tool. Using a scan tool, the technician can observe the Inspection/Maintenance System Status in order to verify that the vehicle meets the criteria that comply with the local area requirements. If inspection and maintenance checks are required in your region, and the customer concern is related to not passing an Inspection/Maintenance test, a link is provided to *Inspection/Maintenance System Check 3-421* where the technician can choose the appropriate Inspection/Maintenance System Check for the actual engine application being used.
15. SYMPTOM DIAGNOSIS — At this step, the diagnostics are assuming that the only information the technician has available to diagnose the customer concern are symptoms of a problem. There are no DTCs set current or history. There may be a Driver Information Center display message or a system indicator to aid in identifying the root cause. The technician should evaluate the symptoms and conditions described by the customer and perform the symptoms diagnostics for the area of customer concern. A link is provided to *Symptoms - Vehicle 3-420* which contains a list of all symptoms related to this service manual publication.

Diagnostic Starting Point - Vehicle

Begin the system diagnosis with *Diagnostic System Check - Vehicle 3-358*. The Diagnostic System Check - Vehicle will provide a complete strategy to locate and repair a mechanical or electrical vehicle fault. Not following this strategy may cause additional diagnostic time and/or misdiagnosis.

The Diagnostic System Check - Vehicle will provide the following strategy:

- When to verify the customer concern and identify related bulletins, recalls and preliminary information
- When to identify a control module that is not communicating, a control module that has set a DTC, and the DTC diagnostic priority
- When to address power mode concerns
- When to verify the engine cranks and runs
- When to diagnose symptom related concerns

Diagnostic System Check - Vehicle

Diagnostic Instructions

- Review *Strategy Based Diagnosis 3-348* for an overview of the diagnostic approach.
- *Diagnostic System Check Instructions 3-353* provides an overview of each diagnostic step.
- Continue through the Diagnostic System Check until you are directed to follow a particular diagnostic or repair procedure. Once a repair has been completed, perform the *Diagnostic Repair Verification 3-421* and verify the customer concern has been corrected.

The diagnostic procedures within this manual are developed on the assumption that the following areas function as designed:

- The 12 V battery is fully charged and cables are clean and tight. Refer to: [Link target (target-id 37781-) not found] .
- Fuses are not open. Refer to: *Power Distribution Schematics 8-1049* and *Electrical Center Identification Views 8-40*.
- Ground circuits for the area of customer concern are clean, tight, and in the correct location. Refer to: *Ground Distribution Schematics 8-1101* and *Harness Routing Views 8-785*.
- All connectors/terminals fully seated in the area of concern. Refer to: *Master Electrical Component List 8-1143*.
- There are no aftermarket devices that affect the operation of the system. Refer to: [Link target (target-id 310488-) not found] .
- The scan tool powers up. Refer to: [Link target (target-id 148078-) not found] .

Updating Control Module Software

For control modules that are able to be reprogrammed, updated software may become available as a part of normal bug correction, feature updates, and control module diagnostic enhancement. In the course of normal fault diagnosis, if a diagnostic procedure indicates to replace a programmable control module, the control module must first be reprogrammed with the latest available software and retested before replacement:

- If updated control module software is available, reprogram the control module and re-test to verify if updated software has corrected the concern. If the updated software has corrected the concern, no further action is required; Do not replace the control module. If the concern persists after programming the control module with the latest software, continue following the diagnostic instructions.
- If updated control module software is not available, continue following the diagnostic instructions.

Diagnostic System Check

1. VERIFY CUSTOMER CONCERN — Understand and validate the customer concern. Inspect the visible system components for obvious damage or conditions that may cause the concern.
2. BULLETIN SEARCH — Check for related bulletins, recall/field actions and preliminary information.
3. MECHANICAL CONCERNS — Verify the symptom is not exclusively a mechanical concern.

⇒ **If the symptom is exclusively a mechanical concern**

Refer to: *Symptoms - Vehicle 3-420*.

⇓ **If the symptom is not a mechanical concern**

Note:

- Do not clear any DTCs unless instructed to do so by a diagnostic procedure. If any DTC is Powertrain related, select Capture Info to store DTC and Freeze Frame/Failure Records to the scan tool.
- Changes in vehicle power mode can be determined by the indicators on the S38 On/Off Vehicle Switch. The indicator should match the selected power mode and change as the power mode is changed.

4. VEHICLE POWER UP VERIFICATION — Vehicle in Service Mode, verify the vehicle powers up.

⇒ **If the vehicle does not power up**

Refer to: [Link target (target-id 148321-) not found] .

⇓ **If the vehicle powers up**

Note: When checking for DTCs and determining what diagnostic actions should be taken, it is important to understand if the DTC is a current DTC or a history DTC. It is not uncommon for vehicles to arrive for service with a DTC that is history and the underlying fault condition no longer present. Refer to *DTC Status Information 3-362* to help determine which DTCs are current and should be diagnosed as such, and which DTCs are not current and should not be considered for diagnosis.

5. CONTROL MODULE COMMUNICATION and DTC CHECK - Using a scan tool, perform the Vehicle DTC Information function and verify at least one control module communicates with the scan tool. Record on the Repair Order the following information:
   - Any control module that is not communicating.
   - Any DTC, including symptom byte, and the control module that has set the DTC.

⇒ **If the scan tool does not communicate with the vehicle**

Refer to: [Link target (target-id 300812-) not found] .

⇓ **If the scan tool communicates with any control module**

6. CONTROL MODULE INTERNAL PERFORMANCE FAULTS - Verify there is no current control module Internal Performance DTCs set.

⇒ **If any DTC of this type is set**

Refer to: *Diagnostic Trouble Code (DTC) List - Vehicle 3-364*.

⇓ **If no DTC of this type is set**

Note: If the scan tool is unable to communicate with a control module, attempt to reestablish communication by removing and reconnecting power to the control module. This action will typically be performed in the course of normal fault diagnosis but may also be performed by removing the fuse or fuses powering the control module or by disconnecting the electrical connector(s) at the control module. If communication with the control module is reestablished after removing and reconnecting power, reprogram the control module with the latest software (if available) and re-examine the concern. Do not replace the control module without first determining if new software is available and, if so, programming the control module with the new software to determine if the software has corrected the concern.

7. CONTROL MODULE COMMUNICATION VERIFICATION — Verify the vehicle is equipped with any control module identified as not communicating on the scan tool. For a list of all control modules the vehicle may be equipped with, refer to: [Link target (target-id 148085-) not found] . With all non-communicating control module(s) identified, select the appropriate Data Communication schematic to determine the RPO(s) associated with the control module and verify the RPO is or is not present on the vehicle being diagnosed. All control modules should be communicating, as equipped.

⇒ **If the vehicle is equipped with a control module that is not communicating**

Refer to: [Link target (target-id 148085-) not found] . Select the appropriate Scan Tool Does Not Communicate with Device on CAN link in the Diagnostic Procedure column.

⇓ **If all control modules the vehicle is built with are communicating**

8. COMMUNICATION and POWER MODE FAULTS - Verify there are no current control module Power Mode or Communication DTCs set.

⇒ **If any DTC of this type is set**

Refer to: *Diagnostic Trouble Code (DTC) List - Vehicle 3-364*.

⇓ **If no DTC of this type is set**

Note: The engine may start during this test. Ensure the vehicle is out of gear and the parking brake is applied. Turn the engine OFF as soon as the crank power mode parameter has been observed.

9. POWER MODE VERIFICATION — Driver door open, observe each scan tool Power Mode data parameter while cycling through all power modes. Verify all Power Mode data parameters match the actual ignition switch/push button switch selection.

⇒ **If any Power Mode data parameter does not match**

Refer to: [Link target (target-id 148321-) not found] .

⇓ **If all Power Mode data parameters match**

10. SERIAL DATA AUTHENTICATION FAULTS - Verify DTC U1960, U1961, U1962,U19A3, U3034, or U3035 is not set.

⇒ **If any of the DTCs are set**

Refer to: *Diagnostic Trouble Code (DTC) List - Vehicle 3-364*.

⇓ **If none of the DTCs are set**

11. PROACTIVE ALERT IDENTIFIERS — The technician is asked in this step to verify there are no Proactive Alert Identifiers set. These identifiers are displayed on the scan tool and will only appear when the OnStar subscription is active and the customer has opted into the Proactive Alert service.

⇒ **If any Proactive Alert Identifier is set**

Refer to: *Proactive Alerts List 3-421*

⇓ **If no Proactive Alert Identifier is set**

12. ENGINE CRANK and RUN VERIFICATION — Verify that the engine cranks and runs.

⇒ **If the engine does not crank**

Refer to: *Engine Does Not Crank 3-421*.

⇒ **If the engine does not run**

Refer to: *Engine Cranks But Does Not Run 3-421*.

⇓ **If the engine cranks and runs**

13. REMAINING DTC REVIEW — Verify there are no other DTCs set.

⇒ **If other DTCs are set**

Diagnose them in the order listed below. Refer to *Diagnostic Trouble Code (DTC) List - Vehicle 3-364*.

13.1. Voltage DTCs

13.2. Programming, Setup or Configuration or Software Performance DTCs

13.3. Component related DTCs

13.4. System related DTCs

13.5. Any remaining DTCs

⇓ **If no other DTCs are set**

14. EMISSION RELATED INSPECTION/MAINTENANCE TESTING CONCERNS — If inspection and maintenance checks are required in your region, verify the customer concern is not related to inspection/maintenance testing.

⇒ **If the customer concern is related to inspection/maintenance testing**

Refer to: *Inspection/Maintenance System Check 3-421*.

⇓ **If the customer concern is not related to inspection/maintenance testing**

15. SYMPTOM DIAGNOSIS — Diagnose any remaining customer concern. Refer to: *Symptoms - Vehicle 3-420*.

DTC Status Information

Diagnostic Trouble Codes (DTCs) are status indicators of the vehicle's self-diagnostic and reporting capability. Each DTC represents the status of a particular internal test within a control module. Given appropriate conditions, the control module will begin actively monitoring conditions specified by the diagnostic. These are identified and referred to as Conditions for Running the DTC in service information. Each DTC has an associated status, identifying the state of the control module diagnostic. These statuses are identified when viewing DTC information on the scan tool and are described below.

DTC Status

Decoded Value	Description
Not Failed	Test has completed at least once this operating cycle and has passed successfully each time
Current	Test has completed since the last DTC clear, has met the threshold to be stored in long term memory, and has failed the most recent completed test. Test may not have run yet this operation cycle.
History	Test has completed since the last DTC clear, has met the threshold to be stored in long term memory, and has passed the most recent completed test. Test may not have run yet this operation cycle.
Pending	Test has completed and failed at least once in the current or previous operation cycle.
Test Not Complete this Operating Cycle	Test has completed at least once since DTC clear but has not completed yet this operation cycle. Test may have failed since clear but has not met the threshold to be stored in long term memory.
Test Not Complete Since DTC Cleared	Test has not completed successfully since the DTC was last cleared.
Failed Since DTC Cleared	Test has completed since the last DTC clear and failed at least once but has not met the threshold to be stored in long term memory and has not failed during the current or previous operation cycle.

This Operating Cycle

Decoded Value	Description
Failed	Test has completed at least once this operation cycle and has failed at least once.
Not Failed	Test has completed at least once this operation cycle and has passed each time.
Passed and Failed	Test has completed and failed at least once this operation cycle, but the most recent test passed.
Test Not Complete for this DTC	Test has not completed yet this operation cycle.

Last Test

Decoded Value	Description
Passed	Most recent test completed and passed.
Failed	Most recent test completed and failed.
Not Complete Since DTC Cleared	Test has not completed since DTC clear.

Since DTC Clear

Decoded Value	Description
Failed	Test has completed at least once since DTC was cleared and has failed at least once, including the most recent test.
Passed and Failed	Test has completed at least once since DTC was cleared and the most recent test passed, but not all tests have passed.
Not Failed	Test has completed at least once since DTC was cleared and every test has passed.
Test Not Complete for this DTC	Test has not completed yet since DTC was cleared.

Warning Indicator

Decoded Value	Description
Requested	A malfunction indicator has been commanded to be illuminated as a result of this DTC.
Not Requested	A malfunction indicator has not been requested as a result of this DTC.

Diagnosing History DTCs

It is very important to understand DTC status and its relationship to diagnosing a vehicle. If a DTC status is History, this means that the fault is not currently present on the vehicle. In any instance of a history DTC, diagnosis using a DTC diagnostic procedure in service information should not be attempted if not directly related to the customer complaint. Every diagnostic is written only for an active fault with a current DTC. Following a diagnostic procedure when only a history DTC is present will likely result in a misdiagnosis. This is foundational to *Strategy Based Diagnosis 3-348* and outlined as part of *Diagnostic System Check - Vehicle 3-358*.

If a DTC is only presented as a history DTC and is related to the customer complaint, it may be used as a guide or indicator for replicating the condition that caused the DTC to set. Observing the Conditions for Running the DTC in a DTC diagnostic procedure may help in recreating the conditions necessary for the DTC to run. Information within the DTC diagnostic procedure, such as the Fault Information table or Conditions for Setting the DTC, may also be helpful in recreating an intermittent DTC. Refer to Additional Information in *Strategy Based Diagnosis 3-348* for more detail in diagnosing intermittent concerns.

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Emissions Related DTCs

Action Taken When the DTC Sets – Type A

- The control module illuminates the malfunction indicator lamp (MIL) when the diagnostic runs and fails.
- The control module records the operating conditions at the time the diagnostic fails. The control module stores this information in the Freeze Frame/Failure Records.

Action Taken When the DTC Sets – Type B

- The control module illuminates the MIL on the second consecutive ignition cycle that the diagnostic runs and fails.
- The control module records the operating conditions at the time the diagnostic fails. The first time the diagnostic fails, the control module stores this information in the Failure Records. If the diagnostic reports a failure on the second consecutive ignition cycle, the control module records the operating conditions at the time of the failure. The control module writes the operating conditions to the Freeze Frame and updates the Failure Records.
- The following applies to misfire DTCs:
  - If the control module detects a low level or an emission level misfire condition during 2 consecutive trips, the control module illuminates the MIL.
  - If the control module detects a high level or catalyst damaging misfire, the control module flashes the MIL at a rate of once per second.
  - If the control module detects a misfire during 2 non-consecutive trips, the stored conditions are compared with the current conditions. The control module illuminates the MIL when the following conditions occur:
    - The engine load is within 20 percent of the previous test that failed.
    - The engine speed is within 375 RPM of the previous test that failed.
    - The engine coolant temperature is in the same range of the previous test that failed.
- The following applies to fuel trim DTCs:
  - If the control module detects a fuel trim condition during 2 consecutive trips, the control module illuminates the MIL.
  - If the control module detects a fuel trim condition during 2 non-consecutive trips, the stored conditions are compared with the current conditions. The control module illuminates the MIL when the following conditions occur:
    - The engine load is within 20 percent of the previous test that failed.
    - The engine speed is within 375 RPM of the previous test that failed.
    - The engine coolant temperature is in the same range of the previous test that failed.

Conditions for Clearing the MIL/DTC – Type A or Type B

- The control module turns OFF the MIL after 4 consecutive ignition cycles that the diagnostic runs and does not fail.

- A current DTC, Last Test Failed, clears when the diagnostic runs and passes.
- A history DTC clears after 40 consecutive warm-up cycles, if no failures are reported by this or any other emission related diagnostic.
- Clear the MIL and the DTC with a scan tool.

Non-Emissions Related DTCs

Action Taken When the DTC Sets – Type C

- The control module stores the DTC information into memory when the diagnostic runs and fails.
- The MIL will not illuminate.
- The control module records the operating conditions at the time the diagnostic fails. The control module stores this information in the Failure Records.
- The driver information center, if equipped, may display a message.

Conditions for Clearing the DTC – Type C

- A current DTC Last Test Failed clears when the diagnostic runs and passes.
- A history DTC clears after 40 consecutive warm-up cycles, if no failures are reported by this or any other non-emission related diagnostic.
- Clear the DTC with a scan tool.

Diagnostic Trouble Code (DTC) List - Vehicle

This master list includes all applicable diagnostic trouble codes in alphanumeric order.

Diagnostic Trouble Code (DTC) List - Vehicle

DTC	Diagnostic Procedure
B0001	Supplemental Restraints - [Link target (target-id 289883-) not found]
B0002	Supplemental Restraints - [Link target (target-id 289883-) not found]
B0010	Supplemental Restraints - [Link target (target-id 289884-) not found]
B0011	Supplemental Restraints - [Link target (target-id 289884-) not found]
B0021	Supplemental Restraints - [Link target (target-id 317288-) not found]
B0029	Supplemental Restraints - [Link target (target-id 317288-) not found]
B0070	Supplemental Restraints - [Link target (target-id 317289-) not found]
B0072	Supplemental Restraints - [Link target (target-id 317289-) not found]
B007E	Supplemental Restraints - [Link target (target-id 313882-) not found]
B007F	Supplemental Restraints - [Link target (target-id 313882-) not found]
B0090	Supplemental Restraints - [Link target (target-id 317522-) not found]
B0091	Supplemental Restraints - [Link target (target-id 317522-) not found]
B0092	Supplemental Restraints - [Link target (target-id 317522-) not found]
B0093	Supplemental Restraints - [Link target (target-id 317522-) not found]
B0094	Supplemental Restraints - [Link target (target-id 317522-) not found]
B0095	Supplemental Restraints - [Link target (target-id 317522-) not found]
B0096	Supplemental Restraints - [Link target (target-id 317522-) not found]
B0097	Supplemental Restraints - [Link target (target-id 317522-) not found]
B0098	Supplemental Restraints - [Link target (target-id 317522-) not found]

DTC	Diagnostic Procedure
B0126	Driver Monitoring and Occupant Detection - [Link target (target-id 327949-) not found]
B012C	Power Outlets - [Link target (target-id 338801-) not found]
B0172	HVAC - Automatic - [Link target (target-id 373382-) not found]
B0201	Image Display Cameras - [Link target (target-id 333522-) not found]
B0202	Image Display Cameras - [Link target (target-id 344552-) not found]
B0203	Image Display Cameras - [Link target (target-id 344553-) not found]
B0204	Image Display Cameras - [Link target (target-id 344554-) not found]
B1008	Horns and Pedestrian Alerts - [Link target (target-id 315457-) not found]
B100C	Trailering Systems - [Link target (target-id 326388-) not found]
B1023	Wipers and Washers - [Link target (target-id 317708-) not found]
B1038	Vehicle Access - [Link target (target-id 316927-) not found]
B1048	Lighting - [Link target (target-id 317465-) not found]
B1066	Fixed and Moveable Windows - [Link target (target-id 315458-) not found]
B107E	Vehicle Access - [Link target (target-id 317528-) not found]
B107F	Vehicle Access - [Link target (target-id 317528-) not found]
B108E	Lighting - [Link target (target-id 313551-) not found]
B1090	Power Seats - [Link target (target-id 324035-) not found]
B1091	Power Seats - [Link target (target-id 324035-) not found]
B1092	Power Seats - [Link target (target-id 324035-) not found]
B1093	Power Seats - [Link target (target-id 324035-) not found]
B1094	Power Seats - [Link target (target-id 324035-) not found]
B1095	Power Seats - [Link target (target-id 324035-) not found]
B1096	Power Seats - [Link target (target-id 324036-) not found]
B1097	Power Seats - [Link target (target-id 324036-) not found]
B1098	Power Seats - [Link target (target-id 324036-) not found]
B1099	HVAC - Automatic - [Link target (target-id 373356-) not found]
B109C	Power Seats - [Link target (target-id 324036-) not found]
B109D	Power Seats - [Link target (target-id 324036-) not found]
B109E	Power Seats - [Link target (target-id 324036-) not found]
B10A9	Trailering Systems - [Link target (target-id 325943-) not found]
B10B4	Supplemental Restraints - [Link target (target-id 317523-) not found]
B10BD	Supplemental Restraints - [Link target (target-id 313886-) not found]
B10E9	Lighting - [Link target (target-id 338014-) not found]
B10FA	HVAC - Automatic - [Link target (target-id 318791-) not found]
B1105	Power Seats - [Link target (target-id 317270-) not found]
B1114	Cellular, Entertainment, and Navigation - [Link target (target-id 313041-) not found]
B113C	Theft Deterrent - [Link target (target-id 320486-) not found]
B1141	HVAC - Automatic - [Link target (target-id 318791-) not found]
B114C	HVAC - Automatic - [Link target (target-id 373298-) not found]
B1152	HVAC - Automatic - [Link target (target-id 373146-) not found]
B115E	Vehicle Access - [Link target (target-id 317532-) not found]
B115F	Vehicle Access - [Link target (target-id 317532-) not found]

DTC	Diagnostic Procedure
B11A2	Vehicle Access - [Link target (target-id 317530-) not found]
B11A3	Vehicle Access - [Link target (target-id 317530-) not found]
B11A4	Vehicle Access - [Link target (target-id 317531-) not found]
B11A5	Vehicle Access - [Link target (target-id 317531-) not found]
B120C	Supplemental Restraints - [Link target (target-id 317523-) not found]
B1236	Lighting - [Link target (target-id 313554-) not found]
B1236	Image Display Cameras - [Link target (target-id 319392-) not found]
B125D	Vehicle Access - [Link target (target-id 317533-) not found]
B1267	Wipers and Washers - [Link target (target-id 317709-) not found]
B1270	Driver Assistance Systems - [Link target (target-id 357004-) not found]
B1271	Driver Assistance Systems - [Link target (target-id 373915-) not found]
B12CC	Seat Heating and Cooling - [Link target (target-id 317279-) not found]
B12D4	Supplemental Restraints - [Link target (target-id 317524-) not found]
B12D5	Supplemental Restraints - [Link target (target-id 317524-) not found]
B12FA	Wipers and Washers - [Link target (target-id 316884-) not found]
B132B	Parking Assistance Systems - [Link target (target-id 297192-) not found]
B132C	Parking Assistance Systems - [Link target (target-id 297192-) not found]
B132D	Parking Assistance Systems - [Link target (target-id 297192-) not found]
B132E	Parking Assistance Systems - [Link target (target-id 297192-) not found]
B1338	Seat Heating and Cooling - [Link target (target-id 317279-) not found]
B1339	Seat Heating and Cooling - [Link target (target-id 317279-) not found]
B133A	Seat Heating and Cooling - [Link target (target-id 317279-) not found]
B1346	Cellular, Entertainment, and Navigation - [Link target (target-id 313801-) not found]
B1349	Parking Assistance Systems - [Link target (target-id 317615-) not found]
B1388	Driver Assistance Systems - [Link target (target-id 331168-) not found]
B1389	Driver Assistance Systems - [Link target (target-id 331168-) not found]
B13A9	Supplemental Restraints - [Link target (target-id 329393-) not found]
B13AA	Cellular, Entertainment, and Navigation - [Link target (target-id 313043-) not found]
B13AB	Cellular, Entertainment, and Navigation - [Link target (target-id 317598-) not found]
B13AC	Driver Assistance Systems - [Link target (target-id 297199-) not found]
B13AD	Driver Assistance Systems - [Link target (target-id 297200-) not found]
B13D8	HVAC - Automatic - [Link target (target-id 373299-) not found]
B13E7	Horns and Pedestrian Alerts - [Link target (target-id 313548-) not found]
B1442	Remote Functions - [Link target (target-id 319783-) not found]
B1444	Remote Functions - [Link target (target-id 319784-) not found]
B1451	Remote Functions - [Link target (target-id 319786-) not found]
B147F	Driver Assistance Systems - [Link target (target-id 345921-) not found]
B1491	Supplemental Restraints - [Link target (target-id 317525-) not found]
B1511	Remote Functions - [Link target (target-id 319787-) not found]
B1513	Remote Functions - [Link target (target-id 319788-) not found]
B1586	Vehicle Access - [Link target (target-id 347029-) not found]
B1589	Vehicle Access - [Link target (target-id 347544-) not found]

DTC	Diagnostic Procedure
B158A	Vehicle Access - [Link target (target-id 347544-) not found]
B158B	Vehicle Access - [Link target (target-id 347545-) not found]
B1594	Image Display Cameras - [Link target (target-id 309439-) not found]
B1595	Image Display Cameras - [Link target (target-id 309440-) not found]
B1596	Image Display Cameras - [Link target (target-id 341717-) not found]
B1597	Image Display Cameras - [Link target (target-id 309441-) not found]
B1598	Image Display Cameras - [Link target (target-id 309442-) not found]
B1599	Driver Monitoring and Occupant Detection - [Link target (target-id 327976-) not found]
B15A0	Cellular, Entertainment, and Navigation - [Link target (target-id 317734-) not found]
B15A1	Cellular, Entertainment, and Navigation - [Link target (target-id 313044-) not found]
B15AB	Driver Assistance Systems - [Link target (target-id 345918-) not found]
B15C2	Lighting - [Link target (target-id 327216-) not found]
B15DF	Supplemental Restraints - [Link target (target-id 317291-) not found]
B15E3	Supplemental Restraints - [Link target (target-id 317291-) not found]
B15EE	Immobilizer - [Link target (target-id 320484-) not found]
B16C5	Vehicle Access - [Link target (target-id 313566-) not found]
B170C	Seat Heating and Cooling - [Link target (target-id 317280-) not found]
B170E	Seat Heating and Cooling - [Link target (target-id 317280-) not found]
B171C	Vehicle Access - [Link target (target-id 317538-) not found]
B1737	Cellular, Entertainment, and Navigation - [Link target (target-id 304104-) not found]
B174E	Cellular, Entertainment, and Navigation - [Link target (target-id 324214-) not found]
B176A	Vehicle Access - [Link target (target-id 316934-) not found]
B178C	Cellular, Entertainment, and Navigation - [Link target (target-id 313049-) not found]
B17F0	Supplemental Restraints - [Link target (target-id 328903-) not found]
B17F2	Supplemental Restraints - [Link target (target-id 328903-) not found]
B17FE	Vehicle Access - [Link target (target-id 317538-) not found]
B1800	Vehicle Access - [Link target (target-id 317533-) not found]
B1802	Vehicle Access - [Link target (target-id 317531-) not found]
B1803	Vehicle Access - [Link target (target-id 317538-) not found]
B1804	Vehicle Access - [Link target (target-id 317530-) not found]
B1805	Vehicle Access - [Link target (target-id 317533-) not found]
B1837	Lighting - [Link target (target-id 313557-) not found]
B187B	Seat Heating and Cooling - [Link target (target-id 363709-) not found]
B187D	Seat Heating and Cooling - [Link target (target-id 363709-) not found]
B187E	Trailering Systems - [Link target (target-id 326389-) not found]
B187F	Cellular, Entertainment, and Navigation - [Link target (target-id 335464-) not found]
B1923	HVAC - Automatic - [Link target (target-id 373369-) not found]
B1952	Fixed and Moveable Windows - [Link target (target-id 317545-) not found]
B1953	Fixed and Moveable Windows - [Link target (target-id 323948-) not found]
B1954	Fixed and Moveable Windows - [Link target (target-id 323949-) not found]
B1955	Fixed and Moveable Windows - [Link target (target-id 323950-) not found]
B1956	Fixed and Moveable Windows - [Link target (target-id 349387-) not found]

DTC	Diagnostic Procedure
B1957	Fixed and Moveable Windows - [Link target (target-id 349387-) not found]
B195A	Lighting - [Link target (target-id 331609-) not found]
B1960	Cellular, Entertainment, and Navigation - [Link target (target-id 304095-) not found]
B1961	Cellular, Entertainment, and Navigation - [Link target (target-id 304095-) not found]
B1962	Cellular, Entertainment, and Navigation - [Link target (target-id 304095-) not found]
B1963	Cellular, Entertainment, and Navigation - [Link target (target-id 304095-) not found]
B196D	Power Seats - [Link target (target-id 317272-) not found]
B196E	Power Seats - [Link target (target-id 320495-) not found]
B196F	Power Seats - [Link target (target-id 317273-) not found]
B1970	Power Seats - [Link target (target-id 320496-) not found]
B1976	HVAC - Automatic - [Link target (target-id 373299-) not found]
B1977	Immobilizer - [Link target (target-id 313612-) not found]
B197D	Immobilizer - [Link target (target-id 313618-) not found]
B197F	Immobilizer - [Link target (target-id 313620-) not found]
B1980	Immobilizer - [Link target (target-id 313621-) not found]
B1981	Immobilizer - [Link target (target-id 313622-) not found]
B1987	Immobilizer - [Link target (target-id 313623-) not found]
B1989	Immobilizer - [Link target (target-id 313625-) not found]
B198A	Immobilizer - [Link target (target-id 313626-) not found]
B198B	Wipers and Washers - [Link target (target-id 316885-) not found]
B198F	Lighting - [Link target (target-id 317877-) not found]
B1990	Lighting - [Link target (target-id 317877-) not found]
B1991	Lighting - [Link target (target-id 313648-) not found]
B1994	Lighting - [Link target (target-id 317879-) not found]
B1995	Lighting - [Link target (target-id 317879-) not found]
B1996	Lighting - [Link target (target-id 317880-) not found]
B1997	Lighting - [Link target (target-id 317880-) not found]
B1998	Lighting - [Link target (target-id 317881-) not found]
B1999	Lighting - [Link target (target-id 317881-) not found]
B199A	Lighting - [Link target (target-id 317882-) not found]
B199B	Lighting - [Link target (target-id 317882-) not found]
B199C	Lighting - [Link target (target-id 317883-) not found]
B199D	Lighting - [Link target (target-id 317883-) not found]
B19A0	Lighting - [Link target (target-id 313663-) not found]
B19A1	Lighting - [Link target (target-id 317885-) not found]
B19A2	Lighting - [Link target (target-id 317885-) not found]
B19A3	Lighting - [Link target (target-id 313559-) not found]
B19A4	Lighting - [Link target (target-id 313559-) not found]
B19A7	HVAC - Automatic - [Link target (target-id 373296-) not found]
B19A8	HVAC - Automatic - [Link target (target-id 373838-) not found]
B19A9	HVAC - Automatic - [Link target (target-id 373836-) not found]
B19AA	HVAC - Automatic - [Link target (target-id 373837-) not found]

DTC	Diagnostic Procedure
B19B0	Displays and Gauges - [Link target (target-id 313904-) not found]
B19B6	Power Seats - [Link target (target-id 317276-) not found]
B19BA	Lighting - [Link target (target-id 317476-) not found]
B19BB	Parking Assistance Systems - [Link target (target-id 297191-) not found]
B19BC	Parking Assistance Systems - [Link target (target-id 297191-) not found]
B19BD	Parking Assistance Systems - [Link target (target-id 297191-) not found]
B19BE	Parking Assistance Systems - [Link target (target-id 297191-) not found]
B19C2	Seat Heating and Cooling - [Link target (target-id 317281-) not found]
B19C3	Seat Heating and Cooling - [Link target (target-id 317281-) not found]
B19C5	Lighting - [Link target (target-id 317886-) not found]
B19C6	Lighting - [Link target (target-id 317886-) not found]
B19C7	Vehicle Access - [Link target (target-id 317543-) not found]
B19C8	Vehicle Access - [Link target (target-id 317262-) not found]
B19C9	Vehicle Access - [Link target (target-id 317262-) not found]
B19CA	Seat Heating and Cooling - [Link target (target-id 317282-) not found]
B19CB	Seat Heating and Cooling - [Link target (target-id 317282-) not found]
B19CC	Seat Heating and Cooling - [Link target (target-id 317282-) not found]
B19CD	Seat Heating and Cooling - [Link target (target-id 317282-) not found]
B19CE	Seat Heating and Cooling - [Link target (target-id 327580-) not found]
B19CF	Seat Heating and Cooling - [Link target (target-id 327580-) not found]
B19D0	Seat Heating and Cooling - [Link target (target-id 327580-) not found]
B19D1	Seat Heating and Cooling - [Link target (target-id 327580-) not found]
B19D6	Seat Heating and Cooling - [Link target (target-id 317283-) not found]
B19D7	Seat Heating and Cooling - [Link target (target-id 327566-) not found]
B19D9	Sunroof - [Link target (target-id 313609-) not found]
B19DA	Cellular, Entertainment, and Navigation - [Link target (target-id 313051-) not found]
B19F2	Steering Wheel and Column - [Link target (target-id 317603-) not found]
B19F4	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 314836-) not found]
B19F7	Lighting - [Link target (target-id 329028-) not found]
B19F8	Lighting - [Link target (target-id 329028-) not found]
B19F9	Lighting - [Link target (target-id 329028-) not found]
B19FA	Lighting - [Link target (target-id 329028-) not found]
B19FB	Lighting - [Link target (target-id 329028-) not found]
B19FC	Lighting - [Link target (target-id 329028-) not found]
B19FD	Lighting - [Link target (target-id 329028-) not found]
B19FE	Lighting - [Link target (target-id 329028-) not found]
B19FF	Lighting - [Link target (target-id 329028-) not found]
B1A00	Lighting - [Link target (target-id 329028-) not found]
B1A01	Lighting - [Link target (target-id 329028-) not found]
B1A02	Lighting - [Link target (target-id 329028-) not found]
B1A03	Lighting - [Link target (target-id 329028-) not found]
B1A05	Driver Assistance Systems - [Link target (target-id 310122-) not found]

DTC	Diagnostic Procedure
B1A11	Data Communications - [Link target (target-id 317017-) not found]
B1A1B	Data Communications - [Link target (target-id 297097-) not found]
B1A1D	Data Communications - [Link target (target-id 317028-) not found]
B1A1E	Cellular, Entertainment, and Navigation - [Link target (target-id 318800-) not found]
B1A1F	Cellular, Entertainment, and Navigation - [Link target (target-id 318800-) not found]
B1A1F	Data Communications - [Link target (target-id 317030-) not found]
B1A21	Cellular, Entertainment, and Navigation - [Link target (target-id 341592-) not found]
B1A2F	Lighting - [Link target (target-id 317490-) not found]
B1A30	Parking Assistance Systems - [Link target (target-id 317616-) not found]
B1A33	Supplemental Restraints - [Link target (target-id 313892-) not found]
B1A34	Supplemental Restraints - [Link target (target-id 317293-) not found]
B1A35	Supplemental Restraints - [Link target (target-id 317294-) not found]
B1A37	Secondary and Configurable Customer Controls - [Link target (target-id 323237-) not found]
B1A4B	Power Outlets - [Link target (target-id 338328-) not found]
B1A4C	Steering Wheel and Column - [Link target (target-id 317604-) not found]
B1A57	Interior Trim and Paneling - [Link target (target-id 321209-) not found]
B1A65	Power Seats - [Link target (target-id 317277-) not found]
B1A66	Power Seats - [Link target (target-id 317277-) not found]
B1A67	Power Seats - [Link target (target-id 317277-) not found]
B1A6D	Trailering Systems - [Link target (target-id 325945-) not found]
B1A6E	Trailering Systems - [Link target (target-id 325945-) not found]
B1A6F	Trailering Systems - [Link target (target-id 325948-) not found]
B1A70	Trailering Systems - [Link target (target-id 325948-) not found]
B1A71	Trailering Systems - [Link target (target-id 325949-) not found]
B1A72	Trailering Systems - [Link target (target-id 325950-) not found]
B1A73	Trailering Systems - [Link target (target-id 325951-) not found]
B1A75	Trailering Systems - [Link target (target-id 325953-) not found]
B1A76	Wiring Systems and Power Management - [Link target (target-id 317723-) not found]
B1A78	Power Outlets - [Link target (target-id 331014-) not found]
B1A79	Power Outlets - [Link target (target-id 338329-) not found]
B1A7A	Supplemental Restraints - [Link target (target-id 317295-) not found]
B1A81	Lighting - [Link target (target-id 313562-) not found]
B1A82	Power Seats - [Link target (target-id 324036-) not found]
B1A83	Power Seats - [Link target (target-id 324036-) not found]
B1A84	Power Seats - [Link target (target-id 324035-) not found]
B1A85	Power Seats - [Link target (target-id 324035-) not found]
B1A91	Cellular, Entertainment, and Navigation - [Link target (target-id 323932-) not found]
B1A95	Cellular, Entertainment, and Navigation - [Link target (target-id 323936-) not found]
B1A96	Cellular, Entertainment, and Navigation - [Link target (target-id 323936-) not found]
B1A99	Cellular, Entertainment, and Navigation - [Link target (target-id 323938-) not found]
B1A9A	Cellular, Entertainment, and Navigation - [Link target (target-id 323938-) not found]
B1AA3	Wiring Systems and Power Management - [Link target (target-id 313605-) not found]

DTC	Diagnostic Procedure
B1AA4	Power Seats - [Link target (target-id 372647-) not found]
B1AA5	Power Seats - [Link target (target-id 372647-) not found]
B1AA6	Power Seats - [Link target (target-id 372647-) not found]
B1AA7	Power Seats - [Link target (target-id 372647-) not found]
B1AA8	Power Seats - [Link target (target-id 372648-) not found]
B1AA9	Power Seats - [Link target (target-id 372648-) not found]
B1AAA	Power Seats - [Link target (target-id 372648-) not found]
B1AAB	Power Seats - [Link target (target-id 372648-) not found]
B1AB0	Trailering Systems - [Link target (target-id 325955-) not found]
B1AB4	Power Seats - [Link target (target-id 331819-) not found]
B1ABB	Vehicle Access - [Link target (target-id 347133-) not found]
B1AC1	Power Seats - [Link target (target-id 348652-) not found]
B1AC2	Wiring Systems and Power Management - [Link target (target-id 313601-) not found]
B1AC3	Wiring Systems and Power Management - [Link target (target-id 313602-) not found]
B1AD0	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 327526-) not found]
B1AD2	Seat Belts - [Link target (target-id 330173-) not found]
B1AD3	Seat Belts - [Link target (target-id 317300-) not found]
B1ADC	Instrument Panel and Console Trim - [Link target (target-id 327236-) not found]
B1ADD	Seat Heating and Cooling - [Link target (target-id 327567-) not found]
B1ADE	Seat Heating and Cooling - [Link target (target-id 327567-) not found]
B1ADF	Remote Functions - [Link target (target-id 319790-) not found]
B1AE2	Cellular, Entertainment, and Navigation - [Link target (target-id 365714-) not found]
B1AE3	Cellular, Entertainment, and Navigation - [Link target (target-id 365714-) not found]
B1AE6	Supplemental Restraints - [Link target (target-id 335228-) not found]
B1AEE	Remote Functions - [Link target (target-id 319791-) not found]
B1B0A	Frame and Underbody - [Link target (target-id 325180-) not found]
B1B0B	Frame and Underbody - [Link target (target-id 325180-) not found]
B1B12	Wiring Systems and Power Management - [Link target (target-id 317724-) not found]
B1B13	Fixed and Moveable Windows - [Link target (target-id 332471-) not found]
B1B15	Wiring Systems and Power Management - [Link target (target-id 317726-) not found]
B1B19	Cellular, Entertainment, and Navigation - [Link target (target-id 319001-) not found]
B1B30	Data Communications - [Link target (target-id 329017-) not found]
B1B31	Cellular, Entertainment, and Navigation - [Link target (target-id 327983-) not found]
B1B35	Instrument Panel and Console Trim - [Link target (target-id 327239-) not found]
B1B42	Wiring Systems and Power Management - [Link target (target-id 322002-) not found]
B1B44	Driver Assistance Systems - [Link target (target-id 328988-) not found]
B1B46	Driver Assistance Systems - [Link target (target-id 328990-) not found]
B1B4D	Image Display Cameras - [Link target (target-id 333111-) not found]
B1B4F	Image Display Cameras - [Link target (target-id 332634-) not found]
B1B55	Trailering Systems - [Link target (target-id 325956-) not found]
B1B56	Trailering Systems - [Link target (target-id 325958-) not found]
B1B57	Trailering Systems - [Link target (target-id 325958-) not found]

DTC	Diagnostic Procedure
B1B58	Trailering Systems - [Link target (target-id 325960-) not found]
B1B5C	Vehicle Access - [Link target (target-id 333026-) not found]
B1B6E	Vehicle Access - [Link target (target-id 333036-) not found]
B1B70	Vehicle Access - [Link target (target-id 333036-) not found]
B1B71	Vehicle Access - [Link target (target-id 333036-) not found]
B1B72	Vehicle Access - [Link target (target-id 333036-) not found]
B1B73	Vehicle Access - [Link target (target-id 333037-) not found]
B1B74	Vehicle Access - [Link target (target-id 333027-) not found]
B1B75	Vehicle Access - [Link target (target-id 333028-) not found]
B1B77	Cellular, Entertainment, and Navigation - [Link target (target-id 356556-) not found]
B1B77	Data Communications - [Link target (target-id 324200-) not found]
B1B83	Trailering Systems - [Link target (target-id 325961-) not found]
B1B84	Vehicle Access - [Link target (target-id 333028-) not found]
B1BA5	Driver Assistance Systems - [Link target (target-id 328996-) not found]
B1BA6	Cellular, Entertainment, and Navigation - [Link target (target-id 349175-) not found]
B1BA7	Cellular, Entertainment, and Navigation - [Link target (target-id 338829-) not found]
B1BAA	Cellular, Entertainment, and Navigation - [Link target (target-id 338829-) not found]
B1BAB	Cellular, Entertainment, and Navigation - [Link target (target-id 338829-) not found]
B1BB5	Trailering Systems - [Link target (target-id 325943-) not found]
B1BB6	Wiring Systems and Power Management - [Link target (target-id 332638-) not found]
B1BE7	Lighting - [Link target (target-id 340107-) not found]
B1BE8	Lighting - [Link target (target-id 340107-) not found]
B1BEC	Driver Monitoring and Occupant Detection - [Link target (target-id 327978-) not found]
B1C09	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 200414-) not found]
B1C0A	Vehicle Access - [Link target (target-id 325974-) not found]
B1C0B	Lighting - [Link target (target-id 373974-) not found]
B1C4A	Displays and Gauges - [Link target (target-id 341722-) not found]
B1C4D	Displays and Gauges - [Link target (target-id 363749-) not found]
B1C57	Vehicle Access - [Link target (target-id 333039-) not found]
B1C58	Vehicle Access - [Link target (target-id 347133-) not found]
B1C59	Vehicle Access - [Link target (target-id 333036-) not found]
B1C9F	Displays and Gauges - [Link target (target-id 363749-) not found]
B1CA2	Cellular, Entertainment, and Navigation - [Link target (target-id 345316-) not found]
B1CC1	Lighting - [Link target (target-id 341395-) not found]
B1CC6	Wiring Systems and Power Management - [Link target (target-id 348761-) not found]
B1CC7	Wiring Systems and Power Management - [Link target (target-id 348761-) not found]
B1CC8	Wiring Systems and Power Management - [Link target (target-id 348761-) not found]
B1CC9	Wiring Systems and Power Management - [Link target (target-id 348761-) not found]
B1CCA	Wiring Systems and Power Management - [Link target (target-id 348761-) not found]
B1CCB	Wiring Systems and Power Management - [Link target (target-id 348761-) not found]
B1CCC	Wiring Systems and Power Management - [Link target (target-id 348761-) not found]
B1CCD	Wiring Systems and Power Management - [Link target (target-id 348761-) not found]

DTC	Diagnostic Procedure
B1CCE	Wiring Systems and Power Management - [Link target (target-id 348761-) not found]
B1CCF	Wiring Systems and Power Management - [Link target (target-id 348761-) not found]
B1CD0	Wiring Systems and Power Management - [Link target (target-id 348761-) not found]
B1CD1	Wiring Systems and Power Management - [Link target (target-id 348761-) not found]
B1CD2	Wiring Systems and Power Management - [Link target (target-id 348761-) not found]
B1CD3	Wiring Systems and Power Management - [Link target (target-id 348761-) not found]
B1CD4	Wiring Systems and Power Management - [Link target (target-id 348761-) not found]
B1CD5	Wiring Systems and Power Management - [Link target (target-id 348761-) not found]
B1CD6	Wiring Systems and Power Management - [Link target (target-id 348761-) not found]
B1CD7	Wiring Systems and Power Management - [Link target (target-id 348761-) not found]
B1CD8	Wiring Systems and Power Management - [Link target (target-id 348761-) not found]
B1CD9	Wiring Systems and Power Management - [Link target (target-id 348761-) not found]
B1CDA	Wiring Systems and Power Management - [Link target (target-id 348761-) not found]
B1CDB	Wiring Systems and Power Management - [Link target (target-id 348761-) not found]
B1CDC	Wiring Systems and Power Management - [Link target (target-id 348761-) not found]
B1CDD	Wiring Systems and Power Management - [Link target (target-id 348761-) not found]
B1CDE	Wiring Systems and Power Management - [Link target (target-id 348761-) not found]
B1CDF	Wiring Systems and Power Management - [Link target (target-id 348761-) not found]
B1CE0	Wiring Systems and Power Management - [Link target (target-id 348761-) not found]
B1CE1	Wiring Systems and Power Management - [Link target (target-id 348761-) not found]
B1CE2	Wiring Systems and Power Management - [Link target (target-id 348761-) not found]
B1CE3	Wiring Systems and Power Management - [Link target (target-id 348761-) not found]
B1D3B	Remote Functions - [Link target (target-id 333385-) not found]
B1D3C	Remote Functions - [Link target (target-id 333386-) not found]
B1D3D	Remote Functions - [Link target (target-id 333387-) not found]
B1D3E	Remote Functions - [Link target (target-id 333388-) not found]
B1D3F	Remote Functions - [Link target (target-id 333389-) not found]
B1D40	Remote Functions - [Link target (target-id 333390-) not found]
B1D44	Remote Functions - [Link target (target-id 333394-) not found]
B1D71	Displays and Gauges - [Link target (target-id 341729-) not found]
B1D73	Displays and Gauges - [Link target (target-id 341730-) not found]
B1D74	Displays and Gauges - [Link target (target-id 341731-) not found]
B1D77	Displays and Gauges - [Link target (target-id 341732-) not found]
B1DD0	Driver Assistance Systems - [Link target (target-id 345919-) not found]
B1E3E	Driver Assistance Systems - [Link target (target-id 345920-) not found]
B1EEF	Remote Functions - [Link target (target-id 348421-) not found]
B1FF8	HVAC - Automatic - [Link target (target-id 359132-) not found]
B1FF9	HVAC - Automatic - [Link target (target-id 359133-) not found]
B200B	Cellular, Entertainment, and Navigation - [Link target (target-id 353706-) not found]
B200C	Cellular, Entertainment, and Navigation - [Link target (target-id 356555-) not found]
B212B	Driver Assistance Systems - [Link target (target-id 373374-) not found]
B272D	Rear Drive Axle - [Link target (target-id 282299-) not found]

DTC	Diagnostic Procedure
B2A03	HVAC - Automatic - [Link target (target-id 373300-) not found]
B2A38	HVAC - Automatic - [Link target (target-id 373301-) not found]
B2A40	HVAC - Automatic - [Link target (target-id 317655-) not found]
B2A44	HVAC - Automatic - [Link target (target-id 317659-) not found]
B2A69	HVAC - Automatic - [Link target (target-id 373306-) not found]
B2A6D	HVAC - Automatic - [Link target (target-id 373302-) not found]
B2A7D	HVAC - Automatic - [Link target (target-id 373869-) not found]
B2A89	HVAC - Automatic - [Link target (target-id 373357-) not found]
B2A8D	HVAC - Automatic - [Link target (target-id 373358-) not found]
B2A95	HVAC - Automatic - [Link target (target-id 373360-) not found]
B2A99	HVAC - Automatic - [Link target (target-id 373361-) not found]
B2AEF	HVAC - Automatic - [Link target (target-id 373369-) not found]
B2B9B	Electronic Transmission Range Select - [Link target (target-id 326138-) not found]
B2BA1	Driver Assistance Systems - [Link target (target-id 328998-) not found]
B2BC2	HVAC - Automatic - [Link target (target-id 373297-) not found]
B2BCC	Cellular, Entertainment, and Navigation - [Link target (target-id 345999-) not found]
B2BCD	Cellular, Entertainment, and Navigation - [Link target (target-id 348881-) not found]
B2BD4	HVAC - Automatic - [Link target (target-id 359132-) not found]
B2BD5	HVAC - Automatic - [Link target (target-id 359132-) not found]
B2BD6	HVAC - Automatic - [Link target (target-id 359132-) not found]
B2BD7	HVAC - Automatic - [Link target (target-id 359133-) not found]
B2BD8	HVAC - Automatic - [Link target (target-id 359133-) not found]
B2BD9	HVAC - Automatic - [Link target (target-id 359133-) not found]
C0001	Antilock Brake System - [Link target (target-id 261542-) not found]
C0002	Antilock Brake System - [Link target (target-id 261542-) not found]
C0003	Antilock Brake System - [Link target (target-id 261542-) not found]
C0004	Antilock Brake System - [Link target (target-id 261542-) not found]
C0010	Antilock Brake System - [Link target (target-id 261542-) not found]
C0011	Antilock Brake System - [Link target (target-id 261542-) not found]
C0013	Data Communications - [Link target (target-id 371462-) not found]
C0014	Antilock Brake System - [Link target (target-id 261542-) not found]
C0015	Antilock Brake System - [Link target (target-id 261542-) not found]
C0018	Antilock Brake System - [Link target (target-id 261542-) not found]
C0019	Antilock Brake System - [Link target (target-id 261542-) not found]
C001C	Antilock Brake System - [Link target (target-id 261542-) not found]
C001D	Antilock Brake System - [Link target (target-id 261542-) not found]
C0021	Hydraulic Brakes - [Link target (target-id 301649-) not found]
C0024	Antilock Brake System - [Link target (target-id 127367-) not found]
C0031	Antilock Brake System - [Link target (target-id 200323-) not found]
C0034	Antilock Brake System - [Link target (target-id 200323-) not found]
C0037	Antilock Brake System - [Link target (target-id 200323-) not found]
C003A	Antilock Brake System - [Link target (target-id 200323-) not found]

DTC	Diagnostic Procedure
C003F	Antilock Brake System - [Link target (target-id 310825-) not found]
C0044	Antilock Brake System - [Link target (target-id 211576-) not found]
C004A	Disc Brakes - [Link target (target-id 313905-) not found]
C004B	Hydraulic Brakes - [Link target (target-id 325748-) not found]
C0051	Power Steering - [Link target (target-id 297198-) not found]
C0052	Antilock Brake System - [Link target (target-id 364335-) not found]
C0056	Antilock Brake System - [Link target (target-id 340056-) not found]
C0057	Antilock Brake System - [Link target (target-id 340056-) not found]
C0058	Antilock Brake System - [Link target (target-id 340056-) not found]
C0059	Antilock Brake System - [Link target (target-id 340056-) not found]
C0061	Antilock Brake System - [Link target (target-id 261544-) not found]
C0061	Driver Assistance Systems - [Link target (target-id 328999-) not found]
C0062	Antilock Brake System - [Link target (target-id 261544-) not found]
C0062	Driver Assistance Systems - [Link target (target-id 328999-) not found]
C0063	Antilock Brake System - [Link target (target-id 261544-) not found]
C0063	Driver Assistance Systems - [Link target (target-id 328999-) not found]
C006A	Supplemental Restraints - [Link target (target-id 329408-) not found]
C00C4	Data Communications - [Link target (target-id 373161-) not found]
C00C5	Data Communications - [Link target (target-id 373162-) not found]
C00C6	Data Communications - [Link target (target-id 366270-) not found]
C00C7	Data Communications - [Link target (target-id 373616-) not found]
C0505	Antilock Brake System - [Link target (target-id 302672-) not found]
C050B	Antilock Brake System - [Link target (target-id 302672-) not found]
C0511	Antilock Brake System - [Link target (target-id 302672-) not found]
C0517	Antilock Brake System - [Link target (target-id 302672-) not found]
C0520	Driver Assistance Systems - [Link target (target-id 329000-) not found]
C052A	Power Steering - [Link target (target-id 333347-) not found]
C053B	Antilock Brake System - [Link target (target-id 307000-) not found]
C0546	Data Communications - [Link target (target-id 332895-) not found]
C0551	Antilock Brake System - [Link target (target-id 374684-) not found]
C0559	Data Communications - [Link target (target-id 372483-) not found]
C0573	Antilock Brake System - [Link target (target-id 362775-) not found]
C057F	Hydraulic Brakes - [Link target (target-id 327694-) not found]
C0580	Hydraulic Brakes - [Link target (target-id 327694-) not found]
C0582	Hydraulic Brakes - [Link target (target-id 327694-) not found]
C0587	Antilock Brake System - [Link target (target-id 362784-) not found]
C058A	Hydraulic Brakes - [Link target (target-id 301767-) not found]
C058B	Antilock Brake System - [Link target (target-id 364344-) not found]
C058E	Hydraulic Brakes - [Link target (target-id 301767-) not found]
C0590	Hydraulic Brakes - [Link target (target-id 327694-) not found]
C0591	Hydraulic Brakes - [Link target (target-id 327694-) not found]
C0594	Hydraulic Brakes - [Link target (target-id 301767-) not found]

DTC	Diagnostic Procedure
C0595	Hydraulic Brakes - [Link target (target-id 301767-) not found]
C0596	Hydraulic Brakes - [Link target (target-id 301767-) not found]
C0597	Antilock Brake System - [Link target (target-id 347227-) not found]
C0597	Data Communications - [Link target (target-id 371463-) not found]
C05B8	Antilock Brake System - [Link target (target-id 366059-) not found]
C05D0	Antilock Brake System - [Link target (target-id 302614-) not found]
C05D1	Antilock Brake System - [Link target (target-id 302615-) not found]
C05D2	Antilock Brake System - [Link target (target-id 302616-) not found]
C05D3	Antilock Brake System - [Link target (target-id 302617-) not found]
C05D5	Antilock Brake System - [Link target (target-id 302619-) not found]
C05D6	Data Communications - [Link target (target-id 371464-) not found]
C05D6	Power Steering - [Link target (target-id 333345-) not found]
C05DD	Transfer Case - MP 3015 - [Link target (target-id 325241-) not found]
C05DD	Transfer Case - MP 3025 - [Link target (target-id 325245-) not found]
C05FB	Transfer Case - MP 3015 - [Link target (target-id 300826-) not found]
C05FB	Transfer Case - MP 3025 - [Link target (target-id 300827-) not found]
C05FF	Transfer Case - MP 3015 - [Link target (target-id 306748-) not found]
C05FF	Transfer Case - MP 3025 - [Link target (target-id 306749-) not found]
C0605	Power Steering - [Link target (target-id 350265-) not found]
C060B	Park Brake - [Link target (target-id 306987-) not found]
C0610	Park Brake - [Link target (target-id 306988-) not found]
C0697	Antilock Brake System - [Link target (target-id 374684-) not found]
C0800	Hydraulic Brakes - [Link target (target-id 364349-) not found]
C0803	Antilock Brake System - [Link target (target-id 364336-) not found]
C0806	Antilock Brake System - [Link target (target-id 364339-) not found]
C0807	Antilock Brake System - [Link target (target-id 364340-) not found]
C0809	Antilock Brake System - [Link target (target-id 364341-) not found]
C080A	Antilock Brake System - [Link target (target-id 364342-) not found]
C080B	Antilock Brake System - [Link target (target-id 364343-) not found]
C1034	Suspension Controls - [Link target (target-id 316883-) not found]
C1035	Suspension Controls - [Link target (target-id 316883-) not found]
C1036	Suspension Controls - [Link target (target-id 316883-) not found]
C1037	Suspension Controls - [Link target (target-id 316883-) not found]
C103C	Suspension Controls - [Link target (target-id 324295-) not found]
C103D	Suspension Controls - [Link target (target-id 324295-) not found]
C103E	Suspension Controls - [Link target (target-id 324295-) not found]
C103F	Suspension Controls - [Link target (target-id 324295-) not found]
C10CC	Frame and Underbody - [Link target (target-id 356859-) not found]
C10CD	Frame and Underbody - [Link target (target-id 356859-) not found]
C10CE	Steering Wheel and Column - [Link target (target-id 317605-) not found]
C10DA	Lighting - [Link target (target-id 317493-) not found]
C10EE	Antilock Brake System - [Link target (target-id 304967-) not found]

DTC	Diagnostic Procedure
C1114	Trailering Systems - [Link target (target-id 325998-) not found]
C1119	Power Steering - [Link target (target-id 313799-) not found]
C1133	Frame and Underbody - [Link target (target-id 325183-) not found]
C1134	Frame and Underbody - [Link target (target-id 325183-) not found]
C1146	Power Steering - [Link target (target-id 297201-) not found]
C114B	Park Brake - [Link target (target-id 313591-) not found]
C114F	Steering Wheel and Column - [Link target (target-id 347270-) not found]
C1158	Trailering Systems - [Link target (target-id 326009-) not found]
C1159	Steering Wheel and Column - [Link target (target-id 317607-) not found]
C115E	Transfer Case - MP 3015 - [Link target (target-id 325249-) not found]
C115E	Transfer Case - MP 3025 - [Link target (target-id 325247-) not found]
C1162	Transfer Case - MP 3015 - [Link target (target-id 374401-) not found]
C1162	Transfer Case - MP 3025 - [Link target (target-id 374402-) not found]
C1168	Power Steering - [Link target (target-id 317736-) not found]
C116A	Power Steering - [Link target (target-id 317738-) not found]
C116B	Disc Brakes - [Link target (target-id 301556-) not found]
C116C	Disc Brakes - [Link target (target-id 301557-) not found]
C116D	Tire Pressure Monitoring - [Link target (target-id 313635-) not found]
C116E	Transfer Case - MP 3015 - [Link target (target-id 374401-) not found]
C116E	Transfer Case - MP 3025 - [Link target (target-id 374402-) not found]
C1170	Transfer Case - MP 3015 - [Link target (target-id 325249-) not found]
C1170	Transfer Case - MP 3025 - [Link target (target-id 325247-) not found]
C1171	Tire Pressure Monitoring - [Link target (target-id 314982-) not found]
C1172	Tire Pressure Monitoring - [Link target (target-id 314982-) not found]
C1173	Tire Pressure Monitoring - [Link target (target-id 314982-) not found]
C1174	Tire Pressure Monitoring - [Link target (target-id 314982-) not found]
C1178	Steering Wheel and Column - [Link target (target-id 315482-) not found]
C1180	Frame and Underbody - [Link target (target-id 328943-) not found]
C1181	Frame and Underbody - [Link target (target-id 328943-) not found]
C1182	Frame and Underbody - [Link target (target-id 328943-) not found]
C1183	Frame and Underbody - [Link target (target-id 328943-) not found]
C11A1	Power Steering - [Link target (target-id 333349-) not found]
C11A2	Power Steering - [Link target (target-id 333349-) not found]
C11A4	Transfer Case - MP 3015 - [Link target (target-id 300357-) not found]
C11A4	Transfer Case - MP 3025 - [Link target (target-id 300372-) not found]
C11A5	Rear Drive Axle - [Link target (target-id 282300-) not found]
C11A6	Power Steering - [Link target (target-id 333350-) not found]
C11A8	Power Steering - [Link target (target-id 333351-) not found]
C11A9	Transfer Case - MP 3025 - [Link target (target-id 327124-) not found]
C11AD	Transfer Case - MP 3015 - [Link target (target-id 300360-) not found]
C11AD	Transfer Case - MP 3025 - [Link target (target-id 300375-) not found]
C11B0	Front Drive Axle - [Link target (target-id 282290-) not found]

DTC	Diagnostic Procedure
C11B3	Transfer Case - MP 3015 - [Link target (target-id 300363-) not found]
C11B3	Transfer Case - MP 3025 - [Link target (target-id 300378-) not found]
C11B9	Transfer Case - MP 3015 - [Link target (target-id 300826-) not found]
C11B9	Transfer Case - MP 3025 - [Link target (target-id 300827-) not found]
C11C8	Antilock Brake System - [Link target (target-id 365297-) not found]
C1201	Automatic Transmission - 10L80 - [Link target (target-id 312077-) not found]
C1305	Automatic Transmission - 10L80 - [Link target (target-id 374398-) not found]
C1308	Front Drive Axle - [Link target (target-id 282294-) not found]
C1309	Rear Drive Axle - [Link target (target-id 282303-) not found]
C1595	Trailering Systems - [Link target (target-id 326013-) not found]
C1596	Trailering Systems - [Link target (target-id 326014-) not found]
C159A	Rear Drive Axle - [Link target (target-id 282305-) not found]
C159B	Front Drive Axle - [Link target (target-id 282296-) not found]
C159C	Trailering Systems - [Link target (target-id 326015-) not found]
C159D	Trailering Systems - [Link target (target-id 326016-) not found]
C159E	Trailering Systems - [Link target (target-id 326016-) not found]
C159F	Trailering Systems - [Link target (target-id 326016-) not found]
C15A0	Trailering Systems - [Link target (target-id 326016-) not found]
C15A1	Trailering Systems - [Link target (target-id 326016-) not found]
C15A2	Trailering Systems - [Link target (target-id 326016-) not found]
C15A6	Trailering Systems - [Link target (target-id 326017-) not found]
C15A9	Transfer Case - MP 3015 - [Link target (target-id 300363-) not found]
C15A9	Transfer Case - MP 3025 - [Link target (target-id 300378-) not found]
C15AA	Transfer Case - MP 3015 - [Link target (target-id 300360-) not found]
C15AA	Transfer Case - MP 3025 - [Link target (target-id 300375-) not found]
C15AB	Transfer Case - MP 3015 - [Link target (target-id 300826-) not found]
C15AB	Transfer Case - MP 3025 - [Link target (target-id 300827-) not found]
C15AC	Transfer Case - MP 3015 - [Link target (target-id 306748-) not found]
C15AC	Transfer Case - MP 3025 - [Link target (target-id 306749-) not found]
C15C1	Transfer Case - MP 3015 - [Link target (target-id 300826-) not found]
C15C1	Transfer Case - MP 3025 - [Link target (target-id 300827-) not found]
C15C6	Antilock Brake System - [Link target (target-id 307843-) not found]
C15C7	Hydraulic Brakes - [Link target (target-id 310750-) not found]
C2A01	Antilock Brake System - [Link target (target-id 310825-) not found]
C2A02	Antilock Brake System - [Link target (target-id 310825-) not found]
C2A03	Antilock Brake System - [Link target (target-id 310825-) not found]
C2A04	Antilock Brake System - [Link target (target-id 310825-) not found]
C2A07	Antilock Brake System - [Link target (target-id 302623-) not found]
C2A08	Antilock Brake System - [Link target (target-id 309963-) not found]
C2A0A	Antilock Brake System - [Link target (target-id 324293-) not found]
C2A0B	Antilock Brake System - [Link target (target-id 304968-) not found]
C2A13	Antilock Brake System - [Link target (target-id 304969-) not found]

DTC	Diagnostic Procedure
C2A14	Antilock Brake System - [Link target (target-id 304969-) not found]
C2A17	Hydraulic Brakes - [Link target (target-id 310751-) not found]
C2A1A	Antilock Brake System - [Link target (target-id 304970-) not found]
C2A1B	Hydraulic Brakes - [Link target (target-id 312949-) not found]
C2A1D	Park Brake - [Link target (target-id 303014-) not found]
C2A1E	Antilock Brake System - [Link target (target-id 304971-) not found]
C2A21	Park Brake - [Link target (target-id 309644-) not found]
C2A3B	Hydraulic Brakes - [Link target (target-id 354261-) not found]
C2A3D	Antilock Brake System - [Link target (target-id 324294-) not found]
C2A57	Antilock Brake System - [Link target (target-id 340091-) not found]
P0010	Engine Controls and Fuel - 2.7L - [Link target (target-id 373824-) not found]
P0010	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372254-) not found]
P0011	Engine Controls and Fuel - 2.7L - [Link target (target-id 373824-) not found]
P0011	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372254-) not found]
P0013	Engine Controls and Fuel - 2.7L - [Link target (target-id 373824-) not found]
P0014	Engine Controls and Fuel - 2.7L - [Link target (target-id 373824-) not found]
P0016	Engine Controls and Fuel - 2.7L - [Link target (target-id 373900-) not found]
P0016	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307167-) not found]
P0016	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372255-) not found]
P0017	Engine Controls and Fuel - 2.7L - [Link target (target-id 373901-) not found]
P001A	Engine Controls and Fuel - 2.7L - [Link target (target-id 373850-) not found]
P002A	Engine Controls and Fuel - 2.7L - [Link target (target-id 373851-) not found]
P0030	Engine Controls and Fuel - 2.7L - [Link target (target-id 373871-) not found]
P0030	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372320-) not found]
P0033	Engine Controls and Fuel - 2.7L - [Link target (target-id 373654-) not found]
P0036	Engine Controls and Fuel - 2.7L - [Link target (target-id 373871-) not found]
P0036	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372321-) not found]
P0045	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366060-) not found]
P0050	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372320-) not found]
P0056	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372321-) not found]
P0068	Engine Controls and Fuel - 2.7L - [Link target (target-id 306017-) not found]
P0068	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 369639-) not found]
P006E	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366060-) not found]
P0070	Displays and Gauges - [Link target (target-id 373111-) not found]
P007A	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366061-) not found]
P0087	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365615-) not found]
P0090	Engine Controls and Fuel - 2.7L - [Link target (target-id 373242-) not found]
P0090	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365615-) not found]
P0090	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372216-) not found]
P0095	Engine Controls and Fuel - 2.7L - [Link target (target-id 373657-) not found]
P0095	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366278-) not found]
P0095	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372542-) not found]

DTC	Diagnostic Procedure
P00B1	Engine Controls and Fuel - 2.7L - [Link target (target-id 373820-) not found]
P00B1	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366286-) not found]
P00B1	Engine Heating and Cooling - [Link target (target-id 359530-) not found]
P00C6	Engine Controls and Fuel - 2.7L - [Link target (target-id 373242-) not found]
P00C6	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372216-) not found]
P00C7	Engine Controls and Fuel - 2.7L - [Link target (target-id 305823-) not found]
P00C7	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 327454-) not found]
P00C7	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 370168-) not found]
P00C8	Engine Controls and Fuel - 2.7L - [Link target (target-id 373242-) not found]
P00C8	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365615-) not found]
P00C8	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372216-) not found]
P00DE	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366063-) not found]
P00E8	Engine Controls and Fuel - 2.7L - [Link target (target-id 373655-) not found]
P00E8	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366064-) not found]
P00F2	Engine Controls and Fuel - 2.7L - [Link target (target-id 373657-) not found]
P00F2	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366278-) not found]
P00F2	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372542-) not found]
P0100	Engine Controls and Fuel - 2.7L - [Link target (target-id 373658-) not found]
P0100	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366065-) not found]
P0100	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372543-) not found]
P0105	Engine Controls and Fuel - 2.7L - [Link target (target-id 373659-) not found]
P0105	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366066-) not found]
P0105	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372544-) not found]
P0110	Engine Controls and Fuel - 2.7L - [Link target (target-id 373657-) not found]
P0110	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366278-) not found]
P0110	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372542-) not found]
P0115	Engine Controls and Fuel - 2.7L - [Link target (target-id 373847-) not found]
P0115	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366287-) not found]
P0120	Engine Controls and Fuel - 2.7L - [Link target (target-id 373660-) not found]
P0120	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372545-) not found]
P0128	Engine Controls and Fuel - 2.7L - [Link target (target-id 306150-) not found]
P0128	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 314808-) not found]
P0128	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 369717-) not found]
P0130	Engine Controls and Fuel - 2.7L - [Link target (target-id 373872-) not found]
P0130	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366295-) not found]
P0130	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372331-) not found]
P0135	Engine Controls and Fuel - 2.7L - [Link target (target-id 373871-) not found]
P0135	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372320-) not found]
P0136	Engine Controls and Fuel - 2.7L - [Link target (target-id 373873-) not found]
P0136	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 370700-) not found]
P0136	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372332-) not found]
P013A	Engine Controls and Fuel - 2.7L - [Link target (target-id 373873-) not found]

DTC	Diagnostic Procedure
P013A	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 370110-) not found]
P013B	Engine Controls and Fuel - 2.7L - [Link target (target-id 373873-) not found]
P013B	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 370110-) not found]
P013C	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 370110-) not found]
P013D	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 370110-) not found]
P013E	Engine Controls and Fuel - 2.7L - [Link target (target-id 373873-) not found]
P013E	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 370110-) not found]
P013F	Engine Controls and Fuel - 2.7L - [Link target (target-id 373873-) not found]
P013F	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 370110-) not found]
P0141	Engine Controls and Fuel - 2.7L - [Link target (target-id 373871-) not found]
P0141	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372321-) not found]
P0142	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366299-) not found]
P014A	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 370110-) not found]
P014B	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 370110-) not found]
P0150	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372331-) not found]
P0155	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372320-) not found]
P0156	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372332-) not found]
P015A	Engine Controls and Fuel - 2.7L - [Link target (target-id 373872-) not found]
P015A	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 370110-) not found]
P015B	Engine Controls and Fuel - 2.7L - [Link target (target-id 373872-) not found]
P015B	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 370110-) not found]
P015C	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 370110-) not found]
P015D	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 370110-) not found]
P0161	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372321-) not found]
P0171	Engine Controls and Fuel - 2.7L - [Link target (target-id 306146-) not found]
P0171	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307664-) not found]
P0172	Engine Controls and Fuel - 2.7L - [Link target (target-id 306146-) not found]
P0172	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307664-) not found]
P017A	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 370714-) not found]
P0180	Engine Controls and Fuel - 2.7L - [Link target (target-id 373243-) not found]
P0180	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365736-) not found]
P0180	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372217-) not found]
P0185	Engine Controls and Fuel - 2.7L - [Link target (target-id 373243-) not found]
P0185	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365616-) not found]
P0185	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372217-) not found]
P018A	Engine Controls and Fuel - 2.7L - [Link target (target-id 373228-) not found]
P018A	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365738-) not found]
P018A	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372537-) not found]
P0190	Engine Controls and Fuel - 2.7L - [Link target (target-id 373243-) not found]
P0190	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365616-) not found]
P0190	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372217-) not found]
P0195	Displays and Gauges - [Link target (target-id 366226-) not found]

DTC	Diagnostic Procedure
P01B9	Displays and Gauges - [Link target (target-id 371151-) not found]
P01CB	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 309300-) not found]
P01CC	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 309300-) not found]
P01CD	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 309300-) not found]
P01CE	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 309300-) not found]
P01CF	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 309300-) not found]
P01D0	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 309300-) not found]
P01D1	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 309300-) not found]
P01D2	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 309300-) not found]
P01D3	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 309300-) not found]
P01D4	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 309300-) not found]
P01D5	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 309300-) not found]
P01D6	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 309300-) not found]
P01E3	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373345-) not found]
P01F0	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 314808-) not found]
P0201	Engine Controls and Fuel - 2.7L - [Link target (target-id 373244-) not found]
P0201	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365617-) not found]
P0201	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P0202	Engine Controls and Fuel - 2.7L - [Link target (target-id 373244-) not found]
P0202	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365617-) not found]
P0202	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P0203	Engine Controls and Fuel - 2.7L - [Link target (target-id 373244-) not found]
P0203	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365617-) not found]
P0203	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P0204	Engine Controls and Fuel - 2.7L - [Link target (target-id 373244-) not found]
P0204	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365617-) not found]
P0204	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P0205	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365617-) not found]
P0205	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P0206	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365617-) not found]
P0206	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P0207	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P0208	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P020A	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 371402-) not found]
P020B	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 371402-) not found]
P020C	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 371402-) not found]
P020D	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 371402-) not found]
P020E	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 371402-) not found]
P020F	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 371402-) not found]
P0216	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307637-) not found]
P0220	Engine Controls and Fuel - 2.7L - [Link target (target-id 373660-) not found]
P0220	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372545-) not found]

DTC	Diagnostic Procedure
P0234	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307319-) not found]
P0235	Engine Controls and Fuel - 2.7L - [Link target (target-id 373661-) not found]
P023A	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366067-) not found]
P0243	Engine Controls and Fuel - 2.7L - [Link target (target-id 373662-) not found]
P026A	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307409-) not found]
P026B	Engine Controls and Fuel - 2.7L - [Link target (target-id 373235-) not found]
P026B	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366172-) not found]
P026B	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372525-) not found]
P026C	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307493-) not found]
P026D	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307493-) not found]
P0299	Engine Controls and Fuel - 2.7L - [Link target (target-id 310250-) not found]
P0299	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307319-) not found]
P02CC	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 371402-) not found]
P02CD	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 371402-) not found]
P02CE	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 371402-) not found]
P02CF	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 371402-) not found]
P02D0	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 371402-) not found]
P02D1	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 371402-) not found]
P02D2	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 371402-) not found]
P02D3	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 371402-) not found]
P02D4	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 371402-) not found]
P02D5	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 371402-) not found]
P02D6	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 371402-) not found]
P02D7	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 371402-) not found]
P02E0	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366068-) not found]
P02E6	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366069-) not found]
P0300	Engine Controls and Fuel - 2.7L - [Link target (target-id 373831-) not found]
P0300	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 311938-) not found]
P0300	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 369918-) not found]
P0301	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 311938-) not found]
P0301	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 369918-) not found]
P0302	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 311938-) not found]
P0302	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 369918-) not found]
P0303	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 311938-) not found]
P0303	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 369918-) not found]
P0304	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 311938-) not found]
P0304	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 369918-) not found]
P0305	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 311938-) not found]
P0305	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 369918-) not found]
P0306	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 311938-) not found]
P0306	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 369918-) not found]
P0307	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 369918-) not found]

DTC	Diagnostic Procedure
P0308	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 369918-) not found]
P0315	Engine Controls and Fuel - 2.7L - [Link target (target-id 306044-) not found]
P0315	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307499-) not found]
P0315	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 370201-) not found]
P0324	Engine Controls and Fuel - 2.7L - [Link target (target-id 373825-) not found]
P0324	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372388-) not found]
P0325	Engine Controls and Fuel - 2.7L - [Link target (target-id 373825-) not found]
P0325	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372388-) not found]
P0330	Engine Controls and Fuel - 2.7L - [Link target (target-id 373825-) not found]
P0330	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372388-) not found]
P0335	Engine Controls and Fuel - 2.7L - [Link target (target-id 373826-) not found]
P0335	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307088-) not found]
P0335	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 369276-) not found]
P0340	Engine Controls and Fuel - 2.7L - [Link target (target-id 306038-) not found]
P0340	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307761-) not found]
P0340	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372256-) not found]
P034A	Engine Controls and Fuel - 2.7L - [Link target (target-id 305998-) not found]
P034A	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 311939-) not found]
P034A	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 369560-) not found]
P034B	Engine Controls and Fuel - 2.7L - [Link target (target-id 305998-) not found]
P034B	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 311939-) not found]
P034B	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 369560-) not found]
P0351	Engine Controls and Fuel - 2.7L - [Link target (target-id 306056-) not found]
P0351	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372386-) not found]
P0352	Engine Controls and Fuel - 2.7L - [Link target (target-id 306056-) not found]
P0352	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372386-) not found]
P0353	Engine Controls and Fuel - 2.7L - [Link target (target-id 306056-) not found]
P0353	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372386-) not found]
P0354	Engine Controls and Fuel - 2.7L - [Link target (target-id 306056-) not found]
P0354	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372386-) not found]
P0355	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372386-) not found]
P0356	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372386-) not found]
P0357	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372386-) not found]
P0358	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372386-) not found]
P0365	Engine Controls and Fuel - 2.7L - [Link target (target-id 306038-) not found]
P037D	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365732-) not found]
P03EC	Engine Controls and Fuel - 2.7L - [Link target (target-id 373850-) not found]
P03F1	Engine Controls and Fuel - 2.7L - [Link target (target-id 373851-) not found]
P0400	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366289-) not found]
P0403	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 371306-) not found]
P0409	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 370682-) not found]
P041A	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366290-) not found]

DTC	Diagnostic Procedure
P0420	Engine Controls and Fuel - 2.7L - [Link target (target-id 306159-) not found]
P0420	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 369742-) not found]
P0421	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307619-) not found]
P0430	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 369742-) not found]
P0441	Engine Controls and Fuel - 2.7L - [Link target (target-id 373229-) not found]
P0441	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372536-) not found]
P0442	Engine Controls and Fuel - 2.7L - [Link target (target-id 306061-) not found]
P0442	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 370425-) not found]
P0443	Engine Controls and Fuel - 2.7L - [Link target (target-id 306170-) not found]
P0443	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 370250-) not found]
P0446	Engine Controls and Fuel - 2.7L - [Link target (target-id 305877-) not found]
P0446	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 370049-) not found]
P044A	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 370682-) not found]
P0450	Engine Controls and Fuel - 2.7L - [Link target (target-id 373230-) not found]
P0450	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372534-) not found]
P0455	Engine Controls and Fuel - 2.7L - [Link target (target-id 306061-) not found]
P0455	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 370425-) not found]
P045A	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 371306-) not found]
P0460	Engine Controls and Fuel - 2.7L - [Link target (target-id 373233-) not found]
P0460	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 373913-) not found]
P0460	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372526-) not found]
P0475	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366293-) not found]
P048B	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366294-) not found]
P0494	Engine Heating and Cooling - [Link target (target-id 370718-) not found]
P049A	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366289-) not found]
P04CE	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366291-) not found]
P04DB	Engine Controls and Fuel - 2.7L - [Link target (target-id 373663-) not found]
P04DB	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366070-) not found]
P04E1	Engine Controls and Fuel - 2.7L - [Link target (target-id 373663-) not found]
P04E1	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366070-) not found]
P0506	Engine Controls and Fuel - 2.7L - [Link target (target-id 373664-) not found]
P0506	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307144-) not found]
P0506	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 369480-) not found]
P0507	Engine Controls and Fuel - 2.7L - [Link target (target-id 373664-) not found]
P0507	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307144-) not found]
P0507	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 369480-) not found]
P050A	Engine Controls and Fuel - 2.7L - [Link target (target-id 373664-) not found]
P050A	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 369480-) not found]
P050B	Engine Controls and Fuel - 2.7L - [Link target (target-id 373827-) not found]
P050B	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 369431-) not found]
P050D	Engine Controls and Fuel - 2.7L - [Link target (target-id 306021-) not found]
P050D	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 369795-) not found]

DTC	Diagnostic Procedure
P0513	Immobilizer - [Link target (target-id 156476-) not found]
P0520	Displays and Gauges - [Link target (target-id 68699-) not found]
P0530	HVAC - Automatic - [Link target (target-id 49328-) not found]
P0532	HVAC - Automatic - [Link target (target-id 69299-) not found]
P0533	HVAC - Automatic - [Link target (target-id 69299-) not found]
P0535	HVAC - Automatic - [Link target (target-id 370796-) not found]
P0544	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366292-) not found]
P054E	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307473-) not found]
P054F	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307473-) not found]
P0560	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 303008-) not found]
P0561	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 303008-) not found]
P0562	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 303008-) not found]
P0563	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 303008-) not found]
P0564	Cruise Control - [Link target (target-id 366134-) not found]
P0565	Cruise Control - [Link target (target-id 366134-) not found]
P0567	Cruise Control - [Link target (target-id 366134-) not found]
P0568	Cruise Control - [Link target (target-id 366134-) not found]
P056C	Cruise Control - [Link target (target-id 366134-) not found]
P057A	Engine Controls and Fuel - 2.7L - [Link target (target-id 373828-) not found]
P057A	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365741-) not found]
P057A	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372387-) not found]
P0589	Cruise Control - [Link target (target-id 366134-) not found]
P058A	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 314847-) not found]
P058B	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 314847-) not found]
P058C	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 314847-) not found]
P058D	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 314847-) not found]
P058E	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 314847-) not found]
P058F	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 314847-) not found]
P059F	Bumpers and Fascias - [Link target (target-id 371206-) not found]
P05A9	Bumpers and Fascias - [Link target (target-id 371205-) not found]
P05CC	Engine Controls and Fuel - 2.7L - [Link target (target-id 305821-) not found]
P05CC	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372257-) not found]
P05CE	Engine Controls and Fuel - 2.7L - [Link target (target-id 305821-) not found]
P05D1	Secondary and Configurable Customer Controls - [Link target (target-id 323238-) not found]
P05D2	Secondary and Configurable Customer Controls - [Link target (target-id 323238-) not found]
P05D3	Secondary and Configurable Customer Controls - [Link target (target-id 323238-) not found]
P05EC	Engine Controls and Fuel - 2.7L - [Link target (target-id 373235-) not found]
P05EC	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366172-) not found]
P05EC	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372525-) not found]
P0601	Data Communications - [Link target (target-id 202770-) not found]
P0602	Data Communications - [Link target (target-id 202771-) not found]
P0603	Data Communications - [Link target (target-id 202772-) not found]

DTC	Diagnostic Procedure
P0604	Data Communications - [Link target (target-id 202773-) not found]
P0605	Data Communications - [Link target (target-id 254547-) not found]
P0606	Data Communications - [Link target (target-id 220745-) not found]
P0607	Data Communications - [Link target (target-id 372223-) not found]
P060A	Data Communications - [Link target (target-id 220746-) not found]
P060B	Data Communications - [Link target (target-id 372224-) not found]
P060C	Data Communications - [Link target (target-id 272068-) not found]
P060C	Automatic Transmission - 10L80 - [Link target (target-id 366093-) not found]
P0615	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 37804-) not found]
P0627	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365618-) not found]
P0627	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372219-) not found]
P062B	Engine Controls and Fuel - 2.7L - [Link target (target-id 373235-) not found]
P062B	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366172-) not found]
P062B	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372525-) not found]
P062D	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307794-) not found]
P062F	Data Communications - [Link target (target-id 228367-) not found]
P062F	Automatic Transmission - 10L80 - [Link target (target-id 366093-) not found]
P0630	Data Communications - [Link target (target-id 332896-) not found]
P0633	Immobilizer - [Link target (target-id 142528-) not found]
P0641	Engine Controls and Fuel - 2.7L - [Link target (target-id 305808-) not found]
P0641	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307713-) not found]
P0641	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373280-) not found]
P0641	Wiring Systems and Power Management - [Link target (target-id 327177-) not found]
P0645	HVAC - Automatic - [Link target (target-id 69300-) not found]
P0646	HVAC - Automatic - [Link target (target-id 69300-) not found]
P0647	HVAC - Automatic - [Link target (target-id 69300-) not found]
P064D	Engine Controls and Fuel - 2.7L - [Link target (target-id 373235-) not found]
P064D	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366172-) not found]
P064D	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372525-) not found]
P064E	Engine Controls and Fuel - 2.7L - [Link target (target-id 373235-) not found]
P064E	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366172-) not found]
P064E	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372525-) not found]
P064F	Data Communications - [Link target (target-id 299125-) not found]
P0651	Engine Controls and Fuel - 2.7L - [Link target (target-id 305808-) not found]
P0651	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307713-) not found]
P0651	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373280-) not found]
P0651	Wiring Systems and Power Management - [Link target (target-id 327177-) not found]
P0657	Automatic Transmission - 10L80 - [Link target (target-id 366100-) not found]
P065A	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 270132-) not found]
P0671	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365733-) not found]
P0672	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365733-) not found]
P0673	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365733-) not found]

DTC	Diagnostic Procedure
P0674	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365733-) not found]
P0675	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365733-) not found]
P0676	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365733-) not found]
P0685	Engine Controls and Fuel - 2.7L - [Link target (target-id 373829-) not found]
P0685	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365742-) not found]
P0685	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372382-) not found]
P0688	Engine Controls and Fuel - 2.7L - [Link target (target-id 373829-) not found]
P0688	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365742-) not found]
P0688	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372382-) not found]
P0697	Engine Controls and Fuel - 2.7L - [Link target (target-id 305808-) not found]
P0697	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307713-) not found]
P0697	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373280-) not found]
P0697	Wiring Systems and Power Management - [Link target (target-id 327177-) not found]
P06A3	Engine Controls and Fuel - 2.7L - [Link target (target-id 305808-) not found]
P06A3	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307713-) not found]
P06A3	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373280-) not found]
P06A3	Wiring Systems and Power Management - [Link target (target-id 327177-) not found]
P06AF	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 309307-) not found]
P06AF	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 370103-) not found]
P06AF	Automatic Transmission - 10L80 - [Link target (target-id 312855-) not found]
P06B6	Engine Controls and Fuel - 2.7L - [Link target (target-id 373825-) not found]
P06B6	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372388-) not found]
P06B7	Engine Controls and Fuel - 2.7L - [Link target (target-id 373825-) not found]
P06B7	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372388-) not found]
P06D2	Engine Controls and Fuel - 2.7L - [Link target (target-id 305808-) not found]
P06D2	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373280-) not found]
P06DA	Engine Mechanical - 2.7L - [Link target (target-id 373830-) not found]
P06DA	Engine Mechanical - 3.0L Diesel - [Link target (target-id 366050-) not found]
P06DA	Engine Mechanical - 5.7L or 6.6L - [Link target (target-id 372259-) not found]
P0710	Automatic Transmission - 10L80 - [Link target (target-id 366080-) not found]
P0715	Automatic Transmission - 10L80 - [Link target (target-id 366094-) not found]
P0720	Automatic Transmission - 10L80 - [Link target (target-id 366079-) not found]
P073D	Electronic Transmission Range Select - [Link target (target-id 325570-) not found]
P073E	Electronic Transmission Range Select - [Link target (target-id 325570-) not found]
P0740	Automatic Transmission - 10L80 - [Link target (target-id 366095-) not found]
P0745	Automatic Transmission - 10L80 - [Link target (target-id 366081-) not found]
P0775	Automatic Transmission - 10L80 - [Link target (target-id 366082-) not found]
P0795	Automatic Transmission - 10L80 - [Link target (target-id 366083-) not found]
P07B2	Electronic Transmission Range Select - [Link target (target-id 363681-) not found]
P07B8	Electronic Transmission Range Select - [Link target (target-id 363681-) not found]
P07BE	Electronic Transmission Range Select - [Link target (target-id 363681-) not found]
P07E4	Electronic Transmission Range Select - [Link target (target-id 325570-) not found]

DTC	Diagnostic Procedure
P07E5	Electronic Transmission Range Select - [Link target (target-id 325570-) not found]
P080F	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373976-) not found]
P0815	Automatic Transmission - 10L80 - [Link target (target-id 321006-) not found]
P0816	Automatic Transmission - 10L80 - [Link target (target-id 321006-) not found]
P0821	Electronic Transmission Range Select - [Link target (target-id 363681-) not found]
P0822	Electronic Transmission Range Select - [Link target (target-id 363681-) not found]
P0826	Automatic Transmission - 10L80 - [Link target (target-id 321006-) not found]
P089A	Electronic Transmission Range Select - [Link target (target-id 363681-) not found]
P089F	Electronic Transmission Range Select - [Link target (target-id 363681-) not found]
P0960	Automatic Transmission - 10L80 - [Link target (target-id 366101-) not found]
P0964	Automatic Transmission - 10L80 - [Link target (target-id 366101-) not found]
P0968	Automatic Transmission - 10L80 - [Link target (target-id 366101-) not found]
P0A1A	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 270134-) not found]
P0E31	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 366046-) not found]
P0E36	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 366047-) not found]
P0F34	Engine Controls and Fuel - 2.7L - [Link target (target-id 373817-) not found]
P0F34	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373190-) not found]
P0FFF	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 355759-) not found]
P1005	Engine Controls and Fuel - 2.7L - [Link target (target-id 310703-) not found]
P1005	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307795-) not found]
P1005	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 369883-) not found]
P100B	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366060-) not found]
P100C	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 280530-) not found]
P100D	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 280530-) not found]
P1018	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366309-) not found]
P1029	Engine Controls and Fuel - 2.7L - [Link target (target-id 373245-) not found]
P1029	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365737-) not found]
P1029	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372220-) not found]
P1037	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307723-) not found]
P1047	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366310-) not found]
P1089	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307495-) not found]
P109F	Engine Heating and Cooling - [Link target (target-id 363075-) not found]
P10A3	Engine Controls and Fuel - 2.7L - [Link target (target-id 373244-) not found]
P10A3	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P10A4	Engine Controls and Fuel - 2.7L - [Link target (target-id 373244-) not found]
P10A4	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P10A5	Engine Controls and Fuel - 2.7L - [Link target (target-id 373244-) not found]
P10A5	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P10A6	Engine Controls and Fuel - 2.7L - [Link target (target-id 373244-) not found]
P10A6	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P10A7	Engine Controls and Fuel - 2.7L - [Link target (target-id 373244-) not found]
P10A7	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]

DTC	Diagnostic Procedure
P10A8	Engine Controls and Fuel - 2.7L - [Link target (target-id 373244-) not found]
P10A8	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P10A9	Engine Controls and Fuel - 2.7L - [Link target (target-id 373244-) not found]
P10A9	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P10AA	Engine Controls and Fuel - 2.7L - [Link target (target-id 373244-) not found]
P10AA	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P10AB	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P10AC	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P10AD	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P10AE	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P10AF	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P10B0	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P10B1	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P10B2	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P10BA	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366067-) not found]
P10BC	Engine Controls and Fuel - 2.7L - [Link target (target-id 373657-) not found]
P10BC	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372542-) not found]
P10C9	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366307-) not found]
P10D1	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307633-) not found]
P10D6	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366061-) not found]
P10DA	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366305-) not found]
P10DC	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366306-) not found]
P10E6	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365615-) not found]
P1101	Engine Controls and Fuel - 2.7L - [Link target (target-id 306017-) not found]
P1101	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 369639-) not found]
P1102	Displays and Gauges - [Link target (target-id 373281-) not found]
P1146	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 374340-) not found]
P115E	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366295-) not found]
P116A	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366295-) not found]
P116D	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366295-) not found]
P1176	Engine Controls and Fuel - 2.7L - [Link target (target-id 305791-) not found]
P1176	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 369295-) not found]
P1177	Engine Controls and Fuel - 2.7L - [Link target (target-id 305791-) not found]
P1177	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 311940-) not found]
P1177	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 369295-) not found]
P118E	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 313400-) not found]
P118F	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 313401-) not found]
P1192	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366295-) not found]
P1196	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 313401-) not found]
P1199	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 327454-) not found]
P11BE	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 370700-) not found]
P11C5	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366295-) not found]

DTC	Diagnostic Procedure
P11C7	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 370700-) not found]
P11D0	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 370700-) not found]
P11D3	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366295-) not found]
P11D5	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 370700-) not found]
P11D8	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 370700-) not found]
P11FC	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 370700-) not found]
P122B	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366068-) not found]
P1255	Engine Controls and Fuel - 2.7L - [Link target (target-id 306086-) not found]
P1255	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307750-) not found]
P1255	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 369895-) not found]
P126E	Engine Controls and Fuel - 2.7L - [Link target (target-id 373243-) not found]
P126E	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372217-) not found]
P126F	Engine Controls and Fuel - 2.7L - [Link target (target-id 373243-) not found]
P126F	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372217-) not found]
P127B	Engine Controls and Fuel - 2.7L - [Link target (target-id 373243-) not found]
P127B	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365616-) not found]
P127B	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372217-) not found]
P128A	Engine Controls and Fuel - 2.7L - [Link target (target-id 373243-) not found]
P128A	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372217-) not found]
P128B	Engine Controls and Fuel - 2.7L - [Link target (target-id 373243-) not found]
P128B	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372217-) not found]
P128C	Engine Controls and Fuel - 2.7L - [Link target (target-id 373234-) not found]
P128C	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366124-) not found]
P128C	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372654-) not found]
P128D	Engine Controls and Fuel - 2.7L - [Link target (target-id 373234-) not found]
P128D	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366124-) not found]
P128D	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372654-) not found]
P128F	Engine Controls and Fuel - 2.7L - [Link target (target-id 373234-) not found]
P128F	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366124-) not found]
P128F	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372654-) not found]
P129F	Engine Controls and Fuel - 2.7L - [Link target (target-id 310226-) not found]
P129F	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307446-) not found]
P129F	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 370252-) not found]
P12A3	Engine Controls and Fuel - 2.7L - [Link target (target-id 373246-) not found]
P12A3	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365618-) not found]
P12A3	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372219-) not found]
P131B	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366309-) not found]
P131E	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 364446-) not found]
P134B	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 349542-) not found]
P134C	Engine Controls and Fuel - 2.7L - [Link target (target-id 373235-) not found]
P134C	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366172-) not found]
P134C	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372525-) not found]

DTC	Diagnostic Procedure
P135A	Engine Controls and Fuel - 2.7L - [Link target (target-id 306057-) not found]
P135A	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 369271-) not found]
P135B	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 369271-) not found]
P1373	Engine Heating and Cooling - [Link target (target-id 374047-) not found]
P138D	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366313-) not found]
P13B1	Engine Mechanical - 2.7L - [Link target (target-id 373830-) not found]
P13B1	Engine Mechanical - 3.0L Diesel - [Link target (target-id 366050-) not found]
P13B1	Engine Mechanical - 5.7L or 6.6L - [Link target (target-id 372259-) not found]
P13F5	Engine Heating and Cooling - [Link target (target-id 374046-) not found]
P1402	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 371306-) not found]
P140B	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307114-) not found]
P140C	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307114-) not found]
P1419	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 371306-) not found]
P1428	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 327137-) not found]
P1465	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 370663-) not found]
P146B	Engine Controls and Fuel - 2.7L - [Link target (target-id 320982-) not found]
P146D	Engine Controls and Fuel - 2.7L - [Link target (target-id 373231-) not found]
P1474	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366312-) not found]
P147A	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366312-) not found]
P148E	Engine Controls and Fuel - 2.7L - [Link target (target-id 373232-) not found]
P1497	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366312-) not found]
P1498	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366312-) not found]
P14A4	Engine Controls and Fuel - 2.7L - [Link target (target-id 373232-) not found]
P14A5	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 313864-) not found]
P14A6	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 313864-) not found]
P14A7	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366299-) not found]
P14AA	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366299-) not found]
P14AD	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366299-) not found]
P14B0	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366299-) not found]
P14B3	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366299-) not found]
P14CD	Engine Controls and Fuel - 2.7L - [Link target (target-id 373234-) not found]
P14CD	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366124-) not found]
P14CD	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372654-) not found]
P14D4	Engine Controls and Fuel - 2.7L - [Link target (target-id 373234-) not found]
P14D4	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366124-) not found]
P14D4	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372654-) not found]
P14D5	Engine Controls and Fuel - 2.7L - [Link target (target-id 373234-) not found]
P14D5	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366124-) not found]
P14D5	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372654-) not found]
P14D9	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366299-) not found]
P1516	Engine Controls and Fuel - 2.7L - [Link target (target-id 373665-) not found]
P1516	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372546-) not found]

DTC	Diagnostic Procedure
P155A	Cruise Control - [Link target (target-id 366134-) not found]
P155B	Cruise Control - [Link target (target-id 366134-) not found]
P155C	Cruise Control - [Link target (target-id 366134-) not found]
P157A	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 371137-) not found]
P1589	Driver Assistance Systems - [Link target (target-id 329008-) not found]
P15CC	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 370701-) not found]
P15D4	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 370701-) not found]
P15FD	Antilock Brake System - [Link target (target-id 272641-) not found]
P15FF	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 272217-) not found]
P163A	Engine Controls and Fuel - 2.7L - [Link target (target-id 373242-) not found]
P163A	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365615-) not found]
P163A	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372216-) not found]
P163B	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365615-) not found]
P1682	Engine Controls and Fuel - 2.7L - [Link target (target-id 373829-) not found]
P1682	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365742-) not found]
P1682	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372382-) not found]
P16A7	Engine Controls and Fuel - 2.7L - [Link target (target-id 373829-) not found]
P16A7	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372382-) not found]
P16BC	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365742-) not found]
P16BC	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372382-) not found]
P16D4	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 314848-) not found]
P16D5	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 314848-) not found]
P16D6	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 314848-) not found]
P16D7	Engine Controls and Fuel - 2.7L - [Link target (target-id 373819-) not found]
P16D7	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 371137-) not found]
P16D7	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372527-) not found]
P16E1	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 314850-) not found]
P16E2	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 314850-) not found]
P16E3	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 314850-) not found]
P16F4	Electronic Transmission Range Select - [Link target (target-id 325570-) not found]
P16FD	Data Communications - [Link target (target-id 372228-) not found]
P172A	Automatic Transmission - 10L80 - [Link target (target-id 366079-) not found]
P175E	Automatic Transmission - 10L80 - [Link target (target-id 289033-) not found]
P176C	Automatic Transmission - 10L80 - [Link target (target-id 366097-) not found]
P1783	Automatic Transmission - 10L80 - [Link target (target-id 366094-) not found]
P1787	Electronic Transmission Range Select - [Link target (target-id 325570-) not found]
P1789	Electronic Transmission Range Select - [Link target (target-id 325570-) not found]
P178F	Automatic Transmission - 10L80 - [Link target (target-id 366097-) not found]
P17C5	Automatic Transmission - 10L80 - [Link target (target-id 366098-) not found]
P17C6	Automatic Transmission - 10L80 - [Link target (target-id 366098-) not found]
P17CC	Automatic Transmission - 10L80 - [Link target (target-id 366098-) not found]
P17CE	Automatic Transmission - 10L80 - [Link target (target-id 366094-) not found]

DTC	Diagnostic Procedure
P17D3	Automatic Transmission - 10L80 - [Link target (target-id 366097-) not found]
P17D4	Transfer Case - MP 3015 - [Link target (target-id 302594-) not found]
P17D4	Transfer Case - MP 3025 - [Link target (target-id 302595-) not found]
P17F3	Electronic Transmission Range Select - [Link target (target-id 363681-) not found]
P17F5	Automatic Transmission - 10L80 - [Link target (target-id 366092-) not found]
P17FA	Automatic Transmission - 10L80 - [Link target (target-id 366092-) not found]
P185F	Transfer Case - MP 3015 - [Link target (target-id 302594-) not found]
P185F	Transfer Case - MP 3025 - [Link target (target-id 302595-) not found]
P186C	Electronic Transmission Range Select - [Link target (target-id 372548-) not found]
P187D	Automatic Transmission - 10L80 - [Link target (target-id 366099-) not found]
P189C	Automatic Transmission - 10L80 - [Link target (target-id 312082-) not found]
P18A1	Automatic Transmission - 10L80 - [Link target (target-id 366096-) not found]
P18A3	Automatic Transmission - 10L80 - [Link target (target-id 366088-) not found]
P18AA	Automatic Transmission - 10L80 - [Link target (target-id 366096-) not found]
P18AE	Automatic Transmission - 10L80 - [Link target (target-id 323134-) not found]
P1911	Electronic Transmission Range Select - [Link target (target-id 346845-) not found]
P1970	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372221-) not found]
P1975	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372221-) not found]
P1976	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372221-) not found]
P197A	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372221-) not found]
P197B	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372221-) not found]
P1981	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366312-) not found]
P1C30	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 347078-) not found]
P2002	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307221-) not found]
P2008	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366071-) not found]
P200C	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307570-) not found]
P200E	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307324-) not found]
P2014	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366072-) not found]
P201B	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366071-) not found]
P2031	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366292-) not found]
P203A	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366309-) not found]
P2047	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366310-) not found]
P204A	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366307-) not found]
P204F	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307361-) not found]
P2053	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366313-) not found]
P205A	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 370631-) not found]
P206A	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366309-) not found]
P208A	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366311-) not found]
P2096	Engine Controls and Fuel - 2.7L - [Link target (target-id 306129-) not found]
P2096	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 370090-) not found]
P2097	Engine Controls and Fuel - 2.7L - [Link target (target-id 306129-) not found]
P2097	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 370090-) not found]

DTC	Diagnostic Procedure
P2098	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 370090-) not found]
P2099	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 370090-) not found]
P20B9	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366296-) not found]
P20BD	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366297-) not found]
P20C1	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366298-) not found]
P20E8	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307361-) not found]
P20E9	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307361-) not found]
P20EE	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307800-) not found]
P20FE	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 347129-) not found]
P20FF	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 371136-) not found]
P2100	Engine Controls and Fuel - 2.7L - [Link target (target-id 373665-) not found]
P2100	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372546-) not found]
P2119	Engine Controls and Fuel - 2.7L - [Link target (target-id 373665-) not found]
P2119	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372546-) not found]
P2120	Engine Controls and Fuel - 2.7L - [Link target (target-id 373666-) not found]
P2120	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366073-) not found]
P2120	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372547-) not found]
P2125	Engine Controls and Fuel - 2.7L - [Link target (target-id 373666-) not found]
P2125	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366073-) not found]
P2125	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372547-) not found]
P2135	Engine Controls and Fuel - 2.7L - [Link target (target-id 373660-) not found]
P2135	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372545-) not found]
P2138	Engine Controls and Fuel - 2.7L - [Link target (target-id 373666-) not found]
P2138	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366073-) not found]
P2138	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372547-) not found]
P2146	Engine Controls and Fuel - 2.7L - [Link target (target-id 373244-) not found]
P2146	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365617-) not found]
P2146	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P2149	Engine Controls and Fuel - 2.7L - [Link target (target-id 373244-) not found]
P2149	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365617-) not found]
P2149	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P214E	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366311-) not found]
P2152	Engine Controls and Fuel - 2.7L - [Link target (target-id 373244-) not found]
P2152	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365617-) not found]
P2152	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P2155	Engine Controls and Fuel - 2.7L - [Link target (target-id 373244-) not found]
P2155	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P215B	Transfer Case - MP 3015 - [Link target (target-id 302594-) not found]
P215B	Transfer Case - MP 3025 - [Link target (target-id 302595-) not found]
P216A	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P216D	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P2176	Engine Controls and Fuel - 2.7L - [Link target (target-id 373665-) not found]

DTC	Diagnostic Procedure
P2176	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372546-) not found]
P217A	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P217D	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P2182	Engine Controls and Fuel - 2.7L - [Link target (target-id 373847-) not found]
P2182	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366287-) not found]
P2182	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373345-) not found]
P2195	Engine Controls and Fuel - 2.7L - [Link target (target-id 373884-) not found]
P2195	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372330-) not found]
P2196	Engine Controls and Fuel - 2.7L - [Link target (target-id 373884-) not found]
P2196	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372330-) not found]
P2197	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372330-) not found]
P2198	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372330-) not found]
P219A	Engine Controls and Fuel - 2.7L - [Link target (target-id 305843-) not found]
P219A	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 369648-) not found]
P219B	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 369648-) not found]
P21CA	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 370710-) not found]
P21CF	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372222-) not found]
P21D0	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372222-) not found]
P21D1	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372222-) not found]
P21D2	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372222-) not found]
P21D3	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372222-) not found]
P21D4	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372222-) not found]
P21D5	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372222-) not found]
P21D6	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372222-) not found]
P2200	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366295-) not found]
P2205	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366295-) not found]
P2208	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366295-) not found]
P220A	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366295-) not found]
P220B	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 370700-) not found]
P2226	Engine Controls and Fuel - 2.7L - [Link target (target-id 373657-) not found]
P2226	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366074-) not found]
P2226	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372542-) not found]
P2237	Engine Controls and Fuel - 2.7L - [Link target (target-id 373872-) not found]
P2237	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372331-) not found]
P223C	Engine Controls and Fuel - 2.7L - [Link target (target-id 373872-) not found]
P223C	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372331-) not found]
P223D	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372331-) not found]
P223E	Engine Controls and Fuel - 2.7L - [Link target (target-id 373872-) not found]
P223E	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372331-) not found]
P223F	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372331-) not found]
P2240	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372331-) not found]
P2243	Engine Controls and Fuel - 2.7L - [Link target (target-id 373872-) not found]

DTC	Diagnostic Procedure
P2251	Engine Controls and Fuel - 2.7L - [Link target (target-id 373872-) not found]
P2251	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372331-) not found]
P2254	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372331-) not found]
P2264	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 312012-) not found]
P2269	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 312012-) not found]
P226D	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307614-) not found]
P2270	Engine Controls and Fuel - 2.7L - [Link target (target-id 373873-) not found]
P2270	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 370110-) not found]
P2271	Engine Controls and Fuel - 2.7L - [Link target (target-id 373873-) not found]
P2271	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 370110-) not found]
P2272	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 370110-) not found]
P2273	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 370110-) not found]
P227A	Engine Controls and Fuel - 2.7L - [Link target (target-id 373657-) not found]
P227A	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366278-) not found]
P227A	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372542-) not found]
P228A	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365615-) not found]
P228B	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365615-) not found]
P228C	Engine Controls and Fuel - 2.7L - [Link target (target-id 373242-) not found]
P228C	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365615-) not found]
P228C	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372216-) not found]
P228D	Engine Controls and Fuel - 2.7L - [Link target (target-id 373242-) not found]
P228D	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365615-) not found]
P228D	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372216-) not found]
P2294	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365615-) not found]
P2297	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366295-) not found]
P2299	Antilock Brake System - [Link target (target-id 272254-) not found]
P229E	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 370700-) not found]
P22A3	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 370700-) not found]
P22A6	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 370700-) not found]
P22B5	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 370700-) not found]
P22FB	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366295-) not found]
P22FE	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 370700-) not found]
P233A	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365615-) not found]
P2380	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 370715-) not found]
P23AC	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366299-) not found]
P23B1	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366299-) not found]
P23B4	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366299-) not found]
P23B6	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366299-) not found]
P23C1	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366299-) not found]
P23C3	Engine Heating and Cooling - [Link target (target-id 363075-) not found]
P241F	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 313867-) not found]
P242A	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366292-) not found]

DTC	Diagnostic Procedure
P244A	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307427-) not found]
P244B	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307427-) not found]
P2452	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 370712-) not found]
P2459	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307772-) not found]
P2463	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307527-) not found]
P249C	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307677-) not found]
P249D	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307800-) not found]
P249E	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307800-) not found]
P24A0	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307577-) not found]
P24A1	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307577-) not found]
P24A4	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307717-) not found]
P24AE	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366312-) not found]
P24B3	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366312-) not found]
P24C6	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366312-) not found]
P24C7	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366312-) not found]
P24D0	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366312-) not found]
P24D1	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366312-) not found]
P24D5	Engine Controls and Fuel - 2.7L - [Link target (target-id 373818-) not found]
P24D5	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373191-) not found]
P24DA	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366312-) not found]
P250A	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373976-) not found]
P2533	Wiring Systems and Power Management - [Link target (target-id 272042-) not found]
P2534	Wiring Systems and Power Management - [Link target (target-id 272042-) not found]
P2535	Wiring Systems and Power Management - [Link target (target-id 272042-) not found]
P2544	Engine Controls and Fuel - 2.7L - [Link target (target-id 373234-) not found]
P2544	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366124-) not found]
P2544	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372654-) not found]
P254F	Vehicle Access - [Link target (target-id 372501-) not found]
P2562	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366075-) not found]
P2583	Data Communications - [Link target (target-id 373262-) not found]
P2591	Data Communications - [Link target (target-id 373263-) not found]
P2592	Data Communications - [Link target (target-id 373264-) not found]
P25BD	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 307311-) not found]
P25C4	Antilock Brake System - [Link target (target-id 362771-) not found]
P2600	Engine Heating and Cooling - [Link target (target-id 373014-) not found]
P2626	Engine Controls and Fuel - 2.7L - [Link target (target-id 373872-) not found]
P2626	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366295-) not found]
P262B	Data Communications - [Link target (target-id 213557-) not found]
P2669	Automatic Transmission - 10L80 - [Link target (target-id 366101-) not found]
P2687	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365740-) not found]
P26B7	Engine Heating and Cooling - [Link target (target-id 363075-) not found]
P26CA	Engine Heating and Cooling - [Link target (target-id 373870-) not found]

DTC	Diagnostic Procedure
P26CE	Engine Heating and Cooling - [Link target (target-id 373870-) not found]
P26E4	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 257466-) not found]
P2713	Automatic Transmission - 10L80 - [Link target (target-id 366087-) not found]
P2718	Automatic Transmission - 10L80 - [Link target (target-id 366101-) not found]
P2722	Automatic Transmission - 10L80 - [Link target (target-id 366086-) not found]
P2727	Automatic Transmission - 10L80 - [Link target (target-id 366101-) not found]
P2731	Automatic Transmission - 10L80 - [Link target (target-id 366085-) not found]
P2736	Automatic Transmission - 10L80 - [Link target (target-id 366101-) not found]
P2796	Automatic Transmission - 10L80 - [Link target (target-id 366089-) not found]
P279A	Transfer Case - MP 3015 - [Link target (target-id 302594-) not found]
P279A	Transfer Case - MP 3025 - [Link target (target-id 302595-) not found]
P279B	Transfer Case - MP 3015 - [Link target (target-id 302594-) not found]
P279B	Transfer Case - MP 3025 - [Link target (target-id 302595-) not found]
P279C	Transfer Case - MP 3015 - [Link target (target-id 302594-) not found]
P279C	Transfer Case - MP 3025 - [Link target (target-id 302595-) not found]
P27EB	Automatic Transmission - 10L80 - [Link target (target-id 366090-) not found]
P27FC	Data Communications - [Link target (target-id 371466-) not found]
P2807	Automatic Transmission - 10L80 - [Link target (target-id 366091-) not found]
P2812	Automatic Transmission - 10L80 - [Link target (target-id 366100-) not found]
P2816	Automatic Transmission - 10L80 - [Link target (target-id 366095-) not found]
P281B	Automatic Transmission - 10L80 - [Link target (target-id 366100-) not found]
P281F	Automatic Transmission - 10L80 - [Link target (target-id 366084-) not found]
P2824	Automatic Transmission - 10L80 - [Link target (target-id 366101-) not found]
P28F7	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 315480-) not found]
P2963	Engine Controls and Fuel - 2.7L - [Link target (target-id 373873-) not found]
P2963	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372332-) not found]
P2964	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372332-) not found]
P29FC	Engine Heating and Cooling - [Link target (target-id 374046-) not found]
P2AB0	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366312-) not found]
P2AB7	Engine Controls and Fuel - 2.7L - [Link target (target-id 373667-) not found]
P2ADE	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366309-) not found]
P2AFC	Engine Controls and Fuel - 2.7L - [Link target (target-id 373847-) not found]
P2B00	Engine Controls and Fuel - 2.7L - [Link target (target-id 373244-) not found]
P2B00	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P2B01	Engine Controls and Fuel - 2.7L - [Link target (target-id 373244-) not found]
P2B01	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P2B02	Engine Controls and Fuel - 2.7L - [Link target (target-id 373244-) not found]
P2B02	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P2B03	Engine Controls and Fuel - 2.7L - [Link target (target-id 373244-) not found]
P2B03	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P2B04	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P2B05	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]

DTC	Diagnostic Procedure
P2B06	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P2B07	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P2B08	Engine Controls and Fuel - 2.7L - [Link target (target-id 373244-) not found]
P2B08	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P2B09	Engine Controls and Fuel - 2.7L - [Link target (target-id 373244-) not found]
P2B09	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P2B0A	Engine Controls and Fuel - 2.7L - [Link target (target-id 373244-) not found]
P2B0A	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P2B0B	Engine Controls and Fuel - 2.7L - [Link target (target-id 373244-) not found]
P2B0B	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P2B0C	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P2B0D	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P2B0E	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P2B0F	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P2B2B	Engine Controls and Fuel - 2.7L - [Link target (target-id 373847-) not found]
P2B2B	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373345-) not found]
P2B33	Engine Controls and Fuel - 2.7L - [Link target (target-id 373850-) not found]
P2B39	Engine Controls and Fuel - 2.7L - [Link target (target-id 373851-) not found]
P2B59	Engine Heating and Cooling - [Link target (target-id 366315-) not found]
P2B5C	Engine Heating and Cooling - [Link target (target-id 366315-) not found]
P2B5D	Engine Heating and Cooling - [Link target (target-id 366315-) not found]
P2B83	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366067-) not found]
P2B86	Engine Heating and Cooling - [Link target (target-id 373014-) not found]
P2B95	Engine Controls and Fuel - 2.7L - [Link target (target-id 373244-) not found]
P2B95	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P2B96	Engine Controls and Fuel - 2.7L - [Link target (target-id 373244-) not found]
P2B96	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P2B98	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366293-) not found]
P2BA3	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 373203-) not found]
P2BB6	Engine Controls and Fuel - 2.7L - [Link target (target-id 373847-) not found]
P2BB6	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373345-) not found]
P2BF0	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 369186-) not found]
P2BF1	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 369186-) not found]
P2BF2	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 369186-) not found]
P2BF3	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 369186-) not found]
P2BF8	Exhaust - [Link target (target-id 374429-) not found]
P2C05	Engine Controls and Fuel - 2.7L - [Link target (target-id 373852-) not found]
P2C09	Engine Controls and Fuel - 2.7L - [Link target (target-id 373852-) not found]
P2C0D	Engine Controls and Fuel - 2.7L - [Link target (target-id 373852-) not found]
P2C12	Engine Controls and Fuel - 2.7L - [Link target (target-id 373852-) not found]
P2C16	Engine Controls and Fuel - 2.7L - [Link target (target-id 373852-) not found]
P2C1E	Engine Controls and Fuel - 2.7L - [Link target (target-id 373242-) not found]

DTC	Diagnostic Procedure
P2C1E	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372216-) not found]
P2C1F	Engine Controls and Fuel - 2.7L - [Link target (target-id 373242-) not found]
P2C1F	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365615-) not found]
P2C1F	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372216-) not found]
P2C20	Engine Controls and Fuel - 2.7L - [Link target (target-id 373242-) not found]
P2C20	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365615-) not found]
P2C20	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372216-) not found]
P2C21	Displays and Gauges - [Link target (target-id 309840-) not found]
P2C62	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366299-) not found]
P2C7A	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 349542-) not found]
P2CB9	Engine Heating and Cooling - [Link target (target-id 370718-) not found]
P2CBB	Engine Heating and Cooling - [Link target (target-id 370718-) not found]
P2CE5	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 370712-) not found]
P2D45	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 327139-) not found]
P2D86	Engine Controls and Fuel - 2.7L - [Link target (target-id 373243-) not found]
P2D86	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372217-) not found]
P2DC7	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 355011-) not found]
P2E00	Electronic Transmission Range Select - [Link target (target-id 363681-) not found]
P2E04	Electronic Transmission Range Select - [Link target (target-id 363681-) not found]
P2E62	Engine Heating and Cooling - [Link target (target-id 374046-) not found]
P2E65	Engine Heating and Cooling - [Link target (target-id 374046-) not found]
P2EAD	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 347079-) not found]
P2F93	Engine Controls and Fuel - 2.7L - [Link target (target-id 373247-) not found]
P2F93	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 369187-) not found]
P2F94	Engine Controls and Fuel - 2.7L - [Link target (target-id 373247-) not found]
P2F94	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 369187-) not found]
P305E	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 266399-) not found]
P3075	Engine Heating and Cooling - [Link target (target-id 371569-) not found]
P3080	Engine Controls and Fuel - 2.7L - [Link target (target-id 373850-) not found]
P3085	Engine Controls and Fuel - 2.7L - [Link target (target-id 373850-) not found]
P308A	Engine Controls and Fuel - 2.7L - [Link target (target-id 373850-) not found]
P308F	Engine Controls and Fuel - 2.7L - [Link target (target-id 373850-) not found]
P3094	Engine Controls and Fuel - 2.7L - [Link target (target-id 373850-) not found]
P3099	Engine Controls and Fuel - 2.7L - [Link target (target-id 373851-) not found]
P30B0	Engine Controls and Fuel - 2.7L - [Link target (target-id 373852-) not found]
P30BE	Engine Controls and Fuel - 2.7L - [Link target (target-id 373853-) not found]
P30C2	Engine Controls and Fuel - 2.7L - [Link target (target-id 373853-) not found]
P30C6	Engine Controls and Fuel - 2.7L - [Link target (target-id 373853-) not found]
P30CA	Engine Controls and Fuel - 2.7L - [Link target (target-id 373853-) not found]
P30CE	Engine Controls and Fuel - 2.7L - [Link target (target-id 310671-) not found]
P30CF	Engine Controls and Fuel - 2.7L - [Link target (target-id 310671-) not found]
P30D0	Engine Controls and Fuel - 2.7L - [Link target (target-id 310671-) not found]

DTC	Diagnostic Procedure
P30D1	Engine Controls and Fuel - 2.7L - [Link target (target-id 310671-) not found]
P30D4	Engine Controls and Fuel - 2.7L - [Link target (target-id 373244-) not found]
P30D4	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 373187-) not found]
P30D6	Data Communications - [Link target (target-id 372287-) not found]
P30D7	Data Communications - [Link target (target-id 372289-) not found]
P30D8	Data Communications - [Link target (target-id 372290-) not found]
P30D9	Data Communications - [Link target (target-id 372291-) not found]
P30DA	Data Communications - [Link target (target-id 372292-) not found]
P30DB	Data Communications - [Link target (target-id 372310-) not found]
P30DC	Data Communications - [Link target (target-id 372311-) not found]
P30DD	Data Communications - [Link target (target-id 372312-) not found]
P3105	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372601-) not found]
P3108	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372601-) not found]
P310B	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372601-) not found]
P310E	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372601-) not found]
P3111	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372601-) not found]
P3114	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372601-) not found]
P3117	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372601-) not found]
P311A	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372601-) not found]
P316E	Exhaust - [Link target (target-id 374429-) not found]
P3172	Exhaust - [Link target (target-id 374429-) not found]
P3173	Exhaust - [Link target (target-id 374429-) not found]
P3174	Exhaust - [Link target (target-id 374429-) not found]
P3177	Exhaust - [Link target (target-id 374429-) not found]
P3178	Exhaust - [Link target (target-id 374429-) not found]
P3186	Data Communications - [Link target (target-id 319695-) not found]
P3187	Engine Controls and Fuel - 2.7L - [Link target (target-id 338053-) not found]
P3187	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 327624-) not found]
P3187	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 370312-) not found]
P3188	Engine Controls and Fuel - 2.7L - [Link target (target-id 338053-) not found]
P3188	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 327624-) not found]
P3188	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 370312-) not found]
P3189	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372747-) not found]
P318A	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372747-) not found]
P318B	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372747-) not found]
P318C	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372747-) not found]
P318D	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372747-) not found]
P318E	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372747-) not found]
P318F	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372747-) not found]
P3190	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372747-) not found]
P31C2	Engine Controls and Fuel - 2.7L - [Link target (target-id 373248-) not found]
P31C2	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 365478-) not found]

DTC	Diagnostic Procedure
P31C2	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372218-) not found]
P3401	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372601-) not found]
P3409	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372601-) not found]
P3417	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372601-) not found]
P3425	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372601-) not found]
P3433	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372601-) not found]
P3441	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372601-) not found]
P3449	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372601-) not found]
P3457	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372601-) not found]
P3498	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372601-) not found]
P3499	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372601-) not found]
P349A	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372601-) not found]
P349B	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372601-) not found]
P349C	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372601-) not found]
P349D	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372601-) not found]
P349E	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372601-) not found]
P349F	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372601-) not found]
P34C9	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372222-) not found]
P34CA	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372222-) not found]
P34CB	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372222-) not found]
P34CC	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372222-) not found]
P34CD	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372222-) not found]
P34CE	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372222-) not found]
P34CF	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372222-) not found]
P34D0	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372222-) not found]
P34D1	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372222-) not found]
P34D2	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372222-) not found]
P34D3	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372222-) not found]
P34D4	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372222-) not found]
P34D5	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372222-) not found]
P34D6	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372222-) not found]
P34D7	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372222-) not found]
P34D8	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372222-) not found]
U0028	Data Communications - [Link target (target-id 219712-) not found]
U0037	Data Communications - [Link target (target-id 299126-) not found]
U0055	Data Communications - [Link target (target-id 321231-) not found]
U0073	Data Communications - [Link target (target-id 148027-) not found]
U0074	Data Communications - [Link target (target-id 168614-) not found]
U0075	Data Communications - [Link target (target-id 219671-) not found]
U0076	Data Communications - [Link target (target-id 225597-) not found]
U0078	Data Communications - [Link target (target-id 208739-) not found]
U0079	Data Communications - [Link target (target-id 313798-) not found]

DTC	Diagnostic Procedure
U007B	Data Communications - [Link target (target-id 274046-) not found]
U007E	Data Communications - [Link target (target-id 277590-) not found]
U0080	Data Communications - [Link target (target-id 362610-) not found]
U00A1	Engine Heating and Cooling - [Link target (target-id 374046-) not found]
U0101	Data Communications - [Link target (target-id 263537-) not found]
U0102	Data Communications - [Link target (target-id 373172-) not found]
U0103	Electronic Transmission Range Select - [Link target (target-id 371489-) not found]
U0114	Data Communications - [Link target (target-id 324227-) not found]
U0125	Data Communications - [Link target (target-id 284672-) not found]
U012A	Data Communications - [Link target (target-id 374087-) not found]
U0131	Data Communications - [Link target (target-id 284675-) not found]
U0134	Data Communications - [Link target (target-id 370683-) not found]
U0136	Data Communications - [Link target (target-id 373174-) not found]
U0139	Data Communications - [Link target (target-id 370720-) not found]
U0140	Data Communications - [Link target (target-id 210836-) not found]
U0142	Data Communications - [Link target (target-id 370685-) not found]
U0146	Data Communications - [Link target (target-id 284676-) not found]
U0151	Data Communications - [Link target (target-id 284677-) not found]
U0154	Data Communications - [Link target (target-id 363458-) not found]
U0159	Data Communications - [Link target (target-id 363460-) not found]
U015B	Data Communications - [Link target (target-id 370722-) not found]
U0164	Data Communications - [Link target (target-id 284679-) not found]
U0165	Data Communications - [Link target (target-id 363461-) not found]
U0183	Data Communications - [Link target (target-id 370711-) not found]
U0184	Data Communications - [Link target (target-id 284682-) not found]
U018B	Data Communications - [Link target (target-id 370686-) not found]
U0198	Data Communications - [Link target (target-id 261520-) not found]
U01B0	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 366196-) not found]
U01DF	Data Communications - [Link target (target-id 370687-) not found]
U01E0	Data Communications - [Link target (target-id 370688-) not found]
U0208	Seat Heating and Cooling - [Link target (target-id 371122-) not found]
U0209	Power Seats - [Link target (target-id 371107-) not found]
U020C	Data Communications - [Link target (target-id 370689-) not found]
U0210	Power Seats - [Link target (target-id 371108-) not found]
U0211	Data Communications - [Link target (target-id 370690-) not found]
U0212	Steering Wheel and Column - [Link target (target-id 373046-) not found]
U0214	Remote Functions - [Link target (target-id 366179-) not found]
U0230	Data Communications - [Link target (target-id 363416-) not found]
U0235	Data Communications - [Link target (target-id 363417-) not found]
U0236	Data Communications - [Link target (target-id 329088-) not found]
U023A	Data Communications - [Link target (target-id 370677-) not found]
U023B	Data Communications - [Link target (target-id 370691-) not found]

DTC	Diagnostic Procedure
U023C	Data Communications - [Link target (target-id 370692-) not found]
U023D	Data Communications - [Link target (target-id 370693-) not found]
U023E	Data Communications - [Link target (target-id 370694-) not found]
U0243	Data Communications - [Link target (target-id 370695-) not found]
U0244	Data Communications - [Link target (target-id 370696-) not found]
U0246	Data Communications - [Link target (target-id 363419-) not found]
U0247	Seat Heating and Cooling - [Link target (target-id 371123-) not found]
U024B	Data Communications - [Link target (target-id 371566-) not found]
U024C	Data Communications - [Link target (target-id 372206-) not found]
U0259	Data Communications - [Link target (target-id 370678-) not found]
U0260	Power Seats - [Link target (target-id 371109-) not found]
U0261	Power Seats - [Link target (target-id 371110-) not found]
U0265	Data Communications - [Link target (target-id 297210-) not found]
U0284	Bumpers and Fascias - [Link target (target-id 371206-) not found]
U0285	Bumpers and Fascias - [Link target (target-id 371205-) not found]
U0288	Power Outlets - [Link target (target-id 373377-) not found]
U029D	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 327907-) not found]
U029E	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 327907-) not found]
U02A1	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 327907-) not found]
U02A3	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 327907-) not found]
U02A9	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366067-) not found]
U02B3	Data Communications - [Link target (target-id 370679-) not found]
U02B8	Data Communications - [Link target (target-id 370697-) not found]
U02B9	Data Communications - [Link target (target-id 370698-) not found]
U02BB	Engine Controls and Fuel - 2.7L - [Link target (target-id 373232-) not found]
U03C1	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366278-) not found]
U03C1	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372542-) not found]
U03C1	Data Communications - [Link target (target-id 359318-) not found]
U0400-U05FF	Data Communications - [Link target (target-id 179843-) not found]
U04A4	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366312-) not found]
U0585	Bumpers and Fascias - [Link target (target-id 371206-) not found]
U0586	Bumpers and Fascias - [Link target (target-id 371205-) not found]
U059E	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366295-) not found]
U05A8	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366299-) not found]
U05AA	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366067-) not found]
U0600-U06FF	Data Communications - [Link target (target-id 276055-) not found]
U0601	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 370712-) not found]
U0606	Engine Controls and Fuel - 2.7L - [Link target (target-id 373660-) not found]
U0606	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372545-) not found]
U0607	Engine Controls and Fuel - 2.7L - [Link target (target-id 373660-) not found]
U0607	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372545-) not found]
U060F	Engine Controls and Fuel - 2.7L - [Link target (target-id 373657-) not found]

DTC	Diagnostic Procedure
U060F	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366278-) not found]
U060F	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372542-) not found]
U0617	Engine Heating and Cooling - [Link target (target-id 366139-) not found]
U061F	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366292-) not found]
U0620	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366292-) not found]
U0623	Engine Heating and Cooling - [Link target (target-id 373014-) not found]
U0625	Engine Controls and Fuel - 2.7L - [Link target (target-id 373243-) not found]
U0625	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372217-) not found]
U0632	Engine Heating and Cooling - [Link target (target-id 370718-) not found]
U0633	Engine Heating and Cooling - [Link target (target-id 370718-) not found]
U063F	Engine Heating and Cooling - [Link target (target-id 366315-) not found]
U0644	Engine Controls and Fuel - 2.7L - [Link target (target-id 373667-) not found]
U064F	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366072-) not found]
U0650	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366294-) not found]
U0651	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 370682-) not found]
U0653	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 370682-) not found]
U0654	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366069-) not found]
U0656	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366075-) not found]
U0658	HVAC - Automatic - [Link target (target-id 369164-) not found]
U0659	HVAC - Automatic - [Link target (target-id 369165-) not found]
U065A	HVAC - Automatic - [Link target (target-id 369166-) not found]
U065B	HVAC - Automatic - [Link target (target-id 369167-) not found]
U065D	HVAC - Automatic - [Link target (target-id 369168-) not found]
U0669	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 370715-) not found]
U0670	Engine Controls and Fuel - 2.7L - [Link target (target-id 373243-) not found]
U0670	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372217-) not found]
U0671	Engine Controls and Fuel - 2.7L - [Link target (target-id 373243-) not found]
U0671	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372217-) not found]
U0672	Engine Heating and Cooling - [Link target (target-id 373870-) not found]
U067C	Engine Heating and Cooling - [Link target (target-id 370718-) not found]
U068E	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366290-) not found]
U0696	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 370712-) not found]
U069A	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366292-) not found]
U06B4	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 370701-) not found]
U06B6	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 370701-) not found]
U073A	Data Communications - [Link target (target-id 371467-) not found]
U0765	Data Communications - [Link target (target-id 366140-) not found]
U0798	Data Communications - [Link target (target-id 372511-) not found]
U07C7	Trailering Systems - [Link target (target-id 371443-) not found]
U07C9	HVAC - Automatic - [Link target (target-id 373362-) not found]
U0800	Data Communications - [Link target (target-id 371470-) not found]
U0801	Data Communications - [Link target (target-id 372512-) not found]

DTC	Diagnostic Procedure
U0802	Data Communications - [Link target (target-id 366141-) not found]
U0814	Data Communications - [Link target (target-id 373176-) not found]
U082A	Data Communications - [Link target (target-id 372513-) not found]
U0837	Trailering Systems - [Link target (target-id 372780-) not found]
U0839	Data Communications - [Link target (target-id 366143-) not found]
U0840	Data Communications - [Link target (target-id 366144-) not found]
U0851	Data Communications - [Link target (target-id 366145-) not found]
U0859	Parking Assistance Systems - [Link target (target-id 373202-) not found]
U0884	Data Communications - [Link target (target-id 371472-) not found]
U101A	Data Communications - [Link target (target-id 317051-) not found]
U101B	Engine Controls and Fuel - 2.7L - [Link target (target-id 373243-) not found]
U101B	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372217-) not found]
U101F	Data Communications - [Link target (target-id 359629-) not found]
U1042	Power Outlets - [Link target (target-id 359090-) not found]
U1099	Data Communications - [Link target (target-id 372662-) not found]
U1109	HVAC - Automatic - [Link target (target-id 369171-) not found]
U110A	HVAC - Automatic - [Link target (target-id 369172-) not found]
U110D	Lighting - [Link target (target-id 366193-) not found]
U1110	Lighting - [Link target (target-id 369160-) not found]
U1121	Lighting - [Link target (target-id 366194-) not found]
U1126	Data Communications - [Link target (target-id 329058-) not found]
U1127	Data Communications - [Link target (target-id 301016-) not found]
U112F	Data Communications - [Link target (target-id 329060-) not found]
U1135	Remote Functions - [Link target (target-id 362504-) not found]
U1136	Remote Functions - [Link target (target-id 362505-) not found]
U1137	Remote Functions - [Link target (target-id 362506-) not found]
U1138	Remote Functions - [Link target (target-id 362507-) not found]
U113B	Secondary and Configurable Customer Controls - [Link target (target-id 366199-) not found]
U1145	Seat Heating and Cooling - [Link target (target-id 371126-) not found]
U1146	Seat Heating and Cooling - [Link target (target-id 371127-) not found]
U1150	Data Communications - [Link target (target-id 329077-) not found]
U1151	Data Communications - [Link target (target-id 329078-) not found]
U1191	Electronic Transmission Range Select - [Link target (target-id 350236-) not found]
U1194	Electronic Transmission Range Select - [Link target (target-id 350237-) not found]
U1195	Electronic Transmission Range Select - [Link target (target-id 350236-) not found]
U1196	Electronic Transmission Range Select - [Link target (target-id 350237-) not found]
U119C	Remote Functions - [Link target (target-id 362500-) not found]
U11EC	Data Communications - [Link target (target-id 349282-) not found]
U11FD	Data Communications - [Link target (target-id 349284-) not found]
U11FF	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372221-) not found]
U1200-U1202	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372221-) not found]
U1300-U1344	Data Communications - [Link target (target-id 317053-) not found]

DTC	Diagnostic Procedure
U1314	Engine Heating and Cooling - [Link target (target-id 370717-) not found]
U1314-U1316	Engine Heating and Cooling - [Link target (target-id 370718-) not found]
U1315	Engine Heating and Cooling - [Link target (target-id 370717-) not found]
U1319	Engine Controls and Fuel - 2.7L - [Link target (target-id 373657-) not found]
U131B	Engine Heating and Cooling - [Link target (target-id 373870-) not found]
U1345-U1349	Data Communications - [Link target (target-id 317756-) not found]
U134A-U14FF	Data Communications - [Link target (target-id 317053-) not found]
U137A	Engine Controls and Fuel - 2.7L - [Link target (target-id 373232-) not found]
U13E0	Electronic Transmission Range Select - [Link target (target-id 350236-) not found]
U13E1	Electronic Transmission Range Select - [Link target (target-id 350237-) not found]
U13E2	Electronic Transmission Range Select - [Link target (target-id 350236-) not found]
U13E3	Electronic Transmission Range Select - [Link target (target-id 350237-) not found]
U140B	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372221-) not found]
U140D	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372221-) not found]
U140E	Engine Controls and Fuel - 5.7L or 6.6L - [Link target (target-id 372221-) not found]
U1500-U15FF	Data Communications - [Link target (target-id 179844-) not found]
U1602	Data Communications - [Link target (target-id 328899-) not found]
U1603	Data Communications - [Link target (target-id 328900-) not found]
U1607	Data Communications - [Link target (target-id 328512-) not found]
U1608	Data Communications - [Link target (target-id 328513-) not found]
U1609	Data Communications - [Link target (target-id 328514-) not found]
U160A	Data Communications - [Link target (target-id 328515-) not found]
U160B	Data Communications - [Link target (target-id 328516-) not found]
U1610	Data Communications - [Link target (target-id 328519-) not found]
U1611	Data Communications - [Link target (target-id 319395-) not found]
U1615	Data Communications - [Link target (target-id 328522-) not found]
U1616	Data Communications - [Link target (target-id 328523-) not found]
U1623	Data Communications - [Link target (target-id 328524-) not found]
U1624	Data Communications - [Link target (target-id 328525-) not found]
U1625	Data Communications - [Link target (target-id 328526-) not found]
U1627	Data Communications - [Link target (target-id 332914-) not found]
U1639	Data Communications - [Link target (target-id 332925-) not found]
U163D	Data Communications - [Link target (target-id 332929-) not found]
U1642	Data Communications - [Link target (target-id 335270-) not found]
U1643	Data Communications - [Link target (target-id 332932-) not found]
U1647	Data Communications - [Link target (target-id 332933-) not found]
U164A	Data Communications - [Link target (target-id 332934-) not found]
U164B	Data Communications - [Link target (target-id 335271-) not found]
U164E	Data Communications - [Link target (target-id 332935-) not found]
U164F	Data Communications - [Link target (target-id 332936-) not found]
U1651	Data Communications - [Link target (target-id 184702-) not found]
U166A	Data Communications - [Link target (target-id 332946-) not found]

DTC	Diagnostic Procedure
U166B	Data Communications - [Link target (target-id 347246-) not found]
U1818	Data Communications - [Link target (target-id 168622-) not found]
U18A2	Data Communications - [Link target (target-id 225598-) not found]
U18E2	Data Communications - [Link target (target-id 317760-) not found]
U1960-U1962	Data Communications - [Link target (target-id 315363-) not found]
U1967	Cellular, Entertainment, and Navigation - [Link target (target-id 319002-) not found]
U196E	Power Outlets - [Link target (target-id 359630-) not found]
U1973	Displays and Gauges - [Link target (target-id 309457-) not found]
U1977	Data Communications - [Link target (target-id 317061-) not found]
U1978	Data Communications - [Link target (target-id 317062-) not found]
U197A	Data Communications - [Link target (target-id 317064-) not found]
U197E	Displays and Gauges - [Link target (target-id 317153-) not found]
U197F	Displays and Gauges - [Link target (target-id 317154-) not found]
U198B	Data Communications - [Link target (target-id 349296-) not found]
U1991	Data Communications - [Link target (target-id 345199-) not found]
U1992	Data Communications - [Link target (target-id 345200-) not found]
U19A3	Data Communications - [Link target (target-id 315363-) not found]
U2000-U20FF	Data Communications - [Link target (target-id 317070-) not found]
U2110-U2117	Data Communications - [Link target (target-id 317071-) not found]
U2211	Data Communications - [Link target (target-id 328630-) not found]
U2212	Data Communications - [Link target (target-id 328631-) not found]
U2213	Data Communications - [Link target (target-id 328632-) not found]
U223B	Displays and Gauges - [Link target (target-id 348392-) not found]
U223C	HVAC - Automatic - [Link target (target-id 354508-) not found]
U2627	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366309-) not found]
U2629	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366309-) not found]
U2630	Engine Controls and Fuel - 3.0L Diesel - [Link target (target-id 366309-) not found]
U2A90	Displays and Gauges - [Link target (target-id 322010-) not found]
U2A91	Displays and Gauges - [Link target (target-id 322011-) not found]
U2C91	Data Communications - [Link target (target-id 349297-) not found]
U3000	Data Communications - [Link target (target-id 229188-) not found]
U3000	Driver Assistance Systems - [Link target (target-id 317614-) not found]
U3000	Driver Monitoring and Occupant Detection - [Link target (target-id 354524-) not found]
U3000	Remote Functions - [Link target (target-id 347127-) not found]
U3000	Supplemental Restraints - [Link target (target-id 321864-) not found]
U3000	Power Seats - [Link target (target-id 352062-) not found]
U3000	Power Steering - [Link target (target-id 317740-) not found]
U3002	Data Communications - [Link target (target-id 280674-) not found]
U3003	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 205272-) not found]
U3006-U3009	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 311937-) not found]
U300D	Wiring Systems and Power Management - [Link target (target-id 319488-) not found]
U3018	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 297157-) not found]

DTC	Diagnostic Procedure
U3019	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 297157-) not found]
U3023	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 327359-) not found]
U3024	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 345322-) not found]
U3034	Data Communications - [Link target (target-id 315363-) not found]
U3035	Data Communications - [Link target (target-id 315363-) not found]
U3042	Data Communications - [Link target (target-id 372663-) not found]
U3501-U3588	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 297157-) not found]
U35B9	Data Communications - [Link target (target-id 332964-) not found]

Symptom Byte List

Symptom Byte List

Symptom Byte	Symptom Byte Description	Symptom Byte Definition
00	No Sub Type Information	This sub type is used for failures where the base DTC text string provides the complete description of the failure itself.
01	General Electrical Malfunction	This sub type is used for General Electrical Failures that cannot be assigned to a specific sub type.
02	General Signal Malfunction	This sub type is used for General Signal Failures that cannot be assigned to a specific sub type.
03	FM (Frequency Modulated) / PWM (Pulse Width Modulated) Malfunction	This sub type is used for FM / PWM Failures that cannot be assigned to a specific sub type.
04	System Internal Malfunction	This sub type is used for control module Internal Failures that cannot be assigned to a specific sub type.
05	Programming Malfunction	This sub type is used for System Programming Failures that cannot be assigned to a specific sub type.
06	Algorithm Based Malfunction	This sub type is used for Algorithm Based Failures that cannot be assigned to a specific sub type.
07	Mechanical Malfunction	This sub type is used for Mechanical Failures that cannot be assigned to a specific sub type.
08	Bus Signal / Message Malfunction	This sub type is used for Bus Signal / Message Failures that cannot be assigned to a specific sub type.
09	Component Malfunction	This sub type is used for Component Failures that cannot be assigned to a specific sub type.
0A	General Electric Malfunction	This range specifies the standard wiring failure modes (i.e., shorts and opens), and direct current (DC) quantities related by Ohm's Law.
0B	Reserved	—
0C	Reserved	—
0D	Reserved	—
0E	Reserved	—
0F	Reserved	—
10	Reserved	—
11	Circuit Short To Ground	This sub type is used for failures where the control module measures ground (battery negative) potential for greater than a specified time period or when some other value less than the low voltage limit DTC Sub Type is measured.
12	Circuit Short To Battery	This sub type is used for failures, where the control module measures vehicle system (battery positive) potential for greater than a specified time period or when some other value higher than the high voltage limit DTC Sub Type is measured.

Symptom Byte	Symptom Byte Description	Symptom Byte Definition
13	Circuit Open	This sub type is used for failures, where the control module determines an open circuit via lack of bias voltage, low current flow, no change in the state of an input in response to an output, etc.
14	Circuit Short To Ground or Open	This sub type is used for failures, where the condition detected by the control module is the same for either indicated failure mode.
15	Circuit Short To Battery or Open	This sub type is used for failures, where the condition detected by the control module is the same for either indicated failure mode.
16	Circuit Low Voltage	This sub type is used for failures, where the control module measures a voltage below a specified range.
17	Circuit High Voltage	This sub type is used for failures, where the control module measures a voltage above a specified range.
18	Circuit Low Current	This sub type is used for failures, where the control module measures current flow below a specified range.
19	Circuit High Current	This sub type is used for failures, where the control module measures current flow above a specified range.
1A	Circuit Low Resistance	This sub type is used for failures, where the control module infers a circuit resistance below a specified range.
1B	Circuit High Resistance	This sub type is used for failures, where the control module infers a circuit resistance above a specified range.
1C	Circuit Voltage Out of Range	This sub type is used for failures, where the control module measures a voltage outside the expected range but not identified as too high or too low.
1D	Current Out of Range	This sub type is used for failures, where the control module measures a current outside the expected range but not identified as too high or too low.
1E	Circuit Resistance Out of Range	This sub type is used for failures, where the control module measures a resistance outside the expected range but not identified as too high or too low.
1F	Circuit Intermittent	This sub type is used for failures, where the control module momentarily detects one of the conditions defined above, but not long enough to set a specific sub type.
20	Reserved	—
21	Low Signal Amplitude	This sub type is used for failures where the control module measures a signal voltage amplitude below a specified range (e.g., low gain).
22	High Signal Amplitude	This sub type is used for failures where the control module measures a signal voltage amplitude above a specified range (e.g., gain too high).
23	Stuck Low	This sub type is used for failures where the control module measures a signal that remains low when transitions are expected.
24	Stuck High	This sub type is used for failures where the control module measures a signal that remains high when transitions are expected.
25	Performance - Signal Shape/ Waveform Failure	This sub type is used for failures where the shape of the signal (plot of the amplitude with respect to time) is not correct, e.g., improper circuit impedance.
26	Low Signal Rate of Change	This sub type is used for failures where the signal transitions more slowly than the specified limit.
27	High Signal Rate of Change	This sub type is used for failures where the signal transitions more quickly than the specified limit.

Symptom Byte	Symptom Byte Description	Symptom Byte Definition
28	Performance - Bias Level Out of Range	This sub type is used for failures where the control module applies a bias voltage or a zero signal level to a circuit upon which is superimposed a signal voltage (e.g., bias voltage to an Oxygen Sensor circuit, or a filtered digital m/sec2 signal while vehicle stands still for a lateral accelerator sensor module.)
29	Performance - Signal Invalid	This sub type is used for failures where the value of the signal is not plausible given the operating conditions.
2A	Signal Stuck In Range	This sub type is used for failures where the value of the signal is in the normal operating range, but not correct for current operating conditions.
2B	Signal Cross Coupled	This sub type is used when a signal is found to be incorrectly correlated to another signal that the control module is also monitoring, indicating that the signals are shorted together
2C	Parameter Too Low	This sub type is used for failures where the value of the signal is below the expected value and a more specific FTB such as temperature is not available, e.g. Pressure.
2D	Parameter Too High	This sub type is used for failures where the value of the signal is above the expected value and a more specific FTB such as temperature is not available, e.g. Pressure.
2E	Reserved	—
2F	Signal Erratic	This sub type is used for failures where the signal is momentarily implausible (not long enough for "signal invalid") or discontinuous.
30	Reserved	—
31	No Signal	This sub type is used for failures where the control module does not detect a signal which ought to be present (e.g., wheel speed signals present for three of the four wheels and brakes not applied.)
32	Signal Low Time Below Minimum	This sub type is used for failures where the control module detects the low pulse is too narrow with respect to time.
33	Signal Low Time Above Maximum	This sub type is used for failures where the control module detects the low pulse is too wide with respect to time.
34	Signal High Time Below Minimum	This sub type is used for failures where the control module detects the high pulse is too narrow with respect to time.
35	Signal High Time Above Maximum	This sub type is used for failures where the control module detects the high pulse is too wide with respect to time.
36	Frequency Too Low	This sub type is used for failures where the control module detects excessive duration for one cycle of the output across a specified sample size.
37	Frequency Too High	This sub type is used for failures where the control module detects insufficient duration for one cycle of the output across a specified sample size.
38	Incorrect Frequency	This sub type is used for failures where the control module measures an incorrect number of cycles in a given time period.
39	Too Few Pulses	This sub type is used for failures where the control module measures too few pulses (e.g., position is calibrated in counts from one extreme to the other).
3A	Too Many Pulses	This sub type is used for failures where the control module measures too many pulses (e.g., position is calibrated in counts from one extreme to the other).
3B	Reserved	—
3C	Reserved	—
3D	Reserved	—
3E	Reserved	—
3F	Reserved	—

Symptom Byte	Symptom Byte Description	Symptom Byte Definition
40	Reserved	—
41	General Checksum Malfunction	This sub type is used by the control module to indicate an incorrect checksum calculation where memory type is not specified.
42	General Memory Malfunction	This sub type is used by the control module to indicate a memory failure where memory type is not specified.
43	Special Memory Malfunction	This sub type is used by the control module to indicate a memory failure where the specific memory type is not defined in this category.
44	Data Memory Malfunction	This sub type is used by the control module to indicate a data (or working) memory failure for embedded systems using FLASH memory. This is equivalent to RAM in RAM/ROM/EEPROM embedded systems.
45	Program Memory Malfunction	This sub type is used by the control module to indicate a program memory failure for embedded systems using FLASH memory. This is equivalent to ROM in RAM/ROM/EEPROM embedded systems.
46	Calibration / Parameter Memory Malfunction	This sub type is used by the control module to indicate a calibration / parameter memory failure for embedded systems using FLASH memory. This is equivalent to EEPROM in RAM/ROM/EEPROM embedded systems.
47	Watchdog/Safety Controller Malfunction	This sub type is used by the control module to indicate a watchdog / safety µC failure, or a failure in the execution of operational software.
48	Supervision Software Malfunction	This sub type is used by the control module to indicate a supervision software failure.
49	Internal Malfunction	This sub type is used by the control module to indicate the detection of an internal circuit failure.
4A	Incorrect Component Installed	This sub type is used by the control module to indicate a mismatch between the hardware connected to the control module and the hardware expected by the control module.
4B	High Temperature	This sub type is used by the control module to indicate the detection of an internal temperature above the expected range.
4C	Memory Full	This sub type is used by the control module to indicate the accumulated memory has reached maximum capacity.
4D	Reserved	—
4E	Reserved	—
4F	Reserved	—
50	Reserved	—
51	Not Programmed	This sub type is used by the control module to indicate that programming is required.
52	Not Activated	This sub type is used by the control module to indicate that some portion of the program has not been enabled.
53	Deactivated	This sub type is used by the control module to indicate that that some portion of the program has been disabled.
54	Missing Setup/Learn	This sub type is used by the control module to indicate that an operational range, etc., for a sensor or actuator must be taught to the control module, e.g. by programming or learning.
55	Not Configured	This sub type is used by the control module to indicate the need to enter (program) the sub system option content or the vehicle option content.
56	Invalid / Incompatible Configuration	This sub type indicates a control module or system configuration that cannot be valid, e.g. to have mutually exclusive options set on at the same time, or a set up that is not supported by the currently installed hardware/software.

Symptom Byte	Symptom Byte Description	Symptom Byte Definition
57	Invalid / Incompatible Software Component	This sub type is used by the control module to indicate that a software component (calibration or program) has been identified as invalid for the control module or incompatible with other hardware or software identified by the control module, e.g. a downloaded calibration software component is incompatible with a permanent or downloaded strategy software component.
58	Reserved	—
59	Reserved	—
5A	Reserved	—
5B	Reserved	—
5C	Reserved	—
5D	Reserved	—
5E	Reserved	—
5F	Reserved	—
60	Reserved	—
61	Signal Calculation Failure	This sub type is used for algorithm based calculation failures where the calculated value is outside the expected range.
62	Signal Compare Malfunction	This sub type is used for failures where the control module compares two or more input parameters for plausibility but cannot specifically identify the component that is faulted.
63	Protection Time-Out	This sub type is used for failures where the control module detects a function is active for greater than a specified time period.
64	Not Plausible	This sub type is used for failures where the control module detects a single input parameter is operating outside the plausible range.
65	Too Few Transitions/Events	This sub type is used for failures where the control module monitors a parameter over time within specified limits and detects fewer than the expected number of transitions.
66	Too Many Transitions/Events	This sub type is used for failures where the control module monitors a parameter over time within specified limits and detects more than the expected number of transitions.
67	Signal Incorrect After Event	This sub type is used for failures where the control module does not see the correct change of a parameter or group of parameters in response to a particular event.
68	Event Information	This sub type is used by the control module to indicate the detection of a system event that was not caused by the control module itself but forces the control module to store a DTC (e.g. missing functionality from another system/control module).
69	Reserved	—
6A	Reserved	—
6B	Reserved	—
6C	Reserved	—
6D	Reserved	—
6E	Reserved	—
6F	Reserved	—
70	Reserved	—
71	Actuator Stuck	This sub type is used for failures where the control module does not detect any mechanical motion in response to energizing a motor, solenoid, relay, etc.

Symptom Byte	Symptom Byte Description	Symptom Byte Definition
72	Actuator Stuck Open	This sub type is used for failures where the control module does not detect any mechanical motion upon commanding the operation of a motor, solenoid, relay, etc., to close some piece of equipment.
73	Actuator Stuck Closed	This sub type is used for failures where the control module does not detect any mechanical motion upon commanding the operation of a motor, solenoid, relay, etc., to open some piece of equipment.
74	Actuator Slipping	This sub type is used for failures where the control module detects excessive duration to command a motor, solenoid, relay, etc., to move a piece of equipment to a desired position.
75	Emergency Position Not Reachable	This sub type is used for failures where the control module is unable to command a motor, solenoid, relay, etc., to move a piece of equipment to the emergency position.
76	Incorrect Mounting	This sub type is used for failures where the control module detects incorrectly mounted components, e.g., acceleration sensor showing a position error of 90°.
77	Commanded Position Not Reachable	This sub type is used for failures where the control module is unable to command a motor, solenoid, relay, etc., to move a piece of equipment to the commanded position either due to a failure in the actuator or its mechanical environment.
78	Alignment or Adjustment Incorrect	This sub type is used for failures where the control module detects incorrectly adjusted or aligned components.
79	Mechanical Linkage Malfunction	This sub type is used for failures where the control module detects that the actuator is operational but the driven device is not operating, e.g., drive cable for power sliding door broken.
7A	Fluid Leak or Seal Malfunction	This sub type is used for failures where the control module detects that a mechanical component has an unexpected gas or liquid flow in, out, or through the component.
7B	Low Fluid Level	This sub type is used for failures where the control module detects that a fluid level is too low for proper operation of the system.
7C	Slow Response	This sub type is used where control module has detected a response that is longer than expected or a degraded rate of change in the monitored component or system.
7D	Reserved	—
7E	Actuator Stuck On	This sub type is used for failures where the control module detects the actuator mechanical function is fixed in the ON / applied state
7F	Actuator Stuck Off	This sub type is used for failures where the control module detects the actuator mechanical function is fixed in the OFF / Released state.
80	Reserved	—
81	Invalid Data Received	This sub type is used by the control module to indicate a signal was received with the corresponding validity bit equal to "invalid" or post processing of the signal determines it is invalid.
82	Alive / Sequence Counter Incorrect / Not Updated	This sub type is used by the control module to indicate that a signal was received without the corresponding rolling count value being properly updated.
83	Value of Signal Protection Calculation Incorrect	This sub type is used by the control module to indicate, that a message was processed with an incorrect protection (checksum) calculation.
84	Below Allowable Range	This sub type is used for failures where some circuit quantity, reported via serial data, is below a specified range.
85	Above Allowable Range	This sub type is used for failures where some circuit quantity, reported via serial data, is above a specified range.

Symptom Byte	Symptom Byte Description	Symptom Byte Definition
86	Performance - Signal Invalid	This sub type is used for failures where some circuit quantity, reported via serial data, is not plausible given the operating conditions.
87	Missing Message	This sub type is used for failures where one (or more) expected message(s) is not received, e.g., periodic transmission where the repetition time is too high, or message not received as a result of unforeseen reset events of the concerning component (e.g. engine control unit communicating with ABS).
88	Bus Off	This sub type is used for failures where a data bus is not available.
89	Data Transfer Failure	This subtype is for failures where an ECU requests a data transfer from an external source (off-board, on-board, or another ECU) and the data transfer initiates but fails to complete.
8A	Authentication Failure	This sub type is used when an authentication process fails. This may include, but is not limited to invalid certificate, invalid password, invalid security hash, or invalid user ID.
8B	Invalid Message Structure/Length	This sub type indicates that a received serial data message did not match the expected byte length or format.
8C	Communication Lost	This subtype is for failures where serial data messages are no longer being received from the component
8D	Reserved	—
8E	Reserved	—
8F	Erratic	This sub type is used for failures where the signal, reported via serial data, is momentarily implausible or discontinuous.
90	Reserved	—
91	Parametric	This sub type is used for failures where the control module has detected that a component parameter (e.g., capacitance or inductance) is outside its expected range.
92	Performance	This sub type is used for failures where the control module has detected that the component performance is outside its expected range or operating in an incorrect way.
93	No Operation	This sub type is used for failures where the control module has detected that the component is not operating.
94	Unexpected Operation	This sub type is used for failures where the control module has detected that the component is operating in a way or at a time that it has not been commanded to operate.
95	Incorrect Assembly	This sub type is used for failures where the control module has detected that the component has been incorrectly installed (e.g., hydraulic pipes crossed over, circuits cross wired) or polarity errors.
96	Component Internal Malfunction	This sub type is used for failures where the control module has received an indication about the component that indicates a failure (e.g., an intelligent actuator or sensor) is indicating an internal fault.
97	Component or System Operation Obstructed or Blocked	This sub type is used for failures where the control module has detected that the operation of a component is prevented by an obstruction, e.g., advanced cruise system radar beam obstructed.
98	Component or System Over Temperature	This sub type is used for failures where the control module has detected that the temperature is too high for the correct operation of the component or system.
99	Exceeded Learning Limit	This sub type is used for failures where the control module has detected that the component or system has exceeded the expected range allowed for learning component tolerances.

Symptom Byte	Symptom Byte Description	Symptom Byte Definition
9A	Component or System Operating Conditions Exceeded	This sub type is used for failures where the control module has detected that environmental or other operating conditions are either temporarily or permanently outside the design limits for correct operation such that all or part of a component function is inhibited or fails, e.g. a radio is disabled because its LCD display or its CD mechanism cannot operate at a low ambient temperature.
9B	High/Excessive Flow	This sub type is used for failures where the control module has detected that the component or system is operating above the expected flow range flow, e.g. too much EGR at idle.
9C	Low/Insufficient Flow	This sub type is used for failures where the control module has detected that the component or system is operating below the expected flow range flow, e.g. too little EGR at part throttle.
9D	Component or System Under Temperature	This sub type is used for failures where the control module has detected that the temperature is too low for the correct operation of the component or system.
9E	Stuck On	This sub type is used for failures where the control module detects the electrical circuit or switch is fixed in the ON / Applied state
9F	Stuck Off	This sub type is used for failures where the control module detects the electrical circuit or switch is fixed in the OFF / Released state.
A0	Reserved	—
A1	System Voltage Out of Range	This sub type is used for failures, where the control module system voltage is outside the expected range but not identified as too high or too low.
A2	System Voltage Low	This sub type is used for failures where the control module system voltage is below a specified range.
A3	System Voltage High	This sub type is used for failures where the control module system voltage is above a specified range.
A4	Reserved	—
A5	Reserved	—
A6	Reserved	—
A7	Reserved	—
A8	Reserved	—
A9	Reserved	—
AA	Reserved	—
AB	Reserved	—
AC	Reserved	—
AD	Reserved	—
AE	Reserved	—
AF	Reserved	—
B0	Reserved	—
B1	Speed Above Threshold - Overspeed	This sub type is used for failures where the control module has detected that a component speed parameter is above an expected speed range.
B2	Speed Below Threshold - Underspeed	This sub type is used for failures where the control module has detected that a component speed parameter is below an expected speed range.
B3	Speed Below Requested	This sub type is used for failures where the control module has detected that a component speed parameter is below a requested speed.

Symptom Byte	Symptom Byte Description	Symptom Byte Definition
B4	Speed Above Requested	This sub type is used for failures where the control module has detected that a component speed parameter is above a requested speed.
B5	Cold Start Performance	This sub type is used for failures where the control module has detected that the component performance is outside its expected range or operating in an incorrect way during cold operation.
B6	Reserved	—
B7	Reserved	—
B8	Reserved	—
B9	Reserved	—
BA	Reserved	—
BB	Reserved	—
BC	Reserved	—
BD	Reserved	—
BE	Reserved	—
BF	Reserved	—
C0	Reserved	—
C1	Reserved	—
C2	Reserved	—
C3	Reserved	—
C4	Reserved	—
C5	Reserved	—
C6	Reserved	—
C7	Reserved	—
C8	Reserved	—
C9	Reserved	—
CA	Reserved	—
CB	Reserved	—
CC	Reserved	—
CD	Reserved	—
CE	Reserved	—
CF	Reserved	—
D0	Reserved	—
D1	Reserved	—
D2	Reserved	—
D3	Reserved	—
D4	Reserved	—
D5	Reserved	—
D6	Reserved	—
D7	Reserved	—
D8	Reserved	—
D9	Reserved	—
DA	Reserved	—
DB	Reserved	—

Symptom Byte	Symptom Byte Description	Symptom Byte Definition
DC	Reserved	—
DD	Reserved	—
DE	Reserved	—
DF	Reserved	—
E0	Reserved	—
E1	Reserved	—
E2	Reserved	—
E3	Reserved	—
E4	Reserved	—
E5	Reserved	—
E6	Reserved	—
E7	Reserved	—
E8	Reserved	—
E9	Reserved	—
EA	Reserved	—
EB	Reserved	—
EC	Reserved	—
ED	Reserved	—
EE	Reserved	—
EF	Reserved	—
F0	Internal Communication Failure	This sub type is used for failures where two or more control module internal processors are no longer communicating with each other.
F1	Manufacturer Defined	This value is reserved for vehicle manufacturer/system supplier use.
F2	Manufacturer Defined	This value is reserved for vehicle manufacturer/system supplier use.
F3	Manufacturer Defined	This value is reserved for vehicle manufacturer/system supplier use.
F4	Manufacturer Defined	This value is reserved for vehicle manufacturer/system supplier use.
F5	Manufacturer Defined	This value is reserved for vehicle manufacturer/system supplier use.
F6	Manufacturer Defined	This value is reserved for vehicle manufacturer/system supplier use.
F7	Manufacturer Defined	This value is reserved for vehicle manufacturer/system supplier use.
F8	Manufacturer Defined	This value is reserved for vehicle manufacturer/system supplier use.
F9	Manufacturer Defined	This value is reserved for vehicle manufacturer/system supplier use.
FA	Manufacturer Defined	This value is reserved for vehicle manufacturer/system supplier use.
FB	Manufacturer Defined	This value is reserved for vehicle manufacturer/system supplier use.
FC	Manufacturer Defined	This value is reserved for vehicle manufacturer/system supplier use.
FD	Manufacturer Defined	This value is reserved for vehicle manufacturer/system supplier use.

Symptom Byte	Symptom Byte Description	Symptom Byte Definition
FE	Manufacturer Defined	This value is reserved for vehicle manufacturer/system supplier use.
FF	Manufacturer Defined	This value is reserved for vehicle manufacturer/system supplier use.

Symptoms - Vehicle

Body Repair

[Link target (target-id 263864-) not found]

Body Systems

- [Link target (target-id 157990-) not found]
- [Link target (target-id 48522-) not found]
- [Link target (target-id 157988-) not found]
- [Link target (target-id 157992-) not found]
- [Link target (target-id 157994-) not found]
- [Link target (target-id 61936-) not found]

Brakes

- [Link target (target-id 1496-) not found]
- [Link target (target-id 302729-) not found]
- [Link target (target-id 50306-) not found]
- [Link target (target-id 54639-) not found]

Driveline/Axle

- [Link target (target-id 64694-) not found]
- [Link target (target-id 64690-) not found]
- [Link target (target-id 150354-) not found]
- [Link target (target-id 64697-) not found]

Driver Information and Entertainment

- [Link target (target-id 149620-) not found]
- [Link target (target-id 47032-) not found]
- [Link target (target-id 158155-) not found]
- [Link target (target-id 284269-) not found]
- [Link target (target-id 158091-) not found]

Engine

- [Link target (target-id 37791-) not found]
- [Link target (target-id 213827-) not found]
- [Link target (target-id 10846-) not found]
- [Link target (target-id 305969-) not found] – 2.7L (L4B) engine
- [Link target (target-id 307123-) not found] – 3.0L (LZ0) Diesel engine
- [Link target (target-id 370041-) not found] – 5.7L (L76) or 6.6L (L78) engine
- [Link target (target-id 37429-) not found]
- [Link target (target-id 304793-) not found] – 2.7L (L4B) engine
- [Link target (target-id 302760-) not found] – 3.0L (LZ0) Diesel engine
- [Link target (target-id 370522-) not found] – 5.7L (L76) or 6.6L (L78) engine
- [Link target (target-id 37994-) not found]

General Information

[Link target (target-id 62604-) not found]

HVAC

- [Link target (target-id 169242-) not found]
- [Link target (target-id 49126-) not found]

Power and Signal Distribution

- [Link target (target-id 159675-) not found]
- [Link target (target-id 259572-) not found]
- [Link target (target-id 121150-) not found]
- [Link target (target-id 62211-) not found]

Roof

[Link target (target-id 56634-) not found]

Safety and Security

- [Link target (target-id 284270-) not found]
- [Link target (target-id 158595-) not found]
- [Link target (target-id 284271-) not found]
- [Link target (target-id 158156-) not found]
- [Link target (target-id 346599-) not found]
- [Link target (target-id 56800-) not found]
- [Link target (target-id 57885-) not found]
- [Link target (target-id 151732-) not found]

Seats

- [Link target (target-id 160302-) not found]
- [Link target (target-id 160303-) not found]

Steering

- [Link target (target-id 55202-) not found]
- [Link target (target-id 65643-) not found]

Suspension

- [Link target (target-id 62585-) not found]
- [Link target (target-id 59474-) not found]

Transmission/Transaxle

- [Link target (target-id 284831-) not found] – 10L60/10L80/10L90 transmission
- [Link target (target-id 192283-) not found] – MP 3010/3015 (NP0) transfer case
- [Link target (target-id 161481-) not found] – MP 3023/3024/3025 (NQH) transfer case

Engine Does Not Crank

Refer to the appropriate diagnostic procedure below for the symptom observed.

- [Link target (target-id 306209-) not found]
- [Link target (target-id 37780-) not found]

Engine Cranks But Does Not Run

Refer to the appropriate diagnostic procedure below for the vehicle being serviced.

- [Link target (target-id 306011-) not found] – 2.7L (L4B) engine
- [Link target (target-id 307245-) not found] – 3.0L (LZ0) Diesel engine
- [Link target (target-id 370076-) not found] – 5.7L (L76) or 6.6L (L78) engine

Inspection/Maintenance System Check

Refer to the appropriate diagnostic procedure below for the vehicle being serviced.

- [Link target (target-id 306161-) not found] – 2.7L (L4B) engine
- [Link target (target-id 307357-) not found] – 3.0L (LZ0) Diesel engine
- [Link target (target-id 370191-) not found] – 5.7L (L76) or 6.6L (L78) engine

Diagnostic Repair Verification

Note: After a repair has been made, some DTCs require the ignition to be turned Off and then back On before the scan tool function will clear the DTC.

1. Ignition/Vehicle » Off
2. Install any components or connectors that have been removed or replaced during diagnosis.
3. Perform any adjustment, programming or setup procedures that are required when a component or module is removed or replaced.
4. Perform the following action:
   4.1. Ignition » On / Vehicle » In Service Mode
   4.2. Clear the DTCs.
   4.3. Ignition/Vehicle » Off
   4.4. Driver Door» Open& Close
   4.5. Wait for greater than 2 min. orInstrument Panel = Off
5. Perform the Circuit/System Verification and verify the result ends with an All OK — If available

   or

   If the repair was related to a DTC, duplicate the Conditions for Running the DTC and use the Freeze Frame/Failure Records, if applicable, in order to verify the DTC does not set. If the DTC sets or another DTC is present » Refer to: *Diagnostic Trouble Code (DTC) List - Vehicle 3-364*

   or

   If the repair was symptom related, duplicate the conditions under which the customer concern occurred to verify the repair. If the customer concern reoccurs or another symptom is present » Refer to: *Symptoms - Vehicle 3-420*

Proactive Alerts List

This master list includes all applicable Proactive Alert Identifiers in alphanumeric order.

Proactive alert identifiers are stored in the K73 Telematics Communication Interface Module and can only be cleared using a scan tool.

Note: If the concern is still present after following the steps for Diagnostics in any of the Proactive Alert Identifiers, contact GM TAC for further assistance. The GM TAC Agent will arrange for the stuck Proactive Alert to be cleared from OnStar Back Office.

Proactive Alerts List

Proactive Alert Service Message	Diagnostic Procedure
SAC001	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 276794-) not found]
SAC002	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 276795-) not found]
SAC003	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 276796-) not found]

Proactive Alert Service Message	Diagnostic Procedure
SAC004	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 276797-) not found]
SAC005	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 276798-) not found]
SAC008	Starting, Charging, and Low Voltage Energy Storage - [Link target (target-id 355765-) not found]

Description and Operation

Proactive Alerts Description and Operation

Proactive Alert System Overview

Note: The customer must enroll their vehicle in this program through the OnStar website or with an OnStar advisor to receive Proactive Alerts. When the customer enrolls their vehicle, they select their notification preferences. They also identify their preferred service provider which is often the selling dealer.

This feature collects and stores specific system performance data. The data is then transmitted via the cellular system (OnStar). The transmitted data is stored off-board the vehicle and analyzed by special algorithms to detect degraded performance. When monitored system performance degrades to predetermined levels, the off-board system sends a Proactive Alert identifier. The affected system is identified within the alert.

When a Proactive Alert is set, one or more of the following may occur:

- Notification (e.g. myBrand App, e-mail, text message) is sent to the customer
- Proactive alert code is stored in the telematics module

Power of Green Overview

Note: Power of Green is only available for vehicles that are enrolled in Proactive Alerts.

“Power of Green” utilizes available vehicle data collected through OnStar to establish a history of 12 V battery health and determine a battery condition. The history is based on battery voltage, current, and other prognostic-related data, which is collected onboard during every ignition cycle. The current Battery Condition can be accessed for enrolled vehicles via the Dashboard in Techline Connect (TLC). Battery Condition will include a timestamp (date/time) with the OnStar logo if valid.

Battery Condition will be one of the following four statuses:

Green

- “OnStar monitoring indicated good battery condition.”
- No fault detected internal to Battery
- It is unlikely that the Battery will require replacement at this time

Red

- “Battery replacement recommended.”
- SAC001 – Battery Low Cranking Capability Due to Shorted Cell
- Battery testing is NOT required, therefore a print out of the Warranty Code when the battery is replaced for SAC001 is not required.
- Follow SI procedure for Proactive Alert Identifier SAC001

Yellow

- “Starting and Charging proactive alerts detected. Please consult Service Information to diagnose the concern.”
- One of the following:
  - SAC002 – Low Cranking Capability Due to Battery High Resistance
  - SAC003 – Low Cranking Capability Due to Battery Low State of Charge
  - SAC004 – Low Cranking Capability Due to High Resistance in Starter System
  - SAC005 – Low Cranking Capability Due to High Resistance in Battery or Short in Starter System
- Follow SI procedure for appropriate Proactive Alert Identifier

Grey

- “Not enough data available to determine battery condition.”
- One of the following:
  - Vehicle is not enrolled in OnStar Proactive Alerts
  - Inability to contact the Power of Green data service
  - Insufficient recent ignition cycles to make a Red/Yellow/Green determination
- If a Battery issue is suspected, proceed to Battery Inspection/Test

Updated Battery Condition data may be obtained by selecting “Refresh” button next to the timestamp.

Note: Since the Green status is dependent on a history of battery health, the Battery Condition may not update immediately and turn Green if the battery is replaced.While the vehicle is being serviced, the Battery Condition may change from Green depending on Service actions (e.g. if battery is disconnected or becomes discharged, status may change).

Parasitic Drain Detection Overview

Note: Parasitic Drain Detection is only available for vehicles that are enrolled in Proactive Alerts.

Parasitic Drain Detection utilizes available vehicle data collected through OnStar to determine if an excessive amount of battery capacity, measured in amp-hours, was drawn from the 12 V battery while the vehicle was in OFF mode.

Parasitic Drain Detection includes the following Proactive Alerts:

SAC008 — Severe Drain Detected

- Customer directed to schedule service
- Follow SI procedure for Proactive Alert Identifier SAC008
- In most cases, the parasitic drain is caused by out-of-date software; Vehicle Wide Programming may be recommended

Section 4

Driveline/Axle

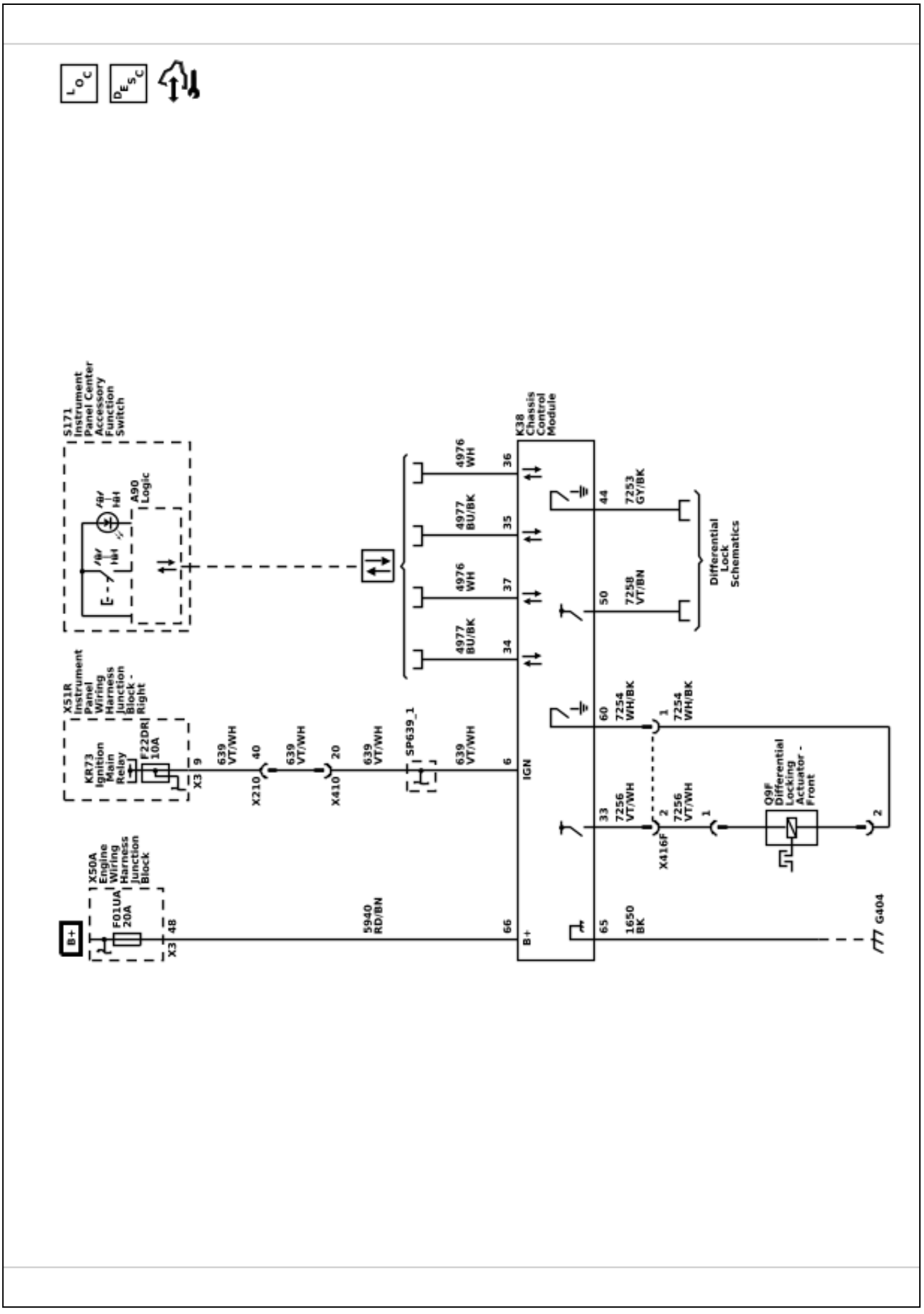
Front Drive Axle **4-2**
Schematic and Routing Diagrams **4-2**
Differential Lock Schematics 4-3
Description and Operation **4-4**
Front Axle Electronic Locking Differential Description and Operation 4-4
Rear Drive Axle **4-5**
Schematic and Routing Diagrams **4-5**
Differential Lock Schematics 4-6
Description and Operation **4-7**
Rear Axle Electronic Locking Differential Description and Operation 4-7

Driveline/Axle

Front Drive Axle

Schematic and Routing Diagrams

Differential Lock Schematics (Front Locking Differential)



Description and Operation

Front Axle Electronic Locking Differential Description and Operation

The electronic locking differential functions as an open differential when not engaged while providing the capability to fully lock the differential based on driver request and vehicle engagement conditions. Locking of the front differential provides 100% of the available torque to both ends of the axle forcing the left and right wheels to rotate at the same speed. In order for the front axle differential lock actuator to energize, the vehicle must be operating under the following conditions:

- Transfer case 4 LO range is engaged
- Rear axle differential lock is engaged
- Hill Descent Control is not active

The Normal/Off-Road mode switch provides an input to the Body Control Module (BCM) which sends the selected vehicle mode to the Integrated Chassis Control Module (ICCM) through the High Speed GMLAN. The ICCM uses this message to determine front locker engagement/disengagement based upon vehicle speed:

- Normal mode engagement allowed if vehicle speed is less than 30 km/h (19 mph).
- Off road mode engagement allowed if vehicle speed is less than 30 km/h (19 mph).

In addition to engagement/disengagement of the differentials, the mode switch signal is used to disable the ABS and ESC features when the front axle is locked in Normal mode. The momentary Front Lock switch provides an ICCM input to energize the front axle differential lock high control and low control relays. The relays provide power to energize an electromagnetic actuator within the front differential. As the electromagnet is energized, torque is created on a drag plate which actuates a ramping mechanism. The ramping mechanism translates this rotational force into the axial motion of a locking mechanism. The locking mechanism engages the differential side gear which locks side gear rotation to the differential housing, providing a fully locked differential.

The ICCM uses wheel speed sensor signals from the Electronic Brake Control Module (EBCM) and a steering angle sensor signal from the Power Steering Control Module (PSCM) to determine if the axle is locked. The ICCM will illuminate the front axle lock switch indicator and send a Front Axle Locked indicator request to the BCM which transfers the message request to the Instrument Panel Cluster (IPC). The IPC will display a front axle locked state on the Off Road DIC screen. The front axle will remain in the locked position until one of the following events occur:

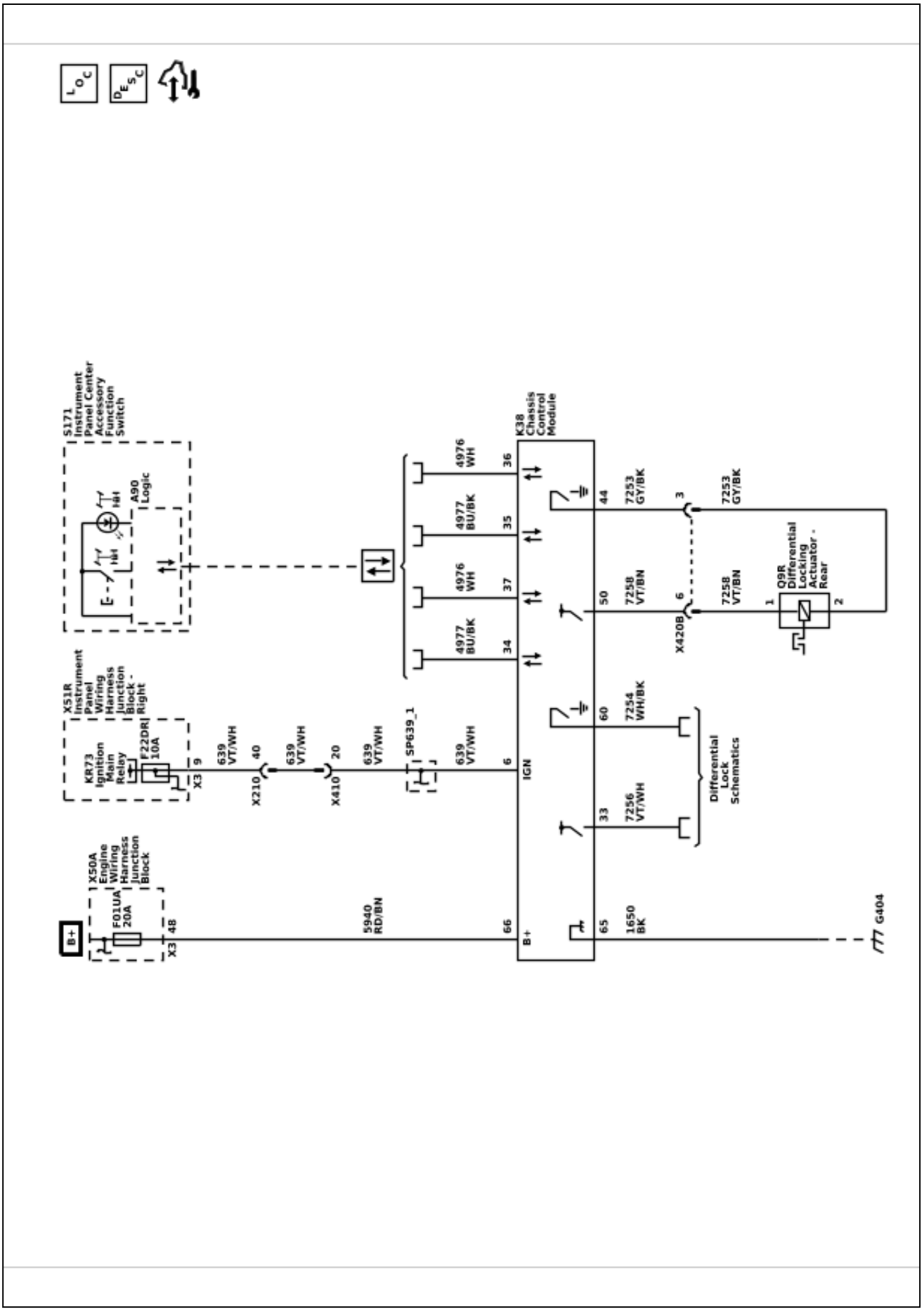
- A driver request to disengage
- Rear axle differential lock is disengaged
- Vehicle speed is greater than 40 km/h (25 mph) in Normal Mode
- Vehicle speed is greater than 56 km/h (35 mph) in Off-Road Mode
- Transfer case is shifted into 4 HI or NEUTRAL
- An ABS or ESC event in OFF Road Mode and vehicle speed is greater than 40 km/h (25 mph)

When the locking differential is deactivated, the ICCM will de-energize the front axle differential lock high control and low control relays. With the electromagnetic actuator deenergized, a series of return springs within the differential lock assembly forces the locking mechanism to disengage and the differential again operates as a fully open differential.

Rear Drive Axle

Schematic and Routing Diagrams

Differential Lock Schematics (Rear Locking Differential)



Description and Operation

Rear Axle Electronic Locking Differential Description and Operation

The electronic locking differential functions as an open differential when not engaged while providing the capability to fully lock the differential based on driver request and vehicle engagement conditions. Locking of the rear differential provides 100% of the available torque to both ends of the axle forcing the left and right wheels to rotate at the same speed.

The rear axle differential lock is available in 2 H, 4 Auto, 4 High or 4 Lo. The Normal/Off-Road mode switch provides an input to the Body Control Module (BCM) which sends the selected vehicle mode to the K38 Chassis Control Module through the High Speed GMLAN. The K38 Chassis Control Module uses this message to determine rear locker engagement/disengagement based upon vehicle speed

- Normal mode engagement allowed if vehicle speed is less than 30 km/h (19 mph)
- Off road mode engagement allowed if vehicle speed is less than 30 km/h (19 mph)

In addition to engagement/disengagement of the differentials, the mode switch signal is used to disable the ABS and ESC features when the front axle is locked in Normal mode. The momentary Rear Lock switch provides an K38 Chassis Control Module input to energize the rear axle differential lock high control and low control . This provides power to energize an electromagnetic actuator within the rear differential. As the electromagnet is energized, torque is created on a drag plate which actuates a ramping mechanism. The ramping mechanism translates this rotational force into the axial motion of a locking mechanism. The locking mechanism engages the differential side gear which locks side gear rotation to the differential housing, providing a fully locked differential.

The K38 Chassis Control Module uses wheel speed sensor signals from the Electronic Brake Control Module (EBCM) and a steering angle sensor signal from the Power Steering Control Module (PSCM) to determine if the axle is locked. The K38 Chassis Control Module will illuminate the rear axle lock switch indicator and send a Rear Axle Locked indicator request to the K9 Body Control Module which transfers the message request to the Instrument Panel Cluster (IPC). The IPC will display a rear axle locked state on the Off Road DIC screen. The rear axle will remain in the locked position until one of the following events occur:

- A driver request to disengage
- Vehicle speed is greater than 40 km/h (25 mph) in Normal Mode
- Vehicle speed is greater than 160 km/h (100 mph) in Off-Road Mode
- An ABS or ESC event in OFF Road Mode and vehicle speed is greater than 40 km/h (25 mph)

When the locking differential is deactivated, the ICCM will de-energize the rear axle differential lock high control and low control. With the electromagnetic actuator deenergized, a series of return springs within the differential lock assembly forces the locking mechanism to disengage and the differential again operates as a fully open differential.

Section 5

Driver Information and Entertainment

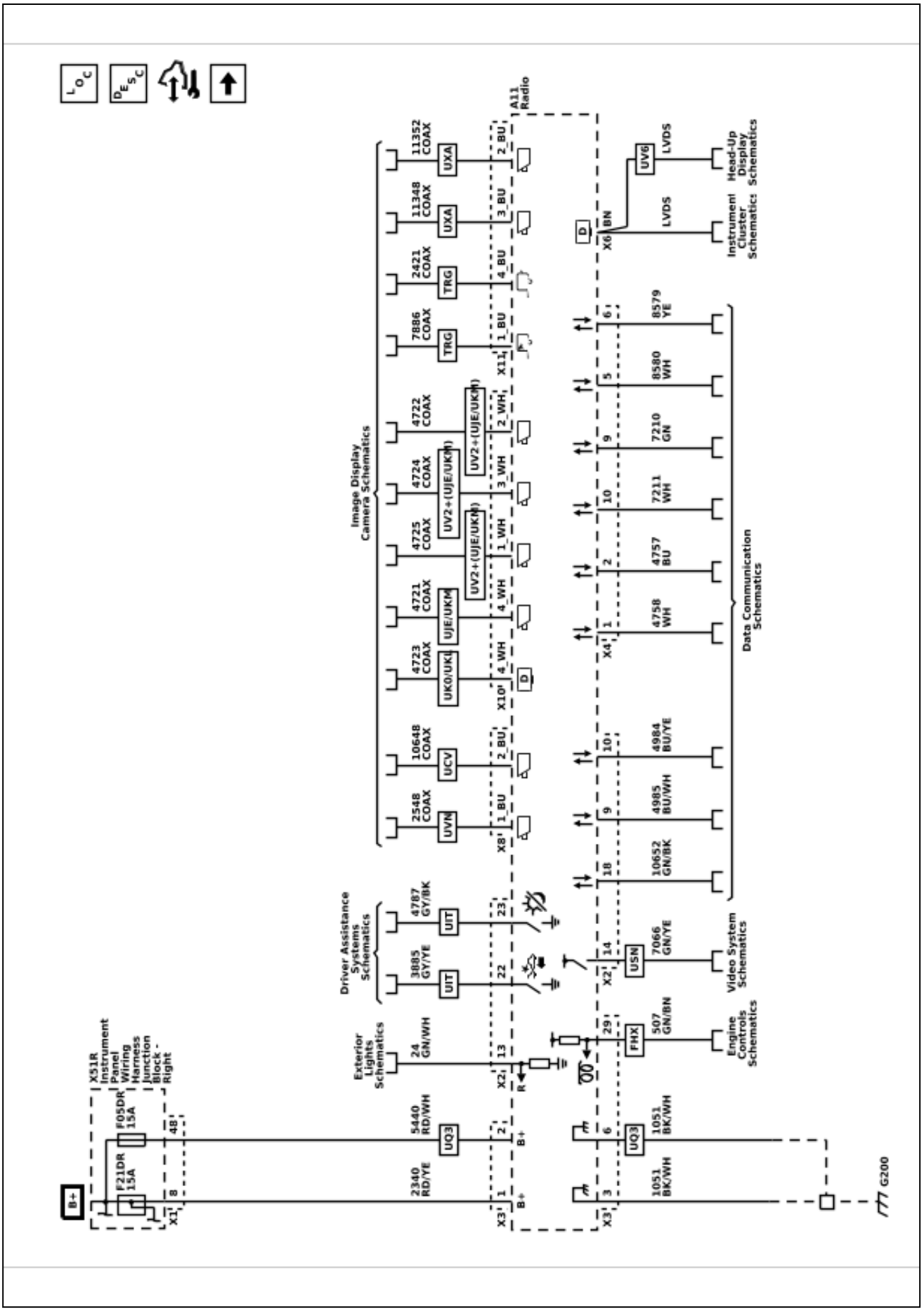
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Driver Information and Entertainment

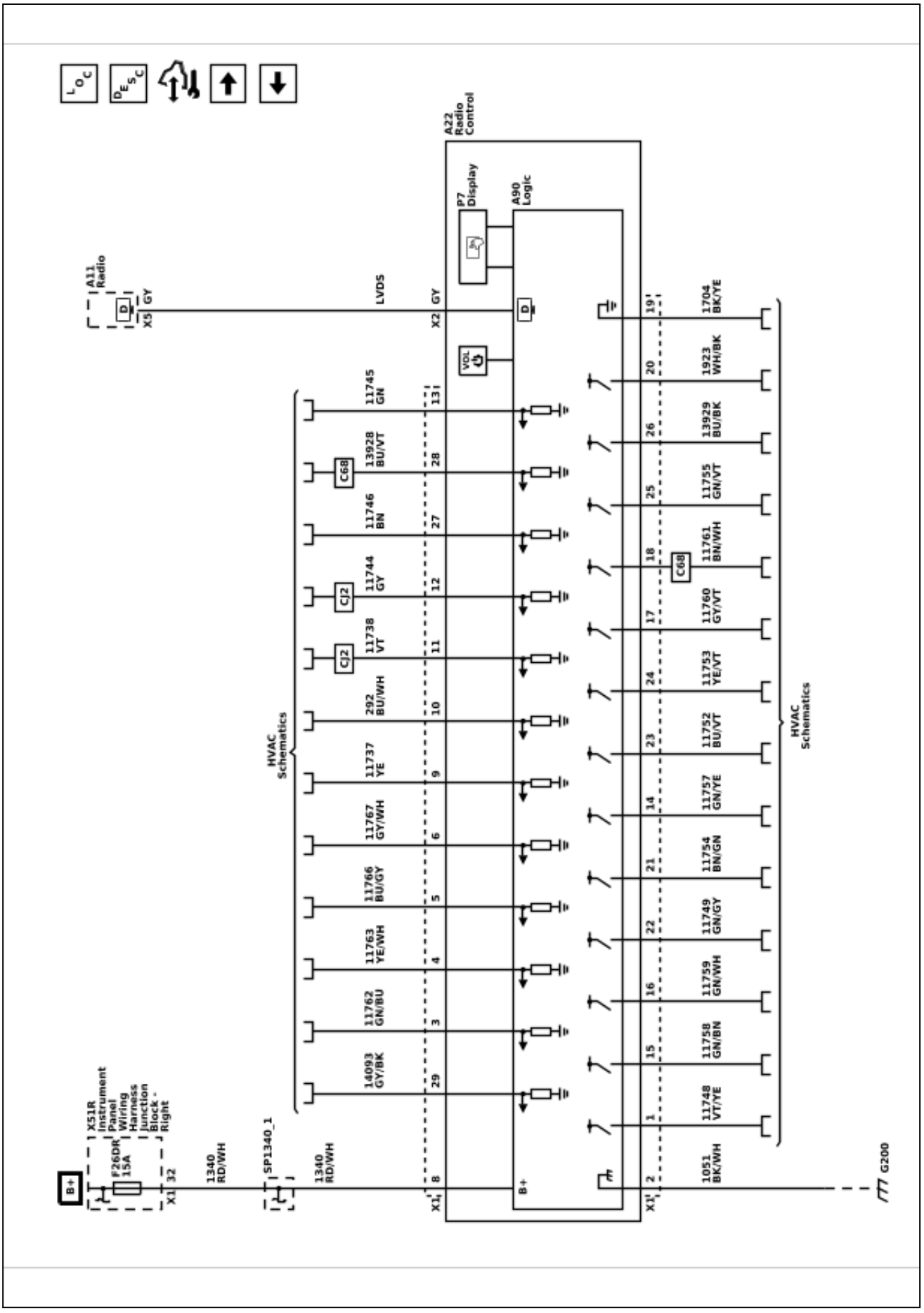
Cellular, Entertainment, and Navigation

Schematic and Routing Diagrams

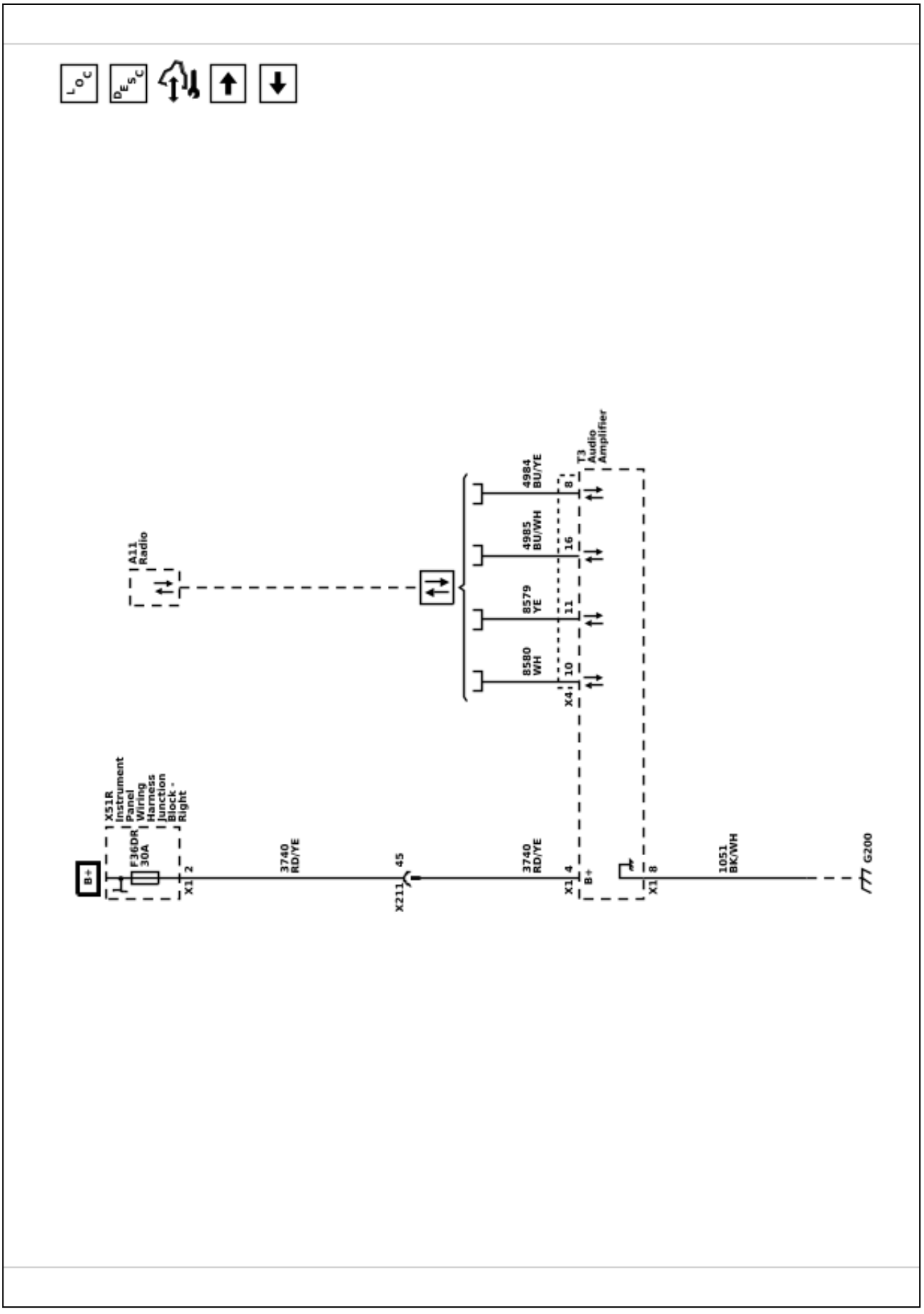
Radio/Navigation System Schematics (Radio - Power, Ground, Serial Data, and Subsystem References)



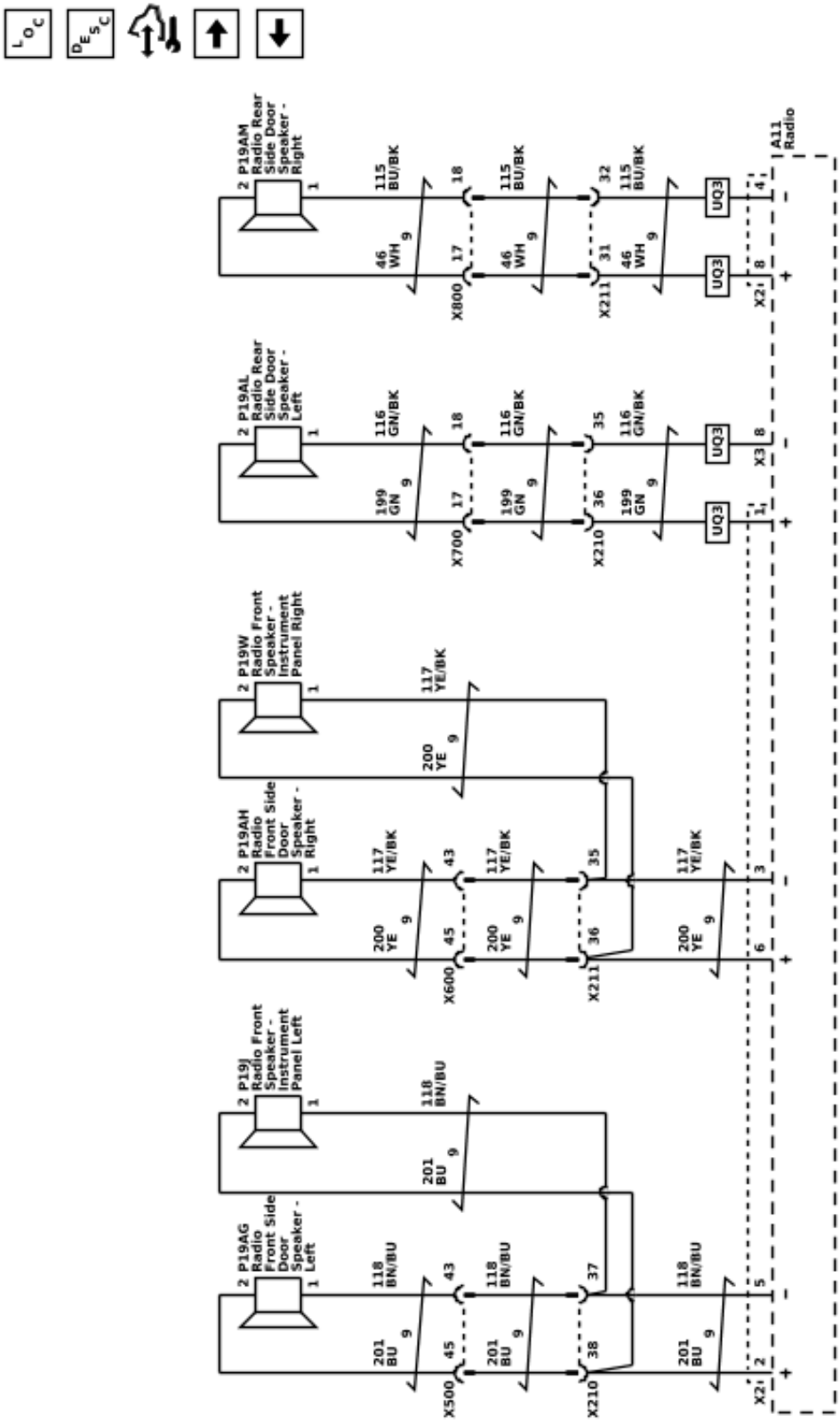
Radio/Navigation System Schematics (Radio Controls and Display)



Radio/Navigation System Schematics (Audio Amplifier - Power, Ground and Serial Data (UQA))

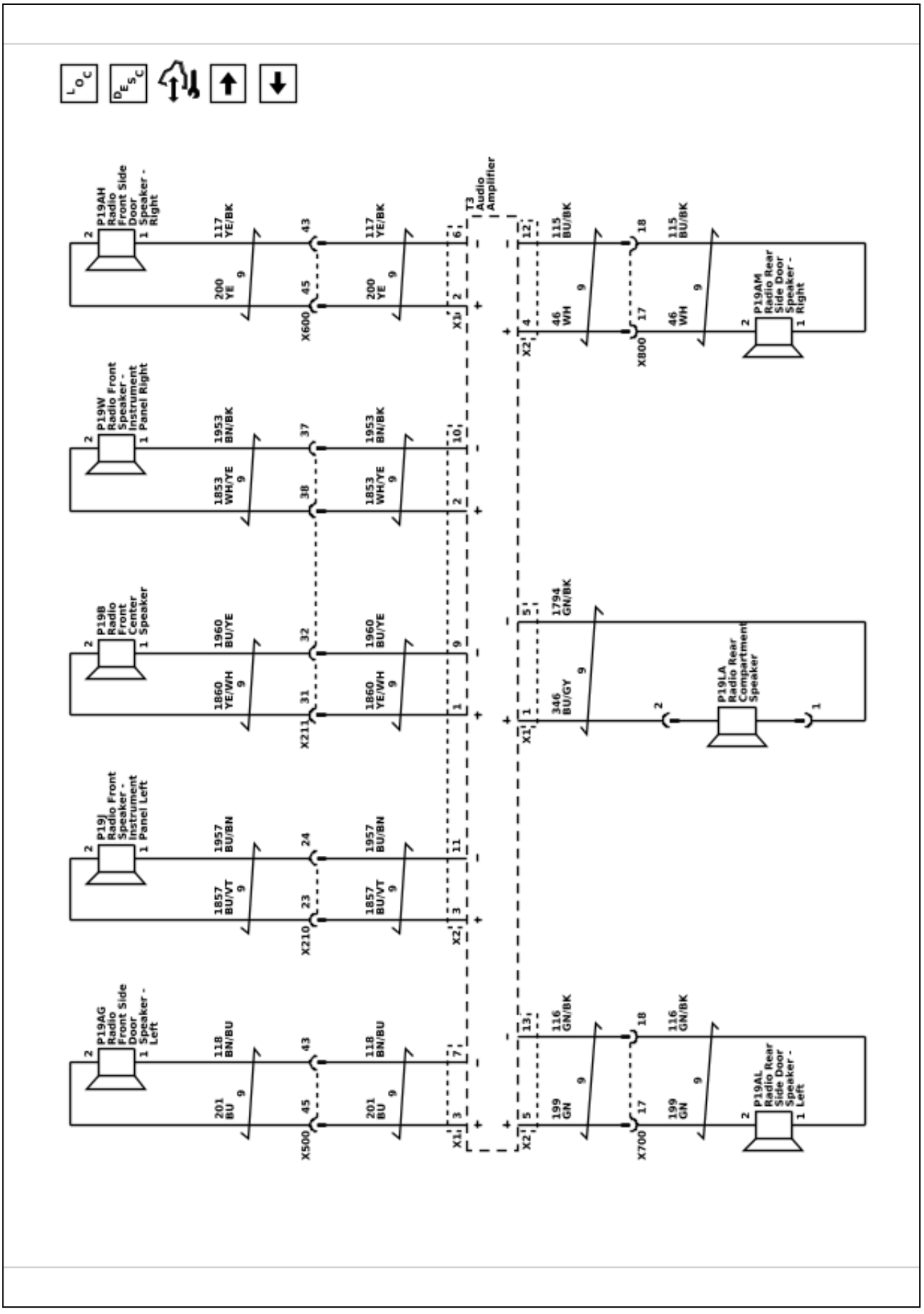


Radio/Navigation System Schematics (Speakers (UQ3 / UQF))



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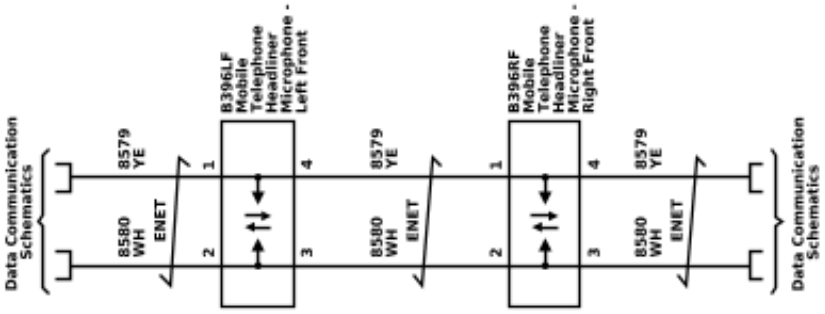
Radio/Navigation System Schematics (Speakers (UQA))



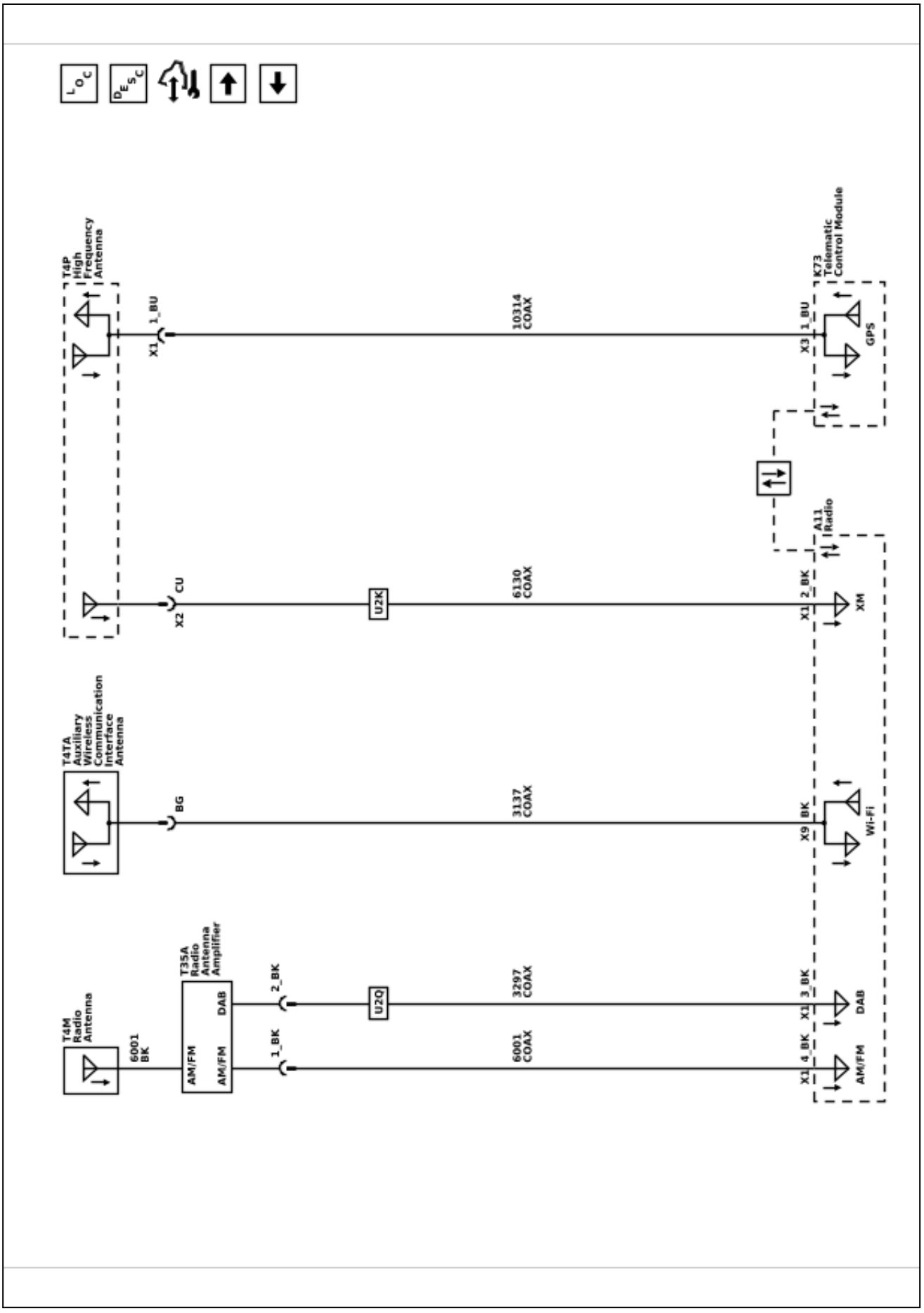
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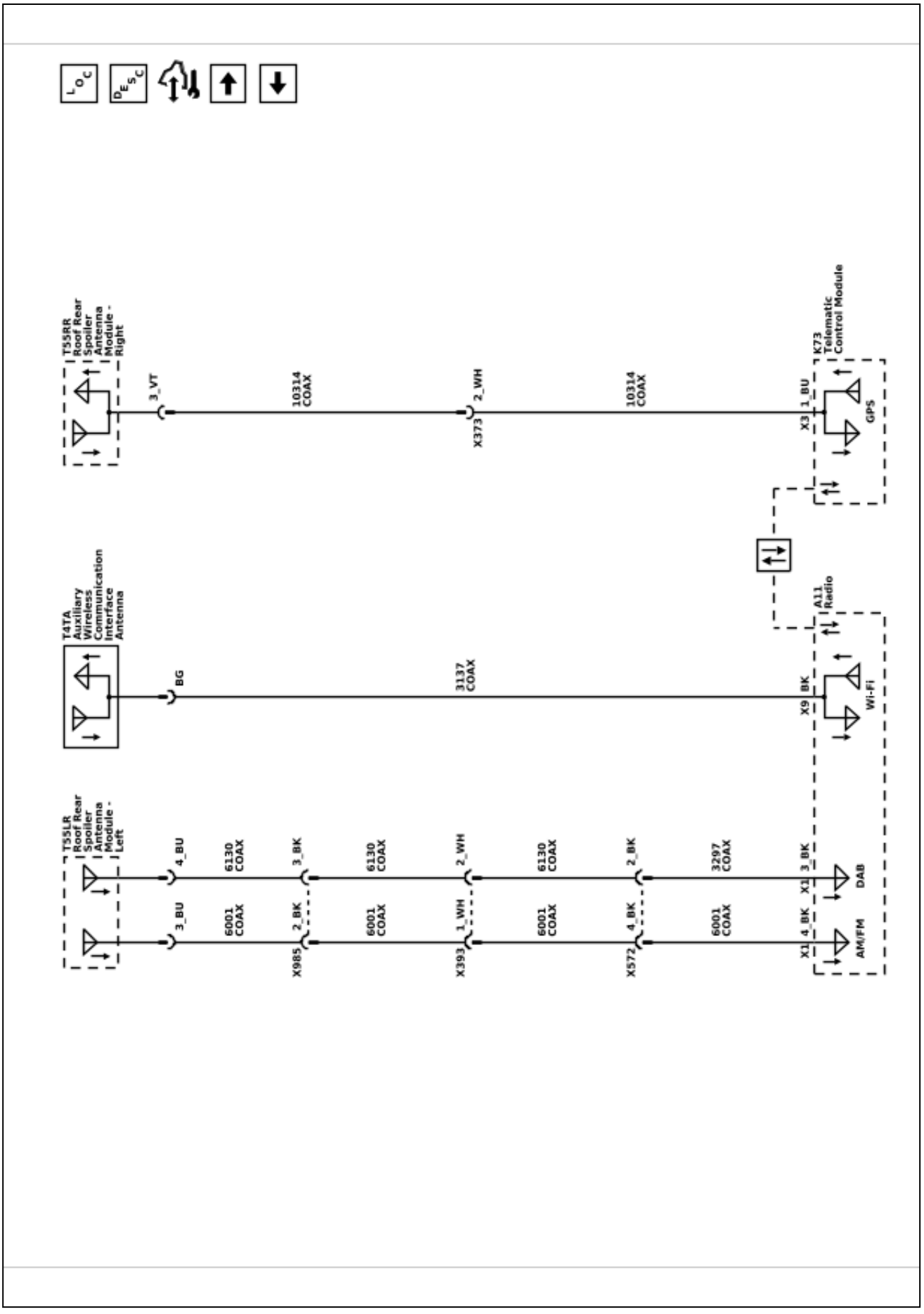



Data Communication Schematics
8579 YE
8580 WH
ENET
1
2
3
4
B396LF Mobile Telephone Headliner Microphone - Left Front
B396RF Mobile Telephone Headliner Microphone - Right Front
Data Communication Schematics

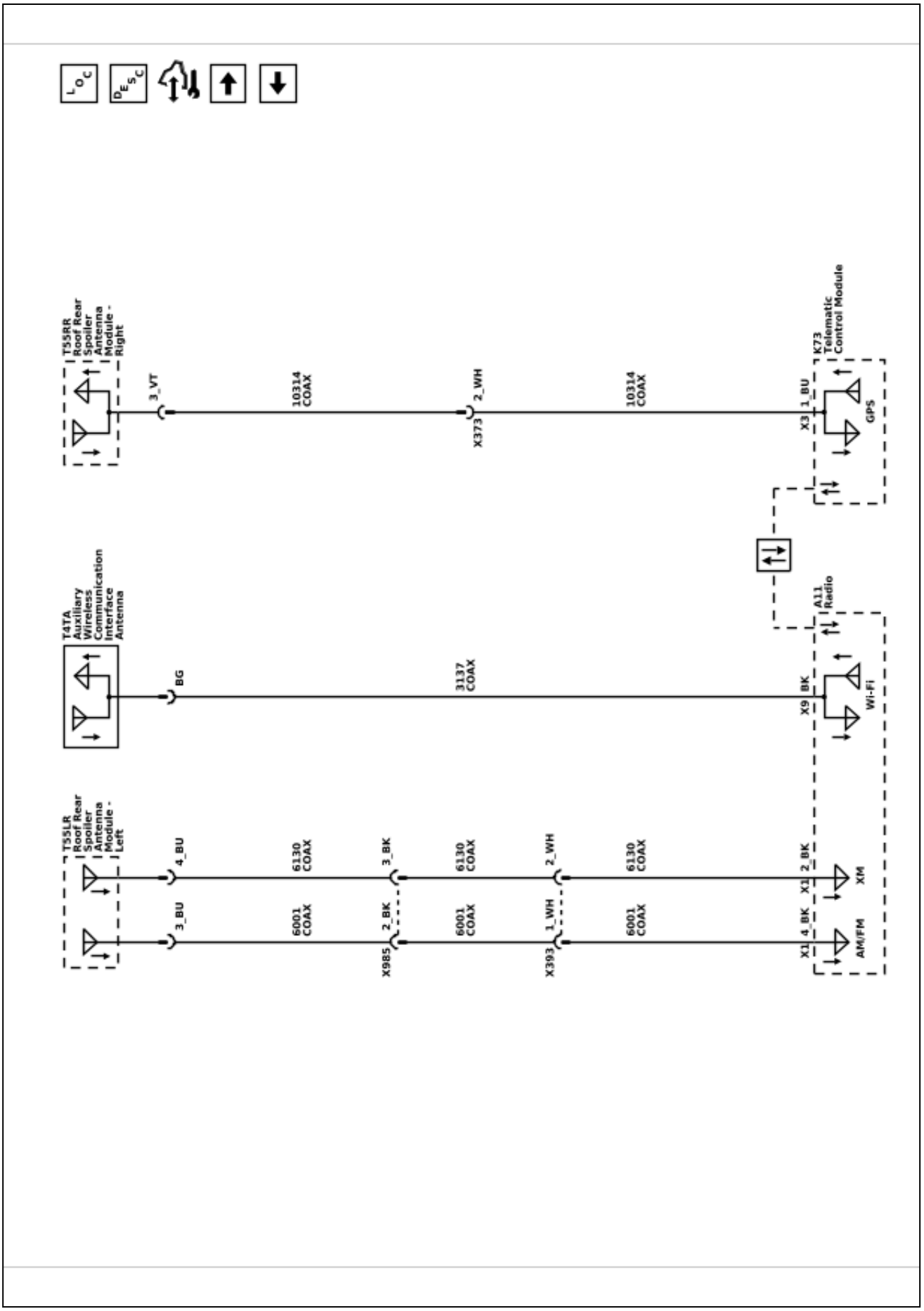
Radio/Navigation System Schematics (Antennas - 2-Door)



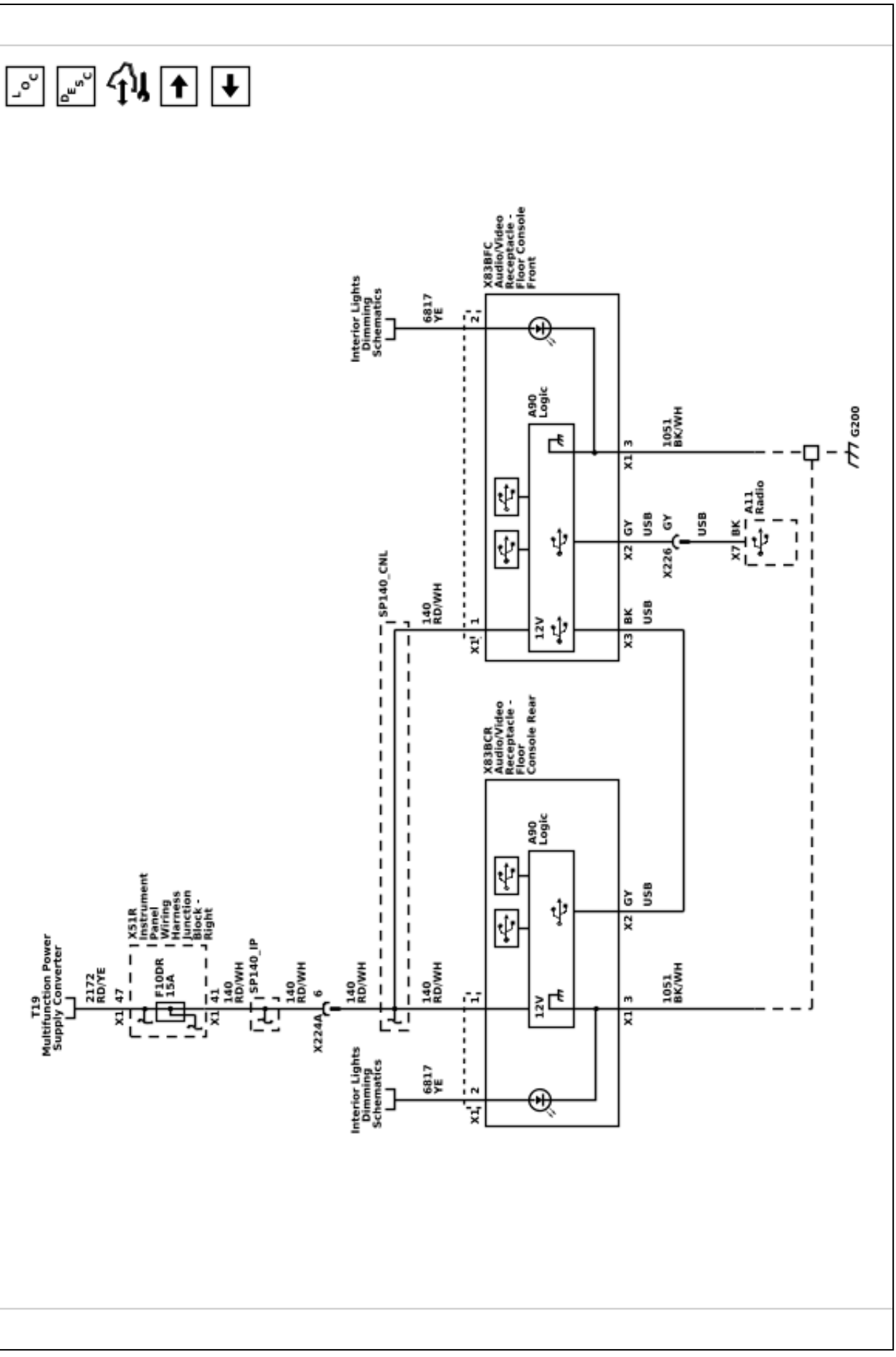
Radio/Navigation System Schematics (Antennas - 4-Door (U2Q))



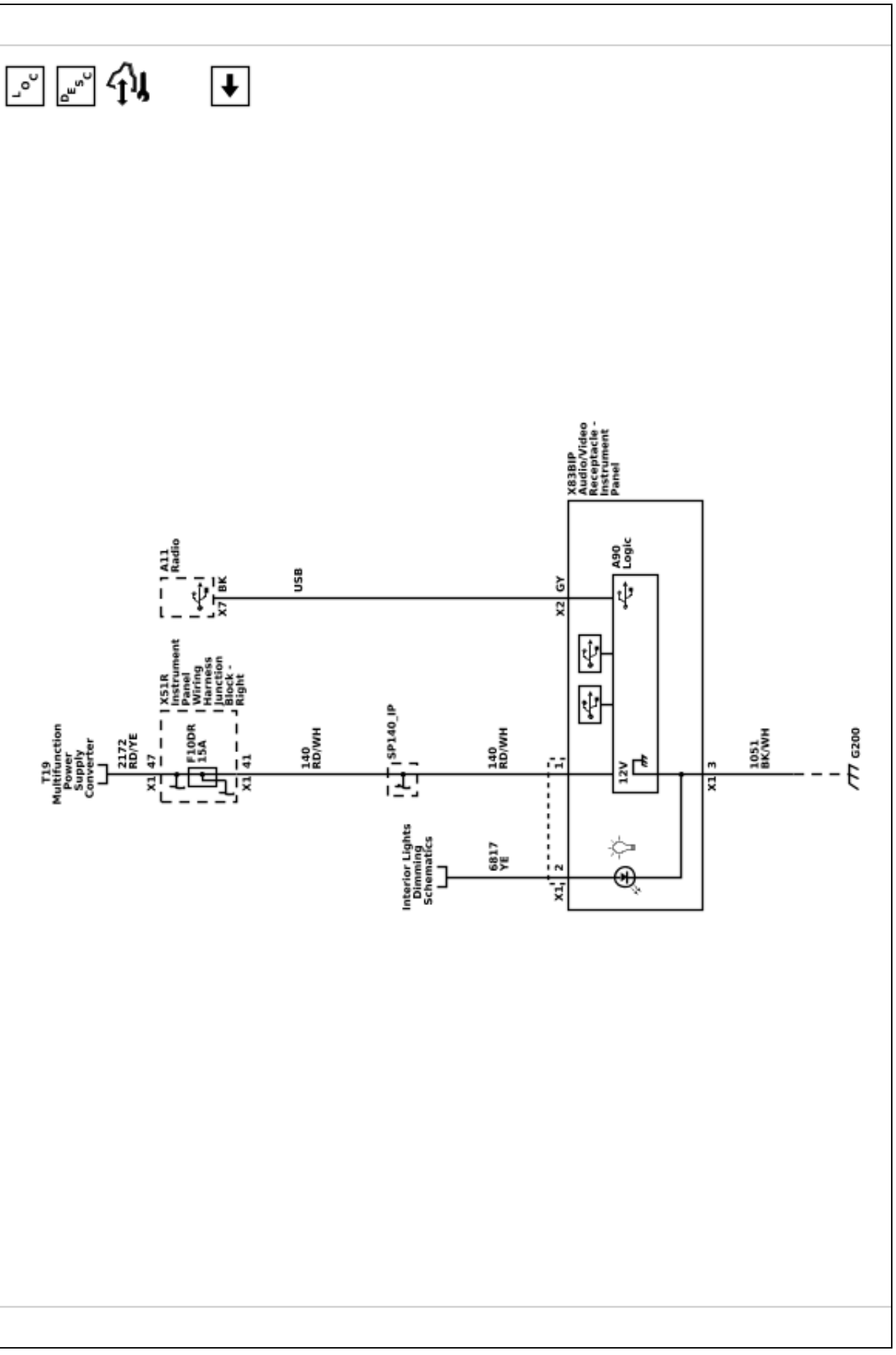
Radio/Navigation System Schematics (Antennas - 4-Door (- U2Q))



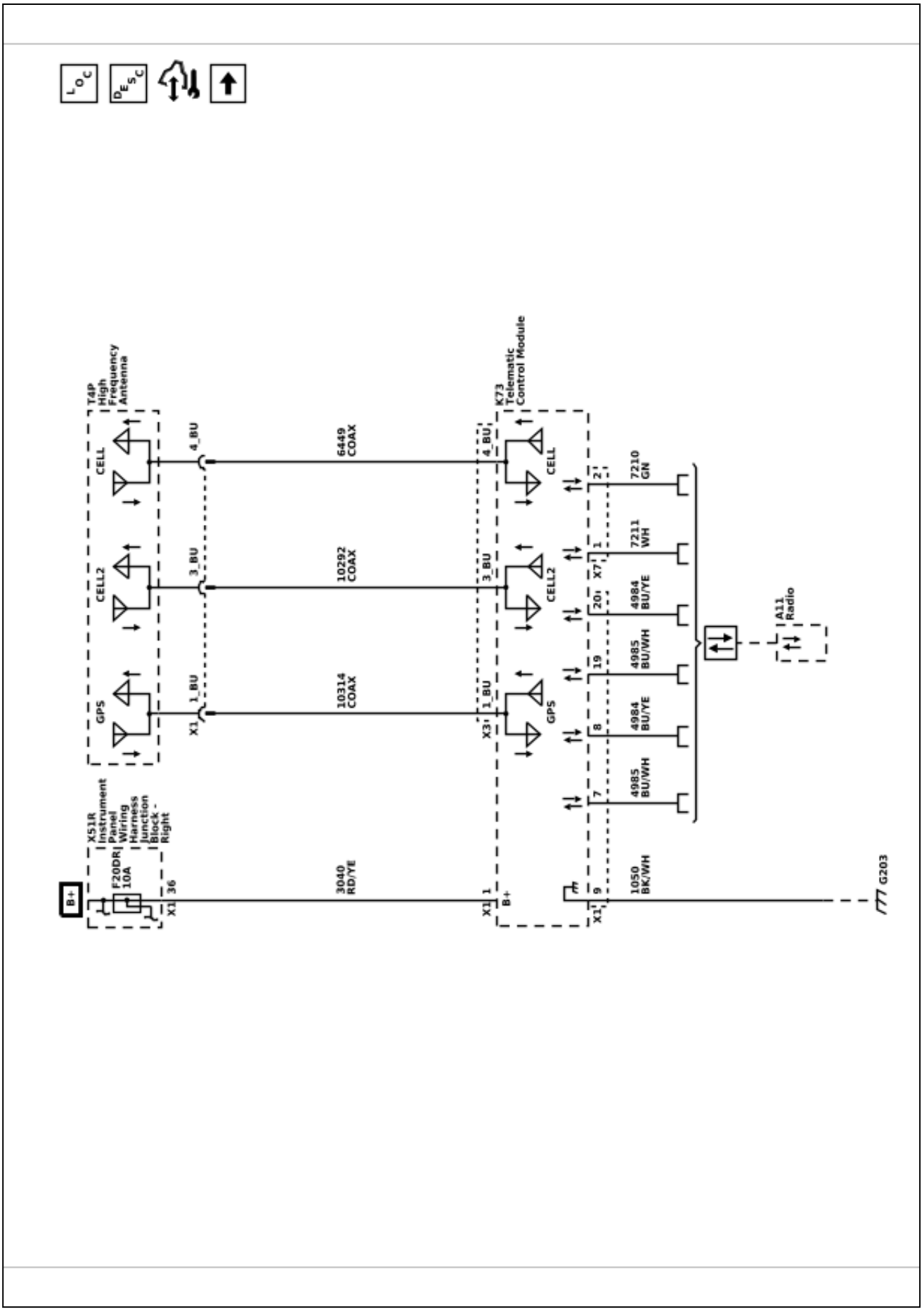
Radio/Navigation System Schematics (Auxiliary Inputs (D07 / DCK))



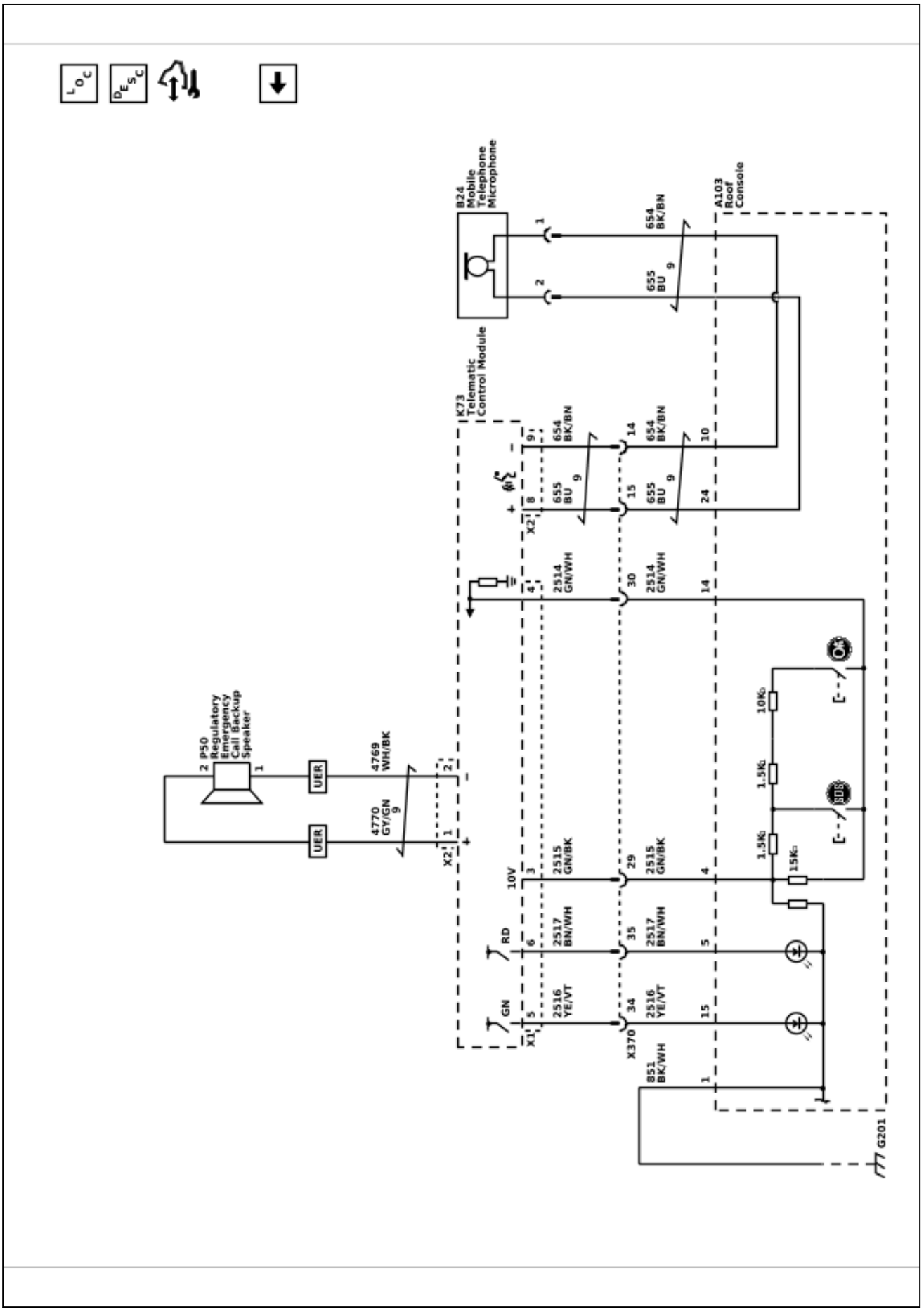
Radio/Navigation System Schematics (Auxiliary Inputs (- (D07 / DCK)))



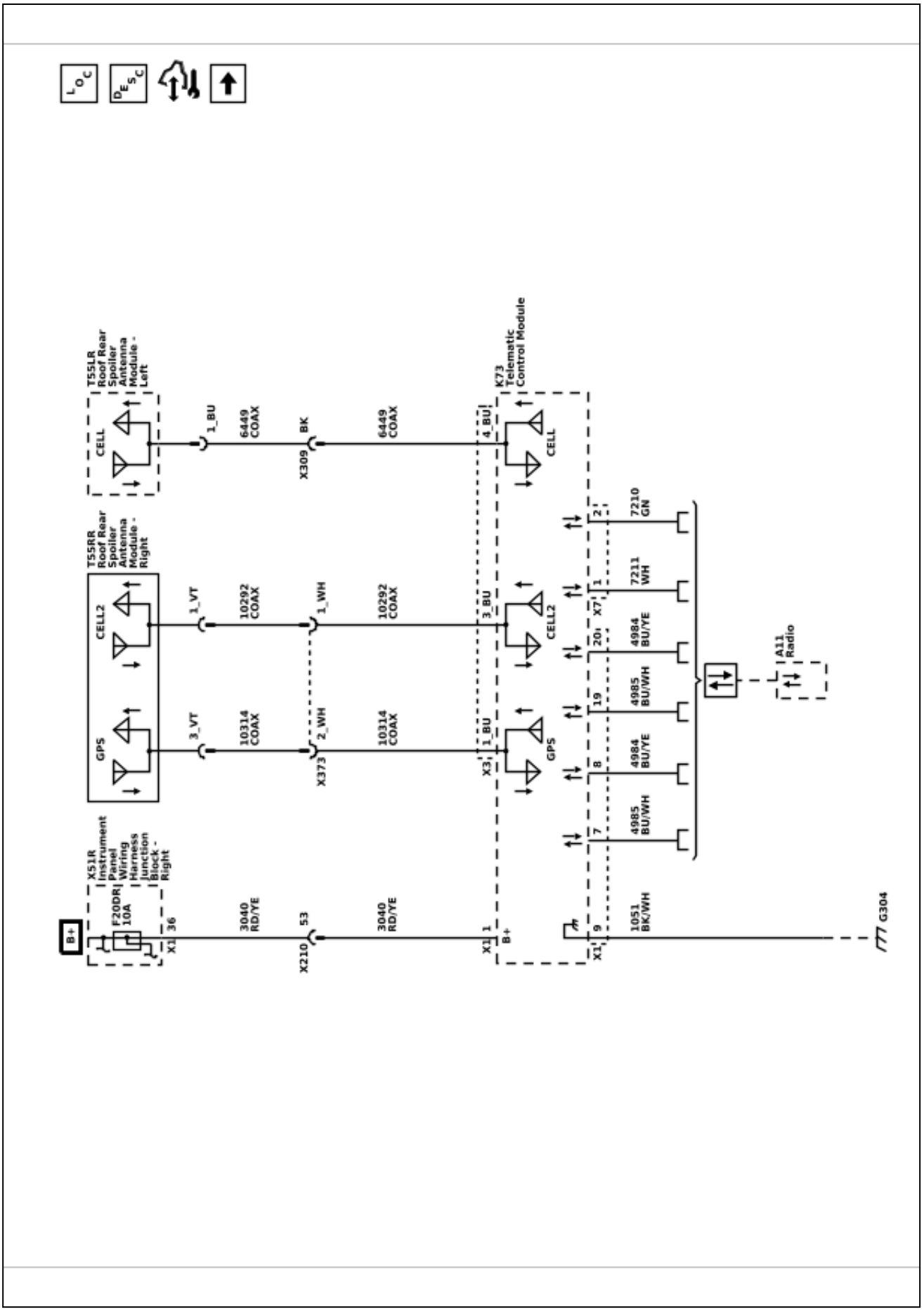
OnStar/Telematics Schematics (2-Door) (Power, Ground, Serial Data and Antennas)



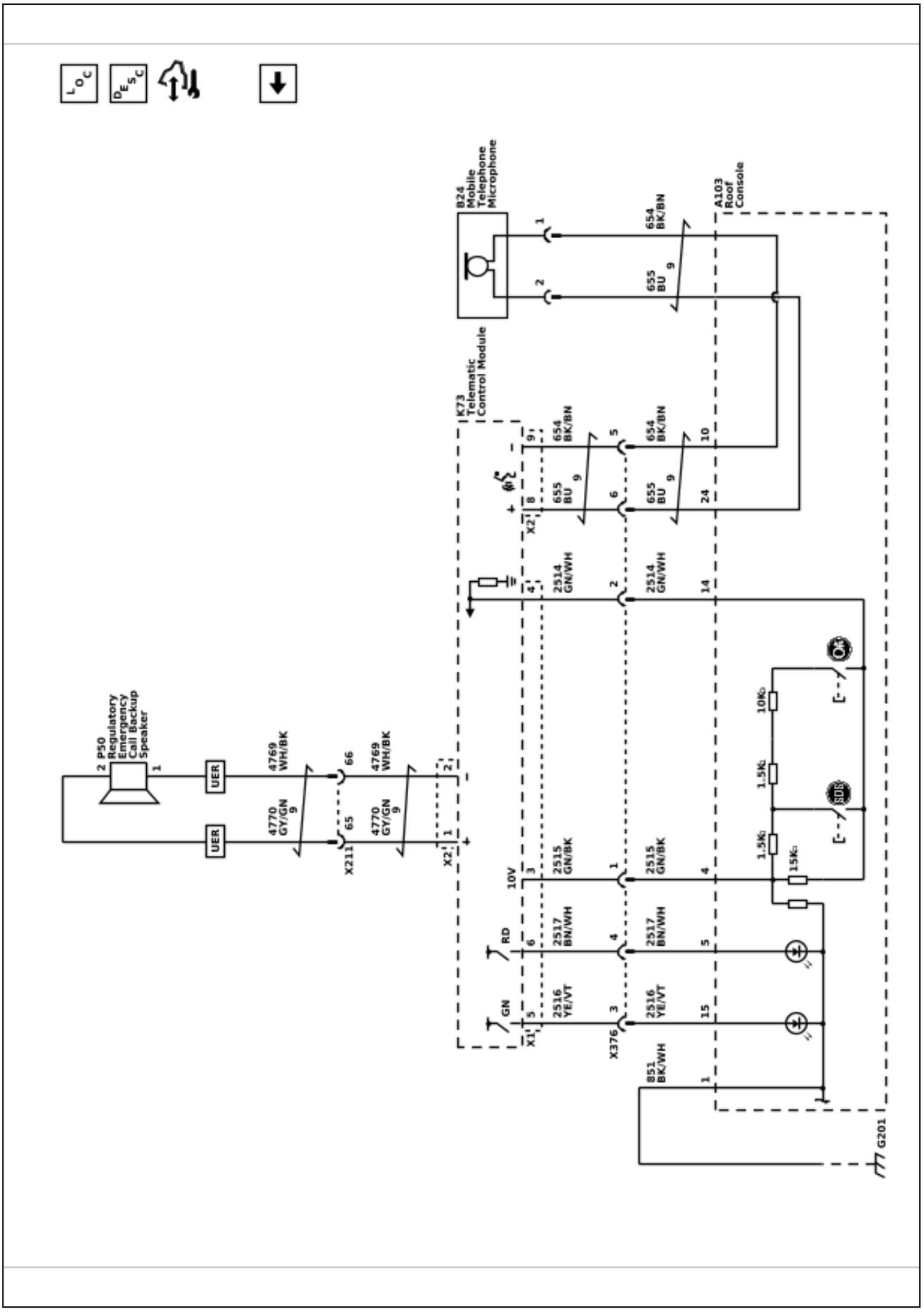
OnStar/Telematics Schematics (2-Door) (Controls and Audio Signals)



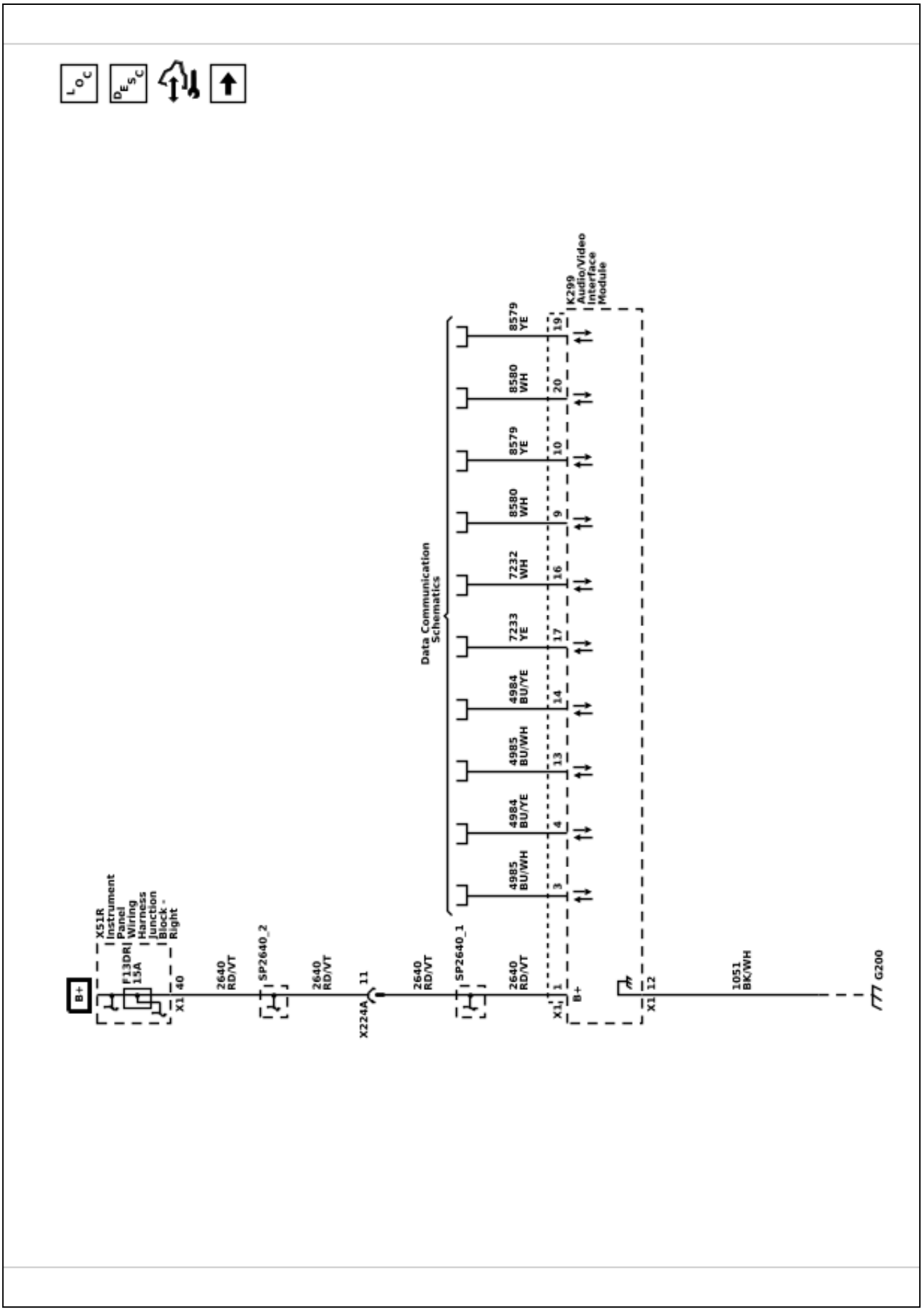
OnStar/Telematics Schematics (4-Door) (Power, Ground, Serial Data and Antennas)



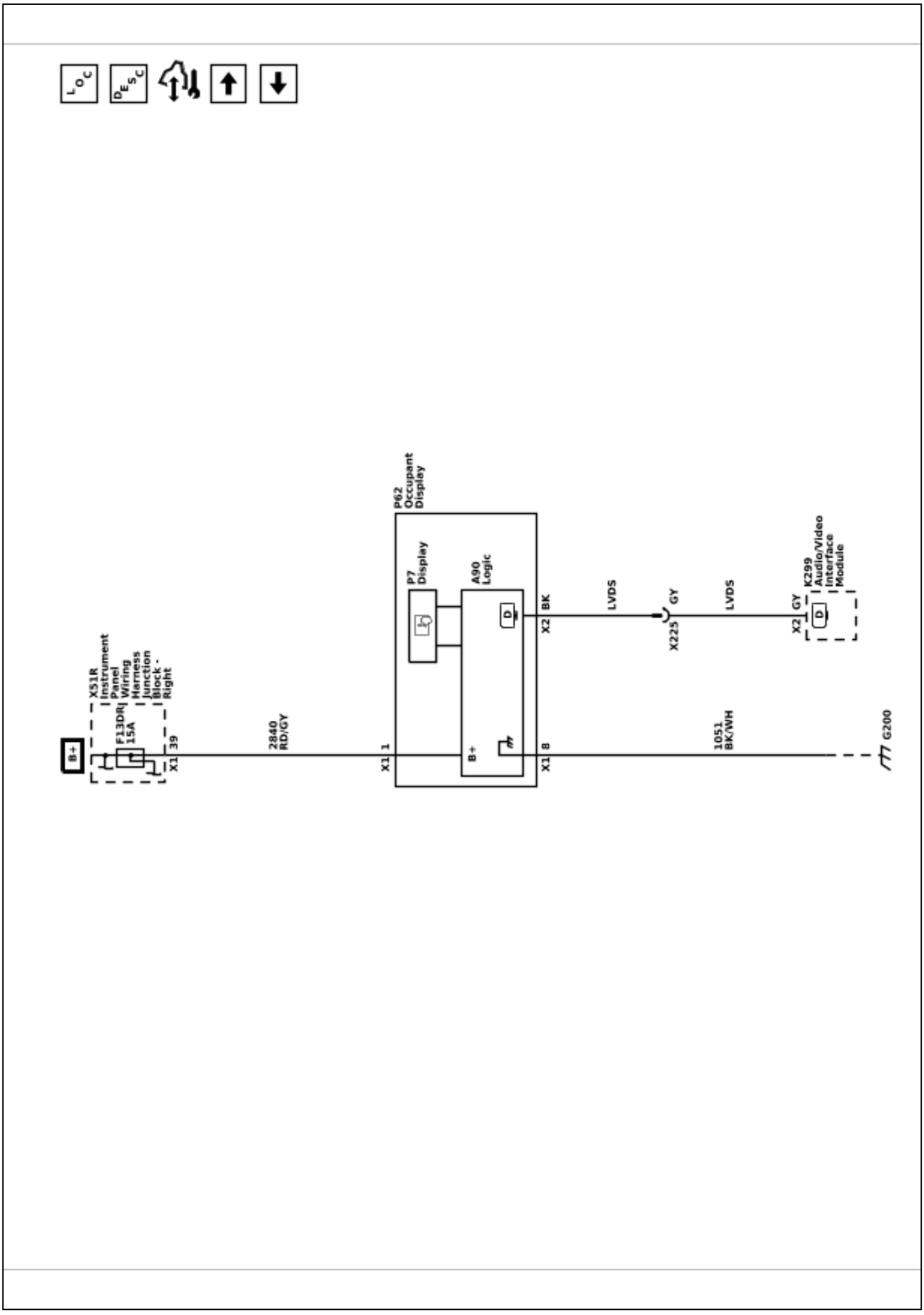
OnStar/Telematics Schematics (4-Door) (Controls and Audio Signals)



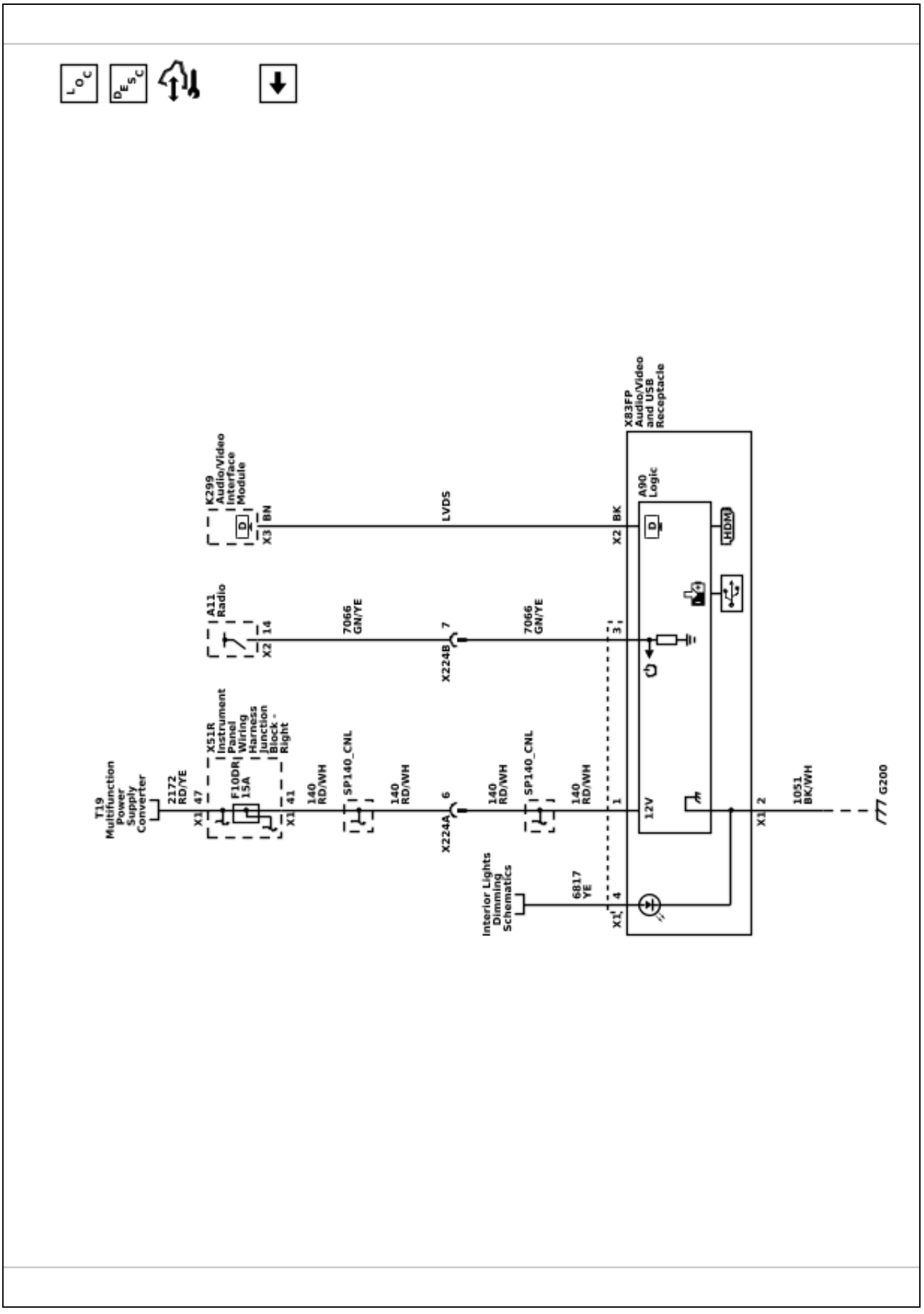
Video System Schematics (Audio/Video Interface Module Power, Ground, and Serial Data)



Video System Schematics (Front Passenger Infotainment Display)



Video System Schematics (Front Passenger Infotainment Multimedia Receptacle)



Description and Operation

OnStar Description and Operation

The OnStar® system consists of the following components:

- Telematic Control Module (TCM)
- OnStar® Three Button Assembly
- Microphones
- Cellular Antenna
- Navigation Antenna
- Back Up Battery

The OnStar® system supports the following capabilities:

- WiFi Support
- TTY (Teletypewriter)
- FOTA (Firmware Over The Air)

This system also interfaces with the factory installed vehicle audio system.

Telematic Control Module

The OnStar® Telecommunications Platform (TCP) system communicates with various infotainment components via ethernet. The OnStar® TCP uses Global System for Mobile Communication (GSM) to communicate data and voice signals over the national cellular network. The Telematic Control Module (TCM) supports entertainment WiFi Hotspots by providing a connection to the cellular network for internet access. The module is capable of up to 5G LTE speeds and houses 2 technology systems, one to process Global Positioning System (GPS) data, and another for cellular information. The module sends and receives all cellular communications over two cellular antennas and cellular antenna coax cables.

The OnStar® TCP system has two antenna inputs, a primary cellular signal and a combined GPS/secondary cellular signal. OnStar® can receive signals from multiple global navigation satellite systems, including the United States developed GPS and Russian developed Global Navigation Satellite System (GLONASS).

The module also has the capability of activating certain features such as, the horn, remote engine starting, initiating door lock/unlock, or activating the exterior lamps using the serial data circuits. These functions can be commanded by the OnStar® Call Center per a customer request or mobile device app depending on vehicle and customer subscription.

Dedicated circuits are used to connect the TCM to a microphone, the button assembly, and radio. When equipped, the TCM may contain a back up battery (BUB) which is internal to the control module and replaceable through an access cover. The TCM communicates with the rest of the vehicle over the serial data bus and Ethernet.

Power is provided by a dedicated, fused B+ circuit. Ground is provided through the vehicle wiring harness attached to the module. The power mode state is determined by the TCM through serial data messaging.

OnStar® Three Button Assembly

- The OnStar® button assembly may be part of the rearview mirror, or a separate, stand alone unit. The button assembly is comprised of 3 buttons or 3 capacitive touch buttons and status LED's or an error indicator. The buttons are defined as follows:
  - The answer/end button, which is black with a white phone icon or a white driver figure seated with voice signals near its face, allows the user to answer and end calls or initiate speech recognition.
  - The blue OnStar® call center button, which displays the OnStar® logo, allows the user to connect to the OnStar® call center.
  - The emergency button, which displays white letters "SOS" with red background, sends a high priority emergency call to the OnStar® call center when pressed.

If the green LED does not illuminate, this may indicate that the customers OnStar® subscription is not active or has expired. Push the blue OnStar® button to connect to an advisor who can then verify the account status.

The Telematic Control Module (TCM) supplies 10 volts to the OnStar® button assembly on the keypad supply voltage circuit. When pressed, each button completes a circuit across a resistor allowing a specific voltage to be returned to the TCM on the keypad signal circuit. Depending upon the voltage range returned the TCM is able to identify which button has been pressed.

The OnStar® status LED or error indicator is located near the buttons. The LED is green when the system is ON and operating normally. When any indicator is illuminated and flashing, it is an indication that a call is in progress. When the LED is red, this indicates a system malfunction is present. In the event there is a system malfunction and the OnStar® system is still able to make a call, the LED will flash red during the call.

Each LED or error indicator is controlled by either the TCM over dedicated LED signal circuits or by low speed CAN 5 serial data depending on the inside rearview mirror option. Ground for the LED is provided by the wiring harness attached to the button assembly.

Secondary OnStar® Controls

Some vehicles may have an additional button that when pushed can engage the OnStar® system. The button may be a symbol of a face with sound waves, or may say MUTE, or be a symbol of a radio speaker with a slash through it.

By engaging the OnStar® system with this feature, the user can interact with the system by use of voice commands. A complete list of these commands is supplied in the information provided to the customer. If the information is not available for reference, at any command prompt the user can say "HELP" and the TCM will return an audible list of available commands.

Microphones

This system utilizes two hands free audio microphones, the primary microphone on the driver side and a secondary/reference microphone for the front passenger side. The primary microphone is connected directly to the Telematic Control Module (TCM). It is also connected by an analog pass-through circuit to the radio from the TCM. The secondary microphone is connected directly to the radio.

The primary microphone is used for emergency and OnStar® calls. During normal operating conditions it also provides Bluetooth® calls and speech recognition to the radio. The secondary microphone is used as a reference for the primary microphone for Barge-in and Passenger Interference Cancellation during speech recognition and also to enhance the driver side hands free calls. For model year 2018 and beyond the secondary microphone can also be used for front passenger hands free phone calls. Barge-in allows a user to speak over the system prompts. Passenger Interference Cancellation ignores unwanted inputs from cabin noise that is not related to the prompts given by the user.

The front passenger secondary microphone is never used as a direct source for an OnStar® call.
The second microphone input modifies the primary microphone input to reduce background noise and other interference. An OnStar® call requires the microphone to be directly connected to the TCM. During a normal (non-emergency) OnStar® call the TCM receives an audio signal from the primary microphone and sends the signal to the radio via the Ethernet connection. The radio processes the OnStar® call audio and sends it back to the TCM via the Ethernet connection. During an emergency button call the TCM contacts the OnStar® call center directly and does not send the signal to the radio.

Cellular and GPS Antennas

The combination antenna will have any of the following antenna elements when equipped with OnStar®:

- Primary cellular element
- Secondary cellular element
- GPS element
- Digital radio element
- AM/FM element

The OnStar® Telematics Communication Platform (TCP) system uses 2 cellular antenna elements to send and receive cellular data, the primary cellular element and the secondary cellular element. The primary cellular signal is carried by a coax cable that connects the antenna directly to the Telematic Control Module (TCM). Details of the secondary cellular signal are further described below.

The GPS antenna element is used to collect the signals of the orbiting GPS satellites. GPS signals are output from the TCM on Ethernet or CAN 5. Other modules on Ethernet may use the GPS latitude, longitude and satellite time data broadcast by the TCM. Using positioning information from the vehicle Ethernet avoids the use of a coaxial signal splitter to pass the analog GPS signal to other modules. Within the antenna is housed a low noise amplifier that allows for a more broad and precise reception of this data. Also housed within the antenna is circuitry to combine the GPS signal and the secondary cellular signal. The combination GPS/secondary cellular signal is carried by a coax cable that connects directly to the TCM. The cable also provides a path for DC current for powering the antenna.

Compass Heading

The Telematic Control Module (TCM) has a compass feature to calculate vehicle direction which is displayed via the instrument panel cluster or designated display. The compass heading is determined by dead reckoning until the GPS 3rd fix is established. The dead reckoning is accomplished by using the yaw rate sensors and wheel ticks to determine heading changes from a GPS known heading. The GPS 3rd fix heading is determined by the deferential of two locations.

Bluetooth®

With the OnStar® TCP system, Bluetooth® resides in the radio. Refer to Radio/Audio System Description and Operation for further details.

Phantom Phone Calls

A customer may report that the OnStar® system is attempting and/or completing phone calls which the operator of the vehicle did not initiate.

It is important to know which type of reported phantom phone call the operator is reporting. Some phone calls of this nature are considered normal and cannot be addressed other than through education, while others may require some remedial action to resolve. When attempting resolve, it is very important to determine under which circumstances the reported Phantom Phone Call resulted.

The following are different scenarios:

- The vehicle may receive an incoming call just like any other phone. Typically the customer will hear the phone ringing in the vehicle. This scenario also includes incoming Bluetooth® calls.
- Because the button assembly and associated wiring feeds voltage back to the OnStar® system based on the amount of voltage drop through each of the buttons, should the return line be partially shorted to voltage, the system could interpret this voltage as a key press. If one of the buttons voltage is simulated, such as the Blue button, the system will make a phone call just as if the button had been pressed by the operator of the vehicle. Refer to the OnStar® Button Malfunction document for diagnostics.
- Internal module fault. Some customers may report a condition where ″Phone Unavailable″ message is heard after the vehicle door is opened or key is cycled. The technician may find a DTC stored in the Telematic Control Module (example: U1500 or B1000). Refer to diagnostics for the DTC making sure to follow any applicable Bulletins or PIs.
- Unwanted Hands free calling activation. A customer may report that the ″Ready!″ or ″OnStar® Ready!″ message is heard while driving. The customer may also advise that this seems to happen mostly while making a turn. In some cases it has been found that the customer is inadvertently pressing the ″push to talk″ button on the steering wheel controls. On rare occasions, other issues in the steering column or Steering Wheel Control system may induce this event.

The majority of reported Phantom Phone Calls can be attributed to accidental button presses or customer induced concern. In some cases an incoming call may be mistaken as a phantom call concern. It is important to verify all aspects of the customer concern in order to properly duplicate and diagnose the condition. If the concern points to normal operation and customer induced concern, please communicate to the customer this condition is a normal operating characteristic of their vehicle.

Back-up Battery

In some vehicles, the telematics system is equipped with a Back-Up Battery (BUB) installed inside the Telematic Control Module (TCM). This battery is a single-cell lithium-ion battery assembly, connected with a short electrical harness, to the circuit board in the module. Contained within this single-cell battery package are a temperature-sensing thermistor, automatic-resetting circuit-overload protection, and a low-pressure vent valve. Nominal voltage of the battery pack is 3.0 - 3.4 volts.

The BUB is only switched into service when the telematics system is in normal On condition, Ignition » On / Vehicle » In Service Mode and main vehicle battery power (B+) at the TCM suddenly becomes near-zero. At this time BUB power is connected to the main circuit board power using solid-state power switching circuits. After initiating BUB for module power, the CAN 5 bus is monitored for a message confirming a collision-event, or near-collision event, has occurred. If a confirmation message is received, the TCM continues to use BUB as the power supply until it is depleted. If a confirmation message is not received within 10 seconds, the BUB power circuits are internally disconnected, preventing inadvertent dis-charge of the battery.

Charging circuitry within the TCM maintains the state of charge. The BUB charging occurs as determined by the module software, primarily based on temperature and state of charge. The BUB can not be charged externally. Battery state of charge is measured by the telematics module circuitry, and remaining energy capacity calculated by the module software. On-board diagnostic tests check for circuit faults, over-temperature conditions, and low-energy capacity. Current DTCs will set for each of these conditions. No component checks are required, and are not recommended, for BUB diagnosis. If the BUB is activated for any reason it must be replaced.

WiFi Support

The Telematic Control Module (TCM) supports entertainment WiFi hotspots by providing a connection to the cellular network for internet access. The radio acts as the central WiFi router and connects hardwire Ethernet to the TCM. The TCM completes the connection to the internet through the cellular network. It has the ability to connect up to 7 devices at one time.

Audio System Interface

When the OnStar® requires audio output, a serial data message is sent to the audio system to mute all radio functions and transmit OnStar® originated audio. The OnStar® audio is transmitted to the vehicle audio system by the Ethernet and CAN 5 circuits.

The audio system will mute and an audible ring will be heard though the speakers if the vehicle receives a call with the radio ON.

On some vehicles, the HVAC blower speed may be reduced when the OnStar® system is active to aid in reducing interior noise. When the system is no longer active, the blower speed will return to its previous setting.

OnStar® Sleep Cycle

The OnStar® system uses a unique sleep cycle to allow the system to receive cellular calls while the vehicle is OFF and retained accessory power mode has ended. This cycle enables the Telematic Control Module (TCM) to perform remote functions, such as door unlock, as commanded over the air by the OnStar® Call Center, and to continue to maintain an acceptable level of battery electrical drain.

The OnStar® system uses 4 states of readiness, depending upon the type of cellular market the vehicle is in when the vehicle is Off:

- High power
- Low power
- Sleep
- Digital standby

The high power state is in effect whenever the vehicle is ON or in PROPULSION MODE, or retained accessory power is enabled, and the OnStar® system is sending or receiving calls or when the system is performing a remote function.

The low power state is in effect when the OnStar® system is idle with the vehicle is Ignition » On / Vehicle » In Service Mode, or with retained accessory power enabled.

The digital standby power state is entered after the vehicle has been shut off and the retained accessory power has timed out while in a digital cellular area. When in digital standby mode, the OnStar® module is able to perform all remote functions as commanded by an OnStar® advisor at any time, for a continuous 120 hours. After 120 hours, the OnStar® module will go into sleep mode until a wake up signal from the vehicle is seen by the TCM. If the OnStar® module loses the digital cellular signal it will revert to analog mode and follow the standard sleep state (9 minutes OFF, 1 minute standby) based on the time of the GPS signals, this will continue until a digital cellular signal is again received.

If the OnStar® system loses battery power while the system is in a standby or sleep mode, the system will remain OFF until battery power is restored and the vehicle is Ignition » On / Vehicle » In Service Mode.

Features

OnStar® Personal Calling
The hands free, OnStar® personal calling cellular phone feature is an additional feature of the OnStar® system. This feature is embedded within the Telematic Control Module (TCM); however it must be activated by an OnStar® advisor. OnStar® personal calling operates similar to most hand held cellular phones in that the availability for its usage is based on minutes or units. The customer must have a current OnStar® subscription, as this feature cannot be utilized without it. To use OnStar® personal calling, the customer must also purchase units (minutes) as outlined in the owners guide provided with the OnStar® system. Units begin to deplete, 1 unit is equal to 1 minute, as the customer makes outbound phone calls, answers inbound phone calls, or while connected to the OnStar® virtual advisor. In addition, units may also have an expiration date, depending upon the type of units purchased.

Turn by Turn Navigation (if equipped)
Turn by Turn Navigation allows the driver to contact OnStar® to obtain directions for driving from a current location to a desired location. The Turn by Turn Navigation system stores your planned route and continually checks your position along that route, when you deviate from the planned route, the system will recognize this and prompt the driver with verbal prompts for how to proceed. .

Teletypewriter (TTY) Users

OnStar® has the ability to communicate to deaf, hard-of-hearing, or speech-impaired customers while in the vehicle. The available dealer-installed TTY system can provide in-vehicle access to all of the OnStar® services, except Virtual Advisor and OnStar® Turn-by-Turn Navigation.

Deactivated OnStar® Accounts

In the event a customer has not renewed their OnStar® account after expiration or the account was never activated, OnStar® will make a discrete cellular call to the vehicle to deactivate the OnStar® system. Before taking this action, customers are notified that the OnStar® system in their vehicle will be deactivated unless they elect to renew the account. After the OnStar® account has been deactivated, customers will experience the following:

- The OnStar® status LED will not illuminate.
- The OnStar® system will NOT attempt to connect to the OnStar® Call Center in the event of a collision or if the vehicle's front air bags deploy for any other reason.
- An emergency button press will play a demo message indicating the service has been deactivated.
- An OnStar® Call Center button press will connect the customer with a dedicated sales team who can sell an OnStar® subscription and reactivate the vehicle. Depending on the type of OnStar® hardware in the vehicle, the customer may first hear a demonstration message stating there is no current OnStar® subscription for the vehicle, and directing the customer what to do to activate services.
- OnStar® personal calling will not be available, as this feature requires the customer to have a current OnStar® account. Attempts to use this feature may result in cellular connection failure messages and the inability to connect to the number dialed.

Certain vehicles that have never had an active OnStar® account, or that have been deactivated, may be unable to establish a connection with the OnStar® Call Center. When normal published diagnostic procedures do not indicate a possible cause for the no connect concern, the vehicle may have been deactivated. For deactivated vehicles, a no connect response should be considered normal operation. Further diagnosis and subsequent repair is only necessary should the customer elect to become an active OnStar® subscriber or renew the account subscription.

OnStar® Cellular, GPS, and Diagnostic Limitations

The proper operation of the OnStar® System is dependent on several elements outside the components integrated into the vehicle. These include the National Cellular Network Infrastructure, the cellular telephone carriers within the network, and the GPS.

The cellular operation of the OnStar® system may be inhibited by factors such as the users range from an analog or digital cellular tower, the state of the cellular carrier’s equipment, and the location where the call is placed. Making an OnStar® key press in areas that lack sufficient cellular coverage or have a temporary equipment failure will result in either the inability of a call to complete with a data transfer or the complete inability to connect to the OnStar® Call Center. The OnStar® system may also experience connection issues if the identification numbers for the module, station identification number, electronic serial number or manufacturers electronic ID, are not recognized by the cellular carriers local signal receiving towers.

The satellites that orbit earth providing the OnStar® system with GPS data have almost no failures associated with them. In the event of a no GPS concern, the failure will likely lie with the inability of the system to gain GPS signals because of its location, i.e. in a parking structure, hardware failure, or being mistaken with an OnStar® call which has reached the Call Center without vehicle data.

During diagnostic testing of the OnStar® system, the technician should ensure the vehicle is located in an area that has a clear unobstructed view of the open sky, and preferably, an area where analog or digital cellular calls have been successfully placed. These areas can be found by successfully making an OnStar® keypress in a known good OnStar® equipped vehicle and confirming success with the OnStar® Call Center advisor. Such places can be used as a permanent reference for future OnStar® testing.

Mobile Identification Number and Mobile Directory Number

The Telematic Control Module utilizes 2 numbers for cellular device identification, call routing and connection, a mobile identification number and a mobile directory number. The mobile identification number represents the number used by the cellular carrier for call routing purposes while the mobile directory number represents the number dialed to reach the cellular device.

Firmware Over The Air

The Firmware Over The Air feature was designed to reflash software remotely. Remote reflash is an in-vehicle feature that enables the installation of a software package to update the infotainment system without requiring service test equipment to be physically connected to the vehicle. Remote reflash will utilize a long range or short range connection from the host module to a remote IT system. There must be an active OnStar® account to receive Over The Air programming or updates. To verify the status of the account perform a blue button press and verify the account is active and connects with data and location. Customers need to accept the OnStar® terms and conditions, and must have an active OnStar® account to receive any Over The Air programming or updates.

Note: A data plan is not required to receive Over The Air programming or updates. Also the programming or updates do not consume a customers available data.

Note: Cold temperatures can cause the update to fail. Warm vehicle's interior to fix this issue.

Note: Low battery can cause the update to fail. Have battery charged before running update.

Note: Fleet vehicles must be activated as a Fleet account (not a business account) and require a separate Terms and Conditions agreement to be completed. Please see your fleet administrator for assistance with completing this agreement.

Video Entertainment System Description and Operation

Front Passenger Infotainment

The Front Passenger Infotainment system includes:

- Audio/Video Interface Module
- 1 display screen
- Front Consumer Port

System Operation

The front display is connected to the Audio/Video Interface Module via LVDS cable. The Audio/Video Interface Module drives the display, front consumer port, and Bluetooth audio but is also connected to the radio via CAN, Ethernet, and A2B bus. The Front Consumer Port is connected to the Audio/Video Interface Module via LVDS cable. The FPI system is controlled by touchscreen input or "Quick Remote" which can be accessed via vehicle WiFi connection.

To turn on the FPI screen, touch anywhere on the screen and the home screen will be displayed. The screen is designed with a left side navigation panel, which provides a power button, a Bluetooth headphones settings button, a home screen button and a setting button to access the FPI system settings. The Power button allows the user to turn OFF the screen.

The screen has a "Privacy" feature that is automatically turned on when the vehicle is in motion. This is used to ensure the driver is not distracted by the video content being displayed on the FPI screen while the vehicle is in motion.

The front users can control the Front Passenger Infotainment through the entertainment hub app. The front user has the ability to see the overview of the content played on FPI screen, turn the front screen On/Off, mute the front screen, play and pause, lock the front screen, enable listen in and close source. Within the entertainment hub settings menu, the front user can restart the front screen if they encounter any issues, without losing any personal data, such as log in credentials or bookmarked pages. The user can also perform a factory reset on the front screen to clear all personal data, log in credentials, and bookmarked pages and return the Front screen to factory settings.

For additional features refer to the Owner Manual. The FPI system does not support Navigation.

Note: For Apps and Streaming Services to work with the Rear Seat Infotainment system a specific Data Plan must be purchased.

Display Screen

The front display utilize a 11.5 inch fixed amorphous screen, touch screen LCD with 2560x1080 pixel resolution and switchable privacy feature.

Some models are equipped with a built-in articulating cover designed to conceal the screen when not in use.

Quick Remote Experience

The quick remote feature allows the customers to utilize their mobile phones as a soft remote to control the FPI screen and the contents within it without touching the screen.

- To use the quick remote, users must first connect their mobile phone to the vehicles WiFi hot spot.
- Once the mobile phone is connected to the vehicles WiFi hot spot, use the mobile phone camera app to scan the QR code on the FPI screen.
- This 2–step process will help connect the users phone to the FPI system and sue as a quick remote

- Within the quick remote, users can seek forward/backward, play/pause, and use trackpad for the mouse curser.
- Users may also use the bookmark feature, tabs feature, and URL search bar feature when using the quick remote in browser app.
- If the user disconnects from the quick remote, simply follow the first 2 steps to reconnect to the FPI quick remote.

Front Consumer Port
The Front Consumer Port (FCP) is connected to the Audio/Video Interface Module via LVDS cable.

The Front Consumer Port has HDMI 1 as an available input.

USB
Equipped with 1 front USB-C charge only port.

HDMI
The HDMI input allows an HDMI cable to be connected from an auxiliary device such as a video streaming device or video game system. For certain HDMI devices that support USB charging, the USB ports can be used as a power source.

Headphones
The FPI system supports bought in Bluetooth headphones, only 1 headphone can be active at one time.

To pair a Bluetooth headphone to the front screen:

- Touch the Headphone icon from the front screen Home page.
- Select Connect Headphones
- Select Add Headphones
- Make sure the Bluetooth headphone is in pairing mode. Following the device instructions to enter the pairing mode.

Once recognized by the system, the headphone is displayed on the list of available headphones.

Select the appropriate headphone from the list. Once connected, touch OK at the Pairing Successful pop-up.

For additional features refer to the Owner Manual.

Radio/Audio System Description and Operation

The entertainment system on this vehicle may have several different configurations available to it. To determine the specific configuration of the vehicle, please see the Service Parts ID Label, and refer to RPO Code List.

Each item in the list below represents topics covered in detail below.

- Demo Mode
- Data Communications
- Remote Radio Receiver
- Speaker Operation
- Subwoofer Operation
- Antenna System
- Radio Reception
- Active Noise Cancellation/Auto Volume Control (If equipped)
- Microphones
- Bluetooth ® (if equipped)
- WiFi
- Back Office Registration
- Applications (if equipped)
- Speech Recognition
- Navigation System Components and Features (if equipped)
- Locations Services
- Valet Mode
- Teen Driver
- Theft Deterrent
- Audio Amplifier (if equipped)
- Infotainment Controls and Display
- Steering Wheel Controls (If equipped)
- USB port
- OnStar ®
- OTA (Over The Air) Programming
- GAS (Google Automotive Services) if equipped
- Compass Data
- Media Disc Player (if equipped)
- Digital Rearview Camera (if equipped)
- Immersive Audio – Dolby Atmos (if equipped)

Demo Mode

The radio on new unsold vehicles received at the dealer will be in Demo Mode. In Demo Mode a phone will only stay paired for the current key cycle and lose pairing to the radio after the vehicle shuts down and restarted after 10 min. Additional operational characteristics of Demo Mode include no retention of the following:

- Stored favorites
- Last station tuned
- Bluetooth synced devices
- Volume level
- Last app or screen view

- Audio/equalizer settings

Note: If a device was originally paired while in Demo Mode, a similar condition could occur that randomly continues to drop Bluetooth pairing after exiting Demo Mode. If the vehicle is not in Demo Mode, but it is believed the device was originally paired while in Demo Mode, then delete the device from the radio, delete the radio from the device, and perform the pairing process again.

Loss of functionality on the above items may be due to the design intent of the vehicle while in Demo Mode, no correction is needed for these conditions. This is the normal operating characteristic of the Demo Mode of the vehicle. Once the vehicle is sold, select the option labeled “Not a Demo Vehicle” to exit Demo Mode.

Data Communications

The infotainment system communicates with other devices on multiple serial data networks during operation.

Ethernet AVB
At the core of the infotainment system is the Radio Ethernet AVB (Audio Video Bridging) switch, which communicates directly to each contributing Infotainment module terminator. The Ethernet harness consists of twisted pair wires from point to point. Each module on the Ethernet infotainment system sends/receives data at 100 megabit per second (Mbps) to/from a specified port at the Radio. Some system configurations support a 1 Gigabit per second (Gbps) connection at the Radio to/from the TCP (Telematics) module. The Radio/Ethernet will also be used to program USB S/W update files to the modules connected to the Ethernet ports. Some of the data services performed over Ethernet AVB include: Chime, Service Programming via Over-The-Air updates, OnStar Turn-by-Turn directions and all other OnStar data services.

Local Interconnect Network (LIN)
The Local Interconnect Network (LIN) Bus is a single wire communication system. This bus is used to exchange information between a master control module and other smart devices which provide supporting functionality.

The Remote Radio Receiver, Information Display, Infotainment Controls and the Multifunction (tunnel) Controls all communicate on the LIN bus.

Controller Area Network (CAN)
The Radio will communicate with other modules and systems in the vehicle via CAN and CAN5. Diagnostic Trouble Codes will be read on CAN/CAN5 to diagnose Ethernet, LIN and system faults. CAN will also be used for programming calibrations using Tech Line Connect (TLC)/SPS. CAN takes the place of GMLAN on Global-B architecture systems. CAN5 is a sub-system of the entire CAN network on a vehicle and is the specific network that connects the Infotainment modules on the vehicle.

For additional information refer to *Data Link Communications Description and Operation 8-35*

Automotive Audio Bus (A2B)
The Automotive Audio Bus (A2B) uses a radio and one or more nodes. It is a private, digital, and high speed serial bus. The system contains a master (radio) and one or more nodes connected by an unshielded twisted pair (UTP) wiring harness. Diagnostic Trouble Codes (DTCs) are set within the master node for all errors in the system, if the bus is up and communicating. The system operates on full duplex, where communication is possible over a single wire if the other wire is damaged or open. The network is daisy chained. A and B ports are isolated by the A2B transceiver. The A2B bus line doesn’t require any terminator. The last device is configured as end node by the A2B master processor during the network discovery process.

Remote Radio Receiver

Overview

The Radio is the Ethernet master. The radio also communicates with other components and systems within the vehicle via CAN/CAN5 and LIN. The remote radio receiver communicates with the info display module via the LIN bus for control information, touch communications and dimming level. Digital video data is sent to the display through a dedicated video cable.

The Radio receiver contains internal antennas for Bluetooth ® and WiFi. The Radio also has an external WiFi antenna (on applicable systems) that is used to receive local WiFi signals at increased distances. This is mainly used to support Over-the-Air updates.The Radio must be mounted properly to obtain proper wireless signals and GPS position. The remote radio receiver is responsible for receiving all broadcast audio bands. Broadcast signals from AM, FM, XM and DAB bands are transmitted to the radio via the vehicle antenna systems. The remote radio receiver is also responsible for the following: Video for the infotainment display, Bluetooth ®, USB, memory card reader, and speech recognition functions.

The Radio has phone projection capabilities that can transmits information directly to the vehicle infotainment system through Bluetooth or a USB connection. Downloadable applications will be available based on distracted driver safety requirements.

Radio Power
The radio receives battery power and ground from the vehicle harness.

The radio does not use a discrete ignition feed circuit for power moding. The power mode master provides the system power mode to the radio via serial data messages. The power mode master determines the system power mode by processing power mode information from ignition switch inputs. Serial data power modes supported by the radio are OFF, ACCESSORY, RUN, and CRANK REQUEST.

The radio can be turned ON with the ignition OFF. After 10 minutes of inactivity the radio will power down. If any setting (e.g. changing the station) or volume has been changed or if the radio has been powered OFF then back ON the 10 minute timer will reset from that point.

Radio Audio Outputs
When not equipped with an amplifier, the radio outputs all audio signals to the speakers via the vehicle wiring harness.

When equipped with an amplifier, the radio outputs all audio signals digitally over Ethernet.

Speaker Operation

Speakers turn electrical energy into mechanical energy to move air, using a permanent magnet and an electromagnet. The electromagnet is energized when the radio or amplifier (if equipped) delivers current to the voice coil on the speaker. The voice coil will form a north and south pole that will cause the voice coil and the speaker cone to move in relation to the permanent magnet. The current delivered to the speaker is rapidly changing alternating current (A/C). This causes the speaker cone to move in two directions producing sound.

Subwoofer Operation

The Ducted Subwoofer, also known as the Fresh-Air Subwoofer (FAS), converts electrical energy from the audio amplifier into mechanical energy that moves the speaker's cone and produces low-frequency sound. The subwoofer is mounted to the back panel of the cab, near the pressure relief valve (PRV). The movement of the speaker and the resulting low-frequency air pressure can cause the back panel and PRV flaps to vibrate which may be heard from outside the vehicle.

Antenna System

Multi-Band Antenna
The multi-band antenna is located on the roof of the vehicle. This type of antenna may be used with the AM/FM radio, but is primarily for cellular, GPS signals, and XM, if the vehicle has these features. Keep this antenna clear of snow and ice for clear reception. If the vehicle has a sunroof, the performance of the system may be affected if the sunroof is open. Loading items onto the roof of the vehicle can interfere with the performance of the system, ensure the multi-band antenna is not obstructed.

Diversity Antenna
The diversity antenna system can use up to 2 antenna amplifiers and an AM/FM element that is part of the rear end spoiler assembly or applied as appliqués to the rear glass. With 2 antennas the right antenna 1 receives both AM and FM signals, while the left antenna 2 may receive FM and DAB signals only. The antenna amplifier receives the signals from the rear end spoiler antenna element or from the glass antenna element. Each antenna amplifier is connected to the radio by a coaxial cable.

The radio antenna amplifier is enabled when the radio is turned on. The radio provides battery voltage to the antenna amplifier using the center conductor of the antenna coaxial cable. When a 12 V signal is seen by the amplifier on the center conductor of the antenna coax, the received signals are amplified.

With a 2 antenna amplifier system when the AM band is selected on the radio, the antenna 1 amplifier connects the AM antenna to the radio. When the FM band is selected, both antenna amplifiers provide FM signals to the radio. The radio switches between the two FM antennas, monitoring the signal strength and combines the signals to create one stronger signal.

Global Positioning System (GPS) Antenna
The global positioning system (GPS) antenna is part of the multi-band antenna located on the roof of the vehicle. The GPS antenna is used to collect the signals of the orbiting GPS satellites. Within the antenna is housed a low noise amplifier that allows for a more broad and precise reception of this data. The GPS antenna amplifier is powered through the coaxial cable.

The GPS antenna is connected to the telematics communication interface control module via a coax cable. The GPS signal is sent to the navigation radio via an Ethernet harness.

External WiFi Antenna
On some system configurations, an external WiFi antenna is connected to the radio to support longer range reception, compared to the internal Wifi antenna. Over-the-air updates is the main feature supported by this antenna. Data transfers used for consumer media will also be supported by this antenna when connected to a local network. The antenna is connected to the radio via coaxial cable.

Radio Reception

AM/FM Radio Signal
The radio signal is sent from a broadcast station and is then received by an antenna. The strength of the signal received depends on the following:

- The power output (wattage) of the broadcasting station

- The location of the vehicle (or receiver) relative to the broadcast tower.
- Height of the broadcast antenna
- Height of the receiving antenna
- Obstacles between the tower and the receiver
- Atmospheric conditions
- What band (AM or FM) the station is broadcasting
- Type of antenna and the ground plane

Sirius XM (SXM) Digital Radio Receiver (If equipped)
A service fee is required in order to receive the XM service.

The XM satellite receiver is integrated into the radio. XM satellite radio provides digital radio reception. The XM signal is broadcast from two satellites and, where necessary, terrestrial repeaters. The high power satellites allow the antenna to receive the XM signal even when foliage and other partial obstructions block the antennas view of the satellite. Terrestrial repeaters are used in dense urban areas. These repeaters will receive the satellite signal and re-broadcast them at much higher power levels in order to ensure reception in areas with densely packed tall buildings. Even with repeaters the signal can be compromised resulting in loss of XM.

SiriusXM 360L
SiriusXM with 360L interface has enhanced in-vehicle listening experience for subscribers. The experience now offers more categories and system learned recommendations toward discovering more personalized content.

To use the full SiriusXM 360L program, including streaming content and listening recommendations, OnStar Connected Access is required. Connected vehicle services vary by model and require a complete working electrical system, cell reception, and GPS signal. An active OnStar connected plan is required, if the customer declines OnStar Terms and Conditions the following message can be displayed: Connection Unavailable, Please call OnStar Agent.

Reference the SiriusXM user guide for use and subscription information.

SiriusXM Tune Start
SiriusXM Tune Start is a feature that begins playing the current song from the beginning when you tune to a SiriusXM music channel in the stored Favorites. This feature can be enabled/disabled through the radio Settings menu.

When equipped, Tune Start works with most SiriusXM music channels when the channel has been saved as a Favorite in the radio. The SiriusXM app in the radio also has a list of Favorites. Saving a SiriusXM music channel as a Favorite automatically saves it in the hidden SiriusXM Favorites list. If a SiriusXM music channel is not working in Tune Start ensure the channel exists in the SiriusXM Favorites list. SiriusXM Favorites can be found in the SiriusXM Settings menu under Listener Options. Note that SiriusXM channels stored by default in new vehicles are not stored in the SiriusXM Favorites list. These channels would need to be stored as Favorites by the user for them to appear in the Sirius XM Favorites list. The radio may require a sleep cycle before Tune Start will begin to function on newly saved Favorites. Tune Start will only begin to record SiriusXM Favorites with the Ignition On, so some buffering time is required before Tune Start can function after the vehicle is started.

Tune Start is a SiriusXM feature. Reference the SiriusXM user guide, or contact SiriusXM for use and subscription information.

High Definition (HD) Radio (If equipped with RPO U2L)
HD Radio delivers subscription free local broadcasting in a digital format which may include song title, artist name, album art, weather, traffic data, etc., on AM/FM bands. Up to four stations could be available on a single frequency for e.g. if radio station is 96.9 FM, the HD enabled radio would have additional broadcasts on 96.9 HD1, HD2, HD3 and HD4. The digital technology allows for clear reception quality and additional information.

Active Noise Cancellation/Auto Volume Control (If equipped)

Active Noise Cancellation (or sometimes referred to as Auto Volume Control) may have several different configurations. To determine the specific configuration of the vehicle, please see the Service Parts ID Label.

The main components of the Active Noise Cancellation system are:

- Microphones in the vehicle headliner. Use schematics to determine the number of microphones in each vehicle.
- An engine speed (RPM) signal from the engine control module to the amplifier/active noise cancellation module/radio.
- Active Noise Cancellation electronics and software integrated into the audio amplifier/active noise cancellation module/radio.
- The vehicle speaker system, connected to the amplifier/active noise cancellation module/radio, to output the desired cancellation frequencies.

The Active Noise Cancellation system is operational under the following conditions:

- The amplifier/active noise cancellation module/radio has passed all self diagnostic checks.
- All doors are closed.
- Battery voltage is between 9.5 V and 16 V.
- The vehicle cabin temperature is less than 140°F (60°C).
- For internal combustion engines- Engine speed is between 550 and 3000 RPM

The Active Noise Cancellation/Auto Volume Control system is a method used to reduce the perception of certain undesirable sounds generated by the engine into the vehicle cabin. The system uses microphone and engine speed signals, software integrated into the amplifier/active noise cancellation module/radio, and the vehicle speakers to determine and generate the correct frequencies needed to achieve the desired reduction.

The microphones are located in the headliner to monitor noise/sounds in the vehicle cabin, and are directly connected to the amplifier/active noise cancellation module/radio. For internal combustion engines the amplifier/active noise cancellation module/radio also receives an engine speed (RPM) signal from the engine control module. The amplifier/active noise cancellation module/radio processes these inputs to determine the frequency of the undesirable sound. The amplifier/active noise cancellation module/radio then calculates the appropriate cancellation frequency and outputs a cancellation signal (audio tone) to the vehicle speakers to reduce the perception of undesirable sounds by the vehicle occupants so the vehicle cabin appears quieter and without vibration.

Microphones

There are two different microphone systems depending on the vehicle. The first system is the traditional analog two wire discrete circuits wired directly to the OnStar module or the radio depending on options. The second system uses microphone arrays and amplifier referred to as nodes that operate in tandem. The system typically uses six circuits also utilizing the two wire discrete analog circuits along with input and output of the Automotive Audio Bus (A2B) Serial Data 1 digital circuits.

First Microphone System

This system utilizes two hands free audio microphones, the primary microphone on the driver side and a secondary/reference microphone for the front passenger side. The primary microphone is connected directly to the Telematics Control Module. It is also connected by an analog pass-through circuit to the radio from the Telematics Control Module. Without OnStar the primary microphone is connected directly to the radio. The secondary microphone is always connected directly to the radio.

The primary microphone is used for emergency and OnStar calls. During normal operating conditions it also provides Bluetooth calls and speech recognition to the radio. The secondary microphone is used as a reference for the primary microphone for Barge-in and Passenger Interference Cancellation during speech recognition and also to enhance the driver side hands free calls. The secondary microphone can also be used for front passenger hands free phone calls. Barge-in allows a user to speak over the system prompts. Passenger Interference Cancellation ignores unwanted inputs from cabin noise that is not related to the prompts given by the user.

The front passenger secondary microphone is never used as a direct source for an OnStar call. The second microphone input modifies the primary microphone input to reduce background noise and other interference. An OnStar call requires the microphone to be directly connected to the Telematics Control Module. During a normal (non-emergency) OnStar call the Telematics Control Module receives an audio signal from the primary microphone and sends the signal to the radio via the Ethernet connection. The radio processes the OnStar call audio and sends it back to the Telematics Control Module via the Ethernet connection. During an emergency button call the Telematics Control Module contacts the OnStar call center directly and does not send the signal to the radio.

Second Microphone System

The microphone array system uses a master which is the radio and any number of microphones or amplifiers referred to as nodes. The nodes are connected to the master via the Automotive Audio Bus (A2B) Serial Data 1 circuits. The microphone array system also utilizes the traditional 2 wire analog discrete signal circuits wired to the OnStar module or the radio. These analog circuits are only used as a backup for emergency OnStar calls if the A2B 1 is down. The primary microphone uses a digital signal operating on the A2B serial data 1 circuits. The nodes will have a + and – A2B 1 input and a + and – A2B 1 output, except for the end node which only has a + and – A2B 1 input.

Bluetooth® (If equipped)

Bluetooth® wireless technology is a short-range communications technology intended to replace the cables connecting portable and/or fixed devices while maintaining high levels of security. The operating range of the signal is approximately 30 feet.

The available features and functions are determined by the type of device and the software within the devices being used. For a feature or function to operate, it must be supported in both devices.

The first connection between devices is established through a process called pairing. In order to pair two devices, a password (passkey) has to be exchanged between the two devices. One device will generate the password, the other device accepts the password to complete the process. Once the devices are paired, future connections between the devices will occur automatically when the devices are on and within range of each other.

The Bluetooth® hardware is internal to the Remote Radio Receiver. The antenna is internal to the Remote Radio Receiver. The Remote Radio Receiver supports streaming of data (music, voice, information) from cellular phones and other mobile devices that support those features. The Remote Radio Receiver is also capable of interfacing with cellular phones for hands-free features.

- The device must be paired to the system to use the available Bluetooth® feature(s). The pairing process must only be performed once for each device, unless that device's information is deleted.
- Depending on model year up to 10 devices can be paired, refer to owners manual for details.
- Streaming Audio allows playing music from the mobile device wirelessly. Music stored on the mobile device can be viewed and controlled from the display.
- To stream audio from a mobile device, the device must be unlocked, and any additional applications should be closed.

Refer to the owners manual, supplements, and the device manufacturers information for pairing instructions.

WiFi

The WiFi hardware is internal to the Remote Radio Receiver. The WiFi or WLAN antenna is called the Wireless Communication Antenna which is connected to the Remote Radio Receiver. WiFi expands the abilities of the vehicle as described below:

- Connect to home WiFi to update software.
- When used with OnStar 4G LTE HotSpot service, it provides internet access to devices in the vehicle when connected to the HotSpot. This requires the purchase of OnStar WiFi data plan.
- Enables in-vehicle networking between passengers' devices, like home WiFi network.
- Allows remote access to external connected device application data for vehicle internet application use.

Back Office Registration

The Radio must be registered with the GM Back Office in order to receive downloaded information such as approved applications, module software updates, weather and traffic information for current location. The vehicle must have a Cellular or WiFi connection to complete the initial registration process. This process will verify the assembly plant factory feed data from the BCM, CGM and Radio serial numbers to the VIN and if the security checks are met, then the user must complete the registration process by entering email and required personal information. The registration status can be verified through the Radio "Setting – About selection.

When any of these secured ECU's are replaced, a new serial number will be recorded during the service calibration process and appended to the vehicles history data for uninterrupted back office connection.

If the Radio is replaced, the user can recover settings/applications by reregistering the email account. During the initial registration process the user will enter an email/password. The user will then be sent a follow up verification email link to setup the account completely. If the complete account setup is not performed the password reset security questions will not be entered, which will prevent reregistering this email account in the future if the password is forgotten. The radio will operate in Demo Mode or as Guest until a user profile has been set up.

Applications (If equipped)

Note: For vehicles equipped with Google Automotive Services (GAS) refer to that section below.

When the system is equipped with Bluetooth® or WiFI, the system is capable of using applications, commonly referred to as apps.

The term application refers to any piece of software that works on a system (hardware) that is being operated by it's own software. Applications are typically small software programs which uses the hardware to perform a specific task, as opposed to operating the entire system.

- For an application to be used, it must be installed on both the vehicle infotainment system and a compatible mobile device.
- The device must be connected to the system. this may be done wirelessly via Bluetooth ®, WiFi, or via the vehicle USB port. Refer to the device manufacturers information for the proper connection method.
- When the device is connected, the vehicle infotainment system is used to remotely access and control the application on the mobile device.
- The application must work correctly on the device to work with the vehicle infotainment system.
- The user may be required to log-in to the application on the mobile device before using the application from the vehicle controls.
- Using applications will use the device's data plan.
- The device must be unlocked, and any additional applications should be closed.

Refer to the owners manual and supplements for information on mobile devices, control, and operation.

Speech Recognition

The Speech Recognition feature is implemented only in a Mid/High System Radio- CSM module. There is no Speech Recognition in a Low System. Speech Recognition allows the user to command various features of the radio via voice commands. For addition information refer to the owners manual. For model year 2018 (and forward) Mid/High systems, part of the speech recognition functionality is controlled via off-board cloud connection. A speech icon in the radio allows user to see if an utterance has been received by the off-board cloud. Points-of-interest (POIs) data are also stored off-board. Any disruption in the connection to the cloud will cause a partial loss of functionality for these systems.

For model year 2018 (and forward) there will also be a new speech recognition feature called Barge-in. This allows the user to speak over the voice prompts generated by the system. This feature is turned off by default from the factory and must be enabled by the user.

Navigation System Components and Features (if equipped)

There navigation system uses the Google Maps app which is a subscription based service (depending on available options).

The navigation system provides the following:

- A global positioning system (GPS) signal, which provides the vehicle location information.
- Map data for navigation and map route guidance.
- Route guidance with verbal prompts to the operator.
- Traffic and weather information for display on the navigation system map (with active subscription, where available).

GPS signals are an output from the telematics communication interface control module on Ethernet. Other modules on Ethernet, such as the radio may use the GPS latitude, longitude and satellite time data broadcast by the telematics communication interface control module.

Route Guidance
The map will display the route to the selected destination. Voice prompts alert the operator of upcoming events (turns) and arrivals at the destination. The navigation system will automatically recalculate if the route is not followed. The remote radio receiver uses data received from the global positioning system (GPS) satellites, the vehicle speed signal, and serial data information to accurately display the current position of the vehicle.

Points of Interest
The map database provides point of interest information. Points of interests are locations that are frequently visited. Points of interest can be can be displayed on the map or set as a destination. The following are some of the available Points of interests:

- Gas Station
- Restaurant
- College
- Police Station

Locations Services

"Locations Services Off" also referred to as Location Masking, is a feature in select 2019 and beyond Infotainment 3 systems that allows customers to enable or disable location services in their vehicle. This allows customers to control what data is being sent from their vehicle, and has important implications for other connected services.

The default setting is "Locations Services On", however, customers can enable or disable Locations Masking in two ways:

1. Press and hold the white button next to the blue OnStar® button in the overhead console.
2. In the Setting menu, select System>Privacy>Location Services>ON or OFF.

- Look for the white LOCATIONS SERVICES icon in the status bar on the Home Screen, next to the clock and outside temperature in the lower right corner of the screen.
- When Locations Services are On, there will be no circle around the icon.
- When the Locations Services are Off, the icon will be circled in red.

Certain functions that require the vehicle's location may not operate properly when Location Services are Off, including:

- Connected Navigation services, if equipped and active, will not work (the system will operate as a non-connected Navigation system).
- Speech recognition may not offer full functionality.
- OnStar advisors will be unable to provide Turn-by-Turn Navigation services.
- Customers may receive error messages in their myChevrolet, myBuick, myGMC, or myCadillac mobile app when trying to use Vehicle Locate.
- Some features of Smart Driver may be inoperable or not work properly, including the score being replaced by dashes.

Note: Emergency services, such as Automatic Crash Notification and Stolen Vehicle Assistance, are NOT impacted by Location Masking.

Valet Mode (If equipped)

Valet Mode is a customer enabled feature of the infotainment system, found in the settings menu, if equipped. The customer creates and inputs a four digit code using the infotainment controls. Confirming the code and selecting LOCK will lock the infotainment system, steering wheel controls and other vehicle features, dependent on vehicle equipment. The vehicle will remain in valet mode until the same four digit code is re-entered.

In the event that the four digit code is forgotten, it can be reset with the scan tool under BCM.

Teen Driver

The teen driver feature puts the vehicle into a mode that can only be unlocked with a valid PIN. It allows various restrictive features for safer driving. Some of the features include Speed Limiter, Speed Warning, Register Key, Report Card, etc. For additional information refer to owners manual.

In the event that the four digit code is forgotten, it can be reset with the scan tool under BCM.

Theft Deterrent

The radio theft deterrent system is intended to disable or limit radio functionality if incorrect vehicle information is received by the radio. The radio disables functionality if the VIN information received by the radio does not match the VIN information that has been learned by the radio. The radio receives this information via serial data. A possible cause of incorrect VIN info could be the radio was originally installed in another vehicle.

The radio has the following theft operating modes as part of the theft deterrent system:

- Normal Mode: The radio has learned a correct VIN sequence and the VIN information received via serial data matches the learned VIN sequence. In this mode the radio has full functionality.
- No VIN Mode: The radio has not received or learned a correct VIN sequence. In this mode the radio has limited functionality.
- Theft Detected Mode: The radio has learned a correct VIN sequence and the VIN information received via serial data does NOT match the learned VIN sequence. In this mode the radio may be disabled or have limited functionality. The radio display will indicate that theft protection is active.

Audio Amplifier (If equipped)

Amplifier Interface

A fused battery voltage circuit provides the main amplifier power. The audio amplifier (when equipped) is a participant on the Ethernet bus. The audio amplifier receives audio signals and control information from the Radio. The Amplifier receives battery power and ground from the vehicle harness.

Amplifier Operation

The purpose of the amplifier is to increase the power of a voltage or current signal. The output signal of an amplifier may consist of the same frequencies as the input signal or it may consist of only a portion of the frequencies as in the case of a subwoofer or midrange speaker. The audio amplifier amplifies the signal and sends it to the appropriate speakers.

Each of the audio output channel circuits (+) and (−), at the audio amplifier have a DC bias voltage that is approximately one half of the battery voltage. When using a DMM, each of the audio output channel circuits will measure approximately 6.5V DC. The audio being played on the system is produced by a varying AC voltage that is centered around the DC bias voltage on the same circuit. The AC voltage is what causes the speaker cone to move and produce sound. Both the DC bias voltage and the AC voltage signals are needed for the audio system to properly produce sound.

The audio amplifier is also responsible for operation of active noise cancellation if equipped. Refer to Active

Noise Cancellation Description and Operation for more information.

Audio Exterior – Vehicle Exterior Sound (RPO NVS), The Vehicle Exterior Sound system is an audio system designed to produce sound on the exterior of the vehicle. The VES system includes two exterior speakers, one front and one rear and an A2B auxiliary amplifier. The VES system receives audio signals from the radio.

Infotainment Controls and Display

The infotainment display and controls are a separate component from the radio, combined into an assembly. The assembly contains the control knobs and buttons for all audio and HVAC functions and the information display. The assembly is supplied battery voltage and ground from the vehicle harness.

Control information, touch communications and dimming level for the display are communicated via a Low Speed serial data circuit or LVDS cable to the Radio.

The remote radio receiver sends the display digital video data for on-screen display through a dedicated video cable.

The information display provides a feedback on the touch screen and certain controls.

The controls communicate via a Low Speed serial data circuit or LVDS cable with the remote radio receiver. Messages communicated include the following:

- Wake-up/power state messages
- Diagnostic information
- Button presses/knob rotations
- Commands for the state of indicators
- Back-lighting dimming level

Steering Wheel Controls (If equipped)

Some audio functions are available using the steering wheel controls. The steering wheel controls duplicate the function of the primary controls available on the radio.

For additional information on steering wheel controls, refer to Steering Wheel Controls Description and Operation.

USB Port

The USB hub device interfaces directly with the remote radio receiver via a standard USB cable. A Mini type USB connector is used to connect the cable at the USB port and at the remote radio receiver and at the auxiliary input receptacle. Standard USB male to female connections are typically used for connecting USB cables together where an in-line connection is required. An in-line cable connection is typically found between the console and I/P harness.

USB Port
The USB port allows connectivity to the infotainment system from portable media players or a USB storage device (memory stick/ flash drive). When a device is connected to the USB port, the device can be controlled from the radio controls.

Not all portable media player devices or file types are compatible. Connection to USB HUB devices is not supported.

Refer to the owner's manual for information on USB devices, control, and operation.

OnStar® (If equipped)

When OnStar is activated, a serial data message is sent to the radio that activates default audio settings. The fade will be set to the front, bass and treble are set to the mid range, the outputs are set to mono, when the audio source is OnStar. OnStar takes priority over any other audio source.

For additional OnStar information, refer to OnStar Description and Operation.

Over The Air Programming

The Over The Air Programming feature was designed to reflash software remotely. Remote reflash is an in-vehicle feature that enables the installation of a software package to update the infotainment system without requiring service test equipment to be physically connected to the vehicle. Remote reflash will utilize a long range or short range connection from the host module to a remote IT system. There must be an active OnStar account to receive Over The Air programming or updates. To verify the status of the account perform a blue button press and verify the account is active and connects with data and location. Customers need to accept the OnStar terms and conditions, and must have an active OnStar account to receive any Over The Air programming or updates.

Note: A data plan is not required to receive Over The Air programming or updates. Also the programming or updates do not consume a customers available data.

Note: Fleet vehicles must be activated as a Fleet account (not a business account) and require a

separate Terms and Conditions agreement to be completed. Please see your fleet administrator for assistance with completing this agreement.

GAS (Google Assistant Services) if equipped

Some of the GAS features are:

- Maps – Benchmark maps, navigation, traffic and point of interest data and legal speed limit sign information.
- Assistant – Voice assistant cloud services with vehicle integration (e.g., radio, HVAC).
- Play Store – Access to favorite media streaming apps plus first party GM apps.
- Keyguard – similar to a code to unlock your cell phone. When this feature is enabled a customer created lock (pattern, PIN or password) will need to be entered to unlock the radio at every ignition cycle. When the radio is locked SPS diagnostics will be unavailable. To utilize SPS diagnostics when the radio is locked enter the “Guest Mode” feature.

A connectivity package needs to be purchased to have the full experience. Refer to the Owner Manual for further information on Google Automotive Services.

Compass Data

With the Base Radio the Telematics Control module provides compass and GPS position information on the Info-CAN bus when it is present.

In a Mid / High Radio System configuration without a Telematics Control Module and equipped with GPS, the radio shall provide the GPS and heading information on Info-CAN as shown below.

An external Remote Compass Module (RCM) is required to transmit the heading and position information on Info-CAN if either:

- The Base Radio is present in a system configuration with no Telematics control module.
- The radio variant without GPS is present in a system configuration with no Telematics control module.

Media Disc Player (if equipped)

The Remote Media Player feature sends information through a USB connection to the Rear Seat Infotainment and outputs digital audio/video to vehicle displays and to the Radio over the Ethernet bus. The Rear Seat Infotainment system also has a USB hub with an auxiliary port for digital media file access.

The media disc player receives battery power and ground from the vehicle harness.

Digital Rearview Camera (if equipped)

The digital rearview camera is a direct input to the radio via coaxial cable. Camera and image activation are driven by reverse gear signal from the reverse lamp input. This function is used for reverse guidance. For radio systems that manage the camera signal, the system does not have video bypass module, as this functionality is managed onboard the radio.

Immersive Audio – Dolby Atmos (if equipped)

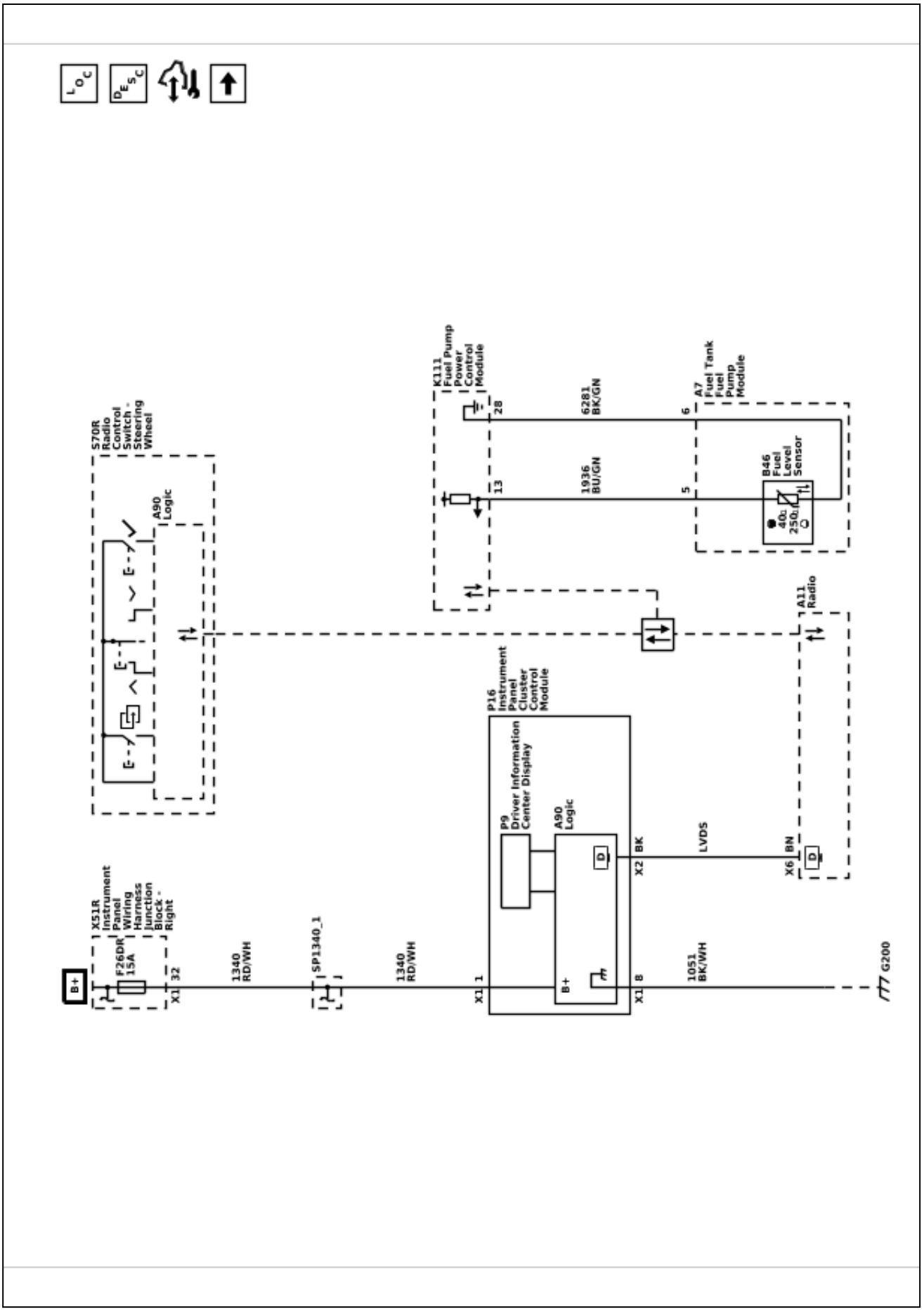
Dolby Atmos is an immersive audio technology that delivers a three-dimensional sounds experience. It makes sound seem to come from all directions, including behind, above and beside. The 7.1.4 system utilizes 7 surround channels, 1 subwoofer, and 4 height channels.

For Dolby Atmos to operate the vehicle may need an OTA update. If an update is available download and install the update first. To confirm Dolby Atmos is installed in the vehicle go to Audio Settings and select Sound. Confirm the Immersive Audio option is present. Verify the vehicle has an active OnStar service plan and a Dolby Atmos compatible streaming service such as TIDAL or Amazon Music Unlimited. The compatible streaming service must be downloaded from the vehicles Google Play Store and not through a cell phone via Bluetooth. In the streaming app look for files with Dolby Atmos labels or badges or search for Dolby Atmos files.

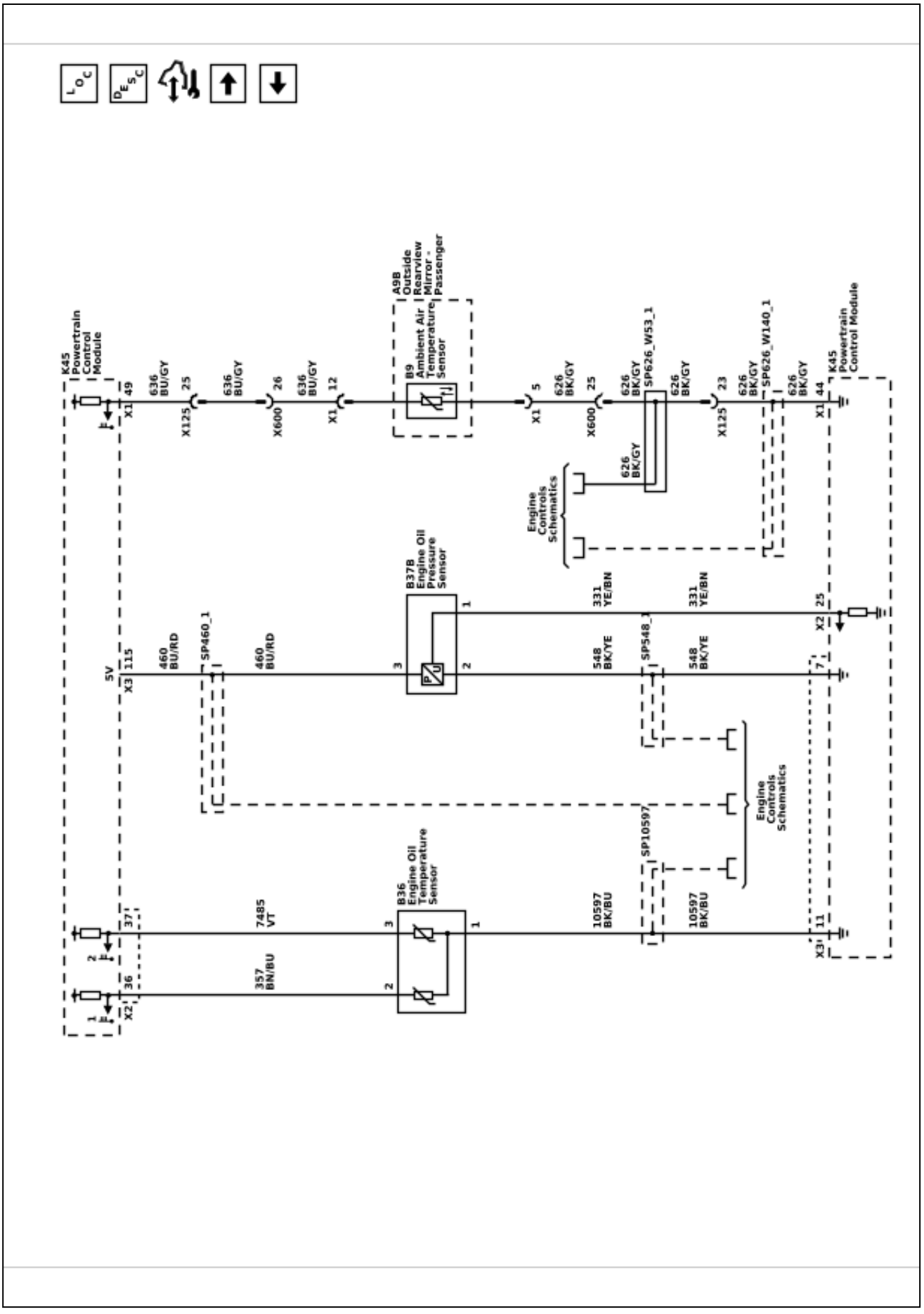
Displays and Gauges

Schematic and Routing Diagrams

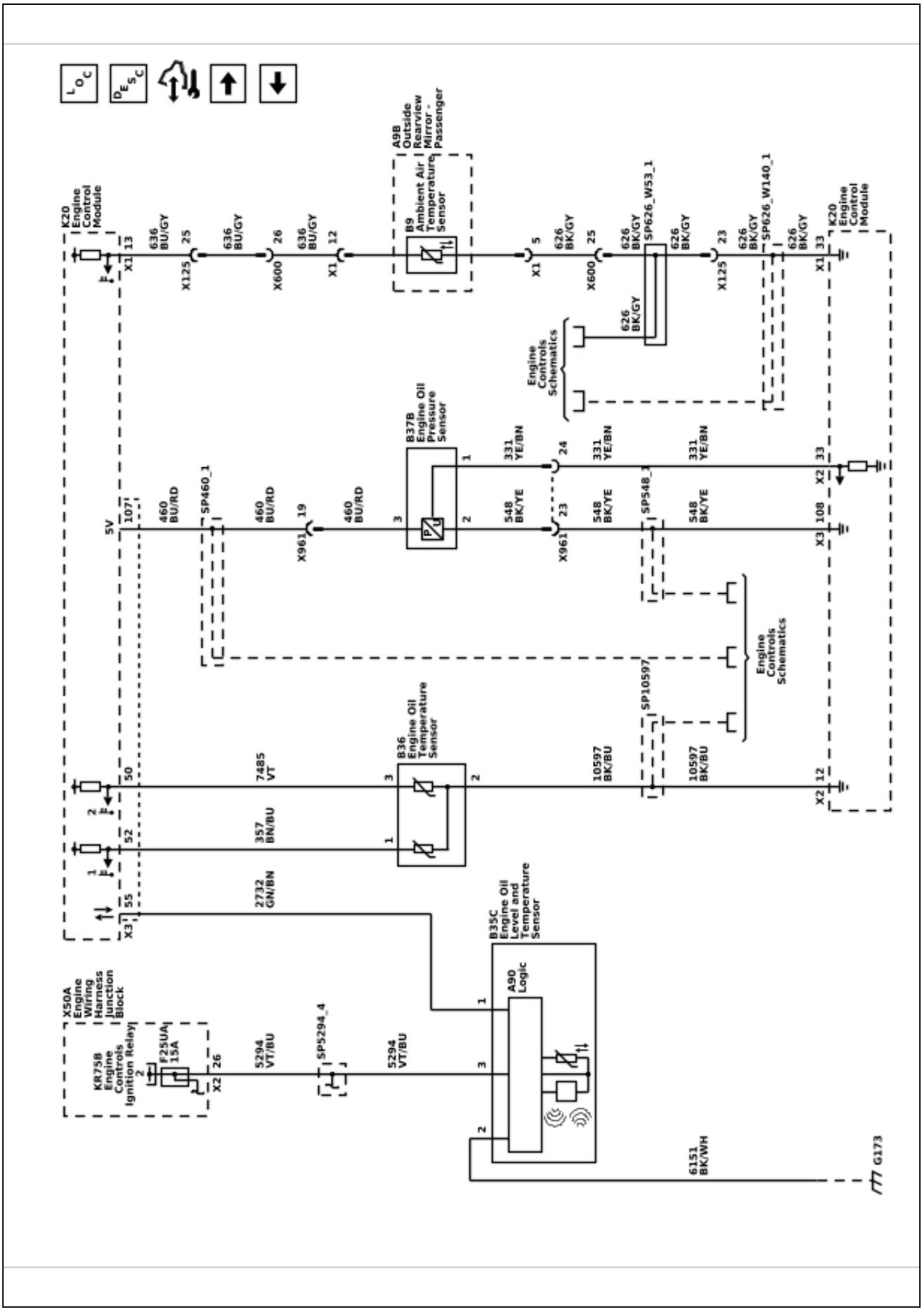
Instrument Cluster Schematics (Instrument Cluster and Fuel Level)



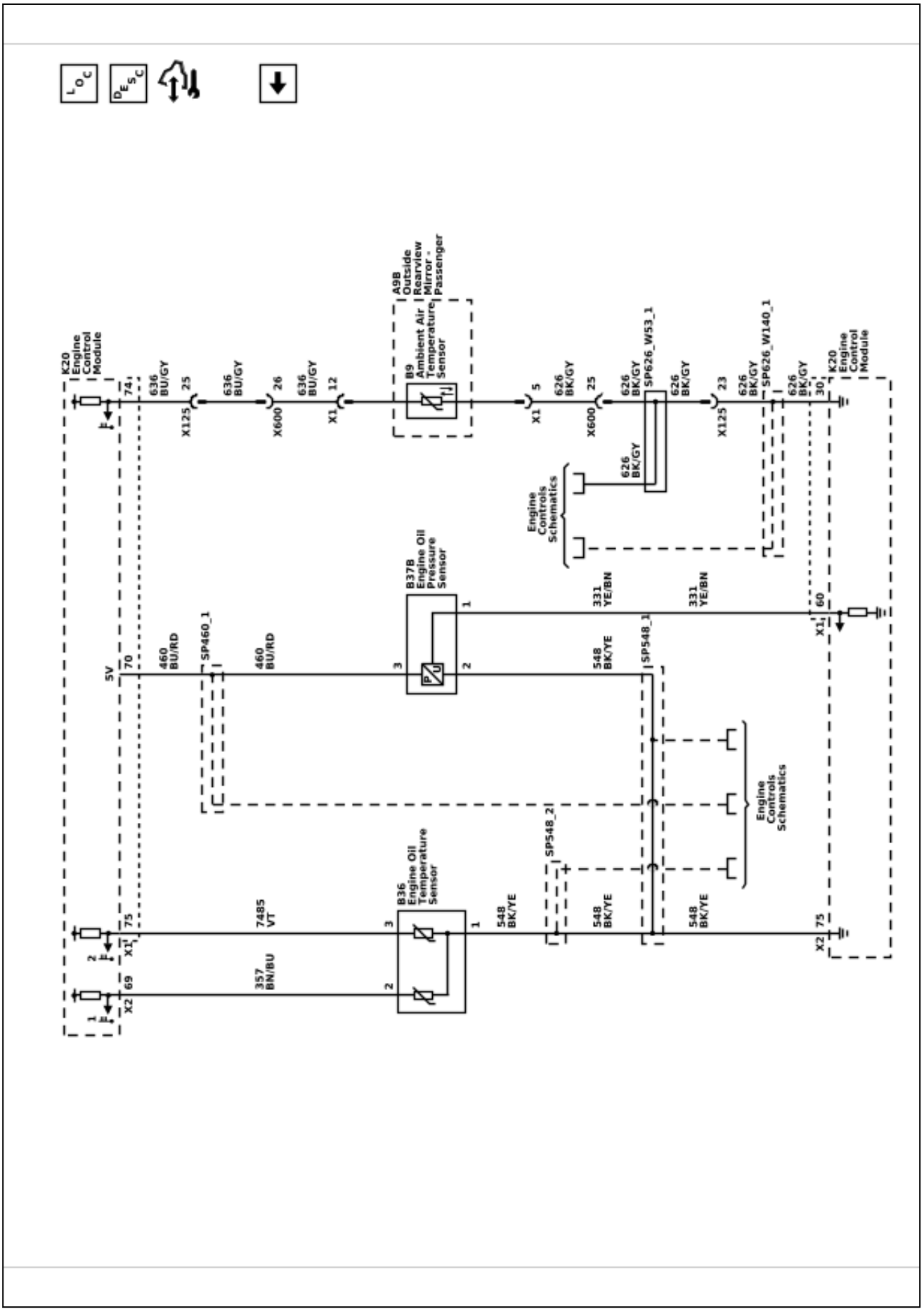
Instrument Cluster Schematics (Gauge/Indicator Inputs (L4B))



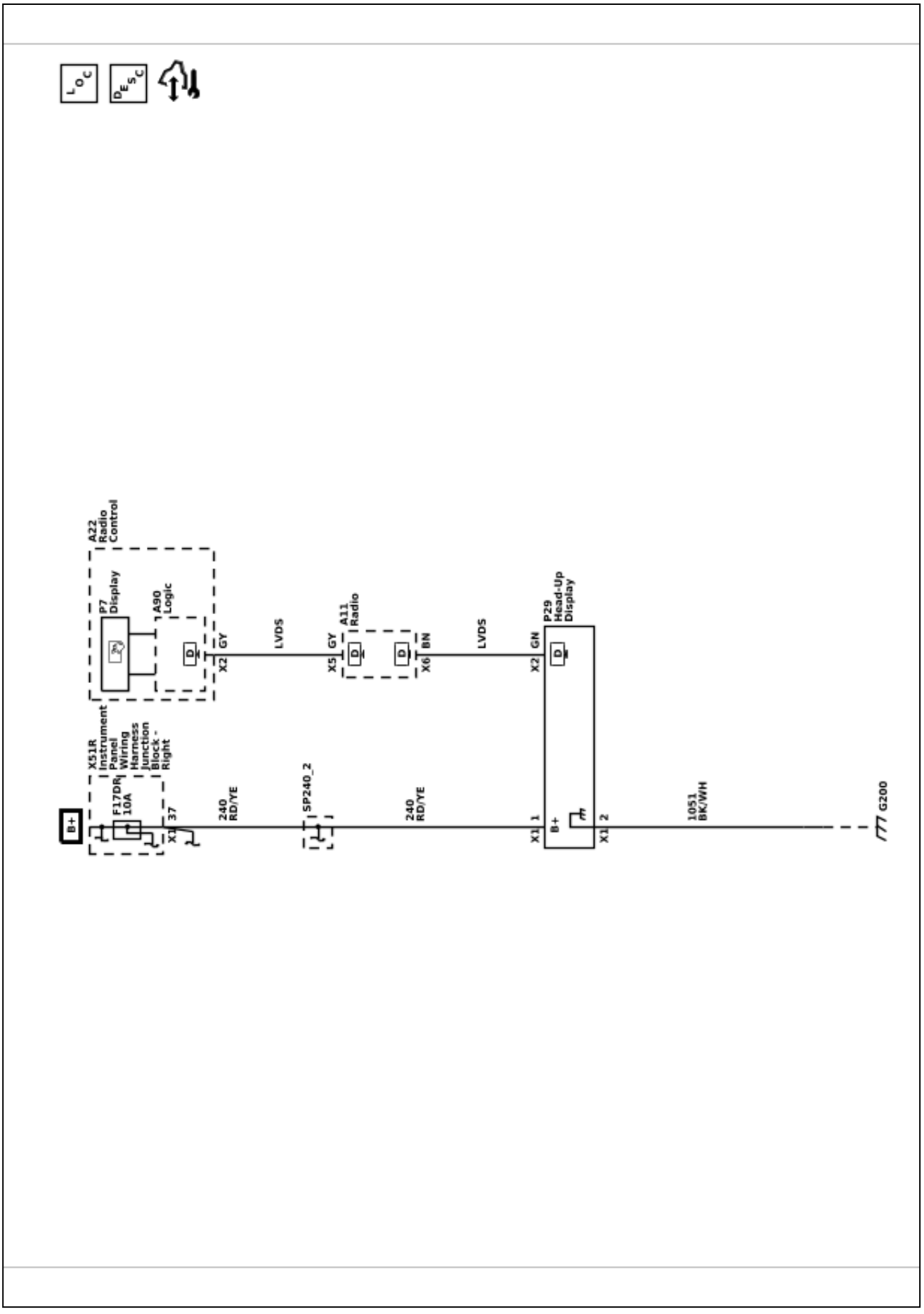
Instrument Cluster Schematics (Gauge/Indicator Inputs (L76 / L78))



Instrument Cluster Schematics (Gauge/Indicator Inputs (LZ0))

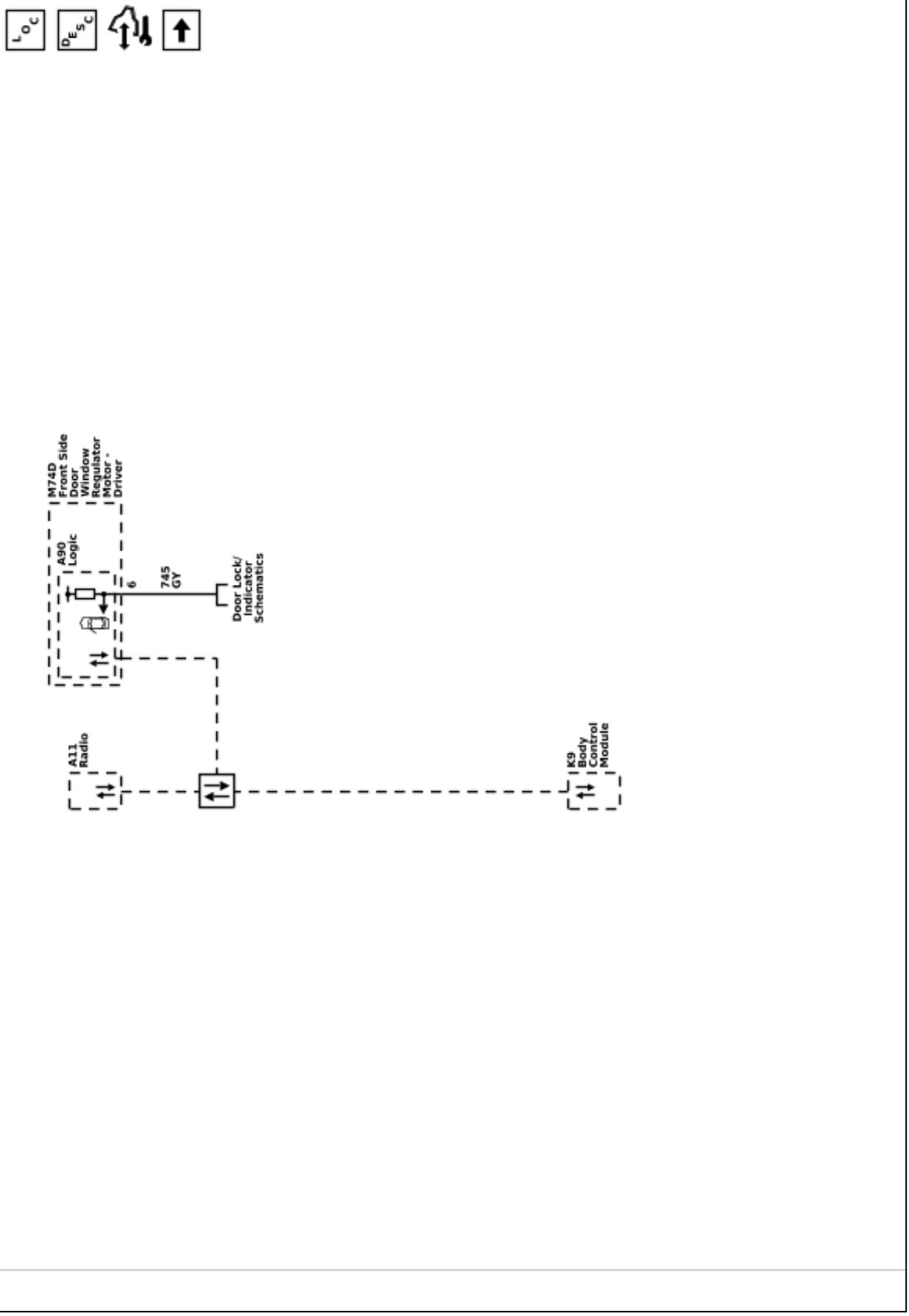


Head-Up Display Schematics (Head-Up Display)

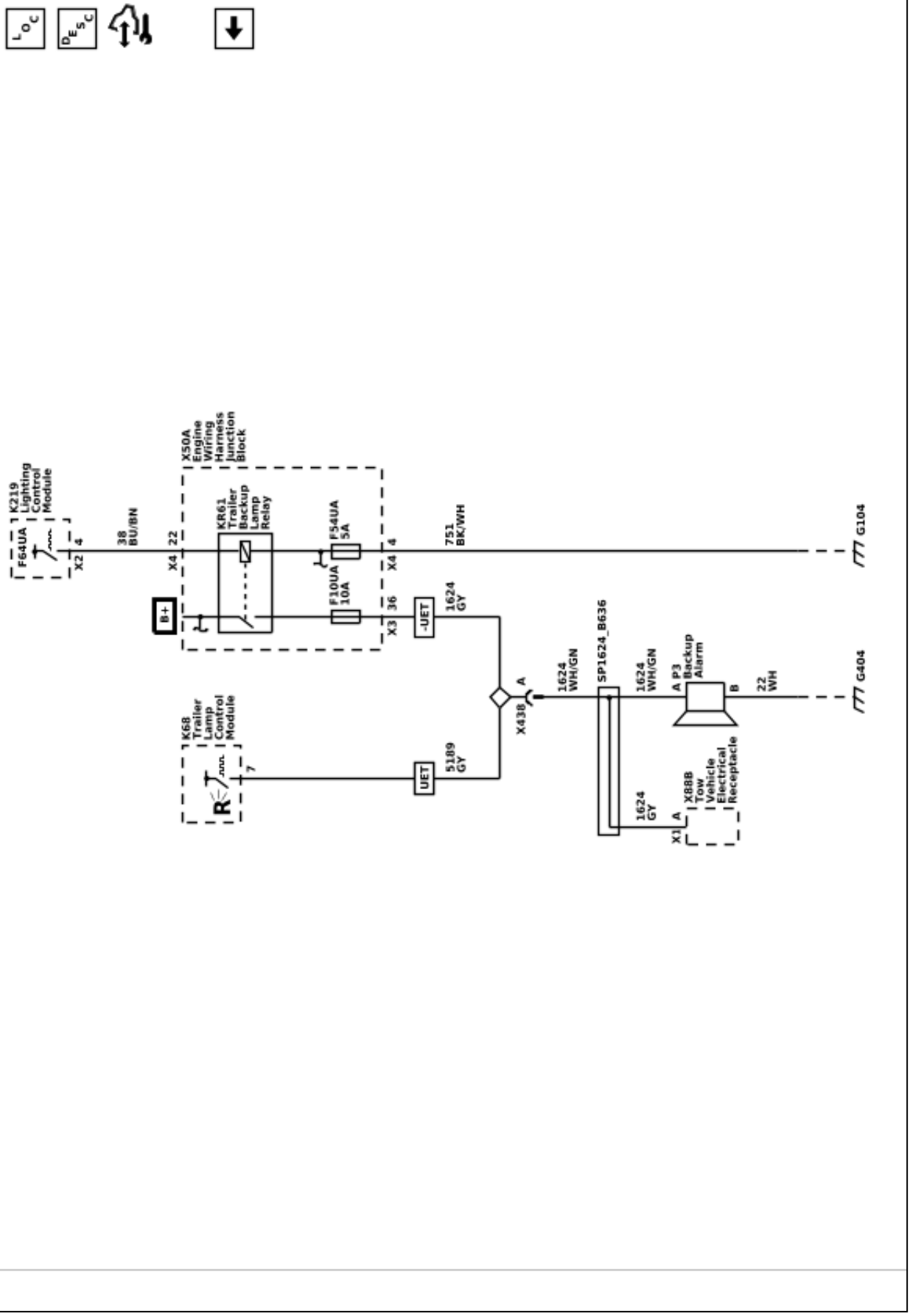


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Audible Warnings Schematics (Audible Warnings)



Audible Warnings Schematics (Backup Alarm (8S3))



Description and Operation

Audible Warnings Description and Operation

The audible warnings alert the driver of a system concern or a critical vehicle condition. The radio generates the audible warnings through the speakers. The radio receives audible warning requests via the serial data circuit. If the radio receives multiple audible warning requests, the warning with the highest priority sounds first. On vehicles without a radio, a chime module generates the audible warnings and receives audible warning requests via the serial data circuit. Either the radio or the chime module is the chime producer. The following lists the audible warning sounds:

1. Single pulse gong
2. Multiple pulse gong
3. Single pulse beep
4. Multiple pulse beep
5. Click
6. Clack

Auto Stop Mode

The chime producer activates when the vehicle comes to a stop and the driver or passenger door is opened as requested by the body control module.

Fasten Safety Belt Warning

The chime producer activates the fasten safety belt audible warning as requested by the body control module (BCM). The BCM sends a serial data message to the chime producer indicating the chime as a multiple gong. The fasten safety belt warning sounds and the fasten safety belt indicator illuminates when the following occurs:

- The ignition switch transitions to ON.
- The inflatable restraint sensing and diagnostic module (SDM) detects that the drivers seat belt is not buckled and the signal is low. The SDM sends a serial data message to the BCM indicating the seat belt status. The instrument cluster receives a serial data message from the BCM indicating the driver seat belt status.

If the seat belt is buckled when the ignition is turned ON, the chime does not sound. If the seat belt is buckled while the chime is sounding, the chime stops. If the seat belt is unbuckled after the initial transition to ON, the chime does not sound.

Lights On Warning

The chime producer activates the lights on warning as requested by the BCM. The BCM sends a serial data message to the chime producer indicating the chime as a multiple gong. The lights on warning sounds when the following occurs:

- The ignition is OFF.
- The BCM determines that the driver door is open and the signal circuit is low.
- The BCM determines that the headlamp switch is in the park or head position.

Brake Warning

The chime producer activates the brake audible warning as requested by multiple control modules. The BCM, electronic brake control module or the parking brake control module sends a serial data message to the chime producer indicating the chime as a multiple gong. The brake warning sounds and the BRAKE indicator illuminates when the following occurs:

- The ignition is ON.
- The vehicle speed is greater than 8 km/h (4.9 mph). The instrument cluster receives a serial data message from the Battery Energy Control Module indicating the vehicle speed.
- The BCM determines that the parking brake is engaged and the signal circuit is low.
- The brake fluid is low.

Door Ajar Warning

The chime producer activates the door ajar audible warning as requested by the BCM. The BCM sends a serial data message to the chime producer indicating the chime frequency of a medium rate and continuous duration. The door ajar warning sounds and the appropriate door ajar indicator illuminates in the driver information center when the following occurs:

- The BCM determines that a door (driver door, passenger door, left rear door, right rear door) is open and the signal circuit is low. The instrument cluster also receives a serial data message from the BCM indicating the door ajar status.
- The vehicle is not in PARK. The BCM receives a serial data message indicating the gear position.

Object Detection

The chime producer activates the object detection audible warning as requested by the object alarm module. When an object is within the measuring range of the sensor, the ultrasonic pulse is reflected and is received by the sending or a neighboring sensor. The sensor converts this signal into a voltage signal and sends this signal to the object alarm module. The object alarm module evaluates the received sensor signals. As soon as an object is within the measuring range, the object alarm module sends a message via CAN-Bus to the chime producer in order to give out the acoustic distance signal. The measuring range is between 30–120 cm (11.81–47.24 in). From a distance of 120 cm (47.24 in), the acoustic signal is active. The frequency of the beep sound increases with decreasing distance. From a distance less than 30 cm (11.81 in), the sound becomes continuous.

Additional Warnings

The following warnings have an associated instrument cluster indicator or driver information center message:

- Turn Signal Indicators – The chime producer activates the audible warning as requested by the BCM. The chime produces two different chimes, one when the turn signal turns off and another when the turn signal turns on.
- Vehicle Overspeed Message – The chime producer activates the audible warning as requested by the BCM. The BCM sends a serial data message to the chime producer.
- Fuel Level Low Message – The chime producer activates the audible warning as requested by the BCM. The BCM sends a serial data message to the chime producer.
- Oil Pressure Indicator – The chime producer activates the audible warning as requested by the BCM. The BCM sends a serial data message to the chime producer.
- Park Assist Fault Clean Rear Bumper Message – The chime producer activates the audible warning as requested by the BCM. The BCM sends a serial data message to the chime producer.
- Tire Pressure Low Indicator – The chime producer activates the audible warning as requested by the BCM. The BCM sends a serial data message to the chime producer.

Refer to *Indicator/Warning Message Description and Operation 5-47*.

Head-Up Display Description and Operation

The head-up display projects an image on the windshield that is viewed from the driver seat. Information that is relevant to what the drive is currently doing is displayed, as well as any safety-critical information as it is happening.

The components of the head-up display are:

- P29 Head-Up Display
- P16 Instrument Panel Cluster Control Module
- A22 Radio Control
- A11 Radio

Head-Up Display

The P29 Head-Up Display is a slave device to the A11 Radio. The P29 Head-Up Display is powered through battery voltage and ground. It communicates directly with P29 Head-Up Display via another LVDS cable. In some configurations the P16 Instrument Panel Cluster Control Module acts as a pass-through to relay information from the A11 Radio to the P29 Head-Up Display.

The head-up display projects a full color image onto the windshield and is only viewable from the driver seat. The image location and brightness is adjustable using the infotainment screen.

Head-Up Display Operation

The HUD information can be displayed in various languages. The speedometer reading and other numerical values can be displayed in either English or metric units.

The language selection and the units of measurement are changed through the infotainment screen.

Depending on how the vehicle is equipped, the HUD may display some of the following vehicle information, messages, or alerts:

- Speed
- Incoming Phone Call
- Navigation
- Drivers Assistance Indicators
- Vehicle Messages

Some vehicle messages or alerts displayed in the HUD may be cleared by using the steering wheel controls. Critical alerts may display in the HUD even when it is turned off.

Speed/Speed Limit Sign

The head-up display projects the vehicle speed. Additionally, traffic sign recognition information (speed limit) may also be displayed. This can be enabled

through the Driver Display setting on the radio control display

Navigation
Displays the speed sign, if enabled, speedometer, select indicators, and Turn-by-Turn Navigation information during an active route.

Turn-by-Turn Navigation alerts shown in the instrument cluster may also display in the HUD.

Head Up Display Controls
The HUD Controls are located under the HUD Settings on the infotainment screen. You can adjust brightness, height, and rotation, or turn the HUD on or off. This feature may only be available in P (Park).

Adaptive Cruise Control Configuration (if equipped)
The head-up display will project the selected following distance when adaptive cruise control is active.

Indicator/Warning Message Description and Operation

Indicator LIGHT ON

Refer to the owner's manual for the descriptions and explanations of all indicator lights.

For diagnosis and repair information related to an indicator light, refer to the System Diagnosis and the Description of Operation that the message relates to.

Message Displayed

Refer to the owner's manual for descriptions and explanations of all messages displayed.

For diagnosis and repair information related to a displayed message, refer to the System Diagnosis and the Description of Operation that the message relates to.

Transmission Shift Lever Position Indicator

The transmission shift lever position indicator (if equipped) is located on the center console and indicates the current transmission shift lever position. The transmission shift lever position indicator receives power and ground and is controlled by the Body Control Module (BCM) via serial data. The Transmission Control Module/Powertrain Control Module determines transmission shift lever position based on signals from the transmission internal mode switch and sends the shift lever position information to the BCM via serial data.

Instrument Cluster Description and Operation

This vehicle does not contain a traditional instrument cluster to display vehicle information to the driver. Instead, it displays vehicle information on the P53 Driver Information Display. This P53 Driver Information Display is merely a display that is controlled by the A11 Radio. For more information, refer to [Link target (target-id 50968-) not found]

Image Display Cameras

Schematic and Routing Diagrams

Image Display Camera Schematics (360 Degree Vision Cameras (UV2 and (UK0 / UKL)))

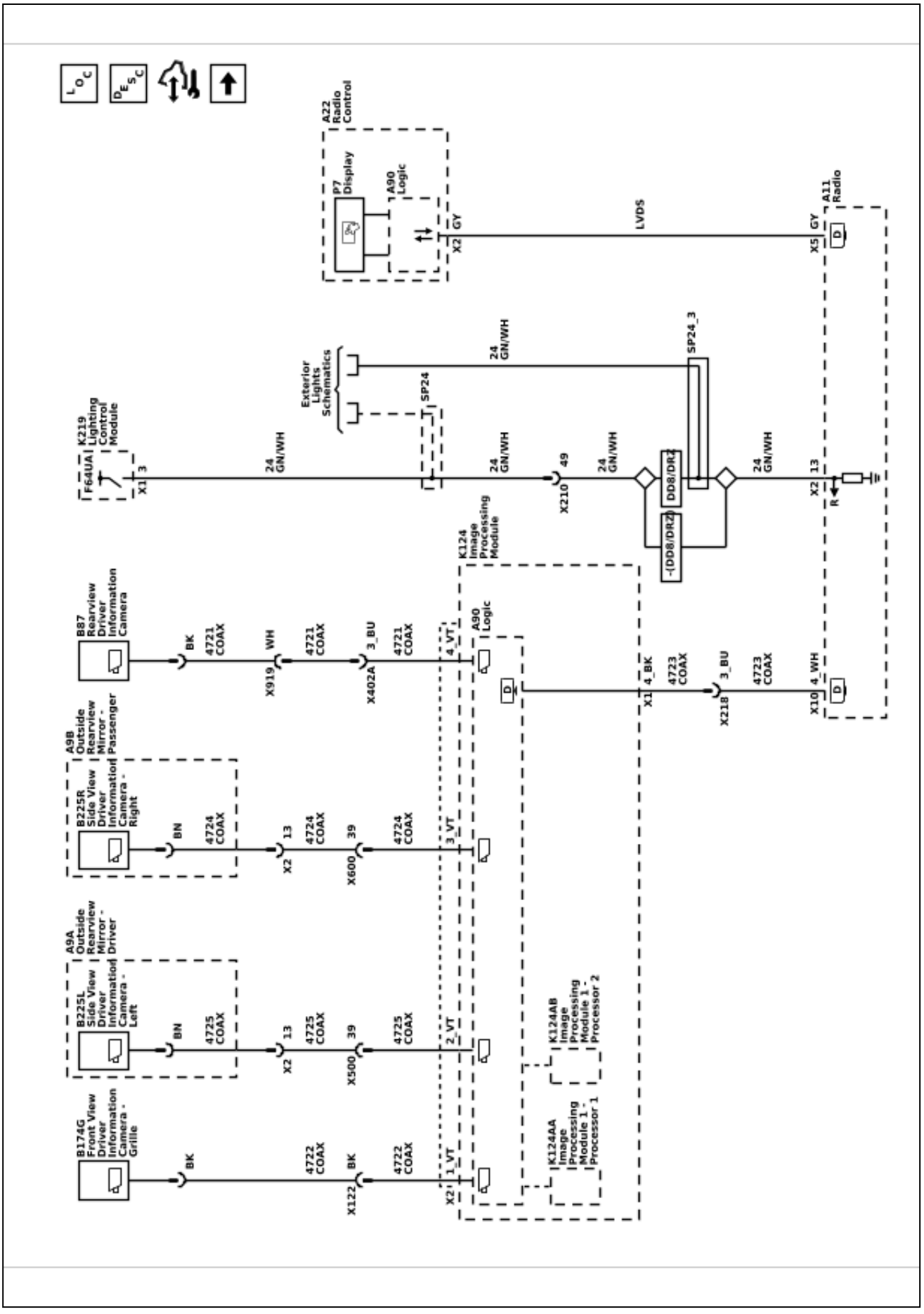


Image Display Camera Schematics (360 Degree Vision Cameras (UV2 and (UJE / UKM)))

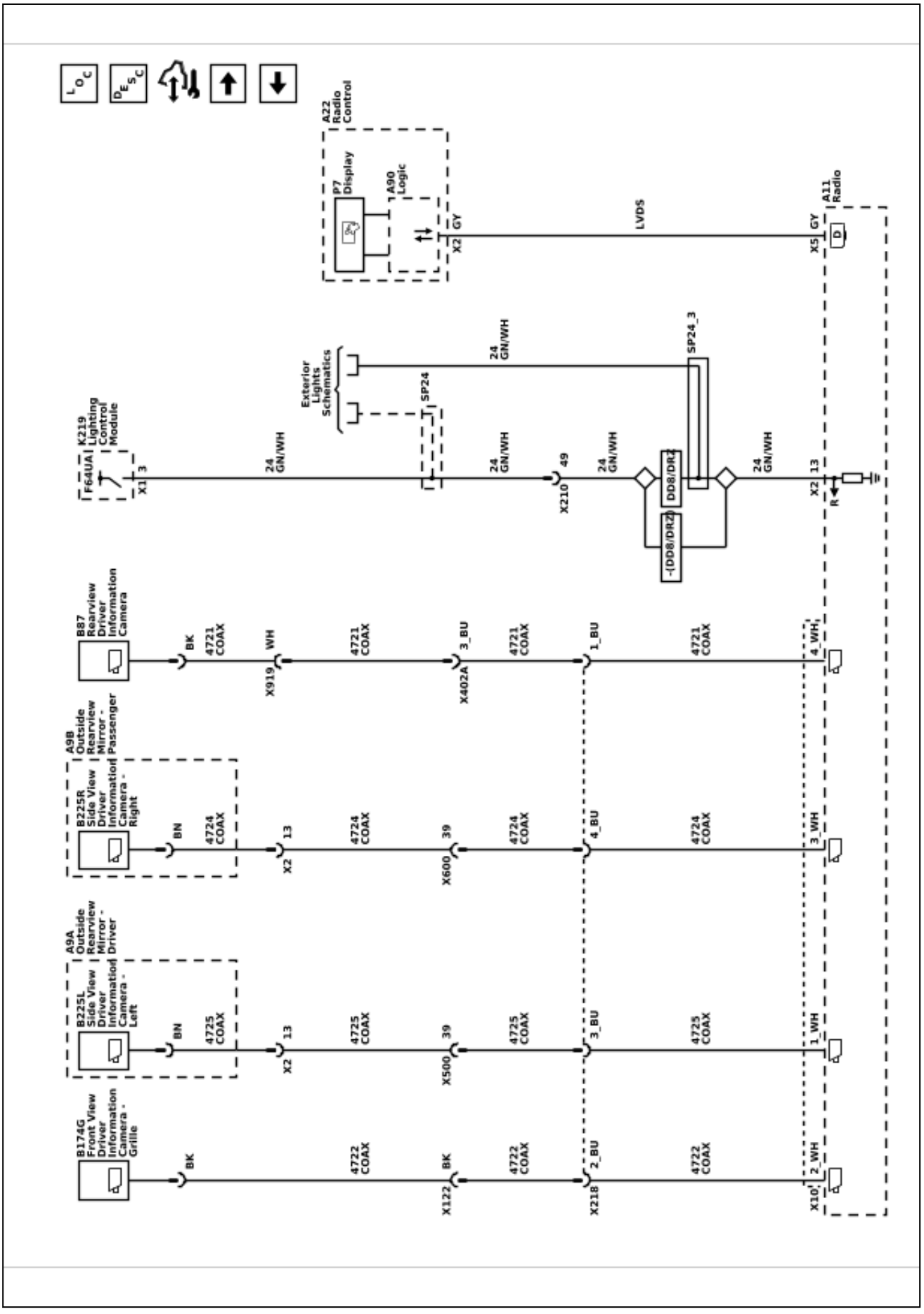


Image Display Camera Schematics (Rearview Camera (UVB))

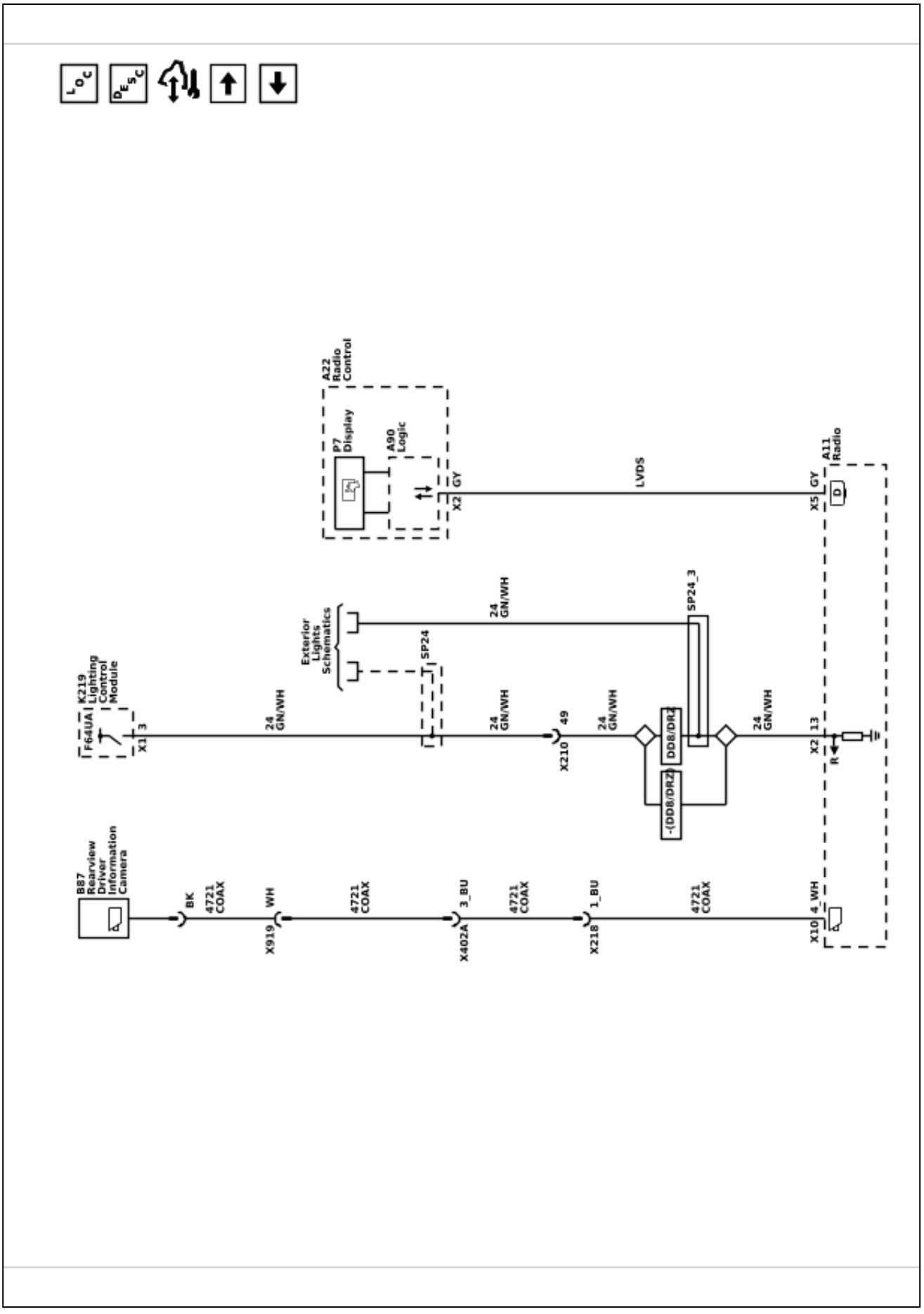


Image Display Camera Schematics (Cargo, Underbody and Trailer Cameras (TRG / UVN / UXA))

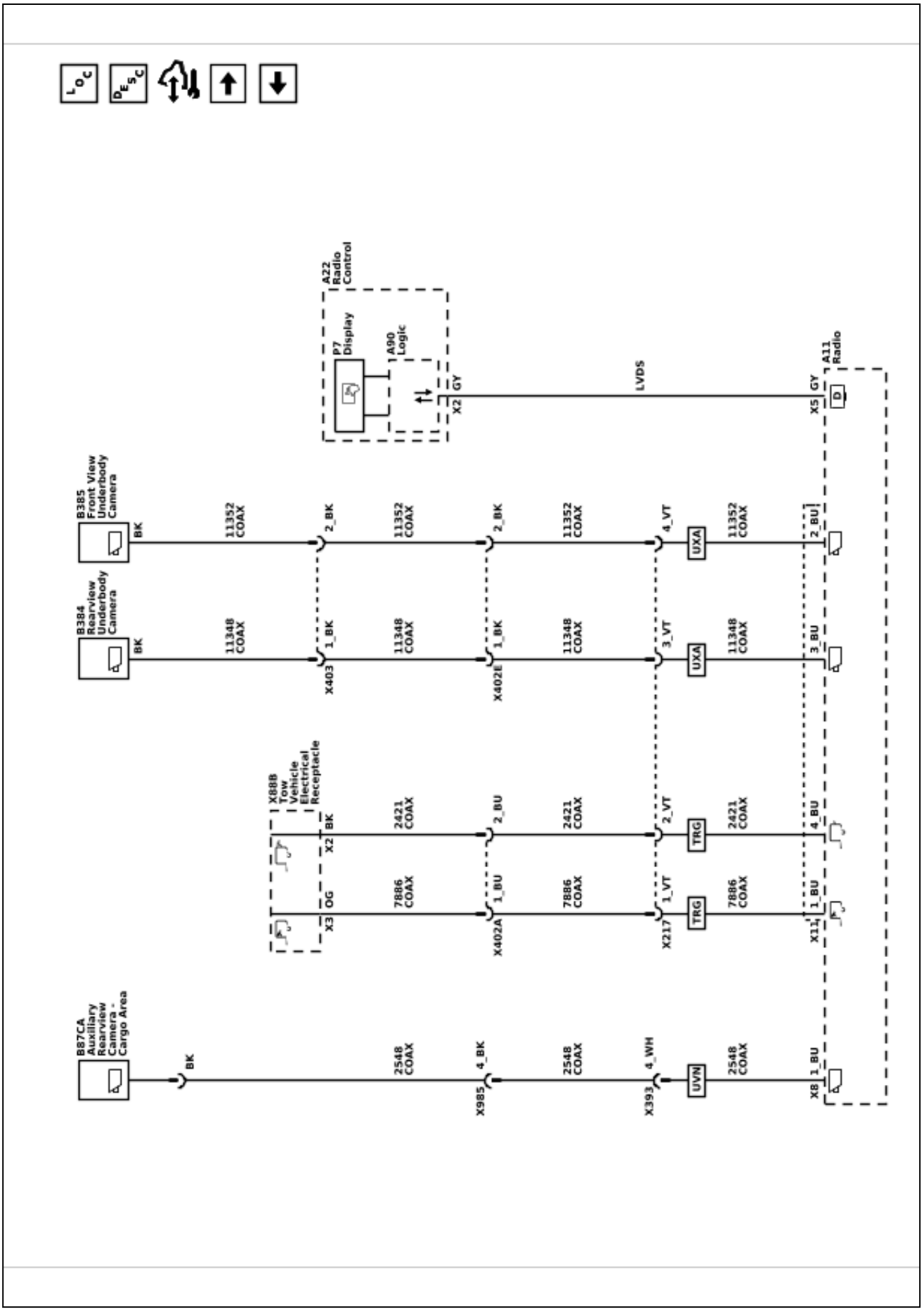


Image Display Camera Schematics (Interior View Camera (UCV))

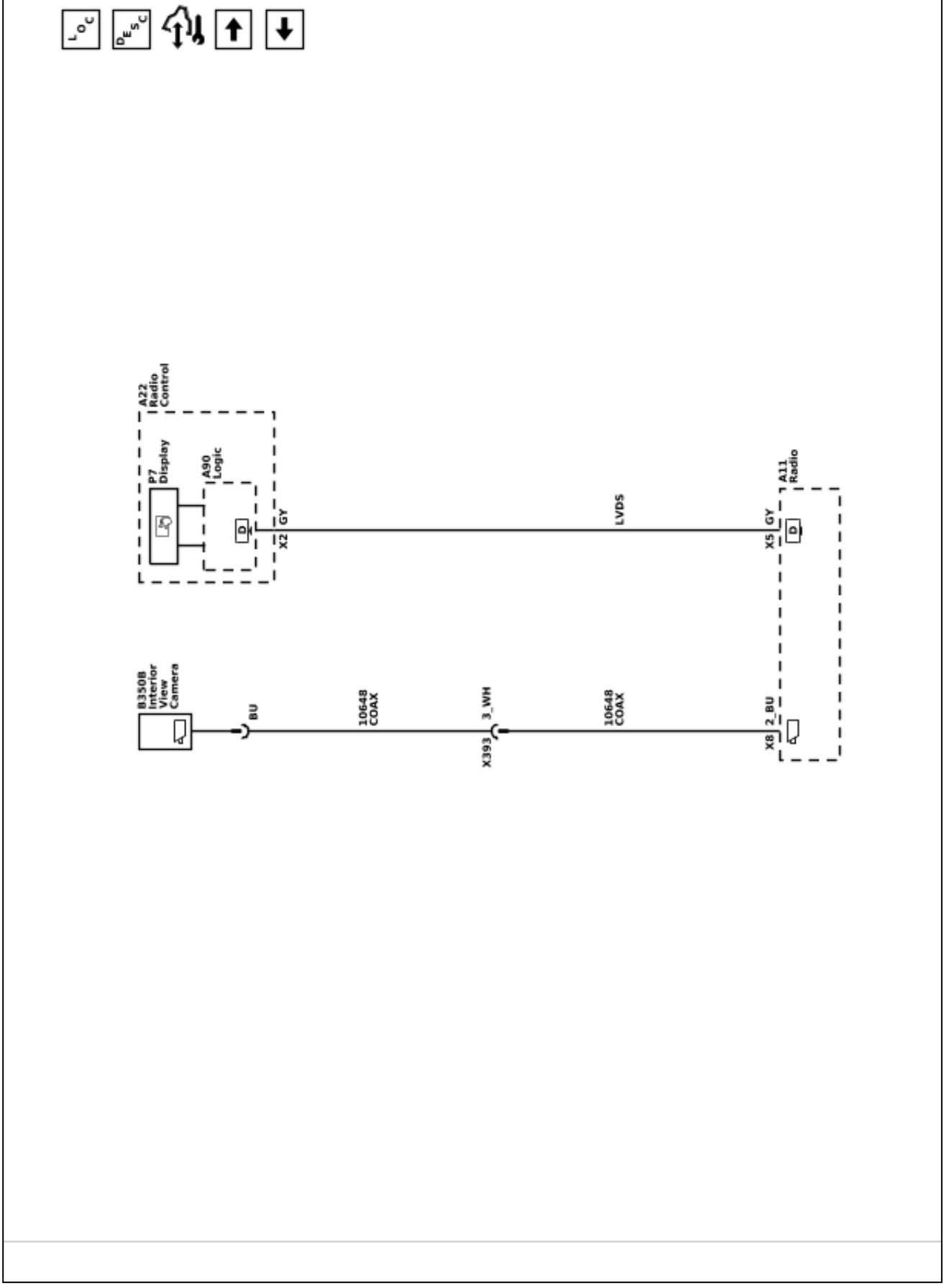
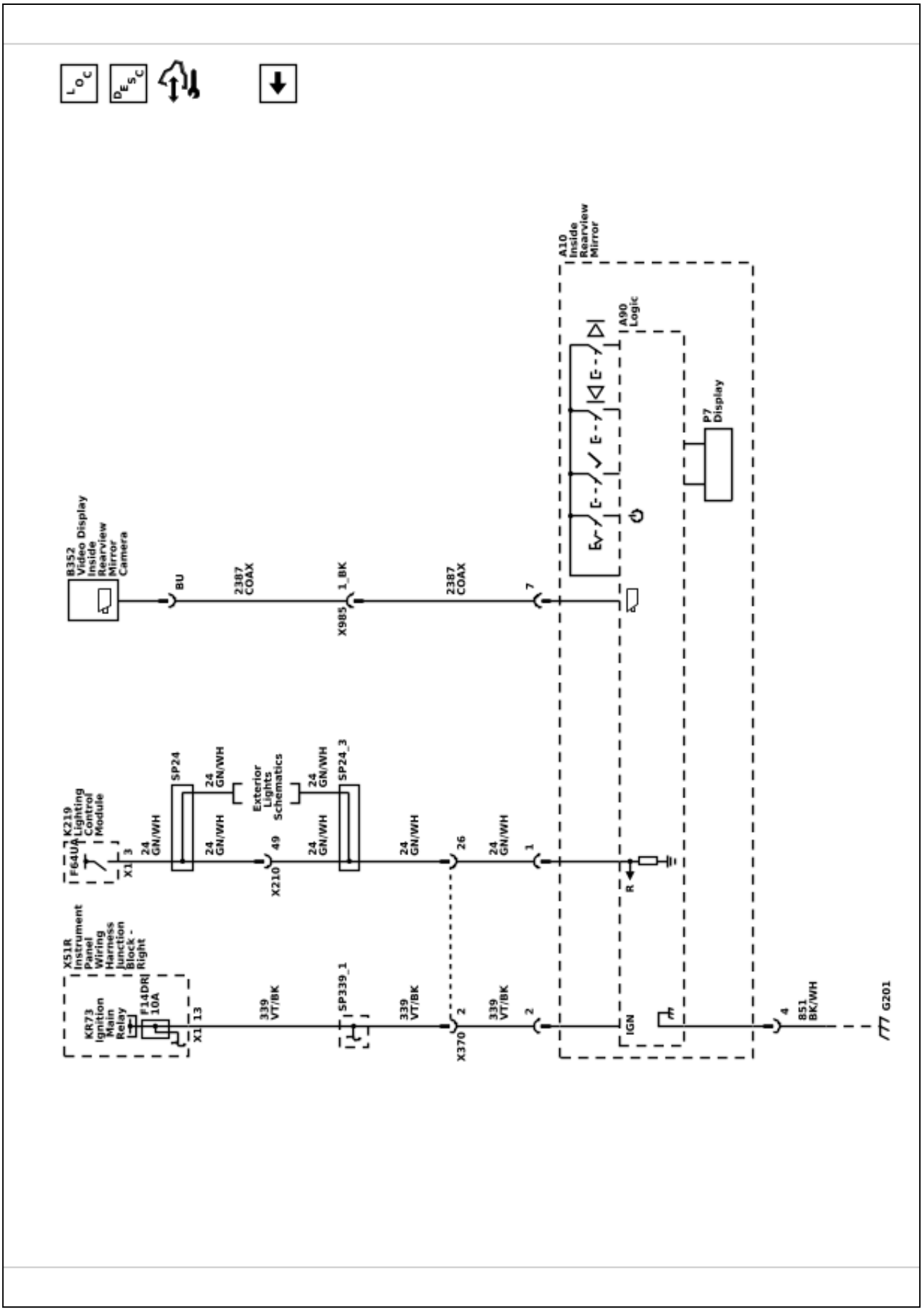


Image Display Camera Schematics (Inside Rearview Mirror Camera (DRZ))



Description and Operation

Interior View Camera Description and Operation

The Interior View Camera system consists of the following components:

- A11 Radio
- Infotainment Display
- B350B Interior View Camera

The following conditions may cause a degraded interior view camera image:

- Dark conditions
- Extreme light conditions, such as glare from the sun or the headlights of another vehicle
- Damage to the roof console
- Extreme high temperatures or extreme temperature changes

System Operation

The B350B Interior View Camera is connected to the A11 Radio by a shielded coaxial cable. The coaxial cable provides power for the camera and also carries the video image from the camera to the A11 Radio for processing. The A11 Radio will then send the processed image output to the infotainment system via another coaxial cable.

The interior view camera displays a rearward view of the vehicle cabin from the roof console that is viewable on the infotainment display. When the interior view camera is activated in a low light or dark cabin environment the vehicles interior lighting may switch on.

Rearview Camera Full Display Mirror Description and Operation

If equipped, full display mirror provides a wider field of view than normally seen from the inside rearview mirror to assist when driving and changing lanes. When the tab under the inside rearview mirror is pulled rearward, a view of the area behind the vehicle displays on the mirror. The inside rearview camera full display mirror is connected to the outside rearview camera via a shielded coaxial cable.

When the tab under the inside rearview mirror is pulled rearward, a view of the area behind the vehicle displays on the mirror.

Adjust the rearview mirror for a clear view of the area behind the vehicle before turning on full display mirror. Use the three buttons on the bottom of the mirror to adjust the brightness, zoom, and tilt of the display. Make sure the light sensor is not covered when adjusting the brightness.

The inside rearview camera full display mirror may not work properly or display a clear image if:

- It is dark.
- The sun or the beam of headlamps are shining directly into the camera lens.
- Ice, snow, mud, or anything else builds up on the camera lens. Clean the lens, rinse it with water, and wipe it with a soft cloth.

When the mirror detects that the camera is not sending a valid video signal, it “blue screens” with a “no video” decal for 3 seconds, then reverts back to the mirror.

Rear Vision Camera Description and Operation

Rear Vision Camera System Operation

The rear vision camera system consists of a video camera located at the rear of the vehicle and the A11 Radio.

When the transmission is placed into REVERSE, a signal is sent to the A11 Radio indicating that camera operation is requested. The rearview camera sends video information to the A11 Radio through a coax cable. The coax cable also provides power from the A11 Radio to the rearview camera. The Radio then sends the video information to the infotainment display through an LVDS cable.

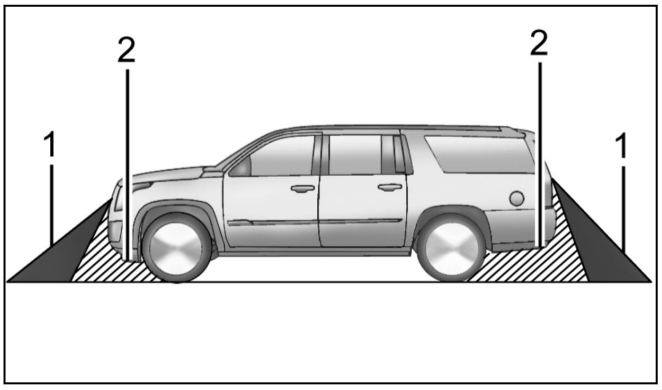
The following conditions may cause a degraded rear vision camera image:

- Ice, snow, or mud has built up on the rear vision camera
- Dark conditions
- Extreme light conditions, such as glare from the sun or the headlights of another vehicle
- Damage to the rear of the vehicle
- Extreme high temperatures or extreme temperature changes

If a malfunction is detected in the system, SERVICE REAR VISION CAMERA may be displayed on the infotainment display as an indicator to the customer that a problem exists that requires service.

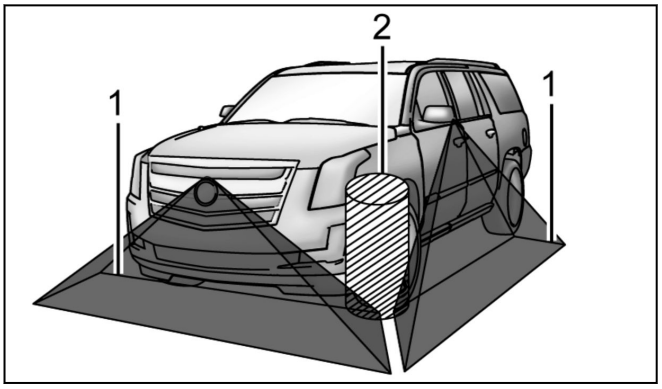
Surround Vision Camera Description and Operation

Warning: The Surround Vision cameras have blind spots and will not display all objects near the corners of the vehicle. Folding outside mirrors that are out of position may not display surround view correctly. Always check around the vehicle when parking or backing.



4291164

1. View displayed by the surround vision camera
2. Area not shown



4291749

1. View displayed by the surround vision camera
2. Area not shown

The surround vision camera system consists of the following components:

- K124 Image Processing Module
- A11 Radio
- Infotainment Display
- B87 Rearview Camera
- B174G Frontview Camera – Grille
- B225L Sideview Camera – Left
- B225R Sideview Camera – Right
- X92CF USB 2 Port Receptacle – Floor Console Front
- Front View Underbody Camera (UXA)
- Rearview Underbody Camera (UXA)
- B87CA Auxiliary Rearview Camera - Cargo Area (UVN)

The following conditions may cause a degraded surround vision camera image:

- Ice, snow, or mud has built up on the rear vision camera
- Dark conditions
- Extreme light conditions, such as glare from the sun or the headlights of another vehicle
- Damage to the vehicle near camera locations
- Extreme high temperatures or extreme temperature changes

Surround Vision displays an overhead view of the area surrounding the vehicle, along with the front or rear camera views in the center stack. The front camera is in the grille or near the front emblem, the side cameras are on the bottom of the outside rearview mirrors, and the rear vision camera is above the license plate.

Note: Images from the Sideview Cameras are only displayed when both front doors are properly closed.

Features of the Surround Vision System

- Rear camera (B87 Rearview Camera) view alongside overhead view is displayed in reverse
- Front camera (B174G Frontview Camera – Grille) view alongside overhead view is displayed after shifting out of reverse to Neutral or Drive
- Front View Underbody Camera image and Rearview Underbody Camera image are displayed when selected via the application on the Infotainment screen.
- Will display front view when front park assist object is within trigger range calibration value (30 cm (12 in) in a forward gear
- Image is removed from display when vehicle speed exceeds speed calibration (10kph/6 mph) or button press / screen touch
- If equipped, Surround Vision Camera video recording capability to USB Flash Drive

System Operation

The K124 Image Processing Module is connected to each camera via a shielded coaxial cable. The coaxial cable provides power for the camera and also carries the video image from the cameras to the K124 Image Processing Module for processing. The K124 Image Processing Module will then send the processed image output to infotainment system via another coaxial cable.

The K124 Image Processing Module receives various vehicle information (such as steering wheel angle, object detection, etc) from other sources such as parking assist modules and the Body Control Module via serial data. This information is used to produce the enhanced surround vision system images that include a warning triangle that may display if an object is detected nearby. This triangle changes from amber to red and increases in size as the object gets closer to the vehicle. Also, dynamic guidelines are displayed in Reverse to show the projected path of the vehicle based on steering wheel angle. Due to this use of

vehicle information, any faults or DTCs in these related systems can prohibit proper surround vision operation.

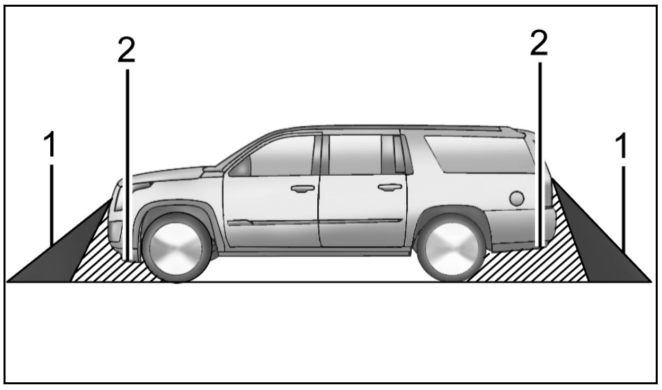
Surround Vision Recorder

If equipped, the surround vision system may include the Surround Vision Recorder feature. This feature uses the infotainment USB data ports to record video from the surround vision system to a customer-supplied USB device. The USB data ports interface with the A11 Radio via a USB cable, and functions as either an auxiliary audio input or mass storage device for the Surround Vision Recorder feature. The A11 Radio requires a USB device with the following specifications:

- 64GB storage capacity, with at least 32GB of storage available.
- A FAT32 or exFAT file system. MS-DOS (FAT) should be used for Mac.
- USB type C or A.
- USB3.0 or greater.

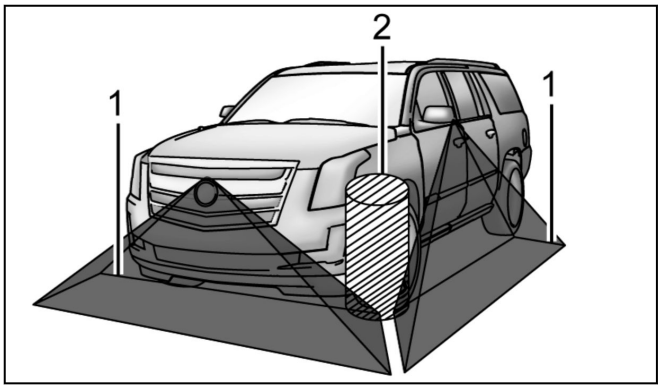
Surround Vision Camera Description and Operation

Warning: The Surround Vision cameras have blind spots and will not display all objects near the corners of the vehicle. Folding outside mirrors that are out of position may not display surround view correctly. Always check around the vehicle when parking or backing.



4291164

1. View displayed by the surround vision camera
2. Area not shown



4291749

1. View displayed by the surround vision camera
2. Area not shown

The surround vision camera system consists of the following components:

- A11 Radio
- Infotainment display
- B87 Rearview Camera
- B174G Frontview Camera – Grille
- B225L Sideview Camera – Left
- B225R Sideview Camera – Right
- X92CF USB 2 Port Receptacle – Floor Console Front
- Front View Underbody Camera (UXA)
- Rearview Underbody Camera (UXA)
- B87CA Auxiliary Rearview Camera - Cargo Area (UVN)

The following conditions may cause a degraded surround vision camera image:

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Surround Vision Recorder

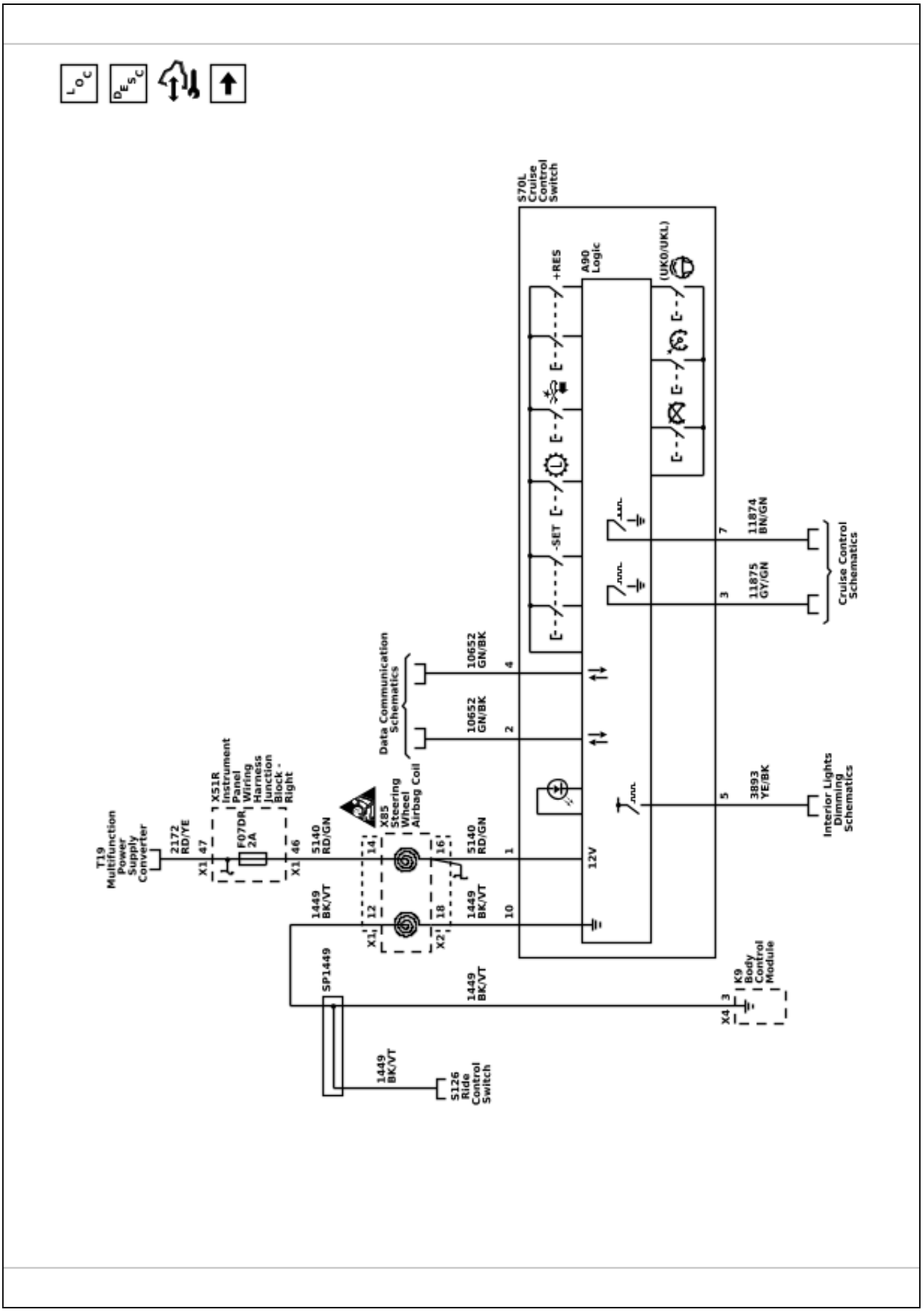
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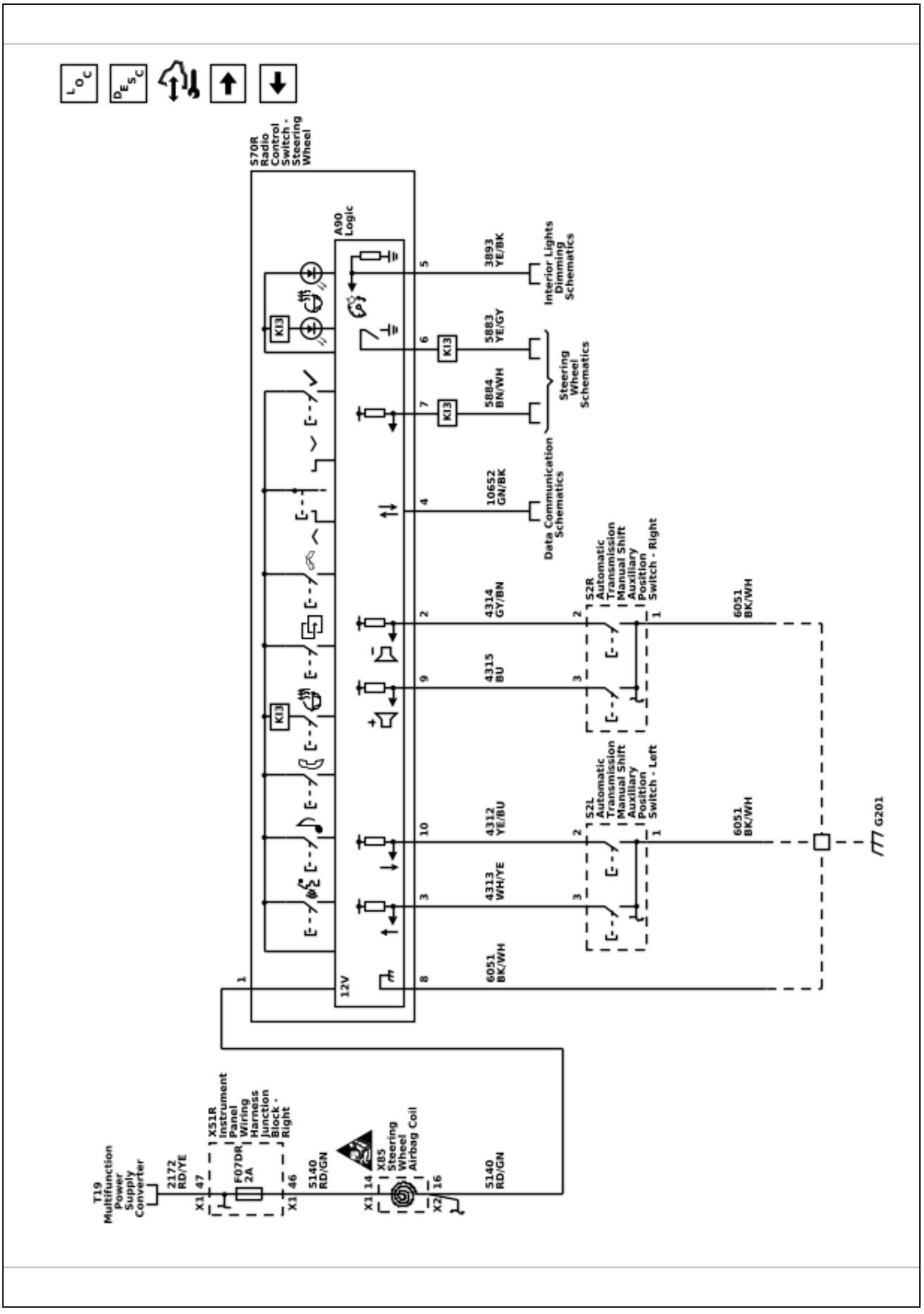
Secondary and Configurable Customer Controls

Schematic and Routing Diagrams

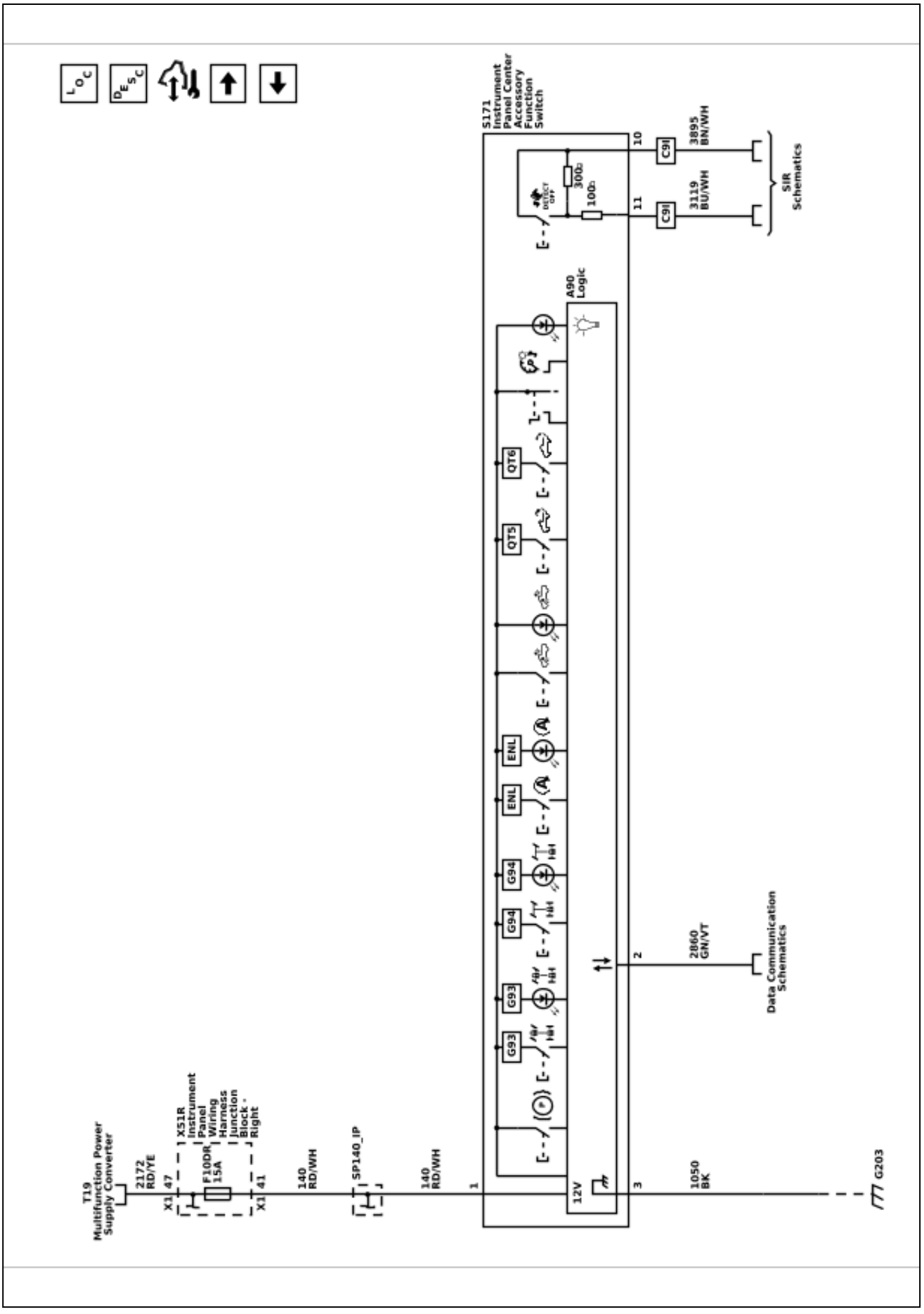
Steering Wheel Secondary/Configurable Control Schematics (Left Steering Wheel Controls)



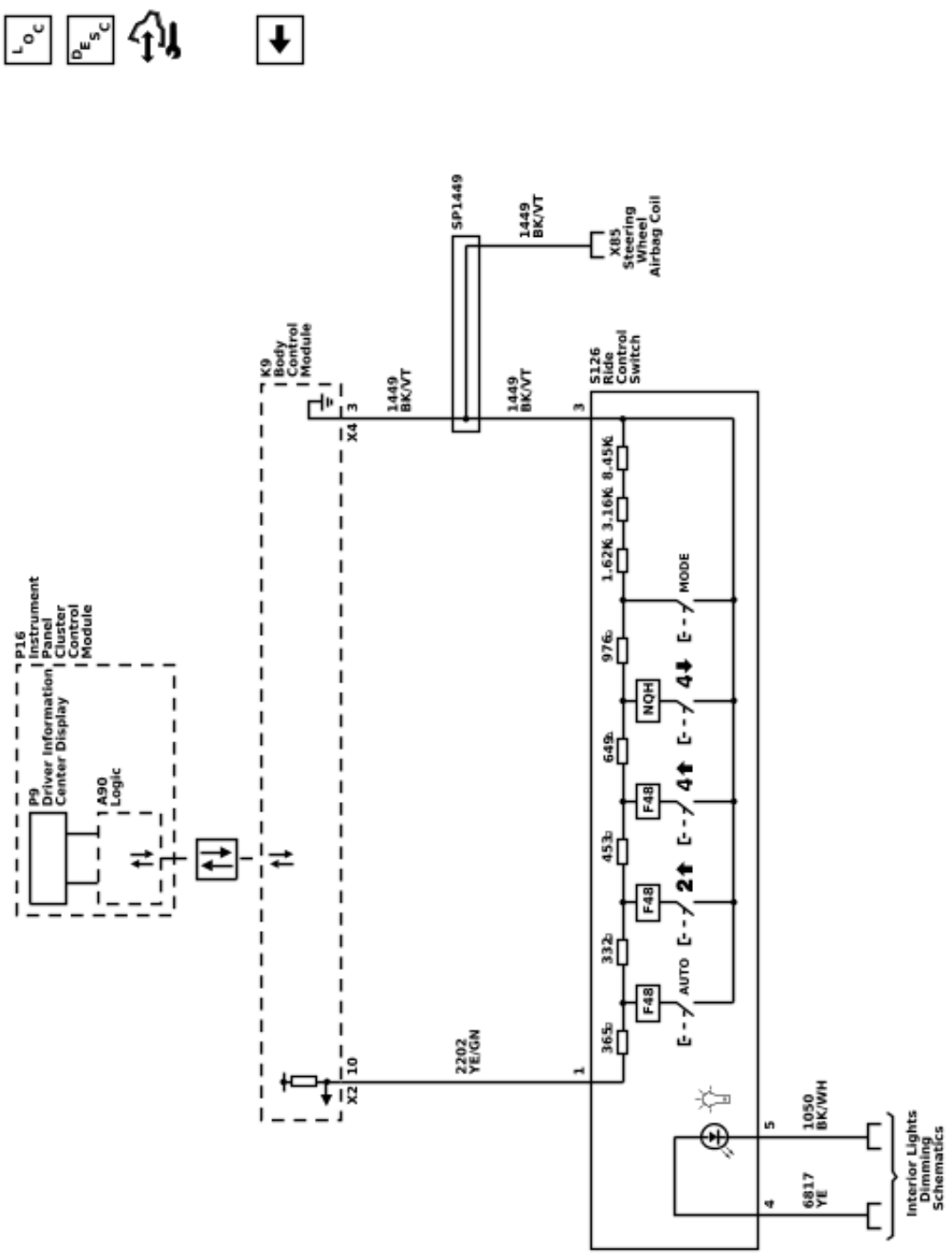
Steering Wheel Secondary/Configurable Control Schematics (Right Steering Wheel Controls)



Steering Wheel Secondary/Configurable Control Schematics (Instrument Panel Center Accessory Function Switch)



Steering Wheel Secondary/Configurable Control Schematics (Ride Control Switch)



Description and Operation

Steering Wheel Controls Description and Operation

The steering wheel control switches duplicate the function of the primary controls of the associated component, through a network of momentary contact switches.

The steering wheel controls are divided into a right-hand set and left-hand set. The switches are connected to a dedicated LIN data circuit.

- The S70E Radio Favorites Switch-Steering Wheel controls the favorites function of the radio.
- The S70F Radio Volume Switch-Steering Wheel allows for volume control of the radio.
- The S70L Cruise Control Switch consists of various cruise control specific functions including cruise on/off functions.
- The S70R Radio Control Switch controls various audio, communication and vehicle systems

Refer to the owners manual for more detailed operation of each steering wheel switch.

Steering Wheel Control Components

Note: In vehicles with RPO 5W4 (Special Service Package), the steering wheel controls on the left rear side do not control radio favorites. Instead, momentary output in blunt cut harness for two-way radio microphone and latching output in blunt cut siren/light.

Note: In vehicles with RPO 9C1 (Sales Package-Police Vehicle), the steering wheel controls on the left rear side do not control radio favorites. Instead, momentary output in blunt cut harness for two-way radio microphone and latching output in blunt cut siren/light.

S70E Radio Favorites Switch-Steering Wheel
The S70E Radio Favorites Switch-Steering Wheel is a momentary contact switch located on the left rear side of the steering wheel. The S70E Radio Favorites Switch-Steering Wheel has two dedicated 5V Reference circuits for each switch function, the 5V Reference circuits come directly from the S70R Radio Control Switch. When a switch is depressed the signal is sent to the S70R Radio Control Switch that outputs a request through the LIN serial data circuit to perform the requested function.

S70F Radio Volume Switch-Steering Wheel
The S70F Radio Volume Switch-Steering Wheel is a momentary contact switch located on the right rear side of the steering wheel. The S70F Radio Volume Switch-Steering Wheel has two dedicated 5V Reference circuits for each switch function, the 5V Reference circuits come directly from the S70R Radio Control Switch. When a switch is depressed the signal is sent to the S70R Radio Control Switch that outputs a request through the LIN serial data circuit to perform the requested function.

S70L Cruise Control Switch
The S70L Cruise Control Switch is a resistive ladder design located on the left side of the steering wheel, each control function button having a different resistance value. The S70L Cruise Control Switch has its own 5V reference circuit from the BCM. The BCM detects a specific voltage value that is associated with the cruise control function switch being activated and sends the appropriate serial data message to complete the request.

For information on Cruise Control, refer to *Cruise Control Description and Operation 6-4*

S70R Radio Control Switch - Steering Wheel
The S70R Radio Control Switch is a set of momentary contact switches located on the right side of the steering wheel. When a switch is depressed the signal is grounded, the S70R Radio Control Switch sends a request through the LIN serial data circuit to the A11 Radio to perform the requested function.

Section 6

Engine/Propulsion

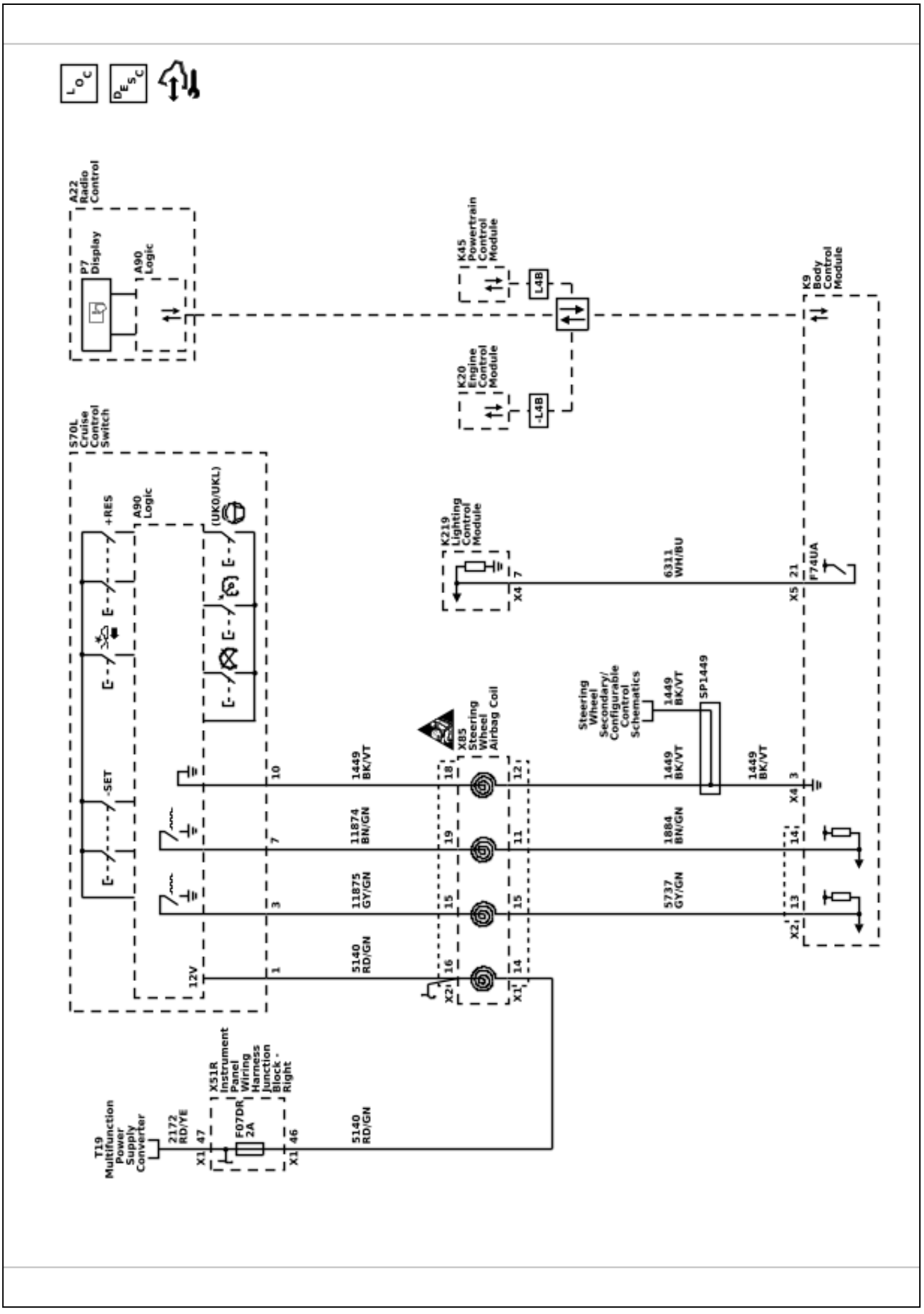
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Engine/Propulsion

Cruise Control

Schematic and Routing Diagrams

Cruise Control Schematics (Cruise Control)



Description and Operation

Cruise Control Description and Operation

Note: If the vehicle is equipped with RPO KSG, it also has Adaptive Cruise Control. Refer to the Object Detection or the Driver Assistance Systems subsection for schematics, diagnostics, and description and operation related to Adaptive Cruise Control functions.

Cruise control is a speed control system that maintains a desired vehicle speed under normal driving conditions at speeds above 40 km/h (25 mph). Steep grades may cause variations in the selected vehicle speeds.

The following are the main components of the Cruise Control System:

- The accelerator pedal
- The brake pedal position (BPP) sensor
- The body control module (BCM)
- The cruise on/off switch
- The cruise control cancel switch
- The + RES switch (equivalent to resume/accelerate switch)
- The − SET switch (equivalent to set/coast switch)
- The engine control module (ECM)
- The throttle actuator control (TAC) motor (gasoline engines only)
- The vehicle speed sensor

The body control module (BCM) monitors the signal circuit of the cruise control switches, which are located on the steering wheel. The BCM relays the cruise control switch status to the engine control module (ECM) via the serial data circuit. The ECM uses the status of the cruise control switch to determine when to capture and maintain the vehicle speed. The ECM monitors the vehicle speed signal circuit in order to determine the desired vehicle speed.

Voltage is supplied to the cruise control switch via the steering wheel control switch reference voltage circuit supplied by the BCM. The cruise control function switches are arranged in a resistive ladder design, with each cruise control function switch having a different resistance value. The BCM detects a specific voltage value that is associated with the cruise control function switch being activated. The BCM sends a serial data message to the ECM indicating that the on/off switch is active. Similarly, when the normally open + RES switch or the normally open − SET switch are pressed, the switch closes and the BCM detects the predetermined voltage signal on the cruise control resume/accel and set/coast switch signal circuit. The BCM sends a serial data message to the ECM indicating that the + RES switch or the − SET switch is active.

Cruise Control Engaged

The Cruise Control System will engage and adjust vehicle speeds, based on the activation of the following cruise control switches, which are located on the steering wheel:

- On/Off
- + RES
- − SET

To engage the Cruise Control System, ensure that the vehicle speed is above 40.2 km/h (25 mph), turn the cruise On/Off switch ON and momentarily press the − SET switch. The ECM will engage the Cruise Control System and record the vehicle speed. The ECM sends a serial data message to the instrument panel cluster (IPC) in order to illuminate the Cruise Engaged indicator in the IPC. Refer to the vehicle owner's manual for the location and operation of the cruise control On/Off indicators and driver information center (DIC) messages.

Pressing the accelerator pedal while the Cruise Control System is engaged, allows the driver to override the Cruise Control System in order to accelerate the vehicle beyond the current set vehicle speed. When the accelerator pedal is released, the vehicle will decelerate and resume the current set vehicle speed.

The driver can also override the current set vehicle speed via the − SET switch and the + RES switch. When the Cruise Control System is engaged, pressing and holding the − SET switch will allow the vehicle to decelerate from the current set vehicle speed without deactivating the Cruise Control System. When the − SET switch is released, the ECM will record the vehicle speed and maintain the vehicle speed as the new set vehicle speed. When the Cruise Control System is engaged, momentarily pressing the − SET switch will allow the vehicle to decelerate at a vehicle specific calibratable increment, commonly 1 km/h or 1 mph, each time that the − SET is momentarily pressed, with a minimum vehicle speed of 38 km/h (24 mph). Refer to the vehicle Owner's Manual for more information.

Pressing and holding the + RES switch, when the Cruise Control System is engaged, will allow the vehicle to accelerate to a greater vehicle speed than the current set vehicle speed. When the + RES switch is released, the ECM will record the vehicle speed and maintain the vehicle speed as the new set vehicle speed. When the Cruise Control System is engaged, momentarily pressing the + RES switch will allow the vehicle to accelerate at a vehicle specific calibratable increment, commonly 1 km/h or 1 mph, each time that the + RES switch is momentarily pressed. Momentarily activating the + RES switch will recall the previous vehicle speed, after the cruise control system has been disengaged by pressing the brake pedal, or CANCEL switch. Refer to the vehicle Owner's Manual for more information.

Cruise Control Disengaged

The engine control module (ECM) disengages the cruise control operation based on the signals from the following switches:

- The brake pedal position (BPP) sensor
- The On/Off switch
- The cruise control cancel switch

The Cruise Control System will disengage when the brake pedal is applied. The body control module (BCM) monitors the BPP sensor via the BPP sensor signal circuit as the voltage signal increases while the pedal is further applied. The ECM monitors the BPP signal through a discrete input and a serial data message signal from the BCM indicating the brake status. When either signal indicates the brake pedal is applied, the ECM will disengage the cruise control system.

The Cruise Control System will also disengage when the cruise control on/off switch is switched OFF, or the cruise control cancel switch is activated. The body control module (BCM) determines when the cruise control cancel switch is activated. When the normally open cancel switch is closed, the BCM detects the predetermined voltage signal on the cruise control function switch circuit. The vehicle speed stored in the memory of the engine control module will be erased when the cruise control On/Off switch is turned OFF, or the ignition switch is turned OFF. The BCM sends a serial data message to the ECM in order to disengage the cruise control system. When the Cruise Control System has been disengaged, the ECM sends a serial message to the instrument panel cluster (IPC) in order to turn OFF the Cruise Engaged indicator.

Every time the Cruise Control System is disengaged, the ECM will keep track of the reason for system disengagement. The last 8 disengagement reasons will be recorded within the ECM memory. The scan tool will display the last 8 Cruise Disengage History parameters, in which one out of approximately 50 possible reasons will be displayed in each of these 8 parameters. For the disengagement reason to be displayed within the scan tool parameter the Cruise Control System is active and disengagement is requested.

When engagement of the system is requested but an engagement inhibit is present, the most recent inhibit reason is recorded in the ECM history. The scan tool will display the most recent inhibit reason, in which one out of approximately 50 possible reasons will be displayed.

Cruise Control Inhibited

The engine control module (ECM) inhibits the cruise control operation when any of the following conditions exist:

- The ECM has not detected a brake pedal activation from the body control module (BCM) this ignition cycle.
- A Cruise Control System DTC has been set.
- The vehicle speed is less than 38.6 km/h (24 mph).
- The vehicle speed is too high.
- The vehicle is in PARK, REVERSE, NEUTRAL, or 1st gear.
- The engine RPM is low.
- The engine RPM is high.
- The system voltage is not between 9 volts and 16 volts.
- The Antilock Brake System (ABS)/Traction Control System (TCS) is active for more than a calibratable time (typically 0.3 to 0.7 seconds).

Cruise Control Inhibit Reasons

This is a general list of inhibit reasons. Not every inhibit reason is applicable to all vehicles. Refer to the scan tool inhibit reason list for the last 8 reasons that have been recorded during the current ignition cycle.

Scan Tool Name	Description	Long Description
Acceleration Rate too High	High acceleration	The vehicle acceleration rate is too high.
TRAILER BRAKES APPLIED	Trailer brakes applied	The trailer brake system has been activated.

Scan Tool Name	Description	Long Description
Acceleration Time	Rate limiting fault	Cruise torque request rate limiting active too long.
Adaptive Cruise Control Configuration Incorrect	Adaptive cruise control option mismatch	The cruise control type (adaptive cruise or conventional cruise) is mismatched between the engine control module (ECM) and the body control module (BCM).
Antilock Braking System Active	Antilock Braking System Active	The antilock braking system was active. Only reported on enhanced cruise control vehicles.
Automatic Braking Engine Torque Request Signal Communication Malfunction	Automatic braking engine torque request signal communication malfunction	An engine control module to electronic brake control module (EBCM) serial data fault is active or communication has been lost between the modules.
Automatic Braking Malfunction	Brake system malfunction	The electronic brake control module has detected a failure that does not allow automatic braking to be performed.
Axle Torque Serial Communication Malfunction	Axle Torque Serial Communication Malfunction	The adaptive cruise control is being inhibited by the ECM because a serial data signal timeout error has occurred with the hybrid max/min torque signals.
Battery Voltage Too High	Voltage above high voltage threshold	The ignition voltage is too high at the engine control module (typically 18 volts).
Battery Voltage Too Low	Voltage below low voltage threshold	The ignition voltage is low at the engine control module (typically 9 volts).
Brake Pedal Applied	Brake pedal apply	The brake pedal was applied.
Brake Pedal Not Initialized	Brake before cruise	The brake pedal has not been seen as applied prior to driver request to engage cruise with set switch. A brake pedal apply must be seen before allowing cruise engagement during each key cycle. On a vehicle equipped with a manual transmission, a clutch pedal apply may satisfy the brake pedal apply criteria.
Brake Pedal Position Malfunction	Brake pedal position signal invalid	A brake pedal apply circuit fault has been detected.
Brake Pedal Position Signal Malfunction	DTC P0703 is active or maximum time elapsed without receiving a valid Brake Pedal Position signal.	A serial data fault is active or communication has been lost with the module sending the brake pedal apply state.
Brake Pedal Pressure Detected	Brake pedal driver applied pressure detected	A brake pedal apply has been detected based on brake pedal pressure as measured by the electronic brake control module.
Brake Pedal Released Position Not Learned	Brake apply sensor home position not learned	The brake pedal position sensor released position is not learned.
Brake System Malfunction	Adaptive cruise control automatic braking failed	Adaptive cruise control automatic braking inoperative.
Calculated Torque	Calculated engine torque	The engine torque calculation is incorrect.
Clutch Pedal Applied	Clutch switch active	The clutch pedal was applied.
Coast Below Minimum Speed	Coast below low speed inhibit	The Set/Coast switch was depressed and the vehicle slowed below the minimum cruise control operating speed.
Coast Mode	Coast disengage	Cruise control is in coast mode with the Set/ Coast switch depressed and is requesting no throttle.
Control Function Active	DLC override	A scan tool is plugged into the Data Link Connector (DLC) connector.
Control Module Memory Malfunction	Memory failure	A control module memory failure has been detected.
Control Module Processor Malfunction	Processor integrity fault (random access memory corruption)	An engine control module software error has occurred.

Scan Tool Name	Description	Long Description
Crawl Mode Active	Crawl Mode Active	Crawl mode is active and inhibiting cruise control.
Cruise Control Cancel Switch Active	Cancel switch active	The cruise control cancel switch was depressed.
Cruise Control Software Malfunction	Sequence of completion checks	A cruise control software execution error has occurred.
Cruise Control Switch Inactive	On/Off switch in Off state	The cruise control On/Off switch is turned off.
Cruise Control Switch Invalid	Analog cruise switch input out of range	The cruise control switch voltage signal is in an invalid range.
Cruise Control Switch Serial Communication Malfunction	Serial data fault (cruise switch serial communication fault)	The cruise control switch serial data fault is active or communication has been lost with the module sending cruise control switch states.
Deceleration Rate Too High	High deceleration	The vehicle deceleration rate is too high.
Diagnostic Trouble Code (DTC) Set	Malfunction in PCM/ECM (DTC active)	A DTC is active or in history that inhibits cruise control operation.
Distance Sensing Cruise Control Brake Pedal Applied	Distance Sensing Cruise Control Brake Pedal Applied	Adaptive cruise control is being inhibited by the ECM because a brake pedal apply has occurred.
Distance Sensing Cruise Control Cancel Switch Active	Distance Sensing Cruise Control Cancel Switch Active	Adaptive cruise control is being inhibited by the ECM because the driver applied the cancel switch.
Distance Sensing Cruise Control Data	Serial data fault for adaptive cruise control throttle control and brake control signals sent by the distance sensing cruise control module	A distance sensing cruise control module serial data fault is active or communication has been lost between the distance sensing cruise control module and the engine control module.
Distance Sensing Cruise Control Inhibit	Distance sensing cruise control inhibited	The distance sensing cruise control system is inhibited.
Distance Sensing Cruise Control Invalid Engage	Distance Sensing Cruise Control Invalid Engage	Adaptive cruise control is being inhibited by the ECM because an invalid sequence of cruise control applies, brake pedal applies, or an invalid speed range has been detected.
Distance Sensing Cruise Control Off	Distance Sensing Cruise Control Off	Adaptive cruise control is being inhibited by the ECM because the driver has turned off the cruise on/off switch.
Distance Sensing Cruise Control Reduced Engine Power	Distance Sensing Cruise Control Reduced Engine Power	Adaptive cruise control is being inhibited by the ECM due to a fault resulting in “Reduced Engine Power”.
Driven Wheel Speed Higher Than Non Driven Wheel Speed	Driven wheel speed greater (wheel slip detection)	The driven wheel speed is greater than the non driven wheel speed (slip detection).
Engine Control Module	PCM/ECM inhibit (RAM corruption)	Engine control module internal communication error.
Engine Control Module (ECM) Reset	ECM running reset	An engine control module running reset has occurred.
Engine Overspeed Protection Active	Injectors disabled (engine overspeed fuel cut-off active)	Engine RPM limiter active with fuel cut off active.
Engine Overtemperature Protection Active	Engine metal overtemp active	The engine is over temperature. The engine is overheated.
Engine Run Time	Engine run time not elapsed	The engine has not been running long enough, typically five seconds.
Engine Speed	Engine speed too low or too high	The engine RPM is too low (near stall) or too high (near engine RPM fuel shutoff).
Excessive Accelerator Position Override	Pedal greater than cruise (override)	The driver has overridden cruise control set speed with accelerator pedal for greater than an allowable time.
1st Gear	First Gear	Transmission is engaged in 1st gear.

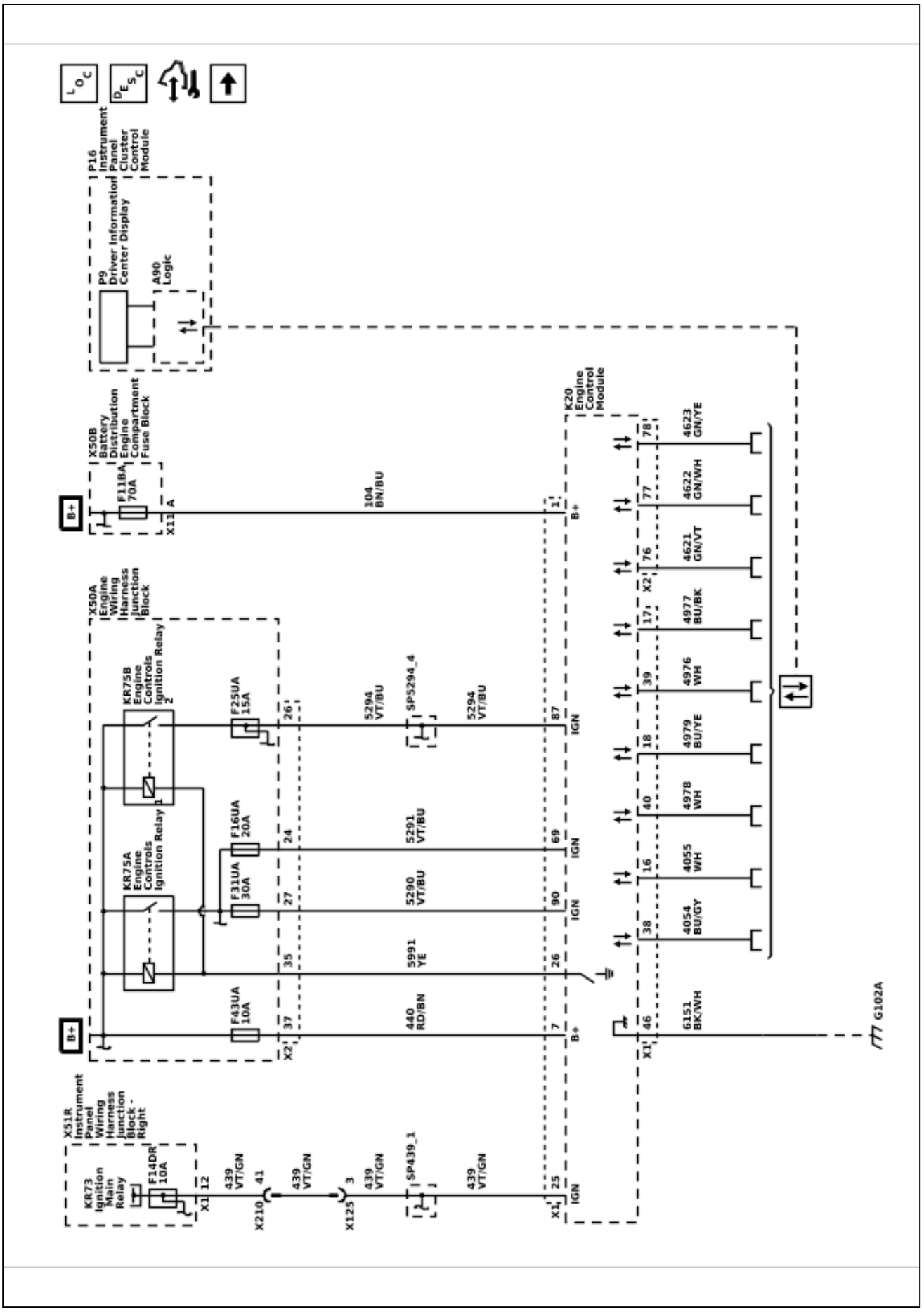
Scan Tool Name	Description	Long Description
Gear Change without Applied Clutch Pedal	Manual transmission out of gear with no clutch pedal apply	Manual transmission shifted to Neutral without clutch pedal being applied.
Hill Descent Control Active	Hill Descent Control System Active	The hill descent control system has gone active.
Hill Descent Control Serial Communication Malfunction	Hill Descent Control Serial Communication Malfunction	An electronic brake control module serial data fault is active or communication has been lost between the EBCM and ECM.
Hybrid/EV System	Hybrid Cruise Disengage	Cruise control is inhibited on hybrid applications when “Regen on Demand” is requested by the driver via the tap-up/tap-down paddles.
Illegal Mode	Illegal cruise mode	The cruise control mode is incorrect based on switch states.
Lane Center Control Serial Data Error	Lane Center Control Serial Communication Malfunction	Adaptive cruise control is being inhibited by the ECM because a serial data error has been detected on a vehicle with Lane Center Control.
Non Driven Wheel Speed Higher Than Drive Wheel Speed	Non-driven wheel speed greater	The non driven wheel speed is greater than the driven wheel speed.
None	None	This disengagement reason may be displayed after a dead battery repair or module replacement.
Park Brake Applied	Park brake switch signal active	The parking brake is applied.
Power Take-Off Active	Power Take Off active	The Power Take Off (PTO) system is active.
Rear Axle in Low Range	Rear axle in low	The rear axle is in low range.
Set/Coast and Resume/Accelerate Switches Active Simultaneously	SET and RESUME switches simultaneously active	The Set/Coast and Resume/Accelerate switches were pressed simultaneously.
Set/Coast Switch Active With Vehicle Speed Higher Than Set Point	Over schedule tap-down	The Set/Coast switch is selected, vehicle speed is above set speed and does not decrease. May be due to traveling down hill.
Speed Limiting/Warning System On	Speed limiter/warning On/Off switch turned on	Driver has turned on the Speed Limiter/Warning on/off switch. Cruise is disabled/inhibited and cruise on/off switch will be set to Off.
Throttle Actuator Control System	Electronic throttle control prevents cruise operation	The electronic throttle control system has detected a failure in the throttle control hardware.
Traction Control Active	Traction control active	The traction control system was active.
Traction Control System Malfunction	Traction Control System Malfunction	A fault is present in the traction control system.
Traction Control System Off	Traction Control System Off	The traction control system has been turned off by the driver.
Transfer Case in 4WD Low Range	Transfer case in 4WD Low	The transfer case is in low range.
Transmission Gear Ratio Malfunction	Transmission gear fault	A transmission DTC is active or in history, that inhibits cruise control operation.
Transmission Not in Forward Gear	Transmission in neutral, reverse or park	The transmission gear selector is not in a forward gear.
Vehicle Overspeed Protection Active	MPH limited fuel (vehicle overspeed fuel cut-off active)	The vehicle overspeed protection is active with fuel cut off active.
Vehicle Speed Higher Than Set Point	Over schedule	Vehicle speed has exceeded driver selected set speed by more than an allowable amount. This may occur while driving down a significant grade or driver overriding cruise while performing a passing maneuver.
Vehicle Speed Lower Than Set Point	Under schedule	The vehicle speed is below cruise control set speed by more than an allowable amount.
Vehicle Speed Too High	Vehicle speed exceeds high speed threshold	Vehicle speed has exceeded maximum cruise operating speed.

Scan Tool Name	Description	Long Description
Vehicle Speed Too Low	Vehicle speed drops below low speed threshold	Vehicle speed dropped below the cruise control minimum operating speed. May be due to hilly terrain and low vehicle speed. Manual transmission gear selection and engine torque may contribute to this disengagement reason.
Vehicle Stability System Active	Vehicle stability control active	The vehicle stability control system was active.
Vehicle Stability System Malfunction	Vehicle Stability System Malfunction	A fault has been detected in the vehicle stability control system.
Vehicle Stability System Off	Vehicle Stability System Off	The vehicle stability control system has been turned off by the driver.

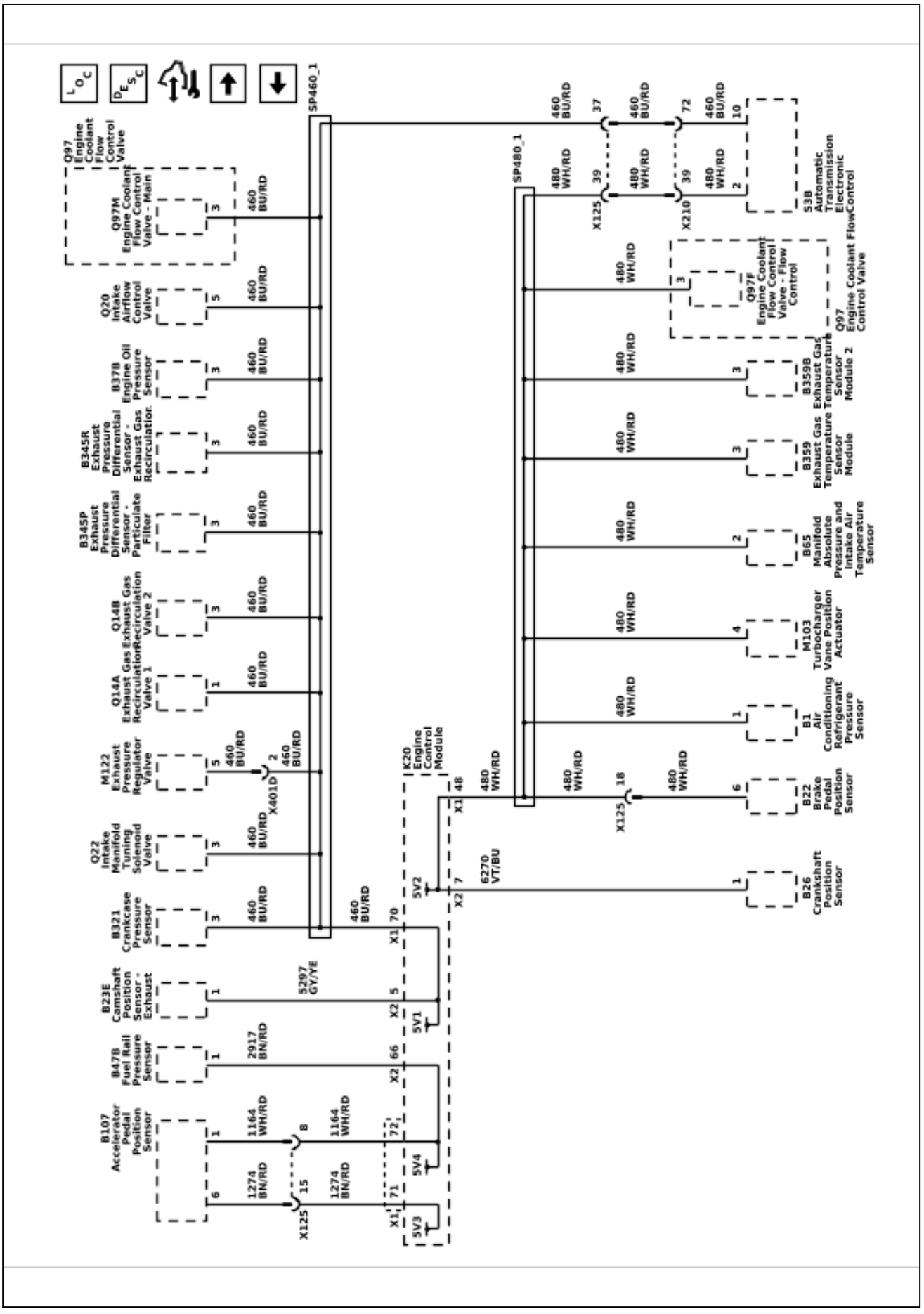
Engine Controls and Fuel - 3.0L Diesel

Schematic and Routing Diagrams

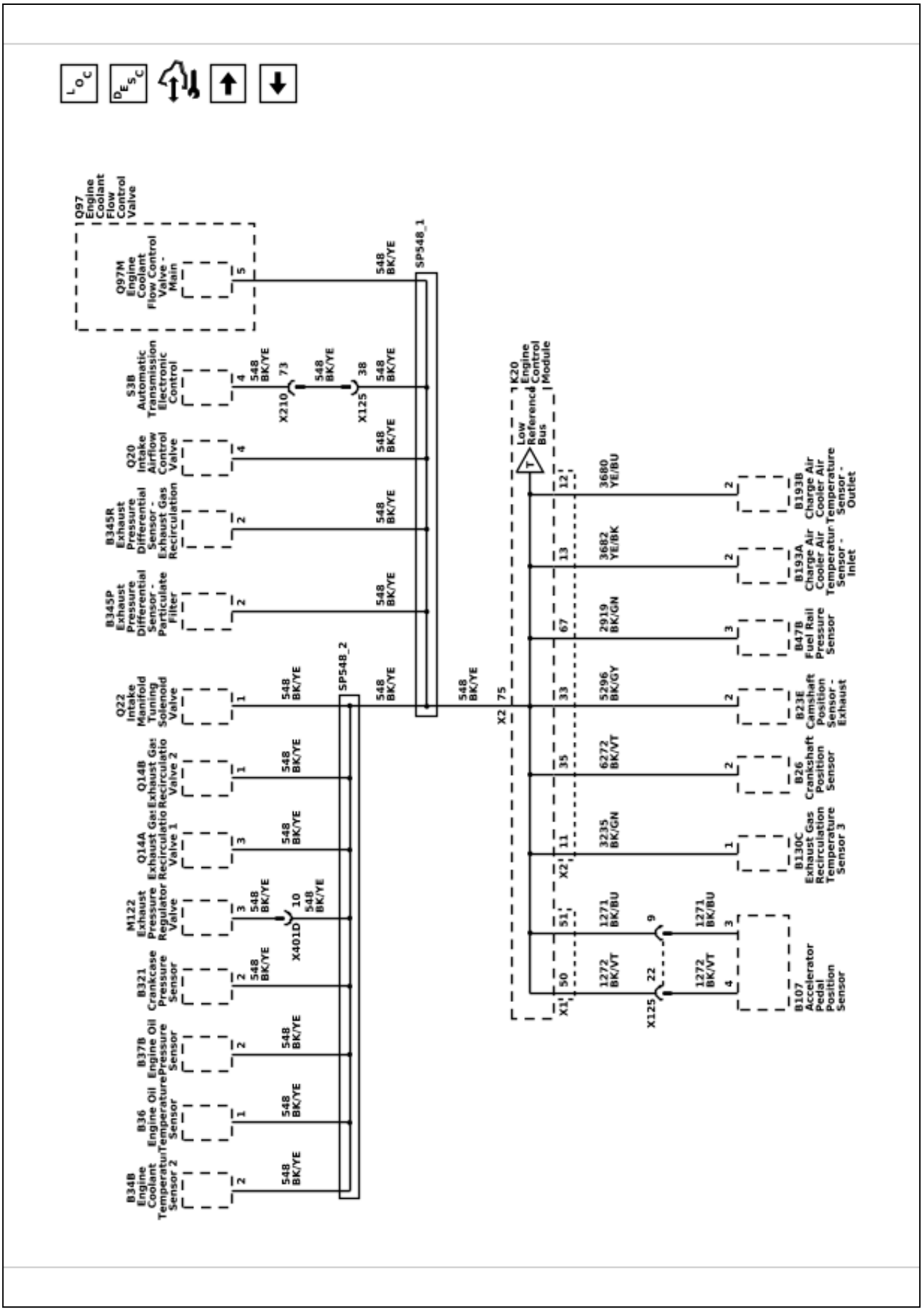
Engine Controls Schematics (Engine Control Module Power, Ground, Serial Data, and MIL)



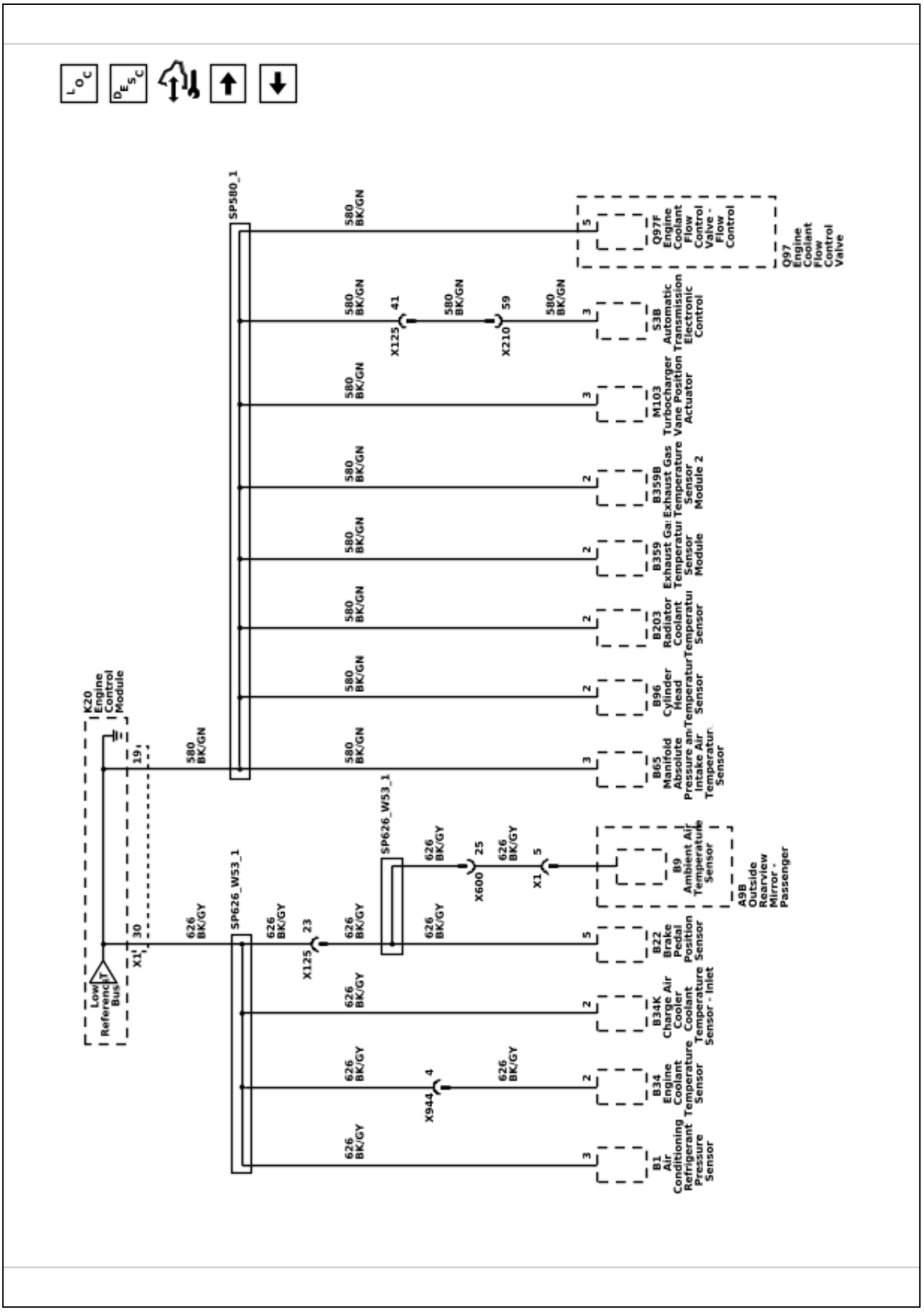
Engine Controls Schematics (5V Reference Bus)



Engine Controls Schematics (Low Reference Bus - 1 of 2)

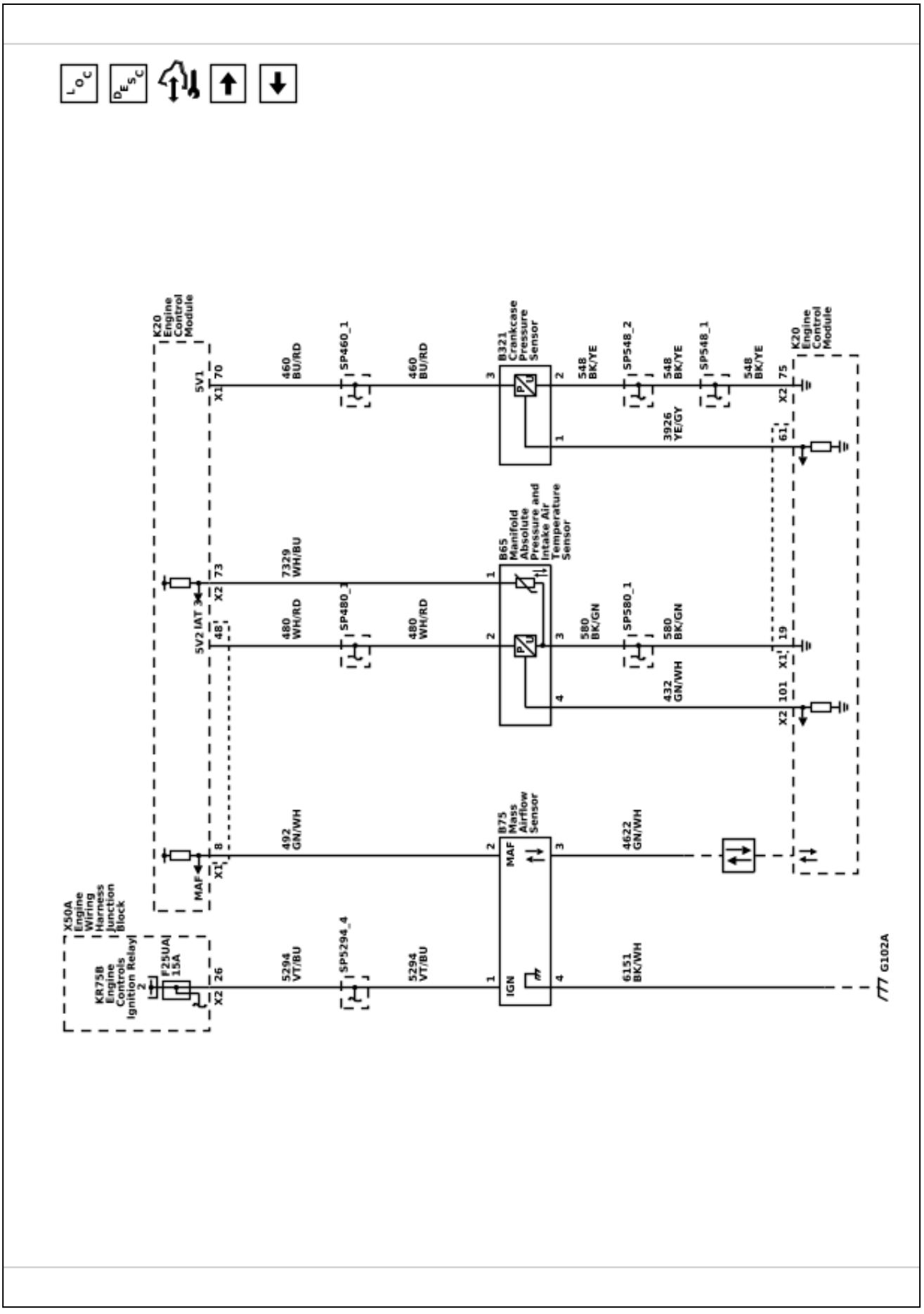


Engine Controls Schematics (Low Reference Bus - 2 of 2)

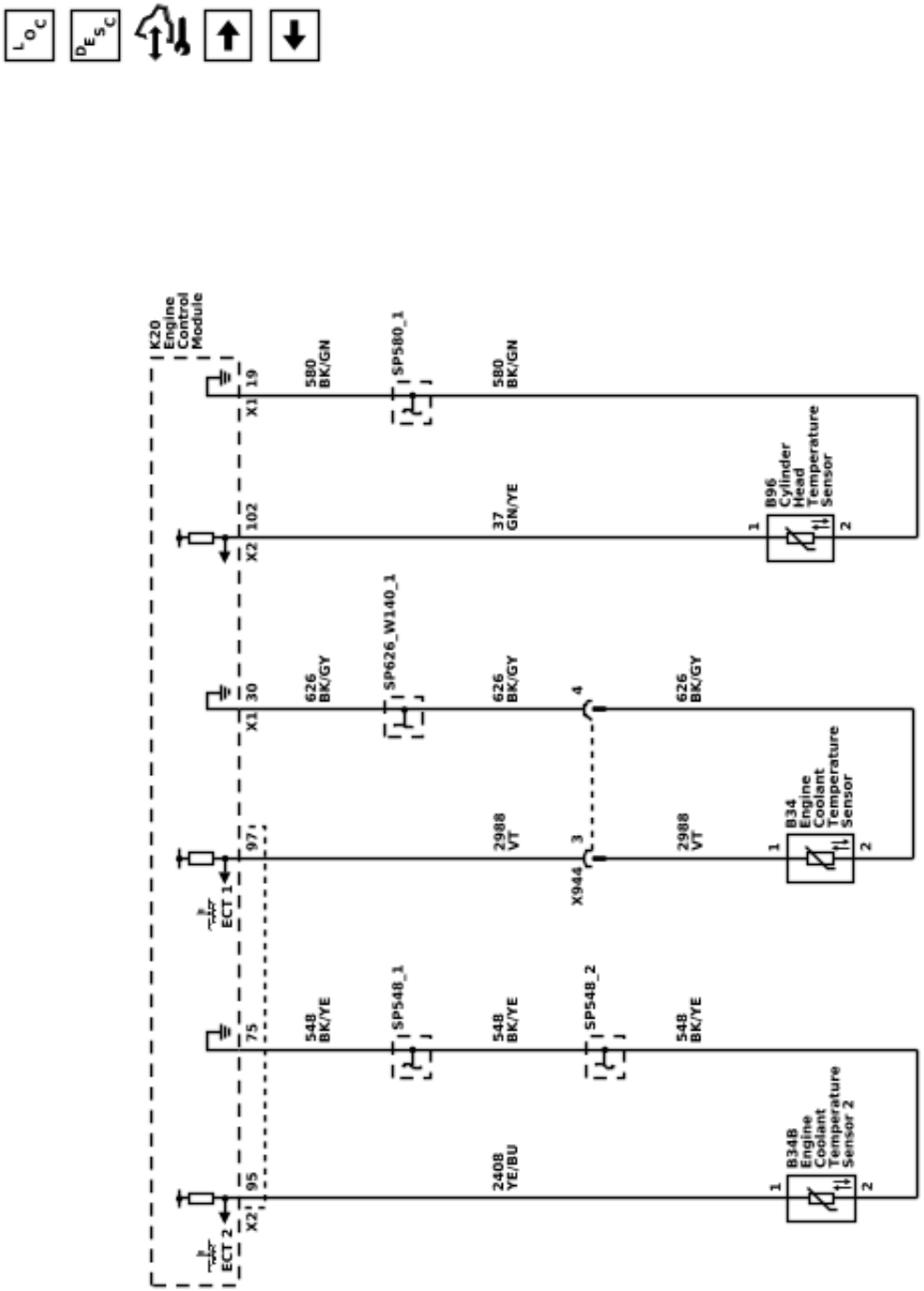


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Engine Controls Schematics (Engine Data Sensors - Intake Air and Crankcase Pressure Sensors)

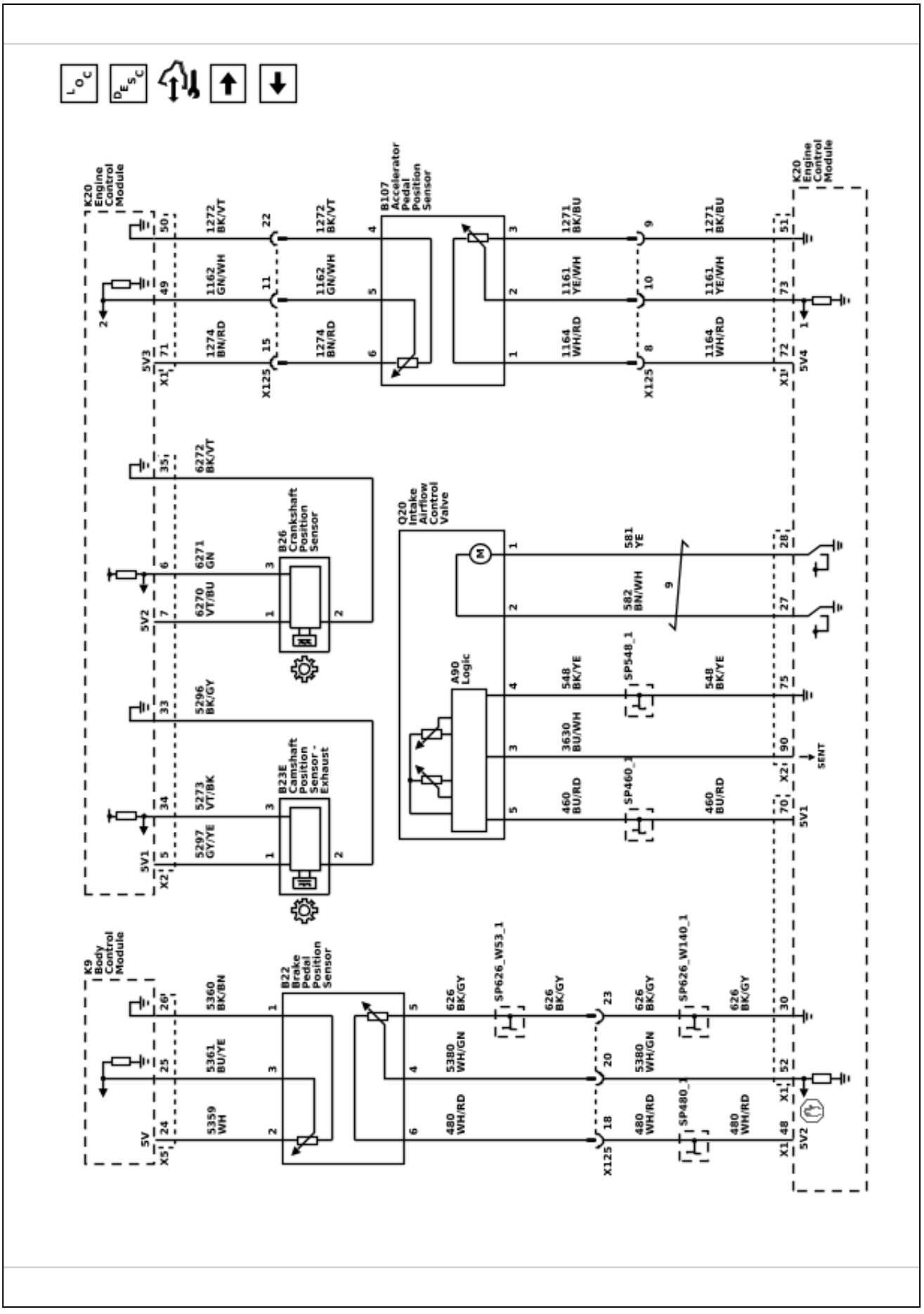


Engine Controls Schematics (Engine Data Sensors - Coolant and Engine Metal Temperature)

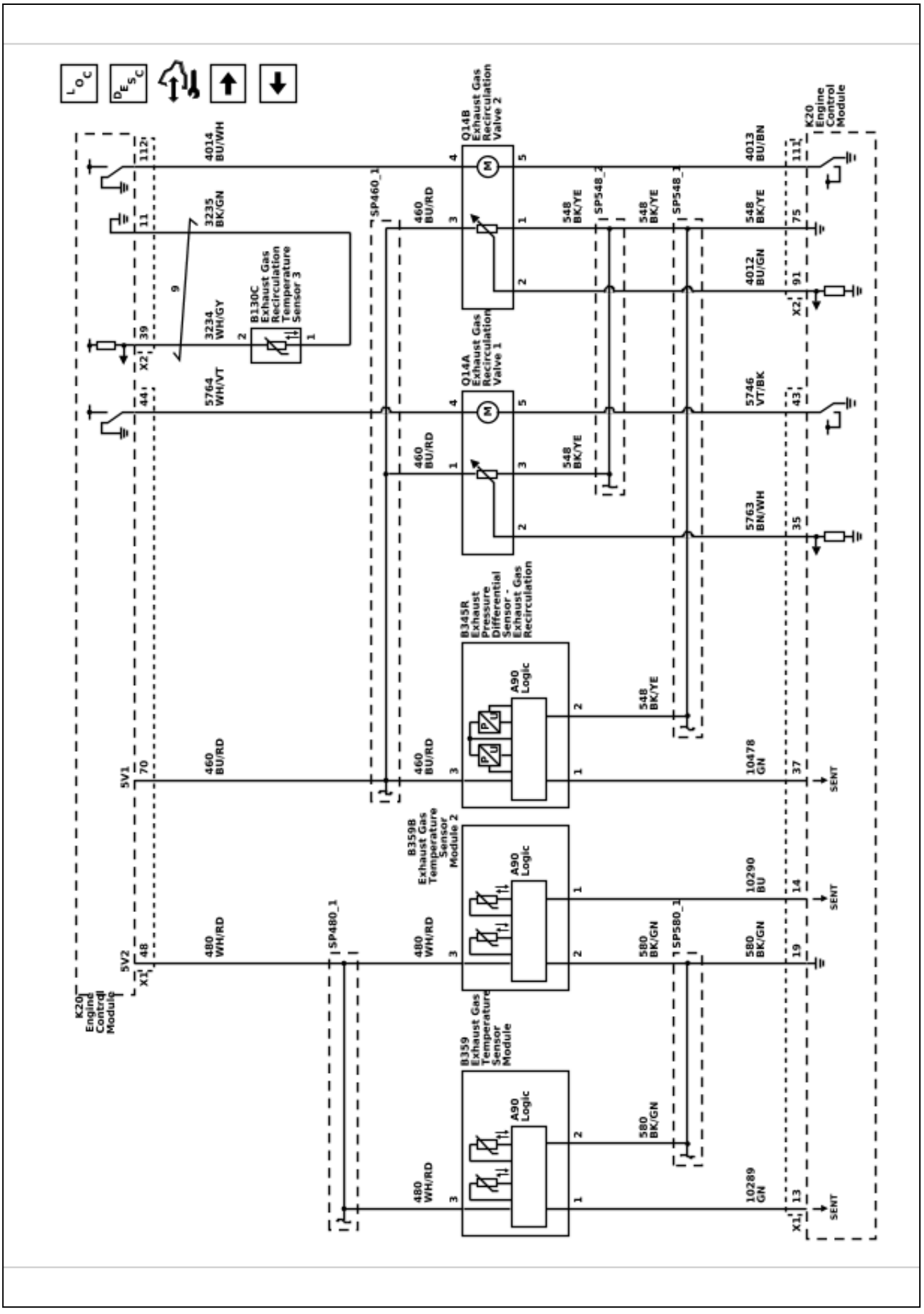


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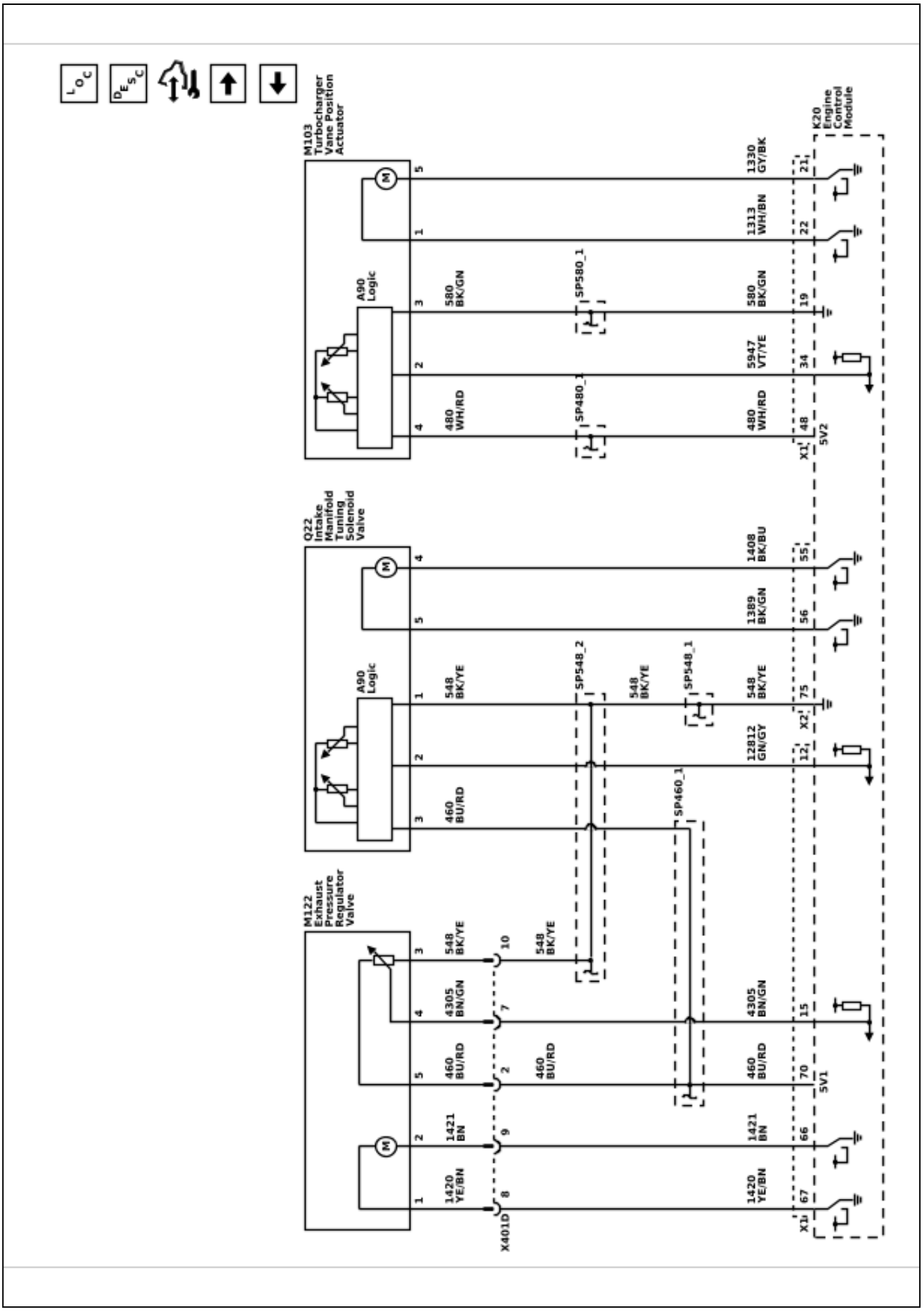
Engine Controls Schematics (Engine Data Sensors - Injector Timing Controls and Override)



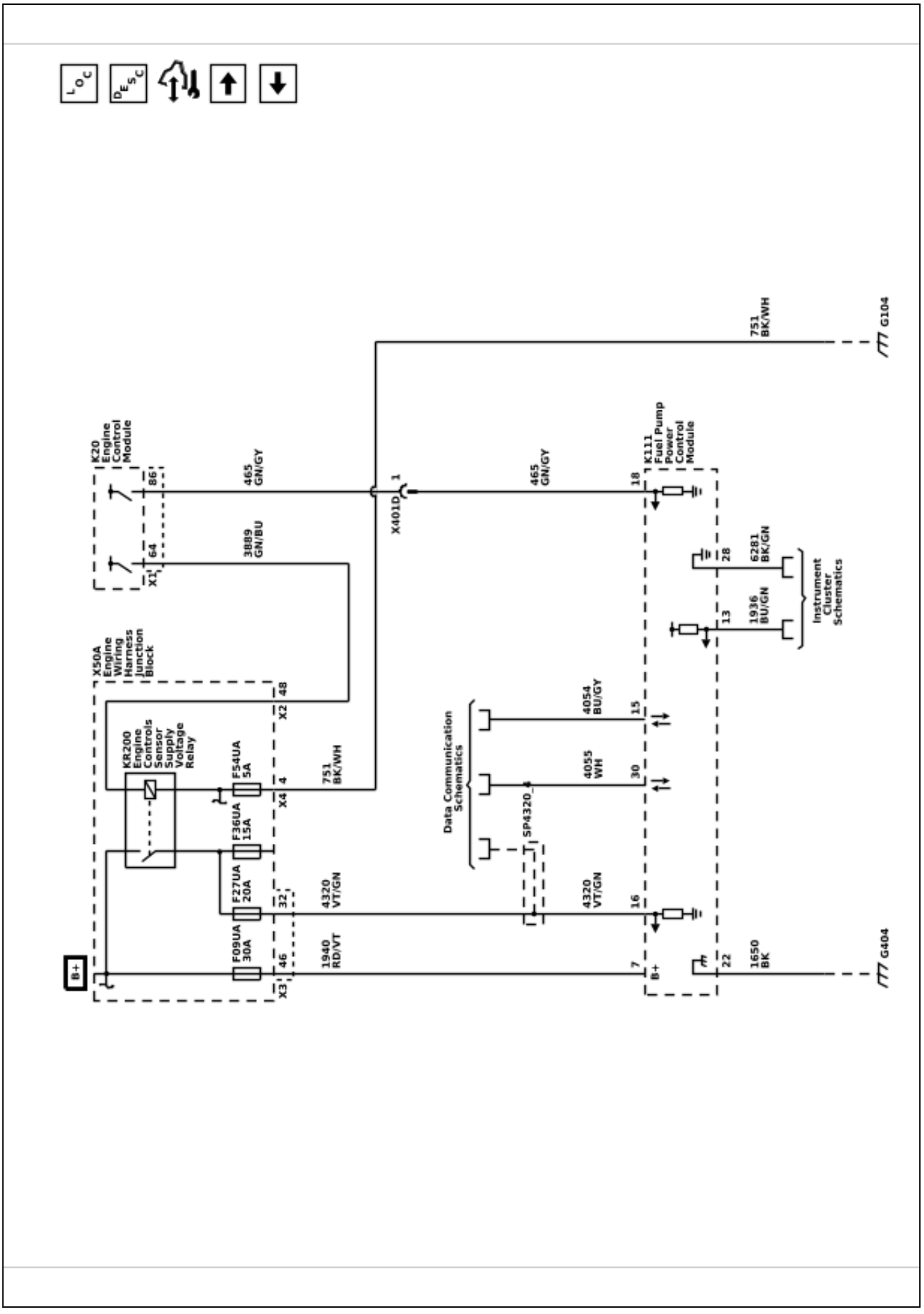
Engine Controls Schematics (Engine Data Sensors - EGR and Exhaust Gas Temperature)



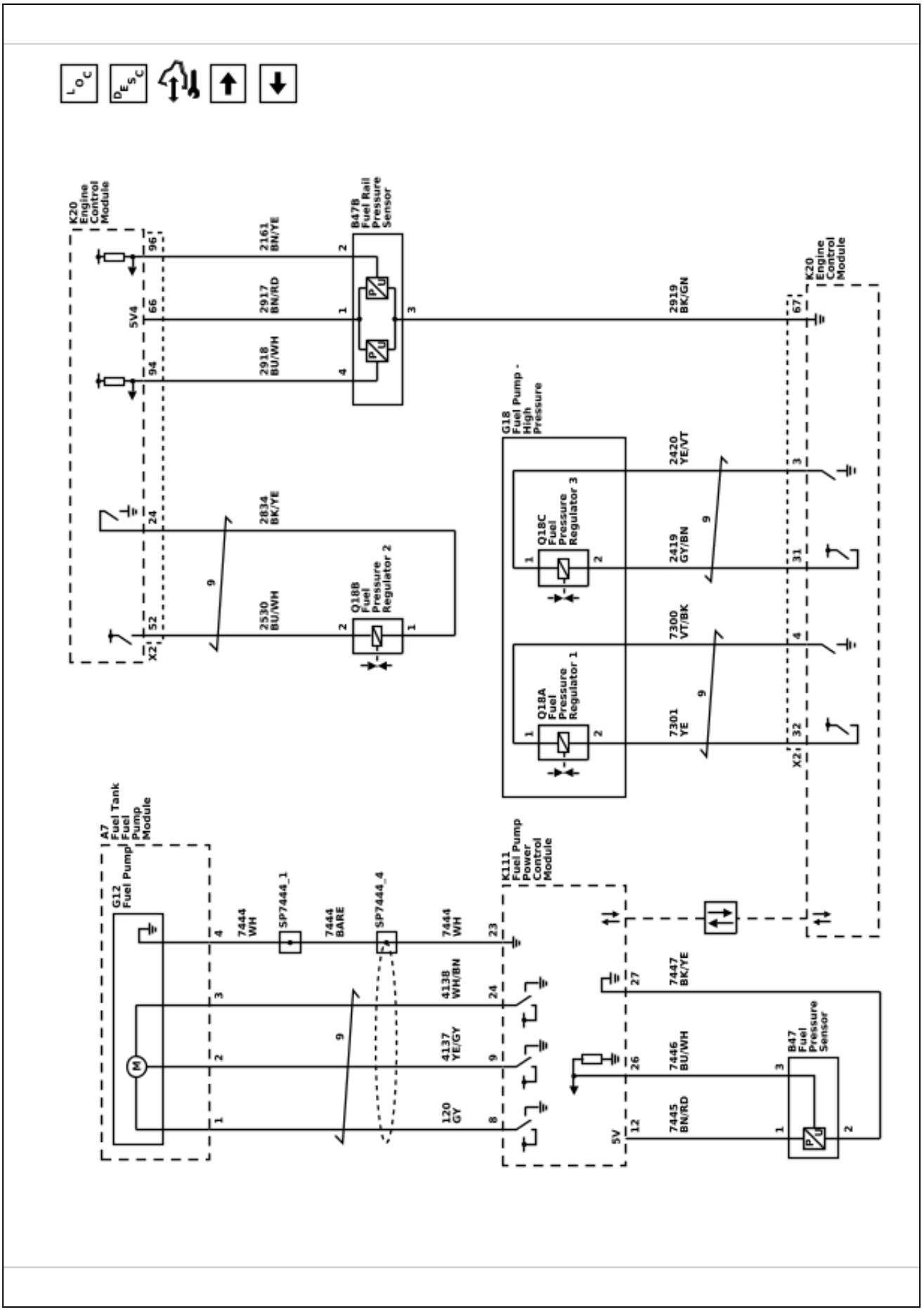
Engine Controls Schematics (Engine Data Sensors - Exhaust, Turbo, and Intake Manifold Actuators)



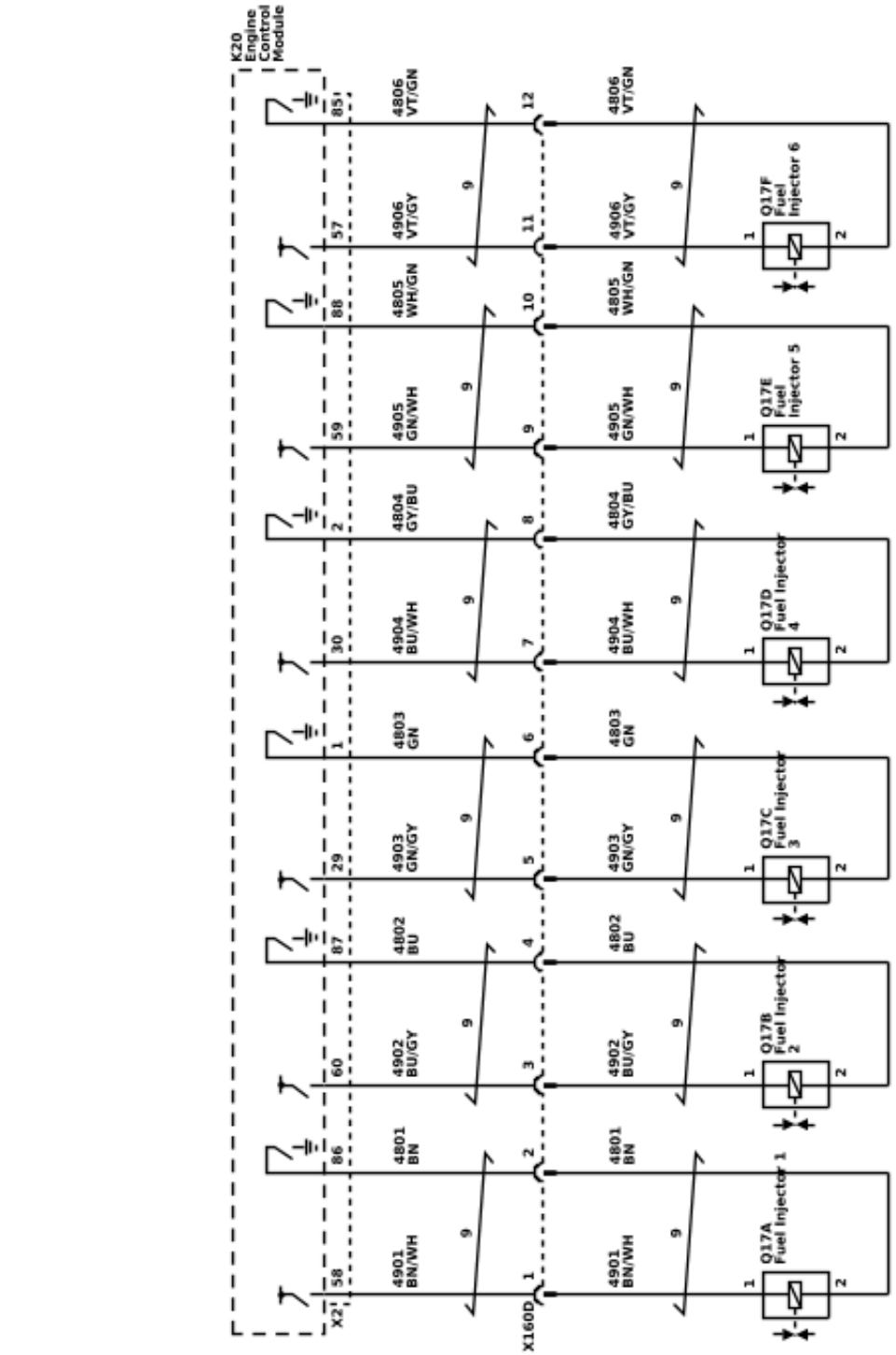
Engine Controls Schematics (Fuel Pump Power Control Module Power, Ground, and Subsystem References)



Engine Controls Schematics (Fuel Controls - Low Pressure and High Pressure)



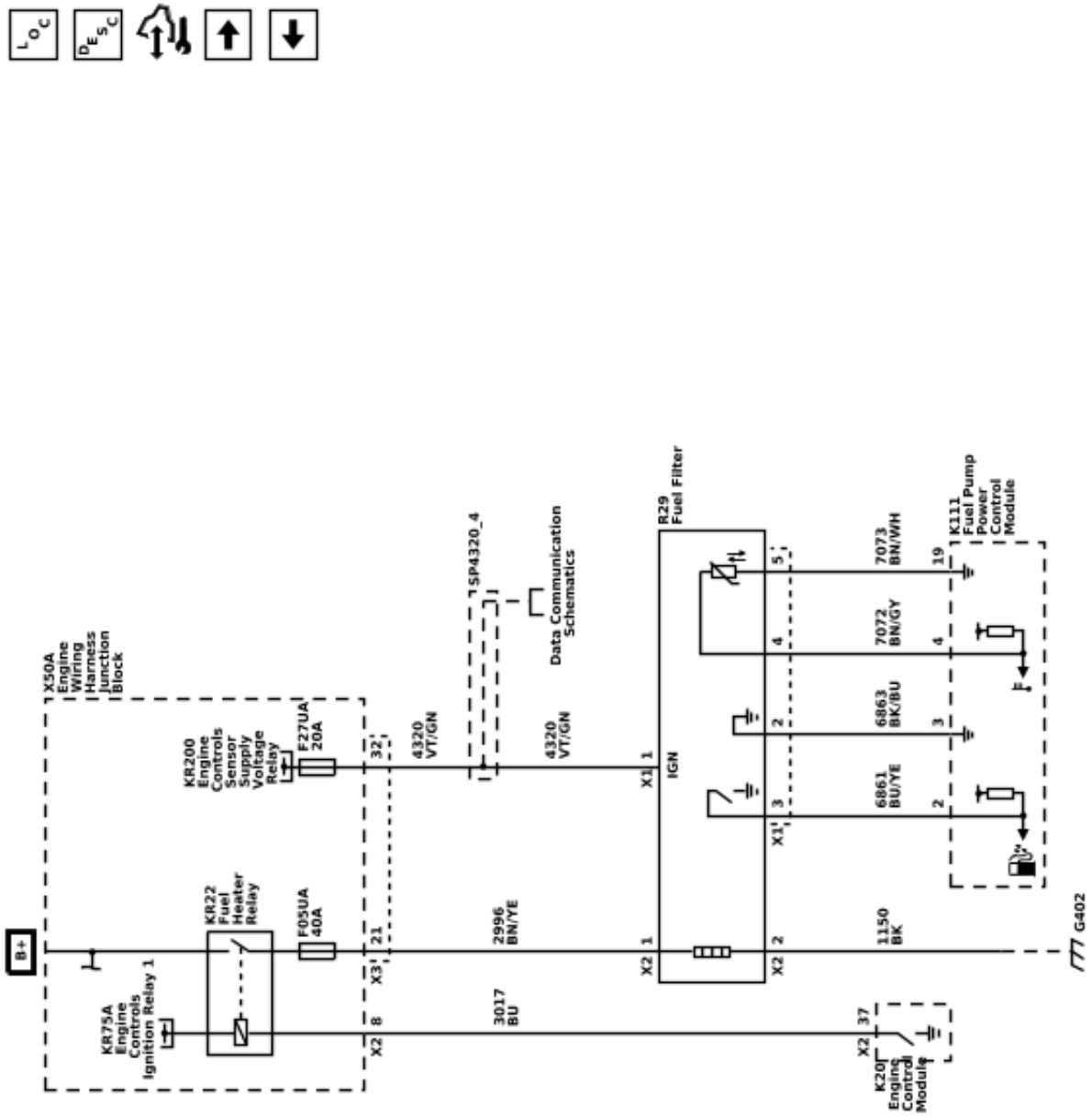
Engine Controls Schematics (Fuel Controls - Fuel Injectors)



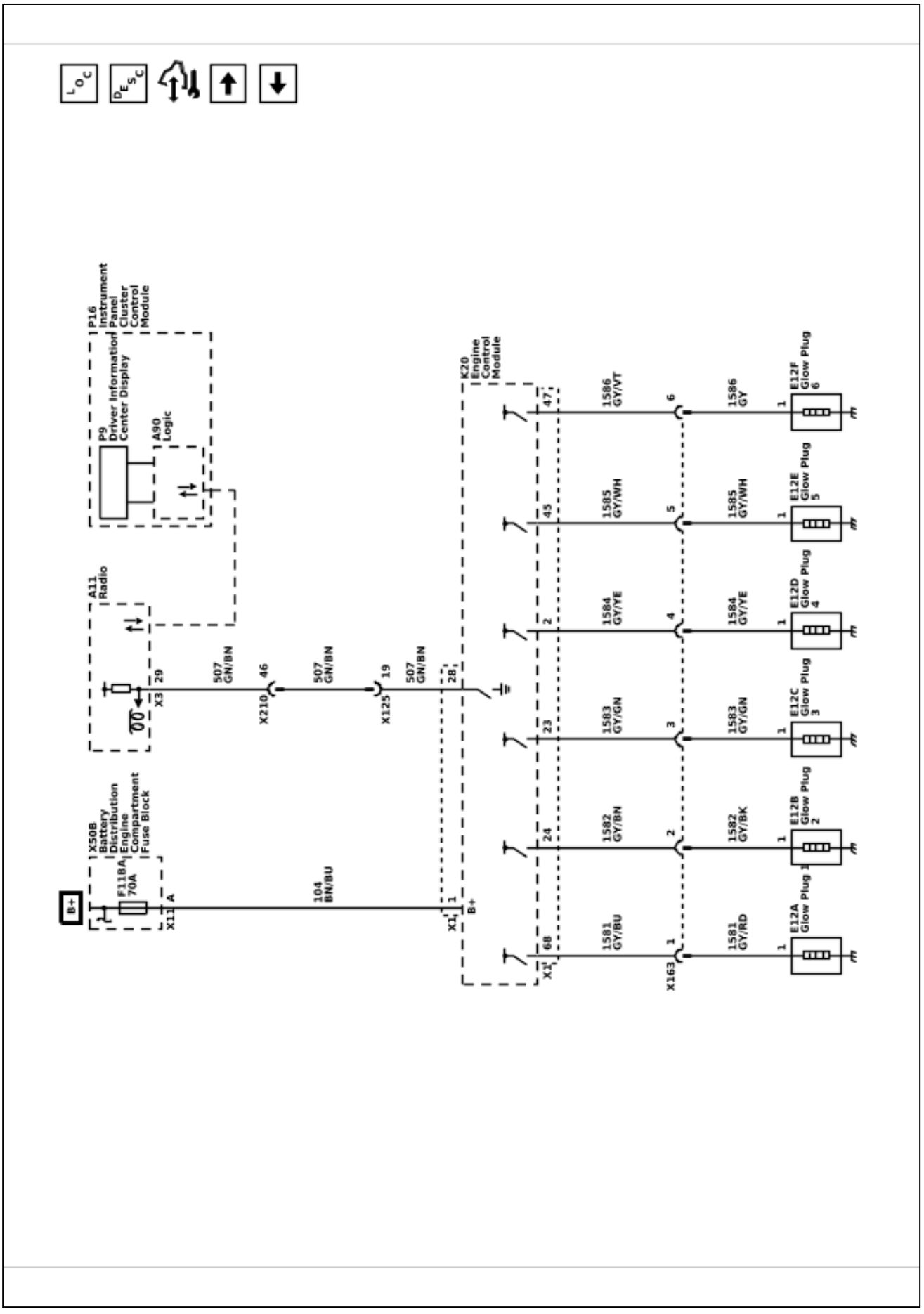
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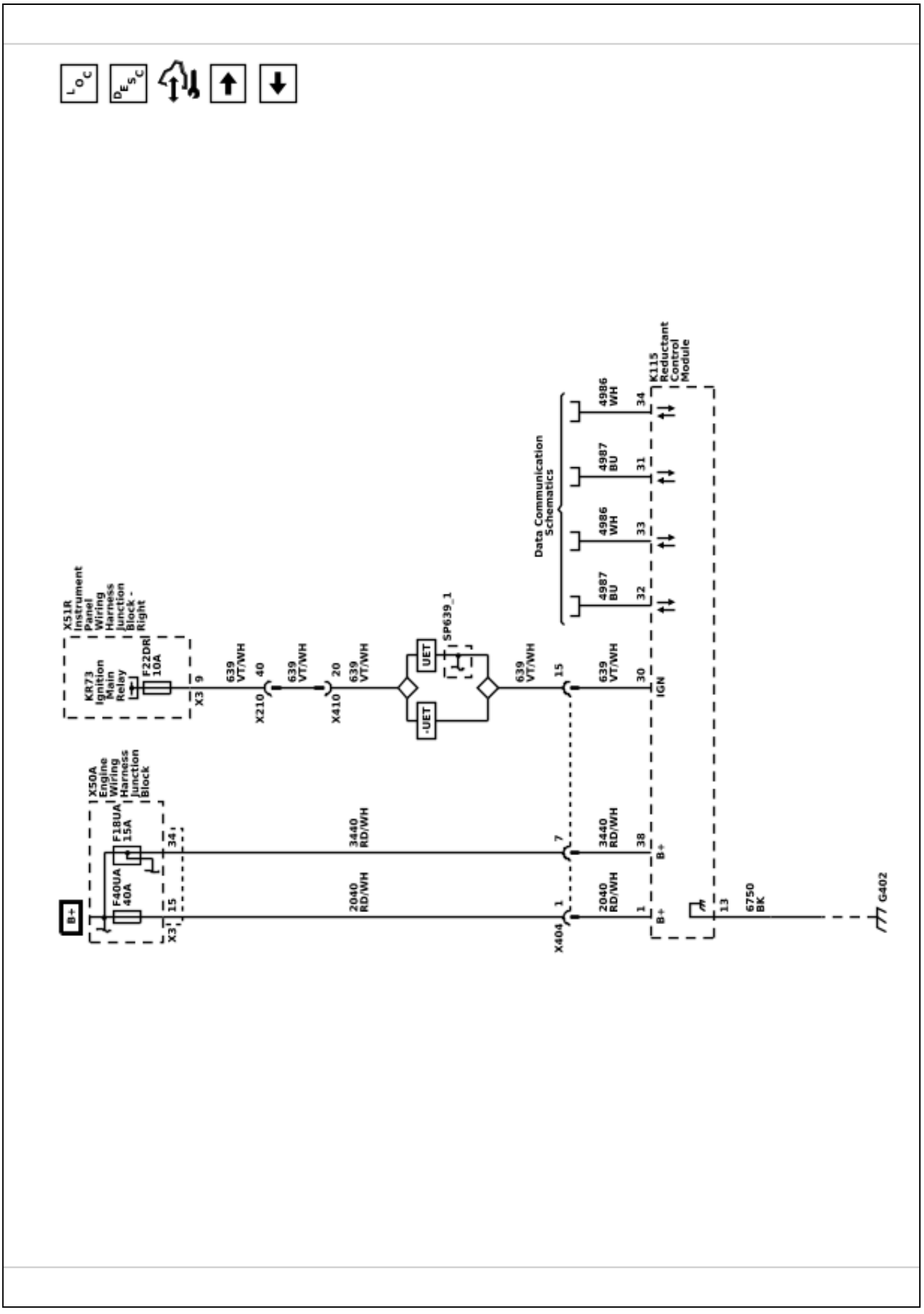
Engine Controls Schematics (Fuel Controls - Fuel Filter)



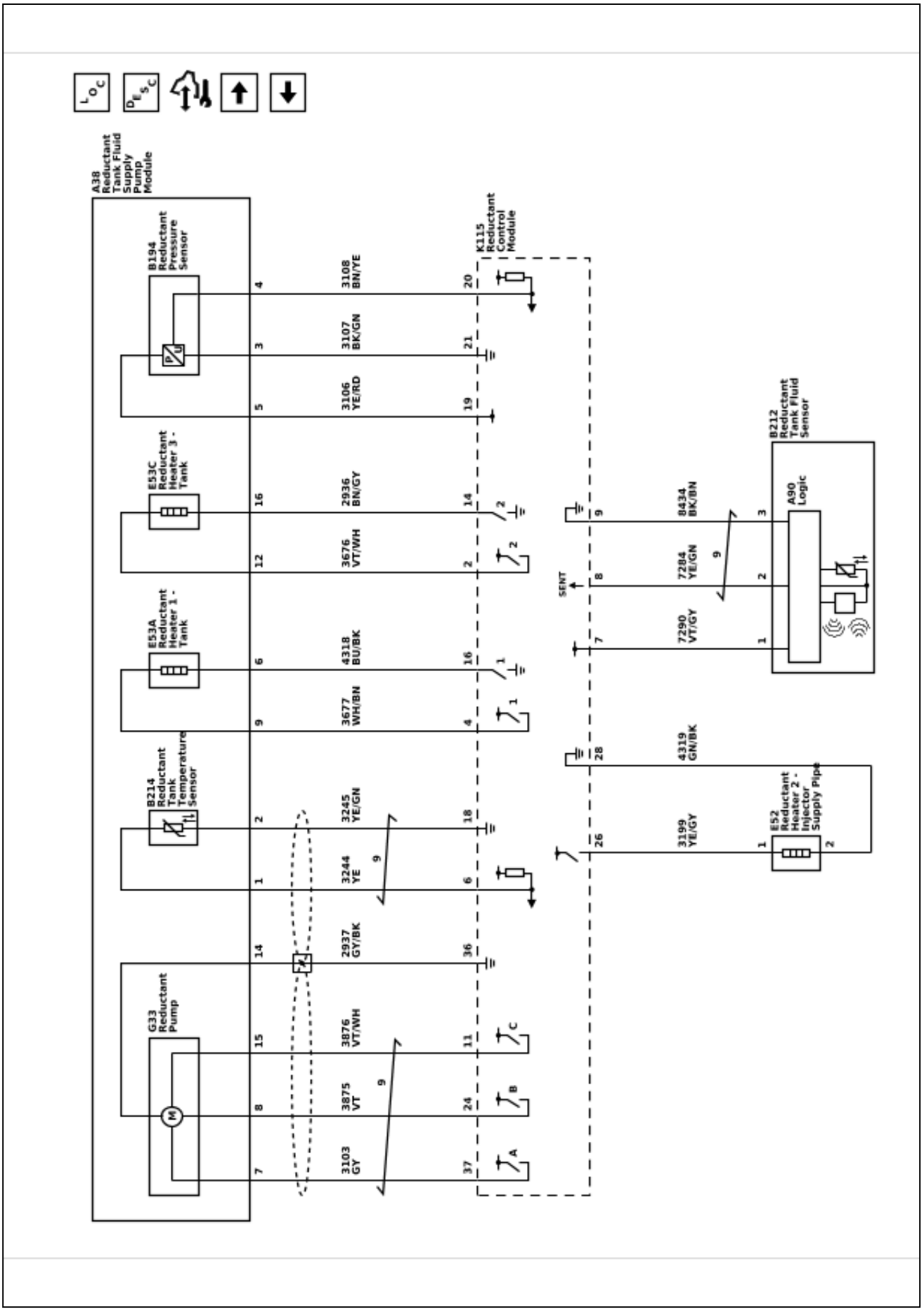
Engine Controls Schematics (Glow Plugs)



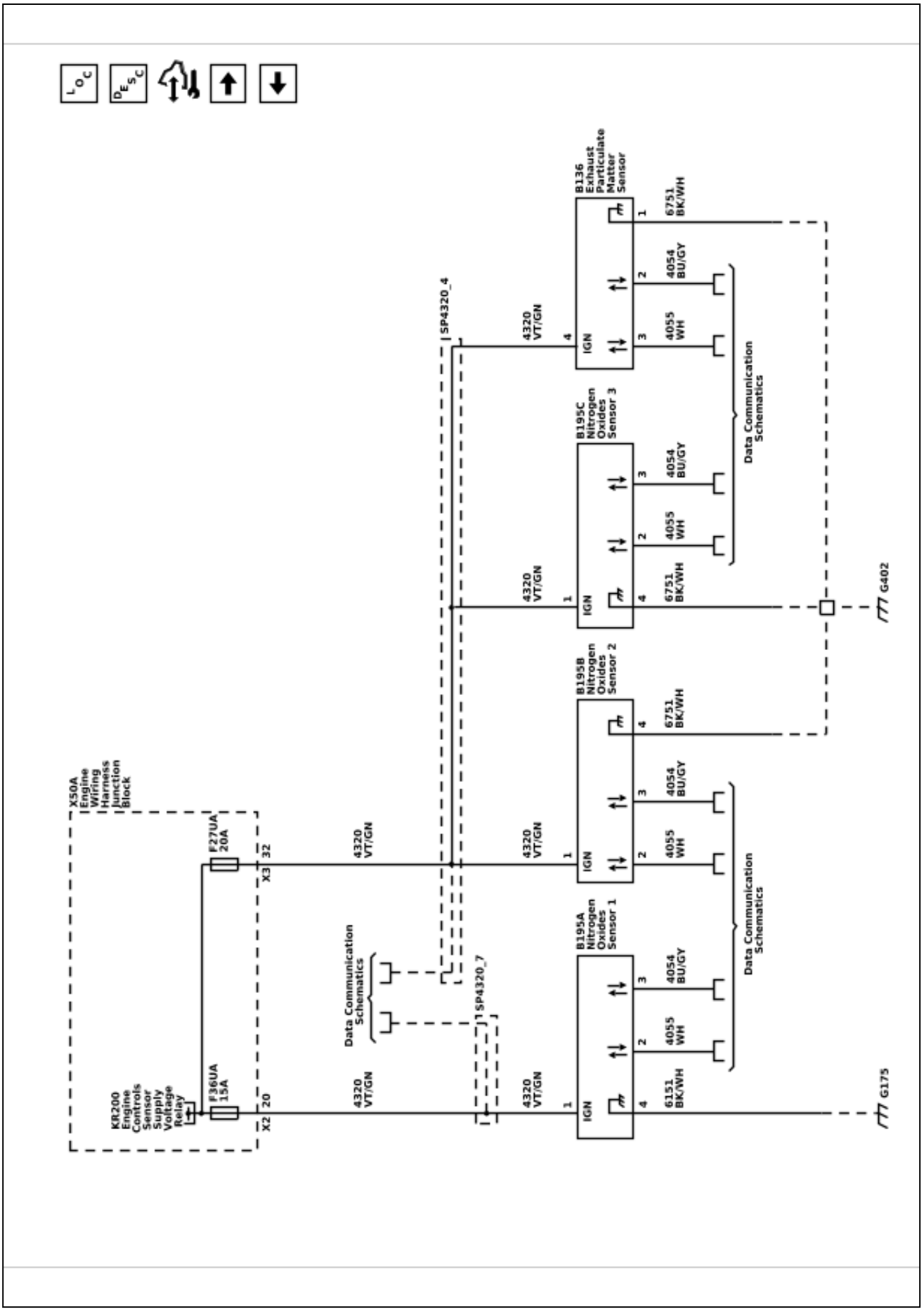
Engine Controls Schematics (Reductant Controls - Module Power, Ground, and Serial Data)



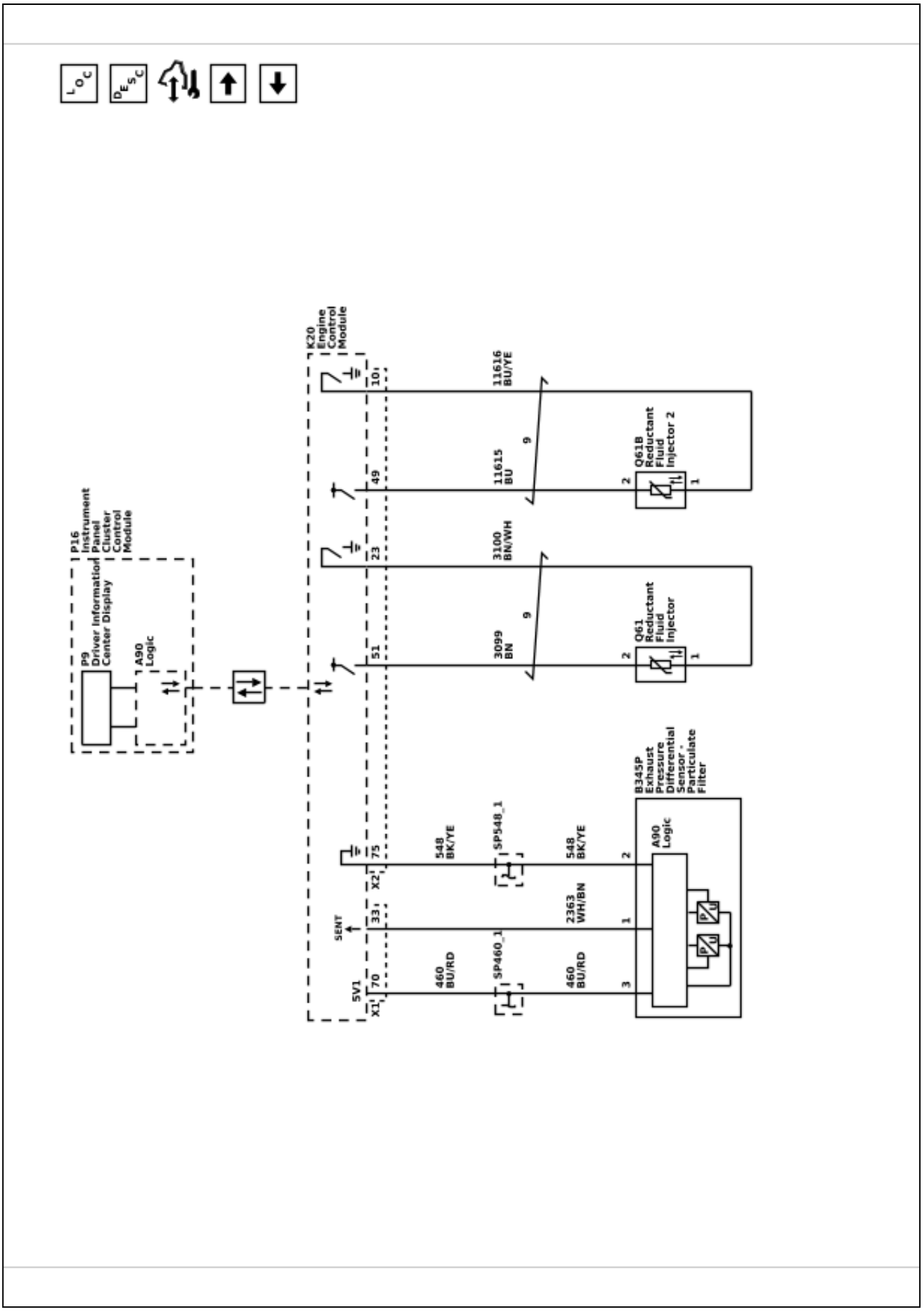
Engine Controls Schematics (Reductant Controls - Reductant Tank Fluid Supply Pump Module, Line Heater, and Reductant Tank Fluid Sensor)



Engine Controls Schematics (Reductant Controls - Nitrogen Oxide Sensors and Exhaust Particulate Matter Sensor)

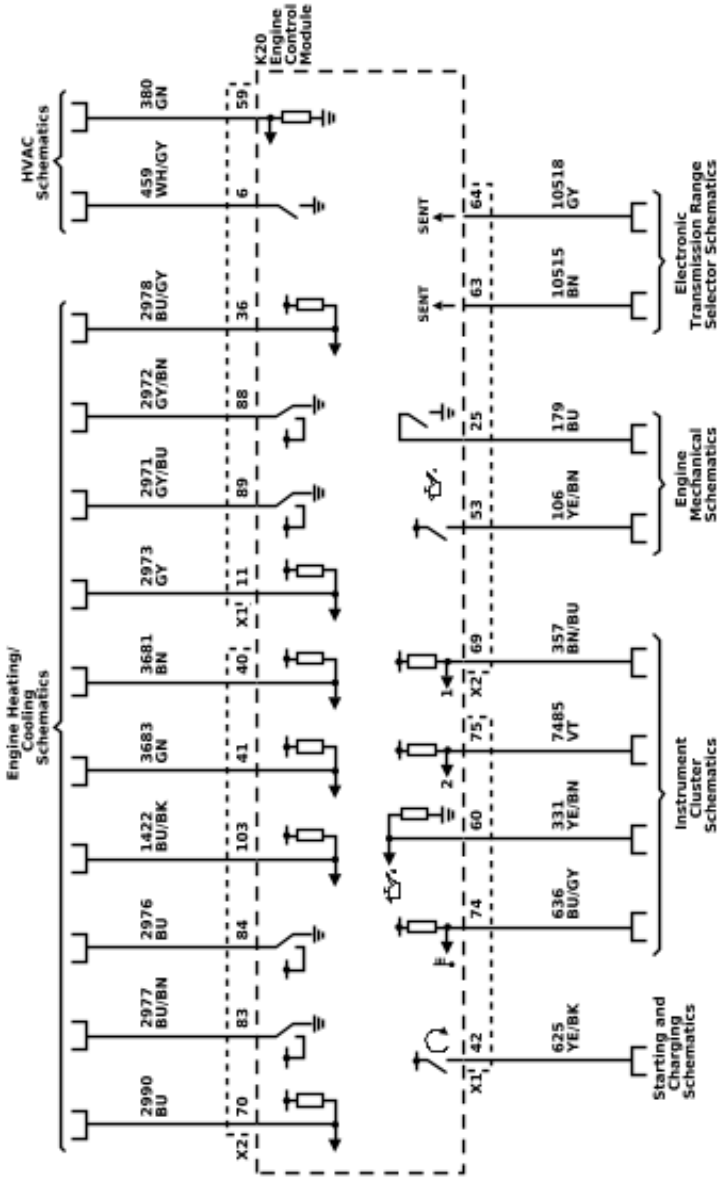


Engine Controls Schematics (Reductant Controls - Reductant Fluid Injector and Particulate Filter Pressure Sensor)



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Engine Controls Schematics (Controlled/Monitored Subsystem References)



Description and Operation

Inspection/Maintenance Description and Operation

Some state/provincial and local governments require that a vehicle pass on-board diagnostic (OBD) system tests and the Inspection/Maintenance (I/M) emission inspection in order to renew license plates. This is accomplished by viewing the I/M System monitors on a scan tool and confirming that no Permanent DTCs are set.

The OBD II system monitors all emission control systems that are on-board. The OBD II regulations require monitoring of the following:

Monitor	Diesel	Gasoline
Boost System Monitor - Since Diagnostic Trouble Codes Cleared	X	—
Catalytic Converter Monitor - Since Diagnostic Trouble Codes Cleared	X	X
Evaporative Emission Monitor - Since Diagnostic Trouble Codes Cleared	—	X
Exhaust Aftertreatment Monitor - Since Diagnostic Trouble Codes Cleared	X	—
Exhaust Gas Recirculation Valve/Camshaft Position Monitor - Since Diagnostic Trouble Codes Cleared	X	X
Exhaust Gas Sensor Monitor - Since Diagnostic Trouble Codes Cleared	X	—
Fuel System Monitor - Since Diagnostic Trouble Codes Cleared	X	X
Heated Catalytic Converter Monitor - Since Diagnostic Trouble Codes Cleared	—	X
Misfire Monitor - Since Diagnostic Trouble Codes Cleared	X	X
Oxygen Sensor Heater Monitor - Since Diagnostic Trouble Codes Cleared	—	X
Oxygen Sensor/Heated Oxygen Sensor Monitor - Since Diagnostic Trouble Codes Cleared	—	X
Particulate Filter Monitor - Since Diagnostic Trouble Codes Cleared	X	X

I/M System Status

Each system monitor requires at least one, and sometimes several diagnostic tests. The result of each test is reported by a DTC. A system monitor is Complete when either all of the DTCs comprising the monitor have run and passed, or when any one of the DTCs comprising the monitor has illuminated the malfunction indicator lamp (MIL). For example, when the Oxygen Sensor Heater Monitor indicates Complete, all of the oxygen sensor heaters have been diagnosed. If the vehicle has 4 heated oxygen sensors, all 4 heaters have been diagnosed.

Once the system monitor is complete, the I/M System Status parameter will display Complete in the value column of the scan tool. Any monitor that is not applicable to a vehicle will display Not Supported in the scan tool value column. The I/M System Status parameter will display Incomplete in the value column when any of the required tests for that system have not run. The following is a list of conditions that would set the I/M System Status monitor to Incomplete:

- The vehicle is new from the factory and has not yet been driven through the necessary drive conditions to complete the tests.
- The battery has been disconnected or discharged below operating voltage.
- The control module power or ground has been interrupted.
- The control module has been programmed.
- The control module DTCs have been cleared.

Permanent DTCs

Permanent DTCs are defined as confirmed fault codes that are currently commanding the MIL on and stored in non-volatile memory. Permanent DTCs cannot be erased by any scan tool command or by disconnecting power to the controller.

The intended use of this data is to prevent vehicles from passing an I/M inspection by disconnecting the battery or clearing codes with a scan tool prior to the inspection. The presence of Permanent DTCs at an inspection without the MIL illuminated is an indication that a proper repair was not verified by the OBD II system.

Only the OBD II system can clear Permanent DTCs. The OBD II system must determine that the malfunction that caused the Permanent DTC to be stored no longer exists and is not commanding the MIL.

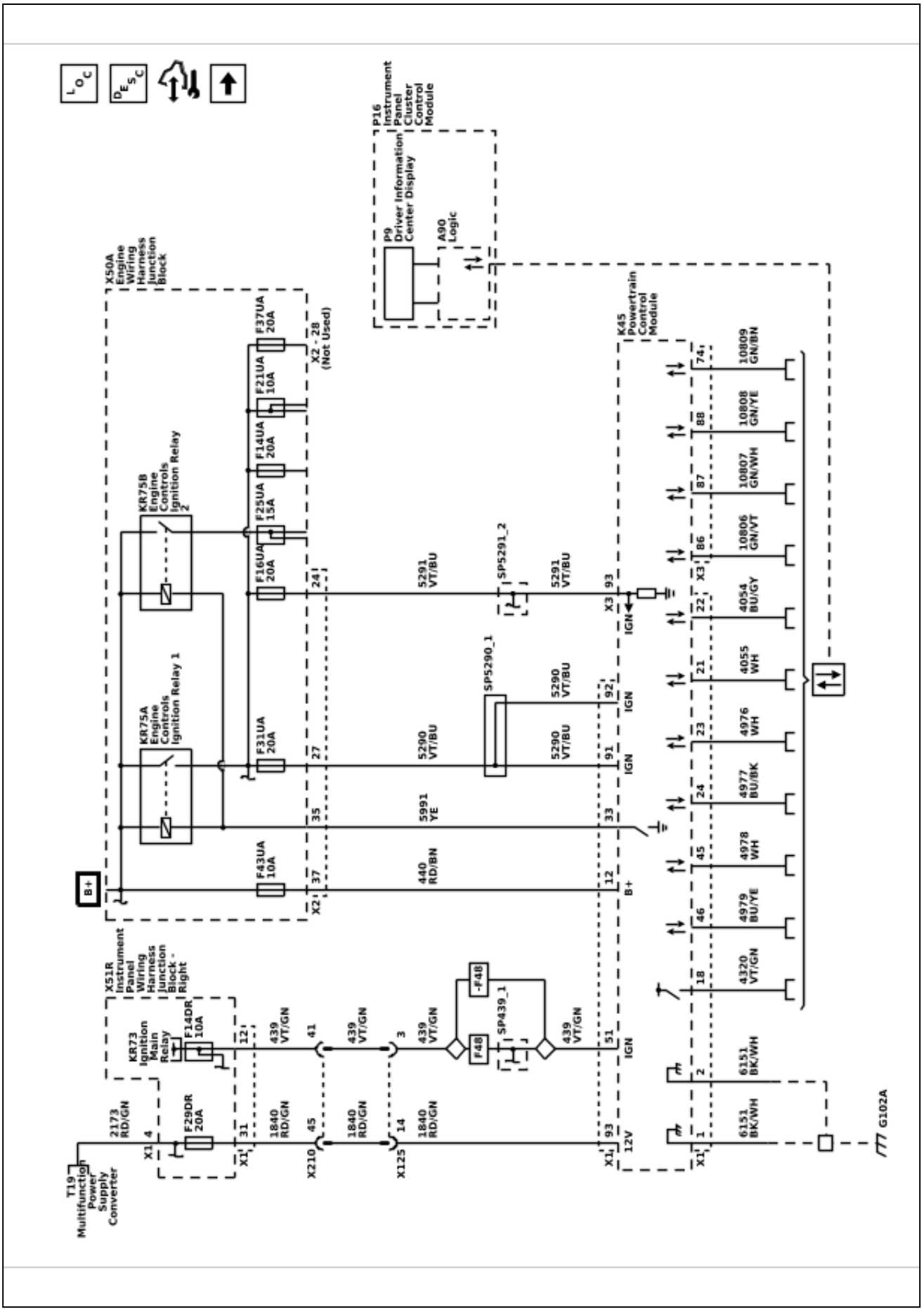
- If the MIL goes out naturally due to 3 passing drive cycles (scan tool code clear is not used), then the Permanent DTC is cleared at power down of the last drive cycle.
- If a scan tool code clear is used to turn off the MIL then the Permanent DTC is not cleared, the DTC must PASS and not FAIL. The Permanent DTC is cleared at power down of the drive cycle.

- If the controller is programmed, all Permanent DTCs are cleared.

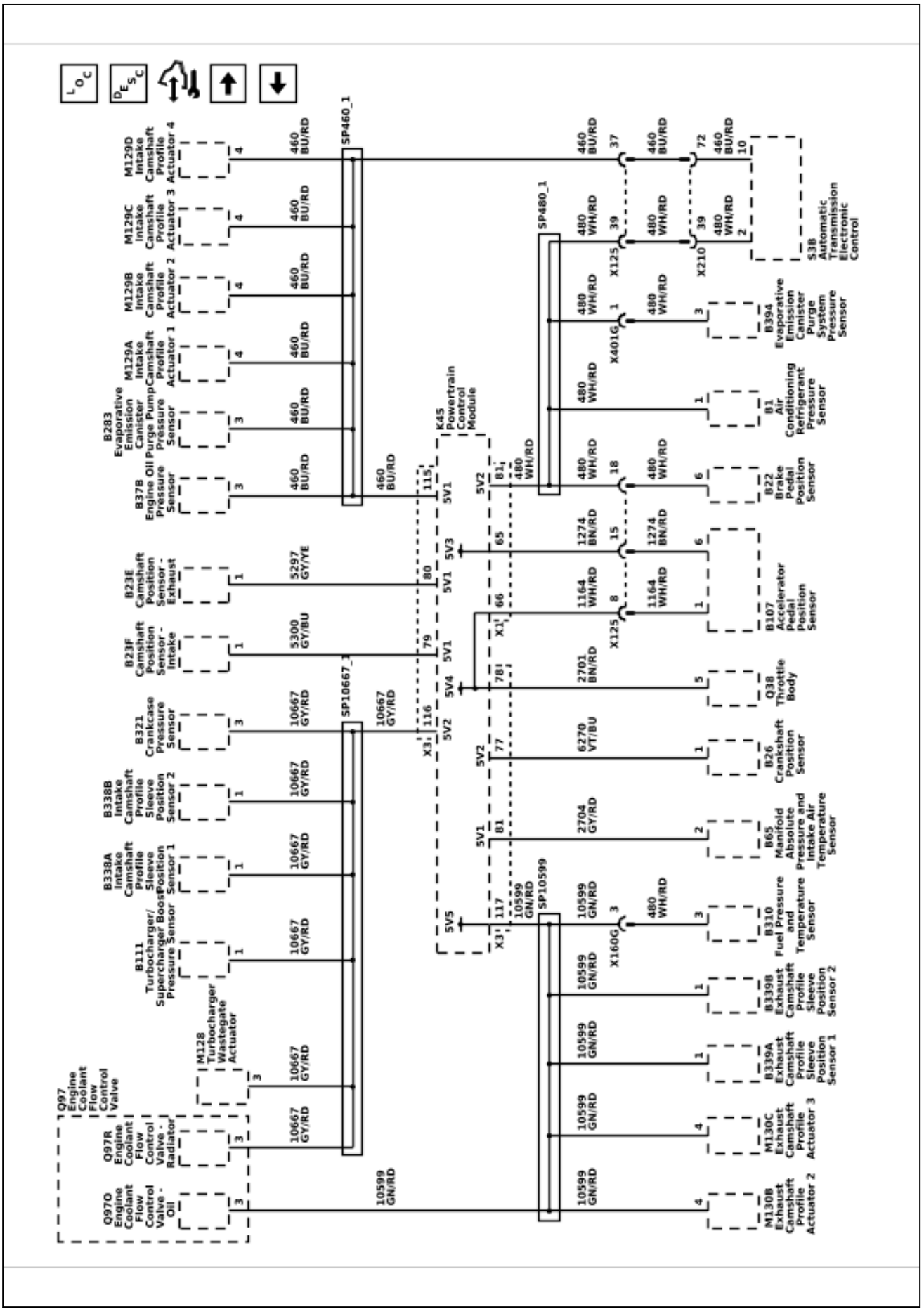
Engine Controls and Fuel - 2.7L

Schematic and Routing Diagrams

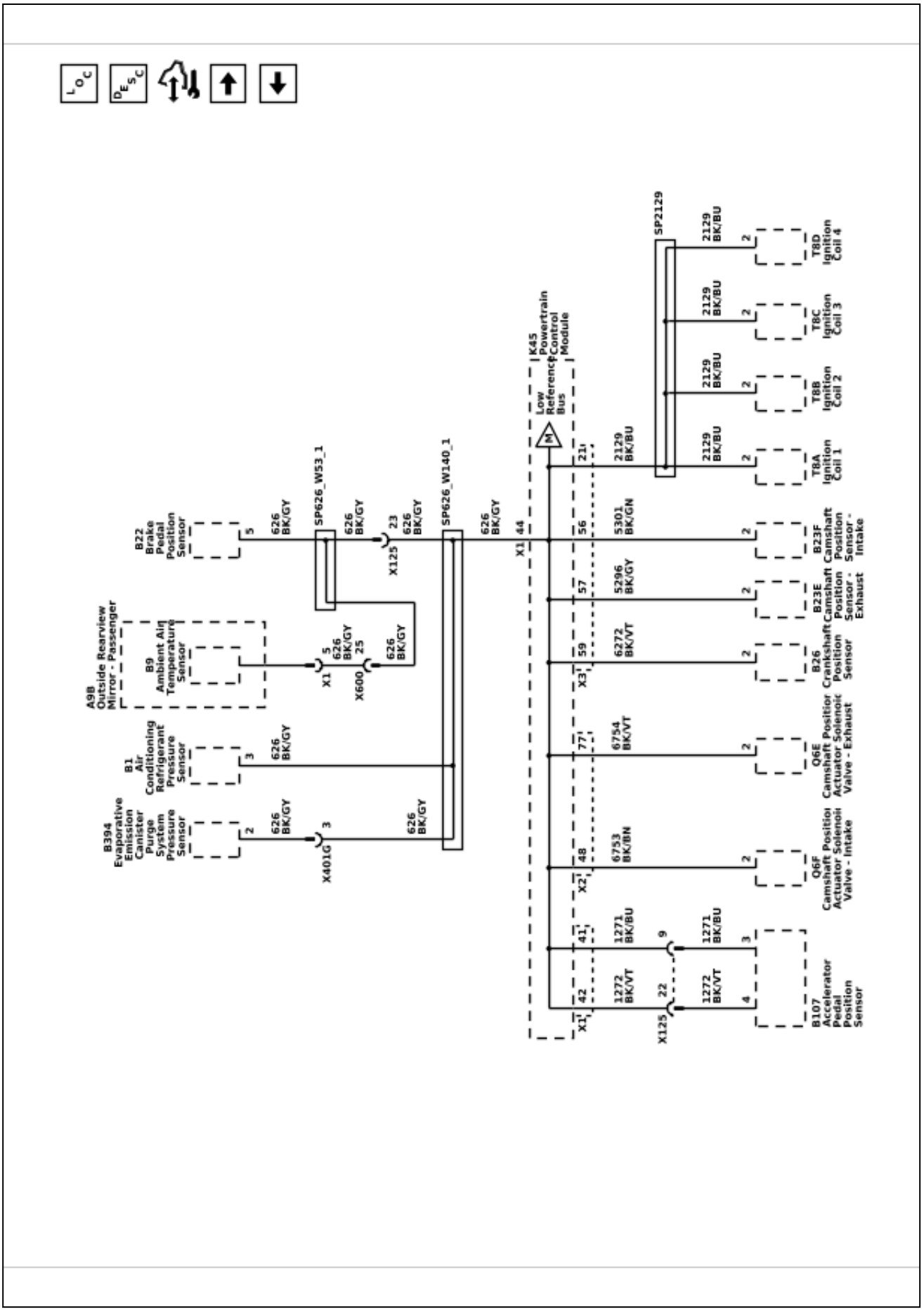
Engine Controls Schematics (Powertrain Control Module Power, Ground, Serial Data, and MIL)



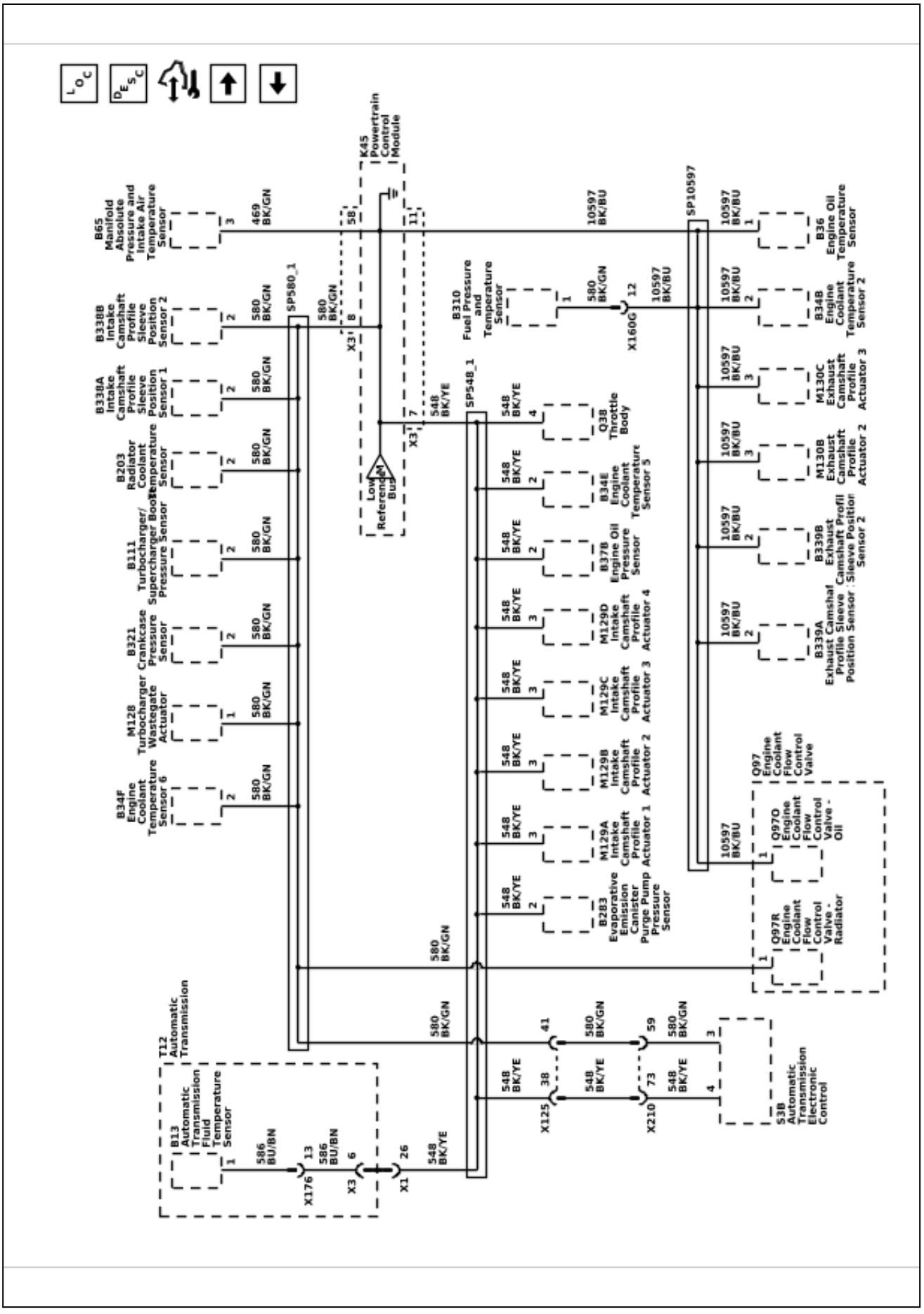
Engine Controls Schematics (5V Reference Bus)



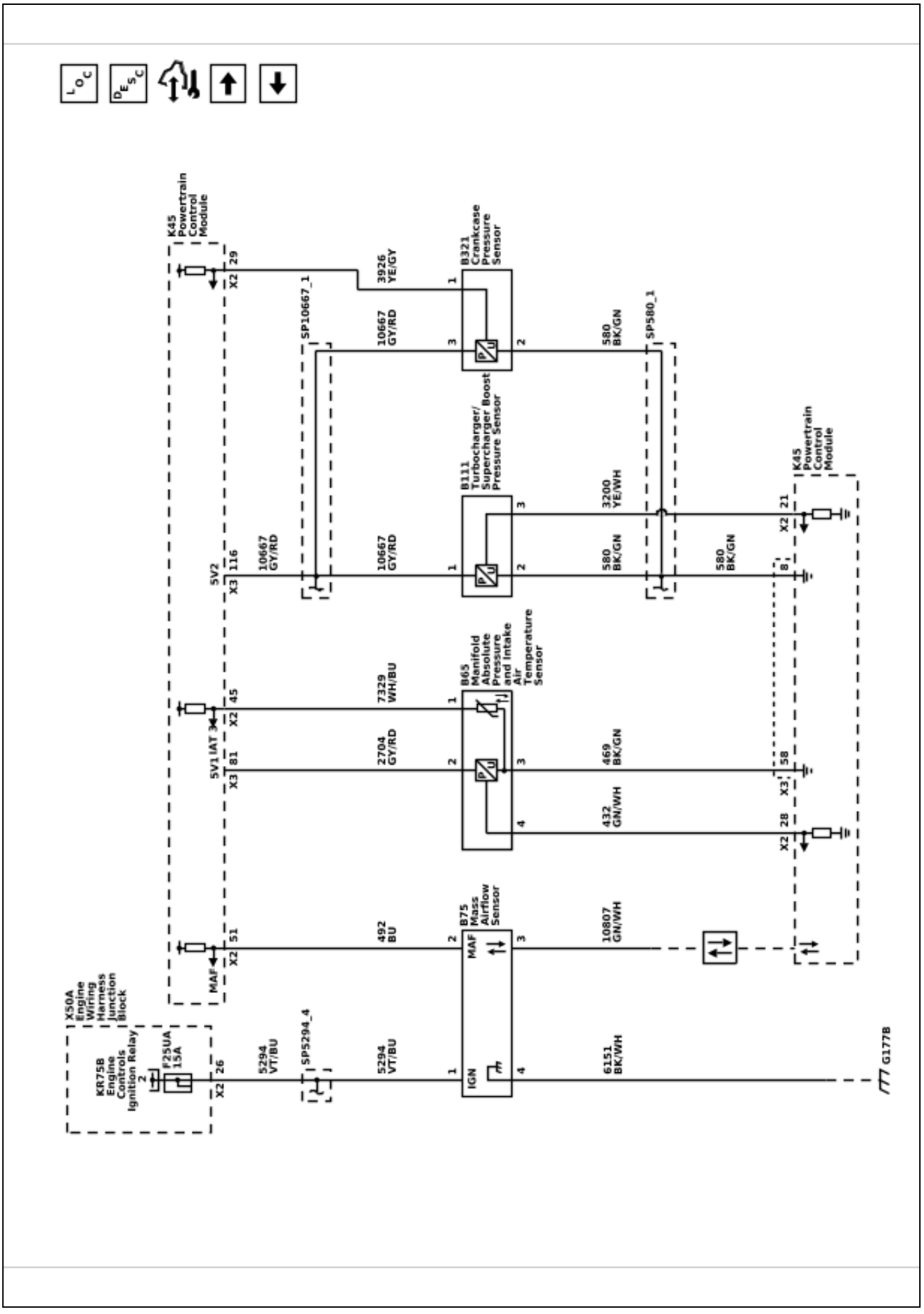
Engine Controls Schematics (Low Reference Bus - 1 of 2)



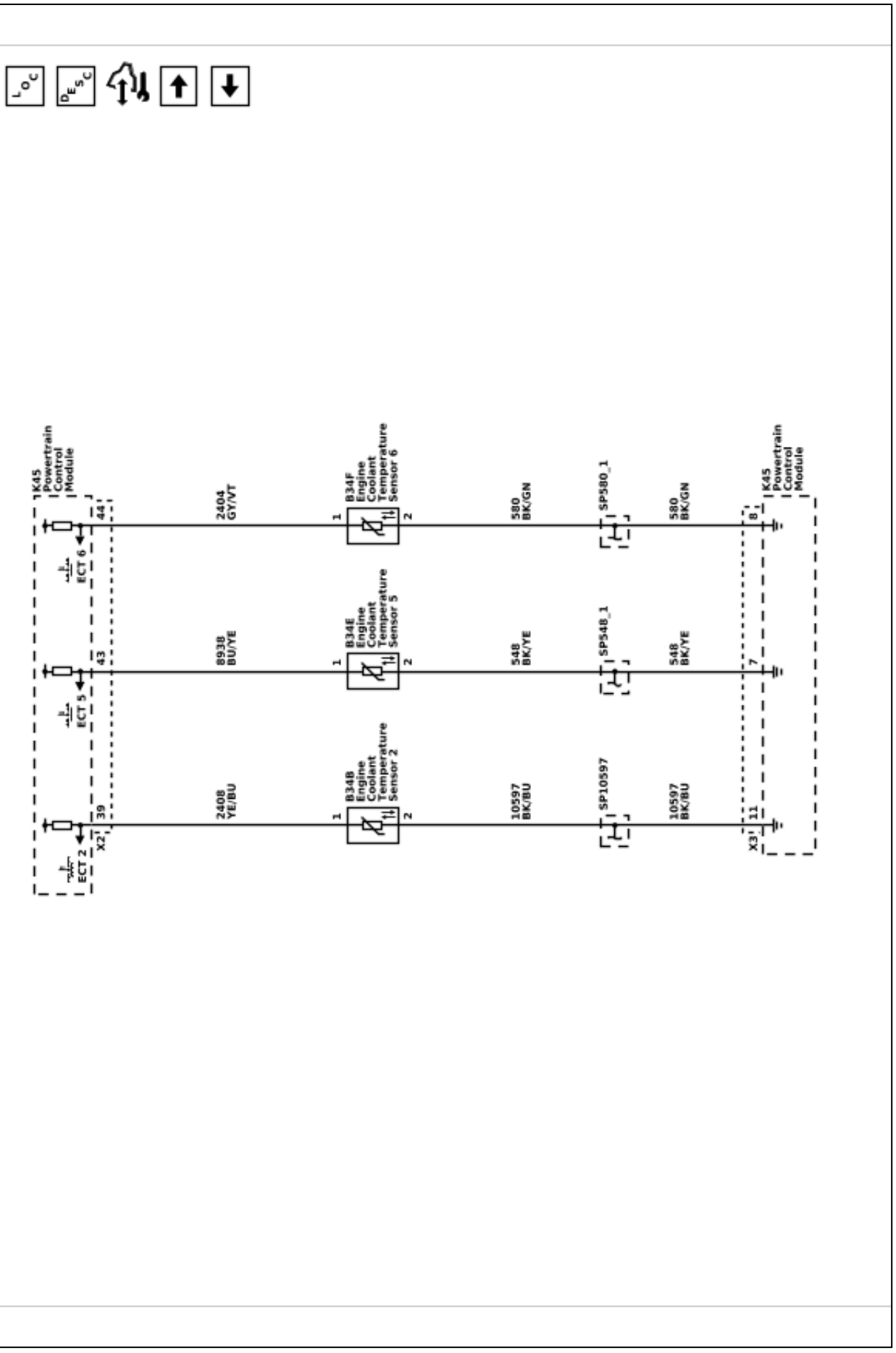
Engine Controls Schematics (Low Reference Bus - 2 of 2)



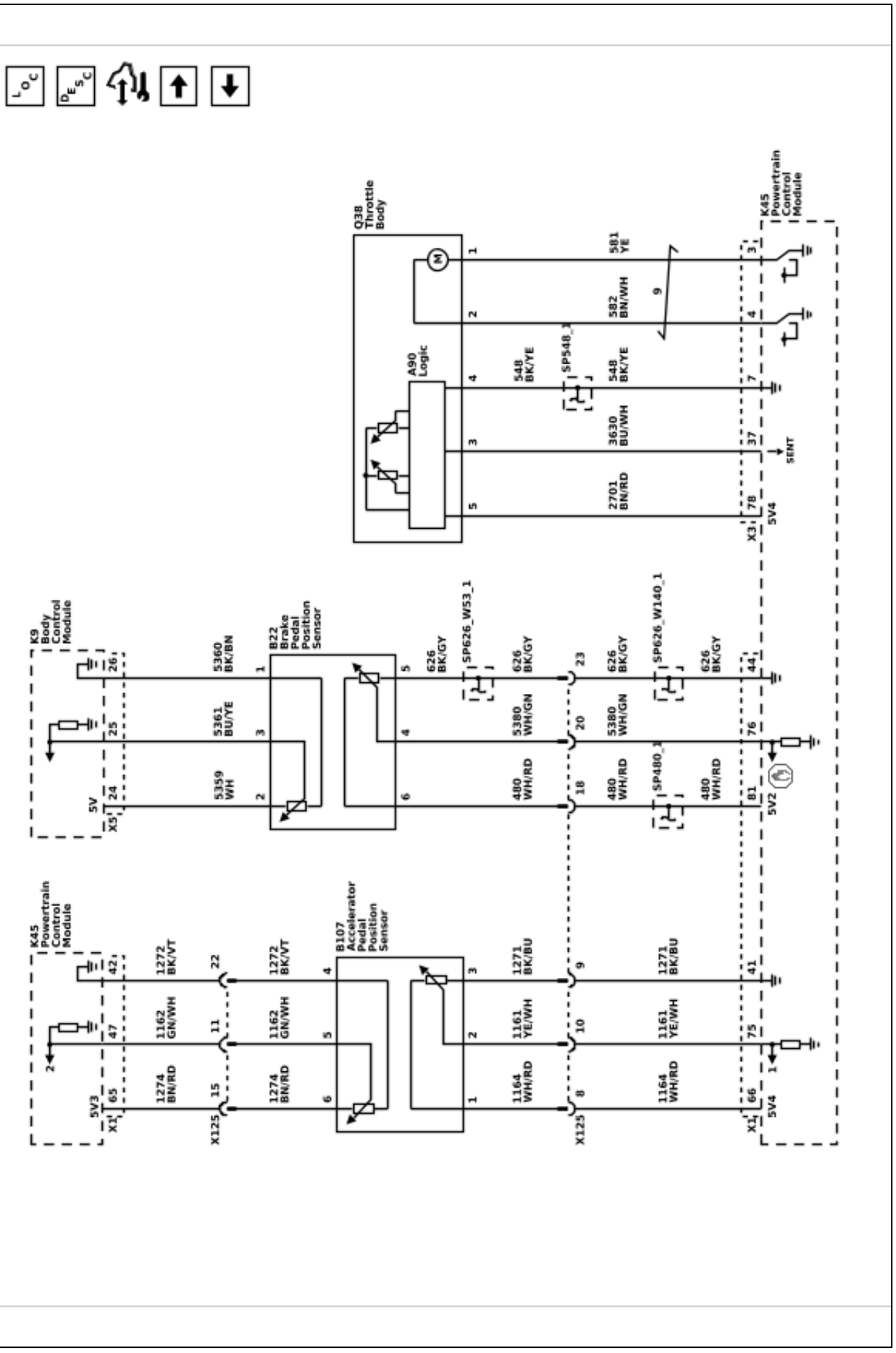
Engine Controls Schematics (Engine Data Sensors - Air Pressure and Temperature)



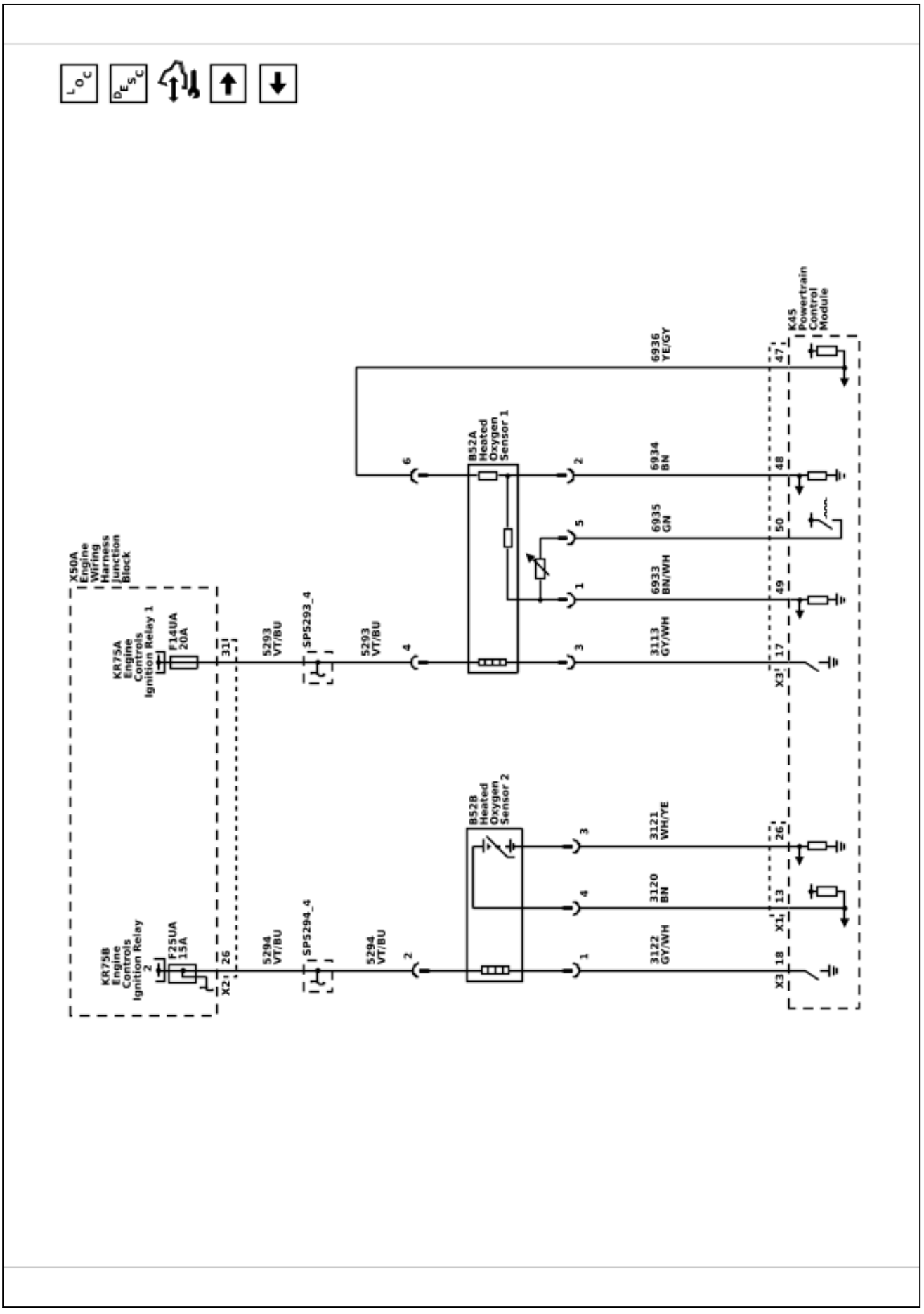
Engine Controls Schematics (Engine Data Sensors - Coolant Temperature)



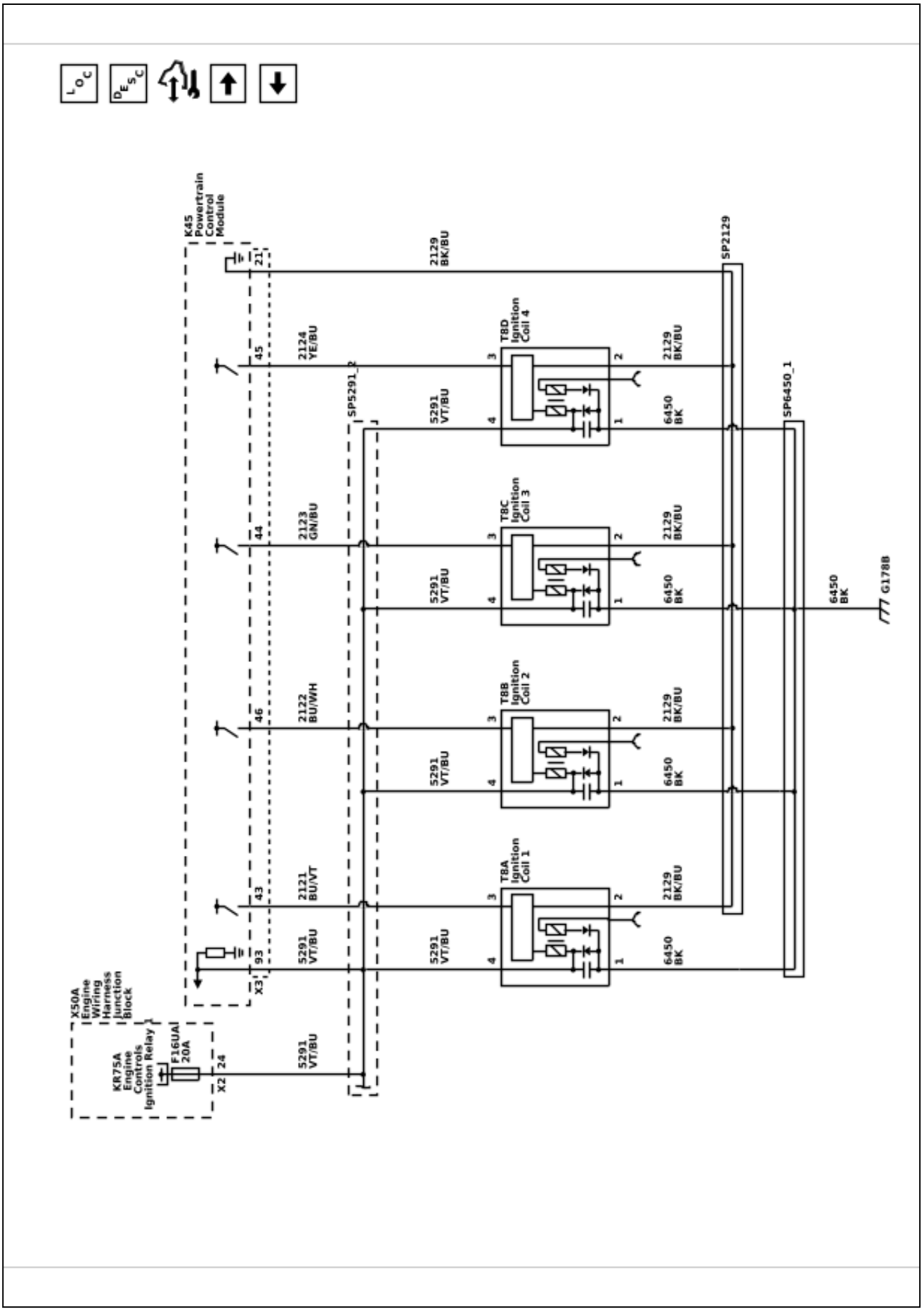
Engine Controls Schematics (Engine Data Sensors - Throttle Controls and Override)



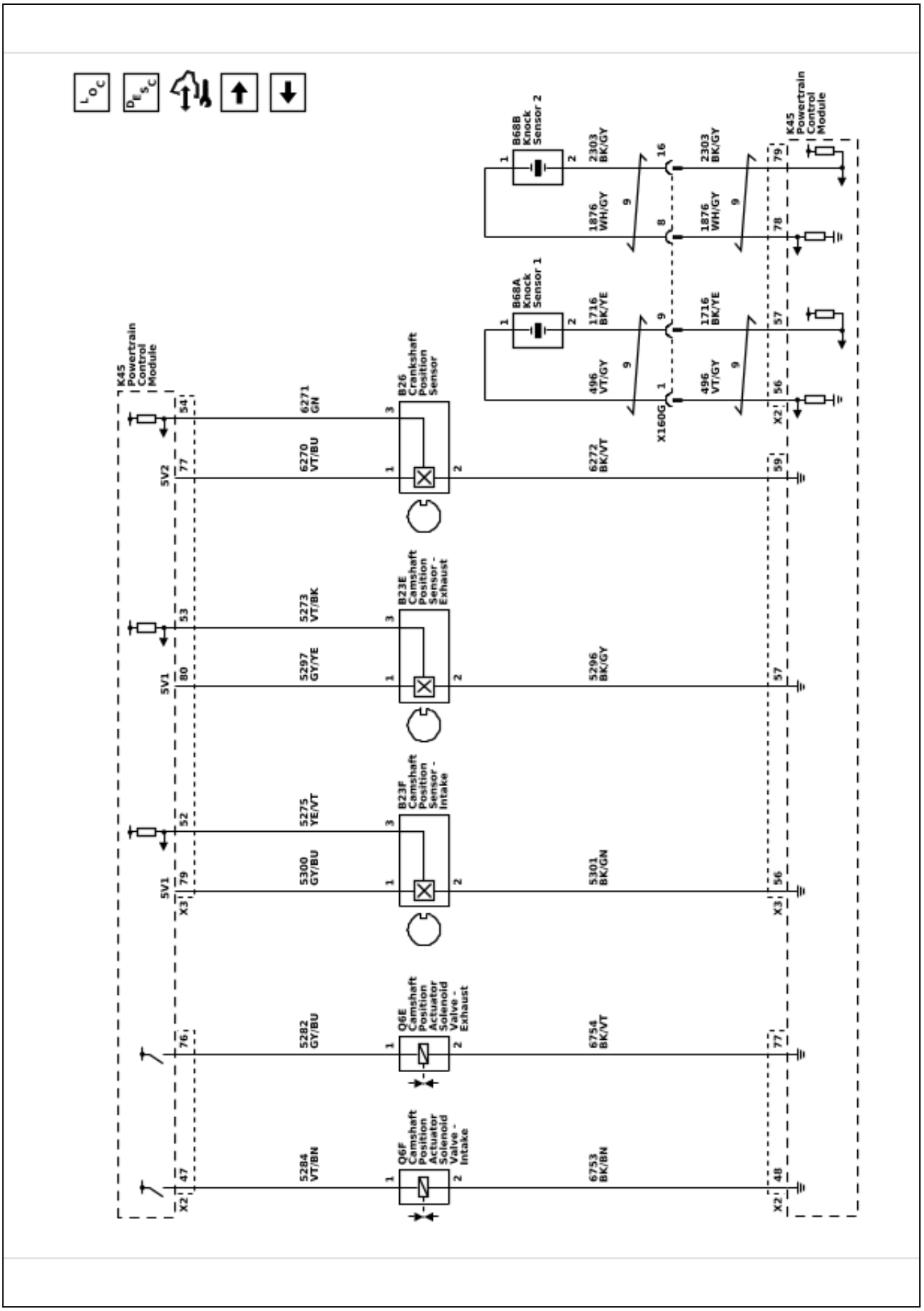
Engine Controls Schematics (Engine Data Sensors - Oxygen Sensors)



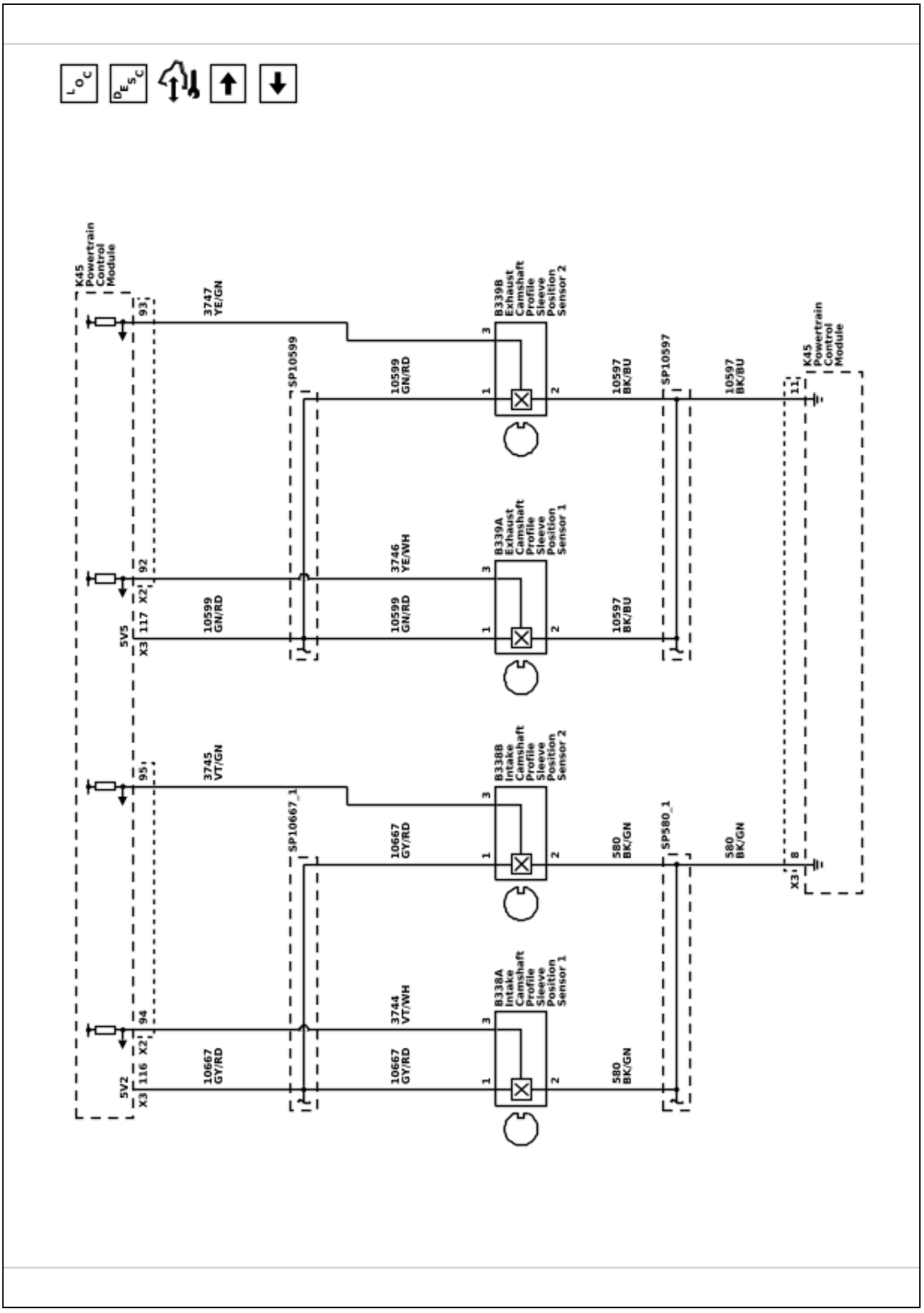
Engine Controls Schematics (Ignition Controls - Ignition Coils)



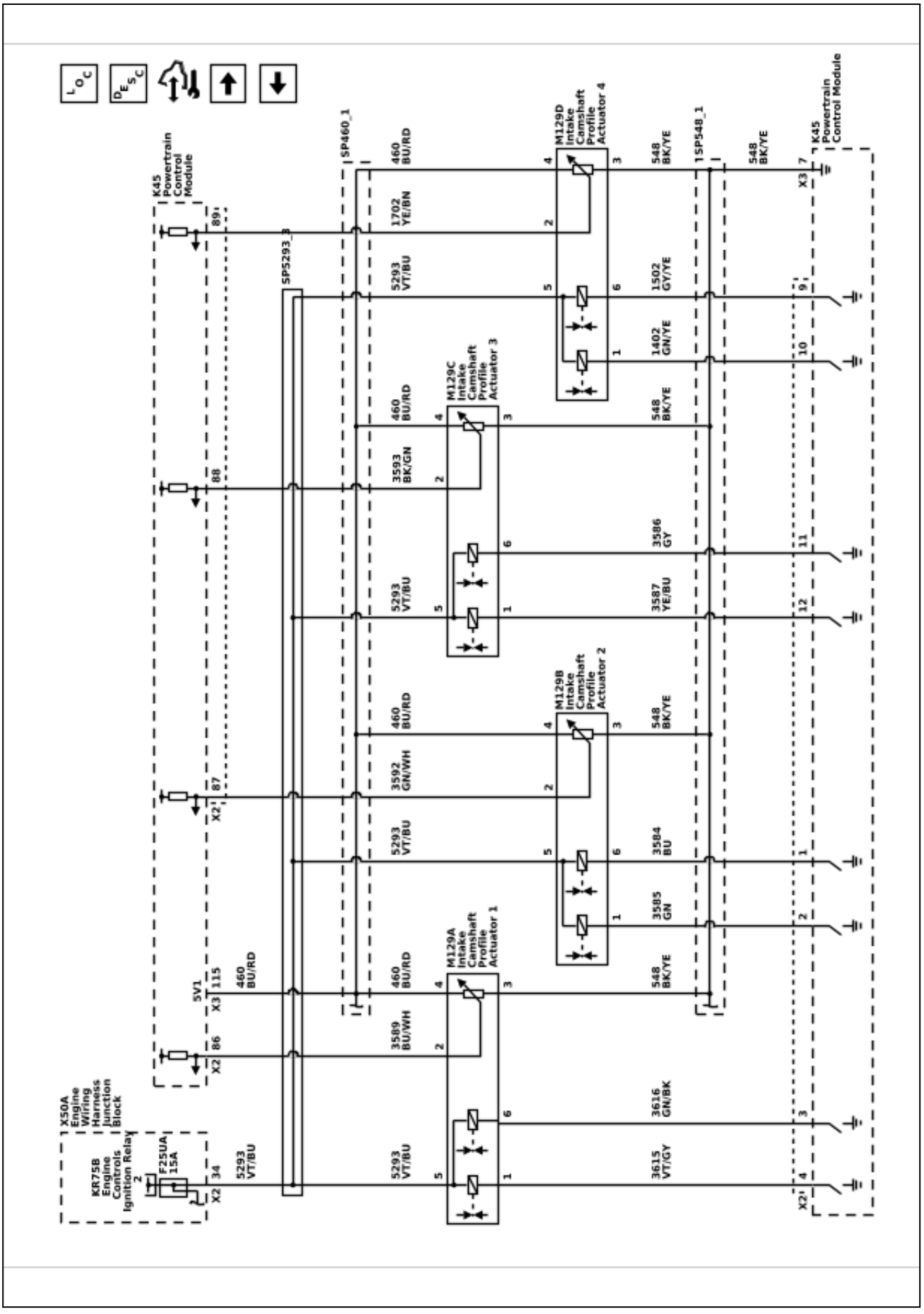
Engine Controls Schematics (Ignition Controls - Crankshaft Position, Camshaft Position, Knock Sensors and Camshaft Position Actuator)



Engine Controls Schematics (Camshaft Profile Controls - Position Sensors)

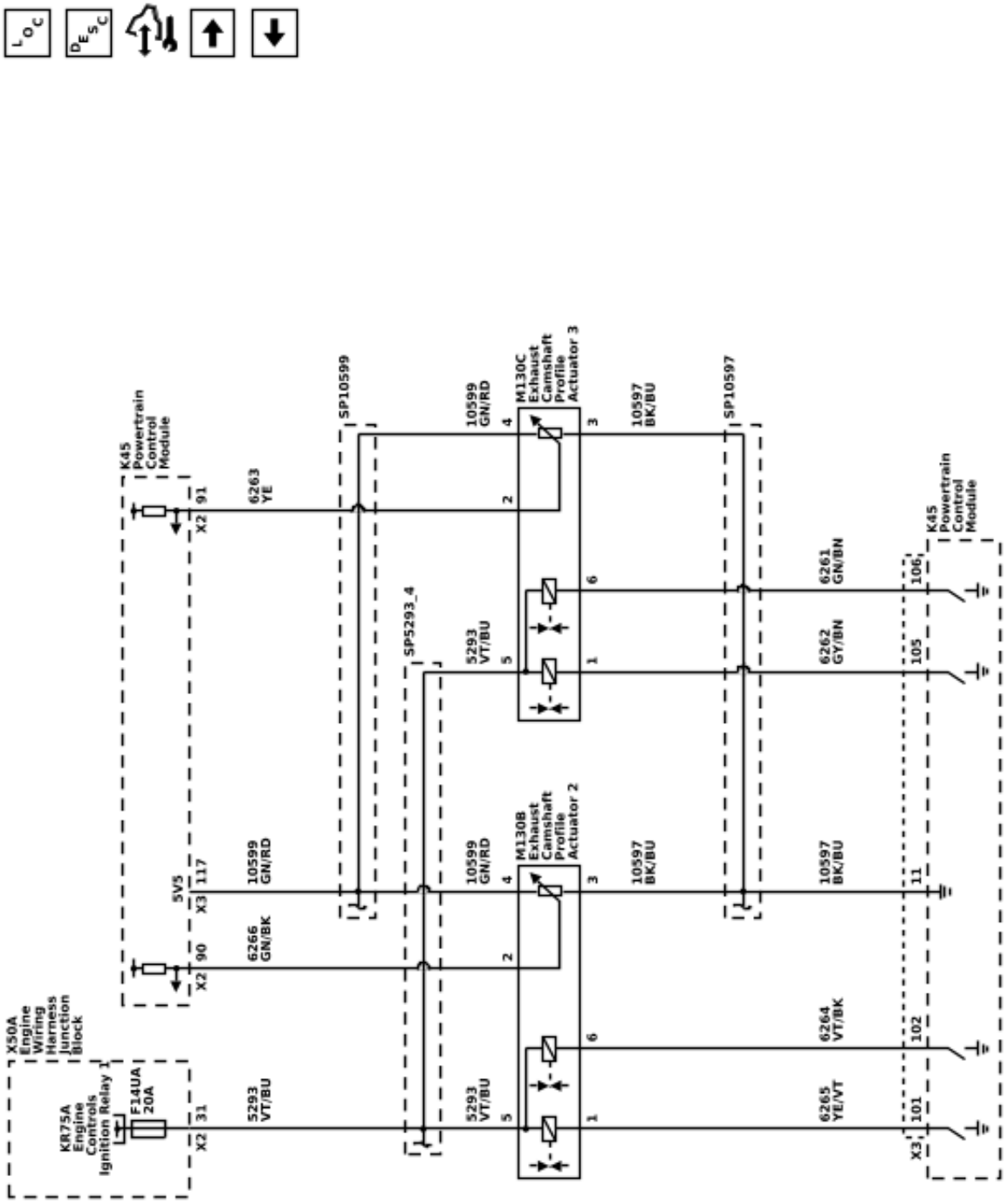


Engine Controls Schematics (Camshaft Profile Controls - Intake Actuators)

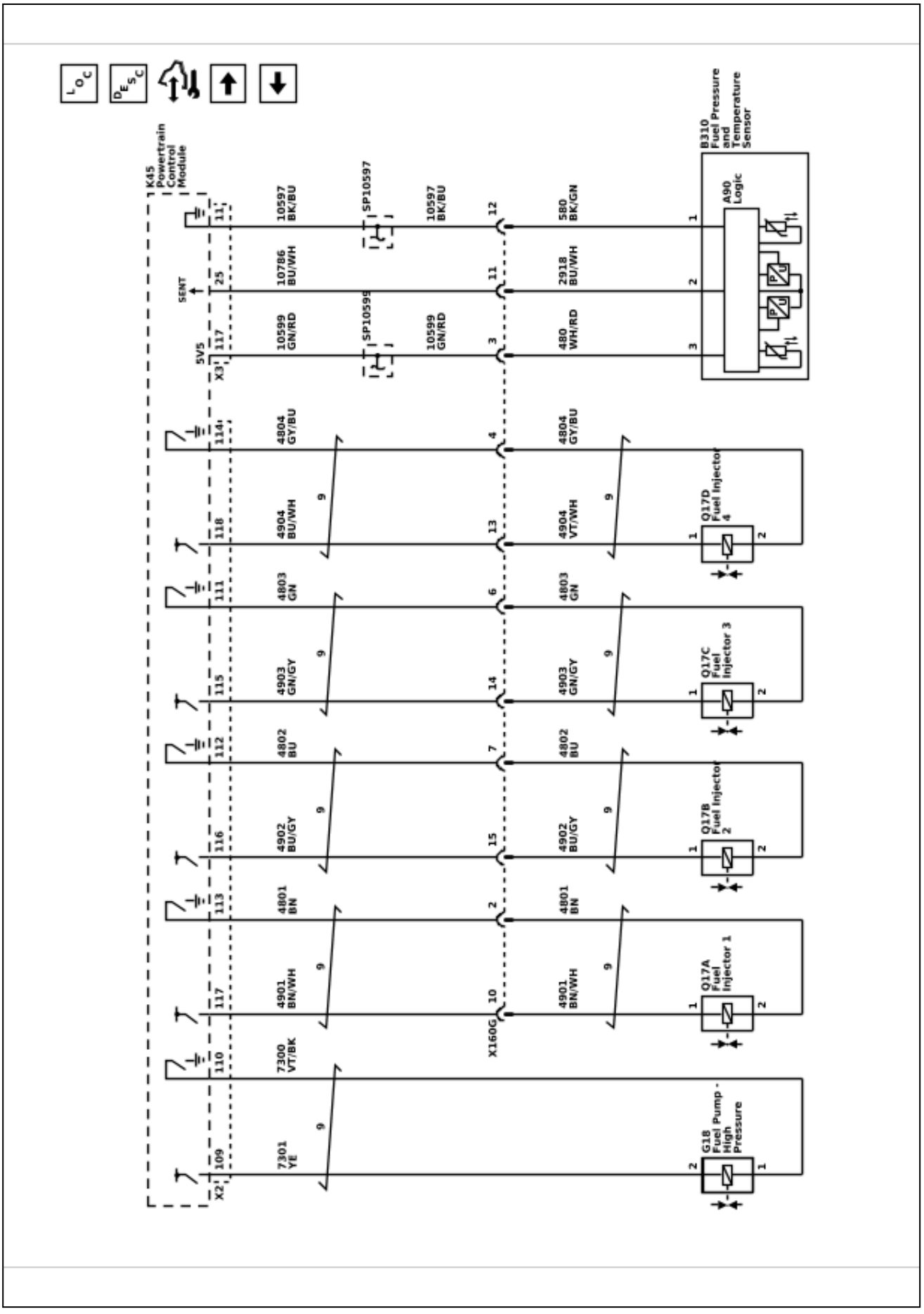


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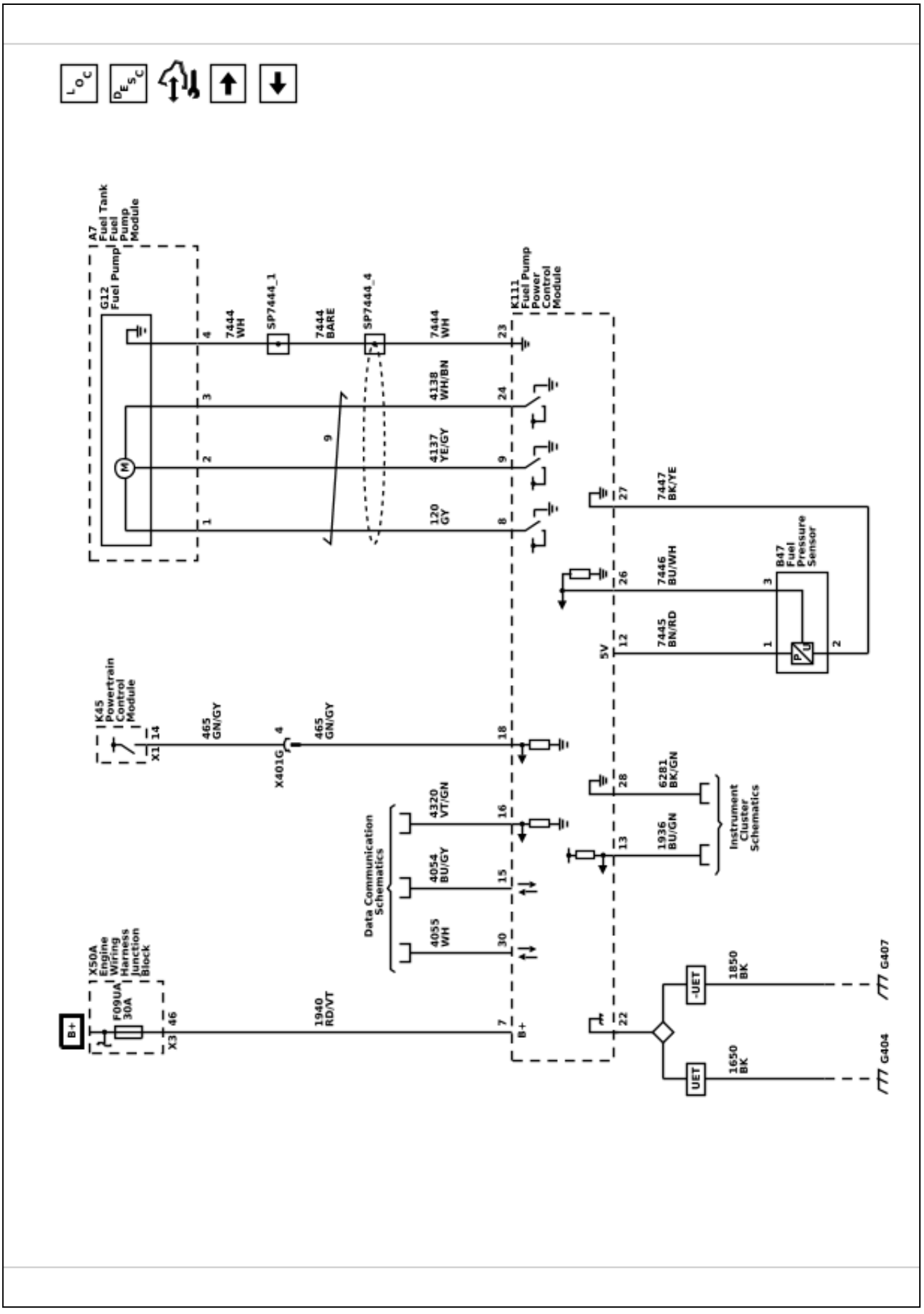
Engine Controls Schematics (Camshaft Profile Controls - Exhaust Actuators)



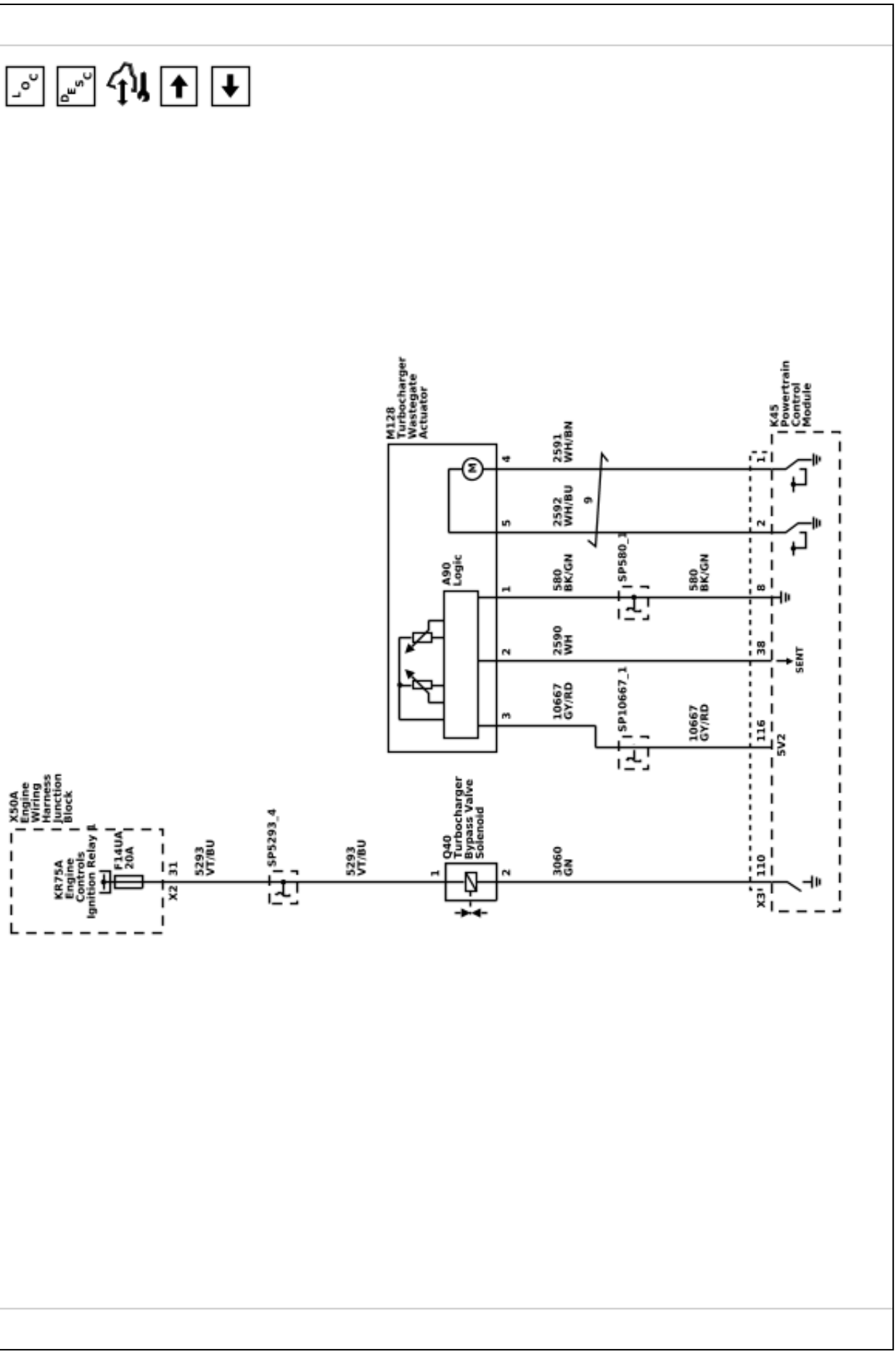
Engine Controls Schematics (Fuel Controls - Fuel Injectors and Fuel Pressure)



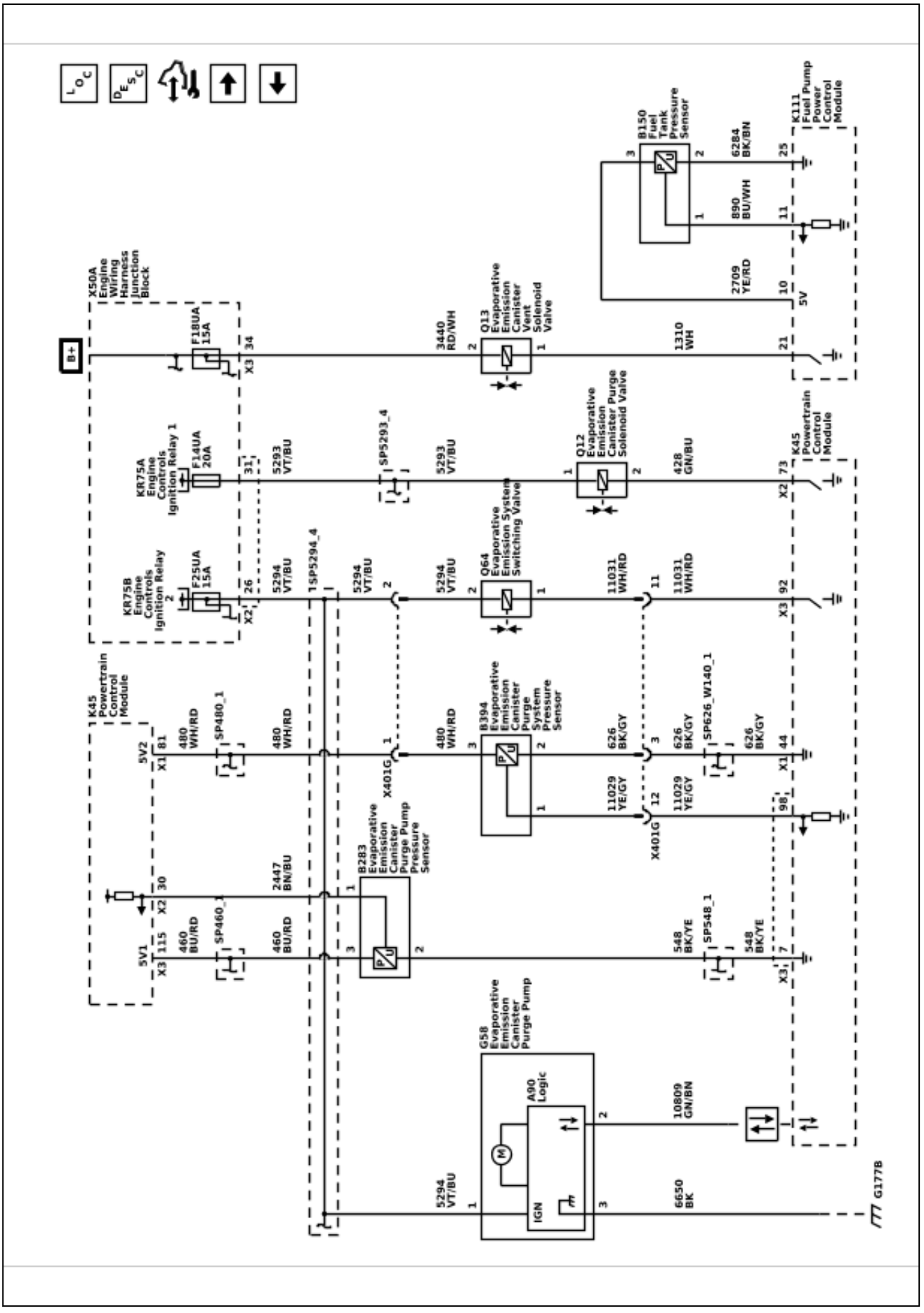
Engine Controls Schematics (Fuel Controls - Fuel Pump Control)



Engine Controls Schematics (Fuel Controls - Turbocharger Controls)

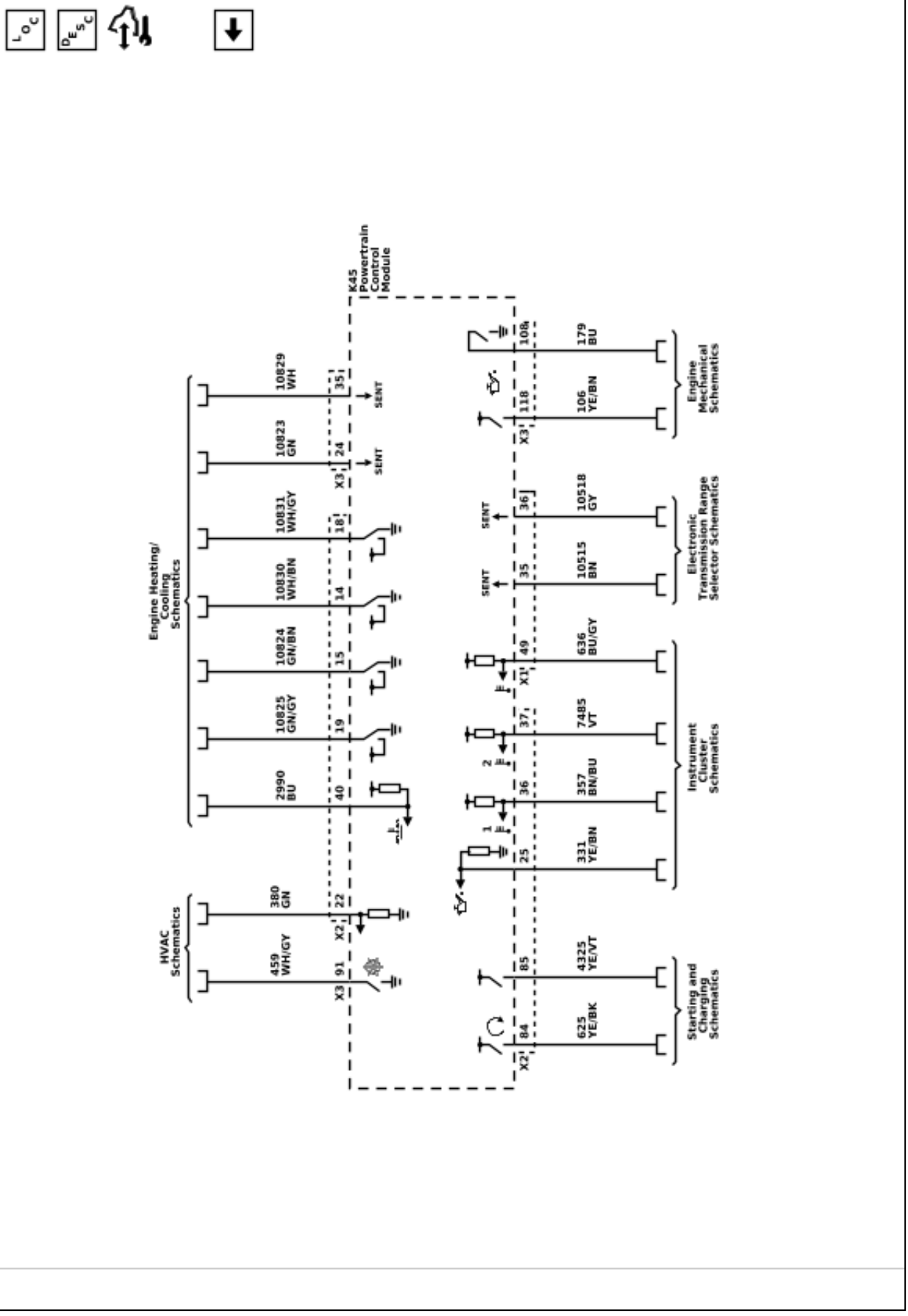


Engine Controls Schematics (Fuel Controls - Evaporative Emissions Controls)



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Engine Controls Schematics (Controlled/Monitored Subsystem References)



Description and Operation

Heated Oxygen Sensor Description and Operation

The engine control module (ECM) controls a closed loop air/fuel metering system in order to provide the best possible combination of driveability, fuel economy, and emission control. The ECM monitors the heated oxygen sensor (HO2S) signal and adjusts the fuel delivery based on the signal while in closed loop operation. The short term fuel trim values change rapidly in response to the HO2S signal. These changes fine tune the engine fueling. The long term fuel trim values change in response to trends in the short term fuel trim. The long term fuel trim makes coarse adjustments to fueling in order to re-center and restore control to short term fuel trim.

Heated Oxygen Sensor

When the engine is started, the ECM operates in an Open Loop mode, ignoring the HO2S signal voltage while calculating the air-to-fuel ratio. While the engine runs, the HO2S heats up and begins to generate a voltage within a range of 0–1,000 mV. Once sufficient HO2S voltage fluctuation is observed by the ECM, Closed Loop mode is entered. The ECM uses the HO2S voltage to determine the air-to-fuel ratio. An HO2S voltage that increases toward 1,000 mV indicates a rich fuel mixture. An HO2S voltage that decreases toward 0 mV indicates a lean fuel mixture.

Heated oxygen sensors are used for fuel control and post catalyst monitoring. Each HO2S compares the oxygen content of the surrounding air with the oxygen content in the exhaust stream. The HO2S must reach operating temperature to provide an accurate voltage signal. A heating element inside the HO2S minimizes the time required for the sensor to reach operating temperature. This allows the system to enter Closed Loop earlier and the ECM to calculate the air-to-fuel ratio sooner. Voltage is provided to the heater by an ignition voltage circuit through a fuse. With the engine running, ground is provided to the heater by the HO2S heater low control circuit through a low side driver within the ECM. The ECM uses pulse width modulation (PWM) to control the HO2S heater operation to maintain a specific HO2S operating temperature range.

Wide Band Heated Oxygen Sensor

The wide band heated oxygen sensor (HO2S) measures the amount of oxygen in the exhaust system and provides more information than the switching style HO2S. The wide band sensor consists of an oxygen sensing cell, an oxygen pumping cell, and a heater. The exhaust gas sample passes through a diffusion gap between the sensing cell and the pumping cell. An electronic circuit within the ECM controls the pump current through the oxygen pumping cell in order to maintain a constant voltage in the oxygen sensing cell. The ECM monitors the voltage variation in the sensing cell and attempts to keep the voltage constant by increasing or decreasing the amount of current flow, or oxygen ion flow, from the pumping cell. By measuring the amount of current required to maintain the voltage in the sensing cell, the ECM can determine the concentration of oxygen in the exhaust. The HO2S pumping current is displayed as a lambda value. A lambda value of 1 is equal to a stoichiometric air fuel ratio of 14.7:1. Under normal operating conditions, the lambda value will remain around 1. When the fuel system is lean, the oxygen level will be high and the lambda signal will be high or more than 1. When the fuel system is rich, the oxygen level will be low, and the lambda signal will be low or less than 1. The ECM uses this information to maintain the correct air/fuel ratio. If the ECM detects that the HO2S signal is out of range a DTC will set.

The heating element inside each HO2S heats the sensor to bring it up to operating conditions faster. This allows the system to enter Closed Loop mode earlier and the ECM to calculate the air-to-fuel ratio sooner.

Inspection/Maintenance Description and Operation

Some state/provincial and local governments require that a vehicle pass on-board diagnostic (OBD) system tests and the Inspection/Maintenance (I/M) emission inspection in order to renew license plates. This is accomplished by viewing the I/M System monitors on a scan tool and confirming that no Permanent DTCs are set.

The OBD II system monitors all emission control systems that are on-board. The OBD II regulations require monitoring of the following:

Monitor	Diesel	Gasoline
Boost System Monitor - Since Diagnostic Trouble Codes Cleared	X	—
Catalytic Converter Monitor - Since Diagnostic Trouble Codes Cleared	X	X
Evaporative Emission Monitor - Since Diagnostic Trouble Codes Cleared	—	X
Exhaust Aftertreatment Monitor - Since Diagnostic Trouble Codes Cleared	X	—
Exhaust Gas Recirculation Valve/Camshaft Position Monitor - Since Diagnostic Trouble Codes Cleared	X	X

Monitor	Diesel	Gasoline
Exhaust Gas Sensor Monitor - Since Diagnostic Trouble Codes Cleared	X	—
Fuel System Monitor - Since Diagnostic Trouble Codes Cleared	X	X
Heated Catalytic Converter Monitor - Since Diagnostic Trouble Codes Cleared	—	X
Misfire Monitor - Since Diagnostic Trouble Codes Cleared	X	X
Oxygen Sensor Heater Monitor - Since Diagnostic Trouble Codes Cleared	—	X
Oxygen Sensor/Heated Oxygen Sensor Monitor - Since Diagnostic Trouble Codes Cleared	—	X
Particulate Filter Monitor - Since Diagnostic Trouble Codes Cleared	X	X

I/M System Status

Each system monitor requires at least one, and sometimes several diagnostic tests. The result of each test is reported by a DTC. A system monitor is Complete when either all of the DTCs comprising the monitor have run and passed, or when any one of the DTCs comprising the monitor has illuminated the malfunction indicator lamp (MIL). For example, when the Oxygen Sensor Heater Monitor indicates Complete, all of the oxygen sensor heaters have been diagnosed. If the vehicle has 4 heated oxygen sensors, all 4 heaters have been diagnosed.

Once the system monitor is complete, the I/M System Status parameter will display Complete in the value column of the scan tool. Any monitor that is not applicable to a vehicle will display Not Supported in the scan tool value column. The I/M System Status parameter will display Incomplete in the value column when any of the required tests for that system have not run. The following is a list of conditions that would set the I/M System Status monitor to Incomplete:

- The vehicle is new from the factory and has not yet been driven through the necessary drive conditions to complete the tests.
- The battery has been disconnected or discharged below operating voltage.
- The control module power or ground has been interrupted.
- The control module has been programmed.
- The control module DTCs have been cleared.

Permanent DTCs

Permanent DTCs are defined as confirmed fault codes that are currently commanding the MIL on and stored in non-volatile memory. Permanent DTCs cannot be erased by any scan tool command or by disconnecting power to the controller.

The intended use of this data is to prevent vehicles from passing an I/M inspection by disconnecting the battery or clearing codes with a scan tool prior to the inspection. The presence of Permanent DTCs at an inspection without the MIL illuminated is an indication that a proper repair was not verified by the OBD II system.

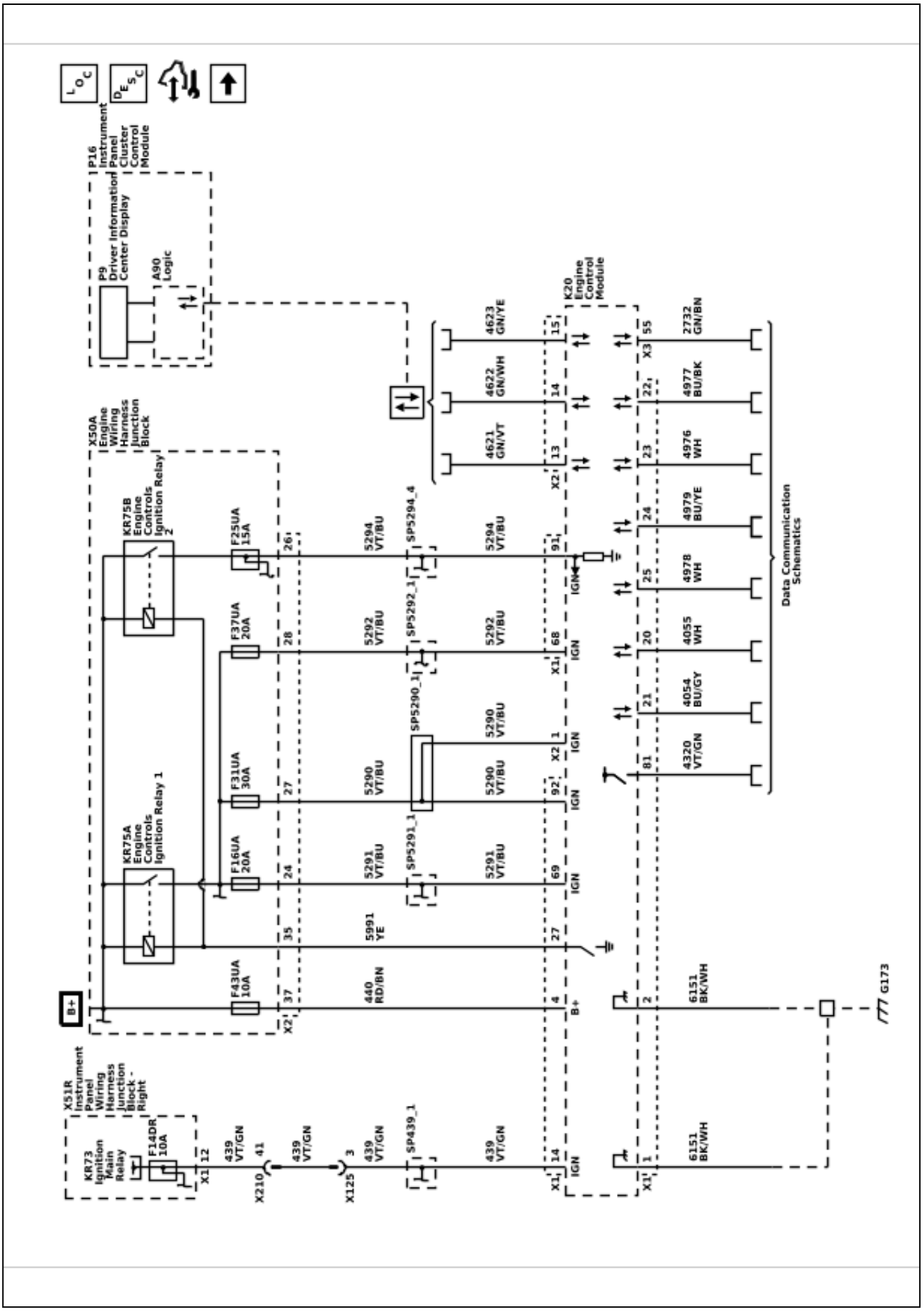
Only the OBD II system can clear Permanent DTCs. The OBD II system must determine that the malfunction that caused the Permanent DTC to be stored no longer exists and is not commanding the MIL.

- If the MIL goes out naturally due to 3 passing drive cycles (scan tool code clear is not used), then the Permanent DTC is cleared at power down of the last drive cycle.
- If a scan tool code clear is used to turn off the MIL then the Permanent DTC is not cleared, the DTC must PASS and not FAIL. The Permanent DTC is cleared at power down of the drive cycle.
- If the controller is programmed, all Permanent DTCs are cleared.

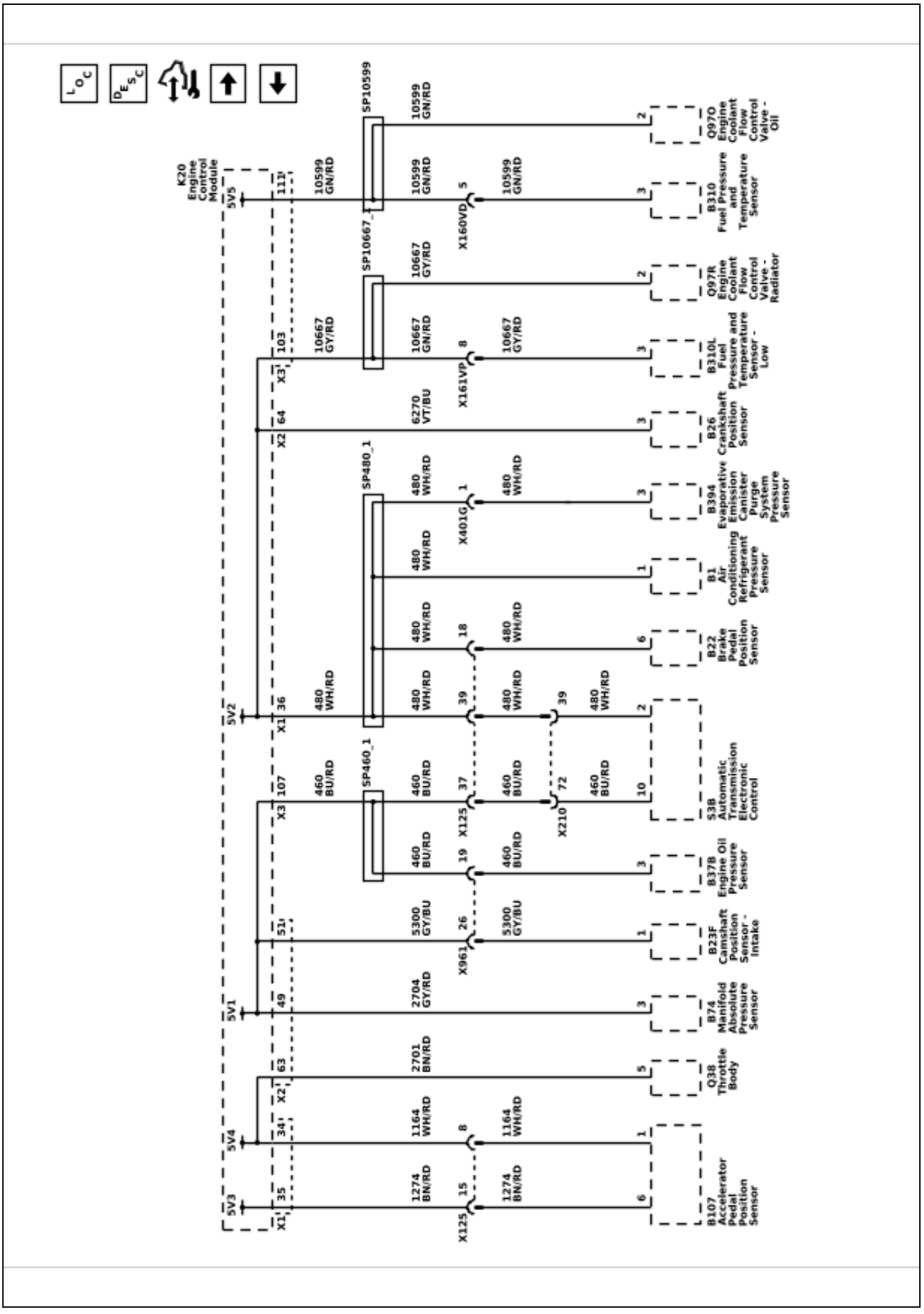
Engine Controls and Fuel - 5.7L or 6.6L

Schematic and Routing Diagrams

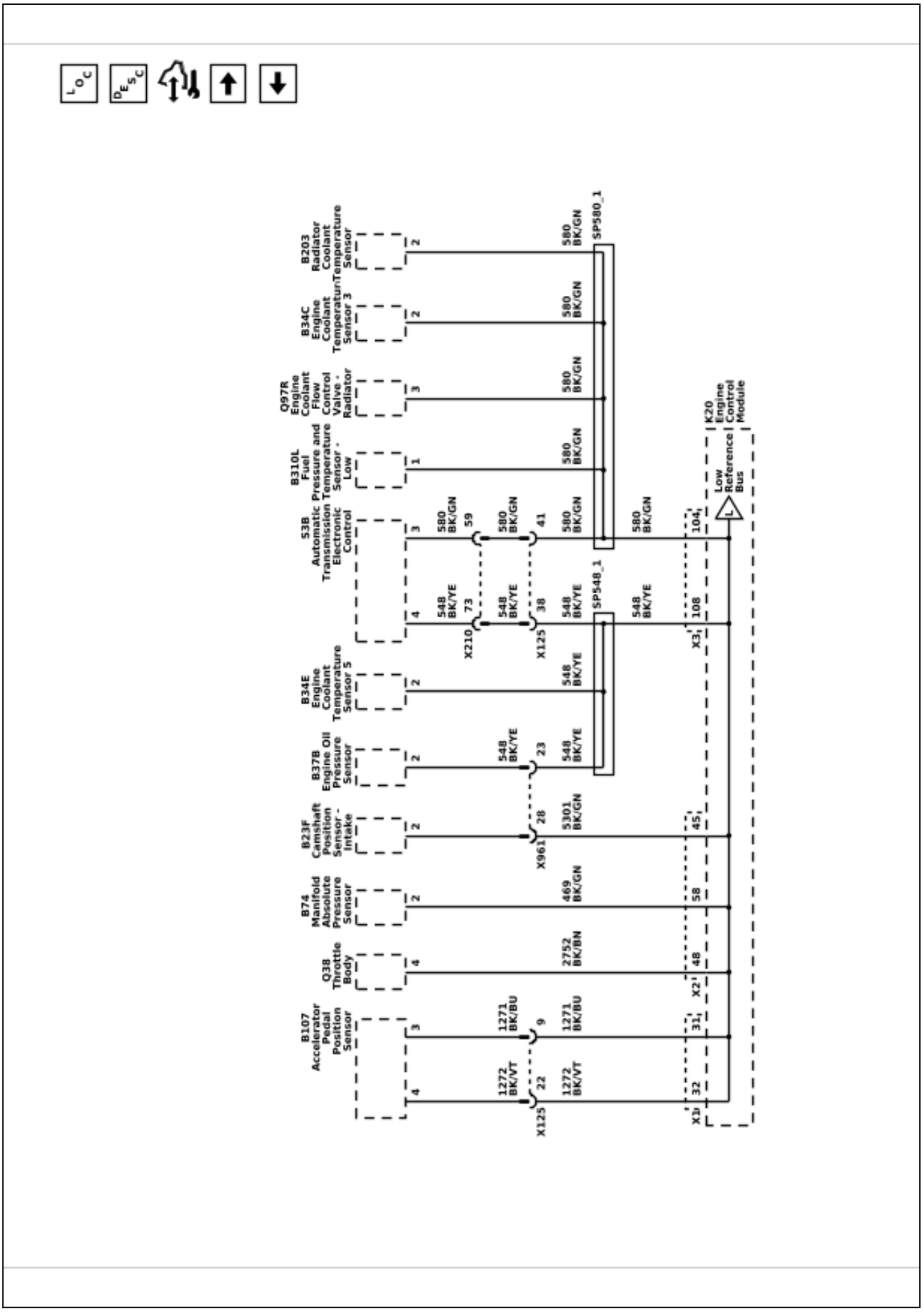
Engine Controls Schematics (Engine Control Module Power, Ground, Serial Data, and MIL)



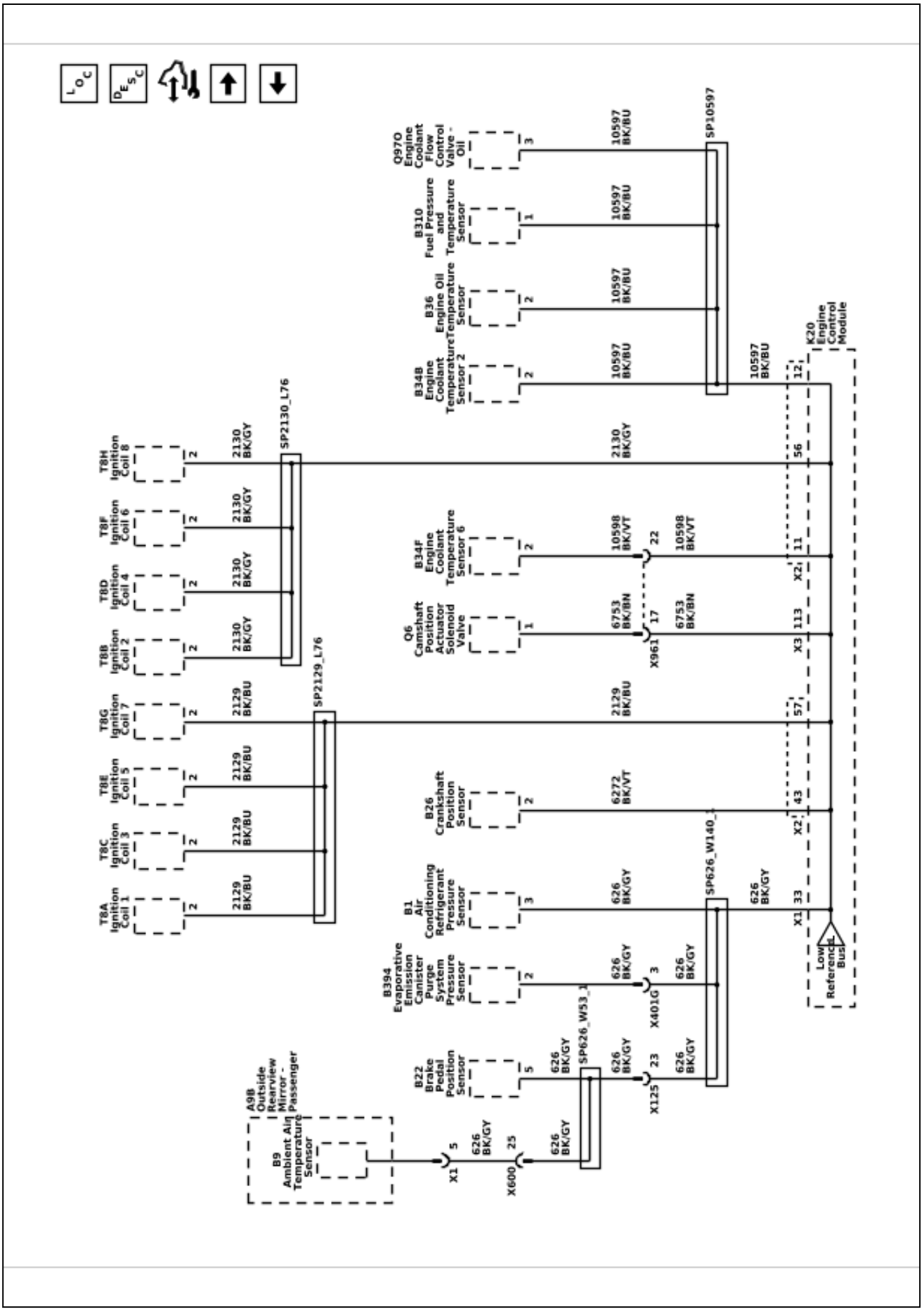
Engine Controls Schematics (5V Reference Bus)



Engine Controls Schematics (Low Reference Bus - 1 of 2)

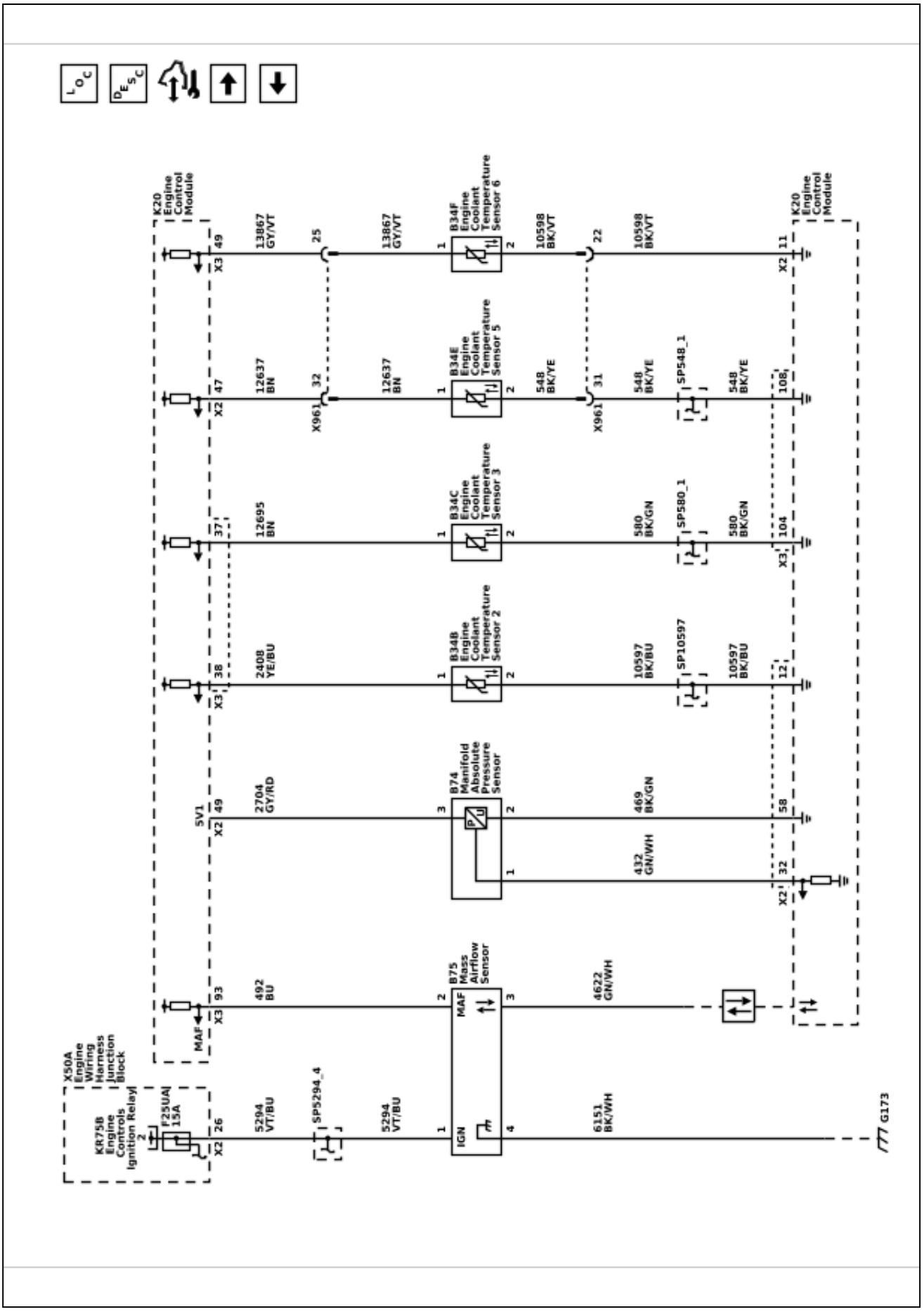


Engine Controls Schematics (Low Reference Bus - 2 of 2)

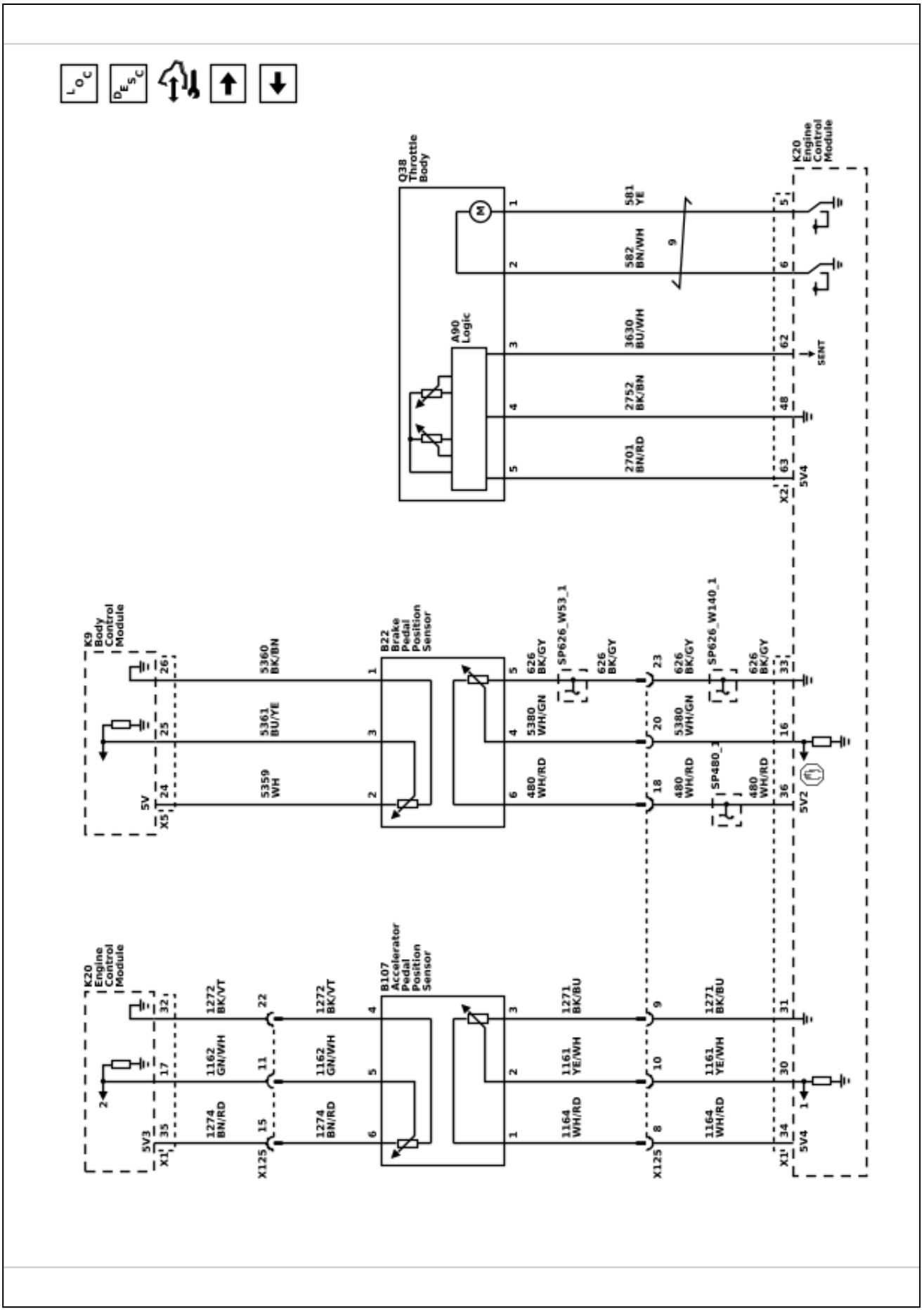


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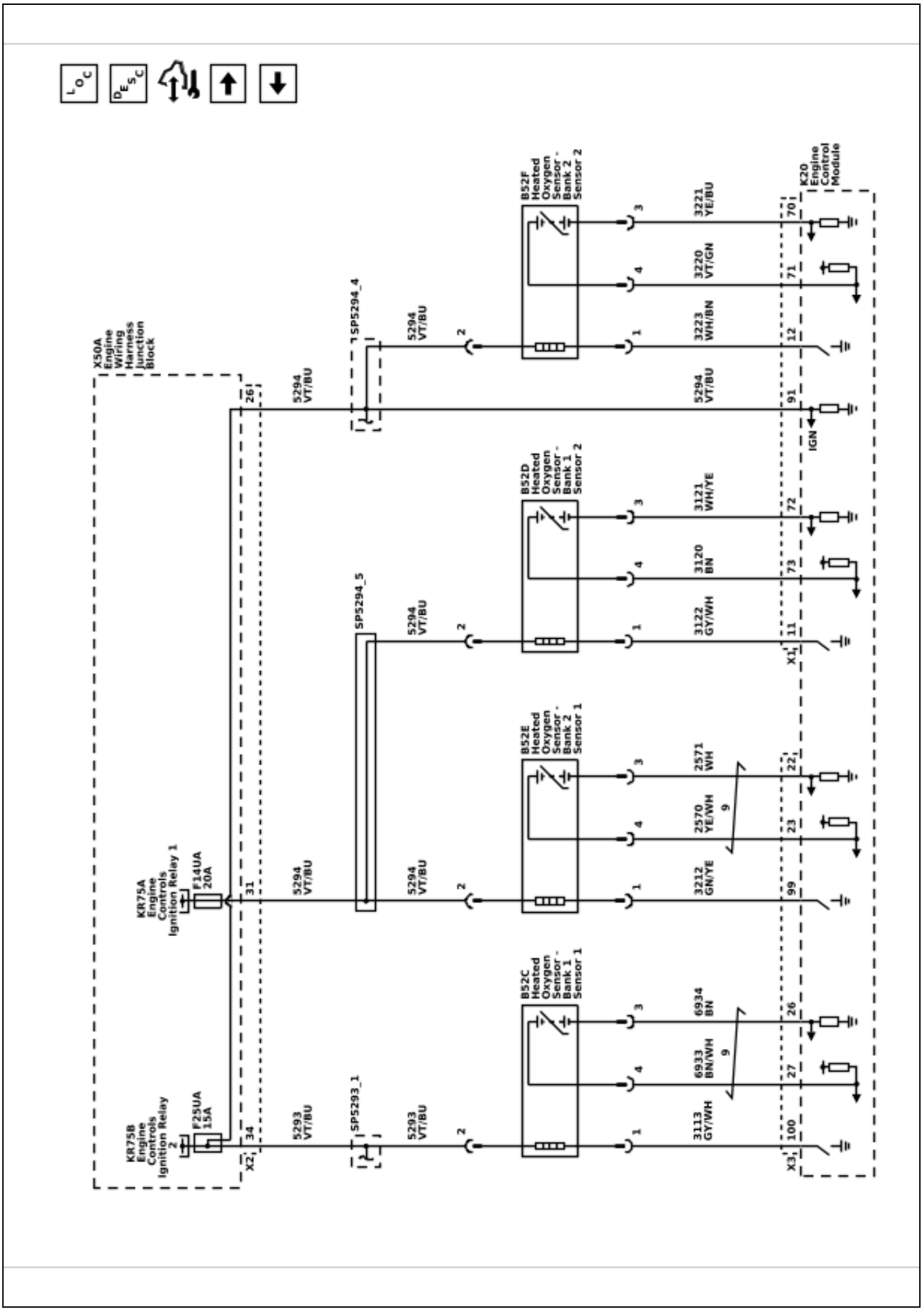
Engine Controls Schematics (Engine Data Sensors - Pressure and Temperature)



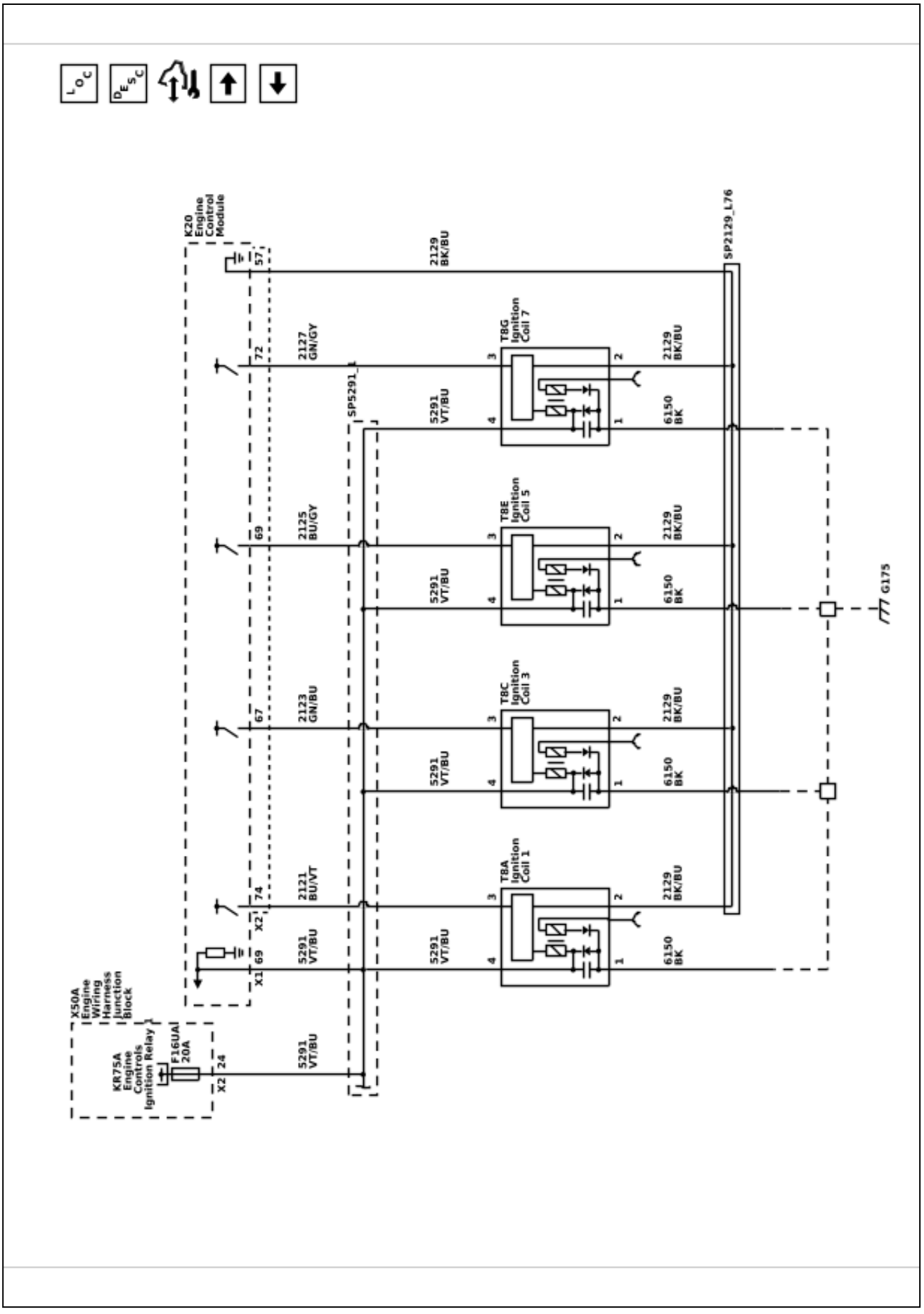
Engine Controls Schematics (Engine Data Sensors - Throttle Controls and Override)



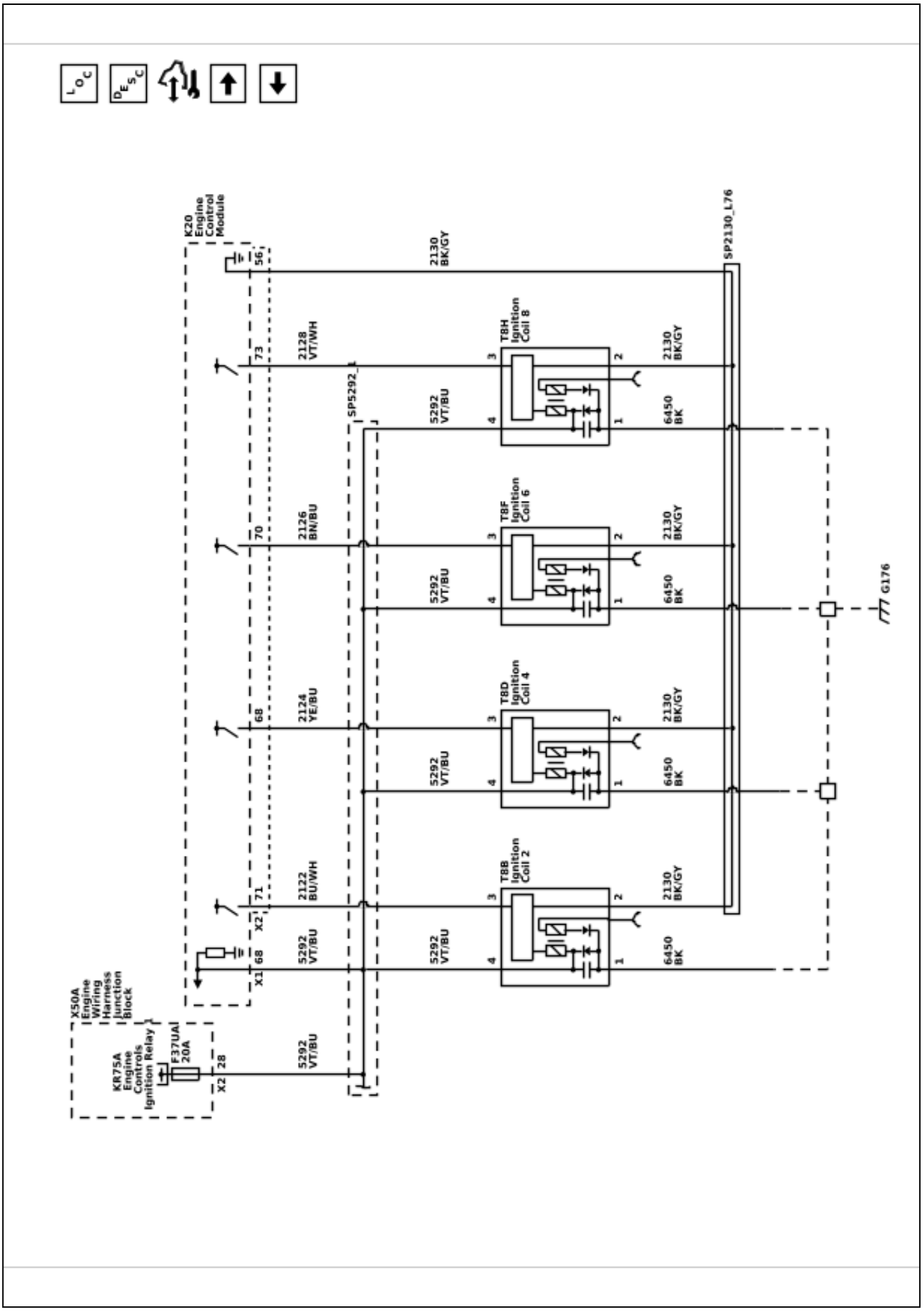
Engine Controls Schematics (Engine Data Sensors - Oxygen Sensors)



Engine Controls Schematics (Ignition Controls - Ignition Coils Bank 1)

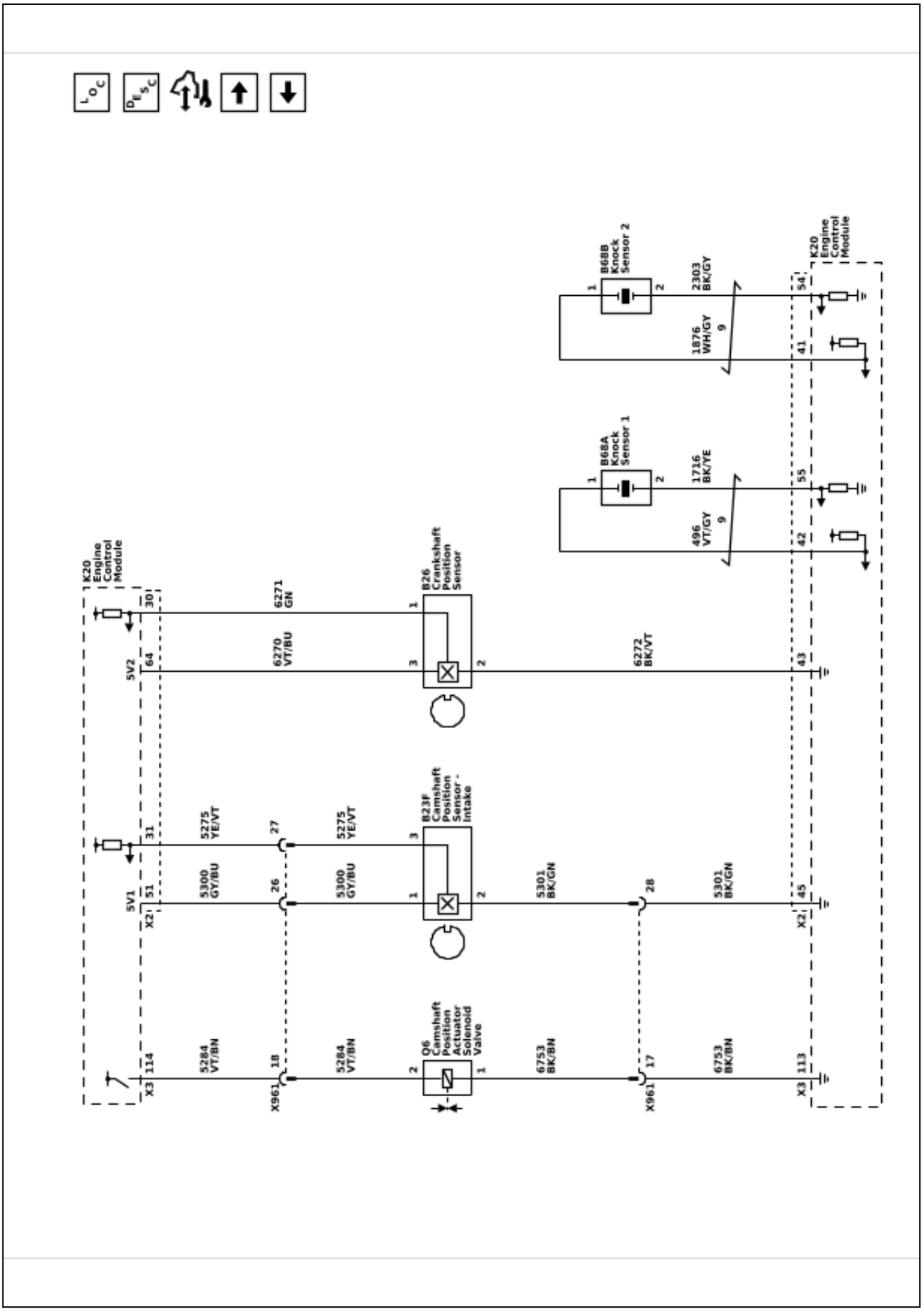


Engine Controls Schematics (Ignition Controls - Ignition Coils Bank 2)

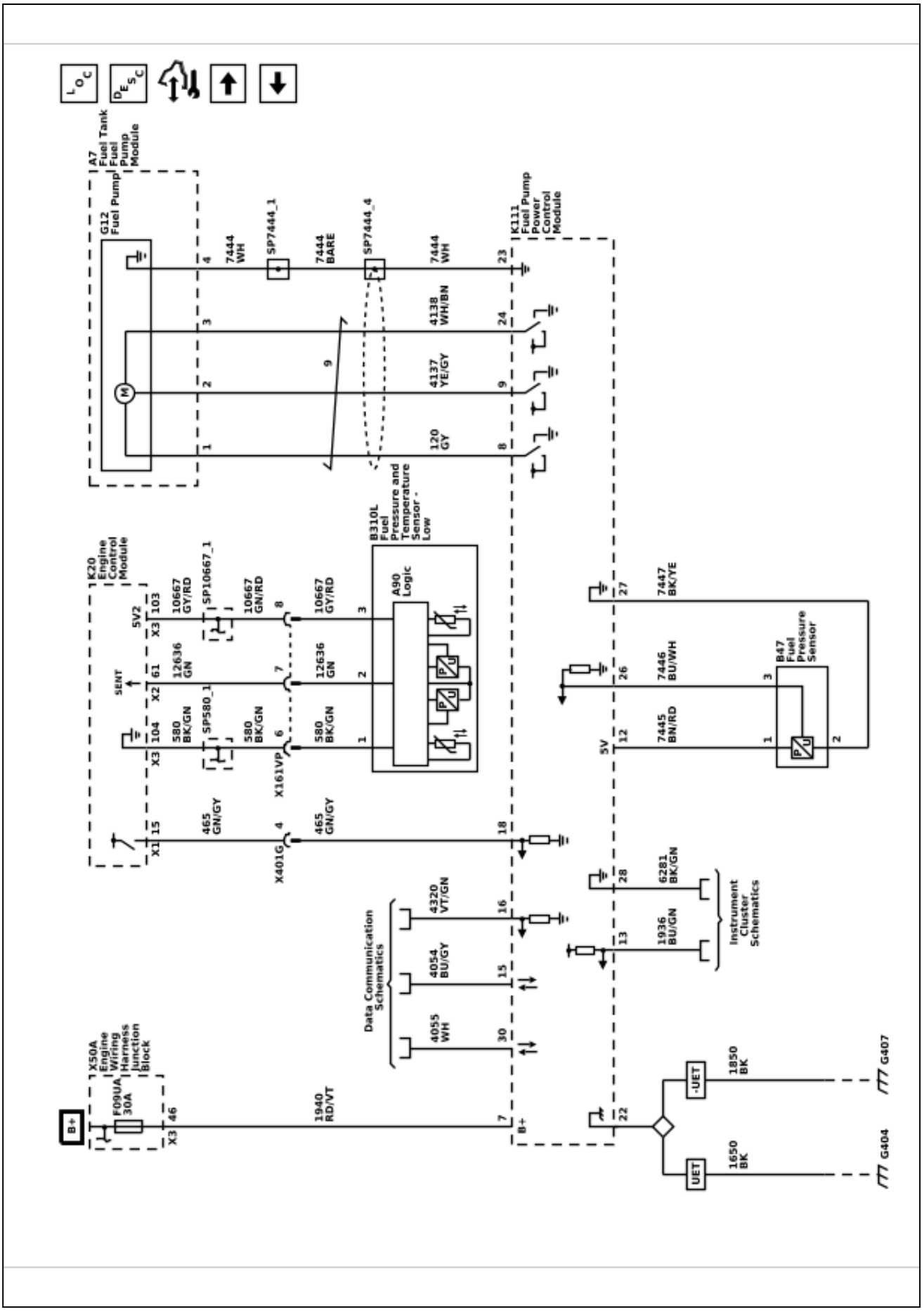


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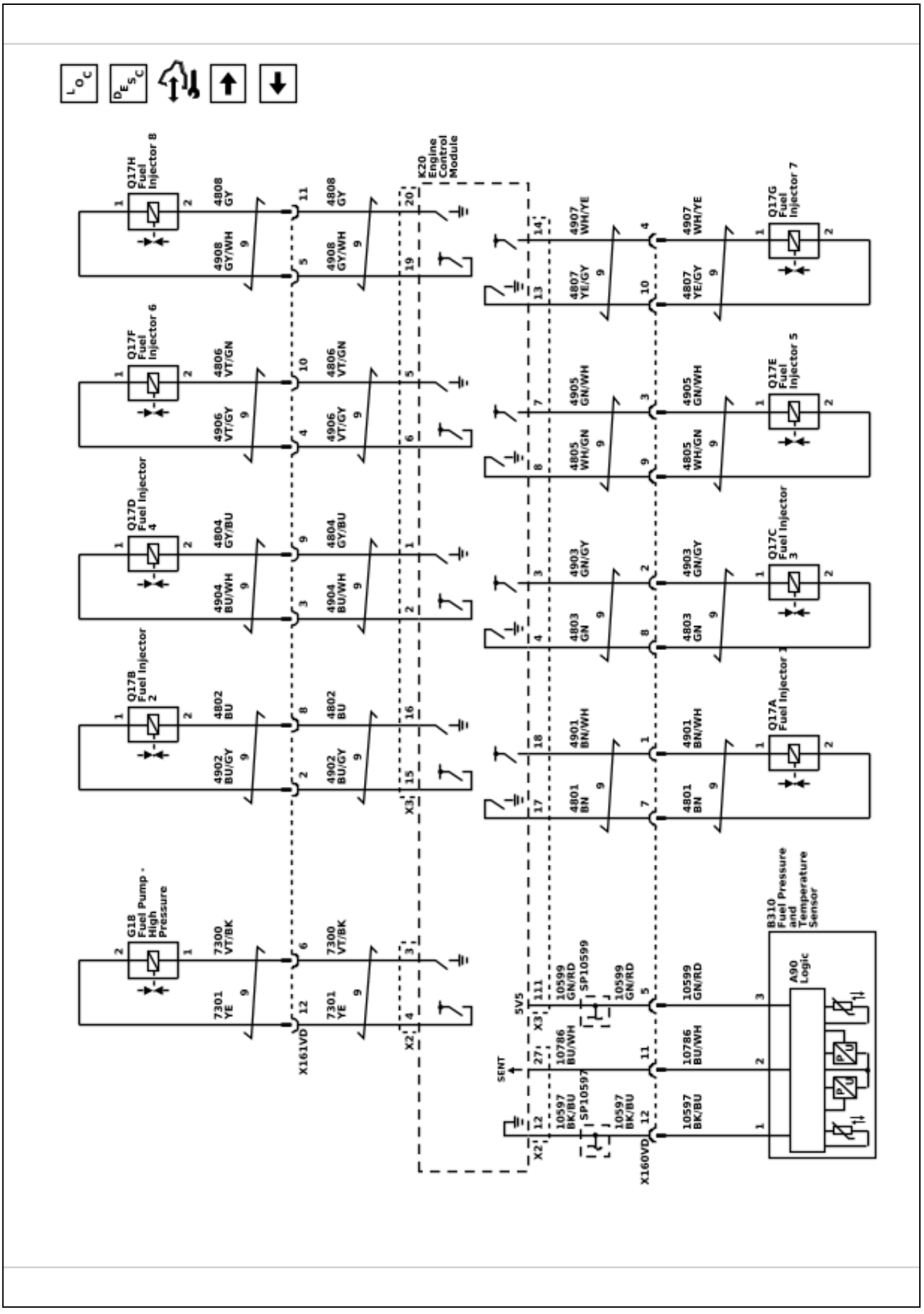
Engine Controls Schematics (Ignition Controls - Crankshaft Position, Camshaft Position, Knock Sensors, and Camshaft Position Actuator)



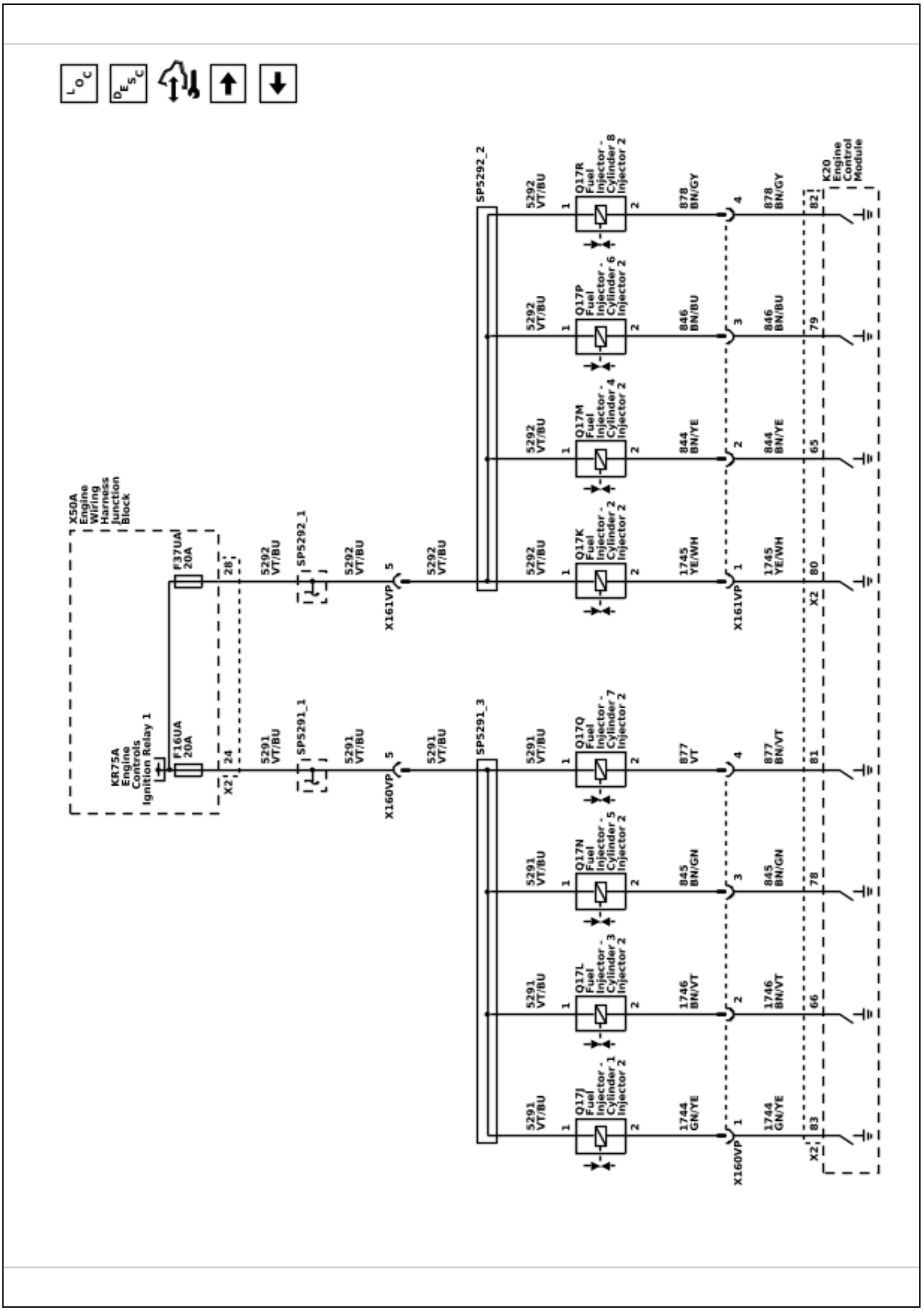
Engine Controls Schematics (Fuel Controls - Low Pressure Control and Fuel Pump)



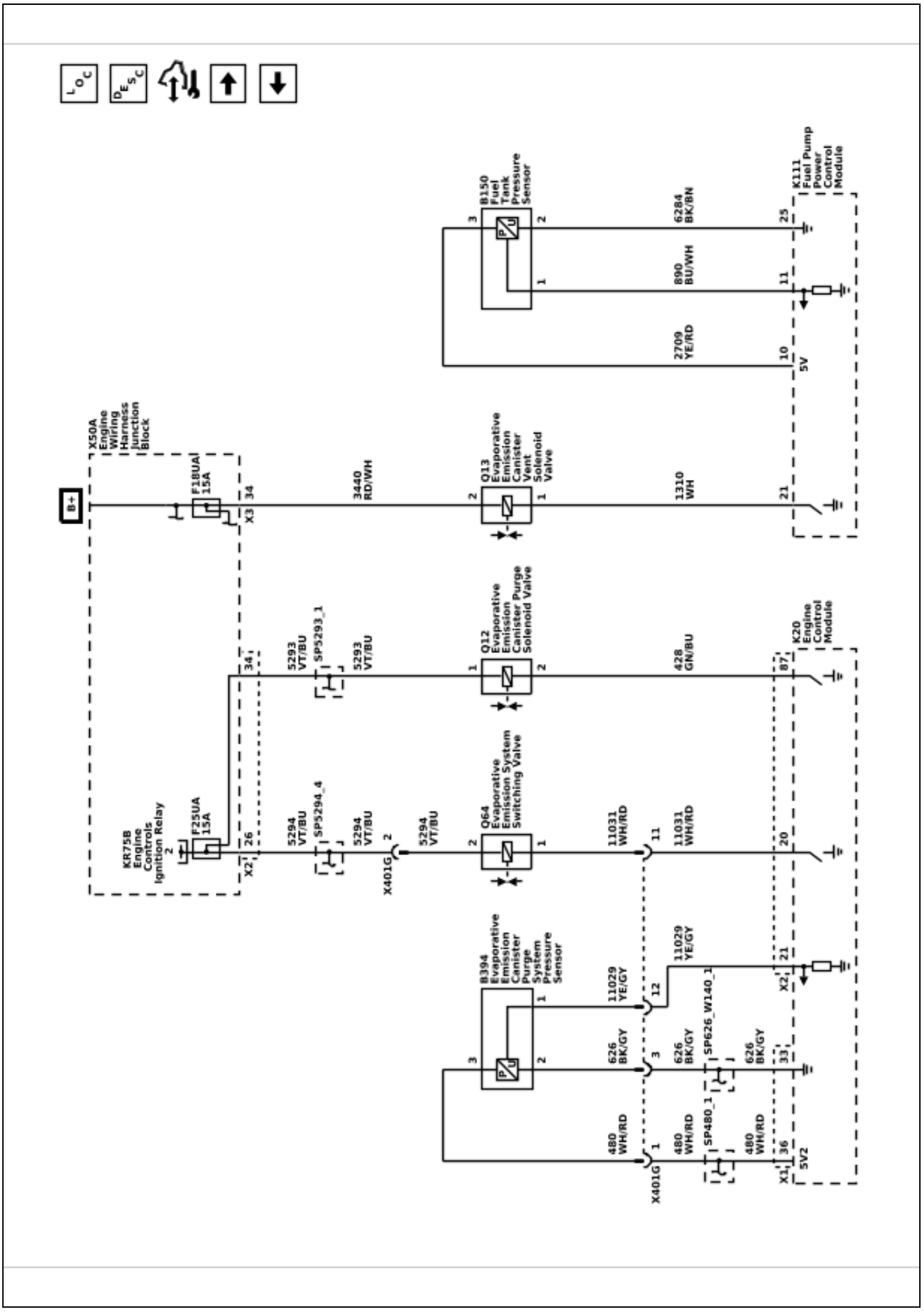
Engine Controls Schematics (Fuel Controls - High Pressure Controls, Fuel Pump and Primary/Direct Fuel Injectors)



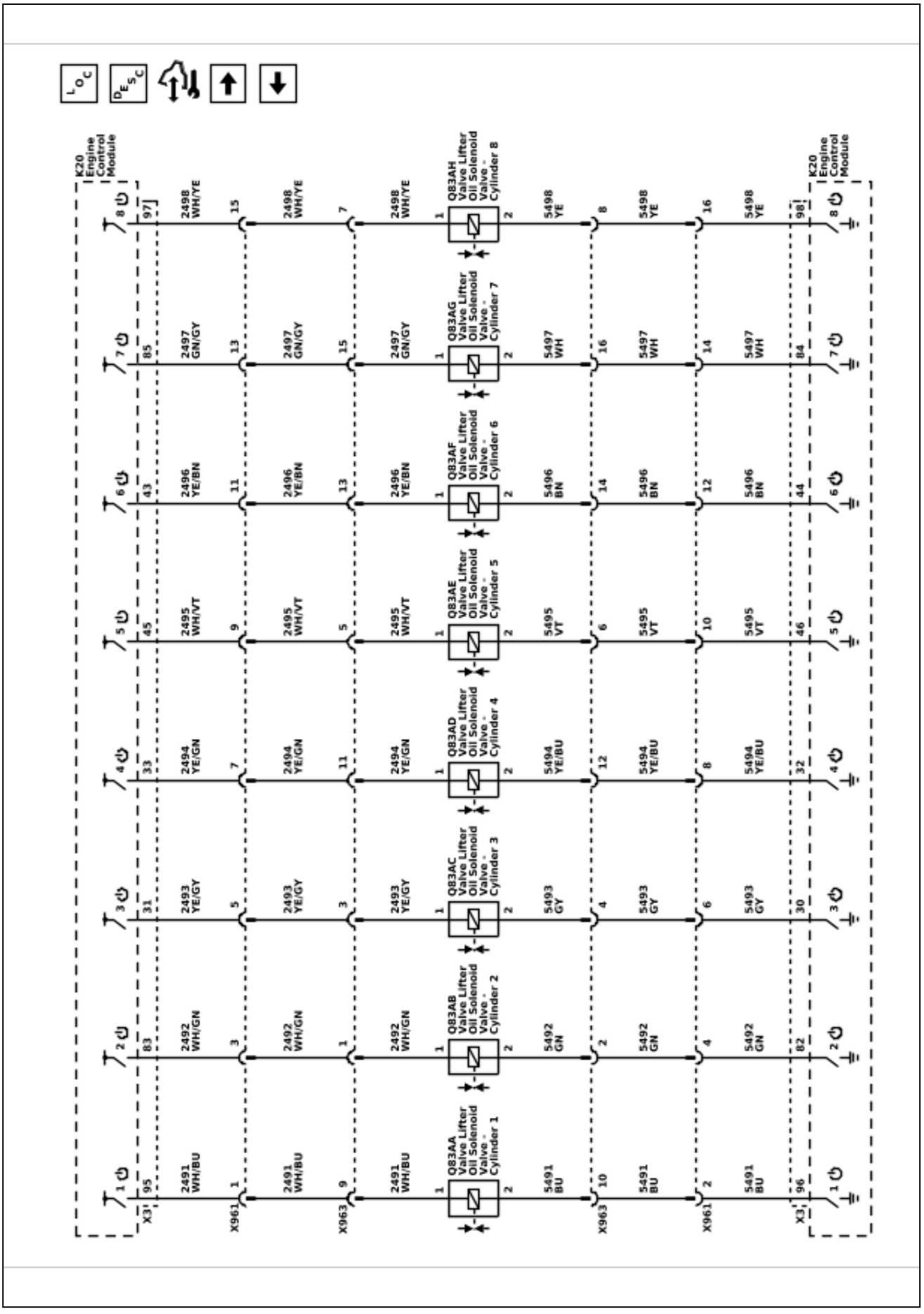
Engine Controls Schematics (Fuel Controls - Secondary/Port Fuel Injectors)



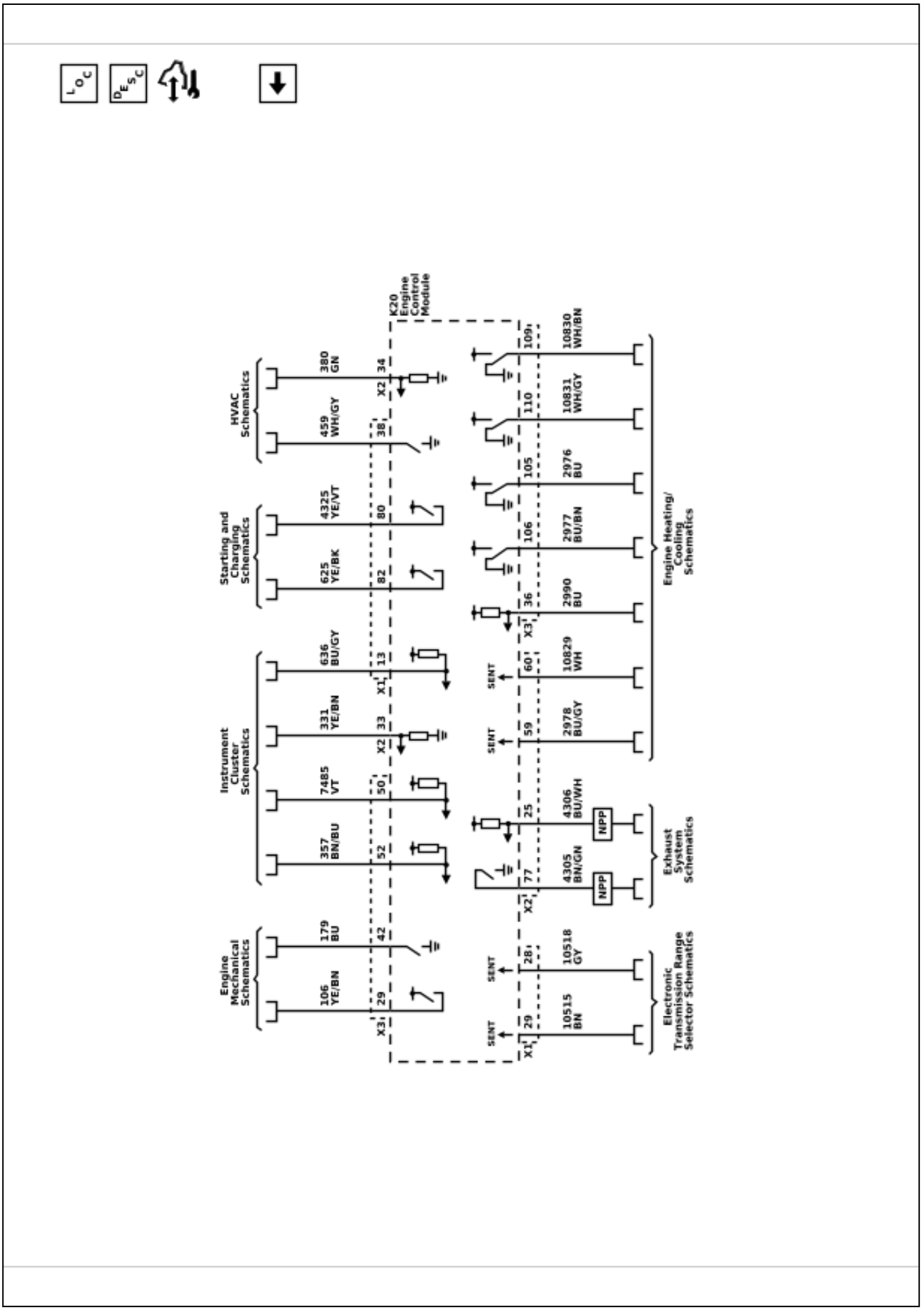
Engine Controls Schematics (Fuel Controls - Evaporative Emissions Controls)



Engine Controls Schematics (Device Controls - Displacement on Demand)



Engine Controls Schematics (Controlled/Monitored Subsystem References)



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Description and Operation

Heated Oxygen Sensor Description and Operation

The engine control module (ECM) controls a closed loop air/fuel metering system in order to provide the best possible combination of driveability, fuel economy, and emission control. The ECM monitors the heated oxygen sensor (HO2S) signal and adjusts the fuel delivery based on the signal while in closed loop operation. The short term fuel trim values change rapidly in response to the HO2S signal. These changes fine tune the engine fueling. The long term fuel trim values change in response to trends in the short term fuel trim. The long term fuel trim makes coarse adjustments to fueling in order to re-center and restore control to short term fuel trim.

Heated Oxygen Sensor

When the engine is started, the ECM operates in an Open Loop mode, ignoring the HO2S signal voltage while calculating the air-to-fuel ratio. While the engine runs, the HO2S heats up and begins to generate a voltage within a range of 0–1,000 mV. Once sufficient HO2S voltage fluctuation is observed by the ECM, Closed Loop mode is entered. The ECM uses the HO2S voltage to determine the air-to-fuel ratio. An HO2S voltage that increases toward 1,000 mV indicates a rich fuel mixture. An HO2S voltage that decreases toward 0 mV indicates a lean fuel mixture.

Heated oxygen sensors are used for fuel control and post catalyst monitoring. Each HO2S compares the oxygen content of the surrounding air with the oxygen content in the exhaust stream. The HO2S must reach operating temperature to provide an accurate voltage signal. A heating element inside the HO2S minimizes the time required for the sensor to reach operating temperature. This allows the system to enter Closed Loop earlier and the ECM to calculate the air-to-fuel ratio sooner. Voltage is provided to the heater by an ignition voltage circuit through a fuse. With the engine running, ground is provided to the heater by the HO2S heater low control circuit through a low side driver within the ECM. The ECM uses pulse width modulation (PWM) to control the HO2S heater operation to maintain a specific HO2S operating temperature range.

Wide Band Heated Oxygen Sensor

The wide band heated oxygen sensor (HO2S) measures the amount of oxygen in the exhaust system and provides more information than the switching style HO2S. The wide band sensor consists of an oxygen sensing cell, an oxygen pumping cell, and a heater. The exhaust gas sample passes through a diffusion gap between the sensing cell and the pumping cell. An electronic circuit within the ECM controls the pump current through the oxygen pumping cell in order to maintain a constant voltage in the oxygen sensing cell. The ECM monitors the voltage variation in the sensing cell and attempts to keep the voltage constant by increasing or decreasing the amount of current flow, or oxygen ion flow, from the pumping cell. By measuring the amount of current required to maintain the voltage in the sensing cell, the ECM can determine the concentration of oxygen in the exhaust. The HO2S pumping current is displayed as a lambda value. A lambda value of 1 is equal to a stoichiometric air fuel ratio of 14.7:1. Under normal operating conditions, the lambda value will remain around 1. When the fuel system is lean, the oxygen level will be high and the lambda signal will be high or more than 1. When the fuel system is rich, the oxygen level will be low, and the lambda signal will be low or less than 1. The ECM uses this information to maintain the correct air/fuel ratio. If the ECM detects that the HO2S signal is out of range a DTC will set.

The heating element inside each HO2S heats the sensor to bring it up to operating conditions faster. This allows the system to enter Closed Loop mode earlier and the ECM to calculate the air-to-fuel ratio sooner.

Inspection/Maintenance Description and Operation

Some state/provincial and local governments require that a vehicle pass on-board diagnostic (OBD) system tests and the Inspection/Maintenance (I/M) emission inspection in order to renew license plates. This is accomplished by viewing the I/M System monitors on a scan tool and confirming that no Permanent DTCs are set.

The OBD II system monitors all emission control systems that are on-board. The OBD II regulations require monitoring of the following:

Monitor	Diesel	Gasoline
Boost System Monitor - Since Diagnostic Trouble Codes Cleared	X	—
Catalytic Converter Monitor - Since Diagnostic Trouble Codes Cleared	X	X
Evaporative Emission Monitor - Since Diagnostic Trouble Codes Cleared	—	X
Exhaust Aftertreatment Monitor - Since Diagnostic Trouble Codes Cleared	X	—
Exhaust Gas Recirculation Valve/Camshaft Position Monitor - Since Diagnostic Trouble Codes Cleared	X	X

Monitor	Diesel	Gasoline
Exhaust Gas Sensor Monitor - Since Diagnostic Trouble Codes Cleared	X	—
Fuel System Monitor - Since Diagnostic Trouble Codes Cleared	X	X
Heated Catalytic Converter Monitor - Since Diagnostic Trouble Codes Cleared	—	X
Misfire Monitor - Since Diagnostic Trouble Codes Cleared	X	X
Oxygen Sensor Heater Monitor - Since Diagnostic Trouble Codes Cleared	—	X
Oxygen Sensor/Heated Oxygen Sensor Monitor - Since Diagnostic Trouble Codes Cleared	—	X
Particulate Filter Monitor - Since Diagnostic Trouble Codes Cleared	X	X

I/M System Status

Each system monitor requires at least one, and sometimes several diagnostic tests. The result of each test is reported by a DTC. A system monitor is Complete when either all of the DTCs comprising the monitor have run and passed, or when any one of the DTCs comprising the monitor has illuminated the malfunction indicator lamp (MIL). For example, when the Oxygen Sensor Heater Monitor indicates Complete, all of the oxygen sensor heaters have been diagnosed. If the vehicle has 4 heated oxygen sensors, all 4 heaters have been diagnosed.

Once the system monitor is complete, the I/M System Status parameter will display Complete in the value column of the scan tool. Any monitor that is not applicable to a vehicle will display Not Supported in the scan tool value column. The I/M System Status parameter will display Incomplete in the value column when any of the required tests for that system have not run. The following is a list of conditions that would set the I/M System Status monitor to Incomplete:

- The vehicle is new from the factory and has not yet been driven through the necessary drive conditions to complete the tests.
- The battery has been disconnected or discharged below operating voltage.
- The control module power or ground has been interrupted.
- The control module has been programmed.
- The control module DTCs have been cleared.

Permanent DTCs

Permanent DTCs are defined as confirmed fault codes that are currently commanding the MIL on and stored in non-volatile memory. Permanent DTCs cannot be erased by any scan tool command or by disconnecting power to the controller.

The intended use of this data is to prevent vehicles from passing an I/M inspection by disconnecting the battery or clearing codes with a scan tool prior to the inspection. The presence of Permanent DTCs at an inspection without the MIL illuminated is an indication that a proper repair was not verified by the OBD II system.

Only the OBD II system can clear Permanent DTCs. The OBD II system must determine that the malfunction that caused the Permanent DTC to be stored no longer exists and is not commanding the MIL.

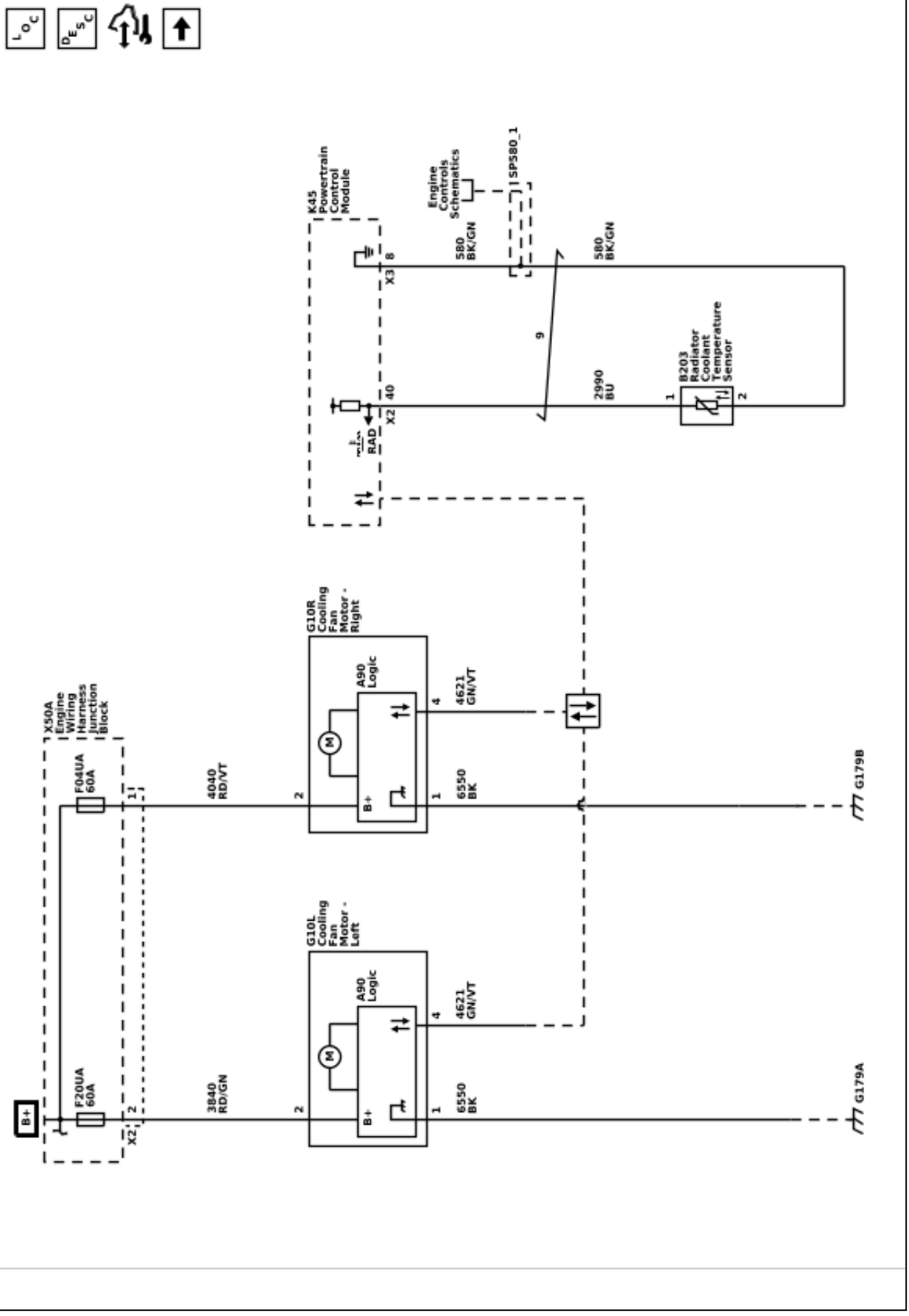
- If the MIL goes out naturally due to 3 passing drive cycles (scan tool code clear is not used), then the Permanent DTC is cleared at power down of the last drive cycle.
- If a scan tool code clear is used to turn off the MIL then the Permanent DTC is not cleared, the DTC must PASS and not FAIL. The Permanent DTC is cleared at power down of the drive cycle.
- If the controller is programmed, all Permanent DTCs are cleared.

Engine Heating and Cooling

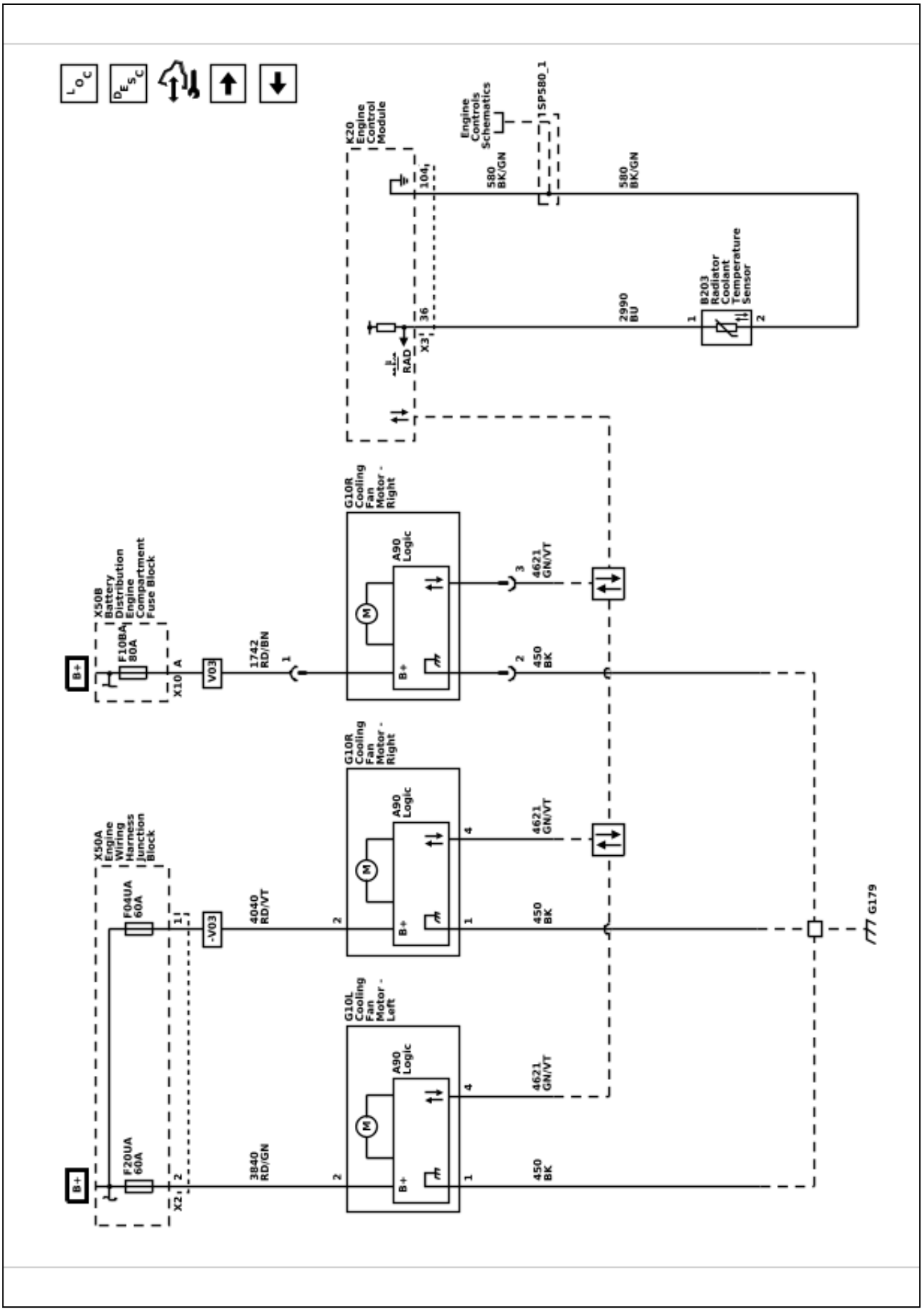
Schematic and Routing Diagrams

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Engine Heating/Cooling Schematics (Engine Cooling Fans and Temperature (L4B))

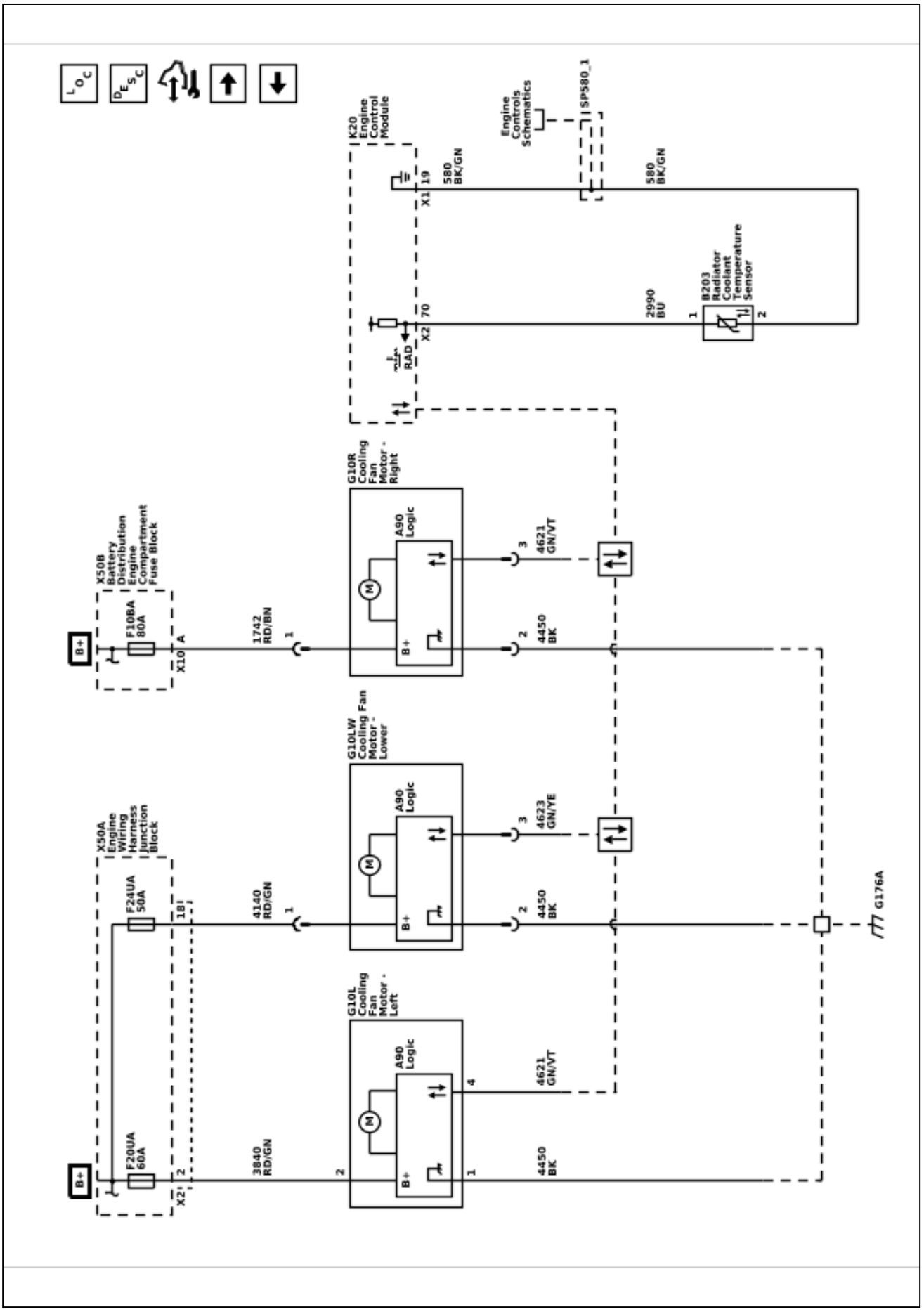


Engine Heating/Cooling Schematics (Engine Cooling Fans and Temperature (L76 / L78))

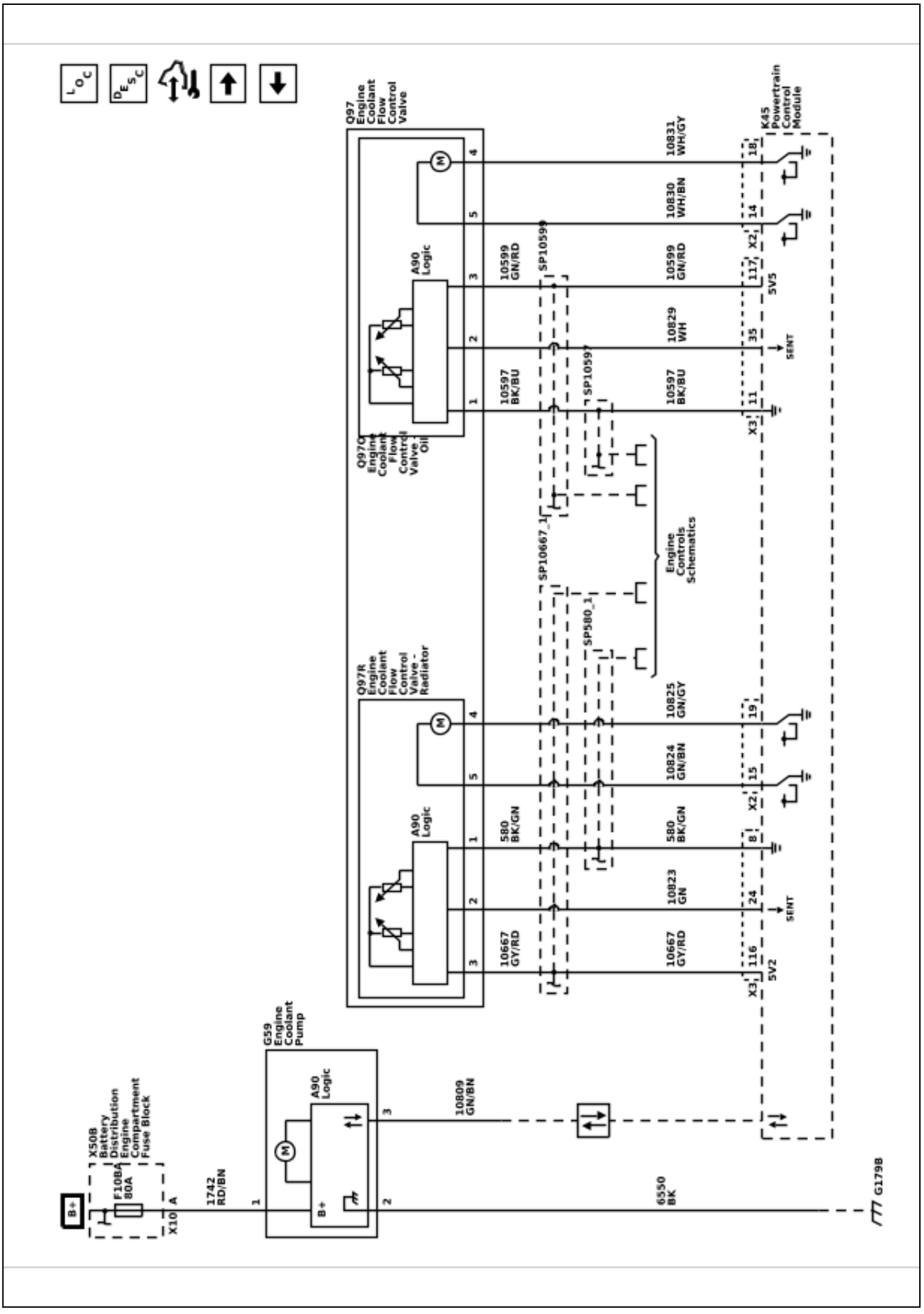


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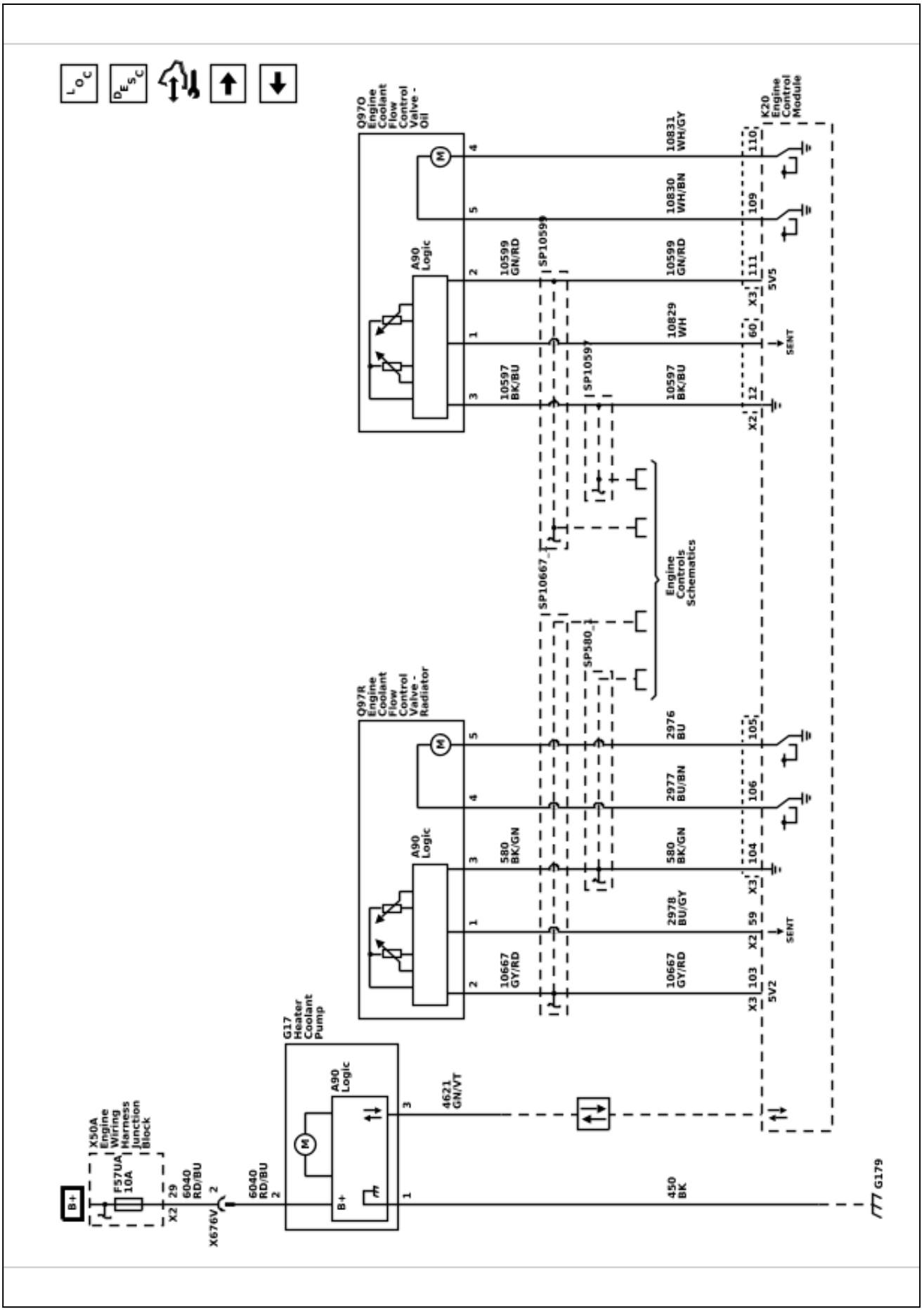
Engine Heating/Cooling Schematics (Engine Cooling Fans and Temperature (LZ0))



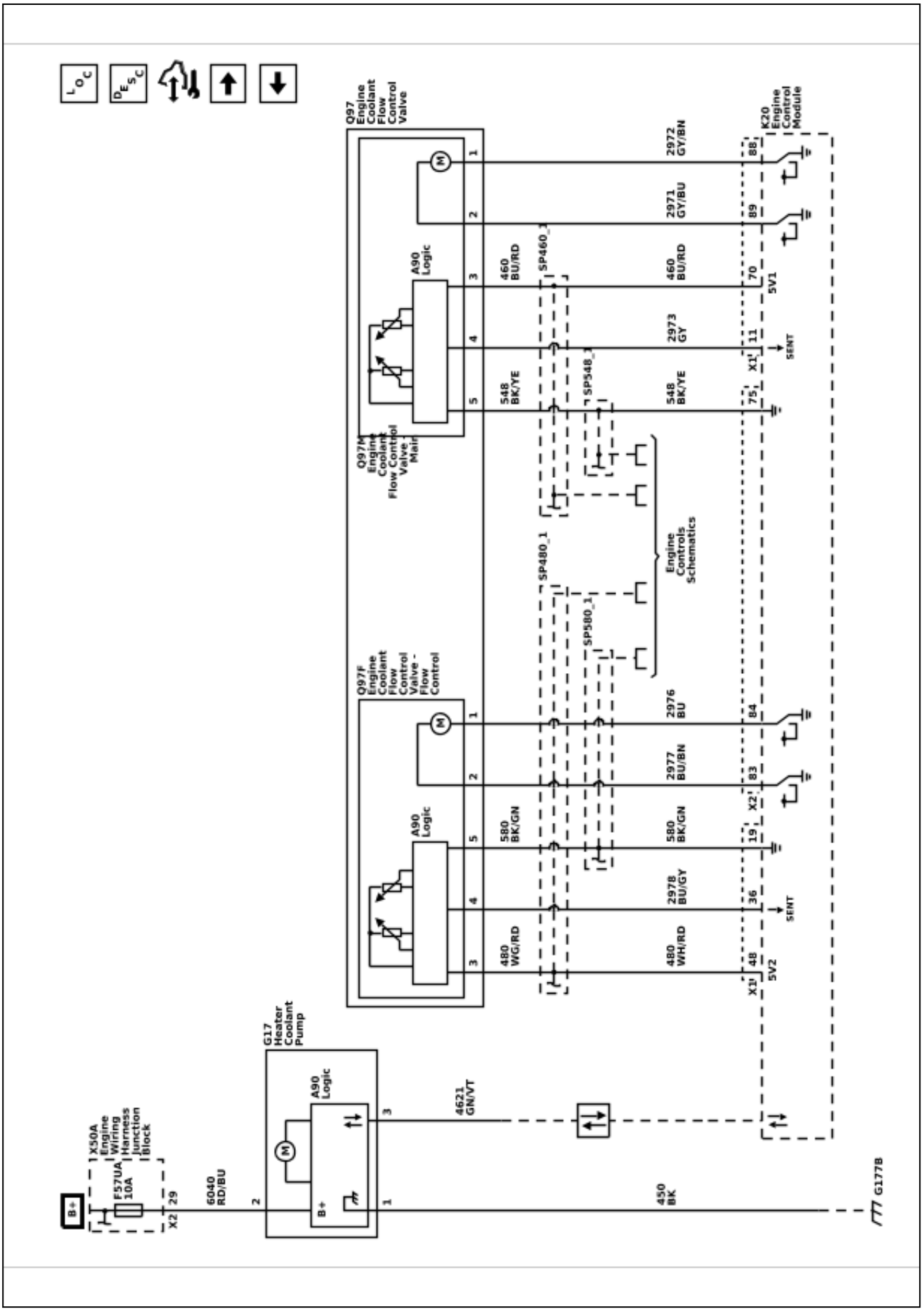
Engine Heating/Cooling Schematics (Coolant Circulation (L4B))



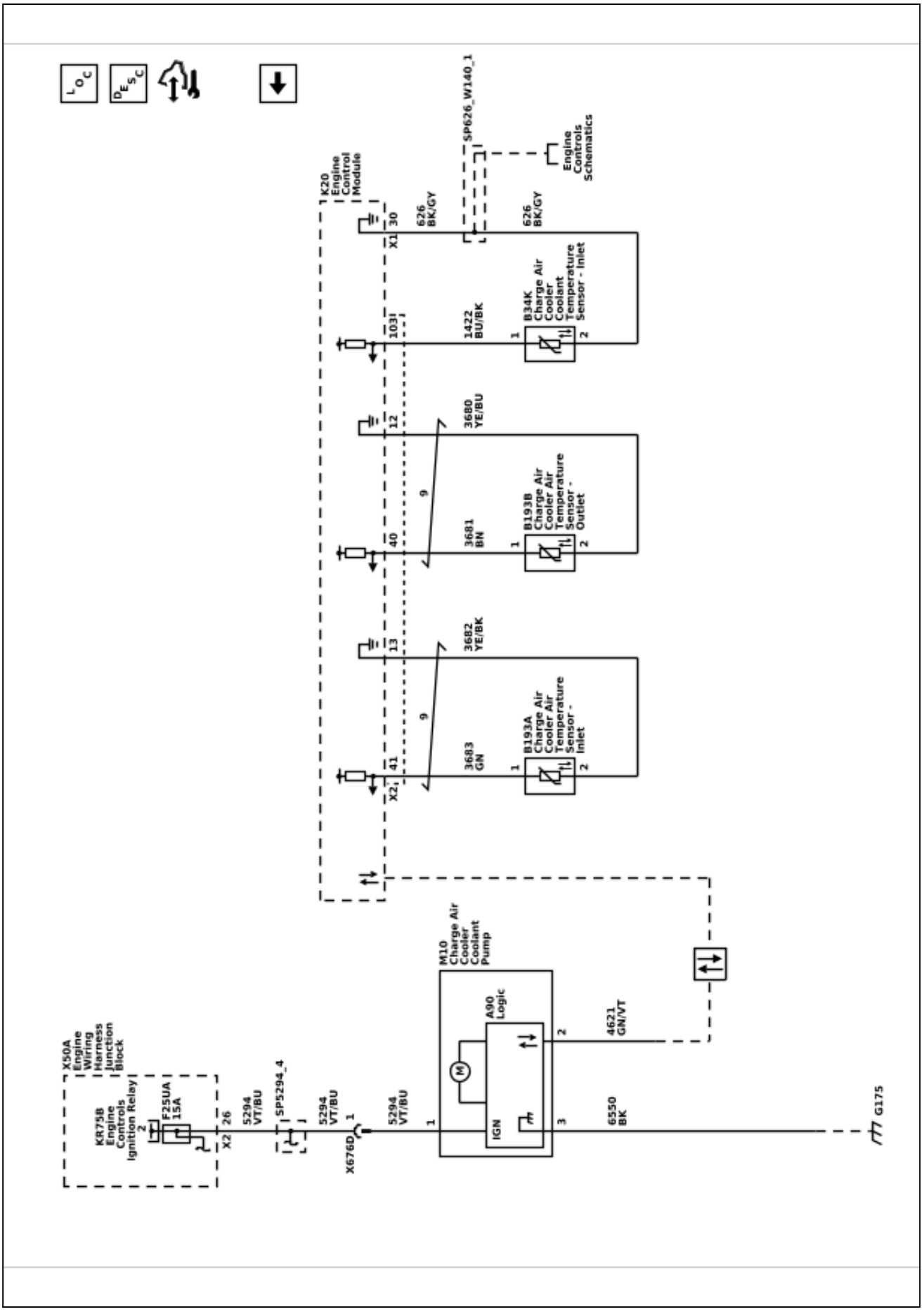
Engine Heating/Cooling Schematics (Coolant Circulation (L76 / L78))



Engine Heating/Cooling Schematics (Coolant Circulation (LZ0))



Engine Heating/Cooling Schematics (Charge Air Cooler (LZ0))



Description and Operation

Cooling Fan Description and Operation

Cooling Fan Control

The engine cooling fan system is composed of 3 electric cooling fans and an integral cooling fan control module Each cooling fan control module communicates with the engine or powertrain control module (ECM/PCM) via a local interconnect network (LIN). The ECM/PCM controls fan speed by sending a digital signal to the cooling fan control modules over a serial data network or (LIN Bus). Each cooling fan control module decodes the signal and controls the voltage drop across the cooling fan motor with a pulse width modulated (PWM) signal in relation to the speed request. This allows the cooling fan to operate at variable speeds.

Each cooling fan is specifically addressed with in the system. If the cooling fans are not connected to their specific connector, the fans will operate with out a DTC, but there will be noise or performance issues that will occur.

Cooling fan speed is affected by many different conditions and the ECM/PCM will adjust the duty cycle from 0–100 percent based on cooling system requirements. The actual commanded cooling fan speed is based on a number of inputs from the ECM/PCM, and cooling fan requests from other modules, such as the BCM, TCM, and HPCM, if equipped. When multiple cooling fan speed requests are received, the ECM/PCM commands the cooling fan control modules to operate the fan at the highest requested speed.

Diagnostic Tests
The scan tool Cooling Fan Request Source parameter identifies the predominant sub-system requiring cooling fan operation.

The scan tool cooling fan output control is only capable of operating the cooling fan in increments between 10–90 percent. 90 percent is considered high speed. The increments and ranges found within the scan tool function may vary from vehicle to vehicle.

The scan tool cooling fan output control may be inhibited by an A/C pressure sensor value that is less than ~1200 kPa (174 PSI).

Modes of Operation
The ECM/PCM commands the fans On under the following conditions:

- The engine coolant temperature is warmer than a predetermined value
- The engine oil temperature is warmer than a predetermined value
- The transmission fluid temperature is warmer than a predetermined value
- The A/C pressure reaches a predetermined pressure.
- If the engine coolant temperature at key-off is warmer than a predetermined value, or the A/C pressure is greater than a predetermined value, the cooling fans will operate at a low speed. The fans will shut OFF if the temperature or pressure drops below the predetermined value, but will only operate for 2 minutes, regardless of the coolant temperature or A/C pressure.
- Any DTC that monitors the inputs to the engine cooling system or cooling system performance will enable the cooling fans at high speed, if a fault in the cooling system or it’s inputs is detected.

Cooling Fan Description and Operation

Cooling Fan Control

The engine cooling fan system is composed of 2 electric cooling fans and an integral cooling fan control module Each cooling fan control module communicates with the engine or powertrain control module (ECM/PCM) via a local interconnect network (LIN). The ECM/PCM controls fan speed by sending a digital signal to the cooling fan control modules over a serial data network or (LIN Bus). Each cooling fan control module decodes the signal and controls the voltage drop across the cooling fan motor with a pulse width modulated (PWM) signal in relation to the speed request. This allows the cooling fan to operate at variable speeds.

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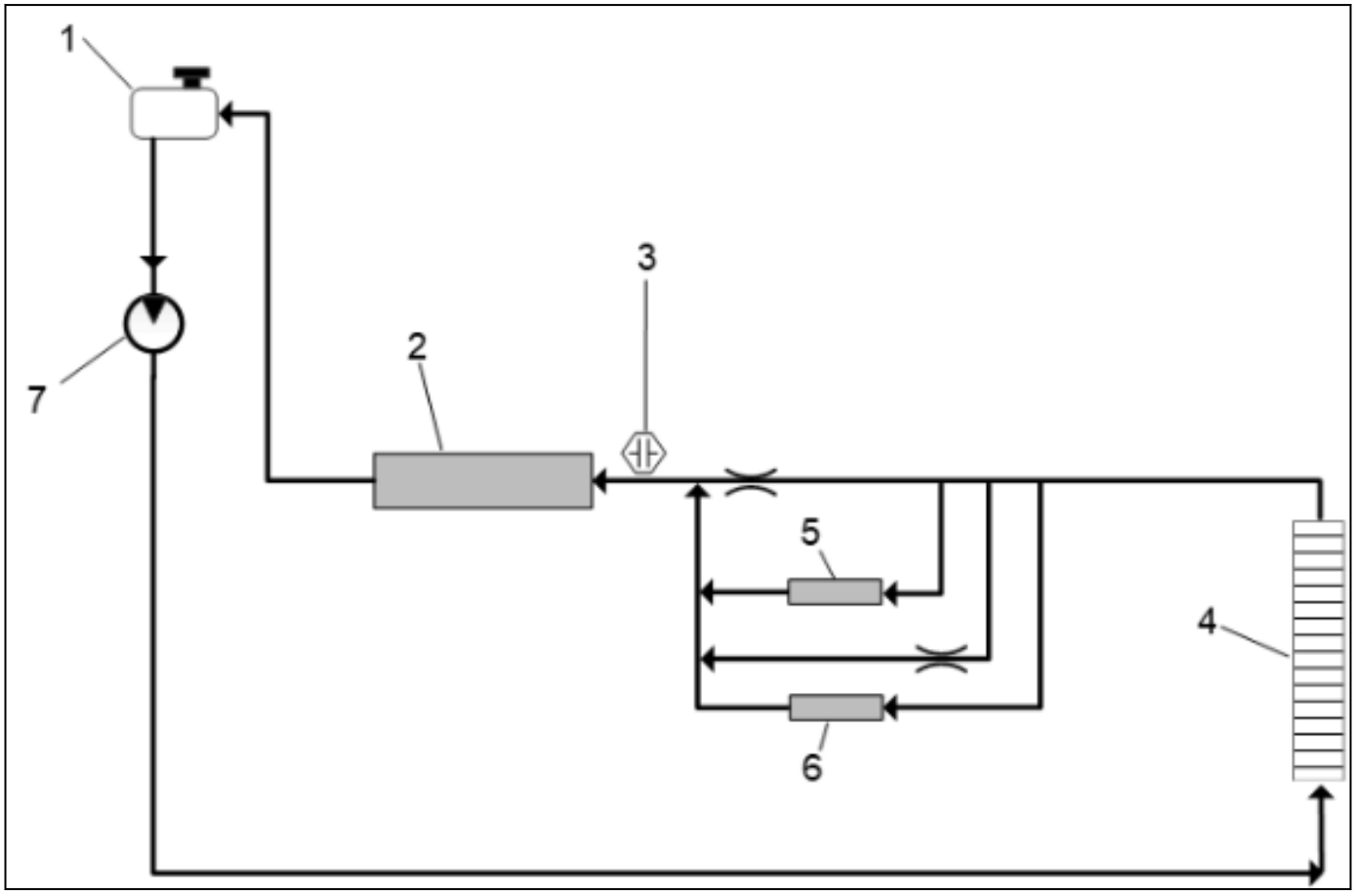
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- The engine oil temperature is warmer than a predetermined value
- The transmission fluid temperature is warmer than a predetermined value
- The A/C pressure reaches a predetermined pressure.
- If the engine coolant temperature at key-off is warmer than a predetermined value, or the A/C pressure is greater than a predetermined value, the cooling fans will operate at a low speed. The fans will shut OFF if the temperature or pressure drops below the predetermined value, but will only operate for 2 minutes, regardless of the coolant temperature or A/C pressure.
- Any DTC that monitors the inputs to the engine cooling system or cooling system performance will enable the cooling fans at high speed, if a fault in the cooling system or it's inputs is detected.

Cooling System Description and Operation (Low Temperature Coolant Loop)

Secondary Low Temperature Coolant Loop

This vehicle utilizes a secondary coolant loop which circulates coolant to the water charge air cooler, fuel cooler, and the diesel exhaust fluid injector via a engine auxiliary radiator and charge air cooler coolant pump. Coolant flows from the charge air cooler coolant pump to the engine auxiliary radiator and then to the fuel cooler and diesel exhaust fluid injectors prior to entering the water charge air cooler. Coolant exiting the water charge air cooler flows to the charge air cooler surge tank and the then back to the charge air cooler coolant pump. There is a coolant temperature sensor located near the inlet to the water charge air cooler.

Low Temperature Coolant Loop



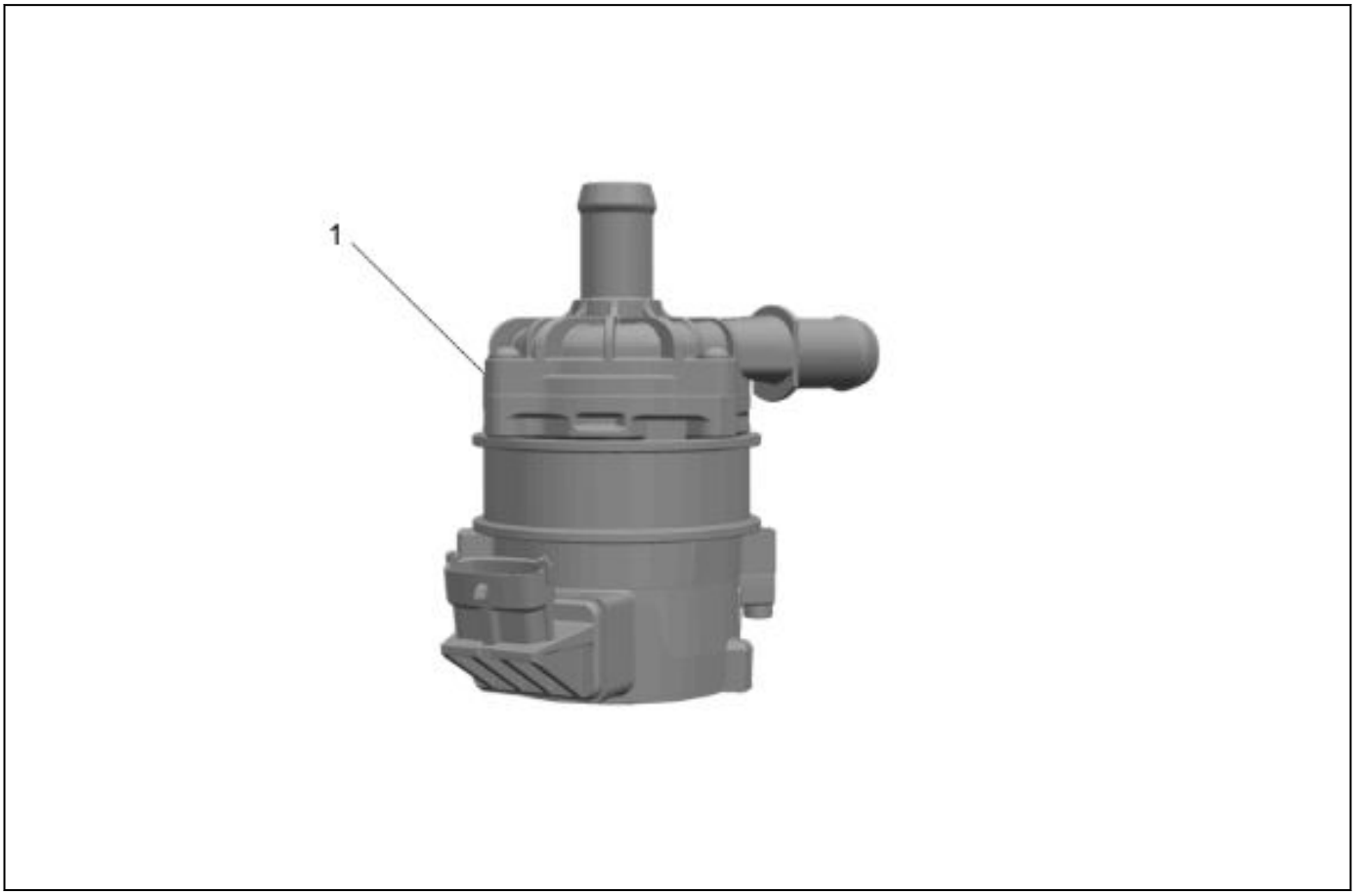
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(1) Charge Air Cooler Surge Tank
(2) Water Charge Air Cooler

(3) Engine Coolant Temperature Sensor
(4) Engine Auxiliary Radiator
(5) Reductant Fluid Injector (DEF Injector 1)
(6) Emission Reduction Fluid Secondary Injector (DEF Injector 2)
(7) Charge Air Cooler Coolant Pump

The key features of the Secondary Low Temperature Coolant Loop include:

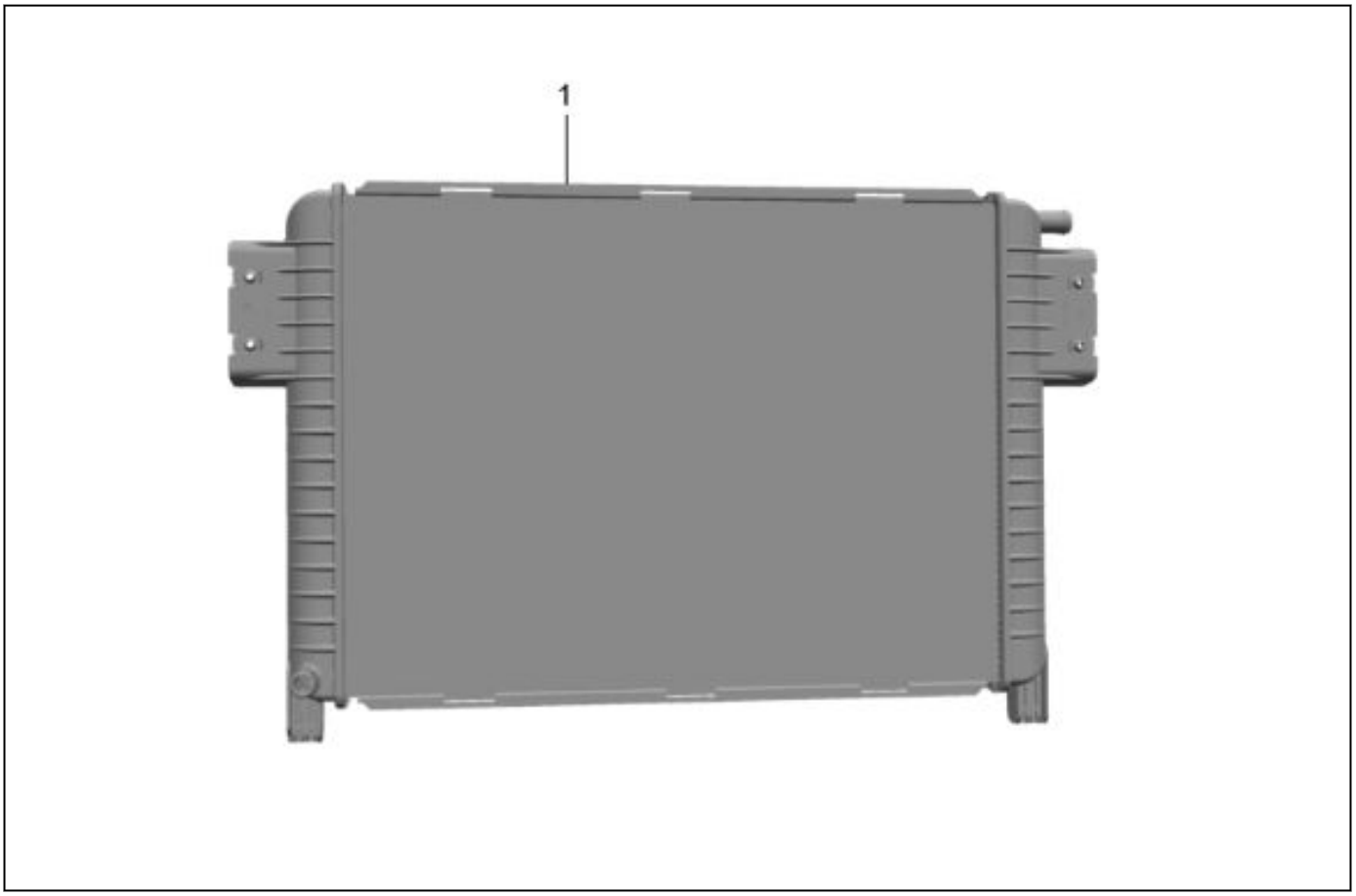
- **Charge Air Cooler Coolant Pump**



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  - The charge air cooler coolant pump (1) provides coolant flow from the charge air cooler surge tank through the engine auxiliary radiator and on to the fuel cooler, diesel exhaust fluid injectors and water charge air cooler before returning to the charge air cooler surge tank.

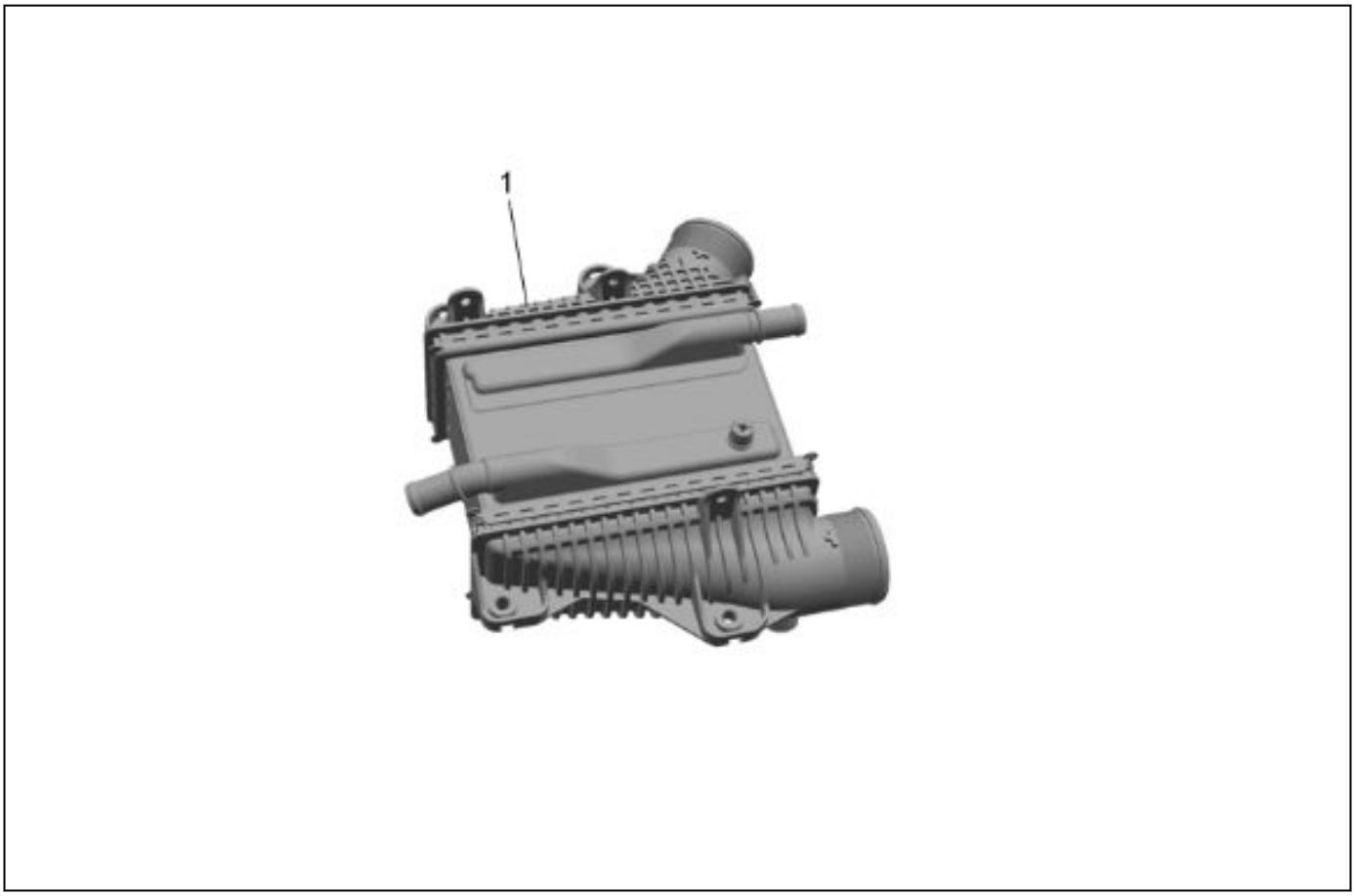
- **Engine Auxiliary Radiator**



6890643

- The engine auxiliary radiator (1) is a heat exchanger. It consists of a core and two end tanks. The aluminum core is a tube and fin crossflow design that extends from the inlet tank to the outlet tank. Fins are placed around the outside of these tubes to improve heat transfer to the atmosphere. The inlet and outlet tanks are a molded high temperature nylon reinforced plastic material. A high temperature rubber gasket seals the tank flange edge to the aluminum core. The tanks are clamped to the core with clinch tabs. The tabs are part of the aluminum header at each end of the core.

- **Water Charge Air Cooler**



6890644

- The water charge air cooler (1) is a heat exchanger that uses coolant flowing through tubes to cool the air passing outside of those tubes. The air is cooled in the water charge air cooler after exiting the turbocharger before entering the intake manifold.

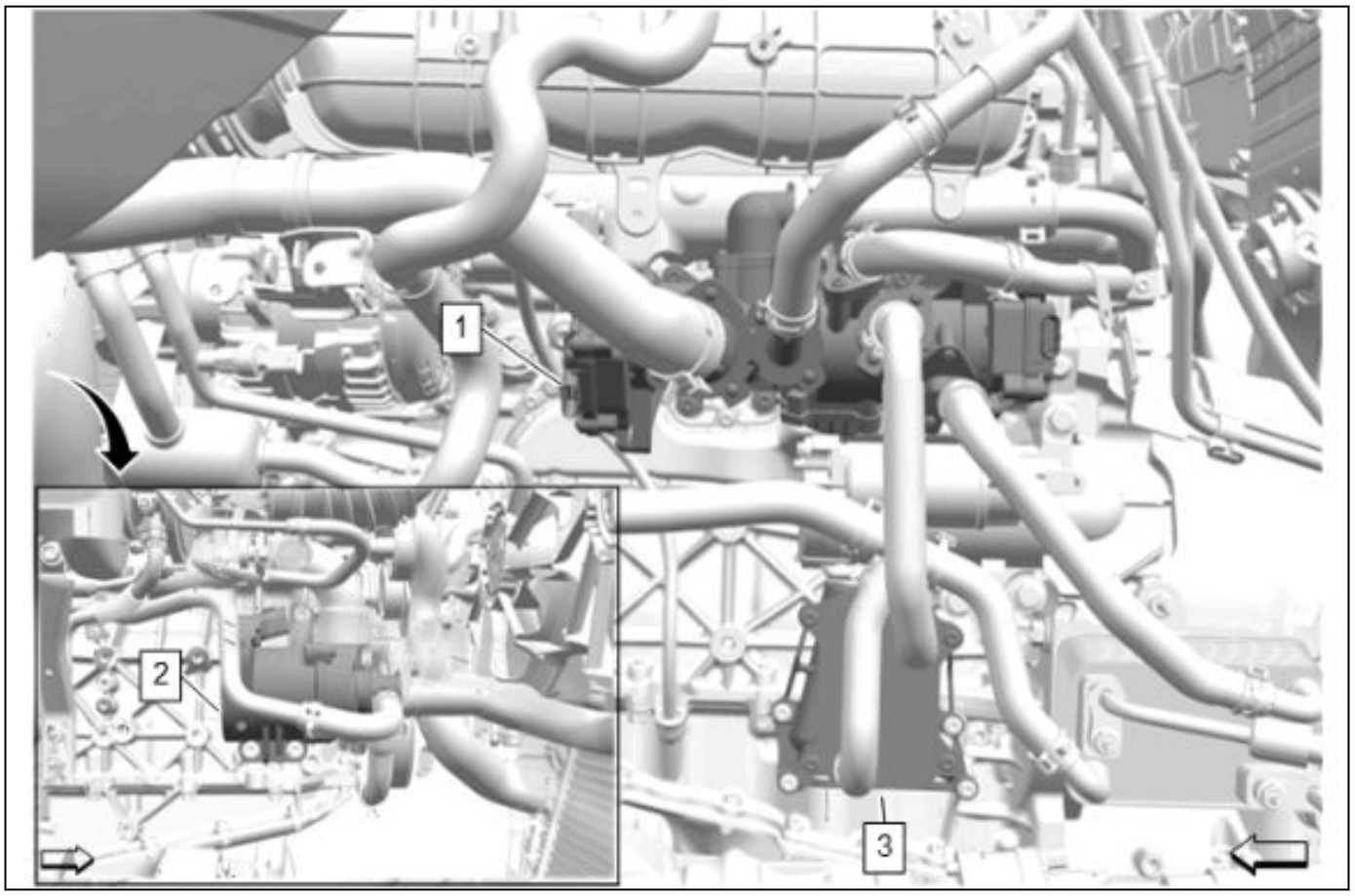
Cooling System Description and Operation

Active Thermal Management

This vehicle uses advance technology cooling system design, which makes use of active thermal management strategy. The difference between conventional cooling systems that use mechanical water pumps and active thermal management is that the predominant goal of the active thermal management strategy is to prioritize fuel economy by maintaining an ideal engine operating temperature during all engine speeds and operating conditions, while still meeting customer expectations for vehicle performance and reducing vehicle emissions.

The key features of active thermal management include:

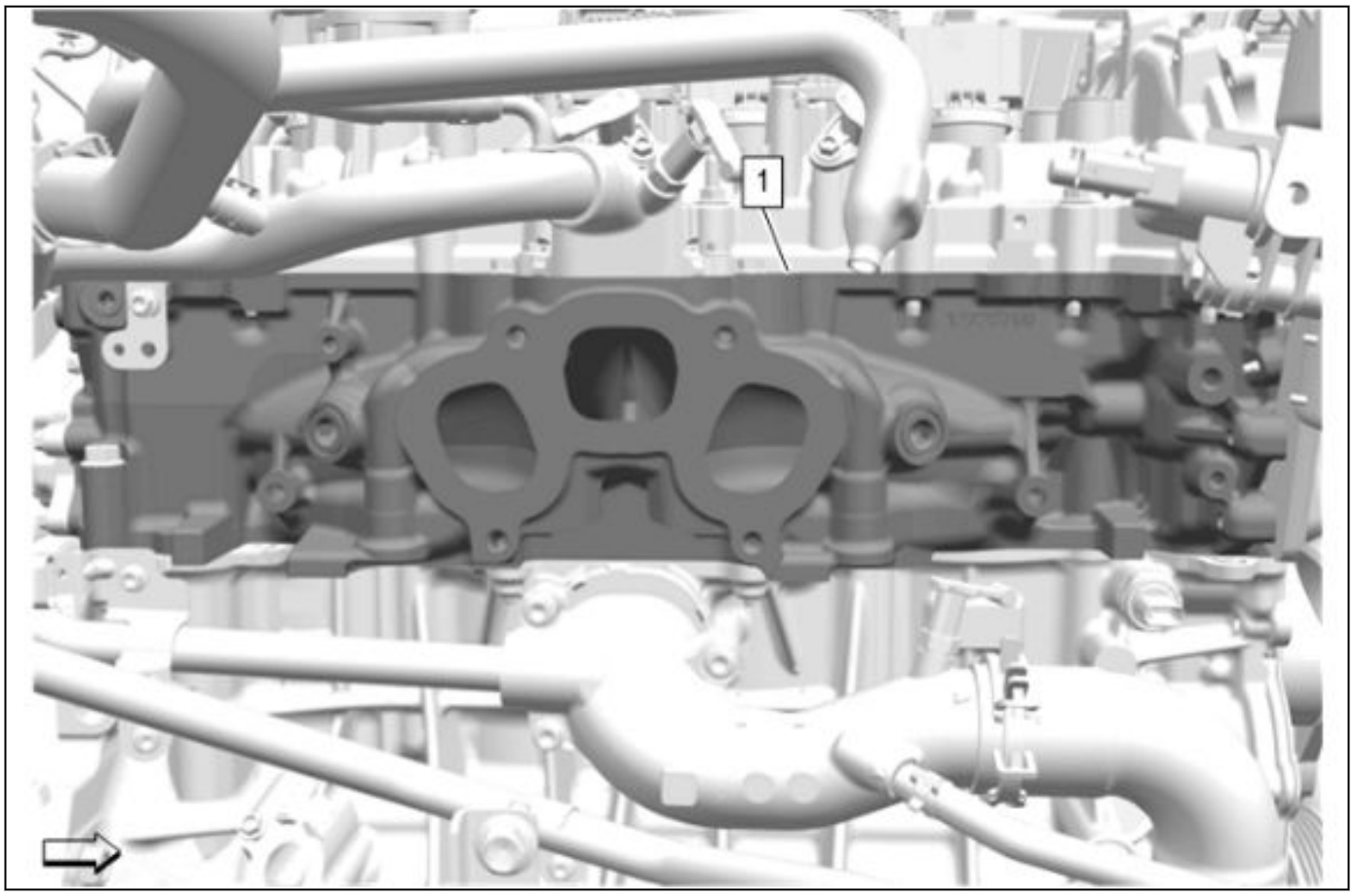
- **Engine Internal**
  - Integrated exhaust manifold that pulls heat from the engine exhaust.
  - Improved engine coolant jacket that targets hot spots in the engine.
- **Engine Mounted Cooling**



7165711

- − Water pump module (2) that replaces the conventional mechanical water pump.
- − The coolant control valve (1) contains two rotary control valves. The radiator control valve and the oil rotary coolant valve eliminate the need for the conventional cooling system thermostat.
- − Engine oil cooler (3) that uses coolant to heat or cool the engine oil as required.

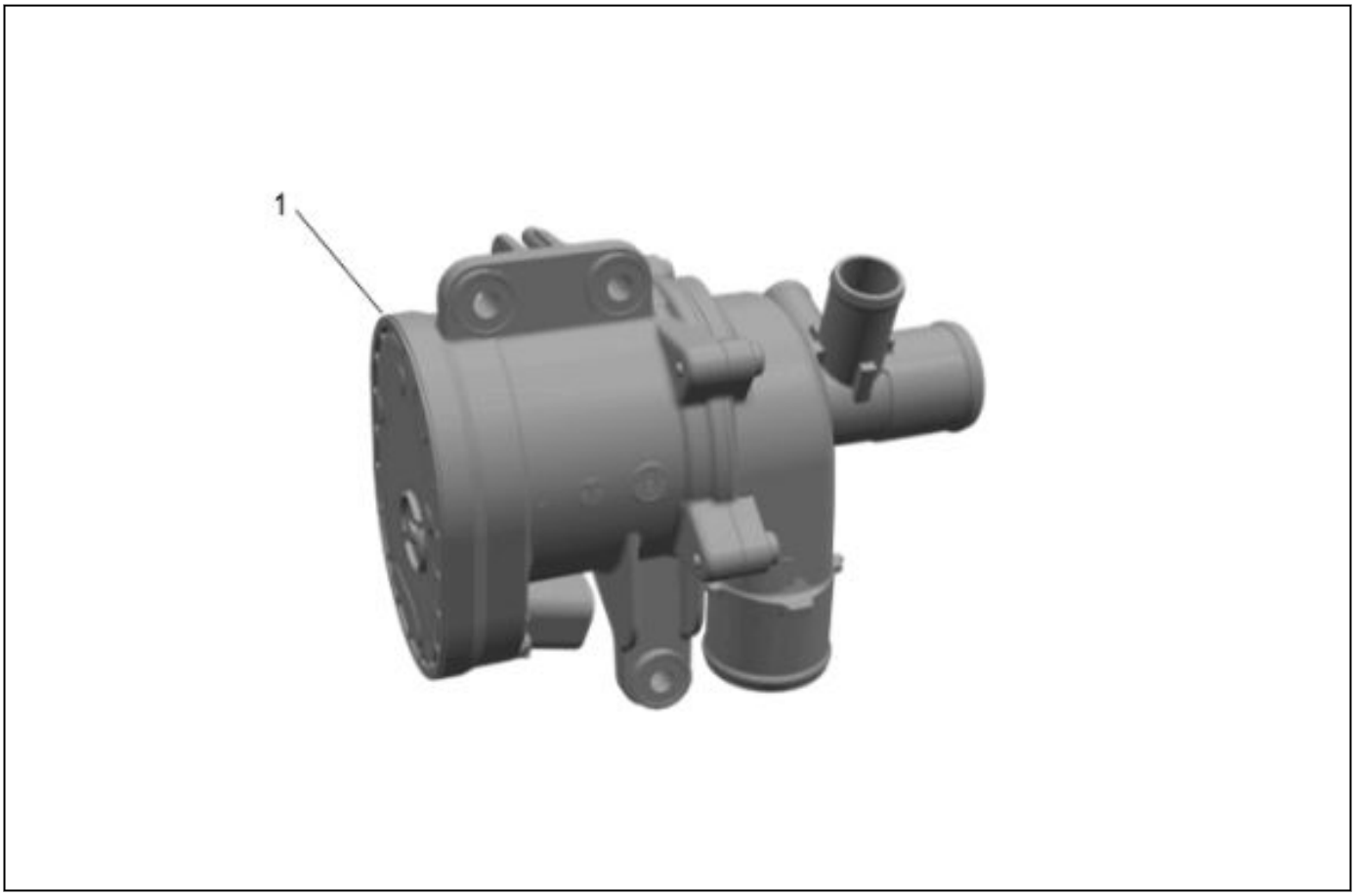
- **Temperature and Position Sensors**
- The powertrain control module, which controls the complete active thermal management system using feedback from numerous sensors:
  - − Engine Block Coolant Temperature Sensor
  - − Engine Cylinder Head Coolant Temperature Sensor
  - − Engine Inlet Coolant Temperature Sensor
  - − Engine Oil Temperature Sensor 1 and 2
  - − Transmission Oil Temperature Sensor
  - − Radiator Outlet Coolant Temperature Sensor
  - − Radiator Coolant Flow Control Valve Position Sensor
  - − Oil Coolant Flow Control Valve Position Sensor
- **Integrated Exhaust Manifold**



7165758

- The integrated exhaust manifold (1) is part of the cylinder head and is used to extract heat from the exhaust, which can then be directed to either the engine oil cooler, automatic transmission fluid cooling exchanger or the passenger compartment heater core. The integrated exhaust manifold provides a large portion of recuperated heat to the coolant.

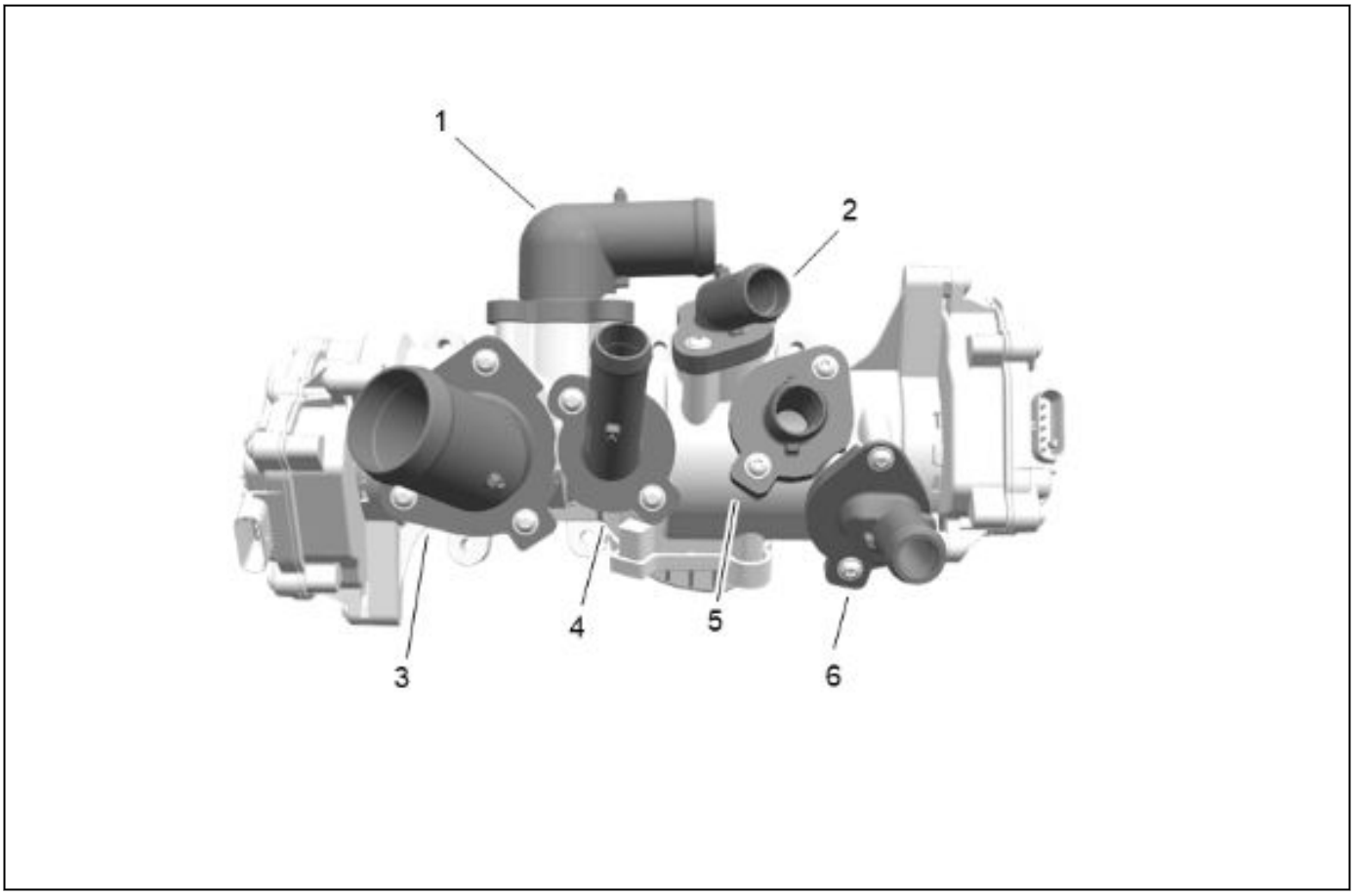
- **Water Pump Module**



7027473

- The water pump module (1) is attached to the side of the engine block and controls the coolant flow through the entire coolant system. The water pump module replaces the conventional belt or chain driven pump whose speed is directly coupled to the engine speed. The coolant flow from the water pump module is not related to engine speed but it is independently controlled by the powertrain control module.

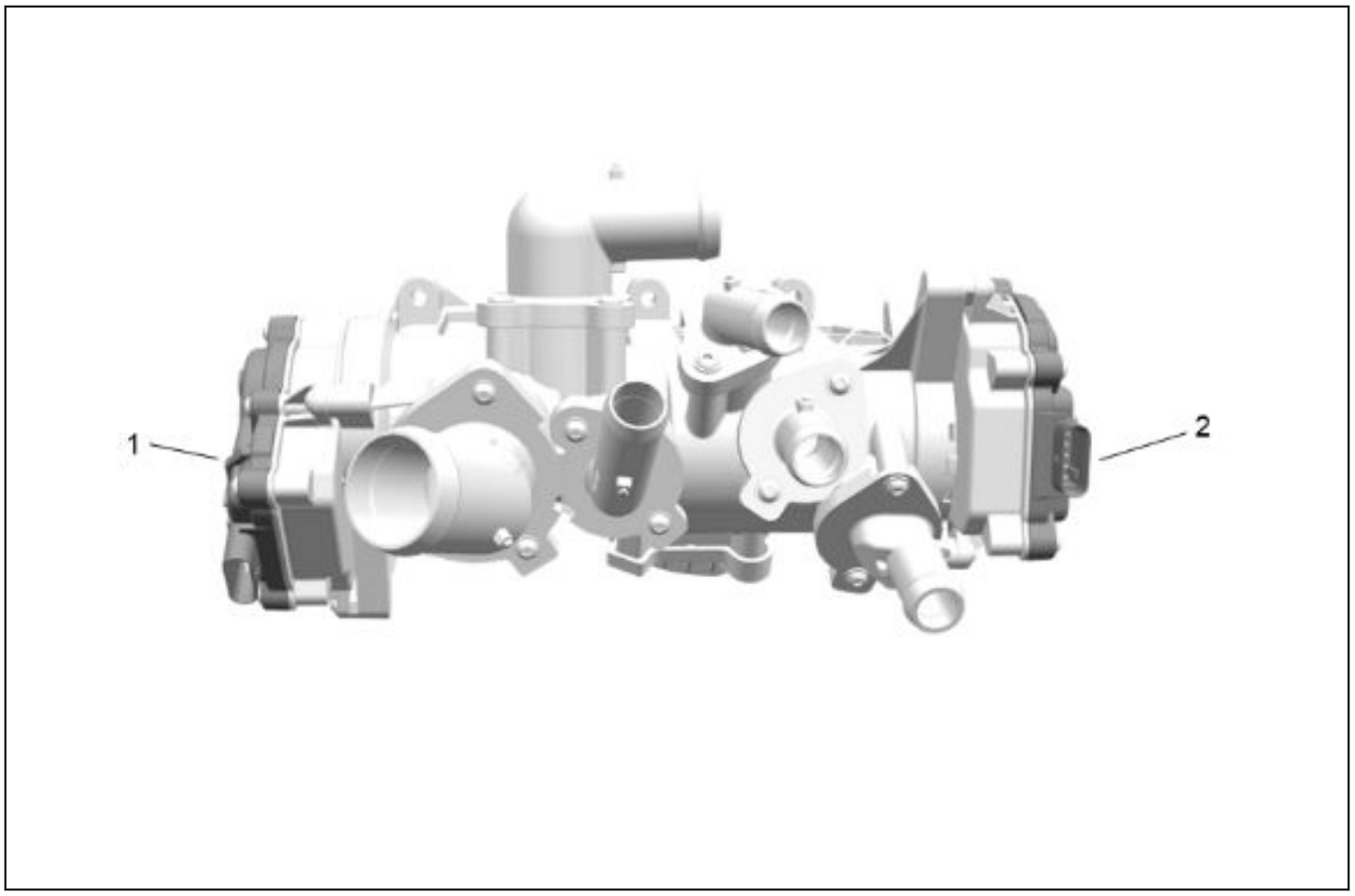
- **Engine Coolant Flow Control Valve**



7027615

- The engine coolant flow control valve controls coolant flow to the radiator as well as the engine and transmission oil heat exchangers eliminating the need for a conventional wax-operated thermostat and is controlled by the engine control module, through sensor feedback. Hot coolant from the integrated exhaust manifold is brought in through the port on the top left of the valve (1). The top right of the valve (2) is the cold feed port and sends hot coolant back to the water pump module. The left most port, and the biggest port (3), is the radiator port and sends hot coolant to the radiator. The small port second to the left of the valve (4) is always open and flowing to the heater core. The right two ports (5, 6) are for the engine and transmission oil heat exchangers and the ports send hot coolant to the oil heat exchangers when the oils are cold, and cold coolant to the oil heat exchangers when the oils are hot.

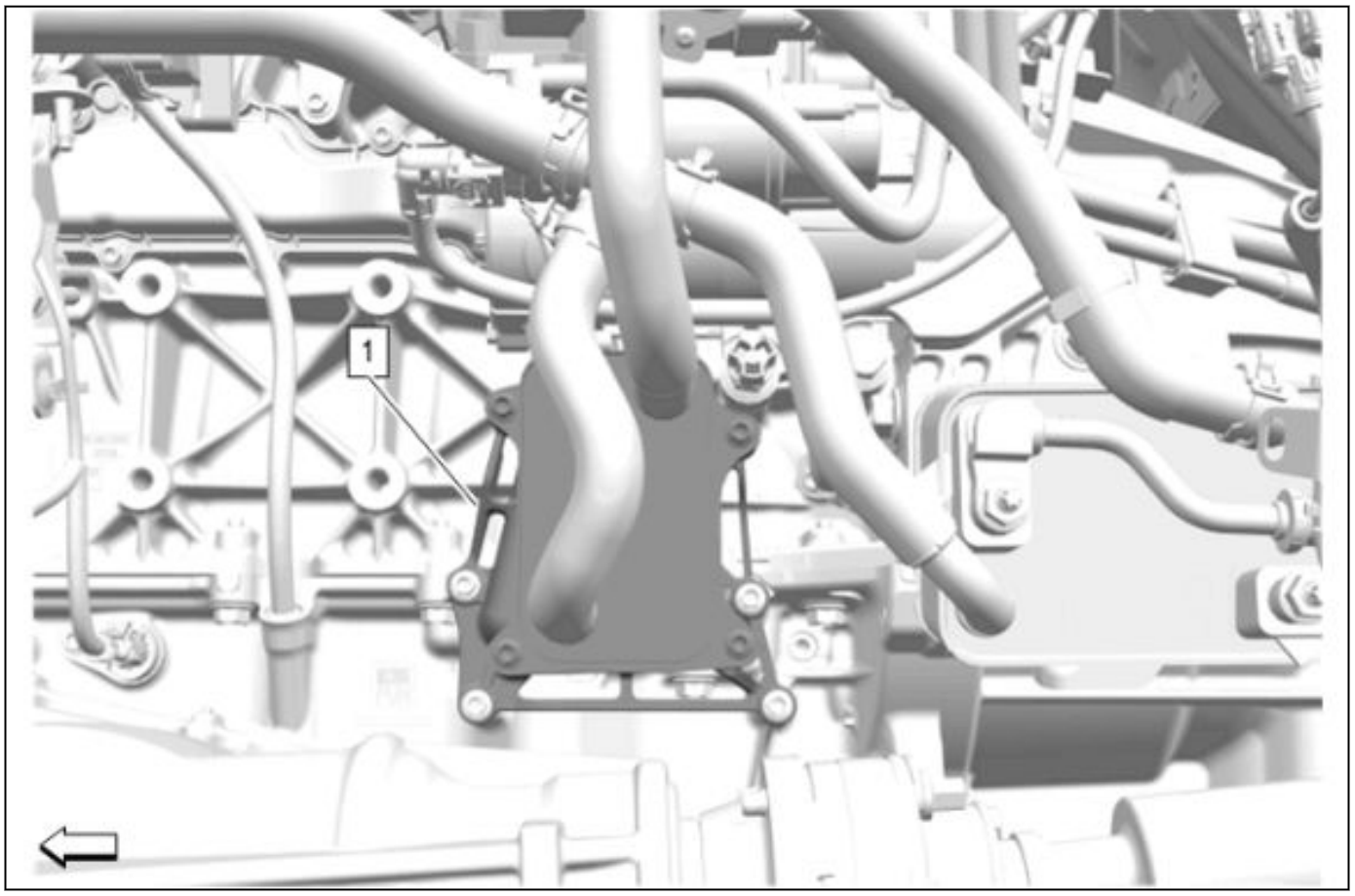
- **Engine Coolant Flow Control Valve (Radiator Coolant Valve and Oil Coolant Valve)**



7032536

- The radiator coolant valve (1) is part of the engine coolant flow control valve and isolated on the left side of the valve assembly and has it's own actuator and controls coolant flow to the radiator and heater core.
- The oil coolant valve (2) sends hot coolant to the oil heat exchangers when the oils are cold, and cold coolant to the oil heat exchangers when the oils are hot. The valve can control the temperatures of the engine and transmission oil independently.

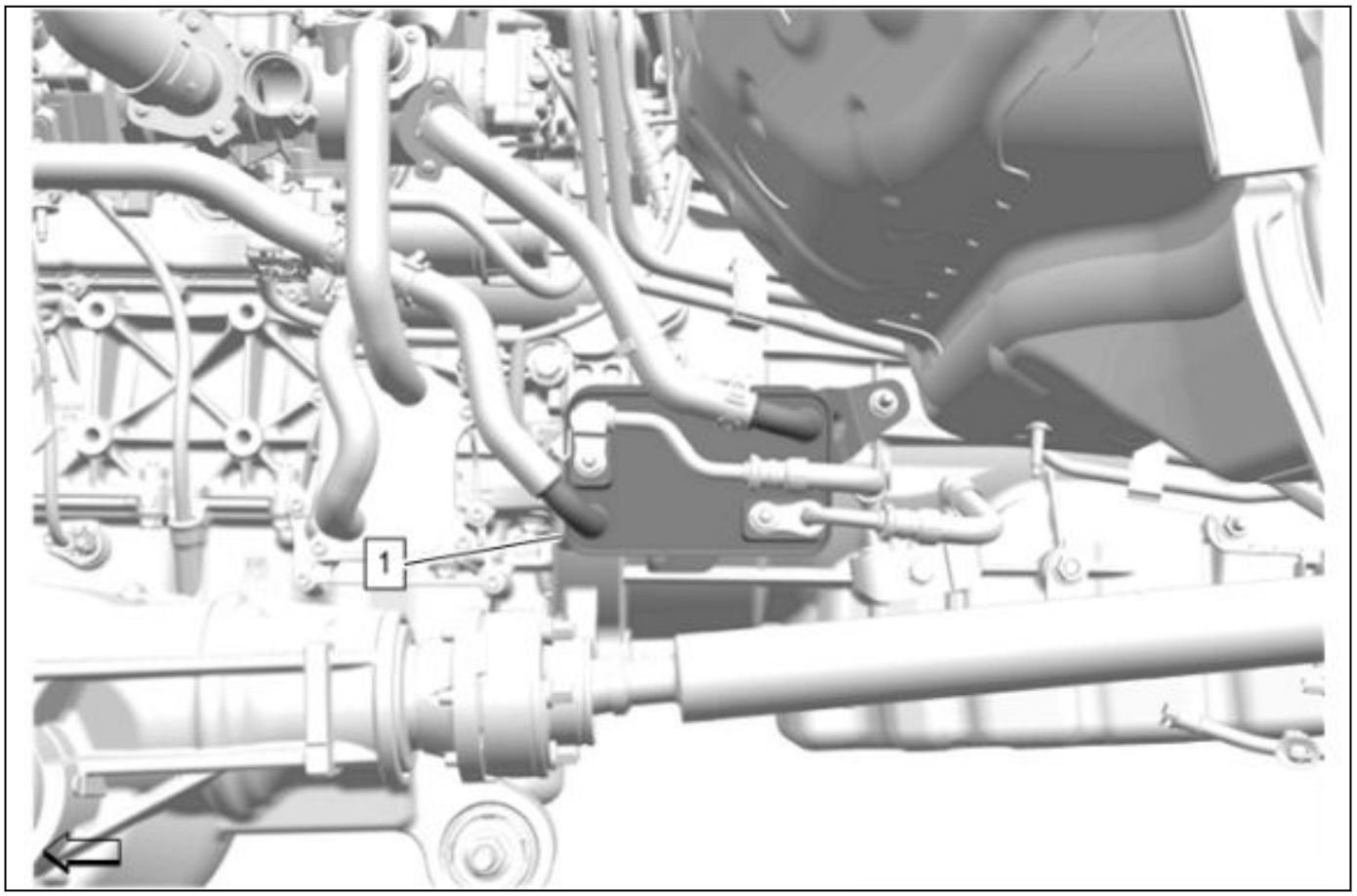
- **Engine Oil Cooler**



7027641

- The engine oil cooler (1) is a heat exchanger that is attached to the side of the engine and exchanges heat between the engine oil and engine coolant. The engine oil fluid cooling exchanger can flow no coolant, provide hot coolant for transmission oil heating (during engine warm-up) or provide cooled coolant for transmission oil cooling (under high thermal loads).

- **Automatic Transmission Fluid Cooling Exchanger**

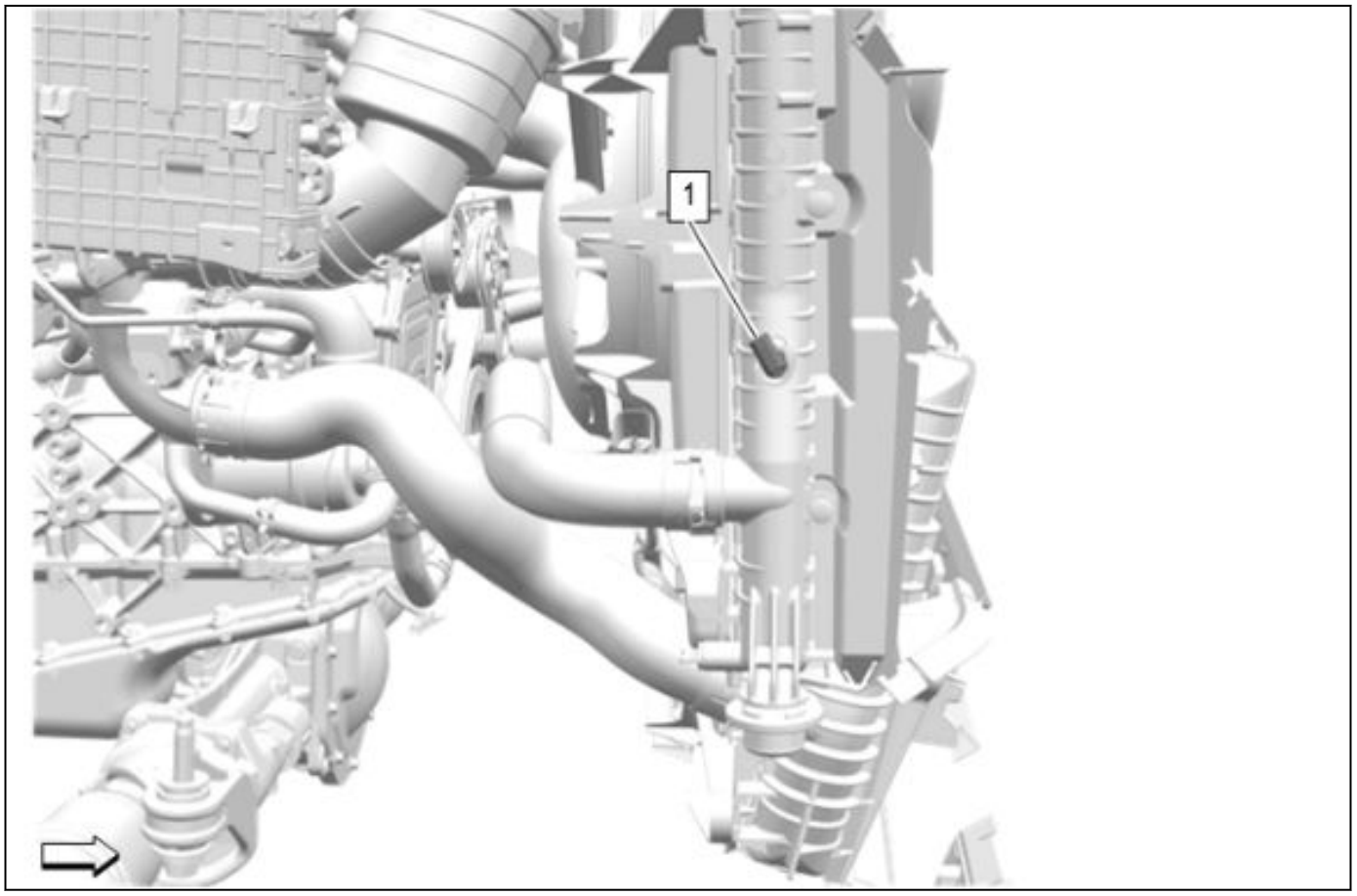


7027644

- The automatic transmission fluid cooling exchanger (1) is a heat exchanger that is attached to the front of the transmission and exchanges heat between the transmission oil and engine coolant. The automatic transmission fluid cooling exchanger can flow no coolant, provide hot coolant for transmission oil heating (during engine warm-up) or provide cooled coolant for transmission oil cooling (under high thermal loads).

- **Automatic Coolant Service Fill Description**
  - Active thermal management systems are more difficult to fill with coolant than traditional thermostat based systems. Therefore the vehicle is equipped with an automatic coolant service fill that can be activated via the scan tool or driver controls that will cycle the electric water pump module and coolant valves to de-aerate the coolant system.

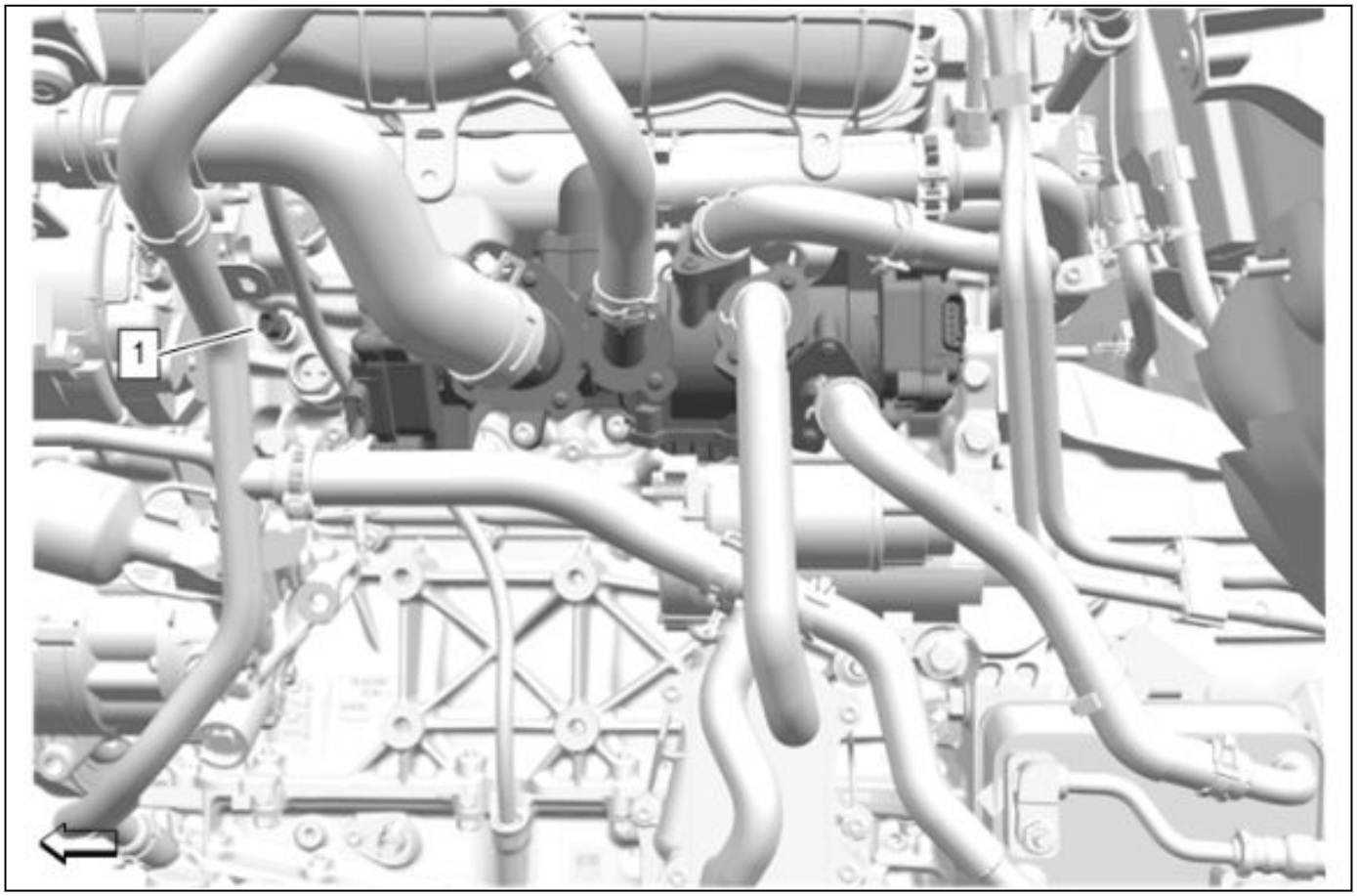
Component Locator - Engine View



7027645

Front right of engine view

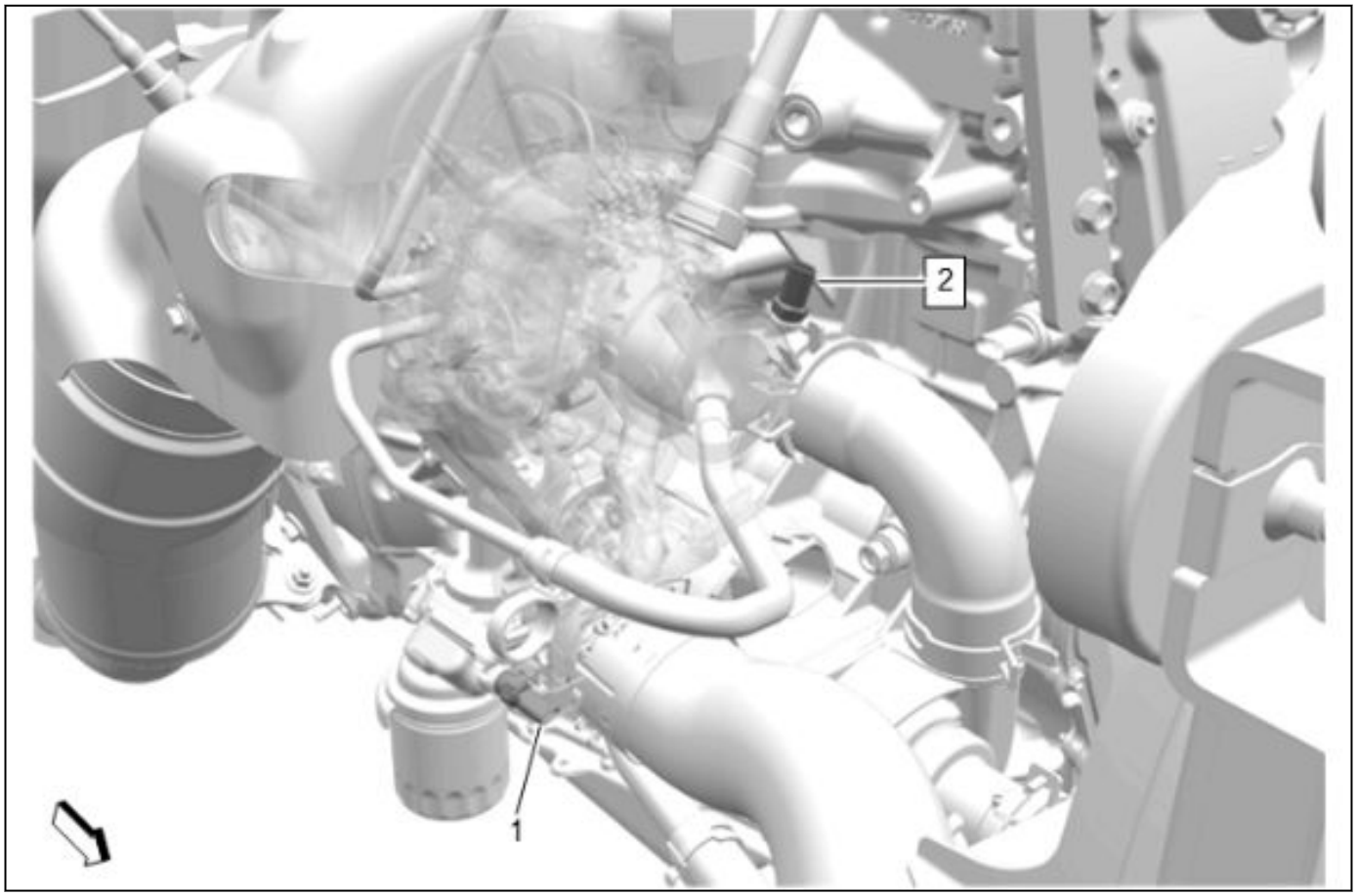
Callout	Scan Tool Reference	Service Information Part Name or Electronic Part Catalog Name
1	Radiator Coolant Temperature Sensor	Radiator Outlet Coolant Temperature Sensor



7027646

Left side of engine view

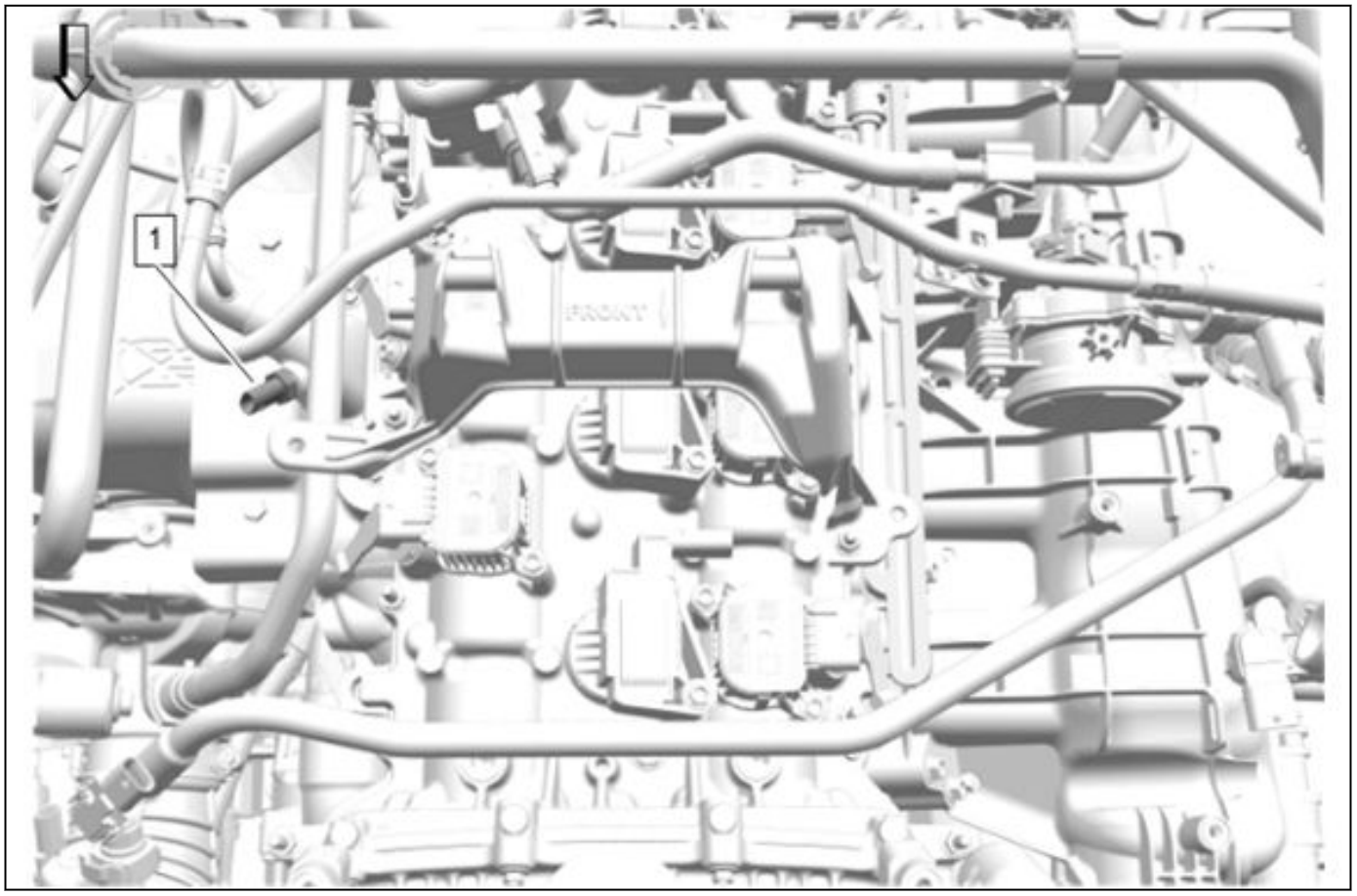
Callout	Scan Tool Reference	Service Information Part Name or Electronic Part Catalog Name
1	Engine Coolant Temperature Sensor 6	Engine Block Coolant Temperature Sensor



7027652

Right side of engine view

Callout	Scan Tool Reference	Service Information Part Name or Electronic Part Catalog Name
1	Engine Oil Temperature Sensor	Engine Oil Temperature Sensor 1 and 2
2	Engine Coolant Temperature Sensor 2	Engine Inlet Coolant Temperature Sensor



7027653

Top side of engine view

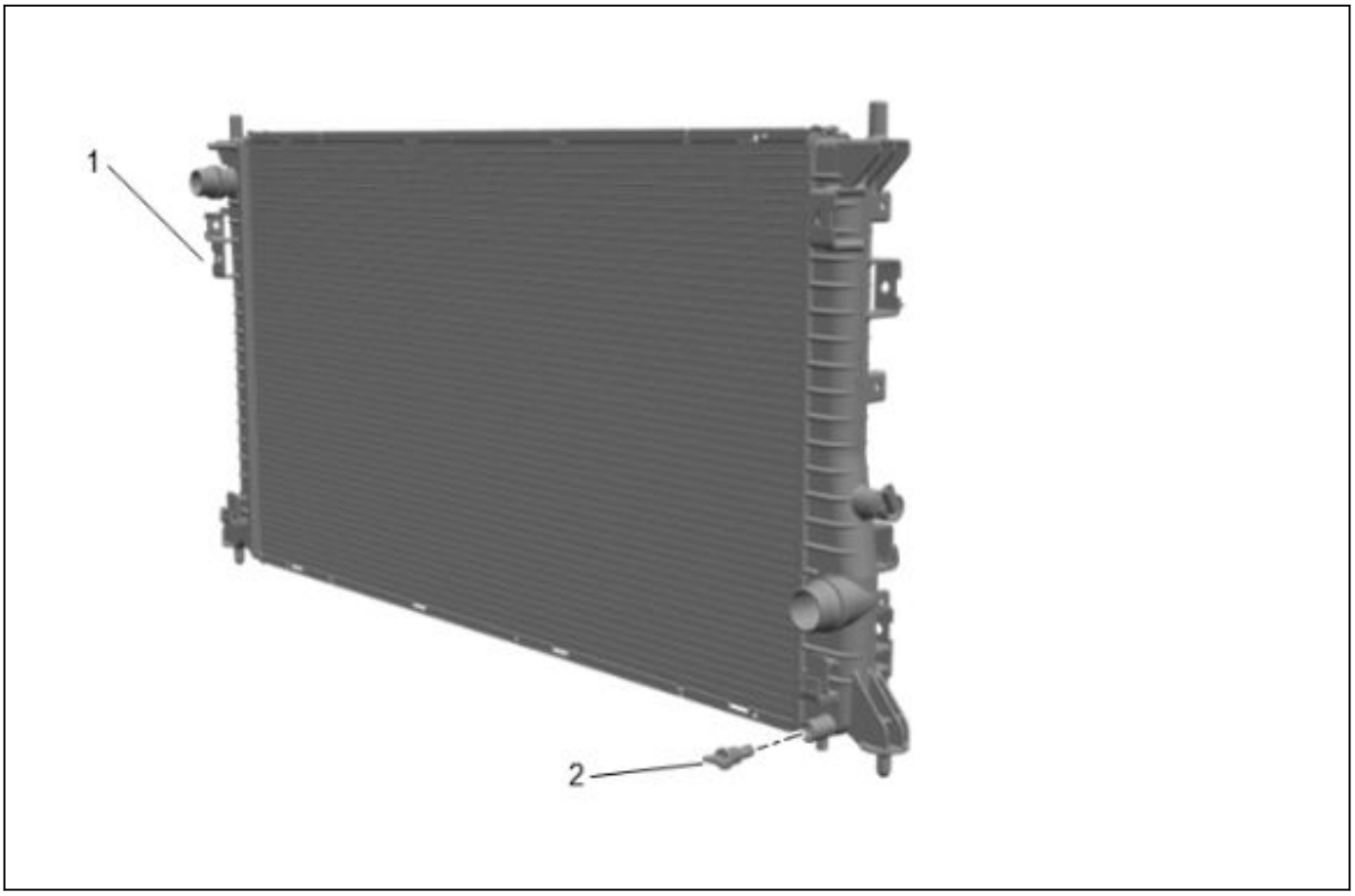
Callout	Scan Tool Reference	Service Information Part Name or Electronic Part Catalog Name
1	Engine Coolant Temperature Sensor 5	Engine Cylinder Head Coolant Temperature Sensor

Cooling System Components

- Various temperature and position sensors provide data back to the powertrain control module.
- Active thermal management still uses many of the conventional cooling system features, including:
  - Coolant
  - Coolant Hoses
  - Radiator
  - Radiator Surge Tank
  - Surge Tank Pressure Cap
  - Engine Coolant Indicators
  - Air Baffles/Guides and Seals
  - Cabin Heater Core Route, if equipped with Rear Cabin Heater

Coolant
The engine coolant is a solution made up of a 50-50 mixture of DEX-COOL® and suitable drinking water. The coolant solution transfers heat between the components of the engine heating/cooling system.

Radiator

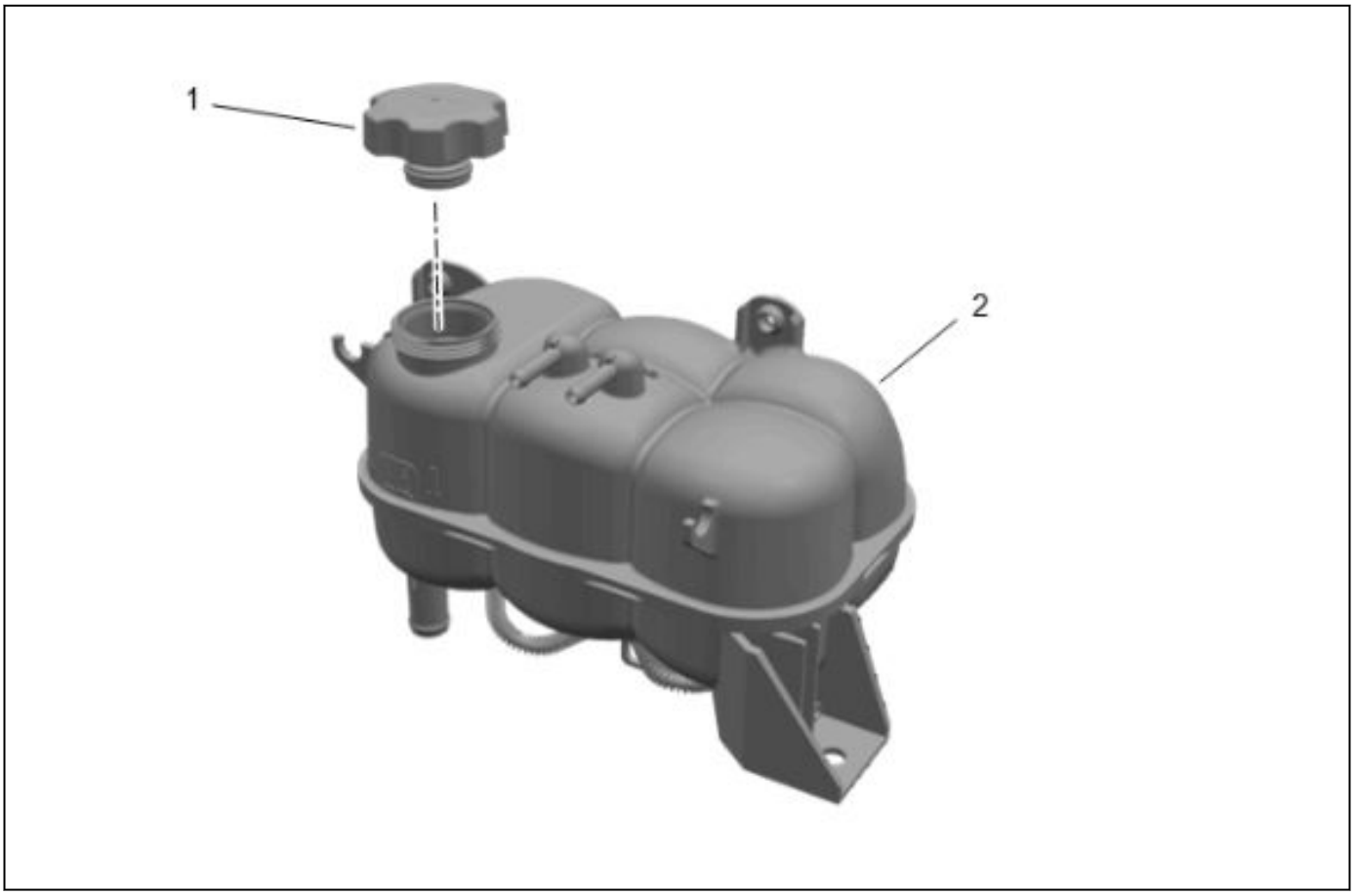


7027655

The radiator (1) is a heat exchanger. It consists of a core and two end tanks. The aluminum core is a tube and fin crossflow design that extends from the inlet tank to the outlet tank. Fins are placed around the outside of the tubes to improve heat transfer to the atmosphere. The inlet and outlet tanks are a molded high temperature nylon reinforced plastic material. A high temperature rubber gasket seals the tank flange edge to the aluminum core. The tanks are clamped to the core with clinch tabs. The tabs are part of the aluminum header at each end of the core. The fins on the core transfer heat from the coolant passing through the tubes. Air passing between the fins absorbs the heat and cools the coolant. Heat is removed from the coolant as the coolant passes through the radiator.

The radiator also has a drain cock (2) located in the bottom of the left or right hand tank. The drain cock unit includes the drain cock and drain cock seal.

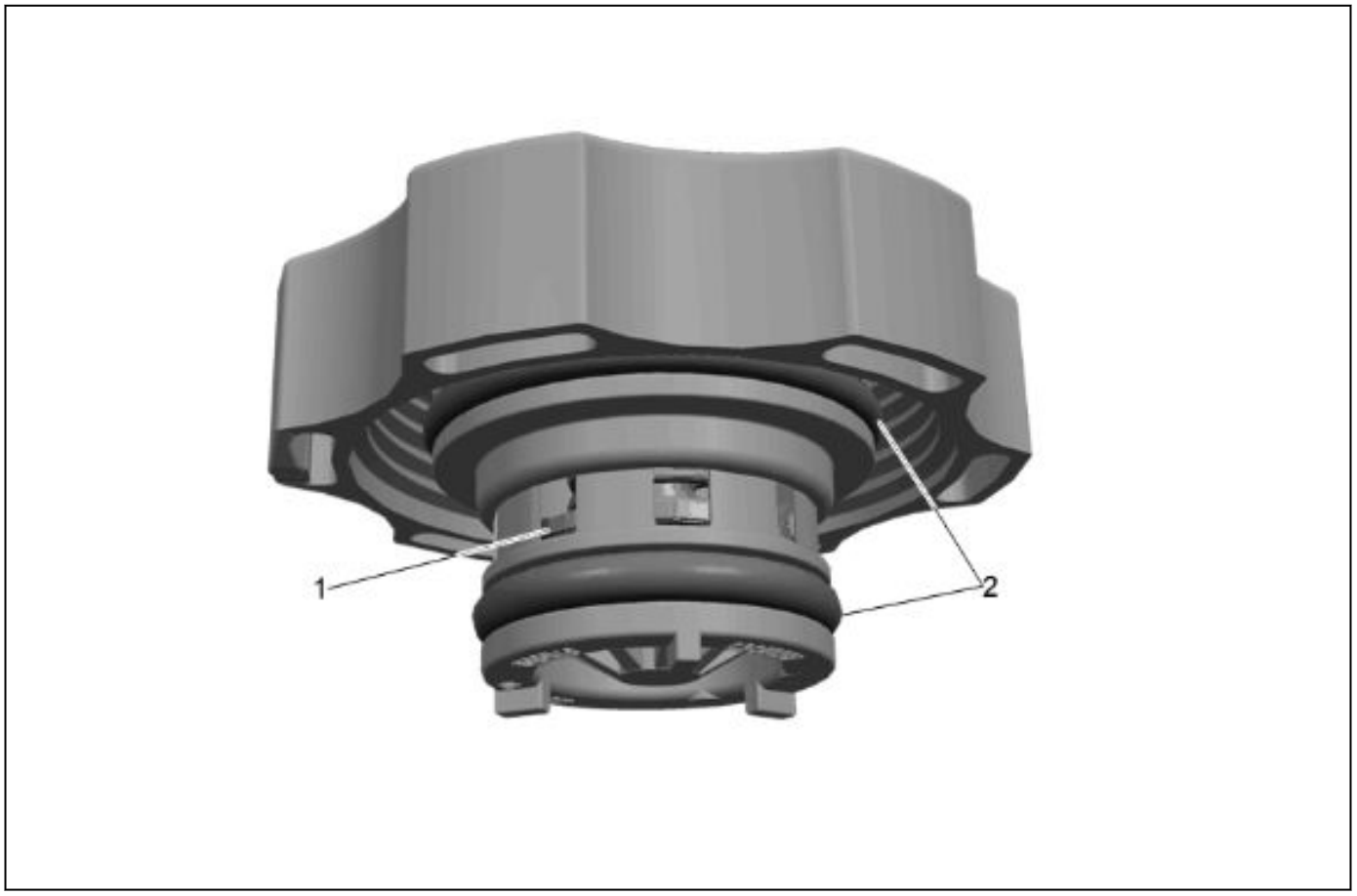
Radiator Surge Tank



6852834

The radiator surge tank (2) is a plastic tank with a pressure cap (1) mounted to it. The tank is mounted at a point higher than all other coolant passages. The surge tank provides an air space in the cooling system. The air space allows the coolant to expand and contract. The surge tank also provides a coolant fill point and a central air bleed location. During vehicle use, the coolant heats and expands. The coolant that is displaced by this expansion flows into the surge tank. As the coolant circulates, air is allowed to exit. This is an advantage to the cooling system. Coolant without air bubbles absorbs heat much better than coolant with air bubbles.

Radiator Surge Tank Cap

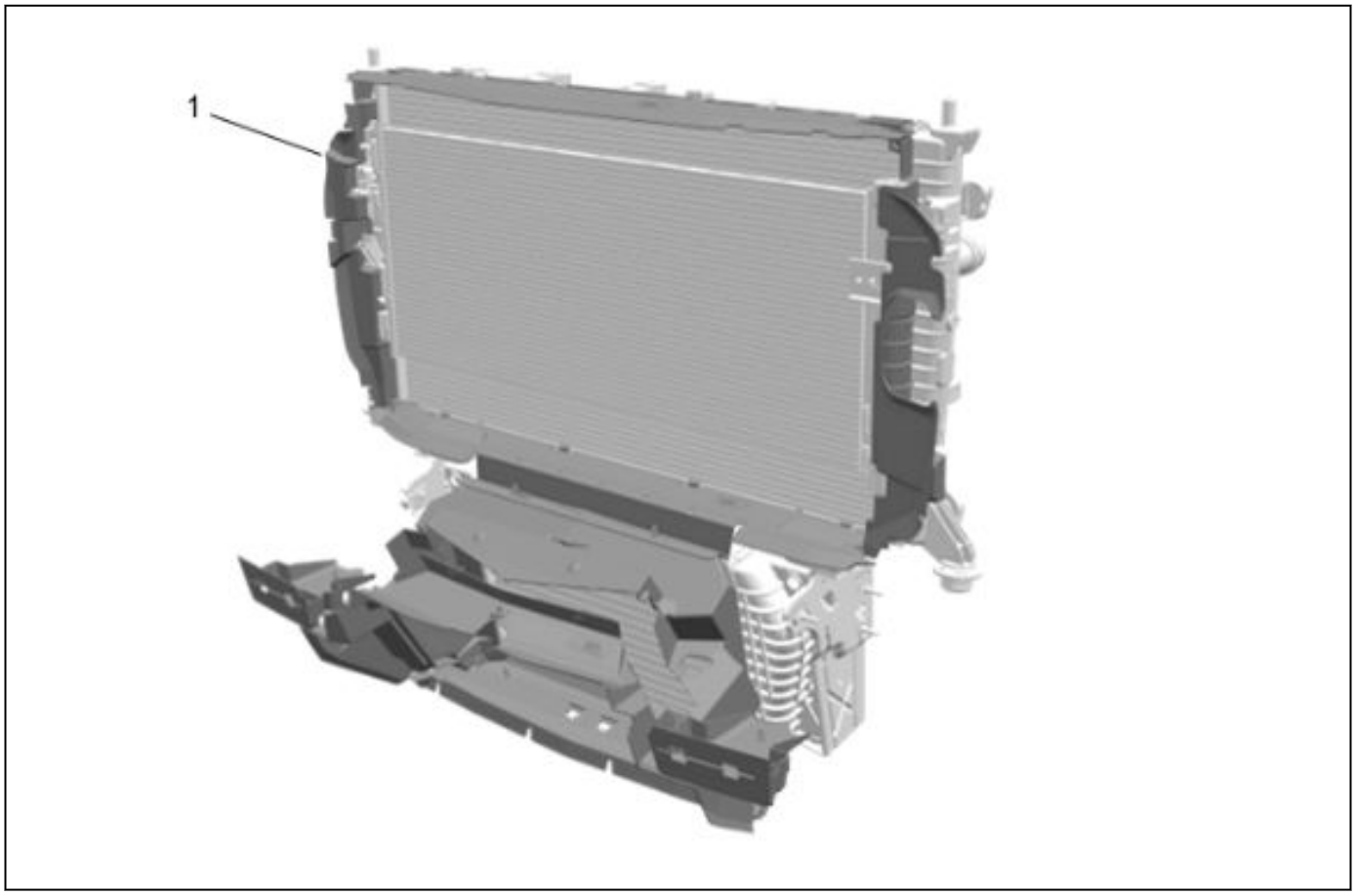


6636994

The radiator surge tank cap is a pressure cap that seals (2) and pressurizes the cooling system. It contains a blow off or pressure valve (1) and a vacuum or atmospheric valve.

- The pressure valve is held against its seat by a spring and protects the radiator by relieving pressure if it exceeds 20 psi.
- The vacuum valve is held against its seat by a spring, which permits opening of the valve to relieve vacuum created in the cooling system as it cools off. The vacuum, if not relieved, could cause the radiator hoses to collapse.
- The pressure cap allows pressure in the cooling system to build up. As the pressure builds, the boiling point of the coolant goes up as well. Therefore, the coolant can be safely run at a temperature higher than the boiling point of the coolant at atmospheric pressure.
- The hotter the coolant is, the faster the heat moves from the radiator to the cooler passing air. However, if the pressure exceeds the strength of the spring, the pressure valve rises so that the excess pressure can escape.
- When the engine cools down, the temperature of the coolant drops and a vacuum is created in the cooling system. This vacuum causes the vacuum valve to open, allowing outside air into the cooling system. This equalizes the pressure in the cooling system with atmospheric pressure, thus preventing the radiator hoses from collapsing.

Air Baffles/Guides and Seals



7165792

The cooling system uses deflectors, air baffles/guides (1) and air seals to increase cooling system capability. Deflectors are installed under the vehicle to redirect airflow beneath the vehicle and through the radiator to increase engine cooling. Air baffles/guides are also used to direct airflow through the radiator and increase cooling capability. Air seals prevent air from bypassing the radiator and air conditioning condenser, and prevent recirculation of hot air for better hot weather cooling and air conditioning condenser performance.

Engine Coolant Indicators
The instrument panel cluster (IPC) shows the engine temperature on the temperature gauge. The value is sent on the data communication line from powertrain control module. When the coolant temperature is hot, the IPC receives a discrete input from powertrain control module requesting illumination.

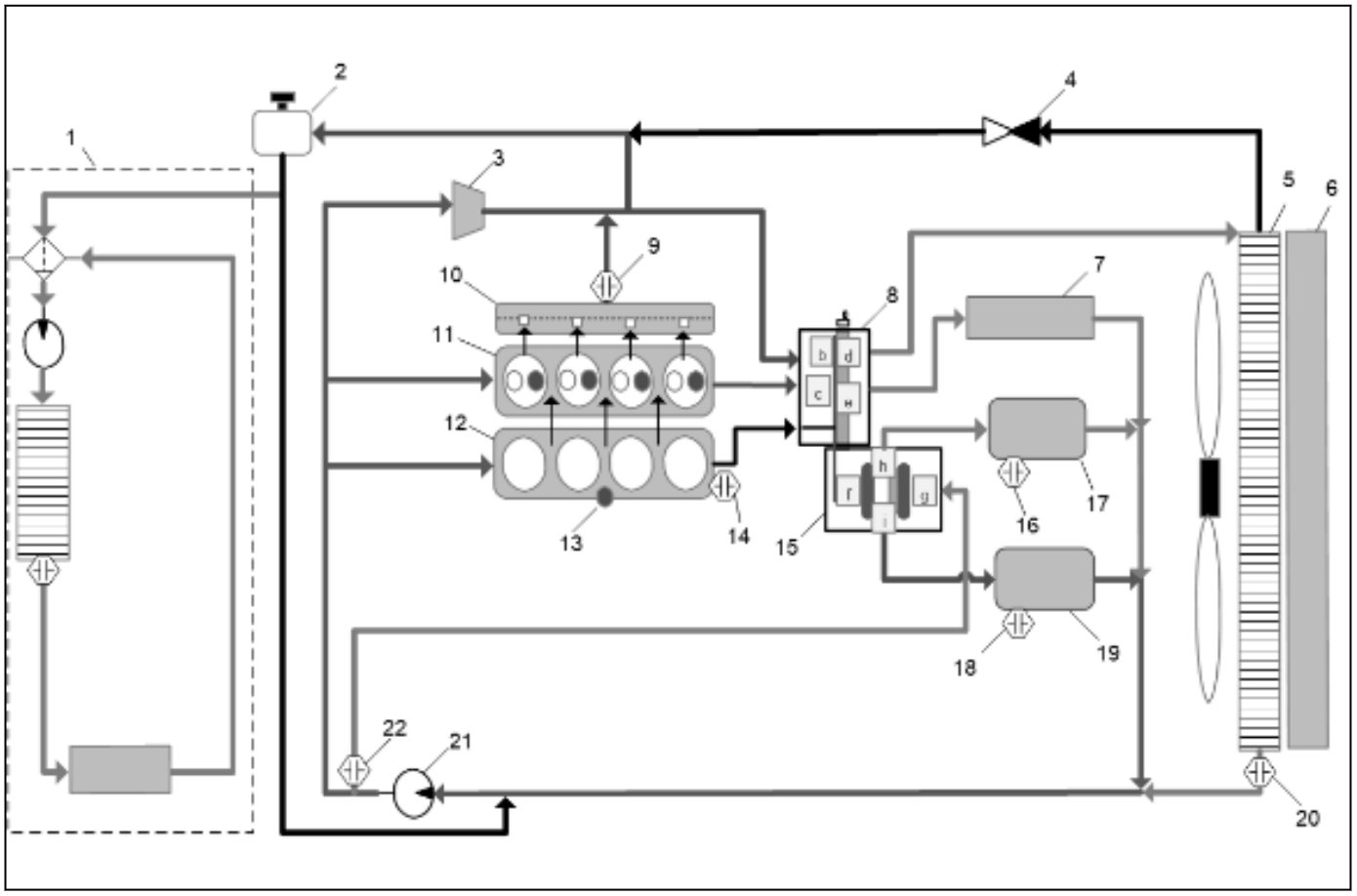
The IPC performs the display test at the start of each ignition cycle. The IPC illuminates the TEMP indicator.

Coolant Heater (If Equipped)
The optional coolant heater (RPO K05) operates using 110 V AC external power and is designed to warm the coolant in the engine block area for improved starting in very cold weather. The coolant heater also helps reduce fuel consumption when a cold engine is warming up. The unit is equipped with a detachable AC power cord. There is an internal thermal switch in the coolant heater cord that prevents operation above **-20°C (-4°F)**. A weather shield on the cord is provided to protect the plug when not in use.

Cooling Cycle
Coolant flows from the electric water pump module outlet and into the engine circuit and turbocharger cooling circuit. It also provides cooled coolant flow from the radiator to the engine coolant flow control valve to be used as necessary to manage transmission and engine oil temperature. In the engine, the coolant flow direction and volume are controlled by the radiator control valve, block control valve, and oil control valve to provide necessary flow for optimal engine block, cylinder head, and exhaust manifold cooling. The engine coolant flow control valve can also provide the transmission and engine oil circuits warmed coolant from the engine to optimize the oil temperatures. Excess heat is removed from the coolant in the radiator and the cooled coolant returns to the electric water pump module.

Low Flow

Low Flow Mode



7035709

(1) Low Temperature Coolant Loop (see low temp coolant loop D&O)
(2) Radiator Surge Tank (shared surge tank by both systems)
(3) Turbo Charger
(4) Check Valve
(5) Engine Radiator
(6) Air Conditioning Condenser
(7) Heater Core
(8) Radiator Rotary Valve
(9) Engine Cylinder Head Coolant Temperature Sensor
(10) Integrated Exhaust Manifold
(11) Cylinder Head
(12) Engine Block
(13) Block Heater
(14) Engine Block Coolant Temperature Sensor
(15) Oil Rotary Valve
(16) Engine Oil Temperature Sensor 1 and 2
(17) Engine Oil Cooler
(18) Transmission Oil Temperature Sensor (internal to transmission)
(19) Transmission Oil Cooler
(20) Radiator Coolant Temperature Sensor
(21) Water Pump Module

(22) Engine Inlet Temperature Sensor
Valve Port B
Valve Port C
Valve Port D
Valve Port E
Valve Port F
Valve Port G
Valve Port H
Valve Port I

If the engine is started cold, the system will go to low flow mode, which means the electric water pump runs just enough for the sensors to provide reliable information on the state of the system. As the engine warms up, the heat stays around the combustion chamber and is not taken away by coolant flow. Low flow mode is the fastest method for engine warm up. Low flow mode will not enable if the interior HVAC is turned on. Transmission oil heat exchanger branch will be open to provide a path for coolant to flow back to the water pump module.

COMPONENT	CONDITION
Electric Water Pump Module	Low Speed, Low Flow
Radiator Rotary Coolant Valve	Low Flow
Oil Rotary Coolant Valve	Low Flow

Radiator Rotary Valve Modes

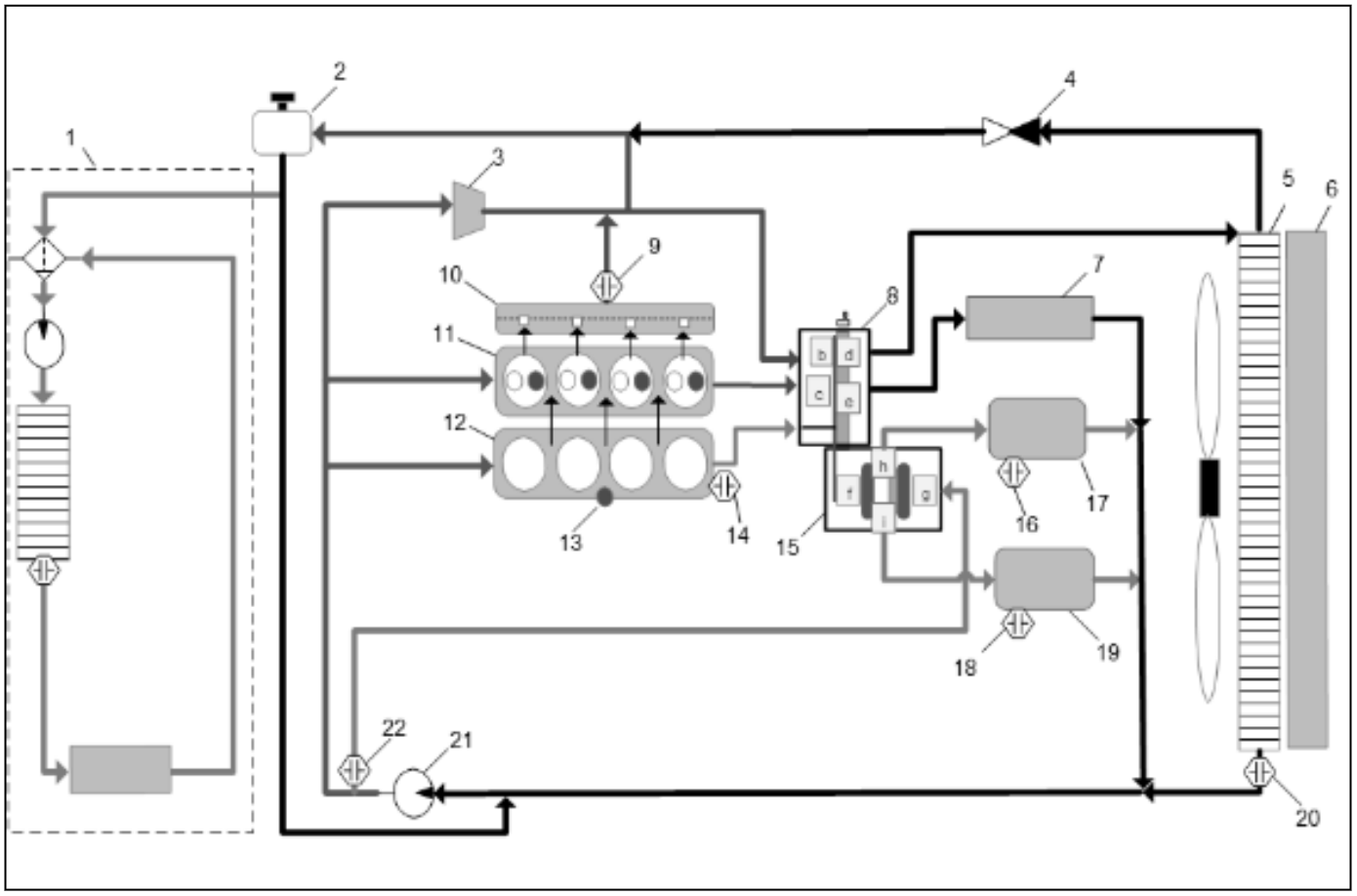
The radiator rotary coolant valve directs the coolant coming out of the engine to the heater core and radiator branches.

Color legend for coolant Schematics:

- Yellow Lines: Highlights the radiator rotary coolant valve in the coolant schematic.
- Black Lines: Coolant lines that are closed off to flow by the radiator rotary coolant valve.
- Grey Lines: Coolant line that are not affected by the position of the radiator rotary coolant valve.
- Red Lines: Warm coolant that is flowing through the specific branch.
- Blue Lines: Cold coolant that is flowing through the specific branch.

Radiator Closed, Heater Core Closed

Radiator Closed, Heater Core Closed



7036608

(1) Low Temperature Coolant Loop (see low temp coolant loop D&O)
(2) Radiator Surge Tank (shared surge tank by both systems)
(3) Turbo Charger
(4) Check Valve
(5) Engine Radiator
(6) Air Conditioning Condenser
(7) Heater Core
(8) Radiator Rotary Valve
(9) Engine Cylinder Head Coolant Temperature Sensor
(10) Integrated Exhaust Manifold
(11) Cylinder Head
(12) Engine Block
(13) Block Heater
(14) Engine Block Coolant Temperature Sensor
(15) Oil Rotary Valve
(16) Engine Oil Temperature Sensor 1 and 2
(17) Engine Oil Cooler
(18) Transmission Oil Temperature Sensor (internal to transmission)
(19) Transmission Oil Cooler
(20) Radiator Coolant Temperature Sensor
(21) Water Pump Module

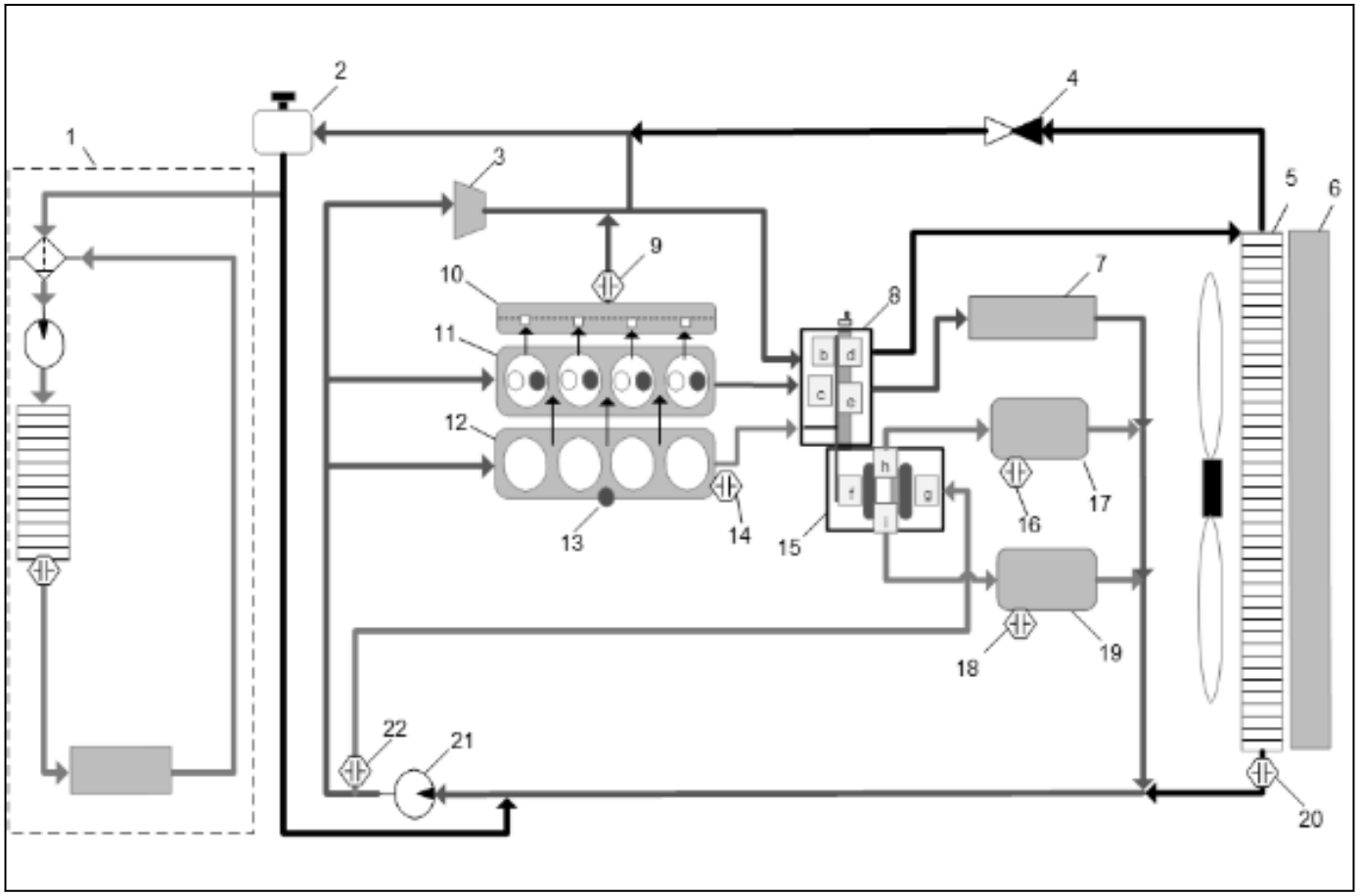
(22) Engine Inlet Temperature Sensor
Valve Port B
Valve Port C
Valve Port D
Valve Port E
Valve Port F
Valve Port G
Valve Port H
Valve Port I

Radiator Closed, Heater Core Open

In this mode, the radiator rotary coolant valve has shut coolant flow off to the radiator and to the heater core.

COMPONENT	CONDITION
Electric Water Pump Module	Speed-Controlled to Engine Demand
Radiator Rotary Coolant Valve	Closed
Radiator Rotary Coolant Valve Position	150 degrees – 170 degrees

Radiator Closed, Heater Core Open



7036798

(1) Low Temperature Coolant Loop (see low temp coolant loop D&O)
(2) Radiator Surge Tank (shared surge tank by both systems)
(3) Turbo Charger
(4) Check Valve

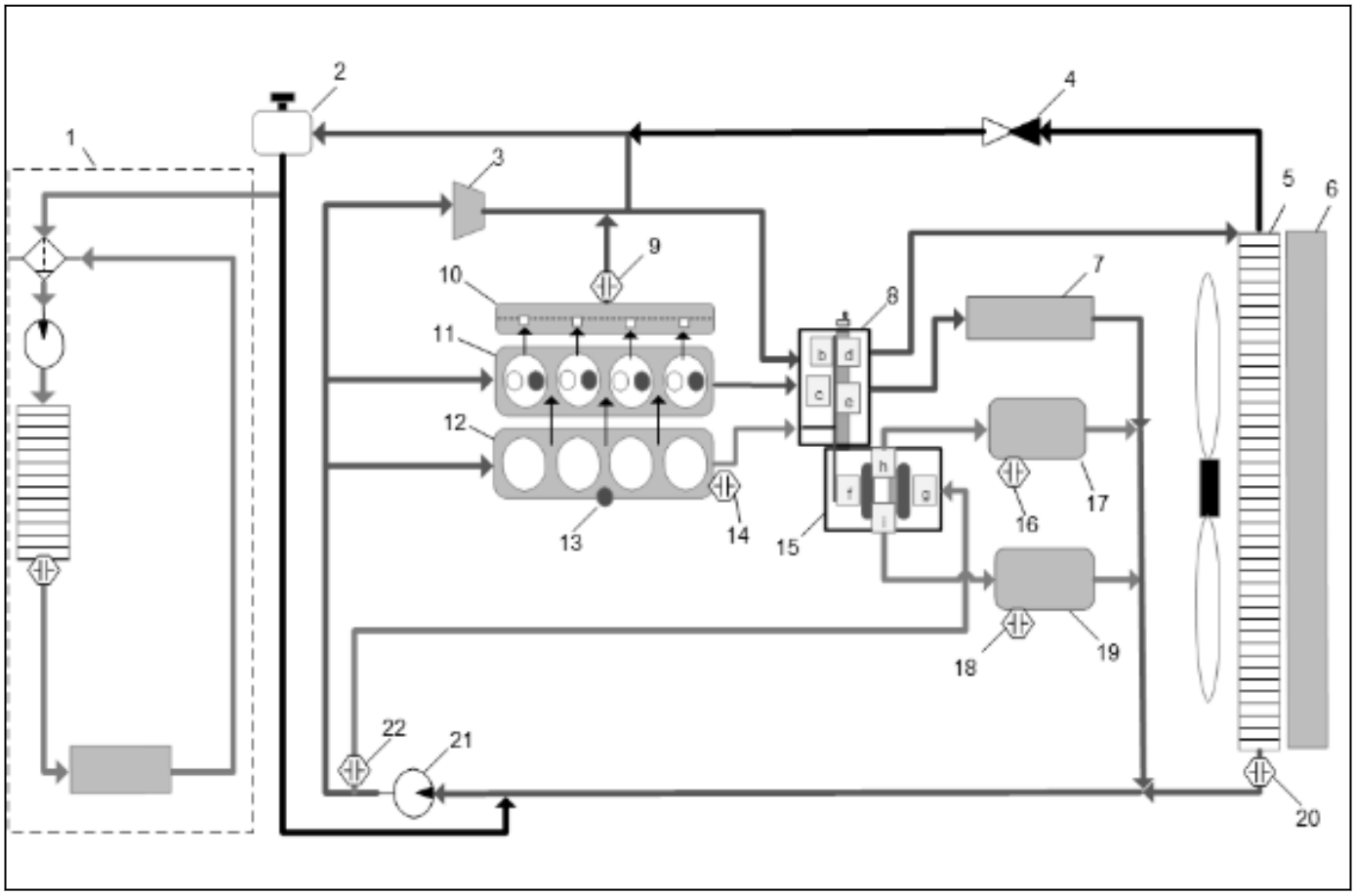
(5) Engine Radiator
(6) Air Conditioning Condenser
(7) Heater Core
(8) Radiator Rotary Valve
(9) Engine Cylinder Head Coolant Temperature Sensor
(10) Integrated Exhaust Manifold
(11) Cylinder Head
(12) Engine Block
(13) Block Heater
(14) Engine Block Coolant Temperature Sensor
(15) Oil Rotary Valve
(16) Engine Oil Temperature Sensor 1 and 2
(17) Engine Oil Cooler
(18) Transmission Oil Temperature Sensor (internal to transmission)
(19) Transmission Oil Cooler
(20) Radiator Coolant Temperature Sensor
(21) Water Pump Module
(22) Engine Inlet Temperature Sensor
Valve Port B
Valve Port C
Valve Port D
Valve Port E
Valve Port F
Valve Port G
Valve Port H
Valve Port I

In this mode, the radiator rotary coolant valve has opened flow to the heater core (port e), which provides warm coolant to the heater core to assist in warming the vehicle cabin. The radiator flow remains shut off to flow (port d).

COMPONENT	CONDITION
Electric Water Pump Module	Speed-Controlled to Engine Demand
Radiator Rotary Coolant Valve	Heater
Radiator Rotary Coolant Valve Position	90 degrees – 140 degrees

Radiator Open, Heater Core Open

Radiator Open, Heater Core Open



7036610

(1) Low Temperature Coolant Loop (see low temp coolant loop D&O)
(2) Radiator Surge Tank (shared surge tank by both systems)
(3) Turbo Charger
(4) Check Valve
(5) Engine Radiator
(6) Air Conditioning Condenser
(7) Heater Core
(8) Radiator Rotary Valve
(9) Engine Cylinder Head Coolant Temperature Sensor
(10) Integrated Exhaust Manifold
(11) Cylinder Head
(12) Engine Block
(13) Block Heater
(14) Engine Block Coolant Temperature Sensor
(15) Oil Rotary Valve
(16) Engine Oil Temperature Sensor 1 and 2
(17) Engine Oil Cooler
(18) Transmission Oil Temperature Sensor (internal to transmission)
(19) Transmission Oil Cooler
(20) Radiator Coolant Temperature Sensor
(21) Water Pump Module

(22) Engine Inlet Temperature Sensor
Valve Port B
Valve Port C
Valve Port D
Valve Port E
Valve Port F
Valve Port G
Valve Port H
Valve Port I

In this mode, the radiator rotary coolant valve is providing flow to the heater core to provide warm coolant for cooling the cabin (port d) and has opened the valve to radiator (port e) to help maintain engine temperatures at optimal levels. Valve position will very be depending on much flow is needed to keep engine temperatures at proper temperatures.

COMPONENT	CONDITION
Electric Water Pump Module	Speed-Controlled to Engine Demand
Radiator Rotary Coolant Valve	Heater and Radiator
Radiator Rotary Coolant Valve Position	0 degrees – 80 degrees

Oil Rotary Valve Modes

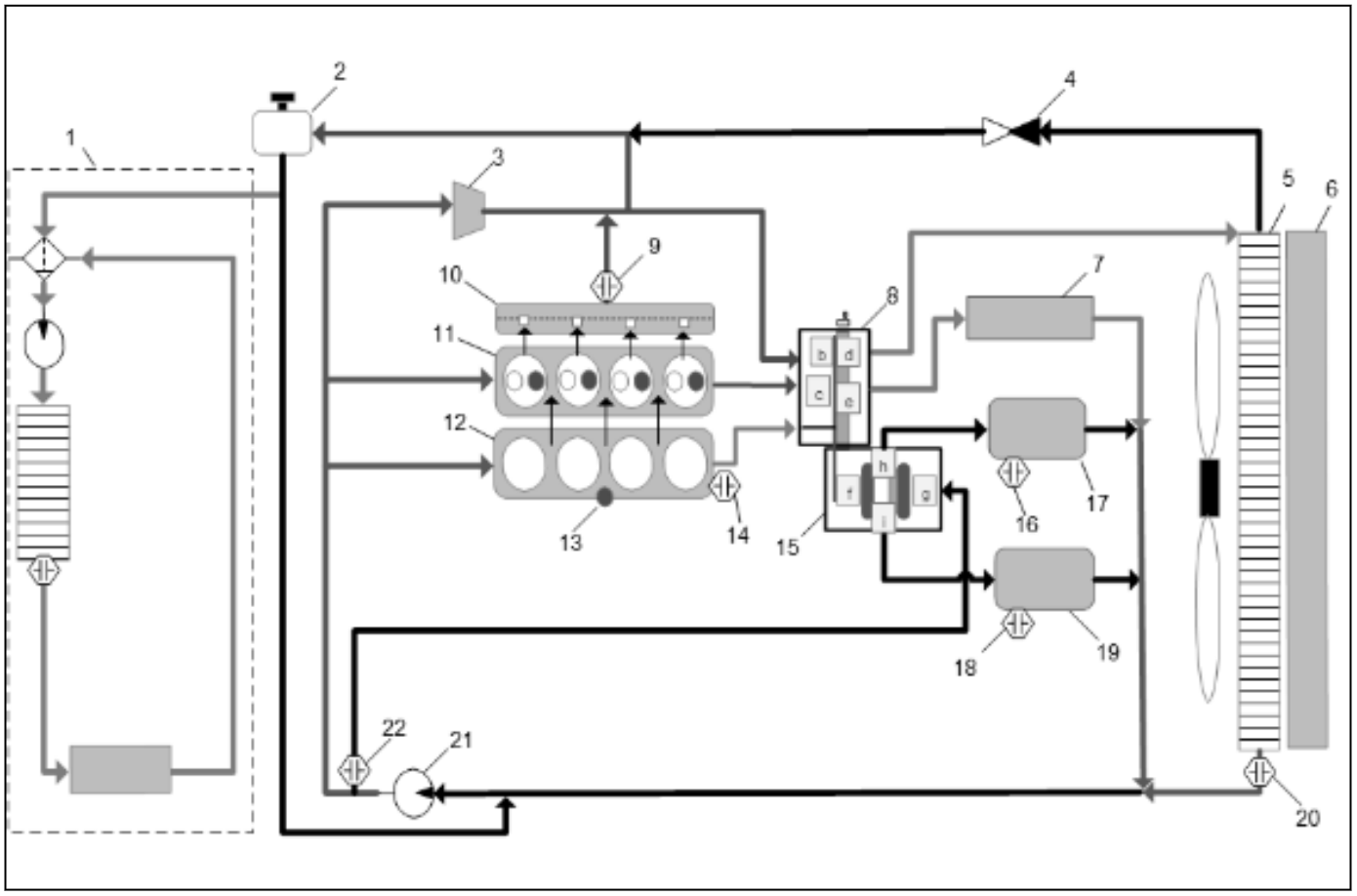
The oil rotary coolant valve controls coolant to the transmission and engine oil heat exchangers. When the specific oil needs warming to get to proper operating temperatures, the valve will direct warm coolant from the engine to the specific oil heat exchanger. When the specific oil needs cooling to maintain proper operating temperatures, the valve will direct cold coolant from the water pump module directly to the specific oil heat exchanger.

Color legend for coolant Schematics:

- Black Lines: Coolant lines that are closed off to flow by the radiator rotary coolant valve.
- Grey Lines: Coolant line that are not affected by the position of the radiator rotary coolant valve.
- Red Lines: Warm coolant that is flowing through the specific branch.
- Blue Lines: Cold coolant that is flowing through the specific branch.

Engine Oil Closed, Transmission Oil Closed

Engine Oil Closed, Transmission Oil Closed



7036612

(1) Low Temperature Coolant Loop (see low temp coolant loop D&O)
(2) Radiator Surge Tank (shared surge tank by both systems)
(3) Turbo Charger
(4) Check Valve
(5) Engine Radiator
(6) Air Conditioning Condenser
(7) Heater Core
(8) Radiator Rotary Valve
(9) Engine Cylinder Head Coolant Temperature Sensor
(10) Integrated Exhaust Manifold
(11) Cylinder Head
(12) Engine Block
(13) Block Heater
(14) Engine Block Coolant Temperature Sensor
(15) Oil Rotary Valve
(16) Engine Oil Temperature Sensor 1 and 2
(17) Engine Oil Cooler
(18) Transmission Oil Temperature Sensor (internal to transmission)
(19) Transmission Oil Cooler
(20) Radiator Coolant Temperature Sensor
(21) Water Pump Module

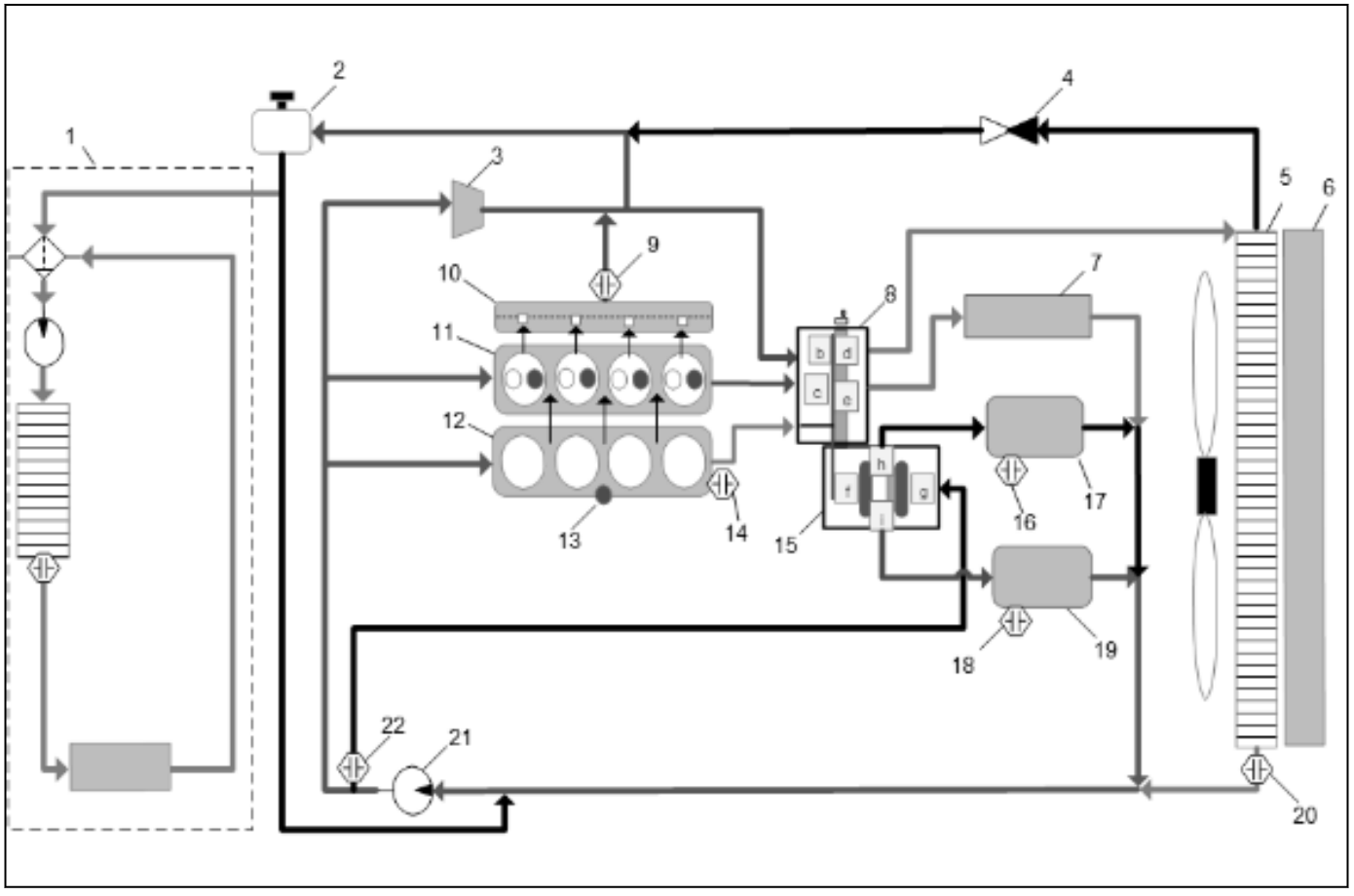
(22) Engine Inlet Temperature Sensor
Valve Port B
Valve Port C
Valve Port D
Valve Port E
Valve Port F
Valve Port G
Valve Port H
Valve Port I

Engine Oil Closed, Transmission Oil Warming

In this mode, no coolant is provided to either oil heat exchanger.

COMPONENT	CONDITION
Electric Water Pump Module	Speed-Controlled to Engine Demand
Oil Rotary Coolant Valve	Closed
Oil Rotary Coolant Valve Position	140 dregrees

Engine Oil Closed, Transmission Oil Warming



7036616

(1) Low Temperature Coolant Loop (see low temp coolant loop D&O)
(2) Radiator Surge Tank (shared surge tank by both systems)
(3) Turbo Charger
(4) Check Valve
(5) Engine Radiator

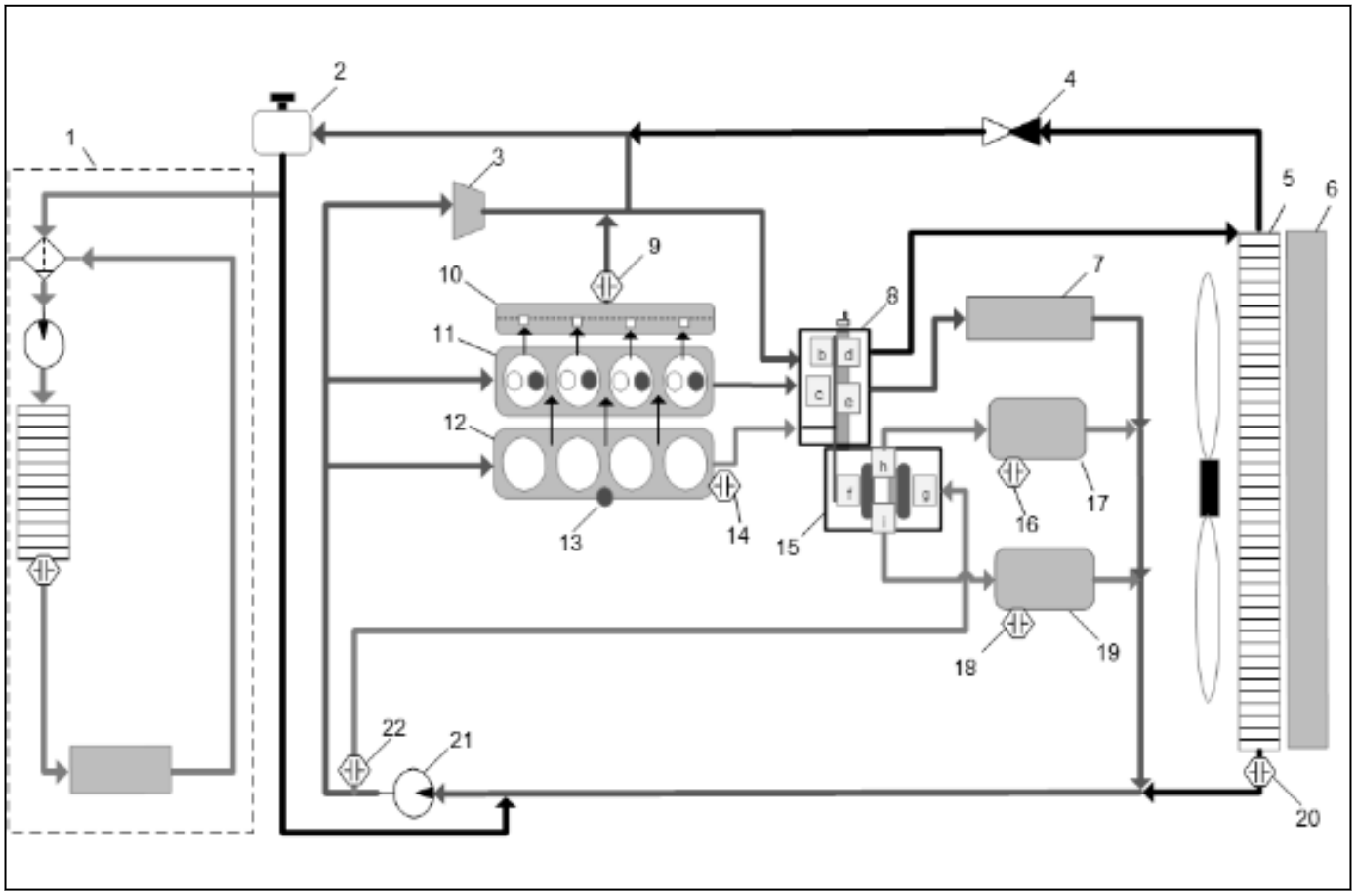
(6) Air Conditioning Condenser
(7) Heater Core
(8) Radiator Rotary Valve
(9) Engine Cylinder Head Coolant Temperature Sensor
(10) Integrated Exhaust Manifold
(11) Cylinder Head
(12) Engine Block
(13) Block Heater
(14) Engine Block Coolant Temperature Sensor
(15) Oil Rotary Valve
(16) Engine Oil Temperature Sensor 1 and 2
(17) Engine Oil Cooler
(18) Transmission Oil Temperature Sensor (internal to transmission)
(19) Transmission Oil Cooler
(20) Radiator Coolant Temperature Sensor
(21) Water Pump Module
(22) Engine Inlet Temperature Sensor
Valve Port B
Valve Port C
Valve Port D
Valve Port E
Valve Port F
Valve Port G
Valve Port H
Valve Port I

In this mode, warm coolant is provided from the engine (port f) to the transmission oil heat exchanger (port i), but no coolant is provided to the engine oil heat exchanger (port h).

COMPONENT	CONDITION
Electric Water Pump Module	Speed-Controlled to Engine Demand
Oil Rotary Coolant Valve	Transmission Oil Warming
Oil Rotary Coolant Valve Position	75 degrees – 95 degrees

Engine Oil Warming, Transmission Oil Closed

Engine Oil Warming, Transmission Oil Closed



7036798

(1) Low Temperature Coolant Loop (see low temp coolant loop D&O)
(2) Radiator Surge Tank (shared surge tank by both systems)
(3) Turbo Charger
(4) Check Valve
(5) Engine Radiator
(6) Air Conditioning Condenser
(7) Heater Core
(8) Radiator Rotary Valve
(9) Engine Cylinder Head Coolant Temperature Sensor
(10) Integrated Exhaust Manifold
(11) Cylinder Head
(12) Engine Block
(13) Block Heater
(14) Engine Block Coolant Temperature Sensor
(15) Oil Rotary Valve
(16) Engine Oil Temperature Sensor 1 and 2
(17) Engine Oil Cooler
(18) Transmission Oil Temperature Sensor (internal to transmission)
(19) Transmission Oil Cooler
(20) Radiator Coolant Temperature Sensor
(21) Water Pump Module

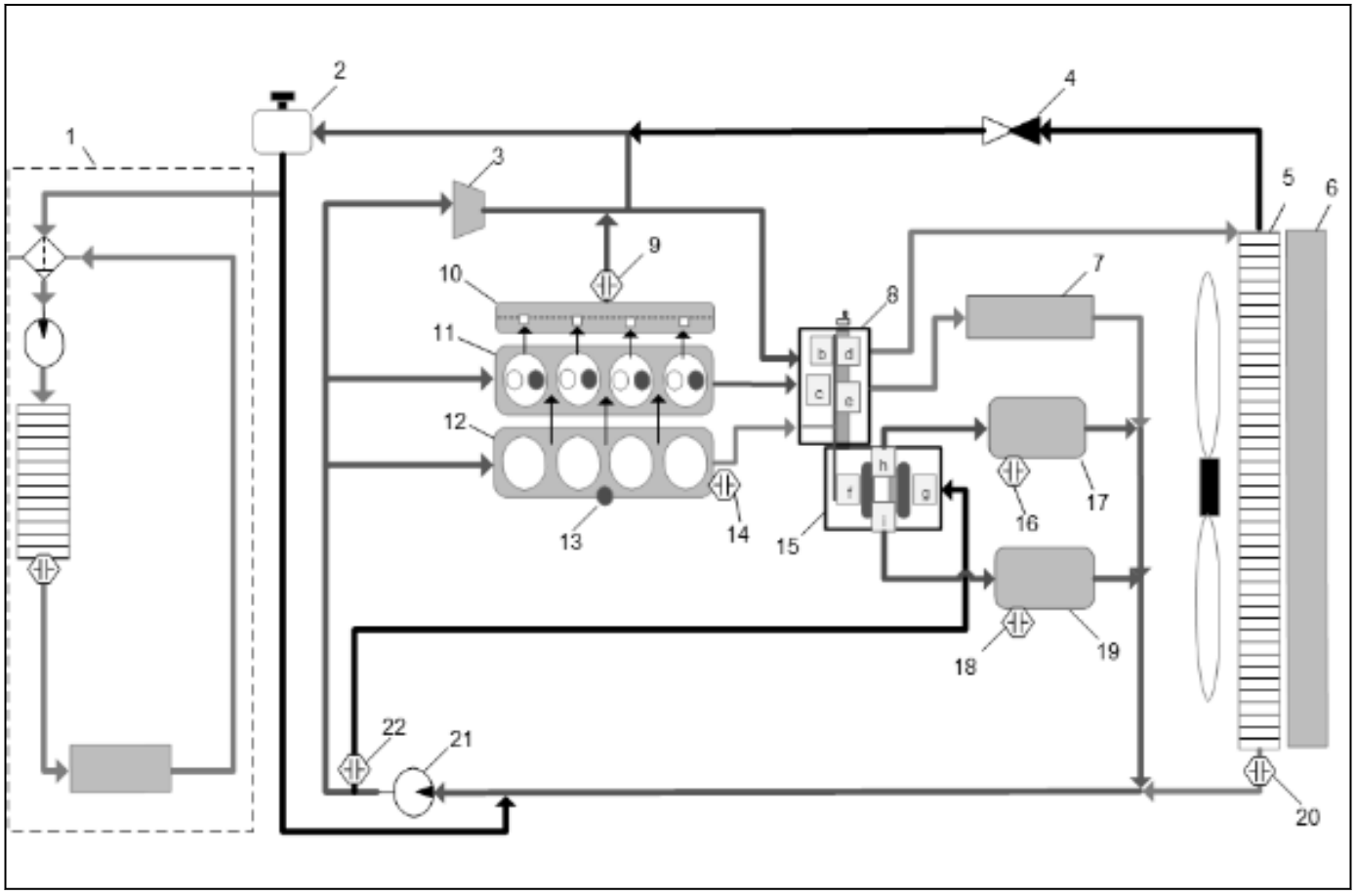
(22) Engine Inlet Temperature Sensor
Valve Port B
Valve Port C
Valve Port D
Valve Port E
Valve Port F
Valve Port G
Valve Port H
Valve Port I

In this mode, warm coolant is provided from the engine (port f) to the engine oil heat exchanger (port h), but no coolant is provided to the transmission oil heat exchanger (port i).

Engine Oil Warming, Transmission Oil Warming

COMPONENT	CONDITION
Electric Water Pump Module	Speed-Controlled to Engine Demand
Oil Rotary Coolant Valve	Engine Oil Warming
Oil Rotary Coolant Valve Position	0 degrees – 12 degrees

Engine Oil Warming, Transmission Oil Warming



7036806

(1) Low Temperature Coolant Loop (see low temp coolant loop D&O)
(2) Radiator Surge Tank (shared surge tank by both systems)
(3) Turbo Charger

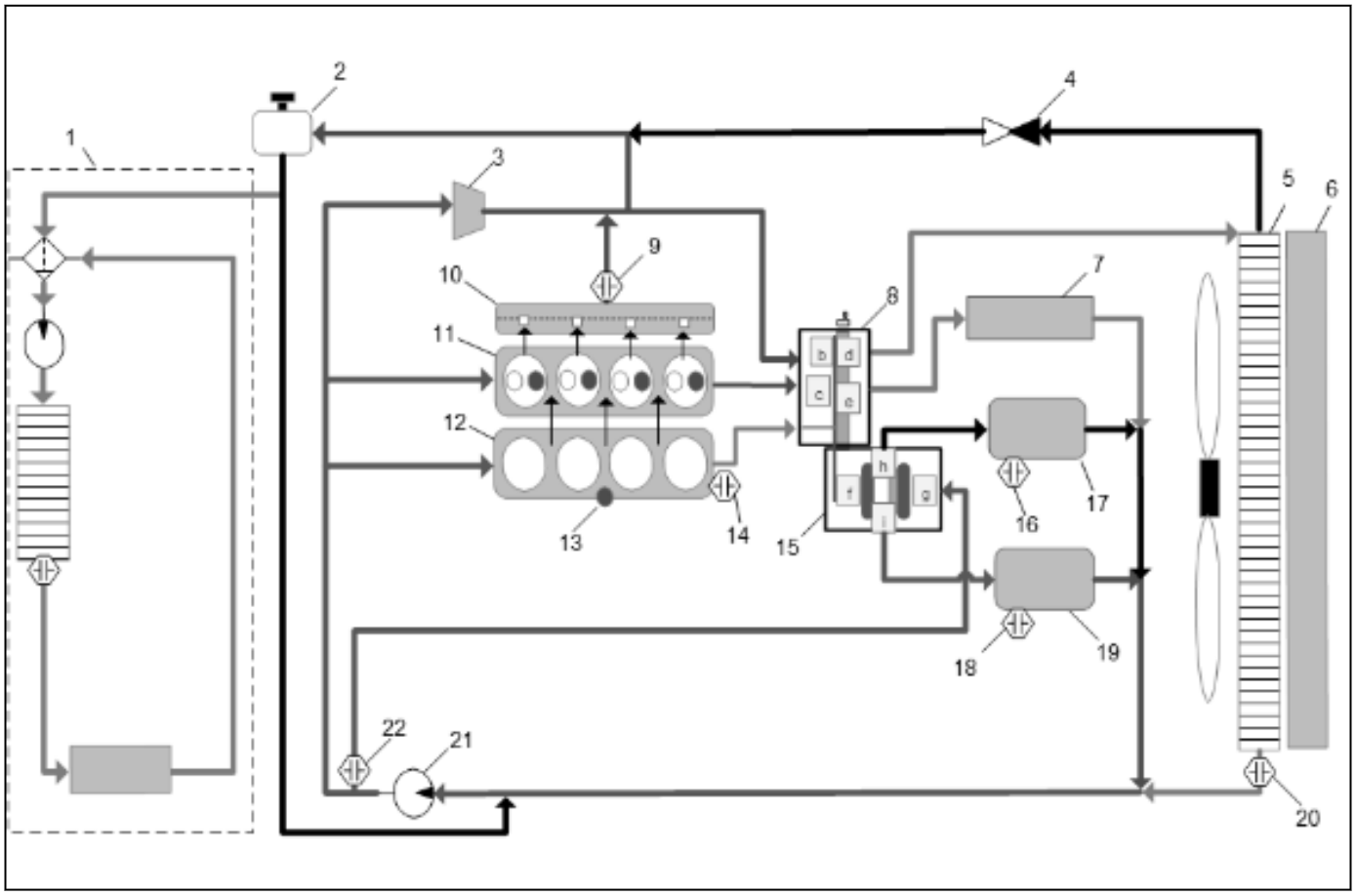
(4) Check Valve
(5) Engine Radiator
(6) Air Conditioning Condenser
(7) Heater Core
(8) Radiator Rotary Valve
(9) Engine Cylinder Head Coolant Temperature Sensor
(10) Integrated Exhaust Manifold
(11) Cylinder Head
(12) Engine Block
(13) Block Heater
(14) Engine Block Coolant Temperature Sensor
(15) Oil Rotary Valve
(16) Engine Oil Temperature Sensor 1 and 2
(17) Engine Oil Cooler
(18) Transmission Oil Temperature Sensor (internal to transmission)
(19) Transmission Oil Cooler
(20) Radiator Coolant Temperature Sensor
(21) Water Pump Module
(22) Engine Inlet Temperature Sensor
Valve Port B
Valve Port C
Valve Port D
Valve Port E
Valve Port F
Valve Port G
Valve Port H
Valve Port I

In this mode, warm coolant is provided from the engine (port f) to both the engine oil heat exchanger (port h) and transmission oil heat exchanger (port i).

COMPONENT	CONDITION
Electric Water Pump Module	Speed-Controlled to Engine Demand
Oil Rotary Coolant Valve	Engine Oil Warming and Trans Oil Warming
Oil Rotary Coolant Valve Position	20 degrees – 50 degrees

Engine Oil Closed, Transmission Oil Cooling

Engine Oil Closed, Transmission Oil Cooling



7036809

(1) Low Temperature Coolant Loop (see low temp coolant loop D&O)
(2) Radiator Surge Tank (shared surge tank by both systems)
(3) Turbo Charger
(4) Check Valve
(5) Engine Radiator
(6) Air Conditioning Condenser
(7) Heater Core
(8) Radiator Rotary Valve
(9) Engine Cylinder Head Coolant Temperature Sensor
(10) Integrated Exhaust Manifold
(11) Cylinder Head
(12) Engine Block
(13) Block Heater
(14) Engine Block Coolant Temperature Sensor
(15) Oil Rotary Valve
(16) Engine Oil Temperature Sensor 1 and 2
(17) Engine Oil Cooler
(18) Transmission Oil Temperature Sensor (internal to transmission)
(19) Transmission Oil Cooler
(20) Radiator Coolant Temperature Sensor
(21) Water Pump Module

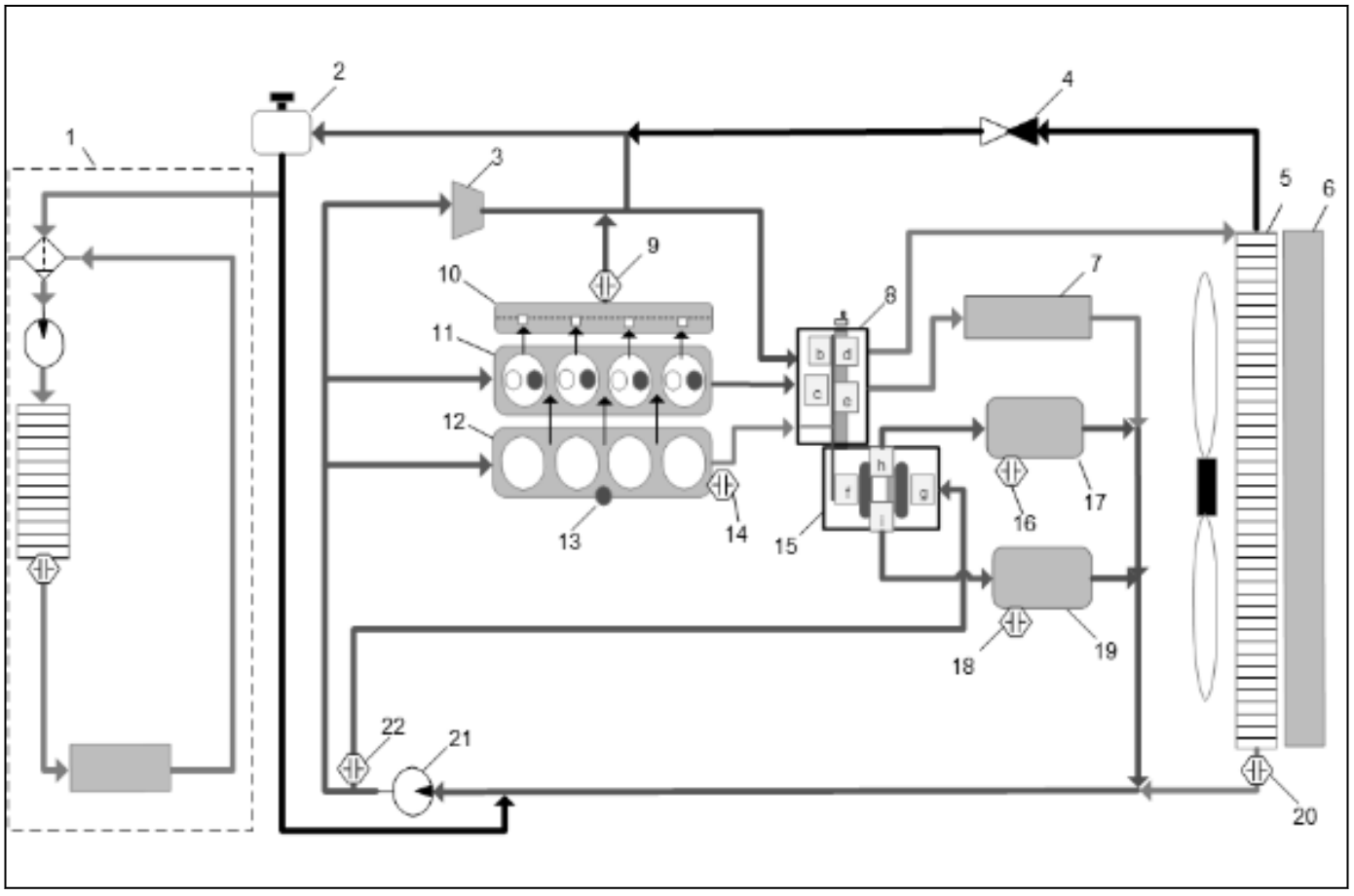
(22) Engine Inlet Temperature Sensor
Valve Port B
Valve Port C
Valve Port D
Valve Port E
Valve Port F
Valve Port G
Valve Port H
Valve Port I

Engine Oil Cooling, Transmission Oil Cooling

In this mode, cold coolant provided from the electric water pump (port g) is provided directly to the transmission oil heat exchanger (port i), but no coolant is provided to the engine oil heat exchanger (port h).

COMPONENT	CONDITION
Electric Water Pump Module	Speed-Controlled to Engine Demand
Oil Rotary Coolant Valve	Position-Controlled with Oil Heating
Oil Rotary Coolant Valve Position	160 degrees – 200 degrees

Engine Oil Cooling, Transmission Oil Cooling



7036812

(1) Low Temperature Coolant Loop (see low temp coolant loop D&O)
(2) Radiator Surge Tank (shared surge tank by both systems)

(3) Turbo Charger
(4) Check Valve
(5) Engine Radiator
(6) Air Conditioning Condenser
(7) Heater Core
(8) Radiator Rotary Valve
(9) Engine Cylinder Head Coolant Temperature Sensor
(10) Integrated Exhaust Manifold
(11) Cylinder Head
(12) Engine Block
(13) Block Heater
(14) Engine Block Coolant Temperature Sensor
(15) Oil Rotary Valve
(16) Engine Oil Temperature Sensor 1 and 2
(17) Engine Oil Cooler
(18) Transmission Oil Temperature Sensor (internal to transmission)
(19) Transmission Oil Cooler
(20) Radiator Coolant Temperature Sensor
(21) Water Pump Module
(22) Engine Inlet Temperature Sensor
Valve Port B
Valve Port C
Valve Port D
Valve Port E
Valve Port F
Valve Port G
Valve Port H
Valve Port I

In this mode, cold coolant provided from the electric water pump module (port g) is provided directly to both the engine oil heat exchanger (port h) and transmission oil heat exchanger (port i).

COMPONENT	CONDITION
Electric Water Pump Module	Speed-Controlled to Engine Demand
Oil Rotary Valve	Engine Oil Cooling and Trans Oil Cooling
Radiator Rotary Valve	174 degrees – 250 degrees

Cooling System Description and Operation (High Temperature Coolant Loop)

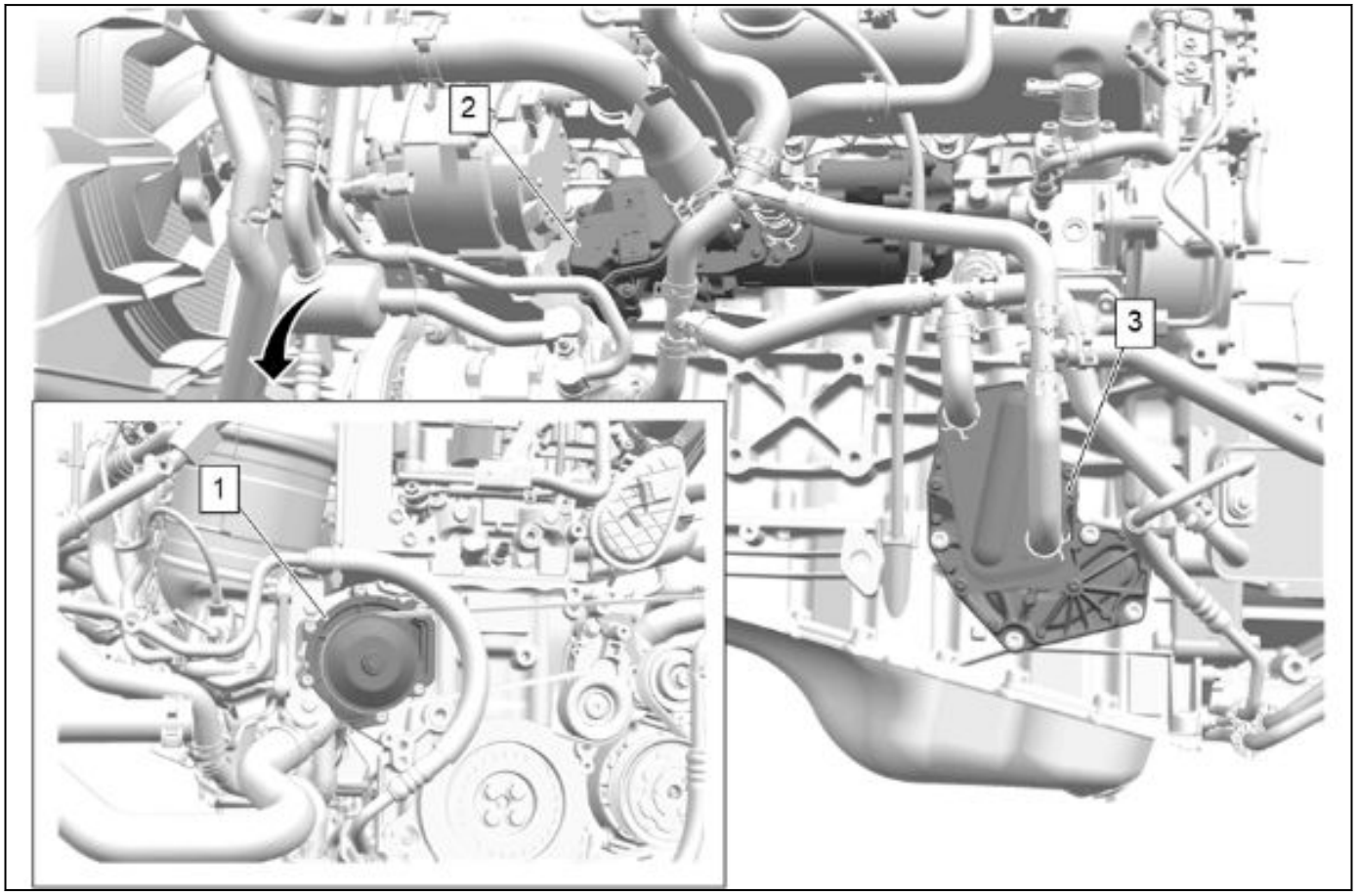
Active Thermal Management

This vehicle uses an advance technology cooling system design, which makes use of active thermal management strategy. The difference between conventional cooling systems that use mechanical water pumps and active thermal management is that the predominant goal of the active thermal management strategy is to prioritize fuel economy by maintaining an ideal engine operating temperature during all engine speeds and operating conditions, while still meeting customer expectations for vehicle performance and reducing vehicle emissions. This vehicle utilizes a secondary coolant loop which circulates coolant to the water charge air cooler, fuel cooler, and the diesel exhaust fluid injectors via an auxiliary low temperature radiator and chassis mounted electric coolant pump. Refer to low temperature coolant loop description and operation: *Cooling System Description and Operation (Low Temperature Coolant Loop) 6-81* *Cooling System Description and Operation 6-84* *Cooling System Description and Operation (High Temperature Coolant*

Loop) 6-115 *Cooling System Description and Operation 6-137*

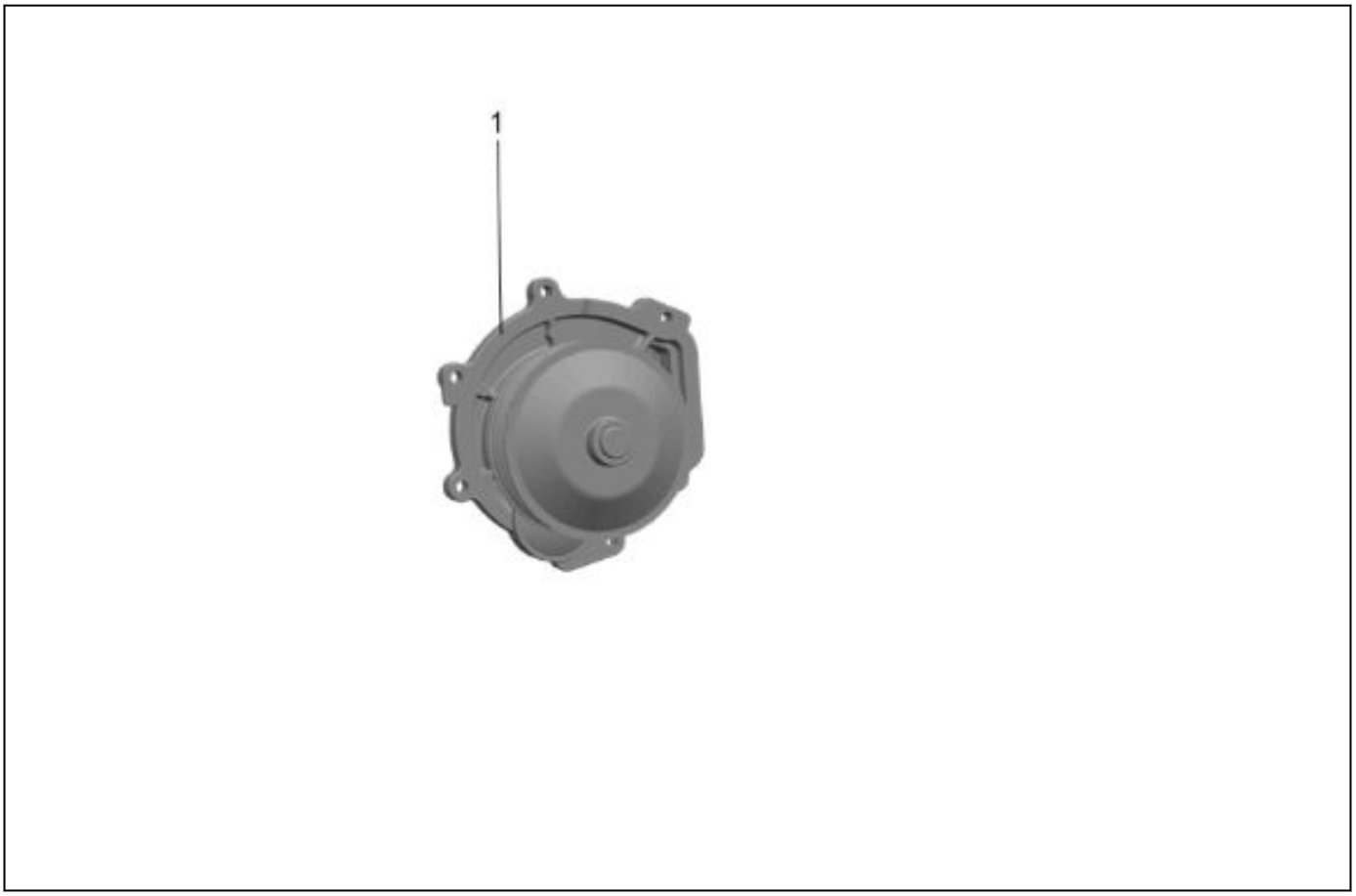
The key features of active thermal management include:

- **Engine Internal**
  - Improved engine coolant jacket that targets hot spots in the engine.
- **Engine Mounted Cooling**



6852839

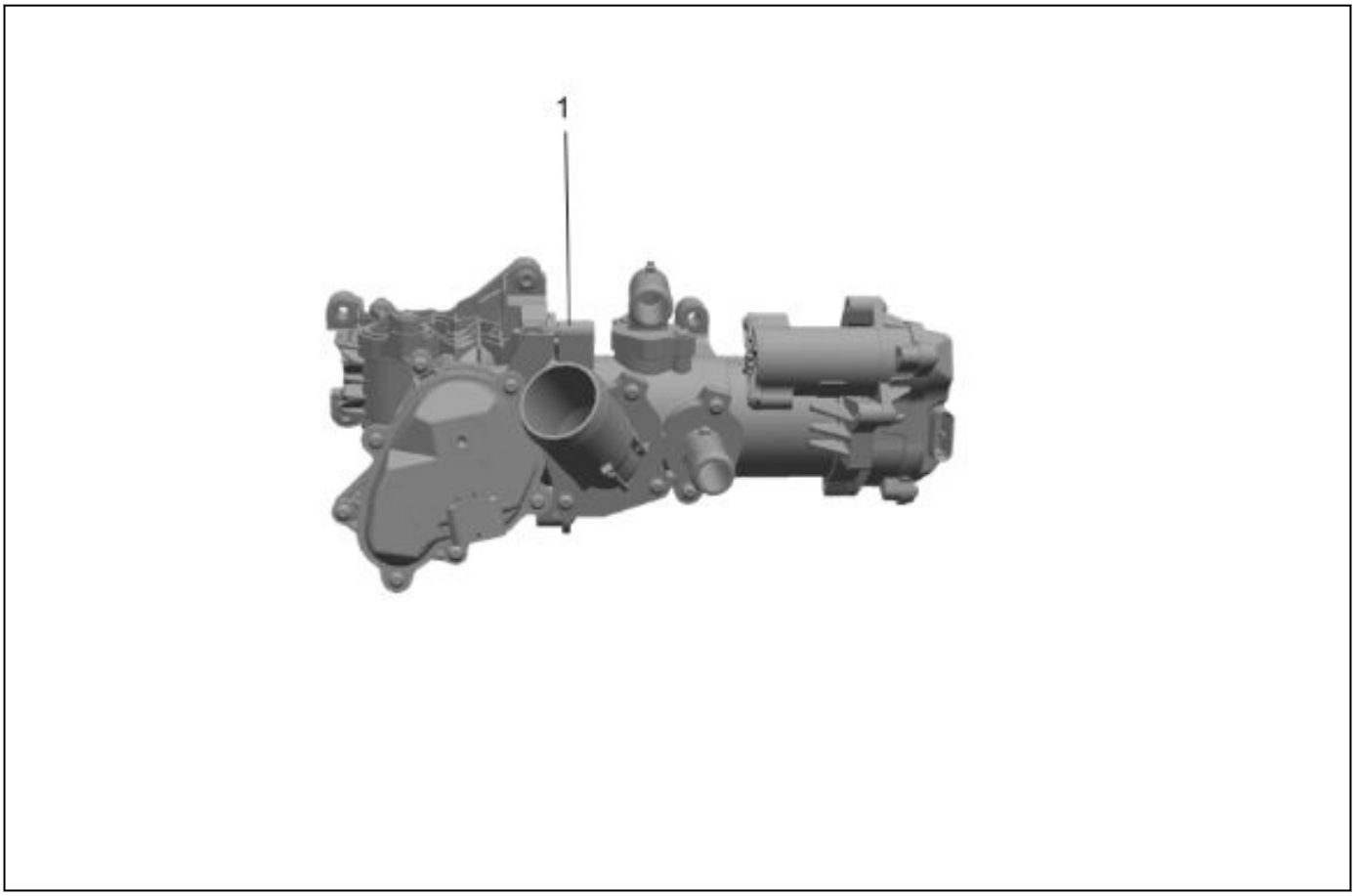
  - Conventional mechanical water pump (1).
  - The engine coolant flow control valve (2) contains two rotary control valves. The flow control coolant valve and the main rotary coolant valve both eliminate the need for the conventional cooling system thermostat.
  - Engine oil cooler (3) that uses coolant to heat or cool the engine oil as required.
- **Temperature and Position Sensors**
  - The engine control module, which controls the complete active thermal management system using feedback from numerous sensors:
    - Engine Cylinder Head Metal Temperature Sensor
    - Engine Inlet Coolant Temperature Sensor
    - Engine Outlet Coolant Temperature Sensor
    - Engine Oil Temperature Sensor
    - Transmission Oil Temperature Sensor
    - Radiator Outlet Coolant Temperature Sensor
    - Engine Coolant Flow Control Valve Position Sensor
- **Mechanical Water Pump**



6852815

- Mechanical water pump (1) provides constant coolant flow to the engine cylinder block, cylinder head and the engine coolant flow control valve.

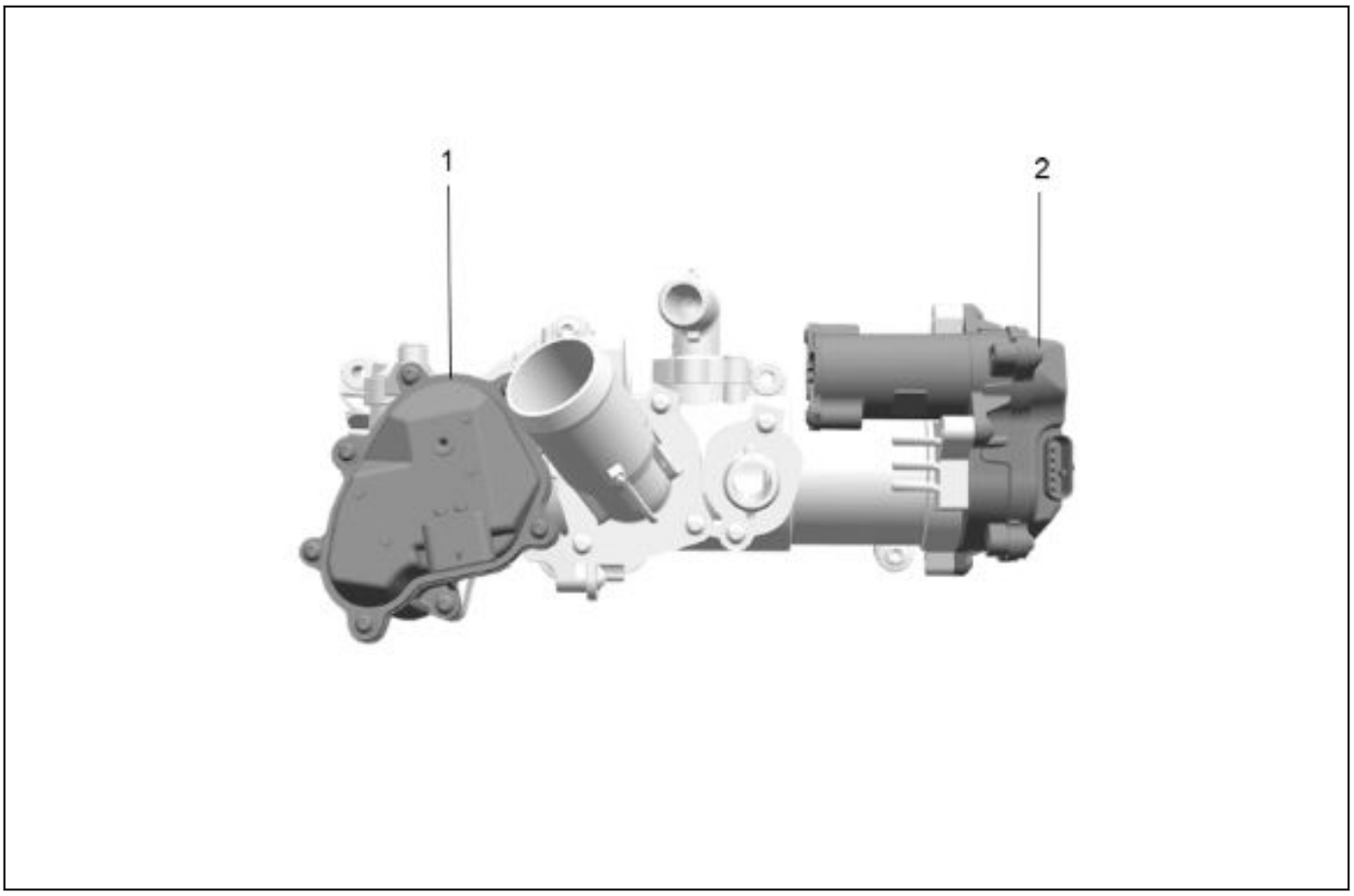
- **Engine Coolant Flow Control Valve**



6852697

- The engine coolant flow control valve (1) contains two coolant valves. The flow control valve and the main rotary valve.
- The combination of the engine coolant flow control valve and main rotary coolant valve is critical to achieving optimal combustion chamber temperatures as quickly as possible during engine warm up.

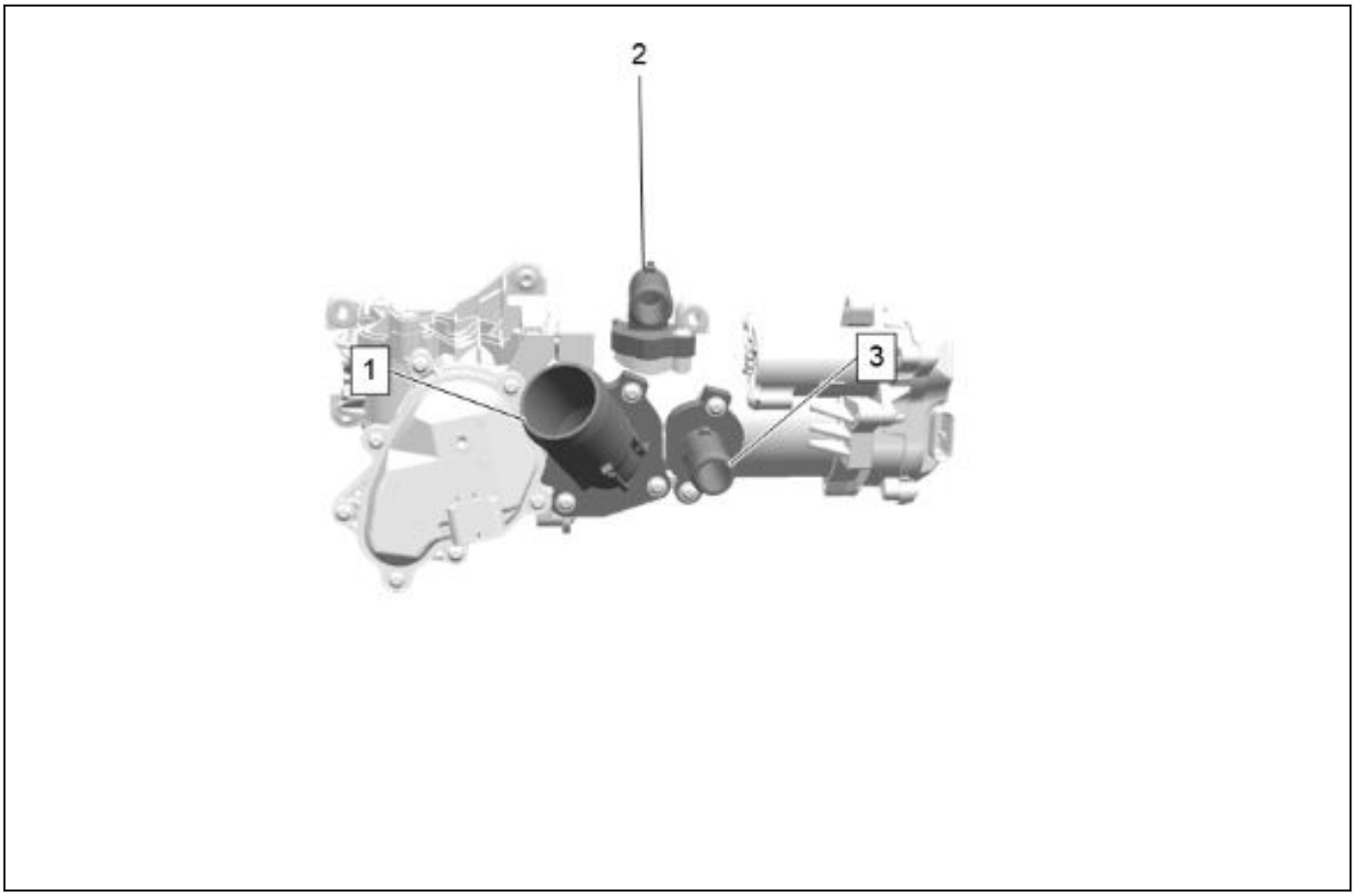
- **Engine Coolant Flow Control Valve (Flow Control Valve and Main Rotary Coolant Valve)**



7014703

- The main rotary coolant valve (2) is part of the engine coolant flow control valve and is located on the right side of the valve assembly. The main rotary valve controls coolant flow to the radiator, and oil heat exchangers.
- The flow control valve (1) is located on the left side of the assembly. The engine coolant flow control valve controls coolant flow through the engine by throttling the coolant pump flow. This is done to prevent excess flow through the engine when not needed to improve fuel economy.

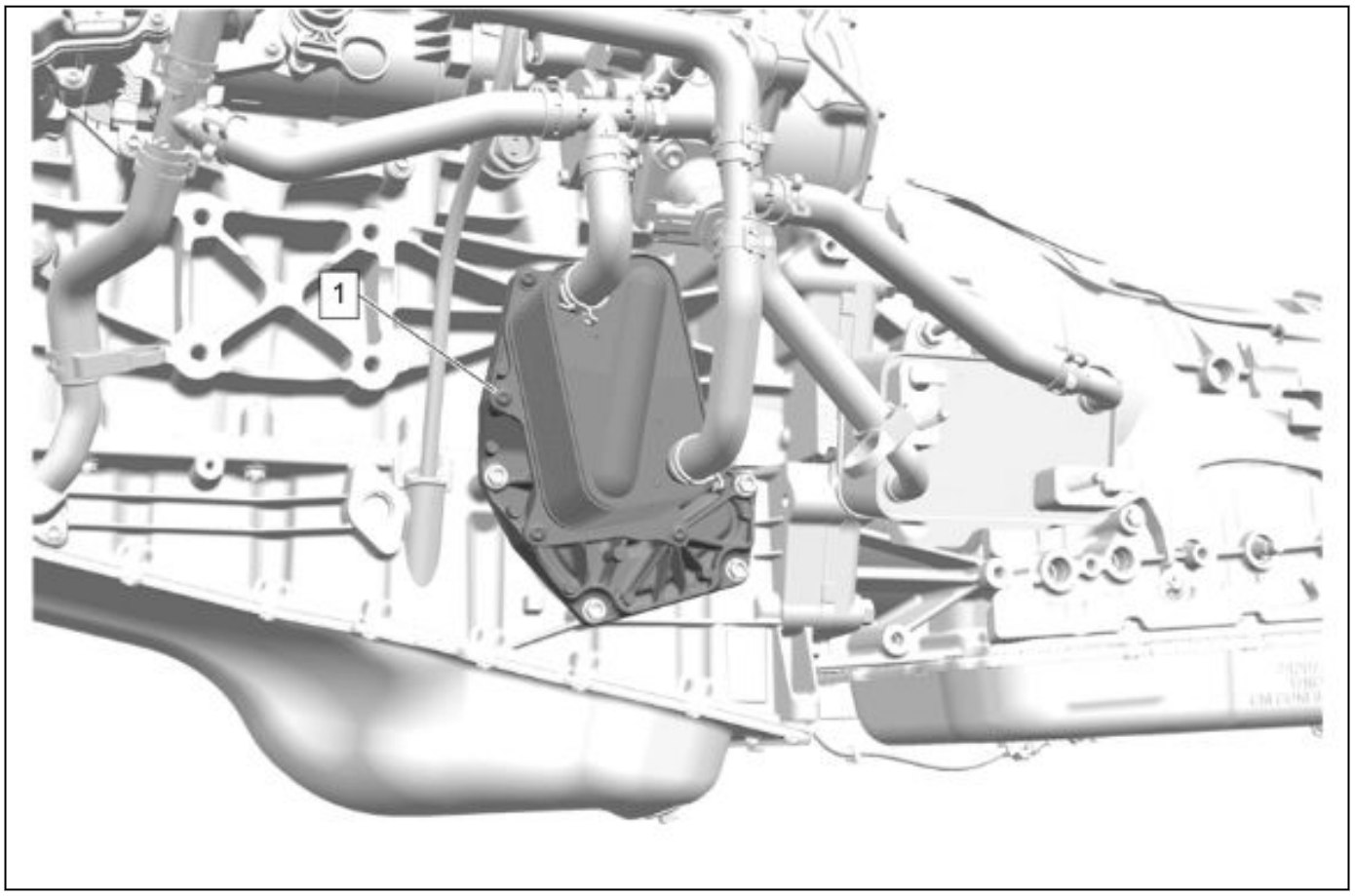
- **Engine Coolant Flow Control Valve (Main Rotary Coolant Control Valve)**



6852802

- The coolant flow control valve controls coolant flow to the radiator as well as the engine and transmission oil heat exchangers eliminating the need for a conventional wax-operated thermostat and is controlled by the engine control module through sensor feedback. The large port on the left side of the valve (1) controls flow to the radiator. The small port on the top of the valve (2) is always open and flowing to the exhaust gas recirculation cooler, turbo and the heater core. The small port to the right side of the valve (3) allows flow to the engine oil and transmission oil heat exchangers.

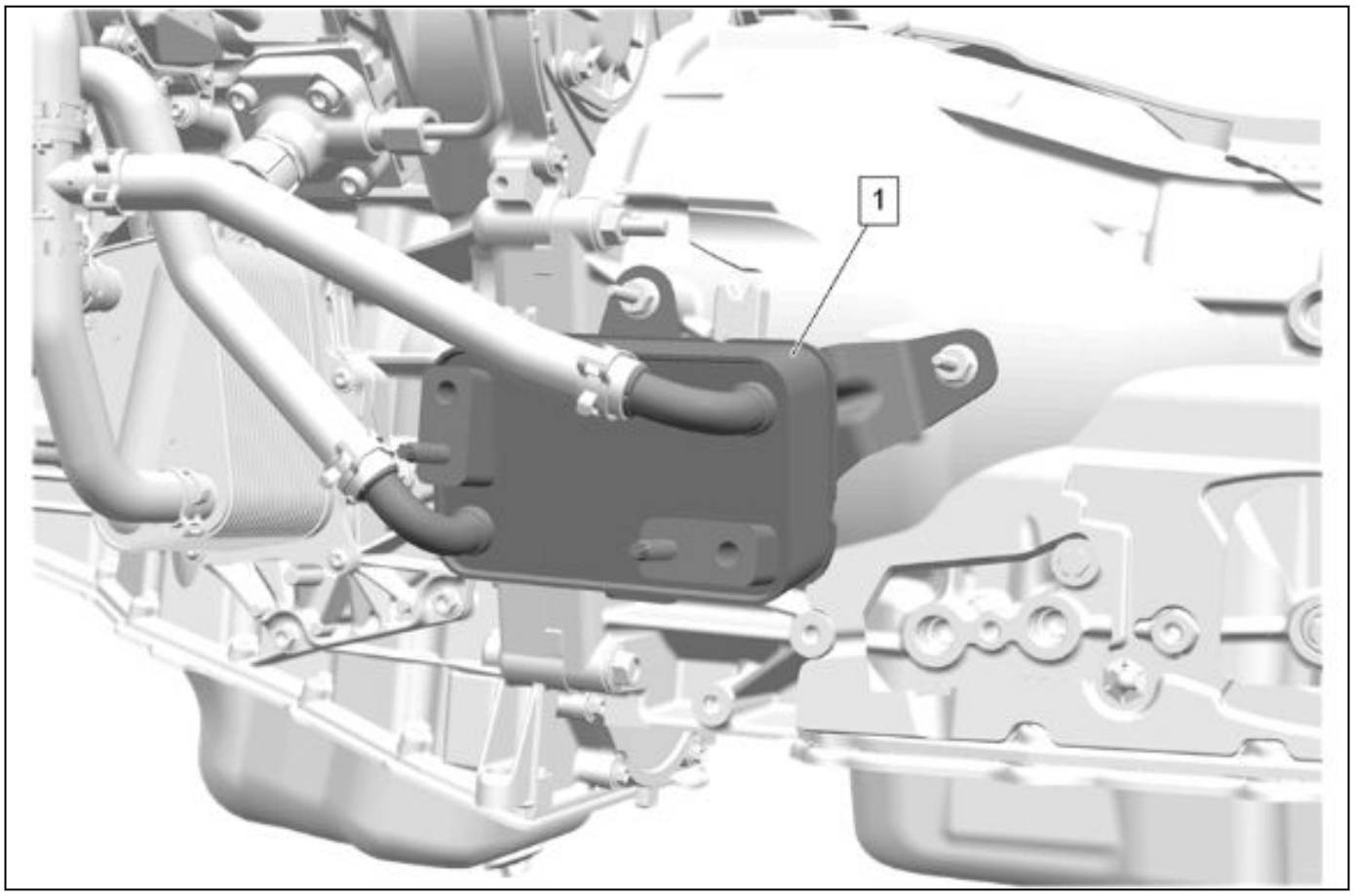
- **Engine Oil Cooler**



6852830

- The engine oil cooler (1) is a heat exchanger that is attached to the side of the engine and exchanges heat between the engine oil and engine coolant. The engine oil fluid cooling exchanger can flow no coolant, provide hot coolant for transmission oil heating (during engine warm-up) or provide cooled coolant for transmission oil cooling (under high thermal loads).

- **Automatic Transmission Fluid Cooling Exchanger**

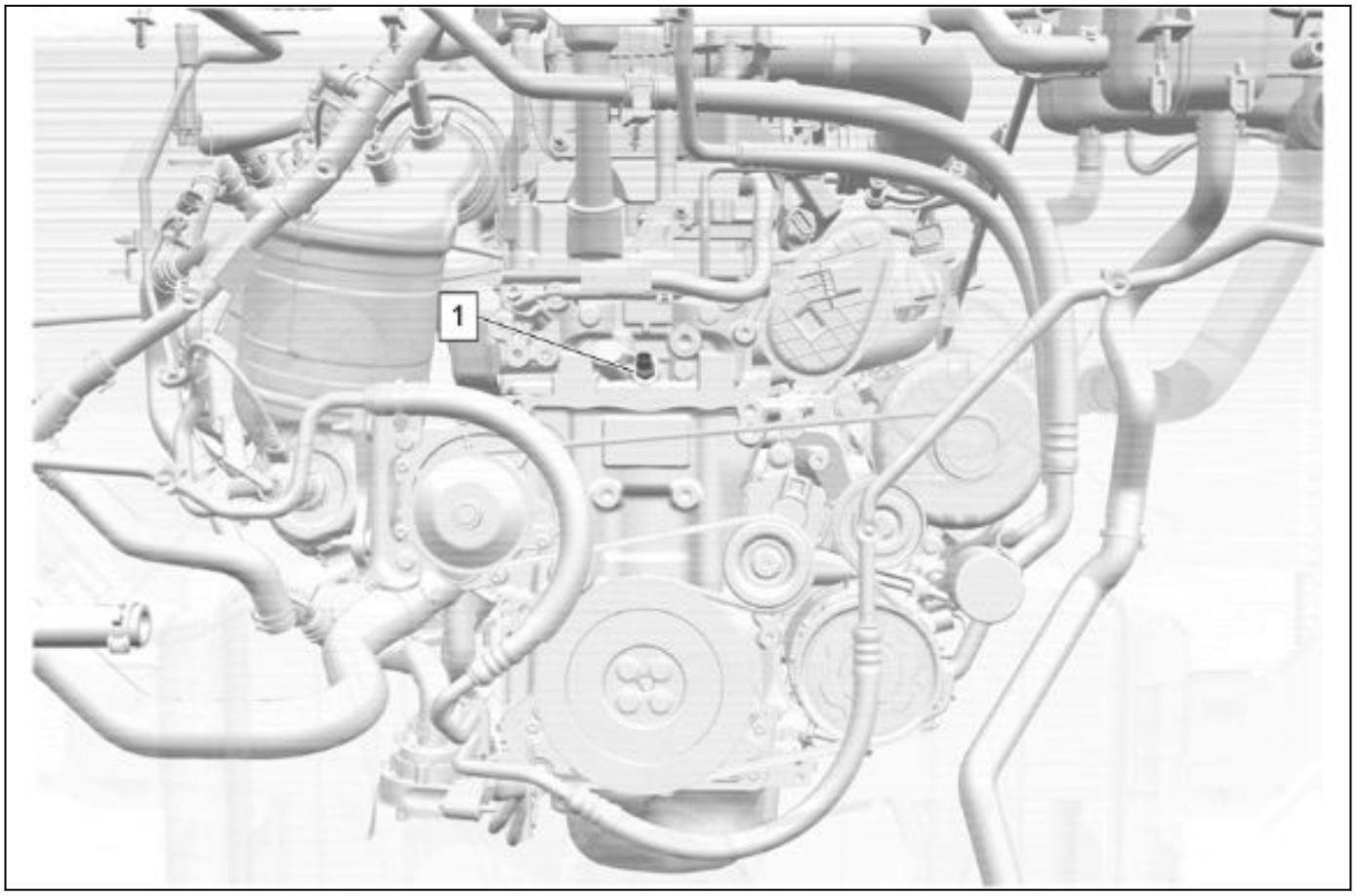


6852831

- The automatic transmission fluid cooling exchanger (1) is a heat exchanger that is attached to the front of the transmission and exchanges heat between the transmission oil and engine coolant. The automatic transmission fluid cooling exchanger can flow no coolant, provide hot coolant for transmission oil heating (during engine warm-up) or provide cooled coolant for transmission oil cooling (under high thermal loads).

- **Automatic Coolant Service Fill Description**
  - Active thermal management systems are more difficult to fill with coolant than traditional thermostat based systems. Therefore the vehicle is equipped with an automatic coolant service fill that can be activated via the scan tool or driver controls that will cycle the electric water pump and coolant valves to de-aerate the coolant system.

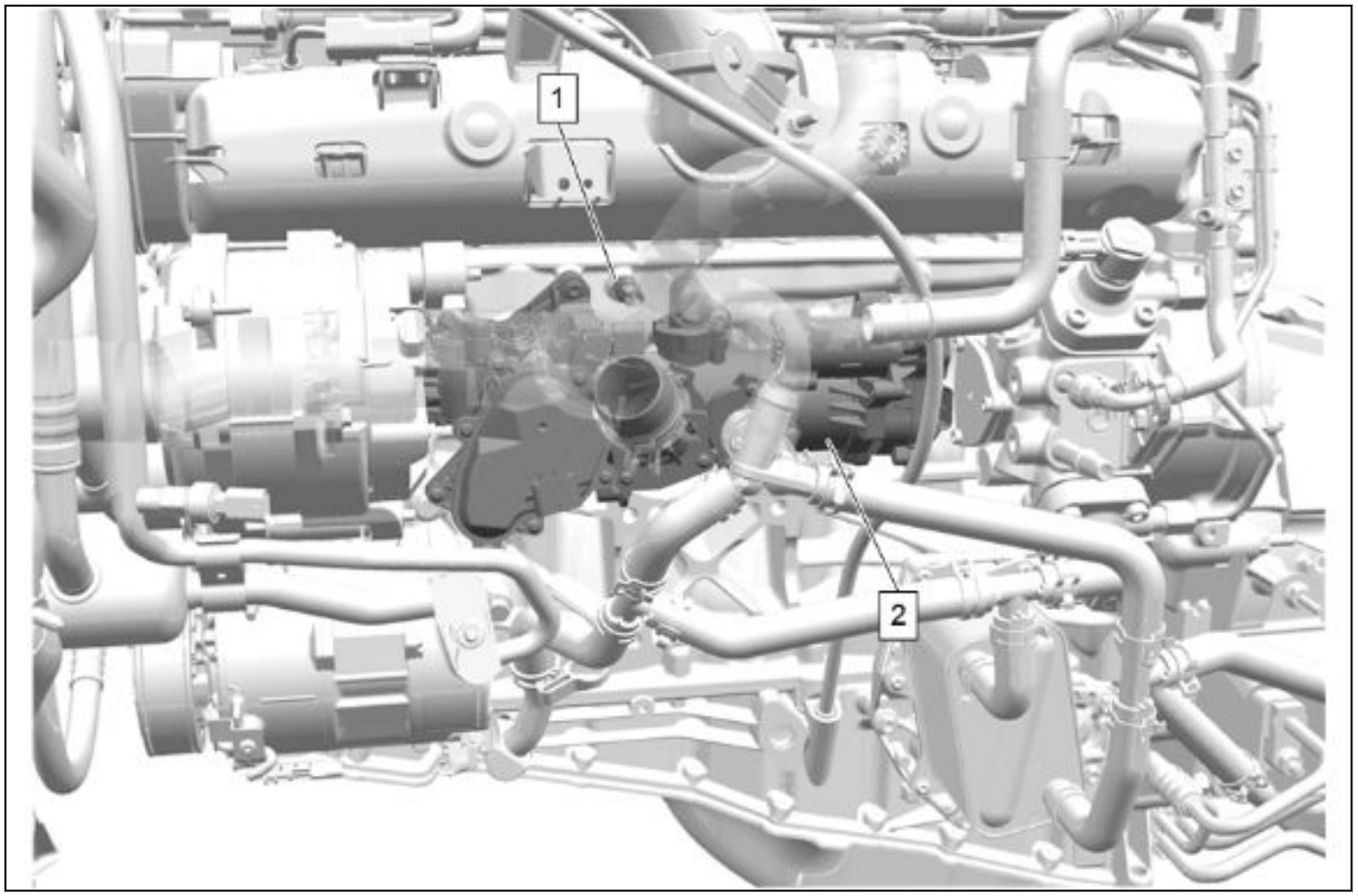
Component Locator - Engine View



6852877

Front of engine view

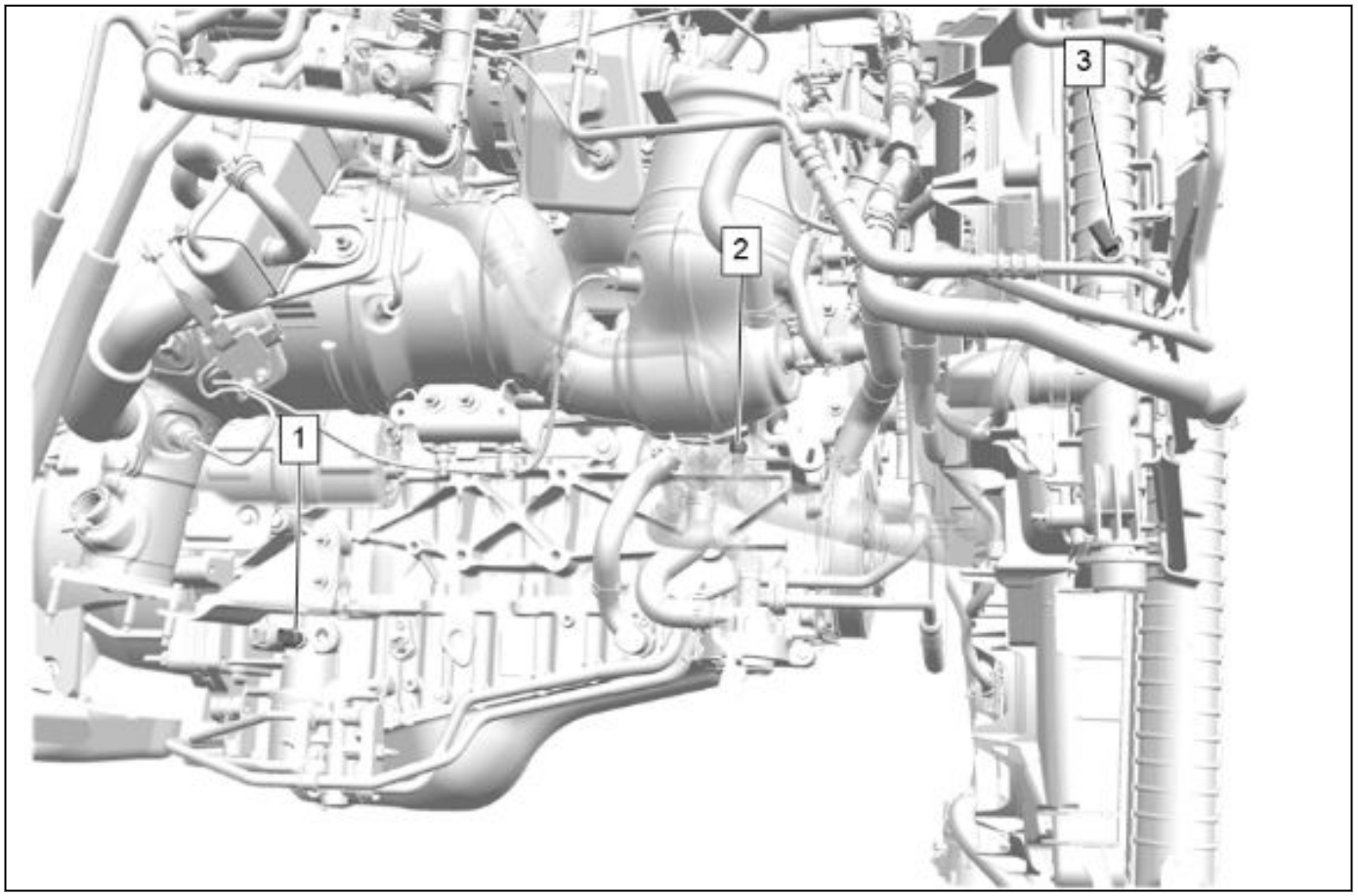
Callout	Scan Tool Reference	Service Information Part Name or Electronic Part Catalog Name
1	Cylinder Head Temperature Sensor	Engine Cylinder Head Metal Temperature Sensor



6852876

Left side of engine view

Callout	Scan Tool Reference	Service Information Part Name or Electronic Part Catalog Name
1	Engine Coolant Temperature Sensor 1	Engine Outlet Coolant Temperature Sensor
2	Engine Coolant Control Valve Position Sensor	Engine Coolant Flow Control Valve Position Sensor



6852875

Right side of engine view

Callout	Scan Tool Reference	Service Information Part Name or Electronic Part Catalog Name
1	Engine Oil Temperature Sensor and Engine Oil Temperature Sensor 2	Engine Oil Temperature Sensor
2	Engine Coolant Temperature Sensor 2	Engine Inlet Coolant Temperature Sensor
3	Radiator Coolant Temperature Sensor	Radiator Outlet Coolant Temperature Sensor
Internal to the transmission	Transmission Oil Temperature Sensor	Transmission Oil Temperature Sensor

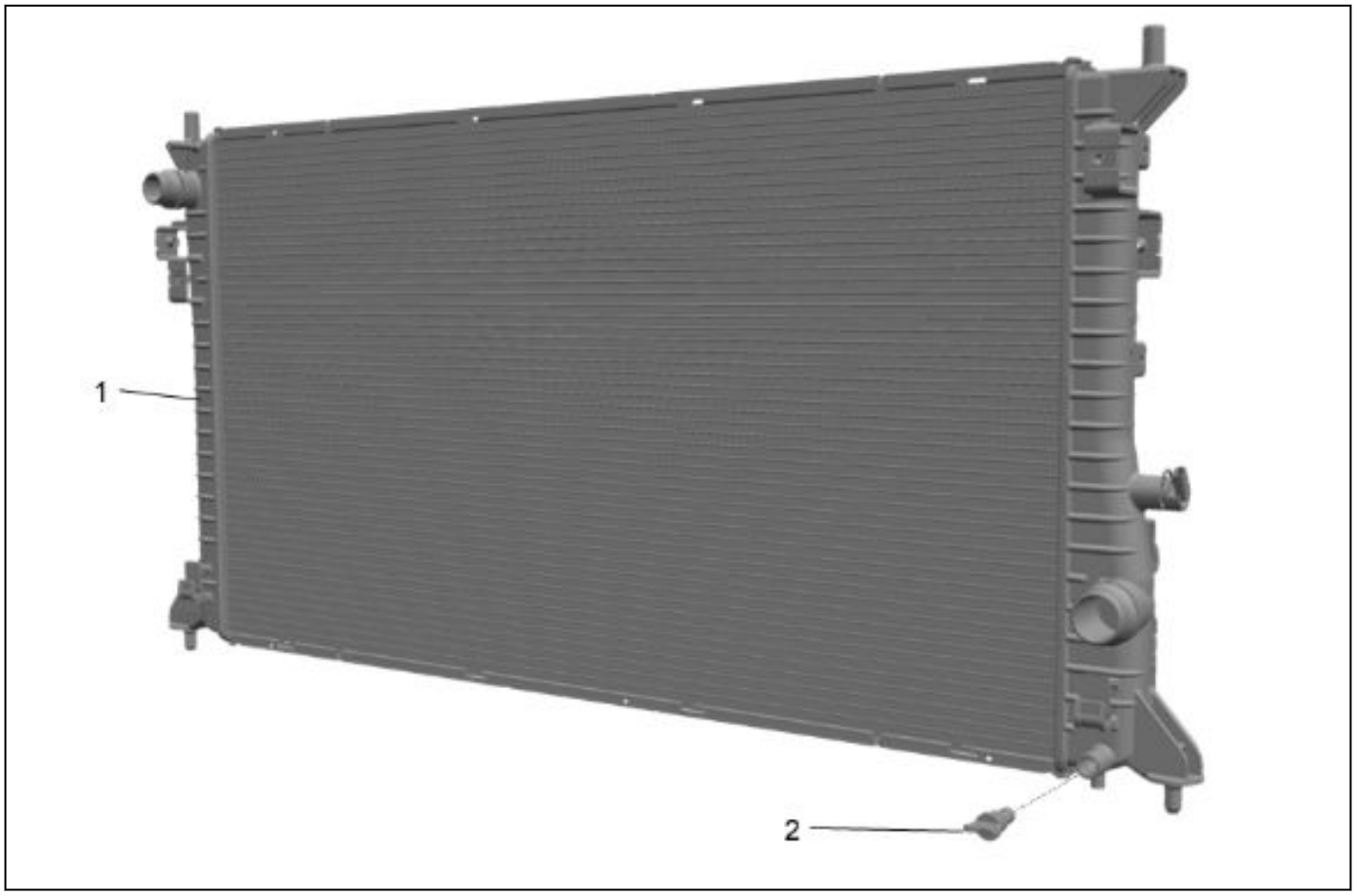
Cooling System Components

- Various temperature and position sensors provide data back to the engine control module.
- Active thermal management still uses many of the conventional cooling system features, including:
  - Coolant
  - Coolant Hoses
  - Radiator
  - Radiator Bypass Route
  - Radiator Surge Tank
  - Surge Tank Pressure Cap
  - Engine Coolant Indicators
  - Air Baffles/Guides and Seals
  - Cabin Heater Core Route, if equipped with Rear Cabin Heater

Coolant

The engine coolant is a solution made up of a 50-50 mixture of DEX-COOL® and suitable drinking water. The coolant solution transfers heat between the components of the engine heating/cooling system.

Radiator

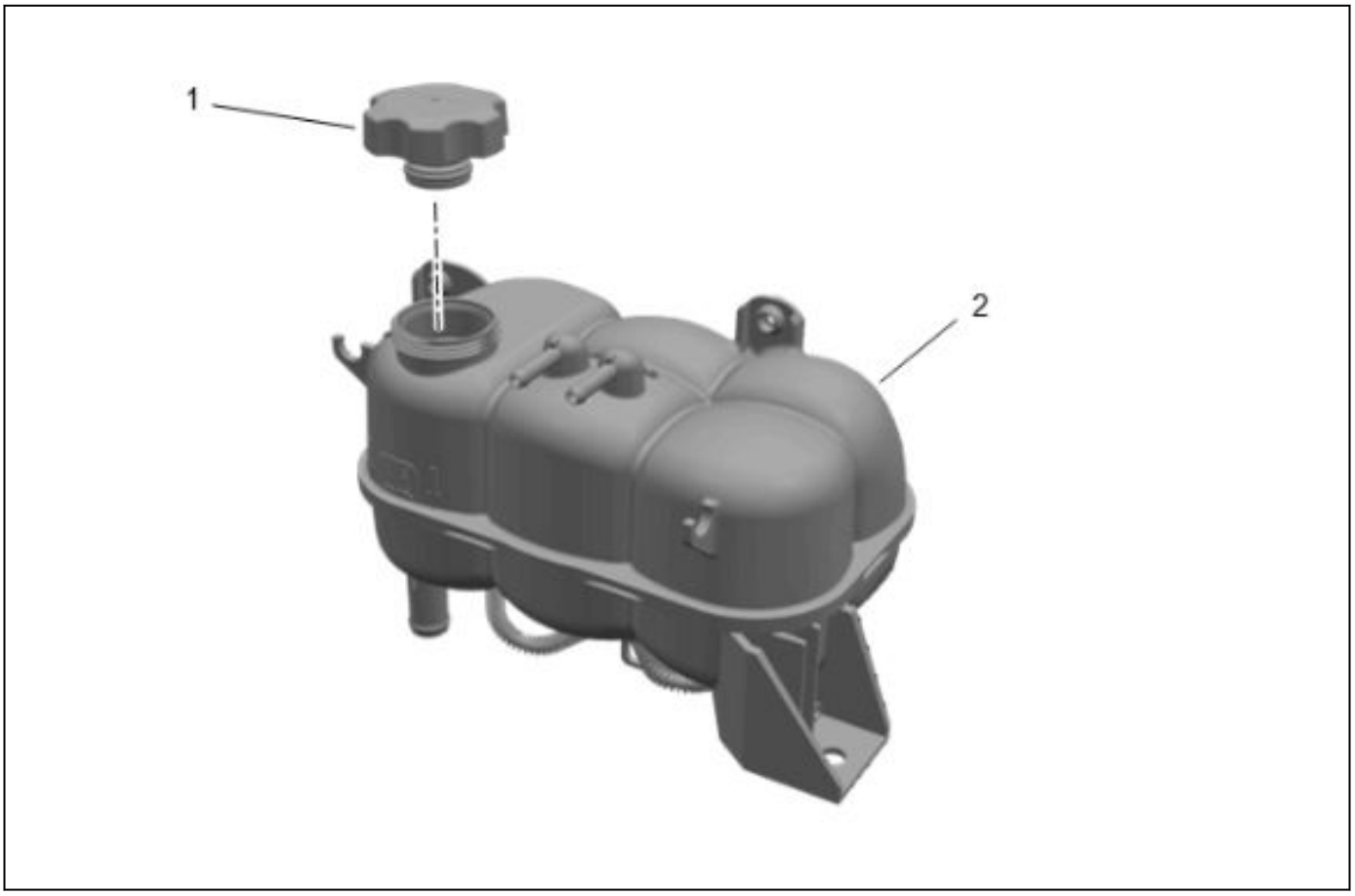


6637073

The radiator (1) is a heat exchanger. It consists of a core and two end tanks. The aluminum core is a tube and fin crossflow design that extends from the inlet tank to the outlet tank. Fins are placed around the outside of the tubes to improve heat transfer to the atmosphere. The inlet and outlet tanks are a molded high temperature nylon reinforced plastic material. A high temperature rubber gasket seals the tank flange edge to the aluminum core. The tanks are clamped to the core with clinch tabs. The tabs are part of the aluminum header at each end of the core. The fins on the core transfer heat from the coolant passing through the tubes. Air passing between the fins absorbs the heat and cools the coolant. Heat is removed from the coolant as the coolant passes through the radiator.

The radiator also has a drain cock (2) located in the bottom of the left or right side tank. The drain cock unit includes the drain cock and drain cock seal.

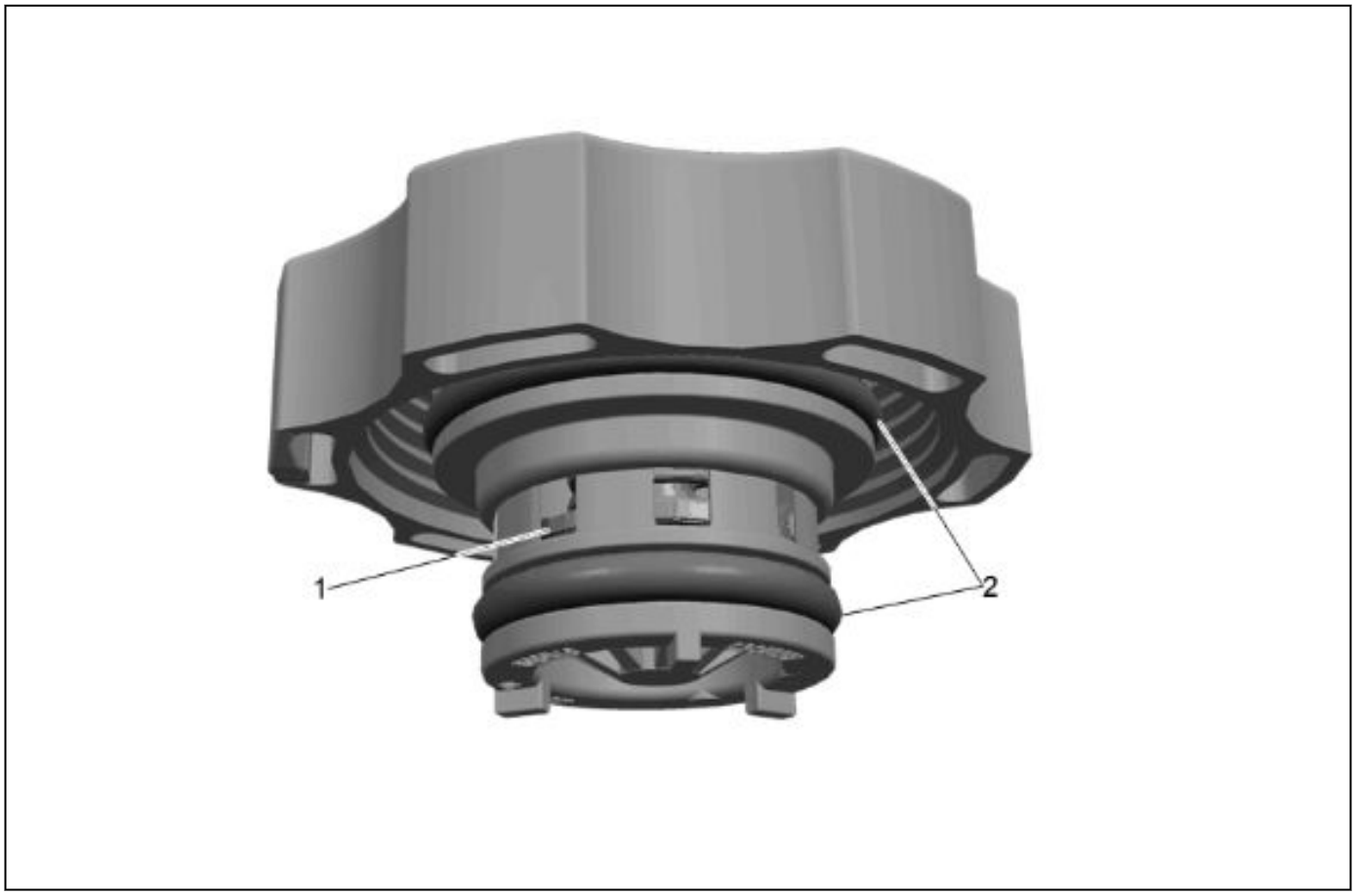
Radiator Surge Tank



6852834

The radiator surge tank (2) is a plastic tank with a pressure cap (1) mounted to it. The tank is mounted at a point higher than all other coolant passages. The surge tank provides an air space in the cooling system. The air space allows the coolant to expand and contract. The surge tank also provides a coolant fill point and a central air bleed location. During vehicle use, the coolant heats and expands. The coolant that is displaced by this expansion flows into the surge tank. As the coolant circulates, air is allowed to exit. This is an advantage to the cooling system. Coolant without air bubbles absorbs heat much better than coolant with air bubbles.

Radiator Surge Tank Cap

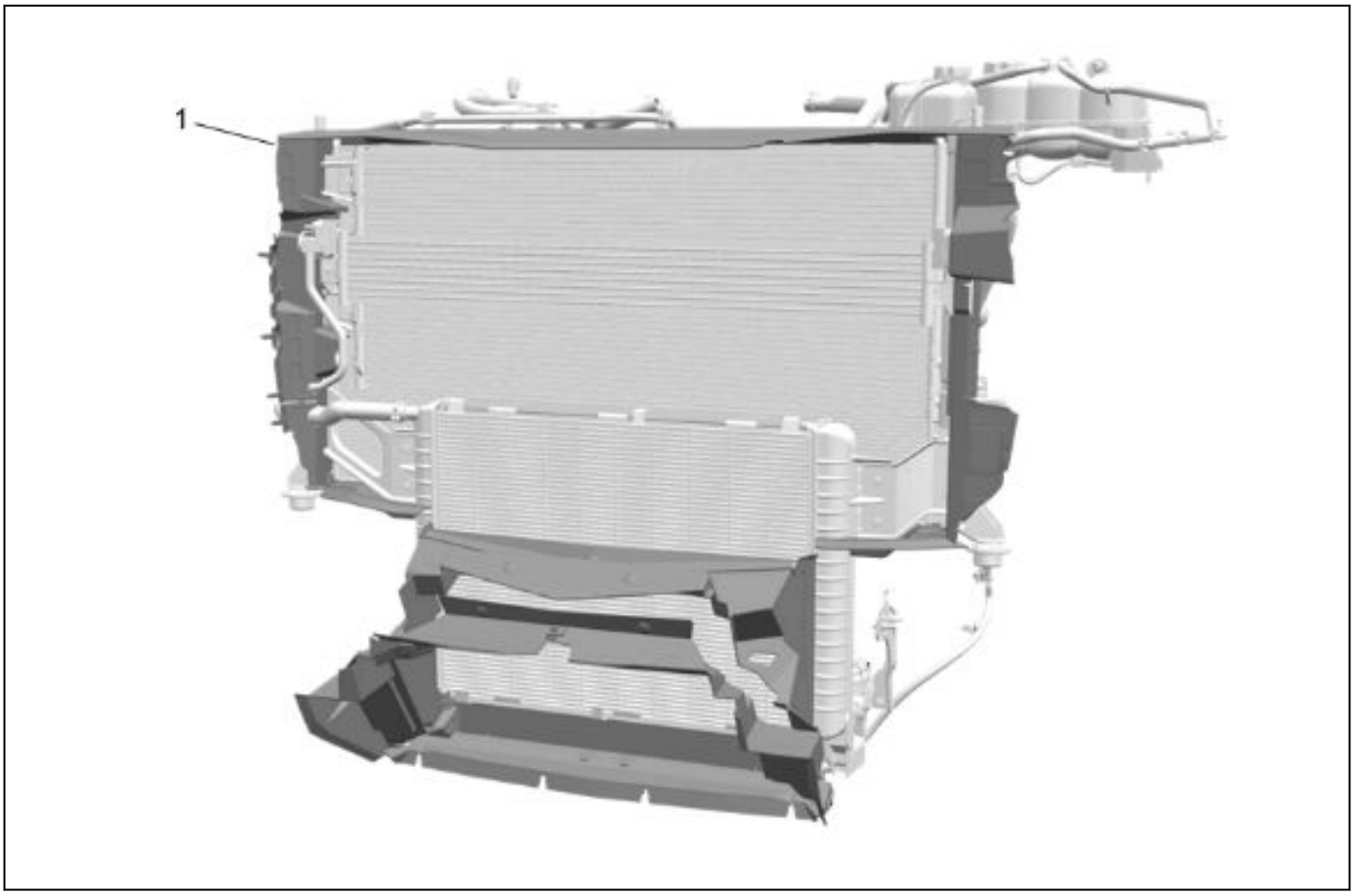


6636994

The radiator surge tank cap is a pressure cap that seals (2) and pressurizes the cooling system. It contains a blow-off or pressure valve (1) and a vacuum or atmospheric valve.

- The pressure valve is held against its seat by a spring and protects the radiator by relieving pressure if it exceeds 20 psi.
- The vacuum valve is held against its seat by a spring, which permits opening of the valve to relieve vacuum created in the cooling system as it cools off. The vacuum, if not relieved, could cause the radiator hoses to collapse.
- The pressure cap allows pressure in the cooling system to build up. As the pressure builds, the boiling point of the coolant goes up as well. Therefore, the coolant can be safely run at a temperature higher than the boiling point of the coolant at atmospheric pressure.
- The hotter the coolant is, the faster the heat moves from the radiator to the cooler passing air. However, if the pressure exceeds the strength of the spring, the pressure valve rises so that the excess pressure can escape.
- When the engine cools down, the temperature of the coolant drops and a vacuum is created in the cooling system. This vacuum causes the vacuum valve to open, allowing outside air into the cooling system. This equalizes the pressure in the cooling system with atmospheric pressure, thus preventing the radiator hoses from collapsing.

Air Baffles/Guides and Seals



7166621

The cooling system uses deflectors, air baffles/guides and air seals to increase cooling system capability. Deflectors are installed under the vehicle to redirect airflow beneath the vehicle and through the radiator to increase engine cooling. Air baffles/guides are also used to direct airflow through the radiator and increase cooling capability. Air seals prevent air from bypassing the radiator and air conditioning condenser, and prevent recirculation of hot air for better hot weather cooling and air conditioning condenser performance.

Engine Coolant Indicators
The instrument panel cluster shows the engine temperature on the temperature gauge. The value is sent on the data communication line from engine control module. When the coolant temperature is hot, the instrument panel cluster receives a discrete input from engine control module requesting illumination.

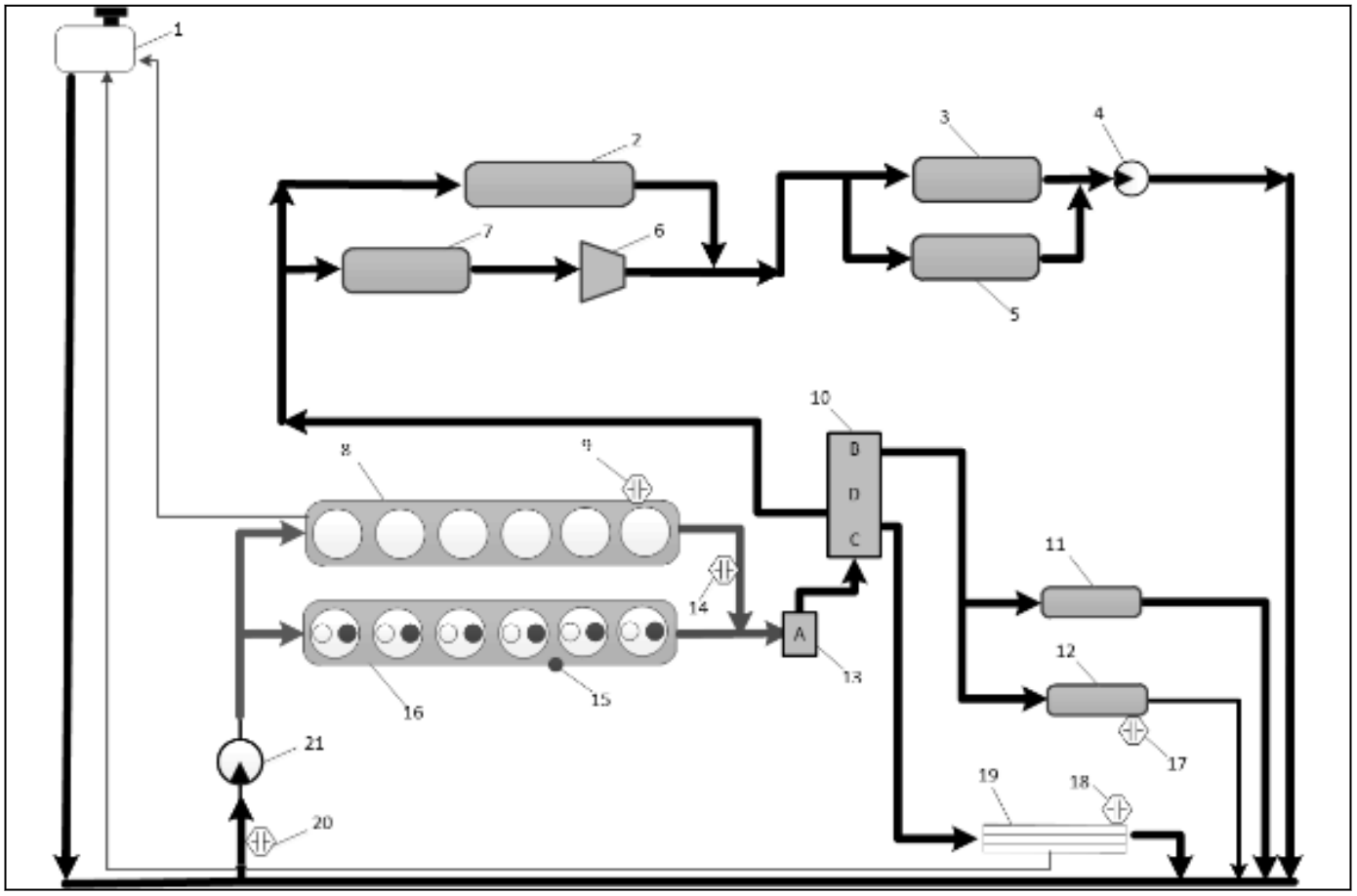
The instrument panel cluster performs the display test at the start of each ignition cycle. The instrument panel cluster illuminates the TEMP indicator.

Coolant Heater (If Equipped)
The optional coolant heater (RPO K05) operates using 110 V AC external power and is designed to warm the coolant in the engine block area for improved starting in very cold weather. The coolant heater also helps reduce fuel consumption when a cold engine is warming up. The unit is equipped with a detachable AC power cord. There is an internal thermal switch in the coolant heater cord that prevents operation above **-18°C (0°F)**. A weather shield on the cord is provided to protect the plug when not in use.

Cooling Cycle
Coolant flows from the electric water pump outlet and into the engine circuit and turbocharger cooling circuit. It also provides cooled coolant flow from the radiator to the engine coolant flow control valve to be used as necessary to manage transmission and engine oil temperature. In the engine, the coolant flow direction and volume is controlled by the engine coolant flow control valve and the block control valve to provide necessary flow for optimal engine block, cylinder head, and exhaust manifold cooling. The engine coolant flow control valve can also provide the transmission and engine oil circuits warmed coolant from the engine to optimize the oil temperatures. Excess heat is removed from the coolant in the radiator and the cooled coolant returns to the electric water pump.

Mode 1 (Low Flow):

Flow Diagram - Mode 1



6864586

(1) Surge Tank
(2) LP EGR
(3) Heater Core
(4) Heater Coolant Pump
(5) Auxiliary Heater Core (If Equipped)
(6) Turbocharger
(7) HP EGR
(8) Cylinder Head
(9) Engine Cylinder Head Metal Temperature Sensor
(10) Main Rotary Valve
(11) Automatic Transmission Fluid Cooling Exchanger
(12) Engine Oil Cooler
(13) Flow Control Valve
(14) Engine Outlet Coolant Temperature Sensor
(15) Block Heater
(16) Engine Block
(17) Engine Oil Temperature Sensor
(18) Radiator Outlet Coolant Temperature Sensor
(19) Radiator
(20) Engine Inlet Coolant Temperature Sensor
(21) Mechanical Water Pump

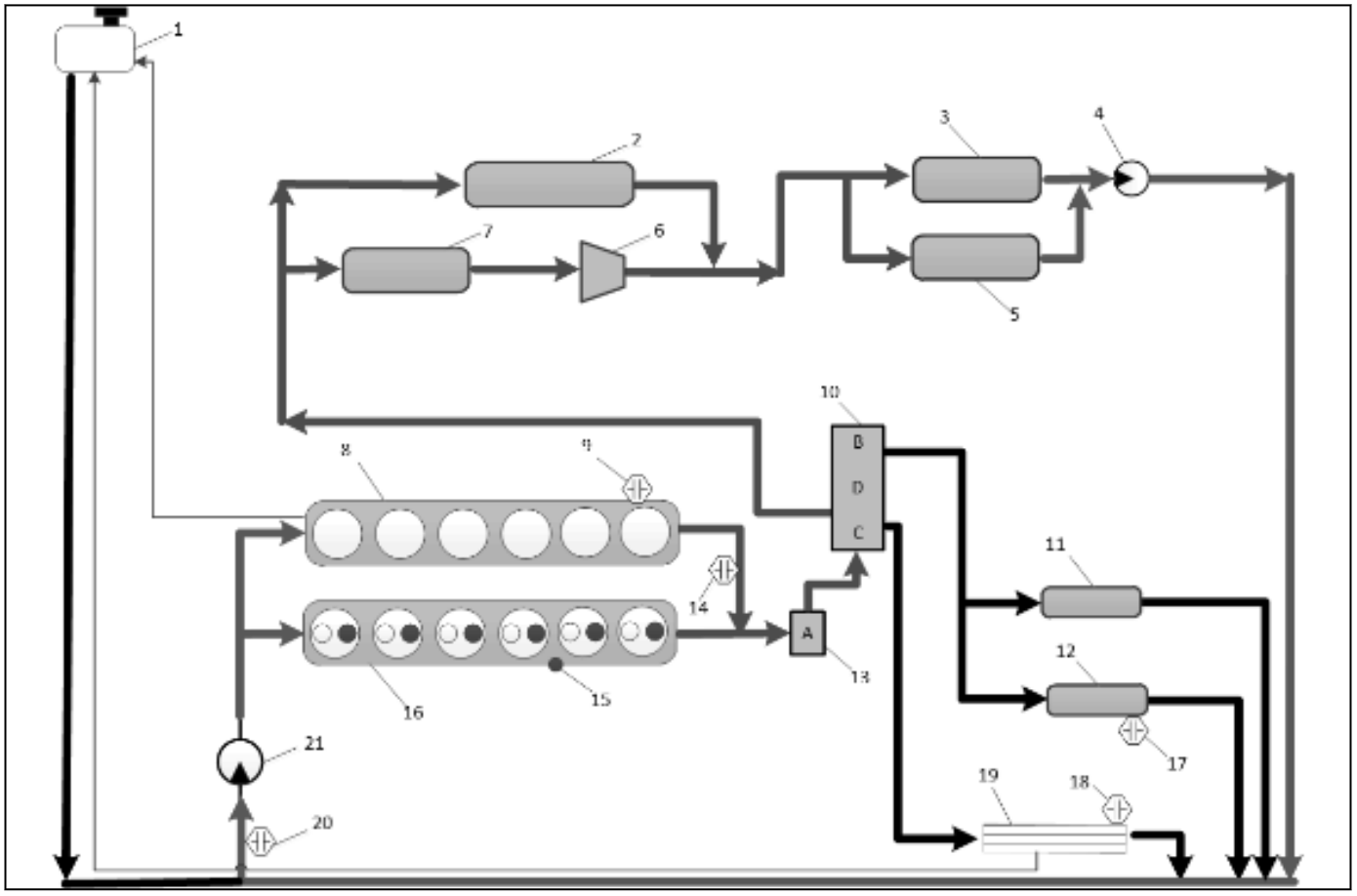
Valve Port A
Valve Port B
Valve Port C
Valve Port D

If the engine is started cold, the system will go to low flow mode, which means the flow control valve allows just enough flow for the sensors to provide reliable information on the state of the system. As the engine warms up, the heat stays around the combustion chamber and is not taken away by coolant flow. Low flow mode is the fastest method for engine warm up. Low flow mode will not enable if the interior HVAC is turned on.

COMPONENT	CONDITION
Heater Coolant Pump	Low Speed, Low Flow
Main Rotary Coolant Valve	Low Speed, Low Flow
Block Rotary Coolant Control Valve	Low Speed, Low Flow

Mode 2 (Engine Warm Up With Cabin Heating Only):

Flow Diagram - Mode 2



6864979

(1) Surge Tank
(2) LP EGR
(3) Heater Core
(4) Heater Coolant Pump
(5) Auxiliary Heater Core (If Equipped)
(6) Turbocharger
(7) HP EGR
(8) Cylinder Head
(9) Engine Cylinder Head Metal Temperature Sensor
(10) Main Rotary Valve
(11) Automatic Transmission Fluid Cooling Exchanger

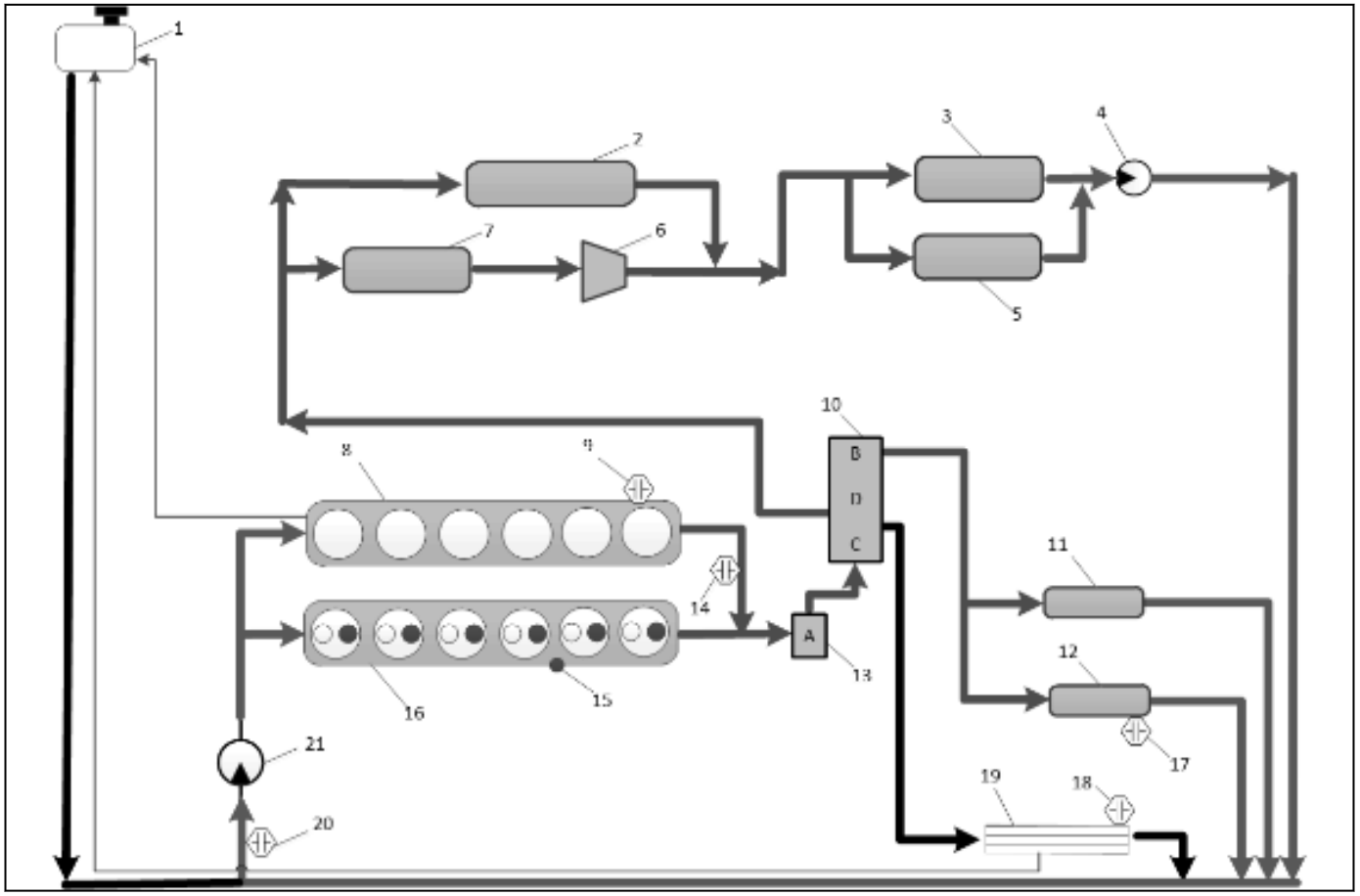
(12) Engine Oil Cooler
(13) Flow Control Valve
(14) Engine Outlet Coolant Temperature Sensor
(15) Block Heater
(16) Engine Block
(17) Engine Oil Temperature Sensor
(18) Radiator Outlet Coolant Temperature Sensor
(19) Radiator
(20) Engine Inlet Coolant Temperature Sensor
(21) Mechanical Water Pump
Valve Port A
Valve Port B
Valve Port C
Valve Port D

When the driver requests passenger compartment heat or windshield defrosting, coolant flow is controlled to maximize coolant heat transfer from engine to passenger compartment. This heater circuit is fed by a combination of warmed coolant from the cylinder head, high pressure EGR valve, and turbocharger. The engine coolant main rotary valve is closed to the radiator and oil heat exchanger at this time. The warmed coolant goes through the low pressure EGR cooler then to the passenger compartment heater core. Heater core flow returns to the mechanical water pump.

COMPONENT	CONDITION
Heater Coolant Pump	Low Speed or Speed-Controlled to Heater Core Demand
Main Rotary Coolant Valve	Low Speed, Low Flow
Block Rotary Control Valve	Low Speed, Low Flow

Mode 3 (Cabin Heating with Oil Warming):

Flow Diagram - Mode 3



6864983

(1) Surge Tank
(2) LP EGR
(3) Heater Core
(4) Heater Coolant Pump
(5) Auxiliary Heater Core (If Equipped)
(6) Turbocharger
(7) HP EGR
(8) Cylinder Head
(9) Engine Cylinder Head Metal Temperature Sensor
(10) Main Rotary Valve
(11) Automatic Transmission Fluid Cooling Exchanger
(12) Engine Oil Cooler
(13) Flow Control Valve

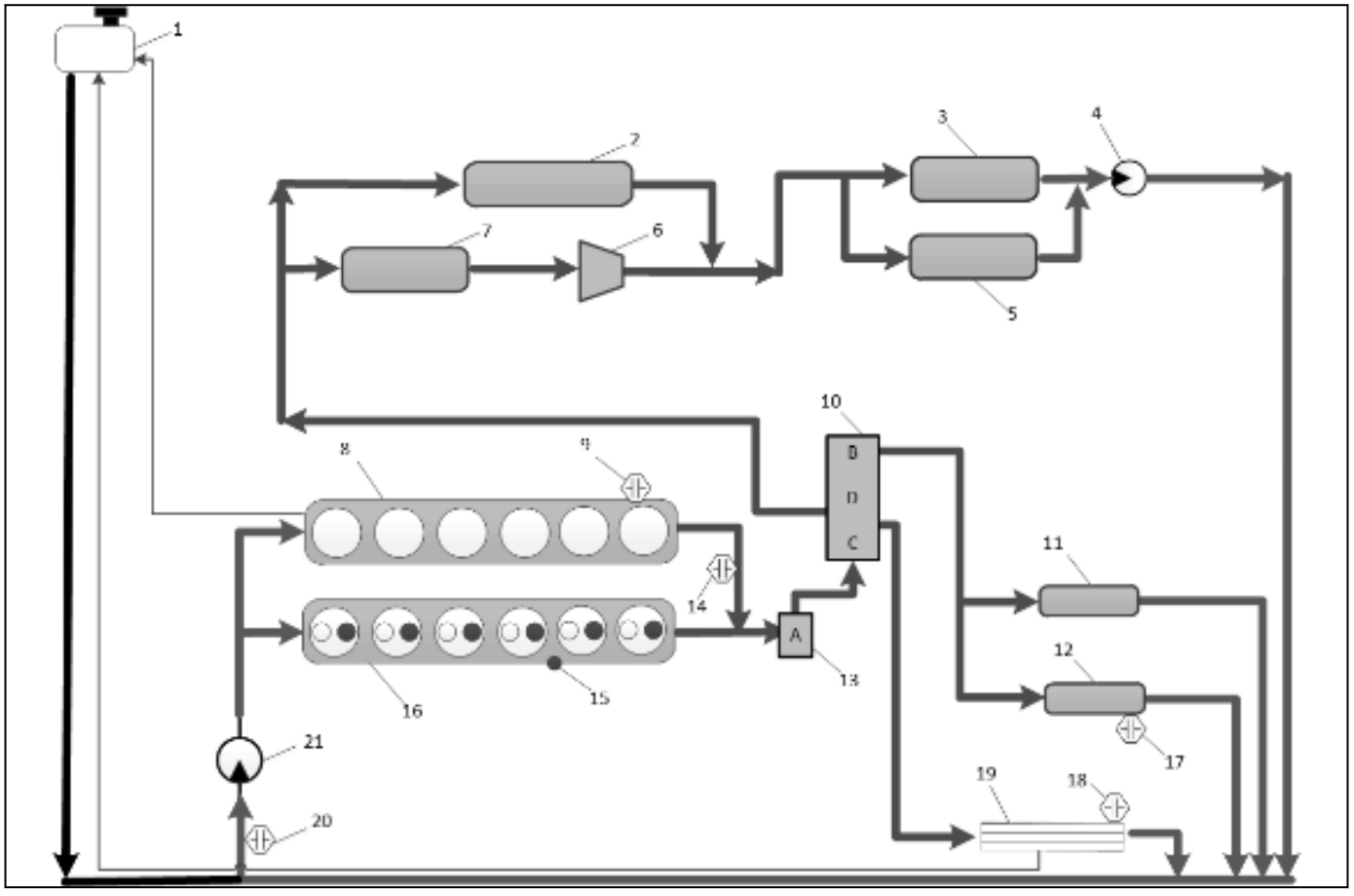
(14) Engine Outlet Coolant Temperature Sensor
(15) Block Heater
(16) Engine Block
(17) Engine Oil Temperature Sensor
(18) Radiator Outlet Coolant Temperature Sensor
(19) Radiator
(20) Engine Inlet Coolant Temperature Sensor
(21) Mechanical Water Pump
Valve Port A
Valve Port B
Valve Port C
Valve Port D

The cylinder head, turbocharger, and EGR cooler passages are still flowing and providing warmed coolant directly to the passenger compartment heater core, if requested. At this point, the combustion chamber temperature has reached a high enough temperature that some heat can be transferred to the engine or transmission oil. Based on engine temperature, the engine coolant main rotary valve will control flow through the oil heat exchanger in a ratio necessary to warm the oil. Coolant flow from the engine and heat exchangers returns to the mechanical water pump.

COMPONENT	CONDITION
Heater Coolant Pump	Speed-Controlled to Engine Demand
Main Rotary Coolant Valve	Bypass Radiator
Block Rotary Control Valve	Position-Controlled

Mode 4 (Engine-Demand Cooling With Cabin Heating And Oil Heating):

Flow Diagram - Mode 4



6864986

(1) Surge Tank

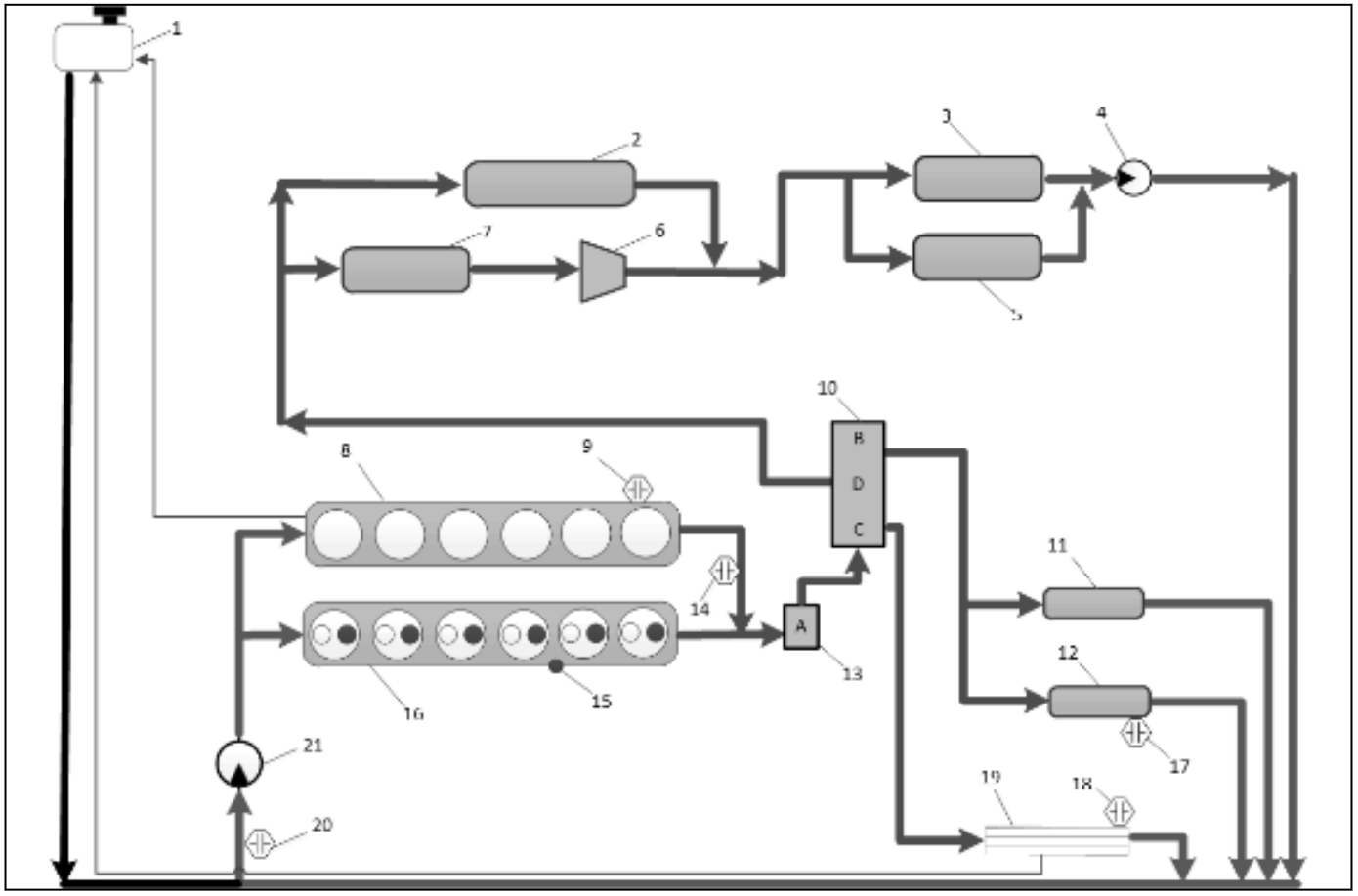
(2) LP EGR
(3) Heater Core
(4) Heater Coolant Pump
(5) Auxiliary Heater Core (If Equipped)
(6) Turbocharger
(7) HP EGR
(8) Cylinder Head
(9) Engine Cylinder Head Metal Temperature Sensor
(10) Main Rotary Valve
(11) Automatic Transmission Fluid Cooling Exchanger
(12) Engine Oil Cooler
(13) Flow Control Valve
(14) Engine Outlet Coolant Temperature Sensor
(15) Block Heater
(16) Engine Block
(17) Engine Oil Temperature Sensor
(18) Radiator Outlet Coolant Temperature Sensor
(19) Radiator
(20) Engine Inlet Coolant Temperature Sensor
(21) Mechanical Water Pump
Valve Port A
Valve Port B
Valve Port C
Valve Port D

The cylinder head, turbocharger, and EGR cooler passages are still flowing and providing warmed coolant directly to the passenger compartment heater core. At this point, the combustion chamber temperature has reached its optimal temperature and the engine needs to dissipate heat through the radiator. Based on engine temperature, the engine coolant main rotary valve will control flow to the radiator to maintain optimal engine temperatures. Additionally, coolant flow will continue to flow to the engine/transmission oil heat exchangers. Engine oil and transmission oil can take significantly longer time to reach optimal temperatures after the engine is already warmed. Coolant flow from the radiator and heat exchangers returns to the mechanical water pump.

COMPONENT	CONDITION
Heater Coolant Pump	Speed-Controlled to Engine Demand
Main Rotary Coolant Valve	Position-Controlled with Oil Heating
Block Control Valve	Position-Controlled

Mode 5 (After Run Cooling):

Flow Diagram - Mode 5



6864989

(1) Surge Tank
(2) LP EGR
(3) Heater Core
(4) Heater Coolant Pump
(5) Auxiliary Heater Core (If Equipped)
(6) Turbocharger
(7) HP EGR
(8) Cylinder Head
(9) Engine Cylinder Head Metal Temperature Sensor
(10) Main Rotary Valve
(11) Automatic Transmission Fluid Cooling Exchanger
(12) Engine Oil Cooler

(13) Flow Control Valve
(14) Engine Outlet Coolant Temperature Sensor
(15) Block Heater
(16) Engine Block
(17) Engine Oil Temperature Sensor
(18) Radiator Outlet Coolant Temperature Sensor
(19) Radiator
(20) Engine Inlet Coolant Temperature Sensor
(21) Mechanical Water Pump
Valve Port A
Valve Port B
Valve Port C
Valve Port D

The after run mode is after key off and is needed only after extreme hot conditions with high engine, oil and coolant temperatures. For after run mode, the same valve positions are used as in engine demand cooling with cabin heating and the auxiliary water pump is used to provide flow to continue cooling.

COMPONENT	CONDITION
Heater Coolant Pump	Low Speed
Main Rotary Coolant Valve	Max Cooling
Block Control Valve	Open

SHUT DOWN

At engine shutdown, the control valves remain open to permit radiator flow and allow coolant service fill by gravity alone. Both control valves also undergo a diagnostic check after engine shutdown, which is sometimes audible.

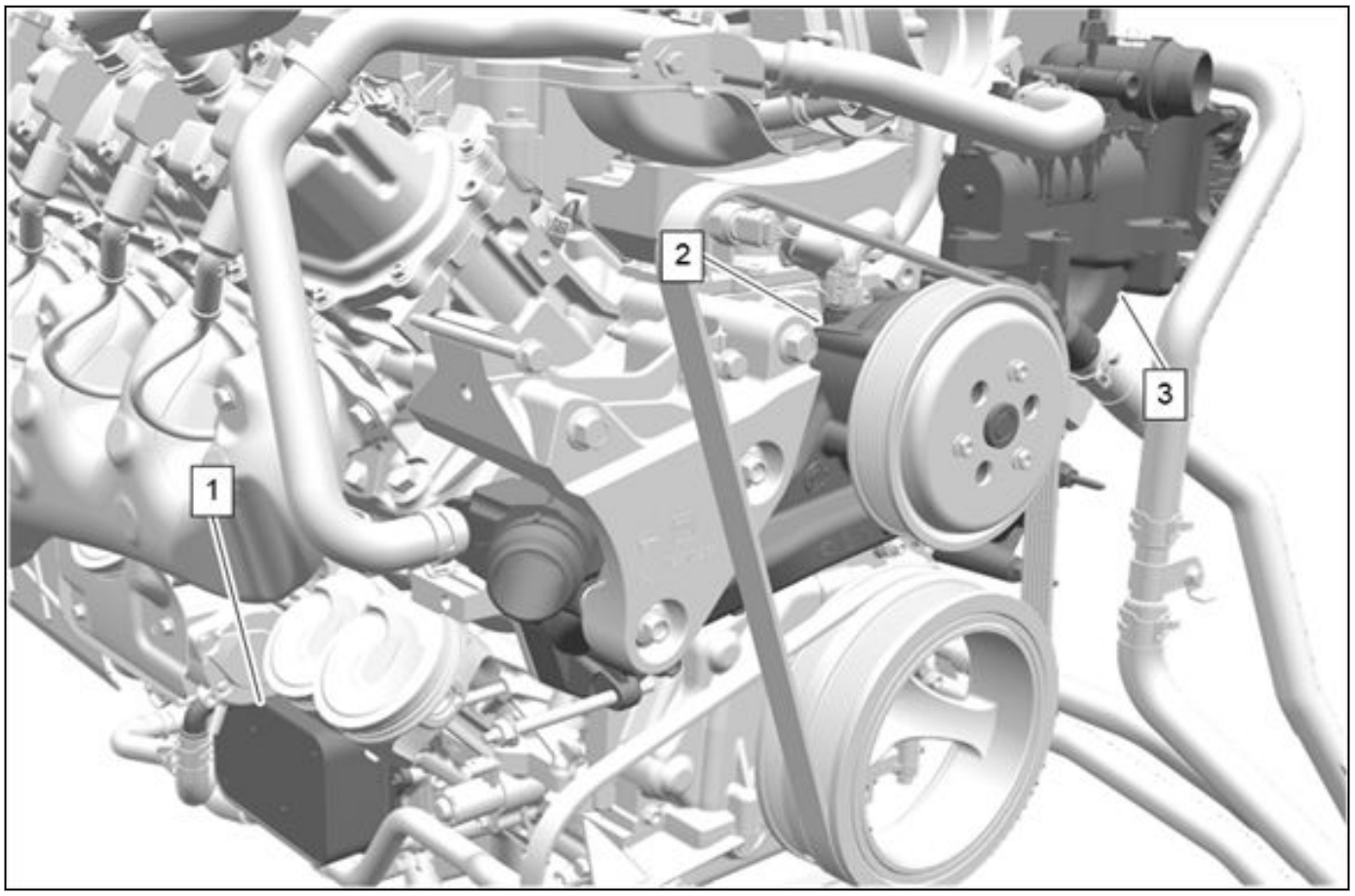
Cooling System Description and Operation

Active Thermal Management

This vehicle uses Advance Technology cooling system design, which makes use of active thermal management strategy. The difference between conventional cooling systems and active thermal management is that the predominant goal of the active thermal management strategy is to prioritize fuel economy by maintaining an ideal engine operating temperature during all engine speeds and operating conditions, while still meeting customer expectations for vehicle performance and reducing vehicle emissions.

The key features of active thermal management include:

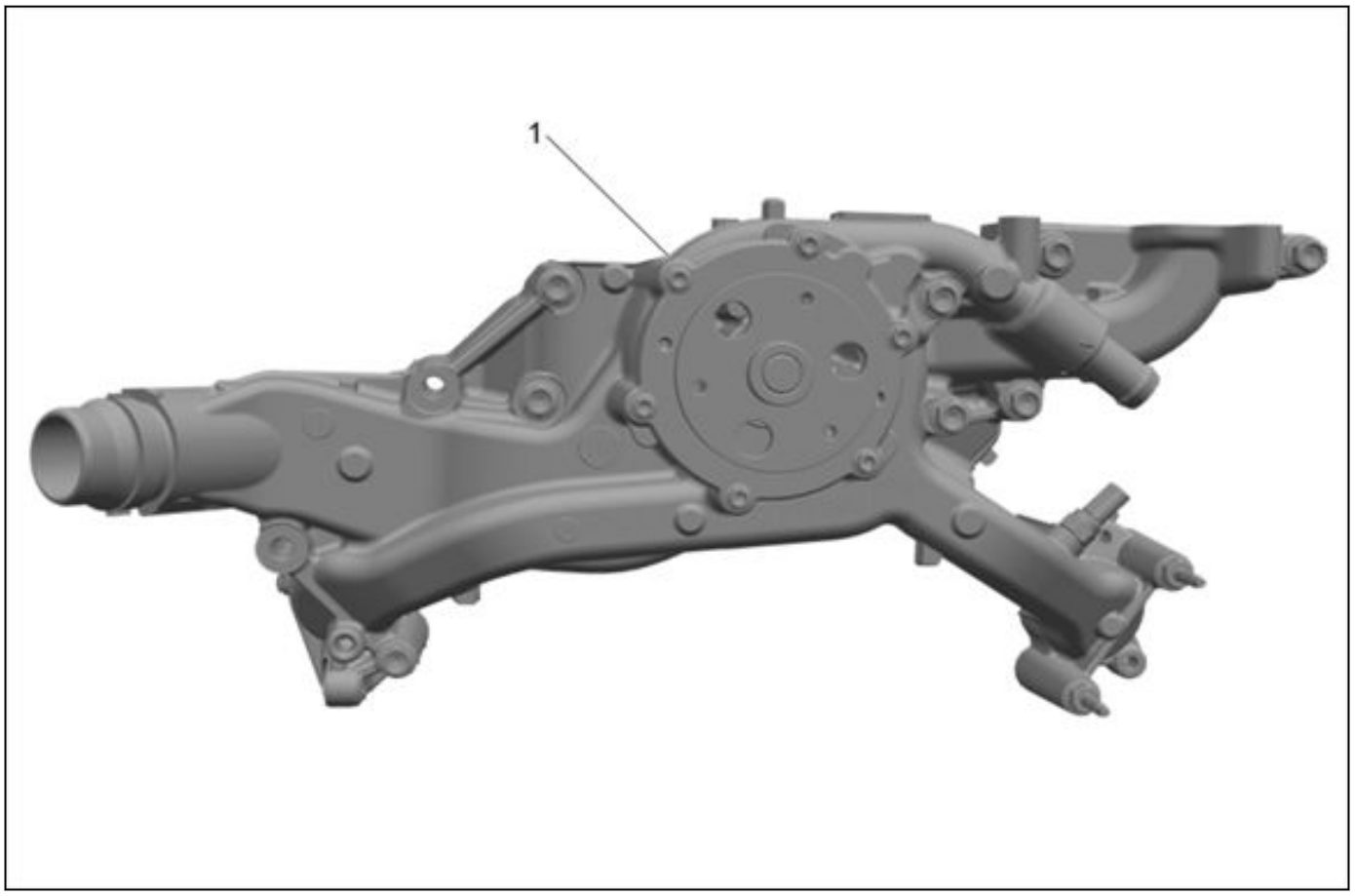
- **Engine Internal**
  - Improved engine coolant jacket that targets hot spots in the engine.
- **Engine Mounted Cooling**



7175672

- − Conventional mechanical water pump (2).
- − The coolant flow control valve (3) contains two rotary control valves. The radiator rotary valve, and the oil rotary valve are positioned at different engine locations and eliminate the need for the conventional cooling system thermostat.
- − Engine oil cooler (1) that uses coolant to heat or cool the engine oil as required.

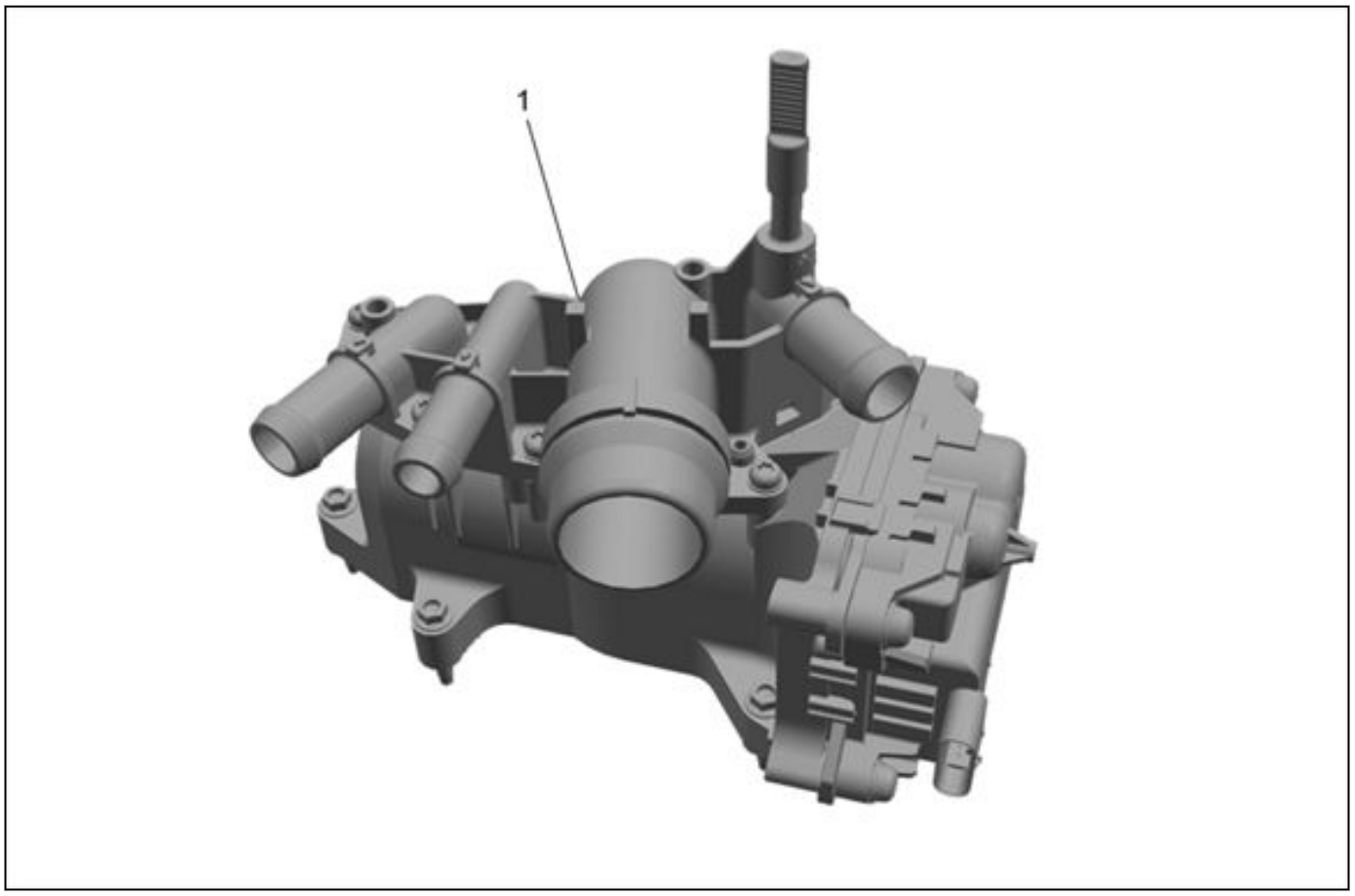
- **Temperature and Position Sensors**
- The powertrain control module, which controls the complete active thermal management system using feedback from numerous sensors:
  - − Engine Cylinder Head Coolant Temperature Sensor
  - − Engine Bank Outlet Temperature Sensor
  - − Engine Inlet Coolant Temperature Sensor
  - − Engine Oil Temperature Sensor 1 and 2
  - − Transmission Oil Temperature Sensor
  - − Auxiliary Radiator Coolant Temperature Sensor
  - − Radiator Outlet Coolant Temperature Sensor
  - − Radiator Coolant Flow Control Valve Position Sensor
  - − Oil Coolant Flow Control Valve Position Sensor
- **Mechanical Water Pump With Manifold**



7175673

- The mechanical water pump (1), provides constant coolant flow to the engine cylinder block, cylinder head, and the engine coolant flow control valve.

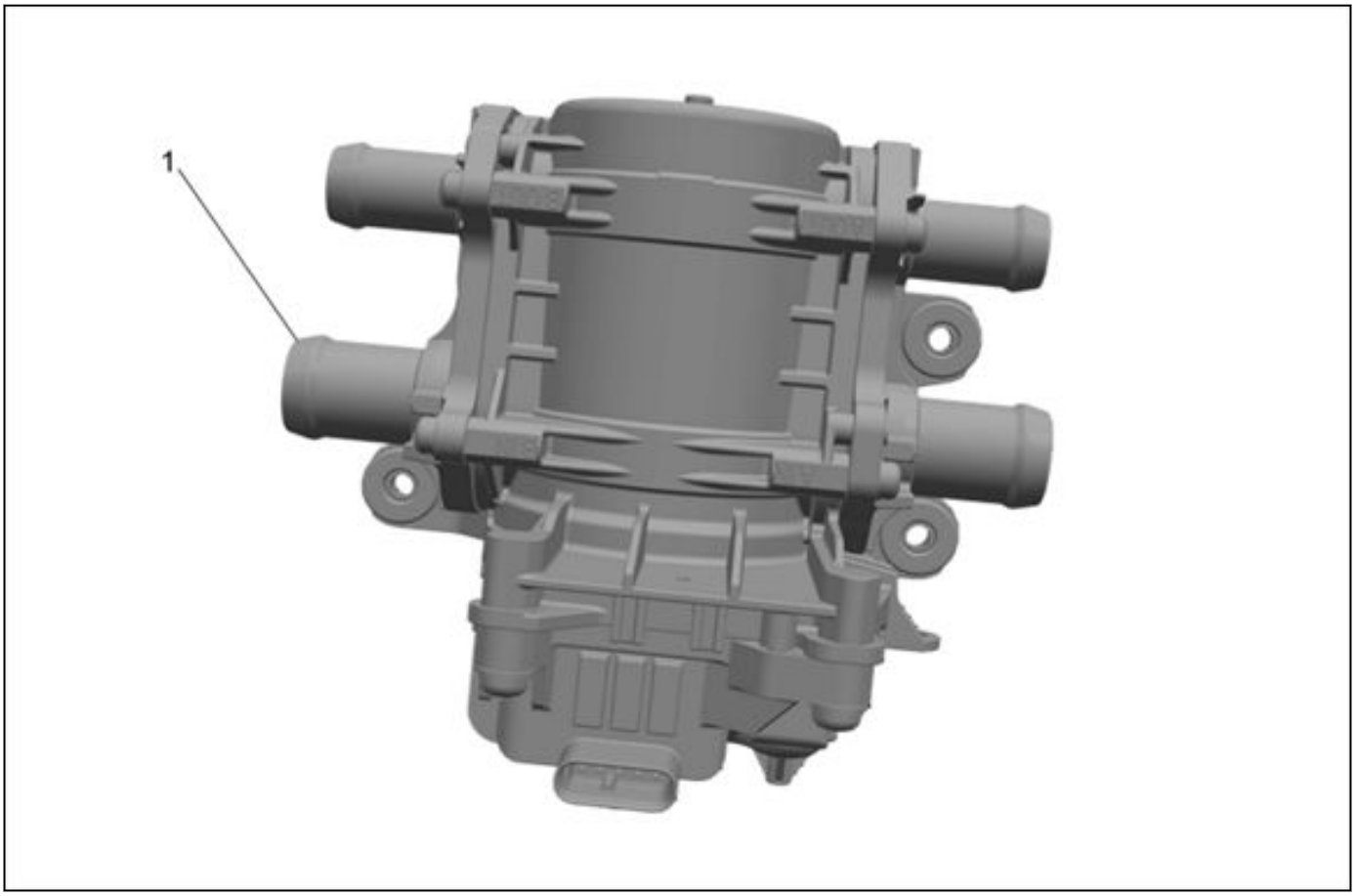
- **Engine Coolant Flow Control Valve**



7175675

- The engine coolant flow control valve (1), also referred to as the radiator rotary valve (RRV), controls coolant flow to the radiator and heater core as well as the engine and transmission oil heat exchangers. This valve eliminates the need for a conventional wax-operated thermostat and is controlled by the powertrain control module, through sensor feedback. Hot coolant from the manifold is brought into the valve from the side of the engine block. The engine coolant flow control valve controls bypass and radiator flow to promote rapid engine warm-up and maintain the required engine coolant temperature under varying operating conditions. The engine coolant flow control valve is engine-mounted and is one of two coolant flow control valves used in the L76/L78 cooling system. The second valve is the auxiliary engine coolant flow control valve and is mounted on the vehicle frame.

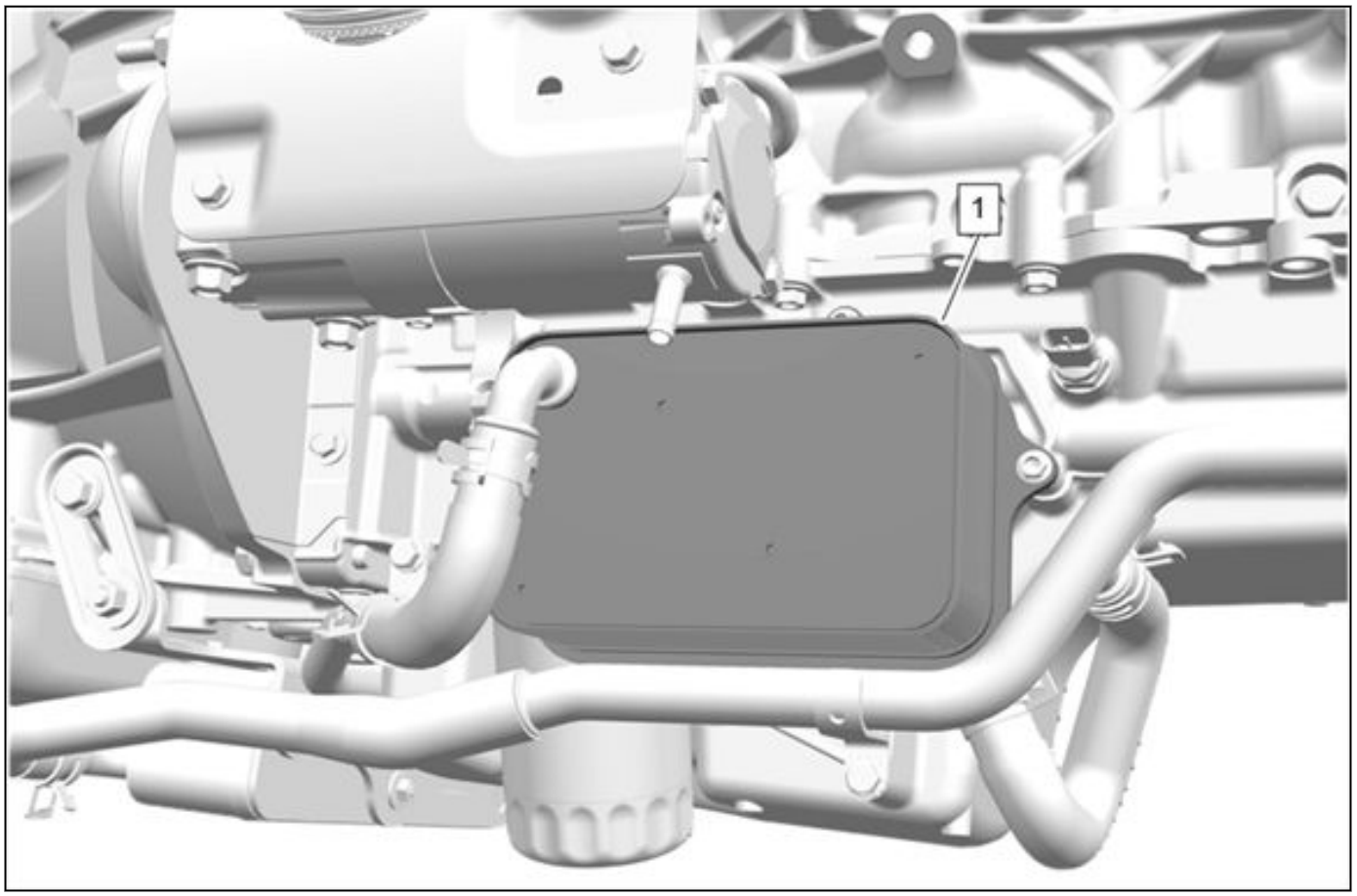
- **Auxiliary Engine Coolant Flow Control Valve**



7202799

- The auxiliary engine coolant flow control valve (1), also referred to as the oil rotary valve (ORV), controls coolant flow to the auxiliary radiator as well as the engine and transmission oil heat exchangers. The auxiliary engine coolant flow control valve manages coolant distribution for oil and transmission-fluid temperature control while supporting overall engine thermal management. The auxiliary engine coolant flow control valve is frame-mounted and is one of two coolant flow control valves used in the L76/L78 cooling system. The first valve is the engine coolant flow control valve and is mounted on the engine.

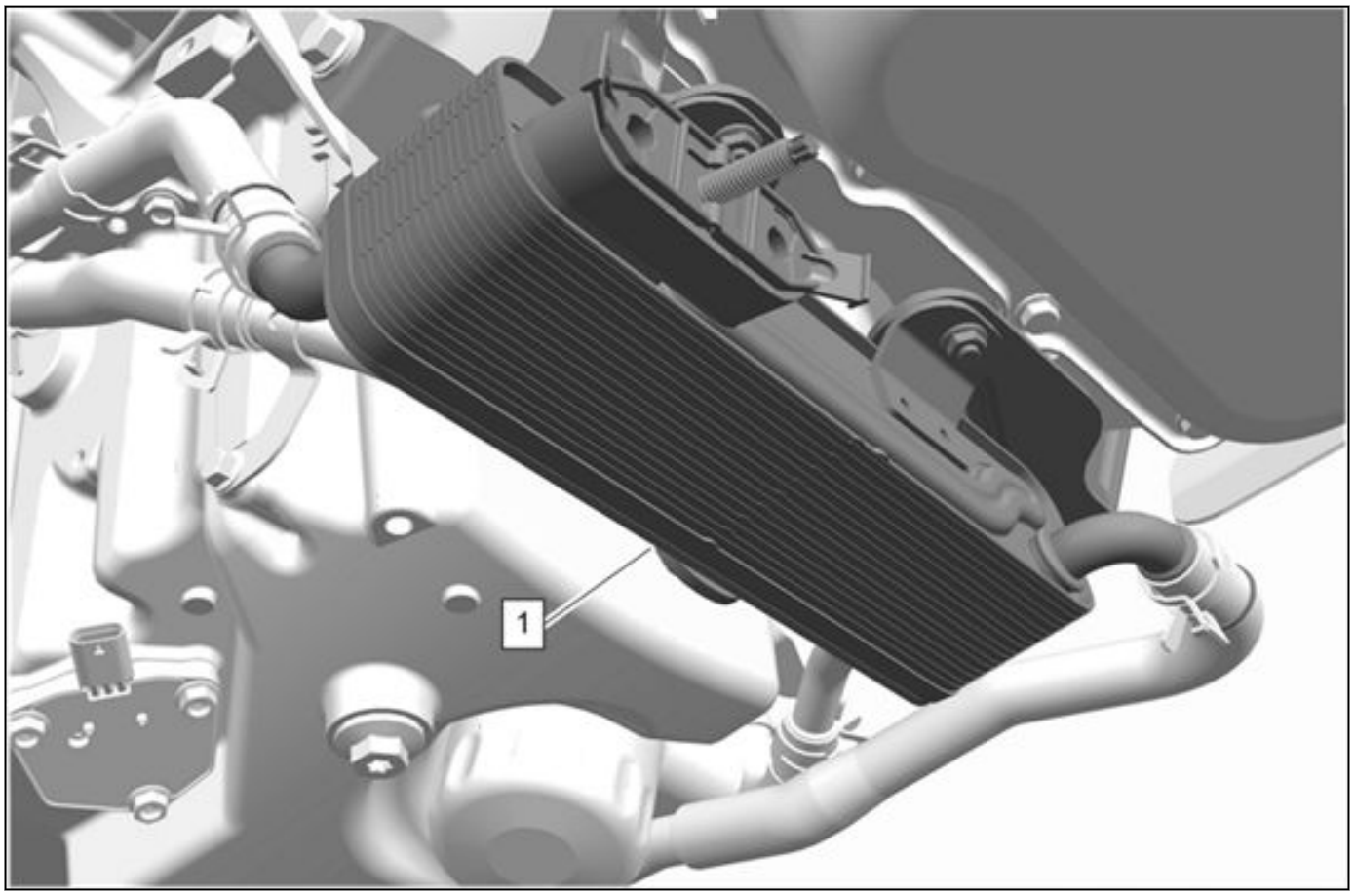
- **Engine Oil Cooler**



7175676

- The engine oil cooler (1) is a heat exchanger that is attached to the side of the engine and exchanges heat between the engine oil and engine coolant. The engine oil fluid cooling exchanger can flow no coolant, provide hot coolant for transmission oil heating (during engine warm-up) or provide cooled coolant for transmission oil cooling (under high thermal loads).

- **Automatic Transmission Fluid Cooling Exchanger**

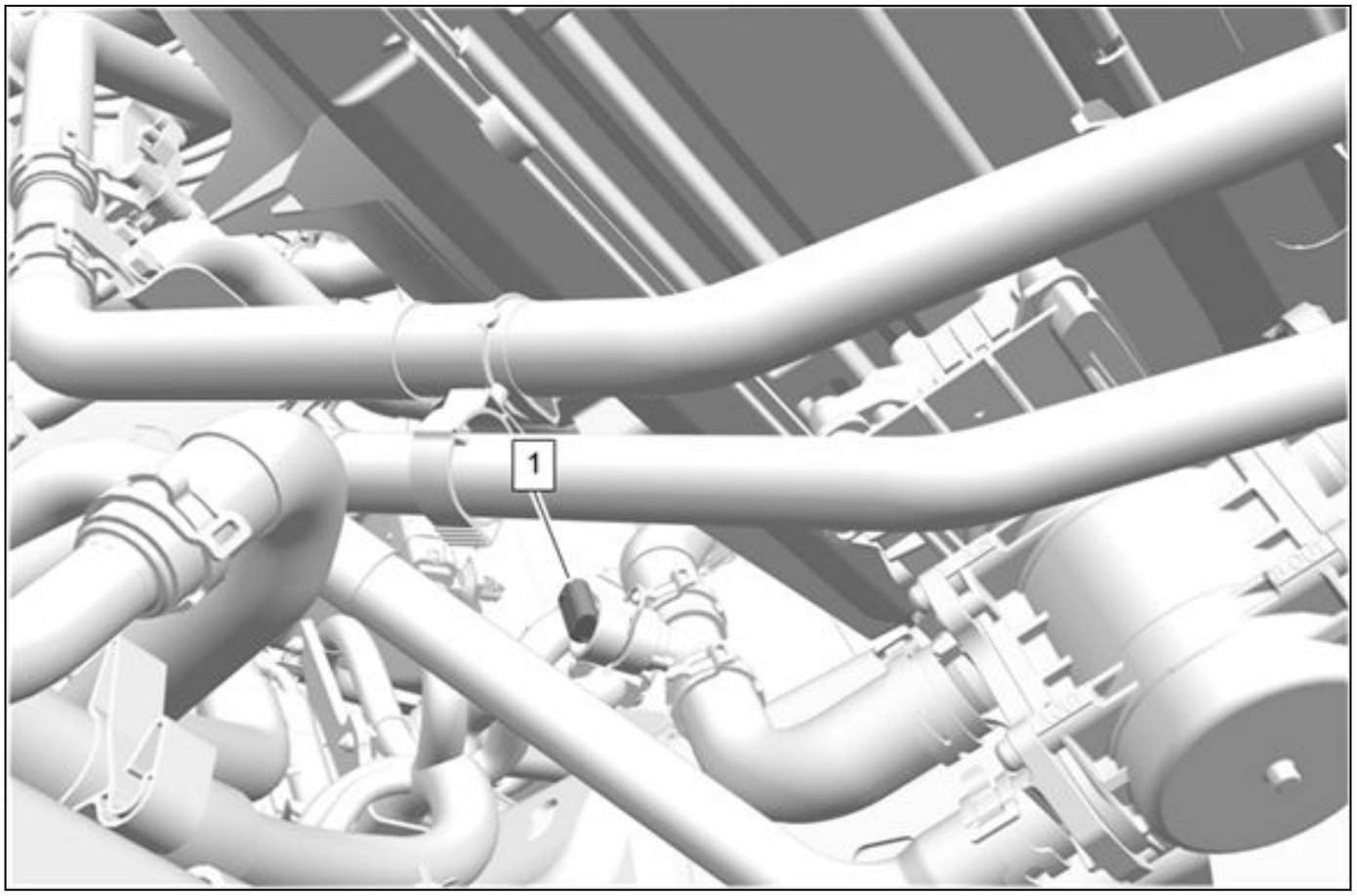


7175677

- The automatic transmission fluid cooling exchanger (1) is a heat exchanger that is attached to the front of the transmission and exchanges heat between the transmission oil and engine coolant. The automatic transmission fluid cooling exchanger can flow no coolant, provide hot coolant for transmission oil heating (during engine warm-up) or provide cooled coolant for transmission oil cooling (under high thermal loads).

- **Automatic Coolant Service Fill Description**
  - Active thermal management systems are more difficult to fill with coolant than traditional thermostat based systems. Therefore the vehicle is equipped with an automatic coolant service fill that can be activated via the scan tool or driver controls that will cycle the water pump and coolant valves to de-aerate the coolant system.

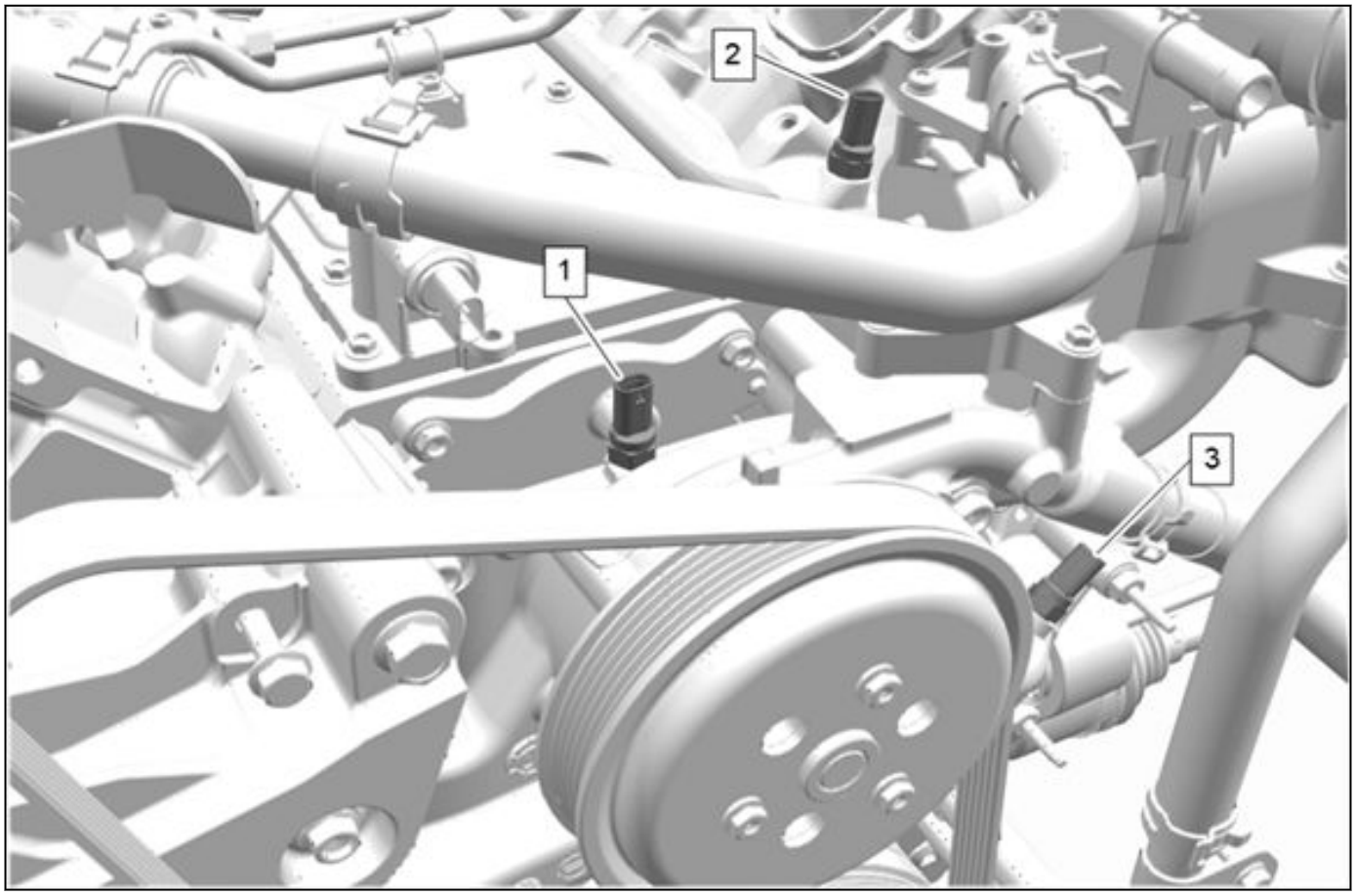
Component Locator - Engine View



7175679

Bottom side of engine view

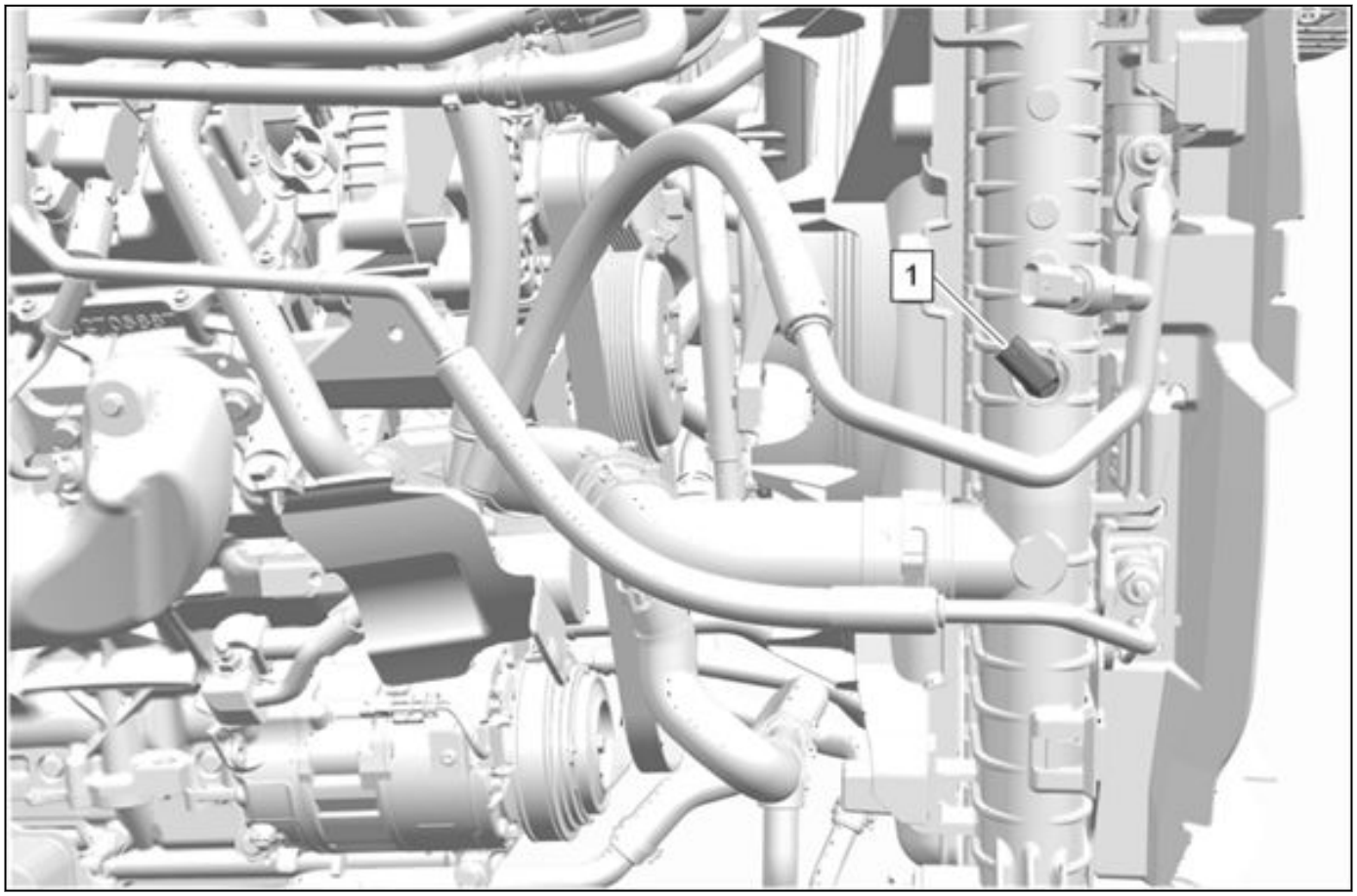
Callout	Scan Tool Reference	Service Information Part Name or Electronic Part Catalog Name
1	Engine Coolant Temperature Sensor 3	Auxiliary Radiator Outlet Coolant Temperature Sensor



7175683

Front of engine view

Callout	Scan Tool Reference	Service Information Part Name or Electronic Part Catalog Name
1	Engine Coolant Temperature Sensor 6	Bank Outlet Coolant Temperature Sensor
2	Engine Coolant Temperature Sensor 5	Cylinder Head Outlet Coolant Temperature Sensor
3	Engine Coolant Temperature Sensor 2	Engine Inlet Coolant Temperature Sensor



7202804

Front right side of engine view

Callout	Scan Tool Reference	Service Information Part Name or Electronic Part Catalog Name
1	Radiator Coolant Temperature Sensor	Radiator Outlet Coolant Temperature Sensor

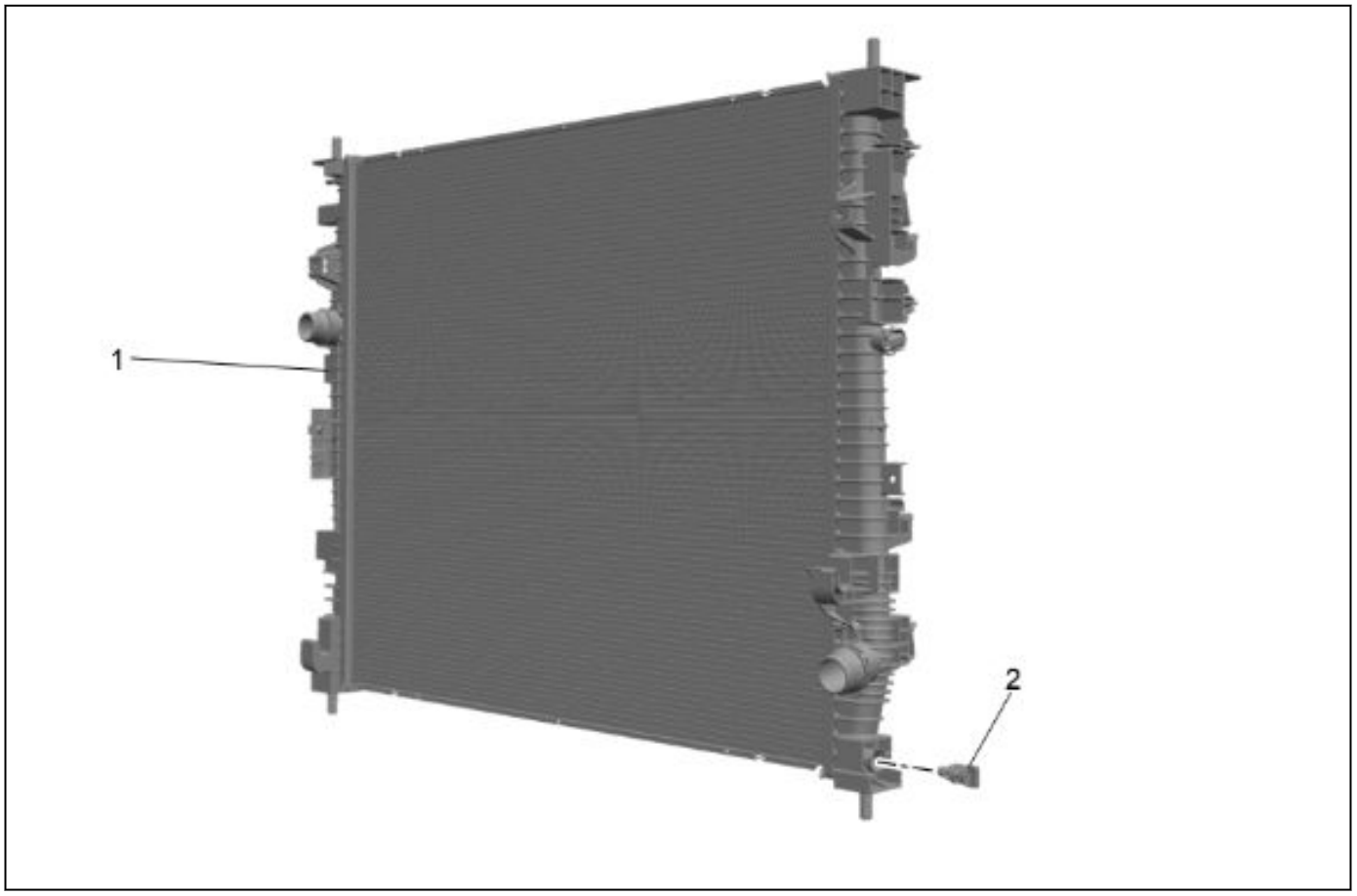
Cooling System Components

- Various temperature and position sensors provide data back to the powertrain control module.
- Active thermal management still uses many of the conventional cooling system features, including:
  - Coolant
  - Coolant Hoses
  - Radiator
  - Radiator Surge Tank
  - Surge Tank Pressure Cap
  - Engine Coolant Indicators
  - Air Baffles/Guides and Seals
  - Cabin Heater Core Route, if equipped with Rear Cabin Heater

Coolant

The engine coolant is a solution made up of a 50-50 mixture of DEX-COOL® and suitable drinking water. The coolant solution transfers heat between the components of the engine heating/cooling system.

Radiator

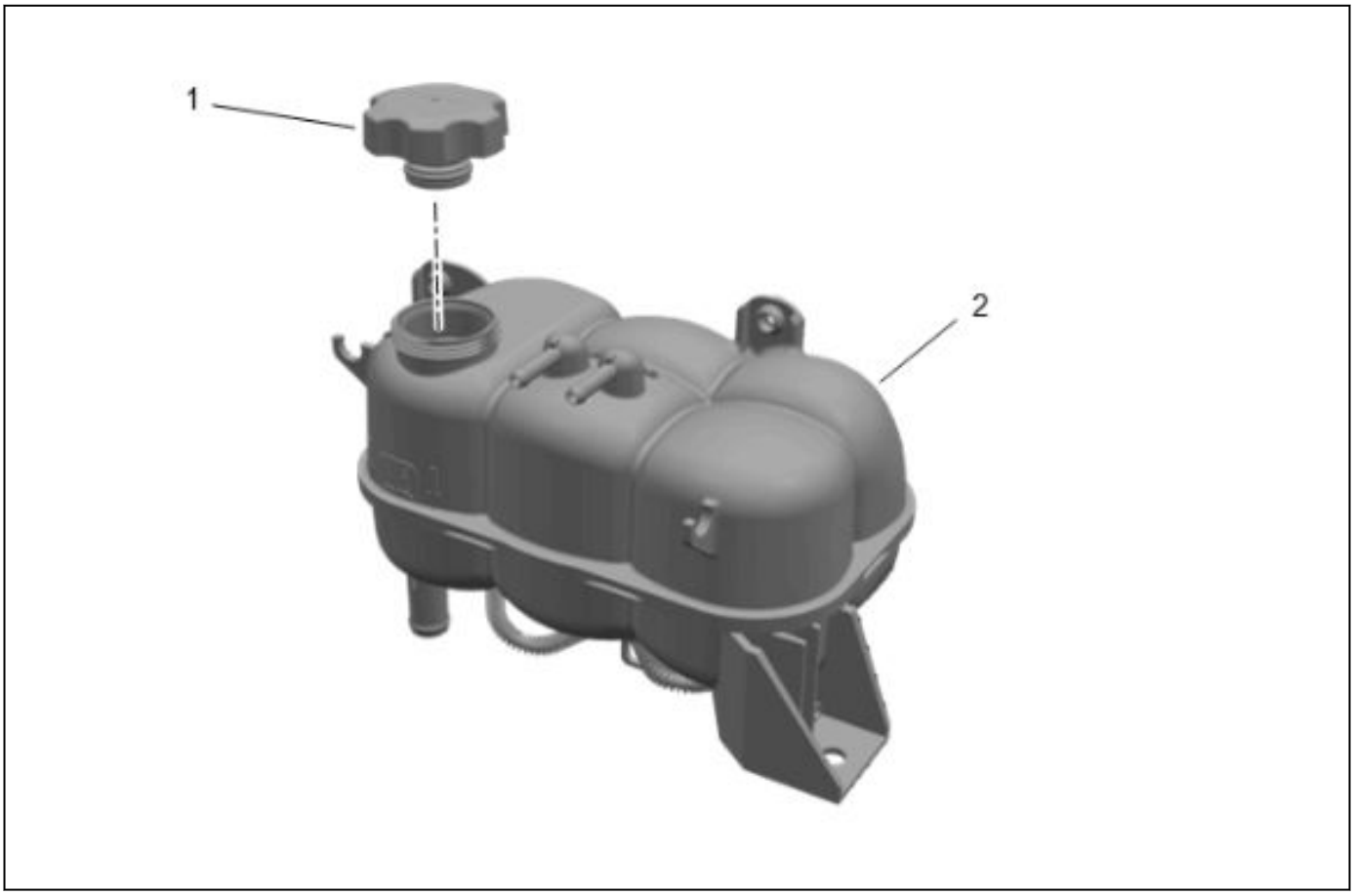


6902678

The radiator (1) is a heat exchanger. It consists of a core and two end tanks. The aluminum core is a tube and fin crossflow design that extends from the inlet tank to the outlet tank. Fins are placed around the outside of the tubes to improve heat transfer to the atmosphere. The inlet and outlet tanks are a molded high temperature nylon reinforced plastic material. A high temperature rubber gasket seals the tank flange edge to the aluminum core. The tanks are clamped to the core with clinch tabs. The tabs are part of the aluminum header at each end of the core. The fins on the core transfer heat from the coolant passing through the tubes. Air passing between the fins absorbs the heat and cools the coolant. Heat is removed from the coolant as the coolant passes through the radiator.

The radiator also has a drain cock (2) located in the bottom of the left or right hand tank. The drain cock unit includes the drain cock and drain cock seal.

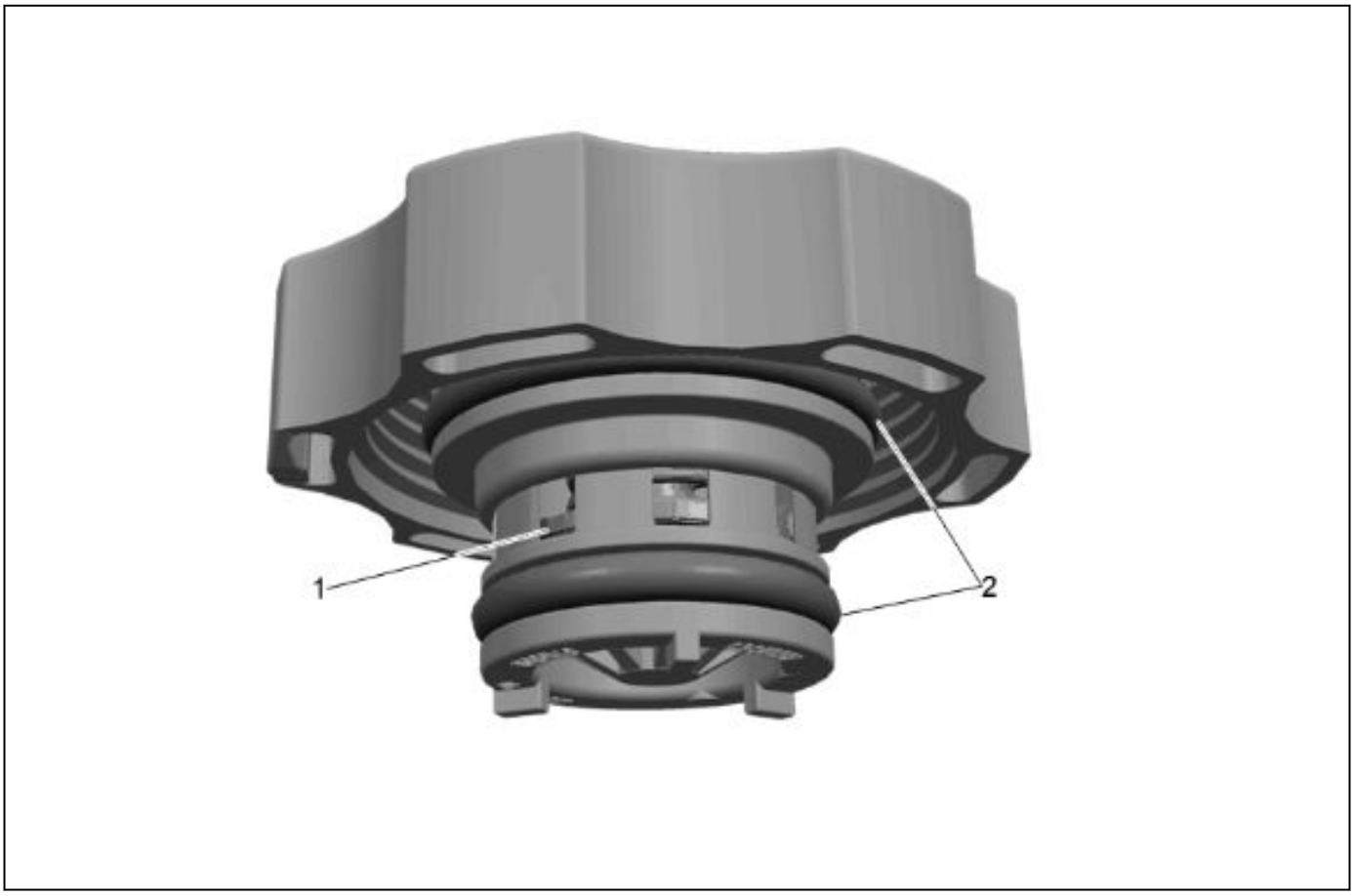
Radiator Surge Tank



6852834

The radiator surge tank (2) is a plastic tank with a pressure cap (1) mounted to it. The tank is mounted at a point higher than all other coolant passages. The surge tank provides an air space in the cooling system. The air space allows the coolant to expand and contract. The surge tank also provides a coolant fill point and a central air bleed location. During vehicle use, the coolant heats and expands. The coolant that is displaced by this expansion flows into the surge tank. As the coolant circulates, air is allowed to exit. This is an advantage to the cooling system. Coolant without air bubbles absorbs heat much better than coolant with air bubbles.

Radiator Surge Tank Cap

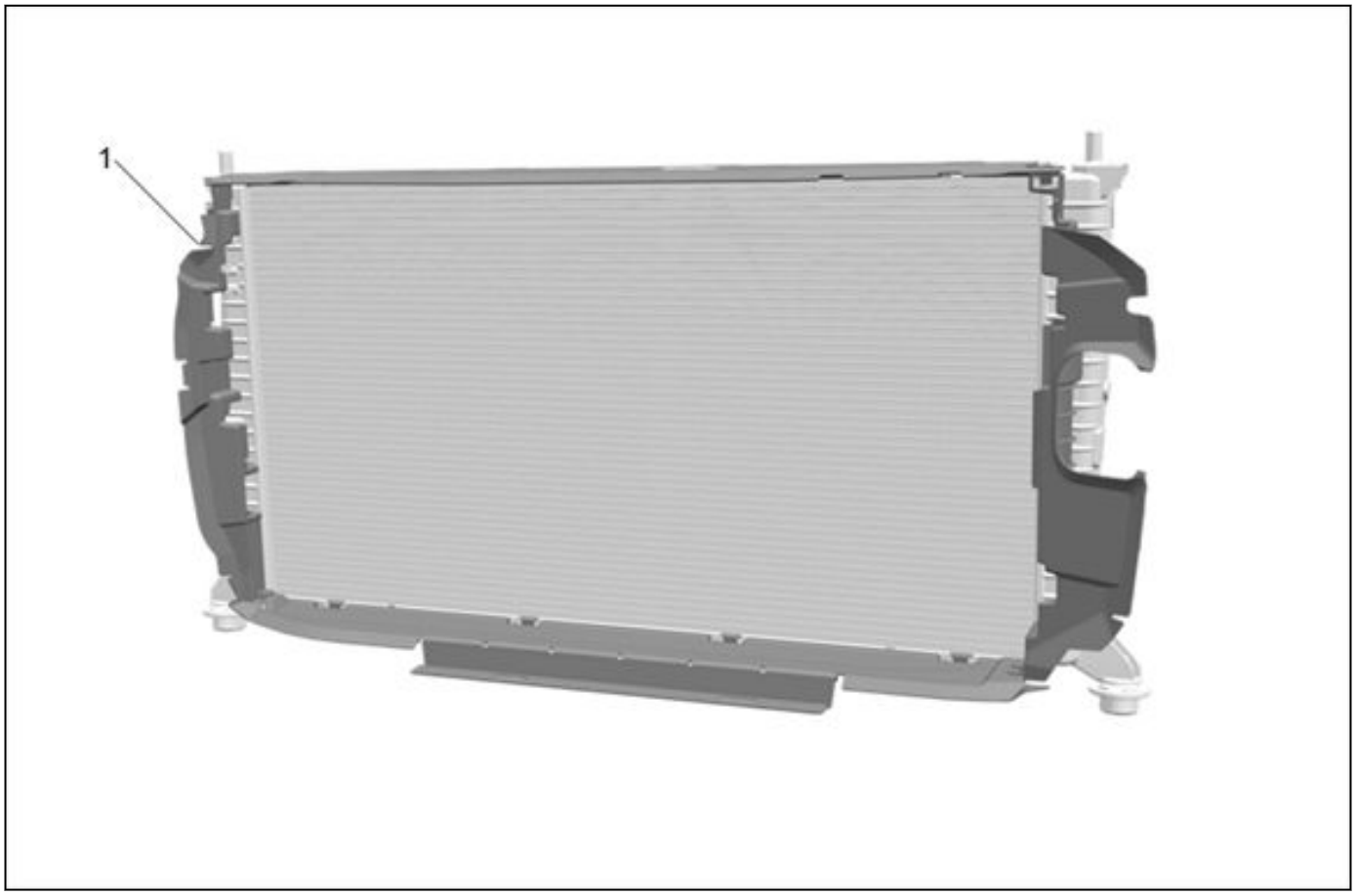


6636994

The radiator surge tank cap is a pressure cap that seals (2) and pressurizes the cooling system. It contains a blow off or pressure valve (1) and a vacuum or atmospheric valve.

- The pressure valve is held against its seat by a spring and protects the radiator by relieving pressure if it exceeds 20 psi.
- The vacuum valve is held against its seat by a spring, which permits opening of the valve to relieve vacuum created in the cooling system as it cools off. The vacuum, if not relieved, could cause the radiator hoses to collapse.
- The pressure cap allows pressure in the cooling system to build up. As the pressure builds, the boiling point of the coolant goes up as well. Therefore, the coolant can be safely run at a temperature higher than the boiling point of the coolant at atmospheric pressure.
- The hotter the coolant is, the faster the heat moves from the radiator to the cooler passing air. However, if the pressure exceeds the strength of the spring, the pressure valve rises so that the excess pressure can escape.
- When the engine cools down, the temperature of the coolant drops and a vacuum is created in the cooling system. This vacuum causes the vacuum valve to open, allowing outside air into the cooling system. This equalizes the pressure in the cooling system with atmospheric pressure, thus preventing the radiator hoses from collapsing.

Air Baffles/Guides and Seals



7175684

The cooling system uses deflectors, air baffles/guides (1) and air seals to increase cooling system capability. Deflectors are installed under the vehicle to redirect airflow beneath the vehicle and through the radiator to increase engine cooling. Air baffles/guides are also used to direct airflow through the radiator and increase cooling capability. Air seals prevent air from bypassing the radiator and air conditioning condenser, and prevent recirculation of hot air for better hot weather cooling and air conditioning condenser performance.

Engine Coolant Indicators
The instrument panel cluster (IPC) shows the engine temperature on the temperature gauge. The value is sent on the data communication line from Powertrain Control Module. When the coolant temperature is hot, the IPC receives a discrete input from Powertrain Control Module requesting illumination.

The IPC performs the display test at the start of each ignition cycle. The IPC illuminates the TEMP indicator.

Coolant Heater (If Equipped)
The optional coolant heater (RPO K05) operates using 110 V AC external power and is designed to warm the coolant in the engine block area for improved starting in very cold weather. The coolant heater also helps reduce fuel consumption when a cold engine is warming up. The unit is equipped with a detachable AC power cord. There is an internal thermal switch in the coolant heater cord that prevents operation above **-20°C**. A weather shield on the cord is provided to protect the plug when not in use.

Cooling Cycle
Coolant flows from the mechanical water pump outlet into the engine circuit. It also provides cooled coolant flow from the radiator to the engine coolant flow control valves to be used as necessary to manage transmission and engine oil temperatures. The engine coolant flow control valve can also provide the transmission and engine oil circuits warmed coolant from the engine to optimize the oil temperatures. Excess heat is removed from the coolant in the radiator and the cooled coolant returns to the mechanical water pump.

Radiator Rotary Valve Modes

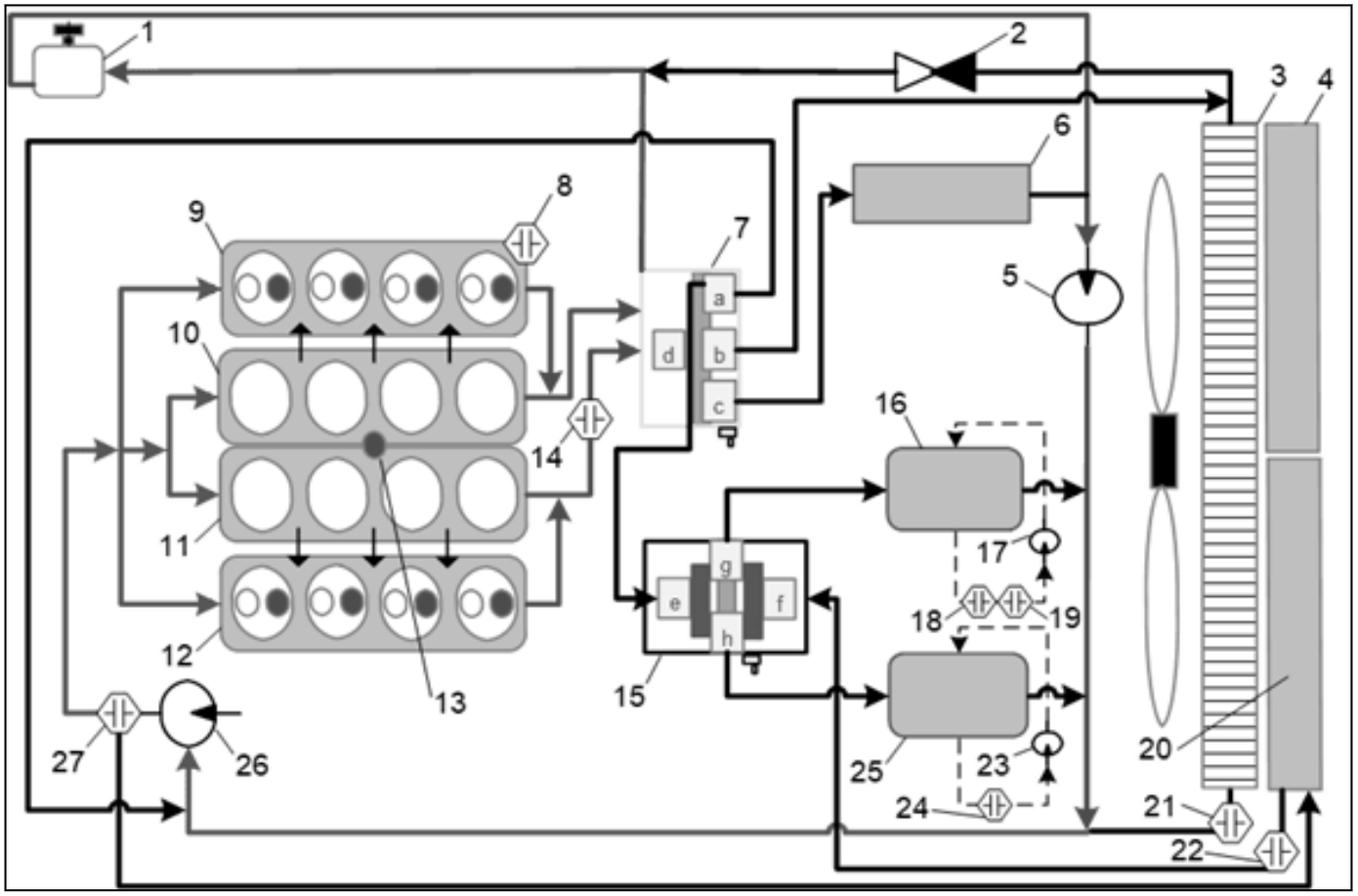
The radiator rotary coolant valve directs the coolant coming out of the engine to the heater core and radiator branches.

Color legend for coolant Schematics:

- Yellow Lines: Highlights the radiator rotary coolant valve in the coolant schematic.
- Black Lines: Coolant lines that are closed off to flow by the radiator rotary coolant valve.
- Red Lines: Warm coolant that is flowing through the specific branch.
- Blue Lines: Cold coolant that is flowing through the specific branch.

Radiator Closed, Heater Core Closed, Bypass Closed

Radiator Closed, Heater Core Closed, Bypass Closed



7200742

(1) Radiator Surge Tank
(2) Check Valve
(3) Engine Radiator
(4) Air Conditioning Condenser
(5) Auxiliary Pump
(6) Heater Core(s)
(7) Radiator Rotary Valve
(8) Cylinder Head Outlet Coolant Temperature Sensor
(9) Cylinder Head
(10) Engine Block
(11) Engine Block
(12) Cylinder Head
(13) Block Heater

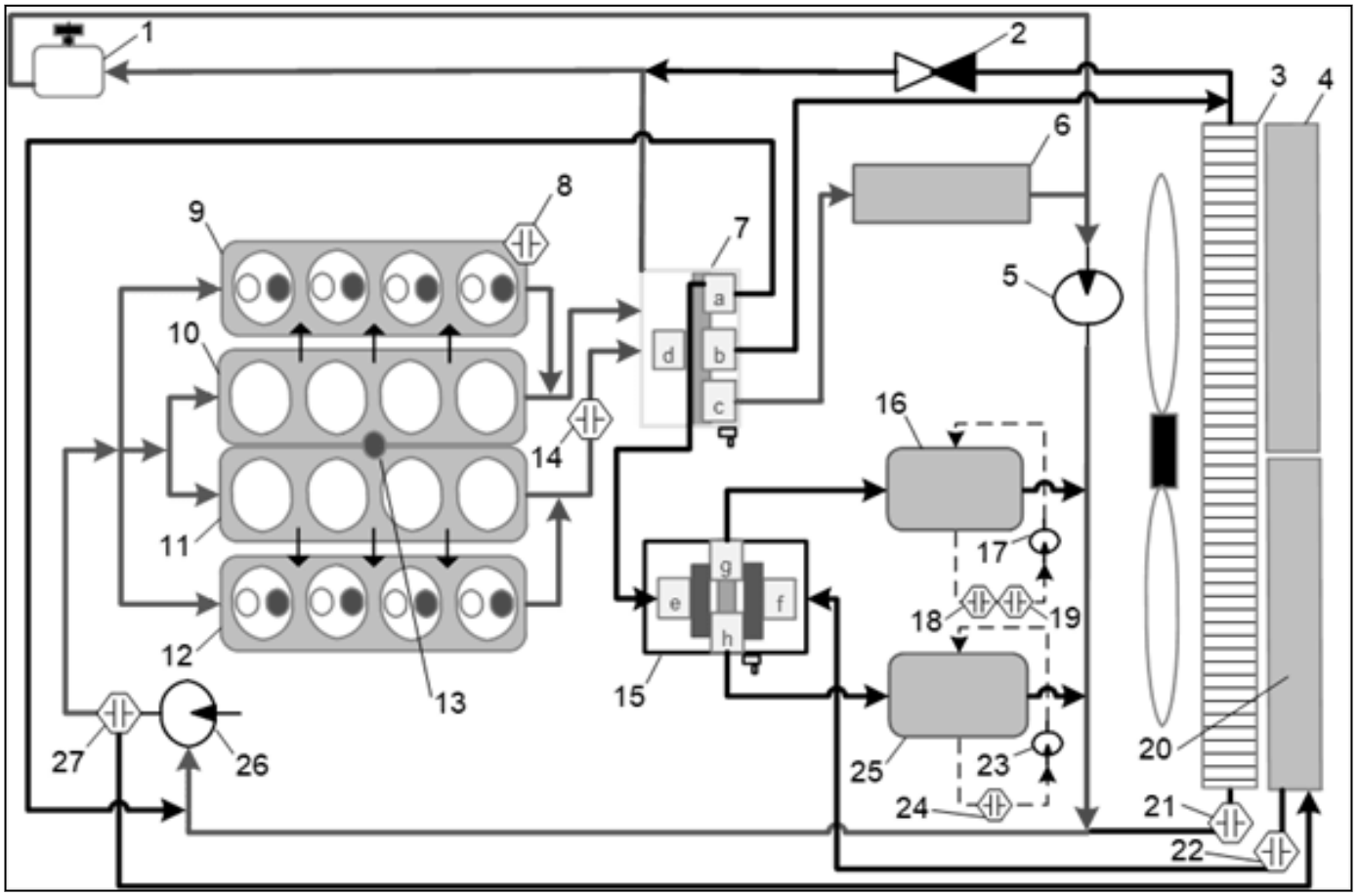
(14) Bank Outlet Coolant Temperature Sensor
(15) Oil Rotary Valve
(16) Engine Oil Cooler
(17) Engine Oil Pump
(18) Engine Oil Temperature Sensor
(19) Redundant Engine Oil Temperature Sensor
(20) Engine Auxiliary Radiator
(21) Radiator Outlet Coolant Temperature Sensor
(22) Auxiliary Radiator Outlet Coolant Temperature Sensor
(23) Transmission Oil Pump
(24) Transmission Oil Temperature Sensor
(25) Transmission Oil Cooler
(26) Mechanical Water Pump
(27) Engine Inlet Coolant Temperature Sensor
Valve Port A
Valve Port B
Valve Port C
Valve Port D
Valve Port E
Valve Port F
Valve Port G
Valve Port H

In this mode, the radiator rotary coolant valve has shut coolant flow off to the radiator, heater core, and to the bypass.

COMPONENT	CONDITION
Mechanical Water Pump	Speed-Controlled to Engine Demand
Radiator Rotary Coolant Valve	Closed

Radiator Closed, Heater Core Open, Bypass Closed

Radiator Closed, Heater Core Open, Bypass Closed



7200743

(1) Radiator Surge Tank
(2) Check Valve
(3) Engine Radiator
(4) Air Conditioning Condenser
(5) Auxiliary Pump
(6) Heater Core(s)
(7) Radiator Rotary Valve
(8) Cylinder Head Outlet Coolant Temperature Sensor
(9) Cylinder Head
(10) Engine Block
(11) Engine Block
(12) Cylinder Head
(13) Block Heater
(14) Bank Outlet Coolant Temperature Sensor
(15) Oil Rotary Valve
(16) Engine Oil Cooler
(17) Engine Oil Pump
(18) Engine Oil Temperature Sensor
(19) Redundant Engine Oil Temperature Sensor
(20) Engine Auxiliary Radiator
(21) Radiator Outlet Coolant Temperature Sensor

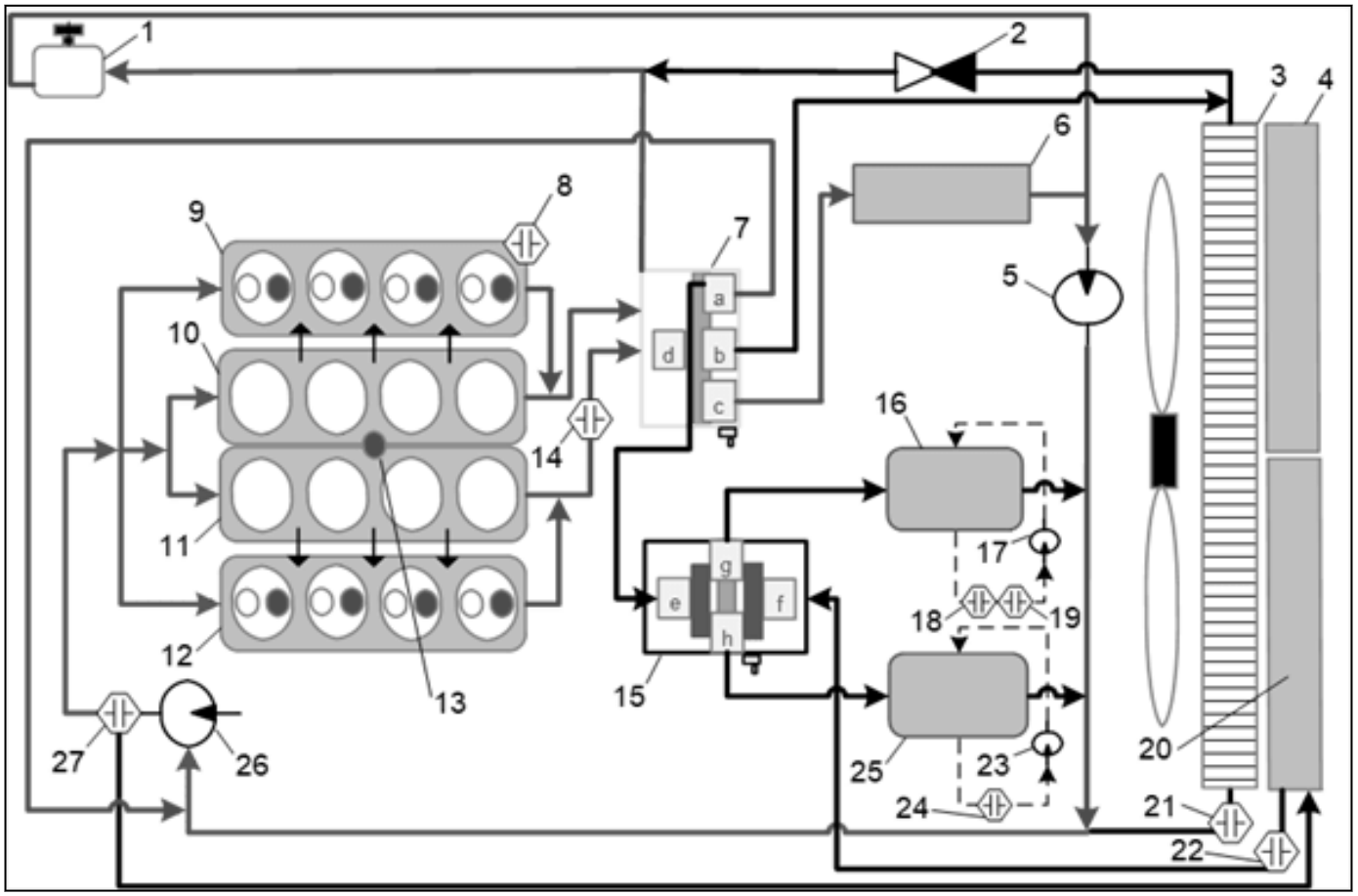
(22) Auxiliary Radiator Outlet Coolant Temperature Sensor
(23) Transmission Oil Pump
(24) Transmission Oil Temperature Sensor
(25) Transmission Oil Cooler
(26) Mechanical Water Pump
(27) Engine Inlet Coolant Temperature Sensor
Valve Port A
Valve Port B
Valve Port C
Valve Port D
Valve Port E
Valve Port F
Valve Port G
Valve Port H

In this mode, the radiator rotary coolant valve has opened flow to the heater core (port c), which provides warm coolant to the heater core to assist in warming the vehicle cabin. The bypass flow (port a) and radiator flow (port b) remains closed off.

COMPONENT	CONDITION
Mechanical Water Pump	Speed-Controlled to Engine Demand
Radiator Rotary Coolant Valve	Heater

Radiator Closed, Heater Core Open, Bypass Open

Radiator Closed, Heater Core Open, Bypass Open



7200745

(1) Radiator Surge Tank
(2) Check Valve
(3) Engine Radiator
(4) Air Conditioning Condenser
(5) Auxiliary Pump
(6) Heater Core(s)
(7) Radiator Rotary Valve
(8) Cylinder Head Outlet Coolant Temperature Sensor
(9) Cylinder Head
(10) Engine Block
(11) Engine Block
(12) Cylinder Head
(13) Block Heater
(14) Bank Outlet Coolant Temperature Sensor
(15) Oil Rotary Valve
(16) Engine Oil Cooler
(17) Engine Oil Pump
(18) Engine Oil Temperature Sensor
(19) Redundant Engine Oil Temperature Sensor
(20) Engine Auxiliary Radiator
(21) Radiator Outlet Coolant Temperature Sensor

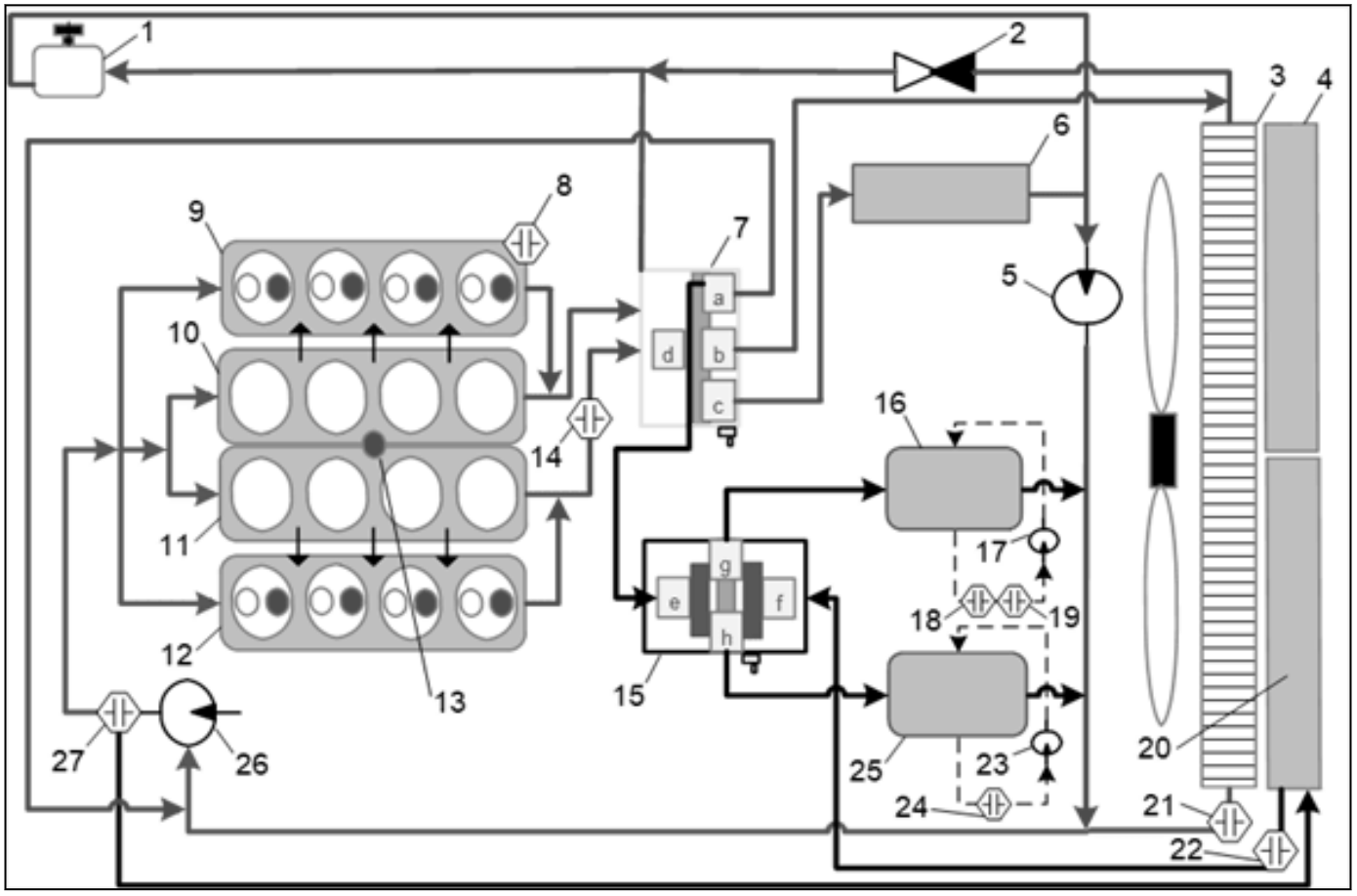
(22) Auxiliary Radiator Outlet Coolant Temperature Sensor
(23) Transmission Oil Pump
(24) Transmission Oil Temperature Sensor
(25) Transmission Oil Cooler
(26) Mechanical Water Pump
(27) Engine Inlet Coolant Temperature Sensor
Valve Port A
Valve Port B
Valve Port C
Valve Port D
Valve Port E
Valve Port F
Valve Port G
Valve Port H

In this mode, the radiator rotary coolant valve has opened flow to the bypass (port a), which maintains coolant circulation through the engine when radiator flow is reduced, supporting warming of the engine. Additionally, the radiator rotary coolant valve has opened flow to the heater core (port c), which provides warm coolant to the heater core to assist in warming the vehicle cabin. The radiator flow (port b) remains closed off.

COMPONENT	CONDITION
Mechanical Water Pump	Speed-Controlled to Engine Demand
Radiator Rotary Coolant Valve	Heater and Bypass

Radiator Open, Heater Core Open, Bypass Open

Radiator Open, Heater Core Open, Bypass Open



7200747

(1) Radiator Surge Tank

(2) Check Valve
(3) Engine Radiator
(4) Air Conditioning Condenser
(5) Auxiliary Pump
(6) Heater Core(s)
(7) Radiator Rotary Valve
(8) Cylinder Head Outlet Coolant Temperature Sensor
(9) Cylinder Head
(10) Engine Block
(11) Engine Block
(12) Cylinder Head
(13) Block Heater
(14) Bank Outlet Coolant Temperature Sensor
(15) Oil Rotary Valve
(16) Engine Oil Cooler
(17) Engine Oil Pump
(18) Engine Oil Temperature Sensor
(19) Redundant Engine Oil Temperature Sensor
(20) Engine Auxiliary Radiator
(21) Radiator Outlet Coolant Temperature Sensor
(22) Auxiliary Radiator Outlet Coolant Temperature Sensor
(23) Transmission Oil Pump
(24) Transmission Oil Temperature Sensor
(25) Transmission Oil Cooler
(26) Mechanical Water Pump
(27) Engine Inlet Coolant Temperature Sensor
Valve Port A
Valve Port B
Valve Port C
Valve Port D
Valve Port E
Valve Port F
Valve Port G
Valve Port H

In this mode, the radiator rotary coolant valve is providing flow to the heater core to provide warm coolant for cooling the cabin (port c). Additionally, the radiator rotary coolant valve has opened flow to the bypass (port a) and to the radiator (port b), to help maintain coolant circulation and engine temperatures at optimal levels. Valve position will very be depending on much flow is needed to keep engine temperatures at proper temperatures.

COMPONENT	CONDITION
Mechanical Water Pump	Speed-Controlled to Engine Demand
Radiator Rotary Coolant Valve	Heater, Bypass and Radiator

Oil Rotary Valve Modes

The oil rotary coolant valve controls coolant to the transmission and engine oil heat exchangers. When the specific oil needs warming to get to proper operating temperatures, the valve will direct warm coolant from the engine to the specific oil heat exchanger. When the specific oil needs cooling to maintain proper operating temperatures, the valve will direct cold coolant from the water pump directly to the specific oil heat exchanger.

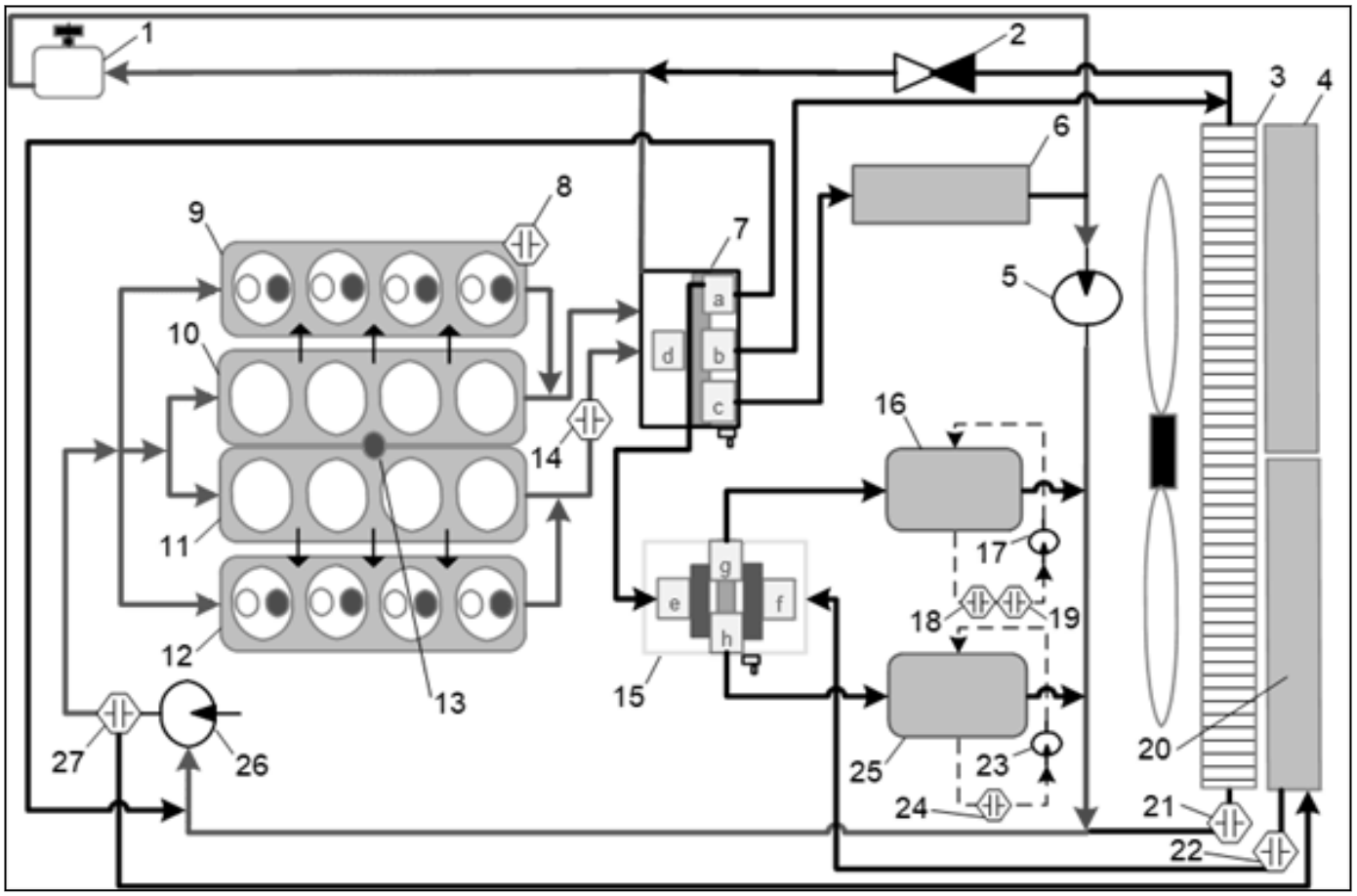
Color legend for coolant Schematics:

- Yellow Lines: Highlights the radiator rotary coolant valve in the coolant schematic.
- Black Lines: Coolant lines that are closed off to flow by the radiator rotary coolant valve.

- Red Lines: Warm coolant that is flowing through the specific branch.
- Blue Lines: Cold coolant that is flowing through the specific branch.

Engine Oil Closed, Transmission Oil Closed

Engine Oil Closed, Transmission Oil Closed



7200763

(1) Radiator Surge Tank
(2) Check Valve
(3) Engine Radiator
(4) Air Conditioning Condenser
(5) Auxiliary Pump
(6) Heater Core(s)
(7) Radiator Rotary Valve
(8) Cylinder Head Outlet Coolant Temperature Sensor
(9) Cylinder Head
(10) Engine Block
(11) Engine Block
(12) Cylinder Head
(13) Block Heater
(14) Bank Outlet Coolant Temperature Sensor
(15) Oil Rotary Valve
(16) Engine Oil Cooler
(17) Engine Oil Pump
(18) Engine Oil Temperature Sensor

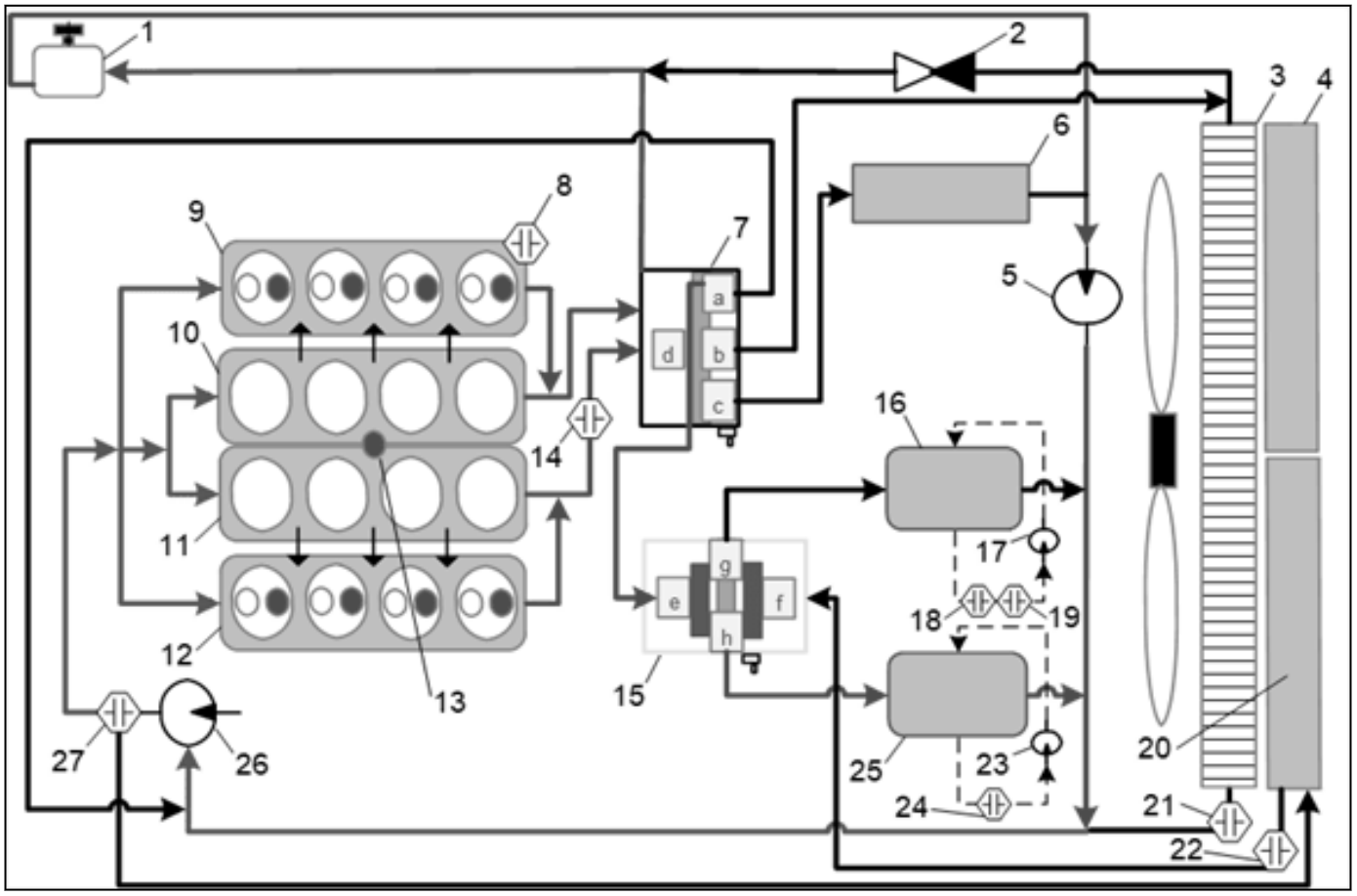
(19) Redundant Engine Oil Temperature Sensor
(20) Engine Auxiliary Radiator
(21) Radiator Outlet Coolant Temperature Sensor
(22) Auxiliary Radiator Outlet Coolant Temperature Sensor
(23) Transmission Oil Pump
(24) Transmission Oil Temperature Sensor
(25) Transmission Oil Cooler
(26) Mechanical Water Pump
(27) Engine Inlet Coolant Temperature Sensor
Valve Port A
Valve Port B
Valve Port C
Valve Port D
Valve Port E
Valve Port F
Valve Port G
Valve Port H

In this mode, no coolant is provided to either oil heat exchanger.

COMPONENT	CONDITION
Mechanical Water Pump	Speed-Controlled to Engine Demand
Oil Rotary Coolant Valve	Closed

Engine Oil Closed, Transmission Oil Warming

Engine Oil Closed, Transmission Oil Warming



7200765

(1) Radiator Surge Tank
(2) Check Valve
(3) Engine Radiator
(4) Air Conditioning Condenser
(5) Auxiliary Pump
(6) Heater Core(s)
(7) Radiator Rotary Valve
(8) Cylinder Head Outlet Coolant Temperature Sensor
(9) Cylinder Head
(10) Engine Block
(11) Engine Block
(12) Cylinder Head
(13) Block Heater
(14) Bank Outlet Coolant Temperature Sensor
(15) Oil Rotary Valve
(16) Engine Oil Cooler
(17) Engine Oil Pump
(18) Engine Oil Temperature Sensor
(19) Redundant Engine Oil Temperature Sensor
(20) Engine Auxiliary Radiator
(21) Radiator Outlet Coolant Temperature Sensor

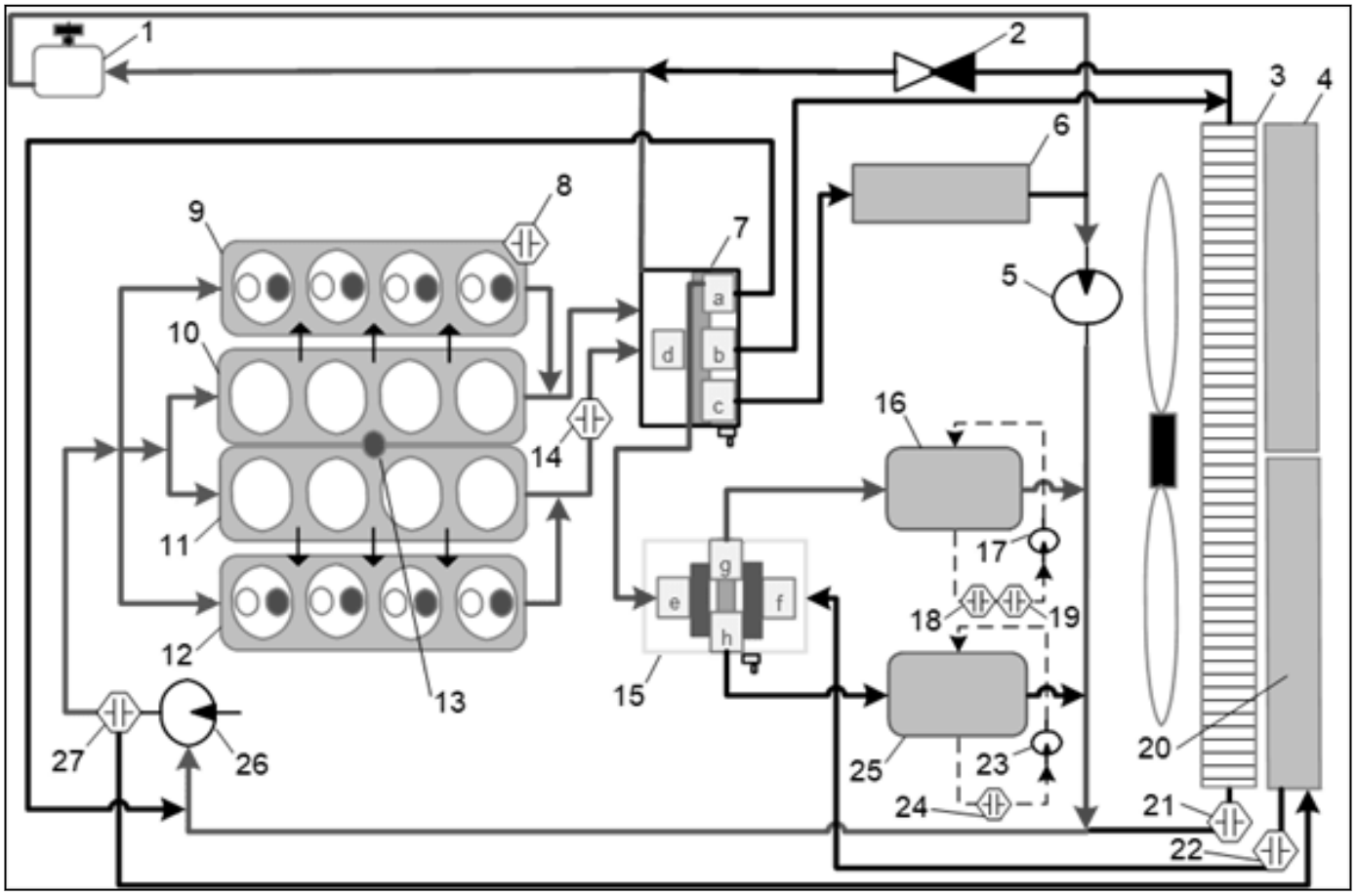
(22) Auxiliary Radiator Outlet Coolant Temperature Sensor
(23) Transmission Oil Pump
(24) Transmission Oil Temperature Sensor
(25) Transmission Oil Cooler
(26) Mechanical Water Pump
(27) Engine Inlet Coolant Temperature Sensor
Valve Port A
Valve Port B
Valve Port C
Valve Port D
Valve Port E
Valve Port F
Valve Port G
Valve Port H

In this mode, warm coolant is provided from the engine (port e) to the transmission oil heat exchanger (port h), but no coolant is provided to the engine oil heat exchanger (port g).

COMPONENT	CONDITION
Mechanical Water Pump	Speed-Controlled to Engine Demand
Oil Rotary Coolant Valve	Transmission Oil Warming

Engine Oil Warming, Transmission Oil Closed

Engine Oil Warming, Transmission Oil Closed



7200766

(1) Radiator Surge Tank
(2) Check Valve
(3) Engine Radiator
(4) Air Conditioning Condenser
(5) Auxiliary Pump
(6) Heater Core(s)
(7) Radiator Rotary Valve
(8) Cylinder Head Outlet Coolant Temperature Sensor
(9) Cylinder Head
(10) Engine Block
(11) Engine Block
(12) Cylinder Head
(13) Block Heater
(14) Bank Outlet Coolant Temperature Sensor
(15) Oil Rotary Valve
(16) Engine Oil Cooler
(17) Engine Oil Pump
(18) Engine Oil Temperature Sensor
(19) Redundant Engine Oil Temperature Sensor
(20) Engine Auxiliary Radiator
(21) Radiator Outlet Coolant Temperature Sensor

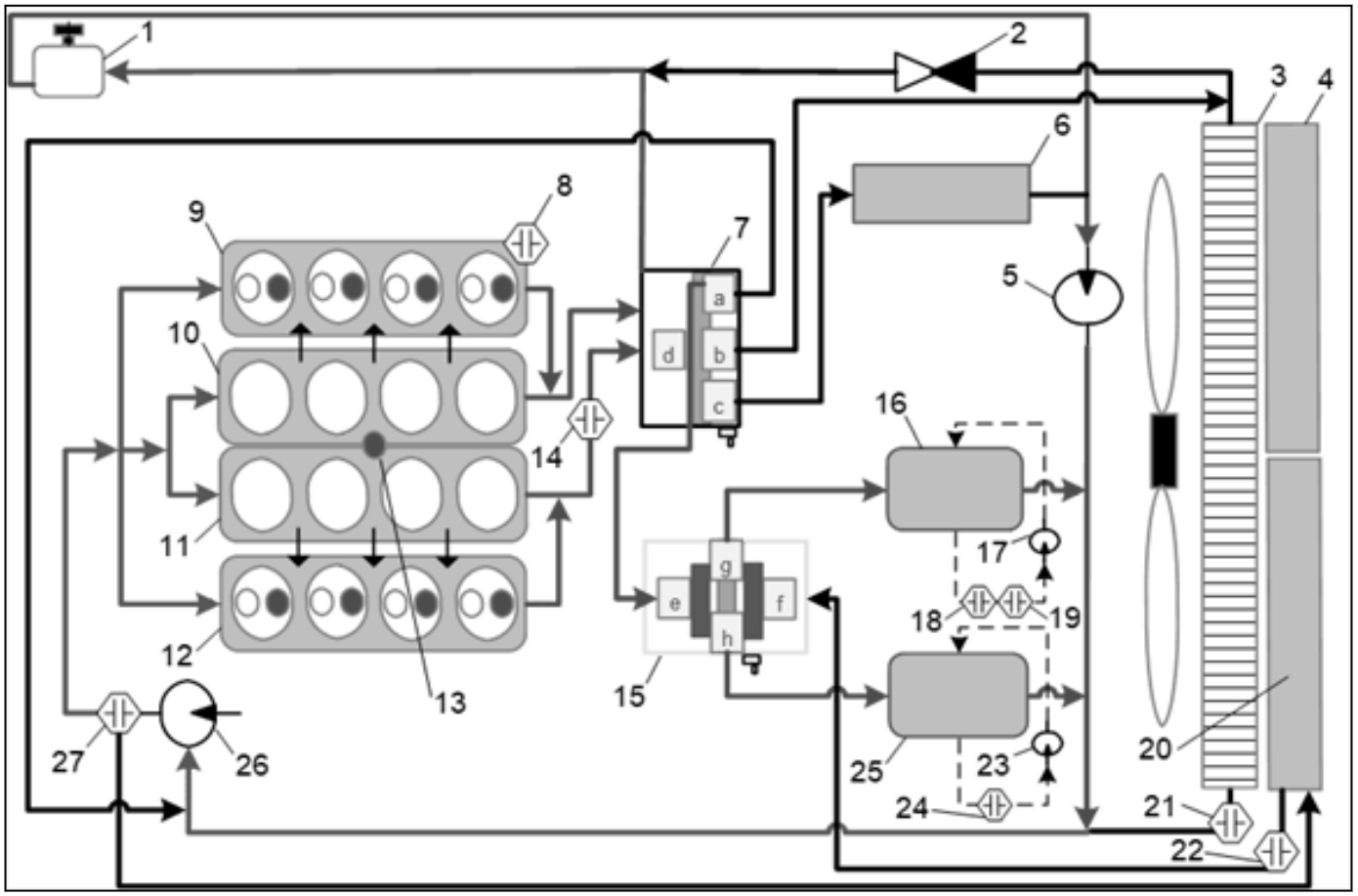
(22) Auxiliary Radiator Outlet Coolant Temperature Sensor
(23) Transmission Oil Pump
(24) Transmission Oil Temperature Sensor
(25) Transmission Oil Cooler
(26) Mechanical Water Pump
(27) Engine Inlet Coolant Temperature Sensor
Valve Port A
Valve Port B
Valve Port C
Valve Port D
Valve Port E
Valve Port F
Valve Port G
Valve Port H

In this mode, warm coolant is provided from the engine (port e) to the engine oil heat exchanger (port g), but no coolant is provided to the transmission oil heat exchanger (port h).

COMPONENT	CONDITION
Mechanical Water Pump	Speed-Controlled to Engine Demand
Oil Rotary Coolant Valve	Engine Oil Warming

Engine Oil Warming, Transmission Oil Warming

Engine Oil Warming, Transmission Oil Warming



7200768

(1) Radiator Surge Tank
(2) Check Valve
(3) Engine Radiator
(4) Air Conditioning Condenser
(5) Auxiliary Pump
(6) Heater Core(s)
(7) Radiator Rotary Valve
(8) Cylinder Head Outlet Coolant Temperature Sensor
(9) Cylinder Head
(10) Engine Block
(11) Engine Block
(12) Cylinder Head
(13) Block Heater
(14) Bank Outlet Coolant Temperature Sensor
(15) Oil Rotary Valve
(16) Engine Oil Cooler
(17) Engine Oil Pump
(18) Engine Oil Temperature Sensor
(19) Redundant Engine Oil Temperature Sensor
(20) Engine Auxiliary Radiator
(21) Radiator Outlet Coolant Temperature Sensor

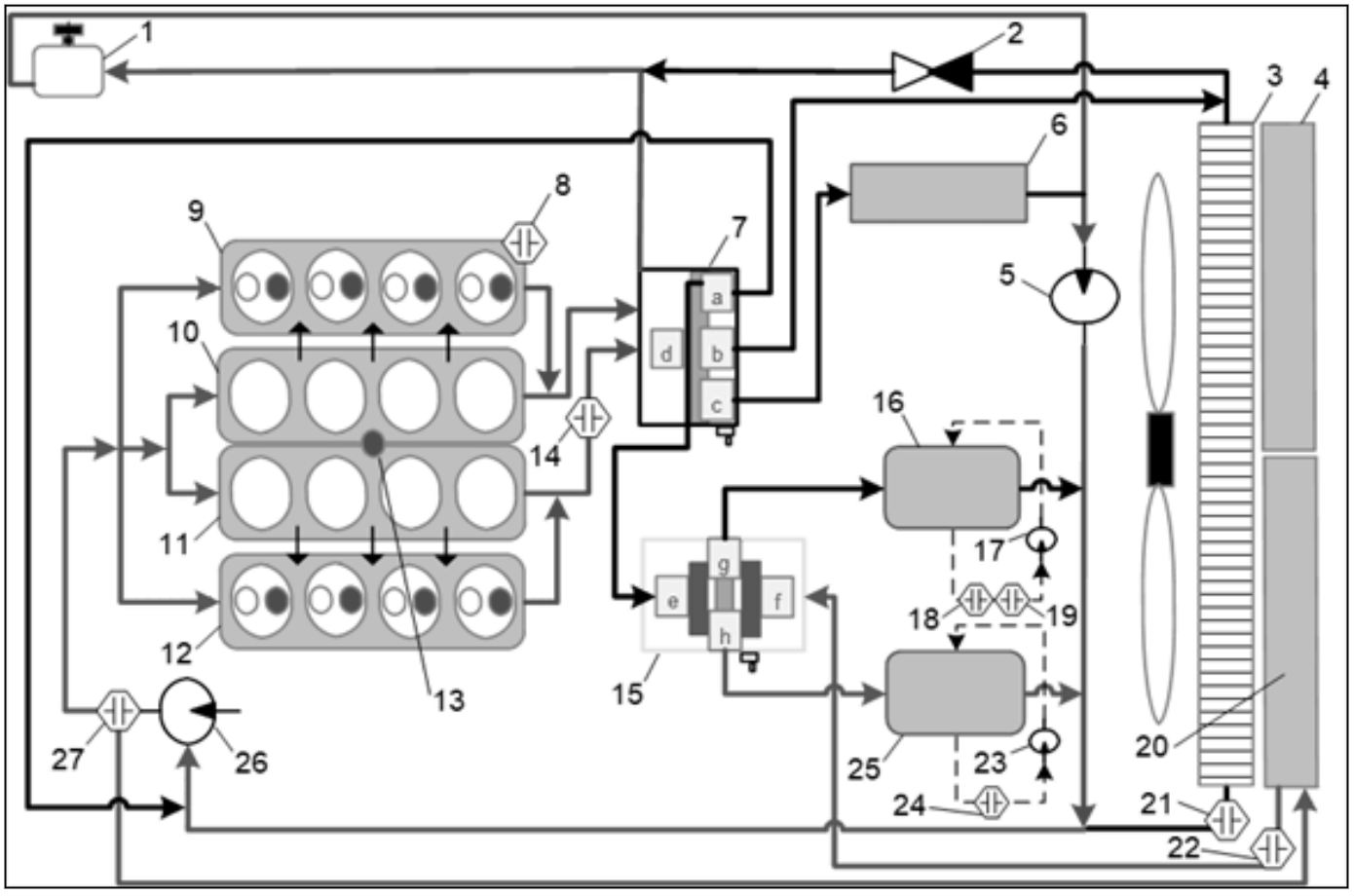
(22) Auxiliary Radiator Outlet Coolant Temperature Sensor
(23) Transmission Oil Pump
(24) Transmission Oil Temperature Sensor
(25) Transmission Oil Cooler
(26) Mechanical Water Pump
(27) Engine Inlet Coolant Temperature Sensor
Valve Port A
Valve Port B
Valve Port C
Valve Port D
Valve Port E
Valve Port F
Valve Port G
Valve Port H

Engine Oil Closed, Transmission Oil Cooling

In this mode, warm coolant is provided from the engine (port e) to both the engine oil heat exchanger (port g) and transmission oil heat exchanger (port h).

COMPONENT	CONDITION
Mechanical Water Pump	Speed-Controlled to Engine Demand
Oil Rotary Coolant Valve	Engine Oil Warming and Transmission Oil Warming

Engine Oil Closed, Transmission Oil Cooling



7200772

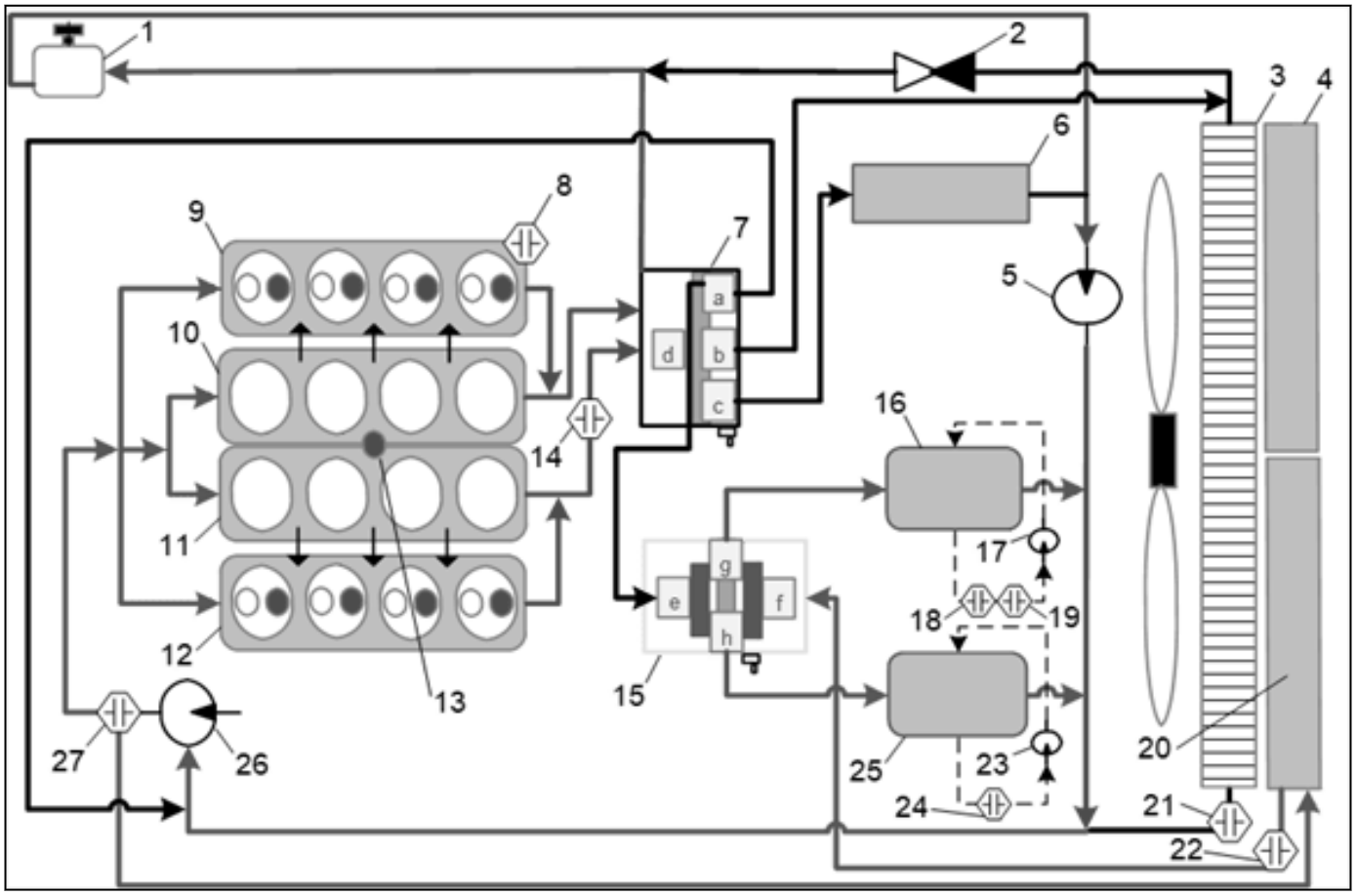
(1) Radiator Surge Tank
(2) Check Valve
(3) Engine Radiator
(4) Air Conditioning Condenser
(5) Auxiliary Pump
(6) Heater Core(s)
(7) Radiator Rotary Valve
(8) Cylinder Head Outlet Coolant Temperature Sensor
(9) Cylinder Head
(10) Engine Block
(11) Engine Block
(12) Cylinder Head
(13) Block Heater
(14) Bank Outlet Coolant Temperature Sensor
(15) Oil Rotary Valve
(16) Engine Oil Cooler
(17) Engine Oil Pump
(18) Engine Oil Temperature Sensor
(19) Redundant Engine Oil Temperature Sensor
(20) Engine Auxiliary Radiator
(21) Radiator Outlet Coolant Temperature Sensor
(22) Auxiliary Radiator Outlet Coolant Temperature Sensor
(23) Transmission Oil Pump
(24) Transmission Oil Temperature Sensor
(25) Transmission Oil Cooler
(26) Mechanical Water Pump
(27) Engine Inlet Coolant Temperature Sensor
Valve Port A
Valve Port B
Valve Port C
Valve Port D
Valve Port E
Valve Port F
Valve Port G
Valve Port H

In this mode, cold coolant provided from the mechanical water pump (port f) is provided directly to the transmission oil heat exchanger (port h), but no coolant is provided to the engine oil heat exchanger (port g).

COMPONENT	CONDITION
Mechanical Water Pump	Speed-Controlled to Engine Demand
Oil Rotary Coolant Valve	Transmission Oil Cooling

Engine Oil Cooling, Transmission Oil Cooling

Engine Oil Cooling, Transmission Oil Cooling



7200773

(1) Radiator Surge Tank
(2) Check Valve
(3) Engine Radiator
(4) Air Conditioning Condenser
(5) Auxiliary Pump
(6) Heater Core(s)
(7) Radiator Rotary Valve
(8) Cylinder Head Outlet Coolant Temperature Sensor
(9) Cylinder Head
(10) Engine Block
(11) Engine Block
(12) Cylinder Head
(13) Block Heater
(14) Bank Outlet Coolant Temperature Sensor
(15) Oil Rotary Valve
(16) Engine Oil Cooler
(17) Engine Oil Pump
(18) Engine Oil Temperature Sensor
(19) Redundant Engine Oil Temperature Sensor
(20) Engine Auxiliary Radiator
(21) Radiator Outlet Coolant Temperature Sensor

(22) Auxiliary Radiator Outlet Coolant Temperature Sensor
(23) Transmission Oil Pump
(24) Transmission Oil Temperature Sensor
(25) Transmission Oil Cooler
(26) Mechanical Water Pump
(27) Engine Inlet Coolant Temperature Sensor
Valve Port A
Valve Port B
Valve Port C
Valve Port D
Valve Port E
Valve Port F
Valve Port G
Valve Port H

In this mode, cold coolant provided from the mechanical water pump (port f) is provided directly to both the engine oil heat exchanger (port g) and transmission oil heat exchanger (port h).

COMPONENT	CONDITION
Mechanical Water Pump	Speed-Controlled to Engine Demand
Oil Rotary Coolant Valve	Engine Oil Cooling and Transmission Oil Cooling

After Run Cooling

The after run mode is after key off and is needed only after extreme hot conditions with high engine, oil and coolant temperatures. For after run mode, the auxiliary pump is run at maximum speed to continue cooling, while the powertrain control module controls the engine-cooling fans based on the engine coolant temperature and engine oil temperature.

COMPONENT	CONDITION
Mechanical Water Pump	Speed-Controlled to Engine Demand
Radiator Rotary Coolant Valve	Park Position
Oil Rotary Coolant Valve	Park Position

SHUT DOWN

At engine shutdown, the control valves remain open to permit radiator flow and allow coolant service fill by gravity alone. Both control valves also undergo an diagnostic check after engine shutdown, which is sometimes audible.

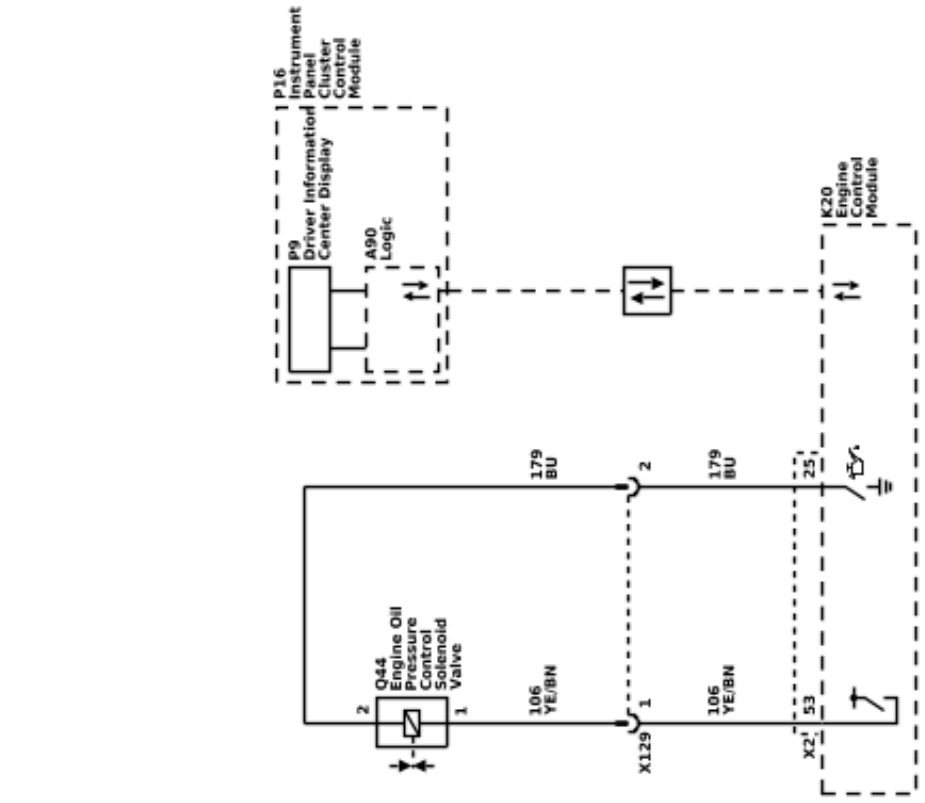
Auxiliary Pump On/Auxiliary Pump Off

The auxiliary pump on mode operates the auxiliary coolant pump to maintain the required coolant flow through the heater core during idle or low engine-speed conditions when the flow from the mechanical water pump is insufficient. During auxiliary pump off mode, the mechanical water pump is able to provide sufficient coolant flow through the heater core.

Engine Mechanical - 3.0L Diesel

Schematic and Routing Diagrams

Engine Mechanical Schematics (Engine Oil Pressure Control)

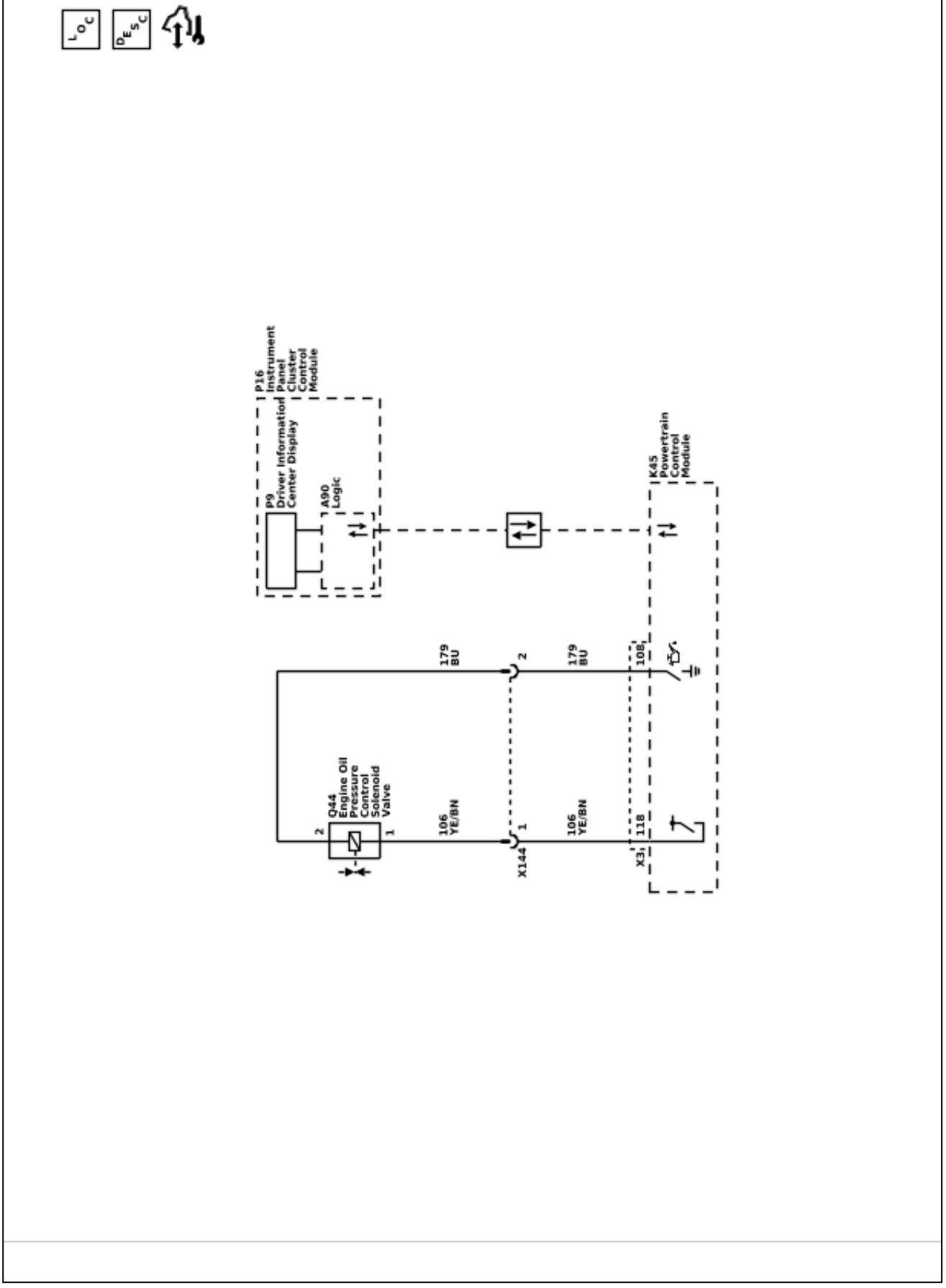


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Engine Mechanical - 2.7L

Schematic and Routing Diagrams

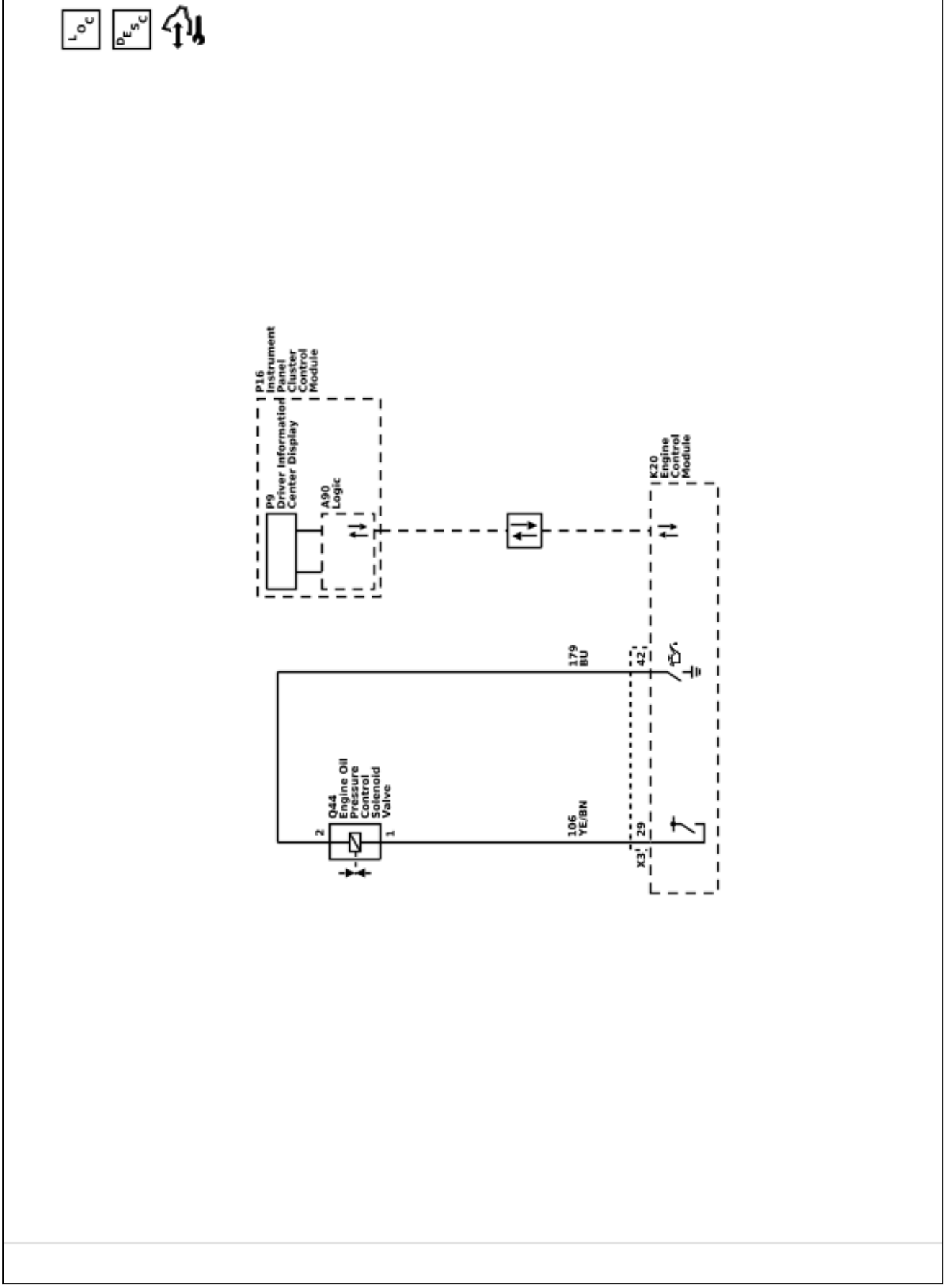
Engine Mechanical Schematics (Engine Oil Pressure Control)



Engine Mechanical - 5.7L or 6.6L

Schematic and Routing Diagrams

Engine Mechanical Schematics (Engine Oil Pressure Control)

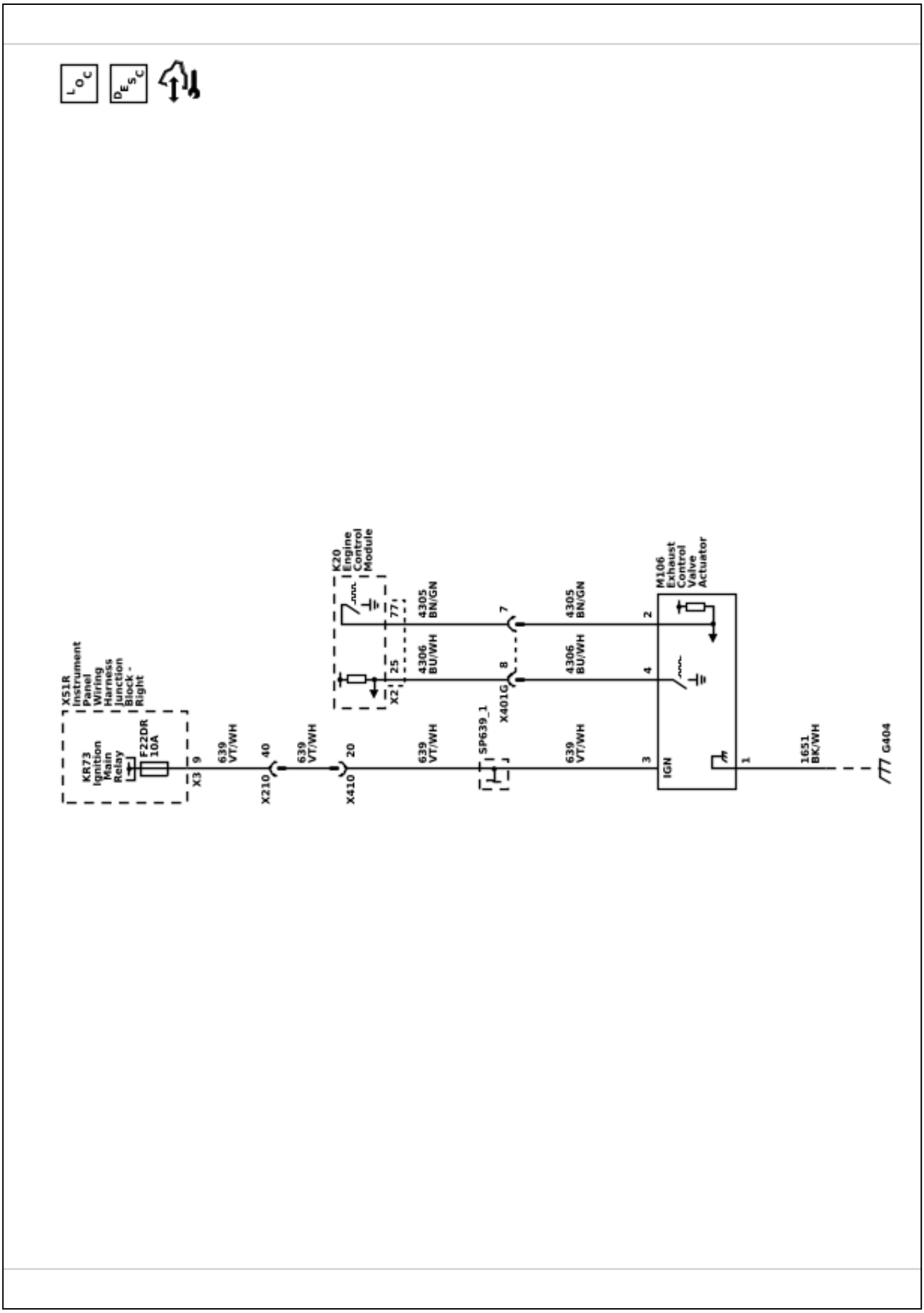


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Exhaust

Schematic and Routing Diagrams

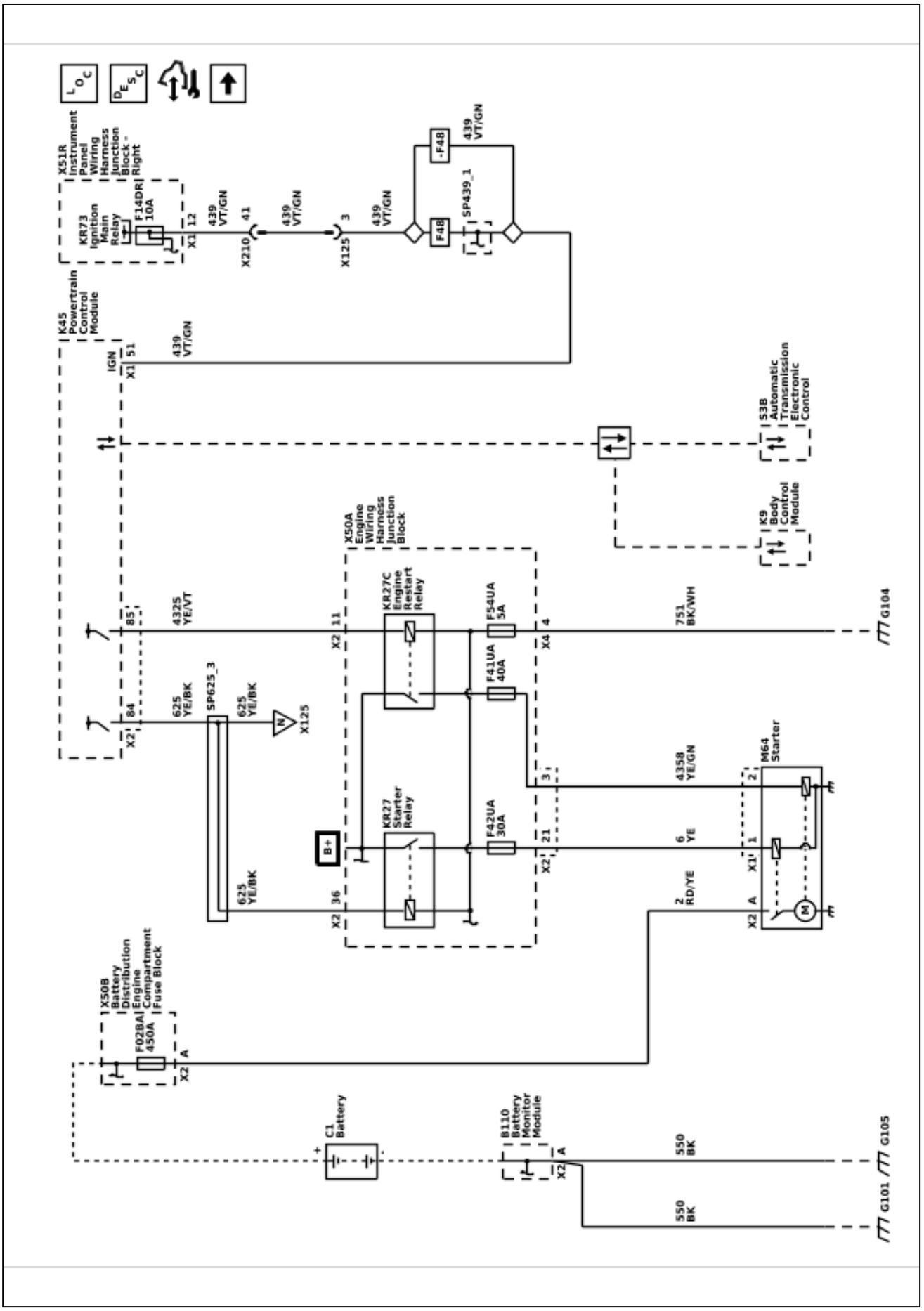
Exhaust System Schematics (Engine Exhaust Flow Control)



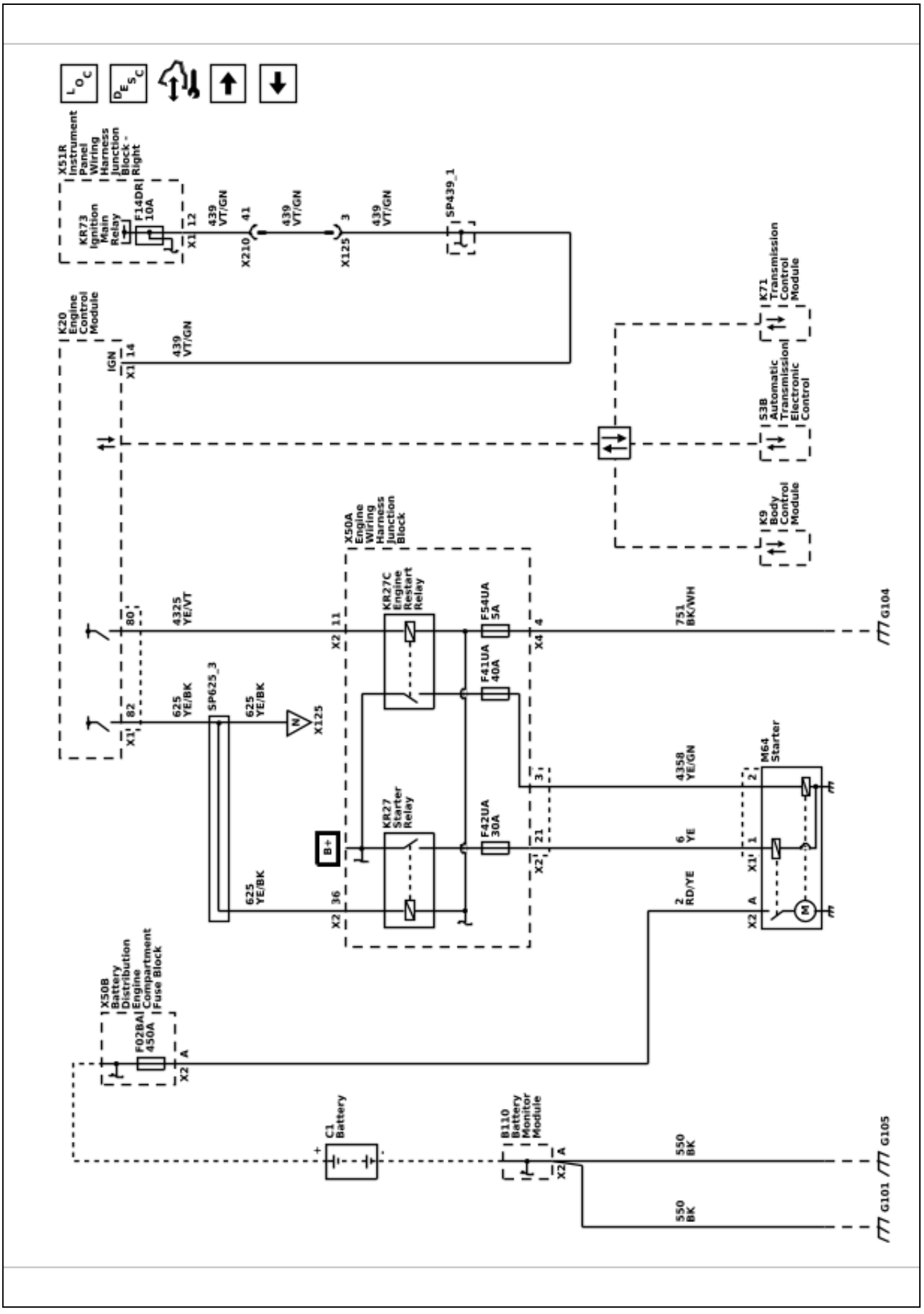
Starting, Charging, and Low Voltage Energy Storage

Schematic and Routing Diagrams

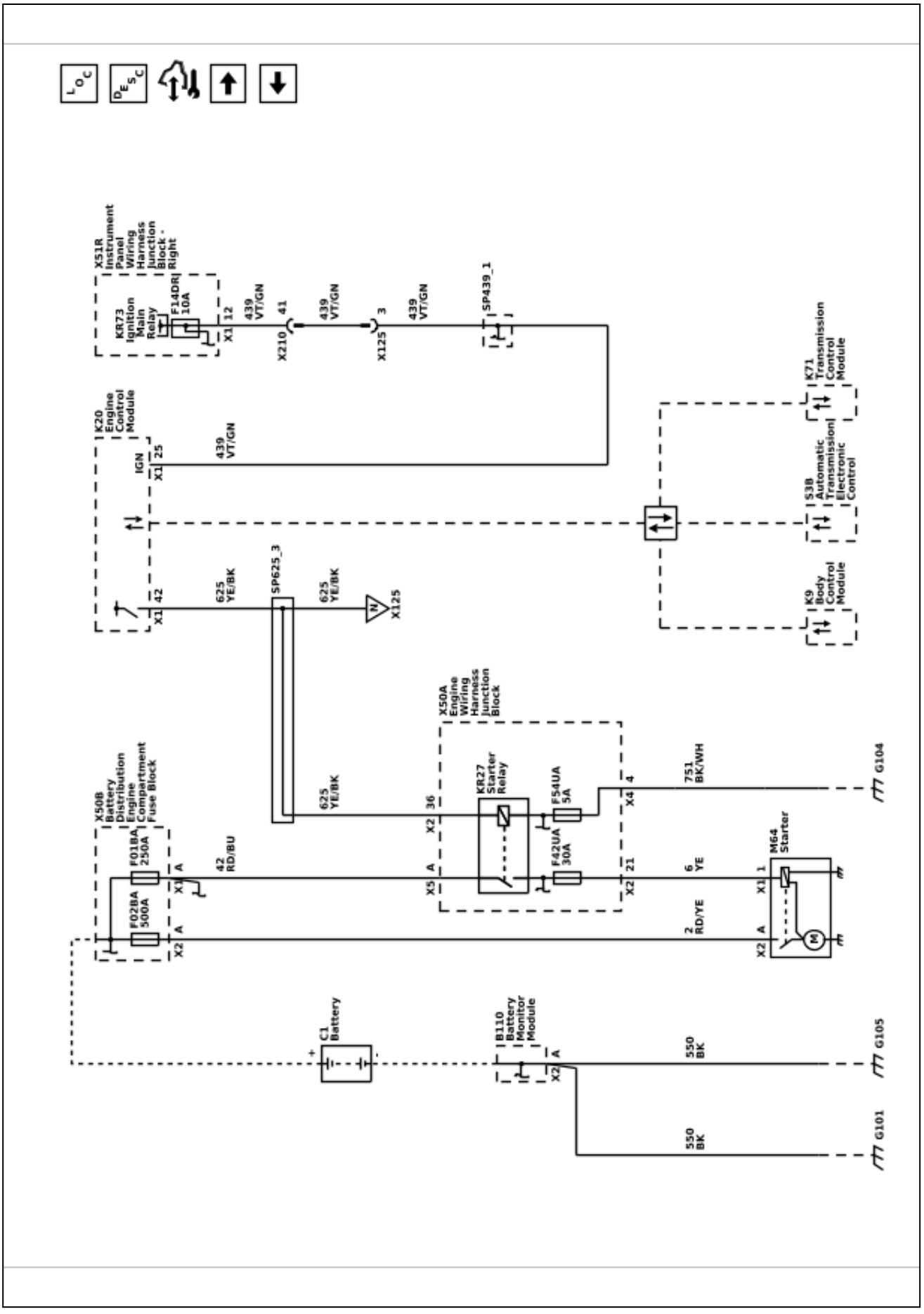
Starting and Charging Schematics (Starting (L4B))



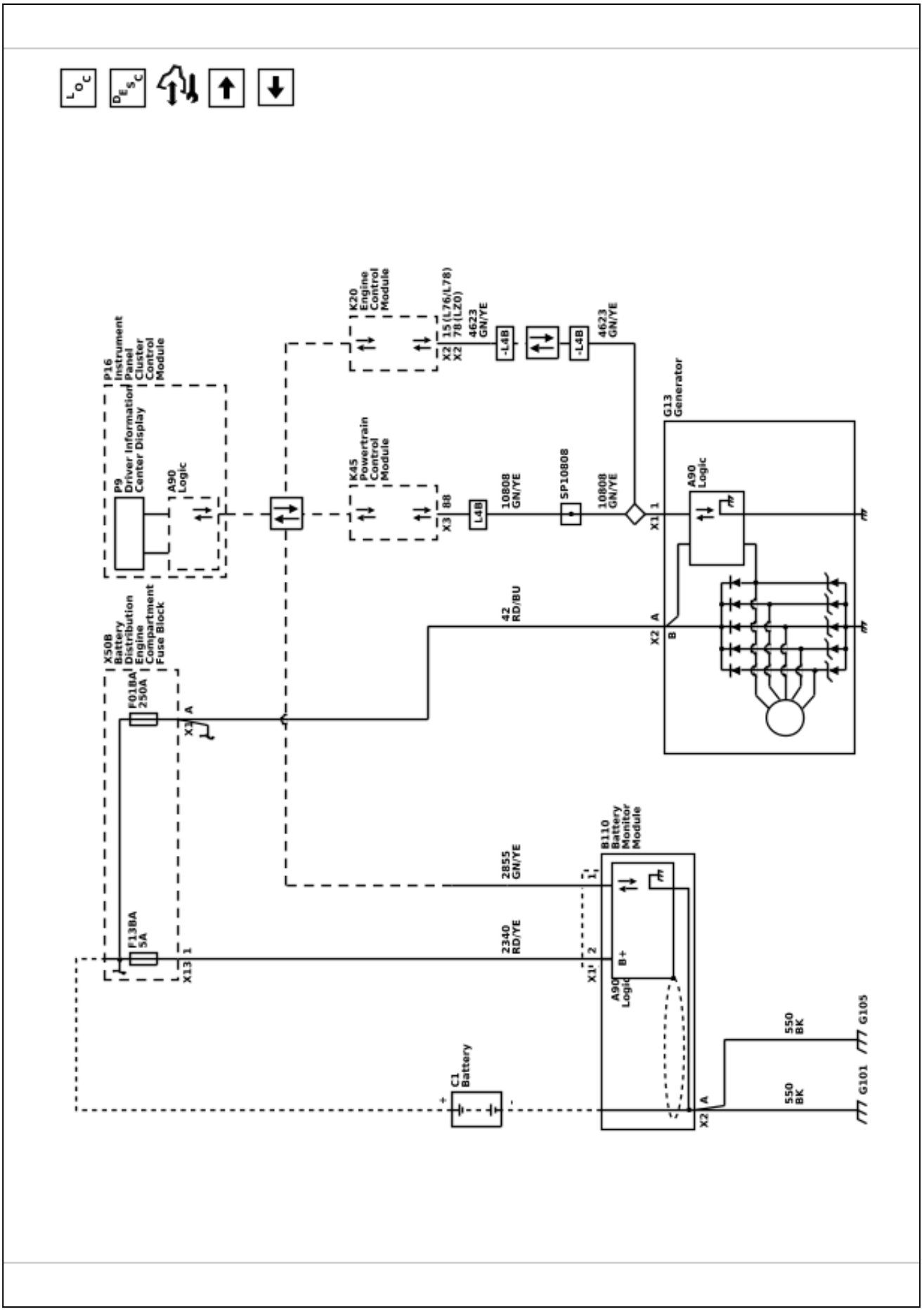
Starting and Charging Schematics (Starting (L76 / L78))



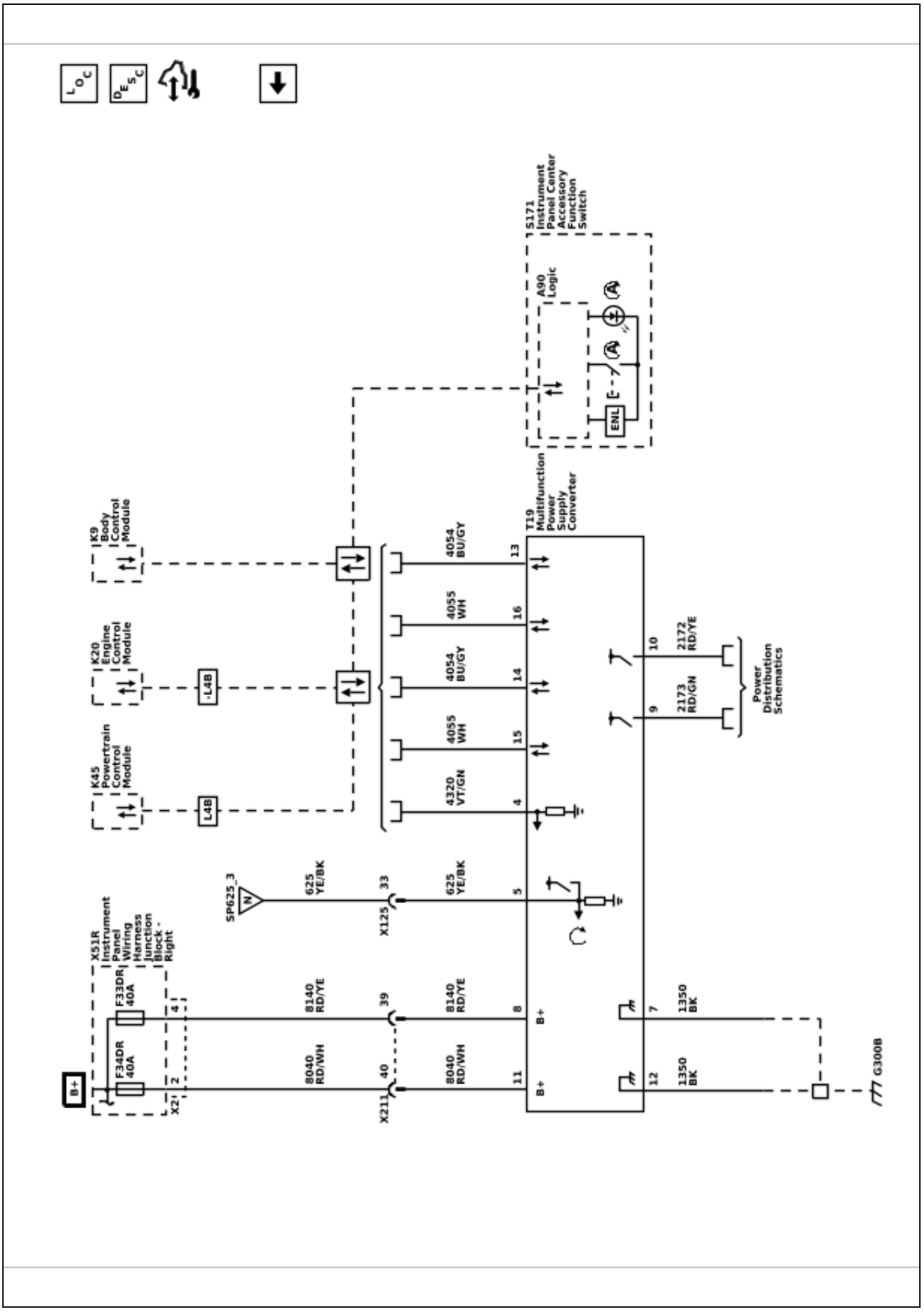
Starting and Charging Schematics (Starting (LZ0))



Starting and Charging Schematics (Charging)



Starting and Charging Schematics (Multifunction Power Supply Converter and Auto Stop/Start Deactivation Switch)



Description and Operation

Battery Description and Operation

Warning: Batteries produce explosive gases, contain corrosive acid, and supply levels of electrical current high enough to cause burns. Therefore, to reduce the risk of personal injury when working near a battery:

- ***Always shield your eyes and avoid leaning over the battery whenever possible.***
- ***Do not expose the battery to open flames or sparks.***
- ***Do not allow the battery electrolyte to contact the eyes or the skin. Flush immediately and thoroughly any contacted areas with water and get medical help.***
- ***Follow each step of the jump starting procedure in order.***
- ***Treat both the booster and the discharged batteries carefully when using the jumper cables.***

Batteries that are no longer wanted must be disposed of by an approved battery recycler and must never be thrown in the trash or sent to a landfill.

Batteries that are not part of the vehicle itself, not the battery under the hood, must only be transported on public streets for business purposes via approved hazardous material transportation procedures.

Battery storage, charging and testing facilities in repair shops must meet various requirements for ventilation, safety equipment, material segregation, etc.

The maintenance free battery is standard. There are no vent plugs in the cover. The battery is completely sealed except for 2 small vent holes in the side. These vent holes allow the small amount of gas that is produced in the battery to escape.

The battery has 3 functions as a major source of energy:

- Engine cranking
- Voltage stabilizer
- Alternate source of energy with generator overload

Battery Low Start Vehicle Message

The body control module (BCM) monitors battery positive voltage to determine battery state of charge. If one or more of the BCM battery positive voltage terminals measure less than approximately 11.6V compared to the BCM ground circuits, this message will display and four chimes may sound. Start the vehicle immediately. If the vehicle is not started and the battery continues to discharge, the climate controls, heated seats, and audio systems will shut off and the vehicle may require a jump start. These systems will function again after the vehicle is started.

Battery Ratings

A battery has 2 ratings:

- Cold cranking amperage
- Amperage hours

When a battery is replaced use a battery with similar ratings. See battery specification label on the original battery.

Amperage Hours

The amperage hour rating tells you how much amperage is available when discharged evenly over a 20 hour period. The amperage hour rating is cumulative, so in order to know how much constant amperage the battery will output for 20 h, you have to divide the amperage hour rating by 20. Example: If a battery has an amperage hour rating of 74, dividing by 20 = 3.75. Such a battery can carry a 3.75 A load for 20 hours before dropping to 10.5 V. (10.5 V is the fully discharged level, at which point the battery needs to be recharged). A battery with an amperage hour rating of 55 will carry a 2.75 A load for 20 hours before dropping to 10.5 V.

Cold Cranking Amperage

The cold cranking amperage is an indication of the ability of the battery to crank the engine at cold temperatures. The cold cranking amperage rating is the minimum amperage the battery must maintain for 30 seconds at −18°C (0°F) while maintaining at least 7.2 V. See battery label for the cold cranking amperage rating of this battery.

Charging System Description and Operation

Electrical Power Management Overview

The electrical power management system is designed to monitor and control the charging system and send diagnostic messages to alert the driver of possible problems with the battery and generator. This electrical power management system primarily utilizes existing on-board computer capability to maximize the effectiveness of the generator, to manage the load, improve battery state-of-charge and life, and minimize the system's impact on fuel economy. The electrical power management system performs 3 functions:

- Monitor the battery voltage and estimate the battery condition
- Take corrective actions by boosting idle speeds, and adjusting the regulated voltage
- Perform diagnostics and driver notification

The battery condition is estimated during ignition/vehicle off and during ignition/vehicle on. During ignition/vehicle off the state-of-charge of the battery is determined by measuring the open-circuit voltage. The state-of-charge is a function of the acid concentration and the internal resistance of the battery, and is estimated by reading the battery open circuit voltage when the battery has been at rest for several hours.

Any time the ignition/vehicle is on, the vehicle algorithm continuously estimates battery state-of-charge based on adjusted net amp hours, battery capacity, initial state-of-charge, and calculated temperature.

While the engine is running, the battery degree of discharge is primarily determined by the integrated battery current sensor, to obtain net amp hours.

In addition, the electrical power management function is designed to perform regulated voltage control to improve battery state-of-charge, battery life, and fuel economy. This is accomplished by using knowledge of the battery state-of-charge and temperature to set the charging voltage to an optimum battery voltage level for recharging without detriment to battery life.

Charging System Components

G13 Generator
The engine drive belt drives the generator. When the rotor is spun, it induces an alternating current (AC) into the stator windings. The AC voltage is then sent through a series of diodes for rectification. The rectified voltage has been converted into a direct current (DC) for use by the vehicles electrical system to maintain electrical loads and the battery charge.
The voltage regulator integral to the generator controls the output of the generator; It is not serviceable.
The voltage regulator controls the amount of current provided to the rotor. If the generator has field control circuit fault, the generator defaults to an output voltage of 13.8 V.

The generator is serviced as a complete assembly. If there is a diagnosed fault in the generator, it must be replaced as an assembly.

Generator Pulley
The pulley drives the Generator via the engine drive belt. There are 2 types of pulleys:

1. Conventional solid Pulley which is bolted to the Generator stator shaft. This Pulley can be serviced separately.

2. One Way Clutch Pulley or Overrunning Alternator Decoupler Pulley allows the Generator to spin freely when the engine rapidly slows down on sudden deceleration. This part is not serviceable and the Generator needs to be replaced as an assembly.

K9 Body Control Module (BCM)
The BCM communicates with the Engine Control Module (ECM) and the instrument cluster for electrical power management operation. The BCM determines the output of the generator and sends the information to the ECM for control of the generator turn on signal circuit. It monitors the generator field duty cycle signal circuit information sent from the ECM for control of the generator. It monitors the battery current sensor, the battery positive voltage circuit, and estimates battery temperature to determine battery state of charge. The BCM also performs idle boost.

B110 Battery Monitor Module
The Battery Monitor Module communicates to the BCM via LIN. The BCM shares this information with the ECM. The purpose of the battery sensor module is to transmit battery information that the BCM/ECM can use to make decisions regarding stop/start, battery saver mode, and load shedding.

K20 Engine Control Module (ECM)/ K45 Powertrain Control Module (PCM)
The ECM/PCM controls the generator output via a LIN circuit. The generator's voltage regulator controls current to the rotor, thereby controlling the output voltage. The rotor current is proportional to the electrical pulse width supplied by the regulator. When the engine is started, the regulator senses generator rotation by detecting AC voltage at the stator through an internal wire. Once the engine is running, the regulator varies the field current by controlling the pulse width. This regulates the generator output voltage for proper battery charging and electrical system operation.

P16 Instrument Cluster
As a means of displaying the charging system functions, some vehicles may be equipped with a voltmeter gauge on the instrument cluster and/or a

system voltage display in the driver information center. These will indicate the current vehicle system voltage.

The instrument cluster also provides customer notification if there is a concern with the charging system. There are two means of notification: a charge indicator on the instrument cluster and/or a service system message displayed on the Driver Information Center (DIC) if equipped.

Charging System Operation

The purpose of the charging system is to maintain the battery charge and vehicle loads. There are 6 modes of operation and they include:

- Battery Sulfation Mode
- Charge Mode
- Fuel Economy Mode
- Head lamp Mode
- Start Up Mode
- Voltage Reduction Mode

The ECM communicates with the generator via a LIN circuit, allowing for more precise control of battery charging, as well feedback and diagnostics from the generator. The internal logic is supplied battery voltage from the generator B+ circuit, and is grounded through the generator housing. The internal logic operates the generators voltage regulator without the need for external control circuits.

Commanded Duty Cycle	Generator Output Voltage (+/- .25 V)
0–5%	13.8 V
10%	11 V
20%	11.56 V
30%	12.13 V
40%	12.69 V
50%	13.25 V
60%	13.81 V
70%	14.38 V
80%	14.94 V
90%	15.5 V
95–100%	13.8 V

As the charging systems works to maintain the battery charge and manage vehicle electrical loads, it is normal for the voltmeter gauge on the instrument cluster or the system voltage displayed in the DIC to fluctuate or change. This does not indicate a malfunction. Depending on the battery state of charge and the vehicle electrical load, these values may be anywhere from 12.5 V to 15.5 V.

Charging System Modes

Battery Sulfation Mode

The BCM will enter this mode when the interpreted Generator output voltage is less than 13.2 V for 45 minutes. When this condition exists the BCM will enter Charge Mode for 2–3 minutes. The BCM will then determine which mode to enter depending on voltage requirements.

Charge Mode

The BCM will enter Charge Mode when ever one of the following conditions are met:

- Windshield wipers are ON for more than 3 s.
- Climate Control Voltage Boost Mode Request is true, as sensed by the HVAC control module via serial data. High speed cooling fan, rear defogger, and HVAC high speed blower operation can cause the BCM to enter the Charge Mode.
- The estimated battery temperature is less than 0°C (32°F).
- Battery State of Charge is less than 80%.
- Vehicle speed is greater than 145 km/h (90 mph)
- A current sensor malfunction exists.
- System voltage is determined to be below 12.56 V

When any one of these conditions is met, the system will set targeted generator output voltage to a charging voltage between 13.9–15.5 V, depending on the battery state of charge and estimated battery temperature.

Fuel Economy Mode

The BCM will enter Fuel Economy Mode when the estimated battery temperature is at least 0°C (32°F) but less than or equal to 80°C (176°F), the calculated battery current is less than 15 A and greater than −8 A, and the battery state-of-charge is greater than or equal to 80%. Its targeted generator output voltage is the open circuit voltage of the battery and can vary between 12.5–13.1 V. When fuel economy mode is active, the generator is not charging, only maintaining open circuit battery voltage to increase fuel economy. The BCM will exit this mode and enter Charge Mode when any of the conditions described above are present. The ECM ramps up the voltage when slowing down in an effort to charge the battery in a brake regenerative energy capture, and ramps it back down when accelerating, then the BCM is once again controlling the charging system. This can result with a volt meter displaying varying voltage while driving a fully charged battery. This is normal operation to maximize fuel economy by increasing and decreasing output of the charging system.

Headlamp Mode
The BCM will enter Headlamp Mode when ever the head lamps are ON (high or low beams). Voltage will be regulated between 13.9–14.5 V.

Start Up Mode
When the engine is started the BCM sets a targeted generator output voltage of 14.5 V for 30 s.

Tow/Haul Mode (if applicable)
Pressing the Tow/Haul Mode button located on the center stack, the vehicle system voltage is raised and the remote (non-vehicle) battery will be charged. Having the headlamps on will raise the system voltage and if the Tow/Haul button is applied it will not serve any purpose. The voltage is regulated between 13.9-14.5 V.

Instrument Cluster Operation

Charge Indicator Operation
The instrument cluster illuminates the charge indicator and displays a warning message in the driver information center if equipped, when the one or more of the following occurs:

- The ECM detects that the generator output is less than 11 V or greater than 16 V. The instrument cluster receives a serial data message from the ECM requesting illumination.
- The instrument cluster determines that the system voltage is less than 11 V or greater than 16 V for more than 30 s. The instrument cluster receives a serial data message from the BCM indicating there is a system voltage range concern.
- The instrument cluster performs the displays test at the start of each ignition cycle. The indicator illuminates for approximately 3 s.

Driver Information Center Message: BATTERY NOT CHARGING SERVICE CHARGING SYSTEM or SERVICE BATTERY CHARGING SYSTEM
The BCM and the ECM will send a serial data message to the driver information center for the BATTERY NOT CHARGING SERVICE CHARGING SYSTEM or SERVICE BATTERY CHARGING SYSTEM message to be displayed. It is displayed when a charging system DTC is a current DTC. The message is turned off when the conditions for clearing the DTC have been met.

Voltmeter Gauge and/or System Voltage Display (if equipped)
As a means of displaying the charging system functions, some vehicles may be equipped with a voltmeter gauge on the instrument cluster and/or a system voltage display in the driver information center. These will indicate the current vehicle system voltage.

As the charging systems works to maintain the battery charge and manage vehicle electrical loads, it is normal for the voltmeter gauge on the instrument cluster or the system voltage display in the driver information center to fluctuate or change. This does not indicate a malfunction. Depending on the battery state of charge and the vehicle electrical load, these values may be anywhere from 12.5 V to 15.5 V.

Electrical Power Management Description and Operation

Electrical Power Management

The electrical power management is used to monitor and control the charging system and alert the driver of possible problems within the charging system. The electrical power management system makes the most efficient use of the generator output, improves the battery state-of-charge, extends battery life, and manages system electrical loads.

The load shed operation is a means of reducing electrical loads during a low voltage or low battery state-of-charge condition.

The idle boost operation is a means of improving generator performance during a low voltage or low battery state-of-charge condition.

Each electrical power management function, either idle boost or load shed, is activated in incremental steps. For example, idle boost 1 must be active before idle boost 2 can be active. The criteria used by the body control module (BCM) to regulate electrical power management are outlined below:

Idle Boost and Load Shed With Current Sensor

Function	Battery Temperature Calculation	Battery Voltage Calculation	Amp-Hour Calculation	Action Taken
Idle Boost 1 Start	Less Than −15°C (5°F)	Less Than 13 V	—	First level Idle boost requested
Idle Boost 1 Start	—	—	Battery has a net loss greater than 0.6 Ah	First level Idle boost requested
Idle Boost 1 Start	—	Less Than 11 V	—	First level Idle boost requested

Function	Battery Temperature Calculation	Battery Voltage Calculation	Amp-Hour Calculation	Action Taken
Idle Boost 1 End	Greater Than −10°C (14°F)	Greater Than 12 V	Battery has a net loss less than 0.2 Ah	First level Idle boost request cancelled
Idle Boost 2 Start	—	—	Battery has a net loss greater than 1.6 Ah	Second level Idle boost requested
Idle Boost 2 Start	—	Less Than 11 V	—	Second level Idle boost requested
Idle Boost 2 End	—	Greater Than 12 V	Battery has a net loss less than 0.8 Ah	Second level Idle boost request cancelled
Load Shed 1 Start	—	—	Battery has a net loss of 4 Ah	Rear Defrost, Heated Mirrors, Heated Seats, HVAC cycled OFF for 20% of their cycle
Load Shed 1 Start	—	Less Than 11 V	—	Rear Defrost, Heated Mirrors, Heated Seats, HVAC cycled OFF for 20% of their cycle
Load Shed 1 End	—	Greater Than 12 V	Battery has a net loss of less than 2 Ah	Clear Load Shed 1
Idle Boost 3 Start	—	—	Battery has a net loss of 10 Ah	Third level Idle boost requested
Idle Boost 3 Start	—	Less Than 11 V	—	Third level Idle boost requested
Idle Boost 3 End	—	Greater Than 12 V	Battery has a net loss of less than 6.0 Ah	Third level Idle boost request cancelled
Load Shed 2 Start	—	—	Battery has a net loss greater than 12 Ah	Rear Defrost, Heated Mirrors, Heated Seats, HVAC cycled OFF for 50% of their cycle. The BATTERY SAVER ACTIVE message will be displayed on the DIC
Load Shed 2 Start	—	Less Than 11 V	—	Rear Defrost, Heated Mirrors, Heated Seats, HVAC cycled OFF for 50% of their cycle. The BATTERY SAVER ACTIVE message will be displayed on the DIC
Load Shed 2 End	—	Greater Than 12 V	Battery has a net loss of less than 8 Ah	Clear Load Shed 2
Load Shed 3 Start	—	Less Than 11.9 V	Battery has a net loss greater than 20 Ah	Rear Defrost, Heated Mirrors, Heated Seats, HVAC cycled OFF for 100% of their cycle. The BATTERY SAVER ACTIVE message will be displayed on the DIC
Load Shed 3 Start	—	Less Than 11 V	—	Rear Defrost, Heated Mirrors, Heated Seats, HVAC cycled OFF for 100% of their cycle. The BATTERY SAVER ACTIVE message will be displayed on the DIC
Load Shed 3 End	—	Greater Than 12.6 V	Battery has a net loss of less than 13 Ah	Clear Load Shed 3

Idle Boost and Load Shed Without Current Sensor (based on battery voltage)

Function	Battery Temperature Calculation	Battery Voltage Calculation	Action Taken
Idle Boost 1 Start	Less Than −15°C (5°F)	Less Than 13 V	First level Idle boost requested
Idle Boost 1 Start	—	Less Than 12.6 V	First level Idle boost requested
Idle Boost 1 End	Greater Than −15°C (5°F)	—	First level Idle boost request cancelled
Idle Boost 1 End	—	Greater Than 13 V	First level Idle boost request cancelled
Idle Boost 2 Start	—	Less Than 12.4 V	Second level Idle boost requested
Idle Boost 2 End	—	Greater Than 12.5 V	Second level Idle boost request cancelled
Load Shed 1 Start	—	Less Than 12.3 V	Rear Defrost, Heated Mirrors, Heated Seats, HVAC cycled OFF for 20% of their cycle
Load Shed 1 End	—	Greater Than 12.4 V	Clear Load Shed 1
Idle Boost 3 Start	—	Less Than 10 V	Third level Idle boost requested
Idle Boost 3 End	—	Greater Than 12.3 V	Third level Idle boost request cancelled
Load Shed 2 Start	—	Less Than 12.1 V	Rear Defrost, Heated Mirrors, Heated Seats, HVAC cycled OFF for 50% of their cycle. The BATTERY SAVER ACTIVE message will be displayed on the DIC
Load Shed 2 End	—	Greater Than 12.2 V	Clear Load Shed 2
Load Shed 3 Start	—	Less Than 11.9 V	Rear Defrost, Heated Mirrors, Heated Seats, HVAC cycled OFF for 100% of their cycle. The BATTERY SAVER ACTIVE message will be displayed on the DIC
Load Shed 3 End	—	Greater Than 12.0 V	Clear Load Shed 3

Starting System Description and Operation

Starter Motor Operation (Gasoline Engines Without KL5/KL9, and Diesel Engines)

The starter motors are non-repairable. They have pole pieces that are arranged around the armature. Both solenoid windings are energized. The pull-in winding circuit is completed to the ground through the starter motor. The windings work together magnetically to pull and hold in the plunger. The plunger moves the shift lever. This action causes the starter drive assembly to rotate on the armature shaft spline as it engages with the flywheel ring gear on the engine. Moving at the same time, the plunger also closes the solenoid switch contacts in the starter solenoid. Full battery voltage is applied directly to the starter motor and it cranks the engine.

As soon as the solenoid switch contacts close, current stops flowing thorough the pull-in winding because battery voltage is applied to both ends of the windings. The hold-in winding remains energized. Its magnetic field is strong enough to hold the plunger, shift lever, starter drive assembly, and solenoid switch contacts in place to continue cranking the engine. When the engine starts, pinion overrun protects the armature from excessive speed until the switch is opened.

When the crank signal is removed, the starter relay opens and battery voltage is removed from the starter solenoid terminal. Current flows from the motor contacts through both windings to the ground at the end of the hold-in winding. However, the direction of the current flow through the pull-in winding is now opposite the direction of the current flow when the winding was first energized.

The magnetic fields of the pull-in and hold-in windings now oppose one another. This action of the windings, along with the help of the return spring, causes the starter drive assembly to disengage and the solenoid switch contacts to open simultaneously. As soon as the contacts open, the starter circuit is turned off.

Enhanced Starter Motor Operation (Gasoline Engines with KL5/KL9)

The tandem solenoid starter is an enhanced starter motor with independent control of the pinion actuator and starter motor functions. The ECM/PCM controls two separate relays, one for the pinion actuator and one for the starter motor.

When a crank request is received, the ECM/PCM first energizes the pinion actuator relay to move the starter pinion gear into engagement with the engine flywheel/ring gear. After a short delay, the ECM/PCM then energizes the starter motor relay to apply battery voltage to the starter motor, allowing the motor to crank the engine. When the engine starts and engine speed exceeds starter speed, the ECM/PCM turns off the starter motor and pinion actuator circuits and the starter disengages.

Because pinion engagement and motor operation are controlled separately, the system allows smoother pinion-to-flywheel engagement with reduced gear clash, noise, and wear, and on Stop/Start applications can position the pinion for a rapid restart before the engine fully stops rotating.

Ignition Switch

Keyless Start

When the Ignition mode switch is placed in the crank position, a discrete signal is supplied to the body control module (BCM) notifying it that the ignition is in the crank position. The BCM then sends a serial data message to the ECM/PCM that crank has been requested. The ECM/PCM then verifies that the brake pedal is applied and for manual transmission the clutch is fully depressed or for automatic transmission is in Park/Neutral. If it is, the ECM/PCM then supplies 12 V to the control circuit of the starter relay.

Stop/Start System Description and Operation

The Stop/Start System is used to improve fuel efficiency in stop/start driving. The vehicle automatically shuts down the engine in appropriate conditions at a traffic light, for example, resulting in zero tail pipe emissions and saving fuel which otherwise is used idling the engine when stationary. The engine instantly restarts when the driver is ready to move away.

As soon as the driver prepares to move away (by releasing the brake pedal and/or depressing the accelerator pedal), the engine will start; it only takes the system around 0.3 s to start the engine.

To support the increased number of engine starts, the starter motor is upgraded with a high performance electric motor and a stronger pinion engagement mechanism with reduced noise levels.

Along with the upgraded starter motor, advanced battery technology is required to ensure the vehicles battery can handle the frequent charge and discharge cycles common with stop/start operation. There is battery sensor module connected to the battery which continually monitors the battery charge and healthy state. The Engine Control Module (ECM) uses this information from the battery sensor module to determine if the battery charge and health is sufficient for an Stop/Start condition.

The Stop/Start system can reduce fuel consumption and carbon dioxide (CO2) emissions by up to 5% in mixed driving conditions. In an urban environment and in heavy traffic with frequent stops the savings may increase to as much as 10%.

There are also sophisticated controls in place to help ensure the Stop/Start System does not compromise the needs of either the driver or vehicle. For the engine to shutdown, the vehicle must be below 5 km/h (3 MPH), the selector lever in position D, and brake pedal depressed. To restart, the driver simply releases the brake pedal and the enhanced starter motor engages the engine. When the engine has been shut down by the Stop/Start System, a control indicator will be illuminated in the Driver Information Center (DIC). When the engine is restarted, the control indicator in the DIC extinguishes.

To ensure neither the needs of the driver or vehicle are compromised the engine will not shut down in the following circumstances:

- Ambient and coolant temperature correlation does not match specified values.
- Ambient temperature is less than −10°C (14°F)
- Battery temperature is less than 0°C (32°F) or greater than 55°C (131°F)
- Driver seat belt is not fastened and the drivers door is not fully closed (not applicable to vehicles in North America)
- HVAC system demand is high
- HVAC defrost has been selected
- Battery charge is low

Likewise the engine will automatically restart if:

- Driver door opened and driver seat belt unbuckled (not applicable to vehicles in North America)
- Engine hood opened
- Battery charge is low

- HVAC demand increases
- Vehicle speed increases
- Brake booster vacuum has been reduced
- Engine coolant temperature is greater than 125°C (257°F)
- Economy mode turned OFF by driver
- Autostop time exceeded 2 min

When the Stop/Start System has shut down the engine, and the ambient temperature is below 15°C (59°F), the ECM will activate the Stop/Start auxiliary relay which controls the electric engine coolant pump motor to continually circulate the engine coolant through the engine while the engine is off. This is to ensure the engine and passenger compartment temperature is maintained while off. Once the Stop/Start System has restarted the engine, the ECM will turn off the electric coolant pump motor, thus allowing the engines internal coolant pump to circulate the engine coolant. The Stop/Start System is automatically activated each time the ignition switch is turned on.

Through the climate control system, the vehicle can be cycled between off, comfort, and eco air conditioning modes (if equipped). In comfort mode, the priority for Stop/Start operation is on customer comfort. Depending on ambient temp, humidity, cabin temperature and cabin temperature setpoint, the least amount of autostops occur in this mode. In eco mode, the priority is on fuel economy. There are more frequent autostops with some sacrificing of cabin temperature control. With the HVAC turned off, the maximum autostops occur since there will be no A/C compressor requests.

Autostop Criteria

The ECM/PCM will send an Autostop state message to the body control module (BCM) and shut down the engine when all of the following criteria is met. The BCM will transmit the Autostop state message to the instrument cluster which will display the Autostop indicator in the tachometer display.

- Initial minimum vehicle speed during drive cycle must be 19 km/h (12 MPH) or greater. Subsequent autostop minimum speed may vary from 2-10 km/h (1-6 MPH), depending on vehicle
- Ambient and engine coolant temperature correlation meets specified values.
- Ambient and transmission fluid temperature correlation meets specified values.
- Hood switch status is closed
- Driver door status is closed
- Driver seat belt status is buckled
- Brake booster vacuum is greater than 45 kPa (7 PSI)
- Transmission gear selector is in the Drive position
- Vehicle speed is less than 5 km/h (3 MPH)
- Engine speed is below 1,500 RPM
- Engine coolant temperature is less than 120°C (248°F)
- Ambient temperature is greater than −10°C (14°F)
- No A/C compressor request from HVAC (A/C or Defrost modes)
- Battery voltage greater than 12 V
- Battery state of charge greater than 65% (changes with state of health)

Autostop Enable Ambient and Engine Coolant Temperature Table

Ambient Temperature	Minimum Coolant Temperature	Autostop Enable
−10°C (14°F)	60°C (140°F)	Yes
0°C (32°F)	50°C (122°F)	Yes
6°C (43°F)	40°C (104°F)	Yes
12°C (54°F)	30°C (86°F)	Yes
20°C (68°F)	18°C (64°F)	Yes
30°C (86°F)	18°C (64°F)	Yes

Autostart Criteria

The ECM/PCM will send an Autostart state message to the BCM. If all of the following conditions are true the ECM and BCM will restart the vehicle.

Driver Enabled Conditions that will engage Autostart:

- Driver removes pressure from the brake or depresses the accelerator pedal while the vehicle is in the forward Drive gear

System Enabled Conditions that will engage Autostart

Note: If one or more of the following conditions occur, the system will force the engine to restart.

- Brake booster vacuum is less than 40 kPa (6 PSI)
- A/C compressor request from HVAC (A/C or Defrost modes)
- Battery voltage less than 11 V,
- Battery state of charge is less than 65% (changes with state of health)
- Driver door status changes to open and driver seat belt status changes to unbuckled (not applicable to vehicles in North America)
- Hood switch status changes to open
- Autostop time exceeded 2 min

If the crank time exceeds 2 s, a manual ignition switch restart will be necessary.

System Components

Engine Control Module (ECM)/Powertrain Control Module(PCM)
The control module monitors the inputs from the Engine Coolant Temperature (ECT) sensor, Vehicle Speed Sensor (VSS), Battery Sensor Module, hood ajar switch, brake booster vacuum sensor, and engine speed to determine Autostart and Autostop conditions. The control module also controls the auxiliary coolant pump motor (if equipped).

Transmission Control Module (TCM)
The TCM monitors the inputs from the transmission neutral safety switch to determine the driver selected gear. This information is transmitted to the ECM via serial data to support the Auto Stop Start algorithm.

Engine Coolant Temperature sensor (ECT)
The ECT sensor is used to determine engine operating temperature.

Intake Air Temperature Sensor (IAT)
The ECM uses this sensor to monitor ambient air temperature. If too cold, the Autostop will not occur.

Inside air temperature sensor
The HVAC control module monitors the passenger compartment temperature sensor to determine the temperature inside the passenger compartment. The HVAC control module sends this temperature reading to the ECM on the data communication circuit. The ECM uses this temperature values to determine if a restart is requires based on the temperature inside the passenger compartment.

Vehicle speed sensor
The vehicle speed sensor is used to determine vehicle speed. If vehicle speed is detected above a calculated value during an Autostop condition, the ECM will start the engine.

Hood Ajar Switch
If the hood switch is in the open position, the vehicle will not Autostop. If the hood is opened during Autostop, the vehicle will automatically restart.

Brake Booster Vacuum Sensor
The ECM monitors vacuum in order to ensure proper power assist for the brake pedal. If the ECM determines vacuum is too low, it will restart the engine.

Brake Pedal Position Sensor (BPPS) & Accelerator Pedal Position Sensor (APP)
The ECM monitors both the brake pedal position sensor and the accelerator pedal position sensor to determine the level of activation for each. While the accelerator pedal is in it's at rest position with no pressure applied by the operator, a partially depressed Brake pedal will cause the ECM to prepare the engine for an Autostop event. When the vehicle is in an auto stop event and the status of the brake pedal position sensor changes from meeting the autostop criteria to not meeting this criteria the engine will be restarted provided all of the other conditions to allow an autostart are met. If the Accelerator pedal is moved from its at rest position the vehicle will also enter an auto start event if all other conditions to support an autostart event, except for the brake pedal position, are met.

Transmission Gear Shift Position Switch
The transmission gear shift position switch is used to determine if the transmission is in the proper state to allow an auto stop/start event. The ECM will not allow Autostop until the brake is engaged, the transmission is in the forward gear position and then the vehicle slows to below the minimum speed required to allow and autostop while meeting all of the other minimum criteria to support an autostop event.

Coolant Pump Motor
The ECM will turn on the auxiliary coolant pump motor during Autostop to maintain engine operating temperature and HVAC temperature. Once the engine is running, the ECM will turn off the coolant pump motor.

Body Control Module (BCM)
The Body Control Module (BCM) monitors the Autostop Disable switch in order to enable or disable the system.

It sends the appropriate messages to the ECM Via serial data to enable or disable the system.

Battery Sensor Module
The Battery Sensor Module monitors the battery current load, state of health, and state of charge, the information is sent to the BCM Via LIN then to the ECM Via Serial Data. If the module detects high current load, the battery is in a poor state of health or a low charge condition, the ECM will not allow Autostop to occur.

Autostop Disable Switch (if equipped)
The disable switch is an input to the BCM, it allows the customer to disable or re-enable the Autostop system. After the vehicle is turned off the Autostop system will turn back on the next time the vehicle is started.

Power Supply Transformer
The DC to DC converter monitors battery voltage and will maintain operating voltage to the radio, instrument cluster and instrument panel displays. The DC to DC converter will provide a boosted voltage to sensitive loads during Autostart to ensure proper operation of the driver informational displays.

Instrument Cluster
In order to differentiate between a normal engine shut down (engine speed 0 RPM) and when the engine has been shut down by the Stop/Start System, the tachometer needle will rest at the Autostop indicator icon (500 RPM point) indicating the engine has been shut down by the Stop/Start System. Once the engine is restarted, or the ECO button has disengaged Autostop, the tachometer will function normally.

Section 7

HVAC

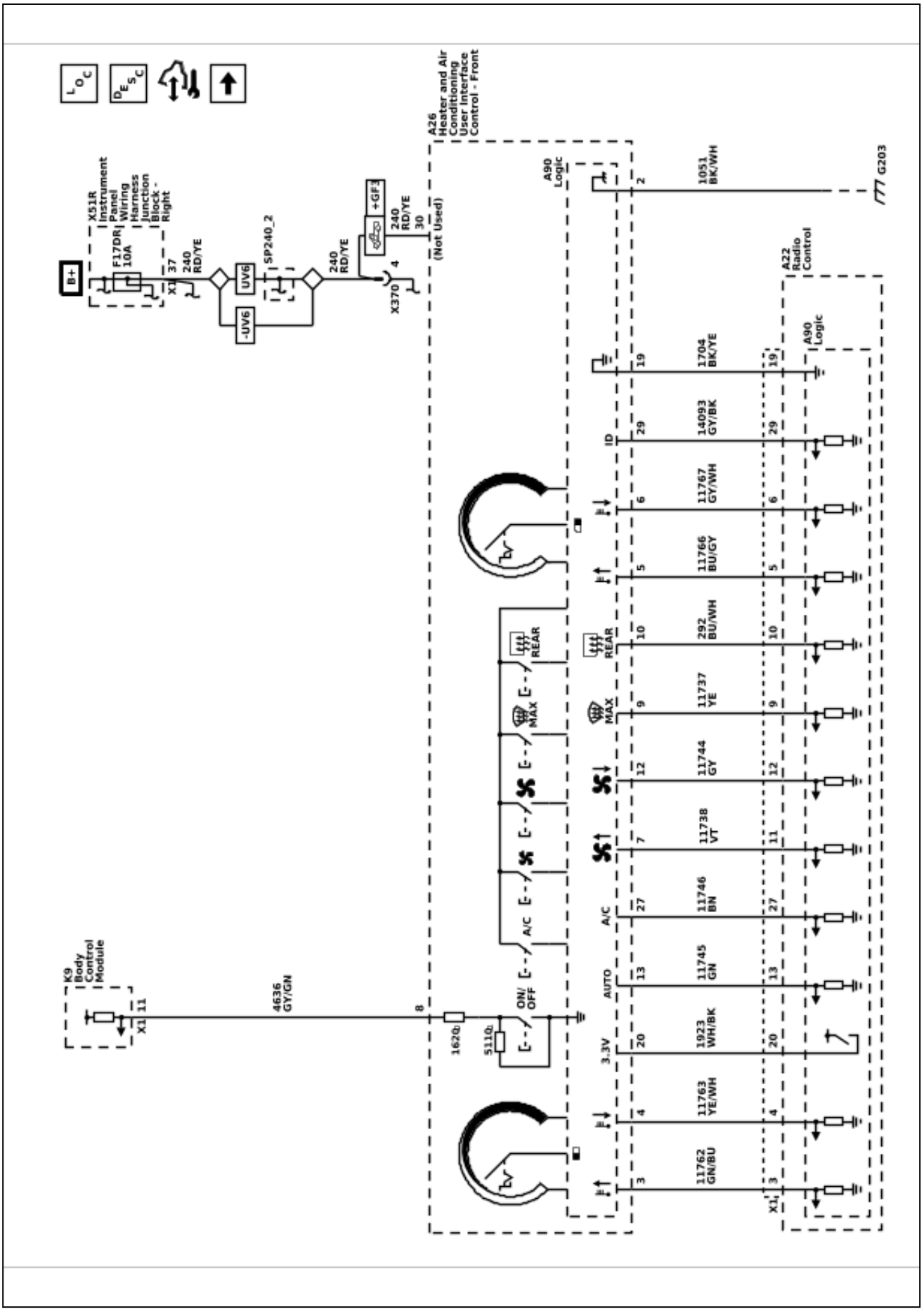
HVAC - Automatic **7-2**
Schematic and Routing Diagrams **7-2**
HVAC Schematics 7-3
Description and Operation **7-12**
Automatic HVAC Description and Operation 7-12

HVAC

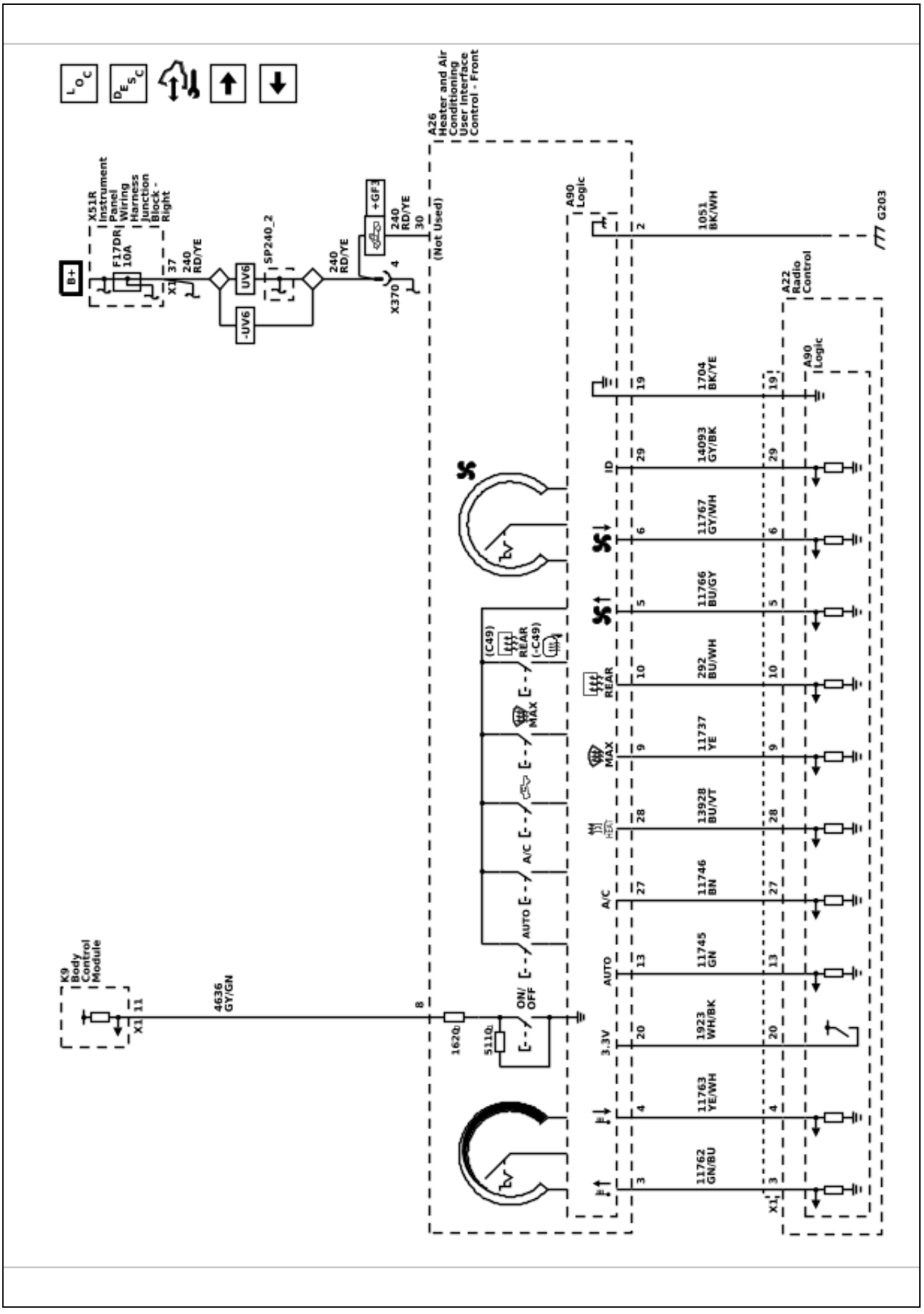
HVAC - Automatic

Schematic and Routing Diagrams

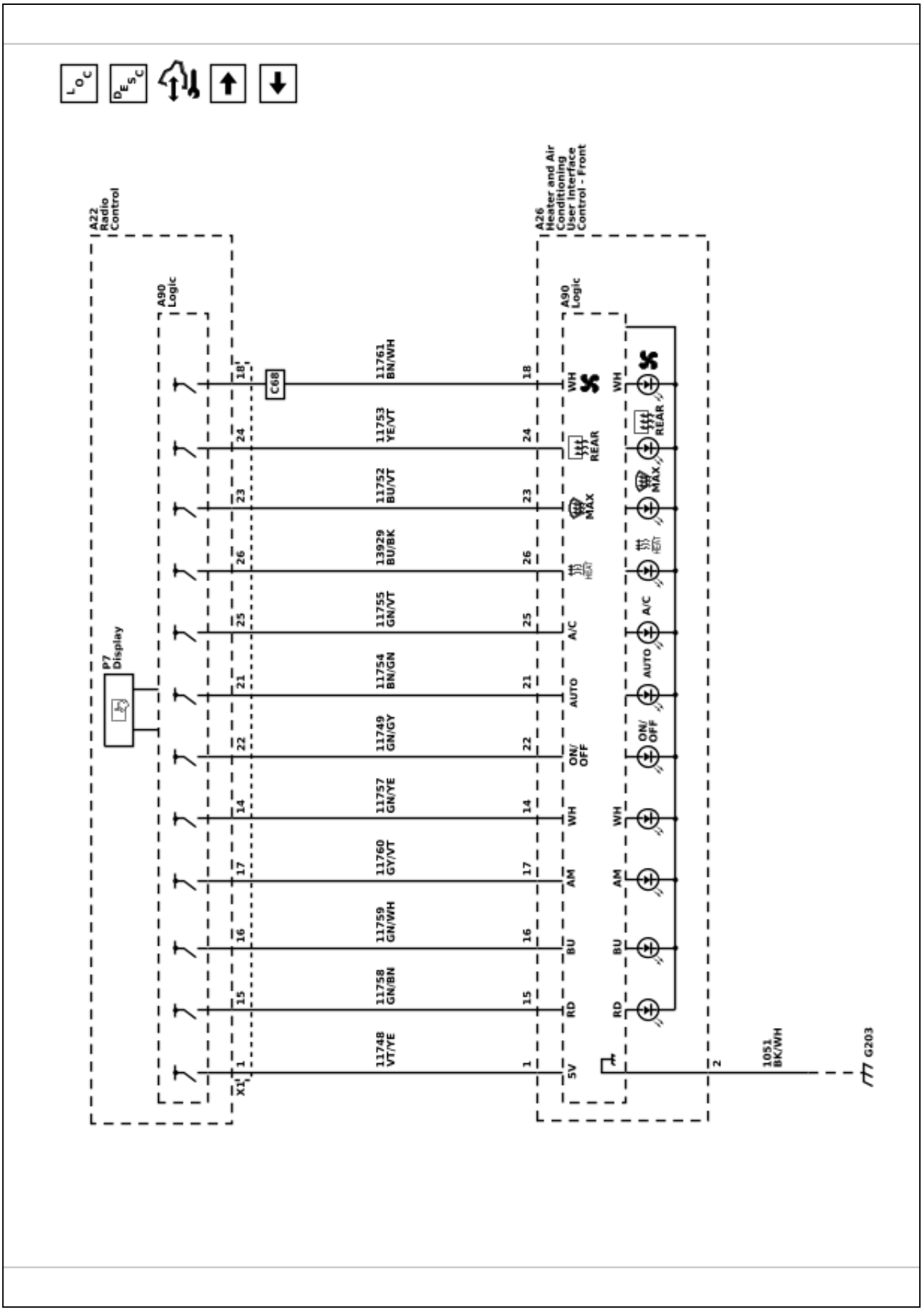
HVAC Schematics (HVAC Controls (CJ2))



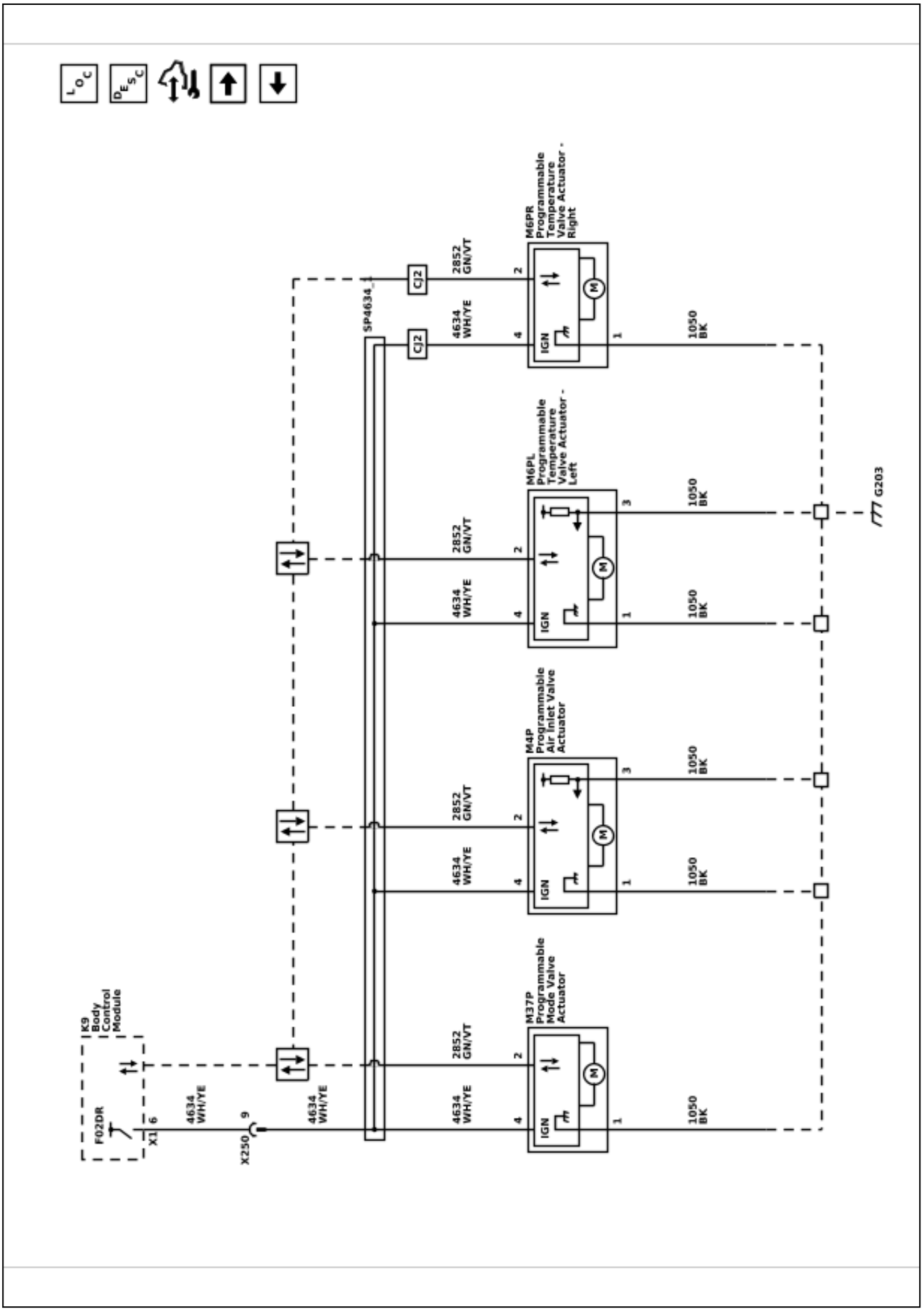
HVAC Schematics (HVAC Controls (C68))



HVAC Schematics (HVAC Controls - Backlighting, Indicators, and Display)

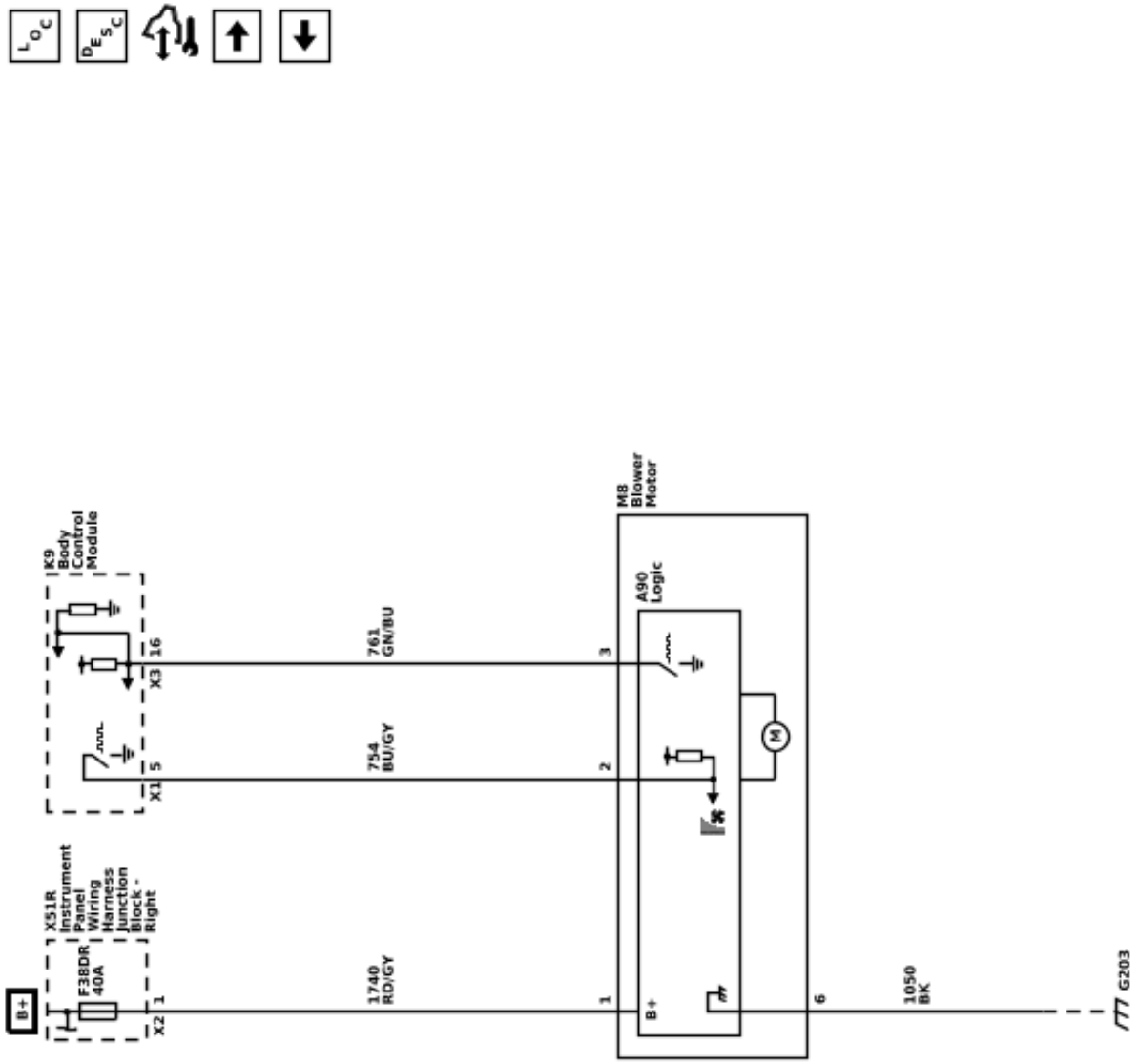


HVAC Schematics (Actuators)

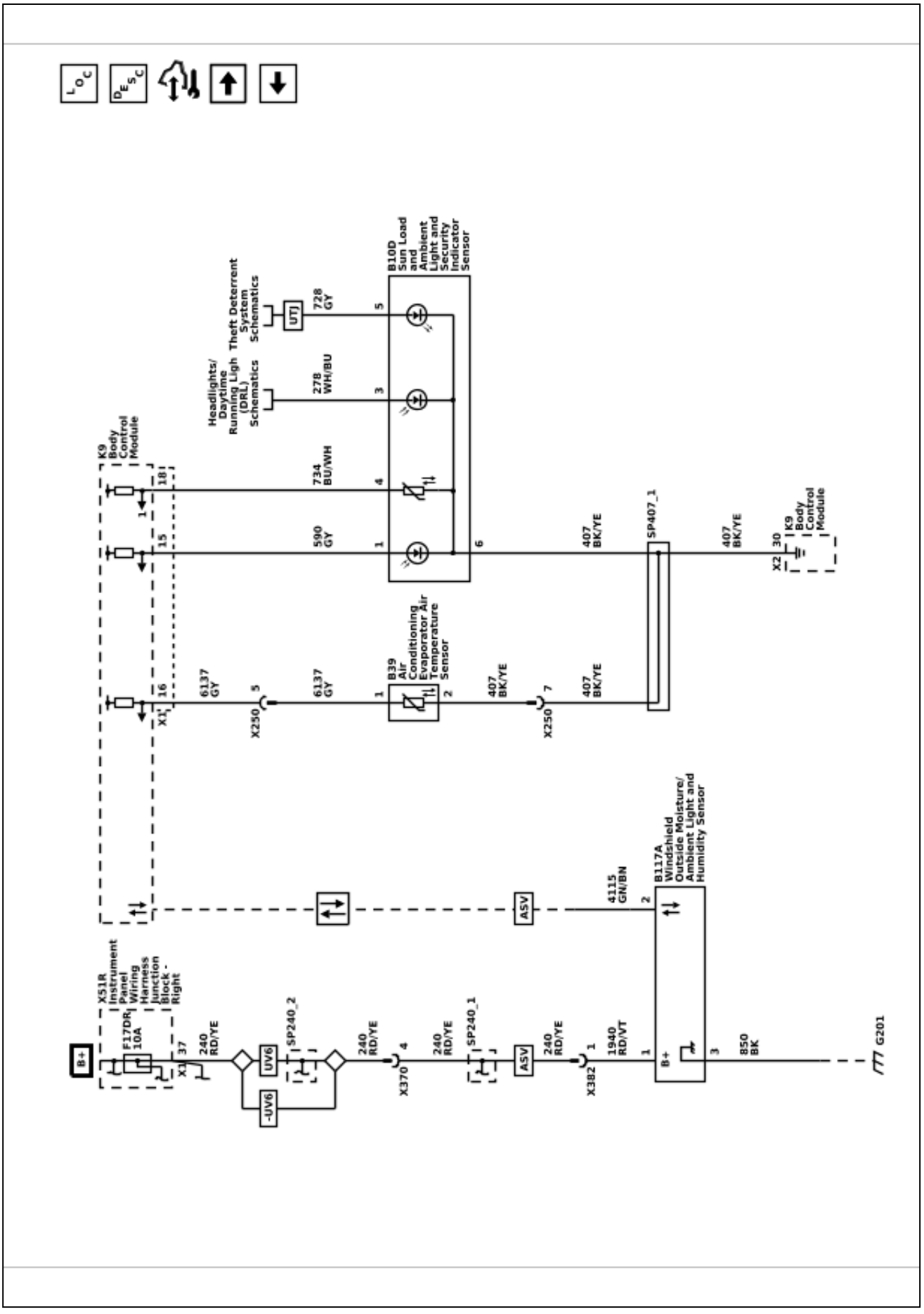


HVAC Schematics (Blower Motor)

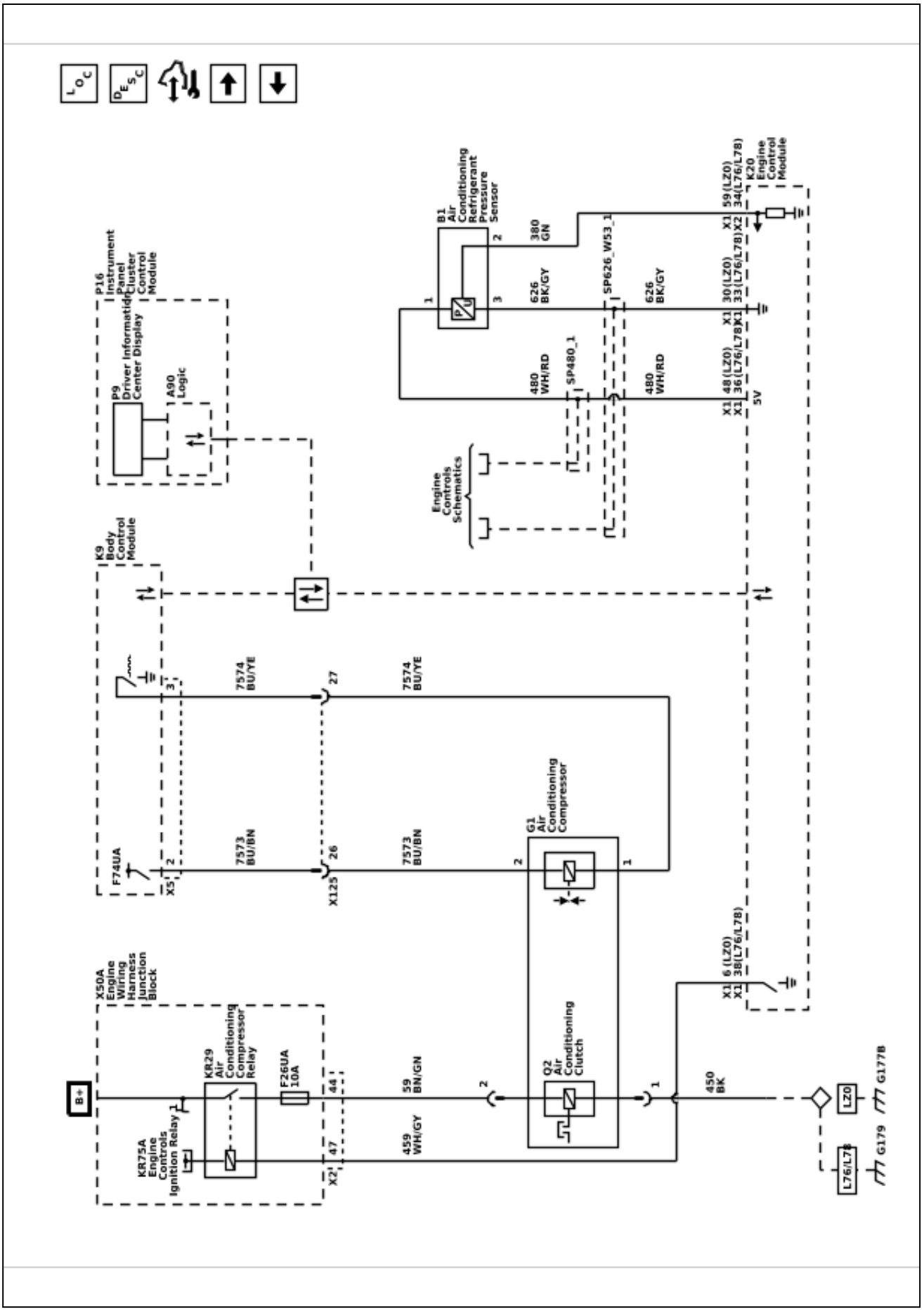
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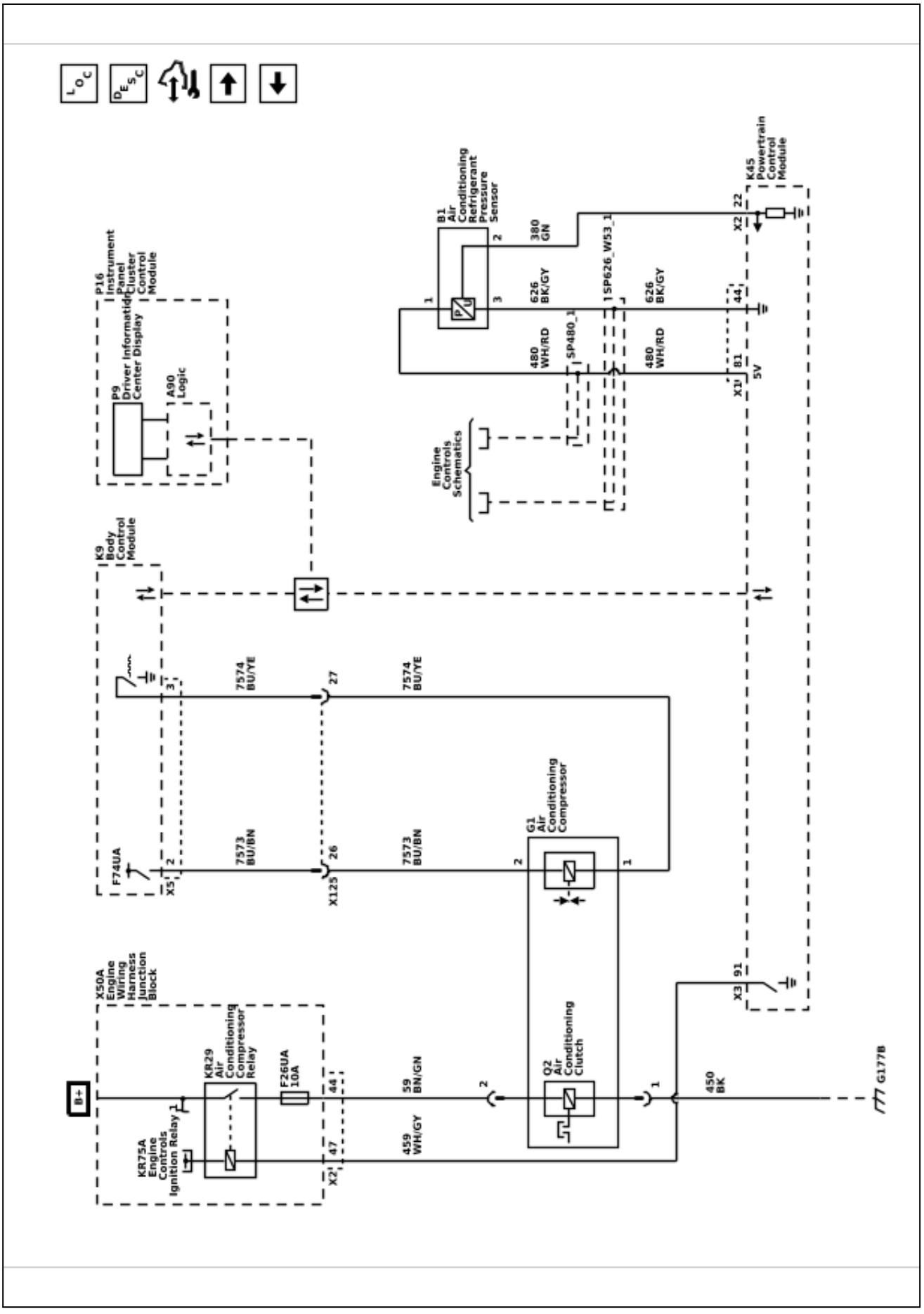
HVAC Schematics (Windshield Sensors and A/C Evaporator Temperature Sensor)



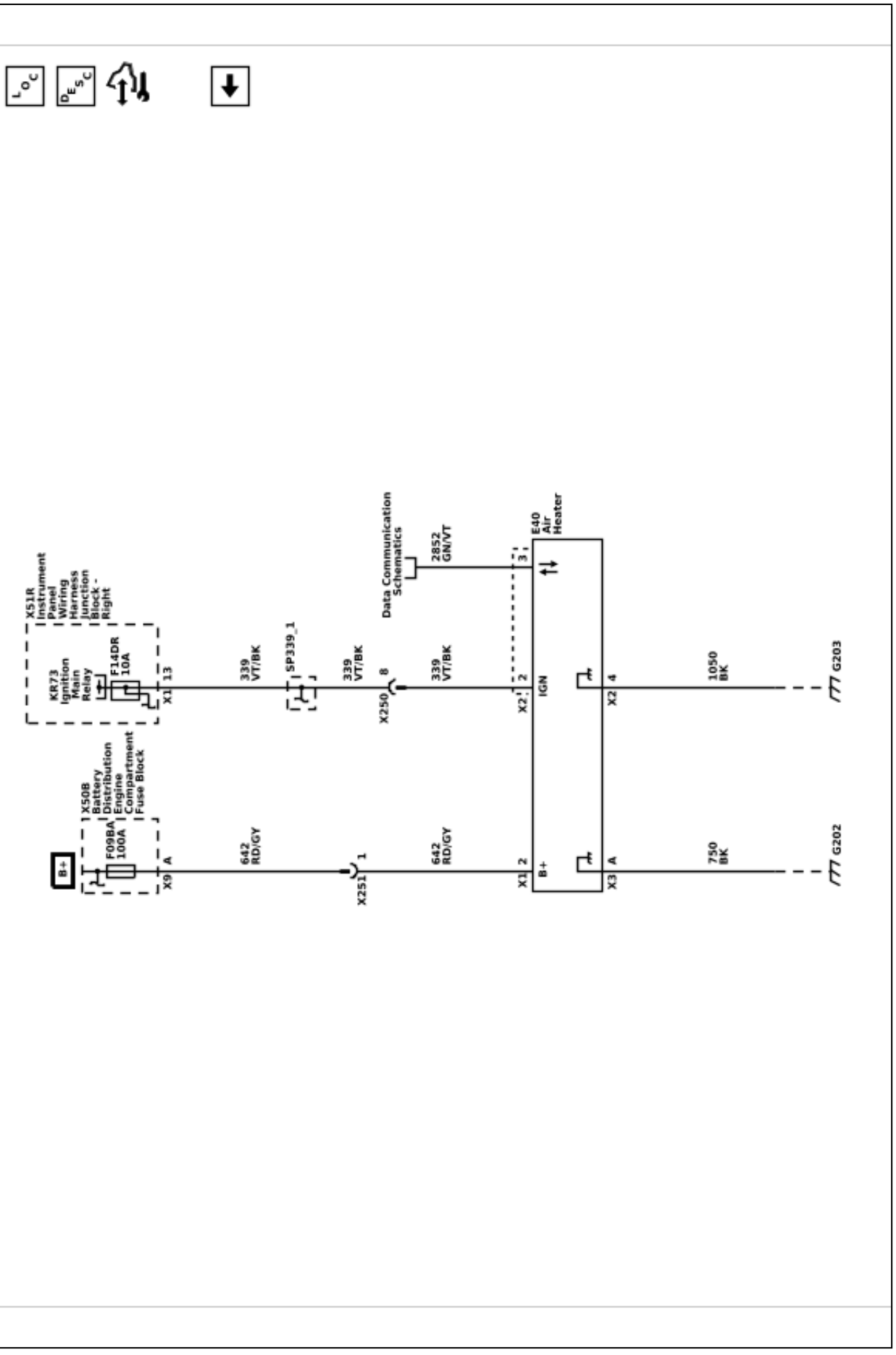
HVAC Schematics (A/C Compressor Controls (L76 / L78 / LZ0))



HVAC Schematics (A/C Compressor Controls (L4B))



HVAC Schematics (Air Heater (C32))



Description and Operation

Automatic HVAC Description and Operation

The air temperature and the air delivery description and operation are divided into the following:

- HVAC Control Components
- Air Speed and Blower Motor
- Air Delivery
- Heating and A/C Operation
- Recirculation Operation
- Automatic Operation
- Engine Coolant and A/C System Refrigerant

HVAC Control Components

K9 Body Control Module

The body control module (BCM) is a CAN device that interfaces between the operator and the HVAC system to maintain and control desired air temperature and air distribution settings. The BCM provides a device ON-Signal for the HVAC controls. The BCM provides blower, air delivery mode and air temperature control.

A26 Heater and Air Conditioning User Interface Control - Front

The HVAC control contains all switches which are required to control the functions of HVAC and serve as interface between the operator and the BCM. The selected values are passed to the BCM via serial data.

Actuators

Doors in the HVAC case assembly are used to control air flow. The BCM operates the doors through the use of actuators, with one actuator being used for each door. The system has the following air control doors and associated actuators: mode, left and right temperature, and recirculation.

Each actuator used in the system is a LIN device controlled by the BCM. The BCM supplies a 12 V reference voltage to the actuators, and ground is provided by the wiring harness. When the BCM sends a request message to the actuator, the actuator then operates internal stepper motors to move the door to the required position.

Air Speed and M8 Blower Motor

The selected blower motor speed is passed from the controls to the BCM via serial data.

The motor uses a fused B+, ground, control, and speed output signal circuits to operate. The blower motor speed is controlled by increasing or decreasing the voltage drop on the ground side of the blower motor speed control circuit. The BCM provides a low side pulse width modulation (PWM) signal to the blower motor to request a specific motor speed. The blower motor internal circuitry translates the PWM signal and drives the motor accordingly.

The blower motor has a signal wire used to output a speed signal. The signal is monitored by the BCM. The BCM monitors the blower motor speed to modify the total commanded engine coolant flow rate, which is a percentage of available coolant flow sent to the heater core for occupant comfort and windshield defrosting. The HVAC Blower Speed is monitored so that the ECM can optimize engine coolant flow for fuel economy and emissions.

Afterblow

Afterblow is a feature that dries the evaporator core by operating the blower motor after the engine is turned OFF under certain conditions. This reduces the amount of moisture that can create undesirable odors. For additional information on afterblow, the default setting, and changing the setting, refer to [Link target (target-id 328146-) not found] .

Duct Air Temperature

Physical duct air temperature sensors are not used with the front system. The air temperature in the air distribution ducts is calculated by the BCM based on the engine coolant temperature, coolant flow, evaporator temperature, outside air temperature, solar load, blower motor speed, air inlet door position, and temperature door position information. The BCM uses the values to calculate actuator position.

B39 Air Conditioning Evaporator Air Temperature Sensor

The evaporator temperature sensor is a 2-wire negative temperature coefficient thermistor. The sensor operates within a temperature range of −40 to +85°C (−40 to +185°F). The sensor is installed near the evaporator core to measure the air temperature exiting the core.

Based on vehicle operating conditions and operator settings, the HVAC software algorithms will determine a target evaporator air temperature. The operation of the compressor solenoid will be adjusted as needed to quickly reach and maintain the targeted temperature.

B1 Air Conditioning Refrigerant Pressure Sensor

The A/C refrigerant pressure sensor is a 3-wire piezoelectric pressure transducer. A 5 V reference voltage, low reference, and signal circuits enable the sensor to operate. The A/C pressure signal can be between 0.2–4.8 V. When the A/C refrigerant pressure is low, the signal value is near 0 V. When the A/C refrigerant pressure is high, the signal value is near 5 V. The engine control module (ECM) converts the voltage signal to a pressure value. When pressure is too high or too low, the ECM will not allow the A/C compressor clutch to engage.

G1 Air Conditioning Compressor
The A/C compressor uses a conventional belt driven magnetic clutch to engage and mechanically turn the compressor. When the A/C switch is pressed, the BCM sends an A/C request message to the ECM via serial data. If specific criteria is met, the ECM then grounds the A/C compressor clutch relay control circuit, which will switch the A/C compressor clutch relay. With the relay contacts closed, battery voltage is supplied to the permanently grounded A/C compressor clutch. The A/C compressor clutch will then be activated.

This A/C system utilizes a variable displacement solenoid valve to alter the amount of displacement created by the turning of the compressor. The BCM provides both battery voltage and a pulse width modulated ground to the Q46 Air Conditioning Compressor Solenoid Valve. When the A/C switch is pressed, the BCM grounds the variable displacement solenoid using a (PWM) signal in order to determine the amount of compressor displacement. The performance of the A/C compressor is regulated based on cooling load.

B160 Inside Air Moisture and Windshield Temperature Sensor
The windshield temperature and inside moisture sensor includes the relative humidity sensor, windshield temperature sensor and humidity sensing element temperature sensor.

This sensor assembly provides information about:

- Relative humidity level at windshield (passenger compartment side)
- Temperature of the windshield (passenger compartment side)
- Temperature of the humidity sensor element

The relative humidity sensor measures the relative humidity of the passenger compartment side of the windshield. It also detects the temperature of the windshield surface on the passenger compartment side. Both values are used as control inputs for the BCM application to calculate the fog risk on windshield compartment side and ability to reduce fuel consumption by decreasing A/C compressor power to a minimum without causing any fog. The sensor will also enable partial recirculation mode in order to improve heat-up performance of the passenger compartment under cold ambient temperature conditions without the risk of mist build-up on the windshield. The humidity sensor element temperature sensor supplies the temperature of the humidity sensor element. It is only needed if the thermal contact between the humidity sensing element and the inside windshield surface is not sufficient.

The sensor is a LIN device, and the sensor values are transmitted to the BCM via serial data.

When equipped with CE1, the sensor is part of the B117A Windshield Outside Moisture/Ambient Light and Humidity Sensor LIN windshield sensor array, and the windshield temperature and humidity values are transmitted to the BCM via serial data.

B10D Sun Load Temperature and Ambient Light and Security Indicator Sensor
The ambient light/sunload sensor includes the solar sensor and passenger compartment temperature sensor.

The solar sensor is connected to a low reference and 5 V supply through the BCM. As the sunload increases, the sensor signal voltage also increases and vice versa. The signal provided to the BCM varies between 1.2–4.85 V.

The passenger compartment temperature sensor is a negative temperature coefficient thermistor, connected to a low reference and 5 V supply through the BCM. As the air temperature increases, the sensor resistance decreases. The signal varies between 0–5 V.

Bright or high intensity light can cause the vehicles interior temperature to increase. The HVAC system uses the sensor values and compensates for the increased temperature to maintain the system settings.

E40 Air Heater (C32)
Some models are equipped with an auxiliary electric heater to assist in warming the passenger compartment when the engine coolant has not sufficiently warmed to operating temperature. The air heater is a LIN device. The heater uses an ignition circuit, battery voltage circuit, ground circuit, and a serial data signal from the BCM to operate.

The heater is a 12 V positive temperature coefficient heating element located in the HVAC case just downstream of the traditional heater core. The system will activate the heater when the outside temperature is less than approximately 8°C (46°F), the engine coolant temperature is less than approximately 75°C (167°F), and the temperature blend door is commanded to the full hot position.

Air Delivery

The BCM controls the distribution of air by the use of recirculation and mode door actuators. The modes that may be selected are:

- Defrost: windshield outlet
- Panel: dashboard outlets
- Floor: front footwell outlets
- Defog: defrost + floor
- Bi-level: panel + floor
- Tri-level: panel + defrost + floor

- Hi-level: panel + defrost

The desired air distribution mode can be selected with the air distribution switches at the HVAC control. The HVAC control delivers the values to the BCM via serial data. The BCM sends a request to the mode door actuator to move the door to the required position. Depending on the position of the door, air is distributed through various ducts leading to the outlets in the dash. When defrost airflow is active, the BCM will move the recirculation actuator to outside air, to aid in reducing window fogging. When defrost is selected the blower motor will be activated, regardless of the coolant temperature. A/C is available in all modes.

Refer to the owners manual for operation of the HVAC controls and mode selection.

Recirculation Operation
The recirculation switch is integrated into the HVAC control. The selected recirculation setting is sent to the BCM via serial data. The BCM controls the air intake using the recirculation actuator. In recirculation mode the recirculation door is positioned to block outside air from entering and circulate the air within the vehicle. In outside air mode the recirculation door is positioned to route outside air into the vehicle.

Recirculation is only available if the defrost mode is not active. When the defrost mode is active, the recirculation actuator positions the recirculation door so that outside air is circulated to the windshield to reduce fogging.

In automatic mode the values of the sensors are used as inputs for the BCM to calculate the fog risk on the passenger compartment side of the windshield. The A/C compressor and the defrost mode may be activated to prevent or remove fog on the passenger compartment side of the windshield.

In automatic mode, a partial recirculation mode may be commanded to accelerate cabin heating or cooling and reduce energy usage. The recirculation indicator remains illuminated at all times, regardless of the actual operating mode determined by the system.

Heating and A/C Operation

The purpose of the heating and A/C system is to provide heated and cooled air to the interior of the vehicle. The A/C system will also remove humidity from the interior and reduce windshield fogging. Regardless of the temperature setting, the following may affect the rate that the HVAC system can achieve the desired temperature:

- Recirculation setting
- Difference between inside and desired temperature
- Blower motor speed setting
- Mode setting
- Dashboard outlet open/closed position

When the A/C switch or the AUTO switch is pressed, the HVAC control sends a signal to the BCM via serial data. The BCM evaluates this signal and sends an A/C request signal to the ECM via CAN-Bus. The ECM checks all preconditions before releasing and if all conditions are met sends a release signal back to the BCM. The A/C compressor is activated by the BCM. The BCM supplies battery voltage to the A/C compressor solenoid. When the A/C switch is pressed, the BCM provides a pulse width modulation (PWM) signal to the A/C compressor solenoid in order to command the performance of the A/C compressor. The performance of the A/C compressor is regulated using evaporator temperature and engine load.

The A/C indicator does not indicate the compressor is currently active. The A/C indicator shows that A/C has been requested and the system will activate the compressor as needed.

The following conditions must be met in order to activate the A/C compressor:

- Battery voltage is between 9–18 V
- Engine coolant temperature is less than 124°C (255°F)
- Engine speed is greater than 600 RPM
- Engine speed is less than 5 500 RPM
- A/C high side pressure is between 269–2 929 kPa (39–425 PSI)
- Throttle position is less than 100%
- Evaporator temperature is greater than 3°C (38°F)
- ECM does not detect immoderate torque load
- ECM does not detect insufficient idle quality
- The ambient temperature is above 1°C (34°F)

The sensor information is used by the ECM to determine the following:

- The A/C high side pressure
- An A/C system load on the engine
- An immoderate A/C high side pressure
- The heat load at the A/C condenser

The air streams into the passenger compartment through the heater core and the evaporator core. The air temperature actuator drives the mixed air door to direct the airflow. If the interior temperature should be increased, the mixed air door is put into the position in which more air streams through the heater core. If the interior temperature should be decreased, the mixed air door is put into the position in which more air streams through the evaporator core.

Automatic Operation

In automatic operation, the BCM maintains the comfort level inside of the vehicle by controlling the A/C compressor solenoid, the blower motor, the air temperature actuators, mode actuator and recirculation actuator.

The automatic mode indicator shows that the system is in full automatic operation. If an individual setting is changed (excluding temperature), the automatic indicator will turn off, and that function will enter manual control. All other functions will remain under automatic control unless manually changed.

To put the HVAC system in automatic mode, the following is required:

1. The auto switch must be activated.
2. The air temperature switch must not be in either the full hot or full cold position.

Once the desired temperature is reached, the blower motor, mode, recirculation and temperature actuators automatically adjust to maintain the temperature selected. The BCM performs the following functions to maintain the desired air temperature:

- Monitors the following:
  - Ambient (outside) air temperature sensor
  - Passenger compartment temperature sensor
  - Calculated front duct air temperatures
  - Windshield temperature and inside moisture sensor
  - Evaporator temperature sensor
  - Ambient light/sunload sensor
- Regulate the blower motor speed
- Position the air temperature actuators
- Position the mode door actuators
- Position the recirculation actuator
- Control of the A/C compressor solenoid

When the temperature setting is set to full hot, the blower speed will increase gradually as the coolant warms to normal operating temperature. When normal engine operating temperature is reached the blower stays on high speed and the air temperature actuators stays in the full heat position.

When the temperature setting is set to full cold, the blower will immediately operate at high speed and the air temperature actuators move to full cold position. The mode actuator moves to the panel position and the recirculation actuator moves to the recirculation position.

Under cold ambient temperatures, the automatic HVAC system provides heat in the most efficient manner. The operator can select an extreme temperature setting but the system will not warm the vehicle any faster. Under warm ambient temperatures, the automatic HVAC system also provides air conditioning in the most efficient manner. Selecting an extreme cool temperature will not cool the vehicle any faster.

In automatic mode the values of the windshield temperature and inside moisture sensor are used as control inputs for the BCM application to calculate the fog risk on the passenger compartment side of the windshield and ability to reduce fuel consumption by decreasing A/C compressor power to a minimum without causing any fog. The A/C compressor and the defrost mode are activated to prevent or remove fog on the passenger compartment side of the windshield. The sensor will also enable partial recirculation mode in order to improve heat-up performance of the passenger compartment under cold ambient temperature conditions without the risk of mist build-up on the windshield.

Engine Coolant and A/C System Refrigerant

For information on engine coolant, coolant flow, A/C refrigerant, and the A/C refrigerant cycle, refer to [Link target (target-id 162334-) not found] .

Section 8

Power and Signal Distribution

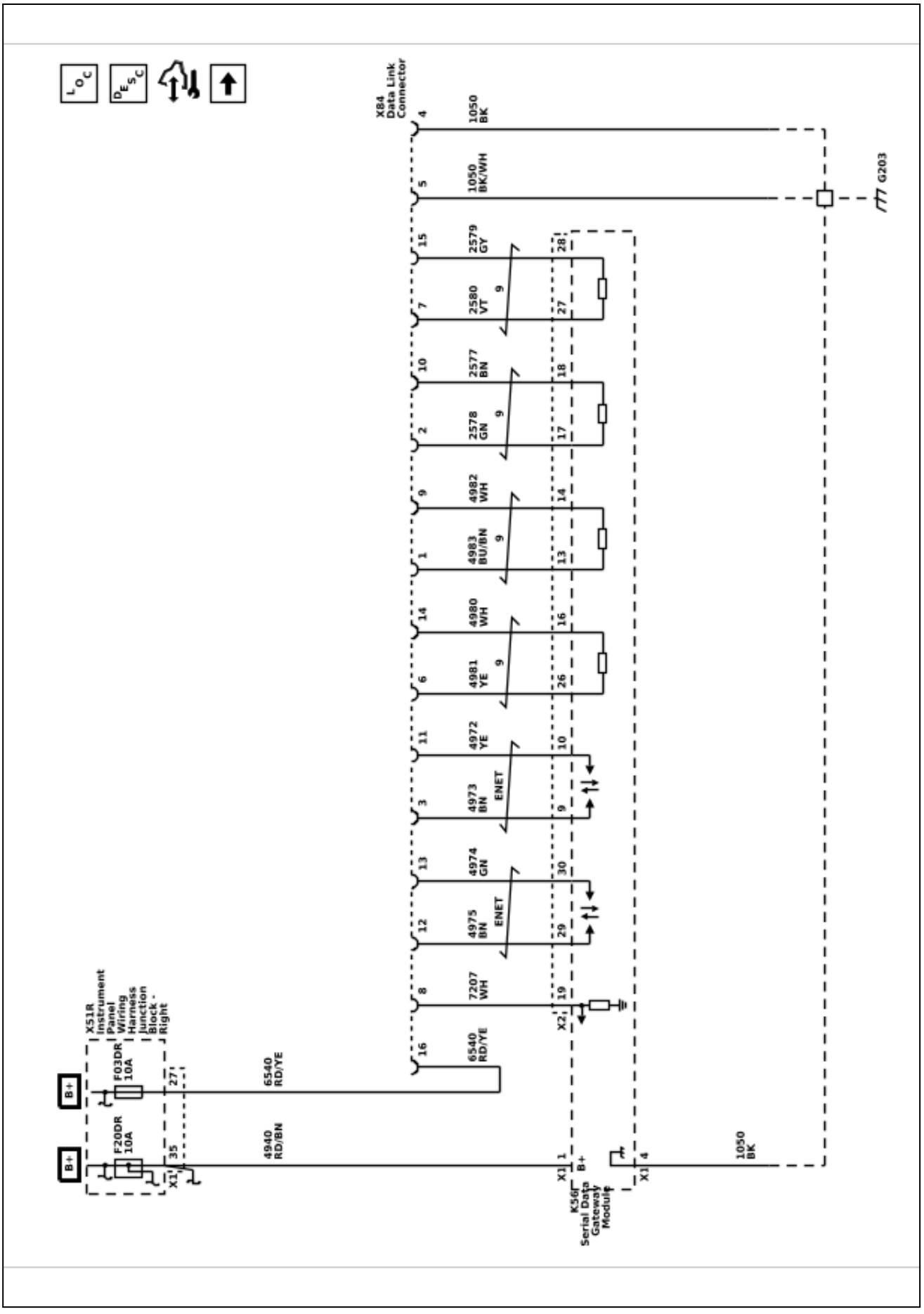
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Power and Signal Distribution

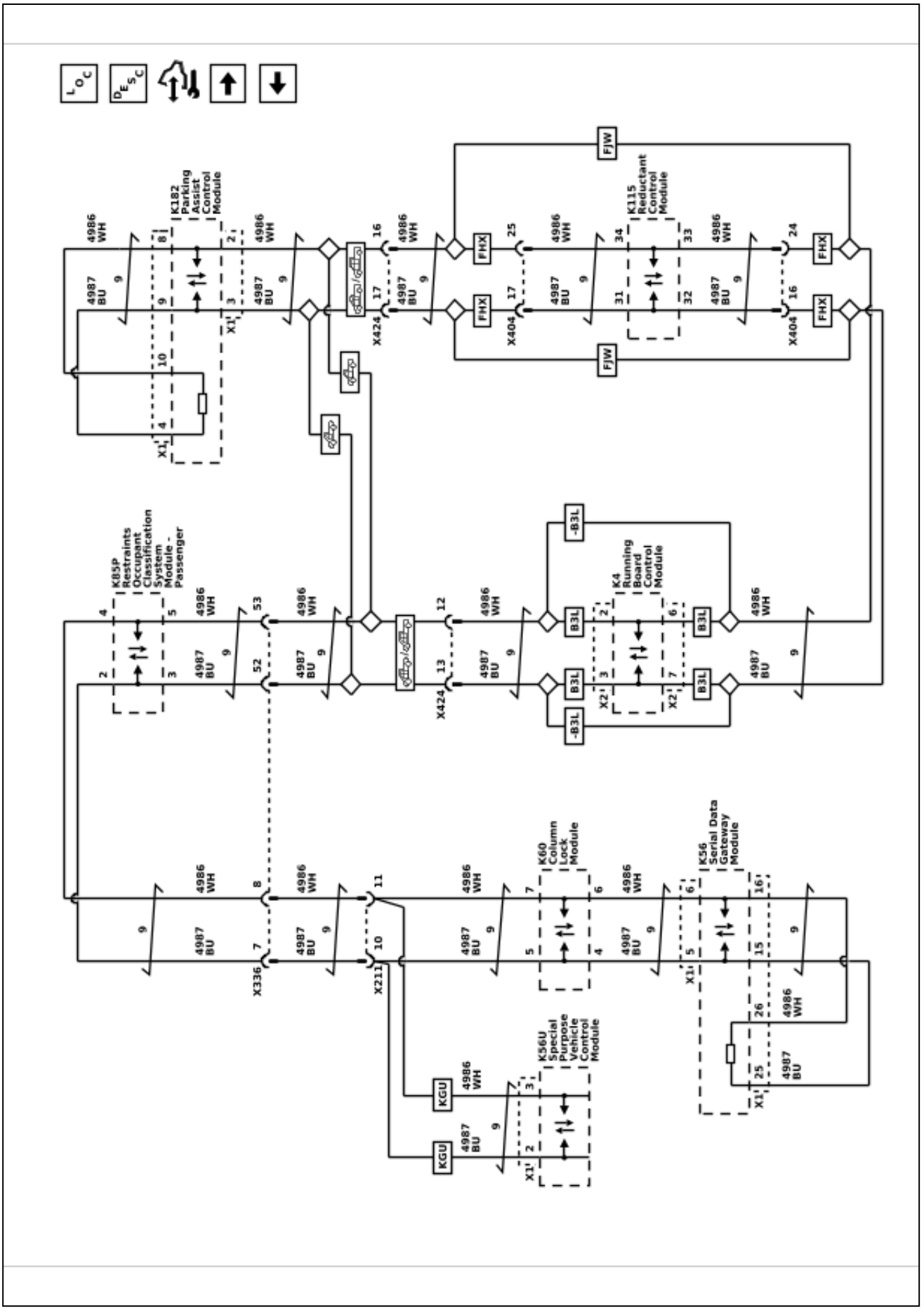
Data Communications

Schematic and Routing Diagrams

Data Communication Schematics (Data Link Connector and Serial Data Gateway Module Power, and Ground)

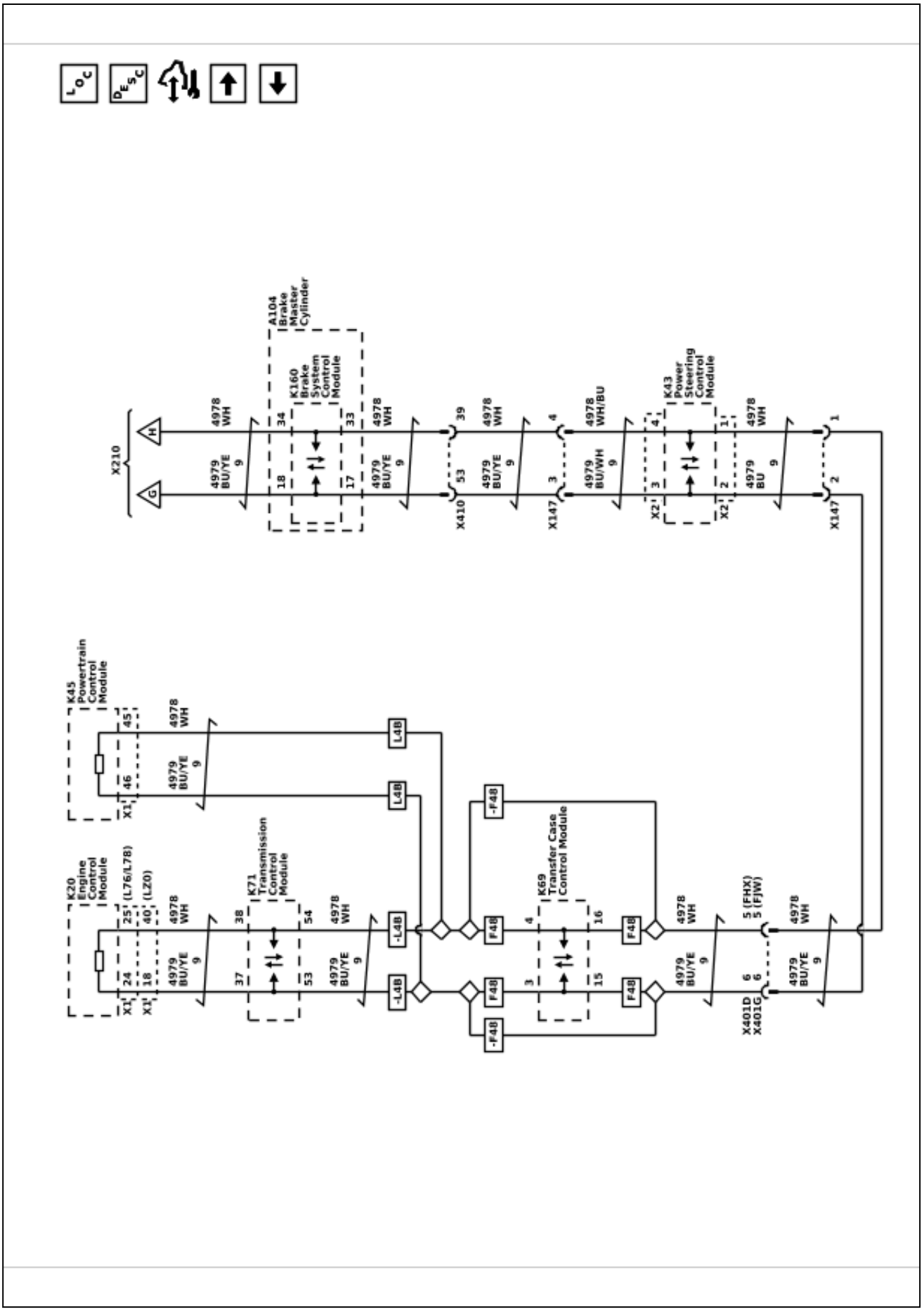


Data Communication Schematics (CAN 1)

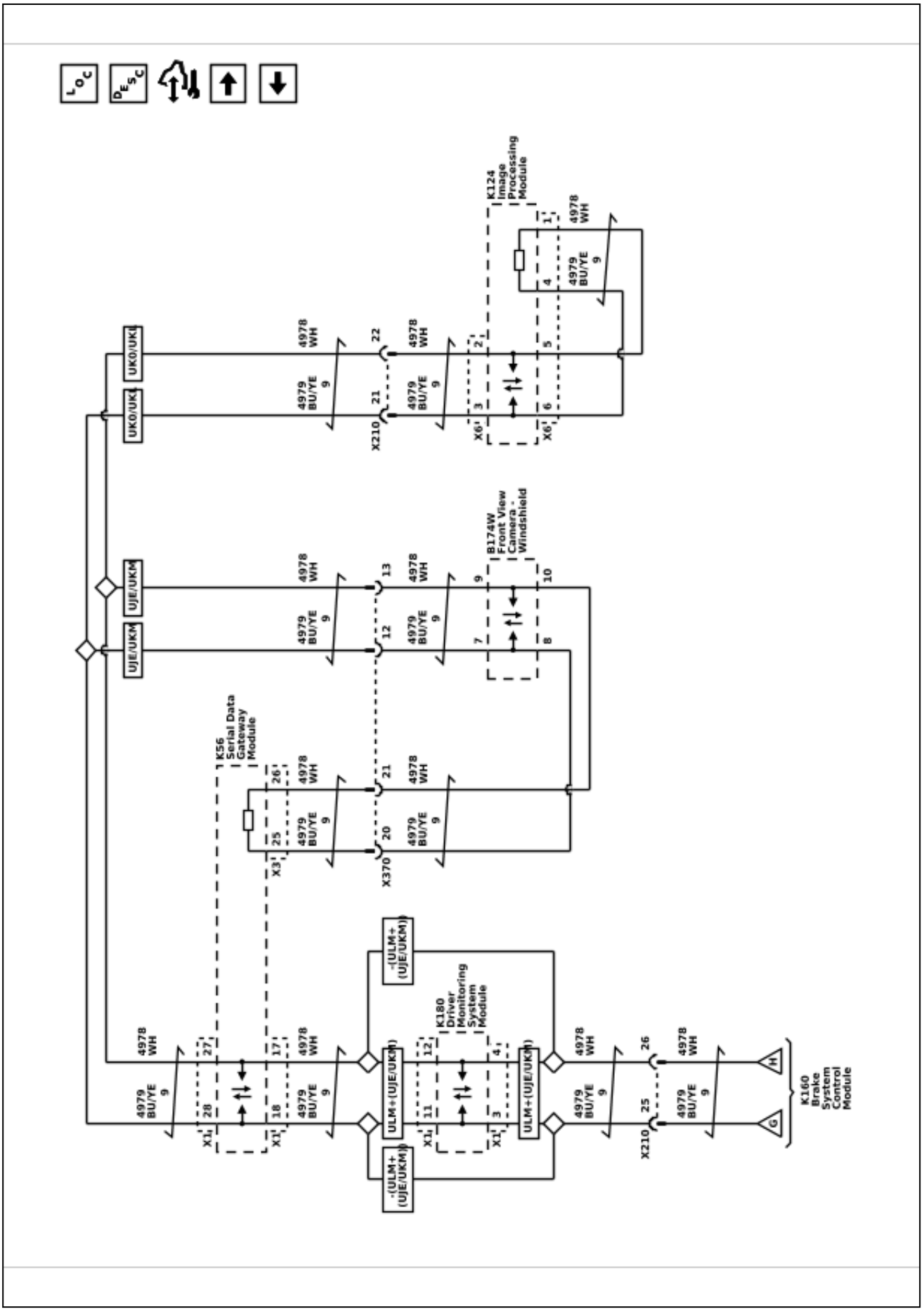


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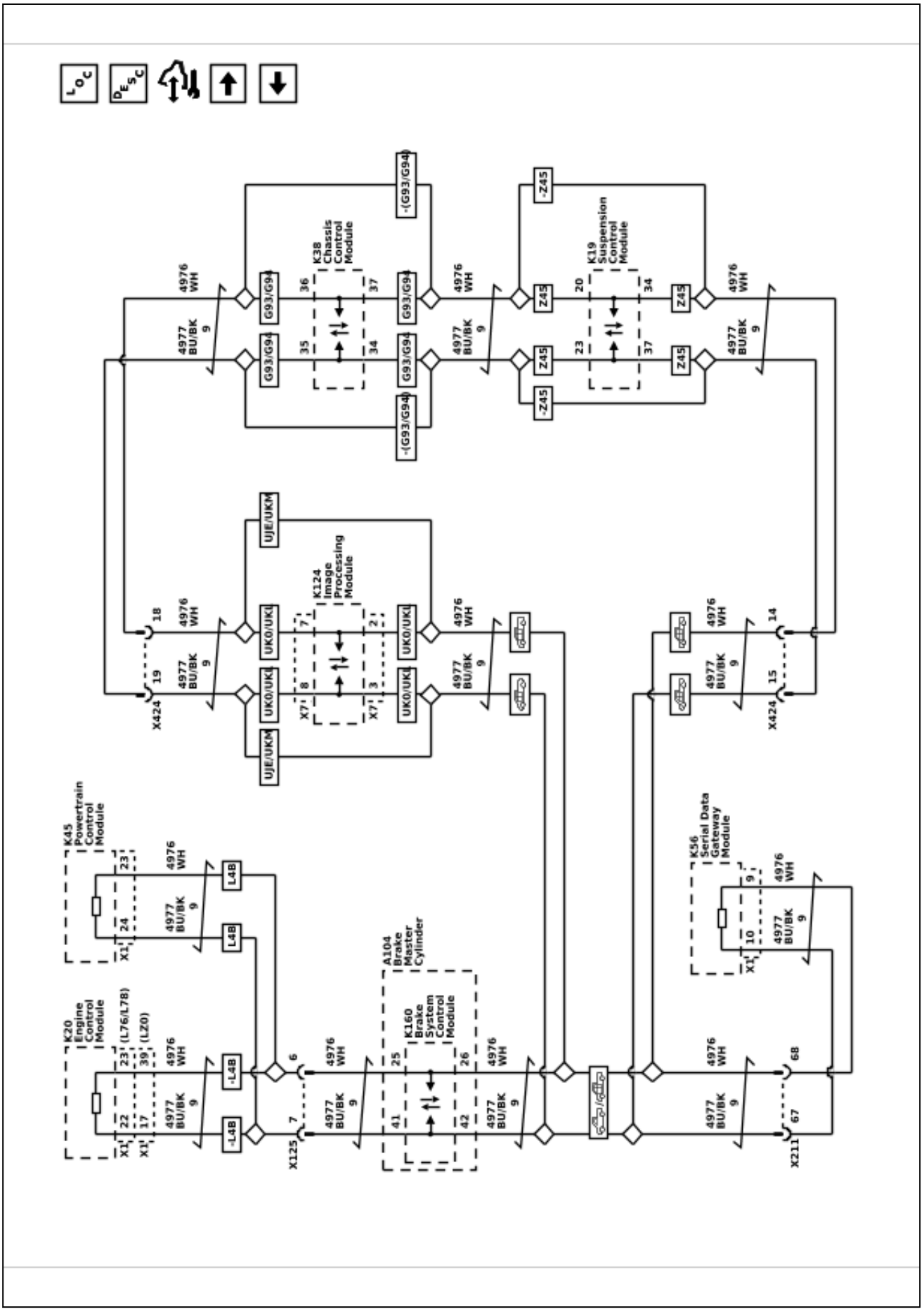


Data Communication Schematics (CAN 2 - 2 of 2)

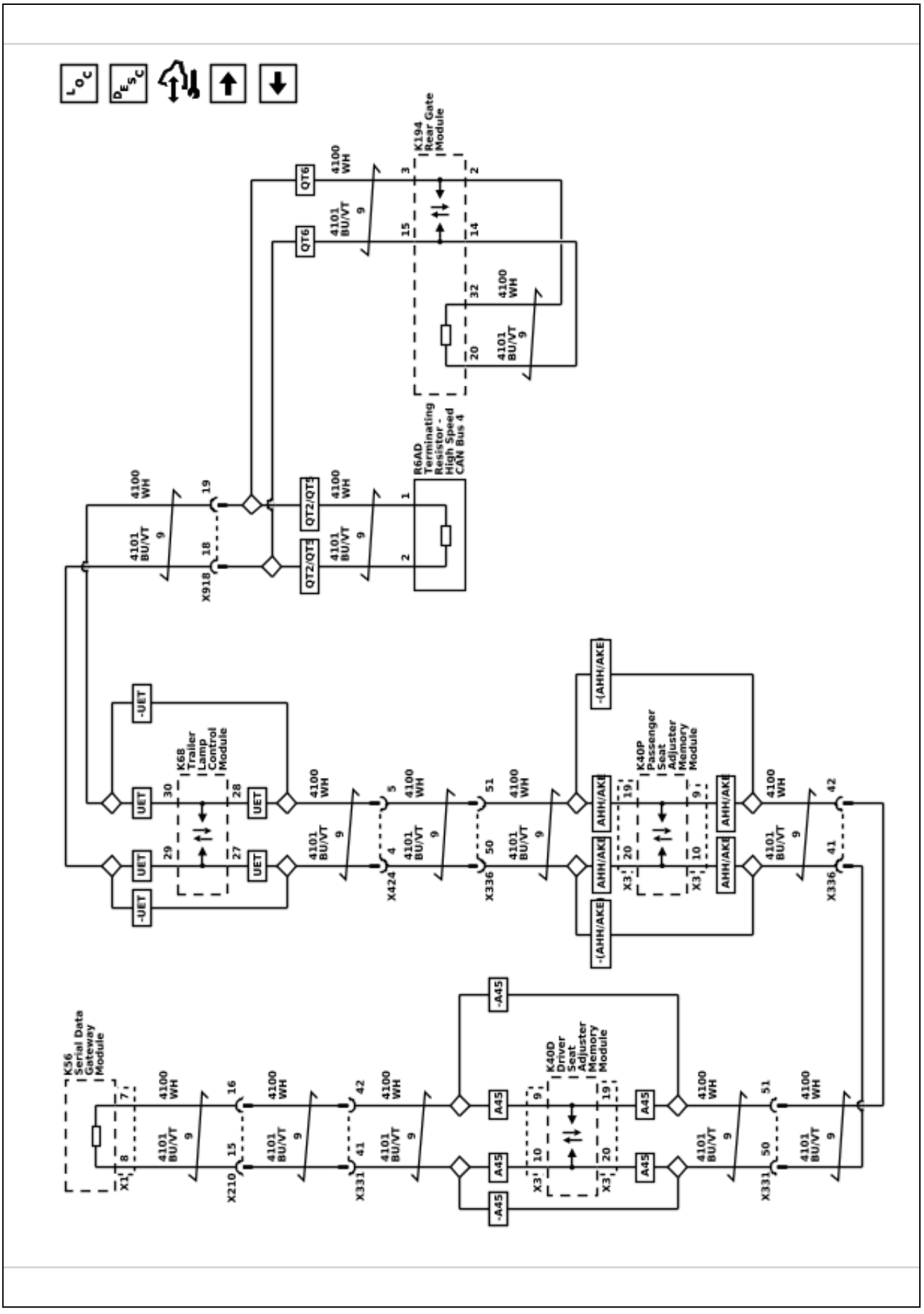


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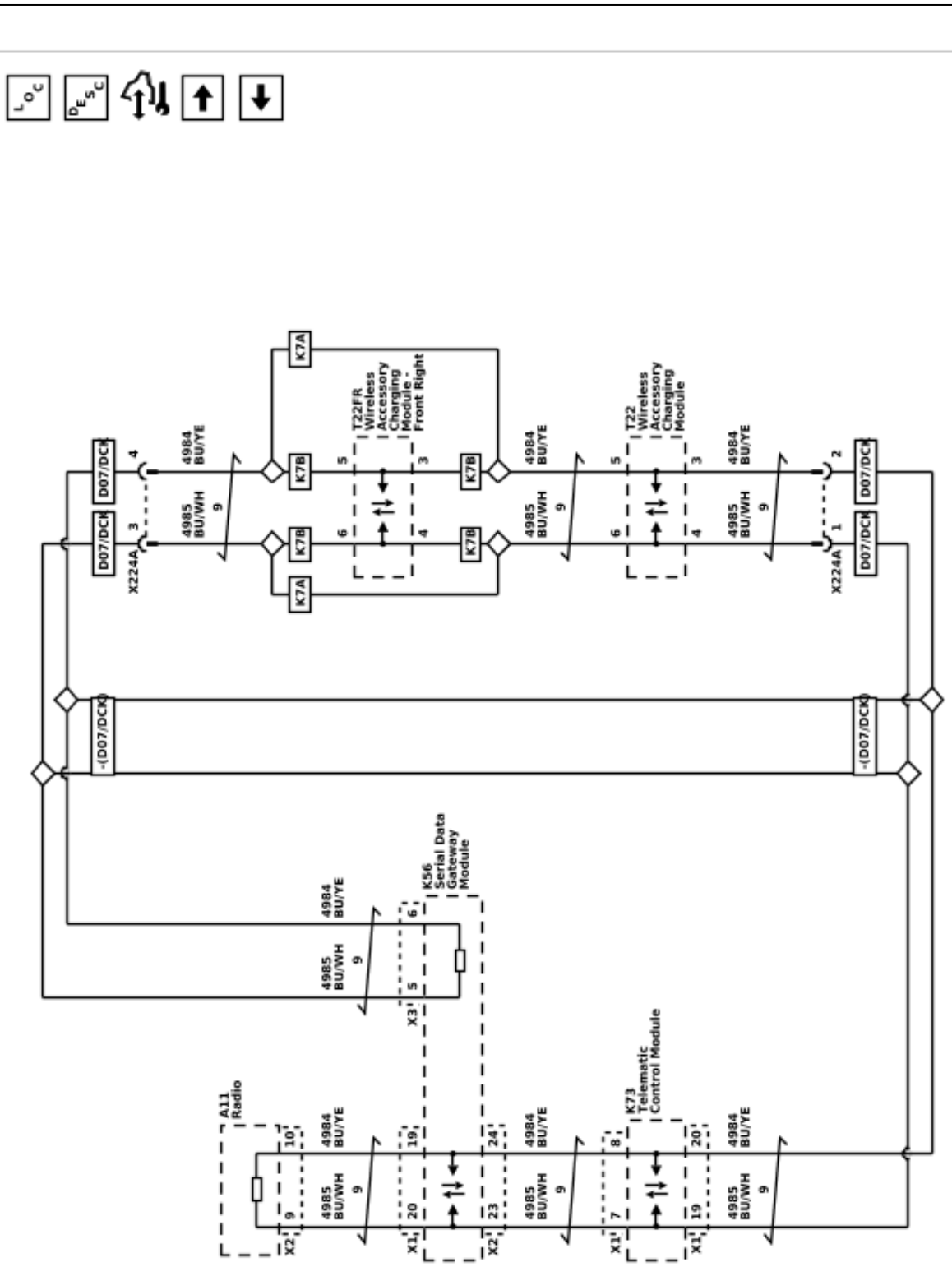


Data Communication Schematics (CAN 4)



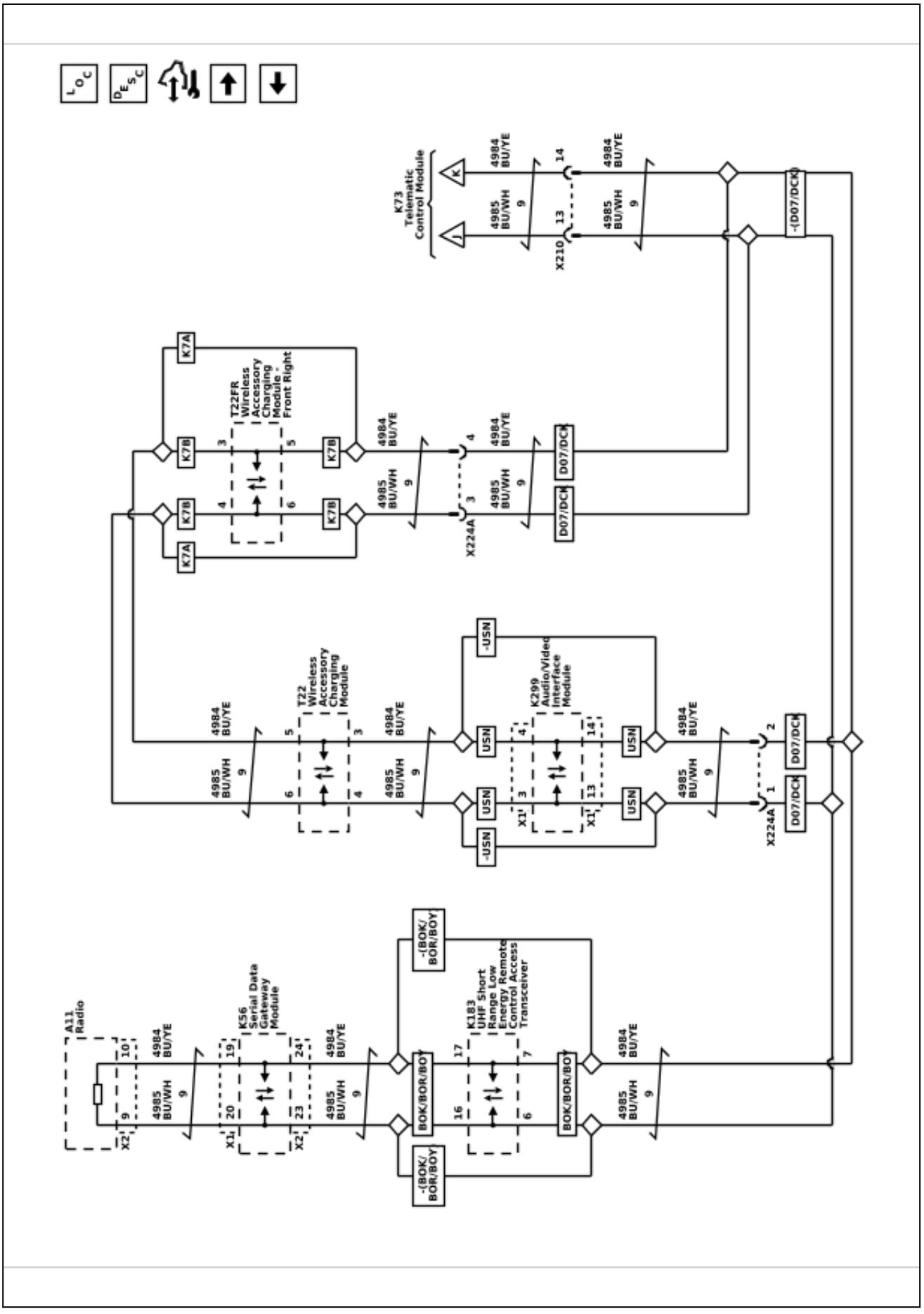
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Data Communication Schematics (CAN 5 - 2-Door)



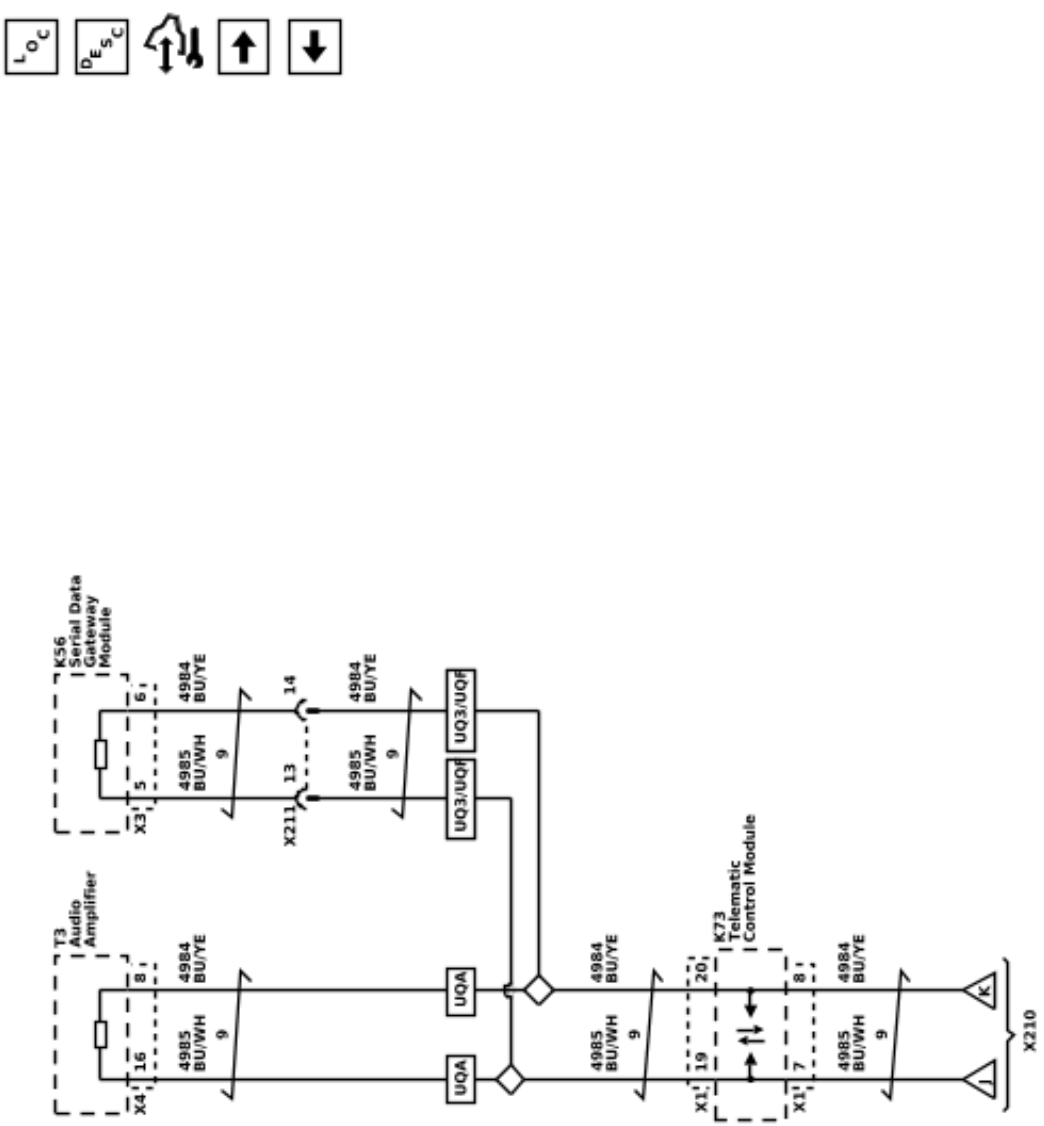
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Data Communication Schematics (CAN 5 - 1 of 2 - 4-Door)

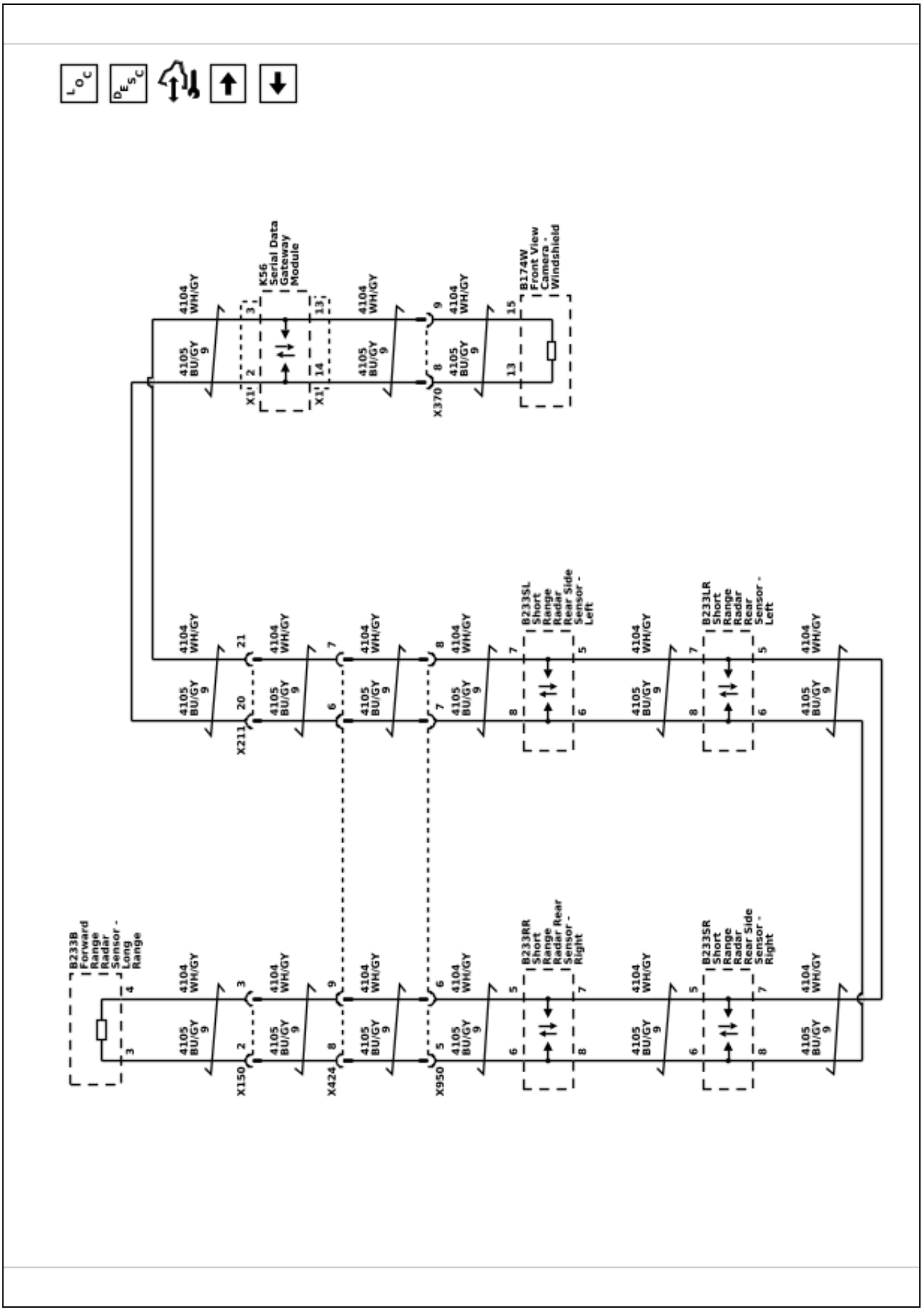


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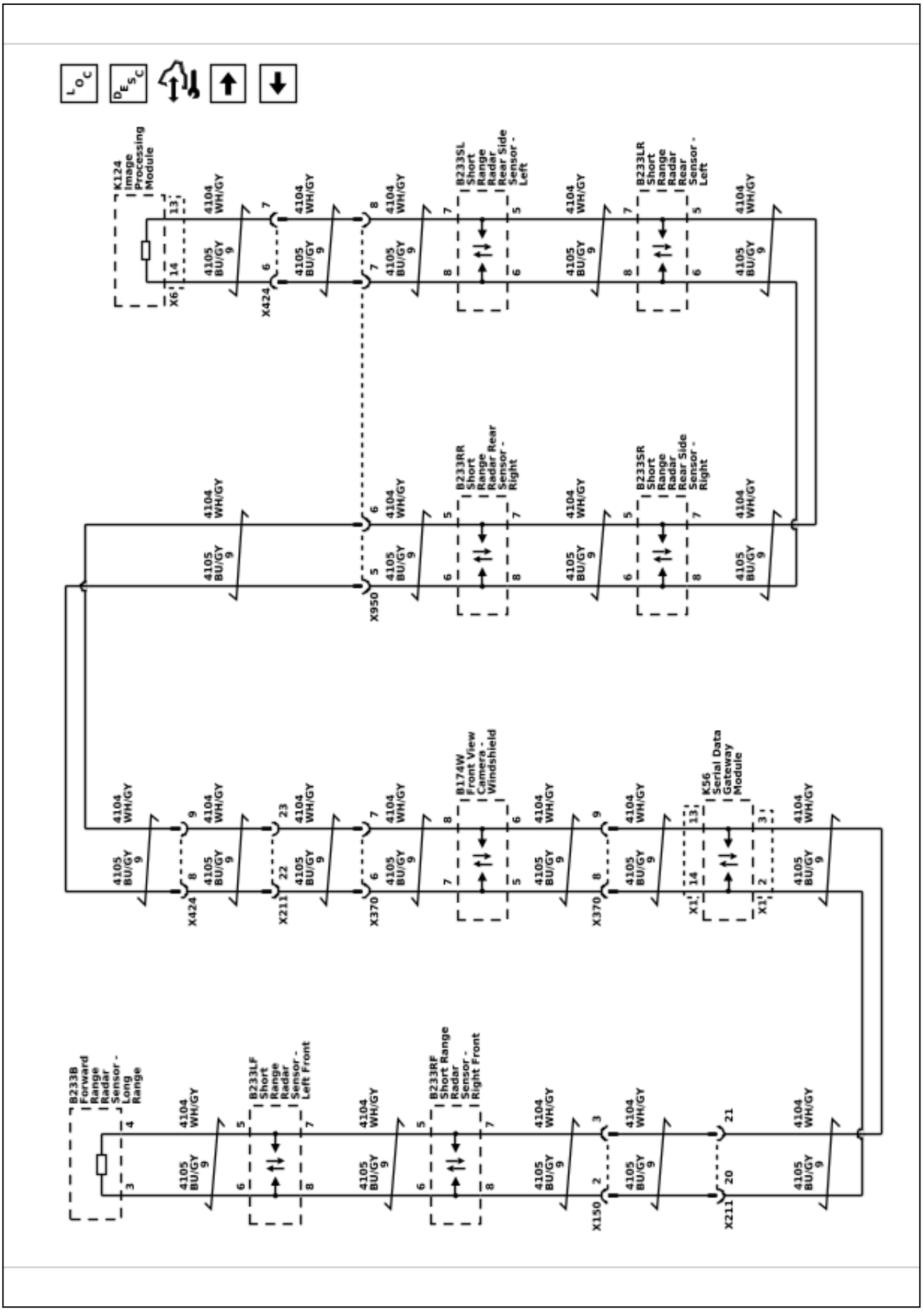
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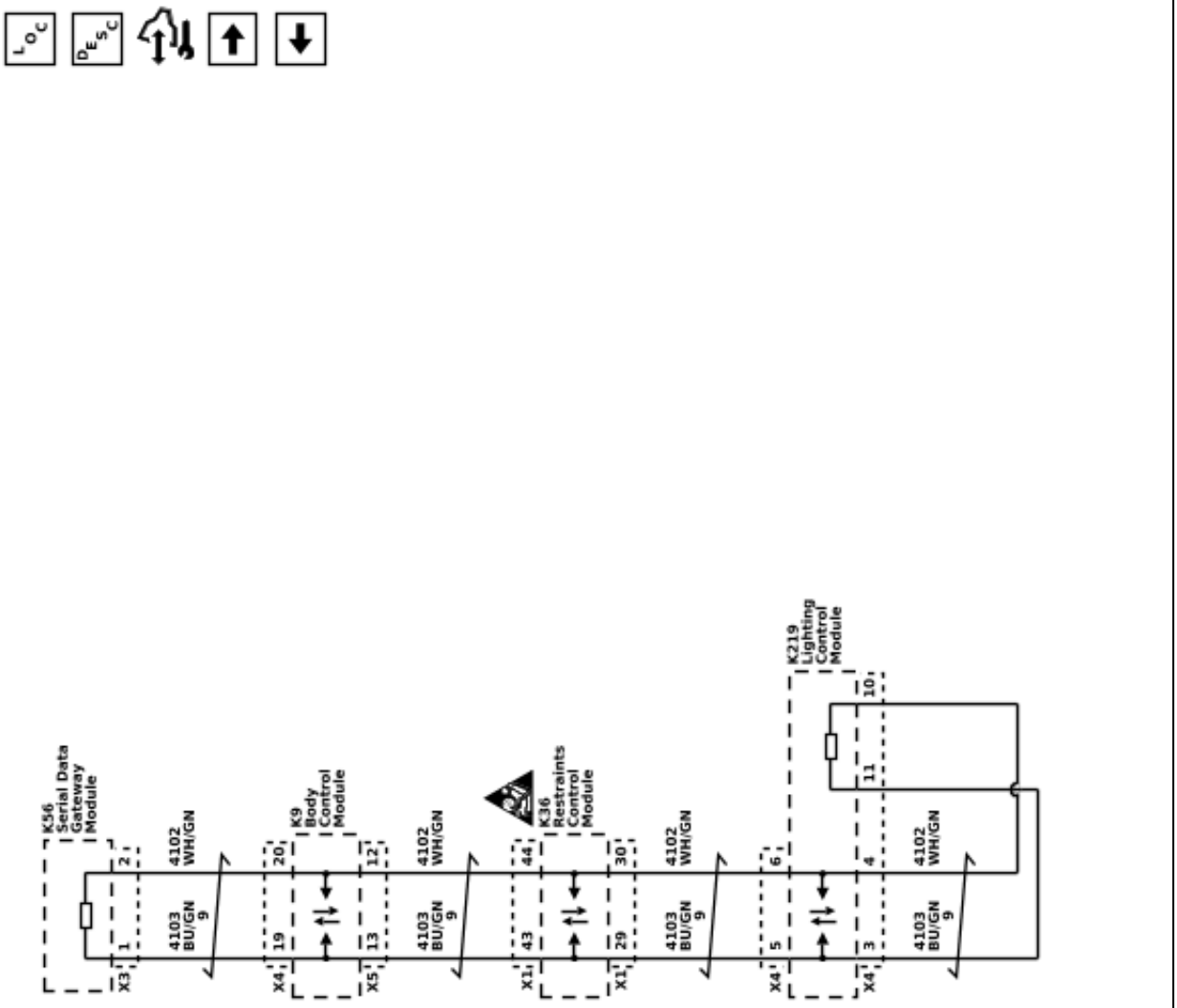
Data Communication Schematics (CAN 8 (UJE / UKM))



Data Communication Schematics (CAN 8 (UK0 / UKL))

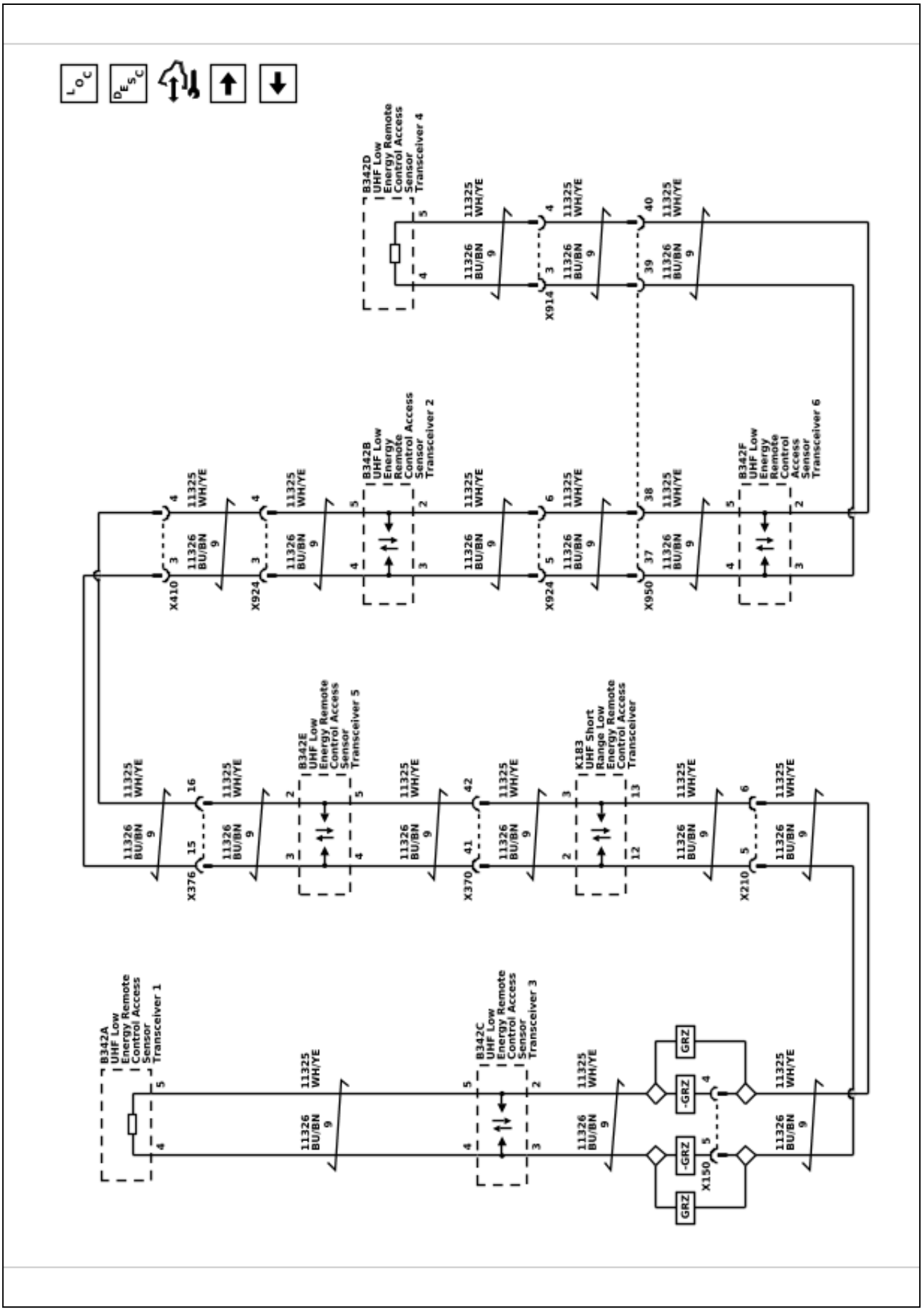


Data Communication Schematics (CAN 9)

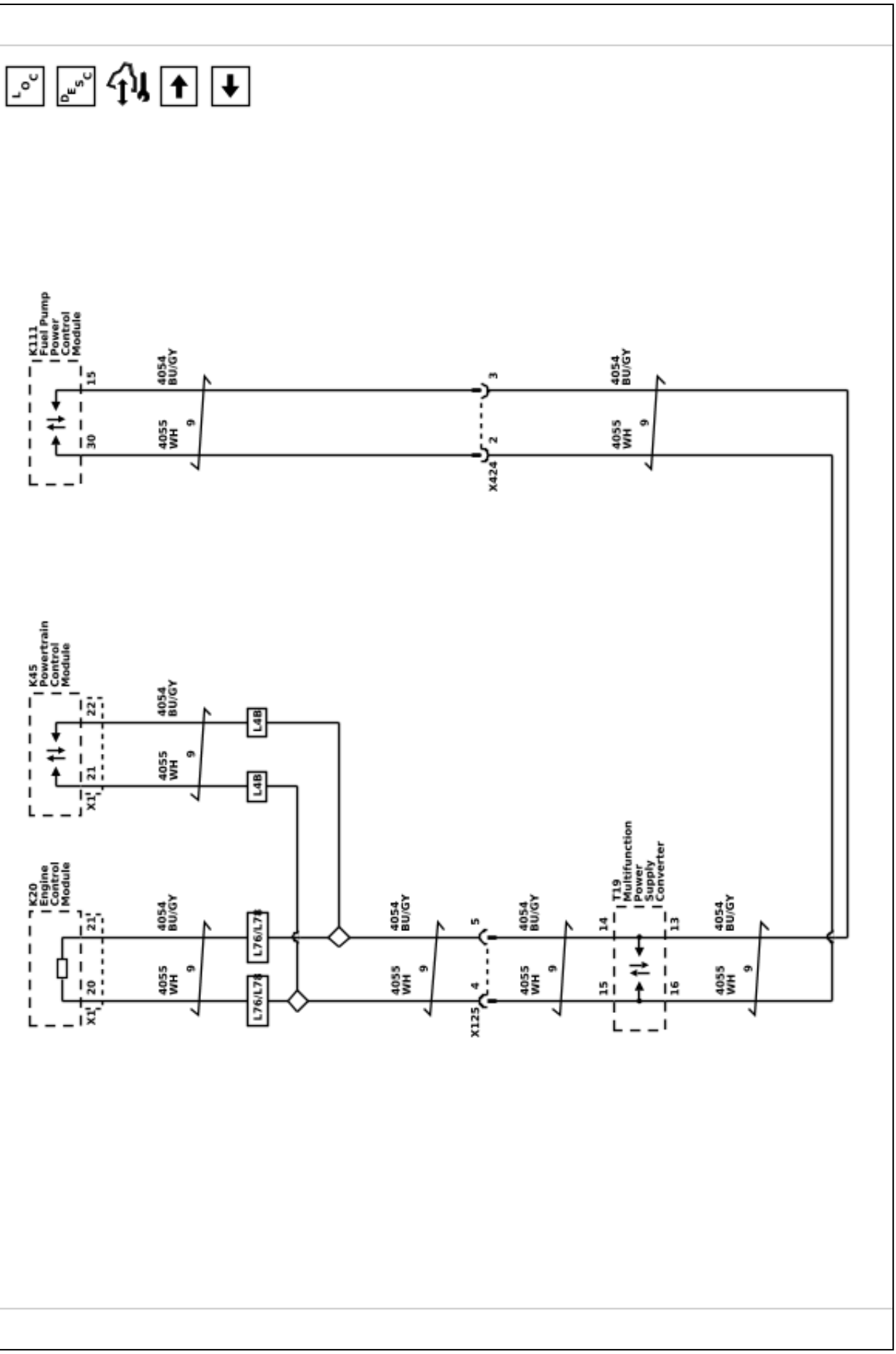


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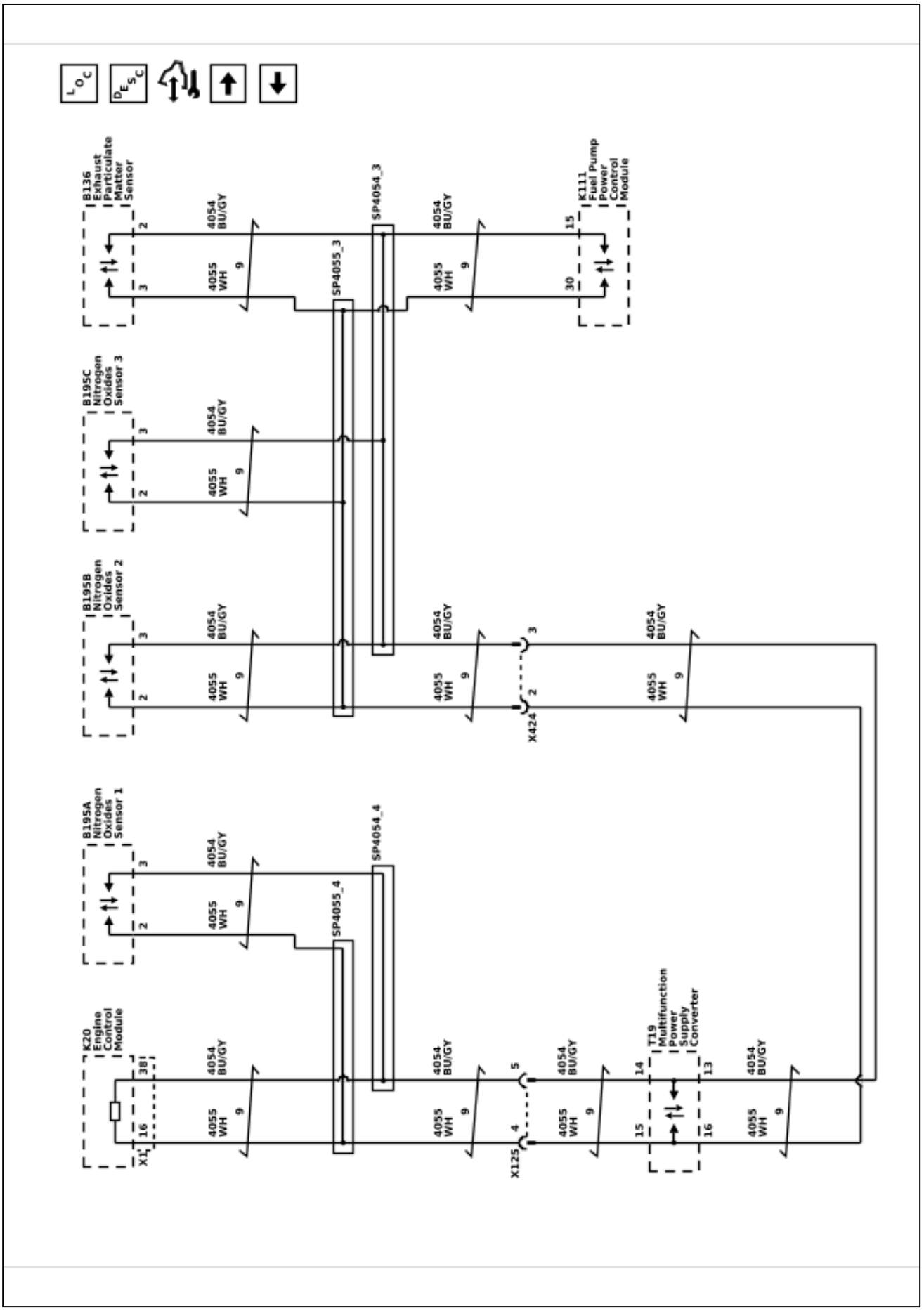
Data Communication Schematics (Virtual Key CAN (BOK / BOR / BOY))



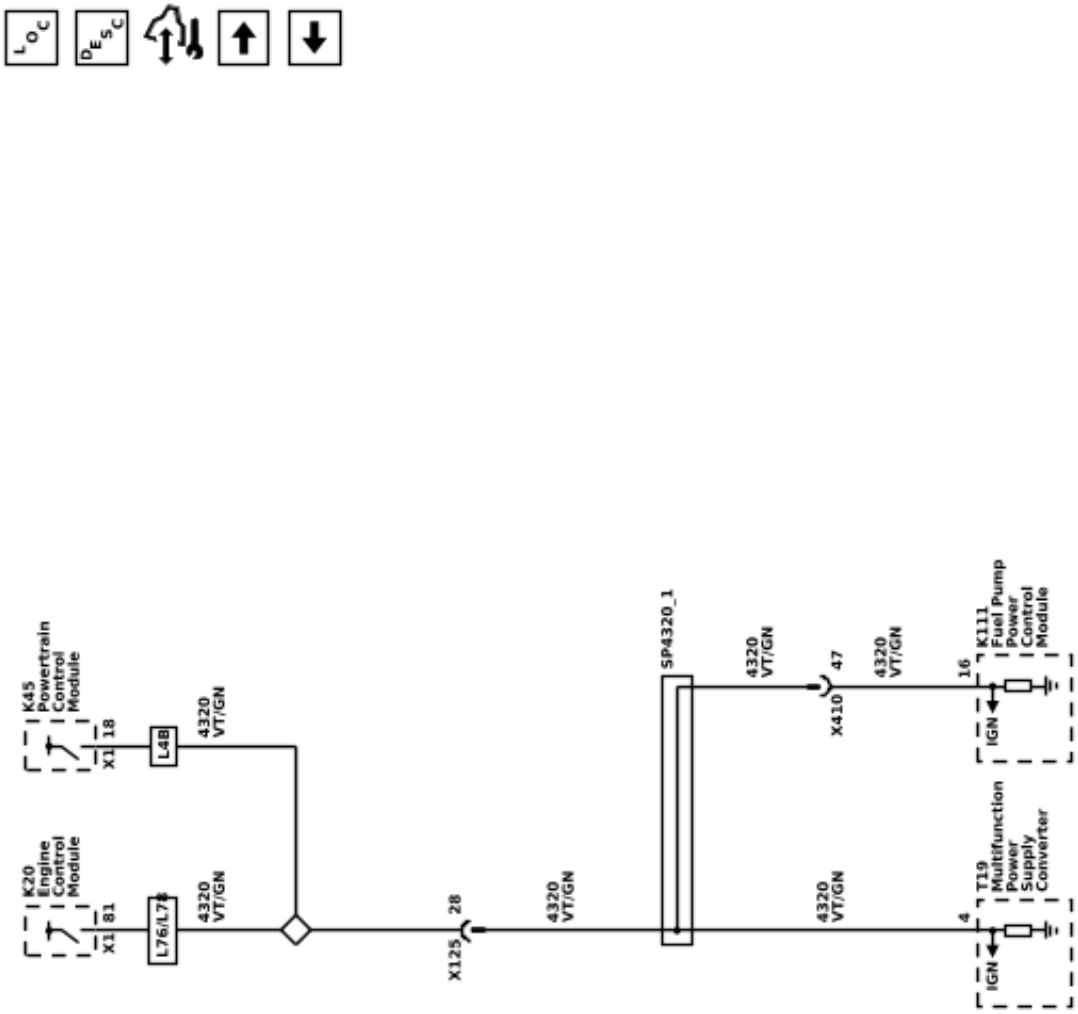
Data Communication Schematics (Powertrain CAN (FJW))



Data Communication Schematics (Powertrain CAN (FHX))

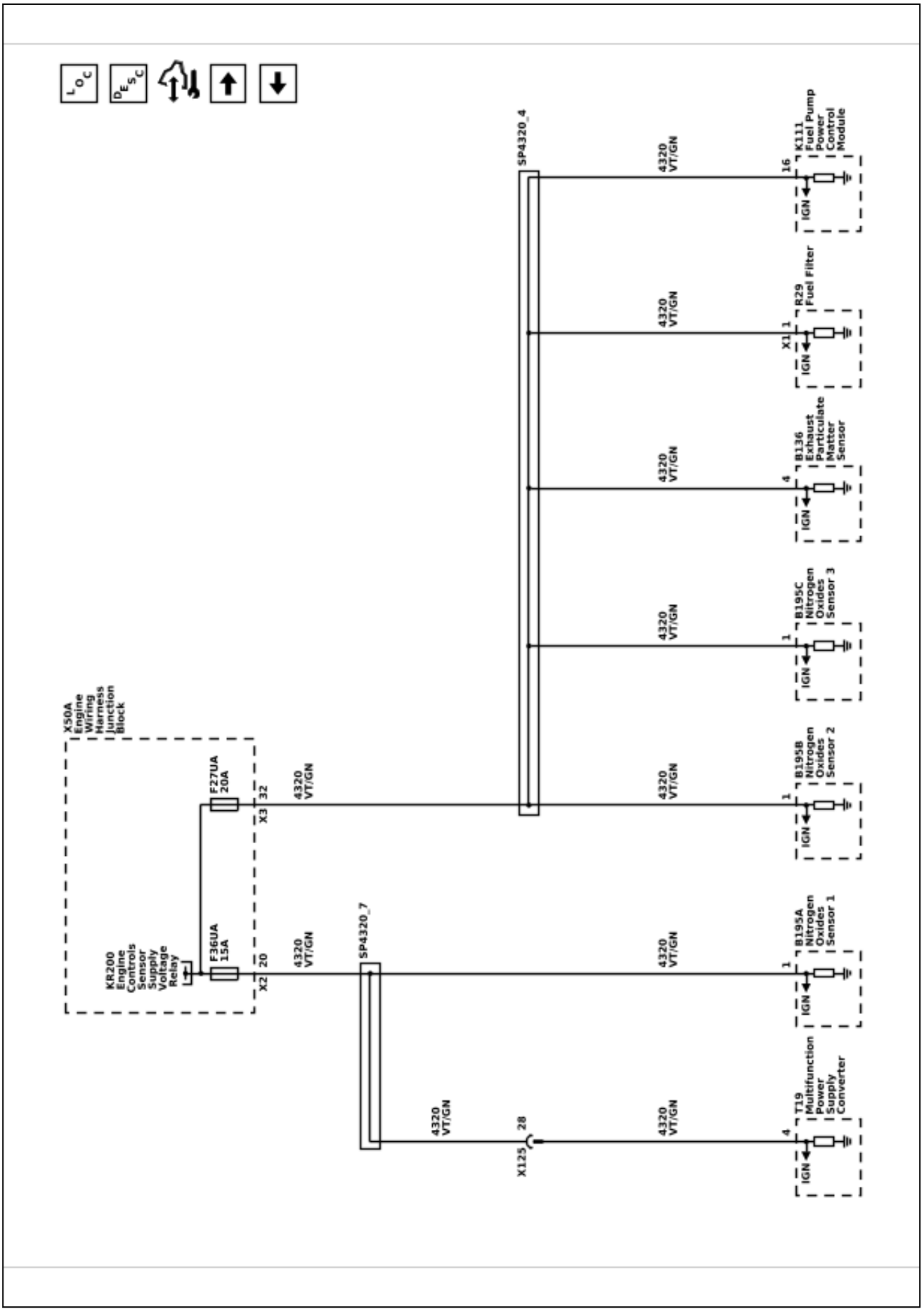


Data Communication Schematics (Powertrain CAN Enable (FJW))

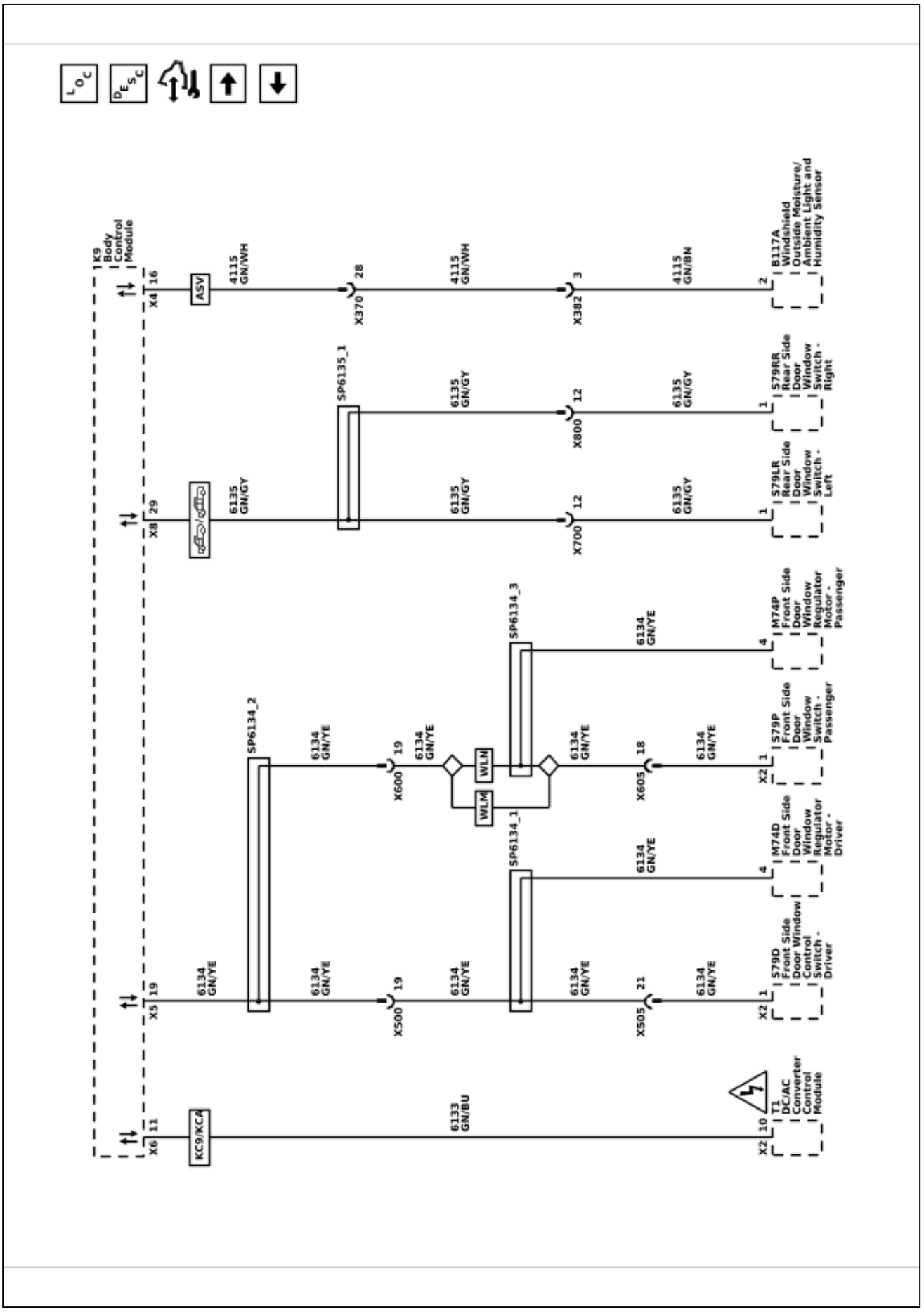


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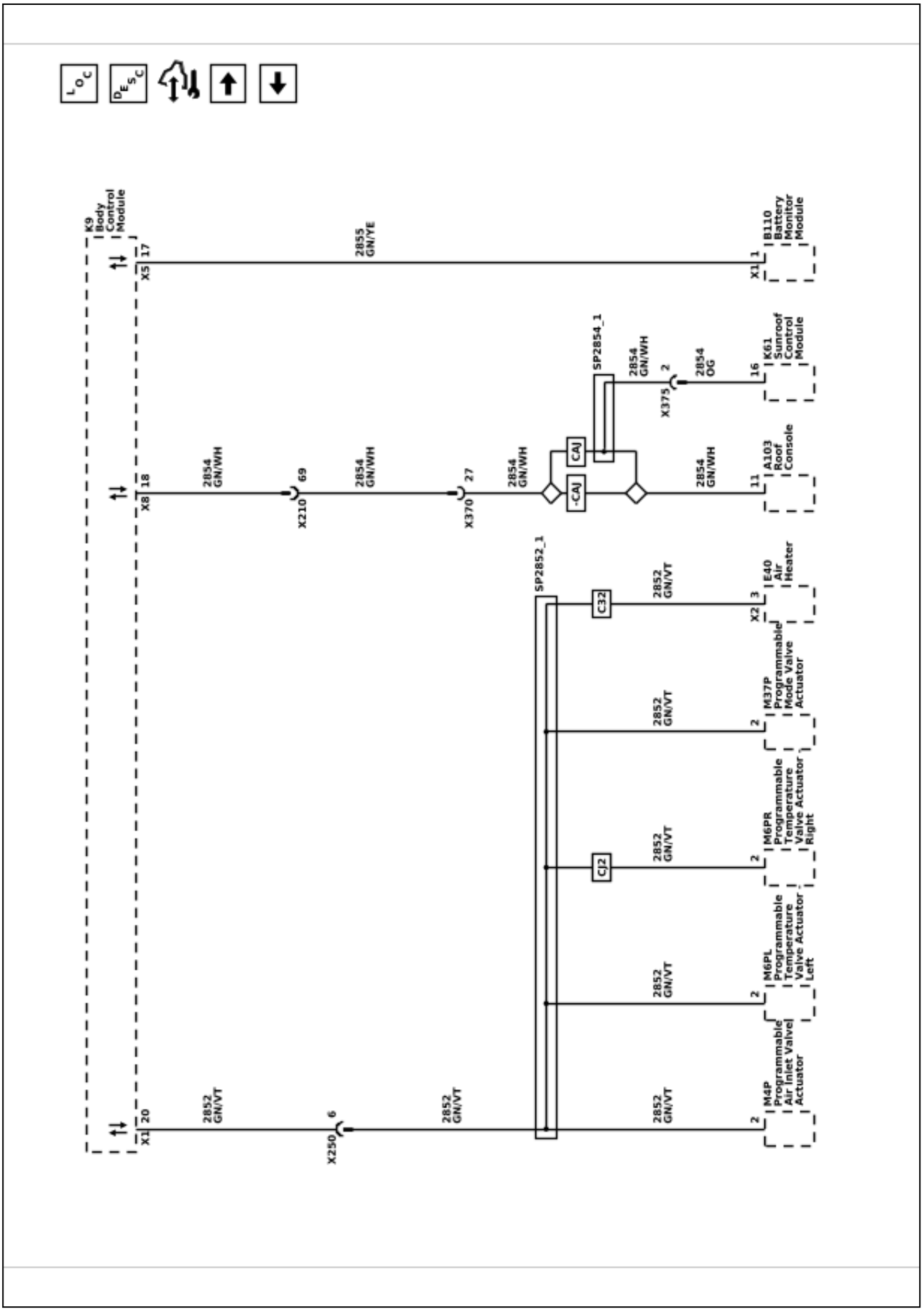
Data Communication Schematics (Powertrain CAN Enable (FHX))



Data Communication Schematics (Body Control Module Local Interconnect Network LIN Busses 2, 3, 4, and 5)

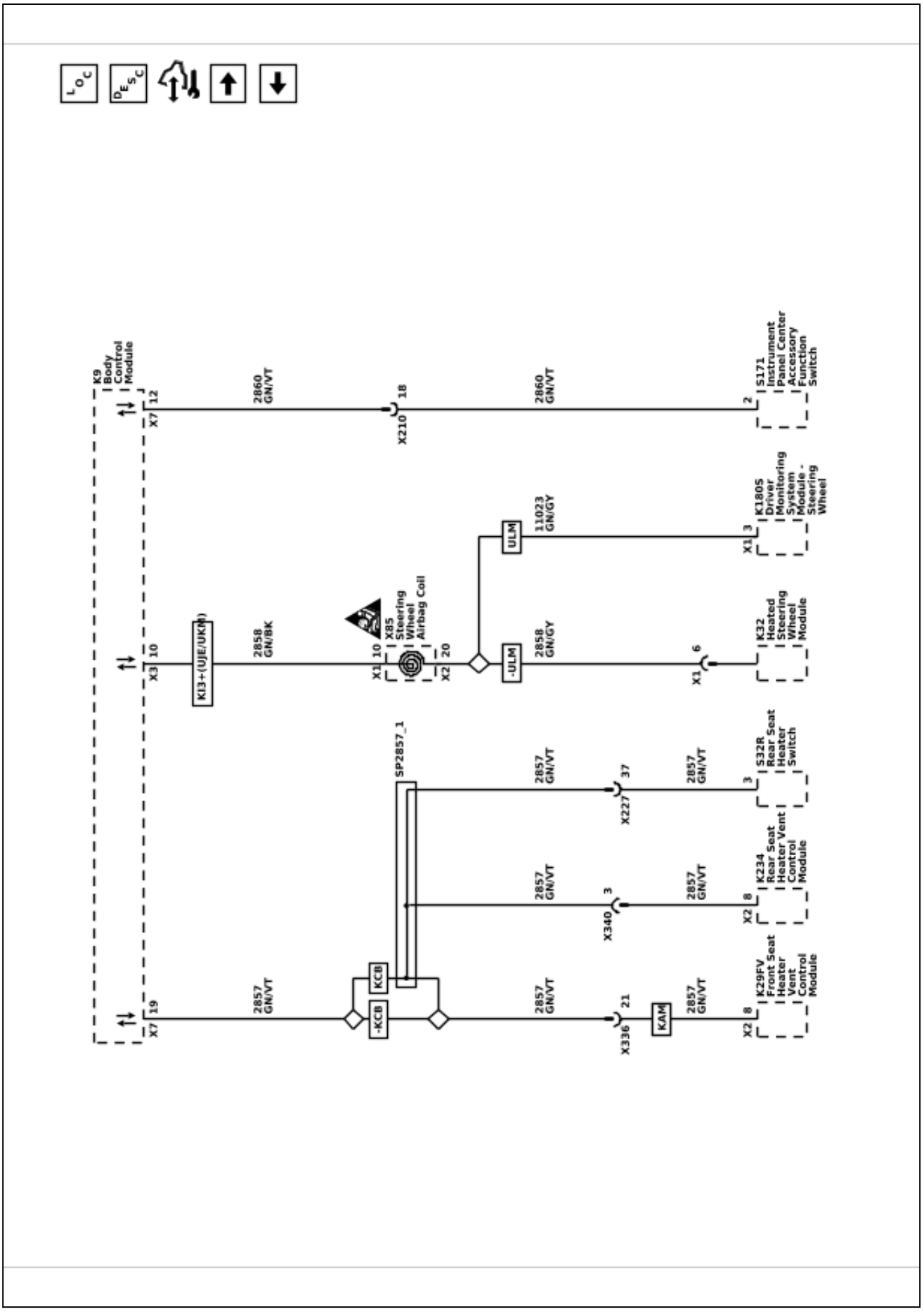


Data Communication Schematics (Body Control Module Local Interconnect Network LIN Busses 6, 8, and 9)

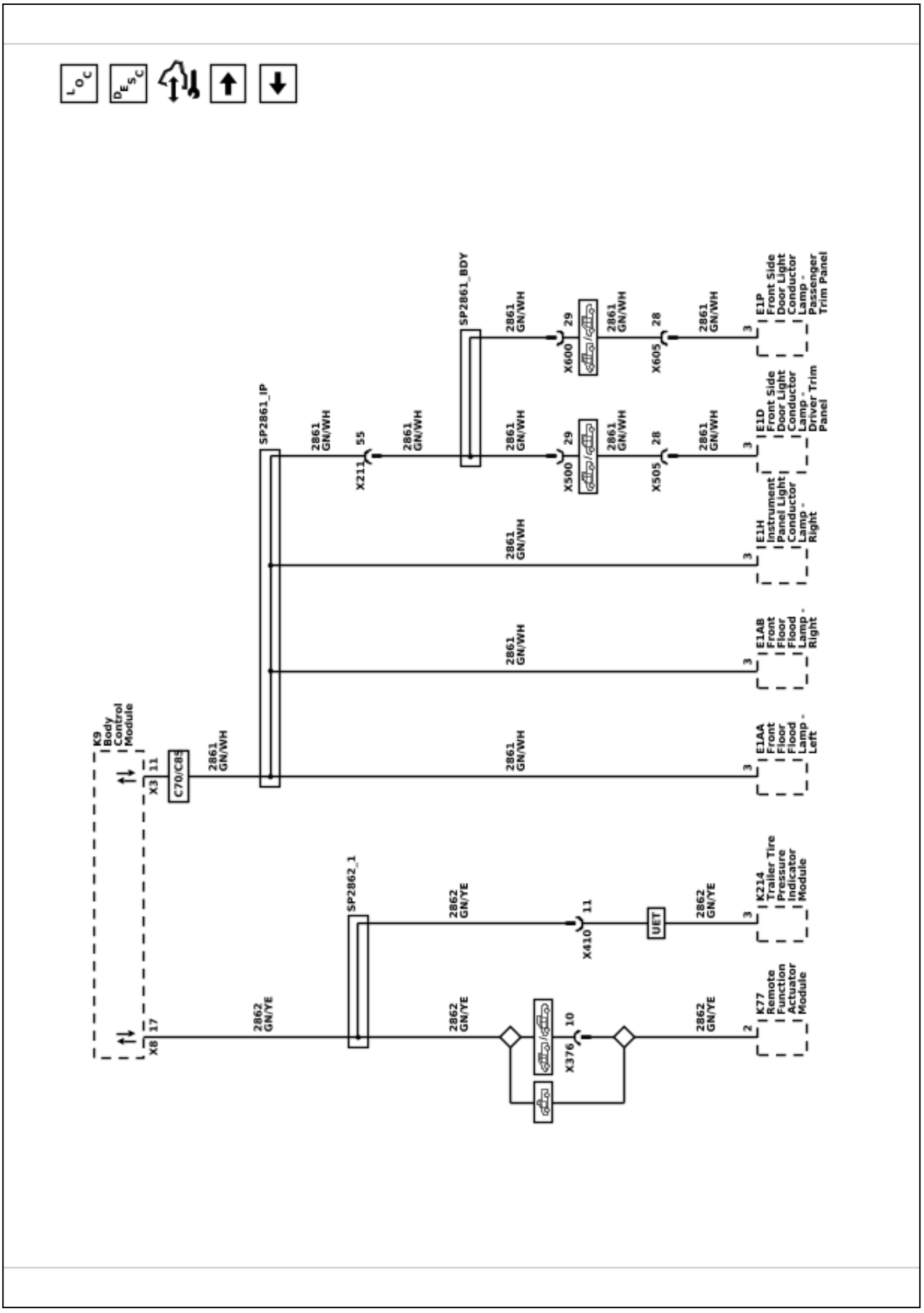


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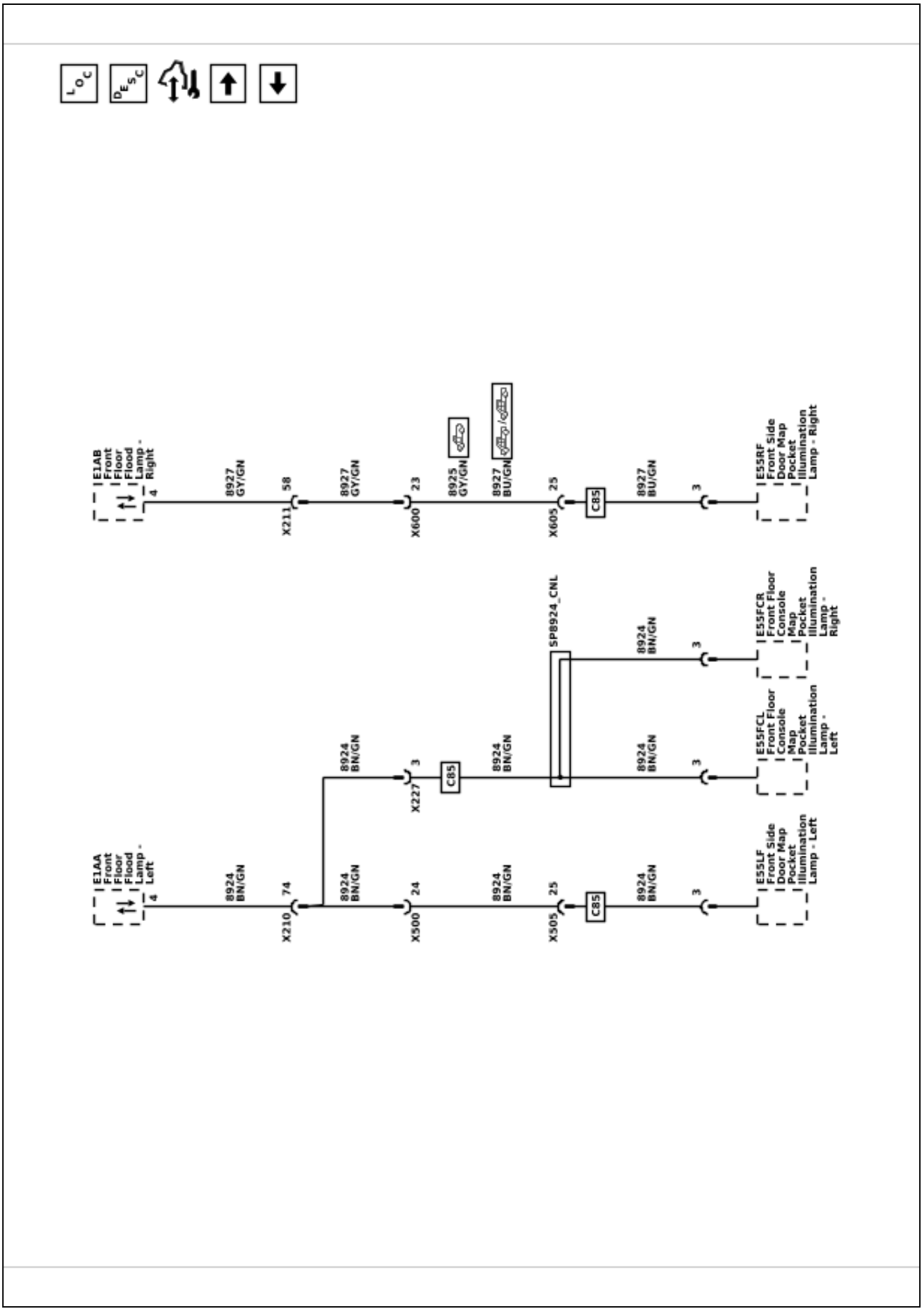
Data Communication Schematics (Body Control Module Local Interconnect Network LIN Busses 11, 12, and 14)



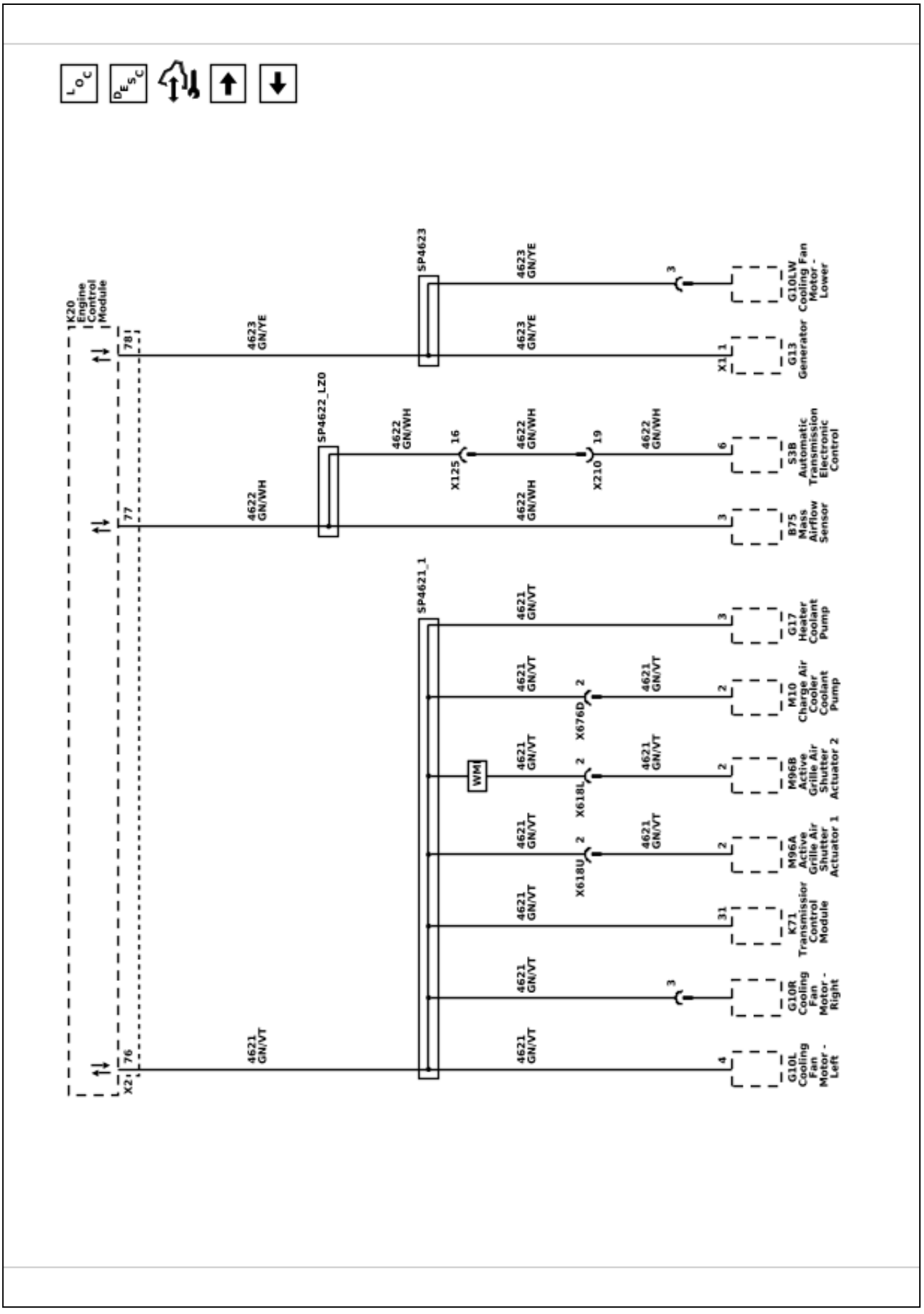
Data Communication Schematics (Body Control Module Local Interconnect Network LIN Busses 15 and 16)



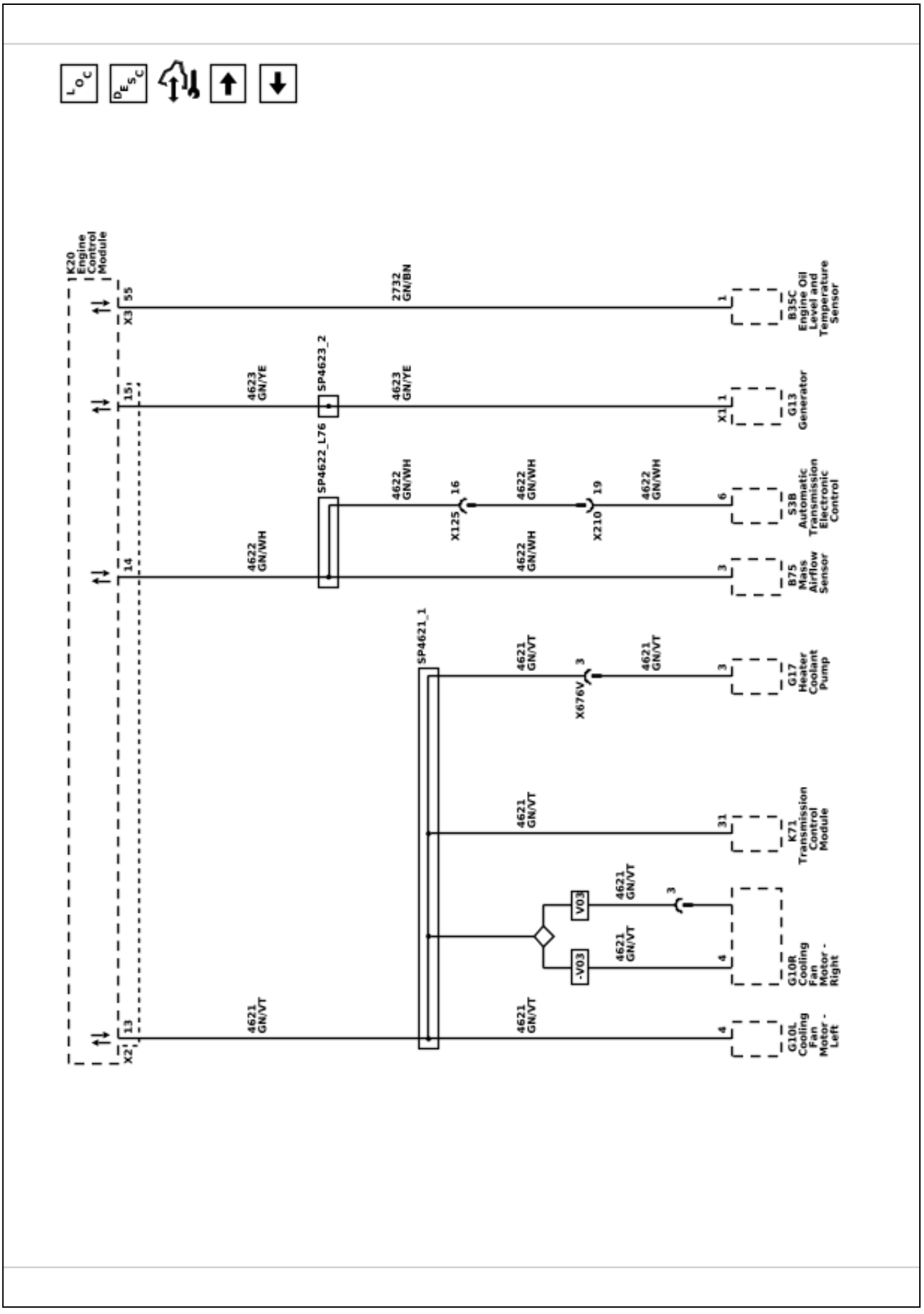
Data Communication Schematics (Ambient Lighting Local Interconnect Network LIN Busses (C70 / C85))



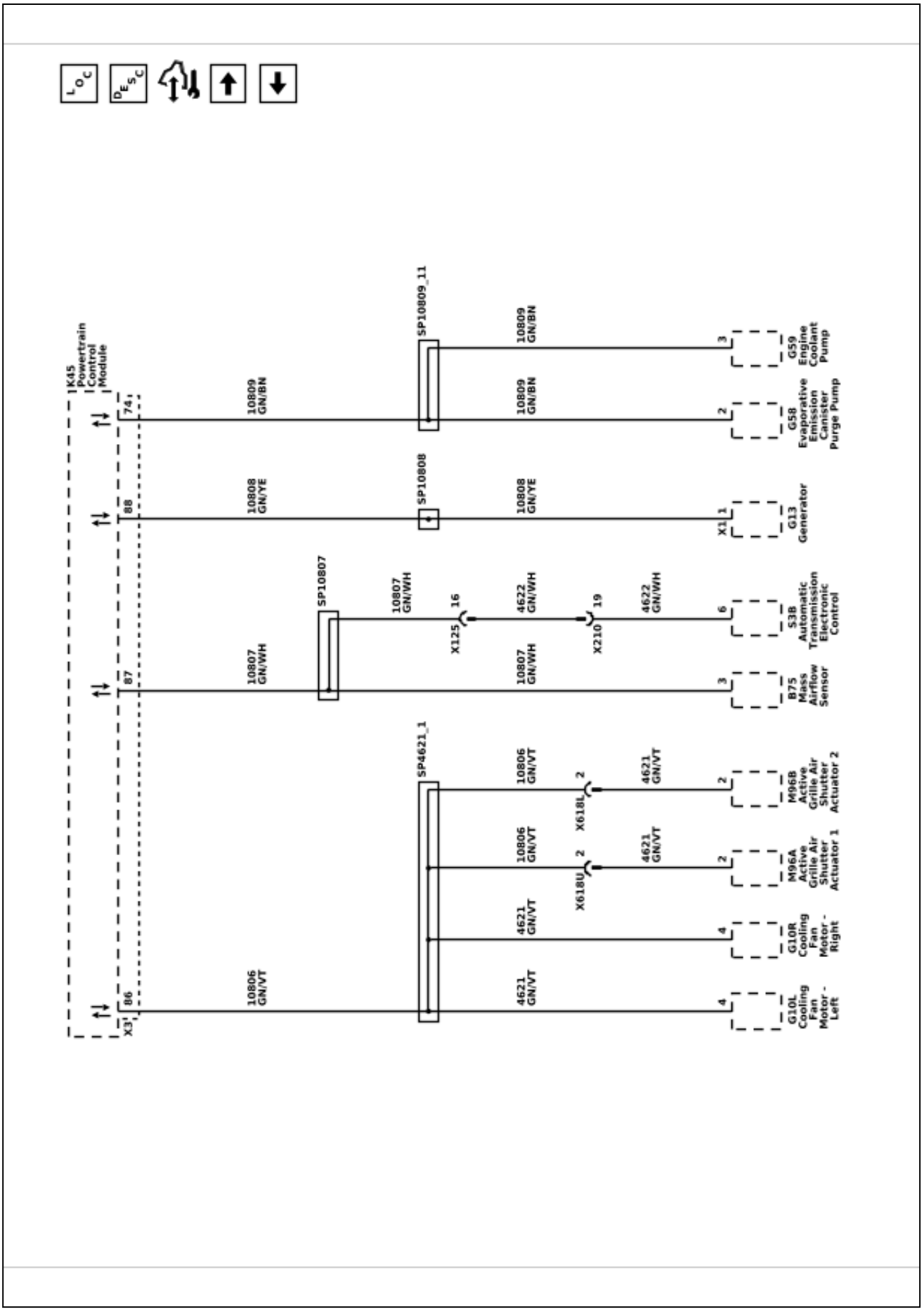
Data Communication Schematics (Engine Control Module Local Interconnect Network LIN Busses (LZ0))



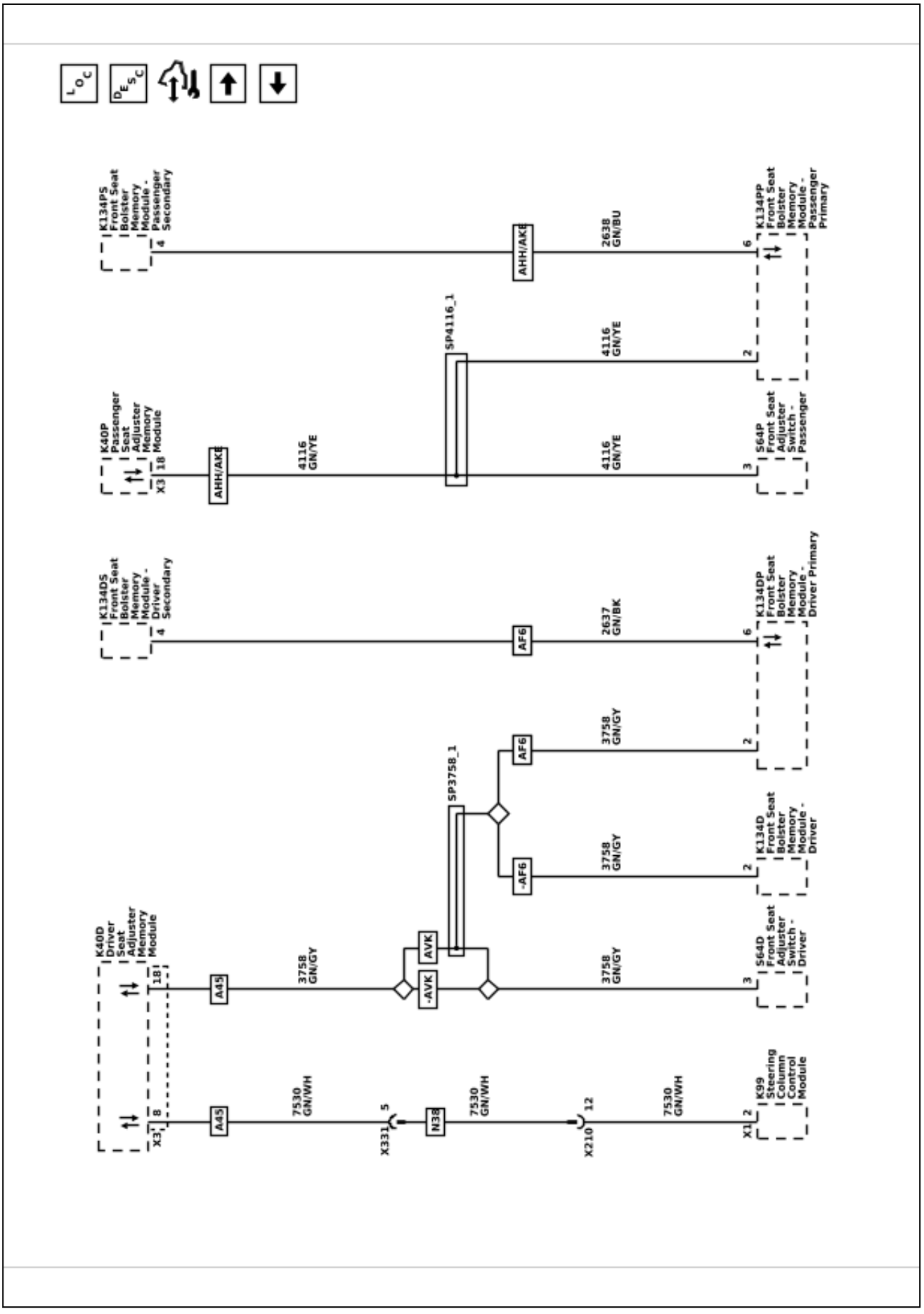
Data Communication Schematics (Engine Control Module Local Interconnect Network LIN Busses (L76 / L78))



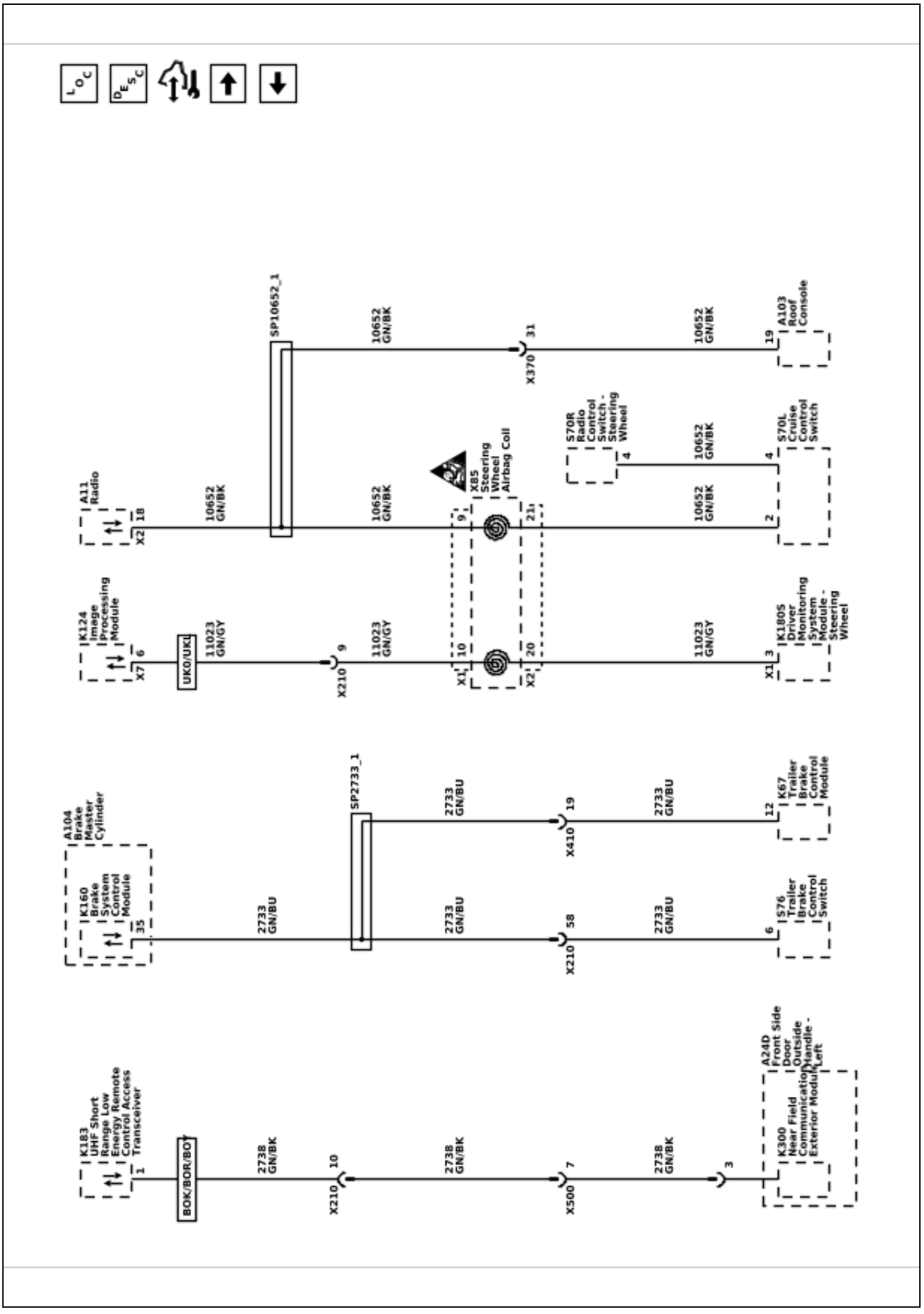
Data Communication Schematics (Powertrain Control Module Local Interconnect Network LIN Busses (L4B))



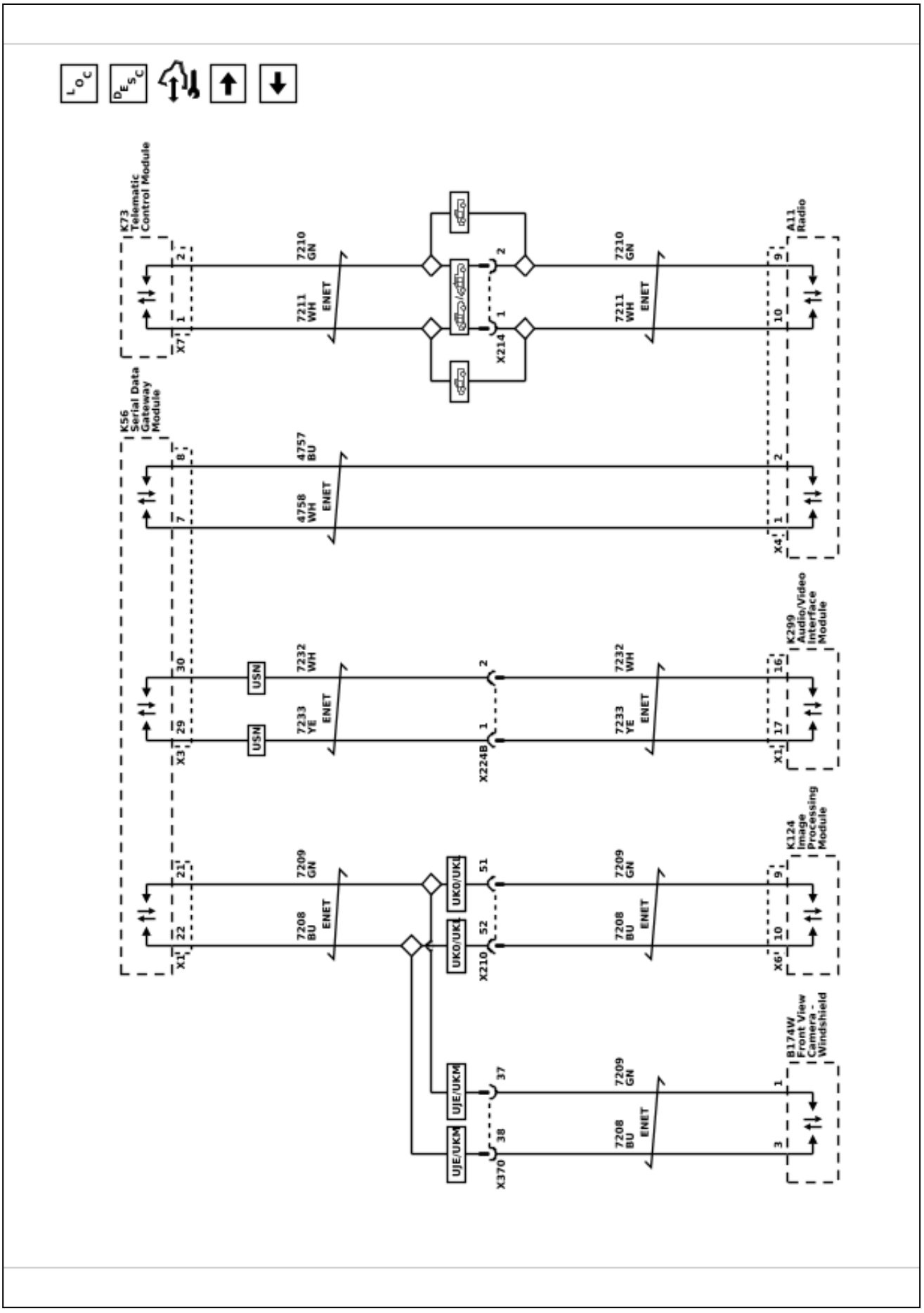
Data Communication Schematics (Seat Memory Module Local Interconnect Network LIN Busses)



Data Communication Schematics (General Local Interconnect Network LIN Busses)

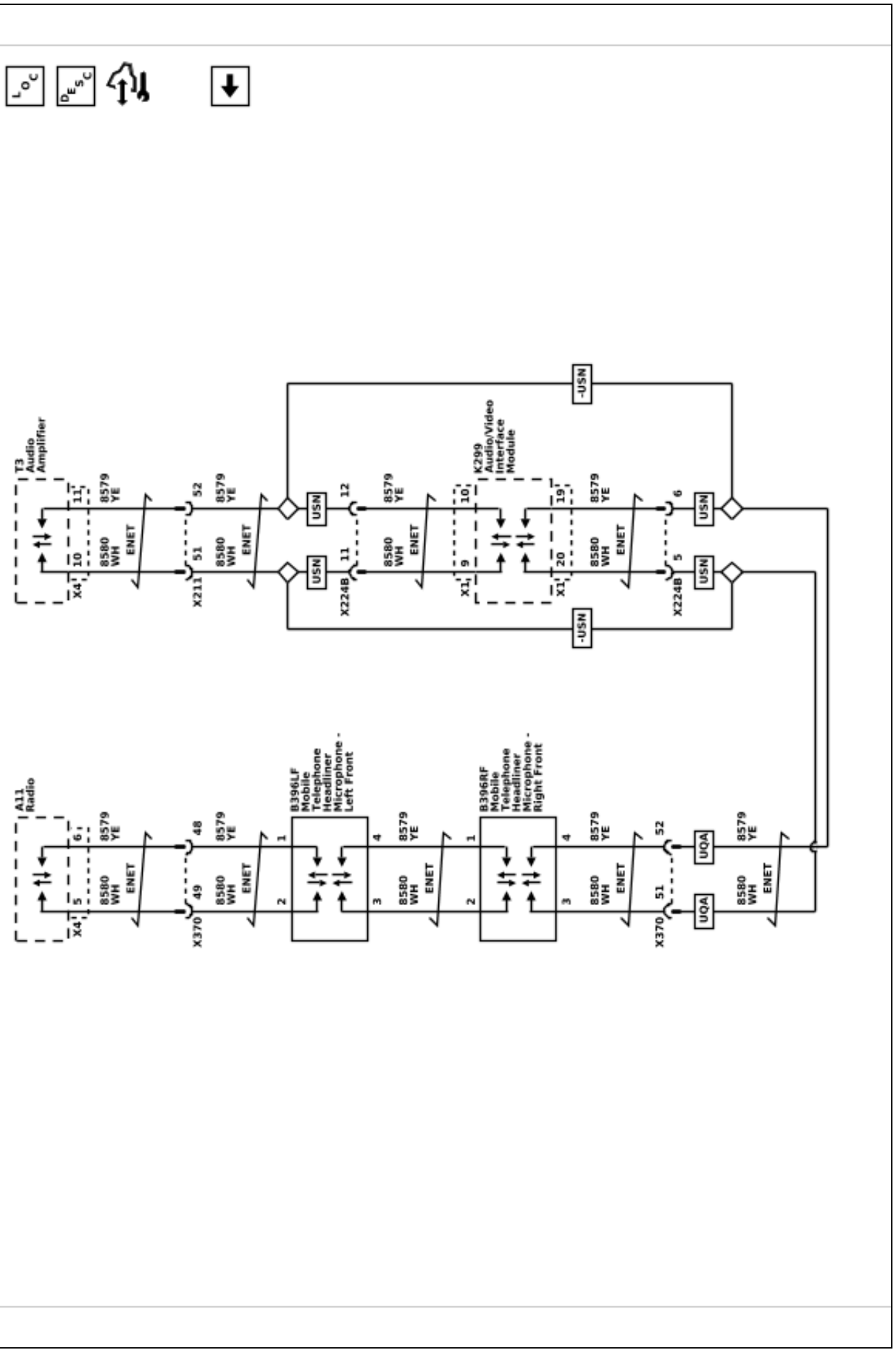


Data Communication Schematics (Ethernet Busses)

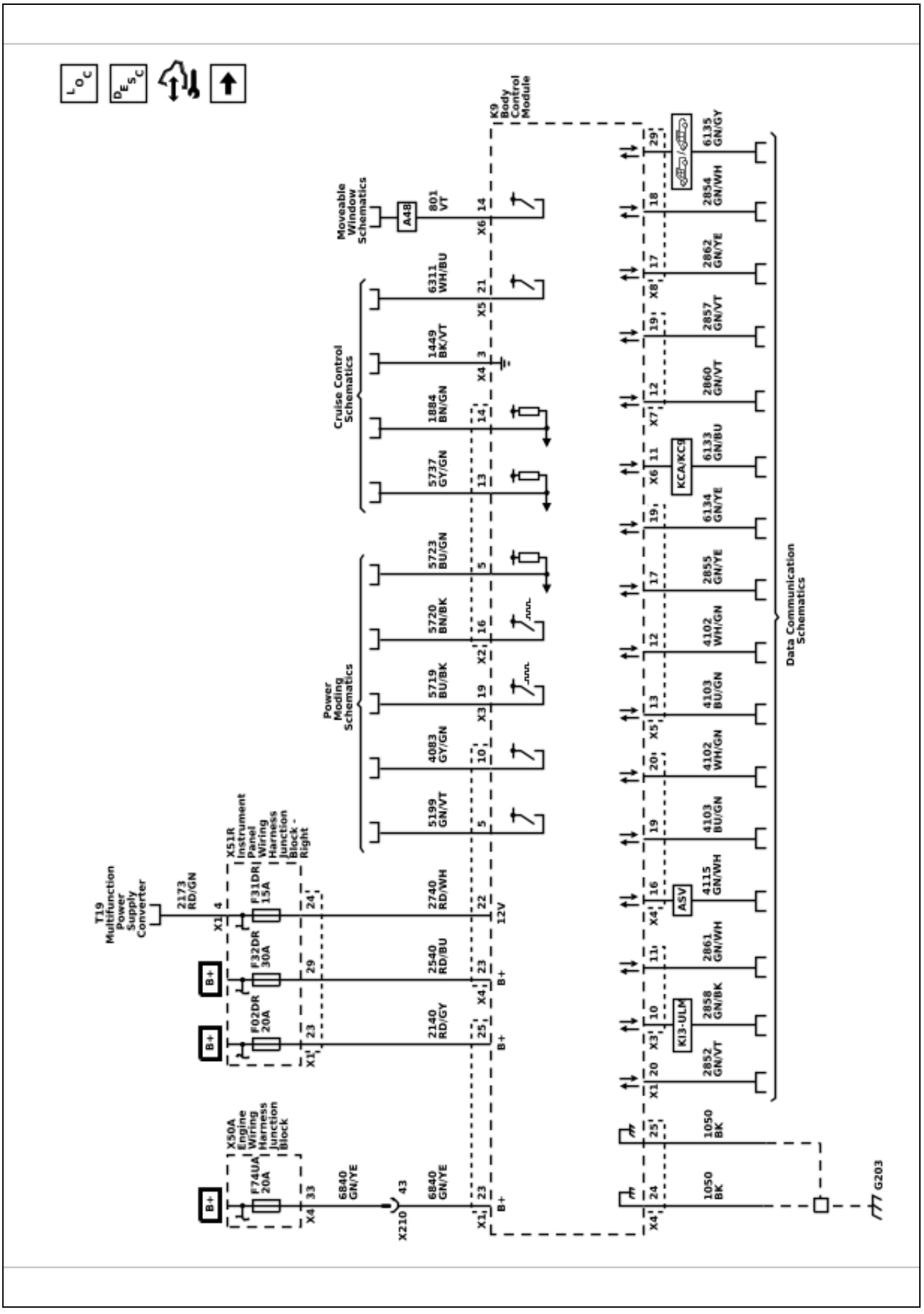


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Data Communication Schematics (Automotive Audio Bus 1)

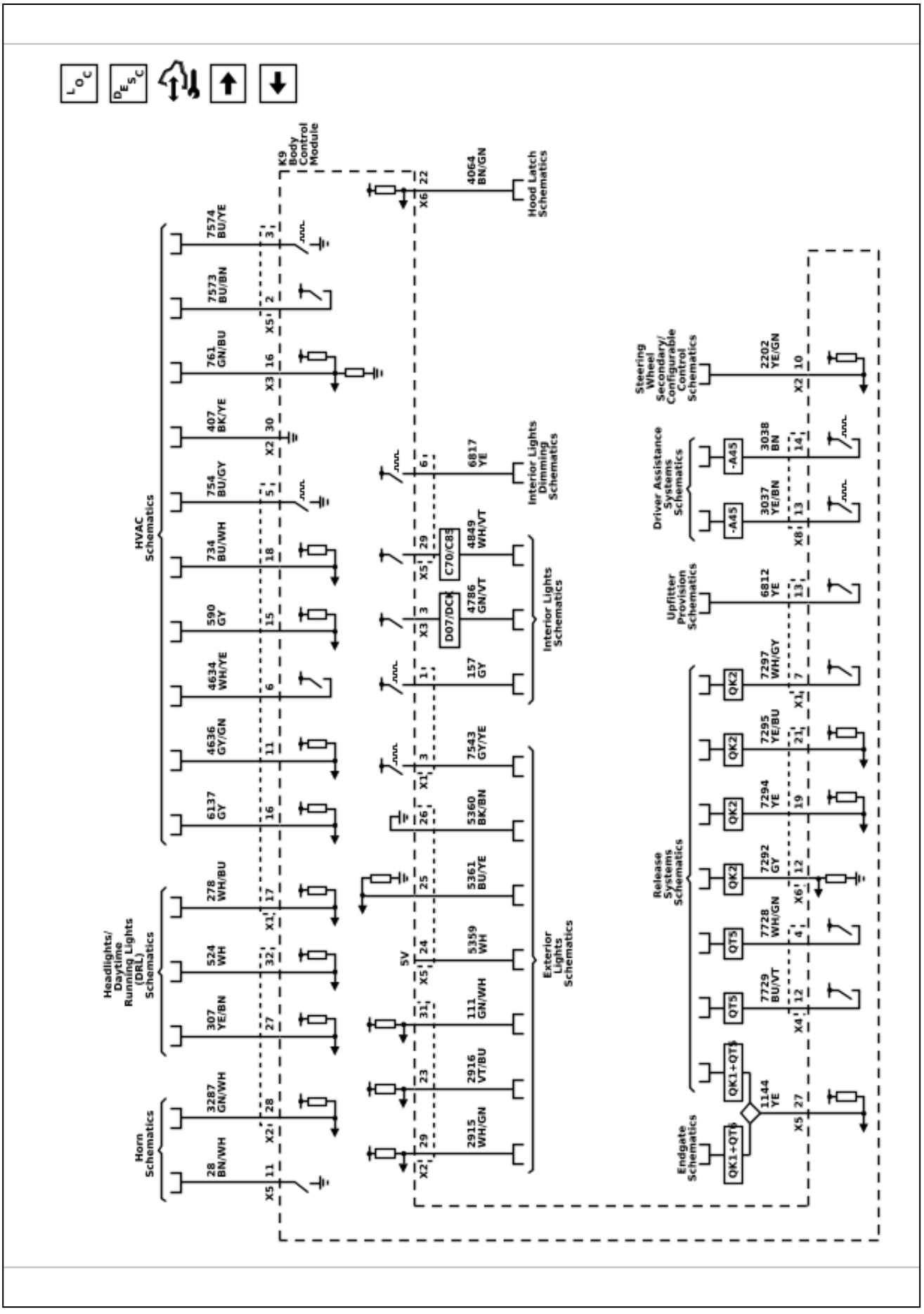


Body Control System Schematics (Power, Ground, Serial Data, and Subsystem References - 1 of 3)



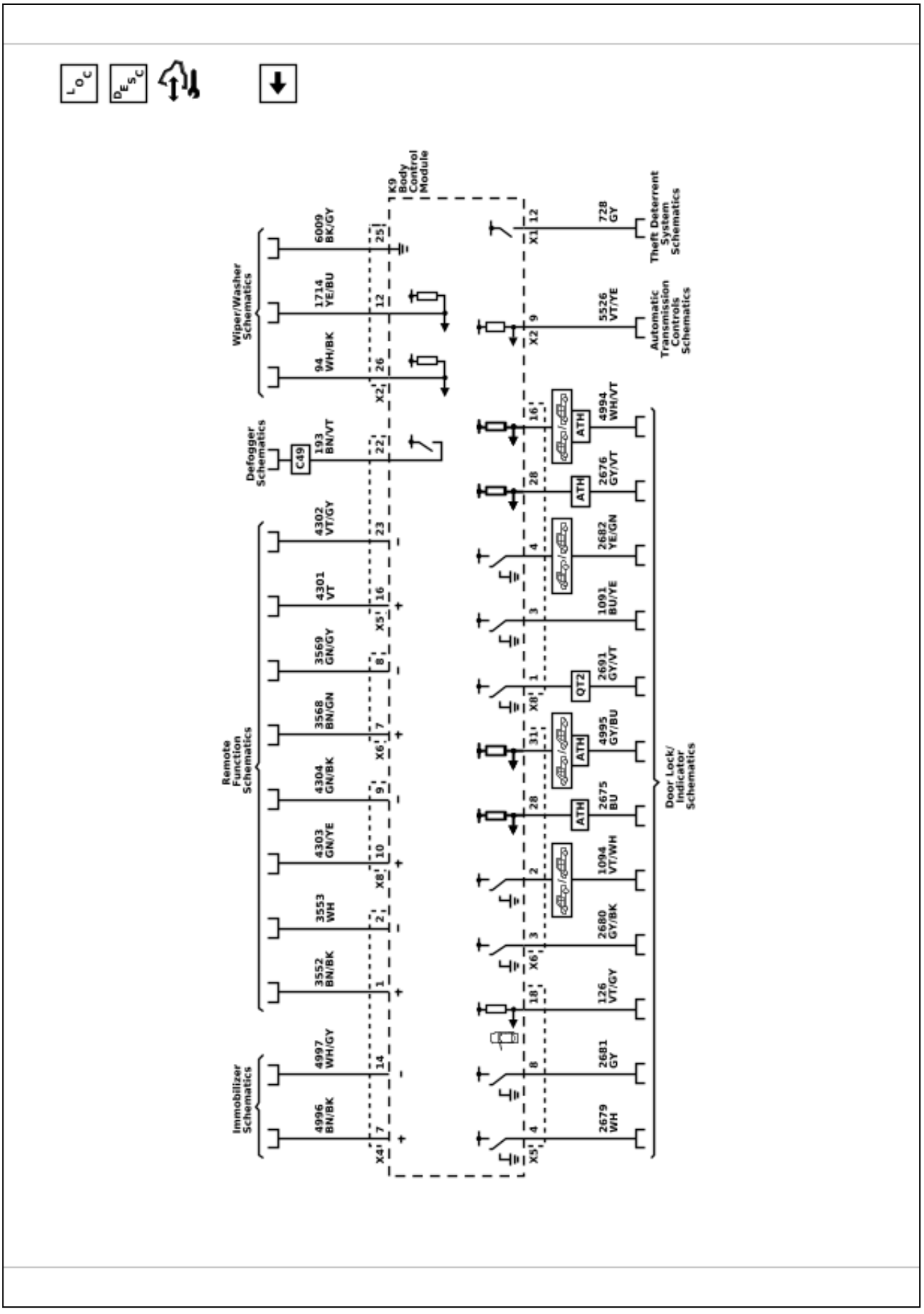
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Body Control System Schematics (Subsystem References - 2 of 3)



7157942

Body Control System Schematics (Subsystem References - 3 of 3)



7157943

Description and Operation

Data Link Communications Description and Operation

Note: This is an overview of different serial data buses used by control modules to communicate with each others. Use *Data Communication Schematics 8-3* to find out which serial data buses are configured for a specific vehicle.

Vehicle Intelligence Platform (VIP) Data Link Communications Overview

There are many components in a vehicle that rely on information from other sources, transmit information to other sources, or both. Serial data communication networks provide a reliable, cost effective, way for various components of the vehicle to “talk” to one another and share information.

General Motors uses a number of different communication buses to ensure the timely and efficient exchange of information between control modules. When compared to each other, some of these buses are different in nature as far as speed, signal characteristics, and behavior.

On the other hand, when other buses are compared to each other they have similar characteristics and simply operate in parallel. In this case they are used to group together components which have high interaction. Examples are the Controller Area Network (CAN), private CAN, and Local Interconnect Network (LIN) buses. This allows them to communicate with each other on a bus with reduced message congestion insuring faster and the more timely exchange of information than if all vehicle control modules were on a single bus.

The majority of information that exists within a given network generally stays local; however some information will have to be shared on other networks. Control modules designated as Gateways perform the function of transferring information between the various buses. A Gateway module is connected to at least 2 buses and will interact with each network according to its message strategy and transmission models.

CAN provides the capability for a receiving control module to monitor message transmissions from other control modules in order to determine if messages of interest are not being received. The primary purpose is to allow reasonable default values to be substituted for the information no longer being received. Additionally, a control module may set a Diagnostic Trouble Code (DTC) to indicate that the control module it is expecting information from is no longer communicating.

K9 Body Control Module (BCM)

The body control system consists of the K9 Body Control Module, communications, and various input and outputs. Some inputs, outputs and messages require other control modules to interact with the K9 Body Control Module. The K9 Body Control Module also has discrete input and output terminals to control the vehicle's body functions. The K9 Body Control Module is wired to CAN bus and multiple LIN buses and acts as a gateway between them.

The various K9 Body Control Module input and output circuits are illustrated in the corresponding functional areas on the K9 Body Control Module electrical schematics. Refer to the *Body Control System Schematics 8-32* for more detailed information.

K56 Serial Data Gateway Module

The K56 Serial Data Gateway Module gates messages between the CAN networks described in the Controller Area Network (CAN) Bus Description section below. The K56 Serial Data Gateway Module needs to know what CAN control modules are present on a given vehicle in order to enable/disable loss of communication DTCs and to know which CAN control modules to track for their communication status. The K56 Serial Data Gateway Module has the ability to learn the diagnostic addresses list of CAN control modules to identify what CAN control modules are equipped on the vehicle and what CAN buses they are on. If the K56 Serial Data Gateway Module is replaced, this learn/verification process will have to be done again through K56 Serial Data Gateway Module programming and setup procedure in SPS. This learn process will not cause any previously learned contents to be forgotten/overwritten. If the learn process is not done on a new K56 Serial Data Gateway Module, DTC U1977 will be set until the learn procedure is executed. If the learn is invalid due to control module internal malfunction or a K56 Serial Data Gateway Module swap, DTC U3000 42 or DTC U3002 56 will be set. If any of these DTCs sets, the K56 Serial Data Gateway Module will enable loss of communication for all CAN control modules. This will result in loss of communication DTCs being set against CAN control modules that are not equipped on the vehicle.

A fault can be localized by monitoring the normal mode messages on a CAN bus. The K56 Serial Data Gateway Module will monitor one signal per CAN control module per CAN bus to determine control module status. When a signal times out, a loss of communication event will be started.

Controller Area Network (CAN) Bus Description

The CAN buses are used where data needs to be exchanged at a high enough rate to minimize the delay between the occurrence of a change in sensor value and the reception of this information by a control device using the information to adjust vehicle system performance.

Each CAN serial data network consists of two twisted wires. One signal circuit is identified as CAN-High and the other signal circuit is identified as CAN-Low. At each end of the data bus there is a 124 Ω termination resistor between the CAN-High and CAN-Low circuits. Most CAN control modules have an internal resistance of 4.950K Ω. There may be one or two CAN control modules that have a higher internal resistance like the K60 Column Lock Module which has an internal resistance of 77.4K Ω. The internal resistance of CAN control modules causes lower terminating resistor reading when splitting the CAN network to check for faults. The more CAN control modules on the network the lower the terminating resistor will read.

The data to be transmitted over a CAN bus is represented by the voltage difference between the CAN-High signal voltage and the CAN-Low signal voltage. Data symbols (1's and 0's) are transmitted sequentially at the following rate:

- CAN 1 (circuits 4986 & 4987) = 500 Kbit/s
- CAN 2 (circuits 4978 & 4979) = 2 Mbit/s
- CAN 3 (circuits 4976 & 4977) = 500 Kbit/s
- CAN 4 (circuits 4100 & 4101) = 500 Kbit/s
- CAN 5 (circuits 4984 & 4985) = 500 Kbit/s
- CAN 6 (circuits 4980 & 4981) = 5 Mbit/s
- CAN 7 (circuits 4982 & 4983) = 5 Mbit/s
- CAN 8 (circuits 4104 & 4105) = 2 Mbit/s
- CAN 9 (circuits 4102 & 4103) = 2 Mbit/s

Classical CAN: CAN 1, CAN 3, CAN 4, and CAN 5 are Classical CAN buses. In Classical CAN, the entire message is transmitted at the same baud rate. The size of the data field is limited to 8 bytes.

CAN FD: CAN 2, CAN 8, and CAN 9 are CAN FD buses (FD = Flexible Data-Rate). In CAN FD, the data field of the message is transmitted at the same or at a faster baud rate. The size of the data field can be up to 64 bytes in length.

When the two wire bus is at rest the CAN-High and CAN-Low signal circuits are not being driven and this represents a logic "1". In this state both signal circuits are at the same voltage of 2.5 V. The differential voltage is approximately 0 V.

When a logic "0" is to be transmitted, the CAN-High signal circuit is driven higher to about 3.5 V and the CAN-Low circuit is driven lower to about 1.5 V. The differential voltage becomes approximately 2.0 (+/- 0.5) V.

The CAN 1, CAN 2, CAN 3, CAN 4, CAN 5, CAN 8, and CAN 9 buses are used to communicate between the K56 Serial Data Gateway Module and other CAN control modules.

The CAN 8 and CAN 9 buses are reserved for the following systems:

- The CAN 8 bus is reserved for most control modules and sensors related to active safety system, if applicable.
- The CAN 9 bus is reserved for most control modules and sensors related to Hybrid/EV system, if applicable.

The following CAN buses are between the X84 Data Link Connector and the K56 Serial Data Gateway Module:

- The CAN 6 bus is used for CAN diagnostics and programming.
- The CAN 7 bus is used for programming by assembly plant only.
- The Private Presentation CAN 1 bus (circuits 2577 & 2578) is used by Engineering to observe data communications on CAN buses not directly accessible at the X84 Data Link Connector. It requires special security access and will not be used in a service environment.
- The Private Presentation CAN 2 bus (circuits 2579 & 2580) is used by Engineering to observe data communications on CAN buses not directly accessible at the X84 Data Link Connector. It requires special security access and will not be used in a service environment.

CAN Bus Tools/Functions:

The K56 Serial Data Gateway Module has the ability to monitor, detect, identify and localize CAN bus wiring issues. It also has the ability to monitor and display the raw voltage information of each CAN serial data circuit on each CAN bus. The following CAN bus tools/functions in the scan tool (GDS2) can be used as additional tools to identify the fault type and fault location under **Vehicle Diagnostics > Vehicle Communication Diagnostics**.

- [Link target (target-id 326162-) not found] : This can be used to determine what CAN control modules are equipped on a particular CAN bus and the communication status of those control modules.

- [Link target (target-id 354522-) not found] : This can be used to monitor and detect a fault in the CAN serial data circuit of a targeted CAN bus.
- [Link target (target-id 326161-) not found] : This can be used to determine what CAN control modules are equipped on a particular CAN bus, the communication status of those control modules, and CAN wiring fault types such as short to battery, short to ground, short together, open, control module poor ground, etc.

Private Powertrain CAN Bus Description

The Private Powertrain CAN bus (circuits 4054 & 4055) is reserved for Powertrain components. It has a transmission rate of 500 Kbit/s. Sometimes communication is required between the Private Powertrain CAN bus and another CAN bus. This is accomplished by using the K20 Engine Control Module / K45 Powertrain Control Module (for gas vehicles) or K16 Battery Energy Control Module (for electric vehicles) as the Gateway module. Since the Private Powertrain CAN bus and other CAN buses operate in the same manner, the diagnostics for each are similar.

Local Interconnect Network (LIN) Bus Description

The LIN Bus consists of a single wire with a transmission rate of 10.417 Kbit/s or 19.23 Kbit/s. This bus is used to exchange information between a master control module and other smart devices which provide supporting functionality. This type of configuration does not require the capacity or speed of a CAN bus and is thus relatively simpler.

The data symbols (1’s and 0’s) to be transmitted are represented by different voltage levels on the communication bus. When the LIN Bus is at rest and is not being driven, the signal is in a high voltage state of approximately Vbatt. This represents a logic “1”. When a logic “0” is to be transmitted, the signal voltage is driven low to about ground (0.0 V).

Ethernet Bus Description

Note: Ethernet harness failures should only be repaired using an appropriate kit to perform de-pin/re-pin overlays or in cases where the wiring harness repair kits are not available, the entire harness should be replaced. No crimps or splicing should be performed on the Ethernet wiring harness.

Ethernet is a data communication technology that uses a single twisted copper pair of wires at speeds of 100 Mbit/s and 1000 Mbit/s. The Ethernet system uses point-to-point communication that is connected via an Ethernet switch [Module <--> Switch <--> Module]. The Ethernet bus does not use terminating resistors.

The K56 Serial Data Gateway Module and the A11 Radio have an Ethernet switch that connects to other Ethernet modules. The K56 Serial Data Gateway Module and the A11 Radio communicate with other devices and systems in the vehicle via CAN and LIN buses. Diagnostic Trouble Codes will be read on CAN to diagnose Ethernet, LIN and system faults.

Ethernet 1

Ethernet bus 1 consists of 2 twisted pair of wires [1 pair for Ethernet bus 1R (circuits 4972 & 4973) and 1 pair for Ethernet bus 1T (circuits 4974 & 4975)]. It is connected between X84 Data Link Connector (DLC) and K56 Serial Data Gateway Module. This bus is used for diagnostics and service programming of control modules using Ethernet instead of CAN. The K56 Serial Data Gateway Module will convert Ethernet serial data to CAN as necessary, and vice versa. There is an Ethernet enable circuit (circuit 7207) which can be used to wake up the K56 Serial Data Gateway Module for Ethernet diagnostic and programming.

Ethernet 2

Ethernet bus 2 (circuits 4757 & 4758) is for connection between the A11 Radio and the K56 Serial Data Gateway Module.

Ethernet 3

Ethernet bus 3 (circuits 7208 & 7209) is for connection between the following control modules depending on vehicle configuration:

- K56 Serial Data Gateway Module and K179 Automated Driving Mapping Module.
- K56 Serial Data Gateway Module and K124 Image Processing Module.
- K56 Serial Data Gateway Module and B174W Front View Camera - Windshield.

Ethernet 4

Ethernet bus 4 (circuits 7210 & 7211) is for connection between the following control modules:

- K56 Serial Data Gateway Module and K73 Telematic Control Module for vehicles equipped with IOR radio.
- A11 Radio and K73 Telematic Control Module for vehicles equipped with other radios.

Ethernet 5

Ethernet bus 5 (circuits 7212 & 7213) is for connection between the following control modules:

- A11 Radio and P22F Video Display - Right Front Seat Back.

- A11 Radio and K299R Audio/Video Interface Rear Module.

Ethernet 6

Ethernet bus 6 (circuits 7214 & 7215) is for connection between the A11 Radio and T3 Audio Amplifier.

Ethernet 7

Ethernet bus 7 (circuits 7216 & 7217) is for connection between the following control modules:

- K56 Serial Data Gateway Module and P16 Instrument Panel Cluster Control Module.
- K56 Serial Data Gateway Module and K190 Off-Board Charger Control Module.

Ethernet 11

Ethernet bus 11 (circuits 7224 & 7225) is for connection between the K124 Image Processing Module and K179 Automated Driving Mapping Module.

Ethernet 14

Ethernet bus 14 (circuits 7230 & 7231) is for connection between the A11 Radio and P29 Head-Up Display.

Ethernet 15

Ethernet bus 15 (circuits 7232 & 7233) is for connection between the following control modules:

- K56 Serial Data Gateway Module and K161 Vehicle Performance Data Recorder.
- K56 Serial Data Gateway Module and K299 Audio/Video Interface Module.

Automotive Audio Bus (A2B) Description

Note: Automotive Audio Bus (A2B) harness failures should only be repaired using an appropriate kit to perform de-pin/re-pin overlays or in cases where the wiring harness repair kits are not available, the entire harness should be replaced. No crimps or splicing should be performed on the Automotive Audio Bus (A2B) wiring harness.

The Automotive Audio Bus (A2B) is a digital communication bus used to transmit bidirectional audio data, clock/synchronization, control data between a main/master node and multiple subordinate nodes over a single unshielded twisted pair. It can also provide bus power to some subordinate nodes such as microphones, eliminating the need for a separate power supply. The network is daisy chained. A and B ports are isolated by the A2B transceiver. For A port, the A2B transceiver interface faces toward the main node. For B port, the A2B transceiver interface faces toward the last-in-line node. The A2B bus line does not require any terminator. The last device is configured as an end node by the A2B master processor during the network discovery process.

A2B communication is frame-based. The host processor programs the main transceiver. The main node generates the clock and frame timing for the entire A2B network. The host provides the sync rate at a fixed frequency (44.1kHz or 48kHz), and bus communication occurs at the audio sync rate is called superframe. The superframe is divided into downstream and upstream data sections. Downstream communication flows from the main node toward the last subordinate node. Upstream communication flows back from the last subordinate node toward the main node. Nodes may consume downstream audio data and add upstream audio or status data for return to the host.

During initialization, the A2B stack establishes communication with the main node, configures the bus, and discovers the connected subordinate nodes. In systems with more than one possible hardware layout, blind discovery may be used to identify the connected node arrangement before the final configuration file is loaded. After initialization, the software stack continues to process network events, monitor node status, and manage fault recovery.

Automotive Audio Bus 1 (A2B 1, circuits 8579 & 8580)

A11 Radio is the main node. Depending on the vehicle contents, the subordinate nodes may contain microphones, K299 Audio/Video Interface Module, K299R Audio/Video Interface Rear Module, and T3 Audio Amplifier. When there is a fault on the Automotive Audio Bus 1, the A11 Radio will set DTC B1B77.

Automotive Audio Bus 2 (A2B 2, circuits 8581 & 8582)

T3 Audio Amplifier is the main node. Depending on the vehicle contents, the subordinate nodes may contain up to 3 auxiliary amplifiers. When there is a fault on the Automotive Audio Bus 2, the T3 Audio Amplifier will set DTC B1B30.

Automotive Audio Bus 3 (A2B 3, circuits 10600 & 10601)

T3 Audio Amplifier is the main node. Depending on the vehicle contents, the subordinate nodes may contain up to 3 Radio Speaker Amplifier Accelerometers. When there is a fault on the Automotive Audio Bus 3, the T3 Audio Amplifier will set DTC B1EBF.

X84 Data Link Connector (DLC)

The X84 Data Link Connector is a standardized 16-cavity connector. Connector design and location is dictated by an industry wide standard, and is required to provide the following:

- Terminal 1: CAN Bus 7 Serial Data [+]
- Terminal 2: Private Presentation CAN Bus 1 Serial Data [+]
- Terminal 3: Ethernet Bus 1R [+]
- Terminal 4: Scan tool power ground
- Terminal 5: Common signal ground
- Terminal 6: CAN Bus 6 Serial Data [+]
- Terminal 7: Private Presentation CAN Bus 2 Serial Data [+]
- Terminal 8: Ethernet Bus 1 Enable Signal
- Terminal 9: CAN Bus 7 Serial Data [-]
- Terminal 10: Private Presentation CAN Bus 1 Serial Data [-]
- Terminal 11: Ethernet Bus 1R [-]
- Terminal 12: Ethernet Bus 1T [+]
- Terminal 13: Ethernet Bus 1T [-]
- Terminal 14: CAN Bus 6 Serial Data [-]
- Terminal 15: Private Presentation CAN Bus 2 Serial Data [-]
- Terminal 16: Scan tool power, B+

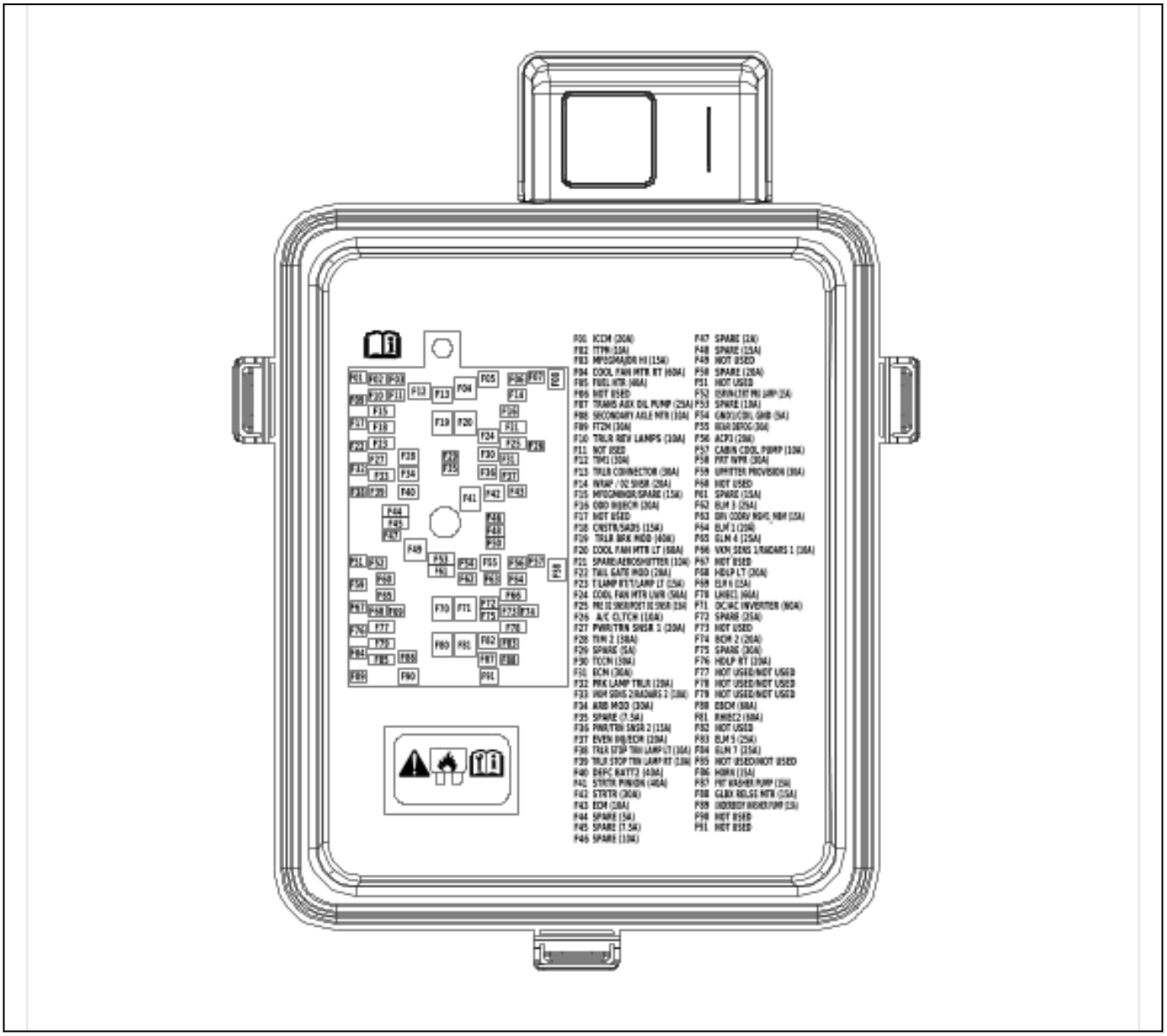
Serial Data Reference

The scan tool communicates over the various buses on the vehicle. When a scan tool is installed on a vehicle, the scan tool will try to communicate with every control module that could be optioned into the vehicle. If an option is not installed on the vehicle, the scan tool will display No Communication for that optional control module. In order to avert misdiagnoses of No Communication with a specific control module, refer to [Link target (target-id 148085-) not found] for a list of control modules and the buses they communicate with. Use schematics and specific vehicle build RPO codes to determine optional control modules.

Electrical Component and Inline Harness Connector End Views

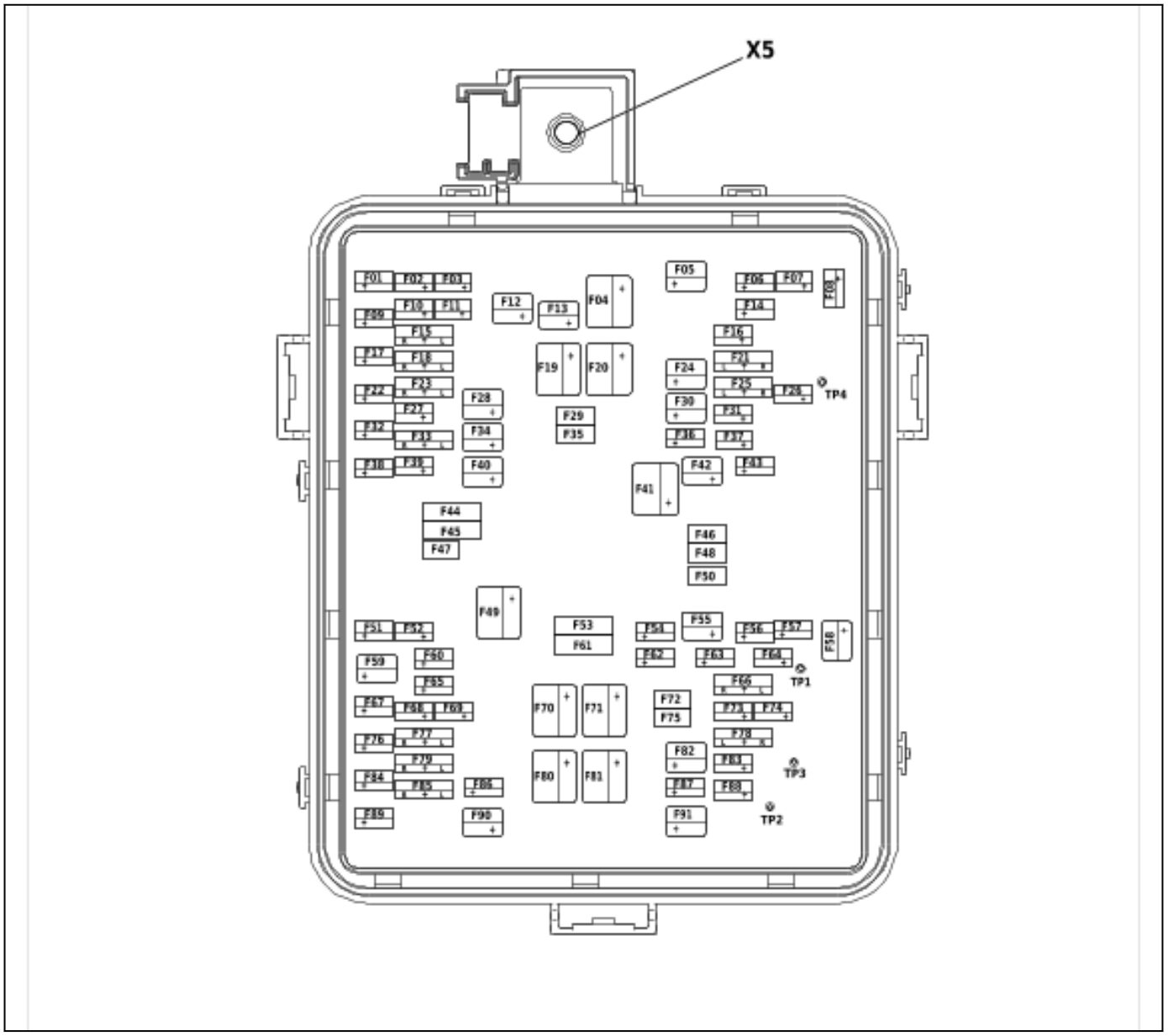
Component Locator

X50A Engine Wiring Harness Junction Block - Label



7157103

X50A Engine Wiring Harness Junction Block - Top View



7157104

Usage Table

No.	Device Label Name	Device Assigned Name	Rating	Description
Fuses				
F01	ICCM	F01UA	20A	• K38 Chassis Control Module (G93 / G94)
F02	TTPM	F02UA	10A	• K214 Trailer Tire Pressure Indicator Module (UET)
F03	MFEGMAJOR HI	F03UA	15A	• A99L Pickup Box Endgate Latch - Left (QT5) • A99R Pickup Box Endgate Latch - Right (QT5)
F04	COOL FAN MTR RT	F04UA	60A	• G10R Cooling Fan Motor - Right (FJW - V03)
F05	FUEL HTR	F05UA	40A (LZ0)	• R29 Fuel Filter (LZ0)
F06	NOT USED	F06UA	—	• Not Used

No.	Device Label Name	Device Assigned Name	Rating	Description
F07	TRANS AUX OIL PUMP	F07UA	25A	• G5 Automatic Transmission Auxiliary Fluid Pump
F08	SECONDARY AXLE MTR	F08UA	10A	• KR203 Front Drive Axle Actuator Relay
F09	FTZM	F09UA	30A	• K111 Fuel Pump Power Control Module
F10	TRLR REV LAMPS	F10UA	10A	• X88B Tow Vehicle Electrical Receptacle (- UET)
F11	NOT USED	F11UA	—	• Not Used
F12	TIM1	F12UA	30A	• K68 Trailer Lamp Control Module (UET)
F13	TRLR CONNECTOR	F13UA	30A	• X88B Tow Vehicle Electrical Receptacle
F14	WRAF/O2 SNSR	F14UA	20A	• B52A Heated Oxygen Sensor - Sensor 1 (L4B) • B52D Heated Oxygen Sensor - Bank 1 Sensor 2 (L76 / L78) • B52E Heated Oxygen Sensor - Bank 2 Sensor 1 (L76 / L78) • M130B Exhaust Camshaft Profile Actuator 2 (L4B) • M130C Exhaust Camshaft Profile Actuator 3 (L4B) • Q12 Evaporative Emission Canister Purge Solenoid Valve (L4B) • Q40 Turbocharger Bypass Valve Solenoid (L4B)
F15	MFEGMINOR/ SPARE	F15UA	15A	• A100L Pickup Box Auxiliary Endgate Latch - Left (QK2) • A100R Pickup Box Auxiliary Endgate Latch - Right (QK2)
F16	ODD INJ/ECM	F16UA	20A	• K20 Engine Control Module (L76 / L78 / LZ0) • K45 Powertrain Control Module (L4B) • T8A Ignition Coil 1 (L4B / L76 / L78) • T8B Ignition Coil 2 (L4B) • T8C Ignition Coil 3 (L4B / L76 / L78) • T8D Ignition Coil 4 (L4B) • T8E Ignition Coil 5 (L76 / L78) • T8G Ignition Coil 7 (L76 / L78) • Q17J Fuel Injector - Cylinder 1 Injector 2 (L76 / L78) • Q17L Fuel Injector - Cylinder 3 Injector 2 (L76 / L78) • Q17N Fuel Injector - Cylinder 5 Injector 2 (L76 / L78) • Q17Q Fuel Injector - Cylinder 7 Injector 2 (L76 / L78)
F17	NOT USED	F17UA	—	• Not Used
F18	CNSTR/SADS	F18UA	15A	• K19 Suspension Control Module (Z45) • K115 Reductant Control Module (FHX) • Q13 Evaporative Emission Canister Vent Solenoid Valve (FJW)
F19	TRLR BRK MOD	F19UA	40A	• K87 Trailer Brake Control Module
F20	COOL FAN MTR LT	F20UA	60A	• G10L Cooling Fan Motor - Left
F21	SPARE/ AEROSHUTTER	F21UA	10A	• M96A Active Grille Air Shutter Actuator 1 (VTI / WMI) • M96B Active Grille Air Shutter Actuator 2 (WMI) •

No.	Device Label Name	Device Assigned Name	Rating	Description
F22	TAIL GATE MOD	F22UA	20A	• K194 Rear Gate Module (QT6)
F23	T/LAMP RT/T/ LAMP LT	F23UA	15A	• E42L Rear Body Structure Stop Lamp - Left • E42R Rear Body Structure Stop Lamp - Right
F24	COOL FAN MTR LWR	F24UA	50A	• G10LW Cooling Fan Motor - Lower (LZ0)
F25	PRE O2 SNSR/ POST O2 SNSR	F25UA	15A	• B35C Engine Oil Level and Temperature Sensor (L76 / L78) • B52B Heated Oxygen Sensor 2(L4B) • B52C Heated Oxygen Sensor - Bank 1 Sensor 1 (L76 / L78) • B52F Heated Oxygen Sensor - Bank 2 Sensor 2 (L76 / L78) • B75 Mass Air Flow Sensor • G58 Evaporative Emission Canister Purge Pump (L4B) • K20 Engine Control Module (L76 / L78 / LZ0) • M10 Charge Air Cooler Coolant Pump (LZ0) • M129A Intake Camshaft Profile Actuator 1 (L4B) • M129B Intake Camshaft Profile Actuator 2 (L4B) • M129C Intake Camshaft Profile Actuator 3 (L4B) • M129D Intake Camshaft Profile Actuator 4 (L4B) • Q12 Evaporative Emission Canister Purge Solenoid Valve (L76 / L78) • Q64 Evaporative Emission System Switching Valve (FJW)
F26	A/C CLTCH	F26UA	10A	• Q2 Air Conditioning Clutch
F27	PWR/TRN SNSR 1	F27UA	20A (LZ0)	• B136 Exhaust Particulate Matter Sensor (LZ0) • B195B Nitrogen Oxides Sensor 2 (LZ0) • B195C Nitrogen Oxides Sensor 3 (LZ0) • K111 Fuel Pump Power Control Module (LZ0) • R29 Fuel Filter (LZ0)
F28	TIM 2	F28UA	30A	• K68 Trailer Lamp Control Module (UET)
F29	SPARE	F29UA	5A	• Spare
F30	TCCM	F30UA	30A	• K69 Transfer Case Control Module (F48)
F31	ECM	F31UA	30A	• K20 Engine Control Module (L76 / L78 / LZ0) • K45 Powertrain Control Module (L4B)
F32	PRK LAMP TRLR	F32UA	20A	• X88B Tow Vehicle Electrical Receptacle (- UET)
F33	VKM SENS 2/ RADARS 2	F33UA	10A	• B233LR Short Range Radar Rear Sensor - Left • B233RR Short Range Radar Rear Sensor - Right • B233SL Short Range Radar Rear Side Sensor - Left • B233SR Short Range Radar Rear Side Sensor - Right • B342B UHF Low Energy Remote Control Access Sensor Transceiver 2 (BOK / BOR / BOY) • B342D UHF Low Energy Remote Control Access Sensor Transceiver 4 (BOK / BOR / BOY) • B342F UHF Low Energy Remote Control Access Sensor Transceiver 6 (BOK / BOR / BOY)

No.	Device Label Name	Device Assigned Name	Rating	Description
F34	ARB MOD	F34UA	30A	• K4 Running Board Control Module (B3L)
F35	SPARE	F35UA	7.5A	• Spare
F36	PWR/TRN SNSR 2	F36UA	15A (LZ0)	• B195A Nitrogen Oxides Sensor 1 (LZ0) • T19 Multifunction Power Supply Converter (LZ0)
F37	EVEN INJ/ECM	F37UA	20A	• K20 Engine Control Module (L76 / L78) • T8B Ignition Coil 2 (L76 / L78) • T8D Ignition Coil 4 (L76 / L78) • T8F Ignition Coil 6 (L76 / L78) • T8H Ignition Coil 8 (L76 / L78) • Q17K Fuel Injector - Cylinder 2 Injector 2 (L76 / L78) • Q17M Fuel Injector - Cylinder 4 Injector 2 (L76 / L78) • Q17P Fuel Injector - Cylinder 6 Injector 2 (L76 / L78) • Q17R Fuel Injector - Cylinder 8 Injector 2 (L76 / L78)
F38	TRLR STOP TRN LAMP LT	F38UA	10A	• X88B Tow Vehicle Electrical Receptacle (- UET)
F39	TRLR STOP TRN LAMP RT	F39UA	10A	• X88B Tow Vehicle Electrical Receptacle (- UET)
F40	DEFC BATT2	F40UA	40A (LZ0)	• K115 Reductant Control Module (FHX)
F41	STRTR PINON	F41UA	40A	• M64 Starter (FJW)
F42	STRTR	F42UA	30A	• M64 Starter
F43	ECM	F43UA	10A	• K20 Engine Control Module (L76 / L78 / LZ0) • K45 Powertrain Control Module (L4B)
F44	SPARE	F44UA	5A	• Spare
F45	SPARE	F45UA	7.5A	• Spare
F46	SPARE	F46UA	10A	• Spare
F47	SPARE	F47UA	2A	• Spare
F48	SPARE	F48UA	15A	• Spare
F49	NOT USED	F49UA	—	• Not Used
F50	SPARE	F50UA	20A	• Spare
F51	NOT USED	F51UA	—	• Not Used
F52	OSRVM-LT/RT PRK LAMP	F52UA	15A	• A9A Outside Rearview Mirror - Driver (DQS) • A9B Outside Rearview Mirror - Passenger (DQS) • E2LF Front Side Marker Lamp - Left • E2RF Front Side Marker Lamp - Right • E13LA Front Headlamp - Left • E13RA Front Headlamp - Right • X88B Tow Vehicle Electrical Receptacle (-UET)
F53	SPARE	F53UA	10A	• Spare
F54	GND1/COIL GND	F54UA	5A	• KR5 Rear Window Defogger Relay • KR11 Windshield Washer Pump Relay • KR12B Windshield Wiper Motor Relay • KR27 Starter Motor • KR27C Engine Restart Relay • KR53 Parking Lamp Relay

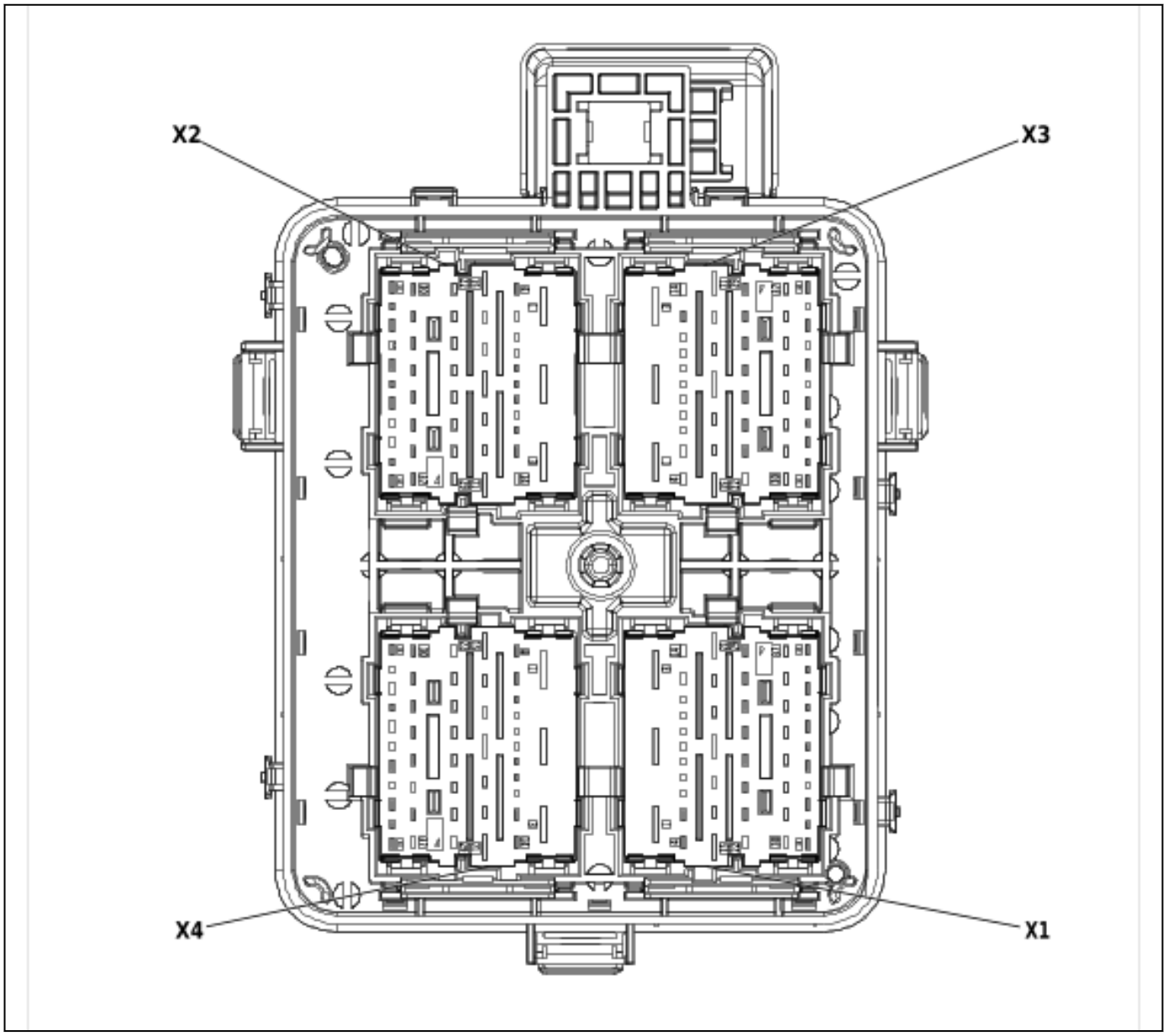
No.	Device Label Name	Device Assigned Name	Rating	Description
				• KR61 Trailer Backup Lamp Relay • KR63L Trailer Stop/Turn Signal Lamp Relay - Left • KR63R Trailer Stop/Turn Signal Lamp Relay - Right • KR147 Instrument Panel Compartment Door Latch Actuator Relay • KR191G Pickup Box Endgate Latch Relay - Ground • KR191S Pickup Box Endgate Latch Relay - Supply Voltage • KR192 Pickup Box Auxiliary Endgate Latch Relay • KR200 Engine Controls Sensor Supply Voltage Relay (LZ0) • KR202 Accessory AC and DC Power Control Module Relay
F55	REAR DEFOG	F55UA	30A	• E18 Rear Window Defogger Grid (C49)
F56	ACP3	F56UA	20A	• K124 Image Processing Module (UK0 / UKL)
F57	CABIN COOL PUMP	F57UA	10A	• G17 Heater Coolant Pump (L76 / L78 / LZ0)
F58	FRT WPR	F58UA	30A	• KR12B Windshield Wiper Motor Relay • KR12C Windshield Wiper Motor Speed Control Relay
F59	UPFITTER PROVISION	F59UA	30A	• X213 pin 7
F60	NOT USED	F60UA	—	• Not Used
F61	SPARE	F61UA	15A	• Spare
F62	ELM 3	F62UA	25A	• K219 Lighting Control Module
F63	DRV_CODRV_MSM1_MBM	F63UA	15A	• K40D Driver Seat Adjuster Memory Module (A45) • K40P Passenger Seat Adjuster Memory Module (AHH / AKE) • K104P Front Seat Bladder Control Module - Passenger (AVU - (AHH / AKE)) • K134D Front Seat Bolster Memory Module - Driver (AVK - AF6) • K134DP Front Seat Bolster Memory Module - Driver Primary (AF6) • K134DS Front Seat Bolster Memory Module - Driver Secondary (AF6) • K134PP Front Seat Bolster Memory Module - Passenger Primary (AHH / AKE) • K134PS Front Seat Bolster Memory Module - Passenger Secondary (AHH / AKE) • S64D Front Seat Adjuster Switch - Driver (A45) • S64P Front Seat Adjuster Switch - Passenger (AHH / AKE) • S65D Front Seat Lumbar Switch - Driver (A2X - AVK) • S65P Front Seat Lumbar Switch - Passenger (A7K - AVU)
F64	ELM 1	F64UA	20A	• K219 Lighting Control Module
F65	ELM 4	F65UA	25A	• K219 Lighting Control Module

No.	Device Label Name	Device Assigned Name	Rating	Description
F66	VKM_SENS 1/ RADARS 1	F66UA	10A	• B233B Forward Range Radar Sensor - Long Range • B233LF Short Range Radar Sensor - Left Front (UK0/ UKL) • B233RF Short Range Radar Sensor - Right Front (UK0/UKL) • B342A UHF Low Energy Remote Control Access Sensor Transceiver 1 (BOK / BOR / BOY) • B342C UHF Low Energy Remote Control Access Sensor Transceiver 3 (BOK / BOR / BOY) • K183 UHF Short Range Low Energy Remote Control Access Transceiver (BOK / BOR / BOY)
F67	NOT USED	F67UA	—	• Not Used
F68	HDLP LT	F68UA	20A	• E13LA Front Headlamp - Left
F69	ELM 6	F69UA	15A	• K219 Lighting Control Module
F70	LHIEC1	F70UA	60A	• Not Used
F71	DC/AC INVERTER	F71UA	60A	• T1 DC/AC Converter Control Module (KI4/KI5/KFG/KFH/KC9/KCA)
F72	SPARE	F72UA	25A	• Spare
F73	NOT USED	F73UA	—	• Not Used
F74	BCM 2	F74UA	20A	• K9 Body Control Module
F75	SPARE	F75UA	30A	• Spare
F76	HDLP RT	F76UA	20A	• E13RA Front Headlamp - Right
F77	NOT USED/NOT USED	F77UA	—	• Not Used
F78	NOT USED/NOT USED	F78UA	—	• Not Used
F79	NOT USED/NOT USED	F79UA	—	• Not Used
F80	EBCM	F80UA	60A	• K160 Brake System Control Module
F81	RHIEC2	F81UA	60A	• X51R Instrument Panel Wiring Harness Junction Block - Right
F82	NOT USED	F82UA	—	• Not Used
F83	ELM 5	F83UA	25A	• K219 Lighting Control Module
F84	ELM 7	F84UA	25A	• K219 Lighting Control Module
F85	NOT USED/NOT USED	F85UA	—	• Not Used
F86	HORN	F86UA	15A	• P13 Horn
F87	FRT WASHER PUMP	F87UA	15A	• KR11 Windshield Washer Pump Relay
F88	GLBX RELSE MTR	F88UA	15A	• Not Used
F89	UNDERBODY WASHER PUMP	F89UA	15A	• KR204 Camera Washer Fluid Pump Relay - Underbody Cameras
F90	NOT USED	F90UA	—	• Not Used
F91	NOT USED	F91UA	—	• Not Used
Note: Relays listed below are non-serviceable Printed Circuit Board (PCB) relays and are internal to the block.				

No.	Device Label Name	Device Assigned Name	Rating	Description
K01	—	KR191G Pickup Box Endgate Latch Relay - Ground	—	• Ground: A99L Pickup Box Endgate Latch - Left (QT5) • A99R Pickup Box Endgate Latch - Right (QT5) • A100L Pickup Box Auxiliary Endgate Latch - Left (QK2) • A100R Pickup Box Auxiliary Endgate Latch - Right (QK2) •
K02	—	KR191S Pickup Box Endgate Latch Relay - Supply Voltage	—	• F03UA
K03	—	KR202 Accessory AC and DC Power Control Module Relay	—	• F71UA
K04	—	KR147 Instrument Panel Compartment Door Latch Actuator Relay	—	• F88UA
K05	—	KR12B Windshield Wiper Motor Relay	—	• M75 Windshield Wiper Motor
K06	—	KR12C Windshield Wiper Motor Speed Control Relay	—	• M75 Windshield Wiper Motor
K07	—	KR75A Engine Controls Ignition Relay 1	—	• F14UA • F16UA • F21UA • F31UA • F37UA
K08	—	KR5 Rear Window Defogger Relay	—	• F55UA
K09	—	KR192 Pickup Box Auxiliary Endgate Latch Relay	—	• F15UA • F67UA
K10	—	KR27 Starter Motor	—	• F42UA
K11	—	KR27C Engine Restart Relay	—	• F41UA
K12	—	KR53 Parking Lamp Relay	—	• F32UA • F52UA • F60UA
K13	—	KR61 Trailer Backup Lamp Relay	—	• F10UA
K14	—	KR63L Trailer Stop/ Turn Signal Lamp Relay - Left	—	• F38UA
K15	—	KR63R Trailer Stop/ Turn Signal Lamp Relay - Right	—	• F39UA
K16	—	KR11 Windshield Washer Pump Relay	—	• F87UA

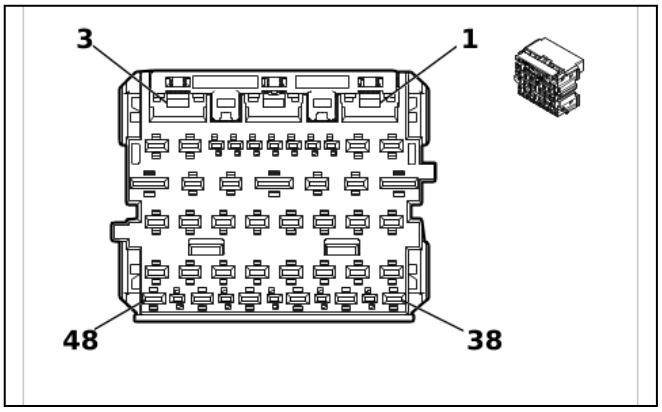
No.	Device Label Name	Device Assigned Name	Rating	Description
K17	—	KR75B Engine Controls Ignition Relay 2	—	• F25UA
K18	—	KR29 A/C Compressor Clutch Relay	—	• F26UA
K19	—	KR200 Engine Controls Sensor Supply Voltage Relay (LZ0)	—	• F27UA (LZ0) • F36UA (LZ0)
K20	—	—	—	• Not Used
K21	—	KR22 Fuel Heater Relay (LZ0)	—	• F05UA (LZ0)
K22	—	—	—	• Not Used
K23	—	KR203 Front Drive Axle Actuator Relay	—	• M26 Front Drive Axle Actuator (F48) • TP4
K24	—	KR204 Camera Washer Fluid Pump Relay - Underbody Cameras	—	• F89UA
K25	—	KR3 Horn Relay	—	• F86UA
Note: Items listed below are diagnostic test points for Wiper/Washer				
TP1	—	TP1	—	• Ground: KR12B Windshield Wiper Motor Relay • Ground: KR12C Windshield Wiper Motor Speed Control Relay
TP2	—	TP2	—	• High: KR12C Windshield Wiper Motor Speed Control Relay
TP3	—	TP3	—	• Low: KR12C Windshield Wiper Motor Speed Control Relay
Note: Items listed below are diagnostic test points for Transfer Case Control				
TP4	—	TP4	—	• M26 Front Drive Axle Actuator (F48)

X50A Engine Wiring Harness Junction Block - Bottom View



7157105

X50A Engine Wiring Harness Junction Block X1



5830395

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 7298-4588-30
- Service Connector: 85650078
- Description: 48-Way F 1.5, 2.8, 6.3 MCP, 9.5 YESC Series(BK)

Terminal Part Information

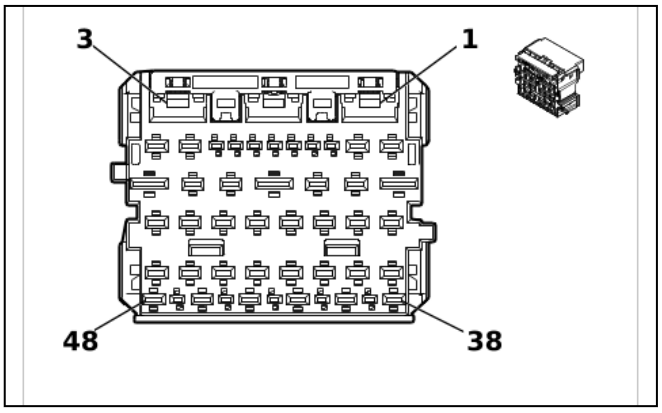
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19333301	J-35616-22 (RD)	J-38125-12A
II	19369711	J-35616-14 (GN)	J-38125-560A
III	84779405	J-35616-35 (VT)	J-38125-36

X50A Engine Wiring Harness Junction Block X1

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 6	(1) RD / WH	(1) 1040	(1) Battery Positive Voltage	(1) I	(1) —
2 - 3	—	—	—	Not Occupied	—	—
(4) 4	(4) 1.5	(4) BK	(4) 650	(4) Ground	(4) III	(4) —
(5) 5	(5) 0.35	(5) BN / WH	(5) 28	(5) Horn Relay Control	(5) III	(5) —
6 - 8	—	—	—	Not Occupied	—	—
(9) 9	(9) 0.75	(9) WH / GY	(9) 7297	(9) Minor Endgate High Relay Control	(9) II	(9) —
10 - 15	—	—	—	Not Occupied	—	—
(16) 16	(16) 1	(16) BN / GY	(16) 29	(16) Horn Control	(16) III	(16) —
17 - 18	—	—	—	Not Occupied	—	—
(19) 19	(19) 0.75	(19) BU / VT	(19) 7729	(19) Major Endgate Low Relay Control	(19) III	(19) —
20 - 25	—	—	—	Not Occupied	—	—
(26) 26	(26) 0.5	(26) RD / BU	(26) 840	(26) Battery Positive Voltage	(26) III	(26) —
(27) 27	(27) 1.5	(27) RD / BU	(27) 540	(27) Battery Positive Voltage	(27) III	(27) —
28	—	—	—	Not Occupied	—	—

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(29) 29	(29) 0.35	(29) WH / BN	(29) 7055	(29) Auxiliary Park Lamp Relay Control	(29) III	(29) —
30 - 33	—	—	—	Not Occupied	—	—
(34) 34	(34) 1.5	(34) RD / WH	(34) 640	(34) Battery Positive Voltage	(34) III	(34) —
35	—	—	—	Not Occupied	—	—
(36) 36	(36) 0.5	(36) BN / GN	(36) 14026	(36) Identification Side Marker Lamp Supply Voltage	(36) III	(36) —
(37) 37	(37) 0.5	(37) BN / GN	(37) 14026	(37) Identification Side Marker Lamp Supply Voltage	(37) III	(37) —
(38) 38	(38) 0.75	(38) GN / GY	(38) 11346	(38) Underbody Camera Washer Motor Control	(38) III	(38) —
(39) 39	(39) 0.35	(39) BU / BN	(39) 11347	(39) Underbody Camera Washer Relay Control	(39) II	(39) —
(40) 40	(40) 1.5	(40) RD / VT	(40) 7140	(40) Battery Positive Voltage	(40) III	(40) —
41	—	—	—	Not Occupied	—	—
(42) 42	(42) 1.5	(42) RD / YE	(42) 740	(42) Battery Positive Voltage	(42) III	(42) —
(43) 43	(43) 0.35	(43) GN / BN	(43) 319	(43) Right Rear Trailer Stop/Turn Lamp Control	(43) II	(43) —
44	—	—	—	Not Occupied	—	—
(45) 45	(45) 0.5	(45) BN / YE	(45) 820	(45) Center High Mounted Stop Lamp Supply Voltage	(45) II	(45) —
(46) 46	(46) 2.5	(46) RD / VT	(46) 1242	(46) Battery Positive Voltage	(46) III	(46) —
(47) 47	(47) 0.35	(47) YE / BU	(47) 318	(47) Left Rear Trailer Stop/Turn Lamp Control	(47) II	(47) —
48	—	—	—	Not Occupied	—	—

X50A Engine Wiring Harness Junction Block X2



5838162

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 7298-4593-40
- Service Connector: 85595155
- Description: 48-Way F 1.5, 2.8, 6.3 MCP, 9.5 YESC Series(GY)

Terminal Part Information

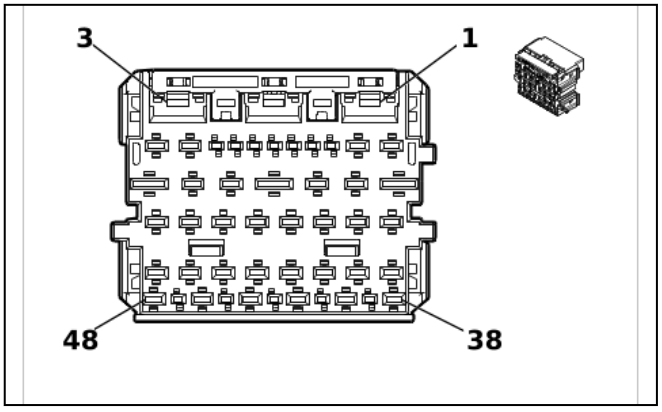
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19333301	J-35616-22 (RD)	J-38125-12A
II	19369711	J-35616-14 (GN)	J-38125-560A
III	84764078	J-35616-42 (RD)	J-38125-36
IV	84779405	J-35616-35 (VT)	J-38125-36

X50A Engine Wiring Harness Junction Block X2

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 5	(1) RD / VT	(1) 4040	(1) Battery Positive Voltage	(1) I	(1) —
(2) 2	(2) 5	(2) RD / GN	(2) 3840	(2) Battery Positive Voltage	(2) I	(2) —
(3) 3	(3) 2.5	(3) YE / GN	(3) 4358	(3) Starter Pinion Solenoid Voltage	(3) I	(3) —
4 - 7	—	—	—	Not Occupied	—	—
(8) 8	(8) 0.5	(8) BU	(8) 3017	(8) Fuel Heater Relay 1 Control	(8) II	(8) —
9 - 10	—	—	—	Not Occupied	—	—
(11) 11	(11) 0.5	(11) YE / VT	(11) 4325	(11) Starter Pinion Solenoid Actuator Relay Control	(11) II	(11) —
12 - 17	—	—	—	Not Occupied	—	—
(18) 18	(18) 5	(18) RD / GN	(18) 4140	(18) Battery Positive Voltage	(18) III	(18) —
(19) 19	(19) 3	(19) GN / RD	(19) 6240	(19) Battery Positive Voltage	(19) IV	(19) —
(20) 20	(20) 1	(20) VT / GN	(20) 4320	(20) Powertrain Sensor Bus Enable	(20) IV	(20) —
(21) 21	(21) 2.5	(21) YE	(21) 6	(21) Starter Solenoid Crank Ignition Voltage	(21) III	(21) —
22 - 23	—	—	—	Not Occupied	—	—
(24) 24	(24) 2 (24) 1 (24) 2.5	(24) VT / BU (24) VT / BU (24) VT / BU	(24) 5291 (24) 5291 (24) 5290	(24) Powertrain Main Relay Fused Supply Voltage 2 (24) Powertrain Main Relay Fused Supply Voltage 2 (24) Powertrain Main Relay Fused Supply Voltage 1	(24) IV (24) IV (24) IV	(24) L4B (24) L76 / L78 (24) LZ0
(25) 25	(25) 0.5	(25) VT / BU	(25) 5705	(25) Powertrain Main Relay Control	(25) IV	(25) —
(26) 26	(26) 2 (26) 1	(26) VT / BU (26) VT / BU	(26) 5294 (26) 5294	(26) Powertrain Main Relay Fused Supply Voltage 5 (26) Powertrain Main Relay Fused Supply Voltage 5	(26) IV (26) IV	(26) L4B (26) L76 / L78 / LZ0
(27) 27	(27) 2.5	(27) VT / BU	(27) 5290	(27) Powertrain Main Relay Fused Supply Voltage 1	(27) IV	(27) —
(28) 28	(28) 1	(28) VT / BU	(28) 5292	(28) Powertrain Main Relay Fused Supply Voltage 3	(28) IV	(28) —
(29) 29	(29) 0.5	(29) RD / BU	(29) 6040	(29) Battery Positive Voltage	(29) IV	(29) —
30	—	—	—	Not Occupied	—	—

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(31) 31	(31) 0.75 (31) 2	(31) VT / BU (31) VT / BU	(31) 5293 (31) 5294	(31) Powertrain Main Relay Fused Supply Voltage 4 (31) Powertrain Main Relay Fused Supply Voltage 5	(31) IV (31) IV	(31) L4B (31) L76 / L78
32 - 33	—	—	—	Not Occupied	—	—
(34) 34	(34) 0.75	(34) VT / BU	(34) 5293	(34) Powertrain Main Relay Fused Supply Voltage 4	(34) IV	(34) —
(35) 35	(35) 0.5	(35) YE	(35) 5991	(35) Powertrain Relay Coil Control	(35) IV	(35) —
(36) 36	(36) 0.5	(36) YE / BK	(36) 625	(36) Starter Enable Relay Control	(36) IV	(36) —
(37) 37	(37) 0.5 (37) 0.75	(37) RD / BN (37) RD / BN	(37) 440 (37) 440	(37) Battery Positive Voltage (37) Battery Positive Voltage	(37) IV (37) IV	(37) L4B (37) L76 / L78 / LZ0
(38) 38	(38) 1.5	(38) RD / GY	(38) 8540	(38) Battery Positive Voltage	(38) IV	(38) —
(39) 39	(39) 0.5	(39) VT / GY	(39) 8017	(39) Secondary Axle Motor Relay Control	(39) II	(39) —
40 - 41	—	—	—	Not Occupied	—	—
(42) 42	(42) 0.5	(42) GN	(42) 8016	(42) Secondary Axle Motor Control	(42) IV	(42) —
43	—	—	—	Not Occupied	—	—
(44) 44	(44) 0.75	(44) BN / GN	(44) 59	(44) Air Conditioning Compressor Clutch Control	(44) IV	(44) —
45 - 46	—	—	—	Not Occupied	—	—
(47) 47	(47) 0.5	(47) WH / GY	(47) 459	(47) Air Conditioning Compressor Clutch Relay Control	(47) II	(47) —
(48) 48	(48) 0.5	(48) GN / BU	(48) 3889	(48) Powertrain Sensor Bus Relay Control	(48) IV	(48) —

X50A Engine Wiring Harness Junction Block X3



5834300

Connector Part Information

- Harness Type: Chassis Wiring Harness
- OEM Connector: 7298-4594-60
- Service Connector: 85595153
- Description: 48-Way F 1.5, 2.8, 6.3 MCP, 9.5 YESC Series(GN)

Terminal Part Information

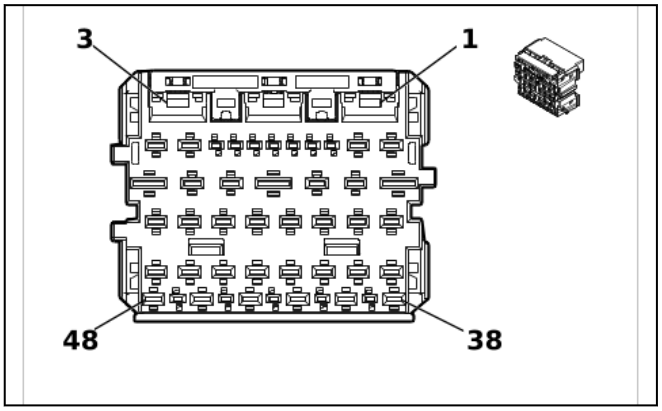
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19333301	J-35616-22 (RD)	J-38125-12A
II	84764078	J-35616-42 (RD)	J-38125-36
III	84779405	J-35616-35 (VT)	J-38125-36

X50A Engine Wiring Harness Junction Block X3

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	—	—	—	Not Occupied	—	—
(2) 2	(2) 2.5	(2) RD / VT	(2) 4142	(2) Primary Fused Battery Positive Voltage	(2) I	(2) —
3 - 12	—	—	—	Not Occupied	—	—
(13) 13	(13) 2.5	(13) RD / VT	(13) 5640	(13) Battery Positive Voltage	(13) III	(13) —
14	—	—	—	Not Occupied	—	—
(15) 15	(15) 3	(15) RD / WH	(15) 2040	(15) Battery Positive Voltage	(15) II	(15) —
(16) 16	(16) 2.5	(16) RD / WH	(16) 1040	(16) Battery Positive Voltage	(16) III	(16) —
(17) 17	(17) 2.5	(17) RD / YE	(17) 5840	(17) Battery Positive Voltage	(17) III	(17) —
18	—	—	—	Not Occupied	—	—
(19) 19	(19) 4	(19) OG	(19) 3940	(19) Battery Positive Voltage	(19) III	(19) —
20	—	—	—	Not Occupied	—	—
(21) 21	(21) 2.5	(21) BN / YE	(21) 2996	(21) Fuel Heater Control 1	(21) II	(21) —
(22) 22	(22) 1	(22) YE / BK	(22) 7730	(22) Major Endgate Motor Low Reference	(22) III	(22) —
(23) 23	(23) 0.75	(23) RD / BU	(23) 5240	(23) Battery Positive Voltage	(23) III	(23) —
24	—	—	—	Not Occupied	—	—
(25) 25	(25) 1.5	(25) RD / VT	(25) 6340	(25) Battery Positive Voltage	(25) III	(25) —
(26) 26	(26) 0.75	(26) RD / GN	(26) 2440	(26) Battery Positive Voltage	(26) III	(26) —
27 - 28	—	—	—	Not Occupied	—	—
(29) 29	(29) 1	(29) GN	(29) 1299	(29) Major Endgate Motor Control	(29) III	(29) —
(30) 30	(30) 1	(30) GN	(30) 1619	(30) Right Rear Trailer Stop/Turn Lamp Control	(30) III	(30) —
(31) 31	(31) 0.5	(31) RD / WH	(31) 6440	(31) Battery Positive Voltage	(31) III	(31) —
(32) 32	(32) 1.5	(32) VT / GN	(32) 4320	(32) Powertrain Sensor Bus Enable	(32) III	(32) —
(33) 33	(33) 1.5	(33) RD / BU	(33) 6740	(33) Battery Positive Voltage	(33) III	(33) —
(34) 34	(34) 2 (34) 0.5	(34) RD / WH (34) RD / WH	(34) 3440 (34) 3440	(34) Battery Positive Voltage (34) Battery Positive Voltage	(34) III (34) III	(34) FHX (34) FJW
(35) 35	(35) 1	(35) VT	(35) 7725	(35) Minor Endgate Motor Control	(35) III	(35) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(36) 36	(36) 1	(36) GY	(36) 1624	(36) Trailer Backup Lamp Control	(36) III	(36) —
(37) 37	(37) 0.5	(37) RD / GN	(37) 6940	(37) Battery Positive Voltage	(37) III	(37) —
(38) 38	(38) 1	(38) YE	(38) 1618	(38) Left Rear Trailer Stop/Turn Lamp Control	(38) III	(38) —
39	—	—	—	Not Occupied	—	—
(40) 40	(40) 1.5	(40) BN	(40) 2109	(40) Trailer Park Lamp Control	(40) III	(40) —
41	—	—	—	Not Occupied	—	—
(42) 42	(42) 2.5	(42) RD / VT	(42) 4442	(42) Primary Fused Battery Positive Voltage	(42) III	(42) —
43 - 45	—	—	—	Not Occupied	—	—
(46) 46	(46) 2.5	(46) RD / VT	(46) 1940	(46) Battery Positive Voltage	(46) III	(46) —
47	—	—	—	Not Occupied	—	—
(48) 48	(48) 1.5	(48) RD / BN	(48) 5940	(48) Battery Positive Voltage	(48) III	(48) —

X50A Engine Wiring Harness Junction Block X4



5833039

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 7298-4633-90
- Service Connector: 85595154
- Description: 48-Way F 1.5, 2.8, 6.3 MCP, 9.5 YESC Series(BU)

Terminal Part Information

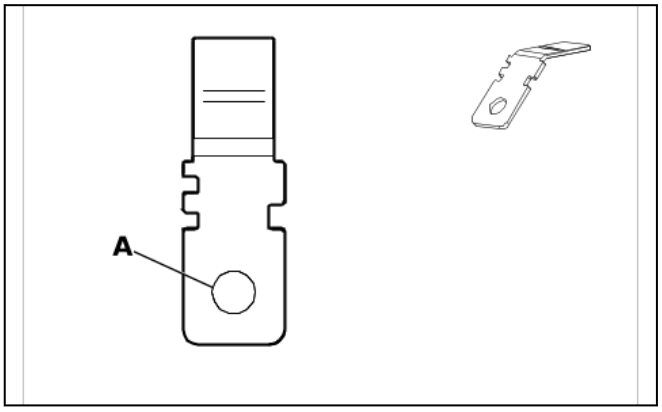
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19333301	J-35616-22 (RD)	J-38125-12A
II	19369711	J-35616-14 (GN)	J-38125-560A
III	84764078	J-35616-42 (RD)	J-38125-36
IV	84779405	J-35616-35 (VT)	J-38125-36
V	Not required	J-35616-42 (RD)	J-38125-215A

X50A Engine Wiring Harness Junction Block X4

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	—	—	—	Not Occupied	—	—
(2) 2	(2) 5	(2) BN / BK	(2) 4629	(2) DC/AC Inverter Control	(2) I	(2) —
(3) 3	(3) 10	(3) RD / WH	(3) 342	(3) Battery Positive Voltage	(3) V	(3) —
(4) 4	(4) 0.75	(4) BK / WH	(4) 751	(4) Signal Ground	(4) IV	(4) —
(5) 5	(5) 1.5	(5) RD / BN	(5) 1440	(5) Battery Positive Voltage	(5) IV	(5) —
(6) 6	(6) 0.35	(6) BN / VT	(6) 193	(6) Rear Defogger Relay Control	(6) II	(6) —
7 - 10	—	—	—	Not Occupied	—	—
(11) 11	(11) 0.75	(11) WH / GN	(11) 7728	(11) Major Endgate High Relay Control	(11) II	(11) —
(12) 12	(12) 0.5	(12) WH / GN	(12) 4628	(12) DC/AC Inverter Relay Control	(12) II	(12) —
(13) 13	(13) 0.35	(13) BN / GY	(13) 2268	(13) Windshield Washer Relay Control	(13) IV	(13) —
14	—	—	—	Not Occupied	—	—
(15) 15	(15) 2.5	(15) BN / VT	(15) 293	(15) Rear Defogger Grid Control	(15) III	(15) —
16 - 19	—	—	—	Not Occupied	—	—
(20) 20	(20) 0.75	(20) GY / VT	(20) 228	(20) Windshield Washer Pump Control	(20) IV	(20) —
21	—	—	—	Not Occupied	—	—
(22) 22	(22) 0.35	(22) BU / BN	(22) 38	(22) Backup Lamp Relay Control	(22) IV	(22) —
(23) 23	(23) 0.75	(23) RD / BN	(23) 2240	(23) Battery Positive Voltage	(23) IV	(23) —
(24) 24	(24) 0.5	(24) RD / GY	(24) 7040	(24) Battery Positive Voltage	(24) IV	(24) —
25 - 26	—	—	—	Not Occupied	—	—
(27) 27	(27) 1.5	(27) RD / GN	(27) 7740	(27) Battery Positive Voltage	(27) IV	(27) —
28 - 29	—	—	—	Not Occupied	—	—
(30) 30	(30) 1	(30) RD / WH	(30) 4740	(30) Battery Positive Voltage	(30) IV	(30) —
(31) 31	(31) 1	(31) RD / BN	(31) 1140	(31) Battery Positive Voltage	(31) IV	(31) —
(32) 32	(32) 0.5	(32) RD / GN	(32) 3140	(32) Battery Positive Voltage	(32) IV	(32) —
(33) 33	(33) 1	(33) GN / YE	(33) 6840	(33) Auxiliary Device 2 Switched Voltage	(33) IV	(33) —
34 - 40	—	—	—	Not Occupied	—	—
(41) 41	(41) 0.35	(41) GY	(41) 91	(41) Windshield Wiper Motor Relay Coil Control	(41) II	(41) —
42 - 43	—	—	—	Not Occupied	—	—
(44) 44	(44) 2	(44) BK	(44) 150	(44) Ground	(44) IV	(44) —
45	—	—	—	Not Occupied	—	—

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(46) 46	(46) 2	(46) YE / BN	(46) 95	(46) Windshield Wiper Motor Low Speed Control	(46) IV	(46) —
(47) 47	(47) 0.35	(47) WH / VT	(47) 860	(47) Windshield Wiper Switch High Signal	(47) II	(47) —
(48) 48	(48) 2	(48) WH	(48) 92	(48) Windshield Wiper Motor High Speed Control	(48) IV	(48) —

X50A Engine Wiring Harness Junction Block X5 (L4B)



7154302

Connector Part Information

- Harness Type: Starter Generator Positive Cable
- OEM Connector: 85770555
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way Ring Terminal

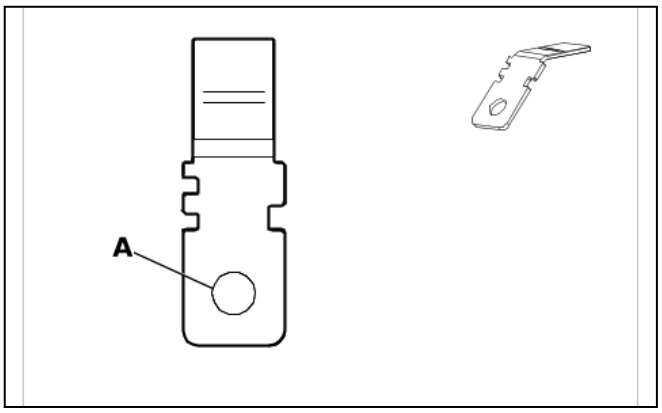
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

X50A Engine Wiring Harness Junction Block X5 (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	35	RD / BU	42	Battery Positive Voltage	I	—

X50A Engine Wiring Harness Junction Block X5 (L76 / L78 / LZ0)



7154302

Connector Part Information

- Harness Type: Generator Battery Jumper Cable
- OEM Connector: 85770555
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way Ring Terminal

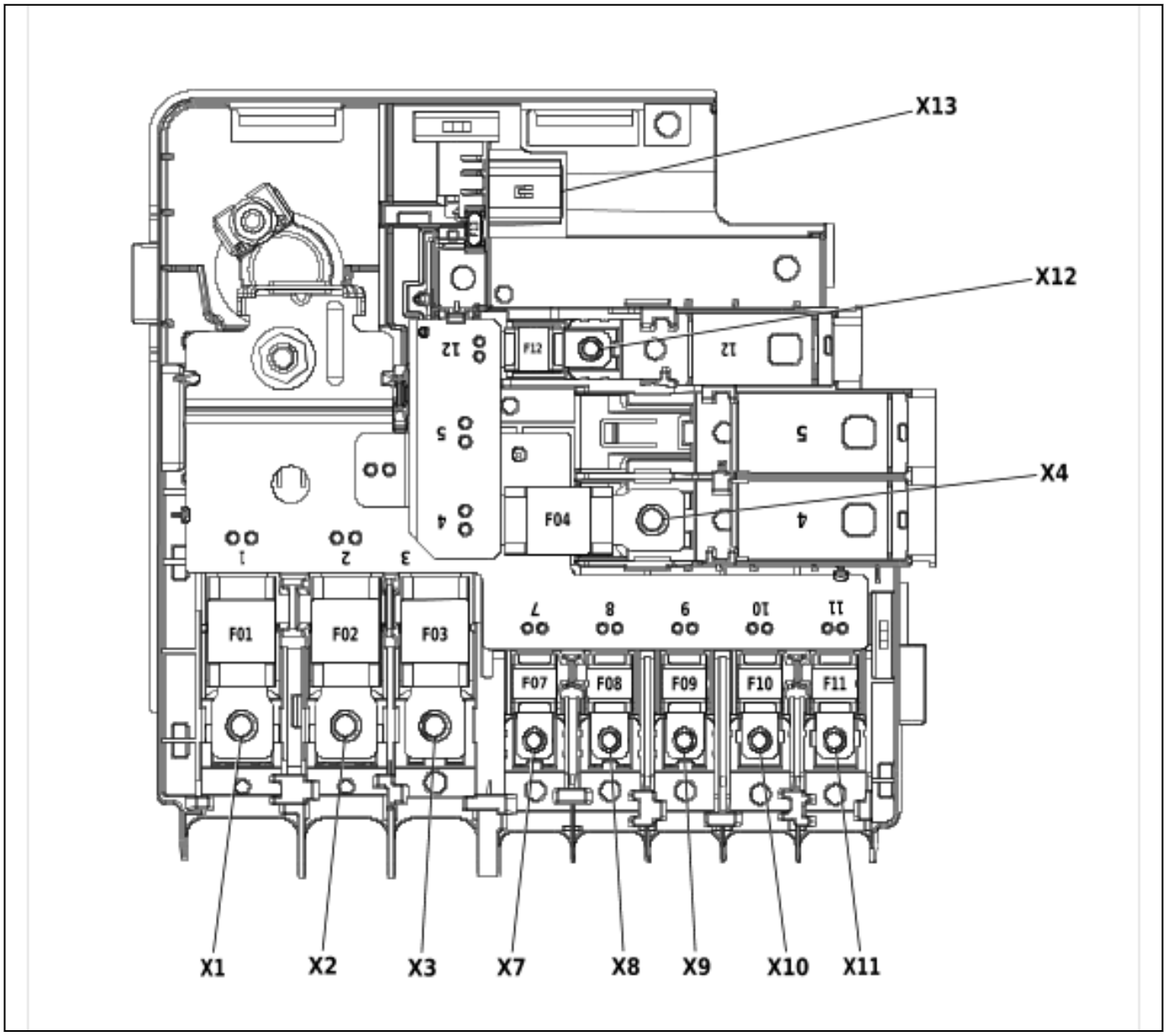
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

X50A Engine Wiring Harness Junction Block X5 (L76 / L78 / LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	35	RD / BU	42	Battery Positive Voltage	I	—

X50B Battery Distribution Engine Compartment Fuse Block - Top View



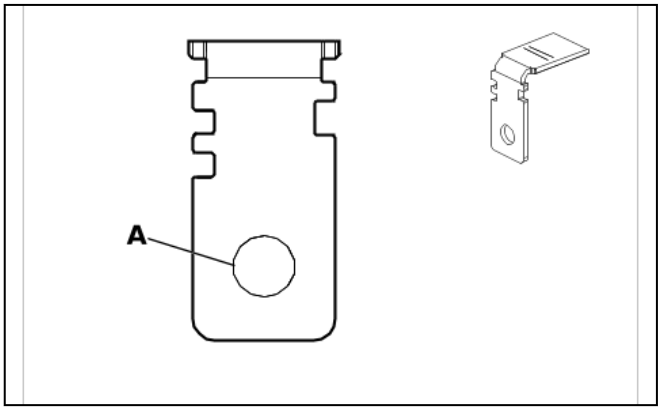
7157106

Usage Table

No.	Device Label Name	Device Assigned Name	Rating	Description
Fuses				
F01	—	F01BA	250A	• G13 Generator • X50A Engine Wiring Harness Junction Block
F02	—	F02BA	450A (-LZ0) 500A (LZ0)	• M64 Starter
F03	—	F03BA	175A	• K43 Power Steering Control Module
F04	—	F04BA	400A (LZ0 / VYU)	• Not Used
F05	—	F05BA	—	• Not Used

No.	Device Label Name	Device Assigned Name	Rating	Description
F07	—	F07BA	60A	• X51R Instrument Panel Wiring Harness Junction Block - Right
F08	—	F08BA	60A	• K160 Brake System Control Module • X410 pin 55
F09	—	F09BA	100A (C32)	• E40 Air Heater (C32)
F10	—	F10BA	80A	• G10R Cooling Fan Motor - Right (LZ0 / V03) • G59 Engine Coolant Pump (L4B)
F11	—	F11BA	70A (LZ0)	• K20 Engine Control Module (LZ0)
F12	—	F12BA	60A (LZ0 / VYU)	• X52P Wiring Harness Auxiliary Junction Block (VBP)
F13	—	F13BA	5A	• B110 Battery Monitor Module

X50B Battery Distribution Engine Compartment Fuse Block X1 (L4B)



7150050

Connector Part Information

- Harness Type: Starter Generator Positive Cable
- OEM Connector: 85695020
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way Ring Terminal

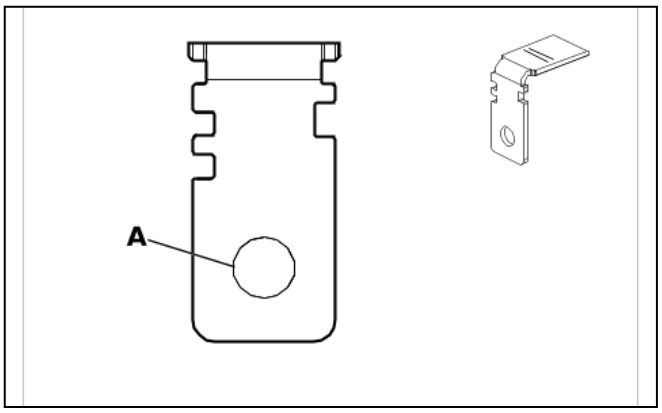
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

X50B Battery Distribution Engine Compartment Fuse Block X1 (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	35	RD / BU	42	Battery Positive Voltage	I	—

X50B Battery Distribution Engine Compartment Fuse Block X1 (L76 / L78 / LZ0)



7150050

Connector Part Information
- Harness Type: Generator Battery Jumper Cable
- OEM Connector: 85770566
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way Ring Terminal

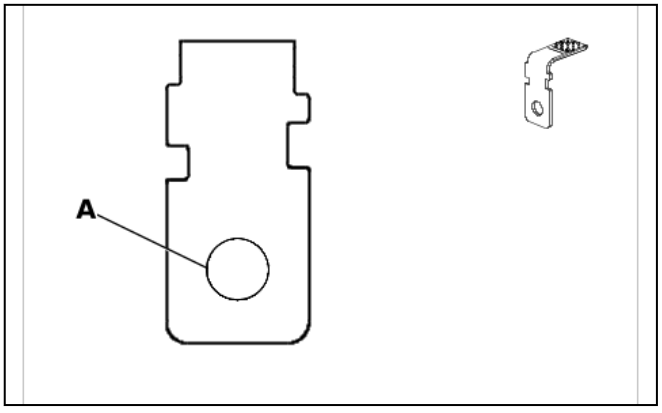
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

X50B Battery Distribution Engine Compartment Fuse Block X1 (L76 / L78 / LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	35	RD / BU	42	Battery Positive Voltage	I	—

X50B Battery Distribution Engine Compartment Fuse Block X2 (L4B)



5902836

Connector Part Information
- Harness Type: Starter Generator Positive Cable
- OEM Connector: 84809755
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way Ring Terminal

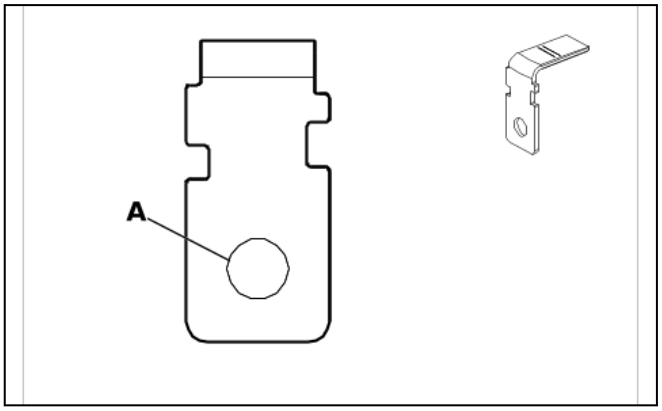
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

X50B Battery Distribution Engine Compartment Fuse Block X2 (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	35	RD / YE	2	Battery Positive Voltage	I	L4B

X50B Battery Distribution Engine Compartment Fuse Block X2 (L76 / L78 / LZ0)



7150524

Connector Part Information

- Harness Type: Starter Solenoid Cable
- OEM Connector: 85770563
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way Ring Terminal

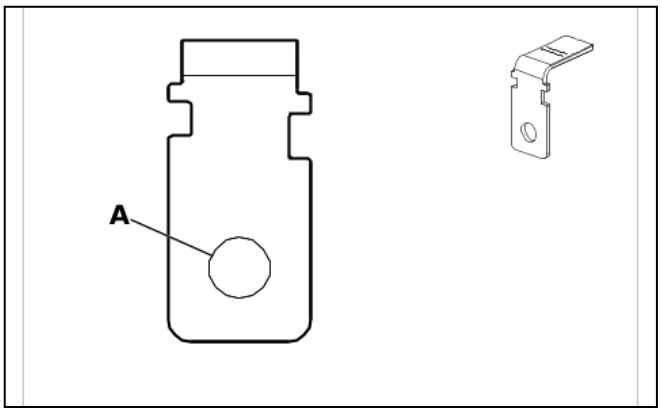
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

X50B Battery Distribution Engine Compartment Fuse Block X2 (L76 / L78 / LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	35	RD / YE	2	Battery Positive Voltage	I	—

X50B Battery Distribution Engine Compartment Fuse Block X3



7154306

Connector Part Information
- Harness Type: Power Steering Wiring Harness
- OEM Connector: 86379812
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way Ring Terminal

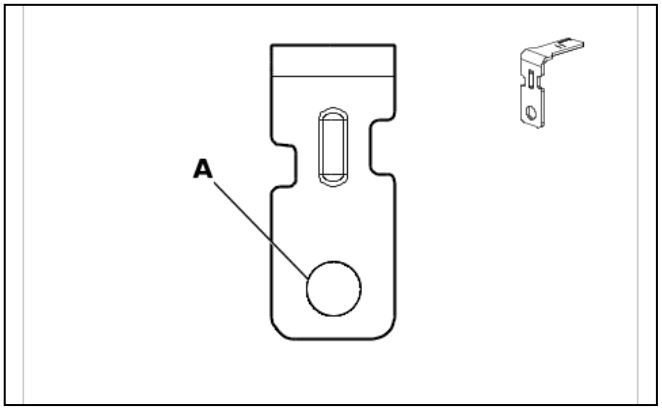
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

X50B Battery Distribution Engine Compartment Fuse Block X3

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	25	RD / VT	3340	Battery Positive Voltage	I	—

X50B Battery Distribution Engine Compartment Fuse Block X7



6258695

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 1137002
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way Ring Terminal

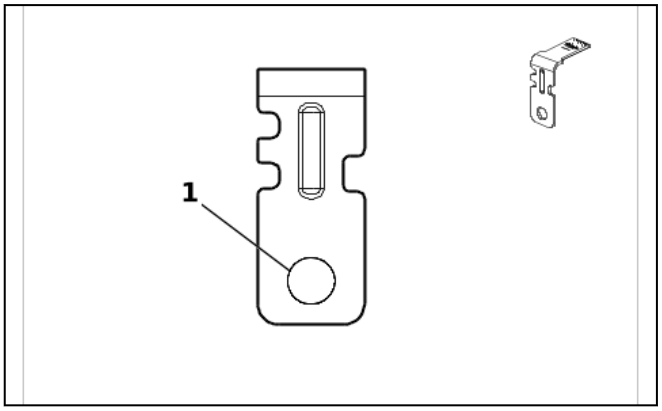
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

X50B Battery Distribution Engine Compartment Fuse Block X7

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	10	RD / YE	1442	Battery Positive Voltage	I	—

X50B Battery Distribution Engine Compartment Fuse Block X8



6193451

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 85528461
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way Ring Terminal

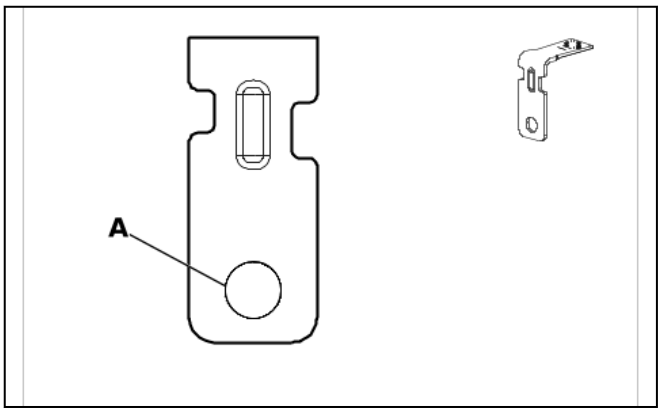
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

X50B Battery Distribution Engine Compartment Fuse Block X8

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 8	(1) RD / WH	(1) 1642	(1) Battery Positive Voltage	(1) I	(1) —

X50B Battery Distribution Engine Compartment Fuse Block X9 (C32)



6143257

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 1136802
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way Ring Terminal

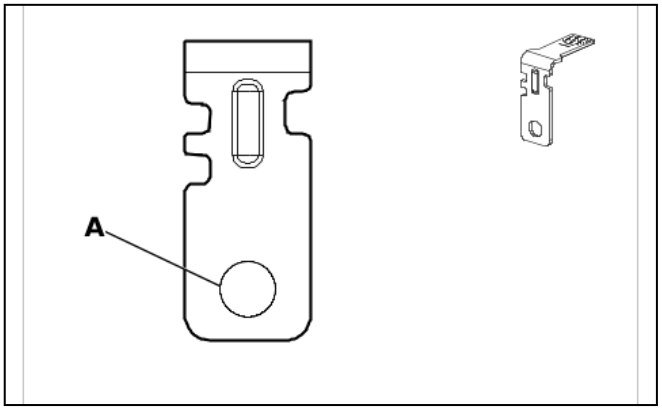
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

X50B Battery Distribution Engine Compartment Fuse Block X9 (C32)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	10	RD / GY	642	Battery Positive Voltage	I	—

X50B Battery Distribution Engine Compartment Fuse Block X10 ((L76 / L78) and V03)



6143262

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 1136902
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way Ring Terminal

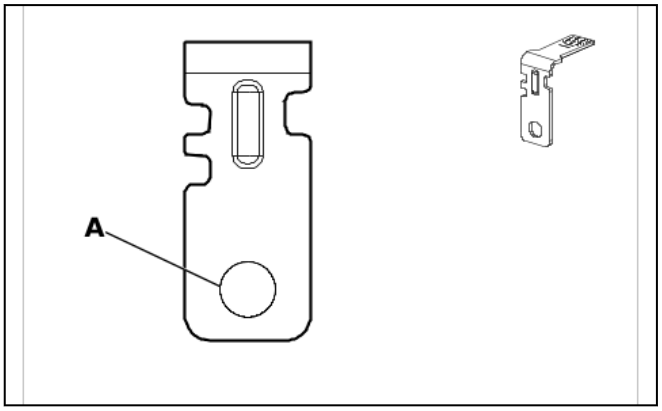
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

X50B Battery Distribution Engine Compartment Fuse Block X10 ((L76 / L78) and V03)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	8	RD / BN	1742	Battery Positive Voltage	I	—

X50B Battery Distribution Engine Compartment Fuse Block X10 (L4B / LZ0)



6143262

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 1136902
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way Ring Terminal

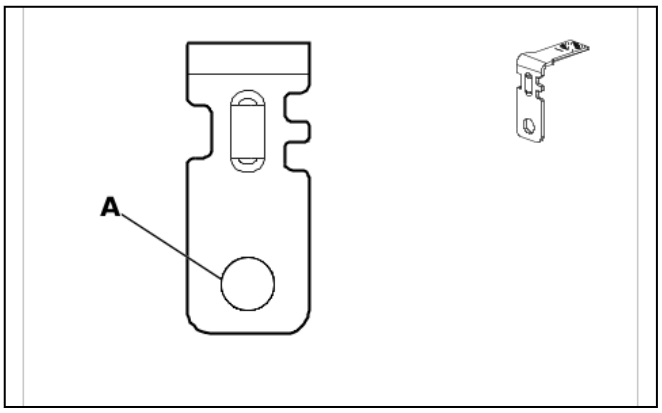
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

X50B Battery Distribution Engine Compartment Fuse Block X10 (L4B / LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	8	RD / BN	1742	Battery Positive Voltage	I	—

X50B Battery Distribution Engine Compartment Fuse Block X11 (LZ0)



6143251

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 1136602
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way Ring Terminal

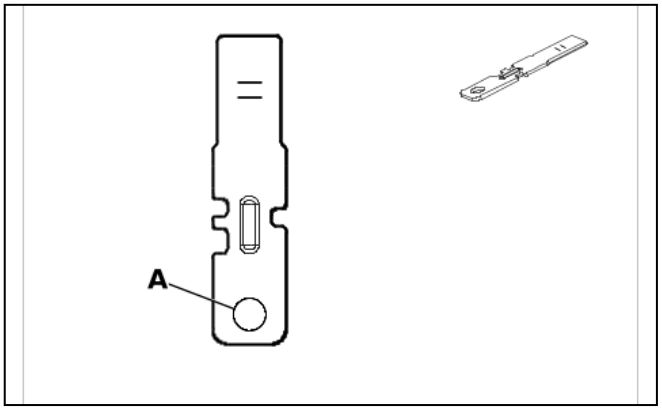
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

X50B Battery Distribution Engine Compartment Fuse Block X11 (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	6	BN / BU	104	Glow Plug Control	I	—

X50B Battery Distribution Engine Compartment Fuse Block X12 (VBP)



7188558

Connector Part Information
- Harness Type: Auxiliary Battery Wiring Harness
- OEM Connector: 85695022
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way Ring Terminal

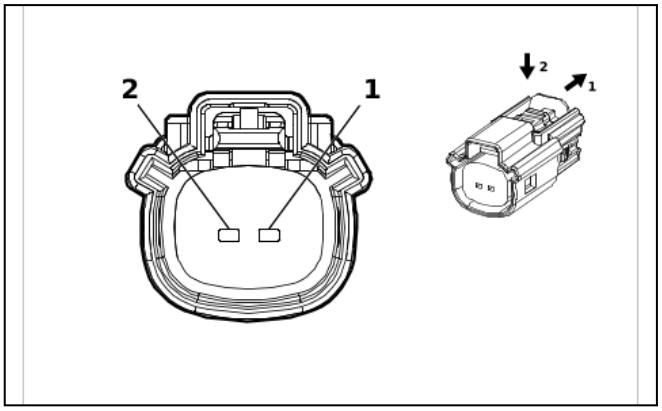
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

X50B Battery Distribution Engine Compartment Fuse Block X12 (VBP)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	—	RD	1342	Battery Positive Voltage	I	—

X50B Battery Distribution Engine Compartment Fuse Block X13



2474713

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 33471-0224
- Service Connector: 13577534
- Description: 2-Way F 1.5 Series, Sealed(BK)

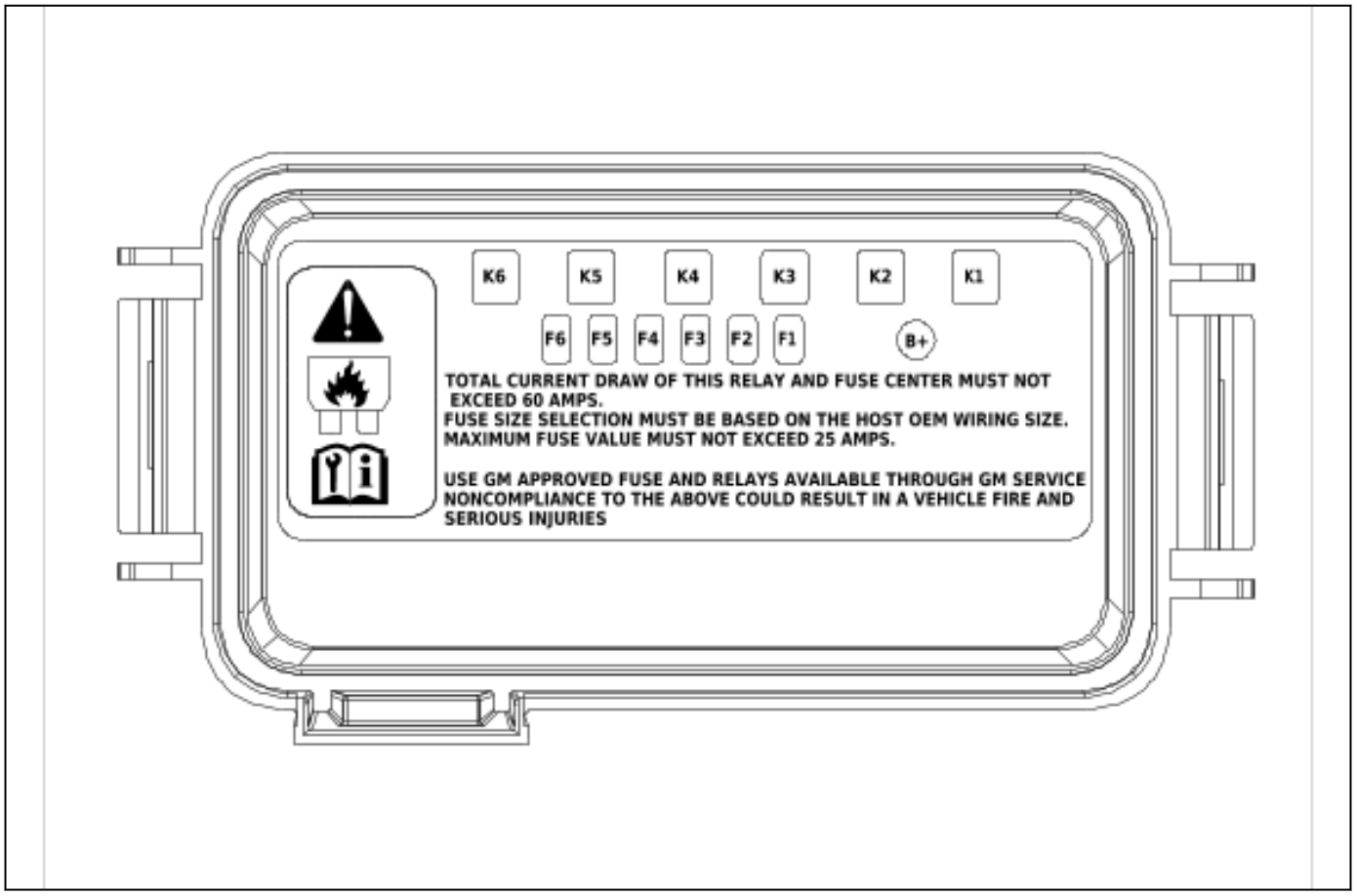
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required

X50B Battery Distribution Engine Compartment Fuse Block X13

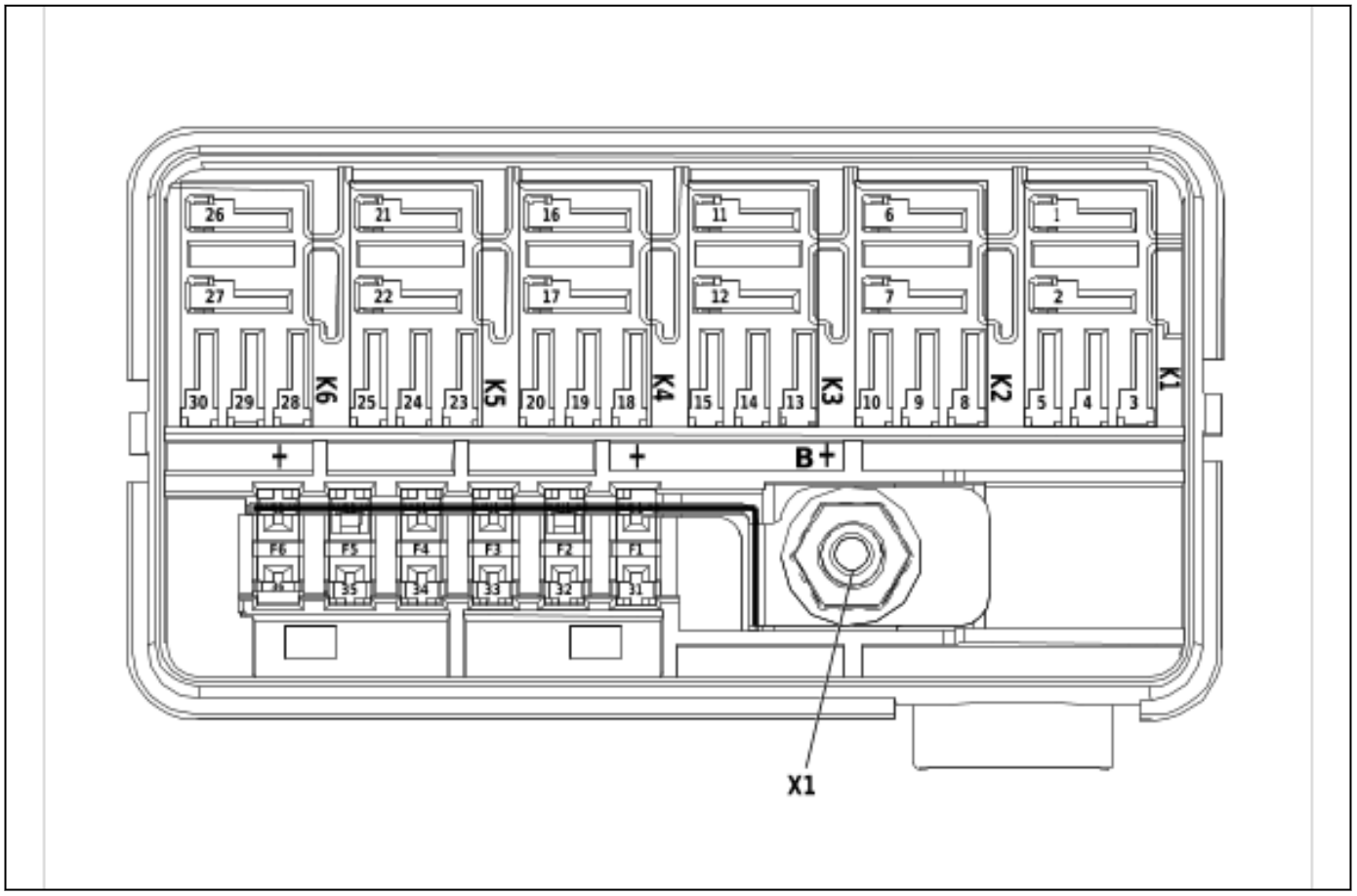
Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) RD / YE	(1) 2340	(1) Battery Positive Voltage	(1) I	(1) —
2	—	—	—	Not Occupied	—	—

X52P Wiring Harness Auxiliary Junction Block - Label (VBP)



7157107

X52P Wiring Harness Auxiliary Junction Block - Top View (VBP)

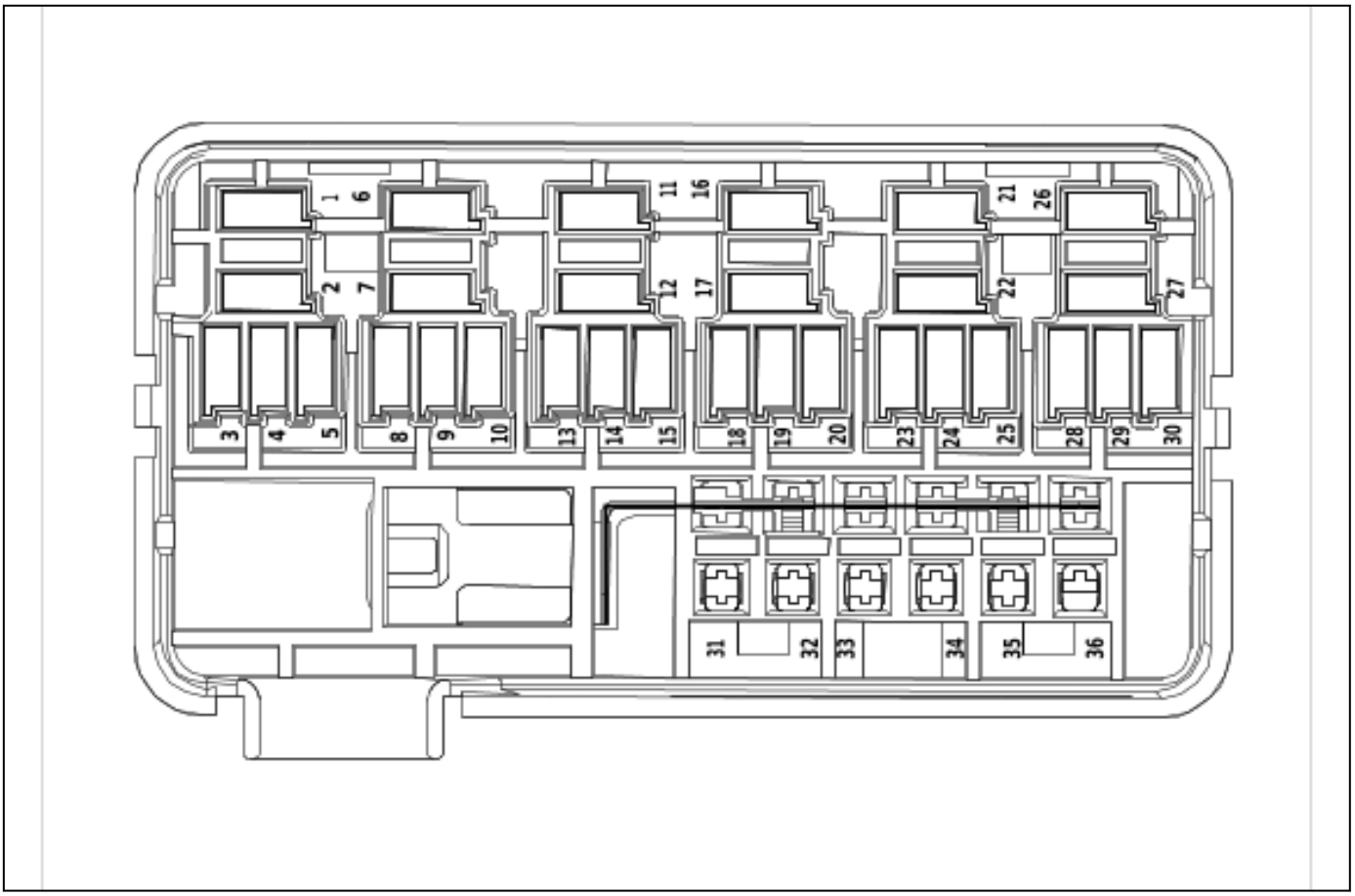


7157108

Usage Table

No.	Device Label Name	Device Assigned Name	Rating	Description
Fuses				
F1	F1	F1AUX	10A	• KR161AA Configurable/Accessory Provision Relay 1
F2	F2	F2AUX	10A	• KR161BA Configurable/Accessory Provision Relay 2
F3	F3	F3AUX	10A	• KR161CA Configurable/Accessory Provision Relay 3
F4	F4	F4AUX	10A	• KR161DA Configurable/Accessory Provision Relay 4
F5	F5	F5AUX	10A	• KR161EA Configurable/Accessory Provision Relay 5
F6	F6	F6AUX	10A	• KR161FA Configurable/Accessory Provision Relay 6

X52P Wiring Harness Auxiliary Junction Block (VBP)



7157109

Connector Part Information

- Harness Type: Auxiliary Battery Wiring Harness
- OEM Connector: PNK00653
- Service Connector: Service by Harness - See Part Catalog
- Description: 42-Way F

Terminal Part Information

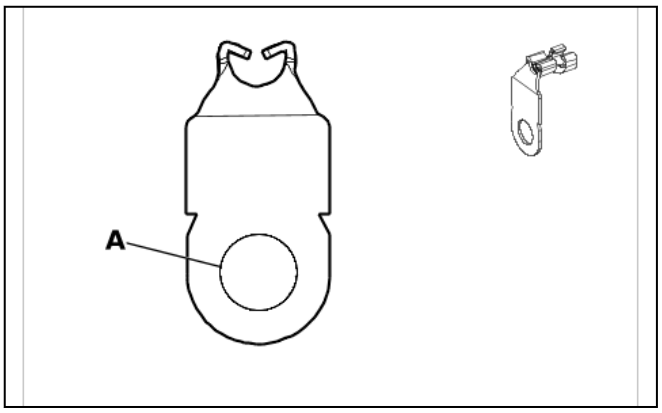
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

X52P Wiring Harness Auxiliary Junction Block (VBP)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 2	(1) BU / GN	(1) 10726	(1) Upfitter Accessory Fuse 1 Supply Voltage	(1) I	(1) —
(2) 2	(2) 2	(2) YE	(2) 10731	(2) Upfitter Accessory 1 Supply Voltage	(2) I	(2) —
(3) 3	(3) 0.35	(3) RD / YE	(3) 10716	(3) Upfitter Accessory Relay 1 Coil Control	(3) I	(3) —
(5) 5	(5) 0.35	(5) BK	(5) 650	(5) Ground	(5) I	(5) —
(6) 6	(6) 2	(6) GY	(6) 10727	(6) Upfitter Accessory Fuse 2 Supply Voltage	(6) I	(6) —
(7) 7	(7) 2	(7) BU	(7) 10732	(7) Upfitter Accessory 2 Supply Voltage	(7) I	(7) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(8) 8	(8) 0.35	(8) RD / BU	(8) 10717	(8) Upfitter Accessory Relay 2 Coil Control	(8) I	(8) —
(10) 10	(10) 0.35	(10) BK	(10) 650	(10) Ground	(10) I	(10) —
(11) 11	(11) 2	(11) BN	(11) 10728	(11) Upfitter Accessory Fuse 3 Supply Voltage	(11) I	(11) —
(12) 12	(12) 2	(12) GY	(12) 10733	(12) Upfitter Accessory 3 Supply Voltage	(12) I	(12) —
(13) 13	(13) 0.35	(13) RD / GY	(13) 10718	(13) Upfitter Accessory Relay 3 Coil Control	(13) I	(13) —
(15) 15	(15) 0.35	(15) BK	(15) 650	(15) Ground	(15) I	(15) —
(16) 16	(16) 2	(16) YE	(16) 10729	(16) Upfitter Accessory Fuse 4 Supply Voltage	(16) I	(16) —
(17) 17	(17) 2	(17) RD	(17) 10734	(17) Upfitter Accessory 4 Supply Voltage	(17) I	(17) —
(18) 18	(18) 0.35	(18) RD	(18) 10719	(18) Upfitter Accessory Relay 4 Coil Control	(18) I	(18) —
(20) 20	(20) 0.35	(20) BK	(20) 650	(20) Ground	(20) I	(20) —
(21) 21	(21) 2	(21) VT	(21) 10730	(21) Upfitter Accessory Fuse 5 Supply Voltage	(21) I	(21) —
(22) 22	(22) 2	(22) WH	(22) 10735	(22) Upfitter Accessory 5 Supply Voltage	(22) I	(22) —
(23) 23	(23) 0.35	(23) RD / WH	(23) 10720	(23) Upfitter Accessory Relay 5 Coil Control	(23) I	(23) —
(25) 25	(25) 0.35	(25) BK	(25) 650	(25) Ground	(25) I	(25) —
(26) 26	(26) 2	(26) GN	(26) 11024	(26) Upfitter Accessory Fuse 6 Supply Voltage	(26) I	(26) —
(27) 27	(27) 2	(27) BN	(27) 11025	(27) Upfitter Accessory 6 Supply Voltage	(27) I	(27) —
(28) 28	(28) 0.35	(28) RD / BN	(28) 10908	(28) Upfitter Accessory Relay 6 Coil Control	(28) I	(28) —
(30) 30	(30) 0.35	(30) BK	(30) 650	(30) Ground	(30) I	(30) —
(31) 31	(31) 2	(31) BU / GN	(31) 10726	(31) Upfitter Accessory Fuse 1 Supply Voltage	(31) I	(31) —
(32) 32	(32) 2	(32) GY	(32) 10727	(32) Upfitter Accessory Fuse 2 Supply Voltage	(32) I	(32) —
(33) 33	(33) 2	(33) BN	(33) 10728	(33) Upfitter Accessory Fuse 3 Supply Voltage	(33) I	(33) —
(34) 34	(34) 2	(34) YE	(34) 10729	(34) Upfitter Accessory Fuse 4 Supply Voltage	(34) I	(34) —
(35) 35	(35) 2	(35) VT	(35) 10730	(35) Upfitter Accessory Fuse 5 Supply Voltage	(35) I	(35) —
(36) 36	(36) 2	(36) GN	(36) 11024	(36) Upfitter Accessory Fuse 6 Supply Voltage	(36) I	(36) —

X52P Wiring Harness Auxiliary Junction Block X1 (VBP)



7188560

Connector Part Information

- Harness Type: Auxiliary Battery Wiring Harness
- OEM Connector: PNT00240
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way Ring Terminal

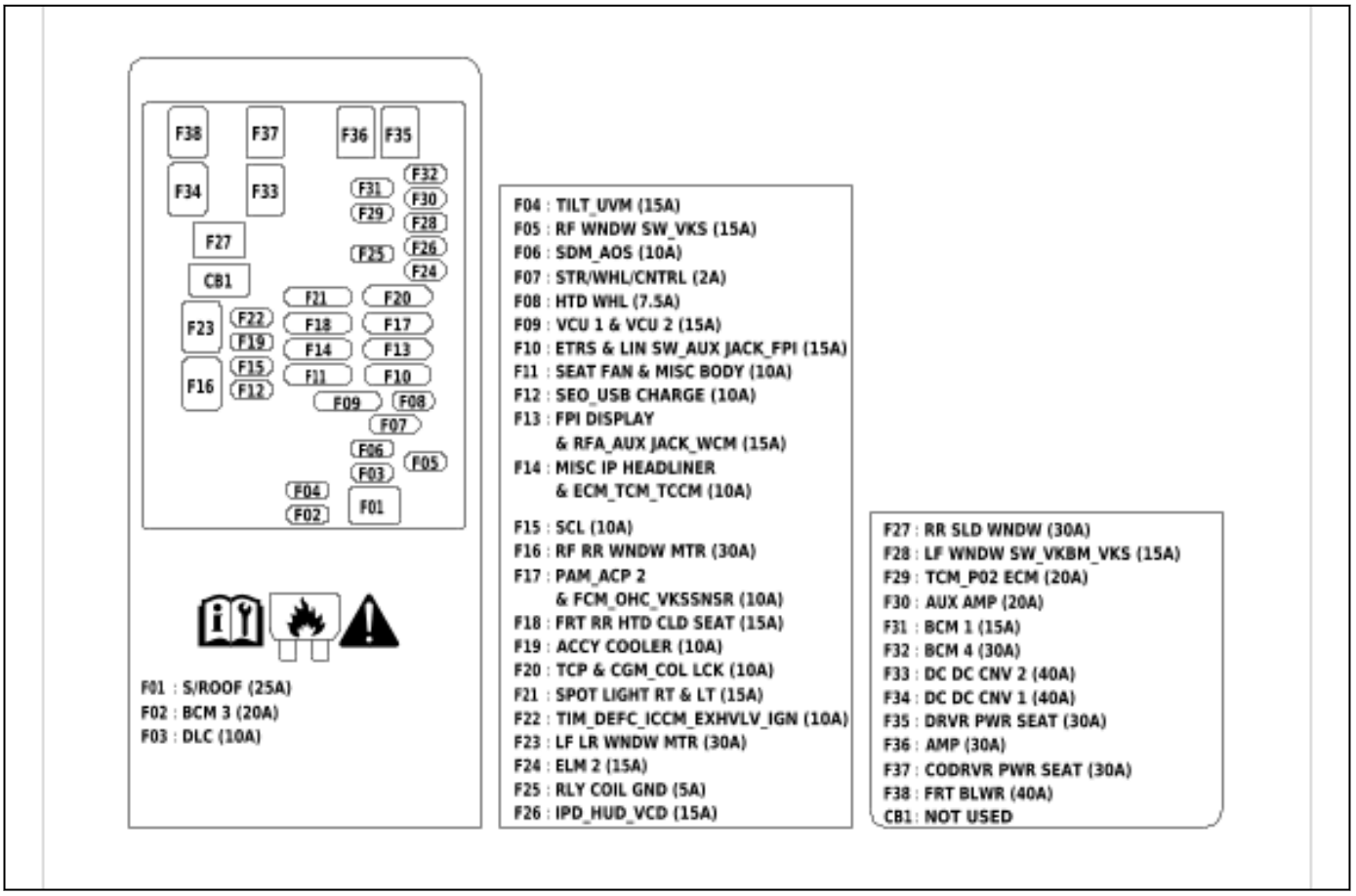
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

X52P Wiring Harness Auxiliary Junction Block X1 (VBP)

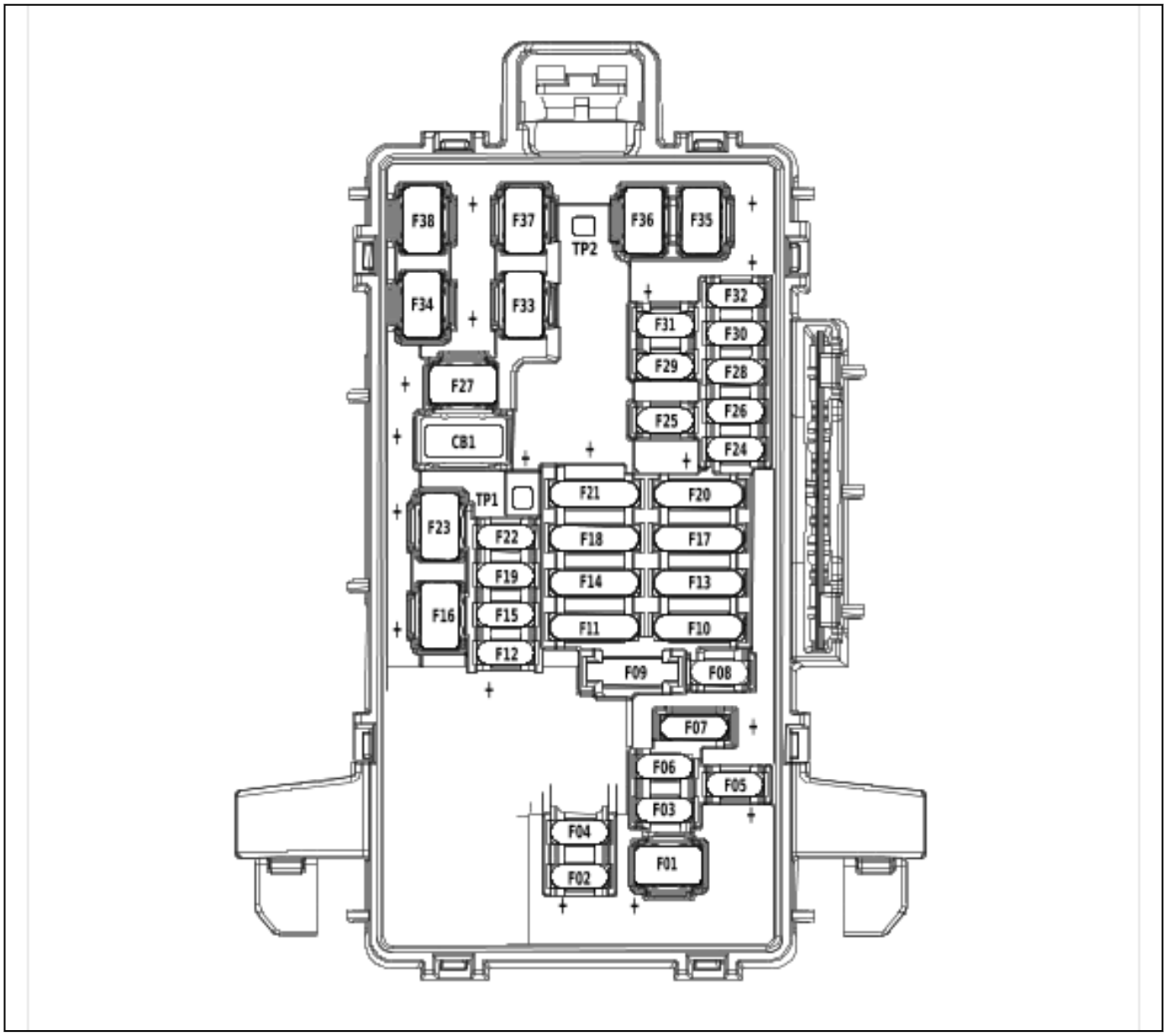
Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	—	RD	1342	Battery Positive Voltage	I	—

X51R Instrument Panel Wiring Harness Junction Block - Right Label



7157110

X51R Instrument Panel Wiring Harness Junction Block - Right Top View



7157111

Usage Table

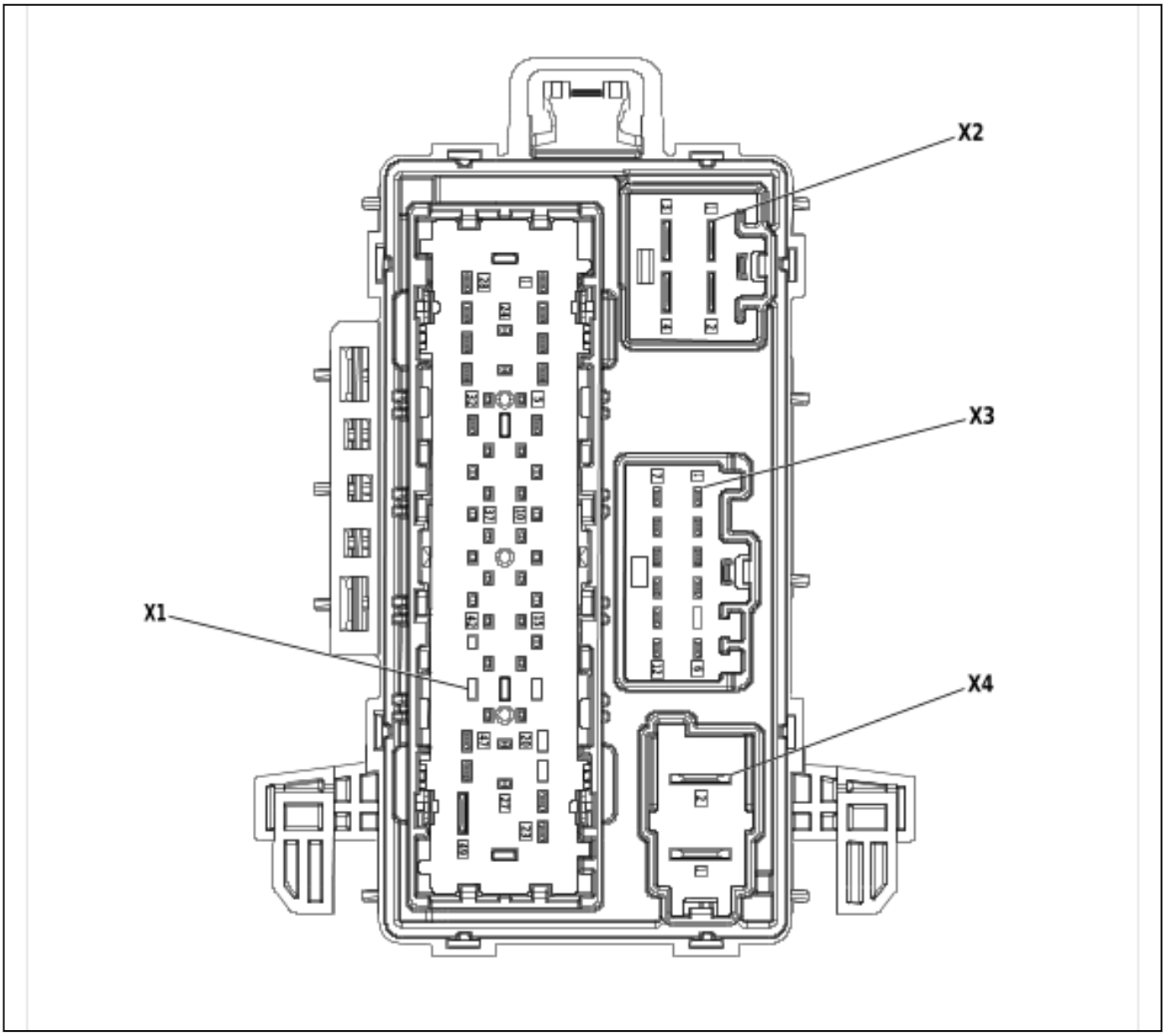
No.	Device Label Name	Device Assigned Name	Rating	Description
Fuses				
F01	S/ROOF	F01DR	25A	• K61 Sunroof Control Module (CAJ)
F02	BCM 3	F02DR	20A	• K9 Body Control Module
F03	DLC	F03DR	10A	• X84 Data Link Connector
F04	TILT_UVM	F04DR	15A	• K56U Special Purpose Vehicle Control Module (KGU) • K99 Steering Column Control Module (N38)
F05	RF WNDW SW_VKS	F05DR	15A	• A11 Radio (UQ3) • S79P Front Side Door Window Switch - Passenger (WLN)

No.	Device Label Name	Device Assigned Name	Rating	Description
F06	SDM_AOS	F06DR	10A	• K36 Restraints Control Module • K85P Restraints Occupant Classification System Module - Passenger
F07	STR/WHL/CNTRL	F07DR	2A	• S70L Cruise Control Switch • S70R Radio Control Switch - Steering Wheel
F08	HTD WHL	F08DR	7.5A	• K32 Heated Steering Wheel Module (KI3 - ULM) • K180S Driver Monitoring System Module - Steering Wheel (ULM)
F09	VCU 1 and VCU 2	F09DR	15A	• Not Used
F10	ETRS and LIN SW_AUX JACK_FPI	F10DR	15A	• S3B Automatic Transmission Electronic Control • S171 Instrument Panel Center Accessory Function Switch • X83BIP Audio/Video Receptacle - Instrument Panel (-(D07 / DCK)) • X83BFC Audio/Video Receptacle - Floor Console Front (D07 / DCK) • X83BCR Audio/Video Receptacle Floor Console Rear (D07 / DCK) • X83FP Audio/Video and USB Receptacle (USN)
F11	SEAT FAN and MISC BODY	F11DR	10A	• K36 Restraints Control Module • K160 Brake System Control Module • K219 Lighting Control Module • M73A Front Seat Back Ventilation Blower - Driver (KU9) • M73B Front Seat Back Ventilation Blower - Passenger (KU9) • M73D Front Seat Cushion Ventilation Blower - Driver (KU9) • M73P Front Seat Cushion Ventilation Blower - Passenger (KU9) • T1 DC/AC Converter Control Module (KI4/KI5/KFG/KFH/KC9/KCA)
F12	SEO_USB CHARGE	F12DR	10A	• X213 pin 6 • X92CD Dual Charge Only Receptacle - Floor Console Rear (UBI and (D07 / DCK)) • X92FSR Dual Charge Only Receptacle - Front Center Seat Rear Cover (UBI and AZ3)
F13	FPI DISPLAY and RFA_AUX JACK_WCM	F13DR	15A	• K77 Remote Function Actuator Module • K299 Audio/Video Interface Module (USN) • P62 Occupant Display (USN) • S32R Rear Seat Heater Switch (KCB) • S76 Trailer Brake Control Switch • T22 Wireless Accessory Charging Module (K7A / K7B) • T22FR Wireless Accessory Charging Module - Front Right (K7B)

No.	Device Label Name	Device Assigned Name	Rating	Description
F14	MISC IP HEADLINER and ECM_TCM_TCCM	F14DR	10A	• A10 Inside Rearview Mirror (DD8 / DRZ) • E40 Air Heater (C32) • K20 Engine Control Module (L76 / L78 / LZ0) • K45 Powertrain Control Module (L4B) • K69 Transfer Case Control Module (F48) • K71 Transmission Control Module (L76 / L78 / LZ0) • P43 Forward Collision Alert Display (UIT) • X213 pin 13
F15	SCL	F15DR	10A	• K60 Column Lock Module
F16	RF RR WNDW MTR	F16DR	30A	• M74P Front Side Door Window Regulator Motor - Passenger (WLN) • S79P Front Side Door Window Switch - Passenger (WLM) • S79RR Rear Side Door Window Switch - Right (4-Door)
F17	PAM_ACP 2 and FCM_OHC_VKSSN SR	F17DR	10A	• A26 Heater and Air Conditioning User Interface Control - Front (2-Door and GF3) • A103 Roof Console • B117A Windshield Outside Moisture/Ambient Light and Humidity Sensor (ASV) • B174W Front View Camera - Windshield • B342E UHF Low Energy Remote Control Access Sensor Transciever 5 (BOK / BOR / BOY) • K180 Driver Monitoring System Module (ULM and (UJE / UKM)) • K182 Parking Assist Control Module • P29 Head-Up Display (UV6)
F18	FRT RR HTD CLD SEAT	F18DR	15A	• K29FV Front Seat Heater Vent Control Module (KAM) • K234 Rear Seat Heater Vent Control Module (KCB)
F19	ACCY COOLER	F19DR	10A	• K175 Front Floor Console Compartment Cooler (D07 / DCK)
F20	TCP and CGM_COL LCK	F20DR	10A	• K56 Serial Data Gateway Module • K60 Column Lock Module • K73 Telematic Control Module
F21	SPOT LIGHT RT and LT	F21DR	15A	• A11 Radio • X219 pin B (5W4 / 9C1)
F22	TIM_DEFC_ICCM_ EXHVLV_IGN	F22DR	10A	• K38 Chassis Control Module (G93 / G94) • K68 Trailer Lamp Control Module (UET) • K115 Reductant Control Module (FHX) • M106 Exhaust Control Valve Actuator (NPP)
F23	LF LR WNDW MTR	F23DR	30A	• M74D Front Side Door Window Regulator Motor - Driver • S79LR Rear Side Door Window Switch - Left (4-Door)
F24	ELM 2	F24DR	15A	• K219 Lighting Control Module

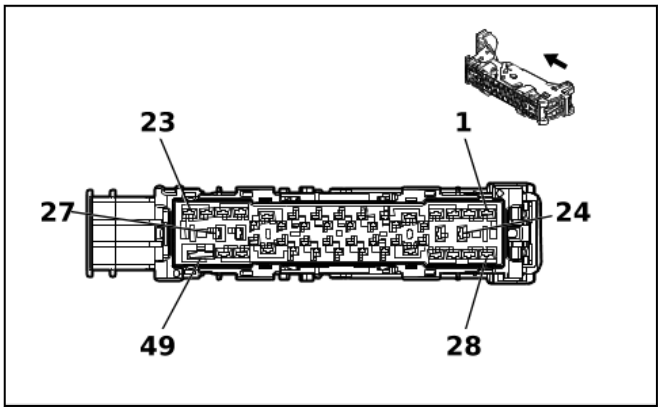
No.	Device Label Name	Device Assigned Name	Rating	Description
F25	RLY COIL GND	F25DR	5A	• KR73 Ignition Main Relay • KR76 Accessory Time Delay Cutoff Relay • KR206C Rear Sliding Window Close Relay • KR206O Rear Sliding Window Open Relay
F26	IPD_HUD_VCD	F26DR	15A	• A22 Radio Control • P16 Instrument Panel Cluster Control Module
F27	RR SLD WNDW	F27DR	30A	• KR206C Rear Sliding Window Close Relay • KR206O Rear Sliding Window Open Relay
F28	LF WNDW SW_VKBM_VKS	F28DR	15A	• A24D Front Side Door Outside Handle - Left (BOK / BOR / BOY) • S79D Front Side Door Window Switch - Driver
F29	TCM_P02 ECM	F29DR	20A	• K45 Powertrain Control Module (L4B) • K71 Transmission Control Module (L76 / L78 / LZ0)
F30	AUX AMP	F30DR	20A	• Not Used
F31	BCM 1	F31DR	15A	• K9 Body Control Module
F32	BCM 4	F32DR	30A	• K9 Body Control Module
F33	DC DC CNV 2	F33DR	40A	• T19 Multifunction Power Supply Converter
F34	DC DC CNV 1	F34DR	40A	• T19 Multifunction Power Supply Converter
F35	DRVR PWR SEAT	F35DR	30A	• K40D Driver Seat Adjuster Memory Module (A45) • S64D Front Seat Adjuster Switch - Driver (A2X - A45)
F36	AMP	F36DR	30A	• T3 Audio Amplifier (UQA)
F37	CODRVR PWR SEAT	F37DR	30A	• K40P Passenger Seat Adjuster Memory Module (AHH / AKE) • S64P Front Seat Adjuster Switch - Passenger (A7K - (AHH / AKE))
F38	FRT BLWR	F38DR	40A	• M8 Blower Motor
Circuit Breakers				
CB1	NOT USED	CB1DR	—	• Not Used
Note: Relays listed below are non-serviceable Printed Circuit Board (PCB) relays and are internal to the block.				
K01	—	KR76 Accessory Time Delay Cutoff Relay	—	• CB1DR • F12DR
K02	—	KR206O Rear Sliding Window Open Relay	—	• M63 Rear Sliding Window Motor • TP1
K03	—	KR73 Ignition Main Relay	—	• F11DR • F14DR • F15DR • F19DR • F22DR
K04	—	KR206C Rear Sliding Window Close Relay	—	• M63 Rear Sliding Window Motor • TP2
Note: Items listed below are diagnostic test points for Moveable Windows				
TP1	—	TP1	—	• KR206O Rear Sliding Window Open Relay
TP2	—	TP2	—	• KR206C Rear Sliding Window Close Relay

X51R Instrument Panel Wiring Harness Junction Block - Right Bottom View



7157112

X51R Instrument Panel Wiring Harness Junction Block - Right X1



7148399

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 13566200
- Service Connector: 85564871
- Description: 49-Way F 1.5, 2.8, 6.3 Kaizen Series(BK)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	13575835	J-35616-42 (RD)	J-38125-11A
II	13575850	J-35616-2A (GY)	J-38125-557
III	19368264	J-35616-4A (PU)	J-38125-11A

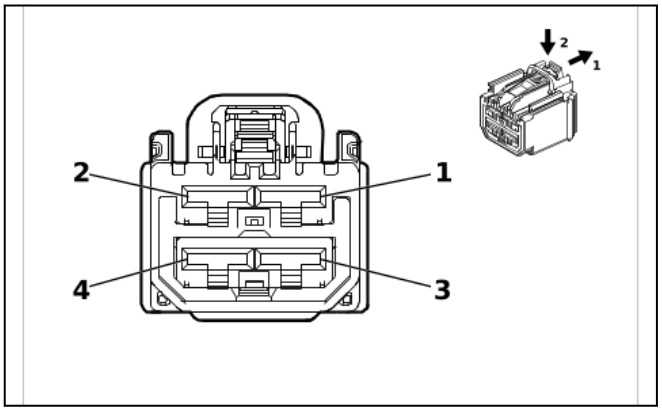
X51R Instrument Panel Wiring Harness Junction Block - Right X1

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 2.5	(1) YE	(1) 7454	(1) Window Motor Rear Auxiliary Close Control	(1) III	(1) —
(2) 2	(2) 2.5	(2) RD / YE	(2) 3740	(2) Battery Positive Voltage	(2) III	(2) —
(3) 3	(3) 2.5	(3) BK	(3) 1050	(3) Ground	(3) III	(3) —
(4) 4	(4) 2.5	(4) RD / GN	(4) 2173	(4) 12V Regulated Supply Voltage 2	(4) III	(4) —
(5) 5	(5) 0.5	(5) WH	(5) 6192	(5) Sliding Rear Window Switch Close Signal	(5) II	(5) —
(6) 6	(6) 2.5	(6) BK	(6) 1050	(6) Ground	(6) III	(6) —
(7) 7	(7) 0.5	(7) YE / VT	(7) 6191	(7) Power Rear Window Switch Open Signal	(7) II	(7) —
(8) 8	(8) 0.75	(8) RD / YE	(8) 2340	(8) Battery Positive Voltage	(8) II	(8) —
(9) 9	(9) 0.75	(9) RD / GN	(9) 10240	(9) Battery Positive Voltage Police	(9) II	(9) —
(10) 10	(10) 1	(10) RD / BN	(10) 6640	(10) Battery Positive Voltage	(10) II	(10) —
(11) 11	(11) 1	(11) RD / GN	(11) 6140	(11) Battery Positive Voltage	(11) II	(11) —
(12) 12	(12) 0.75	(12) VT / GN	(12) 439	(12) Run/Crank Ignition 1 Voltage	(12) II	(12) —
(13) 13	(13) 0.5	(13) VT / BK	(13) 339	(13) Run/Crank Ignition 1 Voltage	(13) II	(13) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(14) 14	(14) 0.75	(14) VT / WH	(14) 1139	(14) Run/Crank Ignition 1 Voltage	(14) II	(14) —
(15) 15	(15) 0.5	(15) VT / WH	(15) 239	(15) Run/Crank Ignition 1 Voltage	(15) II	(15) —
(19) 19	(19) 0.5	(19) GN / VT	(19) 5199	(19) Run/Crank Relay Coil Control	(19) II	(19) —
(22) 22	(22) 0.75 (22) 0.75	(22) RD / VT (22) RD / VT	(22) 14240 (22) 4640	(22) Battery Positive Voltage (22) Battery Positive Voltage	(22) III (22) III	(22) KGU (22) N38
(23) 23	(23) 1	(23) RD / GY	(23) 2140	(23) Battery Positive Voltage	(23) III	(23) —
(24) 24	(24) 0.5	(24) RD / WH	(24) 2740	(24) Battery Positive Voltage	(24) II	(24) —
(25) 25	(25) 0.5	(25) RD / BU	(25) 1240	(25) Battery Positive Voltage	(25) II	(25) —
(26) 26	(26) 0.5	(26) RD / GN	(26) 4440	(26) Battery Positive Voltage	(26) II	(26) —
(27) 27	(27) 0.5	(27) RD / YE	(27) 6540	(27) Battery Positive Voltage	(27) II	(27) —
(28) 28	(28) 2.5	(28) RD / YE	(28) 5040	(28) Battery Positive Voltage	(28) III	(28) —
(29) 29	(29) 2	(29) RD / BU	(29) 2540	(29) Battery Positive Voltage	(29) III	(29) —
(31) 31	(31) 2.5	(31) RD / GN	(31) 1840	(31) Battery Positive Voltage	(31) III	(31) —
(32) 32	(32) 0.5	(32) RD / WH	(32) 1340	(32) Battery Positive Voltage	(32) II	(32) —
(33) 33	(33) 0.75	(33) BK	(33) 1050	(33) Ground	(33) III	(33) —
(34) 34	(34) 0.5	(34) RD / GN	(34) 1540	(34) Battery Positive Voltage	(34) II	(34) —
(35) 35	(35) 0.35	(35) RD / BN	(35) 4940	(35) Battery Positive Voltage	(35) II	(35) —
(36) 36	(36) 0.35 (36) 0.5	(36) RD / YE (36) RD / YE	(36) 3040 (36) 3040	(36) Battery Positive Voltage (36) Battery Positive Voltage	(36) II (36) II	(36) 2- DOOR (36) 4- DOOR
(37) 37	(37) 0.5 (37) 0.35	(37) RD / YE (37) RD / YE	(37) 240 (37) 240	(37) Battery Positive Voltage (37) Battery Positive Voltage	(37) II	(37) — (37) ULM & UJE
(38) 38	(38) 0.5 (38) 0.35	(38) RD / VT (38) RD / VT	(38) 1640 (38) 1640	(38) Battery Positive Voltage (38) Battery Positive Voltage	(38) II	(38) — (38) UJE / UKM
(39) 39	(39) 0.75	(39) RD / GY	(39) 2840	(39) Battery Positive Voltage	(39) II	(39) —
(40) 40	(40) 1	(40) RD / VT	(40) 2640	(40) Battery Positive Voltage	(40) II	(40) —
(41) 41	(41) 0.75	(41) RD / WH	(41) 140	(41) Battery Positive Voltage	(41) II	(41) —
(42) 42	(42) 0.5	(42) RD / WH	(42) 7240	(42) Battery Positive Voltage	(42) II	(42) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(44) 44	(44) 0.5	(44) RD / BN	(44) 10040	(44) Battery Positive Voltage	(44) II	(44) —
(46) 46	(46) 0.5	(46) RD / GN	(46) 5140	(46) Battery Positive Voltage	(46) II	(46) —
(47) 47	(47) 2.5	(47) RD / YE	(47) 2172	(47) 12V Regulated Supply Voltage 1	(47) III	(47) —
(48) 48	(48) 0.75 (48) 0.5	(48) RD / WH (48) RD / WH	(48) 5440 (48) 5440	(48) Battery Positive Voltage (48) Battery Positive Voltage	(48) III (48) III	(48) UQ3 (48) WLN
(49) 49	(49) 2	(49) RD / BU	(49) 4540	(49) Battery Positive Voltage	(49) I	(49) —

X51R Instrument Panel Wiring Harness Junction Block - Right X2



5492913

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 7289-7459-40
- Service Connector: 84766433
- Description: 4-Way F 6.3 YESC Series(GY)

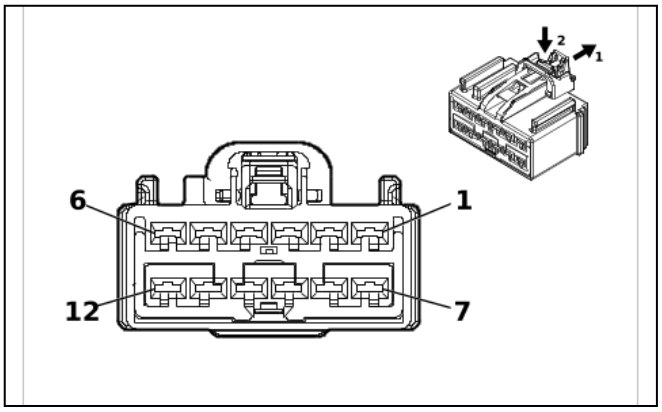
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-42 (RD)	No Tool Required

X51R Instrument Panel Wiring Harness Junction Block - Right X2

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 4	(1) RD / GY	(1) 1740	(1) Battery Positive Voltage	(1) I	(1) —
(2) 2	(2) 2.5	(2) RD / WH	(2) 8040	(2) Battery Positive Voltage	(2) I	(2) —
(3) 3	(3) 2.5	(3) RD / YE	(3) 7440	(3) Battery Positive Voltage	(3) I	(3) —
(4) 4	(4) 2.5	(4) RD / YE	(4) 8140	(4) Battery Positive Voltage	(4) I	(4) —

X51R Instrument Panel Wiring Harness Junction Block - Right X3



5254826

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 7289-9152-40
- Service Connector: 13518424
- Description: 12-Way F 2.8 Kaizen Series(L-GY)

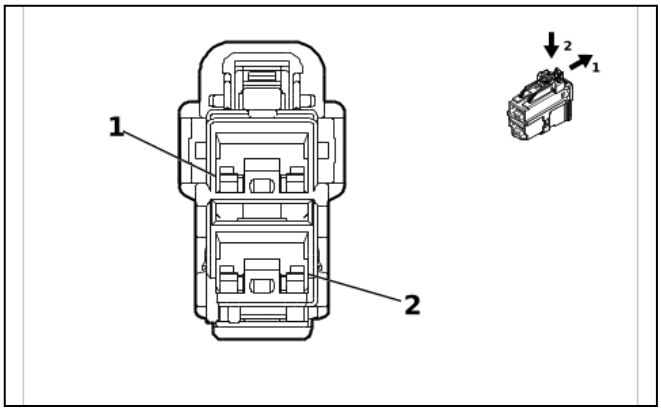
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19368264	J-35616-4A (PU)	J-38125-11A

X51R Instrument Panel Wiring Harness Junction Block - Right X3

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 2.5	(1) RD / BU	(1) 3240	(1) Battery Positive Voltage	(1) I	(1) —
(2) 2	(2) 2.5	(2) RD / GY	(2) 3540	(2) Battery Positive Voltage	(2) I	(2) —
(3) 3	(3) 2.5	(3) RD / GY	(3) 4840	(3) Battery Positive Voltage	(3) I	(3) —
(4) 4	(4) 2.5	(4) RD / BN	(4) 4240	(4) Battery Positive Voltage	(4) I	(4) —
5	—	—	—	Not Occupied	—	—
(6) 6	(6) 0.35	(6) GY / GN	(6) 4083	(6) Retained Accessory Power Relay 2 Coil Control	(6) I	(6) —
(7) 7	(7) 2.5	(7) VT / YE	(7) 7453	(7) Window Motor Rear Auxiliary Open Control	(7) I	(7) —
8	—	—	—	Not Occupied	—	—
(9) 9	(9) 0.5	(9) VT / WH	(9) 639	(9) Run/Crank Ignition 1 Voltage	(9) I	(9) —
(10) 10	(10) 0.5	(10) VT / GY	(10) 539	(10) Run/Crank Ignition 1 Voltage	(10) I	(10) —
(11) 11	(11) 0.35	(11) BU / VT	(11) 807	(11) Ignition Off/Accessory Ignition Voltage	(11) I	(11) —
(12) 12	(12) 0.35	(12) VT	(12) 4701	(12) Retained Accessory Power Control	(12) I	(12) —

X51R Instrument Panel Wiring Harness Junction Block - Right X4



5835292

Connector Part Information
- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 7289-8732-30
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 9.5 YESC Series(BK)

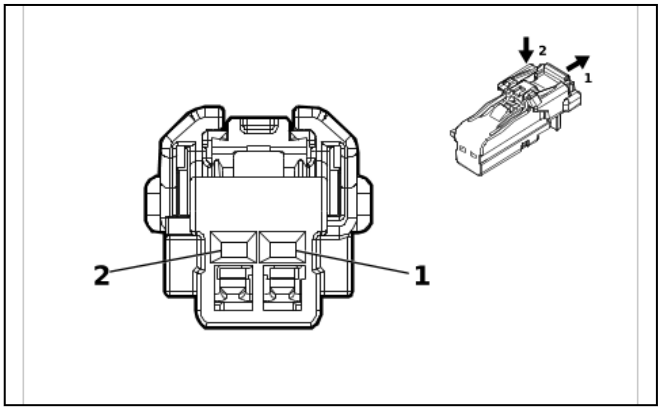
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-42 (RD)	No Tool Required

X51R Instrument Panel Wiring Harness Junction Block - Right X4

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 10	(1) RD / WH	(1) 342	(1) Battery Positive Voltage	(1) I	(1) —
(2) 2	(2) 10	(2) RD / YE	(2) 1442	(2) Battery Positive Voltage	(2) I	(2) —

A3L Sunshade - Left (DEG)



5377746

Connector Part Information
- Harness Type: Dome Lamp Wiring Harness
- OEM Connector: 6098-8990
- Service Connector: 84867147
- Description: 2-Way F 1.2 MCON Series(BN)

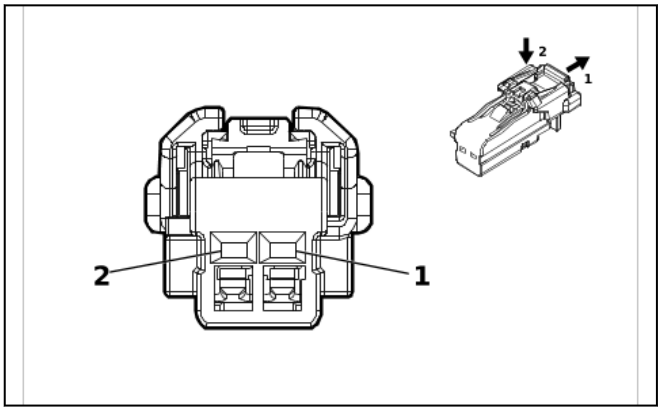
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required
II	Not required	J-35616-16 (L-GN)	No Tool Required

A3L Sunshade - Left (DEG)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) BU / GN	(1) 4785	(1) Interior Lamp Overhead Enable Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK	(2) 1050	(2) Ground	(2) II	(2) —

A3R Sunshade - Right (DEG)



5377746

Connector Part Information

- Harness Type: Dome Lamp Wiring Harness
- OEM Connector: 6098-8990
- Service Connector: 84867147
- Description: 2-Way F 1.2 MCON Series(BN)

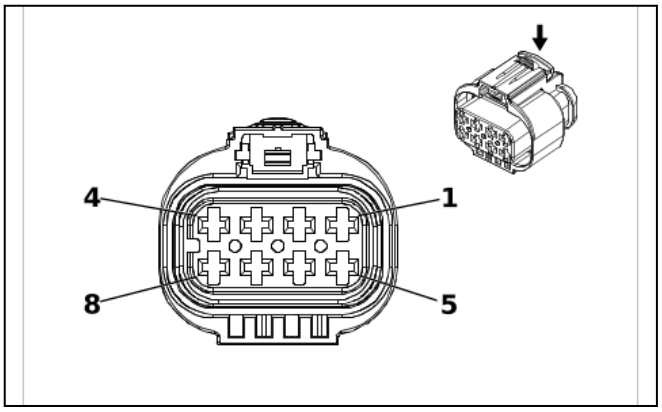
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required
II	Not required	J-35616-16 (L-GN)	No Tool Required

A3R Sunshade - Right (DEG)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) GY / WH	(1) 2369	(1) Interior Lamp Overhead 2 Enable Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK	(2) 1050	(2) Ground	(2) II	(2) —

A7 Fuel Tank Fuel Pump Module



3749582

Connector Part Information
- Harness Type: Chassis Wiring Harness
- OEM Connector: 2-2109441-5
- Service Connector: 19354078
- Description: 8-Way F 2.8 Series, Sealed(L-GY)

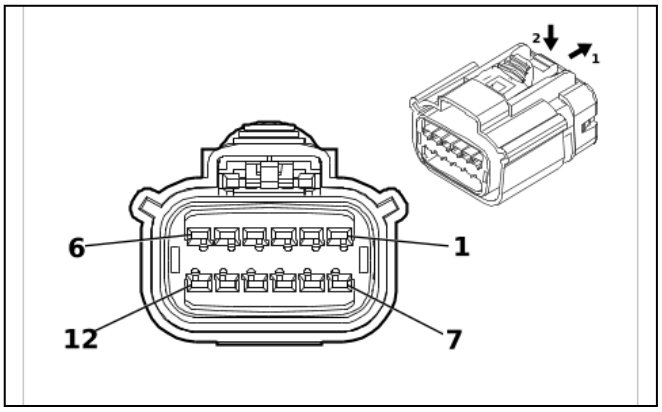
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-35 (VT)	No Tool Required
II	Not required	J-35616-4A (PU)	No Tool Required

A7 Fuel Tank Fuel Pump Module

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 2.5	(1) GY	(1) 120	(1) Fuel Pump Control	(1) I	(1) —
(2) 2	(2) 2.5	(2) YE / GY	(2) 4137	(2) Fuel Pump Supply Voltage Phase 2	(2) I	(2) —
(3) 3	(3) 2.5	(3) WH / BN	(3) 4138	(3) Fuel Pump Supply Voltage Phase 3	(3) I	(3) —
(4) 4	(4) 0.5	(4) WH	(4) 7444	(4) Fuel Pump Assembly Shield Ground	(4) II	(4) —
(5) 5	(5) 0.5	(5) BU / GN	(5) 1936	(5) Primary Fuel Level Sensor Signal	(5) II	(5) —
(6) 6	(6) 0.5	(6) BK / GN	(6) 6281	(6) Fuel Level Sensor Low Reference	(6) II	(6) —
7 - 8	—	—	—	Not Occupied	—	—

A9A Outside Rearview Mirror - Driver X1



4621955

Connector Part Information

- Harness Type: Front Side Door Door Wiring Harness - Driver
- OEM Connector: 15514623
- Service Connector: Service by Harness - See Part Catalog
- Description: 12-Way F 1.5 OCS Series, Sealed(BK)

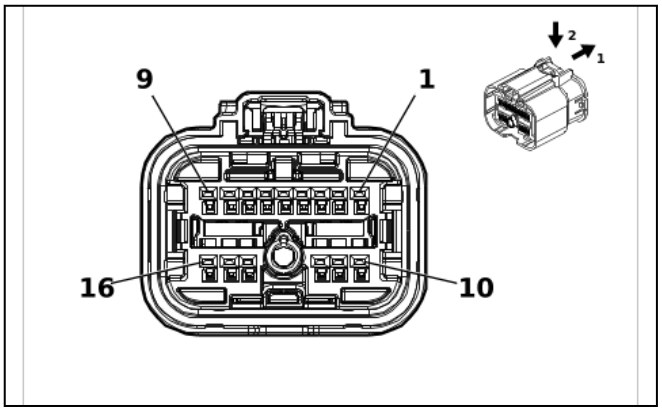
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required

A9A Outside Rearview Mirror - Driver X1

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) VT / BU	(1) 2788	(1) Left Front Mirror Motor Up [+] Down [-] Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) GY / YE	(2) 1760	(2) Left Side Object Detection LED Control	(2) I	(2) —
(3) 3	(3) 0.5	(3) BN / BK	(3) 2790	(3) Left Front Mirror Motor Right [+] Left [-] Control	(3) I	(3) —
(4) 4	(4) 0.5	(4) WH / GY	(4) 2114	(4) Left Turn Signal Lamp Control 2	(4) I	(4) —
5	—	—	—	Not Occupied	—	—
(6) 6	(6) 0.5	(6) BK	(6) 1550	(6) Ground	(6) I	(6) —
(7) 7	(7) 0.5	(7) WH	(7) 606	(7) Left Outside Rearview Mirror Heater Control	(7) I	(7) —
(8) 8	(8) 0.5	(8) YE / BN	(8) 2789	(8) Left Front Mirror Motor Common Control	(8) I	(8) —
(9) 9	(9) 0.5	(9) BN / GN	(9) 14026	(9) Identification Side Marker Lamp Supply Voltage	(9) I	(9) —
10	—	—	—	Not Occupied	—	—
(11) 11	(11) 0.5	(11) BK	(11) 1550	(11) Ground	(11) I	(11) —
12	—	—	—	Not Occupied	—	—

A9A Outside Rearview Mirror - Driver X2



7150011

Connector Part Information

- Harness Type: Front Side Door Door Wiring Harness - Driver
- OEM Connector: 36064167
- Service Connector: Service by Harness - See Part Catalog
- Description: 16-Way F 1.2 SWS, Coaxial Series(BK)

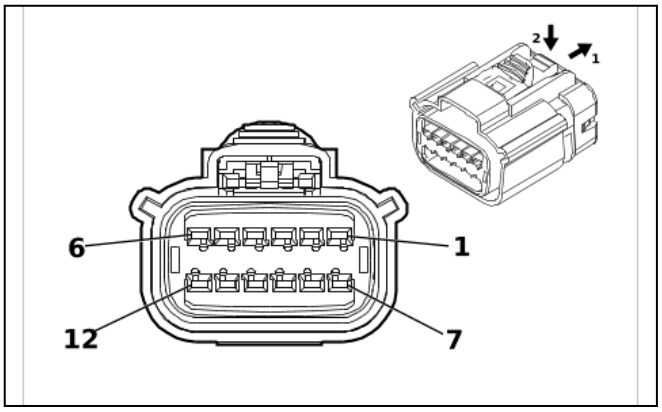
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required
II	Not required	No Tool Required	No Tool Required

A9A Outside Rearview Mirror - Driver X2

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BK / YE	(1) 1691	(1) Automatic Day/Night Mirror Low Reference	(1) I	(1) —
(2) 2	(2) 0.5	(2) VT / RD	(2) 2791	(2) Left Front Mirror Position Sensor High Reference	(2) I	(2) —
(4) 4	(4) 0.5	(4) BK / BN	(4) 673	(4) Left Outside Rearview Mirror Position Sensor Low Reference	(4) I	(4) —
(6) 6	(6) 0.5	(6) GY / WH	(6) 2785	(6) Left Front Mirror Motor Fold Out Control	(6) I	(6) —
(7) 7	(7) 0.5	(7) BU / YE	(7) 7761	(7) Backup Illumination Lamp Control	(7) I	(7) —
(9) 9	(9) 0.5	(9) WH / GN	(9) 5966	(9) Approach Lamp Control	(9) I	(9) —
(10) 10	(10) 0.5	(10) GY / BN	(10) 2787	(10) Left Front Mirror Position Sensor Up [+] Down [-] Signal	(10) I	(10) —
(11) 11	(11) 0.5	(11) YE / WH	(11) 1690	(11) Mirror Dimming Signal	(11) I	(11) —
(12) 12	(12) 0.5	(12) WH / YE	(12) 2792	(12) Left Front Mirror Position Sensor Left [-] Right [+] Signal	(12) I	(12) —
(13) 13	(13) 0	(13) Coax Cable	(13) 4725	(13) Left Sideview Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	(13) II	(13) —
(14) 14	(14) 0.5	(14) WH / GN	(14) 2786	(14) Left Front Mirror Motor Fold In Control	(14) I	(14) —
(15) 15	(15) 0.5	(15) YE / GY	(15) 2933	(15) Task Lamp Control Left	(15) I	(15) —

A9B Outside Rearview Mirror - Passenger X1



4621955

Connector Part Information

- Harness Type: Front Side Door Door Wiring Harness - Passenger
- OEM Connector: 15514623
- Service Connector: Service by Harness - See Part Catalog
- Description: 12-Way F 1.5 OCS Series, Sealed(BK)

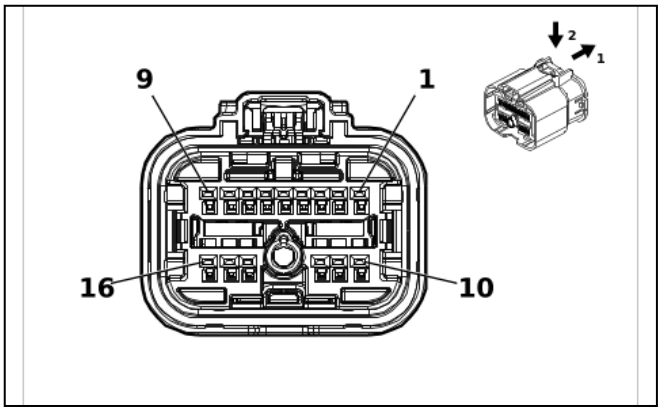
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required

A9B Outside Rearview Mirror - Passenger X1

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) YE / VT	(1) 2796	(1) Right Front Mirror Motor Up [+] Down [-] Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) GY	(2) 1761	(2) Right Side Object Detection LED Control	(2) I	(2) —
(3) 3	(3) 0.5	(3) GN / BK	(3) 2798	(3) Right Front Mirror Motor Right [+] Left [-] Control	(3) I	(3) —
(4) 4	(4) 0.5	(4) GN / GY	(4) 2115	(4) Right Turn Signal Lamp Control 2	(4) I	(4) —
(5) 5	(5) 0.5	(5) BK / GY	(5) 626	(5) Engine Control Vehicle Sensors Low Reference 1	(5) I	(5) —
(6) 6	(6) 0.75	(6) BK	(6) 1350	(6) Ground	(6) I	(6) —
(7) 7	(7) 0.5	(7) BN / VT	(7) 607	(7) Right Outside Rearview Mirror Heater Control	(7) I	(7) —
(8) 8	(8) 0.5	(8) WH	(8) 2797	(8) Right Front Mirror Motor Common Control	(8) I	(8) —
(9) 9	(9) 0.5	(9) BN / GN	(9) 14026	(9) Identification Side Marker Lamp Supply Voltage	(9) I	(9) —
10	—	—	—	Not Occupied	—	—
(11) 11	(11) 0.75	(11) BK	(11) 1350	(11) Ground	(11) I	(11) —
(12) 12	(12) 0.5	(12) BU / GY	(12) 636	(12) Ambient Air Temperature Sensor Signal	(12) I	(12) —

A9B Outside Rearview Mirror - Passenger X2



7150011

Connector Part Information

- Harness Type: Front Side Door Door Wiring Harness - Passenger
- OEM Connector: 13567509
- Service Connector: Service by Harness - See Part Catalog
- Description: 16-Way F 1.2 SWS, Coaxial Series(BK)

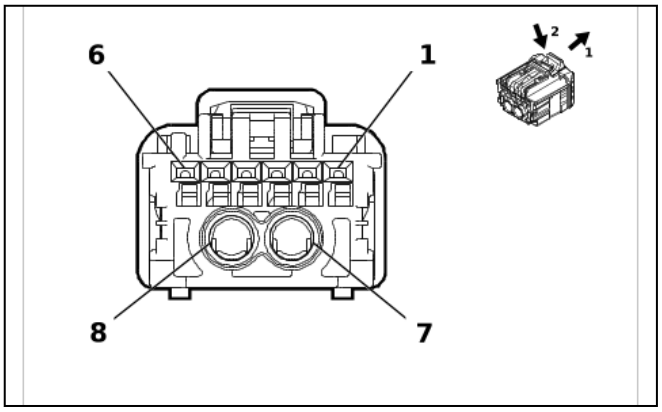
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required
II	Not required	No Tool Required	No Tool Required

A9B Outside Rearview Mirror - Passenger X2

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(2) 2	(2) 0.5	(2) YE / RD	(2) 2799	(2) Right Front Mirror Position Sensor High Reference	(2) I	(2) —
(4) 4	(4) 0.5	(4) BK / GN	(4) 675	(4) Right Outside Rearview Mirror Position Sensor Low Reference	(4) I	(4) —
(6) 6	(6) 0.5	(6) YE / WH	(6) 2793	(6) Right Front Mirror Motor Fold Out Control	(6) I	(6) —
(7) 7	(7) 0.5	(7) BU / YE	(7) 7761	(7) Backup Illumination Lamp Control	(7) I	(7) —
(9) 9	(9) 0.5	(9) WH / GN	(9) 5966	(9) Approach Lamp Control	(9) I	(9) —
(10) 10	(10) 0.5	(10) BU / YE	(10) 2795	(10) Right Front Mirror Position Sensor Up [+] Down [-] Signal	(10) I	(10) —
(12) 12	(12) 0.5	(12) VT / WH	(12) 2800	(12) Right Front Mirror Position Sensor Left [-] Right [+] Signal	(12) I	(12) —
(13) 13	(13) 0	(13) Coax Cable	(13) 4724	(13) Right Sideview Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	(13) II	(13) —
(14) 14	(14) 0.5	(14) BU / GY	(14) 2794	(14) Right Front Mirror Motor Fold In Control	(14) I	(14) —
(15) 15	(15) 0.5	(15) YE / GY	(15) 2933	(15) Task Lamp Control Left	(15) I	(15) —

A10 Inside Rearview Mirror (DD8 / DRZ)



6383008

Connector Part Information

- Harness Type: Dome Lamp Wiring Harness
- OEM Connector: 7298-6354-30
- Service Connector: 85733265
- Description: 8-Way F 1.2 OCS, Coaxial Series(BK)

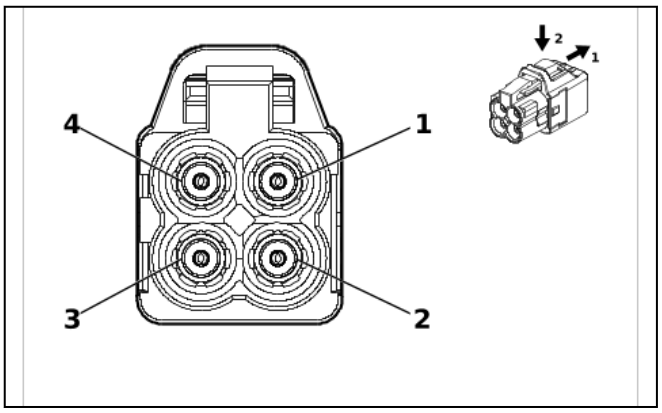
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required
II	Not required	J-35616-16 (L-GN)	No Tool Required

A10 Inside Rearview Mirror (DD8 / DRZ)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GN / WH	(1) 24	(1) Backup Lamp Control	(1) II	(1) —
(2) 2	(2) 0.5	(2) VT / BK	(2) 339	(2) Run/Crank Ignition 1 Voltage	(2) II	(2) —
3	—	—	—	Not Occupied	—	—
(4) 4	(4) 0.5	(4) BK / WH	(4) 851	(4) Signal Ground	(4) II	(4) —
(5) 5	(5) 0.35	(5) BK / YE	(5) 1691	(5) Automatic Day/Night Mirror Low Reference	(5) I	(5) —
(6) 6	(6) 0.35	(6) YE / WH	(6) 1690	(6) Mirror Dimming Signal	(6) I	(6) —
(7) 7	(7) 0	(7) Coax Cable	(7) 2387	(7) Full Display Mirror Rear Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	(7) I	(7) —
8	—	—	—	Not Occupied	—	—

A11 Radio X1 - 2 - Door



5835118

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: AMZW25-001-A
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 4-Way F Mini Coax Type(BK)

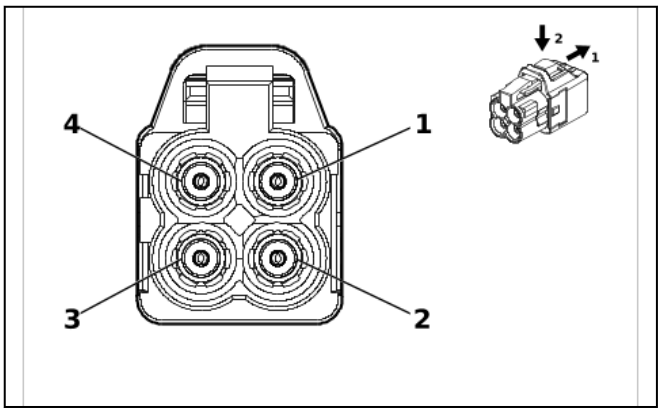
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

A11 Radio X1 - 2 - Door

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(2) 2	(2) —	(2) Coax Cable	(2) 6130	(2) Coaxial Antenna XM Signal	(2) I	(2) —
(3) 3	(3) —	(3) Coax Cable	(3) 3297	(3) Coaxial Antenna DAB Signal	(3) I	(3) —
(4) 4	(4) —	(4) Coax Cable	(4) 6001	(4) Coaxial Antenna RF Signal	(4) I	(4) —

A11 Radio X1 - 4 - Door (- U2Q)



5835118

Connector Part Information
- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: AMZW25-001-A
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 4-Way F Mini Coax Type(BK)

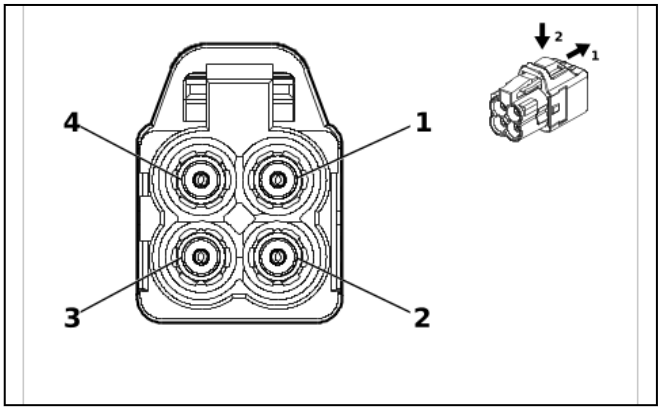
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

A11 Radio X1 - 4 - Door (- U2Q)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(2) 2	(2) —	(2) Coax Cable	(2) 6130	(2) Coaxial Antenna XM Signal	(2) I	(2) —
(4) 4	(4) —	(4) Coax Cable	(4) 6001	(4) Coaxial Antenna RF Signal	(4) I	(4) —

A11 Radio X1 - 4 - Door (U2Q)



5835118

Connector Part Information
- Harness Type: Radio Antenna Wiring Harness
- OEM Connector: AMZW25-001-A
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 4-Way F Mini Coax Type(BK)

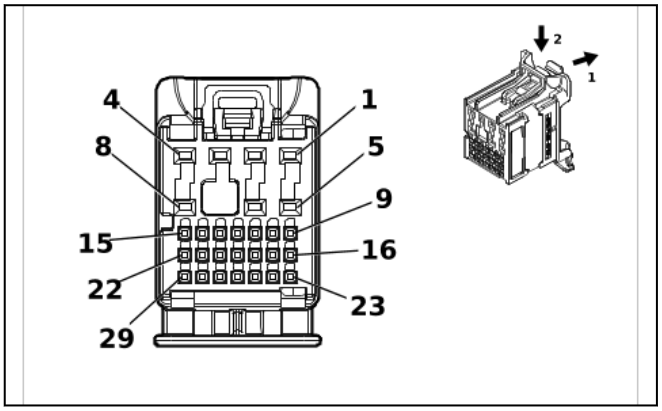
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

A11 Radio X1 - 4 - Door (U2Q)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(3) 3	(3) —	(3) Coax Cable	(3) 3297	(3) Coaxial Antenna DAB Signal	(3) I	(3) —
(4) 4	(4) —	(4) Coax Cable	(4) 6001	(4) Coaxial Antenna RF Signal	(4) I	(4) —

A11 Radio X2



4578560

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 160014-0011
- Service Connector: 13534971
- Description: 29-Way F 0.5 NANO, 1.2 MCON, stAK50h Series(DK-GY with GY Inner Connector)

Terminal Part Information

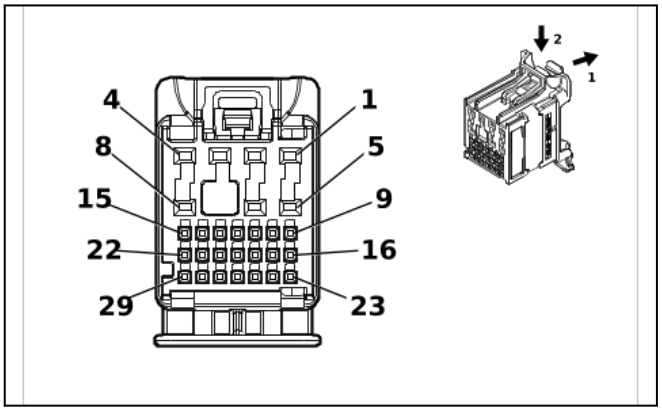
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19370262	EL-35616-58 (BK)	EL-38125-58
II	19371217	J-35616-12 (BU)	J-38125-553

A11 Radio X2

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) GN	(1) 199	(1) Left Rear Speaker [+] Control	(1) II	(1) —
(2) 2	(2) 0.75	(2) BU	(2) 201	(2) Left Front Speaker 1 [+] Control	(2) II	(2) —
(3) 3	(3) 0.75	(3) YE / BK	(3) 117	(3) Right Front Speaker [-] Control 1	(3) II	(3) —
(4) 4	(4) 0.75	(4) BU / BK	(4) 115	(4) Right Rear Speaker [-] Control	(4) II	(4) —
(5) 5	(5) 0.75	(5) BN / BU	(5) 118	(5) Left Front Speaker [-] Control 1	(5) II	(5) —
(6) 6	(6) 0.75	(6) YE	(6) 200	(6) Right Front Speaker 1 [+] Control	(6) II	(6) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
7	—	—	—	Not Occupied	—	—
(8) 8	(8) 0.75	(8) WH	(8) 46	(8) Right Rear Speaker [+] Control	(8) II	(8) —
(9) 9	(9) 0.35	(9) BU / WH	(9) 4985	(9) AUTOSAR CAN Bus [+] 5 Serial Data	(9) I	(9) —
(10) 10	(10) 0.35	(10) BU / YE	(10) 4984	(10) AUTOSAR CAN Bus [-] 5 Serial Data	(10) I	(10) —
11 - 12	—	—	—	Not Occupied	—	—
(13) 13	(13) 0.35	(13) GN / WH	(13) 24	(13) Backup Lamp Control	(13) I	(13) —
(14) 14	(14) 0.35	(14) GN / YE	(14) 7066	(14) Entertainment Remote Enable Signal	(14) I	(14) —
15 - 17	—	—	—	Not Occupied	—	—
(18) 18	(18) 0.35	(18) GN / BK	(18) 10652	(18) Radio LIN Bus 1	(18) I	(18) —
19 - 21	—	—	—	Not Occupied	—	—
(22) 22	(22) 0.35	(22) GY / YE	(22) 3885	(22) Forward Collision Alert LED Control	(22) I	(22) —
(23) 23	(23) 0.35	(23) GY / BK	(23) 4787	(23) Day Night LED Control	(23) I	(23) —
24 - 29	—	—	—	Not Occupied	—	—

A11 Radio X3



4496253

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 160014-0014
- Service Connector: 13534974
- Description: 29-Way F 0.5 NANO, 1.2 MCON, stAK50h Series(BK with GY Inner Connector)

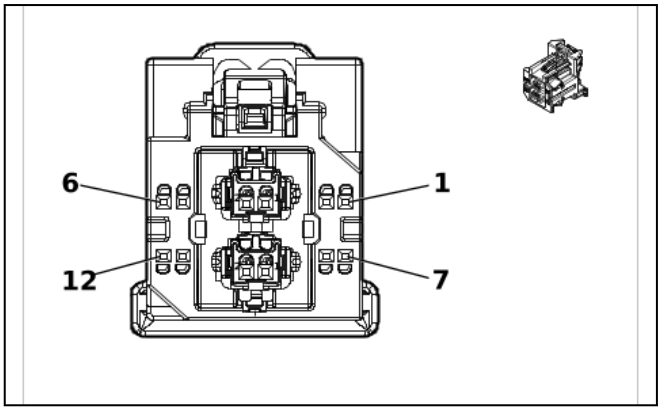
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19370262	EL-35616-58 (BK)	EL-38125-58
II	19371217	J-35616-12 (BU)	J-38125-553

A11 Radio X3

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) RD / YE	(1) 2340	(1) Battery Positive Voltage	(1) II	(1) —
(2) 2	(2) 0.75	(2) RD / WH	(2) 5440	(2) Battery Positive Voltage	(2) II	(2) —
(3) 3	(3) 0.75	(3) BK / WH	(3) 1051	(3) Signal Ground	(3) II	(3) —
4 - 5	—	—	—	Not Occupied	—	—
(6) 6	(6) 0.75	(6) BK / WH	(6) 1051	(6) Signal Ground	(6) II	(6) —
7	—	—	—	Not Occupied	—	—
(8) 8	(8) 0.75	(8) GN / BK	(8) 116	(8) Left Rear Speaker [-] Control	(8) II	(8) —
9 - 28	—	—	—	Not Occupied	—	—
(29) 29	(29) 0.35	(29) GN / BN	(29) 507	(29) Wait To Start Indicator Control	(29) I	(29) —

A11 Radio X4



5902882

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 86407005
- Service Connector: 86555356
- Description: 12-Way F 0.5 CTS, AMEC High Speed Data Series(BK)

Terminal Part Information

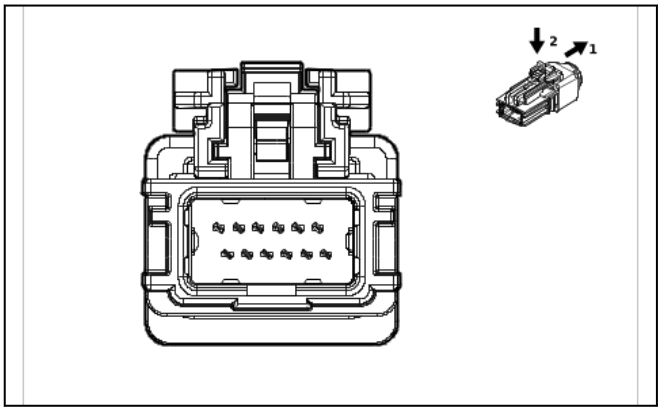
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Service by Cable	EL-35616-58 (BK)	EL-38125-58

A11 Radio X4

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) WH	(1) 4758	(1) Ethernet Bus 2 [+]	(1) I	(1) —
(2) 2	(2) 0.35	(2) BU	(2) 4757	(2) Ethernet Bus 2 [-]	(2) I	(2) —
3 - 4	—	—	—	Not Occupied	—	—

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(5) 5	(5) 0.35	(5) WH	(5) 8580	(5) Automotive Audio Bus A2B Serial Data 1 [+]	(5) I	(5) —
(6) 6	(6) 0.35	(6) YE	(6) 8579	(6) Automotive Audio Bus A2B Serial Data 1 [-]	(6) I	(6) —
7 - 8	—	—	—	Not Occupied	—	—
(9) 9	(9) 0.35	(9) GN	(9) 7210	(9) Ethernet Bus 4 [-]	(9) I	(9) —
(10) 10	(10) 0.35	(10) WH	(10) 7211	(10) Ethernet Bus 4 [+]	(10) I	(10) —
11 - 12	—	—	—	Not Occupied	—	—

A11 Radio X5



6175343

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 111146-7103
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 12-Way M 2.0 HSAL-2 Series(GY)

Terminal Part Information

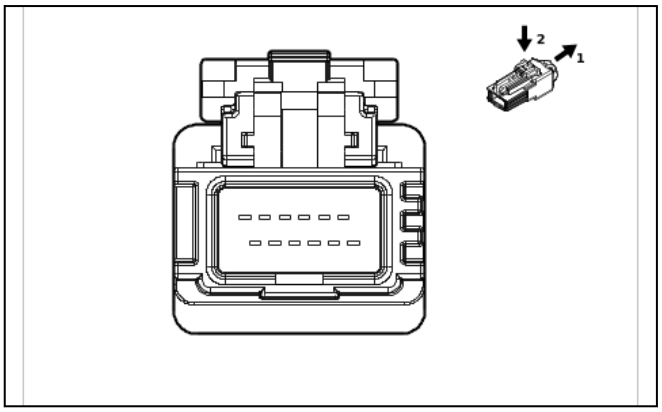
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

A11 Radio X5

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) —	(1) BARE	(1) 10624	(1) Virtual Cockpit Unit Virtual Cockpit Display LVDS (Low Voltage Differential Signaling) Low Reference	(1) I	(1) —
(2) 2	(2) —	(2) BARE	(2) 10625	(2) Virtual Cockpit Unit Virtual Cockpit Display LVDS (Low Voltage Differential Signaling) Signal [+]	(2) I	(2) —
(3) 3	(3) —	(3) BARE	(3) 10626	(3) Virtual Cockpit Unit Virtual Cockpit Display LVDS (Low Voltage Differential Signaling) Signal [-]	(3) I	(3) —
(4) 4	(4) —	(4) BARE	(4) 10627	(4) Virtual Cockpit Unit Virtual Cockpit Display LVDS (Low Voltage Differential Signaling) 2 Low Reference	(4) I	(4) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(5) 5	(5) —	(5) BARE	(5) 10628	(5) Virtual Cockpit Unit Virtual Cockpit Display LVDS (Low Voltage Differential Signaling) 2 Signal [+]	(5) I	(5) —
(6) 6	(6) —	(6) BARE	(6) 10629	(6) Virtual Cockpit Unit Virtual Cockpit Display LVDS (Low Voltage Differential Signaling) 2 Signal [-]	(6) I	(6) —

A11 Radio X6 (UIT)



6186830

Connector Part Information
- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 13551157
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 12-Way M 2.0 HSAL-2 Series(BN)

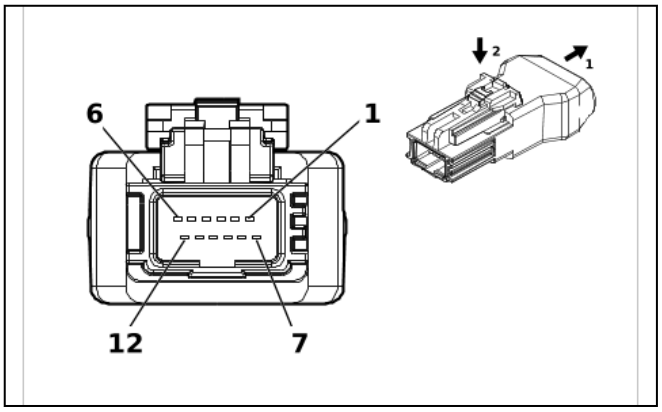
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

A11 Radio X6 (UIT)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) —	(1) BARE	(1) 10603	(1) Virtual Cockpit Unit Instrument Panel Display LVDS (Low Voltage Differential Signaling) Low Reference	(1) I	(1) —
(2) 2	(2) —	(2) BARE	(2) 10604	(2) Virtual Cockpit Unit Instrument Panel Display LVDS (Low Voltage Differential Signaling) Signal [+]	(2) I	(2) —
(3) 3	(3) —	(3) BARE	(3) 10605	(3) Virtual Cockpit Unit Instrument Panel Display LVDS (Low Voltage Differential Signaling) Signal [-]	(3) I	(3) —

A11 Radio X6 (UV6)



6425428

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 111146-3407
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 12-Way M 2.0 HSAL-2 Series(BN)

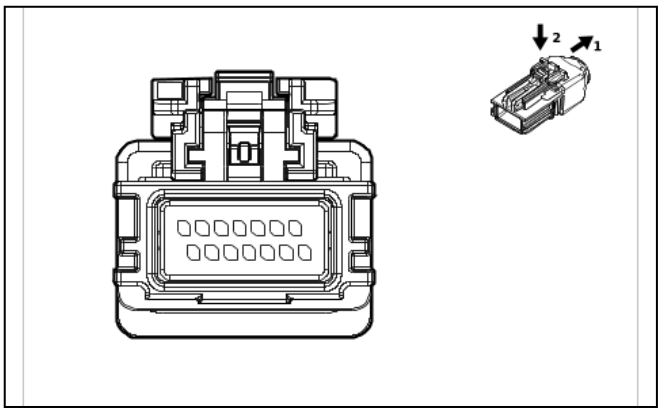
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

A11 Radio X6 (UV6)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) —	(1) BARE	(1) 10603	(1) Virtual Cockpit Unit Instrument Panel Display LVDS (Low Voltage Differential Signaling) Low Reference	(1) I	(1) —
(2) 2	(2) —	(2) BARE	(2) 10604	(2) Virtual Cockpit Unit Instrument Panel Display LVDS (Low Voltage Differential Signaling) Signal [+]	(2) I	(2) —
(3) 3	(3) —	(3) BARE	(3) 10605	(3) Virtual Cockpit Unit Instrument Panel Display LVDS (Low Voltage Differential Signaling) Signal [-]	(3) I	(3) —
(7) 7	(7) —	(7) BARE	(7) 10618	(7) Head Up Display LVDS (Low Voltage Differential Signaling) Signal [+]	(7) I	(7) —
(8) 8	(8) —	(8) BARE	(8) 10619	(8) Head Up Display LVDS (Low Voltage Differential Signaling) Signal [-]	(8) I	(8) —
(9) 9	(9) —	(9) BARE	(9) 10617	(9) Head Up Display LVDS (Low Voltage Differential Signaling) Low Reference	(9) I	(9) —

A11 Radio X7



6002723

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness USB
- OEM Connector: 111146-6000
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 14-Way M 2.0 HSAL-2 Series(BK)

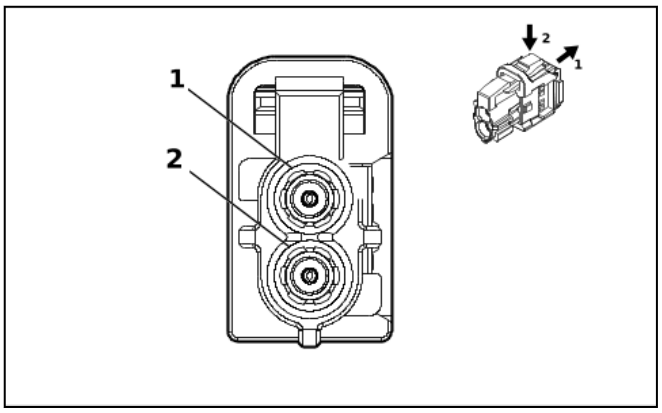
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

A11 Radio X7

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(7) 7	(7) —	(7) BARE	(7) 7899	(7) Auxiliary Audio/Video Jack USB Serial Data Supply Voltage	(7) I	(7) —
(12) 12	(12) —	(12) BARE	(12) 7896	(12) Auxiliary Audio/Video Jack USB [+] Serial Data	(12) I	(12) —
(13) 13	(13) —	(13) BARE	(13) 7897	(13) Auxiliary Audio/Video Jack USB [-] Serial Data	(13) I	(13) —
(14) 14	(14) —	(14) BARE	(14) 7898	(14) Auxiliary Audio/Video Jack USB Low Reference	(14) I	(14) —

A11 Radio X8 (UCV / UVN)



6154796

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 13544814
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 2-Way F Mini Coax Type(BU)

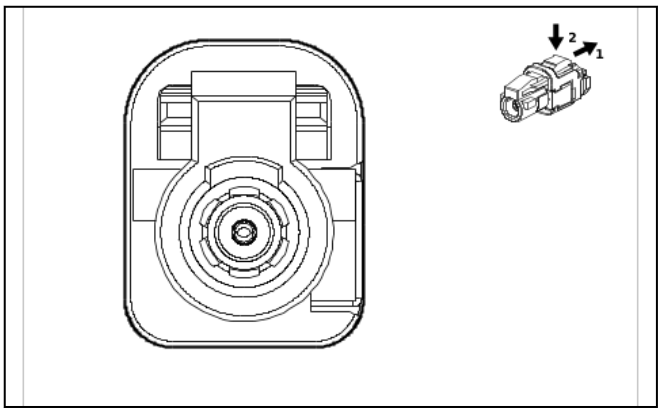
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

A11 Radio X8 (UCV / UVN)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) —	(1) Coax Cable	(1) 2548	(1) Cargo Bed Rear Vision Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	(1) I	(1) —
(2) 2	(2) —	(2) Coax Cable	(2) 10648	(2) Interior Vision Cabin Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	(2) I	(2) —

A11 Radio X9



5926227

Connector Part Information
- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 13544788
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way F Mini Coax Type(BK)

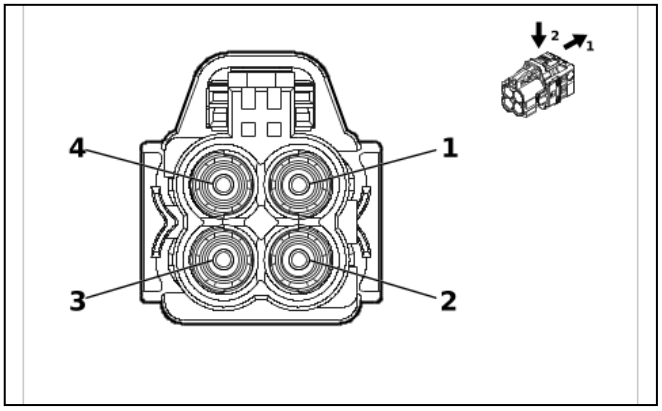
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

A11 Radio X9

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
BK	—	Coax Cable	3137	Coaxial Antenna WLAN Signal	I	—

A11 Radio X10



5903560

Connector Part Information
- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: AMZW25-001-B
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 4-Way F Mini Coax Type(WH)

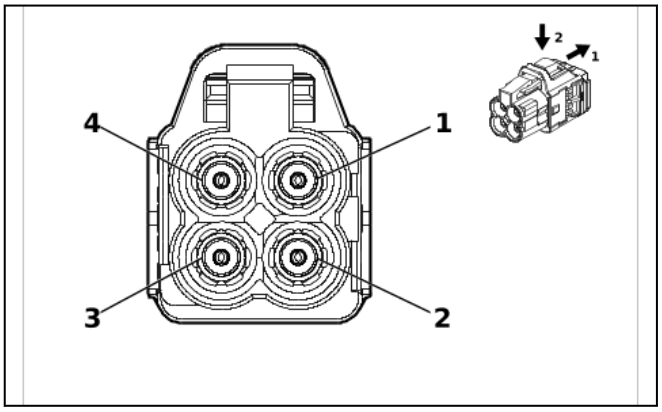
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

A11 Radio X10

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) —	(1) Coax Cable	(1) 4725	(1) Left Sideview Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	(1) I	(1) UV2 & (UJE / UKM)
(2) 2	(2) —	(2) Coax Cable	(2) 4722	(2) Frontview Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	(2) I	(2) UV2 & (UJE / UKM)
(3) 3	(3) —	(3) Coax Cable	(3) 4724	(3) Right Sideview Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	(3) I	(3) UV2 & (UJE / UKM)
(4) 4	(4) — (4) —	(4) Coax Cable (4) Coax Cable	(4) 4721 (4) 4723	(4) Rearview Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal (4) Video Processing Module LVDS (Low Voltage Differential Signaling) Coaxial Signal	(4) I (4) I	(4) UJE / UKM (4) UKL / UK0

A11 Radio X11 (TRG)



6186811

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness Extension Harness
- OEM Connector: 35856739
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 4-Way F Mini Coax Type(BU)

Terminal Part Information

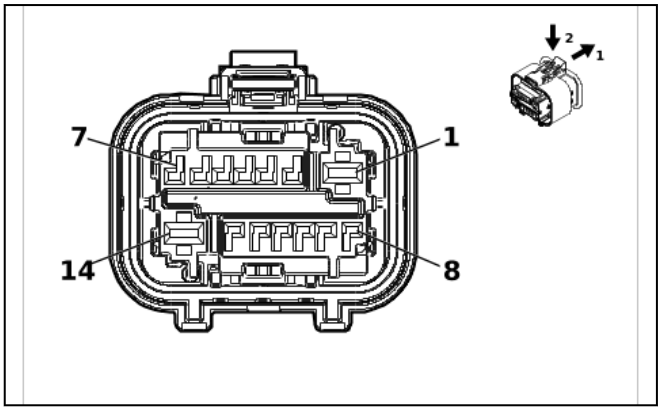
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

A11 Radio X11 (TRG)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) —	(1) Coax Cable	(1) 7886	(1) Trailer 2 Rear Vision Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	(1) I	(1) —
(2) 2	(2) —	(2) Coax Cable	(2) 11352	(2) Underbody Camera 2 LVDS (Low Voltage DIfferential Signaling) Coaxial Signal	(2) I	(2) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(3) 3	(3) —	(3) Coax Cable	(3) 11348	(3) Underbody Camera LVDS (Low Voltage DIfferential Signaling) Coaxial Signal	(3) I	(3) —
(4) 4	(4) —	(4) Coax Cable	(4) 2421	(4) Trailer Rear Vision Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	(4) I	(4) —

A16 Transfer Case Four Wheel Drive Actuator (F48)



6650652

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 13563686
- Service Connector: 86419005
- Description: 14-Way F 1.2 MCON, 2.8 MCP Series, Sealed(BK)

Terminal Part Information

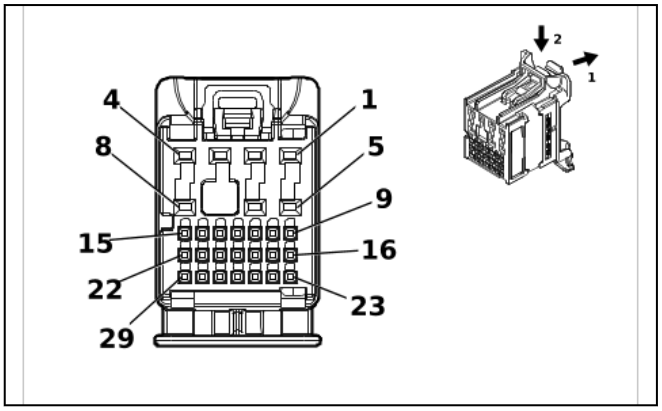
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	84962854	J-35616-12 (BU)	J-38125-215A
II	85533337	J-35616-4A (PU)	J-38125-11A

A16 Transfer Case Four Wheel Drive Actuator (F48)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 2.5	(1) YE / GY	(1) 1552	(1) Transfer Case Motor Clockwise Control	(1) II	(1) —
(2) 2	(2) 0.75	(2) BU	(2) 8013	(2) Transfer Case Lock Solenoid Control 2	(2) I	(2) —
3 - 4	—	—	—	Not Occupied	—	—
(5) 5	(5) 0.75	(5) YE / BN	(5) 1569	(5) Transfer Case Lock Solenoid Valve Control	(5) I	(5) —
6 - 7	—	—	—	Not Occupied	—	—
(8) 8	(8) 0.5	(8) YE	(8) 7474	(8) Incremental Encoder Direction Signal	(8) I	(8) —
9	—	—	—	Not Occupied	—	—
(10) 10	(10) 0.5	(10) BU / GY	(10) 7473	(10) Incremental Encoder Impulse Signal	(10) I	(10) —
(11) 11	(11) 0.5	(11) WH / GN	(11) 7475	(11) Incremental Encoder Sensor Voltage Reference	(11) I	(11) —
12	—	—	—	Not Occupied	—	—

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(13) 13	(13) 0.5	(13) VT	(13) 7476	(13) Incremental Encoder Sensor Low Reference	(13) I	(13) —
(14) 14	(14) 2.5	(14) YE / VT	(14) 1553	(14) Transfer Case Motor Counter Clockwise Control	(14) II	(14) —

A22 Radio Control X1



4578560

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 160014-0011
- Service Connector: 13534971
- Description: 29-Way F 0.5 NANO, 1.2 MCON, stAK50h Series(DK-GY with GY Inner Connector)

Terminal Part Information

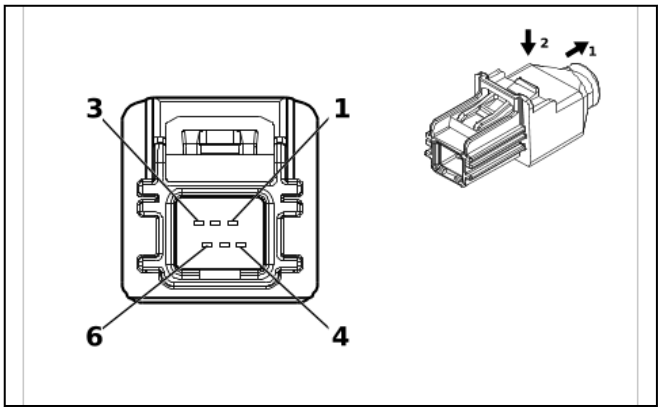
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19370262	EL-35616-58 (BK)	EL-38125-58
II	19371217	J-35616-12 (BU)	J-38125-553

A22 Radio Control X1

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) VT / YE	(1) 11748	(1) HVAC Indicator Supply Voltage	(1) II	(1) —
(2) 2	(2) 0.75	(2) BK / WH	(2) 1051	(2) Signal Ground	(2) II	(2) —
(3) 3	(3) 0.35	(3) GN / BU	(3) 11762	(3) HVAC Temperature 1 Encoder Phase A Signal	(3) II	(3) —
(4) 4	(4) 0.35	(4) YE / WH	(4) 11763	(4) HVAC Temperature 1 Encoder Phase B Signal	(4) II	(4) —
(5) 5	(5) 0.35	(5) BU / GY	(5) 11766	(5) HVAC Temperature 2 Encoder Phase A Signal	(5) II	(5) —
(6) 6	(6) 0.35	(6) GY / WH	(6) 11767	(6) HVAC Temperature 2 Encoder Phase B Signal	(6) II	(6) —
7	—	—	—	Not Occupied	—	—
(8) 8	(8) 0.5	(8) RD / WH	(8) 1340	(8) Battery Positive Voltage	(8) II	(8) —
(9) 9	(9) 0.35	(9) YE	(9) 11737	(9) Front Defrost Switch Signal	(9) I	(9) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(10) 10	(10) 0.35	(10) BU / WH	(10) 292	(10) Rear Defogger Switch Signal	(10) I	(10) —
(11) 11	(11) 0.35	(11) VT	(11) 11738	(11) HVAC Fan Up Switch Signal	(11) I	(11) —
(12) 12	(12) 0.35	(12) GY	(12) 11744	(12) HVAC Fan Down Switch Signal	(12) I	(12) —
(13) 13	(13) 0.35	(13) GN	(13) 11745	(13) HVAC Auto Mode Switch Signal	(13) I	(13) —
(14) 14	(14) 0.35	(14) GN / YE	(14) 11757	(14) HVAC White Backlighting Intensity Control	(14) I	(14) —
(15) 15	(15) 0.35	(15) GN / BN	(15) 11758	(15) HVAC Red Backlighting Intensity Control	(15) I	(15) —
(16) 16	(16) 0.35	(16) GN / WH	(16) 11759	(16) HVAC Blue Backlighting Intensity Control	(16) I	(16) —
(17) 17	(17) 0.35	(17) GY / VT	(17) 11760	(17) HVAC Amber Backlighting Intensity Control	(17) I	(17) —
(18) 18	(18) 0.35	(18) BN / WH	(18) 11761	(18) HVAC White Fan Backlighting Intensity Control	(18) I	(18) —
(19) 19	(19) 0.35	(19) BK / YE	(19) 1704	(19) Sensor Low Reference	(19) I	(19) —
(20) 20	(20) 0.35	(20) WH / BK	(20) 1923	(20) Auxiliary HVAC Switch Signal	(20) I	(20) —
(21) 21	(21) 0.35	(21) BN / GN	(21) 11754	(21) HVAC Auto Mode Indicator Control	(21) I	(21) —
(22) 22	(22) 0.35	(22) GN / GY	(22) 11749	(22) HVAC System Enable Indicator Control	(22) I	(22) —
(23) 23	(23) 0.35	(23) BU / VT	(23) 11752	(23) Front Defrost Indicator Control	(23) I	(23) —
(24) 24	(24) 0.35	(24) YE / VT	(24) 11753	(24) Rear Defog Indicator Control	(24) I	(24) —
(25) 25	(25) 0.35	(25) GN / VT	(25) 11755	(25) HVAC Air Conditioning Request Indicator Control	(25) I	(25) —
(26) 26	(26) 0.35	(26) BU / BK	(26) 13929	(26) HVAC Recirculation Switch Indicator	(26) I	(26) —
(27) 27	(27) 0.35	(27) BN	(27) 11746	(27) HVAC Air Conditioning Request Switch Signal	(27) I	(27) —
(28) 28	(28) 0.35	(28) BU / VT	(28) 13928	(28) HVAC Recirculation Switch Signal	(28) I	(28) —
(29) 29	(29) 0.35	(29) GY / BK	(29) 14093	(29) HVAC Faceplate Identification	(29) I	(29) —

A22 Radio Control X2



5278781

Connector Part Information
- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 100337-1123
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 6-Way M HSAL-2 Series(GY)

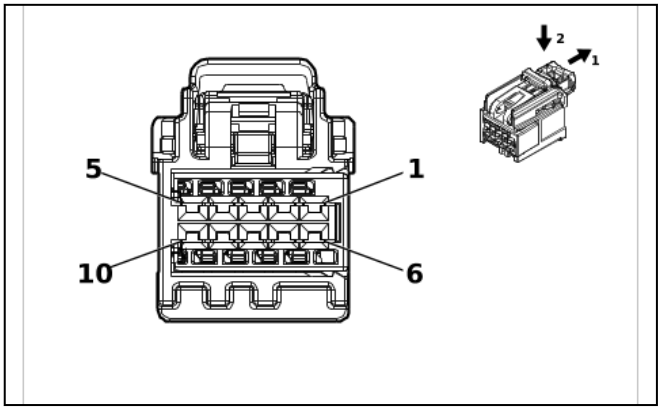
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

A22 Radio Control X2

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
GY	—	<p01>	LVDS	Low Voltage Differential Signaling	I	—

A23D Front Side Door Latch - Driver



7150012

Connector Part Information
- Harness Type: Front Side Door Door Wiring Harness - Driver
- OEM Connector: 35357167
- Service Connector: Service by Harness - See Part Catalog
- Description: 10-Way F 0.64 OCS Series(GN)

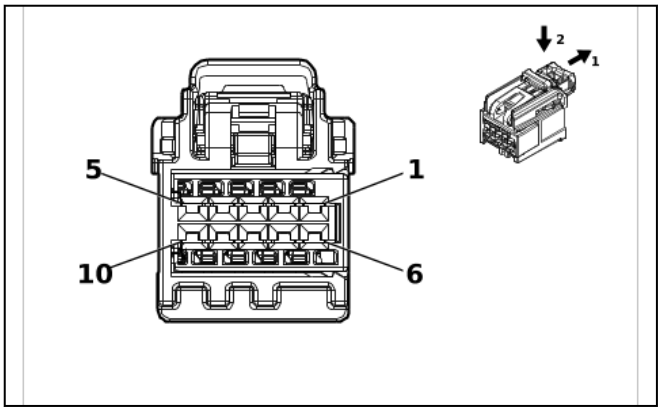
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

A23D Front Side Door Latch - Driver

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GY	(1) 745	(1) Left Front Door Ajar Switch Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) VT / GY	(2) 126	(2) Left Front Door Open Switch Signal	(2) I	(2) —
(3) 3	(3) 0.5	(3) BK	(3) 1550	(3) Ground	(3) I	(3) —
(4) 4	(4) 0.5	(4) WH / VT	(4) 4258	(4) Left Front Door Lock Status Signal	(4) I	(4) —
(7) 7	(7) 0.75	(7) GY	(7) 2681	(7) Left Front Door Lock Actuator Lock Control	(7) I	(7) —
(8) 8	(8) 0.75	(8) WH	(8) 2679	(8) Lock Actuators Unlock Control 1	(8) I	(8) —

A23LR Rear Side Door Latch - Left - 4 - Door



7150012

Connector Part Information

- Harness Type: Rear Side Door Door Wiring Harness - Left
- OEM Connector: 35357167
- Service Connector: Service by Harness - See Part Catalog
- Description: 10-Way F 0.64 OCS Series(GN)

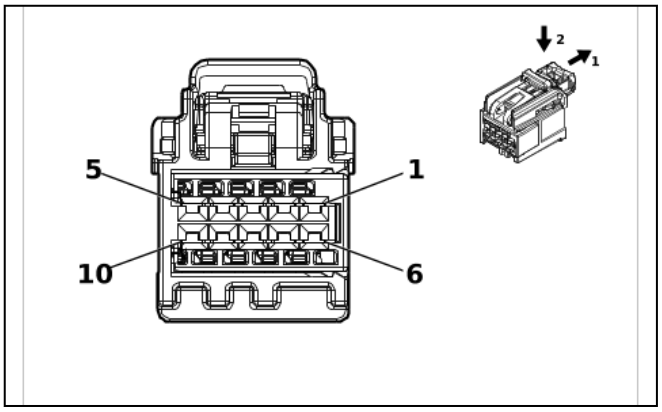
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

A23LR Rear Side Door Latch - Left - 4 - Door

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GY	(1) 747	(1) Left Rear Door Ajar Switch Signal	(1) I	(1) —
(3) 3	(3) 0.5	(3) BK	(3) 1550	(3) Ground	(3) I	(3) —
(7) 7	(7) 0.75	(7) BU / YE	(7) 1091	(7) Left Rear Door Lock Actuator Lock Control	(7) I	(7) —
(8) 8	(8) 0.75	(8) WH	(8) 2679	(8) Lock Actuators Unlock Control 1	(8) I	(8) —

A23P Front Side Door Latch - Passenger



7150012

Connector Part Information

- Harness Type: Front Side Door Door Wiring Harness - Passenger
- OEM Connector: 35357167
- Service Connector: Service by Harness - See Part Catalog
- Description: 10-Way F 0.64 OCS Series(GN)

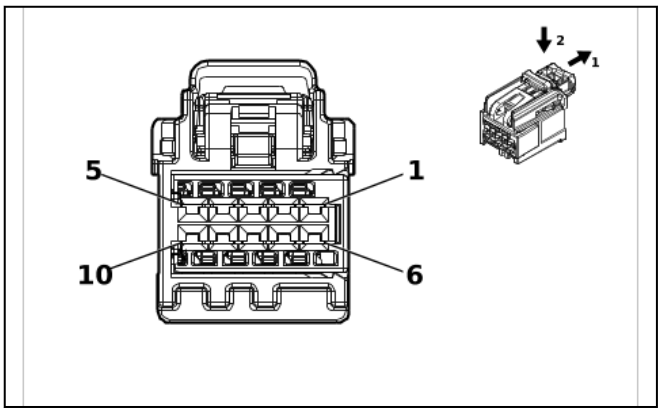
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

A23P Front Side Door Latch - Passenger

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(2) 2	(2) 0.5	(2) VT	(2) 4259	(2) Right Front Door Lock Status Signal	(2) I	(2) —
(3) 3	(3) 0.75	(3) BK	(3) 1350	(3) Ground	(3) I	(3) —
(5) 5	(5) 0.5	(5) GY	(5) 746	(5) Right Front Door Ajar Switch Signal	(5) I	(5) —
(8) 8	(8) 0.75	(8) GY / BK	(8) 2680	(8) Lock Actuators Unlock Control 2	(8) I	(8) —
(9) 9	(9) 0.75	(9) YE / GN	(9) 2682	(9) Right Front Door Lock Actuator Lock Control	(9) I	(9) —

A23RR Rear Side Door Latch - Right - 4 - Door



7150012

Connector Part Information

- Harness Type: Rear Side Door Door Wiring Harness - Right
- OEM Connector: 35357167
- Service Connector: Service by Harness - See Part Catalog
- Description: 10-Way F 0.64 OCS Series(GN)

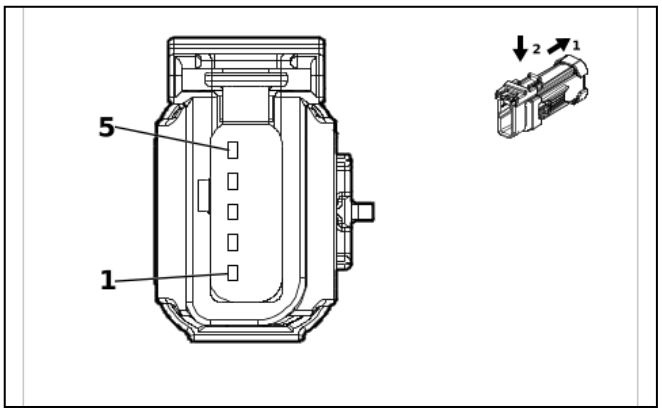
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

A23RR Rear Side Door Latch - Right - 4 - Door

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(3) 3	(3) 0.5	(3) BK	(3) 1350	(3) Ground	(3) I	(3) —
(5) 5	(5) 0.5	(5) GY	(5) 748	(5) Right Rear Door Ajar Switch Signal	(5) I	(5) —
(8) 8	(8) 0.75	(8) GY / BK	(8) 2680	(8) Lock Actuators Unlock Control 2	(8) I	(8) —
(9) 9	(9) 0.75	(9) VT / WH	(9) 1094	(9) Right Rear Door Lock Actuator Lock Control	(9) I	(9) —

A24D Front Side Door Outside Handle - Left - 2 - Door (ATH - (BOK / BOR / BOY))



5925819

Connector Part Information

- Harness Type: Front Side Door Door Wiring Harness - Driver
- OEM Connector: 6188-6505
- Service Connector: Service by Harness - See Part Catalog
- Description: 5-Way M 1.2 SWS Series, Sealed(BK with NA Lock Cover)

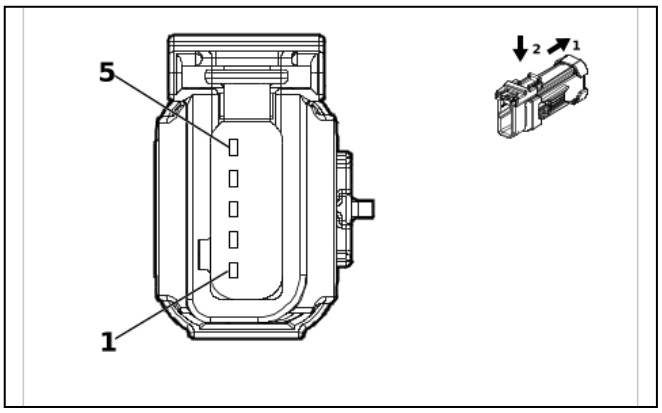
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-17 (L-GN)	No Tool Required

A24D Front Side Door Outside Handle - Left - 2 - Door (ATH - (BOK / BOR / BOY))

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BU	(1) 2675	(1) Left Front Exterior Door Handle Switch Unlock Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) VT	(2) 4301	(2) Passive Entry Left Antenna Signal High	(2) I	(2) —
3	—	—	—	Not Occupied	—	—
(4) 4	(4) 0.5	(4) VT / GY	(4) 4302	(4) Passive Entry Left Antenna Signal Low	(4) I	(4) —
(5) 5	(5) 0.5	(5) BK / WH	(5) 1551	(5) Signal Ground	(5) I	(5) —

A24D Front Side Door Outside Handle - Left - 4 - Door (ATH - (BOK / BOR / BOY))



6144289

Connector Part Information

- Harness Type: Front Side Door Door Wiring Harness - Driver
- OEM Connector: 6188-6507
- Service Connector: Service by Harness - See Part Catalog
- Description: 5-Way M 1.2 SWS Series, Sealed(BK with BK Lock Cover)

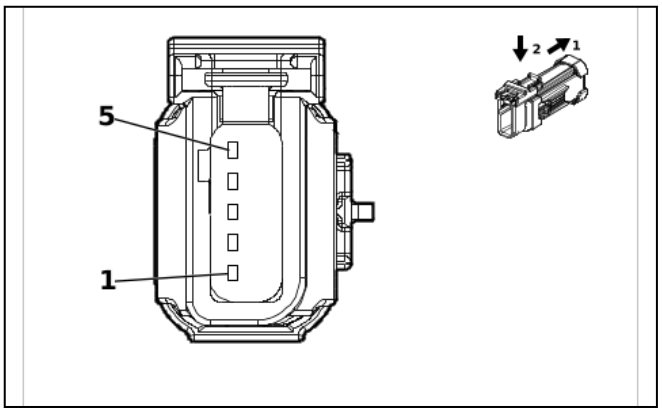
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-17 (L-GN)	No Tool Required

A24D Front Side Door Outside Handle - Left - 4 - Door (ATH - (BOK / BOR / BOY))

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BU	(1) 2675	(1) Left Front Exterior Door Handle Switch Unlock Signal	(1) I	(1) —
2 - 4	—	—	—	Not Occupied	—	—
(5) 5	(5) 0.5	(5) BK / WH	(5) 1551	(5) Signal Ground	(5) I	(5) —

A24D Front Side Door Outside Handle - Left (ATH and (BOK / BOR / BOY))



6268455

Connector Part Information

- Harness Type: Front Side Door Door Wiring Harness - Driver
- OEM Connector: 6188-6504
- Service Connector: Service by Harness - See Part Catalog
- Description: 5-Way M 1.2 SWS Series, Sealed(BK with GY Lock Cover)

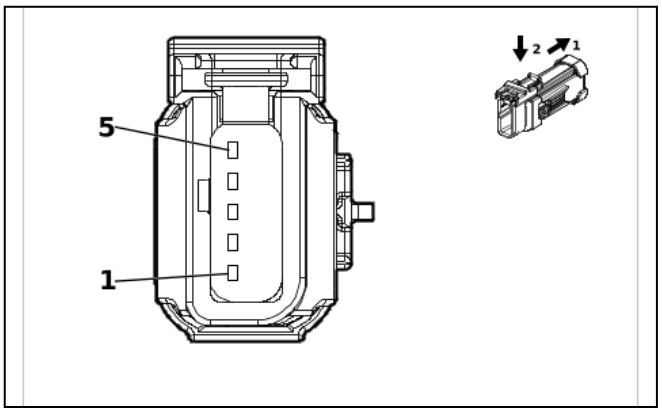
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-17 (L-GN)	No Tool Required

A24D Front Side Door Outside Handle - Left (ATH and (BOK / BOR / BOY))

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BU	(1) 2675	(1) Left Front Exterior Door Handle Switch Unlock Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) RD / BU	(2) 1240	(2) Battery Positive Voltage	(2) I	(2) —
(3) 3	(3) 0.5	(3) GN / BK	(3) 2738	(3) Near Field Communication Module LIN Bus 1	(3) I	(3) —
(4) 4	(4) 0.5	(4) BK / WH	(4) 1551	(4) Signal Ground	(4) I	(4) —
(5) 5	(5) 0.5	(5) BK / WH	(5) 1551	(5) Signal Ground	(5) I	(5) —

A24LR Rear Side Door Outside Handle - Left - 4 - Door (ATH)



5925819

Connector Part Information

- Harness Type: Rear Side Door Door Wiring Harness - Left
- OEM Connector: 6188-6505
- Service Connector: Service by Harness - See Part Catalog
- Description: 5-Way M 1.2 SWS Series, Sealed(BK with NA Lock Cover)

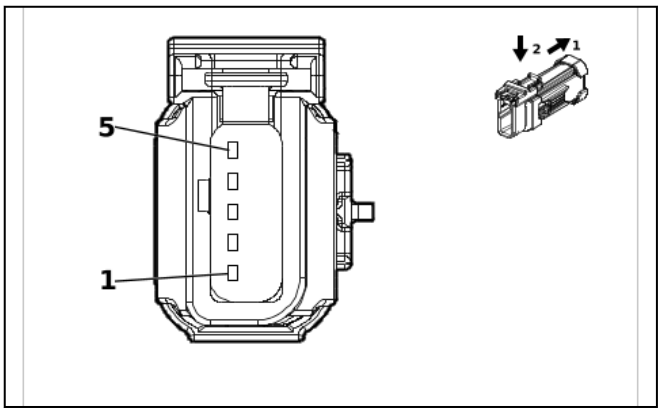
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-17 (L-GN)	No Tool Required

A24LR Rear Side Door Outside Handle - Left - 4 - Door (ATH)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) WH / VT	(1) 4994	(1) Left Rear Door Exterior Switch Unlock Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) VT	(2) 4301	(2) Passive Entry Left Antenna Signal High	(2) I	(2) —
3	—	—	—	Not Occupied	—	—
(4) 4	(4) 0.5	(4) VT / GY	(4) 4302	(4) Passive Entry Left Antenna Signal Low	(4) I	(4) —
(5) 5	(5) 0.5	(5) BK	(5) 1550	(5) Ground	(5) I	(5) —

A24P Front Side Door Outside Handle - Right - 2 - Door (ATH)



5925819

Connector Part Information

- Harness Type: Front Side Door Door Wiring Harness - Passenger
- OEM Connector: 6188-6505
- Service Connector: Service by Harness - See Part Catalog
- Description: 5-Way M 1.2 SWS Series, Sealed(BK with NA Lock Cover)

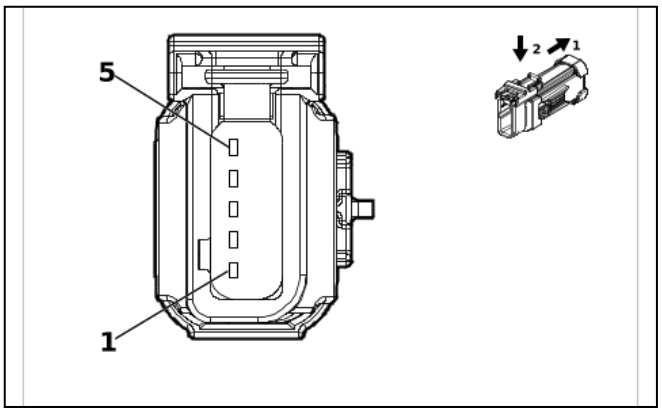
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-17 (L-GN)	No Tool Required

A24P Front Side Door Outside Handle - Right - 2 - Door (ATH)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GY / VT	(1) 2676	(1) Right Front Door Exterior Switch Unlock Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) GN / YE	(2) 4303	(2) Passive Entry Right Antenna Signal High	(2) I	(2) —
3	—	—	—	Not Occupied	—	—
(4) 4	(4) 0.5	(4) GN / BK	(4) 4304	(4) Passive Entry Right Antenna Signal Low	(4) I	(4) —
(5) 5	(5) 0.5	(5) BK / WH	(5) 1451	(5) Signal Ground	(5) I	(5) —

A24P Front Side Door Outside Handle - Right - 4 - Door (ATH)



6144289

Connector Part Information

- Harness Type: Front Side Door Door Wiring Harness - Passenger
- OEM Connector: 6188-6507
- Service Connector: Service by Harness - See Part Catalog
- Description: 5-Way M 1.2 SWS Series, Sealed(BK with BK Lock Cover)

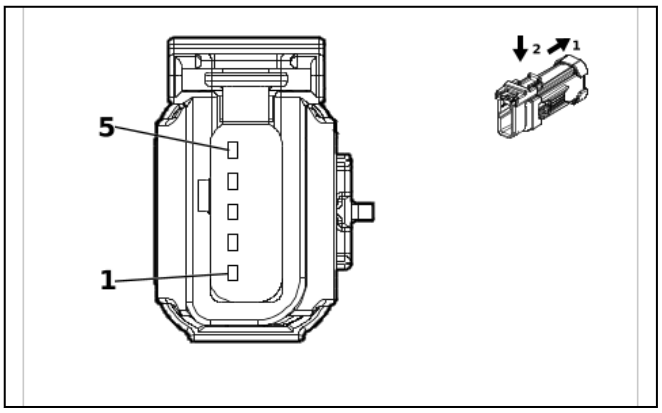
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-17 (L-GN)	No Tool Required

A24P Front Side Door Outside Handle - Right - 4 - Door (ATH)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GY / VT	(1) 2676	(1) Right Front Door Exterior Switch Unlock Signal	(1) I	(1) —
2 - 4	—	—	—	Not Occupied	—	—
(5) 5	(5) 0.5	(5) BK / WH	(5) 1451	(5) Signal Ground	(5) I	(5) —

A24RR Rear Side Door Outside Handle - Right - 4 - Door (ATH)



5925819

Connector Part Information

- Harness Type: Rear Side Door Door Wiring Harness - Right
- OEM Connector: 6188-6505
- Service Connector: Service by Harness - See Part Catalog
- Description: 5-Way M 1.2 SWS Series, Sealed(BK with NA Lock Cover)

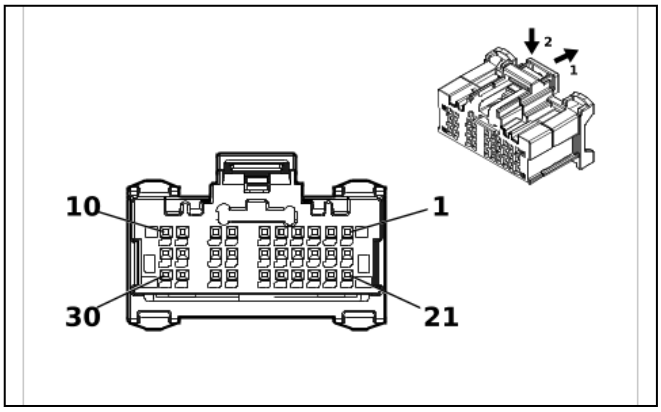
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-17 (L-GN)	No Tool Required

A24RR Rear Side Door Outside Handle - Right - 4 - Door (ATH)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GY / BU	(1) 4995	(1) Right Rear Door Exterior Switch Unlock Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) GN / YE	(2) 4303	(2) Passive Entry Right Antenna Signal High	(2) I	(2) —
3	—	—	—	Not Occupied	—	—
(4) 4	(4) 0.5	(4) GN / BK	(4) 4304	(4) Passive Entry Right Antenna Signal Low	(4) I	(4) —
(5) 5	(5) 0.5	(5) BK	(5) 1350	(5) Ground	(5) I	(5) —

A26 Heater and Air Conditioning User Interface Control - Front



5203942

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 2309644-2
- Service Connector: 84766509
- Description: 30-Way F 0.5 MQS Series(BK with L-GY Front Housing)

Terminal Part Information

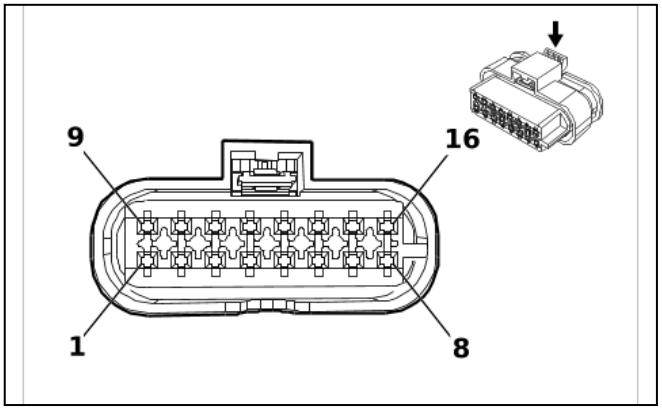
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19370262	EL-35616-58 (BK)	EL-38125-58

A26 Heater and Air Conditioning User Interface Control - Front

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) VT / YE	(1) 11748	(1) HVAC Indicator Supply Voltage	(1) I	(1) —
(2) 2	(2) 0.35	(2) BK / WH	(2) 1051	(2) Signal Ground	(2) I	(2) —
(3) 3	(3) 0.35	(3) GN / BU	(3) 11762	(3) HVAC Temperature 1 Encoder Phase A Signal	(3) I	(3) —
(4) 4	(4) 0.35	(4) YE / WH	(4) 11763	(4) HVAC Temperature 1 Encoder Phase B Signal	(4) I	(4) —
(5) 5	(5) 0.35	(5) BU / GY	(5) 11766	(5) HVAC Temperature 2 Encoder Phase A Signal	(5) I	(5) —
(6) 6	(6) 0.35	(6) GY / WH	(6) 11767	(6) HVAC Temperature 2 Encoder Phase B Signal	(6) I	(6) —
(7) 7	(7) 0.35	(7) VT	(7) 11738	(7) HVAC Fan Up Switch Signal	(7) I	(7) —
(8) 8	(8) 0.35	(8) GY / GN	(8) 4636	(8) HVAC System Enable Signal	(8) I	(8) —
(9) 9	(9) 0.35	(9) YE	(9) 11737	(9) Front Defrost Switch Signal	(9) I	(9) —
(10) 10	(10) 0.35	(10) BU / WH	(10) 292	(10) Rear Defogger Switch Signal	(10) I	(10) —
11	—	—	—	Not Occupied	—	—
(12) 12	(12) 0.35	(12) GY	(12) 11744	(12) HVAC Fan Down Switch Signal	(12) I	(12) —
(13) 13	(13) 0.35	(13) GN	(13) 11745	(13) HVAC Auto Mode Switch Signal	(13) I	(13) —
(14) 14	(14) 0.35	(14) GN / YE	(14) 11757	(14) HVAC White Backlighting Intensity Control	(14) I	(14) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(15) 15	(15) 0.35	(15) GN / BN	(15) 11758	(15) HVAC Red Backlighting Intensity Control	(15) I	(15) —
(16) 16	(16) 0.35	(16) GN / WH	(16) 11759	(16) HVAC Blue Backlighting Intensity Control	(16) I	(16) —
(17) 17	(17) 0.35	(17) GY / VT	(17) 11760	(17) HVAC Amber Backlighting Intensity Control	(17) I	(17) —
(18) 18	(18) 0.35	(18) BN / WH	(18) 11761	(18) HVAC White Fan Backlighting Intensity Control	(18) I	(18) C68
(19) 19	(19) 0.35	(19) BK / YE	(19) 1704	(19) Sensor Low Reference	(19) I	(19) —
(20) 20	(20) 0.35	(20) WH / BK	(20) 1923	(20) Auxiliary HVAC Switch Signal	(20) I	(20) —
(21) 21	(21) 0.35	(21) BN / GN	(21) 11754	(21) HVAC Auto Mode Indicator Control	(21) I	(21) —
(22) 22	(22) 0.35	(22) GN / GY	(22) 11749	(22) HVAC System Enable Indicator Control	(22) I	(22) —
(23) 23	(23) 0.35	(23) BU / VT	(23) 11752	(23) Front Defrost Indicator Control	(23) I	(23) —
(24) 24	(24) 0.35	(24) YE / VT	(24) 11753	(24) Rear Defog Indicator Control	(24) I	(24) —
(25) 25	(25) 0.35	(25) GN / VT	(25) 11755	(25) HVAC Air Conditioning Request Indicator Control	(25) I	(25) —
(26) 26	(26) 0.35	(26) BU / BK	(26) 13929	(26) HVAC Recirculation Switch Indicator	(26) I	(26) —
(27) 27	(27) 0.35	(27) BN	(27) 11746	(27) HVAC Air Conditioning Request Switch Signal	(27) I	(27) —
(28) 28	(28) 0.35	(28) BU / VT	(28) 13928	(28) HVAC Recirculation Switch Signal	(28) I	(28) —
(29) 29	(29) 0.35	(29) GY / BK	(29) 14093	(29) HVAC Faceplate Identification	(29) I	(29) —
(30) 30	(30) 0.35	(30) RD / YE	(30) 240	(30) Battery Positive Voltage	(30) I	(30) —

A38 Reductant Tank Fluid Supply Pump Module (FHX)



4259227

Connector Part Information

- Harness Type: Emission Reduction Fluid Tank Reservoir Wire Harness
- OEM Connector: 805-587-542
- Service Connector: Service by Harness - See Part Catalog
- Description: 16-Way F 1.2 MLK Series, Sealed(BK)

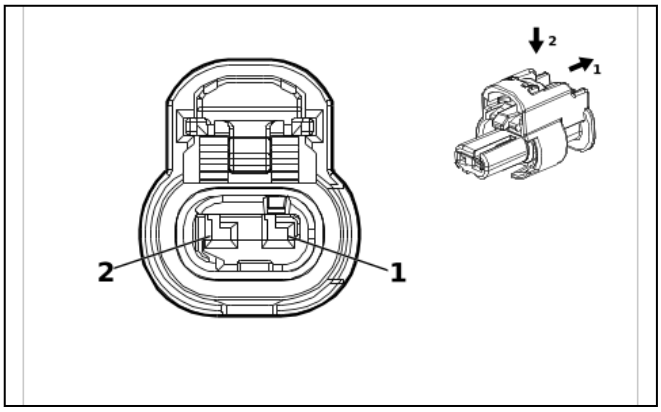
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

A38 Reductant Tank Fluid Supply Pump Module (FHX)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) YE	(1) 3244	(1) Diesel Exhaust Fluid Tank Temperature Sensor Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) YE / GN	(2) 3245	(2) Diesel Exhaust Fluid Tank Temperature Sensor Low Reference	(2) I	(2) —
(3) 3	(3) 0.5	(3) BK / GN	(3) 3107	(3) Diesel Exhaust Fluid Pressure Sensor Low Reference	(3) I	(3) —
(4) 4	(4) 0.5	(4) BN / YE	(4) 3108	(4) Diesel Exhaust Fluid Pressure Sensor Signal	(4) I	(4) —
(5) 5	(5) 0.5	(5) YE / RD	(5) 3106	(5) Diesel Exhaust Fluid Pressure Sensor 5 Volt Reference	(5) I	(5) —
(6) 6	(6) 1	(6) BU / BK	(6) 4318	(6) Diesel Exhaust Fluid Tank Heater Low Control	(6) I	(6) —
(7) 7	(7) 1	(7) GY	(7) 3103	(7) Diesel Exhaust Fluid Smart Pump Control	(7) I	(7) —
(8) 8	(8) 1	(8) VT	(8) 3875	(8) Diesel Exhaust Fluid Smart Pump Supply Voltage Phase 2	(8) I	(8) —
(9) 9	(9) 1	(9) WH / BN	(9) 3677	(9) Diesel Exhaust Fluid Reservoir Heater Control	(9) I	(9) —
10 - 11	—	—	—	Not Occupied	—	—
(12) 12	(12) 1	(12) VT / WH	(12) 3676	(12) Diesel Exhaust Fluid Heating Tank 2 Heater Control	(12) I	(12) —
13	—	—	—	Not Occupied	—	—
(14) 14	(14) 1	(14) GY / BK	(14) 2937	(14) Diesel Exhaust Fluid Pump Motor Stator Low Reference	(14) I	(14) —
(15) 15	(15) 1	(15) VT / WH	(15) 3876	(15) Diesel Exhaust Fluid Smart Pump Supply Voltage Phase 3	(15) I	(15) —
(16) 16	(16) 1	(16) BN / GY	(16) 2936	(16) Diesel Exhaust Fluid Heating Tank 2 Heater Control Low	(16) I	(16) —

A99 Pickup Box Endgate Latch (QT2)



4649903

Connector Part Information
- Harness Type: Endgate Wiring Harness
- OEM Connector: 1-2296694-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

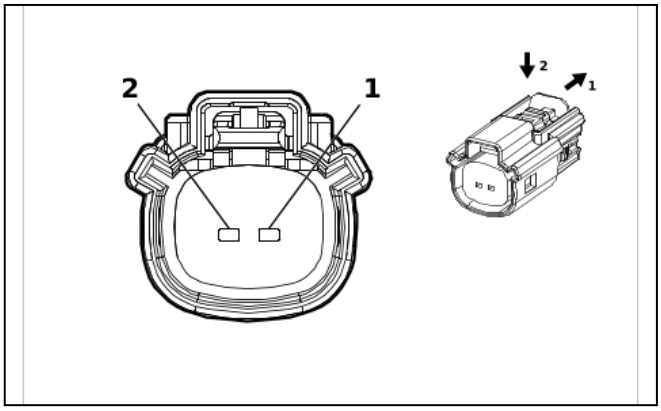
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

A99 Pickup Box Endgate Latch (QT2)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) GY / VT	(1) 2691	(1) Rear Closure Actuator Lock Control	(1) I	(1) —
(2) 2	(2) 0.75	(2) GY / BK	(2) 2680	(2) Lock Actuators Unlock Control 2	(2) I	(2) —

A99L Pickup Box Endgate Latch - Left (QT5)



2474713

Connector Part Information
- Harness Type: Endgate Wiring Harness
- OEM Connector: 33471-0206
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.5 Series, Sealed(BK)

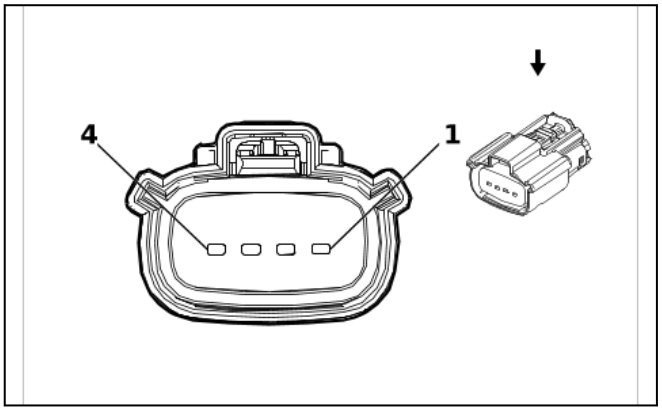
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required

A99L Pickup Box Endgate Latch - Left (QT5)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1	(1) GN	(1) 1299	(1) Major Endgate Motor Control	(1) I	(1) —
(2) 2	(2) 1	(2) YE / BK	(2) 7730	(2) Major Endgate Motor Low Reference	(2) I	(2) —

A99R Pickup Box Endgate Latch - Right (QT5)



2474747

Connector Part Information
- Harness Type: Endgate Wiring Harness
- OEM Connector: 33471-0406
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 1.5 Series, Sealed(BK)

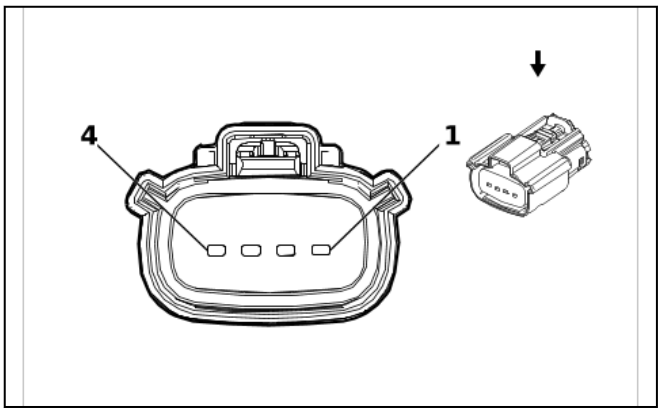
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required

A99R Pickup Box Endgate Latch - Right (QT5)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1	(1) YE / BK	(1) 7730	(1) Major Endgate Motor Low Reference	(1) I	(1) —
(2) 2	(2) 1	(2) GN	(2) 1299	(2) Major Endgate Motor Control	(2) I	(2) —
(3) 3	(3) 0.75	(3) BU / YE	(3) 10926	(3) Major Endgate Ajar Signal	(3) I	(3) —
(4) 4	(4) 0.75	(4) BK	(4) 1850	(4) Ground	(4) I	(4) —

A100L Pickup Box Auxiliary Endgate Latch - Left (QK2)



2474747

Connector Part Information

- Harness Type: Endgate Wiring Harness
- OEM Connector: 33471-0406
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 1.5 Series, Sealed(BK)

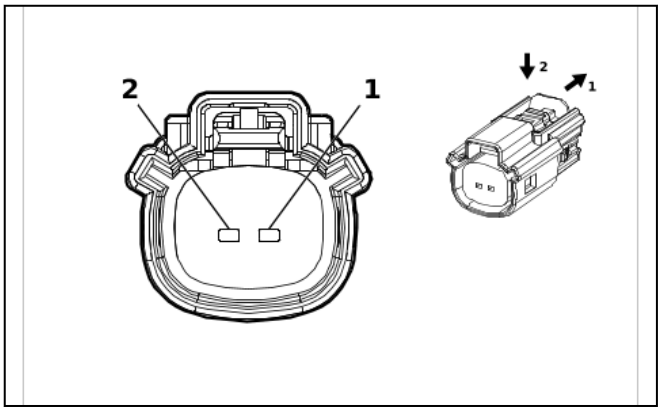
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required

A100L Pickup Box Auxiliary Endgate Latch - Left (QK2)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) YE / BU	(1) 7295	(1) Left Minor Endgate Ajar Signal	(1) I	(1) —
(2) 2	(2) 0.75	(2) BK	(2) 1850	(2) Ground	(2) I	(2) —
(3) 3	(3) 1	(3) YE / BK	(3) 7730	(3) Major Endgate Motor Low Reference	(3) I	(3) —
(4) 4	(4) 1	(4) VT	(4) 7725	(4) Minor Endgate Motor Control	(4) I	(4) —

A100R Pickup Box Auxiliary Endgate Latch - Right (QK2)



2474713

Connector Part Information
- Harness Type: Endgate Wiring Harness
- OEM Connector: 33471-0206
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.5 Series, Sealed(BK)

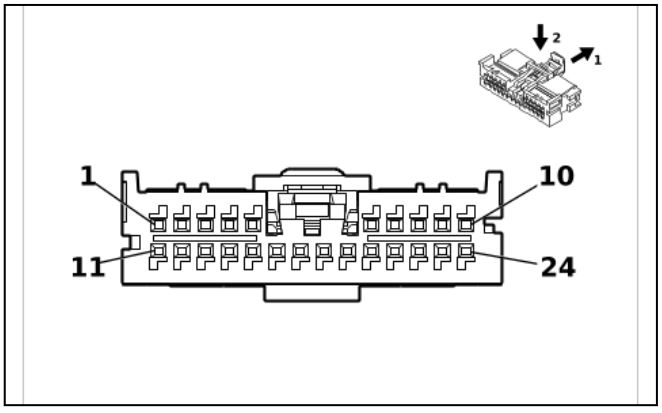
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required

A100R Pickup Box Auxiliary Endgate Latch - Right (QK2)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1	(1) VT	(1) 7725	(1) Minor Endgate Motor Control	(1) I	(1) —
(2) 2	(2) 1	(2) YE / BK	(2) 7730	(2) Major Endgate Motor Low Reference	(2) I	(2) —

A103 Roof Console



7148058

Connector Part Information
- Harness Type: Dome Lamp Wiring Harness
- OEM Connector: 35412168
- Service Connector: 13566164
- Description: 24-Way F Mini 50 Series(BK)

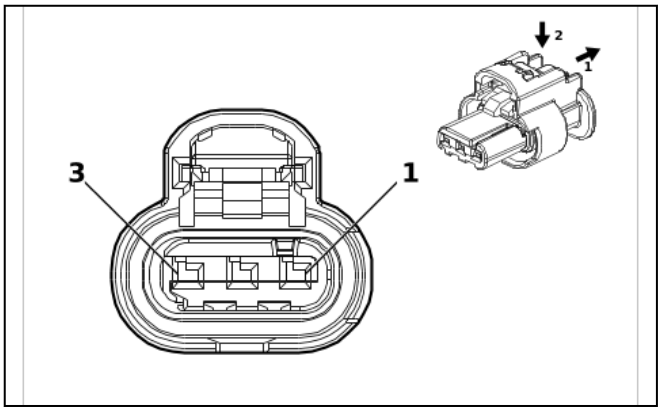
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not Available	EL-35616-58 (BK)	EL-38125-58

A103 Roof Console

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) BK / WH	(1) 851	(1) Signal Ground	(1) I	(1) —
(3) 3	(3) 0.35	(3) GN / WH	(3) 111	(3) Hazard Warning Switch Signal	(3) I	(3) —
(4) 4	(4) 0.35	(4) GN / BK	(4) 2515	(4) Telematics Switch Supply Voltage	(4) I	(4) —
(5) 5	(5) 0.35	(5) BN / WH	(5) 2517	(5) Telematics Switch Red LED Indicator Control	(5) I	(5) —
(7) 7	(7) 0.35	(7) VT / GY	(7) 2906	(7) Row 2 Dome Reading Lamp 2 Switch Signal	(7) I	(7) —
(8) 8	(8) 0.35	(8) GY / WH	(8) 2369	(8) Interior Lamp Overhead 2 Enable Signal	(8) I	(8) —
(9) 9	(9) 0.35	(9) BN / BU	(9) 2905	(9) Row 2 Dome Reading Lamp 2 Interior Lamp Control	(9) I	(9) —
(10) 10	(10) 0.35	(10) BK / BN	(10) 654	(10) Cellular Telephone Microphone Low Reference	(10) I	(10) —
(11) 11	(11) 0.35	(11) GN / WH	(11) 2854	(11) Body Control Module LIN Bus 8	(11) I	(11) —
(12) 12	(12) 0.35	(12) RD / YE	(12) 240	(12) Battery Positive Voltage	(12) I	(12) —
(13) 13	(13) 0.35	(13) GY / YE	(13) 7543	(13) Hazard Warning Indicator LED Dimming Signal	(13) I	(13) —
(14) 14	(14) 0.35	(14) GN / WH	(14) 2514	(14) Telematics Switch Signal	(14) I	(14) —
(15) 15	(15) 0.35	(15) YE / VT	(15) 2516	(15) Telematics Switch Green LED Indicator Control	(15) I	(15) —
(16) 16	(16) 0.35	(16) VT	(16) 801	(16) Retained Accessory Power Control	(16) I	(16) —
(17) 17	(17) 0.35	(17) WH	(17) 6192	(17) Sliding Rear Window Switch Close Signal	(17) I	(17) —
(18) 18	(18) 0.35	(18) YE / VT	(18) 6191	(18) Power Rear Window Switch Open Signal	(18) I	(18) —
(19) 19	(19) 0.35	(19) GN / BK	(19) 10652	(19) Radio LIN Bus 1	(19) I	(19) —
(21) 21	(21) 0.35	(21) WH / BN	(21) 2904	(21) Row 2 Dome Reading Lamp Switch Signal	(21) I	(21) —
(22) 22	(22) 0.35	(22) BU / GN	(22) 4785	(22) Interior Lamp Overhead Enable Signal	(22) I	(22) —
(23) 23	(23) 0.35	(23) GN / YE	(23) 2903	(23) Row 2 Dome Reading Lamp Interior Lamp Control	(23) I	(23) —
(24) 24	(24) 0.35	(24) BU	(24) 655	(24) Cellular Telephone Microphone Signal	(24) I	(24) —

B1 Air Conditioning Refrigerant Pressure Sensor



4581126

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 1-2296695-1
- Service Connector: 86792094
- Description: 3-Way F 1.2 MCON-CB Series, Sealed(BK)

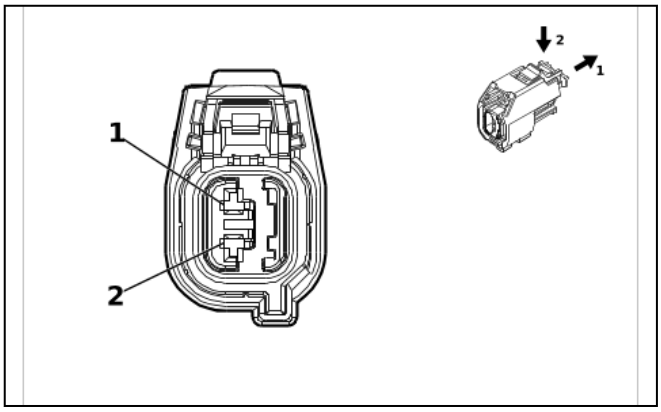
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

B1 Air Conditioning Refrigerant Pressure Sensor

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) WH / RD	(1) 480	(1) Engine Control Vehicle Sensors 5 Volt Reference 1	(1) I	(1) —
(2) 2	(2) 0.5	(2) GN	(2) 380	(2) Air Conditioning Refrigerant Pressure Sensor Signal	(2) I	(2) —
(3) 3	(3) 0.5	(3) BK / GY	(3) 626	(3) Engine Control Vehicle Sensors Low Reference 1	(3) I	(3) —

B5LF Front Wheel Speed Sensor - Left



5666214

Connector Part Information
- Harness Type: Chassis Wiring Harness
- OEM Connector: 33189092
- Service Connector: 85526683
- Description: 2-Way F 1.5 OCS Series, Sealed(GY)

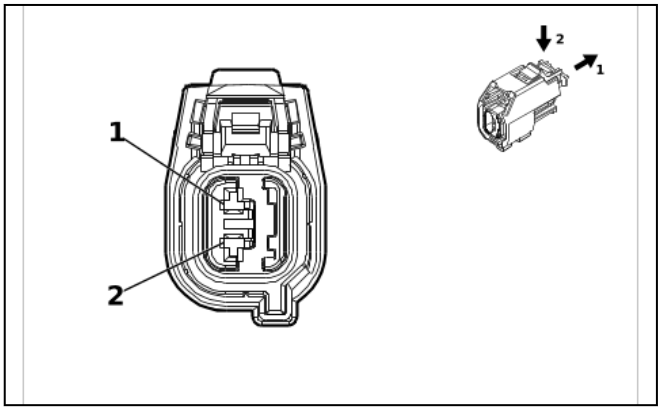
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required

B5LF Front Wheel Speed Sensor - Left

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GY / WH	(1) 7064	(1) Left Front Wheel Speed Sensor Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) GY	(2) 830	(2) Left Front Wheel Speed Sensor Signal	(2) I	(2) —

B5LR Rear Wheel Speed Sensor - Left



5666214

Connector Part Information
- Harness Type: Chassis Wiring Harness
- OEM Connector: 33189092
- Service Connector: 85526683
- Description: 2-Way F 1.5 OCS Series, Sealed(GY)

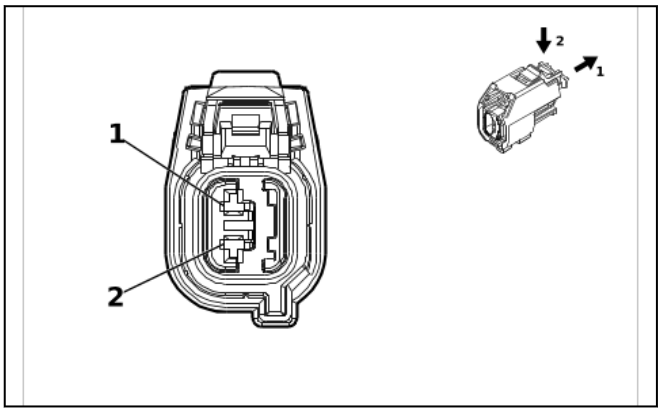
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required

B5LR Rear Wheel Speed Sensor - Left

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GY / BK	(1) 7127	(1) Left Rear Wheel Speed Sensor Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) BU	(2) 884	(2) Left Rear Wheel Speed Sensor Signal	(2) I	(2) —

B5RF Front Wheel Speed Sensor - Right



5666214

Connector Part Information

- Harness Type: Chassis Wiring Harness
- OEM Connector: 33189092
- Service Connector: 85526683
- Description: 2-Way F 1.5 OCS Series, Sealed(GY)

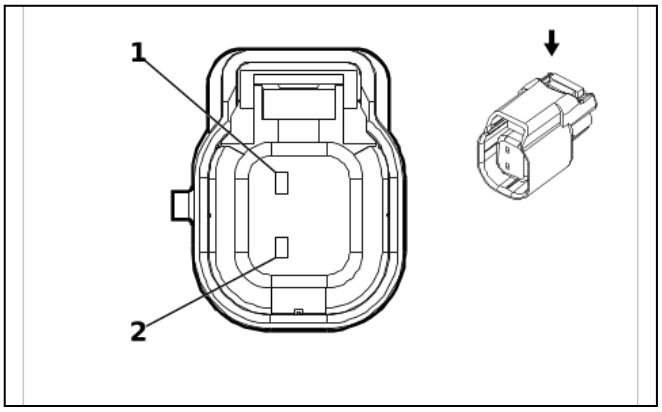
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required

B5RF Front Wheel Speed Sensor - Right

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GY / BN	(1) 7065	(1) Right Front Wheel Speed Sensor Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) YE	(2) 872	(2) Right Front Wheel Speed Sensor Signal	(2) I	(2) —

B5RR Rear Wheel Speed Sensor - Right



4115616

Connector Part Information
- Harness Type: Chassis Wiring Harness
- OEM Connector: 34062-0046
- Service Connector: 19366860
- Description: 2-Way F 1.5 Series, Sealed(BK)

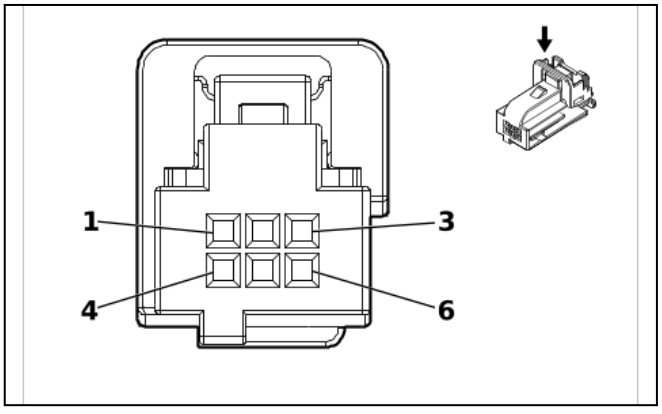
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-14 (GN)	No Tool Required

B5RR Rear Wheel Speed Sensor - Right

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GY / YE	(1) 7128	(1) Right Rear Wheel Speed Sensor Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) VT	(2) 882	(2) Right Rear Wheel Speed Sensor Signal	(2) I	(2) —

B10D Sun Load and Ambient Light and Security Indicator Sensor



2282896

Connector Part Information
- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 2294663-1
- Service Connector: 85587649
- Description: 6-Way F 0.64 Micro-Quadlock Series(BK)

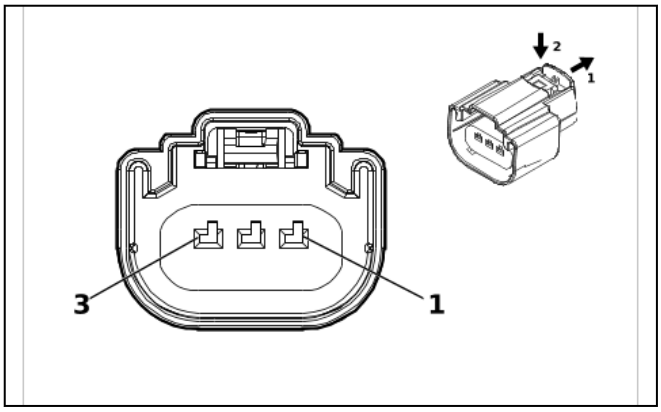
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

B10D Sun Load and Ambient Light and Security Indicator Sensor

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) GY	(1) 590	(1) Driver Solar Sensor Signal	(1) I	(1) —
2	—	—	—	Not Occupied	—	—
(3) 3	(3) 0.35	(3) WH / BU	(3) 278	(3) Ambient Light Sensor Signal	(3) I	(3) —
(4) 4	(4) 0.35	(4) BU / WH	(4) 734	(4) Inside Air Temperature Sensor Signal	(4) I	(4) —
(5) 5	(5) 0.35	(5) GY	(5) 728	(5) Security Indicator Control	(5) I	(5) —
(6) 6	(6) 0.35	(6) BK / YE	(6) 407	(6) Sensor Low Reference	(6) I	(6) —

B11RF Front Suspension 4 Corner Leveling System Position Sensor - Right (Z45)



4569745

Connector Part Information

- Harness Type: Chassis Wiring Harness
- OEM Connector: 33343869
- Service Connector: 19179750
- Description: 3-Way F 1.5 MX Series, Sealed(BK)

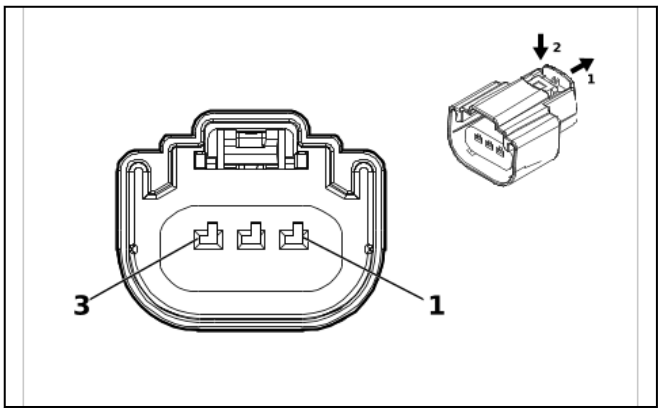
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-14 (GN)	No Tool Required

B11RF Front Suspension 4 Corner Leveling System Position Sensor - Right (Z45)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BN / RD	(1) 1211	(1) Right Front Suspension Position Sensor Voltage Reference	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / GY	(2) 1212	(2) Right Front Suspension Position Sensor Low Reference	(2) I	(2) —
(3) 3	(3) 0.5	(3) YE / WH	(3) 1213	(3) Right Front Suspension Position Sensor Signal	(3) I	(3) —

B11RR Rear Suspension 2 or 4 Corner Air Leveling Position Sensor - Right (Z45)



4569745

Connector Part Information

- Harness Type: Chassis Wiring Harness
- OEM Connector: 160073-3105
- Service Connector: 19179750
- Description: 3-Way F 1.5 MX Series, Sealed(BK)

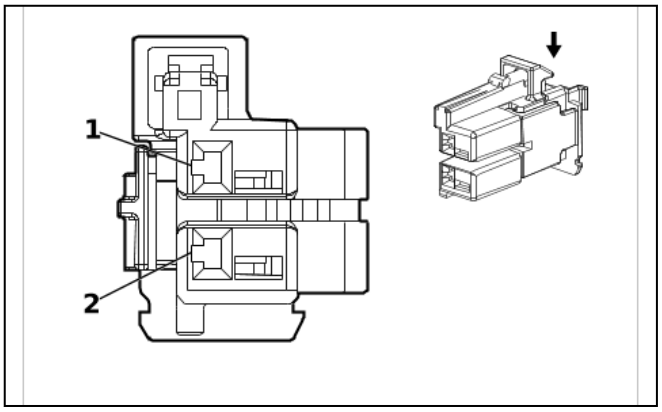
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-14 (GN)	No Tool Required

B11RR Rear Suspension 2 or 4 Corner Air Leveling Position Sensor - Right (Z45)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GN / RD	(1) 1214	(1) Right Rear Suspension Position Sensor Voltage Reference	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / YE	(2) 1215	(2) Right Rear Suspension Position Sensor Low Reference	(2) I	(2) —
(3) 3	(3) 0.5	(3) GN / GY	(3) 1216	(3) Right Rear Suspension Position Sensor Signal	(3) I	(3) —

B13 Automatic Transmission Fluid Temperature Sensor



4672650

Connector Part Information
- Harness Type: Automatic Transmission Wiring Harness - Control
- OEM Connector: 13540048
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series(BN)

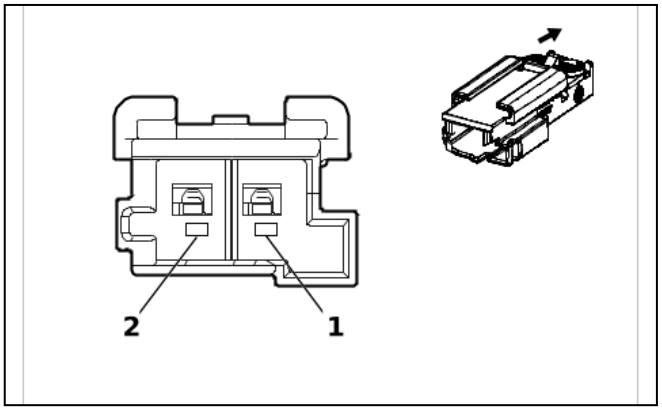
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

B13 Automatic Transmission Fluid Temperature Sensor

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BU / BN	(1) 586	(1) Transmission Fluid Temperature Sensor Low Reference	(1) I	(1) —
(2) 2	(2) 0.5	(2) BN / YE	(2) 585	(2) Transmission Fluid Temperature Sensor Signal	(2) I	(2) —

B14A Automatic Transmission Output Speed Sensor



4672593

Connector Part Information
- Harness Type: Automatic Transmission Wiring Harness - Case
- OEM Connector: 2340311-2
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way M 1.2 MCON Series(BU)

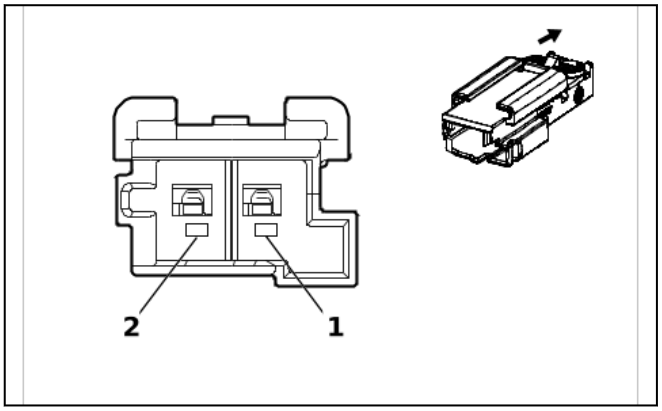
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-13 (BU)	No Tool Required

B14A Automatic Transmission Output Speed Sensor

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) YE / OG	(1) 6358	(1) Output Speed Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) GN	(2) 4170	(2) Transmission Output Shaft Speed Sensor Circuit 9V Reference	(2) I	(2) —

B14C Automatic Transmission Input Speed Sensor



4672611

Connector Part Information

- Harness Type: Automatic Transmission Wiring Harness - Case
- OEM Connector: 2340311-3
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way M 1.2 MCON Series(GN)

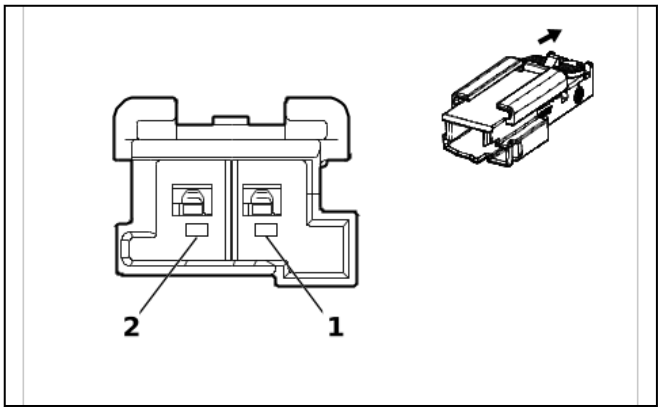
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-13 (BU)	No Tool Required

B14C Automatic Transmission Input Speed Sensor

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) WH / VT	(1) 4173	(1) Transmission Speed Input Low Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) BU	(2) 4171	(2) Transmission Input Shaft Speed Sensor Circuit 9V Reference	(2) I	(2) —

B14DA Automatic Transmission Intermediate Speed Sensor 1



4663490

Connector Part Information
- Harness Type: Automatic Transmission Wiring Harness - Case
- OEM Connector: 2340311-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way M 1.2 MCON Series(NA)

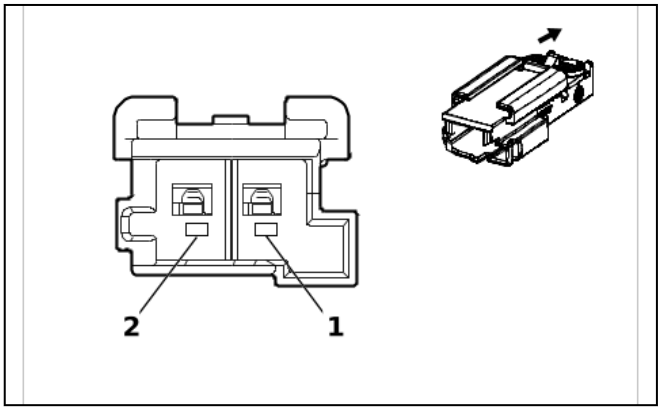
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-13 (BU)	No Tool Required

B14DA Automatic Transmission Intermediate Speed Sensor 1

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) VT / GN	(1) 12791	(1) Transmission Intermediate Speed Sensor Signal Low	(1) I	(1) —
(2) 2	(2) 0.5	(2) GN	(2) 4170	(2) Transmission Output Shaft Speed Sensor Circuit 9V Reference	(2) I	(2) —

B14DB Automatic Transmission Intermediate Speed Sensor 2



4672593

Connector Part Information
- Harness Type: Automatic Transmission Wiring Harness - Case
- OEM Connector: 2340311-2
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way M 1.2 MCON Series(BU)

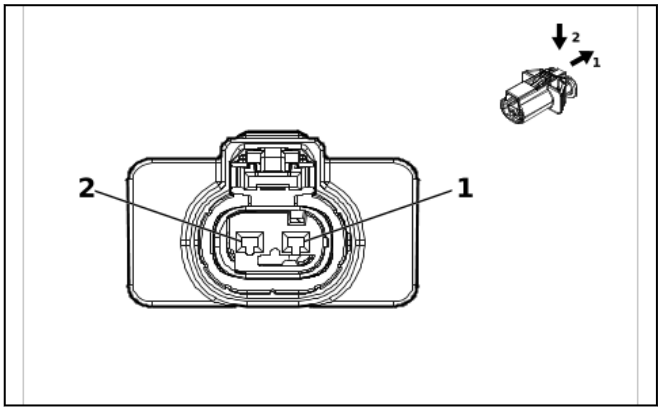
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-13 (BU)	No Tool Required

B14DB Automatic Transmission Intermediate Speed Sensor 2

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) WH / BU	(1) 12792	(1) Transmission Intermediate Speed Sensor 2 Signal Low	(1) I	(1) —
(2) 2	(2) 0.5	(2) BU	(2) 4171	(2) Transmission Input Shaft Speed Sensor Circuit 9V Reference	(2) I	(2) —

B20A Brake Fluid Level Indicator Switch



5877143

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 35747313
- Service Connector: 85751409
- Description: 2-Way F 1.2 MLK Series, Sealed(BK)

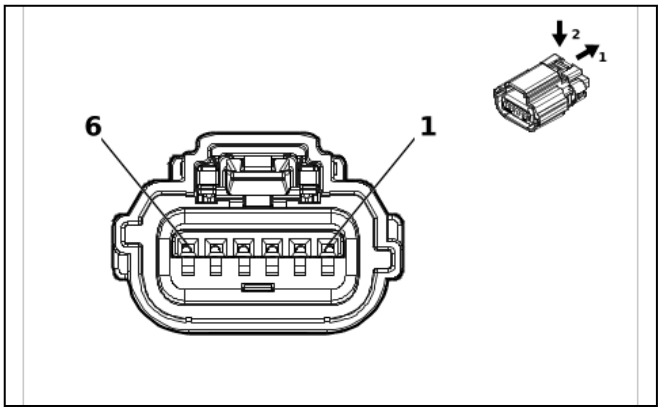
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

B20A Brake Fluid Level Indicator Switch

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GN / GY	(1) 333	(1) Brake Fluid Level Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / WH	(2) 151	(2) Signal Ground	(2) I	(2) —

B22 Brake Pedal Position Sensor



5921818

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 35547326
- Service Connector: 86825468
- Description: 6-Way F 0.64 OCS Series, Sealed(NA)

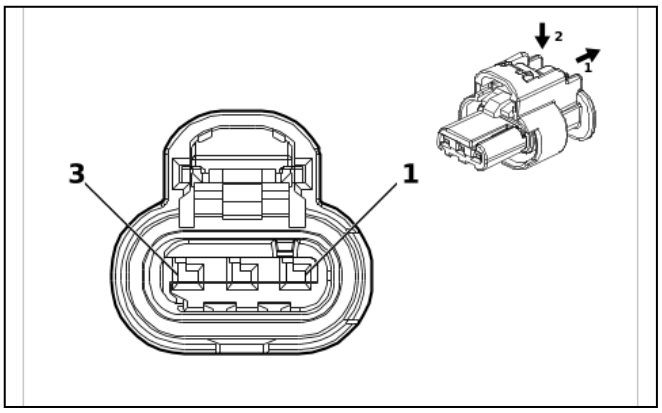
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

B22 Brake Pedal Position Sensor

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) BK / BN	(1) 5360	(1) Brake Apply Sensor Low Reference	(1) I	(1) —
(2) 2	(2) 0.35	(2) WH	(2) 5359	(2) Brake Apply Sensor Control	(2) I	(2) —
(3) 3	(3) 0.35	(3) BU / YE	(3) 5361	(3) Brake Apply Sensor Signal	(3) I	(3) —
(4) 4	(4) 0.35	(4) WH / GN	(4) 5380	(4) Brake Position Sensor Signal	(4) I	(4) —
(5) 5	(5) 0.35	(5) BK / GY	(5) 626	(5) Engine Control Vehicle Sensors Low Reference 1	(5) I	(5) —
(6) 6	(6) 0.35	(6) WH / RD	(6) 480	(6) Engine Control Vehicle Sensors 5 Volt Reference 1	(6) I	(6) —

B23E Camshaft Position Sensor - Exhaust (L4B / LZ0)



4581126

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 1-2296695-1
- Service Connector: 86792094
- Description: 3-Way F 1.2 MCON-CB Series, Sealed(BK)

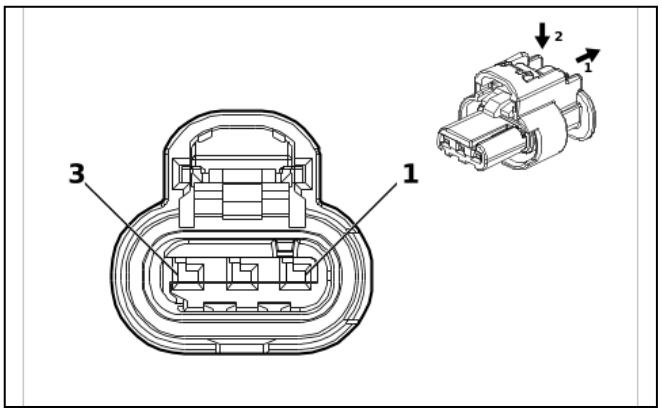
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B23E Camshaft Position Sensor - Exhaust (L4B / LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GY / YE	(1) 5297	(1) Exhaust Camshaft Position Sensor 1 Voltage Reference	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / GY	(2) 5296	(2) Exhaust Camshaft Position Sensor Low Reference 1	(2) I	(2) —
(3) 3	(3) 0.5	(3) VT / BK	(3) 5273	(3) Exhaust Camshaft Position Sensor 1	(3) I	(3) —

B23F Camshaft Position Sensor - Intake (L4B)



4581126

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 1-2296695-1
- Service Connector: 86792094
- Description: 3-Way F 1.2 MCON-CB Series, Sealed(BK)

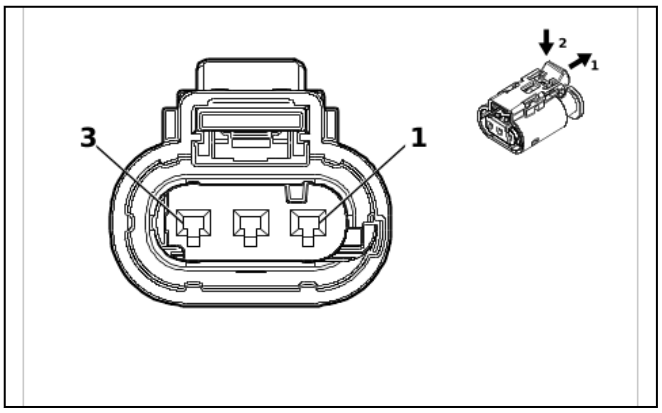
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B23F Camshaft Position Sensor - Intake (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GY / BU	(1) 5300	(1) Intake Camshaft Position Sensor 1 Voltage Reference	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / GN	(2) 5301	(2) Intake Camshaft Position Sensor Low Reference 1	(2) I	(2) —
(3) 3	(3) 0.5	(3) YE / VT	(3) 5275	(3) Intake Camshaft Position Sensor 1	(3) I	(3) —

B23F Camshaft Position Sensor - Intake (L76 / L78)



6851172

Connector Part Information

- Harness Type: Engine Wiring Harness Extension Harness
- OEM Connector: 13551872
- Service Connector: Service by Harness - See Part Catalog
- Description: 3-Way F 1.2 MLK Series, Sealed(BK)

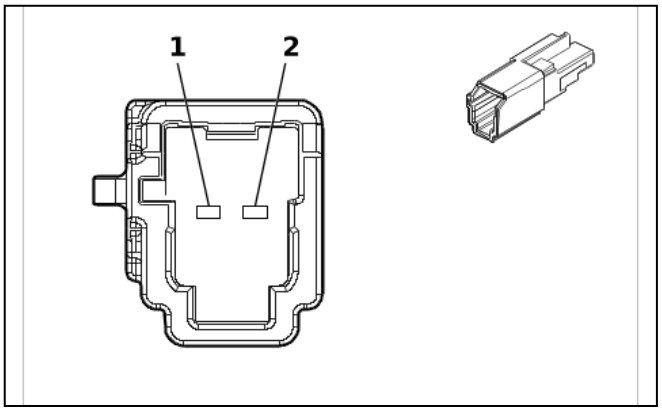
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

B23F Camshaft Position Sensor - Intake (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GY / BU	(1) 5300	(1) Intake Camshaft Position Sensor 1 Voltage Reference	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / GN	(2) 5301	(2) Intake Camshaft Position Sensor Low Reference 1	(2) I	(2) —
(3) 3	(3) 0.5	(3) YE / VT	(3) 5275	(3) Intake Camshaft Position Sensor 1	(3) I	(3) —

B24 Mobile Telephone Microphone



6529124

Connector Part Information
- Harness Type: Roof Console
- OEM Connector: 13558181
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way M 1.2 MBS Series(BK)

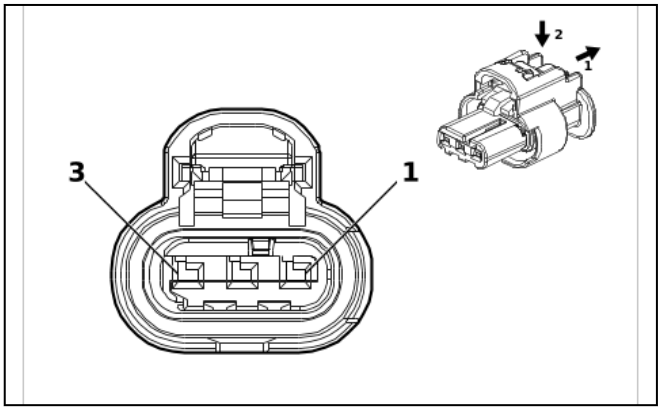
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

B24 Mobile Telephone Microphone

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) BK / BN	(1) 654	(1) Cellular Telephone Microphone Low Reference	(1) I	(1) —
(2) 2	(2) 0.35	(2) BU	(2) 655	(2) Cellular Telephone Microphone Signal	(2) I	(2) —

B26 Crankshaft Position Sensor (L4B)



4778903

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 1-2296695-2
- Service Connector: 86792095
- Description: 3-Way F 1.2 MCON-CB Series, Sealed(BK)

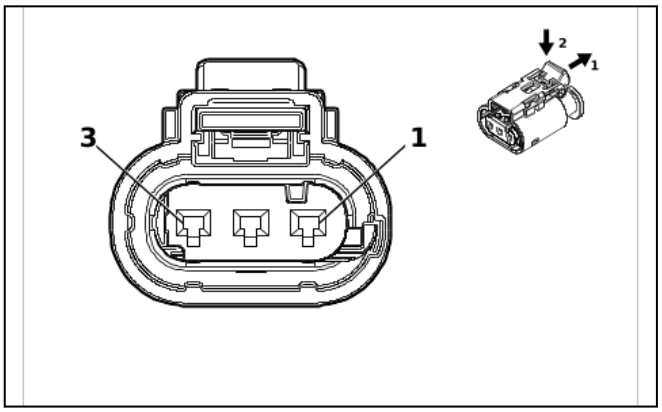
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B26 Crankshaft Position Sensor (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) VT / BU	(1) 6270	(1) Crankshaft Position Sensor Voltage	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / VT	(2) 6272	(2) Crankshaft Position Sensor Low Reference	(2) I	(2) —
(3) 3	(3) 0.5	(3) GN	(3) 6271	(3) Crankshaft Position Sensor Signal	(3) I	(3) —

B26 Crankshaft Position Sensor (L76 / L78)



6851172

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 10531901
- Service Connector: 86419006
- Description: 3-Way F 1.2 MLK Series, Sealed(BK)

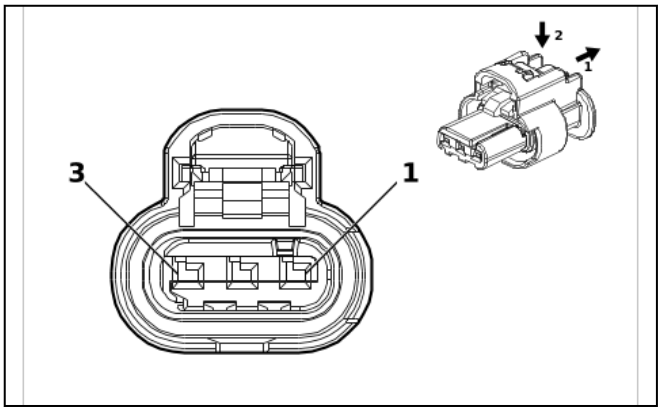
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B26 Crankshaft Position Sensor (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GN	(1) 6271	(1) Crankshaft Position Sensor Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / VT	(2) 6272	(2) Crankshaft Position Sensor Low Reference	(2) I	(2) —
(3) 3	(3) 0.5	(3) VT / BU	(3) 6270	(3) Crankshaft Position Sensor Voltage	(3) I	(3) —

B26 Crankshaft Position Sensor (LZ0)



4581126

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 1-2296695-1
- Service Connector: 86792094
- Description: 3-Way F 1.2 MCON-CB Series, Sealed(BK)

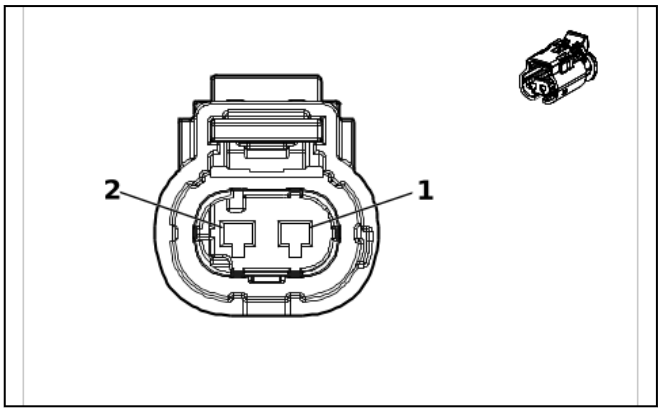
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B26 Crankshaft Position Sensor (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) VT / BU	(1) 6270	(1) Crankshaft Position Sensor Voltage	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / VT	(2) 6272	(2) Crankshaft Position Sensor Low Reference	(2) I	(2) —
(3) 3	(3) 0.5	(3) GN	(3) 6271	(3) Crankshaft Position Sensor Signal	(3) I	(3) —

B34 Engine Coolant Temperature Sensor (LZ0)



6860491

Connector Part Information
- Harness Type: Engine Coolant Temperature Sensor Harness
- OEM Connector: 13562389
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MLK Series, Sealed(GY)

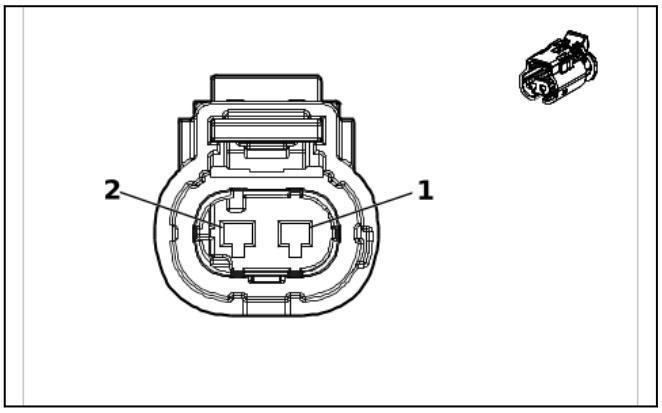
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

B34 Engine Coolant Temperature Sensor (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) VT	(1) 2988	(1) Engine Outlet Coolant Temperature Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / GY	(2) 626	(2) Engine Control Vehicle Sensors Low Reference 1	(2) I	(2) —

B34B Engine Coolant Temperature Sensor 2 (L4B / L76 / L78)



6860491

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 10530499
- Service Connector: 86308599
- Description: 2-Way F 1.2 MLK Series, Sealed(GY)

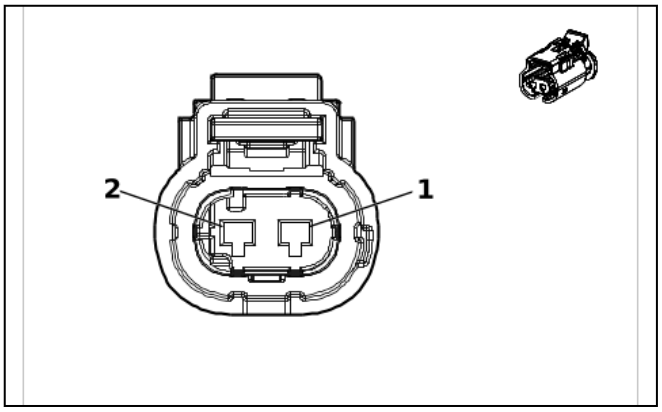
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B34B Engine Coolant Temperature Sensor 2 (L4B / L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) YE / BU	(1) 2408	(1) Engine Inlet Coolant Temperature Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / BU	(2) 10597	(2) Engine Control Sensors Low Reference 3	(2) I	(2) —

B34B Engine Coolant Temperature Sensor 2 (LZ0)



6860491

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 10530499
- Service Connector: 86308599
- Description: 2-Way F 1.2 MLK Series, Sealed(GY)

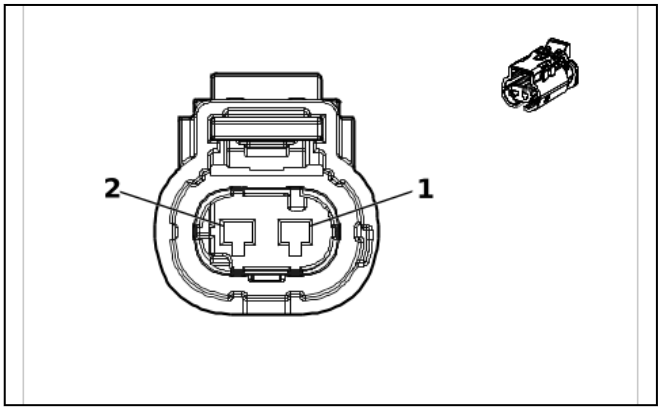
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B34B Engine Coolant Temperature Sensor 2 (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) YE / BU	(1) 2408	(1) Engine Inlet Coolant Temperature Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / YE	(2) 548	(2) Engine Control Sensors Low Reference 1	(2) I	(2) —

B34C Engine Coolant Temperature Sensor 3 (L76 / L78)



6776339

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 10530497
- Service Connector: 86308598
- Description: 2-Way F 1.2 MLK Series, Sealed(BK)

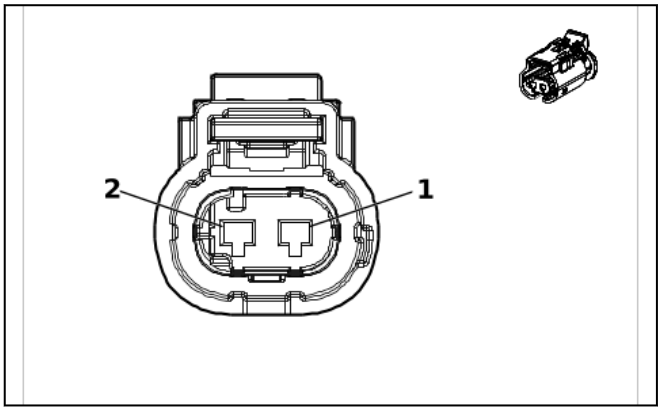
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B34C Engine Coolant Temperature Sensor 3 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BN	(1) 12695	(1) Engine Radiator Coolant Temperature Sensor 2 Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / GN	(2) 580	(2) Engine Control Sensors Low Reference 2	(2) I	(2) —

B34E Engine Coolant Temperature Sensor 5 (L4B)



6860491

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 10530499
- Service Connector: 86308599
- Description: 2-Way F 1.2 MLK Series, Sealed(GY)

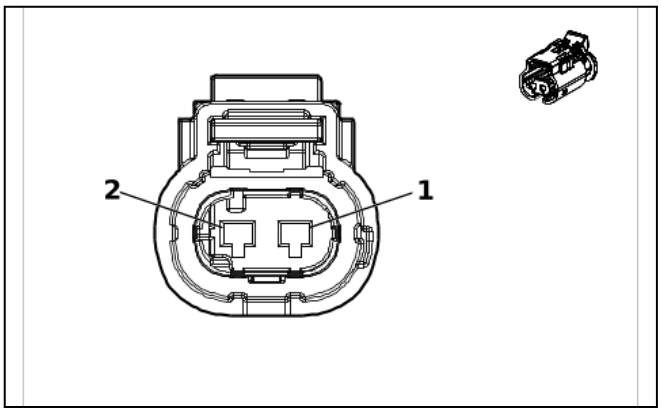
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B34E Engine Coolant Temperature Sensor 5 (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BU / YE	(1) 8938	(1) Engine Integrated Exhaust Manifold Temperature Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / YE	(2) 548	(2) Engine Control Sensors Low Reference 1	(2) I	(2) —

B34E Engine Coolant Temperature Sensor 5 (L76 / L78)



6860491

Connector Part Information
- Harness Type: Engine Wiring Harness Extension Harness
- OEM Connector: 13562389
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MLK Series, Sealed(GY)

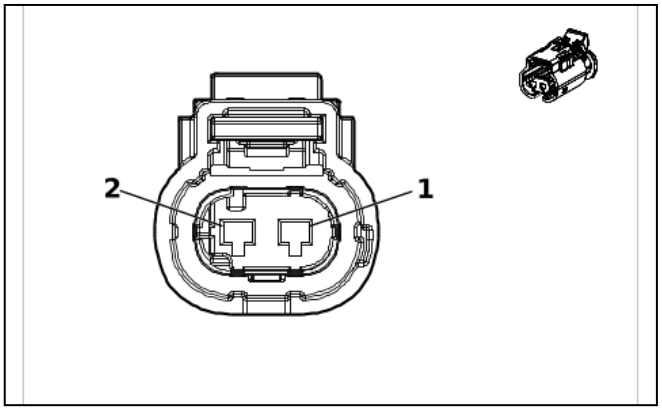
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

B34E Engine Coolant Temperature Sensor 5 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BN	(1) 12637	(1) Engine Head Coolant Temperature Bank 1 Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / YE	(2) 548	(2) Engine Control Sensors Low Reference 1	(2) I	(2) —

B34F Engine Coolant Temperature Sensor 6 (L4B)



6860491

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 10530499
- Service Connector: 86308599
- Description: 2-Way F 1.2 MLK Series, Sealed(GY)

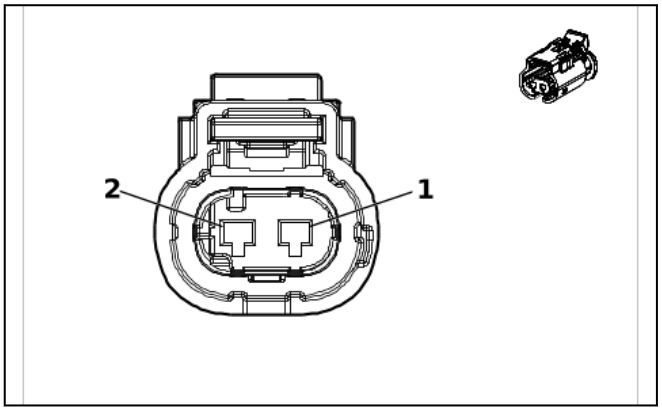
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B34F Engine Coolant Temperature Sensor 6 (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GY / VT	(1) 2404	(1) Engine Block Coolant Temperature Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / GN	(2) 580	(2) Engine Control Sensors Low Reference 2	(2) I	(2) —

B34F Engine Coolant Temperature Sensor 6 (L76 / L78)



6860491

Connector Part Information

- Harness Type: Engine Wiring Harness Extension Harness
- OEM Connector: 13562389
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MLK Series, Sealed(GY)

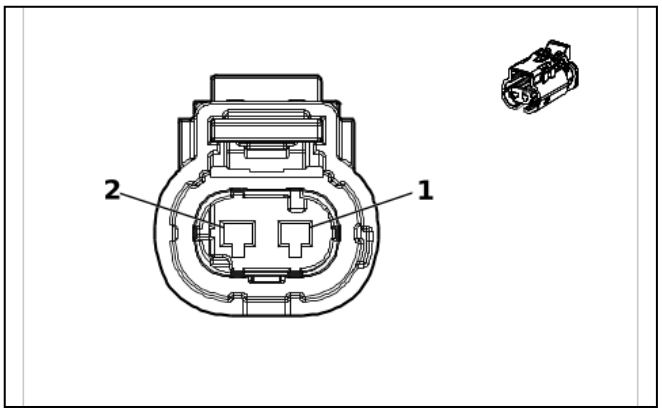
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

B34F Engine Coolant Temperature Sensor 6 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GY / VT	(1) 13867	(1) Engine Bank Outlet Coolant Temperature Sensor Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / VT	(2) 10598	(2) Engine Control Sensors Low Reference 4	(2) I	(2) —

B34K Charge Air Cooler Coolant Temperature Sensor - Inlet (LZ0)



6776339

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 10530497
- Service Connector: 86308598
- Description: 2-Way F 1.2 MLK Series, Sealed(BK)

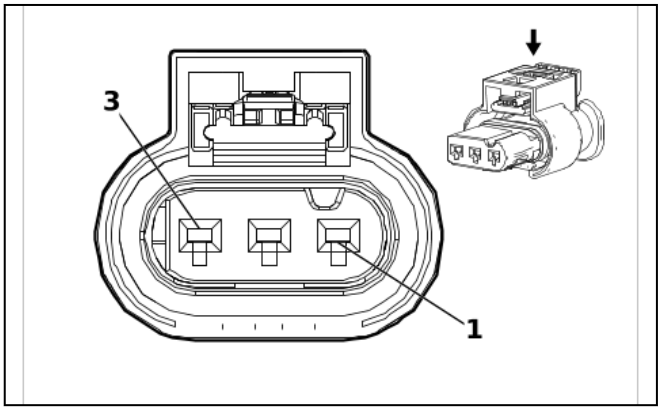
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B34K Charge Air Cooler Coolant Temperature Sensor - Inlet (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BU / BK	(1) 1422	(1) Engine Water Charge Air Coolant Temperature Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / GY	(2) 626	(2) Engine Control Vehicle Sensors Low Reference 1	(2) I	(2) —

B35C Engine Oil Level and Temperature Sensor (L76 / L78)



2394093

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 805-121-521
- Service Connector: 13574937
- Description: 3-Way F 1.2 Multilock Series, Sealed(BK)

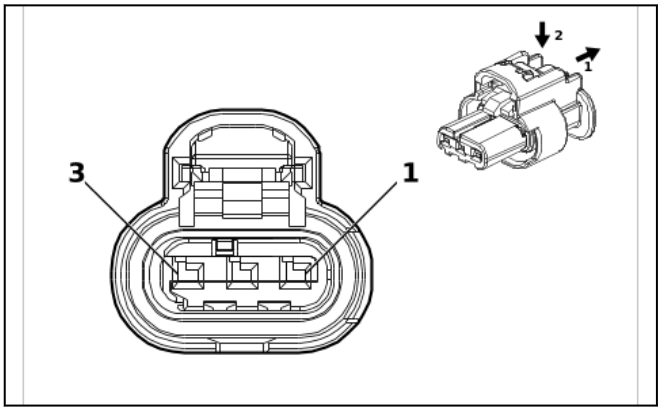
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B35C Engine Oil Level and Temperature Sensor (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GN / BN	(1) 2732	(1) Engine Control Module LIN Bus 4	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / WH	(2) 6151	(2) Engine Control Module Ground	(2) I	(2) —
(3) 3	(3) 0.5	(3) VT / BU	(3) 5294	(3) Powertrain Main Relay Fused Supply Voltage 5	(3) I	(3) —

B36 Engine Oil Temperature Sensor (L4B)



4994602

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 1-2296695-3
- Service Connector: 19371199
- Description: 3-Way F 1.2 MCON-CB Series, Sealed(BK)

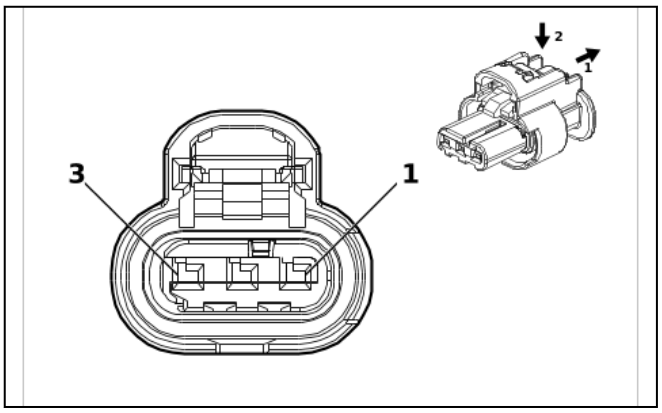
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B36 Engine Oil Temperature Sensor (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BK / BU	(1) 10597	(1) Engine Control Sensors Low Reference 3	(1) I	(1) —
(2) 2	(2) 0.5	(2) BN / BU	(2) 357	(2) Oil Temperature Sensor Signal	(2) I	(2) —
(3) 3	(3) 0.5	(3) VT	(3) 7485	(3) Engine Oil Temperature Sensor 2 Signal	(3) I	(3) —

B36 Engine Oil Temperature Sensor (L76 / L78)



4778903

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 1-2296695-2
- Service Connector: 86792095
- Description: 3-Way F 1.2 MCON-CB Series, Sealed(BK)

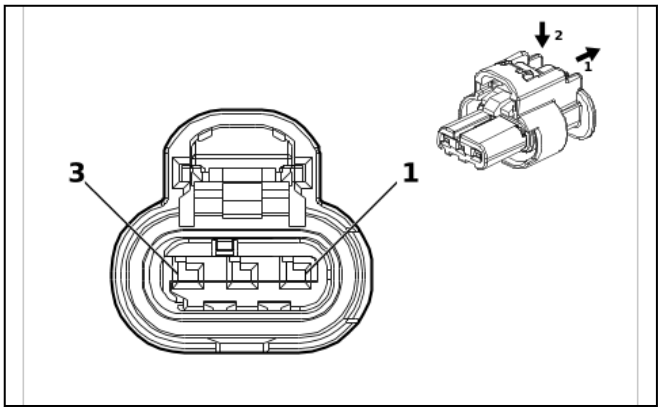
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B36 Engine Oil Temperature Sensor (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BN / BU	(1) 357	(1) Oil Temperature Sensor Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / BU	(2) 10597	(2) Engine Control Sensors Low Reference 3	(2) I	(2) —
(3) 3	(3) 0.5	(3) VT	(3) 7485	(3) Engine Oil Temperature Sensor 2 Signal	(3) I	(3) —

B36 Engine Oil Temperature Sensor (LZ0)



4994602

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 1-2296695-3
- Service Connector: 19371199
- Description: 3-Way F 1.2 MCON-CB Series, Sealed(BK)

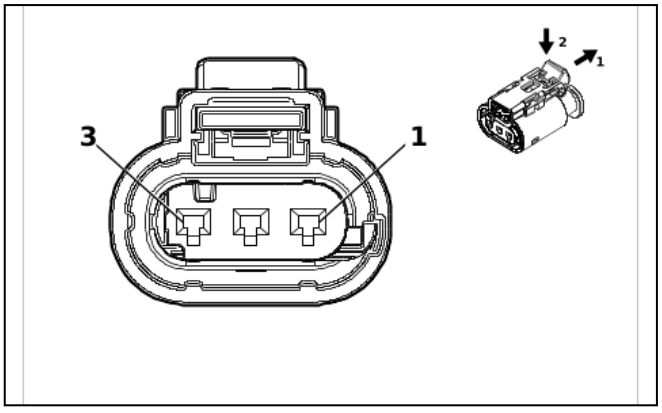
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B36 Engine Oil Temperature Sensor (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BK / YE	(1) 548	(1) Engine Control Sensors Low Reference 1	(1) I	(1) —
(2) 2	(2) 0.5	(2) BN / BU	(2) 357	(2) Oil Temperature Sensor Signal	(2) I	(2) —
(3) 3	(3) 0.5	(3) VT	(3) 7485	(3) Engine Oil Temperature Sensor 2 Signal	(3) I	(3) —

B37B Engine Oil Pressure Sensor (L4B / LZ0)



6932387

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 10531904
- Service Connector: 86419008
- Description: 3-Way F 1.2 MLK Series, Sealed(BK)

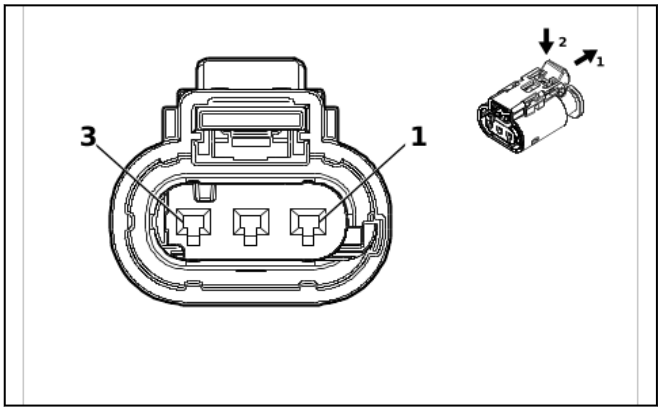
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B37B Engine Oil Pressure Sensor (L4B / LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) YE / BN	(1) 331	(1) Oil Pressure Sensor Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / YE	(2) 548	(2) Engine Control Sensors Low Reference 1	(2) I	(2) —
(3) 3	(3) 0.5	(3) BU / RD	(3) 460	(3) Engine Control Sensors 5 Volt Reference 1	(3) I	(3) —

B37B Engine Oil Pressure Sensor (L76 / L78)



6932387

Connector Part Information

- Harness Type: Engine Wiring Harness Extension Harness
- OEM Connector: 13551875
- Service Connector: Service by Harness - See Part Catalog
- Description: 3-Way F 1.2 MLK Series, Sealed(BK)

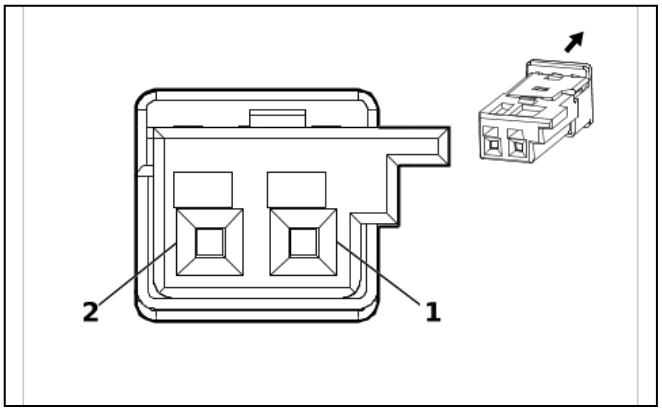
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

B37B Engine Oil Pressure Sensor (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) YE / BN	(1) 331	(1) Oil Pressure Sensor Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / YE	(2) 548	(2) Engine Control Sensors Low Reference 1	(2) I	(2) —
(3) 3	(3) 0.5	(3) BU / RD	(3) 460	(3) Engine Control Sensors 5 Volt Reference 1	(3) I	(3) —

B39 Air Conditioning Evaporator Air Temperature Sensor



2780265

Connector Part Information
- Harness Type: HVAC Assembly Wiring Harness
- OEM Connector: Not Available
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F

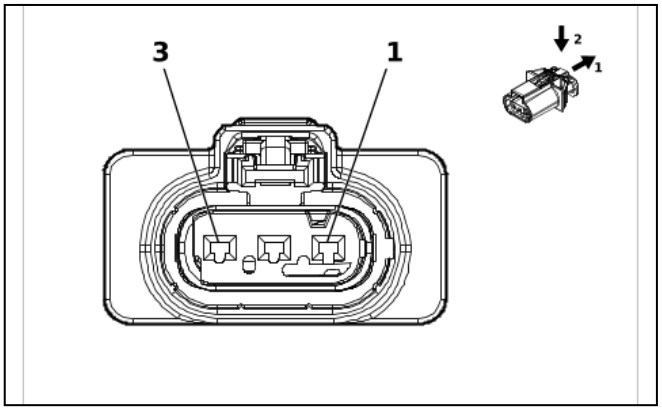
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

B39 Air Conditioning Evaporator Air Temperature Sensor

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) GY	(1) 6137	(1) Air Conditioning Evaporator Temperature Sensor Signal	(1) I	(1) —
(2) 2	(2) 0.35	(2) BK / YE	(2) 407	(2) Sensor Low Reference	(2) I	(2) —

B47 Fuel Pressure Sensor (FHX)



7149178

Connector Part Information
- Harness Type: Chassis Wiring Harness
- OEM Connector: 13560395
- Service Connector: 85596544
- Description: 3-Way F 1.2 MLK Series, Sealed(BK)

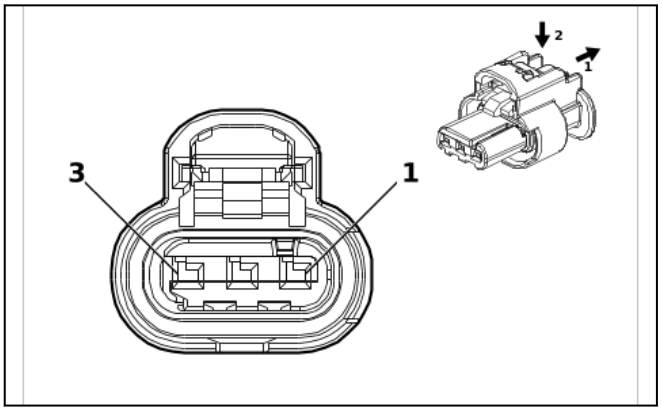
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

B47 Fuel Pressure Sensor (FHX)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BN / RD	(1) 7445	(1) Fuel Line Pressure Sensor 5V Reference	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / YE	(2) 7447	(2) Fuel Pressure Sensor Low Reference	(2) I	(2) —
(3) 3	(3) 0.5	(3) BU / WH	(3) 7446	(3) Fuel Pressure Sensor Signal	(3) I	(3) —

B47 Fuel Pressure Sensor (FJW)



4581126

Connector Part Information
- Harness Type: Chassis Wiring Harness
- OEM Connector: 1-2296695-1
- Service Connector: 86792094
- Description: 3-Way F 1.2 MCON-CB Series, Sealed(BK)

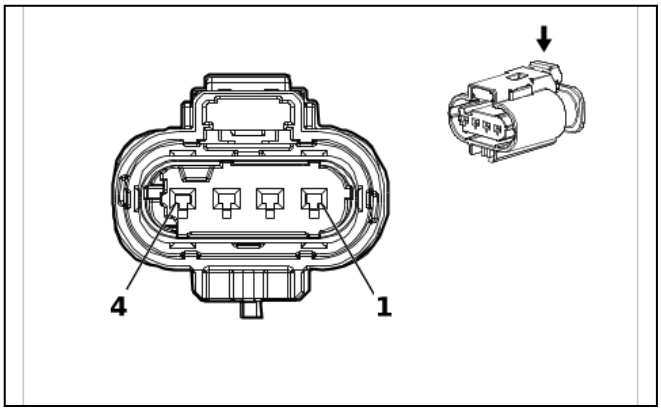
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

B47 Fuel Pressure Sensor (FJW)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BN / RD	(1) 7445	(1) Fuel Line Pressure Sensor 5V Reference	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / YE	(2) 7447	(2) Fuel Pressure Sensor Low Reference	(2) I	(2) —
(3) 3	(3) 0.5	(3) BU / WH	(3) 7446	(3) Fuel Pressure Sensor Signal	(3) I	(3) —

B47B Fuel Rail Pressure Sensor (LZ0)



5402120

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 10531905
- Service Connector: 85877329
- Description: 4-Way F 1.2 Multilock Series, Sealed(BK)

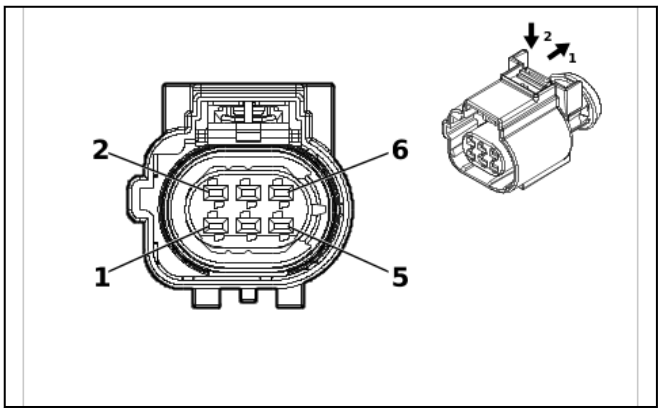
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B47B Fuel Rail Pressure Sensor (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BN / RD	(1) 2917	(1) Fuel Rail Pressure Sensor 5V Reference	(1) I	(1) —
(2) 2	(2) 0.5	(2) BN / YE	(2) 2161	(2) Fuel Rail Pressure Sensor 2 Signal	(2) I	(2) —
(3) 3	(3) 0.5	(3) BK / GN	(3) 2919	(3) Fuel Rail Pressure Sensor Low Reference	(3) I	(3) —
(4) 4	(4) 0.5	(4) BU / WH	(4) 2918	(4) Fuel Rail Pressure Sensor Signal	(4) I	(4) —

B52A Heated Oxygen Sensor 1 (L4B)



5086832

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 2-2309220-8
- Service Connector: 84613131
- Description: 6-Way F 1.5 MCP Series, Sealed(GY)

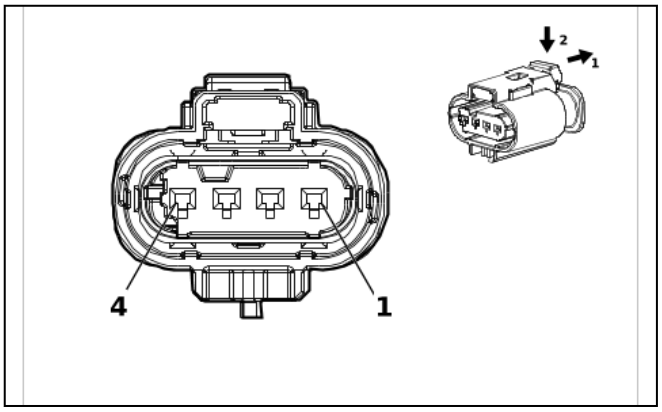
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-14 (GN)	No Tool Required

B52A Heated Oxygen Sensor 1 (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BN / WH	(1) 6933	(1) HO2S Pump Current Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) BN	(2) 6934	(2) HO2S Low Signal	(2) I	(2) —
(3) 3	(3) 0.5	(3) GY / WH	(3) 3113	(3) HO2S Heater Low Control Bank 1 Sensor 1	(3) I	(3) —
(4) 4	(4) 0.5	(4) VT / BU	(4) 5293	(4) Powertrain Main Relay Fused Supply Voltage 4	(4) I	(4) —
(5) 5	(5) 0.5	(5) GN	(5) 6935	(5) HO2S Pump Current Trim Signal	(5) I	(5) —
(6) 6	(6) 0.5	(6) YE / GY	(6) 6936	(6) HO2S Signal	(6) I	(6) —

B52B Heated Oxygen Sensor 2 (L4B)



6932385

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 10531909
- Service Connector: 86419009
- Description: 4-Way F 1.2 Multilock Series, Sealed(BK)

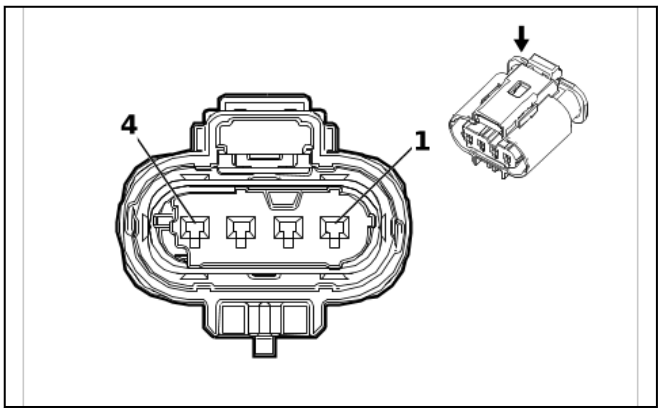
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B52B Heated Oxygen Sensor 2 (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GY / WH	(1) 3122	(1) HO2S Heater Low Control Bank 1 Sensor 2	(1) I	(1) —
(2) 2	(2) 0.5	(2) VT / BU	(2) 5294	(2) Powertrain Main Relay Fused Supply Voltage 5	(2) I	(2) —
(3) 3	(3) 0.5	(3) WH / YE	(3) 3121	(3) HO2S Low Signal Bank 1 Sensor 2	(3) I	(3) —
(4) 4	(4) 0.5	(4) BN	(4) 3120	(4) HO2S High Signal Bank 1 Sensor 2	(4) I	(4) —

B52C Heated Oxygen Sensor - Bank 1 Sensor 1 (L76 / L78)



3240113

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 10531907
- Service Connector: 86447448
- Description: 4-Way F 1.2 Multilock Series, Sealed(D-GY)

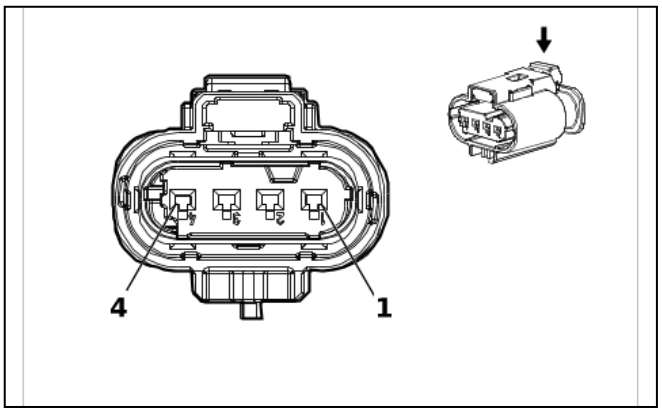
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B52C Heated Oxygen Sensor - Bank 1 Sensor 1 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GY / WH	(1) 3113	(1) HO2S Heater Low Control Bank 1 Sensor 1	(1) I	(1) —
(2) 2	(2) 0.5	(2) VT / BU	(2) 5293	(2) Powertrain Main Relay Fused Supply Voltage 4	(2) I	(2) —
(3) 3	(3) 0.5	(3) BN	(3) 6934	(3) HO2S Low Signal	(3) I	(3) —
(4) 4	(4) 0.5	(4) BN / WH	(4) 6933	(4) HO2S Pump Current Signal	(4) I	(4) —

B52D Heated Oxygen Sensor - Bank 1 Sensor 2 (L76 / L78)



4381050

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 13562508
- Service Connector: 85877333
- Description: 4-Way F 1.2 Multilock Series, Sealed(GY)

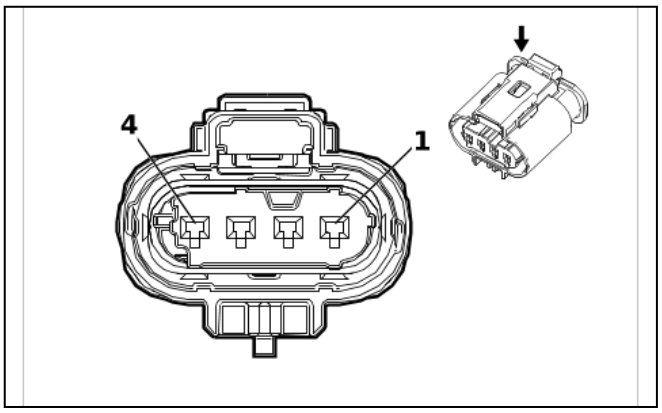
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B52D Heated Oxygen Sensor - Bank 1 Sensor 2 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GY / WH	(1) 3122	(1) HO2S Heater Low Control Bank 1 Sensor 2	(1) I	(1) —
(2) 2	(2) 0.5	(2) VT / BU	(2) 5294	(2) Powertrain Main Relay Fused Supply Voltage 5	(2) I	(2) —
(3) 3	(3) 0.5	(3) WH / YE	(3) 3121	(3) HO2S Low Signal Bank 1 Sensor 2	(3) I	(3) —
(4) 4	(4) 0.5	(4) BN	(4) 3120	(4) HO2S High Signal Bank 1 Sensor 2	(4) I	(4) —

B52E Heated Oxygen Sensor - Bank 2 Sensor 1 (L76 / L78)



3240113

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 10531907
- Service Connector: 86447448
- Description: 4-Way F 1.2 Multilock Series, Sealed(D-GY)

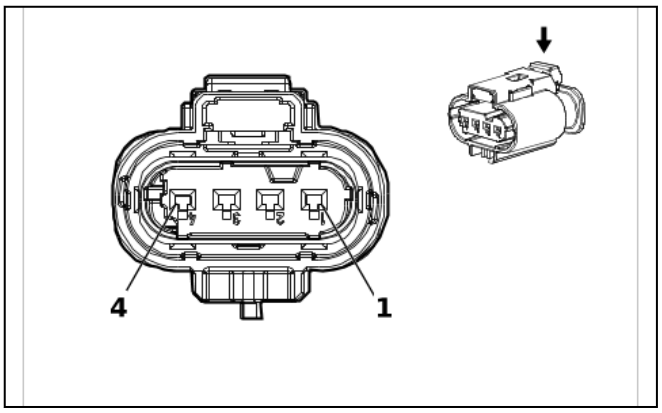
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B52E Heated Oxygen Sensor - Bank 2 Sensor 1 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GN / YE	(1) 3212	(1) HO2S Heater Low Control Bank 2 Sensor 1	(1) I	(1) —
(2) 2	(2) 0.5	(2) VT / BU	(2) 5294	(2) Powertrain Main Relay Fused Supply Voltage 5	(2) I	(2) —
(3) 3	(3) 0.5	(3) WH	(3) 2571	(3) HO2S Low Signal Bank 2 Sensor 1	(3) I	(3) —
(4) 4	(4) 0.5	(4) YE / WH	(4) 2570	(4) Heated Oxygen Sensor 2 Pump Current Signal	(4) I	(4) —

B52F Heated Oxygen Sensor - Bank 2 Sensor 2 (L76 / L78)



4381050

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 13562508
- Service Connector: 85877333
- Description: 4-Way F 1.2 Multilock Series, Sealed(GY)

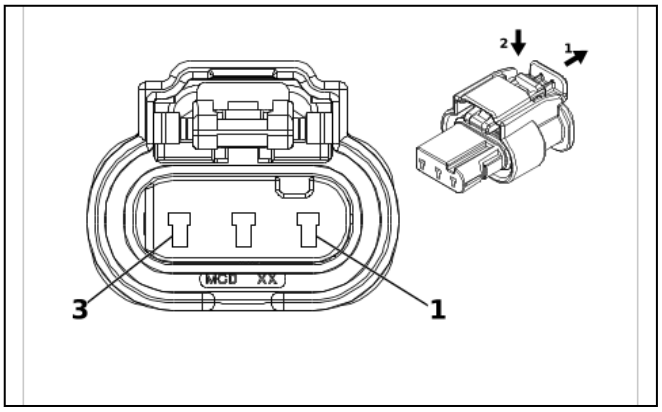
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B52F Heated Oxygen Sensor - Bank 2 Sensor 2 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) WH / BN	(1) 3223	(1) HO2S Heater Low Control Bank 2 Sensor 2	(1) I	(1) —
(2) 2	(2) 0.5	(2) VT / BU	(2) 5294	(2) Powertrain Main Relay Fused Supply Voltage 5	(2) I	(2) —
(3) 3	(3) 0.5	(3) YE / BU	(3) 3221	(3) HO2S Low Signal Bank 2 Sensor 2	(3) I	(3) —
(4) 4	(4) 0.5	(4) VT / GN	(4) 3220	(4) HO2S High Signal Bank 2 Sensor 2	(4) I	(4) —

B55 Engine Compartment Cover Switch



4421568

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 34900-3120
- Service Connector: 19368220
- Description: 3-Way F 1.2 MCON-LL Series, Sealed(BK)

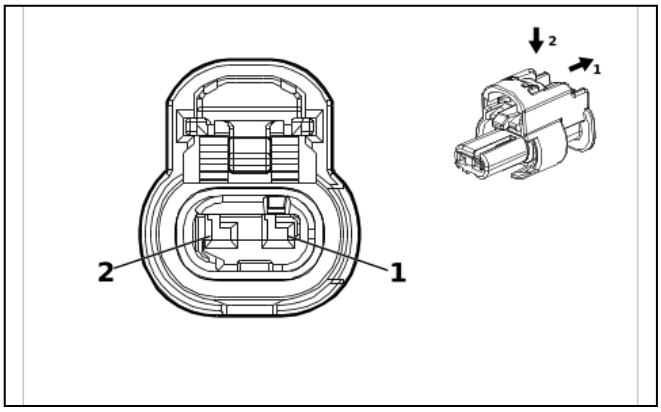
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B55 Engine Compartment Cover Switch

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	—	—	—	Not Occupied	—	—
(2) 2	(2) 0.35	(2) BN / GN	(2) 4064	(2) Hood Status B Signal	(2) I	(2) —
(3) 3	(3) 0.5	(3) BK / WH	(3) 151	(3) Signal Ground	(3) I	(3) —

B58L Airbag Front End Discriminating Sensor - Left



4649903

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 1-2296694-1
- Service Connector: 85761014
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

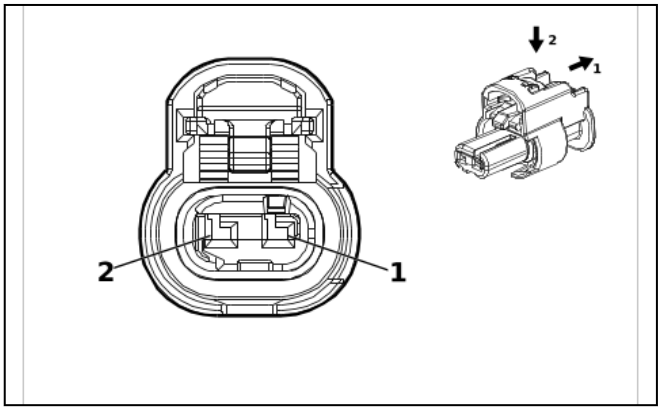
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

B58L Airbag Front End Discriminating Sensor - Left

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) OG / YE	(1) 354	(1) Left Front Impact Discriminating Sensor Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / OG	(2) 5045	(2) Left Front Impact Discriminating Sensor Low Reference	(2) I	(2) —

B58R Airbag Front End Discriminating Sensor - Right



4649903

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 1-2296694-1
- Service Connector: 85761014
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

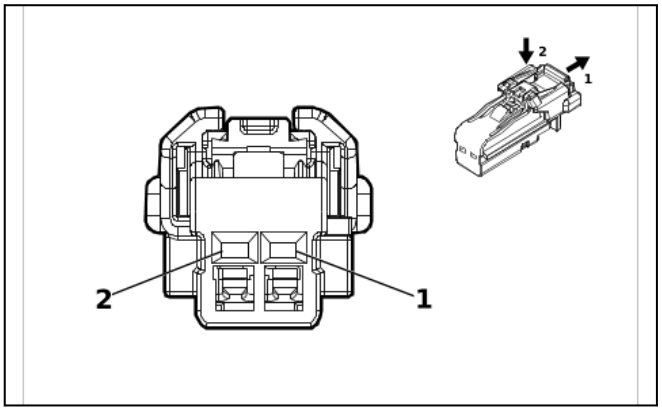
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

B58R Airbag Front End Discriminating Sensor - Right

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) OG / GN	(1) 1409	(1) Right Front Impact Discriminating Sensor Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / OG	(2) 5600	(2) Right Front Impact Discriminating Sensor Low Reference	(2) I	(2) —

B61P Seat Belt Tension Sensor - Passenger



4115691

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 6098-8988
- Service Connector: 87816612
- Description: 2-Way F 1.2 MCON Series(BK)

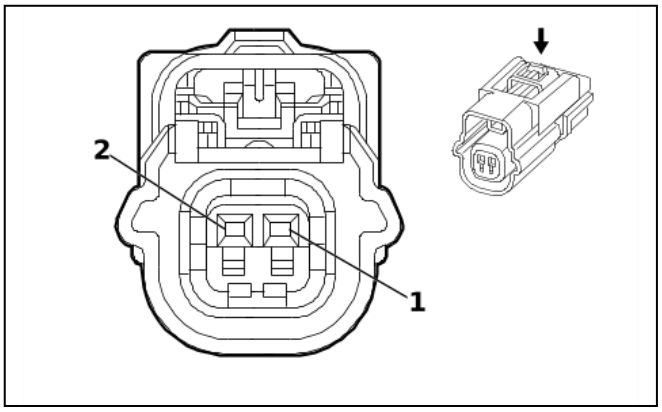
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

B61P Seat Belt Tension Sensor - Passenger

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) GY / OG	(1) 3946	(1) Passenger Automatic Locking Retractor Switch Low Reference	(1) I	(1) —
(2) 2	(2) 0.35	(2) OG / BN	(2) 3947	(2) Passenger Automatic Locking Retractor Switch Signal	(2) I	(2) —

B62P Airbag Front Seat Position Sensor - Passenger



1664592

Connector Part Information
- Harness Type: Front Seat Wiring Harness - Passenger
- OEM Connector: 54390239
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 0.64 Kaizen Series, Sealed(BK)

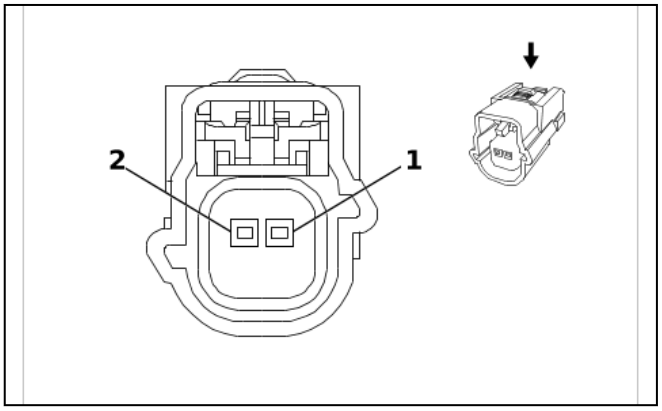
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

B62P Airbag Front Seat Position Sensor - Passenger

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BK / OG	(1) 1363	(1) Driver Seat Belt Switch Low Reference	(1) I	(1) —
(2) 2	(2) 0.5	(2) OG / BU	(2) 5056	(2) Passenger Seat Adjuster Switch Signal	(2) I	(2) —

B63LF Airbag Side Impact Sensor - Left Front Door



2179777

Connector Part Information
- Harness Type: Front Side Door Door Wiring Harness - Driver
- OEM Connector: 13610095
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 0.64 Series, Sealed(GY)

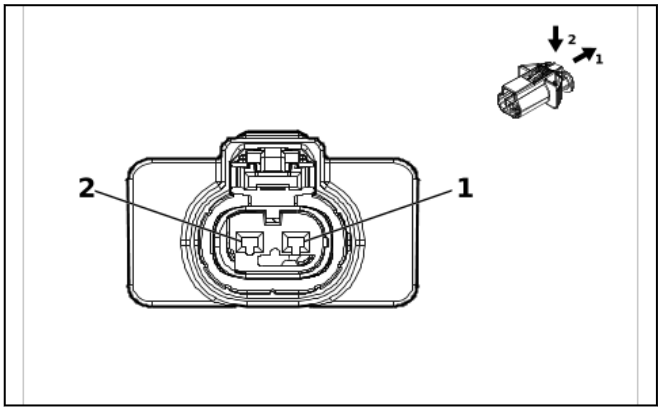
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

B63LF Airbag Side Impact Sensor - Left Front Door

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) OG / GN	(1) 2132	(1) Left Front Side Impact Sensor Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / OG	(2) 6628	(2) Left Front Side Impact Sensor Low Reference	(2) I	(2) —

B63LR Airbag Side Impact Rear Sensor - Left Door - 4 - Door



5877154

Connector Part Information

- Harness Type: Rear Side Door Door Wiring Harness - Left
- OEM Connector: 35747314
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MLK Series, Sealed(BK)

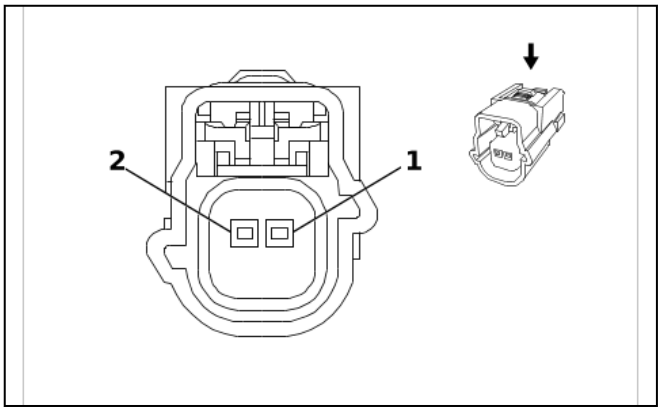
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

B63LR Airbag Side Impact Rear Sensor - Left Door - 4 - Door

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) OG / BU	(1) 6622	(1) Left Rear Side Impact Sensor Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / OG	(2) 6623	(2) Left Rear Side Impact Sensor Low Reference	(2) I	(2) —

B63RF Airbag Side Impact Sensor - Right Front Door



2179777

Connector Part Information
- Harness Type: Front Side Door Door Wiring Harness - Passenger
- OEM Connector: 13610095
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 0.64 Series, Sealed(GY)

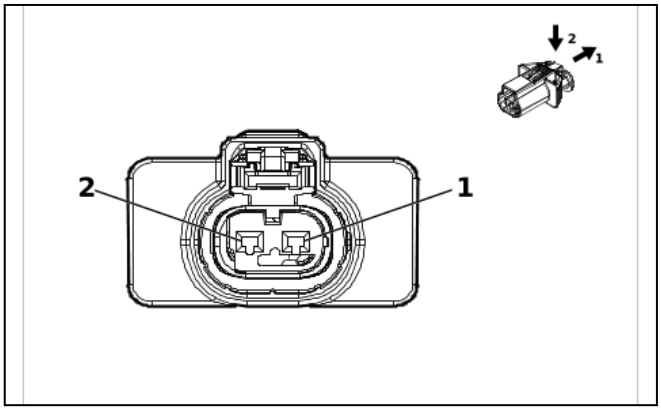
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

B63RF Airbag Side Impact Sensor - Right Front Door

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BN / OG	(1) 2134	(1) Right Front Side Impact Sensor Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / OG	(2) 6629	(2) Right Front Side Impact Sensor Low Reference	(2) I	(2) —

B63RR Airbag Side Impact Rear Sensor - Right Door - 4 - Door



5877154

Connector Part Information
- Harness Type: Rear Side Door Door Wiring Harness - Right
- OEM Connector: 35747314
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MLK Series, Sealed(BK)

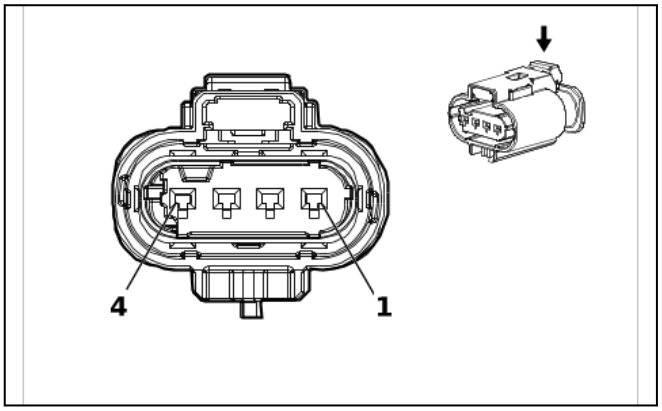
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

B63RR Airbag Side Impact Rear Sensor - Right Door - 4 - Door

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) OG / WH	(1) 6626	(1) Right Rear Side Impact Sensor Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / OG	(2) 6627	(2) Right Rear Side Impact Sensor Low Reference	(2) I	(2) —

B65 Manifold Absolute Pressure and Intake Air Temperature Sensor (L4B)



5402120

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 10531905
- Service Connector: 85877329
- Description: 4-Way F 1.2 Multilock Series, Sealed(BK)

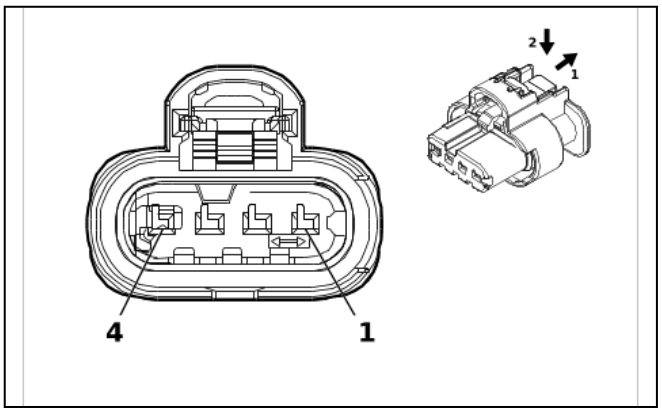
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B65 Manifold Absolute Pressure and Intake Air Temperature Sensor (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) WH / BU	(1) 7329	(1) Pre-Throttle Air Temperature Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) GY / RD	(2) 2704	(2) Manifold Absolute Pressure Sensor 5V Reference	(2) I	(2) —
(3) 3	(3) 0.5	(3) BK / GN	(3) 469	(3) Manifold Absolute Pressure Sensor Low Reference	(3) I	(3) —
(4) 4	(4) 0.5	(4) GN / WH	(4) 432	(4) Manifold Absolute Pressure Sensor Signal	(4) I	(4) —

B65 Manifold Absolute Pressure and Intake Air Temperature Sensor (LZ0)



4934614

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 1-2296696-2
- Service Connector: 85519071
- Description: 4-Way F 1.2 MCON-CB Series, Sealed(BK)

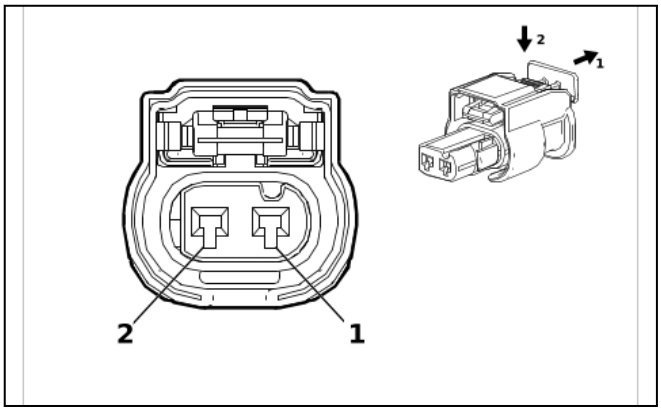
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B65 Manifold Absolute Pressure and Intake Air Temperature Sensor (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) WH / BU	(1) 7329	(1) Pre-Throttle Air Temperature Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) WH / RD	(2) 480	(2) Engine Control Vehicle Sensors 5 Volt Reference 1	(2) I	(2) —
(3) 3	(3) 0.5	(3) BK / GN	(3) 580	(3) Engine Control Sensors Low Reference 2	(3) I	(3) —
(4) 4	(4) 0.5	(4) GN / WH	(4) 432	(4) Manifold Absolute Pressure Sensor Signal	(4) I	(4) —

B68A Knock Sensor 1 (L4B)



3960139

Connector Part Information
- Harness Type: Fuel Injector Wiring Harness
- OEM Connector: 34900-2120
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

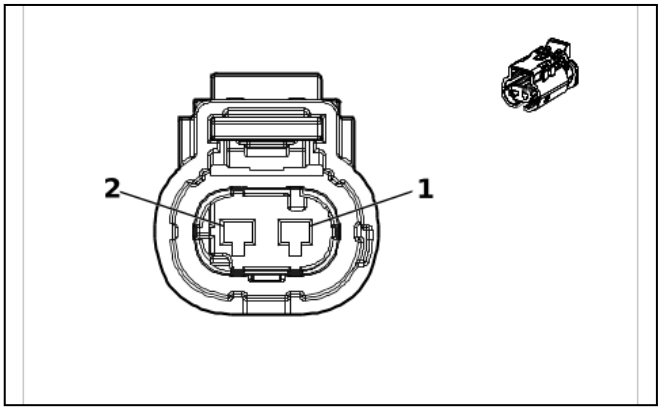
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

B68A Knock Sensor 1 (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) VT / GY	(1) 496	(1) Knock Sensor 1 Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / YE	(2) 1716	(2) Knock Sensor Low Reference 1	(2) I	(2) —

B68A Knock Sensor 1 (L76 / L78)



6776339

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 10530497
- Service Connector: 86308598
- Description: 2-Way F 1.2 MLK Series, Sealed(BK)

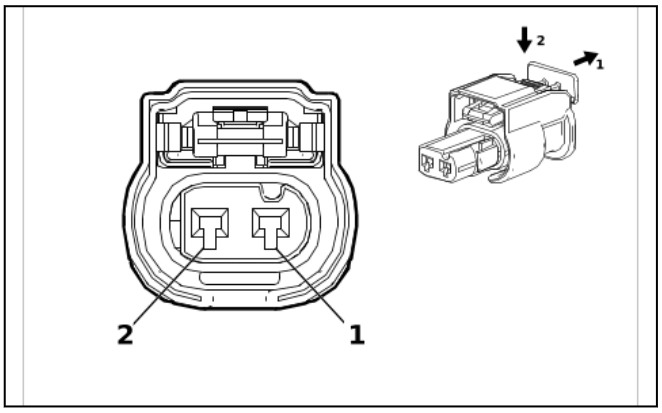
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B68A Knock Sensor 1 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) VT / GY	(1) 496	(1) Knock Sensor 1 Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / YE	(2) 1716	(2) Knock Sensor Low Reference 1	(2) I	(2) —

B68B Knock Sensor 2 (L4B)



3960139

Connector Part Information

- Harness Type: Fuel Injector Wiring Harness
- OEM Connector: 34900-2120
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

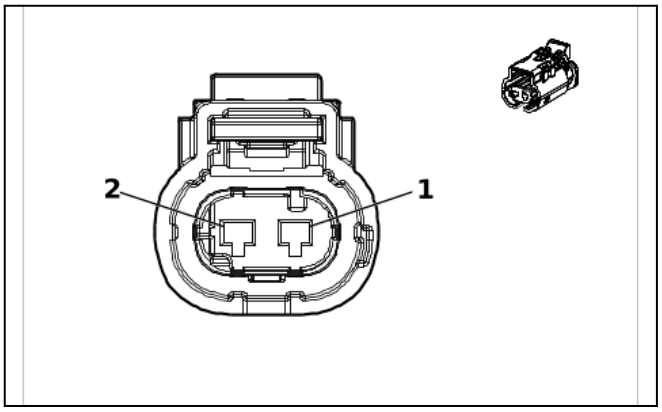
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

B68B Knock Sensor 2 (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) WH / GY	(1) 1876	(1) Knock Sensor 2 Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / GY	(2) 2303	(2) Knock Sensor Low Reference 2	(2) I	(2) —

B68B Knock Sensor 2 (L76 / L78)



6776339

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 10530497
- Service Connector: 86308598
- Description: 2-Way F 1.2 MLK Series, Sealed(BK)

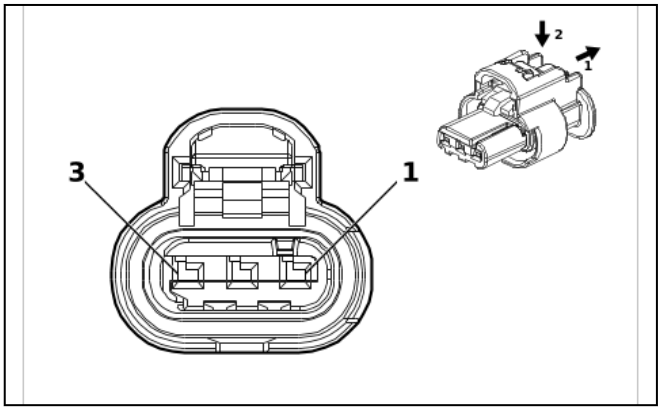
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B68B Knock Sensor 2 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) WH / GY	(1) 1876	(1) Knock Sensor 2 Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / GY	(2) 2303	(2) Knock Sensor Low Reference 2	(2) I	(2) —

B74 Manifold Absolute Pressure Sensor (L76 / L78)



4581126

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 1-2296695-1
- Service Connector: 86792094
- Description: 3-Way F 1.2 MCON-CB Series, Sealed(BK)

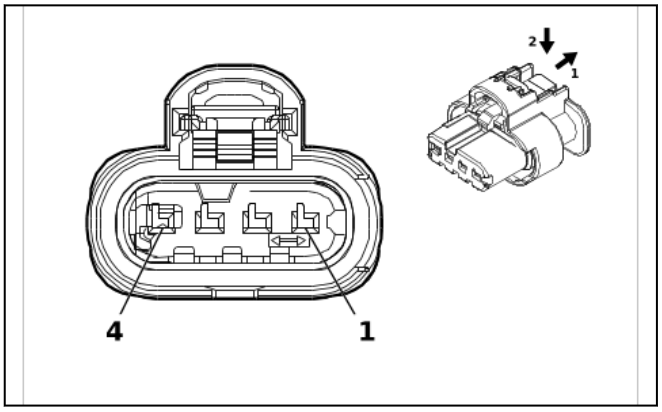
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B74 Manifold Absolute Pressure Sensor (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GN / WH	(1) 432	(1) Manifold Absolute Pressure Sensor Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / GN	(2) 469	(2) Manifold Absolute Pressure Sensor Low Reference	(2) I	(2) —
(3) 3	(3) 0.5	(3) GY / RD	(3) 2704	(3) Manifold Absolute Pressure Sensor 5V Reference	(3) I	(3) —

B75 Mass Airflow Sensor



4934614

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 1-2296696-2
- Service Connector: 85519071
- Description: 4-Way F 1.2 MCON-CB Series, Sealed(BK)

Terminal Part Information

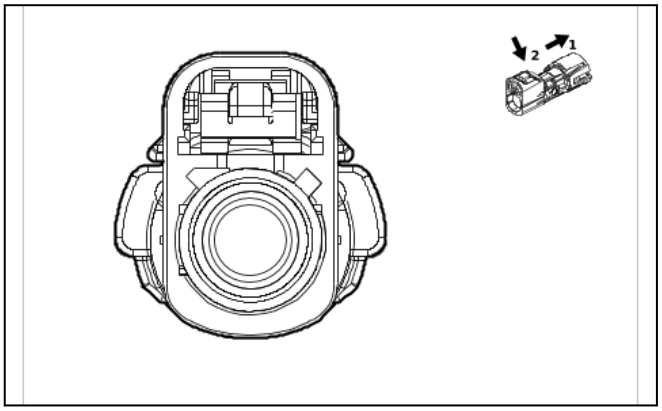
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B75 Mass Airflow Sensor

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) VT / BU	(1) 5294	(1) Powertrain Main Relay Fused Supply Voltage 5	(1) I	(1) —
(2) 2	(2) 0.5 (2) 0.5	(2) BU (2) GN / WH	(2) 492 (2) 492	(2) Mass Air Flow Sensor Signal (2) Mass Air Flow Sensor Signal	(2) I (2) I	(2) L4B / L76 / L78 (2) LZ0

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(3) 3	(3) 0.5 (3) 0.5	(3) GN / WH (3) GN / WH	(3) 10807 (3) 4622	(3) Engine Control Module LIN Bus 2 (3) Engine Control Module LIN Bus 2	(3) I (3) I	(3) L4B (3) L76 / L78 / LZ0
(4) 4	(4) 0.5 (4) 1	(4) BK / WH (4) BK / WH	(4) 6151 (4) 6151	(4) Engine Control Module Ground (4) Engine Control Module Ground	(4) I (4) I	(4) L4B / L76 / L78 (4) LZ0

B87 Rearview Driver Information Camera (QK1)



5758030

Connector Part Information

- Harness Type: Endgate Wiring Harness
- OEM Connector: 35187032
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way F Coax Type(BK)

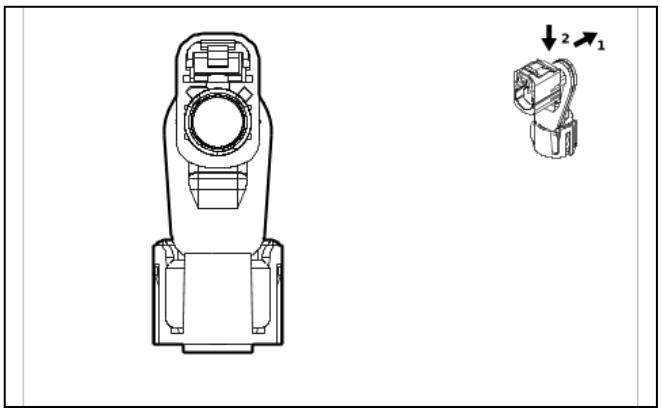
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

B87 Rearview Driver Information Camera (QK1)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
BK	—	Coax Cable	4721	Rearview Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	I	—

B87 Rearview Driver Information Camera (QK2)



5920539

Connector Part Information
- Harness Type: Endgate Wiring Harness
- OEM Connector: 35339728
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way F Coax Type(BK)

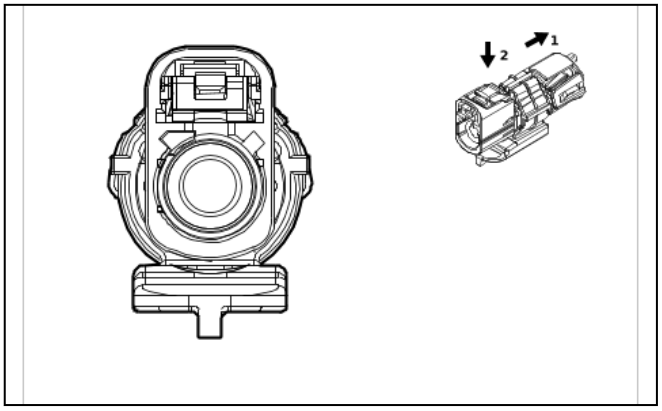
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

B87 Rearview Driver Information Camera (QK2)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
BK	—	Coax Cable	4721	Rearview Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	I	—

B87CA Auxiliary Rearview Camera - Cargo Area (UVN)



5519150

Connector Part Information
- Harness Type: Roof Rear Spoiler Wiring Harness
- OEM Connector: 35187047
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way F Coax Type, Sealed(BK)

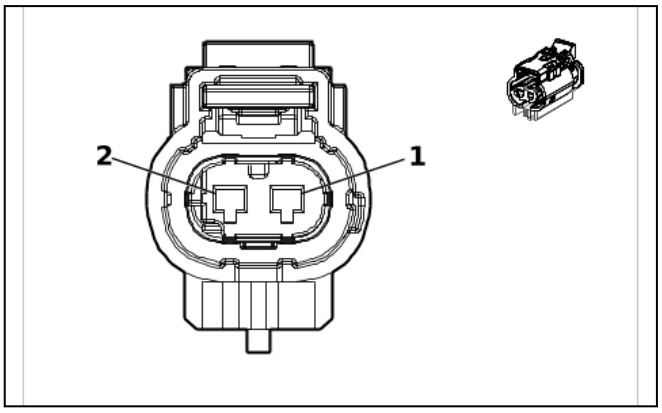
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

B87CA Auxiliary Rearview Camera - Cargo Area (UVN)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
BK	—	Coax Cable	2548	Cargo Bed Rear Vision Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	I	—

B96 Cylinder Head Temperature Sensor (LZ0)



6776342

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 10530493
- Service Connector: 86308597
- Description: 2-Way F 1.2 MLK Series, Sealed(GY)

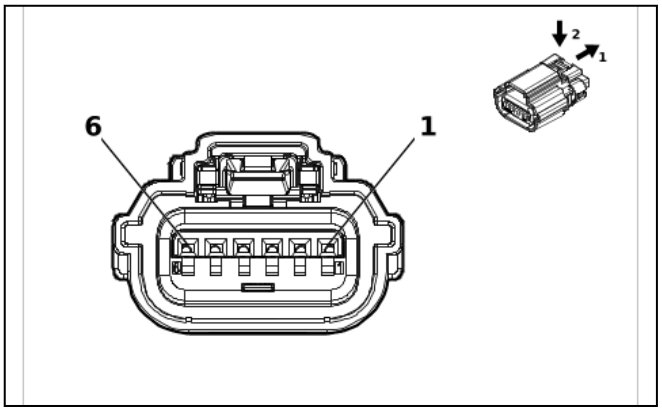
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B96 Cylinder Head Temperature Sensor (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GN / YE	(1) 37	(1) Engine Block Temperature Sensor Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / GN	(2) 580	(2) Engine Control Sensors Low Reference 2	(2) I	(2) —

B107 Accelerator Pedal Position Sensor



5921819

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 35390637
- Service Connector: 86825466
- Description: 6-Way F 0.64 OCS Series, Sealed(BK)

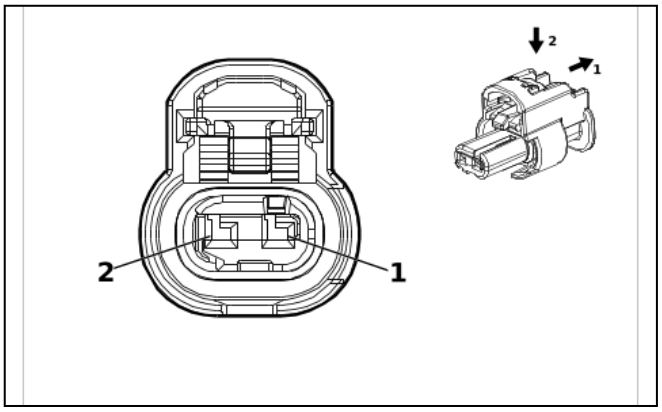
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

B107 Accelerator Pedal Position Sensor

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) WH / RD	(1) 1164	(1) Accelerator Pedal Position 5V Reference 1	(1) I	(1) —
(2) 2	(2) 0.35	(2) YE / WH	(2) 1161	(2) Accelerator Pedal Position Signal 1	(2) I	(2) —
(3) 3	(3) 0.35	(3) BK / BU	(3) 1271	(3) Accelerator Pedal Position Low Reference 1	(3) I	(3) —
(4) 4	(4) 0.35	(4) BK / VT	(4) 1272	(4) Accelerator Pedal Position Low Reference 2	(4) I	(4) —
(5) 5	(5) 0.35	(5) GN / WH	(5) 1162	(5) Accelerator Pedal Position Signal 2	(5) I	(5) —
(6) 6	(6) 0.35	(6) BN / RD	(6) 1274	(6) Accelerator Pedal Position 5V Reference 2	(6) I	(6) —

B110 Battery Monitor Module X1



4649903

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 1-2296694-1
- Service Connector: 85761014
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

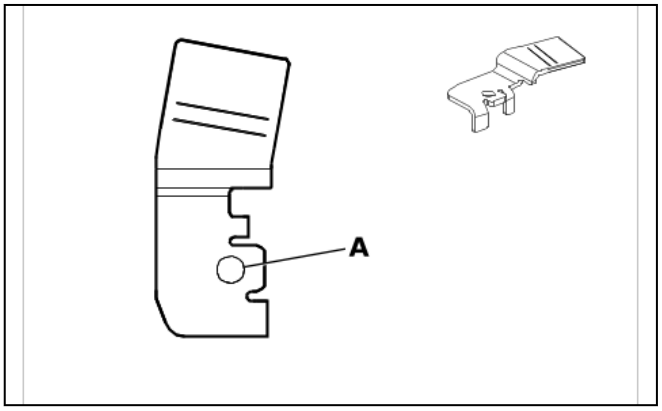
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

B110 Battery Monitor Module X1

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) GN / YE	(1) 2855	(1) Body Control Module LIN Bus 9	(1) I	(1) —
(2) 2	(2) 0.75	(2) RD / YE	(2) 2340	(2) Battery Positive Voltage	(2) I	(2) —

B110 Battery Monitor Module X2



7151685

Connector Part Information
- Harness Type: Battery Negative Cable
- OEM Connector: 85815088
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way Ring Terminal

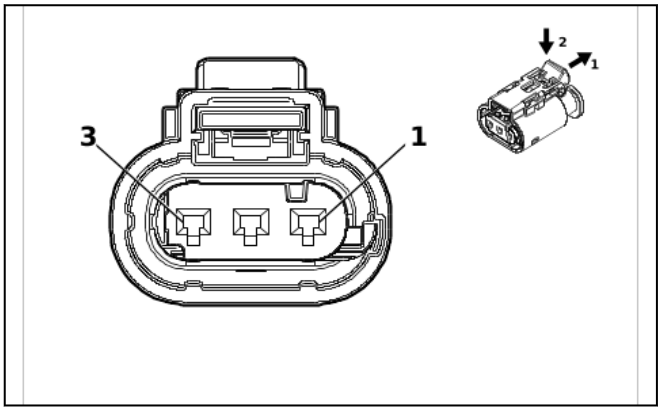
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

B110 Battery Monitor Module X2

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	50	BK	550	Ground	I	- (L76/ L78)
	35	BK	550	Ground	I	L76/ L78
	35	BK	550	Ground	I	LZ0

B111 Turbocharger/Supercharger Boost Pressure Sensor (L4B)



6851172

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 10531901
- Service Connector: 86419006
- Description: 3-Way F 1.2 MLK Series, Sealed(BK)

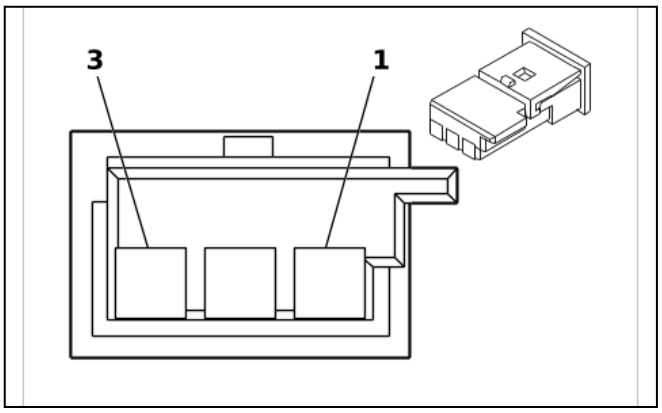
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B111 Turbocharger/Supercharger Boost Pressure Sensor (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GY / RD	(1) 10667	(1) Engine Control Sensors 5 Volt Reference	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / GN	(2) 580	(2) Engine Control Sensors Low Reference 2	(2) I	(2) —
(3) 3	(3) 0.5	(3) YE / WH	(3) 3200	(3) Throttle Inlet Absolute Pressure Sensor Signal	(3) I	(3) —

B117A Windshield Outside Moisture/Ambient Light and Humidity Sensor (ASV)



647970

Connector Part Information

- Harness Type: Headlamp Automatic Control Ambient Light Sensor Wiring Harness
- OEM Connector: 1-1718346-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 3-Way F 0.64 Micro-Quadlock Series(BK)

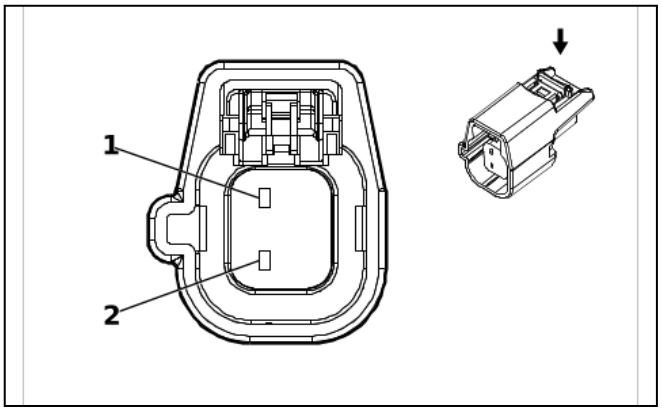
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

B117A Windshield Outside Moisture/Ambient Light and Humidity Sensor (ASV)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) RD / VT	(1) 1940	(1) Battery Positive Voltage	(1) I	(1) —
(2) 2	(2) 0.35	(2) GN / BN	(2) 4115	(2) Body Control Module LIN Bus 5	(2) I	(2) —
(3) 3	(3) 0.35	(3) BK	(3) 850	(3) Ground	(3) I	(3) —

B118 Windshield Washer Solvent Container Level Sensor



3958652

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 7287-8378-40
- Service Connector: 13593220
- Description: 2-Way F 1.5 Series, Sealed(L-GY)

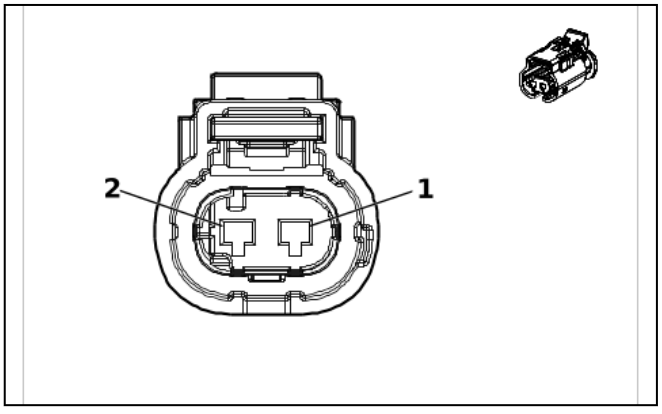
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-14 (GN)	No Tool Required

B118 Windshield Washer Solvent Container Level Sensor

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) VT	(1) 185	(1) Low Washer Fluid Indicator Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / WH	(2) 151	(2) Signal Ground	(2) I	(2) —

B130C Exhaust Gas Recirculation Temperature Sensor 3 (LZ0)



6860491

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 10530499
- Service Connector: 86308599
- Description: 2-Way F 1.2 MLK Series, Sealed(GY)

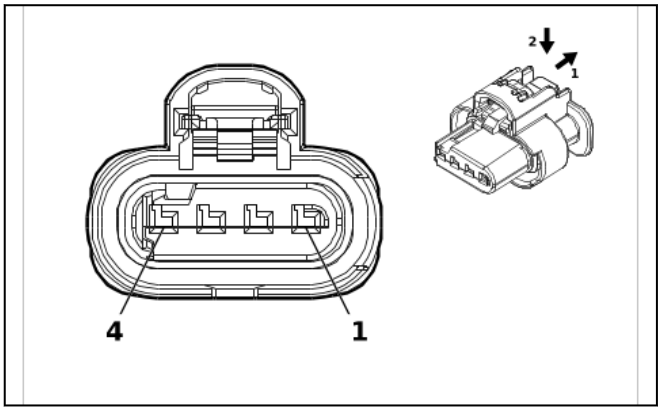
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B130C Exhaust Gas Recirculation Temperature Sensor 3 (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BK / GN	(1) 3235	(1) Exhaust Gas Recirculation Temperature Sensor 3 Low Reference	(1) I	(1) —
(2) 2	(2) 0.5	(2) WH / GY	(2) 3234	(2) Exhaust Gas Recirculation Temperature Sensor 3 Signal	(2) I	(2) —

B136 Exhaust Particulate Matter Sensor (LZ0)



4210809

Connector Part Information

- Harness Type: Chassis Wiring Harness
- OEM Connector: 1-2296696-1
- Service Connector: 85518225
- Description: 4-Way F 1.2 MCON-CB Series, Sealed(BK)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B136 Exhaust Particulate Matter Sensor (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1	(1) BK / WH	(1) 6751	(1) Exhaust Treatment Ground	(1) I	(1) —
(2) 2	(2) 0.5	(2) BU / GY	(2) 4054	(2) Private Serial Data Powertrain CAN Bus [-] Serial Data	(2) I	(2) —
(3) 3	(3) 0.5	(3) WH	(3) 4055	(3) Private Serial Data Powertrain CAN Bus [+] Serial Data	(3) I	(3) —
(4) 4	(4) 1	(4) VT / GN	(4) 4320	(4) Powertrain Sensor Bus Enable	(4) I	(4) —

B137B Power Steering Shaft Torque/Position Sensor

—

Connector Part Information
- Harness Type: Power Steering Control Module Wiring Harness - Sensor
- OEM Connector: Not Available
- Service Connector: Service by Harness - See Part Catalog
- Description: 10-Way F (BN)

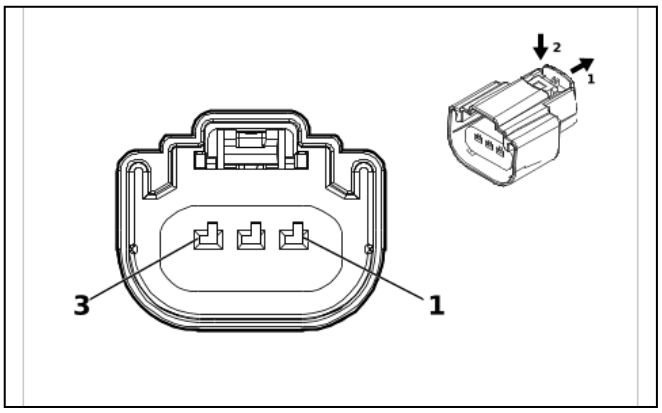
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

B137B Power Steering Shaft Torque/Position Sensor

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) WH / RD	(1) 8371	(1) Handwheel Channel B High Reference	(1) I	(1) —
(2) 2	(2) 0.5	(2) WH / BU	(2) 8372	(2) Handwheel Channel B Torque Pressure Sensor 1 SENT Signal	(2) I	(2) —
(3) 3	(3) 0.5	(3) GY	(3) 8375	(3) Handwheel Channel B Low Reference	(3) I	(3) —
(4) 4	(4) 0.5	(4) VT	(4) 8368	(4) Handwheel Channel A Torque Pressure Sensor 2 SENT Signal	(4) I	(4) —
(5) 5	(5) 0.5	(5) RD	(5) 8366	(5) Handwheel Channel A High Reference	(5) I	(5) —
(6) 6	(6) 0.5	(6) GN	(6) 8373	(6) Handwheel Channel B Torque Pressure Sensor 2 SENT Signal	(6) I	(6) —
(7) 7	(7) 0.5	(7) YE	(7) 8374	(7) Handwheel Channel B Angle Position Sensor SENT Signal	(7) I	(7) —
(8) 8	(8) 0.5	(8) BK	(8) 8370	(8) Handwheel Channel A Low Reference	(8) I	(8) —
(9) 9	(9) 0.5	(9) OG	(9) 8369	(9) Handwheel Channel A Angle Position Sensor SENT Signal	(9) I	(9) —
(10) 10	(10) 0.5	(10) BU	(10) 8367	(10) Handwheel Channel A Torque Pressure Sensor 1 SENT Signal	(10) I	(10) —

B139 Transfer Case Two/Four Wheel Drive Actuator Position Sensor (F48)



4569745

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 160073-3105
- Service Connector: 19179750
- Description: 3-Way F 1.5 MX Series, Sealed(BK)

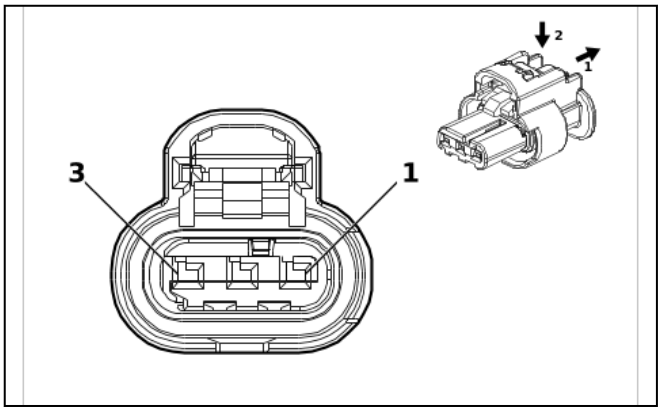
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required

B139 Transfer Case Two/Four Wheel Drive Actuator Position Sensor (F48)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) WH / RD	(1) 7477	(1) Gear Position Sensor 5V Reference	(1) I	(1) —
(2) 2	(2) 0.5	(2) WH / GN	(2) 7479	(2) Rotary Position Sensor Signal	(2) I	(2) —
(3) 3	(3) 0.5	(3) YE / BK	(3) 7478	(3) Gear Position Sensor Low Reference	(3) I	(3) —

B150 Fuel Tank Pressure Sensor (FJW)



4778903

Connector Part Information

- Harness Type: Chassis Wiring Harness
- OEM Connector: 1-2296695-2
- Service Connector: 86792095
- Description: 3-Way F 1.2 MCON-CB Series, Sealed(BK)

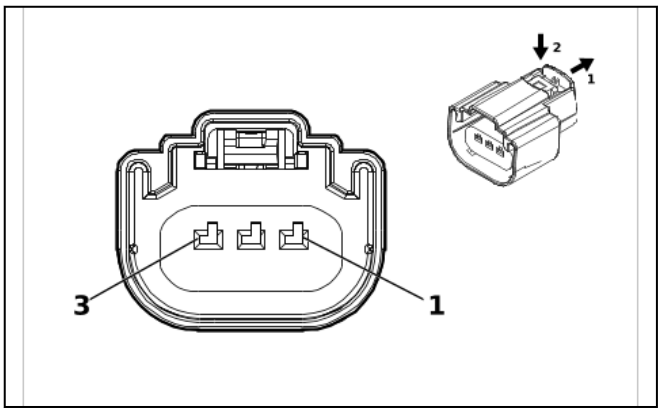
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

B150 Fuel Tank Pressure Sensor (FJW)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BU / WH	(1) 890	(1) Fuel Tank Pressure Sensor Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / BN	(2) 6284	(2) Fuel Tank Pressure Sensor Low Reference	(2) I	(2) —
(3) 3	(3) 0.5	(3) YE / RD	(3) 2709	(3) Fuel Tank Pressure Sensor 5V Reference	(3) I	(3) —

B152LF Front Suspension Automatic Forward Lighting Position Sensor - Left (Z45)



4569745

Connector Part Information

- Harness Type: Chassis Wiring Harness
- OEM Connector: 33343869
- Service Connector: 19179750
- Description: 3-Way F 1.5 MX Series, Sealed(BK)

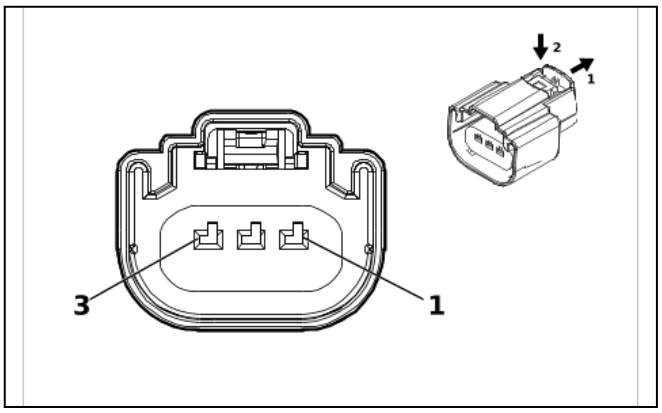
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-14 (GN)	No Tool Required

B152LF Front Suspension Automatic Forward Lighting Position Sensor - Left (Z45)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BU / RD	(1) 1205	(1) Left Front Suspension Position Sensor Voltage Reference	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / BU	(2) 1206	(2) Left Front Suspension Position Sensor Low Reference	(2) I	(2) —
(3) 3	(3) 0.5	(3) BN / WH	(3) 1207	(3) Left Front Suspension Position Sensor Signal	(3) I	(3) —

B152R Rear Suspension Automatic Forward Lighting Leveling Position Sensor (Z45)



4569745

Connector Part Information

- Harness Type: Chassis Wiring Harness
- OEM Connector: 160073-3105
- Service Connector: 19179750
- Description: 3-Way F 1.5 MX Series, Sealed(BK)

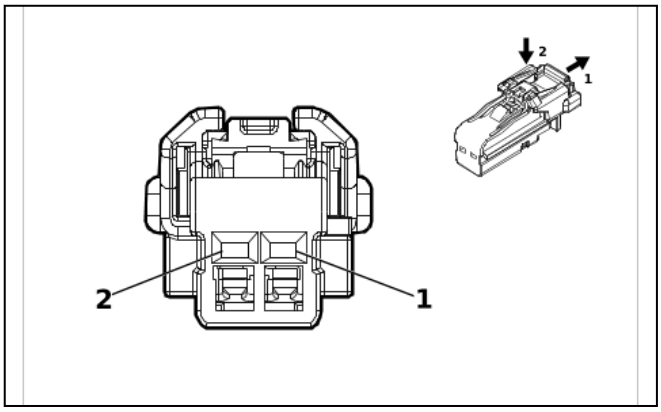
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-14 (GN)	No Tool Required

B152R Rear Suspension Automatic Forward Lighting Leveling Position Sensor (Z45)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) YE / RD	(1) 1208	(1) Left Rear Suspension Position Sensor Voltage Reference	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / GN	(2) 1209	(2) Left Rear Suspension Position Sensor Low Reference	(2) I	(2) —
(3) 3	(3) 0.5	(3) GN / WH	(3) 1210	(3) Left Rear Suspension Position Sensor Signal	(3) I	(3) —

B153D Front Seat Belt Buckle - Driver



4115691

Connector Part Information
- Harness Type: Front Seat Wiring Harness - Driver
- OEM Connector: 6098-8988
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series(BK)

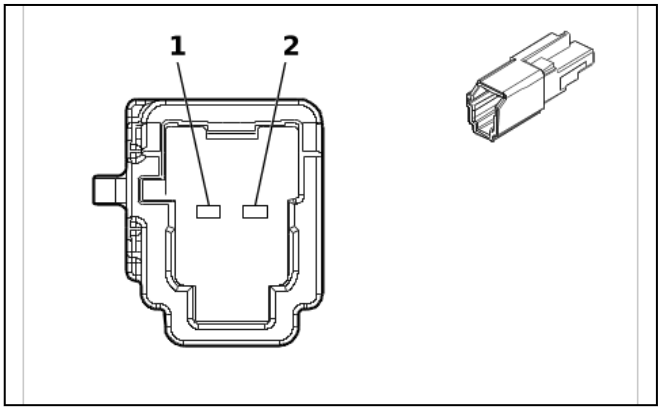
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B153D Front Seat Belt Buckle - Driver

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BK / OG	(1) 1363	(1) Driver Seat Belt Switch Low Reference	(1) I	(1) —
(2) 2	(2) 0.5	(2) OG / GY	(2) 2652	(2) Driver Seat Belt Sensor Signal	(2) I	(2) —

B153LR Rear Seat Belt Buckle - Left - 4 - Door



6529124

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 6099-0610
- Service Connector: 85725003
- Description: 2-Way M 1.2 MBS Series(BK)

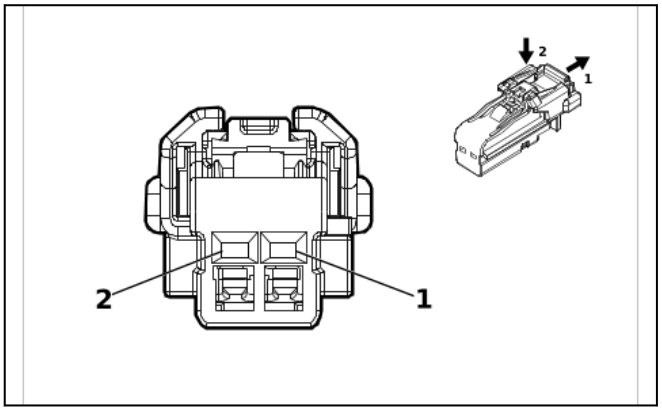
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-17 (L-GN)	No Tool Required

B153LR Rear Seat Belt Buckle - Left - 4 - Door

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BK / OG	(1) 1363	(1) Driver Seat Belt Switch Low Reference	(1) I	(1) —
(2) 2	(2) 0.5	(2) YE / OG	(2) 5161	(2) Left Rear Seat Belt Switch Signal	(2) I	(2) —

B153P Front Seat Belt Buckle - Passenger



4115691

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Passenger
- OEM Connector: 6098-8988
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series(BK)

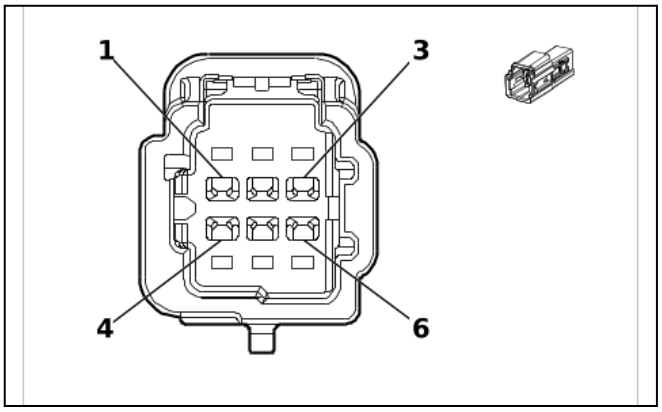
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B153P Front Seat Belt Buckle - Passenger

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BK / OG	(1) 1363	(1) Driver Seat Belt Switch Low Reference	(1) I	(1) —
(2) 2	(2) 0.5	(2) OG / WH	(2) 2653	(2) Passenger Seat Belt Sensor Signal	(2) I	(2) —

B153RR Rear Seat Belt Buckle - Right - 4 - Door



5714613

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 6098-9120
- Service Connector: 86825467
- Description: 6-Way M 1.2 MBS Series(BK)

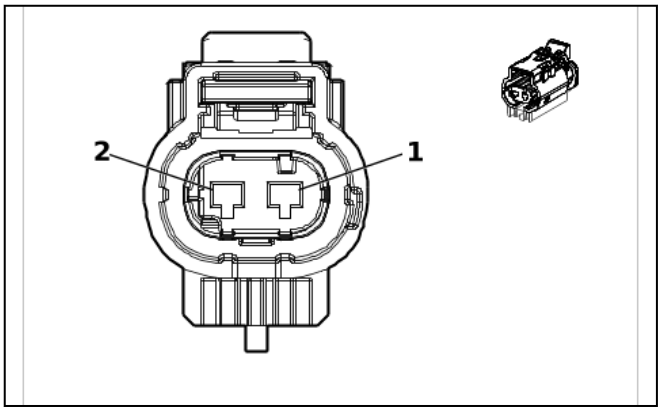
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-17 (L-GN)	No Tool Required

B153RR Rear Seat Belt Buckle - Right - 4 - Door

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	—	—	—	Not Occupied	—	—
(2) 2	(2) 0.5	(2) BU / OG	(2) 5163	(2) Rear Center Seat Belt Switch Signal	(2) I	(2) —
(3) 3	(3) 0.5	(3) BK / OG	(3) 1363	(3) Driver Seat Belt Switch Low Reference	(3) I	(3) —
4	—	—	—	Not Occupied	—	—
(5) 5	(5) 0.5	(5) BN / OG	(5) 5162	(5) Right Rear Seat Belt Switch Signal	(5) I	(5) —
(6) 6	(6) 0.5	(6) BK / OG	(6) 1363	(6) Driver Seat Belt Switch Low Reference	(6) I	(6) —

B172LF Front Disc Brake Pad Wear Sensor - Left



6819415

Connector Part Information
- Harness Type: Front Disc Brake Pad Wear Sensor Harness
- OEM Connector: 13551877
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MLK Series, Sealed(BK)

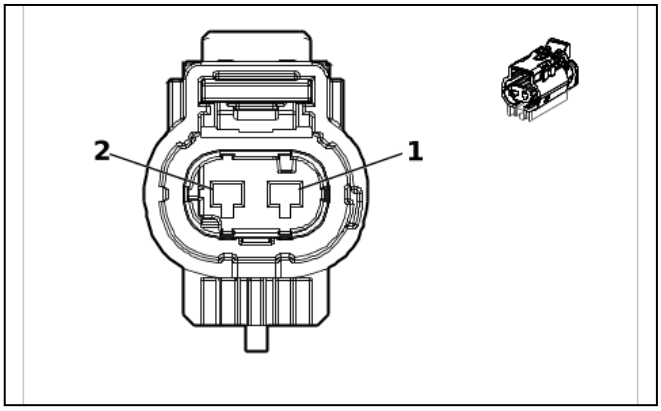
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

B172LF Front Disc Brake Pad Wear Sensor - Left

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BN / BU	(1) 1602	(1) Front Brake Pad Wear Sensor Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / WH	(2) 1151	(2) Signal Ground	(2) I	(2) —

B172LR Rear Disc Brake Pad Wear Sensor - Left



6819415

Connector Part Information
- Harness Type: Chassis Rear Wiring Harness Extension Harness
- OEM Connector: 13551877
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MLK Series, Sealed(BK)

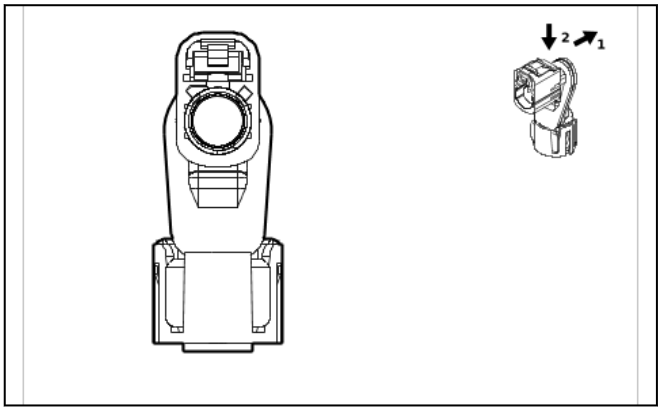
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B172LR Rear Disc Brake Pad Wear Sensor - Left

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) GN / YE	(1) 1616	(1) Rear Brake Pad Wear Sensor Signal	(1) I	(1) —
(2) 2	(2) 0.75	(2) BK / WH	(2) 1751	(2) Signal Ground	(2) I	(2) —

B174G Front View Driver Information Camera - Grille (UV2)



5920539

Connector Part Information

- Harness Type: Front View Camera Wiring Harness
- OEM Connector: 35339728
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way F Coax Type(BK)

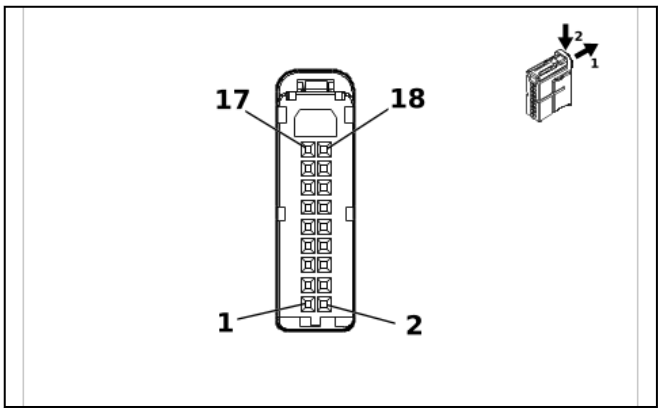
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

B174G Front View Driver Information Camera - Grille (UV2)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
BK	—	Coax Cable	4722	Frontview Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	I	—

B174W Front View Camera - Windshield (UJE / UKM)



6177962

Connector Part Information

- Harness Type: Dome Lamp Wiring Harness
- OEM Connector: 2312118-1
- Service Connector: 13543041
- Description: 18-Way F 0.5 GEN 50 Series(BK)

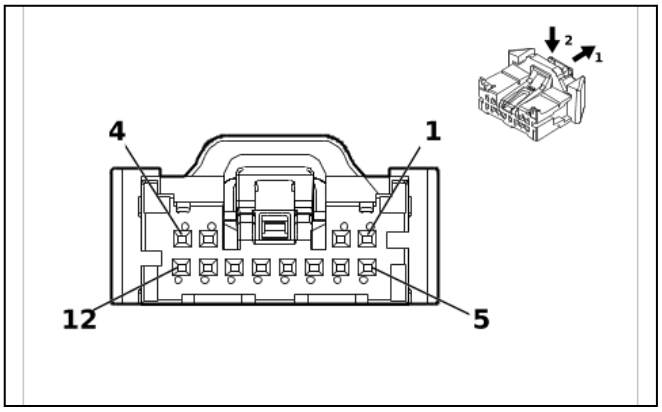
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19370262	EL-35616-58 (BK)	EL-38125-58
II	Service by Cable	EL-35616-58 (BK)	EL-38125-58

B174W Front View Camera - Windshield (UJE / UKM)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) GN	(1) 7209	(1) Ethernet Bus 3 [+]	(1) II	(1) —
2	—	—	—	Not Occupied	—	—
(3) 3	(3) 0.35	(3) BU	(3) 7208	(3) Ethernet Bus 3 [-]	(3) II	(3) —
4 - 6	—	—	—	Not Occupied	—	—
(7) 7	(7) 0.35	(7) BU / YE	(7) 4979	(7) AUTOSAR CAN Bus [+] 2 Serial Data	(7) I	(7) —
(8) 8	(8) 0.35	(8) BU / YE	(8) 4979	(8) AUTOSAR CAN Bus [+] 2 Serial Data	(8) I	(8) —
(9) 9	(9) 0.35	(9) WH	(9) 4978	(9) AUTOSAR CAN Bus [-] 2 Serial Data	(9) I	(9) —
(10) 10	(10) 0.35	(10) WH	(10) 4978	(10) AUTOSAR CAN Bus [-] 2 Serial Data	(10) I	(10) —
(11) 11	(11) 0.35	(11) BK / WH	(11) 851	(11) Signal Ground	(11) I	(11) —
12	—	—	—	Not Occupied	—	—
(13) 13	(13) 0.35	(13) BU / GY	(13) 4105	(13) AUTOSAR CAN Bus [+] 8 Serial Data	(13) I	(13) —
14	—	—	—	Not Occupied	—	—
(15) 15	(15) 0.35	(15) WH / GY	(15) 4104	(15) AUTOSAR CAN Bus [-] 8 Serial Data	(15) I	(15) —
16 - 17	—	—	—	Not Occupied	—	—
(18) 18	(18) 0.35	(18) RD / VT	(18) 1640	(18) Battery Positive Voltage	(18) I	(18) —

B174W Front View Camera - Windshield (UK0 / UKL)



5360826

Connector Part Information

- Harness Type: Dome Lamp Wiring Harness
- OEM Connector: 35068239
- Service Connector: 13529935
- Description: 12-Way F 050 CTS Series(BK)

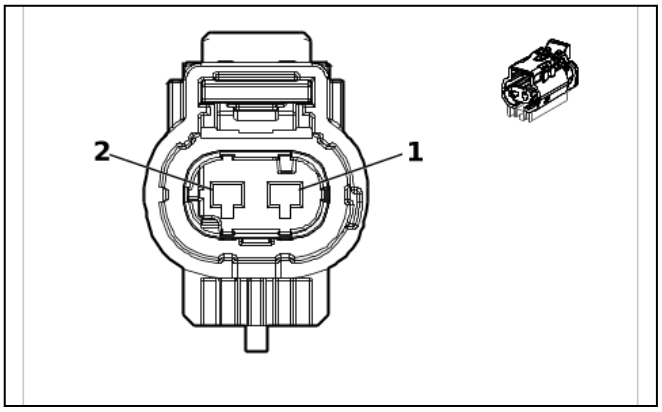
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	84944580	EL-35616-58 (BK)	EL-38125-58

B174W Front View Camera - Windshield (UK0 / UKL)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) BK / WH	(1) 851	(1) Signal Ground	(1) I	(1) —
2	—	—	—	Not Occupied	—	—
(3) 3	(3) 0.35	(3) RD / YE	(3) 240	(3) Battery Positive Voltage	(3) I	(3) —
4	—	—	—	Not Occupied	—	—
(5) 5	(5) 0.35	(5) BU / GY	(5) 4105	(5) AUTOSAR CAN Bus [+] 8 Serial Data	(5) I	(5) —
(6) 6	(6) 0.35	(6) WH / GY	(6) 4104	(6) AUTOSAR CAN Bus [-] 8 Serial Data	(6) I	(6) —
(7) 7	(7) 0.35	(7) BU / GY	(7) 4105	(7) AUTOSAR CAN Bus [+] 8 Serial Data	(7) I	(7) —
(8) 8	(8) 0.35	(8) WH / GY	(8) 4104	(8) AUTOSAR CAN Bus [-] 8 Serial Data	(8) I	(8) —
9 - 12	—	—	—	Not Occupied	—	—

B193A Charge Air Cooler Air Temperature Sensor - Inlet (LZ0)



6819415

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 10530492
- Service Connector: 86308596
- Description: 2-Way F 1.2 MLK Series, Sealed(BK)

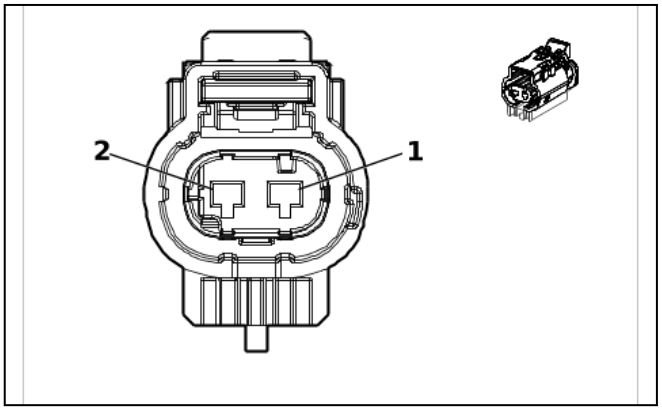
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B193A Charge Air Cooler Air Temperature Sensor - Inlet (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GN	(1) 3683	(1) Charge Air Cooler Inlet Temperature Sensor Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) YE / BK	(2) 3682	(2) Charge Air Cooler Inlet Temperature Sensor Low Reference	(2) I	(2) —

B193B Charge Air Cooler Air Temperature Sensor - Outlet (LZ0)



6819415

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 10530492
- Service Connector: 86308596
- Description: 2-Way F 1.2 MLK Series, Sealed(BK)

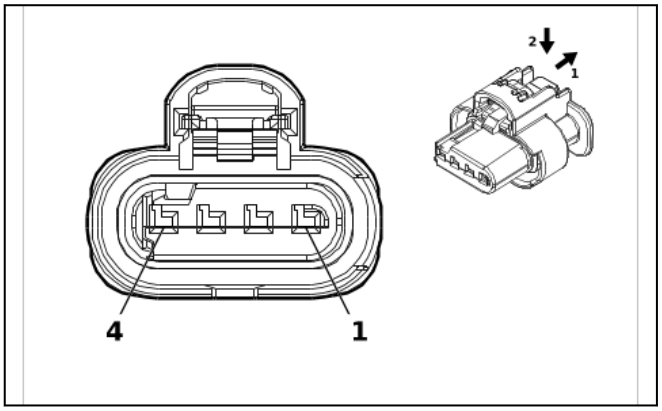
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B193B Charge Air Cooler Air Temperature Sensor - Outlet (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BN	(1) 3681	(1) Charge Air Cooler Outlet Temperature Sensor Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) YE / BU	(2) 3680	(2) Charge Air Cooler Outlet Temperature Sensor Low Reference	(2) I	(2) —

B195A Nitrogen Oxides Sensor 1 (LZ0)



4210809

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 1-2296696-1
- Service Connector: 85518225
- Description: 4-Way F 1.2 MCON-CB Series, Sealed(BK)

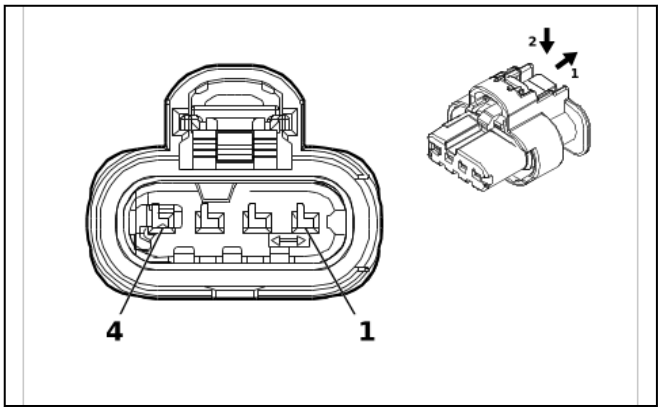
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B195A Nitrogen Oxides Sensor 1 (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1	(1) VT / GN	(1) 4320	(1) Powertrain Sensor Bus Enable	(1) I	(1) —
(2) 2	(2) 0.5	(2) WH	(2) 4055	(2) Private Serial Data Powertrain CAN Bus [+] Serial Data	(2) I	(2) —
(3) 3	(3) 0.5	(3) BU / GY	(3) 4054	(3) Private Serial Data Powertrain CAN Bus [-] Serial Data	(3) I	(3) —
(4) 4	(4) 1	(4) BK / WH	(4) 6151	(4) Engine Control Module Ground	(4) I	(4) —

B195B Nitrogen Oxides Sensor 2 (LZ0)



4934614

Connector Part Information

- Harness Type: Chassis Wiring Harness
- OEM Connector: 1-2296696-2
- Service Connector: 85519071
- Description: 4-Way F 1.2 MCON-CB Series, Sealed(BK)

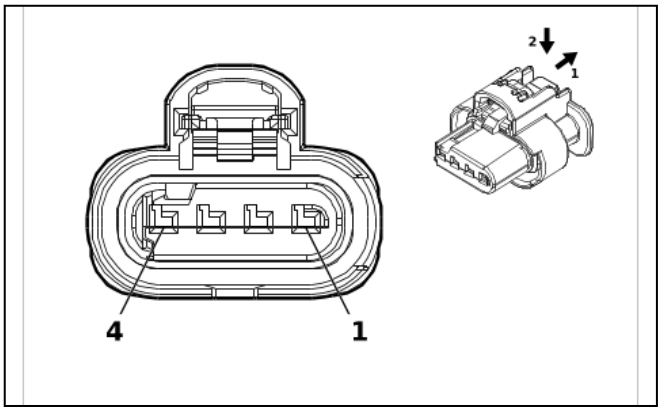
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B195B Nitrogen Oxides Sensor 2 (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1	(1) VT / GN	(1) 4320	(1) Powertrain Sensor Bus Enable	(1) I	(1) —
(2) 2	(2) 0.5	(2) WH	(2) 4055	(2) Private Serial Data Powertrain CAN Bus [+] Serial Data	(2) I	(2) —
(3) 3	(3) 0.5	(3) BU / GY	(3) 4054	(3) Private Serial Data Powertrain CAN Bus [-] Serial Data	(3) I	(3) —
(4) 4	(4) 1	(4) BK / WH	(4) 6751	(4) Exhaust Treatment Ground	(4) I	(4) —

B195C Nitrogen Oxides Sensor 3 (LZ0)



4210809

Connector Part Information
- Harness Type: Chassis Wiring Harness
- OEM Connector: 1-2296696-1
- Service Connector: 85518225
- Description: 4-Way F 1.2 MCON-CB Series, Sealed(BK)

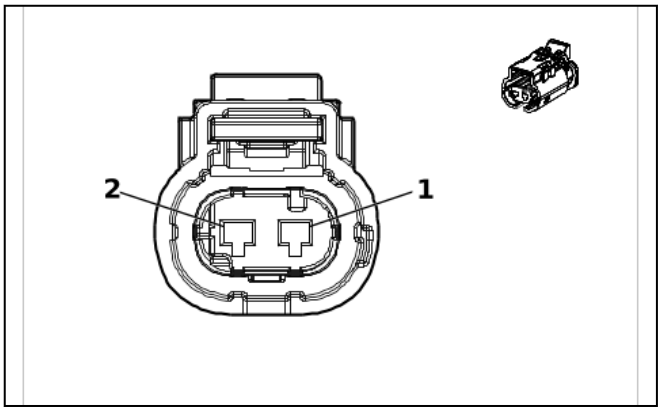
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B195C Nitrogen Oxides Sensor 3 (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1	(1) VT / GN	(1) 4320	(1) Powertrain Sensor Bus Enable	(1) I	(1) —
(2) 2	(2) 0.5	(2) WH	(2) 4055	(2) Private Serial Data Powertrain CAN Bus [+] Serial Data	(2) I	(2) —
(3) 3	(3) 0.5	(3) BU / GY	(3) 4054	(3) Private Serial Data Powertrain CAN Bus [-] Serial Data	(3) I	(3) —
(4) 4	(4) 1	(4) BK / WH	(4) 6751	(4) Exhaust Treatment Ground	(4) I	(4) —

B203 Radiator Coolant Temperature Sensor



6776339

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 10530497
- Service Connector: 86308598
- Description: 2-Way F 1.2 MLK Series, Sealed(BK)

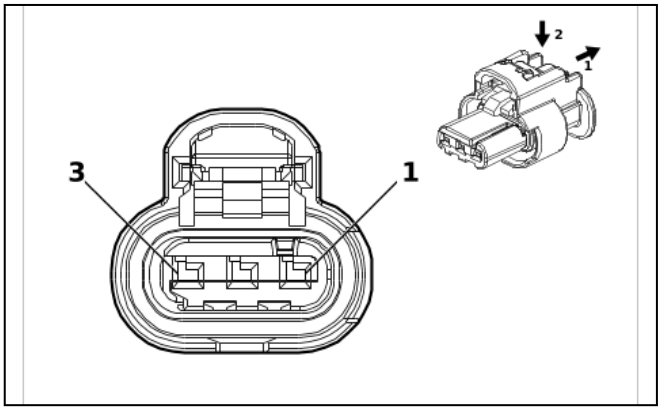
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B203 Radiator Coolant Temperature Sensor

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BU	(1) 2990	(1) Engine Radiator Coolant Temperature Sensor Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / GN	(2) 580	(2) Engine Control Sensors Low Reference 2	(2) I	(2) —

B212 Reductant Tank Fluid Sensor (FHX)



4581126

Connector Part Information
- Harness Type: Emission Reduction Fluid Tank Reservoir Wire Harness
- OEM Connector: 1-2296695-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 3-Way F 1.2 MCON-CB Series, Sealed(BK)

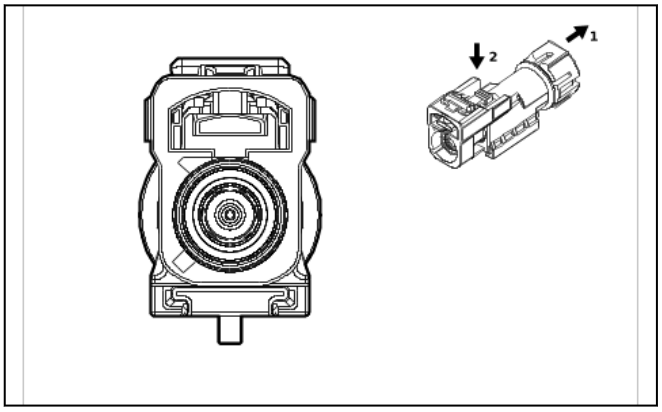
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

B212 Reductant Tank Fluid Sensor (FHX)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) VT / GY	(1) 7290	(1) Diesel Exhaust Fluid Sensor Voltage Reference 1	(1) I	(1) —
(2) 2	(2) 0.5	(2) YE / GN	(2) 7284	(2) Diesel Exhaust Fluid Liquid Quality Temperature Signal	(2) I	(2) —
(3) 3	(3) 0.5	(3) BK / BN	(3) 8434	(3) Diesel Exhaust Fluid Sensor Low Reference	(3) I	(3) —

B225L Side View Driver Information Camera - Left (UV2)



7178662

Connector Part Information

- Harness Type: Outside Rearview Mirror - Driver
- OEM Connector: 13552699
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way F Coax Type(BN)

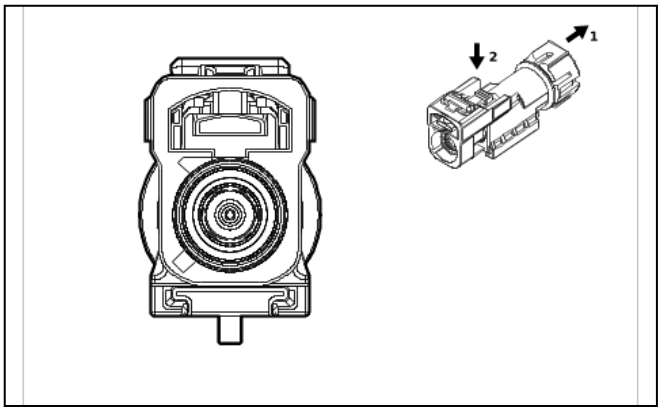
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

B225L Side View Driver Information Camera - Left (UV2)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
BN	—	Coax Cable	4725	Left Sideview Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	I	—

B225R Side View Driver Information Camera - Right (UV2)



7178662

Connector Part Information
- Harness Type: Outside Rearview Mirror - Passenger
- OEM Connector: 13552699
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way F Coax Type(BN)

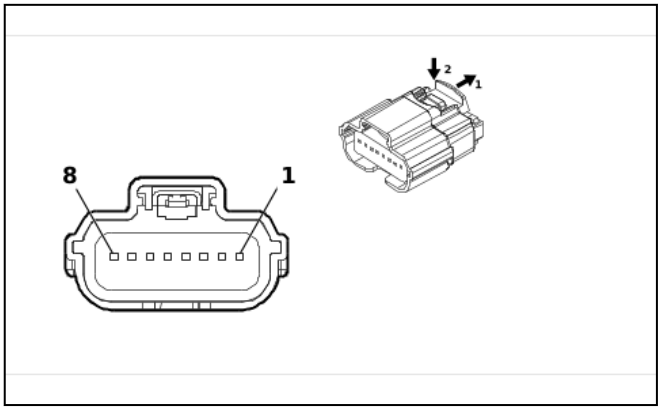
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

B225R Side View Driver Information Camera - Right (UV2)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
BN	—	Coax Cable	4724	Right Sideview Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	I	—

B233B Forward Range Radar Sensor - Long Range



4708234

Connector Part Information
- Harness Type: Front Object Alarm Sensor Wiring Harness
- OEM Connector: 31404-9134
- Service Connector: Service by Harness - See Part Catalog
- Description: 8-Way F 0.64 Series, Sealed(BK)

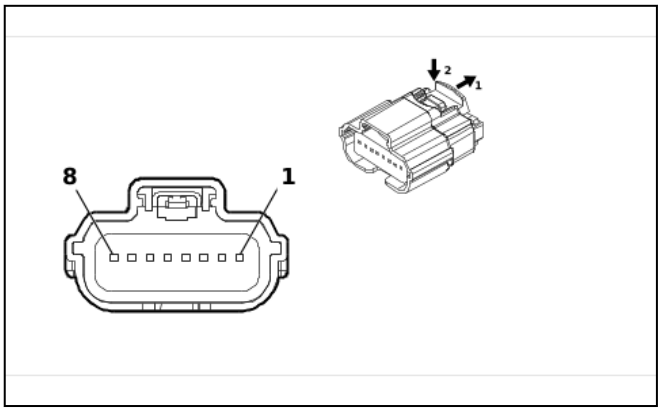
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

B233B Forward Range Radar Sensor - Long Range

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1 - 2	—	—	—	Not Occupied	—	—
(3) 3	(3) 0.35	(3) BU / GY	(3) 4105	(3) AUTOSAR CAN Bus [+] 8 Serial Data	(3) I	(3) —
(4) 4	(4) 0.35	(4) WH / GY	(4) 4104	(4) AUTOSAR CAN Bus [-] 8 Serial Data	(4) I	(4) —
(5) 5	(5) 0.5	(5) RD / GN	(5) 3140	(5) Battery Positive Voltage	(5) I	(5) —
6 - 7	—	—	—	Not Occupied	—	—
(8) 8	(8) 0.5 (8) 0.75	(8) BK / WH (8) BK / WH	(8) 651 (8) 651	(8) Signal Ground (8) Signal Ground	(8) I (8) I	(8) UKL / UK0 (8) UKM / UJE

B233LF Short Range Radar Sensor - Left Front (UK0 / UKL)



4708234

Connector Part Information

- Harness Type: Front Object Alarm Sensor Wiring Harness
- OEM Connector: 31404-9111
- Service Connector: Service by Harness - See Part Catalog
- Description: 8-Way F 0.64 Series, Sealed(BK)

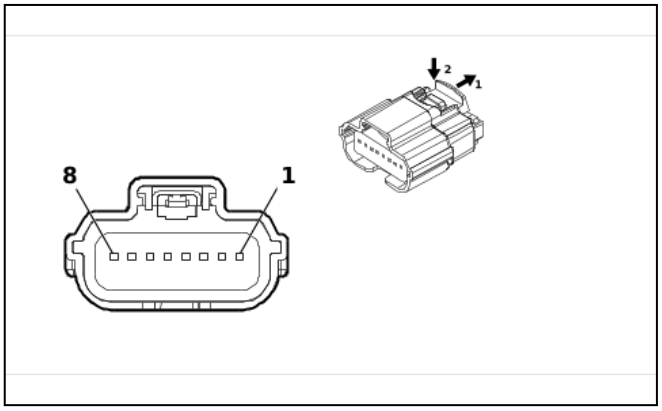
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

B233LF Short Range Radar Sensor - Left Front (UK0 / UKL)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BK / WH	(1) 651	(1) Signal Ground	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / WH	(2) 651	(2) Signal Ground	(2) I	(2) —
3	—	—	—	Not Occupied	—	—
(4) 4	(4) 0.5	(4) RD / GN	(4) 3140	(4) Battery Positive Voltage	(4) I	(4) —
(5) 5	(5) 0.35	(5) WH / GY	(5) 4104	(5) AUTOSAR CAN Bus [-] 8 Serial Data	(5) I	(5) —
(6) 6	(6) 0.35	(6) BU / GY	(6) 4105	(6) AUTOSAR CAN Bus [+] 8 Serial Data	(6) I	(6) —
(7) 7	(7) 0.35	(7) WH / GY	(7) 4104	(7) AUTOSAR CAN Bus [-] 8 Serial Data	(7) I	(7) —
(8) 8	(8) 0.35	(8) BU / GY	(8) 4105	(8) AUTOSAR CAN Bus [+] 8 Serial Data	(8) I	(8) —

B233LR Short Range Radar Rear Sensor - Left



4708234

Connector Part Information

- Harness Type: Rear Object Alarm Sensor Wiring Harness
- OEM Connector: 31404-9552
- Service Connector: Service by Harness - See Part Catalog
- Description: 8-Way F 0.64 Series, Sealed(BK)

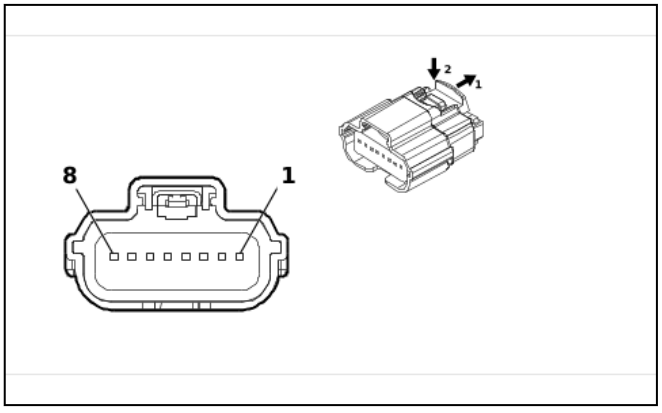
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

B233LR Short Range Radar Rear Sensor - Left

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5 (1) 0.5	(1) BK / WH (1) BK / WH	(1) 1851 (1) 1951	(1) Signal Ground (1) Signal Ground	(1) I (1) I	(1) VFE / VJG / VJH (1) VPS
2 - 3	—	—	—	Not Occupied	—	—
(4) 4	(4) 0.5	(4) RD / BU	(4) 5240	(4) Battery Positive Voltage	(4) I	(4) —
(5) 5	(5) 0.35	(5) WH / GY	(5) 4104	(5) AUTOSAR CAN Bus [-] 8 Serial Data	(5) I	(5) —
(6) 6	(6) 0.35	(6) BU / GY	(6) 4105	(6) AUTOSAR CAN Bus [+] 8 Serial Data	(6) I	(6) —
(7) 7	(7) 0.35	(7) WH / GY	(7) 4104	(7) AUTOSAR CAN Bus [-] 8 Serial Data	(7) I	(7) —
(8) 8	(8) 0.35	(8) BU / GY	(8) 4105	(8) AUTOSAR CAN Bus [+] 8 Serial Data	(8) I	(8) —

B233RF Short Range Radar Sensor - Right Front (UK0 / UKL)



4708234

Connector Part Information

- Harness Type: Front Object Alarm Sensor Wiring Harness
- OEM Connector: 31404-9171
- Service Connector: Service by Harness - See Part Catalog
- Description: 8-Way F 0.64 Series, Sealed(BK)

Terminal Part Information

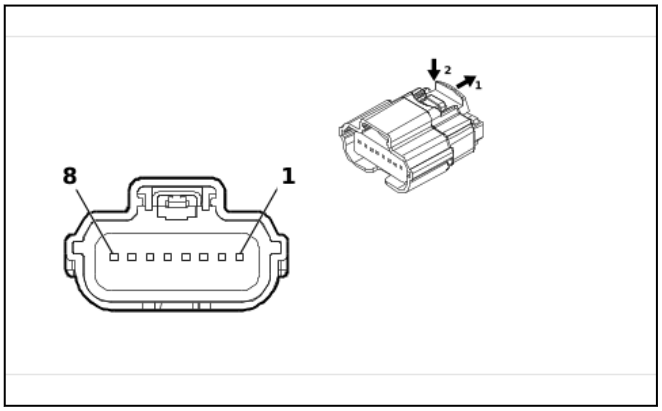
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

B233RF Short Range Radar Sensor - Right Front (UK0 / UKL)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BK / WH	(1) 651	(1) Signal Ground	(1) I	(1) —
2	—	—	—	Not Occupied	—	—

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(3) 3	(3) 0.5	(3) BK / WH	(3) 651	(3) Signal Ground	(3) I	(3) —
(4) 4	(4) 0.5	(4) RD / GN	(4) 3140	(4) Battery Positive Voltage	(4) I	(4) —
(5) 5	(5) 0.35	(5) WH / GY	(5) 4104	(5) AUTOSAR CAN Bus [-] 8 Serial Data	(5) I	(5) —
(6) 6	(6) 0.35	(6) BU / GY	(6) 4105	(6) AUTOSAR CAN Bus [+] 8 Serial Data	(6) I	(6) —
(7) 7	(7) 0.35	(7) WH / GY	(7) 4104	(7) AUTOSAR CAN Bus [-] 8 Serial Data	(7) I	(7) —
(8) 8	(8) 0.35	(8) BU / GY	(8) 4105	(8) AUTOSAR CAN Bus [+] 8 Serial Data	(8) I	(8) —

B233RR Short Range Radar Rear Sensor - Right



4708234

Connector Part Information

- Harness Type: Rear Object Alarm Sensor Wiring Harness
- OEM Connector: 31404-9110
- Service Connector: Service by Harness - See Part Catalog
- Description: 8-Way F 0.64 Series, Sealed(BK)

Terminal Part Information

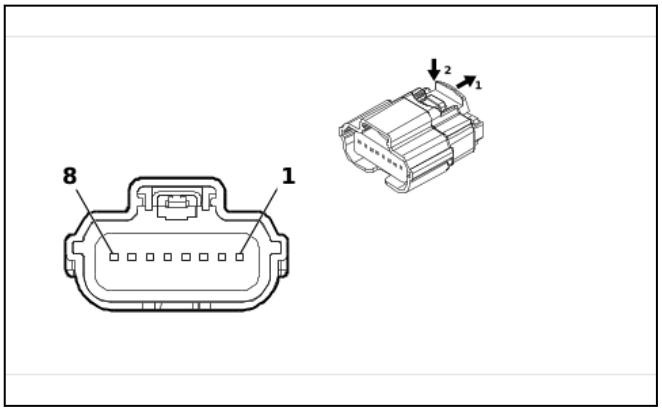
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

B233RR Short Range Radar Rear Sensor - Right

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5 (1) 0.5	(1) BK / WH (1) BK / WH	(1) 1851 (1) 1951	(1) Signal Ground (1) Signal Ground	(1) I (1) I	(1) VFE / VJG / VJH (1) VPS
(2) 2	(2) 0.5 (2) 0.5	(2) BK / WH (2) BK / WH	(2) 1851 (2) 1951	(2) Signal Ground (2) Signal Ground	(2) I (2) I	(2) VFE / VJG / VJH (2) VPS

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(3) 3	(3) 0.5 (3) 0.5	(3) BK / WH (3) BK / WH	(3) 1851 (3) 1951	(3) Signal Ground (3) Signal Ground	(3) I (3) I	(3) VFE / VJG / VJH (3) VPS
(4) 4	(4) 0.5	(4) RD / BU	(4) 5240	(4) Battery Positive Voltage	(4) I	(4) —
(5) 5	(5) 0.35	(5) WH / GY	(5) 4104	(5) AUTOSAR CAN Bus [-] 8 Serial Data	(5) I	(5) —
(6) 6	(6) 0.35	(6) BU / GY	(6) 4105	(6) AUTOSAR CAN Bus [+] 8 Serial Data	(6) I	(6) —
(7) 7	(7) 0.35	(7) WH / GY	(7) 4104	(7) AUTOSAR CAN Bus [-] 8 Serial Data	(7) I	(7) —
(8) 8	(8) 0.35	(8) BU / GY	(8) 4105	(8) AUTOSAR CAN Bus [+] 8 Serial Data	(8) I	(8) —

B233SL Short Range Radar Rear Side Sensor - Left



4708234

Connector Part Information

- Harness Type: Rear Object Alarm Sensor Wiring Harness
- OEM Connector: 31404-9552
- Service Connector: Service by Harness - See Part Catalog
- Description: 8-Way F 0.64 Series, Sealed(BK)

Terminal Part Information

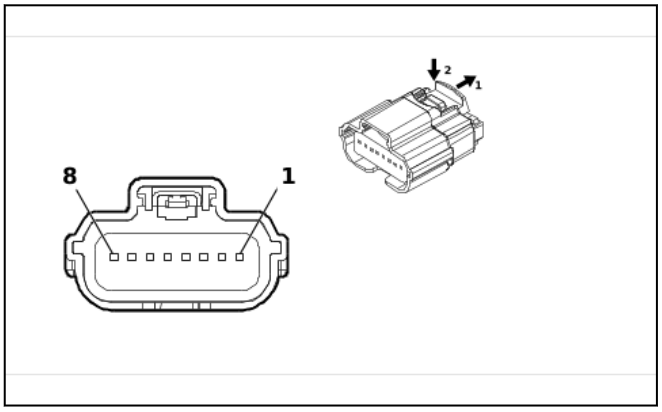
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

B233SL Short Range Radar Rear Side Sensor - Left

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5 (1) 0.5	(1) BK / WH (1) BK / WH	(1) 1851 (1) 1951	(1) Signal Ground (1) Signal Ground	(1) I (1) I	(1) VFE / VJG / VJH (1) VPS
2 - 3	—	—	—	Not Occupied	—	—
(4) 4	(4) 0.5	(4) RD / BU	(4) 5240	(4) Battery Positive Voltage	(4) I	(4) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(5) 5	(5) 0.35	(5) WH / GY	(5) 4104	(5) AUTOSAR CAN Bus [-] 8 Serial Data	(5) I	(5) —
(6) 6	(6) 0.35	(6) BU / GY	(6) 4105	(6) AUTOSAR CAN Bus [+] 8 Serial Data	(6) I	(6) —
(7) 7	(7) 0.35	(7) WH / GY	(7) 4104	(7) AUTOSAR CAN Bus [-] 8 Serial Data	(7) I	(7) —
(8) 8	(8) 0.35	(8) BU / GY	(8) 4105	(8) AUTOSAR CAN Bus [+] 8 Serial Data	(8) I	(8) —

B233SR Short Range Radar Rear Side Sensor - Right



4708234

Connector Part Information
- Harness Type: Rear Object Alarm Sensor Wiring Harness
- OEM Connector: 31404-9110
- Service Connector: Service by Harness - See Part Catalog
- Description: 8-Way F 0.64 Series, Sealed(BK)

Terminal Part Information

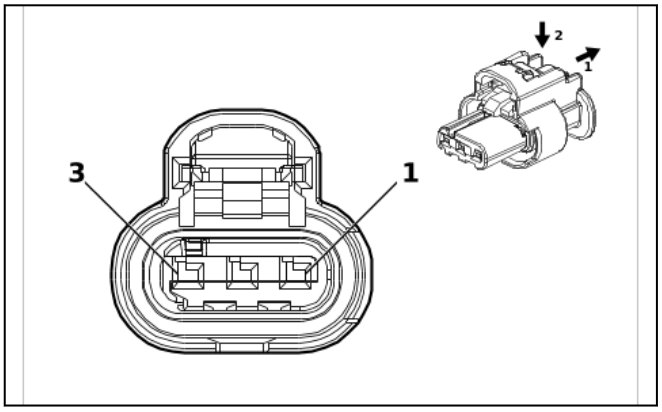
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

B233SR Short Range Radar Rear Side Sensor - Right

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5 (1) 0.5	(1) BK / WH (1) BK / WH	(1) 1851 (1) 1951	(1) Signal Ground (1) Signal Ground	(1) I (1) I	(1) VFE / VJG / VJH (1) VPS
(2) 2	(2) 0.5 (2) 0.5	(2) BK / WH (2) BK / WH	(2) 1851 (2) 1951	(2) Signal Ground (2) Signal Ground	(2) I (2) I	(2) VFE / VJG / VJH (2) VPS
(3) 3	(3) 0.5 (3) 0.5	(3) BK / WH (3) BK / WH	(3) 1851 (3) 1951	(3) Signal Ground (3) Signal Ground	(3) I (3) I	(3) VFE / VJG / VJH (3) VPS
(4) 4	(4) 0.5	(4) RD / BU	(4) 5240	(4) Battery Positive Voltage	(4) I	(4) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(5) 5	(5) 0.35	(5) WH / GY	(5) 4104	(5) AUTOSAR CAN Bus [-] 8 Serial Data	(5) I	(5) —
(6) 6	(6) 0.35	(6) BU / GY	(6) 4105	(6) AUTOSAR CAN Bus [+] 8 Serial Data	(6) I	(6) —
(7) 7	(7) 0.35	(7) WH / GY	(7) 4104	(7) AUTOSAR CAN Bus [-] 8 Serial Data	(7) I	(7) —
(8) 8	(8) 0.35	(8) BU / GY	(8) 4105	(8) AUTOSAR CAN Bus [+] 8 Serial Data	(8) I	(8) —

B283 Evaporative Emission Canister Purge Pump Pressure Sensor (L4B)



4974888

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 1-2296695-4
- Service Connector: 19371242
- Description: 3-Way F 1.2 MCON-CB Series, Sealed(BN)

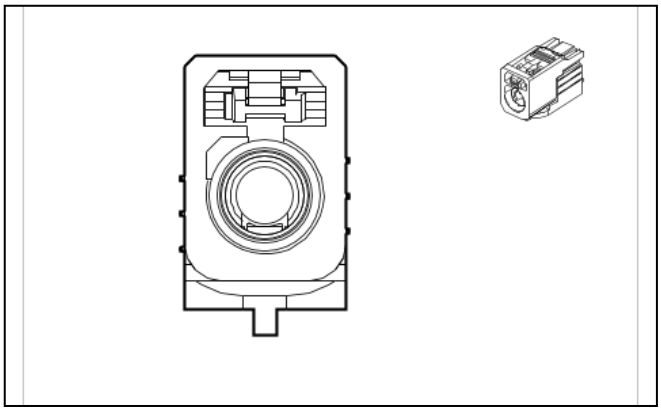
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B283 Evaporative Emission Canister Purge Pump Pressure Sensor (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BN / BU	(1) 2447	(1) Evaporative Purge Pump Pressure Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / YE	(2) 548	(2) Engine Control Sensors Low Reference 1	(2) I	(2) —
(3) 3	(3) 0.5	(3) BU / RD	(3) 460	(3) Engine Control Sensors 5 Volt Reference 1	(3) I	(3) —

B292 Driver Monitoring Camera (ULM)



5633912

Connector Part Information
- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 33351016
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way F Coax Type(GN)

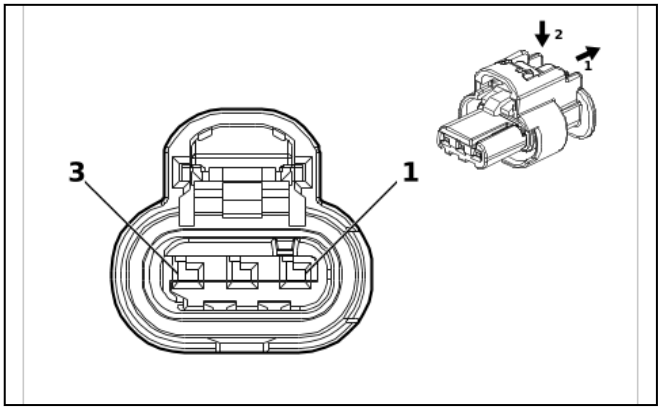
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

B292 Driver Monitoring Camera (ULM)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
GN	—	Coax Cable	4726	Driver Monitoring System Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	I	—

B306AB Front Parking Assist Alarm Outer Sensor - Left



4581126

Connector Part Information
- Harness Type: Front Object Alarm Sensor Wiring Harness
- OEM Connector: 1-2296695-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 3-Way F 1.2 MCON-CB Series, Sealed(BK)

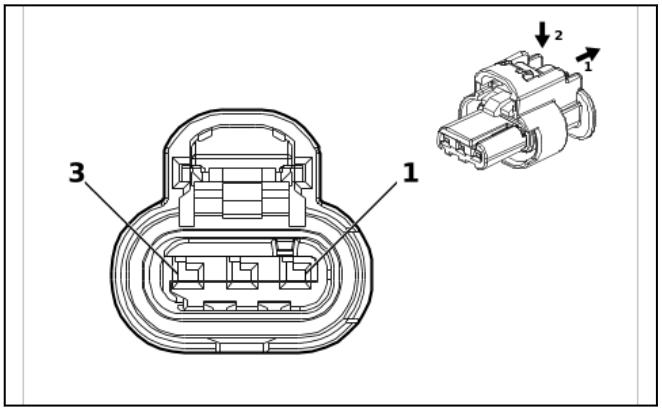
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B306AB Front Parking Assist Alarm Outer Sensor - Left

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BN	(1) 6581	(1) Front Parking Assist Display Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) VT / WH	(2) 5215	(2) Left Front Outer Parking Assist Sensor	(2) I	(2) —
(3) 3	(3) 0.5	(3) BK / BU	(3) 5214	(3) Front Parking Assist Sensor Low Reference	(3) I	(3) —

B306BB Front Parking Assist Alarm Sensor - Left Middle



4581126

Connector Part Information

- Harness Type: Front Object Alarm Sensor Wiring Harness
- OEM Connector: 1-2296695-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 3-Way F 1.2 MCON-CB Series, Sealed(BK)

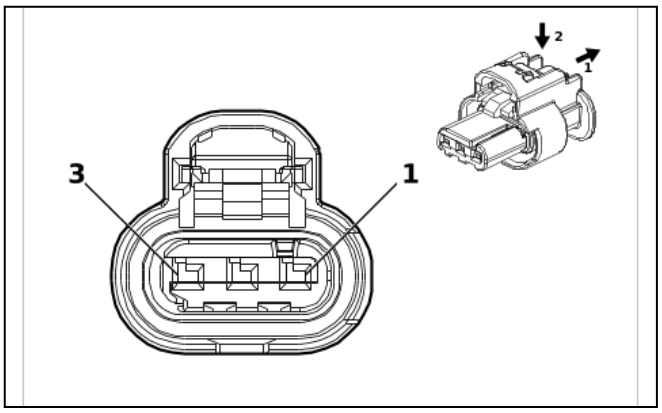
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B306BB Front Parking Assist Alarm Sensor - Left Middle

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BN	(1) 6581	(1) Front Parking Assist Display Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) YE / GY	(2) 5216	(2) Left Front Middle Parking Assist Sensor	(2) I	(2) —
(3) 3	(3) 0.5	(3) BK / BU	(3) 5214	(3) Front Parking Assist Sensor Low Reference	(3) I	(3) —

B306CB Front Parking Assist Alarm Sensor - Right Middle



4581126

Connector Part Information

- Harness Type: Front Object Alarm Sensor Wiring Harness
- OEM Connector: 1-2296695-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 3-Way F 1.2 MCON-CB Series, Sealed(BK)

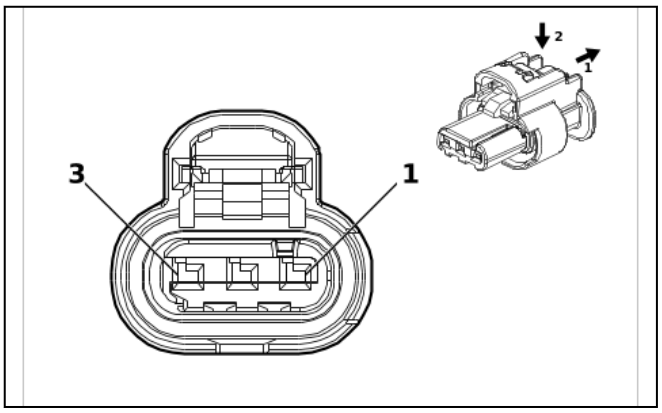
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B306CB Front Parking Assist Alarm Sensor - Right Middle

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BN	(1) 6581	(1) Front Parking Assist Display Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) VT / GY	(2) 5218	(2) Right Front Middle Parking Assist Sensor	(2) I	(2) —
(3) 3	(3) 0.5	(3) BK / BU	(3) 5214	(3) Front Parking Assist Sensor Low Reference	(3) I	(3) —

B306DB Front Parking Assist Alarm Outer Sensor - Right



4581126

Connector Part Information

- Harness Type: Front Object Alarm Sensor Wiring Harness
- OEM Connector: 1-2296695-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 3-Way F 1.2 MCON-CB Series, Sealed(BK)

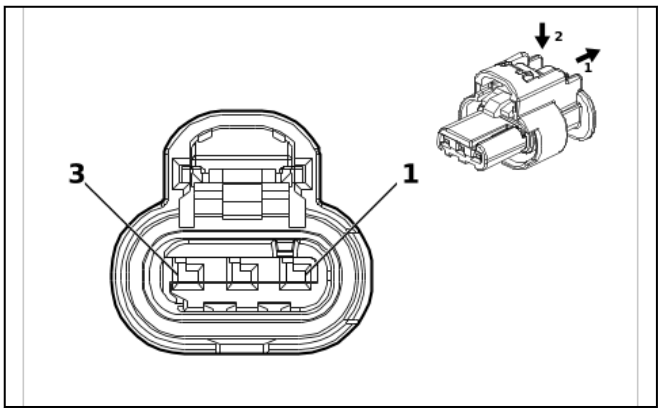
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B306DB Front Parking Assist Alarm Outer Sensor - Right

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BN	(1) 6581	(1) Front Parking Assist Display Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) WH / GY	(2) 5217	(2) Right Front Outer Parking Assist Sensor	(2) I	(2) —
(3) 3	(3) 0.5	(3) BK / BU	(3) 5214	(3) Front Parking Assist Sensor Low Reference	(3) I	(3) —

B306EB Rear Parking Assist Alarm Outer Sensor - Left



4581126

Connector Part Information

- Harness Type: Rear Object Alarm Sensor Wiring Harness
- OEM Connector: 1-2296695-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 3-Way F 1.2 MCON-CB Series, Sealed(BK)

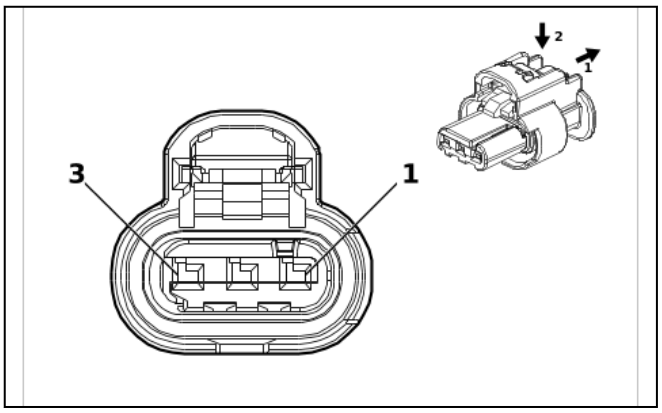
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B306EB Rear Parking Assist Alarm Outer Sensor - Left

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BN / WH	(1) 2374	(1) Object Sensor Voltage Reference	(1) I	(1) —
(2) 2	(2) 0.5	(2) YE	(2) 2375	(2) Left Rear Outer Parking Assist Sensor Signal	(2) I	(2) —
(3) 3	(3) 0.5	(3) BK / GY	(3) 2379	(3) Object Sensor Low Reference	(3) I	(3) —

B306FB Rear Parking Assist Alarm Sensor - Left Middle



4581126

Connector Part Information

- Harness Type: Rear Object Alarm Sensor Wiring Harness
- OEM Connector: 1-2296695-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 3-Way F 1.2 MCON-CB Series, Sealed(BK)

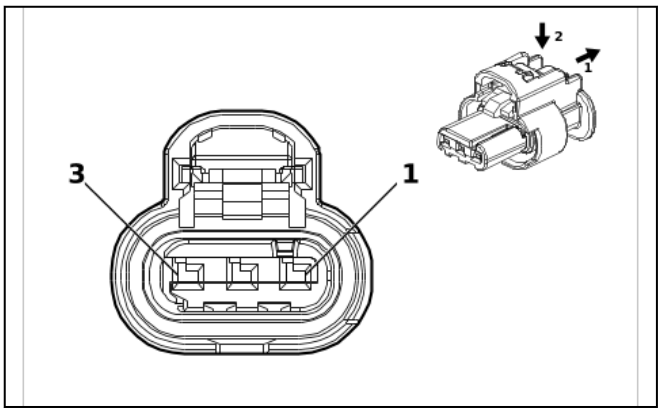
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B306FB Rear Parking Assist Alarm Sensor - Left Middle

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BN / WH	(1) 2374	(1) Object Sensor Voltage Reference	(1) I	(1) —
(2) 2	(2) 0.5	(2) YE / BU	(2) 2376	(2) Left Rear Middle Parking Assist Sensor Signal	(2) I	(2) —
(3) 3	(3) 0.5	(3) BK / GY	(3) 2379	(3) Object Sensor Low Reference	(3) I	(3) —

B306GB Rear Parking Assist Alarm Sensor - Right Middle



4581126

Connector Part Information

- Harness Type: Rear Object Alarm Sensor Wiring Harness
- OEM Connector: 1-2296695-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 3-Way F 1.2 MCON-CB Series, Sealed(BK)

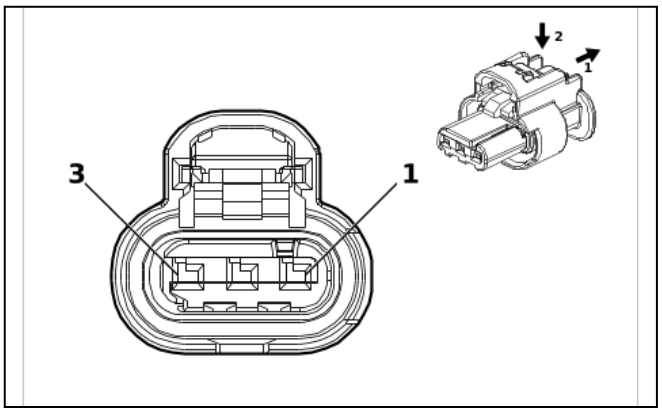
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B306GB Rear Parking Assist Alarm Sensor - Right Middle

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BN / WH	(1) 2374	(1) Object Sensor Voltage Reference	(1) I	(1) —
(2) 2	(2) 0.5	(2) YE / WH	(2) 2377	(2) Right Rear Middle Parking Assist Sensor Signal	(2) I	(2) —
(3) 3	(3) 0.5	(3) BK / GY	(3) 2379	(3) Object Sensor Low Reference	(3) I	(3) —

B306HB Rear Parking Assist Alarm Outer Sensor - Right



4581126

Connector Part Information

- Harness Type: Rear Object Alarm Sensor Wiring Harness
- OEM Connector: 1-2296695-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 3-Way F 1.2 MCON-CB Series, Sealed(BK)

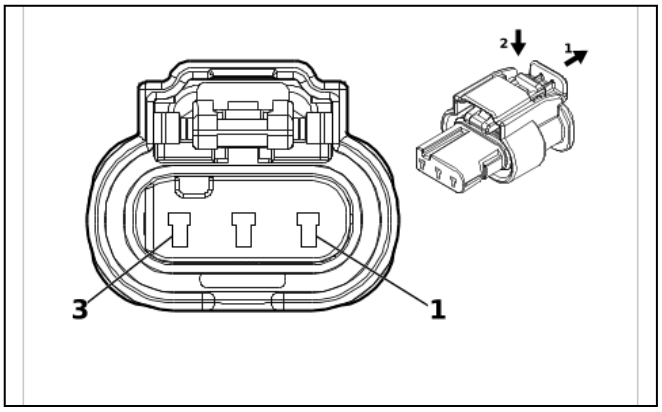
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B306HB Rear Parking Assist Alarm Outer Sensor - Right

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BN / WH	(1) 2374	(1) Object Sensor Voltage Reference	(1) I	(1) —
(2) 2	(2) 0.5	(2) YE / VT	(2) 2378	(2) Right Rear Outer Parking Assist Sensor Signal	(2) I	(2) —
(3) 3	(3) 0.5	(3) BK / GY	(3) 2379	(3) Object Sensor Low Reference	(3) I	(3) —

B310 Fuel Pressure and Temperature Sensor (L4B)



5420917

Connector Part Information

- Harness Type: Fuel Injector Wiring Harness
- OEM Connector: 34900-3127
- Service Connector: Service by Harness - See Part Catalog
- Description: 3-Way F 1.2 MCON-LL Series, Sealed(GY)

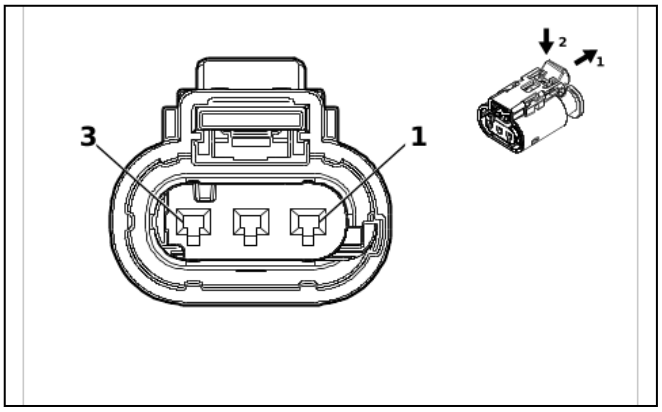
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

B310 Fuel Pressure and Temperature Sensor (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BK / GN	(1) 580	(1) Engine Control Sensors Low Reference 2	(1) I	(1) —
(2) 2	(2) 0.5	(2) BU / WH	(2) 2918	(2) Fuel Rail Pressure Sensor Signal	(2) I	(2) —
(3) 3	(3) 0.5	(3) WH / RD	(3) 480	(3) Engine Control Vehicle Sensors 5 Volt Reference 1	(3) I	(3) —

B310 Fuel Pressure and Temperature Sensor (L76 / L78)



6932387

Connector Part Information

- Harness Type: Fuel Injector Wiring Harness - Bank 1 Direct
- OEM Connector: 13551875
- Service Connector: Service by Harness - See Part Catalog
- Description: 3-Way F 1.2 MLK Series, Sealed(BK)

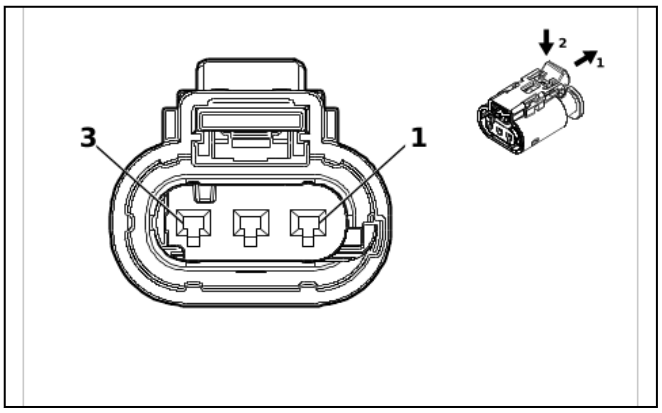
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

B310 Fuel Pressure and Temperature Sensor (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BK / BU	(1) 10597	(1) Engine Control Sensors Low Reference 3	(1) I	(1) —
(2) 2	(2) 0.75	(2) BU / WH	(2) 10786	(2) Fuel Rail Pressure Sensor SENT 1 Signal	(2) I	(2) —
(3) 3	(3) 0.75	(3) GN / RD	(3) 10599	(3) Engine Control Sensors 5 Volt Reference 3	(3) I	(3) —

B310L Fuel Pressure and Temperature Sensor - Low (L76 / L78)



6932387

Connector Part Information

- Harness Type: Fuel Injector Wiring Harness - Bank 2 Port
- OEM Connector: 10531904
- Service Connector: Service by Harness - See Part Catalog
- Description: 3-Way F 1.2 MLK Series, Sealed(BK)

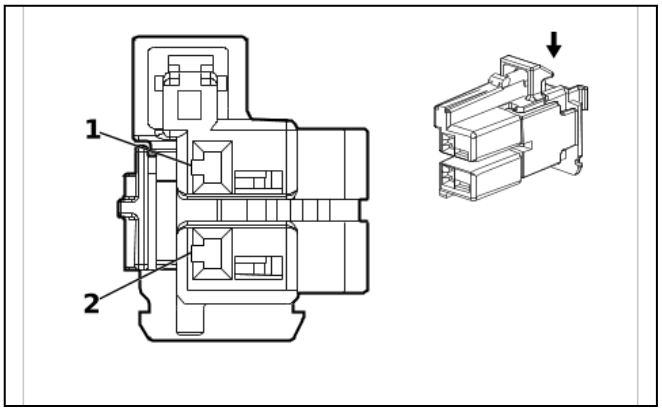
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

B310L Fuel Pressure and Temperature Sensor - Low (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.8	(1) BK / GN	(1) 580	(1) Engine Control Sensors Low Reference 2	(1) I	(1) —
(2) 2	(2) 0.8	(2) GN	(2) 12636	(2) Fuel Rail Low Pressure Sensor Signal	(2) I	(2) —
(3) 3	(3) 0.8	(3) GY / RD	(3) 10667	(3) Engine Control Sensors 5 Volt Reference	(3) I	(3) —

B315A Transmission Range Control Valve 1 Position Switch



4672650

Connector Part Information
- Harness Type: Automatic Transmission Wiring Harness - Control
- OEM Connector: 13540048
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series(BN)

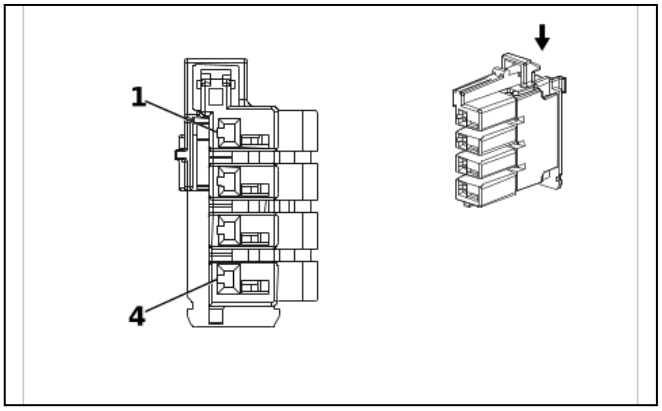
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

B315A Transmission Range Control Valve 1 Position Switch

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BU	(1) 4171	(1) Transmission Input Shaft Speed Sensor Circuit 9V Reference	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / GY	(2) 3706	(2) Electronic Transmission Range Select Switch Analog Signal 1	(2) I	(2) —

B316 Transmission Park Valve Position Switch



4364148

Connector Part Information
- Harness Type: Automatic Transmission Wiring Harness - Control
- OEM Connector: 13514144
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 1.2 MCON Series(BN)

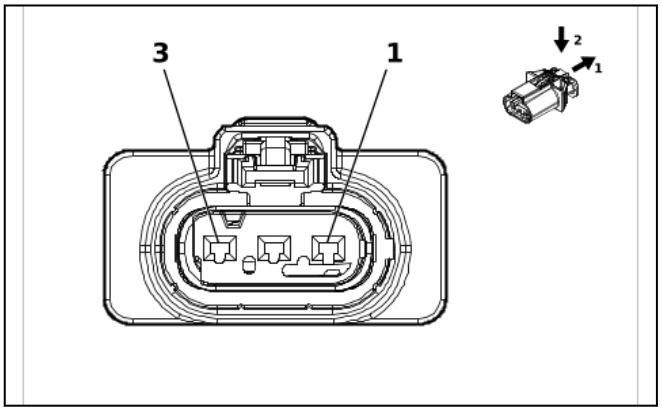
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

B316 Transmission Park Valve Position Switch

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	—	—	—	Not Occupied	—	—
(2) 2	(2) 0.5	(2) GN	(2) 4170	(2) Transmission Output Shaft Speed Sensor Circuit 9V Reference	(2) I	(2) —
(3) 3	(3) 0.5	(3) YE	(3) 6317	(3) Electronic Transmission Range Select Out of Park Switch Signal	(3) I	(3) —
(4) 4	(4) 0.5	(4) YE / GY	(4) 6319	(4) Electronic Transmission Range Select Out of Park Switch 2 Signal	(4) I	(4) —

B321 Crankcase Pressure Sensor (L4B)



6530824

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 35748533
- Service Connector: 85736068
- Description: 3-Way F 1.2 MLK Series, Sealed(BK)

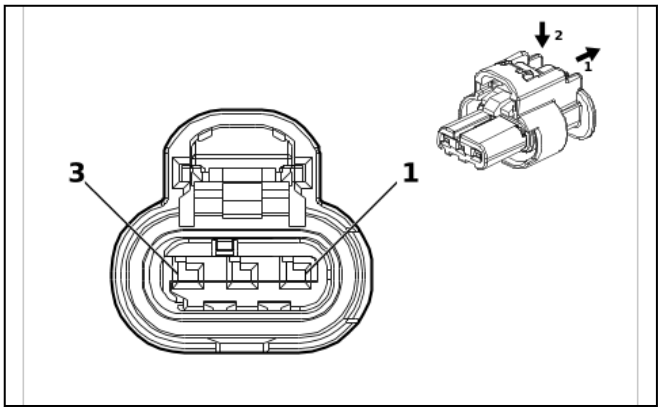
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

B321 Crankcase Pressure Sensor (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) YE / GY	(1) 3926	(1) Crankcase Differential Pressure Sensor Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / GN	(2) 580	(2) Engine Control Sensors Low Reference 2	(2) I	(2) —
(3) 3	(3) 0.5	(3) GY / RD	(3) 10667	(3) Engine Control Sensors 5 Volt Reference	(3) I	(3) —

B321 Crankcase Pressure Sensor (LZ0)



4994602

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 1-2296695-3
- Service Connector: 19371199
- Description: 3-Way F 1.2 MCON-CB Series, Sealed(BK)

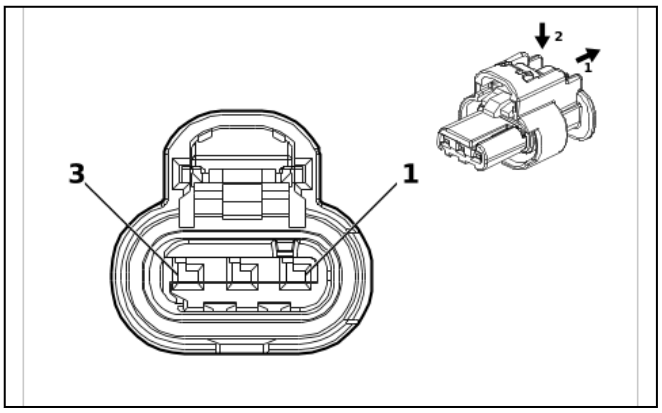
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B321 Crankcase Pressure Sensor (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) YE / GY	(1) 3926	(1) Crankcase Differential Pressure Sensor Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / YE	(2) 548	(2) Engine Control Sensors Low Reference 1	(2) I	(2) —
(3) 3	(3) 0.5	(3) BU / RD	(3) 460	(3) Engine Control Sensors 5 Volt Reference 1	(3) I	(3) —

B338A Intake Camshaft Profile Sleeve Position Sensor 1 (L4B)



4581126

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 1-2296695-1
- Service Connector: 86792094
- Description: 3-Way F 1.2 MCON-CB Series, Sealed(BK)

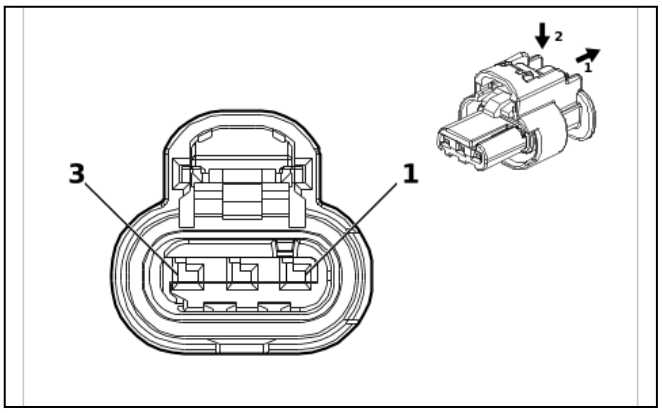
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B338A Intake Camshaft Profile Sleeve Position Sensor 1 (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GY / RD	(1) 10667	(1) Engine Control Sensors 5 Volt Reference	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / GN	(2) 580	(2) Engine Control Sensors Low Reference 2	(2) I	(2) —
(3) 3	(3) 0.5	(3) VT / WH	(3) 3744	(3) Camshaft Intake Lobe Axial Position Signal 1	(3) I	(3) —

B338B Intake Camshaft Profile Sleeve Position Sensor 2 (L4B)



4581126

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 1-2296695-1
- Service Connector: 86792094
- Description: 3-Way F 1.2 MCON-CB Series, Sealed(BK)

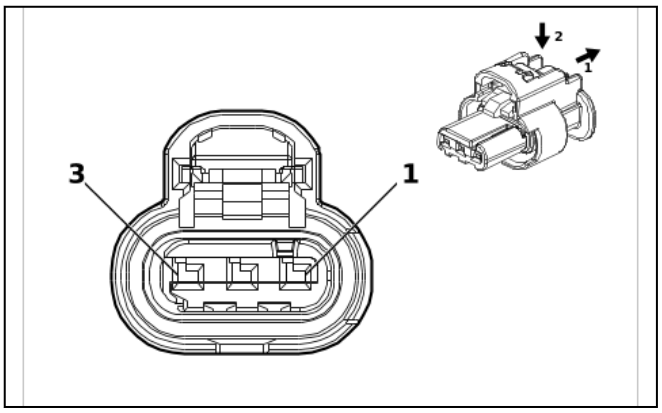
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B338B Intake Camshaft Profile Sleeve Position Sensor 2 (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GY / RD	(1) 10667	(1) Engine Control Sensors 5 Volt Reference	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / GN	(2) 580	(2) Engine Control Sensors Low Reference 2	(2) I	(2) —
(3) 3	(3) 0.5	(3) VT / GN	(3) 3745	(3) Camshaft Intake Lobe Axial Position Signal 2	(3) I	(3) —

B339A Exhaust Camshaft Profile Sleeve Position Sensor 1 (L4B)



4581126

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 1-2296695-1
- Service Connector: 86792094
- Description: 3-Way F 1.2 MCON-CB Series, Sealed(BK)

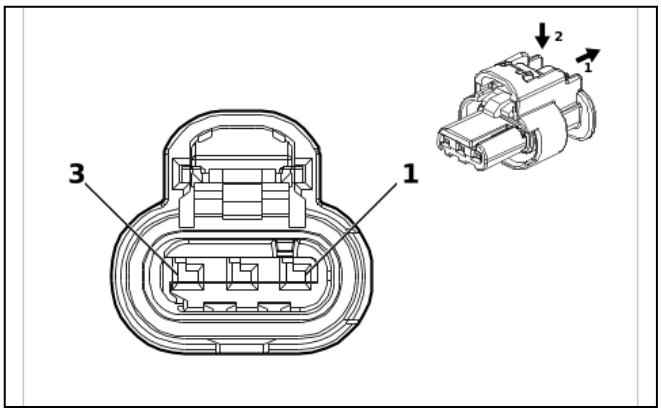
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B339A Exhaust Camshaft Profile Sleeve Position Sensor 1 (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GN / RD	(1) 10599	(1) Engine Control Sensors 5 Volt Reference 3	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / BU	(2) 10597	(2) Engine Control Sensors Low Reference 3	(2) I	(2) —
(3) 3	(3) 0.5	(3) YE / WH	(3) 3746	(3) Camshaft Exhaust Lobe Axial Position Signal 1	(3) I	(3) —

B339B Exhaust Camshaft Profile Sleeve Position Sensor 2 (L4B)



4581126

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 1-2296695-1
- Service Connector: 86792094
- Description: 3-Way F 1.2 MCON-CB Series, Sealed(BK)

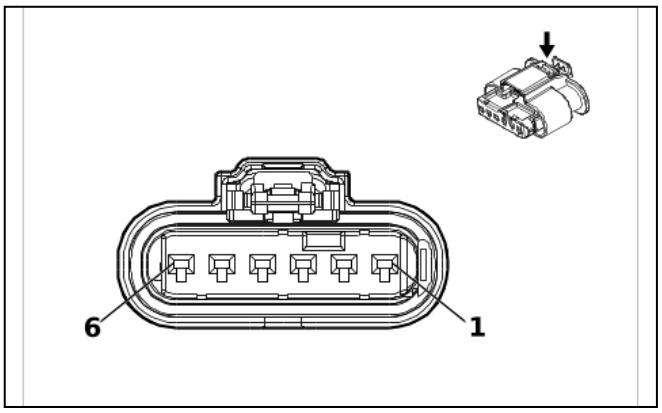
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B339B Exhaust Camshaft Profile Sleeve Position Sensor 2 (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GN / RD	(1) 10599	(1) Engine Control Sensors 5 Volt Reference 3	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / BU	(2) 10597	(2) Engine Control Sensors Low Reference 3	(2) I	(2) —
(3) 3	(3) 0.5	(3) YE / GN	(3) 3747	(3) Camshaft Exhaust Lobe Axial Position Signal 2	(3) I	(3) —

B342A UHF Low Energy Remote Control Access Sensor Transceiver 1 ((BOK / BOR / BOY) - GRZ)



5835086

Connector Part Information

- Harness Type: Front Object Alarm Sensor Wiring Harness
- OEM Connector: 34900-6221
- Service Connector: Service by Harness - See Part Catalog
- Description: 6-Way F 1.2 MCON-LL Series, Sealed(BK)

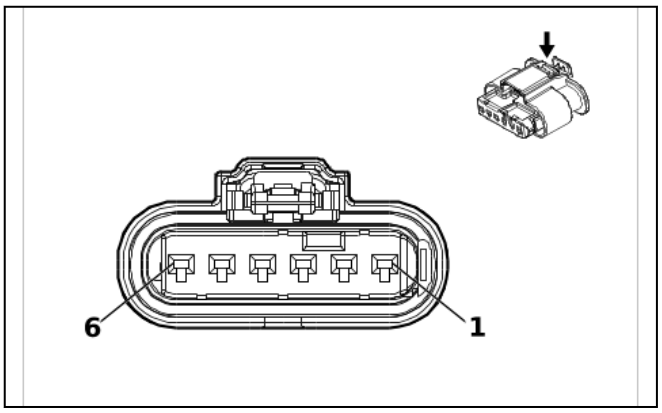
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B342A UHF Low Energy Remote Control Access Sensor Transceiver 1 ((BOK / BOR / BOY) - GRZ)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) RD / GY	(1) 7040	(1) Battery Positive Voltage	(1) I	(1) —
2 - 3	—	—	—	Not Occupied	—	—
(4) 4	(4) 0.5	(4) BU / BN	(4) 11326	(4) Virtual Key Private CAN Bus [+] Serial Data	(4) I	(4) —
(5) 5	(5) 0.5	(5) WH / YE	(5) 11325	(5) Virtual Key Private CAN Bus [-] Serial Data	(5) I	(5) —
(6) 6	(6) 0.5	(6) BK	(6) 650	(6) Ground	(6) I	(6) —

B342A UHF Low Energy Remote Control Access Sensor Transceiver 1 ((BOK / BOR / BOY) and GRZ)



5835086

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 34900-6221
- Service Connector: 85526044
- Description: 6-Way F 1.2 MCON-LL Series, Sealed(BK)

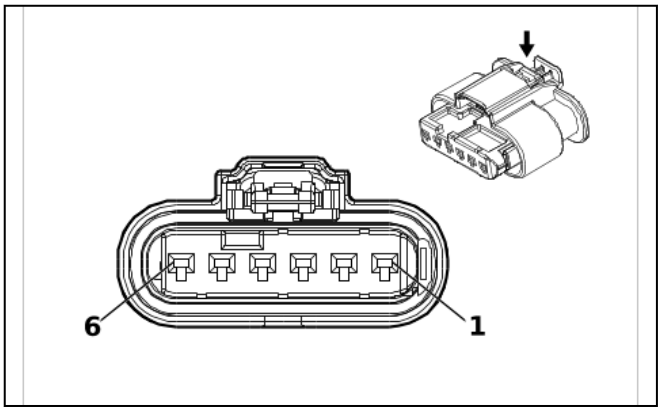
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B342A UHF Low Energy Remote Control Access Sensor Transceiver 1 ((BOK / BOR / BOY) and GRZ)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) RD / GY	(1) 7040	(1) Battery Positive Voltage	(1) I	(1) —
2 - 3	—	—	—	Not Occupied	—	—
(4) 4	(4) 0.5	(4) BU / BN	(4) 11326	(4) Virtual Key Private CAN Bus [+] Serial Data	(4) I	(4) —
(5) 5	(5) 0.5	(5) WH / YE	(5) 11325	(5) Virtual Key Private CAN Bus [-] Serial Data	(5) I	(5) —
(6) 6	(6) 0.75	(6) BK	(6) 650	(6) Ground	(6) I	(6) —

B342B UHF Low Energy Remote Control Access Sensor Transceiver 2 (BOK / BOR / BOY)



4455148

Connector Part Information

- Harness Type: Rear Lamp Wiring Harness - Right
- OEM Connector: 34900-6228
- Service Connector: Service by Harness - See Part Catalog
- Description: 6-Way F 1.2 MCON-LL Series, Sealed(BK)

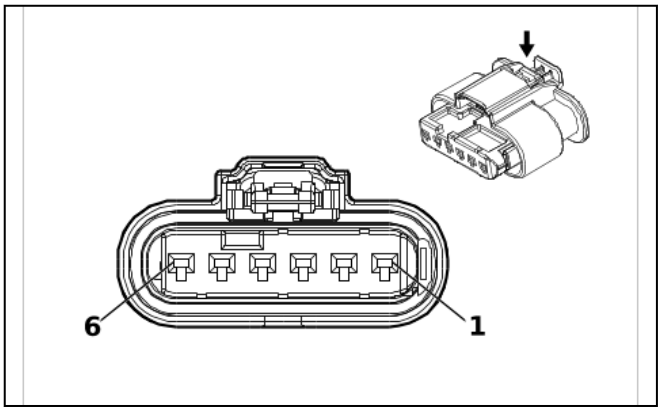
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B342B UHF Low Energy Remote Control Access Sensor Transceiver 2 (BOK / BOR / BOY)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) RD / WH	(1) 6440	(1) Battery Positive Voltage	(1) I	(1) —
(2) 2	(2) 0.35	(2) WH / YE	(2) 11325	(2) Virtual Key Private CAN Bus [-] Serial Data	(2) I	(2) —
(3) 3	(3) 0.35	(3) BU / BN	(3) 11326	(3) Virtual Key Private CAN Bus [+] Serial Data	(3) I	(3) —
(4) 4	(4) 0.35	(4) BU / BN	(4) 11326	(4) Virtual Key Private CAN Bus [+] Serial Data	(4) I	(4) —
(5) 5	(5) 0.35	(5) WH / YE	(5) 11325	(5) Virtual Key Private CAN Bus [-] Serial Data	(5) I	(5) —
(6) 6	(6) 0.5	(6) BK	(6) 1850	(6) Ground	(6) I	(6) —

B342C UHF Low Energy Remote Control Access Sensor Transceiver 3 ((BOK / BOR / BOY) - GRZ)



4455148

Connector Part Information

- Harness Type: Front Object Alarm Sensor Wiring Harness
- OEM Connector: 34900-6228
- Service Connector: Service by Harness - See Part Catalog
- Description: 6-Way F 1.2 MCON-LL Series, Sealed(BK)

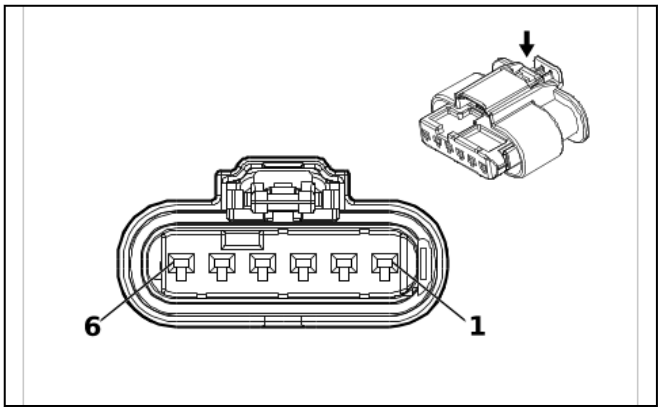
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B342C UHF Low Energy Remote Control Access Sensor Transceiver 3 ((BOK / BOR / BOY) - GRZ)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) RD / GY	(1) 7040	(1) Battery Positive Voltage	(1) I	(1) —
(2) 2	(2) 0.5	(2) WH / YE	(2) 11325	(2) Virtual Key Private CAN Bus [-] Serial Data	(2) I	(2) —
(3) 3	(3) 0.5	(3) BU / BN	(3) 11326	(3) Virtual Key Private CAN Bus [+] Serial Data	(3) I	(3) —
(4) 4	(4) 0.5	(4) BU / BN	(4) 11326	(4) Virtual Key Private CAN Bus [+] Serial Data	(4) I	(4) —
(5) 5	(5) 0.5	(5) WH / YE	(5) 11325	(5) Virtual Key Private CAN Bus [-] Serial Data	(5) I	(5) —
(6) 6	(6) 0.5	(6) BK	(6) 650	(6) Ground	(6) I	(6) —

B342C UHF Low Energy Remote Control Access Sensor Transceiver 3 ((BOK / BOR / BOY) and GRZ)



4455148

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 34900-6228
- Service Connector: 85526045
- Description: 6-Way F 1.2 MCON-LL Series, Sealed(BK)

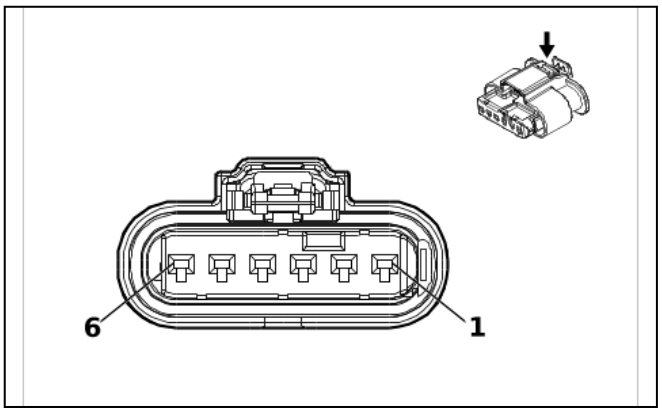
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B342C UHF Low Energy Remote Control Access Sensor Transceiver 3 ((BOK / BOR / BOY) and GRZ)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) RD / GY	(1) 7040	(1) Battery Positive Voltage	(1) I	(1) —
(2) 2	(2) 0.5	(2) WH / YE	(2) 11325	(2) Virtual Key Private CAN Bus [-] Serial Data	(2) I	(2) —
(3) 3	(3) 0.5	(3) BU / BN	(3) 11326	(3) Virtual Key Private CAN Bus [+] Serial Data	(3) I	(3) —
(4) 4	(4) 0.5	(4) BU / BN	(4) 11326	(4) Virtual Key Private CAN Bus [+] Serial Data	(4) I	(4) —
(5) 5	(5) 0.5	(5) WH / YE	(5) 11325	(5) Virtual Key Private CAN Bus [-] Serial Data	(5) I	(5) —
(6) 6	(6) 0.5	(6) BK	(6) 650	(6) Ground	(6) I	(6) —

B342D UHF Low Energy Remote Control Access Sensor Transceiver 4 (BOK / BOR / BOY)



5835086

Connector Part Information

- Harness Type: Rear Lamp Wiring Harness - Left
- OEM Connector: 34900-6221
- Service Connector: Service by Harness - See Part Catalog
- Description: 6-Way F 1.2 MCON-LL Series, Sealed(BK)

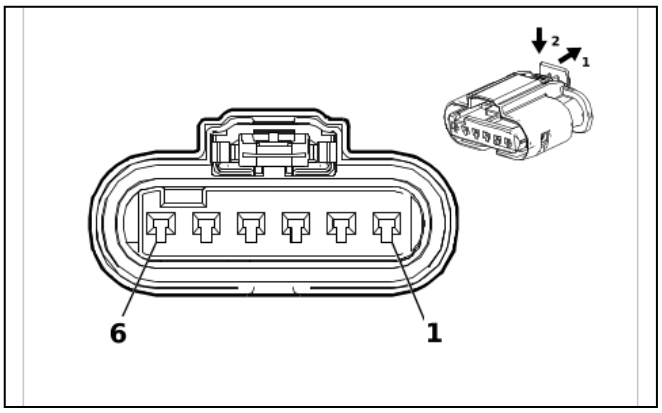
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B342D UHF Low Energy Remote Control Access Sensor Transceiver 4 (BOK / BOR / BOY)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) RD / WH	(1) 6440	(1) Battery Positive Voltage	(1) I	(1) —
2	—	—	—	Not Occupied	—	—
(3) 3	(3) 0.5	(3) BK / WH	(3) 1951	(3) Signal Ground	(3) I	(3) —
(4) 4	(4) 0.35	(4) BU / BN	(4) 11326	(4) Virtual Key Private CAN Bus [+] Serial Data	(4) I	(4) —
(5) 5	(5) 0.35	(5) WH / YE	(5) 11325	(5) Virtual Key Private CAN Bus [-] Serial Data	(5) I	(5) —
(6) 6	(6) 0.5	(6) BK / WH	(6) 1951	(6) Signal Ground	(6) I	(6) —

B342E UHF Low Energy Remote Control Access Sensor Transceiver 5 (BOK / BOR / BOY)



3960142

Connector Part Information

- Harness Type: Dome Lamp Wiring Harness
- OEM Connector: 34900-6219
- Service Connector: 85005020
- Description: 6-Way F 1.2 MCON-LL Series, Sealed(BK)

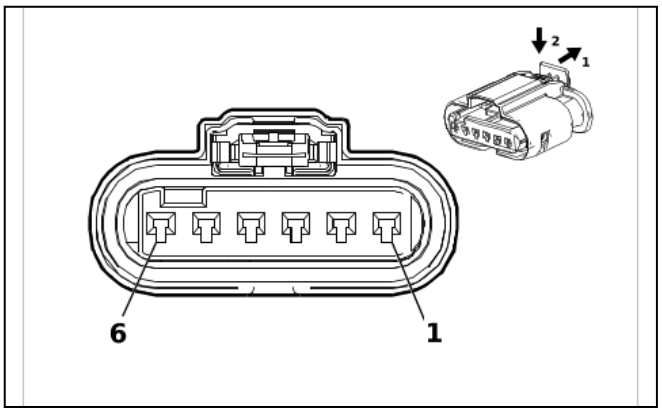
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B342E UHF Low Energy Remote Control Access Sensor Transceiver 5 (BOK / BOR / BOY)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) RD / YE	(1) 240	(1) Battery Positive Voltage	(1) I	(1) —
(2) 2	(2) 0.35	(2) WH / YE	(2) 11325	(2) Virtual Key Private CAN Bus [-] Serial Data	(2) I	(2) —
(3) 3	(3) 0.35	(3) BU / BN	(3) 11326	(3) Virtual Key Private CAN Bus [+] Serial Data	(3) I	(3) —
(4) 4	(4) 0.35	(4) BU / BN	(4) 11326	(4) Virtual Key Private CAN Bus [+] Serial Data	(4) I	(4) —
(5) 5	(5) 0.35	(5) WH / YE	(5) 11325	(5) Virtual Key Private CAN Bus [-] Serial Data	(5) I	(5) —
(6) 6	(6) 0.5	(6) BK / WH	(6) 851	(6) Signal Ground	(6) I	(6) —

B342F UHF Low Energy Remote Control Access Sensor Transceiver 6 (BOK / BOR / BOY)



3960142

Connector Part Information

- Harness Type: Rear Object Alarm Sensor Wiring Harness
- OEM Connector: 34900-6219
- Service Connector: Service by Harness - See Part Catalog
- Description: 6-Way F 1.2 MCON-LL Series, Sealed(BK)

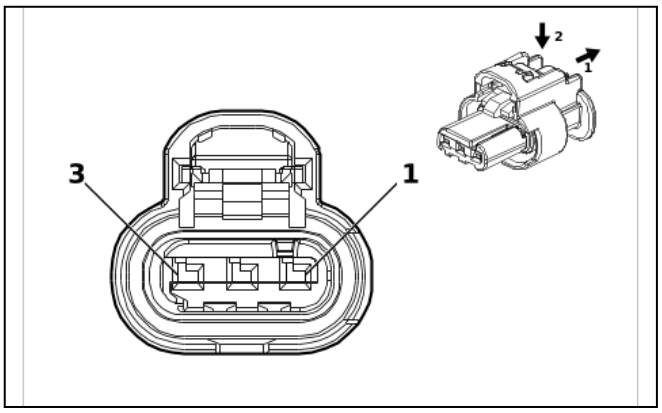
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B342F UHF Low Energy Remote Control Access Sensor Transceiver 6 (BOK / BOR / BOY)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) RD / WH	(1) 6440	(1) Battery Positive Voltage	(1) I	(1) —
(2) 2	(2) 0.35	(2) WH / YE	(2) 11325	(2) Virtual Key Private CAN Bus [-] Serial Data	(2) I	(2) —
(3) 3	(3) 0.35	(3) BU / BN	(3) 11326	(3) Virtual Key Private CAN Bus [+] Serial Data	(3) I	(3) —
(4) 4	(4) 0.35	(4) BU / BN	(4) 11326	(4) Virtual Key Private CAN Bus [+] Serial Data	(4) I	(4) —
(5) 5	(5) 0.35	(5) WH / YE	(5) 11325	(5) Virtual Key Private CAN Bus [-] Serial Data	(5) I	(5) —
(6) 6	(6) 0.5 (6) 0.5	(6) BK / WH (6) BK / WH	(6) 1851 (6) 1951	(6) Signal Ground (6) Signal Ground	(6) I (6) I	(6) VFE / VJG / VJH (6) VPS

B345P Exhaust Pressure Differential Sensor - Particulate Filter (LZ0)



4581126

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 1-2296695-1
- Service Connector: 86792094
- Description: 3-Way F 1.2 MCON-CB Series, Sealed(BK)

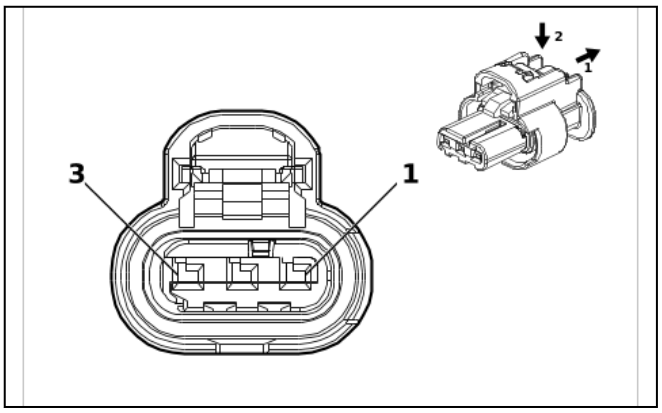
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B345P Exhaust Pressure Differential Sensor - Particulate Filter (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) WH / BN	(1) 2363	(1) Exhaust Pressure Sensor SENT 1 Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / YE	(2) 548	(2) Engine Control Sensors Low Reference 1	(2) I	(2) —
(3) 3	(3) 0.5	(3) BU / RD	(3) 460	(3) Engine Control Sensors 5 Volt Reference 1	(3) I	(3) —

B345R Exhaust Pressure Differential Sensor - Exhaust Gas Recirculation (LZ0)



4778903

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 1-2296695-2
- Service Connector: 86792095
- Description: 3-Way F 1.2 MCON-CB Series, Sealed(BK)

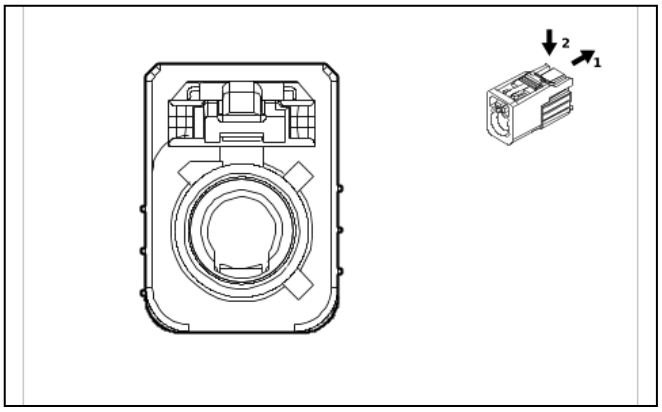
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B345R Exhaust Pressure Differential Sensor - Exhaust Gas Recirculation (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GN	(1) 10478	(1) Low Pressure Exhaust Gas Recirculation Sensor SENT Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / YE	(2) 548	(2) Engine Control Sensors Low Reference 1	(2) I	(2) —
(3) 3	(3) 0.5	(3) BU / RD	(3) 460	(3) Engine Control Sensors 5 Volt Reference 1	(3) I	(3) —

B350B Interior View Camera (UCV)



5907152

Connector Part Information
- Harness Type: Dome Lamp Wiring Harness
- OEM Connector: 33340315
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way F Coax Type(BU)

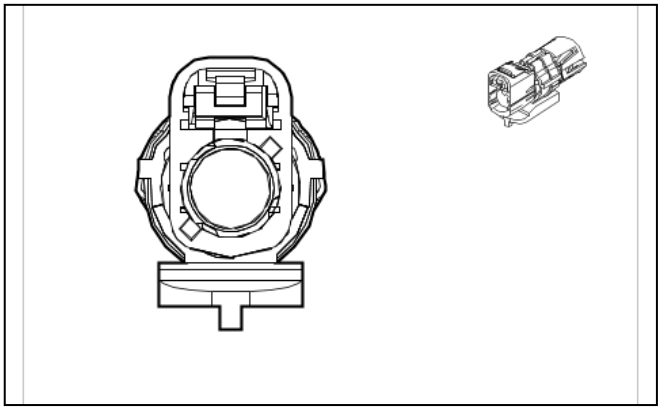
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

B350B Interior View Camera (UCV)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
BU	—	Coax Cable	10648	Interior Vision Cabin Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	I	—

B352 Video Display Inside Rearview Mirror Camera (DRZ)



5633894

Connector Part Information
- Harness Type: Roof Rear Spoiler Wiring Harness
- OEM Connector: 35187049
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way F Coax Type, Sealed(BU)

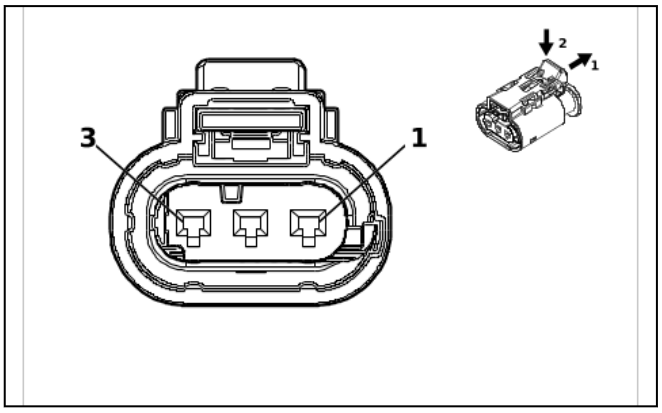
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

B352 Video Display Inside Rearview Mirror Camera (DRZ)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
BU	—	Coax Cable	2387	Full Display Mirror Rear Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	I	—

B359 Exhaust Gas Temperature Sensor Module (LZ0)



6952635

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 13551874
- Service Connector: 86419007
- Description: 3-Way F 1.2 MLK Series, Sealed(GY)

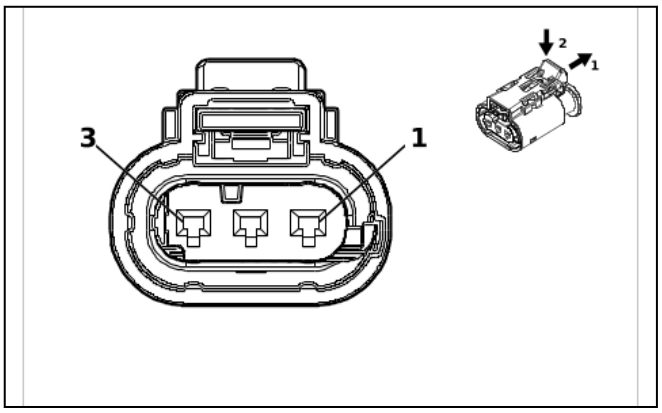
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B359 Exhaust Gas Temperature Sensor Module (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GN	(1) 10289	(1) Exhaust Gas Temperature Sensor SENT 1 Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / GN	(2) 580	(2) Engine Control Sensors Low Reference 2	(2) I	(2) —
(3) 3	(3) 0.5	(3) WH / RD	(3) 480	(3) Engine Control Vehicle Sensors 5 Volt Reference 1	(3) I	(3) —

B359B Exhaust Gas Temperature Sensor Module 2 (LZ0)



6952635

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 13551874
- Service Connector: 86419007
- Description: 3-Way F 1.2 MLK Series, Sealed(GY)

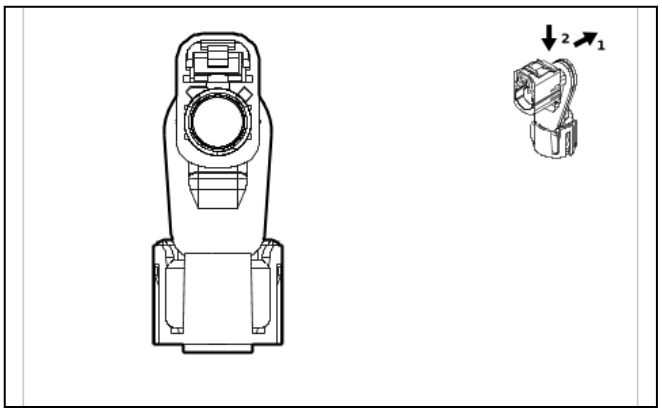
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

B359B Exhaust Gas Temperature Sensor Module 2 (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BU	(1) 10290	(1) Exhaust Gas Temperature Sensor SENT 2 Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / GN	(2) 580	(2) Engine Control Sensors Low Reference 2	(2) I	(2) —
(3) 3	(3) 0.5	(3) WH / RD	(3) 480	(3) Engine Control Vehicle Sensors 5 Volt Reference 1	(3) I	(3) —

B384 Rearview Underbody Camera (UXA)



5920539

Connector Part Information
- Harness Type: Underbody Camera Wiring Harness
- OEM Connector: 13537644
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way F Coax Type(BK)

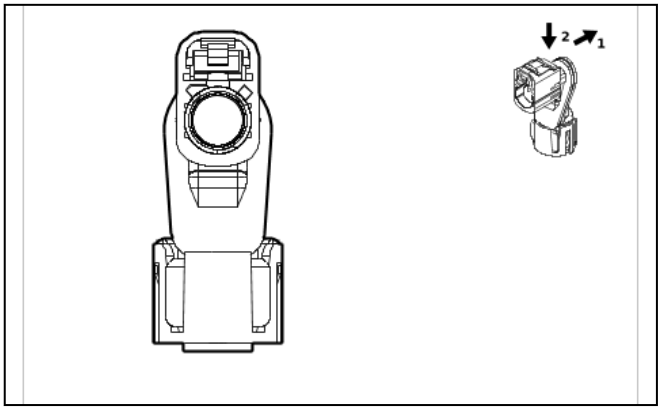
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

B384 Rearview Underbody Camera (UXA)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
BK	—	Coax Cable	11348	Underbody Camera LVDS (Low Voltage DIfferential Signaling) Coaxial Signal	I	—

B385 Front View Underbody Camera (UXA)



5920539

Connector Part Information
- Harness Type: Underbody Camera Wiring Harness
- OEM Connector: 13537644
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way F Coax Type(BK)

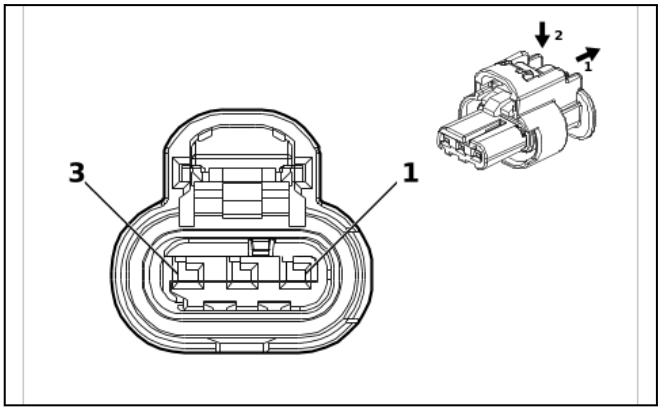
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

B385 Front View Underbody Camera (UXA)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
BK	—	Coax Cable	11352	Underbody Camera 2 LVDS (Low Voltage DIfferential Signaling) Coaxial Signal	I	—

B394 Evaporative Emission Canister Purge System Pressure Sensor (FJW)



4778903

Connector Part Information

- Harness Type: Chassis Wiring Harness
- OEM Connector: 1-2296695-2
- Service Connector: 86792095
- Description: 3-Way F 1.2 MCON-CB Series, Sealed(BK)

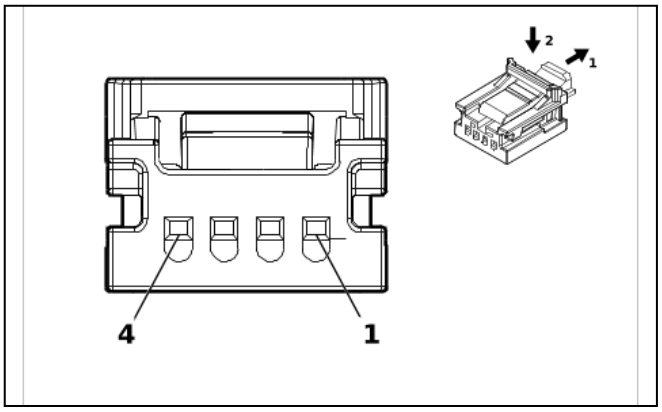
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

B394 Evaporative Emission Canister Purge System Pressure Sensor (FJW)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) YE / GY	(1) 11029	(1) Canister Vapor Pressure Sensor Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / GY	(2) 626	(2) Engine Control Vehicle Sensors Low Reference 1	(2) I	(2) —
(3) 3	(3) 0.5	(3) WH / RD	(3) 480	(3) Engine Control Vehicle Sensors 5 Volt Reference 1	(3) I	(3) —

B396LF Mobile Telephone Headliner Microphone - Left Front



5493278

Connector Part Information

- Harness Type: Dome Lamp Wiring Harness
- OEM Connector: 34791-5140
- Service Connector: 19354840
- Description: 4-Way F Mini 50 Series(BK)

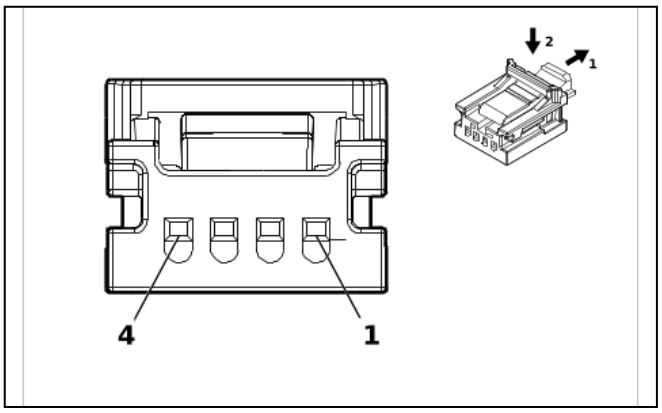
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Service by Cable	EL-35616-58 (BK)	EL-38125-58

B396LF Mobile Telephone Headliner Microphone - Left Front

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) YE	(1) 8579	(1) Automotive Audio Bus A2B Serial Data 1 [-]	(1) I	(1) —
(2) 2	(2) 0.35	(2) WH	(2) 8580	(2) Automotive Audio Bus A2B Serial Data 1 [+]	(2) I	(2) —
(3) 3	(3) 0.35	(3) WH	(3) 8580	(3) Automotive Audio Bus A2B Serial Data 1 [+]	(3) I	(3) —
(4) 4	(4) 0.35	(4) YE	(4) 8579	(4) Automotive Audio Bus A2B Serial Data 1 [-]	(4) I	(4) —

B396RF Mobile Telephone Headliner Microphone - Right Front



5493278

Connector Part Information

- Harness Type: Dome Lamp Wiring Harness
- OEM Connector: 34791-5140
- Service Connector: 19354840
- Description: 4-Way F Mini 50 Series(BK)

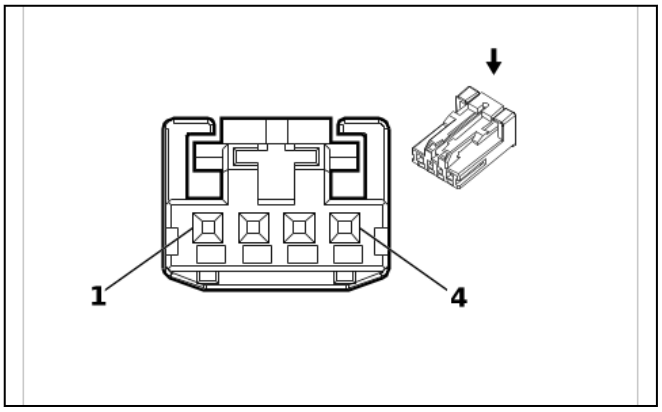
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Service by Cable	EL-35616-58 (BK)	EL-38125-58

B396RF Mobile Telephone Headliner Microphone - Right Front

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) YE	(1) 8579	(1) Automotive Audio Bus A2B Serial Data 1 [-]	(1) I	(1) —
(2) 2	(2) 0.35	(2) WH	(2) 8580	(2) Automotive Audio Bus A2B Serial Data 1 [+]	(2) I	(2) —
(3) 3	(3) 0.35	(3) WH	(3) 8580	(3) Automotive Audio Bus A2B Serial Data 1 [+]	(3) I	(3) —
(4) 4	(4) 0.35	(4) YE	(4) 8579	(4) Automotive Audio Bus A2B Serial Data 1 [-]	(4) I	(4) —

E1AA Front Floor Flood Lamp - Left (C70 / C85)



2717162

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 1-936119-1
- Service Connector: 19367524
- Description: 4-Way F 0.64 Micro-Quadlock Series(BK)

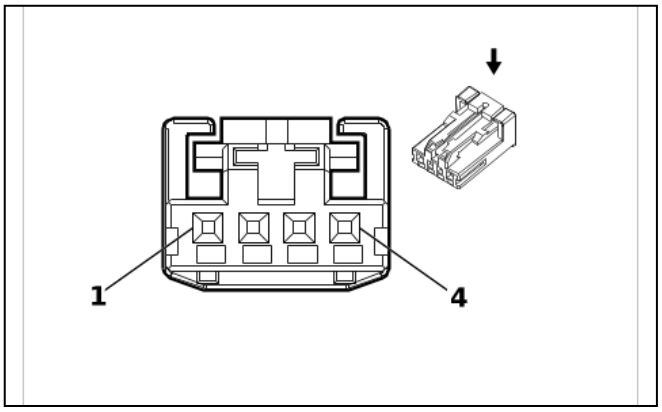
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

E1AA Front Floor Flood Lamp - Left (C70 / C85)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) BK / WH	(1) 851	(1) Signal Ground	(1) I	(1) —
(2) 2	(2) 0.35	(2) WH / VT	(2) 4849	(2) LED Ambient Lighting Enable Signal	(2) I	(2) —
(3) 3	(3) 0.35	(3) GN / WH	(3) 2861	(3) Body Control Module LIN Bus 15	(3) I	(3) —
(4) 4	(4) 0.35	(4) BN / GN	(4) 8924	(4) Ambient Light Device 1 LIN Bus 1	(4) I	(4) —

E1AB Front Floor Flood Lamp - Right (C70 / C85)



2717162

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 1-936119-1
- Service Connector: 19367524
- Description: 4-Way F 0.64 Micro-Quadlock Series(BK)

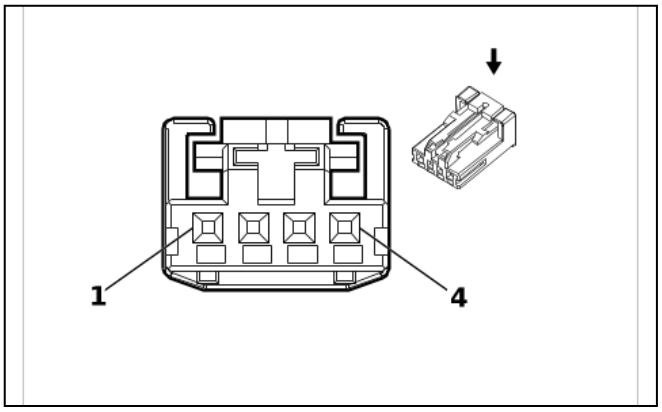
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

E1AB Front Floor Flood Lamp - Right (C70 / C85)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) BK / WH	(1) 851	(1) Signal Ground	(1) I	(1) —
(2) 2	(2) 0.35	(2) WH / VT	(2) 4849	(2) LED Ambient Lighting Enable Signal	(2) I	(2) —
(3) 3	(3) 0.35	(3) GN / WH	(3) 2861	(3) Body Control Module LIN Bus 15	(3) I	(3) —
(4) 4	(4) 0.35	(4) GY / GN	(4) 8927	(4) Ambient Light Device 4 LIN Bus 1	(4) I	(4) —

E1D Front Side Door Light Conductor Lamp - Driver Trim Panel (C70 / C85)



2717162

Connector Part Information

- Harness Type: Front Side Door Door Lock Door Wiring Harness - Driver
- OEM Connector: 1-936119-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 0.64 Micro-Quadlock Series(BK)

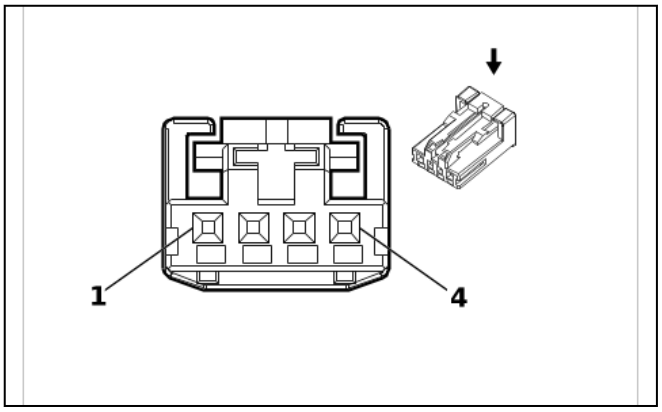
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

E1D Front Side Door Light Conductor Lamp - Driver Trim Panel (C70 / C85)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) BK	(1) 1550	(1) Ground	(1) I	(1) —
(2) 2	(2) 0.35	(2) WH / VT	(2) 4849	(2) LED Ambient Lighting Enable Signal	(2) I	(2) —
(3) 3	(3) 0.35	(3) GN / WH	(3) 2861	(3) Body Control Module LIN Bus 15	(3) I	(3) —
4	—	—	—	Not Occupied	—	—

E1H Instrument Panel Light Conductor Lamp - Right



2717162

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 1-936119-1
- Service Connector: 19367524
- Description: 4-Way F 0.64 Micro-Quadlock Series(BK)

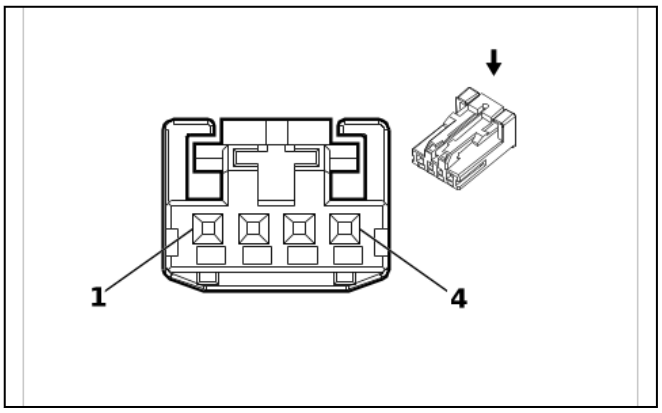
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

E1H Instrument Panel Light Conductor Lamp - Right

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) BK / WH	(1) 851	(1) Signal Ground	(1) I	(1) —
(2) 2	(2) 0.35	(2) WH / VT	(2) 4849	(2) LED Ambient Lighting Enable Signal	(2) I	(2) —
(3) 3	(3) 0.35	(3) GN / WH	(3) 2861	(3) Body Control Module LIN Bus 15	(3) I	(3) —
4	—	—	—	Not Occupied	—	—

E1P Front Side Door Light Conductor Lamp - Passenger Trim Panel (C70 / C85)



2717162

Connector Part Information

- Harness Type: Front Side Door Door Lock Door Wiring Harness - Passenger
- OEM Connector: 1-936119-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 0.64 Micro-Quadlock Series(BK)

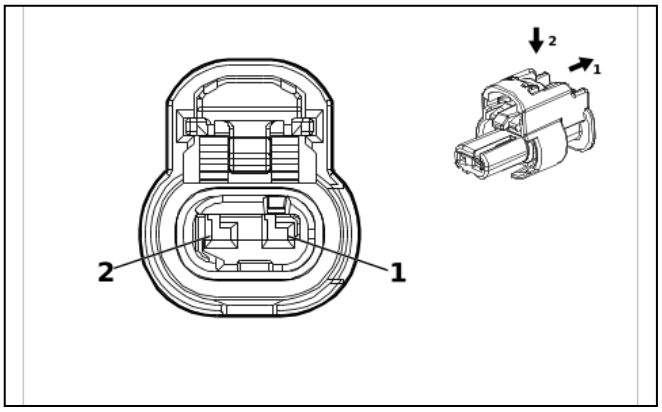
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

E1P Front Side Door Light Conductor Lamp - Passenger Trim Panel (C70 / C85)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) BK / WH	(1) 1451	(1) Signal Ground	(1) I	(1) —
(2) 2	(2) 0.35	(2) WH / VT	(2) 4849	(2) LED Ambient Lighting Enable Signal	(2) I	(2) —
(3) 3	(3) 0.35	(3) GN / WH	(3) 2861	(3) Body Control Module LIN Bus 15	(3) I	(3) —
4	—	—	—	Not Occupied	—	—

E2LF Front Side Marker Lamp - Left (- GRZ)



4649903

Connector Part Information
- Harness Type: Front Object Alarm Sensor Wiring Harness
- OEM Connector: 1-2296694-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

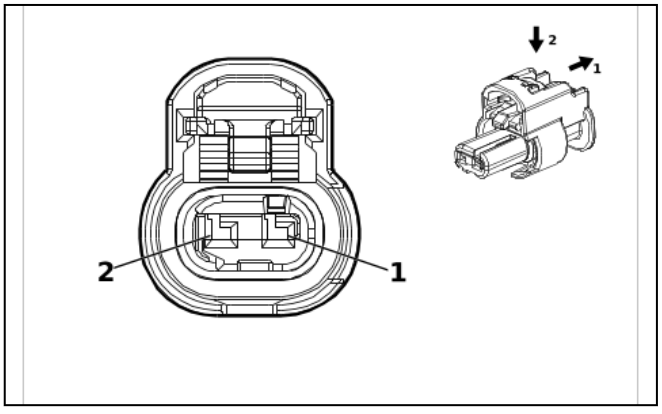
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

E2LF Front Side Marker Lamp - Left (- GRZ)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BK	(1) 650	(1) Ground	(1) I	(1) —
(2) 2	(2) 0.5	(2) BN / GN	(2) 14026	(2) Identification Side Marker Lamp Supply Voltage	(2) I	(2) —

E2LF Front Side Marker Lamp - Left (GRZ)



4649903

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 1-2296694-1
- Service Connector: 85761014
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

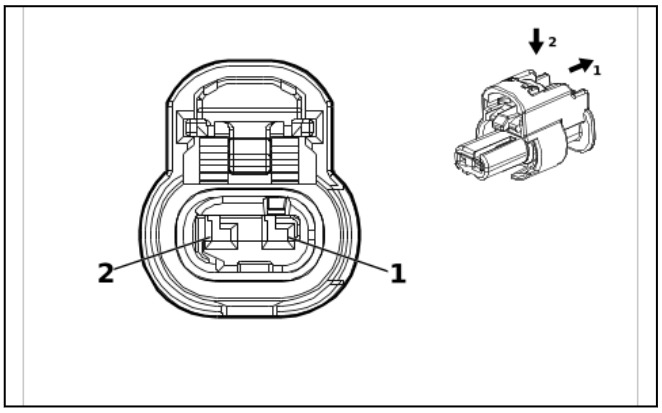
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

E2LF Front Side Marker Lamp - Left (GRZ)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BK	(1) 650	(1) Ground	(1) I	(1) —
(2) 2	(2) 0.5	(2) BN / GN	(2) 14026	(2) Identification Side Marker Lamp Supply Voltage	(2) I	(2) —

E2RF Front Side Marker Lamp - Right (- GRZ)



4649903

Connector Part Information

- Harness Type: Front Object Alarm Sensor Wiring Harness
- OEM Connector: 1-2296694-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

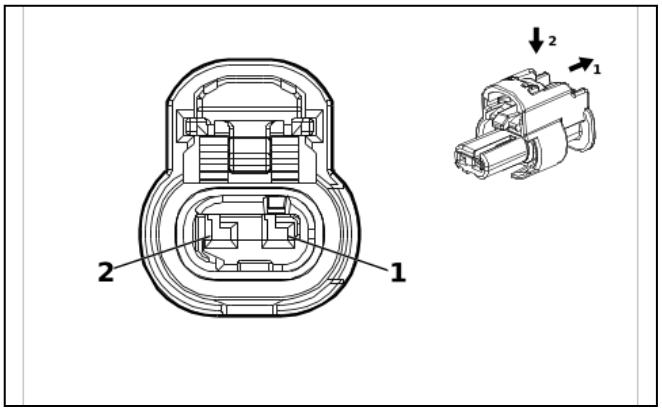
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

E2RF Front Side Marker Lamp - Right (- GRZ)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BK	(1) 650	(1) Ground	(1) I	(1) —
(2) 2	(2) 0.5	(2) BN / GN	(2) 14026	(2) Identification Side Marker Lamp Supply Voltage	(2) I	(2) —

E2RF Front Side Marker Lamp - Right (GRZ)



4649903

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 1-2296694-1
- Service Connector: 85761014
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

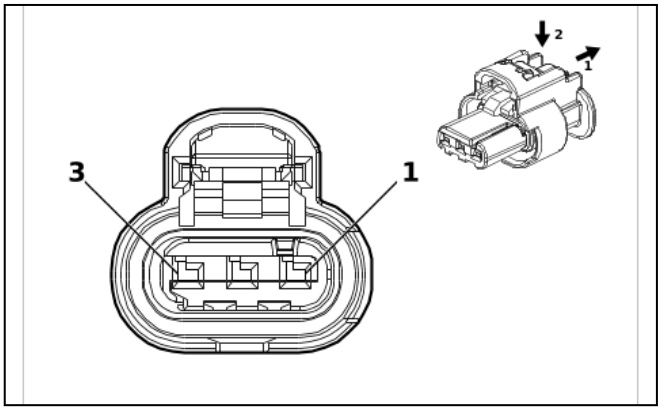
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

E2RF Front Side Marker Lamp - Right (GRZ)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BK	(1) 650	(1) Ground	(1) I	(1) —
(2) 2	(2) 0.5	(2) BN / GN	(2) 14026	(2) Identification Side Marker Lamp Supply Voltage	(2) I	(2) —

E6A High Mount Stop and Cargo Lamp - 2 - Door



4581126

Connector Part Information
- Harness Type: Dome Lamp Wiring Harness
- OEM Connector: 1-2296695-1
- Service Connector: 86792094
- Description: 3-Way F 1.2 MCON-CB Series, Sealed(BK)

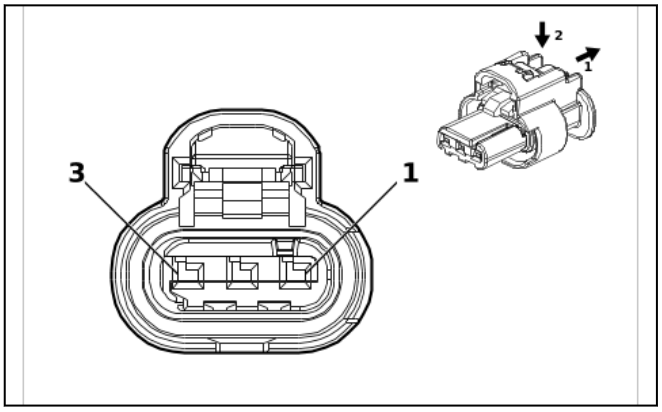
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

E6A High Mount Stop and Cargo Lamp - 2 - Door

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) WH / VT	(1) 1430	(1) Exterior Courtesy Lamp Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) BN / YE	(2) 820	(2) Center High Mounted Stop Lamp Supply Voltage	(2) I	(2) —
(3) 3	(3) 0.5	(3) BK	(3) 1050	(3) Ground	(3) I	(3) —

E6A High Mount Stop and Cargo Lamp - 4 - Door



4581126

Connector Part Information

- Harness Type: Roof Rear Spoiler Wiring Harness
- OEM Connector: 1-2296695-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 3-Way F 1.2 MCON-CB Series, Sealed(BK)

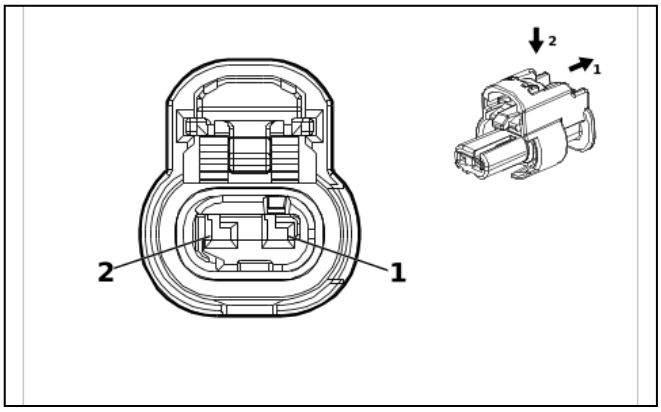
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

E6A High Mount Stop and Cargo Lamp - 4 - Door

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) WH / VT	(1) 1430	(1) Exterior Courtesy Lamp Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) BN / YE	(2) 820	(2) Center High Mounted Stop Lamp Supply Voltage	(2) I	(2) —
(3) 3	(3) 0.5	(3) BK	(3) 8350	(3) Antenna Filter Ground	(3) I	(3) —

E7L Rear License Plate Lamp - Left



4649903

Connector Part Information
- Harness Type: Rear Object Alarm Sensor Wiring Harness
- OEM Connector: 1-2296694-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

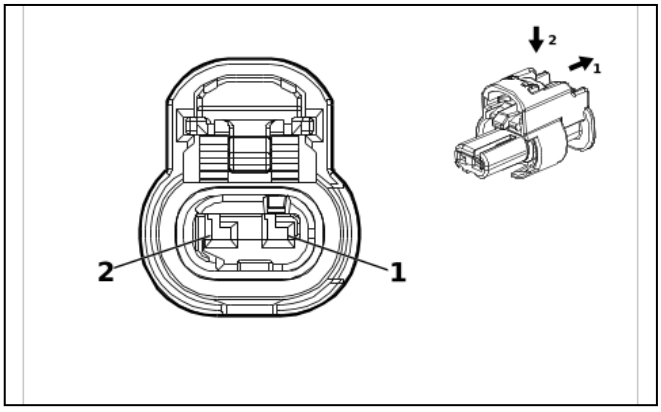
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

E7L Rear License Plate Lamp - Left

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BK	(1) 1850	(1) Ground	(1) I	(1) —
(2) 2	(2) 0.5	(2) GN / YE	(2) 6846	(2) Rear License Plate Lamp Control	(2) I	(2) —

E7R Rear License Plate Lamp - Right



4649903

Connector Part Information
- Harness Type: Rear Object Alarm Sensor Wiring Harness
- OEM Connector: 1-2296694-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

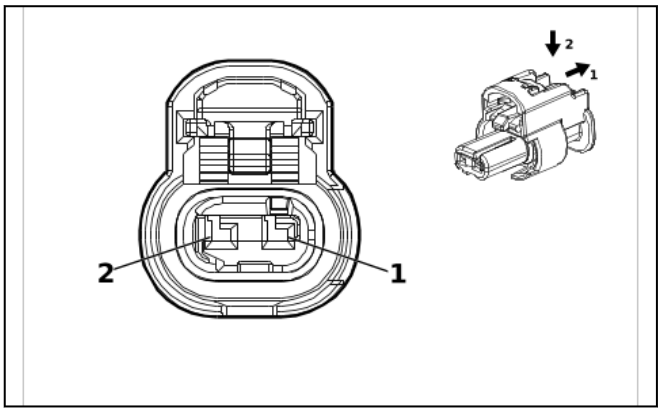
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

E7R Rear License Plate Lamp - Right

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BK	(1) 1850	(1) Ground	(1) I	(1) —
(2) 2	(2) 0.5	(2) GN / YE	(2) 6846	(2) Rear License Plate Lamp Control	(2) I	(2) —

E8A Front Side Door Sill Plate Illumination Lamp - Left (S0M)



4036662

Connector Part Information

- Harness Type: Accessory Wiring Harness - Sill Plate
- OEM Connector: 1-2203312-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

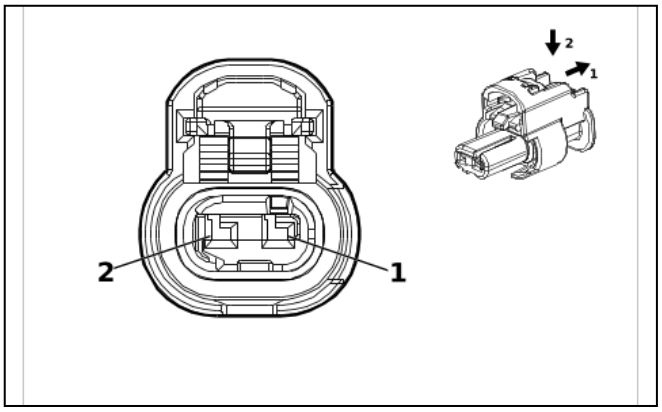
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

E8A Front Side Door Sill Plate Illumination Lamp - Left (S0M)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) GY	(1) 157	(1) Interior Lamp Control	(1) I	(1) —
(2) 2	(2) 0.75	(2) BK	(2) 150	(2) Ground	(2) I	(2) —

E8B Front Side Door Sill Plate Illumination Lamp - Right (S0M)



4036662

Connector Part Information
- Harness Type: Accessory Wiring Harness - Sill Plate
- OEM Connector: 1-2203312-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

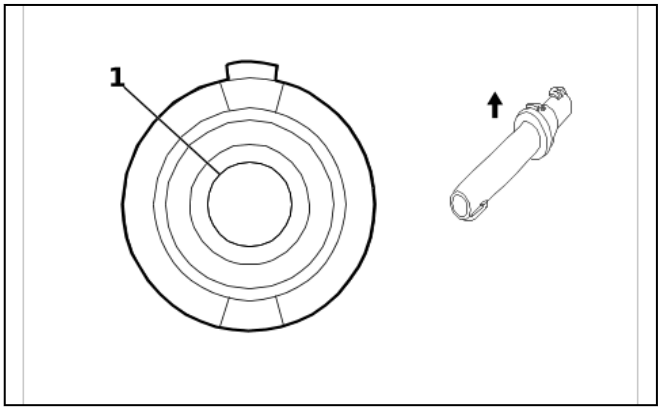
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

E8B Front Side Door Sill Plate Illumination Lamp - Right (S0M)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) GY	(1) 157	(1) Interior Lamp Control	(1) I	(1) —
(2) 2	(2) 0.75	(2) BK	(2) 150	(2) Ground	(2) I	(2) —

E12A Glow Plug 1 (LZ0)



2231591

Connector Part Information
- Harness Type: Diesel Glow Plug Wiring Harness
- OEM Connector: 284818-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 1-Way F 4.0 Series(BK)

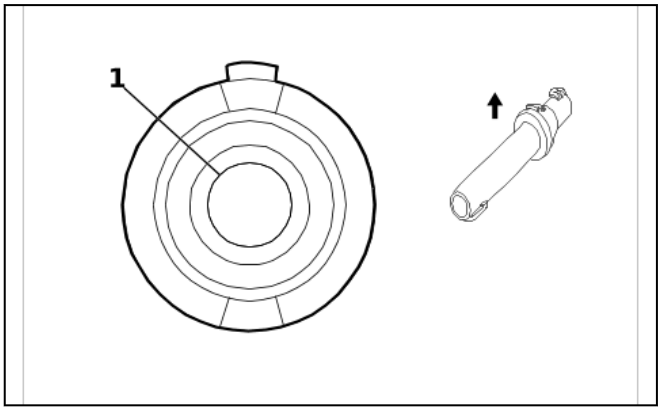
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-37 (L-BU)	No Tool Required

E12A Glow Plug 1 (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 2.5	(1) GY / RD	(1) 1581	(1) Glow Plug 1 Control	(1) I	(1) —

E12B Glow Plug 2 (LZ0)



2231591

Connector Part Information

- Harness Type: Diesel Glow Plug Wiring Harness
- OEM Connector: 284818-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 1-Way F 4.0 Series(BK)

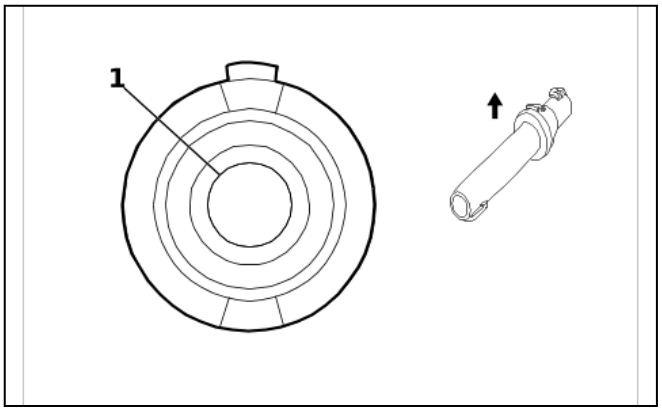
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-37 (L-BU)	No Tool Required

E12B Glow Plug 2 (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 2.5	(1) GY / BK	(1) 1582	(1) Glow Plug 2 Control	(1) I	(1) —

E12C Glow Plug 3 (LZ0)



2231591

Connector Part Information
- Harness Type: Diesel Glow Plug Wiring Harness
- OEM Connector: 284818-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 1-Way F 4.0 Series(BK)

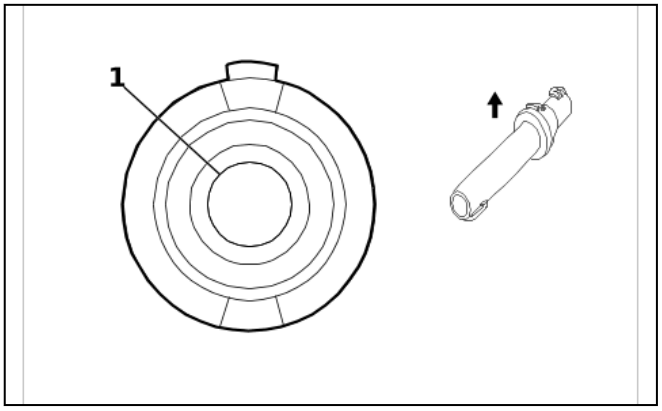
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-37 (L-BU)	No Tool Required

E12C Glow Plug 3 (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 2.5	(1) GY / GN	(1) 1583	(1) Glow Plug 3 Control	(1) I	(1) —

E12D Glow Plug 4 (LZ0)



2231591

Connector Part Information
- Harness Type: Diesel Glow Plug Wiring Harness
- OEM Connector: 284818-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 1-Way F 4.0 Series(BK)

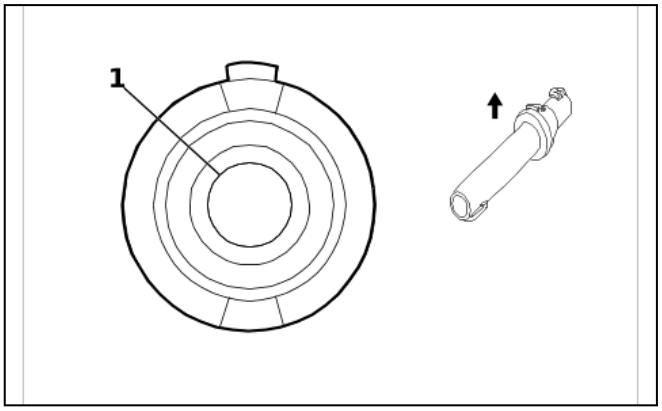
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-37 (L-BU)	No Tool Required

E12D Glow Plug 4 (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 2.5	(1) GY / YE	(1) 1584	(1) Glow Plug 4 Control	(1) I	(1) —

E12E Glow Plug 5 (LZ0)



2231591

Connector Part Information

- Harness Type: Diesel Glow Plug Wiring Harness
- OEM Connector: 284818-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 1-Way F 4.0 Series(BK)

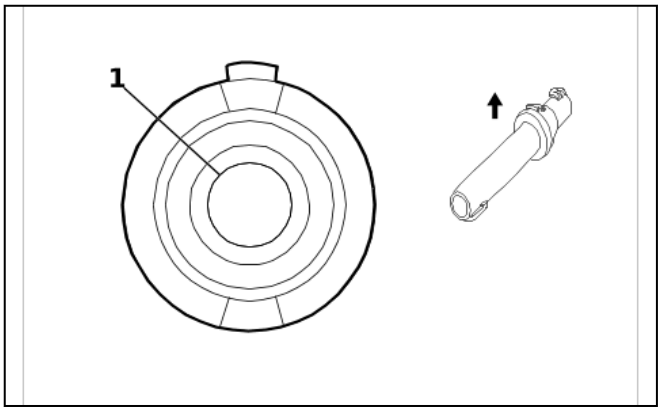
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-37 (L-BU)	No Tool Required

E12E Glow Plug 5 (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 2.5	(1) GY / WH	(1) 1585	(1) Glow Plug 5 Control	(1) I	(1) —

E12F Glow Plug 6 (LZ0)



2231591

Connector Part Information
- Harness Type: Diesel Glow Plug Wiring Harness
- OEM Connector: 284818-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 1-Way F 4.0 Series(BK)

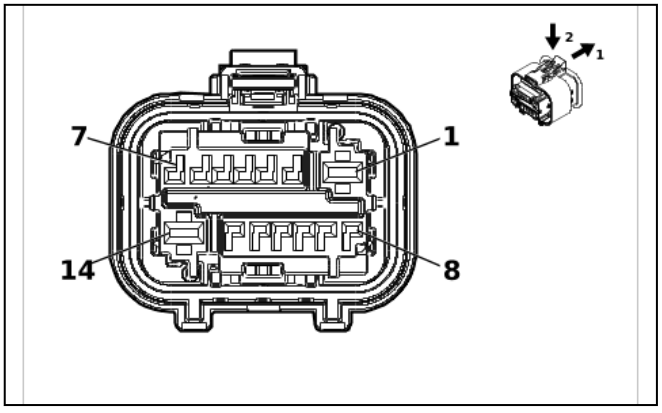
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-37 (L-BU)	No Tool Required

E12F Glow Plug 6 (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 2.5	(1) GY	(1) 1586	(1) Glow Plug 6 Control	(1) I	(1) —

E13LA Front Headlamp - Left



6650652

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 12192300
- Service Connector: 86419005
- Description: 14-Way F 1.2 MCON, 2.8 MCP Series, Sealed(BK)

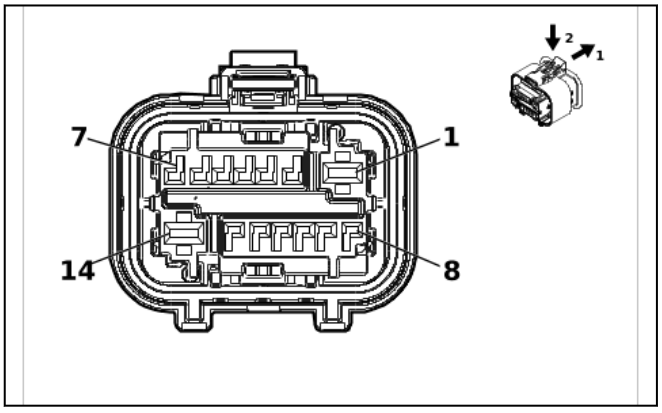
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	84962854	J-35616-12 (BU)	J-38125-215A
II	85533337	J-35616-4A (PU)	J-38125-11A

E13LA Front Headlamp - Left

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1.5	(1) BK	(1) 250	(1) Ground	(1) II	(1) —
(2) 2	(2) 0.5	(2) YE	(2) 712	(2) Left Headlamp Low Beam Control	(2) I	(2) —
(3) 3	(3) 0.5	(3) WH	(3) 711	(3) Left Headlamp High Beam Control	(3) I	(3) —
(4) 4	(4) 0.5	(4) GY / BU	(4) 7538	(4) Left Front DRL Control	(4) I	(4) —
(5) 5	(5) 0.5	(5) BU / WH	(5) 1314	(5) Left Front Turn Signal Lamp Control	(5) I	(5) —
(6) 6	(6) 0.35	(6) VT / BK	(6) 6568	(6) Front Turn Signal Lamp Feedback Signal	(6) I	(6) —
(7) 7	(7) 0.5	(7) YE / GN	(7) 2024	(7) Animation Lighting Control	(7) I	(7) —
(8) 8	(8) 0.5	(8) GY / BN	(8) 10749	(8) Sequential Turn Lamp Enable Signal	(8) I	(8) —
(9) 9	(9) 0.5	(9) BN / GN	(9) 14026	(9) Identification Side Marker Lamp Supply Voltage	(9) I	(9) —
10 - 13	—	—	—	Not Occupied	—	—
(14) 14	(14) 1.5	(14) RD / WH	(14) 640	(14) Battery Positive Voltage	(14) II	(14) —

E13RA Front Headlamp - Right



6650652

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 12192300
- Service Connector: 86419005
- Description: 14-Way F 1.2 MCON, 2.8 MCP Series, Sealed(BK)

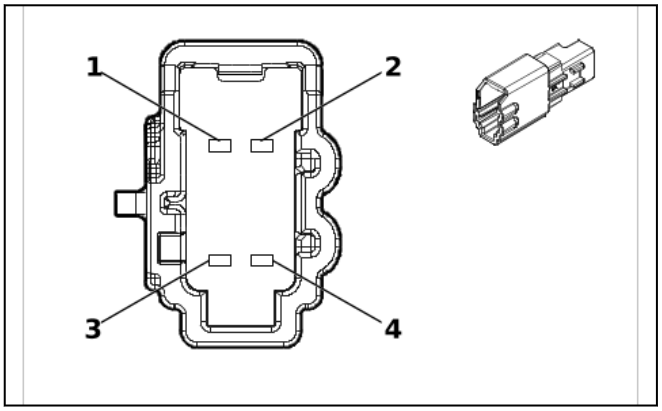
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	84962854	J-35616-12 (BU)	J-38125-215A
II	85533337	J-35616-4A (PU)	J-38125-11A

E13RA Front Headlamp - Right

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1.5	(1) BK	(1) 650	(1) Ground	(1) II	(1) —
(2) 2	(2) 0.5	(2) YE	(2) 312	(2) Right Headlamp Low Beam Control	(2) I	(2) —
(3) 3	(3) 0.5	(3) WH	(3) 311	(3) Right Headlamp High Beam Control	(3) I	(3) —
(4) 4	(4) 0.5	(4) BU / BN	(4) 7539	(4) Right Front DRL Control	(4) I	(4) —
(5) 5	(5) 0.5	(5) GN / VT	(5) 1315	(5) Right Front Turn Signal Lamp Control	(5) I	(5) —
(6) 6	(6) 0.35	(6) WH / YE	(6) 7545	(6) Right Front Turn Signal Lamp Feedback Signal	(6) I	(6) —
(7) 7	(7) 0.5	(7) YE / GN	(7) 2024	(7) Animation Lighting Control	(7) I	(7) —
(8) 8	(8) 0.5	(8) GY / BN	(8) 10749	(8) Sequential Turn Lamp Enable Signal	(8) I	(8) —
(9) 9	(9) 0.5	(9) BN / GN	(9) 14026	(9) Identification Side Marker Lamp Supply Voltage	(9) I	(9) —
10 - 13	—	—	—	Not Occupied	—	—
(14) 14	(14) 1.5	(14) RD / YE	(14) 740	(14) Battery Positive Voltage	(14) II	(14) —

E14A Front Seat Back Heater - Driver (KAM)



5423974

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Driver
- OEM Connector: 6098-9049
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way M 1.2 MCON Series(GY)

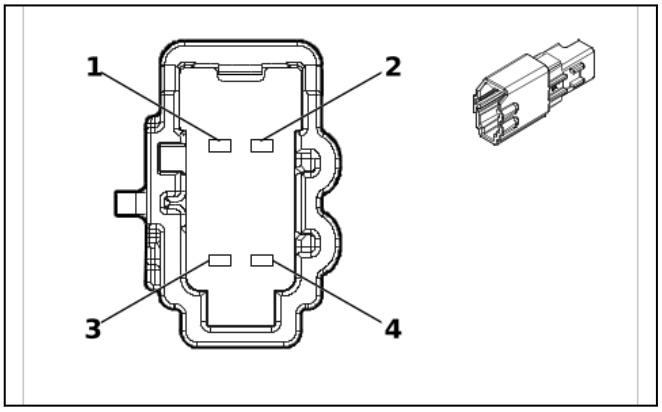
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-13 (BU)	No Tool Required
II	Not required	J-35616-17 (L-GN)	No Tool Required

E14A Front Seat Back Heater - Driver (KAM)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BN	(1) 2432	(1) Driver Seat Back Heating Element Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) BU	(2) 2425	(2) Driver Seat Back Heating Temperature Sensor Signal	(2) II	(2) —
(3) 3	(3) 0.5	(3) BK / YE	(3) 2080	(3) Driver Heated Seat Thermistor Low Reference	(3) II	(3) —
(4) 4	(4) 0.75	(4) BN / BK	(4) 2078	(4) Driver Seat Heating Element Low Reference	(4) I	(4) —

E14B Front Seat Cushion Heater - Driver (KAM)



5360963

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Driver
- OEM Connector: 6098-9046
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way M 1.2 MCON Series(BK)

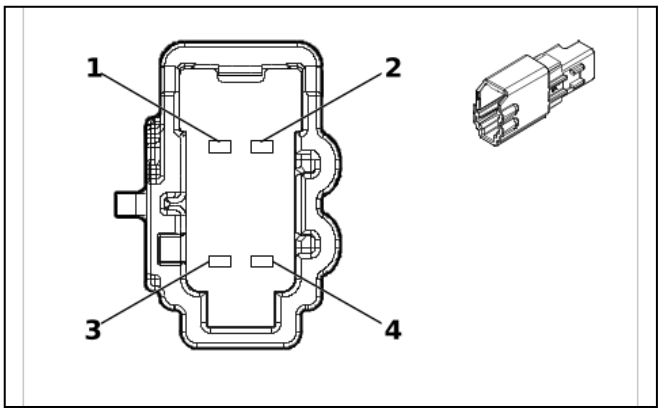
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-13 (BU)	No Tool Required
II	Not required	J-35616-17 (L-GN)	No Tool Required

E14B Front Seat Cushion Heater - Driver (KAM)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BN / VT	(1) 2077	(1) Driver Seat Heating Element Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) YE / GY	(2) 2079	(2) Driver Seat Heating Temperature Sensor Signal	(2) II	(2) —
(3) 3	(3) 0.5	(3) BK / YE	(3) 2080	(3) Driver Heated Seat Thermistor Low Reference	(3) II	(3) —
(4) 4	(4) 0.75	(4) BN / BK	(4) 2078	(4) Driver Seat Heating Element Low Reference	(4) I	(4) —

E14C Front Seat Back Heater - Passenger (KAM)



5423974

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Passenger
- OEM Connector: 6098-9049
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way M 1.2 MCON Series(GY)

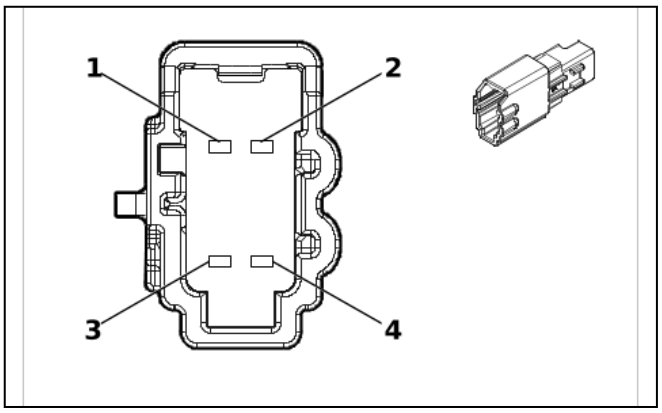
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-13 (BU)	No Tool Required
II	Not required	J-35616-17 (L-GN)	No Tool Required

E14C Front Seat Back Heater - Passenger (KAM)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) WH / BN	(1) 2481	(1) Passenger Seat Back Heating Element Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) WH / BU	(2) 2436	(2) Passenger Seat Back Heating Temperature Sensor Signal	(2) II	(2) —
(3) 3	(3) 0.5	(3) BK / GN	(3) 2482	(3) Passenger Heated Back Thermistor Low Reference	(3) II	(3) —
(4) 4	(4) 0.75	(4) GY / BK	(4) 2480	(4) Passenger Seat Heating Element Low Reference	(4) I	(4) —

E14D Front Seat Cushion Heater - Passenger (KAM)



5360963

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Passenger
- OEM Connector: 6098-9046
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way M 1.2 MCON Series(BK)

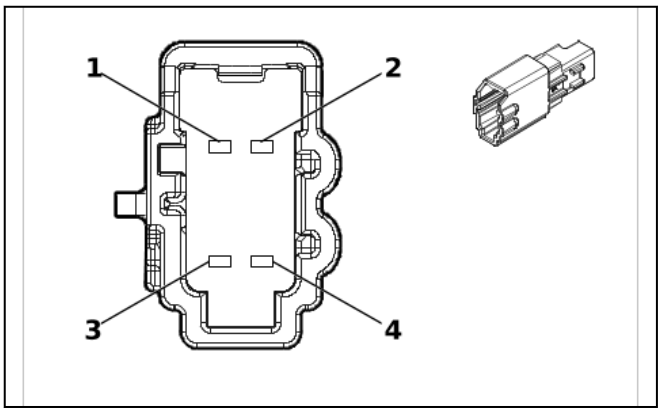
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-13 (BU)	No Tool Required
II	Not required	J-35616-17 (L-GN)	No Tool Required

E14D Front Seat Cushion Heater - Passenger (KAM)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BN / BU	(1) 2479	(1) Passenger Seat Heating Element Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) WH / GY	(2) 2434	(2) Passenger Seat Heating Temperature Sensor Signal	(2) II	(2) —
(3) 3	(3) 0.5	(3) BK / GY	(3) 2435	(3) Passenger Heated Seat Thermistor Low Reference	(3) II	(3) —
(4) 4	(4) 0.75	(4) GY / BK	(4) 2480	(4) Passenger Seat Heating Element Low Reference	(4) I	(4) —

E14F Rear Seat Cushion Heater - Left Rear (KCB)



5360963

Connector Part Information

- Harness Type: Rear Seat Heater Control Wiring Harness
- OEM Connector: 6098-9046
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way M 1.2 MCON Series(BK)

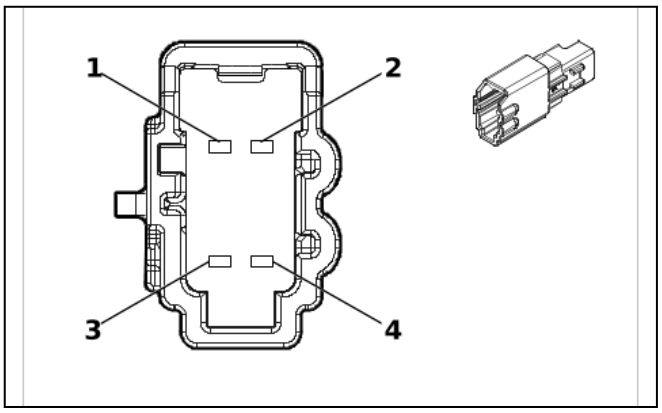
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-13 (BU)	No Tool Required
II	Not required	J-35616-17 (L-GN)	No Tool Required

E14F Rear Seat Cushion Heater - Left Rear (KCB)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) GY	(1) 2294	(1) Left Rear Seat Cushion Heating Element Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) WH / BU	(2) 7047	(2) Left Rear Seat Cushion Temperature Sensor Signal	(2) II	(2) —
(3) 3	(3) 0.5	(3) BU / WH	(3) 7048	(3) Left Rear Cushion Thermistor Feedback Signal	(3) II	(3) —
(4) 4	(4) 0.75	(4) BU / BK	(4) 2446	(4) Left Rear Seat Heating Element Low Reference	(4) I	(4) —

E14H Rear Seat Cushion Heater - Right Rear (KCB)



5360963

Connector Part Information

- Harness Type: Rear Seat Heater Control Wiring Harness
- OEM Connector: 6098-9046
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way M 1.2 MCON Series(BK)

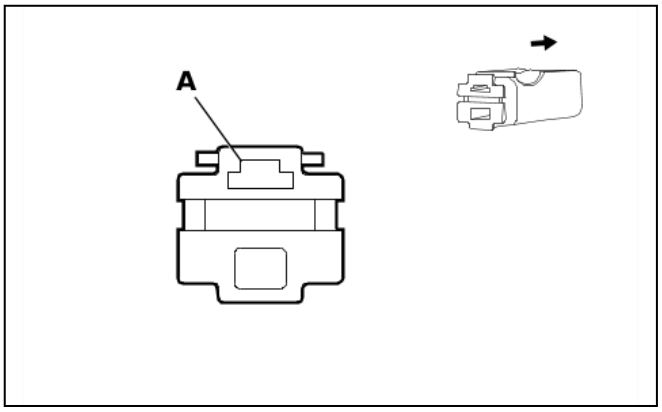
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-13 (BU)	No Tool Required
II	Not required	J-35616-17 (L-GN)	No Tool Required

E14H Rear Seat Cushion Heater - Right Rear (KCB)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) GN / BN	(1) 2296	(1) Right Rear Seat Cushion Heating Element Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) YE / WH	(2) 7053	(2) Right Rear Seat Cushion Temperature Sensor Signal	(2) II	(2) —
(3) 3	(3) 0.5	(3) WH / BK	(3) 7054	(3) Right Rear Cushion Thermistor Feedback Signal	(3) II	(3) —
(4) 4	(4) 0.75	(4) GN / BK	(4) 2457	(4) Right Rear Seat Heating Element Low Reference	(4) I	(4) —

E18 Rear Window Defogger Grid X1 (C49)



4248834

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 7123-5014-30
- Service Connector: 19367647
- Description: 1-Way F 250 Series(BK)

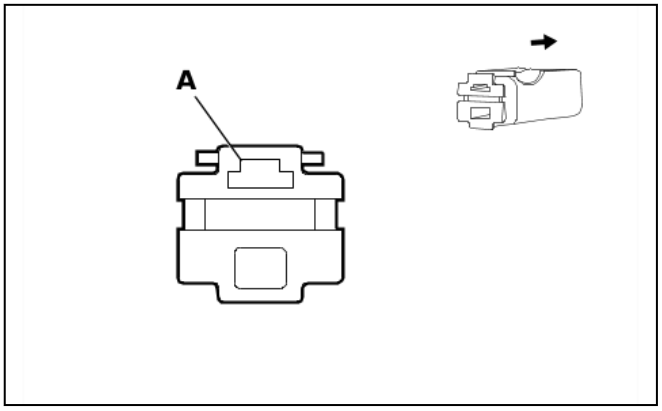
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-42 (RD)	No Tool Required

E18 Rear Window Defogger Grid X1 (C49)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	2.5	BN / VT	293	Rear Defogger Grid Control	I	—

E18 Rear Window Defogger Grid X2 (C49)



4248834

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 7123-5014-30
- Service Connector: 19367647
- Description: 1-Way F 250 Series(BK)

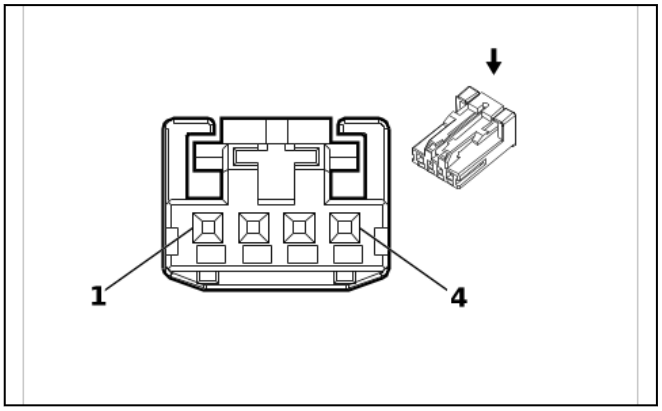
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-42 (RD)	No Tool Required

E18 Rear Window Defogger Grid X2 (C49)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	2.5	BK	8150	Defog Ground	I	—

E28 Front Floor Console Compartment Lamp (D07 / DCK)



2717162

Connector Part Information

- Harness Type: Front Floor Console Wiring Harness
- OEM Connector: 1-936119-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 0.64 Micro-Quadlock Series(BK)

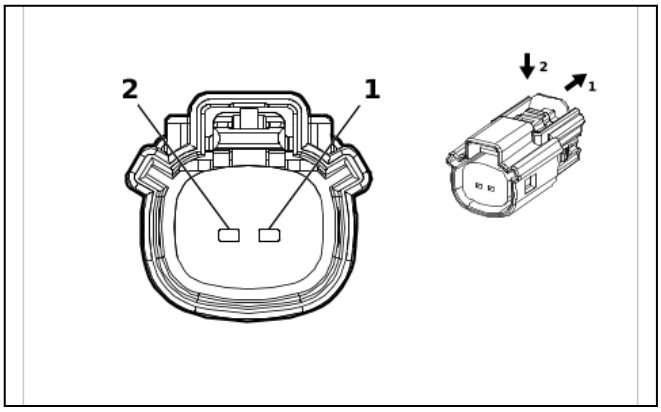
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

E28 Front Floor Console Compartment Lamp (D07 / DCK)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) BK / WH	(1) 1451	(1) Signal Ground	(1) I	(1) —
2	—	—	—	Not Occupied	—	—
(3) 3	(3) 0.5	(3) GN / VT	(3) 4786	(3) Dome/Reading Lamp Enable Signal	(3) I	(3) —
4	—	—	—	Not Occupied	—	—

E29LF Front Fog Lamp - Left (T3U)



2474713

Connector Part Information
- Harness Type: Front Object Alarm Sensor Wiring Harness
- OEM Connector: 33471-0206
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.5 Series, Sealed(BK)

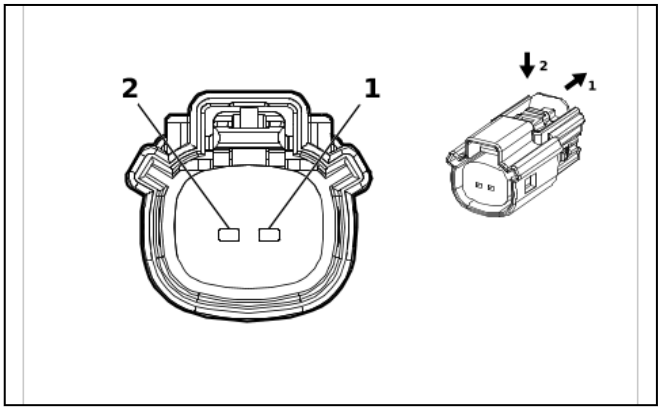
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required

E29LF Front Fog Lamp - Left (T3U)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BN / GY	(1) 5061	(1) Left Front Fog Lamp Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK	(2) 650	(2) Ground	(2) I	(2) —

E29RF Front Fog Lamp - Right (T3U)



2474713

Connector Part Information
- Harness Type: Front Object Alarm Sensor Wiring Harness
- OEM Connector: 33471-0206
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.5 Series, Sealed(BK)

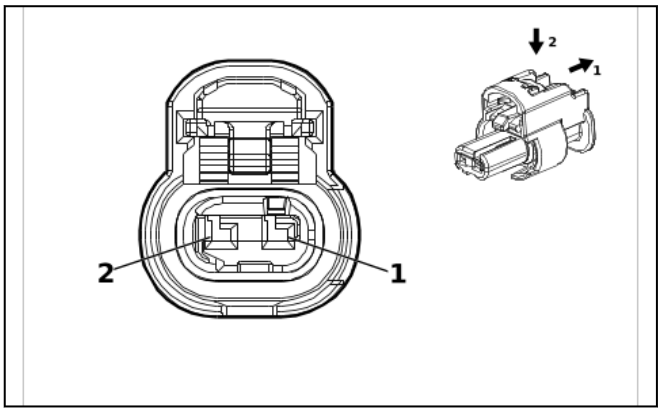
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required

E29RF Front Fog Lamp - Right (T3U)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BN / GN	(1) 5062	(1) Right Front Fog Lamp Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK	(2) 650	(2) Ground	(2) I	(2) —

E33L Cargo Lamp - Left



4649903

Connector Part Information

- Harness Type: Tail Lamp Wiring Harness
- OEM Connector: 1-2296694-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

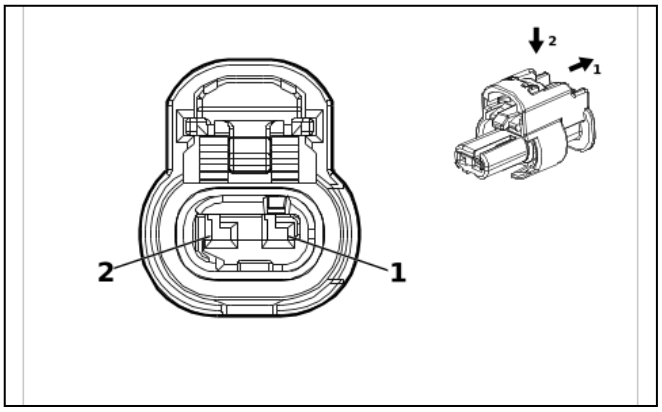
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

E33L Cargo Lamp - Left

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GY / BU	(1) 7762	(1) Cargo Lamp Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK	(2) 1850	(2) Ground	(2) I	(2) —

E33LEA Cargo Lamp - Pickup Box Endgate Left (63G)



4649903

Connector Part Information
- Harness Type: Accessory Wiring Harness - Endgate Step
- OEM Connector: 1-2296694-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

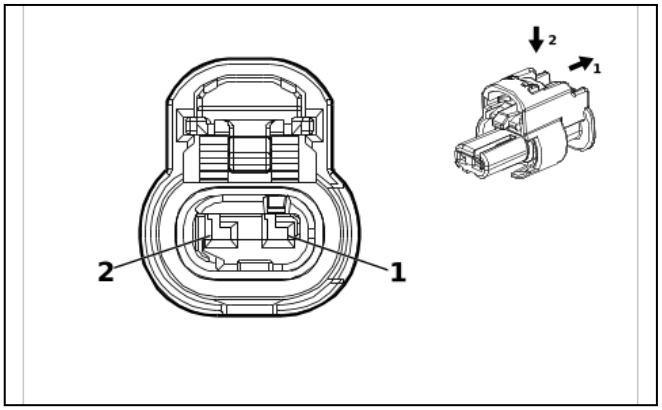
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

E33LEA Cargo Lamp - Pickup Box Endgate Left (63G)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) WH	(1) 1430	(1) Exterior Courtesy Lamp Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK	(2) 1450	(2) Ground	(2) I	(2) —

E33R Cargo Lamp - Right



4649903

Connector Part Information
- Harness Type: Tail Lamp Wiring Harness
- OEM Connector: 1-2296694-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

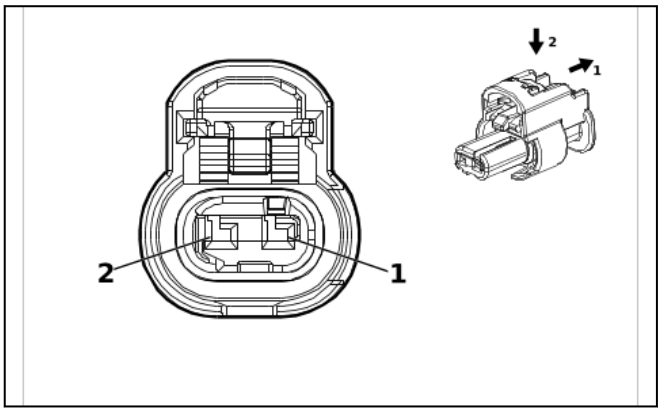
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

E33R Cargo Lamp - Right

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GY / BU	(1) 7762	(1) Cargo Lamp Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK	(2) 1850	(2) Ground	(2) I	(2) —

E33REA Cargo Lamp - Pickup Box Endgate Right (63G)



4649903

Connector Part Information

- Harness Type: Accessory Wiring Harness - Endgate Step
- OEM Connector: 1-2296694-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

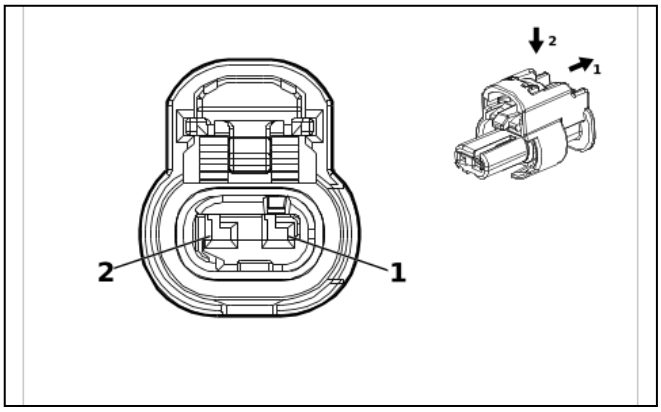
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

E33REA Cargo Lamp - Pickup Box Endgate Right (63G)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) WH	(1) 1430	(1) Exterior Courtesy Lamp Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK	(2) 1450	(2) Ground	(2) I	(2) —

E33THX Cargo Lamp - Rear Closure Auxiliary ((QT5 / QT6) - 63G)



4649903

Connector Part Information
- Harness Type: Endgate Wiring Harness
- OEM Connector: 1-2296694-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

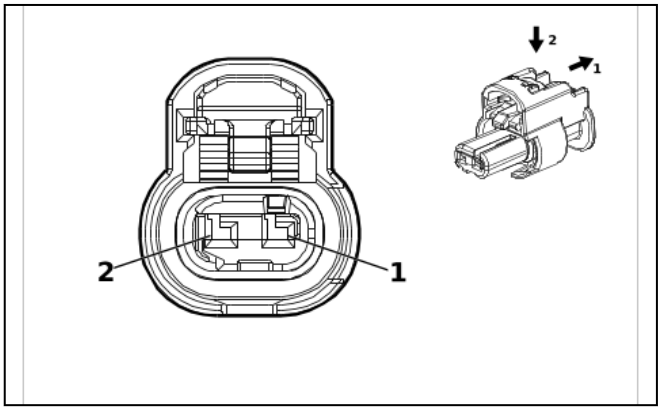
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

E33THX Cargo Lamp - Rear Closure Auxiliary ((QT5 / QT6) - 63G)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) WH / VT	(1) 1430	(1) Exterior Courtesy Lamp Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK	(2) 1850	(2) Ground	(2) I	(2) —

E33THX Cargo Lamp - Rear Closure Auxiliary (63G)



4649903

Connector Part Information
- Harness Type: Accessory Wiring Harness - Endgate Step
- OEM Connector: 1-2296694-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

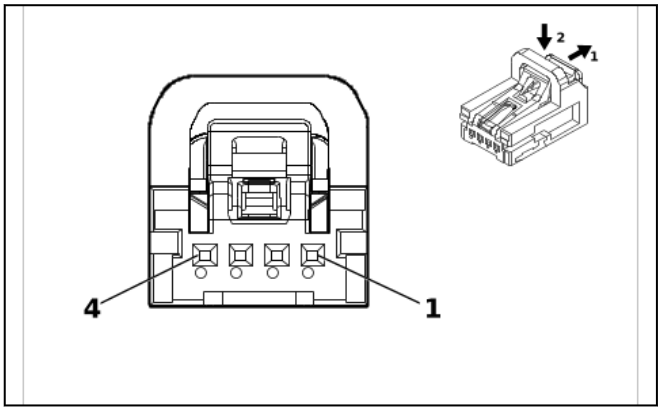
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

E33THX Cargo Lamp - Rear Closure Auxiliary (63G)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) WH	(1) 1430	(1) Exterior Courtesy Lamp Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK	(2) 1450	(2) Ground	(2) I	(2) —

E37H Roof Rail Rear Seat Position Reading and Courtesy Lamp - Left (CAJ)



5200696

Connector Part Information
- Harness Type: Dome Lamp Wiring Harness
- OEM Connector: 35068218
- Service Connector: 84769202
- Description: 4-Way F Mini 50 Series(BK)

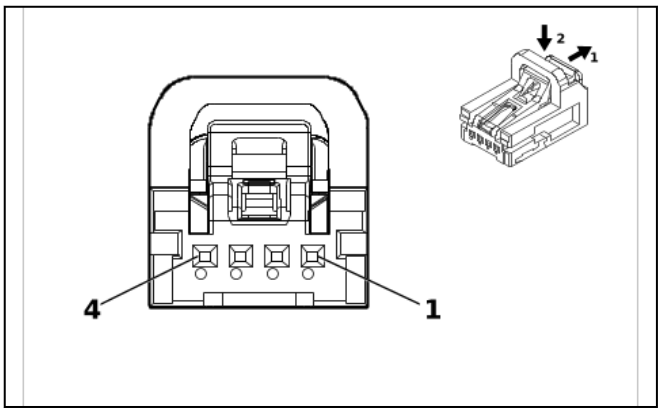
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	EL-35616-58 (BK)	No Tool Required

E37H Roof Rail Rear Seat Position Reading and Courtesy Lamp - Left (CAJ)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) GN / YE	(1) 2903	(1) Row 2 Dome Reading Lamp Interior Lamp Control	(1) I	(1) —
2	—	—	—	Not Occupied	—	—
(3) 3	(3) 0.35	(3) BK	(3) 1050	(3) Ground	(3) I	(3) —
(4) 4	(4) 0.35	(4) WH / BN	(4) 2904	(4) Row 2 Dome Reading Lamp Switch Signal	(4) I	(4) —

E37J Roof Rail Rear Seat Position Reading and Courtesy Lamp - Right (CAJ)



5200696

Connector Part Information

- Harness Type: Dome Lamp Wiring Harness
- OEM Connector: 35068218
- Service Connector: 84769202
- Description: 4-Way F Mini 50 Series(BK)

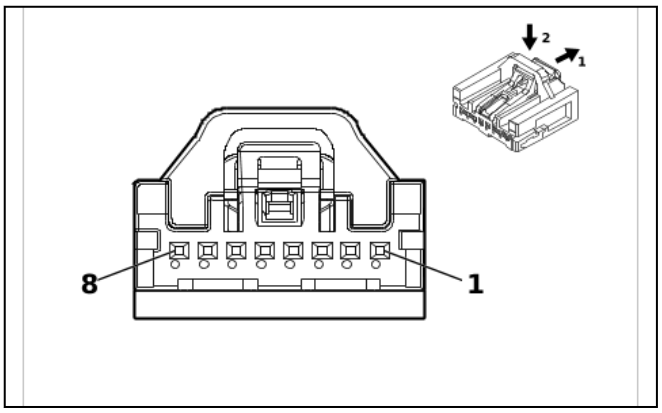
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	EL-35616-58 (BK)	No Tool Required

E37J Roof Rail Rear Seat Position Reading and Courtesy Lamp - Right (CAJ)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) BN / BU	(1) 2905	(1) Row 2 Dome Reading Lamp 2 Interior Lamp Control	(1) I	(1) —
2	—	—	—	Not Occupied	—	—
(3) 3	(3) 0.35	(3) BK	(3) 1050	(3) Ground	(3) I	(3) —
(4) 4	(4) 0.35	(4) VT / GY	(4) 2906	(4) Row 2 Dome Reading Lamp 2 Switch Signal	(4) I	(4) —

E37SMC Rear Seat Position Center Reading and Courtesy Lamp (- CAJ)



5200269

Connector Part Information

- Harness Type: Dome Lamp Wiring Harness
- OEM Connector: 35068228
- Service Connector: 84769201
- Description: 8-Way F Mini 50 Series(BK)

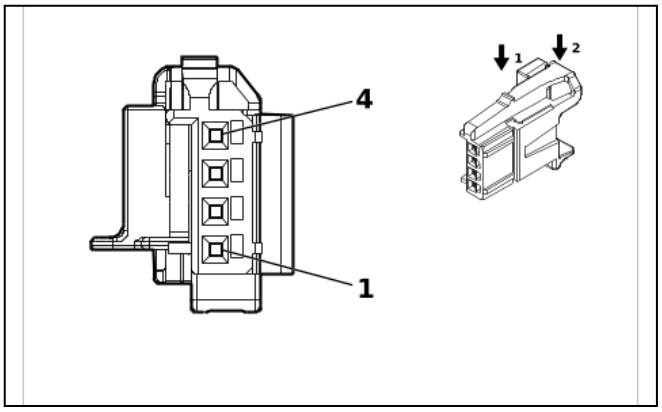
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	EL-35616-58 (BK)	No Tool Required

E37SMC Rear Seat Position Center Reading and Courtesy Lamp (- CAJ)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) GN / YE	(1) 2903	(1) Row 2 Dome Reading Lamp Interior Lamp Control	(1) I	(1) —
(2) 2	(2) 0.35	(2) BN / BU	(2) 2905	(2) Row 2 Dome Reading Lamp 2 Interior Lamp Control	(2) I	(2) —
(3) 3	(3) 0.35	(3) BK	(3) 1050	(3) Ground	(3) I	(3) —
(4) 4	(4) 0.35	(4) WH / BN	(4) 2904	(4) Row 2 Dome Reading Lamp Switch Signal	(4) I	(4) —
(5) 5	(5) 0.35	(5) VT / GY	(5) 2906	(5) Row 2 Dome Reading Lamp 2 Switch Signal	(5) I	(5) —
6 - 8	—	—	—	Not Occupied	—	—

E40 Air Heater X2 (C32)



5191926

Connector Part Information

- Harness Type: HVAC Assembly Wiring Harness
- OEM Connector: 13510940
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 0.64 Micro-Quadlock Series(BK)

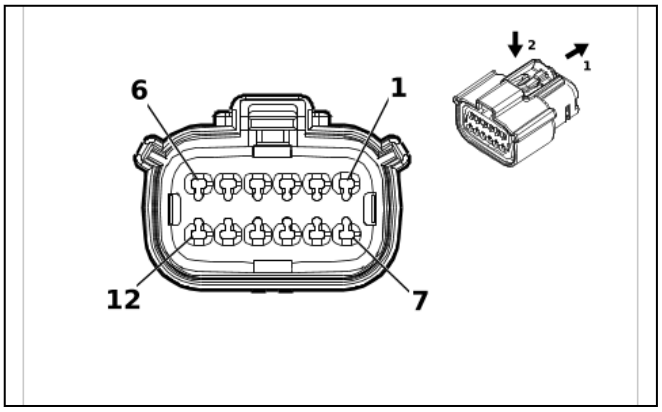
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-10 (GN)	No Tool Required

E40 Air Heater X2 (C32)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	—	—	—	Not Occupied	—	—
(2) 2	(2) 0.5	(2) VT / BK	(2) 339	(2) Run/Crank Ignition 1 Voltage	(2) I	(2) —
(3) 3	(3) 0.5	(3) GN / VT	(3) 2852	(3) Body Control Module LIN Bus 6	(3) I	(3) —
(4) 4	(4) 0.5	(4) BK	(4) 1050	(4) Ground	(4) I	(4) —

E42L Rear Body Structure Stop Lamp - Left



2871860

Connector Part Information

- Harness Type: Tail Lamp Wiring Harness
- OEM Connector: 33472-1287
- Service Connector: Service by Harness - See Part Catalog
- Description: 12-Way F 1.5 MX Series, Sealed(BK)

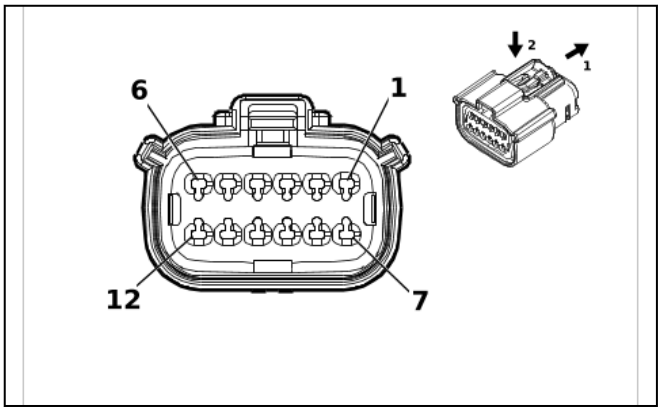
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-14 (GN)	No Tool Required
II	Not required	J-35616-2A (GY)	No Tool Required

E42L Rear Body Structure Stop Lamp - Left

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BK	(1) 1850	(1) Ground	(1) II	(1) —
(2) 2	(2) 1.5	(2) RD / BU	(2) 6340	(2) Battery Positive Voltage	(2) I	(2) —
(3) 3	(3) 0.75	(3) WH / YE	(3) 7542	(3) Left Rear Stop Lamp Control	(3) II	(3) —
(4) 4	(4) 0.75	(4) BN / GY	(4) 6993	(4) Left Rear Park Lamp Control	(4) II	(4) —
(5) 5	(5) 0.75	(5) BU / VT	(5) 1334	(5) Left Rear Turn Signal Lamp Control 2	(5) II	(5) —
(6) 6	(6) 0.5	(6) WH / BK	(6) 6567	(6) Rear Turn Signal Lamp Feedback Signal	(6) II	(6) —
(7) 7	(7) 0.5	(7) GN / WH	(7) 24	(7) Backup Lamp Control	(7) II	(7) —
(8) 8	(8) 0.75	(8) GY / BN	(8) 10749	(8) Sequential Turn Lamp Enable Signal	(8) II	(8) —
(9) 9	(9) 0.75	(9) YE / GN	(9) 2024	(9) Animation Lighting Control	(9) II	(9) —
10 - 12	—	—	—	Not Occupied	—	—

E42R Rear Body Structure Stop Lamp - Right



2871860

Connector Part Information

- Harness Type: Tail Lamp Wiring Harness
- OEM Connector: 33472-1287
- Service Connector: Service by Harness - See Part Catalog
- Description: 12-Way F 1.5 MX Series, Sealed(BK)

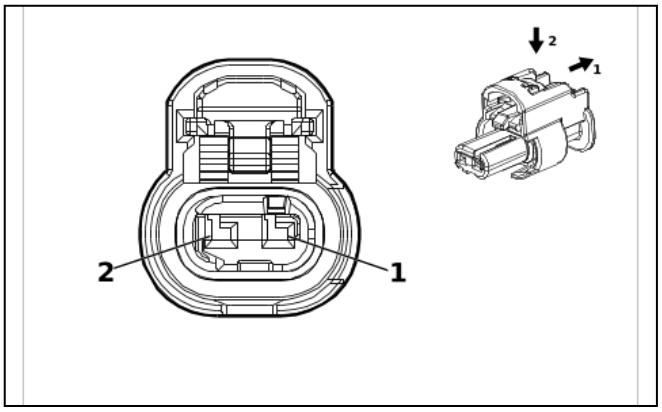
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-14 (GN)	No Tool Required
II	Not required	J-35616-2A (GY)	No Tool Required

E42R Rear Body Structure Stop Lamp - Right

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BK	(1) 1850	(1) Ground	(1) II	(1) —
(2) 2	(2) 1.5	(2) RD / BU	(2) 6740	(2) Battery Positive Voltage	(2) I	(2) —
(3) 3	(3) 0.75	(3) WH / YE	(3) 7541	(3) Right Rear Stop Lamp Control	(3) II	(3) —
(4) 4	(4) 0.75	(4) BN / GY	(4) 6995	(4) Right Rear Park Lamp Control	(4) II	(4) —
(5) 5	(5) 0.75	(5) BU / VT	(5) 1335	(5) Right Rear Turn Signal Lamp Control 2	(5) II	(5) —
(6) 6	(6) 0.5	(6) WH / BK	(6) 7544	(6) Right Rear Turn Signal Lamp Feedback Signal	(6) II	(6) —
(7) 7	(7) 0.5	(7) GN / WH	(7) 24	(7) Backup Lamp Control	(7) II	(7) —
(8) 8	(8) 0.75	(8) GY / BN	(8) 10749	(8) Sequential Turn Lamp Enable Signal	(8) II	(8) —
(9) 9	(9) 0.75	(9) YE / GN	(9) 2024	(9) Animation Lighting Control	(9) II	(9) —
10 - 12	—	—	—	Not Occupied	—	—

E52 Reductant Heater 2 - Injector Supply Pipe (FHX)



4649903

Connector Part Information
- Harness Type: Emission Reduction Fluid Tank Reservoir Wire Harness
- OEM Connector: 1-2296694-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

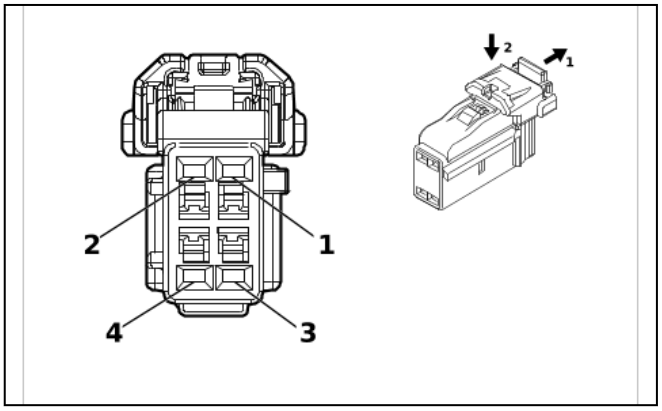
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

E52 Reductant Heater 2 - Injector Supply Pipe (FHX)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1	(1) YE / GY	(1) 3199	(1) Diesel Exhaust Fluid Pressure Line Heater Control	(1) I	(1) —
(2) 2	(2) 1	(2) GN / BK	(2) 4319	(2) Diesel Exhaust Fluid Line Heater Low Control	(2) I	(2) —

E55FCL Front Floor Console Map Pocket Illumination Lamp - Left (C85)



4872683

Connector Part Information
- Harness Type: Front Floor Console Wiring Harness
- OEM Connector: 6098-8435
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 1.2 Series(BK)

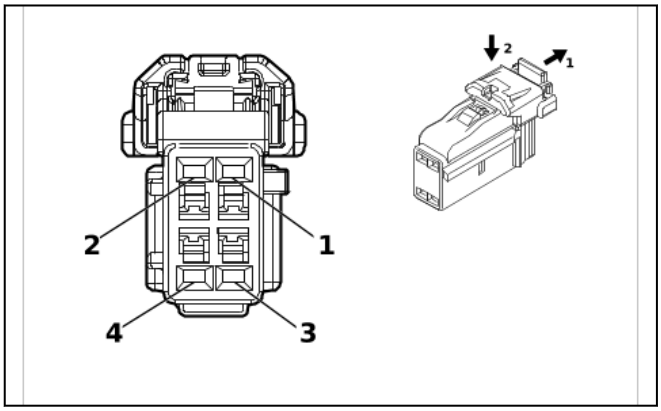
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

E55FCL Front Floor Console Map Pocket Illumination Lamp - Left (C85)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) BK / WH	(1) 1451	(1) Signal Ground	(1) I	(1) —
(2) 2	(2) 0.35	(2) WH / VT	(2) 4849	(2) LED Ambient Lighting Enable Signal	(2) I	(2) —
(3) 3	(3) 0.35	(3) BN / GN	(3) 8924	(3) Ambient Light Device 1 LIN Bus 1	(3) I	(3) —
4	—	—	—	Not Occupied	—	—

E55FCR Front Floor Console Map Pocket Illumination Lamp - Right (C85)



4872683

Connector Part Information

- Harness Type: Front Floor Console Wiring Harness
- OEM Connector: 6098-8435
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 1.2 Series(BK)

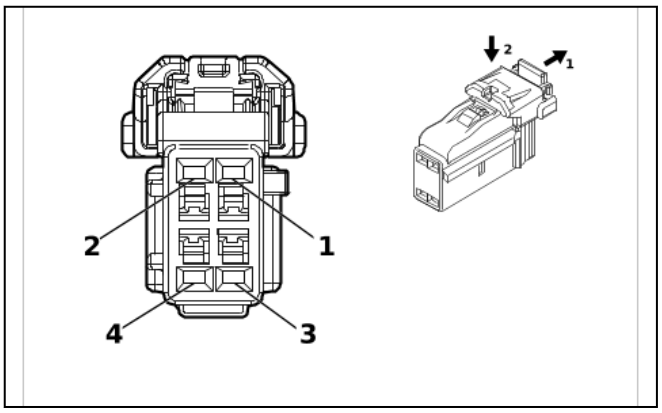
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

E55FCR Front Floor Console Map Pocket Illumination Lamp - Right (C85)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) BK / WH	(1) 1451	(1) Signal Ground	(1) I	(1) —
(2) 2	(2) 0.35	(2) WH / VT	(2) 4849	(2) LED Ambient Lighting Enable Signal	(2) I	(2) —
(3) 3	(3) 0.35	(3) BN / GN	(3) 8924	(3) Ambient Light Device 1 LIN Bus 1	(3) I	(3) —
4	—	—	—	Not Occupied	—	—

E55LF Front Side Door Map Pocket Illumination Lamp - Left (C85)



4872683

Connector Part Information

- Harness Type: Front Side Door Door Lock Door Wiring Harness - Driver
- OEM Connector: 6098-8435
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 1.2 Series(BK)

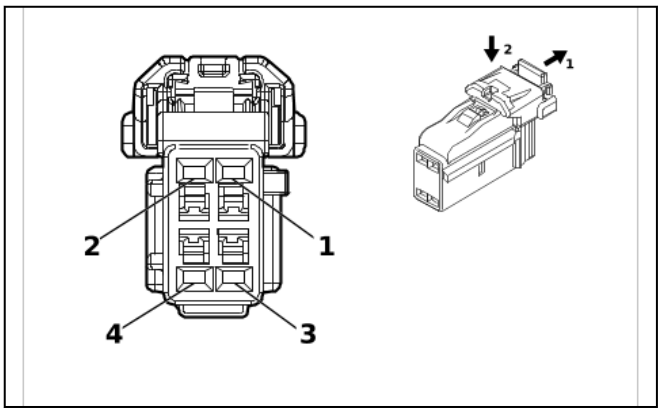
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

E55LF Front Side Door Map Pocket Illumination Lamp - Left (C85)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) BK	(1) 1550	(1) Ground	(1) I	(1) —
(2) 2	(2) 0.35	(2) WH / VT	(2) 4849	(2) LED Ambient Lighting Enable Signal	(2) I	(2) —
(3) 3	(3) 0.35	(3) BN / GN	(3) 8924	(3) Ambient Light Device 1 LIN Bus 1	(3) I	(3) —
4	—	—	—	Not Occupied	—	—

E55RF Front Side Door Map Pocket Illumination Lamp - Right (C85)



4872683

Connector Part Information

- Harness Type: Front Side Door Door Lock Door Wiring Harness - Passenger
- OEM Connector: 6098-8435
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 1.2 Series(BK)

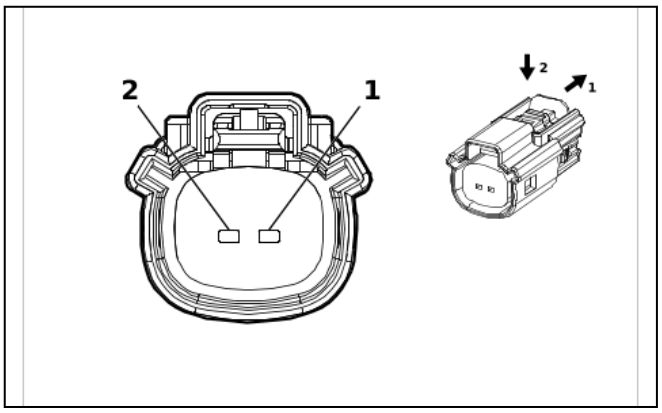
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

E55RF Front Side Door Map Pocket Illumination Lamp - Right (C85)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) BK / WH	(1) 1451	(1) Signal Ground	(1) I	(1) —
(2) 2	(2) 0.35	(2) WH / VT	(2) 4849	(2) LED Ambient Lighting Enable Signal	(2) I	(2) —
(3) 3	(3) 0.35	(3) BU / GN	(3) 8927	(3) Ambient Light Device 4 LIN Bus 1	(3) I	(3) —
4	—	—	—	Not Occupied	—	—

E135L Front Bumper Fascia Auxiliary Signal Lamp - Left (GRZ)



2474713

Connector Part Information
- Harness Type: Front View Camera Wiring Harness
- OEM Connector: 33471-0206
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.5 Series, Sealed(BK)

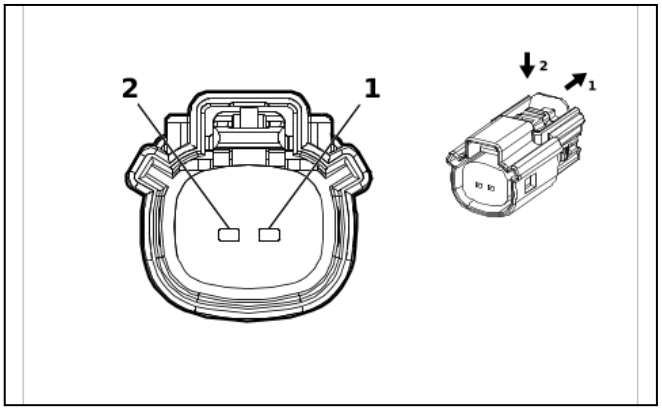
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required

E135L Front Bumper Fascia Auxiliary Signal Lamp - Left (GRZ)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BK	(1) 650	(1) Ground	(1) I	(1) —
(2) 2	(2) 0.5	(2) BU / YE	(2) 11418	(2) Exterior Emblem Light Control	(2) I	(2) —

E135R Front Bumper Fascia Auxiliary Signal Lamp - Right (GRZ)



2474713

Connector Part Information
- Harness Type: Front View Camera Wiring Harness
- OEM Connector: 33471-0206
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.5 Series, Sealed(BK)

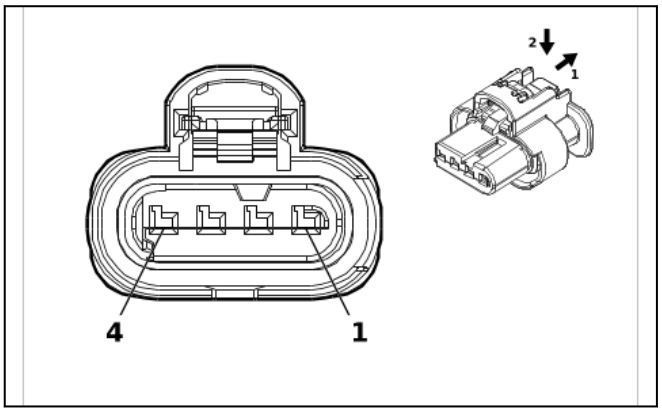
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required

E135R Front Bumper Fascia Auxiliary Signal Lamp - Right (GRZ)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BK	(1) 650	(1) Ground	(1) I	(1) —
(2) 2	(2) 0.5	(2) BU / YE	(2) 11418	(2) Exterior Emblem Light Control	(2) I	(2) —

F101 Instrument Panel Airbag



4900699

Connector Part Information
- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 2296700-3
- Service Connector: 19371193
- Description: 4-Way F 1.2 MCON-CB Series, Sealed(YE)

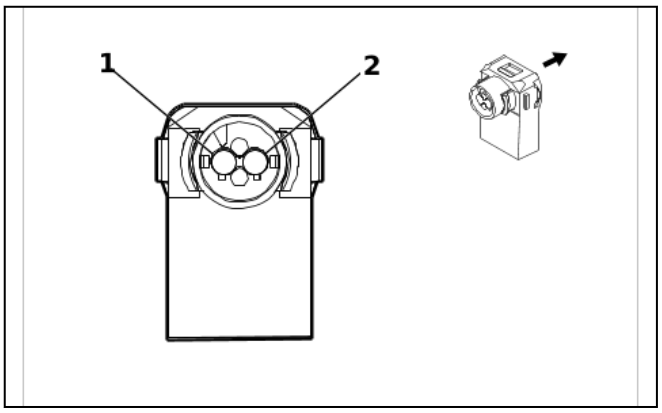
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

F101 Instrument Panel Airbag

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) YE / OG	(1) 3025	(1) Passenger Instrument Panel Air Bag Stage 1 High Control	(1) I	(1) —
(2) 2	(2) 0.35	(2) OG / WH	(2) 3024	(2) Passenger Instrument Panel Air Bag Stage 1 Low Control	(2) I	(2) —
(3) 3	(3) 0.35	(3) GY / OG	(3) 3027	(3) Passenger Instrument Panel Air Bag Stage 2 High Control	(3) I	(3) —
(4) 4	(4) 0.35	(4) OG / VT	(4) 3026	(4) Passenger Instrument Panel Air Bag Stage 2 Low Control	(4) I	(4) —

F105L Front and Rear Row Roof Rail Airbag - Left - 4 - Door



4679778

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 35504154
- Service Connector: 85666124
- Description: 2-Way F ABX-5 Series(GY with YE Cover)

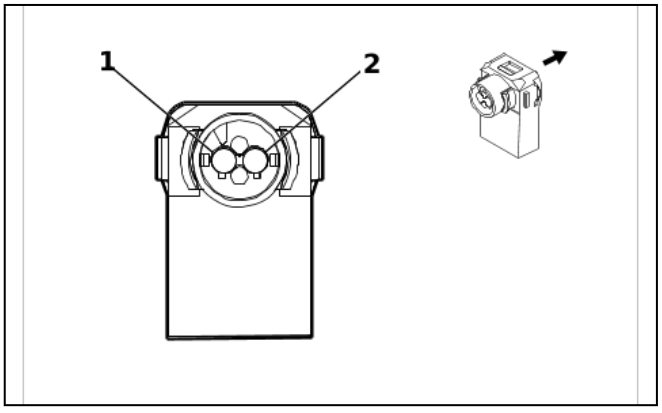
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-10 (GN)	No Tool Required

F105L Front and Rear Row Roof Rail Airbag - Left - 4 - Door

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) OG / GN	(1) 5019	(1) Left Front Roof Rail Air Bag High Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) VT / OG	(2) 5020	(2) Left Front Roof Rail Air Bag Low Control	(2) I	(2) —

F105LF Front Row Roof Rail Airbag - Left - 2 - Door



4679778

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 35504154
- Service Connector: 85666124
- Description: 2-Way F ABX-5 Series(GY with YE Cover)

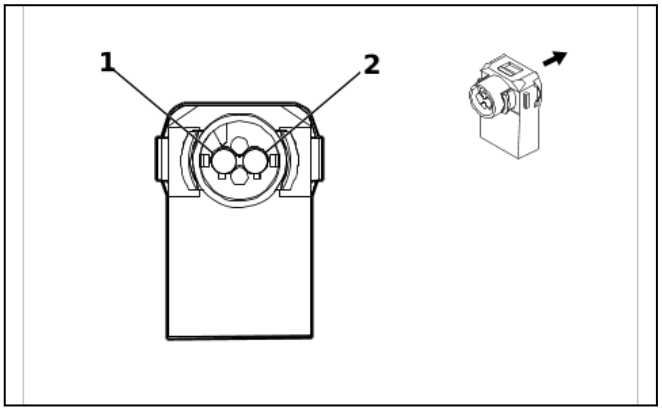
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-10 (GN)	No Tool Required

F105LF Front Row Roof Rail Airbag - Left - 2 - Door

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) OG / GN	(1) 5019	(1) Left Front Roof Rail Air Bag High Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) VT / OG	(2) 5020	(2) Left Front Roof Rail Air Bag Low Control	(2) I	(2) —

F105R Front and Rear Row Roof Rail Airbag - Right - 4 - Door



4679778

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 35504154
- Service Connector: 85666124
- Description: 2-Way F ABX-5 Series(GY with YE Cover)

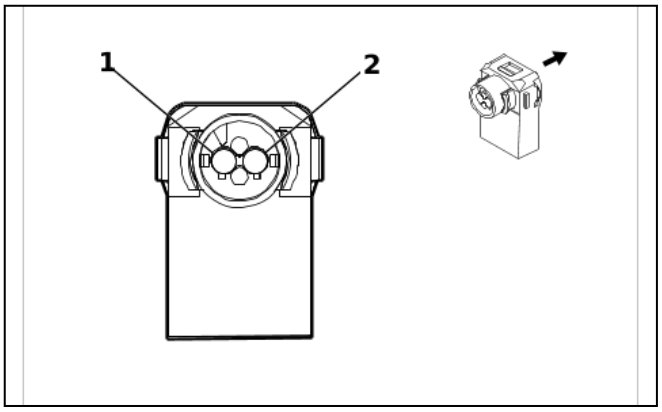
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-10 (GN)	No Tool Required

F105R Front and Rear Row Roof Rail Airbag - Right - 4 - Door

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) OG / GY	(1) 5021	(1) Right Front Roof Rail Air Bag High Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) WH / OG	(2) 5022	(2) Right Front Roof Rail Air Bag Low Control	(2) I	(2) —

F105RF Front Row Roof Rail Airbag - Right - 2 - Door



4679778

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 35504154
- Service Connector: 85666124
- Description: 2-Way F ABX-5 Series(GY with YE Cover)

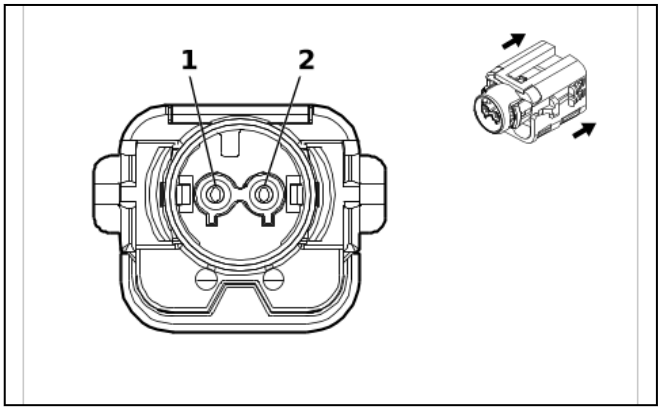
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-10 (GN)	No Tool Required

F105RF Front Row Roof Rail Airbag - Right - 2 - Door

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) OG / GY	(1) 5021	(1) Right Front Roof Rail Air Bag High Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) WH / OG	(2) 5022	(2) Right Front Roof Rail Air Bag Low Control	(2) I	(2) —

F106D Front Seat Outboard Seat Back Airbag - Driver



5499727

Connector Part Information
- Harness Type: Front Seat Wiring Harness - Driver
- OEM Connector: 13535270
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F ABX-5 Series(PK with YE Cover)

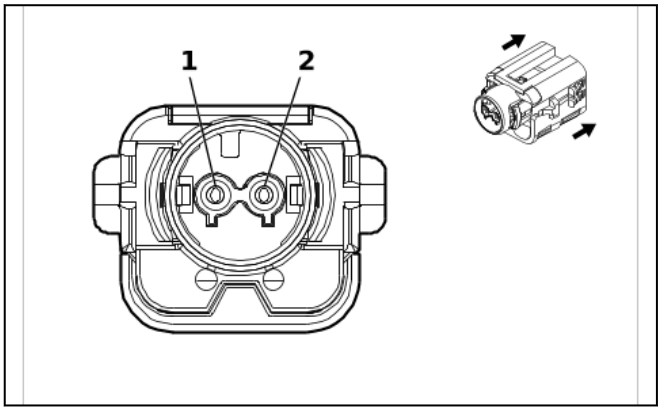
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-10 (GN)	No Tool Required

F106D Front Seat Outboard Seat Back Airbag - Driver

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) OG / BU	(1) 4962	(1) Driver Seat Back Air Bag High Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / OG	(2) 4963	(2) Driver Seat Back Air Bag Low Control	(2) I	(2) —

F106P Front Seat Outboard Seat Back Airbag - Passenger



5499727

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Passenger
- OEM Connector: 13535270
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F ABX-5 Series(PK with YE Cover)

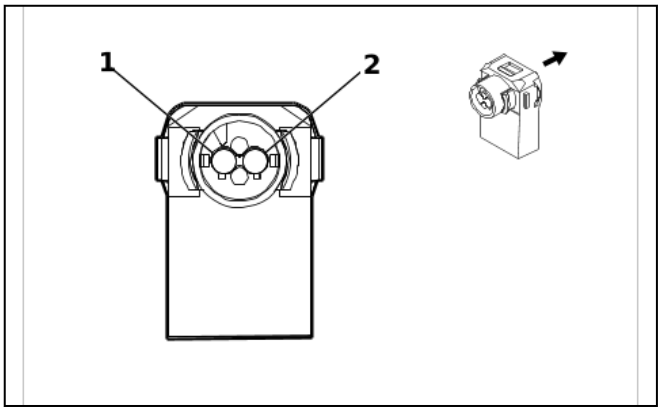
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-10 (GN)	No Tool Required

F106P Front Seat Outboard Seat Back Airbag - Passenger

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) OG / GY	(1) 4956	(1) Passenger Seat Back Air Bag High Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) BU / OG	(2) 4957	(2) Passenger Seat Back Air Bag Low Control	(2) I	(2) —

F107 Steering Wheel Airbag



4679778

Connector Part Information
- Harness Type: Steering Wheel Horn Switch Wiring Harness
- OEM Connector: 35504154
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F ABX-5 Series(GY with YE Cover)

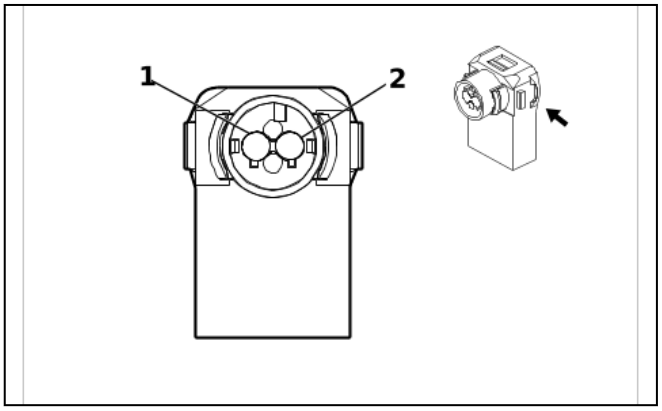
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-10 (GN)	No Tool Required

F107 Steering Wheel Airbag

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) OG / VT	(1) 3021	(1) Steering Wheel Air Bag Stage 1 High Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) BN / OG	(2) 3020	(2) Steering Wheel Air Bag Stage 1 Low Control	(2) I	(2) —

F112D Front Seat Belt Retractor - Driver



4241364

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 35504153
- Service Connector: 85666123
- Description: 2-Way F ABX-5 Series(PU with YE Cover)

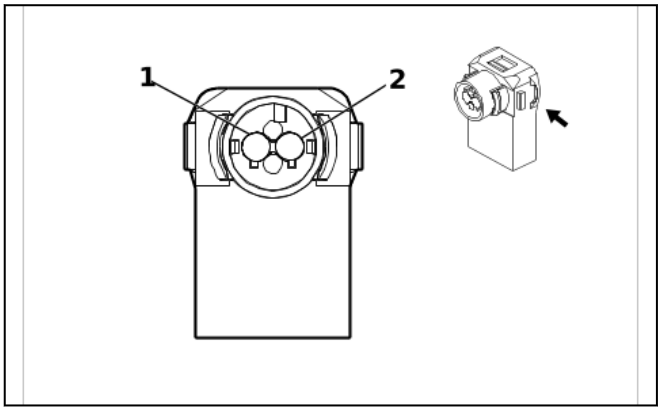
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-10 (GN)	No Tool Required

F112D Front Seat Belt Retractor - Driver

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) OG / WH	(1) 3477	(1) Driver Seat Belt Retractor Pretensioner High Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) VT / OG	(2) 3478	(2) Driver Seat Belt Retractor Pretensioner Low Control	(2) I	(2) —

F112LR Rear Seat Belt Retractor - Left - 4 - Door



4241364

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 35504153
- Service Connector: 85666123
- Description: 2-Way F ABX-5 Series(PU with YE Cover)

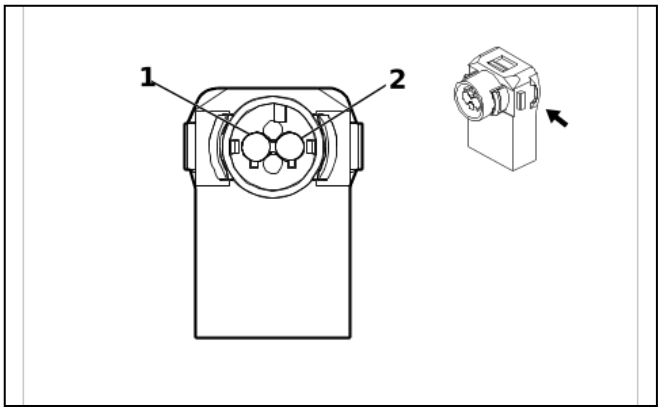
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-10 (GN)	No Tool Required

F112LR Rear Seat Belt Retractor - Left - 4 - Door

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) OG / VT	(1) 5155	(1) Left Rear Seat Belt Pretensioner Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / OG	(2) 5156	(2) Left Rear Seat Belt Pretensioner Low Control	(2) I	(2) —

F112P Front Seat Belt Retractor - Passenger X1



4241364

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 35504153
- Service Connector: 85666123
- Description: 2-Way F ABX-5 Series(PU with YE Cover)

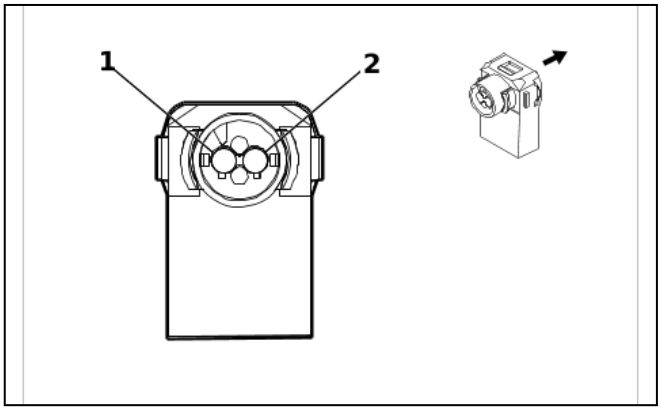
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-10 (GN)	No Tool Required

F112P Front Seat Belt Retractor - Passenger X1

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) OG / GN	(1) 3475	(1) Passenger Seat Belt Retractor Pretensioner High Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) WH / OG	(2) 3476	(2) Passenger Seat Belt Retractor Pretensioner Low Control	(2) I	(2) —

F112P Front Seat Belt Retractor - Passenger X2



4679778

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 35504154
- Service Connector: 85666124
- Description: 2-Way F ABX-5 Series(GY with YE Cover)

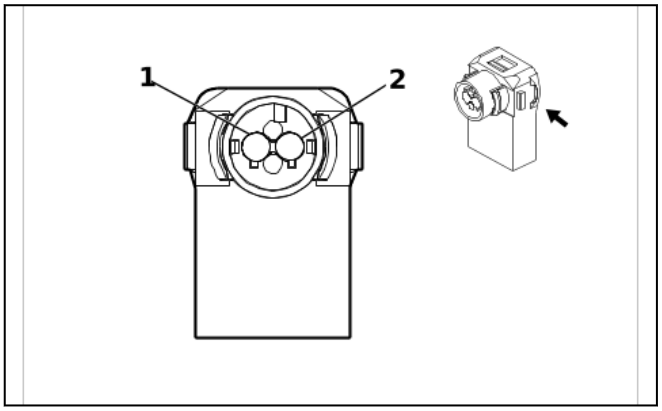
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-10 (GN)	No Tool Required

F112P Front Seat Belt Retractor - Passenger X2

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) OG / YE	(1) 4211	(1) Passenger Seat Belt Load Limiter High Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) VT / OG	(2) 4212	(2) Passenger Seat Belt Load Limiter Low Control	(2) I	(2) —

F112RR Rear Seat Belt Retractor - Right - 4 - Door



4241364

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 35504153
- Service Connector: 85666123
- Description: 2-Way F ABX-5 Series(PU with YE Cover)

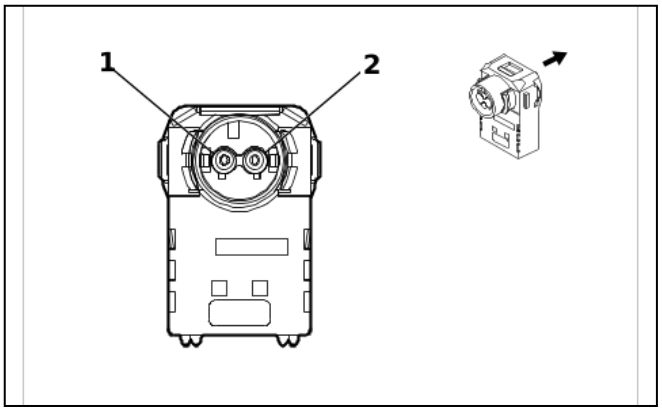
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-10 (GN)	No Tool Required

F112RR Rear Seat Belt Retractor - Right - 4 - Door

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) OG / WH	(1) 5157	(1) Right Rear Seat Belt Pretensioner Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / OG	(2) 5158	(2) Right Rear Seat Belt Pretensioner Low Control	(2) I	(2) —

F113D Front Seat Belt Anchor Plate Tensioner - Driver



4231869

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 35504152
- Service Connector: 85666122
- Description: 2-Way F ABX-5 Series(PK with YE Cover)

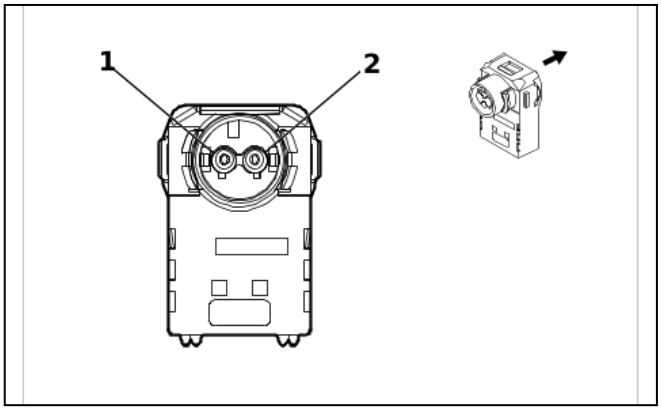
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-10 (GN)	No Tool Required

F113D Front Seat Belt Anchor Plate Tensioner - Driver

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) OG / YE	(1) 3481	(1) Driver Seat Belt Anchor Pretensioner High Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) VT / OG	(2) 3482	(2) Driver Seat Belt Anchor Pretensioner Low Control	(2) I	(2) —

F113P Front Seat Belt Anchor Plate Tensioner - Passenger



4231869

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 35504152
- Service Connector: 85666122
- Description: 2-Way F ABX-5 Series(PK with YE Cover)

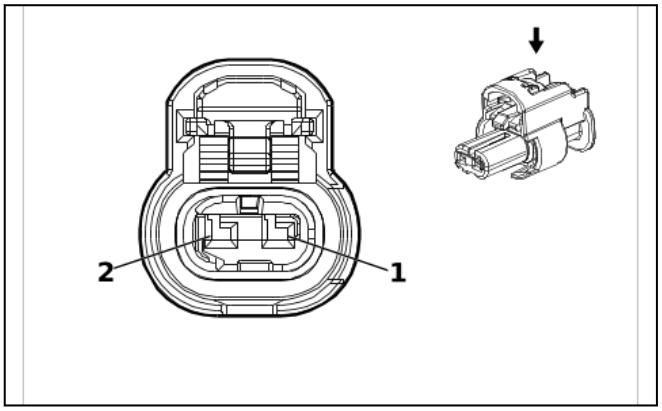
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-10 (GN)	No Tool Required

F113P Front Seat Belt Anchor Plate Tensioner - Passenger

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) OG / BN	(1) 3479	(1) Passenger Seat Belt Anchor Pretensioner High Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) GY / OG	(2) 3480	(2) Passenger Seat Belt Anchor Pretensioner Low Control	(2) I	(2) —

G1 Air Conditioning Compressor



4335931

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 1-2296694-2
- Service Connector: 19366843
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

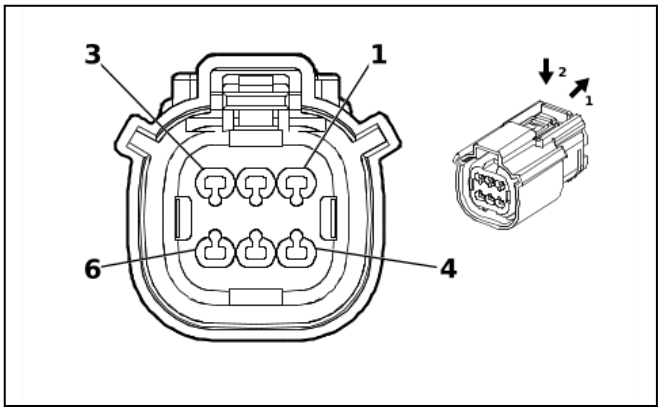
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

G1 Air Conditioning Compressor

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BU / YE	(1) 7574	(1) Air Conditioning Compressor Solenoid Valve Control	(1) I	(1) —
(2) 2	(2) 0.75	(2) BU / BN	(2) 7573	(2) Air Conditioning Compressor Solenoid Valve Control	(2) I	(2) —

G5 Automatic Transmission Auxiliary Fluid Pump



4574736

Connector Part Information

- Harness Type: Automatic Transmission Wiring Harness - Case
- OEM Connector: 160038-3009
- Service Connector: Service by Harness - See Part Catalog
- Description: 6-Way F 1.5 MX Series, Sealed(WH)

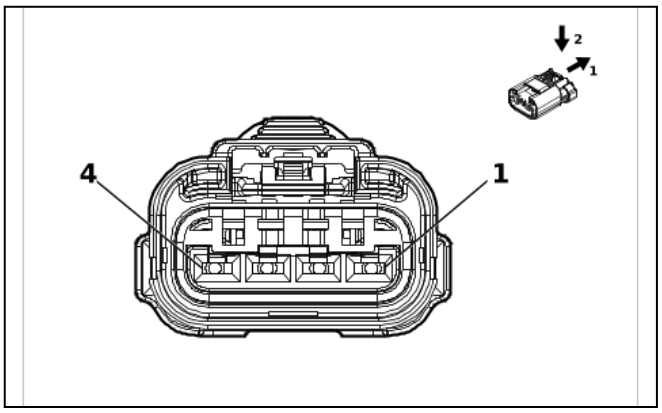
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required

G5 Automatic Transmission Auxiliary Fluid Pump

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1.5	(1) GN / VT	(1) 8540	(1) Battery Positive Voltage	(1) I	(1) —
2	—	—	—	Not Occupied	—	—
(3) 3	(3) 0.5	(3) BN	(3) 6387	(3) Transmission High Side Driver 1 Control	(3) I	(3) —
(4) 4	(4) 0.5	(4) GY / OG	(4) 2968	(4) Transmission Auxiliary Fluid Pump Control	(4) I	(4) —
5	—	—	—	Not Occupied	—	—
(6) 6	(6) 1.5	(6) BK / YE	(6) 450	(6) Ground	(6) I	(6) —

G10L Cooling Fan Motor - Left



5838592

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 35243535
- Service Connector: 85563415
- Description: 4-Way F 2.8 APEX Series, Sealed(BK)

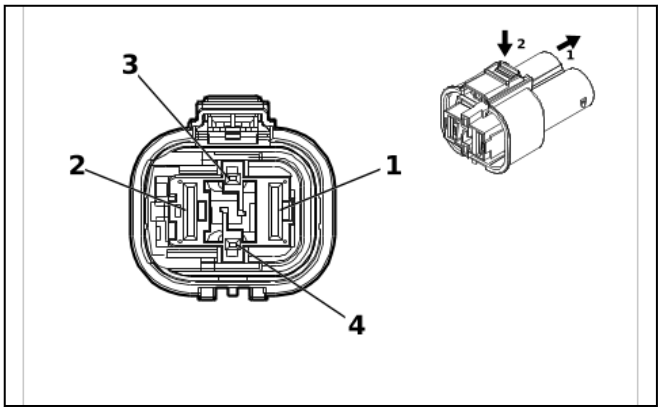
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-4A (PU)	No Tool Required

G10L Cooling Fan Motor - Left

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 5 (1) 5 (1) 5	(1) BK (1) BK (1) BK	(1) 6550 (1) 450 (1) 4450	(1) Ground (1) Ground (1) Ground	(1) I (1) I (1) I	(1) L4B (1) L76 / L78 (1) LZ0
(2) 2	(2) 5	(2) RD / GN	(2) 3840	(2) Battery Positive Voltage	(2) I	(2) —
3	—	—	—	Not Occupied	—	—
(4) 4	(4) 0.75	(4) GN / VT	(4) 4621	(4) Engine Control Module LIN Bus 1	(4) I	(4) —

G10LW Cooling Fan Motor - Lower (LZ0)



4847569

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 4-2286732-1
- Service Connector: 84766431
- Description: 4-Way F 1.2, 9.5 MCON Series, Sealed(BK)

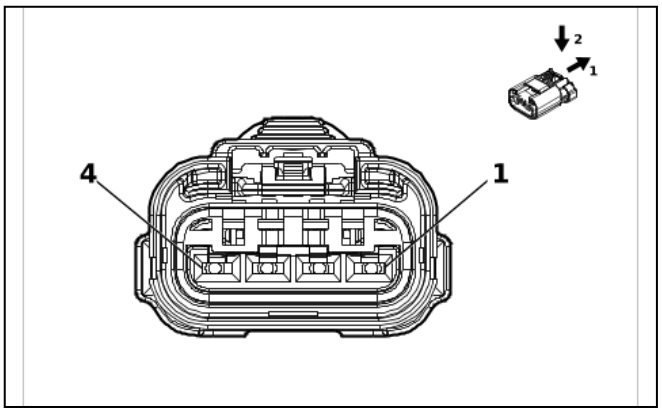
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required
II	Not required	J-35616-22 (RD)	No Tool Required

G10LW Cooling Fan Motor - Lower (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 5	(1) RD / GN	(1) 4140	(1) Battery Positive Voltage	(1) II	(1) —
(2) 2	(2) 5	(2) BK	(2) 4450	(2) Ground	(2) II	(2) —
(3) 3	(3) 0.5	(3) GN / YE	(3) 4623	(3) Engine Control Module LIN Bus 3	(3) I	(3) —
4	—	—	—	Not Occupied	—	—

G10R Cooling Fan Motor - Right (FJW - V03)



5838592

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 35243535
- Service Connector: 85563415
- Description: 4-Way F 2.8 APEX Series, Sealed(BK)

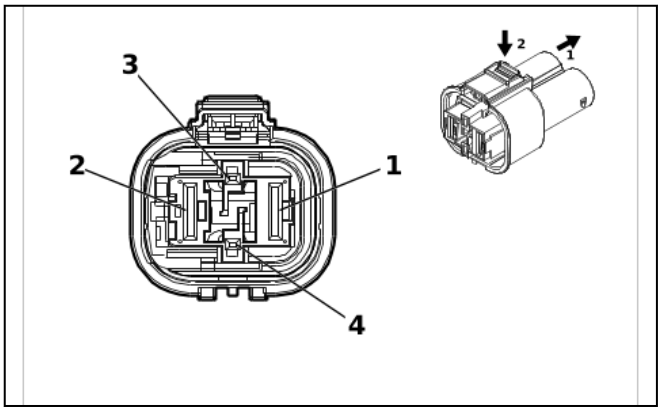
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-4A (PU)	No Tool Required

G10R Cooling Fan Motor - Right (FJW - V03)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 5 (1) 5	(1) BK (1) BK	(1) 6550 (1) 450	(1) Ground (1) Ground	(1) I (1) I	(1) L4B (1) L76 / L78
(2) 2	(2) 5	(2) RD / VT	(2) 4040	(2) Battery Positive Voltage	(2) I	(2) —
3	—	—	—	Not Occupied	—	—
(4) 4	(4) 0.75	(4) GN / VT	(4) 4621	(4) Engine Control Module LIN Bus 1	(4) I	(4) —

G10R Cooling Fan Motor - Right (LZ0 / V03)



5187743

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 4-2286732-2
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 1.2, 9.5 MCON Series(GY)

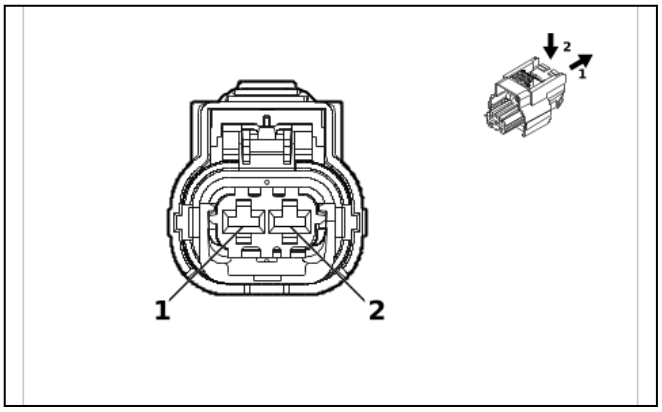
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required
II	Not required	J-35616-22 (RD)	No Tool Required

G10R Cooling Fan Motor - Right (LZ0 / V03)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 8	(1) RD / BN	(1) 1742	(1) Battery Positive Voltage	(1) II	(1) —
(2) 2	(2) 8 (2) 8	(2) BK (2) BK	(2) 450 (2) 4450	(2) Ground (2) Ground	(2) II (2) II	(2) L76 / L78 (2) LZ0
(3) 3	(3) 0.5	(3) GN / VT	(3) 4621	(3) Engine Control Module LIN Bus 1	(3) I	(3) —
4	—	—	—	Not Occupied	—	—

G13 Generator X1 (L4B)



6398251

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 35499138
- Service Connector: 85079955
- Description: 2-Way F 2.8 MCP Series, Sealed(BK)

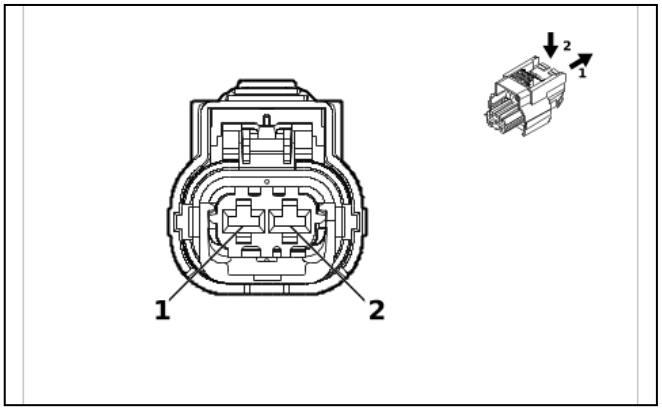
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-35 (VT)	No Tool Required

G13 Generator X1 (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) GN / YE	(1) 10808	(1) Engine Control Module LIN Bus 3	(1) I	(1) —
2	—	—	—	Not Occupied	—	—

G13 Generator X1 (L76 / L78)



6398251

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 35499138
- Service Connector: 85079955
- Description: 2-Way F 2.8 MCP Series, Sealed(BK)

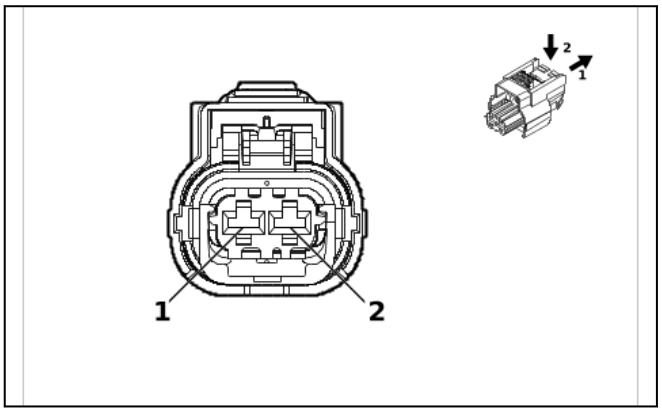
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-35 (VT)	No Tool Required

G13 Generator X1 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) GN / YE	(1) 4623	(1) Engine Control Module LIN Bus 3	(1) I	(1) —
2	—	—	—	Not Occupied	—	—

G13 Generator X1 (LZ0)



6398251

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 35499138
- Service Connector: 85079955
- Description: 2-Way F 2.8 MCP Series, Sealed(BK)

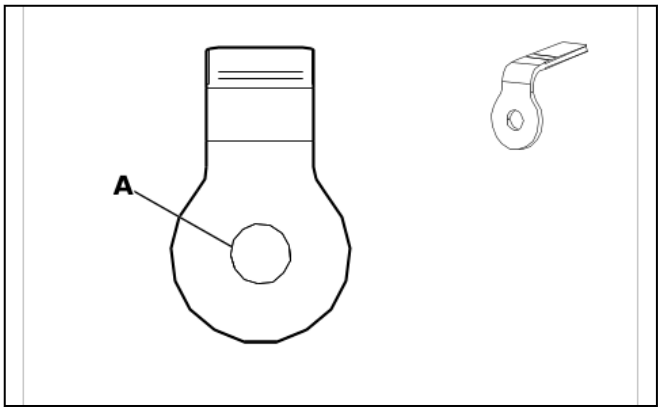
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-35 (VT)	No Tool Required

G13 Generator X1 (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) GN / YE	(1) 4623	(1) Engine Control Module LIN Bus 3	(1) I	(1) —
2	—	—	—	Not Occupied	—	—

G13 Generator X2 (L4B)



7154219

Connector Part Information
- Harness Type: Starter Generator Positive Cable
- OEM Connector: 85770288
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way Ring Terminal

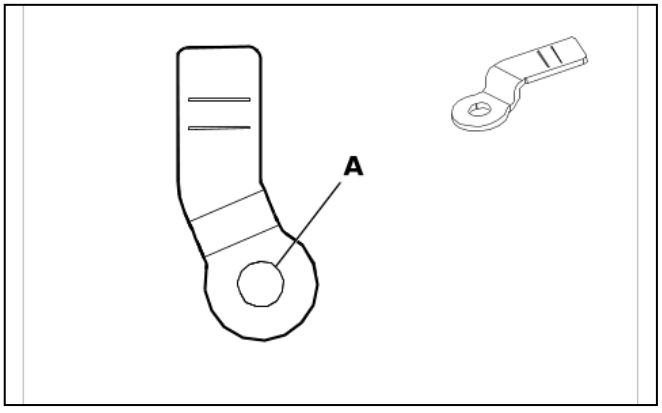
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

G13 Generator X2 (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	35	RD / BU	42	Battery Positive Voltage	I	L4B/ LZ0

G13 Generator X2 (L76 / L78)



7150046

Connector Part Information
- Harness Type: Generator Battery Jumper Cable
- OEM Connector: 85770295
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way Ring Terminal

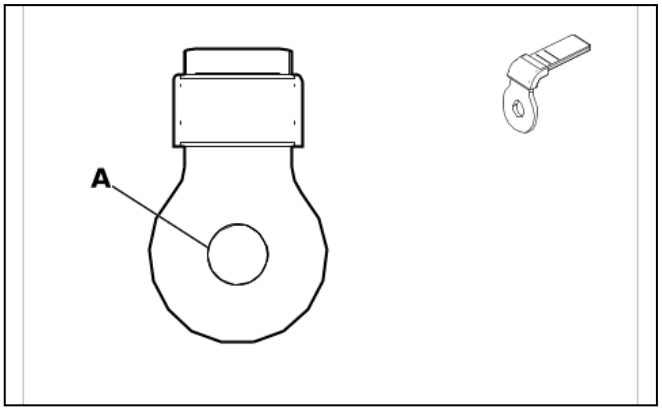
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

G13 Generator X2 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	35	RD / BU	42	Battery Positive Voltage	I	L76/ L78

G13 Generator X2 (LZ0)



7150037

Connector Part Information

- Harness Type: Generator Battery Jumper Cable
- OEM Connector: 86281558
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way Ring Terminal

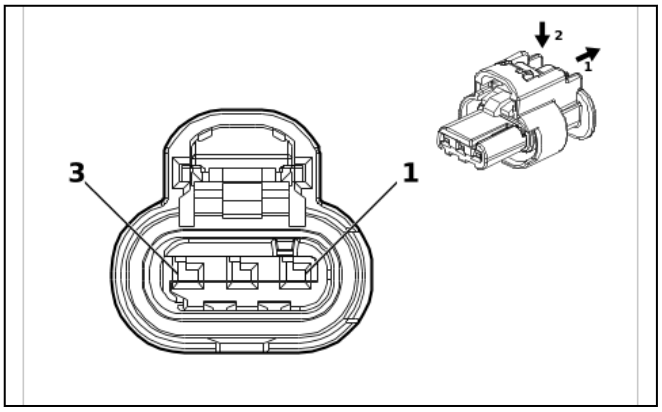
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

G13 Generator X2 (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	35	RD / BU	42	Battery Positive Voltage	I	L4B/ LZ0

G17 Heater Coolant Pump (L76 / L78)



4581126

Connector Part Information

- Harness Type: Heater Coolant Pump Wiring Harness
- OEM Connector: 1-2296695-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 3-Way F 1.2 MCON-CB Series, Sealed(BK)

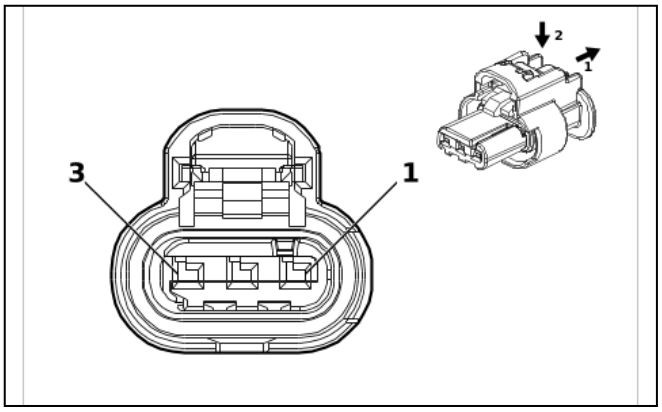
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

G17 Heater Coolant Pump (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BK	(1) 450	(1) Ground	(1) I	(1) —
(2) 2	(2) 0.5	(2) RD / BU	(2) 6040	(2) Battery Positive Voltage	(2) I	(2) —
(3) 3	(3) 0.5	(3) GN / VT	(3) 4621	(3) Engine Control Module LIN Bus 1	(3) I	(3) —

G17 Heater Coolant Pump (LZ0)



4581126

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 1-2296695-1
- Service Connector: 86792094
- Description: 3-Way F 1.2 MCON-CB Series, Sealed(BK)

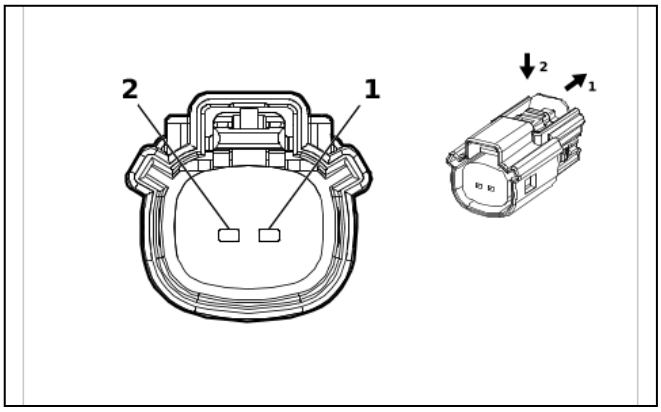
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

G17 Heater Coolant Pump (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BK	(1) 450	(1) Ground	(1) I	(1) —
(2) 2	(2) 0.5	(2) RD / BU	(2) 6040	(2) Battery Positive Voltage	(2) I	(2) —
(3) 3	(3) 0.5	(3) GN / VT	(3) 4621	(3) Engine Control Module LIN Bus 1	(3) I	(3) —

G18 Fuel Pump - High Pressure (L4B)



2474713

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 33471-0206
- Service Connector: 13577534
- Description: 2-Way F 1.5 Series, Sealed(BK)

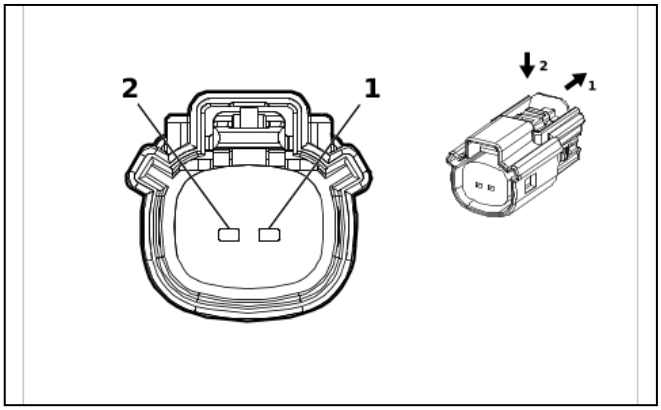
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-14 (GN)	No Tool Required

G18 Fuel Pump - High Pressure (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) VT / BK	(1) 7300	(1) High Pressure Fuel Pump Low Control	(1) I	(1) —
(2) 2	(2) 0.75	(2) YE	(2) 7301	(2) High Pressure Fuel Pump High Control	(2) I	(2) —

G18 Fuel Pump - High Pressure (L76 / L78)



2474713

Connector Part Information
- Harness Type: Fuel Injector Wiring Harness - Bank 2 Direct
- OEM Connector: 33471-0206
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.5 Series, Sealed(BK)

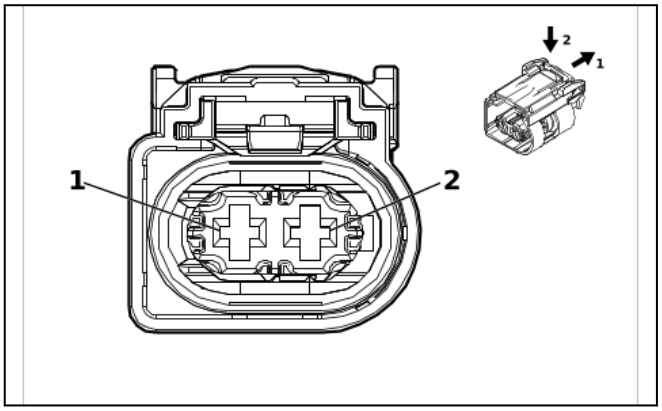
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required

G18 Fuel Pump - High Pressure (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) VT / BK	(1) 7300	(1) High Pressure Fuel Pump Low Control	(1) I	(1) —
(2) 2	(2) 0.75	(2) YE	(2) 7301	(2) High Pressure Fuel Pump High Control	(2) I	(2) —

G24 Windshield Washer Pump



5580410

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 2425741-1
- Service Connector: 85005016
- Description: 2-Way F 2.8 MCP Series, Sealed(BK)

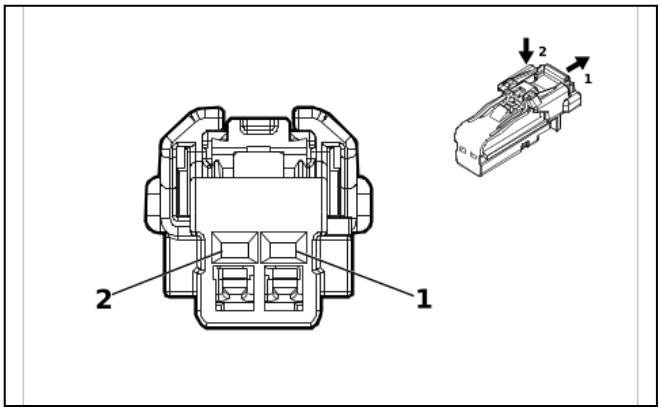
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-4A (PU)	No Tool Required

G24 Windshield Washer Pump

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) GY / VT	(1) 228	(1) Windshield Washer Pump Control	(1) I	(1) —
(2) 2	(2) 0.75 (2) 0.75	(2) BK (2) GN / GY	(2) 150 (2) 11346	(2) Ground (2) Underbody Camera Washer Motor Control	(2) I (2) I	(2) - UXA (2) UXA

G31D Front Seat Back Lumbar Pump - Driver (AVK)



4115691

Connector Part Information
- Harness Type: Front Seat Wiring Harness - Driver
- OEM Connector: 6098-8988
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series(BK)

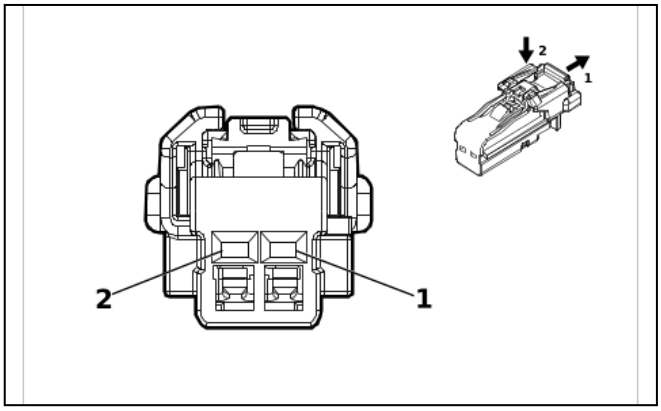
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

G31D Front Seat Back Lumbar Pump - Driver (AVK)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) WH / BU	(1) 4891	(1) Driver Seat Lumbar/Bolster Pump Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) BN / BK	(2) 2305	(2) Driver Seat Bolster Pump Low Reference	(2) I	(2) —

G31P Front Seat Back Lumbar Pump - Passenger (AVU)



4115691

Connector Part Information
- Harness Type: Front Seat Wiring Harness - Passenger
- OEM Connector: 6098-8988
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series(BK)

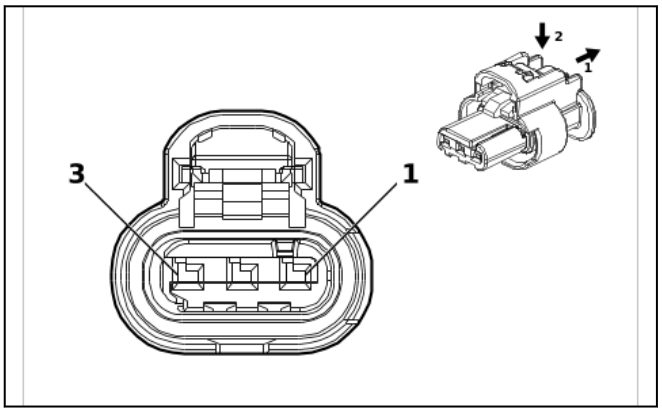
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

G31P Front Seat Back Lumbar Pump - Passenger (AVU)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GY / WH	(1) 4890	(1) Passenger Seat Lumbar/Bolster Pump Control	(1) I	(1) —
(2) 2	(2) 0.5 (2) 0.5	(2) GY / BK (2) BK	(2) 2306 (2) 1350	(2) Passenger Seat Bolster Pump Low Reference (2) Ground	(2) I (2) I	(2) AHH + AKE (2) AVU - AHH - AKE

G58 Evaporative Emission Canister Purge Pump (L4B)



4581126

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 1-2296695-1
- Service Connector: 86792094
- Description: 3-Way F 1.2 MCON-CB Series, Sealed(BK)

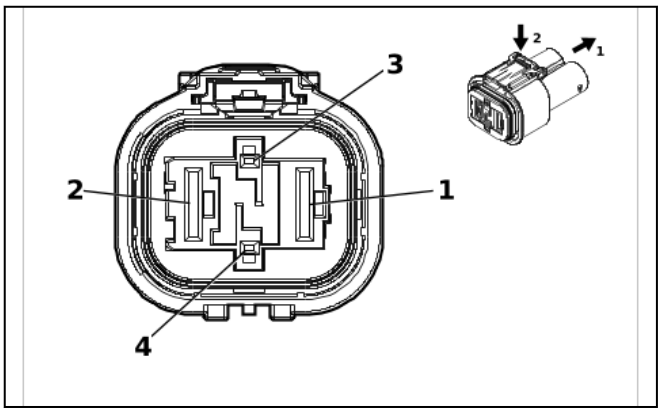
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

G58 Evaporative Emission Canister Purge Pump (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) VT / BU	(1) 5294	(1) Powertrain Main Relay Fused Supply Voltage 5	(1) I	(1) —
(2) 2	(2) 0.5	(2) GN / BN	(2) 10809	(2) Engine Control Module LIN Bus 4	(2) I	(2) —
(3) 3	(3) 0.5	(3) BK	(3) 6650	(3) Ground	(3) I	(3) —

G59 Engine Coolant Pump (L4B)



5389785

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 1-2332470-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 1.2, 9.5 MCON Series(BK)

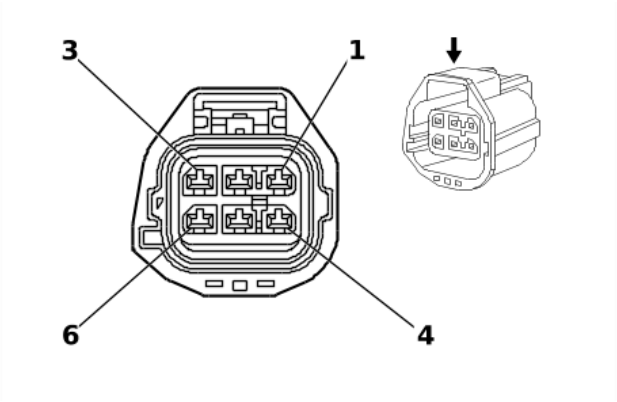
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required
II	Not required	J-35616-22 (RD)	No Tool Required

G59 Engine Coolant Pump (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 8	(1) RD / BN	(1) 1742	(1) Battery Positive Voltage	(1) II	(1) —
(2) 2	(2) 8	(2) BK	(2) 6550	(2) Ground	(2) II	(2) —
(3) 3	(3) 0.5	(3) GN / BN	(3) 10809	(3) Engine Control Module LIN Bus 4	(3) I	(3) —
4	—	—	—	Not Occupied	—	—

K4 Running Board Control Module X1 (B3L)



1420587

Connector Part Information

- Harness Type: Chassis Wiring Harness
- OEM Connector: 7287-9814-10
- Service Connector: 19368306
- Description: 6-Way F 2.8 Series, Sealed(GY)

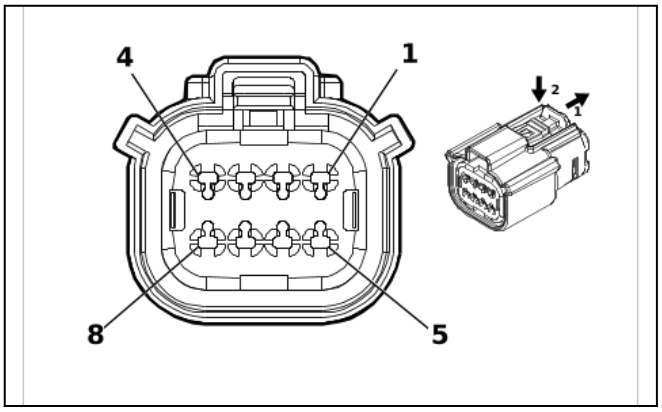
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-35 (VT)	No Tool Required

K4 Running Board Control Module X1 (B3L)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 2.5	(1) RD / WH	(1) 1040	(1) Battery Positive Voltage	(1) I	(1) —
(2) 2	(2) 2	(2) GY	(2) 7472	(2) Left Running Board Step Motor Control Retract	(2) I	(2) —
(3) 3	(3) 2	(3) BU	(3) 7470	(3) Right Running Board Step Motor Control Extend	(3) I	(3) —
(4) 4	(4) 2.5	(4) BK	(4) 1150	(4) Ground	(4) I	(4) —
(5) 5	(5) 2	(5) WH / BN	(5) 7471	(5) Left Running Board Step Motor Control Extend	(5) I	(5) —
(6) 6	(6) 2	(6) GN	(6) 7469	(6) Right Left Running Board Step Motor Control Retract	(6) I	(6) —

K4 Running Board Control Module X2 (B3L)



4846407

Connector Part Information

- Harness Type: Chassis Wiring Harness
- OEM Connector: 33472-4846
- Service Connector: 84928314
- Description: 8-Way F 1.5 MX Series, Sealed(BK)

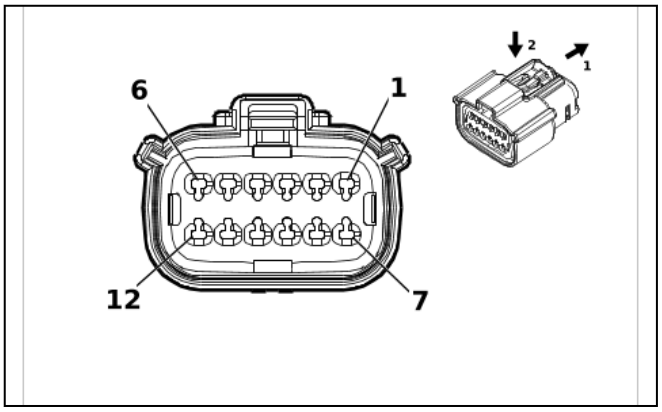
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required

K4 Running Board Control Module X2 (B3L)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	—	—	—	Not Occupied	—	—
(2) 2	(2) 0.5	(2) WH	(2) 4986	(2) AUTOSAR CAN Bus [-] 1 Serial Data	(2) I	(2) —
(3) 3	(3) 0.5	(3) BU	(3) 4987	(3) AUTOSAR CAN Bus [+] 1 Serial Data	(3) I	(3) —
4 - 5	—	—	—	Not Occupied	—	—
(6) 6	(6) 0.5	(6) WH	(6) 4986	(6) AUTOSAR CAN Bus [-] 1 Serial Data	(6) I	(6) —
(7) 7	(7) 0.5	(7) BU	(7) 4987	(7) AUTOSAR CAN Bus [+] 1 Serial Data	(7) I	(7) —
8	—	—	—	Not Occupied	—	—

K4 Running Board Control Module X3 (B3L)



2871860

Connector Part Information
- Harness Type: Chassis Wiring Harness
- OEM Connector: 13503526
- Service Connector: 19352907
- Description: 12-Way F 1.5 MX Series, Sealed(BK)

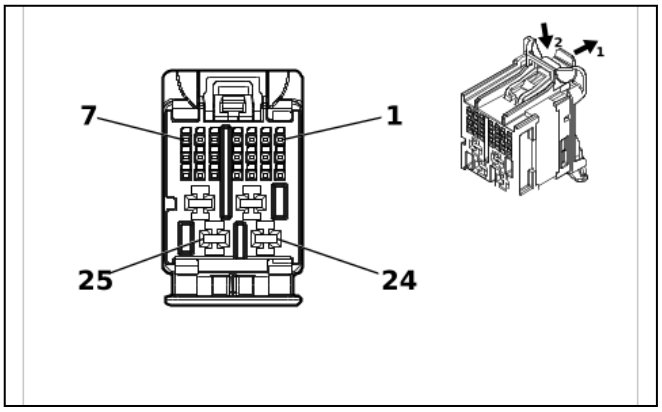
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	85528055	J-35616-2A (GY)	J-38125-217

K4 Running Board Control Module X3 (B3L)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GN / RD	(1) 7464	(1) Right Running Board Step Motor Hall Sensor Voltage Reference	(1) I	(1) —
(2) 2	(2) 0.5	(2) VT	(2) 7465	(2) Right Running Board Step Motor Hall Sensor Signal	(2) I	(2) —
(3) 3	(3) 0.5	(3) YE / BK	(3) 7463	(3) Right Running Board Step Motor Hall Sensor Low Reference	(3) I	(3) —
4 - 6	—	—	—	Not Occupied	—	—
(7) 7	(7) 0.5	(7) VT / RD	(7) 7468	(7) Left Running Board Step Motor Hall Sensor Voltage Reference	(7) I	(7) —
(8) 8	(8) 0.5	(8) YE	(8) 7467	(8) Left Running Board Step Motor Hall Sensor Signal	(8) I	(8) —
(9) 9	(9) 0.5	(9) YE / BN	(9) 7466	(9) Left Running Board Step Motor Hall Sensor Low Reference	(9) I	(9) —
(10) 10	(10) 0.5	(10) BU / GN	(10) 4746	(10) Running Board Step Left Kick Switch Signal	(10) I	(10) —
(11) 11	(11) 0.5	(11) WH	(11) 4747	(11) Running Board Step Right Kick Switch Signal	(11) I	(11) —
12	—	—	—	Not Occupied	—	—

K9 Body Control Module X1



5203995

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 160027-0013
- Service Connector: 13534967
- Description: 25-Way F 0.5 MQS, 2.8 MCP Series(BK with GY Inner Connector)

Terminal Part Information

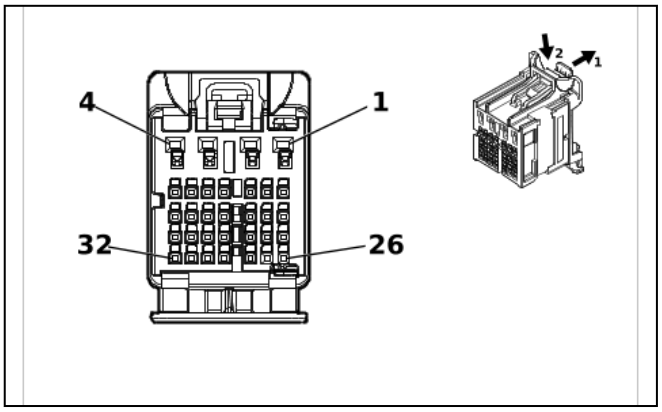
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19370262	EL-35616-58 (BK)	EL-38125-58
II	87814662	J-35616-35 (VT)	J-38125-557

K9 Body Control Module X1

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) GY	(1) 157	(1) Interior Lamp Control	(1) I	(1) S0M
2	—	—	—	Not Occupied	—	—
(3) 3	(3) 0.35	(3) GY / YE	(3) 7543	(3) Hazard Warning Indicator LED Dimming Signal	(3) I	(3) —
4	—	—	—	Not Occupied	—	—
(5) 5	(5) 0.35	(5) BU / GY	(5) 754	(5) Blower Motor Speed Control	(5) I	(5) —
(6) 6	(6) 0.35	(6) WH / YE	(6) 4634	(6) HVAC Remote Enable Signal	(6) I	(6) —
(7) 7	(7) 0.35	(7) WH / GY	(7) 7297	(7) Minor Endgate High Relay Control	(7) I	(7) —
8 - 10	—	—	—	Not Occupied	—	—
(11) 11	(11) 0.35	(11) GY / GN	(11) 4636	(11) HVAC System Enable Signal	(11) I	(11) —
(12) 12	(12) 0.35	(12) GY	(12) 728	(12) Security Indicator Control	(12) I	(12) —
(13) 13	(13) 0.35	(13) YE	(13) 6812	(13) Out of Park Signal	(13) I	(13) —
14	—	—	—	Not Occupied	—	—
(15) 15	(15) 0.35	(15) GY	(15) 590	(15) Driver Solar Sensor Signal	(15) I	(15) —
(16) 16	(16) 0.35	(16) GY	(16) 6137	(16) Air Conditioning Evaporator Temperature Sensor Signal	(16) I	(16) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(17) 17	(17) 0.35	(17) WH / BU	(17) 278	(17) Ambient Light Sensor Signal	(17) I	(17) —
(18) 18	(18) 0.35	(18) BU / WH	(18) 734	(18) Inside Air Temperature Sensor Signal	(18) I	(18) —
19	—	—	—	Not Occupied	—	—
(20) 20	(20) 0.35	(20) GN / VT	(20) 2852	(20) Body Control Module LIN Bus 6	(20) I	(20) —
21 - 22	—	—	—	Not Occupied	—	—
(23) 23	(23) 1	(23) GN / YE	(23) 6840	(23) Auxiliary Device 2 Switched Voltage	(23) II	(23) —
24	—	—	—	Not Occupied	—	—
(25) 25	(25) 1	(25) RD / GY	(25) 2140	(25) Battery Positive Voltage	(25) II	(25) —

K9 Body Control Module X2



5204222

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 160028-0015
- Service Connector: 13534980
- Description: 32-Way F 0.5 NANO, 1.2 MCON, stAK50h Series(PK with GY Inner Connector)

Terminal Part Information

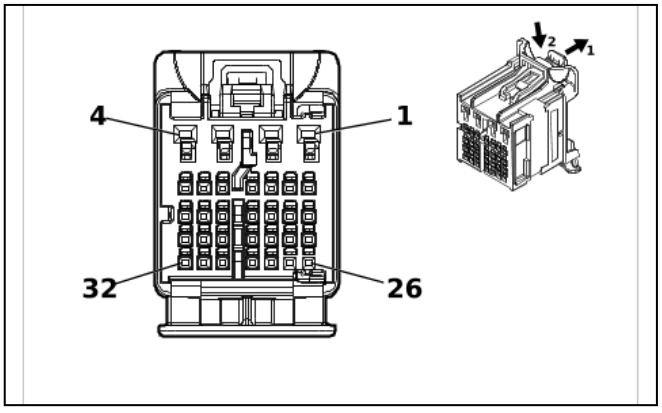
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19370262	EL-35616-58 (BK)	EL-38125-58

K9 Body Control Module X2

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1 - 4	—	—	—	Not Occupied	—	—
(5) 5	(5) 0.35	(5) BU / GN	(5) 5723	(5) Ignition Mode Switch Mode Voltage	(5) I	(5) —
6 - 8	—	—	—	Not Occupied	—	—
(9) 9	(9) 0.35	(9) VT / YE	(9) 5526	(9) Tap Up/Tap Down Switch Signal	(9) I	(9) —
(10) 10	(10) 0.35	(10) YE / GN	(10) 2202	(10) Enhanced Driver Mode 1 Switch Signal	(10) I	(10) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
11	—	—	—	Not Occupied	—	—
(12) 12	(12) 0.35	(12) YE / BU	(12) 1714	(12) Windshield Wiper Switch Low Signal	(12) I	(12) —
(13) 13	(13) 0.35	(13) GY / GN	(13) 5737	(13) Distance Sensing Cruise Control Gap Up/ Down Switch Signal	(13) I	(13) —
(14) 14	(14) 0.35	(14) BN / GN	(14) 1884	(14) Cruise Control Set/Coast/Resume/ Accelerate Switch Signal	(14) I	(14) —
15	—	—	—	Not Occupied	—	—
(16) 16	(16) 0.35	(16) BN / BK	(16) 5720	(16) Ignition Mode Switch Accessory LED Signal	(16) I	(16) —
17 - 22	—	—	—	Not Occupied	—	—
(23) 23	(23) 0.35	(23) VT / BU	(23) 2916	(23) Right Turn Signal Switch Signal	(23) I	(23) —
24	—	—	—	Not Occupied	—	—
(25) 25	(25) 0.35	(25) BK / GY	(25) 6009	(25) Windshield Wiper Switch Low Reference	(25) I	(25) —
(26) 26	(26) 0.35	(26) WH / BK	(26) 94	(26) Windshield Washer Switch Signal	(26) I	(26) —
(27) 27	(27) 0.35	(27) YE / BN	(27) 307	(27) Headlamp Switch Flash Signal	(27) I	(27) —
(28) 28	(28) 0.35	(28) GN / WH	(28) 3287	(28) Horn Switch Signal	(28) I	(28) —
(29) 29	(29) 0.35	(29) WH / GN	(29) 2915	(29) Left Turn Signal Switch Signal	(29) I	(29) —
(30) 30	(30) 0.35	(30) BK / YE	(30) 407	(30) Sensor Low Reference	(30) I	(30) —
(31) 31	(31) 0.35	(31) GN / WH	(31) 111	(31) Hazard Warning Switch Signal	(31) I	(31) —
(32) 32	(32) 0.35	(32) WH	(32) 524	(32) High Beam Select Switch High Beam Signal	(32) I	(32) —

K9 Body Control Module X3



5203925

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 160028-0012
- Service Connector: 13534977
- Description: 32-Way F 0.5 NANO, 1.2 MCON, stAK50h Series(BU with GY Inner Connector)

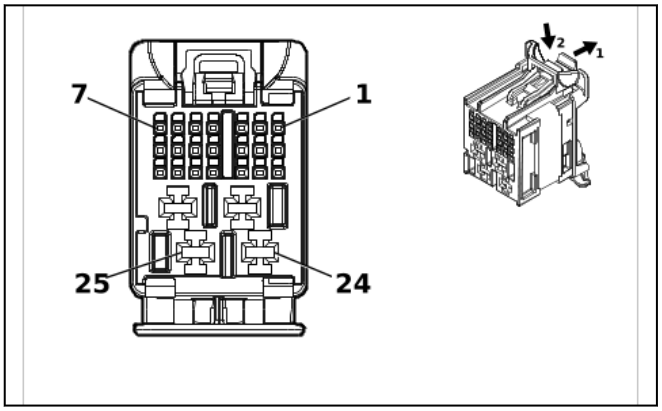
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19370262	EL-35616-58 (BK)	EL-38125-58
II	19371217	J-35616-12 (BU)	J-38125-553

K9 Body Control Module X3

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1 - 2	—	—	—	Not Occupied	—	—
(3) 3	(3) 0.5	(3) GN / VT	(3) 4786	(3) Dome/Reading Lamp Enable Signal	(3) II	(3) —
4 - 9	—	—	—	Not Occupied	—	—
(10) 10	(10) 0.35	(10) GN / BK	(10) 2858	(10) Body Control Module LIN Bus 12	(10) I	(10) —
(11) 11	(11) 0.35	(11) GN / WH	(11) 2861	(11) Body Control Module LIN Bus 15	(11) I	(11) —
12 - 15	—	—	—	Not Occupied	—	—
(16) 16	(16) 0.35	(16) GN / BU	(16) 761	(16) Blower Speed Feedback Signal	(16) I	(16) —
17 - 18	—	—	—	Not Occupied	—	—
(19) 19	(19) 0.35	(19) BU / BK	(19) 5719	(19) Ignition Mode Switch Start LED Signal	(19) I	(19) —
20 - 32	—	—	—	Not Occupied	—	—

K9 Body Control Module X4



5203893

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 160027-0018
- Service Connector: 13534970
- Description: 25-Way F 0.5 MQS, 2.8 MCP Series(GY)

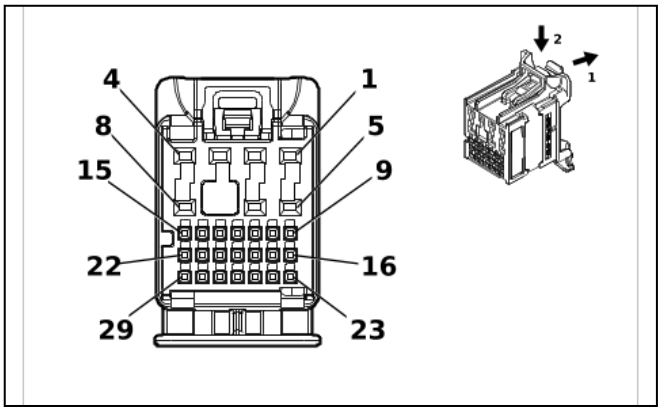
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19370262	EL-35616-58 (BK)	EL-38125-58
II	87814662	J-35616-35 (VT)	J-38125-557

K9 Body Control Module X4

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) BN / BK	(1) 3552	(1) Interior Passive Entry Antenna 1 High Signal	(1) I	(1) —
(2) 2	(2) 0.35	(2) WH	(2) 3553	(2) Interior Passive Entry Antenna 1 Low Signal	(2) I	(2) —
(3) 3	(3) 0.35	(3) BK / VT	(3) 1449	(3) Steering Wheel Resistor Ladder Low Reference	(3) I	(3) —
(4) 4	(4) 0.35	(4) WH / GN	(4) 7728	(4) Major Endgate High Relay Control	(4) I	(4) —
(5) 5	(5) 0.35	(5) GN / VT	(5) 5199	(5) Run/Crank Relay Coil Control	(5) I	(5) —
6	—	—	—	Not Occupied	—	—
(7) 7	(7) 0.35	(7) BN / BK	(7) 4996	(7) Immobilizer Antenna Signal [+]	(7) I	(7) —
8 - 9	—	—	—	Not Occupied	—	—
(10) 10	(10) 0.35	(10) GY / GN	(10) 4083	(10) Retained Accessory Power Relay 2 Coil Control	(10) I	(10) —
11	—	—	—	Not Occupied	—	—
(12) 12	(12) 0.35	(12) BU / VT	(12) 7729	(12) Major Endgate Low Relay Control	(12) I	(12) —
13	—	—	—	Not Occupied	—	—
(14) 14	(14) 0.35	(14) WH / GY	(14) 4997	(14) Immobilizer Antenna Low Signal	(14) I	(14) —
15	—	—	—	Not Occupied	—	—
(16) 16	(16) 0.35	(16) GN / WH	(16) 4115	(16) Body Control Module LIN Bus 5	(16) I	(16) —
17 - 18	—	—	—	Not Occupied	—	—
(19) 19	(19) 0.35	(19) BU / GN	(19) 4103	(19) AUTOSAR CAN Bus [+] 9 Serial Data	(19) I	(19) —
(20) 20	(20) 0.35	(20) WH / GN	(20) 4102	(20) AUTOSAR CAN Bus [-] 9 Serial Data	(20) I	(20) —
21	—	—	—	Not Occupied	—	—
(22) 22	(22) 0.5	(22) RD / WH	(22) 2740	(22) Battery Positive Voltage	(22) II	(22) —
(23) 23	(23) 2	(23) RD / BU	(23) 2540	(23) Battery Positive Voltage	(23) II	(23) —
(24) 24	(24) 2	(24) BK	(24) 1050	(24) Ground	(24) II	(24) —
(25) 25	(25) 2	(25) BK	(25) 1050	(25) Ground	(25) II	(25) —

K9 Body Control Module X5



4584346

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 160014-0012
- Service Connector: 13534972
- Description: 29-Way F 0.5 NANO, 1.2 MCON Series(GN)

Terminal Part Information

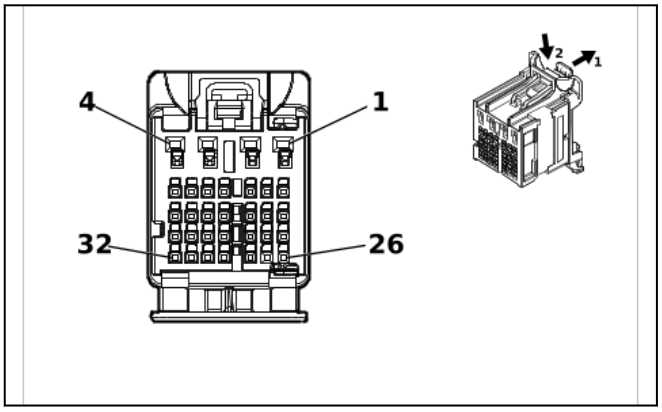
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19370262	EL-35616-58 (BK)	EL-38125-58
II	19371217	J-35616-12 (BU)	J-38125-553

K9 Body Control Module X5

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	—	—	—	Not Occupied	—	—
(2) 2	(2) 0.5	(2) BU / BN	(2) 7573	(2) Air Conditioning Compressor Solenoid Valve Control	(2) II	(2) —
(3) 3	(3) 0.5	(3) BU / YE	(3) 7574	(3) Air Conditioning Compressor Solenoid Valve Control	(3) II	(3) —
(4) 4	(4) 0.75	(4) WH	(4) 2679	(4) Lock Actuators Unlock Control 1	(4) II	(4) —
5	—	—	—	Not Occupied	—	—
(6) 6	(6) 0.5	(6) YE	(6) 6817	(6) LED Backlight Dimming Control 1	(6) II	(6) —
7	—	—	—	Not Occupied	—	—
(8) 8	(8) 0.75	(8) GY	(8) 2681	(8) Left Front Door Lock Actuator Lock Control	(8) II	(8) —
9 - 10	—	—	—	Not Occupied	—	—
(11) 11	(11) 0.35	(11) BN / WH	(11) 28	(11) Horn Relay Control	(11) I	(11) —
(12) 12	(12) 0.35	(12) WH / GN	(12) 4102	(12) AUTOSAR CAN Bus [-] 9 Serial Data	(12) I	(12) —
(13) 13	(13) 0.35	(13) BU / GN	(13) 4103	(13) AUTOSAR CAN Bus [+] 9 Serial Data	(13) I	(13) —
14 - 15	—	—	—	Not Occupied	—	—
(16) 16	(16) 0.35	(16) VT	(16) 4301	(16) Passive Entry Left Antenna Signal High	(16) I	(16) —
(17) 17	(17) 0.35	(17) GN / YE	(17) 2855	(17) Body Control Module LIN Bus 9	(17) I	(17) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(18) 18	(18) 0.35	(18) VT / GY	(18) 126	(18) Left Front Door Open Switch Signal	(18) I	(18) —
(19) 19	(19) 0.35	(19) GN / YE	(19) 6134	(19) Body Control Module LIN Bus 3	(19) I	(19) —
20	—	—	—	Not Occupied	—	—
(21) 21	(21) 0.35	(21) WH / BU	(21) 6311	(21) Cruise/ETC/TCC Brake Signal	(21) I	(21) —
(22) 22	(22) 0.35	(22) BN / VT	(22) 193	(22) Rear Defogger Relay Control	(22) I	(22) —
(23) 23	(23) 0.35	(23) VT / GY	(23) 4302	(23) Passive Entry Left Antenna Signal Low	(23) I	(23) —
(24) 24	(24) 0.35	(24) WH	(24) 5359	(24) Brake Apply Sensor Control	(24) I	(24) —
(25) 25	(25) 0.35	(25) BU / YE	(25) 5361	(25) Brake Apply Sensor Signal	(25) I	(25) —
(26) 26	(26) 0.35	(26) BK / BN	(26) 5360	(26) Brake Apply Sensor Low Reference	(26) I	(26) —
(27) 27	(27) 0.35	(27) YE	(27) 1144	(27) Endgate Release Switch Discrete Signal Exterior	(27) I	(27) —
28	—	—	—	Not Occupied	—	—
(29) 29	(29) 0.35	(29) WH / VT	(29) 4849	(29) LED Ambient Lighting Enable Signal	(29) I	(29) —

K9 Body Control Module X6



5202291

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 160028-0017
- Service Connector: 13534981
- Description: 32-Way F 0.5 MQS, 1.2 OCS Series(BN with GY Inner Connector)

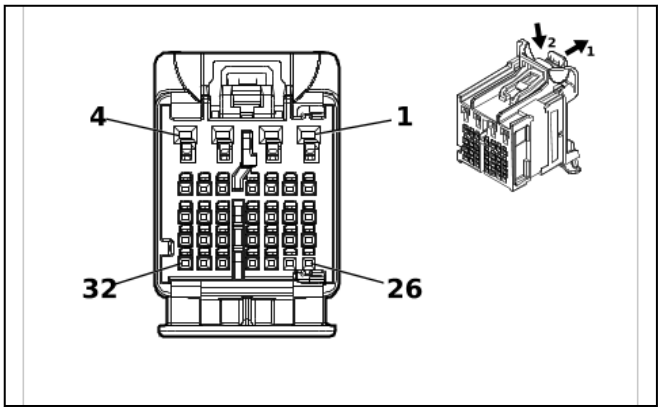
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19370262	EL-35616-58 (BK)	EL-38125-58
II	19371217	J-35616-12 (BU)	J-38125-553

K9 Body Control Module X6

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	—	—	—	Not Occupied	—	—
(2) 2	(2) 0.75	(2) VT / WH	(2) 1094	(2) Right Rear Door Lock Actuator Lock Control	(2) II	(2) —
(3) 3	(3) 0.75	(3) GY / BK	(3) 2680	(3) Lock Actuators Unlock Control 2	(3) II	(3) —
4 - 6	—	—	—	Not Occupied	—	—
(7) 7	(7) 0.35	(7) BN / GN	(7) 3568	(7) Rear Closure Passive Entry Antenna High Signal	(7) I	(7) —
(8) 8	(8) 0.35	(8) GN / GY	(8) 3569	(8) Rear Closure Passive Entry Antenna Low Signal	(8) I	(8) —
9 - 10	—	—	—	Not Occupied	—	—
(11) 11	(11) 0.35	(11) GN / BU	(11) 6133	(11) Body Control Module LIN Bus 2	(11) I	(11) —
(12) 12	(12) 0.35	(12) GY	(12) 7292	(12) Major Endgate Release Switch Signal Exterior	(12) I	(12) —
13	—	—	—	Not Occupied	—	—
(14) 14	(14) 0.35	(14) VT	(14) 801	(14) Retained Accessory Power Control	(14) I	(14) —
15 - 18	—	—	—	Not Occupied	—	—
(19) 19	(19) 0.35	(19) YE	(19) 7294	(19) Minor Endgate Release Switch Discrete Signal Exterior	(19) I	(19) —
20	—	—	—	Not Occupied	—	—
(21) 21	(21) 0.35	(21) YE / BU	(21) 7295	(21) Left Minor Endgate Ajar Signal	(21) I	(21) —
(22) 22	(22) 0.35	(22) BN / GN	(22) 4064	(22) Hood Status B Signal	(22) I	(22) —
23 - 27	—	—	—	Not Occupied	—	—
(28) 28	(28) 0.35	(28) BU	(28) 2675	(28) Left Front Exterior Door Handle Switch Unlock Signal	(28) I	(28) —
29 - 30	—	—	—	Not Occupied	—	—
(31) 31	(31) 0.35	(31) GY / BU	(31) 4995	(31) Right Rear Door Exterior Switch Unlock Signal	(31) I	(31) —
32	—	—	—	Not Occupied	—	—

K9 Body Control Module X7



5202294

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 160028-0014
- Service Connector: 13534979
- Description: 32-Way F 0.5 MQS, 1.2 OCS Series(PU with GY Inner Connector)

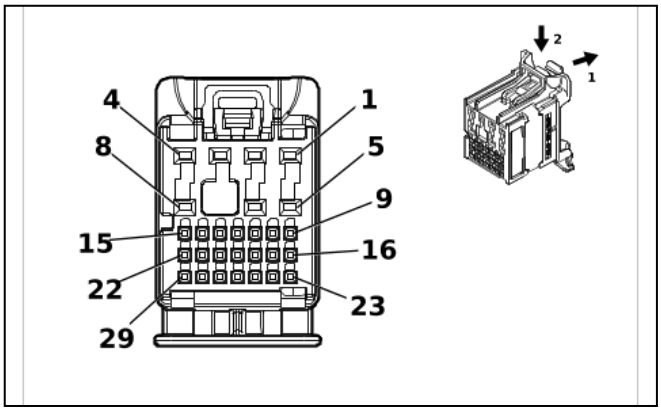
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19370262	EL-35616-58 (BK)	EL-38125-58

K9 Body Control Module X7

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1 - 11	—	—	—	Not Occupied	—	—
(12) 12	(12) 0.35	(12) GN / VT	(12) 2860	(12) Body Control Module LIN Bus 14	(12) I	(12) —
13 - 18	—	—	—	Not Occupied	—	—
(19) 19	(19) 0.35	(19) GN / VT	(19) 2857	(19) Body Control Module LIN Bus 11	(19) I	(19) —
20 - 32	—	—	—	Not Occupied	—	—

K9 Body Control Module X8



4578560

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 160014-0011
- Service Connector: 13534971
- Description: 29-Way F 0.5 NANO, 1.2 MCON, stAK50h Series(DK-GY with GY Inner Connector)

Terminal Part Information

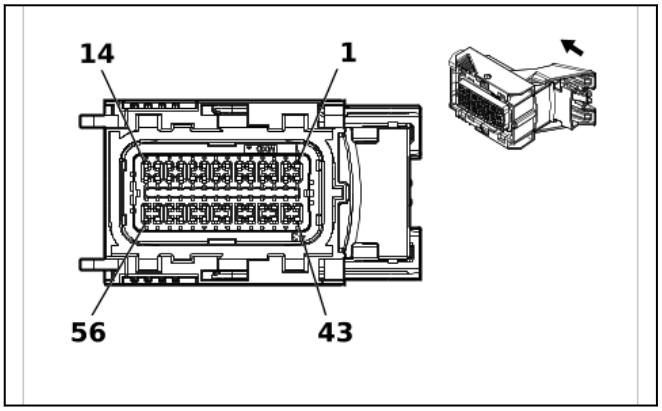
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19370262	EL-35616-58 (BK)	EL-38125-58
II	19371217	J-35616-12 (BU)	J-38125-553

K9 Body Control Module X8

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) GY / VT	(1) 2691	(1) Rear Closure Actuator Lock Control	(1) II	(1) —
2	—	—	—	Not Occupied	—	—
(3) 3	(3) 0.75	(3) BU / YE	(3) 1091	(3) Left Rear Door Lock Actuator Lock Control	(3) II	(3) —
(4) 4	(4) 0.75	(4) YE / GN	(4) 2682	(4) Right Front Door Lock Actuator Lock Control	(4) II	(4) —
5 - 8	—	—	—	Not Occupied	—	—
(9) 9	(9) 0.35	(9) GN / BK	(9) 4304	(9) Passive Entry Right Antenna Signal Low	(9) I	(9) —
(10) 10	(10) 0.35	(10) GN / YE	(10) 4303	(10) Passive Entry Right Antenna Signal High	(10) I	(10) —
11 - 12	—	—	—	Not Occupied	—	—
(13) 13	(13) 0.35	(13) YE / BN	(13) 3037	(13) Driver Seat Left Rear Haptic Movement Motor Control	(13) I	(13) —
(14) 14	(14) 0.35	(14) BN	(14) 3038	(14) Driver Seat Right Rear Haptic Movement Motor Control	(14) I	(14) —
15	—	—	—	Not Occupied	—	—
(16) 16	(16) 0.35	(16) WH / VT	(16) 4994	(16) Left Rear Door Exterior Switch Unlock Signal	(16) I	(16) —
(17) 17	(17) 0.35	(17) GN / YE	(17) 2862	(17) Body Control Module LIN Bus 16	(17) I	(17) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(18) 18	(18) 0.35	(18) GN / WH	(18) 2854	(18) Body Control Module LIN Bus 8	(18) I	(18) —
19 - 27	—	—	—	Not Occupied	—	—
(28) 28	(28) 0.35	(28) GY / VT	(28) 2676	(28) Right Front Door Exterior Switch Unlock Signal	(28) I	(28) —
(29) 29	(29) 0.35	(29) GN / GY	(29) 6135	(29) Body Control Module LIN Bus 4	(29) I	(29) —

K19 Suspension Control Module (Z45)



5377109

Connector Part Information
- Harness Type: Chassis Wiring Harness
- OEM Connector: 12707485
- Service Connector: 85758037
- Description: 56-Way F 0.64 MX123 Series, Sealed(BK with BU Terminal Position Assurance)

Terminal Part Information

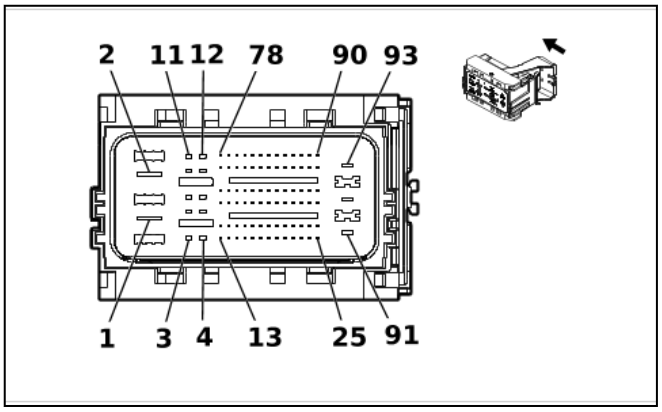
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19351723	J-35616-64B (L-BU)	J-38125-213

K19 Suspension Control Module (Z45)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BU / GY	(1) 1114	(1) Left Rear Shock Absorber Actuator Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) BN / WH	(2) 1207	(2) Left Front Suspension Position Sensor Signal	(2) I	(2) —
3	—	—	—	Not Occupied	—	—
(4) 4	(4) 0.5	(4) BK / BU	(4) 1206	(4) Left Front Suspension Position Sensor Low Reference	(4) I	(4) —
(5) 5	(5) 0.5	(5) GN / WH	(5) 1210	(5) Left Rear Suspension Position Sensor Signal	(5) I	(5) —
6 - 10	—	—	—	Not Occupied	—	—
(11) 11	(11) 0.5	(11) YE / WH	(11) 1213	(11) Right Front Suspension Position Sensor Signal	(11) I	(11) —
12 - 13	—	—	—	Not Occupied	—	—

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(14) 14	(14) 0.75	(14) BN / GN	(14) 1118	(14) Right Rear Shock Absorber Actuator Control	(14) I	(14) —
(15) 15	(15) 0.75	(15) GN / VT	(15) 1115	(15) Left Rear Shock Absorber Actuator Control	(15) I	(15) —
(16) 16	(16) 0.5	(16) BU / RD	(16) 1205	(16) Left Front Suspension Position Sensor Voltage Reference	(16) I	(16) —
(17) 17	(17) 0.75	(17) BK / WH	(17) 1651	(17) Signal Ground	(17) I	(17) —
(18) 18	(18) 0.5	(18) BK / YE	(18) 1215	(18) Right Rear Suspension Position Sensor Low Reference	(18) I	(18) —
(19) 19	(19) 0.5	(19) GN / RD	(19) 1214	(19) Right Rear Suspension Position Sensor Voltage Reference	(19) I	(19) —
(20) 20	(20) 0.5	(20) WH	(20) 4976	(20) AUTOSAR CAN Bus [-] 3 Serial Data	(20) I	(20) —
21 - 22	—	—	—	Not Occupied	—	—
(23) 23	(23) 0.5	(23) BU / BK	(23) 4977	(23) AUTOSAR CAN Bus [+] 3 Serial Data	(23) I	(23) —
24 - 25	—	—	—	Not Occupied	—	—
(26) 26	(26) 0.75	(26) RD / GN	(26) 2440	(26) Battery Positive Voltage	(26) I	(26) —
(27) 27	(27) 0.5	(27) GN / GY	(27) 1216	(27) Right Rear Suspension Position Sensor Signal	(27) I	(27) —
(28) 28	(28) 0.75	(28) GN / GY	(28) 1119	(28) Right Rear Shock Absorber Actuator Control	(28) I	(28) —
(29) 29	(29) 0.75	(29) BN / WH	(29) 1107	(29) Left Front Shock Absorber Actuator Control	(29) I	(29) —
(30) 30	(30) 0.75	(30) GY / BU	(30) 1113	(30) Left Front Shock Absorber Actuator Control	(30) I	(30) —
31	—	—	—	Not Occupied	—	—
(32) 32	(32) 0.5	(32) BK / GN	(32) 1209	(32) Left Rear Suspension Position Sensor Low Reference	(32) I	(32) —
(33) 33	(33) 0.5	(33) YE / RD	(33) 1208	(33) Left Rear Suspension Position Sensor Voltage Reference	(33) I	(33) —
(34) 34	(34) 0.5	(34) WH	(34) 4976	(34) AUTOSAR CAN Bus [-] 3 Serial Data	(34) I	(34) —
35 - 36	—	—	—	Not Occupied	—	—
(37) 37	(37) 0.5	(37) BU / BK	(37) 4977	(37) AUTOSAR CAN Bus [+] 3 Serial Data	(37) I	(37) —
(38) 38	(38) 0.5	(38) BK / GY	(38) 1212	(38) Right Front Suspension Position Sensor Low Reference	(38) I	(38) —
(39) 39	(39) 0.5	(39) BN / RD	(39) 1211	(39) Right Front Suspension Position Sensor Voltage Reference	(39) I	(39) —
40	—	—	—	Not Occupied	—	—
(41) 41	(41) 0.75	(41) GY / WH	(41) 1117	(41) Right Front Shock Absorber Actuator Control	(41) I	(41) —
(42) 42	(42) 0.75	(42) BN / BU	(42) 1116	(42) Right Front Shock Absorber Actuator Control	(42) I	(42) —
43 - 56	—	—	—	Not Occupied	—	—

K20 Engine Control Module X1 (L76 / L78)



6173672

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 212806-0108
- Service Connector: 85079961
- Description: 93-Way F 0.5, 1.2, 2.8, 6.3 MX GENV Series, Sealed(BK with BU Terminal Position Assurance)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19355735	J-35616-4A (PU)	J-38125-217
II	85079962	EL-35616-58 (BK)	EL-38125-58
III	85079963	J-35616-2A (GY)	EL-38125-58
IV	85079964	J-35616-42 (RD)	J-38125-217

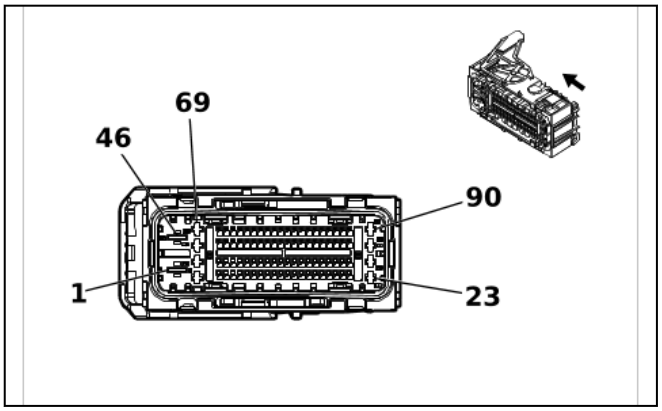
K20 Engine Control Module X1 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 4	(1) BK / WH	(1) 6151	(1) Engine Control Module Ground	(1) IV	(1) —
(2) 2	(2) 4	(2) BK / WH	(2) 6151	(2) Engine Control Module Ground	(2) IV	(2) —
3	—	—	—	Not Occupied	—	—
(4) 4	(4) 0.75	(4) RD / BN	(4) 440	(4) Battery Positive Voltage	(4) III	(4) —
5 - 10	—	—	—	Not Occupied	—	—
(11) 11	(11) 0.5	(11) GY / WH	(11) 3122	(11) HO2S Heater Low Control Bank 1 Sensor 2	(11) III	(11) —
(12) 12	(12) 0.5	(12) WH / BN	(12) 3223	(12) HO2S Heater Low Control Bank 2 Sensor 2	(12) III	(12) —
(13) 13	(13) 0.5	(13) BU / GY	(13) 636	(13) Ambient Air Temperature Sensor Signal	(13) II	(13) —
(14) 14	(14) 0.5	(14) VT / GN	(14) 439	(14) Run/Crank Ignition 1 Voltage	(14) II	(14) —
(15) 15	(15) 0.5	(15) GN / GY	(15) 465	(15) Fuel Pump Primary Relay Control	(15) II	(15) —
(16) 16	(16) 0.5	(16) WH / GN	(16) 5380	(16) Brake Position Sensor Signal	(16) II	(16) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(17) 17	(17) 0.5	(17) GN / WH	(17) 1162	(17) Accelerator Pedal Position Signal 2	(17) II	(17) —
18 - 19	—	—	—	Not Occupied	—	—
(20) 20	(20) 0.5	(20) WH	(20) 4055	(20) Private Serial Data Powertrain CAN Bus [+] Serial Data	(20) II	(20) —
(21) 21	(21) 0.5	(21) BU / GY	(21) 4054	(21) Private Serial Data Powertrain CAN Bus [-] Serial Data	(21) II	(21) —
(22) 22	(22) 0.5	(22) BU / BK	(22) 4977	(22) AUTOSAR CAN Bus [+] 3 Serial Data	(22) II	(22) —
(23) 23	(23) 0.5	(23) WH	(23) 4976	(23) AUTOSAR CAN Bus [-] 3 Serial Data	(23) II	(23) —
(24) 24	(24) 0.5	(24) BU / YE	(24) 4979	(24) AUTOSAR CAN Bus [+] 2 Serial Data	(24) II	(24) —
(25) 25	(25) 0.5	(25) WH	(25) 4978	(25) AUTOSAR CAN Bus [-] 2 Serial Data	(25) II	(25) —
26	—	—	—	Not Occupied	—	—
(27) 27	(27) 0.5	(27) YE	(27) 5991	(27) Powertrain Relay Coil Control	(27) II	(27) —
(28) 28	(28) 0.5	(28) GY	(28) 1051 8	(28) Electronic Transmission Range Select Shifter Position Sensor 2 Signal	(28) II	(28) —
(29) 29	(29) 0.5	(29) BN	(29) 1051 5	(29) Electronic Transmission Range Select Shifter Position Sensor 1 Signal	(29) II	(29) —
(30) 30	(30) 0.5	(30) YE / WH	(30) 1161	(30) Accelerator Pedal Position Signal 1	(30) II	(30) —
(31) 31	(31) 0.5	(31) BK / BU	(31) 1271	(31) Accelerator Pedal Position Low Reference 1	(31) II	(31) —
(32) 32	(32) 0.5	(32) BK / VT	(32) 1272	(32) Accelerator Pedal Position Low Reference 2	(32) II	(32) —
(33) 33	(33) 0.5	(33) BK / GY	(33) 626	(33) Engine Control Vehicle Sensors Low Reference 1	(33) II	(33) —
(34) 34	(34) 0.5	(34) WH / RD	(34) 1164	(34) Accelerator Pedal Position 5V Reference 1	(34) II	(34) —
(35) 35	(35) 0.5	(35) BN / RD	(35) 1274	(35) Accelerator Pedal Position 5V Reference 2	(35) II	(35) —
(36) 36	(36) 0.5	(36) WH / RD	(36) 480	(36) Engine Control Vehicle Sensors 5 Volt Reference 1	(36) II	(36) —
37	—	—	—	Not Occupied	—	—
(38) 38	(38) 0.5	(38) WH / GY	(38) 459	(38) Air Conditioning Compressor Clutch Relay Control	(38) II	(38) —
39 - 67	—	—	—	Not Occupied	—	—
(68) 68	(68) 0.5	(68) VT / BU	(68) 5292	(68) Powertrain Main Relay Fused Supply Voltage 3	(68) II	(68) —
(69) 69	(69) 0.5	(69) VT / BU	(69) 5291	(69) Powertrain Main Relay Fused Supply Voltage 2	(69) II	(69) —
(70) 70	(70) 0.5	(70) YE / BU	(70) 3221	(70) HO2S Low Signal Bank 2 Sensor 2	(70) II	(70) —
(71) 71	(71) 0.5	(71) VT / GN	(71) 3220	(71) HO2S High Signal Bank 2 Sensor 2	(71) II	(71) —
(72) 72	(72) 0.5	(72) WH / YE	(72) 3121	(72) HO2S Low Signal Bank 1 Sensor 2	(72) II	(72) —
(73) 73	(73) 0.5	(73) BN	(73) 3120	(73) HO2S High Signal Bank 1 Sensor 2	(73) II	(73) —
74 - 79	—	—	—	Not Occupied	—	—

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(80) 80	(80) 0.5	(80) YE / VT	(80) 4325	(80) Starter Pinion Solenoid Actuator Relay Control	(80) II	(80) —
(81) 81	(81) 0.5	(81) VT / GN	(81) 4320	(81) Powertrain Sensor Bus Enable	(81) II	(81) —
(82) 82	(82) 0.5	(82) YE / BK	(82) 625	(82) Starter Enable Relay Control	(82) II	(82) —
83 - 90	—	—	—	Not Occupied	—	—
(91) 91	(91) 2.5	(91) VT / BU	(91) 5294	(91) Powertrain Main Relay Fused Supply Voltage 5	(91) I	(91) —
(92) 92	(92) 2.5	(92) VT / BU	(92) 5290	(92) Powertrain Main Relay Fused Supply Voltage 1	(92) I	(92) —
93	—	—	—	Not Occupied	—	—

K20 Engine Control Module X1 (LZ0)



5492269

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 2344715-1
- Service Connector: 84941451
- Description: 90-Way F 0.64 GEN-Y, 2.8, 6.3 MCP Series, Sealed(BK with BU Terminal Position Assurance)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19367373	J-35616-64B (L-BU)	J-38125-215A
II	19371214	J-35616-35 (VT)	J-38125-556
III	84616649	J-35616-42 (RD)	J-38125-556

K20 Engine Control Module X1 (LZ0)

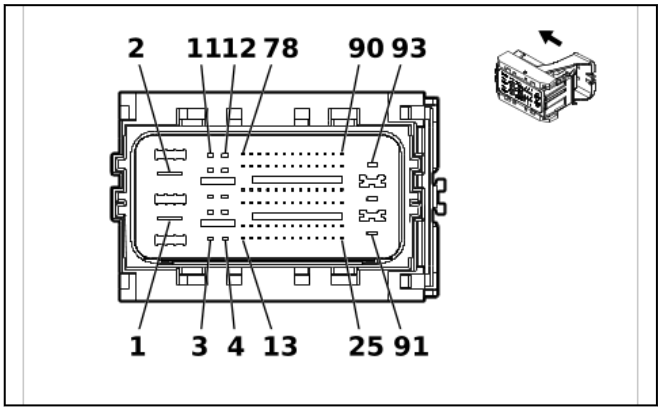
Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 6	(1) BN / BU	(1) 104	(1) Glow Plug Control	(1) III	(1) —
(2) 2	(2) 2.5	(2) GY / YE	(2) 1584	(2) Glow Plug 4 Control	(2) II	(2) —
3 - 5	—	—	—	Not Occupied	—	—

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(6) 6	(6) 0.5	(6) WH / GY	(6) 459	(6) Air Conditioning Compressor Clutch Relay Control	(6) I	(6) —
(7) 7	(7) 0.75	(7) RD / BN	(7) 440	(7) Battery Positive Voltage	(7) I	(7) —
(8) 8	(8) 0.5	(8) GN / WH	(8) 492	(8) Mass Air Flow Sensor Signal	(8) I	(8) —
9 - 10	—	—	—	Not Occupied	—	—
(11) 11	(11) 0.5	(11) GY	(11) 2973	(11) Coolant Flow Control Valve Position Signal	(11) I	(11) —
(12) 12	(12) 0.5	(12) GN / GY	(12) 12812	(12) Variable Swirl SENT Signal	(12) I	(12) —
(13) 13	(13) 0.5	(13) GN	(13) 10289	(13) Exhaust Gas Temperature Sensor SENT 1 Signal	(13) I	(13) —
(14) 14	(14) 0.5	(14) BU	(14) 10290	(14) Exhaust Gas Temperature Sensor SENT 2 Signal	(14) I	(14) —
(15) 15	(15) 0.5	(15) BN / GN	(15) 4305	(15) Exhaust Flow Control Valve 1	(15) I	(15) —
(16) 16	(16) 0.5	(16) WH	(16) 4055	(16) Private Serial Data Powertrain CAN Bus [+] Serial Data	(16) I	(16) —
(17) 17	(17) 0.5	(17) BU / BK	(17) 4977	(17) AUTOSAR CAN Bus [+] 3 Serial Data	(17) I	(17) —
(18) 18	(18) 0.5	(18) BU / YE	(18) 4979	(18) AUTOSAR CAN Bus [+] 2 Serial Data	(18) I	(18) —
(19) 19	(19) 0.5	(19) BK / GN	(19) 580	(19) Engine Control Sensors Low Reference 2	(19) I	(19) —
20	—	—	—	Not Occupied	—	—
(21) 21	(21) 0.75	(21) GY / BK	(21) 1330	(21) Variable Geometry Turbocharger Position Sensor Motor Close Control	(21) I	(21) —
(22) 22	(22) 0.75	(22) WH / BN	(22) 1313	(22) Variable Geometry Turbocharger Position Sensor Motor Open Control	(22) I	(22) —
(23) 23	(23) 2.5	(23) GY / GN	(23) 1583	(23) Glow Plug 3 Control	(23) II	(23) —
(24) 24	(24) 2.5	(24) GY / BN	(24) 1582	(24) Glow Plug 2 Control	(24) II	(24) —
(25) 25	(25) 0.75	(25) VT / GN	(25) 439	(25) Run/Crank Ignition 1 Voltage	(25) I	(25) —
(26) 26	(26) 0.5	(26) YE	(26) 5991	(26) Powertrain Relay Coil Control	(26) I	(26) —
27	—	—	—	Not Occupied	—	—
(28) 28	(28) 0.5	(28) GN / BN	(28) 507	(28) Wait To Start Indicator Control	(28) I	(28) —
29	—	—	—	Not Occupied	—	—
(30) 30	(30) 0.5	(30) BK / GY	(30) 626	(30) Engine Control Vehicle Sensors Low Reference 1	(30) I	(30) —
31 - 32	—	—	—	Not Occupied	—	—
(33) 33	(33) 0.5	(33) WH / BN	(33) 2363	(33) Exhaust Pressure Sensor SENT 1 Signal	(33) I	(33) —
(34) 34	(34) 0.5	(34) VT / YE	(34) 5947	(34) Turbocharger Vane Position Sensor Signal	(34) I	(34) —
(35) 35	(35) 0.5	(35) BN / WH	(35) 5763	(35) Exhaust Gas Recirculation Position Signal	(35) I	(35) —
(36) 36	(36) 0.5	(36) BU / GY	(36) 2978	(36) Coolant Diverter Valve Position Signal	(36) I	(36) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(37) 37	(37) 0.5	(37) GN	(37) 10478	(37) Low Pressure Exhaust Gas Recirculation Sensor SENT Signal	(37) I	(37) —
(38) 38	(38) 0.5	(38) BU / GY	(38) 4054	(38) Private Serial Data Powertrain CAN Bus [-] Serial Data	(38) I	(38) —
(39) 39	(39) 0.5	(39) WH	(39) 4976	(39) AUTOSAR CAN Bus [-] 3 Serial Data	(39) I	(39) —
(40) 40	(40) 0.5	(40) WH	(40) 4978	(40) AUTOSAR CAN Bus [-] 2 Serial Data	(40) I	(40) —
41	—	—	—	Not Occupied	—	—
(42) 42	(42) 0.5	(42) YE / BK	(42) 625	(42) Starter Enable Relay Control	(42) I	(42) —
(43) 43	(43) 0.75	(43) VT / BK	(43) 5746	(43) Exhaust Gas Recirculation Valve Low Control	(43) I	(43) —
(44) 44	(44) 0.75	(44) WH / VT	(44) 5764	(44) Exhaust Gas Recirculation Valve High Control	(44) I	(44) —
(45) 45	(45) 2.5	(45) GY / WH	(45) 1585	(45) Glow Plug 5 Control	(45) II	(45) —
(46) 46	(46) 4	(46) BK / WH	(46) 6151	(46) Engine Control Module Ground	(46) III	(46) —
(47) 47	(47) 2.5	(47) GY / VT	(47) 1586	(47) Glow Plug 6 Control	(47) II	(47) —
(48) 48	(48) 0.5	(48) WH / RD	(48) 480	(48) Engine Control Vehicle Sensors 5 Volt Reference 1	(48) I	(48) —
(49) 49	(49) 0.5	(49) GN / WH	(49) 1162	(49) Accelerator Pedal Position Signal 2	(49) I	(49) —
(50) 50	(50) 0.5	(50) BK / VT	(50) 1272	(50) Accelerator Pedal Position Low Reference 2	(50) I	(50) —
(51) 51	(51) 0.5	(51) BK / BU	(51) 1271	(51) Accelerator Pedal Position Low Reference 1	(51) I	(51) —
(52) 52	(52) 0.5	(52) WH / GN	(52) 5380	(52) Brake Position Sensor Signal	(52) I	(52) —
53 - 58	—	—	—	Not Occupied	—	—
(59) 59	(59) 0.5	(59) GN	(59) 380	(59) Air Conditioning Refrigerant Pressure Sensor Signal	(59) I	(59) —
(60) 60	(60) 0.5	(60) YE / BN	(60) 331	(60) Oil Pressure Sensor Signal	(60) I	(60) —
(61) 61	(61) 0.5	(61) YE / GY	(61) 3926	(61) Crankcase Differential Pressure Sensor Signal	(61) I	(61) —
62 - 63	—	—	—	Not Occupied	—	—
(64) 64	(64) 0.5	(64) GN / BU	(64) 3889	(64) Powertrain Sensor Bus Relay Control	(64) I	(64) —
65	—	—	—	Not Occupied	—	—
(66) 66	(66) 0.75	(66) BN	(66) 1421	(66) Exhaust Restrictor Motor Closed Control	(66) I	(66) —
(67) 67	(67) 0.75	(67) YE / BN	(67) 1420	(67) Exhaust Restrictor Motor Open Control	(67) I	(67) —
(68) 68	(68) 2.5	(68) GY / BU	(68) 1581	(68) Glow Plug 1 Control	(68) II	(68) —
(69) 69	(69) 2.5	(69) VT / BU	(69) 5290	(69) Powertrain Main Relay Fused Supply Voltage 1	(69) II	(69) —
(70) 70	(70) 0.5	(70) BU / RD	(70) 460	(70) Engine Control Sensors 5 Volt Reference 1	(70) I	(70) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(71) 71	(71) 0.5	(71) BN / RD	(71) 1274	(71) Accelerator Pedal Position 5V Reference 2	(71) I	(71) —
(72) 72	(72) 0.5	(72) WH / RD	(72) 1164	(72) Accelerator Pedal Position 5V Reference 1	(72) I	(72) —
(73) 73	(73) 0.5	(73) YE / WH	(73) 1161	(73) Accelerator Pedal Position Signal 1	(73) I	(73) —
(74) 74	(74) 0.5	(74) BU / GY	(74) 636	(74) Ambient Air Temperature Sensor Signal	(74) I	(74) —
(75) 75	(75) 0.5	(75) VT	(75) 7485	(75) Engine Oil Temperature Sensor 2 Signal	(75) I	(75) —
76 - 85	—	—	—	Not Occupied	—	—
(86) 86	(86) 0.5	(86) GN / GY	(86) 465	(86) Fuel Pump Primary Relay Control	(86) I	(86) —
(87) 87	(87) 0.75	(87) VT / BU	(87) 5294	(87) Powertrain Main Relay Fused Supply Voltage 5	(87) I	(87) —
(88) 88	(88) 0.75	(88) GY / BN	(88) 2972	(88) Coolant Flow Control Actuator Control Close	(88) I	(88) —
(89) 89	(89) 0.75	(89) GY / BU	(89) 2971	(89) Coolant Flow Control Actuator Control Open	(89) I	(89) —
(90) 90	(90) 2.5	(90) VT / BU	(90) 5290	(90) Powertrain Main Relay Fused Supply Voltage 1	(90) II	(90) —

K20 Engine Control Module X2 (L76 / L78)



7050811

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 212806-0106
- Service Connector: 86471437
- Description: 93-Way F 0.5, 1.2, 2.8, 6.3 MX GENV Series, Sealed(BK with GY Terminal Position Assurance)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	85079962	EL-35616-58 (BK)	EL-38125-58
II	85079963	J-35616-2A (GY)	EL-38125-58
III	85079964	J-35616-42 (RD)	J-38125-217

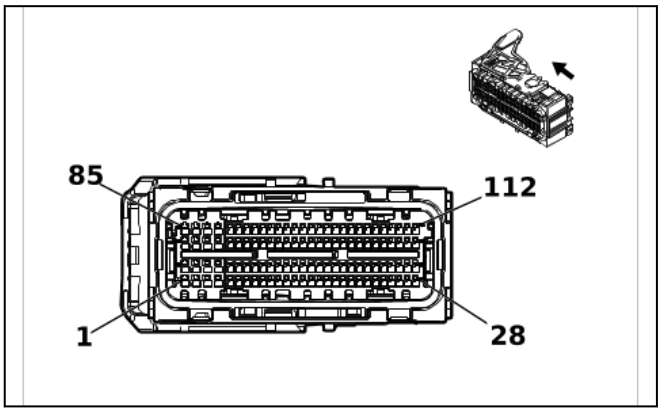
K20 Engine Control Module X2 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 4	(1) VT / BU	(1) 5290	(1) Powertrain Main Relay Fused Supply Voltage 1	(1) III	(1) —
(3) 3	(3) 0.75	(3) VT / BK	(3) 7300	(3) High Pressure Fuel Pump Low Control	(3) II	(3) —
(4) 4	(4) 0.75	(4) YE	(4) 7301	(4) High Pressure Fuel Pump High Control	(4) II	(4) —
(5) 5	(5) 0.5	(5) YE	(5) 581	(5) Throttle Actuator Open Control	(5) II	(5) —
(6) 6	(6) 0.5	(6) BN / WH	(6) 582	(6) Throttle Actuator Close Control	(6) II	(6) —
(11) 11	(11) 0.5	(11) BK / VT	(11) 10598	(11) Engine Control Sensors Low Reference 4	(11) II	(11) —
(12) 12	(12) 0.5	(12) BK / BU	(12) 10597	(12) Engine Control Sensors Low Reference 3	(12) II	(12) —
(13) 13	(13) 0.5	(13) GN / VT	(13) 4621	(13) Engine Control Module LIN Bus 1	(13) I	(13) —
(14) 14	(14) 0.5	(14) GN / WH	(14) 4622	(14) Engine Control Module LIN Bus 2	(14) I	(14) —
(15) 15	(15) 0.5	(15) GN / YE	(15) 4623	(15) Engine Control Module LIN Bus 3	(15) I	(15) —
(20) 20	(20) 0.5	(20) WH / RD	(20) 11031	(20) Fuel Tank Isolation Valve Supply Voltage	(20) I	(20) —
(21) 21	(21) 0.5	(21) YE / GY	(21) 11029	(21) Canister Vapor Pressure Sensor Signal	(21) I	(21) —
(25) 25	(25) 0.5	(25) BU / WH	(25) 4306	(25) Exhaust Flow Control Valve 1 - Cylinder Deactivation Feedback Signal	(25) I	(25) —
(27) 27	(27) 0.5	(27) BU / WH	(27) 10786	(27) Fuel Rail Pressure Sensor SENT 1 Signal	(27) I	(27) —
(30) 30	(30) 0.5	(30) GN	(30) 6271	(30) Crankshaft Position Sensor Signal	(30) I	(30) —
(31) 31	(31) 0.5	(31) YE / VT	(31) 5275	(31) Intake Camshaft Position Sensor 1	(31) I	(31) —
(32) 32	(32) 0.5	(32) GN / WH	(32) 432	(32) Manifold Absolute Pressure Sensor Signal	(32) I	(32) —
(33) 33	(33) 0.5	(33) YE / BN	(33) 331	(33) Oil Pressure Sensor Signal	(33) I	(33) —
(34) 34	(34) 0.5	(34) GN	(34) 380	(34) Air Conditioning Refrigerant Pressure Sensor Signal	(34) I	(34) —
(41) 41	(41) 0.5	(41) WH / GY	(41) 1876	(41) Knock Sensor 2 Signal	(41) I	(41) —
(42) 42	(42) 0.5	(42) VT / GY	(42) 496	(42) Knock Sensor 1 Signal	(42) I	(42) —
(43) 43	(43) 0.5	(43) BK / VT	(43) 6272	(43) Crankshaft Position Sensor Low Reference	(43) I	(43) —
(45) 45	(45) 0.5	(45) BK / GN	(45) 5301	(45) Intake Camshaft Position Sensor Low Reference 1	(45) I	(45) —
(47) 47	(47) 0.5	(47) BN	(47) 12637	(47) Engine Head Coolant Temperature Bank 1 Signal	(47) I	(47) —
(48) 48	(48) 0.5	(48) BK / BN	(48) 2752	(48) Throttle Position Sensor Low Reference	(48) I	(48) —
(49) 49	(49) 0.5	(49) GY / RD	(49) 2704	(49) Manifold Absolute Pressure Sensor 5V Reference	(49) I	(49) —
(51) 51	(51) 0.5	(51) GY / BU	(51) 5300	(51) Intake Camshaft Position Sensor 1 Voltage Reference	(51) I	(51) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(54) 54	(54) 0.5	(54) BK / GY	(54) 2303	(54) Knock Sensor Low Reference 2	(54) I	(54) —
(55) 55	(55) 0.5	(55) BK / YE	(55) 1716	(55) Knock Sensor Low Reference 1	(55) I	(55) —
(56) 56	(56) 0.5	(56) BK / GY	(56) 2130	(56) Ignition Control Low Reference Bank 2	(56) I	(56) —
(57) 57	(57) 0.5	(57) BK / BU	(57) 2129	(57) Ignition Control Low Reference Bank 1	(57) I	(57) —
(58) 58	(58) 0.5	(58) BK / GN	(58) 469	(58) Manifold Absolute Pressure Sensor Low Reference	(58) I	(58) —
(59) 59	(59) 0.5	(59) BU / GY	(59) 2978	(59) Coolant Diverter Valve Position Signal	(59) I	(59) —
(60) 60	(60) 0.5	(60) WH	(60) 10829	(60) Oil Rotary Valve Feedback Signal	(60) I	(60) —
(61) 61	(61) 0.5	(61) GN	(61) 12636	(61) Fuel Rail Low Pressure Sensor Signal	(61) I	(61) —
(62) 62	(62) 0.5	(62) BU / WH	(62) 3630	(62) Throttle Position Sensor SENT 1 Signal	(62) I	(62) —
(63) 63	(63) 0.5	(63) BN / RD	(63) 2701	(63) Throttle Position Sensor 5V Reference	(63) I	(63) —
(64) 64	(64) 0.5	(64) VT / BU	(64) 6270	(64) Crankshaft Position Sensor Voltage	(64) I	(64) —
(65) 65	(65) 0.5	(65) BN / YE	(65) 844	(65) Fuel Injector 4 Control	(65) I	(65) —
(66) 66	(66) 0.5	(66) BN / VT	(66) 1746	(66) Fuel Injector 3 Control	(66) I	(66) —
(67) 67	(67) 0.5	(67) GN / BU	(67) 2123	(67) Ignition Control 3	(67) I	(67) —
(68) 68	(68) 0.5	(68) YE / BU	(68) 2124	(68) Ignition Control 4	(68) I	(68) —
(69) 69	(69) 0.5	(69) BU / GY	(69) 2125	(69) Ignition Control 5	(69) I	(69) —
(70) 70	(70) 0.5	(70) BN / BU	(70) 2126	(70) Ignition Control 6	(70) I	(70) —
(71) 71	(71) 0.5	(71) BU / WH	(71) 2122	(71) Ignition Control 2	(71) I	(71) —
(72) 72	(72) 0.5	(72) GN / GY	(72) 2127	(72) Ignition Control 7	(72) I	(72) —
(73) 73	(73) 0.5	(73) VT / WH	(73) 2128	(73) Ignition Control 8	(73) I	(73) —
(74) 74	(74) 0.5	(74) BU / VT	(74) 2121	(74) Ignition Control 1	(74) I	(74) —
(77) 77	(77) 0.5	(77) BN / GN	(77) 4305	(77) Exhaust Flow Control Valve 1	(77) I	(77) —
(78) 78	(78) 0.5	(78) BN / GN	(78) 845	(78) Fuel Injector 5 Control	(78) I	(78) —
(79) 79	(79) 0.5	(79) BN / BU	(79) 846	(79) Fuel Injector 6 Control	(79) I	(79) —
(80) 80	(80) 0.5	(80) YE / WH	(80) 1745	(80) Fuel Injector 2 Control	(80) I	(80) —
(81) 81	(81) 0.5	(81) BN / VT	(81) 877	(81) Fuel Injector 7 Control	(81) I	(81) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(82) 82	(82) 0.5	(82) BN / GY	(82) 878	(82) Fuel Injector 8 Control	(82) I	(82) —
(83) 83	(83) 0.5	(83) GN / YE	(83) 1744	(83) Fuel Injector 1 Control	(83) I	(83) —
(87) 87	(87) 0.5	(87) GN / BU	(87) 428	(87) EVAP Canister Purge Solenoid Control	(87) I	(87) —

K20 Engine Control Module X2 (LZ0)



5491584

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 2344717-2
- Service Connector: 84941452
- Description: 112-Way F 0.64 GEN-Y, 1.2 MCON Series, Sealed(BK with BK Terminal Position Assurance)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19367373	J-35616-64B (L-BU)	J-38125-215A
II	84963773	J-35616-12 (BU)	J-38125-215A

K20 Engine Control Module X2 (LZ0)

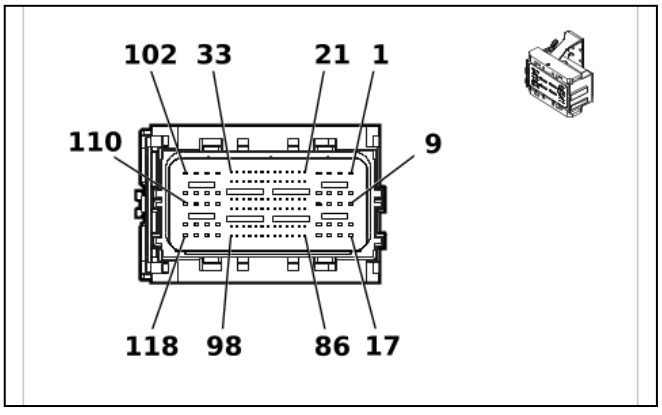
Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1.5	(1) GN	(1) 4803	(1) Direct Fuel Injector High Voltage Control Cylinder 3	(1) II	(1) —
(2) 2	(2) 1.5	(2) GY / BU	(2) 4804	(2) Direct Fuel Injector High Voltage Control Cylinder 4	(2) II	(2) —
(3) 3	(3) 0.75	(3) YE / VT	(3) 2420	(3) Fuel High Pressure Pump Low Enable Signal	(3) II	(3) —
(4) 4	(4) 0.75	(4) VT / BK	(4) 7300	(4) High Pressure Fuel Pump Low Control	(4) II	(4) —
(5) 5	(5) 0.5	(5) GY / YE	(5) 5297	(5) Exhaust Camshaft Position Sensor 1 Voltage Reference	(5) I	(5) —
(6) 6	(6) 0.5	(6) GN	(6) 6271	(6) Crankshaft Position Sensor Signal	(6) I	(6) —
(7) 7	(7) 0.5	(7) VT / BU	(7) 6270	(7) Crankshaft Position Sensor Voltage	(7) I	(7) —
8 - 9	—	—	—	Not Occupied	—	—
(10) 10	(10) 0.75	(10) BU / YE	(10) 11616	(10) Diesel Exhaust Fluid Dosing Valve Low Control 2	(10) I	(10) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(11) 11	(11) 0.5	(11) BK / GN	(11) 3235	(11) Exhaust Gas Recirculation Temperature Sensor 3 Low Reference	(11) I	(11) —
(12) 12	(12) 0.5	(12) YE / BU	(12) 3680	(12) Charge Air Cooler Outlet Temperature Sensor Low Reference	(12) I	(12) —
(13) 13	(13) 0.5	(13) YE / BK	(13) 3682	(13) Charge Air Cooler Inlet Temperature Sensor Low Reference	(13) I	(13) —
14 - 22	—	—	—	Not Occupied	—	—
(23) 23	(23) 0.75	(23) BN / WH	(23) 3100	(23) Diesel Exhaust Fluid Dosing Valve Low Control	(23) I	(23) —
(24) 24	(24) 0.5	(24) BK / YE	(24) 2834	(24) Fuel Rail Pressure Solenoid Valve Low Control	(24) I	(24) —
(25) 25	(25) 0.5	(25) BU	(25) 179	(25) Engine Oil Pump Control	(25) I	(25) —
26	—	—	—	Not Occupied	—	—
(27) 27	(27) 0.75	(27) BN / WH	(27) 582	(27) Throttle Actuator Close Control	(27) I	(27) —
(28) 28	(28) 0.75	(28) YE	(28) 581	(28) Throttle Actuator Open Control	(28) I	(28) —
(29) 29	(29) 1.5	(29) GN / GY	(29) 4903	(29) Direct Fuel Injector High Voltage Supply Cylinder 3	(29) II	(29) —
(30) 30	(30) 1.5	(30) BU / WH	(30) 4904	(30) Direct Fuel Injector High Voltage Supply Cylinder 4	(30) II	(30) —
(31) 31	(31) 0.75	(31) GY / BN	(31) 2419	(31) Fuel High Pressure Pump High Side Supply Voltage	(31) II	(31) —
(32) 32	(32) 0.75	(32) YE	(32) 7301	(32) High Pressure Fuel Pump High Control	(32) II	(32) —
(33) 33	(33) 0.5	(33) BK / GY	(33) 5296	(33) Exhaust Camshaft Position Sensor Low Reference 1	(33) I	(33) —
(34) 34	(34) 0.5	(34) VT / BK	(34) 5273	(34) Exhaust Camshaft Position Sensor 1	(34) I	(34) —
(35) 35	(35) 0.5	(35) BK / VT	(35) 6272	(35) Crankshaft Position Sensor Low Reference	(35) I	(35) —
36	—	—	—	Not Occupied	—	—
(37) 37	(37) 0.5	(37) BU	(37) 3017	(37) Fuel Heater Relay 1 Control	(37) I	(37) —
38	—	—	—	Not Occupied	—	—
(39) 39	(39) 0.5	(39) WH / GY	(39) 3234	(39) Exhaust Gas Recirculation Temperature Sensor 3 Signal	(39) I	(39) —
(40) 40	(40) 0.5	(40) BN	(40) 3681	(40) Charge Air Cooler Outlet Temperature Sensor Signal	(40) I	(40) —
(41) 41	(41) 0.5	(41) GN	(41) 3683	(41) Charge Air Cooler Inlet Temperature Sensor Signal	(41) I	(41) —
42 - 48	—	—	—	Not Occupied	—	—
(49) 49	(49) 0.75	(49) BU	(49) 11615	(49) Diesel Exhaust Fluid Dosing Valve High Control 2	(49) I	(49) —
50	—	—	—	Not Occupied	—	—
(51) 51	(51) 0.75	(51) BN	(51) 3099	(51) Diesel Exhaust Fluid Dosing Valve High Control	(51) I	(51) —
(52) 52	(52) 0.5	(52) BU / WH	(52) 2530	(52) Fuel Rail Pressure Solenoid Valve Control	(52) I	(52) —
(53) 53	(53) 0.5	(53) YE / BN	(53) 106	(53) Oil Pump Motor Control	(53) I	(53) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
54	—	—	—	Not Occupied	—	—
(55) 55	(55) 0.75	(55) BK / BU	(55) 1408	(55) Variable Swirl Valve Close Control	(55) I	(55) —
(56) 56	(56) 0.75	(56) BK / GN	(56) 1389	(56) Variable Swirl Valve Open Control	(56) I	(56) —
(57) 57	(57) 1.5	(57) VT / GY	(57) 4906	(57) Direct Fuel Injector High Voltage Supply Cylinder 6	(57) II	(57) —
(58) 58	(58) 1.5	(58) BN / WH	(58) 4901	(58) Direct Fuel Injector High Voltage Supply Cylinder 1	(58) II	(58) —
(59) 59	(59) 1.5	(59) GN / WH	(59) 4905	(59) Direct Fuel Injector High Voltage Supply Cylinder 5	(59) II	(59) —
(60) 60	(60) 1.5	(60) BU / GY	(60) 4902	(60) Direct Fuel Injector High Voltage Supply Cylinder 2	(60) II	(60) —
61 - 62	—	—	—	Not Occupied	—	—
(63) 63	(63) 0.5	(63) BN	(63) 10515	(63) Electronic Transmission Range Select Shifter Position Sensor 1 Signal	(63) I	(63) —
(64) 64	(64) 0.5	(64) GY	(64) 10518	(64) Electronic Transmission Range Select Shifter Position Sensor 2 Signal	(64) I	(64) —
65	—	—	—	Not Occupied	—	—
(66) 66	(66) 0.5	(66) BN / RD	(66) 2917	(66) Fuel Rail Pressure Sensor 5V Reference	(66) I	(66) —
(67) 67	(67) 0.5	(67) BK / GN	(67) 2919	(67) Fuel Rail Pressure Sensor Low Reference	(67) I	(67) —
68	—	—	—	Not Occupied	—	—
(69) 69	(69) 0.5	(69) BN / BU	(69) 357	(69) Oil Temperature Sensor Signal	(69) I	(69) —
(70) 70	(70) 0.5	(70) BU	(70) 2990	(70) Engine Radiator Coolant Temperature Sensor Signal	(70) I	(70) —
71 - 72	—	—	—	Not Occupied	—	—
(73) 73	(73) 0.5	(73) WH / BU	(73) 7329	(73) Pre-Throttle Air Temperature Signal	(73) I	(73) —
74	—	—	—	Not Occupied	—	—
(75) 75	(75) 0.5	(75) BK / YE	(75) 548	(75) Engine Control Sensors Low Reference 1	(75) I	(75) —
(76) 76	(76) 0.5	(76) GN / VT	(76) 4621	(76) Engine Control Module LIN Bus 1	(76) I	(76) —
(77) 77	(77) 0.5	(77) GN / WH	(77) 4622	(77) Engine Control Module LIN Bus 2	(77) I	(77) —
(78) 78	(78) 0.5	(78) GN / YE	(78) 4623	(78) Engine Control Module LIN Bus 3	(78) I	(78) —
79 - 82	—	—	—	Not Occupied	—	—
(83) 83	(83) 0.75	(83) BU / BN	(83) 2977	(83) Coolant Diverter Valve Actuator Control Close	(83) I	(83) —
(84) 84	(84) 0.75	(84) BU	(84) 2976	(84) Coolant Diverter Valve Actuator Control Open	(84) I	(84) —
(85) 85	(85) 1.5	(85) VT / GN	(85) 4806	(85) Direct Fuel Injector High Voltage Control Cylinder 6	(85) II	(85) —
(86) 86	(86) 1.5	(86) BN	(86) 4801	(86) Direct Fuel Injector High Voltage Control Cylinder 1	(86) II	(86) —
(87) 87	(87) 1.5	(87) BU	(87) 4802	(87) Direct Fuel Injector High Voltage Control Cylinder 2	(87) II	(87) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(88) 88	(88) 1.5	(88) WH / GN	(88) 4805	(88) Direct Fuel Injector High Voltage Control Cylinder 5	(88) II	(88) —
89	—	—	—	Not Occupied	—	—
(90) 90	(90) 0.5	(90) BU / WH	(90) 3630	(90) Throttle Position Sensor SENT 1 Signal	(90) I	(90) —
(91) 91	(91) 0.5	(91) BU / GN	(91) 4012	(91) Exhaust Gas Recirculation 2 Valve Position Sensor Signal	(91) I	(91) —
92 - 93	—	—	—	Not Occupied	—	—
(94) 94	(94) 0.5	(94) BU / WH	(94) 2918	(94) Fuel Rail Pressure Sensor Signal	(94) I	(94) —
(95) 95	(95) 0.5	(95) YE / BU	(95) 2408	(95) Engine Inlet Coolant Temperature Signal	(95) I	(95) —
(96) 96	(96) 0.5	(96) BN / YE	(96) 2161	(96) Fuel Rail Pressure Sensor 2 Signal	(96) I	(96) —
(97) 97	(97) 0.5	(97) VT	(97) 2988	(97) Engine Outlet Coolant Temperature Signal	(97) I	(97) —
98 - 100	—	—	—	Not Occupied	—	—
(101) 101	(101) 0.5	(101) GN / WH	(101) 432	(101) Manifold Absolute Pressure Sensor Signal	(101) I	(101) —
(102) 102	(102) 0.5	(102) GN / YE	(102) 37	(102) Engine Block Temperature Sensor Signal	(102) I	(102) —
(103) 103	(103) 0.5	(103) BU / BK	(103) 1422	(103) Engine Water Charge Air Coolant Temperature Signal	(103) I	(103) —
104 - 110	—	—	—	Not Occupied	—	—
(111) 111	(111) 0.75	(111) BU / BN	(111) 4013	(111) Exhaust Gas Recirculation 2 Valve Close Control	(111) I	(111) —
(112) 112	(112) 0.75	(112) BU / WH	(112) 4014	(112) Exhaust Gas Recirculation 2 Valve Open Control	(112) I	(112) —

K20 Engine Control Module X3 (L76 / L78)



6480316

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 13552800
- Service Connector: 86471438
- Description: 118-Way F 0.5, 1.2 MXGENV Series, Sealed(BK with BK Terminal Position Assurance)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	85079962	EL-35616-58 (BK)	EL-38125-58
II	85079963	J-35616-2A (GY)	EL-38125-58

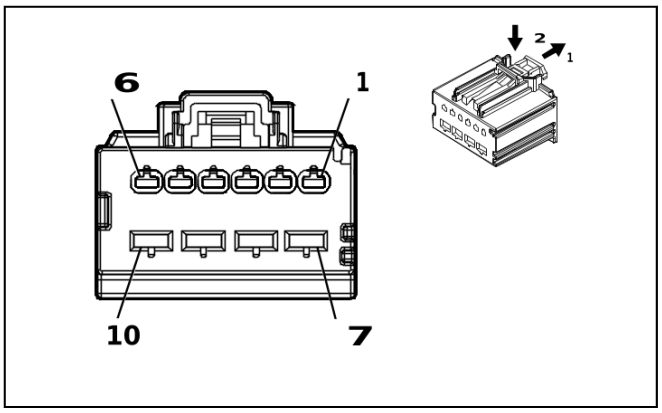
K20 Engine Control Module X3 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) GY / BU	(1) 4804	(1) Direct Fuel Injector High Voltage Control Cylinder 4	(1) II	(1) —
(2) 2	(2) 0.75	(2) BU / WH	(2) 4904	(2) Direct Fuel Injector High Voltage Supply Cylinder 4	(2) II	(2) —
(3) 3	(3) 0.75	(3) GN / GY	(3) 4903	(3) Direct Fuel Injector High Voltage Supply Cylinder 3	(3) II	(3) —
(4) 4	(4) 0.75	(4) GN	(4) 4803	(4) Direct Fuel Injector High Voltage Control Cylinder 3	(4) II	(4) —
(5) 5	(5) 0.75	(5) VT / GN	(5) 4806	(5) Direct Fuel Injector High Voltage Control Cylinder 6	(5) II	(5) —
(6) 6	(6) 0.75	(6) VT / GY	(6) 4906	(6) Direct Fuel Injector High Voltage Supply Cylinder 6	(6) II	(6) —
(7) 7	(7) 0.75	(7) GN / WH	(7) 4905	(7) Direct Fuel Injector High Voltage Supply Cylinder 5	(7) II	(7) —
(8) 8	(8) 0.75	(8) WH / GN	(8) 4805	(8) Direct Fuel Injector High Voltage Control Cylinder 5	(8) II	(8) —
9 - 12	—	—	—	Not Occupied	—	—
(13) 13	(13) 0.75	(13) YE / GY	(13) 4807	(13) Direct Fuel Injector High Voltage Control Cylinder 7	(13) II	(13) —
(14) 14	(14) 0.75	(14) WH / YE	(14) 4907	(14) Direct Fuel Injector High Voltage Supply Cylinder 7	(14) II	(14) —
(15) 15	(15) 0.75	(15) BU / GY	(15) 4902	(15) Direct Fuel Injector High Voltage Supply Cylinder 2	(15) II	(15) —
(16) 16	(16) 0.75	(16) BU	(16) 4802	(16) Direct Fuel Injector High Voltage Control Cylinder 2	(16) II	(16) —
(17) 17	(17) 0.75	(17) BN	(17) 4801	(17) Direct Fuel Injector High Voltage Control Cylinder 1	(17) II	(17) —
(18) 18	(18) 0.75	(18) BN / WH	(18) 4901	(18) Direct Fuel Injector High Voltage Supply Cylinder 1	(18) II	(18) —
(19) 19	(19) 0.75	(19) GY / WH	(19) 4908	(19) Direct Fuel Injector High Voltage Supply Cylinder 8	(19) II	(19) —
(20) 20	(20) 0.75	(20) GY	(20) 4808	(20) Direct Fuel Injector High Voltage Control Cylinder 8	(20) II	(20) —
21	—	—	—	Not Occupied	—	—
(22) 22	(22) 0.5	(22) WH	(22) 2571	(22) HO2S Low Signal Bank 2 Sensor 1	(22) I	(22) —
(23) 23	(23) 0.5	(23) YE / WH	(23) 2570	(23) Heated Oxygen Sensor 2 Pump Current Signal	(23) I	(23) —
24 - 25	—	—	—	Not Occupied	—	—
(26) 26	(26) 0.5	(26) BN	(26) 6934	(26) HO2S Low Signal	(26) I	(26) —
(27) 27	(27) 0.5	(27) BN / WH	(27) 6933	(27) HO2S Pump Current Signal	(27) I	(27) —
28	—	—	—	Not Occupied	—	—
(29) 29	(29) 0.5	(29) YE / BN	(29) 106	(29) Oil Pump Motor Control	(29) I	(29) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(30) 30	(30) 0.5	(30) GY	(30) 5493	(30) Cylinder Deactivation Solenoid Valve Control 3	(30) I	(30) —
(31) 31	(31) 0.5	(31) YE / GY	(31) 2493	(31) Cylinder Shutoff Solenoid Enable Signal 3	(31) I	(31) —
(32) 32	(32) 0.5	(32) YE / BU	(32) 5494	(32) Cylinder Deactivation Solenoid Valve Control 4	(32) I	(32) —
(33) 33	(33) 0.5	(33) YE / GN	(33) 2494	(33) Cylinder Shutoff Solenoid Enable Signal 4	(33) I	(33) —
34 - 35	—	—	—	Not Occupied	—	—
(36) 36	(36) 0.5	(36) BU	(36) 2990	(36) Engine Radiator Coolant Temperature Sensor Signal	(36) I	(36) —
(37) 37	(37) 0.5	(37) BN	(37) 12695	(37) Engine Radiator Coolant Temperature Sensor 2 Signal	(37) I	(37) —
(38) 38	(38) 0.5	(38) YE / BU	(38) 2408	(38) Engine Inlet Coolant Temperature Signal	(38) I	(38) —
39 - 41	—	—	—	Not Occupied	—	—
(42) 42	(42) 0.5	(42) BU	(42) 179	(42) Engine Oil Pump Control	(42) I	(42) —
(43) 43	(43) 0.5	(43) YE / BN	(43) 2496	(43) Cylinder Shutoff Solenoid Enable Signal 6	(43) I	(43) —
(44) 44	(44) 0.5	(44) BN	(44) 5496	(44) Cylinder Deactivation Solenoid Valve Control 6	(44) I	(44) —
(45) 45	(45) 0.5	(45) WH / VT	(45) 2495	(45) Cylinder Shutoff Solenoid Enable Signal 5	(45) I	(45) —
(46) 46	(46) 0.5	(46) VT	(46) 5495	(46) Cylinder Deactivation Solenoid Valve Control 5	(46) I	(46) —
47 - 48	—	—	—	Not Occupied	—	—
(49) 49	(49) 0.5	(49) GY / VT	(49) 13867	(49) Engine Bank Outlet Coolant Temperature Sensor Signal	(49) I	(49) —
(50) 50	(50) 0.5	(50) VT	(50) 7485	(50) Engine Oil Temperature Sensor 2 Signal	(50) I	(50) —
51	—	—	—	Not Occupied	—	—
(52) 52	(52) 0.5	(52) BN / BU	(52) 357	(52) Oil Temperature Sensor Signal	(52) I	(52) —
53 - 54	—	—	—	Not Occupied	—	—
(55) 55	(55) 0.5	(55) GN / BN	(55) 2732	(55) Engine Control Module LIN Bus 4	(55) I	(55) —
56 - 81	—	—	—	Not Occupied	—	—
(82) 82	(82) 0.5	(82) GN	(82) 5492	(82) Cylinder Deactivation Solenoid Valve Control 2	(82) I	(82) —
(83) 83	(83) 0.5	(83) WH / GN	(83) 2492	(83) Cylinder Shutoff Solenoid Enable Signal 2	(83) I	(83) —
(84) 84	(84) 0.5	(84) WH	(84) 5497	(84) Cylinder Deactivation Solenoid Valve Control 7	(84) I	(84) —
(85) 85	(85) 0.5	(85) GN / GY	(85) 2497	(85) Cylinder Shutoff Solenoid Enable Signal 7	(85) I	(85) —
86 - 92	—	—	—	Not Occupied	—	—
(93) 93	(93) 0.5	(93) BU	(93) 492	(93) Mass Air Flow Sensor Signal	(93) I	(93) —
94	—	—	—	Not Occupied	—	—
(95) 95	(95) 0.5	(95) WH / BU	(95) 2491	(95) Cylinder Shutoff Solenoid Enable Signal 1	(95) I	(95) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(96) 96	(96) 0.5	(96) BU	(96) 5491	(96) Cylinder Deactivation Solenoid Valve Control 1	(96) I	(96) —
(97) 97	(97) 0.5	(97) WH / YE	(97) 2498	(97) Cylinder Shutoff Solenoid Enable Signal 8	(97) I	(97) —
(98) 98	(98) 0.5	(98) YE	(98) 5498	(98) Cylinder Deactivation Solenoid Valve Control 8	(98) I	(98) —
(99) 99	(99) 0.5	(99) GN / YE	(99) 3212	(99) HO2S Heater Low Control Bank 2 Sensor 1	(99) II	(99) —
(100) 100	(100) 0.5	(100) GY / WH	(100) 3113	(100) HO2S Heater Low Control Bank 1 Sensor 1	(100) II	(100) —
101 - 102	—	—	—	Not Occupied	—	—
(103) 103	(103) 0.5	(103) GY / RD	(103) 10667	(103) Engine Control Sensors 5 Volt Reference	(103) II	(103) —
(104) 104	(104) 0.5	(104) BK / GN	(104) 580	(104) Engine Control Sensors Low Reference 2	(104) II	(104) —
(105) 105	(105) 0.75	(105) BU	(105) 2976	(105) Coolant Diverter Valve Actuator Control Open	(105) II	(105) —
(106) 106	(106) 0.75	(106) BU / BN	(106) 2977	(106) Coolant Diverter Valve Actuator Control Close	(106) II	(106) —
(107) 107	(107) 0.5	(107) BU / RD	(107) 460	(107) Engine Control Sensors 5 Volt Reference 1	(107) II	(107) —
(108) 108	(108) 0.5	(108) BK / YE	(108) 548	(108) Engine Control Sensors Low Reference 1	(108) II	(108) —
(109) 109	(109) 0.75	(109) WH / BN	(109) 10830	(109) Oil Rotary Valve Open Control	(109) II	(109) —
(110) 110	(110) 0.75	(110) WH / GY	(110) 10831	(110) Oil Rotary Valve Close Control	(110) II	(110) —
(111) 111	(111) 0.5	(111) GN / RD	(111) 10599	(111) Engine Control Sensors 5 Volt Reference 3	(111) II	(111) —
112	—	—	—	Not Occupied	—	—
(113) 113	(113) 0.5	(113) BK / BN	(113) 6753	(113) Camshaft Position Actuator Solenoid Valve 1 Low Reference	(113) II	(113) —
(114) 114	(114) 0.5	(114) VT / BN	(114) 5284	(114) Intake Camshaft Position Actuator Solenoid Valve 1	(114) II	(114) —
115 - 118	—	—	—	Not Occupied	—	—

K29FV Front Seat Heater Vent Control Module X1 (KAM)



5035058

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Passenger
- OEM Connector: 31372-1600
- Service Connector: Service by Harness - See Part Catalog
- Description: 10-Way F 1.5, 2.8 MX Series(BK)

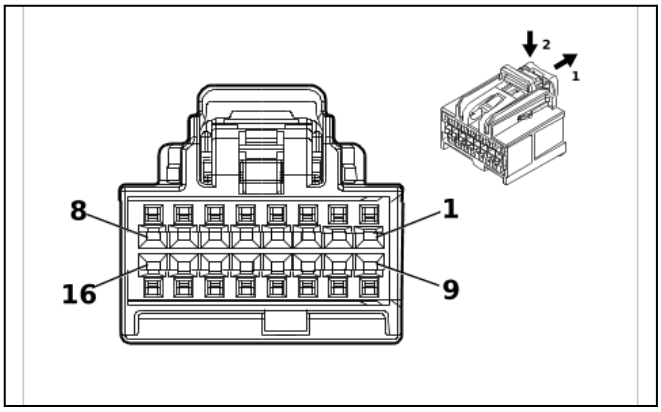
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required
II	Not required	J-35616-4A (PU)	No Tool Required

K29FV Front Seat Heater Vent Control Module X1 (KAM)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) WH / BN	(1) 2481	(1) Passenger Seat Back Heating Element Control	(1) I	(1) —
(2) 2	(2) 0.75	(2) BN / BU	(2) 2479	(2) Passenger Seat Heating Element Control	(2) I	(2) —
(3) 3	(3) 0.75	(3) GY / BK	(3) 2480	(3) Passenger Seat Heating Element Low Reference	(3) I	(3) —
(4) 4	(4) 0.75	(4) BN / BK	(4) 2078	(4) Driver Seat Heating Element Low Reference	(4) I	(4) —
(5) 5	(5) 0.75	(5) BN	(5) 2432	(5) Driver Seat Back Heating Element Control	(5) I	(5) —
(6) 6	(6) 0.75	(6) BN / VT	(6) 2077	(6) Driver Seat Heating Element Control	(6) I	(6) —
(7) 7	(7) 0.75	(7) RD / GN	(7) 6140	(7) Battery Positive Voltage	(7) II	(7) —
(8) 8	(8) 0.75	(8) BK	(8) 1350	(8) Ground	(8) II	(8) —
9	—	—	—	Not Occupied	—	—
(10) 10	(10) 0.75	(10) RD / BN	(10) 6640	(10) Battery Positive Voltage	(10) II	(10) —

K29FV Front Seat Heater Vent Control Module X2 (KAM)



4873243

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Passenger
- OEM Connector: 35016343
- Service Connector: Service by Harness - See Part Catalog
- Description: 16-Way F 0.64 OCS Series(BK)

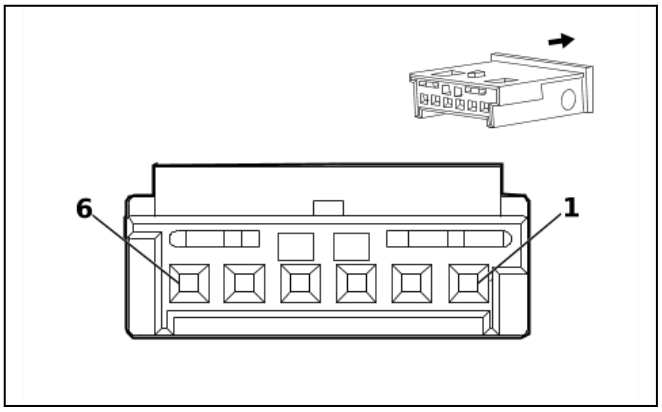
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

K29FV Front Seat Heater Vent Control Module X2 (KAM)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BK / YE	(1) 2080	(1) Driver Heated Seat Thermistor Low Reference	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / GY	(2) 2435	(2) Passenger Heated Seat Thermistor Low Reference	(2) I	(2) —
(3) 3	(3) 0.5	(3) BU	(3) 2425	(3) Driver Seat Back Heating Temperature Sensor Signal	(3) I	(3) —
(4) 4	(4) 0.5	(4) WH / BU	(4) 2436	(4) Passenger Seat Back Heating Temperature Sensor Signal	(4) I	(4) —
(5) 5	(5) 0.5	(5) WH / GY	(5) 2434	(5) Passenger Seat Heating Temperature Sensor Signal	(5) I	(5) —
(6) 6	(6) 0.5	(6) YE / GY	(6) 2079	(6) Driver Seat Heating Temperature Sensor Signal	(6) I	(6) —
7	—	—	—	Not Occupied	—	—
(8) 8	(8) 0.5	(8) GN / VT	(8) 2857	(8) Body Control Module LIN Bus 11	(8) I	(8) —
(9) 9	(9) 0.5	(9) GN / VT	(9) 5906	(9) Driver Seat Blower Motor Control 1	(9) I	(9) —
(10) 10	(10) 0.5	(10) VT / WH	(10) 5908	(10) Passenger Seat Blower Motor Control 1	(10) I	(10) —
11	—	—	—	Not Occupied	—	—
(12) 12	(12) 0.5	(12) BK / GN	(12) 2482	(12) Passenger Heated Back Thermistor Low Reference	(12) I	(12) —
13 - 16	—	—	—	Not Occupied	—	—

K32 Heated Steering Wheel Module X1 (KI3 - ULM)



1862024

Connector Part Information

- Harness Type: Steering Wheel Horn Switch Wiring Harness
- OEM Connector: 1-1241370-3
- Service Connector: Service by Harness - See Part Catalog
- Description: 6-Way F 0.64 Micro-Quadlock Series(BK)

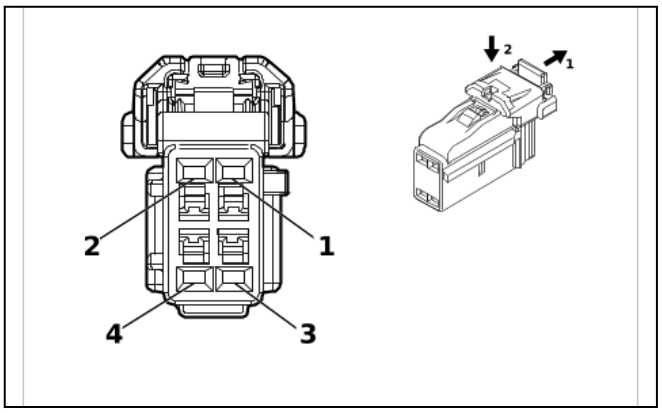
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

K32 Heated Steering Wheel Module X1 (KI3 - ULM)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) YE / GY	(1) 5883	(1) Steering Wheel Heating Switch Signal	(1) I	(1) —
(2) 2	(2) 0.35	(2) BN / WH	(2) 5884	(2) Steering Wheel Heating Switch LED Control	(2) I	(2) —
(3) 3	(3) 0.5	(3) RD / BN	(3) 10040	(3) Battery Positive Voltage	(3) I	(3) —
(4) 4	(4) 0.5	(4) BK	(4) 6050	(4) Steering Wheel Ground	(4) I	(4) —
(5) 5	(5) 0.35	(5) BK / WH	(5) 6051	(5) Steering Wheel Ground	(5) I	(5) —
(6) 6	(6) 0.35	(6) GN / GY	(6) 2858	(6) Body Control Module LIN Bus 12	(6) I	(6) —

K32 Heated Steering Wheel Module X2 (KI3 - ULM)



4872683

Connector Part Information

- Harness Type: Steering Wheel
- OEM Connector: 13533335
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 1.2 Series(BK)

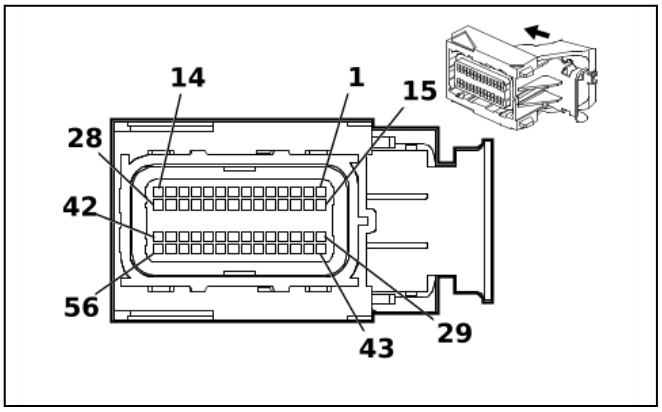
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

K32 Heated Steering Wheel Module X2 (KI3 - ULM)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) WH / YE	(1) 5888	(1) Steering Wheel Heating High Control	(1) I	(1) —
(2) 2	(2) 0.75	(2) GY / YE	(2) 5887	(2) Steering Wheel Heating Low Control	(2) I	(2) —
(3) 3	(3) 0.35	(3) VT / BU	(3) 5886	(3) Steering Wheel Heating Temperature Sensor Signal	(3) I	(3) —
(4) 4	(4) 0.35	(4) YE / RD	(4) 5885	(4) Steering Wheel Heating Voltage Reference	(4) I	(4) —

K36 Restraints Control Module X1



1590948

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 216783-9007
- Service Connector: 85090371
- Description: 56-Way F 0.64 MX123 Series, Sealed(BK with BU Terminal Position Assurance)

Terminal Part Information

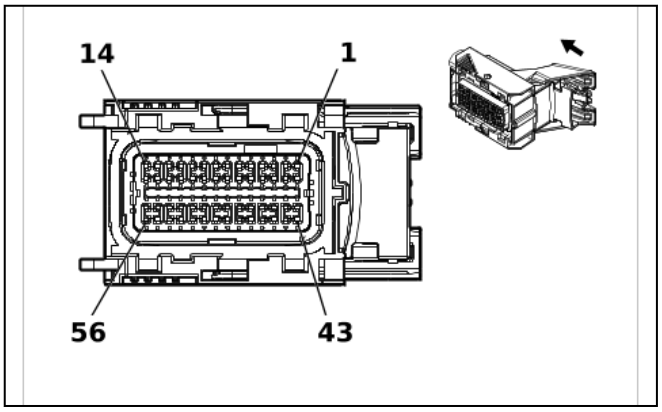
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19354746	J-35616-64B (L-BU)	J-38125-213

K36 Restraints Control Module X1

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1 - 6	—	—	—	Not Occupied	—	—
(7) 7	(7) 0.5	(7) BK / OG	(7) 5045	(7) Left Front Impact Discriminating Sensor Low Reference	(7) I	(7) —
(8) 8	(8) 0.5	(8) OG / YE	(8) 354	(8) Left Front Impact Discriminating Sensor Signal	(8) I	(8) —
(9) 9	(9) 0.5	(9) OG / GN	(9) 1409	(9) Right Front Impact Discriminating Sensor Signal	(9) I	(9) —
(10) 10	(10) 0.5	(10) BK / OG	(10) 5600	(10) Right Front Impact Discriminating Sensor Low Reference	(10) I	(10) —
(11) 11	(11) 0.5	(11) WH / OG	(11) 3476	(11) Passenger Seat Belt Retractor Pretensioner Low Control	(11) I	(11) —
(12) 12	(12) 0.5	(12) OG / GN	(12) 3475	(12) Passenger Seat Belt Retractor Pretensioner High Control	(12) I	(12) —
(13) 13	(13) 0.35	(13) YE / OG	(13) 3025	(13) Passenger Instrument Panel Air Bag Stage 1 High Control	(13) I	(13) —
(14) 14	(14) 0.35	(14) OG / WH	(14) 3024	(14) Passenger Instrument Panel Air Bag Stage 1 Low Control	(14) I	(14) —
15 - 24	—	—	—	Not Occupied	—	—
(25) 25	(25) 0.5	(25) VT / OG	(25) 3478	(25) Driver Seat Belt Retractor Pretensioner Low Control	(25) I	(25) —
(26) 26	(26) 0.5	(26) OG / WH	(26) 3477	(26) Driver Seat Belt Retractor Pretensioner High Control	(26) I	(26) —
(27) 27	(27) 0.35	(27) OG / VT	(27) 3021	(27) Steering Wheel Air Bag Stage 1 High Control	(27) I	(27) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(28) 28	(28) 0.35	(28) BN / OG	(28) 3020	(28) Steering Wheel Air Bag Stage 1 Low Control	(28) I	(28) —
(29) 29	(29) 0.35	(29) BU / GN	(29) 4103	(29) AUTOSAR CAN Bus [+] 9 Serial Data	(29) I	(29) —
(30) 30	(30) 0.35	(30) WH / GN	(30) 4102	(30) AUTOSAR CAN Bus [-] 9 Serial Data	(30) I	(30) —
31	—	—	—	Not Occupied	—	—
(32) 32	(32) 0.5	(32) OG / BN	(32) 3479	(32) Passenger Seat Belt Anchor Pretensioner High Control	(32) I	(32) —
(33) 33	(33) 0.5	(33) GY / OG	(33) 3480	(33) Passenger Seat Belt Anchor Pretensioner Low Control	(33) I	(33) —
34	—	—	—	Not Occupied	—	—
(35) 35	(35) 0.5	(35) OG / BU	(35) 5056	(35) Passenger Seat Adjuster Switch Signal	(35) I	(35) —
36 - 37	—	—	—	Not Occupied	—	—
(38) 38	(38) 0.35	(38) OG / VT	(38) 3026	(38) Passenger Instrument Panel Air Bag Stage 2 Low Control	(38) I	(38) —
(39) 39	(39) 0.35	(39) GY / OG	(39) 3027	(39) Passenger Instrument Panel Air Bag Stage 2 High Control	(39) I	(39) —
40 - 41	—	—	—	Not Occupied	—	—
(42) 42	(42) 0.5	(42) BK / WH	(42) 1251	(42) Signal Ground	(42) I	(42) —
(43) 43	(43) 0.35	(43) BU / GN	(43) 4103	(43) AUTOSAR CAN Bus [+] 9 Serial Data	(43) I	(43) —
(44) 44	(44) 0.35	(44) WH / GN	(44) 4102	(44) AUTOSAR CAN Bus [-] 9 Serial Data	(44) I	(44) —
45	—	—	—	Not Occupied	—	—
(46) 46	(46) 0.5	(46) VT / OG	(46) 3482	(46) Driver Seat Belt Anchor Pretensioner Low Control	(46) I	(46) —
(47) 47	(47) 0.5	(47) OG / YE	(47) 3481	(47) Driver Seat Belt Anchor Pretensioner High Control	(47) I	(47) —
48 - 49	—	—	—	Not Occupied	—	—
(50) 50	(50) 0.35	(50) BN / WH	(50) 3895	(50) Roof Rail Air Bag Disable Switch Low Reference	(50) I	(50) —
(51) 51	(51) 0.35	(51) BU / WH	(51) 3119	(51) Roof Rail Air Bag Disable Switch Signal	(51) I	(51) —
52 - 54	—	—	—	Not Occupied	—	—
(55) 55	(55) 0.35	(55) VT / WH	(55) 239	(55) Run/Crank Ignition 1 Voltage	(55) I	(55) —
(56) 56	(56) 0.5	(56) RD / GN	(56) 4440	(56) Battery Positive Voltage	(56) I	(56) —

K36 Restraints Control Module X2



5377124

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 216783-9009
- Service Connector: 85004498
- Description: 56-Way F 0.64 MX123 Series, Sealed(BK)

Terminal Part Information

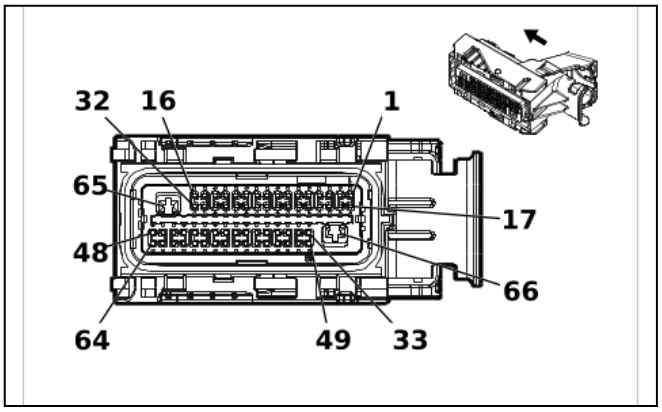
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19354746	J-35616-64B (L-BU)	J-38125-213

K36 Restraints Control Module X2

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) OG / WH	(1) 5157	(1) Right Rear Seat Belt Pretensioner Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / OG	(2) 5158	(2) Right Rear Seat Belt Pretensioner Low Control	(2) I	(2) —
(3) 3	(3) 0.5	(3) VT / OG	(3) 4212	(3) Passenger Seat Belt Load Limiter Low Control	(3) I	(3) —
(4) 4	(4) 0.5	(4) OG / YE	(4) 4211	(4) Passenger Seat Belt Load Limiter High Control	(4) I	(4) —
5 - 9	—	—	—	Not Occupied	—	—
(10) 10	(10) 0.5	(10) BU / OG	(10) 5163	(10) Rear Center Seat Belt Switch Signal	(10) I	(10) —
(11) 11	(11) 0.5	(11) YE / OG	(11) 5161	(11) Left Rear Seat Belt Switch Signal	(11) I	(11) —
(12) 12	(12) 0.35	(12) OG / GY	(12) 2652	(12) Driver Seat Belt Sensor Signal	(12) I	(12) —
(13) 13	(13) 0.5	(13) BK / OG	(13) 6627	(13) Right Rear Side Impact Sensor Low Reference	(13) I	(13) —
(14) 14	(14) 0.5	(14) OG / WH	(14) 6626	(14) Right Rear Side Impact Sensor Signal	(14) I	(14) —
15 - 16	—	—	—	Not Occupied	—	—
(17) 17	(17) 0.5	(17) BK / OG	(17) 5156	(17) Left Rear Seat Belt Pretensioner Low Control	(17) I	(17) —
(18) 18	(18) 0.5	(18) OG / VT	(18) 5155	(18) Left Rear Seat Belt Pretensioner Control	(18) I	(18) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
19 - 22	—	—	—	Not Occupied	—	—
(23) 23	(23) 0.5	(23) BK / OG	(23) 1363	(23) Driver Seat Belt Switch Low Reference	(23) I	(23) —
(24) 24	(24) 0.5	(24) BN / OG	(24) 5162	(24) Right Rear Seat Belt Switch Signal	(24) I	(24) —
(25) 25	(25) 0.35	(25) OG / WH	(25) 2653	(25) Passenger Seat Belt Sensor Signal	(25) I	(25) —
26	—	—	—	Not Occupied	—	—
(27) 27	(27) 0.5	(27) BK / OG	(27) 6628	(27) Left Front Side Impact Sensor Low Reference	(27) I	(27) —
(28) 28	(28) 0.5	(28) OG / GN	(28) 2132	(28) Left Front Side Impact Sensor Signal	(28) I	(28) —
29 - 36	—	—	—	Not Occupied	—	—
(37) 37	(37) 0.5	(37) OG / GY	(37) 5021	(37) Right Front Roof Rail Air Bag High Control	(37) I	(37) —
(38) 38	(38) 0.5	(38) WH / OG	(38) 5022	(38) Right Front Roof Rail Air Bag Low Control	(38) I	(38) —
(39) 39	(39) 0.5	(39) BU / OG	(39) 4957	(39) Passenger Seat Back Air Bag Low Control	(39) I	(39) —
(40) 40	(40) 0.5	(40) OG / GY	(40) 4956	(40) Passenger Seat Back Air Bag High Control	(40) I	(40) —
(41) 41	(41) 0.5	(41) BK / OG	(41) 6629	(41) Right Front Side Impact Sensor Low Reference	(41) I	(41) —
(42) 42	(42) 0.5	(42) BN / OG	(42) 2134	(42) Right Front Side Impact Sensor Signal	(42) I	(42) —
43 - 50	—	—	—	Not Occupied	—	—
(51) 51	(51) 0.5	(51) OG / GN	(51) 5019	(51) Left Front Roof Rail Air Bag High Control	(51) I	(51) —
(52) 52	(52) 0.5	(52) VT / OG	(52) 5020	(52) Left Front Roof Rail Air Bag Low Control	(52) I	(52) —
(53) 53	(53) 0.5	(53) BK / OG	(53) 4963	(53) Driver Seat Back Air Bag Low Control	(53) I	(53) —
(54) 54	(54) 0.5	(54) OG / BU	(54) 4962	(54) Driver Seat Back Air Bag High Control	(54) I	(54) —
(55) 55	(55) 0.5	(55) BK / OG	(55) 6623	(55) Left Rear Side Impact Sensor Low Reference	(55) I	(55) —
(56) 56	(56) 0.5	(56) OG / BU	(56) 6622	(56) Left Rear Side Impact Sensor Signal	(56) I	(56) —

K38 Chassis Control Module (G93 / G94)



3621452

Connector Part Information

- Harness Type: Chassis Wiring Harness
- OEM Connector: 12707495
- Service Connector: 85761018
- Description: 66-Way F 0.64, 2.8 MX123 Series, Sealed(BK with BK Terminal Position Assurance)

Terminal Part Information

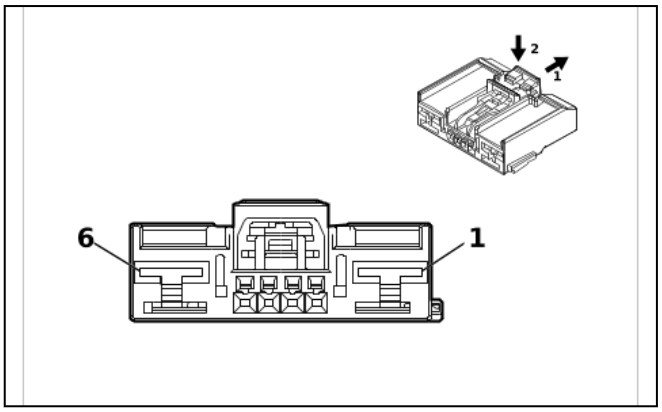
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	13587518	J-35616-35 (VT)	J-38125-11A
II	19351723	J-35616-64B (L-BU)	J-38125-213

K38 Chassis Control Module (G93 / G94)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1 - 5	—	—	—	Not Occupied	—	—
(6) 6	(6) 0.5	(6) VT / WH	(6) 639	(6) Run/Crank Ignition 1 Voltage	(6) II	(6) —
7 - 32	—	—	—	Not Occupied	—	—
(33) 33	(33) 0.75	(33) VT / WH	(33) 7256	(33) Front Differential Lock Actuator Control	(33) II	(33) —
(34) 34	(34) 0.5	(34) BU / BK	(34) 4977	(34) AUTOSAR CAN Bus [+] 3 Serial Data	(34) II	(34) —
(35) 35	(35) 0.5	(35) BU / BK	(35) 4977	(35) AUTOSAR CAN Bus [+] 3 Serial Data	(35) II	(35) —
(36) 36	(36) 0.5	(36) WH	(36) 4976	(36) AUTOSAR CAN Bus [-] 3 Serial Data	(36) II	(36) —
(37) 37	(37) 0.5	(37) WH	(37) 4976	(37) AUTOSAR CAN Bus [-] 3 Serial Data	(37) II	(37) —
38 - 43	—	—	—	Not Occupied	—	—
(44) 44	(44) 0.75	(44) GY / BK	(44) 7253	(44) Rear Differential Lock Actuator Low Control	(44) II	(44) —
45 - 49	—	—	—	Not Occupied	—	—
(50) 50	(50) 0.75	(50) VT / BN	(50) 7258	(50) Rear Differential Lock Actuator Control	(50) II	(50) —
51 - 59	—	—	—	Not Occupied	—	—
(60) 60	(60) 0.75	(60) WH / BK	(60) 7254	(60) Front Differential Lock Actuator Low Control	(60) II	(60) —
61 - 64	—	—	—	Not Occupied	—	—

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(65) 65	(65) 1.5	(65) BK	(65) 1650	(65) Ground	(65) I	(65) —
(66) 66	(66) 1.5	(66) RD / BN	(66) 5940	(66) Battery Positive Voltage	(66) I	(66) —

K40D Driver Seat Adjuster Memory Module X1 (A45)



4650258

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Driver
- OEM Connector: 7289-7139-30
- Service Connector: Service by Harness - See Part Catalog
- Description: 6-Way F 0.64, 6.3 Series(BK)

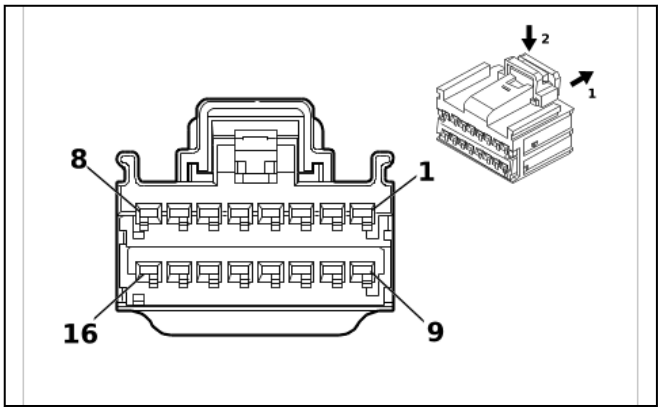
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-42 (RD)	No Tool Required
II	Not required	J-35616-64B (L-BU)	No Tool Required

K40D Driver Seat Adjuster Memory Module X1 (A45)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 2.5	(1) BK	(1) 1550	(1) Ground	(1) I	(1) —
2	—	—	—	Not Occupied	—	—
(3) 3	(3) 0.5	(3) RD / BN	(3) 2240	(3) Battery Positive Voltage	(3) II	(3) —
4 - 5	—	—	—	Not Occupied	—	—
(6) 6	(6) 2.5	(6) RD / YE	(6) 5040	(6) Battery Positive Voltage	(6) I	(6) —

K40D Driver Seat Adjuster Memory Module X2 (A45)



4332214

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Driver
- OEM Connector: 15512506
- Service Connector: Service by Harness - See Part Catalog
- Description: 16-Way F 1.5 OCS Series(BK)

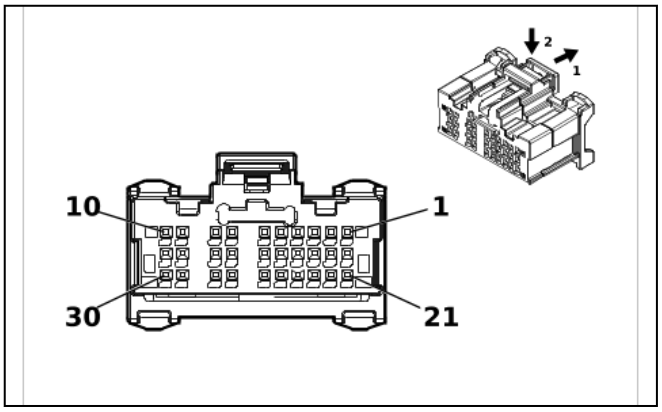
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-14 (GN)	No Tool Required

K40D Driver Seat Adjuster Memory Module X2 (A45)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1.5	(1) YE / BU	(1) 285	(1) Driver Seat Horizontal Motor Forward Control	(1) I	(1) —
2	—	—	—	Not Occupied	—	—
(3) 3	(3) 1.5	(3) GN / YE	(3) 276	(3) Driver Seat Recline Motor Forward Control	(3) I	(3) —
4 - 5	—	—	—	Not Occupied	—	—
(6) 6	(6) 1.5	(6) BU / VT	(6) 287	(6) Driver Seat Front Vertical Motor Down Control	(6) I	(6) —
(7) 7	(7) 1.5	(7) YE	(7) 282	(7) Driver Seat Rear Vertical Motor Up Control	(7) I	(7) —
8	—	—	—	Not Occupied	—	—
(9) 9	(9) 1.5	(9) BU / YE	(9) 277	(9) Driver Seat Recline Motor Rearward Control	(9) I	(9) —
10	—	—	—	Not Occupied	—	—
(11) 11	(11) 1.5	(11) GY / GN	(11) 284	(11) Driver Seat Horizontal Motor Rearward Control	(11) I	(11) —
12	—	—	—	Not Occupied	—	—
(13) 13	(13) 1.5	(13) GY / BU	(13) 283	(13) Driver Seat Rear Vertical Motor Down Control	(13) I	(13) —
14 - 15	—	—	—	Not Occupied	—	—
(16) 16	(16) 1.5	(16) GN / BN	(16) 286	(16) Driver Seat Front Vertical Motor Up Control	(16) I	(16) —

K40D Driver Seat Adjuster Memory Module X3 (A45)



5202284

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Driver
- OEM Connector: 2309644-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 30-Way F 0.5 MQS Series(BK)

Terminal Part Information

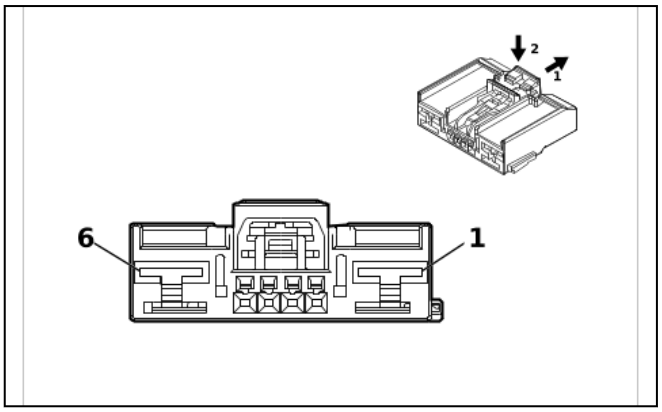
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	EL-35616-58 (BK)	No Tool Required

K40D Driver Seat Adjuster Memory Module X3 (A45)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	—	—	—	Not Occupied	—	—
(2) 2	(2) 0.35	(2) BU / GN	(2) 614	(2) Seat Memory Switch Set Signal	(2) I	(2) —
3 - 4	—	—	—	Not Occupied	—	—
(5) 5	(5) 0.35	(5) BN	(5) 3038	(5) Driver Seat Right Rear Haptic Movement Motor Control	(5) I	(5) —
(6) 6	(6) 0.35	(6) YE / BN	(6) 3037	(6) Driver Seat Left Rear Haptic Movement Motor Control	(6) I	(6) —
7	—	—	—	Not Occupied	—	—
(8) 8	(8) 0.35	(8) GN / WH	(8) 7530	(8) Driver Seat Adjuster Memory Module LIN Bus 1	(8) I	(8) —
(9) 9	(9) 0.35	(9) WH	(9) 4100	(9) AUTOSAR CAN Bus [-] 4 Serial Data	(9) I	(9) —
(10) 10	(10) 0.35	(10) BU / VT	(10) 4101	(10) AUTOSAR CAN Bus [+] 4 Serial Data	(10) I	(10) —
11 - 15	—	—	—	Not Occupied	—	—
(16) 16	(16) 0.35	(16) WH	(16) 615	(16) Seat Memory Switch Signal 1	(16) I	(16) —
17	—	—	—	Not Occupied	—	—
(18) 18	(18) 0.35	(18) GN / GY	(18) 3758	(18) Driver Seat Adjuster Memory Module LIN Bus 2	(18) I	(18) —
(19) 19	(19) 0.35	(19) WH	(19) 4100	(19) AUTOSAR CAN Bus [-] 4 Serial Data	(19) I	(19) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(20) 20	(20) 0.35	(20) BU / VT	(20) 4101	(20) AUTOSAR CAN Bus [+] 4 Serial Data	(20) I	(20) —
21 - 30	—	—	—	Not Occupied	—	—

K40P Passenger Seat Adjuster Memory Module X1 (AHH / AKE)



4650258

Connector Part Information
- Harness Type: Front Seat Wiring Harness - Passenger
- OEM Connector: 7289-7139-30
- Service Connector: Service by Harness - See Part Catalog
- Description: 6-Way F 0.64, 6.3 Series(BK)

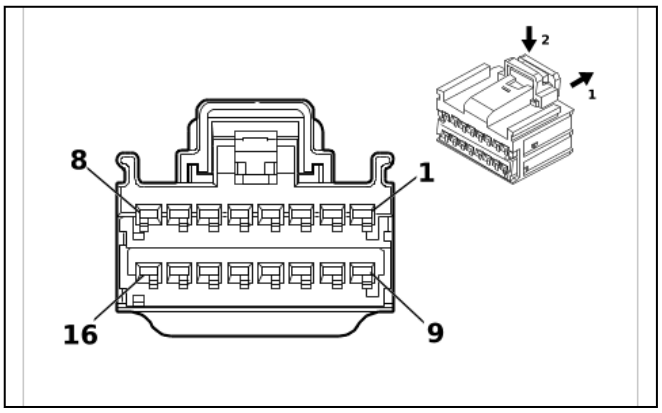
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-42 (RD)	No Tool Required
II	Not required	J-35616-64B (L-BU)	No Tool Required

K40P Passenger Seat Adjuster Memory Module X1 (AHH / AKE)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 2.5	(1) BK	(1) 1350	(1) Ground	(1) I	(1) —
2	—	—	—	Not Occupied	—	—
(3) 3	(3) 0.5	(3) RD / BN	(3) 2240	(3) Battery Positive Voltage	(3) II	(3) —
4 - 5	—	—	—	Not Occupied	—	—
(6) 6	(6) 2.5	(6) RD / YE	(6) 7440	(6) Battery Positive Voltage	(6) I	(6) —

K40P Passenger Seat Adjuster Memory Module X2 (AHH / AKE)



4332214

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Passenger
- OEM Connector: 15512506
- Service Connector: Service by Harness - See Part Catalog
- Description: 16-Way F 1.5 OCS Series(BK)

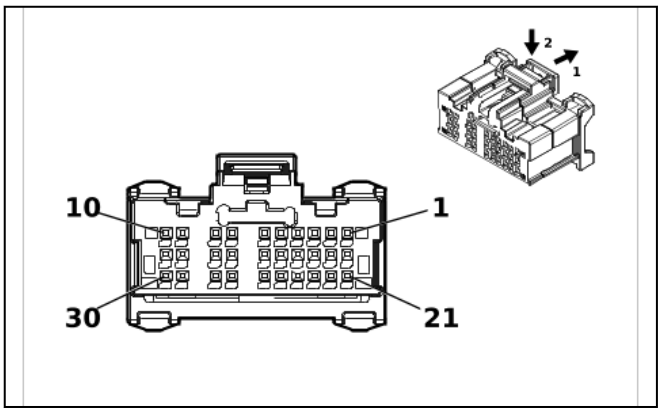
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-14 (GN)	No Tool Required

K40P Passenger Seat Adjuster Memory Module X2 (AHH / AKE)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1.5	(1) YE / WH	(1) 296	(1) Passenger Seat Horizontal Motor Forward Control	(1) I	(1) —
2	—	—	—	Not Occupied	—	—
(3) 3	(3) 1.5	(3) GN	(3) 76	(3) Passenger Seat Recline Motor Forward Control	(3) I	(3) —
4 - 5	—	—	—	Not Occupied	—	—
(6) 6	(6) 1.5	(6) GN / BU	(6) 298	(6) Passenger Seat Front Vertical Motor Down Control	(6) I	(6) —
(7) 7	(7) 1.5	(7) GN / WH	(7) 288	(7) Passenger Seat Rear Vertical Motor Up Control	(7) I	(7) —
8	—	—	—	Not Occupied	—	—
(9) 9	(9) 1.5	(9) BU / BN	(9) 77	(9) Passenger Seat Recline Motor Rearward Control	(9) I	(9) —
10	—	—	—	Not Occupied	—	—
(11) 11	(11) 1.5	(11) YE / BU	(11) 290	(11) Passenger Seat Horizontal Motor Rearward Control	(11) I	(11) —
12	—	—	—	Not Occupied	—	—
(13) 13	(13) 1.5	(13) BU / WH	(13) 289	(13) Passenger Seat Rear Vertical Motor Down Control	(13) I	(13) —
14 - 15	—	—	—	Not Occupied	—	—
(16) 16	(16) 1.5	(16) GN / VT	(16) 297	(16) Passenger Seat Front Vertical Motor Up Control	(16) I	(16) —

K40P Passenger Seat Adjuster Memory Module X3 (AHH / AKE)



5202284

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Passenger
- OEM Connector: 2309644-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 30-Way F 0.5 MQS Series(BK)

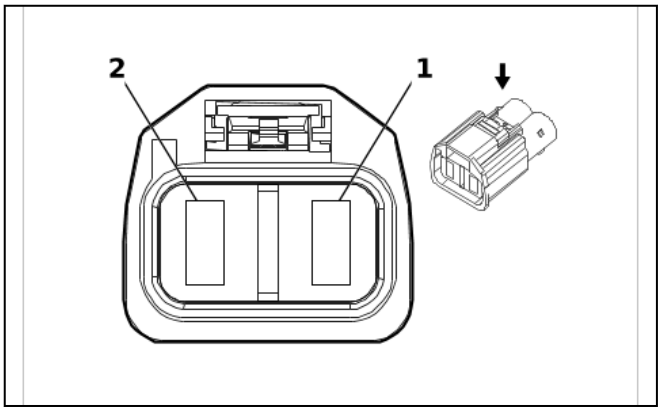
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	EL-35616-58 (BK)	No Tool Required

K40P Passenger Seat Adjuster Memory Module X3 (AHH / AKE)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1 - 8	—	—	—	Not Occupied	—	—
(9) 9	(9) 0.35	(9) WH	(9) 4100	(9) AUTOSAR CAN Bus [-] 4 Serial Data	(9) I	(9) —
(10) 10	(10) 0.35	(10) BU / VT	(10) 4101	(10) AUTOSAR CAN Bus [+] 4 Serial Data	(10) I	(10) —
11 - 17	—	—	—	Not Occupied	—	—
(18) 18	(18) 0.35	(18) GN / YE	(18) 4116	(18) Passenger Seat Adjuster Memory Module LIN Bus 2	(18) I	(18) —
(19) 19	(19) 0.35	(19) WH	(19) 4100	(19) AUTOSAR CAN Bus [-] 4 Serial Data	(19) I	(19) —
(20) 20	(20) 0.35	(20) BU / VT	(20) 4101	(20) AUTOSAR CAN Bus [+] 4 Serial Data	(20) I	(20) —
21	—	—	—	Not Occupied	—	—
(22) 22	(22) 0.35	(22) BN / VT	(22) 2452	(22) Seat Memory Module Configuration 2	(22) I	(22) —
(23) 23	(23) 0.35	(23) BN / VT	(23) 2452	(23) Seat Memory Module Configuration 2	(23) I	(23) —
24 - 30	—	—	—	Not Occupied	—	—

K43 Power Steering Control Module X1



2748050

Connector Part Information
- Harness Type: Power Steering Wiring Harness Extension Harness
- OEM Connector: 13581053
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 9.5 Series, Sealed(BK)

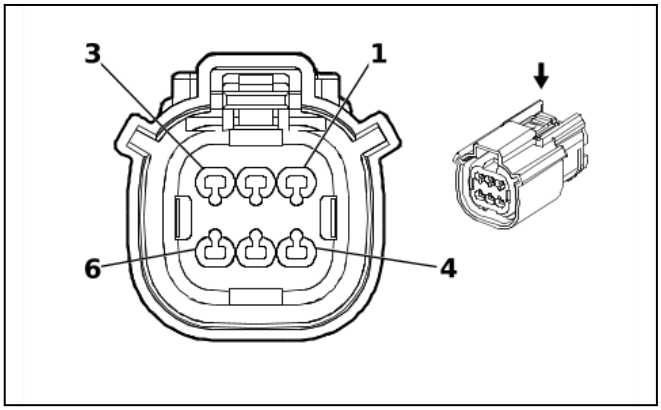
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

K43 Power Steering Control Module X1

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1	(1) BK	(1) 350	(1) Ground	(1) I	(1) —
(2) 2	(2) 1	(2) RD	(2) 3340	(2) Battery Positive Voltage	(2) I	(2) —

K43 Power Steering Control Module X2



1986157

Connector Part Information
- Harness Type: Power Steering Control Module Wiring Harness - Data
- OEM Connector: 38292376
- Service Connector: Service by Harness - See Part Catalog
- Description: 6-Way F 1.5 MX Series, Sealed(BK)

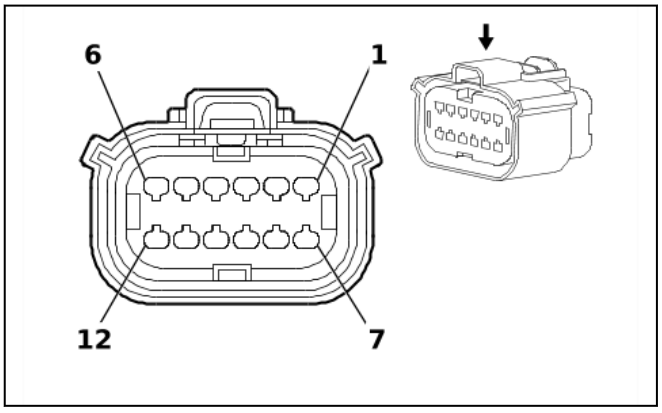
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required

K43 Power Steering Control Module X2

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) WH	(1) 4978	(1) AUTOSAR CAN Bus [-] 2 Serial Data	(1) I	(1) —
(2) 2	(2) 0.5	(2) BU	(2) 4979	(2) AUTOSAR CAN Bus [+] 2 Serial Data	(2) I	(2) —
(3) 3	(3) 0.5	(3) BU / WH	(3) 4979	(3) AUTOSAR CAN Bus [+] 2 Serial Data	(3) I	(3) —
(4) 4	(4) 0.5	(4) WH / BU	(4) 4978	(4) AUTOSAR CAN Bus [-] 2 Serial Data	(4) I	(4) —
5 - 6	—	—	—	Not Occupied	—	—

K43 Power Steering Control Module X3



1825165

Connector Part Information

- Harness Type: Power Steering Control Module Wiring Harness - Sensor
- OEM Connector: 13503528
- Service Connector: Service by Harness - See Part Catalog
- Description: 12-Way F 1.5 MX Series, Sealed(BK)

Terminal Part Information

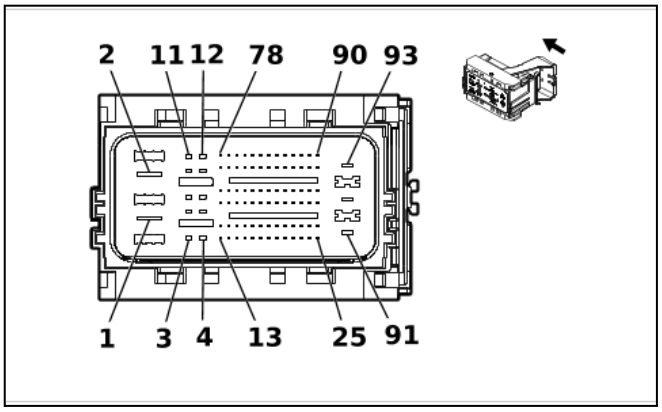
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required

K43 Power Steering Control Module X3

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) OG	(1) 8369	(1) Handwheel Channel A Angle Position Sensor SENT Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) RD	(2) 8366	(2) Handwheel Channel A High Reference	(2) I	(2) —
(3) 3	(3) 0.5	(3) BK	(3) 8370	(3) Handwheel Channel A Low Reference	(3) I	(3) —
(4) 4	(4) 0.5	(4) GY	(4) 8375	(4) Handwheel Channel B Low Reference	(4) I	(4) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(5) 5	(5) 0.5	(5) WH / RD	(5) 8371	(5) Handwheel Channel B High Reference	(5) I	(5) —
(6) 6	(6) 0.5	(6) YE	(6) 8374	(6) Handwheel Channel B Angle Position Sensor SENT Signal	(6) I	(6) —
(7) 7	(7) 0.5	(7) BU	(7) 8367	(7) Handwheel Channel A Torque Pressure Sensor 1 SENT Signal	(7) I	(7) —
(8) 8	(8) 0.5	(8) VT	(8) 8368	(8) Handwheel Channel A Torque Pressure Sensor 2 SENT Signal	(8) I	(8) —
9 - 10	—	—	—	Not Occupied	—	—
(11) 11	(11) 0.5	(11) WH / BU	(11) 8372	(11) Handwheel Channel B Torque Pressure Sensor 1 SENT Signal	(11) I	(11) —
(12) 12	(12) 0.5	(12) GN	(12) 8373	(12) Handwheel Channel B Torque Pressure Sensor 2 SENT Signal	(12) I	(12) —

K45 Powertrain Control Module X1 (L4B)



6173672

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 212806-0108
- Service Connector: 85079961
- Description: 93-Way F 0.5, 1.2, 2.8, 6.3 MX GENV Series, Sealed(BK with BU Terminal Position Assurance)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19355735	J-35616-4A (PU)	J-38125-217
II	85079962	EL-35616-58 (BK)	EL-38125-58
III	85079963	J-35616-2A (GY)	EL-38125-58
IV	85079964	J-35616-42 (RD)	J-38125-217

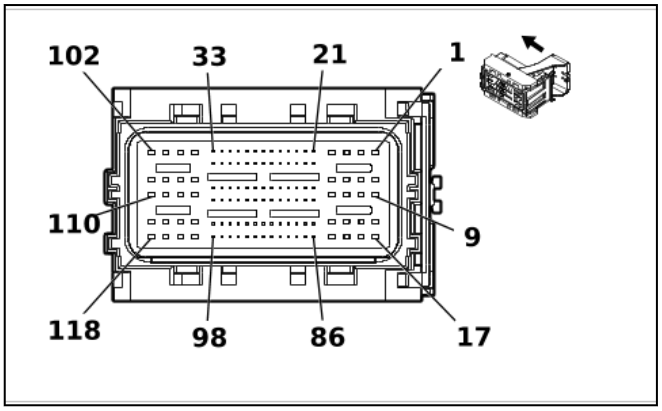
K45 Powertrain Control Module X1 (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 4	(1) BK / WH	(1) 6151	(1) Engine Control Module Ground	(1) IV	(1) —
(2) 2	(2) 4	(2) BK / WH	(2) 6151	(2) Engine Control Module Ground	(2) IV	(2) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
3 - 11	—	—	—	Not Occupied	—	—
(12) 12	(12) 0.5	(12) RD / BN	(12) 440	(12) Battery Positive Voltage	(12) III	(12) —
(13) 13	(13) 0.5	(13) BN	(13) 3120	(13) HO2S High Signal Bank 1 Sensor 2	(13) II	(13) —
(14) 14	(14) 0.5	(14) GN / GY	(14) 465	(14) Fuel Pump Primary Relay Control	(14) II	(14) —
15 - 17	—	—	—	Not Occupied	—	—
(18) 18	(18) 0.5	(18) VT / GN	(18) 4320	(18) Powertrain Sensor Bus Enable	(18) II	(18) —
19 - 20	—	—	—	Not Occupied	—	—
(21) 21	(21) 0.5	(21) WH	(21) 4055	(21) Private Serial Data Powertrain CAN Bus [+] Serial Data	(21) II	(21) —
(22) 22	(22) 0.5	(22) BU / GY	(22) 4054	(22) Private Serial Data Powertrain CAN Bus [-] Serial Data	(22) II	(22) —
(23) 23	(23) 0.5	(23) WH	(23) 4976	(23) AUTOSAR CAN Bus [-] 3 Serial Data	(23) II	(23) —
(24) 24	(24) 0.5	(24) BU / BK	(24) 4977	(24) AUTOSAR CAN Bus [+] 3 Serial Data	(24) II	(24) —
25	—	—	—	Not Occupied	—	—
(26) 26	(26) 0.5	(26) WH / YE	(26) 3121	(26) HO2S Low Signal Bank 1 Sensor 2	(26) II	(26) —
27 - 32	—	—	—	Not Occupied	—	—
(33) 33	(33) 0.5	(33) YE	(33) 5991	(33) Powertrain Relay Coil Control	(33) II	(33) —
34	—	—	—	Not Occupied	—	—
(35) 35	(35) 0.5	(35) BN	(35) 10515	(35) Electronic Transmission Range Select Shifter Position Sensor 1 Signal	(35) II	(35) —
(36) 36	(36) 0.5	(36) GY	(36) 10518	(36) Electronic Transmission Range Select Shifter Position Sensor 2 Signal	(36) II	(36) —
37 - 40	—	—	—	Not Occupied	—	—
(41) 41	(41) 0.5	(41) BK / BU	(41) 1271	(41) Accelerator Pedal Position Low Reference 1	(41) II	(41) —
(42) 42	(42) 0.5	(42) BK / VT	(42) 1272	(42) Accelerator Pedal Position Low Reference 2	(42) II	(42) —
43	—	—	—	Not Occupied	—	—
(44) 44	(44) 0.5	(44) BK / GY	(44) 626	(44) Engine Control Vehicle Sensors Low Reference 1	(44) II	(44) —
(45) 45	(45) 0.5	(45) WH	(45) 4978	(45) AUTOSAR CAN Bus [-] 2 Serial Data	(45) II	(45) —
(46) 46	(46) 0.5	(46) BU / YE	(46) 4979	(46) AUTOSAR CAN Bus [+] 2 Serial Data	(46) II	(46) —
(47) 47	(47) 0.5	(47) GN / WH	(47) 1162	(47) Accelerator Pedal Position Signal 2	(47) II	(47) —
48	—	—	—	Not Occupied	—	—
(49) 49	(49) 0.5	(49) BU / GY	(49) 636	(49) Ambient Air Temperature Sensor Signal	(49) II	(49) —
50	—	—	—	Not Occupied	—	—
(51) 51	(51) 0.5	(51) VT / GN	(51) 439	(51) Run/Crank Ignition 1 Voltage	(51) II	(51) —
52 - 64	—	—	—	Not Occupied	—	—
(65) 65	(65) 0.5	(65) BN / RD	(65) 1274	(65) Accelerator Pedal Position 5V Reference 2	(65) II	(65) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(66) 66	(66) 0.5	(66) WH / RD	(66) 1164	(66) Accelerator Pedal Position 5V Reference 1	(66) II	(66) —
67 - 74	—	—	—	Not Occupied	—	—
(75) 75	(75) 0.5	(75) YE / WH	(75) 1161	(75) Accelerator Pedal Position Signal 1	(75) II	(75) —
(76) 76	(76) 0.5	(76) WH / GN	(76) 5380	(76) Brake Position Sensor Signal	(76) II	(76) —
77 - 80	—	—	—	Not Occupied	—	—
(81) 81	(81) 0.5	(81) WH / RD	(81) 480	(81) Engine Control Vehicle Sensors 5 Volt Reference 1	(81) II	(81) —
82 - 90	—	—	—	Not Occupied	—	—
(91) 91	(91) 2.5	(91) VT / BU	(91) 5290	(91) Powertrain Main Relay Fused Supply Voltage 1	(91) I	(91) —
(92) 92	(92) 2.5	(92) VT / BU	(92) 5290	(92) Powertrain Main Relay Fused Supply Voltage 1	(92) I	(92) —
(93) 93	(93) 2.5	(93) RD / GN	(93) 1840	(93) Battery Positive Voltage	(93) I	(93) —

K45 Powertrain Control Module X2 (L4B)



6166536

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 212805-0101
- Service Connector: 85079959
- Description: 118-Way F 0.5, 1.2 MXGENV Series, Sealed(BK with BK Terminal Position Assurance)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	85079962	EL-35616-58 (BK)	EL-38125-58
II	85079963	J-35616-2A (GY)	EL-38125-58

K45 Powertrain Control Module X2 (L4B)

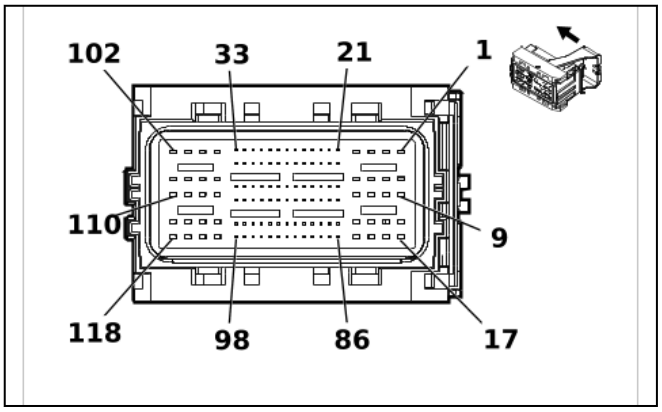
Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BU	(1) 3584	(1) Intake Camshaft Profile Actuator 2 Control B	(1) II	(1) —
(2) 2	(2) 0.5	(2) GN	(2) 3585	(2) Intake Camshaft Profile Actuator 2 Control A	(2) II	(2) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(3) 3	(3) 0.5	(3) GN / BK	(3) 3616	(3) Intake Camshaft Profile Actuator 1 Control B	(3) II	(3) —
(4) 4	(4) 0.5	(4) VT / GY	(4) 3615	(4) Intake Camshaft Profile Actuator 1 Control A	(4) II	(4) —
5 - 8	—	—	—	Not Occupied	—	—
(9) 9	(9) 0.5	(9) GY / YE	(9) 1502	(9) Intake Camshaft Profile Actuator 4 Control B	(9) II	(9) —
(10) 10	(10) 0.5	(10) GN / YE	(10) 1402	(10) Intake Camshaft Profile Actuator 4 Control A	(10) II	(10) —
(11) 11	(11) 0.5	(11) GY	(11) 3586	(11) Intake Camshaft Profile Actuator 3 Control B	(11) II	(11) —
(12) 12	(12) 0.5	(12) YE / BU	(12) 3587	(12) Intake Camshaft Profile Actuator 3 Control A	(12) II	(12) —
13	—	—	—	Not Occupied	—	—
(14) 14	(14) 0.5	(14) WH / BN	(14) 10830	(14) Oil Rotary Valve Open Control	(14) II	(14) —
(15) 15	(15) 0.5	(15) GN / BN	(15) 10824	(15) Radiator Rotary Valve Open Control	(15) II	(15) —
16 - 17	—	—	—	Not Occupied	—	—
(18) 18	(18) 0.5	(18) WH / GY	(18) 10831	(18) Oil Rotary Valve Close Control	(18) II	(18) —
(19) 19	(19) 0.5	(19) GN / GY	(19) 10825	(19) Radiator Rotary Valve Close Control	(19) II	(19) —
20	—	—	—	Not Occupied	—	—
(21) 21	(21) 0.5	(21) YE / WH	(21) 3200	(21) Throttle Inlet Absolute Pressure Sensor Signal	(21) I	(21) —
(22) 22	(22) 0.5	(22) GN	(22) 380	(22) Air Conditioning Refrigerant Pressure Sensor Signal	(22) I	(22) —
23 - 24	—	—	—	Not Occupied	—	—
(25) 25	(25) 0.5	(25) YE / BN	(25) 331	(25) Oil Pressure Sensor Signal	(25) I	(25) —
26 - 27	—	—	—	Not Occupied	—	—
(28) 28	(28) 0.5	(28) GN / WH	(28) 432	(28) Manifold Absolute Pressure Sensor Signal	(28) I	(28) —
(29) 29	(29) 0.5	(29) YE / GY	(29) 3926	(29) Crankcase Differential Pressure Sensor Signal	(29) I	(29) —
(30) 30	(30) 0.5	(30) BN / BU	(30) 2447	(30) Evaporative Purge Pump Pressure Signal	(30) I	(30) —
31 - 34	—	—	—	Not Occupied	—	—
(35) 35	(35) 0.5	(35) WH / YE	(35) 6317	(35) Electronic Transmission Range Select Out of Park Switch Signal	(35) I	(35) —
(36) 36	(36) 0.5	(36) BN / BU	(36) 357	(36) Oil Temperature Sensor Signal	(36) I	(36) —
(37) 37	(37) 0.5	(37) VT	(37) 7485	(37) Engine Oil Temperature Sensor 2 Signal	(37) I	(37) —
38	—	—	—	Not Occupied	—	—
(39) 39	(39) 0.5	(39) YE / BU	(39) 2408	(39) Engine Inlet Coolant Temperature Signal	(39) I	(39) —
(40) 40	(40) 0.5	(40) BU	(40) 2990	(40) Engine Radiator Coolant Temperature Sensor Signal	(40) I	(40) —
41 - 42	—	—	—	Not Occupied	—	—

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(43) 43	(43) 0.5	(43) BU / YE	(43) 8938	(43) Engine Integrated Exhaust Manifold Temperature Signal	(43) I	(43) —
(44) 44	(44) 0.5	(44) GY / VT	(44) 2404	(44) Engine Block Coolant Temperature Signal	(44) I	(44) —
(45) 45	(45) 0.5	(45) WH / BU	(45) 7329	(45) Pre-Throttle Air Temperature Signal	(45) I	(45) —
(46) 46	(46) 0.5	(46) BN / WH	(46) 585	(46) Transmission Fluid Temperature Sensor Signal	(46) I	(46) —
(47) 47	(47) 0.5	(47) VT / BN	(47) 5284	(47) Intake Camshaft Position Actuator Solenoid Valve 1	(47) I	(47) —
(48) 48	(48) 0.5	(48) BK / BN	(48) 6753	(48) Camshaft Position Actuator Solenoid Valve 1 Low Reference	(48) I	(48) —
49 - 50	—	—	—	Not Occupied	—	—
(51) 51	(51) 0.5	(51) BU	(51) 492	(51) Mass Air Flow Sensor Signal	(51) I	(51) —
(52) 52	(52) 0.5	(52) VT / WH	(52) 6319	(52) Electronic Transmission Range Select Out of Park Switch 2 Signal	(52) I	(52) —
53 - 55	—	—	—	Not Occupied	—	—
(56) 56	(56) 0.5	(56) VT / GY	(56) 496	(56) Knock Sensor 1 Signal	(56) I	(56) —
(57) 57	(57) 0.5	(57) BK / YE	(57) 1716	(57) Knock Sensor Low Reference 1	(57) I	(57) —
(58) 58	(58) 0.5	(58) BN	(58) 3706	(58) Electronic Transmission Range Select Switch Analog Signal 1	(58) I	(58) —
59 - 72	—	—	—	Not Occupied	—	—
(73) 73	(73) 0.5	(73) GN / BU	(73) 428	(73) EVAP Canister Purge Solenoid Control	(73) I	(73) —
74 - 75	—	—	—	Not Occupied	—	—
(76) 76	(76) 0.5	(76) GY / BU	(76) 5282	(76) Exhaust Camshaft Position Actuator Solenoid Valve 1	(76) I	(76) —
(77) 77	(77) 0.5	(77) BK / VT	(77) 6754	(77) Camshaft Position Actuator Solenoid Valve 1 Low Reference	(77) I	(77) —
(78) 78	(78) 0.5	(78) WH / GY	(78) 1876	(78) Knock Sensor 2 Signal	(78) I	(78) —
(79) 79	(79) 0.5	(79) BK / GY	(79) 2303	(79) Knock Sensor Low Reference 2	(79) I	(79) —
80 - 83	—	—	—	Not Occupied	—	—
(84) 84	(84) 0.5	(84) YE / BK	(84) 625	(84) Starter Enable Relay Control	(84) I	(84) —
(85) 85	(85) 0.5	(85) YE / VT	(85) 4325	(85) Starter Pinion Solenoid Actuator Relay Control	(85) I	(85) —
(86) 86	(86) 0.5	(86) BU / WH	(86) 3589	(86) Intake Camshaft Profile Actuator 1 Position Sensor Signal	(86) I	(86) —
(87) 87	(87) 0.5	(87) GN / WH	(87) 3592	(87) Intake Camshaft Profile Actuator 2 Position Sensor Signal	(87) I	(87) —
(88) 88	(88) 0.5	(88) BK / GN	(88) 3593	(88) Intake Camshaft Profile Actuator 3 Position Sensor Signal	(88) I	(88) —
(89) 89	(89) 0.5	(89) YE / BN	(89) 1702	(89) Intake Camshaft Profile Actuator 4 Position Sensor Signal	(89) I	(89) —
(90) 90	(90) 0.5	(90) GN / BK	(90) 6266	(90) Exhaust Camshaft Profile Actuator 2 Position Sensor Signal	(90) I	(90) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(91) 91	(91) 0.5	(91) YE	(91) 6263	(91) Exhaust Camshaft Profile Actuator 3 Position Sensor Signal	(91) I	(91) —
(92) 92	(92) 0.5	(92) YE / WH	(92) 3746	(92) Camshaft Exhaust Lobe Axial Position Signal 1	(92) I	(92) —
(93) 93	(93) 0.5	(93) YE / GN	(93) 3747	(93) Camshaft Exhaust Lobe Axial Position Signal 2	(93) I	(93) —
(94) 94	(94) 0.5	(94) VT / WH	(94) 3744	(94) Camshaft Intake Lobe Axial Position Signal 1	(94) I	(94) —
(95) 95	(95) 0.5	(95) VT / GN	(95) 3745	(95) Camshaft Intake Lobe Axial Position Signal 2	(95) I	(95) —
96 - 98	—	—	—	Not Occupied	—	—
(99) 99	(99) 0.5	(99) GN / WH	(99) 2968	(99) Transmission Auxiliary Fluid Pump Control	(99) II	(99) —
100 - 106	—	—	—	Not Occupied	—	—
(107) 107	(107) 0.5	(107) WH / YE	(107) 2159	(107) Park Inhibit Solenoid Assembly Control	(107) II	(107) —
(108) 108	(108) 0.5	(108) GN / WH	(108) 12513	(108) Transmission Default Disable Solenoid Control	(108) II	(108) —
(109) 109	(109) 0.75	(109) YE	(109) 7301	(109) High Pressure Fuel Pump High Control	(109) II	(109) —
(110) 110	(110) 0.75	(110) VT / BK	(110) 7300	(110) High Pressure Fuel Pump Low Control	(110) II	(110) —
(111) 111	(111) 0.75	(111) GN	(111) 4803	(111) Direct Fuel Injector High Voltage Control Cylinder 3	(111) II	(111) —
(112) 112	(112) 0.75	(112) BU	(112) 4802	(112) Direct Fuel Injector High Voltage Control Cylinder 2	(112) II	(112) —
(113) 113	(113) 0.75	(113) BN	(113) 4801	(113) Direct Fuel Injector High Voltage Control Cylinder 1	(113) II	(113) —
(114) 114	(114) 0.75	(114) GY / BU	(114) 4804	(114) Direct Fuel Injector High Voltage Control Cylinder 4	(114) II	(114) —
(115) 115	(115) 0.75	(115) GN / GY	(115) 4903	(115) Direct Fuel Injector High Voltage Supply Cylinder 3	(115) II	(115) —
(116) 116	(116) 0.75	(116) BU / GY	(116) 4902	(116) Direct Fuel Injector High Voltage Supply Cylinder 2	(116) II	(116) —
(117) 117	(117) 0.75	(117) BN / WH	(117) 4901	(117) Direct Fuel Injector High Voltage Supply Cylinder 1	(117) II	(117) —
(118) 118	(118) 0.75	(118) BU / WH	(118) 4904	(118) Direct Fuel Injector High Voltage Supply Cylinder 4	(118) II	(118) —

K45 Powertrain Control Module X3 (L4B)



6384303

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 212805-0102
- Service Connector: 85079960
- Description: 118-Way F 0.5, 1.2 MXGENV Series, Sealed(BK with L-GY Terminal Position Assurance)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	85079962	EL-35616-58 (BK)	EL-38125-58
II	85079963	J-35616-2A (GY)	EL-38125-58

K45 Powertrain Control Module X3 (L4B)

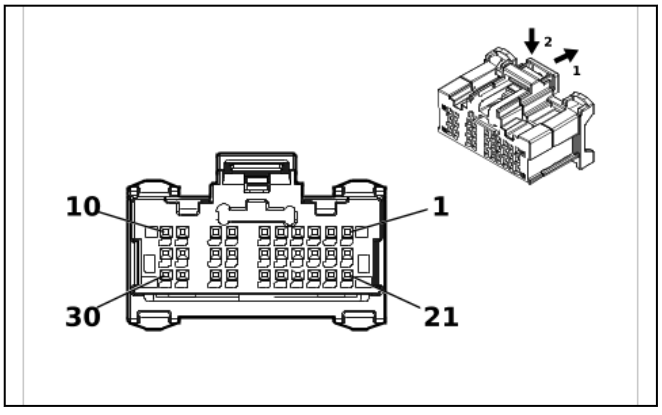
Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) WH / BN	(1) 2591	(1) Turbocharger Wastegate Motor Open Control	(1) II	(1) —
(2) 2	(2) 0.75	(2) WH / BU	(2) 2592	(2) Turbocharger Wastegate Motor Close Control	(2) II	(2) —
(3) 3	(3) 0.5	(3) YE	(3) 581	(3) Throttle Actuator Open Control	(3) II	(3) —
(4) 4	(4) 0.5	(4) BN / WH	(4) 582	(4) Throttle Actuator Close Control	(4) II	(4) —
5 - 6	—	—	—	Not Occupied	—	—
(7) 7	(7) 0.5	(7) BK / YE	(7) 548	(7) Engine Control Sensors Low Reference 1	(7) II	(7) —
(8) 8	(8) 0.5	(8) BK / GN	(8) 580	(8) Engine Control Sensors Low Reference 2	(8) II	(8) —
9 - 10	—	—	—	Not Occupied	—	—
(11) 11	(11) 0.5	(11) BK / BU	(11) 10597	(11) Engine Control Sensors Low Reference 3	(11) II	(11) —
12 - 16	—	—	—	Not Occupied	—	—
(17) 17	(17) 0.5	(17) GY / WH	(17) 3113	(17) HO2S Heater Low Control Bank 1 Sensor 1	(17) II	(17) —
(18) 18	(18) 0.5	(18) GY / WH	(18) 3122	(18) HO2S Heater Low Control Bank 1 Sensor 2	(18) II	(18) —
19 - 20	—	—	—	Not Occupied	—	—
(21) 21	(21) 0.5	(21) BK / BU	(21) 2129	(21) Ignition Control Low Reference Bank 1	(21) I	(21) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
22 - 23	—	—	—	Not Occupied	—	—
(24) 24	(24) 0.5	(24) GN	(24) 10823	(24) Radiator Rotary Valve Feedback Signal	(24) I	(24) —
(25) 25	(25) 0.5	(25) BU / WH	(25) 10786	(25) Fuel Rail Pressure Sensor SENT 1 Signal	(25) I	(25) —
(26) 26	(26) 0.5	(26) GY	(26) 12463	(26) Transmission Valve 3 Solenoid Control	(26) I	(26) —
(27) 27	(27) 0.5	(27) WH / BU	(27) 12465	(27) Transmission Valve 5 Solenoid Control	(27) I	(27) —
(28) 28	(28) 0.5	(28) VT	(28) 12464	(28) Transmission Valve 4 Solenoid Control	(28) I	(28) —
(29) 29	(29) 0.5	(29) WH	(29) 12466	(29) Transmission Valve 6 Solenoid Control	(29) I	(29) —
(30) 30	(30) 0.5	(30) BN	(30) 12461	(30) Transmission Valve 1 Solenoid Control	(30) I	(30) —
(31) 31	(31) 0.5	(31) GY / GN	(31) 12462	(31) Transmission Valve 2 Solenoid Control	(31) I	(31) —
(32) 32	(32) 0.5	(32) GN / WH	(32) 1530	(32) Transmission Line Pressure Control Solenoid Valve Control	(32) I	(32) —
(33) 33	(33) 0.5	(33) VT / WH	(33) 422	(33) Torque Converter Clutch Solenoid Valve Control	(33) I	(33) —
34	—	—	—	Not Occupied	—	—
(35) 35	(35) 0.5	(35) WH	(35) 10829	(35) Oil Rotary Valve Feedback Signal	(35) I	(35) —
36	—	—	—	Not Occupied	—	—
(37) 37	(37) 0.5	(37) BU / WH	(37) 3630	(37) Throttle Position Sensor SENT 1 Signal	(37) I	(37) —
(38) 38	(38) 0.5	(38) WH	(38) 2590	(38) Turbocharger Wastegate Motor Feedback Signal	(38) I	(38) —
(39) 39	(39) 0.5	(39) BN / WH	(39) 12792	(39) Transmission Intermediate Speed Sensor 2 Signal Low	(39) I	(39) —
(40) 40	(40) 0.5	(40) GN / VT	(40) 12791	(40) Transmission Intermediate Speed Sensor Signal Low	(40) I	(40) —
(41) 41	(41) 0.5	(41) GY / BU	(41) 6358	(41) Output Speed Signal	(41) I	(41) —
(42) 42	(42) 0.5	(42) VT / WH	(42) 4173	(42) Transmission Speed Input Low Signal	(42) I	(42) —
(43) 43	(43) 0.5	(43) BU / VT	(43) 2121	(43) Ignition Control 1	(43) I	(43) —
(44) 44	(44) 0.5	(44) GN / BU	(44) 2123	(44) Ignition Control 3	(44) I	(44) —
(45) 45	(45) 0.5	(45) YE / BU	(45) 2124	(45) Ignition Control 4	(45) I	(45) —
(46) 46	(46) 0.5	(46) BU / WH	(46) 2122	(46) Ignition Control 2	(46) I	(46) —
(47) 47	(47) 0.5	(47) YE / GY	(47) 6936	(47) HO2S Signal	(47) I	(47) —
(48) 48	(48) 0.5	(48) BN	(48) 6934	(48) HO2S Low Signal	(48) I	(48) —
(49) 49	(49) 0.5	(49) BN / WH	(49) 6933	(49) HO2S Pump Current Signal	(49) I	(49) —
(50) 50	(50) 0.5	(50) GN	(50) 6935	(50) HO2S Pump Current Trim Signal	(50) I	(50) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
51	—	—	—	Not Occupied	—	—
(52) 52	(52) 0.5	(52) YE / VT	(52) 5275	(52) Intake Camshaft Position Sensor 1	(52) I	(52) —
(53) 53	(53) 0.5	(53) VT / BK	(53) 5273	(53) Exhaust Camshaft Position Sensor 1	(53) I	(53) —
(54) 54	(54) 0.5	(54) GN	(54) 6271	(54) Crankshaft Position Sensor Signal	(54) I	(54) —
55	—	—	—	Not Occupied	—	—
(56) 56	(56) 0.5	(56) BK / GN	(56) 5301	(56) Intake Camshaft Position Sensor Low Reference 1	(56) I	(56) —
(57) 57	(57) 0.5	(57) BK / GY	(57) 5296	(57) Exhaust Camshaft Position Sensor Low Reference 1	(57) I	(57) —
(58) 58	(58) 0.5	(58) BK / GN	(58) 469	(58) Manifold Absolute Pressure Sensor Low Reference	(58) I	(58) —
(59) 59	(59) 0.5	(59) BK / VT	(59) 6272	(59) Crankshaft Position Sensor Low Reference	(59) I	(59) —
60 - 73	—	—	—	Not Occupied	—	—
(74) 74	(74) 0.5	(74) GN / BN	(74) 10809	(74) Engine Control Module LIN Bus 4	(74) I	(74) —
75 - 76	—	—	—	Not Occupied	—	—
(77) 77	(77) 0.5	(77) VT / BU	(77) 6270	(77) Crankshaft Position Sensor Voltage	(77) I	(77) —
(78) 78	(78) 0.5	(78) BN / RD	(78) 2701	(78) Throttle Position Sensor 5V Reference	(78) I	(78) —
(79) 79	(79) 0.5	(79) GY / BU	(79) 5300	(79) Intake Camshaft Position Sensor 1 Voltage Reference	(79) I	(79) —
(80) 80	(80) 0.5	(80) GY / YE	(80) 5297	(80) Exhaust Camshaft Position Sensor 1 Voltage Reference	(80) I	(80) —
(81) 81	(81) 0.5	(81) GY / RD	(81) 2704	(81) Manifold Absolute Pressure Sensor 5V Reference	(81) I	(81) —
82 - 85	—	—	—	Not Occupied	—	—
(86) 86	(86) 0.5	(86) GN / VT	(86) 10806	(86) Engine Control Module LIN Bus 1	(86) I	(86) —
(87) 87	(87) 0.5	(87) GN / WH	(87) 10807	(87) Engine Control Module LIN Bus 2	(87) I	(87) —
(88) 88	(88) 0.5	(88) GN / YE	(88) 10808	(88) Engine Control Module LIN Bus 3	(88) I	(88) —
89 - 90	—	—	—	Not Occupied	—	—
(91) 91	(91) 0.5	(91) WH / GY	(91) 459	(91) Air Conditioning Compressor Clutch Relay Control	(91) I	(91) —
(92) 92	(92) 0.5	(92) WH / RD	(92) 11031	(92) Fuel Tank Isolation Valve Supply Voltage	(92) I	(92) —
(93) 93	(93) 0.5	(93) VT / BU	(93) 5291	(93) Powertrain Main Relay Fused Supply Voltage 2	(93) I	(93) —
94 - 97	—	—	—	Not Occupied	—	—
(98) 98	(98) 0.5	(98) YE / GY	(98) 11029	(98) Canister Vapor Pressure Sensor Signal	(98) I	(98) —
(99) 99	(99) 0.5	(99) GN / GY	(99) 6387	(99) Transmission High Side Driver 1 Control	(99) II	(99) —
(100) 100	(100) 0.5	(100) GY / BN	(100) 6388	(100) Transmission High Side Driver 2 Control	(100) II	(100) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(101) 101	(101) 0.5	(101) YE / VT	(101) 6265	(101) Exhaust Camshaft Profile Actuator 2 Control B	(101) II	(101) —
(102) 102	(102) 0.5	(102) VT / BK	(102) 6264	(102) Exhaust Camshaft Profile Actuator 2 Control A	(102) II	(102) —
(103) 103	(103) 0.5	(103) YE / BU	(103) 4171	(103) Transmission Input Shaft Speed Sensor Circuit 9V Reference	(103) II	(103) —
(104) 104	(104) 0.5	(104) YE / GN	(104) 4170	(104) Transmission Output Shaft Speed Sensor Circuit 9V Reference	(104) II	(104) —
(105) 105	(105) 0.5	(105) GY / BN	(105) 6262	(105) Exhaust Camshaft Profile Actuator 3 Control B	(105) II	(105) —
(106) 106	(106) 0.5	(106) GN / BN	(106) 6261	(106) Exhaust Camshaft Profile Actuator 3 Control A	(106) II	(106) —
107	—	—	—	Not Occupied	—	—
(108) 108	(108) 0.5	(108) BU	(108) 179	(108) Engine Oil Pump Control	(108) II	(108) —
109	—	—	—	Not Occupied	—	—
(110) 110	(110) 0.5	(110) GN	(110) 3060	(110) Turbocharger Bypass Solenoid Valve Control Bank 1	(110) II	(110) —
111 - 114	—	—	—	Not Occupied	—	—
(115) 115	(115) 0.5	(115) BU / RD	(115) 460	(115) Engine Control Sensors 5 Volt Reference 1	(115) II	(115) —
(116) 116	(116) 0.5	(116) GY / RD	(116) 10667	(116) Engine Control Sensors 5 Volt Reference	(116) II	(116) —
(117) 117	(117) 0.5	(117) GN / RD	(117) 10599	(117) Engine Control Sensors 5 Volt Reference 3	(117) II	(117) —
(118) 118	(118) 0.5	(118) YE / BN	(118) 106	(118) Oil Pump Motor Control	(118) II	(118) —

K56 Serial Data Gateway Module X1



5202284

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 2309644-1
- Service Connector: 84766507
- Description: 30-Way F 0.5 MQS Series(BK)

Terminal Part Information

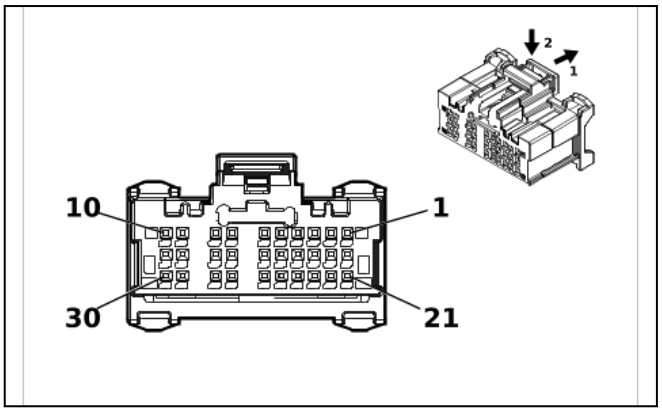
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19370262	EL-35616-58 (BK)	EL-38125-58
II	Service by Cable	EL-35616-58 (BK)	EL-38125-58

K56 Serial Data Gateway Module X1

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) RD / BN	(1) 4940	(1) Battery Positive Voltage	(1) I	(1) —
(2) 2	(2) 0.35	(2) BU / GY	(2) 4105	(2) AUTOSAR CAN Bus [+] 8 Serial Data	(2) I	(2) —
(3) 3	(3) 0.35	(3) WH / GY	(3) 4104	(3) AUTOSAR CAN Bus [-] 8 Serial Data	(3) I	(3) —
(4) 4	(4) 0.35	(4) BK	(4) 1050	(4) Ground	(4) I	(4) —
(5) 5	(5) 0.35	(5) BU	(5) 4987	(5) AUTOSAR CAN Bus [+] 1 Serial Data	(5) I	(5) —
(6) 6	(6) 0.35	(6) WH	(6) 4986	(6) AUTOSAR CAN Bus [-] 1 Serial Data	(6) I	(6) —
(7) 7	(7) 0.35	(7) WH	(7) 4100	(7) AUTOSAR CAN Bus [-] 4 Serial Data	(7) I	(7) —
(8) 8	(8) 0.35	(8) BU / VT	(8) 4101	(8) AUTOSAR CAN Bus [+] 4 Serial Data	(8) I	(8) —
(9) 9	(9) 0.35	(9) WH	(9) 4976	(9) AUTOSAR CAN Bus [-] 3 Serial Data	(9) I	(9) —
(10) 10	(10) 0.35	(10) BU / BK	(10) 4977	(10) AUTOSAR CAN Bus [+] 3 Serial Data	(10) I	(10) —
11 - 12	—	—	—	Not Occupied	—	—
(13) 13	(13) 0.35	(13) WH / GY	(13) 4104	(13) AUTOSAR CAN Bus [-] 8 Serial Data	(13) I	(13) —
(14) 14	(14) 0.35	(14) BU / GY	(14) 4105	(14) AUTOSAR CAN Bus [+] 8 Serial Data	(14) I	(14) —
(15) 15	(15) 0.35	(15) BU	(15) 4987	(15) AUTOSAR CAN Bus [+] 1 Serial Data	(15) I	(15) —
(16) 16	(16) 0.35	(16) WH	(16) 4986	(16) AUTOSAR CAN Bus [-] 1 Serial Data	(16) I	(16) —
(17) 17	(17) 0.35	(17) WH	(17) 4978	(17) AUTOSAR CAN Bus [-] 2 Serial Data	(17) I	(17) —
(18) 18	(18) 0.35	(18) BU / YE	(18) 4979	(18) AUTOSAR CAN Bus [+] 2 Serial Data	(18) I	(18) —
(19) 19	(19) 0.35	(19) BU / YE	(19) 4984	(19) AUTOSAR CAN Bus [-] 5 Serial Data	(19) I	(19) —
(20) 20	(20) 0.35	(20) BU / WH	(20) 4985	(20) AUTOSAR CAN Bus [+] 5 Serial Data	(20) I	(20) —
(21) 21	(21) 0.35	(21) GN	(21) 7209	(21) Ethernet Bus 3 [+]	(21) II	(21) —
(22) 22	(22) 0.35	(22) BU	(22) 7208	(22) Ethernet Bus 3 [-]	(22) II	(22) —
23 - 24	—	—	—	Not Occupied	—	—
(25) 25	(25) 0.35	(25) BU	(25) 4987	(25) AUTOSAR CAN Bus [+] 1 Serial Data	(25) I	(25) —
(26) 26	(26) 0.35	(26) WH	(26) 4986	(26) AUTOSAR CAN Bus [-] 1 Serial Data	(26) I	(26) —
(27) 27	(27) 0.35	(27) WH	(27) 4978	(27) AUTOSAR CAN Bus [-] 2 Serial Data	(27) I	(27) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(28) 28	(28) 0.35	(28) BU / YE	(28) 4979	(28) AUTOSAR CAN Bus [+] 2 Serial Data	(28) I	(28) —
29 - 30	—	—	—	Not Occupied	—	—

K56 Serial Data Gateway Module X2



5203942

Connector Part Information
- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 2309644-2
- Service Connector: 84766509
- Description: 30-Way F 0.5 MQS Series(BK with L-GY Front Housing)

Terminal Part Information

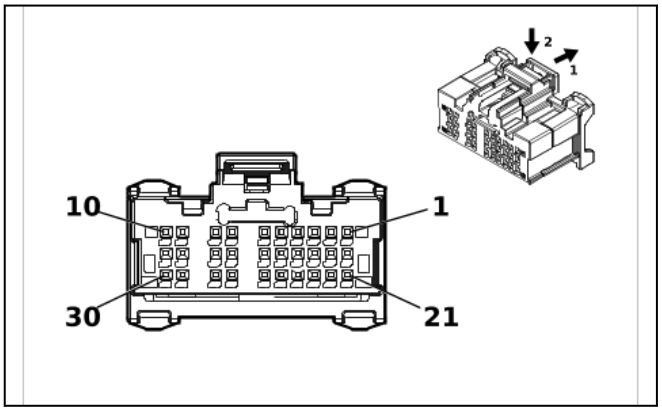
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19370262	EL-35616-58 (BK)	EL-38125-58
II	Service by Cable	EL-35616-58 (BK)	EL-38125-58

K56 Serial Data Gateway Module X2

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1 - 4	—	—	—	Not Occupied	—	—
(5) 5	(5) 0.35	(5) BK / GY	(5) 3559	(5) Passive Start Switch 2 Low Reference	(5) I	(5) —
6	—	—	—	Not Occupied	—	—
(7) 7	(7) 0.35	(7) GN / VT	(7) 5199	(7) Run/Crank Relay Coil Control	(7) I	(7) —
8	—	—	—	Not Occupied	—	—
(9) 9	(9) 0.35	(9) BN	(9) 4973	(9) Ethernet Bus 1R [+]	(9) II	(9) —
(10) 10	(10) 0.35	(10) YE	(10) 4972	(10) Ethernet Bus 1R [-]	(10) II	(10) —
11 - 12	—	—	—	Not Occupied	—	—
(13) 13	(13) 0.35	(13) BU / BN	(13) 4983	(13) AUTOSAR CAN Bus [+] 7 Serial Data	(13) I	(13) —
(14) 14	(14) 0.35	(14) WH	(14) 4982	(14) AUTOSAR CAN Bus [-] 7 Serial Data	(14) I	(14) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(15) 15	(15) 0.35	(15) GN / BK	(15) 3558	(15) Passive Start Switch Signal 2	(15) I	(15) —
(16) 16	(16) 0.35	(16) WH	(16) 4980	(16) AUTOSAR CAN Bus [-] 6 Serial Data	(16) I	(16) —
(17) 17	(17) 0.35	(17) GN	(17) 2578	(17) Private Serial Data Presentation CAN Bus [+] 1 Serial Data	(17) I	(17) —
(18) 18	(18) 0.35	(18) BN	(18) 2577	(18) Private Serial Data Presentation CAN Bus [-] 1 Serial Data	(18) I	(18) —
(19) 19	(19) 0.35	(19) WH	(19) 7207	(19) Ethernet Bus 1 Enable Signal	(19) I	(19) —
20 - 22	—	—	—	Not Occupied	—	—
(23) 23	(23) 0.35	(23) BU / WH	(23) 4985	(23) AUTOSAR CAN Bus [+] 5 Serial Data	(23) I	(23) —
(24) 24	(24) 0.35	(24) BU / YE	(24) 4984	(24) AUTOSAR CAN Bus [-] 5 Serial Data	(24) I	(24) —
25	—	—	—	Not Occupied	—	—
(26) 26	(26) 0.35	(26) YE	(26) 4981	(26) AUTOSAR CAN Bus [+] 6 Serial Data	(26) I	(26) —
(27) 27	(27) 0.35	(27) VT	(27) 2580	(27) Private Serial Data Presentation CAN Bus [+] 2 Serial Data	(27) I	(27) —
(28) 28	(28) 0.35	(28) GY	(28) 2579	(28) Private Serial Data Presentation CAN Bus [-] 2 Serial Data	(28) I	(28) —
(29) 29	(29) 0.35	(29) BN	(29) 4975	(29) Ethernet Bus 1T [+]	(29) II	(29) —
(30) 30	(30) 0.35	(30) GN	(30) 4974	(30) Ethernet Bus 1T [-]	(30) II	(30) —

K56 Serial Data Gateway Module X3



4900333

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 2309644-3
- Service Connector: 13519319
- Description: 30-Way F 0.5 MQS Series(BK with D-GY Front Housing)

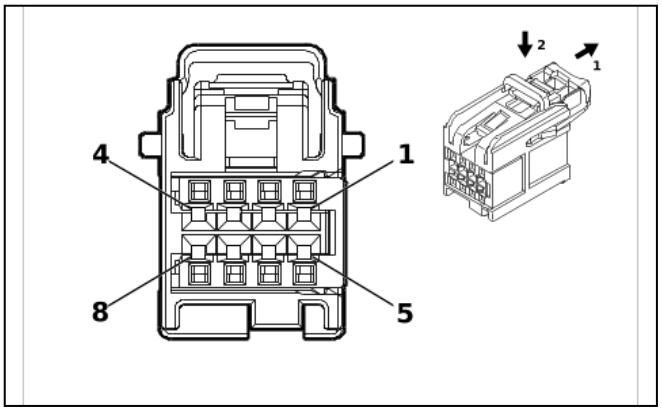
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19370262	EL-35616-58 (BK)	EL-38125-58
II	Service by Cable	EL-35616-58 (BK)	EL-38125-58

K56 Serial Data Gateway Module X3

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) BU / GN	(1) 4103	(1) AUTOSAR CAN Bus [+] 9 Serial Data	(1) I	(1) —
(2) 2	(2) 0.35	(2) WH / GN	(2) 4102	(2) AUTOSAR CAN Bus [-] 9 Serial Data	(2) I	(2) —
3 - 4	—	—	—	Not Occupied	—	—
(5) 5	(5) 0.35	(5) BU / WH	(5) 4985	(5) AUTOSAR CAN Bus [+] 5 Serial Data	(5) I	(5) —
(6) 6	(6) 0.35	(6) BU / YE	(6) 4984	(6) AUTOSAR CAN Bus [-] 5 Serial Data	(6) I	(6) —
(7) 7	(7) 0.35	(7) WH	(7) 4758	(7) Ethernet Bus 2 [+]	(7) II	(7) —
(8) 8	(8) 0.35	(8) BU	(8) 4757	(8) Ethernet Bus 2 [-]	(8) II	(8) —
9 - 24	—	—	—	Not Occupied	—	—
(25) 25	(25) 0.35	(25) BU / YE	(25) 4979	(25) AUTOSAR CAN Bus [+] 2 Serial Data	(25) I	(25) —
(26) 26	(26) 0.35	(26) WH	(26) 4978	(26) AUTOSAR CAN Bus [-] 2 Serial Data	(26) I	(26) —
27 - 28	—	—	—	Not Occupied	—	—
(29) 29	(29) 0.35	(29) YE	(29) 7233	(29) Ethernet Bus 15 [+]	(29) II	(29) —
(30) 30	(30) 0.35	(30) WH	(30) 7232	(30) Ethernet Bus 15 [-]	(30) II	(30) —

K56U Special Purpose Vehicle Control Module X1 (KGU)



4935776

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 15526972
- Service Connector: 19370429
- Description: 8-Way F 0.64 OCS Series(BK)

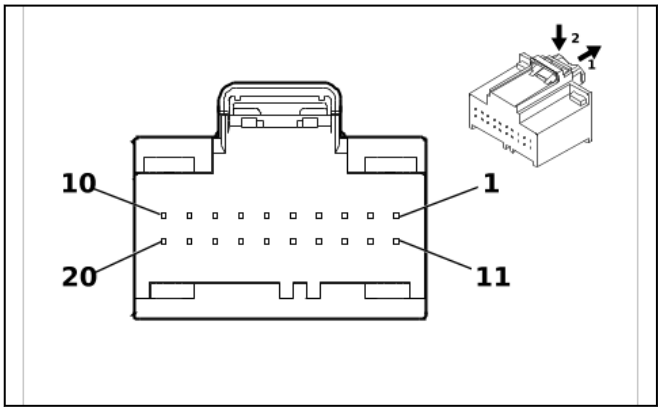
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

K56U Special Purpose Vehicle Control Module X1 (KGU)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) RD / VT	(1) 14240	(1) Battery Positive Voltage	(1) I	(1) —
(2) 2	(2) 0.35	(2) BU	(2) 4987	(2) AUTOSAR CAN Bus [+] 1 Serial Data	(2) I	(2) —
(3) 3	(3) 0.35	(3) WH	(3) 4986	(3) AUTOSAR CAN Bus [-] 1 Serial Data	(3) I	(3) —
(4) 4	(4) 0.75	(4) BK	(4) 8950	(4) Upfitter Vehicle Module Ground	(4) I	(4) —
5 - 8	—	—	—	Not Occupied	—	—

K56U Special Purpose Vehicle Control Module X2 (KGU)



5112891

Connector Part Information

- Harness Type: USB Data Cable
- OEM Connector: 31410-0205
- Service Connector: Service by Harness - See Part Catalog
- Description: 20-Way F 0.64 Series(BK)

Terminal Part Information

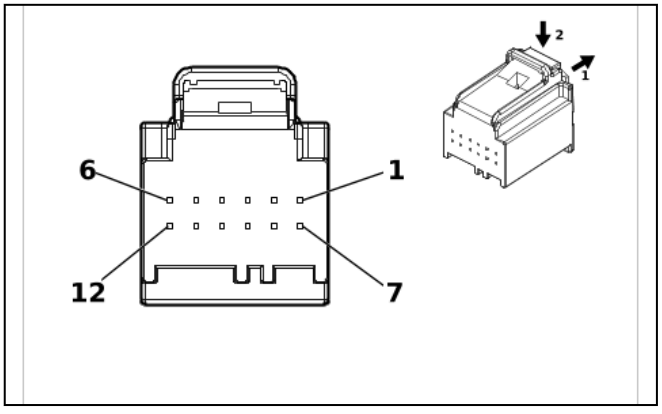
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

K56U Special Purpose Vehicle Control Module X2 (KGU)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BU / BK	(1) —	(1) Digital Output 1 (ODH01)	(1) I	(1) —
(2) 2	(2) 0.5	(2) GN / BN	(2) —	(2) Digital Output 2 (ODH02)	(2) I	(2) —
(3) 3	(3) 0.5	(3) GY / BU	(3) —	(3) Digital Output 3 (ODH03)	(3) I	(3) —
(4) 4	(4) 0.5	(4) VT / GN	(4) —	(4) Digital Output 4 (ODH04)	(4) I	(4) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(5) 5	(5) 0.5	(5) WH / GY	(5) —	(5) Digital Output 5 (ODH05)	(5) I	(5) —
(6) 6	(6) 0.5	(6) BN / BK	(6) —	(6) Output Enable 1 (IA11)	(6) I	(6) —
(7) 7	(7) 0.5	(7) BU / BN	(7) —	(7) Output Enable 2 (IA12)	(7) I	(7) —
(8) 8	(8) 0.5	(8) GN / BU	(8) —	(8) Output Enable 3 (IA13)	(8) I	(8) —
(9) 9	(9) 0.5	(9) GY / GN	(9) —	(9) Output Enable 4 (IA14)	(9) I	(9) —
(10) 10	(10) 0.5	(10) VT / GY	(10) —	(10) Output Enable 5 (IA15)	(10) I	(10) —
(11) 11	(11) 0.5	(11) YE / VT	(11) —	(11) Digital Output 6 (ODH06)	(11) I	(11) —
(12) 12	(12) 0.5	(12) BU / GN	(12) —	(12) Digital Output 7 (ODH07)	(12) I	(12) —
(13) 13	(13) 0.5	(13) GN / GY	(13) —	(13) Digital Output 8 (ODH08)	(13) I	(13) —
(14) 14	(14) 0.5	(14) GY / VT	(14) —	(14) Digital Output 9 (ODH09)	(14) I	(14) —
(15) 15	(15) 0.5	(15) VT / WH	(15) —	(15) Digital Output 10 (ODH10)	(15) I	(15) —
(16) 16	(16) 0.5	(16) WH / VT	(16) —	(16) Output Enable 6 (IA16)	(16) I	(16) —
(17) 17	(17) 0.5	(17) BN / GN	(17) —	(17) Output Enable 7 (IA17)	(17) I	(17) —
(18) 18	(18) 0.5	(18) BU / GY	(18) —	(18) Output Enable 8 (IA18)	(18) I	(18) —
(19) 19	(19) 0.5	(19) GN / VT	(19) —	(19) Output Enable 9 (IA19)	(19) I	(19) —
(20) 20	(20) 0.5	(20) GY / WH	(20) —	(20) Output Enable 10 (IA20)	(20) I	(20) —

K56U Special Purpose Vehicle Control Module X3 (KGU)



5095565

Connector Part Information

- Harness Type: USB Data Cable
- OEM Connector: 31410-0125
- Service Connector: Service by Harness - See Part Catalog
- Description: 12-Way F 0.64 Series(BK)

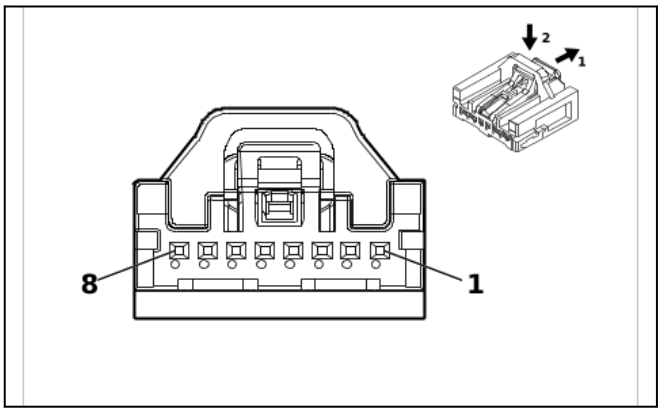
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

K56U Special Purpose Vehicle Control Module X3 (KGU)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BN / BK	(1) —	(1) CAN Bus B L1	(1) I	(1) —
(2) 2	(2) 0.5	(2) GN / GY	(2) —	(2) CAN Bus B H1	(2) I	(2) —
(3) 3	(3) 0.5	(3) BN / WH	(3) —	(3) Auto Start 2 Activation (IA01)	(3) I	(3) —
(4) 4	(4) 0.5	(4) BU / YE	(4) —	(4) Shutdown Inhibit (IA02)	(4) I	(4) —
(5) 5	(5) 0.5	(5) GN / WH	(5) —	(5) Increased Idle (IA03)	(5) I	(5) —
(6) 6	(6) 0.5	(6) GY / BK	(6) —	(6) Auto Start Enable (IA04)	(6) I	(6) —
(7) 7	(7) 0.5	(7) VT / BN	(7) —	(7) Not Used - Feature Removed (IA05)	(7) I	(7) —
(8) 8	(8) 0.5	(8) WH / YE	(8) —	(8) Snowplow Support 1 (Present) (IA06)	(8) I	(8) —
(9) 9	(9) 0.5	(9) YE / BN	(9) —	(9) Snowplow Support 2 (Ext Light Disable) (IA07)	(9) I	(9) —
(10) 10	(10) 0.5	(10) BN / VT	(10) —	(10) Feature Enable 1 (IA08)	(10) I	(10) —
(11) 11	(11) 0.5	(11) GN / YE	(11) —	(11) Feature Enable 2 (IA09)	(11) I	(11) —
(12) 12	(12) 0.5	(12) VT / BK	(12) —	(12) Feature Enable 3 (IA10)	(12) I	(12) —

K60 Column Lock Module



5200269

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 35068228
- Service Connector: 84769201
- Description: 8-Way F Mini 50 Series(BK)

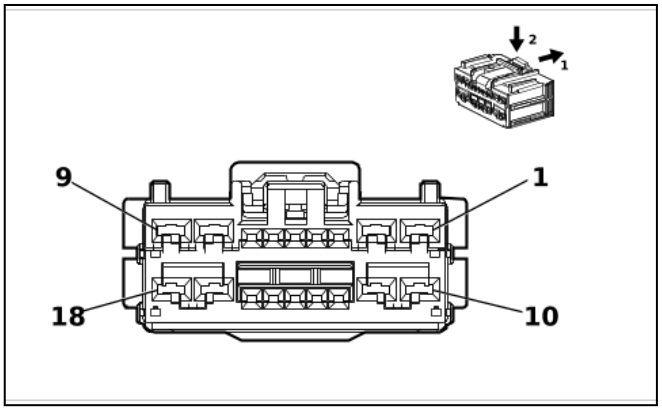
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	EL-35616-58 (BK)	No Tool Required

K60 Column Lock Module

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) RD / BN	(1) 4940	(1) Battery Positive Voltage	(1) I	(1) —
2	—	—	—	Not Occupied	—	—
(3) 3	(3) 0.35	(3) BK / WH	(3) 851	(3) Signal Ground	(3) I	(3) —
(4) 4	(4) 0.35	(4) BU	(4) 4987	(4) AUTOSAR CAN Bus [+] 1 Serial Data	(4) I	(4) —
(5) 5	(5) 0.35	(5) BU	(5) 4987	(5) AUTOSAR CAN Bus [+] 1 Serial Data	(5) I	(5) —
(6) 6	(6) 0.35	(6) WH	(6) 4986	(6) AUTOSAR CAN Bus [-] 1 Serial Data	(6) I	(6) —
(7) 7	(7) 0.35	(7) WH	(7) 4986	(7) AUTOSAR CAN Bus [-] 1 Serial Data	(7) I	(7) —
(8) 8	(8) 0.35	(8) BU / VT	(8) 807	(8) Ignition Off/Accessory Ignition Voltage	(8) I	(8) —

K61 Sunroof Control Module (CAJ)



5671221

Connector Part Information

- Harness Type: Sunroof Wiring Harness
- OEM Connector: 7289-9762-30
- Service Connector: Service by Harness - See Part Catalog
- Description: 18-Way F 0.64 GEN-Y, 2.8 YESC Series(BK)

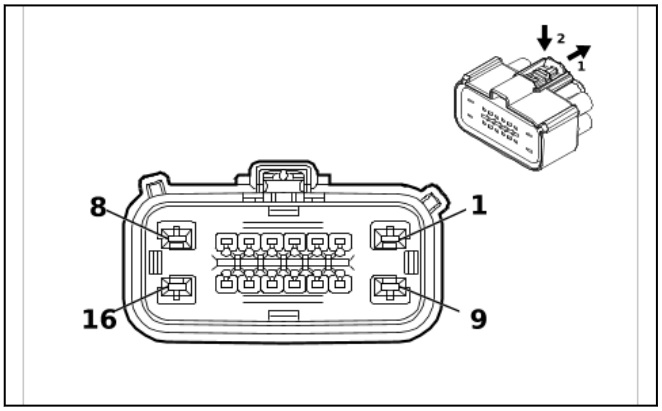
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-35 (VT)	No Tool Required
II	Not required	J-35616-4A (PU)	No Tool Required
III	Not required	J-35616-64B (L-BU)	No Tool Required

K61 Sunroof Control Module (CAJ)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1.5	(1) BN	(1) 3781	(1) Front Sunroof Sunshade Motor Open Control	(1) II	(1) —
(2) 2	(2) 1.5	(2) BK	(2) 1050	(2) Ground	(2) II	(2) —
3	—	—	—	Not Occupied	—	—
(4) 4	(4) 0.35	(4) WH	(4) 10285	(4) Front Sunshade Motor Position Sensor Low Reference	(4) III	(4) —
5 - 7	—	—	—	Not Occupied	—	—
(8) 8	(8) 0.35	(8) YE	(8) 10288	(8) Front Sunshade Motor Y Position Sensor Signal	(8) I	(8) —
(9) 9	(9) 0.35	(9) BU	(9) 10287	(9) Front Sunshade Motor X Position Sensor Signal	(9) I	(9) —
(10) 10	(10) 1.5	(10) VT	(10) 3782	(10) Front Sunshade Motor Close Control	(10) I	(10) —
11 - 15	—	—	—	Not Occupied	—	—
(16) 16	(16) 0.35	(16) OG	(16) 2854	(16) Body Control Module LIN Bus 8	(16) III	(16) —
(17) 17	(17) 0.35	(17) GY	(17) 10286	(17) Front Sunshade Motor Position Sensor High Reference	(17) I	(17) —
(18) 18	(18) 1.5	(18) RD	(18) 4540	(18) Battery Positive Voltage	(18) I	(18) —

K67 Trailer Brake Control Module



4624589

Connector Part Information

- Harness Type: Chassis Wiring Harness
- OEM Connector: 34985-4016
- Service Connector: 13599889
- Description: 16-Way F 1.5, 2.8 MX Series, Sealed(GY)

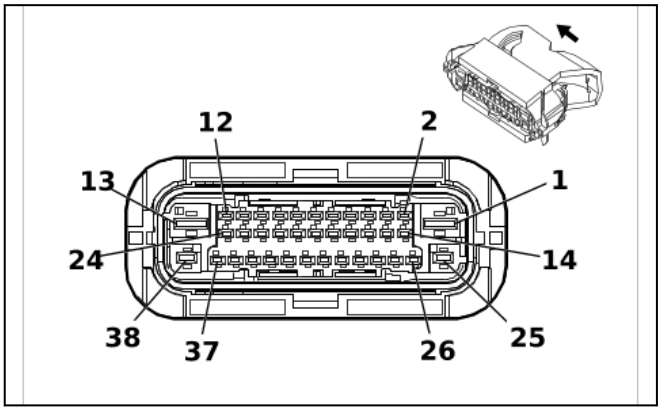
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	13576377	J-35616-35 (VT)	J-38125-12A
II	85528055	J-35616-2A (GY)	J-38125-217

K67 Trailer Brake Control Module

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 2.5	(1) RD / VT	(1) 4142	(1) Primary Fused Battery Positive Voltage	(1) I	(1) —
(2) 2	(2) 1.5	(2) WH / BK	(2) 2223	(2) Trailer Brake Apply Signal	(2) II	(2) —
3 - 4	—	—	—	Not Occupied	—	—
(5) 5	(5) 1.5	(5) YE / BK	(5) 2224	(5) Trailer Brake Enable Signal	(5) II	(5) —
6 - 7	—	—	—	Not Occupied	—	—
(8) 8	(8) 2.5	(8) BU	(8) 47	(8) Trailer Auxiliary Control	(8) I	(8) —
(9) 9	(9) 2.5	(9) BK	(9) 1850	(9) Ground	(9) I	(9) —
10 - 11	—	—	—	Not Occupied	—	—
(12) 12	(12) 0.5	(12) GN / BU	(12) 2733	(12) Brake System Control Module LIN Bus 2	(12) II	(12) —
13 - 16	—	—	—	Not Occupied	—	—

K68 Trailer Lamp Control Module (UET)



5141918

Connector Part Information

- Harness Type: Chassis Wiring Harness
- OEM Connector: 35497871
- Service Connector: 86825459
- Description: 38-Way F 1.5, 2.8, 4.8 MCP Series, Sealed(BK with BN Inner Connector)

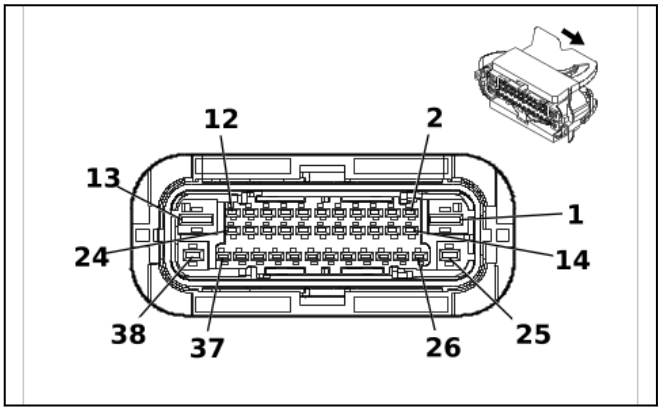
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19368624	J-35616-35 (VT)	J-38125-556
II	19369235	J-35616-14 (GN)	EL-38125-560A
III	85158596	J-35616-42 (RD)	J-38125-556

K68 Trailer Lamp Control Module (UET)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 2.5	(1) RD / VT	(1) 5640	(1) Battery Positive Voltage	(1) III	(1) —
(2) 2	(2) 1	(2) YE	(2) 1618	(2) Left Rear Trailer Stop/Turn Lamp Control	(2) II	(2) —
(3) 3	(3) 1	(3) GN	(3) 1619	(3) Right Rear Trailer Stop/Turn Lamp Control	(3) II	(3) —
4 - 6	—	—	—	Not Occupied	—	—
(7) 7	(7) 1	(7) GY	(7) 5189	(7) Trailer Backup Lamp Control	(7) II	(7) —
8 - 9	—	—	—	Not Occupied	—	—
(10) 10	(10) 0.5	(10) VT / WH	(10) 639	(10) Run/Crank Ignition 1 Voltage	(10) II	(10) —
(11) 11	(11) 0.5	(11) BN / YE	(11) 820	(11) Center High Mounted Stop Lamp Supply Voltage	(11) II	(11) —
12	—	—	—	Not Occupied	—	—
(13) 13	(13) 2.5	(13) BK	(13) 1850	(13) Ground	(13) III	(13) —
14 - 24	—	—	—	Not Occupied	—	—
(25) 25	(25) 1	(25) BN	(25) 2109	(25) Trailer Park Lamp Control	(25) I	(25) —
26	—	—	—	Not Occupied	—	—
(27) 27	(27) 0.5	(27) BU / VT	(27) 4101	(27) AUTOSAR CAN Bus [+] 4 Serial Data	(27) II	(27) —
(28) 28	(28) 0.5	(28) WH	(28) 4100	(28) AUTOSAR CAN Bus [-] 4 Serial Data	(28) II	(28) —
(29) 29	(29) 0.5	(29) BU / VT	(29) 4101	(29) AUTOSAR CAN Bus [+] 4 Serial Data	(29) II	(29) —
(30) 30	(30) 0.5	(30) WH	(30) 4100	(30) AUTOSAR CAN Bus [-] 4 Serial Data	(30) II	(30) —
31 - 37	—	—	—	Not Occupied	—	—
(38) 38	(38) 2.5	(38) RD / YE	(38) 5840	(38) Battery Positive Voltage	(38) I	(38) —

K69 Transfer Case Control Module (F48)



5199340

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 35497867
- Service Connector: 86825458
- Description: 38-Way F 1.5, 2.8, 4.8 MCP Series, Sealed(BK with BN Inner Connector)

Terminal Part Information

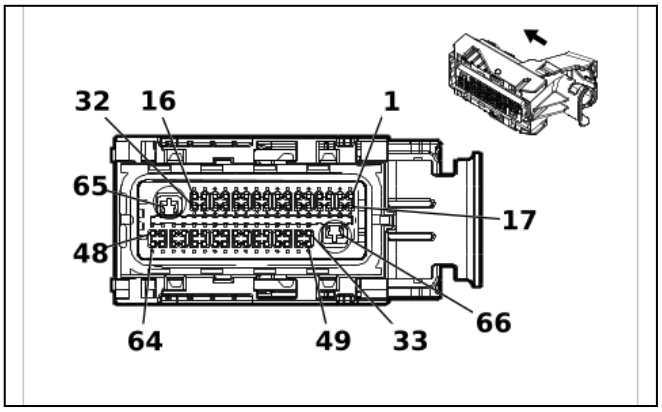
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19368624	J-35616-35 (VT)	J-38125-556
II	19369235	J-35616-14 (GN)	EL-38125-560A
III	85158596	J-35616-42 (RD)	J-38125-556

K69 Transfer Case Control Module (F48)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 3	(1) GN / RD	(1) 6240	(1) Battery Positive Voltage	(1) III	(1) —
2	—	—	—	Not Occupied	—	—
(3) 3	(3) 0.5	(3) BU / YE	(3) 4979	(3) AUTOSAR CAN Bus [+] 2 Serial Data	(3) II	(3) —
(4) 4	(4) 0.5	(4) WH	(4) 4978	(4) AUTOSAR CAN Bus [-] 2 Serial Data	(4) II	(4) —
(5) 5	(5) 0.5	(5) WH / GN	(5) 7479	(5) Rotary Position Sensor Signal	(5) II	(5) —
6	—	—	—	Not Occupied	—	—
(7) 7	(7) 0.5	(7) YE	(7) 7474	(7) Incremental Encoder Direction Signal	(7) II	(7) —
8	—	—	—	Not Occupied	—	—
(9) 9	(9) 0.5	(9) YE / WH	(9) 1695	(9) 4WD Locked Range Indicator Control	(9) II	(9) —
10	—	—	—	Not Occupied	—	—
(11) 11	(11) 0.5	(11) VT / GY	(11) 8017	(11) Secondary Axle Motor Relay Control	(11) II	(11) —
(12) 12	(12) 0.5	(12) GY / BK	(12) 1570	(12) Front Axle Actuator Control	(12) II	(12) —
(13) 13	(13) 4	(13) YE / VT	(13) 1553	(13) Transfer Case Motor Counter Clockwise Control	(13) III	(13) —
14	—	—	—	Not Occupied	—	—
(15) 15	(15) 0.5	(15) BU / YE	(15) 4979	(15) AUTOSAR CAN Bus [+] 2 Serial Data	(15) II	(15) —
(16) 16	(16) 0.5	(16) WH	(16) 4978	(16) AUTOSAR CAN Bus [-] 2 Serial Data	(16) II	(16) —
17	—	—	—	Not Occupied	—	—
(18) 18	(18) 0.5	(18) VT / GN	(18) 439	(18) Run/Crank Ignition 1 Voltage	(18) II	(18) —
(19) 19	(19) 0.5	(19) BU / GY	(19) 7473	(19) Incremental Encoder Impulse Signal	(19) II	(19) —
(20) 20	(20) 0.5	(20) WH / RD	(20) 7477	(20) Gear Position Sensor 5V Reference	(20) II	(20) —
21 - 23	—	—	—	Not Occupied	—	—
(24) 24	(24) 0.5	(24) GN	(24) 8015	(24) Transfer Case Motor Low Reference	(24) II	(24) —
(25) 25	(25) 2.5	(25) BK	(25) 450	(25) Ground	(25) I	(25) —
26	—	—	—	Not Occupied	—	—
(27) 27	(27) 0.5	(27) GN	(27) 8014	(27) Transfer Case Lock Solenoid Low Reference	(27) II	(27) —
28 - 29	—	—	—	Not Occupied	—	—
(30) 30	(30) 0.5	(30) YE / BK	(30) 7478	(30) Gear Position Sensor Low Reference	(30) II	(30) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(31) 31	(31) 0.5	(31) WH / GN	(31) 7475	(31) Incremental Encoder Sensor Voltage Reference	(31) II	(31) —
32	—	—	—	Not Occupied	—	—
(33) 33	(33) 0.75	(33) BU	(33) 8013	(33) Transfer Case Lock Solenoid Control 2	(33) II	(33) —
(34) 34	(34) 0.75	(34) YE / BN	(34) 1569	(34) Transfer Case Lock Solenoid Valve Control	(34) II	(34) —
35	—	—	—	Not Occupied	—	—
(36) 36	(36) 0.5	(36) VT	(36) 7476	(36) Incremental Encoder Sensor Low Reference	(36) II	(36) —
37	—	—	—	Not Occupied	—	—
(38) 38	(38) 2.5	(38) YE / GY	(38) 1552	(38) Transfer Case Motor Clockwise Control	(38) I	(38) —

K71 Transmission Control Module (- L4B)



6758198

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 216741-0001
- Service Connector: 85761018
- Description: 66-Way F 0.64, 2.8 MX123 Series, Sealed(BK with BU Terminal Position Assurance)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	13587518	J-35616-35 (VT)	J-38125-11A
II	19351723	J-35616-64B (L-BU)	J-38125-213

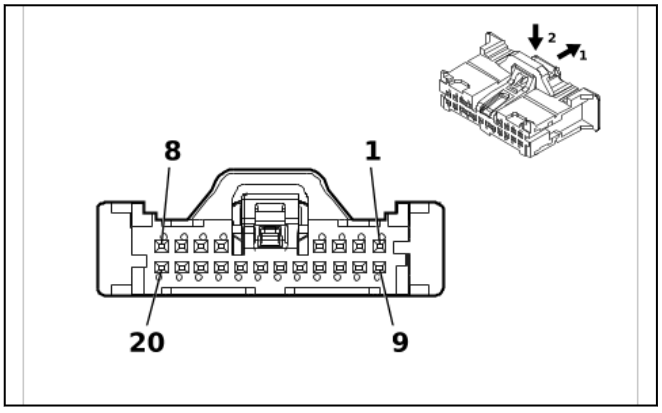
K71 Transmission Control Module (- L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) VT / WH	(1) 422	(1) Torque Converter Clutch Solenoid Valve Control	(1) II	(1) —
(2) 2	(2) 0.5	(2) GY / GN	(2) 12462	(2) Transmission Valve 2 Solenoid Control	(2) II	(2) —
(3) 3	(3) 0.5	(3) WH / BU	(3) 12465	(3) Transmission Valve 5 Solenoid Control	(3) II	(3) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(4) 4	(4) 0.5	(4) WH	(4) 12466	(4) Transmission Valve 6 Solenoid Control	(4) II	(4) —
5 - 6	—	—	—	Not Occupied	—	—
(7) 7	(7) 0.5	(7) YE / GN	(7) 4170	(7) Transmission Output Shaft Speed Sensor Circuit 9V Reference	(7) II	(7) —
(8) 8	(8) 0.5	(8) YE / BU	(8) 4171	(8) Transmission Input Shaft Speed Sensor Circuit 9V Reference	(8) II	(8) —
9 - 11	—	—	—	Not Occupied	—	—
(12) 12	(12) 0.5	(12) VT / WH	(12) 4173	(12) Transmission Speed Input Low Signal	(12) II	(12) —
(13) 13	(13) 0.5	(13) GN / VT	(13) 12791	(13) Transmission Intermediate Speed Sensor Signal Low	(13) II	(13) —
(14) 14	(14) 0.5	(14) GY / BU	(14) 6358	(14) Output Speed Signal	(14) II	(14) —
(15) 15	(15) 0.5	(15) BN / WH	(15) 12792	(15) Transmission Intermediate Speed Sensor 2 Signal Low	(15) II	(15) —
16	—	—	—	Not Occupied	—	—
(17) 17	(17) 0.5	(17) GN / WH	(17) 1530	(17) Transmission Line Pressure Control Solenoid Valve Control	(17) II	(17) —
(18) 18	(18) 0.5	(18) BN	(18) 12461	(18) Transmission Valve 1 Solenoid Control	(18) II	(18) —
(19) 19	(19) 0.5	(19) GY	(19) 12463	(19) Transmission Valve 3 Solenoid Control	(19) II	(19) —
(20) 20	(20) 0.5	(20) VT	(20) 12464	(20) Transmission Valve 4 Solenoid Control	(20) II	(20) —
(21) 21	(21) 0.5	(21) WH / YE	(21) 2159	(21) Park Inhibit Solenoid Assembly Control	(21) II	(21) —
(22) 22	(22) 0.5	(22) GN / WH	(22) 12513	(22) Transmission Default Disable Solenoid Control	(22) II	(22) —
23	—	—	—	Not Occupied	—	—
(24) 24	(24) 0.5	(24) GN / WH	(24) 2968	(24) Transmission Auxiliary Fluid Pump Control	(24) II	(24) —
25 - 27	—	—	—	Not Occupied	—	—
(28) 28	(28) 0.5	(28) BK / BN	(28) 586	(28) Transmission Fluid Temperature Sensor Low Reference	(28) II	(28) —
29 - 30	—	—	—	Not Occupied	—	—
(31) 31	(31) 0.5	(31) GN / VT	(31) 4621	(31) Engine Control Module LIN Bus 1	(31) II	(31) —
32	—	—	—	Not Occupied	—	—
(33) 33	(33) 0.5	(33) GN / GY	(33) 6387	(33) Transmission High Side Driver 1 Control	(33) II	(33) —
34	—	—	—	Not Occupied	—	—
(35) 35	(35) 0.5	(35) VT / GN	(35) 439	(35) Run/Crank Ignition 1 Voltage	(35) II	(35) —
36	—	—	—	Not Occupied	—	—
(37) 37	(37) 0.5	(37) BU / YE	(37) 4979	(37) AUTOSAR CAN Bus [+] 2 Serial Data	(37) II	(37) —
(38) 38	(38) 0.5	(38) WH	(38) 4978	(38) AUTOSAR CAN Bus [-] 2 Serial Data	(38) II	(38) —
39 - 48	—	—	—	Not Occupied	—	—
(49) 49	(49) 0.5	(49) GY / BN	(49) 6388	(49) Transmission High Side Driver 2 Control	(49) II	(49) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
50 - 52	—	—	—	Not Occupied	—	—
(53) 53	(53) 0.5	(53) BU / YE	(53) 4979	(53) AUTOSAR CAN Bus [+] 2 Serial Data	(53) II	(53) —
(54) 54	(54) 0.5	(54) WH	(54) 4978	(54) AUTOSAR CAN Bus [-] 2 Serial Data	(54) II	(54) —
55 - 58	—	—	—	Not Occupied	—	—
(59) 59	(59) 0.5	(59) VT / WH	(59) 6319	(59) Electronic Transmission Range Select Out of Park Switch 2 Signal	(59) II	(59) —
60	—	—	—	Not Occupied	—	—
(61) 61	(61) 0.5	(61) WH / YE	(61) 6317	(61) Electronic Transmission Range Select Out of Park Switch Signal	(61) II	(61) —
(62) 62	(62) 0.5	(62) BN	(62) 3706	(62) Electronic Transmission Range Select Switch Analog Signal 1	(62) II	(62) —
(63) 63	(63) 0.5	(63) BN / WH	(63) 585	(63) Transmission Fluid Temperature Sensor Signal	(63) II	(63) —
64	—	—	—	Not Occupied	—	—
(65) 65	(65) 1.5	(65) BK / WH	(65) 251	(65) Signal Ground	(65) I	(65) —
(66) 66	(66) 2	(66) RD / GN	(66) 1840	(66) Battery Positive Voltage	(66) I	(66) —

K73 Telematic Control Module X1 - 2 - Door



5200955

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 35068196
- Service Connector: 84769280
- Description: 20-Way F Mini 50 Series(BK)

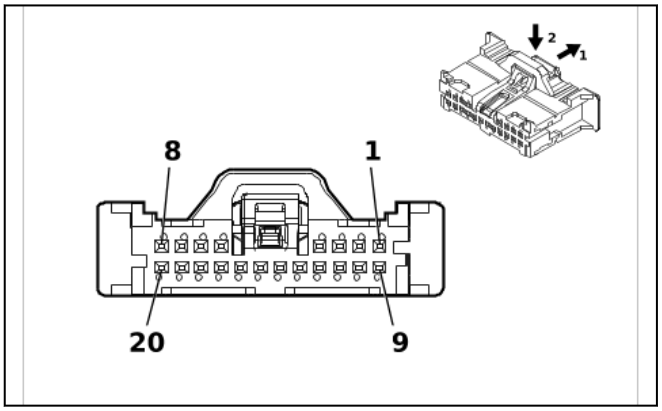
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	84944580	EL-35616-58 (BK)	EL-38125-58

K73 Telematic Control Module X1 - 2 - Door

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) RD / YE	(1) 3040	(1) Battery Positive Voltage	(1) I	(1) —
2	—	—	—	Not Occupied	—	—
(3) 3	(3) 0.35	(3) GN / BK	(3) 2515	(3) Telematics Switch Supply Voltage	(3) I	(3) —
(4) 4	(4) 0.35	(4) GN / WH	(4) 2514	(4) Telematics Switch Signal	(4) I	(4) —
(5) 5	(5) 0.35	(5) YE / VT	(5) 2516	(5) Telematics Switch Green LED Indicator Control	(5) I	(5) —
(6) 6	(6) 0.35	(6) BN / WH	(6) 2517	(6) Telematics Switch Red LED Indicator Control	(6) I	(6) —
(7) 7	(7) 0.35	(7) BU / WH	(7) 4985	(7) AUTOSAR CAN Bus [+] 5 Serial Data	(7) I	(7) —
(8) 8	(8) 0.35	(8) BU / YE	(8) 4984	(8) AUTOSAR CAN Bus [-] 5 Serial Data	(8) I	(8) —
(9) 9	(9) 0.35	(9) BK / WH	(9) 1050	(9) Ground	(9) I	(9) —
10 - 18	—	—	—	Not Occupied	—	—
(19) 19	(19) 0.35	(19) BU / WH	(19) 4985	(19) AUTOSAR CAN Bus [+] 5 Serial Data	(19) I	(19) —
(20) 20	(20) 0.35	(20) BU / YE	(20) 4984	(20) AUTOSAR CAN Bus [-] 5 Serial Data	(20) I	(20) —

K73 Telematic Control Module X1 - 4 - Door



5200955

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 35068196
- Service Connector: 84769280
- Description: 20-Way F Mini 50 Series(BK)

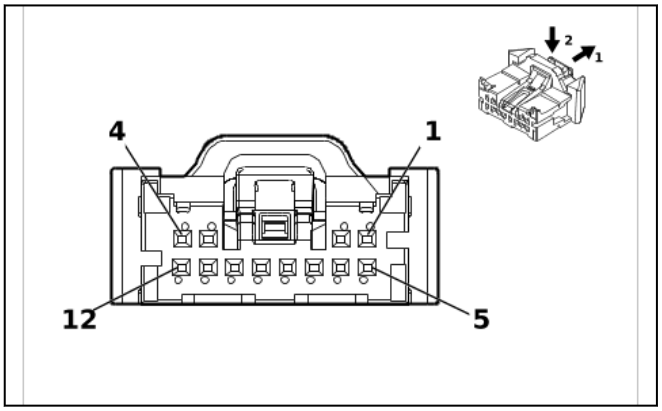
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	84944580	EL-35616-58 (BK)	EL-38125-58

K73 Telematic Control Module X1 - 4 - Door

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) RD / YE	(1) 3040	(1) Battery Positive Voltage	(1) I	(1) —
2	—	—	—	Not Occupied	—	—
(3) 3	(3) 0.35	(3) GN / BK	(3) 2515	(3) Telematics Switch Supply Voltage	(3) I	(3) —
(4) 4	(4) 0.35	(4) GN / WH	(4) 2514	(4) Telematics Switch Signal	(4) I	(4) —
(5) 5	(5) 0.35	(5) YE / VT	(5) 2516	(5) Telematics Switch Green LED Indicator Control	(5) I	(5) —
(6) 6	(6) 0.35	(6) BN / WH	(6) 2517	(6) Telematics Switch Red LED Indicator Control	(6) I	(6) —
(7) 7	(7) 0.35	(7) BU / WH	(7) 4985	(7) AUTOSAR CAN Bus [+] 5 Serial Data	(7) I	(7) —
(8) 8	(8) 0.35	(8) BU / YE	(8) 4984	(8) AUTOSAR CAN Bus [-] 5 Serial Data	(8) I	(8) —
(9) 9	(9) 0.35	(9) BK / WH	(9) 1051	(9) Signal Ground	(9) I	(9) —
10 - 18	—	—	—	Not Occupied	—	—
(19) 19	(19) 0.35	(19) BU / WH	(19) 4985	(19) AUTOSAR CAN Bus [+] 5 Serial Data	(19) I	(19) —
(20) 20	(20) 0.35	(20) BU / YE	(20) 4984	(20) AUTOSAR CAN Bus [-] 5 Serial Data	(20) I	(20) —

K73 Telematic Control Module X2 - 2 - Door



5360826

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 35068239
- Service Connector: 13529935
- Description: 12-Way F 050 CTS Series(BK)

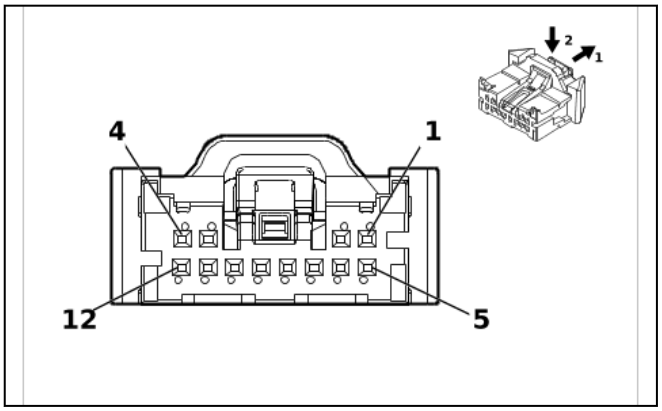
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	84944580	EL-35616-58 (BK)	EL-38125-58

K73 Telematic Control Module X2 - 2 - Door

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) GY / GN	(1) 4770	(1) Emergency Call Backup Speaker [+] Control	(1) I	(1) —
(2) 2	(2) 0.35	(2) WH / BK	(2) 4769	(2) Emergency Call Backup Speaker [-] Control	(2) I	(2) —
3 - 7	—	—	—	Not Occupied	—	—
(8) 8	(8) 0.35	(8) BU	(8) 655	(8) Cellular Telephone Microphone Signal	(8) I	(8) —
(9) 9	(9) 0.35	(9) BK / BN	(9) 654	(9) Cellular Telephone Microphone Low Reference	(9) I	(9) —
10 - 12	—	—	—	Not Occupied	—	—

K73 Telematic Control Module X2 - 4 - Door



5360826

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 35068239
- Service Connector: 13529935
- Description: 12-Way F 050 CTS Series(BK)

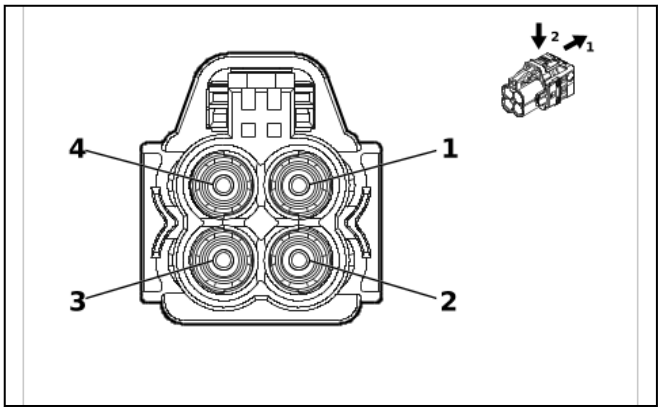
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	84944580	EL-35616-58 (BK)	EL-38125-58

K73 Telematic Control Module X2 - 4 - Door

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) GY / GN	(1) 4770	(1) Emergency Call Backup Speaker [+] Control	(1) I	(1) —
(2) 2	(2) 0.35	(2) WH / BK	(2) 4769	(2) Emergency Call Backup Speaker [-] Control	(2) I	(2) —
3 - 7	—	—	—	Not Occupied	—	—
(8) 8	(8) 0.35	(8) BU	(8) 655	(8) Cellular Telephone Microphone Signal	(8) I	(8) —
(9) 9	(9) 0.35	(9) BK / BN	(9) 654	(9) Cellular Telephone Microphone Low Reference	(9) I	(9) —
10 - 12	—	—	—	Not Occupied	—	—

K73 Telematic Control Module X3 - 2 - Door



6749172

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: AMZW25-001-Z
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 4-Way F Mini Coax Type(BU)

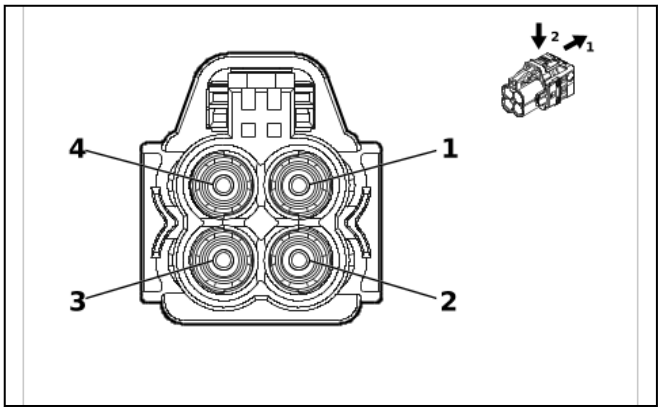
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

K73 Telematic Control Module X3 - 2 - Door

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) —	(1) Coax Cable	(1) 10314	(1) Global Navigation Satellite System Antenna Coaxial Signal	(1) I	(1) —
(3) 3	(3) —	(3) Coax Cable	(3) 10292	(3) Cell Phone Antenna 2 Coaxial Signal	(3) I	(3) —
(4) 4	(4) —	(4) Coax Cable	(4) 6449	(4) Coaxial Antenna Cell Phone Signal	(4) I	(4) —

K73 Telematic Control Module X3 - 4 - Door



6749172

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: AMZW25-001-Z
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 4-Way F Mini Coax Type(BU)

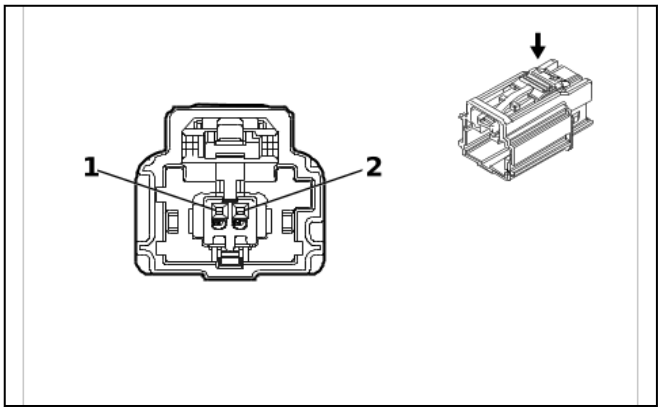
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

K73 Telematic Control Module X3 - 4 - Door

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) —	(1) Coax Cable	(1) 10314	(1) Global Navigation Satellite System Antenna Coaxial Signal	(1) I	(1) —
(3) 3	(3) —	(3) Coax Cable	(3) 10292	(3) Cell Phone Antenna 2 Coaxial Signal	(3) I	(3) —
(4) 4	(4) —	(4) Coax Cable	(4) 6449	(4) Coaxial Antenna Cell Phone Signal	(4) I	(4) —

K73 Telematic Control Module X7 - 2 - Door



4942391

Connector Part Information
- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 13532867
- Service Connector: 13532867
- Description: 2-Way F 0.5 CTS, AMEC High Speed Data Series(BK)

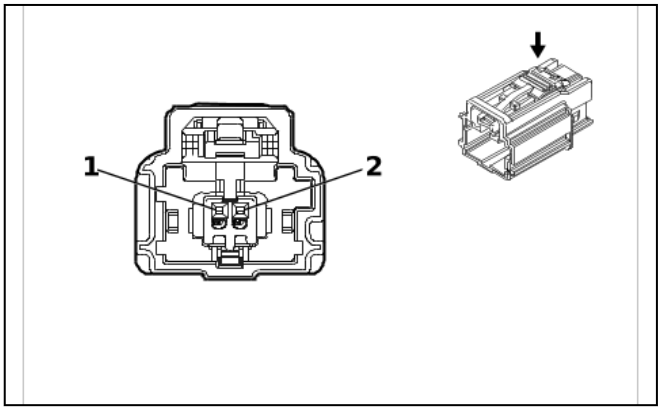
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Service by Cable	J-35616-64B (L-BU)	No Tool Required

K73 Telematic Control Module X7 - 2 - Door

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0	(1) WH	(1) 7211	(1) Ethernet Bus 4 [+]	(1) I	(1) —
(2) 2	(2) 0	(2) GN	(2) 7210	(2) Ethernet Bus 4 [-]	(2) I	(2) —

K73 Telematic Control Module X7 - 4 - Door



4942391

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 13532867
- Service Connector: 13532867
- Description: 2-Way F 0.5 CTS, AMEC High Speed Data Series(BK)

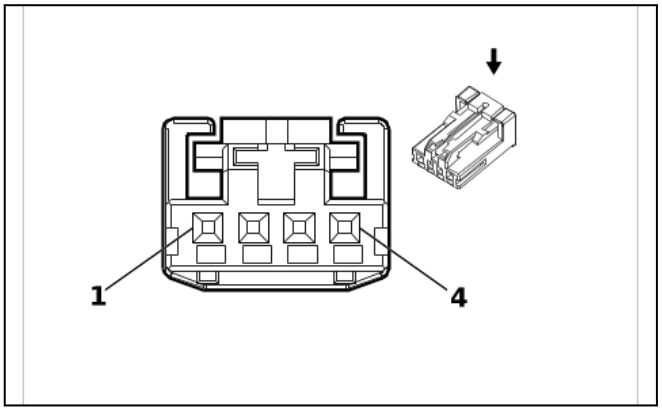
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Service by Cable	J-35616-64B (L-BU)	No Tool Required

K73 Telematic Control Module X7 - 4 - Door

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0	(1) WH	(1) 7211	(1) Ethernet Bus 4 [+]	(1) I	(1) —
(2) 2	(2) 0	(2) GN	(2) 7210	(2) Ethernet Bus 4 [-]	(2) I	(2) —

K77 Remote Function Actuator Module - 2 - Door



2717162

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 1-936119-1
- Service Connector: 19367524
- Description: 4-Way F 0.64 Micro-Quadlock Series(BK)

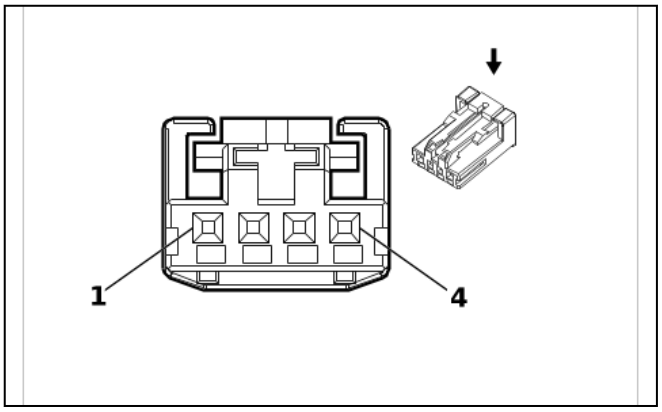
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

K77 Remote Function Actuator Module - 2 - Door

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) RD / VT	(1) 2640	(1) Battery Positive Voltage	(1) I	(1) —
(2) 2	(2) 0.35	(2) GN / YE	(2) 2862	(2) Body Control Module LIN Bus 16	(2) I	(2) —
3	—	—	—	Not Occupied	—	—
(4) 4	(4) 0.75	(4) BK / WH	(4) 1451	(4) Signal Ground	(4) I	(4) —

K77 Remote Function Actuator Module - 4 - Door



2717162

Connector Part Information

- Harness Type: Dome Lamp Wiring Harness
- OEM Connector: 1-936119-1
- Service Connector: 19367524
- Description: 4-Way F 0.64 Micro-Quadlock Series(BK)

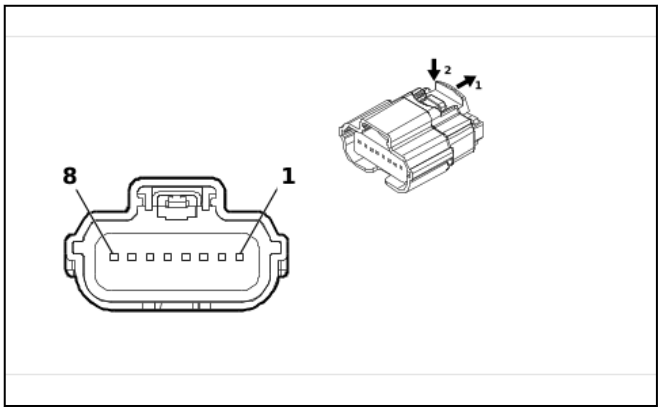
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

K77 Remote Function Actuator Module - 4 - Door

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) RD / VT	(1) 2640	(1) Battery Positive Voltage	(1) I	(1) —
(2) 2	(2) 0.35	(2) GN / YE	(2) 2862	(2) Body Control Module LIN Bus 16	(2) I	(2) —
3	—	—	—	Not Occupied	—	—
(4) 4	(4) 0.75	(4) BK / WH	(4) 851	(4) Signal Ground	(4) I	(4) —

K85P Restraints Occupant Classification System Module - Passenger



4708234

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Passenger
- OEM Connector: 31404-9110
- Service Connector: Service by Harness - See Part Catalog
- Description: 8-Way F 0.64 Series, Sealed(BK)

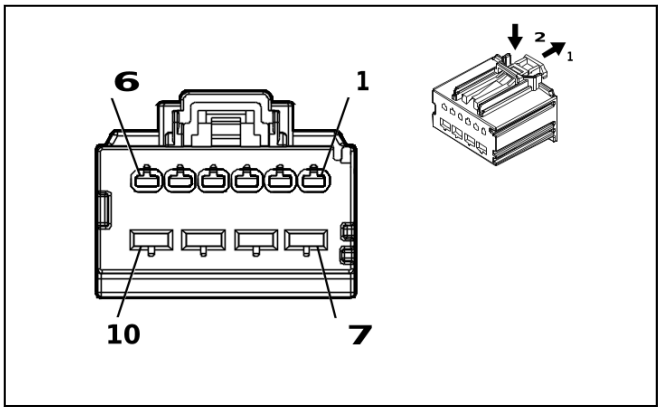
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

K85P Restraints Occupant Classification System Module - Passenger

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) RD / GN	(1) 4440	(1) Battery Positive Voltage	(1) I	(1) —
(2) 2	(2) 0.5	(2) BU	(2) 4987	(2) AUTOSAR CAN Bus [+] 1 Serial Data	(2) I	(2) —
(3) 3	(3) 0.5	(3) BU	(3) 4987	(3) AUTOSAR CAN Bus [+] 1 Serial Data	(3) I	(3) —
(4) 4	(4) 0.5	(4) WH	(4) 4986	(4) AUTOSAR CAN Bus [-] 1 Serial Data	(4) I	(4) —
(5) 5	(5) 0.5	(5) WH	(5) 4986	(5) AUTOSAR CAN Bus [-] 1 Serial Data	(5) I	(5) —
(6) 6	(6) 0.5	(6) BK / WH	(6) 1251	(6) Signal Ground	(6) I	(6) —
(7) 7	(7) 0.5	(7) OG / BN	(7) 3947	(7) Passenger Automatic Locking Retractor Switch Signal	(7) I	(7) —
(8) 8	(8) 0.5	(8) GY / OG	(8) 3946	(8) Passenger Automatic Locking Retractor Switch Low Reference	(8) I	(8) —

K99 Steering Column Control Module X1 (N38)



5035058

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 31372-1600
- Service Connector: 13525907
- Description: 10-Way F 1.5, 2.8 MX Series(BK)

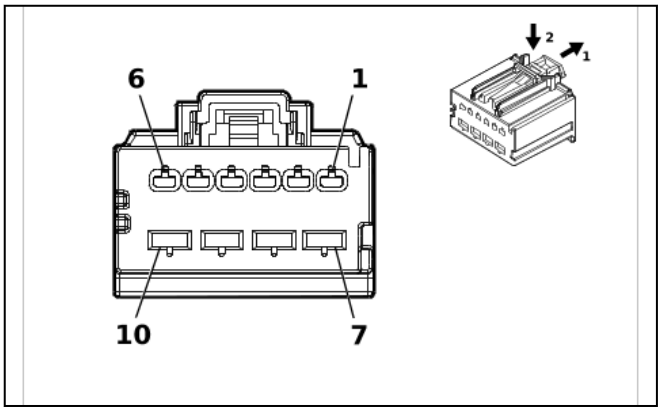
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19300432	J-35616-2A (GY)	J-38125-557
II	85544080	J-35616-4A (PU)	J-38125-11A

K99 Steering Column Control Module X1 (N38)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) VT / BK	(1) 2020	(1) Steering Column Tilt and Telescope Switch Feedback Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) GN / WH	(2) 7530	(2) Driver Seat Adjuster Memory Module LIN Bus 1	(2) I	(2) —
(3) 3	(3) 0.5	(3) GN / BN	(3) 2095	(3) Steering Column Tilt and Telescope Switch Rearward Signal	(3) I	(3) —
(4) 4	(4) 0.5	(4) BN / GY	(4) 2096	(4) Steering Column Tilt and Telescope Switch Up Signal	(4) I	(4) —
(5) 5	(5) 0.5	(5) YE / BN	(5) 2097	(5) Steering Column Tilt and Telescope Switch Down Signal	(5) I	(5) —
(6) 6	(6) 0.5	(6) BU / YE	(6) 2094	(6) Steering Column Tilt and Telescope Switch Forward Signal	(6) I	(6) —
(7) 7	(7) 0.75	(7) RD / VT	(7) 4640	(7) Battery Positive Voltage	(7) II	(7) —
(8) 8	(8) 0.75	(8) BK	(8) 1050	(8) Ground	(8) II	(8) —
9 - 10	—	—	—	Not Occupied	—	—

K99 Steering Column Control Module X2 (N38)



5190551

Connector Part Information

- Harness Type: Steering Column Tilt and Telescope Wheel Actuator Motor Harness
- OEM Connector: 31372-1700
- Service Connector: Service by Harness - See Part Catalog
- Description: 10-Way F 1.5, 2.8 MX Series(GY)

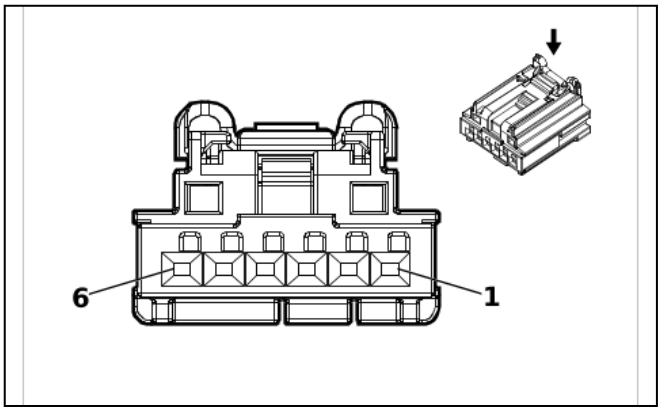
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

K99 Steering Column Control Module X2 (N38)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) YE	(1) 2153	(1) Steering Column Telescope Motor Signal	(1) I	(1) —
(2) 2	(2) 0.35	(2) WH	(2) 2152	(2) Steering Column Telescope Motor Low Reference	(2) I	(2) —
(3) 3	(3) 0.35	(3) BN	(3) 2154	(3) Steering Column Tilt Motor Signal	(3) I	(3) —
(4) 4	(4) 0.35	(4) BU	(4) 2157	(4) Steering Column Tilt Motor Low Reference	(4) I	(4) —
5 - 6	—	—	—	Not Occupied	—	—
(7) 7	(7) 1	(7) GN	(7) 2098	(7) Steering Column Telescope Motor Forward Control	(7) I	(7) —
(8) 8	(8) 1	(8) RD	(8) 2110	(8) Steering Column Telescope Motor Rearward Control	(8) I	(8) —
(9) 9	(9) 1	(9) OG	(9) 2112	(9) Steering Column Tilt Motor Down Control	(9) I	(9) —
(10) 10	(10) 1	(10) VT	(10) 2111	(10) Steering Column Tilt Motor Up Control	(10) I	(10) —

K104P Front Seat Bladder Control Module - Passenger (AVU - (AHH / AKE))



3960313

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Passenger
- OEM Connector: 2035363-4
- Service Connector: Service by Harness - See Part Catalog
- Description: 6-Way F 0.64 Generation Y Series(BK)

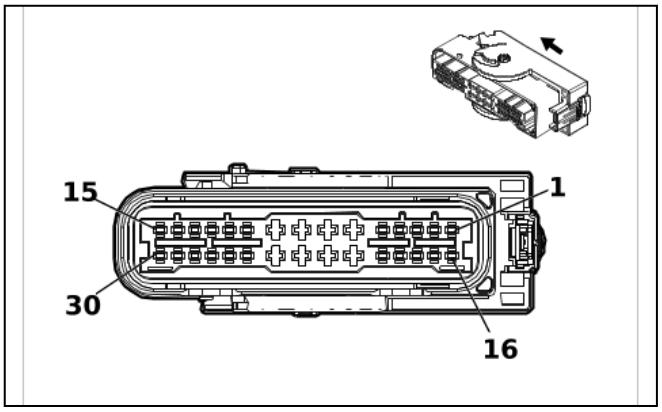
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

K104P Front Seat Bladder Control Module - Passenger (AVU - (AHH / AKE))

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) RD / BN	(1) 2240	(1) Battery Positive Voltage	(1) I	(1) —
2	—	—	—	Not Occupied	—	—
(3) 3	(3) 0.5	(3) GY / WH	(3) 4890	(3) Passenger Seat Lumbar/Bolster Pump Control	(3) I	(3) —
(4) 4	(4) 0.5	(4) BK	(4) 1350	(4) Ground	(4) I	(4) —
(5) 5	(5) 0.5	(5) BK / BU	(5) 2194	(5) Passenger Seat Position Switch Low Reference	(5) I	(5) —
(6) 6	(6) 0.5	(6) YE / GN	(6) 1068	(6) Passenger Seat Lumbar Support Switch Analog Signal	(6) I	(6) —

K111 Fuel Pump Power Control Module



3240109

Connector Part Information

- Harness Type: Chassis Wiring Harness
- OEM Connector: 5-2109446-2
- Service Connector: 86545828
- Description: 30-Way F 1.5, 2.8 MCP Series, Sealed(BK)

Terminal Part Information

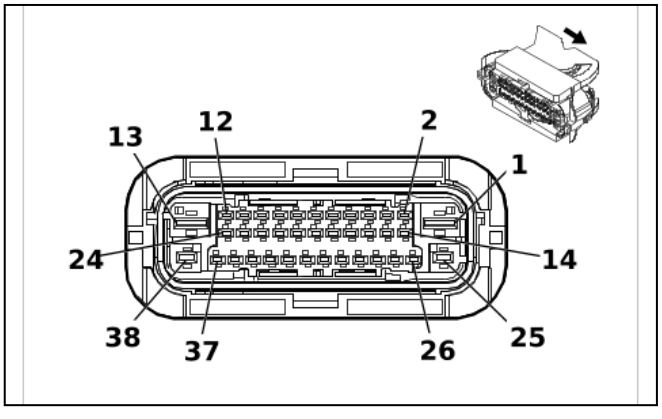
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19329958	J-35616-2A (GY)	J-38125-217
II	19371214	J-35616-35 (VT)	J-38125-556

K111 Fuel Pump Power Control Module

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	—	—	—	Not Occupied	—	—
(2) 2	(2) 0.5	(2) BU / YE	(2) 6861	(2) Water In Fuel Sensor Signal	(2) I	(2) —
(3) 3	(3) 0.5	(3) BK / BU	(3) 6863	(3) Water In Fuel Sensor Low Reference	(3) I	(3) —
(4) 4	(4) 0.5	(4) BN / GY	(4) 7072	(4) Fuel Temperature Sensor 1 Signal	(4) I	(4) —
5 - 6	—	—	—	Not Occupied	—	—
(7) 7	(7) 2.5	(7) RD / VT	(7) 1940	(7) Battery Positive Voltage	(7) II	(7) —
(8) 8	(8) 2.5	(8) GY	(8) 120	(8) Fuel Pump Control	(8) II	(8) —
(9) 9	(9) 2.5	(9) YE / GY	(9) 4137	(9) Fuel Pump Supply Voltage Phase 2	(9) II	(9) —
(10) 10	(10) 0.5	(10) YE / RD	(10) 2709	(10) Fuel Tank Pressure Sensor 5V Reference	(10) I	(10) —
(11) 11	(11) 0.5	(11) BU / WH	(11) 890	(11) Fuel Tank Pressure Sensor Signal	(11) I	(11) —
(12) 12	(12) 0.5	(12) BN / RD	(12) 7445	(12) Fuel Line Pressure Sensor 5V Reference	(12) I	(12) —
(13) 13	(13) 0.5	(13) BU / GN	(13) 1936	(13) Primary Fuel Level Sensor Signal	(13) I	(13) —
14	—	—	—	Not Occupied	—	—

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(15) 15	(15) 0.5	(15) BU / GY	(15) 4054	(15) Private Serial Data Powertrain CAN Bus [-] Serial Data	(15) I	(15) —
(16) 16	(16) 1 (16) 0.5	(16) VT / GN (16) VT / GN	(16) 4320 (16) 4320	(16) Powertrain Sensor Bus Enable (16) Powertrain Sensor Bus Enable	(16) I (16) I	(16) FHX (16) FJW
17	—	—	—	Not Occupied	—	—
(18) 18	(18) 0.5	(18) GN / GY	(18) 465	(18) Fuel Pump Primary Relay Control	(18) I	(18) —
(19) 19	(19) 0.5	(19) BN / WH	(19) 7073	(19) Fuel Temperature Sensor 1 Low Reference	(19) I	(19) —
20	—	—	—	Not Occupied	—	—
(21) 21	(21) 0.5	(21) WH	(21) 1310	(21) EVAP Vent Solenoid Valve Control	(21) II	(21) —
(22) 22	(22) 2.5 (22) 2.5	(22) BK (22) BK	(22) 1650 (22) 1850	(22) Ground (22) Ground	(22) II (22) II	(22) FHX / (FJW & UET) (22) FJW - UET
(23) 23	(23) 0.5	(23) WH	(23) 7444	(23) Fuel Pump Assembly Shield Ground	(23) II	(23) —
(24) 24	(24) 2.5	(24) WH / BN	(24) 4138	(24) Fuel Pump Supply Voltage Phase 3	(24) II	(24) —
(25) 25	(25) 0.5	(25) BK / BN	(25) 6284	(25) Fuel Tank Pressure Sensor Low Reference	(25) I	(25) —
(26) 26	(26) 0.5	(26) BU / WH	(26) 7446	(26) Fuel Pressure Sensor Signal	(26) I	(26) —
(27) 27	(27) 0.5	(27) BK / YE	(27) 7447	(27) Fuel Pressure Sensor Low Reference	(27) I	(27) —
(28) 28	(28) 0.5	(28) BK / GN	(28) 6281	(28) Fuel Level Sensor Low Reference	(28) I	(28) —
29	—	—	—	Not Occupied	—	—
(30) 30	(30) 0.5	(30) WH	(30) 4055	(30) Private Serial Data Powertrain CAN Bus [+] Serial Data	(30) I	(30) —

K115 Reductant Control Module (FHX)



5512176

Connector Part Information

- Harness Type: Emission Reduction Fluid Tank Reservoir Wire Harness
- OEM Connector: 35525168
- Service Connector: Service by Harness - See Part Catalog
- Description: 38-Way F 1.5, 2.8, 4.8 MCP Series, Sealed(BK with BK Inner Connector)

Terminal Part Information

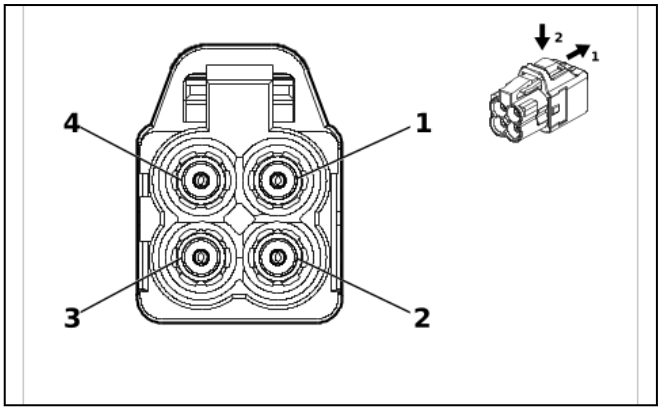
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

K115 Reductant Control Module (FHX)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 3	(1) RD / WH	(1) 2040	(1) Battery Positive Voltage	(1) I	(1) —
(2) 2	(2) 1	(2) VT / WH	(2) 3676	(2) Diesel Exhaust Fluid Heating Tank 2 Heater Control	(2) I	(2) —
3	—	—	—	Not Occupied	—	—
(4) 4	(4) 1	(4) WH / BN	(4) 3677	(4) Diesel Exhaust Fluid Reservoir Heater Control	(4) I	(4) —
5	—	—	—	Not Occupied	—	—
(6) 6	(6) 0.5	(6) YE	(6) 3244	(6) Diesel Exhaust Fluid Tank Temperature Sensor Signal	(6) I	(6) —
(7) 7	(7) 0.5	(7) VT / GY	(7) 7290	(7) Diesel Exhaust Fluid Sensor Voltage Reference 1	(7) I	(7) —
(8) 8	(8) 0.5	(8) YE / GN	(8) 7284	(8) Diesel Exhaust Fluid Liquid Quality Temperature Signal	(8) I	(8) —
(9) 9	(9) 0.5	(9) BK / BN	(9) 8434	(9) Diesel Exhaust Fluid Sensor Low Reference	(9) I	(9) —
10	—	—	—	Not Occupied	—	—
(11) 11	(11) 1	(11) VT / WH	(11) 3876	(11) Diesel Exhaust Fluid Smart Pump Supply Voltage Phase 3	(11) I	(11) —
12	—	—	—	Not Occupied	—	—
(13) 13	(13) 3	(13) BK	(13) 6750	(13) Ground	(13) I	(13) —
(14) 14	(14) 1	(14) BN / GY	(14) 2936	(14) Diesel Exhaust Fluid Heating Tank 2 Heater Control Low	(14) I	(14) —
15	—	—	—	Not Occupied	—	—
(16) 16	(16) 1	(16) BU / BK	(16) 4318	(16) Diesel Exhaust Fluid Tank Heater Low Control	(16) I	(16) —
17	—	—	—	Not Occupied	—	—
(18) 18	(18) 0.5	(18) YE / GN	(18) 3245	(18) Diesel Exhaust Fluid Tank Temperature Sensor Low Reference	(18) I	(18) —
(19) 19	(19) 0.5	(19) YE / RD	(19) 3106	(19) Diesel Exhaust Fluid Pressure Sensor 5 Volt Reference	(19) I	(19) —
(20) 20	(20) 0.5	(20) BN / YE	(20) 3108	(20) Diesel Exhaust Fluid Pressure Sensor Signal	(20) I	(20) —
(21) 21	(21) 0.5	(21) BK / GN	(21) 3107	(21) Diesel Exhaust Fluid Pressure Sensor Low Reference	(21) I	(21) —
22 - 23	—	—	—	Not Occupied	—	—
(24) 24	(24) 1	(24) VT	(24) 3875	(24) Diesel Exhaust Fluid Smart Pump Supply Voltage Phase 2	(24) I	(24) —
25	—	—	—	Not Occupied	—	—
(26) 26	(26) 1	(26) YE / GY	(26) 3199	(26) Diesel Exhaust Fluid Pressure Line Heater Control	(26) I	(26) —
27	—	—	—	Not Occupied	—	—
(28) 28	(28) 1	(28) GN / BK	(28) 4319	(28) Diesel Exhaust Fluid Line Heater Low Control	(28) I	(28) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
29	—	—	—	Not Occupied	—	—
(30) 30	(30) 0.5	(30) VT / WH	(30) 639	(30) Run/Crank Ignition 1 Voltage	(30) I	(30) —
(31) 31	(31) 0.5	(31) BU	(31) 4987	(31) AUTOSAR CAN Bus [+] 1 Serial Data	(31) I	(31) —
(32) 32	(32) 0.5	(32) BU	(32) 4987	(32) AUTOSAR CAN Bus [+] 1 Serial Data	(32) I	(32) —
(33) 33	(33) 0.5	(33) WH	(33) 4986	(33) AUTOSAR CAN Bus [-] 1 Serial Data	(33) I	(33) —
(34) 34	(34) 0.5	(34) WH	(34) 4986	(34) AUTOSAR CAN Bus [-] 1 Serial Data	(34) I	(34) —
35	—	—	—	Not Occupied	—	—
(36) 36	(36) 1	(36) GY / BK	(36) 2937	(36) Diesel Exhaust Fluid Pump Motor Stator Low Reference	(36) I	(36) —
(37) 37	(37) 1	(37) GY	(37) 3103	(37) Diesel Exhaust Fluid Smart Pump Control	(37) I	(37) —
(38) 38	(38) 2	(38) RD / WH	(38) 3440	(38) Battery Positive Voltage	(38) I	(38) —

K124 Image Processing Module X1 (UK0 / UKL)



5835118

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: AMZW25-001-A
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 4-Way F Mini Coax Type(BK)

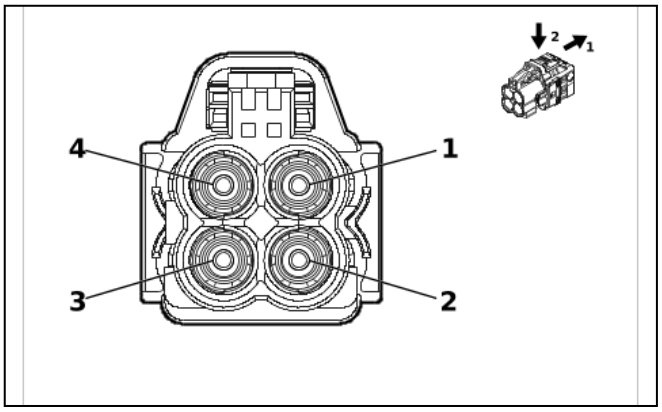
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

K124 Image Processing Module X1 (UK0 / UKL)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(4) 4	(4) —	(4) Coax Cable	(4) 4723	(4) Video Processing Module LVDS (Low Voltage Differential Signaling) Coaxial Signal	(4) I	(4) —

K124 Image Processing Module X2 (UK0 / UKL)



6904492

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: AMZW25-001-D
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 4-Way F Mini Coax Type(VT)

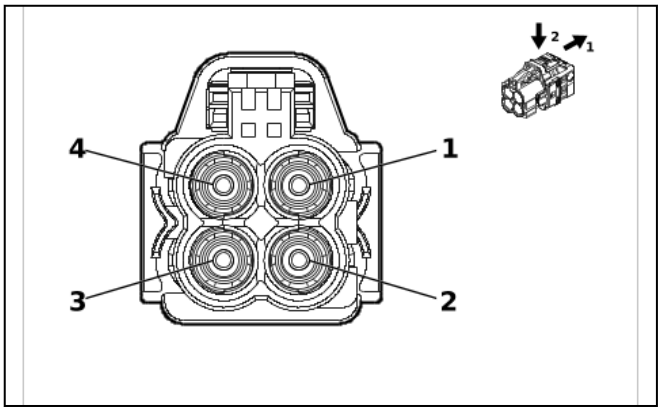
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

K124 Image Processing Module X2 (UK0 / UKL)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) —	(1) Coax Cable	(1) 4722	(1) Frontview Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	(1) I	(1) —
(2) 2	(2) —	(2) Coax Cable	(2) 4725	(2) Left Sideview Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	(2) I	(2) —
(3) 3	(3) —	(3) Coax Cable	(3) 4724	(3) Right Sideview Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	(3) I	(3) —
(4) 4	(4) —	(4) Coax Cable	(4) 4721	(4) Rearview Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	(4) I	(4) —

K124 Image Processing Module X3 (UK0 / UKL)



5903560

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: AMZW25-001-B
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 4-Way F Mini Coax Type(WH)

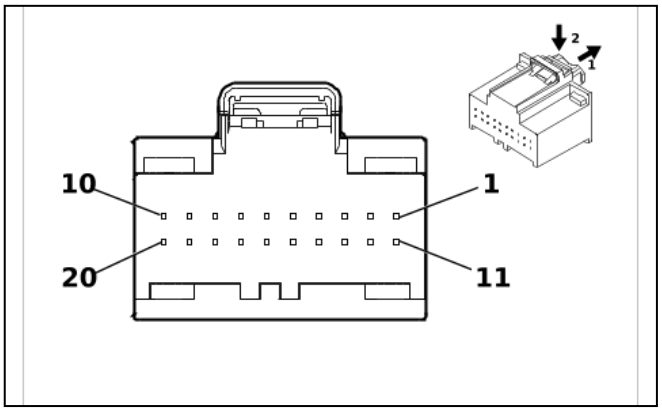
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

K124 Image Processing Module X3 (UK0 / UKL)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(3) 3	(3) —	(3) Coax Cable	(3) 4726	(3) Driver Monitoring System Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	(3) I	(3) —

K124 Image Processing Module X6 (UK0 / UKL)



5109511

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 31410-0208
- Service Connector: 13525993
- Description: 20-Way F 0.64 Series(GN)

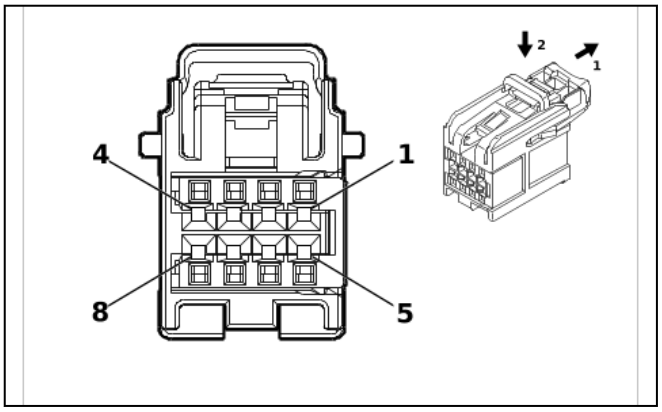
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	13584547	J-35616-64B (L-BU)	J-38125-215A
II	Service by Cable	J-35616-64B (L-BU)	J-38125-215A

K124 Image Processing Module X6 (UK0 / UKL)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) WH	(1) 4978	(1) AUTOSAR CAN Bus [-] 2 Serial Data	(1) I	(1) —
(2) 2	(2) 0.35	(2) WH	(2) 4978	(2) AUTOSAR CAN Bus [-] 2 Serial Data	(2) I	(2) —
(3) 3	(3) 0.35	(3) BU / YE	(3) 4979	(3) AUTOSAR CAN Bus [+] 2 Serial Data	(3) I	(3) —
(4) 4	(4) 0.35	(4) BU / YE	(4) 4979	(4) AUTOSAR CAN Bus [+] 2 Serial Data	(4) I	(4) —
(5) 5	(5) 0.35	(5) WH	(5) 4978	(5) AUTOSAR CAN Bus [-] 2 Serial Data	(5) I	(5) —
(6) 6	(6) 0.35	(6) BU / YE	(6) 4979	(6) AUTOSAR CAN Bus [+] 2 Serial Data	(6) I	(6) —
7 - 8	—	—	—	Not Occupied	—	—
(9) 9	(9) 0.35	(9) GN	(9) 7209	(9) Ethernet Bus 3 [+]	(9) II	(9) —
(10) 10	(10) 0.35	(10) BU	(10) 7208	(10) Ethernet Bus 3 [-]	(10) II	(10) —
11 - 12	—	—	—	Not Occupied	—	—
(13) 13	(13) 0.35	(13) WH / GY	(13) 4104	(13) AUTOSAR CAN Bus [-] 8 Serial Data	(13) I	(13) —
(14) 14	(14) 0.35	(14) BU / GY	(14) 4105	(14) AUTOSAR CAN Bus [+] 8 Serial Data	(14) I	(14) —
15 - 20	—	—	—	Not Occupied	—	—

K124 Image Processing Module X7 (UK0 / UKL)



4232228

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 15526973
- Service Connector: 19353873
- Description: 8-Way F 0.64 OCS Series(GY)

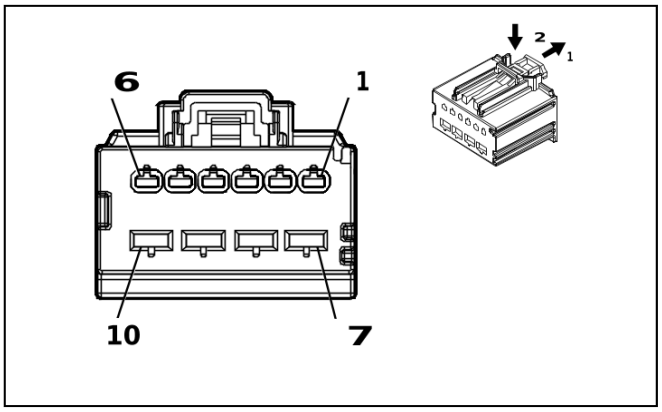
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

K124 Image Processing Module X7 (UK0 / UKL)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	—	—	—	Not Occupied	—	—
(2) 2	(2) 0.35	(2) WH	(2) 4976	(2) AUTOSAR CAN Bus [-] 3 Serial Data	(2) I	(2) —
(3) 3	(3) 0.35	(3) BU / BK	(3) 4977	(3) AUTOSAR CAN Bus [+] 3 Serial Data	(3) I	(3) —
4 - 5	—	—	—	Not Occupied	—	—
(6) 6	(6) 0.35	(6) GN / GY	(6) 11023	(6) Image Processing Module LIN Bus 1	(6) I	(6) —
(7) 7	(7) 0.35	(7) WH	(7) 4976	(7) AUTOSAR CAN Bus [-] 3 Serial Data	(7) I	(7) —
(8) 8	(8) 0.35	(8) BU / BK	(8) 4977	(8) AUTOSAR CAN Bus [+] 3 Serial Data	(8) I	(8) —

K124 Image Processing Module X8 (UK0 / UKL)



5035058

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 31372-1600
- Service Connector: 13525907
- Description: 10-Way F 1.5, 2.8 MX Series(BK)

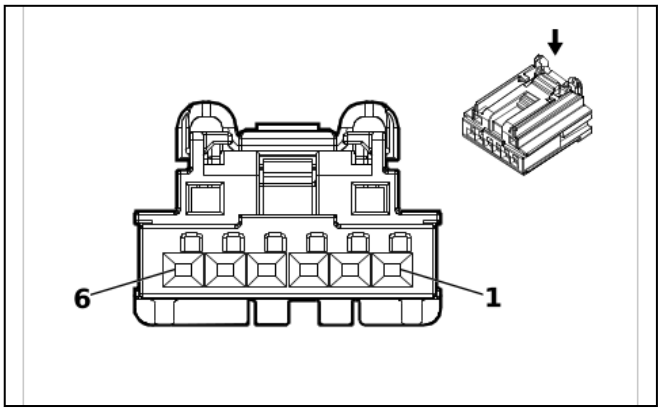
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19300432	J-35616-2A (GY)	J-38125-557
II	85544080	J-35616-4A (PU)	J-38125-11A

K124 Image Processing Module X8 (UK0 / UKL)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BU / BN	(1) 7744	(1) Driver Illumination Lamp Ground	(1) I	(1) —
(2) 2	(2) 0.5	(2) WH / VT	(2) 2246	(2) Driver Illumination Lamp 1 Control	(2) I	(2) —
(3) 3	(3) 0.5	(3) YE / BU	(3) 2245	(3) Driver Illumination Lamp 2 Control	(3) I	(3) —
4 - 6	—	—	—	Not Occupied	—	—
(7) 7	(7) 1	(7) RD / WH	(7) 4740	(7) Battery Positive Voltage	(7) II	(7) —
(8) 8	(8) 1	(8) BK / WH	(8) 1551	(8) Signal Ground	(8) II	(8) —
9 - 10	—	—	—	Not Occupied	—	—

K134D Front Seat Bolster Memory Module - Driver (AVK - AF6)



5020940

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Driver
- OEM Connector: 2035363-6
- Service Connector: Service by Harness - See Part Catalog
- Description: 6-Way F 0.64 Generation Y Series(BK)

Terminal Part Information

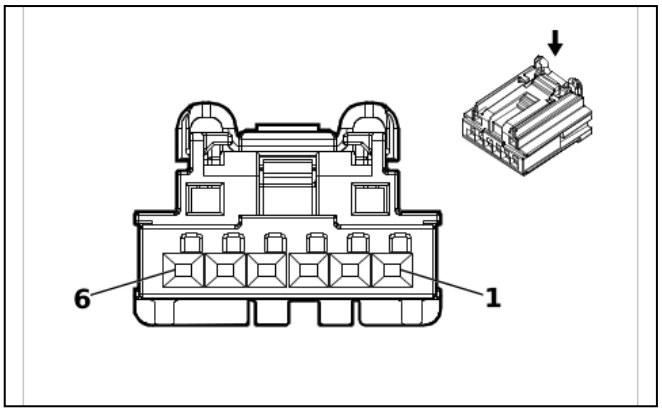
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

K134D Front Seat Bolster Memory Module - Driver (AVK - AF6)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) RD / BN	(1) 2240	(1) Battery Positive Voltage	(1) I	(1) —
(2) 2	(2) 0.5	(2) GN / GY	(2) 3758	(2) Driver Seat Adjuster Memory Module LIN Bus 2	(2) I	(2) —
(3) 3	(3) 0.5	(3) WH / BU	(3) 4891	(3) Driver Seat Lumbar/Bolster Pump Control	(3) I	(3) —
(4) 4	(4) 0.5	(4) BK	(4) 1550	(4) Ground	(4) I	(4) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(5) 5	(5) 0.5	(5) BN / BK	(5) 2305	(5) Driver Seat Bolster Pump Low Reference	(5) I	(5) —
6	—	—	—	Not Occupied	—	—

K134DP Front Seat Bolster Memory Module - Driver Primary (AF6)



5020940

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Driver
- OEM Connector: 2035363-6
- Service Connector: Service by Harness - See Part Catalog
- Description: 6-Way F 0.64 Generation Y Series(BK)

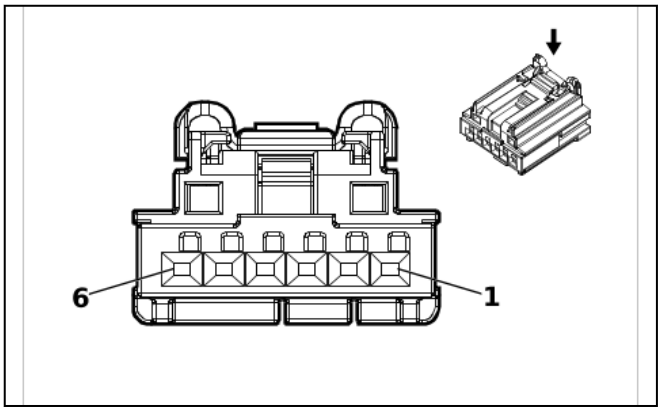
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

K134DP Front Seat Bolster Memory Module - Driver Primary (AF6)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) RD / BN	(1) 2240	(1) Battery Positive Voltage	(1) I	(1) —
(2) 2	(2) 0.5	(2) GN / GY	(2) 3758	(2) Driver Seat Adjuster Memory Module LIN Bus 2	(2) I	(2) —
(3) 3	(3) 0.5	(3) WH / BU	(3) 4891	(3) Driver Seat Lumbar/Bolster Pump Control	(3) I	(3) —
(4) 4	(4) 0.5	(4) BK	(4) 1550	(4) Ground	(4) I	(4) —
(5) 5	(5) 0.5	(5) BN / BK	(5) 2305	(5) Driver Seat Bolster Pump Low Reference	(5) I	(5) —
(6) 6	(6) 0.5	(6) GN / BK	(6) 2637	(6) Front Seat Bolster Memory Module - Driver LIN Bus 1	(6) I	(6) —

K134DS Front Seat Bolster Memory Module - Driver Secondary (AF6)



3960313

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Driver
- OEM Connector: 2035363-4
- Service Connector: Service by Harness - See Part Catalog
- Description: 6-Way F 0.64 Generation Y Series(BK)

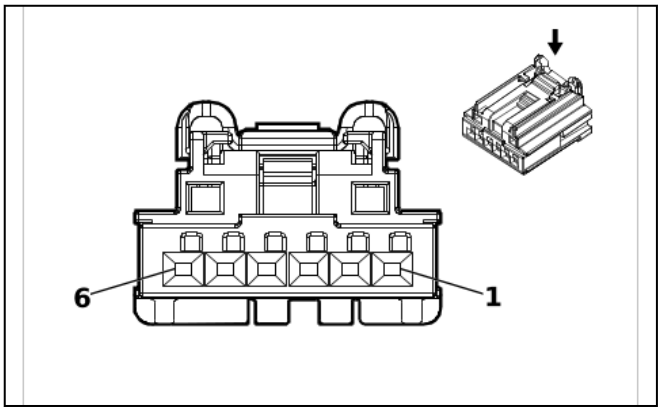
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

K134DS Front Seat Bolster Memory Module - Driver Secondary (AF6)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1 - 2	—	—	—	Not Occupied	—	—
(3) 3	(3) 0.5	(3) RD / BN	(3) 2240	(3) Battery Positive Voltage	(3) I	(3) —
(4) 4	(4) 0.5	(4) GN / BK	(4) 2637	(4) Front Seat Bolster Memory Module - Driver LIN Bus 1	(4) I	(4) —
5	—	—	—	Not Occupied	—	—
(6) 6	(6) 0.5	(6) BK	(6) 1550	(6) Ground	(6) I	(6) —

K134PP Front Seat Bolster Memory Module - Passenger Primary (AHH / AKE)



5020940

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Passenger
- OEM Connector: 2035363-6
- Service Connector: Service by Harness - See Part Catalog
- Description: 6-Way F 0.64 Generation Y Series(BK)

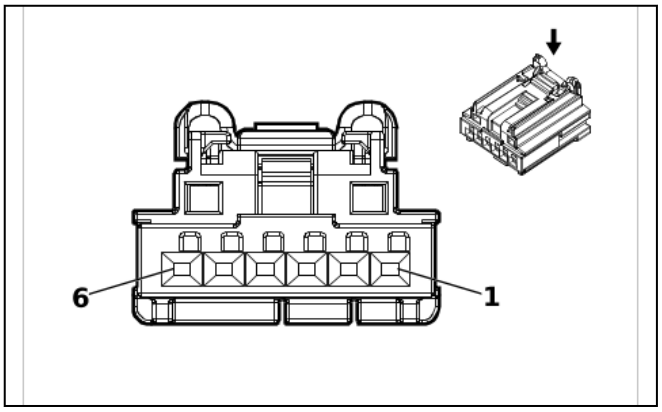
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

K134PP Front Seat Bolster Memory Module - Passenger Primary (AHH / AKE)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) RD / BN	(1) 2240	(1) Battery Positive Voltage	(1) I	(1) —
(2) 2	(2) 0.5	(2) GN / YE	(2) 4116	(2) Passenger Seat Adjuster Memory Module LIN Bus 2	(2) I	(2) —
(3) 3	(3) 0.5	(3) GY / WH	(3) 4890	(3) Passenger Seat Lumbar/Bolster Pump Control	(3) I	(3) —
(4) 4	(4) 0.5	(4) BK	(4) 1350	(4) Ground	(4) I	(4) —
(5) 5	(5) 0.5	(5) GY / BK	(5) 2306	(5) Passenger Seat Bolster Pump Low Reference	(5) I	(5) —
(6) 6	(6) 0.5	(6) GN / BU	(6) 2638	(6) Front Seat Bolster Memory Module - Passenger LIN Bus 1	(6) I	(6) —

K134PS Front Seat Bolster Memory Module - Passenger Secondary (AHH / AKE)



3960313

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Passenger
- OEM Connector: 2035363-4
- Service Connector: Service by Harness - See Part Catalog
- Description: 6-Way F 0.64 Generation Y Series(BK)

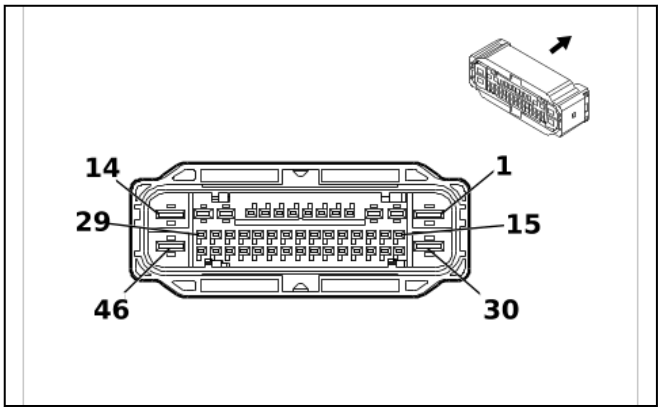
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

K134PS Front Seat Bolster Memory Module - Passenger Secondary (AHH / AKE)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1 - 2	—	—	—	Not Occupied	—	—
(3) 3	(3) 0.5	(3) RD / BN	(3) 2240	(3) Battery Positive Voltage	(3) I	(3) —
(4) 4	(4) 0.5	(4) GN / BU	(4) 2638	(4) Front Seat Bolster Memory Module - Passenger LIN Bus 1	(4) I	(4) —
5	—	—	—	Not Occupied	—	—
(6) 6	(6) 0.5	(6) BK	(6) 1350	(6) Ground	(6) I	(6) —

K160 Brake System Control Module



4162046

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 35492372
- Service Connector: 85090369
- Description: 46-Way F 1.2 OCS, 2.8, 6.3 CTS Series, Sealed(GY)

Terminal Part Information

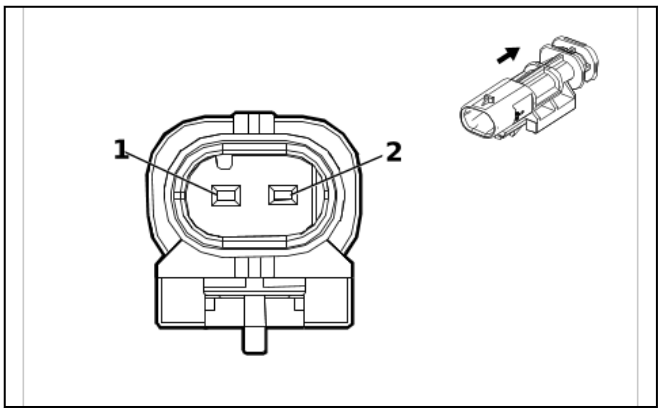
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	13575368	J-35616-35 (VT)	J-38125-556
II	19370818	J-35616-12 (BU)	J-38125-553
III	84634921	J-35616-42 (RD)	J-38125-212

K160 Brake System Control Module

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 6	(1) BK	(1) 150	(1) Ground	(1) III	(1) —
(2) 2	(2) 2.5	(2) WH	(2) 2001	(2) Left Park Brake Motor Apply Control	(2) I	(2) —
(3) 3	(3) 2.5	(3) GY / BK	(3) 4369	(3) Left Park Brake Motor Low Reference	(3) I	(3) —
(4) 4	(4) 0.5	(4) GY / WH	(4) 7064	(4) Left Front Wheel Speed Sensor Control	(4) II	(4) —
(5) 5	(5) 0.5	(5) GY	(5) 830	(5) Left Front Wheel Speed Sensor Signal	(5) II	(5) —
6 - 8	—	—	—	Not Occupied	—	—
(9) 9	(9) 0.5	(9) VT / WH	(9) 239	(9) Run/Crank Ignition 1 Voltage	(9) II	(9) —
(10) 10	(10) 0.5	(10) GY / BN	(10) 7065	(10) Right Front Wheel Speed Sensor Control	(10) II	(10) —
(11) 11	(11) 0.5	(11) YE	(11) 872	(11) Right Front Wheel Speed Sensor Signal	(11) II	(11) —
(12) 12	(12) 2.5	(12) GN / VT	(12) 1988	(12) Right Park Brake Motor Apply Control	(12) I	(12) —
(13) 13	(13) 2.5	(13) GY	(13) 4368	(13) Right Park Brake Motor Low Reference	(13) I	(13) —
(14) 14	(14) 6	(14) RD / WH	(14) 1040	(14) Battery Positive Voltage	(14) III	(14) —
(15) 15	(15) 0.5	(15) GY / BK	(15) 7127	(15) Left Rear Wheel Speed Sensor Control	(15) II	(15) —
(16) 16	(16) 0.5	(16) BU	(16) 884	(16) Left Rear Wheel Speed Sensor Signal	(16) II	(16) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(17) 17	(17) 0.35	(17) BU / YE	(17) 4979	(17) AUTOSAR CAN Bus [+] 2 Serial Data	(17) II	(17) —
(18) 18	(18) 0.35	(18) BU / YE	(18) 4979	(18) AUTOSAR CAN Bus [+] 2 Serial Data	(18) II	(18) —
(19) 19	(19) 0.35	(19) GN / GY	(19) 817	(19) Vehicle Speed Signal	(19) II	(19) —
20 - 24	—	—	—	Not Occupied	—	—
(25) 25	(25) 0.35	(25) WH	(25) 4976	(25) AUTOSAR CAN Bus [-] 3 Serial Data	(25) II	(25) —
(26) 26	(26) 0.35	(26) WH	(26) 4976	(26) AUTOSAR CAN Bus [-] 3 Serial Data	(26) II	(26) —
27	—	—	—	Not Occupied	—	—
(28) 28	(28) 0.5	(28) GY / YE	(28) 7128	(28) Right Rear Wheel Speed Sensor Control	(28) II	(28) —
(29) 29	(29) 0.5	(29) VT	(29) 882	(29) Right Rear Wheel Speed Sensor Signal	(29) II	(29) —
(30) 30	(30) 6	(30) BK	(30) 250	(30) Ground	(30) III	(30) —
31 - 32	—	—	—	Not Occupied	—	—
(33) 33	(33) 0.35	(33) WH	(33) 4978	(33) AUTOSAR CAN Bus [-] 2 Serial Data	(33) II	(33) —
(34) 34	(34) 0.35	(34) WH	(34) 4978	(34) AUTOSAR CAN Bus [-] 2 Serial Data	(34) II	(34) —
(35) 35	(35) 0.5	(35) GN / BU	(35) 2733	(35) Brake System Control Module LIN Bus 2	(35) II	(35) —
(36) 36	(36) 0.75	(36) WH / BK	(36) 2223	(36) Trailer Brake Apply Signal	(36) II	(36) —
(37) 37	(37) 0.75	(37) YE / BK	(37) 2224	(37) Trailer Brake Enable Signal	(37) II	(37) —
(38) 38	(38) 0.5	(38) GN / GY	(38) 333	(38) Brake Fluid Level Signal	(38) II	(38) —
(39) 39	(39) 0.5	(39) BN / BU	(39) 1602	(39) Front Brake Pad Wear Sensor Signal	(39) II	(39) —
40	—	—	—	Not Occupied	—	—
(41) 41	(41) 0.35	(41) BU / BK	(41) 4977	(41) AUTOSAR CAN Bus [+] 3 Serial Data	(41) II	(41) —
(42) 42	(42) 0.35	(42) BU / BK	(42) 4977	(42) AUTOSAR CAN Bus [+] 3 Serial Data	(42) II	(42) —
43	—	—	—	Not Occupied	—	—
(44) 44	(44) 0.5	(44) GN / YE	(44) 1616	(44) Rear Brake Pad Wear Sensor Signal	(44) II	(44) —
45	—	—	—	Not Occupied	—	—
(46) 46	(46) 6	(46) RD / WH	(46) 1642	(46) Battery Positive Voltage	(46) III	(46) —

K175 Front Floor Console Compartment Cooler (D07 / DCK)



2474755

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 2203314-1
- Service Connector: 85533165
- Description: 2-Way M 1.2 MCON Series, Sealed(BK)

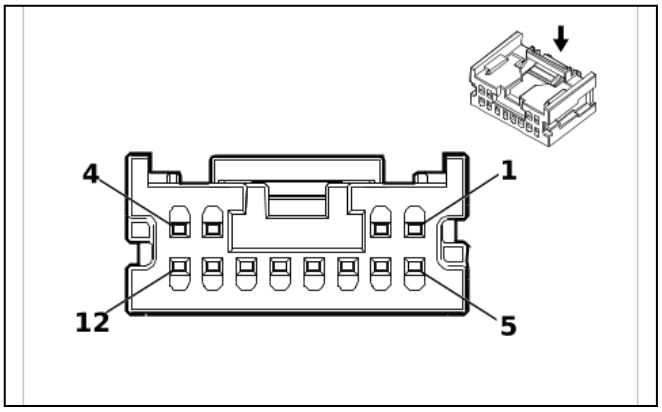
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-17 (L-GN)	No Tool Required

K175 Front Floor Console Compartment Cooler (D07 / DCK)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) VT / GY	(1) 539	(1) Run/Crank Ignition 1 Voltage	(1) I	(1) —
(2) 2	(2) 0.5 (2) 0.75	(2) BK (2) BK	(2) 1550 (2) 1550	(2) Ground (2) Ground	(2) I (2) I	(2) (2- DOOR) / (4- DOOR & (KCB / USN)) (2) 4- DOOR - (KCB / USN)

K180 Driver Monitoring System Module X1 (ULM and (UJE / UKM))



3824362

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 34824-5124
- Service Connector: 13507121
- Description: 12-Way F Mini 50 Series(BK)

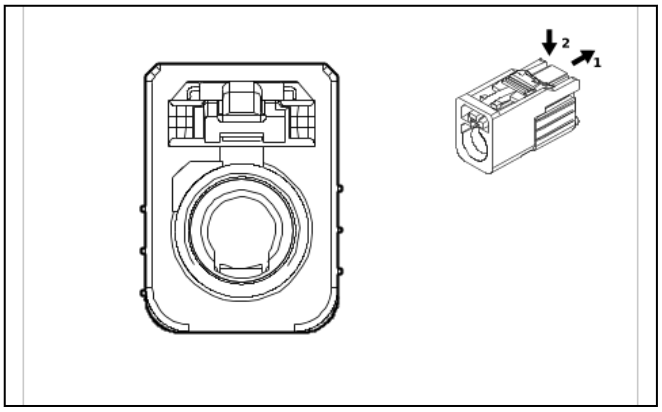
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19333221	EL-35616-58 (BK)	EL-38125-58

K180 Driver Monitoring System Module X1 (ULM and (UJE / UKM))

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) RD / YE	(1) 240	(1) Battery Positive Voltage	(1) I	(1) —
(2) 2	(2) 0.35	(2) BK	(2) 1050	(2) Ground	(2) I	(2) —
(3) 3	(3) 0.35	(3) BU / YE	(3) 4979	(3) AUTOSAR CAN Bus [+] 2 Serial Data	(3) I	(3) —
(4) 4	(4) 0.35	(4) WH	(4) 4978	(4) AUTOSAR CAN Bus [-] 2 Serial Data	(4) I	(4) —
5 - 6	—	—	—	Not Occupied	—	—
(7) 7	(7) 0.35	(7) BU / BN	(7) 7744	(7) Driver Illumination Lamp Ground	(7) I	(7) —
(8) 8	(8) 0.35	(8) YE / BU	(8) 2245	(8) Driver Illumination Lamp 2 Control	(8) I	(8) —
(9) 9	(9) 0.35	(9) WH / VT	(9) 2246	(9) Driver Illumination Lamp 1 Control	(9) I	(9) —
10	—	—	—	Not Occupied	—	—
(11) 11	(11) 0.35	(11) BU / YE	(11) 4979	(11) AUTOSAR CAN Bus [+] 2 Serial Data	(11) I	(11) —
(12) 12	(12) 0.35	(12) WH	(12) 4978	(12) AUTOSAR CAN Bus [-] 2 Serial Data	(12) I	(12) —

K180 Driver Monitoring System Module X2 (ULM and (UJE / UKM))



5519144

Connector Part Information
- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 33340313
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way F Coax Type(GN)

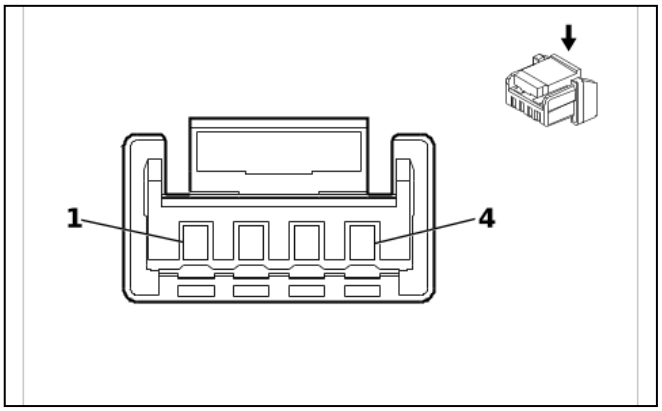
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

K180 Driver Monitoring System Module X2 (ULM and (UJE / UKM))

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
GN	—	Coax Cable	4726	Driver Monitoring System Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	I	—

K180S Driver Monitoring System Module - Steering Wheel X1 (ULM)



7154331

Connector Part Information
- Harness Type: Steering Wheel Horn Switch Wiring Harness
- OEM Connector: 505565-0401
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F Micro Lock Plus Series(BK)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-10 (GN)	No Tool Required

K180S Driver Monitoring System Module - Steering Wheel X1 (ULM)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.13	(1) OG	(1) A51	(1) Ground	(1) I	(1) —
(2) 2	(2) 0.13	(2) BK	(2) 6050	(2) Steering Wheel Ground	(2) I	(2) —
(3) 3	(3) 0.13	(3) GN / GY	(3) 11023	(3) Image Processing Module LIN Bus 1	(3) I	(3) —
(4) 4	(4) 0.13	(4) RD / BN	(4) 10040	(4) Battery Positive Voltage	(4) I	(4) —

K180S Driver Monitoring System Module - Steering Wheel X2 (ULM)

—

Connector Part Information
- Harness Type: Steering Wheel
- OEM Connector: Not Available
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

K180S Driver Monitoring System Module - Steering Wheel X2 (ULM)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) —	(1) —	(1) 7746	(1) Steering Wheel Lightbar Red Control	(1) I	(1) —
(2) 2	(2) —	(2) —	(2) 7747	(2) Steering Wheel Lightbar Green Control	(2) I	(2) —
(3) 3	(3) —	(3) —	(3) 7748	(3) Steering Wheel Lightbar Blue Control	(3) I	(3) —
(5) 5	(5) —	(5) —	(5) 7745	(5) Steering Wheel Lightbar Control	(5) I	(5) —

K180S Driver Monitoring System Module - Steering Wheel X3 (ULM)

—

Connector Part Information
- Harness Type: Steering Wheel
- OEM Connector: Not Available
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

K180S Driver Monitoring System Module - Steering Wheel X3 (ULM)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) —	(1) —	(1) 13908	(1) Steering Wheel Front Hands On Detection Sensor 5V Reference	(1) I	(1) —
(2) 2	(2) —	(2) —	(2) 13909	(2) Steering Wheel Front Hands On Detection Sensor Signal	(2) I	(2) —

K180S Driver Monitoring System Module - Steering Wheel X4 (ULM)

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Connector Part Information
- Harness Type: Steering Wheel
- OEM Connector: Not Available
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way

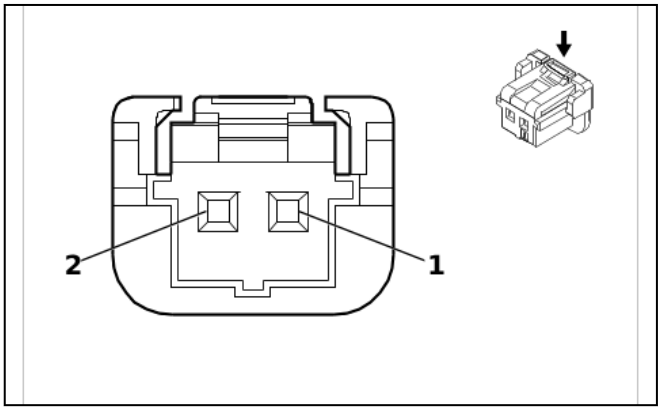
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

K180S Driver Monitoring System Module - Steering Wheel X4 (ULM)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(2) 2	(2) —	(2) —	(2) 13910	(2) Steering Wheel Rear Hands On Detection Sensor 5V Reference	(2) I	(2) —
(3) 3	(3) —	(3) —	(3) 13911	(3) Steering Wheel Rear Hands On Detection Sensor Signal	(3) I	(3) —

K180S Driver Monitoring System Module - Steering Wheel X5 (ULM)



7156861

Connector Part Information
- Harness Type: Steering Wheel Horn Switch Wiring Harness
- OEM Connector: 502351-0200
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F DuraClik Series(WH)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

K180S Driver Monitoring System Module - Steering Wheel X5 (ULM)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.13	(1) YE / GY	(1) 5883	(1) Steering Wheel Heating Switch Signal	(1) I	(1) —
(2) 2	(2) 0.13	(2) BN / WH	(2) 5884	(2) Steering Wheel Heating Switch LED Control	(2) I	(2) —

K180S Driver Monitoring System Module - Steering Wheel X6 (ULM)

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Connector Part Information

- Harness Type: Steering Wheel
- OEM Connector: Not Available
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way

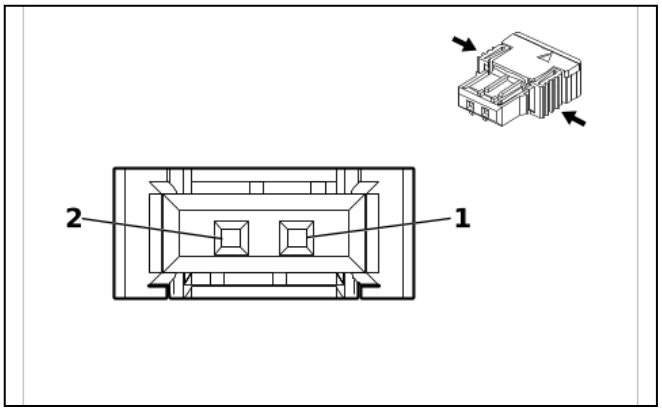
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

K180S Driver Monitoring System Module - Steering Wheel X6 (ULM)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) —	(1) GY / YE	(1) 5887	(1) Steering Wheel Heating Low Control	(1) I	(1) —
(2) 2	(2) —	(2) YE / RD	(2) 5885	(2) Steering Wheel Heating Voltage Reference	(2) I	(2) —
(3) 3	(3) —	(3) VT / BU	(3) 5886	(3) Steering Wheel Heating Temperature Sensor Signal	(3) I	(3) —
(4) 4	(4) —	(4) WH / YE	(4) 5888	(4) Steering Wheel Heating High Control	(4) I	(4) —

K180S Driver Monitoring System Module - Steering Wheel X7 (ULM)



7156894

Connector Part Information
- Harness Type: Steering Wheel Horn Switch Wiring Harness
- OEM Connector: 364198-E
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F ERNI MaxiBridge Series(BK)

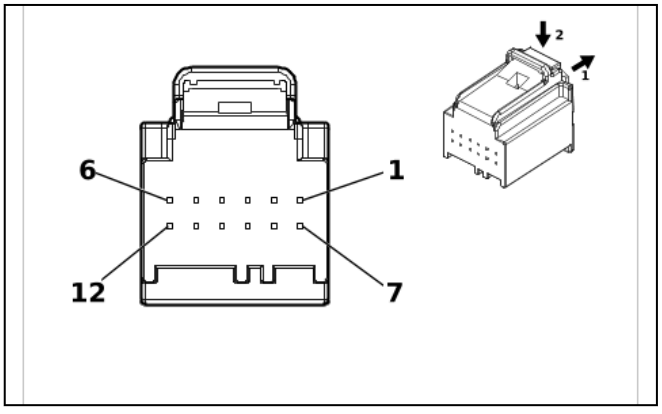
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

K180S Driver Monitoring System Module - Steering Wheel X7 (ULM)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BK	(1) 6050	(1) Steering Wheel Ground	(1) I	(1) —
(2) 2	(2) 0.5	(2) RD / BN	(2) 10040	(2) Battery Positive Voltage	(2) I	(2) —

K182 Parking Assist Control Module X1



5095565

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 31410-0125
- Service Connector: 13525987
- Description: 12-Way F 0.64 Series(BK)

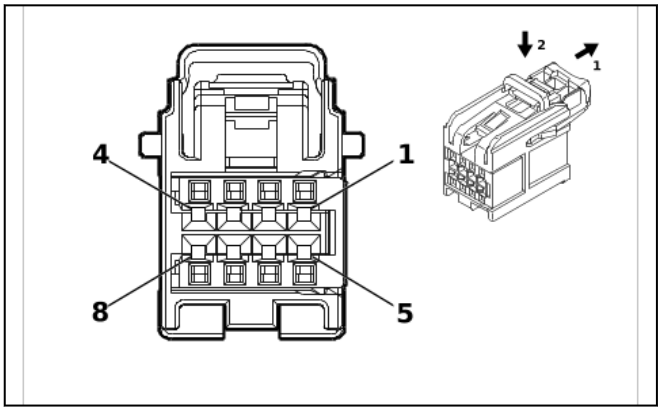
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	13584547	J-35616-64B (L-BU)	J-38125-215A

K182 Parking Assist Control Module X1

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) RD / VT	(1) 1640	(1) Battery Positive Voltage	(1) I	(1) —
(2) 2	(2) 0.35	(2) WH	(2) 4986	(2) AUTOSAR CAN Bus [-] 1 Serial Data	(2) I	(2) —
(3) 3	(3) 0.35	(3) BU	(3) 4987	(3) AUTOSAR CAN Bus [+] 1 Serial Data	(3) I	(3) —
(4) 4	(4) 0.35	(4) BU	(4) 4987	(4) AUTOSAR CAN Bus [+] 1 Serial Data	(4) I	(4) —
5	—	—	—	Not Occupied	—	—
(6) 6	(6) 0.5	(6) BK / WH	(6) 1551	(6) Signal Ground	(6) I	(6) —
7	—	—	—	Not Occupied	—	—
(8) 8	(8) 0.35	(8) WH	(8) 4986	(8) AUTOSAR CAN Bus [-] 1 Serial Data	(8) I	(8) —
(9) 9	(9) 0.35	(9) BU	(9) 4987	(9) AUTOSAR CAN Bus [+] 1 Serial Data	(9) I	(9) —
(10) 10	(10) 0.35	(10) WH	(10) 4986	(10) AUTOSAR CAN Bus [-] 1 Serial Data	(10) I	(10) —
11 - 12	—	—	—	Not Occupied	—	—

K182 Parking Assist Control Module X2



4232228

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 15526973
- Service Connector: 19353873
- Description: 8-Way F 0.64 OCS Series(GY)

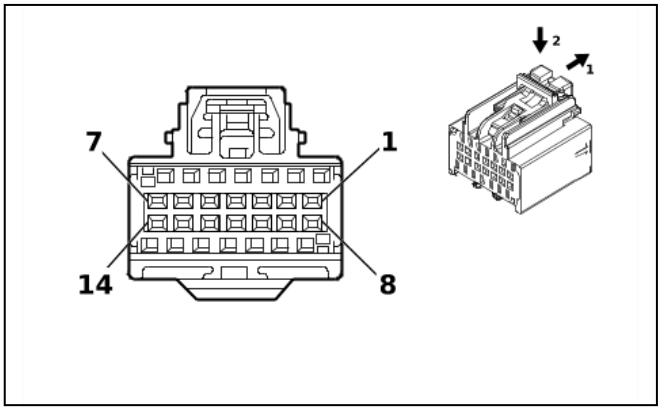
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

K182 Parking Assist Control Module X2

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	—	—	—	Not Occupied	—	—
(2) 2	(2) 0.5	(2) YE / WH	(2) 2377	(2) Right Rear Middle Parking Assist Sensor Signal	(2) I	(2) —
(3) 3	(3) 0.5	(3) YE	(3) 2375	(3) Left Rear Outer Parking Assist Sensor Signal	(3) I	(3) —
(4) 4	(4) 0.5	(4) BN / WH	(4) 2374	(4) Object Sensor Voltage Reference	(4) I	(4) —
(5) 5	(5) 0.5	(5) YE / VT	(5) 2378	(5) Right Rear Outer Parking Assist Sensor Signal	(5) I	(5) —
(6) 6	(6) 0.5	(6) YE / BU	(6) 2376	(6) Left Rear Middle Parking Assist Sensor Signal	(6) I	(6) —
7	—	—	—	Not Occupied	—	—
(8) 8	(8) 0.5	(8) BK / GY	(8) 2379	(8) Object Sensor Low Reference	(8) I	(8) —

K182 Parking Assist Control Module X3



4547098

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 7289-2897-90
- Service Connector: 19354933
- Description: 14-Way F 0.64 Kaizen Series(BU)

Terminal Part Information

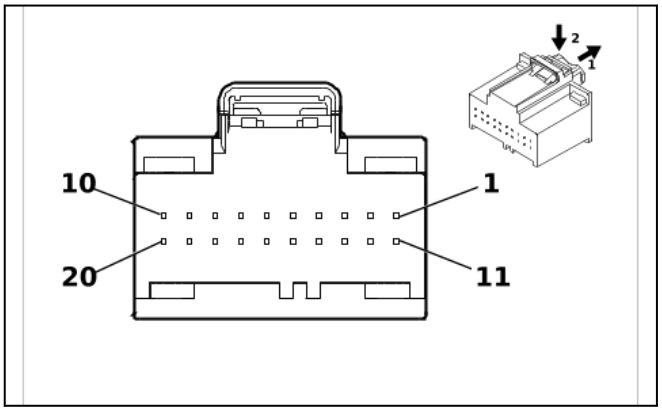
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19303553	J-35616-64B (L-BU)	J-38125-215A

K182 Parking Assist Control Module X3

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1 - 4	—	—	—	Not Occupied	—	—
(5) 5	(5) 0.5	(5) YE / GY	(5) 5216	(5) Left Front Middle Parking Assist Sensor	(5) I	(5) —
(6) 6	(6) 0.5	(6) WH / GY	(6) 5217	(6) Right Front Outer Parking Assist Sensor	(6) I	(6) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(7) 7	(7) 0.5	(7) BN	(7) 6581	(7) Front Parking Assist Display Control	(7) I	(7) —
8 - 10	—	—	—	Not Occupied	—	—
(11) 11	(11) 0.5	(11) VT / WH	(11) 5215	(11) Left Front Outer Parking Assist Sensor	(11) I	(11) —
(12) 12	(12) 0.5	(12) VT / GY	(12) 5218	(12) Right Front Middle Parking Assist Sensor	(12) I	(12) —
13	—	—	—	Not Occupied	—	—
(14) 14	(14) 0.5	(14) BK / BU	(14) 5214	(14) Front Parking Assist Sensor Low Reference	(14) I	(14) —

K183 UHF Short Range Low Energy Remote Control Access Transceiver (BOK / BOR / BOY)



5112891

Connector Part Information
- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 31410-0205
- Service Connector: 13525990
- Description: 20-Way F 0.64 Series(BK)

Terminal Part Information

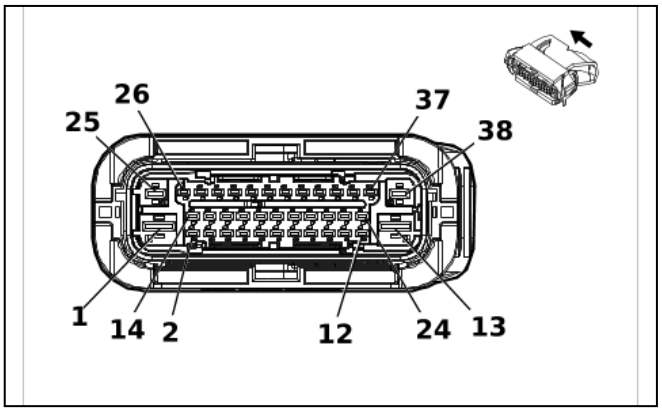
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	13584547	J-35616-64B (L-BU)	J-38125-215A

K183 UHF Short Range Low Energy Remote Control Access Transceiver (BOK / BOR / BOY)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GN / BK	(1) 2738	(1) Near Field Communication Module LIN Bus 1	(1) I	(1) —
(2) 2	(2) 0.35	(2) BU / BN	(2) 11326	(2) Virtual Key Private CAN Bus [+] Serial Data	(2) I	(2) —
(3) 3	(3) 0.35	(3) WH / YE	(3) 11325	(3) Virtual Key Private CAN Bus [-] Serial Data	(3) I	(3) —
4 - 5	—	—	—	Not Occupied	—	—
(6) 6	(6) 0.35	(6) BU / WH	(6) 4985	(6) AUTOSAR CAN Bus [+] 5 Serial Data	(6) I	(6) —
(7) 7	(7) 0.35	(7) BU / YE	(7) 4984	(7) AUTOSAR CAN Bus [-] 5 Serial Data	(7) I	(7) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
8 - 11	—	—	—	Not Occupied	—	—
(12) 12	(12) 0.35	(12) BU / BN	(12) 11326	(12) Virtual Key Private CAN Bus [+] Serial Data	(12) I	(12) —
(13) 13	(13) 0.35	(13) WH / YE	(13) 11325	(13) Virtual Key Private CAN Bus [-] Serial Data	(13) I	(13) —
14 - 15	—	—	—	Not Occupied	—	—
(16) 16	(16) 0.35	(16) BU / WH	(16) 4985	(16) AUTOSAR CAN Bus [+] 5 Serial Data	(16) I	(16) —
(17) 17	(17) 0.35	(17) BU / YE	(17) 4984	(17) AUTOSAR CAN Bus [-] 5 Serial Data	(17) I	(17) —
(18) 18	(18) 0.75	(18) BK / WH	(18) 851	(18) Signal Ground	(18) I	(18) —
19	—	—	—	Not Occupied	—	—
(20) 20	(20) 0.5	(20) RD / GY	(20) 7040	(20) Battery Positive Voltage	(20) I	(20) —

K194 Rear Gate Module (QT6)



3240112

Connector Part Information

- Harness Type: Endgate Wiring Harness
- OEM Connector: 35503407
- Service Connector: Service by Harness - See Part Catalog
- Description: 38-Way F 1.5 CTS, 2.8 MCP, 4.8 MCP Series, Sealed(BK with BU Inner Connector)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-14 (GN)	No Tool Required
II	Not required	J-35616-35 (VT)	No Tool Required
III	Not required	J-35616-40 (BU)	No Tool Required

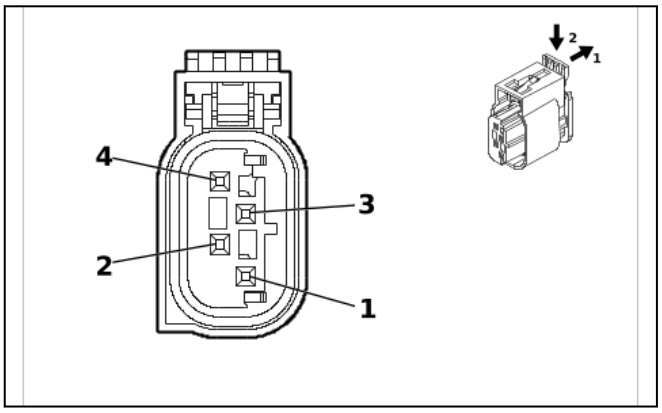
K194 Rear Gate Module (QT6)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 2.5	(1) BK	(1) 1850	(1) Ground	(1) III	(1) —
(2) 2	(2) 0.5	(2) WH	(2) 4100	(2) AUTOSAR CAN Bus [-] 4 Serial Data	(2) I	(2) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(3) 3	(3) 0.5	(3) WH	(3) 4100	(3) AUTOSAR CAN Bus [-] 4 Serial Data	(3) I	(3) —
4	—	—	—	Not Occupied	—	—
(5) 5	(5) 0.5	(5) YE / BK	(5) 8085	(5) Rear Closure Latch Primary Status	(5) I	(5) —
(6) 6	(6) 0.5	(6) BN / GY	(6) 10281	(6) Rear Closure Latch Secondary Status Signal	(6) I	(6) —
(7) 7	(7) 0.5	(7) WH / GN	(7) 8084	(7) Rear Closure Latch Neutral Status	(7) I	(7) —
(8) 8	(8) 0.5	(8) GY / VT	(8) 4678	(8) Rear Closure Latch Unlatch Status	(8) I	(8) —
9 - 12	—	—	—	Not Occupied	—	—
(13) 13	(13) 2.5	(13) RD / VT	(13) 4442	(13) Primary Fused Battery Positive Voltage	(13) III	(13) —
(14) 14	(14) 0.5	(14) BU / VT	(14) 4101	(14) AUTOSAR CAN Bus [+] 4 Serial Data	(14) I	(14) —
(15) 15	(15) 0.5	(15) BU / VT	(15) 4101	(15) AUTOSAR CAN Bus [+] 4 Serial Data	(15) I	(15) —
(16) 16	(16) 0.5	(16) BN	(16) 7736	(16) Rear Closure Latch 2 Unlatch Status Signal	(16) I	(16) —
17	—	—	—	Not Occupied	—	—
(18) 18	(18) 0.5	(18) BN / RD	(18) 4683	(18) Rear Closure Position Sensor Voltage Reference	(18) I	(18) —
(19) 19	(19) 0.5	(19) BK / GN	(19) 4687	(19) Rear Closure Position Sensor Low Reference	(19) I	(19) —
(20) 20	(20) 0.5	(20) BU / VT	(20) 4101	(20) AUTOSAR CAN Bus [+] 4 Serial Data	(20) I	(20) —
(21) 21	(21) 0.5	(21) BN / YE	(21) 4686	(21) Rear Closure Position Sensor Signal 2	(21) I	(21) —
(22) 22	(22) 0.5	(22) BU / WH	(22) 4685	(22) Rear Closure Position Sensor Signal 1	(22) I	(22) —
(23) 23	(23) 0.5	(23) GN / BU	(23) 10283	(23) Rear Closure Latch 2 Primary Status Signal	(23) I	(23) —
(24) 24	(24) 0.5	(24) VT / WH	(24) 10284	(24) Rear Closure Latch 2 Secondary Status Signal	(24) I	(24) —
(25) 25	(25) 1	(25) BN / WH	(25) 4690	(25) Rear Closure Open/Close Motor Close Control	(25) II	(25) —
(26) 26	(26) 0.5	(26) BU / BN	(26) 10282	(26) Rear Closure Latch 2 Neutral Status Signal	(26) I	(26) —
(27) 27	(27) 0.5	(27) GY / BK	(27) 1575	(27) Rear Closure Sensor Low Reference 2	(27) I	(27) —
(28) 28	(28) 0.5	(28) BK / VT	(28) 4656	(28) Rear Closure Object Sensor Low Reference	(28) I	(28) —
29	—	—	—	Not Occupied	—	—
(30) 30	(30) 1	(30) BU	(30) 1509	(30) Rear Closure Cinch Latch Motor 2 Release Control	(30) I	(30) —
(31) 31	(31) 1	(31) GN	(31) 1499	(31) Rear Closure Cinch Latch Motor 2 Cinch Control	(31) I	(31) —
(32) 32	(32) 0.5	(32) WH	(32) 4100	(32) AUTOSAR CAN Bus [-] 4 Serial Data	(32) I	(32) —
(33) 33	(33) 1	(33) BU / GY	(33) 4682	(33) Rear Closure Cinch Latch Motor Release Control	(33) I	(33) —
(34) 34	(34) 1	(34) BN	(34) 4681	(34) Rear Closure Cinch Latch Motor Cinch Control	(34) I	(34) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(35) 35	(35) 0.5	(35) GN	(35) 1577	(35) Rear Closure Clutch Control	(35) I	(35) —
(36) 36	(36) 0.5	(36) BU / BK	(36) 1590	(36) Rear Closure Clutch Low Return	(36) I	(36) —
37	—	—	—	Not Occupied	—	—
(38) 38	(38) 1	(38) WH	(38) 4689	(38) Rear Closure Open/Close Motor Open Control	(38) II	(38) —

K214 Trailer Tire Pressure Indicator Module (UET)



5215490

Connector Part Information

- Harness Type: Chassis Wiring Harness
- OEM Connector: 13655424
- Service Connector: 86825461
- Description: 4-Way F 0.64 MTS Series, Sealed(BK)

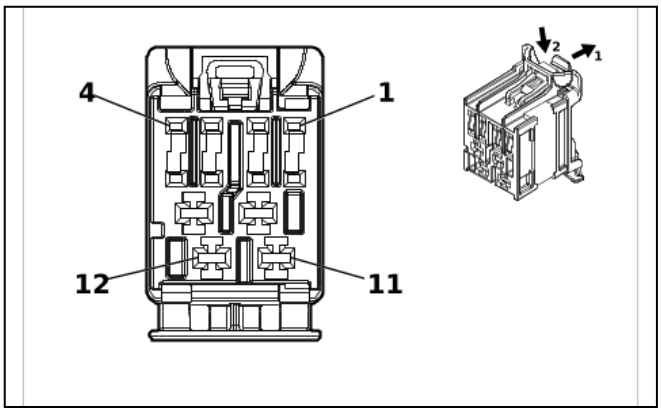
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

K214 Trailer Tire Pressure Indicator Module (UET)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) RD / GN	(1) 6940	(1) Battery Positive Voltage	(1) I	(1) —
(2) 2	(2) 0.75	(2) BK / WH	(2) 1851	(2) Signal Ground	(2) I	(2) —
(3) 3	(3) 0.5	(3) GN / YE	(3) 2862	(3) Body Control Module LIN Bus 16	(3) I	(3) —
4	—	—	—	Not Occupied	—	—

K219 Lighting Control Module X1



5203784

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 160026-0003
- Service Connector: 13509990
- Description: 12-Way F 1.2, 2.8 stAK50h Series(L-PU)

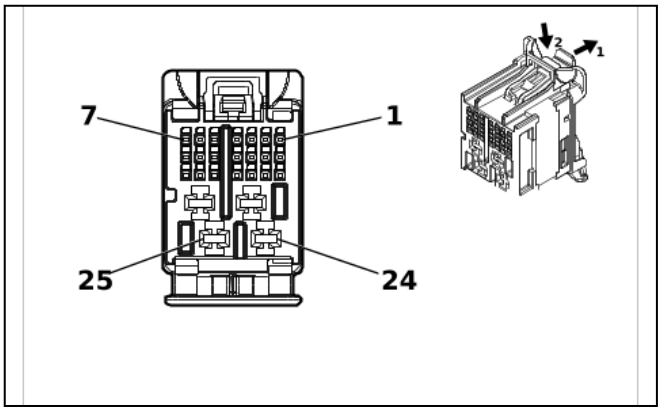
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19371217	J-35616-12 (BU)	J-38125-553
II	87814662	J-35616-35 (VT)	J-38125-557

K219 Lighting Control Module X1

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GY / BU	(1) 7538	(1) Left Front DRL Control	(1) I	(1) —
2	—	—	—	Not Occupied	—	—
(3) 3	(3) 0.5	(3) GN / WH	(3) 24	(3) Backup Lamp Control	(3) I	(3) —
4	—	—	—	Not Occupied	—	—
(5) 5	(5) 0.5	(5) BU / WH	(5) 1314	(5) Left Front Turn Signal Lamp Control	(5) I	(5) —
(6) 6	(6) 0.5	(6) BN / GY	(6) 5061	(6) Left Front Fog Lamp Control	(6) I	(6) —
(7) 7	(7) 0.5	(7) BN / GN	(7) 5062	(7) Right Front Fog Lamp Control	(7) I	(7) —
8	—	—	—	Not Occupied	—	—
(9) 9	(9) 1.5	(9) RD / VT	(9) 7140	(9) Battery Positive Voltage	(9) II	(9) —
(10) 10	(10) 0.5	(10) YE	(10) 712	(10) Left Headlamp Low Beam Control	(10) II	(10) —
11	—	—	—	Not Occupied	—	—
(12) 12	(12) 0.5	(12) WH	(12) 711	(12) Left Headlamp High Beam Control	(12) II	(12) —

K219 Lighting Control Module X2



5203807

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 160027-0012
- Service Connector: 13534966
- Description: 25-Way F 0.5 MQS, 2.8 MCP Series(GY with GY Inner Connector)

Terminal Part Information

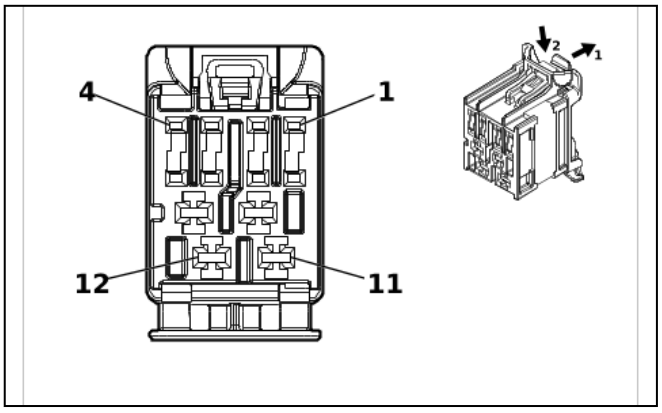
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19370262	EL-35616-58 (BK)	EL-38125-58
II	87814662	J-35616-35 (VT)	J-38125-557

K219 Lighting Control Module X2

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) GN / YE	(1) 6846	(1) Rear License Plate Lamp Control	(1) I	(1) —
(2) 2	(2) 0.35	(2) WH / YE	(2) 7541	(2) Right Rear Stop Lamp Control	(2) I	(2) —
(3) 3	(3) 0.35	(3) BN / GY	(3) 2268	(3) Windshield Washer Relay Control	(3) I	(3) —
(4) 4	(4) 0.35	(4) BU / BN	(4) 38	(4) Backup Lamp Relay Control	(4) I	(4) —
5 - 9	—	—	—	Not Occupied	—	—
(10) 10	(10) 0.35	(10) BN / GN	(10) 196	(10) Windshield Wiper Motor Park Switch Signal	(10) I	(10) —
(11) 11	(11) 0.35	(11) VT / BK	(11) 6568	(11) Front Turn Signal Lamp Feedback Signal	(11) I	(11) —
(12) 12	(12) 0.35	(12) GY	(12) 91	(12) Windshield Wiper Motor Relay Coil Control	(12) I	(12) —
13	—	—	—	Not Occupied	—	—
(14) 14	(14) 0.35	(14) VT	(14) 185	(14) Low Washer Fluid Indicator Control	(14) I	(14) —
(15) 15	(15) 0.35	(15) VT / GY	(15) 10717	(15) Upfitter Accessory Relay 2 Coil Control	(15) I	(15) —
(16) 16	(16) 0.35	(16) YE / BU	(16) 318	(16) Left Rear Trailer Stop/Turn Lamp Control	(16) I	(16) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(17) 17	(17) 0.35	(17) GY / YE	(17) 7542	(17) Left Rear Stop Lamp Control	(17) I	(17) —
(18) 18	(18) 0.35	(18) BU / BN	(18) 11347	(18) Underbody Camera Washer Relay Control	(18) I	(18) —
(19) 19	(19) 0.35	(19) WH / BN	(19) 7055	(19) Auxiliary Park Lamp Relay Control	(19) I	(19) —
(20) 20	(20) 0.35	(20) WH / YE	(20) 7545	(20) Right Front Turn Signal Lamp Feedback Signal	(20) I	(20) —
(21) 21	(21) 0.35	(21) WH / VT	(21) 860	(21) Windshield Wiper Switch High Signal	(21) I	(21) —
(22) 22	(22) 1.5	(22) RD / GN	(22) 7740	(22) Battery Positive Voltage	(22) II	(22) —
(23) 23	(23) 0.5	(23) RD / BU	(23) 840	(23) Battery Positive Voltage	(23) II	(23) —
24 - 25	—	—	—	Not Occupied	—	—

K219 Lighting Control Module X3



5203797

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 160026-0002
- Service Connector: 13509989
- Description: 12-Way F 1.2, 2.8 stAK50h Series(GN)

Terminal Part Information

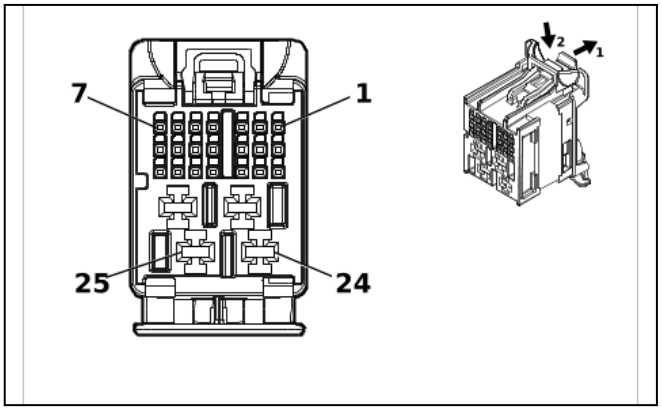
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19371217	J-35616-12 (BU)	J-38125-553
II	87814662	J-35616-35 (VT)	J-38125-557

K219 Lighting Control Module X3

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	—	—	—	Not Occupied	—	—
(2) 2	(2) 0.5	(2) BU / YE	(2) 11418	(2) Exterior Emblem Light Control	(2) I	(2) —
3	—	—	—	Not Occupied	—	—

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(4) 4	(4) 0.5	(4) BU / BN	(4) 7539	(4) Right Front DRL Control	(4) I	(4) —
5	—	—	—	Not Occupied	—	—
(6) 6	(6) 0.75	(6) BU / VT	(6) 1335	(6) Right Rear Turn Signal Lamp Control 2	(6) I	(6) —
(7) 7	(7) 0.5	(7) BU / YE	(7) 7761	(7) Backup Illumination Lamp Control	(7) I	(7) —
8	—	—	—	Not Occupied	—	—
(9) 9	(9) 1.5	(9) RD / BU	(9) 540	(9) Battery Positive Voltage	(9) II	(9) —
(10) 10	(10) 1.5	(10) RD / BN	(10) 1440	(10) Battery Positive Voltage	(10) II	(10) —
(11) 11	(11) 0.5	(11) WH	(11) 311	(11) Right Headlamp High Beam Control	(11) II	(11) —
(12) 12	(12) 0.5	(12) YE	(12) 312	(12) Right Headlamp Low Beam Control	(12) II	(12) —

K219 Lighting Control Module X4



5203416

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 160027-0015
- Service Connector: 13534969
- Description: 25-Way F 0.5 MQS, 2.8 MCP Series(PU with GY Inner Connector)

Terminal Part Information

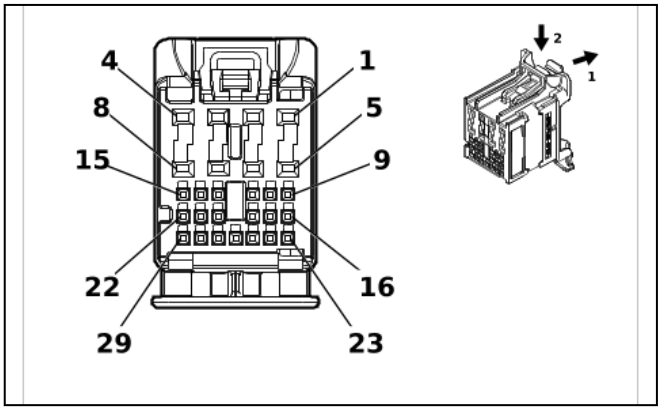
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19370262	EL-35616-58 (BK)	EL-38125-58
II	87814662	J-35616-35 (VT)	J-38125-557

K219 Lighting Control Module X4

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1 - 2	—	—	—	Not Occupied	—	—
(3) 3	(3) 0.35	(3) BU / GN	(3) 4103	(3) AUTOSAR CAN Bus [+] 9 Serial Data	(3) I	(3) —
(4) 4	(4) 0.35	(4) WH / GN	(4) 4102	(4) AUTOSAR CAN Bus [-] 9 Serial Data	(4) I	(4) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(5) 5	(5) 0.35	(5) BU / GN	(5) 4103	(5) AUTOSAR CAN Bus [+] 9 Serial Data	(5) I	(5) —
(6) 6	(6) 0.35	(6) WH / GN	(6) 4102	(6) AUTOSAR CAN Bus [-] 9 Serial Data	(6) I	(6) —
(7) 7	(7) 0.35	(7) WH / BU	(7) 6311	(7) Cruise/ETC/TCC Brake Signal	(7) I	(7) —
8	—	—	—	Not Occupied	—	—
(9) 9	(9) 0.35	(9) BU / YE	(9) 10926	(9) Major Endgate Ajar Signal	(9) I	(9) —
(10) 10	(10) 0.35	(10) WH / GN	(10) 4102	(10) AUTOSAR CAN Bus [-] 9 Serial Data	(10) I	(10) —
(11) 11	(11) 0.35	(11) BU / GN	(11) 4103	(11) AUTOSAR CAN Bus [+] 9 Serial Data	(11) I	(11) —
(12) 12	(12) 0.35	(12) BU / GN	(12) 8864	(12) Police Tail Lamp Red/Red Alternate Flash Enable Signal	(12) I	(12) —
(13) 13	(13) 0.35	(13) GY / GN	(13) 8865	(13) Police Tail Lamp Red/White Alternate Flash Enable Signal	(13) I	(13) —
(14) 14	(14) 0.35	(14) GN	(14) 8863	(14) Police High Beam Alternate Flash Enable Signal	(14) I	(14) —
15 - 18	—	—	—	Not Occupied	—	—
(19) 19	(19) 0.35	(19) GY / WH	(19) 10137	(19) Radio Audio Mute Police Signal	(19) I	(19) —
20 - 21	—	—	—	Not Occupied	—	—
(22) 22	(22) 1	(22) RD / BN	(22) 1140	(22) Battery Positive Voltage	(22) II	(22) —
(23) 23	(23) 1	(23) BK / WH	(23) 1551	(23) Signal Ground	(23) II	(23) —
(24) 24	(24) 0.5	(24) RD / GN	(24) 1540	(24) Battery Positive Voltage	(24) II	(24) —
(25) 25	(25) 1	(25) BK / WH	(25) 1451	(25) Signal Ground	(25) II	(25) —

K219 Lighting Control Module X5



5203373

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 160029-0013
- Service Connector: 13534975
- Description: 29-Way F 0.5 NANO, 1.2 MCON, stAK50h Series(BU with GY Inner Connector)

Terminal Part Information

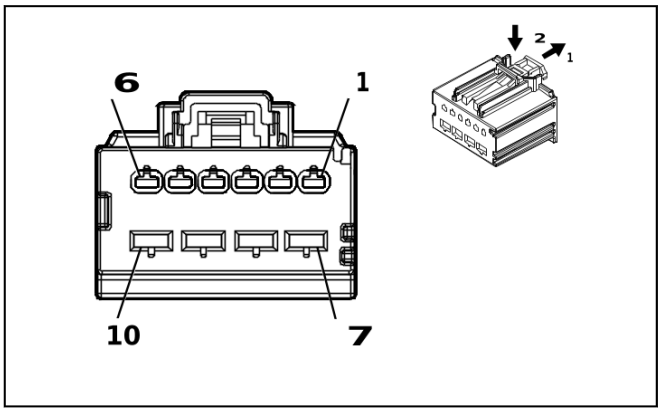
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19370262	EL-35616-58 (BK)	EL-38125-58
II	19371217	J-35616-12 (BU)	J-38125-553

K219 Lighting Control Module X5

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) WH / GN	(1) 5966	(1) Approach Lamp Control	(1) II	(1) —
(2) 2	(2) 0.75	(2) BN / GY	(2) 6995	(2) Right Rear Park Lamp Control	(2) II	(2) —
(3) 3	(3) 0.5	(3) GY / BU	(3) 7762	(3) Cargo Lamp Control	(3) II	(3) —
(4) 4	(4) 0.5	(4) GN / VT	(4) 1315	(4) Right Front Turn Signal Lamp Control	(4) II	(4) —
(5) 5	(5) 0.5	(5) YE / GN	(5) 2024	(5) Animation Lighting Control	(5) II	(5) —
(6) 6	(6) 0.75	(6) BN / BU	(6) 6993	(6) Left Rear Park Lamp Control	(6) II	(6) —
(7) 7	(7) 0.35	(7) YE / GY	(7) 2933	(7) Task Lamp Control Left	(7) II	(7) —
(8) 8	(8) 0.75	(8) BU / WH	(8) 1334	(8) Left Rear Turn Signal Lamp Control 2	(8) II	(8) —
(9) 9	(9) 0.35	(9) GN / WH	(9) 10908	(9) Upfitter Accessory Relay 6 Coil Control	(9) I	(9) —
(10) 10	(10) 0.35	(10) GY / VT	(10) 10720	(10) Upfitter Accessory Relay 5 Coil Control	(10) I	(10) —
(11) 11	(11) 0.35	(11) GY	(11) 1715	(11) Windshield Wiper Switch High Signal	(11) I	(11) —
(13) 13	(13) 0.35	(13) GN / GY	(13) 2115	(13) Right Turn Signal Lamp Control 2	(13) I	(13) —
(14) 14	(14) 0.35	(14) WH / YE	(14) 10719	(14) Upfitter Accessory Relay 4 Coil Control	(14) I	(14) —
15	—	—	—	Not Occupied	—	—
(16) 16	(16) 0.35	(16) WH / VT	(16) 1430	(16) Exterior Courtesy Lamp Control	(16) I	(16) —
17	—	—	—	Not Occupied	—	—
(18) 18	(18) 0.35	(18) VT / WH	(18) 239	(18) Run/Crank Ignition 1 Voltage	(18) I	(18) —
20 - 21	—	—	—	Not Occupied	—	—
(22) 22	(22) 0.35	(22) BU / WH	(22) 10716	(22) Upfitter Accessory Relay 1 Coil Control	(22) I	(22) —
(23) 23	(23) 0.35	(23) WH / VT	(23) 6567	(23) Rear Turn Signal Lamp Feedback Signal	(23) I	(23) —
(24) 24	(24) 0.35	(24) WH / BK	(24) 7544	(24) Right Rear Turn Signal Lamp Feedback Signal	(24) I	(24) —
(25) 25	(25) 0.35	(25) BN / YE	(25) 820	(25) Center High Mounted Stop Lamp Supply Voltage	(25) I	(25) —
(26) 26	(26) 0.35	(26) GN / BN	(26) 319	(26) Right Rear Trailer Stop/Turn Lamp Control	(26) I	(26) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(27) 27	(27) 0.35	(27) GN / BN	(27) 10718	(27) Upfitter Accessory Relay 3 Coil Control	(27) I	(27) —
(28) 28	(28) 0.35	(28) GY / BN	(28) 10749	(28) Sequential Turn Lamp Enable Signal	(28) I	(28) —
(29) 29	(29) 0.35	(29) WH / GY	(29) 2114	(29) Left Turn Signal Lamp Control 2	(29) I	(29) —

K234 Rear Seat Heater Vent Control Module X1 (KCB)



5035058

Connector Part Information
- Harness Type: Rear Seat Heater Control Wiring Harness
- OEM Connector: 31372-1600
- Service Connector: Service by Harness - See Part Catalog
- Description: 10-Way F 1.5, 2.8 MX Series(BK)

Terminal Part Information

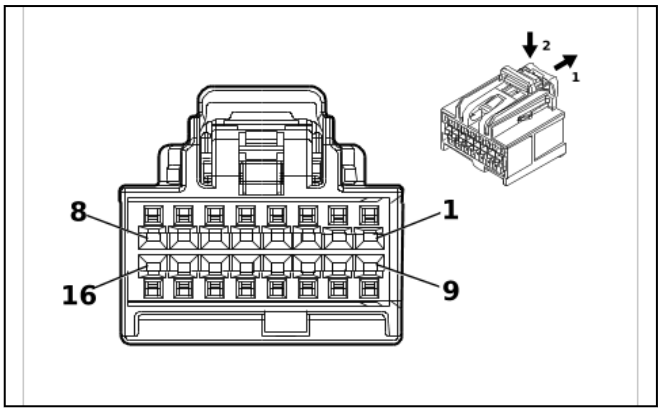
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required
II	Not required	J-35616-4A (PU)	No Tool Required

K234 Rear Seat Heater Vent Control Module X1 (KCB)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	—	—	—	Not Occupied	—	—
(2) 2	(2) 0.75	(2) GN / BN	(2) 2296	(2) Right Rear Seat Cushion Heating Element Control	(2) I	(2) —
(3) 3	(3) 0.75	(3) GN / BK	(3) 2457	(3) Right Rear Seat Heating Element Low Reference	(3) I	(3) —
(4) 4	(4) 0.75	(4) BU / BK	(4) 2446	(4) Left Rear Seat Heating Element Low Reference	(4) I	(4) —
5	—	—	—	Not Occupied	—	—
(6) 6	(6) 0.75	(6) GY	(6) 2294	(6) Left Rear Seat Cushion Heating Element Control	(6) I	(6) —
(7) 7	(7) 0.75	(7) RD / BU	(7) 6140	(7) Battery Positive Voltage	(7) II	(7) —
(8) 8	(8) 1	(8) BK	(8) 1550	(8) Ground	(8) II	(8) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
9	—	—	—	Not Occupied	—	—
(10) 10	(10) 0.75	(10) RD / WH	(10) 6640	(10) Battery Positive Voltage	(10) II	(10) —

K234 Rear Seat Heater Vent Control Module X2 (KCB)



4873243

Connector Part Information

- Harness Type: Rear Seat Heater Control Wiring Harness
- OEM Connector: 35016343
- Service Connector: Service by Harness - See Part Catalog
- Description: 16-Way F 0.64 OCS Series(BK)

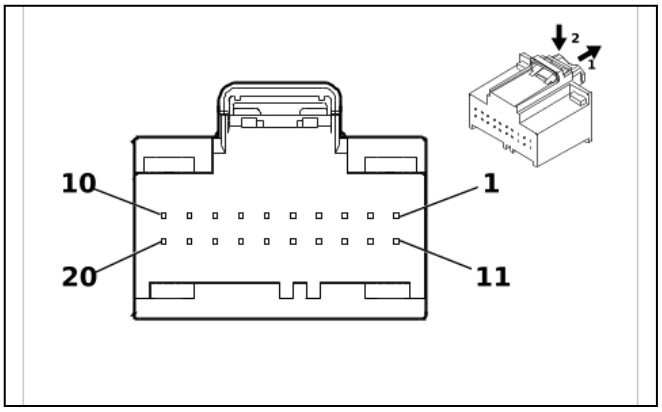
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

K234 Rear Seat Heater Vent Control Module X2 (KCB)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BU / WH	(1) 7048	(1) Left Rear Cushion Thermistor Feedback Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) WH / BK	(2) 7054	(2) Right Rear Cushion Thermistor Feedback Signal	(2) I	(2) —
3 - 4	—	—	—	Not Occupied	—	—
(5) 5	(5) 0.5	(5) YE / WH	(5) 7053	(5) Right Rear Seat Cushion Temperature Sensor Signal	(5) I	(5) —
(6) 6	(6) 0.5	(6) WH / BU	(6) 7047	(6) Left Rear Seat Cushion Temperature Sensor Signal	(6) I	(6) —
(7) 7	(7) 0.5	(7) BK	(7) 1550	(7) Ground	(7) I	(7) —
(8) 8	(8) 0.5	(8) GN / VT	(8) 2857	(8) Body Control Module LIN Bus 11	(8) I	(8) —
9 - 16	—	—	—	Not Occupied	—	—

K299 Audio/Video Interface Module X1 (USN)



5112891

Connector Part Information

- Harness Type: Front Floor Console Wiring Harness
- OEM Connector: 31410-0205
- Service Connector: Service by Harness - See Part Catalog
- Description: 20-Way F 0.64 Series(BK)

Terminal Part Information

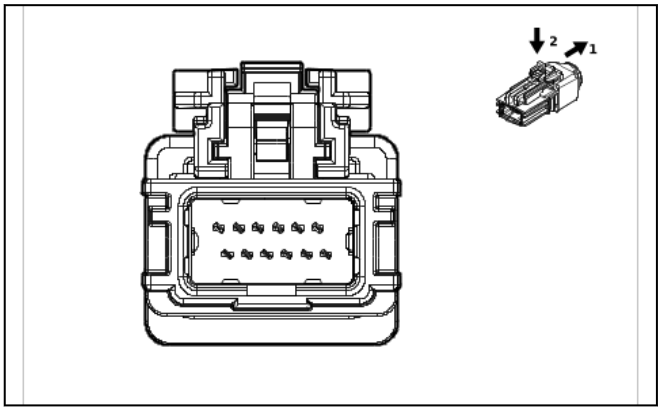
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required
II	Service by Cable	J-35616-64B (L-BU)	No Tool Required

K299 Audio/Video Interface Module X1 (USN)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) RD / VT	(1) 2640	(1) Battery Positive Voltage	(1) I	(1) —
2	—	—	—	Not Occupied	—	—
(3) 3	(3) 0.35	(3) BU / WH	(3) 4985	(3) AUTOSAR CAN Bus [+] 5 Serial Data	(3) I	(3) —
(4) 4	(4) 0.35	(4) BU / YE	(4) 4984	(4) AUTOSAR CAN Bus [-] 5 Serial Data	(4) I	(4) —
5 - 8	—	—	—	Not Occupied	—	—
(9) 9	(9) 0.35	(9) WH	(9) 8580	(9) Automotive Audio Bus A2B Serial Data 1 [+]	(9) II	(9) —
(10) 10	(10) 0.35	(10) YE	(10) 8579	(10) Automotive Audio Bus A2B Serial Data 1 [-]	(10) II	(10) —
11	—	—	—	Not Occupied	—	—
(12) 12	(12) 0.5	(12) BK / WH	(12) 1051	(12) Signal Ground	(12) I	(12) —
(13) 13	(13) 0.35	(13) BU / WH	(13) 4985	(13) AUTOSAR CAN Bus [+] 5 Serial Data	(13) I	(13) —
(14) 14	(14) 0.35	(14) BU / YE	(14) 4984	(14) AUTOSAR CAN Bus [-] 5 Serial Data	(14) I	(14) —
15	—	—	—	Not Occupied	—	—
(16) 16	(16) 0.35	(16) WH	(16) 7232	(16) Ethernet Bus 15 [-]	(16) II	(16) —
(17) 17	(17) 0.35	(17) YE	(17) 7233	(17) Ethernet Bus 15 [+]	(17) II	(17) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
18	—	—	—	Not Occupied	—	—
(19) 19	(19) 0.35	(19) YE	(19) 8579	(19) Automotive Audio Bus A2B Serial Data 1 [-]	(19) II	(19) —
(20) 20	(20) 0.35	(20) WH	(20) 8580	(20) Automotive Audio Bus A2B Serial Data 1 [+]	(20) II	(20) —

K299 Audio/Video Interface Module X2 (USN)



6175343

Connector Part Information
- Harness Type: Front Floor Console Wiring Harness
- OEM Connector: 111146-7103
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 12-Way M 2.0 HSAL-2 Series(GY)

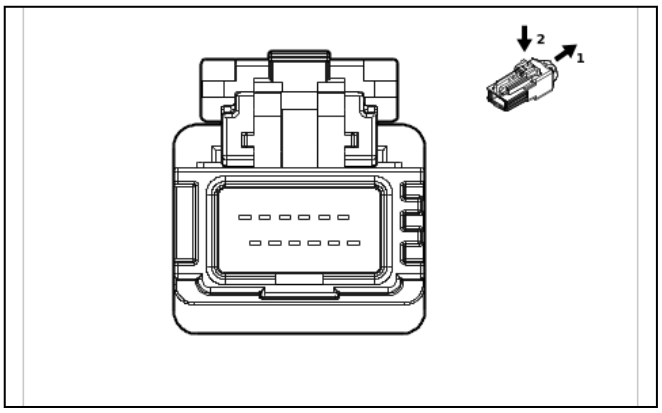
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

K299 Audio/Video Interface Module X2 (USN)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) —	(1) BARE	(1) 12152	(1) Front Passenger Infotainment Display LVDS (Low Voltage Differential Signaling) Low Reference	(1) I	(1) —
(2) 2	(2) —	(2) BARE	(2) 12153	(2) Front Passenger Infotainment Display LVDS (Low Voltage Differential Signaling) Signal [+]	(2) I	(2) —
(3) 3	(3) —	(3) BARE	(3) 12154	(3) Front Passenger Infotainment Display LVDS (Low Voltage Differential Signaling) Signal [-]	(3) I	(3) —

K299 Audio/Video Interface Module X3 (USN)



6186830

Connector Part Information

- Harness Type: Front Floor Console Wiring Harness
- OEM Connector: 13551157
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 12-Way M 2.0 HSAL-2 Series(BN)

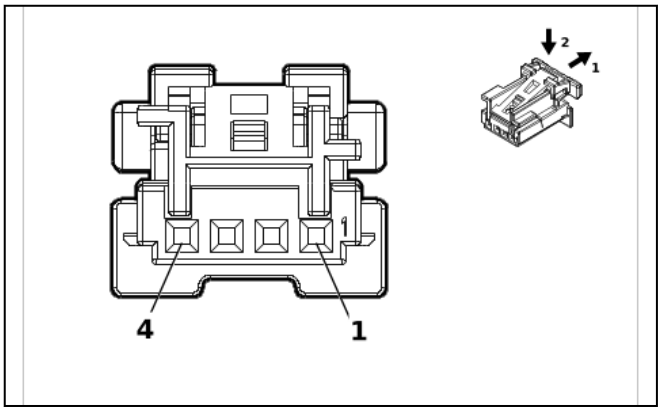
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

K299 Audio/Video Interface Module X3 (USN)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) —	(1) BARE	(1) 12673	(1) Front Passenger Infotainment Auxiliary Audio/Video Jack LVDS (Low Voltage Differential Signaling) Low Reference	(1) I	(1) —
(2) 2	(2) —	(2) BARE	(2) 12674	(2) Front Passenger Infotainment Auxiliary Audio/Video Jack LVDS (Low Voltage Differential Signaling) Signal [+]	(2) I	(2) —
(3) 3	(3) —	(3) BARE	(3) 12675	(3) Front Passenger Infotainment Auxiliary Audio/Video Jack LVDS (Low Voltage Differential Signaling) Signal [-]	(3) I	(3) —

M4P Programmable Air Inlet Valve Actuator



4997407

Connector Part Information

- Harness Type: HVAC Assembly Wiring Harness
- OEM Connector: 13511018
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 0.64 Micro-Quadlock Series(BK)

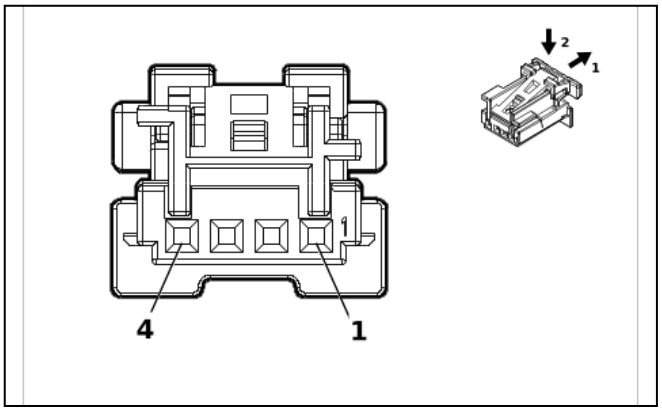
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

M4P Programmable Air Inlet Valve Actuator

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) BK	(1) 1050	(1) Ground	(1) I	(1) —
(2) 2	(2) 0.35	(2) GN / VT	(2) 2852	(2) Body Control Module LIN Bus 6	(2) I	(2) —
(3) 3	(3) 0.35	(3) BK	(3) 1050	(3) Ground	(3) I	(3) —
(4) 4	(4) 0.35	(4) WH / YE	(4) 4634	(4) HVAC Remote Enable Signal	(4) I	(4) —

M6PL Programmable Temperature Valve Actuator - Left



4997407

Connector Part Information

- Harness Type: HVAC Assembly Wiring Harness
- OEM Connector: 13511018
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 0.64 Micro-Quadlock Series(BK)

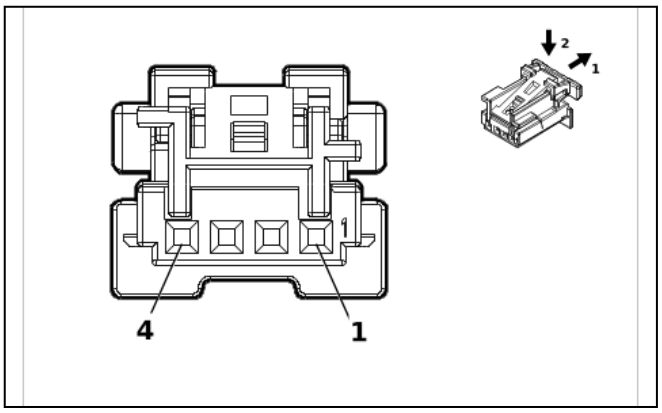
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

M6PL Programmable Temperature Valve Actuator - Left

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) BK	(1) 1050	(1) Ground	(1) I	(1) —
(2) 2	(2) 0.35	(2) GN / VT	(2) 2852	(2) Body Control Module LIN Bus 6	(2) I	(2) —
(3) 3	(3) 0.35	(3) BK	(3) 1050	(3) Ground	(3) I	(3) —
(4) 4	(4) 0.35	(4) WH / YE	(4) 4634	(4) HVAC Remote Enable Signal	(4) I	(4) —

M6PR Programmable Temperature Valve Actuator - Right (CJ2)



4997407

Connector Part Information

- Harness Type: HVAC Assembly Wiring Harness
- OEM Connector: 13511018
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 0.64 Micro-Quadlock Series(BK)

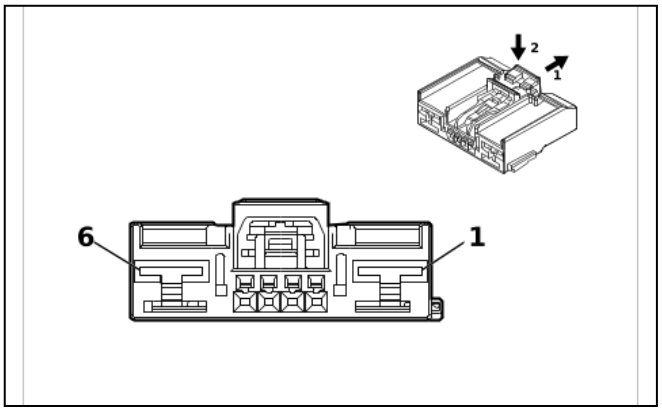
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

M6PR Programmable Temperature Valve Actuator - Right (CJ2)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) BK	(1) 1050	(1) Ground	(1) I	(1) —
(2) 2	(2) 0.35	(2) GN / VT	(2) 2852	(2) Body Control Module LIN Bus 6	(2) I	(2) —
3	—	—	—	Not Occupied	—	—
(4) 4	(4) 0.35	(4) WH / YE	(4) 4634	(4) HVAC Remote Enable Signal	(4) I	(4) —

M8 Blower Motor



4650258

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 7289-7139-30
- Service Connector: 19356432
- Description: 6-Way F 0.64, 6.3 Series(BK)

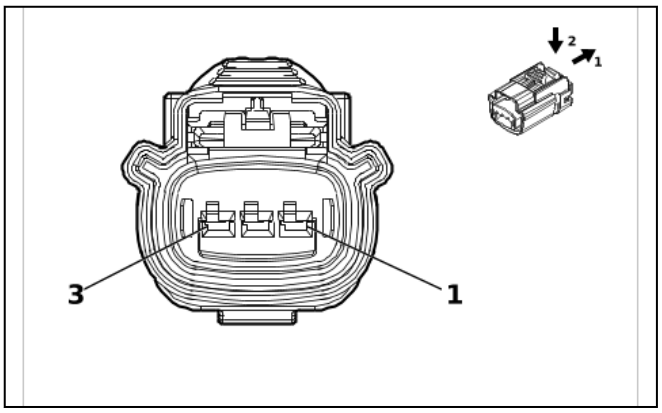
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-42 (RD)	No Tool Required
II	Not required	J-35616-64B (L-BU)	No Tool Required

M8 Blower Motor

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 4	(1) RD / GY	(1) 1740	(1) Battery Positive Voltage	(1) I	(1) —
(2) 2	(2) 0.35	(2) BU / GY	(2) 754	(2) Blower Motor Speed Control	(2) II	(2) —
(3) 3	(3) 0.35	(3) GN / BU	(3) 761	(3) Blower Speed Feedback Signal	(3) II	(3) —
4 - 5	—	—	—	Not Occupied	—	—
(6) 6	(6) 4	(6) BK	(6) 1050	(6) Ground	(6) I	(6) —

M10 Charge Air Cooler Coolant Pump (LZ0)



5765306

Connector Part Information

- Harness Type: Charge Air Cooler Pump Wiring Harness
- OEM Connector: 15514762
- Service Connector: Service by Harness - See Part Catalog
- Description: 3-Way F 1.5 YESC Series, Sealed(BK)

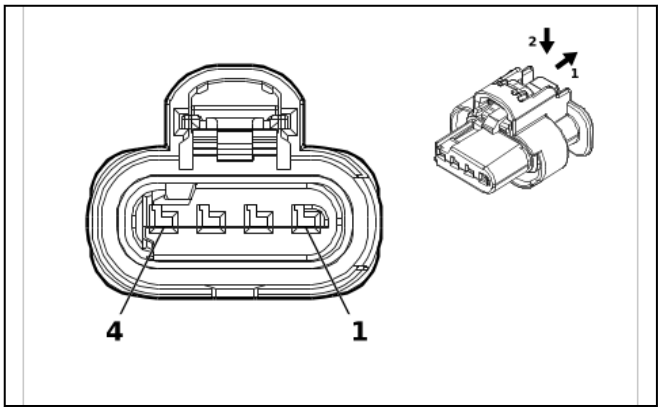
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required

M10 Charge Air Cooler Coolant Pump (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1	(1) VT / BU	(1) 5294	(1) Powertrain Main Relay Fused Supply Voltage 5	(1) I	(1) —
(2) 2	(2) 0.5	(2) GN / VT	(2) 4621	(2) Engine Control Module LIN Bus 1	(2) I	(2) —
(3) 3	(3) 1	(3) BK	(3) 6550	(3) Ground	(3) I	(3) —

M26 Front Drive Axle Actuator (F48)



4210809

Connector Part Information

- Harness Type: Front Axle Wiring Harness
- OEM Connector: 1-2296696-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 1.2 MCON-CB Series, Sealed(BK)

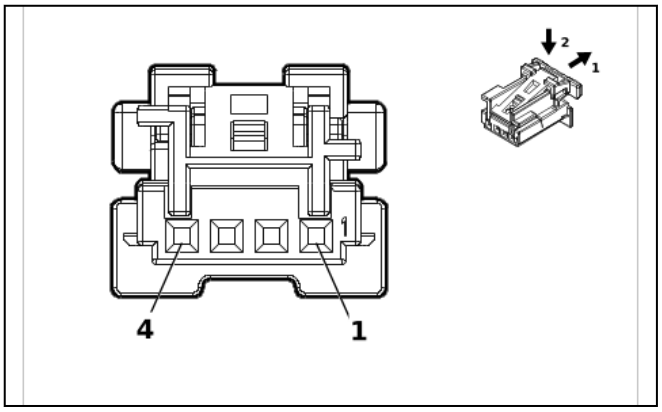
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

M26 Front Drive Axle Actuator (F48)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GN	(1) 8016	(1) Secondary Axle Motor Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) GY / BK	(2) 1570	(2) Front Axle Actuator Control	(2) I	(2) —
(3) 3	(3) 0.5	(3) YE / WH	(3) 1695	(3) 4WD Locked Range Indicator Control	(3) I	(3) —
(4) 4	(4) 0.5	(4) BK	(4) 450	(4) Ground	(4) I	(4) —

M37P Programmable Mode Valve Actuator



4997407

Connector Part Information

- Harness Type: HVAC Assembly Wiring Harness
- OEM Connector: 13511018
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 0.64 Micro-Quadlock Series(BK)

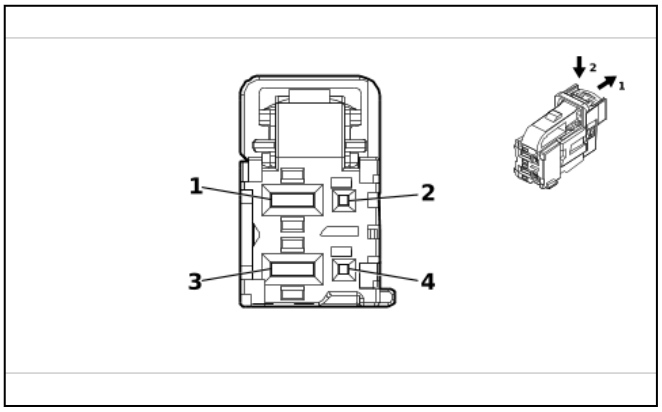
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

M37P Programmable Mode Valve Actuator

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) BK	(1) 1050	(1) Ground	(1) I	(1) —
(2) 2	(2) 0.35	(2) GN / VT	(2) 2852	(2) Body Control Module LIN Bus 6	(2) I	(2) —
3	—	—	—	Not Occupied	—	—
(4) 4	(4) 0.35	(4) WH / YE	(4) 4634	(4) HVAC Remote Enable Signal	(4) I	(4) —

M50D Front Seat Tilt Adjuster Actuator - Driver (A2X)



7150028

Connector Part Information
- Harness Type: Front Seat Wiring Harness - Driver
- OEM Connector: 86350846
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 0.64 MSK, 2.8 MAK Series(BK)

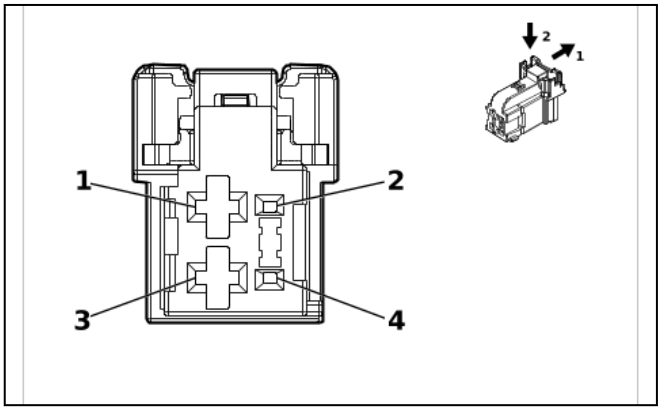
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-4A (PU)	No Tool Required

M50D Front Seat Tilt Adjuster Actuator - Driver (A2X)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1.5	(1) BU / VT	(1) 287	(1) Driver Seat Front Vertical Motor Down Control	(1) I	(1) —
(3) 3	(3) 1.5	(3) GN / BN	(3) 286	(3) Driver Seat Front Vertical Motor Up Control	(3) I	(3) —

M50P Front Seat Tilt Adjuster Actuator - Passenger (A7K)



5410027

Connector Part Information
- Harness Type: Front Seat Wiring Harness - Passenger
- OEM Connector: 2316171-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 0.64, 2.8 Series(BK)

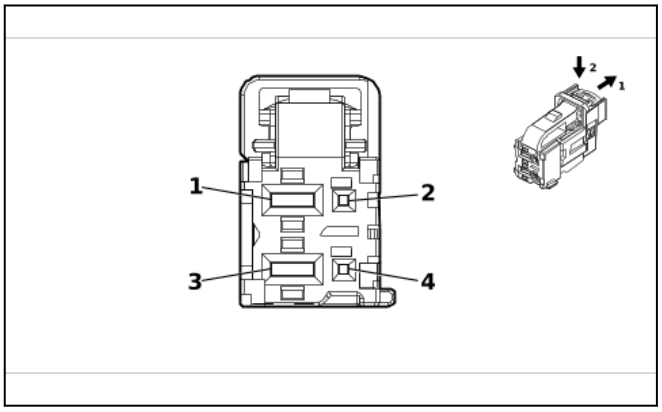
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-4A (PU)	No Tool Required

M50P Front Seat Tilt Adjuster Actuator - Passenger (A7K)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1.5	(1) GN / VT	(1) 297	(1) Passenger Seat Front Vertical Motor Up Control	(1) I	(1) —
2	—	—	—	Not Occupied	—	—
(3) 3	(3) 1.5	(3) GN / BU	(3) 298	(3) Passenger Seat Front Vertical Motor Down Control	(3) I	(3) —
4	—	—	—	Not Occupied	—	—

M51D Front Seat Adjuster Actuator - Driver (A2X)



7150028

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Driver
- OEM Connector: 86350846
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 0.64 MSK, 2.8 MAK Series(BK)

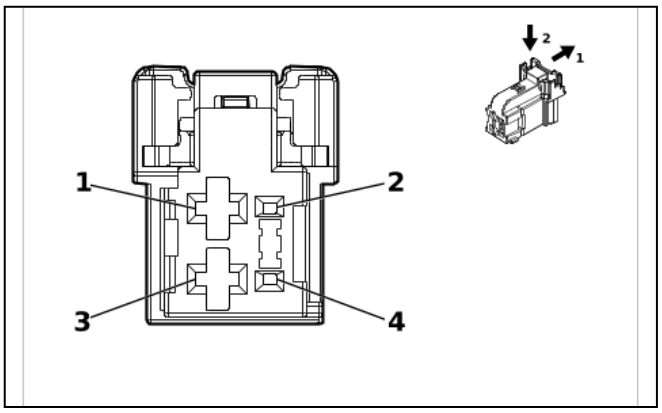
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-4A (PU)	No Tool Required

M51D Front Seat Adjuster Actuator - Driver (A2X)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1.5	(1) GY / GN	(1) 284	(1) Driver Seat Horizontal Motor Rearward Control	(1) I	(1) —
(3) 3	(3) 1.5	(3) YE / BU	(3) 285	(3) Driver Seat Horizontal Motor Forward Control	(3) I	(3) —

M51P Front Seat Adjuster Actuator - Passenger (A7K)



5410027

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Passenger
- OEM Connector: 2316171-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 0.64, 2.8 Series(BK)

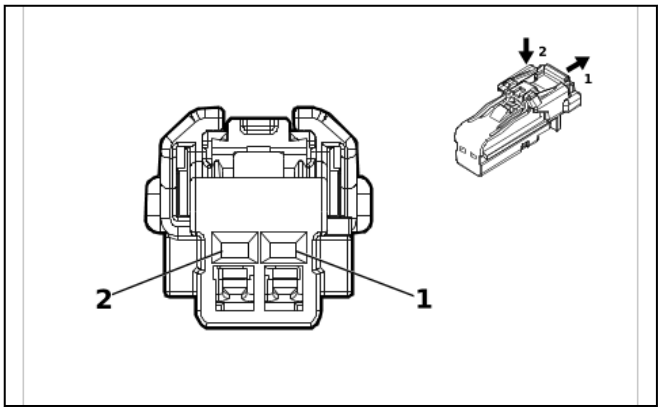
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-4A (PU)	No Tool Required

M51P Front Seat Adjuster Actuator - Passenger (A7K)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1.5	(1) YE / BU	(1) 290	(1) Passenger Seat Horizontal Motor Rearward Control	(1) I	(1) —
2	—	—	—	Not Occupied	—	—
(3) 3	(3) 1.5	(3) YE / WH	(3) 296	(3) Passenger Seat Horizontal Motor Forward Control	(3) I	(3) —
4	—	—	—	Not Occupied	—	—

M53D Front Seat Back Lumbar Motor - Driver (A2X - AVK)



4115691

Connector Part Information
- Harness Type: Front Seat Wiring Harness - Driver
- OEM Connector: 6098-8988
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series(BK)

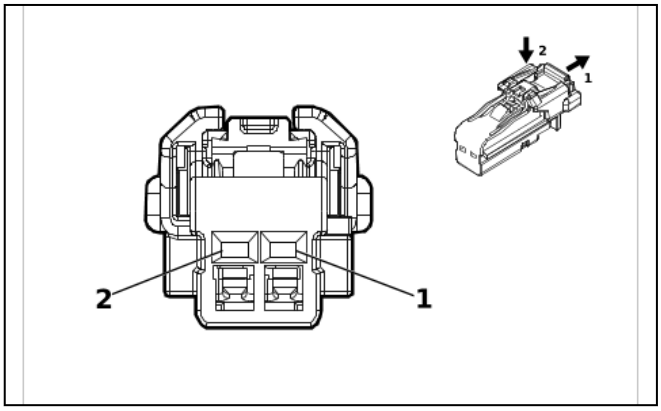
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

M53D Front Seat Back Lumbar Motor - Driver (A2X - AVK)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BU	(1) 611	(1) Driver Seat Lumbar Support Motor Forward Control	(1) I	(1) —
(2) 2	(2) 0.75	(2) VT	(2) 610	(2) Driver Seat Lumbar Support Motor Backward Control	(2) I	(2) —

M53P Front Seat Back Lumbar Motor - Passenger (A7K - AVU)



4115691

Connector Part Information
- Harness Type: Front Seat Wiring Harness - Passenger
- OEM Connector: 6098-8988
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series(BK)

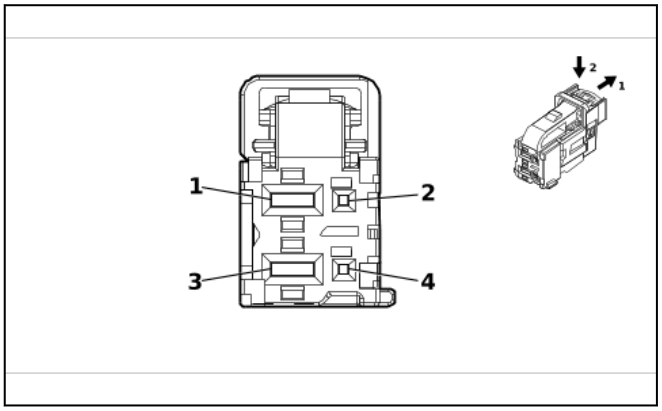
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

M53P Front Seat Back Lumbar Motor - Passenger (A7K - AVU)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BU	(1) 211	(1) Passenger Seat Lumbar Support Motor Forward Control	(1) I	(1) —
(2) 2	(2) 0.75	(2) VT	(2) 210	(2) Passenger Seat Lumbar Support Motor Backward Control	(2) I	(2) —

M55D Front Seat Vertical Adjuster Actuator - Driver (A2X)



7150028

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Driver
- OEM Connector: 86350846
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 0.64 MSK, 2.8 MAK Series(BK)

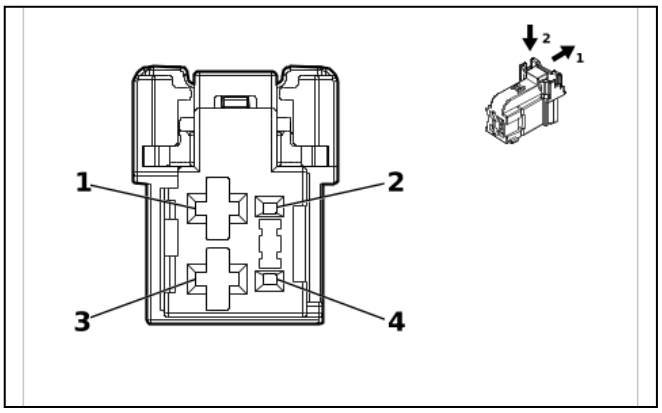
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-4A (PU)	No Tool Required

M55D Front Seat Vertical Adjuster Actuator - Driver (A2X)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1.5	(1) GY / BU	(1) 283	(1) Driver Seat Rear Vertical Motor Down Control	(1) I	(1) —
(3) 3	(3) 1.5	(3) YE	(3) 282	(3) Driver Seat Rear Vertical Motor Up Control	(3) I	(3) —

M55P Front Seat Vertical Adjuster Actuator - Passenger (A7K)



5410027

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Passenger
- OEM Connector: 2316171-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 0.64, 2.8 Series(BK)

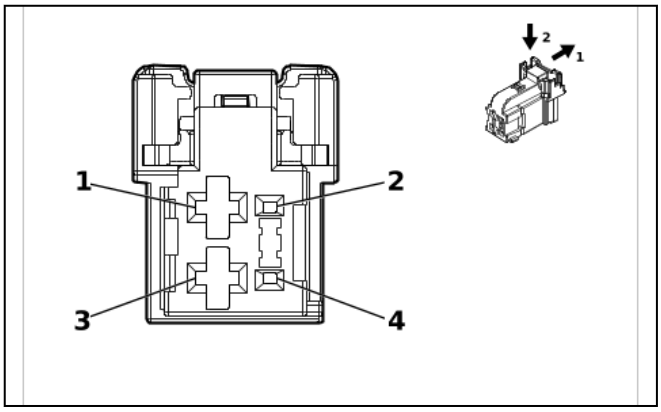
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-4A (PU)	No Tool Required

M55P Front Seat Vertical Adjuster Actuator - Passenger (A7K)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1.5	(1) BU / WH	(1) 289	(1) Passenger Seat Rear Vertical Motor Down Control	(1) I	(1) —
2	—	—	—	Not Occupied	—	—
(3) 3	(3) 1.5	(3) GN / WH	(3) 288	(3) Passenger Seat Rear Vertical Motor Up Control	(3) I	(3) —
4	—	—	—	Not Occupied	—	—

M56D Front Seat Recliner Actuator - Driver (A2X)



5410027

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Driver
- OEM Connector: 2316171-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 0.64, 2.8 Series(BK)

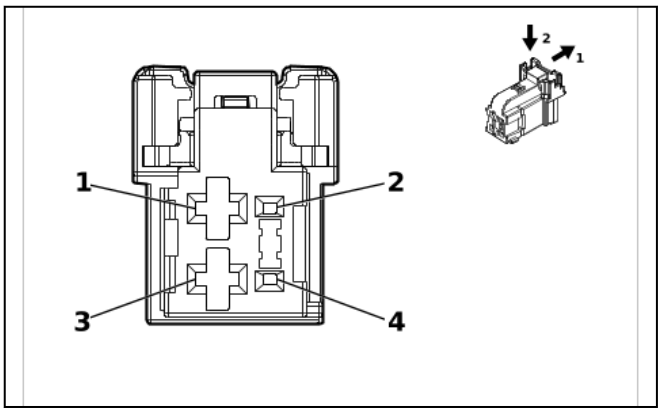
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-4A (PU)	No Tool Required

M56D Front Seat Recliner Actuator - Driver (A2X)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1.5	(1) GN / YE	(1) 276	(1) Driver Seat Recline Motor Forward Control	(1) I	(1) —
2	—	—	—	Not Occupied	—	—
(3) 3	(3) 1.5	(3) BU / YE	(3) 277	(3) Driver Seat Recline Motor Rearward Control	(3) I	(3) —
4	—	—	—	Not Occupied	—	—

M56P Front Seat Recliner Actuator - Passenger (A7K)



5410027

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Passenger
- OEM Connector: 2316171-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 0.64, 2.8 Series(BK)

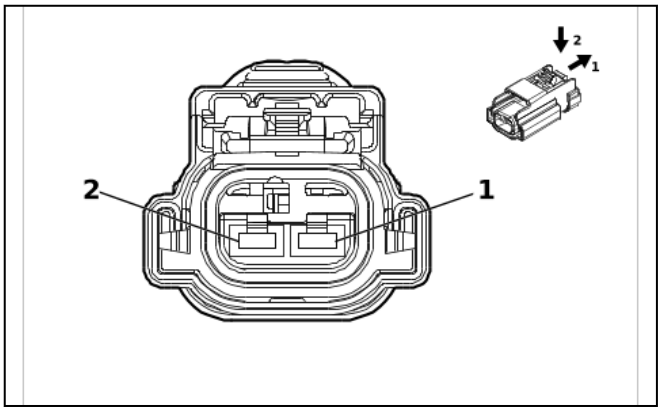
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-4A (PU)	No Tool Required

M56P Front Seat Recliner Actuator - Passenger (A7K)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1.5	(1) GN	(1) 76	(1) Passenger Seat Recline Motor Forward Control	(1) I	(1) —
2	—	—	—	Not Occupied	—	—
(3) 3	(3) 1.5	(3) BU / BN	(3) 77	(3) Passenger Seat Recline Motor Rearward Control	(3) I	(3) —
4	—	—	—	Not Occupied	—	—

M63 Rear Sliding Window Motor (A48)



5795169

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 35286783
- Service Connector: 19301518
- Description: 2-Way F 2.8 APEX Series, Sealed(BK)

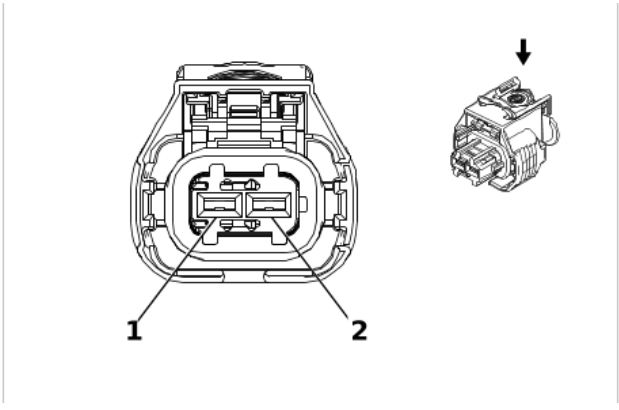
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-35 (VT)	No Tool Required

M63 Rear Sliding Window Motor (A48)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 2.5	(1) YE	(1) 7454	(1) Window Motor Rear Auxiliary Close Control	(1) I	(1) —
(2) 2	(2) 2.5	(2) VT / YE	(2) 7453	(2) Window Motor Rear Auxiliary Open Control	(2) I	(2) —

M64 Starter X1 (L4B / L76 / L78)



2577394

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 1 928 405 714
- Service Connector: 13384371
- Description: 2-Way F 2.8 Series, Sealed(BK)

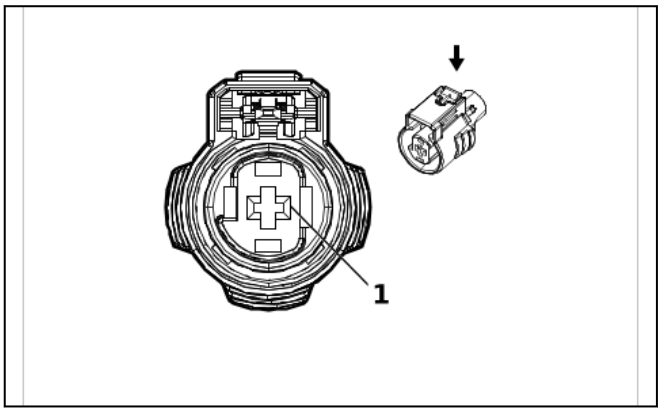
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-35 (VT)	No Tool Required

M64 Starter X1 (L4B / L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 2.5	(1) YE	(1) 6	(1) Starter Solenoid Crank Ignition Voltage	(1) I	(1) —
(2) 2	(2) 2.5	(2) YE / GN	(2) 4358	(2) Starter Pinion Solenoid Voltage	(2) I	(2) —

M64 Starter X1 (LZ0)



2717134

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 2098198-5
- Service Connector: 19300471
- Description: 1-Way F 2.8 MCP Series, Sealed(BK)

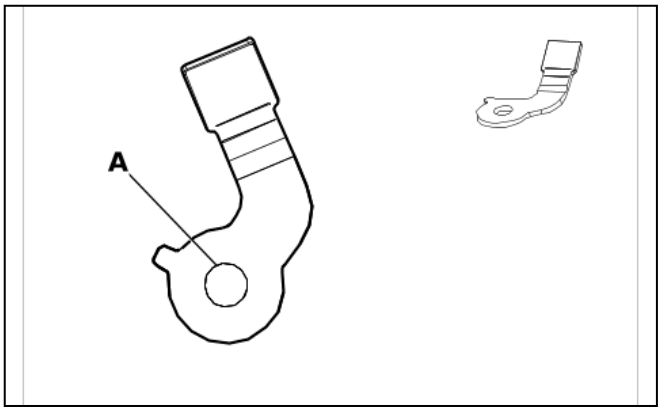
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-4A (PU)	No Tool Required

M64 Starter X1 (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 2.5	(1) YE	(1) 6	(1) Starter Solenoid Crank Ignition Voltage	(1) I	(1) —

M64 Starter X2 (L4B)



7154294

Connector Part Information
- Harness Type: Starter Generator Positive Cable
- OEM Connector: 85770289
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way Ring Terminal

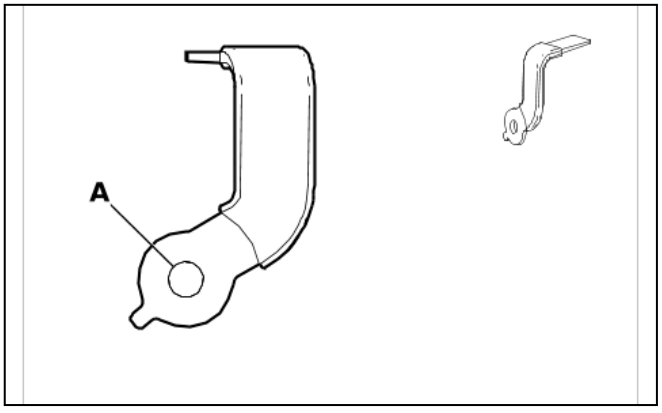
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

M64 Starter X2 (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	35	RD / YE	2	Battery Positive Voltage	I	L4B

M64 Starter X2 (L76 / L78)



7150040

Connector Part Information
- Harness Type: Starter Solenoid Cable
- OEM Connector: 86281557
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way Ring Terminal

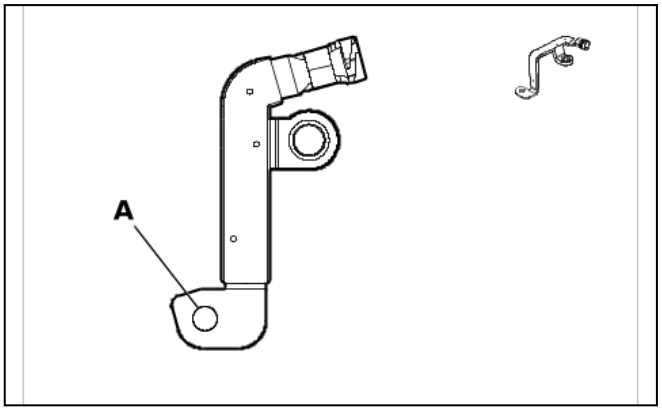
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

M64 Starter X2 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	35	RD / YE	2	Battery Positive Voltage	I	L76/ L78

M64 Starter X2 (LZ0)



5911297

Connector Part Information

- Harness Type: Starter Solenoid Cable
- OEM Connector: 86583844
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way Ring Terminal

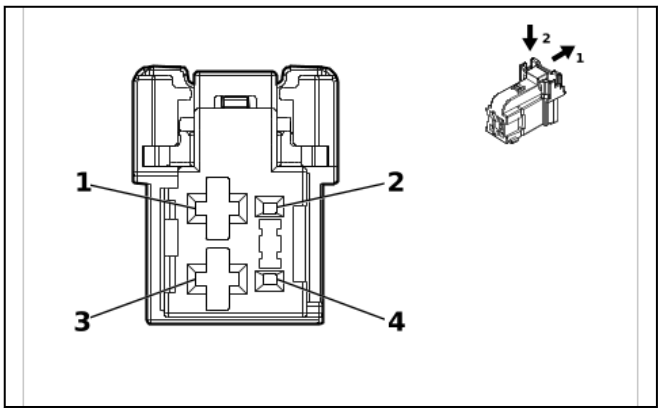
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

M64 Starter X2 (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	35	RD / YE	2	Battery Positive Voltage	I	LZ0

M65 Steering Column Telescope Actuator (N38)



5410027

Connector Part Information

- Harness Type: Steering Column Tilt and Telescope Wheel Actuator Motor Harness
- OEM Connector: 2316171-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 0.64, 2.8 Series(BK)

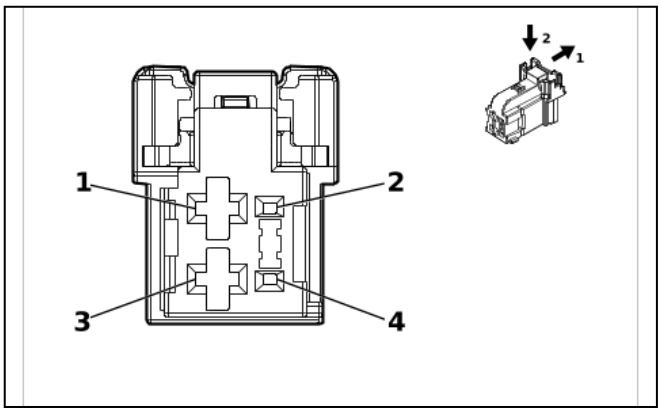
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

M65 Steering Column Telescope Actuator (N38)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1	(1) GN	(1) 2098	(1) Steering Column Telescope Motor Forward Control	(1) I	(1) —
(2) 2	(2) 0.35	(2) YE	(2) 2153	(2) Steering Column Telescope Motor Signal	(2) I	(2) —
(3) 3	(3) 1	(3) RD	(3) 2110	(3) Steering Column Telescope Motor Rearward Control	(3) I	(3) —
(4) 4	(4) 0.35	(4) WH	(4) 2152	(4) Steering Column Telescope Motor Low Reference	(4) I	(4) —

M68 Steering Column Tilt Wheel Actuator (N38)



5410027

Connector Part Information

- Harness Type: Steering Column Tilt and Telescope Wheel Actuator Motor Harness
- OEM Connector: 2316171-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 0.64, 2.8 Series(BK)

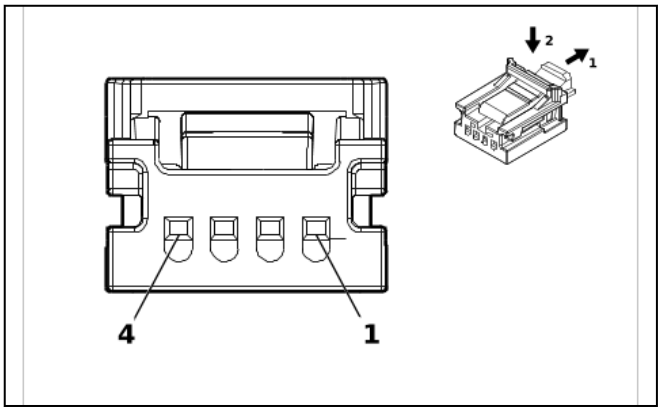
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

M68 Steering Column Tilt Wheel Actuator (N38)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1	(1) OG	(1) 2112	(1) Steering Column Tilt Motor Down Control	(1) I	(1) —
(2) 2	(2) 0.35	(2) BN	(2) 2154	(2) Steering Column Tilt Motor Signal	(2) I	(2) —
(3) 3	(3) 1	(3) VT	(3) 2111	(3) Steering Column Tilt Motor Up Control	(3) I	(3) —
(4) 4	(4) 0.35	(4) BU	(4) 2157	(4) Steering Column Tilt Motor Low Reference	(4) I	(4) —

M73A Front Seat Back Ventilation Blower - Driver (KU9)



5493278

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Driver
- OEM Connector: 34791-5140
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F Mini 50 Series(BK)

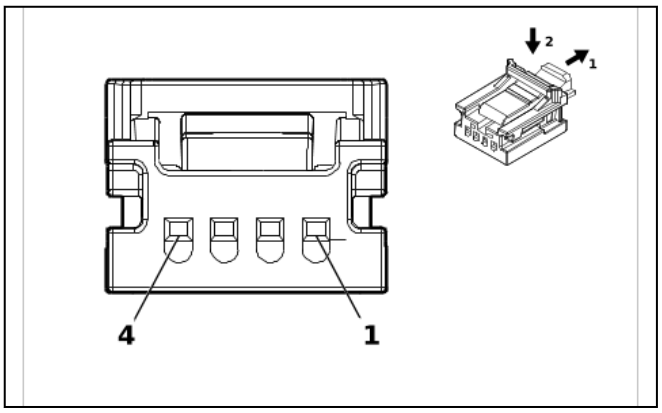
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	EL-35616-58 (BK)	No Tool Required

M73A Front Seat Back Ventilation Blower - Driver (KU9)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) VT / WH	(1) 1139	(1) Run/Crank Ignition 1 Voltage	(1) I	(1) —
(2) 2	(2) 0.75	(2) BK	(2) 1550	(2) Ground	(2) I	(2) —
(3) 3	(3) 0.5	(3) GN / VT	(3) 5906	(3) Driver Seat Blower Motor Control 1	(3) I	(3) —
4	—	—	—	Not Occupied	—	—

M73B Front Seat Back Ventilation Blower - Passenger (KU9)



5493278

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Passenger
- OEM Connector: 34791-5140
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F Mini 50 Series(BK)

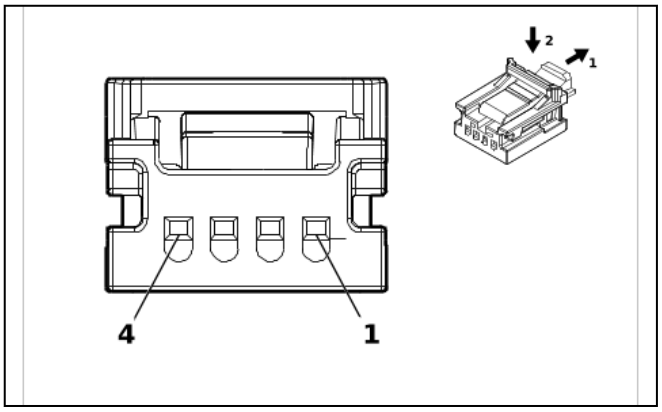
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	EL-35616-58 (BK)	No Tool Required

M73B Front Seat Back Ventilation Blower - Passenger (KU9)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) VT / WH	(1) 1139	(1) Run/Crank Ignition 1 Voltage	(1) I	(1) —
(2) 2	(2) 0.75	(2) BK	(2) 1350	(2) Ground	(2) I	(2) —
(3) 3	(3) 0.5	(3) VT / WH	(3) 5908	(3) Passenger Seat Blower Motor Control 1	(3) I	(3) —
4	—	—	—	Not Occupied	—	—

M73D Front Seat Cushion Ventilation Blower - Driver (KU9)



5493278

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Driver
- OEM Connector: 34791-5140
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F Mini 50 Series(BK)

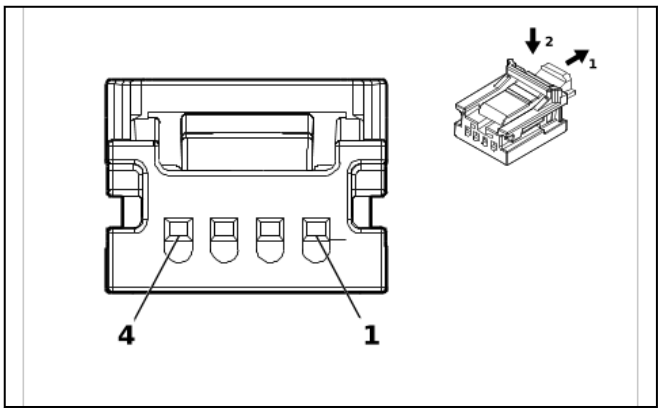
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	EL-35616-58 (BK)	No Tool Required

M73D Front Seat Cushion Ventilation Blower - Driver (KU9)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) VT / WH	(1) 1139	(1) Run/Crank Ignition 1 Voltage	(1) I	(1) —
(2) 2	(2) 0.75	(2) BK	(2) 1550	(2) Ground	(2) I	(2) —
(3) 3	(3) 0.5	(3) GN / VT	(3) 5906	(3) Driver Seat Blower Motor Control 1	(3) I	(3) —
4	—	—	—	Not Occupied	—	—

M73P Front Seat Cushion Ventilation Blower - Passenger (KU9)



5493278

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Passenger
- OEM Connector: 34791-5140
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F Mini 50 Series(BK)

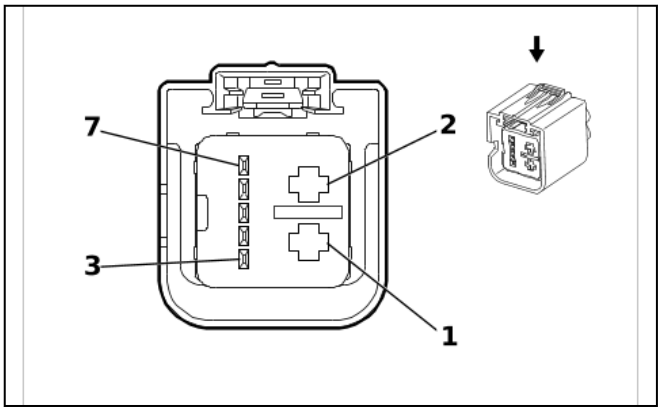
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	EL-35616-58 (BK)	No Tool Required

M73P Front Seat Cushion Ventilation Blower - Passenger (KU9)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) VT / WH	(1) 1139	(1) Run/Crank Ignition 1 Voltage	(1) I	(1) —
(2) 2	(2) 0.75	(2) BK	(2) 1350	(2) Ground	(2) I	(2) —
(3) 3	(3) 0.5	(3) VT / WH	(3) 5908	(3) Passenger Seat Blower Motor Control 1	(3) I	(3) —
4	—	—	—	Not Occupied	—	—

M74D Front Side Door Window Regulator Motor - Driver



2282932

Connector Part Information

- Harness Type: Front Side Door Door Wiring Harness - Driver
- OEM Connector: 13590001
- Service Connector: Service by Harness - See Part Catalog
- Description: 7-Way F 0.64, 2.8 Kaizen Timer Series, Sealed(GY)

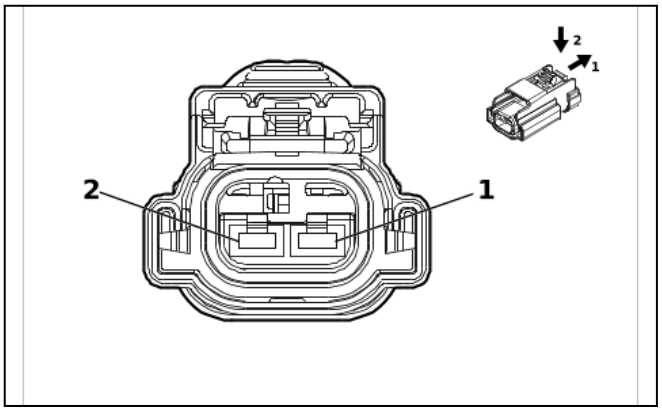
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-4A (PU)	No Tool Required
II	Not required	J-35616-64B (L-BU)	No Tool Required

M74D Front Side Door Window Regulator Motor - Driver

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 2.5	(1) BK	(1) 1550	(1) Ground	(1) I	(1) —
(2) 2	(2) 2.5	(2) RD / GY	(2) 3540	(2) Battery Positive Voltage	(2) I	(2) —
3	—	—	—	Not Occupied	—	—
(4) 4	(4) 0.5	(4) GN / YE	(4) 6134	(4) Body Control Module LIN Bus 3	(4) II	(4) —
5	—	—	—	Not Occupied	—	—
(6) 6	(6) 0.5	(6) GY	(6) 745	(6) Left Front Door Ajar Switch Signal	(6) II	(6) —
7	—	—	—	Not Occupied	—	—

M74LR Rear Side Door Window Regulator Motor - Left - 4 - Door



5795169

Connector Part Information
- Harness Type: Rear Side Door Door Wiring Harness - Left
- OEM Connector: 35286783
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 2.8 APEX Series, Sealed(BK)

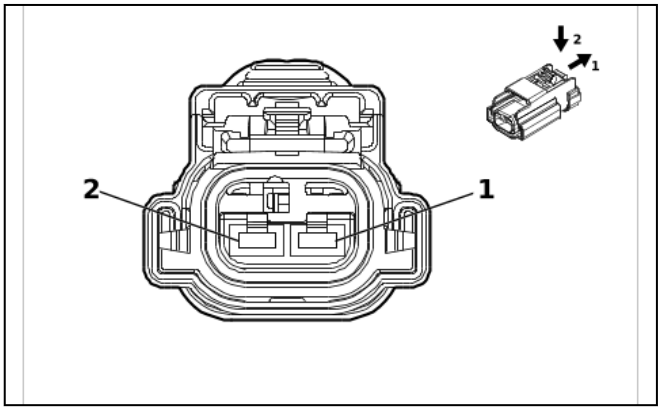
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-35 (VT)	No Tool Required

M74LR Rear Side Door Window Regulator Motor - Left - 4 - Door

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 2	(1) BU / VT	(1) 668	(1) Left Rear Window Motor Up Control	(1) I	(1) —
(2) 2	(2) 2	(2) YE / BU	(2) 669	(2) Left Rear Window Motor Down Control	(2) I	(2) —

M74P Front Side Door Window Regulator Motor - Passenger (WLM)



5795169

Connector Part Information
- Harness Type: Front Side Door Door Wiring Harness - Passenger
- OEM Connector: 35286783
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 2.8 APEX Series, Sealed(BK)

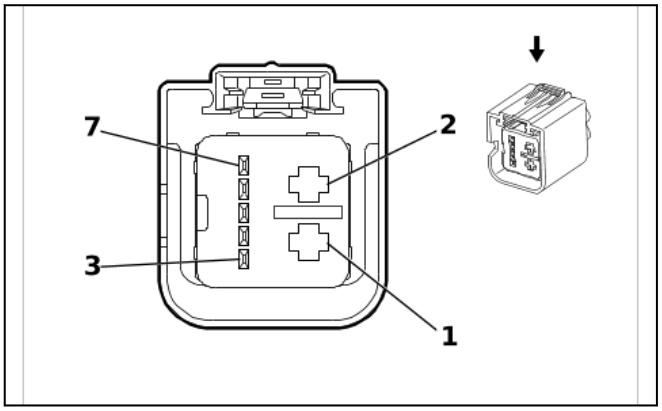
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-35 (VT)	No Tool Required

M74P Front Side Door Window Regulator Motor - Passenger (WLM)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 2	(1) GN / GY	(1) 666	(1) Right Front Window Motor Up Control	(1) I	(1) —
(2) 2	(2) 2	(2) YE / BU	(2) 667	(2) Right Front Window Motor Down Control	(2) I	(2) —

M74P Front Side Door Window Regulator Motor - Passenger (WLN)



2282932

Connector Part Information

- Harness Type: Front Side Door Door Wiring Harness - Passenger
- OEM Connector: 13590001
- Service Connector: Service by Harness - See Part Catalog
- Description: 7-Way F 0.64, 2.8 Kaizen Timer Series, Sealed(GY)

Terminal Part Information

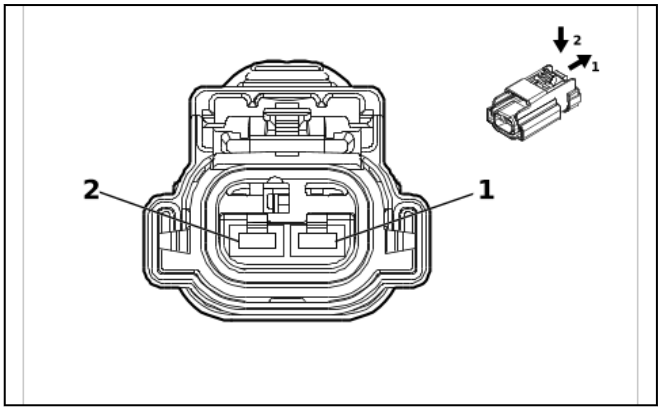
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-4A (PU)	No Tool Required
II	Not required	J-35616-64B (L-BU)	No Tool Required

M74P Front Side Door Window Regulator Motor - Passenger (WLN)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 2.5	(1) BK	(1) 1350	(1) Ground	(1) I	(1) —
(2) 2	(2) 2.5	(2) RD / BN	(2) 4240	(2) Battery Positive Voltage	(2) I	(2) —
3	—	—	—	Not Occupied	—	—
(4) 4	(4) 0.5	(4) GN / YE	(4) 6134	(4) Body Control Module LIN Bus 3	(4) II	(4) —
5	—	—	—	Not Occupied	—	—

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(6) 6	(6) 0.5	(6) GY	(6) 746	(6) Right Front Door Ajar Switch Signal	(6) II	(6) —
7	—	—	—	Not Occupied	—	—

M74RR Rear Side Door Window Regulator Motor - Right - 4 - Door



5795169

Connector Part Information

- Harness Type: Rear Side Door Door Wiring Harness - Right
- OEM Connector: 35286783
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 2.8 APEX Series, Sealed(BK)

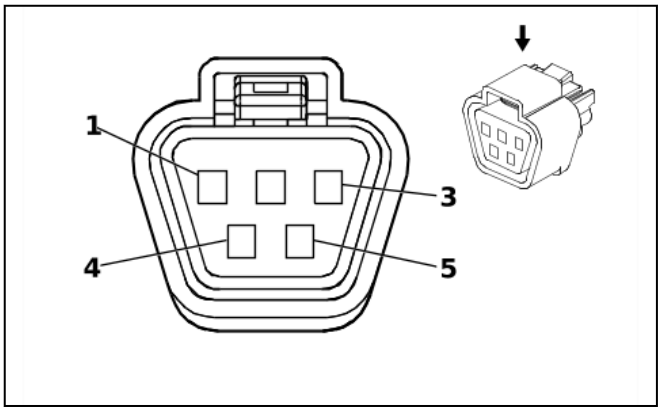
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-35 (VT)	No Tool Required

M74RR Rear Side Door Window Regulator Motor - Right - 4 - Door

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 2	(1) BU / GY	(1) 670	(1) Right Rear Window Motor Up Control	(1) I	(1) —
(2) 2	(2) 2	(2) GN / BK	(2) 671	(2) Right Rear Window Motor Down Control	(2) I	(2) —

M75 Windshield Wiper Motor



1715213

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 6189-0587
- Service Connector: 13587179
- Description: 5-Way F 090 Series, Sealed(BK)

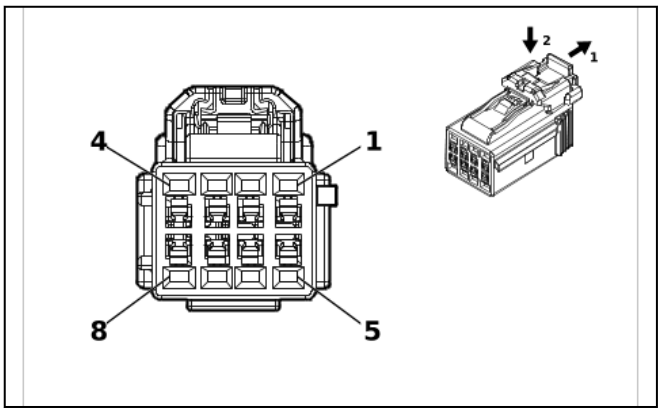
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-18 (BK)	No Tool Required

M75 Windshield Wiper Motor

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 2	(1) YE / BN	(1) 95	(1) Windshield Wiper Motor Low Speed Control	(1) I	(1) —
2	—	—	—	Not Occupied	—	—
(3) 3	(3) 0.35	(3) BN / GN	(3) 196	(3) Windshield Wiper Motor Park Switch Signal	(3) I	(3) —
(4) 4	(4) 2	(4) WH	(4) 92	(4) Windshield Wiper Motor High Speed Control	(4) I	(4) —
(5) 5	(5) 2	(5) BK	(5) 150	(5) Ground	(5) I	(5) —

M81 Sunroof Sunshade Motor (CAJ)



5086387

Connector Part Information

- Harness Type: Sunroof Wiring Harness
- OEM Connector: 6098-8443
- Service Connector: Service by Harness - See Part Catalog
- Description: 8-Way F 1.2 Series(BK)

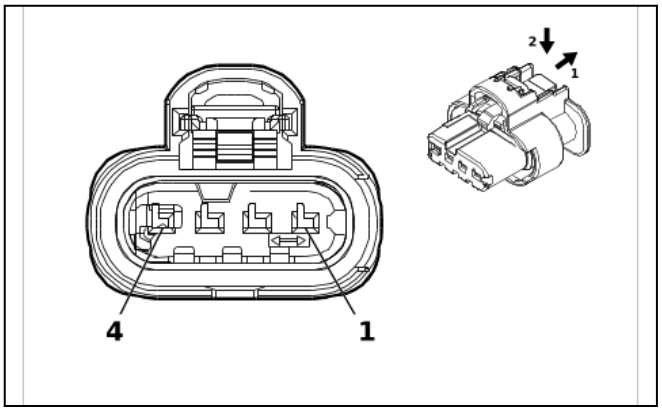
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

M81 Sunroof Sunshade Motor (CAJ)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1.5	(1) VT	(1) 3782	(1) Front Sunshade Motor Close Control	(1) I	(1) —
2	—	—	—	Not Occupied	—	—
(3) 3	(3) 0.5	(3) BU	(3) 10287	(3) Front Sunshade Motor X Position Sensor Signal	(3) I	(3) —
(4) 4	(4) 0.35	(4) WH	(4) 10285	(4) Front Sunshade Motor Position Sensor Low Reference	(4) I	(4) —
(5) 5	(5) 0.5	(5) YE	(5) 10288	(5) Front Sunshade Motor Y Position Sensor Signal	(5) I	(5) —
(6) 6	(6) 0.35	(6) GY	(6) 10286	(6) Front Sunshade Motor Position Sensor High Reference	(6) I	(6) —
7	—	—	—	Not Occupied	—	—
(8) 8	(8) 1.5	(8) BN	(8) 3781	(8) Front Sunroof Sunshade Motor Open Control	(8) I	(8) —

M96A Active Grille Air Shutter Actuator 1 (VTI / WMI)



4934614

Connector Part Information

- Harness Type: Air Shutter Wiring Harness - Upper
- OEM Connector: 1-2296696-2
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 1.2 MCON-CB Series, Sealed(BK)

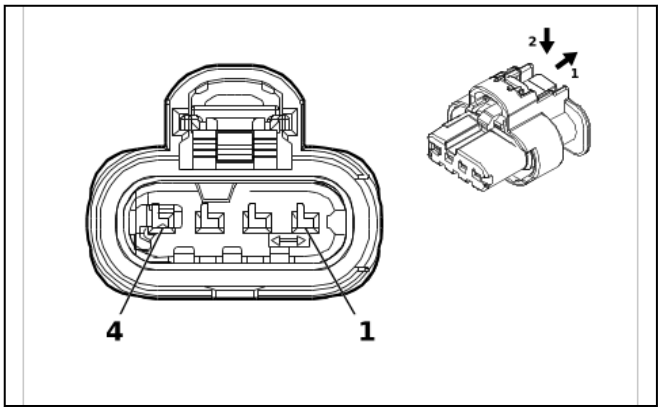
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

M96A Active Grille Air Shutter Actuator 1 (VTI / WMI)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) VT / BU	(1) 5705	(1) Powertrain Main Relay Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) GN / VT	(2) 4621	(2) Engine Control Module LIN Bus 1	(2) I	(2) —
3	—	—	—	Not Occupied	—	—
(4) 4	(4) 0.5	(4) BK	(4) 450	(4) Ground	(4) I	(4) —

M96B Active Grille Air Shutter Actuator 2 (WMI)



4934614

Connector Part Information

- Harness Type: Air Shutter Wiring Harness - Lower
- OEM Connector: 1-2296696-2
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 1.2 MCON-CB Series, Sealed(BK)

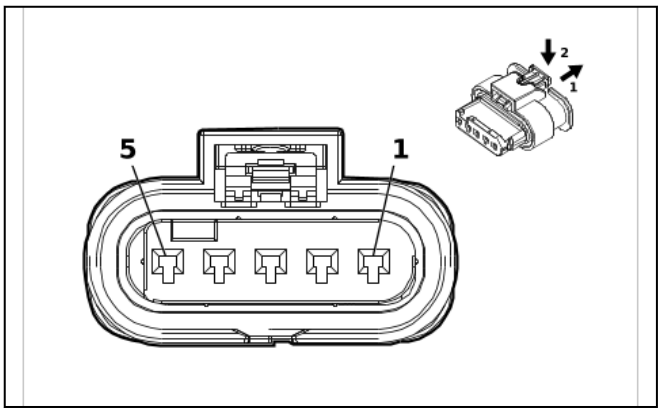
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

M96B Active Grille Air Shutter Actuator 2 (WMI)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) VT / BU	(1) 5705	(1) Powertrain Main Relay Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) GN / VT	(2) 4621	(2) Engine Control Module LIN Bus 1	(2) I	(2) —
(3) 3	(3) 0.5	(3) BK	(3) 450	(3) Ground	(3) I	(3) —
(4) 4	(4) 0.5	(4) BK	(4) 450	(4) Ground	(4) I	(4) —

M103 Turbocharger Vane Position Actuator (LZ0)



3338689

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 1-1718806-1
- Service Connector: 19119351
- Description: 5-Way F 1.2 MCON-LL Series, Sealed(BK)

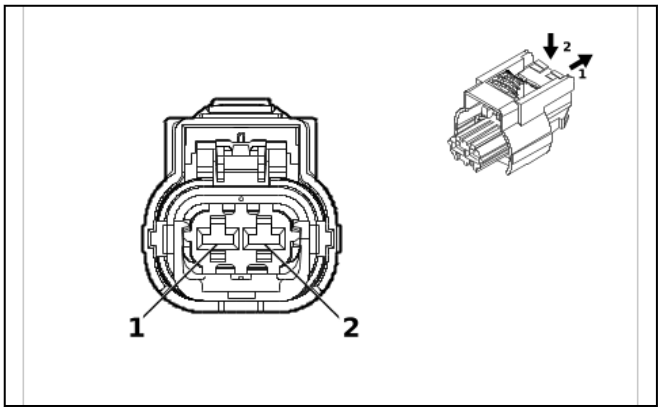
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

M103 Turbocharger Vane Position Actuator (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) WH / BN	(1) 1313	(1) Variable Geometry Turbocharger Position Sensor Motor Open Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) VT / YE	(2) 5947	(2) Turbocharger Vane Position Sensor Signal	(2) I	(2) —
(3) 3	(3) 0.5	(3) BK / GN	(3) 580	(3) Engine Control Sensors Low Reference 2	(3) I	(3) —
(4) 4	(4) 0.5	(4) WH / RD	(4) 480	(4) Engine Control Vehicle Sensors 5 Volt Reference 1	(4) I	(4) —
(5) 5	(5) 0.75	(5) GY / BK	(5) 1330	(5) Variable Geometry Turbocharger Position Sensor Motor Close Control	(5) I	(5) —

M104L Parking Brake Actuator - Left



4992524

Connector Part Information
- Harness Type: Chassis Rear Wiring Harness Extension Harness
- OEM Connector: 13532979
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 2.8 MCP Series, Sealed(BK)

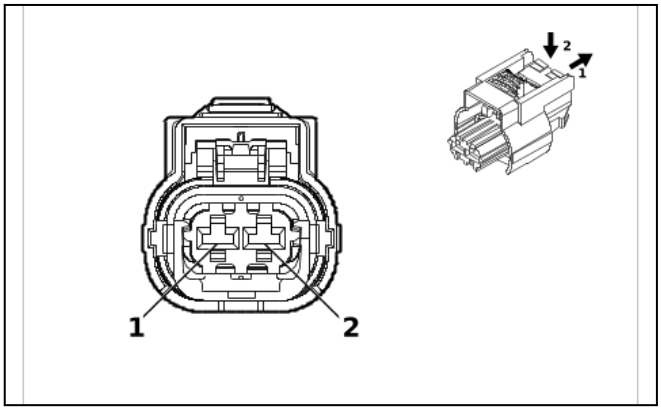
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-35 (VT)	No Tool Required

M104L Parking Brake Actuator - Left

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 2.5	(1) WH	(1) 2001	(1) Left Park Brake Motor Apply Control	(1) I	(1)
(2) 2	(2) 2.5	(2) GY / BK	(2) 4369	(2) Left Park Brake Motor Low Reference	(2) I	(2)

M104R Parking Brake Actuator - Right



4992524

Connector Part Information
- Harness Type: Chassis Rear Wiring Harness Extension Harness
- OEM Connector: 13532979
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 2.8 MCP Series, Sealed(BK)

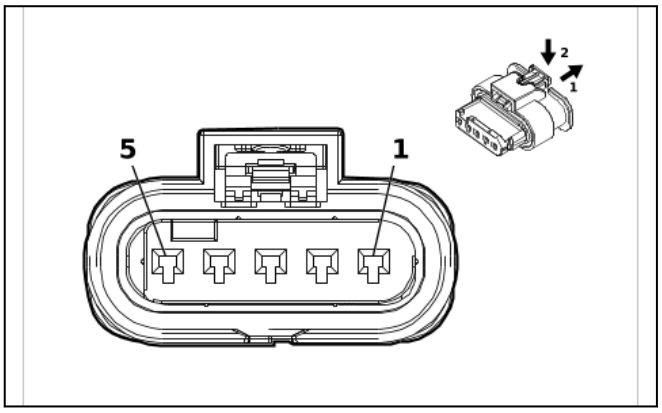
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-35 (VT)	No Tool Required

M104R Parking Brake Actuator - Right

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 2.5	(1) GN / VT	(1) 1988	(1) Right Park Brake Motor Apply Control	(1) I	(1)
(2) 2	(2) 2.5	(2) GY	(2) 4368	(2) Right Park Brake Motor Low Reference	(2) I	(2)

M106 Exhaust Control Valve Actuator (NPP)



3338689

Connector Part Information

- Harness Type: Chassis Wiring Harness
- OEM Connector: 1-1718806-1
- Service Connector: 19119351
- Description: 5-Way F 1.2 MCON-LL Series, Sealed(BK)

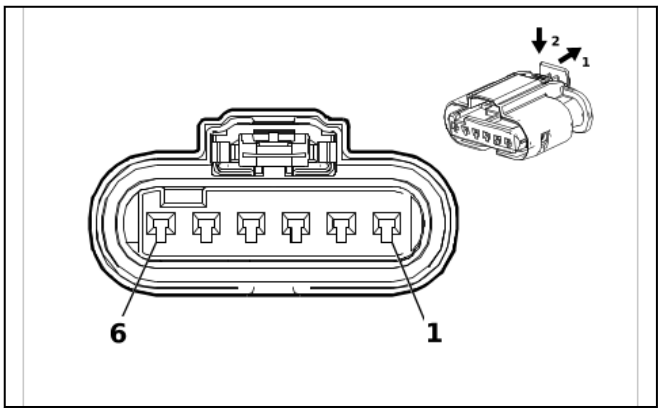
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

M106 Exhaust Control Valve Actuator (NPP)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BK / WH	(1) 1651	(1) Signal Ground	(1) I	(1) —
(2) 2	(2) 0.5	(2) BN / GN	(2) 4305	(2) Exhaust Flow Control Valve 1	(2) I	(2) —
(3) 3	(3) 0.5	(3) VT / WH	(3) 639	(3) Run/Crank Ignition 1 Voltage	(3) I	(3) —
(4) 4	(4) 0.5	(4) BU / WH	(4) 4306	(4) Exhaust Flow Control Valve 1 - Cylinder Deactivation Feedback Signal	(4) I	(4) —
5	—	—	—	Not Occupied	—	—

M122 Exhaust Pressure Regulator Valve (LZ0)



3960142

Connector Part Information

- Harness Type: Chassis Wiring Harness
- OEM Connector: 34900-6219
- Service Connector: 85005020
- Description: 6-Way F 1.2 MCON-LL Series, Sealed(BK)

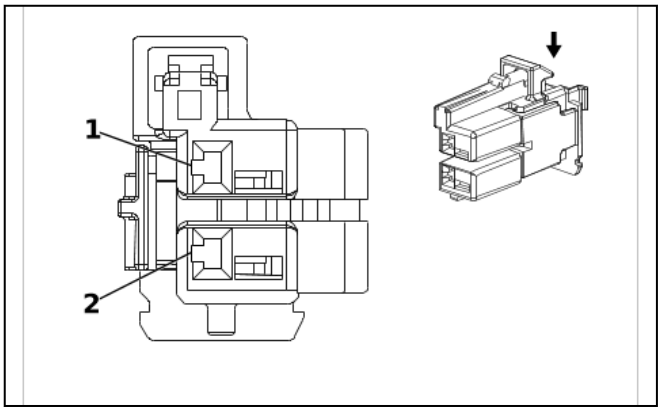
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

M122 Exhaust Pressure Regulator Valve (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) YE / BN	(1) 1420	(1) Exhaust Restrictor Motor Open Control	(1) I	(1) —
(2) 2	(2) 0.75	(2) BN	(2) 1421	(2) Exhaust Restrictor Motor Closed Control	(2) I	(2) —
(3) 3	(3) 0.5	(3) BK / YE	(3) 548	(3) Engine Control Sensors Low Reference 1	(3) I	(3) —
(4) 4	(4) 0.5	(4) BN / GN	(4) 4305	(4) Exhaust Flow Control Valve 1	(4) I	(4) —
(5) 5	(5) 0.5	(5) BU / RD	(5) 460	(5) Engine Control Sensors 5 Volt Reference 1	(5) I	(5) —
6	—	—	—	Not Occupied	—	—

M123 Transmission Park Valve Lock Solenoid Actuator (MHU)



4364736

Connector Part Information
- Harness Type: Automatic Transmission Wiring Harness - Control
- OEM Connector: 13540049
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series(BU)

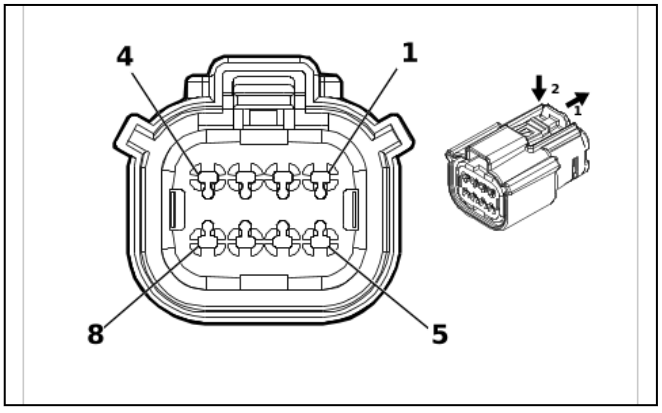
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

M123 Transmission Park Valve Lock Solenoid Actuator (MHU)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BN	(1) 6387	(1) Transmission High Side Driver 1 Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) OG	(2) 2159	(2) Park Inhibit Solenoid Assembly Control	(2) I	(2) —

M125 Pickup Box Endgate Power Assist Actuator (QT6)



4846407

Connector Part Information
- Harness Type: Endgate Wiring Harness
- OEM Connector: 33472-4806
- Service Connector: Service by Harness - See Part Catalog
- Description: 8-Way F 1.5 MX Series, Sealed(BK)

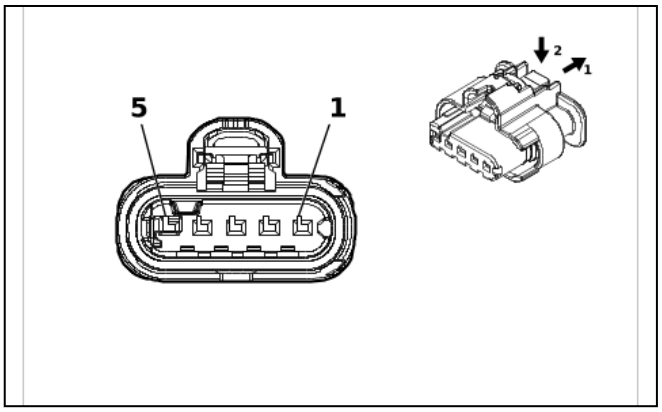
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required

M125 Pickup Box Endgate Power Assist Actuator (QT6)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1	(1) BN / WH	(1) 4690	(1) Rear Closure Open/Close Motor Close Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) GN	(2) 1577	(2) Rear Closure Clutch Control	(2) I	(2) —
(3) 3	(3) 0.5	(3) BU / BK	(3) 1590	(3) Rear Closure Clutch Low Return	(3) I	(3) —
(4) 4	(4) 0.5	(4) BN / RD	(4) 4683	(4) Rear Closure Position Sensor Voltage Reference	(4) I	(4) —
(5) 5	(5) 1	(5) WH	(5) 4689	(5) Rear Closure Open/Close Motor Open Control	(5) I	(5) —
(6) 6	(6) 0.5	(6) BN / YE	(6) 4686	(6) Rear Closure Position Sensor Signal 2	(6) I	(6) —
(7) 7	(7) 0.5	(7) BK / GN	(7) 4687	(7) Rear Closure Position Sensor Low Reference	(7) I	(7) —
(8) 8	(8) 0.5	(8) BU / WH	(8) 4685	(8) Rear Closure Position Sensor Signal 1	(8) I	(8) —

M128 Turbocharger Wastegate Actuator (L4B)



4997783

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 1-2296697-1
- Service Connector: 19371195
- Description: 5-Way F 1.2 MCON-CB Series, Sealed(BK)

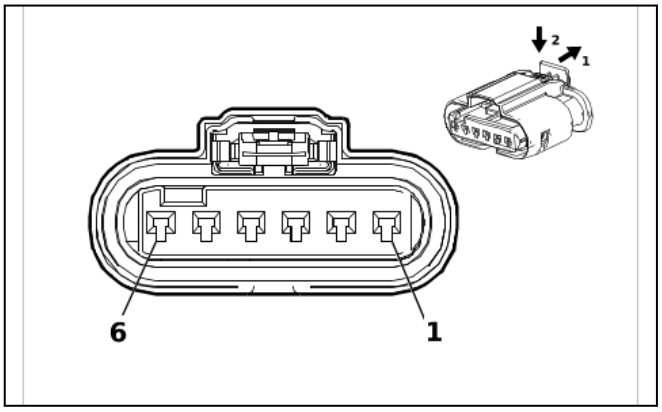
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

M128 Turbocharger Wastegate Actuator (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BK / GN	(1) 580	(1) Engine Control Sensors Low Reference 2	(1) I	(1) —
(2) 2	(2) 0.5	(2) WH	(2) 2590	(2) Turbocharger Wastegate Motor Feedback Signal	(2) I	(2) —
(3) 3	(3) 0.5	(3) GY / RD	(3) 10667	(3) Engine Control Sensors 5 Volt Reference	(3) I	(3) —
(4) 4	(4) 0.75	(4) WH / BN	(4) 2591	(4) Turbocharger Wastegate Motor Open Control	(4) I	(4) —
(5) 5	(5) 0.75	(5) WH / BU	(5) 2592	(5) Turbocharger Wastegate Motor Close Control	(5) I	(5) —

M129A Intake Camshaft Profile Actuator 1 (L4B)



3960142

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 34900-6219
- Service Connector: 85005020
- Description: 6-Way F 1.2 MCON-LL Series, Sealed(BK)

Terminal Part Information

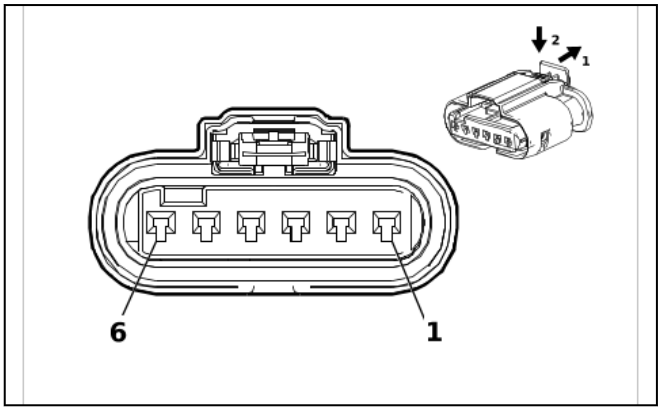
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

M129A Intake Camshaft Profile Actuator 1 (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) VT / GY	(1) 3615	(1) Intake Camshaft Profile Actuator 1 Control A	(1) I	(1) —
(2) 2	(2) 0.5	(2) BU / WH	(2) 3589	(2) Intake Camshaft Profile Actuator 1 Position Sensor Signal	(2) I	(2) —
(3) 3	(3) 0.5	(3) BK / YE	(3) 548	(3) Engine Control Sensors Low Reference 1	(3) I	(3) —
(4) 4	(4) 0.5	(4) BU / RD	(4) 460	(4) Engine Control Sensors 5 Volt Reference 1	(4) I	(4) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(5) 5	(5) 0.5	(5) VT / BU	(5) 5293	(5) Powertrain Main Relay Fused Supply Voltage 4	(5) I	(5) —
(6) 6	(6) 0.5	(6) GN / BK	(6) 3616	(6) Intake Camshaft Profile Actuator 1 Control B	(6) I	(6) —

M129B Intake Camshaft Profile Actuator 2 (L4B)



3960142

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 34900-6219
- Service Connector: 85005020
- Description: 6-Way F 1.2 MCON-LL Series, Sealed(BK)

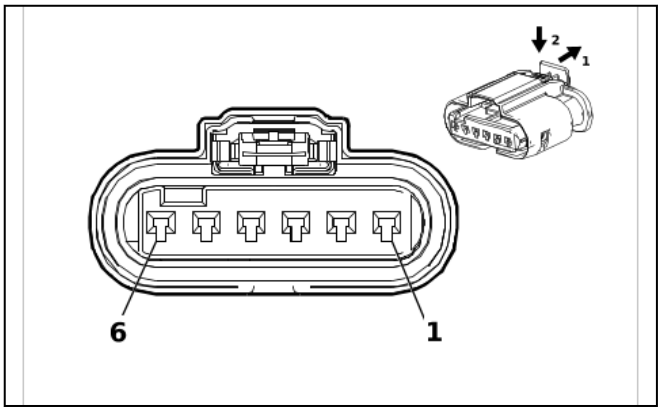
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

M129B Intake Camshaft Profile Actuator 2 (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GN	(1) 3585	(1) Intake Camshaft Profile Actuator 2 Control A	(1) I	(1) —
(2) 2	(2) 0.5	(2) GN / WH	(2) 3592	(2) Intake Camshaft Profile Actuator 2 Position Sensor Signal	(2) I	(2) —
(3) 3	(3) 0.5	(3) BK / YE	(3) 548	(3) Engine Control Sensors Low Reference 1	(3) I	(3) —
(4) 4	(4) 0.5	(4) BU / RD	(4) 460	(4) Engine Control Sensors 5 Volt Reference 1	(4) I	(4) —
(5) 5	(5) 0.5	(5) VT / BU	(5) 5293	(5) Powertrain Main Relay Fused Supply Voltage 4	(5) I	(5) —
(6) 6	(6) 0.5	(6) BU	(6) 3584	(6) Intake Camshaft Profile Actuator 2 Control B	(6) I	(6) —

M129C Intake Camshaft Profile Actuator 3 (L4B)



3960142

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 34900-6219
- Service Connector: 85005020
- Description: 6-Way F 1.2 MCON-LL Series, Sealed(BK)

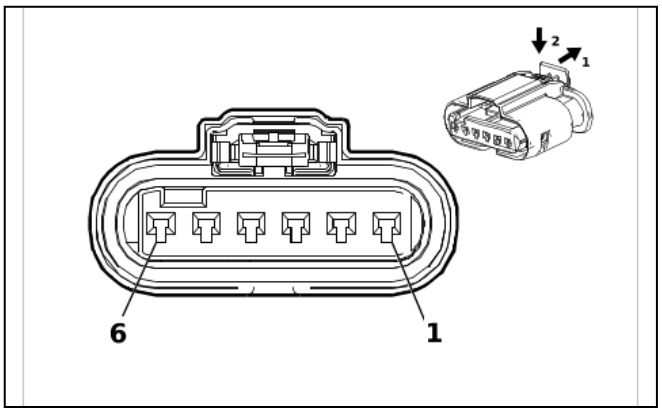
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

M129C Intake Camshaft Profile Actuator 3 (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) YE / BU	(1) 3587	(1) Intake Camshaft Profile Actuator 3 Control A	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / GN	(2) 3593	(2) Intake Camshaft Profile Actuator 3 Position Sensor Signal	(2) I	(2) —
(3) 3	(3) 0.5	(3) BK / YE	(3) 548	(3) Engine Control Sensors Low Reference 1	(3) I	(3) —
(4) 4	(4) 0.5	(4) BU / RD	(4) 460	(4) Engine Control Sensors 5 Volt Reference 1	(4) I	(4) —
(5) 5	(5) 0.5	(5) VT / BU	(5) 5293	(5) Powertrain Main Relay Fused Supply Voltage 4	(5) I	(5) —
(6) 6	(6) 0.5	(6) GY	(6) 3586	(6) Intake Camshaft Profile Actuator 3 Control B	(6) I	(6) —

M129D Intake Camshaft Profile Actuator 4 (L4B)



3960142

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 34900-6219
- Service Connector: 85005020
- Description: 6-Way F 1.2 MCON-LL Series, Sealed(BK)

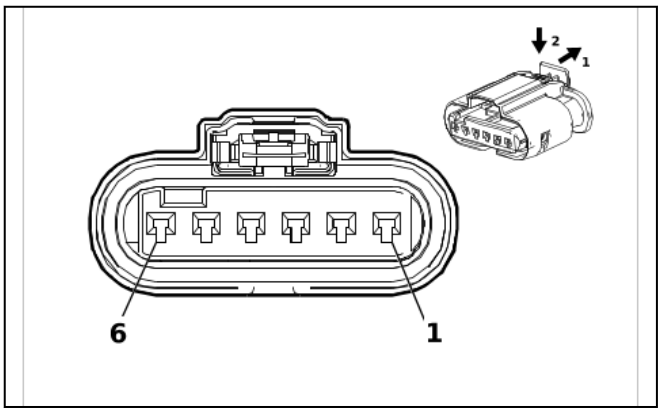
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

M129D Intake Camshaft Profile Actuator 4 (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GN / YE	(1) 1402	(1) Intake Camshaft Profile Actuator 4 Control A	(1) I	(1) —
(2) 2	(2) 0.5	(2) YE / BN	(2) 1702	(2) Intake Camshaft Profile Actuator 4 Position Sensor Signal	(2) I	(2) —
(3) 3	(3) 0.5	(3) BK / YE	(3) 548	(3) Engine Control Sensors Low Reference 1	(3) I	(3) —
(4) 4	(4) 0.5	(4) BU / RD	(4) 460	(4) Engine Control Sensors 5 Volt Reference 1	(4) I	(4) —
(5) 5	(5) 0.5	(5) VT / BU	(5) 5293	(5) Powertrain Main Relay Fused Supply Voltage 4	(5) I	(5) —
(6) 6	(6) 0.5	(6) GY / YE	(6) 1502	(6) Intake Camshaft Profile Actuator 4 Control B	(6) I	(6) —

M130B Exhaust Camshaft Profile Actuator 2 (L4B)



3960142

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 34900-6219
- Service Connector: 85005020
- Description: 6-Way F 1.2 MCON-LL Series, Sealed(BK)

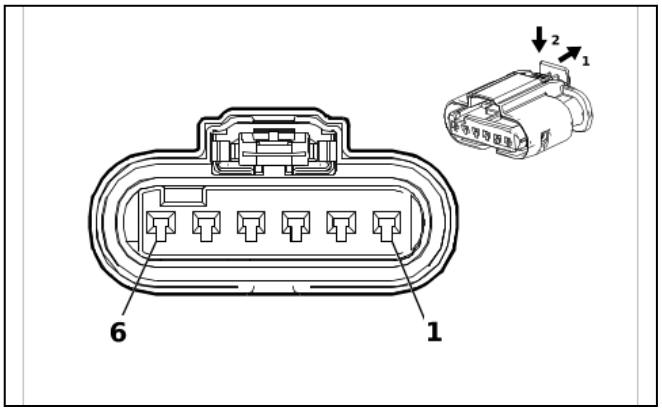
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

M130B Exhaust Camshaft Profile Actuator 2 (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) YE / VT	(1) 6265	(1) Exhaust Camshaft Profile Actuator 2 Control B	(1) I	(1) —
(2) 2	(2) 0.5	(2) GN / BK	(2) 6266	(2) Exhaust Camshaft Profile Actuator 2 Position Sensor Signal	(2) I	(2) —
(3) 3	(3) 0.5	(3) BK / BU	(3) 10597	(3) Engine Control Sensors Low Reference 3	(3) I	(3) —
(4) 4	(4) 0.5	(4) GN / RD	(4) 10599	(4) Engine Control Sensors 5 Volt Reference 3	(4) I	(4) —
(5) 5	(5) 0.5	(5) VT / BU	(5) 5293	(5) Powertrain Main Relay Fused Supply Voltage 4	(5) I	(5) —
(6) 6	(6) 0.5	(6) VT / BK	(6) 6264	(6) Exhaust Camshaft Profile Actuator 2 Control A	(6) I	(6) —

M130C Exhaust Camshaft Profile Actuator 3 (L4B)



3960142

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 34900-6219
- Service Connector: 85005020
- Description: 6-Way F 1.2 MCON-LL Series, Sealed(BK)

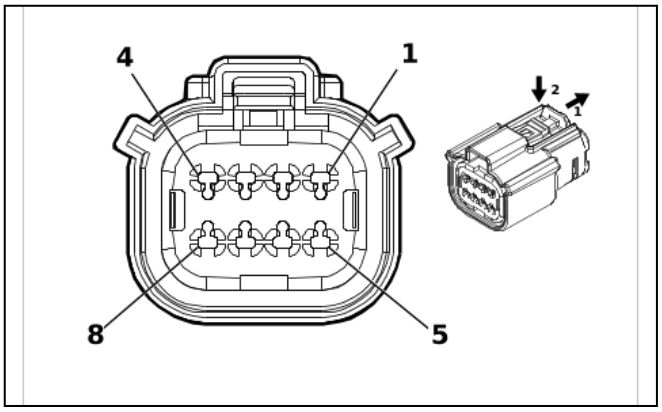
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

M130C Exhaust Camshaft Profile Actuator 3 (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GY / BN	(1) 6262	(1) Exhaust Camshaft Profile Actuator 3 Control B	(1) I	(1) —
(2) 2	(2) 0.5	(2) YE	(2) 6263	(2) Exhaust Camshaft Profile Actuator 3 Position Sensor Signal	(2) I	(2) —
(3) 3	(3) 0.5	(3) BK / BU	(3) 10597	(3) Engine Control Sensors Low Reference 3	(3) I	(3) —
(4) 4	(4) 0.5	(4) GN / RD	(4) 10599	(4) Engine Control Sensors 5 Volt Reference 3	(4) I	(4) —
(5) 5	(5) 0.5	(5) VT / BU	(5) 5293	(5) Powertrain Main Relay Fused Supply Voltage 4	(5) I	(5) —
(6) 6	(6) 0.5	(6) GN / BN	(6) 6261	(6) Exhaust Camshaft Profile Actuator 3 Control A	(6) I	(6) —

M151L Pickup Box Endgate Cinch Latch Actuator - Left (QT6)



4846407

Connector Part Information

- Harness Type: Endgate Wiring Harness
- OEM Connector: 13520069
- Service Connector: Service by Harness - See Part Catalog
- Description: 8-Way F 1.5 MX Series, Sealed(BK)

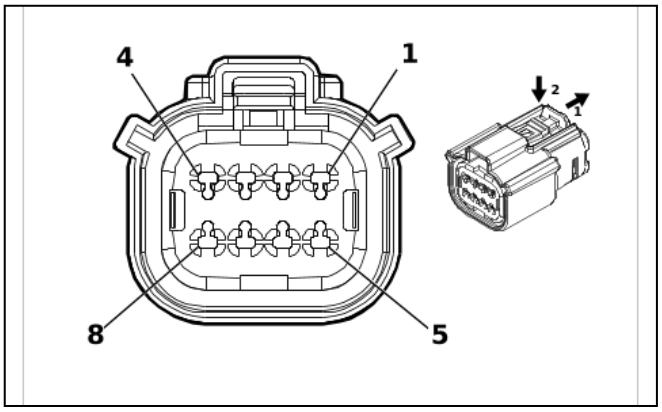
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required

M151L Pickup Box Endgate Cinch Latch Actuator - Left (QT6)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	—	—	—	Not Occupied	—	—
(2) 2	(2) 0.5	(2) BN / GY	(2) 10281	(2) Rear Closure Latch Secondary Status Signal	(2) I	(2) —
(3) 3	(3) 0.5	(3) GY / VT	(3) 4678	(3) Rear Closure Latch Unlatch Status	(3) I	(3) —
(4) 4	(4) 0.5	(4) BK / VT	(4) 4656	(4) Rear Closure Object Sensor Low Reference	(4) I	(4) —
(5) 5	(5) 1	(5) BN	(5) 4681	(5) Rear Closure Cinch Latch Motor Cinch Control	(5) I	(5) —
(6) 6	(6) 1	(6) BU / GY	(6) 4682	(6) Rear Closure Cinch Latch Motor Release Control	(6) I	(6) —
(7) 7	(7) 0.5	(7) WH / GN	(7) 8084	(7) Rear Closure Latch Neutral Status	(7) I	(7) —
(8) 8	(8) 0.5	(8) YE / BK	(8) 8085	(8) Rear Closure Latch Primary Status	(8) I	(8) —

M151R Pickup Box Endgate Cinch Latch Actuator - Right (QT6)



4846407

Connector Part Information

- Harness Type: Endgate Wiring Harness
- OEM Connector: 33472-4816
- Service Connector: Service by Harness - See Part Catalog
- Description: 8-Way F 1.5 MX Series, Sealed(BK)

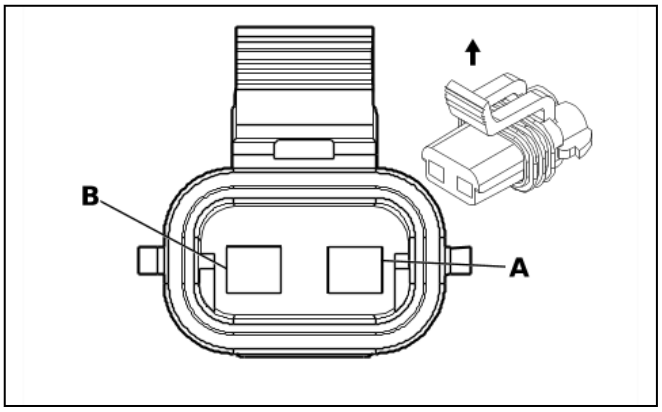
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required

M151R Pickup Box Endgate Cinch Latch Actuator - Right (QT6)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GY / BK	(1) 1575	(1) Rear Closure Sensor Low Reference 2	(1) I	(1) —
(2) 2	(2) 0.5	(2) BN	(2) 7736	(2) Rear Closure Latch 2 Unlatch Status Signal	(2) I	(2) —
(3) 3	(3) 0.5	(3) VT / WH	(3) 10284	(3) Rear Closure Latch 2 Secondary Status Signal	(3) I	(3) —
4	—	—	—	Not Occupied	—	—
(5) 5	(5) 0.5	(5) GN / BU	(5) 10283	(5) Rear Closure Latch 2 Primary Status Signal	(5) I	(5) —
(6) 6	(6) 0.5	(6) BU / BN	(6) 10282	(6) Rear Closure Latch 2 Neutral Status Signal	(6) I	(6) —
(7) 7	(7) 1	(7) GN	(7) 1499	(7) Rear Closure Cinch Latch Motor 2 Cinch Control	(7) I	(7) —
(8) 8	(8) 1	(8) BU	(8) 1509	(8) Rear Closure Cinch Latch Motor 2 Release Control	(8) I	(8) —

P3 Backup Alarm (8S3)



68721

Connector Part Information
- Harness Type: Backup Alarm Wiring Harness
- OEM Connector: 15300027
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 280 Metri-Pack Series, Sealed(BK)

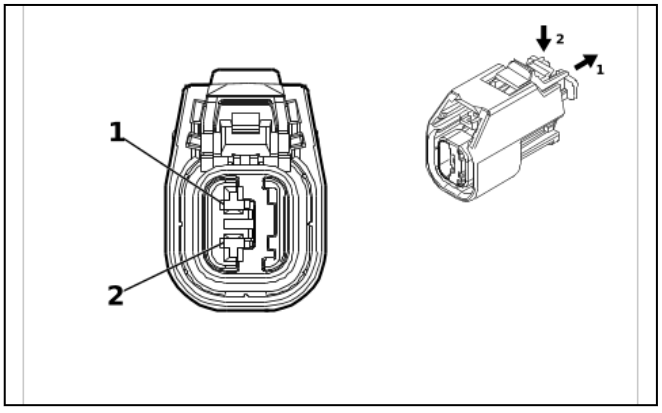
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-4A (PU)	No Tool Required

P3 Backup Alarm (8S3)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	1	WH / GN	1624	Trailer Backup Lamp Control	I	—
B	1	WH	22	Trailer Ground	I	—

P13 Horn



4889830

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 33164011
- Service Connector: 86802964
- Description: 2-Way F 1.5 OCS Series, Sealed(BK)

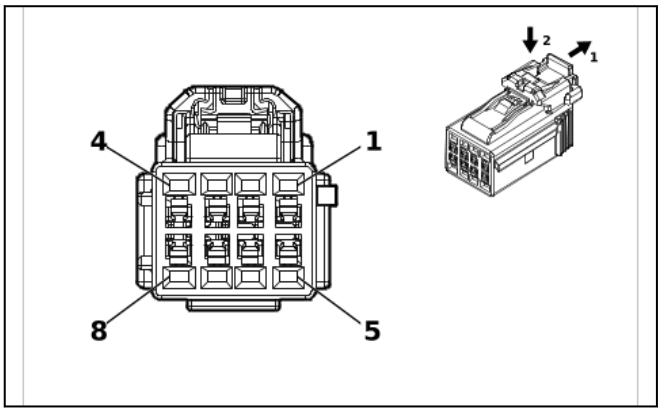
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required

P13 Horn

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1	(1) BK	(1) 650	(1) Ground	(1) I	(1) —
(2) 2	(2) 1	(2) BN / GY	(2) 29	(2) Horn Control	(2) I	(2) —

P16 Instrument Panel Cluster Control Module X1



5086387

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 6098-8443
- Service Connector: 84613126
- Description: 8-Way F 1.2 Series(BK)

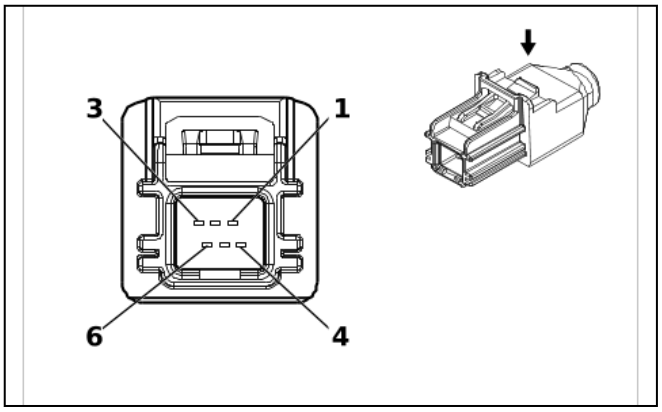
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

P16 Instrument Panel Cluster Control Module X1

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) RD / WH	(1) 1340	(1) Battery Positive Voltage	(1) I	(1) —
2 - 7	—	—	—	Not Occupied	—	—
(8) 8	(8) 0.5	(8) BK / WH	(8) 1051	(8) Signal Ground	(8) I	(8) —

P16 Instrument Panel Cluster Control Module X2



4806625

Connector Part Information
- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 100337-1023
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 6-Way M HSAL-2 Series(BK)

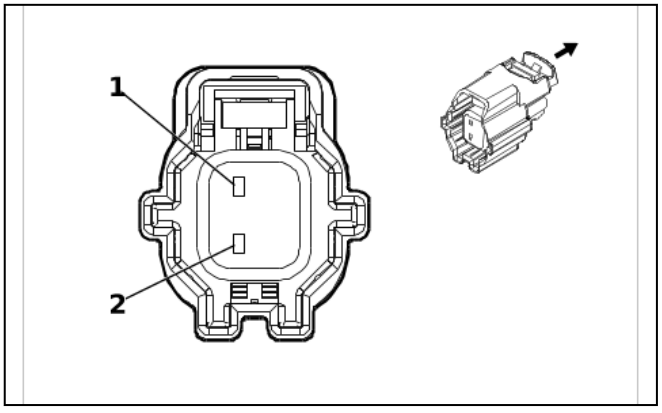
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

P16 Instrument Panel Cluster Control Module X2

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
BK	—	<p01>	LVDS	Low Voltage Differential Signaling	I	—

P19AG Radio Front Side Door Speaker - Left



4223204

Connector Part Information
- Harness Type: Front Side Door Door Wiring Harness - Driver
- OEM Connector: 34062-0044
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.5 MX Series, Sealed(BK)

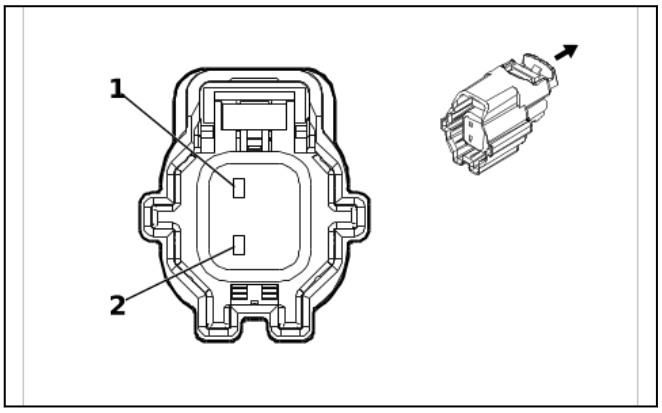
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required

P19AG Radio Front Side Door Speaker - Left

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BN / BU	(1) 118	(1) Left Front Speaker [-] Control 1	(1) I	(1) —
(2) 2	(2) 0.75	(2) BU	(2) 201	(2) Left Front Speaker 1 [+] Control	(2) I	(2) —

P19AH Radio Front Side Door Speaker - Right



4223204

Connector Part Information

- Harness Type: Front Side Door Door Wiring Harness - Passenger
- OEM Connector: 34062-0044
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.5 MX Series, Sealed(BK)

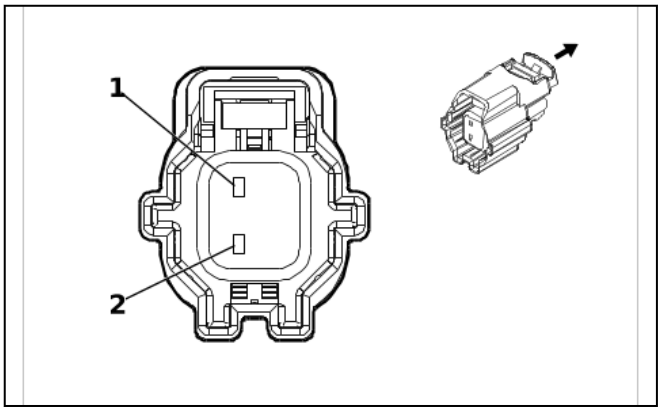
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required

P19AH Radio Front Side Door Speaker - Right

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) YE / BK	(1) 117	(1) Right Front Speaker [-] Control 1	(1) I	(1) —
(2) 2	(2) 0.75	(2) YE	(2) 200	(2) Right Front Speaker 1 [+] Control	(2) I	(2) —

P19AL Radio Rear Side Door Speaker - Left - 4 - Door



4223204

Connector Part Information
- Harness Type: Rear Side Door Door Wiring Harness - Left
- OEM Connector: 34062-0044
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.5 MX Series, Sealed(BK)

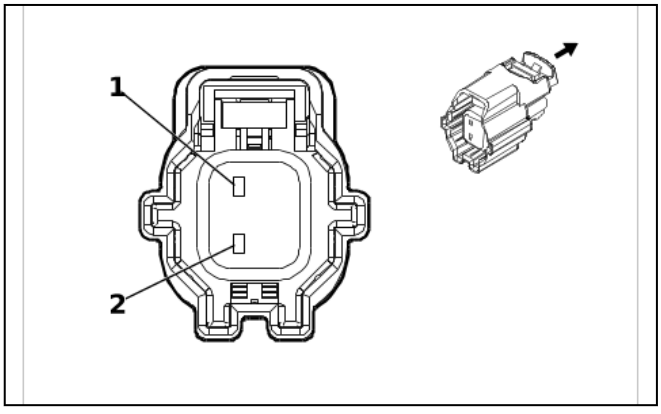
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required

P19AL Radio Rear Side Door Speaker - Left - 4 - Door

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) GN / BK	(1) 116	(1) Left Rear Speaker [-] Control	(1) I	(1) —
(2) 2	(2) 0.75	(2) GN	(2) 199	(2) Left Rear Speaker [+] Control	(2) I	(2) —

P19AM Radio Rear Side Door Speaker - Right - 4 - Door



4223204

Connector Part Information
- Harness Type: Rear Side Door Door Wiring Harness - Right
- OEM Connector: 34062-0044
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.5 MX Series, Sealed(BK)

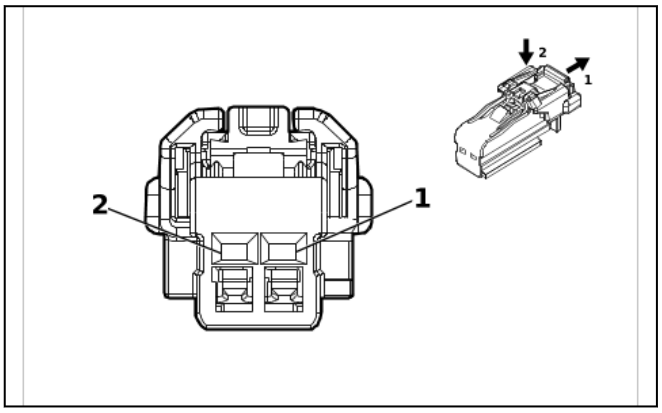
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required

P19AM Radio Rear Side Door Speaker - Right - 4 - Door

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BU / BK	(1) 115	(1) Right Rear Speaker [-] Control	(1) I	(1) —
(2) 2	(2) 0.75	(2) WH	(2) 46	(2) Right Rear Speaker [+] Control	(2) I	(2) —

P19B Radio Front Center Speaker (UQA)



4373379

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 6098-8989
- Service Connector: 19369632
- Description: 2-Way F 1.2 MCON Series(GY)

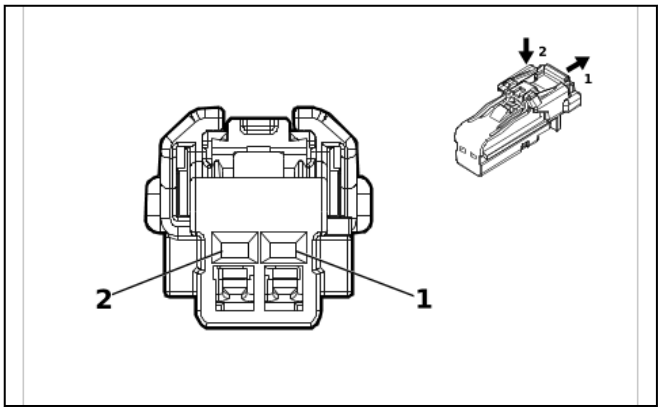
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

P19B Radio Front Center Speaker (UQA)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BU / YE	(1) 1960	(1) Front Center Speaker [-] Control	(1) I	(1) —
(2) 2	(2) 0.75	(2) YE / WH	(2) 1860	(2) Front Center Speaker [+] Control	(2) I	(2) —

P19J Radio Front Speaker - Instrument Panel Left (UQ3 / UQF)



4115691

Connector Part Information
- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 6098-8988
- Service Connector: 87816612
- Description: 2-Way F 1.2 MCON Series(BK)

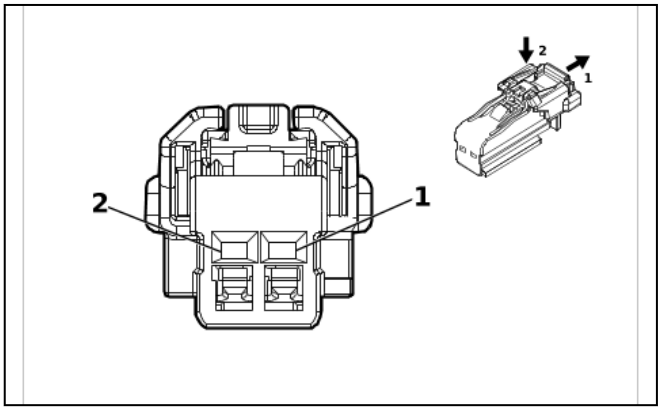
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

P19J Radio Front Speaker - Instrument Panel Left (UQ3 / UQF)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BN / BU	(1) 118	(1) Left Front Speaker [-] Control 1	(1) I	(1) —
(2) 2	(2) 0.75	(2) BU	(2) 201	(2) Left Front Speaker 1 [+] Control	(2) I	(2) —

P19J Radio Front Speaker - Instrument Panel Left (UQA)



4373379

Connector Part Information
- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 6098-8989
- Service Connector: 19369632
- Description: 2-Way F 1.2 MCON Series(GY)

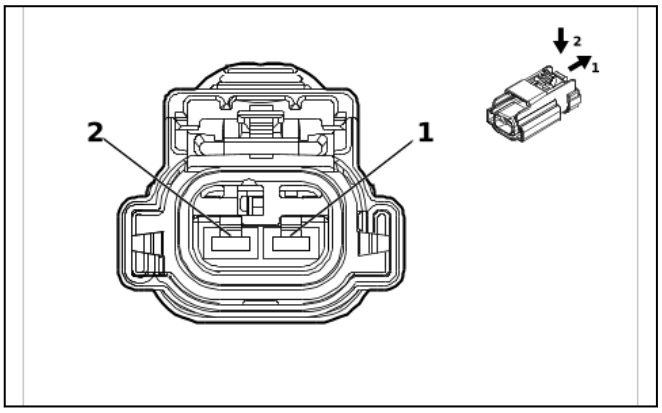
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

P19J Radio Front Speaker - Instrument Panel Left (UQA)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BU / BN	(1) 1957	(1) Left Front Midrange Speaker [-] Control	(1) I	(1) —
(2) 2	(2) 0.75	(2) BU / VT	(2) 1857	(2) Left Front Midrange Speaker [+] Control	(2) I	(2) —

P19LA Radio Rear Compartment Speaker (UQA)



5835067

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 35286784
- Service Connector: 85563416
- Description: 2-Way F 2.8 APEX Series, Sealed(GY)

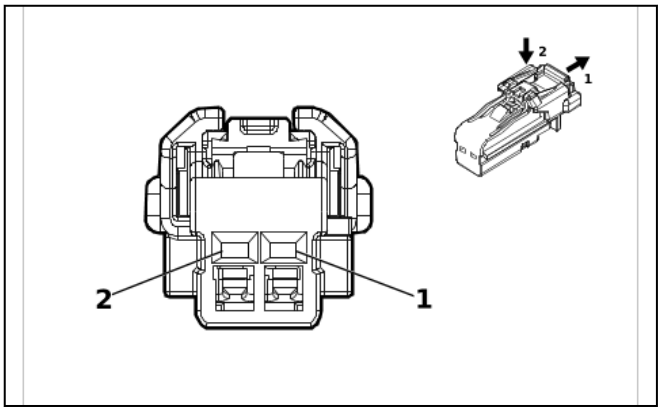
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-35 (VT)	No Tool Required

P19LA Radio Rear Compartment Speaker (UQA)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 2	(1) GN / BK	(1) 1794	(1) Left/Rear Subwoofer [-] Control	(1) I	(1) —
(2) 2	(2) 2	(2) BU / GY	(2) 346	(2) Left/Rear Subwoofer [+] Control	(2) I	(2) —

P19W Radio Front Speaker - Instrument Panel Right (UQ3 / UQF)



4115691

Connector Part Information
- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 6098-8988
- Service Connector: 87816612
- Description: 2-Way F 1.2 MCON Series(BK)

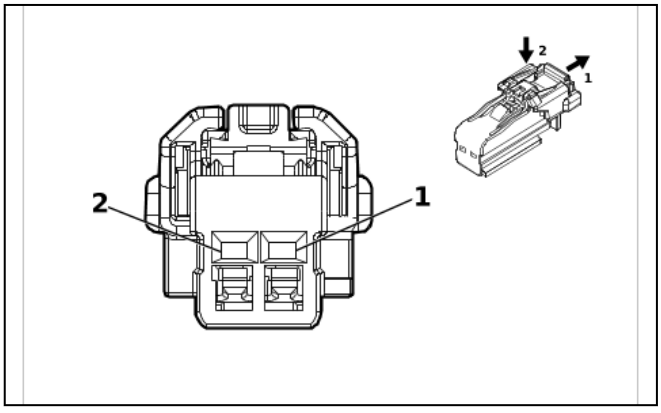
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

P19W Radio Front Speaker - Instrument Panel Right (UQ3 / UQF)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) YE / BK	(1) 117	(1) Right Front Speaker [-] Control 1	(1) I	(1) —
(2) 2	(2) 0.75	(2) YE	(2) 200	(2) Right Front Speaker 1 [+] Control	(2) I	(2) —

P19W Radio Front Speaker - Instrument Panel Right (UQA)



4373379

Connector Part Information
- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 6098-8989
- Service Connector: 19369632
- Description: 2-Way F 1.2 MCON Series(GY)

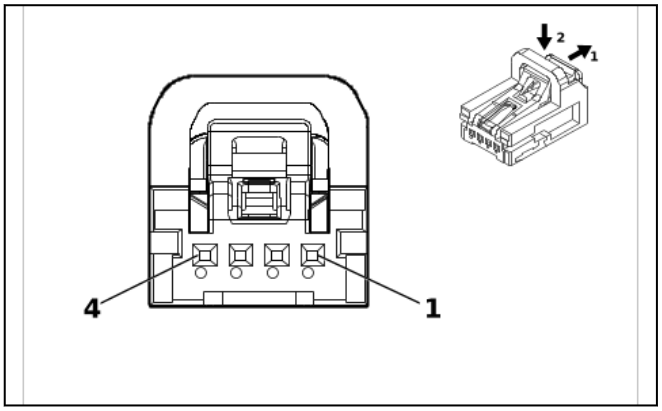
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

P19W Radio Front Speaker - Instrument Panel Right (UQA)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BN / BK	(1) 1953	(1) Right Front Midrange Speaker [-] Control	(1) I	(1) —
(2) 2	(2) 0.75	(2) WH / YE	(2) 1853	(2) Right Front Midrange Speaker [+] Control	(2) I	(2) —

P29 Head-Up Display X1 (UV6)



5200696

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 35068218
- Service Connector: 84769202
- Description: 4-Way F Mini 50 Series(BK)

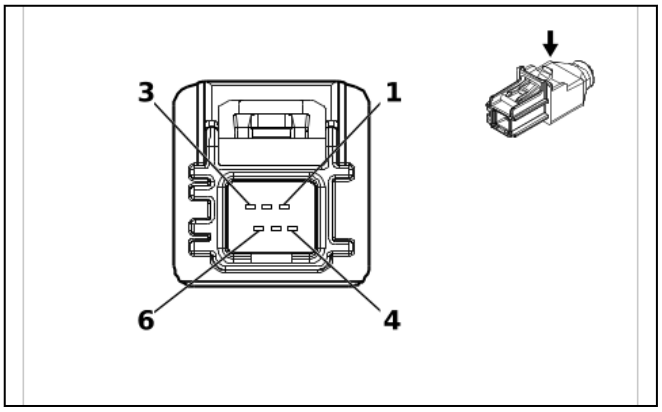
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	EL-35616-58 (BK)	No Tool Required

P29 Head-Up Display X1 (UV6)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) RD / YE	(1) 240	(1) Battery Positive Voltage	(1) I	(1) —
(2) 2	(2) 0.35	(2) BK / WH	(2) 1051	(2) Signal Ground	(2) I	(2) —
3 - 4	—	—	—	Not Occupied	—	—

P29 Head-Up Display X2 (UV6)



6175927

Connector Part Information
- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 100337-1323
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 6-Way M HSAL-2 Series(GN)

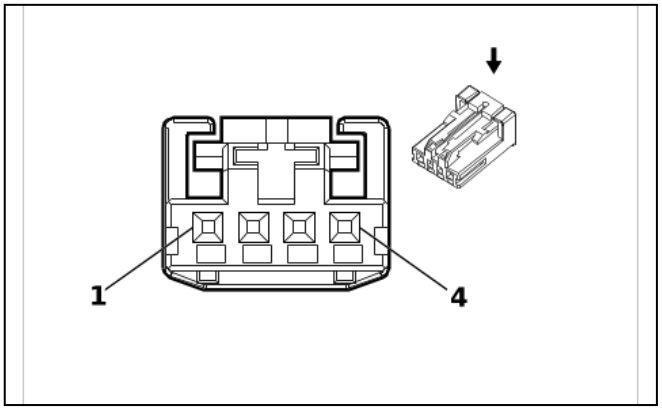
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

P29 Head-Up Display X2 (UV6)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
GN	—	<p01>	LVDS	Low Voltage Differential Signaling	I	—

P43 Forward Collision Alert Display (UIT)



2717162

Connector Part Information
- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 1-936119-1
- Service Connector: 19367524
- Description: 4-Way F 0.64 Micro-Quadlock Series(BK)

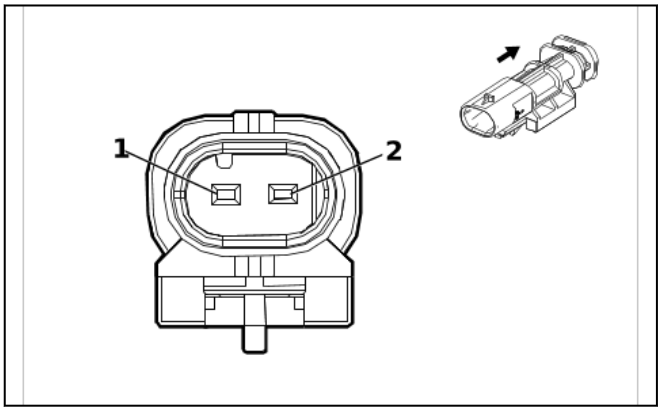
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

P43 Forward Collision Alert Display (UIT)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) VT / BK	(1) 339	(1) Run/Crank Ignition 1 Voltage	(1) I	(1) —
(2) 2	(2) 0.35	(2) GY / YE	(2) 3885	(2) Forward Collision Alert LED Control	(2) I	(2) —
(3) 3	(3) 0.35	(3) GY / BK	(3) 4787	(3) Day Night LED Control	(3) I	(3) —
(4) 4	(4) 0.35	(4) BK / WH	(4) 851	(4) Signal Ground	(4) I	(4) —

P45L Front Seat Lane Departure Warning Actuator - Left



2474755

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Driver
- OEM Connector: 2203314-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way M 1.2 MCON Series, Sealed(BK)

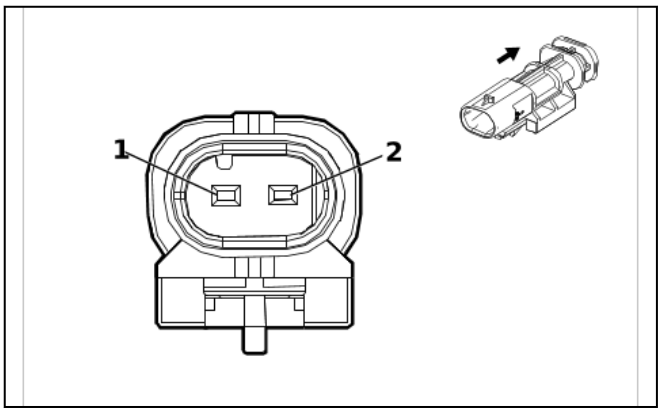
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-13 (BU)	No Tool Required
II	Not required	J-35616-17 (L-GN)	No Tool Required

P45L Front Seat Lane Departure Warning Actuator - Left

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BK	(1) 1550	(1) Ground	(1) I	(1) —
(2) 2	(2) 0.5 (2) 0.35	(2) YE / BN (2) YE / BN	(2) 3037 (2) 3037	(2) Driver Seat Left Rear Haptic Movement Motor Control (2) Driver Seat Left Rear Haptic Movement Motor Control	(2) I (2) II	(2) - A45 (2) A45

P45R Front Seat Lane Departure Warning Actuator - Right



2474755

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Driver
- OEM Connector: 2203314-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way M 1.2 MCON Series, Sealed(BK)

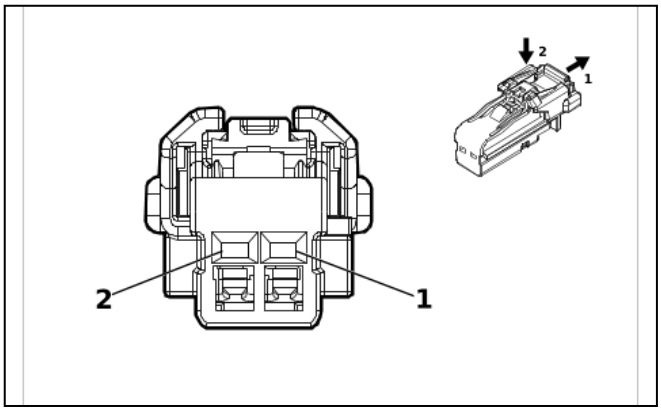
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-13 (BU)	No Tool Required
II	Not required	J-35616-17 (L-GN)	No Tool Required

P45R Front Seat Lane Departure Warning Actuator - Right

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BK	(1) 1550	(1) Ground	(1) I	(1) —
(2) 2	(2) 0.5 (2) 0.35	(2) BN (2) BN	(2) 3038 (2) 3038	(2) Driver Seat Right Rear Haptic Movement Motor Control (2) Driver Seat Right Rear Haptic Movement Motor Control	(2) I (2) II	(2) - A45 (2) A45

P50 Regulatory Emergency Call Backup Speaker (UER)



4115691

Connector Part Information
- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 6098-8988
- Service Connector: 87816612
- Description: 2-Way F 1.2 MCON Series(BK)

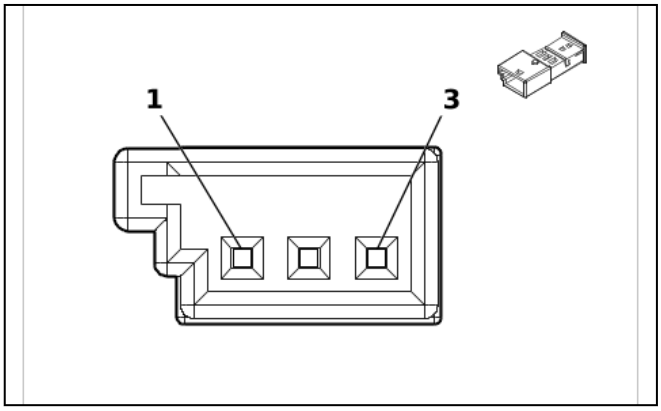
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

P50 Regulatory Emergency Call Backup Speaker (UER)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) WH / BK	(1) 4769	(1) Emergency Call Backup Speaker [-] Control	(1) I	(1) —
(2) 2	(2) 0.35	(2) GY / GN	(2) 4770	(2) Emergency Call Backup Speaker [+] Control	(2) I	(2) —

P51 Steering Wheel LED Display (ULM)



6280498

Connector Part Information
- Harness Type: Steering Wheel Horn Switch Wiring Harness
- OEM Connector: 1-968700-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 3-Way M 0.64 Micro-Quadlock Series(BK)

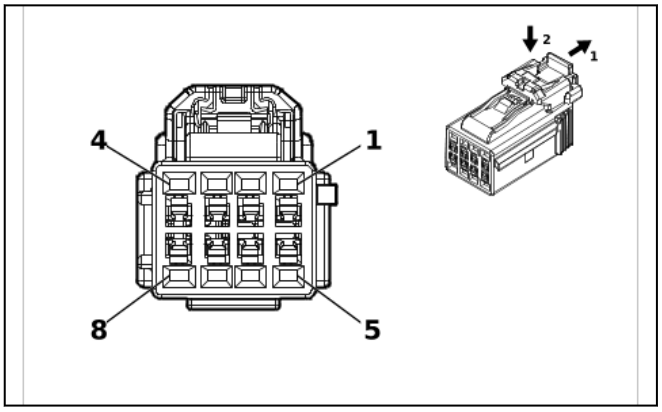
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-65B (L-BU)	No Tool Required

P51 Steering Wheel LED Display (ULM)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) BU / BN	(1) 7744	(1) Driver Illumination Lamp Ground	(1) I	(1) —
(2) 2	(2) 0.35	(2) WH / VT	(2) 2246	(2) Driver Illumination Lamp 1 Control	(2) I	(2) —
(3) 3	(3) 0.35	(3) YE / BU	(3) 2245	(3) Driver Illumination Lamp 2 Control	(3) I	(3) —

P62 Occupant Display X1 (USN)



5086387

Connector Part Information
- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 6098-8443
- Service Connector: 84613126
- Description: 8-Way F 1.2 Series(BK)

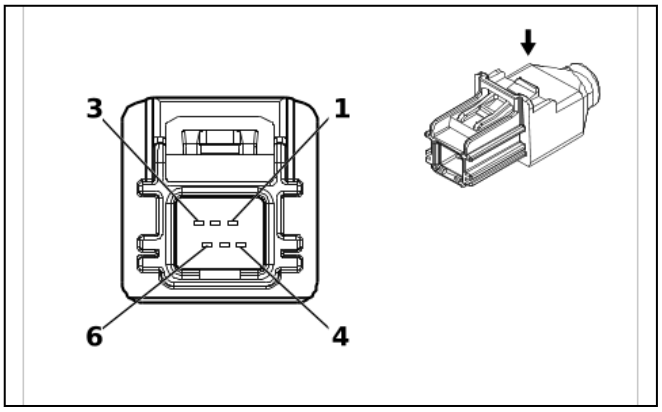
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

P62 Occupant Display X1 (USN)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) RD / GY	(1) 2840	(1) Battery Positive Voltage	(1) I	(1) —
2 - 7	—	—	—	Not Occupied	—	—
(8) 8	(8) 0.75	(8) BK / WH	(8) 1051	(8) Signal Ground	(8) I	(8) —

P62 Occupant Display X2 (USN)



4806625

Connector Part Information
- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 100337-1023
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 6-Way M HSAL-2 Series(BK)

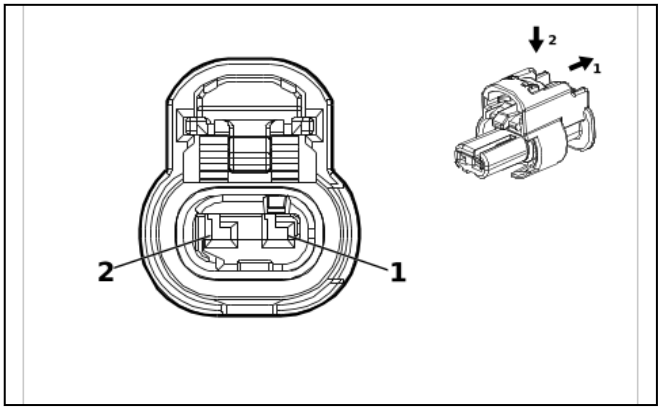
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

P62 Occupant Display X2 (USN)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
BK	—	<p01>	LVDS	Low Voltage Differential Signaling	I	—

Q2 Air Conditioning Clutch



4649903

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 1-2296694-1
- Service Connector: 85761014
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

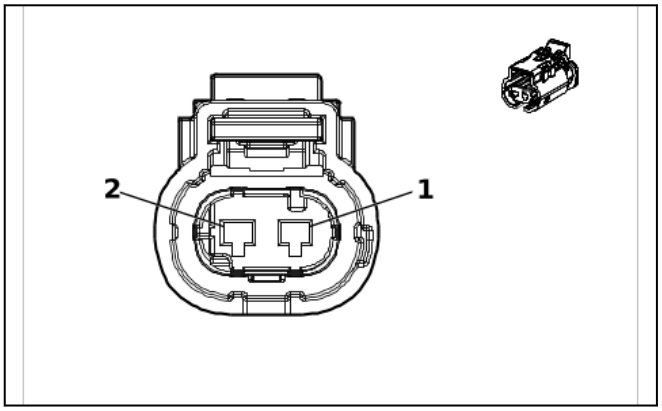
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

Q2 Air Conditioning Clutch

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1 (1) 0.75	(1) BK (1) BK	(1) 450 (1) 450	(1) Ground (1) Ground	(1) I (1) I	(1) L76 / L78 (1) LZ0 / L4B
(2) 2	(2) 0.75	(2) BN / GN	(2) 59	(2) Air Conditioning Compressor Clutch Control	(2) I	(2) —

Q6 Camshaft Position Actuator Solenoid Valve (L76 / L78)



6776339

Connector Part Information

- Harness Type: Engine Wiring Harness Extension Harness
- OEM Connector: 13562387
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MLK Series, Sealed(BK)

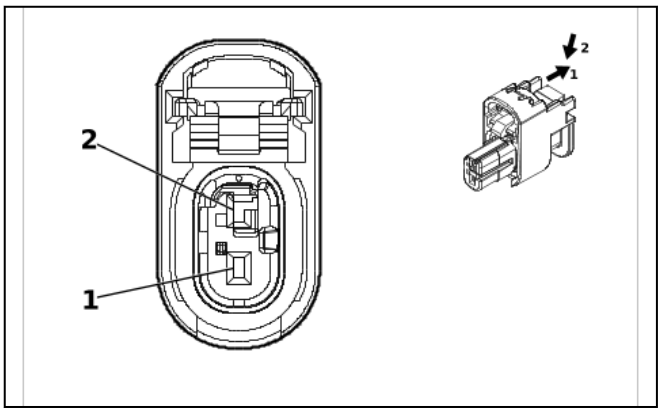
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

Q6 Camshaft Position Actuator Solenoid Valve (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BK / BN	(1) 6753	(1) Camshaft Position Actuator Solenoid Valve 1 Low Reference	(1) I	(1) —
(2) 2	(2) 0.5	(2) VT / BN	(2) 5284	(2) Intake Camshaft Position Actuator Solenoid Valve 1	(2) I	(2) —

Q6E Camshaft Position Actuator Solenoid Valve - Exhaust (L48)



5340268

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 1-2296702-2
- Service Connector: 19371204
- Description: 2-Way F 1.2 MCON-CB Series, Sealed(BK)

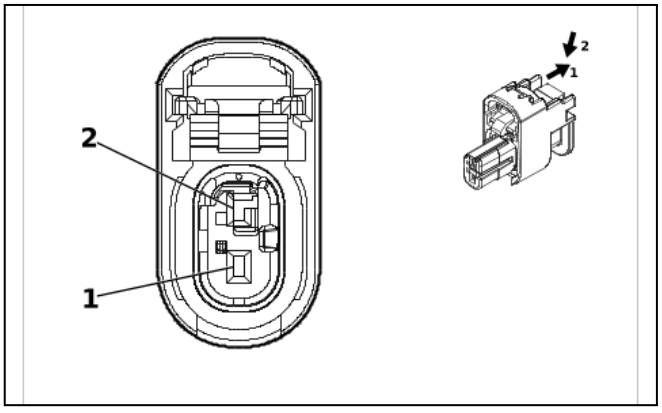
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

Q6E Camshaft Position Actuator Solenoid Valve - Exhaust (L48)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GY / BU	(1) 5282	(1) Exhaust Camshaft Position Actuator Solenoid Valve 1	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / VT	(2) 6754	(2) Camshaft Position Actuator Solenoid Valve 1 Low Reference	(2) I	(2) —

Q6F Camshaft Position Actuator Solenoid Valve - Intake (L48)



5340268

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 1-2296702-2
- Service Connector: 19371204
- Description: 2-Way F 1.2 MCON-CB Series, Sealed(BK)

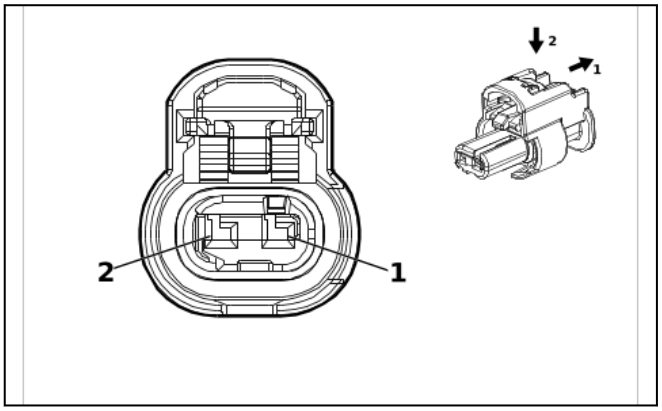
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

Q6F Camshaft Position Actuator Solenoid Valve - Intake (L48)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) VT / BN	(1) 5284	(1) Intake Camshaft Position Actuator Solenoid Valve 1	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / BN	(2) 6753	(2) Camshaft Position Actuator Solenoid Valve 1 Low Reference	(2) I	(2) —

Q9F Differential Locking Actuator - Front (G93)



4649903

Connector Part Information

- Harness Type: Front Axle Wiring Harness
- OEM Connector: 1-2296694-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

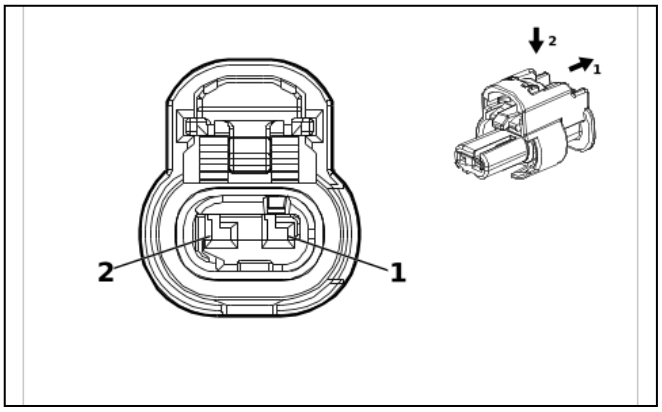
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

Q9F Differential Locking Actuator - Front (G93)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) VT / WH	(1) 7256	(1) Front Differential Lock Actuator Control	(1) I	(1) —
(2) 2	(2) 0.75	(2) WH / BK	(2) 7254	(2) Front Differential Lock Actuator Low Control	(2) I	(2) —

Q9R Differential Locking Actuator - Rear (G94)



4649903

Connector Part Information
- Harness Type: Chassis Rear Wiring Harness Extension Harness
- OEM Connector: 1-2296694-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

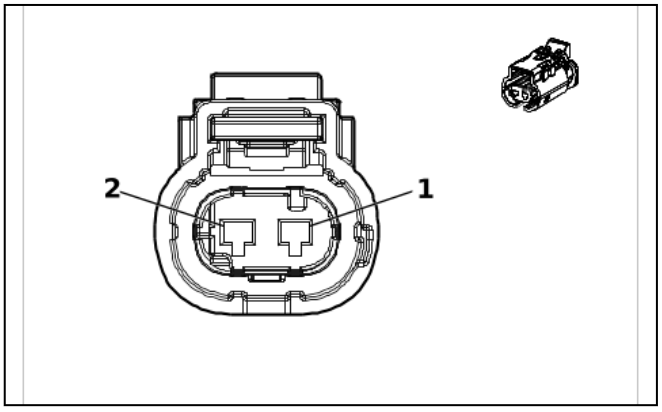
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

Q9R Differential Locking Actuator - Rear (G94)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) VT / BN	(1) 7258	(1) Rear Differential Lock Actuator Control	(1) I	(1) G94
(2) 2	(2) 0.75	(2) GY / BK	(2) 7253	(2) Rear Differential Lock Actuator Low Control	(2) I	(2) G94

Q12 Evaporative Emission Canister Purge Solenoid Valve (FJW)



6776339

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 10530497
- Service Connector: 86308598
- Description: 2-Way F 1.2 MLK Series, Sealed(BK)

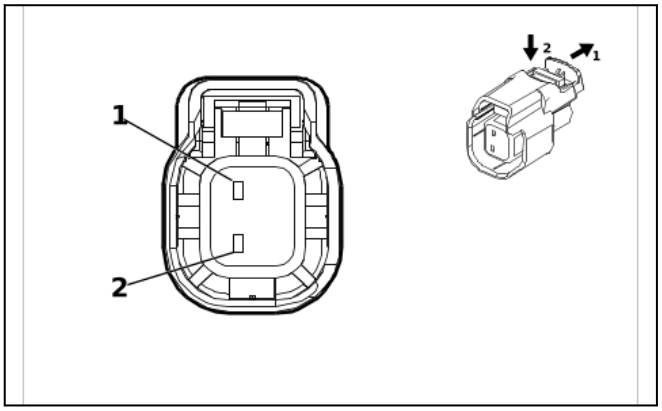
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

Q12 Evaporative Emission Canister Purge Solenoid Valve (FJW)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) VT / BU	(1) 5293	(1) Powertrain Main Relay Fused Supply Voltage 4	(1) I	(1) —
(2) 2	(2) 0.5	(2) GN / BU	(2) 428	(2) EVAP Canister Purge Solenoid Control	(2) I	(2) —

Q13 Evaporative Emission Canister Vent Solenoid Valve (FJW)



3028817

Connector Part Information

- Harness Type: Chassis Wiring Harness
- OEM Connector: 34062-4009
- Service Connector: 19352404
- Description: 2-Way F 1.5 Series, Sealed(BK)

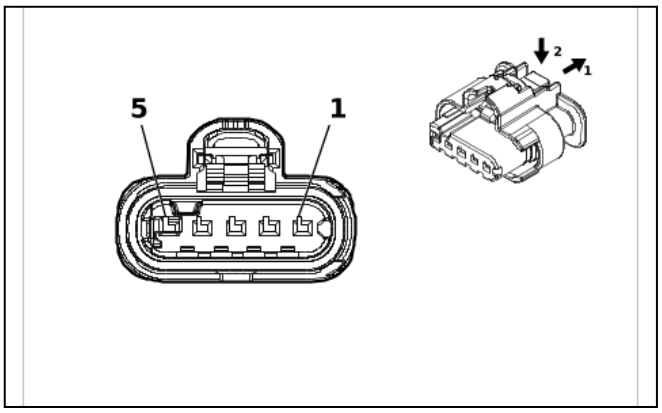
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-14 (GN)	No Tool Required

Q13 Evaporative Emission Canister Vent Solenoid Valve (FJW)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) WH	(1) 1310	(1) EVAP Vent Solenoid Valve Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) RD / WH	(2) 3440	(2) Battery Positive Voltage	(2) I	(2) —

Q14A Exhaust Gas Recirculation Valve 1 (LZ0)



4997783

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 1-2296697-1
- Service Connector: 19371195
- Description: 5-Way F 1.2 MCON-CB Series, Sealed(BK)

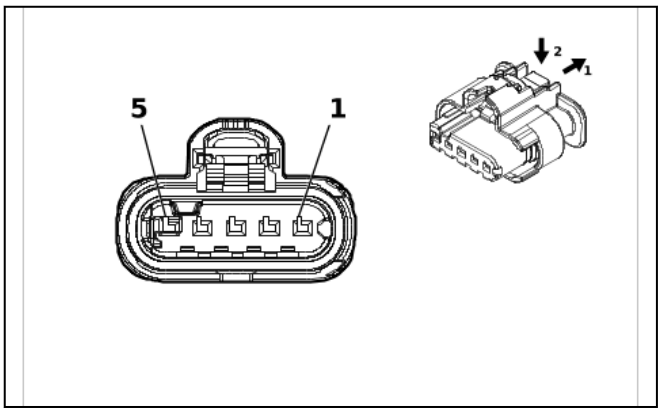
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

Q14A Exhaust Gas Recirculation Valve 1 (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BU / RD	(1) 460	(1) Engine Control Sensors 5 Volt Reference 1	(1) I	(1) —
(2) 2	(2) 0.5	(2) BN / WH	(2) 5763	(2) Exhaust Gas Recirculation Position Signal	(2) I	(2) —
(3) 3	(3) 0.5	(3) BK / YE	(3) 548	(3) Engine Control Sensors Low Reference 1	(3) I	(3) —
(4) 4	(4) 0.75	(4) WH / VT	(4) 5764	(4) Exhaust Gas Recirculation Valve High Control	(4) I	(4) —
(5) 5	(5) 0.75	(5) VT / BK	(5) 5746	(5) Exhaust Gas Recirculation Valve Low Control	(5) I	(5) —

Q14B Exhaust Gas Recirculation Valve 2 (LZ0)



4997783

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 1-2296697-1
- Service Connector: 19371195
- Description: 5-Way F 1.2 MCON-CB Series, Sealed(BK)

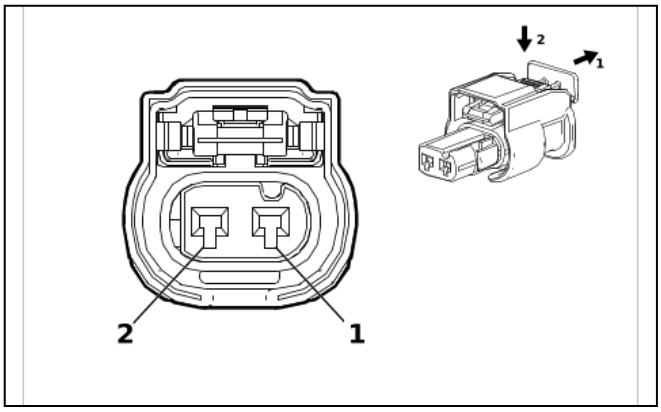
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

Q14B Exhaust Gas Recirculation Valve 2 (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BK / YE	(1) 548	(1) Engine Control Sensors Low Reference 1	(1) I	(1) —
(2) 2	(2) 0.5	(2) BU / GN	(2) 4012	(2) Exhaust Gas Recirculation 2 Valve Position Sensor Signal	(2) I	(2) —
(3) 3	(3) 0.5	(3) BU / RD	(3) 460	(3) Engine Control Sensors 5 Volt Reference 1	(3) I	(3) —
(4) 4	(4) 0.75	(4) BU / WH	(4) 4014	(4) Exhaust Gas Recirculation 2 Valve Open Control	(4) I	(4) —
(5) 5	(5) 0.75	(5) BU / BN	(5) 4013	(5) Exhaust Gas Recirculation 2 Valve Close Control	(5) I	(5) —

Q17A Fuel Injector 1 (L4B)



3960139

Connector Part Information
- Harness Type: Fuel Injector Wiring Harness
- OEM Connector: 34900-2120
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

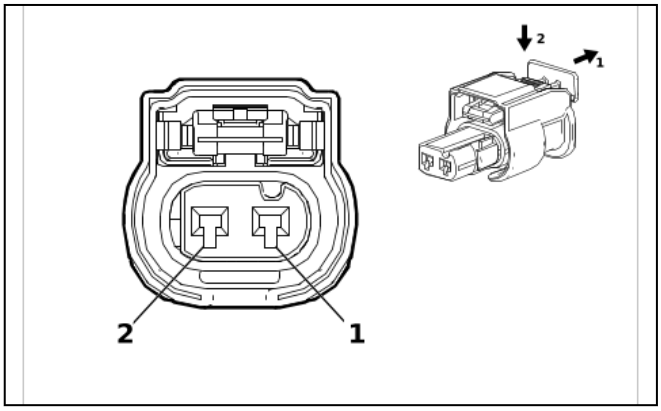
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

Q17A Fuel Injector 1 (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BN / WH	(1) 4901	(1) Direct Fuel Injector High Voltage Supply Cylinder 1	(1) I	(1) —
(2) 2	(2) 0.75	(2) BN	(2) 4801	(2) Direct Fuel Injector High Voltage Control Cylinder 1	(2) I	(2) —

Q17A Fuel Injector 1 (L76 / L78)



3960139

Connector Part Information
- Harness Type: Fuel Injector Wiring Harness - Bank 1 Direct
- OEM Connector: 34900-2120
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

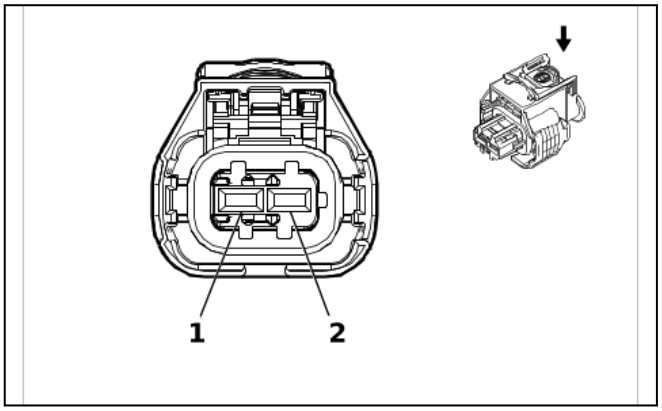
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

Q17A Fuel Injector 1 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BN / WH	(1) 4901	(1) Direct Fuel Injector High Voltage Supply Cylinder 1	(1) I	(1) —
(2) 2	(2) 0.75	(2) BN	(2) 4801	(2) Direct Fuel Injector High Voltage Control Cylinder 1	(2) I	(2) —

Q17A Fuel Injector 1 (LZ0)



2845578

Connector Part Information

- Harness Type: Fuel Injector Wiring Harness
- OEM Connector: 1 928 405 715
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 2.8 Series, Sealed(BK)

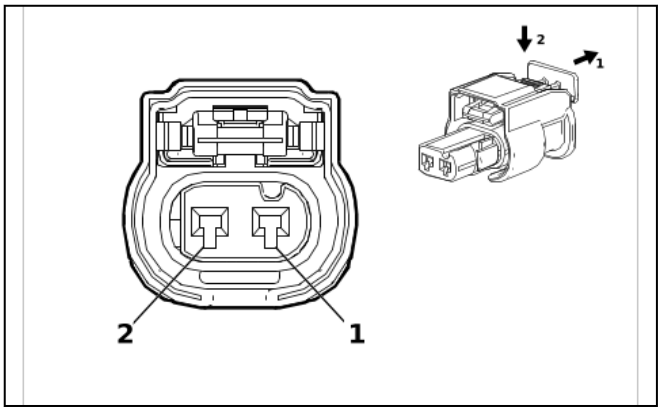
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-35 (VT)	No Tool Required

Q17A Fuel Injector 1 (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1.5	(1) BN / WH	(1) 4901	(1) Direct Fuel Injector High Voltage Supply Cylinder 1	(1) I	(1) —
(2) 2	(2) 1.5	(2) BN	(2) 4801	(2) Direct Fuel Injector High Voltage Control Cylinder 1	(2) I	(2) —

Q17B Fuel Injector 2 (L4B)



3960139

Connector Part Information
- Harness Type: Fuel Injector Wiring Harness
- OEM Connector: 34900-2120
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

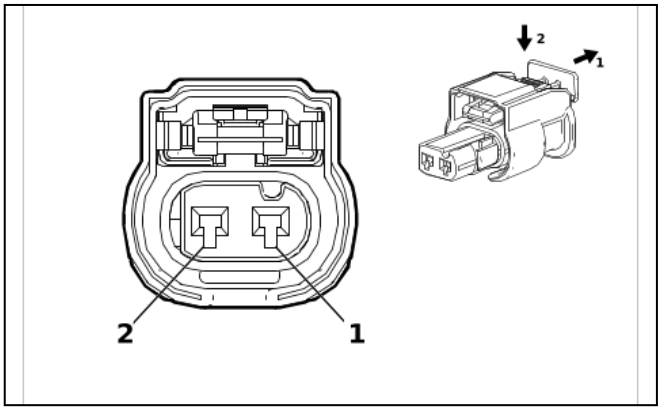
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

Q17B Fuel Injector 2 (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BU / GY	(1) 4902	(1) Direct Fuel Injector High Voltage Supply Cylinder 2	(1) I	(1) —
(2) 2	(2) 0.75	(2) BU	(2) 4802	(2) Direct Fuel Injector High Voltage Control Cylinder 2	(2) I	(2) —

Q17B Fuel Injector 2 (L76 / L78)



3960139

Connector Part Information
- Harness Type: Fuel Injector Wiring Harness - Bank 2 Direct
- OEM Connector: 34900-2120
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

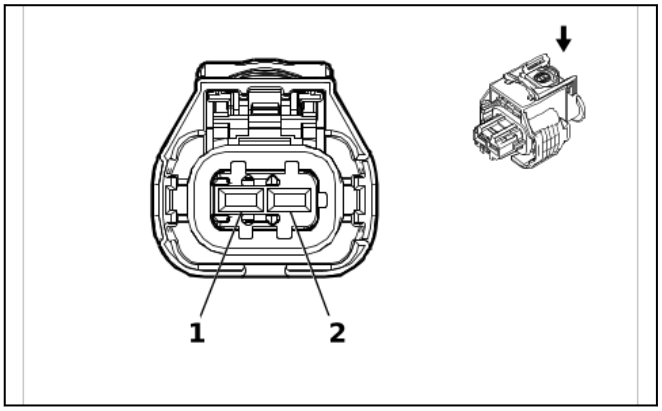
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

Q17B Fuel Injector 2 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BU / GY	(1) 4902	(1) Direct Fuel Injector High Voltage Supply Cylinder 2	(1) I	(1) —
(2) 2	(2) 0.75	(2) BU	(2) 4802	(2) Direct Fuel Injector High Voltage Control Cylinder 2	(2) I	(2) —

Q17B Fuel Injector 2 (LZ0)



2845578

Connector Part Information
- Harness Type: Fuel Injector Wiring Harness
- OEM Connector: 1 928 405 715
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 2.8 Series, Sealed(BK)

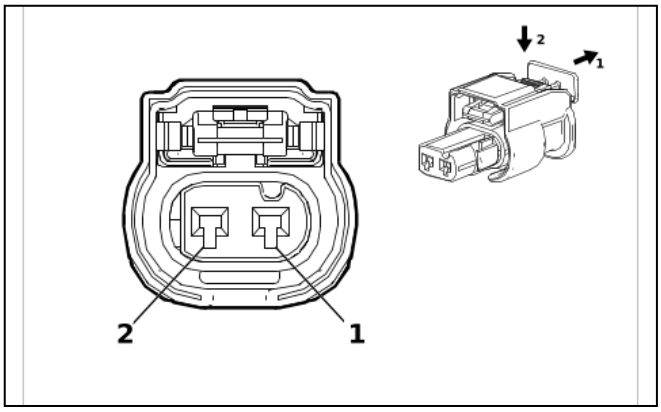
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-35 (VT)	No Tool Required

Q17B Fuel Injector 2 (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1.5	(1) BU / GY	(1) 4902	(1) Direct Fuel Injector High Voltage Supply Cylinder 2	(1) I	(1) —
(2) 2	(2) 1.5	(2) BU	(2) 4802	(2) Direct Fuel Injector High Voltage Control Cylinder 2	(2) I	(2) —

Q17C Fuel Injector 3 (L4B)



3960139

Connector Part Information
- Harness Type: Fuel Injector Wiring Harness
- OEM Connector: 34900-2120
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

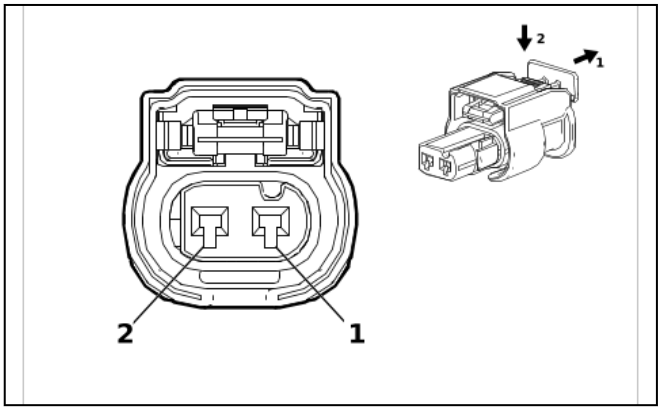
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

Q17C Fuel Injector 3 (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) GN / GY	(1) 4903	(1) Direct Fuel Injector High Voltage Supply Cylinder 3	(1) I	(1) —
(2) 2	(2) 0.75	(2) GN	(2) 4803	(2) Direct Fuel Injector High Voltage Control Cylinder 3	(2) I	(2) —

Q17C Fuel Injector 3 (L76 / L78)



3960139

Connector Part Information
- Harness Type: Fuel Injector Wiring Harness - Bank 1 Direct
- OEM Connector: 34900-2120
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

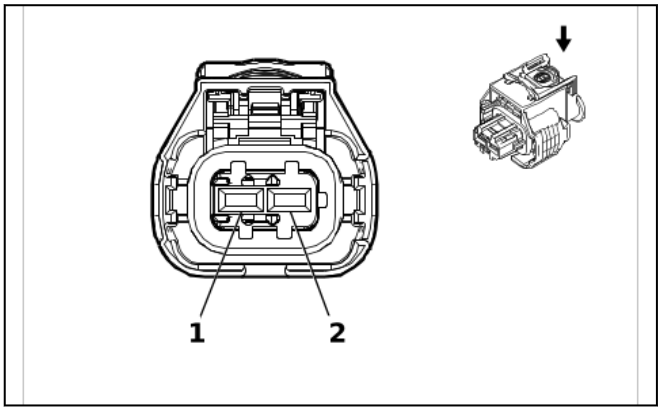
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

Q17C Fuel Injector 3 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) GN / GY	(1) 4903	(1) Direct Fuel Injector High Voltage Supply Cylinder 3	(1) I	(1) —
(2) 2	(2) 0.75	(2) GN	(2) 4803	(2) Direct Fuel Injector High Voltage Control Cylinder 3	(2) I	(2) —

Q17C Fuel Injector 3 (LZ0)



2845578

Connector Part Information
- Harness Type: Fuel Injector Wiring Harness
- OEM Connector: 1 928 405 715
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 2.8 Series, Sealed(BK)

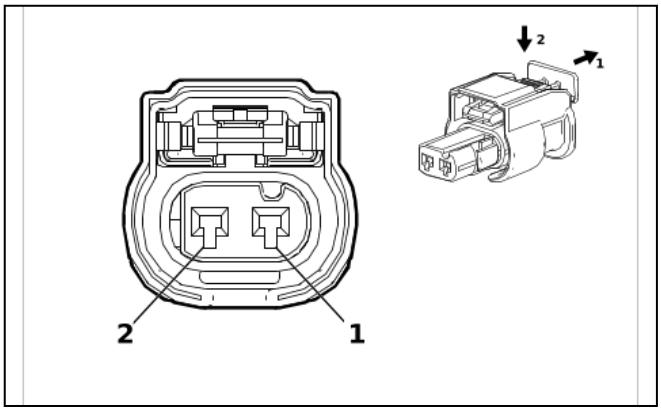
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-35 (VT)	No Tool Required

Q17C Fuel Injector 3 (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1.5	(1) GN / GY	(1) 4903	(1) Direct Fuel Injector High Voltage Supply Cylinder 3	(1) I	(1) —
(2) 2	(2) 1.5	(2) GN	(2) 4803	(2) Direct Fuel Injector High Voltage Control Cylinder 3	(2) I	(2) —

Q17D Fuel Injector 4 (L4B)



3960139

Connector Part Information
- Harness Type: Fuel Injector Wiring Harness
- OEM Connector: 34900-2120
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

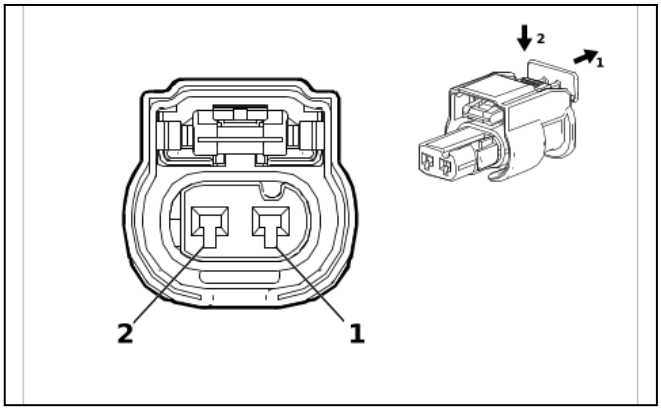
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

Q17D Fuel Injector 4 (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) VT / WH	(1) 4904	(1) Direct Fuel Injector High Voltage Supply Cylinder 4	(1) I	(1) —
(2) 2	(2) 0.75	(2) GY / BU	(2) 4804	(2) Direct Fuel Injector High Voltage Control Cylinder 4	(2) I	(2) —

Q17D Fuel Injector 4 (L76 / L78)



3960139

Connector Part Information
- Harness Type: Fuel Injector Wiring Harness - Bank 2 Direct
- OEM Connector: 34900-2120
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

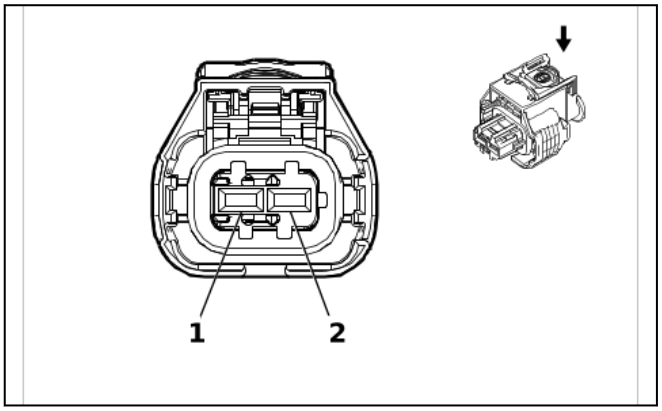
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

Q17D Fuel Injector 4 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BU / WH	(1) 4904	(1) Direct Fuel Injector High Voltage Supply Cylinder 4	(1) I	(1) —
(2) 2	(2) 0.75	(2) GY / BU	(2) 4804	(2) Direct Fuel Injector High Voltage Control Cylinder 4	(2) I	(2) —

Q17D Fuel Injector 4 (LZ0)



2845578

Connector Part Information
- Harness Type: Fuel Injector Wiring Harness
- OEM Connector: 1 928 405 715
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 2.8 Series, Sealed(BK)

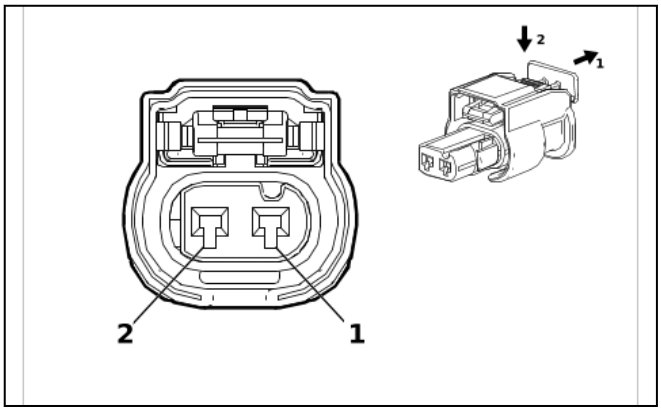
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-35 (VT)	No Tool Required

Q17D Fuel Injector 4 (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1.5	(1) BU / WH	(1) 4904	(1) Direct Fuel Injector High Voltage Supply Cylinder 4	(1) I	(1) —
(2) 2	(2) 1.5	(2) GY / BU	(2) 4804	(2) Direct Fuel Injector High Voltage Control Cylinder 4	(2) I	(2) —

Q17E Fuel Injector 5 (L76 / L78)



3960139

Connector Part Information
- Harness Type: Fuel Injector Wiring Harness - Bank 1 Direct
- OEM Connector: 34900-2120
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

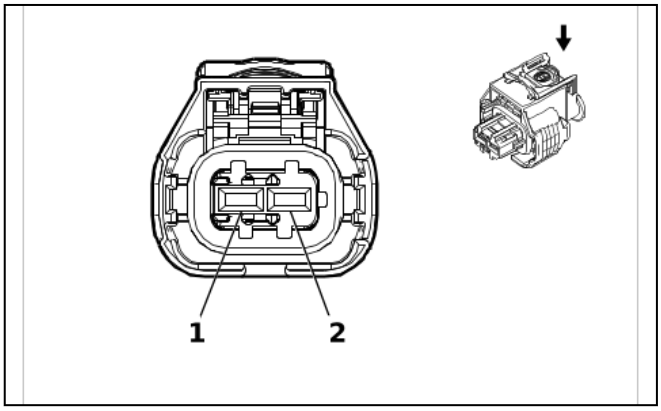
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

Q17E Fuel Injector 5 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) GN / WH	(1) 4905	(1) Direct Fuel Injector High Voltage Supply Cylinder 5	(1) I	(1) —
(2) 2	(2) 0.75	(2) WH / GN	(2) 4805	(2) Direct Fuel Injector High Voltage Control Cylinder 5	(2) I	(2) —

Q17E Fuel Injector 5 (LZ0)



2845578

Connector Part Information
- Harness Type: Fuel Injector Wiring Harness
- OEM Connector: 1 928 405 715
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 2.8 Series, Sealed(BK)

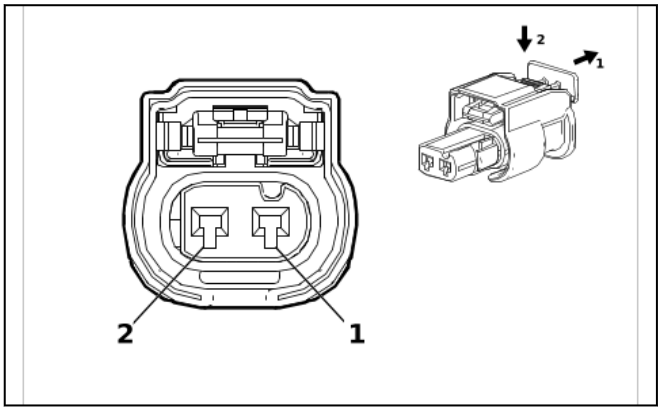
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-35 (VT)	No Tool Required

Q17E Fuel Injector 5 (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1.5	(1) GN / WH	(1) 4905	(1) Direct Fuel Injector High Voltage Supply Cylinder 5	(1) I	(1) —
(2) 2	(2) 1.5	(2) WH / GN	(2) 4805	(2) Direct Fuel Injector High Voltage Control Cylinder 5	(2) I	(2) —

Q17F Fuel Injector 6 (L76 / L78)



3960139

Connector Part Information

- Harness Type: Fuel Injector Wiring Harness - Bank 2 Direct
- OEM Connector: 34900-2120
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

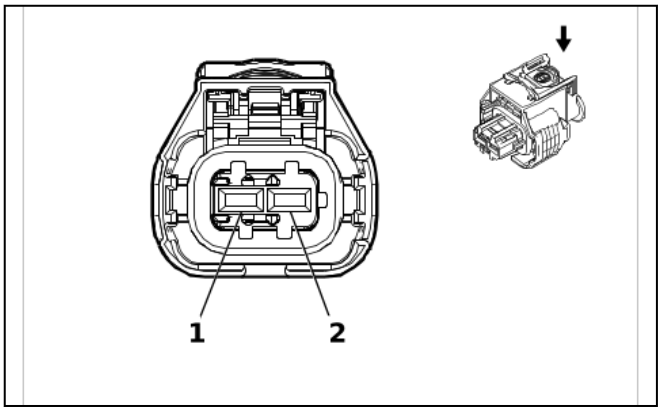
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

Q17F Fuel Injector 6 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) VT / GY	(1) 4906	(1) Direct Fuel Injector High Voltage Supply Cylinder 6	(1) I	(1) —
(2) 2	(2) 0.75	(2) VT / GN	(2) 4806	(2) Direct Fuel Injector High Voltage Control Cylinder 6	(2) I	(2) —

Q17F Fuel Injector 6 (LZ0)



2845578

Connector Part Information
- Harness Type: Fuel Injector Wiring Harness
- OEM Connector: 1 928 405 715
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 2.8 Series, Sealed(BK)

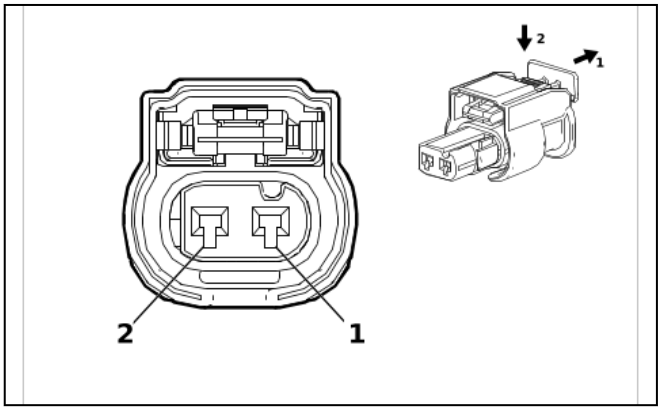
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-35 (VT)	No Tool Required

Q17F Fuel Injector 6 (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1.5	(1) VT / GY	(1) 4906	(1) Direct Fuel Injector High Voltage Supply Cylinder 6	(1) I	(1) —
(2) 2	(2) 1.5	(2) VT / GN	(2) 4806	(2) Direct Fuel Injector High Voltage Control Cylinder 6	(2) I	(2) —

Q17G Fuel Injector 7 (L76 / L78)



3960139

Connector Part Information
- Harness Type: Fuel Injector Wiring Harness - Bank 1 Direct
- OEM Connector: 34900-2120
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

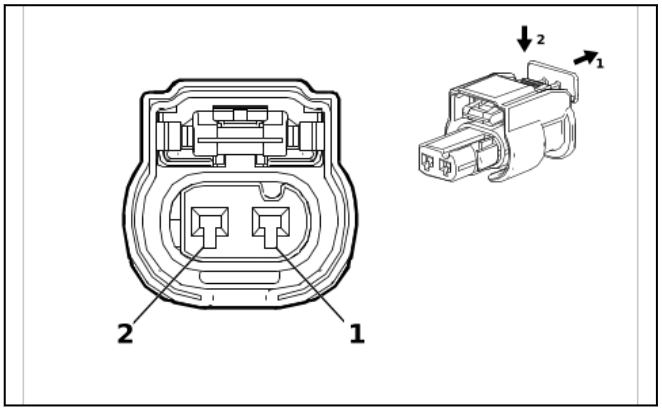
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

Q17G Fuel Injector 7 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) WH / YE	(1) 4907	(1) Direct Fuel Injector High Voltage Supply Cylinder 7	(1) I	(1) —
(2) 2	(2) 0.75	(2) YE / GY	(2) 4807	(2) Direct Fuel Injector High Voltage Control Cylinder 7	(2) I	(2) —

Q17H Fuel Injector 8 (L76 / L78)



3960139

Connector Part Information

- Harness Type: Fuel Injector Wiring Harness - Bank 2 Direct
- OEM Connector: 34900-2120
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

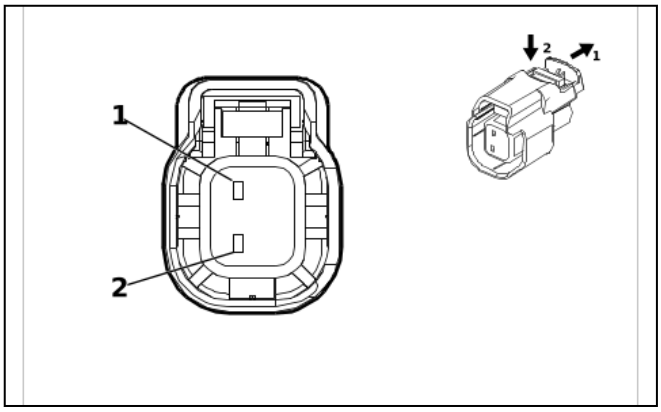
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

Q17H Fuel Injector 8 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) GY / WH	(1) 4908	(1) Direct Fuel Injector High Voltage Supply Cylinder 8	(1) I	(1) —
(2) 2	(2) 0.75	(2) GY	(2) 4808	(2) Direct Fuel Injector High Voltage Control Cylinder 8	(2) I	(2) —

Q17J Fuel Injector - Cylinder 1 Injector 2 (L76 / L78)



3028817

Connector Part Information
- Harness Type: Fuel Injector Wiring Harness - Bank 1 Port
- OEM Connector: 34062-4009
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.5 Series, Sealed(BK)

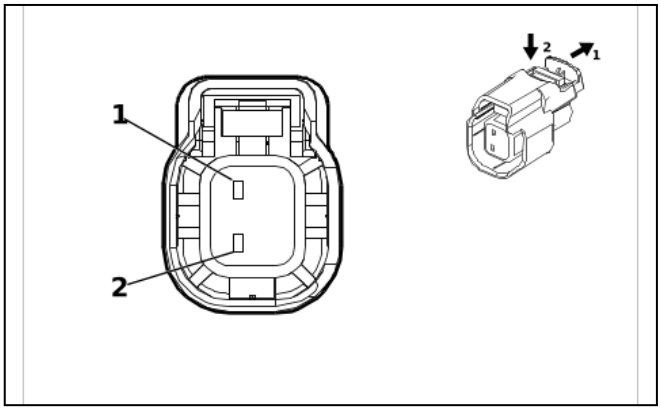
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required

Q17J Fuel Injector - Cylinder 1 Injector 2 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.8	(1) VT / BU	(1) 5291	(1) Powertrain Main Relay Fused Supply Voltage 2	(1) I	(1) —
(2) 2	(2) 0.8	(2) GN / YE	(2) 1744	(2) Fuel Injector 1 Control	(2) I	(2) —

Q17K Fuel Injector - Cylinder 2 Injector 2 (L76 / L78)



3028817

Connector Part Information
- Harness Type: Fuel Injector Wiring Harness - Bank 2 Port
- OEM Connector: 34062-4009
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.5 Series, Sealed(BK)

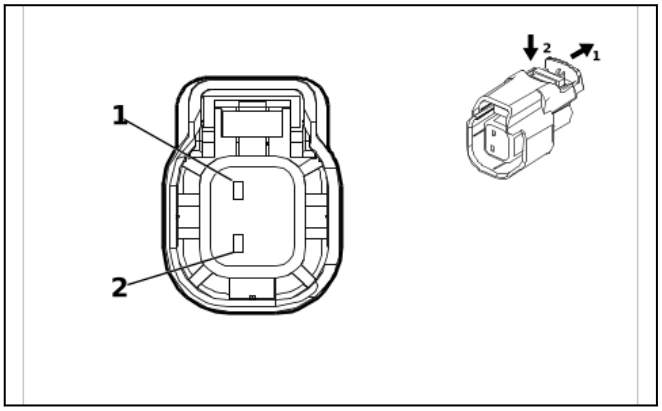
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required

Q17K Fuel Injector - Cylinder 2 Injector 2 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.8	(1) VT / BU	(1) 5292	(1) Powertrain Main Relay Fused Supply Voltage 3	(1) I	(1) —
(2) 2	(2) 0.8	(2) YE / WH	(2) 1745	(2) Fuel Injector 2 Control	(2) I	(2) —

Q17L Fuel Injector - Cylinder 3 Injector 2 (L76 / L78)



3028817

Connector Part Information

- Harness Type: Fuel Injector Wiring Harness - Bank 1 Port
- OEM Connector: 34062-4009
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.5 Series, Sealed(BK)

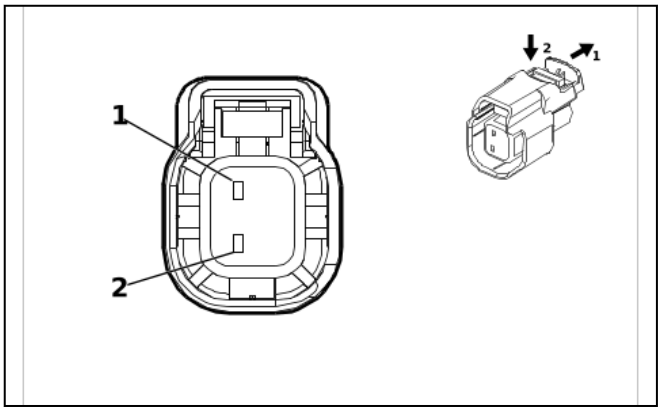
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required

Q17L Fuel Injector - Cylinder 3 Injector 2 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.8	(1) VT / BU	(1) 5291	(1) Powertrain Main Relay Fused Supply Voltage 2	(1) I	(1) —
(2) 2	(2) 0.8	(2) BN / VT	(2) 1746	(2) Fuel Injector 3 Control	(2) I	(2) —

Q17M Fuel Injector - Cylinder 4 Injector 2 (L76 / L78)



3028817

Connector Part Information
- Harness Type: Fuel Injector Wiring Harness - Bank 2 Port
- OEM Connector: 34062-4009
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.5 Series, Sealed(BK)

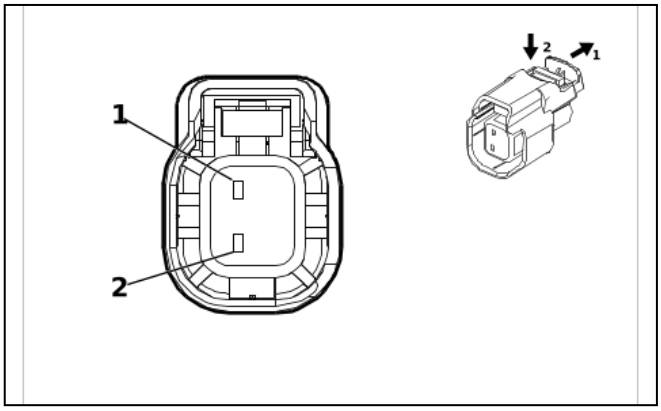
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required

Q17M Fuel Injector - Cylinder 4 Injector 2 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.8	(1) VT / BU	(1) 5292	(1) Powertrain Main Relay Fused Supply Voltage 3	(1) I	(1) —
(2) 2	(2) 0.8	(2) BN / YE	(2) 844	(2) Fuel Injector 4 Control	(2) I	(2) —

Q17N Fuel Injector - Cylinder 5 Injector 2 (L76 / L78)



3028817

Connector Part Information
- Harness Type: Fuel Injector Wiring Harness - Bank 1 Port
- OEM Connector: 34062-4009
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.5 Series, Sealed(BK)

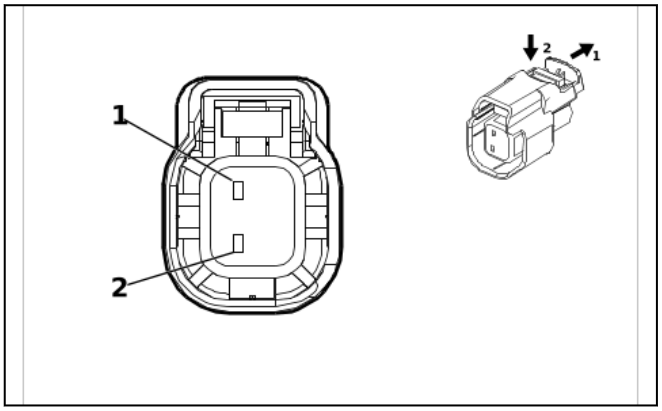
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required

Q17N Fuel Injector - Cylinder 5 Injector 2 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.8	(1) VT / BU	(1) 5291	(1) Powertrain Main Relay Fused Supply Voltage 2	(1) I	(1) —
(2) 2	(2) 0.8	(2) BN / GN	(2) 845	(2) Fuel Injector 5 Control	(2) I	(2) —

Q17P Fuel Injector - Cylinder 6 Injector 2 (L76 / L78)



3028817

Connector Part Information

- Harness Type: Fuel Injector Wiring Harness - Bank 2 Port
- OEM Connector: 34062-4009
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.5 Series, Sealed(BK)

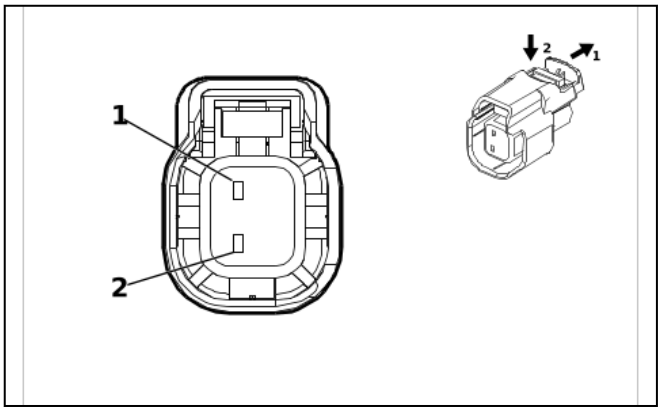
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required

Q17P Fuel Injector - Cylinder 6 Injector 2 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.8	(1) VT / BU	(1) 5292	(1) Powertrain Main Relay Fused Supply Voltage 3	(1) I	(1) —
(2) 2	(2) 0.8	(2) BN / BU	(2) 846	(2) Fuel Injector 6 Control	(2) I	(2) —

Q17Q Fuel Injector - Cylinder 7 Injector 2 (L76 / L78)



3028817

Connector Part Information
- Harness Type: Fuel Injector Wiring Harness - Bank 1 Port
- OEM Connector: 34062-4009
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.5 Series, Sealed(BK)

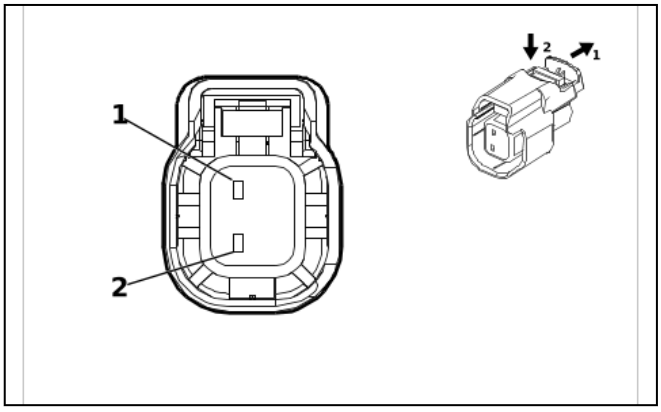
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required

Q17Q Fuel Injector - Cylinder 7 Injector 2 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.8	(1) VT / BU	(1) 5291	(1) Powertrain Main Relay Fused Supply Voltage 2	(1) I	(1) —
(2) 2	(2) 0.8	(2) VT	(2) 877	(2) Fuel Injector 7 Control	(2) I	(2) —

Q17R Fuel Injector - Cylinder 8 Injector 2 (L76 / L78)



3028817

Connector Part Information
- Harness Type: Fuel Injector Wiring Harness - Bank 2 Port
- OEM Connector: 34062-4009
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.5 Series, Sealed(BK)

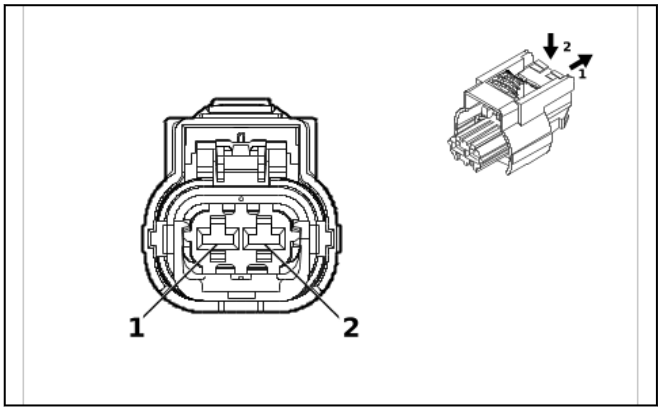
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required

Q17R Fuel Injector - Cylinder 8 Injector 2 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.8	(1) VT / BU	(1) 5292	(1) Powertrain Main Relay Fused Supply Voltage 3	(1) I	(1) —
(2) 2	(2) 0.8	(2) BN / GY	(2) 878	(2) Fuel Injector 8 Control	(2) I	(2) —

Q18A Fuel Pressure Regulator 1 (LZ0)



4992524

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 35182447
- Service Connector: 84941154
- Description: 2-Way F 2.8 MCP Series, Sealed(BK)

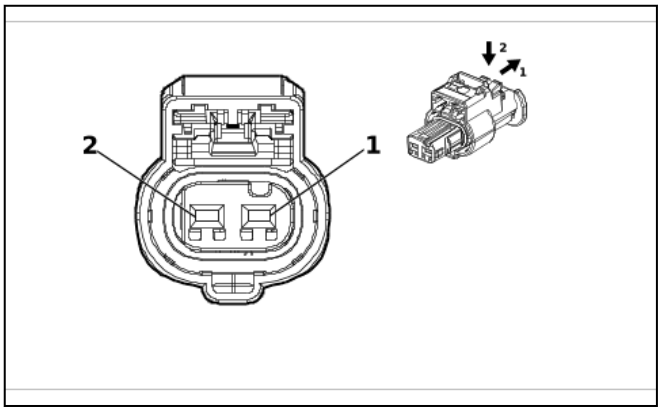
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-4A (PU)	No Tool Required

Q18A Fuel Pressure Regulator 1 (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) VT / BK	(1) 7300	(1) High Pressure Fuel Pump Low Control	(1) I	(1) —
(2) 2	(2) 0.75	(2) YE	(2) 7301	(2) High Pressure Fuel Pump High Control	(2) I	(2) —

Q18B Fuel Pressure Regulator 2 (LZ0)



6055996

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 5-2297795-1
- Service Connector: 85625525
- Description: 2-Way F 1.2 HPF Series, Sealed(BK)

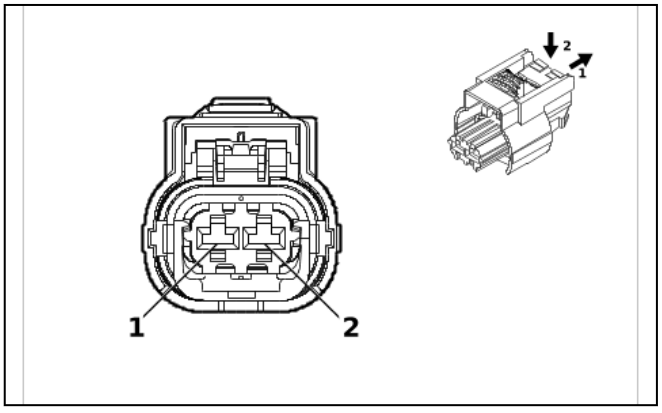
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

Q18B Fuel Pressure Regulator 2 (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BK / YE	(1) 2834	(1) Fuel Rail Pressure Solenoid Valve Low Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) BU / WH	(2) 2530	(2) Fuel Rail Pressure Solenoid Valve Control	(2) I	(2) —

Q18C Fuel Pressure Regulator 3 (LZ0)



4992524

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 35182447
- Service Connector: 84941154
- Description: 2-Way F 2.8 MCP Series, Sealed(BK)

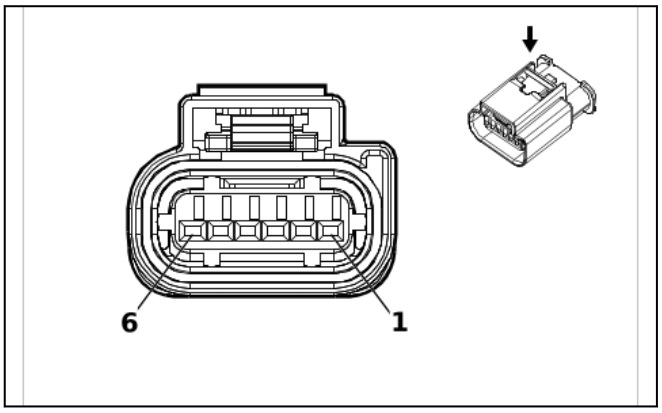
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-4A (PU)	No Tool Required

Q18C Fuel Pressure Regulator 3 (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) YE / VT	(1) 2420	(1) Fuel High Pressure Pump Low Enable Signal	(1) I	(1) —
(2) 2	(2) 0.75	(2) GY / BN	(2) 2419	(2) Fuel High Pressure Pump High Side Supply Voltage	(2) I	(2) —

Q20 Intake Airflow Control Valve (LZ0)



3747579

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 2272975-5
- Service Connector: 19352911
- Description: 6-Way F 1.2 MCON Series, Sealed(BK)

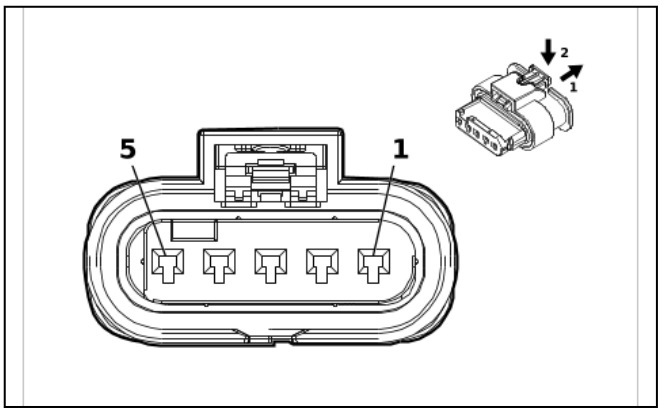
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

Q20 Intake Airflow Control Valve (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) YE	(1) 581	(1) Throttle Actuator Open Control	(1) I	(1) —
(2) 2	(2) 0.75	(2) BN / WH	(2) 582	(2) Throttle Actuator Close Control	(2) I	(2) —
(3) 3	(3) 0.5	(3) BU / WH	(3) 3630	(3) Throttle Position Sensor SENT 1 Signal	(3) I	(3) —
(4) 4	(4) 0.5	(4) BK / YE	(4) 548	(4) Engine Control Sensors Low Reference 1	(4) I	(4) —
(5) 5	(5) 0.5	(5) BU / RD	(5) 460	(5) Engine Control Sensors 5 Volt Reference 1	(5) I	(5) —
6	—	—	—	Not Occupied	—	—

Q22 Intake Manifold Tuning Solenoid Valve (LZ0)



3338689

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 1-1718806-1
- Service Connector: 19119351
- Description: 5-Way F 1.2 MCON-LL Series, Sealed(BK)

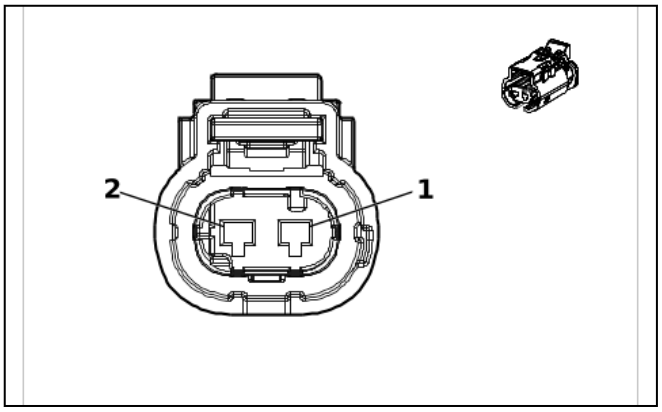
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

Q22 Intake Manifold Tuning Solenoid Valve (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BK / YE	(1) 548	(1) Engine Control Sensors Low Reference 1	(1) I	(1) —
(2) 2	(2) 0.5	(2) GN / GY	(2) 12812	(2) Variable Swirl SENT Signal	(2) I	(2) —
(3) 3	(3) 0.5	(3) BU / RD	(3) 460	(3) Engine Control Sensors 5 Volt Reference 1	(3) I	(3) —
(4) 4	(4) 0.75	(4) BK / BU	(4) 1408	(4) Variable Swirl Valve Close Control	(4) I	(4) —
(5) 5	(5) 0.75	(5) BK / GN	(5) 1389	(5) Variable Swirl Valve Open Control	(5) I	(5) —

Q37LFB Front Shock Absorber Actuator - Left (Z45)



6776339

Connector Part Information
- Harness Type: Electronic Suspension Strut Wiring Harness Extension Harness - Left
- OEM Connector: 10530497
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MLK Series, Sealed(BK)

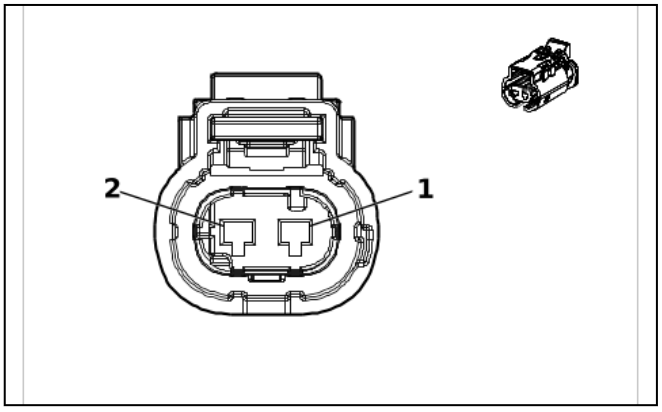
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

Q37LFB Front Shock Absorber Actuator - Left (Z45)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BU / WH	(1) 1107	(1) Left Front Shock Absorber Actuator Control	(1) I	(1) —
(2) 2	(2) 0.75	(2) GY	(2) 1113	(2) Left Front Shock Absorber Actuator Control	(2) I	(2) —

Q37LRB Rear Shock Absorber Actuator - Left (Z45)



6776339

Connector Part Information
- Harness Type: Chassis Rear Wiring Harness Extension Harness
- OEM Connector: 10530497
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MLK Series, Sealed(BK)

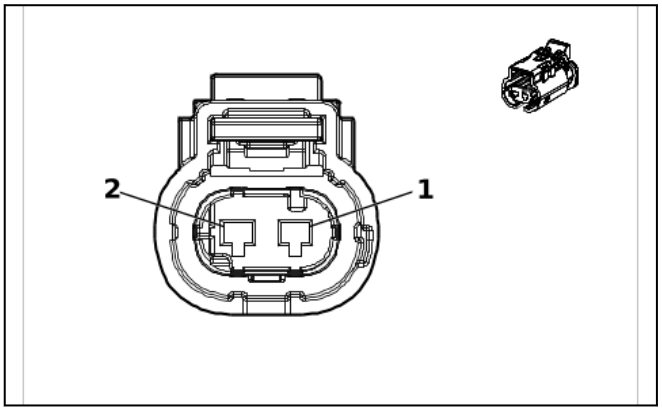
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

Q37LRB Rear Shock Absorber Actuator - Left (Z45)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BU / GY	(1) 1114	(1) Left Rear Shock Absorber Actuator Control	(1) I	(1) Z45
(2) 2	(2) 0.75	(2) GN / VT	(2) 1115	(2) Left Rear Shock Absorber Actuator Control	(2) I	(2) Z45

Q37RFB Front Shock Absorber Actuator - Right (Z45)



6776339

Connector Part Information

- Harness Type: Electronic Suspension Strut Wiring Harness Extension Harness - Right
- OEM Connector: 10530497
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MLK Series, Sealed(BK)

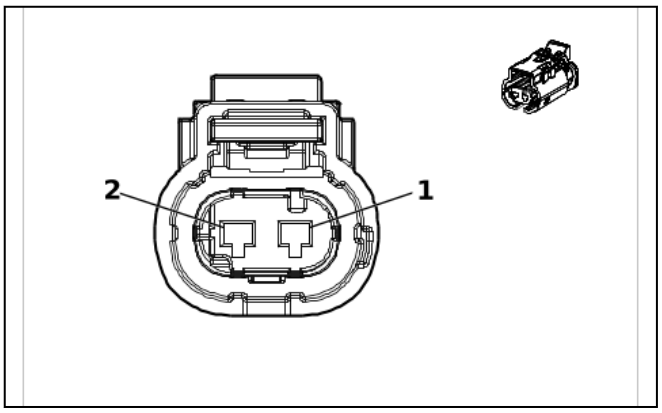
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

Q37RFB Front Shock Absorber Actuator - Right (Z45)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BU / WH	(1) 1116	(1) Right Front Shock Absorber Actuator Control	(1) I	(1) —
(2) 2	(2) 0.75	(2) GY	(2) 1117	(2) Right Front Shock Absorber Actuator Control	(2) I	(2) —

Q37RRB Rear Shock Absorber Actuator - Right (Z45)



6776339

Connector Part Information
- Harness Type: Chassis Rear Wiring Harness Extension Harness
- OEM Connector: 10530497
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MLK Series, Sealed(BK)

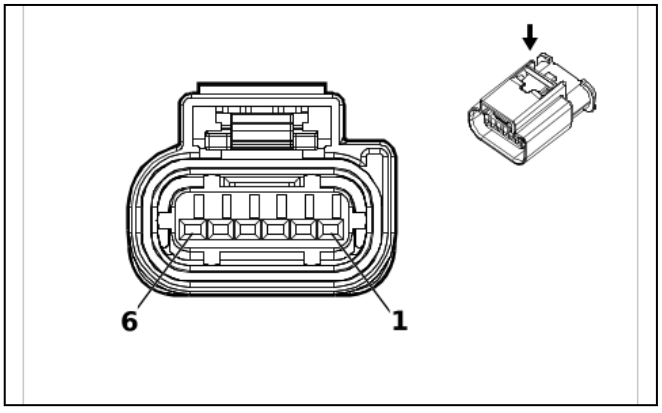
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

Q37RRB Rear Shock Absorber Actuator - Right (Z45)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BN / GN	(1) 1118	(1) Right Rear Shock Absorber Actuator Control	(1) I	(1) Z45
(2) 2	(2) 0.75	(2) GN / GY	(2) 1119	(2) Right Rear Shock Absorber Actuator Control	(2) I	(2) Z45

Q38 Throttle Body (L4B)



3747579

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 2272975-5
- Service Connector: 19352911
- Description: 6-Way F 1.2 MCON Series, Sealed(BK)

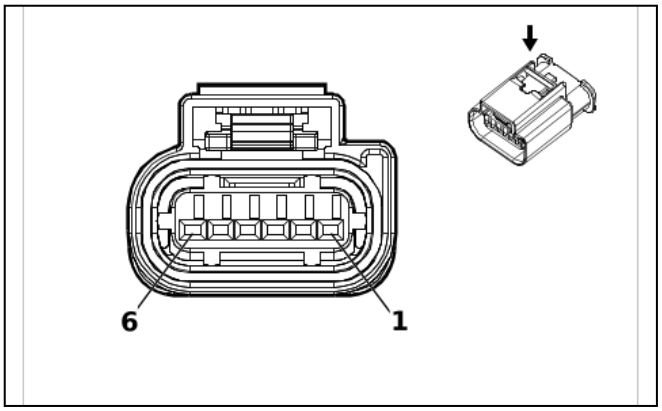
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

Q38 Throttle Body (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) YE	(1) 581	(1) Throttle Actuator Open Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) BN / WH	(2) 582	(2) Throttle Actuator Close Control	(2) I	(2) —
(3) 3	(3) 0.5	(3) BU / WH	(3) 3630	(3) Throttle Position Sensor SENT 1 Signal	(3) I	(3) —
(4) 4	(4) 0.5	(4) BK / YE	(4) 548	(4) Engine Control Sensors Low Reference 1	(4) I	(4) —
(5) 5	(5) 0.5	(5) BN / RD	(5) 2701	(5) Throttle Position Sensor 5V Reference	(5) I	(5) —
6	—	—	—	Not Occupied	—	—

Q38 Throttle Body (L76 / L78)



3747579

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 2272975-5
- Service Connector: 19352911
- Description: 6-Way F 1.2 MCON Series, Sealed(BK)

Terminal Part Information

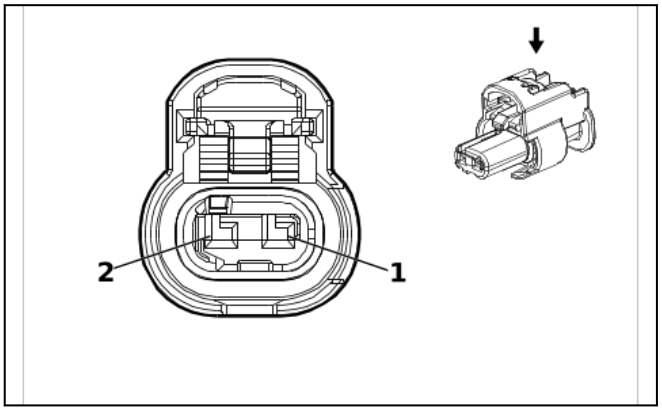
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

Q38 Throttle Body (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) YE	(1) 581	(1) Throttle Actuator Open Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) BN / WH	(2) 582	(2) Throttle Actuator Close Control	(2) I	(2) —
(3) 3	(3) 0.5	(3) BU / WH	(3) 3630	(3) Throttle Position Sensor SENT 1 Signal	(3) I	(3) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(4) 4	(4) 0.5	(4) BK / BN	(4) 2752	(4) Throttle Position Sensor Low Reference	(4) I	(4) —
(5) 5	(5) 0.5	(5) BN / RD	(5) 2701	(5) Throttle Position Sensor 5V Reference	(5) I	(5) —
6	—	—	—	Not Occupied	—	—

Q40 Turbocharger Bypass Valve Solenoid (L4B)



4690744

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 1-2296694-3
- Service Connector: 19366871
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

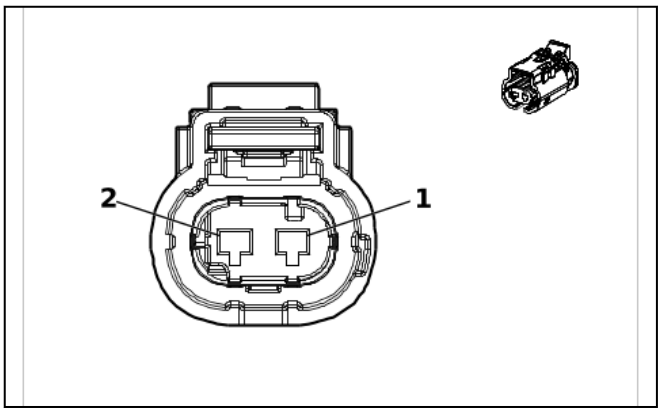
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

Q40 Turbocharger Bypass Valve Solenoid (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) VT / BU	(1) 5293	(1) Powertrain Main Relay Fused Supply Voltage 4	(1) I	(1) —
(2) 2	(2) 0.5	(2) GN	(2) 3060	(2) Turbocharger Bypass Solenoid Valve Control Bank 1	(2) I	(2) —

Q44 Engine Oil Pressure Control Solenoid Valve (L4B)



7027606

Connector Part Information
- Harness Type: Oil Pump Flow Control Solenoid Valve Harness
- OEM Connector: 12205976
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MLK Series, Sealed(BK)

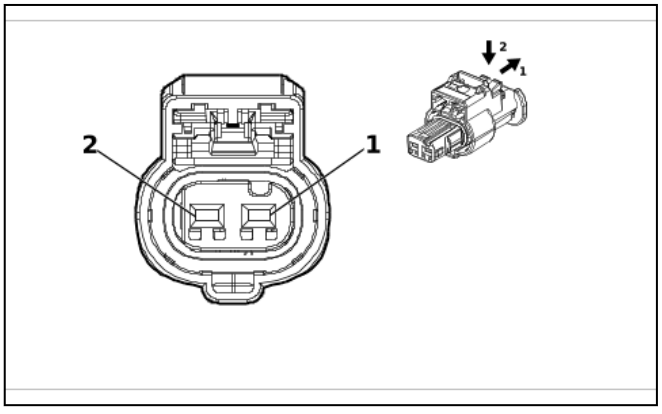
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

Q44 Engine Oil Pressure Control Solenoid Valve (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) YE / BN	(1) 106	(1) Oil Pump Motor Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) BU	(2) 179	(2) Engine Oil Pump Control	(2) I	(2) —

Q44 Engine Oil Pressure Control Solenoid Valve (L76 / L78)



6055996

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 5-2297795-1
- Service Connector: 85625525
- Description: 2-Way F 1.2 HPF Series, Sealed(BK)

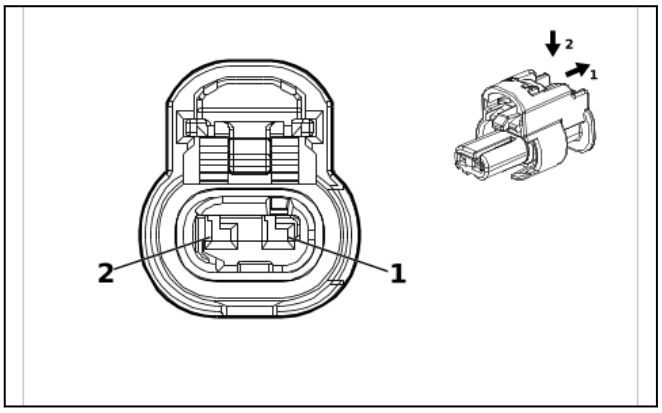
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

Q44 Engine Oil Pressure Control Solenoid Valve (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) YE / BN	(1) 106	(1) Oil Pump Motor Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) BU	(2) 179	(2) Engine Oil Pump Control	(2) I	(2) —

Q44 Engine Oil Pressure Control Solenoid Valve (LZ0)



4036662

Connector Part Information

- Harness Type: Oil Pump Flow Control Solenoid Valve Harness
- OEM Connector: 1-2296704-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON-CB Series, Sealed(BK)

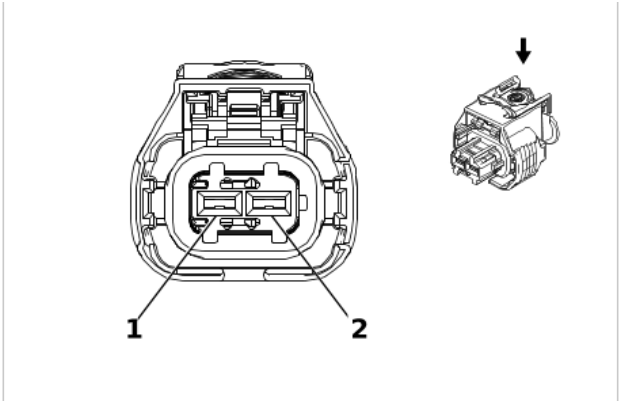
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

Q44 Engine Oil Pressure Control Solenoid Valve (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) YE / BN	(1) 106	(1) Oil Pump Motor Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) BU	(2) 179	(2) Engine Oil Pump Control	(2) I	(2) —

Q61 Reductant Fluid Injector (LZ0)



2577394

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 1 928 405 714
- Service Connector: 13384371
- Description: 2-Way F 2.8 Series, Sealed(BK)

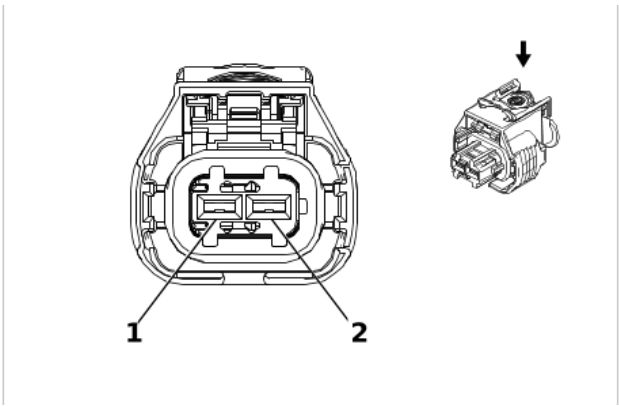
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-35 (VT)	No Tool Required

Q61 Reductant Fluid Injector (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BN / WH	(1) 3100	(1) Diesel Exhaust Fluid Dosing Valve Low Control	(1) I	(1) —
(2) 2	(2) 0.75	(2) BN	(2) 3099	(2) Diesel Exhaust Fluid Dosing Valve High Control	(2) I	(2) —

Q61B Reductant Fluid Injector 2 (LZ0)



2577394

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 1 928 405 714
- Service Connector: 13384371
- Description: 2-Way F 2.8 Series, Sealed(BK)

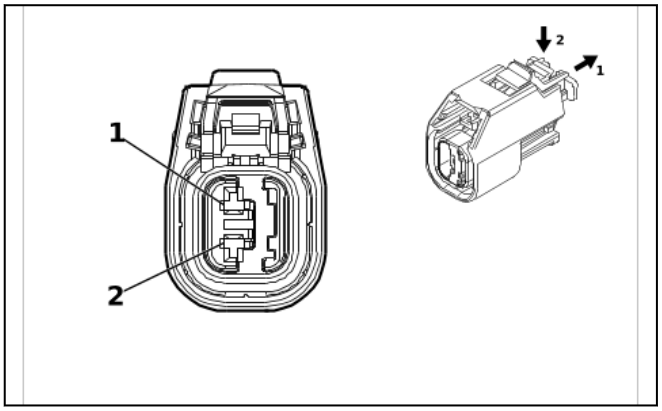
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-35 (VT)	No Tool Required

Q61B Reductant Fluid Injector 2 (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BU / YE	(1) 11616	(1) Diesel Exhaust Fluid Dosing Valve Low Control 2	(1) I	(1) —
(2) 2	(2) 0.75	(2) BU	(2) 11615	(2) Diesel Exhaust Fluid Dosing Valve High Control 2	(2) I	(2) —

Q64 Evaporative Emission System Switching Valve (FJW)



4889830

Connector Part Information

- Harness Type: Chassis Wiring Harness
- OEM Connector: 33164011
- Service Connector: 86802964
- Description: 2-Way F 1.5 OCS Series, Sealed(BK)

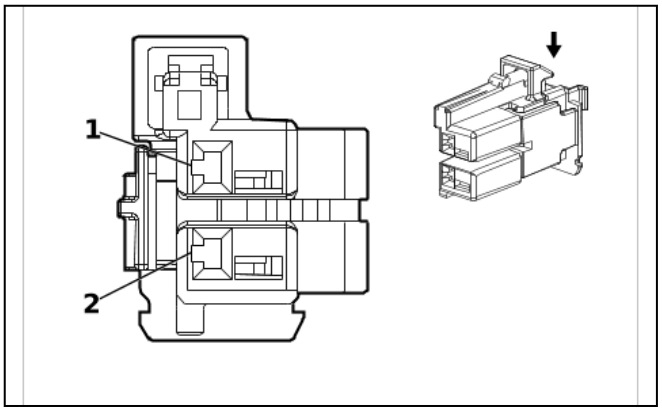
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required

Q64 Evaporative Emission System Switching Valve (FJW)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) WH / RD	(1) 11031	(1) Fuel Tank Isolation Valve Supply Voltage	(1) I	(1) —
(2) 2	(2) 0.5	(2) VT / BU	(2) 5294	(2) Powertrain Main Relay Fused Supply Voltage 5	(2) I	(2) —

Q77A Transmission Control Solenoid Valve 1



4672650

Connector Part Information
- Harness Type: Automatic Transmission Wiring Harness - Control
- OEM Connector: 13540048
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series(BN)

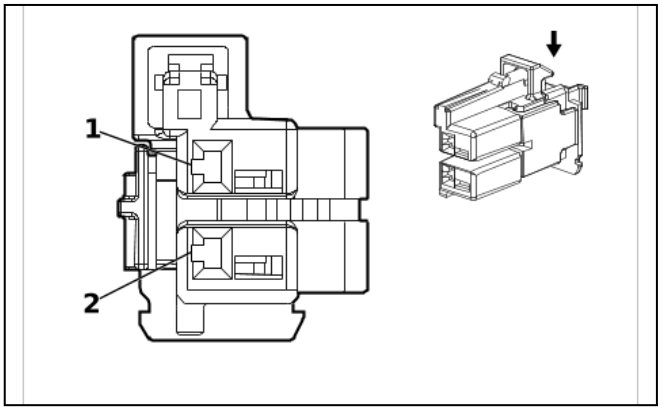
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

Q77A Transmission Control Solenoid Valve 1

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) WH	(1) 6388	(1) Transmission High Side Driver 2 Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) BU / GN	(2) 12461	(2) Transmission Valve 1 Solenoid Control	(2) I	(2) —

Q77B Transmission Control Solenoid Valve 2



4672650

Connector Part Information
- Harness Type: Automatic Transmission Wiring Harness - Control
- OEM Connector: 13540048
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series(BN)

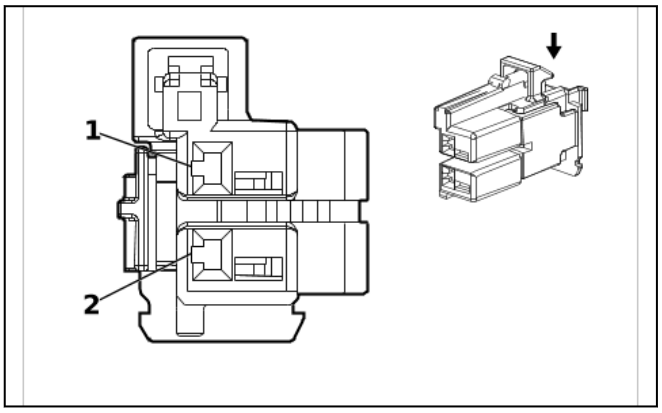
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

Q77B Transmission Control Solenoid Valve 2

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) WH	(1) 6388	(1) Transmission High Side Driver 2 Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) GN / BN	(2) 12462	(2) Transmission Valve 2 Solenoid Control	(2) I	(2) —

Q77C Transmission Control Solenoid Valve 3



4672650

Connector Part Information

- Harness Type: Automatic Transmission Wiring Harness - Control
- OEM Connector: 13540048
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series(BN)

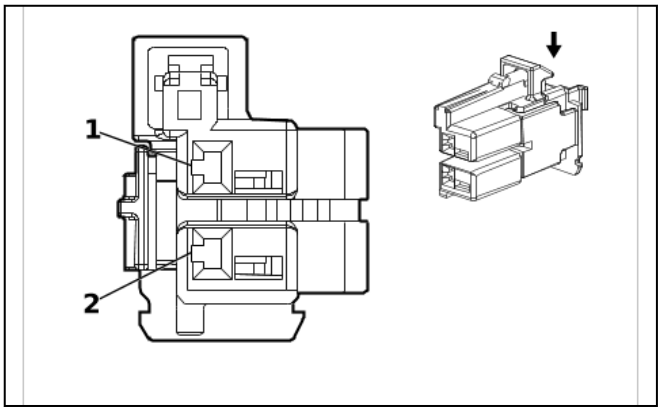
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

Q77C Transmission Control Solenoid Valve 3

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) WH	(1) 6388	(1) Transmission High Side Driver 2 Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) GY	(2) 12463	(2) Transmission Valve 3 Solenoid Control	(2) I	(2) —

Q77D Transmission Control Solenoid Valve 4



4672650

Connector Part Information
- Harness Type: Automatic Transmission Wiring Harness - Control
- OEM Connector: 13540048
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series(BN)

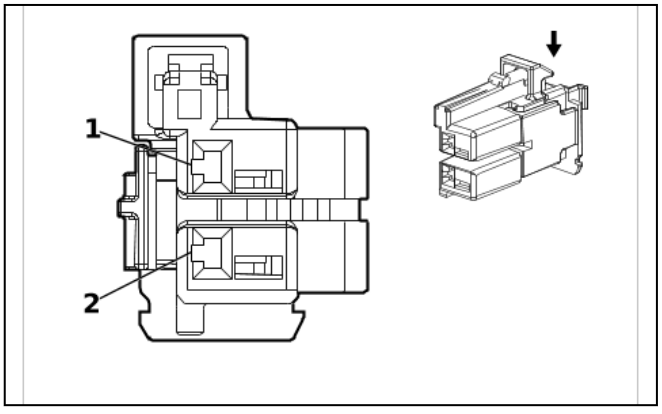
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

Q77D Transmission Control Solenoid Valve 4

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) WH	(1) 6388	(1) Transmission High Side Driver 2 Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) BN / WH	(2) 12464	(2) Transmission Valve 4 Solenoid Control	(2) I	(2) —

Q77E Transmission Control Solenoid Valve 5



4672650

Connector Part Information
- Harness Type: Automatic Transmission Wiring Harness - Control
- OEM Connector: 13540048
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series(BN)

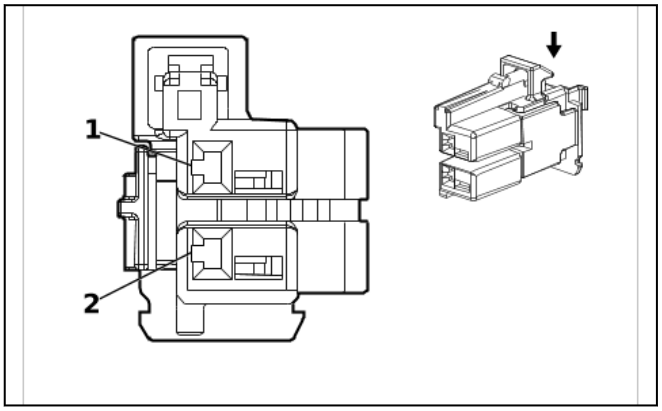
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

Q77E Transmission Control Solenoid Valve 5

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) WH	(1) 6388	(1) Transmission High Side Driver 2 Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) YE / VT	(2) 12465	(2) Transmission Valve 5 Solenoid Control	(2) I	(2) —

Q77F Transmission Control Solenoid Valve 6



4672650

Connector Part Information

- Harness Type: Automatic Transmission Wiring Harness - Control
- OEM Connector: 13540048
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series(BN)

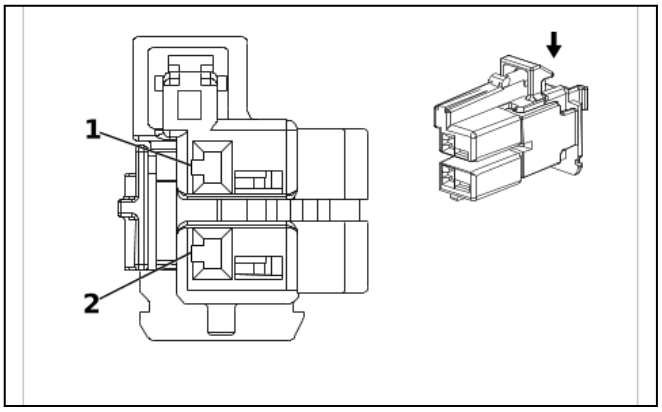
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

Q77F Transmission Control Solenoid Valve 6

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) WH	(1) 6388	(1) Transmission High Side Driver 2 Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) BU / GY	(2) 12466	(2) Transmission Valve 6 Solenoid Control	(2) I	(2) —

Q77G Transmission Control Solenoid Valve 7



4364736

Connector Part Information
- Harness Type: Automatic Transmission Wiring Harness - Control
- OEM Connector: 13540049
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series(BU)

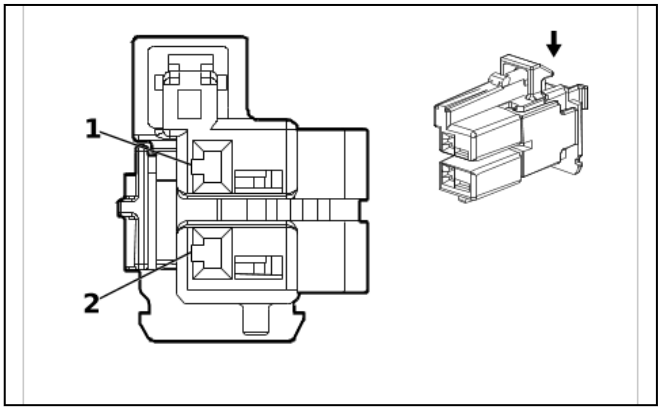
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

Q77G Transmission Control Solenoid Valve 7

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BN	(1) 6387	(1) Transmission High Side Driver 1 Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) GN / OG	(2) 1530	(2) Transmission Line Pressure Control Solenoid Valve Control	(2) I	(2) —

Q77H Transmission Control Solenoid Valve 8



4672683

Connector Part Information
- Harness Type: Automatic Transmission Wiring Harness - Control
- OEM Connector: 13540050
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series(GN)

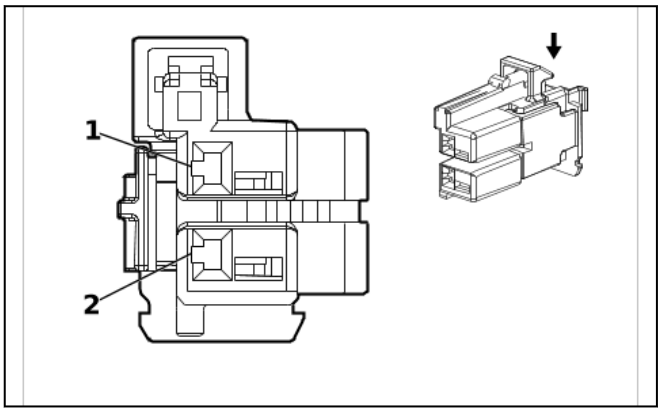
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

Q77H Transmission Control Solenoid Valve 8

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BN	(1) 6387	(1) Transmission High Side Driver 1 Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) GY / BN	(2) 422	(2) Torque Converter Clutch Solenoid Valve Control	(2) I	(2) —

Q77J Transmission Control Solenoid Valve 9



4672650

Connector Part Information

- Harness Type: Automatic Transmission Wiring Harness - Control
- OEM Connector: 13540048
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series(BN)

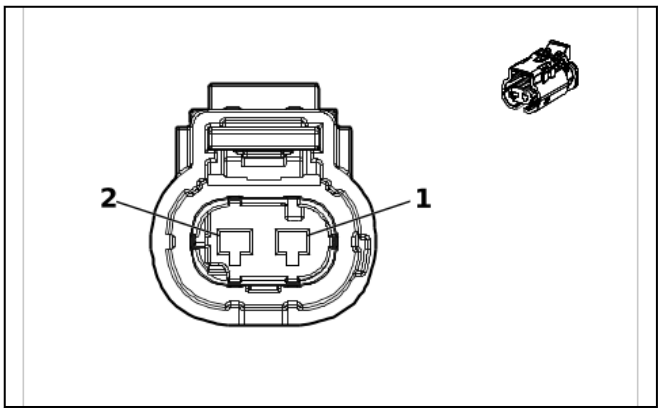
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

Q77J Transmission Control Solenoid Valve 9

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) WH	(1) 6388	(1) Transmission High Side Driver 2 Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) VT	(2) 12513	(2) Transmission Default Disable Solenoid Control	(2) I	(2) —

Q83AA Valve Lifter Oil Solenoid Valve - Cylinder 1 (L76 / L78)



7027606

Connector Part Information
- Harness Type: Valve Rocker Arm Oil Control Valve Harness
- OEM Connector: 13563857
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MLK Series, Sealed(BK)

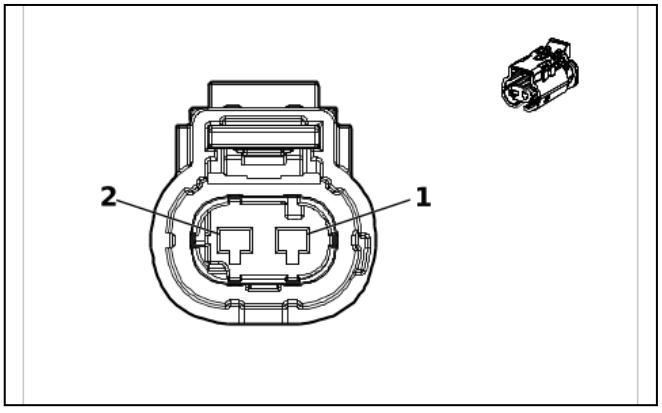
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

Q83AA Valve Lifter Oil Solenoid Valve - Cylinder 1 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) WH / BU	(1) 2491	(1) Cylinder Shutoff Solenoid Enable Signal 1	(1) I	(1) —
(2) 2	(2) 0.5	(2) BU	(2) 5491	(2) Cylinder Deactivation Solenoid Valve Control 1	(2) I	(2) —

Q83AB Valve Lifter Oil Solenoid Valve - Cylinder 2 (L76 / L78)



7027606

Connector Part Information
- Harness Type: Valve Rocker Arm Oil Control Valve Harness
- OEM Connector: 13563857
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MLK Series, Sealed(BK)

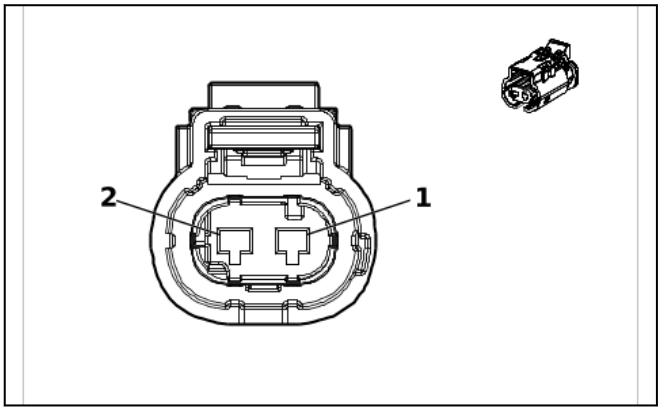
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

Q83AB Valve Lifter Oil Solenoid Valve - Cylinder 2 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) WH / GN	(1) 2492	(1) Cylinder Shutoff Solenoid Enable Signal 2	(1) I	(1) —
(2) 2	(2) 0.5	(2) GN	(2) 5492	(2) Cylinder Deactivation Solenoid Valve Control 2	(2) I	(2) —

Q83AC Valve Lifter Oil Solenoid Valve - Cylinder 3 (L76 / L78)



7027606

Connector Part Information

- Harness Type: Valve Rocker Arm Oil Control Valve Harness
- OEM Connector: 13563857
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MLK Series, Sealed(BK)

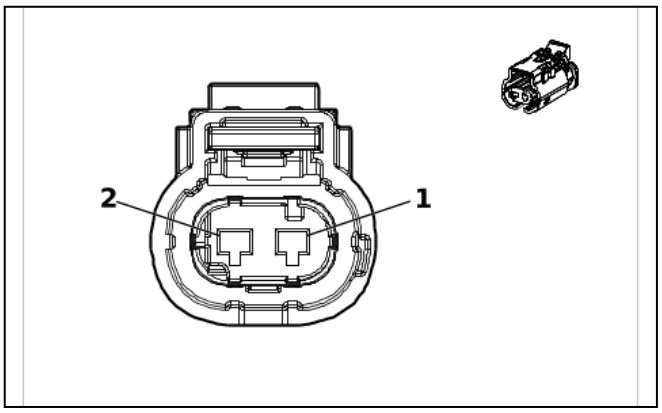
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

Q83AC Valve Lifter Oil Solenoid Valve - Cylinder 3 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) YE / GY	(1) 2493	(1) Cylinder Shutoff Solenoid Enable Signal 3	(1) I	(1) —
(2) 2	(2) 0.5	(2) GY	(2) 5493	(2) Cylinder Deactivation Solenoid Valve Control 3	(2) I	(2) —

Q83AD Valve Lifter Oil Solenoid Valve - Cylinder 4 (L76 / L78)



7027606

Connector Part Information
- Harness Type: Valve Rocker Arm Oil Control Valve Harness
- OEM Connector: 13563857
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MLK Series, Sealed(BK)

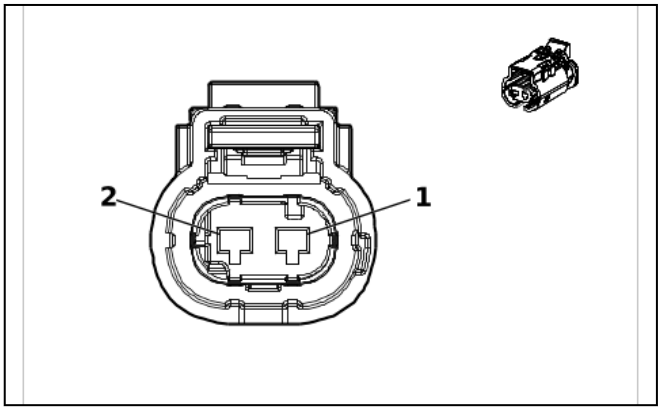
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

Q83AD Valve Lifter Oil Solenoid Valve - Cylinder 4 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) YE / GN	(1) 2494	(1) Cylinder Shutoff Solenoid Enable Signal 4	(1) I	(1) —
(2) 2	(2) 0.5	(2) YE / BU	(2) 5494	(2) Cylinder Deactivation Solenoid Valve Control 4	(2) I	(2) —

Q83AE Valve Lifter Oil Solenoid Valve - Cylinder 5 (L76 / L78)



7027606

Connector Part Information
- Harness Type: Valve Rocker Arm Oil Control Valve Harness
- OEM Connector: 13563857
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MLK Series, Sealed(BK)

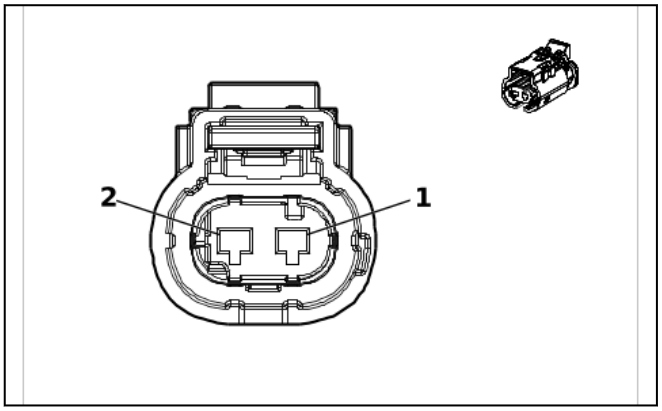
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

Q83AE Valve Lifter Oil Solenoid Valve - Cylinder 5 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) WH / VT	(1) 2495	(1) Cylinder Shutoff Solenoid Enable Signal 5	(1) I	(1) —
(2) 2	(2) 0.5	(2) VT	(2) 5495	(2) Cylinder Deactivation Solenoid Valve Control 5	(2) I	(2) —

Q83AF Valve Lifter Oil Solenoid Valve - Cylinder 6 (L76 / L78)



7027606

Connector Part Information

- Harness Type: Valve Rocker Arm Oil Control Valve Harness
- OEM Connector: 13563857
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MLK Series, Sealed(BK)

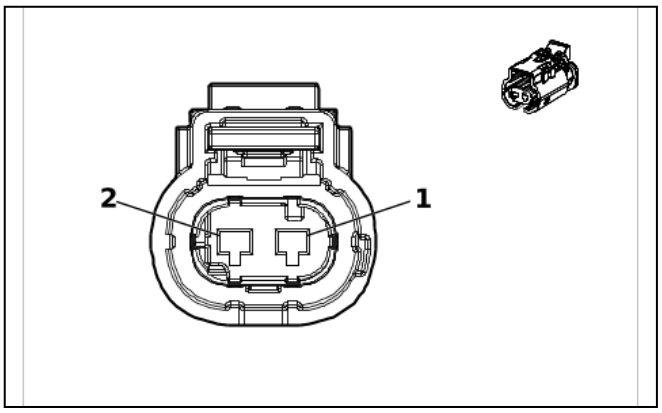
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

Q83AF Valve Lifter Oil Solenoid Valve - Cylinder 6 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) YE / BN	(1) 2496	(1) Cylinder Shutoff Solenoid Enable Signal 6	(1) I	(1) —
(2) 2	(2) 0.5	(2) BN	(2) 5496	(2) Cylinder Deactivation Solenoid Valve Control 6	(2) I	(2) —

Q83AG Valve Lifter Oil Solenoid Valve - Cylinder 7 (L76 / L78)



7027606

Connector Part Information
- Harness Type: Valve Rocker Arm Oil Control Valve Harness
- OEM Connector: 13563857
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MLK Series, Sealed(BK)

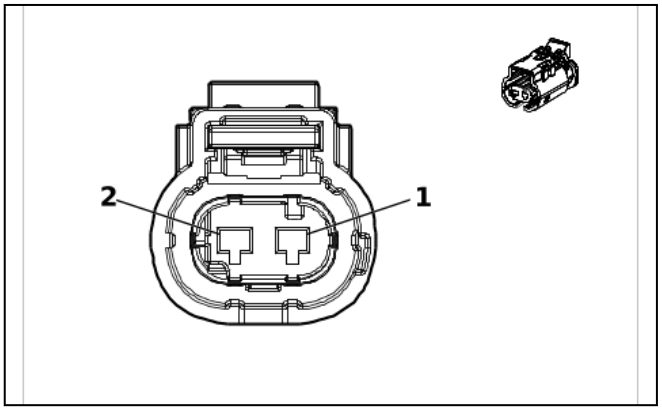
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

Q83AG Valve Lifter Oil Solenoid Valve - Cylinder 7 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GN / GY	(1) 2497	(1) Cylinder Shutoff Solenoid Enable Signal 7	(1) I	(1) —
(2) 2	(2) 0.5	(2) WH	(2) 5497	(2) Cylinder Deactivation Solenoid Valve Control 7	(2) I	(2) —

Q83AH Valve Lifter Oil Solenoid Valve - Cylinder 8 (L76 / L78)



7027606

Connector Part Information
- Harness Type: Valve Rocker Arm Oil Control Valve Harness
- OEM Connector: 13563857
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MLK Series, Sealed(BK)

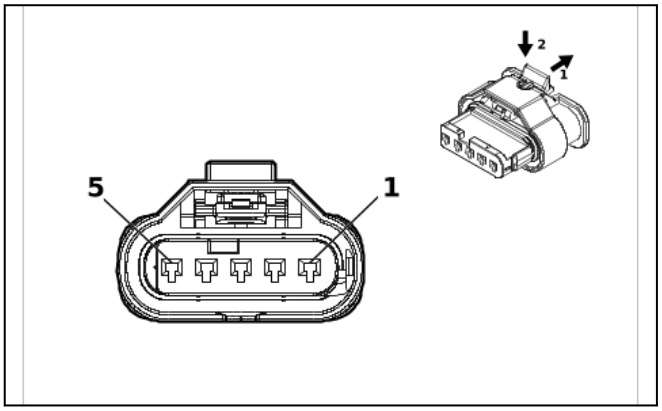
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

Q83AH Valve Lifter Oil Solenoid Valve - Cylinder 8 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) WH / YE	(1) 2498	(1) Cylinder Shutoff Solenoid Enable Signal 8	(1) I	(1) —
(2) 2	(2) 0.5	(2) YE	(2) 5498	(2) Cylinder Deactivation Solenoid Valve Control 8	(2) I	(2) —

Q97F Engine Coolant Flow Control Valve - Flow Control (LZ0)



4994456

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 2-2236898-5
- Service Connector: 19371191
- Description: 5-Way F 1.2 MCON-LL Series, Sealed(NA)

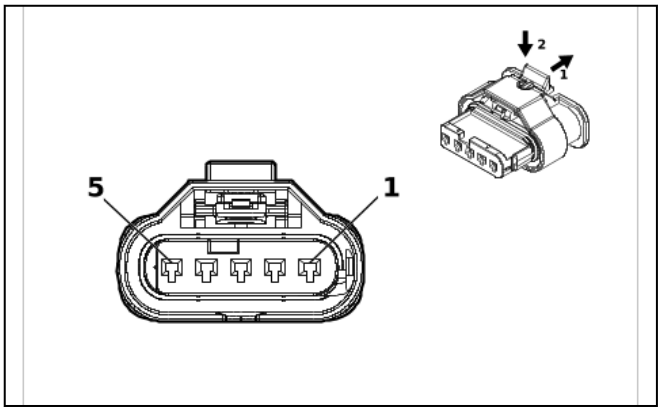
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

Q97F Engine Coolant Flow Control Valve - Flow Control (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BU	(1) 2976	(1) Coolant Diverter Valve Actuator Control Open	(1) I	(1) —
(2) 2	(2) 0.75	(2) BU / BN	(2) 2977	(2) Coolant Diverter Valve Actuator Control Close	(2) I	(2) —
(3) 3	(3) 0.5	(3) WH / RD	(3) 480	(3) Engine Control Vehicle Sensors 5 Volt Reference 1	(3) I	(3) —
(4) 4	(4) 0.5	(4) BU / GY	(4) 2978	(4) Coolant Diverter Valve Position Signal	(4) I	(4) —
(5) 5	(5) 0.5	(5) BK / GN	(5) 580	(5) Engine Control Sensors Low Reference 2	(5) I	(5) —

Q97M Engine Coolant Flow Control Valve - Main (LZ0)



4994456

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 2-2236898-5
- Service Connector: 19371191
- Description: 5-Way F 1.2 MCON-LL Series, Sealed(NA)

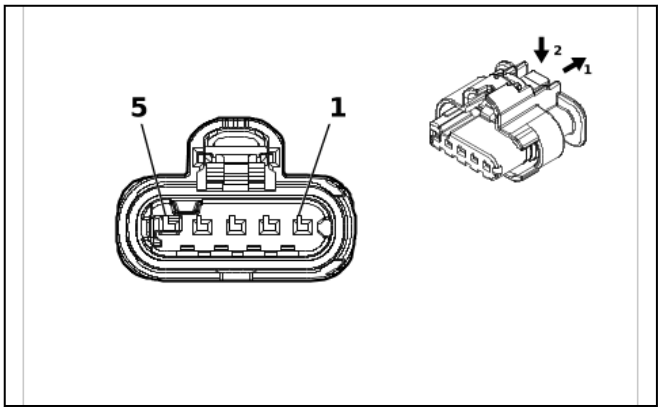
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

Q97M Engine Coolant Flow Control Valve - Main (LZ0)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) GY / BN	(1) 2972	(1) Coolant Flow Control Actuator Control Close	(1) I	(1) —
(2) 2	(2) 0.75	(2) GY / BU	(2) 2971	(2) Coolant Flow Control Actuator Control Open	(2) I	(2) —
(3) 3	(3) 0.5	(3) BU / RD	(3) 460	(3) Engine Control Sensors 5 Volt Reference 1	(3) I	(3) —
(4) 4	(4) 0.5	(4) GY	(4) 2973	(4) Coolant Flow Control Valve Position Signal	(4) I	(4) —
(5) 5	(5) 0.5	(5) BK / YE	(5) 548	(5) Engine Control Sensors Low Reference 1	(5) I	(5) —

Q97O Engine Coolant Flow Control Valve - Oil (L4B)



4997783

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 1-2296697-1
- Service Connector: 19371195
- Description: 5-Way F 1.2 MCON-CB Series, Sealed(BK)

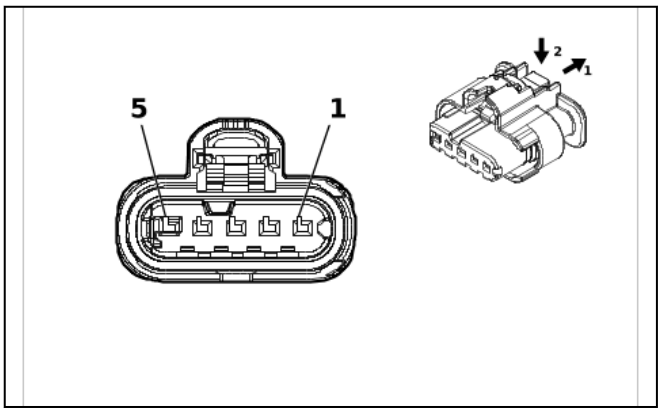
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

Q97O Engine Coolant Flow Control Valve - Oil (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BK / BU	(1) 10597	(1) Engine Control Sensors Low Reference 3	(1) I	(1) —
(2) 2	(2) 0.5	(2) WH	(2) 10829	(2) Oil Rotary Valve Feedback Signal	(2) I	(2) —
(3) 3	(3) 0.5	(3) GN / RD	(3) 10599	(3) Engine Control Sensors 5 Volt Reference 3	(3) I	(3) —
(4) 4	(4) 0.5	(4) WH / GY	(4) 10831	(4) Oil Rotary Valve Close Control	(4) I	(4) —
(5) 5	(5) 0.5	(5) WH / BN	(5) 10830	(5) Oil Rotary Valve Open Control	(5) I	(5) —

Q97O Engine Coolant Flow Control Valve - Oil (L76 / L78)



4967489

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 1-2296697-2
- Service Connector: 85083668
- Description: 5-Way F 1.2 MCON-CB Series, Sealed(BK)

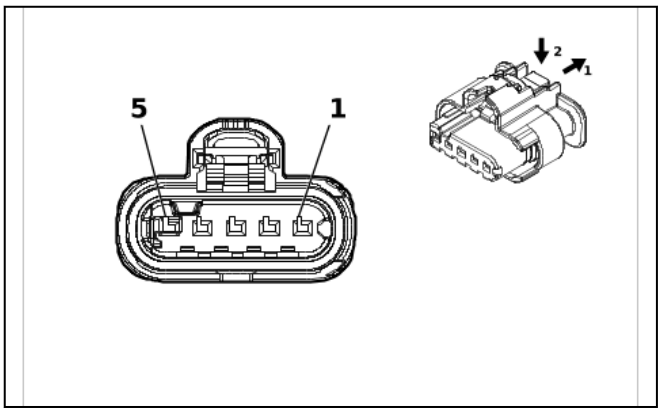
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

Q97O Engine Coolant Flow Control Valve - Oil (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) WH	(1) 10829	(1) Oil Rotary Valve Feedback Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) GN / RD	(2) 10599	(2) Engine Control Sensors 5 Volt Reference 3	(2) I	(2) —
(3) 3	(3) 0.5	(3) BK / BU	(3) 10597	(3) Engine Control Sensors Low Reference 3	(3) I	(3) —
(4) 4	(4) 0.75	(4) WH / GY	(4) 10831	(4) Oil Rotary Valve Close Control	(4) I	(4) —
(5) 5	(5) 0.75	(5) WH / BN	(5) 10830	(5) Oil Rotary Valve Open Control	(5) I	(5) —

Q97R Engine Coolant Flow Control Valve - Radiator (L4B)



4997783

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 1-2296697-1
- Service Connector: 19371195
- Description: 5-Way F 1.2 MCON-CB Series, Sealed(BK)

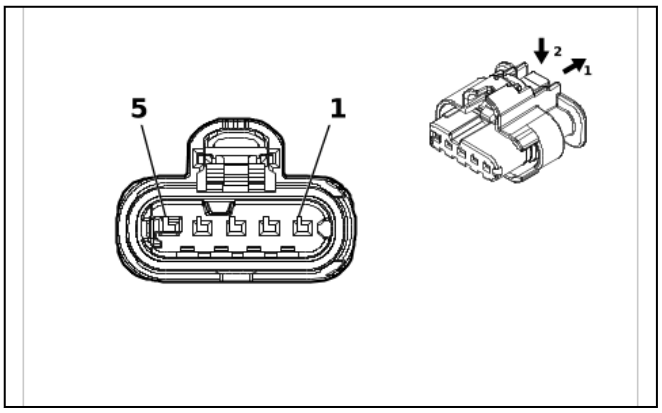
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

Q97R Engine Coolant Flow Control Valve - Radiator (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BK / GN	(1) 580	(1) Engine Control Sensors Low Reference 2	(1) I	(1) —
(2) 2	(2) 0.5	(2) GN	(2) 10823	(2) Radiator Rotary Valve Feedback Signal	(2) I	(2) —
(3) 3	(3) 0.5	(3) GY / RD	(3) 10667	(3) Engine Control Sensors 5 Volt Reference	(3) I	(3) —
(4) 4	(4) 0.5	(4) GN / GY	(4) 10825	(4) Radiator Rotary Valve Close Control	(4) I	(4) —
(5) 5	(5) 0.5	(5) GN / BN	(5) 10824	(5) Radiator Rotary Valve Open Control	(5) I	(5) —

Q97R Engine Coolant Flow Control Valve - Radiator (L76 / L78)



4967489

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 1-2296697-2
- Service Connector: 85083668
- Description: 5-Way F 1.2 MCON-CB Series, Sealed(BK)

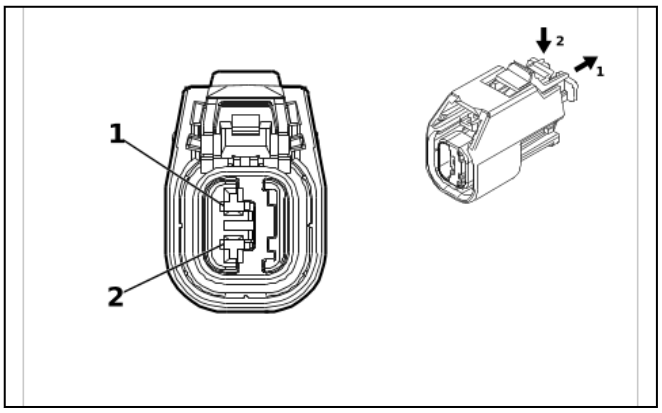
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

Q97R Engine Coolant Flow Control Valve - Radiator (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BU / GY	(1) 2978	(1) Coolant Diverter Valve Position Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) GY / RD	(2) 10667	(2) Engine Control Sensors 5 Volt Reference	(2) I	(2) —
(3) 3	(3) 0.5	(3) BK / GN	(3) 580	(3) Engine Control Sensors Low Reference 2	(3) I	(3) —
(4) 4	(4) 0.75	(4) BU / BN	(4) 2977	(4) Coolant Diverter Valve Actuator Control Close	(4) I	(4) —
(5) 5	(5) 0.75	(5) BU	(5) 2976	(5) Coolant Diverter Valve Actuator Control Open	(5) I	(5) —

R6AD Terminating Resistor - High Speed CAN Bus 4 (QT2 / QT5)



4889830

Connector Part Information
- Harness Type: Endgate Wiring Harness
- OEM Connector: 33164011
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.5 OCS Series, Sealed(BK)

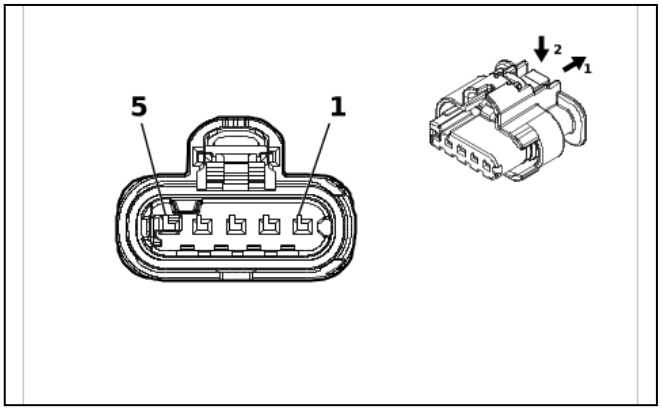
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required

R6AD Terminating Resistor - High Speed CAN Bus 4 (QT2 / QT5)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) WH	(1) 4100	(1) AUTOSAR CAN Bus [-] 4 Serial Data	(1) I	(1) —
(2) 2	(2) 0.5	(2) BU / VT	(2) 4101	(2) AUTOSAR CAN Bus [+] 4 Serial Data	(2) I	(2) —

R29 Fuel Filter X1 (FHX)



4997783

Connector Part Information
- Harness Type: Chassis Wiring Harness
- OEM Connector: 1-2296697-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 5-Way F 1.2 MCON-CB Series, Sealed(BK)

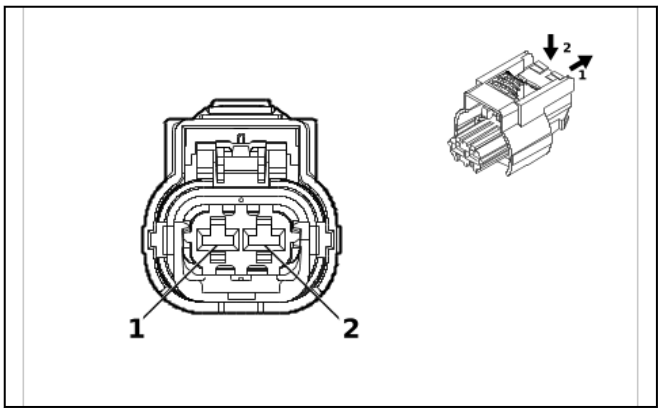
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required
II	Not required	J-35616-16 (L-GN)	No Tool Required

R29 Fuel Filter X1 (FHX)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1	(1) VT / GN	(1) 4320	(1) Powertrain Sensor Bus Enable	(1) II	(1) —
(2) 2	(2) 0.5	(2) BK / BU	(2) 6863	(2) Water In Fuel Sensor Low Reference	(2) I	(2) —
(3) 3	(3) 0.5	(3) BU / YE	(3) 6861	(3) Water In Fuel Sensor Signal	(3) I	(3) —
(4) 4	(4) 0.5	(4) BN / GY	(4) 7072	(4) Fuel Temperature Sensor 1 Signal	(4) I	(4) —
(5) 5	(5) 0.5	(5) BN / WH	(5) 7073	(5) Fuel Temperature Sensor 1 Low Reference	(5) I	(5) —

R29 Fuel Filter X2 (FHX)



4992524

Connector Part Information

- Harness Type: Chassis Wiring Harness
- OEM Connector: 35182447
- Service Connector: 84941154
- Description: 2-Way F 2.8 MCP Series, Sealed(BK)

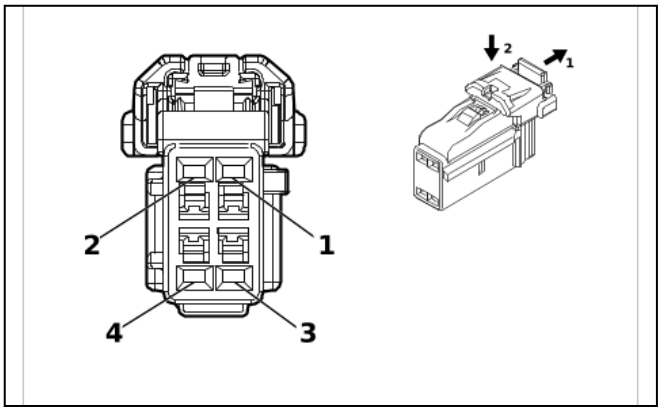
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-35 (VT)	No Tool Required

R29 Fuel Filter X2 (FHX)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 2.5	(1) BN / YE	(1) 2996	(1) Fuel Heater Control 1	(1) I	(1) —
(2) 2	(2) 2.5	(2) BK	(2) 1150	(2) Ground	(2) I	(2) —

R44 Radio AM Antenna Signal Filter Module - Center High Mounted Stop Lamp X1 - 4 - Door



4872683

Connector Part Information

- Harness Type: Roof Rear Spoiler Wiring Harness
- OEM Connector: 6098-8435
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 1.2 Series(BK)

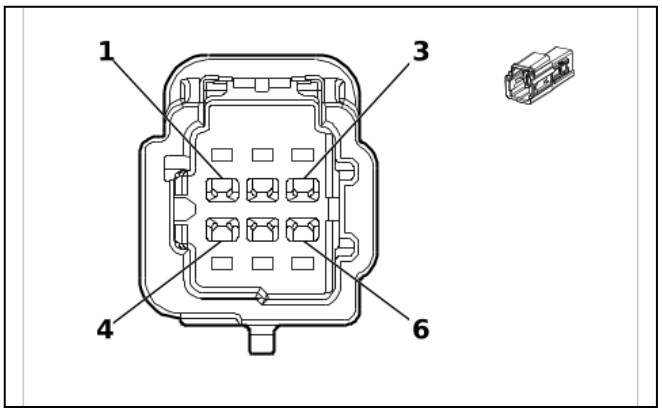
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

R44 Radio AM Antenna Signal Filter Module - Center High Mounted Stop Lamp X1 - 4 - Door

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BN / YE	(1) 820	(1) Center High Mounted Stop Lamp Supply Voltage	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK	(2) 8350	(2) Antenna Filter Ground	(2) I	(2) —
(3) 3	(3) 0.5	(3) WH / VT	(3) 1430	(3) Exterior Courtesy Lamp Control	(3) I	(3) —
4	—	—	—	Not Occupied	—	—

R44 Radio AM Antenna Signal Filter Module - Center High Mounted Stop Lamp X2 - 4 - Door



5714613

Connector Part Information

- Harness Type: Roof Rear Spoiler Wiring Harness
- OEM Connector: 6098-9120
- Service Connector: Service by Harness - See Part Catalog
- Description: 6-Way M 1.2 MBS Series(BK)

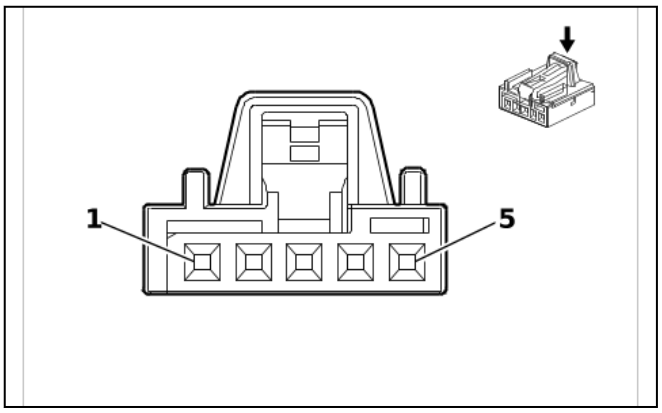
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-17 (L-GN)	No Tool Required

R44 Radio AM Antenna Signal Filter Module - Center High Mounted Stop Lamp X2 - 4 - Door

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BK	(1) 8350	(1) Antenna Filter Ground	(1) I	(1) —
(2) 2	(2) 0.5	(2) BN / YE	(2) 820	(2) Center High Mounted Stop Lamp Supply Voltage	(2) I	(2) —
(3) 3	(3) 0.5	(3) WH / VT	(3) 1430	(3) Exterior Courtesy Lamp Control	(3) I	(3) —
4 - 6	—	—	—	Not Occupied	—	—

S2L Automatic Transmission Manual Shift Auxiliary Position Switch - Left



5730934

Connector Part Information

- Harness Type: Steering Wheel Horn Switch Wiring Harness
- OEM Connector: 1-1418775-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 5-Way F MQS Series(BK)

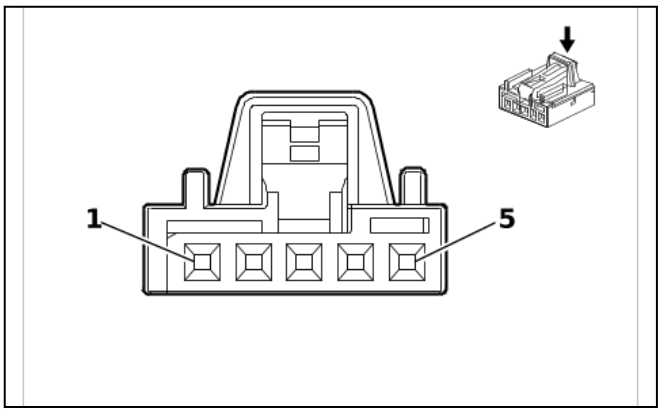
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

S2L Automatic Transmission Manual Shift Auxiliary Position Switch - Left

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) BK / WH	(1) 6051	(1) Steering Wheel Ground	(1) I	(1) —
(2) 2	(2) 0.35	(2) YE / BU	(2) 4312	(2) Radio Favorite Back Switch Signal	(2) I	(2) —
(3) 3	(3) 0.35	(3) WH / YE	(3) 4313	(3) Radio Favorite Forward Switch Signal	(3) I	(3) —
(4) 4	(4) 0.35	(4) YE / BU	(4) 6855	(4) Transmission Tap Down Switch Signal	(4) I	(4) —
5	—	—	—	Not Occupied	—	—

S2R Automatic Transmission Manual Shift Auxiliary Position Switch - Right



5730934

Connector Part Information

- Harness Type: Steering Wheel Horn Switch Wiring Harness
- OEM Connector: 1-1418775-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 5-Way F MQS Series(BK)

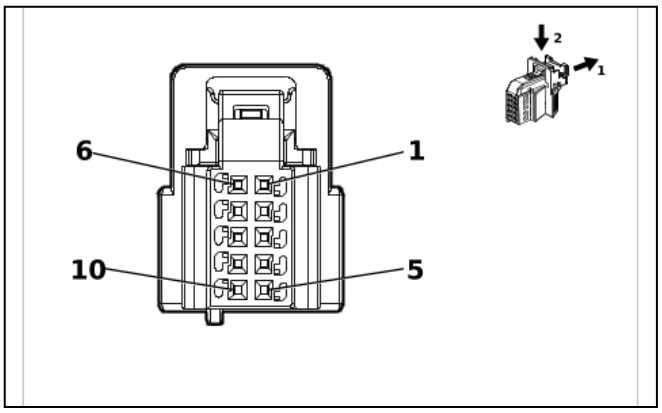
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

S2R Automatic Transmission Manual Shift Auxiliary Position Switch - Right

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) BK / WH	(1) 6051	(1) Steering Wheel Ground	(1) I	(1) —
(2) 2	(2) 0.35	(2) GY / BN	(2) 4314	(2) Radio Volume Down Switch Signal	(2) I	(2) —
(3) 3	(3) 0.35	(3) BU	(3) 4315	(3) Radio Volume Up Switch Signal	(3) I	(3) —
(4) 4	(4) 0.35	(4) YE / BU	(4) 6855	(4) Transmission Tap Down Switch Signal	(4) I	(4) —
(5) 5	(5) 0.35	(5) VT / YE	(5) 5526	(5) Tap Up/Tap Down Switch Signal	(5) I	(5) —

S3B Automatic Transmission Electronic Control



5837272

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 2310000-2
- Service Connector: 13518418
- Description: 10-Way F 0.64 MQS Series(GY)

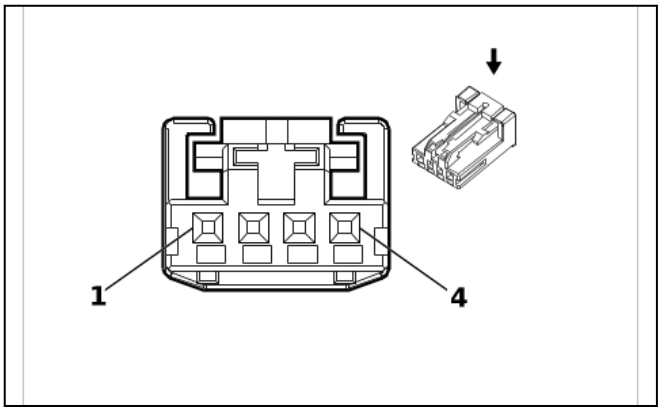
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19300632	J-35616-64B (L-BU)	J-38125-215A

S3B Automatic Transmission Electronic Control

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) RD / WH	(1) 7240	(1) Battery Positive Voltage	(1) I	(1) —
(2) 2	(2) 0.5	(2) WH / RD	(2) 480	(2) Engine Control Vehicle Sensors 5 Volt Reference 1	(2) I	(2) —
(3) 3	(3) 0.5	(3) BK / GN	(3) 580	(3) Engine Control Sensors Low Reference 2	(3) I	(3) —
(4) 4	(4) 0.5	(4) BK / YE	(4) 548	(4) Engine Control Sensors Low Reference 1	(4) I	(4) —
(5) 5	(5) 0.5	(5) BN	(5) 10515	(5) Electronic Transmission Range Select Shifter Position Sensor 1 Signal	(5) I	(5) —
(6) 6	(6) 0.5	(6) GN / WH	(6) 4622	(6) Engine Control Module LIN Bus 2	(6) I	(6) —
7	—	—	—	Not Occupied	—	—
(8) 8	(8) 0.5	(8) GY	(8) 10518	(8) Electronic Transmission Range Select Shifter Position Sensor 2 Signal	(8) I	(8) —
(9) 9	(9) 0.5	(9) BK / WH	(9) 1050	(9) Ground	(9) I	(9) —
(10) 10	(10) 0.5	(10) BU / RD	(10) 460	(10) Engine Control Sensors 5 Volt Reference 1	(10) I	(10) —

S32R Rear Seat Heater Switch (KCB)



2717162

Connector Part Information

- Harness Type: Front Floor Console Wiring Harness
- OEM Connector: 1-936119-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 0.64 Micro-Quadlock Series(BK)

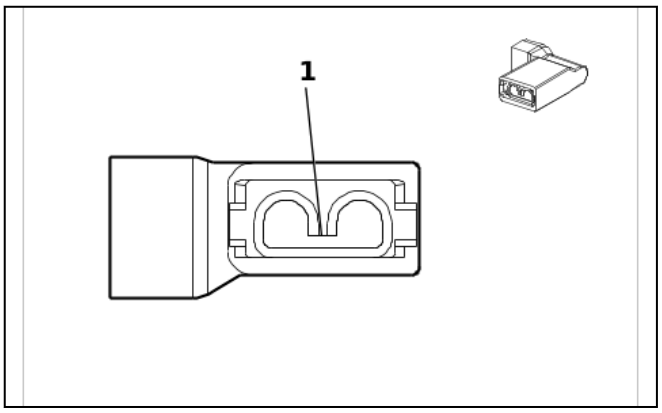
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

S32R Rear Seat Heater Switch (KCB)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) RD / VT	(1) 2640	(1) Battery Positive Voltage	(1) I	(1) —
2	—	—	—	Not Occupied	—	—
(3) 3	(3) 0.5	(3) GN / VT	(3) 2857	(3) Body Control Module LIN Bus 11	(3) I	(3) —
(4) 4	(4) 0.5	(4) BK / WH	(4) 1451	(4) Signal Ground	(4) I	(4) —

S33 Steering Wheel Horn Contact



5730950

Connector Part Information
- Harness Type: Steering Wheel Horn Switch Wiring Harness
- OEM Connector: 1717269-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 1-Way F 187 Ultra-Fast Series(RD)

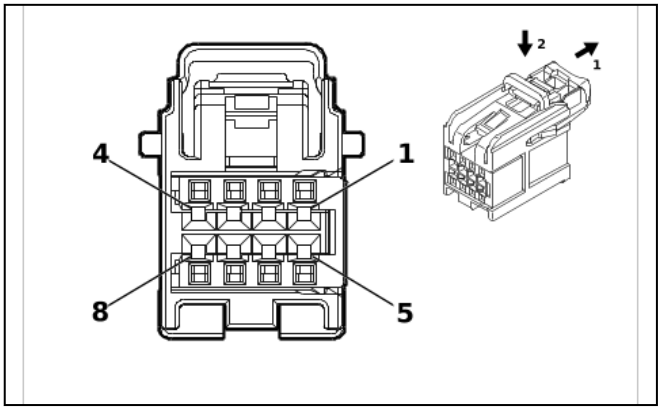
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-40 (BU)	No Tool Required

S33 Steering Wheel Horn Contact

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) GN / WH	(1) 3287	(1) Horn Switch Signal	(1) I	(1) —

S39 Ignition and Start Switch



4232228

Connector Part Information
- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 15526973
- Service Connector: 19353873
- Description: 8-Way F 0.64 OCS Series(GY)

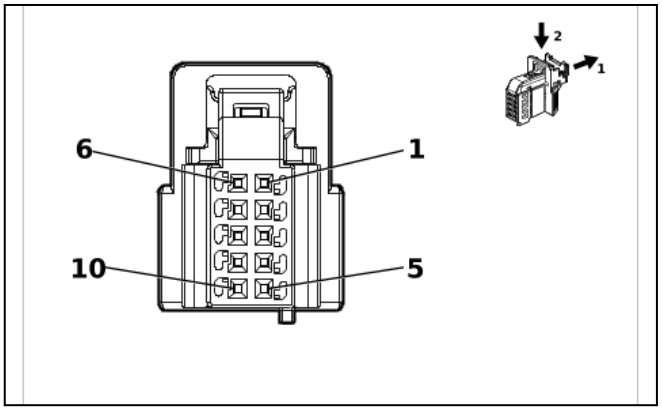
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

S39 Ignition and Start Switch

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) BU / BK	(1) 5719	(1) Ignition Mode Switch Start LED Signal	(1) I	(1) —
(2) 2	(2) 0.35	(2) BN / BK	(2) 5720	(2) Ignition Mode Switch Accessory LED Signal	(2) I	(2) —
(3) 3	(3) 0.35	(3) BK	(3) 1050	(3) Ground	(3) I	(3) —
(4) 4	(4) 0.35	(4) BU / GN	(4) 5723	(4) Ignition Mode Switch Mode Voltage	(4) I	(4) —
(5) 5	(5) 0.35	(5) YE	(5) 6817	(5) LED Backlight Dimming Control 1	(5) I	(5) —
6	—	—	—	Not Occupied	—	—
(7) 7	(7) 0.35	(7) BK / GY	(7) 3559	(7) Passive Start Switch 2 Low Reference	(7) I	(7) —
(8) 8	(8) 0.35	(8) GN / BK	(8) 3558	(8) Passive Start Switch Signal 2	(8) I	(8) —

S47D Front Seat Adjuster Memory Switch - Driver (A45)



5838155

Connector Part Information

- Harness Type: Front Side Door Door Lock Door Wiring Harness - Driver
- OEM Connector: 2310000-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 10-Way F 0.64 MQS Series(BK)

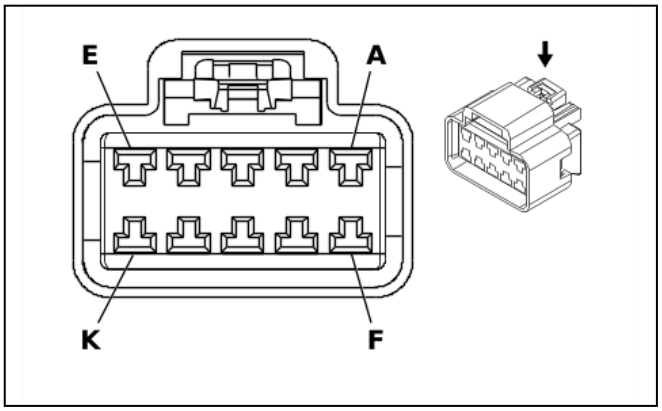
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

S47D Front Seat Adjuster Memory Switch - Driver (A45)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BN / GY	(1) 4784	(1) Left Front Door LED Backlight Dimming Control	(1) I	(1) —
2 - 4	—	—	—	Not Occupied	—	—
(5) 5	(5) 0.5	(5) BK / WH	(5) 1551	(5) Signal Ground	(5) I	(5) —
(6) 6	(6) 0.5	(6) BU / GN	(6) 614	(6) Seat Memory Switch Set Signal	(6) I	(6) —
(7) 7	(7) 0.5	(7) WH	(7) 615	(7) Seat Memory Switch Signal 1	(7) I	(7) —
8 - 10	—	—	—	Not Occupied	—	—

S64D Front Seat Adjuster Switch - Driver (A2X - A45)



623046

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Driver
- OEM Connector: 35058909
- Service Connector: Service by Harness - See Part Catalog
- Description: 10-Way F 280 GT Series(BK)

Terminal Part Information

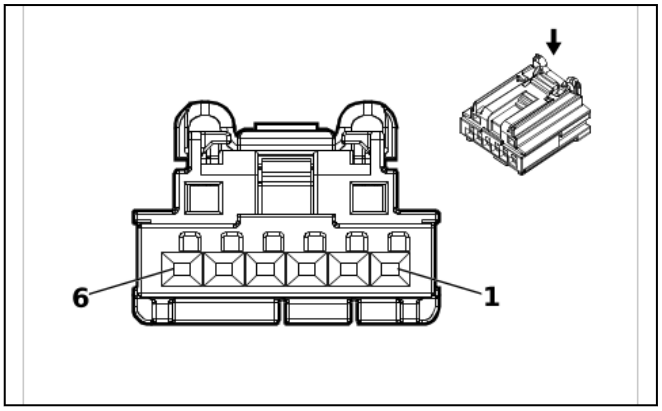
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-4A (PU)	No Tool Required

S64D Front Seat Adjuster Switch - Driver (A2X - A45)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	2.5	RD / YE	5040	Battery Positive Voltage	I	—
B	1.5	BU / YE	277	Driver Seat Recline Motor Rearward Control	I	—
C	1.5	YE / BU	285	Driver Seat Horizontal Motor Forward Control	I	—
D	1.5	GY / GN	284	Driver Seat Horizontal Motor Rearward Control	I	—
E	1.5	GY / BU	283	Driver Seat Rear Vertical Motor Down Control	I	—
F	1.5	GN / BN	286	Driver Seat Front Vertical Motor Up Control	I	—
G	1.5	YE	282	Driver Seat Rear Vertical Motor Up Control	I	—
H	1.5	GN / YE	276	Driver Seat Recline Motor Forward Control	I	—

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
J	2.5	BK	1550	Ground	I	—
K	1.5	BU / VT	287	Driver Seat Front Vertical Motor Down Control	I	—

S64D Front Seat Adjuster Switch - Driver (A45)



3960313

Connector Part Information
- Harness Type: Front Seat Wiring Harness - Driver
- OEM Connector: 2035363-4
- Service Connector: Service by Harness - See Part Catalog
- Description: 6-Way F 0.64 Generation Y Series(BK)

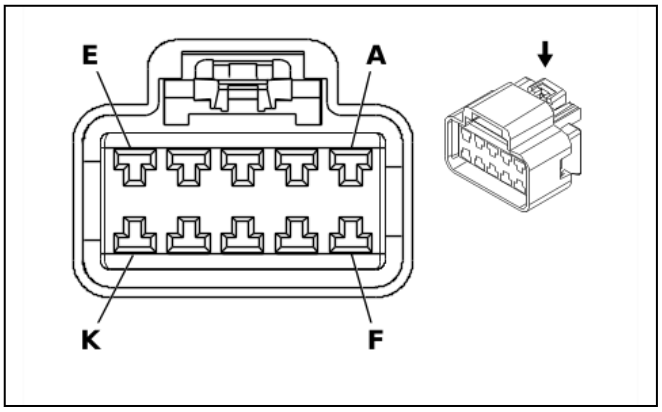
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

S64D Front Seat Adjuster Switch - Driver (A45)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) RD / BN	(1) 2240	(1) Battery Positive Voltage	(1) I	(1) —
2	—	—	—	Not Occupied	—	—
(3) 3	(3) 0.35 (3) 0.5	(3) GN / GY (3) GN / GY	(3) 3758 (3) 3758	(3) Driver Seat Adjuster Memory Module LIN Bus 2 (3) Driver Seat Adjuster Memory Module LIN Bus 2	(3) I (3) I	(3) - AVK (3) AVK
(4) 4	(4) 0.5	(4) BK	(4) 1550	(4) Ground	(4) I	(4) —
(5) 5	(5) 0.5	(5) BU / YE	(5) 2818	(5) Driver Seat Auxiliary Adjustment Switch Signal	(5) I	(5) —
(6) 6	(6) 0.5	(6) BK / VT	(6) 2817	(6) Auxiliary Driver Seat Adjustment Switch Low Reference	(6) I	(6) —

S64P Front Seat Adjuster Switch - Passenger (A7K - (AHH / AKE))



623046

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Passenger
- OEM Connector: 35058909
- Service Connector: Service by Harness - See Part Catalog
- Description: 10-Way F 280 GT Series(BK)

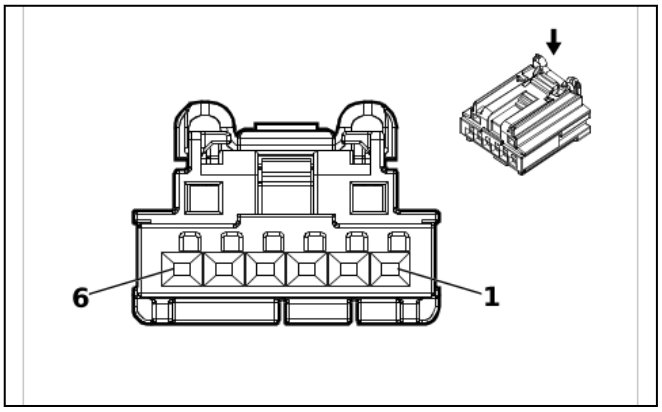
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-4A (PU)	No Tool Required

S64P Front Seat Adjuster Switch - Passenger (A7K - (AHH / AKE))

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	1.5	BU / WH	289	Passenger Seat Rear Vertical Motor Down Control	I	—
B	1.5	YE / BU	290	Passenger Seat Horizontal Motor Rearward Control	I	—
C	1.5	YE / WH	296	Passenger Seat Horizontal Motor Forward Control	I	—
D	1.5	BU / BN	77	Passenger Seat Recline Motor Rearward Control	I	—
E	2.5	BK	1350	Ground	I	—
F	1.5	GN / BU	298	Passenger Seat Front Vertical Motor Down Control	I	—
G	2.5	RD / YE	7440	Battery Positive Voltage	I	—
H	1.5	GN	76	Passenger Seat Recline Motor Forward Control	I	—
J	1.5	GN / WH	288	Passenger Seat Rear Vertical Motor Up Control	I	—
K	1.5	GN / VT	297	Passenger Seat Front Vertical Motor Up Control	I	—

S64P Front Seat Adjuster Switch - Passenger (AHH / AKE)



3960313

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Passenger
- OEM Connector: 2035363-4
- Service Connector: Service by Harness - See Part Catalog
- Description: 6-Way F 0.64 Generation Y Series(BK)

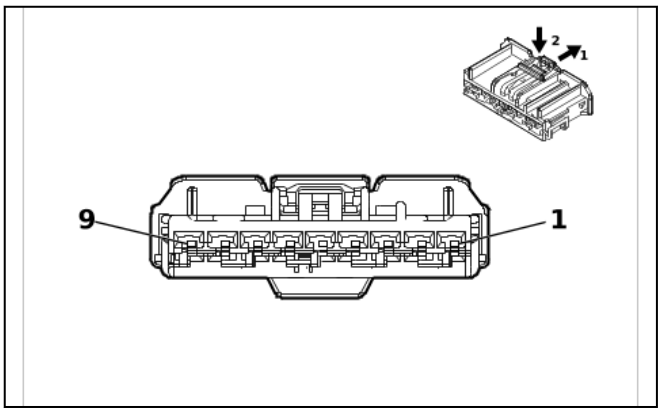
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

S64P Front Seat Adjuster Switch - Passenger (AHH / AKE)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) RD / BN	(1) 2240	(1) Battery Positive Voltage	(1) I	(1) —
2	—	—	—	Not Occupied	—	—
(3) 3	(3) 0.5	(3) GN / YE	(3) 4116	(3) Passenger Seat Adjuster Memory Module LIN Bus 2	(3) I	(3) —
(4) 4	(4) 0.5	(4) BK	(4) 1350	(4) Ground	(4) I	(4) —
(5) 5	(5) 0.5	(5) GN / WH	(5) 2816	(5) Passenger Seat Auxiliary Adjustment Switch Signal	(5) I	(5) —
(6) 6	(6) 0.5	(6) BK / BN	(6) 2815	(6) Auxiliary Passenger Seat Adjustment Switch Low Reference	(6) I	(6) —

S65D Front Seat Lumbar Switch - Driver (A2X - AVK)



5204289

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Driver
- OEM Connector: 7289-6875-40
- Service Connector: Service by Harness - See Part Catalog
- Description: 9-Way F 2.8 YESC Series(GY)

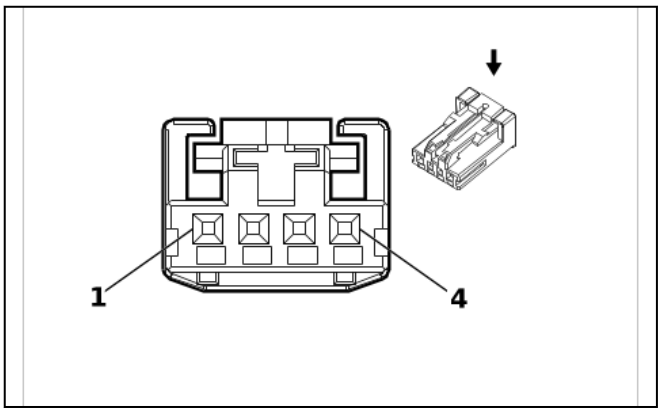
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-4A (PU)	No Tool Required

S65D Front Seat Lumbar Switch - Driver (A2X - AVK)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BK	(1) 1550	(1) Ground	(1) I	(1) —
2	—	—	—	Not Occupied	—	—
(3) 3	(3) 0.75	(3) RD / BN	(3) 2240	(3) Battery Positive Voltage	(3) I	(3) —
4	—	—	—	Not Occupied	—	—
(5) 5	(5) 0.75	(5) BU	(5) 611	(5) Driver Seat Lumbar Support Motor Forward Control	(5) I	(5) —
6	—	—	—	Not Occupied	—	—
(7) 7	(7) 0.75	(7) VT	(7) 610	(7) Driver Seat Lumbar Support Motor Backward Control	(7) I	(7) —
8 - 9	—	—	—	Not Occupied	—	—

S65D Front Seat Lumbar Switch - Driver (AVK)



2717162

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Driver
- OEM Connector: 1-936119-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 0.64 Micro-Quadlock Series(BK)

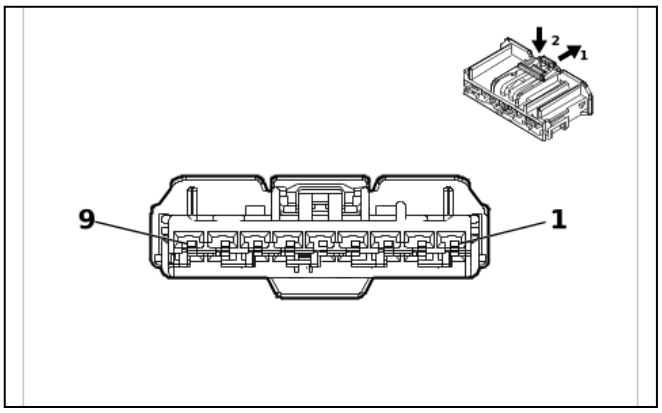
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

S65D Front Seat Lumbar Switch - Driver (AVK)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1 - 2	—	—	—	Not Occupied	—	—
(3) 3	(3) 0.5	(3) BU / YE	(3) 2818	(3) Driver Seat Auxiliary Adjustment Switch Signal	(3) I	(3) —
(4) 4	(4) 0.5	(4) BK / VT	(4) 2817	(4) Auxiliary Driver Seat Adjustment Switch Low Reference	(4) I	(4) —

S65P Front Seat Lumbar Switch - Passenger (A7K - AVU)



5204289

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Passenger
- OEM Connector: 7289-6875-40
- Service Connector: Service by Harness - See Part Catalog
- Description: 9-Way F 2.8 YESC Series(GY)

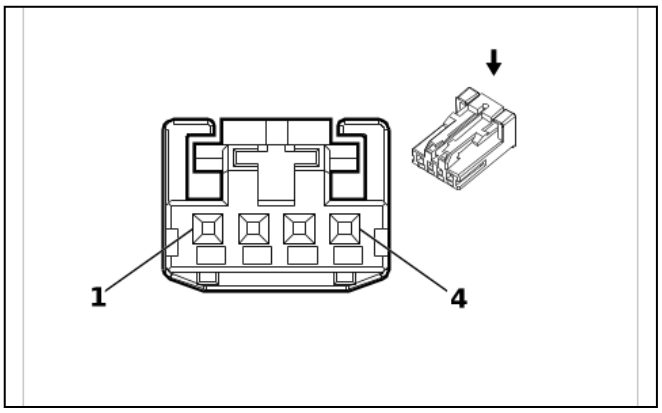
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-4A (PU)	No Tool Required

S65P Front Seat Lumbar Switch - Passenger (A7K - AVU)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BK	(1) 1350	(1) Ground	(1) I	(1) —
2	—	—	—	Not Occupied	—	—
(3) 3	(3) 0.75	(3) RD / BN	(3) 2240	(3) Battery Positive Voltage	(3) I	(3) —
4	—	—	—	Not Occupied	—	—
(5) 5	(5) 0.75	(5) BU	(5) 211	(5) Passenger Seat Lumbar Support Motor Forward Control	(5) I	(5) —
6	—	—	—	Not Occupied	—	—
(7) 7	(7) 0.75	(7) VT	(7) 210	(7) Passenger Seat Lumbar Support Motor Backward Control	(7) I	(7) —
8 - 9	—	—	—	Not Occupied	—	—

S65P Front Seat Lumbar Switch - Passenger (AHH / AKE)



2717162

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Passenger
- OEM Connector: 1-936119-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 0.64 Micro-Quadlock Series(BK)

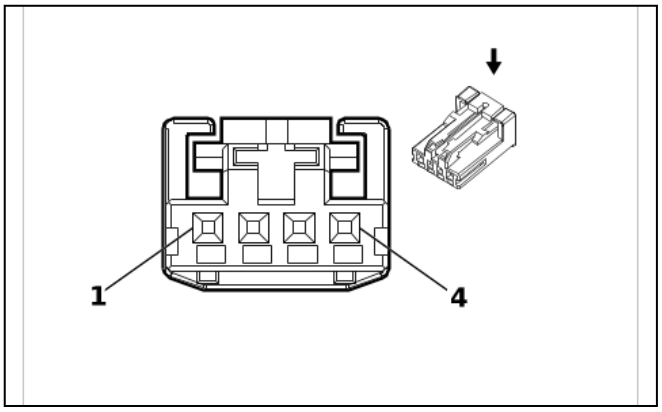
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

S65P Front Seat Lumbar Switch - Passenger (AHH / AKE)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1 - 2	—	—	—	Not Occupied	—	—
(3) 3	(3) 0.5	(3) GN / WH	(3) 2816	(3) Passenger Seat Auxiliary Adjustment Switch Signal	(3) I	(3) —
(4) 4	(4) 0.5	(4) BK / BN	(4) 2815	(4) Auxiliary Passenger Seat Adjustment Switch Low Reference	(4) I	(4) —

S65P Front Seat Lumbar Switch - Passenger (AVU - (AHH / AKE))



2717162

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Passenger
- OEM Connector: 1-936119-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 0.64 Micro-Quadlock Series(BK)

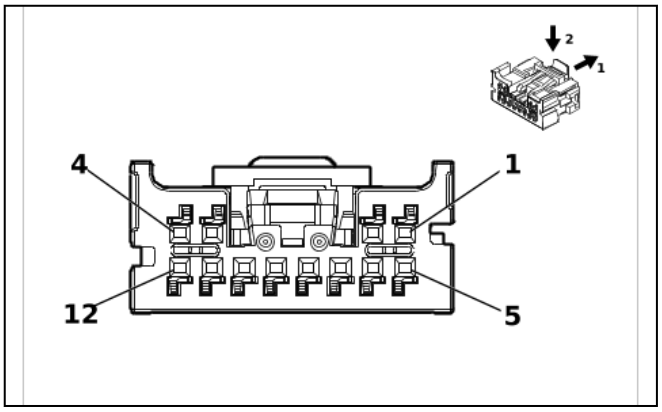
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

S65P Front Seat Lumbar Switch - Passenger (AVU - (AHH / AKE))

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1 - 2	—	—	—	Not Occupied	—	—
(3) 3	(3) 0.5	(3) YE / GN	(3) 1068	(3) Passenger Seat Lumbar Support Switch Analog Signal	(3) I	(3) —
(4) 4	(4) 0.5	(4) BK / BU	(4) 2194	(4) Passenger Seat Position Switch Low Reference	(4) I	(4) —

S70L Cruise Control Switch



5823882

Connector Part Information

- Harness Type: Steering Wheel Horn Switch Wiring Harness
- OEM Connector: 206523-2121
- Service Connector: Service by Harness - See Part Catalog
- Description: 12-Way F Mini 50 Series(BK)

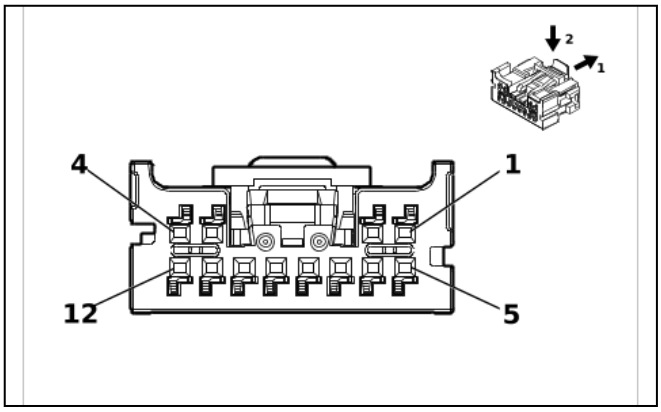
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	EL-35616-58 (BK)	No Tool Required

S70L Cruise Control Switch

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) RD / GN	(1) 5140	(1) Battery Positive Voltage	(1) I	(1) —
(2) 2	(2) 0.35	(2) GN / BK	(2) 10652	(2) Radio LIN Bus 1	(2) I	(2) —
(3) 3	(3) 0.35	(3) GY / GN	(3) 11875	(3) Cruise Control Bank 2 Switch Signal	(3) I	(3) —
(4) 4	(4) 0.35	(4) GN / BK	(4) 10652	(4) Radio LIN Bus 1	(4) I	(4) —
(5) 5	(5) 0.35	(5) YE / BK	(5) 3893	(5) Steering Wheel LED Backlight Dimming Control	(5) I	(5) —
6	—	—	—	Not Occupied	—	—
(7) 7	(7) 0.35	(7) BN / GN	(7) 11874	(7) Cruise Control Bank 1 Switch Signal	(7) I	(7) —
8 - 9	—	—	—	Not Occupied	—	—
(10) 10	(10) 0.35	(10) BK / VT	(10) 1449	(10) Steering Wheel Resistor Ladder Low Reference	(10) I	(10) —
11 - 12	—	—	—	Not Occupied	—	—

S70R Radio Control Switch - Steering Wheel



5823893

Connector Part Information

- Harness Type: Steering Wheel Horn Switch Wiring Harness
- OEM Connector: 206523-2122
- Service Connector: Service by Harness - See Part Catalog
- Description: 12-Way F Mini 50 Series(GY)

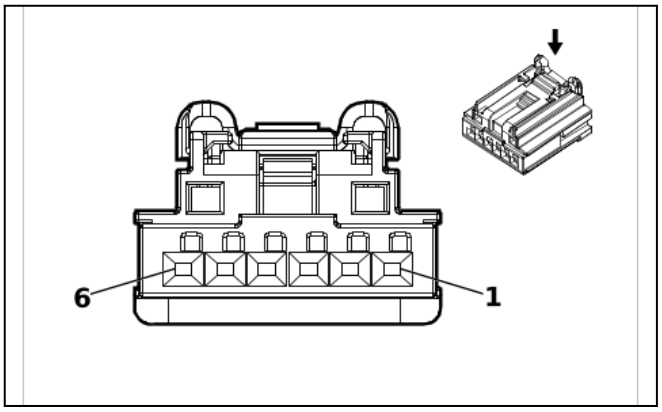
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	EL-35616-58 (BK)	No Tool Required

S70R Radio Control Switch - Steering Wheel

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) RD / GN	(1) 5140	(1) Battery Positive Voltage	(1) I	(1) —
(2) 2	(2) 0.35	(2) GY / BN	(2) 4314	(2) Radio Volume Down Switch Signal	(2) I	(2) —
(3) 3	(3) 0.35	(3) WH / YE	(3) 4313	(3) Radio Favorite Forward Switch Signal	(3) I	(3) —
(4) 4	(4) 0.35	(4) GN / BK	(4) 10652	(4) Radio LIN Bus 1	(4) I	(4) —
(5) 5	(5) 0.35	(5) YE / BK	(5) 3893	(5) Steering Wheel LED Backlight Dimming Control	(5) I	(5) —
(6) 6	(6) 0.35	(6) YE / GY	(6) 5883	(6) Steering Wheel Heating Switch Signal	(6) I	(6) —
(7) 7	(7) 0.35	(7) BN / WH	(7) 5884	(7) Steering Wheel Heating Switch LED Control	(7) I	(7) —
(8) 8	(8) 0.35	(8) BK / WH	(8) 6051	(8) Steering Wheel Ground	(8) I	(8) —
(9) 9	(9) 0.35	(9) BU	(9) 4315	(9) Radio Volume Up Switch Signal	(9) I	(9) —
(10) 10	(10) 0.35	(10) YE / BU	(10) 4312	(10) Radio Favorite Back Switch Signal	(10) I	(10) —
11 - 12	—	—	—	Not Occupied	—	—

S71 Steering Column Tilt Wheel and Telescope Switch (N38)



4145138

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 2035363-2
- Service Connector: 19356359
- Description: 6-Way F 0.64 Generation Y Series(BK)

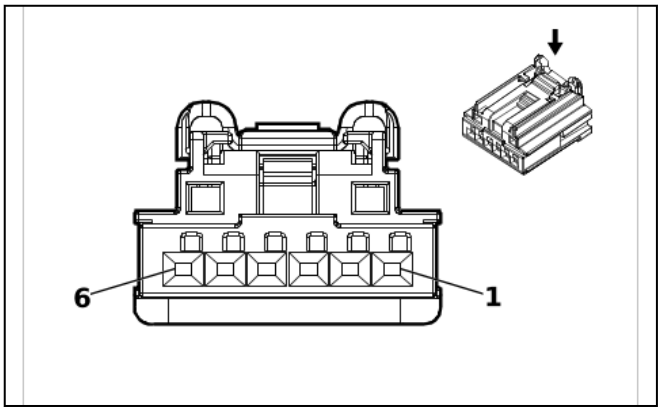
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

S71 Steering Column Tilt Wheel and Telescope Switch (N38)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BU / YE	(1) 2094	(1) Steering Column Tilt and Telescope Switch Forward Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) YE / BN	(2) 2097	(2) Steering Column Tilt and Telescope Switch Down Signal	(2) I	(2) —
(3) 3	(3) 0.5	(3) BN / GY	(3) 2096	(3) Steering Column Tilt and Telescope Switch Up Signal	(3) I	(3) —
4	—	—	—	Not Occupied	—	—
(5) 5	(5) 0.5	(5) GN / BN	(5) 2095	(5) Steering Column Tilt and Telescope Switch Rearward Signal	(5) I	(5) —
(6) 6	(6) 0.5	(6) VT / BK	(6) 2020	(6) Steering Column Tilt and Telescope Switch Feedback Signal	(6) I	(6) —

S76 Trailer Brake Control Switch



4145138

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 2035363-2
- Service Connector: 19356359
- Description: 6-Way F 0.64 Generation Y Series(BK)

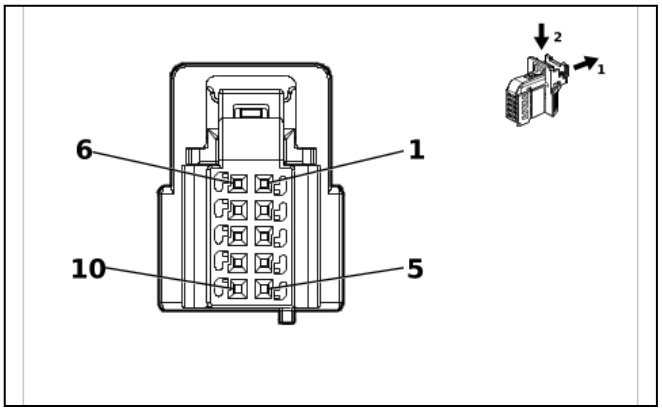
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

S76 Trailer Brake Control Switch

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BK	(1) 1050	(1) Ground	(1) I	(1) —
2 - 3	—	—	—	Not Occupied	—	—
(4) 4	(4) 0.5	(4) RD / VT	(4) 2640	(4) Battery Positive Voltage	(4) I	(4) —
5	—	—	—	Not Occupied	—	—
(6) 6	(6) 0.5	(6) GN / BU	(6) 2733	(6) Brake System Control Module LIN Bus 2	(6) I	(6) —

S78 Turn Signal Switch



5838155

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 2310000-1
- Service Connector: 13518417
- Description: 10-Way F 0.64 MQS Series(BK)

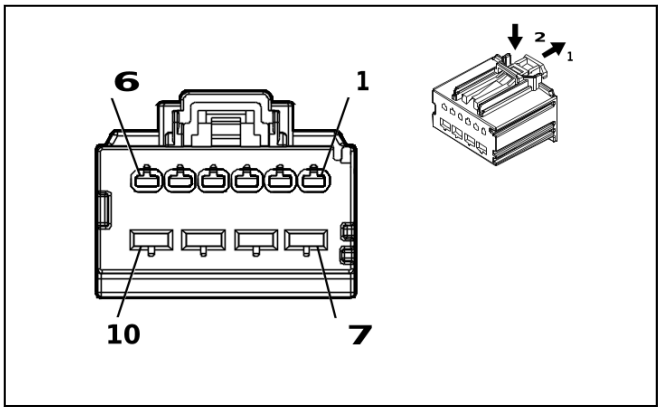
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19300632	J-35616-64B (L-BU)	J-38125-215A

S78 Turn Signal Switch

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) WH / GN	(1) 2915	(1) Left Turn Signal Switch Signal	(1) I	(1) —
(2) 2	(2) 0.35	(2) VT / BU	(2) 2916	(2) Right Turn Signal Switch Signal	(2) I	(2) —
(3) 3	(3) 0.5	(3) BK / WH	(3) 851	(3) Signal Ground	(3) I	(3) —
4	—	—	—	Not Occupied	—	—
(5) 5	(5) 0.35	(5) WH / BK	(5) 94	(5) Windshield Washer Switch Signal	(5) I	(5) —
(6) 6	(6) 0.35	(6) YE / BN	(6) 307	(6) Headlamp Switch Flash Signal	(6) I	(6) —
(7) 7	(7) 0.35	(7) WH	(7) 524	(7) High Beam Select Switch High Beam Signal	(7) I	(7) —
(8) 8	(8) 0.35	(8) BK / GY	(8) 6009	(8) Windshield Wiper Switch Low Reference	(8) I	(8) —
(9) 9	(9) 0.5	(9) GY	(9) 1715	(9) Windshield Wiper Switch High Signal	(9) I	(9) —
(10) 10	(10) 0.35	(10) YE / BU	(10) 1714	(10) Windshield Wiper Switch Low Signal	(10) I	(10) —

S79D Front Side Door Window Control Switch - Driver X1



5035058

Connector Part Information

- Harness Type: Front Side Door Door Lock Door Wiring Harness - Driver
- OEM Connector: 31372-1600
- Service Connector: Service by Harness - See Part Catalog
- Description: 10-Way F 1.5, 2.8 MX Series(BK)

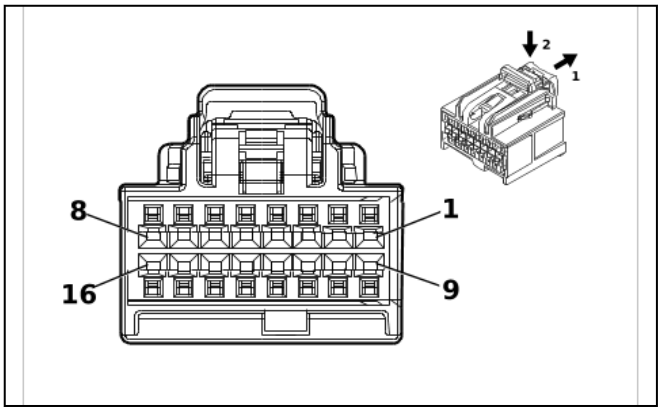
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required
II	Not required	J-35616-4A (PU)	No Tool Required

S79D Front Side Door Window Control Switch - Driver X1

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	—	—	—	Not Occupied	—	—
(2) 2	(2) 0.5	(2) WH	(2) 606	(2) Left Outside Rearview Mirror Heater Control	(2) I	(2) —
3 - 4	—	—	—	Not Occupied	—	—
(5) 5	(5) 0.5	(5) GY / WH	(5) 2785	(5) Left Front Mirror Motor Fold Out Control	(5) I	(5) —
(6) 6	(6) 0.5	(6) WH / GN	(6) 2786	(6) Left Front Mirror Motor Fold In Control	(6) I	(6) —
7 - 8	—	—	—	Not Occupied	—	—
(9) 9	(9) 0.5	(9) BK	(9) 1550	(9) Ground	(9) II	(9) —
(10) 10	(10) 0.5	(10) RD / BU	(10) 1240	(10) Battery Positive Voltage	(10) II	(10) —

S79D Front Side Door Window Control Switch - Driver X2



4873243

Connector Part Information

- Harness Type: Front Side Door Door Lock Door Wiring Harness - Driver
- OEM Connector: 35016343
- Service Connector: Service by Harness - See Part Catalog
- Description: 16-Way F 0.64 OCS Series(BK)

Terminal Part Information

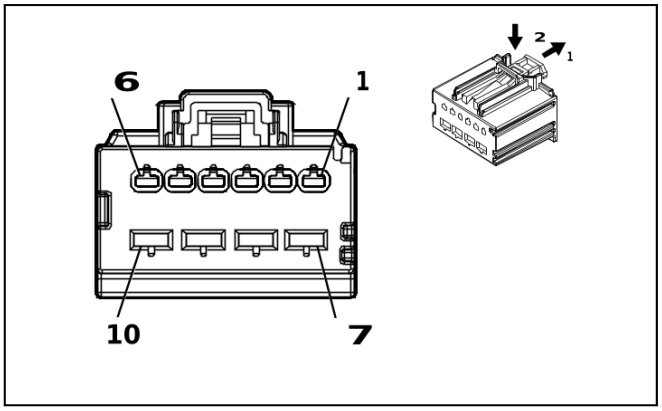
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

S79D Front Side Door Window Control Switch - Driver X2

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GN / YE	(1) 6134	(1) Body Control Module LIN Bus 3	(1) I	(1) —
2	—	—	—	Not Occupied	—	—
(3) 3	(3) 0.5	(3) BN / GY	(3) 4784	(3) Left Front Door LED Backlight Dimming Control	(3) I	(3) —
(4) 4	(4) 0.35	(4) GY / YE	(4) 1760	(4) Left Side Object Detection LED Control	(4) I	(4) —
5	—	—	—	Not Occupied	—	—
(6) 6	(6) 0.5	(6) YE / BN	(6) 2789	(6) Left Front Mirror Motor Common Control	(6) I	(6) —
(7) 7	(7) 0.5	(7) VT / BU	(7) 2788	(7) Left Front Mirror Motor Up [+] Down [-] Control	(7) I	(7) —
(8) 8	(8) 0.5	(8) BN / BK	(8) 2790	(8) Left Front Mirror Motor Right [+] Left [-] Control	(8) I	(8) —
(9) 9	(9) 0.5	(9) WH / VT	(9) 4258	(9) Left Front Door Lock Status Signal	(9) I	(9) —
10 - 12	—	—	—	Not Occupied	—	—
(13) 13	(13) 0.5	(13) VT / RD	(13) 2791	(13) Left Front Mirror Position Sensor High Reference	(13) I	(13) —
(14) 14	(14) 0.5	(14) GY / BN	(14) 2787	(14) Left Front Mirror Position Sensor Up [+] Down [-] Signal	(14) I	(14) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(15) 15	(15) 0.5	(15) WH / YE	(15) 2792	(15) Left Front Mirror Position Sensor Left [-] Right [+] Signal	(15) I	(15) —
(16) 16	(16) 0.5	(16) BK / BN	(16) 673	(16) Left Outside Rearview Mirror Position Sensor Low Reference	(16) I	(16) —

S79LR Rear Side Door Window Switch - Left - 4 - Door



5035058

Connector Part Information
- Harness Type: Rear Side Door Door Wiring Harness - Left
- OEM Connector: 31372-1600
- Service Connector: Service by Harness - See Part Catalog
- Description: 10-Way F 1.5, 2.8 MX Series(BK)

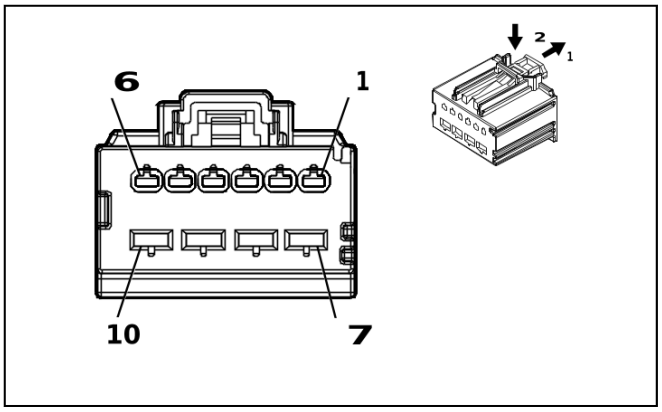
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required
II	Not required	J-35616-4A (PU)	No Tool Required

S79LR Rear Side Door Window Switch - Left - 4 - Door

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GN / GY	(1) 6135	(1) Body Control Module LIN Bus 4	(1) I	(1) —
(2) 2	(2) 0.5	(2) GY	(2) 747	(2) Left Rear Door Ajar Switch Signal	(2) I	(2) —
(3) 3	(3) 0.5	(3) BK	(3) 1550	(3) Ground	(3) I	(3) —
4 - 6	—	—	—	Not Occupied	—	—
(7) 7	(7) 2.5	(7) RD / BU	(7) 3240	(7) Battery Positive Voltage	(7) II	(7) —
(8) 8	(8) 2.5	(8) BK	(8) 1550	(8) Ground	(8) II	(8) —
(9) 9	(9) 2	(9) BU / VT	(9) 668	(9) Left Rear Window Motor Up Control	(9) II	(9) —
(10) 10	(10) 2	(10) YE / BU	(10) 669	(10) Left Rear Window Motor Down Control	(10) II	(10) —

S79P Front Side Door Window Switch - Passenger X1



5035058

Connector Part Information

- Harness Type: Front Side Door Door Lock Door Wiring Harness - Passenger
- OEM Connector: 31372-1600
- Service Connector: Service by Harness - See Part Catalog
- Description: 10-Way F 1.5, 2.8 MX Series(BK)

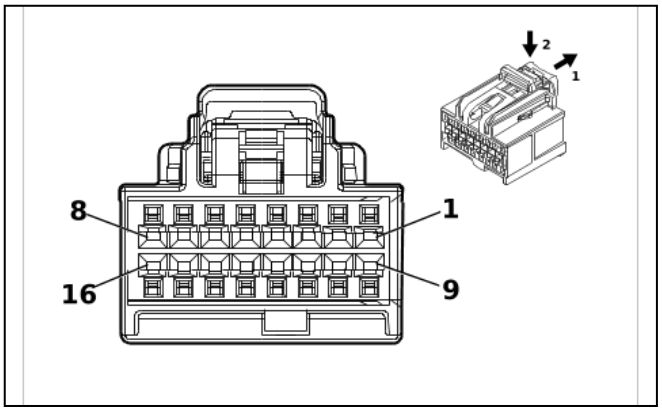
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required
II	Not required	J-35616-4A (PU)	No Tool Required

S79P Front Side Door Window Switch - Passenger X1

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	—	—	—	Not Occupied	—	—
(2) 2	(2) 0.5	(2) BN / VT	(2) 607	(2) Right Outside Rearview Mirror Heater Control	(2) I	(2) —
3 - 4	—	—	—	Not Occupied	—	—
(5) 5	(5) 0.5	(5) YE / WH	(5) 2793	(5) Right Front Mirror Motor Fold Out Control	(5) I	(5) —
(6) 6	(6) 0.5	(6) BU / GY	(6) 2794	(6) Right Front Mirror Motor Fold In Control	(6) I	(6) —
(7) 7	(7) 2.5	(7) GN / GY	(7) 666	(7) Right Front Window Motor Up Control	(7) II	(7) —
(8) 8	(8) 2.5	(8) YE / BU	(8) 667	(8) Right Front Window Motor Down Control	(8) II	(8) —
(9) 9	(9) 2.5 (9) 0.5	(9) BK (9) BK	(9) 1350 (9) 1350	(9) Ground (9) Ground	(9) II (9) II	(9) WLM (9) WLN
(10) 10	(10) 2.5 (10) 0.5	(10) RD / BN (10) RD / WH	(10) 4240 (10) 5440	(10) Battery Positive Voltage (10) Battery Positive Voltage	(10) II (10) II	(10) WLM (10) WLN

S79P Front Side Door Window Switch - Passenger X2



4873243

Connector Part Information

- Harness Type: Front Side Door Door Lock Door Wiring Harness - Passenger
- OEM Connector: 35016343
- Service Connector: Service by Harness - See Part Catalog
- Description: 16-Way F 0.64 OCS Series(BK)

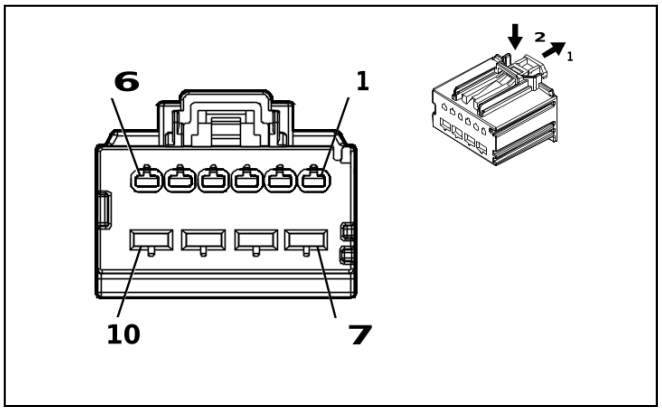
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

S79P Front Side Door Window Switch - Passenger X2

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GN / YE	(1) 6134	(1) Body Control Module LIN Bus 3	(1) I	(1) —
(2) 2	(2) 0.5	(2) GY	(2) 746	(2) Right Front Door Ajar Switch Signal	(2) I	(2) —
3	—	—	—	Not Occupied	—	—
(4) 4	(4) 0.35	(4) GY	(4) 1761	(4) Right Side Object Detection LED Control	(4) I	(4) —
5	—	—	—	Not Occupied	—	—
(6) 6	(6) 0.5	(6) WH	(6) 2797	(6) Right Front Mirror Motor Common Control	(6) I	(6) —
(7) 7	(7) 0.5	(7) YE / VT	(7) 2796	(7) Right Front Mirror Motor Up [+] Down [-] Control	(7) I	(7) —
(8) 8	(8) 0.5	(8) GN / BK	(8) 2798	(8) Right Front Mirror Motor Right [+] Left [-] Control	(8) I	(8) —
(9) 9	(9) 0.5	(9) VT	(9) 4259	(9) Right Front Door Lock Status Signal	(9) I	(9) —
10 - 12	—	—	—	Not Occupied	—	—
(13) 13	(13) 0.5	(13) YE / RD	(13) 2799	(13) Right Front Mirror Position Sensor High Reference	(13) I	(13) —
(14) 14	(14) 0.5	(14) BU / YE	(14) 2795	(14) Right Front Mirror Position Sensor Up [+] Down [-] Signal	(14) I	(14) —
(15) 15	(15) 0.5	(15) VT / WH	(15) 2800	(15) Right Front Mirror Position Sensor Left [-] Right [+] Signal	(15) I	(15) —
(16) 16	(16) 0.5	(16) BK / GN	(16) 675	(16) Right Outside Rearview Mirror Position Sensor Low Reference	(16) I	(16) —

S79RR Rear Side Door Window Switch - Right - 4 - Door



5035058

Connector Part Information

- Harness Type: Rear Side Door Door Wiring Harness - Right
- OEM Connector: 31372-1600
- Service Connector: Service by Harness - See Part Catalog
- Description: 10-Way F 1.5, 2.8 MX Series(BK)

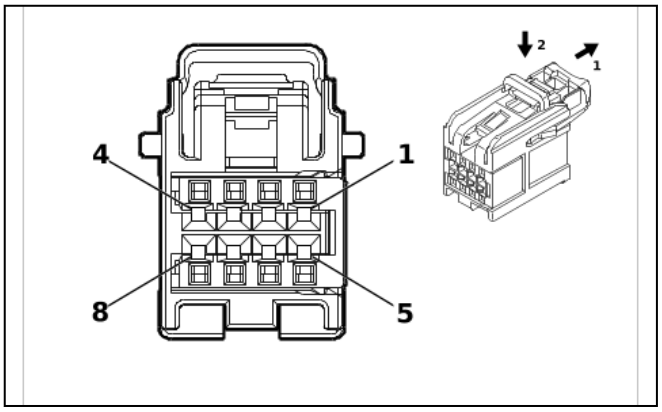
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required
II	Not required	J-35616-4A (PU)	No Tool Required

S79RR Rear Side Door Window Switch - Right - 4 - Door

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GN / GY	(1) 6135	(1) Body Control Module LIN Bus 4	(1) I	(1) —
(2) 2	(2) 0.5	(2) GY	(2) 748	(2) Right Rear Door Ajar Switch Signal	(2) I	(2) —
3 - 6	—	—	—	Not Occupied	—	—
(7) 7	(7) 2.5	(7) YE / BK	(7) 4840	(7) Battery Positive Voltage	(7) II	(7) —
(8) 8	(8) 2.5	(8) BK	(8) 1350	(8) Ground	(8) II	(8) —
(9) 9	(9) 2	(9) BU / GY	(9) 670	(9) Right Rear Window Motor Up Control	(9) II	(9) —
(10) 10	(10) 2	(10) GN / BK	(10) 671	(10) Right Rear Window Motor Down Control	(10) II	(10) —

S126 Ride Control Switch



4232228

Connector Part Information
- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 15526973
- Service Connector: 19353873
- Description: 8-Way F 0.64 OCS Series(GY)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

S126 Ride Control Switch

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) YE / GN	(1) 2202	(1) Enhanced Driver Mode 1 Switch Signal	(1) I	(1) —
2	—	—	—	Not Occupied	—	—
(3) 3	(3) 0.35	(3) BK / VT	(3) 1449	(3) Steering Wheel Resistor Ladder Low Reference	(3) I	(3) —
(4) 4	(4) 0.35	(4) YE	(4) 6817	(4) LED Backlight Dimming Control 1	(4) I	(4) —
(5) 5	(5) 0.35	(5) BK / WH	(5) 1050	(5) Ground	(5) I	(5) —
6 - 8	—	—	—	Not Occupied	—	—

S148L Assist Step Switch - Left (B3L)

—

Connector Part Information
- Harness Type: Assist Step Wire - Left
- OEM Connector: Not Available
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

S148L Assist Step Switch - Left (B3L)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) RD	(1) 4746	(1) Running Board Step Left Kick Switch Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK	(2) 1151	(2) Signal Ground	(2) I	(2) —

S148R Assist Step Switch - Right (B3L)

—

Connector Part Information
- Harness Type: Assist Step Wire - Right
- OEM Connector: Not Available
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F

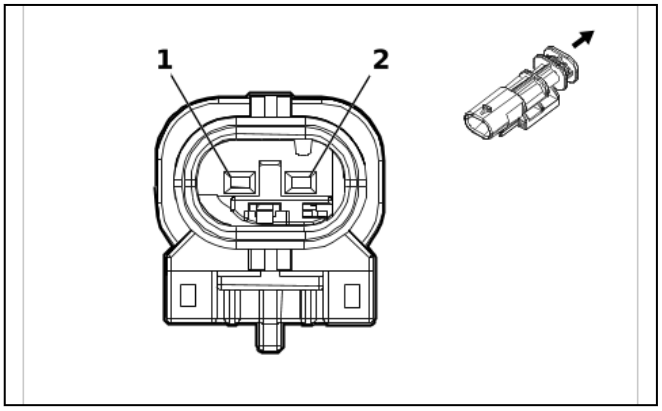
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

S148R Assist Step Switch - Right (B3L)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) RD	(1) 4747	(1) Running Board Step Right Kick Switch Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK	(2) 1151	(2) Signal Ground	(2) I	(2) —

S159E Liftgate Exterior Release Switch - Endgate (QK1 & (QT5 / QT6))



4994411

Connector Part Information
- Harness Type: Endgate Wiring Harness
- OEM Connector: 34899-2082
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way M 1.2 MCON Series, Sealed(GY)

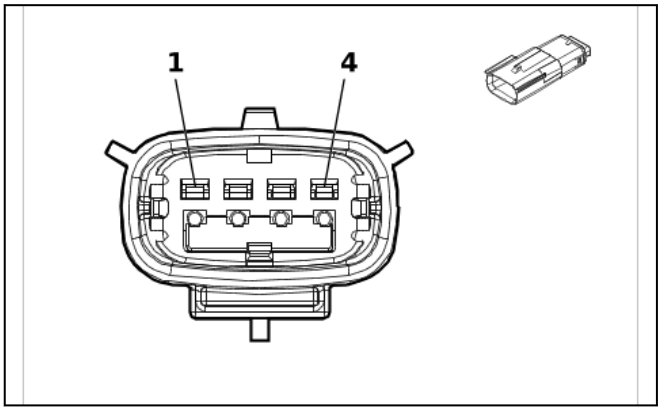
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-17 (L-GN)	No Tool Required

S159E Liftgate Exterior Release Switch - Endgate (QK1 & (QT5 / QT6))

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) YE	(1) 1144	(1) Endgate Release Switch Discrete Signal Exterior	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK	(2) 1850	(2) Ground	(2) I	(2) —

S159E Liftgate Exterior Release Switch - Endgate (QK2)



6824000

Connector Part Information
- Harness Type: Endgate Wiring Harness
- OEM Connector: 15514500
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way M 1.5 OCS Series, Sealed(BK)

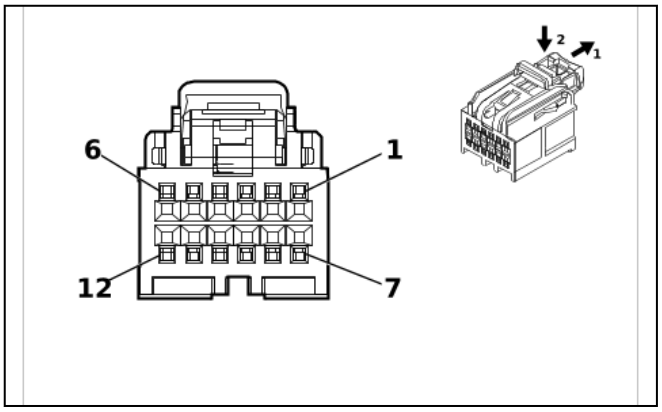
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-3 (GY)	No Tool Required

S159E Liftgate Exterior Release Switch - Endgate (QK2)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GY	(1) 7292	(1) Major Endgate Release Switch Signal Exterior	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK	(2) 1850	(2) Ground	(2) I	(2) —
(3) 3	(3) 0.5	(3) YE	(3) 7294	(3) Minor Endgate Release Switch Discrete Signal Exterior	(3) I	(3) —
4	—	—	—	Not Occupied	—	—

S171 Instrument Panel Center Accessory Function Switch



4997362

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 35016613
- Service Connector: 13519752
- Description: 12-Way F 0.64 OCS Series(BN)

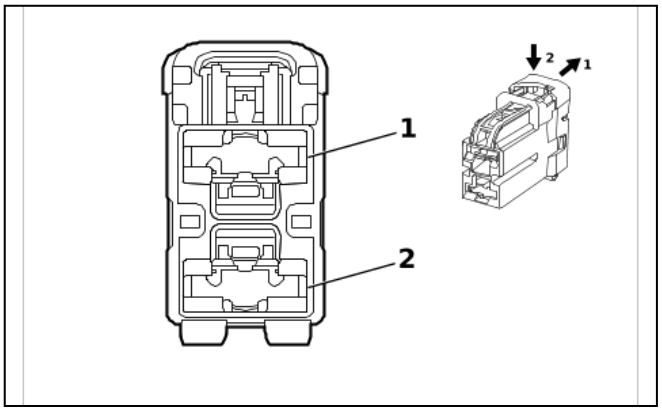
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19300660	J-35616-64B (L-BU)	J-38125-215A

S171 Instrument Panel Center Accessory Function Switch

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) RD / WH	(1) 140	(1) Battery Positive Voltage	(1) I	(1) —
(2) 2	(2) 0.5	(2) GN / VT	(2) 2860	(2) Body Control Module LIN Bus 14	(2) I	(2) —
(3) 3	(3) 0.5	(3) BK	(3) 1050	(3) Ground	(3) I	(3) —
4 - 9	—	—	—	Not Occupied	—	—
(10) 10	(10) 0.35	(10) BN / WH	(10) 3895	(10) Roof Rail Air Bag Disable Switch Low Reference	(10) I	(10) —
(11) 11	(11) 0.35	(11) BU / WH	(11) 3119	(11) Roof Rail Air Bag Disable Switch Signal	(11) I	(11) —
12	—	—	—	Not Occupied	—	—

T1 DC/AC Converter Control Module X1



2453116

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 7283-0724-30
- Service Connector: 85011842
- Description: 2-Way F 9.5 Series(BK)

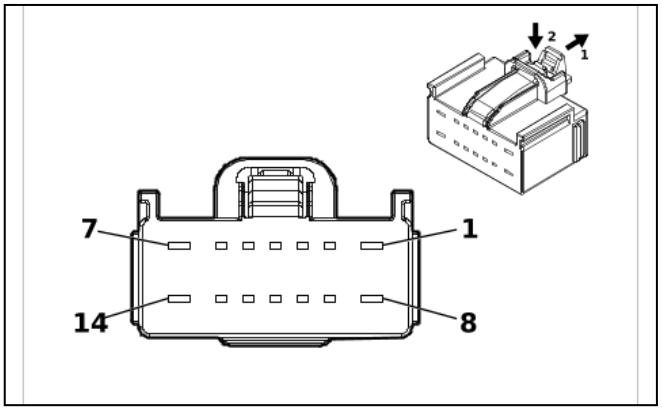
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-22 (RD)	No Tool Required

T1 DC/AC Converter Control Module X1

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 5	(1) BN / BK	(1) 4629	(1) DC/AC Inverter Control	(1) I	(1) —
(2) 2	(2) 5	(2) BK	(2) 1550	(2) Ground	(2) I	(2) —

T1 DC/AC Converter Control Module X2



4934172

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 7289-7630-30
- Service Connector: 13513604
- Description: 14-Way F 1.5, 2.8 YESC Series(BK)

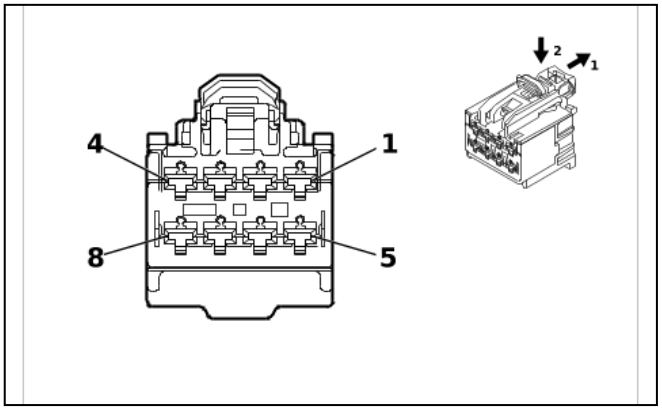
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	13575850	J-35616-2A (GY)	J-38125-557
II	84962855	J-35616-4A (PU)	J-38125-11A

T1 DC/AC Converter Control Module X2

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BK	(1) 10117	(1) AC Outlet Phase A Control	(1) II	(1) —
(2) 2	(2) 0.35	(2) VT / RD	(2) 4049	(2) AC Power Outlet Sensor High Reference	(2) I	(2) —
(3) 3	(3) 0.35	(3) VT / WH	(3) 239	(3) Run/Crank Ignition 1 Voltage	(3) I	(3) —
(4) 4	(4) 0.5	(4) WH / GN	(4) 4628	(4) DC/AC Inverter Relay Control	(4) I	(4) —
(5) 5	(5) 0.5	(5) BU / BN	(5) 6807	(5) DC/AC Inverter Control	(5) I	(5) —
6	—	—	—	Not Occupied	—	—
(7) 7	(7) 0.75	(7) BK / WH	(7) 10120	(7) AC Outlet 2 Phase A Control	(7) II	(7) —
(8) 8	(8) 0.75	(8) RD	(8) 10118	(8) AC Outlet Phase B Control	(8) II	(8) —
(9) 9	(9) 0.35	(9) BARE	(9) 10116	(9) AC Outlet Low Reference	(9) I	(9) —
(10) 10	(10) 0.35	(10) GN / BU	(10) 6133	(10) Body Control Module LIN Bus 2	(10) I	(10) —
11	—	—	—	Not Occupied	—	—
(12) 12	(12) 0.5	(12) GN / BN	(12) 2266	(12) DC/AC Inverter Control 2	(12) I	(12) —
(13) 13	(13) 0.5	(13) BARE	(13) 10119	(13) AC Outlet 2 Low Reference	(13) I	(13) —
(14) 14	(14) 0.75	(14) RD / WH	(14) 10121	(14) AC Outlet 2 Phase B Control	(14) II	(14) —

T3 Audio Amplifier X1 (UQA)



4875738

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 33223792
- Service Connector: 19369366
- Description: 8-Way F 2.8 OCS Series(BK)

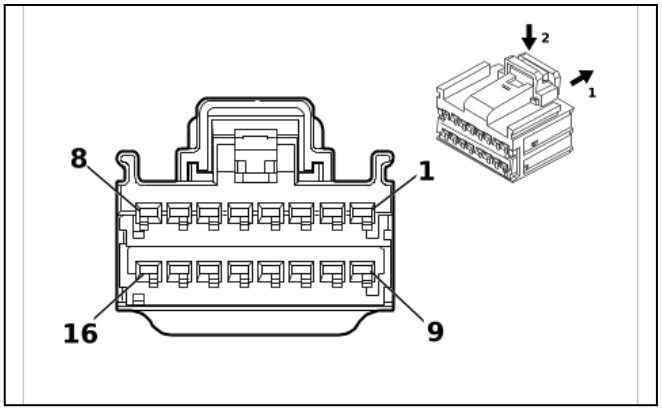
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-4A (PU)	No Tool Required

T3 Audio Amplifier X1 (UQA)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 2	(1) BU / GY	(1) 346	(1) Left/Rear Subwoofer [+] Control	(1) I	(1) —
(2) 2	(2) 0.75	(2) YE	(2) 200	(2) Right Front Speaker 1 [+] Control	(2) I	(2) —
(3) 3	(3) 0.75	(3) BU	(3) 201	(3) Left Front Speaker 1 [+] Control	(3) I	(3) —
(4) 4	(4) 2.5	(4) RD / YE	(4) 3740	(4) Battery Positive Voltage	(4) I	(4) —
(5) 5	(5) 2	(5) GN / BK	(5) 1794	(5) Left/Rear Subwoofer [-] Control	(5) I	(5) —
(6) 6	(6) 0.75	(6) YE / BK	(6) 117	(6) Right Front Speaker [-] Control 1	(6) I	(6) —
(7) 7	(7) 0.75	(7) BN / BU	(7) 118	(7) Left Front Speaker [-] Control 1	(7) I	(7) —
(8) 8	(8) 2.5	(8) BK / WH	(8) 1051	(8) Signal Ground	(8) I	(8) —

T3 Audio Amplifier X2 (UQA)



4332214

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 15512506
- Service Connector: 13591061
- Description: 16-Way F 1.5 OCS Series(BK)

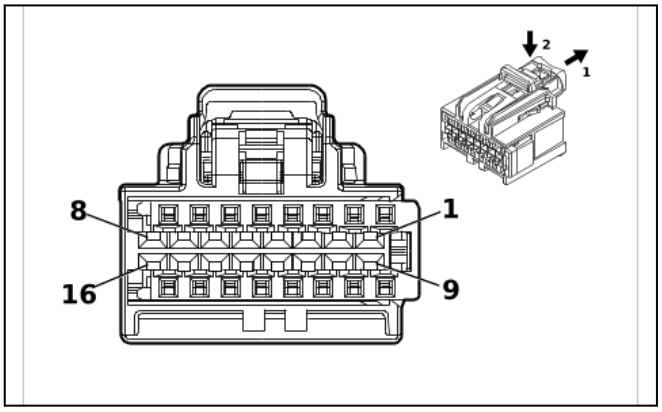
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	84757974	J-35616-2A (GY)	J-38125-215A

T3 Audio Amplifier X2 (UQA)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) YE / WH	(1) 1860	(1) Front Center Speaker [+] Control	(1) I	(1) —
(2) 2	(2) 0.75	(2) WH / YE	(2) 1853	(2) Right Front Midrange Speaker [+] Control	(2) I	(2) —
(3) 3	(3) 0.75	(3) BU / VT	(3) 1857	(3) Left Front Midrange Speaker [+] Control	(3) I	(3) —
(4) 4	(4) 1.5	(4) WH	(4) 46	(4) Right Rear Speaker [+] Control	(4) I	(4) —
(5) 5	(5) 1.5	(5) GN	(5) 199	(5) Left Rear Speaker [+] Control	(5) I	(5) —
6 - 8	—	—	—	Not Occupied	—	—
(9) 9	(9) 0.75	(9) BU / YE	(9) 1960	(9) Front Center Speaker [-] Control	(9) I	(9) —
(10) 10	(10) 0.75	(10) BN / BK	(10) 1953	(10) Right Front Midrange Speaker [-] Control	(10) I	(10) —
(11) 11	(11) 0.75	(11) BU / BN	(11) 1957	(11) Left Front Midrange Speaker [-] Control	(11) I	(11) —
(12) 12	(12) 1.5	(12) BU / BK	(12) 115	(12) Right Rear Speaker [-] Control	(12) I	(12) —
(13) 13	(13) 1.5	(13) GN / BK	(13) 116	(13) Left Rear Speaker [-] Control	(13) I	(13) —
14 - 16	—	—	—	Not Occupied	—	—

T3 Audio Amplifier X4 (UQA)



4256181

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 35016345
- Service Connector: 13519740
- Description: 16-Way F 0.64 OCS Series(BN)

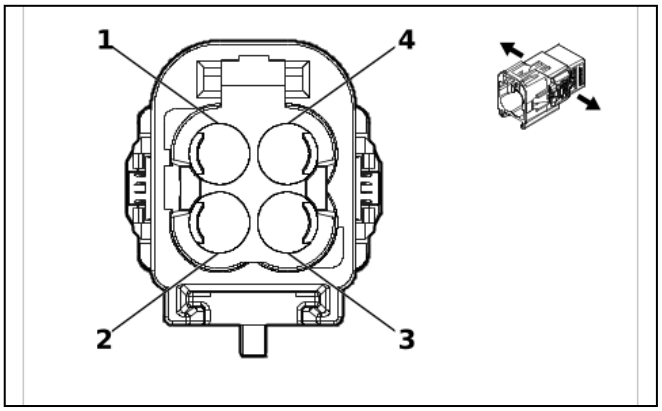
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	84619127	J-35616-64B (L-BU)	J-38125-11A
II	Service by Cable	J-35616-64B (L-BU)	J-38125-215A

T3 Audio Amplifier X4 (UQA)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1 - 7	—	—	—	Not Occupied	—	—
(8) 8	(8) 0.35	(8) BU / YE	(8) 4984	(8) AUTOSAR CAN Bus [-] 5 Serial Data	(8) I	(8) —
9	—	—	—	Not Occupied	—	—
(10) 10	(10) 0.35	(10) WH	(10) 8580	(10) Automotive Audio Bus A2B Serial Data 1 [+]	(10) II	(10) —
(11) 11	(11) 0.35	(11) YE	(11) 8579	(11) Automotive Audio Bus A2B Serial Data 1 [-]	(11) II	(11) —
12 - 15	—	—	—	Not Occupied	—	—
(16) 16	(16) 0.35	(16) BU / WH	(16) 4985	(16) AUTOSAR CAN Bus [+] 5 Serial Data	(16) I	(16) —

T4P High Frequency Antenna X1 - 2 - Door



6425092

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: AMZ040-C00-C
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 4-Way M Mini Coax Type(BU)

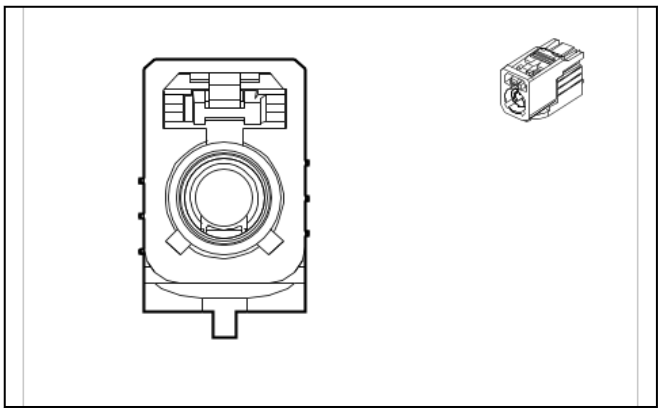
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

T4P High Frequency Antenna X1 - 2 - Door

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) —	(1) Coax Cable	(1) 10314	(1) Global Navigation Satellite System Antenna Coaxial Signal	(1) I	(1) —
(3) 3	(3) —	(3) Coax Cable	(3) 10292	(3) Cell Phone Antenna 2 Coaxial Signal	(3) I	(3) —
(4) 4	(4) —	(4) Coax Cable	(4) 6449	(4) Coaxial Antenna Cell Phone Signal	(4) I	(4) —

T4P High Frequency Antenna X2 - 2 - Door (U2K)



5661657

Connector Part Information
- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 33351022
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way F Coax Type(CU)

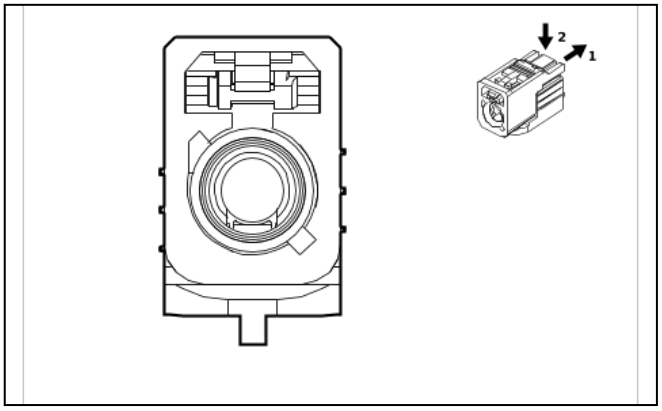
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

T4P High Frequency Antenna X2 - 2 - Door (U2K)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
CU	—	Coax Cable	6130	Coaxial Antenna XM Signal	I	—

T4TA Auxiliary Wireless Communication Interface Antenna



5518436

Connector Part Information
- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 33351021
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way F Coax Type(BG)

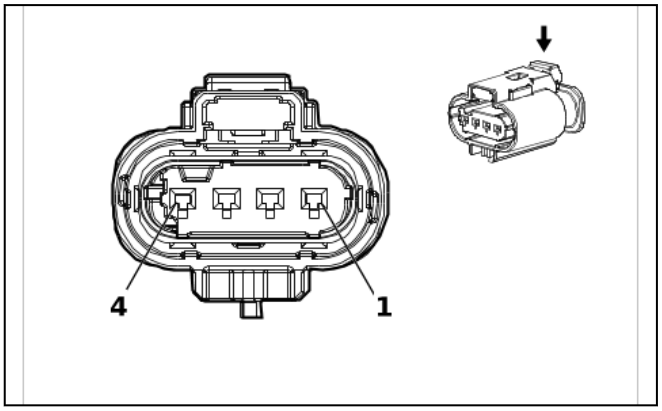
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

T4TA Auxiliary Wireless Communication Interface Antenna

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
BG	—	Coax Cable	3137	Coaxial Antenna WLAN Signal	I	—

T8A Ignition Coil 1 (L4B)



5402120

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 13570048
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 1.2 Multilock Series, Sealed(BK)

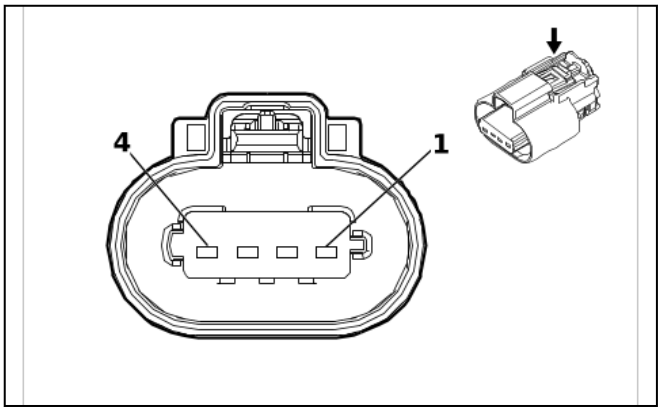
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

T8A Ignition Coil 1 (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1	(1) BK	(1) 6450	(1) Engine Even Bank Ground	(1) I	(1) —
(2) 2	(2) 0.75	(2) BK / BU	(2) 2129	(2) Ignition Control Low Reference Bank 1	(2) I	(2) —
(3) 3	(3) 0.5	(3) BU / VT	(3) 2121	(3) Ignition Control 1	(3) I	(3) —
(4) 4	(4) 1	(4) VT / BU	(4) 5291	(4) Powertrain Main Relay Fused Supply Voltage 2	(4) I	(4) —

T8A Ignition Coil 1 (L76 / L78)



3240115

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 34770-0402
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 1.5 MX Series, Sealed(BK)

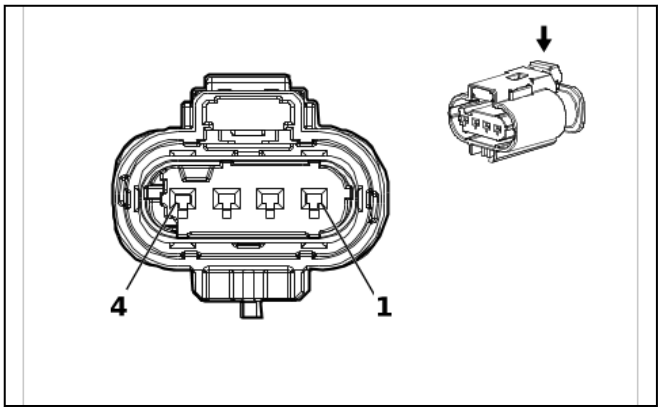
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-14 (GN)	No Tool Required

T8A Ignition Coil 1 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1	(1) BK	(1) 6150	(1) Engine Odd Bank Ground	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / BU	(2) 2129	(2) Ignition Control Low Reference Bank 1	(2) I	(2) —
(3) 3	(3) 0.5	(3) BU / VT	(3) 2121	(3) Ignition Control 1	(3) I	(3) —
(4) 4	(4) 1	(4) VT / BU	(4) 5291	(4) Powertrain Main Relay Fused Supply Voltage 2	(4) I	(4) —

T8B Ignition Coil 2 (L4B)



5402120

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 13570048
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 1.2 Multilock Series, Sealed(BK)

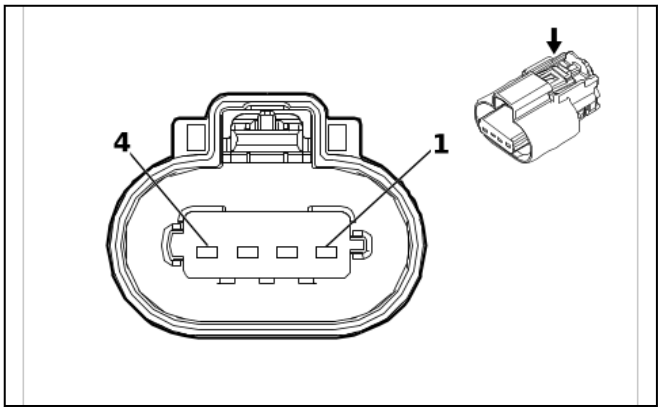
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

T8B Ignition Coil 2 (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1	(1) BK	(1) 6450	(1) Engine Even Bank Ground	(1) I	(1) —
(2) 2	(2) 0.75	(2) BK / BU	(2) 2129	(2) Ignition Control Low Reference Bank 1	(2) I	(2) —
(3) 3	(3) 0.5	(3) BU / WH	(3) 2122	(3) Ignition Control 2	(3) I	(3) —
(4) 4	(4) 1	(4) VT / BU	(4) 5291	(4) Powertrain Main Relay Fused Supply Voltage 2	(4) I	(4) —

T8B Ignition Coil 2 (L76 / L78)



3240115

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 34770-0402
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 1.5 MX Series, Sealed(BK)

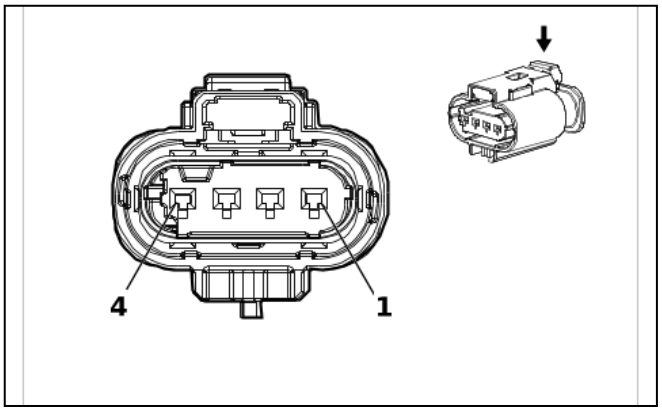
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-14 (GN)	No Tool Required

T8B Ignition Coil 2 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1	(1) BK	(1) 6450	(1) Engine Even Bank Ground	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / GY	(2) 2130	(2) Ignition Control Low Reference Bank 2	(2) I	(2) —
(3) 3	(3) 0.5	(3) BU / WH	(3) 2122	(3) Ignition Control 2	(3) I	(3) —
(4) 4	(4) 1	(4) VT / BU	(4) 5292	(4) Powertrain Main Relay Fused Supply Voltage 3	(4) I	(4) —

T8C Ignition Coil 3 (L4B)



5402120

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 13570048
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 1.2 Multilock Series, Sealed(BK)

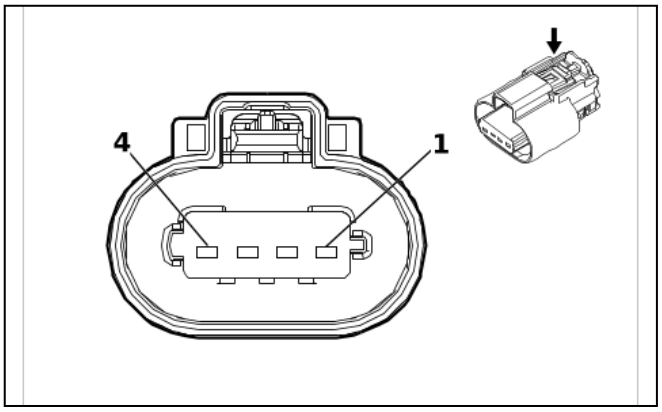
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

T8C Ignition Coil 3 (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1	(1) BK	(1) 6450	(1) Engine Even Bank Ground	(1) I	(1) —
(2) 2	(2) 0.75	(2) BK / BU	(2) 2129	(2) Ignition Control Low Reference Bank 1	(2) I	(2) —
(3) 3	(3) 0.5	(3) GN / BU	(3) 2123	(3) Ignition Control 3	(3) I	(3) —
(4) 4	(4) 1	(4) VT / BU	(4) 5291	(4) Powertrain Main Relay Fused Supply Voltage 2	(4) I	(4) —

T8C Ignition Coil 3 (L76 / L78)



3240115

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 34770-0402
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 1.5 MX Series, Sealed(BK)

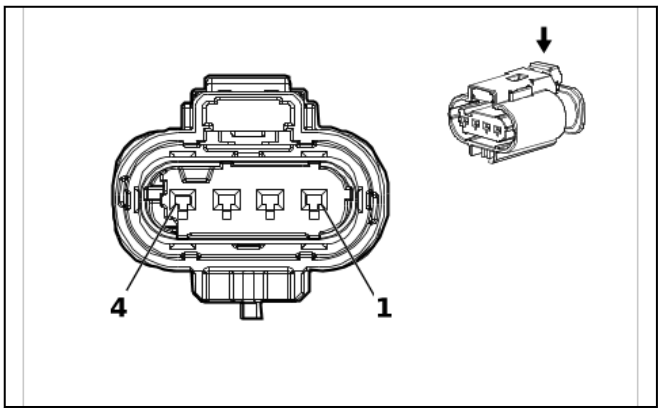
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-14 (GN)	No Tool Required

T8C Ignition Coil 3 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1	(1) BK	(1) 6150	(1) Engine Odd Bank Ground	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / BU	(2) 2129	(2) Ignition Control Low Reference Bank 1	(2) I	(2) —
(3) 3	(3) 0.5	(3) GN / BU	(3) 2123	(3) Ignition Control 3	(3) I	(3) —
(4) 4	(4) 1	(4) VT / BU	(4) 5291	(4) Powertrain Main Relay Fused Supply Voltage 2	(4) I	(4) —

T8D Ignition Coil 4 (L4B)



5402120

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 13570048
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 1.2 Multilock Series, Sealed(BK)

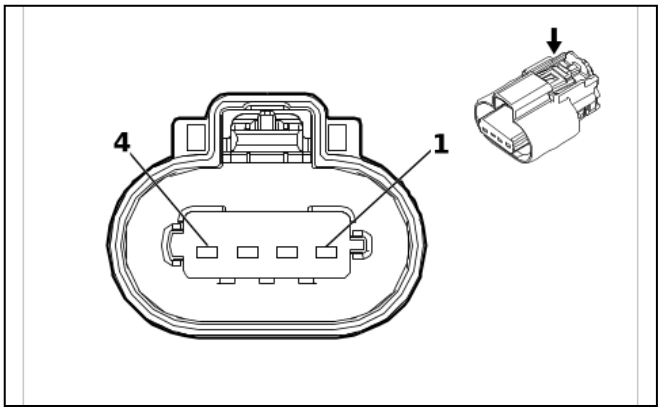
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

T8D Ignition Coil 4 (L4B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1	(1) BK	(1) 6450	(1) Engine Even Bank Ground	(1) I	(1) —
(2) 2	(2) 0.75	(2) BK / BU	(2) 2129	(2) Ignition Control Low Reference Bank 1	(2) I	(2) —
(3) 3	(3) 0.5	(3) YE / BU	(3) 2124	(3) Ignition Control 4	(3) I	(3) —
(4) 4	(4) 1	(4) VT / BU	(4) 5291	(4) Powertrain Main Relay Fused Supply Voltage 2	(4) I	(4) —

T8D Ignition Coil 4 (L76 / L78)



3240115

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 34770-0402
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 1.5 MX Series, Sealed(BK)

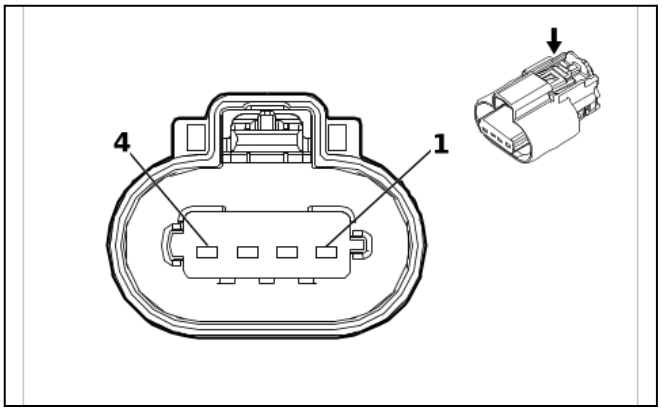
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-14 (GN)	No Tool Required

T8D Ignition Coil 4 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1	(1) BK	(1) 6450	(1) Engine Even Bank Ground	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / GY	(2) 2130	(2) Ignition Control Low Reference Bank 2	(2) I	(2) —
(3) 3	(3) 0.5	(3) YE / BU	(3) 2124	(3) Ignition Control 4	(3) I	(3) —
(4) 4	(4) 1	(4) VT / BU	(4) 5292	(4) Powertrain Main Relay Fused Supply Voltage 3	(4) I	(4) —

T8E Ignition Coil 5 (L76 / L78)



3240115

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 34770-0402
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 1.5 MX Series, Sealed(BK)

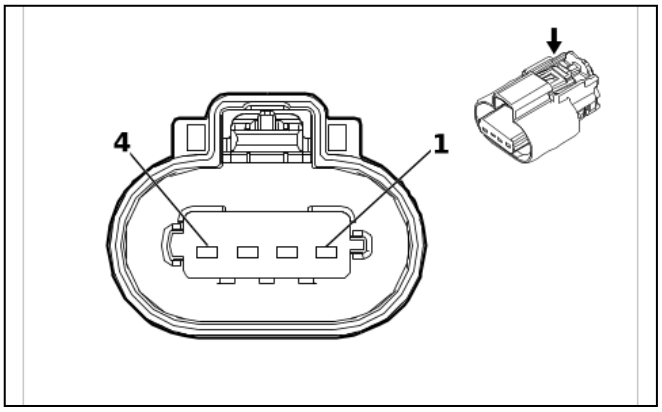
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-14 (GN)	No Tool Required

T8E Ignition Coil 5 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1	(1) BK	(1) 6150	(1) Engine Odd Bank Ground	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / BU	(2) 2129	(2) Ignition Control Low Reference Bank 1	(2) I	(2) —
(3) 3	(3) 0.5	(3) BU / GY	(3) 2125	(3) Ignition Control 5	(3) I	(3) —
(4) 4	(4) 1	(4) VT / BU	(4) 5291	(4) Powertrain Main Relay Fused Supply Voltage 2	(4) I	(4) —

T8F Ignition Coil 6 (L76 / L78)



3240115

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 34770-0402
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 1.5 MX Series, Sealed(BK)

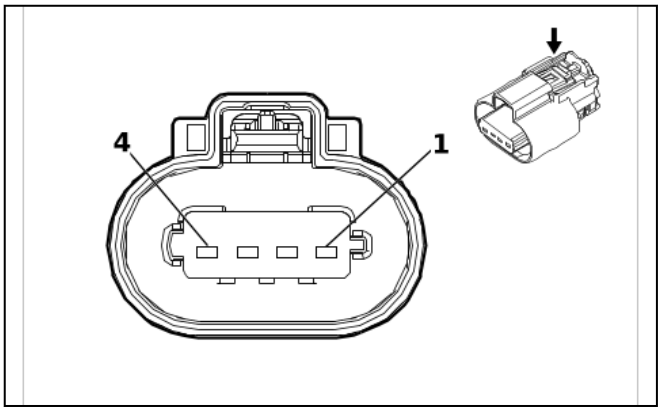
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-14 (GN)	No Tool Required

T8F Ignition Coil 6 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1	(1) BK	(1) 6450	(1) Engine Even Bank Ground	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / GY	(2) 2130	(2) Ignition Control Low Reference Bank 2	(2) I	(2) —
(3) 3	(3) 0.5	(3) BN / BU	(3) 2126	(3) Ignition Control 6	(3) I	(3) —
(4) 4	(4) 1	(4) VT / BU	(4) 5292	(4) Powertrain Main Relay Fused Supply Voltage 3	(4) I	(4) —

T8G Ignition Coil 7 (L76 / L78)



3240115

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 34770-0402
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 1.5 MX Series, Sealed(BK)

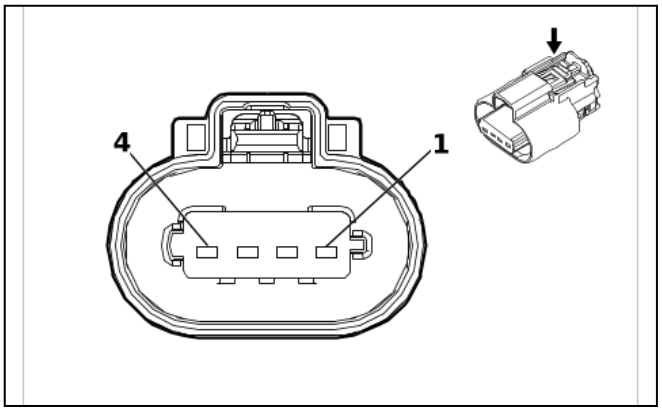
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-14 (GN)	No Tool Required

T8G Ignition Coil 7 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1	(1) BK	(1) 6150	(1) Engine Odd Bank Ground	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / BU	(2) 2129	(2) Ignition Control Low Reference Bank 1	(2) I	(2) —
(3) 3	(3) 0.5	(3) GN / GY	(3) 2127	(3) Ignition Control 7	(3) I	(3) —
(4) 4	(4) 1	(4) VT / BU	(4) 5291	(4) Powertrain Main Relay Fused Supply Voltage 2	(4) I	(4) —

T8H Ignition Coil 8 (L76 / L78)



3240115

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 34770-0402
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 1.5 MX Series, Sealed(BK)

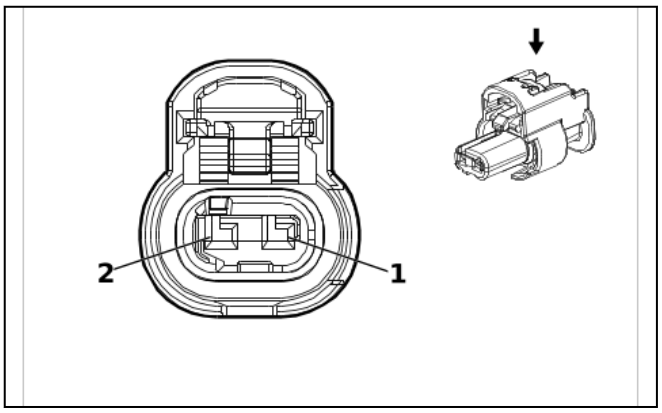
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-14 (GN)	No Tool Required

T8H Ignition Coil 8 (L76 / L78)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 1	(1) BK	(1) 6450	(1) Engine Even Bank Ground	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / GY	(2) 2130	(2) Ignition Control Low Reference Bank 2	(2) I	(2) —
(3) 3	(3) 0.5	(3) VT / WH	(3) 2128	(3) Ignition Control 8	(3) I	(3) —
(4) 4	(4) 1	(4) VT / BU	(4) 5292	(4) Powertrain Main Relay Fused Supply Voltage 3	(4) I	(4) —

T10G Low Frequency Rear Bumper Antenna (ATH)



4690744

Connector Part Information
- Harness Type: Chassis Wiring Harness
- OEM Connector: 1-2296694-3
- Service Connector: 19366871
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

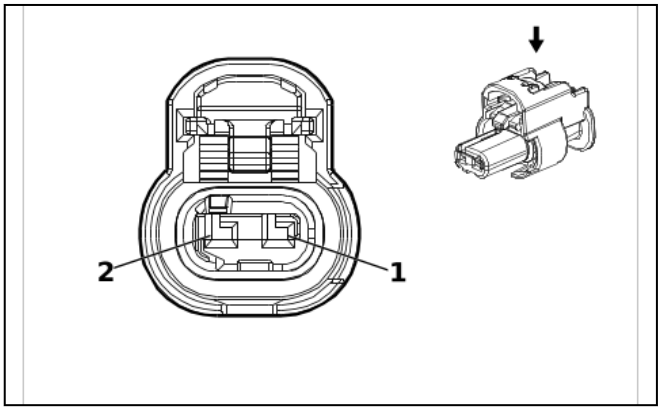
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

T10G Low Frequency Rear Bumper Antenna (ATH)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BN / GN	(1) 3568	(1) Rear Closure Passive Entry Antenna High Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) GN / GY	(2) 3569	(2) Rear Closure Passive Entry Antenna Low Signal	(2) I	(2) —

T10J Low Frequency Instrument Panel Antenna



4690744

Connector Part Information
- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 1-2296694-3
- Service Connector: 19366871
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

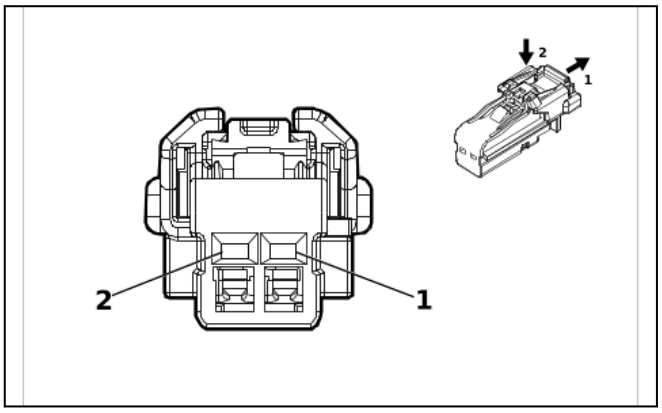
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

T10J Low Frequency Instrument Panel Antenna

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) BN / BK	(1) 3552	(1) Interior Passive Entry Antenna 1 High Signal	(1) I	(1) —
(2) 2	(2) 0.35	(2) WH	(2) 3553	(2) Interior Passive Entry Antenna 1 Low Signal	(2) I	(2) —

T10U Low Frequency Console Antenna - Front (AZ3 / 5Y1)



4115691

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Center
- OEM Connector: 6098-8988
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series(BK)

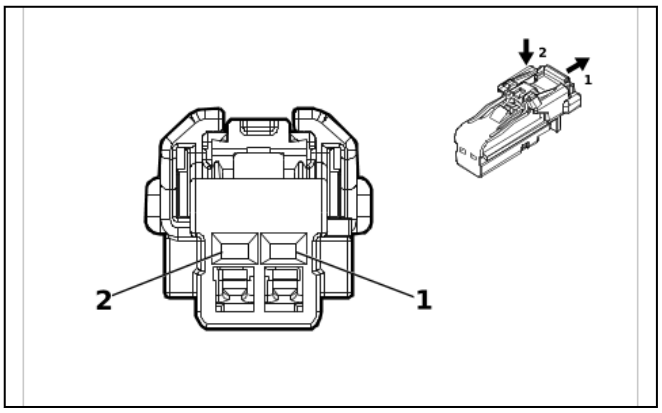
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

T10U Low Frequency Console Antenna - Front (AZ3 / 5Y1)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BN / BK	(1) 4996	(1) Immobilizer Antenna Signal [+]	(1) I	(1) —
(2) 2	(2) 0.5	(2) WH / GY	(2) 4997	(2) Immobilizer Antenna Low Signal	(2) I	(2) —

T10U Low Frequency Console Antenna - Front (D07 / DCK)



4115691

Connector Part Information
- Harness Type: Front Floor Console Wiring Harness
- OEM Connector: 6098-8988
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series(BK)

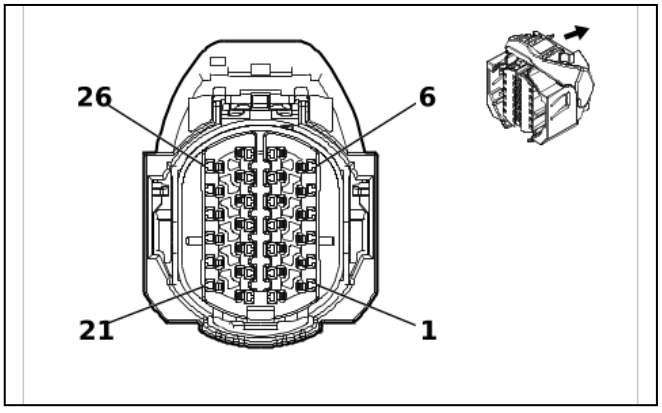
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

T10U Low Frequency Console Antenna - Front (D07 / DCK)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BN / BK	(1) 4996	(1) Immobilizer Antenna Signal [+]	(1) I	(1) —
(2) 2	(2) 0.5	(2) WH / GY	(2) 4997	(2) Immobilizer Antenna Low Signal	(2) I	(2) —

T12 Automatic Transmission X1



5275597

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 2327375-1
- Service Connector: 13528029
- Description: 26-Way F 1.2 MCON Series, Sealed(BK)

Terminal Part Information

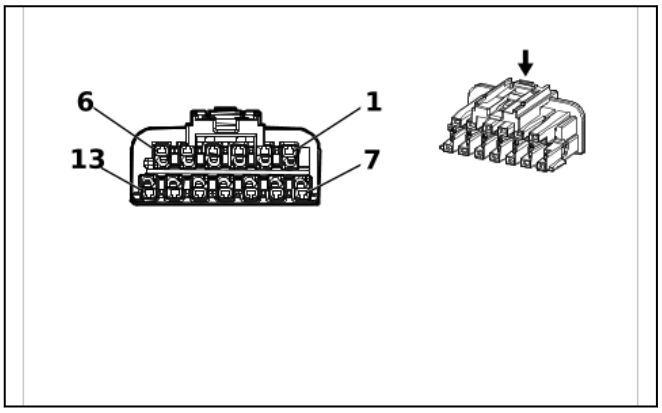
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19331733	J-35616-12 (BU)	J-38125-553
II	84963773	J-35616-12 (BU)	J-38125-215A

T12 Automatic Transmission X1

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) VT / WH	(1) 4173	(1) Transmission Speed Input Low Signal	(1) I	(1) —
(2) 2	(2) 0.5	(2) GN / VT	(2) 12791	(2) Transmission Intermediate Speed Sensor Signal Low	(2) I	(2) —
(3) 3	(3) 0.5	(3) BN / WH	(3) 12792	(3) Transmission Intermediate Speed Sensor 2 Signal Low	(3) I	(3) —
(4) 4	(4) 0.5	(4) GY / BU	(4) 6358	(4) Output Speed Signal	(4) I	(4) —
(5) 5	(5) 0.5	(5) WH / YE	(5) 6317	(5) Electronic Transmission Range Select Out of Park Switch Signal	(5) I	(5) —
(6) 6	(6) 0.5	(6) VT / WH	(6) 6319	(6) Electronic Transmission Range Select Out of Park Switch 2 Signal	(6) I	(6) —
(7) 7	(7) 0.5	(7) YE / GN	(7) 4170	(7) Transmission Output Shaft Speed Sensor Circuit 9V Reference	(7) I	(7) —
(8) 8	(8) 0.5	(8) YE / BU	(8) 4171	(8) Transmission Input Shaft Speed Sensor Circuit 9V Reference	(8) I	(8) —
(9) 9	(9) 0.5	(9) GY / BN	(9) 6388	(9) Transmission High Side Driver 2 Control	(9) I	(9) —
(10) 10	(10) 1.5	(10) RD / GY	(10) 8540	(10) Battery Positive Voltage	(10) II	(10) —
(11) 11	(11) 0.5	(11) GN / GY	(11) 6387	(11) Transmission High Side Driver 1 Control	(11) I	(11) —
(12) 12	(12) 0.5	(12) WH / YE	(12) 2159	(12) Park Inhibit Solenoid Assembly Control	(12) I	(12) —
(13) 13	(13) 0.5	(13) BN / WH	(13) 585	(13) Transmission Fluid Temperature Sensor Signal	(13) I	(13) —
(14) 14	(14) 0.5	(14) BN	(14) 12461	(14) Transmission Valve 1 Solenoid Control	(14) I	(14) —
(15) 15	(15) 0.5	(15) GY / GN	(15) 12462	(15) Transmission Valve 2 Solenoid Control	(15) I	(15) —
(16) 16	(16) 0.5	(16) GY	(16) 12463	(16) Transmission Valve 3 Solenoid Control	(16) I	(16) —
(17) 17	(17) 1.5	(17) BK	(17) 450	(17) Ground	(17) II	(17) —
(18) 18	(18) 0.5	(18) GN / WH	(18) 2968	(18) Transmission Auxiliary Fluid Pump Control	(18) I	(18) —
(19) 19	(19) 0.5	(19) GN / WH	(19) 12513	(19) Transmission Default Disable Solenoid Control	(19) I	(19) —
(20) 20	(20) 0.5	(20) BN	(20) 3706	(20) Electronic Transmission Range Select Switch Analog Signal 1	(20) I	(20) —
(21) 21	(21) 0.5	(21) VT	(21) 12464	(21) Transmission Valve 4 Solenoid Control	(21) I	(21) —
(22) 22	(22) 0.5	(22) WH / BU	(22) 12465	(22) Transmission Valve 5 Solenoid Control	(22) I	(22) —
(23) 23	(23) 0.5	(23) WH	(23) 12466	(23) Transmission Valve 6 Solenoid Control	(23) I	(23) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(24) 24	(24) 0.5	(24) GN / WH	(24) 1530	(24) Transmission Line Pressure Control Solenoid Valve Control	(24) I	(24) —
(25) 25	(25) 0.5	(25) VT / WH	(25) 422	(25) Torque Converter Clutch Solenoid Valve Control	(25) I	(25) —
(26) 26	(26) 0.5 (26) 0.5	(26) BK / BN (26) BK / YE	(26) 586 (26) 548	(26) Transmission Fluid Temperature Sensor Low Reference (26) Engine Control Sensors Low Reference 1	(26) I (26) I	(26) - L4B (26) L4B

T12 Automatic Transmission X2



4757907

Connector Part Information
- Harness Type: Automatic Transmission Wiring Harness - Case
- OEM Connector: 2203990-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 13-Way F 1.2 MCON Series(BN)

Terminal Part Information

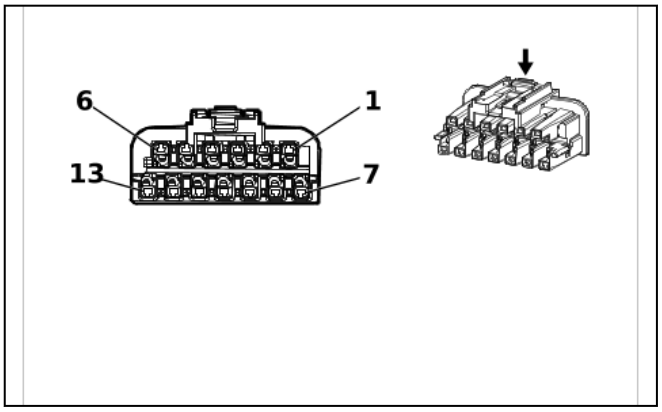
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required
II	Not required	J-35616-16 (L-GN)	No Tool Required

T12 Automatic Transmission X2

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) YE / GY	(1) 6319	(1) Electronic Transmission Range Select Out of Park Switch 2 Signal	(1) II	(1) —
(2) 2	(2) 0.5	(2) YE	(2) 6317	(2) Electronic Transmission Range Select Out of Park Switch Signal	(2) II	(2) —
(3) 3	(3) 0.5	(3) YE / OG	(3) 6358	(3) Output Speed Signal	(3) I	(3) —
(4) 4	(4) 0.5	(4) WH / BU	(4) 12792	(4) Transmission Intermediate Speed Sensor 2 Signal Low	(4) I	(4) —
(5) 5	(5) 0.5	(5) VT / GN	(5) 12791	(5) Transmission Intermediate Speed Sensor Signal Low	(5) I	(5) —
(6) 6	(6) 0.5	(6) WH / VT	(6) 4173	(6) Transmission Speed Input Low Signal	(6) I	(6) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(7) 7	(7) 0.5	(7) BN / YE	(7) 585	(7) Transmission Fluid Temperature Sensor Signal	(7) I	(7) —
(8) 8	(8) 0.5	(8) OG	(8) 2159	(8) Park Inhibit Solenoid Assembly Control	(8) I	(8) —
(9) 9	(9) 0.5	(9) BN	(9) 6387	(9) Transmission High Side Driver 1 Control	(9) I	(9) —
(10) 10	(10) 1.5	(10) GN / VT	(10) 8540	(10) Battery Positive Voltage	(10) I	(10) —
(11) 11	(11) 0.5	(11) WH	(11) 6388	(11) Transmission High Side Driver 2 Control	(11) I	(11) —
(12) 12	(12) 0.5	(12) BU	(12) 4171	(12) Transmission Input Shaft Speed Sensor Circuit 9V Reference	(12) I	(12) —
(13) 13	(13) 0.5	(13) GN	(13) 4170	(13) Transmission Output Shaft Speed Sensor Circuit 9V Reference	(13) I	(13) —

T12 Automatic Transmission X3



4757999

Connector Part Information

- Harness Type: Automatic Transmission Wiring Harness - Case
- OEM Connector: 2203990-2
- Service Connector: Service by Harness - See Part Catalog
- Description: 13-Way F 1.2 MCON Series(BN)

Terminal Part Information

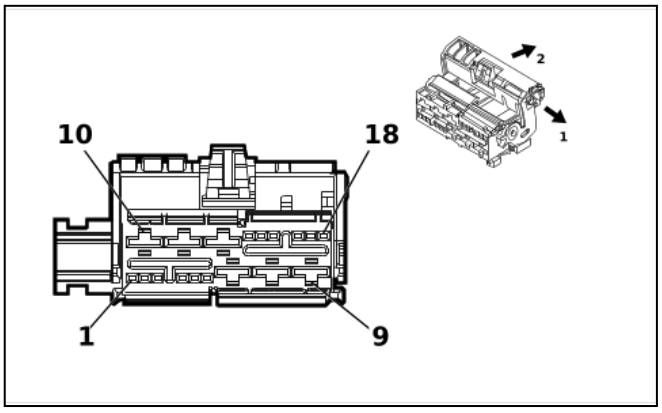
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

T12 Automatic Transmission X3

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BN / WH	(1) 12464	(1) Transmission Valve 4 Solenoid Control	(1) I	(1) —
(2) 2	(2) 0.5	(2) YE / VT	(2) 12465	(2) Transmission Valve 5 Solenoid Control	(2) I	(2) —
(3) 3	(3) 0.5	(3) BU / GY	(3) 12466	(3) Transmission Valve 6 Solenoid Control	(3) I	(3) —
(4) 4	(4) 0.5	(4) GN / OG	(4) 1530	(4) Transmission Line Pressure Control Solenoid Valve Control	(4) I	(4) —
(5) 5	(5) 0.5	(5) GY / BN	(5) 422	(5) Torque Converter Clutch Solenoid Valve Control	(5) I	(5) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(6) 6	(6) 0.5	(6) BU / BN	(6) 586	(6) Transmission Fluid Temperature Sensor Low Reference	(6) I	(6) —
(7) 7	(7) 0.5	(7) BU / GN	(7) 12461	(7) Transmission Valve 1 Solenoid Control	(7) I	(7) —
(8) 8	(8) 0.5	(8) GN / BN	(8) 12462	(8) Transmission Valve 2 Solenoid Control	(8) I	(8) —
(9) 9	(9) 0.5	(9) GY	(9) 12463	(9) Transmission Valve 3 Solenoid Control	(9) I	(9) —
(10) 10	(10) 1.5	(10) BK / YE	(10) 450	(10) Ground	(10) I	(10) —
(11) 11	(11) 0.5	(11) GY / OG	(11) 2968	(11) Transmission Auxiliary Fluid Pump Control	(11) I	(11) —
(12) 12	(12) 0.5	(12) VT	(12) 12513	(12) Transmission Default Disable Solenoid Control	(12) I	(12) —
(13) 13	(13) 0.5	(13) BK / GY	(13) 3706	(13) Electronic Transmission Range Select Switch Analog Signal 1	(13) I	(13) —

T19 Multifunction Power Supply Converter



3825662

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 35509388
- Service Connector: 13549243
- Description: 18-Way F 0.64 MTS, 6.3 MCP Series(BK)

Terminal Part Information

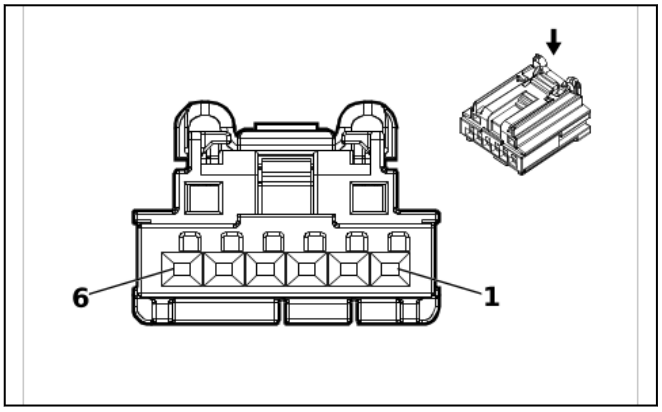
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19300632	J-35616-64B (L-BU)	J-38125-215A
II	19367600	J-35616-42 (RD)	J-38125-556

T19 Multifunction Power Supply Converter

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1 - 3	—	—	—	Not Occupied	—	—
(4) 4	(4) 0.5	(4) VT / GN	(4) 4320	(4) Powertrain Sensor Bus Enable	(4) I	(4) —
(5) 5	(5) 0.5	(5) YE / BK	(5) 625	(5) Starter Enable Relay Control	(5) I	(5) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
6	—	—	—	Not Occupied	—	—
(7) 7	(7) 2.5	(7) BK	(7) 1350	(7) Ground	(7) II	(7) —
(8) 8	(8) 2.5	(8) RD / YE	(8) 8140	(8) Battery Positive Voltage	(8) II	(8) —
(9) 9	(9) 2.5	(9) RD / GN	(9) 2173	(9) 12V Regulated Supply Voltage 2	(9) II	(9) —
(10) 10	(10) 2.5	(10) RD / YE	(10) 2172	(10) 12V Regulated Supply Voltage 1	(10) II	(10) —
(11) 11	(11) 2.5	(11) RD / WH	(11) 8040	(11) Battery Positive Voltage	(11) II	(11) —
(12) 12	(12) 2.5	(12) BK	(12) 1350	(12) Ground	(12) II	(12) —
(13) 13	(13) 0.5	(13) BU / GY	(13) 4054	(13) Private Serial Data Powertrain CAN Bus [-] Serial Data	(13) I	(13) —
(14) 14	(14) 0.5	(14) BU / GY	(14) 4054	(14) Private Serial Data Powertrain CAN Bus [-] Serial Data	(14) I	(14) —
(15) 15	(15) 0.5	(15) WH	(15) 4055	(15) Private Serial Data Powertrain CAN Bus [+] Serial Data	(15) I	(15) —
(16) 16	(16) 0.5	(16) WH	(16) 4055	(16) Private Serial Data Powertrain CAN Bus [+] Serial Data	(16) I	(16) —
17 - 18	—	—	—	Not Occupied	—	—

T22 Wireless Accessory Charging Module (K7A / K7B)



3960313

Connector Part Information

- Harness Type: Front Floor Console Wiring Harness
- OEM Connector: 2035363-4
- Service Connector: Service by Harness - See Part Catalog
- Description: 6-Way F 0.64 Generation Y Series(BK)

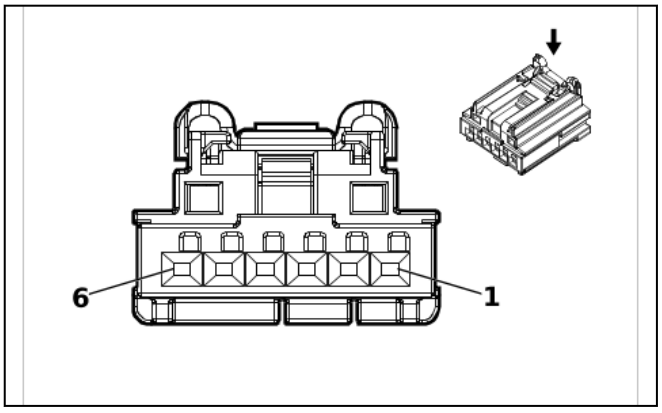
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

T22 Wireless Accessory Charging Module (K7A / K7B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) RD / VT	(1) 2640	(1) Battery Positive Voltage	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / WH	(2) 1451	(2) Signal Ground	(2) I	(2) —
(3) 3	(3) 0.35	(3) BU / YE	(3) 4984	(3) AUTOSAR CAN Bus [-] 5 Serial Data	(3) I	(3) —
(4) 4	(4) 0.35	(4) BU / WH	(4) 4985	(4) AUTOSAR CAN Bus [+] 5 Serial Data	(4) I	(4) —
(5) 5	(5) 0.35	(5) BU / YE	(5) 4984	(5) AUTOSAR CAN Bus [-] 5 Serial Data	(5) I	(5) —
(6) 6	(6) 0.35	(6) BU / WH	(6) 4985	(6) AUTOSAR CAN Bus [+] 5 Serial Data	(6) I	(6) —

T22FR Wireless Accessory Charging Module - Front Right (K7B)



3960313

Connector Part Information

- Harness Type: Front Floor Console Wiring Harness
- OEM Connector: 2035363-4
- Service Connector: Service by Harness - See Part Catalog
- Description: 6-Way F 0.64 Generation Y Series(BK)

Terminal Part Information

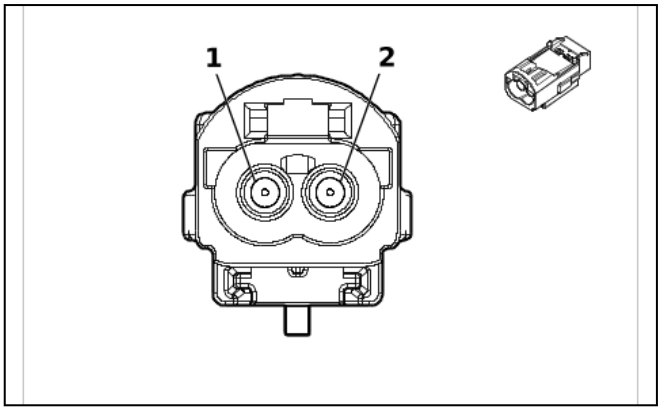
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

T22FR Wireless Accessory Charging Module - Front Right (K7B)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) RD / VT	(1) 2640	(1) Battery Positive Voltage	(1) I	(1) —
(2) 2	(2) 0.5	(2) BK / WH	(2) 1451	(2) Signal Ground	(2) I	(2) —
(3) 3	(3) 0.35	(3) BU / YE	(3) 4984	(3) AUTOSAR CAN Bus [-] 5 Serial Data	(3) I	(3) —
(4) 4	(4) 0.35	(4) BU / WH	(4) 4985	(4) AUTOSAR CAN Bus [+] 5 Serial Data	(4) I	(4) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(5) 5	(5) 0.35	(5) BU / YE	(5) 4984	(5) AUTOSAR CAN Bus [-] 5 Serial Data	(5) I	(5) —
(6) 6	(6) 0.35	(6) BU / WH	(6) 4985	(6) AUTOSAR CAN Bus [+] 5 Serial Data	(6) I	(6) —

T35A Radio Antenna Amplifier - 2 - Door



6186716

Connector Part Information
- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: AMZ032-C00-A
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 2-Way M Coax Type(BK)

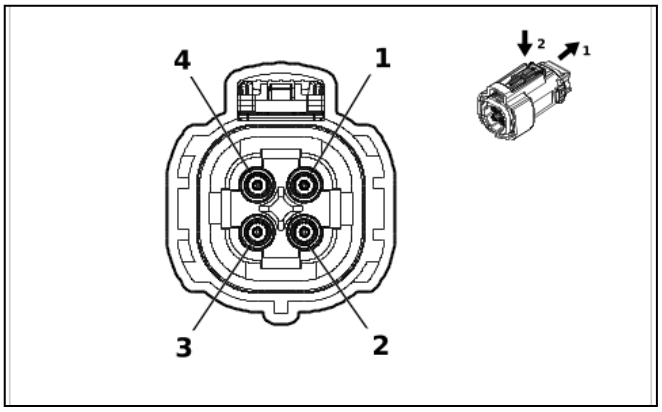
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

T35A Radio Antenna Amplifier - 2 - Door

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) —	(1) Coax Cable	(1) 6001	(1) Coaxial Antenna RF Signal	(1) I	(1) —
(2) 2	(2) —	(2) Coax Cable	(2) 3297	(2) Coaxial Antenna DAB Signal	(2) I	(2) —

T55LR Roof Rear Spoiler Antenna Module - Left - 4 - Door



6193402

Connector Part Information

- Harness Type: Roof Rear Spoiler Wiring Harness
- OEM Connector: AMZ14P-003-C
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 4-Way F Mini Coax Type(BU)

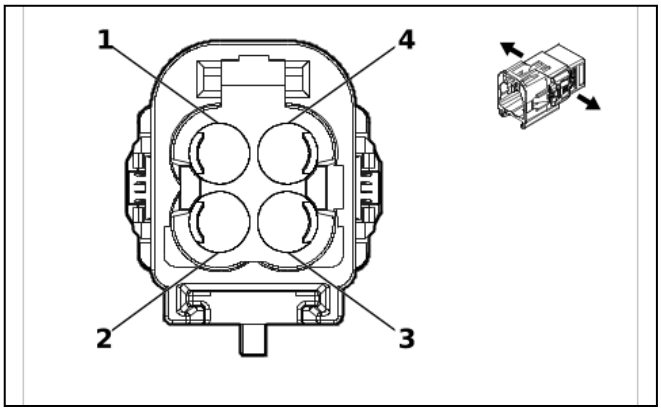
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

T55LR Roof Rear Spoiler Antenna Module - Left - 4 - Door

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) —	(1) Coax Cable	(1) 6449	(1) Coaxial Antenna Cell Phone Signal	(1) I	(1) —
(3) 3	(3) —	(3) Coax Cable	(3) 6001	(3) Coaxial Antenna RF Signal	(3) I	(3) —
(4) 4	(4) —	(4) Coax Cable	(4) 6130	(4) Coaxial Antenna XM Signal	(4) I	(4) —

T55RR Roof Rear Spoiler Antenna Module - Right - 4 - Door



6186622

Connector Part Information
- Harness Type: Dome Lamp Wiring Harness
- OEM Connector: AMZ040-C00-D
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 4-Way M Mini Coax Type(VT)

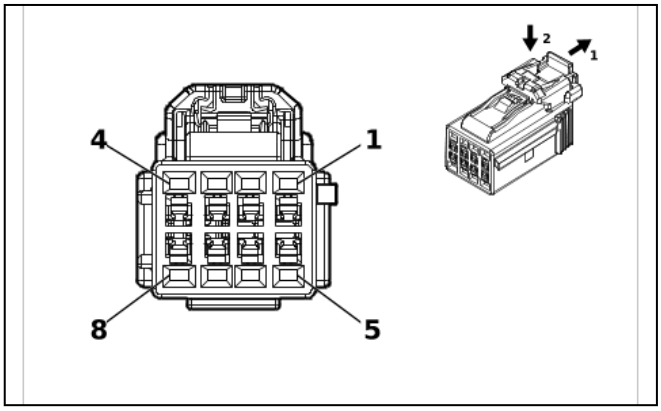
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

T55RR Roof Rear Spoiler Antenna Module - Right - 4 - Door

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) —	(1) Coax Cable	(1) 10292	(1) Cell Phone Antenna 2 Coaxial Signal	(1) I	(1) —
(3) 3	(3) —	(3) Coax Cable	(3) 10314	(3) Global Navigation Satellite System Antenna Coaxial Signal	(3) I	(3) —

X81AC Accessory Power Receptacle - Floor Console 110V AC (KFG)



5086387

Connector Part Information
- Harness Type: Front Floor Console Wiring Harness
- OEM Connector: 6098-8443
- Service Connector: Service by Harness - See Part Catalog
- Description: 8-Way F 1.2 Series(BK)

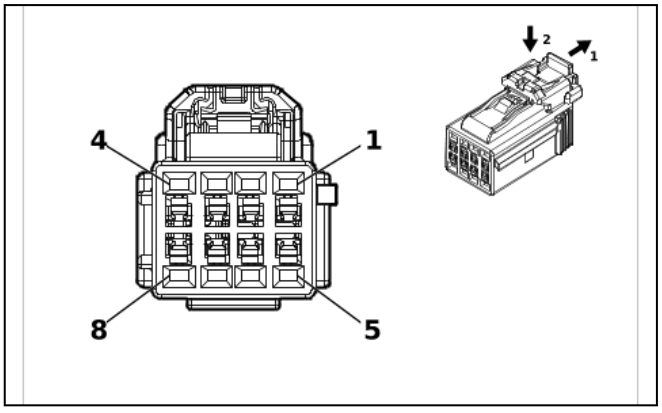
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required
II	Not required	J-35616-16 (L-GN)	No Tool Required

X81AC Accessory Power Receptacle - Floor Console 110V AC (KFG)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BK	(1) 10117	(1) AC Outlet Phase A Control	(1) II	(1) —
2	—	—	—	Not Occupied	—	—
(3) 3	(3) 0.35	(3) VT / RD	(3) 4049	(3) AC Power Outlet Sensor High Reference	(3) I	(3) —
(4) 4	(4) 0.5	(4) BU / BN	(4) 6807	(4) DC/AC Inverter Control	(4) II	(4) —
(5) 5	(5) 0.75	(5) RD	(5) 10118	(5) AC Outlet Phase B Control	(5) II	(5) —
6	—	—	—	Not Occupied	—	—
(7) 7	(7) 0.5	(7) BK	(7) 1451	(7) Signal Ground	(7) II	(7) —
(8) 8	(8) 0.35	(8) YE	(8) 6817	(8) LED Backlight Dimming Control 1	(8) I	(8) —

X81AI Accessory Power Receptacle - Instrument Panel 110V AC (KI4)



5086387

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 6098-8443
- Service Connector: 84613126
- Description: 8-Way F 1.2 Series(BK)

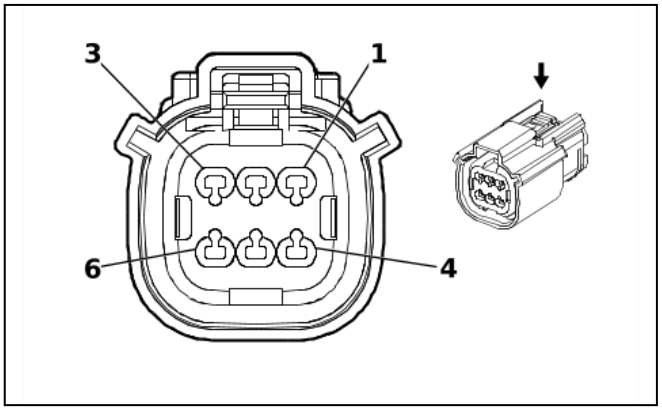
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required
II	Not required	J-35616-16 (L-GN)	No Tool Required

X81AI Accessory Power Receptacle - Instrument Panel 110V AC (KI4)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BK	(1) 10117	(1) AC Outlet Phase A Control	(1) II	(1) —
2	—	—	—	Not Occupied	—	—
(3) 3	(3) 0.35	(3) VT / RD	(3) 4049	(3) AC Power Outlet Sensor High Reference	(3) I	(3) —
(4) 4	(4) 0.5	(4) BU / BN	(4) 6807	(4) DC/AC Inverter Control	(4) II	(4) —
(5) 5	(5) 0.75	(5) RD	(5) 10118	(5) AC Outlet Phase B Control	(5) II	(5) —
6	—	—	—	Not Occupied	—	—
(7) 7	(7) 0.5	(7) BK / WH	(7) 851	(7) Signal Ground	(7) II	(7) —
(8) 8	(8) 0.35	(8) YE	(8) 6817	(8) LED Backlight Dimming Control 1	(8) I	(8) —

X81AP Pickup Box Accessory Power Receptacle - 110V AC (KC9)



1986157

Connector Part Information

- Harness Type: Chassis Rear Wiring Harness
- OEM Connector: 33472-0616
- Service Connector: 13578533
- Description: 6-Way F 1.5 MX Series, Sealed(BK)

Terminal Part Information

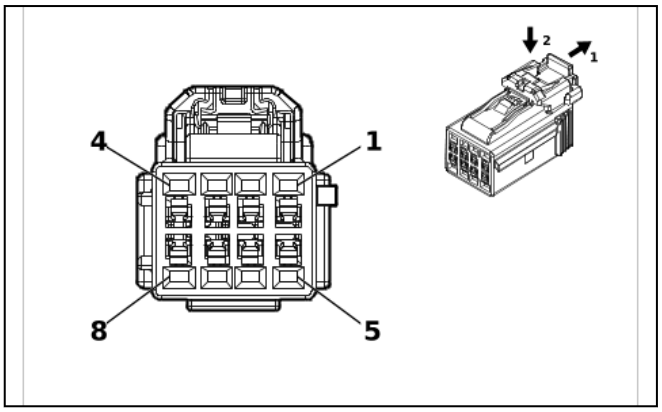
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required

X81AP Pickup Box Accessory Power Receptacle - 110V AC (KC9)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) VT / RD	(1) 4049	(1) AC Power Outlet Sensor High Reference	(1) I	(1) —
(2) 2	(2) 0.5	(2) GN / BN	(2) 2266	(2) DC/AC Inverter Control 2	(2) I	(2) —
3	—	—	—	Not Occupied	—	—
(4) 4	(4) 0.75	(4) BK / WH	(4) 10120	(4) AC Outlet 2 Phase A Control	(4) I	(4) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(5) 5	(5) 0.5	(5) BK	(5) 1650	(5) Ground	(5) I	(5) —
(6) 6	(6) 0.75	(6) RD / WH	(6) 10121	(6) AC Outlet 2 Phase B Control	(6) I	(6) —

X81BC Accessory Power Receptacle - Floor Console 220V AC (KFH)



5086387

Connector Part Information

- Harness Type: Front Floor Console Wiring Harness
- OEM Connector: 6098-8443
- Service Connector: Service by Harness - See Part Catalog
- Description: 8-Way F 1.2 Series(BK)

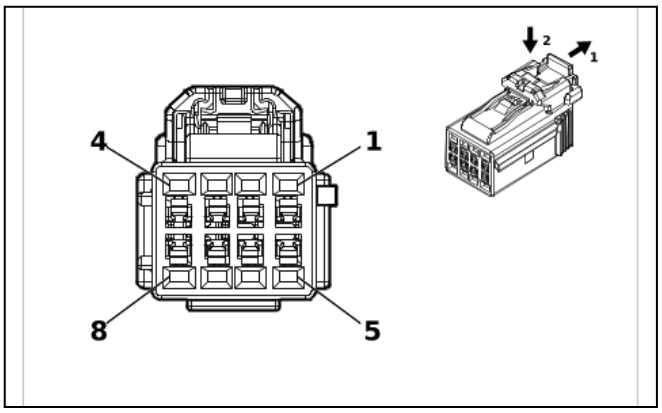
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required
II	Not required	J-35616-16 (L-GN)	No Tool Required

X81BC Accessory Power Receptacle - Floor Console 220V AC (KFH)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BK	(1) 10117	(1) AC Outlet Phase A Control	(1) II	(1) —
2	—	—	—	Not Occupied	—	—
(3) 3	(3) 0.35	(3) VT / RD	(3) 4049	(3) AC Power Outlet Sensor High Reference	(3) I	(3) —
(4) 4	(4) 0.5	(4) BU / BN	(4) 6807	(4) DC/AC Inverter Control	(4) II	(4) —
(5) 5	(5) 0.75	(5) RD	(5) 10118	(5) AC Outlet Phase B Control	(5) II	(5) —
6	—	—	—	Not Occupied	—	—
(7) 7	(7) 0.5	(7) BK	(7) 1451	(7) Signal Ground	(7) II	(7) —
(8) 8	(8) 0.35	(8) YE	(8) 6817	(8) LED Backlight Dimming Control 1	(8) I	(8) —

X81BI Accessory Power Receptacle - Instrument Panel 220V AC (KI5)



5086387

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 6098-8443
- Service Connector: 84613126
- Description: 8-Way F 1.2 Series(BK)

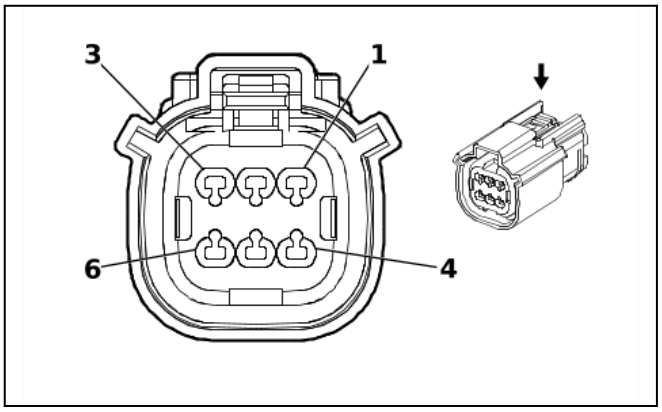
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required
II	Not required	J-35616-16 (L-GN)	No Tool Required

X81BI Accessory Power Receptacle - Instrument Panel 220V AC (KI5)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BK	(1) 10117	(1) AC Outlet Phase A Control	(1) II	(1) —
2	—	—	—	Not Occupied	—	—
(3) 3	(3) 0.35	(3) VT / RD	(3) 4049	(3) AC Power Outlet Sensor High Reference	(3) I	(3) —
(4) 4	(4) 0.5	(4) BU / BN	(4) 6807	(4) DC/AC Inverter Control	(4) II	(4) —
(5) 5	(5) 0.75	(5) RD	(5) 10118	(5) AC Outlet Phase B Control	(5) II	(5) —
6	—	—	—	Not Occupied	—	—
(7) 7	(7) 0.5	(7) BK / WH	(7) 851	(7) Signal Ground	(7) II	(7) —
(8) 8	(8) 0.35	(8) YE	(8) 6817	(8) LED Backlight Dimming Control 1	(8) I	(8) —

X81BP Pickup Box Accessory Power Receptacle - 220V AC (KCA)



1986157

Connector Part Information

- Harness Type: Chassis Rear Wiring Harness
- OEM Connector: 33472-0616
- Service Connector: Service by Harness - See Part Catalog
- Description: 6-Way F 1.5 MX Series, Sealed(BK)

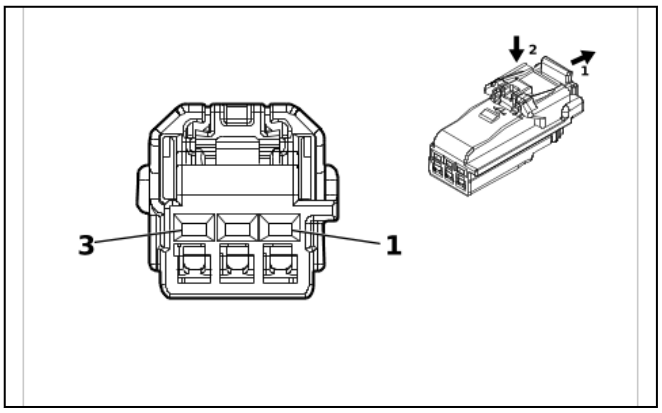
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required

X81BP Pickup Box Accessory Power Receptacle - 220V AC (KCA)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) VT / RD	(1) 4049	(1) AC Power Outlet Sensor High Reference	(1) I	(1) —
(2) 2	(2) 0.5	(2) GN / BN	(2) 2266	(2) DC/AC Inverter Control 2	(2) I	(2) —
3	—	—	—	Not Occupied	—	—
(4) 4	(4) 0.75	(4) BK / WH	(4) 10120	(4) AC Outlet 2 Phase A Control	(4) I	(4) —
(5) 5	(5) 0.5	(5) BK	(5) 1650	(5) Ground	(5) I	(5) —
(6) 6	(6) 0.75	(6) RD / WH	(6) 10121	(6) AC Outlet 2 Phase B Control	(6) I	(6) —

X83BCR Audio/Video Receptacle - Floor Console Rear X1 (D07 / DCK)



4971604

Connector Part Information

- Harness Type: Front Floor Console Wiring Harness
- OEM Connector: 6098-8153
- Service Connector: Service by Harness - See Part Catalog
- Description: 3-Way F 1.2 MCON Series(BK)

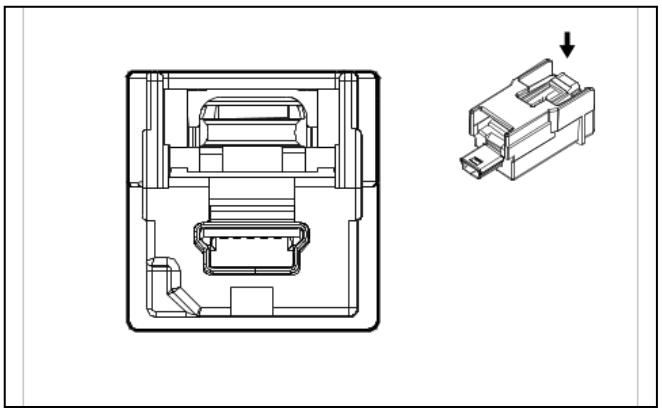
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required
II	Not required	J-35616-16 (L-GN)	No Tool Required

X83BCR Audio/Video Receptacle - Floor Console Rear X1 (D07 / DCK)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) RD / WH	(1) 140	(1) Battery Positive Voltage	(1) II	(1) —
(2) 2	(2) 0.35	(2) YE	(2) 6817	(2) LED Backlight Dimming Control 1	(2) I	(2) —
(3) 3	(3) 0.5	(3) BK / WH	(3) 1051	(3) Signal Ground	(3) II	(3) —

X83BCR Audio/Video Receptacle - Floor Console Rear X2 (D07 / DCK)



2807491

Connector Part Information
- Harness Type: Front Floor Console Wiring Harness
- OEM Connector: 111014-9401
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 5-Way M 2.0 Mini-B USB Type(GY)

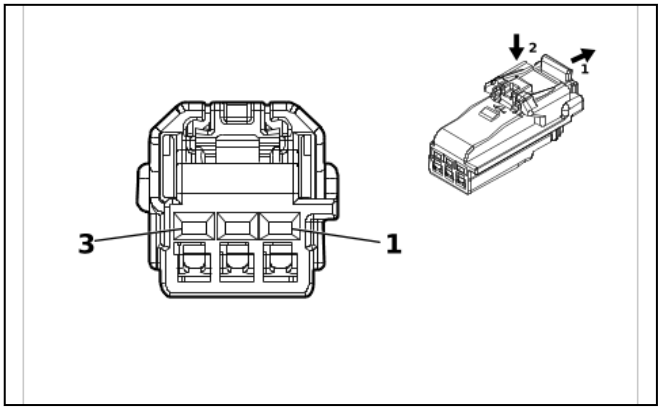
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

X83BCR Audio/Video Receptacle - Floor Console Rear X2 (D07 / DCK)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
GY	—	<p01>	USB	USB Serial Data	I	—

X83BFC Audio/Video Receptacle - Floor Console Front X1 (D07 / DCK)



4971604

Connector Part Information
- Harness Type: Front Floor Console Wiring Harness
- OEM Connector: 6098-8153
- Service Connector: Service by Harness - See Part Catalog
- Description: 3-Way F 1.2 MCON Series(BK)

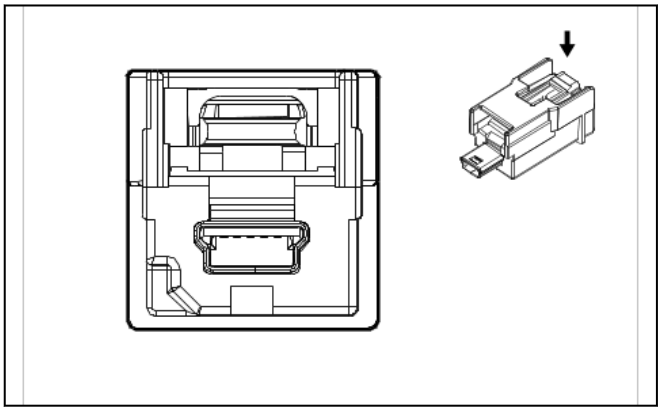
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required
II	Not required	J-35616-16 (L-GN)	No Tool Required

X83BFC Audio/Video Receptacle - Floor Console Front X1 (D07 / DCK)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) RD / WH	(1) 140	(1) Battery Positive Voltage	(1) II	(1) —
(2) 2	(2) 0.35	(2) YE	(2) 6817	(2) LED Backlight Dimming Control 1	(2) I	(2) —
(3) 3	(3) 0.5	(3) BK / WH	(3) 1051	(3) Signal Ground	(3) II	(3) —

X83BFC Audio/Video Receptacle - Floor Console Front X2 (D07 / DCK)



2807491

Connector Part Information

- Harness Type: Front Floor Console Wiring Harness
- OEM Connector: 111014-9201
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 5-Way M 2.0 Mini-B USB Type(GY)

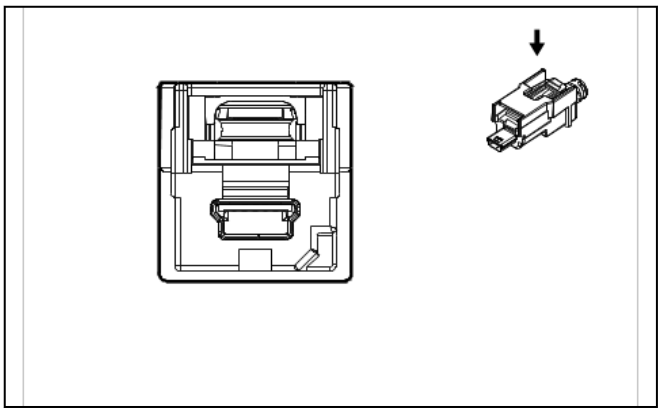
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

X83BFC Audio/Video Receptacle - Floor Console Front X2 (D07 / DCK)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
GY	—	<p01>	USB	USB Serial Data	I	—

X83BFC Audio/Video Receptacle - Floor Console Front X3 (D07 / DCK)



2807425

Connector Part Information
- Harness Type: Front Floor Console Wiring Harness
- OEM Connector: 111014-9200
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 5-Way M 2.0 Mini-B USB Type(BK)

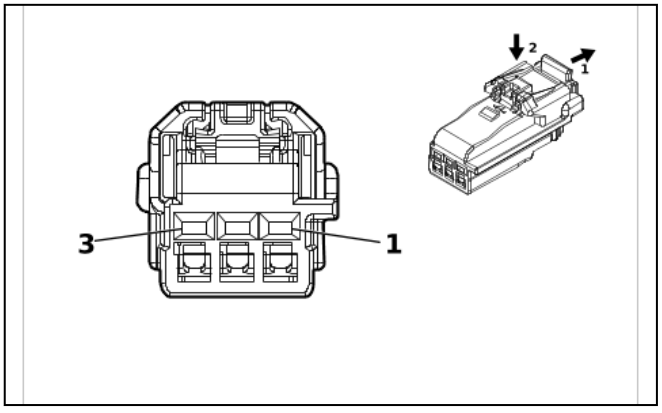
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

X83BFC Audio/Video Receptacle - Floor Console Front X3 (D07 / DCK)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
BK	—	<p01>	USB	USB Serial Data	I	—

X83BIP Audio/Video Receptacle - Instrument Panel X1 (- (D07 / DCK))



4971604

Connector Part Information
- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 6098-8153
- Service Connector: 84644600
- Description: 3-Way F 1.2 MCON Series(BK)

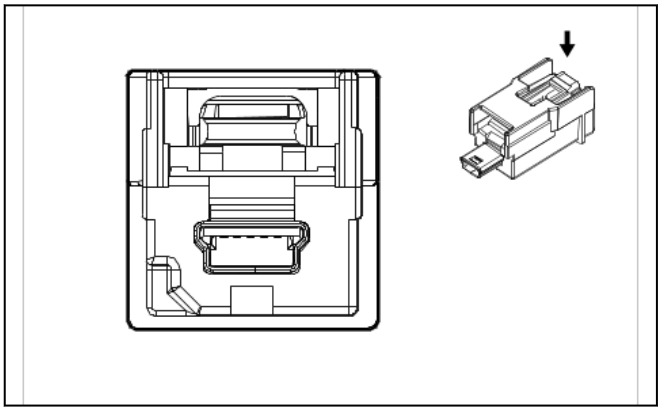
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

X83BIP Audio/Video Receptacle - Instrument Panel X1 (- (D07 / DCK))

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) RD / WH	(1) 140	(1) Battery Positive Voltage	(1) I	(1) —
(2) 2	(2) 0.5	(2) YE	(2) 6817	(2) LED Backlight Dimming Control 1	(2) I	(2) —
(3) 3	(3) 0.75	(3) BK / WH	(3) 1051	(3) Signal Ground	(3) I	(3) —

X83BIP Audio/Video Receptacle - Instrument Panel X2 (- (D07 / DCK))



2807491

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 111014-9001
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 5-Way M 2.0 Mini-B USB Type(GY)

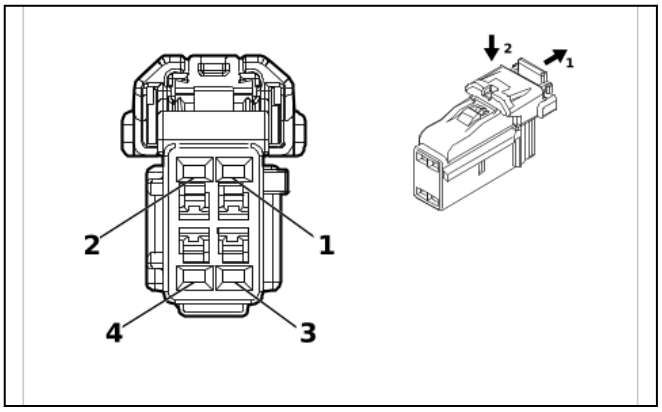
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

X83BIP Audio/Video Receptacle - Instrument Panel X2 (- (D07 / DCK))

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
GY	—	<p01>	USB	USB Serial Data	I	—

X83FP Audio/Video and USB Receptacle X1 (USN)



4872683

Connector Part Information

- Harness Type: Front Floor Console Wiring Harness
- OEM Connector: 6098-8435
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 1.2 Series(BK)

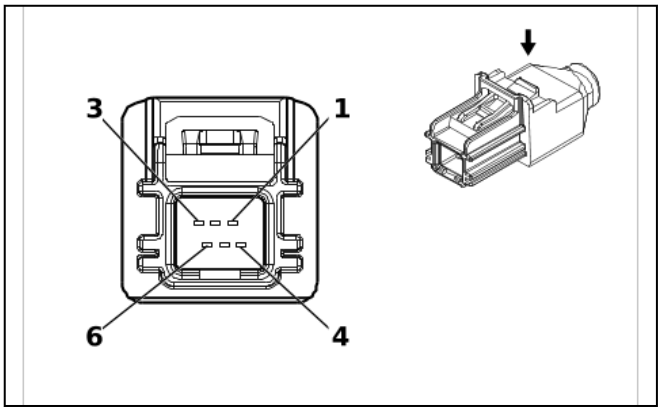
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required
II	Not required	J-35616-16 (L-GN)	No Tool Required

X83FP Audio/Video and USB Receptacle X1 (USN)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) RD / WH	(1) 140	(1) Battery Positive Voltage	(1) II	(1) —
(2) 2	(2) 0.5	(2) BK / WH	(2) 1051	(2) Signal Ground	(2) II	(2) —
(3) 3	(3) 0.35	(3) GN / YE	(3) 7066	(3) Entertainment Remote Enable Signal	(3) I	(3) —
(4) 4	(4) 0.35	(4) YE	(4) 6817	(4) LED Backlight Dimming Control 1	(4) I	(4) —

X83FP Audio/Video and USB Receptacle X2 (USN)



4806625

Connector Part Information
- Harness Type: Front Floor Console Wiring Harness
- OEM Connector: 100337-1023
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 6-Way M HSAL-2 Series(BK)

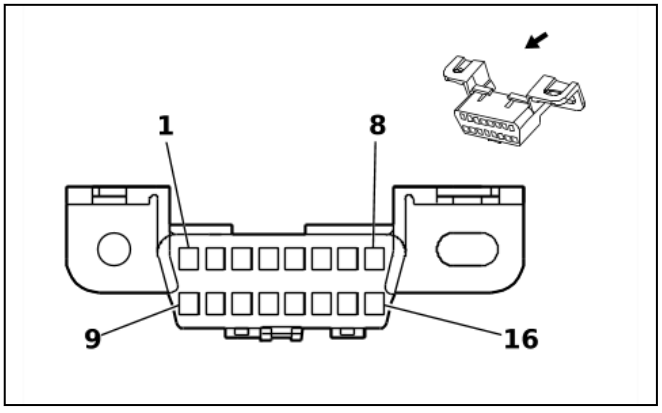
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

X83FP Audio/Video and USB Receptacle X2 (USN)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
BK	—	<p01>	LVDS	Low Voltage Differential Signaling	I	—

X84 Data Link Connector



68793

Connector Part Information
- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 12110250
- Service Connector: 12110250
- Description: 16-Way F 150 Metri-Pack Series(BK)

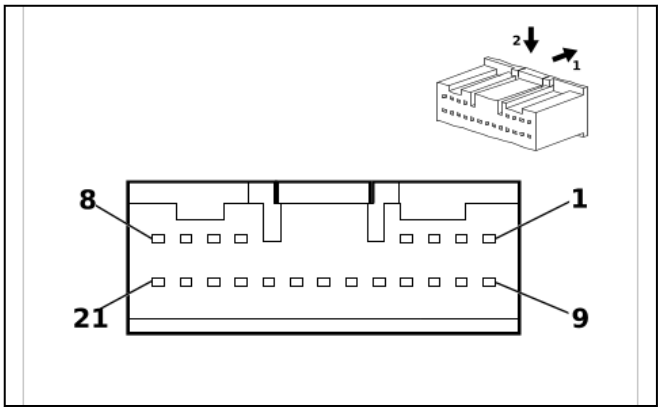
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	13580059	J-35616-14 (GN)	J-38125-12A
II	Service by Cable	J-35616-14 (GN)	J-38125-12A

X84 Data Link Connector

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) BU / BN	(1) 4983	(1) AUTOSAR CAN Bus [+] 7 Serial Data	(1) I	(1) —
(2) 2	(2) 0.35	(2) GN	(2) 2578	(2) Private Serial Data Presentation CAN Bus [+] 1 Serial Data	(2) I	(2) —
(3) 3	(3) 0.35	(3) BN	(3) 4973	(3) Ethernet Bus 1R [+]	(3) II	(3) —
(4) 4	(4) 0.5	(4) BK	(4) 1050	(4) Ground	(4) I	(4) —
(5) 5	(5) 0.5	(5) BK / WH	(5) 1050	(5) Ground	(5) I	(5) —
(6) 6	(6) 0.35	(6) YE	(6) 4981	(6) AUTOSAR CAN Bus [+] 6 Serial Data	(6) I	(6) —
(7) 7	(7) 0.35	(7) VT	(7) 2580	(7) Private Serial Data Presentation CAN Bus [+] 2 Serial Data	(7) I	(7) —
(8) 8	(8) 0.35	(8) WH	(8) 7207	(8) Ethernet Bus 1 Enable Signal	(8) I	(8) —
(9) 9	(9) 0.35	(9) WH	(9) 4982	(9) AUTOSAR CAN Bus [-] 7 Serial Data	(9) I	(9) —
(10) 10	(10) 0.35	(10) BN	(10) 2577	(10) Private Serial Data Presentation CAN Bus [-] 1 Serial Data	(10) I	(10) —
(11) 11	(11) 0.35	(11) YE	(11) 4972	(11) Ethernet Bus 1R [-]	(11) II	(11) —
(12) 12	(12) 0.35	(12) BN	(12) 4975	(12) Ethernet Bus 1T [+]	(12) II	(12) —
(13) 13	(13) 0.35	(13) GN	(13) 4974	(13) Ethernet Bus 1T [-]	(13) II	(13) —
(14) 14	(14) 0.35	(14) WH	(14) 4980	(14) AUTOSAR CAN Bus [-] 6 Serial Data	(14) I	(14) —
(15) 15	(15) 0.35	(15) GY	(15) 2579	(15) Private Serial Data Presentation CAN Bus [-] 2 Serial Data	(15) I	(15) —
(16) 16	(16) 0.5	(16) RD / YE	(16) 6540	(16) Battery Positive Voltage	(16) I	(16) —

X85 Steering Wheel Airbag Coil X1



3960237

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: ATLCPB-21B-2AY
- Service Connector: 13510218
- Description: 21-Way F 0.64 Series(YE)

Terminal Part Information

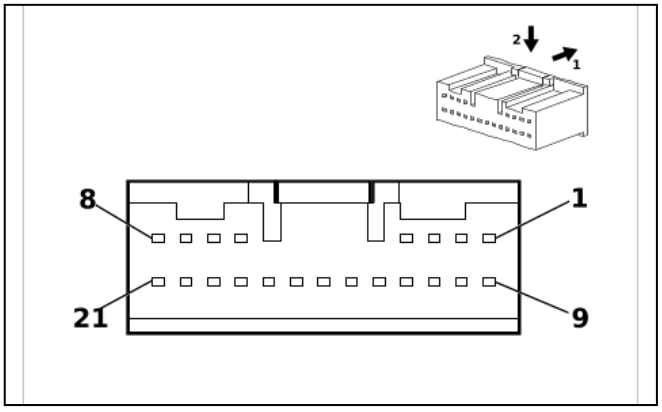
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	13575742	J-35616-64B (L-BU)	J-38125-215A

X85 Steering Wheel Airbag Coil X1

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BK / WH	(1) 851	(1) Signal Ground	(1) I	(1) —
(2) 2	(2) 0.35	(2) GN / WH	(2) 3287	(2) Horn Switch Signal	(2) I	(2) —
3 - 6	—	—	—	Not Occupied	—	—
(7) 7	(7) 0.5	(7) BN / OG	(7) 3020	(7) Steering Wheel Air Bag Stage 1 Low Control	(7) I	(7) —
(8) 8	(8) 0.5	(8) OG / VT	(8) 3021	(8) Steering Wheel Air Bag Stage 1 High Control	(8) I	(8) —
(9) 9	(9) 0.5	(9) GN / BK	(9) 10652	(9) Radio LIN Bus 1	(9) I	(9) —
(10) 10	(10) 0.35 (10) 0.5	(10) GN / BK (10) GN / GY	(10) 2858 (10) 11023	(10) Body Control Module LIN Bus 12 (10) Image Processing Module LIN Bus 1	(10) I (10) I	(10) (UKL / UK0) - N38 (10) (UKL / UK0) & N38
(11) 11	(11) 0.35	(11) BN / GN	(11) 1884	(11) Cruise Control Set/Coast/Resume/ Accelerate Switch Signal	(11) I	(11) —
(12) 12	(12) 0.35	(12) BK / VT	(12) 1449	(12) Steering Wheel Resistor Ladder Low Reference	(12) I	(12) —
(13) 13	(13) 0.35 (13) 0.5	(13) WH / VT (13) WH / VT	(13) 2246 (13) 2246	(13) Driver Illumination Lamp 1 Control (13) Driver Illumination Lamp 1 Control	(13) I (13) I	(13) (UKL / UK0) - N38 (13) (UKL / UK0) & N38
(14) 14	(14) 0.5	(14) RD / GN	(14) 5140	(14) Battery Positive Voltage	(14) I	(14) —

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(15) 15	(15) 0.35	(15) GY / GN	(15) 5737	(15) Distance Sensing Cruise Control Gap Up/ Down Switch Signal	(15) I	(15) —
(16) 16	(16) 0.35	(16) VT / YE	(16) 5526	(16) Tap Up/Tap Down Switch Signal	(16) I	(16) —
(17) 17	(17) 0.35 (17) 0.5	(17) YE / BU (17) YE / BU	(17) 2245 (17) 2245	(17) Driver Illumination Lamp 2 Control (17) Driver Illumination Lamp 2 Control	(17) I (17) I	(17) (UKL / UK0) - N38 (17) (UKL / UK0) & N38
(18) 18	(18) 0.35 (18) 0.5	(18) BU / BN (18) BU / BN	(18) 7744 (18) 7744	(18) Driver Illumination Lamp Ground (18) Driver Illumination Lamp Ground	(18) I (18) I	(18) (UKL / UK0) - N38 (18) (UKL / UK0) & N38
19	—	—	—	Not Occupied	—	—
(20) 20	(20) 0.5	(20) BK	(20) 1050	(20) Ground	(20) I	(20) —
(21) 21	(21) 0.5	(21) RD / BN	(21) 10040	(21) Battery Positive Voltage	(21) I	(21) —

X85 Steering Wheel Airbag Coil X2



3960237

Connector Part Information

- Harness Type: Steering Wheel Horn Switch Wiring Harness
- OEM Connector: ATLCPB-21B-2AY
- Service Connector: Service by Harness - See Part Catalog
- Description: 21-Way F 0.64 Series(YE)

Terminal Part Information

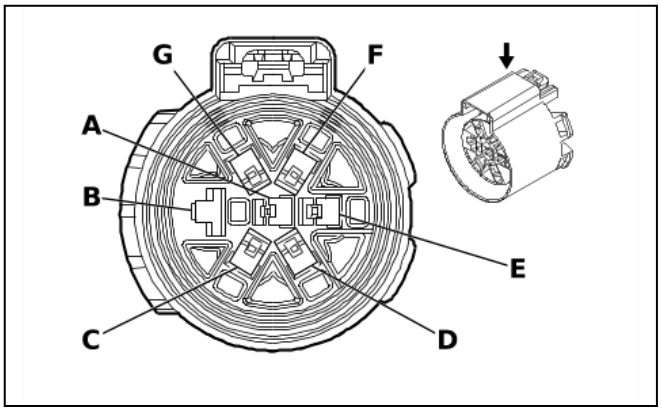
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-64B (L-BU)	No Tool Required

X85 Steering Wheel Airbag Coil X2

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) BK / WH	(1) 6051	(1) Steering Wheel Ground	(1) I	(1) —
(2) 2	(2) 0.35	(2) GN / WH	(2) 3287	(2) Horn Switch Signal	(2) I	(2) —
3 - 6	—	—	—	Not Occupied	—	—

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(7) 7	(7) 0.5	(7) BN / OG	(7) 3020	(7) Steering Wheel Air Bag Stage 1 Low Control	(7) I	(7) —
(8) 8	(8) 0.5	(8) OG / VT	(8) 3021	(8) Steering Wheel Air Bag Stage 1 High Control	(8) I	(8) —
(9) 9	(9) 0.5 (9) 0.35	(9) RD / BN (9) RD / BN	(9) 10040 (9) 10040	(9) Battery Positive Voltage (9) Battery Positive Voltage	(9) I	(9) KI3 (9) ULM
(10) 10	(10) 0.5 (10) 0.35	(10) BK (10) BK	(10) 6050 (10) 6050	(10) Steering Wheel Ground (10) Steering Wheel Ground	(10) I	(10) KI3 (10) ULM
11	—	—	—	Not Occupied	—	—
(12) 12	(12) 0.35	(12) BU / BN	(12) 7744	(12) Driver Illumination Lamp Ground	(12) I	(12) ULM
(13) 13	(13) 0.35	(13) YE / BU	(13) 2245	(13) Driver Illumination Lamp 2 Control	(13) I	(13) ULM
(14) 14	(14) 0.35	(14) VT / YE	(14) 5526	(14) Tap Up/Tap Down Switch Signal	(14) I	(14) —
(15) 15	(15) 0.35	(15) GY / GN	(15) 11875	(15) Cruise Control Bank 2 Switch Signal	(15) I	(15) —
(16) 16	(16) 0.35	(16) RD / GN	(16) 5140	(16) Battery Positive Voltage	(16) I	(16) —
(17) 17	(17) 0.35	(17) WH / VT	(17) 2246	(17) Driver Illumination Lamp 1 Control	(17) I	(17) ULM
(18) 18	(18) 0.35	(18) BK / VT	(18) 1449	(18) Steering Wheel Resistor Ladder Low Reference	(18) I	(18) —
(19) 19	(19) 0.35	(19) BN / GN	(19) 11874	(19) Cruise Control Bank 1 Switch Signal	(19) I	(19) —
(20) 20	(20) 0.35 (20) 0.35	(20) GN / GY (20) GN / GY	(20) 2858 (20) 11023	(20) Body Control Module LIN Bus 12 (20) Image Processing Module LIN Bus 1	(20) I (20) I	(20) KI3 - ULM (20) ULM
(21) 21	(21) 0.35	(21) GN / BK	(21) 10652	(21) Radio LIN Bus 1	(21) I	(21) —

X88B Tow Vehicle Electrical Receptacle X1 (- 8S3)



2056936

Connector Part Information

- Harness Type: Chassis Wiring Harness
- OEM Connector: 13857223
- Service Connector: 86816072
- Description: 7-Way F 280, 630 Metri-Pack Series, Sealed(BK)

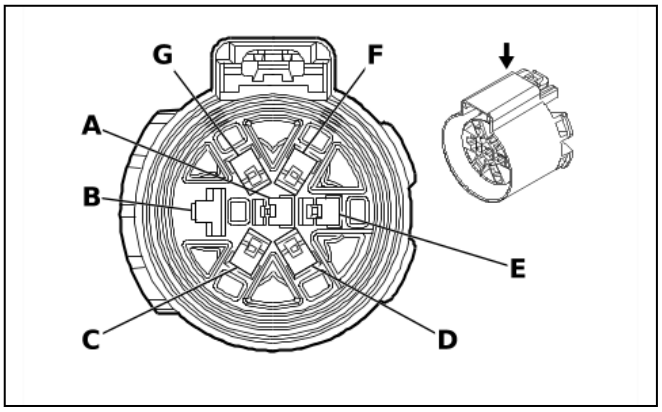
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-42 (RD)	No Tool Required
II	Not required	J-35616-4A (PU)	No Tool Required

X88B Tow Vehicle Electrical Receptacle X1 (- 8S3)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	1	GY	1624	Trailer Backup Lamp Control	II	- UET
	1	GY	5189	Trailer Backup Lamp Control	II	UET
B	5	WH	22	Trailer Ground	I	—
C	2.5	BU	47	Trailer Auxiliary Control	II	—
D	1	GN	1619	Right Rear Trailer Stop/Turn Lamp Control	II	—
E	4	OG	3940	Battery Positive Voltage	II	—
F	1.5	BN	2109	Trailer Park Lamp Control	II	- UET
	1	BN	2109	Trailer Park Lamp Control	II	UET
G	1	YE	1618	Left Rear Trailer Stop/Turn Lamp Control	II	—

X88B Tow Vehicle Electrical Receptacle X1 (8S3)



2056936

Connector Part Information

- Harness Type: Backup Alarm Wiring Harness
- OEM Connector: 13857223
- Service Connector: Service by Harness - See Part Catalog
- Description: 7-Way F 280, 630 Metri-Pack Series, Sealed(BK)

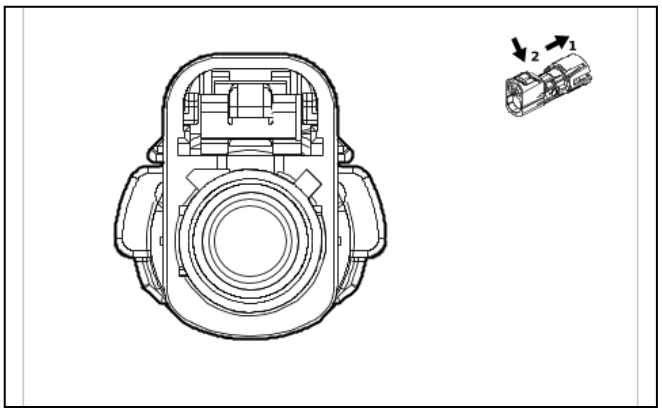
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-42 (RD)	No Tool Required
II	Not required	J-35616-4A (PU)	No Tool Required

X88B Tow Vehicle Electrical Receptacle X1 (8S3)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	1	GY	1624	Trailer Backup Lamp Control	II	—
B	5	WH	22	Trailer Ground	I	—
C	3	BU	47	Trailer Auxiliary Control	II	—
D	1	GN	1619	Right Rear Trailer Stop/Turn Lamp Control	II	—
E	3	OG	3640	Battery Positive Voltage	II	—
F	1.5	BN	2109	Trailer Park Lamp Control	II	—
G	1	YE	1618	Left Rear Trailer Stop/Turn Lamp Control	II	—

X88B Tow Vehicle Electrical Receptacle X2 (TRG)



5758030

Connector Part Information
- Harness Type: Chassis Wiring Harness
- OEM Connector: 35187032
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way F Coax Type(BK)

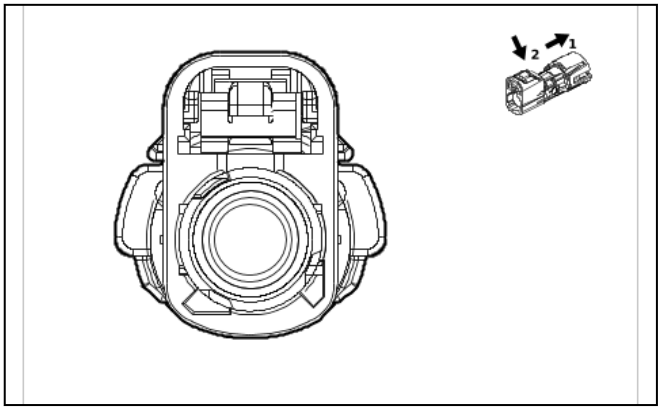
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

X88B Tow Vehicle Electrical Receptacle X2 (TRG)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
BK	—	Coax Cable	2421	Trailer Rear Vision Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	I	—

X88B Tow Vehicle Electrical Receptacle X3 (TRG)



5757455

Connector Part Information
- Harness Type: Chassis Wiring Harness
- OEM Connector: 35187043
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way F Coax Type(OG)

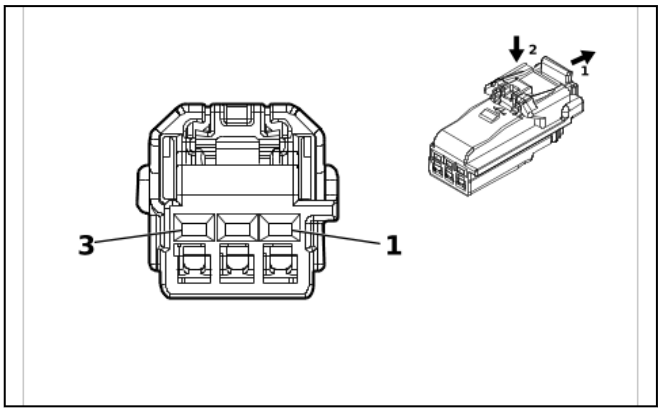
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

X88B Tow Vehicle Electrical Receptacle X3 (TRG)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
OG	—	Coax Cable	7886	Trailer 2 Rear Vision Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	I	—

X92CD Dual Charge Only Receptacle - Floor Console Rear (D07 / DCK)



4971604

Connector Part Information

- Harness Type: Front Floor Console Wiring Harness
- OEM Connector: 6098-8153
- Service Connector: Service by Harness - See Part Catalog
- Description: 3-Way F 1.2 MCON Series(BK)

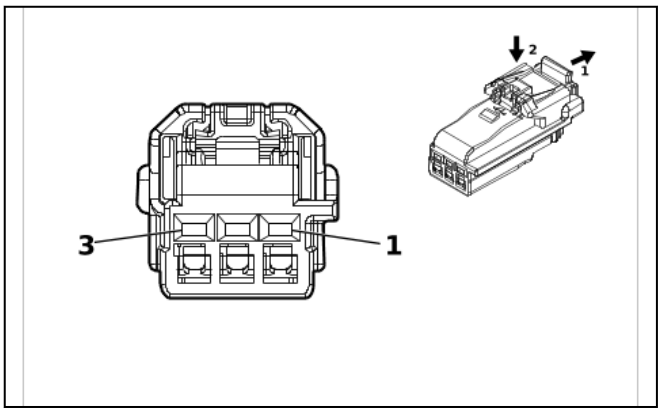
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required

X92CD Dual Charge Only Receptacle - Floor Console Rear (D07 / DCK)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) VT	(1) 4701	(1) Retained Accessory Power Control	(1) I	(1) —
(2) 2	(2) 0.35	(2) YE	(2) 6817	(2) LED Backlight Dimming Control 1	(2) I	(2) —
(3) 3	(3) 0.35	(3) BK / WH	(3) 1451	(3) Signal Ground	(3) I	(3) —

X92FSR Dual Charge Only Receptacle - Front Center Seat Rear Cover (AZ3 and UBI)



4971604

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Center
- OEM Connector: 6098-8153
- Service Connector: Service by Harness - See Part Catalog
- Description: 3-Way F 1.2 MCON Series(BK)

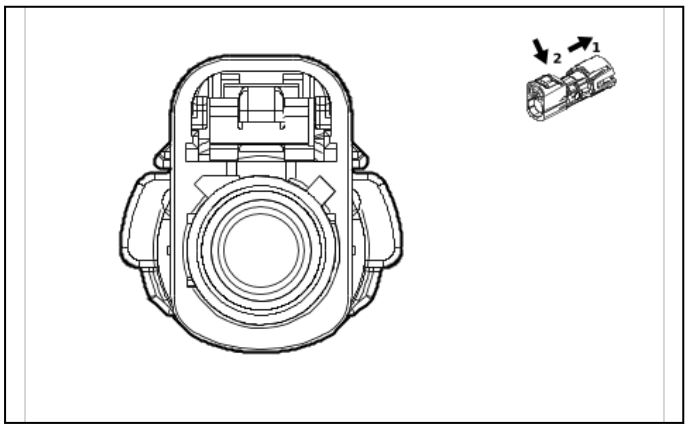
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required

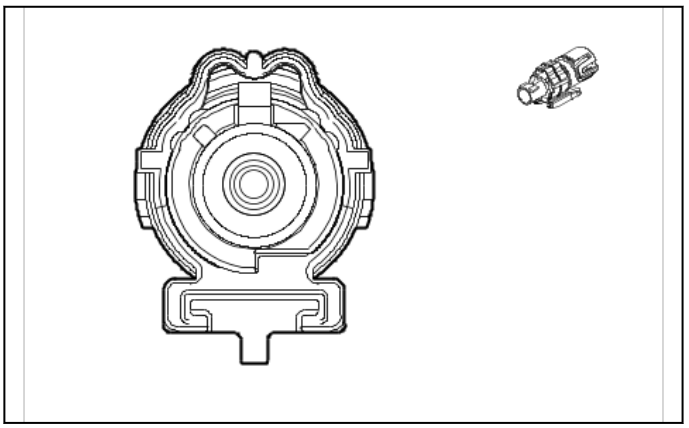
X92FSR Dual Charge Only Receptacle - Front Center Seat Rear Cover (AZ3 and UBI)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) VT	(1) 4701	(1) Retained Accessory Power Control	(1) I	(1) —
(2) 2	(2) 0.75	(2) YE	(2) 6817	(2) LED Backlight Dimming Control 1	(2) I	(2) —
(3) 3	(3) 0.35	(3) BK	(3) 1451	(3) Signal Ground	(3) I	(3) —

X122 Front View Camera Wiring Harness to Body Wiring Harness (UV2)



5758030



5758019

Connector Part Information
- Harness Type: Front View Camera Wiring Harness
- OEM Connector: 35187032
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way F Coax Type(BK)

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 33338239
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way M Coax Type, Sealed(BK)

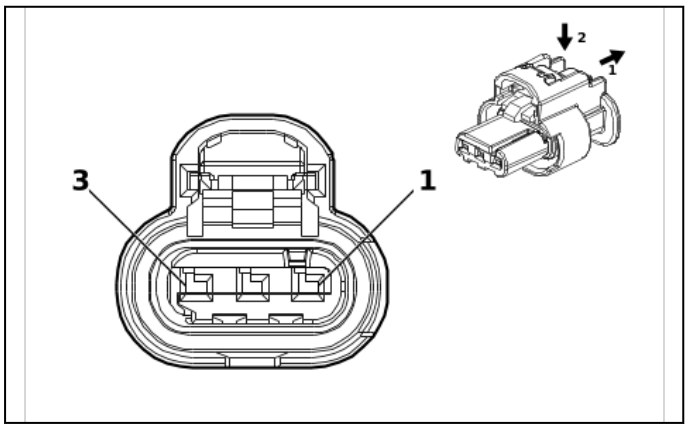
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

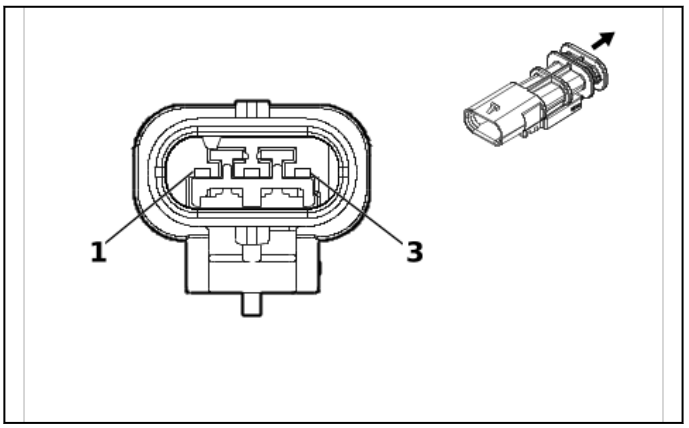
X122 Front View Camera Wiring Harness to Body Wiring Harness (UV2)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
BK	—	Coax Cable	4722	I	—	Frontview Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	BK	—	Coax Cable	4722	II	—

X124 Front View Camera Wiring Harness to Body Wiring Harness (GRZ)



4581126



5087161

Connector Part Information
- Harness Type: Front View Camera Wiring Harness
- OEM Connector: 1-2296695-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 3-Way F 1.2 MCON-CB Series, Sealed(BK)

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 2203318-1
- Service Connector: 86367597
- Description: 3-Way M 1.2 MCON-CB Series, Sealed(BK)

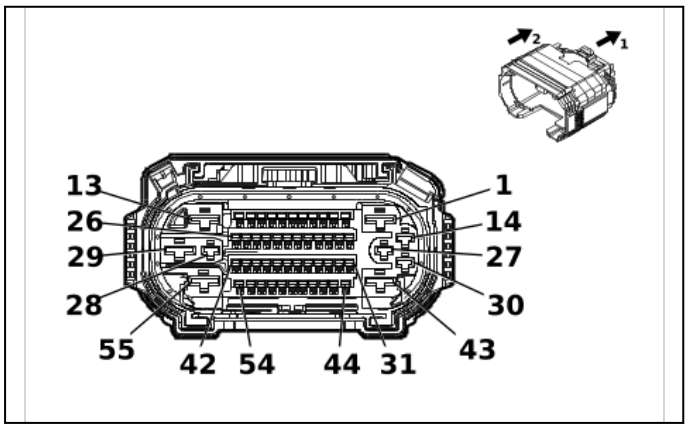
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required
II	Not required	J-35616-16 (L-GN)	No Tool Required
III	Not required	J-35616-13 (BU)	No Tool Required
IV	Not required	J-35616-17 (L-GN)	No Tool Required

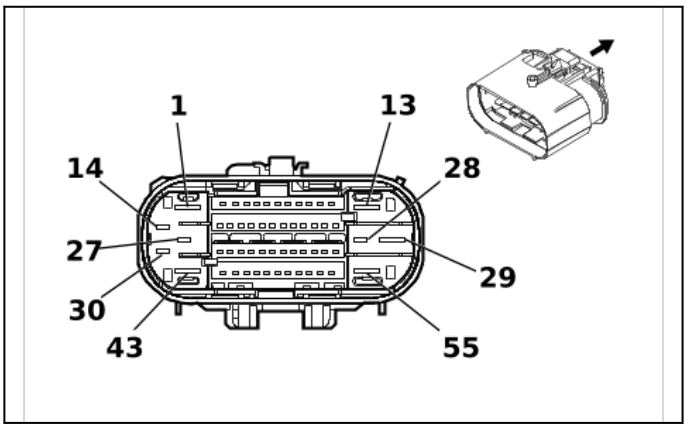
X124 Front View Camera Wiring Harness to Body Wiring Harness (GRZ)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BU / YE	(1) 11418	(1) I	(1) —	(1) Exterior Emblem Light Control	(1) 1	(1) 0.5	(1) BU / YE	(1) 11418	(1) IV	(1) —
(2) 2	(2) 1	(2) BK	(2) 650	(2) II	(2) —	(2) Ground	(2) 2	(2) 1	(2) BK	(2) 650	(2) III	(2) —
3	—	—	—	—	—	Not Occupied	3	—	—	—	—	—

X125 Engine Wiring Harness to Body Wiring Harness



5246872



4994369

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 35016653
- Service Connector: 19371184
- Description: 55-Way F 1.2 OCS, 2.8, 6.3 CTS Series, Sealed(GY)

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 35205174
- Service Connector: 84727363
- Description: 55-Way M 1.2 OCS, 2.8, 6.3 CTS Series, Sealed(GY)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19368624	J-35616-35 (VT)	J-38125-212
II	19370818	J-35616-12 (BU)	J-38125-553
III	84634921	J-35616-42 (RD)	J-38125-212
IV	84847992	J-35616-32 (OG)	J-38125-36
V	84992391	J-35616-5 (PU)	J-38125-36
VI	87838750	J-35616-13 (BU)	J-38125-215A

X125 Engine Wiring Harness to Body Wiring Harness

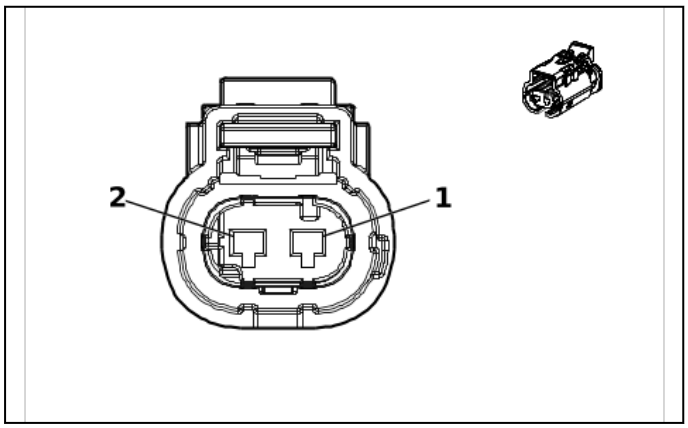
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 3	(1) BK / WH	(1) 251	(1) III	(1) —	(1) Signal Ground	(1) 1	(1) 3	(1) BK / WH	(1) 251	(1) IV	(1) —
(2) 2	(2) 1 (2) 0.75	(2) BK (2) VT / GN	(2) 9000 (2) 9000	(2) II (2) II	(2) - L4B (2) L4B	(2) Cavity Seal (2) Cavity Seal	(2) 2	(2) 0.75	(2) BK	(2) 9000	(2) VI	(2) —
(3) 3	(3) 0.5 (3) 0.75	(3) VT / GN (3) VT / GN	(3) 439 (3) 439	(3) II (3) II	(3) - F48 (3) F48	(3) Run/ Crank Ignition 1 Voltage (3) Run/ Crank Ignition 1 Voltage	(3) 3	(3) 0.75	(3) VT / GN	(3) 439	(3) VI	(3) —
(4) 4	(4) 0.5	(4) WH	(4) 4055	(4) II	(4) —	(4) Private Serial Data Powertrain CAN Bus [+] Serial Data	(4) 4	(4) 0.5	(4) WH	(4) 4055	(4) VI	(4) —

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(5) 5	(5) 0.5	(5) BU / GY	(5) 4054	(5) II	(5) —	(5) Private Serial Data Powertrain CAN Bus [-] Serial Data	(5) 5	(5) 0.5	(5) BU / GY	(5) 4054	(5) VI	(5) —
(6) 6	(6) 0.5	(6) WH	(6) 4976	(6) II	(6) —	(6) AUTOSAR CAN Bus [-] 3 Serial Data	(6) 6	(6) 0.35	(6) WH	(6) 4976	(6) VI	(6) —
(7) 7	(7) 0.5	(7) BU / BK	(7) 4977	(7) II	(7) —	(7) AUTOSAR CAN Bus [+] 3 Serial Data	(7) 7	(7) 0.35	(7) BU / BK	(7) 4977	(7) VI	(7) —
(8) 8	(8) 0.5	(8) WH / RD	(8) 1164	(8) II	(8) —	(8) Accelerator Pedal Position 5V Reference 1	(8) 8	(8) 0.35	(8) WH / RD	(8) 1164	(8) VI	(8) —
(9) 9	(9) 0.5	(9) BK / BU	(9) 1271	(9) II	(9) —	(9) Accelerator Pedal Position Low Reference 1	(9) 9	(9) 0.35	(9) BK / BU	(9) 1271	(9) VI	(9) —
(10) 10	(10) 0.5	(10) YE / WH	(10) 1161	(10) II	(10) —	(10) Accelerator Pedal Position Signal 1	(10) 10	(10) 0.35	(10) YE / WH	(10) 1161	(10) VI	(10) —
(11) 11	(11) 0.5	(11) GN / WH	(11) 1162	(11) II	(11) —	(11) Accelerator Pedal Position Signal 2	(11) 11	(11) 0.35	(11) GN / WH	(11) 1162	(11) VI	(11) —
(12) 12	(12) 1 (12) 0.75	(12) BK (12) VT / GN	(12) 9000 (12) 9000	(12) II (12) II	(12) - L4B (12) L4B	(12) Cavity Seal (12) Cavity Seal	(12) 12	(12) 0.75	(12) BK	(12) 9000	(12) VI	(12) —
13	—	—	—	—	—	Not Occupied	13	—	—	—	—	—
(14) 14	(14) 2 (14) 2.5	(14) RD / GN (14) RD / GN	(14) 1840 (14) 1840	(14) I (14) I	(14) - L4B (14) L4B	(14) Battery Positive Voltage (14) Battery Positive Voltage	(14) 14	(14) 2.5	(14) RD / GN	(14) 1840	(14) V	(14) —
(15) 15	(15) 0.5	(15) BN / RD	(15) 1274	(15) II	(15) —	(15) Accelerator Pedal Position 5V Reference 2	(15) 15	(15) 0.35	(15) BN / RD	(15) 1274	(15) VI	(15) —
(16) 16	(16) 0.5 (16) 0.5	(16) GN / WH (16) GN / WH	(16) 10807 (16) 4622	(16) II (16) II	(16) L4B (16) LZ0	(16) Engine Control Module LIN Bus 2 (16) Engine Control Module LIN Bus 2	(16) 16	(16) 0.5	(16) GN / WH	(16) 4622	(16) VI	(16) —
17	—	—	—	—	—	Not Occupied	17	—	—	—	—	—
(18) 18	(18) 0.5	(18) WH / RD	(18) 480	(18) II	(18) —	(18) Engine Control Vehicle Sensors 5 Volt Reference 1	(18) 18	(18) 0.35	(18) WH / RD	(18) 480	(18) VI	(18) —

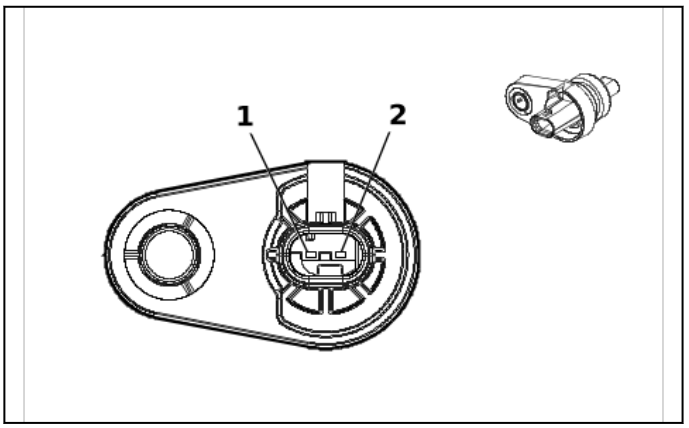
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(19) 19	(19) 0.5	(19) GN / BN	(19) 507	(19) II	(19) —	(19) Wait To Start Indicator Control	(19) 19	(19) 0.35	(19) GN / BN	(19) 507	(19) VI	(19) —
(20) 20	(20) 0.5	(20) WH / GN	(20) 5380	(20) II	(20) —	(20) Brake Position Sensor Signal	(20) 20	(20) 0.35	(20) WH / GN	(20) 5380	(20) VI	(20) —
21	—	—	—	—	—	Not Occupied	21	—	—	—	—	—
(22) 22	(22) 0.5	(22) BK / VT	(22) 1272	(22) II	(22) —	(22) Accelerator Pedal Position Low Reference 2	(22) 22	(22) 0.35	(22) BK / VT	(22) 1272	(22) VI	(22) —
(23) 23	(23) 0.5	(23) BK / GY	(23) 626	(23) II	(23) —	(23) Engine Control Vehicle Sensors Low Reference 1	(23) 23	(23) 0.5	(23) BK / GY	(23) 626	(23) VI	(23) —
24	—	—	—	—	—	Not Occupied	24	—	—	—	—	—
(25) 25	(25) 0.5	(25) BU / GY	(25) 636	(25) II	(25) —	(25) Ambient Air Temperature Sensor Signal	(25) 25	(25) 0.5	(25) BU / GY	(25) 636	(25) VI	(25) —
(26) 26	(26) 0.75	(26) BU / BN	(26) 7573	(26) II	(26) —	(26) Air Conditioning Compressor Solenoid Valve Control	(26) 26	(26) 0.5	(26) BU / BN	(26) 7573	(26) VI	(26) —
(27) 27	(27) 0.75	(27) BU / YE	(27) 7574	(27) I	(27) —	(27) Air Conditioning Compressor Solenoid Valve Control	(27) 27	(27) 0.5	(27) BU / YE	(27) 7574	(27) V	(27) —
(28) 28	(28) 0.5	(28) VT / GN	(28) 4320	(28) I	(28) —	(28) Powertrain Sensor Bus Enable	(28) 28	(28) 0.5	(28) VT / GN	(28) 4320	(28) V	(28) —
29 - 32	—	—	—	—	—	Not Occupied	29 - 32	—	—	—	—	—
(33) 33	(33) 0.5	(33) YE / BK	(33) 625	(33) II	(33) —	(33) Starter Enable Relay Control	(33) 33	(33) 0.5	(33) YE / BK	(33) 625	(33) VI	(33) —
34 - 36	—	—	—	—	—	Not Occupied	34 - 36	—	—	—	—	—
(37) 37	(37) 0.5	(37) BU / RD	(37) 460	(37) II	(37) —	(37) Engine Control Sensors 5 Volt Reference 1	(37) 37	(37) 0.5	(37) BU / RD	(37) 460	(37) VI	(37) —
(38) 38	(38) 0.5	(38) BK / YE	(38) 548	(38) II	(38) —	(38) Engine Control Sensors Low Reference 1	(38) 38	(38) 0.5	(38) BK / YE	(38) 548	(38) VI	(38) —
(39) 39	(39) 0.5	(39) WH / RD	(39) 480	(39) II	(39) —	(39) Engine Control Vehicle Sensors 5 Volt Reference 1	(39) 39	(39) 0.5	(39) WH / RD	(39) 480	(39) VI	(39) —

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(40) 40	(40) 0.5	(40) G Y	(40) 10 518	(40) II	(40) —	(40) Electronic Transmission Range Select Shifter Position Sensor 2 Signal	(40) 40	(40) 0.5	(40) G Y	(40) 10 518	(40) VI	(40) —
(41) 41	(41) 0.5	(41) B K / GN	(41) 58 0	(41) II	(41) —	(41) Engine Control Sensors Low Reference 2	(41) 41	(41) 0.5	(41) B K / GN	(41) 58 0	(41) VI	(41) —
42 - 43	—	—	—	—	—	Not Occupied	42 - 43	—	—	—	—	—
(44) 44	(44) 1 (44) 0.75	(44) B K (44) V T / GN	(44) 90 00 (44) 90 00	(44) II (44) II	(44) - L4B (44) L4B	(44) Cavity Seal (44) Cavity Seal	(44) 44	(44) 0.75	(44) B K	(44) 90 00	(44) VI	(44) —
45 - 49	—	—	—	—	—	Not Occupied	45 - 49	—	—	—	—	—
(50) 50	(50) 0.5	(50) B N	(50) 10 515	(50) II	(50) —	(50) Electronic Transmission Range Select Shifter Position Sensor 1 Signal	(50) 50	(50) 0.5	(50) B N	(50) 10 515	(50) VI	(50) —
51 - 53	—	—	—	—	—	Not Occupied	51 - 53	—	—	—	—	—
(54) 54	(54) 1 (54) 0.75	(54) B K (54) V T / GN	(54) 90 00 (54) 90 00	(54) II (54) II	(54) - L4B (54) L4B	(54) Cavity Seal (54) Cavity Seal	(54) 54	(54) 0.75	(54) B K	(54) 90 00	(54) VI	(54) —
55	—	—	—	—	—	Not Occupied	55	—	—	—	—	—

X129 Engine Wiring Harness to Oil Pump Flow Control Solenoid Valve Harness (LZ0)



6776339



6472905

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 10530497
- Service Connector: 86308598
- Description: 2-Way F 1.2 MLK Series, Sealed(BK)

Connector Part Information
- Harness Type: Oil Pump Flow Control Solenoid Valve Harness
- OEM Connector: 12698857
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way M 1.2 Multilock Series, Sealed(BK)

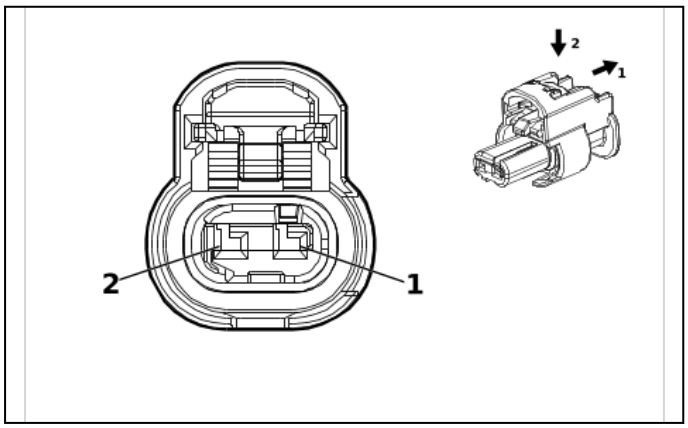
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required
II	Not required	J-35616-13 (BU)	No Tool Required

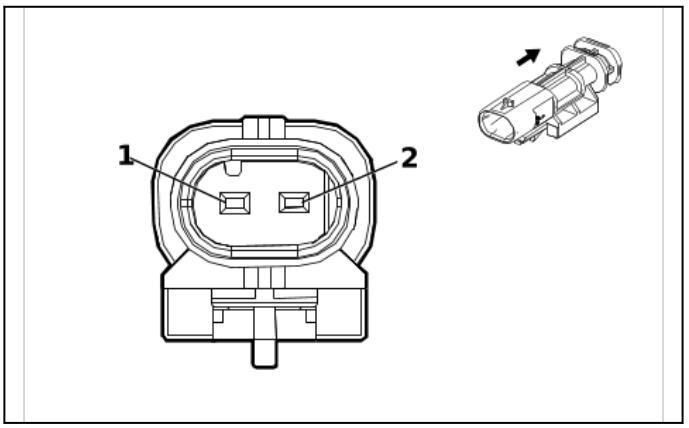
X129 Engine Wiring Harness to Oil Pump Flow Control Solenoid Valve Harness (LZ0)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) YE / BN	(1) 106	(1) I	(1) —	(1) Oil Pump Motor Control	(1) 1	(1) 0.5	(1) YE / BN	(1) 106	(1) II	(1) —
(2) 2	(2) 0.5	(2) BU	(2) 179	(2) I	(2) —	(2) Engine Oil Pump Control	(2) 2	(2) 0.5	(2) BU	(2) 179	(2) II	(2) —

X134 Front Grille Lamp to Accessory Grille Lamp (S0M)



4649903



2474755

Connector Part Information
- Harness Type: Front Grille Lamp
- OEM Connector: 13512365
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

Connector Part Information
- Harness Type: Accessory Grille Lamp
- OEM Connector: 13591337
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way M 1.2 MCON Series, Sealed(BK)

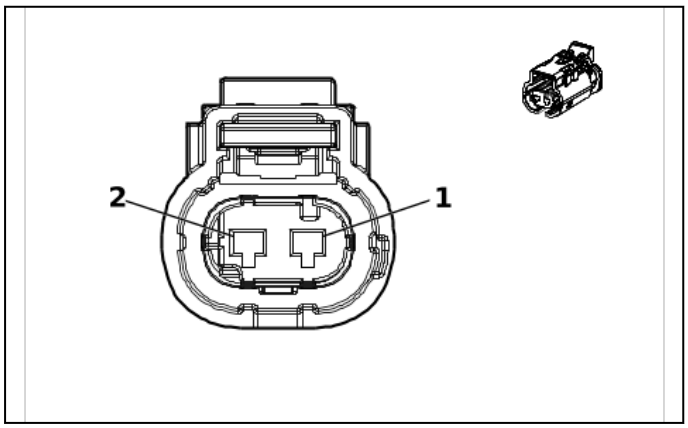
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required
II	Not required	No Tool Required	No Tool Required

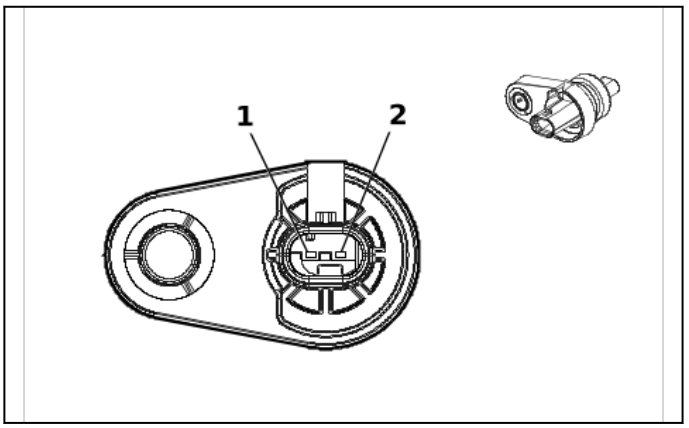
X134 Front Grille Lamp to Accessory Grille Lamp (S0M)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BK	(1) 650	(1) I	(1) —	(1) Ground	(1) 1	(1) 0.5 (1) 0.5	(1) BK (1) BK	(1) 650 (1) 650	(1) II	(1) — (1) —
(2) 2	(2) 0.5	(2) BU / YE	(2) 114 18	(2) I	(2) —	(2) Exterior Emblem Light Control	(2) 2	(2) 0.5 (2) 0.5	(2) BU / YE (2) BU / YE	(2) 114 18 (2) 114 18	(2) II	(2) — (2) —

X144 Engine Wiring Harness to Oil Pump Flow Control Solenoid Valve Harness (L4B)



6776339



6472905

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 10530497
- Service Connector: 86308598
- Description: 2-Way F 1.2 MLK Series, Sealed(BK)

Connector Part Information
- Harness Type: Oil Pump Flow Control Solenoid Valve Harness
- OEM Connector: 12698857
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way M 1.2 Multilock Series, Sealed(BK)

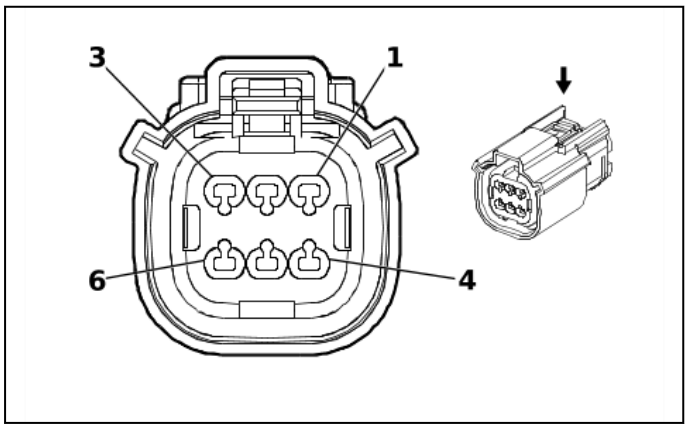
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required
II	Not required	J-35616-13 (BU)	No Tool Required

X144 Engine Wiring Harness to Oil Pump Flow Control Solenoid Valve Harness (L4B)

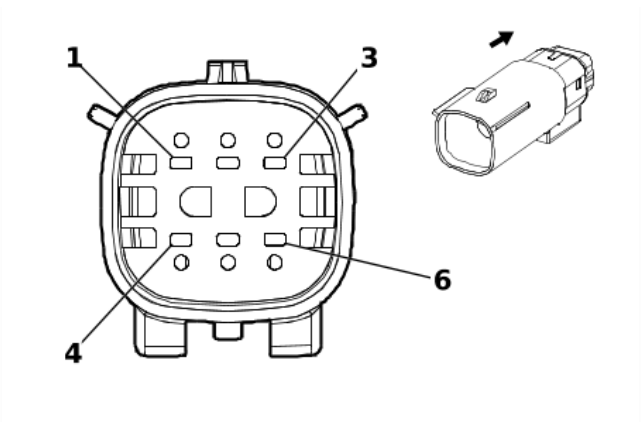
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) YE / BN	(1) 106	(1) I	(1) —	(1) Oil Pump Motor Control	(1) 1	(1) 0.5	(1) YE / BN	(1) 106	(1) II	(1) —
(2) 2	(2) 0.5	(2) BU	(2) 179	(2) I	(2) —	(2) Engine Oil Pump Control	(2) 2	(2) 0.5	(2) BU	(2) 179	(2) II	(2) —

X147 Chassis Wiring Harness to Power Steering Control Module Wiring Harness - Data



1986157

Connector Part Information
- Harness Type: Chassis Wiring Harness
- OEM Connector: 33472-0674
- Service Connector: 13578533
- Description: 6-Way F 1.5 MX Series, Sealed(BK)



1986159

Connector Part Information
- Harness Type: Power Steering Control Module Wiring Harness - Data
- OEM Connector: 38292372
- Service Connector: Service by Harness - See Part Catalog
- Description: 6-Way M 1.5 MX Series, Sealed(BK)

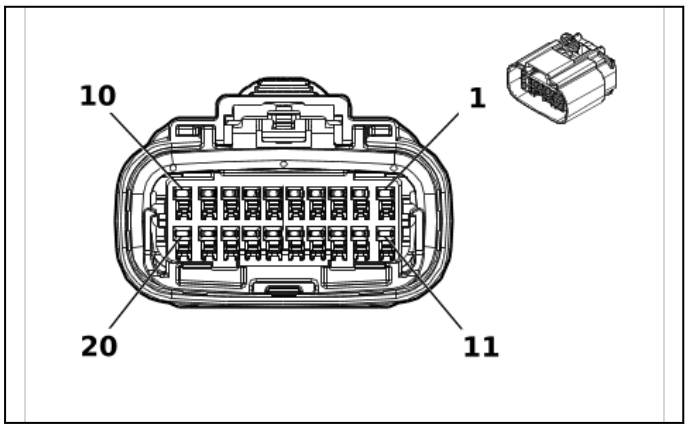
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required
II	Not required	J-35616-3 (GY)	No Tool Required

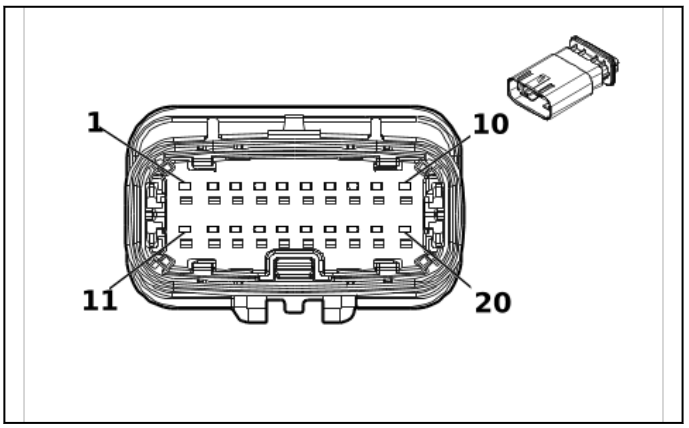
X147 Chassis Wiring Harness to Power Steering Control Module Wiring Harness - Data

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) WH	(1) 4978	(1) I	(1) —	(1) AUTOSAR CAN Bus [-] 2 Serial Data	(1) 1	(1) 0.35	(1) WH	(1) 4978	(1) II	(1) —
(2) 2	(2) 0.5	(2) BU / YE	(2) 4979	(2) I	(2) —	(2) AUTOSAR CAN Bus [+] 2 Serial Data	(2) 2	(2) 0.35	(2) BU	(2) 4979	(2) II	(2) —
(3) 3	(3) 0.5	(3) BU / YE	(3) 4979	(3) I	(3) —	(3) AUTOSAR CAN Bus [+] 2 Serial Data	(3) 3	(3) 0.35	(3) BU / WH	(3) 4979	(3) II	(3) —
(4) 4	(4) 0.5	(4) WH	(4) 4978	(4) I	(4) —	(4) AUTOSAR CAN Bus [-] 2 Serial Data	(4) 4	(4) 0.35	(4) WH / BU	(4) 4978	(4) II	(4) —
5 - 6	—	—	—	—	—	Not Occupied	5 - 6	—	—	—	—	—

X150 Front Object Alarm Sensor Wiring Harness to Body Wiring Harness



6240294



6081336

Connector Part Information
- Harness Type: Front Object Alarm Sensor Wiring Harness
- OEM Connector: 35465658
- Service Connector: Service by Harness - See Part Catalog
- Description: 20-Way F 1.2 MCON-CB Series, Sealed(BK)

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 35465720
- Service Connector: 85625526
- Description: 20-Way M 1.2 MCON-CB Series, Sealed(BK)

Terminal Part Information

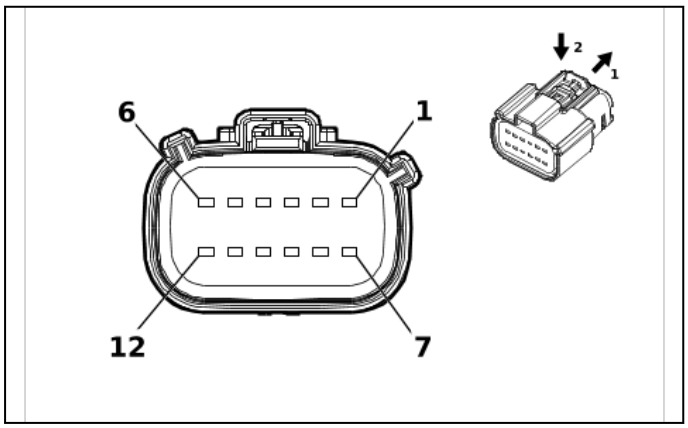
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required
II	84867140	J-35616-13 (BU)	J-38125-553

X150 Front Object Alarm Sensor Wiring Harness to Body Wiring Harness

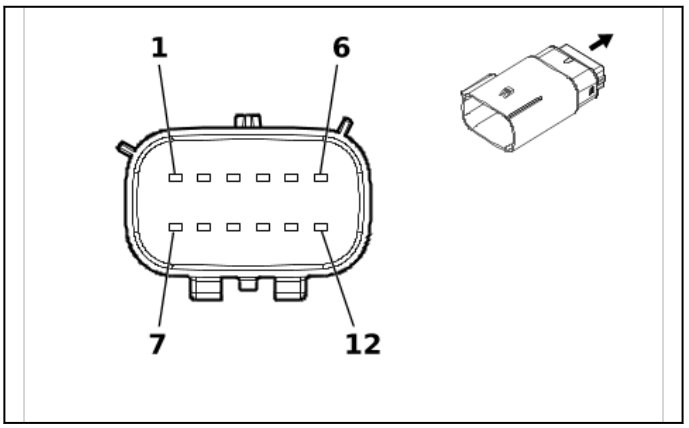
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BK	(1) 650	(1) I	(1) —	(1) Ground	(1) 1	(1) 0.75	(1) BK	(1) 650	(1) II	(1) —
(2) 2	(2) 0.35	(2) BU / GY	(2) 4105	(2) I	(2) —	(2) AUTOSAR CAN Bus [+] 8 Serial Data	(2) 2	(2) 0.35	(2) BU / GY	(2) 4105	(2) II	(2) —
(3) 3	(3) 0.35	(3) WH / GY	(3) 4104	(3) I	(3) —	(3) AUTOSAR CAN Bus [-] 8 Serial Data	(3) 3	(3) 0.35	(3) WH / GY	(3) 4104	(3) II	(3) —
(4) 4	(4) 0.5	(4) WH / YE	(4) 11325	(4) I	(4) —	(4) Virtual Key Private CAN Bus [-] Serial Data	(4) 4	(4) 0.5	(4) WH / YE	(4) 11325	(4) II	(4) —
(5) 5	(5) 0.5	(5) BU / BN	(5) 11326	(5) I	(5) —	(5) Virtual Key Private CAN Bus [+] Serial Data	(5) 5	(5) 0.5	(5) BU / BN	(5) 11326	(5) II	(5) —
(6) 6	(6) 0.5	(6) BN / GN	(6) 5062	(6) I	(6) —	(6) Right Front Fog Lamp Control	(6) 6	(6) 0.5	(6) BN / GN	(6) 5062	(6) II	(6) —
(7) 7	(7) 0.5	(7) BN / GN	(7) 14026	(7) I	(7) —	(7) Identification Side Marker Lamp Supply Voltage	(7) 7	(7) 0.5	(7) BN / GN	(7) 14026	(7) II	(7) —
8	—	—	—	—	—	Not Occupied	8	—	—	—	—	—

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(9) 9	(9) 0.5	(9) RD / GN	(9) 3140	(9) I	(9) —	(9) Battery Positive Voltage	(9) 9	(9) 0.5	(9) RD / GN	(9) 3140	(9) II	(9) —
10	—	—	—	—	—	Not Occupied	10	—	—	—	—	—
(11) 11	(11) 0.75	(11) RD / GY	(11) 7040	(11) I	(11) —	(11) Battery Positive Voltage	(11) 11	(11) 0.75	(11) RD / GY	(11) 7040	(11) II	(11) —
12	—	—	—	—	—	Not Occupied	12	—	—	—	—	—
(13) 13	(13) 0.5	(13) BK / BU	(13) 5214	(13) I	(13) —	(13) Front Parking Assist Sensor Low Reference	(13) 13	(13) 0.5	(13) BK / BU	(13) 5214	(13) II	(13) —
(14) 14	(14) 0.5	(14) VT / WH	(14) 5215	(14) I	(14) —	(14) Left Front Outer Parking Assist Sensor	(14) 14	(14) 0.5	(14) VT / WH	(14) 5215	(14) II	(14) —
(15) 15	(15) 0.5	(15) YE / GY	(15) 5216	(15) I	(15) —	(15) Left Front Middle Parking Assist Sensor	(15) 15	(15) 0.5	(15) YE / GY	(15) 5216	(15) II	(15) —
(16) 16	(16) 0.5	(16) WH / GY	(16) 5217	(16) I	(16) —	(16) Right Front Outer Parking Assist Sensor	(16) 16	(16) 0.5	(16) WH / GY	(16) 5217	(16) II	(16) —
(17) 17	(17) 0.5	(17) VT / GY	(17) 5218	(17) I	(17) —	(17) Right Front Middle Parking Assist Sensor	(17) 17	(17) 0.5	(17) VT / GY	(17) 5218	(17) II	(17) —
(18) 18	(18) 0.5	(18) BN / GY	(18) 5061	(18) I	(18) —	(18) Left Front Fog Lamp Control	(18) 18	(18) 0.5	(18) BN / GY	(18) 5061	(18) II	(18) —
(19) 19	(19) 0.5	(19) BN	(19) 6581	(19) I	(19) —	(19) Front Parking Assist Display Control	(19) 19	(19) 0.5	(19) BN	(19) 6581	(19) II	(19) —
(20) 20	(20) 0.75	(20) BK / WH	(20) 651	(20) I	(20) —	(20) Signal Ground	(20) 20	(20) 0.75	(20) BK / WH	(20) 651	(20) II	(20) —

X160D Engine Wiring Harness to Fuel Injector Wiring Harness (LZ0)



4584248



5187933

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 33472-1259
- Service Connector: 19333239
- Description: 12-Way F 1.5 MX Series, Sealed(D-GY)

Connector Part Information
- Harness Type: Fuel Injector Wiring Harness
- OEM Connector: 33482-6261
- Service Connector: Service by Harness - See Part Catalog
- Description: 12-Way M 1.5 MX Series, Sealed(GY)

Terminal Part Information

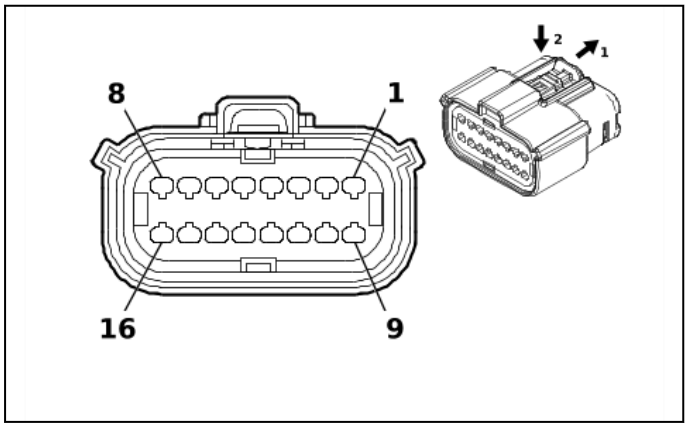
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	85528055	J-35616-2A (GY)	J-38125-217
II	Not required	J-35616-3 (GY)	No Tool Required

X160D Engine Wiring Harness to Fuel Injector Wiring Harness (LZ0)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 1.5	(1) BN / WH	(1) 4901	(1) I	(1) —	(1) Direct Fuel Injector High Voltage Supply Cylinder 1	(1) 1	(1) 1.5	(1) BN / WH	(1) 4901	(1) II	(1) —
(2) 2	(2) 1.5	(2) BN	(2) 4801	(2) I	(2) —	(2) Direct Fuel Injector High Voltage Control Cylinder 1	(2) 2	(2) 1.5	(2) BN	(2) 4801	(2) II	(2) —
(3) 3	(3) 1.5	(3) BU / GY	(3) 4902	(3) I	(3) —	(3) Direct Fuel Injector High Voltage Supply Cylinder 2	(3) 3	(3) 1.5	(3) BU / GY	(3) 4902	(3) II	(3) —
(4) 4	(4) 1.5	(4) BU	(4) 4802	(4) I	(4) —	(4) Direct Fuel Injector High Voltage Control Cylinder 2	(4) 4	(4) 1.5	(4) BU	(4) 4802	(4) II	(4) —
(5) 5	(5) 1.5	(5) GN / GY	(5) 4903	(5) I	(5) —	(5) Direct Fuel Injector High Voltage Supply Cylinder 3	(5) 5	(5) 1.5	(5) GN / GY	(5) 4903	(5) II	(5) —

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(6) 6	(6) 1.5	(6) GN	(6) 4803	(6) I	(6) —	(6) Direct Fuel Injector High Voltage Control Cylinder 3	(6) 6	(6) 1.5	(6) GN	(6) 4803	(6) II	(6) —
(7) 7	(7) 1.5	(7) BU / WH	(7) 4904	(7) I	(7) —	(7) Direct Fuel Injector High Voltage Supply Cylinder 4	(7) 7	(7) 1.5	(7) BU / WH	(7) 4904	(7) II	(7) —
(8) 8	(8) 1.5	(8) GY / BU	(8) 4804	(8) I	(8) —	(8) Direct Fuel Injector High Voltage Control Cylinder 4	(8) 8	(8) 1.5	(8) GY / BU	(8) 4804	(8) II	(8) —
(9) 9	(9) 1.5	(9) GN / WH	(9) 4905	(9) I	(9) —	(9) Direct Fuel Injector High Voltage Supply Cylinder 5	(9) 9	(9) 1.5	(9) GN / WH	(9) 4905	(9) II	(9) —
(10) 10	(10) 1.5	(10) WH / GN	(10) 4805	(10) I	(10) —	(10) Direct Fuel Injector High Voltage Control Cylinder 5	(10) 10	(10) 1.5	(10) WH / GN	(10) 4805	(10) II	(10) —
(11) 11	(11) 1.5	(11) VT / GY	(11) 4906	(11) I	(11) —	(11) Direct Fuel Injector High Voltage Supply Cylinder 6	(11) 11	(11) 1.5	(11) VT / GY	(11) 4906	(11) II	(11) —
(12) 12	(12) 1.5	(12) VT / GN	(12) 4806	(12) I	(12) —	(12) Direct Fuel Injector High Voltage Control Cylinder 6	(12) 12	(12) 1.5	(12) VT / GN	(12) 4806	(12) II	(12) —

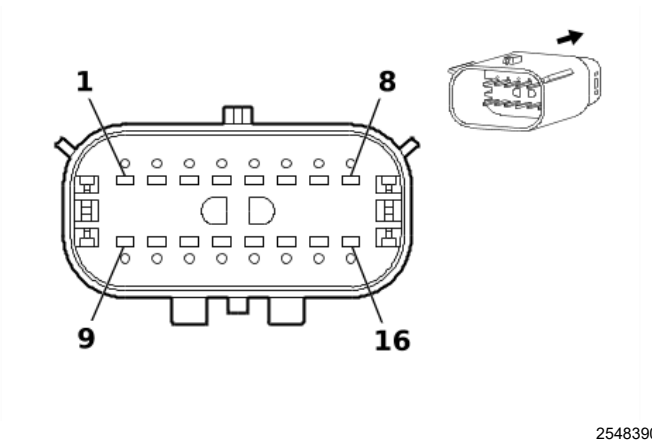
X160G Engine Wiring Harness to Fuel Injector Wiring Harness (L4B)



4574233

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 33472-1866
- Service Connector: 13584788
- Description: 16-Way F 1.5 MX Series, Sealed(BK)



2548390

Connector Part Information

- Harness Type: Fuel Injector Wiring Harness
- OEM Connector: 33482-8601
- Service Connector: Service by Harness - See Part Catalog
- Description: 16-Way M 1.5 MX Series, Sealed(BK)

Terminal Part Information

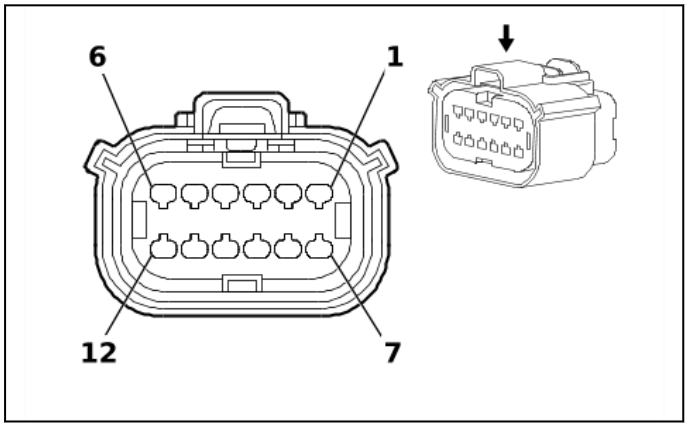
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	85528055	J-35616-2A (GY)	J-38125-217
II	Not required	J-35616-3 (GY)	No Tool Required

X160G Engine Wiring Harness to Fuel Injector Wiring Harness (L4B)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) VT / GY	(1) 496	(1) I	(1) —	(1) Knock Sensor 1 Signal	(1) 1	(1) 0.5	(1) VT / GY	(1) 496	(1) II	(1) —
(2) 2	(2) 0.75	(2) BN	(2) 480 1	(2) I	(2) —	(2) Direct Fuel Injector High Voltage Control Cylinder 1	(2) 2	(2) 0.75	(2) BN	(2) 480 1	(2) II	(2) —
(3) 3	(3) 0.5	(3) GN / RD	(3) 105 99	(3) I	(3) —	(3) Engine Control Sensors 5 Volt Reference 3	(3) 3	(3) 0.5	(3) WH / RD	(3) 480	(3) II	(3) —
(4) 4	(4) 0.75	(4) GY / BU	(4) 480 4	(4) I	(4) —	(4) Direct Fuel Injector High Voltage Control Cylinder 4	(4) 4	(4) 0.75	(4) GY / BU	(4) 480 4	(4) II	(4) —
5	—	—	—	—	—	Not Occupied	5	—	—	—	—	—
(6) 6	(6) 0.75	(6) GN	(6) 480 3	(6) I	(6) —	(6) Direct Fuel Injector High Voltage Control Cylinder 3	(6) 6	(6) 0.75	(6) GN	(6) 480 3	(6) II	(6) —
(7) 7	(7) 0.75	(7) BU	(7) 480 2	(7) I	(7) —	(7) Direct Fuel Injector High Voltage Control Cylinder 2	(7) 7	(7) 0.75	(7) BU	(7) 480 2	(7) II	(7) —
(8) 8	(8) 0.5	(8) WH / GY	(8) 187 6	(8) I	(8) —	(8) Knock Sensor 2 Signal	(8) 8	(8) 0.5	(8) WH / GY	(8) 187 6	(8) II	(8) —
(9) 9	(9) 0.5	(9) BK / YE	(9) 171 6	(9) I	(9) —	(9) Knock Sensor Low Reference 1	(9) 9	(9) 0.5	(9) BK / YE	(9) 171 6	(9) II	(9) —
(10) 10	(10) 0.75	(10) BN / WH	(10) 49 01	(10) I	(10) —	(10) Direct Fuel Injector High Voltage Supply Cylinder 1	(10) 10	(10) 0.75	(10) BN / WH	(10) 49 01	(10) II	(10) —
(11) 11	(11) 0.5	(11) BU / WH	(11) 10 786	(11) I	(11) —	(11) Fuel Rail Pressure Sensor SENT 1 Signal	(11) 11	(11) 0.5	(11) BU / WH	(11) 29 18	(11) II	(11) —
(12) 12	(12) 0.5	(12) BK / BU	(12) 10 597	(12) I	(12) —	(12) Engine Control Sensors Low Reference 3	(12) 12	(12) 0.5	(12) BK / GN	(12) 58 0	(12) II	(12) —

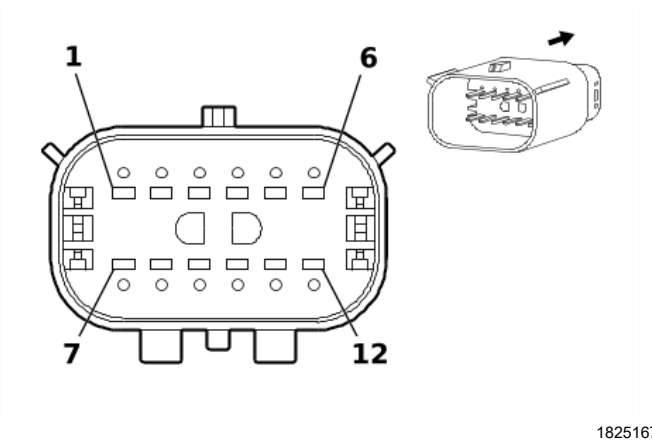
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(13) 13	(13) 0.75	(13) B U / WH	(13) 49 04	(13) I	(13) —	(13) Direct Fuel Injector High Voltage Supply Cylinder 4	(13) 13	(13) 0.75	(13) V T / WH	(13) 49 04	(13) II	(13) —
(14) 14	(14) 0.75	(14) G N / GY	(14) 49 03	(14) I	(14) —	(14) Direct Fuel Injector High Voltage Supply Cylinder 3	(14) 14	(14) 0.75	(14) G N / GY	(14) 49 03	(14) II	(14) —
(15) 15	(15) 0.75	(15) B U / GY	(15) 49 02	(15) I	(15) —	(15) Direct Fuel Injector High Voltage Supply Cylinder 2	(15) 15	(15) 0.75	(15) B U / GY	(15) 49 02	(15) II	(15) —
(16) 16	(16) 0.5	(16) B K / GY	(16) 23 03	(16) I	(16) —	(16) Knock Sensor Low Reference 2	(16) 16	(16) 0.5	(16) B K / GY	(16) 23 03	(16) II	(16) —

X160VD Engine Wiring Harness to Fuel Injector Wiring Harness - Bank 1 Direct (L76 / L78)



1825165

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 33472-1216
- Service Connector: 19352907
- Description: 12-Way F 1.5 MX Series, Sealed(BK)



1825167

Connector Part Information
- Harness Type: Fuel Injector Wiring Harness - Bank 1 Direct
- OEM Connector: 33482-6206
- Service Connector: Service by Harness - See Part Catalog
- Description: 12-Way M 1.5 MX Series, Sealed(BK)

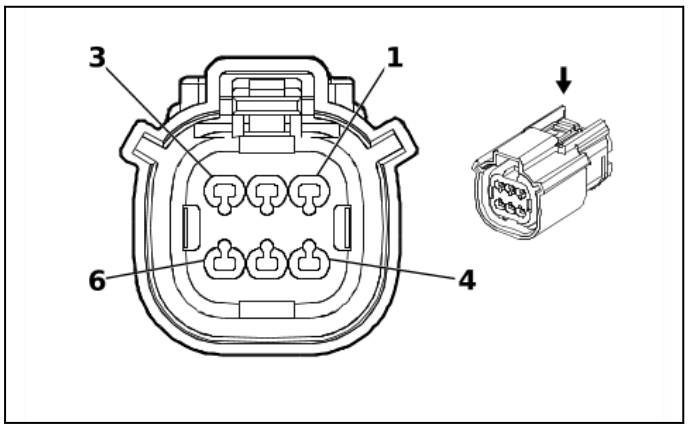
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	85528055	J-35616-2A (GY)	J-38125-217
II	Not required	J-35616-3 (GY)	No Tool Required

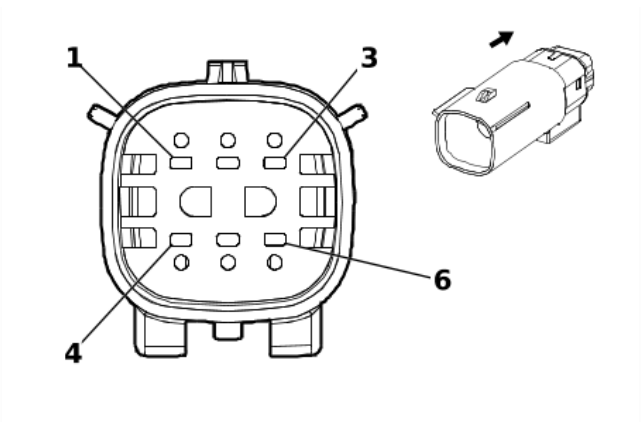
X160VD Engine Wiring Harness to Fuel Injector Wiring Harness - Bank 1 Direct (L76 / L78)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BN / WH	(1) 4901	(1) I	(1) —	(1) Direct Fuel Injector High Voltage Supply Cylinder 1	(1) 1	(1) 0.75	(1) BN / WH	(1) 4901	(1) II	(1) —
(2) 2	(2) 0.75	(2) G N / GY	(2) 4903	(2) I	(2) —	(2) Direct Fuel Injector High Voltage Supply Cylinder 3	(2) 2	(2) 0.75	(2) G N / GY	(2) 4903	(2) II	(2) —
(3) 3	(3) 0.75	(3) G N / WH	(3) 4905	(3) I	(3) —	(3) Direct Fuel Injector High Voltage Supply Cylinder 5	(3) 3	(3) 0.75	(3) G N / WH	(3) 4905	(3) II	(3) —
(4) 4	(4) 0.75	(4) W H / YE	(4) 4907	(4) I	(4) —	(4) Direct Fuel Injector High Voltage Supply Cylinder 7	(4) 4	(4) 0.75	(4) W H / YE	(4) 4907	(4) II	(4) —
(5) 5	(5) 0.5	(5) G N / RD	(5) 10599	(5) I	(5) —	(5) Engine Control Sensors 5 Volt Reference 3	(5) 5	(5) 0.75	(5) G N / RD	(5) 10599	(5) II	(5) —
6	—	—	—	—	—	Not Occupied	6	—	—	—	—	—
(7) 7	(7) 0.75	(7) BN	(7) 4801	(7) I	(7) —	(7) Direct Fuel Injector High Voltage Control Cylinder 1	(7) 7	(7) 0.75	(7) BN	(7) 4801	(7) II	(7) —
(8) 8	(8) 0.75	(8) G N	(8) 4803	(8) I	(8) —	(8) Direct Fuel Injector High Voltage Control Cylinder 3	(8) 8	(8) 0.75	(8) G N	(8) 4803	(8) II	(8) —
(9) 9	(9) 0.75	(9) W H / GN	(9) 4805	(9) I	(9) —	(9) Direct Fuel Injector High Voltage Control Cylinder 5	(9) 9	(9) 0.75	(9) W H / GN	(9) 4805	(9) II	(9) —
(10) 10	(10) 0.75	(10) Y E / GY	(10) 4807	(10) I	(10) —	(10) Direct Fuel Injector High Voltage Control Cylinder 7	(10) 10	(10) 0.75	(10) Y E / GY	(10) 4807	(10) II	(10) —
(11) 11	(11) 0.5	(11) B U / WH	(11) 10786	(11) I	(11) —	(11) Fuel Rail Pressure Sensor SENT 1 Signal	(11) 11	(11) 0.75	(11) B U / WH	(11) 10786	(11) II	(11) —
(12) 12	(12) 0.5	(12) B K / BU	(12) 10597	(12) I	(12) —	(12) Engine Control Sensors Low Reference 3	(12) 12	(12) 0.75	(12) B K / BU	(12) 10597	(12) II	(12) —

X160VP Engine Wiring Harness to Fuel Injector Wiring Harness - Bank 1 Port (L76 / L78)



1986157



1986159

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 33472-0675
- Service Connector: 13578533
- Description: 6-Way F 1.5 MX Series, Sealed(BK)

Connector Part Information
- Harness Type: Fuel Injector Wiring Harness - Bank 1 Port
- OEM Connector: 33482-3624
- Service Connector: Service by Harness - See Part Catalog
- Description: 6-Way M 1.5 MX Series, Sealed(BK)

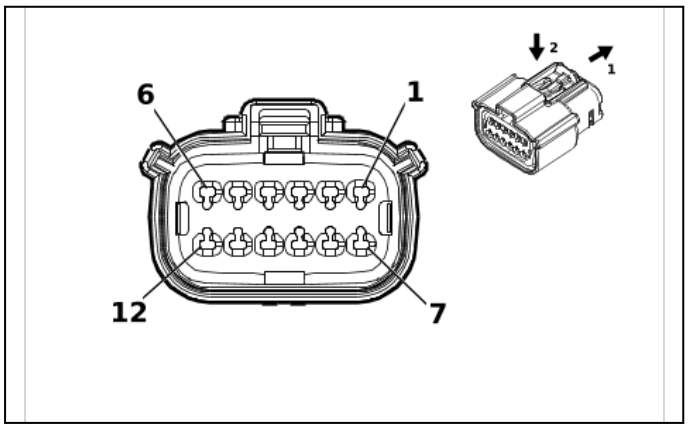
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-14 (GN)	No Tool Required
II	Not required	J-35616-3 (GY)	No Tool Required

X160VP Engine Wiring Harness to Fuel Injector Wiring Harness - Bank 1 Port (L76 / L78)

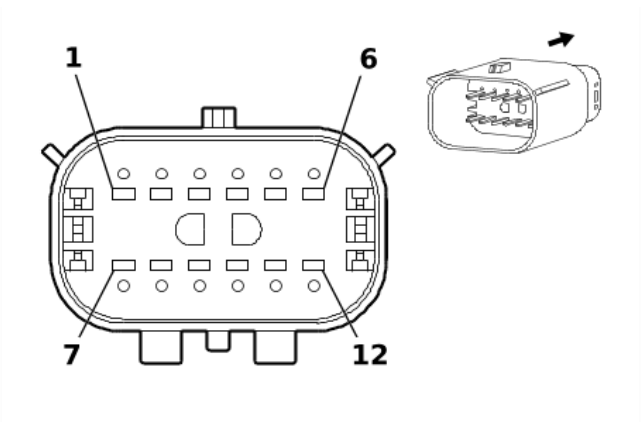
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GN / YE	(1) 1744	(1) I	(1) —	(1) Fuel Injector 1 Control	(1) 1	(1) 0.8	(1) GN / YE	(1) 1744	(1) II	(1) —
(2) 2	(2) 0.5	(2) BN / VT	(2) 1746	(2) I	(2) —	(2) Fuel Injector 3 Control	(2) 2	(2) 0.8	(2) BN / VT	(2) 1746	(2) II	(2) —
(3) 3	(3) 0.5	(3) BN / GN	(3) 845	(3) I	(3) —	(3) Fuel Injector 5 Control	(3) 3	(3) 0.8	(3) BN / GN	(3) 845	(3) II	(3) —
(4) 4	(4) 0.5	(4) BN / VT	(4) 877	(4) I	(4) —	(4) Fuel Injector 7 Control	(4) 4	(4) 0.8	(4) VT	(4) 877	(4) II	(4) —
(5) 5	(5) 0.75	(5) VT / BU	(5) 5291	(5) I	(5) —	(5) Powertrain Main Relay Fused Supply Voltage 2	(5) 5	(5) 0.8	(5) VT / BU	(5) 5291	(5) II	(5) —
6	—	—	—	—	—	Not Occupied	6	—	—	—	—	—

X161VD Engine Wiring Harness to Fuel Injector Wiring Harness - Bank 2 Direct (L76 / L78)



2871860

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 33472-1268
- Service Connector: 19352907
- Description: 12-Way F 1.5 MX Series, Sealed(BK)



1825167

Connector Part Information
- Harness Type: Fuel Injector Wiring Harness - Bank 2 Direct
- OEM Connector: 33482-6287
- Service Connector: Service by Harness - See Part Catalog
- Description: 12-Way M 1.5 MX Series, Sealed(BK)

Terminal Part Information

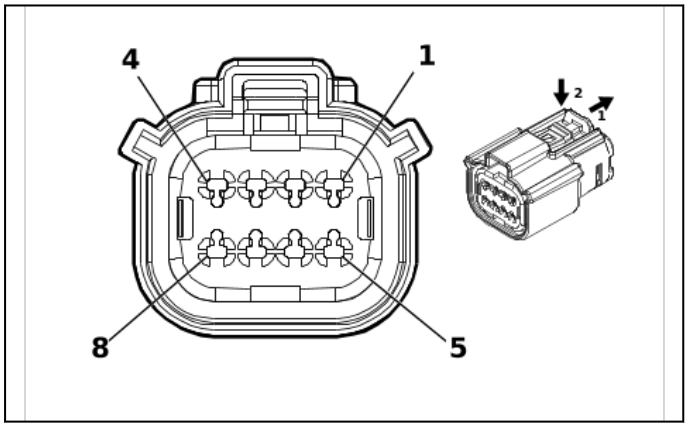
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	85528055	J-35616-2A (GY)	J-38125-217
II	Not required	J-35616-3 (GY)	No Tool Required

X161VD Engine Wiring Harness to Fuel Injector Wiring Harness - Bank 2 Direct (L76 / L78)

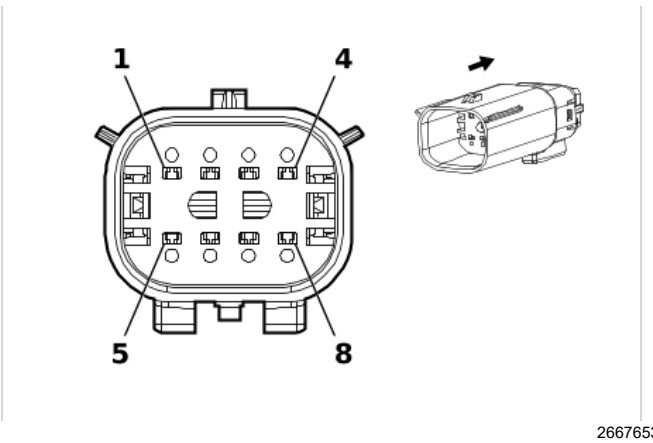
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
1	—	—	—	—	—	Not Occupied	1	—	—	—	—	—
(2) 2	(2) 0.75	(2) BU / GY	(2) 4902	(2) I	(2) —	(2) Direct Fuel Injector High Voltage Supply Cylinder 2	(2) 2	(2) 0.75	(2) BU / GY	(2) 4902	(2) II	(2) —
(3) 3	(3) 0.75	(3) BU / WH	(3) 4904	(3) I	(3) —	(3) Direct Fuel Injector High Voltage Supply Cylinder 4	(3) 3	(3) 0.75	(3) BU / WH	(3) 4904	(3) II	(3) —
(4) 4	(4) 0.75	(4) VT / GY	(4) 4906	(4) I	(4) —	(4) Direct Fuel Injector High Voltage Supply Cylinder 6	(4) 4	(4) 0.75	(4) VT / GY	(4) 4906	(4) II	(4) —
(5) 5	(5) 0.75	(5) GY / WH	(5) 4908	(5) I	(5) —	(5) Direct Fuel Injector High Voltage Supply Cylinder 8	(5) 5	(5) 0.75	(5) GY / WH	(5) 4908	(5) II	(5) —
(6) 6	(6) 0.75	(6) VT / BK	(6) 7300	(6) I	(6) —	(6) High Pressure Fuel Pump Low Control	(6) 6	(6) 0.75	(6) VT / BK	(6) 7300	(6) II	(6) —
7	—	—	—	—	—	Not Occupied	7	—	—	—	—	—

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(8) 8	(8) 0.75	(8) BU	(8) 4802	(8) I	(8) —	(8) Direct Fuel Injector High Voltage Control Cylinder 2	(8) 8	(8) 0.75	(8) BU	(8) 4802	(8) II	(8) —
(9) 9	(9) 0.75	(9) GY / BU	(9) 4804	(9) I	(9) —	(9) Direct Fuel Injector High Voltage Control Cylinder 4	(9) 9	(9) 0.75	(9) GY / BU	(9) 4804	(9) II	(9) —
(10) 10	(10) 0.75	(10) VT / GN	(10) 4806	(10) I	(10) —	(10) Direct Fuel Injector High Voltage Control Cylinder 6	(10) 10	(10) 0.75	(10) VT / GN	(10) 4806	(10) II	(10) —
(11) 11	(11) 0.75	(11) GY	(11) 4808	(11) I	(11) —	(11) Direct Fuel Injector High Voltage Control Cylinder 8	(11) 11	(11) 0.75	(11) GY	(11) 4808	(11) II	(11) —
(12) 12	(12) 0.75	(12) YE	(12) 7301	(12) I	(12) —	(12) High Pressure Fuel Pump High Control	(12) 12	(12) 0.75	(12) YE	(12) 7301	(12) II	(12) —

X161VP Engine Wiring Harness to Fuel Injector Wiring Harness - Bank 2 Port (L76 / L78)



4846407



2667653

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 33472-4806
- Service Connector: 84928314
- Description: 8-Way F 1.5 MX Series, Sealed(BK)

Connector Part Information
- Harness Type: Fuel Injector Wiring Harness - Bank 2 Port
- OEM Connector: 33482-4801
- Service Connector: Service by Harness - See Part Catalog
- Description: 8-Way M 1.5 MX Series, Sealed(BK)

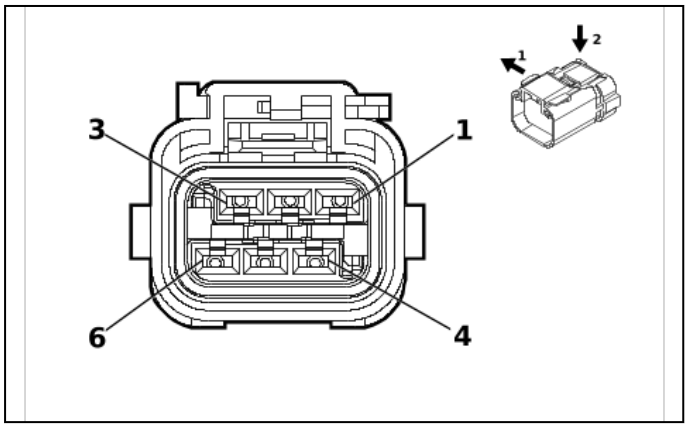
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-14 (GN)	No Tool Required
II	Not required	J-35616-3 (GY)	No Tool Required

X161VP Engine Wiring Harness to Fuel Injector Wiring Harness - Bank 2 Port (L76 / L78)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) YE / WH	(1) 1745	(1) I	(1) —	(1) Fuel Injector 2 Control	(1) 1	(1) 0.8	(1) YE / WH	(1) 1745	(1) II	(1) —
(2) 2	(2) 0.5	(2) BN / YE	(2) 844	(2) I	(2) —	(2) Fuel Injector 4 Control	(2) 2	(2) 0.8	(2) BN / YE	(2) 844	(2) II	(2) —
(3) 3	(3) 0.5	(3) BN / BU	(3) 846	(3) I	(3) —	(3) Fuel Injector 6 Control	(3) 3	(3) 0.8	(3) BN / BU	(3) 846	(3) II	(3) —
(4) 4	(4) 0.5	(4) BN / GY	(4) 878	(4) I	(4) —	(4) Fuel Injector 8 Control	(4) 4	(4) 0.8	(4) BN / GY	(4) 878	(4) II	(4) —
(5) 5	(5) 0.75	(5) VT / BU	(5) 5292	(5) I	(5) —	(5) Powertrain Main Relay Fused Supply Voltage 3	(5) 5	(5) 0.8	(5) VT / BU	(5) 5292	(5) II	(5) —
(6) 6	(6) 0.75	(6) BK / GN	(6) 580	(6) I	(6) —	(6) Engine Control Sensors Low Reference 2	(6) 6	(6) 0.8	(6) BK / GN	(6) 580	(6) II	(6) —
(7) 7	(7) 0.5	(7) GN	(7) 12636	(7) I	(7) —	(7) Fuel Rail Low Pressure Sensor Signal	(7) 7	(7) 0.8	(7) GN	(7) 12636	(7) II	(7) —
(8) 8	(8) 0.75	(8) GN / RD	(8) 10667	(8) I	(8) —	(8) Engine Control Sensors 5 Volt Reference	(8) 8	(8) 0.8	(8) GY / RD	(8) 10667	(8) II	(8) —

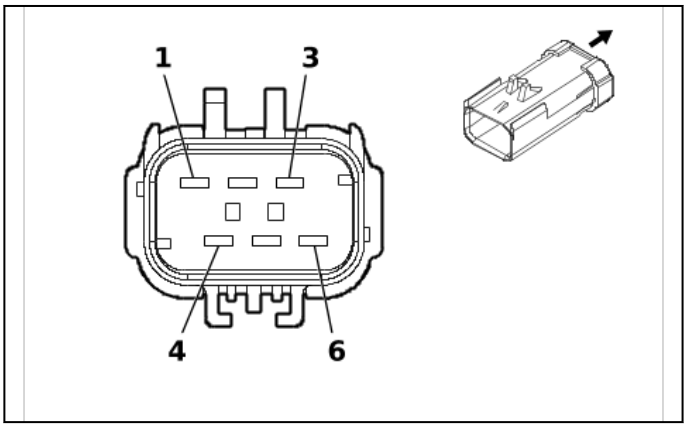
X163 Engine Wiring Harness to Diesel Glow Plug Wiring Harness (LZ0)



4997615

Connector Part Information

- Harness Type: Engine Wiring Harness
- OEM Connector: 35063643
- Service Connector: 86825462
- Description: 6-Way F 2.8 APEX Series, Sealed(BK)



5187846

Connector Part Information

- Harness Type: Diesel Glow Plug Wiring Harness
- OEM Connector: 54200612
- Service Connector: Service by Harness - See Part Catalog
- Description: 6-Way M 2.8 APEX Series, Sealed(BK)

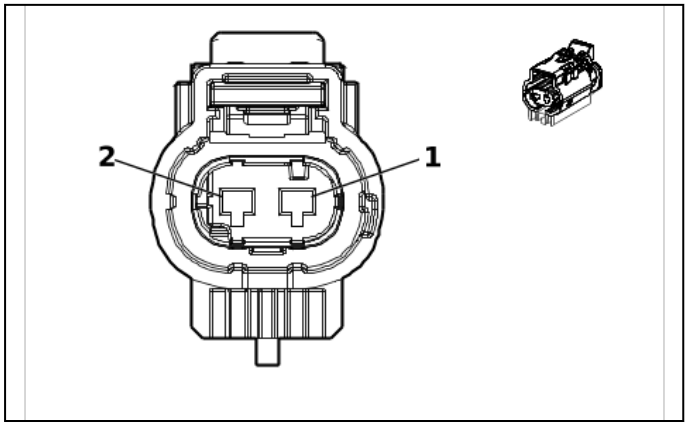
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-35 (VT)	No Tool Required
II	Not required	J-35616-5 (PU)	No Tool Required

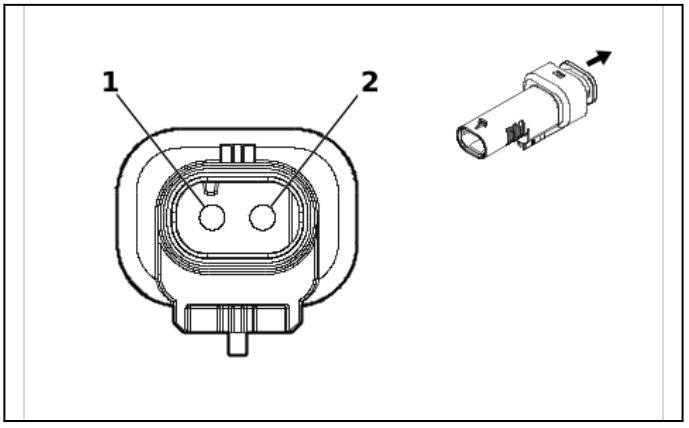
X163 Engine Wiring Harness to Diesel Glow Plug Wiring Harness (LZ0)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 2.5	(1) GY / BU	(1) 1581	(1) I	(1) —	(1) Glow Plug 1 Control	(1) 1	(1) 2.5	(1) GY / RD	(1) 1581	(1) II	(1) —
(2) 2	(2) 2.5	(2) GY / BN	(2) 1582	(2) I	(2) —	(2) Glow Plug 2 Control	(2) 2	(2) 2.5	(2) GY / BK	(2) 1582	(2) II	(2) —
(3) 3	(3) 2.5	(3) GY / GN	(3) 1583	(3) I	(3) —	(3) Glow Plug 3 Control	(3) 3	(3) 2.5	(3) GY / GN	(3) 1583	(3) II	(3) —
(4) 4	(4) 2.5	(4) GY / YE	(4) 1584	(4) I	(4) —	(4) Glow Plug 4 Control	(4) 4	(4) 2.5	(4) GY / YE	(4) 1584	(4) II	(4) —
(5) 5	(5) 2.5	(5) GY / WH	(5) 1585	(5) I	(5) —	(5) Glow Plug 5 Control	(5) 5	(5) 2.5	(5) GY / WH	(5) 1585	(5) II	(5) —
(6) 6	(6) 2.5	(6) GY / VT	(6) 1586	(6) I	(6) —	(6) Glow Plug 6 Control	(6) 6	(6) 2.5	(6) GY	(6) 1586	(6) II	(6) —

X172 Chassis Wiring Harness to Front Disc Brake Pad Wear Sensor Harness



6819415



5202142

Connector Part Information
- Harness Type: Chassis Wiring Harness
- OEM Connector: 10530492
- Service Connector: 86308596
- Description: 2-Way F 1.2 MLK Series, Sealed(BK)

Connector Part Information
- Harness Type: Front Disc Brake Pad Wear Sensor Harness
- OEM Connector: 13583196
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way M 1.2 MLK Series, Sealed(BK)

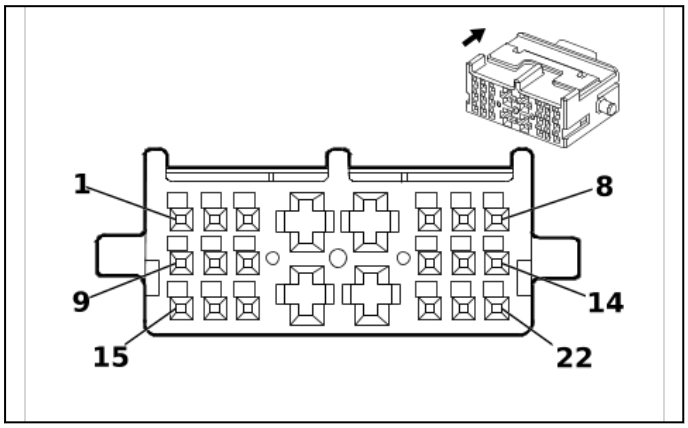
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required
II	Not required	J-35616-13 (BU)	No Tool Required

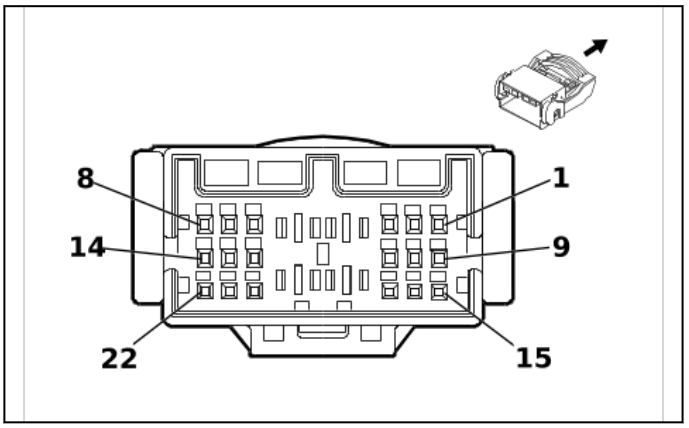
X172 Chassis Wiring Harness to Front Disc Brake Pad Wear Sensor Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BN / BU	(1) 1602	(1) I	(1) —	(1) Front Brake Pad Wear Sensor Signal	(1) 1	(1) 0.5	(1) BN / BU	(1) 1602	(1) II	(1) —
(2) 2	(2) 0.75	(2) BK / WH	(2) 1151	(2) I	(2) —	(2) Signal Ground	(2) 2	(2) 0.5	(2) BK / WH	(2) 1151	(2) II	(2) —

X176 Automatic Transmission Wiring Harness - Case to Automatic Transmission Wiring Harness - Control



3977748



3977770

Connector Part Information

- Harness Type: Automatic Transmission Wiring Harness - Case
- OEM Connector: 1897543-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 22-Way F 0.64 Micro-Quadlock, 2.8 Micro-Power Series(NA)

Connector Part Information

- Harness Type: Automatic Transmission Wiring Harness - Control
- OEM Connector: 13584916
- Service Connector: Service by Harness - See Part Catalog
- Description: 22-Way M 0.64 Micro-Quadlock, 2.8 Micro-Power Series(NA)

Terminal Part Information

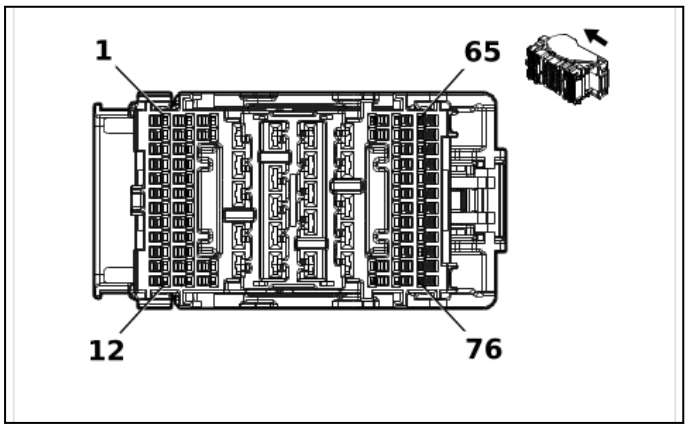
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-35 (VT)	No Tool Required
II	Not required	J-35616-64B (L-BU)	No Tool Required
III	Not required	J-35616-5 (PU)	No Tool Required
IV	Not required	J-35616-65B (L-BU)	No Tool Required

X176 Automatic Transmission Wiring Harness - Case to Automatic Transmission Wiring Harness - Control

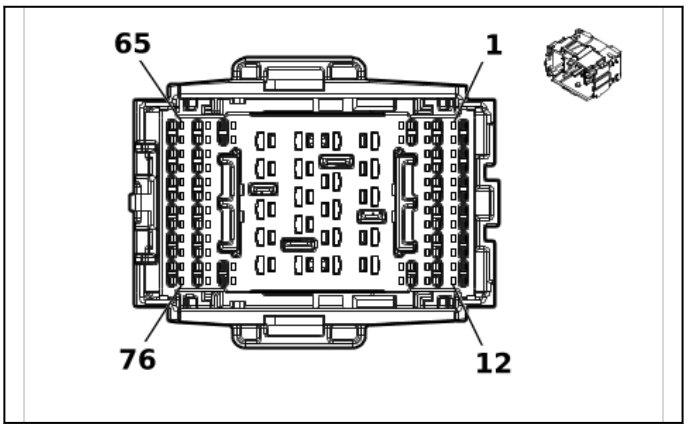
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) VT	(1) 12513	(1) II	(1) —	(1) Transmission Default Disable Solenoid Control	(1) 1	(1) 0.5	(1) VT	(1) 12513	(1) IV	(1) —
(2) 2	(2) 0.5	(2) GN / OG	(2) 1530	(2) II	(2) —	(2) Transmission Line Pressure Control Solenoid Valve Control	(2) 2	(2) 0.5	(2) GN / OG	(2) 1530	(2) IV	(2) —
(3) 3	(3) 0.5	(3) GY / BN	(3) 422	(3) II	(3) —	(3) Torque Converter Clutch Solenoid Valve Control	(3) 3	(3) 0.5	(3) GY / BN	(3) 422	(3) IV	(3) —
(4) 4	(4) 0.5	(4) BN	(4) 6387	(4) I	(4) —	(4) Transmission High Side Driver 1 Control	(4) 4	(4) 0.5	(4) BN	(4) 6387	(4) III	(4) —
5	—	—	—	—	—	Not Occupied	5	—	—	—	—	—
(6) 6	(6) 0.5	(6) YE	(6) 6317	(6) II	(6) —	(6) Electronic Transmission Range Select Out of Park Switch Signal	(6) 6	(6) 0.5	(6) YE	(6) 6317	(6) IV	(6) —
(7) 7	(7) 0.5	(7) YE / GY	(7) 6319	(7) II	(7) —	(7) Electronic Transmission Range Select Out of Park Switch 2 Signal	(7) 7	(7) 0.5	(7) YE / GY	(7) 6319	(7) IV	(7) —
(8) 8	(8) 0.5	(8) GN	(8) 4170	(8) II	(8) —	(8) Transmission Output Shaft Speed Sensor Circuit 9V Reference	(8) 8	(8) 0.5	(8) GN	(8) 4170	(8) IV	(8) —
(9) 9	(9) 0.5	(9) OG	(9) 2159	(9) II	(9) —	(9) Park Inhibit Solenoid Assembly Control	(9) 9	(9) 0.5	(9) OG	(9) 2159	(9) IV	(9) —
(10) 10	(10) 0.5	(10) BK / GY	(10) 3706	(10) II	(10) —	(10) Electronic Transmission Range Select Switch Analog Signal 1	(10) 10	(10) 0.5	(10) BK / GY	(10) 3706	(10) IV	(10) —
(11) 11	(11) 0.5	(11) BU	(11) 4171	(11) II	(11) —	(11) Transmission Input Shaft Speed Sensor Circuit 9V Reference	(11) 11	(11) 0.5	(11) BU	(11) 4171	(11) IV	(11) —
12	—	—	—	—	—	Not Occupied	12	—	—	—	—	—

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(13) 13	(13) 0.5	(13) BU / BN	(13) 586	(13) II	(13) —	(13) Transmission Fluid Temperature Sensor Low Reference	(13) 13	(13) 0.5	(13) BU / BN	(13) 586	(13) IV	(13) —
(14) 14	(14) 0.5	(14) BN / YE	(14) 585	(14) II	(14) —	(14) Transmission Fluid Temperature Sensor Signal	(14) 14	(14) 0.5	(14) BN / YE	(14) 585	(14) IV	(14) —
(15) 15	(15) 0.5	(15) BU / GN	(15) 12461	(15) II	(15) —	(15) Transmission Valve 1 Solenoid Control	(15) 15	(15) 0.5	(15) BU / GN	(15) 12461	(15) IV	(15) —
(16) 16	(16) 0.5	(16) GN / BN	(16) 12462	(16) II	(16) —	(16) Transmission Valve 2 Solenoid Control	(16) 16	(16) 0.5	(16) GN / BN	(16) 12462	(16) IV	(16) —
(17) 17	(17) 0.5	(17) GY	(17) 12463	(17) II	(17) —	(17) Transmission Valve 3 Solenoid Control	(17) 17	(17) 0.5	(17) GY	(17) 12463	(17) IV	(17) —
(18) 18	(18) 0.5	(18) WH	(18) 6388	(18) I	(18) —	(18) Transmission High Side Driver 2 Control	(18) 18	(18) 0.5	(18) WH	(18) 6388	(18) III	(18) —
19	—	—	—	—	—	Not Occupied	19	—	—	—	—	—
(20) 20	(20) 0.5	(20) BN / WH	(20) 12464	(20) II	(20) —	(20) Transmission Valve 4 Solenoid Control	(20) 20	(20) 0.5	(20) BN / WH	(20) 12464	(20) IV	(20) —
(21) 21	(21) 0.5	(21) YE / VT	(21) 12465	(21) II	(21) —	(21) Transmission Valve 5 Solenoid Control	(21) 21	(21) 0.5	(21) YE / VT	(21) 12465	(21) IV	(21) —
(22) 22	(22) 0.5	(22) BU / GY	(22) 12466	(22) II	(22) —	(22) Transmission Valve 6 Solenoid Control	(22) 22	(22) 0.5	(22) BU / GY	(22) 12466	(22) IV	(22) —

X210 Instrument Panel Wiring Harness to Body Wiring Harness



6171454



6171465

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 6099-0188
- Service Connector: 85026856
- Description: 76-Way F 1.2 Sumitomo, 2.8 YESC Series(BK)

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 6099-0184
- Service Connector: 13549030
- Description: 76-Way M 1.2 Sumitomo, 2.8 YESC Series(BK)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	84962854	J-35616-12 (BU)	J-38125-215A
II	84962855	J-35616-4A (PU)	J-38125-11A
III	Service by Cable	J-35616-12 (BU)	J-38125-215A
IV	84616651	J-35616-13 (BU)	J-38125-215A
V	84888592	J-35616-5 (PU)	J-38125-11A
VI	Service by Cable	J-35616-13 (BU)	J-38125-215A

X210 Instrument Panel Wiring Harness to Body Wiring Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) RD / GN	(1) 1540	(1) I	(1) —	(1) Battery Positive Voltage	(1) 1	(1) 0.5	(1) RD / GN	(1) 1540	(1) IV	(1) —
2	—	—	—	—	—	Not Occupied	2	—	—	—	—	—
(3) 3	(3) 0.5	(3) BN / OG	(3) 3020	(3) I	(3) —	(3) Steering Wheel Air Bag Stage 1 Low Control	(3) 3	(3) 0.35	(3) BN / OG	(3) 3020	(3) IV	(3) —
(4) 4	(4) 0.5	(4) OG / VT	(4) 3021	(4) I	(4) —	(4) Steering Wheel Air Bag Stage 1 High Control	(4) 4	(4) 0.35	(4) OG / VT	(4) 3021	(4) IV	(4) —
(5) 5	(5) 0.35	(5) BU / BN	(5) 11326	(5) I	(5) —	(5) Virtual Key Private CAN Bus [+] Serial Data	(5) 5	(5) 0.5	(5) BU / BN	(5) 11326	(5) IV	(5) —
(6) 6	(6) 0.35	(6) WH / YE	(6) 11325	(6) I	(6) —	(6) Virtual Key Private CAN Bus [-] Serial Data	(6) 6	(6) 0.5	(6) WH / YE	(6) 11325	(6) IV	(6) —

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(7) 7	(7) 0.5	(7) BU / BN	(7) 7744	(7) I	(7) —	(7) Driver Illumination Lamp Ground	(7) 7	(7) 0.5	(7) BU / BN	(7) 7744	(7) IV	(7) —
(8) 8	(8) 0.5	(8) GY	(8) 1715	(8) I	(8) —	(8) Windshield Wiper Switch High Signal	(8) 8	(8) 0.35	(8) GY	(8) 1715	(8) IV	(8) —
(9) 9	(9) 0.5	(9) GN / GY	(9) 11023	(9) I	(9) —	(9) Image Processing Module LIN Bus 1	(9) 9	(9) 0.35	(9) GN / GY	(9) 11023	(9) IV	(9) —
(10) 10	(10) 0.5	(10) GN / BK	(10) 2738	(10) I	(10) —	(10) Near Field Communication Module LIN Bus 1	(10) 10	(10) 0.35	(10) GN / BK	(10) 2738	(10) IV	(10) —
(11) 11	(11) 0.35	(11) WH / GY	(11) 7297	(11) I	(11) —	(11) Minor Endgate High Relay Control	(11) 11	(11) 0.75	(11) WH / GY	(11) 7297	(11) IV	(11) —
(12) 12	(12) 0.5	(12) GN / WH	(12) 7530	(12) I	(12) —	(12) Driver Seat Adjuster Memory Module LIN Bus 1	(12) 12	(12) 0.35	(12) GN / WH	(12) 7530	(12) IV	(12) —
(13) 13	(13) 0.35	(13) BU / WH	(13) 4985	(13) I	(13) —	(13) AUTOSAR CAN Bus [+] 5 Serial Data	(13) 13	(13) 0.35	(13) BU / WH	(13) 4985	(13) IV	(13) —
(14) 14	(14) 0.35	(14) BU / YE	(14) 4984	(14) I	(14) —	(14) AUTOSAR CAN Bus [-] 5 Serial Data	(14) 14	(14) 0.35	(14) BU / YE	(14) 4984	(14) IV	(14) —
(15) 15	(15) 0.35	(15) BU / VT	(15) 4101	(15) I	(15) —	(15) AUTOSAR CAN Bus [+] 4 Serial Data	(15) 15	(15) 0.35	(15) BU / VT	(15) 4101	(15) IV	(15) —
(16) 16	(16) 0.35	(16) WH	(16) 4100	(16) I	(16) —	(16) AUTOSAR CAN Bus [-] 4 Serial Data	(16) 16	(16) 0.35	(16) WH	(16) 4100	(16) IV	(16) —
(17) 17	(17) 0.5	(17) WH / VT	(17) 2246	(17) I	(17) —	(17) Driver Illumination Lamp 1 Control	(17) 17	(17) 0.5	(17) WH / VT	(17) 2246	(17) IV	(17) —
(18) 18	(18) 0.5	(18) GN / VT	(18) 2860	(18) I	(18) —	(18) Body Control Module LIN Bus 14	(18) 18	(18) 0.35	(18) GN / VT	(18) 2860	(18) IV	(18) —
(19) 19	(19) 0.5	(19) GN / WH	(19) 4622	(19) I	(19) —	(19) Engine Control Module LIN Bus 2	(19) 19	(19) 0.5	(19) GN / WH	(19) 4622	(19) IV	(19) —
(20) 20	(20) 0.5	(20) BN	(20) 10515	(20) I	(20) —	(20) Electronic Transmission Range Select Shifter Position Sensor 1 Signal	(20) 20	(20) 0.5	(20) BN	(20) 10515	(20) IV	(20) —

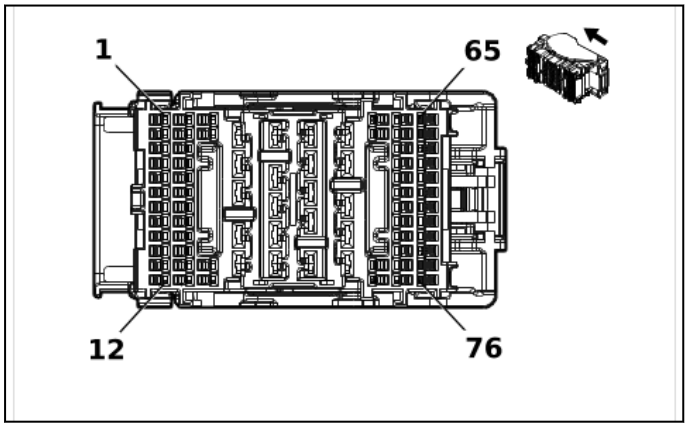
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(21) 21	(21) 0.35	(21) B U / YE	(21) 49 79	(21) I	(21) —	(21) AUTOSAR CAN Bus [+] 2 Serial Data	(21) 21	(21) 0.35	(21) B U / YE	(21) 49 79	(21) IV	(21) —
(22) 22	(22) 0.35	(22) WH	(22) 49 78	(22) I	(22) —	(22) AUTOSAR CAN Bus [-] 2 Serial Data	(22) 22	(22) 0.35	(22) WH	(22) 49 78	(22) IV	(22) —
(23) 23	(23) 0.75	(23) B U / VT	(23) 18 57	(23) I	(23) UQA	(23) Left Front Midrange Speaker [+] Control	(23) 23	(23) 0.75	(23) B U / VT	(23) 18 57	(23) IV	(23) UQA
(24) 24	(24) 0.75	(24) B U / BN	(24) 19 57	(24) I	(24) UQA	(24) Left Front Midrange Speaker [-] Control	(24) 24	(24) 0.75	(24) B U / BN	(24) 19 57	(24) IV	(24) UQA
(25) 25	(25) 0.35	(25) B U / YE	(25) 49 79	(25) I	(25) —	(25) AUTOSAR CAN Bus [+] 2 Serial Data	(25) 25	(25) 0.35	(25) B U / YE	(25) 49 79	(25) IV	(25) —
(26) 26	(26) 0.35	(26) WH	(26) 49 78	(26) I	(26) —	(26) AUTOSAR CAN Bus [-] 2 Serial Data	(26) 26	(26) 0.35	(26) WH	(26) 49 78	(26) IV	(26) —
(27) 27	(27) 0.35	(27) B N / BK	(27) 49 96	(27) I	(27) —	(27) Immobilizer Antenna Signal [+]	(27) 27	(27) 0.5	(27) B N / BK	(27) 49 96	(27) IV	(27) —
(28) 28	(28) 0.35	(28) WH / GY	(28) 49 97	(28) I	(28) —	(28) Immobilizer Antenna Low Signal	(28) 28	(28) 0.5	(28) WH / GY	(28) 49 97	(28) IV	(28) —
(29) 29	(29) 2	(29) B K	(29) 10 50	(29) II	(29) —	(29) Ground	(29) 29	(29) 2	(29) B K	(29) 10 50	(29) V	(29) —
(30) 30	(30) 2.5	(30) R D / VT	(30) 12 42	(30) II	(30) —	(30) Battery Positive Voltage	(30) 30	(30) 2.5	(30) R D / VT	(30) 12 42	(30) V	(30) —
31	—	—	—	—	—	Not Occupied	31	—	—	—	—	—
(32) 32	(32) 2	(32) B K	(32) 10 50	(32) II	(32) —	(32) Ground	(32) 32	(32) 2	(32) B K	(32) 10 50	(32) V	(32) —
(33) 33	(33) 2.5	(33) R D / YE	(33) 50 40	(33) II	(33) —	(33) Battery Positive Voltage	(33) 33	(33) 2.5	(33) R D / YE	(33) 50 40	(33) V	(33) —
(34) 34	(34) 2.5	(34) R D / BU	(34) 32 40	(34) II	(34) —	(34) Battery Positive Voltage	(34) 34	(34) 2.5	(34) R D / BU	(34) 32 40	(34) V	(34) —
(35) 35	(35) 0.75	(35) G N / BK	(35) 11 6	(35) II	(35) UQ3	(35) Left Rear Speaker [-] Control	(35) 35	(35) 0.75	(35) G N / BK	(35) 11 6	(35) V	(35) UQ3
(36) 36	(36) 0.75	(36) G N	(36) 19 9	(36) II	(36) UQ3	(36) Left Rear Speaker [+] Control	(36) 36	(36) 0.75	(36) G N	(36) 19 9	(36) V	(36) UQ3
(37) 37	(37) 0.75 (37) 0.75	(37) B N / BU (37) B N / BU	(37) 11 8 (37) 11 8	(37) II	(37) UQ3 / UQF (37) UQ3 / UQF	(37) Left Front Speaker [-] Control 1 (37) Left Front Speaker [-] Control 1	(37) 37	(37) 0.75 (37) 0.75	(37) B N / BU (37) B N / BU	(37) 11 8 (37) 11 8	(37) V (37) V	(37) UQ3 / UQF (37) —

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(38) 38	(38) 0.75 (38) 0.75	(38) B U (38) B U	(38) 20 1 (38) 20 1	(38) II	(38) UQ3 / UQF (38) UQ3 / UQF	(38) Left Front Speaker 1 [+] Control (38) Left Front Speaker 1 [+] Control	(38) 38	(38) 0.75 (38) 0.75	(38) B U (38) B U	(38) 20 1 (38) 20 1	(38) V (38) V	(38) — (38) UQ3 / UQF
(39) 39	(39) 0.5	(39) WH / RD	(39) 48 0	(39) II	(39) —	(39) Engine Control Vehicle Sensors 5 Volt Reference 1	(39) 39	(39) 0.5	(39) WH / RD	(39) 48 0	(39) V	(39) —
(40) 40	(40) 0.5	(40) V T / WH	(40) 63 9	(40) II	(40) —	(40) Run/ Crank Ignition 1 Voltage	(40) 40	(40) 0.5	(40) V T / WH	(40) 63 9	(40) V	(40) —
(41) 41	(41) 0.75	(41) V T / GN	(41) 43 9	(41) II	(41) —	(41) Run/ Crank Ignition 1 Voltage	(41) 41	(41) 0.75	(41) V T / GN	(41) 43 9	(41) V	(41) —
(42) 42	(42) 0.5	(42) G Y	(42) 10 518	(42) II	(42) —	(42) Electronic Transmission Range Select Shifter Position Sensor 2 Signal	(42) 42	(42) 0.5	(42) G Y	(42) 10 518	(42) V	(42) —
(43) 43	(43) 1	(43) G N / YE	(43) 68 40	(43) II	(43) —	(43) Auxiliary Device 2 Switched Voltage	(43) 43	(43) 1	(43) G N / YE	(43) 68 40	(43) V	(43) —
(44) 44	(44) 2.5	(44) R D / GY	(44) 35 40	(44) II	(44) —	(44) Battery Positive Voltage	(44) 44	(44) 2.5	(44) R D / GY	(44) 35 40	(44) V	(44) —
(45) 45	(45) 2.5	(45) R D / GN	(45) 18 40	(45) II	(45) —	(45) Battery Positive Voltage	(45) 45	(45) 2.5	(45) R D / GN	(45) 18 40	(45) V	(45) —
(46) 46	(46) 0.35	(46) G N / BN	(46) 50 7	(46) II	(46) —	(46) Wait To Start Indicator Control	(46) 46	(46) 0.35	(46) G N / BN	(46) 50 7	(46) V	(46) —
47 - 48	—	—	—	—	—	Not Occupied	47 - 48	—	—	—	—	—
(49) 49	(49) 0.35 (49) 0.5	(49) G N / WH (49) G N / WH	(49) 24 (49) 24	(49) I (49) I	(49) - (DD8 / DRZ) (49) DD8 / DRZ	(49) Backup Lamp Control (49) Backup Lamp Control	(49) 49	(49) 0.5	(49) G N / WH	(49) 24	(49) IV	(49) —
(50) 50	(50) 0.5	(50) Y E	(50) 68 17	(50) I	(50) —	(50) LED Backlight Dimming Control 1	(50) 50	(50) 0.5	(50) Y E	(50) 68 17	(50) IV	(50) —
(51) 51	(51) 0.35	(51) G N	(51) 72 09	(51) III	(51) —	(51) Ethernet Bus 3 [+]	(51) 51	(51) 0.35	(51) G N	(51) 72 09	(51) VI	(51) —
(52) 52	(52) 0.35	(52) B U	(52) 72 08	(52) III	(52) —	(52) Ethernet Bus 3 [-]	(52) 52	(52) 0.35	(52) B U	(52) 72 08	(52) VI	(52) —
(53) 53	(53) 0.5	(53) R D / YE	(53) 30 40	(53) I	(53) —	(53) Battery Positive Voltage	(53) 53	(53) 0.35	(53) R D / YE	(53) 30 40	(53) IV	(53) —

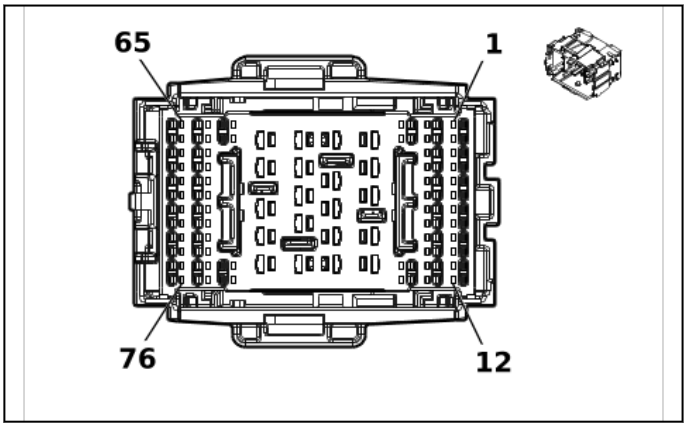
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(54) 54	(54) 0.35	(54) WH / GN	(54) 77 28	(54) I	(54) —	(54) Major Endgate High Relay Control	(54) 54	(54) 0.75	(54) WH / GN	(54) 77 28	(54) IV	(54) —
(55) 55	(55) 0.35	(55) B U / VT	(55) 77 29	(55) I	(55) —	(55) Major Endgate Low Relay Control	(55) 55	(55) 0.75	(55) B U / VT	(55) 77 29	(55) IV	(55) —
(56) 56	(56) 0.5	(56) V T	(56) 80 1	(56) I	(56) —	(56) Retained Accessory Power Control	(56) 56	(56) 0.35	(56) V T	(56) 80 1	(56) IV	(56) —
(57) 57	(57) 0.5	(57) Y E / BU	(57) 22 45	(57) I	(57) —	(57) Driver Illumination Lamp 2 Control	(57) 57	(57) 0.5	(57) Y E / BU	(57) 22 45	(57) IV	(57) —
(58) 58	(58) 0.5	(58) G N / BU	(58) 27 33	(58) I	(58) —	(58) Brake System Control Module LIN Bus 2	(58) 58	(58) 0.35	(58) G N / BU	(58) 27 33	(58) IV	(58) —
(59) 59	(59) 0.5	(59) B K / GN	(59) 58 0	(59) I	(59) —	(59) Engine Control Sensors Low Reference 2	(59) 59	(59) 0.5	(59) B K / GN	(59) 58 0	(59) IV	(59) —
(60) 60	(60) 0.35	(60) B N / WH	(60) 38 95	(60) I	(60) —	(60) Roof Rail Air Bag Disable Switch Low Reference	(60) 60	(60) 0.35	(60) B N / WH	(60) 38 95	(60) IV	(60) —
(61) 61	(61) 0.35	(61) B U / WH	(61) 31 19	(61) I	(61) —	(61) Roof Rail Air Bag Disable Switch Signal	(61) 61	(61) 0.35	(61) B U / WH	(61) 31 19	(61) IV	(61) —
(62) 62	(62) 0.35	(62) B N / WH	(62) 28	(62) I	(62) —	(62) Horn Relay Control	(62) 62	(62) 0.35	(62) B N / WH	(62) 28	(62) IV	(62) —
63 - 64	—	—	—	—	—	Not Occupied	63 - 64	—	—	—	—	—
(65) 65	(65) 0.35	(65) G N / GY	(65) 81 7	(65) I	(65) —	(65) Vehicle Speed Signal	(65) 65	(65) 0.35	(65) G N / GY	(65) 81 7	(65) IV	(65) —
(66) 66	(66) 0.35	(66) Y E / WH	(66) 16 90	(66) I	(66) —	(66) Mirror Dimming Signal	(66) 66	(66) 0.35	(66) Y E / WH	(66) 16 90	(66) IV	(66) —
(67) 67	(67) 0.35	(67) B K / YE	(67) 16 91	(67) I	(67) —	(67) Automatic Day/Night Mirror Low Reference	(67) 67	(67) 0.35	(67) B K / YE	(67) 16 91	(67) IV	(67) —
(68) 68	(68) 0.5	(68) R D / BU	(68) 12 40	(68) I	(68) —	(68) Battery Positive Voltage	(68) 68	(68) 0.5	(68) R D / BU	(68) 12 40	(68) IV	(68) —
(69) 69	(69) 0.5	(69) G N / WH	(69) 28 54	(69) I	(69) —	(69) Body Control Module LIN Bus 8	(69) 69	(69) 0.35	(69) G N / WH	(69) 28 54	(69) IV	(69) —
(70) 70	(70) 0.5	(70) V T / WH	(70) 23 9	(70) I	(70) —	(70) Run/ Crank Ignition 1 Voltage	(70) 70	(70) 0.5	(70) V T / WH	(70) 23 9	(70) IV	(70) —
(71) 71	(71) 0.35	(71) V T / RD	(71) 40 49	(71) I	(71) —	(71) AC Power Outlet Sensor High Reference	(71) 71	(71) 0.35	(71) V T / RD	(71) 40 49	(71) IV	(71) —

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(72) 72	(72) 0.5	(72) B U / RD	(72) 46 0	(72) I	(72) —	(72) Engine Control Sensors 5 Volt Reference 1	(72) 72	(72) 0.5	(72) B U / RD	(72) 46 0	(72) IV	(72) —
(73) 73	(73) 0.5	(73) B K / YE	(73) 54 8	(73) I	(73) —	(73) Engine Control Sensors Low Reference 1	(73) 73	(73) 0.5	(73) B K / YE	(73) 54 8	(73) IV	(73) —
(74) 74	(74) 0.35	(74) B N / GN	(74) 89 24	(74) I	(74) —	(74) Ambient Light Device 1 LIN Bus 1	(74) 74	(74) 0.35	(74) B N / GN	(74) 89 24	(74) IV	(74) —
(75) 75	(75) 0.5	(75) WH / VT	(75) 14 30	(75) I	(75) —	(75) Exterior Courtesy Lamp Control (75) Exterior Courtesy Lamp Control	(75) 75	(75) 0.35 (75) 0.5	(75) WH / VT (75) WH / VT	(75) 14 30 (75) 14 30	(75) IV (75) IV	(75) - (QT5 / QY6) (75) QT5 / QT6
(76) 76	(76) 0.5	(76) B N / YE	(76) 82 0	(76) I	(76) —	(76) Center High Mounted Stop Lamp Supply Voltage	(76) 76	(76) 0.5	(76) B N / YE	(76) 82 0	(76) IV	(76) —

X211 Instrument Panel Wiring Harness to Body Wiring Harness



6171454



6171465

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 6099-0188
- Service Connector: 85026856
- Description: 76-Way F 1.2 Sumitomo, 2.8 YESC Series(BK)

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 6099-0184
- Service Connector: 13549030
- Description: 76-Way M 1.2 Sumitomo, 2.8 YESC Series(BK)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	84962854	J-35616-12 (BU)	J-38125-215A
II	84962855	J-35616-4A (PU)	J-38125-11A
III	Service by Cable	J-35616-12 (BU)	J-38125-215A
IV	84616651	J-35616-13 (BU)	J-38125-215A

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
V	84888592	J-35616-5 (PU)	J-38125-11A
VI	Service by Cable	J-35616-13 (BU)	J-38125-215A

X211 Instrument Panel Wiring Harness to Body Wiring Harness

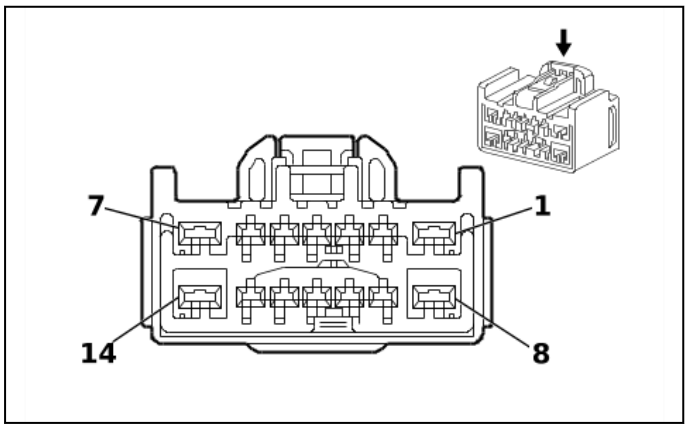
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) RD / VT	(1) 1640	(1) I	(1) —	(1) Battery Positive Voltage	(1) 1	(1) 0.5	(1) RD / VT	(1) 1640	(1) IV	(1) —
(2) 2	(2) 0.5	(2) BU / BN	(2) 6807	(2) I	(2) —	(2) DC/AC Inverter Control	(2) 2	(2) 0.5	(2) BU / BN	(2) 6807	(2) IV	(2) —
3 - 4	—	—	—	—	—	Not Occupied	3 - 4	—	—	—	—	—
(5) 5	(5) 0.35	(5) OG / WH	(5) 3024	(5) I	(5) —	(5) Passenger Instrument Panel Air Bag Stage 1 Low Control	(5) 5	(5) 0.35	(5) OG / WH	(5) 3024	(5) IV	(5) —
(6) 6	(6) 0.35	(6) YE / OG	(6) 3025	(6) I	(6) —	(6) Passenger Instrument Panel Air Bag Stage 1 High Control	(6) 6	(6) 0.35	(6) YE / OG	(6) 3025	(6) IV	(6) —
(7) 7	(7) 0.35	(7) OG / VT	(7) 3026	(7) I	(7) —	(7) Passenger Instrument Panel Air Bag Stage 2 Low Control	(7) 7	(7) 0.35	(7) OG / VT	(7) 3026	(7) IV	(7) —
(8) 8	(8) 0.35	(8) GY / OG	(8) 3027	(8) I	(8) —	(8) Passenger Instrument Panel Air Bag Stage 2 High Control	(8) 8	(8) 0.35	(8) GY / OG	(8) 3027	(8) IV	(8) —
(9) 9	(9) 0.5	(9) RD / GY	(9) 7040	(9) I	(9) —	(9) Battery Positive Voltage	(9) 9	(9) 0.5	(9) RD / GY	(9) 7040	(9) IV	(9) —
(10) 10	(10) 0.35	(10) BU	(10) 4987	(10) I	(10) —	(10) AUTOSAR CAN Bus [+] 1 Serial Data	(10) 10	(10) 0.35	(10) BU	(10) 4987	(10) IV	(10) —
(11) 11	(11) 0.35	(11) WH	(11) 4986	(11) I	(11) —	(11) AUTOSAR CAN Bus [-] 1 Serial Data	(11) 11	(11) 0.35	(11) WH	(11) 4986	(11) IV	(11) —
(12) 12	(12) 0.5	(12) RD / GN	(12) 4440	(12) I	(12) —	(12) Battery Positive Voltage	(12) 12	(12) 0.5	(12) RD / GN	(12) 4440	(12) IV	(12) —
(13) 13	(13) 0.35	(13) BU / WH	(13) 4985	(13) I	(13) —	(13) AUTOSAR CAN Bus [+] 5 Serial Data	(13) 13	(13) 0.35	(13) BU / WH	(13) 4985	(13) IV	(13) —
(14) 14	(14) 0.35	(14) BU / YE	(14) 4984	(14) I	(14) —	(14) AUTOSAR CAN Bus [-] 5 Serial Data	(14) 14	(14) 0.35	(14) BU / YE	(14) 4984	(14) IV	(14) —
15 - 19	—	—	—	—	—	Not Occupied	15 - 19	—	—	—	—	—
(20) 20	(20) 0.35	(20) BU / GY	(20) 4105	(20) I	(20) —	(20) AUTOSAR CAN Bus [+] 8 Serial Data	(20) 20	(20) 0.35	(20) BU / GY	(20) 4105	(20) IV	(20) —

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(21) 21	(21) 0.35	(21) WH / GY	(21) 41 04	(21) I	(21) —	(21) AUTOSAR CAN Bus [-] 8 Serial Data	(21) 21	(21) 0.35	(21) WH / GY	(21) 41 04	(21) IV	(21) —
(22) 22	(22) 0.35	(22) BU / GY	(22) 41 05	(22) I	(22) —	(22) AUTOSAR CAN Bus [+] 8 Serial Data	(22) 22	(22) 0.35	(22) BU / GY	(22) 41 05	(22) IV	(22) —
(23) 23	(23) 0.35	(23) WH / GY	(23) 41 04	(23) I	(23) —	(23) AUTOSAR CAN Bus [-] 8 Serial Data	(23) 23	(23) 0.35	(23) WH / GY	(23) 41 04	(23) IV	(23) —
(24) 24	(24) 0.35	(24) BARE	(24) 10 116	(24) I	(24) —	(24) AC Outlet Low Reference	(24) 24	(24) 0.35	(24) BARE	(24) 10 116	(24) IV	(24) —
25 - 26	—	—	—	—	—	Not Occupied	25 - 26	—	—	—	—	—
(27) 27	(27) 0.75	(27) BK	(27) 10 117	(27) I	(27) —	(27) AC Outlet Phase A Control	(27) 27	(27) 0.75	(27) BK	(27) 10 117	(27) IV	(27) —
(28) 28	(28) 0.75	(28) RD	(28) 10 118	(28) I	(28) —	(28) AC Outlet Phase B Control	(28) 28	(28) 0.75	(28) RD	(28) 10 118	(28) IV	(28) —
(29) 29	(29) 2.5	(29) VT / YE	(29) 74 53	(29) II	(29) —	(29) Window Motor Rear Auxiliary Open Control	(29) 29	(29) 2.5	(29) VT / YE	(29) 74 53	(29) V	(29) —
(30) 30	(30) 2.5	(30) RD / YE	(30) 74 40	(30) II	(30) —	(30) Battery Positive Voltage	(30) 30	(30) 2.5	(30) RD / YE	(30) 74 40	(30) V	(30) —
(31) 31	(31) 0.75 (31) 0.75	(31) WH (31) YE / WH	(31) 46 (31) 18 60	(31) II (31) II	(31) UQ3 (31) UQA	(31) Right Rear Speaker [+] Control (31) Front Center Speaker [+] Control	(31) 31	(31) 0.75 (31) 0.75	(31) WH (31) YE / WH	(31) 46 (31) 18 60	(31) V (31) V	(31) UQ3 (31) UQA
(32) 32	(32) 0.75 (32) 0.75	(32) BU / BK (32) BU / YE	(32) 11 5 (32) 19 60	(32) II (32) II	(32) UQ3 (32) UQA	(32) Right Rear Speaker [-] Control (32) Front Center Speaker [-] Control	(32) 32	(32) 0.75 (32) 0.75	(32) BU / BK (32) BU / YE	(32) 11 5 (32) 19 60	(32) V (32) V	(32) UQ3 (32) UQA
(33) 33	(33) 2.5	(33) RD / GY	(33) 48 40	(33) II	(33) —	(33) Battery Positive Voltage	(33) 33	(33) 2.5	(33) RD / GY	(33) 48 40	(33) V	(33) —
(34) 34	(34) 2.5	(34) RD / BN	(34) 42 40	(34) II	(34) —	(34) Battery Positive Voltage	(34) 34	(34) 2.5	(34) RD / BN	(34) 42 40	(34) V	(34) —
(35) 35	(35) 0.75 (35) 0.75	(35) YE / BK (35) YE / BK	(35) 11 7 (35) 11 7	(35) II	(35) UQ3 / UQF (35) UQ3 / UQF	(35) Right Front Speaker [-] Control 1 (35) Right Front Speaker [-] Control 1	(35) 35	(35) 0.75	(35) YE / BK	(35) 11 7	(35) V	(35) UQ3 / UQF

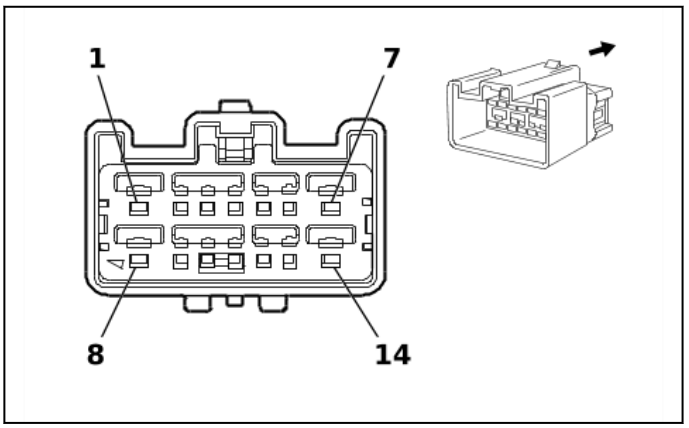
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(36) 36	(36) 0.75 (36) 0.75	(36) YE (36) YE	(36) 200 (36) 200	(36) II	(36) UQ3 / UQF (36) UQ3 / UQF	(36) Right Front Speaker 1 [+] Control (36) Right Front Speaker 1 [+] Control	(36) 36	(36) 0.75	(36) YE	(36) 200	(36) V	(36) UQ3 / UQF
(37) 37	(37) 0.75	(37) BN / BK	(37) 1953	(37) II	(37) UQA	(37) Right Front Midrange Speaker [-] Control	(37) 37	(37) 0.75	(37) BN / BK	(37) 1953	(37) V	(37) UQA
(38) 38	(38) 0.75	(38) WH / YE	(38) 1853	(38) II	(38) UQA	(38) Right Front Midrange Speaker [+] Control	(38) 38	(38) 0.75	(38) WH / YE	(38) 1853	(38) V	(38) UQA
(39) 39	(39) 2.5	(39) RD / YE	(39) 8140	(39) II	(39) —	(39) Battery Positive Voltage	(39) 39	(39) 2.5	(39) RD / YE	(39) 8140	(39) V	(39) —
(40) 40	(40) 2.5	(40) RD / WH	(40) 8040	(40) II	(40) —	(40) Battery Positive Voltage	(40) 40	(40) 2.5	(40) RD / WH	(40) 8040	(40) V	(40) —
(41) 41	(41) 1	(41) RD / BN	(41) 6640	(41) II	(41) —	(41) Battery Positive Voltage	(41) 41	(41) 0.75	(41) RD / BN	(41) 6640	(41) V	(41) —
(42) 42	(42) 1	(42) RD / GN	(42) 6140	(42) II	(42) —	(42) Battery Positive Voltage	(42) 42	(42) 0.75	(42) RD / GN	(42) 6140	(42) V	(42) —
(43) 43	(43) 2.5	(43) RD / YE	(43) 2172	(43) II	(43) —	(43) 12V Regulated Supply Voltage 1	(43) 43	(43) 2.5	(43) RD / YE	(43) 2172	(43) V	(43) —
(44) 44	(44) 2.5	(44) RD / GN	(44) 2173	(44) II	(44) —	(44) 12V Regulated Supply Voltage 2	(44) 44	(44) 2.5	(44) RD / GN	(44) 2173	(44) V	(44) —
(45) 45	(45) 2.5	(45) RD / YE	(45) 3740	(45) II	(45) —	(45) Battery Positive Voltage	(45) 45	(45) 2.5	(45) RD / YE	(45) 3740	(45) V	(45) —
(46) 46	(46) 2.5	(46) BK / WH	(46) 1051	(46) II	(46) —	(46) Signal Ground	(46) 46	(46) 2.5	(46) BK / WH	(46) 1051	(46) V	(46) —
(47) 47	(47) 2.5	(47) YE	(47) 7454	(47) II	(47) —	(47) Window Motor Rear Auxiliary Close Control	(47) 47	(47) 2.5	(47) YE	(47) 7454	(47) V	(47) —
48 - 50	—	—	—	—	—	Not Occupied	48 - 50	—	—	—	—	—
(51) 51	(51) 0.35	(51) WH	(51) 8580	(51) III	(51) —	(51) Automotive Audio Bus A2B Serial Data 1 [+]	(51) 51	(51) 0.35	(51) WH	(51) 8580	(51) VI	(51) —
(52) 52	(52) 0.35	(52) YE	(52) 8579	(52) III	(52) —	(52) Automotive Audio Bus A2B Serial Data 1 [-]	(52) 52	(52) 0.35	(52) YE	(52) 8579	(52) VI	(52) —
53	—	—	—	—	—	Not Occupied	53	—	—	—	—	—

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(54) 54	(54) 0.75	(54) VT / WH	(54) 11 39	(54) I	(54) —	(54) Run/ Crank Ignition 1 Voltage	(54) 54	(54) 0.75	(54) VT / WH	(54) 11 39	(54) IV	(54) —
(55) 55	(55) 0.35	(55) GN / WH	(55) 28 61	(55) I	(55) —	(55) Body Control Module LIN Bus 15	(55) 55	(55) 0.35	(55) GN / WH	(55) 28 61	(55) IV	(55) —
56	—	—	—	—	—	Not Occupied	56	—	—	—	—	—
(57) 57	(57) 0.35	(57) WH / VT	(57) 48 49	(57) I	(57) —	(57) LED Ambient Lighting Enable Signal	(57) 57	(57) 0.35	(57) WH / VT	(57) 48 49	(57) IV	(57) —
(58) 58	(58) 0.35	(58) GY / GN	(58) 89 27	(58) I	(58) —	(58) Ambient Light Device 4 LIN Bus 1	(58) 58	(58) 0.35	(58) GY / GN	(58) 89 27	(58) IV	(58) —
(59) 59	(59) 0.5	(59) VT / GY	(59) 53 9	(59) I	(59) —	(59) Run/ Crank Ignition 1 Voltage	(59) 59	(59) 0.5	(59) VT / GY	(59) 53 9	(59) IV	(59) —
60 - 64	—	—	—	—	—	Not Occupied	60 - 64	—	—	—	—	—
(65) 65	(65) 0.35	(65) GY / GN	(65) 47 70	(65) I	(65) —	(65) Emergency Call Backup Speaker [+] Control	(65) 65	(65) 0.35	(65) GY / GN	(65) 47 70	(65) IV	(65) —
(66) 66	(66) 0.35	(66) WH / BK	(66) 47 69	(66) I	(66) —	(66) Emergency Call Backup Speaker [-] Control	(66) 66	(66) 0.35	(66) WH / BK	(66) 47 69	(66) IV	(66) —
(67) 67	(67) 0.35	(67) BU / BK	(67) 49 77	(67) I	(67) —	(67) AUTOSAR CAN Bus [+] 3 Serial Data	(67) 67	(67) 0.35	(67) BU / BK	(67) 49 77	(67) IV	(67) —
(68) 68	(68) 0.35	(68) WH	(68) 49 76	(68) I	(68) —	(68) AUTOSAR CAN Bus [-] 3 Serial Data	(68) 68	(68) 0.35	(68) WH	(68) 49 76	(68) IV	(68) —
(69) 69	(69) 0.75	(69) RD / VT	(69) 26 40	(69) I	(69) —	(69) Battery Positive Voltage	(69) 69	(69) 0.75	(69) RD / VT	(69) 26 40	(69) IV	(69) —
70 - 73	—	—	—	—	—	Not Occupied	70 - 73	—	—	—	—	—
(74) 74	(74) 0.5	(74) RD / WH	(74) 54 40	(74) I	(74) —	(74) Battery Positive Voltage	(74) 74	(74) 0.5	(74) RD / WH	(74) 54 40	(74) IV	(74) —
75	—	—	—	—	—	Not Occupied	75	—	—	—	—	—
(76) 76	(76) 0.35	(76) VT	(76) 47 01	(76) I	(76) —	(76) Retained Accessory Power Control	(76) 76	(76) 0.35	(76) VT	(76) 47 01	(76) IV	(76) —

X213 Upfitter Wiring Harness to Instrument Panel Wiring Harness



823290



1283905

Connector Part Information
- Harness Type: Upfitter Wiring Harness
- OEM Connector: Not Available
- Service Connector: Service by Harness - See Part Catalog
- Description: 14-Way F (L-GY)

Connector Part Information
- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 7282-6447-40
- Service Connector: 88956523
- Description: 14-Way M 1.5, 2.8 YESC Series(L-GY)

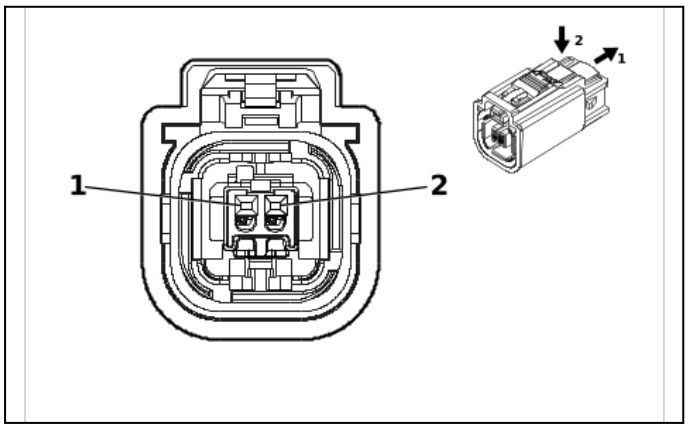
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required
II	13578908	J-35616-5 (PU)	J-38125-11A
III	85544421	J-35616-3 (GY)	J-38125-215A

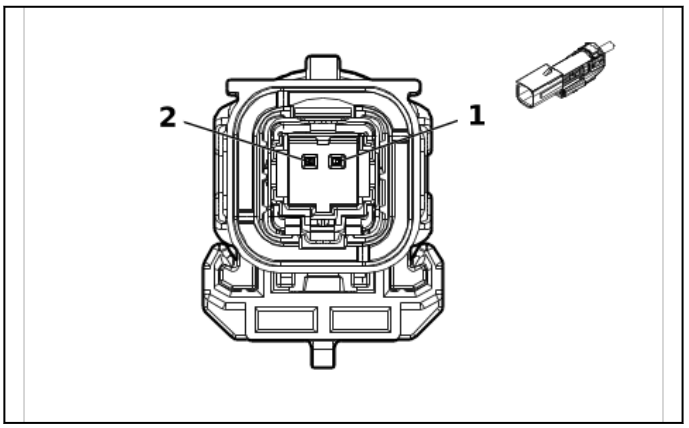
X213 Upfitter Wiring Harness to Instrument Panel Wiring Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
1	—	—	—	—	—	Not Occupied	1	—	—	—	—	—
(2) 2	(2) 0	(2) —	(2) 28	(2) I	(2) —	(2) Horn Relay Control	(2) 2	(2) 0.35	(2) BN / WH	(2) 28	(2) III	(2) —
3 - 5	—	—	—	—	—	Not Occupied	3 - 5	—	—	—	—	—
(6) 6	(6) 0	(6) —	(6) 4701	(6) I	(6) —	(6) Retained Accessory Power Control	(6) 6	(6) 0.35	(6) VT	(6) 4701	(6) III	(6) —
(7) 7	(7) 0	(7) —	(7) 1242	(7) I	(7) —	(7) Battery Positive Voltage	(7) 7	(7) 2.5	(7) RD / VT	(7) 1242	(7) II	(7) —
8	—	—	—	—	—	Not Occupied	8	—	—	—	—	—
(9) 9	(9) 0	(9) —	(9) 6812	(9) I	(9) —	(9) Out of Park Signal	(9) 9	(9) 0.35	(9) YE	(9) 6812	(9) III	(9) —
(10) 10	(10) 0	(10) —	(10) 817	(10) I	(10) —	(10) Vehicle Speed Signal	(10) 10	(10) 0.35	(10) GN / GY	(10) 817	(10) III	(10) —
11 - 12	—	—	—	—	—	Not Occupied	11 - 12	—	—	—	—	—
(13) 13	(13) 0	(13) —	(13) 339	(13) I	(13) —	(13) Run/ Crank Ignition 1 Voltage	(13) 13	(13) 0.5	(13) VT / BK	(13) 339	(13) III	(13) —
14	—	—	—	—	—	Not Occupied	14	—	—	—	—	—

X214 Instrument Panel Wiring Harness to Body Wiring Harness - 4 - Door



5358341



6214897

Connector Part Information
- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 13532801
- Service Connector: 85090373
- Description: 2-Way F 0.5 CTS, AMEC High Speed Data Series(BK)

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 35477674
- Service Connector: Service by Cable Assembly - See Part Catalog
- Description: 2-Way M 0.5 CTS, AMEC High Speed Data Series(BK)

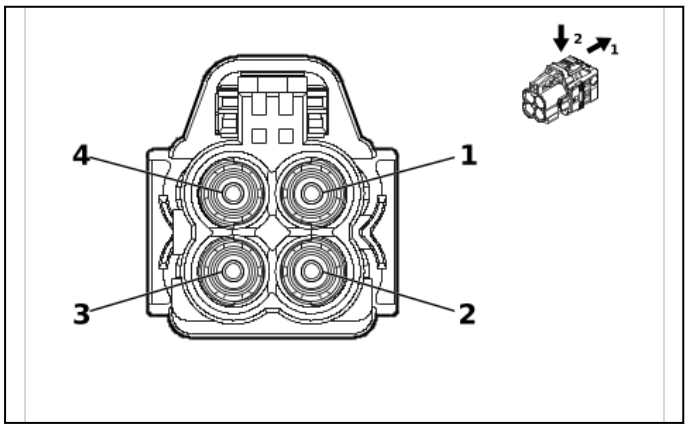
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Service by Cable	J-35616-64B (L-BU)	No Tool Required
II	Service by Cable	J-35616-64B (L-BU)	No Tool Required

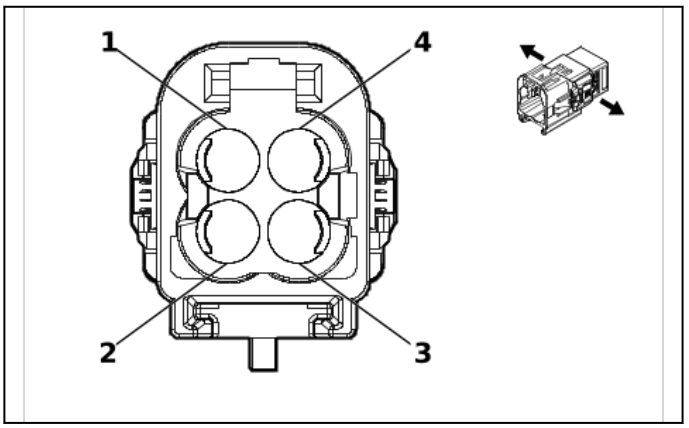
X214 Instrument Panel Wiring Harness to Body Wiring Harness - 4 - Door

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) —	(1) WH	(1) 7211	(1) I	(1) —	(1) Ethernet Bus 4 [+]	(1) 1	(1) —	(1) WH	(1) 7211	(1) II	(1) —
(2) 2	(2) —	(2) GN	(2) 7210	(2) I	(2) —	(2) Ethernet Bus 4 [-]	(2) 2	(2) —	(2) GN	(2) 7210	(2) II	(2) —

X217 Instrument Panel Wiring Harness Extension Harness to Body Wiring Harness (TRG)



6904492



6186622

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness Extension Harness
- OEM Connector: AMZW25-001-D
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 4-Way F Mini Coax Type(VT)

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: AMZ040-C00-D
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 4-Way M Mini Coax Type(VT)

Terminal Part Information

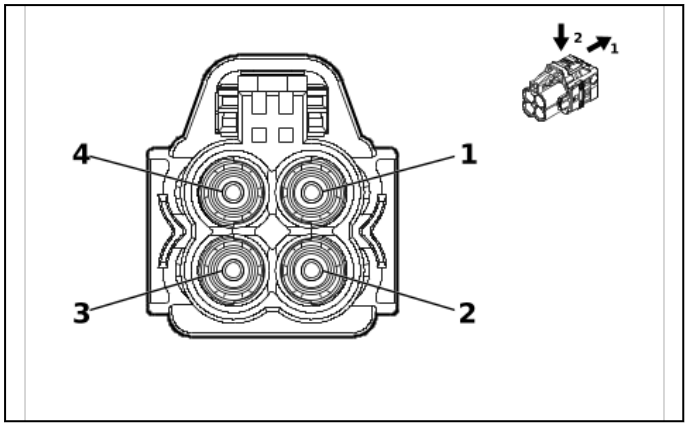
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

X217 Instrument Panel Wiring Harness Extension Harness to Body Wiring Harness (TRG)

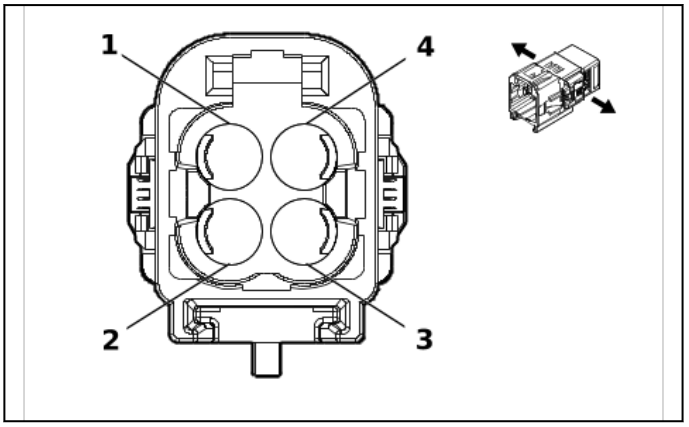
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) —	(1) Coax Cable	(1) 7886	(1) I	(1) —	(1) Trailer 2 Rear Vision Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	(1) 1	(1) —	(1) Coax Cable	(1) 7886	(1) II	(1) —
(2) 2	(2) —	(2) Coax Cable	(2) 2421	(2) I	(2) —	(2) Trailer Rear Vision Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	(2) 2	(2) —	(2) Coax Cable	(2) 2421	(2) II	(2) —

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(3) 3	(3) —	(3) Coax Cable	(3) 11348	(3) I	(3) UXA	(3) Underbody Camera LVDS (Low Voltage DIfferential Signaling) Coaxial Signal	(3) 3	(3) —	(3) Coax Cable	(3) 11348	(3) II	(3) UXA
(4) 4	(4) —	(4) Coax Cable	(4) 11352	(4) I	(4) UXA	(4) Underbody Camera 2 LVDS (Low Voltage DIfferential Signaling) Coaxial Signal	(4) 4	(4) —	(4) Coax Cable	(4) 11352	(4) II	(4) UXA

X218 Instrument Panel Wiring Harness to Body Wiring Harness (UK0 / UKL)



6749172



6325320

Connector Part Information
- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: AMZW25-001-Z
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 4-Way F Mini Coax Type(BU)

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: AMZ040-C00-Z
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 4-Way M Mini Coax Type(BU)

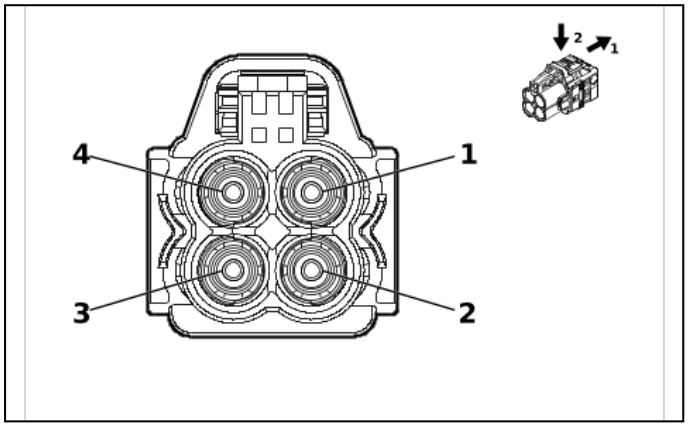
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

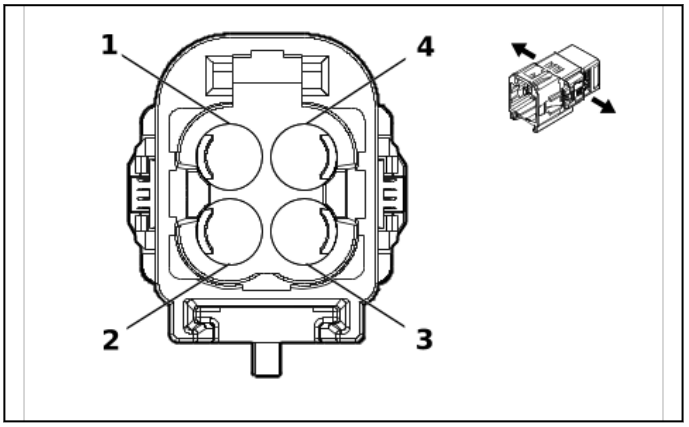
X218 Instrument Panel Wiring Harness to Body Wiring Harness (UK0 / UKL)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(2) 2	(2) —	(2) Coax Cable	(2) 4726	(2) I	(2) —	(2) Driver Monitoring System Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	(2) 2	(2) —	(2) Coax Cable	(2) 4726	(2) II	(2) —
(3) 3	(3) —	(3) Coax Cable	(3) 4723	(3) I	(3) —	(3) Video Processing Module LVDS (Low Voltage Differential Signaling) Coaxial Signal	(3) 3	(3) —	(3) Coax Cable	(3) 4723	(3) II	(3) —

X218 Instrument Panel Wiring Harness to Body Wiring Harness (UV2 & (UJE / UKM))



6749172



6325320

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: AMZW25-001-Z
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 4-Way F Mini Coax Type(BU)

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: AMZ040-C00-Z
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 4-Way M Mini Coax Type(BU)

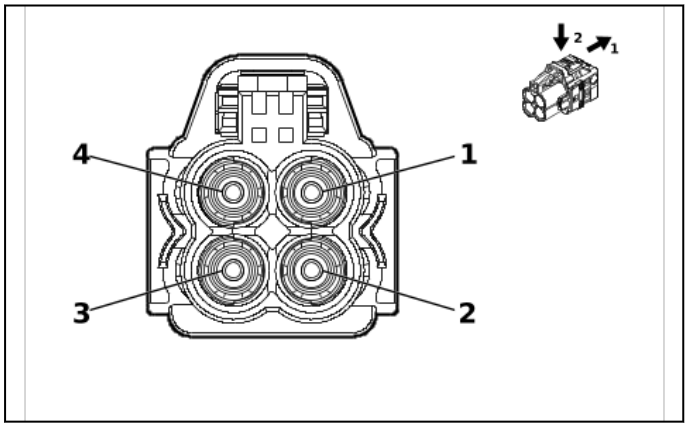
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

X218 Instrument Panel Wiring Harness to Body Wiring Harness (UV2 & (UJE / UKM))

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) —	(1) Coax Cable	(1) 4721	(1) I	(1) —	(1) Rearview Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	(1) 1	(1) —	(1) Coax Cable	(1) 4721	(1) II	(1) —
(2) 2	(2) —	(2) Coax Cable	(2) 4722	(2) I	(2) —	(2) Frontview Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	(2) 2	(2) —	(2) Coax Cable	(2) 4722	(2) II	(2) —
(3) 3	(3) —	(3) Coax Cable	(3) 4725	(3) I	(3) —	(3) Left Sideview Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	(3) 3	(3) —	(3) Coax Cable	(3) 4725	(3) II	(3) —
(4) 4	(4) —	(4) Coax Cable	(4) 4724	(4) I	(4) —	(4) Right Sideview Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	(4) 4	(4) —	(4) Coax Cable	(4) 4724	(4) II	(4) —

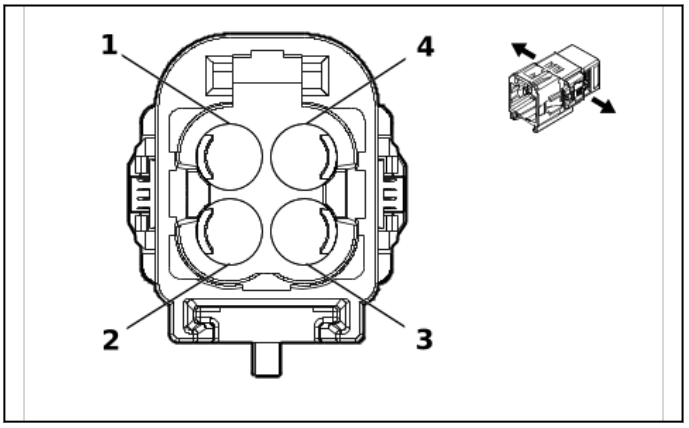
X218 Instrument Panel Wiring Harness to Body Wiring Harness (UVB & (UJE / UKM))



6749172

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: AMZW25-001-Z
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 4-Way F Mini Coax Type(BU)



6325320

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: AMZ040-C00-Z
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 4-Way M Mini Coax Type(BU)

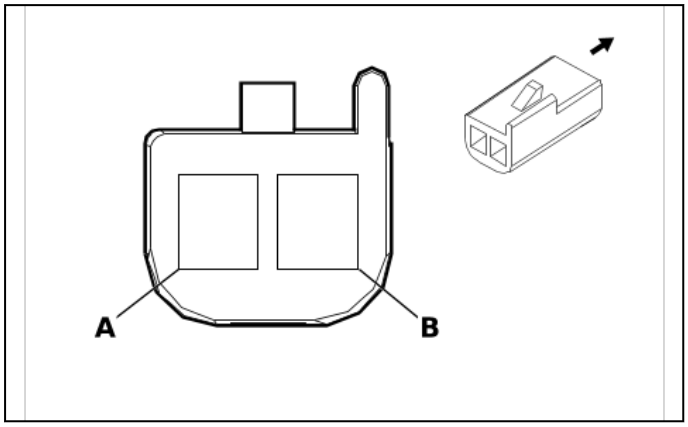
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

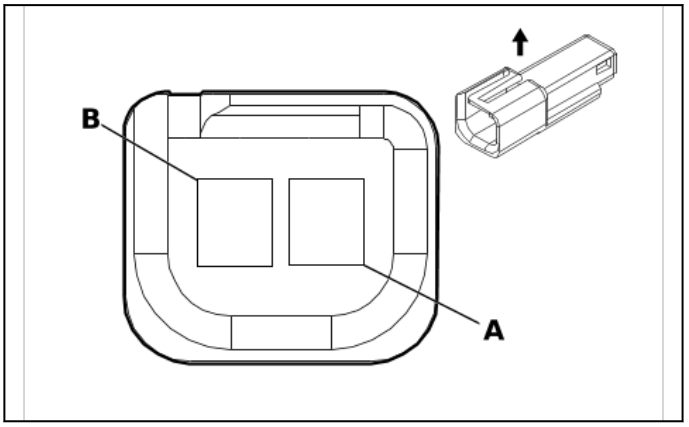
X218 Instrument Panel Wiring Harness to Body Wiring Harness (UVB & (UJE / UKM))

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) —	(1) Coax Cable	(1) 4721	(1) I	(1) —	(1) Rearview Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	(1) 1	(1) —	(1) Coax Cable	(1) 4721	(1) II	(1) —

X219 Spot Light Wiring Harness to Instrument Panel Wiring Harness (5W4 / 9C1)



82383



35441

Connector Part Information
- Harness Type: Spot Light Wiring Harness
- OEM Connector: Not Available
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F (BK)

Connector Part Information
- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 12047663
- Service Connector: 13584278
- Description: 2-Way M 150 Metri-Pack Series(BK)

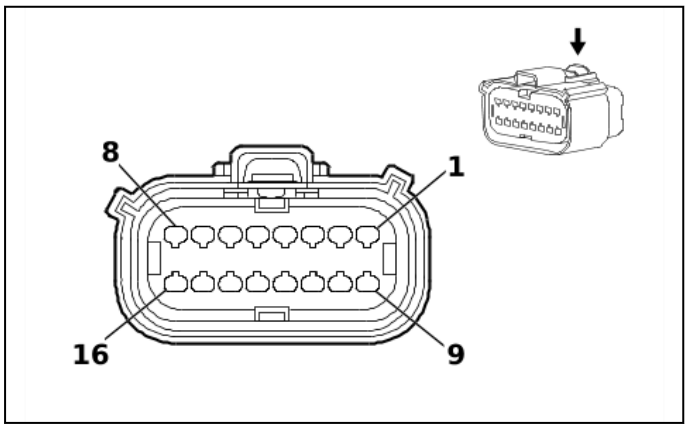
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required
II	Not required	J-35616-3 (GY)	No Tool Required

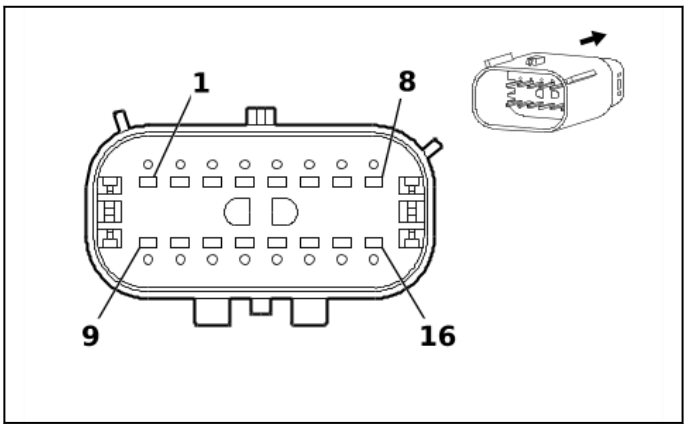
X219 Spot Light Wiring Harness to Instrument Panel Wiring Harness (5W4 / 9C1)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
A	0	—	1050	I	—	Ground	A	0.75	BK	1050	II	—
B	0	—	10240	I	—	Battery Positive Voltage Police	B	0.75	RD / GN	10240	II	—

X224A Instrument Panel Wiring Harness to Front Floor Console Wiring Harness (D07 / DCK)



3639447



4223713

Connector Part Information
- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 13503530
- Service Connector: 19356493
- Description: 16-Way F 1.5 MX Series, Sealed(L-GY)

Connector Part Information
- Harness Type: Front Floor Console Wiring Harness
- OEM Connector: 33482-8602
- Service Connector: Service by Harness - See Part Catalog
- Description: 16-Way M 1.5 MX Series, Sealed(GY)

Terminal Part Information

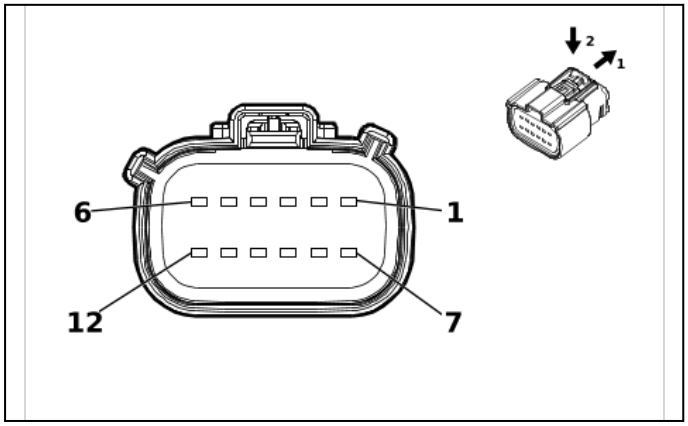
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	85528055	J-35616-2A (GY)	J-38125-217
II	Not required	J-35616-3 (GY)	No Tool Required

X224A Instrument Panel Wiring Harness to Front Floor Console Wiring Harness (D07 / DCK)

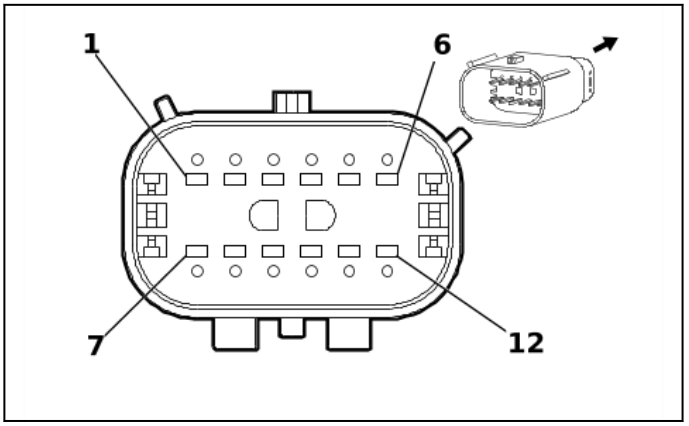
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) BU / WH	(1) 4985	(1) I	(1) —	(1) AUTOSAR CAN Bus [+] 5 Serial Data	(1) 1	(1) 0.35	(1) BU / WH	(1) 4985	(1) II	(1) —
(2) 2	(2) 0.35	(2) BU / YE	(2) 4984	(2) I	(2) —	(2) AUTOSAR CAN Bus [-] 5 Serial Data	(2) 2	(2) 0.35	(2) BU / YE	(2) 4984	(2) II	(2) —
(3) 3	(3) 0.35	(3) BU / WH	(3) 4985	(3) I	(3) —	(3) AUTOSAR CAN Bus [+] 5 Serial Data	(3) 3	(3) 0.35	(3) BU / WH	(3) 4985	(3) II	(3) —
(4) 4	(4) 0.35	(4) BU / YE	(4) 4984	(4) I	(4) —	(4) AUTOSAR CAN Bus [-] 5 Serial Data	(4) 4	(4) 0.35	(4) BU / YE	(4) 4984	(4) II	(4) —
5	—	—	—	—	—	Not Occupied	5	—	—	—	—	—
(6) 6	(6) 0.5	(6) RD / WH	(6) 140	(6) I	(6) —	(6) Battery Positive Voltage	(6) 6	(6) 0.5	(6) RD / WH	(6) 140	(6) II	(6) —
(7) 7	(7) 0.35	(7) VT / RD	(7) 4049	(7) I	(7) —	(7) AC Power Outlet Sensor High Reference	(7) 7	(7) 0.35	(7) VT / RD	(7) 4049	(7) II	(7) —
(8) 8	(8) 0.5	(8) WH	(8) 10116	(8) I	(8) —	(8) AC Outlet Low Reference	(8) 8	(8) 0.5	(8) WH	(8) 10116	(8) II	(8) —

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(9) 9	(9) 0.75	(9) BK / WH	(9) 1051	(9) I	(9) —	(9) Signal Ground	(9) 9	(9) 0.75	(9) BK / WH	(9) 1051	(9) II	(9) —
(10) 10	(10) 0.5	(10) GN / VT	(10) 4786	(10) I	(10) —	(10) Dome/ Reading Lamp Enable Signal	(10) 10	(10) 0.5	(10) GN / VT	(10) 4786	(10) II	(10) —
(11) 11	(11) 0.5	(11) RD / VT	(11) 2640	(11) I	(11) —	(11) Battery Positive Voltage	(11) 11	(11) 0.5	(11) RD / VT	(11) 2640	(11) II	(11) —
12	—	—	—	—	—	Not Occupied	12	—	—	—	—	—
(13) 13	(13) 0.5	(13) BU / BN	(13) 6807	(13) I	(13) —	(13) DC/AC Inverter Control	(13) 13	(13) 0.5	(13) BU / BN	(13) 6807	(13) II	(13) —
14	—	—	—	—	—	Not Occupied	14	—	—	—	—	—
(15) 15	(15) 0.75	(15) RD	(15) 10118	(15) I	(15) —	(15) AC Outlet Phase B Control	(15) 15	(15) 0.75	(15) RD	(15) 10118	(15) II	(15) —
(16) 16	(16) 0.75	(16) BK	(16) 10117	(16) I	(16) —	(16) AC Outlet Phase A Control	(16) 16	(16) 0.75	(16) BK	(16) 10117	(16) II	(16) —

X224B Instrument Panel Wiring Harness to Front Floor Console Wiring Harness (USN)



2871862



3338699

Connector Part Information
- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 13503527
- Service Connector: 19300601
- Description: 12-Way F 1.5 MX Series, Sealed(L-GY)

Connector Part Information
- Harness Type: Front Floor Console Wiring Harness
- OEM Connector: 33482-6202
- Service Connector: Service by Harness - See Part Catalog
- Description: 12-Way M 1.5 MX Series, Sealed(L-GY)

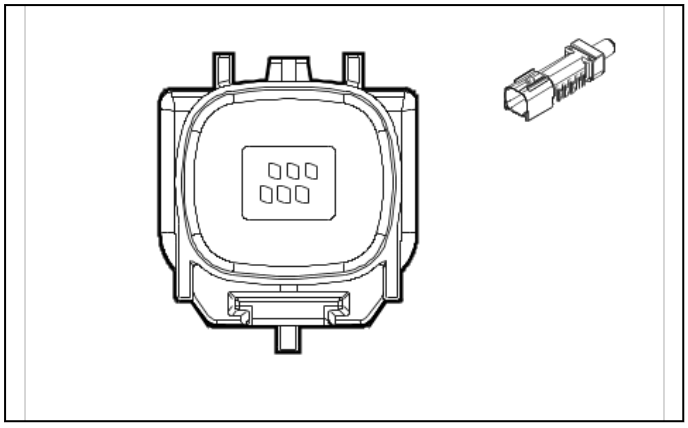
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	85528055	J-35616-2A (GY)	J-38125-217
II	Service by Cable	J-35616-14 (GN)	J-38125-217
III	Not required	J-35616-3 (GY)	No Tool Required
IV	Service by Cable	J-35616-3 (GY)	No Tool Required

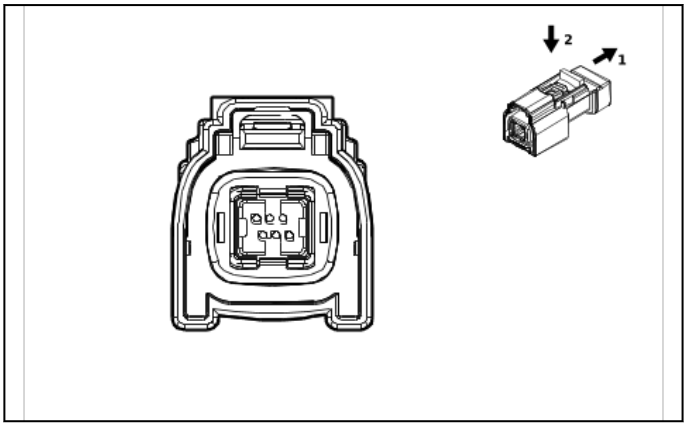
X224B Instrument Panel Wiring Harness to Front Floor Console Wiring Harness (USN)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) YE	(1) 7233	(1) II	(1) —	(1) Ethernet Bus 15 [+]	(1) 1	(1) 0.35	(1) YE	(1) 7233	(1) IV	(1) —
(2) 2	(2) 0.35	(2) WH	(2) 7232	(2) II	(2) —	(2) Ethernet Bus 15 [-]	(2) 2	(2) 0.35	(2) WH	(2) 7232	(2) IV	(2) —
3 - 4	—	—	—	—	—	Not Occupied	3 - 4	—	—	—	—	—
(5) 5	(5) 0.35	(5) WH	(5) 8580	(5) II	(5) —	(5) Automotive Audio Bus A2B Serial Data 1 [+]	(5) 5	(5) 0.35	(5) WH	(5) 8580	(5) IV	(5) —
(6) 6	(6) 0.35	(6) YE	(6) 8579	(6) II	(6) —	(6) Automotive Audio Bus A2B Serial Data 1 [-]	(6) 6	(6) 0.35	(6) YE	(6) 8579	(6) IV	(6) —
(7) 7	(7) 0.35	(7) GN/YE	(7) 7066	(7) I	(7) —	(7) Entertainment Remote Enable Signal	(7) 7	(7) 0.35	(7) GN/YE	(7) 7066	(7) III	(7) —
8 - 10	—	—	—	—	—	Not Occupied	8 - 10	—	—	—	—	—
(11) 11	(11) 0.35	(11) WH	(11) 8580	(11) II	(11) —	(11) Automotive Audio Bus A2B Serial Data 1 [+]	(11) 11	(11) 0.35	(11) WH	(11) 8580	(11) IV	(11) —
(12) 12	(12) 0.35	(12) YE	(12) 8579	(12) II	(12) —	(12) Automotive Audio Bus A2B Serial Data 1 [-]	(12) 12	(12) 0.35	(12) YE	(12) 8579	(12) IV	(12) —

X225 Front Floor Console Wiring Harness to Instrument Panel Wiring Harness (USN)



6409515



5664365

Connector Part Information
- Harness Type: Front Floor Console Wiring Harness
- OEM Connector: 111194-1118
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 6-Way F HSAL-2 Series, Sealed(GY)

Connector Part Information
- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 100048-1118
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 6-Way M HSAL-2 Series, Sealed(GY)

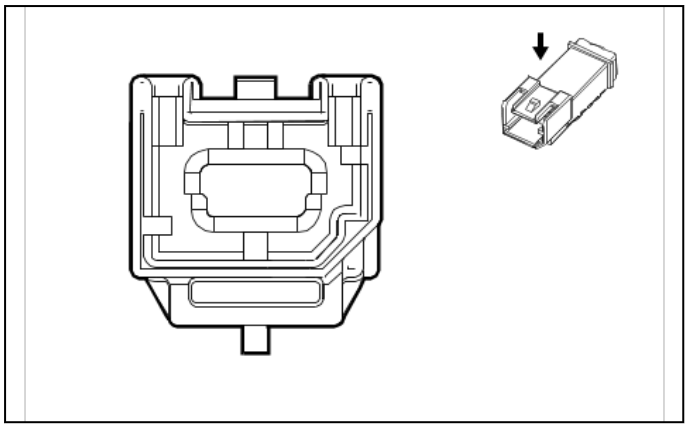
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

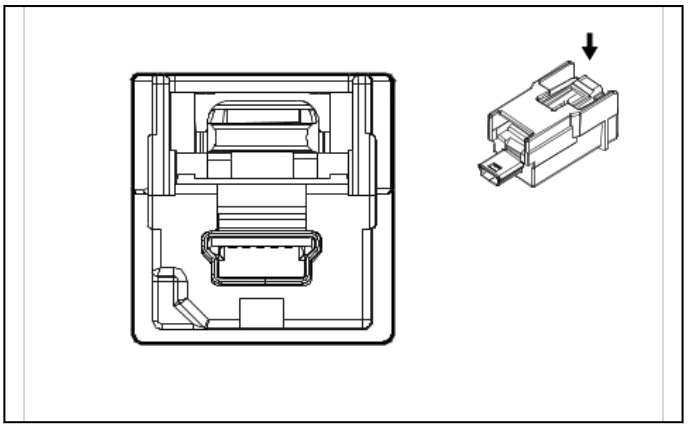
X225 Front Floor Console Wiring Harness to Instrument Panel Wiring Harness (USN)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
GY	—	<p01>	LVDS	I	—	Low Voltage Differential Signaling	GY	—	<p01>	LVDS	II	—

X226 Front Floor Console Wiring Harness to Instrument Panel Wiring Harness (D07 / DCK)



6529215



2807491

Connector Part Information
- Harness Type: Front Floor Console Wiring Harness
- OEM Connector: 111005-9005
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 5-Way F USB Type(GY)

Connector Part Information
- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 111014-9001
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 5-Way M 2.0 Mini-B USB Type(GY)

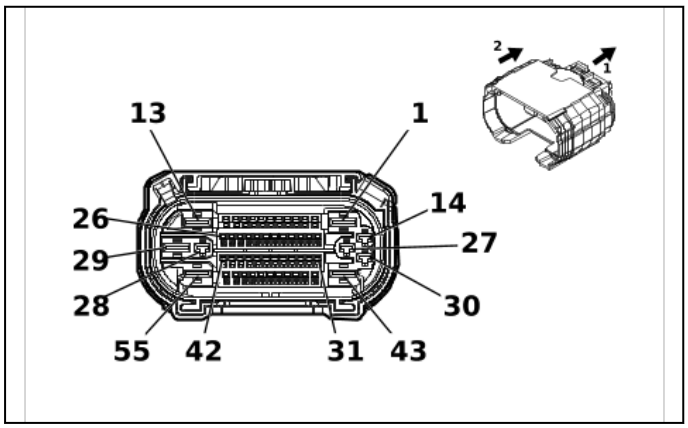
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

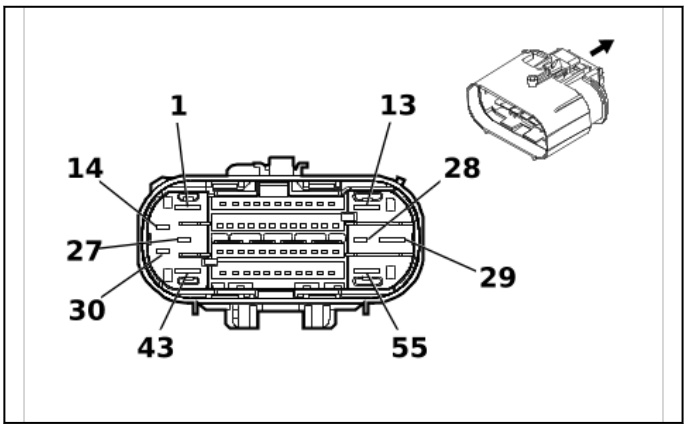
X226 Front Floor Console Wiring Harness to Instrument Panel Wiring Harness (D07 / DCK)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
GY	—	<p01>	USB	I	—	USB Serial Data	GY	—	<p01>	USB	II	—

X227 Front Floor Console Wiring Harness to Body Wiring Harness (D07 / DCK)



4992168



4993301

Connector Part Information
- Harness Type: Front Floor Console Wiring Harness
- OEM Connector: 35016652
- Service Connector: Service by Harness - See Part Catalog
- Description: 55-Way F 1.2 OCS, 2.8, 6.3 CTS Series, Sealed(BK)

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 35205173
- Service Connector: Service by Harness - See Part Catalog
- Description: 55-Way M 1.2 OCS, 2.8, 6.3 CTS Series, Sealed(BK)

Terminal Part Information

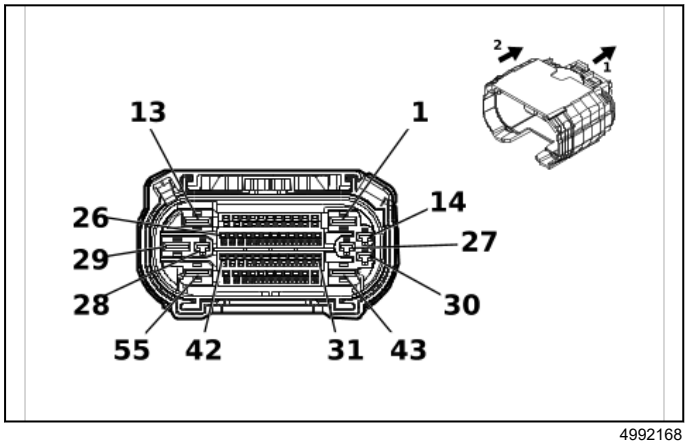
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required
II	Not required	J-35616-16 (L-GN)	No Tool Required
III	Not required	J-35616-13 (BU)	No Tool Required

X227 Front Floor Console Wiring Harness to Body Wiring Harness (D07 / DCK)

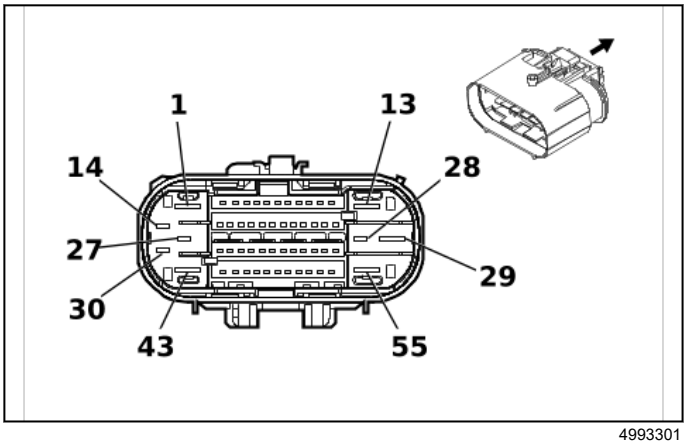
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
1	—	—	—	—	—	Not Occupied	1	—	—	—	—	—
(2) 2	(2) 1	(2) BK	(2) 900 0	(2) II	(2) —	(2) Cavity Seal	(2) 2	(2) 0. 75	(2) BK	(2) 900 0	(2) III	(2) —
(3) 3	(3) 0. 35	(3) BN / GN	(3) 892 4	(3) I	(3) —	(3) Ambient Light Device 1 LIN Bus 1	(3) 3	(3) 0. 35	(3) BN / GN	(3) 892 4	(3) III	(3) —
(4) 4	(4) 0. 35	(4) W H / VT	(4) 484 9	(4) I	(4) —	(4) LED Ambient Lighting Enable Signal	(4) 4	(4) 0. 35	(4) W H / VT	(4) 484 9	(4) III	(4) —
5 - 11	—	—	—	—	—	Not Occupied	5 - 11	—	—	—	—	—
(12) 12	(12) 1	(12) B K	(12) 90 00	(12) II	(12) —	(12) Cavity Seal	(12) 12	(12) 0.75	(12) B K	(12) 90 00	(12) III	(12) —
13 - 31	—	—	—	—	—	Not Occupied	13 - 31	—	—	—	—	—
(32) 32	(32) 0.5	(32) B N / BK	(32) 49 96	(32) II	(32) —	(32) Immobili zer Antenna Signal [+]	(32) 32	(32) 0.5	(32) B N / BK	(32) 49 96	(32) III	(32) —
(33) 33	(33) 0.5	(33) WH / GY	(33) 49 97	(33) II	(33) —	(33) Immobili zer Antenna Low Signal	(33) 33	(33) 0.5	(33) WH / GY	(33) 49 97	(33) III	(33) —

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
34 - 36	—	—	—	—	—	Not Occupied	34 - 36	—	—	—	—	—
(37) 37	(37) 0.5	(37) GN / VT	(37) 28 57	(37) II	(37) —	(37) Body Control Module LIN Bus 11	(37) 37	(37) 0.35	(37) GN / VT	(37) 28 57	(37) III	(37) —
38 - 43	—	—	—	—	—	Not Occupied	38 - 43	—	—	—	—	—
(44) 44	(44) 0.75	(44) YE	(44) 68 17	(44) II	(44) —	(44) LED Backlight Dimming Control 1	(44) 44	(44) 0.75	(44) YE	(44) 68 17	(44) III	(44) —
45 - 46	—	—	—	—	—	Not Occupied	45 - 46	—	—	—	—	—
(47) 47	(47) 0.5	(47) BK	(47) 14 51	(47) II	(47) —	(47) Signal Ground	(47) 47	(47) 0.75	(47) BK / WH	(47) 14 51	(47) III	(47) —
(48) 48	(48) 0.35	(48) VT	(48) 47 01	(48) I	(48) —	(48) Retained Accessory Power Control	(48) 48	(48) 0.35	(48) VT	(48) 47 01	(48) III	(48) —
49 - 50	—	—	—	—	—	Not Occupied	49 - 50	—	—	—	—	—
(51) 51	(51) 0.5	(51) BK / WH	(51) 14 51	(51) II	(51) —	(51) Signal Ground	(51) 51	(51) 0.75	(51) BK / WH	(51) 14 51	(51) III	(51) —
52 - 53	—	—	—	—	—	Not Occupied	52 - 53	—	—	—	—	—
(54) 54	(54) 1	(54) BK	(54) 90 00	(54) II	(54) —	(54) Cavity Seal	(54) 54	(54) 0.75	(54) BK	(54) 90 00	(54) III	(54) —
55	—	—	—	—	—	Not Occupied	55	—	—	—	—	—

X227 Front Seat Wiring Harness - Center to Body Wiring Harness ((AZ3 - UBI) / 5Y1)



4992168



4993301

Connector Part Information
- Harness Type: Front Seat Wiring Harness - Center
- OEM Connector: 35695805
- Service Connector: Service by Harness - See Part Catalog
- Description: 55-Way F 1.2 OCS, 2.8, 6.3 CTS Series, Sealed(BK)

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 35205173
- Service Connector: 84727364
- Description: 55-Way M 1.2 OCS, 2.8, 6.3 CTS Series, Sealed(BK)

Terminal Part Information

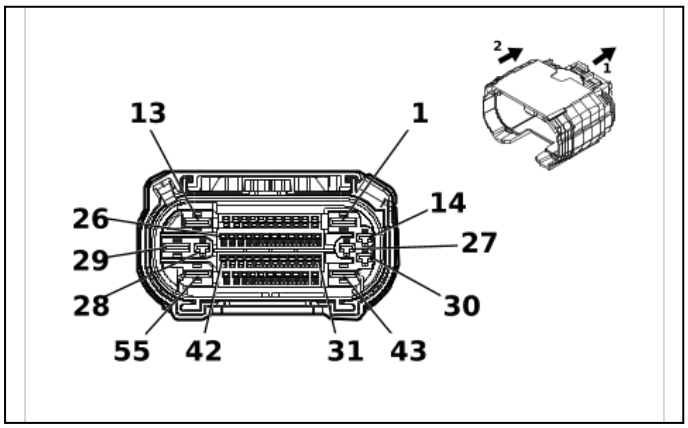
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required
II	87838750	J-35616-13 (BU)	J-38125-215A

X227 Front Seat Wiring Harness - Center to Body Wiring Harness ((AZ3 - UBI) / 5Y1)

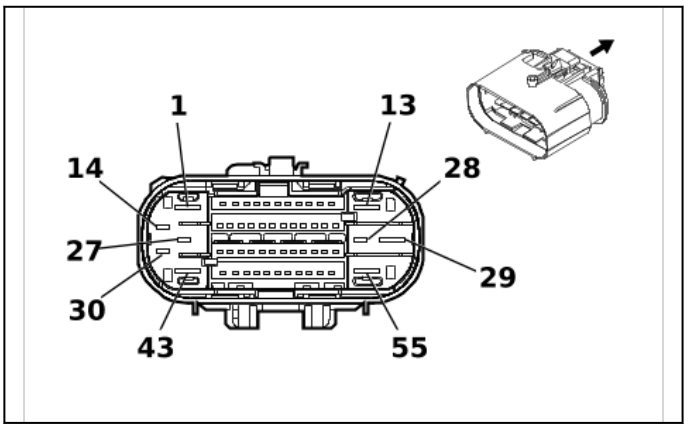
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
1	—	—	—	—	—	Not Occupied	1	—	—	—	—	—
(2) 2	(2) —	(2) —	(2) —	(2) —	(2) —	(2) Cavity Seal	(2) 2	(2) 0.75	(2) BK	(2) 9002	(2) II	(2) —
(3) 3	(3) —	(3) —	(3) —	(3) —	(3) —	(3) Ambient Light Device 1 LIN Bus 1	(3) 3	(3) 0.35	(3) BN / GN	(3) 8924	(3) II	(3) —
(4) 4	(4) —	(4) —	(4) —	(4) —	(4) —	(4) LED Ambient Lighting Enable Signal	(4) 4	(4) 0.35	(4) WH / VT	(4) 4849	(4) II	(4) —
5 - 11	—	—	—	—	—	Not Occupied	5 - 11	—	—	—	—	—
(12) 12	(12) —	(12) —	(12) —	(12) —	(12) —	(12) Cavity Seal	(12) 12	(12) 0.75	(12) BK	(12) 9002	(12) II	(12) —
13 - 15	—	—	—	—	—	Not Occupied	13 - 15	—	—	—	—	—
(16) 16	(16) 0.35	(16) WH	(16) 4976	(16) I	(16) —	(16) AUTOSAR CAN Bus [-] 3 Serial Data	(16) 16	(16) —	(16) —	(16) —	(16) —	(16) —
(17) 17	(17) 0.35	(17) BU / BK	(17) 4977	(17) I	(17) —	(17) AUTOSAR CAN Bus [+] 3 Serial Data	(17) 17	(17) —	(17) —	(17) —	(17) —	(17) —
(18) 18	(18) 0.35	(18) WH	(18) 4976	(18) I	(18) —	(18) AUTOSAR CAN Bus [-] 3 Serial Data	(18) 18	(18) —	(18) —	(18) —	(18) —	(18) —
(19) 19	(19) 0.35	(19) BU / BK	(19) 4977	(19) I	(19) —	(19) AUTOSAR CAN Bus [+] 3 Serial Data	(19) 19	(19) —	(19) —	(19) —	(19) —	(19) —
20 - 21	—	—	—	—	—	Not Occupied	20 - 21	—	—	—	—	—
(22) 22	(22) 0.5	(22) BU / YE	(22) 4984	(22) I	(22) —	(22) AUTOSAR CAN Bus [-] 5 Serial Data	(22) 22	(22) —	(22) —	(22) —	(22) —	(22) —
(23) 23	(23) 0.5	(23) BU / WH	(23) 4985	(23) I	(23) —	(23) AUTOSAR CAN Bus [+] 5 Serial Data	(23) 23	(23) —	(23) —	(23) —	(23) —	(23) —
(24) 24	(24) 0.5	(24) BU / YE	(24) 4984	(24) I	(24) —	(24) AUTOSAR CAN Bus [-] 5 Serial Data	(24) 24	(24) —	(24) —	(24) —	(24) —	(24) —
(25) 25	(25) 0.5	(25) BU / WH	(25) 4985	(25) I	(25) —	(25) AUTOSAR CAN Bus [+] 5 Serial Data	(25) 25	(25) —	(25) —	(25) —	(25) —	(25) —
26 - 31	—	—	—	—	—	Not Occupied	26 - 31	—	—	—	—	—

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(32) 32	(32) 0.5	(32) BN / BK	(32) 49 96	(32) I	(32) —	(32) Immobilizer Antenna Signal [+]	(32) 32	(32) 0.5	(32) BN / BK	(32) 49 96	(32) II	(32) —
(33) 33	(33) 0.5	(33) WH / GY	(33) 49 97	(33) I	(33) —	(33) Immobilizer Antenna Low Signal	(33) 33	(33) 0.5	(33) WH / GY	(33) 49 97	(33) II	(33) —
34 - 39	—	—	—	—	—	Not Occupied	34 - 39	—	—	—	—	—
(40) 40	(40) 0.35	(40) WH	(40) 40 55	(40) I	(40) —	(40) Private Serial Data Powertrain CAN Bus [+] Serial Data	(40) 40	(40) —	(40) —	(40) —	(40) —	(40) —
41 - 43	—	—	—	—	—	Not Occupied	41 - 43	—	—	—	—	—
(44) 44	(44) —	(44) —	(44) —	(44) —	(44) —	(44) LED Backlight Dimming Control 1	(44) 44	(44) 0.75	(44) YE	(44) 68 17	(44) II	(44) —
(45) 45	(45) 0.35	(45) BU / GY	(45) 40 54	(45) I	(45) —	(45) Private Serial Data Powertrain CAN Bus [-] Serial Data	(45) 45	(45) —	(45) —	(45) —	(45) —	(45) —
(46) 46	(46) 0.35	(46) WH	(46) 40 55	(46) I	(46) —	(46) Private Serial Data Powertrain CAN Bus [+] Serial Data	(46) 46	(46) —	(46) —	(46) —	(46) —	(46) —
(47) 47	(47) —	(47) —	(47) —	(47) —	(47) —	(47) Signal Ground	(47) 47	(47) 0.75	(47) BK / WH	(47) 14 51	(47) II	(47) —
(48) 48	(48) —	(48) —	(48) —	(48) —	(48) —	(48) Retained Accessory Power Control	(48) 48	(48) 0.35	(48) VT	(48) 47 01	(48) II	(48) —
49 - 52	—	—	—	—	—	Not Occupied	49 - 52	—	—	—	—	—
(53) 53	(53) 0.35	(53) BU / GY	(53) 40 54	(53) I	(53) —	(53) Private Serial Data Powertrain CAN Bus [-] Serial Data	(53) 53	(53) —	(53) —	(53) —	(53) —	(53) —
(54) 54	(54) —	(54) —	(54) —	(54) —	(54) —	(54) Cavity Seal	(54) 54	(54) 0.75	(54) BK	(54) 90 02	(54) II	(54) —
55	—	—	—	—	—	Not Occupied	55	—	—	—	—	—

X227 Front Seat Wiring Harness - Center to Body Wiring Harness (AZ3 and UBI)



4992168



4993301

Connector Part Information
- Harness Type: Front Seat Wiring Harness - Center
- OEM Connector: 35016652
- Service Connector: Service by Harness - See Part Catalog
- Description: 55-Way F 1.2 OCS, 2.8, 6.3 CTS Series, Sealed(BK)

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 35205173
- Service Connector: 84727364
- Description: 55-Way M 1.2 OCS, 2.8, 6.3 CTS Series, Sealed(BK)

Terminal Part Information

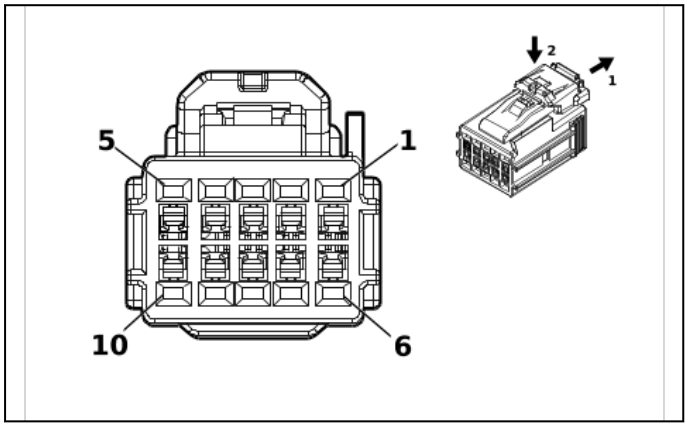
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required
II	87838750	J-35616-13 (BU)	J-38125-215A

X227 Front Seat Wiring Harness - Center to Body Wiring Harness (AZ3 and UBI)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
1	—	—	—	—	—	Not Occupied	1	—	—	—	—	—
(2) 2	(2) 0.75	(2) BK	(2) 0	(2) I	(2) —	(2) —	(2) 2	(2) 0.75	(2) BK	(2) 9001	(2) II	(2) —
(3) 3	(3) —	(3) —	(3) —	(3) —	(3) —	(3) Ambient Light Device 1 LIN Bus 1	(3) 3	(3) 0.35	(3) BN / GN	(3) 8924	(3) II	(3) —
(4) 4	(4) —	(4) —	(4) —	(4) —	(4) —	(4) LED Ambient Lighting Enable Signal	(4) 4	(4) 0.35	(4) WH / VT	(4) 4849	(4) II	(4) —
5 - 11	—	—	—	—	—	Not Occupied	5 - 11	—	—	—	—	—
(12) 12	(12) 0.75	(12) BK	(12) 0	(12) I	(12) —	(12) —	(12) 12	(12) 0.75	(12) BK	(12) 9001	(12) II	(12) —
13 - 31	—	—	—	—	—	Not Occupied	13 - 31	—	—	—	—	—
(32) 32	(32) 0.5	(32) BN / BK	(32) 4996	(32) I	(32) —	(32) Immobilizer Antenna Signal [+]	(32) 32	(32) 0.5	(32) BN / BK	(32) 4996	(32) II	(32) —
(33) 33	(33) 0.5	(33) WH / GY	(33) 4997	(33) I	(33) —	(33) Immobilizer Antenna Low Signal	(33) 33	(33) 0.5	(33) WH / GY	(33) 4997	(33) II	(33) —
34 - 36	—	—	—	—	—	Not Occupied	34 - 36	—	—	—	—	—

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(37) 37	(37) —	(37) —	(37) —	(37) —	(37) —	(37) Body Control Module LIN Bus 11	(37) 37	(37) 0.35	(37) G N / VT	(37) 28 57	(37) II	(37) —
38 - 43	—	—	—	—	—	Not Occupied	38 - 43	—	—	—	—	—
(44) 44	(44) 0.75	(44) Y E	(44) 68 17	(44) I	(44) —	(44) LED Backlight Dimming Control 1	(44) 44	(44) 0.75	(44) Y E	(44) 68 17	(44) II	(44) —
45 - 46	—	—	—	—	—	Not Occupied	45 - 46	—	—	—	—	—
(47) 47	(47) 0.35	(47) B K	(47) 14 51	(47) I	(47) —	(47) Signal Ground	(47) 47	(47) 0.75	(47) B K / WH	(47) 14 51	(47) II	(47) —
(48) 48	(48) 0.35	(48) V T	(48) 47 01	(48) I	(48) —	(48) Retained Accessory Power Control	(48) 48	(48) 0.35	(48) V T	(48) 47 01	(48) II	(48) —
49 - 50	—	—	—	—	—	Not Occupied	49 - 50	—	—	—	—	—
(51) 51	(51) —	(51) —	(51) —	(51) —	(51) —	(51) Signal Ground	(51) 51	(51) 0.75	(51) B K / WH	(51) 14 51	(51) II	(51) —
52 - 53	—	—	—	—	—	Not Occupied	52 - 53	—	—	—	—	—
(54) 54	(54) 0.75	(54) B K	(54) 0	(54) I	(54) —	(54) —	(54) 54	(54) 0.75	(54) B K	(54) 90 01	(54) II	(54) —
55	—	—	—	—	—	Not Occupied	55	—	—	—	—	—

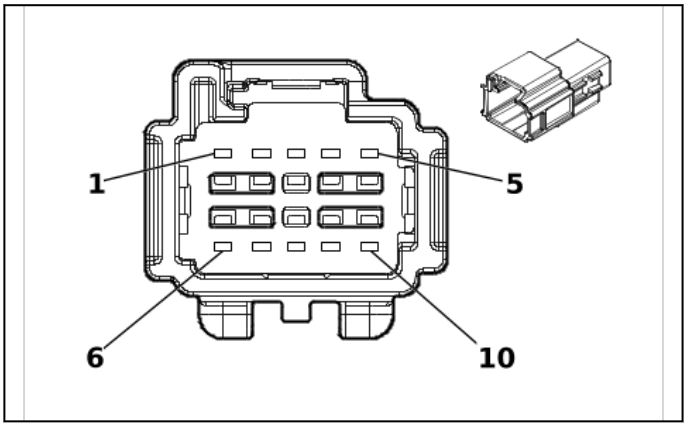
X250 Instrument Panel Wiring Harness to HVAC Assembly Wiring Harness



4254030

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 6098-9004
- Service Connector: 13532428
- Description: 10-Way F 1.2 Series(BK)



5355759

Connector Part Information

- Harness Type: HVAC Assembly Wiring Harness
- OEM Connector: 13530136
- Service Connector: Service by Harness - See Part Catalog
- Description: 10-Way M 1.2 MCON Series(BK)

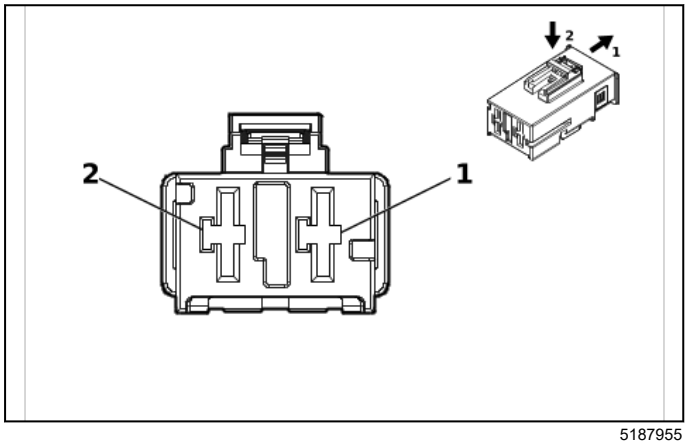
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	84962854	J-35616-12 (BU)	J-38125-215A
II	Not required	J-35616-13 (BU)	No Tool Required

X250 Instrument Panel Wiring Harness to HVAC Assembly Wiring Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
1	—	—	—	—	—	Not Occupied	1	—	—	—	—	—
(2) 2	(2) 0.5	(2) BK	(2) 1050	(2) I	(2) —	(2) Ground	(2) 2	(2) 0.5	(2) BK	(2) 1050	(2) II	(2) —
3 - 4	—	—	—	—	—	Not Occupied	3 - 4	—	—	—	—	—
(5) 5	(5) 0.35	(5) GY	(5) 6137	(5) I	(5) —	(5) Air Conditioning Evaporator Temperature Sensor Signal	(5) 5	(5) 0.35	(5) GY	(5) 6137	(5) II	(5) —
(6) 6	(6) 0.35	(6) GN / VT	(6) 2852	(6) I	(6) —	(6) Body Control Module LIN Bus 6	(6) 6	(6) 0.5	(6) GN / VT	(6) 2852	(6) II	(6) —
(7) 7	(7) 0.35	(7) BK / YE	(7) 407	(7) I	(7) —	(7) Sensor Low Reference	(7) 7	(7) 0.35	(7) BK / YE	(7) 407	(7) II	(7) —
(8) 8	(8) 0.5	(8) VT / BK	(8) 339	(8) I	(8) —	(8) Run/ Crank Ignition 1 Voltage	(8) 8	(8) 0.5	(8) VT / BK	(8) 339	(8) II	(8) —
(9) 9	(9) 0.35	(9) WH / YE	(9) 4634	(9) I	(9) —	(9) HVAC Remote Enable Signal	(9) 9	(9) 0.5	(9) WH / YE	(9) 4634	(9) II	(9) C32
10	—	—	—	—	—	Not Occupied	10	—	—	—	—	—

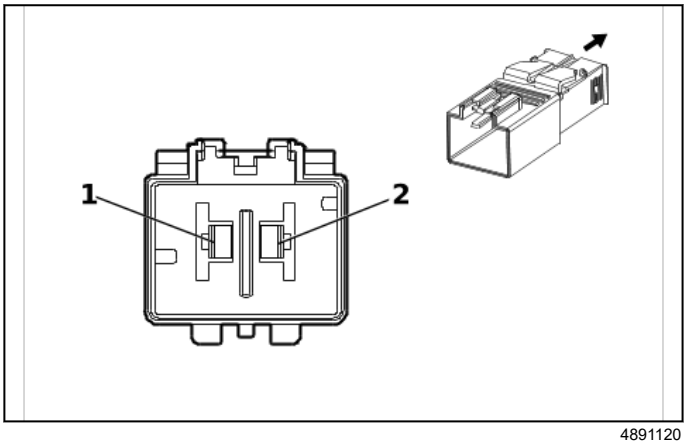
X251 HVAC Assembly Wiring Harness - Electric Heater to Body Wiring Harness (C32)



5187955

Connector Part Information

- Harness Type: HVAC Assembly Wiring Harness - Electric Heater
- OEM Connector: 13525311
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 9.5 MCON-LL Series(BK)



4891120

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 2317373-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way M 9.5 MCON-LL Series(BK)

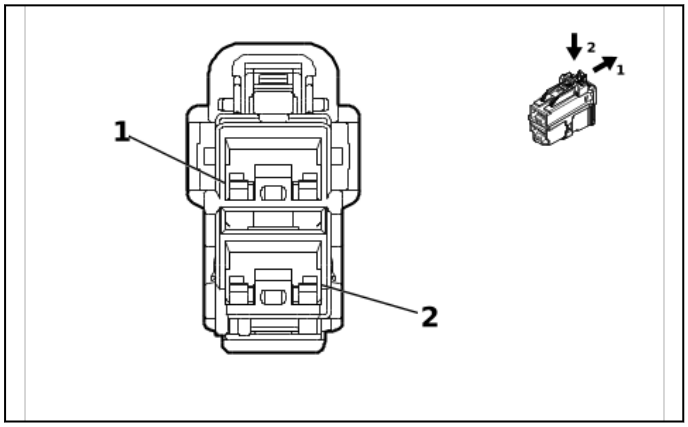
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-21 (RD)	No Tool Required
II	Not required	J-35616-21 (RD)	No Tool Required

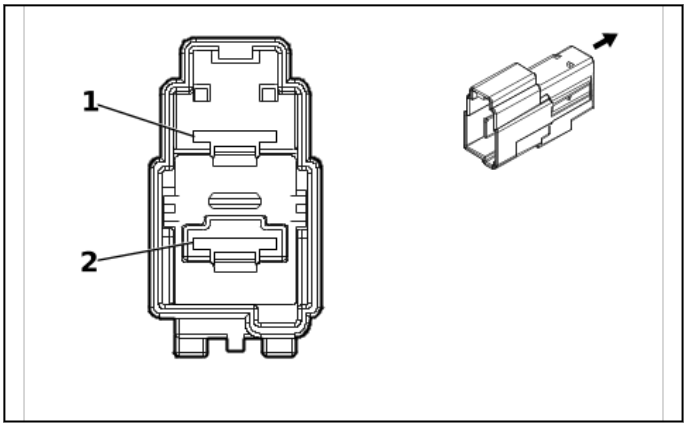
X251 HVAC Assembly Wiring Harness - Electric Heater to Body Wiring Harness (C32)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 10	(1) RD / GY	(1) 642	(1) I	(1) —	(1) Battery Positive Voltage	(1) 1	(1) 10	(1) RD / GY	(1) 642	(1) II	(1) —
2	—	—	—	—	—	Not Occupied	2	—	—	—	—	—

X255 Instrument Panel Wiring Harness to Body Wiring Harness



5835292



5375411

Connector Part Information
- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 7289-8732-30
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 9.5 YESC Series(BK)

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 7288-8751-30
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way M 9.5 Y-Type Series(BK)

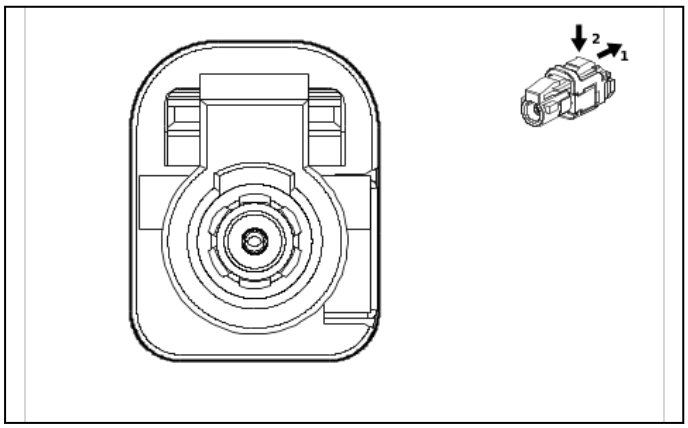
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-42 (RD)	No Tool Required
II	Not required	J-35616-21 (RD)	No Tool Required

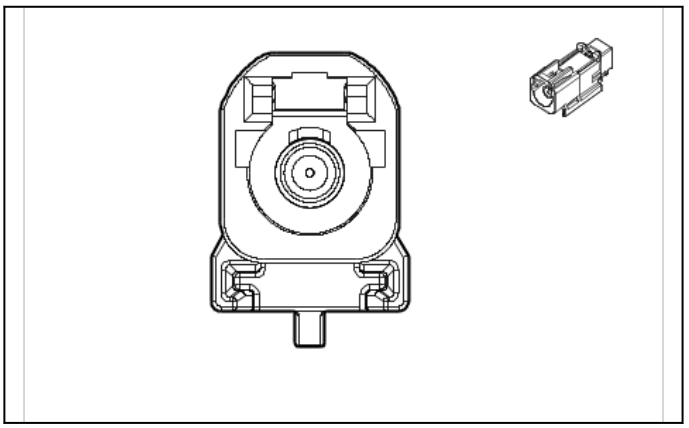
X255 Instrument Panel Wiring Harness to Body Wiring Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 10	(1) RD / WH	(1) 342	(1) I	(1) —	(1) Battery Positive Voltage	(1) 1	(1) 10	(1) RD / WH	(1) 342	(1) II	(1) —
(2) 2	(2) 10	(2) RD / YE	(2) 1442	(2) I	(2) —	(2) Battery Positive Voltage	(2) 2	(2) 10	(2) RD / YE	(2) 1442	(2) II	(2) —

X309 Roof Rear Spoiler Wiring Harness to Body Wiring Harness - 4 - Door



5926227



6186836

Connector Part Information
- Harness Type: Roof Rear Spoiler Wiring Harness
- OEM Connector: 13544788
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way F Mini Coax Type(BK)

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 13532597
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way M Coax Type(BK)

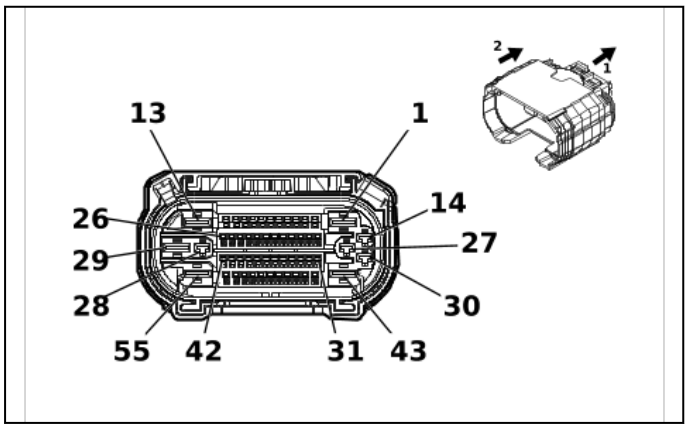
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

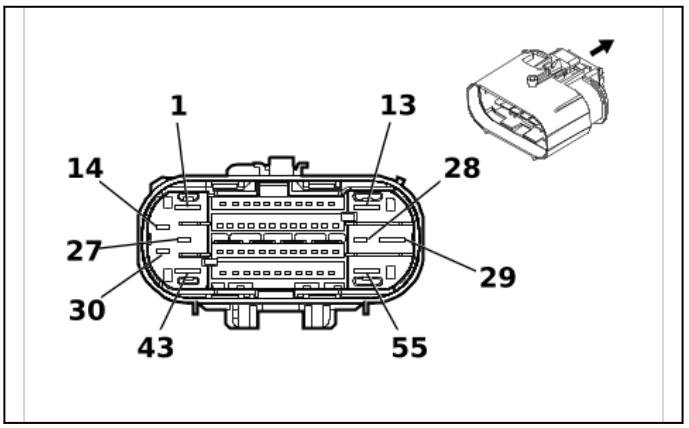
X309 Roof Rear Spoiler Wiring Harness to Body Wiring Harness - 4 - Door

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
BK	—	Coax Cable	6449	I	—	Coaxial Antenna Cell Phone Signal	BK	—	Coax Cable	6449	II	—
Coax Cable	—	—	—	—	—	Not Occupied	Coax Cable	—	—	—	—	—

X331 Front Seat Wiring Harness - Driver to Body Wiring Harness (- A45)



4992168



4993301

Connector Part Information
- Harness Type: Front Seat Wiring Harness - Driver
- OEM Connector: 35997584
- Service Connector: Service by Harness - See Part Catalog
- Description: 55-Way F 1.2 OCS, 2.8, 6.3 CTS Series, Sealed(BK)

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 35205173
- Service Connector: 84727364
- Description: 55-Way M 1.2 OCS, 2.8, 6.3 CTS Series, Sealed(BK)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required
II	Not required	J-35616-42 (RD)	No Tool Required
III	Not required	No Tool Required	No Tool Required
IV	84847992	J-35616-32 (OG)	J-38125-36
V	87838750	J-35616-13 (BU)	J-38125-215A

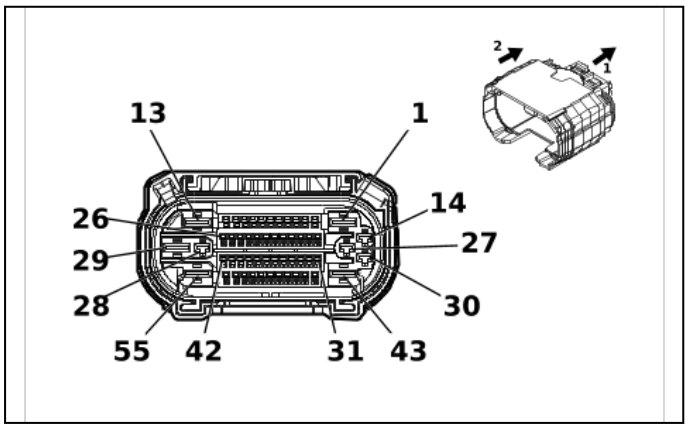
X331 Front Seat Wiring Harness - Driver to Body Wiring Harness (- A45)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 2.5	(1) BK	(1) 1550	(1) II	(1) —	(1) Ground	(1) 1	(1) 2.5	(1) BK	(1) 1550	(1) IV	(1) —
(2) 2	(2) —	(2) —	(2) —	(2) —	(2) —	(2) Cavity Seal	(2) 2	(2) 0.75	(2) BK	(2) 9004	(2) V	(2) —
3	—	—	—	—	—	Not Occupied	3	—	—	—	—	—
(4) 4	(4) 0.75	(4) RD / BN	(4) 2240	(4) I	(4) —	(4) Battery Positive Voltage	(4) 4	(4) 0.75	(4) RD / BN	(4) 2240	(4) V	(4) —
(5) 5	(5) —	(5) —	(5) —	(5) —	(5) —	(5) Driver Seat Adjuster Memory Module LIN Bus 1	(5) 5	(5) 0.35	(5) GN / WH	(5) 7530	(5) V	(5) —
6	—	—	—	—	—	Not Occupied	6	—	—	—	—	—
(7) 7	(7) —	(7) —	(7) —	(7) —	(7) —	(7) Seat Memory Switch Signal 1	(7) 7	(7) 0.35	(7) WH	(7) 615	(7) V	(7) —

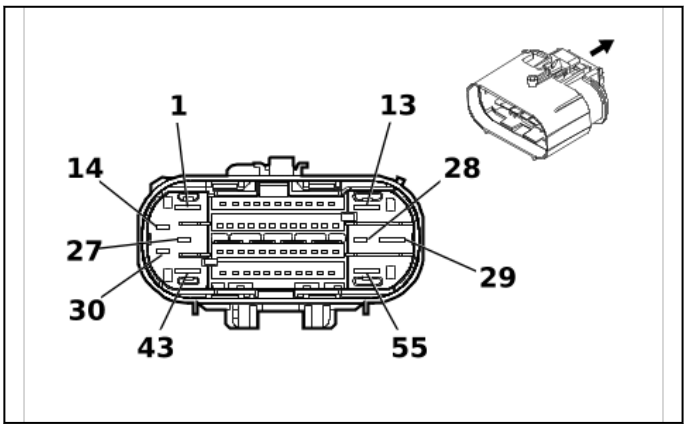
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(8) 8	(8) —	(8) —	(8) —	(8) —	(8) —	(8) Seat Memory Switch Set Signal	(8) 8	(8) 0.35	(8) BU / GN	(8) 614	(8) V	(8) —
9 - 11	—	—	—	—	—	Not Occupied	9 - 11	—	—	—	—	—
(12) 12	(12) —	(12) —	(12) —	(12) —	(12) —	(12) Cavity Seal	(12) 12	(12) 0.75	(12) BK	(12) 9004	(12) V	(12) —
13 - 14	—	—	—	—	—	Not Occupied	13 - 14	—	—	—	—	—
(15) 15	(15) 0.75	(15) BN / VT	(15) 2077	(15) I	(15) KAM	(15) Driver Seat Heating Element Control	(15) 15	(15) 0.75	(15) BN / VT	(15) 2077	(15) V	(15) KAM
(16) 16	(16) 0.75	(16) BN / BK	(16) 2078	(16) I	(16) KAM	(16) Driver Seat Heating Element Low Reference	(16) 16	(16) 0.75	(16) BN / BK	(16) 2078	(16) V	(16) KAM
(17) 17	(17) 0.5	(17) YE / GY	(17) 2079	(17) I	(17) KAM	(17) Driver Seat Heating Temperature Sensor Signal	(17) 17	(17) 0.5	(17) YE / GY	(17) 2079	(17) V	(17) KAM
(18) 18	(18) 0.5	(18) BK / YE	(18) 2080	(18) I	(18) KAM	(18) Driver Heated Seat Thermistor Low Reference	(18) 18	(18) 0.5	(18) BK / YE	(18) 2080	(18) V	(18) KAM
(19) 19	(19) 0.5	(19) BU	(19) 2425	(19) I	(19) KAM	(19) Driver Seat Back Heating Temperature Sensor Signal	(19) 19	(19) 0.5	(19) BU	(19) 2425	(19) V	(19) KAM
(20) 20	(20) 0.75	(20) BN	(20) 2432	(20) I	(20) KAM	(20) Driver Seat Back Heating Element Control	(20) 20	(20) 0.75	(20) BN	(20) 2432	(20) V	(20) KAM
21 - 28	—	—	—	—	—	Not Occupied	21 - 28	—	—	—	—	—
(29) 29	(29) 2.5	(29) RD / YE	(29) 5040	(29) II	(29) —	(29) Battery Positive Voltage	(29) 29	(29) 2.5	(29) RD / YE	(29) 5040	(29) IV	(29) —
30	—	—	—	—	—	Not Occupied	30	—	—	—	—	—
(31) 31	(31) 0.5	(31) OG / GY	(31) 2652	(31) I	(31) —	(31) Driver Seat Belt Sensor Signal	(31) 31	(31) 0.35	(31) OG / GY	(31) 2652	(31) V	(31) —
(32) 32	(32) 0.5	(32) BK / OG	(32) 1363	(32) I	(32) —	(32) Driver Seat Belt Switch Low Reference	(32) 32	(32) 0.5	(32) BK / OG	(32) 1363	(32) V	(32) —
33	—	—	—	—	—	Not Occupied	33	—	—	—	—	—
(34) 34	(34) 0.5	(34) BK / OG	(34) 4963	(34) III	(34) —	(34) Driver Seat Back Air Bag Low Control	(34) 34	(34) 0.5	(34) BK / OG	(34) 4963	(34) V	(34) —
(35) 35	(35) 0.5	(35) OG / BU	(35) 4962	(35) III	(35) —	(35) Driver Seat Back Air Bag High Control	(35) 35	(35) 0.5	(35) OG / BU	(35) 4962	(35) V	(35) —

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
36 - 40	—	—	—	—	—	Not Occupied	36 - 40	—	—	—	—	—
(41) 41	(41) 0.5	(41) BU / VT	(41) 41 01	(41) I	(41) —	(41) AUTOSAR CAN Bus [+] 4 Serial Data	(41) 41	(41) 0.35	(41) BU / VT	(41) 41 01	(41) V	(41) —
(42) 42	(42) 0.5	(42) WH	(42) 41 00	(42) I	(42) —	(42) AUTOSAR CAN Bus [-] 4 Serial Data	(42) 42	(42) 0.35	(42) WH	(42) 41 00	(42) V	(42) —
43	—	—	—	—	—	Not Occupied	43	—	—	—	—	—
(44) 44	(44) —	(44) —	(44) —	(44) —	(44) —	(44) Cavity Seal	(44) 44	(44) 0.75	(44) BK	(44) 90 04	(44) V	(44) —
45 - 47	—	—	—	—	—	Not Occupied	45 - 47	—	—	—	—	—
(48) 48	(48) 0.5	(48) YE / BN	(48) 30 37	(48) I	(48) —	(48) Driver Seat Left Rear Haptic Movement Motor Control	(48) 48	(48) 0.35	(48) YE / BN	(48) 30 37	(48) V	(48) —
(49) 49	(49) 0.5	(49) BN	(49) 30 38	(49) I	(49) —	(49) Driver Seat Right Rear Haptic Movement Motor Control	(49) 49	(49) 0.35	(49) BN	(49) 30 38	(49) V	(49) —
(50) 50	(50) 0.5	(50) BU / VT	(50) 41 01	(50) I	(50) —	(50) AUTOSAR CAN Bus [+] 4 Serial Data	(50) 50	(50) 0.35	(50) BU / VT	(50) 41 01	(50) V	(50) —
(51) 51	(51) 0.5	(51) WH	(51) 41 00	(51) I	(51) —	(51) AUTOSAR CAN Bus [-] 4 Serial Data	(51) 51	(51) 0.35	(51) WH	(51) 41 00	(51) V	(51) —
(52) 52	(52) —	(52) —	(52) —	(52) —	(52) —	(52) Driver Seat Blower Motor Control 1	(52) 52	(52) 0.5	(52) GN / VT	(52) 59 06	(52) V	(52) KU9
(53) 53	(53) —	(53) —	(53) —	(53) —	(53) —	(53) Run/ Crank Ignition 1 Voltage	(53) 53	(53) 0.75	(53) VT / WH	(53) 11 39	(53) V	(53) KU9
(54) 54	(54) —	(54) —	(54) —	(54) —	(54) —	(54) Cavity Seal	(54) 54	(54) 0.75	(54) BK	(54) 90 04	(54) V	(54) —
55	—	—	—	—	—	Not Occupied	55	—	—	—	—	—

X331 Front Seat Wiring Harness - Driver to Body Wiring Harness (A45)



4992168



4993301

Connector Part Information
- Harness Type: Front Seat Wiring Harness - Driver
- OEM Connector: 35997582
- Service Connector: Service by Harness - See Part Catalog
- Description: 55-Way F 1.2 OCS, 2.8, 6.3 CTS Series, Sealed(BK)

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 35205173
- Service Connector: Service by Harness - See Part Catalog
- Description: 55-Way M 1.2 OCS, 2.8, 6.3 CTS Series, Sealed(BK)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required
II	Not required	J-35616-42 (RD)	No Tool Required
III	Not required	No Tool Required	No Tool Required
IV	Not required	J-35616-13 (BU)	No Tool Required
V	Not required	J-35616-32 (OG)	No Tool Required

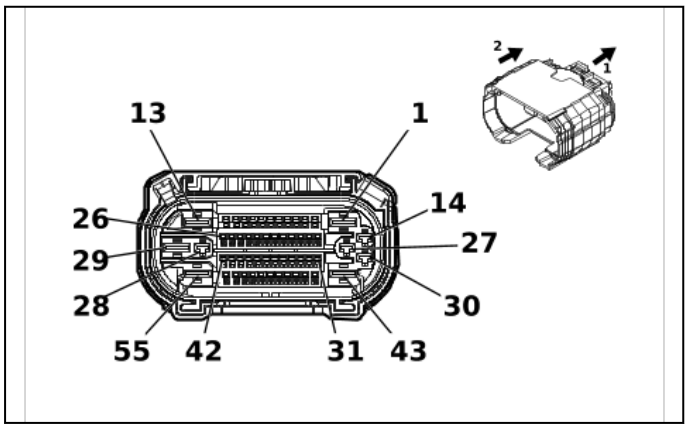
X331 Front Seat Wiring Harness - Driver to Body Wiring Harness (A45)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 2.5	(1) BK	(1) 1550	(1) II	(1) —	(1) Ground	(1) 1	(1) 2.5	(1) BK	(1) 1550	(1) V	(1) —
(2) 2	(2) —	(2) —	(2) —	(2) —	(2) —	(2) Cavity Seal	(2) 2	(2) 0.75	(2) BK	(2) 9004	(2) IV	(2) —
3	—	—	—	—	—	Not Occupied	3	—	—	—	—	—
(4) 4	(4) 0.5	(4) RD / BN	(4) 2240	(4) I	(4) —	(4) Battery Positive Voltage	(4) 4	(4) 0.75	(4) RD / BN	(4) 2240	(4) IV	(4) —
(5) 5	(5) 0.35	(5) GN / WH	(5) 7530	(5) I	(5) —	(5) Driver Seat Adjuster Memory Module LIN Bus 1	(5) 5	(5) 0.35	(5) GN / WH	(5) 7530	(5) IV	(5) N38
6	—	—	—	—	—	Not Occupied	6	—	—	—	—	—
(7) 7	(7) 0.35	(7) WH	(7) 615	(7) I	(7) —	(7) Seat Memory Switch Signal 1	(7) 7	(7) 0.35	(7) WH	(7) 615	(7) IV	(7) —

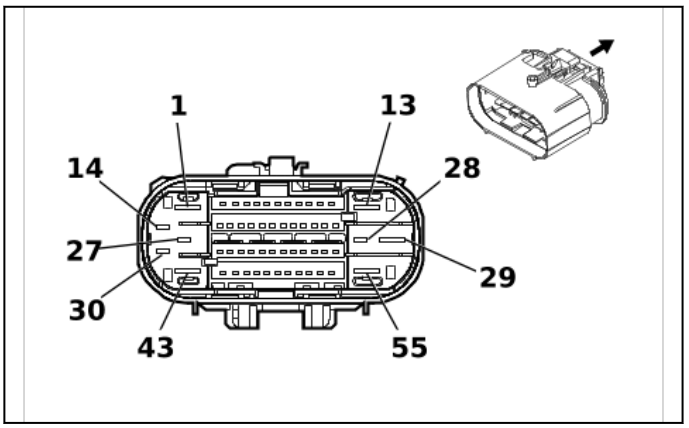
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(8) 8	(8) 0.35	(8) BU / GN	(8) 614	(8) I	(8) —	(8) Seat Memory Switch Set Signal	(8) 8	(8) 0.35	(8) BU / GN	(8) 614	(8) IV	(8) —
9 - 11	—	—	—	—	—	Not Occupied	9 - 11	—	—	—	—	—
(12) 12	(12) —	(12) —	(12) —	(12) —	(12) —	(12) Cavity Seal	(12) 12	(12) 0.75	(12) BK	(12) 9004	(12) IV	(12) —
13 - 14	—	—	—	—	—	Not Occupied	13 - 14	—	—	—	—	—
(15) 15	(15) 0.75	(15) BN / VT	(15) 2077	(15) I	(15) KAM	(15) Driver Seat Heating Element Control	(15) 15	(15) 0.75	(15) BN / VT	(15) 2077	(15) IV	(15) KAM
(16) 16	(16) 0.75	(16) BN / BK	(16) 2078	(16) I	(16) KAM	(16) Driver Seat Heating Element Low Reference	(16) 16	(16) 0.75	(16) BN / BK	(16) 2078	(16) IV	(16) KAM
(17) 17	(17) 0.5	(17) YE / GY	(17) 2079	(17) I	(17) KAM	(17) Driver Seat Heating Temperature Sensor Signal	(17) 17	(17) 0.5	(17) YE / GY	(17) 2079	(17) IV	(17) KAM
(18) 18	(18) 0.5	(18) BK / YE	(18) 2080	(18) I	(18) KAM	(18) Driver Heated Seat Thermistor Low Reference	(18) 18	(18) 0.5	(18) BK / YE	(18) 2080	(18) IV	(18) KAM
(19) 19	(19) 0.5	(19) BU	(19) 2425	(19) I	(19) KAM	(19) Driver Seat Back Heating Temperature Sensor Signal	(19) 19	(19) 0.5	(19) BU	(19) 2425	(19) IV	(19) KAM
(20) 20	(20) 0.75	(20) BN	(20) 2432	(20) I	(20) KAM	(20) Driver Seat Back Heating Element Control	(20) 20	(20) 0.75	(20) BN	(20) 2432	(20) IV	(20) KAM
21 - 28	—	—	—	—	—	Not Occupied	21 - 28	—	—	—	—	—
(29) 29	(29) 2.5	(29) RD / YE	(29) 5040	(29) II	(29) —	(29) Battery Positive Voltage	(29) 29	(29) 2.5	(29) RD / YE	(29) 5040	(29) V	(29) —
30	—	—	—	—	—	Not Occupied	30	—	—	—	—	—
(31) 31	(31) 0.5	(31) OG / GY	(31) 2652	(31) I	(31) —	(31) Driver Seat Belt Sensor Signal	(31) 31	(31) 0.35	(31) OG / GY	(31) 2652	(31) IV	(31) —
(32) 32	(32) 0.5	(32) BK / OG	(32) 1363	(32) I	(32) —	(32) Driver Seat Belt Switch Low Reference	(32) 32	(32) 0.5	(32) BK / OG	(32) 1363	(32) IV	(32) —
33	—	—	—	—	—	Not Occupied	33	—	—	—	—	—
(34) 34	(34) 0.5	(34) BK / OG	(34) 4963	(34) III	(34) —	(34) Driver Seat Back Air Bag Low Control	(34) 34	(34) 0.5	(34) BK / OG	(34) 4963	(34) IV	(34) —
(35) 35	(35) 0.5	(35) OG / BU	(35) 4962	(35) III	(35) —	(35) Driver Seat Back Air Bag High Control	(35) 35	(35) 0.5	(35) OG / BU	(35) 4962	(35) IV	(35) —

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
36 - 40	—	—	—	—	—	Not Occupied	36 - 40	—	—	—	—	—
(41) 41	(41) 0.35	(41) BU / VT	(41) 41 01	(41) I	(41) —	(41) AUTOSAR CAN Bus [+] 4 Serial Data	(41) 41	(41) 0.35	(41) BU / VT	(41) 41 01	(41) IV	(41) —
(42) 42	(42) 0.35	(42) WH	(42) 41 00	(42) I	(42) —	(42) AUTOSAR CAN Bus [-] 4 Serial Data	(42) 42	(42) 0.35	(42) WH	(42) 41 00	(42) IV	(42) —
43	—	—	—	—	—	Not Occupied	43	—	—	—	—	—
(44) 44	(44) 0.75	(44) BK	(44) 0	(44) I	(44) —	(44) —	(44) 44	(44) 0.75	(44) BK	(44) 90 04	(44) IV	(44) —
45 - 47	—	—	—	—	—	Not Occupied	45 - 47	—	—	—	—	—
(48) 48	(48) —	(48) —	(48) —	(48) —	(48) —	(48) Driver Seat Left Rear Haptic Movement Motor Control	(48) 48	(48) 0.35	(48) YE / BN	(48) 30 37	(48) IV	(48) —
(49) 49	(49) —	(49) —	(49) —	(49) —	(49) —	(49) Driver Seat Right Rear Haptic Movement Motor Control	(49) 49	(49) 0.35	(49) BN	(49) 30 38	(49) IV	(49) —
(50) 50	(50) 0.35	(50) BU / VT	(50) 41 01	(50) I	(50) —	(50) AUTOSAR CAN Bus [+] 4 Serial Data	(50) 50	(50) 0.35	(50) BU / VT	(50) 41 01	(50) IV	(50) —
(51) 51	(51) 0.35	(51) WH	(51) 41 00	(51) I	(51) —	(51) AUTOSAR CAN Bus [-] 4 Serial Data	(51) 51	(51) 0.35	(51) WH	(51) 41 00	(51) IV	(51) —
(52) 52	(52) 0.5	(52) GN / VT	(52) 59 06	(52) I	(52) KU9	(52) Driver Seat Blower Motor Control 1	(52) 52	(52) 0.5	(52) GN / VT	(52) 59 06	(52) IV	(52) KU9
(53) 53	(53) 0.75	(53) VT / WH	(53) 11 39	(53) I	(53) KU9	(53) Run/ Crank Ignition 1 Voltage	(53) 53	(53) 0.75	(53) VT / WH	(53) 11 39	(53) IV	(53) KU9
(54) 54	(54) —	(54) —	(54) —	(54) —	(54) —	(54) Cavity Seal	(54) 54	(54) 0.75	(54) BK	(54) 90 04	(54) IV	(54) —
55	—	—	—	—	—	Not Occupied	55	—	—	—	—	—

X336 Front Seat Wiring Harness - Passenger to Body Wiring Harness (- (AHH / AKE))



4992168



4993301

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Passenger
- OEM Connector: 35649541
- Service Connector: Service by Harness - See Part Catalog
- Description: 55-Way F 1.2 OCS, 2.8, 6.3 CTS Series, Sealed(BK)

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 35205173
- Service Connector: 84727364
- Description: 55-Way M 1.2 OCS, 2.8, 6.3 CTS Series, Sealed(BK)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required
II	Not required	J-35616-42 (RD)	No Tool Required
III	Not required	No Tool Required	No Tool Required
IV	84847992	J-35616-32 (OG)	J-38125-36
V	87838750	J-35616-13 (BU)	J-38125-215A

X336 Front Seat Wiring Harness - Passenger to Body Wiring Harness (- (AHH / AKE))

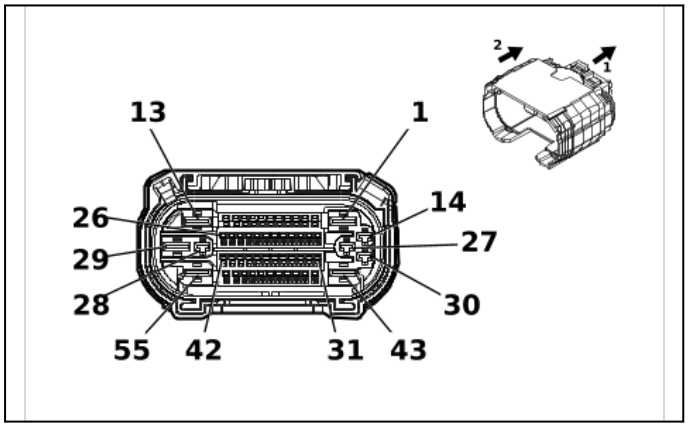
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 2.5 (1) 0.75	(1) BK (1) BK	(1) 1350 (1) 1350	(1) II (1) II	(1) A7K (1) KAM - A7K	(1) Ground (1) Ground	(1) 1	(1) 2.5	(1) BK	(1) 1350	(1) IV	(1) —
(2) 2	(2) —	(2) —	(2) —	(2) —	(2) —	(2) Cavity Seal	(2) 2	(2) 0.75	(2) BK	(2) 9000	(2) V	(2) —
(3) 3	(3) 0.75	(3) RD / GN	(3) 6140	(3) I	(3) KAM	(3) Battery Positive Voltage	(3) 3	(3) 0.75	(3) RD / GN	(3) 6140	(3) V	(3) KAM
(4) 4	(4) 0.75 (4) 0.5	(4) RD / BN (4) RD / BN	(4) 2240 (4) 2240	(4) I (4) I	(4) A7K - AVU (4) AVU - AHH - AKE	(4) Battery Positive Voltage (4) Battery Positive Voltage	(4) 4	(4) 0.75	(4) RD / BN	(4) 2240	(4) V	(4) —
(5) 5	(5) 0.75	(5) RD / BN	(5) 6640	(5) I	(5) KAM	(5) Battery Positive Voltage	(5) 5	(5) 0.75	(5) RD / BN	(5) 6640	(5) V	(5) KAM
6	—	—	—	—	—	Not Occupied	6	—	—	—	—	—

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(7) 7	(7) 0.5	(7) BU	(7) 4987	(7) I	(7) —	(7) AUTOSAR CAN Bus [+] 1 Serial Data	(7) 7	(7) 0.35	(7) BU	(7) 4987	(7) V	(7) —
(8) 8	(8) 0.5	(8) WH	(8) 4986	(8) I	(8) —	(8) AUTOSAR CAN Bus [-] 1 Serial Data	(8) 8	(8) 0.35	(8) WH	(8) 4986	(8) V	(8) —
9 - 11	—	—	—	—	—	Not Occupied	9 - 11	—	—	—	—	—
(12) 12	(12) —	(12) —	(12) —	(12) —	(12) —	(12) Cavity Seal	(12) 12	(12) 0.75	(12) BK	(12) 9000	(12) V	(12) —
13 - 14	—	—	—	—	—	Not Occupied	13 - 14	—	—	—	—	—
(15) 15	(15) 0.75	(15) BN / VT	(15) 2077	(15) I	(15) KAM	(15) Driver Seat Heating Element Control	(15) 15	(15) 0.75	(15) BN / VT	(15) 2077	(15) V	(15) KAM
(16) 16	(16) 0.75	(16) BN / BK	(16) 2078	(16) I	(16) KAM	(16) Driver Seat Heating Element Low Reference	(16) 16	(16) 0.75	(16) BN / BK	(16) 2078	(16) V	(16) KAM
(17) 17	(17) 0.5	(17) YE / GY	(17) 2079	(17) I	(17) KAM	(17) Driver Seat Heating Temperature Sensor Signal	(17) 17	(17) 0.5	(17) YE / GY	(17) 2079	(17) V	(17) KAM
(18) 18	(18) 0.5	(18) BK / YE	(18) 2080	(18) I	(18) KAM	(18) Driver Heated Seat Thermistor Low Reference	(18) 18	(18) 0.5	(18) BK / YE	(18) 2080	(18) V	(18) KAM
(19) 19	(19) 0.5	(19) BU	(19) 2425	(19) I	(19) KAM	(19) Driver Seat Back Heating Temperature Sensor Signal	(19) 19	(19) 0.5	(19) BU	(19) 2425	(19) V	(19) KAM
(20) 20	(20) 0.75	(20) BN	(20) 2432	(20) I	(20) KAM	(20) Driver Seat Back Heating Element Control	(20) 20	(20) 0.75	(20) BN	(20) 2432	(20) V	(20) KAM
(21) 21	(21) 0.5	(21) GN / VT	(21) 2857	(21) I	(21) KAM	(21) Body Control Module LIN Bus 11	(21) 21	(21) 0.35	(21) GN / VT	(21) 2857	(21) V	(21) KAM
(22) 22	(22) 0.5	(22) OG / BU	(22) 5056	(22) I	(22) —	(22) Passenger Seat Adjuster Switch Signal	(22) 22	(22) 0.5	(22) OG / BU	(22) 5056	(22) V	(22) —
(23) 23	(23) 0.5	(23) RD / GN	(23) 4440	(23) I	(23) —	(23) Battery Positive Voltage	(23) 23	(23) 0.5	(23) RD / GN	(23) 4440	(23) V	(23) —
(24) 24	(24) 0.5	(24) GY / OG	(24) 3946	(24) I	(24) —	(24) Passenger Automatic Locking Retractor Switch Low Reference	(24) 24	(24) 0.35	(24) GY / OG	(24) 3946	(24) V	(24) —

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(25) 25	(25) 0.5	(25) OG / BN	(25) 39 47	(25) I	(25) —	(25) Passenger Automatic Locking Retractor Switch Signal	(25) 25	(25) 0.35	(25) OG / BN	(25) 39 47	(25) V	(25) —
(26) 26	(26) 0.5	(26) BK / WH	(26) 12 51	(26) I	(26) —	(26) Signal Ground	(26) 26	(26) 0.5	(26) BK / WH	(26) 12 51	(26) V	(26) —
27 - 28	—	—	—	—	—	Not Occupied	27 - 28	—	—	—	—	—
(29) 29	(29) 2.5	(29) RD / YE	(29) 74 40	(29) II	(29) —	(29) Battery Positive Voltage	(29) 29	(29) 2.5	(29) RD / YE	(29) 74 40	(29) IV	(29) —
30	—	—	—	—	—	Not Occupied	30	—	—	—	—	—
(31) 31	(31) 0.5	(31) OG / WH	(31) 26 53	(31) I	(31) —	(31) Passenger Seat Belt Sensor Signal	(31) 31	(31) 0.35	(31) OG / WH	(31) 26 53	(31) V	(31) —
(32) 32	(32) 0.5	(32) BK / OG	(32) 13 63	(32) I	(32) —	(32) Driver Seat Belt Switch Low Reference	(32) 32	(32) 0.5	(32) BK / OG	(32) 13 63	(32) V	(32) —
33	—	—	—	—	—	Not Occupied	33	—	—	—	—	—
(34) 34	(34) 0.5	(34) BU / OG	(34) 49 57	(34) III	(34) —	(34) Passenger Seat Back Air Bag Low Control	(34) 34	(34) 0.5	(34) BU / OG	(34) 49 57	(34) V	(34) —
(35) 35	(35) 0.5	(35) OG / GY	(35) 49 56	(35) III	(35) —	(35) Passenger Seat Back Air Bag High Control	(35) 35	(35) 0.5	(35) OG / GY	(35) 49 56	(35) V	(35) —
(36) 36	(36) 0.5	(36) GN / VT	(36) 59 06	(36) I	(36) KU9	(36) Driver Seat Blower Motor Control 1	(36) 36	(36) 0.5	(36) GN / VT	(36) 59 06	(36) V	(36) KU9
(37) 37	(37) 0.75	(37) VT / WH	(37) 11 39	(37) I	(37) KU9	(37) Run/ Crank Ignition 1 Voltage	(37) 37	(37) 0.75	(37) VT / WH	(37) 11 39	(37) V	(37) KU9
38 - 40	—	—	—	—	—	Not Occupied	38 - 40	—	—	—	—	—
(41) 41	(41) 0.5	(41) BU / VT	(41) 41 01	(41) I	(41) —	(41) AUTOSAR CAN Bus [+] 4 Serial Data	(41) 41	(41) 0.35	(41) BU / VT	(41) 41 01	(41) V	(41) —
(42) 42	(42) 0.5	(42) WH	(42) 41 00	(42) I	(42) —	(42) AUTOSAR CAN Bus [-] 4 Serial Data	(42) 42	(42) 0.35	(42) WH	(42) 41 00	(42) V	(42) —
43	—	—	—	—	—	Not Occupied	43	—	—	—	—	—
(44) 44	(44) —	(44) —	(44) —	(44) —	(44) —	(44) Cavity Seal	(44) 44	(44) 0.75	(44) BK	(44) 90 00	(44) V	(44) —
45 - 49	—	—	—	—	—	Not Occupied	45 - 49	—	—	—	—	—
(50) 50	(50) 0.5	(50) BU / VT	(50) 41 01	(50) I	(50) —	(50) AUTOSAR CAN Bus [+] 4 Serial Data	(50) 50	(50) 0.35	(50) BU / VT	(50) 41 01	(50) V	(50) —

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(51) 51	(51) 0.5	(51) WH	(51) 41 00	(51) I	(51) —	(51) AUTOSAR CAN Bus [-] 4 Serial Data	(51) 51	(51) 0.35	(51) WH	(51) 41 00	(51) V	(51) —
(52) 52	(52) 0.5	(52) BU	(52) 49 87	(52) I	(52) —	(52) AUTOSAR CAN Bus [+] 1 Serial Data	(52) 52	(52) 0.35	(52) BU	(52) 49 87	(52) V	(52) —
(53) 53	(53) 0.5	(53) WH	(53) 49 86	(53) I	(53) —	(53) AUTOSAR CAN Bus [-] 1 Serial Data	(53) 53	(53) 0.35	(53) WH	(53) 49 86	(53) V	(53) —
(54) 54	(54) —	(54) —	(54) —	(54) —	(54) —	(54) Cavity Seal	(54) 54	(54) 0.75	(54) BK	(54) 90 00	(54) V	(54) —
55	—	—	—	—	—	Not Occupied	55	—	—	—	—	—

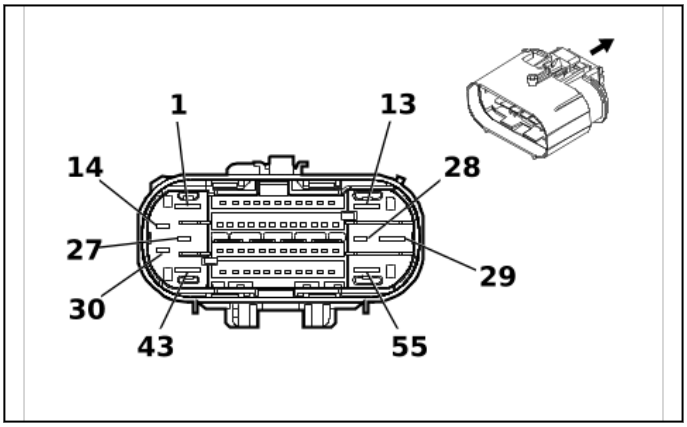
X336 Front Seat Wiring Harness - Passenger to Body Wiring Harness (AHH / AKE)



4992168

Connector Part Information

- Harness Type: Front Seat Wiring Harness - Passenger
- OEM Connector: 35997587
- Service Connector: Service by Harness - See Part Catalog
- Description: 55-Way F 1.2 OCS, 2.8, 6.3 CTS Series, Sealed(BK)



4993301

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 35205173
- Service Connector: Service by Harness - See Part Catalog
- Description: 55-Way M 1.2 OCS, 2.8, 6.3 CTS Series, Sealed(BK)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required
II	Not required	J-35616-42 (RD)	No Tool Required
III	Not required	No Tool Required	No Tool Required
IV	Not required	J-35616-13 (BU)	No Tool Required
V	Not required	J-35616-32 (OG)	No Tool Required

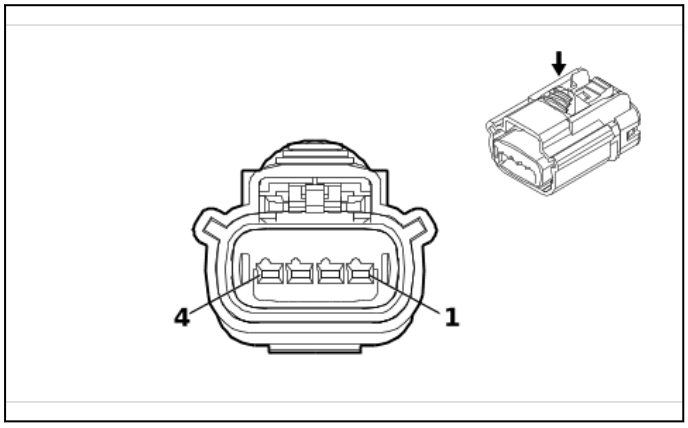
X336 Front Seat Wiring Harness - Passenger to Body Wiring Harness (AHH / AKE)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 2.5	(1) BK	(1) 1350	(1) II	(1) —	(1) Ground	(1) 1	(1) 2.5	(1) BK	(1) 1350	(1) V	(1) —
(2) 2	(2) —	(2) —	(2) —	(2) —	(2) —	(2) Cavity Seal	(2) 2	(2) 0.75	(2) BK	(2) 9002	(2) IV	(2) —
(3) 3	(3) 0.75	(3) RD / GN	(3) 6140	(3) I	(3) KAM	(3) Battery Positive Voltage	(3) 3	(3) 0.75	(3) RD / GN	(3) 6140	(3) IV	(3) KAM
(4) 4	(4) 0.5	(4) RD / BN	(4) 2240	(4) I	(4) —	(4) Battery Positive Voltage	(4) 4	(4) 0.75	(4) RD / BN	(4) 2240	(4) IV	(4) —
(5) 5	(5) 0.75	(5) RD / BN	(5) 6640	(5) I	(5) KAM	(5) Battery Positive Voltage	(5) 5	(5) 0.75	(5) RD / BN	(5) 6640	(5) IV	(5) KAM
6	—	—	—	—	—	Not Occupied	6	—	—	—	—	—
(7) 7	(7) 0.5	(7) BU	(7) 4987	(7) I	(7) —	(7) AUTOSAR CAN Bus [+] 1 Serial Data	(7) 7	(7) 0.35	(7) BU	(7) 4987	(7) IV	(7) —
(8) 8	(8) 0.5	(8) WH	(8) 4986	(8) I	(8) —	(8) AUTOSAR CAN Bus [-] 1 Serial Data	(8) 8	(8) 0.35	(8) WH	(8) 4986	(8) IV	(8) —
9 - 11	—	—	—	—	—	Not Occupied	9 - 11	—	—	—	—	—
(12) 12	(12) —	(12) —	(12) —	(12) —	(12) —	(12) Cavity Seal	(12) 12	(12) 0.75	(12) BK	(12) 9002	(12) IV	(12) —
13 - 14	—	—	—	—	—	Not Occupied	13 - 14	—	—	—	—	—
(15) 15	(15) 0.75	(15) BN / VT	(15) 2077	(15) I	(15) KAM	(15) Driver Seat Heating Element Control	(15) 15	(15) 0.75	(15) BN / VT	(15) 2077	(15) IV	(15) KAM
(16) 16	(16) 0.75	(16) BN / BK	(16) 2078	(16) I	(16) KAM	(16) Driver Seat Heating Element Low Reference	(16) 16	(16) 0.75	(16) BN / BK	(16) 2078	(16) IV	(16) KAM
(17) 17	(17) 0.5	(17) YE / GY	(17) 2079	(17) I	(17) KAM	(17) Driver Seat Heating Temperature Sensor Signal	(17) 17	(17) 0.5	(17) YE / GY	(17) 2079	(17) IV	(17) KAM
(18) 18	(18) 0.5	(18) BK / YE	(18) 2080	(18) I	(18) KAM	(18) Driver Heated Seat Thermistor Low Reference	(18) 18	(18) 0.5	(18) BK / YE	(18) 2080	(18) IV	(18) KAM
(19) 19	(19) 0.5	(19) BU	(19) 2425	(19) I	(19) KAM	(19) Driver Seat Back Heating Temperature Sensor Signal	(19) 19	(19) 0.5	(19) BU	(19) 2425	(19) IV	(19) KAM
(20) 20	(20) 0.75	(20) BN	(20) 2432	(20) I	(20) KAM	(20) Driver Seat Back Heating Element Control	(20) 20	(20) 0.75	(20) BN	(20) 2432	(20) IV	(20) KAM

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(21) 21	(21) 0.5	(21) GN / VT	(21) 28 57	(21) I	(21) KAM	(21) Body Control Module LIN Bus 11	(21) 21	(21) 0.35	(21) GN / VT	(21) 28 57	(21) IV	(21) KAM
(22) 22	(22) 0.5	(22) OG / BU	(22) 50 56	(22) I	(22) —	(22) Passenger Seat Adjuster Switch Signal	(22) 22	(22) 0.5	(22) OG / BU	(22) 50 56	(22) IV	(22) —
(23) 23	(23) 0.5	(23) RD / GN	(23) 44 40	(23) I	(23) —	(23) Battery Positive Voltage	(23) 23	(23) 0.5	(23) RD / GN	(23) 44 40	(23) IV	(23) —
(24) 24	(24) 0.5	(24) GY / OG	(24) 39 46	(24) I	(24) —	(24) Passenger Automatic Locking Retractor Switch Low Reference	(24) 24	(24) 0.35	(24) GY / OG	(24) 39 46	(24) IV	(24) —
(25) 25	(25) 0.5	(25) OG / BN	(25) 39 47	(25) I	(25) —	(25) Passenger Automatic Locking Retractor Switch Signal	(25) 25	(25) 0.35	(25) OG / BN	(25) 39 47	(25) IV	(25) —
(26) 26	(26) 0.5	(26) BK / WH	(26) 12 51	(26) I	(26) —	(26) Signal Ground	(26) 26	(26) 0.5	(26) BK / WH	(26) 12 51	(26) IV	(26) —
27 - 28	—	—	—	—	—	Not Occupied	27 - 28	—	—	—	—	—
(29) 29	(29) 2.5	(29) RD / YE	(29) 74 40	(29) II	(29) —	(29) Battery Positive Voltage	(29) 29	(29) 2.5	(29) RD / YE	(29) 74 40	(29) V	(29) —
30	—	—	—	—	—	Not Occupied	30	—	—	—	—	—
(31) 31	(31) 0.5	(31) OG / WH	(31) 26 53	(31) I	(31) —	(31) Passenger Seat Belt Sensor Signal	(31) 31	(31) 0.35	(31) OG / WH	(31) 26 53	(31) IV	(31) —
(32) 32	(32) 0.5	(32) BK / OG	(32) 13 63	(32) I	(32) —	(32) Driver Seat Belt Switch Low Reference	(32) 32	(32) 0.5	(32) BK / OG	(32) 13 63	(32) IV	(32) —
33	—	—	—	—	—	Not Occupied	33	—	—	—	—	—
(34) 34	(34) 0.5	(34) BU / OG	(34) 49 57	(34) III	(34) —	(34) Passenger Seat Back Air Bag Low Control	(34) 34	(34) 0.5	(34) BU / OG	(34) 49 57	(34) IV	(34) —
(35) 35	(35) 0.5	(35) OG / GY	(35) 49 56	(35) III	(35) —	(35) Passenger Seat Back Air Bag High Control	(35) 35	(35) 0.5	(35) OG / GY	(35) 49 56	(35) IV	(35) —
(36) 36	(36) 0.5	(36) GN / VT	(36) 59 06	(36) I	(36) KU9	(36) Driver Seat Blower Motor Control 1	(36) 36	(36) 0.5	(36) GN / VT	(36) 59 06	(36) IV	(36) KU9
(37) 37	(37) 0.75	(37) VT / WH	(37) 11 39	(37) I	(37) KU9	(37) Run/ Crank Ignition 1 Voltage	(37) 37	(37) 0.75	(37) VT / WH	(37) 11 39	(37) IV	(37) KU9
38 - 40	—	—	—	—	—	Not Occupied	38 - 40	—	—	—	—	—

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(41) 41	(41) 0.35	(41) B U / VT	(41) 41 01	(41) I	(41) —	(41) AUTOSAR CAN Bus [+] 4 Serial Data	(41) 41	(41) 0.35	(41) B U / VT	(41) 41 01	(41) IV	(41) —
(42) 42	(42) 0.35	(42) WH	(42) 41 00	(42) I	(42) —	(42) AUTOSAR CAN Bus [-] 4 Serial Data	(42) 42	(42) 0.35	(42) WH	(42) 41 00	(42) IV	(42) —
43	—	—	—	—	—	Not Occupied	43	—	—	—	—	—
(44) 44	(44) 0.75	(44) B K	(44) 0	(44) I	(44) —	(44) —	(44) 44	(44) 0.75	(44) B K	(44) 90 02	(44) IV	(44) —
45 - 49	—	—	—	—	—	Not Occupied	45 - 49	—	—	—	—	—
(50) 50	(50) 0.35	(50) B U / VT	(50) 41 01	(50) I	(50) —	(50) AUTOSAR CAN Bus [+] 4 Serial Data	(50) 50	(50) 0.35	(50) B U / VT	(50) 41 01	(50) IV	(50) —
(51) 51	(51) 0.35	(51) WH	(51) 41 00	(51) I	(51) —	(51) AUTOSAR CAN Bus [-] 4 Serial Data	(51) 51	(51) 0.35	(51) WH	(51) 41 00	(51) IV	(51) —
(52) 52	(52) 0.5	(52) B U	(52) 49 87	(52) I	(52) —	(52) AUTOSAR CAN Bus [+] 1 Serial Data	(52) 52	(52) 0.35	(52) B U	(52) 49 87	(52) IV	(52) —
(53) 53	(53) 0.5	(53) WH	(53) 49 86	(53) I	(53) —	(53) AUTOSAR CAN Bus [-] 1 Serial Data	(53) 53	(53) 0.35	(53) WH	(53) 49 86	(53) IV	(53) —
(54) 54	(54) —	(54) —	(54) —	(54) —	(54) —	(54) Cavity Seal	(54) 54	(54) 0.75	(54) B K	(54) 90 02	(54) IV	(54) —
55	—	—	—	—	—	Not Occupied	55	—	—	—	—	—

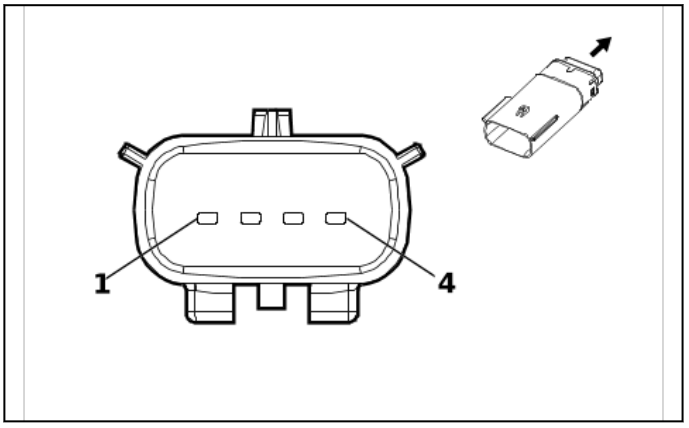
X340 Body Wiring Harness to Rear Seat Heater Control Wiring Harness (KCB)



4455251

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 15514524
- Service Connector: 19355605
- Description: 4-Way F 1.5 OCS Series, Sealed(BK)



2917338

Connector Part Information

- Harness Type: Rear Seat Heater Control Wiring Harness
- OEM Connector: 33481-4401
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way M 1.5 Series, Sealed(BK)

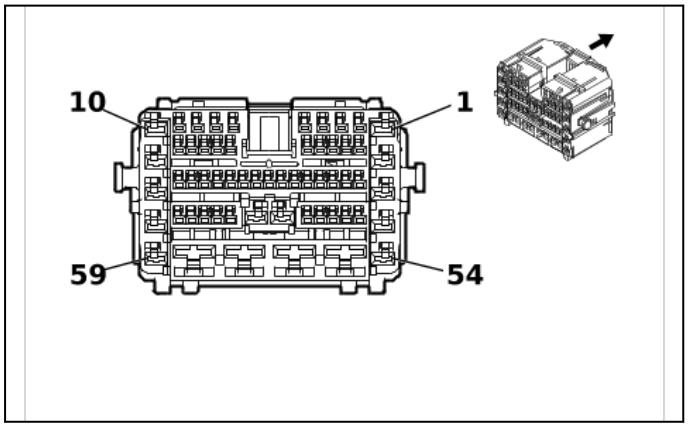
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required
II	Not required	J-35616-3 (GY)	No Tool Required

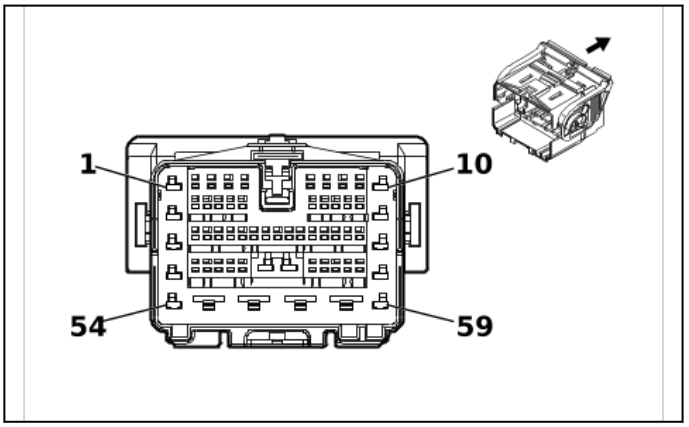
X340 Body Wiring Harness to Rear Seat Heater Control Wiring Harness (KCB)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) RD / BN	(1) 6640	(1) I	(1) —	(1) Battery Positive Voltage	(1) 1	(1) 0.75	(1) RD / WH	(1) 6640	(1) II	(1) —
(2) 2	(2) 0.75	(2) RD / GN	(2) 6140	(2) I	(2) —	(2) Battery Positive Voltage	(2) 2	(2) 0.75	(2) RD / BU	(2) 6140	(2) II	(2) —
(3) 3	(3) 0.35	(3) GN / VT	(3) 2857	(3) I	(3) —	(3) Body Control Module LIN Bus 11	(3) 3	(3) 0.5	(3) GN / VT	(3) 2857	(3) II	(3) —
(4) 4	(4) 1	(4) BK	(4) 1550	(4) I	(4) —	(4) Ground	(4) 4	(4) 1	(4) BK	(4) 1550	(4) II	(4) —

X370 Dome Lamp Wiring Harness to Instrument Panel Wiring Harness



5278767



5278741

Connector Part Information
- Harness Type: Dome Lamp Wiring Harness
- OEM Connector: 7289-7293-30
- Service Connector: 13528126
- Description: 59-Way F 1.2 MCON, 2.8, 6.3 YESC Series(BK)

Connector Part Information
- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 7288-7295-30
- Service Connector: 84766292
- Description: 59-Way M 1.2 MCON, 2.8, 6.3 YESC Series(BK)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19331733	J-35616-12 (BU)	J-38125-553
II	85544080	J-35616-4A (PU)	J-38125-11A
III	Service by Cable	J-35616-12 (BU)	J-38125-215A
IV	13578908	J-35616-5 (PU)	J-38125-11A
V	19330704	J-35616-13 (BU)	J-38125-215A
VI	Service by Cable	J-35616-13 (BU)	J-38125-215A

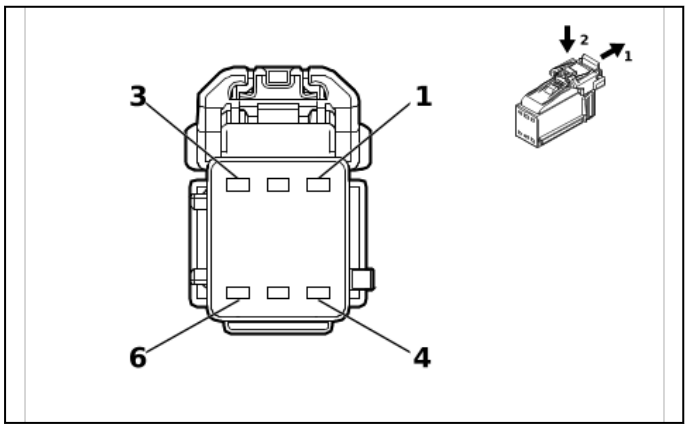
X370 Dome Lamp Wiring Harness to Instrument Panel Wiring Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 2	(1) RD / BU	(1) 4540	(1) II	(1) CAJ	(1) Battery Positive Voltage	(1) 1	(1) 2	(1) RD / BU	(1) 4540	(1) IV	(1) CAJ
(2) 2	(2) 0.5	(2) VT / BK	(2) 339	(2) I	(2) DD8 / DRZ	(2) Run/ Crank Ignition 1 Voltage	(2) 2	(2) 0.5	(2) VT / BK	(2) 339	(2) V	(2) DD8 / DRZ
(3) 3	(3) 0.35	(3) RD / VT	(3) 1640	(3) I	(3) UJE / UKM	(3) Battery Positive Voltage	(3) 3	(3) 0.35	(3) RD / VT	(3) 1640	(3) V	(3) UJE / UKM
(4) 4	(4) 0.35 (4) 0.5	(4) RD / YE (4) RD / YE	(4) 240 (4) 240	(4) I (4) I	(4) - (ASV / BOK / BOR / BOY / UK0 / UKL) (4) ASV / BOK / BOR / BOY / UK0 / UKL	(4) Battery Positive Voltage (4) Battery Positive Voltage	(4) 4	(4) 0.35 (4) 0.5	(4) RD / YE (4) RD / YE	(4) 240 (4) 240	(4) V	(4) 2-DOOR & GF3 (4) —
(5) 5	(5) 0.35	(5) YE / WH	(5) 1690	(5) I	(5) DEZ	(5) Mirror Dimming Signal	(5) 5	(5) 0.35	(5) YE / WH	(5) 1690	(5) V	(5) DEZ
(6) 6	(6) 0.35	(6) BU / GY	(6) 4105	(6) I	(6) UK0 / UKL	(6) AUTOSAR CAN Bus [+] 8 Serial Data	(6) 6	(6) 0.35	(6) BU / GY	(6) 4105	(6) V	(6) UK0 / UKL
(7) 7	(7) 0.35	(7) WH / GY	(7) 4104	(7) I	(7) UK0 / UKL	(7) AUTOSAR CAN Bus [-] 8 Serial Data	(7) 7	(7) 0.35	(7) WH / GY	(7) 4104	(7) V	(7) UK0 / UKL
(8) 8	(8) 0.35	(8) BU / GY	(8) 4105	(8) I	(8) —	(8) AUTOSAR CAN Bus [+] 8 Serial Data	(8) 8	(8) 0.35	(8) BU / GY	(8) 4105	(8) V	(8) —
(9) 9	(9) 0.35	(9) WH / GY	(9) 4104	(9) I	(9) —	(9) AUTOSAR CAN Bus [-] 8 Serial Data	(9) 9	(9) 0.35	(9) WH / GY	(9) 4104	(9) V	(9) —
10 - 11	—	—	—	—	—	Not Occupied	10 - 11	—	—	—	—	—
(12) 12	(12) 0.35	(12) BU / YE	(12) 4979	(12) I	(12) UJE / UKM	(12) AUTOSAR CAN Bus [+] 2 Serial Data	(12) 12	(12) 0.35	(12) BU / YE	(12) 4979	(12) V	(12) UJE / UKM
(13) 13	(13) 0.35	(13) WH	(13) 4978	(13) I	(13) UJE / UKM	(13) AUTOSAR CAN Bus [-] 2 Serial Data	(13) 13	(13) 0.35	(13) WH	(13) 4978	(13) V	(13) UJE / UKM
(14) 14	(14) 0.35	(14) BK / BN	(14) 654	(14) I	(14) 2-DOOR	(14) Cellular Telephone Microphone Low Reference	(14) 14	(14) 0.35	(14) BK / BN	(14) 654	(14) V	(14) 2-DOOR
(15) 15	(15) 0.35	(15) BU	(15) 655	(15) I	(15) 2-DOOR	(15) Cellular Telephone Microphone Signal	(15) 15	(15) 0.35	(15) BU	(15) 655	(15) V	(15) 2-DOOR
(16) 16	(16) 0.35	(16) YE / VT	(16) 6191	(16) I	(16) A48	(16) Power Rear Window Switch Open Signal	(16) 16	(16) 0.5	(16) YE / VT	(16) 6191	(16) V	(16) A48

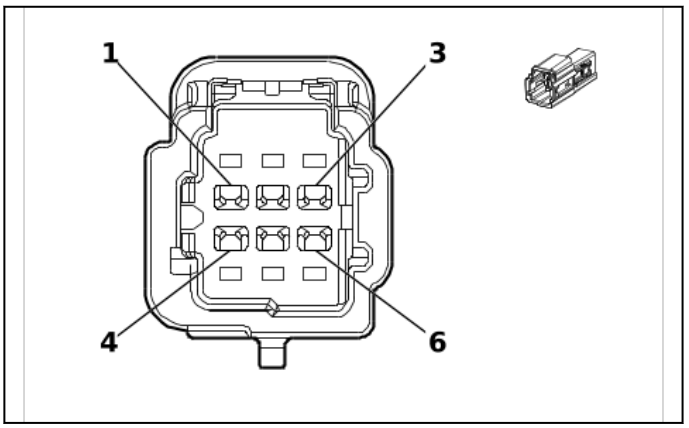
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(17) 17	(17) 0.35	(17) WH	(17) 61 92	(17) I	(17) A48	(17) Sliding Rear Window Switch Close Signal	(17) 17	(17) 0.5	(17) WH	(17) 61 92	(17) V	(17) A48
(18) 18	(18) 0.35	(18) GN / WH	(18) 11 1	(18) I	(18) —	(18) Hazard Warning Switch Signal	(18) 18	(18) 0.35	(18) GN / WH	(18) 11 1	(18) V	(18) —
(19) 19	(19) 0.5	(19) BN / YE	(19) 82 0	(19) I	(19) —	(19) Center High Mounted Stop Lamp Supply Voltage	(19) 19	(19) 0.5	(19) BN / YE	(19) 82 0	(19) V	(19) —
(20) 20	(20) 0.35	(20) BU / YE	(20) 49 79	(20) I	(20) UJE / UKM	(20) AUTOSAR CAN Bus [+] 2 Serial Data	(20) 20	(20) 0.35	(20) BU / YE	(20) 49 79	(20) V	(20) UJE / UKM
(21) 21	(21) 0.35	(21) WH	(21) 49 78	(21) I	(21) UJE / UKM	(21) AUTOSAR CAN Bus [-] 2 Serial Data	(21) 21	(21) 0.35	(21) WH	(21) 49 78	(21) V	(21) UJE / UKM
22 - 23	—	—	—	—	—	Not Occupied	22 - 23	—	—	—	—	—
(24) 24	(24) 0.35	(24) GY / YE	(24) 75 43	(24) I	(24) —	(24) Hazard Warning Indicator LED Dimming Signal	(24) 24	(24) 0.35	(24) GY / YE	(24) 75 43	(24) V	(24) —
(25) 25	(25) 0.35	(25) BK / YE	(25) 16 91	(25) I	(25) DEZ	(25) Automatic Day/Night Mirror Low Reference	(25) 25	(25) 0.35	(25) BK / YE	(25) 16 91	(25) V	(25) DEZ
(26) 26	(26) 0.5	(26) GN / WH	(26) 24	(26) I	(26) DD8 / DRZ	(26) Backup Lamp Control	(26) 26	(26) 0.5	(26) GN / WH	(26) 24	(26) V	(26) DD8 / DRZ
(27) 27	(27) 0.35 (27) 0.5	(27) GN / WH (27) GN / WH	(27) 28 54 (27) 28 54	(27) I (27) I	(27) - CAJ (27) CAJ	(27) Body Control Module LIN Bus 8 (27) Body Control Module LIN Bus 8	(27) 27	(27) 0.5	(27) GN / WH	(27) 28 54	(27) V	(27) —
(28) 28	(28) 0.5	(28) GN / WH	(28) 41 15	(28) I	(28) ASV	(28) Body Control Module LIN Bus 5	(28) 28	(28) 0.35	(28) GN / WH	(28) 41 15	(28) V	(28) ASV
(29) 29	(29) 0.35	(29) GN / BK	(29) 25 15	(29) I	(29) 2-DOOR	(29) Telematics Switch Supply Voltage	(29) 29	(29) 0.35	(29) GN / BK	(29) 25 15	(29) V	(29) 2-DOOR
(30) 30	(30) 0.35	(30) GN / WH	(30) 25 14	(30) I	(30) 2-DOOR	(30) Telematics Switch Signal	(30) 30	(30) 0.35	(30) GN / WH	(30) 25 14	(30) V	(30) 2-DOOR
(31) 31	(31) 0.35	(31) GN / BK	(31) 10 652	(31) I	(31) —	(31) Radio LIN Bus 1	(31) 31	(31) 0.35	(31) GN / BK	(31) 10 652	(31) V	(31) —
(32) 32	(32) 0.35	(32) VT	(32) 80 1	(32) I	(32) A48	(32) Retained Accessory Power Control	(32) 32	(32) 0.5	(32) VT	(32) 80 1	(32) V	(32) A48

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(33) 33	(33) 0.5	(33) WH / VT	(33) 14 30	(33) I	(33) —	(33) Exterior Courtesy Lamp Control	(33) 33	(33) 0.5	(33) WH / VT	(33) 14 30	(33) V	(33) —
(34) 34	(34) 0.35	(34) Y E / VT	(34) 25 16	(34) I	(34) 2-DOOR	(34) Telematics Switch Green LED Indicator Control	(34) 34	(34) 0.35	(34) Y E / VT	(34) 25 16	(34) V	(34) 2-DOOR
(35) 35	(35) 0.35	(35) B N / WH	(35) 25 17	(35) I	(35) 2-DOOR	(35) Telematics Switch Red LED Indicator Control	(35) 35	(35) 0.35	(35) B N / WH	(35) 25 17	(35) V	(35) 2-DOOR
(36) 36	(36) 0.5	(36) B K / WH	(36) 85 1	(36) I	(36) —	(36) Signal Ground	(36) 36	(36) 0.75	(36) B K / WH	(36) 85 1	(36) V	(36) —
(37) 37	(37) 0.35	(37) G N	(37) 72 09	(37) III	(37) UJE / UKM	(37) Ethernet Bus 3 [+]	(37) 37	(37) 0.35	(37) G N	(37) 72 09	(37) VI	(37) UJE / UKM
(38) 38	(38) 0.35	(38) B U	(38) 72 08	(38) III	(38) UJE / UKM	(38) Ethernet Bus 3 [-]	(38) 38	(38) 0.35	(38) B U	(38) 72 08	(38) VI	(38) UJE / UKM
39	—	—	—	—	—	Not Occupied	39	—	—	—	—	—
(40) 40	(40) 1 (40) 2	(40) B K (40) B K	(40) 10 50 (40) 10 50	(40) II (40) II	(40) - CAJ (40) CAJ	(40) Ground (40) Ground	(40) 40	(40) 2	(40) B K	(40) 10 50	(40) IV	(40) —
(41) 41	(41) 0.35	(41) B U / BN	(41) 11 326	(41) I	(41) BOK / BOR / BOY	(41) Virtual Key Private CAN Bus [+] Serial Data	(41) 41	(41) 0.35	(41) B U / BN	(41) 11 326	(41) V	(41) BOK / BOR / BOY
(42) 42	(42) 0.35	(42) WH / YE	(42) 11 325	(42) I	(42) BOK / BOR / BOY	(42) Virtual Key Private CAN Bus [-] Serial Data	(42) 42	(42) 0.35	(42) WH / YE	(42) 11 325	(42) V	(42) BOK / BOR / BOY
43 - 47	—	—	—	—	—	Not Occupied	43 - 47	—	—	—	—	—
(48) 48	(48) 0.35	(48) Y E	(48) 85 79	(48) III	(48) —	(48) Automotive Audio Bus A2B Serial Data 1 [-]	(48) 48	(48) 0.35	(48) Y E	(48) 85 79	(48) VI	(48) —
(49) 49	(49) 0.35	(49) WH	(49) 85 80	(49) III	(49) —	(49) Automotive Audio Bus A2B Serial Data 1 [+]	(49) 49	(49) 0.35	(49) WH	(49) 85 80	(49) VI	(49) —
50	—	—	—	—	—	Not Occupied	50	—	—	—	—	—
(51) 51	(51) 0.35	(51) WH	(51) 85 80	(51) III	(51) —	(51) Automotive Audio Bus A2B Serial Data 1 [+]	(51) 51	(51) 0.35	(51) WH	(51) 85 80	(51) VI	(51) —
(52) 52	(52) 0.35	(52) Y E	(52) 85 79	(52) III	(52) —	(52) Automotive Audio Bus A2B Serial Data 1 [-]	(52) 52	(52) 0.35	(52) Y E	(52) 85 79	(52) VI	(52) —
53 - 59	—	—	—	—	—	Not Occupied	53 - 59	—	—	—	—	—

X371 Roof Rear Spoiler Wiring Harness to Dome Lamp Wiring Harness - 4 - Door



5630339



5830128

Connector Part Information
- Harness Type: Roof Rear Spoiler Wiring Harness
- OEM Connector: 6098-8997
- Service Connector: Service by Harness - See Part Catalog
- Description: 6-Way F 1.2 Series(GY)

Connector Part Information
- Harness Type: Dome Lamp Wiring Harness
- OEM Connector: 6098-9121
- Service Connector: 19371221
- Description: 6-Way M 1.2 MBS Series(GY)

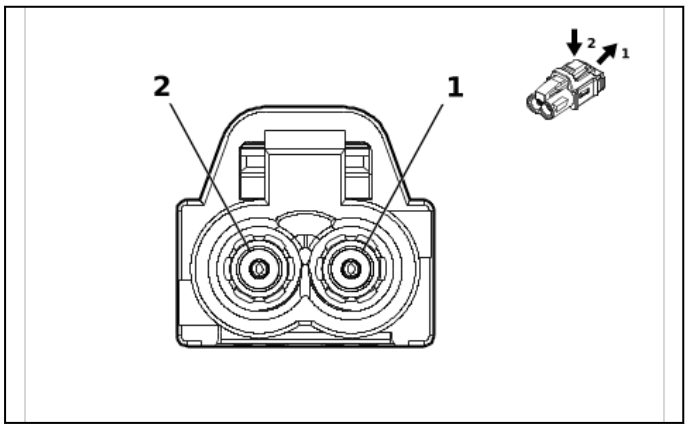
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required
II	Not required	J-35616-17 (L-GN)	No Tool Required

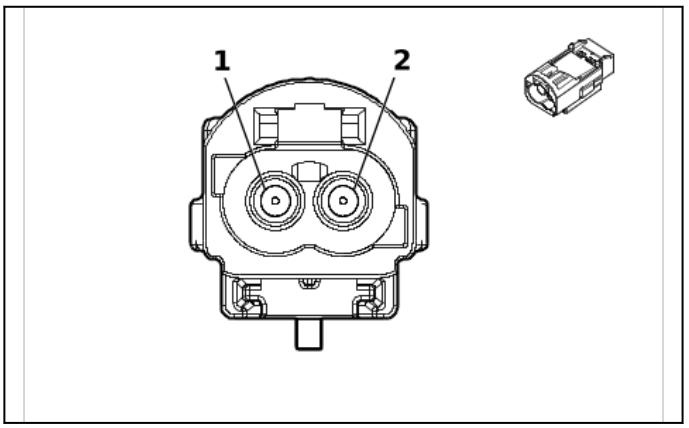
X371 Roof Rear Spoiler Wiring Harness to Dome Lamp Wiring Harness - 4 - Door

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) WH / VT	(1) 1430	(1) I	(1) —	(1) Exterior Courtesy Lamp Control	(1) 1	(1) 0.5	(1) WH / VT	(1) 1430	(1) II	(1) —
(2) 2	(2) 0.5	(2) BN / YE	(2) 820	(2) I	(2) —	(2) Center High Mounted Stop Lamp Supply Voltage	(2) 2	(2) 0.5	(2) BN / YE	(2) 820	(2) II	(2) —
(3) 3	(3) 0.5	(3) BK	(3) 8350	(3) I	(3) —	(3) Antenna Filter Ground	(3) 3	(3) 0.5	(3) BK	(3) 1050	(3) II	(3) —
4 - 6	—	—	—	—	—	Not Occupied	4 - 6	—	—	—	—	—

X373 Body Wiring Harness to Dome Lamp Wiring Harness - 4 - Door



6425506



6425020

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: AMZW31-000-B
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 2-Way F Coax Type(WH)

Connector Part Information
- Harness Type: Dome Lamp Wiring Harness
- OEM Connector: 35610270
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 2-Way M Coax Type(WH)

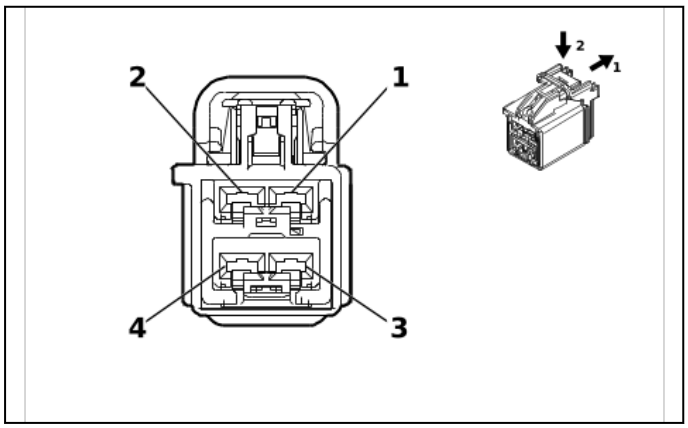
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

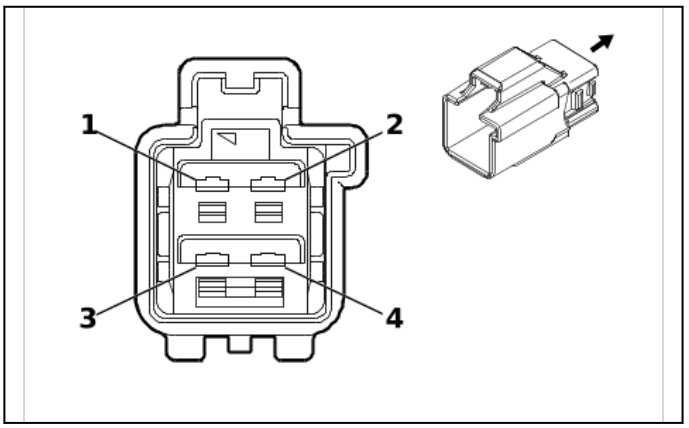
X373 Body Wiring Harness to Dome Lamp Wiring Harness - 4 - Door

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) —	(1) Coax Cable	(1) 10292	(1) I	(1) —	(1) Cell Phone Antenna 2 Coaxial Signal	(1) 1	(1) —	(1) Coax Cable	(1) 10292	(1) II	(1) —
(2) 2	(2) —	(2) Coax Cable	(2) 10314	(2) I	(2) —	(2) Global Navigation Satellite System Antenna Coaxial Signal	(2) 2	(2) —	(2) Coax Cable	(2) 10314	(2) II	(2) —

X375 Dome Lamp Wiring Harness to Sunroof Wiring Harness (CAJ)



5515744



4257143

Connector Part Information
- Harness Type: Dome Lamp Wiring Harness
- OEM Connector: 7289-7224-40
- Service Connector: 84952157
- Description: 4-Way F 2.8 YESC Series(GY)

Connector Part Information
- Harness Type: Sunroof Wiring Harness
- OEM Connector: 7282-6446-40
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way M 2.8 YESC Series(GY)

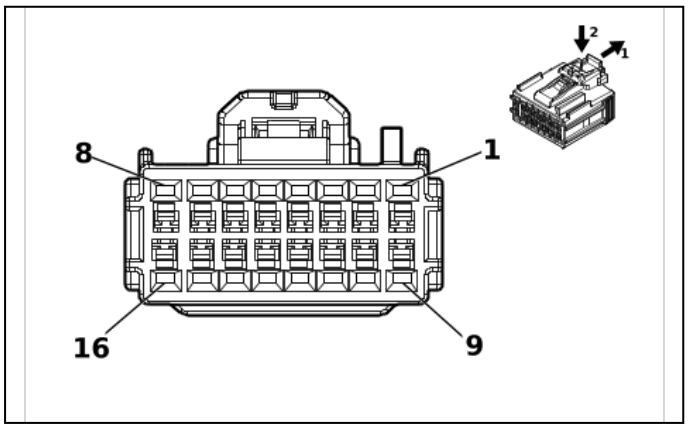
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-4A (PU)	No Tool Required
II	Not required	J-35616-5 (PU)	No Tool Required

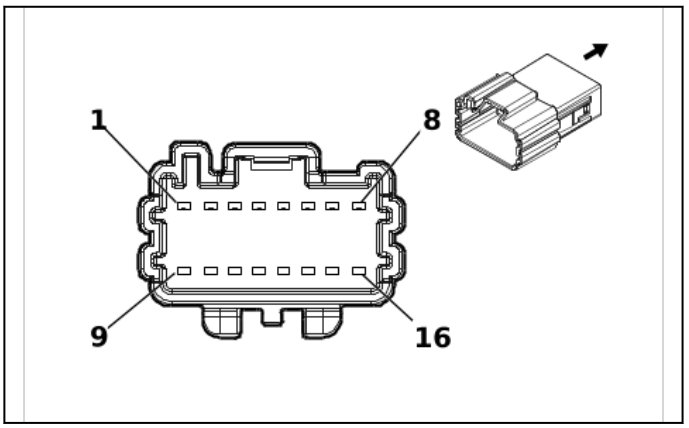
X375 Dome Lamp Wiring Harness to Sunroof Wiring Harness (CAJ)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 2	(1) BK	(1) 1050	(1) I	(1) —	(1) Ground	(1) 1	(1) 1.5	(1) BK	(1) 1050	(1) II	(1) —
(2) 2	(2) 0.5	(2) GN / WH	(2) 2854	(2) I	(2) —	(2) Body Control Module LIN Bus 8	(2) 2	(2) 0.35	(2) OG	(2) 2854	(2) II	(2) —
3	—	—	—	—	—	Not Occupied	3	—	—	—	—	—
(4) 4	(4) 2	(4) RD / BU	(4) 4540	(4) I	(4) —	(4) Battery Positive Voltage	(4) 4	(4) 1.5	(4) RD	(4) 4540	(4) II	(4) —

X376 Body Wiring Harness to Dome Lamp Wiring Harness - 4 - Door



6074391



4223086

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 6098-9012
- Service Connector: 13541574
- Description: 16-Way F 1.2 MCON Series(BK)

Connector Part Information
- Harness Type: Dome Lamp Wiring Harness
- OEM Connector: 6098-8828
- Service Connector: 13526848
- Description: 16-Way M 1.2 Series(BK)

Terminal Part Information

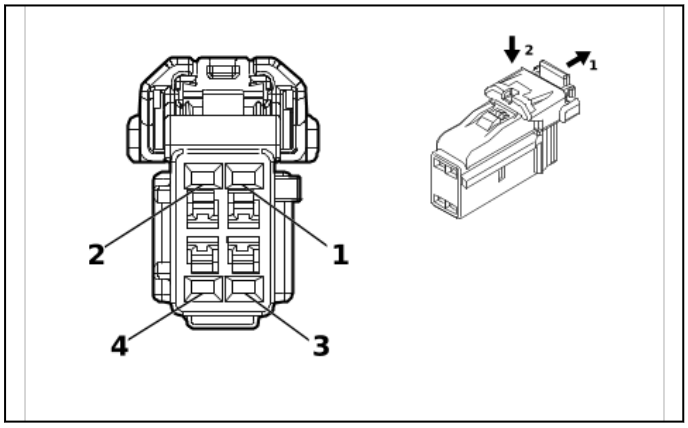
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	84962854	J-35616-12 (BU)	J-38125-215A
II	84616651	J-35616-13 (BU)	J-38125-215A

X376 Body Wiring Harness to Dome Lamp Wiring Harness - 4 - Door

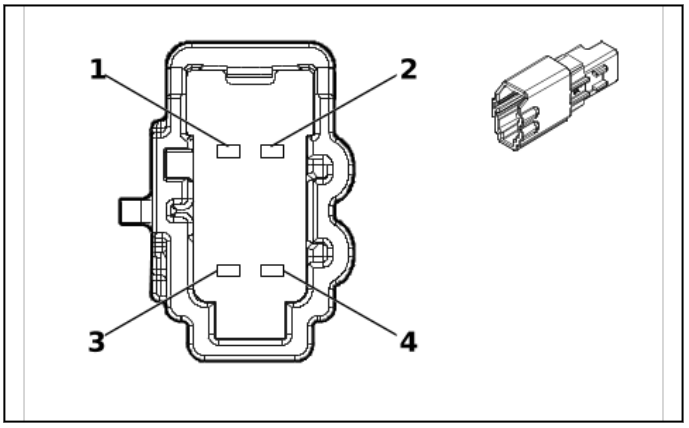
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) GN / BK	(1) 2515	(1) I	(1) —	(1) Telematics Switch Supply Voltage	(1) 1	(1) 0.35	(1) GN / BK	(1) 2515	(1) II	(1) —
(2) 2	(2) 0.35	(2) GN / WH	(2) 2514	(2) I	(2) —	(2) Telematics Switch Signal	(2) 2	(2) 0.35	(2) GN / WH	(2) 2514	(2) II	(2) —
(3) 3	(3) 0.35	(3) YE / VT	(3) 2516	(3) I	(3) —	(3) Telematics Switch Green LED Indicator Control	(3) 3	(3) 0.35	(3) YE / VT	(3) 2516	(3) II	(3) —
(4) 4	(4) 0.35	(4) BN / WH	(4) 2517	(4) I	(4) —	(4) Telematics Switch Red LED Indicator Control	(4) 4	(4) 0.35	(4) BN / WH	(4) 2517	(4) II	(4) —
(5) 5	(5) 0.35	(5) BK / BN	(5) 654	(5) I	(5) —	(5) Cellular Telephone Microphone Low Reference	(5) 5	(5) 0.35	(5) BK / BN	(5) 654	(5) II	(5) —
(6) 6	(6) 0.35	(6) BU	(6) 655	(6) I	(6) —	(6) Cellular Telephone Microphone Signal	(6) 6	(6) 0.35	(6) BU	(6) 655	(6) II	(6) —
7 - 8	—	—	—	—	—	Not Occupied	7 - 8	—	—	—	—	—

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(9) 9	(9) 0.75	(9) RD / VT	(9) 2640	(9) I	(9) —	(9) Battery Positive Voltage	(9) 9	(9) 0.5	(9) RD / VT	(9) 2640	(9) II	(9) —
(10) 10	(10) 0.35	(10) GN / YE	(10) 2862	(10) I	(10) —	(10) Body Control Module LIN Bus 16	(10) 10	(10) 0.35	(10) GN / YE	(10) 2862	(10) II	(10) —
11 - 14	—	—	—	—	—	Not Occupied	11 - 14	—	—	—	—	—
(15) 15	(15) 0.5	(15) BU / BN	(15) 11326	(15) I	(15) —	(15) Virtual Key Private CAN Bus [+] Serial Data	(15) 15	(15) 0.35	(15) BU / BN	(15) 11326	(15) II	(15) —
(16) 16	(16) 0.5	(16) WH / YE	(16) 11325	(16) I	(16) —	(16) Virtual Key Private CAN Bus [-] Serial Data	(16) 16	(16) 0.35	(16) WH / YE	(16) 11325	(16) II	(16) —

X382 Headlamp Automatic Control Ambient Light Sensor Wiring Harness to Dome Lamp Wiring Harness (ASV)



4872683



5360963

Connector Part Information
- Harness Type: Headlamp Automatic Control Ambient Light Sensor Wiring Harness
- OEM Connector: 13533335
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 1.2 Series(BK)

Connector Part Information
- Harness Type: Dome Lamp Wiring Harness
- OEM Connector: 6098-9046
- Service Connector: 84847258
- Description: 4-Way M 1.2 MCON Series(BK)

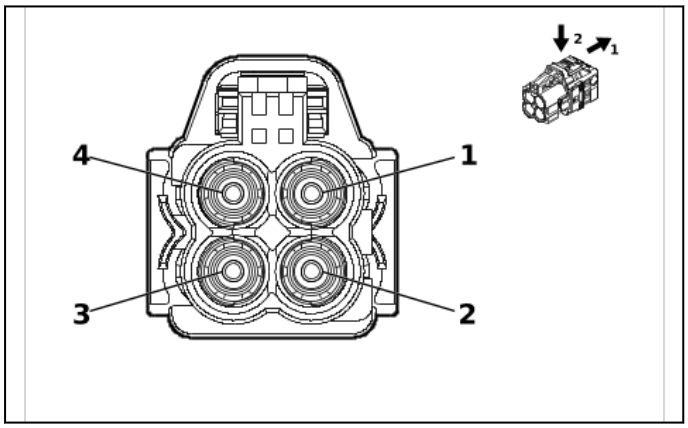
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required
II	Not required	J-35616-17 (L-GN)	No Tool Required

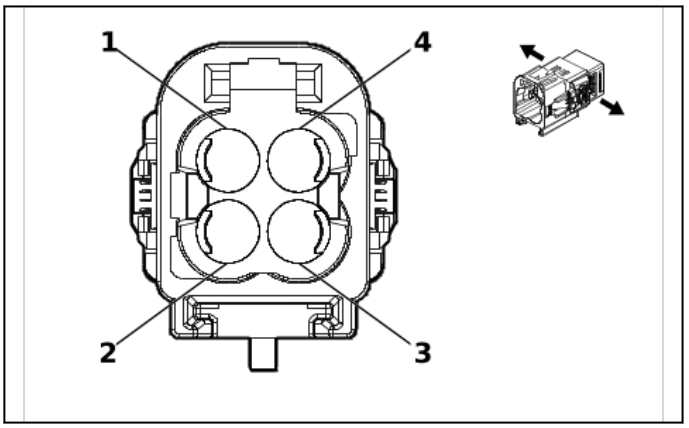
X382 Headlamp Automatic Control Ambient Light Sensor Wiring Harness to Dome Lamp Wiring Harness (ASV)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 0.35	(1) RD / VT	(1) 1940	(1) I	(1) —	(1) Battery Positive Voltage	(1) 1	(1) 0.5	(1) RD / YE	(1) 240	(1) II	(1) —
(2) 2	(2) 0.35	(2) BK	(2) 850	(2) I	(2) —	(2) Ground	(2) 2	(2) 0.5	(2) BK / WH	(2) 851	(2) II	(2) —
(3) 3	(3) 0.35	(3) GN / BN	(3) 4115	(3) I	(3) —	(3) Body Control Module LIN Bus 5	(3) 3	(3) 0.5	(3) GN / WH	(3) 4115	(3) II	(3) —
4	—	—	—	—	—	Not Occupied	4	—	—	—	—	—

X393 Dome Lamp Wiring Harness to Instrument Panel Wiring Harness



5903560



5907137

Connector Part Information
- Harness Type: Dome Lamp Wiring Harness
- OEM Connector: AMZW25-001-B
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 4-Way F Mini Coax Type(WH)

Connector Part Information
- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: 13520456
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 4-Way M Mini Coax Type(WH)

Terminal Part Information

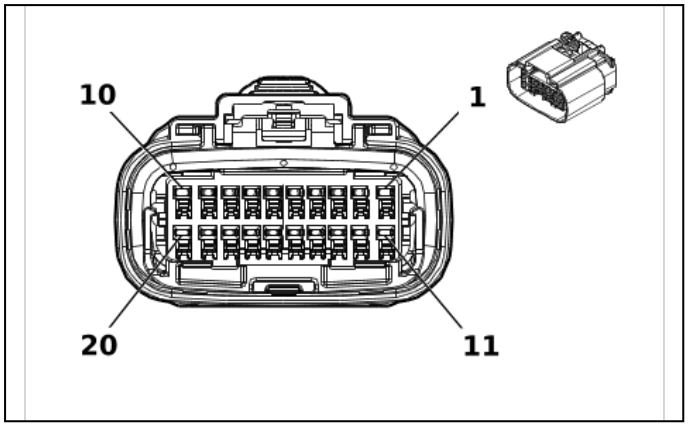
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

X393 Dome Lamp Wiring Harness to Instrument Panel Wiring Harness

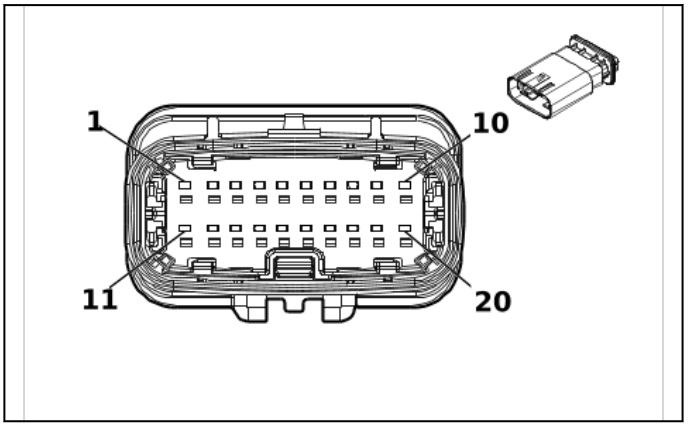
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) —	(1) Coax Cable	(1) 6001	(1) I	(1) 4-DOOR	(1) Coaxial Antenna RF Signal	(1) 1	(1) —	(1) Coax Cable	(1) 6001	(1) II	(1) 4-DOOR
(2) 2	(2) —	(2) Coax Cable	(2) 6130	(2) I	(2) 4-DOOR	(2) Coaxial Antenna XM Signal	(2) 2	(2) —	(2) Coax Cable	(2) 6130	(2) II	(2) 4-DOOR

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(3) 3	(3) —	(3) Coax Cable	(3) 10648	(3) I	(3) UCV	(3) Interior Vision Cabin Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	(3) 3	(3) —	(3) Coax Cable	(3) 10648	(3) II	(3) UCV
(4) 4	(4) —	(4) Coax Cable	(4) 2548	(4) I	(4) UVN	(4) Cargo Bed Rear Vision Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	(4) 4	(4) —	(4) Coax Cable	(4) 2548	(4) II	(4) UVN

X400 Body Wiring Harness to Chassis Wiring Harness



6240294



6081336

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 35465658
- Service Connector: 86579559
- Description: 20-Way F 1.2 MCON-CB Series, Sealed(BK)

Connector Part Information
- Harness Type: Chassis Wiring Harness
- OEM Connector: 35465720
- Service Connector: 85625526
- Description: 20-Way M 1.2 MCON-CB Series, Sealed(BK)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19370818	J-35616-12 (BU)	J-38125-553
II	84867140	J-35616-13 (BU)	J-38125-553
III	Not Available	J-35616-13 (BU)	J-38125-215A

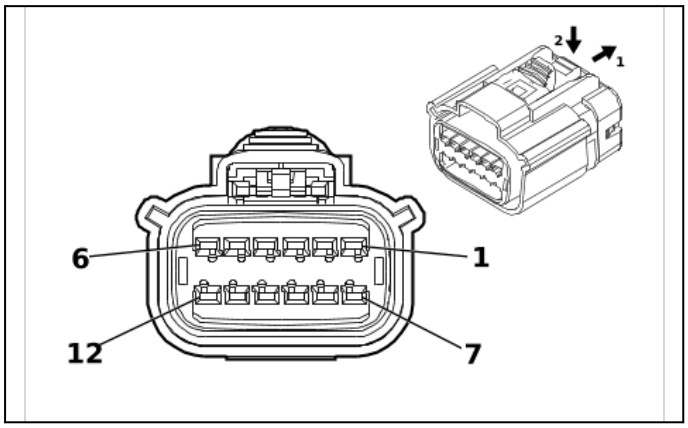
X400 Body Wiring Harness to Chassis Wiring Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BK	(1) 9000	(1) I	(1) —	(1) Cavity Seal	(1) 1	(1) 1.5	(1) BK	(1) 9000	(1) III	(1) —
2	—	—	—	—	—	Not Occupied	2	—	—	—	—	—

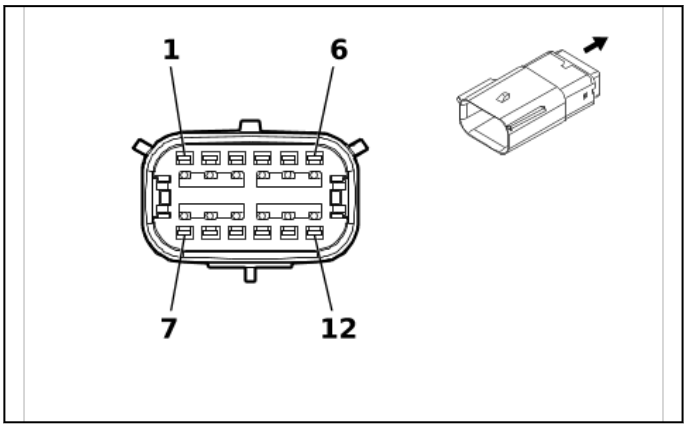
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(3) 3	(3) 0.35	(3) YE	(3) 1144	(3) I	(3) —	(3) Endgate Release Switch Discrete Signal Exterior	(3) 3	(3) 0.75	(3) YE	(3) 1144	(3) II	(3) —
(4) 4	(4) 0.35	(4) BU / YE	(4) 10926	(4) I	(4) —	(4) Major Endgate Ajar Signal	(4) 4	(4) 0.75	(4) BU / YE	(4) 10926	(4) II	(4) —
(5) 5	(5) 0.5	(5) GY	(5) 830	(5) I	(5) —	(5) Left Front Wheel Speed Sensor Signal	(5) 5	(5) 0.5	(5) GY	(5) 830	(5) II	(5) —
(6) 6	(6) 0.5	(6) GY / WH	(6) 7064	(6) I	(6) —	(6) Left Front Wheel Speed Sensor Control	(6) 6	(6) 0.5	(6) GY / WH	(6) 7064	(6) II	(6) —
(7) 7	(7) 0.5	(7) YE	(7) 872	(7) I	(7) —	(7) Right Front Wheel Speed Sensor Signal	(7) 7	(7) 0.5	(7) YE	(7) 872	(7) II	(7) —
(8) 8	(8) 0.5	(8) GY / BN	(8) 7065	(8) I	(8) —	(8) Right Front Wheel Speed Sensor Control	(8) 8	(8) 0.5	(8) GY / BN	(8) 7065	(8) II	(8) —
(9) 9	(9) 0.5	(9) BN / BU	(9) 1602	(9) I	(9) —	(9) Front Brake Pad Wear Sensor Signal	(9) 9	(9) 0.5	(9) BN / BU	(9) 1602	(9) II	(9) —
(10) 10	(10) 0.75	(10) BK	(10) 9000	(10) I	(10) —	(10) Cavity Seal	(10) 10	(10) 1.5	(10) BK	(10) 9000	(10) III	(10) —
(11) 11	(11) 0.75 (11) 0.75	(11) GY / BK (11) BK	(11) 2680 (11) 9000	(11) I (11) I	(11) QT2 (11) QT5 / QT6	(11) Lock Actuators Unlock Control 2 (11) Cavity Seal	(11) 11	(11) 0.75	(11) GY / BK	(11) 2680	(11) II	(11) —
(12) 12	(12) 0.35	(12) YE	(12) 7294	(12) I	(12) —	(12) Minor Endgate Release Switch Discrete Signal Exterior	(12) 12	(12) 0.5	(12) YE	(12) 7294	(12) II	(12) —
(13) 13	(13) 0.35	(13) YE / BU	(13) 7295	(13) I	(13) —	(13) Left Minor Endgate Ajar Signal	(13) 13	(13) 0.75	(13) YE / BU	(13) 7295	(13) II	(13) —
14	—	—	—	—	—	Not Occupied	14	—	—	—	—	—
(15) 15	(15) 0.35	(15) GY	(15) 7292	(15) I	(15) —	(15) Major Endgate Release Switch Signal Exterior	(15) 15	(15) 0.5	(15) GY	(15) 7292	(15) II	(15) —

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
16 - 19	—	—	—	—	—	Not Occupied	16 - 19	—	—	—	—	—
(20) 20	(20) 0.75 (20) 0.75	(20) G Y / VT (20) B K	(20) 26 91 (20) 90 00	(20) I (20) I	(20) QT2 (20) QT5 / QT6	(20) Rear Closure Actuator Lock Control (20) Cavity Seal	(20) 20	(20) 0.75	(20) G Y / VT	(20) 26 91	(20) II	(20) —

X401D Engine Wiring Harness to Chassis Wiring Harness (FHX)



4621955



4862194

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 15514623
- Service Connector: 19355594
- Description: 12-Way F 1.5 OCS Series, Sealed(BK)

Connector Part Information
- Harness Type: Chassis Wiring Harness
- OEM Connector: 15521147
- Service Connector: 19371239
- Description: 12-Way M 1.5 OCS Series, Sealed(BK)

Terminal Part Information

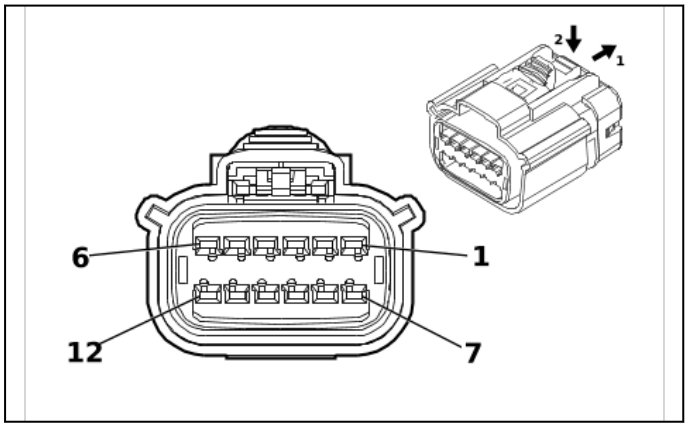
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19370817	J-35616-2A (GY)	J-38125-215A
II	19352418	J-35616-3 (GY)	J-38125-215A

X401D Engine Wiring Harness to Chassis Wiring Harness (FHX)

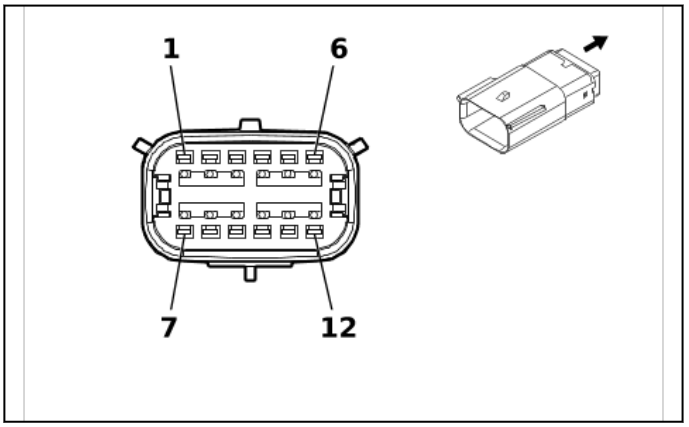
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GN / GY	(1) 465	(1) I	(1) —	(1) Fuel Pump Primary Relay Control	(1) 1	(1) 0.5	(1) GN / GY	(1) 465	(1) II	(1) —
(2) 2	(2) 0.5	(2) BU / RD	(2) 460	(2) I	(2) —	(2) Engine Control Sensors 5 Volt Reference 1	(2) 2	(2) 0.5	(2) BU / RD	(2) 460	(2) II	(2) —
3 - 4	—	—	—	—	—	Not Occupied	3 - 4	—	—	—	—	—
(5) 5	(5) 0.5	(5) WH	(5) 4978	(5) I	(5) —	(5) AUTOSAR CAN Bus [-] 2 Serial Data	(5) 5	(5) 0.5	(5) WH	(5) 4978	(5) II	(5) —

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(6) 6	(6) 0.5	(6) BU / YE	(6) 4979	(6) I	(6) —	(6) AUTOSAR CAN Bus [+] 2 Serial Data	(6) 6	(6) 0.5	(6) BU / YE	(6) 4979	(6) II	(6) —
(7) 7	(7) 0.5	(7) BN / GN	(7) 4305	(7) I	(7) —	(7) Exhaust Flow Control Valve 1	(7) 7	(7) 0.5	(7) BN / GN	(7) 4305	(7) II	(7) —
(8) 8	(8) 0.75	(8) YE / BN	(8) 1420	(8) I	(8) —	(8) Exhaust Restrictor Motor Open Control	(8) 8	(8) 0.75	(8) YE / BN	(8) 1420	(8) II	(8) —
(9) 9	(9) 0.75	(9) BN	(9) 1421	(9) I	(9) —	(9) Exhaust Restrictor Motor Closed Control	(9) 9	(9) 0.75	(9) BN	(9) 1421	(9) II	(9) —
(10) 10	(10) 0.5	(10) BK / YE	(10) 548	(10) I	(10) —	(10) Engine Control Sensors Low Reference 1	(10) 10	(10) 0.5	(10) BK / YE	(10) 548	(10) II	(10) —
11 - 12	—	—	—	—	—	Not Occupied	11 - 12	—	—	—	—	—

X401G Engine Wiring Harness to Chassis Wiring Harness (FJW)



4621955



4862194

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 15514623
- Service Connector: 19355594
- Description: 12-Way F 1.5 OCS Series, Sealed(BK)

Connector Part Information
- Harness Type: Chassis Wiring Harness
- OEM Connector: 15521147
- Service Connector: 19371239
- Description: 12-Way M 1.5 OCS Series, Sealed(BK)

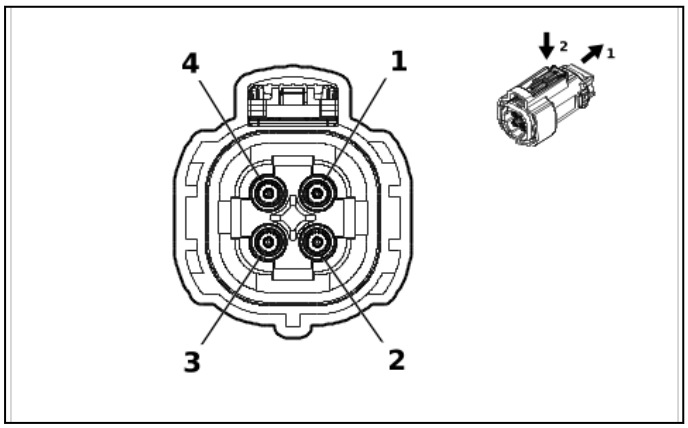
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19370817	J-35616-2A (GY)	J-38125-215A
II	19352418	J-35616-3 (GY)	J-38125-215A

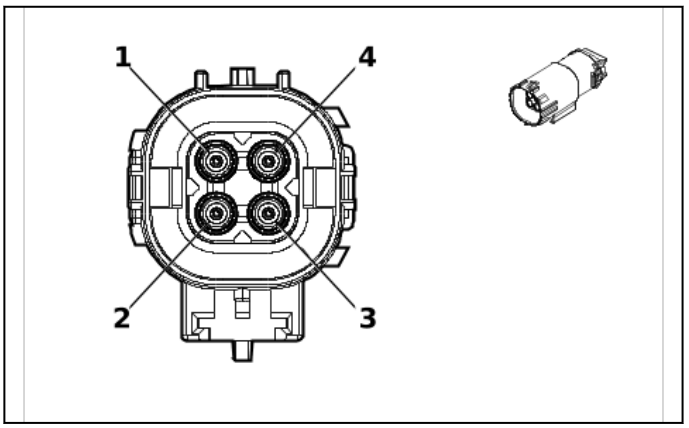
X401G Engine Wiring Harness to Chassis Wiring Harness (FJW)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) WH / RD	(1) 480	(1) I	(1) —	(1) Engine Control Vehicle Sensors 5 Volt Reference 1	(1) 1	(1) 0.5	(1) WH / RD	(1) 480	(1) II	(1) —
(2) 2	(2) 0.5	(2) VT / BU	(2) 5294	(2) I	(2) —	(2) Powertrain Main Relay Fused Supply Voltage 5	(2) 2	(2) 0.5	(2) VT / BU	(2) 5294	(2) II	(2) —
(3) 3	(3) 0.5	(3) BK / GY	(3) 626	(3) I	(3) —	(3) Engine Control Vehicle Sensors Low Reference 1	(3) 3	(3) 0.5	(3) BK / GY	(3) 626	(3) II	(3) —
(4) 4	(4) 0.5	(4) GN / GY	(4) 465	(4) I	(4) —	(4) Fuel Pump Primary Relay Control	(4) 4	(4) 0.5	(4) GN / GY	(4) 465	(4) II	(4) —
(5) 5	(5) 0.5	(5) WH	(5) 4978	(5) I	(5) —	(5) AUTOSAR CAN Bus [-] 2 Serial Data	(5) 5	(5) 0.5	(5) WH	(5) 4978	(5) II	(5) —
(6) 6	(6) 0.5	(6) BU / YE	(6) 4979	(6) I	(6) —	(6) AUTOSAR CAN Bus [+] 2 Serial Data	(6) 6	(6) 0.5	(6) BU / YE	(6) 4979	(6) II	(6) —
(7) 7	(7) 0.5	(7) BN / GN	(7) 4305	(7) I	(7) —	(7) Exhaust Flow Control Valve 1	(7) 7	(7) 0.5	(7) BN / GN	(7) 4305	(7) II	(7) —
(8) 8	(8) 0.5	(8) BU / WH	(8) 4306	(8) I	(8) —	(8) Exhaust Flow Control Valve 1 - Cylinder Deactivation Feedback Signal	(8) 8	(8) 0.5	(8) BU / WH	(8) 4306	(8) II	(8) —
9 - 10	—	—	—	—	—	Not Occupied	9 - 10	—	—	—	—	—
(11) 11	(11) 0.5	(11) WH / RD	(11) 11031	(11) I	(11) —	(11) Fuel Tank Isolation Valve Supply Voltage	(11) 11	(11) 0.5	(11) WH / RD	(11) 11031	(11) II	(11) —
(12) 12	(12) 0.5	(12) YE / GY	(12) 11029	(12) I	(12) —	(12) Canister Vapor Pressure Sensor Signal	(12) 12	(12) 0.5	(12) YE / GY	(12) 11029	(12) II	(12) —

X402A Body Wiring Harness to Chassis Wiring Harness



6193402



7149188

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: AMZ14P-003-C
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 4-Way F Mini Coax Type(BU)

Connector Part Information

- Harness Type: Chassis Wiring Harness
- OEM Connector: 13558968
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 4-Way M Mini Coax Type(BU)

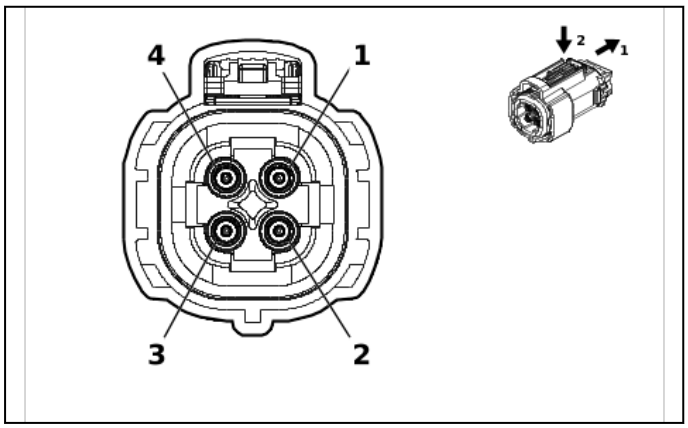
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

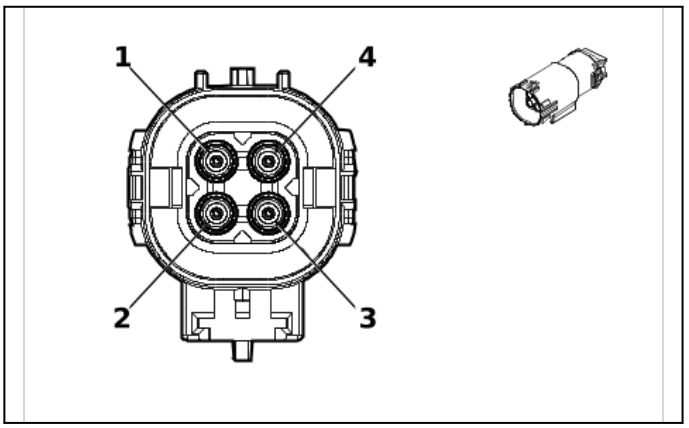
X402A Body Wiring Harness to Chassis Wiring Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) —	(1) Coax Cable	(1) 7886	(1) I	(1) —	(1) Trailer 2 Rear Vision Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	(1) 1	(1) —	(1) Coax Cable	(1) 7886	(1) II	(1) —
(2) 2	(2) —	(2) Coax Cable	(2) 2421	(2) I	(2) —	(2) Trailer Rear Vision Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	(2) 2	(2) —	(2) Coax Cable	(2) 2421	(2) II	(2) —
(3) 3	(3) —	(3) Coax Cable	(3) 4721	(3) I	(3) —	(3) Rearview Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	(3) 3	(3) —	(3) Coax Cable	(3) 4721	(3) II	(3) —

X402E Body Wiring Harness to Chassis Wiring Harness (UXA)



6018776



6020240

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: AMZ14P-003-A
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 4-Way F Mini Coax Type(BK)

Connector Part Information
- Harness Type: Chassis Wiring Harness
- OEM Connector: 13558966
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 4-Way M Mini Coax Type(BK)

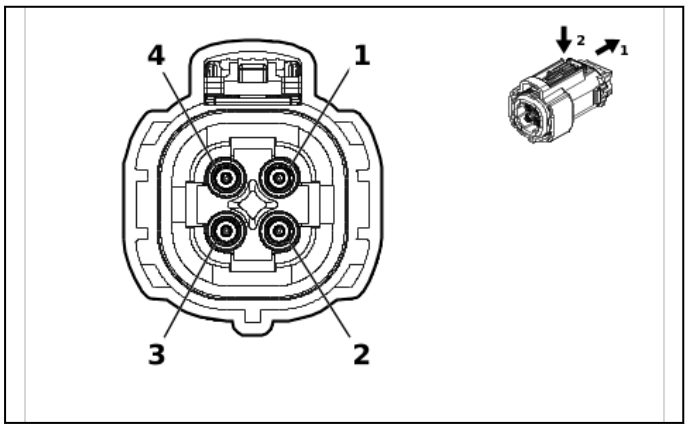
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

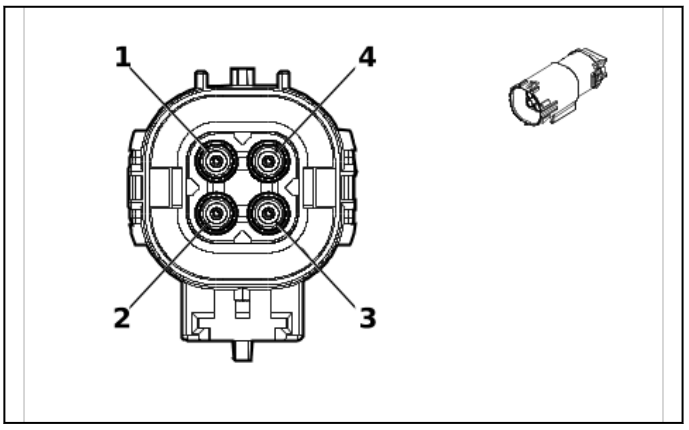
X402E Body Wiring Harness to Chassis Wiring Harness (UXA)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) —	(1) Coax Cable	(1) 11348	(1) I	(1) —	(1) Underbody Camera LVDS (Low Voltage DIfferential Signaling) Coaxial Signal	(1) 1	(1) —	(1) Coax Cable	(1) 11348	(1) II	(1) —
(2) 2	(2) —	(2) Coax Cable	(2) 11352	(2) I	(2) —	(2) Underbody Camera 2 LVDS (Low Voltage DIfferential Signaling) Coaxial Signal	(2) 2	(2) —	(2) Coax Cable	(2) 11352	(2) II	(2) —

X403 Chassis Wiring Harness to Underbody Camera Wiring Harness (UXA)



6018776



6020240

Connector Part Information
- Harness Type: Chassis Wiring Harness
- OEM Connector: AMZ14P-003-A
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 4-Way F Mini Coax Type(BK)

Connector Part Information
- Harness Type: Underbody Camera Wiring Harness
- OEM Connector: 13558966
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 4-Way M Mini Coax Type(BK)

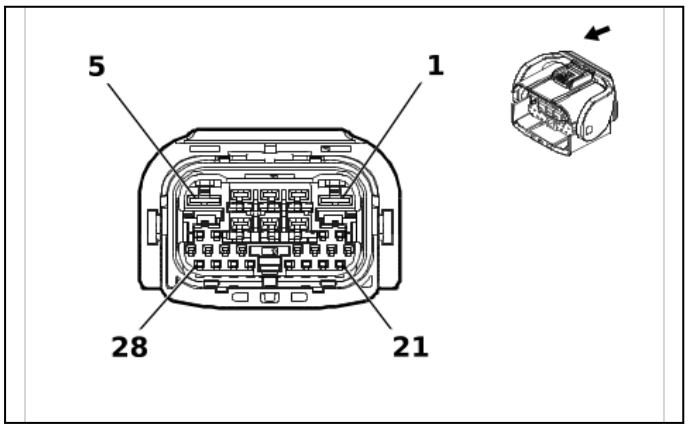
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

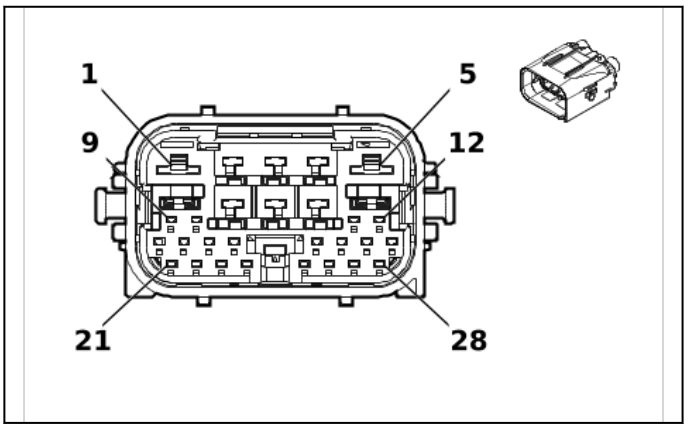
X403 Chassis Wiring Harness to Underbody Camera Wiring Harness (UXA)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) —	(1) Coax Cable	(1) 11348	(1) I	(1) —	(1) Underbody Camera LVDS (Low Voltage DIfferential Signaling) Coaxial Signal	(1) 1	(1) —	(1) Coax Cable	(1) 11348	(1) II	(1) —
(2) 2	(2) —	(2) Coax Cable	(2) 11352	(2) I	(2) —	(2) Underbody Camera 2 LVDS (Low Voltage DIfferential Signaling) Coaxial Signal	(2) 2	(2) —	(2) Coax Cable	(2) 11352	(2) II	(2) —

X404 Chassis Wiring Harness to Emission Reduction Fluid Tank Reservoir Wire Harness (FHX)



6572042



6757546

Connector Part Information
- Harness Type: Chassis Wiring Harness
- OEM Connector: 13550300
- Service Connector: 85761013
- Description: 28-Way F 1.2 MLK, 2.8, 6.3 YESC Series(BK)

Connector Part Information
- Harness Type: Emission Reduction Fluid Tank Reservoir Wire Harness
- OEM Connector: 7297-4839-30
- Service Connector: Service by Harness - See Part Catalog
- Description: 28-Way M 1.2 MLK, 2.8, 6.3 YESC Series(BK)

Terminal Part Information

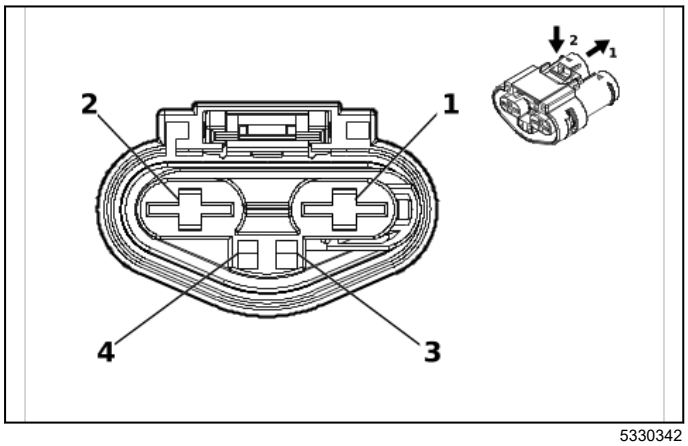
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	13575383	J-35616-42 (RD)	J-38125-11A
II	19368324	J-35616-35 (VT)	J-38125-11A
III	85669160	J-35616-12 (BU)	J-38125-215A
IV	Not required	No Tool Required	No Tool Required

X404 Chassis Wiring Harness to Emission Reduction Fluid Tank Reservoir Wire Harness (FHX)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 3	(1) RD / WH	(1) 2040	(1) I	(1) —	(1) Battery Positive Voltage	(1) 1	(1) 3	(1) RD / WH	(1) 2040	(1) IV	(1) —
2 - 4	—	—	—	—	—	Not Occupied	2 - 4	—	—	—	—	—
(5) 5	(5) 3	(5) BK	(5) 1150	(5) I	(5) —	(5) Ground	(5) 5	(5) 3	(5) BK	(5) 6750	(5) IV	(5) —
6	—	—	—	—	—	Not Occupied	6	—	—	—	—	—
(7) 7	(7) 2	(7) RD / WH	(7) 3440	(7) II	(7) —	(7) Battery Positive Voltage	(7) 7	(7) 2	(7) RD / WH	(7) 3440	(7) IV	(7) —
8 - 14	—	—	—	—	—	Not Occupied	8 - 14	—	—	—	—	—
(15) 15	(15) 0.5	(15) VT / WH	(15) 639	(15) III	(15) —	(15) Run/ Crank Ignition 1 Voltage	(15) 15	(15) 0.5	(15) VT / WH	(15) 639	(15) IV	(15) —
(16) 16	(16) 0.5	(16) BU	(16) 4987	(16) III	(16) —	(16) AUTOSAR CAN Bus [+] 1 Serial Data	(16) 16	(16) 0.5	(16) BU	(16) 4987	(16) IV	(16) —

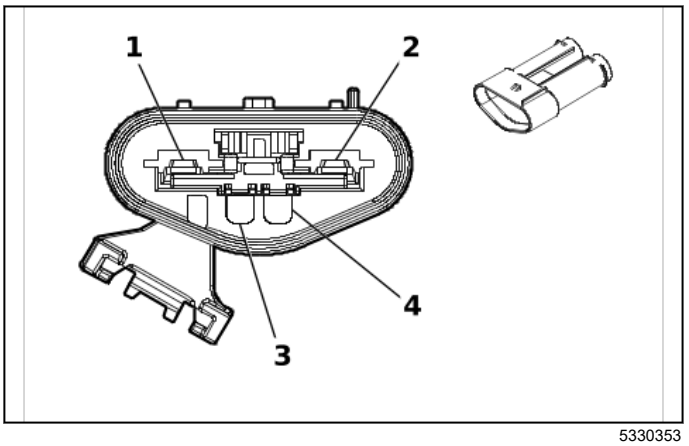
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(17) 17	(17) 0.5	(17) BU	(17) 49 87	(17) III	(17) —	(17) AUTOSAR CAN Bus [+] 1 Serial Data	(17) 17	(17) 0.5	(17) BU	(17) 49 87	(17) IV	(17) —
18 - 23	—	—	—	—	—	Not Occupied	18 - 23	—	—	—	—	—
(24) 24	(24) 0.5	(24) WH	(24) 49 86	(24) III	(24) —	(24) AUTOSAR CAN Bus [-] 1 Serial Data	(24) 24	(24) 0.5	(24) WH	(24) 49 86	(24) IV	(24) —
(25) 25	(25) 0.5	(25) WH	(25) 49 86	(25) III	(25) —	(25) AUTOSAR CAN Bus [-] 1 Serial Data	(25) 25	(25) 0.5	(25) WH	(25) 49 86	(25) IV	(25) —
26 - 28	—	—	—	—	—	Not Occupied	26 - 28	—	—	—	—	—

X405 Power Steering Wiring Harness to Power Steering Wiring Harness Extension Harness



5330342

Connector Part Information
- Harness Type: Power Steering Wiring Harness
- OEM Connector: 13508902
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 2.8, 12 MAK Series, Sealed(BK)



5330353

Connector Part Information
- Harness Type: Power Steering Wiring Harness Extension Harness
- OEM Connector: 13582138
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way M 2.8, 12 MAK Series, Sealed(BK)

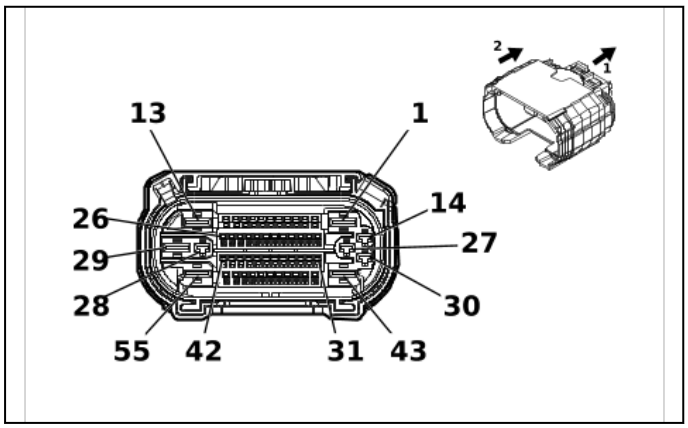
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required
II	Not required	No Tool Required	No Tool Required

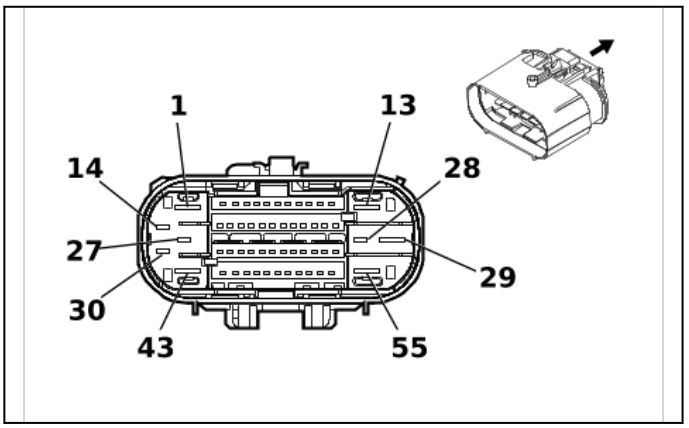
X405 Power Steering Wiring Harness to Power Steering Wiring Harness Extension Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 25	(1) BK	(1) 350	(1) I	(1) —	(1) Ground	(1) 1	(1) 1	(1) BK	(1) 350	(1) II	(1) —
(2) 2	(2) 25	(2) RD / VT	(2) 3340	(2) I	(2) —	(2) Battery Positive Voltage	(2) 2	(2) 1	(2) RD	(2) 3340	(2) II	(2) —
3 - 4	—	—	—	—	—	Not Occupied	3 - 4	—	—	—	—	—

X410 Chassis Wiring Harness to Body Wiring Harness



4992168



4993301

Connector Part Information
- Harness Type: Chassis Wiring Harness
- OEM Connector: 35016652
- Service Connector: 19371185
- Description: 55-Way F 1.2 OCS, 2.8, 6.3 CTS Series, Sealed(BK)

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 35205173
- Service Connector: 84727364
- Description: 55-Way M 1.2 OCS, 2.8, 6.3 CTS Series, Sealed(BK)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19370818	J-35616-12 (BU)	J-38125-553
II	19371217	J-35616-12 (BU)	J-38125-553
III	84634921	J-35616-42 (RD)	J-38125-212
IV	84847992	J-35616-32 (OG)	J-38125-36
V	84992391	J-35616-5 (PU)	J-38125-36
VI	87838750	J-35616-13 (BU)	J-38125-215A

X410 Chassis Wiring Harness to Body Wiring Harness

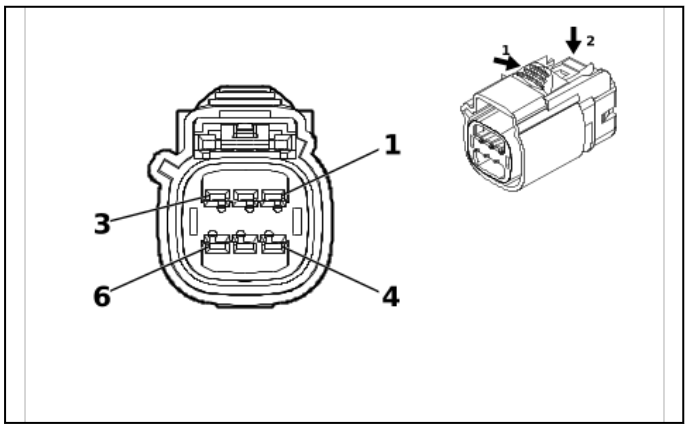
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 5	(1) GN / VT	(1) 1988	(1) III	(1) —	(1) Right Park Brake Motor Apply Control	(1) 1	(1) 2.5	(1) GN / VT	(1) 1988	(1) IV	(1) —
(2) 2	(2) 1.5	(2) WH / BK	(2) 2223	(2) II	(2) —	(2) Trailer Brake Apply Signal	(2) 2	(2) 0.75	(2) WH / BK	(2) 2223	(2) VI	(2) —
(3) 3	(3) 0.5	(3) BU / BN	(3) 11326	(3) I	(3) —	(3) Virtual Key Private CAN Bus [+] Serial Data	(3) 3	(3) 0.5	(3) BU / BN	(3) 11326	(3) VI	(3) —
(4) 4	(4) 0.5	(4) WH / YE	(4) 11325	(4) I	(4) —	(4) Virtual Key Private CAN Bus [-] Serial Data	(4) 4	(4) 0.5	(4) WH / YE	(4) 11325	(4) VI	(4) —
(5) 5	(5) 0.5	(5) BN / GN	(5) 3568	(5) I	(5) —	(5) Rear Closure Passive Entry Antenna High Signal	(5) 5	(5) 0.35	(5) BN / GN	(5) 3568	(5) VI	(5) —

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(6) 6	(6) 0.5	(6) GN / GY	(6) 3569	(6) I	(6) —	(6) Rear Closure Passive Entry Antenna Low Signal	(6) 6	(6) 0.35	(6) GN / GY	(6) 3569	(6) VI	(6) —
7	—	—	—	—	—	Not Occupied	7	—	—	—	—	—
(8) 8	(8) 0.5	(8) WH / VT	(8) 1430	(8) I	(8) —	(8) Exterior Courtesy Lamp Control	(8) 8	(8) 0.5	(8) WH / VT	(8) 1430	(8) VI	(8) —
(9) 9	(9) 0.5	(9) GN / YE	(9) 1616	(9) I	(9) —	(9) Rear Brake Pad Wear Sensor Signal	(9) 9	(9) 0.5	(9) GN / YE	(9) 1616	(9) VI	(9) —
10	—	—	—	—	—	Not Occupied	10	—	—	—	—	—
(11) 11	(11) 0.5	(11) GN / YE	(11) 2862	(11) I	(11) —	(11) Body Control Module LIN Bus 16	(11) 11	(11) 0.35	(11) GN / YE	(11) 2862	(11) VI	(11) —
(12) 12	(12) 1.5	(12) YE / BK	(12) 2224	(12) II	(12) —	(12) Trailer Brake Enable Signal	(12) 12	(12) 0.75	(12) YE / BK	(12) 2224	(12) VI	(12) —
(13) 13	(13) 5	(13) WH	(13) 2001	(13) III	(13) —	(13) Left Park Brake Motor Apply Control	(13) 13	(13) 2.5	(13) WH	(13) 2001	(13) IV	(13) —
14 - 15	—	—	—	—	—	Not Occupied	14 - 15	—	—	—	—	—
(16) 16	(16) 0.75	(16) WH / YE	(16) 7541	(16) I	(16) —	(16) Right Rear Stop Lamp Control	(16) 16	(16) 0.35	(16) WH / YE	(16) 7541	(16) VI	(16) —
(17) 17	(17) 0.5	(17) YE / WH	(17) 2377	(17) I	(17) —	(17) Right Rear Middle Parking Assist Sensor Signal	(17) 17	(17) 0.5	(17) YE / WH	(17) 2377	(17) VI	(17) —
(18) 18	(18) 0.75	(18) BN / BU	(18) 6993	(18) I	(18) —	(18) Left Rear Park Lamp Control	(18) 18	(18) 0.75	(18) BN / BU	(18) 6993	(18) VI	(18) —
(19) 19	(19) 0.5	(19) GN / BU	(19) 2733	(19) I	(19) —	(19) Brake System Control Module LIN Bus 2	(19) 19	(19) 0.5	(19) GN / BU	(19) 2733	(19) VI	(19) —
(20) 20	(20) 0.5	(20) VT / WH	(20) 639	(20) I	(20) —	(20) Run/ Crank Ignition 1 Voltage	(20) 20	(20) 0.5	(20) VT / WH	(20) 639	(20) VI	(20) —
(21) 21	(21) 0.5	(21) VT	(21) 882	(21) I	(21) —	(21) Right Rear Wheel Speed Sensor Signal	(21) 21	(21) 0.5	(21) VT	(21) 882	(21) VI	(21) —
(22) 22	(22) 0.5	(22) GY / YE	(22) 7128	(22) I	(22) —	(22) Right Rear Wheel Speed Sensor Control	(22) 22	(22) 0.5	(22) GY / YE	(22) 7128	(22) VI	(22) —
(23) 23	(23) 0.5	(23) BU	(23) 884	(23) I	(23) —	(23) Left Rear Wheel Speed Sensor Signal	(23) 23	(23) 0.5	(23) BU	(23) 884	(23) VI	(23) —

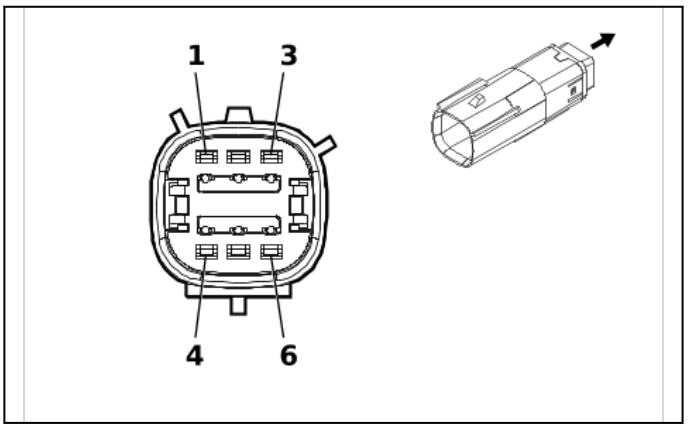
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(24) 24	(24) 0.5	(24) GY / BK	(24) 71 27	(24) I	(24) —	(24) Left Rear Wheel Speed Sensor Control	(24) 24	(24) 0.5	(24) GY / BK	(24) 71 27	(24) VI	(24) —
(25) 25	(25) 0.5	(25) WH / BK	(25) 75 44	(25) I	(25) —	(25) Right Rear Turn Signal Lamp Feedback Signal	(25) 25	(25) 0.35	(25) WH / BK	(25) 75 44	(25) VI	(25) —
(26) 26	(26) 0.5	(26) BN / YE	(26) 82 0	(26) I	(26) —	(26) Center High Mounted Stop Lamp Supply Voltage	(26) 26	(26) 0.5	(26) BN / YE	(26) 82 0	(26) VI	(26) —
(27) 27	(27) —	(27) —	(27) —	(27) —	(27) —	(27) Ground	(27) 27	(27) 2.5	(27) BK	(27) 15 0	(27) V	(27) —
28	—	—	—	—	—	Not Occupied	28	—	—	—	—	—
(29) 29	(29) 5	(29) GY / BK	(29) 43 69	(29) III	(29) —	(29) Left Park Brake Motor Low Reference	(29) 29	(29) 2.5	(29) GY / BK	(29) 43 69	(29) IV	(29) —
30 - 34	—	—	—	—	—	Not Occupied	30 - 34	—	—	—	—	—
(35) 35	(35) 0.5	(35) GN / BN	(35) 22 66	(35) I	(35) —	(35) DC/AC Inverter Control 2	(35) 35	(35) 0.5	(35) GN / BN	(35) 22 66	(35) VI	(35) KC9 / KCA
(36) 36	(36) 0.5	(36) BN / WH	(36) 23 74	(36) I	(36) —	(36) Object Sensor Voltage Reference	(36) 36	(36) 0.5	(36) BN / WH	(36) 23 74	(36) VI	(36) —
(37) 37	(37) 0.5	(37) YE	(37) 23 75	(37) I	(37) —	(37) Left Rear Outer Parking Assist Sensor Signal	(37) 37	(37) 0.5	(37) YE	(37) 23 75	(37) VI	(37) —
(38) 38	(38) 0.5	(38) YE / BU	(38) 23 76	(38) I	(38) —	(38) Left Rear Middle Parking Assist Sensor Signal	(38) 38	(38) 0.5	(38) YE / BU	(38) 23 76	(38) VI	(38) —
(39) 39	(39) 0.5	(39) WH	(39) 49 78	(39) I	(39) —	(39) AUTOSAR CAN Bus [-] 2 Serial Data	(39) 39	(39) 0.35	(39) WH	(39) 49 78	(39) VI	(39) —
(40) 40	(40) 0.5	(40) YE / VT	(40) 23 78	(40) I	(40) —	(40) Right Rear Outer Parking Assist Sensor Signal	(40) 40	(40) 0.5	(40) YE / VT	(40) 23 78	(40) VI	(40) —
(41) 41	(41) 0.5	(41) BK / GY	(41) 23 79	(41) I	(41) —	(41) Object Sensor Low Reference	(41) 41	(41) 0.5	(41) BK / GY	(41) 23 79	(41) VI	(41) —
(42) 42	(42) 0.5	(42) GN / WH	(42) 24	(42) I	(42) —	(42) Backup Lamp Control	(42) 42	(42) 0.5	(42) GN / WH	(42) 24	(42) VI	(42) —
(43) 43	(43) 5	(43) GY	(43) 43 68	(43) III	(43) —	(43) Right Park Brake Motor Low Reference	(43) 43	(43) 2.5	(43) GY	(43) 43 68	(43) IV	(43) —

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(44) 44	(44) 0.75	(44) BK / WH	(44) 10 120	(44) I	(44) —	(44) Cavity Seal (44) AC Outlet 2 Phase A Control	(44) 44	(44) 0.75 (44) 0.75	(44) BK (44) BK / WH	(44) 90 00 (44) 10 120	(44) VI (44) VI	(44) - (KC9 / KCA) (44) KC9 / KCA
(45) 45	(45) 0.75	(45) RD / WH	(45) 10 121	(45) I	(45) —	(45) AC Outlet 2 Phase B Control	(45) 45	(45) 0.75	(45) RD / WH	(45) 10 121	(45) VI	(45) KC9 / KCA
(46) 46	(46) 0.5	(46) BN	(46) 10 119	(46) I	(46) —	(46) AC Outlet 2 Low Reference	(46) 46	(46) 0.5	(46) BN	(46) 10 119	(46) VI	(46) KC9 / KCA
(47) 47	(47) 0.5	(47) VT / GN	(47) 43 20	(47) I	(47) —	(47) Powertrain Sensor Bus Enable	(47) 47	(47) 0.5	(47) VT / GN	(47) 43 20	(47) VI	(47) —
(48) 48	(48) 0.5	(48) WH / VT	(48) 65 67	(48) I	(48) —	(48) Rear Turn Signal Lamp Feedback Signal	(48) 48	(48) 0.35	(48) WH / VT	(48) 65 67	(48) VI	(48) —
(49) 49	(49) 0.75	(49) GY / YE	(49) 75 42	(49) I	(49) —	(49) Left Rear Stop Lamp Control	(49) 49	(49) 0.35	(49) GY / YE	(49) 75 42	(49) VI	(49) —
(50) 50	(50) 0.5	(50) VT / RD	(50) 40 49	(50) I	(50) —	(50) AC Power Outlet Sensor High Reference	(50) 50	(50) 0.35	(50) VT / RD	(50) 40 49	(50) VI	(50) KC9 / KCA
(51) 51	(51) 0.5	(51) GY / BU	(51) 77 62	(51) I	(51) —	(51) Cargo Lamp Control	(51) 51	(51) 0.5	(51) GY / BU	(51) 77 62	(51) VI	(51) —
(52) 52	(52) 0.5	(52) GN / YE	(52) 68 46	(52) I	(52) —	(52) Rear License Plate Lamp Control	(52) 52	(52) 0.35	(52) GN / YE	(52) 68 46	(52) VI	(52) —
(53) 53	(53) 0.5	(53) BU / YE	(53) 49 79	(53) I	(53) —	(53) AUTOSAR CAN Bus [+] 2 Serial Data	(53) 53	(53) 0.35	(53) BU / YE	(53) 49 79	(53) VI	(53) —
(54) 54	(54) 0.75	(54) BN / GY	(54) 69 95	(54) I	(54) —	(54) Right Rear Park Lamp Control	(54) 54	(54) 0.75	(54) BN / GY	(54) 69 95	(54) VI	(54) —
(55) 55	(55) —	(55) —	(55) —	(55) —	(55) —	(55) Battery Positive Voltage	(55) 55	(55) 6	(55) RD / WH	(55) 16 42	(55) IV	(55) —

X414 Chassis Wiring Harness to Chassis Rear Wiring Harness



4996962



4992963

Connector Part Information
- Harness Type: Chassis Wiring Harness
- OEM Connector: 15513505
- Service Connector: 85669156
- Description: 6-Way F 1.5 OCS Series, Sealed(GY)

Connector Part Information
- Harness Type: Chassis Rear Wiring Harness
- OEM Connector: 15513475
- Service Connector: 19371205
- Description: 6-Way M 1.5 OCS Series, Sealed(GY)

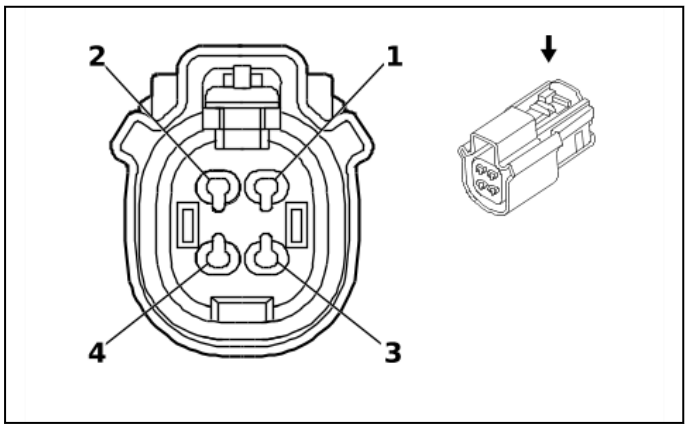
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required
II	Not required	J-35616-3 (GY)	No Tool Required

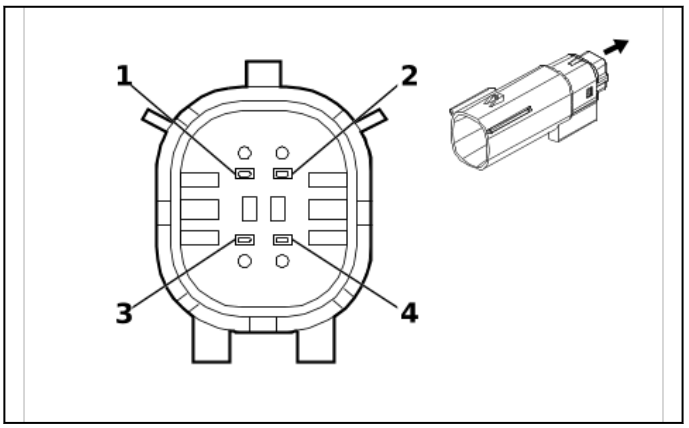
X414 Chassis Wiring Harness to Chassis Rear Wiring Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BK / WH	(1) 10120	(1) I	(1) —	(1) AC Outlet 2 Phase A Control	(1) 1	(1) 0.75	(1) BK / WH	(1) 10120	(1) II	(1) —
(2) 2	(2) 0.75	(2) RD / WH	(2) 10121	(2) I	(2) —	(2) AC Outlet 2 Phase B Control	(2) 2	(2) 0.75	(2) RD / WH	(2) 10121	(2) II	(2) —
(3) 3	(3) 0.5	(3) BN	(3) 10119	(3) I	(3) —	(3) AC Outlet 2 Low Reference	(3) 3	(3) 0.5	(3) BN	(3) 10119	(3) II	(3) —
(4) 4	(4) 0.5	(4) VT / RD	(4) 4049	(4) I	(4) —	(4) AC Power Outlet Sensor High Reference	(4) 4	(4) 0.5	(4) VT / RD	(4) 4049	(4) II	(4) —
(5) 5	(5) 0.5	(5) GN / BN	(5) 2266	(5) I	(5) —	(5) DC/AC Inverter Control 2	(5) 5	(5) 0.5	(5) GN / BN	(5) 2266	(5) II	(5) —
(6) 6	(6) 0.75	(6) BK	(6) 1650	(6) I	(6) —	(6) Ground	(6) 6	(6) 0.5	(6) BK	(6) 1650	(6) II	(6) —

X415 Front Axle Wiring Harness to Engine Wiring Harness (F48)



1960031



2368875

Connector Part Information
- Harness Type: Front Axle Wiring Harness
- OEM Connector: 33472-4006
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 1.5 MX Series, Sealed(BK)

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 33482-4001
- Service Connector: 84838880
- Description: 4-Way M 1.5 MX Series, Sealed(BK)

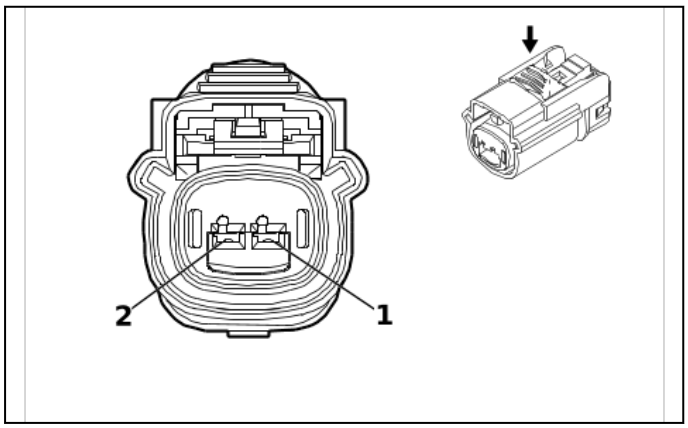
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required
II	Not required	J-35616-3 (GY)	No Tool Required

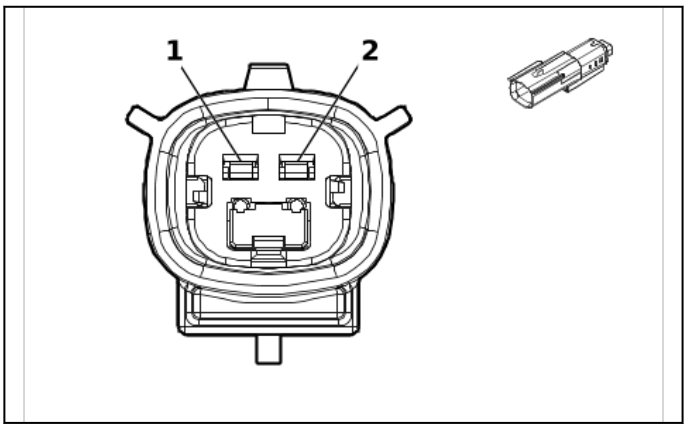
X415 Front Axle Wiring Harness to Engine Wiring Harness (F48)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) GY / BK	(1) 1570	(1) I	(1) —	(1) Front Axle Actuator Control	(1) 1	(1) 0.5	(1) GY / BK	(1) 1570	(1) II	(1) —
(2) 2	(2) 0.5	(2) YE / WH	(2) 1695	(2) I	(2) —	(2) 4WD Locked Range Indicator Control	(2) 2	(2) 0.5	(2) YE / WH	(2) 1695	(2) II	(2) —
(3) 3	(3) 0.5	(3) GN	(3) 8016	(3) I	(3) —	(3) Secondary Axle Motor Control	(3) 3	(3) 0.5	(3) GN	(3) 8016	(3) II	(3) —
(4) 4	(4) 0.5	(4) BK	(4) 450	(4) I	(4) —	(4) Ground (4) Ground	(4) 4	(4) 0.75 (4) 1	(4) BK (4) BK	(4) 450 (4) 450	(4) II (4) II	(4) LZ0 / L4B (4) L76 / L78

X416F Front Axle Wiring Harness to Chassis Wiring Harness (G93)



4332222



5921817

Connector Part Information
- Harness Type: Front Axle Wiring Harness
- OEM Connector: 15514573
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.5 OCS Series, Sealed(BK)

Connector Part Information
- Harness Type: Chassis Wiring Harness
- OEM Connector: 15514550
- Service Connector: 86825463
- Description: 2-Way M 1.5 OCS Series, Sealed(BK)

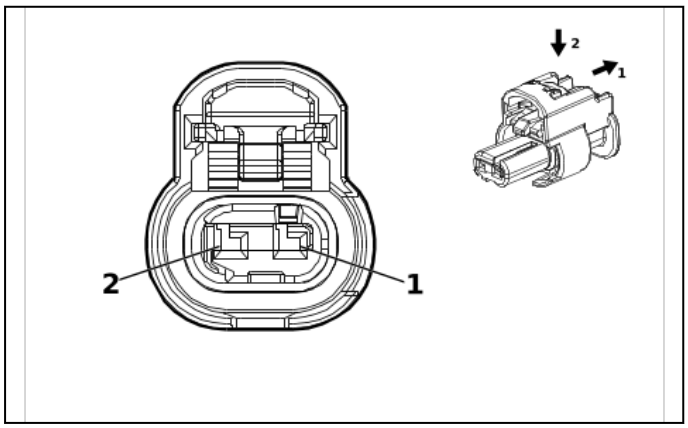
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required
II	Not required	J-35616-3 (GY)	No Tool Required

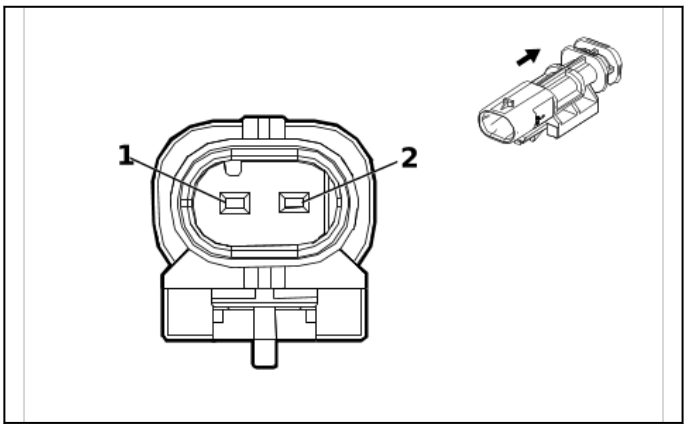
X416F Front Axle Wiring Harness to Chassis Wiring Harness (G93)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) WH / BK	(1) 7254	(1) I	(1) —	(1) Front Differential Lock Actuator Low Control	(1) 1	(1) 0.75	(1) WH / BK	(1) 7254	(1) II	(1) —
(2) 2	(2) 0.75	(2) VT / WH	(2) 7256	(2) I	(2) —	(2) Front Differential Lock Actuator Control	(2) 2	(2) 0.75	(2) VT / WH	(2) 7256	(2) II	(2) —

X416L Chassis Wiring Harness to Electronic Suspension Strut Wiring Harness Extension Harness - Left (Z45)



4649903



2474755

Connector Part Information
- Harness Type: Chassis Wiring Harness
- OEM Connector: 1-2296694-1
- Service Connector: 85761014
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

Connector Part Information
- Harness Type: Electronic Suspension Strut Wiring Harness Extension Harness - Left
- OEM Connector: 2203314-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way M 1.2 MCON Series, Sealed(BK)

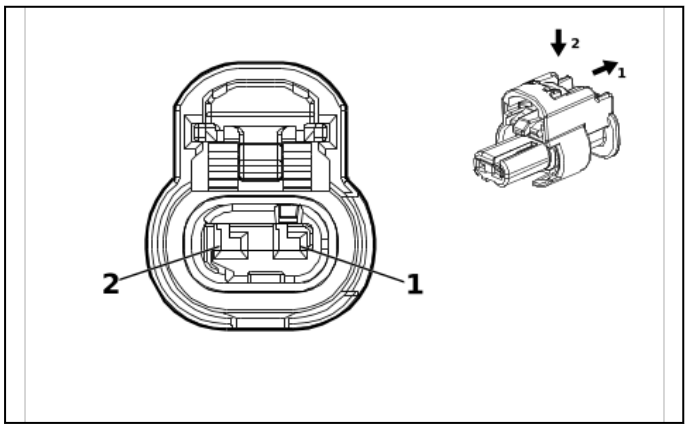
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required
II	Not required	J-35616-17 (L-GN)	No Tool Required

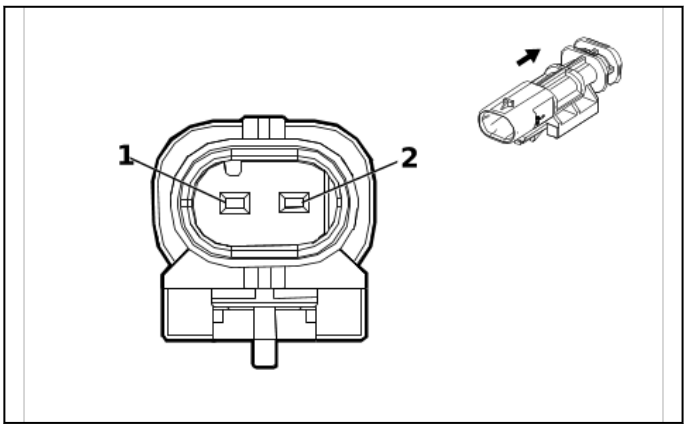
X416L Chassis Wiring Harness to Electronic Suspension Strut Wiring Harness Extension Harness - Left (Z45)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BN / WH	(1) 1107	(1) I	(1) —	(1) Left Front Shock Absorber Actuator Control	(1) 1	(1) 0.75	(1) BU / WH	(1) 1107	(1) II	(1) —
(2) 2	(2) 0.75	(2) GY / BU	(2) 1113	(2) I	(2) —	(2) Left Front Shock Absorber Actuator Control	(2) 2	(2) 0.75	(2) GY	(2) 1113	(2) II	(2) —

X416R Chassis Wiring Harness to Electronic Suspension Strut Wiring Harness Extension Harness - Right (Z45)



4649903



2474755

Connector Part Information
- Harness Type: Chassis Wiring Harness
- OEM Connector: 1-2296694-1
- Service Connector: 85761014
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

Connector Part Information
- Harness Type: Electronic Suspension Strut Wiring Harness Extension Harness - Right
- OEM Connector: 2203314-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way M 1.2 MCON Series, Sealed(BK)

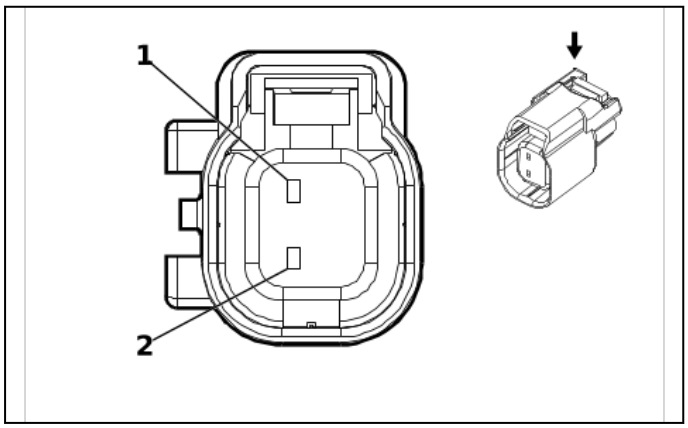
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required
II	Not required	J-35616-17 (L-GN)	No Tool Required

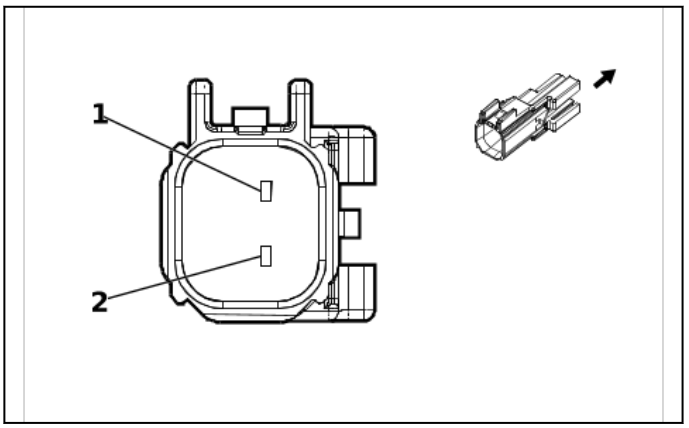
X416R Chassis Wiring Harness to Electronic Suspension Strut Wiring Harness Extension Harness - Right (Z45)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BN / BU	(1) 1116	(1) I	(1) —	(1) Right Front Shock Absorber Actuator Control	(1) 1	(1) 0.75	(1) BU / WH	(1) 1116	(1) II	(1) —
(2) 2	(2) 0.75	(2) GY / WH	(2) 1117	(2) I	(2) —	(2) Right Front Shock Absorber Actuator Control	(2) 2	(2) 0.75	(2) GY	(2) 1117	(2) II	(2) —

X418 Assist Step Motor - Left to Assist Step Wire - Left (B3L)



3653749



3271068

Connector Part Information
- Harness Type: Assist Step Motor - Left
- OEM Connector: 34062-0038
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.5 Series, Sealed(BK)

Connector Part Information
- Harness Type: Assist Step Wire - Left
- OEM Connector: 13503926
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way M 1.5 Series, Sealed(BK)

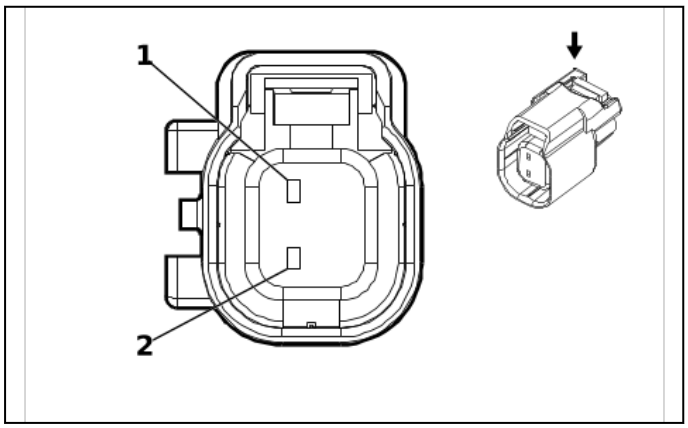
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required
II	Not required	J-35616-3 (GY)	No Tool Required

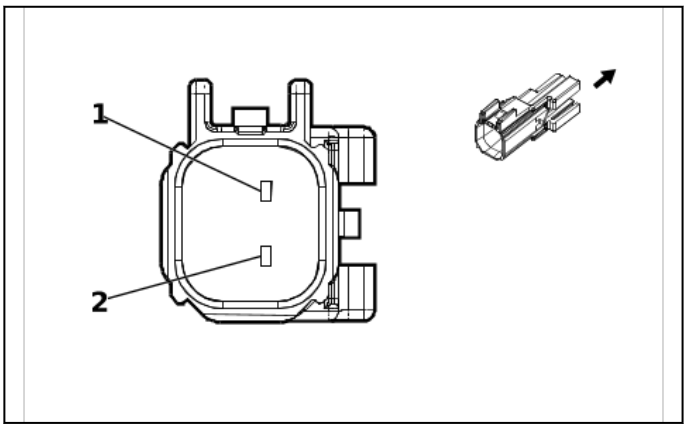
X418 Assist Step Motor - Left to Assist Step Wire - Left (B3L)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) RD	(1) 4746	(1) I	(1) —	(1) Running Board Step Left Kick Switch Signal	(1) 1	(1) 0.5	(1) RD	(1) 4746	(1) II	(1) —
(2) 2	(2) 0.5	(2) BK	(2) 1151	(2) I	(2) —	(2) Signal Ground	(2) 2	(2) 0.5	(2) BK	(2) 1151	(2) II	(2) —

X419 Assist Step Motor - Right to Assist Step Wire - Right (B3L)



3653749



3271068

Connector Part Information
- Harness Type: Assist Step Motor - Right
- OEM Connector: 34062-0038
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.5 Series, Sealed(BK)

Connector Part Information
- Harness Type: Assist Step Wire - Right
- OEM Connector: 13503926
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way M 1.5 Series, Sealed(BK)

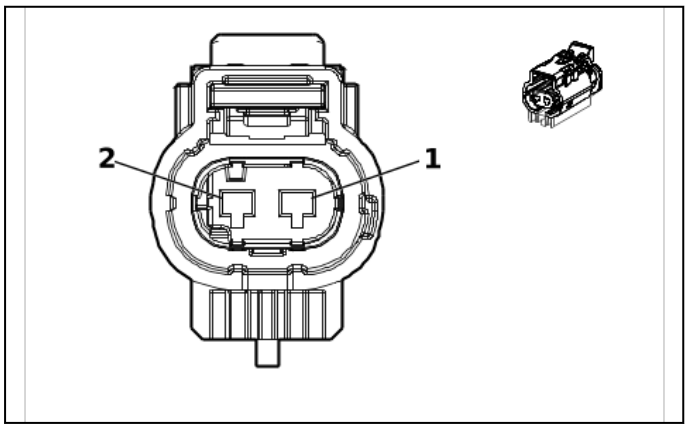
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required
II	Not required	J-35616-3 (GY)	No Tool Required

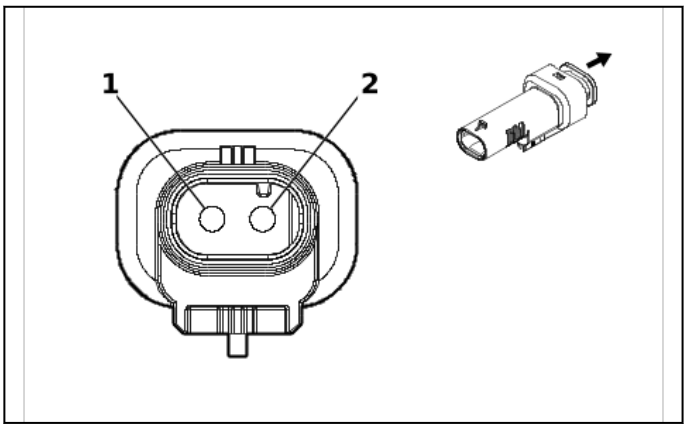
X419 Assist Step Motor - Right to Assist Step Wire - Right (B3L)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) RD	(1) 4747	(1) I	(1) —	(1) Running Board Step Right Kick Switch Signal	(1) 1	(1) 0.5	(1) RD	(1) 4747	(1) II	(1) —
(2) 2	(2) 0.5	(2) BK	(2) 1151	(2) I	(2) —	(2) Signal Ground	(2) 2	(2) 0.5	(2) BK	(2) 1151	(2) II	(2) —

X420A Chassis Rear Wiring Harness Extension Harness to Chassis Wiring Harness (- (G94 / Z45))



6819416



4992757

Connector Part Information
- Harness Type: Chassis Rear Wiring Harness Extension Harness
- OEM Connector: 13551879
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MLK Series, Sealed(GY)

Connector Part Information
- Harness Type: Chassis Wiring Harness
- OEM Connector: 10094251
- Service Connector: 19371200
- Description: 2-Way M 1.2 MLK Series, Sealed(GY)

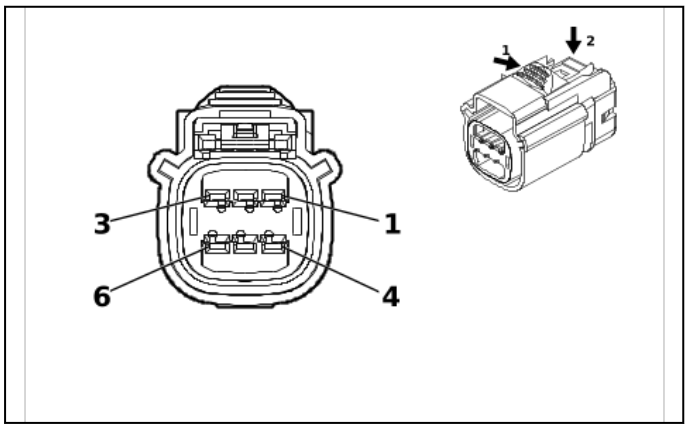
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required
II	Not required	J-35616-13 (BU)	No Tool Required
III	Not required	J-35616-17 (L-GN)	No Tool Required

X420A Chassis Rear Wiring Harness Extension Harness to Chassis Wiring Harness (- (G94 / Z45))

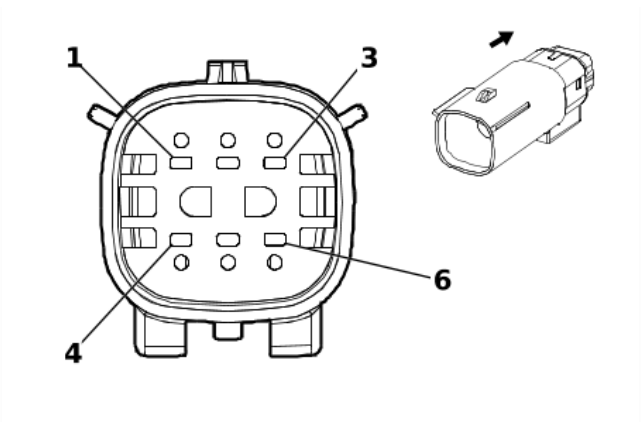
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) GN / YE	(1) 1616	(1) I	(1) —	(1) Rear Brake Pad Wear Sensor Signal	(1) 1	(1) 0.5	(1) GN / YE	(1) 1616	(1) III	(1) —
(2) 2	(2) 0.75	(2) BK / WH	(2) 1751	(2) I	(2) —	(2) Signal Ground	(2) 2	(2) 0.75	(2) BK / WH	(2) 1851	(2) II	(2) —

X420B Chassis Wiring Harness to Chassis Rear Wiring Harness Extension Harness (G94 / Z45)



5004419

Connector Part Information
- Harness Type: Chassis Wiring Harness
- OEM Connector: 15513504
- Service Connector: 84999473
- Description: 6-Way F 1.5 OCS Series, Sealed(BK)



1986159

Connector Part Information
- Harness Type: Chassis Rear Wiring Harness Extension Harness
- OEM Connector: 33482-3601
- Service Connector: Service by Harness - See Part Catalog
- Description: 6-Way M 1.5 MX Series, Sealed(BK)

Terminal Part Information

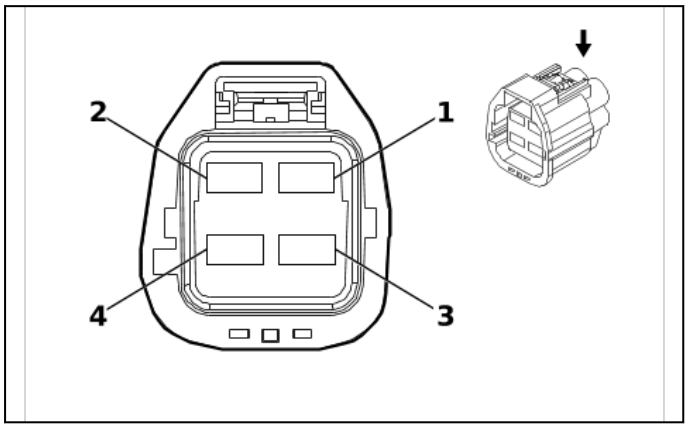
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required
II	Not required	J-35616-3 (GY)	No Tool Required

X420B Chassis Wiring Harness to Chassis Rear Wiring Harness Extension Harness (G94 / Z45)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BU / GY	(1) 1114	(1) I	(1) —	(1) Left Rear Shock Absorber Actuator Control	(1) 1	(1) 0.75	(1) BU / GY	(1) 1114	(1) II	(1) —
(2) 2	(2) 0.5	(2) GN / YE	(2) 1616	(2) I	(2) —	(2) Rear Brake Pad Wear Sensor Signal	(2) 2	(2) 0.75	(2) GN / YE	(2) 1616	(2) II	(2) —
(3) 3	(3) 0.75 (3) 0.75	(3) GY / BK (3) BN / GN	(3) 7253 (3) 1118	(3) I (3) I	(3) G94 (3) Z45	(3) Rear Differential Lock Actuator Low Control (3) Right Rear Shock Absorber Actuator Control	(3) 3	(3) 0.75 (3) 0.75	(3) GY / BK (3) BN / GN	(3) 7253 (3) 1118	(3) II (3) II	(3) G94 (3) Z45
(4) 4	(4) 0.75	(4) GN / VT	(4) 1115	(4) I	(4) —	(4) Left Rear Shock Absorber Actuator Control	(4) 4	(4) 0.75	(4) GN / VT	(4) 1115	(4) II	(4) —

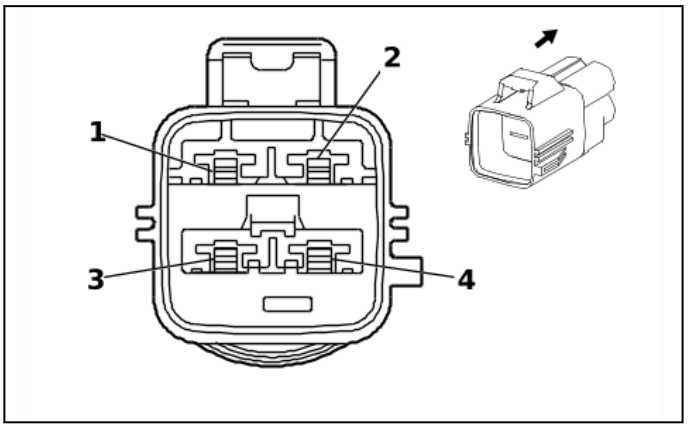
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(5) 5	(5) 0.75	(5) BK / WH	(5) 1851	(5) I	(5) —	(5) Signal Ground	(5) 5	(5) 0.75	(5) BK / WH	(5) 1751	(5) II	(5) —
(6) 6	(6) 0.75 (6) 0.75	(6) VT / BN (6) G N / GY	(6) 7258 (6) 1119	(6) I (6) I	(6) G94 (6) Z45	(6) Rear Differential Lock Actuator Control (6) Right Rear Shock Absorber Actuator Control	(6) 6	(6) 0.75 (6) 0.75	(6) VT / BN (6) G N / GY	(6) 7258 (6) 1119	(6) II (6) II	(6) G94 (6) Z45

X420R Chassis Rear Wiring Harness Extension Harness to Chassis Wiring Harness



2852121

Connector Part Information
- Harness Type: Chassis Rear Wiring Harness Extension Harness
- OEM Connector: 7283-3601-10
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 6.3 Series, Sealed(GY)



1853524

Connector Part Information
- Harness Type: Chassis Wiring Harness
- OEM Connector: 7288-3029-10
- Service Connector: 19371198
- Description: 4-Way M 6.3 Series, Sealed(GY)

Terminal Part Information

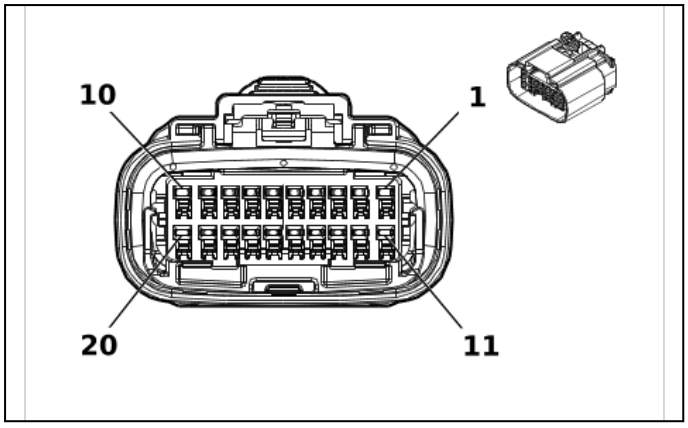
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-42 (RD)	No Tool Required
II	Not required	J-35616-43 (RD)	No Tool Required

X420R Chassis Rear Wiring Harness Extension Harness to Chassis Wiring Harness

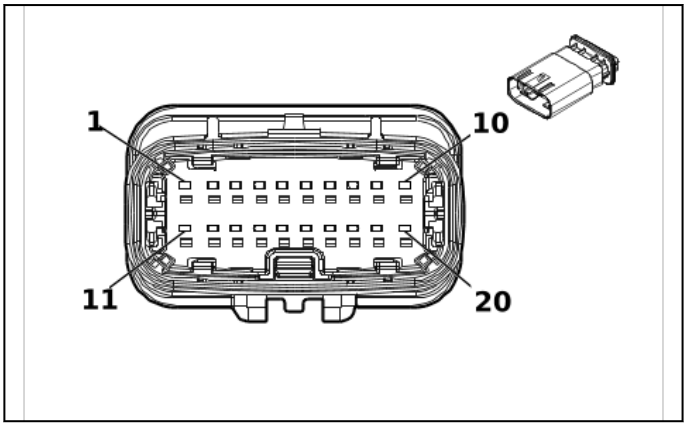
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 2.5	(1) WH	(1) 2001	(1) I	(1)	(1) Left Park Brake Motor Apply Control	(1) 1	(1) 5	(1) WH	(1) 2001	(1) II	(1) —
(2) 2	(2) 2.5	(2) GY / BK	(2) 4369	(2) I	(2)	(2) Left Park Brake Motor Low Reference	(2) 2	(2) 5	(2) GY / BK	(2) 4369	(2) II	(2) —

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(3) 3	(3) 2.5	(3) GN / VT	(3) 1988	(3) I	(3)	(3) Right Park Brake Motor Apply Control	(3) 3	(3) 5	(3) GN / VT	(3) 1988	(3) II	(3) —
(4) 4	(4) 2.5	(4) GY	(4) 4368	(4) I	(4)	(4) Right Park Brake Motor Low Reference	(4) 4	(4) 5	(4) GY	(4) 4368	(4) II	(4) —

X424 Body Wiring Harness to Chassis Wiring Harness



6240294



6081336

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 35465658
- Service Connector: 86579559
- Description: 20-Way F 1.2 MCON-CB Series, Sealed(BK)

Connector Part Information
- Harness Type: Chassis Wiring Harness
- OEM Connector: 35465720
- Service Connector: 85625526
- Description: 20-Way M 1.2 MCON-CB Series, Sealed(BK)

Terminal Part Information

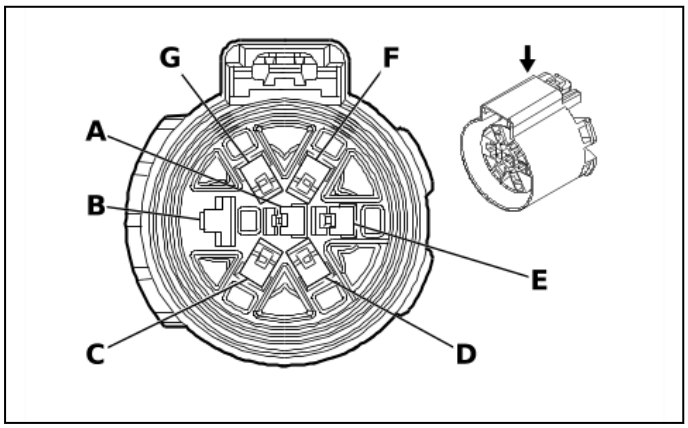
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19370818	J-35616-12 (BU)	J-38125-553
II	84867140	J-35616-13 (BU)	J-38125-553

X424 Body Wiring Harness to Chassis Wiring Harness

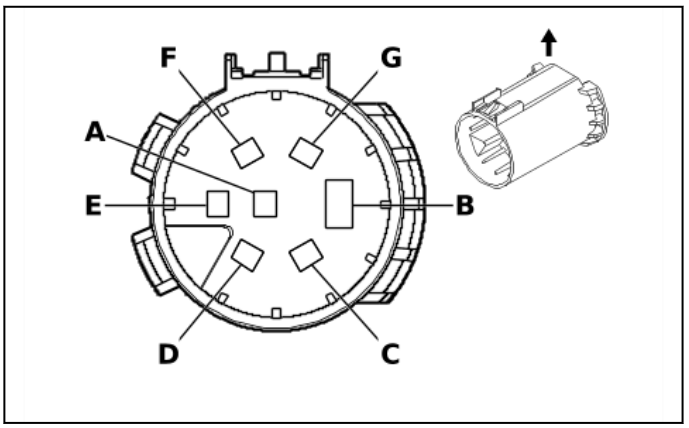
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) YE / GN	(1) 2024	(1) I	(1) —	(1) Animation Lighting Control	(1) 1	(1) 0.75	(1) YE / GN	(1) 2024	(1) II	(1) —
(2) 2	(2) 0.5	(2) WH	(2) 4055	(2) I	(2) —	(2) Private Serial Data Powertrain CAN Bus [+] Serial Data	(2) 2	(2) 0.5	(2) WH	(2) 4055	(2) II	(2) —
(3) 3	(3) 0.5	(3) BU / GY	(3) 4054	(3) I	(3) —	(3) Private Serial Data Powertrain CAN Bus [-] Serial Data	(3) 3	(3) 0.5	(3) BU / GY	(3) 4054	(3) II	(3) —

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(4) 4	(4) 0.35	(4) BU / VT	(4) 4101	(4) I	(4) —	(4) AUTOSAR CAN Bus [+] 4 Serial Data	(4) 4	(4) 0.5	(4) BU / VT	(4) 4101	(4) II	(4) —
(5) 5	(5) 0.35	(5) WH	(5) 4100	(5) I	(5) —	(5) AUTOSAR CAN Bus [-] 4 Serial Data	(5) 5	(5) 0.5	(5) WH	(5) 4100	(5) II	(5) —
(6) 6	(6) 0.35	(6) BU / GY	(6) 4105	(6) I	(6) —	(6) AUTOSAR CAN Bus [+] 8 Serial Data	(6) 6	(6) 0.5	(6) BU / GY	(6) 4105	(6) II	(6) —
(7) 7	(7) 0.35	(7) WH / GY	(7) 4104	(7) I	(7) —	(7) AUTOSAR CAN Bus [-] 8 Serial Data	(7) 7	(7) 0.5	(7) WH / GY	(7) 4104	(7) II	(7) —
(8) 8	(8) 0.35	(8) BU / GY	(8) 4105	(8) I	(8) —	(8) AUTOSAR CAN Bus [+] 8 Serial Data	(8) 8	(8) 0.35	(8) BU / GY	(8) 4105	(8) II	(8) —
(9) 9	(9) 0.35	(9) WH / GY	(9) 4104	(9) I	(9) —	(9) AUTOSAR CAN Bus [-] 8 Serial Data	(9) 9	(9) 0.35	(9) WH / GY	(9) 4104	(9) II	(9) —
(10) 10	(10) 0.75	(10) GY / BN	(10) 10749	(10) I	(10) —	(10) Sequential Turn Lamp Enable Signal	(10) 10	(10) 0.75	(10) GY / BN	(10) 10749	(10) II	(10) —
(11) 11	(11) 0.75	(11) BU / WH	(11) 1334	(11) I	(11) —	(11) Left Rear Turn Signal Lamp Control 2	(11) 11	(11) 0.75	(11) BU / WH	(11) 1334	(11) II	(11) —
(12) 12	(12) 0.35	(12) WH	(12) 4986	(12) I	(12) 4-DOOR	(12) AUTOSAR CAN Bus [-] 1 Serial Data	(12) 12	(12) 0.5	(12) WH	(12) 4986	(12) II	(12) 4-DOOR
(13) 13	(13) 0.35	(13) BU	(13) 4987	(13) I	(13) 4-DOOR	(13) AUTOSAR CAN Bus [+] 1 Serial Data	(13) 13	(13) 0.5	(13) BU	(13) 4987	(13) II	(13) 4-DOOR
(14) 14	(14) 0.35	(14) WH	(14) 4976	(14) I	(14) CREW CAB	(14) AUTOSAR CAN Bus [-] 3 Serial Data	(14) 14	(14) 0.5	(14) WH	(14) 4976	(14) II	(14) CREW CAB
(15) 15	(15) 0.35	(15) BU / BK	(15) 4977	(15) I	(15) CREW CAB	(15) AUTOSAR CAN Bus [+] 3 Serial Data	(15) 15	(15) 0.5	(15) BU / BK	(15) 4977	(15) II	(15) CREW CAB
(16) 16	(16) 0.35	(16) WH	(16) 4986	(16) I	(16) 4-DOOR	(16) AUTOSAR CAN Bus [-] 1 Serial Data	(16) 16	(16) 0.5	(16) WH	(16) 4986	(16) II	(16) 4-DOOR
(17) 17	(17) 0.35	(17) BU	(17) 4987	(17) I	(17) 4-DOOR	(17) AUTOSAR CAN Bus [+] 1 Serial Data	(17) 17	(17) 0.5	(17) BU	(17) 4987	(17) II	(17) 4-DOOR
(18) 18	(18) 0.35	(18) WH	(18) 4976	(18) I	(18) CREW CAB	(18) AUTOSAR CAN Bus [-] 3 Serial Data	(18) 18	(18) 0.5	(18) WH	(18) 4976	(18) II	(18) CREW CAB
(19) 19	(19) 0.35	(19) BU / BK	(19) 4977	(19) I	(19) CREW CAB	(19) AUTOSAR CAN Bus [+] 3 Serial Data	(19) 19	(19) 0.5	(19) BU / BK	(19) 4977	(19) II	(19) CREW CAB
(20) 20	(20) 0.75	(20) BU / VT	(20) 1335	(20) I	(20) —	(20) Right Rear Turn Signal Lamp Control 2	(20) 20	(20) 0.75	(20) BU / VT	(20) 1335	(20) II	(20) —

X438 Chassis Wiring Harness to Backup Alarm Wiring Harness (8S3)



2056936



366087

Connector Part Information
- Harness Type: Chassis Wiring Harness
- OEM Connector: 13857223
- Service Connector: 86816072
- Description: 7-Way F 280, 630 Metri-Pack Series, Sealed(BK)

Connector Part Information
- Harness Type: Backup Alarm Wiring Harness
- OEM Connector: 15317327
- Service Connector: Service by Harness - See Part Catalog
- Description: 7-Way M 280 Metri-Pack Series, Sealed(BK)

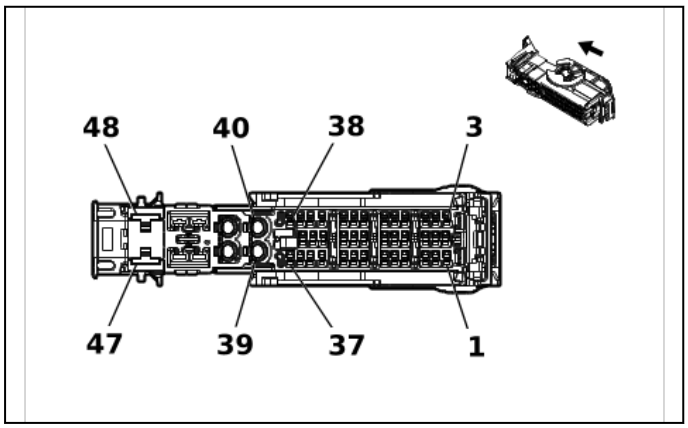
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-42 (RD)	No Tool Required
II	Not required	J-35616-4A (PU)	No Tool Required
III	Not required	J-35616-43 (RD)	No Tool Required
IV	Not required	J-35616-5 (PU)	No Tool Required

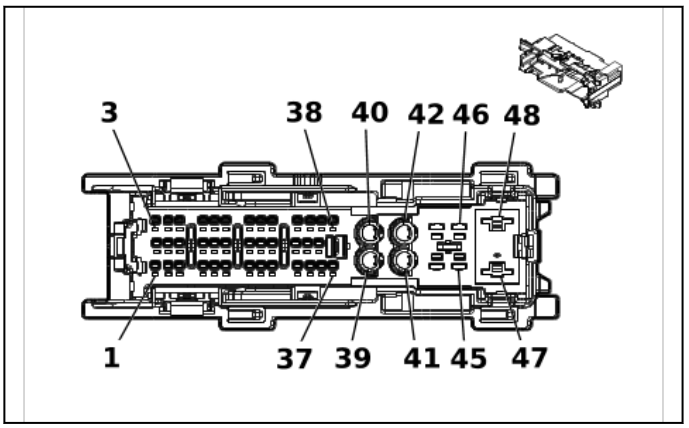
X438 Chassis Wiring Harness to Backup Alarm Wiring Harness (8S3)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
A	1	GY	1624	II	- UET	Trailer Backup Lamp Control	A	1	WH / GN	1624	IV	—
B	5	WH	22	I	—	Trailer Ground	B	5	WH	22	III	—
C	2.5	BU	47	II	—	Trailer Auxiliary Control	C	3	BU	47	IV	—
D	1	GN	1619	II	—	Right Rear Trailer Stop/ Turn Lamp Control	D	1	GN	1619	IV	—
E	4	OG	3940	II	—	Battery Positive Voltage	E	3	OG	3640	IV	—
F	1.5	BN	2109	II	- UET	Trailer Park Lamp Control	F	1.5	BN	2109	IV	—
G	1	YE	1618	II	—	Left Rear Trailer Stop/ Turn Lamp Control	G	1	YE	1618	IV	—

X500 Front Side Door Door Wiring Harness - Driver to Body Wiring Harness



6192563



6187159

Connector Part Information
- Harness Type: Front Side Door Door Wiring Harness - Driver
- OEM Connector: 6099-0288
- Service Connector: Service by Harness - See Part Catalog
- Description: 48-Way F 1.2 SWS, 2.8, 6.3 YESC, Coaxial Series(BK)

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 6099-0560
- Service Connector: 13561848
- Description: 48-Way M 1.2 SWS, 2.8, 6.3 YESC, Coaxial Series(BK)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required
II	Not required	J-35616-16 (L-GN)	No Tool Required
III	Not required	J-35616-42 (RD)	No Tool Required
IV	Not required	J-35616-4A (PU)	No Tool Required
V	Not required	No Tool Required	No Tool Required
VI	84616651	J-35616-13 (BU)	J-38125-215A
VII	84888592	J-35616-5 (PU)	J-38125-11A
VIII	87838107	J-35616-43 (RD)	J-38125-11A
IX	Service by Cable	No Tool Required	No Tool Required

X500 Front Side Door Door Wiring Harness - Driver to Body Wiring Harness

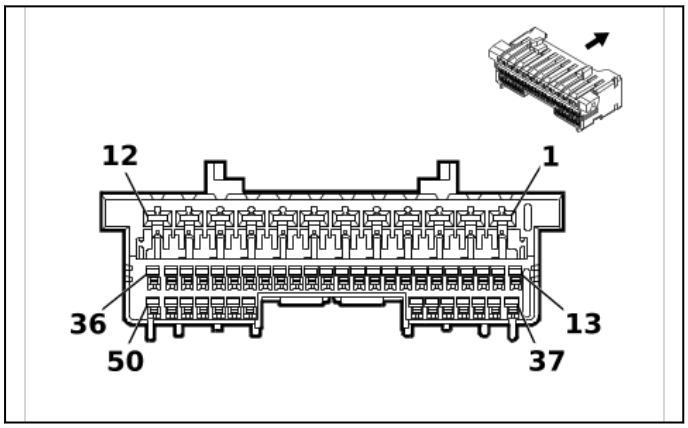
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
1	—	—	—	—	—	Not Occupied	1	—	—	—	—	—
(2) 2	(2) 0.5	(2) BK / OG	(2) 6628	(2) II	(2) —	(2) Left Front Side Impact Sensor Low Reference	(2) 2	(2) 0.5	(2) BK / OG	(2) 6628	(2) VI	(2) —
(3) 3	(3) 0.5	(3) VT	(3) 4301	(3) II	(3) —	(3) Passive Entry Left Antenna Signal High	(3) 3	(3) 0.35	(3) VT	(3) 4301	(3) VI	(3) —
4	—	—	—	—	—	Not Occupied	4	—	—	—	—	—
(5) 5	(5) 0.5	(5) OG / GN	(5) 2132	(5) II	(5) —	(5) Left Front Side Impact Sensor Signal	(5) 5	(5) 0.5	(5) OG / GN	(5) 2132	(5) VI	(5) —

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(6) 6	(6) 0.5	(6) VT / GY	(6) 4302	(6) II	(6) —	(6) Passive Entry Left Antenna Signal Low	(6) 6	(6) 0.35	(6) VT / GY	(6) 4302	(6) VI	(6) —
(7) 7	(7) 0.5	(7) GN / BK	(7) 2738	(7) II	(7) —	(7) Near Field Communication Module LIN Bus 1	(7) 7	(7) 0.35	(7) GN / BK	(7) 2738	(7) VI	(7) —
8	—	—	—	—	—	Not Occupied	8	—	—	—	—	—
(9) 9	(9) 0.5	(9) VT / GY	(9) 126	(9) II	(9) —	(9) Left Front Door Open Switch Signal	(9) 9	(9) 0.35	(9) VT / GY	(9) 126	(9) VI	(9) —
10	—	—	—	—	—	Not Occupied	10	—	—	—	—	—
(11) 11	(11) 0.5	(11) YE / WH	(11) 1690	(11) II	(11) —	(11) Mirror Dimming Signal	(11) 11	(11) 0.35	(11) YE / WH	(11) 1690	(11) VI	(11) —
(12) 12	(12) 0.5	(12) BK / YE	(12) 1691	(12) II	(12) —	(12) Automatic Day/Night Mirror Low Reference	(12) 12	(12) 0.35	(12) BK / YE	(12) 1691	(12) VI	(12) —
13	—	—	—	—	—	Not Occupied	13	—	—	—	—	—
(14) 14	(14) 0.5	(14) WH / GY	(14) 2114	(14) II	(14) —	(14) Left Turn Signal Lamp Control 2	(14) 14	(14) 0.35	(14) WH / GY	(14) 2114	(14) VI	(14) —
(15) 15	(15) 0.5	(15) BU	(15) 2675	(15) II	(15) —	(15) Left Front Exterior Door Handle Switch Unlock Signal	(15) 15	(15) 0.35	(15) BU	(15) 2675	(15) VI	(15) —
(16) 16	(16) 0.5	(16) WH / GN	(16) 5966	(16) II	(16) —	(16) Approach Lamp Control	(16) 16	(16) 0.5	(16) WH / GN	(16) 5966	(16) VI	(16) —
(17) 17	(17) 0.5	(17) BU / GN	(17) 614	(17) II	(17) —	(17) Seat Memory Switch Set Signal	(17) 17	(17) 0.35	(17) BU / GN	(17) 614	(17) VI	(17) —
(18) 18	(18) 0.5	(18) BU / YE	(18) 7761	(18) II	(18) —	(18) Backup Illumination Lamp Control	(18) 18	(18) 0.35	(18) BU / YE	(18) 7761	(18) VI	(18) —
(19) 19	(19) 0.5	(19) GN / YE	(19) 6134	(19) II	(19) —	(19) Body Control Module LIN Bus 3	(19) 19	(19) 0.35	(19) GN / YE	(19) 6134	(19) VI	(19) —
(20) 20	(20) 0.5	(20) BN / GN	(20) 14026	(20) II	(20) —	(20) Identification Side Marker Lamp Supply Voltage	(20) 20	(20) 0.5	(20) BN / GN	(20) 14026	(20) VI	(20) —
21	—	—	—	—	—	Not Occupied	21	—	—	—	—	—
(22) 22	(22) 0.5	(22) YE / GY	(22) 2933	(22) II	(22) —	(22) Task Lamp Control Left	(22) 22	(22) 0.35	(22) YE / GY	(22) 2933	(22) VI	(22) —
(23) 23	(23) 0.5	(23) WH	(23) 615	(23) II	(23) —	(23) Seat Memory Switch Signal 1	(23) 23	(23) 0.35	(23) WH	(23) 615	(23) VI	(23) —

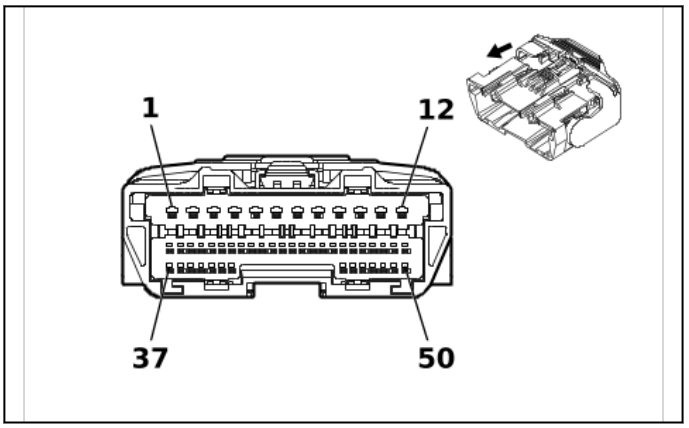
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(24) 24	(24) 0.35	(24) BN / GN	(24) 89 24	(24) I	(24) —	(24) Ambient Light Device 1 LIN Bus 1	(24) 24	(24) 0.35	(24) BN / GN	(24) 89 24	(24) VI	(24) —
(25) 25	(25) 0.5	(25) WH / VT	(25) 48 49	(25) II	(25) —	(25) LED Ambient Lighting Enable Signal	(25) 25	(25) 0.35	(25) WH / VT	(25) 48 49	(25) VI	(25) —
26 - 27	—	—	—	—	—	Not Occupied	26 - 27	—	—	—	—	—
(28) 28	(28) 0.75	(28) WH	(28) 26 79	(28) II	(28) —	(28) Lock Actuators Unlock Control 1	(28) 28	(28) 0.75	(28) WH	(28) 26 79	(28) VI	(28) —
(29) 29	(29) 0.35	(29) GN / WH	(29) 28 61	(29) I	(29) —	(29) Body Control Module LIN Bus 15	(29) 29	(29) 0.35	(29) GN / WH	(29) 28 61	(29) VI	(29) —
(30) 30	(30) 0.75	(30) GY	(30) 26 81	(30) II	(30) —	(30) Left Front Door Lock Actuator Lock Control	(30) 30	(30) 0.75	(30) GY	(30) 26 81	(30) VI	(30) —
31 - 38	—	—	—	—	—	Not Occupied	31 - 38	—	—	—	—	—
(39) 39	(39) —	(39) Coax Cable	(39) 47 25	(39) V	(39) —	(39) Left Sideview Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	(39) 39	(39) —	(39) Coax Cable	(39) 47 25	(39) IX	(39) —
40 - 42	—	—	—	—	—	Not Occupied	40 - 42	—	—	—	—	—
(43) 43	(43) 0.75	(43) BN / BU	(43) 11 8	(43) IV	(43) —	(43) Left Front Speaker [-] Control 1	(43) 43	(43) 0.75	(43) BN / BU	(43) 11 8	(43) VII	(43) —
(44) 44	(44) 0.5 (44) 0.5 (44) 0.5	(44) BK / WH (44) BK / WH (44) BK / WH	(44) 15 51 (44) 15 51 (44) 15 51	(44) IV (44) IV (44) IV	(44) A45 - (BOK / BOR / BOY) (44) ATH - (BOK / BOR / BOY) (44) BOK / BOR / BOY	(44) Signal Ground (44) Signal Ground (44) Signal Ground	(44) 44	(44) 0.5 (44) 0.5	(44) BK (44) BK / WH	(44) 15 50 (44) 15 51	(44) VII (44) VII	(44) 2-DOOR (44) 4-DOOR
(45) 45	(45) 0.75	(45) BU	(45) 20 1	(45) IV	(45) —	(45) Left Front Speaker 1 [+] Control	(45) 45	(45) 0.75	(45) BU	(45) 20 1	(45) VII	(45) —

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(46) 46	(46) 0.5 (46) 0.5 (46) 0.5	(46) R D / BU (46) R D / BU (46) R D / BU	(46) 12 40 (46) 12 40 (46) 12 40	(46) IV	(46) - (BOK / BOR / BOY) (46) BOK / BOR / BOY (46) BOK / BOR / BOY	(46) Battery Positive Voltage (46) Battery Positive Voltage (46) Battery Positive Voltage	(46) 46	(46) 0.5	(46) R D / BU	(46) 12 40	(46) VII	(46) —
(47) 47	(47) 2.5	(47) R D / GY	(47) 35 40	(47) III	(47) —	(47) Battery Positive Voltage	(47) 47	(47) 2.5	(47) R D / GY	(47) 35 40	(47) VIII	(47) —
(48) 48	(48) 2.5	(48) B K	(48) 15 50	(48) III	(48) —	(48) Ground	(48) 48	(48) 2.5	(48) B K	(48) 15 50	(48) VIII	(48) —

X505 Front Side Door Door Wiring Harness - Driver to Front Side Door Door Lock Door Wiring Harness - Driver



4997556



5022037

Connector Part Information
- Harness Type: Front Side Door Door Wiring Harness - Driver
- OEM Connector: 35283943
- Service Connector: Service by Harness - See Part Catalog
- Description: 50-Way F 1.2, 2.8 OCS Series(BK)

Connector Part Information
- Harness Type: Front Side Door Door Lock Door Wiring Harness - Driver
- OEM Connector: 33390111
- Service Connector: Service by Harness - See Part Catalog
- Description: 50-Way M 1.2, 2.8 OCS Series(BK)

Terminal Part Information

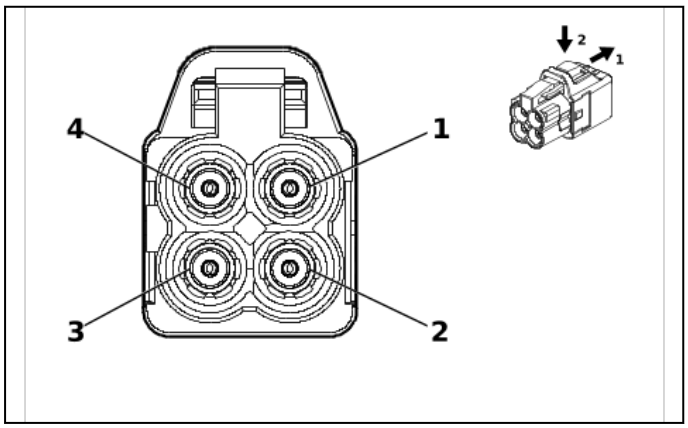
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required
II	Not required	J-35616-16 (L-GN)	No Tool Required
III	Not required	J-35616-4A (PU)	No Tool Required
IV	Not required	J-35616-13 (BU)	No Tool Required
V	Not required	J-35616-17 (L-GN)	No Tool Required
VI	Not required	J-35616-5 (PU)	No Tool Required

X505 Front Side Door Door Wiring Harness - Driver to Front Side Door Door Lock Door Wiring Harness - Driver

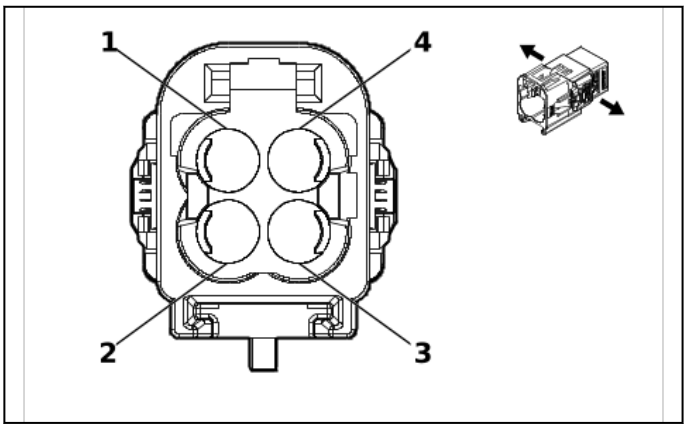
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) RD / BU	(1) 1240	(1) III	(1) —	(1) Battery Positive Voltage	(1) 1	(1) 0.5	(1) RD / BU	(1) 1240	(1) VI	(1) —
(2) 2	(2) 0.5	(2) GY / YE	(2) 1760	(2) III	(2) —	(2) Left Side Object Detection LED Control	(2) 2	(2) 0.35	(2) GY / YE	(2) 1760	(2) VI	(2) —
(3) 3	(3) 0.5	(3) BK / WH	(3) 1551	(3) III	(3) —	(3) Signal Ground	(3) 3	(3) 0.5	(3) BK / WH	(3) 1551	(3) VI	(3) —
(4) 4	(4) 0.5	(4) BK	(4) 1550	(4) III	(4) —	(4) Ground (4) Ground	(4) 4	(4) 0.35 (4) 0.5	(4) BK (4) BK	(4) 1550 (4) 1550	(4) VI	(4) C70 / C85 (4) —
5 - 11	—	—	—	—	—	Not Occupied	5 - 11	—	—	—	—	—
(12) 12	(12) 0.5	(12) GY / WH	(12) 2785	(12) III	(12) —	(12) Left Front Mirror Motor Fold Out Control	(12) 12	(12) 0.5	(12) GY / WH	(12) 2785	(12) VI	(12) —
(13) 13	(13) 0.5	(13) WH / GN	(13) 2786	(13) II	(13) —	(13) Left Front Mirror Motor Fold In Control	(13) 13	(13) 0.5	(13) WH / GN	(13) 2786	(13) V	(13) —
(14) 14	(14) 0.5	(14) GY / BN	(14) 2787	(14) II	(14) —	(14) Left Front Mirror Position Sensor Up [+] Down [-] Signal	(14) 14	(14) 0.5	(14) GY / BN	(14) 2787	(14) V	(14) —
(15) 15	(15) 0.5	(15) VT / BU	(15) 2788	(15) II	(15) —	(15) Left Front Mirror Motor Up [+] Down [-] Control	(15) 15	(15) 0.5	(15) VT / BU	(15) 2788	(15) V	(15) —
(16) 16	(16) 0.5	(16) YE / BN	(16) 2789	(16) II	(16) —	(16) Left Front Mirror Motor Common Control	(16) 16	(16) 0.5	(16) YE / BN	(16) 2789	(16) V	(16) —
(17) 17	(17) 0.5	(17) BN / BK	(17) 2790	(17) II	(17) —	(17) Left Front Mirror Motor Right [+] Left [-] Control	(17) 17	(17) 0.5	(17) BN / BK	(17) 2790	(17) V	(17) —
(18) 18	(18) 0.5	(18) VT / RD	(18) 2791	(18) II	(18) —	(18) Left Front Mirror Position Sensor High Reference	(18) 18	(18) 0.5	(18) VT / RD	(18) 2791	(18) V	(18) —
(19) 19	(19) 0.5	(19) WH / YE	(19) 2792	(19) II	(19) —	(19) Left Front Mirror Position Sensor Left [-] Right [+] Signal	(19) 19	(19) 0.5	(19) WH / YE	(19) 2792	(19) V	(19) —

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(20) 20	(20) 0.5	(20) WH	(20) 60 6	(20) II	(20) —	(20) Left Outside Rearview Mirror Heater Control	(20) 20	(20) 0.5	(20) WH	(20) 60 6	(20) V	(20) —
(21) 21	(21) 0.5	(21) GN / YE	(21) 61 34	(21) II	(21) —	(21) Body Control Module LIN Bus 3	(21) 21	(21) 0.5	(21) GN / YE	(21) 61 34	(21) V	(21) —
(22) 22	(22) 0.5	(22) BU / GN	(22) 61 4	(22) II	(22) —	(22) Seat Memory Switch Set Signal	(22) 22	(22) 0.5	(22) BU / GN	(22) 61 4	(22) V	(22) —
(23) 23	(23) 0.5	(23) WH	(23) 61 5	(23) II	(23) —	(23) Seat Memory Switch Signal 1	(23) 23	(23) 0.5	(23) WH	(23) 61 5	(23) V	(23) —
(24) 24	(24) 0.5	(24) BK / BN	(24) 67 3	(24) II	(24) —	(24) Left Outside Rearview Mirror Position Sensor Low Reference	(24) 24	(24) 0.5	(24) BK / BN	(24) 67 3	(24) V	(24) —
(25) 25	(25) 0.35	(25) BN / GN	(25) 89 24	(25) I	(25) —	(25) Ambient Light Device 1 LIN Bus 1	(25) 25	(25) 0.35	(25) BN / GN	(25) 89 24	(25) IV	(25) —
(26) 26	(26) 0.5	(26) WH / VT	(26) 48 49	(26) II	(26) —	(26) LED Ambient Lighting Enable Signal	(26) 26	(26) 0.35	(26) WH / VT	(26) 48 49	(26) IV	(26) —
27	—	—	—	—	—	Not Occupied	27	—	—	—	—	—
(28) 28	(28) 0.35	(28) GN / WH	(28) 28 61	(28) I	(28) —	(28) Body Control Module LIN Bus 15	(28) 28	(28) 0.35	(28) GN / WH	(28) 28 61	(28) IV	(28) —
(29) 29	(29) 0.5	(29) WH / VT	(29) 42 58	(29) II	(29) —	(29) Left Front Door Lock Status Signal	(29) 29	(29) 0.5	(29) WH / VT	(29) 42 58	(29) V	(29) —
30 - 50	—	—	—	—	—	Not Occupied	30 - 50	—	—	—	—	—

X572 Instrument Panel Wiring Harness to Radio Antenna Wiring Harness - 4 - Door (U2Q)



5835118



5834856

Connector Part Information

- Harness Type: Instrument Panel Wiring Harness
- OEM Connector: AMZW25-001-A
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 4-Way F Mini Coax Type(BK)

Connector Part Information

- Harness Type: Radio Antenna Wiring Harness
- OEM Connector: AMZ040-C00-A
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 4-Way M Mini Coax Type(BK)

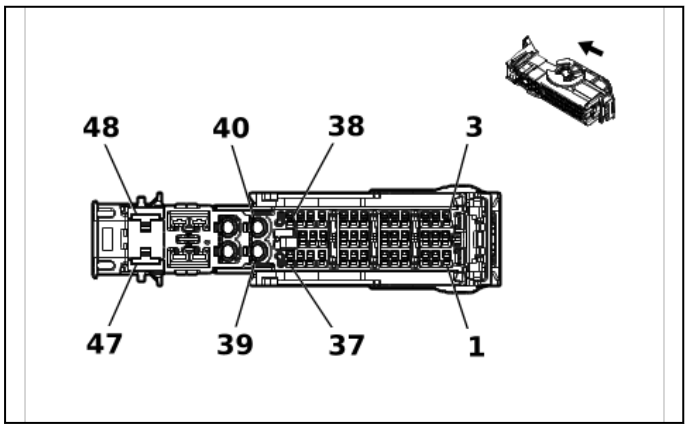
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

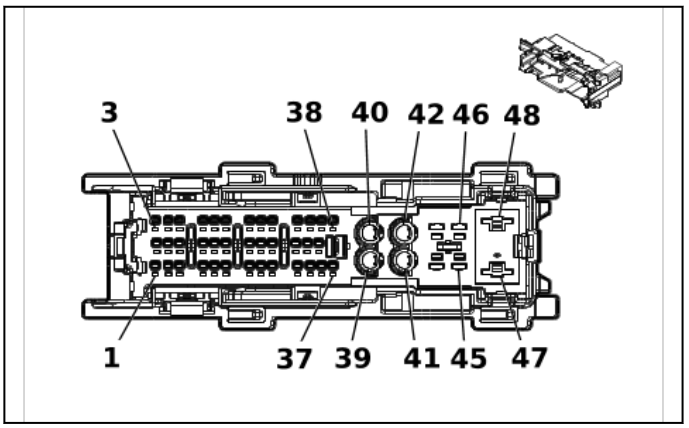
X572 Instrument Panel Wiring Harness to Radio Antenna Wiring Harness - 4 - Door (U2Q)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(2) 2	(2) —	(2) Coax Cable	(2) 6130	(2) I	(2) —	(2) Coaxial Antenna XM Signal	(2) 2	(2) —	(2) Coax Cable	(2) 3297	(2) II	(2) —
(4) 4	(4) —	(4) Coax Cable	(4) 6001	(4) I	(4) —	(4) Coaxial Antenna RF Signal	(4) 4	(4) —	(4) Coax Cable	(4) 6001	(4) II	(4) —

X600 Front Side Door Door Wiring Harness - Passenger to Body Wiring Harness



6192563



6187159

Connector Part Information

- Harness Type: Front Side Door Door Wiring Harness - Passenger
- OEM Connector: 6099-0288
- Service Connector: Service by Harness - See Part Catalog
- Description: 48-Way F 1.2 SWS, 2.8, 6.3 YESC, Coaxial Series(BK)

Connector Part Information

- Harness Type: Body Wiring Harness
- OEM Connector: 6099-0560
- Service Connector: 13561848
- Description: 48-Way M 1.2 SWS, 2.8, 6.3 YESC, Coaxial Series(BK)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required
II	Not required	J-35616-16 (L-GN)	No Tool Required
III	Not required	J-35616-42 (RD)	No Tool Required
IV	Not required	J-35616-4A (PU)	No Tool Required
V	Not required	No Tool Required	No Tool Required
VI	84616651	J-35616-13 (BU)	J-38125-215A
VII	84888592	J-35616-5 (PU)	J-38125-11A
VIII	87838107	J-35616-43 (RD)	J-38125-11A
IX	Service by Cable	No Tool Required	No Tool Required

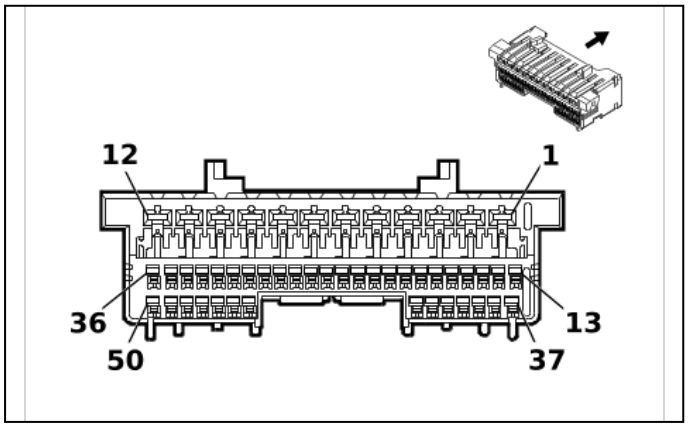
X600 Front Side Door Door Wiring Harness - Passenger to Body Wiring Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
1	—	—	—	—	—	Not Occupied	1	—	—	—	—	—
(2) 2	(2) 0.5	(2) BK / OG	(2) 6629	(2) II	(2) —	(2) Right Front Side Impact Sensor Low Reference	(2) 2	(2) 0.5	(2) BK / OG	(2) 6629	(2) VI	(2) —
(3) 3	(3) 0.5	(3) GN / YE	(3) 4303	(3) II	(3) —	(3) Passive Entry Right Antenna Signal High	(3) 3	(3) 0.35	(3) GN / YE	(3) 4303	(3) VI	(3) —
4	—	—	—	—	—	Not Occupied	4	—	—	—	—	—

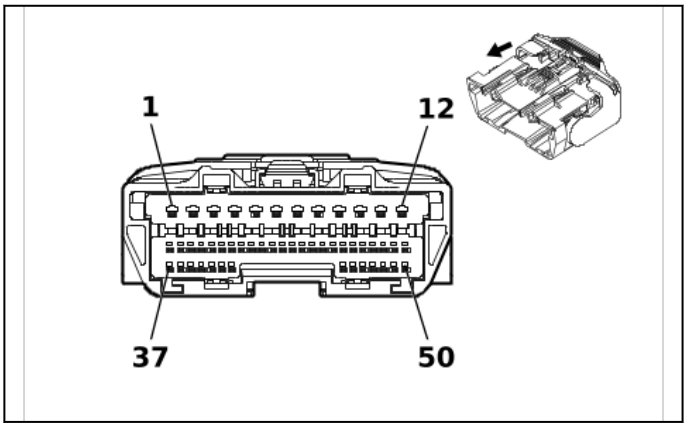
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(5) 5	(5) 0.5	(5) BN / OG	(5) 2134	(5) II	(5) —	(5) Right Front Side Impact Sensor Signal	(5) 5	(5) 0.5	(5) BN / OG	(5) 2134	(5) VI	(5) —
(6) 6	(6) 0.5	(6) GN / BK	(6) 4304	(6) II	(6) —	(6) Passive Entry Right Antenna Signal Low	(6) 6	(6) 0.35	(6) GN / BK	(6) 4304	(6) VI	(6) —
7 - 13	—	—	—	—	—	Not Occupied	7 - 13	—	—	—	—	—
(14) 14	(14) 0.5	(14) GN / GY	(14) 2115	(14) II	(14) —	(14) Right Turn Signal Lamp Control 2	(14) 14	(14) 0.35	(14) GN / GY	(14) 2115	(14) VI	(14) —
(15) 15	(15) 0.5	(15) GY / VT	(15) 2676	(15) II	(15) —	(15) Right Front Door Exterior Switch Unlock Signal	(15) 15	(15) 0.35	(15) GY / VT	(15) 2676	(15) VI	(15) —
(16) 16	(16) 0.5	(16) WH / GN	(16) 5966	(16) II	(16) —	(16) Approach Lamp Control	(16) 16	(16) 0.5	(16) WH / GN	(16) 5966	(16) VI	(16) —
17	—	—	—	—	—	Not Occupied	17	—	—	—	—	—
(18) 18	(18) 0.5	(18) BU / YE	(18) 7761	(18) II	(18) —	(18) Backup Illumination Lamp Control	(18) 18	(18) 0.35	(18) BU / YE	(18) 7761	(18) VI	(18) —
(19) 19	(19) 0.5	(19) GN / YE	(19) 6134	(19) II	(19) —	(19) Body Control Module LIN Bus 3	(19) 19	(19) 0.35	(19) GN / YE	(19) 6134	(19) VI	(19) —
(20) 20	(20) 0.5	(20) BN / GN	(20) 14026	(20) II	(20) —	(20) Identification Side Marker Lamp Supply Voltage	(20) 20	(20) 0.5	(20) BN / GN	(20) 14026	(20) VI	(20) —
21	—	—	—	—	—	Not Occupied	21	—	—	—	—	—
(22) 22	(22) 0.5	(22) YE / GY	(22) 2933	(22) II	(22) —	(22) Task Lamp Control Left	(22) 22	(22) 0.35	(22) YE / GY	(22) 2933	(22) VI	(22) —
(23) 23	(23) 0.35 (23) 0.35	(23) GY / GN (23) BU / GN	(23) 8925 (23) 8927	(23) I (23) I	(23) 2-DOOR (23) 4-DOOR	(23) Ambient Light Device 2 LIN Bus 1 (23) Ambient Light Device 4 LIN Bus 1	(23) 23	(23) 0.35	(23) GY / GN	(23) 8927	(23) VI	(23) —
(24) 24	(24) 0.5	(24) RD / WH	(24) 5440	(24) II	(24) —	(24) Battery Positive Voltage	(24) 24	(24) 0.5	(24) RD / WH	(24) 5440	(24) VI	(24) —
(25) 25	(25) 0.5	(25) BK / GY	(25) 626	(25) II	(25) —	(25) Engine Control Vehicle Sensors Low Reference 1	(25) 25	(25) 0.5	(25) BK / GY	(25) 626	(25) VI	(25) —
(26) 26	(26) 0.5	(26) BU / GY	(26) 636	(26) II	(26) —	(26) Ambient Air Temperature Sensor Signal	(26) 26	(26) 0.5	(26) BU / GY	(26) 636	(26) VI	(26) —

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(27) 27	(27) 0.5	(27) WH / VT	(27) 48 49	(27) II	(27) —	(27) LED Ambient Lighting Enable Signal	(27) 27	(27) 0.35	(27) WH / VT	(27) 48 49	(27) VI	(27) —
(28) 28	(28) 0.75	(28) G Y / BK	(28) 26 80	(28) II	(28) —	(28) Lock Actuators Unlock Control 2	(28) 28	(28) 0.75	(28) G Y / BK	(28) 26 80	(28) VI	(28) —
(29) 29	(29) 0.35	(29) G N / WH	(29) 28 61	(29) I	(29) —	(29) Body Control Module LIN Bus 15	(29) 29	(29) 0.35	(29) G N / WH	(29) 28 61	(29) VI	(29) —
(30) 30	(30) 0.75	(30) Y E / GN	(30) 26 82	(30) II	(30) —	(30) Right Front Door Lock Actuator Lock Control	(30) 30	(30) 0.75	(30) Y E / GN	(30) 26 82	(30) VI	(30) —
31 - 38	—	—	—	—	—	Not Occupied	31 - 38	—	—	—	—	—
(39) 39	(39) —	(39) C oax Cable	(39) 47 24	(39) V	(39) —	(39) Right Sideview Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	(39) 39	(39) —	(39) C oax Cable	(39) 47 24	(39) IX	(39) —
40 - 42	—	—	—	—	—	Not Occupied	40 - 42	—	—	—	—	—
(43) 43	(43) 0.75	(43) Y E / BK	(43) 11 7	(43) IV	(43) —	(43) Right Front Speaker [-] Control 1	(43) 43	(43) 0.75	(43) Y E / BK	(43) 11 7	(43) VII	(43) —
(44) 44	(44) 0.5	(44) B K / WH	(44) 14 51	(44) IV	(44) —	(44) Signal Ground	(44) 44	(44) 0.75	(44) B K / WH	(44) 14 51	(44) VII	(44) —
(45) 45	(45) 0.75	(45) Y E	(45) 20 0	(45) IV	(45) —	(45) Right Front Speaker 1 [+] Control	(45) 45	(45) 0.75	(45) Y E	(45) 20 0	(45) VII	(45) —
46	—	—	—	—	—	Not Occupied	46	—	—	—	—	—
(47) 47	(47) 2.5	(47) R D / BN	(47) 42 40	(47) III	(47) —	(47) Battery Positive Voltage	(47) 47	(47) 2.5	(47) R D / BN	(47) 42 40	(47) VIII	(47) —
(48) 48	(48) 2.5	(48) B K	(48) 13 50	(48) III	(48) —	(48) Ground	(48) 48	(48) 2.5	(48) B K	(48) 13 50	(48) VIII	(48) —

X605 Front Side Door Door Wiring Harness - Passenger to Front Side Door Door Lock Door Wiring Harness - Passenger



4997556



5022037

Connector Part Information
- Harness Type: Front Side Door Door Wiring Harness - Passenger
- OEM Connector: 35283943
- Service Connector: Service by Harness - See Part Catalog
- Description: 50-Way F 1.2, 2.8 OCS Series(BK)

Connector Part Information
- Harness Type: Front Side Door Door Lock Door Wiring Harness - Passenger
- OEM Connector: 33390111
- Service Connector: Service by Harness - See Part Catalog
- Description: 50-Way M 1.2, 2.8 OCS Series(BK)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required
II	Not required	J-35616-16 (L-GN)	No Tool Required
III	Not required	J-35616-4A (PU)	No Tool Required
IV	Not required	J-35616-13 (BU)	No Tool Required
V	Not required	J-35616-17 (L-GN)	No Tool Required
VI	Not required	J-35616-5 (PU)	No Tool Required

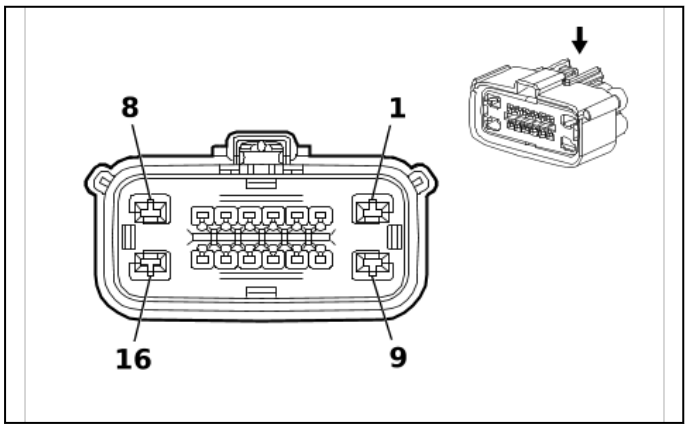
X605 Front Side Door Door Wiring Harness - Passenger to Front Side Door Door Lock Door Wiring Harness - Passenger

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 2.5	(1) RD / BN	(1) 4240	(1) III	(1) —	(1) Battery Positive Voltage	(1) 1	(1) 2.5	(1) RD / BN	(1) 4240	(1) VI	(1) —
2	—	—	—	—	—	Not Occupied	2	—	—	—	—	—
(3) 3	(3) 0.5	(3) GY	(3) 1761	(3) III	(3) —	(3) Right Side Object Detection LED Control	(3) 3	(3) 0.35	(3) GY	(3) 1761	(3) VI	(3) —
(4) 4	(4) 0.5	(4) RD / WH	(4) 5440	(4) III	(4) —	(4) Battery Positive Voltage	(4) 4	(4) 0.5	(4) RD / WH	(4) 5440	(4) VI	(4) —
5 - 7	—	—	—	—	—	Not Occupied	5 - 7	—	—	—	—	—
(8) 8	(8) 0.5	(8) YE / WH	(8) 2793	(8) III	(8) —	(8) Right Front Mirror Motor Fold Out Control	(8) 8	(8) 0.5	(8) YE / WH	(8) 2793	(8) VI	(8) —

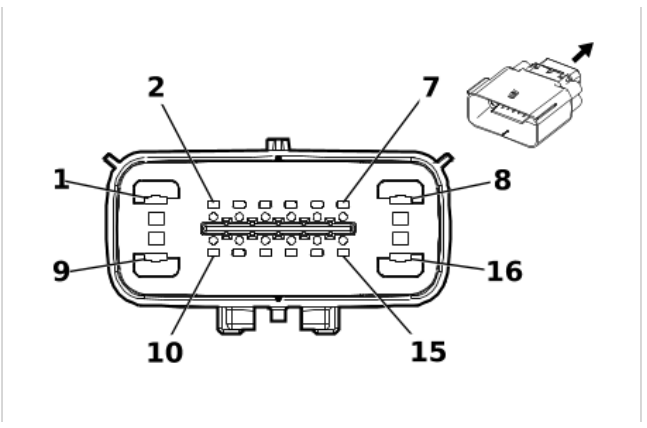
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(9) 9	(9) 0.5	(9) BU / GY	(9) 2794	(9) III	(9) —	(9) Right Front Mirror Motor Fold In Control	(9) 9	(9) 0.5	(9) BU / GY	(9) 2794	(9) VI	(9) —
(10) 10	(10) 2.5	(10) BK	(10) 1350	(10) III	(10) —	(10) Ground (10) Ground	(10) 10	(10) 0.5 (10) 2.5	(10) BK (10) BK	(10) 1350 (10) 1350	(10) VI (10) VI	(10) WLN (10) WLM
(11) 11	(11) 2	(11) GN / GY	(11) 666	(11) III	(11) —	(11) Right Front Window Motor Up Control	(11) 11	(11) 2.5	(11) GN / GY	(11) 666	(11) VI	(11) —
(12) 12	(12) 2	(12) YE / BU	(12) 667	(12) III	(12) —	(12) Right Front Window Motor Down Control	(12) 12	(12) 2.5	(12) YE / BU	(12) 667	(12) VI	(12) —
(13) 13	(13) 0.5	(13) GN / BK	(13) 2798	(13) II	(13) —	(13) Right Front Mirror Motor Right [+] Left [-] Control	(13) 13	(13) 0.5	(13) GN / BK	(13) 2798	(13) V	(13) —
(14) 14	(14) 0.5	(14) YE / RD	(14) 2799	(14) II	(14) —	(14) Right Front Mirror Position Sensor High Reference	(14) 14	(14) 0.5	(14) YE / RD	(14) 2799	(14) V	(14) —
(15) 15	(15) 0.5	(15) VT / WH	(15) 2800	(15) II	(15) —	(15) Right Front Mirror Position Sensor Left [-] Right [+] Signal	(15) 15	(15) 0.5	(15) VT / WH	(15) 2800	(15) V	(15) —
16	—	—	—	—	—	Not Occupied	16	—	—	—	—	—
(17) 17	(17) 0.5	(17) BN / VT	(17) 607	(17) II	(17) —	(17) Right Outside Rearview Mirror Heater Control	(17) 17	(17) 0.5	(17) BN / VT	(17) 607	(17) V	(17) —
(18) 18	(18) 0.5	(18) GN / YE	(18) 6134	(18) II	(18) —	(18) Body Control Module LIN Bus 3	(18) 18	(18) 0.5	(18) GN / YE	(18) 6134	(18) V	(18) —
19 - 20	—	—	—	—	—	Not Occupied	19 - 20	—	—	—	—	—
(21) 21	(21) 0.5	(21) BK / GN	(21) 675	(21) II	(21) —	(21) Right Outside Rearview Mirror Position Sensor Low Reference	(21) 21	(21) 0.5	(21) BK / GN	(21) 675	(21) V	(21) —
22 - 24	—	—	—	—	—	Not Occupied	22 - 24	—	—	—	—	—
(25) 25	(25) 0.35 (25) 0.35	(25) GY / GN (25) BU / GN	(25) 8925 (25) 8927	(25) I (25) I	(25) 2-DOOR (25) 4-DOOR	(25) Ambient Light Device 2 LIN Bus 1 (25) Ambient Light Device 4 LIN Bus 1	(25) 25	(25) 0.35	(25) BU / GN	(25) 8927	(25) IV	(25) —

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(26) 26	(26) 0.5	(26) WH / VT	(26) 48 49	(26) II	(26) —	(26) LED Ambient Lighting Enable Signal	(26) 26	(26) 0.35	(26) WH / VT	(26) 48 49	(26) IV	(26) —
27	—	—	—	—	—	Not Occupied	27	—	—	—	—	—
(28) 28	(28) 0.35	(28) GN / WH	(28) 28 61	(28) I	(28) —	(28) Body Control Module LIN Bus 15	(28) 28	(28) 0.35	(28) GN / WH	(28) 28 61	(28) IV	(28) —
(29) 29	(29) 0.5	(29) VT	(29) 42 59	(29) II	(29) —	(29) Right Front Door Lock Status Signal	(29) 29	(29) 0.5	(29) VT	(29) 42 59	(29) V	(29) —
30 - 35	—	—	—	—	—	Not Occupied	30 - 35	—	—	—	—	—
(36) 36	(36) 0.5	(36) BK / WH	(36) 14 51	(36) II	(36) —	(36) Signal Ground (36) Signal Ground	(36) 36	(36) 0.35 (36) 0.5	(36) BK / WH (36) BK / WH	(36) 14 51 (36) 14 51	(36) V (36) V	(36) C70 (36) C85
37 - 46	—	—	—	—	—	Not Occupied	37 - 46	—	—	—	—	—
(47) 47	(47) 0.5	(47) GY	(47) 74 6	(47) II	(47) —	(47) Right Front Door Ajar Switch Signal	(47) 47	(47) 0.5	(47) GY	(47) 74 6	(47) V	(47) —
(48) 48	(48) 0.5	(48) BU / YE	(48) 27 95	(48) II	(48) —	(48) Right Front Mirror Position Sensor Up [+] Down [-] Signal	(48) 48	(48) 0.5	(48) BU / YE	(48) 27 95	(48) V	(48) —
(49) 49	(49) 0.5	(49) YE / VT	(49) 27 96	(49) II	(49) —	(49) Right Front Mirror Motor Up [+] Down [-] Control	(49) 49	(49) 0.5	(49) YE / VT	(49) 27 96	(49) V	(49) —
(50) 50	(50) 0.5	(50) WH	(50) 27 97	(50) II	(50) —	(50) Right Front Mirror Motor Common Control	(50) 50	(50) 0.5	(50) WH	(50) 27 97	(50) V	(50) —

X608 Auxiliary Battery Wiring Harness to Body Wiring Harness



3684497



2373686

Connector Part Information
- Harness Type: Auxiliary Battery Wiring Harness
- OEM Connector: 34985-1601
- Service Connector: Service by Harness - See Part Catalog
- Description: 16-Way F 1.5, 2.8 MX Series, Sealed(BK)

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 13593409
- Service Connector: 19331031
- Description: 16-Way M 1.5, 2.8 MX Series, Sealed(BK)

Terminal Part Information

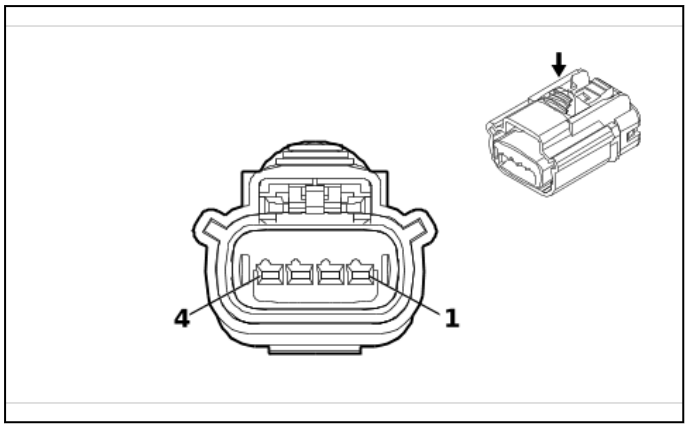
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required
II	86800300	J-35616-3 (GY)	J-38125-217
III	Not required	No Tool Required	No Tool Required

X608 Auxiliary Battery Wiring Harness to Body Wiring Harness

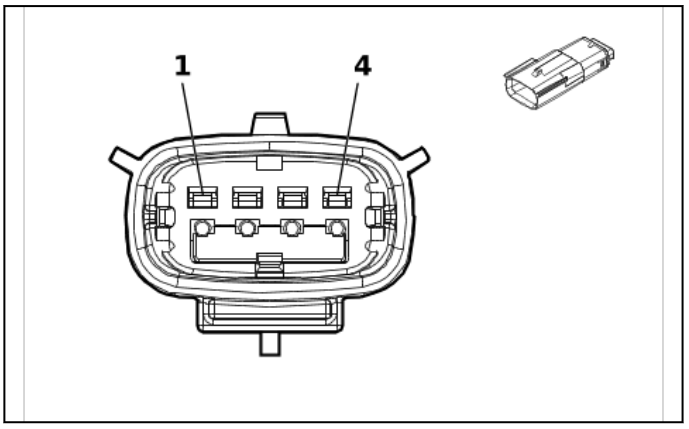
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 2	(1) YE	(1) 10731	(1) I	(1) —	(1) Upfitter Accessory 1 Supply Voltage	(1) 1	(1) —	(1) —	(1) —	(1) —	(1) —
(2) 2	(2) 0.35	(2) RD / BU	(2) 10717	(2) I	(2) —	(2) Upfitter Accessory Relay 2 Coil Control	(2) 2	(2) 0.35	(2) VT / GY	(2) 10717	(2) II	(2) —
(3) 3	(3) 0.35	(3) RD / GY	(3) 10718	(3) I	(3) —	(3) Upfitter Accessory Relay 3 Coil Control	(3) 3	(3) 0.35	(3) GN / BN	(3) 10718	(3) II	(3) —
(4) 4	(4) 0.35	(4) RD	(4) 10719	(4) I	(4) —	(4) Upfitter Accessory Relay 4 Coil Control	(4) 4	(4) 0.35	(4) WH / YE	(4) 10719	(4) II	(4) —
(5) 5	(5) 0.35	(5) RD / WH	(5) 10720	(5) I	(5) —	(5) Upfitter Accessory Relay 5 Coil Control	(5) 5	(5) 0.35	(5) GY / VT	(5) 10720	(5) II	(5) —
(6) 6	(6) 0.35	(6) RD / BN	(6) 10908	(6) I	(6) —	(6) Upfitter Accessory Relay 6 Coil Control	(6) 6	(6) 0.35	(6) GN / WH	(6) 10908	(6) II	(6) —

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(7) 7	(7) 0.35	(7) RD / YE	(7) 10716	(7) I	(7) —	(7) Upfitter Accessory Relay 1 Coil Control	(7) 7	(7) 0.35	(7) BU / WH	(7) 10716	(7) II	(7) —
(8) 8	(8) 2	(8) BU	(8) 10732	(8) I	(8) —	(8) Upfitter Accessory 2 Supply Voltage	(8) 8	(8) —	(8) —	(8) —	(8) —	(8) —
(9) 9	(9) 2	(9) GY	(9) 10733	(9) I	(9) —	(9) Upfitter Accessory 3 Supply Voltage	(9) 9	(9) —	(9) —	(9) —	(9) —	(9) —
10	—	—	—	—	—	Not Occupied	10	—	—	—	—	—
(11) 11	(11) 0.35	(11) BK	(11) 650	(11) I	(11) —	(11) Ground	(11) 11	(11) 0.75	(11) BK	(11) 650	(11) III	(11) —
12	—	—	—	—	—	Not Occupied	12	—	—	—	—	—
(13) 13	(13) 2	(13) WH	(13) 10735	(13) I	(13) —	(13) Upfitter Accessory 5 Supply Voltage	(13) 13	(13) —	(13) —	(13) —	(13) —	(13) —
14	—	—	—	—	—	Not Occupied	14	—	—	—	—	—
(15) 15	(15) 2	(15) BN	(15) 11025	(15) I	(15) —	(15) Upfitter Accessory 6 Supply Voltage	(15) 15	(15) —	(15) —	(15) —	(15) —	(15) —
(16) 16	(16) 2	(16) RD	(16) 10734	(16) I	(16) —	(16) Upfitter Accessory 4 Supply Voltage	(16) 16	(16) —	(16) —	(16) —	(16) —	(16) —

X618L Engine Wiring Harness to Air Shutter Wiring Harness - Lower (WMI)



4455251



6824000

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 15514524
- Service Connector: 19355605
- Description: 4-Way F 1.5 OCS Series, Sealed(BK)

Connector Part Information
- Harness Type: Air Shutter Wiring Harness - Lower
- OEM Connector: 15514500
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way M 1.5 OCS Series, Sealed(BK)

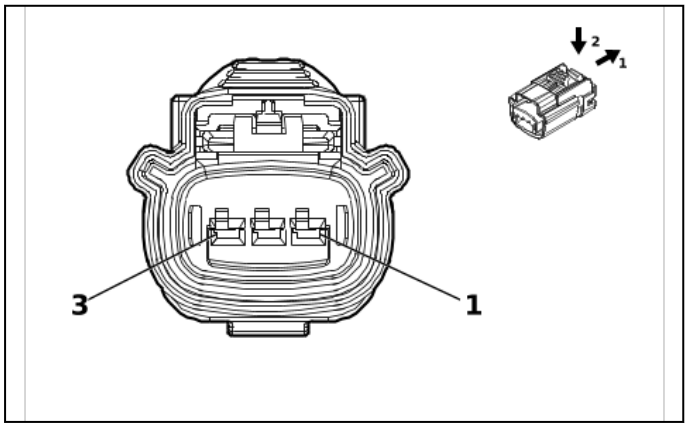
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required
II	Not required	J-35616-3 (GY)	No Tool Required

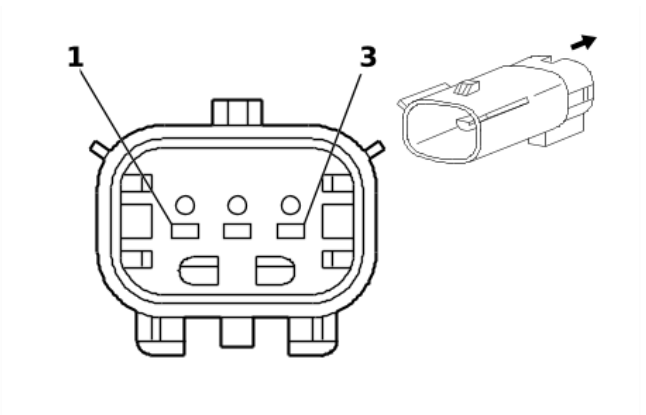
X618L Engine Wiring Harness to Air Shutter Wiring Harness - Lower (WMI)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) VT / BU	(1) 5705	(1) I	(1) —	(1) Powertrain Main Relay Control	(1) 1	(1) 0.5	(1) VT / BU	(1) 5705	(1) II	(1) —
(2) 2	(2) 0.5 (2) 0.5	(2) GN / VT (2) GN / VT	(2) 10806 (2) 4621	(2) I (2) I	(2) L4B (2) - L4B	(2) Engine Control Module LIN Bus 1 (2) Engine Control Module LIN Bus 1	(2) 2	(2) 0.5	(2) GN / VT	(2) 4621	(2) II	(2) —
(3) 3	(3) 0.5 (3) 0.5	(3) BK (3) BK	(3) 450 (3) 6550	(3) I (3) I	(3) L4B (3) LZ0	(3) Ground (3) Ground	(3) 3	(3) 0.5	(3) BK	(3) 450	(3) II	(3) —
4	—	—	—	—	—	Not Occupied	4	—	—	—	—	—

X618U Engine Wiring Harness to Air Shutter Wiring Harness - Upper (VTI / WMI)



5765306



1870038

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 15514762
- Service Connector: 85535179
- Description: 3-Way F 1.5 YESC Series, Sealed(BK)

Connector Part Information
- Harness Type: Air Shutter Wiring Harness - Upper
- OEM Connector: 33481-3301
- Service Connector: Service by Harness - See Part Catalog
- Description: 3-Way M 1.5 MX Series, Sealed(BK)

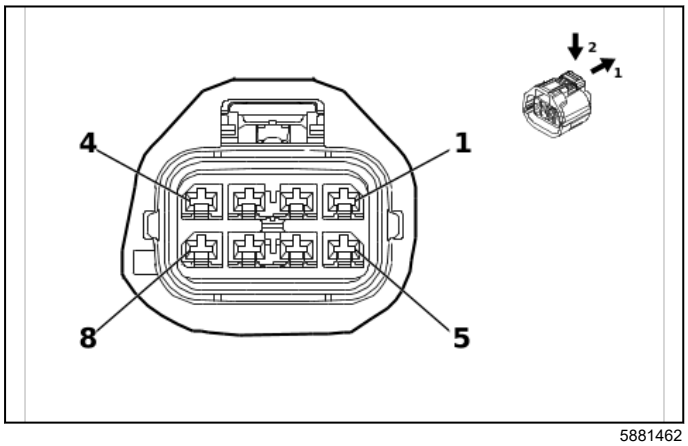
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required
II	Not required	J-35616-3 (GY)	No Tool Required

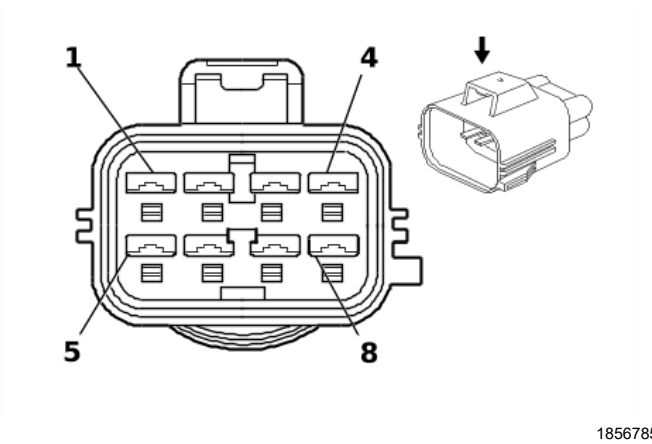
X618U Engine Wiring Harness to Air Shutter Wiring Harness - Upper (VTI / WMI)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) VT / BU	(1) 5705	(1) I	(1) —	(1) Powertrain Main Relay Control	(1) 1	(1) 0.5	(1) VT / BU	(1) 5705	(1) II	(1) —
(2) 2	(2) 0.5 (2) 0.5	(2) GN / VT (2) GN / VT	(2) 10806 (2) 4621	(2) I (2) I	(2) L4B (2) - L4B	(2) Engine Control Module LIN Bus 1 (2) Engine Control Module LIN Bus 1	(2) 2	(2) 0.5	(2) GN / VT	(2) 4621	(2) II	(2) —
(3) 3	(3) 0.75 (3) 0.5	(3) BK (3) BK	(3) 450 (3) 6550	(3) I (3) I	(3) L4B (3) LZ0	(3) Ground (3) Ground	(3) 3	(3) 0.5	(3) BK	(3) 450	(3) II	(3) —

X653L Assist Step Motor - Left to Chassis Wiring Harness (B3L)



5881462



1856785

Connector Part Information
- Harness Type: Assist Step Motor - Left
- OEM Connector: 13583752
- Service Connector: Service by Harness - See Part Catalog
- Description: 8-Way F 2.8 YESC Series, Sealed(D-GY)

Connector Part Information
- Harness Type: Chassis Wiring Harness
- OEM Connector: 7282-5574-10
- Service Connector: 19367561
- Description: 8-Way M 2.8 YESC Series, Sealed(D-GY)

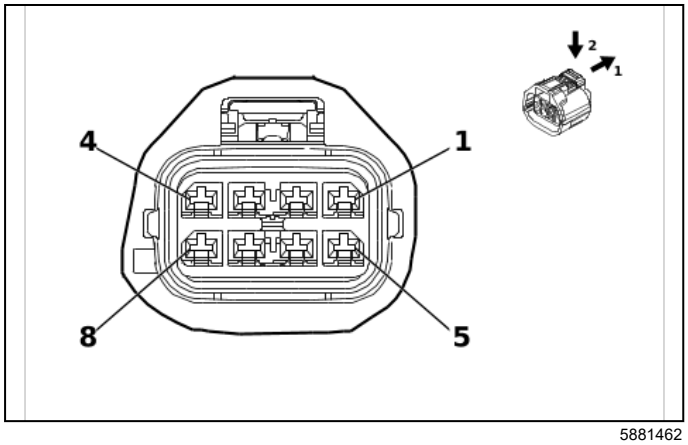
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-35 (VT)	No Tool Required
II	Not required	J-35616-5 (PU)	No Tool Required

X653L Assist Step Motor - Left to Chassis Wiring Harness (B3L)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 2	(1) YE	(1) 7472	(1) I	(1) —	(1) Left Running Board Step Motor Control Retract	(1) 1	(1) 2	(1) GY	(1) 7472	(1) II	(1) —
(2) 2	(2) 0.5	(2) OG / WH	(2) 7468	(2) I	(2) —	(2) Left Running Board Step Motor Hall Sensor Voltage Reference	(2) 2	(2) 0.5	(2) VT / RD	(2) 7468	(2) II	(2) —
(3) 3	(3) 0.5	(3) YE / WH	(3) 7467	(3) I	(3) —	(3) Left Running Board Step Motor Hall Sensor Signal	(3) 3	(3) 0.5	(3) YE	(3) 7467	(3) II	(3) —
(4) 4	(4) 0.5	(4) BN / WH	(4) 7466	(4) I	(4) —	(4) Left Running Board Step Motor Hall Sensor Low Reference	(4) 4	(4) 0.5	(4) YE / BN	(4) 7466	(4) II	(4) —
(5) 5	(5) 2	(5) OG	(5) 7471	(5) I	(5) —	(5) Left Running Board Step Motor Control Extend	(5) 5	(5) 2	(5) WH / BN	(5) 7471	(5) II	(5) —
6	—	—	—	—	—	Not Occupied	6	—	—	—	—	—
(7) 7	(7) 0.5	(7) RD	(7) 4746	(7) I	(7) —	(7) Running Board Step Left Kick Switch Signal	(7) 7	(7) 0.5	(7) BU / GN	(7) 4746	(7) II	(7) —
(8) 8	(8) 0.5	(8) BK	(8) 1151	(8) I	(8) —	(8) Signal Ground	(8) 8	(8) 0.5	(8) BK / WH	(8) 1151	(8) II	(8) —

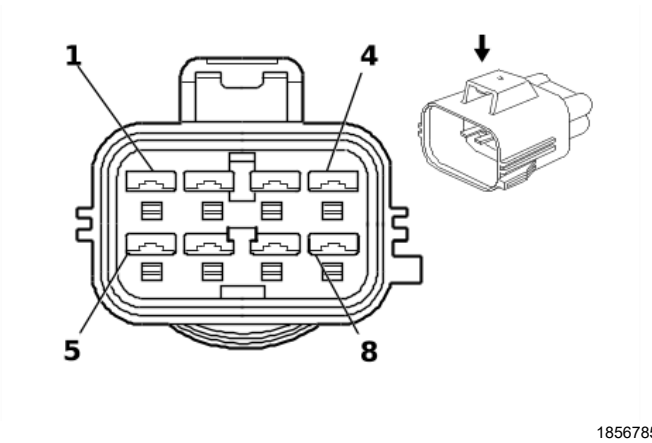
X653R Assist Step Motor - Right to Chassis Wiring Harness (B3L)



5881462

Connector Part Information

- Harness Type: Assist Step Motor - Right
- OEM Connector: 13583752
- Service Connector: Service by Harness - See Part Catalog
- Description: 8-Way F 2.8 YESC Series, Sealed(D-GY)



1856785

Connector Part Information

- Harness Type: Chassis Wiring Harness
- OEM Connector: 7282-5574-10
- Service Connector: 19367561
- Description: 8-Way M 2.8 YESC Series, Sealed(D-GY)

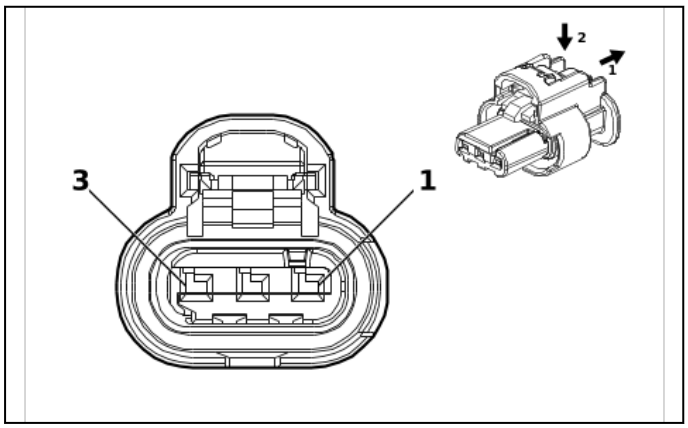
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-35 (VT)	No Tool Required
II	Not required	J-35616-5 (PU)	No Tool Required

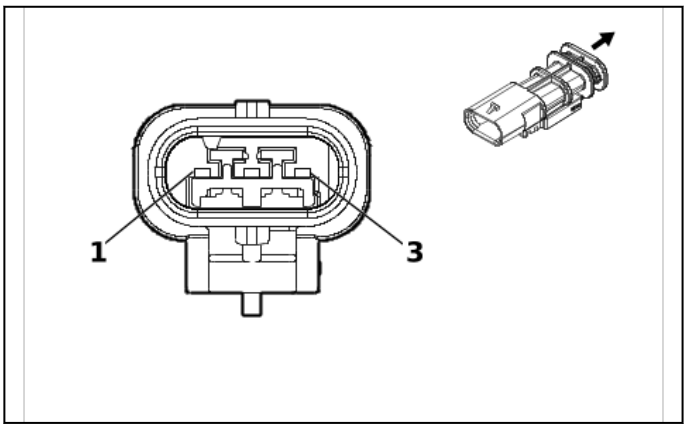
X653R Assist Step Motor - Right to Chassis Wiring Harness (B3L)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 2	(1) YE	(1) 7469	(1) I	(1) —	(1) Right Left Running Board Step Motor Control Retract	(1) 1	(1) 2	(1) GN	(1) 7469	(1) II	(1) —
(2) 2	(2) 0.5	(2) OG / WH	(2) 7464	(2) I	(2) —	(2) Right Running Board Step Motor Hall Sensor Voltage Reference	(2) 2	(2) 0.5	(2) GN / RD	(2) 7464	(2) II	(2) —
(3) 3	(3) 0.5	(3) YE / WH	(3) 7465	(3) I	(3) —	(3) Right Running Board Step Motor Hall Sensor Signal	(3) 3	(3) 0.5	(3) VT	(3) 7465	(3) II	(3) —
(4) 4	(4) 0.5	(4) BN / WH	(4) 7463	(4) I	(4) —	(4) Right Running Board Step Motor Hall Sensor Low Reference	(4) 4	(4) 0.5	(4) YE / BK	(4) 7463	(4) II	(4) —
(5) 5	(5) 2	(5) OG	(5) 7470	(5) I	(5) —	(5) Right Running Board Step Motor Control Extend	(5) 5	(5) 2	(5) BU	(5) 7470	(5) II	(5) —
6	—	—	—	—	—	Not Occupied	6	—	—	—	—	—
(7) 7	(7) 0.5	(7) RD	(7) 4747	(7) I	(7) —	(7) Running Board Step Right Kick Switch Signal	(7) 7	(7) 0.5	(7) WH	(7) 4747	(7) II	(7) —
(8) 8	(8) 0.5	(8) BK	(8) 1151	(8) I	(8) —	(8) Signal Ground	(8) 8	(8) 0.5	(8) BK / WH	(8) 1151	(8) II	(8) —

X676D Engine Wiring Harness to Charge Air Cooler Pump Wiring Harness (LZ0)



4581126



5087161

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 1-2296695-1
- Service Connector: 86792094
- Description: 3-Way F 1.2 MCON-CB Series, Sealed(BK)

Connector Part Information
- Harness Type: Charge Air Cooler Pump Wiring Harness
- OEM Connector: 2203318-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 3-Way M 1.2 MCON-CB Series, Sealed(BK)

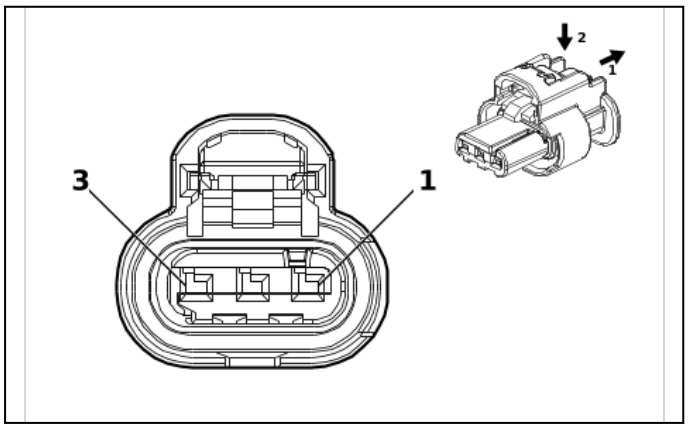
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required
II	Not required	No Tool Required	No Tool Required

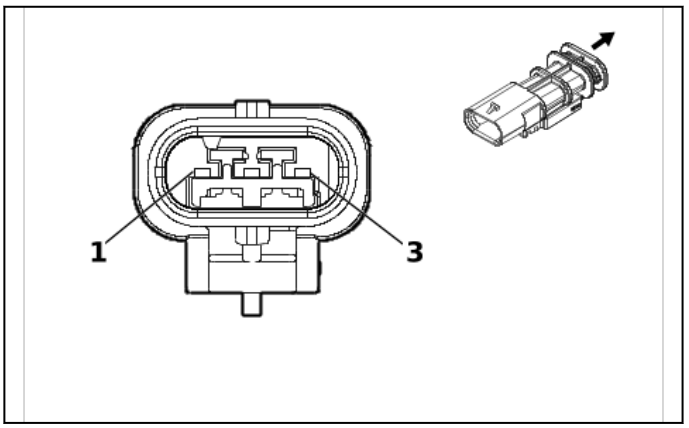
X676D Engine Wiring Harness to Charge Air Cooler Pump Wiring Harness (LZ0)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 1	(1) VT / BU	(1) 5294	(1) I	(1) —	(1) Powertrain Main Relay Fused Supply Voltage 5	(1) 1	(1) 1	(1) VT / BU	(1) 5294	(1) II	(1) —
(2) 2	(2) 0.5	(2) GN / VT	(2) 4621	(2) I	(2) —	(2) Engine Control Module LIN Bus 1	(2) 2	(2) 0.5	(2) GN / VT	(2) 4621	(2) II	(2) —
(3) 3	(3) 1	(3) BK	(3) 6550	(3) I	(3) —	(3) Ground	(3) 3	(3) 1	(3) BK	(3) 6550	(3) II	(3) —

X676V Engine Wiring Harness to Heater Coolant Pump Wiring Harness (L76 / L78)



4581126



5087161

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 1-2296695-1
- Service Connector: 86792094
- Description: 3-Way F 1.2 MCON-CB Series, Sealed(BK)

Connector Part Information
- Harness Type: Heater Coolant Pump Wiring Harness
- OEM Connector: 2203318-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 3-Way M 1.2 MCON-CB Series, Sealed(BK)

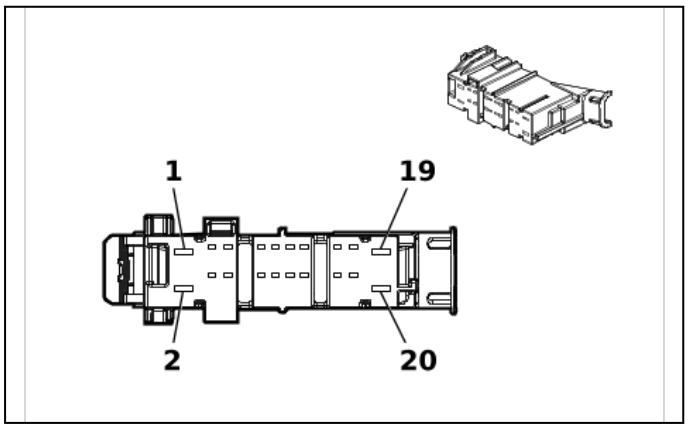
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required
II	Not required	J-35616-17 (L-GN)	No Tool Required

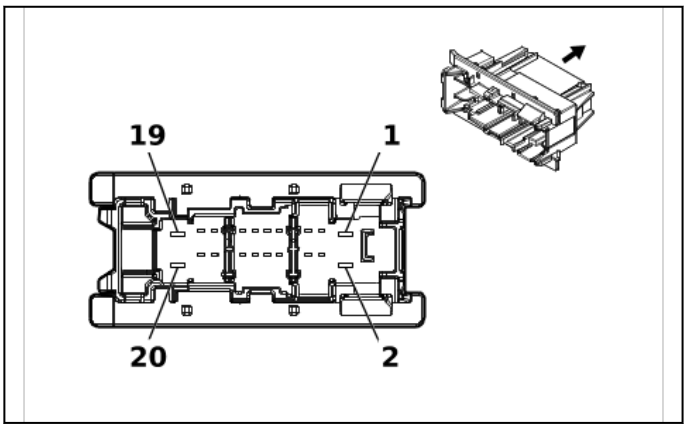
X676V Engine Wiring Harness to Heater Coolant Pump Wiring Harness (L76 / L78)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) BK	(1) 450	(1) I	(1) —	(1) Ground	(1) 1	(1) 0.5	(1) BK	(1) 450	(1) II	(1) —
(2) 2	(2) 0.5	(2) RD / BU	(2) 6040	(2) I	(2) —	(2) Battery Positive Voltage	(2) 2	(2) 0.5	(2) RD / BU	(2) 6040	(2) II	(2) —
(3) 3	(3) 0.5	(3) GN / VT	(3) 4621	(3) I	(3) —	(3) Engine Control Module LIN Bus 1	(3) 3	(3) 0.5	(3) GN / VT	(3) 4621	(3) II	(3) —

X700 Rear Side Door Door Wiring Harness - Left to Body Wiring Harness - 4 - Door



4650257



4663657

Connector Part Information
- Harness Type: Rear Side Door Door Wiring Harness - Left
- OEM Connector: 6098-8196
- Service Connector: Service by Harness - See Part Catalog
- Description: 20-Way F 1.2 MCON, 2.8 MCP Series(BK)

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 6098-8887
- Service Connector: 13527239
- Description: 20-Way M 1.2 MCON, 2.8 MCP Series(BK)

Terminal Part Information

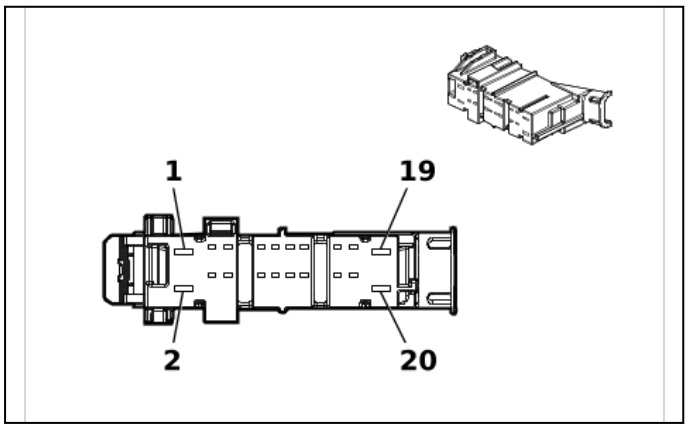
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required
II	Not required	J-35616-35 (VT)	No Tool Required
III	13586064	J-35616-5 (PU)	J-38125-212
IV	84616651	J-35616-13 (BU)	J-38125-215A
V	84726946	J-35616-13 (BU)	J-38125-215A

X700 Rear Side Door Door Wiring Harness - Left to Body Wiring Harness - 4 - Door

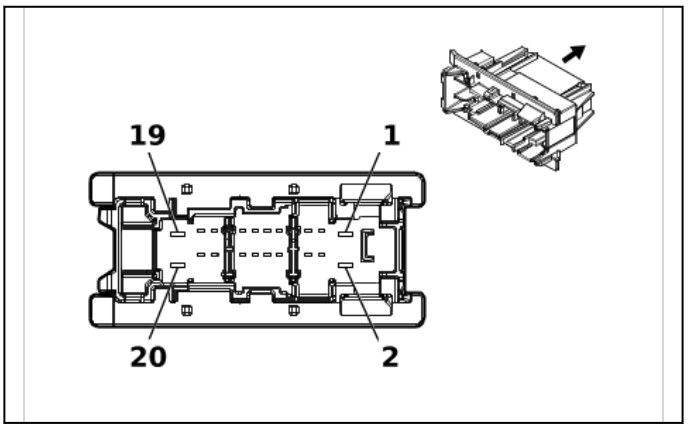
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 2.5	(1) RD / BU	(1) 3240	(1) II	(1) —	(1) Battery Positive Voltage	(1) 1	(1) 2.5	(1) RD / BU	(1) 3240	(1) III	(1) —
2	—	—	—	—	—	Not Occupied	2	—	—	—	—	—
(3) 3	(3) 0.5	(3) WH / VT	(3) 4994	(3) I	(3) —	(3) Left Rear Door Exterior Switch Unlock Signal	(3) 3	(3) 0.35	(3) WH / VT	(3) 4994	(3) IV	(3) —
4 - 5	—	—	—	—	—	Not Occupied	4 - 5	—	—	—	—	—
(6) 6	(6) 0.75	(6) WH	(6) 2679	(6) I	(6) —	(6) Lock Actuators Unlock Control 1	(6) 6	(6) 0.75	(6) WH	(6) 2679	(6) IV	(6) —
(7) 7	(7) 0.75	(7) BU / YE	(7) 1091	(7) I	(7) —	(7) Left Rear Door Lock Actuator Lock Control	(7) 7	(7) 0.75	(7) BU / YE	(7) 1091	(7) IV	(7) —
8	—	—	—	—	—	Not Occupied	8	—	—	—	—	—

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(9) 9	(9) 0.5	(9) BK / OG	(9) 6623	(9) I	(9) —	(9) Left Rear Side Impact Sensor Low Reference	(9) 9	(9) 0.5	(9) BK / OG	(9) 6623	(9) IV	(9) —
10	—	—	—	—	—	Not Occupied	10	—	—	—	—	—
(11) 11	(11) 0.5	(11) OG / BU	(11) 6622	(11) I	(11) —	(11) Left Rear Side Impact Sensor Signal	(11) 11	(11) 0.5	(11) OG / BU	(11) 6622	(11) IV	(11) —
(12) 12	(12) 0.5	(12) GN / GY	(12) 6135	(12) I	(12) —	(12) Body Control Module LIN Bus 4	(12) 12	(12) 0.35	(12) GN / GY	(12) 6135	(12) IV	(12) —
(13) 13	(13) 0.5	(13) VT	(13) 4301	(13) I	(13) —	(13) Passive Entry Left Antenna Signal High	(13) 13	(13) 0.35	(13) VT	(13) 4301	(13) IV	(13) —
(14) 14	(14) 0.5	(14) VT / GY	(14) 4302	(14) I	(14) —	(14) Passive Entry Left Antenna Signal Low	(14) 14	(14) 0.35	(14) VT / GY	(14) 4302	(14) IV	(14) —
15 - 16	—	—	—	—	—	Not Occupied	15 - 16	—	—	—	—	—
(17) 17	(17) 0.75	(17) GN	(17) 199	(17) I	(17) —	(17) Left Rear Speaker [+] Control (17) Left Rear Speaker [+] Control	(17) 17	(17) 1.5 (17) 0.75	(17) GN (17) GN	(17) 199 (17) 199	(17) V (17) IV	(17) UQA (17) UQ3
(18) 18	(18) 0.75	(18) GN / BK	(18) 116	(18) I	(18) —	(18) Left Rear Speaker [-] Control (18) Left Rear Speaker [-] Control	(18) 18	(18) 1.5 (18) 0.75	(18) GN / BK (18) GN / BK	(18) 116 (18) 116	(18) V (18) IV	(18) UQA (18) UQ3
19	—	—	—	—	—	Not Occupied	19	—	—	—	—	—
(20) 20	(20) 2.5	(20) BK	(20) 1550	(20) II	(20) —	(20) Ground	(20) 20	(20) 2.5	(20) BK	(20) 1550	(20) III	(20) —

X800 Rear Side Door Door Wiring Harness - Right to Body Wiring Harness - 4 - Door



4650257



4663657

Connector Part Information
- Harness Type: Rear Side Door Door Wiring Harness - Right
- OEM Connector: 6098-8196
- Service Connector: Service by Harness - See Part Catalog
- Description: 20-Way F 1.2 MCON, 2.8 MCP Series(BK)

Connector Part Information
- Harness Type: Body Wiring Harness
- OEM Connector: 6098-8887
- Service Connector: 13527239
- Description: 20-Way M 1.2 MCON, 2.8 MCP Series(BK)

Terminal Part Information

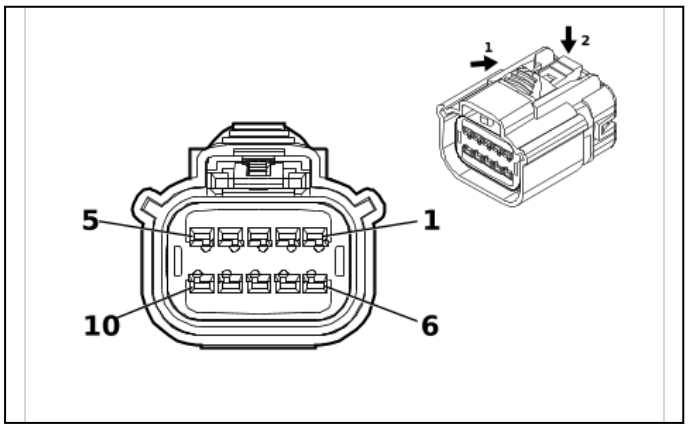
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required
II	Not required	J-35616-35 (VT)	No Tool Required
III	13586064	J-35616-5 (PU)	J-38125-212
IV	84616651	J-35616-13 (BU)	J-38125-215A
V	84726946	J-35616-13 (BU)	J-38125-215A

X800 Rear Side Door Door Wiring Harness - Right to Body Wiring Harness - 4 - Door

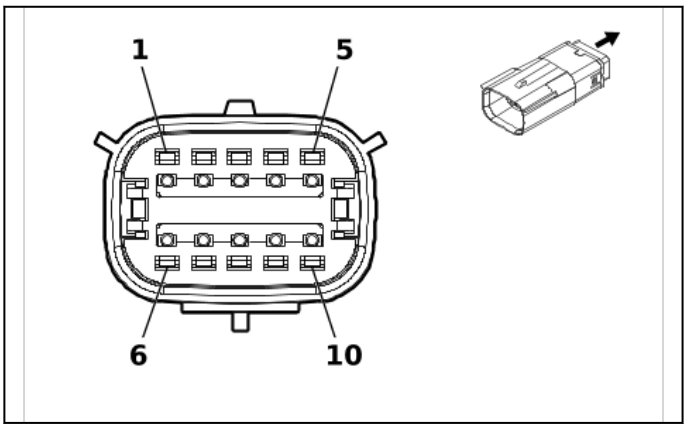
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 2.5	(1) YE / BK	(1) 4840	(1) II	(1) —	(1) Battery Positive Voltage	(1) 1	(1) 2.5	(1) RD / GY	(1) 4840	(1) III	(1) —
2	—	—	—	—	—	Not Occupied	2	—	—	—	—	—
(3) 3	(3) 0.5	(3) GY / BU	(3) 4995	(3) I	(3) —	(3) Right Rear Door Exterior Switch Unlock Signal	(3) 3	(3) 0.35	(3) GY / BU	(3) 4995	(3) IV	(3) —
4 - 5	—	—	—	—	—	Not Occupied	4 - 5	—	—	—	—	—
(6) 6	(6) 0.75	(6) GY / BK	(6) 2680	(6) I	(6) —	(6) Lock Actuators Unlock Control 2	(6) 6	(6) 0.75	(6) GY / BK	(6) 2680	(6) IV	(6) —
(7) 7	(7) 0.75	(7) VT / WH	(7) 1094	(7) I	(7) —	(7) Right Rear Door Lock Actuator Lock Control	(7) 7	(7) 0.75	(7) VT / WH	(7) 1094	(7) IV	(7) —
8	—	—	—	—	—	Not Occupied	8	—	—	—	—	—

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(9) 9	(9) 0.5	(9) BK / OG	(9) 6627	(9) I	(9) —	(9) Right Rear Side Impact Sensor Low Reference	(9) 9	(9) 0.5	(9) BK / OG	(9) 6627	(9) IV	(9) —
10	—	—	—	—	—	Not Occupied	10	—	—	—	—	—
(11) 11	(11) 0.5	(11) OG / WH	(11) 6626	(11) I	(11) —	(11) Right Rear Side Impact Sensor Signal	(11) 11	(11) 0.5	(11) OG / WH	(11) 6626	(11) IV	(11) —
(12) 12	(12) 0.5	(12) GN / GY	(12) 6135	(12) I	(12) —	(12) Body Control Module LIN Bus 4	(12) 12	(12) 0.35	(12) GN / GY	(12) 6135	(12) IV	(12) —
(13) 13	(13) 0.5	(13) GN / YE	(13) 4303	(13) I	(13) —	(13) Passive Entry Right Antenna Signal High	(13) 13	(13) 0.35	(13) GN / YE	(13) 4303	(13) IV	(13) —
(14) 14	(14) 0.5	(14) GN / BK	(14) 4304	(14) I	(14) —	(14) Passive Entry Right Antenna Signal Low	(14) 14	(14) 0.35	(14) GN / BK	(14) 4304	(14) IV	(14) —
15 - 16	—	—	—	—	—	Not Occupied	15 - 16	—	—	—	—	—
(17) 17	(17) 0.75	(17) WH	(17) 46	(17) I	(17) —	(17) Right Rear Speaker [+] Control (17) Right Rear Speaker [+] Control	(17) 17	(17) 1.5 (17) 0.75	(17) WH (17) WH	(17) 46 (17) 46	(17) V (17) IV	(17) UQA (17) UQ3
(18) 18	(18) 0.75	(18) BU / BK	(18) 115	(18) I	(18) —	(18) Right Rear Speaker [-] Control (18) Right Rear Speaker [-] Control	(18) 18	(18) 1.5 (18) 0.75	(18) BU / BK (18) BU / BK	(18) 115 (18) 115	(18) V (18) IV	(18) UQA (18) UQ3
19	—	—	—	—	—	Not Occupied	19	—	—	—	—	—
(20) 20	(20) 2.5	(20) BK	(20) 1350	(20) II	(20) —	(20) Ground	(20) 20	(20) 2.5	(20) BK	(20) 1350	(20) III	(20) —

X912 Chassis Wiring Harness to Tail Lamp Wiring Harness



4900954



5222363

Connector Part Information
- Harness Type: Chassis Wiring Harness
- OEM Connector: 15514821
- Service Connector: 19371235
- Description: 10-Way F 1.5 OCS Series, Sealed(BK)

Connector Part Information
- Harness Type: Tail Lamp Wiring Harness
- OEM Connector: 15514807
- Service Connector: Service by Harness - See Part Catalog
- Description: 10-Way M 1.5 OCS Series, Sealed(BK)

Terminal Part Information

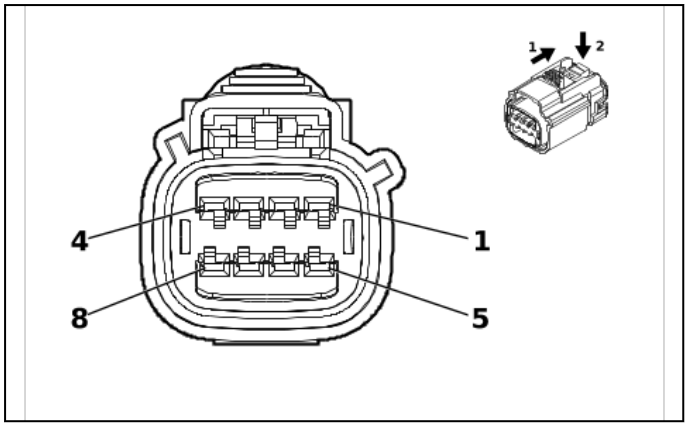
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19370817	J-35616-2A (GY)	J-38125-215A
II	Not Available	J-35616-14 (GN)	J-38125-215A
III	Not required	J-35616-3 (GY)	No Tool Required

X912 Chassis Wiring Harness to Tail Lamp Wiring Harness

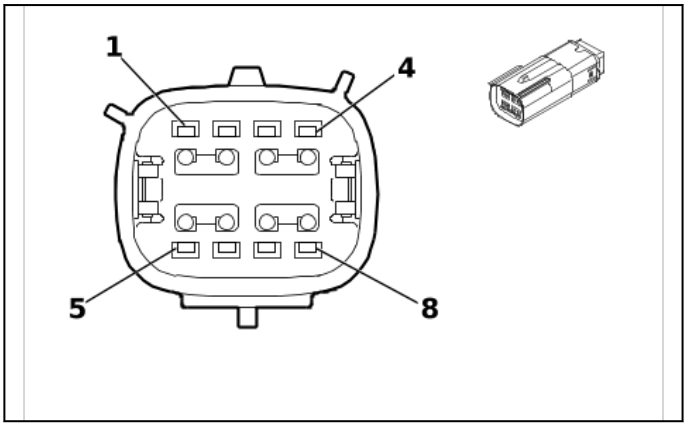
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BU / WH	(1) 1334	(1) I	(1) —	(1) Left Rear Turn Signal Lamp Control 2	(1) 1	(1) 0.75	(1) BU / VT	(1) 1334	(1) III	(1) —
(2) 2	(2) 0.75	(2) GY / YE	(2) 7542	(2) I	(2) —	(2) Left Rear Stop Lamp Control	(2) 2	(2) 0.75	(2) WH / YE	(2) 7542	(2) III	(2) —
(3) 3	(3) 0.5	(3) GY / BU	(3) 7762	(3) I	(3) —	(3) Cargo Lamp Control	(3) 3	(3) 0.5	(3) GY / BU	(3) 7762	(3) III	(3) —
(4) 4	(4) 1.5	(4) BK	(4) 1850	(4) II	(4) —	(4) Ground	(4) 4	(4) 1.5	(4) BK	(4) 1850	(4) III	(4) —
(5) 5	(5) 0.75	(5) YE / GN	(5) 2024	(5) I	(5) —	(5) Animation Lighting Control	(5) 5	(5) 0.75	(5) YE / GN	(5) 2024	(5) III	(5) —
(6) 6	(6) 1.5	(6) RD / VT	(6) 6340	(6) II	(6) —	(6) Battery Positive Voltage	(6) 6	(6) 1.5	(6) RD / BU	(6) 6340	(6) III	(6) —
(7) 7	(7) 0.75	(7) BN / BU	(7) 6993	(7) I	(7) —	(7) Left Rear Park Lamp Control	(7) 7	(7) 0.75	(7) BN / GY	(7) 6993	(7) III	(7) —
(8) 8	(8) 0.5	(8) GN / WH	(8) 24	(8) I	(8) —	(8) Backup Lamp Control	(8) 8	(8) 0.5	(8) GN / WH	(8) 24	(8) III	(8) —

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(9) 9	(9) 0.5	(9) WH / VT	(9) 6567	(9) I	(9) —	(9) Rear Turn Signal Lamp Feedback Signal	(9) 9	(9) 0.5	(9) WH / BK	(9) 6567	(9) III	(9) —
(10) 10	(10) 0.75	(10) GY / BN	(10) 10749	(10) I	(10) —	(10) Sequential Turn Lamp Enable Signal	(10) 10	(10) 0.75	(10) GY / BN	(10) 10749	(10) III	(10) —

X914 Chassis Wiring Harness to Rear Lamp Wiring Harness - Left (BOK/BOR/BOY)



6017603



7148043

Connector Part Information
- Harness Type: Chassis Wiring Harness
- OEM Connector: 15514669
- Service Connector: 85604159
- Description: 8-Way F 1.5 OCS Series, Sealed(GY)

Connector Part Information
- Harness Type: Rear Lamp Wiring Harness - Left
- OEM Connector: 15514653
- Service Connector: Service by Harness - See Part Catalog
- Description: 8-Way M 1.5 OCS Series, Sealed(GY)

Terminal Part Information

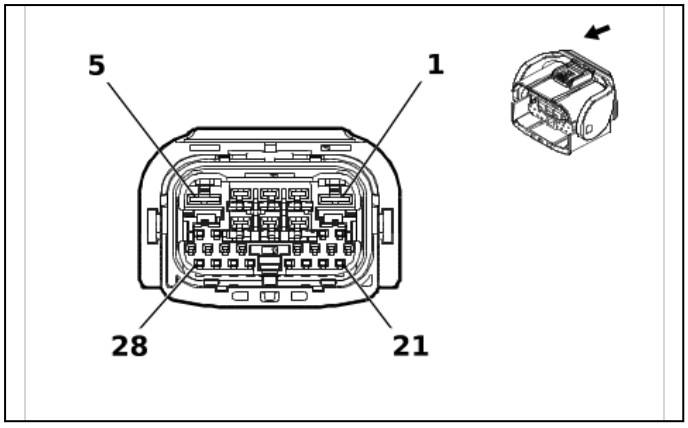
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required
II	Not required	J-35616-3 (GY)	No Tool Required

X914 Chassis Wiring Harness to Rear Lamp Wiring Harness - Left (BOK/BOR/BOY)

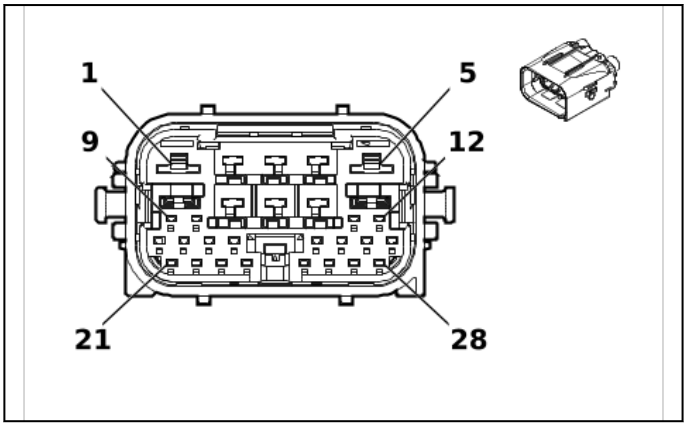
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
1	—	—	—	—	—	Not Occupied	1	—	—	—	—	—
(2) 2	(2) 0.75	(2) BK / WH	(2) 1851	(2) I	(2) —	(2) Signal Ground	(2) 2	(2) 0.75	(2) BK / WH	(2) 1951	(2) II	(2) —
(3) 3	(3) 0.5	(3) BU / BN	(3) 11326	(3) I	(3) —	(3) Virtual Key Private CAN Bus [+] Serial Data	(3) 3	(3) 0.35	(3) BU / BN	(3) 11326	(3) II	(3) —
(4) 4	(4) 0.5	(4) WH / YE	(4) 11325	(4) I	(4) —	(4) Virtual Key Private CAN Bus [-] Serial Data	(4) 4	(4) 0.35	(4) WH / YE	(4) 11325	(4) II	(4) —
5 - 6	—	—	—	—	—	Not Occupied	5 - 6	—	—	—	—	—

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(7) 7	(7) 0.5	(7) RD / WH	(7) 6440	(7) I	(7) —	(7) Battery Positive Voltage	(7) 7	(7) 0.5	(7) RD / WH	(7) 6440	(7) II	(7) —
8	—	—	—	—	—	Not Occupied	8	—	—	—	—	—

X918 Chassis Wiring Harness to Endgate Wiring Harness



6572042



6757546

Connector Part Information
- Harness Type: Chassis Wiring Harness
- OEM Connector: 7298-4827-30
- Service Connector: 85761013
- Description: 28-Way F 1.2 MLK, 2.8, 6.3 YESC Series(BK)

Connector Part Information
- Harness Type: Endgate Wiring Harness
- OEM Connector: 7297-4839-30
- Service Connector: Service by Harness - See Part Catalog
- Description: 28-Way M 1.2 MLK, 2.8, 6.3 YESC Series(BK)

Terminal Part Information

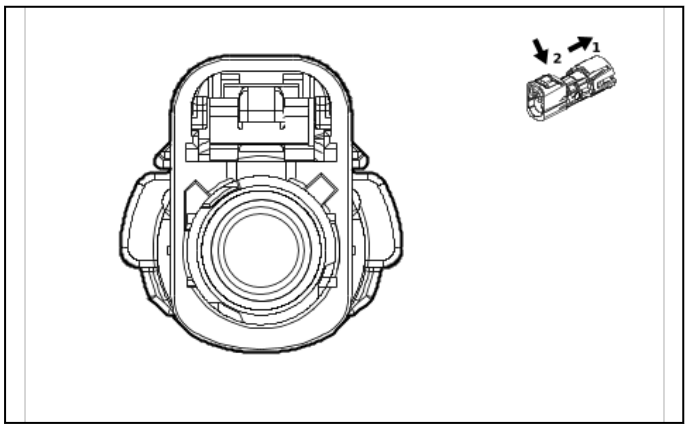
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19368324	J-35616-35 (VT)	J-38125-11A
II	85669160	J-35616-12 (BU)	J-38125-215A
III	Not required	J-35616-13 (BU)	No Tool Required
IV	Not required	J-35616-5 (PU)	No Tool Required

X918 Chassis Wiring Harness to Endgate Wiring Harness

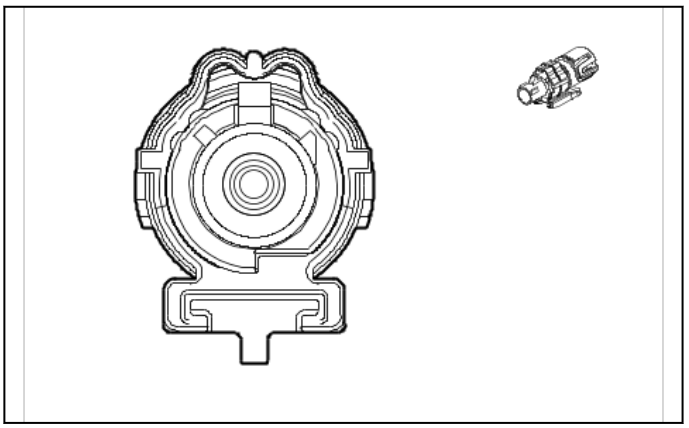
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
1	—	—	—	—	—	Not Occupied	1	—	—	—	—	—
(2) 2	(2) 2.5	(2) RD / VT	(2) 4442	(2) I	(2) —	(2) Primary Fused Battery Positive Voltage	(2) 2	(2) 2.5	(2) RD / VT	(2) 4442	(2) IV	(2) —
(3) 3	(3) 2.5	(3) BK	(3) 1850	(3) I	(3) —	(3) Ground	(3) 3	(3) 2.5	(3) BK	(3) 1850	(3) IV	(3) —
(4) 4	(4) 1	(4) VT	(4) 7725	(4) I	(4) —	(4) Minor Endgate Motor Control	(4) 4	(4) 1	(4) VT	(4) 7725	(4) IV	(4) —
5	—	—	—	—	—	Not Occupied	5	—	—	—	—	—

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(6) 6	(6) 1	(6) GN	(6) 1299	(6) I	(6) —	(6) Major Endgate Motor Control	(6) 6	(6) 1	(6) GN	(6) 1299	(6) IV	(6) —
(7) 7	(7) 1	(7) YE / BK	(7) 7730	(7) I	(7) —	(7) Major Endgate Motor Low Reference	(7) 7	(7) 1	(7) YE / BK	(7) 7730	(7) IV	(7) —
8	—	—	—	—	—	Not Occupied	8	—	—	—	—	—
(9) 9	(9) 0.5	(9) WH / VT	(9) 1430	(9) II	(9) —	(9) Exterior Courtesy Lamp Control	(9) 9	(9) 0.5	(9) WH / VT	(9) 1430	(9) III	(9) —
(10) 10	(10) 0.5	(10) YE	(10) 7294	(10) II	(10) —	(10) Minor Endgate Release Switch Discrete Signal Exterior	(10) 10	(10) 0.5	(10) YE	(10) 7294	(10) III	(10) —
(11) 11	(11) 0.75	(11) YE / BU	(11) 7295	(11) II	(11) —	(11) Left Minor Endgate Ajar Signal	(11) 11	(11) 0.75	(11) YE / BU	(11) 7295	(11) III	(11) —
(12) 12	(12) 0.75	(12) GY / VT	(12) 2691	(12) II	(12) —	(12) Rear Closure Actuator Lock Control	(12) 12	(12) 0.75	(12) GY / VT	(12) 2691	(12) III	(12) —
(13) 13	(13) 0.75	(13) BU / YE	(13) 10926	(13) II	(13) —	(13) Major Endgate Ajar Signal	(13) 13	(13) 0.75	(13) BU / YE	(13) 10926	(13) III	(13) —
(14) 14	(14) 0.75	(14) GY / BK	(14) 2680	(14) II	(14) —	(14) Lock Actuators Unlock Control 2	(14) 14	(14) 0.75	(14) GY / BK	(14) 2680	(14) III	(14) —
15 - 17	—	—	—	—	—	Not Occupied	15 - 17	—	—	—	—	—
(18) 18	(18) 0.5	(18) BU / VT	(18) 4101	(18) II	(18) —	(18) AUTOSAR CAN Bus [+] 4 Serial Data	(18) 18	(18) 0.5	(18) BU / VT	(18) 4101	(18) III	(18) —
(19) 19	(19) 0.5	(19) WH	(19) 4100	(19) II	(19) —	(19) AUTOSAR CAN Bus [-] 4 Serial Data	(19) 19	(19) 0.5	(19) WH	(19) 4100	(19) III	(19) —
(20) 20	(20) 0.75	(20) YE	(20) 1144	(20) II	(20) —	(20) Endgate Release Switch Discrete Signal Exterior	(20) 20	(20) 0.5	(20) YE	(20) 1144	(20) III	(20) —
(21) 21	(21) 0.5	(21) GY	(21) 7292	(21) II	(21) —	(21) Major Endgate Release Switch Signal Exterior	(21) 21	(21) 0.5	(21) GY	(21) 7292	(21) III	(21) —
22 - 28	—	—	—	—	—	Not Occupied	22 - 28	—	—	—	—	—

X919 Endgate Wiring Harness to Chassis Wiring Harness



5810829



5757466

Connector Part Information
- Harness Type: Endgate Wiring Harness
- OEM Connector: 35187033
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way F Coax Type(WH)

Connector Part Information
- Harness Type: Chassis Wiring Harness
- OEM Connector: 33338240
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 1-Way M Coax Type, Sealed(WH)

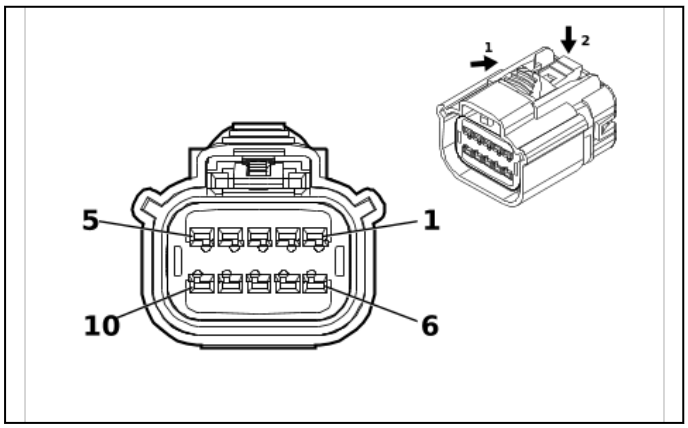
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

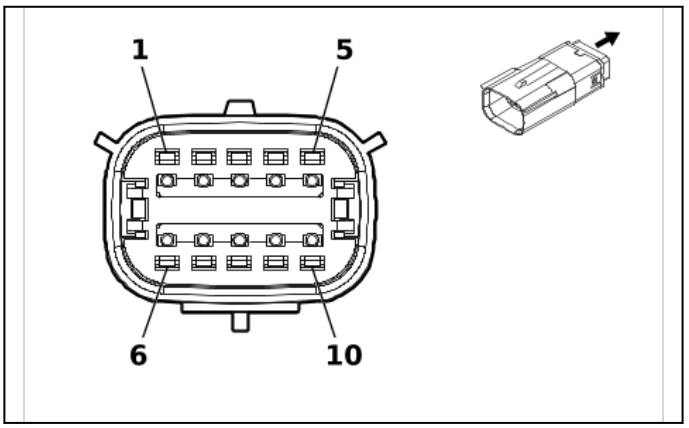
X919 Endgate Wiring Harness to Chassis Wiring Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
WH	—	Coax Cable	4721	I	—	Rearview Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	WH	—	Coax Cable	4721	II	—

X922 Chassis Wiring Harness to Tail Lamp Wiring Harness



4900954



5222363

Connector Part Information
- Harness Type: Chassis Wiring Harness
- OEM Connector: 15514821
- Service Connector: 19371235
- Description: 10-Way F 1.5 OCS Series, Sealed(BK)

Connector Part Information
- Harness Type: Tail Lamp Wiring Harness
- OEM Connector: 15514807
- Service Connector: Service by Harness - See Part Catalog
- Description: 10-Way M 1.5 OCS Series, Sealed(BK)

Terminal Part Information

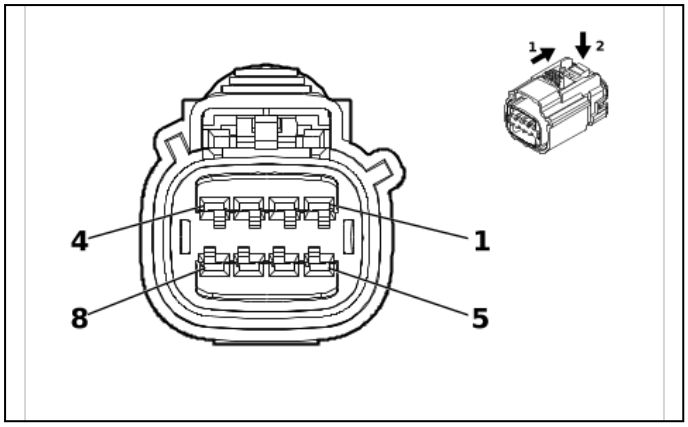
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19370817	J-35616-2A (GY)	J-38125-215A
II	Not Available	J-35616-14 (GN)	J-38125-215A
III	Not required	J-35616-3 (GY)	No Tool Required

X922 Chassis Wiring Harness to Tail Lamp Wiring Harness

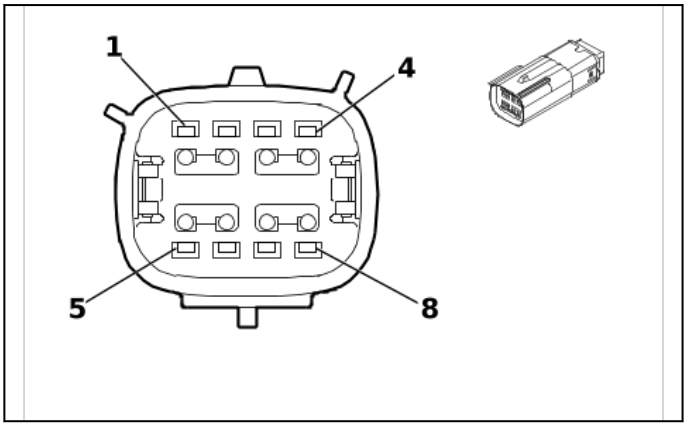
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 0.75	(1) BU / VT	(1) 1335	(1) I	(1) —	(1) Right Rear Turn Signal Lamp Control 2	(1) 1	(1) 0.75	(1) BU / VT	(1) 1335	(1) III	(1) —
(2) 2	(2) 0.75	(2) WH / YE	(2) 7541	(2) I	(2) —	(2) Right Rear Stop Lamp Control	(2) 2	(2) 0.75	(2) WH / YE	(2) 7541	(2) III	(2) —
(3) 3	(3) 0.5	(3) GY / BU	(3) 7762	(3) I	(3) —	(3) Cargo Lamp Control	(3) 3	(3) 0.5	(3) GY / BU	(3) 7762	(3) III	(3) —
(4) 4	(4) 1.5	(4) BK	(4) 1650	(4) II	(4) —	(4) Ground	(4) 4	(4) 1.5	(4) BK	(4) 1850	(4) III	(4) —
(5) 5	(5) 0.75	(5) YE / GN	(5) 2024	(5) I	(5) —	(5) Animation Lighting Control	(5) 5	(5) 0.75	(5) YE / GN	(5) 2024	(5) III	(5) —
(6) 6	(6) 1.5	(6) RD / BU	(6) 6740	(6) II	(6) —	(6) Battery Positive Voltage	(6) 6	(6) 1.5	(6) RD / BU	(6) 6740	(6) III	(6) —
(7) 7	(7) 0.75	(7) BN / GY	(7) 6995	(7) I	(7) —	(7) Right Rear Park Lamp Control	(7) 7	(7) 0.75	(7) BN / GY	(7) 6995	(7) III	(7) —
(8) 8	(8) 0.5	(8) GN / WH	(8) 24	(8) I	(8) —	(8) Backup Lamp Control	(8) 8	(8) 0.5	(8) GN / WH	(8) 24	(8) III	(8) —

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(9) 9	(9) 0.5	(9) WH / BK	(9) 7544	(9) I	(9) —	(9) Right Rear Turn Signal Lamp Feedback Signal	(9) 9	(9) 0.5	(9) WH / BK	(9) 7544	(9) III	(9) —
(10) 10	(10) 0.75	(10) GY / BN	(10) 10749	(10) I	(10) —	(10) Sequential Turn Lamp Enable Signal	(10) 10	(10) 0.75	(10) GY / BN	(10) 10749	(10) III	(10) —

X924 Chassis Wiring Harness to Rear Lamp Wiring Harness - Right (BOK/BOR/BOY)



6017603



7148043

Connector Part Information
- Harness Type: Chassis Wiring Harness
- OEM Connector: 15514669
- Service Connector: 85604159
- Description: 8-Way F 1.5 OCS Series, Sealed(GY)

Connector Part Information
- Harness Type: Rear Lamp Wiring Harness - Right
- OEM Connector: 15514653
- Service Connector: Service by Harness - See Part Catalog
- Description: 8-Way M 1.5 OCS Series, Sealed(GY)

Terminal Part Information

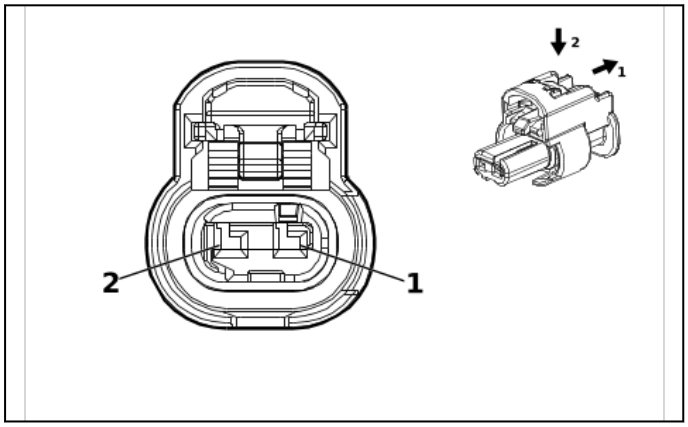
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required
II	Not required	J-35616-3 (GY)	No Tool Required

X924 Chassis Wiring Harness to Rear Lamp Wiring Harness - Right (BOK/BOR/BOY)

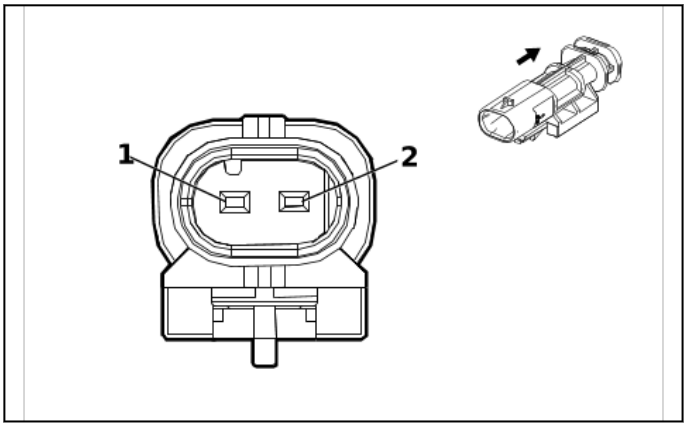
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
1	—	—	—	—	—	Not Occupied	1	—	—	—	—	—
(2) 2	(2) 0.75	(2) BK	(2) 1850	(2) I	(2) —	(2) Ground (2) Ground	(2) 2	(2) 0.5 (2) 0.75	(2) BK (2) BK	(2) 1850 (2) 1850	(2) II (2) II	(2) (BOY / BOR / BOK) (2) - (BOY / BOR / BOK)
(3) 3	(3) 0.5	(3) BU / BN	(3) 11326	(3) I	(3) —	(3) Virtual Key Private CAN Bus [+] Serial Data	(3) 3	(3) 0.35	(3) BU / BN	(3) 11326	(3) II	(3) —
(4) 4	(4) 0.5	(4) WH / YE	(4) 11325	(4) I	(4) —	(4) Virtual Key Private CAN Bus [-] Serial Data	(4) 4	(4) 0.35	(4) WH / YE	(4) 11325	(4) II	(4) —

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(5) 5	(5) 0.5	(5) BU / BN	(5) 11326	(5) I	(5) —	(5) Virtual Key Private CAN Bus [+] Serial Data	(5) 5	(5) 0.35	(5) BU / BN	(5) 11326	(5) II	(5) —
(6) 6	(6) 0.5	(6) W H / YE	(6) 11325	(6) I	(6) —	(6) Virtual Key Private CAN Bus [-] Serial Data	(6) 6	(6) 0.35	(6) W H / YE	(6) 11325	(6) II	(6) —
(7) 7	(7) 0.5	(7) RD / WH	(7) 6440	(7) I	(7) —	(7) Battery Positive Voltage	(7) 7	(7) 0.5	(7) RD / WH	(7) 6440	(7) II	(7) —
8	—	—	—	—	—	Not Occupied	8	—	—	—	—	—

X933 Endgate Wiring Harness to Accessory Wiring Harness - Endgate Step (63G)



4649903



2474755

Connector Part Information
- Harness Type: Endgate Wiring Harness
- OEM Connector: 1-2296694-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MCON Series, Sealed(BK)

Connector Part Information
- Harness Type: Accessory Wiring Harness - Endgate Step
- OEM Connector: 2203314-1
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way M 1.2 MCON Series, Sealed(BK)

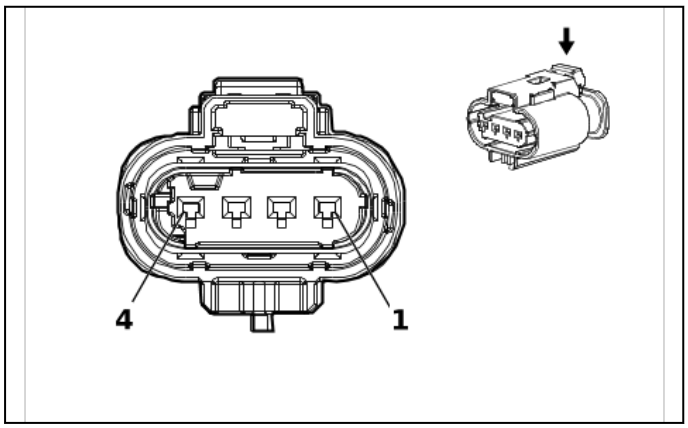
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-12 (BU)	No Tool Required
II	Not required	J-35616-17 (L-GN)	No Tool Required

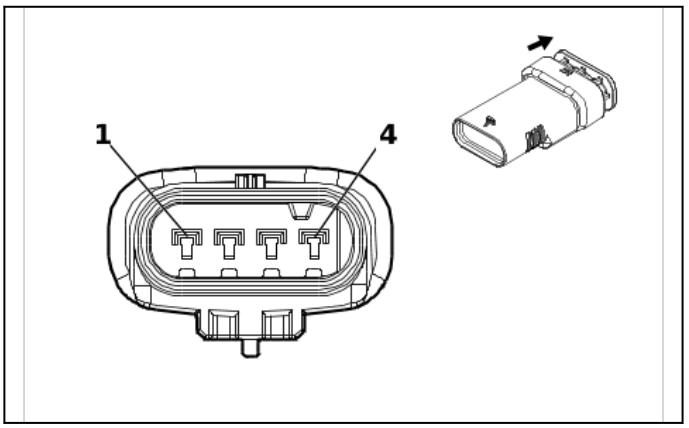
X933 Endgate Wiring Harness to Accessory Wiring Harness - Endgate Step (63G)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) W H / VT	(1) 1430	(1) I	(1) —	(1) Exterior Courtesy Lamp Control	(1) 1	(1) 0.5	(1) W H	(1) 1430	(1) II	(1) —
(2) 2	(2) 0.5	(2) BK	(2) 1850	(2) I	(2) —	(2) Ground	(2) 2	(2) 0.5	(2) BK	(2) 1450	(2) II	(2) —

X944 Engine Wiring Harness to Engine Coolant Temperature Sensor Harness (LZ0)



5402120



4560843

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 10531905
- Service Connector: 85877329
- Description: 4-Way F 1.2 Multilock Series, Sealed(BK)

Connector Part Information
- Harness Type: Engine Coolant Temperature Sensor Harness
- OEM Connector: 13503594
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way M 1.2 Multilock Series, Sealed(GY)

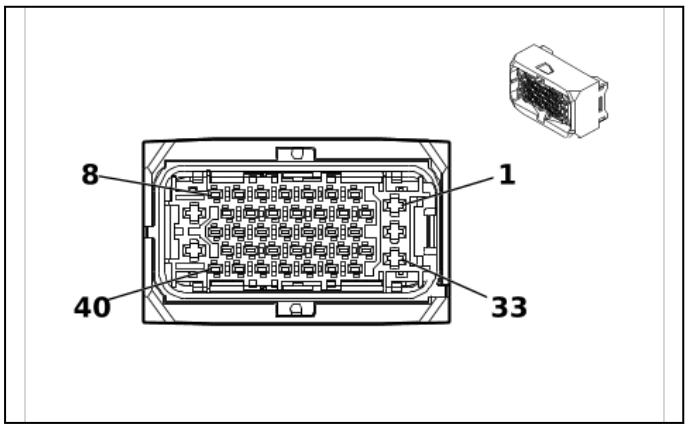
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-16 (L-GN)	No Tool Required
II	Not required	No Tool Required	No Tool Required

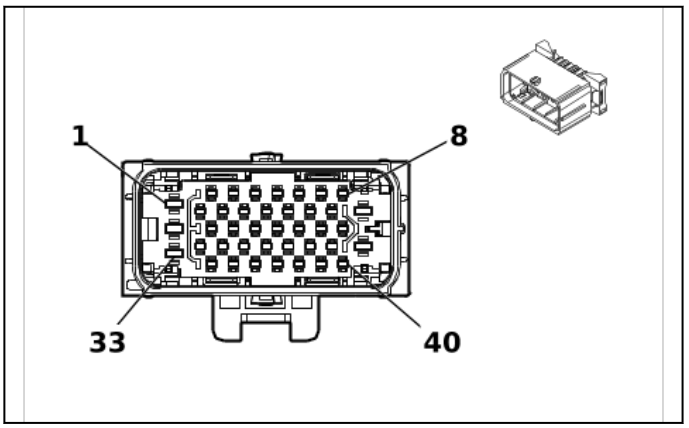
X944 Engine Wiring Harness to Engine Coolant Temperature Sensor Harness (LZ0)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
1 - 2	—	—	—	—	—	Not Occupied	1 - 2	—	—	—	—	—
(3) 3	(3) 0.5	(3) VT	(3) 2988	(3) I	(3) —	(3) Engine Outlet Coolant Temperature Signal	(3) 3	(3) 0.5	(3) VT	(3) 2988	(3) II	(3) —
(4) 4	(4) 0.5	(4) BK / GY	(4) 626	(4) I	(4) —	(4) Engine Control Vehicle Sensors Low Reference 1	(4) 4	(4) 0.5	(4) BK / GY	(4) 626	(4) II	(4) —

X950 Rear Object Alarm Sensor Wiring Harness to Chassis Wiring Harness



5517284



5585013

Connector Part Information
- Harness Type: Rear Object Alarm Sensor Wiring Harness
- OEM Connector: 33367902
- Service Connector: Service by Harness - See Part Catalog
- Description: 40-Way F 1.5, 2.8 MCP Series, Sealed(BK)

Connector Part Information
- Harness Type: Chassis Wiring Harness
- OEM Connector: 33374525
- Service Connector: 84992401
- Description: 40-Way M 1.5, 2.8 MCP Series, Sealed(BK)

Terminal Part Information

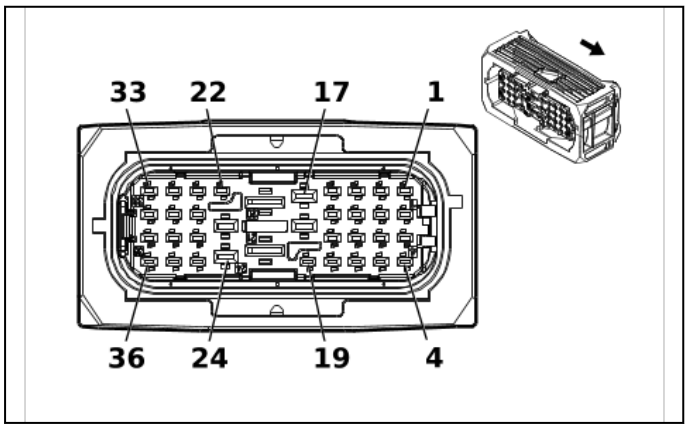
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required
II	Not required	J-35616-35 (VT)	No Tool Required
III	19303873	J-35616-3 (GY)	EL-38125-560A
IV	84992391	J-35616-5 (PU)	J-38125-36

X950 Rear Object Alarm Sensor Wiring Harness to Chassis Wiring Harness

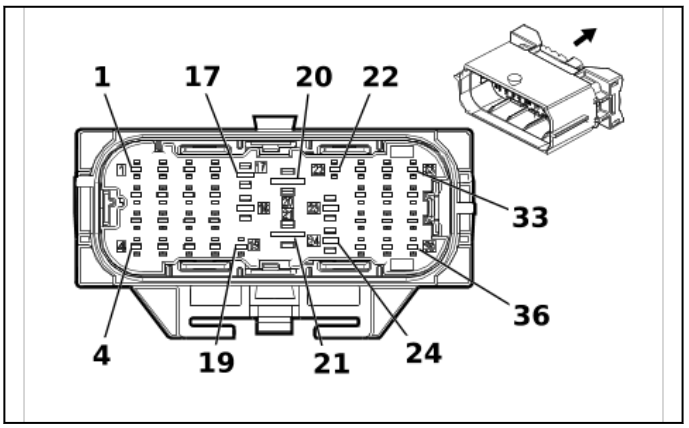
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
1	—	—	—	—	—	Not Occupied	1	—	—	—	—	—
(2) 2	(2) 0.5	(2) RD / BU	(2) 5240	(2) I	(2) —	(2) Battery Positive Voltage	(2) 2	(2) 0.75	(2) RD / BU	(2) 5240	(2) III	(2) —
3 - 4	—	—	—	—	—	Not Occupied	3 - 4	—	—	—	—	—
(5) 5	(5) 0.35	(5) BU / GY	(5) 4105	(5) I	(5) —	(5) AUTOSAR CAN Bus [+] 8 Serial Data	(5) 5	(5) 0.35	(5) BU / GY	(5) 4105	(5) III	(5) —
(6) 6	(6) 0.35	(6) WH / GY	(6) 4104	(6) I	(6) —	(6) AUTOSAR CAN Bus [-] 8 Serial Data	(6) 6	(6) 0.35	(6) WH / GY	(6) 4104	(6) III	(6) —
(7) 7	(7) 0.35	(7) BU / GY	(7) 4105	(7) I	(7) —	(7) AUTOSAR CAN Bus [+] 8 Serial Data	(7) 7	(7) 0.5	(7) BU / GY	(7) 4105	(7) III	(7) —
(8) 8	(8) 0.35	(8) WH / GY	(8) 4104	(8) I	(8) —	(8) AUTOSAR CAN Bus [-] 8 Serial Data	(8) 8	(8) 0.5	(8) WH / GY	(8) 4104	(8) III	(8) —
(9) 9	(9) 0.5	(9) BN / WH	(9) 2374	(9) I	(9) —	(9) Object Sensor Voltage Reference	(9) 9	(9) 0.5	(9) BN / WH	(9) 2374	(9) III	(9) —

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(10) 10	(10) 0.5	(10) Y E	(10) 23 75	(10) I	(10) —	(10) Left Rear Outer Parking Assist Sensor Signal	(10) 10	(10) 0.5	(10) Y E	(10) 23 75	(10) III	(10) —
(11) 11	(11) 0.5	(11) Y E / BU	(11) 23 76	(11) I	(11) —	(11) Left Rear Middle Parking Assist Sensor Signal	(11) 11	(11) 0.5	(11) Y E / BU	(11) 23 76	(11) III	(11) —
(12) 12	(12) 0.5	(12) Y E / WH	(12) 23 77	(12) I	(12) —	(12) Right Rear Middle Parking Assist Sensor Signal	(12) 12	(12) 0.5	(12) Y E / WH	(12) 23 77	(12) III	(12) —
(13) 13	(13) 0.5	(13) Y E / VT	(13) 23 78	(13) I	(13) —	(13) Right Rear Outer Parking Assist Sensor Signal	(13) 13	(13) 0.5	(13) Y E / VT	(13) 23 78	(13) III	(13) —
(14) 14	(14) 0.5	(14) B K / GY	(14) 23 79	(14) I	(14) —	(14) Object Sensor Low Reference	(14) 14	(14) 0.5	(14) B K / GY	(14) 23 79	(14) III	(14) —
(15) 15	(15) 0.5	(15) G N / YE	(15) 68 46	(15) I	(15) —	(15) Rear License Plate Lamp Control	(15) 15	(15) 0.5	(15) G N / YE	(15) 68 46	(15) III	(15) —
(16) 16	(16) 0.75	(16) B K	(16) 18 50	(16) II	(16) —	(16) Ground	(16) 16	(16) 0.75	(16) B K	(16) 18 50	(16) IV	(16) —
(17) 17	(17) 0.5 (17) 0.5	(17) B K / WH (17) B K / WH	(17) 18 51 (17) 19 51	(17) II (17) II	(17) VFE / VJG / VJH (17) VPS	(17) Signal Ground (17) Signal Ground	(17) 17	(17) 0.75	(17) B K / WH	(17) 18 51	(17) IV	(17) —
18 - 35	—	—	—	—	—	Not Occupied	18 - 35	—	—	—	—	—
(36) 36	(36) 0.5	(36) R D / WH	(36) 64 40	(36) I	(36) —	(36) Battery Positive Voltage	(36) 36	(36) 0.5	(36) R D / WH	(36) 64 40	(36) III	(36) —
(37) 37	(37) 0.35	(37) B U / BN	(37) 11 326	(37) I	(37) —	(37) Virtual Key Private CAN Bus [+] Serial Data	(37) 37	(37) 0.5	(37) B U / BN	(37) 11 326	(37) III	(37) —
(38) 38	(38) 0.35	(38) WH / YE	(38) 11 325	(38) I	(38) —	(38) Virtual Key Private CAN Bus [-] Serial Data	(38) 38	(38) 0.5	(38) WH / YE	(38) 11 325	(38) III	(38) —
(39) 39	(39) 0.35	(39) B U / BN	(39) 11 326	(39) I	(39) —	(39) Virtual Key Private CAN Bus [+] Serial Data	(39) 39	(39) 0.5	(39) B U / BN	(39) 11 326	(39) III	(39) —
(40) 40	(40) 0.35	(40) WH / YE	(40) 11 325	(40) I	(40) —	(40) Virtual Key Private CAN Bus [-] Serial Data	(40) 40	(40) 0.5	(40) WH / YE	(40) 11 325	(40) III	(40) —

X961 Engine Wiring Harness to Engine Wiring Harness Extension Harness (L76 / L78)



4204560



3960400

Connector Part Information
- Harness Type: Engine Wiring Harness
- OEM Connector: 13929980
- Service Connector: 19333092
- Description: 36-Way F 1.5, 2.8 CTS, 6.3 MCP Series, Sealed(BK)

Connector Part Information
- Harness Type: Engine Wiring Harness Extension Harness
- OEM Connector: 13594541
- Service Connector: Service by Harness - See Part Catalog
- Description: 36-Way M 1.5, 2.8, 5.8 Series, Sealed(BK)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	19368624	J-35616-35 (VT)	J-38125-556
II	19369235	J-35616-14 (GN)	EL-38125-560A
III	Not required	No Tool Required	No Tool Required
III	Not required	No Tool Required	No Tool Required

X961 Engine Wiring Harness to Engine Wiring Harness Extension Harness (L76 / L78)

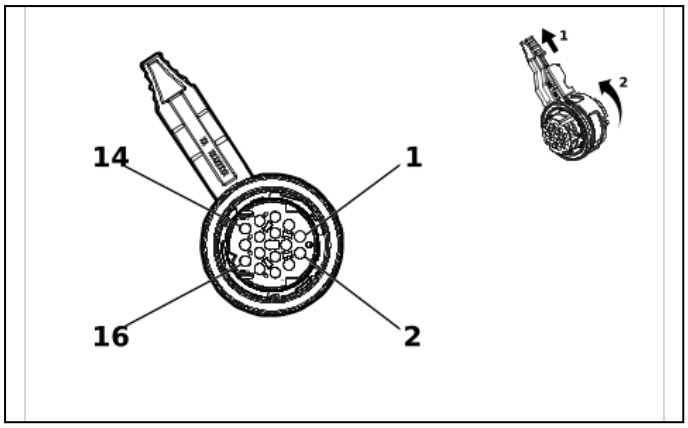
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) WH / BU	(1) 2491	(1) II	(1) —	(1) Cylinder Shutoff Solenoid Enable Signal 1	(1) 1	(1) 0.5	(1) WH / BU	(1) 2491	(1) III	(1) —
(2) 2	(2) 0.5	(2) BU	(2) 5491	(2) II	(2) —	(2) Cylinder Deactivation Solenoid Valve Control 1	(2) 2	(2) 0.5	(2) BU	(2) 5491	(2) III	(2) —
(3) 3	(3) 0.5	(3) WH / GN	(3) 2492	(3) II	(3) —	(3) Cylinder Shutoff Solenoid Enable Signal 2	(3) 3	(3) 0.5	(3) WH / GN	(3) 2492	(3) III	(3) —
(4) 4	(4) 0.5	(4) GN	(4) 5492	(4) II	(4) —	(4) Cylinder Deactivation Solenoid Valve Control 2	(4) 4	(4) 0.5	(4) GN	(4) 5492	(4) III	(4) —

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(5) 5	(5) 0.5	(5) YE / GY	(5) 2493	(5) II	(5) —	(5) Cylinder Shutoff Solenoid Enable Signal 3	(5) 5	(5) 0.5	(5) YE / GY	(5) 2493	(5) III	(5) —
(6) 6	(6) 0.5	(6) GY	(6) 5493	(6) II	(6) —	(6) Cylinder Deactivation Solenoid Valve Control 3	(6) 6	(6) 0.5	(6) GY	(6) 5493	(6) III	(6) —
(7) 7	(7) 0.5	(7) YE / GN	(7) 2494	(7) II	(7) —	(7) Cylinder Shutoff Solenoid Enable Signal 4	(7) 7	(7) 0.5	(7) YE / GN	(7) 2494	(7) III	(7) —
(8) 8	(8) 0.5	(8) YE / BU	(8) 5494	(8) II	(8) —	(8) Cylinder Deactivation Solenoid Valve Control 4	(8) 8	(8) 0.5	(8) YE / BU	(8) 5494	(8) III	(8) —
(9) 9	(9) 0.5	(9) WH / VT	(9) 2495	(9) II	(9) —	(9) Cylinder Shutoff Solenoid Enable Signal 5	(9) 9	(9) 0.5	(9) WH / VT	(9) 2495	(9) III	(9) —
(10) 10	(10) 0.5	(10) VT	(10) 5495	(10) II	(10) —	(10) Cylinder Deactivation Solenoid Valve Control 5	(10) 10	(10) 0.5	(10) VT	(10) 5495	(10) III	(10) —
(11) 11	(11) 0.5	(11) YE / BN	(11) 2496	(11) II	(11) —	(11) Cylinder Shutoff Solenoid Enable Signal 6	(11) 11	(11) 0.5	(11) YE / BN	(11) 2496	(11) III	(11) —
(12) 12	(12) 0.5	(12) BN	(12) 5496	(12) II	(12) —	(12) Cylinder Deactivation Solenoid Valve Control 6	(12) 12	(12) 0.5	(12) BN	(12) 5496	(12) III	(12) —
(13) 13	(13) 0.5	(13) GN / GY	(13) 2497	(13) II	(13) —	(13) Cylinder Shutoff Solenoid Enable Signal 7	(13) 13	(13) 0.5	(13) GN / GY	(13) 2497	(13) III	(13) —
(14) 14	(14) 0.5	(14) WH	(14) 5497	(14) II	(14) —	(14) Cylinder Deactivation Solenoid Valve Control 7	(14) 14	(14) 0.5	(14) WH	(14) 5497	(14) III	(14) —
(15) 15	(15) 0.5	(15) WH / YE	(15) 2498	(15) II	(15) —	(15) Cylinder Shutoff Solenoid Enable Signal 8	(15) 15	(15) 0.5	(15) WH / YE	(15) 2498	(15) III	(15) —
(16) 16	(16) 0.5	(16) YE	(16) 5498	(16) II	(16) —	(16) Cylinder Deactivation Solenoid Valve Control 8	(16) 16	(16) 0.5	(16) YE	(16) 5498	(16) III	(16) —

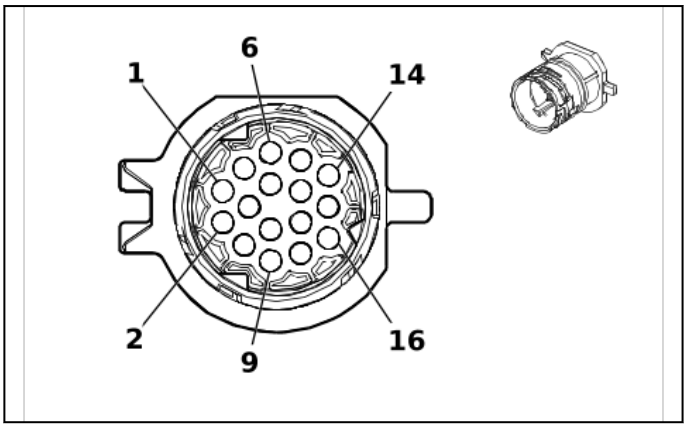
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(17) 17	(17) 0.5	(17) BK / BN	(17) 67 53	(17) I	(17) —	(17) Camshaft Position Actuator Solenoid Valve 1 Low Reference	(17) 17	(17) 0.5	(17) BK / BN	(17) 67 53	(17) III	(17) —
(18) 18	(18) 0.5	(18) VT / BN	(18) 52 84	(18) I	(18) —	(18) Intake Camshaft Position Actuator Solenoid Valve 1	(18) 18	(18) 0.5	(18) VT / BN	(18) 52 84	(18) III	(18) —
(19) 19	(19) 0.5	(19) BU / RD	(19) 46 0	(19) II	(19) —	(19) Engine Control Sensors 5 Volt Reference 1	(19) 19	(19) 0.5	(19) BU / RD	(19) 46 0	(19) III	(19) —
20 - 21	—	—	—	—	—	Not Occupied	20 - 21	—	—	—	—	—
(22) 22	(22) 0.5	(22) BK / VT	(22) 10 598	(22) II	(22) —	(22) Engine Control Sensors Low Reference 4	(22) 22	(22) 0.5	(22) BK / VT	(22) 10 598	(22) III	(22) —
(23) 23	(23) 0.5	(23) BK / YE	(23) 54 8	(23) I	(23) —	(23) Engine Control Sensors Low Reference 1	(23) 23	(23) 0.5	(23) BK / YE	(23) 54 8	(23) III	(23) —
(24) 24	(24) 0.5	(24) YE / BN	(24) 33 1	(24) I	(24) —	(24) Oil Pressure Sensor Signal	(24) 24	(24) 0.5	(24) YE / BN	(24) 33 1	(24) III	(24) —
(25) 25	(25) 0.5	(25) GY / VT	(25) 13 867	(25) II	(25) —	(25) Engine Bank Outlet Coolant Temperature Sensor Signal	(25) 25	(25) —	(25) GY / VT	(25) 13 867	(25) III	(25) —
(26) 26	(26) 0.5	(26) GY / BU	(26) 53 00	(26) II	(26) —	(26) Intake Camshaft Position Sensor 1 Voltage Reference	(26) 26	(26) 0.5	(26) GY / BU	(26) 53 00	(26) III	(26) —
(27) 27	(27) 0.5	(27) YE / VT	(27) 52 75	(27) II	(27) —	(27) Intake Camshaft Position Sensor 1	(27) 27	(27) 0.5	(27) YE / VT	(27) 52 75	(27) III	(27) —
(28) 28	(28) 0.5	(28) BK / GN	(28) 53 01	(28) II	(28) —	(28) Intake Camshaft Position Sensor Low Reference 1	(28) 28	(28) 0.5	(28) BK / GN	(28) 53 01	(28) III	(28) —
29 - 30	—	—	—	—	—	Not Occupied	29 - 30	—	—	—	—	—
(31) 31	(31) 0.5	(31) BK / YE	(31) 54 8	(31) II	(31) —	(31) Engine Control Sensors Low Reference 1	(31) 31	(31) 0.5	(31) BK / YE	(31) 54 8	(31) III	(31) —

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(32) 32	(32) 0.5	(32) B N	(32) 12 637	(32) II	(32) —	(32) Engine Head Coolant Temperature Bank 1 Signal	(32) 32	(32) 0.5	(32) B N	(32) 12 637	(32) III	(32) —
33 - 36	—	—	—	—	—	Not Occupied	33 - 36	—	—	—	—	—

X963 Engine Wiring Harness Extension Harness to Valve Rocker Arm Oil Control Valve Harness (L76 / L78)



7020692



5575849

Connector Part Information
- Harness Type: Engine Wiring Harness Extension Harness
- OEM Connector: 13566829
- Service Connector: Service by Harness - See Part Catalog
- Description: 16-Way F 1.5 LKS Series, Sealed(BK)

Connector Part Information
- Harness Type: Valve Rocker Arm Oil Control Valve Harness
- OEM Connector: 12670796
- Service Connector: Service by Harness - See Part Catalog
- Description: 16-Way M 1.5 RK Series, Sealed(BK)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	J-35616-2A (GY)	No Tool Required
II	Not required	J-35616-3 (GY)	No Tool Required

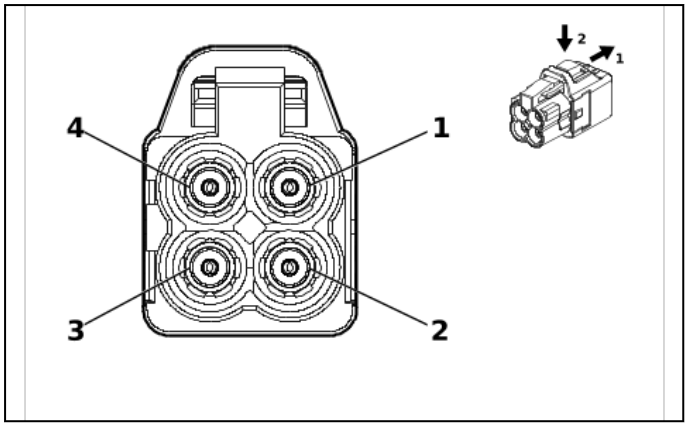
X963 Engine Wiring Harness Extension Harness to Valve Rocker Arm Oil Control Valve Harness (L76 / L78)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) 0.5	(1) WH / GN	(1) 2492	(1) I	(1) —	(1) Cylinder Shutoff Solenoid Enable Signal 2	(1) 1	(1) 0.5	(1) WH / GN	(1) 2492	(1) II	(1) —
(2) 2	(2) 0.5	(2) GN	(2) 5492	(2) I	(2) —	(2) Cylinder Deactivation Solenoid Valve Control 2	(2) 2	(2) 0.5	(2) GN	(2) 5492	(2) II	(2) —
(3) 3	(3) 0.5	(3) YE / GY	(3) 2493	(3) I	(3) —	(3) Cylinder Shutoff Solenoid Enable Signal 3	(3) 3	(3) 0.5	(3) YE / GY	(3) 2493	(3) II	(3) —

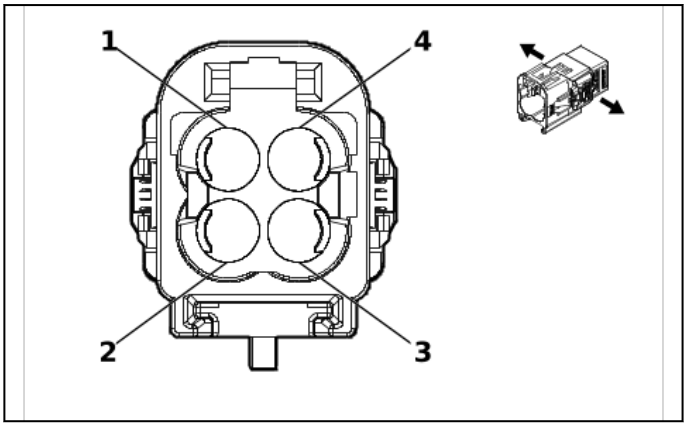
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(4) 4	(4) 0.5	(4) GY	(4) 5493	(4) I	(4) —	(4) Cylinder Deactivation Solenoid Valve Control 3	(4) 4	(4) 0.5	(4) GY	(4) 5493	(4) II	(4) —
(5) 5	(5) 0.5	(5) WH / VT	(5) 2495	(5) I	(5) —	(5) Cylinder Shutoff Solenoid Enable Signal 5	(5) 5	(5) 0.5	(5) WH / VT	(5) 2495	(5) II	(5) —
(6) 6	(6) 0.5	(6) VT	(6) 5495	(6) I	(6) —	(6) Cylinder Deactivation Solenoid Valve Control 5	(6) 6	(6) 0.5	(6) VT	(6) 5495	(6) II	(6) —
(7) 7	(7) 0.5	(7) WH / YE	(7) 2498	(7) I	(7) —	(7) Cylinder Shutoff Solenoid Enable Signal 8	(7) 7	(7) 0.5	(7) WH / YE	(7) 2498	(7) II	(7) —
(8) 8	(8) 0.5	(8) YE	(8) 5498	(8) I	(8) —	(8) Cylinder Deactivation Solenoid Valve Control 8	(8) 8	(8) 0.5	(8) YE	(8) 5498	(8) II	(8) —
(9) 9	(9) 0.5	(9) WH / BU	(9) 2491	(9) I	(9) —	(9) Cylinder Shutoff Solenoid Enable Signal 1	(9) 9	(9) 0.5	(9) WH / BU	(9) 2491	(9) II	(9) —
(10) 10	(10) 0.5	(10) BU	(10) 5491	(10) I	(10) —	(10) Cylinder Deactivation Solenoid Valve Control 1	(10) 10	(10) 0.5	(10) BU	(10) 5491	(10) II	(10) —
(11) 11	(11) 0.5	(11) YE / GN	(11) 2494	(11) I	(11) —	(11) Cylinder Shutoff Solenoid Enable Signal 4	(11) 11	(11) 0.5	(11) YE / GN	(11) 2494	(11) II	(11) —
(12) 12	(12) 0.5	(12) YE / BU	(12) 5494	(12) I	(12) —	(12) Cylinder Deactivation Solenoid Valve Control 4	(12) 12	(12) 0.5	(12) YE / BU	(12) 5494	(12) II	(12) —
(13) 13	(13) 0.5	(13) YE / BN	(13) 2496	(13) I	(13) —	(13) Cylinder Shutoff Solenoid Enable Signal 6	(13) 13	(13) 0.5	(13) YE / BN	(13) 2496	(13) II	(13) —
(14) 14	(14) 0.5	(14) BN	(14) 5496	(14) I	(14) —	(14) Cylinder Deactivation Solenoid Valve Control 6	(14) 14	(14) 0.5	(14) BN	(14) 5496	(14) II	(14) —

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(15) 15	(15) 0.5	(15) GN / GY	(15) 2497	(15) I	(15) —	(15) Cylinder Shutoff Solenoid Enable Signal 7	(15) 15	(15) 0.5	(15) GN / GY	(15) 2497	(15) II	(15) —
(16) 16	(16) 0.5	(16) WH	(16) 5497	(16) I	(16) —	(16) Cylinder Deactivation Solenoid Valve Control 7	(16) 16	(16) 0.5	(16) WH	(16) 5497	(16) II	(16) —

X985 Roof Rear Spoiler Wiring Harness to Dome Lamp Wiring Harness - 4 - Door



5835118



5834856

Connector Part Information
- Harness Type: Roof Rear Spoiler Wiring Harness
- OEM Connector: AMZW25-001-A
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 4-Way F Mini Coax Type(BK)

Connector Part Information
- Harness Type: Dome Lamp Wiring Harness
- OEM Connector: AMZ040-C00-A
- Service Connector: Service by Cable Assembly — See Part Catalog
- Description: 4-Way M Mini Coax Type(BK)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	Not required	No Tool Required	No Tool Required

X985 Roof Rear Spoiler Wiring Harness to Dome Lamp Wiring Harness - 4 - Door

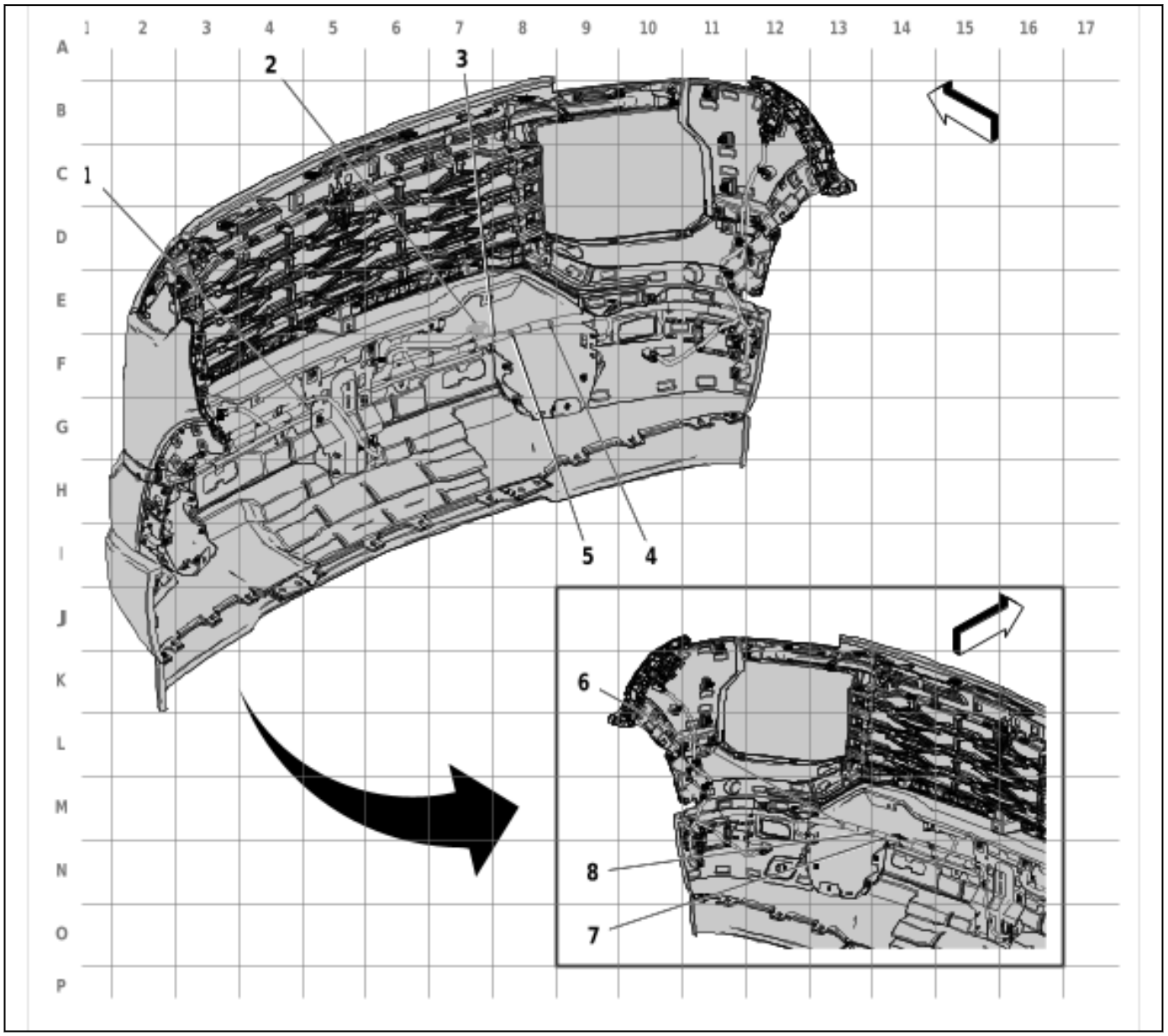
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(1) 1	(1) —	(1) Coax Cable	(1) 2387	(1) I	(1) —	(1) Full Display Mirror Rear Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	(1) 1	(1) —	(1) Coax Cable	(1) 2387	(1) II	(1) —
(2) 2	(2) —	(2) Coax Cable	(2) 6001	(2) I	(2) —	(2) Coaxial Antenna RF Signal	(2) 2	(2) —	(2) Coax Cable	(2) 6001	(2) II	(2) —

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
(3) 3	(3) —	(3) Coax Cable	(3) 6130	(3) I	(3) —	(3) Coaxial Antenna XM Signal	(3) 3	(3) —	(3) Coax Cable	(3) 6130	(3) II	(3) —
(4) 4	(4) —	(4) Coax Cable	(4) 2548	(4) I	(4) —	(4) Cargo Bed Rear Vision Camera LVDS (Low Voltage Differential Signaling) Coaxial Signal	(4) 4	(4) —	(4) Coax Cable	(4) 2548	(4) II	(4) —

Electrical Component Locator and Harness Routing Views

Schematic and Routing Diagrams

Front Object Alarm Sensor Wiring Harness Routing (- GRZ)

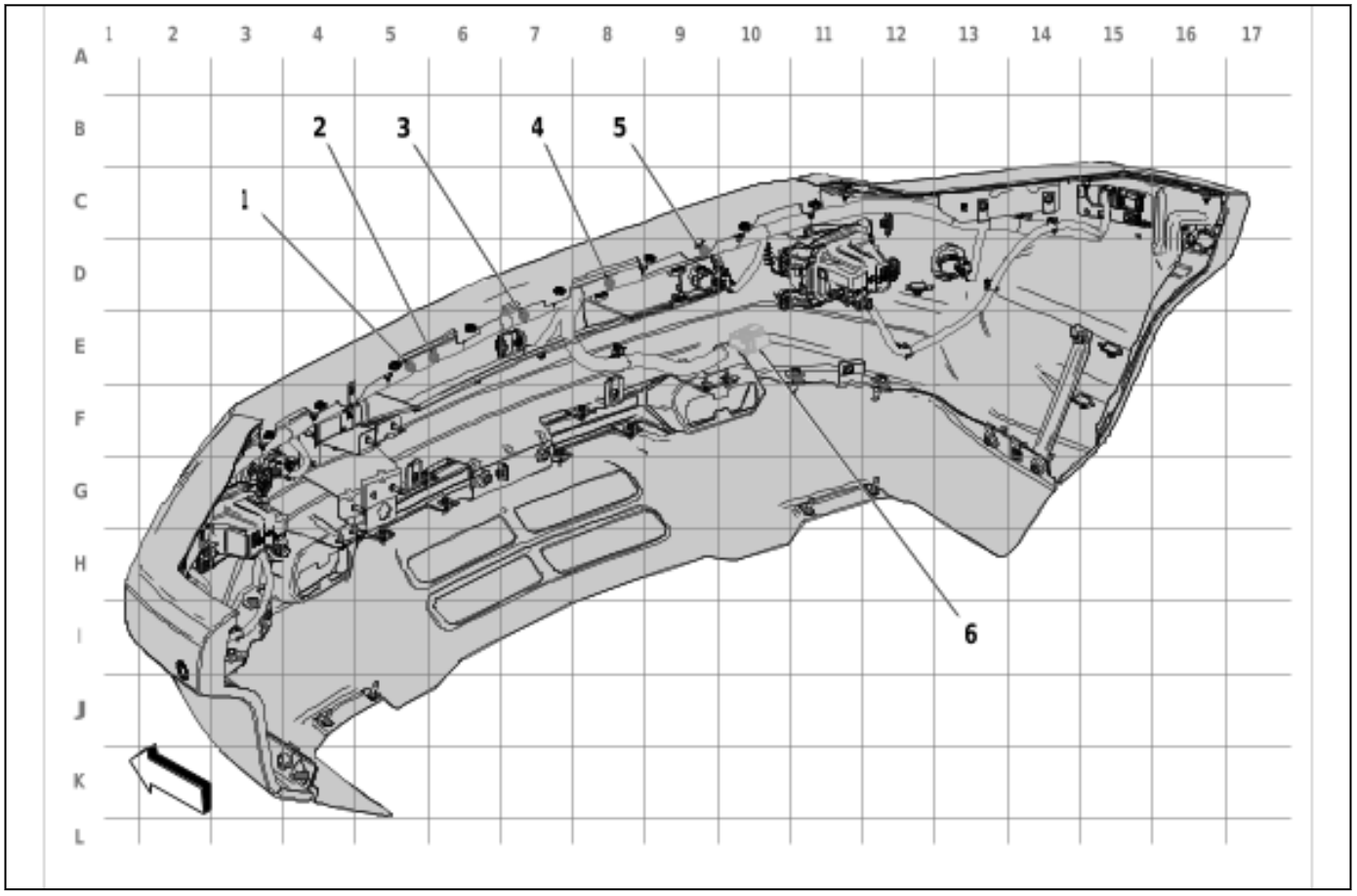


7155424

Items
(1) SP3140 Front Object Alarm Sensor Wiring Harness (UKL / UK0)
(2) X150 Front Object Alarm Sensor Wiring Harness to Body Wiring Harness
(3) SP651_1 Front Object Alarm Sensor Wiring Harness (UK0 / UKL)
(4) SP7040 Front Object Alarm Sensor Wiring Harness ((BOK / BOR / BOY) - GRZ)
(5) SP6581_1 Front Object Alarm Sensor Wiring Harness
(6) SP5214_1 Front Object Alarm Sensor Wiring Harness

Items
(7) SP14026 Front Object Alarm Sensor Wiring Harness (-GRZ)
(8) SP650_1 Front Object Alarm Sensor Wiring Harness

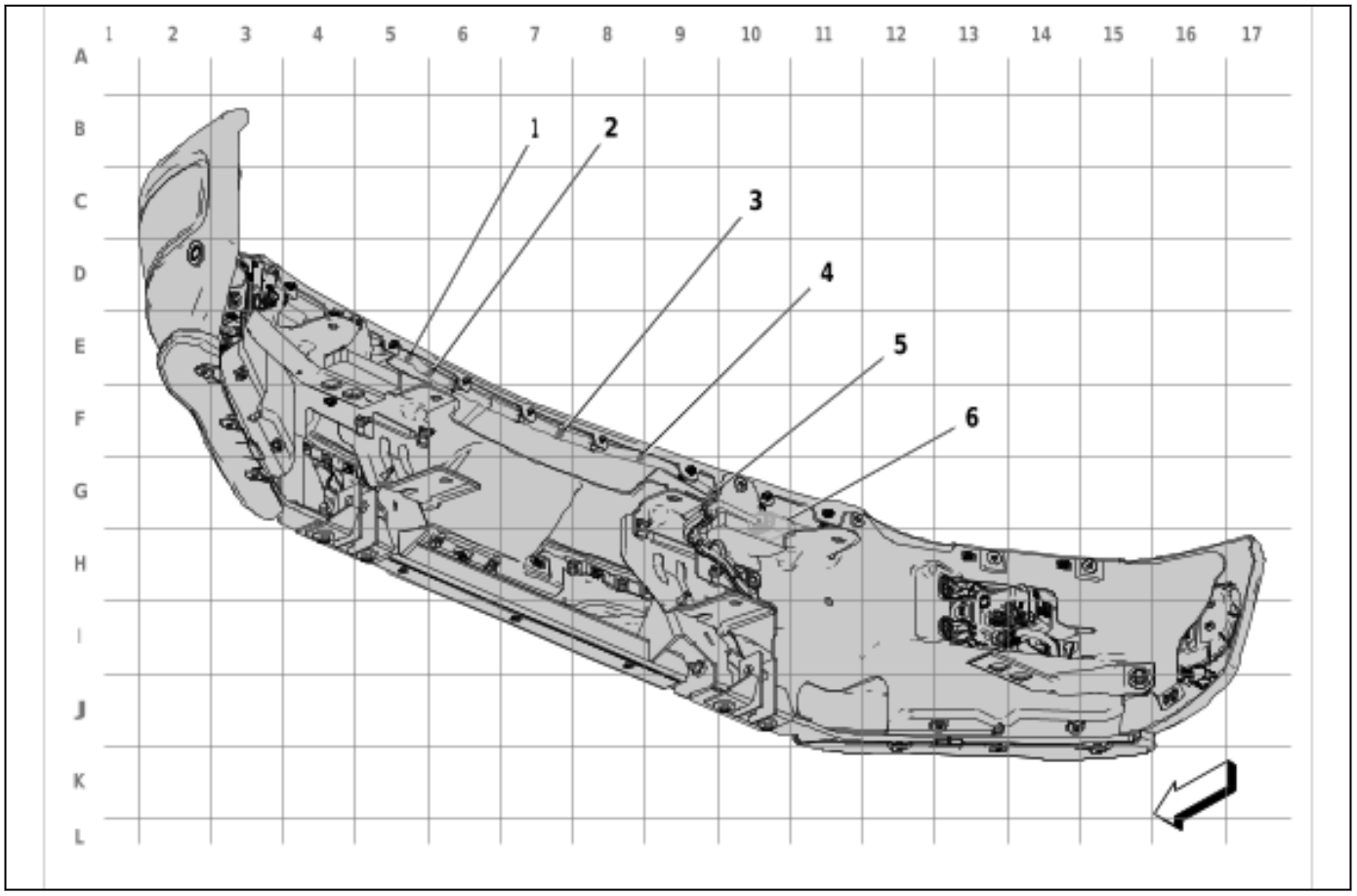
Front Object Alarm Sensor Wiring Harness Routing (GRZ - ULV)



7155425

Items
(1) SP3140 Front Object Alarm Sensor Wiring Harness (UKL / UK0)
(2) SP5214_1 Front Object Alarm Sensor Wiring Harness
(3) SP650_1 Front Object Alarm Sensor Wiring Harness
(4) SP651_1 Front Object Alarm Sensor Wiring Harness (UK0 / UKL)
(5) SP6581_1 Front Object Alarm Sensor Wiring Harness
(6) X150 Front Object Alarm Sensor Wiring Harness to Body Wiring Harness

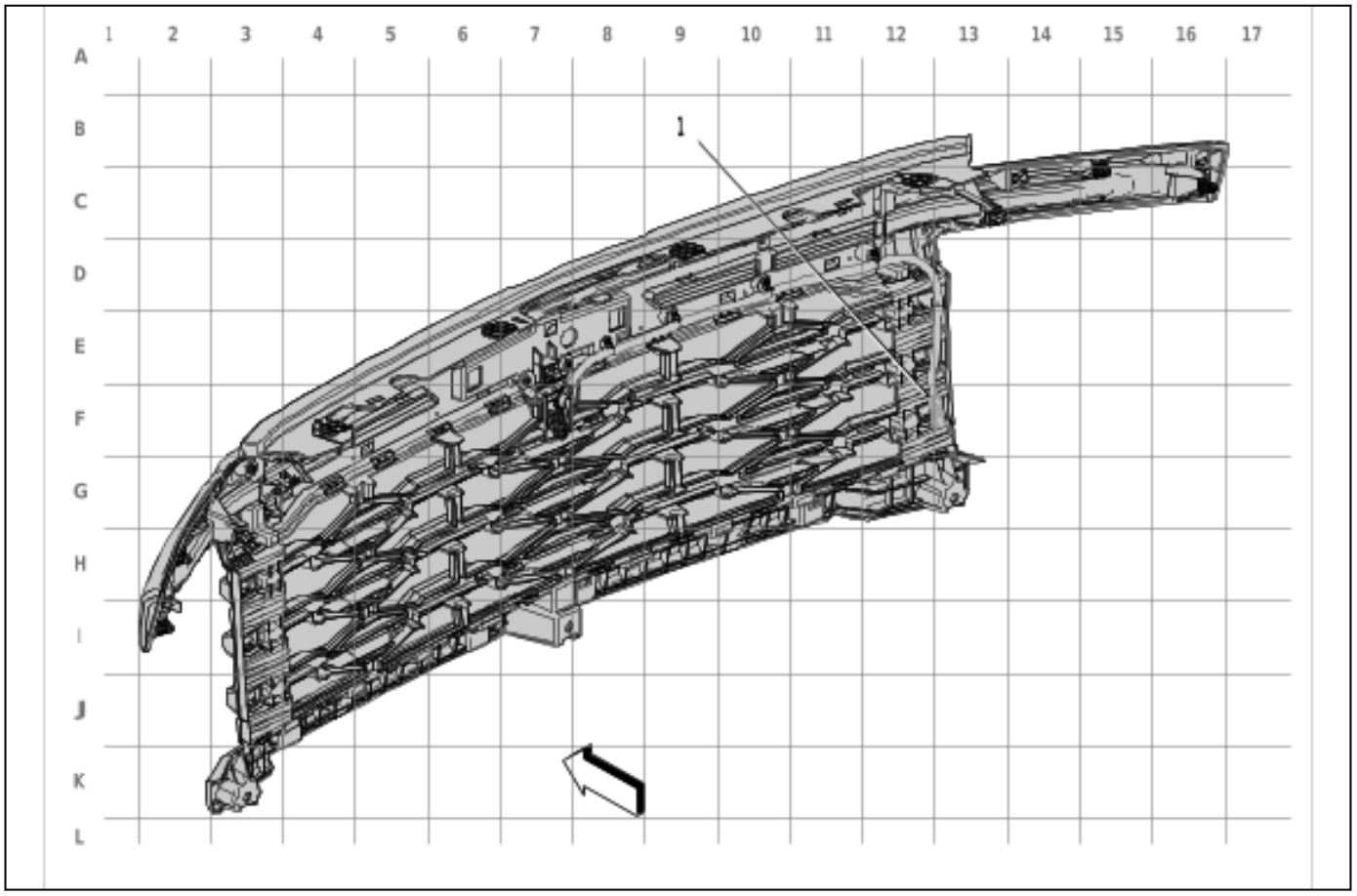
Front Object Alarm Sensor Wiring Harness Routing (ULV)



7155426

Items
(1) SP651_1 Front Object Alarm Sensor Wiring Harness (UK0 / UKL)
(2) SP650_1 Front Object Alarm Sensor Wiring Harness
(3) SP5214_1 Front Object Alarm Sensor Wiring Harness
(4) SP6581_1 Front Object Alarm Sensor Wiring Harness
(5) SP3140 Front Object Alarm Sensor Wiring Harness (UKL / UK0)
(6) X150 Front Object Alarm Sensor Wiring Harness to Body Wiring Harness

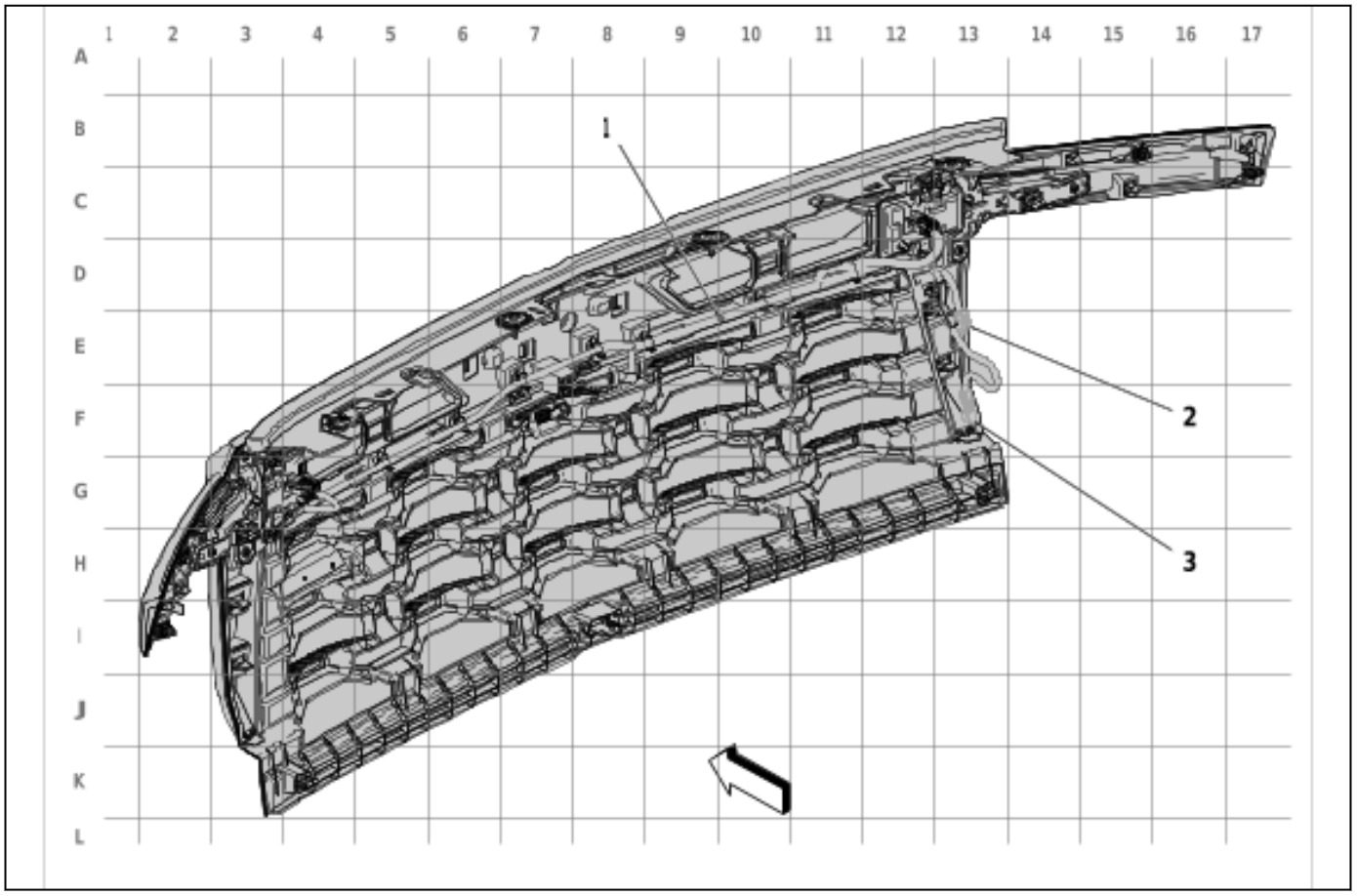
Front View Camera Wiring Harness Routing (- GRZ)



7155427

Items
(1) X122 Front View Camera Wiring Harness to Body Wiring Harness (UV2)

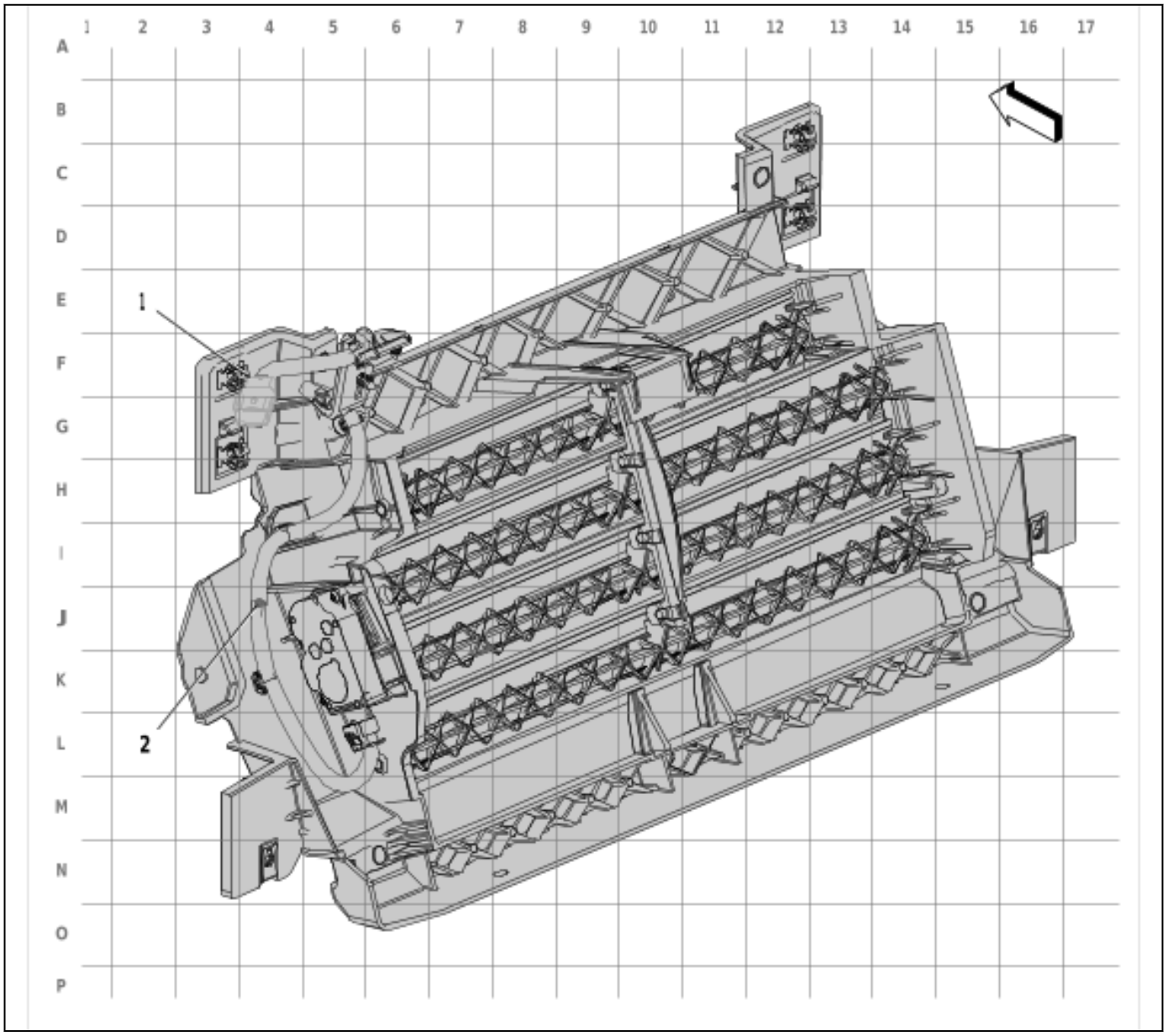
Front View Camera Wiring Harness Routing (GRZ)



7155428

Items
(1) SP650_4 Front View Camera Wiring Harness (GRZ)
(2) X124 Front View Camera Wiring Harness to Body Wiring Harness (GRZ)
(3) X122 Front View Camera Wiring Harness to Body Wiring Harness (UV2)

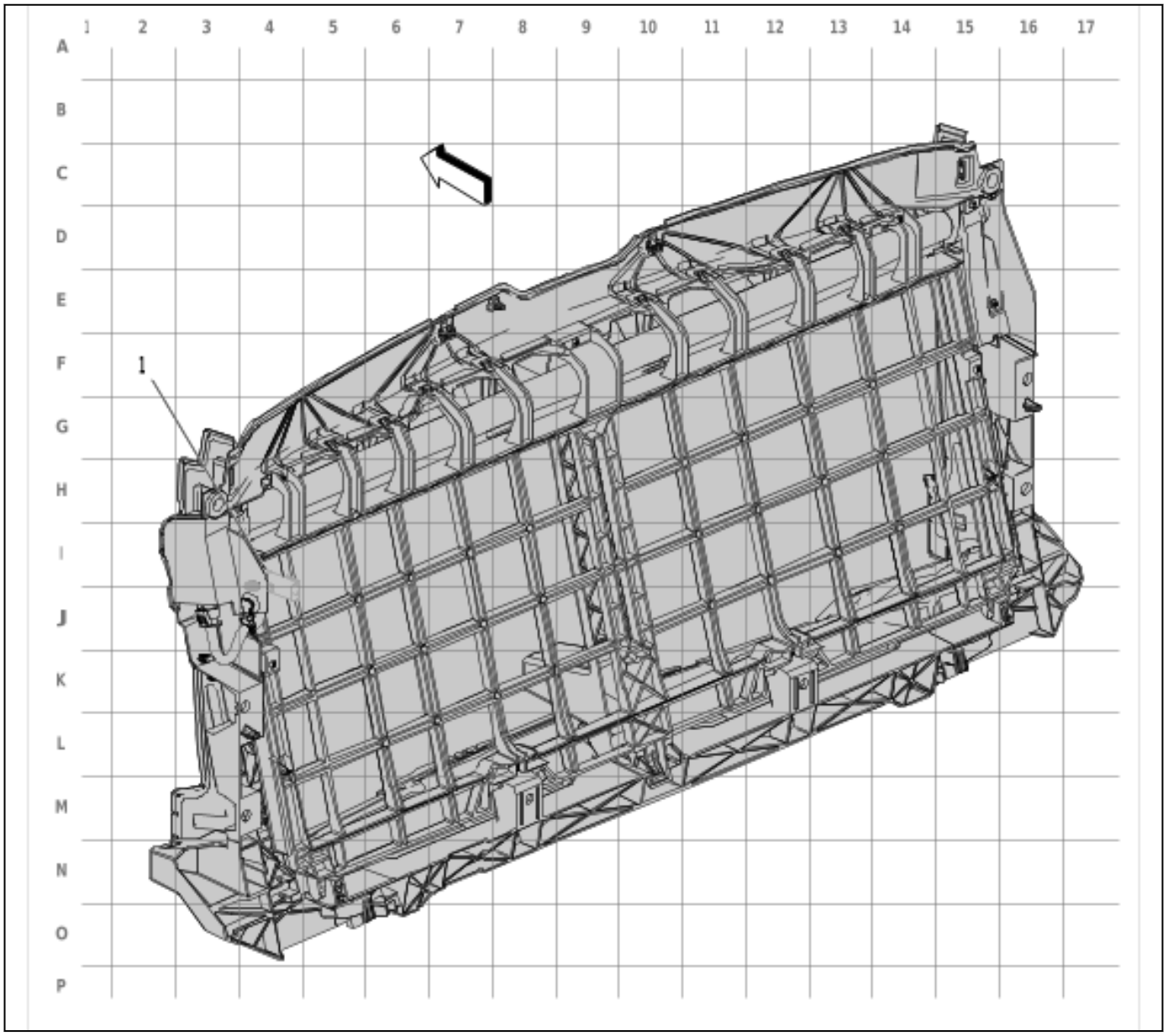
Air Shutter Wiring Harness - Lower Routing (WMI)



7166405

Items
(1) X618L Engine Wiring Harness to Air Shutter Wiring Harness - Lower (WMI)
(2) SP6550_6 Air Shutter Wiring Harness - Lower (WMI)

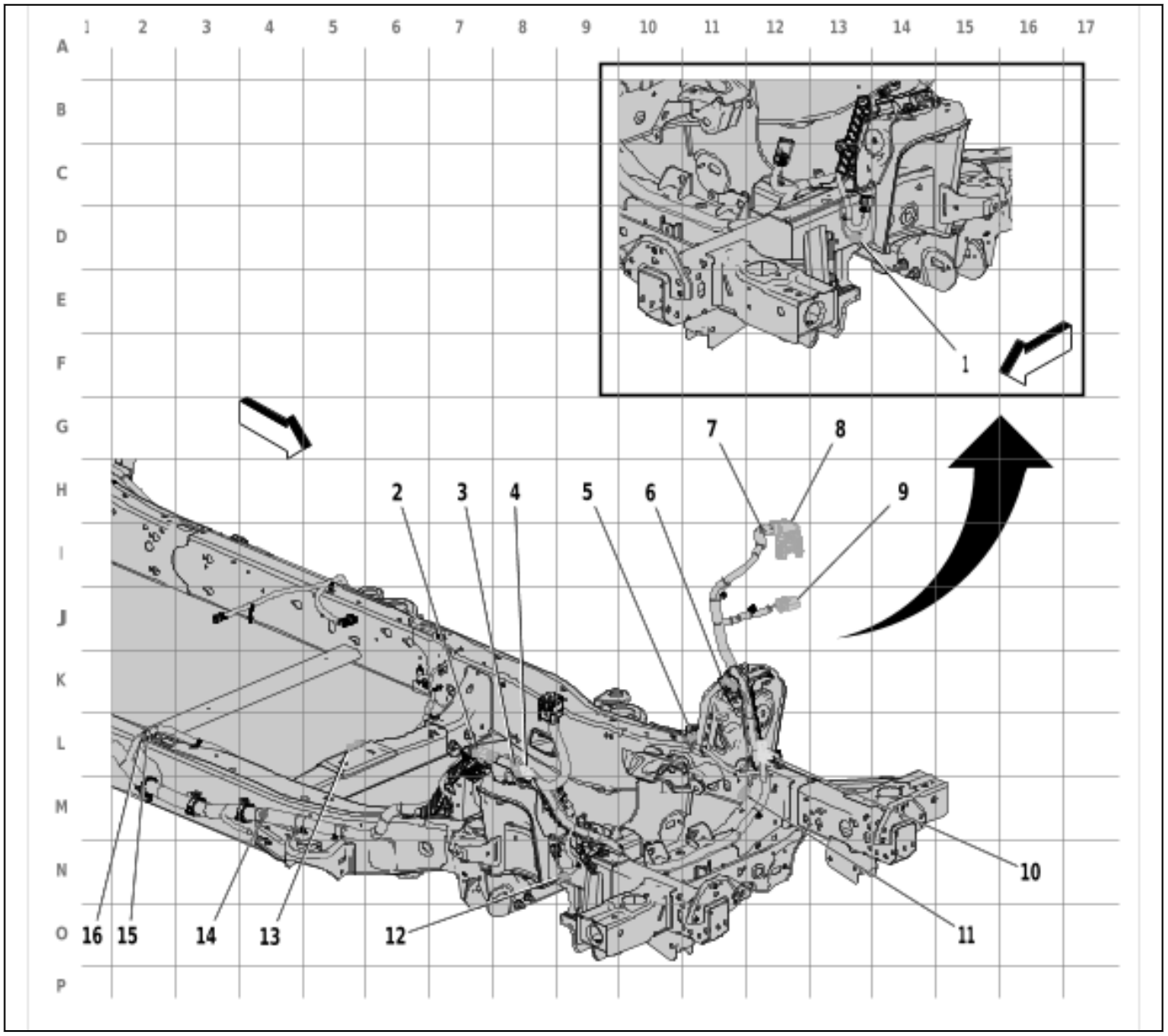
Air Shutter Wiring Harness - Upper Routing (VTI / WMI)



7166406

Items
(1) X618U Engine Wiring Harness to Air Shutter Wiring Harness - Upper (VTI / WMI)

Chassis Wiring Harness Routing - Front

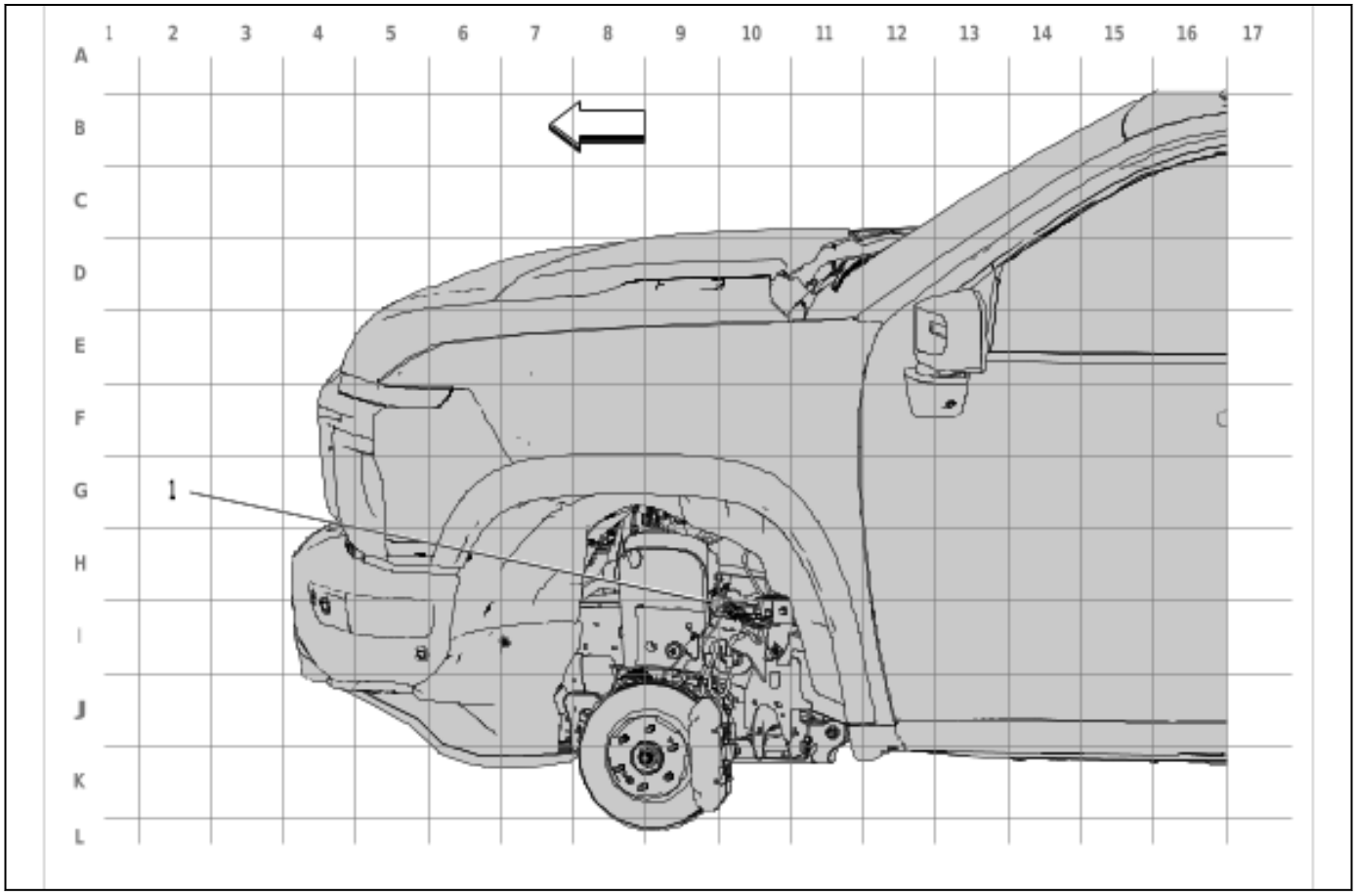


7175708

Items
(1) X416L Chassis Wiring Harness to Electronic Suspension Strut Wiring Harness Extension Harness - Left (Z45)
(2) X424 Body Wiring Harness to Chassis Wiring Harness
(3) X402E Body Wiring Harness to Chassis Wiring Harness (UXA)
(4) X402A Body Wiring Harness to Chassis Wiring Harness
(5) X172 Chassis Wiring Harness to Front Disc Brake Pad Wear Sensor Harness
(6) X416F Front Axle Wiring Harness to Chassis Wiring Harness (G93)
(7) SP10119_7 Chassis Wiring Harness (KC9 / KCA)
(8) X410 Chassis Wiring Harness to Body Wiring Harness
(9) X400 Body Wiring Harness to Chassis Wiring Harness

Items
(10) X401G Engine Wiring Harness to Chassis Wiring Harness (L4B / L76 / L78)
(11) X147 Chassis Wiring Harness to Power Steering Control Module Wiring Harness - Data
(12) X416R Chassis Wiring Harness to Electronic Suspension Strut Wiring Harness Extension Harness - Right (Z45)
(13) X403 Chassis Wiring Harness to Underbody Camera Wiring Harness (UXA)
(14) SP6751 Chassis Wiring Harness (LZ0)
(15) SP4054_3 Chassis Wiring Harness (FHX)
(16) SP4055_3 Chassis Wiring Harness (FHX)

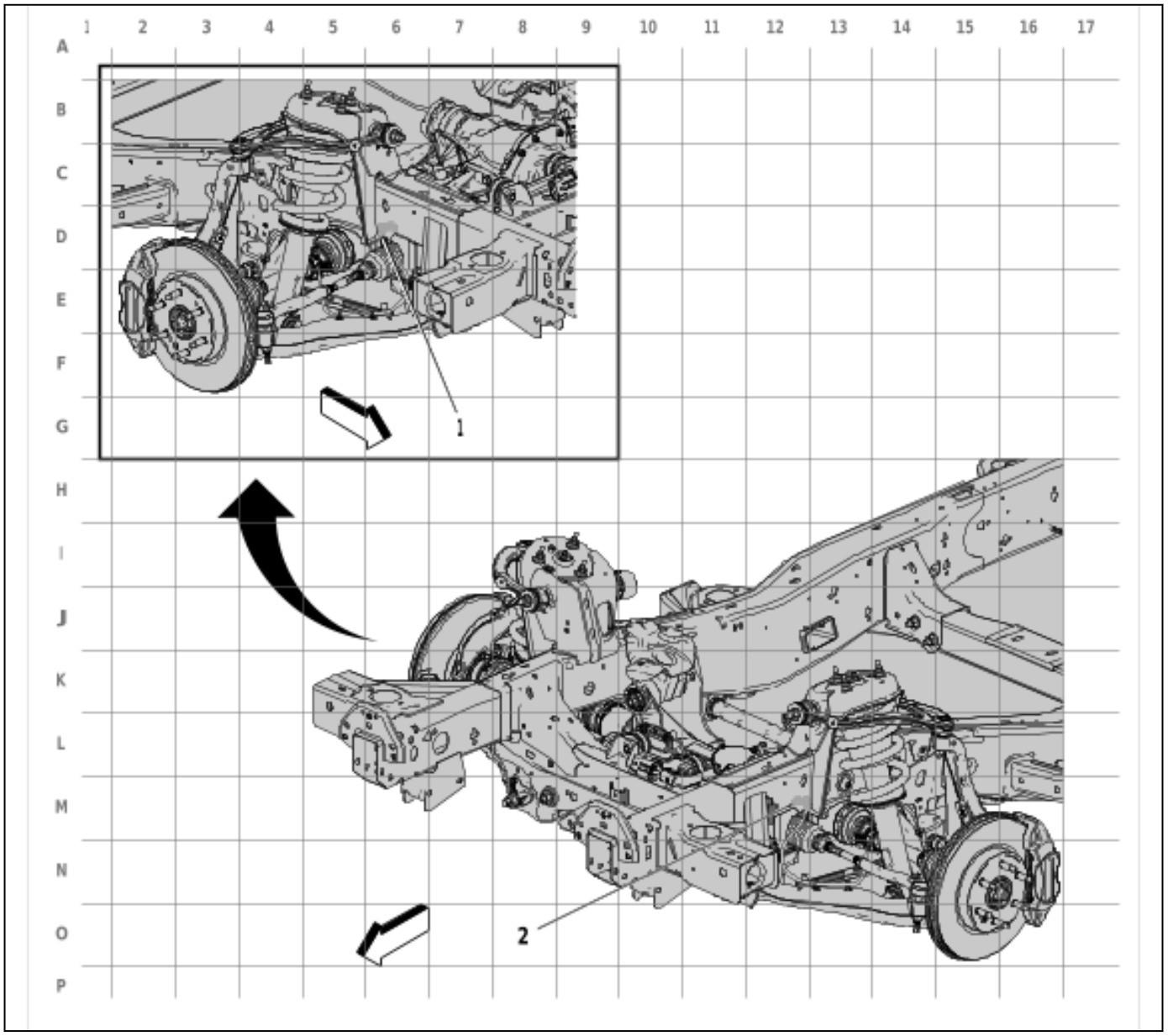
Front Disc Brake Pad Wear Sensor Harness Routing



7188702

Items
(1) X172 Chassis Wiring Harness to Front Disc Brake Pad Wear Sensor Harness

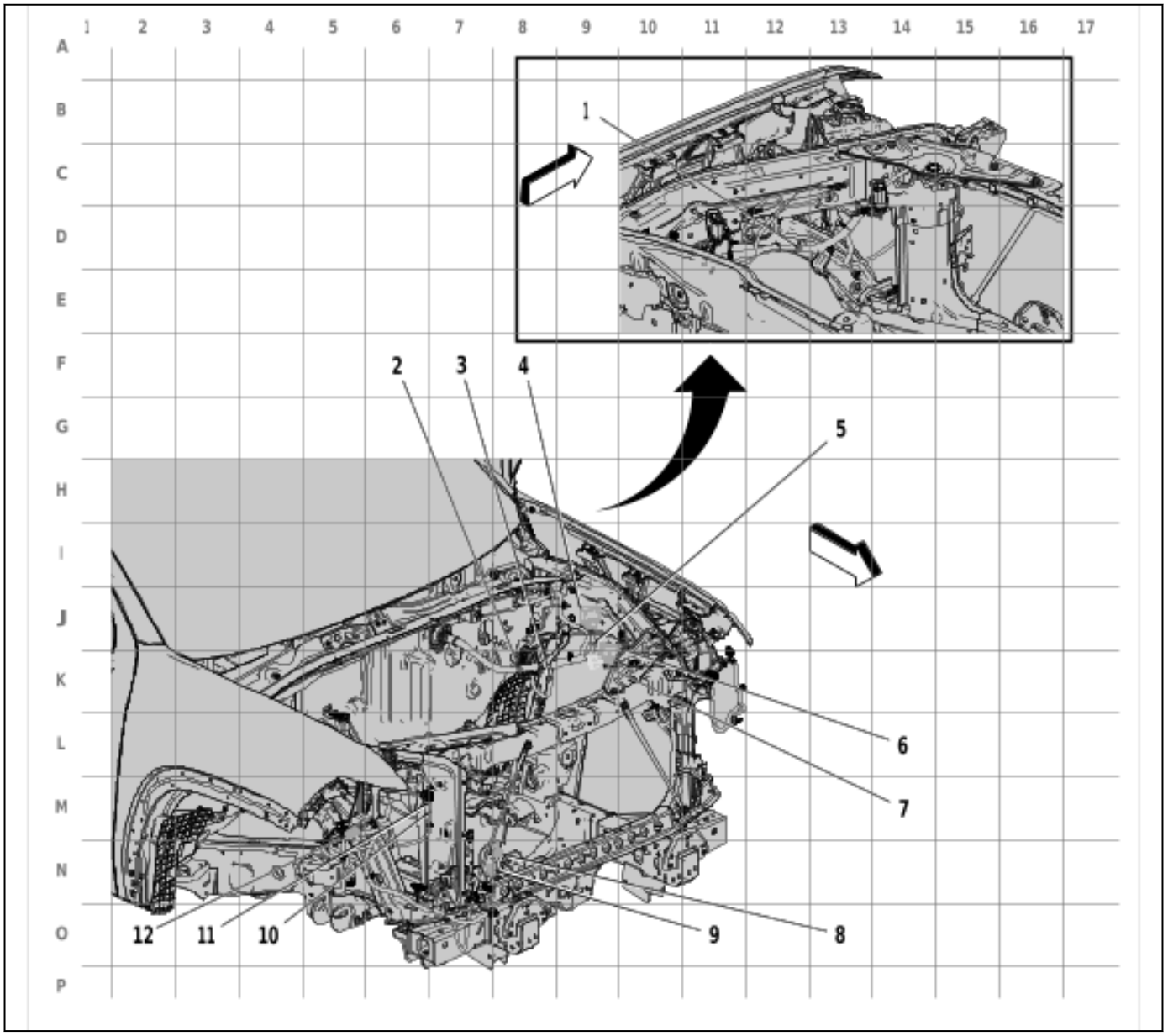
Electronic Suspension Strut Wiring Harness Extension Harness - Left and Right Routing (Z45)



7190454

Items
(1) X416R Chassis Wiring Harness to Electronic Suspension Strut Wiring Harness Extension Harness - Right (Z45)
(2) X416L Chassis Wiring Harness to Electronic Suspension Strut Wiring Harness Extension Harness - Left (Z45)

Body Harness Routing - Engine Compartment Left

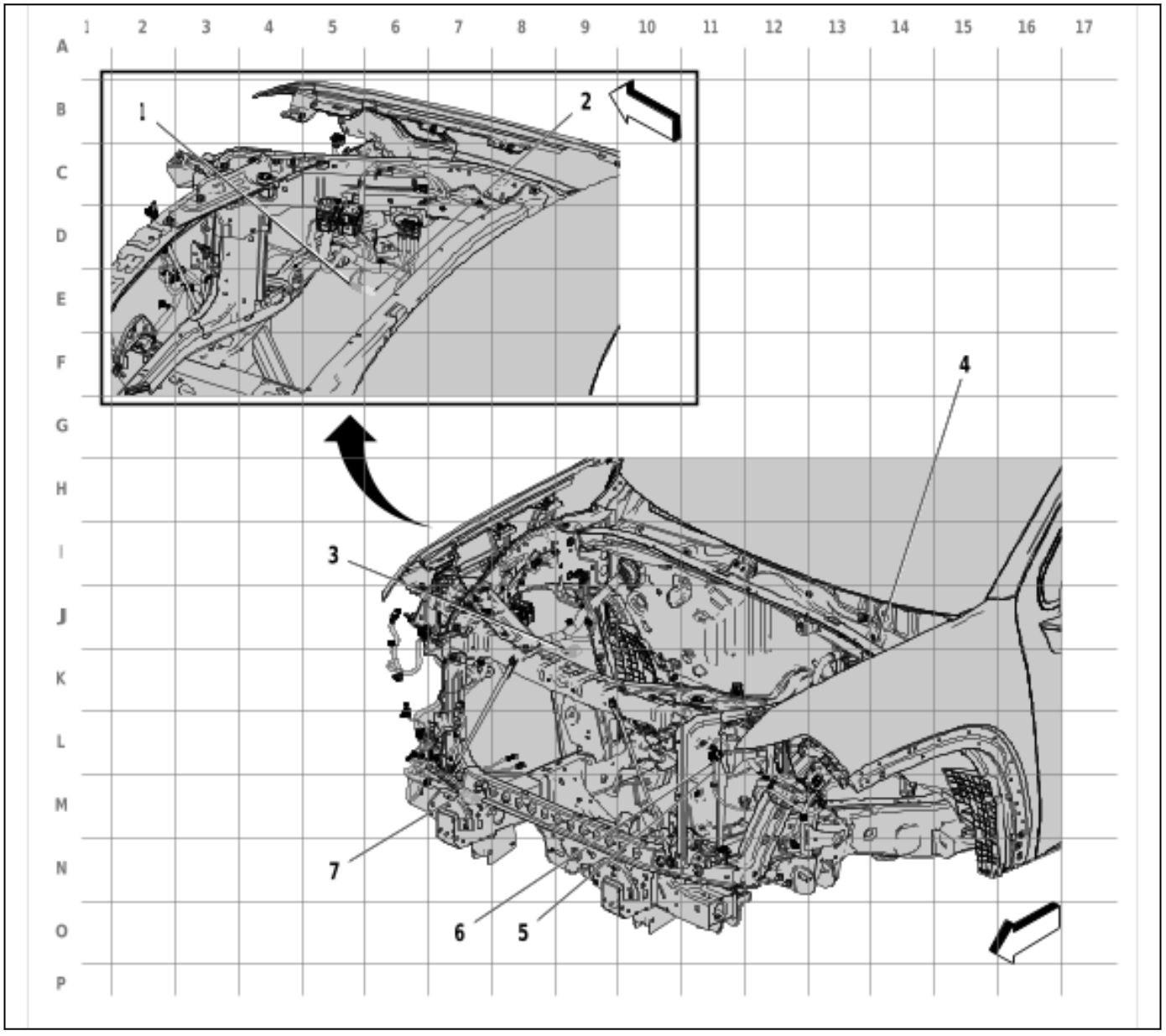


7182714

Items
(1) SP151_1 Body Wiring Harness
(2) SP1642 Body Wiring Harness
(3) SP150 Body Wiring Harness
(4) X410 Chassis Wiring Harness to Body Wiring Harness
(5) SP10119_9 Body Wiring Harness (KC9 / KCA)
(6) X125 Engine Wiring Harness to Body Wiring Harness
(7) X400 Body Wiring Harness to Chassis Wiring Harness
(8) X124 Front View Camera Wiring Harness to Body Wiring Harness (GRZ)
(9) X122 Front View Camera Wiring Harness to Body Wiring Harness (UV2)
(10) SP2024_BD Body Wiring Harness

Items
(11) SP10749_B Body Wiring Harness
(12) X608 Auxiliary Battery Wiring Harness to Body Wiring Harness

Body Harness Routing - Engine Compartment Right

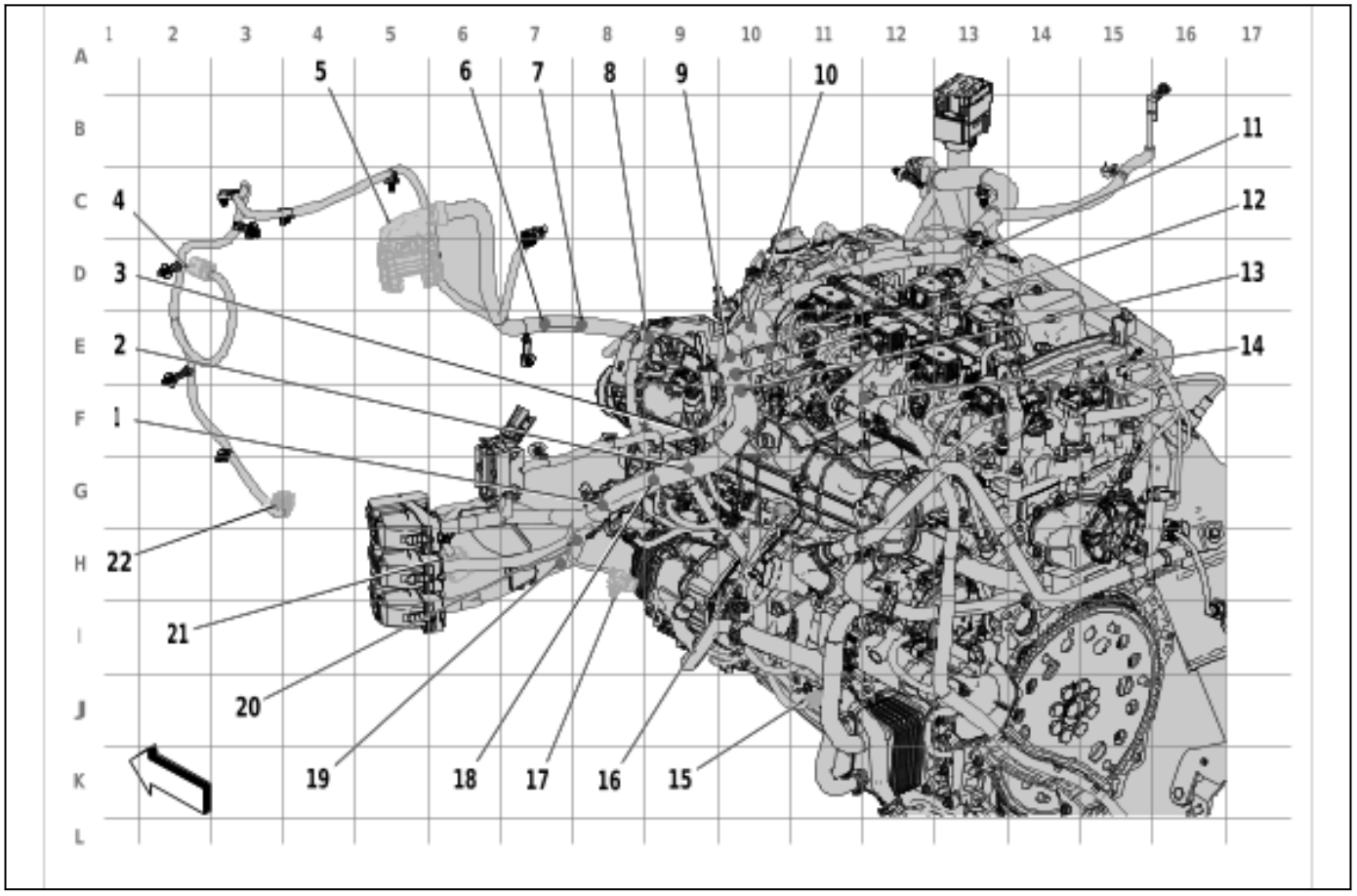


7182715

Items
(1) X402A Body Wiring Harness to Chassis Wiring Harness
(2) X402E Body Wiring Harness to Chassis Wiring Harness (UXA)
(3) X424 Body Wiring Harness to Chassis Wiring Harness
(4) SP150_1 Body Wiring Harness
(5) SP2024_BD Body Wiring Harness

Items
(6) SP10749_B Body Wiring Harness
(7) X150 Front Object Alarm Sensor Wiring Harness to Body Wiring Harness

Engine Harness Routing - Left Rear (L4B)

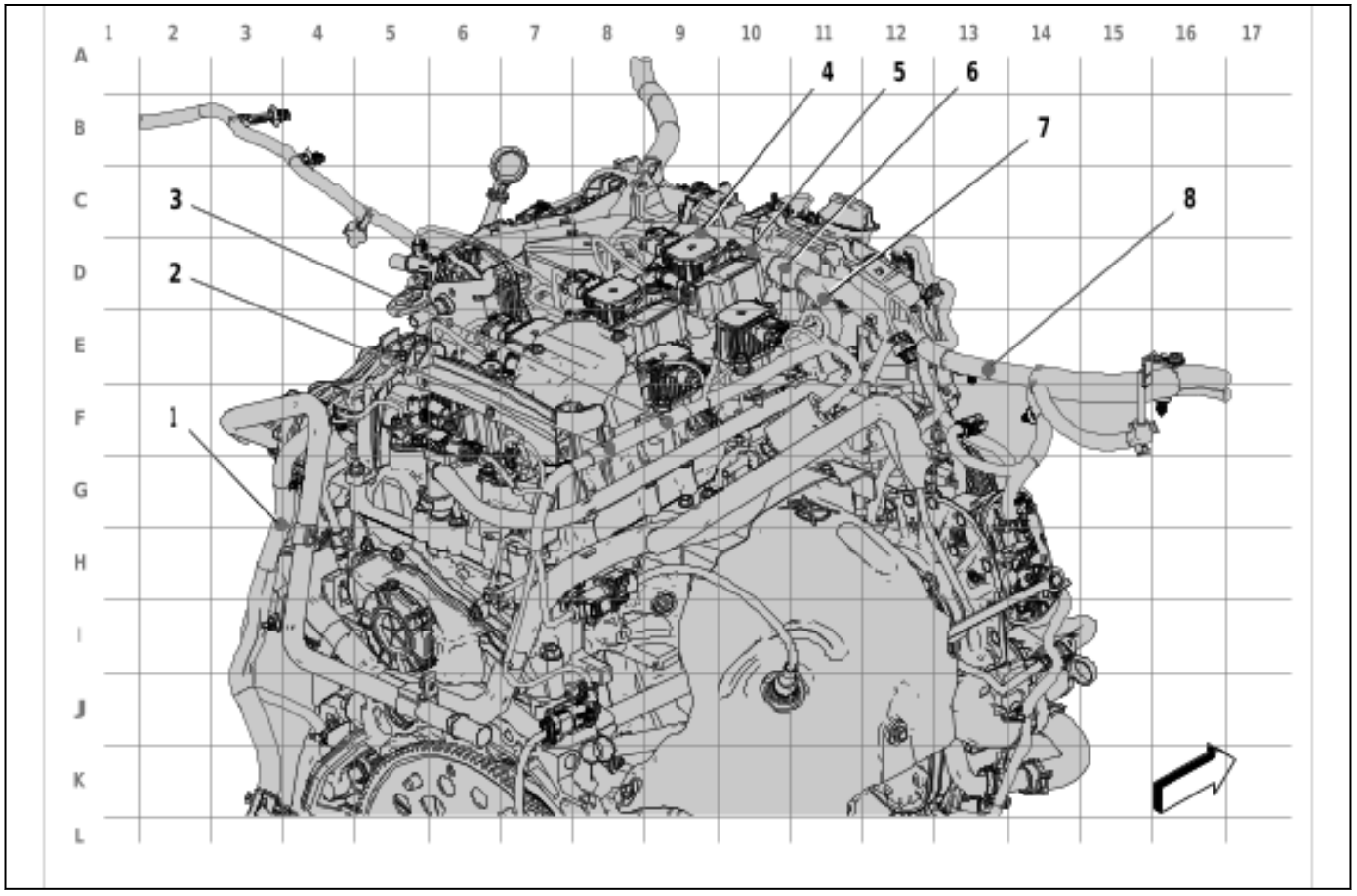


7197790

Items
(1) SP5290_1 Engine Wiring Harness (L4B / L76 / L78)
(2) SP10599 Engine Wiring Harness (L4B / L76 / L78)
(3) SP1552_2 Engine Wiring Harness (F48)
(4) X618U Engine Wiring Harness to Air Shutter Wiring Harness - Upper (VTI / WMI)
(5) X125 Engine Wiring Harness to Body Wiring Harness
(6) SP4621_1 Engine Wiring Harness
(7) SP626_W14 Engine Wiring Harness
(8) SP480_1 Engine Wiring Harness
(9) SP10597 Engine Wiring Harness (L4B / L76 / L78)
(10) SP439_1 Engine Wiring Harness (- L4B / (L4B & F48))
(11) SP5291_2 Engine Wiring Harness (L4B)
(12) SP580_1 Engine Wiring Harness
(13) SP460_1 Engine Wiring Harness
(14) SP2129 Engine Wiring Harness (L4B)
(15) X144 Engine Wiring Harness to Oil Pump Flow Control Solenoid Valve Harness (L4B)

Items
(16) X160G Engine Wiring Harness to Fuel Injector Wiring Harness (L4B)
(17) X415 Front Axle Wiring Harness to Engine Wiring Harness (F48)
(18) SP10807 Engine Wiring Harness (L4B)
(19) SP10808 Engine Wiring Harness (L4B)
(20) SP251_1 Engine Wiring Harness
(21) X401G Engine Wiring Harness to Chassis Wiring Harness (L4B / L76 / L78)
(22) X618L Engine Wiring Harness to Air Shutter Wiring Harness - Lower (WMI)

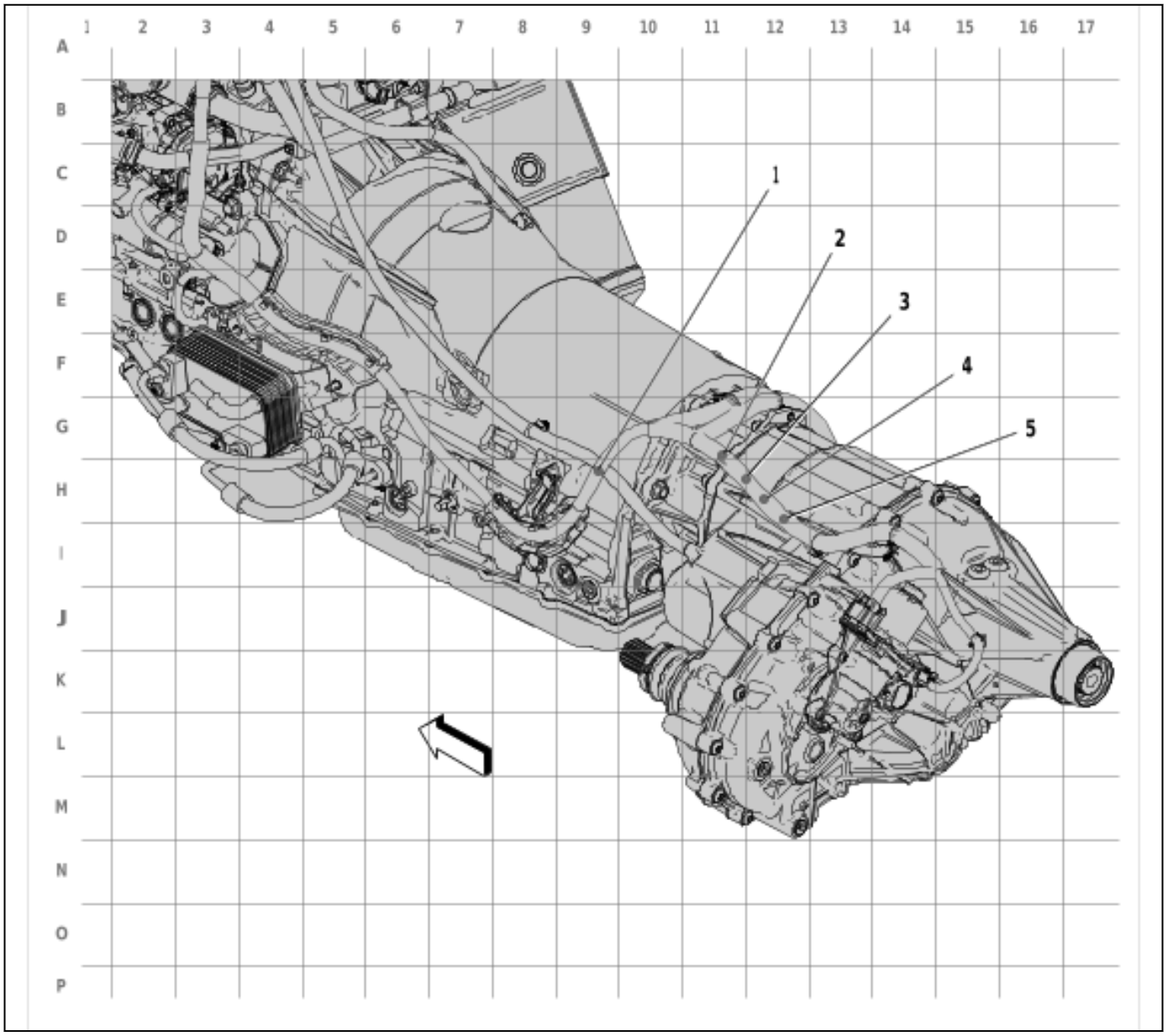
Engine Harness Routing - Right Rear (L4B)



7197791

Items
(1) SP548_1 Engine Wiring Harness
(2) SP5293_4 Engine Wiring Harness (L4B)
(3) SP450_4 Engine Wiring Harness (L4B)
(4) SP10809_1 Engine Wiring Harness (L4B)
(5) SP6450_1 Engine Wiring Harness (L4B / L76 / L78)
(6) SP10667_1 Engine Wiring Harness (L4B / L76 / L78)
(7) SP5293_3 Engine Wiring Harness (L4B)
(8) SP625_3 Engine Wiring Harness

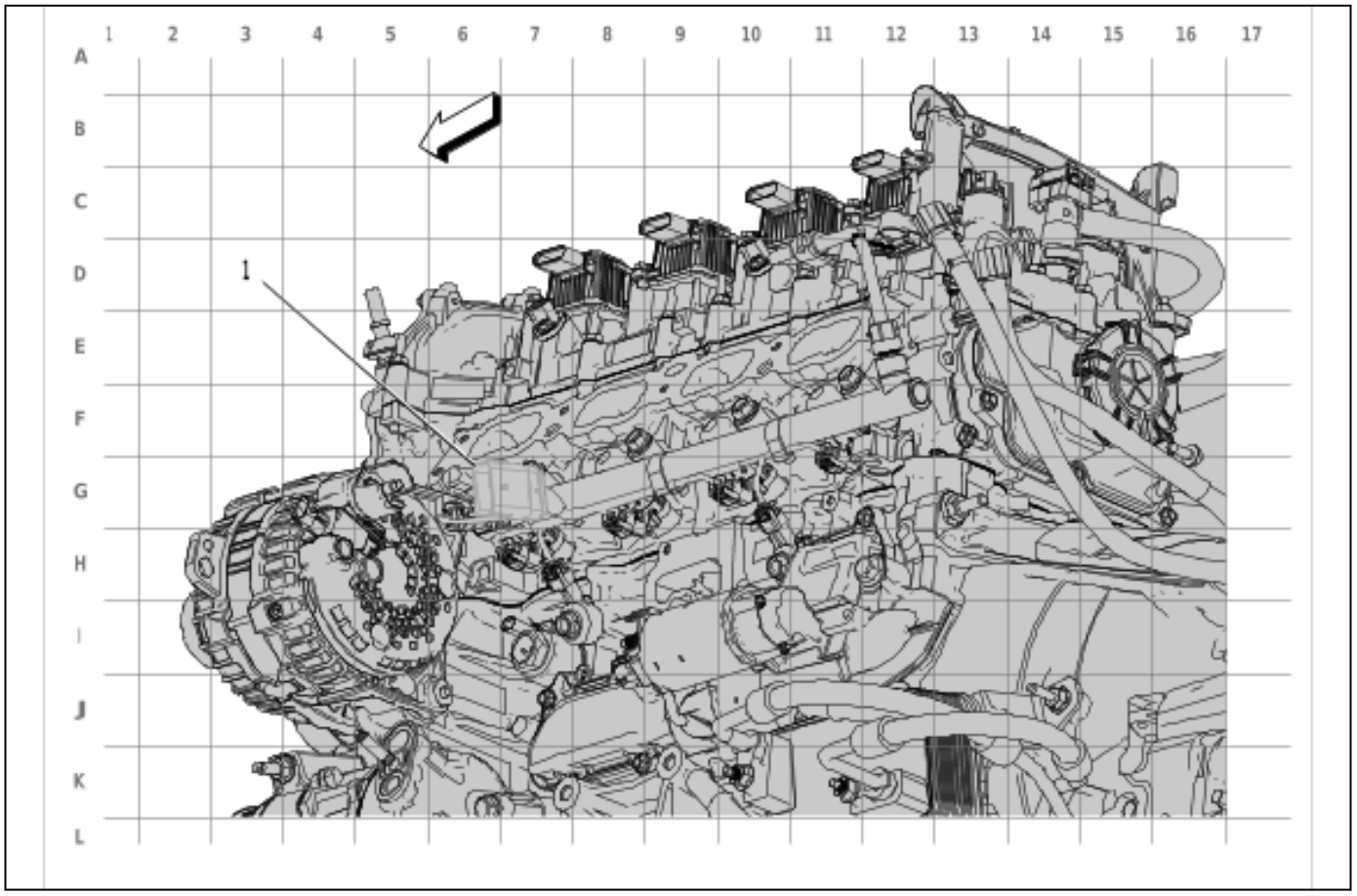
Engine Harness Routing - Transmission Area (L4B)



7163705

Items
(1) SP5294_4 Engine Wiring Harness
(2) SP1552_1 Engine Wiring Harness (F48)
(3) SP1553_1 Engine Wiring Harness (F48)
(4) SP8015_1 Engine Wiring Harness (F48)
(5) SP8014_1 Engine Wiring Harness (F48)

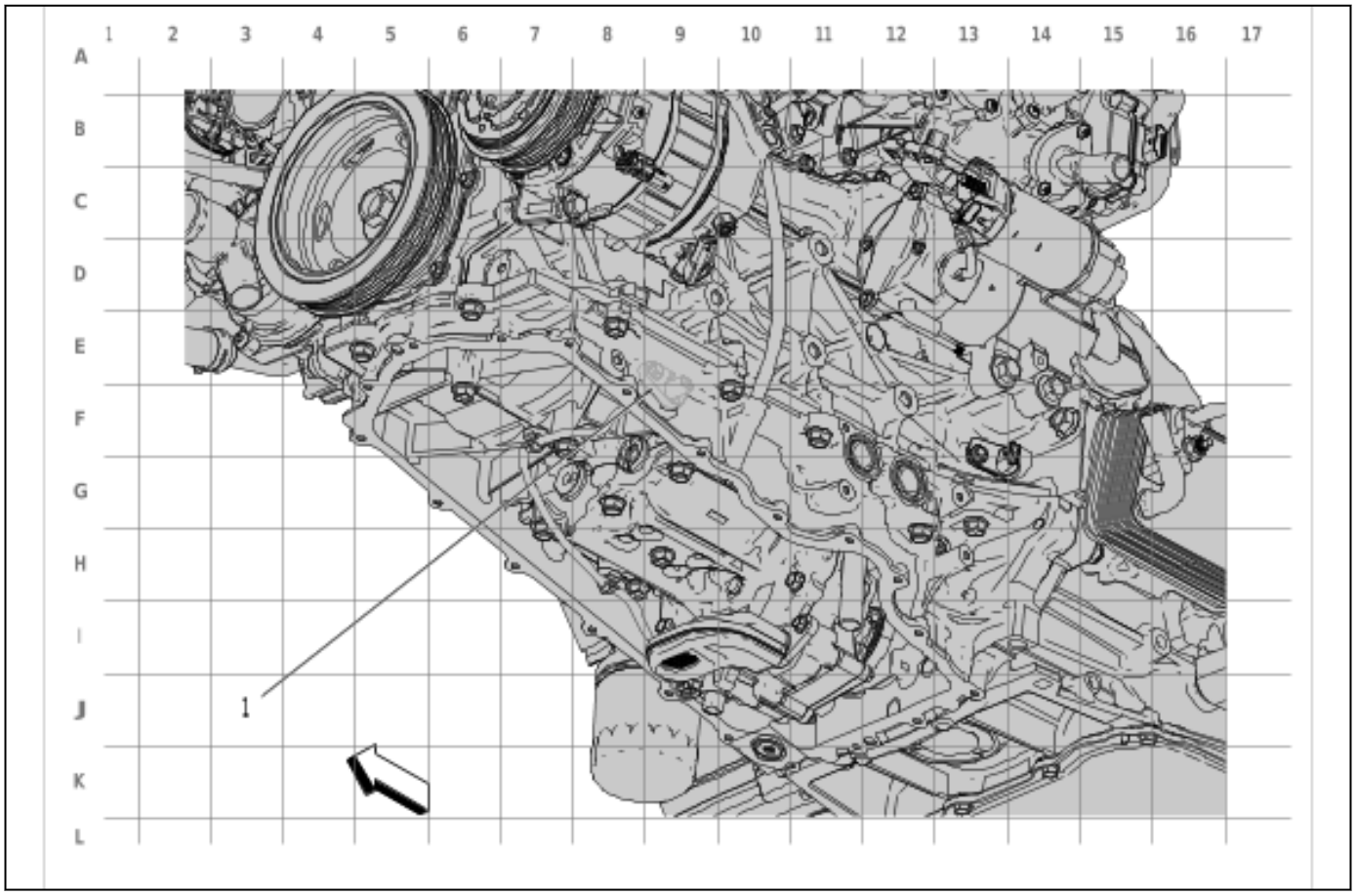
Fuel Injector Wiring Harness Routing (L4B)



7166340

Items
(1) X160G Engine Wiring Harness to Fuel Injector Wiring Harness (L4B)

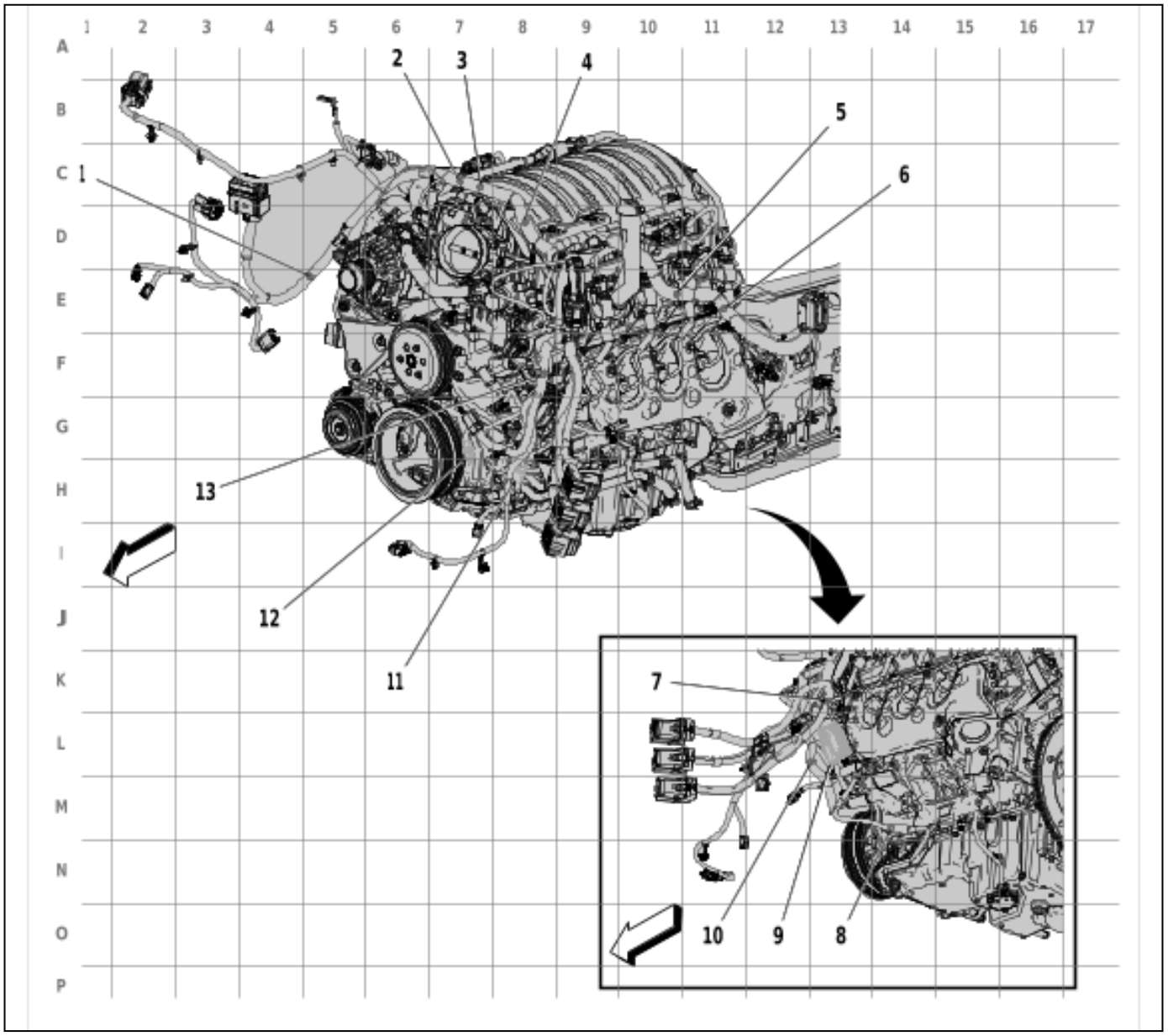
Oil Pump Flow Control Solenoid Valve Harness Routing (L4B)



7166341

Items
(1) X144 Engine Wiring Harness to Oil Pump Flow Control Solenoid Valve Harness (L4B)

Engine Harness Routing - Left Front (L76 / L78)

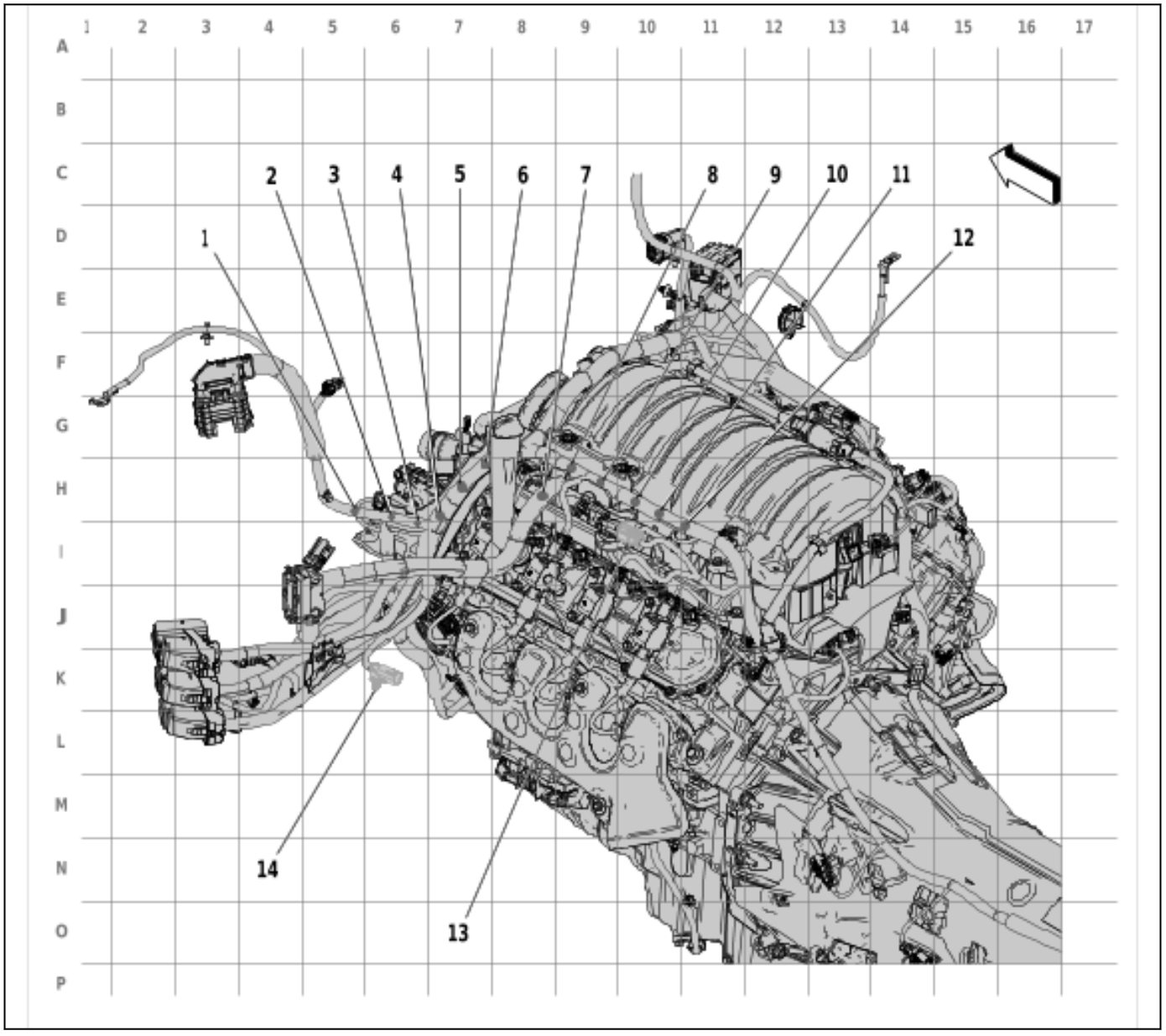


7163706

Items
(1) SP5294_5 Engine Wiring Harness (L76 / L78)
(2) SP4621_1 Engine Wiring Harness
(3) SP439_1 Engine Wiring Harness (- L4B / (L4B & F48))
(4) SP5290_1 Engine Wiring Harness (L4B / L76 / L78)
(5) SP8015_1 Engine Wiring Harness (F48)
(6) SP8014_1 Engine Wiring Harness (F48)
(7) SP580_1 Engine Wiring Harness
(8) SP450 Engine Wiring Harness (L76 / L78)
(9) X961 Engine Wiring Harness to Engine Wiring Harness Extension Harness (L76 / L78)
(10) SP548_1 Engine Wiring Harness
(11) X401G Engine Wiring Harness to Chassis Wiring Harness (L4B / L76 / L78)

Items
(12) X676V Engine Wiring Harness to Heater Coolant Pump Wiring Harness (L76 / L78)
(13) SP460_1 Engine Wiring Harness

Engine Harness Routing - Left Rear (L76 / L78)

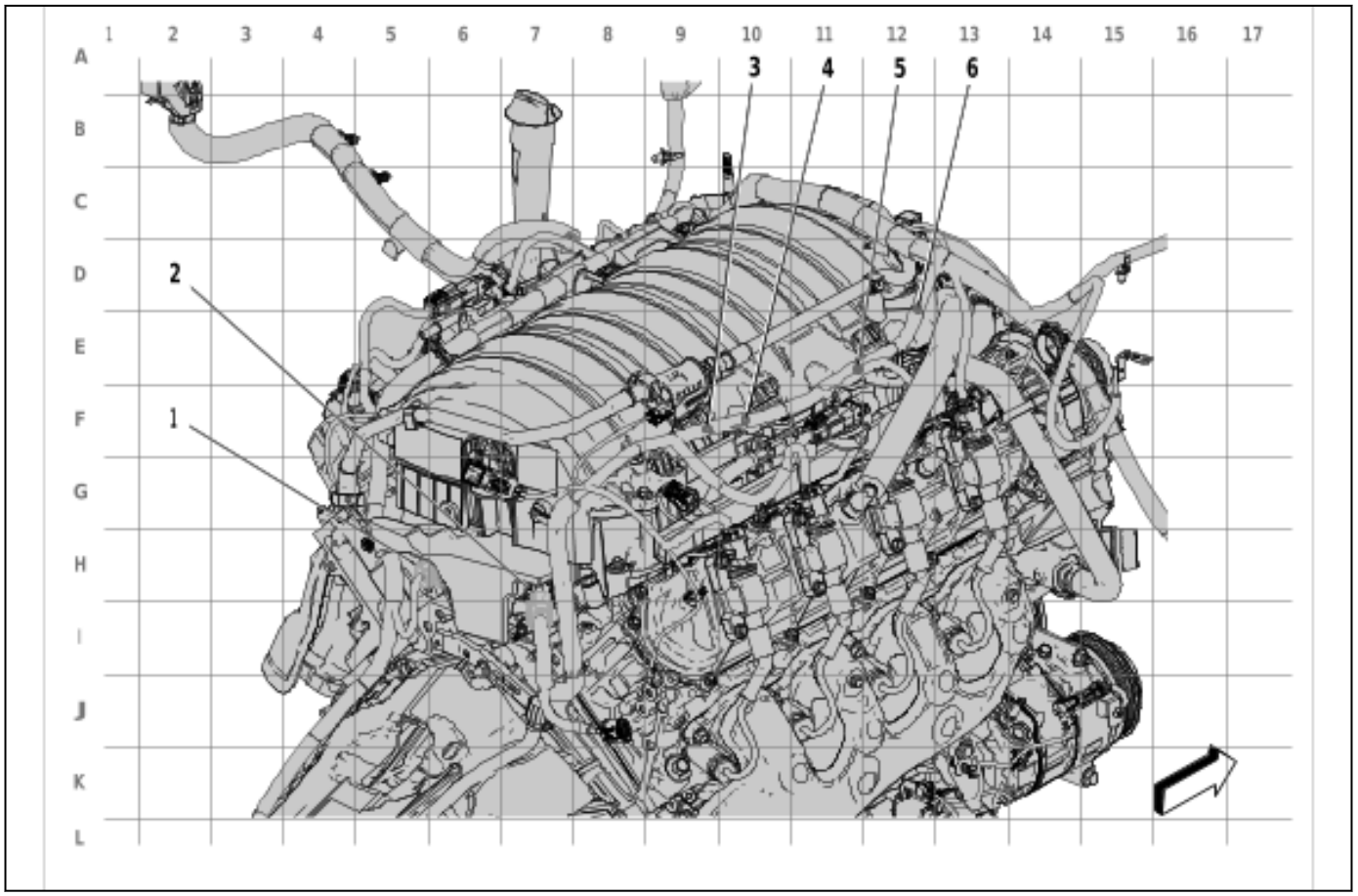


7163707

Items
(1) SP251_1 Engine Wiring Harness
(2) SP625_3 Engine Wiring Harness
(3) SP4622_L7 Engine Wiring Harness (L76 / L78)
(4) SP480_1 Engine Wiring Harness
(5) SP626_W14 Engine Wiring Harness
(6) SP10597 Engine Wiring Harness (L4B / L76 / L78)
(7) SP1552_2 Engine Wiring Harness (F48)
(8) SP2129_L7 Engine Wiring Harness (L76 / L78)

Items
(9) SP5291_1 Engine Wiring Harness (L76 / L78)
(10) SP10599 Engine Wiring Harness (L4B / L76 / L78)
(11) SP10667_1 Engine Wiring Harness (L4B / L76 / L78)
(12) SP6150_1 Engine Wiring Harness (L76 / L78)
(13) X160VP Engine Wiring Harness to Fuel Injector Wiring Harness - Bank 1 Port (L76 / L78)
(14) X415 Front Axle Wiring Harness to Engine Wiring Harness (F48)

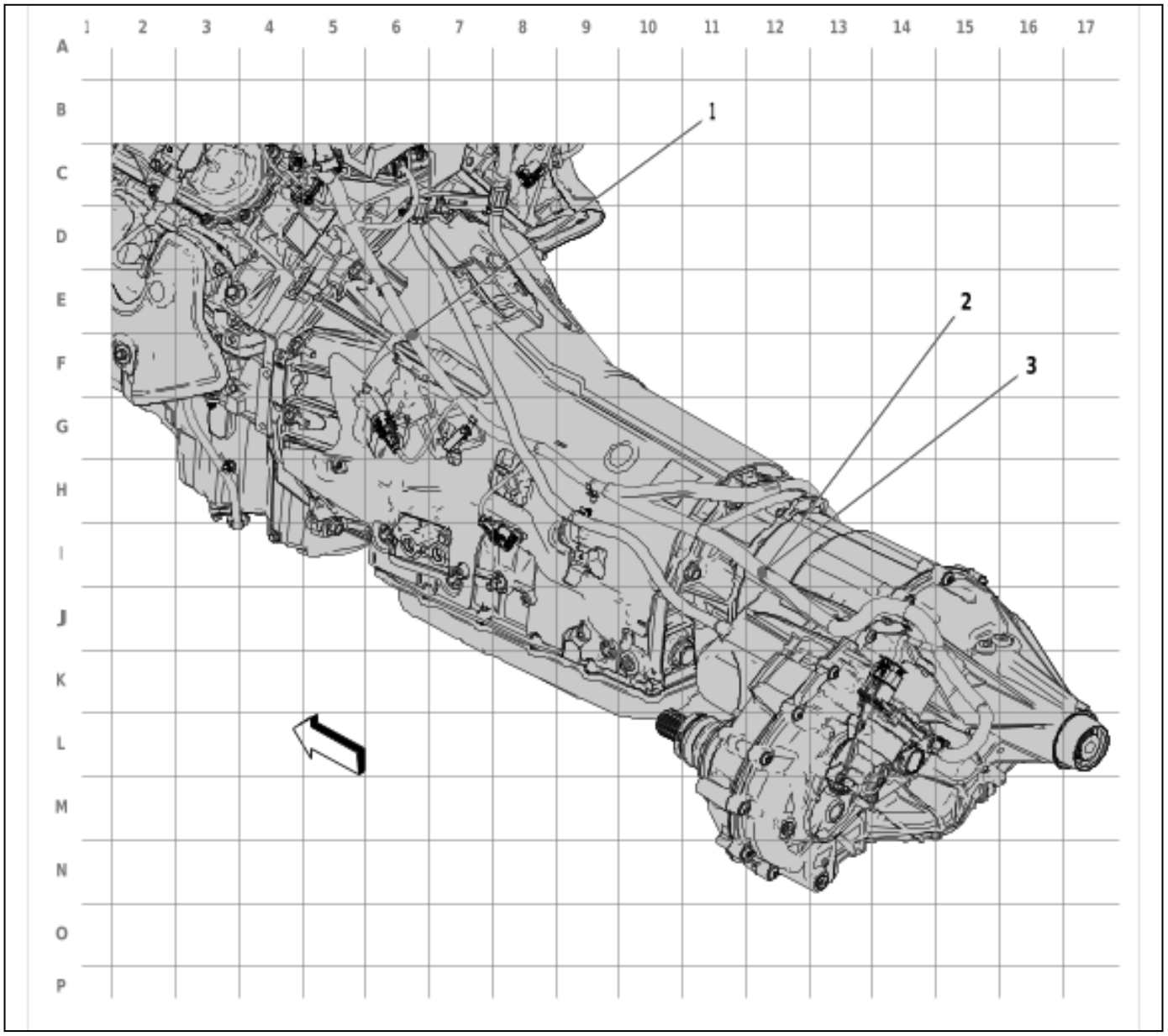
Engine Harness Routing - Right Rear (L76 / L78)



7163708

Items
(1) X160VD Engine Wiring Harness to Fuel Injector Wiring Harness - Bank 1 Direct (L76 / L78)
(2) X161VD Engine Wiring Harness to Fuel Injector Wiring Harness - Bank 2 Direct (L76 / L78)
(3) SP2130_L7 Engine Wiring Harness (L76 / L78)
(4) SP6450_1 Engine Wiring Harness (L4B / L76 / L78)
(5) SP5292_1 Engine Wiring Harness (L76 / L78)
(6) SP5293_1 Engine Wiring Harness (L76 / L78)

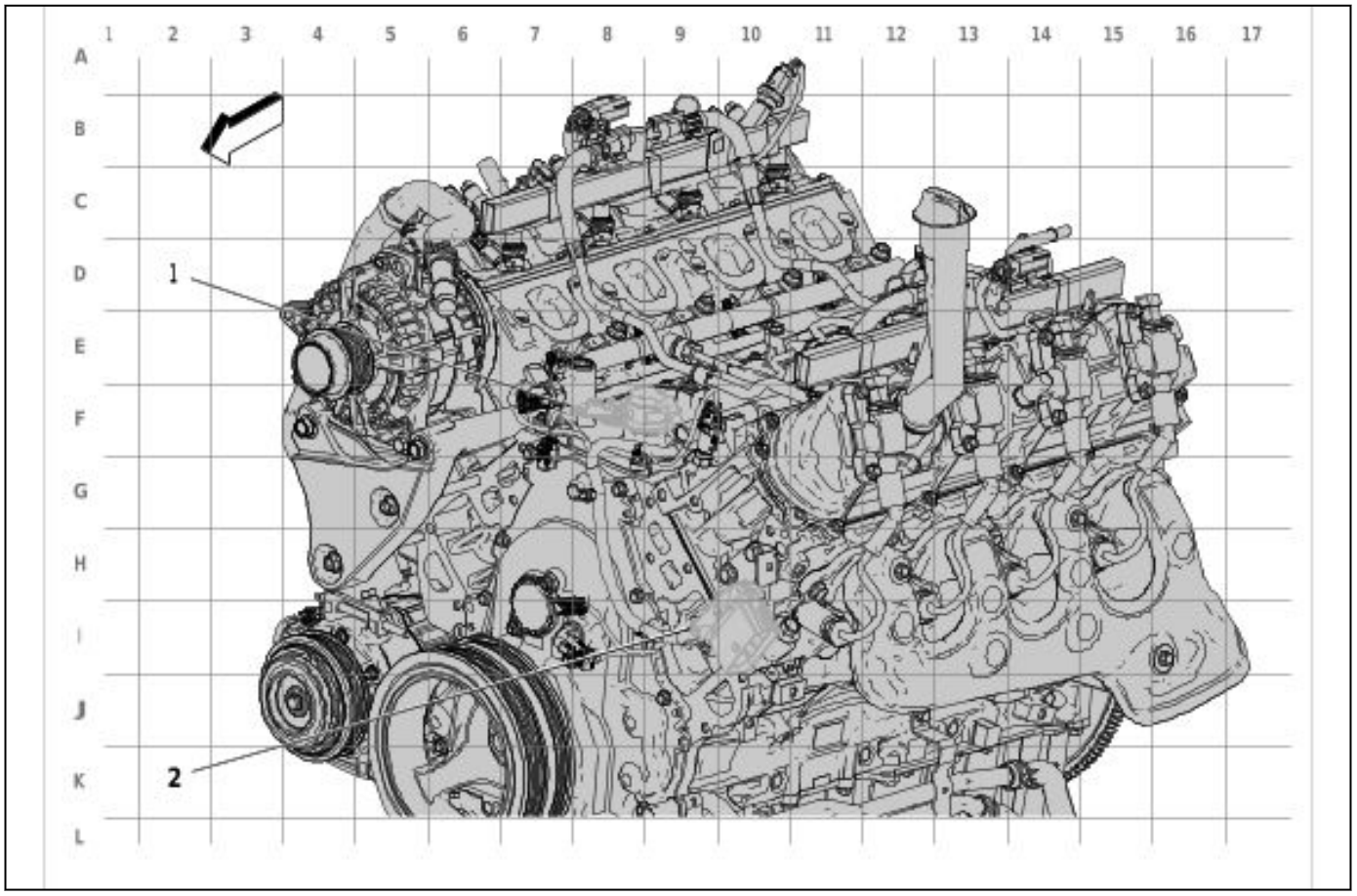
Engine Harness Routing - Transmission Area (L76 / L78)



7163709

Items
(1) SP5294_4 Engine Wiring Harness
(2) SP1552_1 Engine Wiring Harness (F48)
(3) SP1553_1 Engine Wiring Harness (F48)

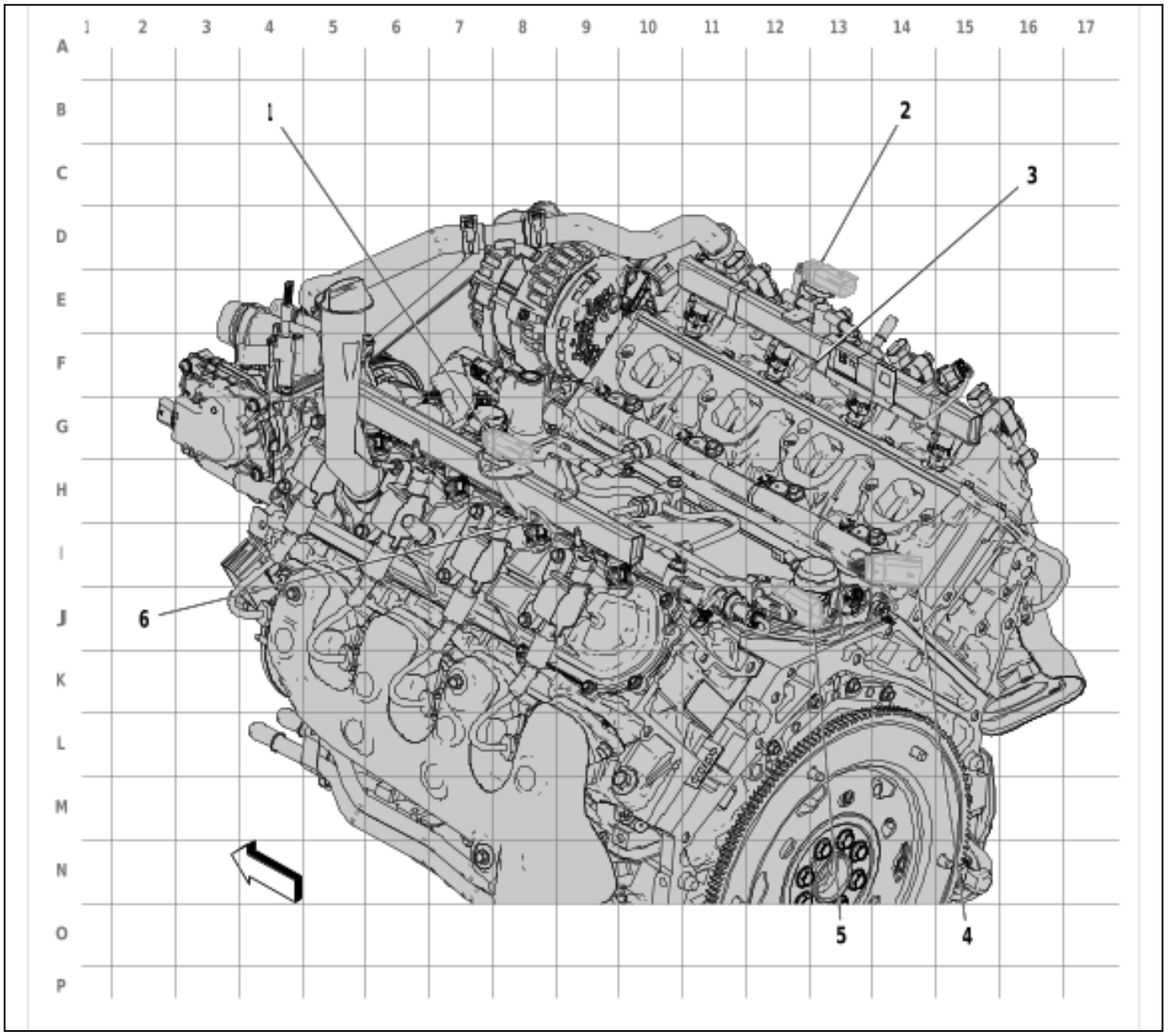
Engine Wiring Harness Extension Harness Routing (L76 / L78)



7166342

Items
(1) X963 Engine Wiring Harness Extension Harness to Valve Rocker Arm Oil Control Valve Harness (L76 / L78)
(2) X961 Engine Wiring Harness to Engine Wiring Harness Extension Harness (L76 / L78)

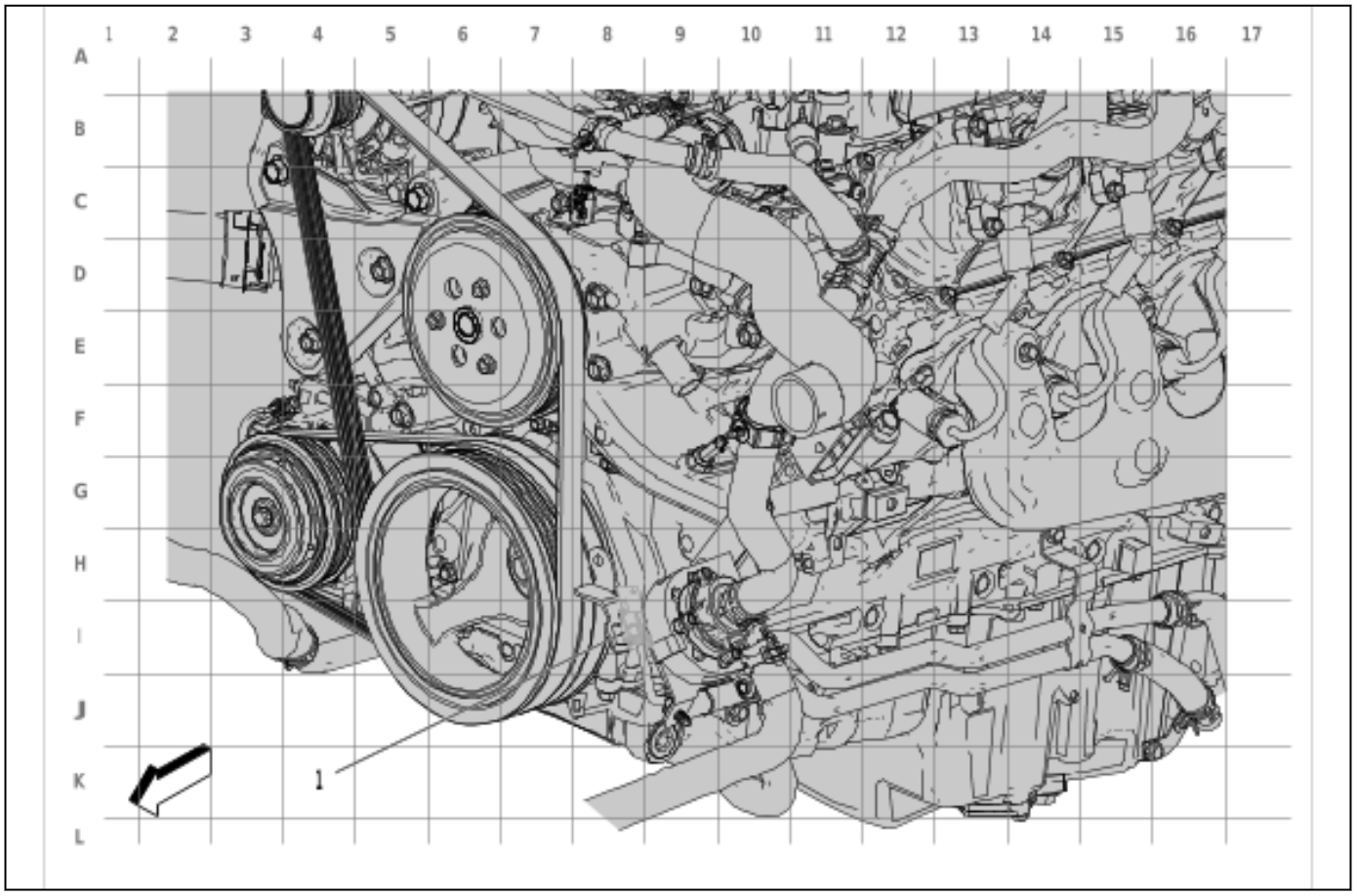
Fuel Injector Wiring Harnesses Routing (L76 / L78)



7166343

Items
(1) X160VP Engine Wiring Harness to Fuel Injector Wiring Harness - Bank 1 Port (L76 / L78)
(2) X161VP Engine Wiring Harness to Fuel Injector Wiring Harness - Bank 2 Port (L76 / L78)
(3) SP5292_2 Fuel Injector Wiring Harness - Bank 2 Port (L76 / L78)
(4) X161VD Engine Wiring Harness to Fuel Injector Wiring Harness - Bank 2 Direct (L76 / L78)
(5) X160VD Engine Wiring Harness to Fuel Injector Wiring Harness - Bank 1 Direct (L76 / L78)
(6) SP5291_3 Fuel Injector Wiring Harness - Bank 1 Port (L76 / L78)

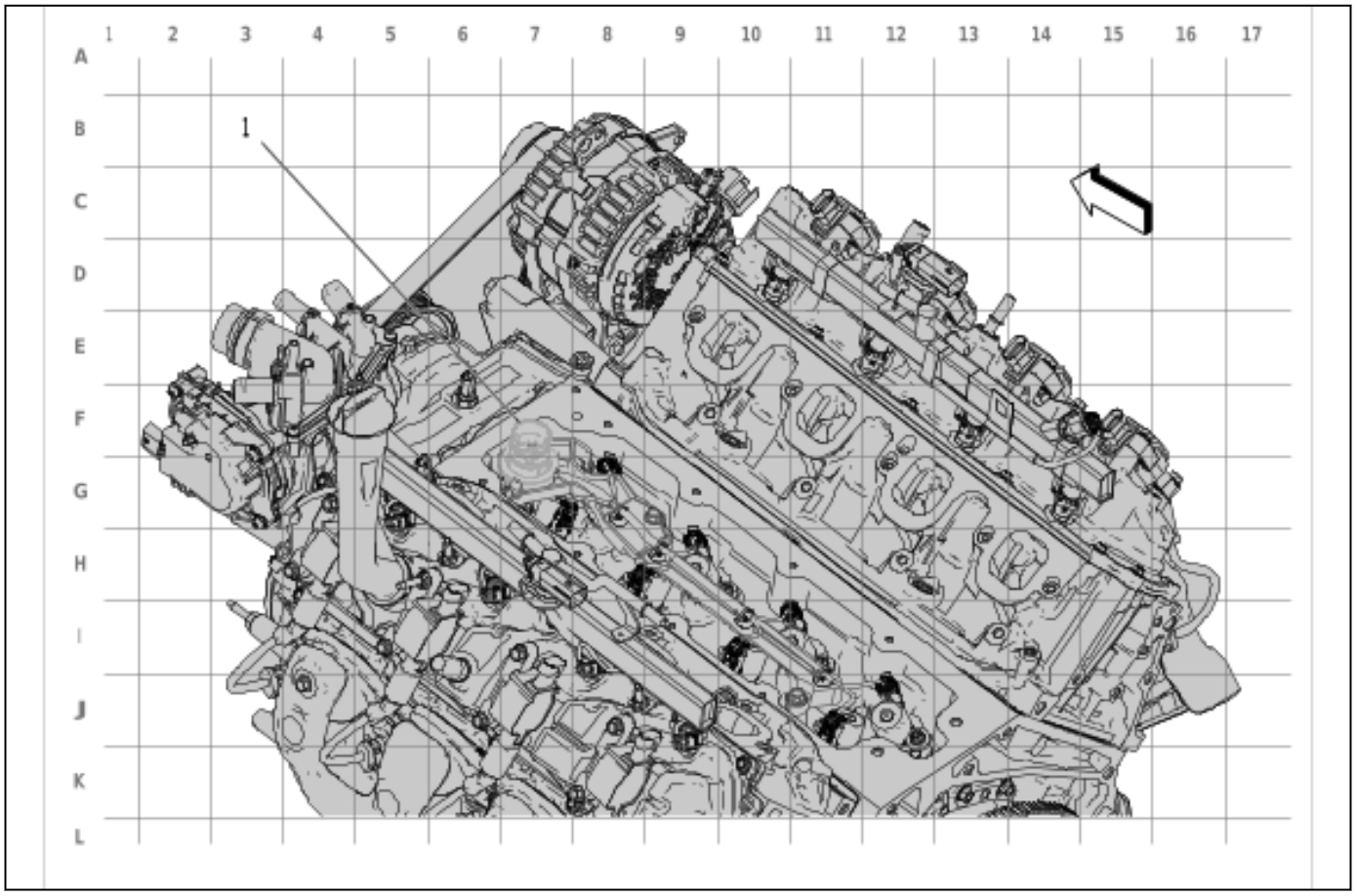
Heater Coolant Pump Wiring Harness Routing (L76 / L78)



7166344

Items
(1) X676V Engine Wiring Harness to Heater Coolant Pump Wiring Harness (L76 / L78)

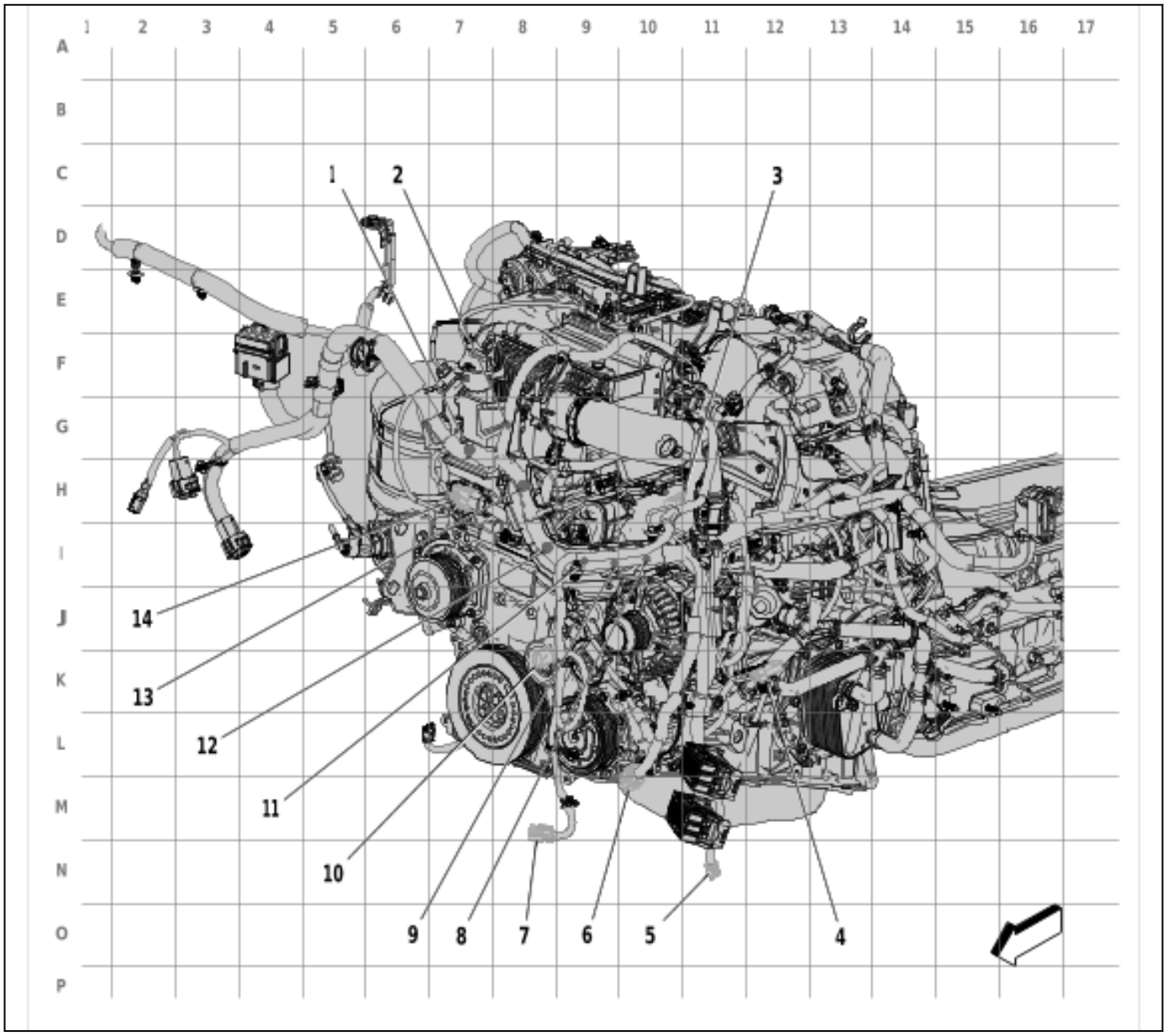
Valve Rocker Arm Oil Control Valve Harness Routing (L76 / L78)



7166345

Items
(1) X963 Engine Wiring Harness Extension Harness to Valve Rocker Arm Oil Control Valve Harness (L76 / L78)

Engine Harness Routing - Left Front (LZ0)

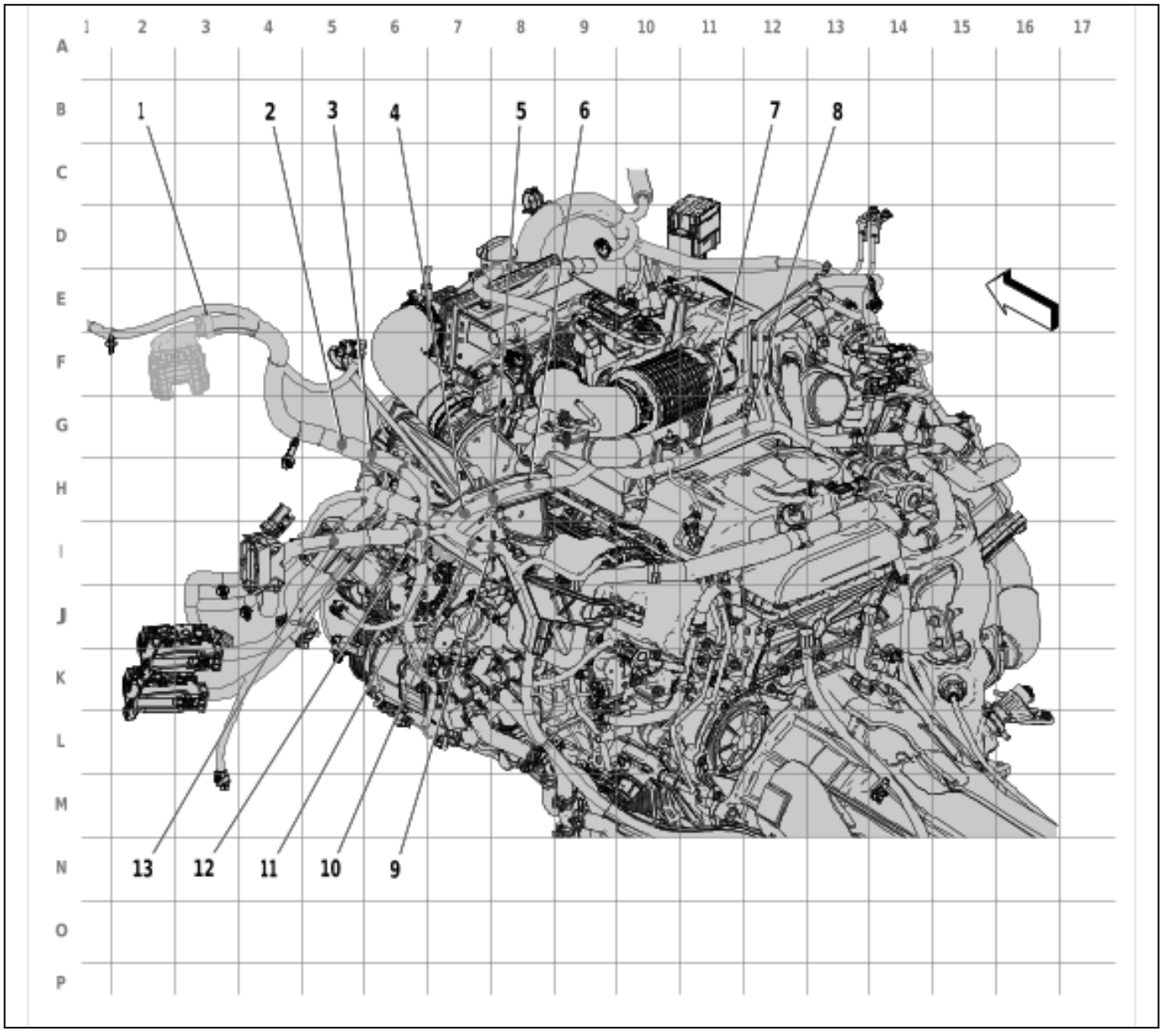


7163710

Items
(1) SP4320_7 Engine Wiring Harness (FHX)
(2) SP439_1 Engine Wiring Harness (- L4B / (L4B & F48))
(3) X163 Engine Wiring Harness to Diesel Glow Plug Wiring Harness (LZ0)
(4) X415 Front Axle Wiring Harness to Engine Wiring Harness (F48)
(5) X676D Engine Wiring Harness to Charge Air Cooler Pump Wiring Harness (LZ0)
(6) X401D Engine Wiring Harness to Chassis Wiring Harness (LZ0)
(7) X618L Engine Wiring Harness to Air Shutter Wiring Harness - Lower (WMI)
(8) SP5294_4 Engine Wiring Harness
(9) SP4621_1 Engine Wiring Harness

Items
(10) X618U Engine Wiring Harness to Air Shutter Wiring Harness - Upper (VTI / WMI)
(11) SP4055_4 Engine Wiring Harness (FHX)
(12) SP4623 Engine Wiring Harness (LZ0)
(13) SP625_3 Engine Wiring Harness
(14) X160D Engine Wiring Harness to Fuel Injector Wiring Harness (LZ0)

Engine Harness Routing - Left Rear (LZ0)

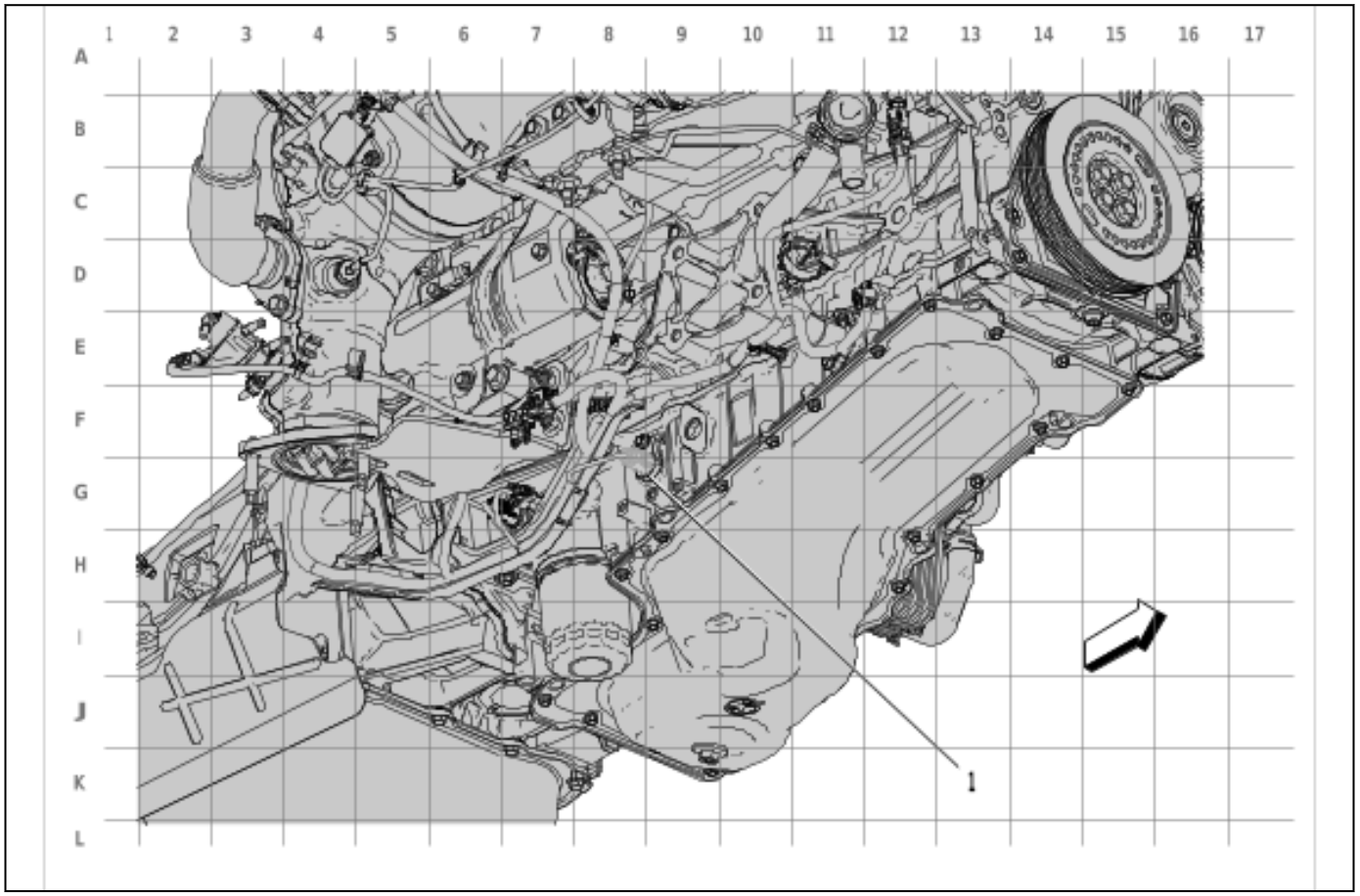


7163711

Items
(1) X125 Engine Wiring Harness to Body Wiring Harness
(2) SP251_1 Engine Wiring Harness
(3) SP4054_4 Engine Wiring Harness (FHX)
(4) SP548_1 Engine Wiring Harness

Items
(5) SP460_1 Engine Wiring Harness
(6) SP626_W14 Engine Wiring Harness
(7) SP548_2 Engine Wiring Harness (LZ0)
(8) SP4622_LZ Engine Wiring Harness (LZ0)
(9) SP480_1 Engine Wiring Harness
(10) SP580_1 Engine Wiring Harness
(11) X944 Engine Wiring Harness to Engine Coolant Temperature Sensor Harness (LZ0)
(12) SP8014_1 Engine Wiring Harness (F48)
(13) SP1552_2 Engine Wiring Harness (F48)

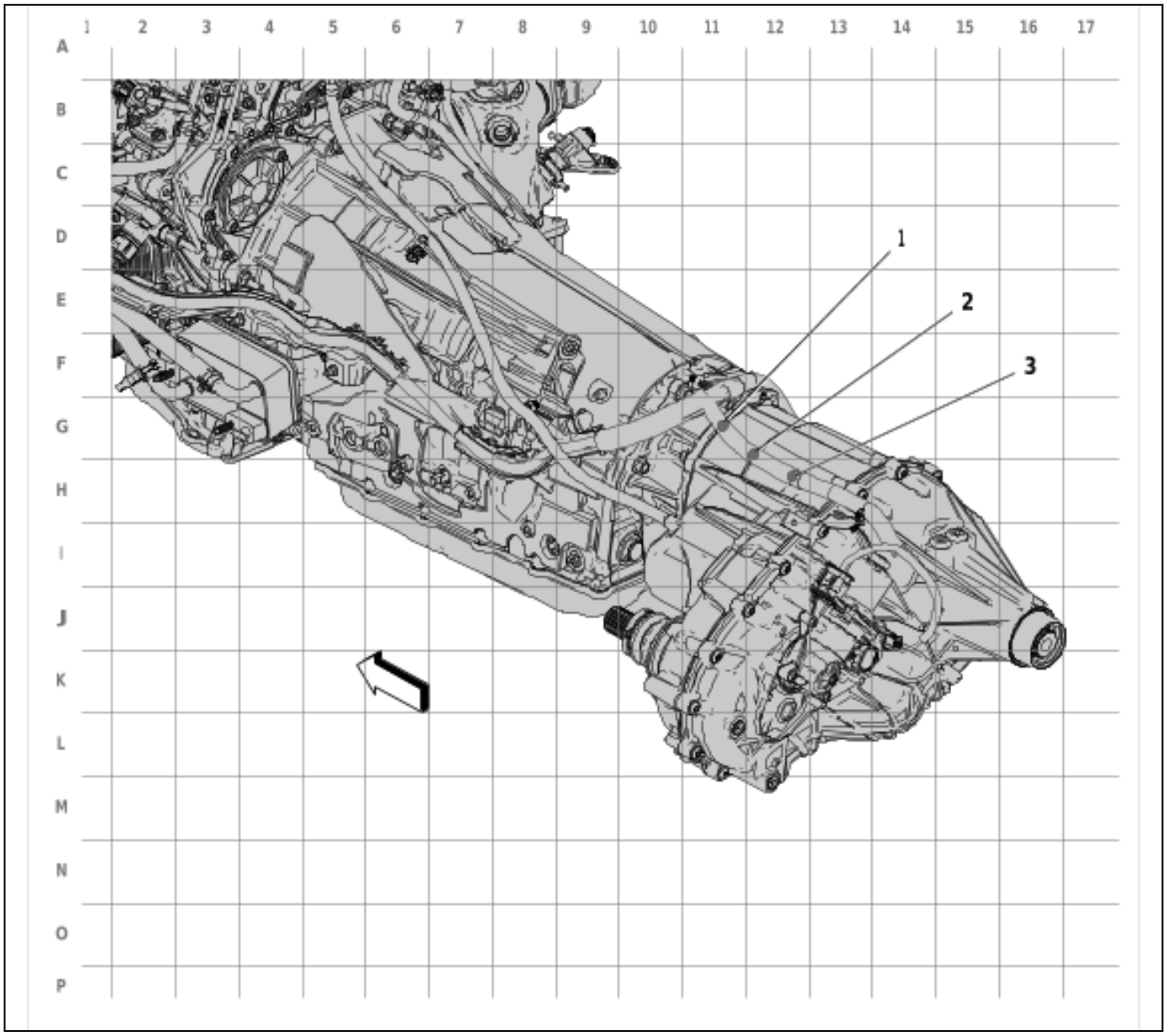
Engine Harness Routing - Right Side (LZ0)



7163712

Items
(1) X129 Engine Wiring Harness to Oil Pump Flow Control Solenoid Valve Harness (LZ0)

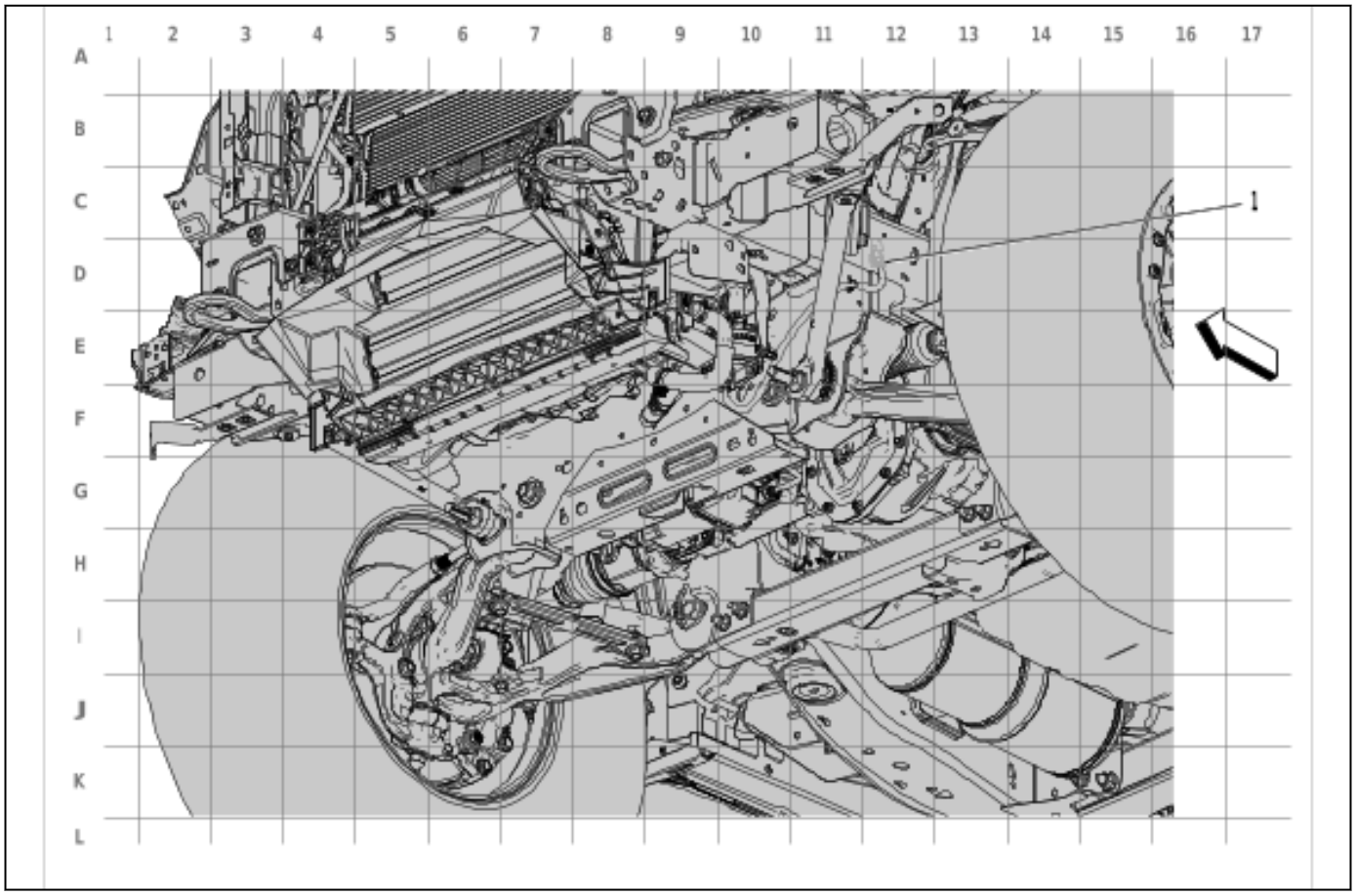
Engine Harness Routing - Transmission Area (LZ0)



7163713

Items
(1) SP8015_1 Engine Wiring Harness (F48)
(2) SP1553_1 Engine Wiring Harness (F48)
(3) SP1552_1 Engine Wiring Harness (F48)

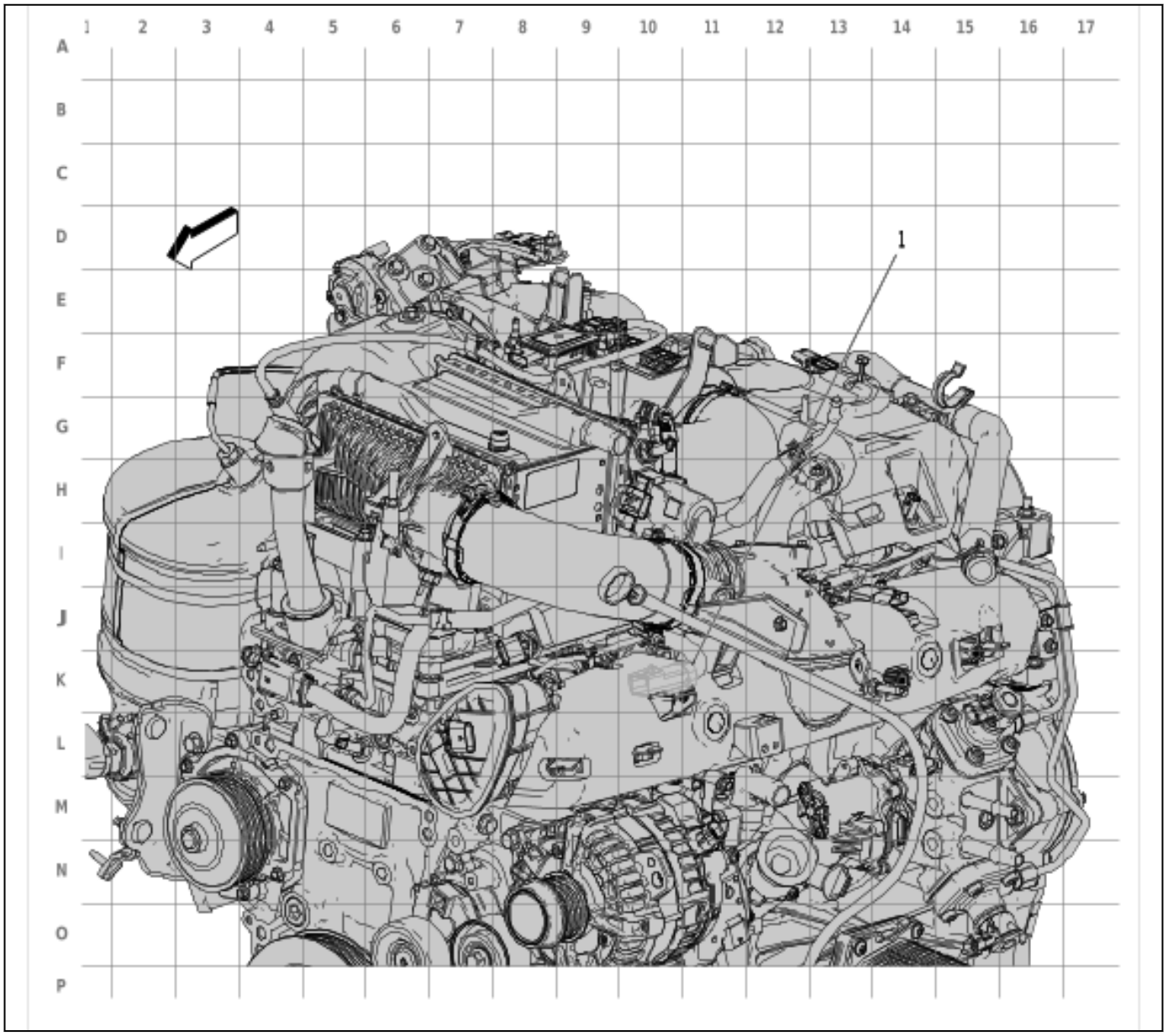
Charge Air Cooler Pump Wiring Harness Routing (LZ0)



7166347

Items
(1) X676D Engine Wiring Harness to Charge Air Cooler Pump Wiring Harness (LZ0)

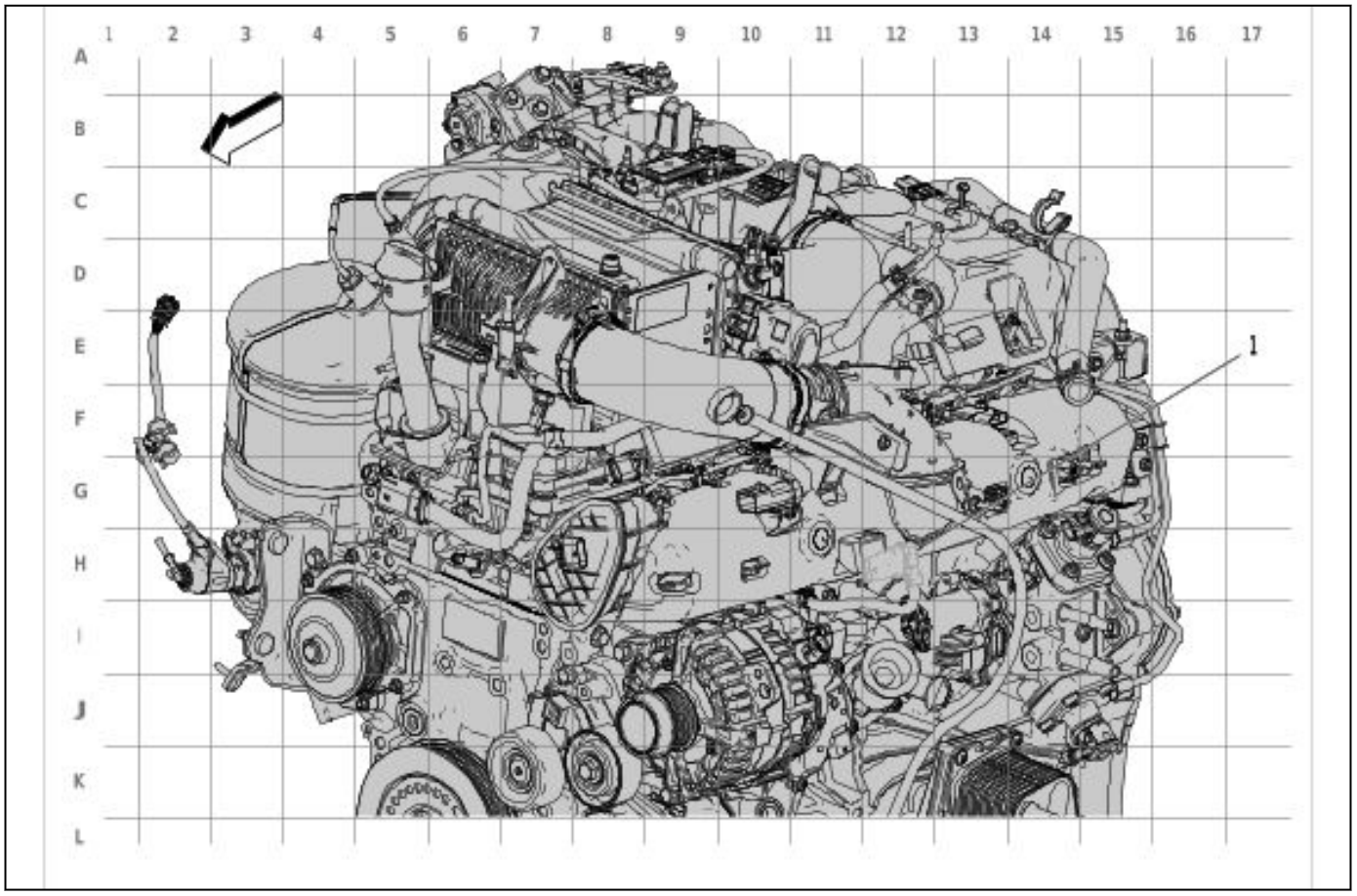
Diesel Glow Plug Wiring Harness Routing (LZ0)



7166348

Items
(1) X163 Engine Wiring Harness to Diesel Glow Plug Wiring Harness (LZ0)

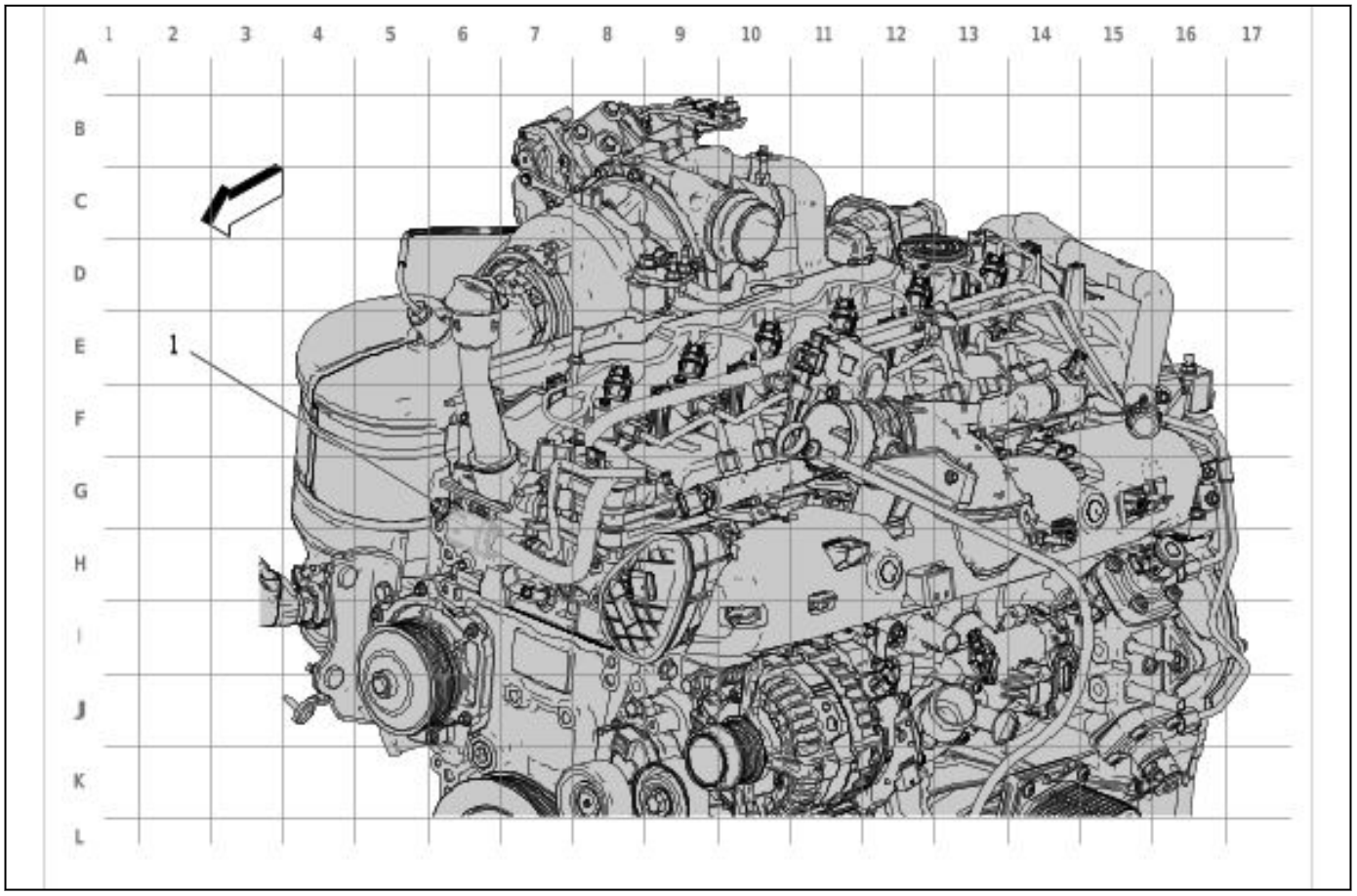
Engine Coolant Temperature Sensor Harness Routing (LZ0)



7166349

Items
(1) X944 Engine Wiring Harness to Engine Coolant Temperature Sensor Harness (LZ0)

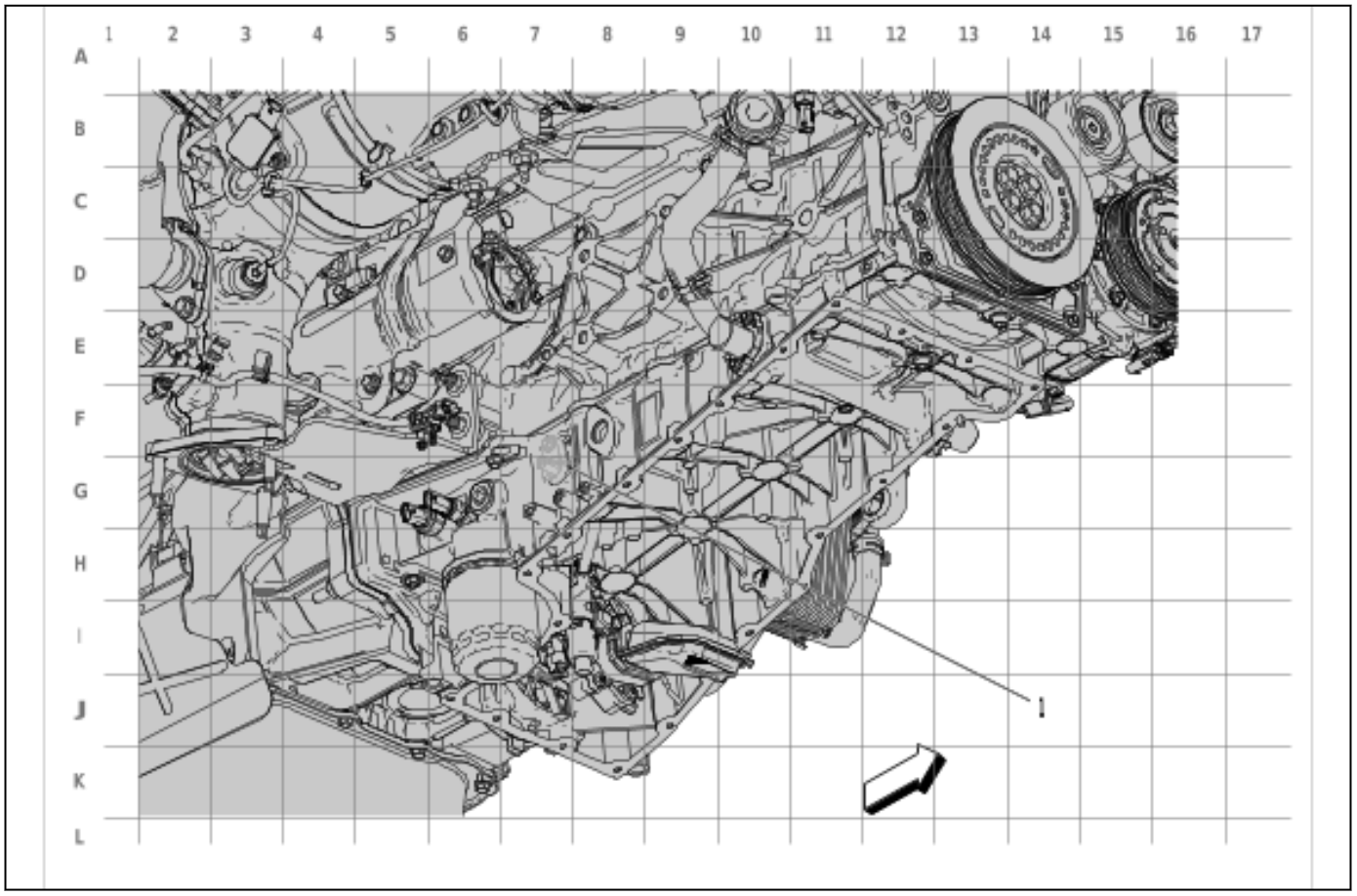
Fuel Injector Wiring Harness Routing (LZ0)



7166350

Items
(1) X160D Engine Wiring Harness to Fuel Injector Wiring Harness (LZ0)

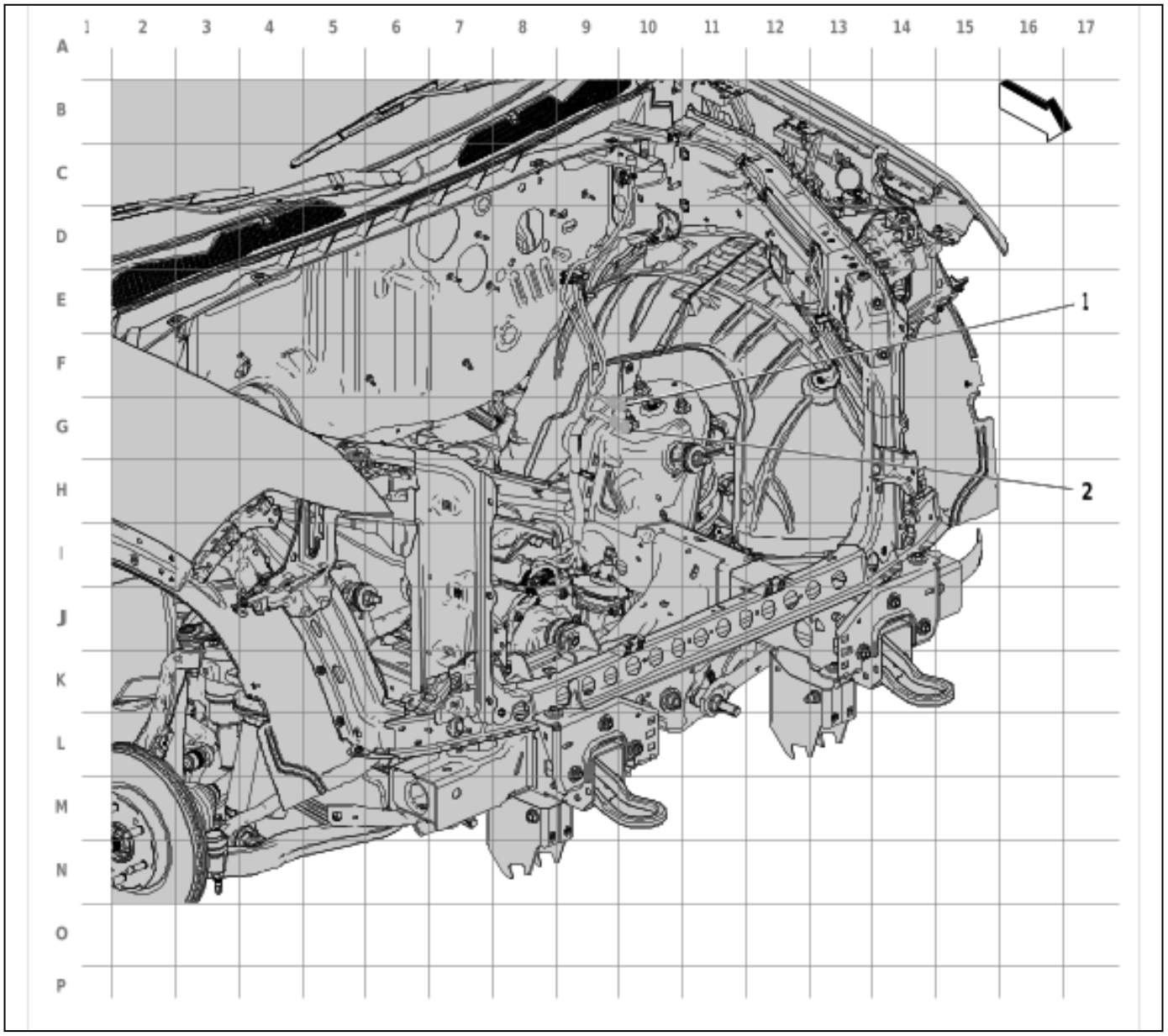
Oil Pump Flow Control Solenoid Valve Harness Routing (LZ0)



7166351

Items
(1) X129 Engine Wiring Harness to Oil Pump Flow Control Solenoid Valve Harness (LZ0)

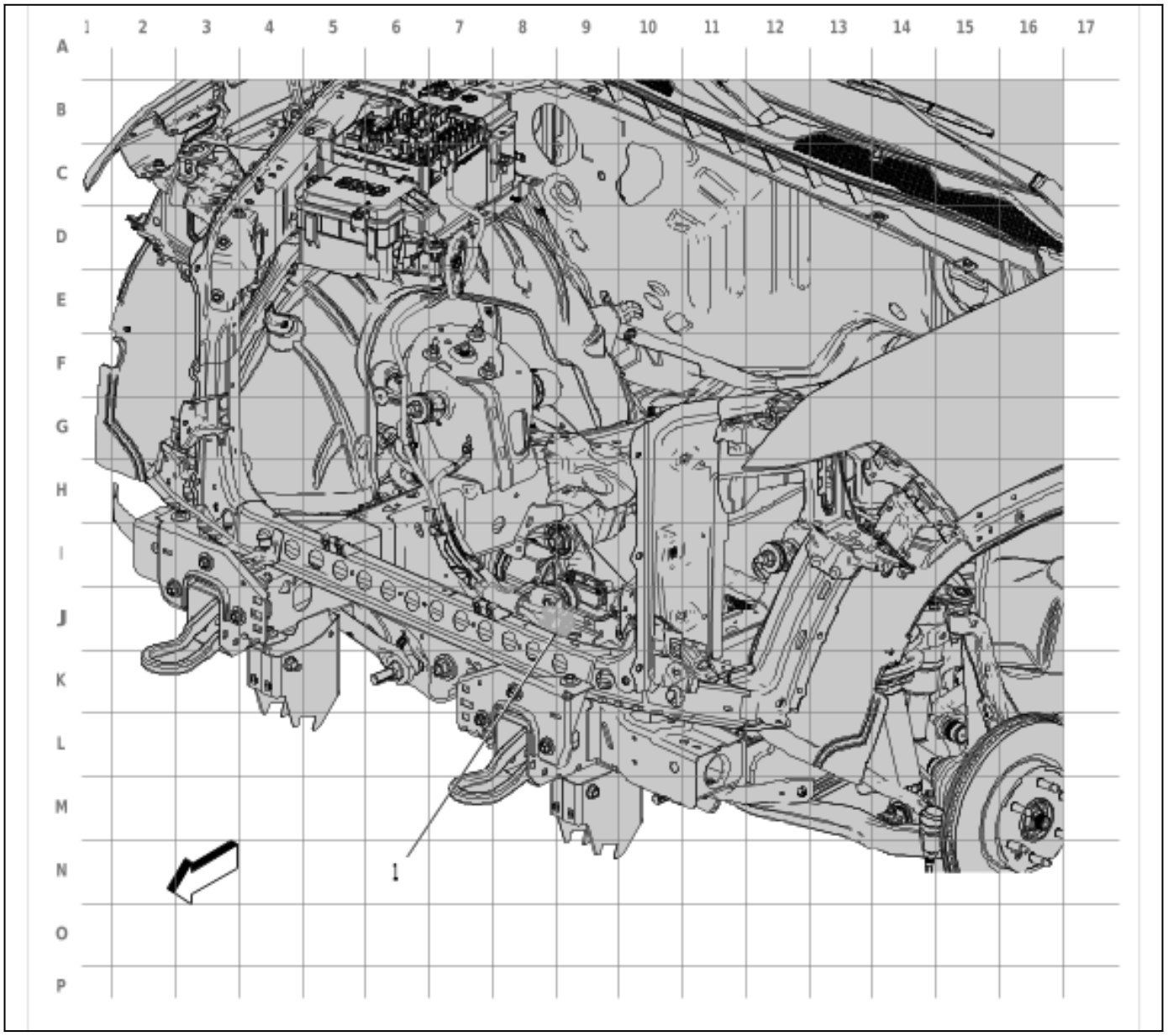
Front Axle Wiring Harness Routing (F48)



7166352

Items
(1) X416F Front Axle Wiring Harness to Chassis Wiring Harness (G93)
(2) X415 Front Axle Wiring Harness to Engine Wiring Harness (F48)

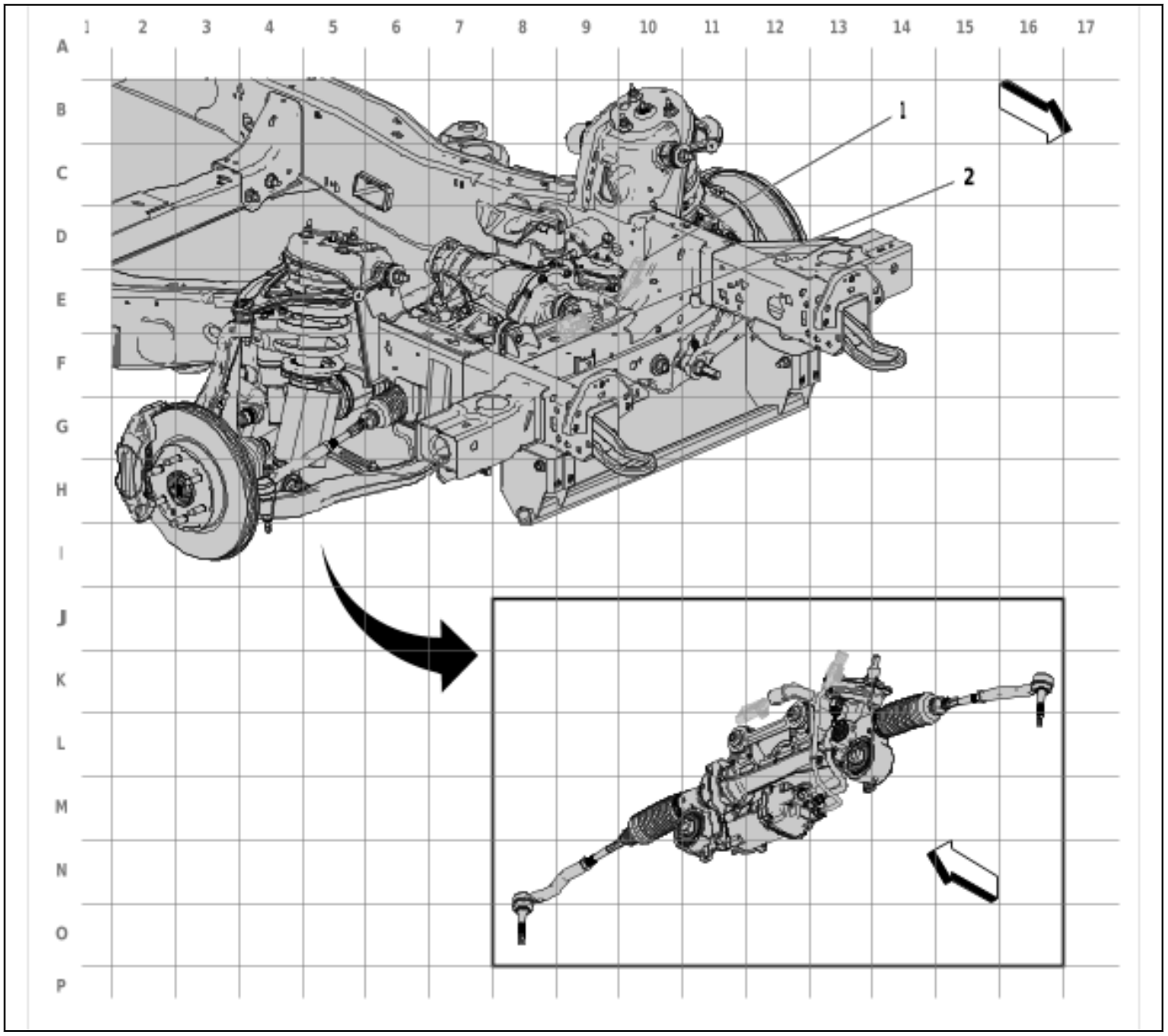
Power Steering Wiring Harness Routing



7166353

Items
(1) X405 Power Steering Wiring Harness to Power Steering Wiring Harness Extension Harness

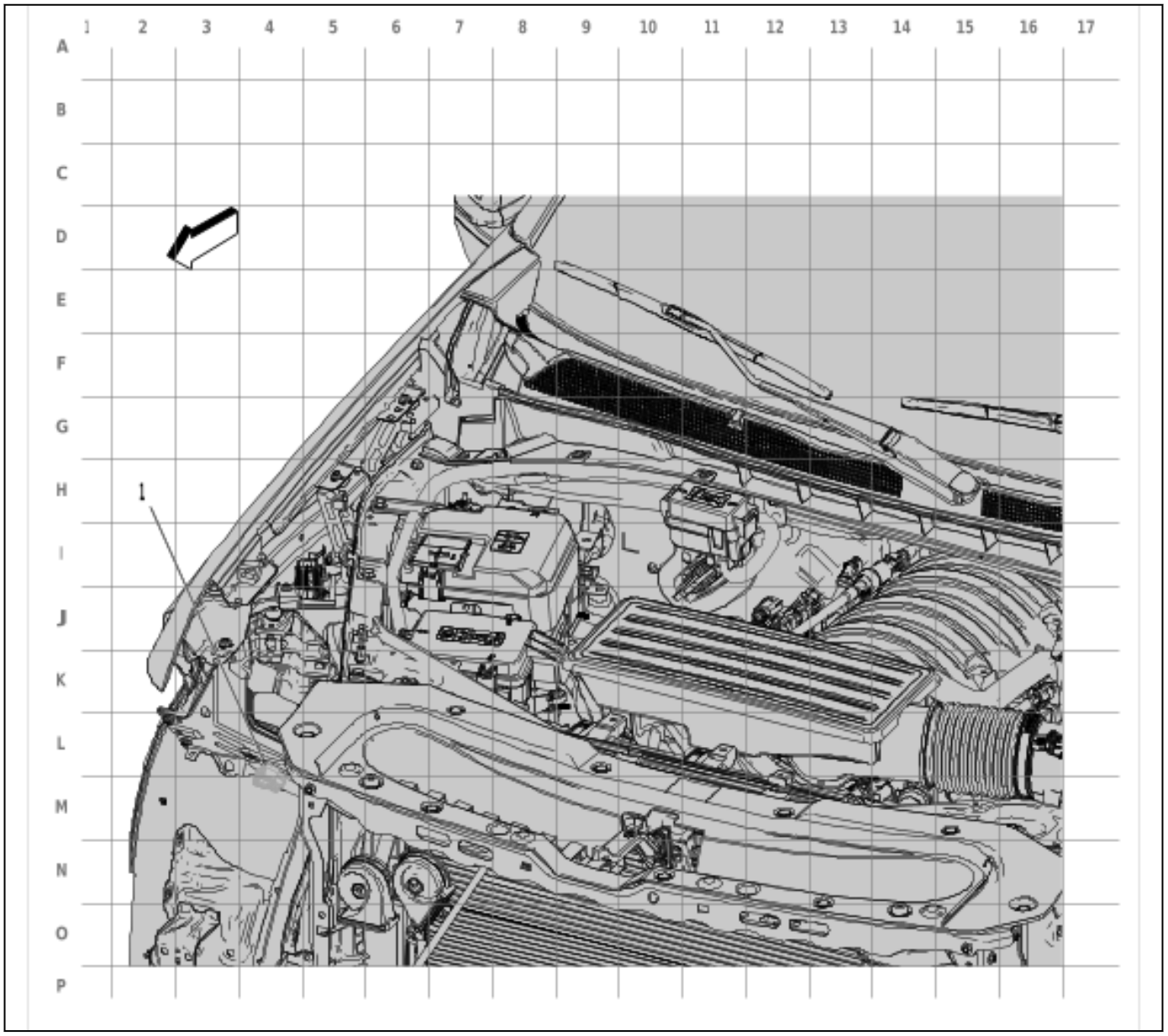
Power Steering Gear Wiring Harnesses Routing



7166354

Items
(1) X147 Chassis Wiring Harness to Power Steering Control Module Wiring Harness - Data
(2) X405 Power Steering Wiring Harness to Power Steering Wiring Harness Extension Harness

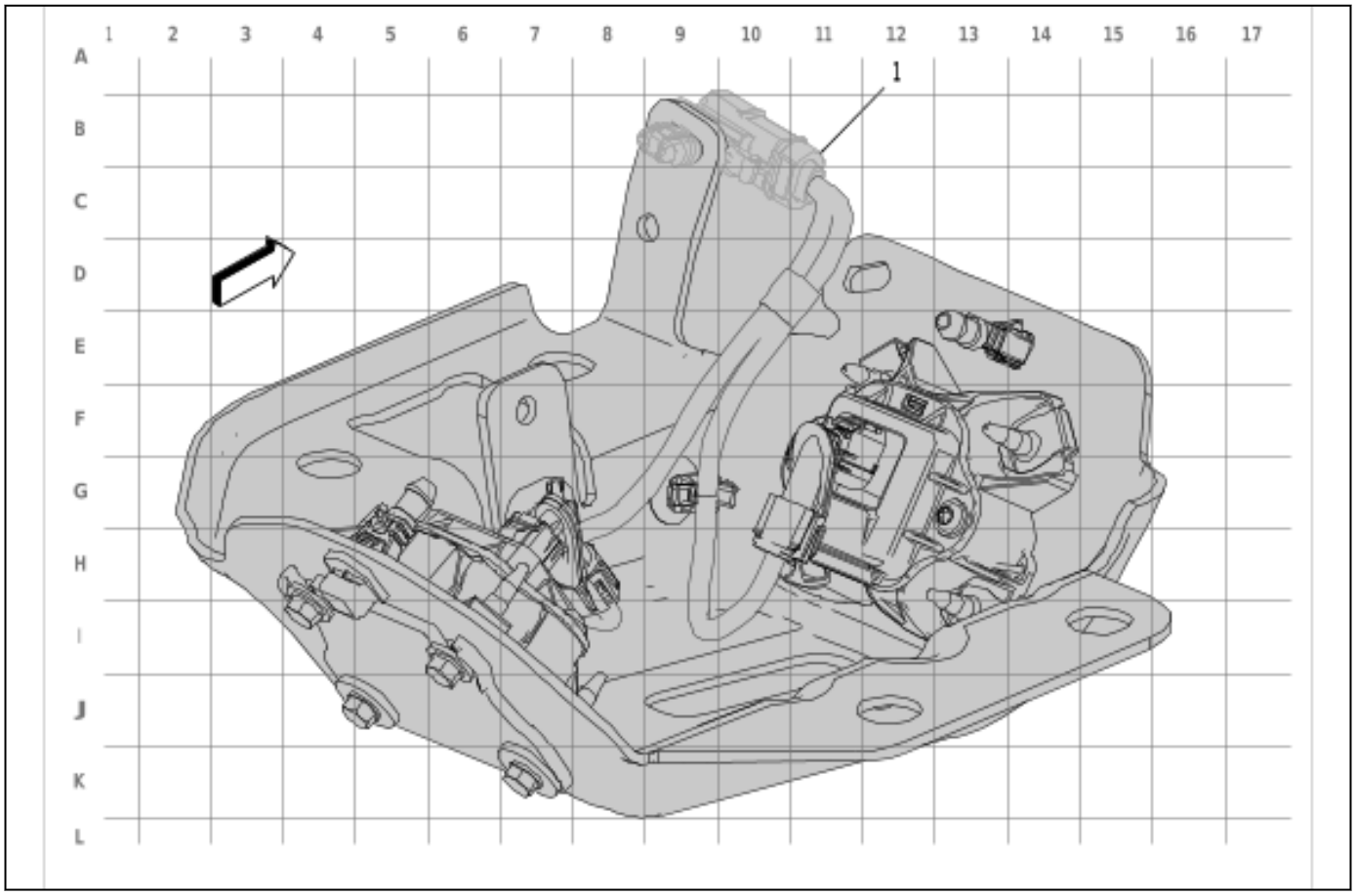
Auxiliary Battery Wiring Harness (VBP)



7166346

Items
(1) X608 Auxiliary Battery Wiring Harness to Body Wiring Harness

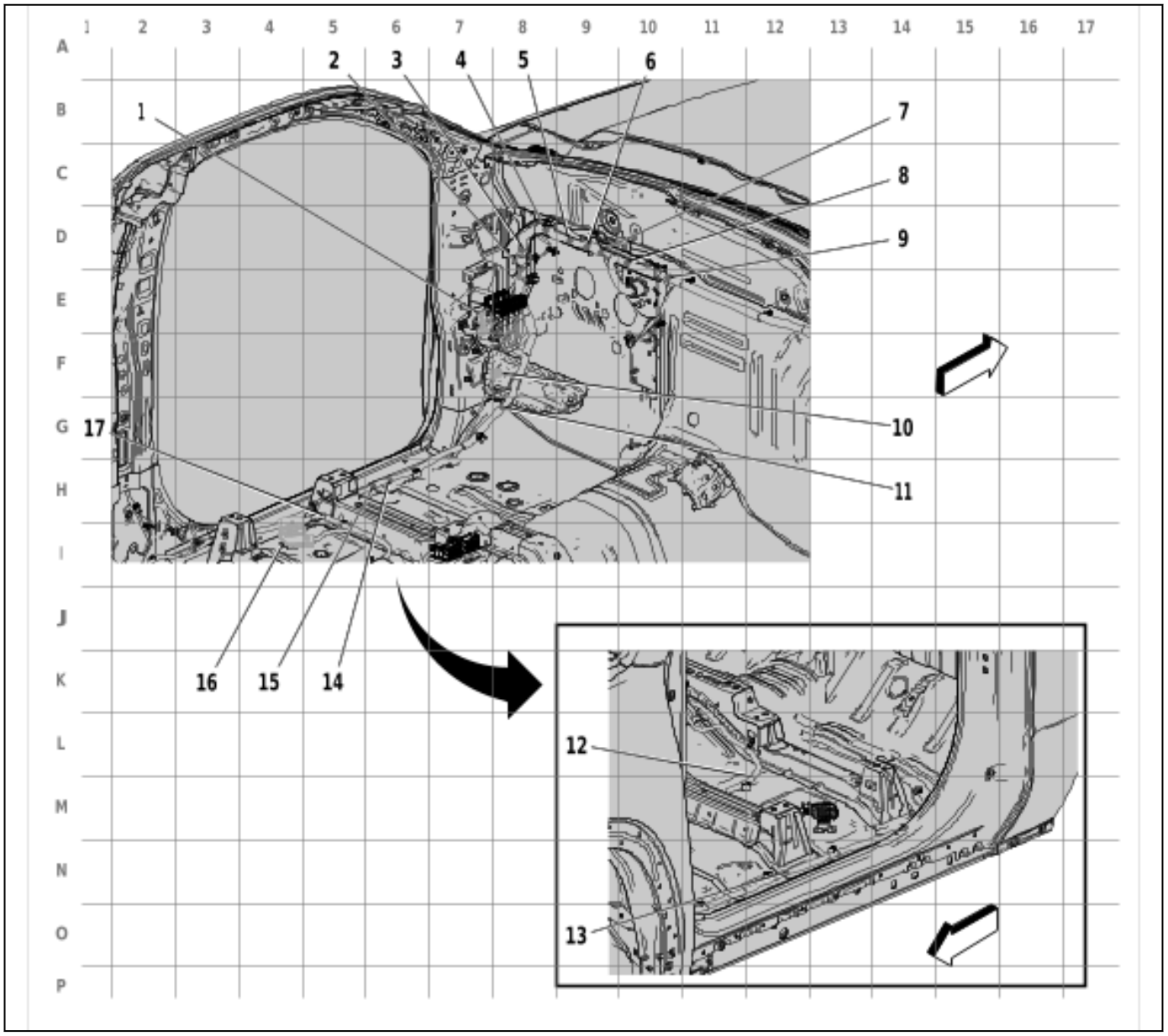
Underbody Camera Wiring Harness Routing (UXA)



7198481

Items
(1) X403 Chassis Wiring Harness to Underbody Camera Wiring Harness (UXA)

Body Harness Routing - Passenger Compartment Left Front - 2-Door

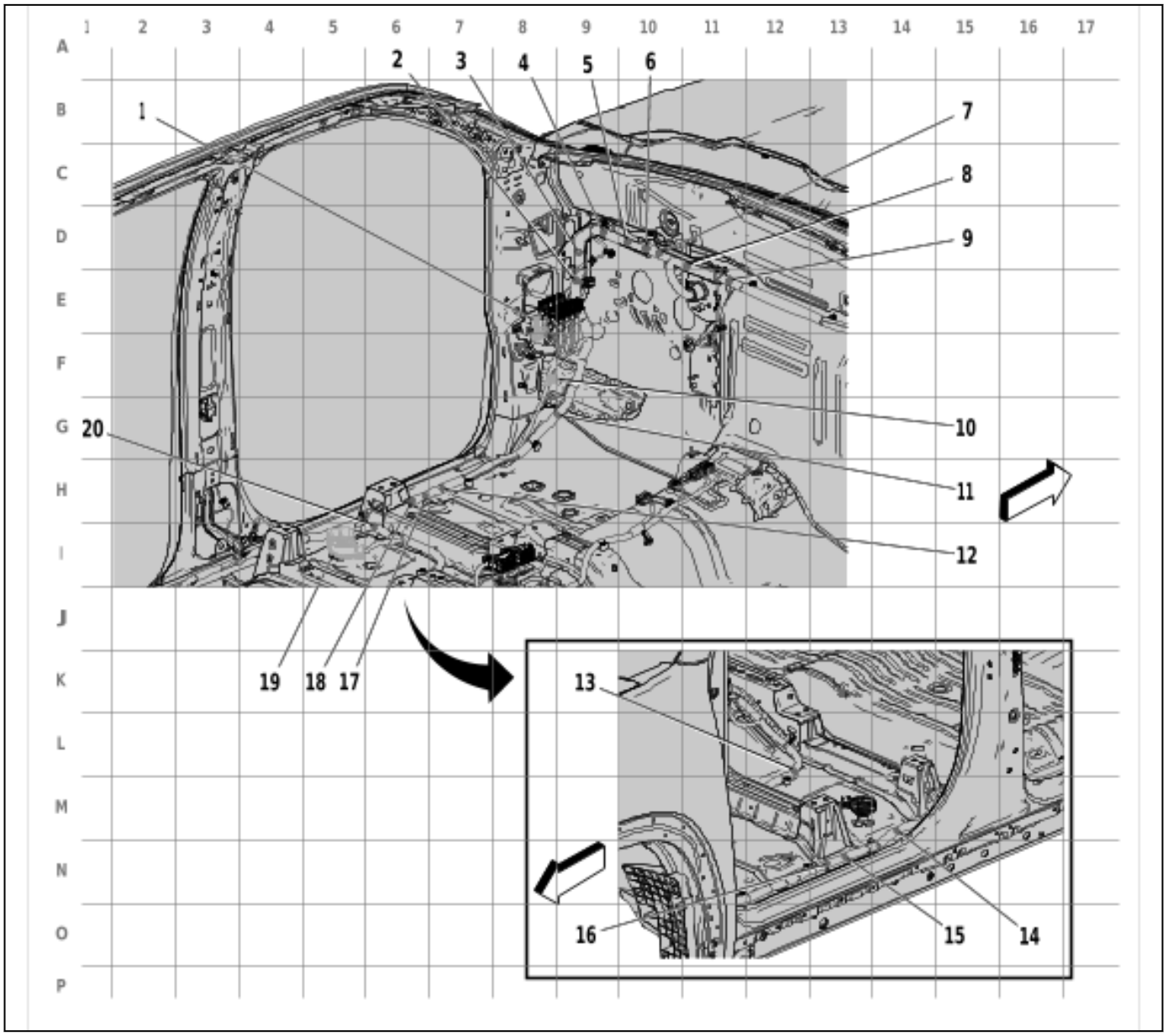


7182716

Items
(1) X210 Instrument Panel Wiring Harness to Body Wiring Harness
(2) SP24 Body Wiring Harness
(3) SP4049_1 Body Wiring Harness (KFG / KFH / KI4 / KI5)
(4) SP14026_B Body Wiring Harness
(5) SP820_1 Body Wiring Harness
(6) SP1430_1 Body Wiring Harness (QT5 / QT6)
(7) SP2733_1 Body Wiring Harness
(8) SP626_W53 Body Wiring Harness
(9) SP4320_1 Body Wiring Harness (FJW)
(10) X218 Instrument Panel Wiring Harness to Body Wiring Harness
(11) SP239_3 Body Wiring Harness

Items
(12) SP6817_6 Body Wiring Harness
(13) SP1551_1 Body Wiring Harness
(14) SP5966_1 Body Wiring Harness (DEZ)
(15) SP2862_1 Body Wiring Harness
(16) X331 Front Seat Wiring Harness - Driver to Body Wiring Harness
(17) SP2240_2 Body Wiring Harness

Body Harness Routing - Passenger Compartment Left Front - 4-Door

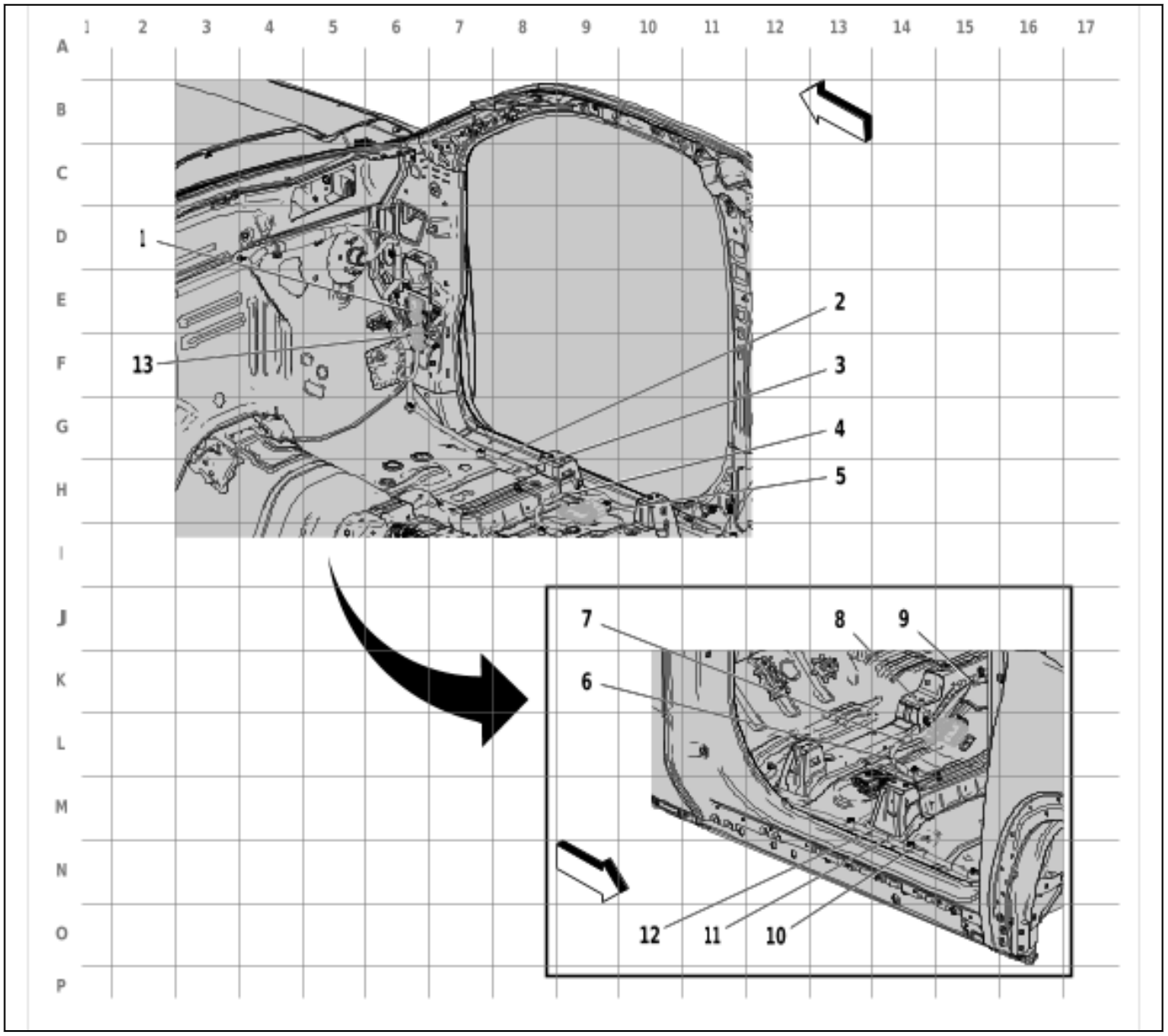


7182717

Items
(1) X210 Instrument Panel Wiring Harness to Body Wiring Harness
(2) SP24 Body Wiring Harness
(3) SP4049_1 Body Wiring Harness (KFG / KFH / KI4 / KI5)

Items
(4) SP14026_B Body Wiring Harness
(5) SP820_1 Body Wiring Harness
(6) SP1430_1 Body Wiring Harness (QT5 / QT6)
(7) SP2733_1 Body Wiring Harness
(8) SP626_W53 Body Wiring Harness
(9) SP4320_1 Body Wiring Harness (FJW)
(10) X218 Instrument Panel Wiring Harness to Body Wiring Harness
(11) SP239_3 Body Wiring Harness
(12) SP5966_1 Body Wiring Harness (DEZ)
(13) SP6817_6 Body Wiring Harness
(14) SP2679_1 Body Wiring Harness (4-Door)
(15) SP6135_1 Body Wiring Harness (4-Door)
(16) SP1551_1 Body Wiring Harness
(17) SP2862_1 Body Wiring Harness
(18) SP2857_1 Body Wiring Harness (KCB)
(19) X331 Front Seat Wiring Harness - Driver to Body Wiring Harness
(20) SP2240_2 Body Wiring Harness

Body Harness Routing - Passenger Compartment Right Front - 2-Door

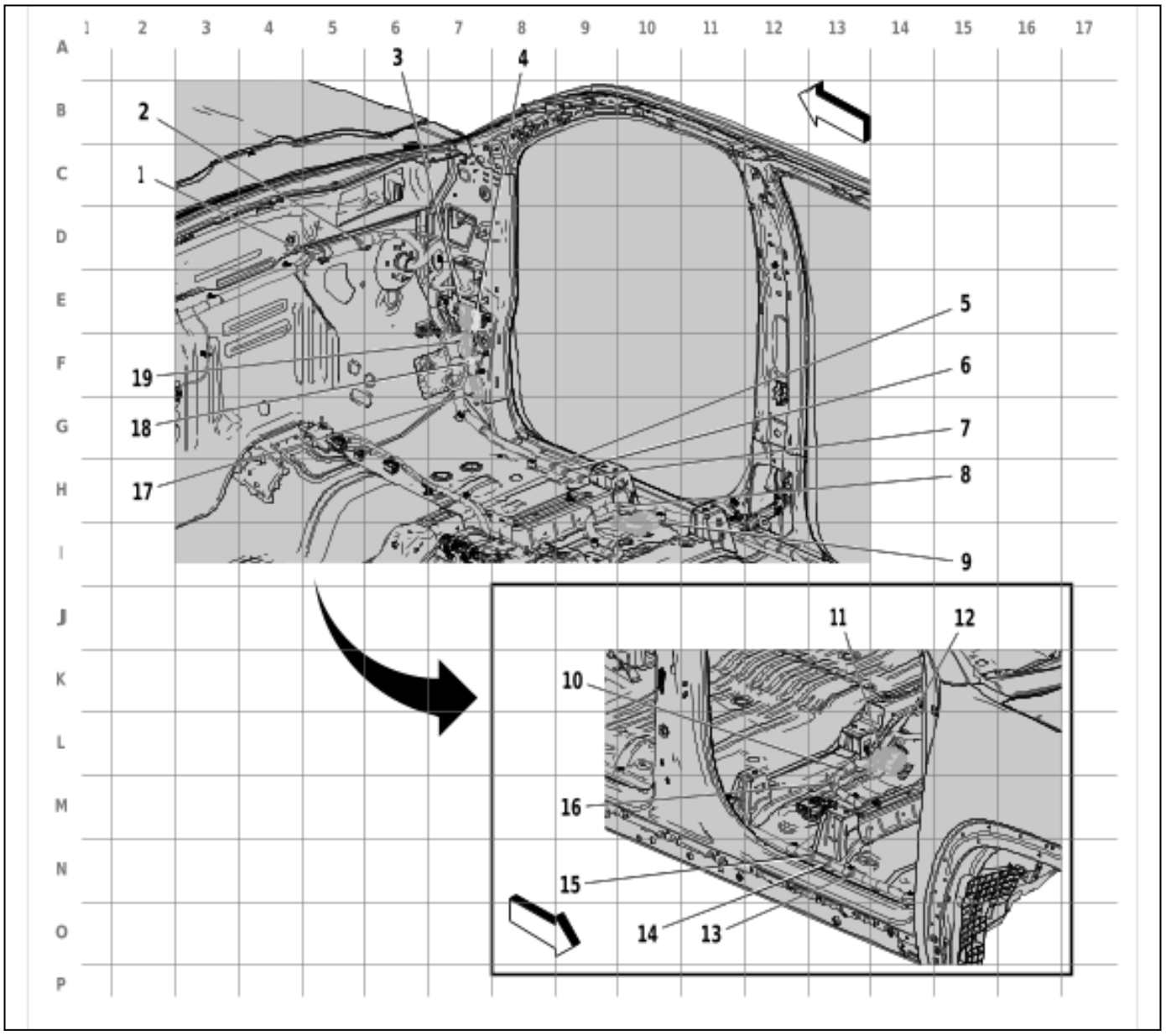


7182718

Items
(1) X211 Instrument Panel Wiring Harness to Body Wiring Harness
(2) SP1350_1 Body Wiring Harness
(3) SP2933 Body Wiring Harness (DBC / DEZ / DME / DQS)
(4) SP2861_BD Body Wiring Harness (C70 / C85)
(5) X336 Front Seat Wiring Harness - Passenger to Body Wiring Harness
(6) SP2680_1 Body Wiring Harness (4-Door / QT2)
(7) SP4849_BD Body Wiring Harness (C70 / C85)
(8) X227 Front Floor Console Wiring Harness to Body Wiring Harness
(9) SP1363_1 Body Wiring Harness
(10) SP6134_2 Body Wiring Harness

Items
(11) SP4440_1 Body Wiring Harness
(12) SP1139_3 Body Wiring Harness (KU9)
(13) X255 Instrument Panel Wiring Harness to Body Wiring Harness

Body Harness Routing - Passenger Compartment Right Front - 4-Door

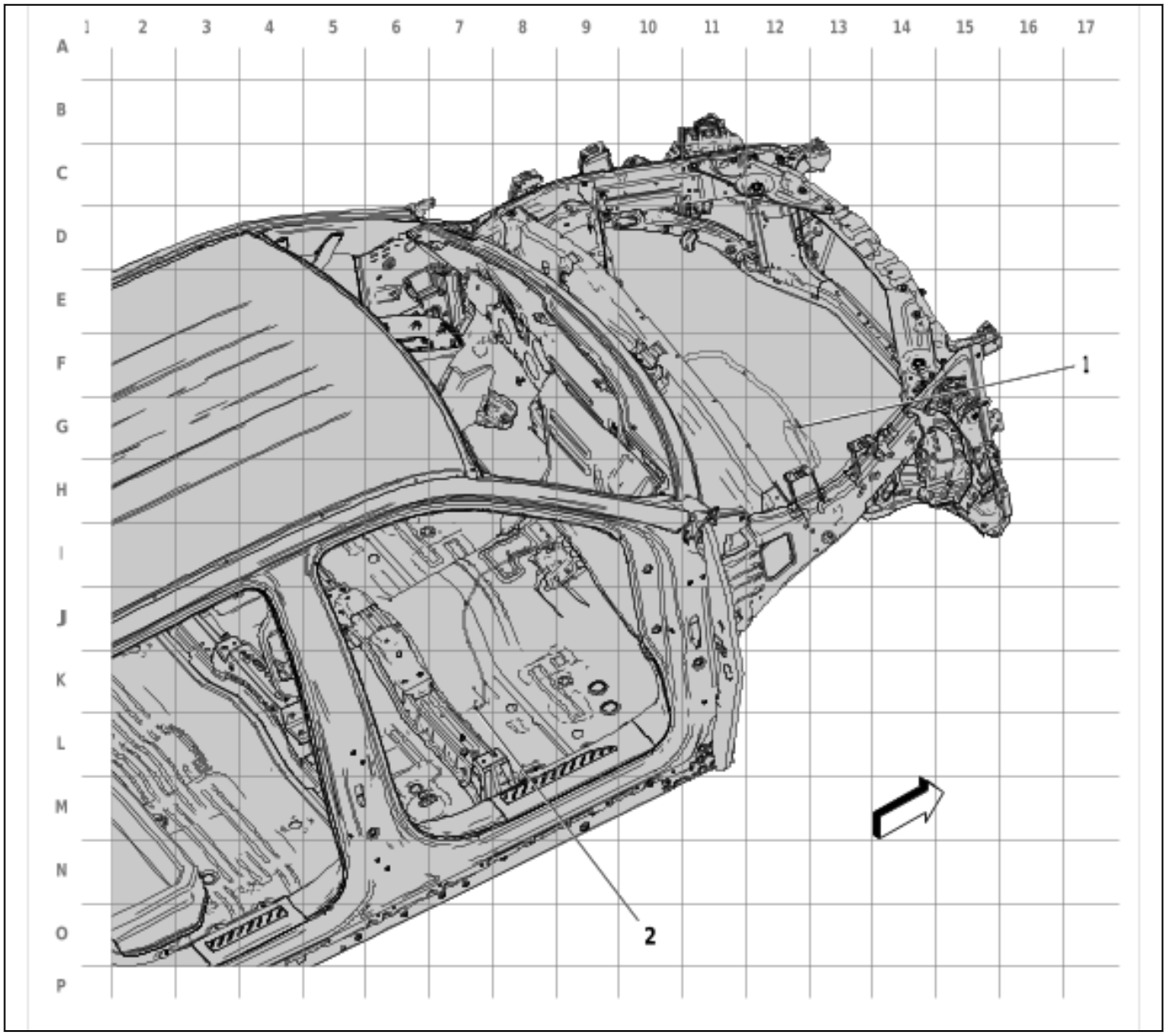


7182719

Items
(1) SP28_1 Body Wiring Harness (5W4 / 9C1)
(2) SP7040_9 Body Wiring Harness (BOK / BOR / BOY)
(3) X211 Instrument Panel Wiring Harness to Body Wiring Harness
(4) X214 Instrument Panel Wiring Harness to Body Wiring Harness (4-Door)
(5) SP1350_1 Body Wiring Harness

Items
(6) SP7761_1 Body Wiring Harness (DQS)
(7) SP2933 Body Wiring Harness (DBC / DEZ / DME / DQS)
(8) SP2861_BD Body Wiring Harness (C70 / C85)
(9) X336 Front Seat Wiring Harness - Passenger to Body Wiring Harness
(10) SP4849_BD Body Wiring Harness (C70 / C85)
(11) X227 Front Floor Console Wiring Harness to Body Wiring Harness
(12) SP1363_1 Body Wiring Harness
(13) SP6134_2 Body Wiring Harness
(14) SP4440_1 Body Wiring Harness
(15) SP1139_3 Body Wiring Harness (KU9)
(16) SP2680_1 Body Wiring Harness (4-Door / QT2)
(17) X251 HVAC Assembly Wiring Harness - Electric Heater to Body Wiring Harness (C32)
(18) X217 Instrument Panel Wiring Harness Extension Harness to Body Wiring Harness (TRG)
(19) X255 Instrument Panel Wiring Harness to Body Wiring Harness

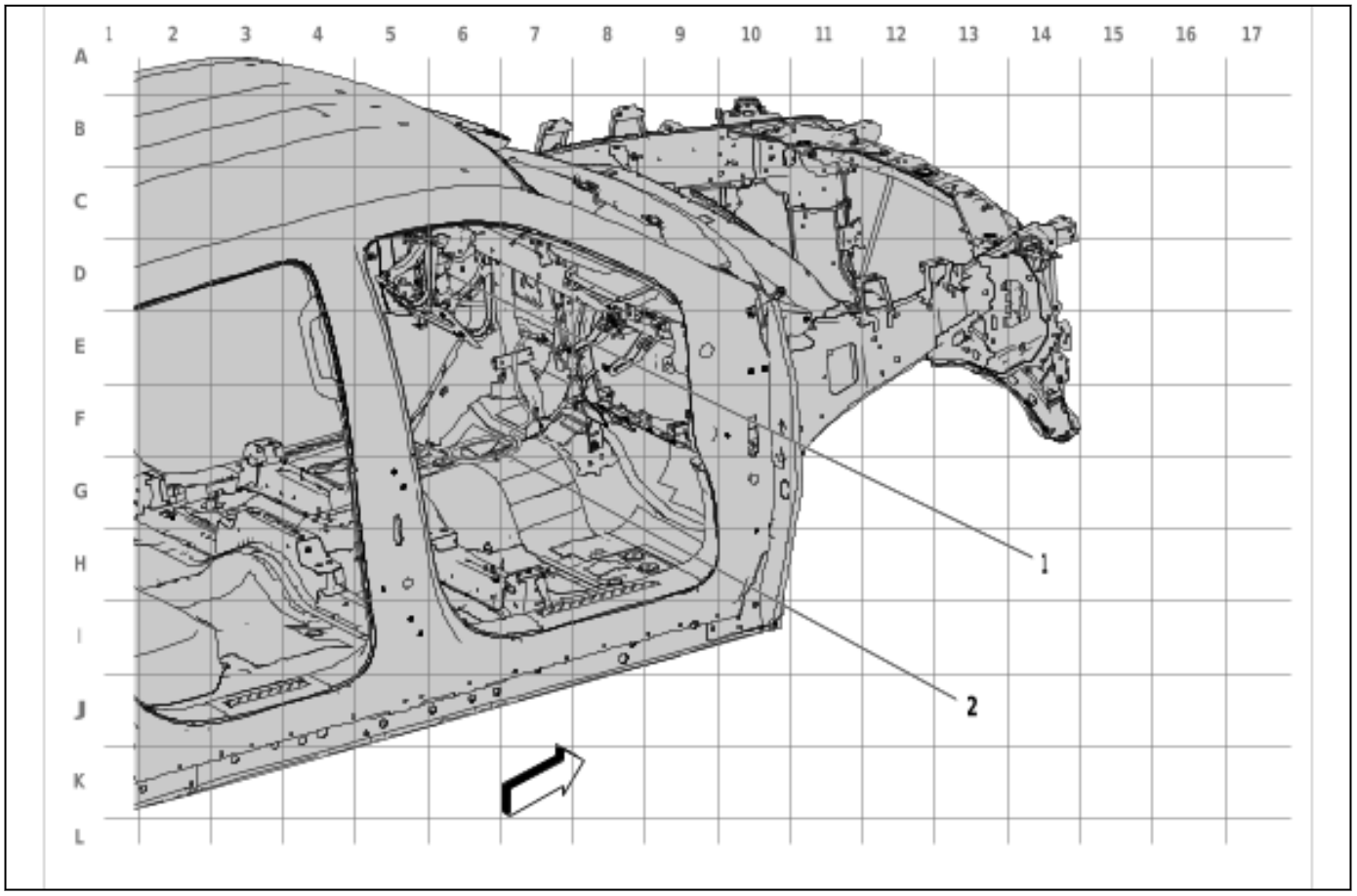
Emergency Vehicle Front Lamp Wiring Harness Routing (5W4 / 9C1)



7188703

Items
(1) W15RAD Blunt Cut - Grille Lamp and Siren Speaker Radiator ((5W4 / 9C1) & 6J3)
(2) W15CSB Blunt Cut - Grille Lamp and Siren Speaker Seating Area ((5W4 / 9C1) & 6J3)

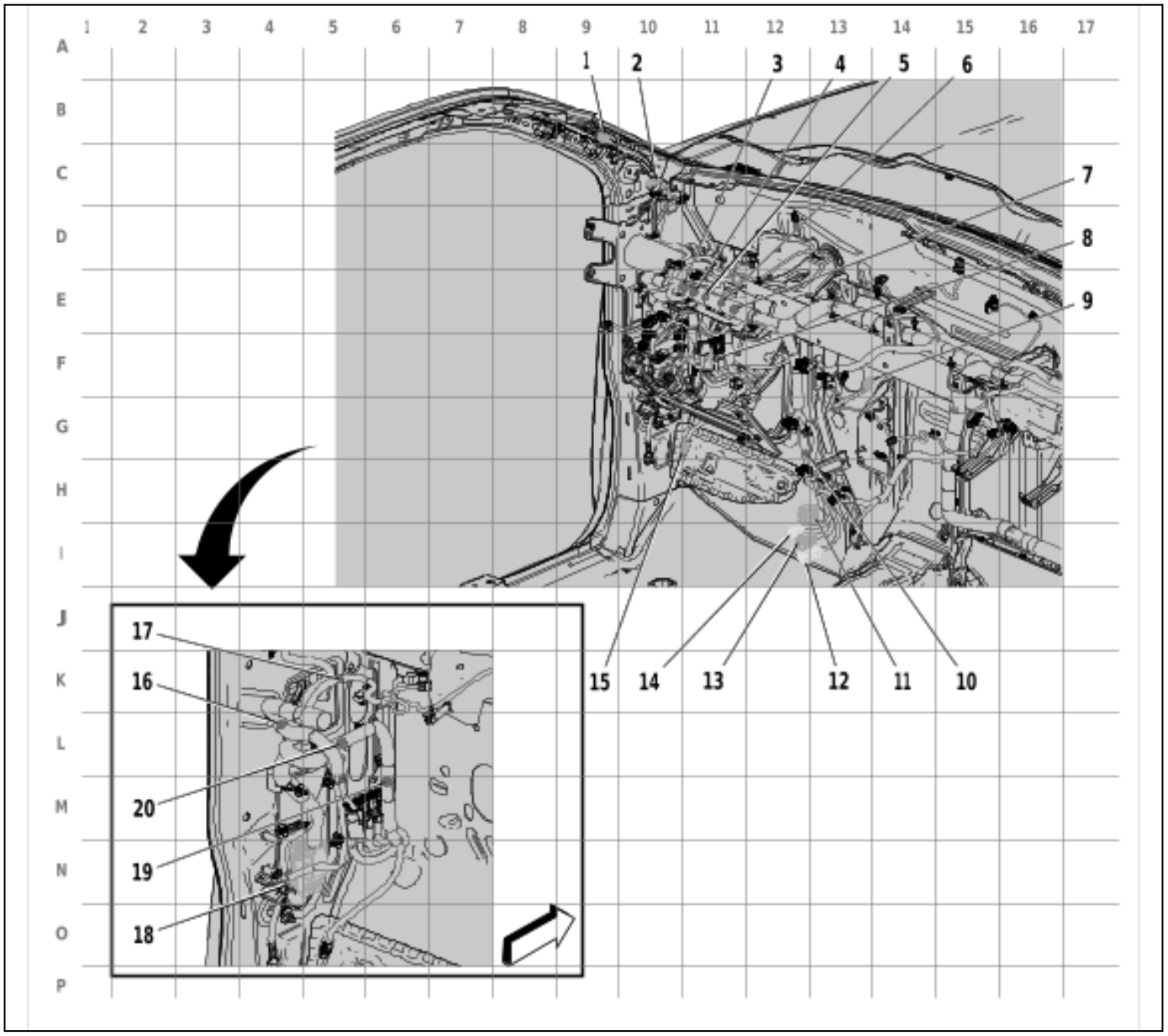
Emergency Vehicle Horn and Siren Wiring Harness Routing (5W4 / 9C1)



7188704

Items
(1) W15IP Blunt Cut - Horn and Siren Instrument Panel ((5W4 / 9C1) & 6J4)
(2) W15CSA Blunt Cut - Horn and Siren Seating Area ((5W4 / 9C1) & 6J4)

Instrument Panel Wiring Harness Routing - Left Side

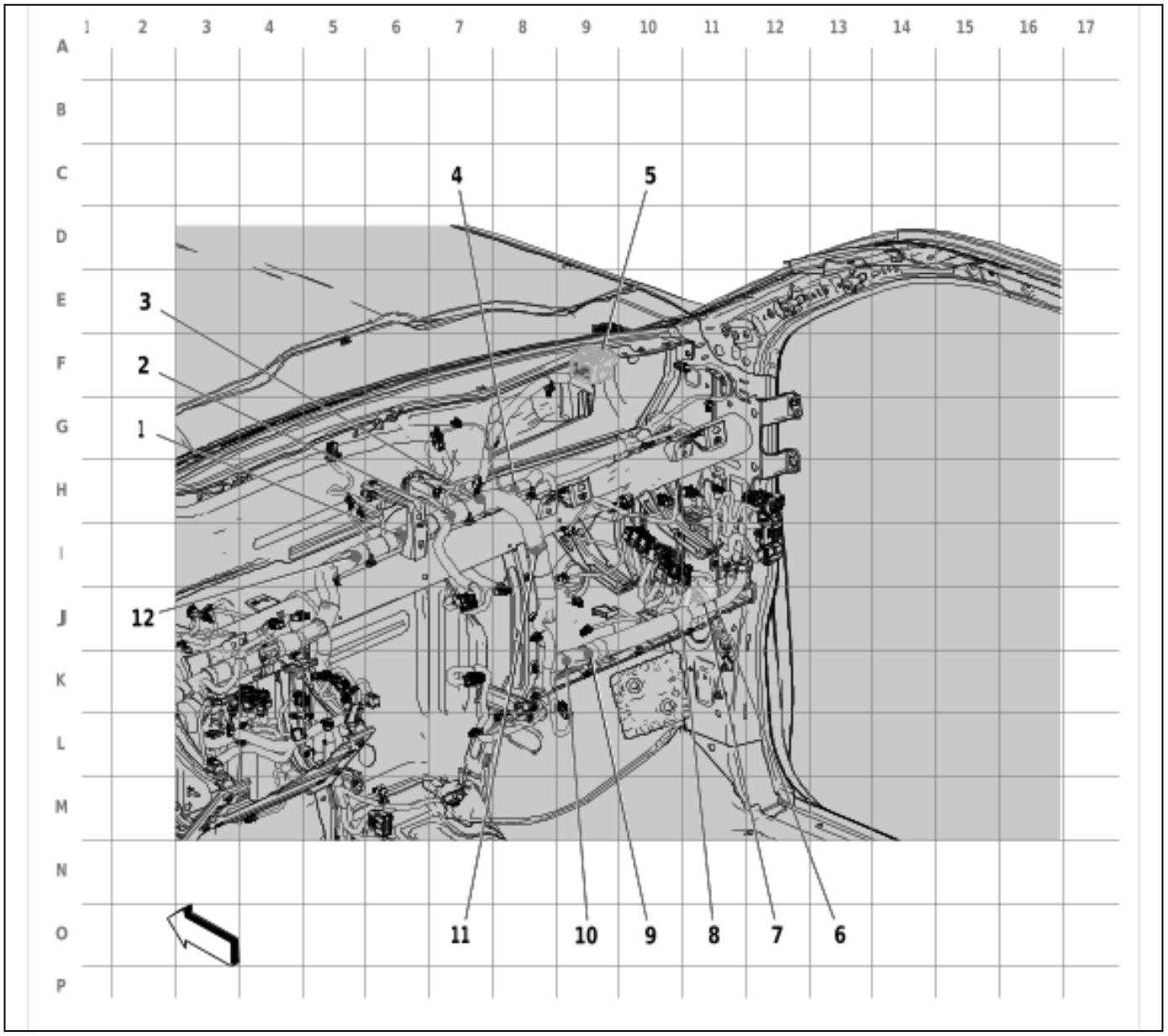


7185171

Items
(1) X393 Dome Lamp Wiring Harness to Instrument Panel Wiring Harness (4-Door / UCV)
(2) X219 Spot Light Wiring Harness to Instrument Panel Wiring Harness (5W4 / 9C1)
(3) SP240_2 Instrument Panel Wiring Harness (UV6)
(4) SP851_LH Instrument Panel Wiring Harness
(5) SP1340_1 Instrument Panel Wiring Harness
(6) SP140_IP Instrument Panel Wiring Harness
(7) SP2640_2 Instrument Panel Wiring Harness
(8) X213 Upfitter Wiring Harness to Instrument Panel Wiring Harness
(9) X250 Instrument Panel Wiring Harness to HVAC Assembly Wiring Harness

Items
(10) SP10116_3 Instrument Panel Wiring Harness (KFG / KFH)
(11) X224A Instrument Panel Wiring Harness to Front Floor Console Wiring Harness (D07 / DCK)
(12) X225 Front Floor Console Wiring Harness to Instrument Panel Wiring Harness (USN)
(13) X224B Instrument Panel Wiring Harness to Front Floor Console Wiring Harness (USN)
(14) X226 Front Floor Console Wiring Harness to Instrument Panel Wiring Harness (D07 / DCK)
(15) X218 Instrument Panel Wiring Harness to Body Wiring Harness
(16) SP1050_7 Instrument Panel Wiring Harness
(17) SP1051_2 Instrument Panel Wiring Harness (UV6)
(18) X210 Instrument Panel Wiring Harness to Body Wiring Harness
(19) SP407_1 Instrument Panel Wiring Harness
(20) SP5199_1 Instrument Panel Wiring Harness

Instrument Panel Wiring Harness Routing - Right Side

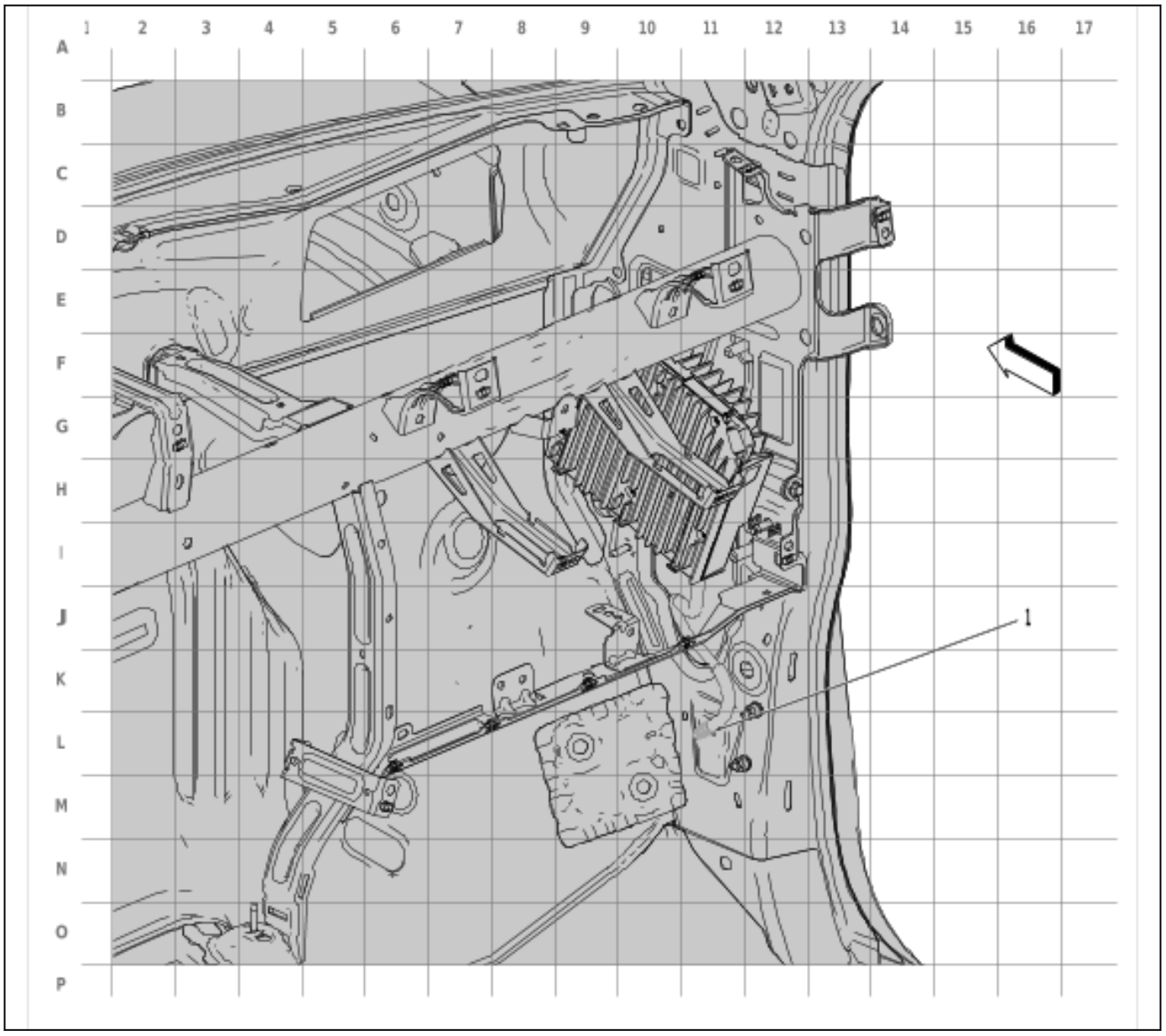


7185172

Items
(1) SP1449 Instrument Panel Wiring Harness
(2) SP1050_8 Instrument Panel Wiring Harness
(3) SP4849_IP Instrument Panel Wiring Harness (C70 / C85)
(4) SP2861_IP Instrument Panel Wiring Harness (C70 / C85)
(5) X370 Dome Lamp Wiring Harness to Instrument Panel Wiring Harness
(6) X214 Instrument Panel Wiring Harness to Body Wiring Harness (4-Door)
(7) X255 Instrument Panel Wiring Harness to Body Wiring Harness
(8) X211 Instrument Panel Wiring Harness to Body Wiring Harness
(9) SP10652_1 Instrument Panel Wiring Harness

Items
(10) SP339_1 Instrument Panel Wiring Harness
(11) SP1050_6 Instrument Panel Wiring Harness (A48 / N38)
(12) SP6817_3 Instrument Panel Wiring Harness

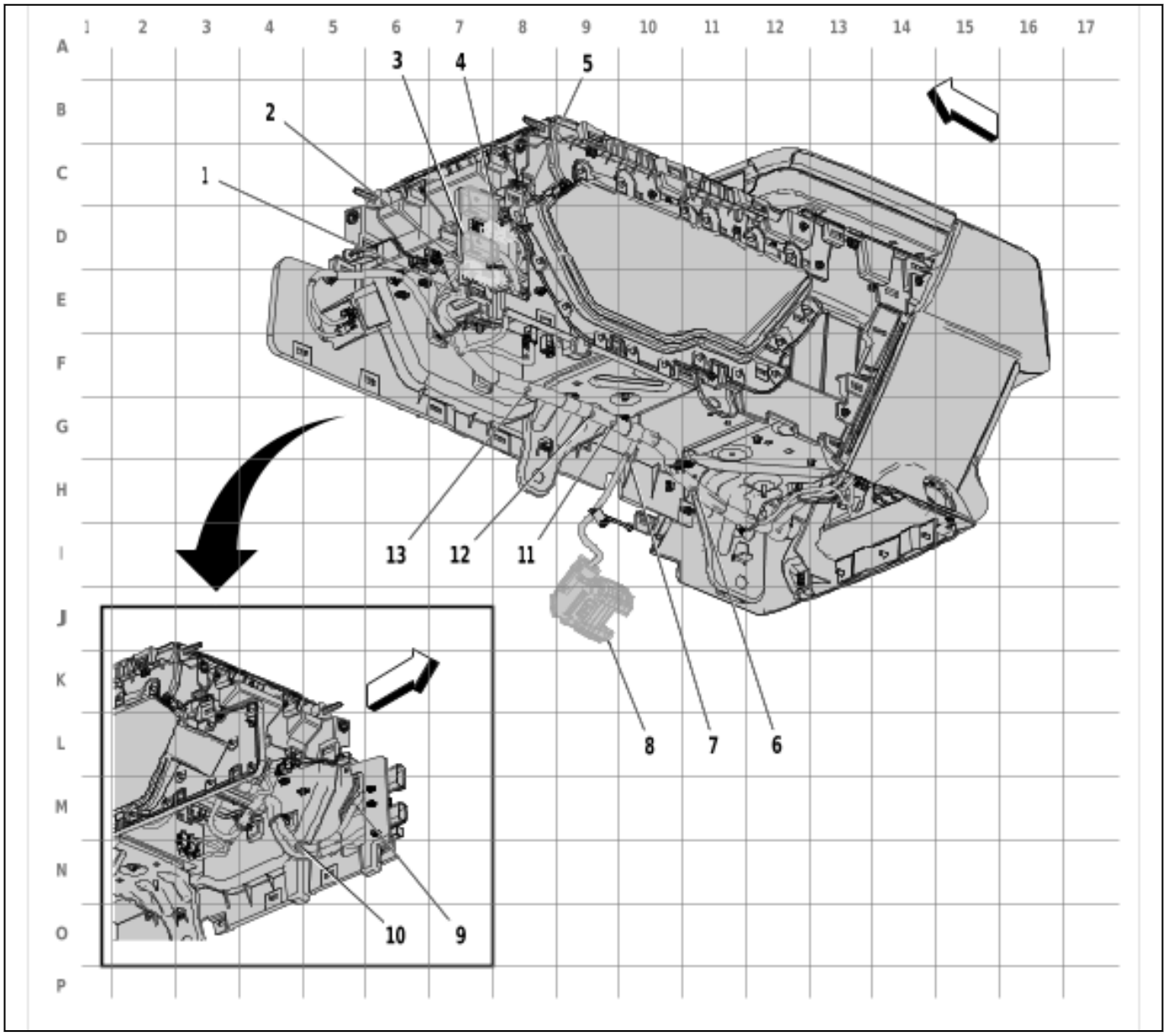
Radio Antenna Wiring Harness Routing - 4-Door (U2Q)



7193978

Items
(1) X572 Instrument Panel Wiring Harness to Radio Antenna Wiring Harness (4-Door & U2Q)

Front Floor Console Wiring Harness Routing (D07 / DCK)

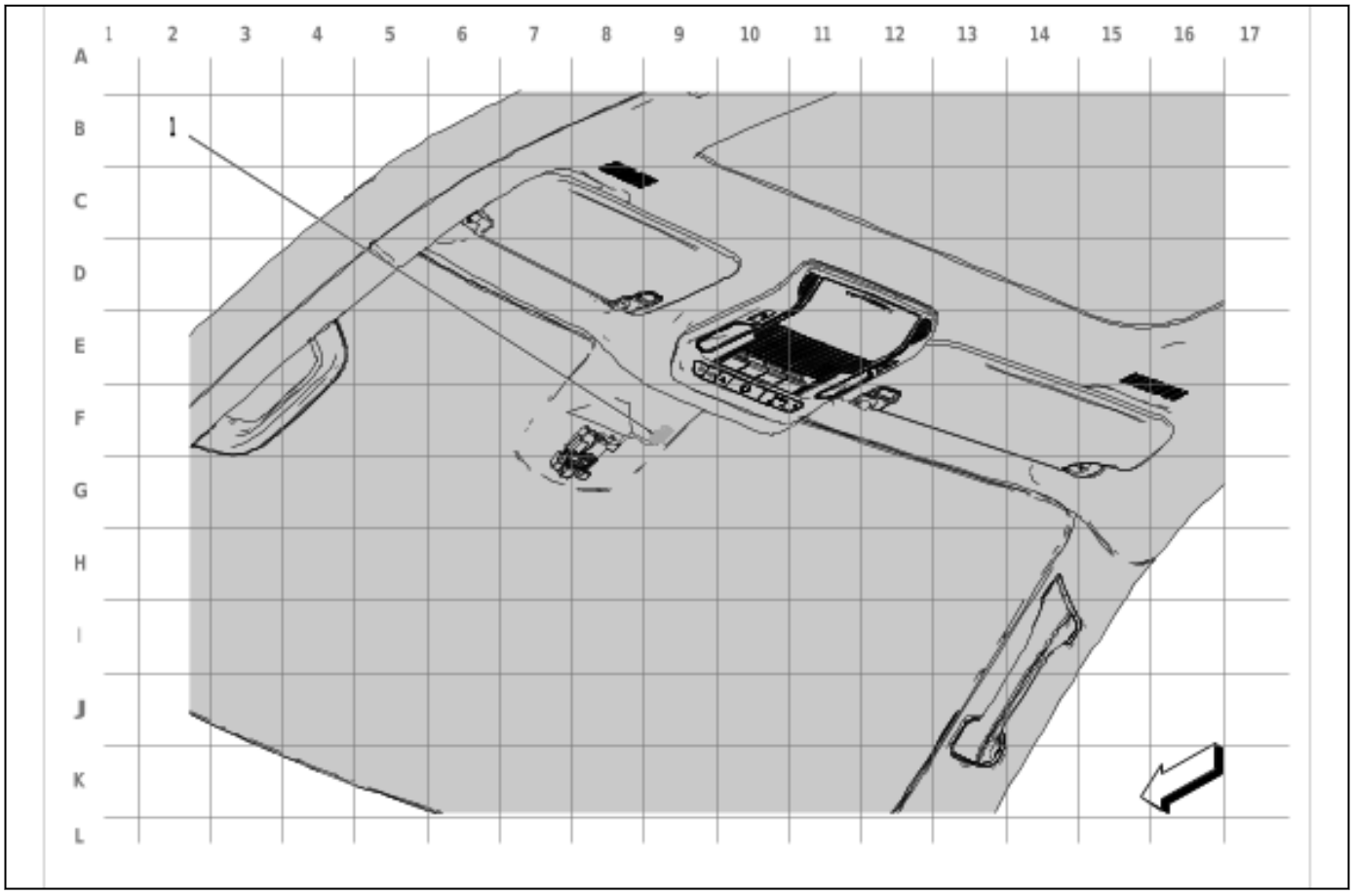


7185173

Items
(1) SP1051_1 Front Floor Console Wiring Harness (D07 / DCK)
(2) X225 Front Floor Console Wiring Harness to Instrument Panel Wiring Harness (USN)
(3) X224B Instrument Panel Wiring Harness to Front Floor Console Wiring Harness (USN)
(4) X224A Instrument Panel Wiring Harness to Front Floor Console Wiring Harness (D07 / DCK)
(5) X226 Front Floor Console Wiring Harness to Instrument Panel Wiring Harness (D07 / DCK)
(6) SP2640_1 Front Floor Console Wiring Harness (K7B / (K7A & (KCB / USN)))
(7) SP4849_CN Front Floor Console Wiring Harness (C85)
(8) X227 Front Floor Console Wiring Harness to Body Wiring Harness

Items
(9) SP10116_2 Front Floor Console Wiring Harness (KFG / KFH)
(10) SP140_CNL Front Floor Console Wiring Harness (D07 / DCK)
(11) SP6817_7 Front Floor Console Wiring Harness (D07 / DCK)
(12) SP1451 Front Floor Console Wiring Harness (D07 / DCK)
(13) SP8924_CN Front Floor Console Wiring Harness (C85)

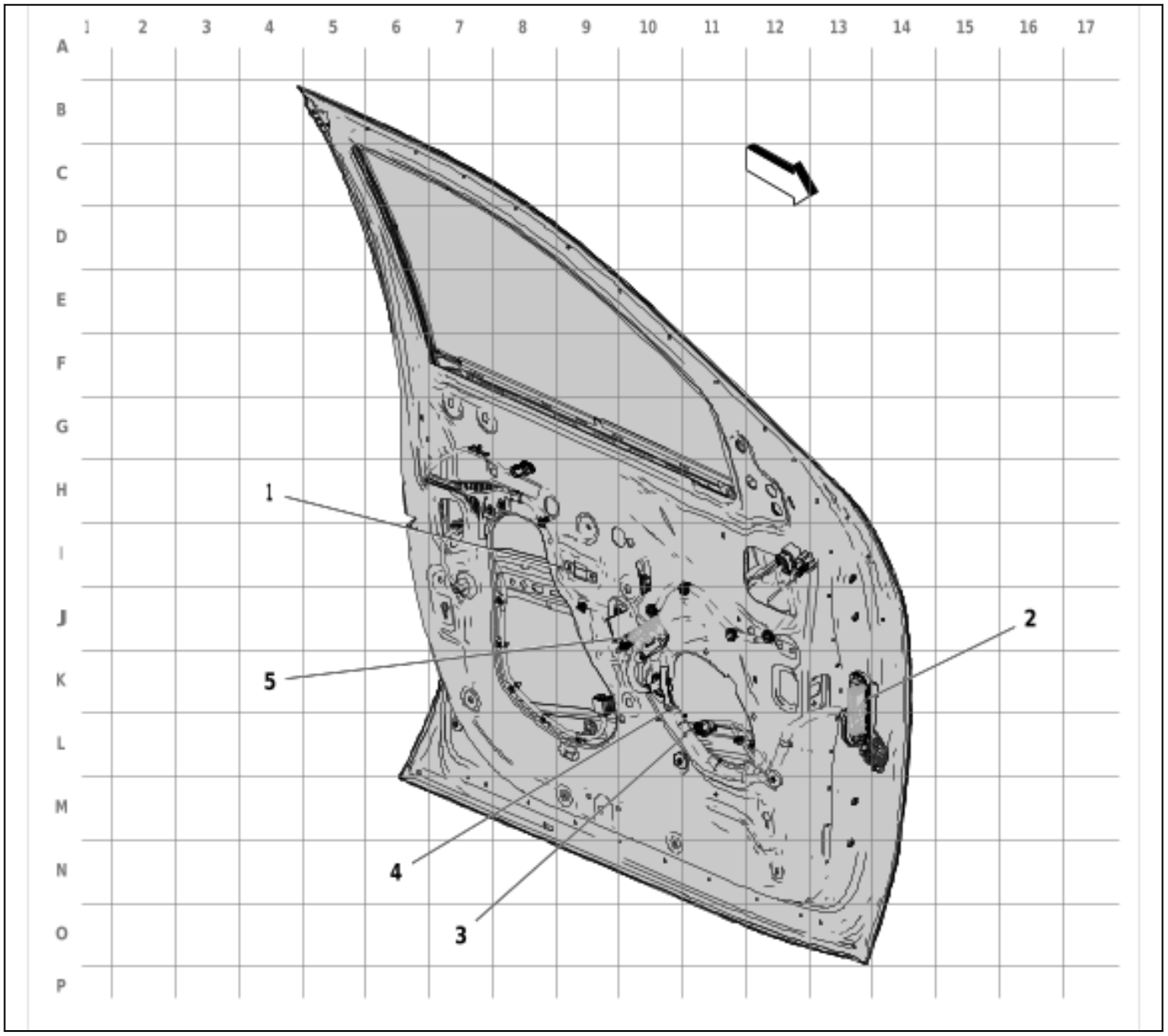
Headlamp Automatic Control Ambient Light Sensor Wiring Harness Routing (ASV)



7188705

Items
(1) X382 Headlamp Automatic Control Ambient Light Sensor Wiring Harness to Dome Lamp Wiring Harness (ASV)

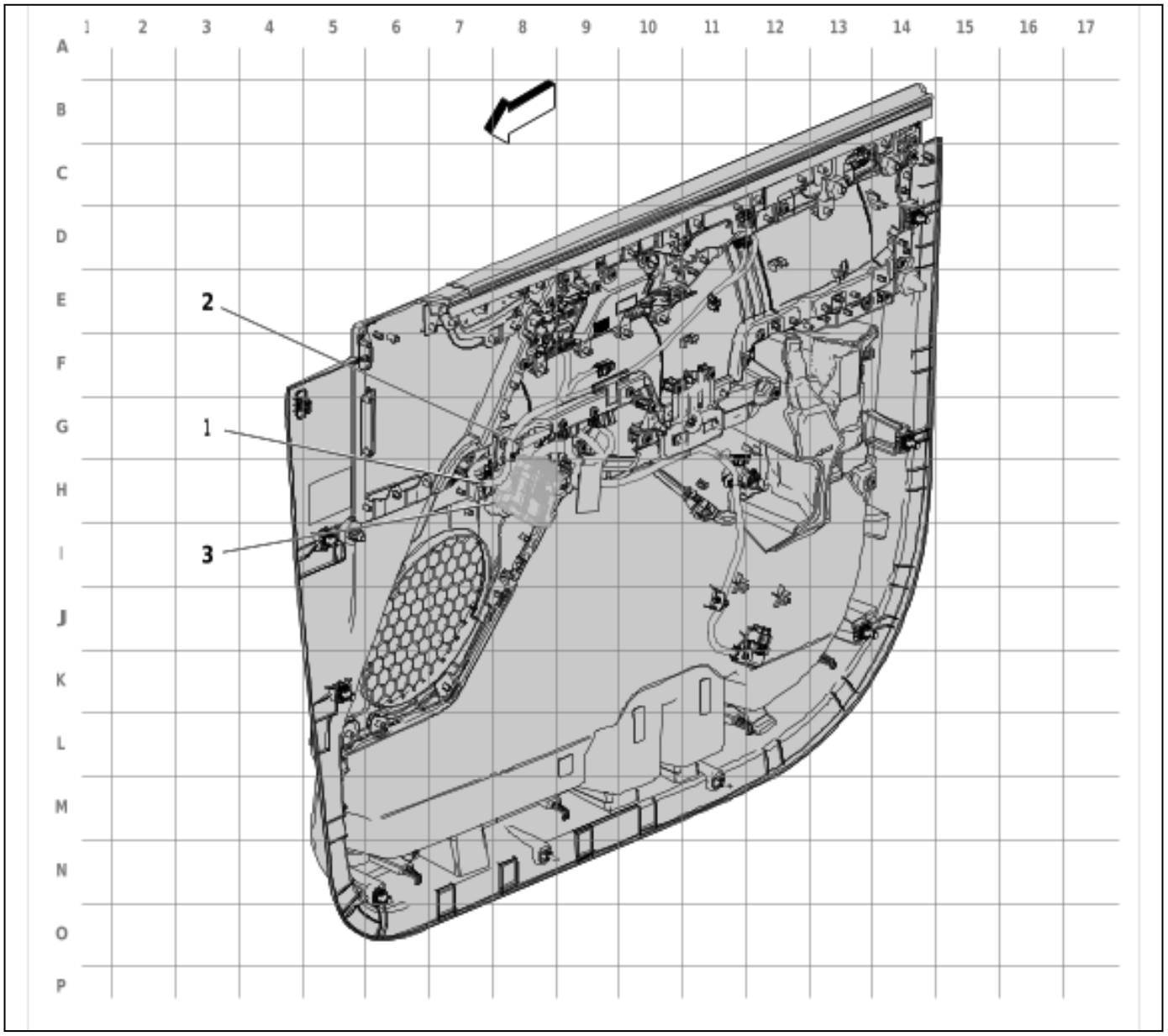
Front Side Door Door Wiring Harness - Driver Routing



7166265

Items
(1) SP1551_2 Front Side Door Door Wiring Harness - Driver ((BOK / BOR / BOY) & (A45 / ATH))
(2) X500 Front Side Door Door Wiring Harness - Driver to Body Wiring Harness
(3) SP6134_1 Front Side Door Door Wiring Harness - Driver
(4) SP1550_1 Front Side Door Door Wiring Harness - Driver
(5) X505 Front Side Door Door Wiring Harness - Driver to Front Side Door Door Lock Door Wiring Harness - Driver

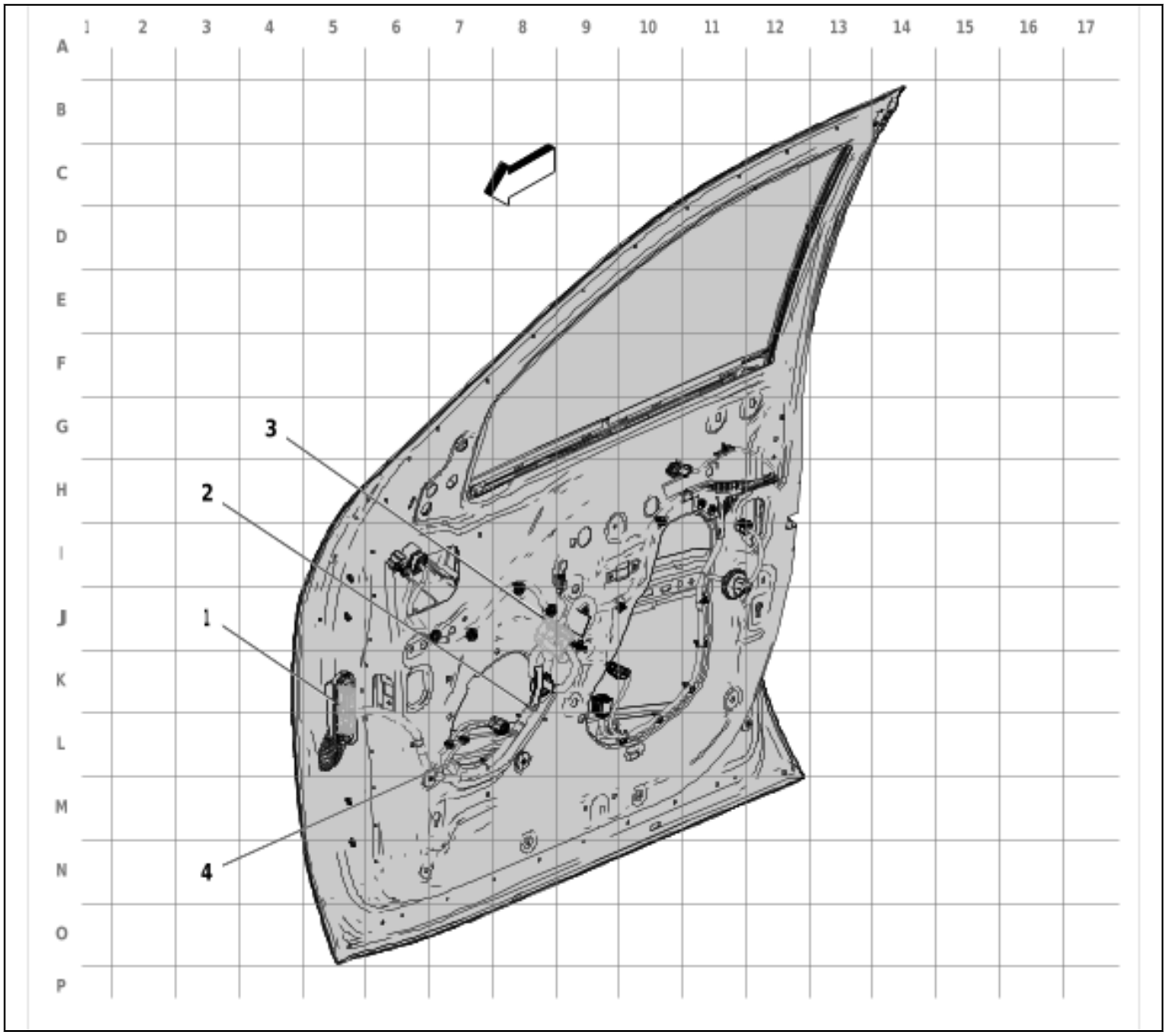
Front Side Door Door Lock Door Wiring Harness - Driver Routing



7166266

Items
(1) SP4849_LF Front Side Door Door Lock Door Wiring Harness - Driver (C85)
(2) SP1550 Front Side Door Door Lock Door Wiring Harness - Driver (C85)
(3) X505 Front Side Door Door Wiring Harness - Driver to Front Side Door Door Lock Door Wiring Harness - Driver

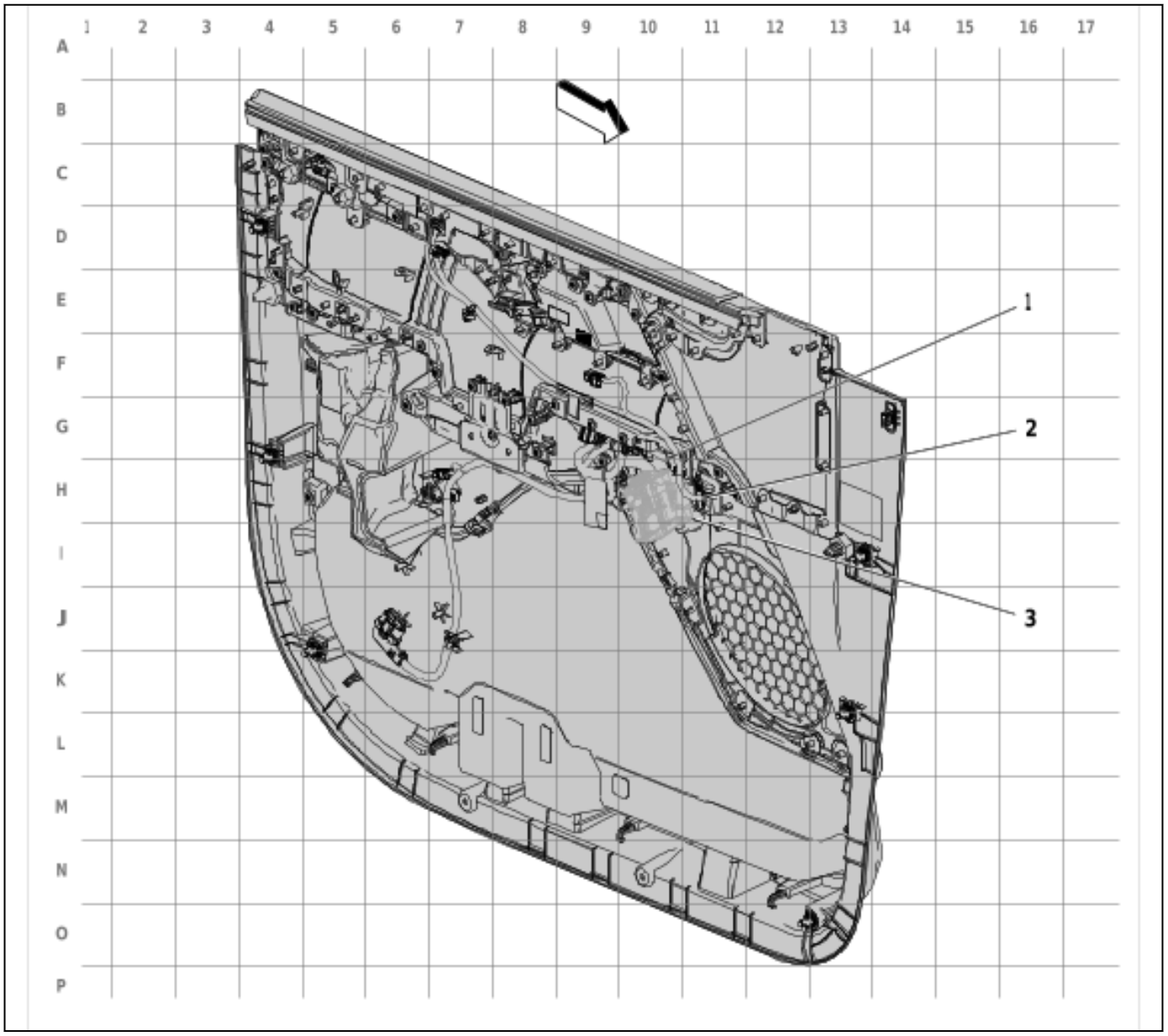
Front Side Door Door Wiring Harness - Passenger Routing



7166267

Items
(1) X600 Front Side Door Door Wiring Harness - Passenger to Body Wiring Harness
(2) SP1350_2 Front Side Door Door Wiring Harness - Passenger
(3) X605 Front Side Door Door Wiring Harness - Passenger to Front Side Door Door Lock Door Wiring Harness - Passenger
(4) SP6134_3 Front Side Door Door Wiring Harness - Passenger (WLN)

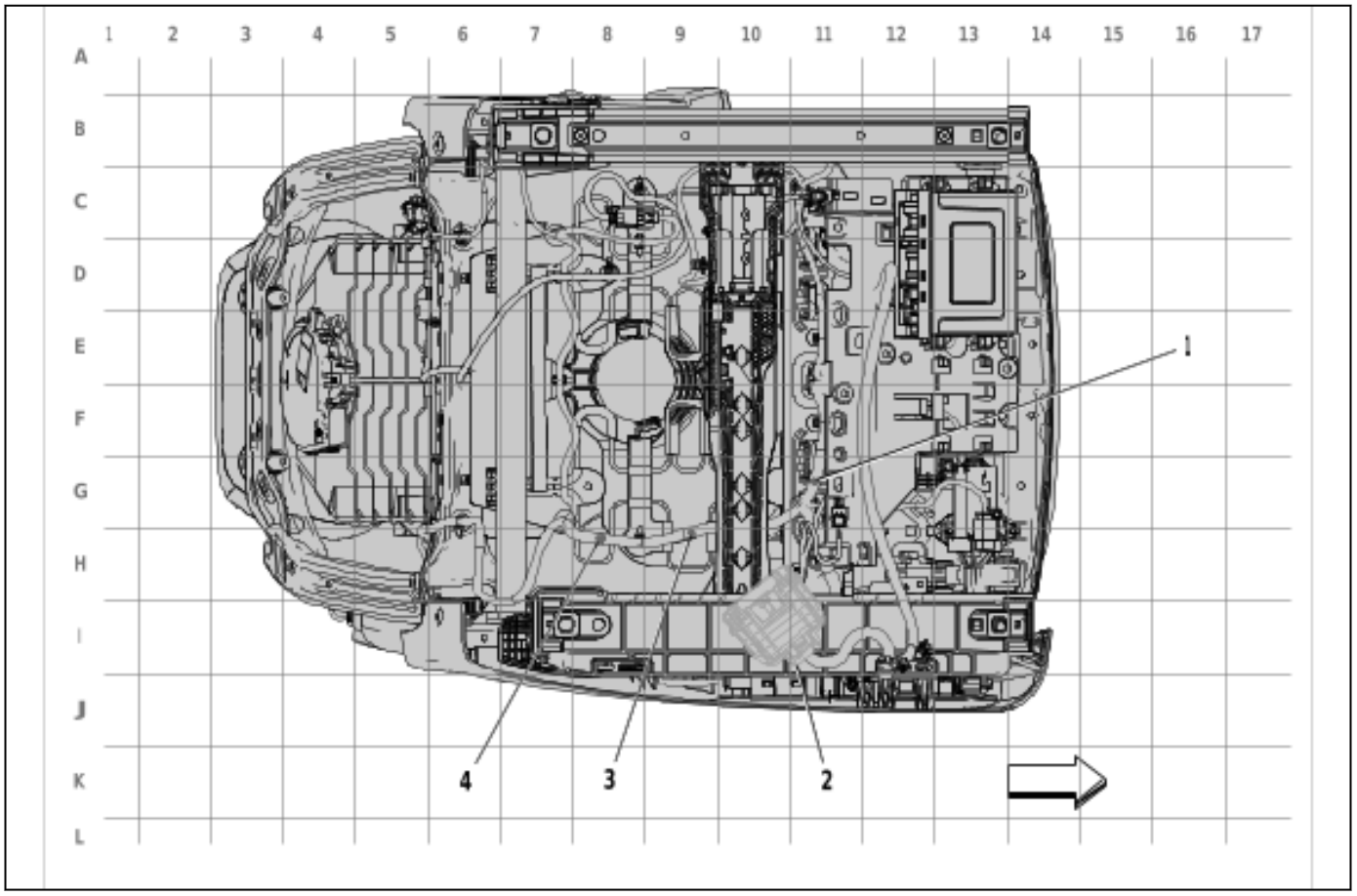
Front Side Door Door Lock Door Wiring Harness - Passenger Routing



7166268

Items
(1) SP1451_RF Front Side Door Door Lock Door Wiring Harness - Passenger (C85)
(2) SP4849_RF Front Side Door Door Lock Door Wiring Harness - Passenger (C85)
(3) X605 Front Side Door Door Wiring Harness - Passenger to Front Side Door Door Lock Door Wiring Harness - Passenger

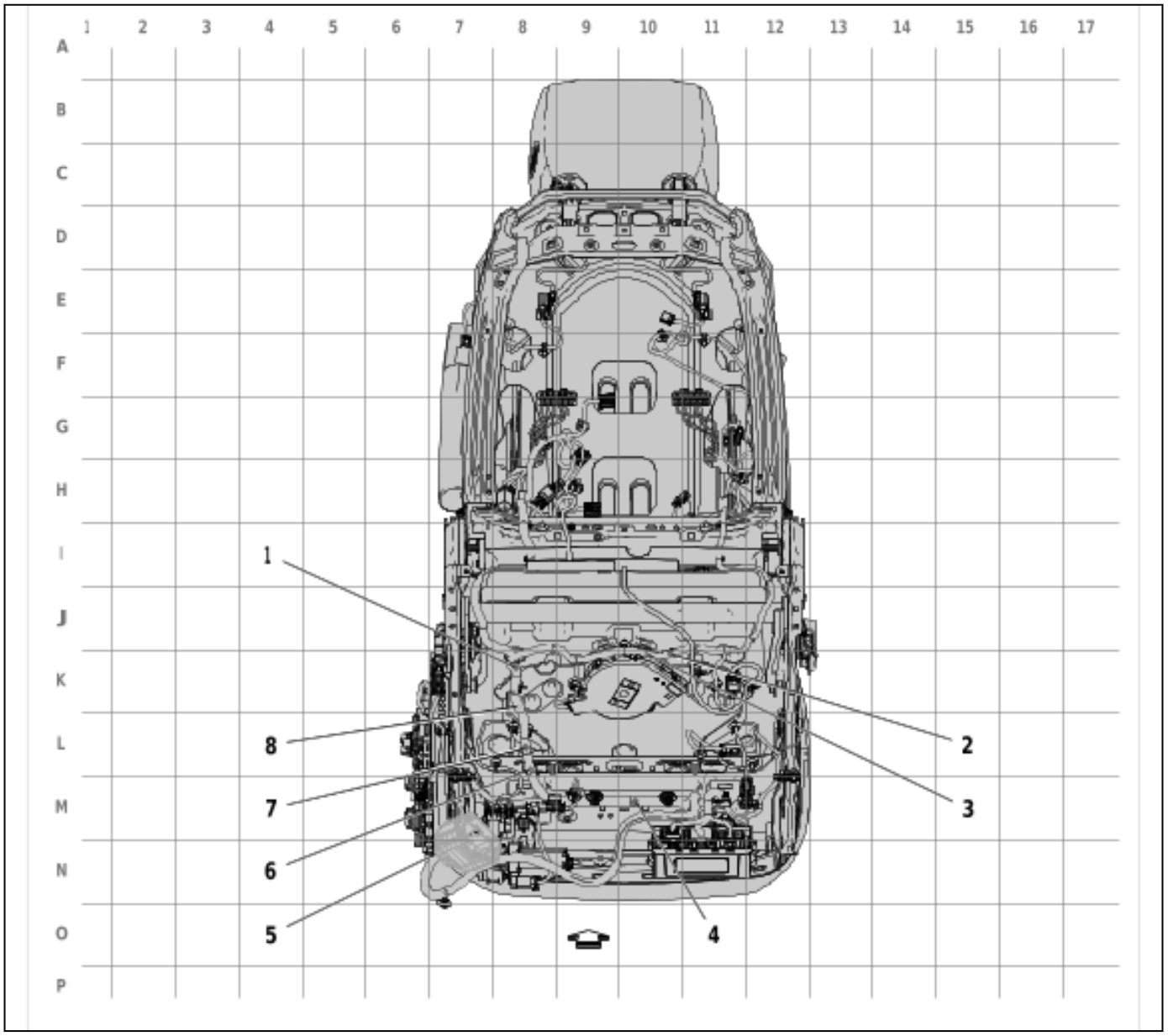
Front Seat Wiring Harness - Driver Routing (- A45)



7166273

Items
(1) SP1550_13 Front Seat Wiring Harness - Driver
(2) X331 Front Seat Wiring Harness - Driver to Body Wiring Harness
(3) SP2080_5 Front Seat Wiring Harness - Driver (KAM)
(4) SP2078_1 Front Seat Wiring Harness - Driver (KAM)

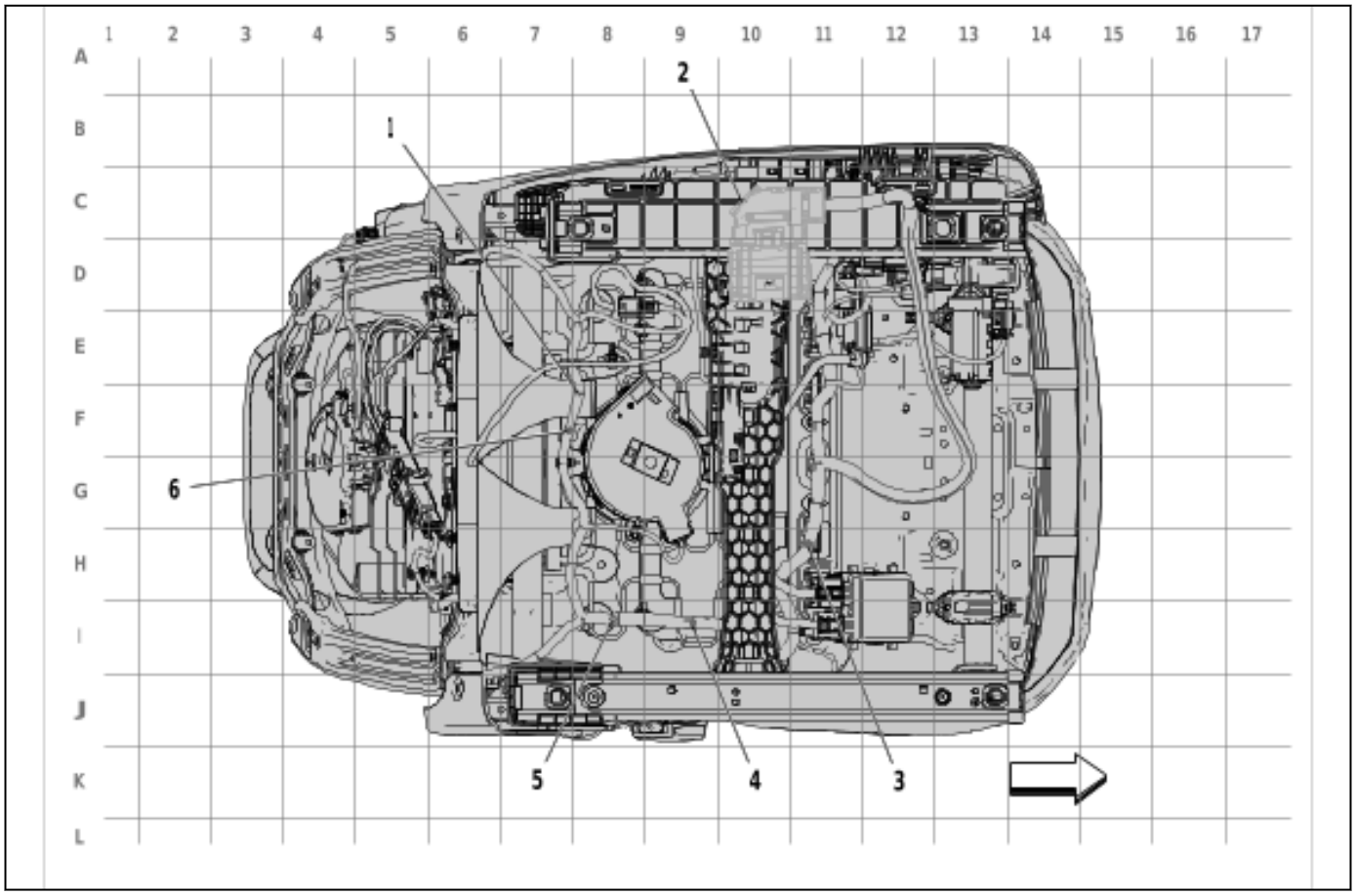
Front Seat Wiring Harness - Driver Routing (A45)



7166274

Items
(1) SP2078_1 Front Seat Wiring Harness - Driver (KAM)
(2) SP1139_1 Front Seat Wiring Harness - Driver (KU9)
(3) SP5906_1 Front Seat Wiring Harness - Driver (KU9)
(4) SP1550_13 Front Seat Wiring Harness - Driver
(5) X331 Front Seat Wiring Harness - Driver to Body Wiring Harness
(6) SP3758_1 Front Seat Wiring Harness - Driver (AVK)
(7) SP2240_1 Front Seat Wiring Harness - Driver (A45)
(8) SP2080_5 Front Seat Wiring Harness - Driver (KAM)

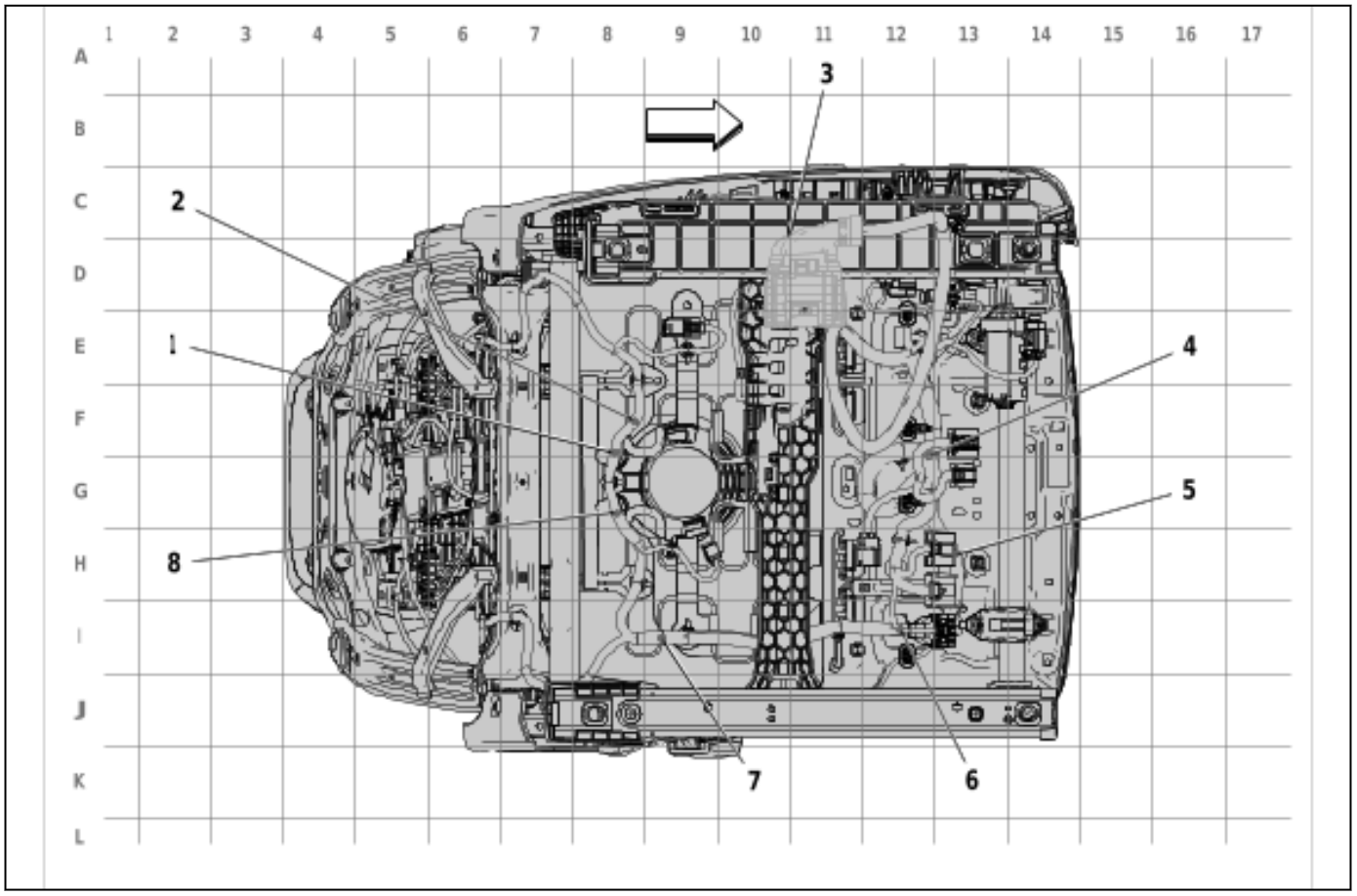
Front Seat Wiring Harness - Passenger Routing (- (AHH / AKE))



7175339

Items
(1) SP1139_2 Front Seat Wiring Harness - Passenger (KU9)
(2) X336 Front Seat Wiring Harness - Passenger to Body Wiring Harness
(3) SP1350_9 Front Seat Wiring Harness - Passenger (A7K)
(4) SP5908_1 Front Seat Wiring Harness - Passenger (KU9)
(5) SP1363_5 Front Seat Wiring Harness - Passenger
(6) SP2480_1 Front Seat Wiring Harness - Passenger (KAM)

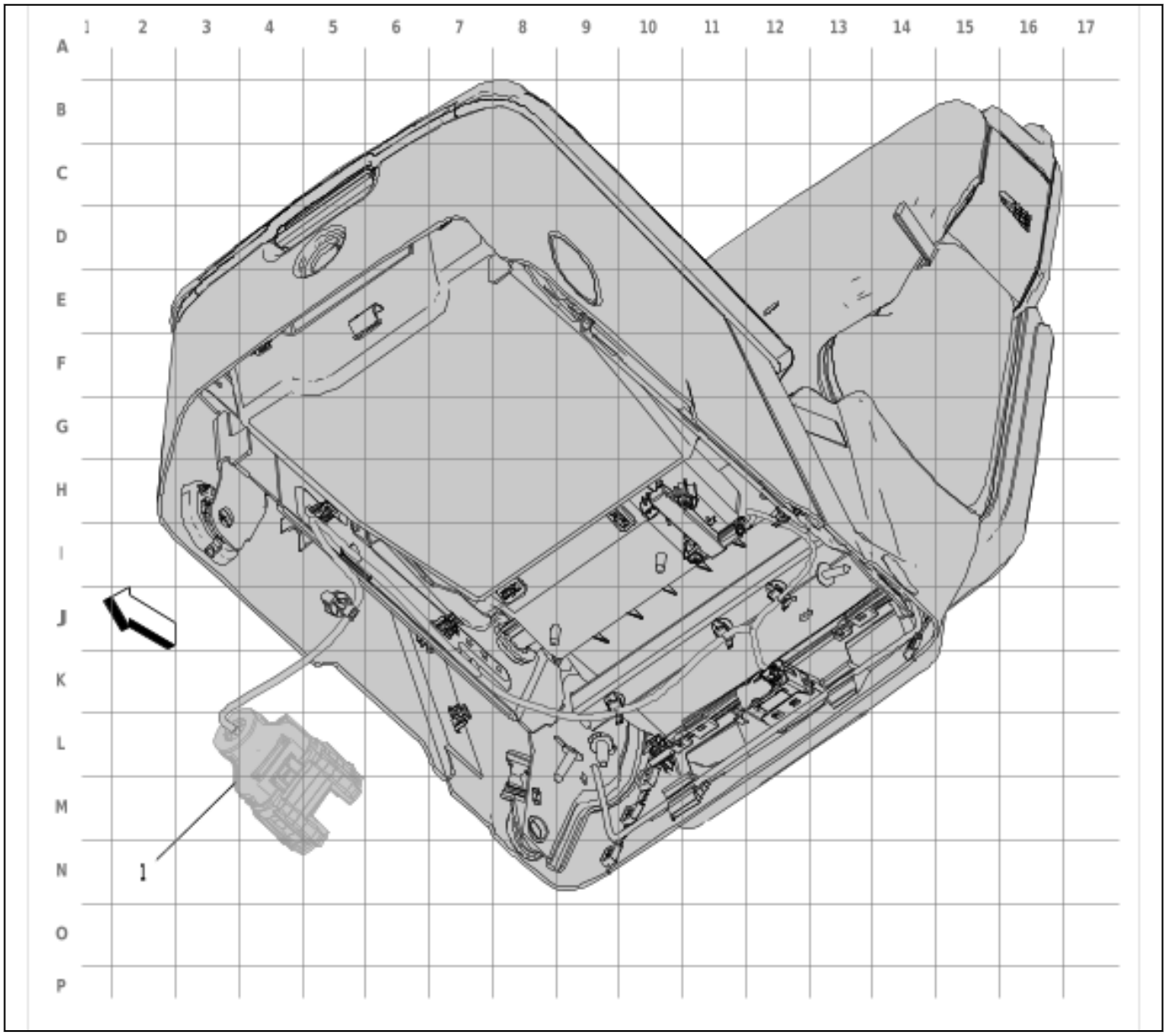
Front Seat Wiring Harness - Passenger Routing (AHH / AKE)



7166275

Items
(1) SP2480_1 Front Seat Wiring Harness - Passenger (KAM)
(2) SP1139_2 Front Seat Wiring Harness - Passenger (KU9)
(3) X336 Front Seat Wiring Harness - Passenger to Body Wiring Harness
(4) SP4116_1 Front Seat Wiring Harness - Passenger (AHH / AKE)
(5) SP1363_5 Front Seat Wiring Harness - Passenger
(6) SP2240_3 Front Seat Wiring Harness - Passenger (AHH / AKE)
(7) SP5908_1 Front Seat Wiring Harness - Passenger (KU9)
(8) SP1350_9 Front Seat Wiring Harness - Passenger (A7K)

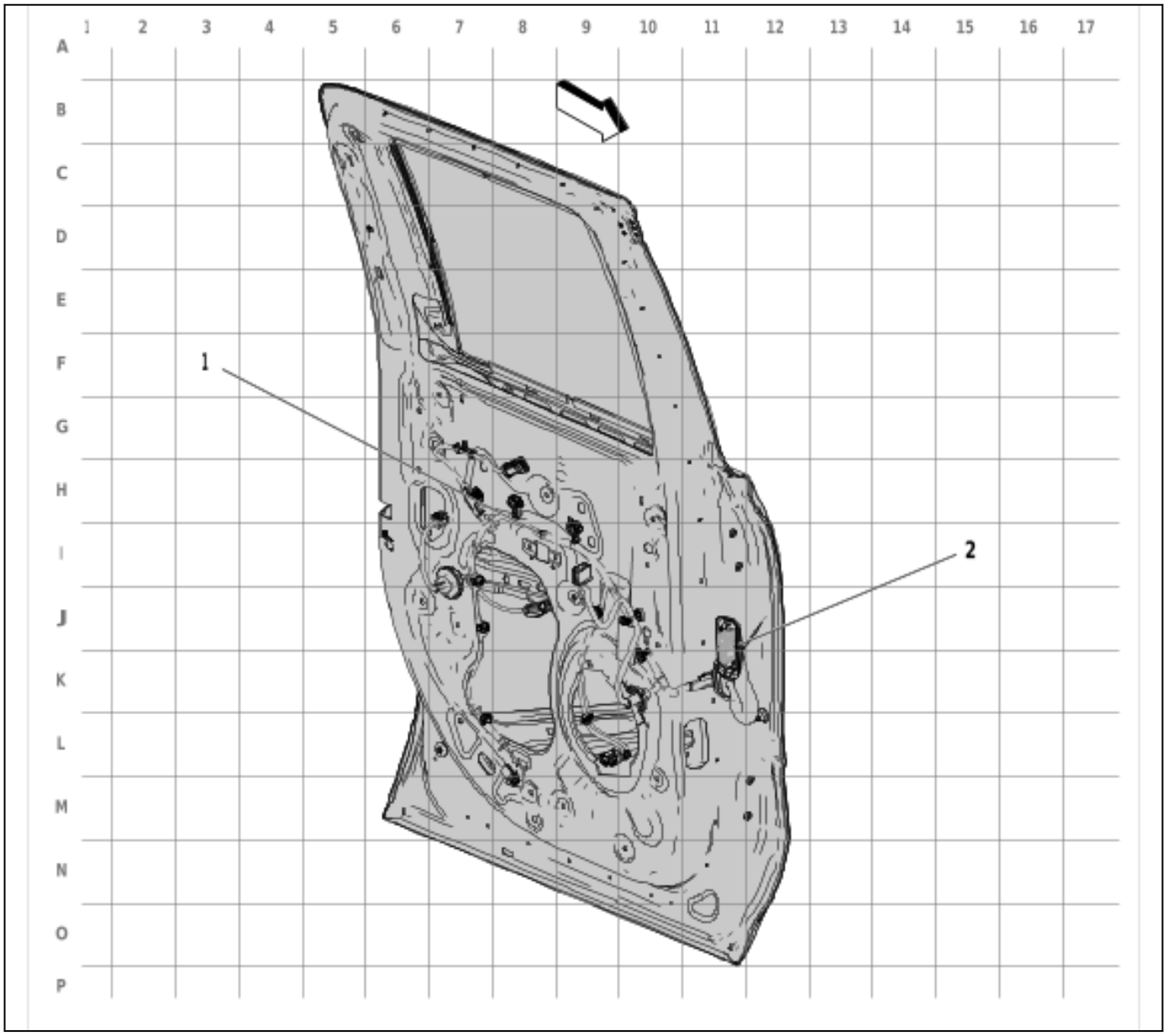
Front Seat Wiring Harness - Center Routing (AZ3 - 5Y1)



7166276

Items
(1) X227 Front Floor Console Wiring Harness to Body Wiring Harness

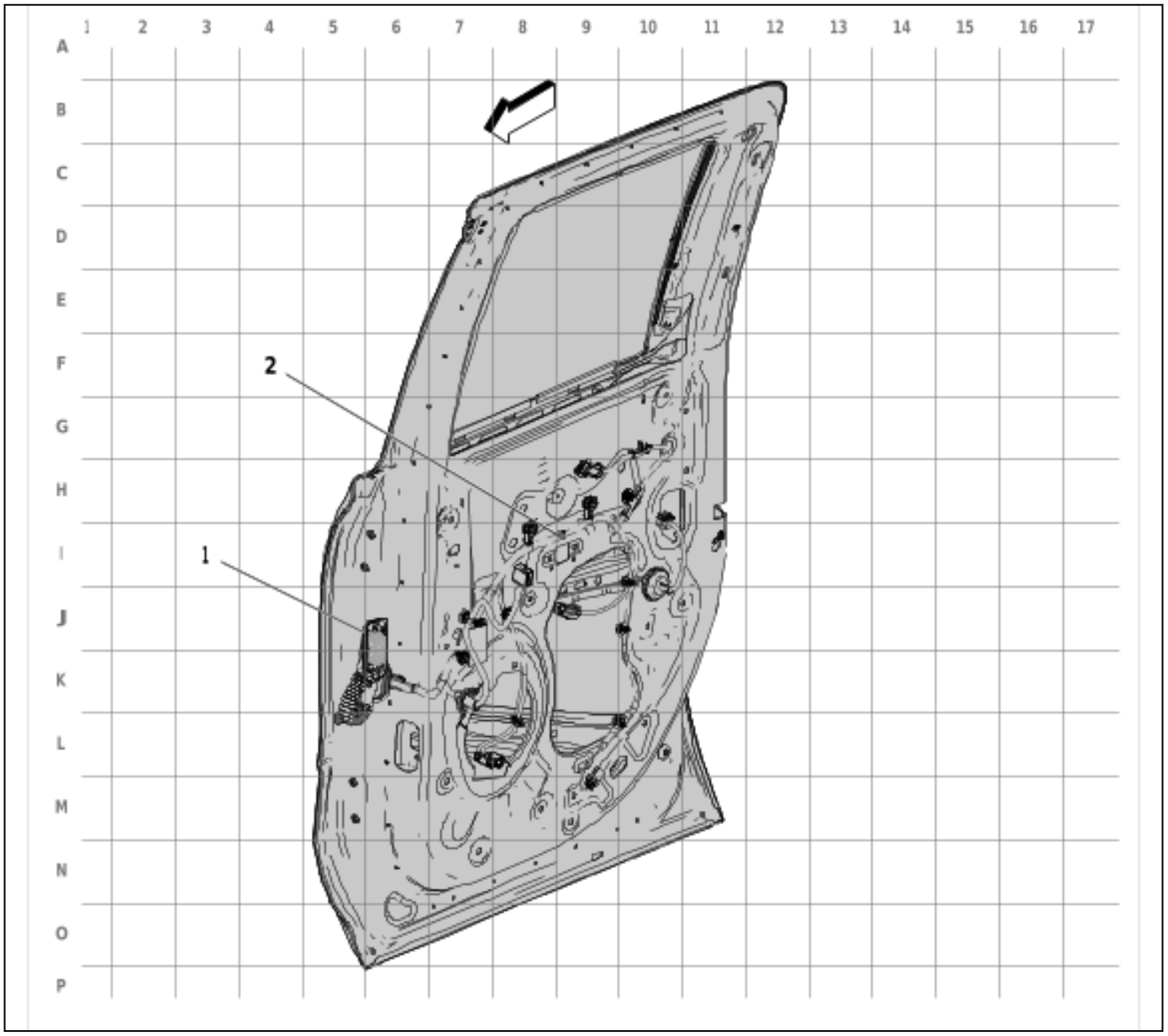
Rear Side Door Door Wiring Harness - Left Routing - Double Cab



7166269

Items
(1) SP1550_2 Rear Side Door Door Wiring Harness - Left (4-Door)
(2) X700 Rear Side Door Door Wiring Harness - Left to Body Wiring Harness (4-Door)

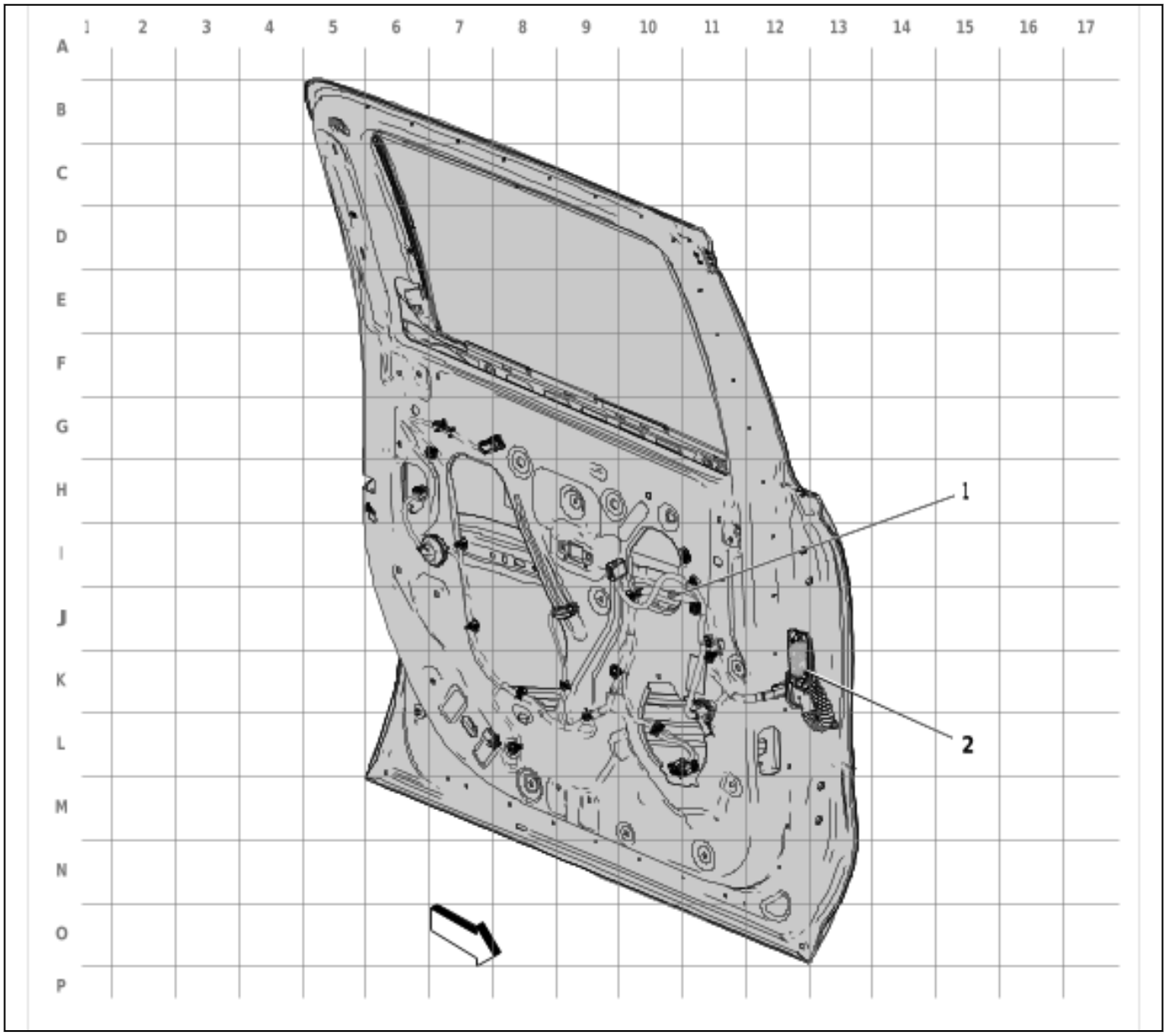
Rear Side Door Door Wiring Harness - Right Routing - Double Cab



7166270

Items
(1) X800 Rear Side Door Door Wiring Harness - Right to Body Wiring Harness (4-Door)
(2) SP1350_5 Rear Side Door Door Wiring Harness - Right (4-Door)

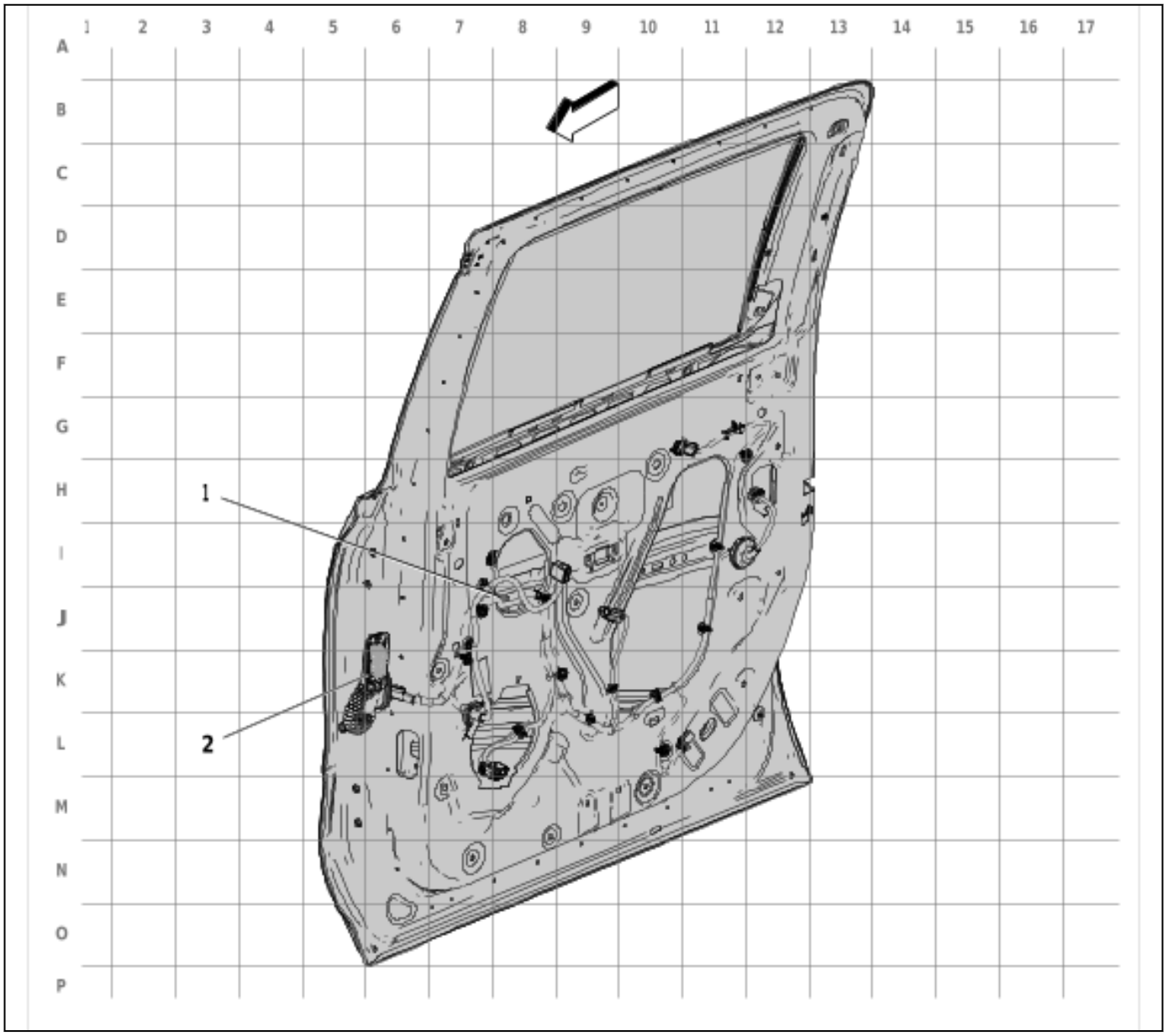
Rear Side Door Door Wiring Harness - Left Routing - Crew Cab



7166271

Items
(1) SP1550_2 Rear Side Door Door Wiring Harness - Left (4-Door)
(2) X700 Rear Side Door Door Wiring Harness - Left to Body Wiring Harness (4-Door)

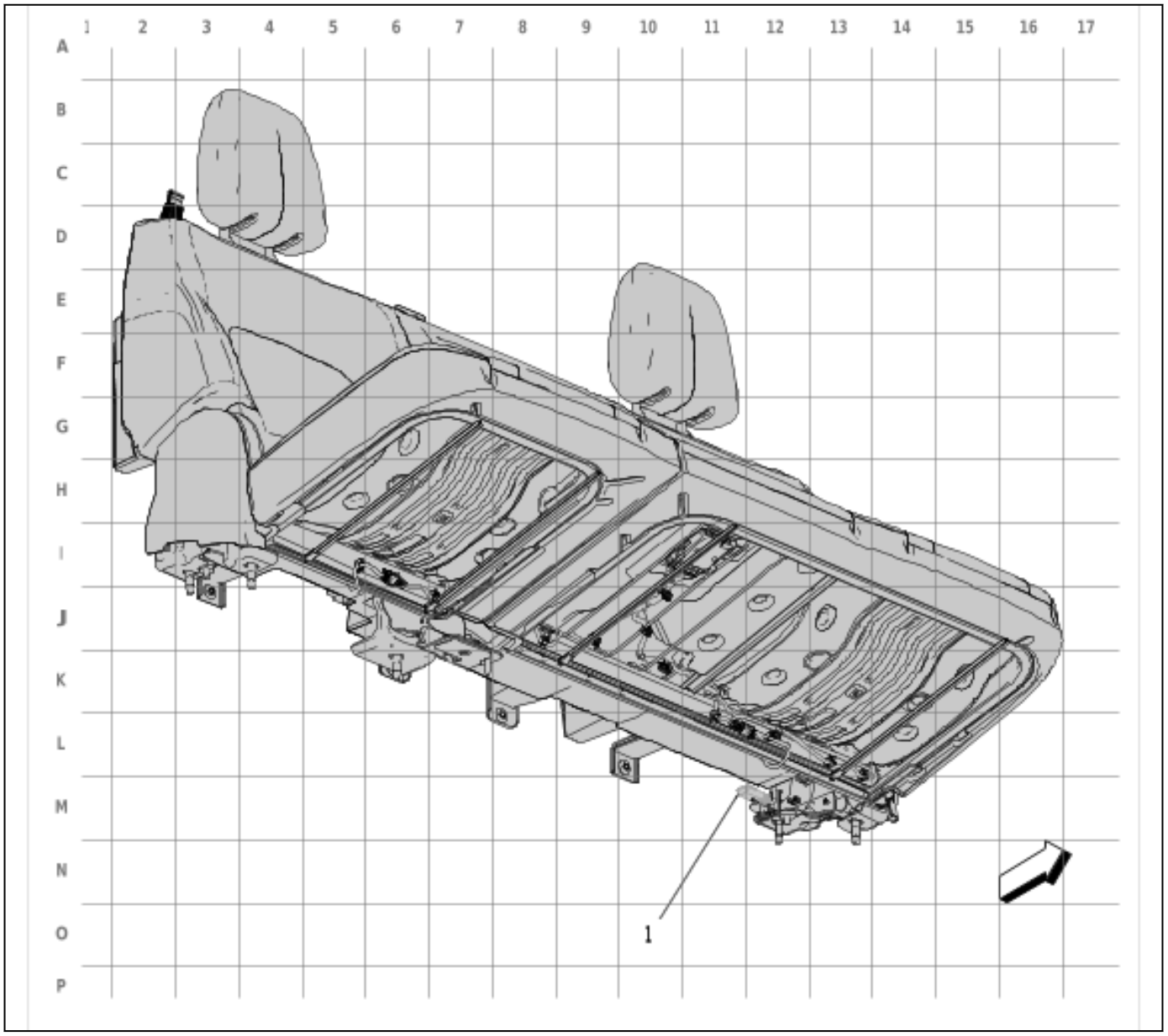
Rear Side Door Door Wiring Harness - Right Routing - Crew Cab



7166272

Items
(1) SP1350_5 Rear Side Door Door Wiring Harness - Right (4-Door)
(2) X800 Rear Side Door Door Wiring Harness - Right to Body Wiring Harness (4-Door)

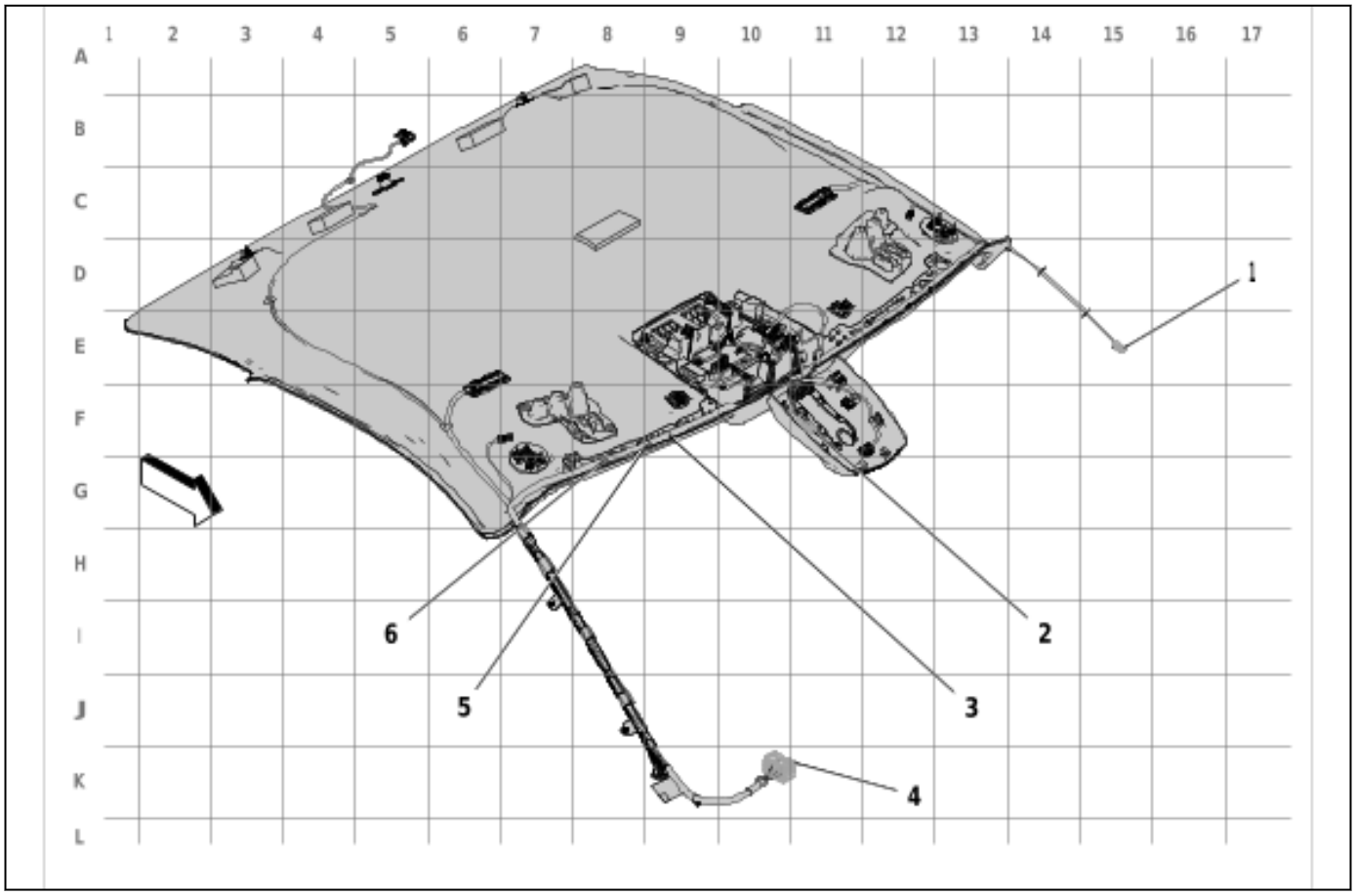
Rear Seat Heater Control Wiring Harness Routing (KCB)



7166277

Items
(1) X340 Body Wiring Harness to Rear Seat Heater Control Wiring Harness (KCB)

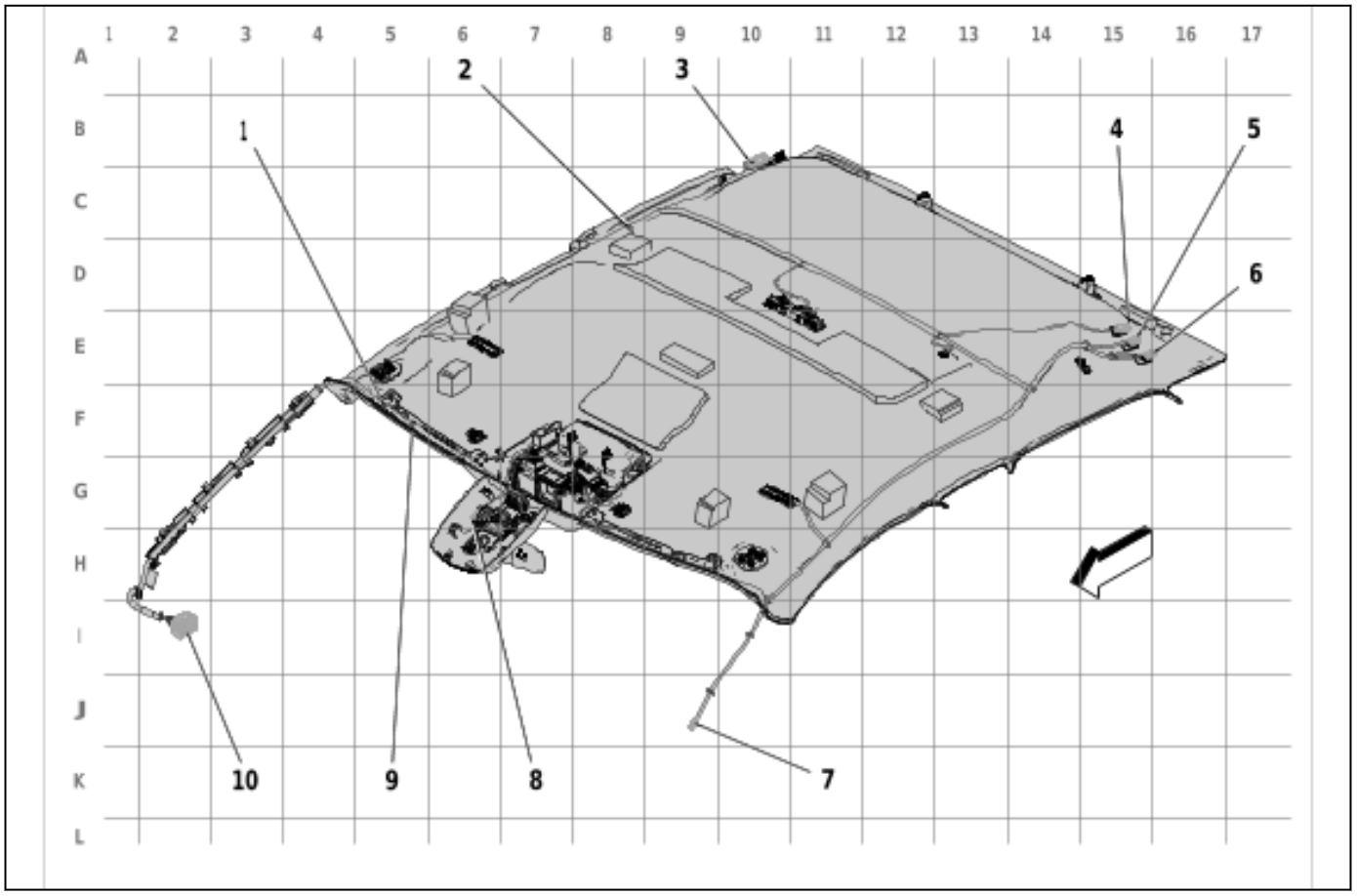
Dome Lamp Wiring Harness Routing - Regular Cab



7175709

Items
(1) X393 Dome Lamp Wiring Harness to Instrument Panel Wiring Harness (4-Door / UCV)
(2) X382 Headlamp Automatic Control Ambient Light Sensor Wiring Harness to Dome Lamp Wiring Harness (ASV)
(3) SP1050_4H Dome Lamp Wiring Harness
(4) X370 Dome Lamp Wiring Harness to Instrument Panel Wiring Harness
(5) SP851_3 Dome Lamp Wiring Harness
(6) SP240_1 Dome Lamp Wiring Harness (ASV / BOK / BOR / BOY / UK0 / UKL)

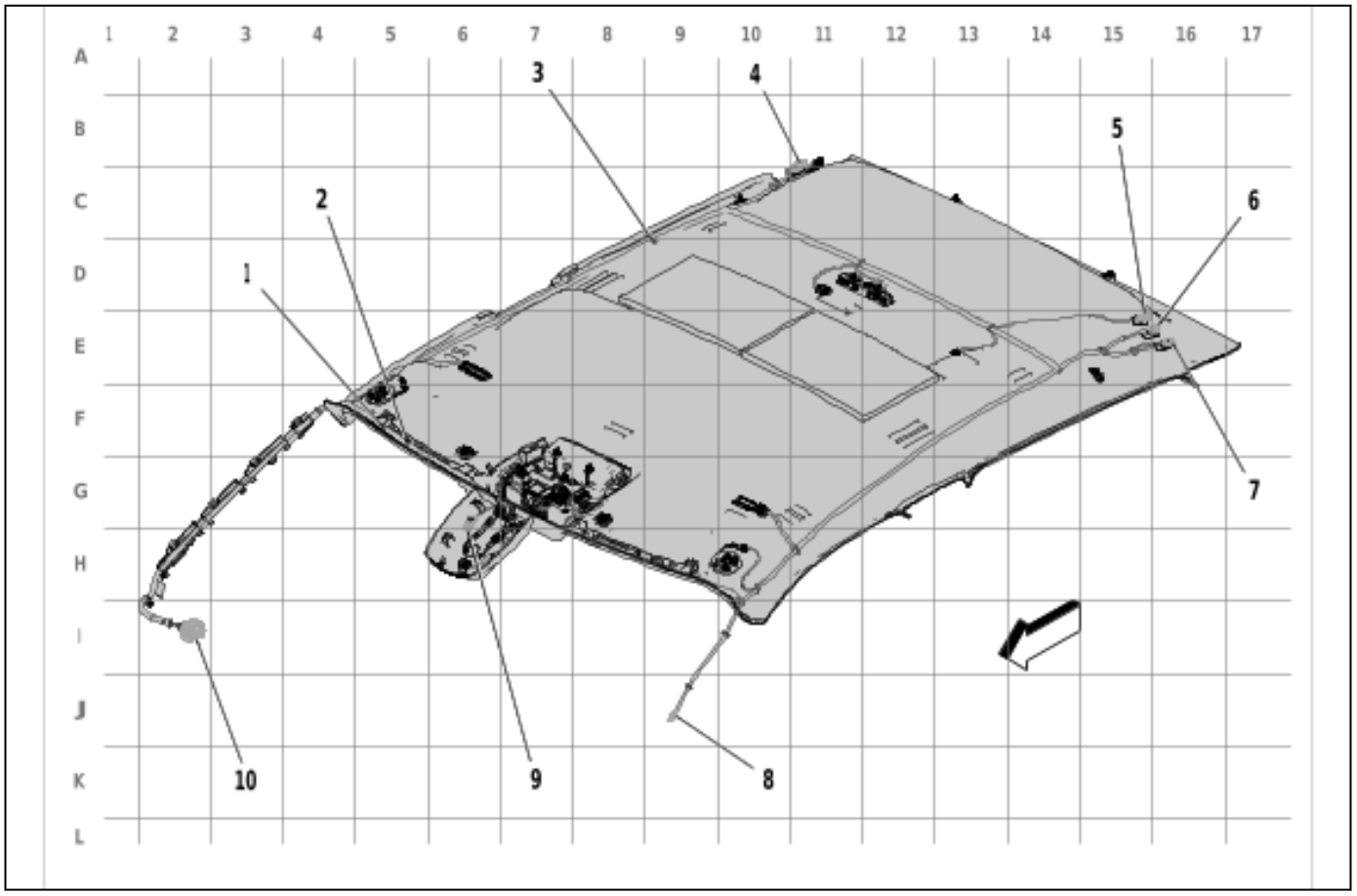
Dome Lamp Wiring Harness Routing - Double Cab



7175710

Items
(1) SP240_1 Dome Lamp Wiring Harness (ASV / BOK / BOR / BOY / UK0 / UKL)
(2) SP1050_4H Dome Lamp Wiring Harness
(3) X376 Body Wiring Harness to Dome Lamp Wiring Harness (4-Door)
(4) X371 Roof Rear Spoiler Wiring Harness to Dome Lamp Wiring Harness (4-Door)
(5) X985 Roof Rear Spoiler Wiring Harness to Dome Lamp Wiring Harness (4-Door)
(6) X373 Body Wiring Harness to Dome Lamp Wiring Harness (4-Door)
(7) X393 Dome Lamp Wiring Harness to Instrument Panel Wiring Harness (4-Door / UCV)
(8) X382 Headlamp Automatic Control Ambient Light Sensor Wiring Harness to Dome Lamp Wiring Harness (ASV)
(9) SP851_3 Dome Lamp Wiring Harness
(10) X370 Dome Lamp Wiring Harness to Instrument Panel Wiring Harness

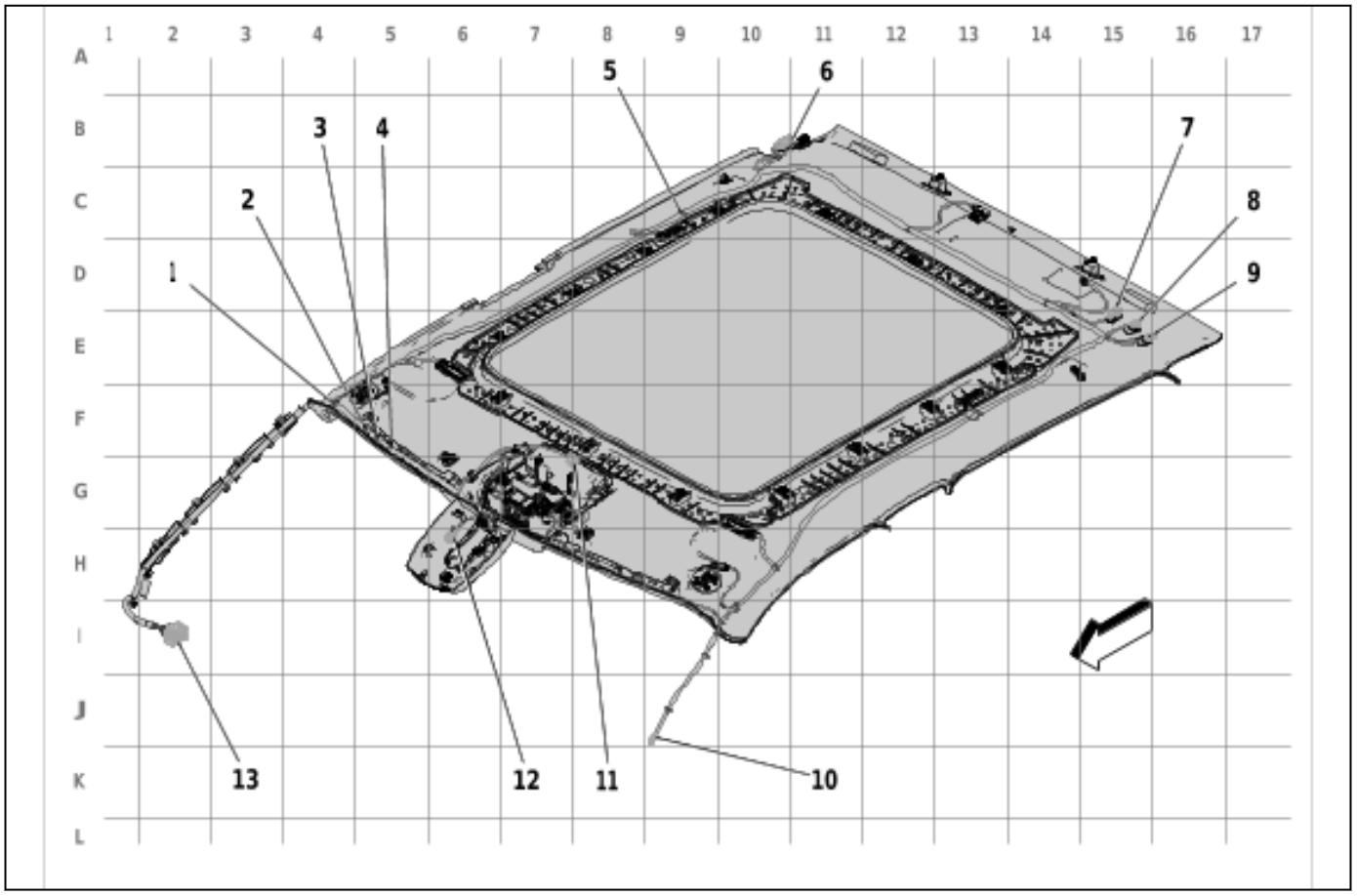
Dome Lamp Wiring Harness Routing - Crew Cab (- CAJ)



7175711

Items
(1) SP240_1 Dome Lamp Wiring Harness (ASV / BOK / BOR / BOY / UK0 / UKL)
(2) SP851_3 Dome Lamp Wiring Harness
(3) SP1050_4H Dome Lamp Wiring Harness
(4) X376 Body Wiring Harness to Dome Lamp Wiring Harness (4-Door)
(5) X371 Roof Rear Spoiler Wiring Harness to Dome Lamp Wiring Harness (4-Door)
(6) X985 Roof Rear Spoiler Wiring Harness to Dome Lamp Wiring Harness (4-Door)
(7) X373 Body Wiring Harness to Dome Lamp Wiring Harness (4-Door)
(8) X393 Dome Lamp Wiring Harness to Instrument Panel Wiring Harness (4-Door / UCV)
(9) X382 Headlamp Automatic Control Ambient Light Sensor Wiring Harness to Dome Lamp Wiring Harness (ASV)
(10) X370 Dome Lamp Wiring Harness to Instrument Panel Wiring Harness

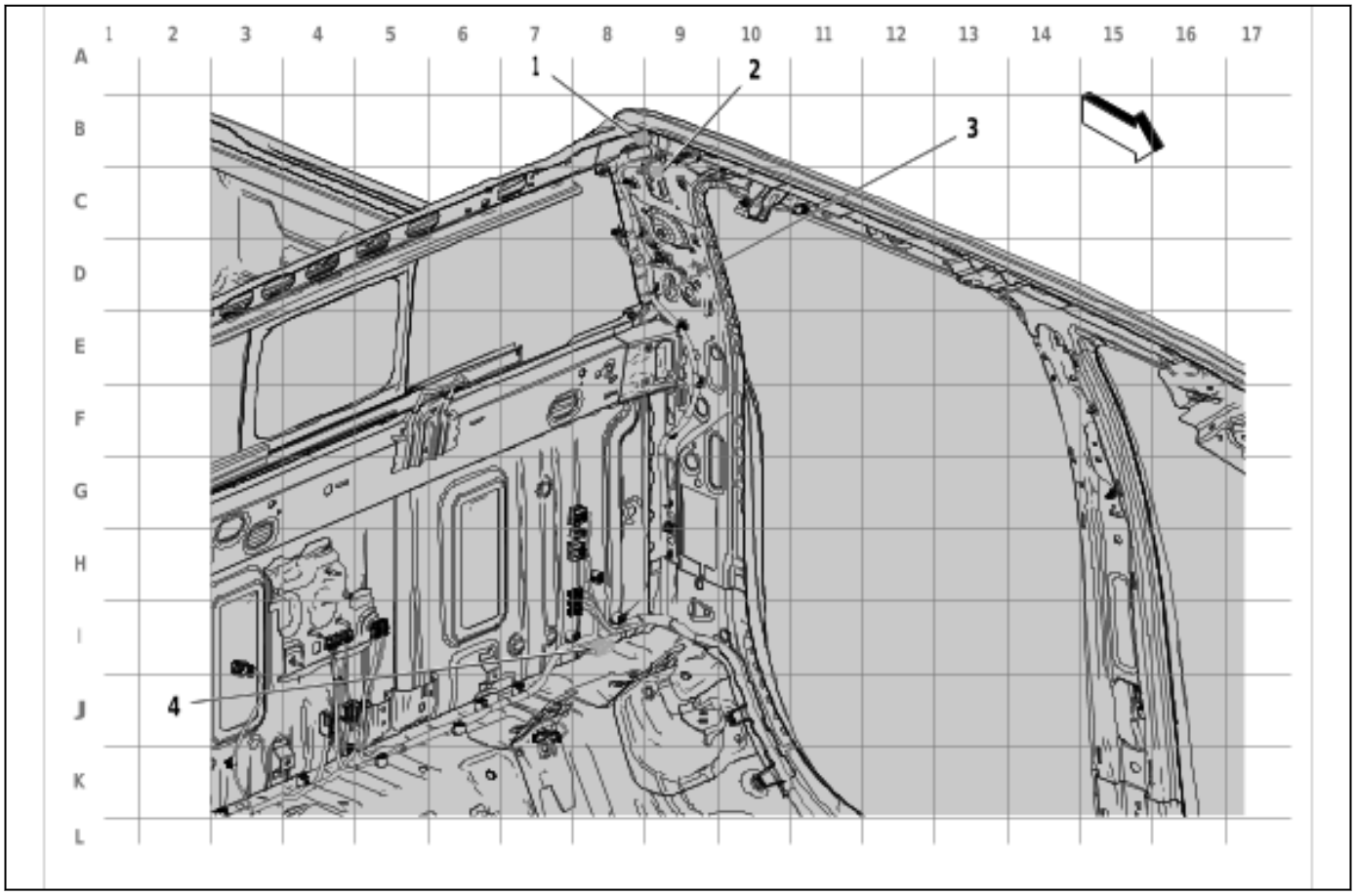
Dome Lamp Wiring Harness Routing - Crew Cab (CAJ)



7175712

Items
(1) SP1050_5 Dome Lamp Wiring Harness (CAJ)
(2) SP240_1 Dome Lamp Wiring Harness (ASV / BOK / BOR / BOY / UK0 / UKL)
(3) SP2854_1 Dome Lamp Wiring Harness (CAJ)
(4) SP851_3 Dome Lamp Wiring Harness
(5) SP1050_4H Dome Lamp Wiring Harness
(6) X376 Body Wiring Harness to Dome Lamp Wiring Harness (4-Door)
(7) X371 Roof Rear Spoiler Wiring Harness to Dome Lamp Wiring Harness (4-Door)
(8) X985 Roof Rear Spoiler Wiring Harness to Dome Lamp Wiring Harness (4-Door)
(9) X373 Body Wiring Harness to Dome Lamp Wiring Harness (4-Door)
(10) X393 Dome Lamp Wiring Harness to Instrument Panel Wiring Harness (4-Door / UCV)
(11) X375 Dome Lamp Wiring Harness to Sunroof Wiring Harness (CAJ)
(12) X382 Headlamp Automatic Control Ambient Light Sensor Wiring Harness to Dome Lamp Wiring Harness (ASV)
(13) X370 Dome Lamp Wiring Harness to Instrument Panel Wiring Harness

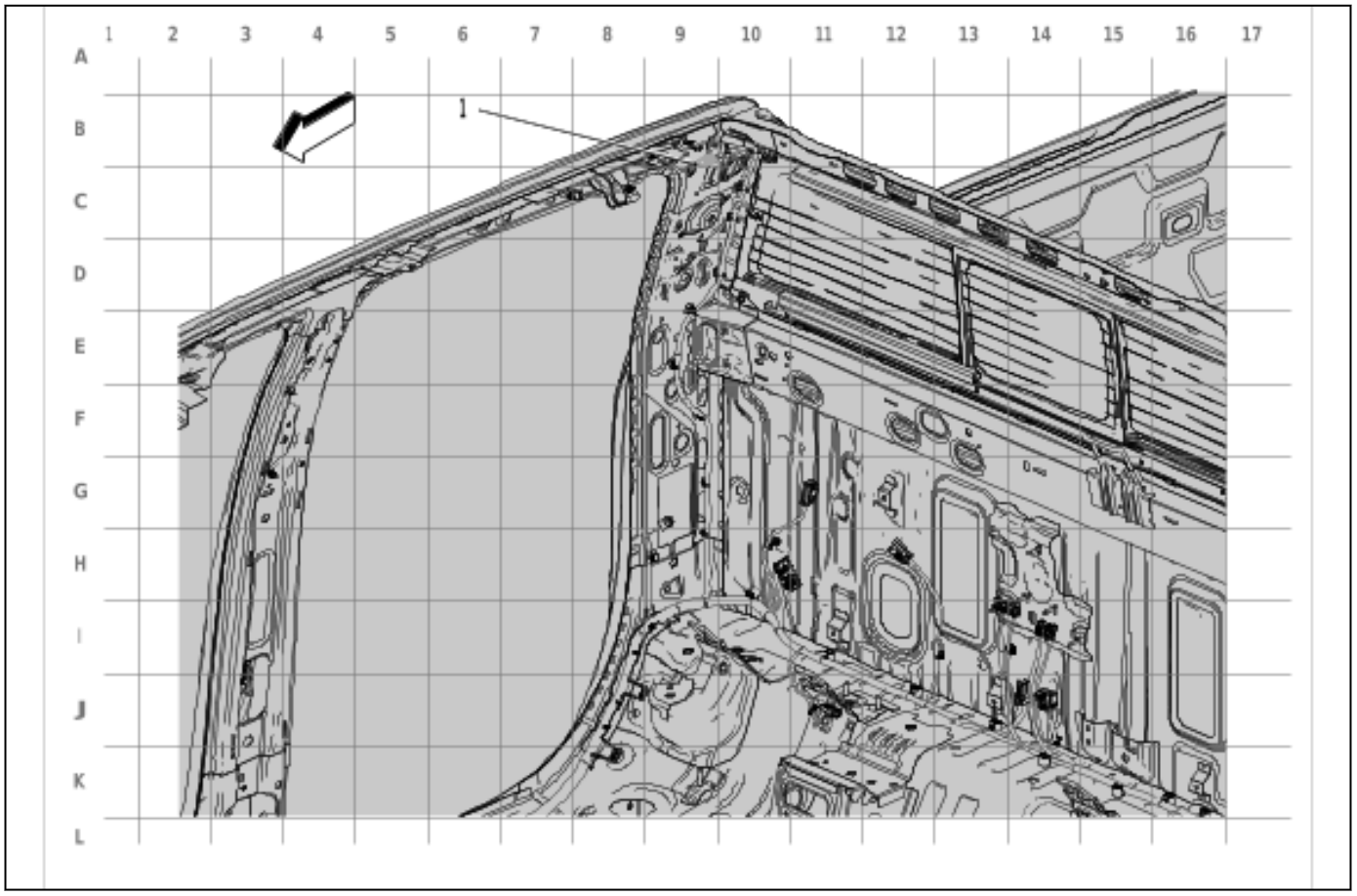
Body Harness Routing - Passenger Compartment Left Rear - 4-Door



7182720

Items
(1) X309 Roof Rear Spoiler Wiring Harness to Body Wiring Harness (4-Door)
(2) X373 Body Wiring Harness to Dome Lamp Wiring Harness (4-Door)
(3) W10GF Blunt Cut - Body Harness Ground Terminal Assurance 1551 (4-Door - (UK0 / UKL))
(4) X340 Body Wiring Harness to Rear Seat Heater Control Wiring Harness (KCB)

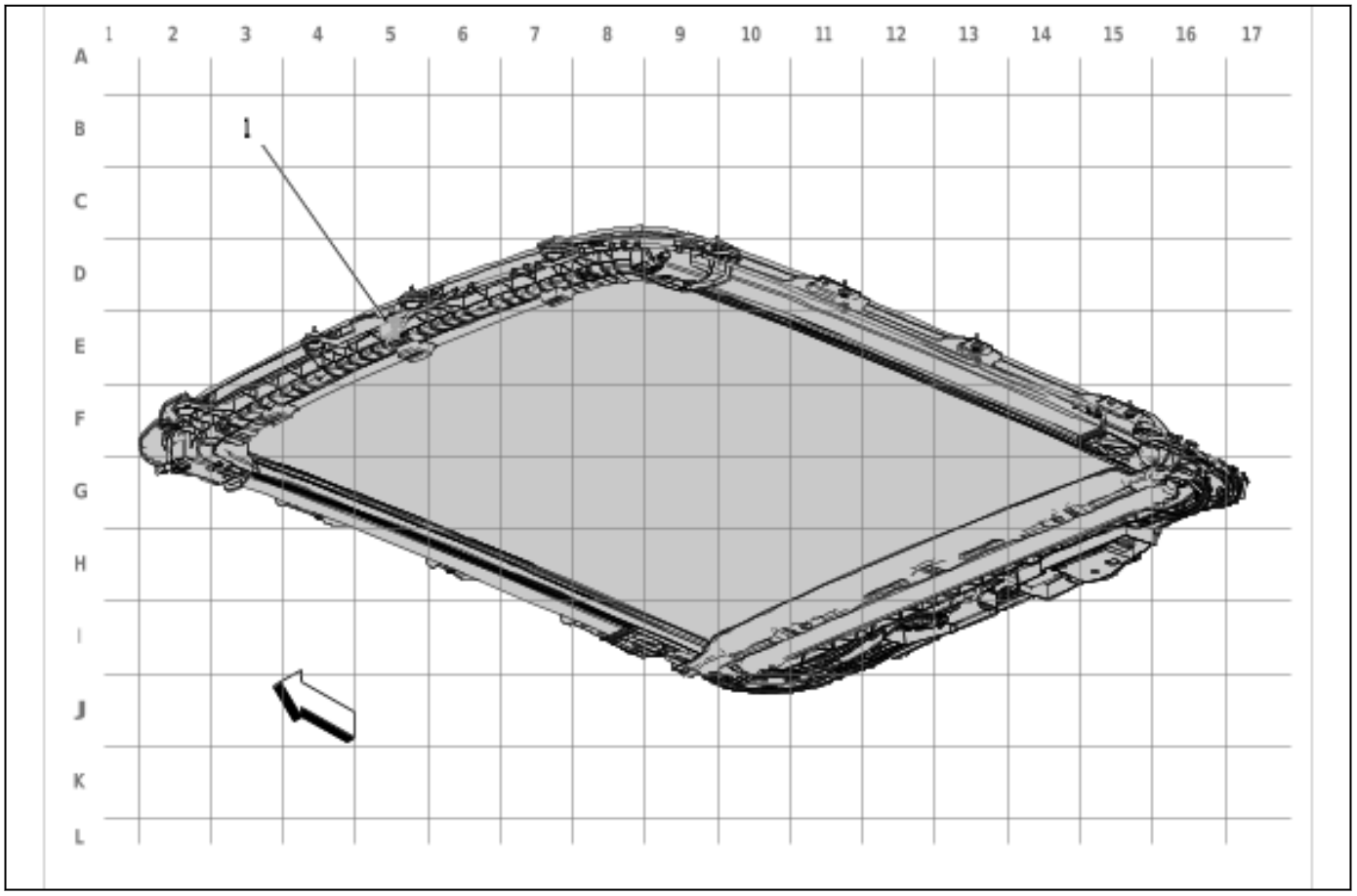
Body Harness Routing - Passenger Compartment Right Rear - 4-Door



7182721

Items
(1) X376 Body Wiring Harness to Dome Lamp Wiring Harness (4-Door)

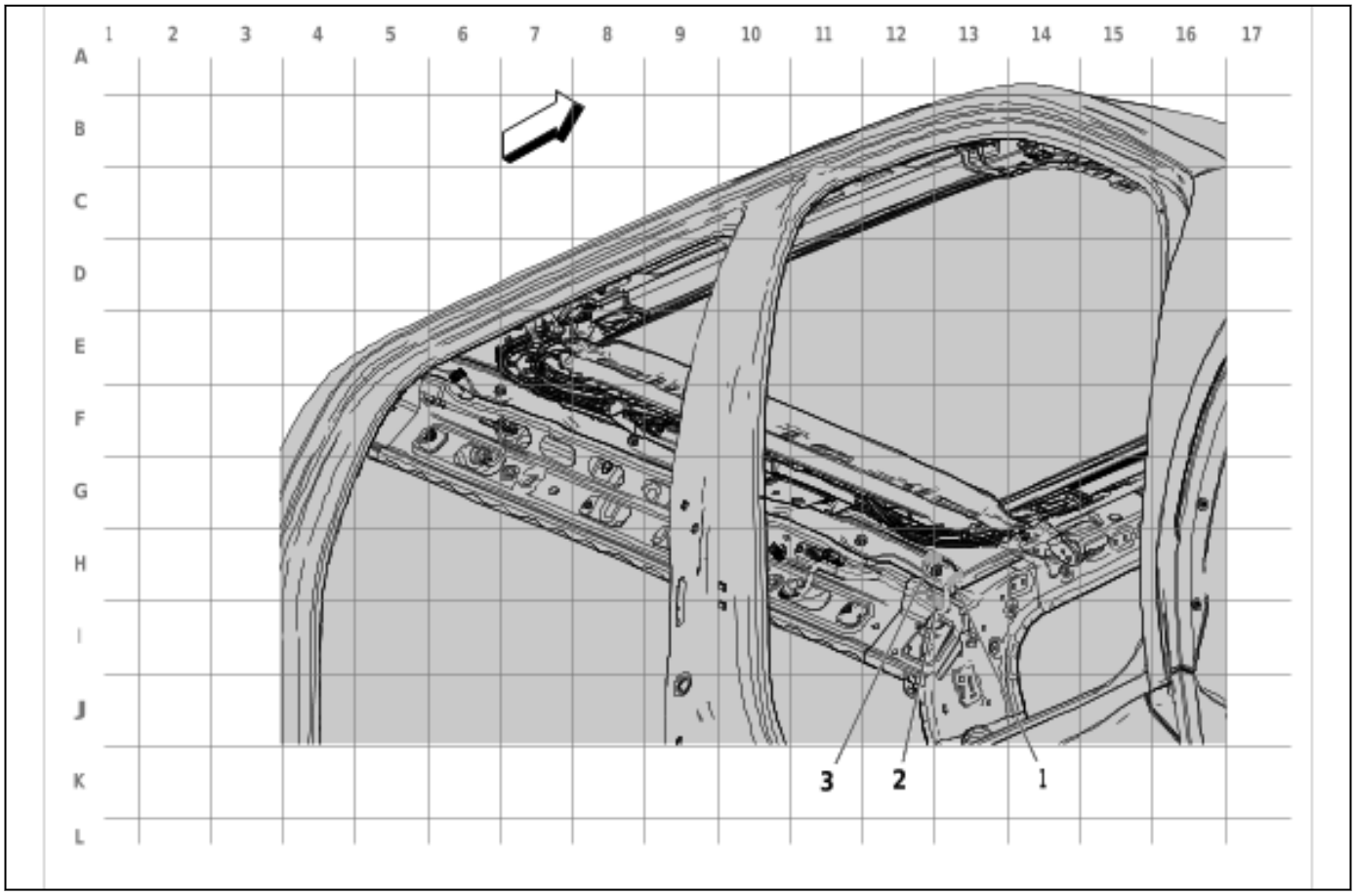
Sunroof Wiring Harness Routing (CAJ)



7155429

Items
(1) X375 Dome Lamp Wiring Harness to Sunroof Wiring Harness (CAJ)

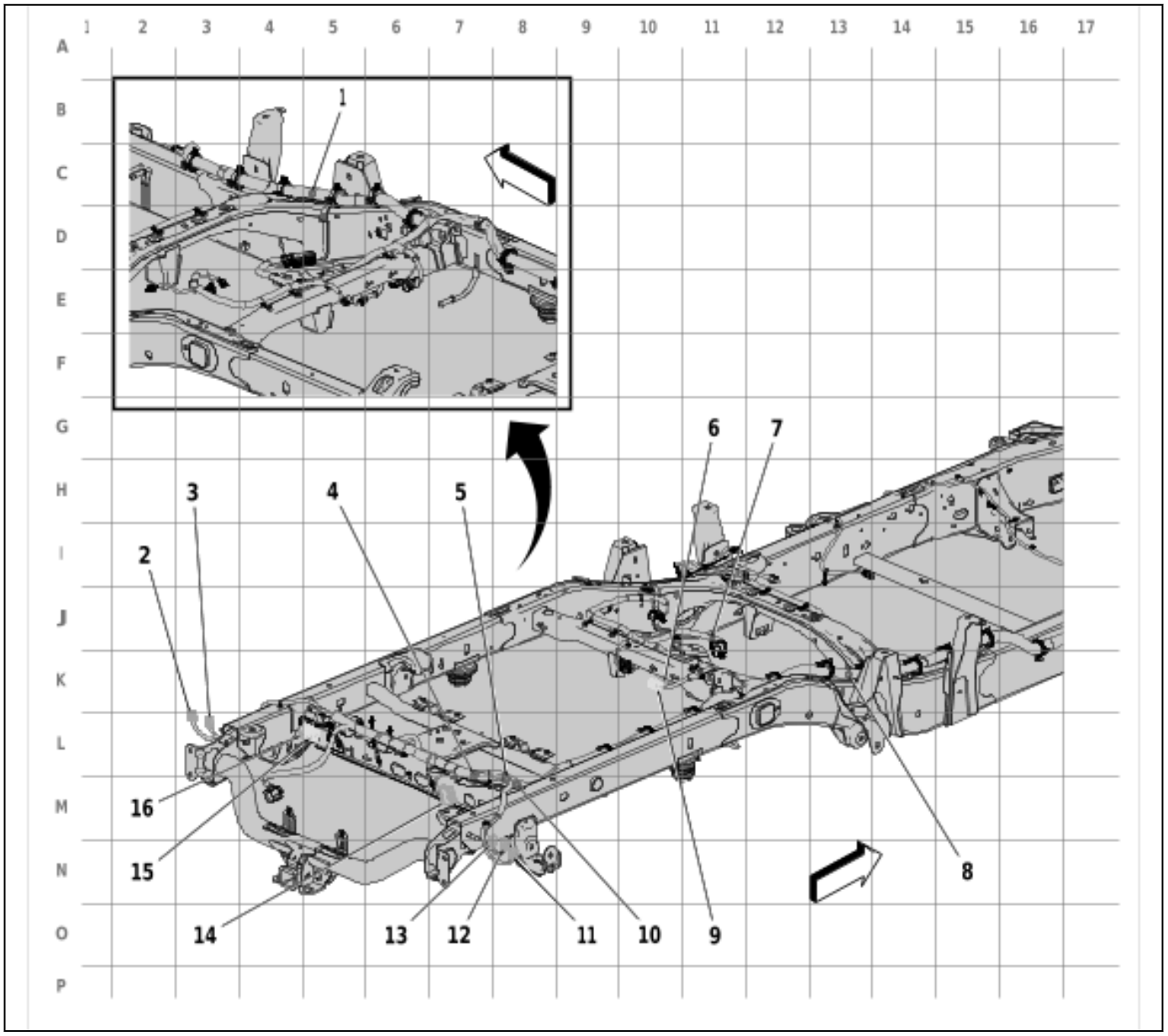
Roof Rear Spoiler Wiring Harness Routing - 4-Door



7155430

Items
(1) X985 Roof Rear Spoiler Wiring Harness to Dome Lamp Wiring Harness (4-Door)
(2) X309 Roof Rear Spoiler Wiring Harness to Body Wiring Harness (4-Door)
(3) X371 Roof Rear Spoiler Wiring Harness to Dome Lamp Wiring Harness (4-Door)

Chassis Wiring Harness Routing - Rear - 2-Door

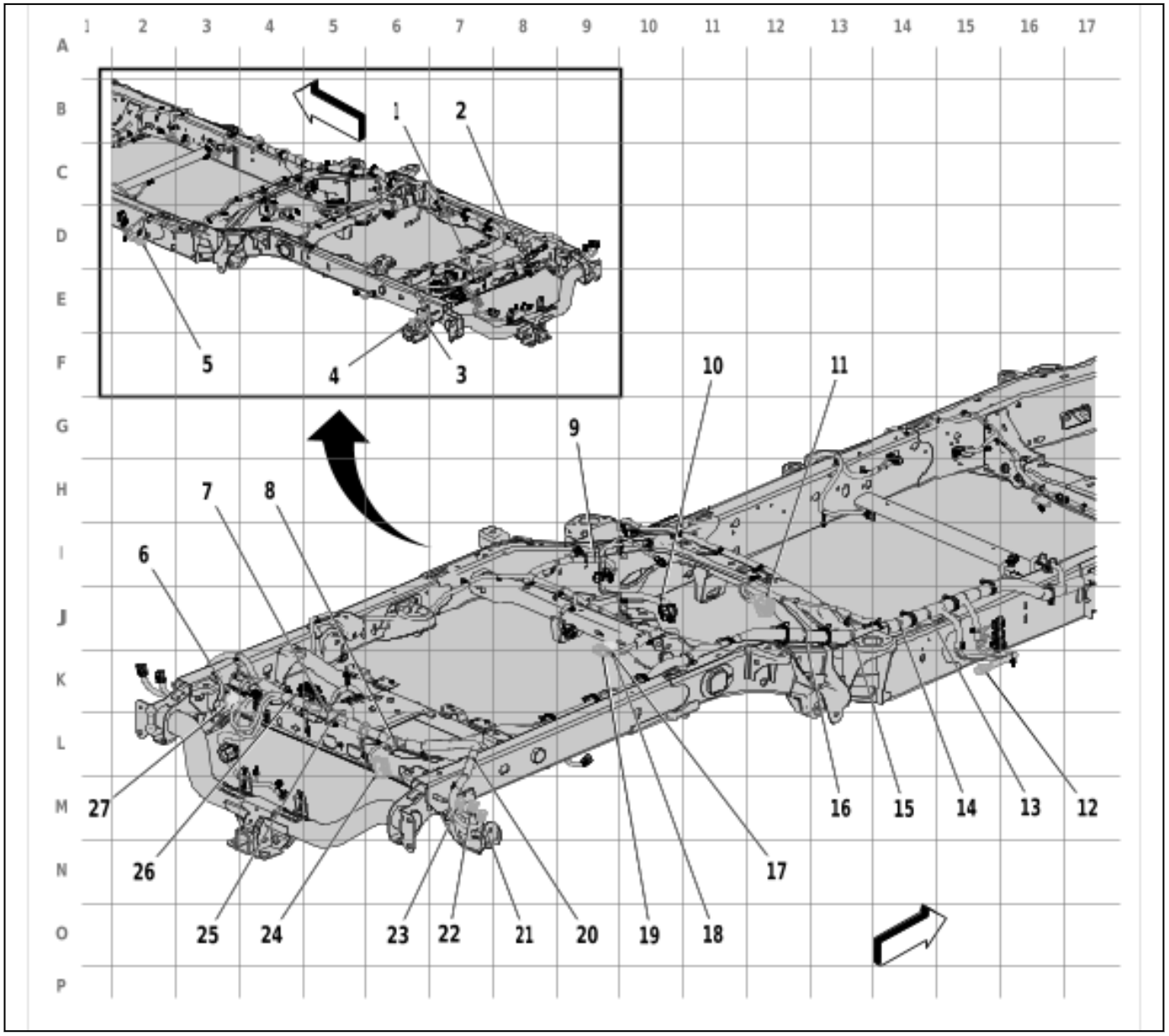


7175713

Items
(1) SP2024_CH Chassis Wiring Harness
(2) X912 Chassis Wiring Harness to Tail Lamp Wiring Harness
(3) X914 Chassis Wiring Harness to Rear Lamp Wiring Harness - Left (BOK / BOR / BOY)
(4) SP7762_1 Chassis Wiring Harness
(5) SP10119_2 Chassis Wiring Harness (KC9 / KCA)
(6) X420A Chassis Rear Wiring Harness Extension Harness to Chassis Wiring Harness (- (G94 / Z45))
(7) SP7444_4 Chassis Wiring Harness
(8) SP10749_C Chassis Wiring Harness
(9) X420R Chassis Rear Wiring Harness Extension Harness to Chassis Wiring Harness
(10) SP24_2 Chassis Wiring Harness

Items
(11) X414 Chassis Wiring Harness to Chassis Rear Wiring Harness
(12) X922 Chassis Wiring Harness to Tail Lamp Wiring Harness
(13) X924 Chassis Wiring Harness to Rear Lamp Wiring Harness - Right (BOK / BOR / BOY)
(14) X950 Rear Object Alarm Sensor Wiring Harness to Chassis Wiring Harness
(15) X918 Chassis Wiring Harness to Endgate Wiring Harness
(16) X919 Endgate Wiring Harness to Chassis Wiring Harness

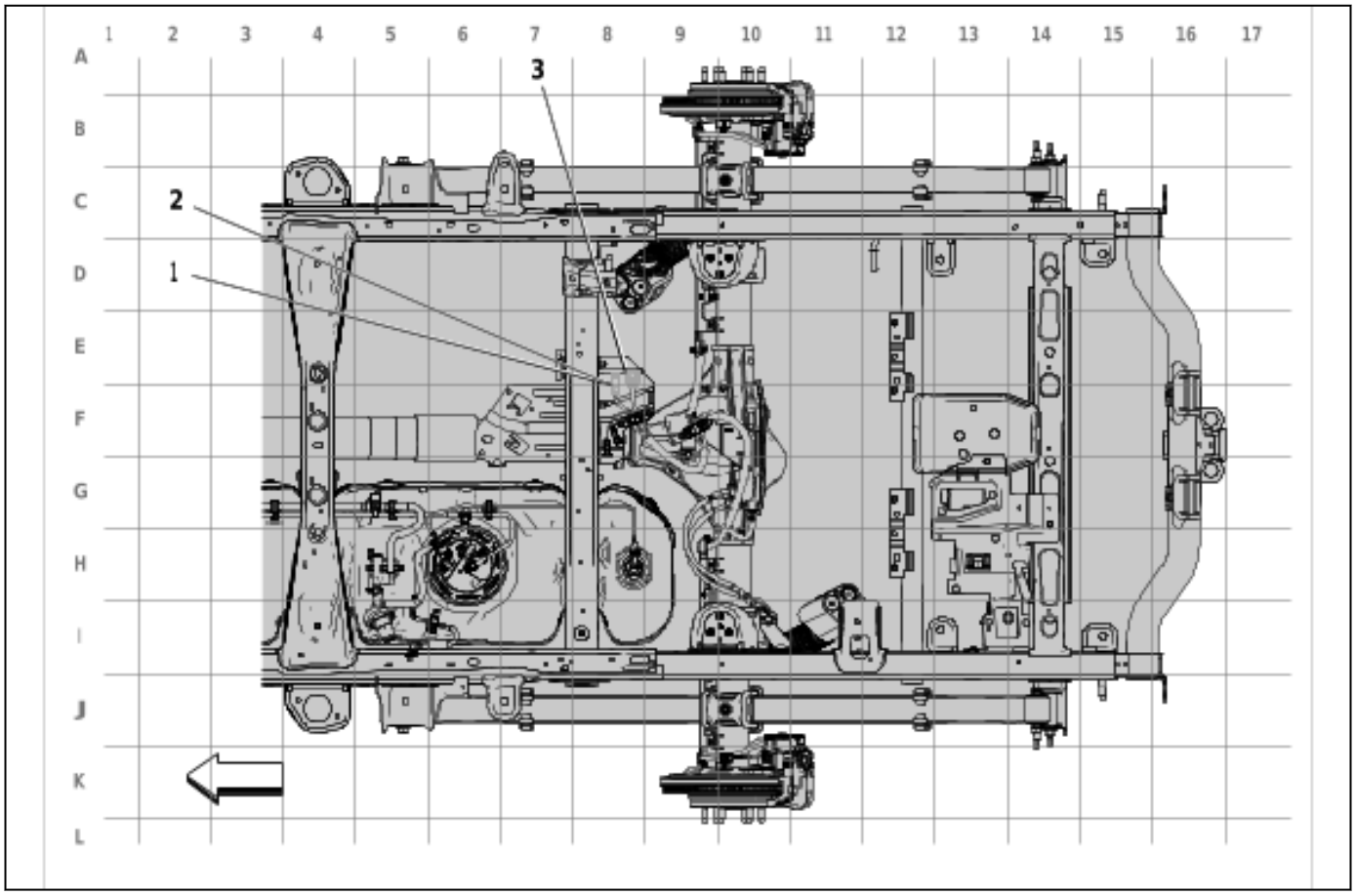
Chassis Wiring Harness Routing - Rear - 4-Door



7175714

Items
(1) SP1850_3 Chassis Wiring Harness
(2) SP24_2 Chassis Wiring Harness
(3) X914 Chassis Wiring Harness to Rear Lamp Wiring Harness - Left (BOK / BOR / BOY)
(4) X912 Chassis Wiring Harness to Tail Lamp Wiring Harness
(5) X653L Assist Step Motor - Left to Chassis Wiring Harness (B3L)
(6) X918 Chassis Wiring Harness to Endgate Wiring Harness
(7) SP6440_18 Chassis Wiring Harness (BOK / BOR / BOY)
(8) SP7762_1 Chassis Wiring Harness
(9) SP7444_1 Chassis Wiring Harness
(10) SP7444_4 Chassis Wiring Harness
(11) X404 Chassis Wiring Harness to Emission Reduction Fluid Tank Reservoir Wire Harness (FHX / LZ0)
(12) X653R Assist Step Motor - Right to Chassis Wiring Harness (B3L)
(13) SP2024_CH Chassis Wiring Harness
(14) SP639_1 Chassis Wiring Harness (UET & (FHX / G93 / G94 / NPP))
(15) SP1150_1 Chassis Wiring Harness (B3L)
(16) SP10749_C Chassis Wiring Harness
(17) X420A Chassis Rear Wiring Harness Extension Harness to Chassis Wiring Harness (- (G94 / Z45))
(18) X420B Chassis Wiring Harness to Chassis Rear Wiring Harness Extension Harness (G94 / Z45)
(19) X420R Chassis Rear Wiring Harness Extension Harness to Chassis Wiring Harness
(20) SP10119_2 Chassis Wiring Harness (KC9 / KCA)
(21) X414 Chassis Wiring Harness to Chassis Rear Wiring Harness
(22) X922 Chassis Wiring Harness to Tail Lamp Wiring Harness
(23) X924 Chassis Wiring Harness to Rear Lamp Wiring Harness - Right (BOK / BOR / BOY)
(24) X950 Rear Object Alarm Sensor Wiring Harness to Chassis Wiring Harness
(25) SP1850_4 Chassis Wiring Harness (FHX / (FJW & UET))
(26) SP1951_3 Chassis Wiring Harness
(27) X919 Endgate Wiring Harness to Chassis Wiring Harness

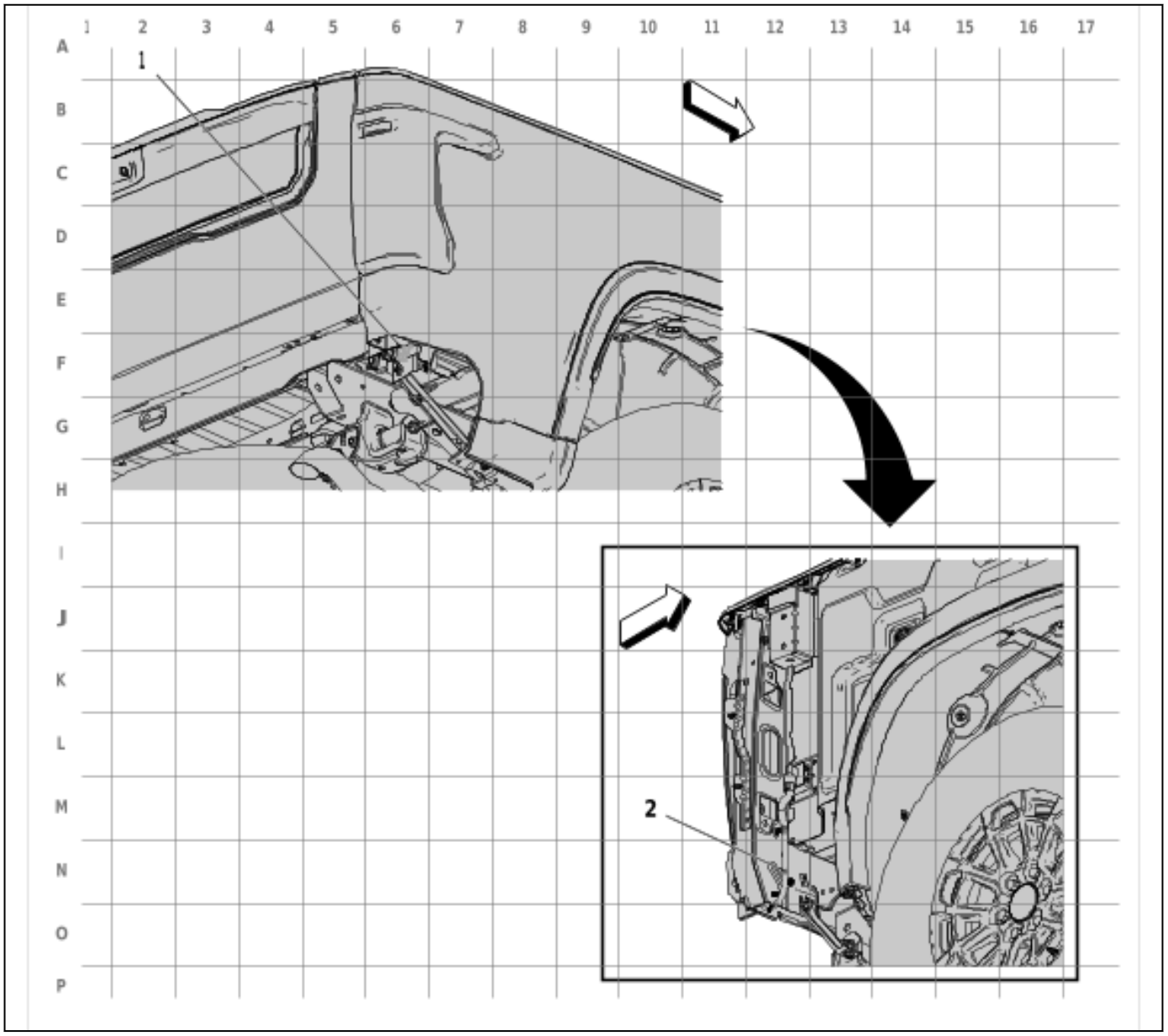
Chassis Rear Wiring Harness Extension Harness



7175715

Items
(1) X420A Chassis Rear Wiring Harness Extension Harness to Chassis Wiring Harness (- (G94 / Z45))
(2) X420B Chassis Wiring Harness to Chassis Rear Wiring Harness Extension Harness (G94 / Z45)
(3) X420R Chassis Rear Wiring Harness Extension Harness to Chassis Wiring Harness

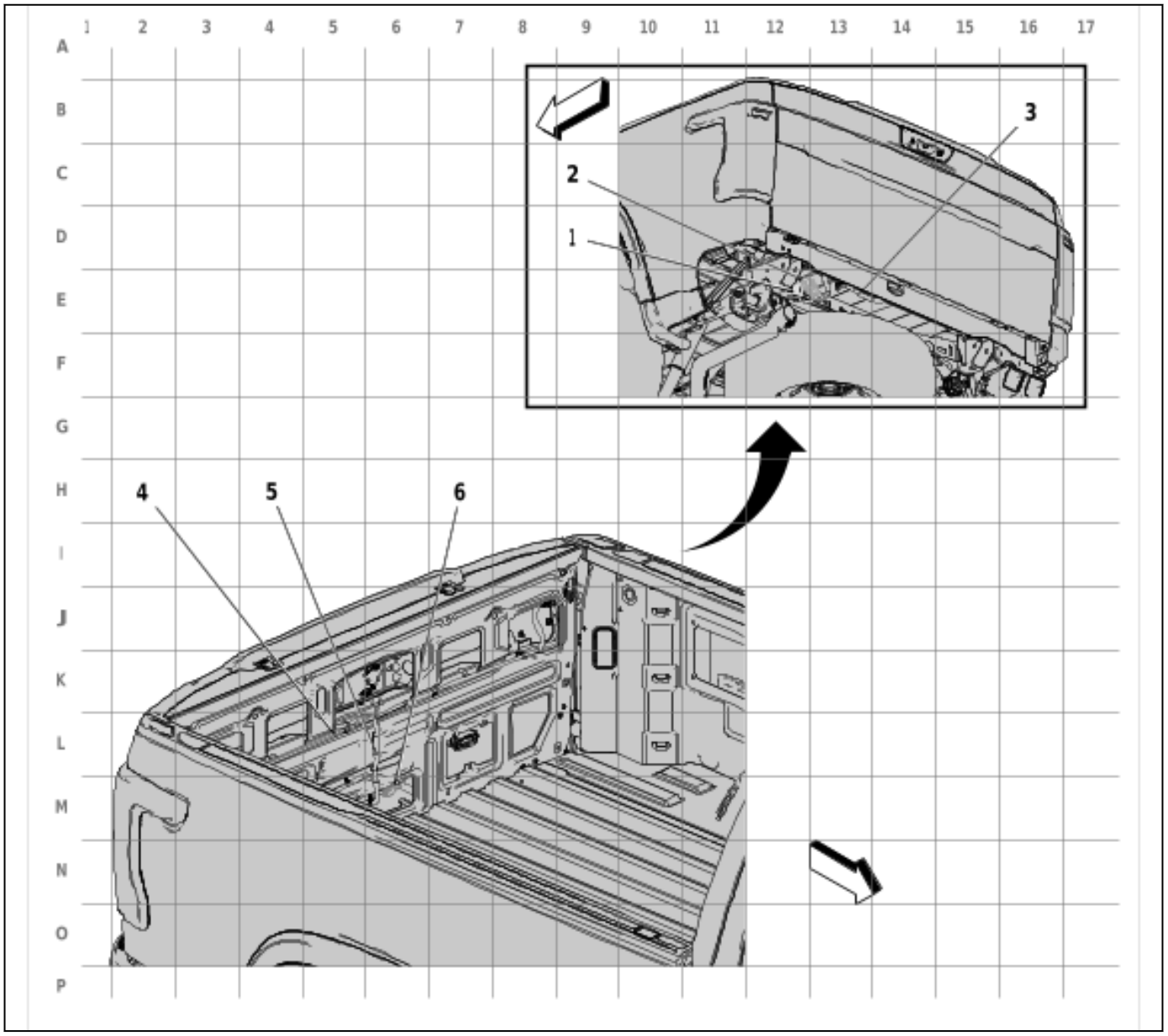
Chassis Rear Wiring Harness Routing



7155431

Items
(1) X414 Chassis Wiring Harness to Chassis Rear Wiring Harness
(2) SP10119_3 Chassis Rear Wiring Harness Routing (KC9 / KCA)

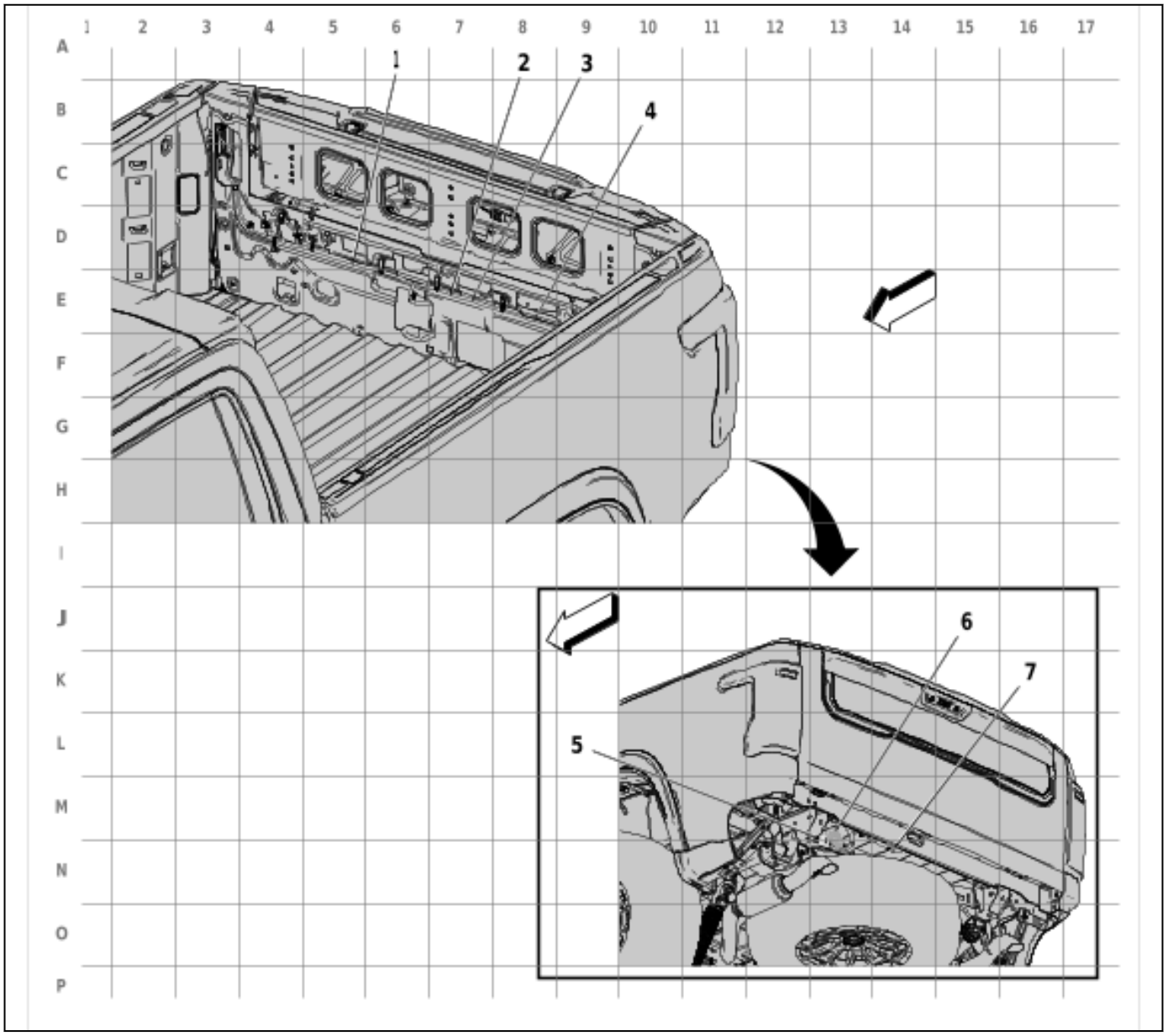
Endgate Wiring Harness Routing (QK1)



7155432

Items
(1) X919 Endgate Wiring Harness to Chassis Wiring Harness
(2) X918 Chassis Wiring Harness to Endgate Wiring Harness
(3) SP1850_1 Endgate Wiring Harness Routing (QT5 / QT6)
(4) SP1299_1 Endgate Wiring Harness Routing (QT5)
(5) SP7730_1 Endgate Wiring Harness Routing (QT5)
(6) R6AD Terminating Resistor - High Speed CAN Bus 4 (QT2 / QT5)

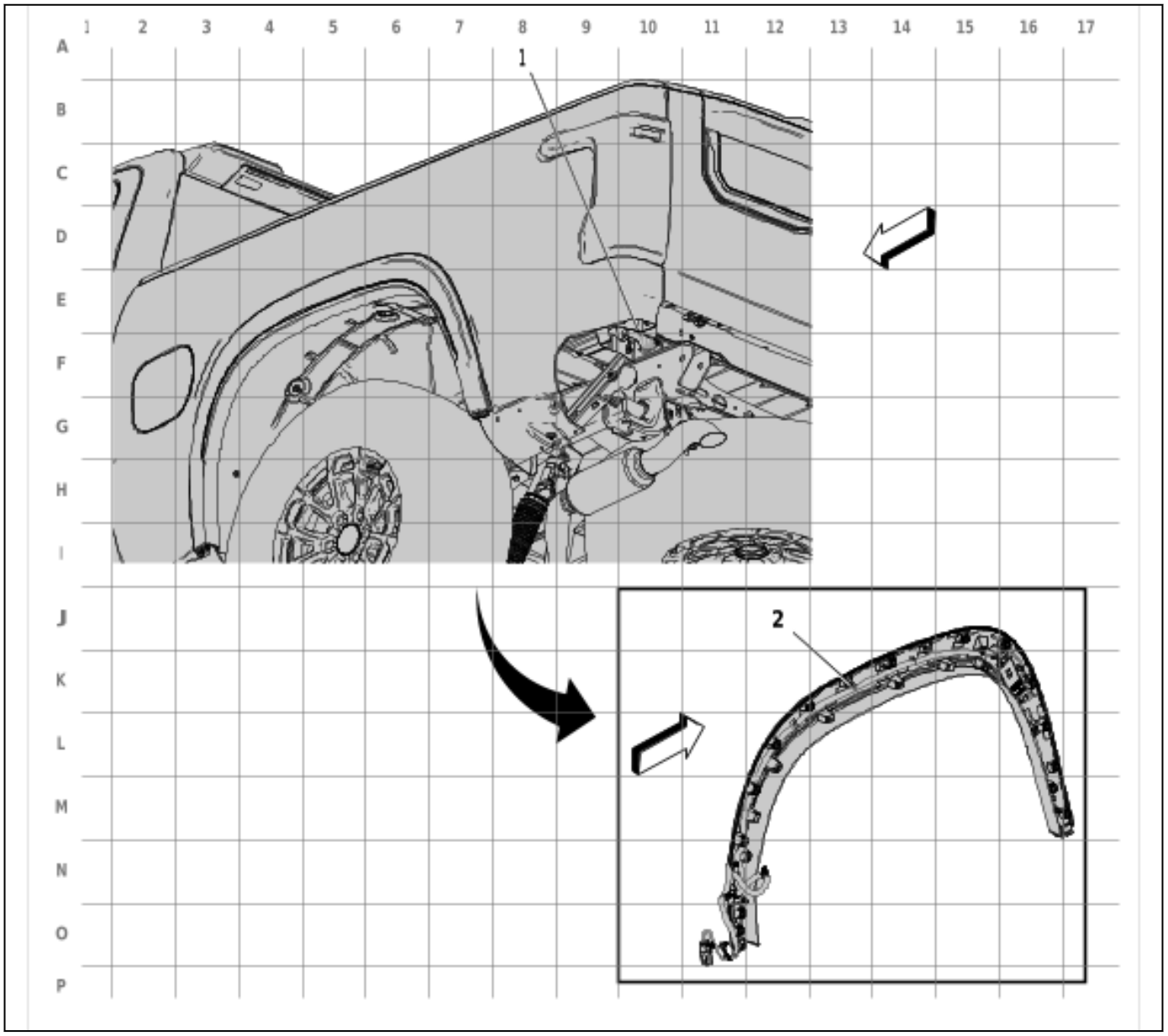
Endgate Wiring Harness Routing (QK2)



7155433

Items
(1) SP1850_1 Endgate Wiring Harness Routing (QT5 / QT6)
(2) SP7730_1 Endgate Wiring Harness Routing (QT5)
(3) SP1299_1 Endgate Wiring Harness Routing (QT5)
(4) SP7725_1 Endgate Wiring Harness Routing (QK2)
(5) X919 Endgate Wiring Harness to Chassis Wiring Harness
(6) X918 Chassis Wiring Harness to Endgate Wiring Harness
(7) R6AD Terminating Resistor - High Speed CAN Bus 4 (QT2 / QT5)

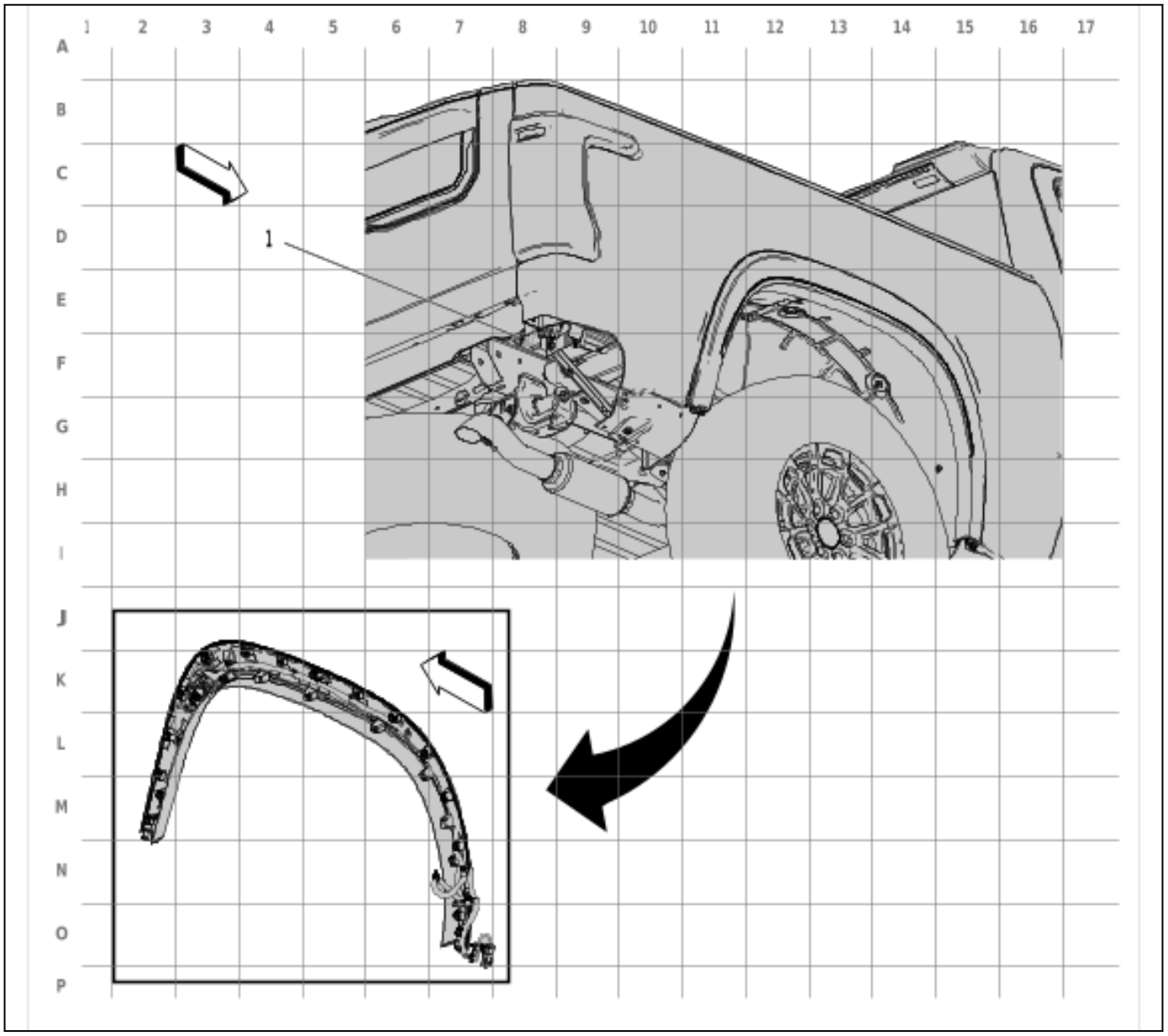
Rear Lamp Wiring Harness - Left Routing (BOK / BOR / BOY)



7155434

Items
(1) X914 Chassis Wiring Harness to Rear Lamp Wiring Harness - Left (BOK / BOR / BOY)
(2) SP1951_17 Rear Lamp Wiring Harness - Left (BOK / BOR / BOY)

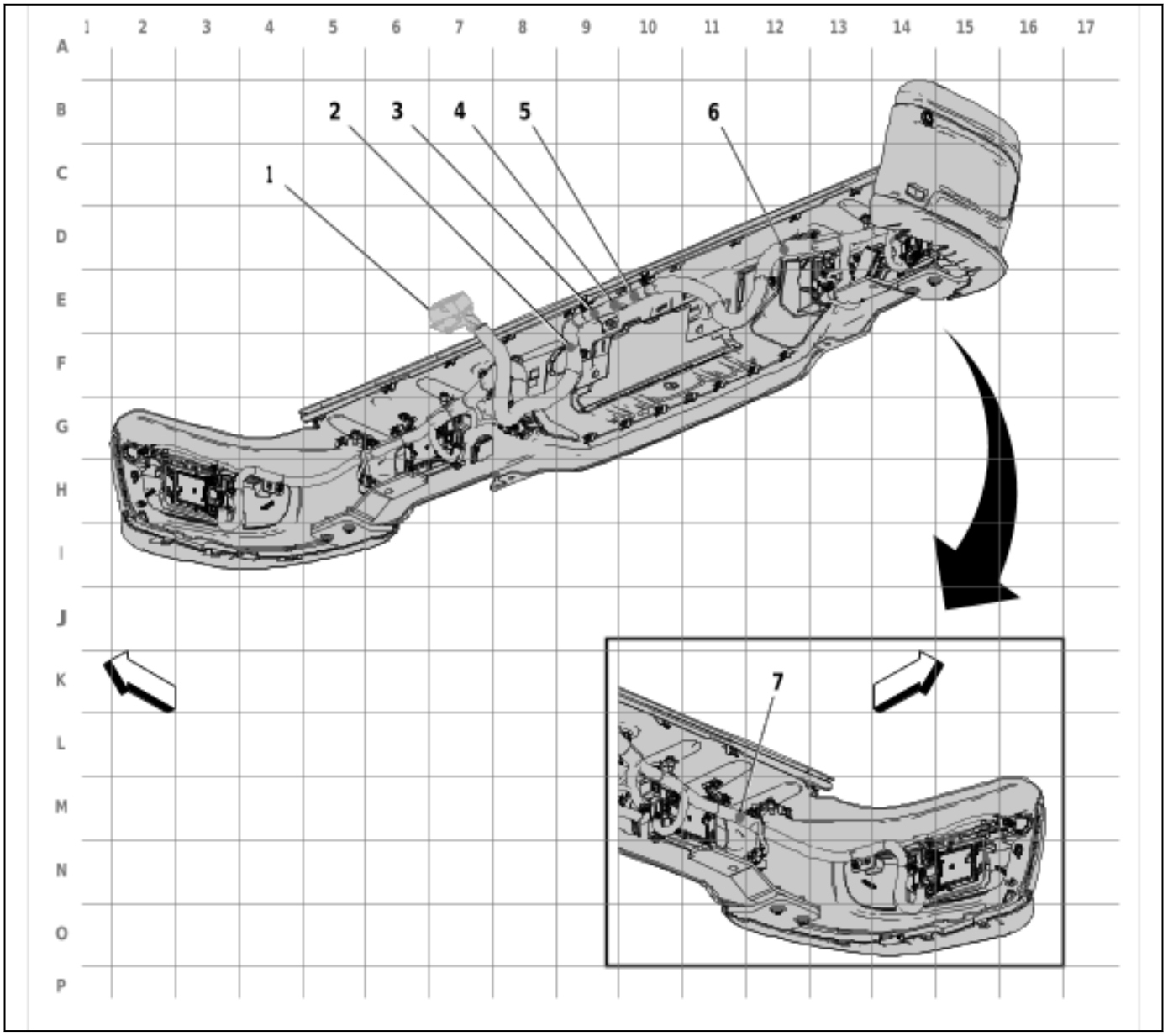
Rear Lamp Wiring Harness - Right Routing (BOK / BOR / BOY)



7155435

Items
(1) X924 Chassis Wiring Harness to Rear Lamp Wiring Harness - Right (BOK / BOR / BOY)

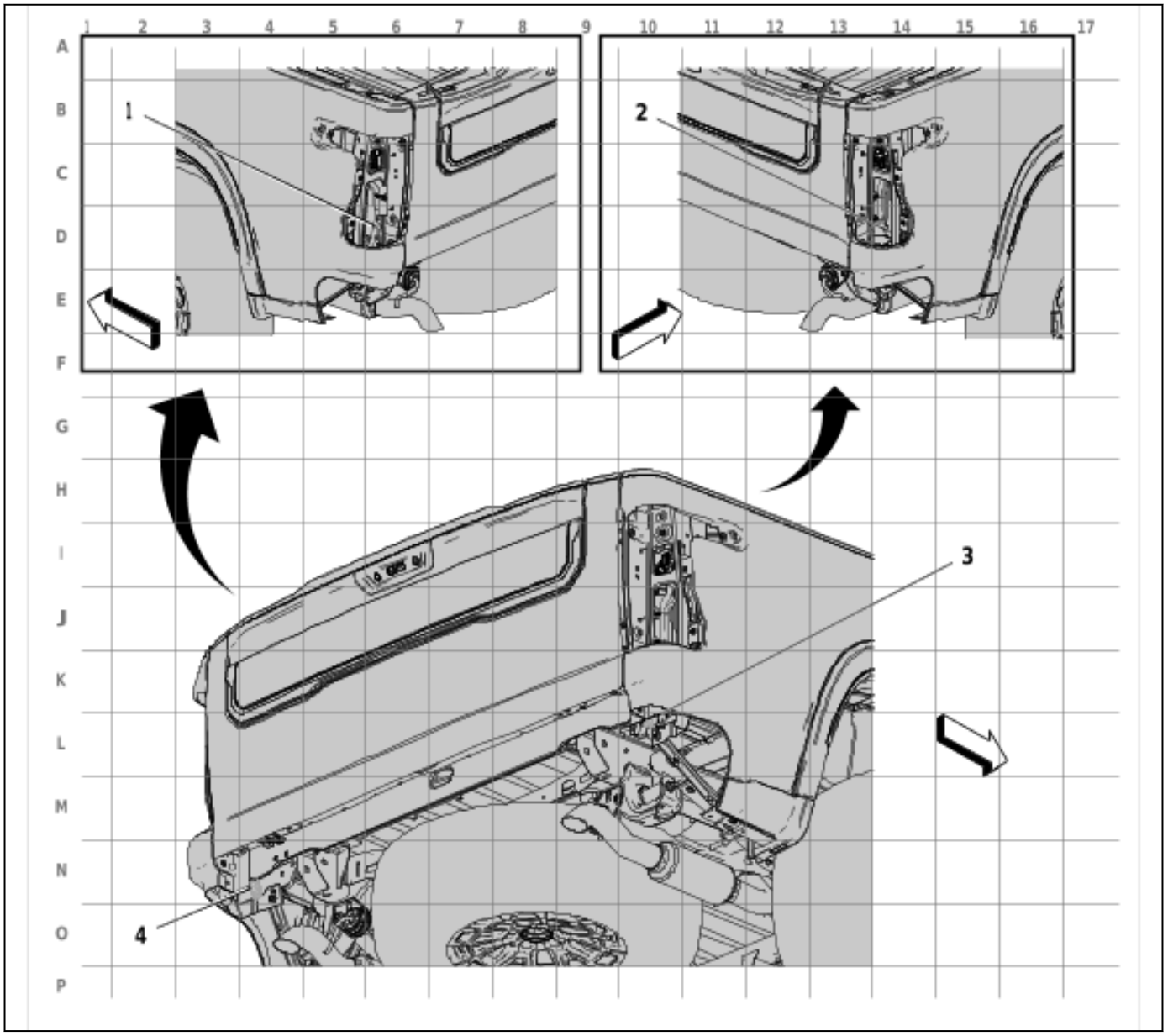
Rear Object Alarm Sensor Wiring Harness Routing



7155436

Items
(1) X950 Rear Object Alarm Sensor Wiring Harness to Chassis Wiring Harness
(2) SP5240_1 Rear Object Alarm Sensor Wiring Harness
(3) SP2374_1 Rear Object Alarm Sensor Wiring Harness
(4) SP2379_1 Rear Object Alarm Sensor Wiring Harness
(5) SP1951 Rear Object Alarm Sensor Wiring Harness
(6) SP6846_1 Rear Object Alarm Sensor Wiring Harness
(7) SP1850_4B Rear Object Alarm Sensor Wiring Harness

Tail Lamp Wiring Harness - Left and Right Routing

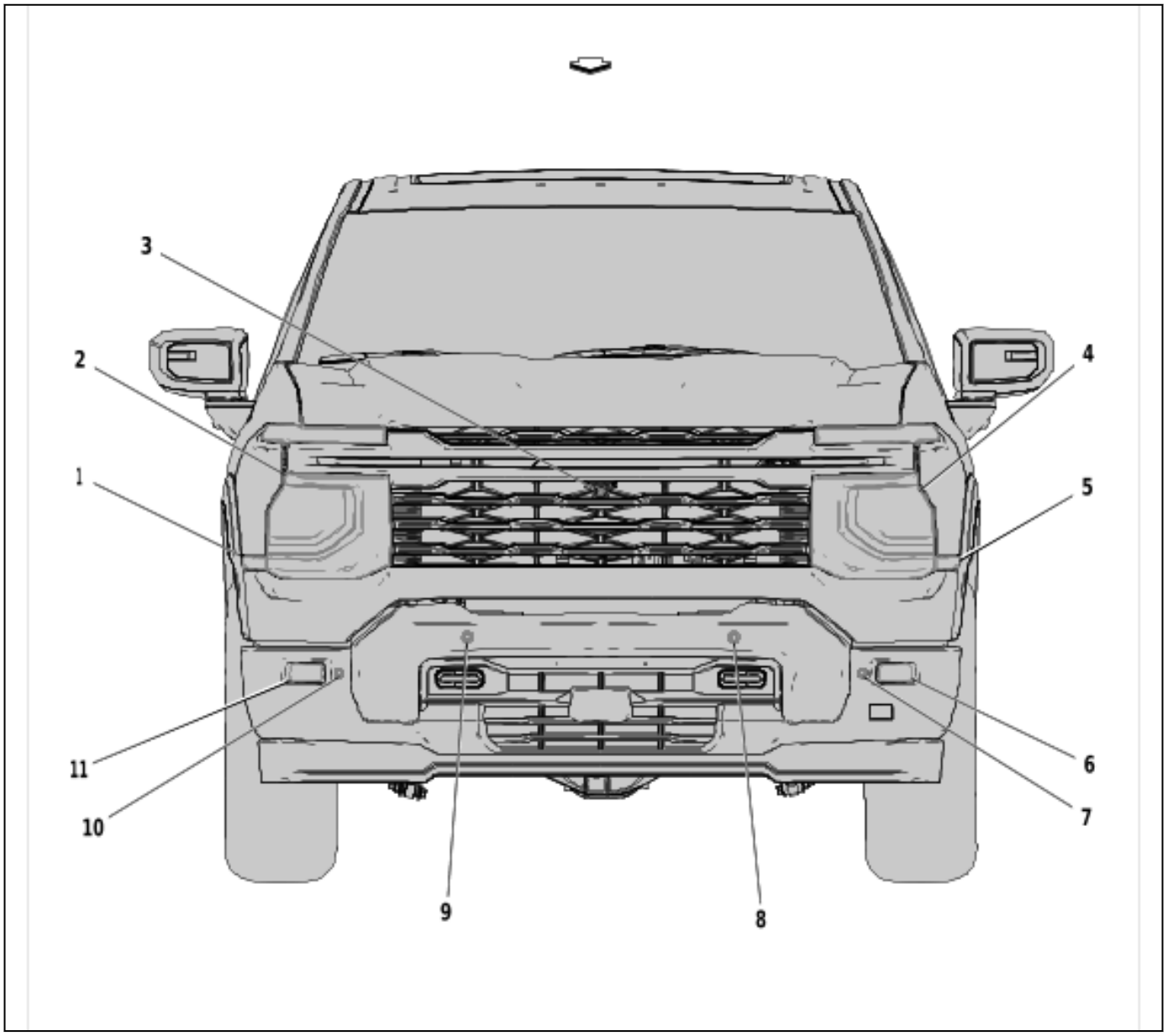


7155437

Items
(1) SP1951_1 Tail Lamp Wiring Harness - Left
(2) SP1850_6 Tail Lamp Wiring Harness - Right
(3) X922 Chassis Wiring Harness to Tail Lamp Wiring Harness
(4) X912 Chassis Wiring Harness to Tail Lamp Wiring Harness

Component Locator

Front of Vehicle Components (- GRZ)

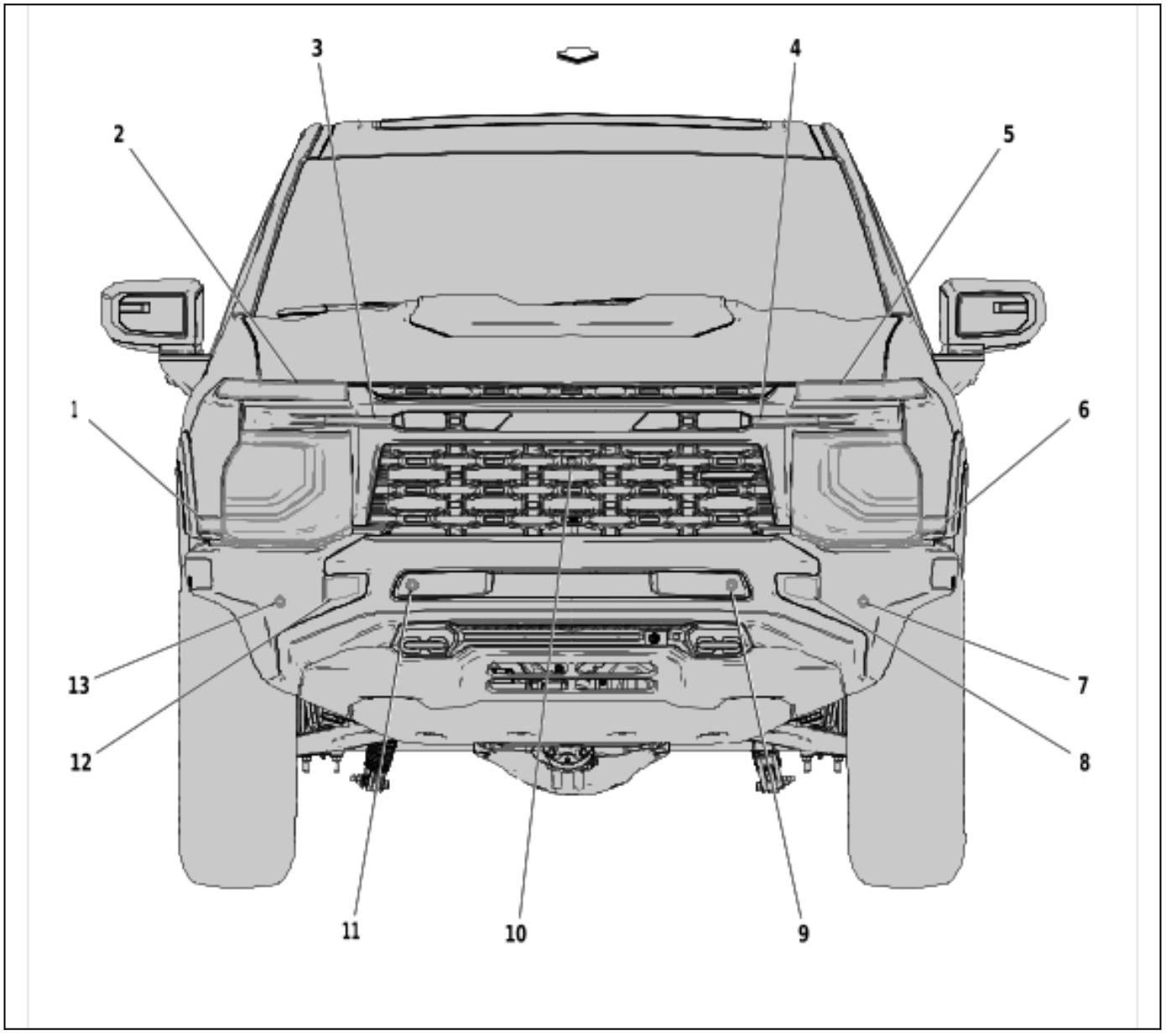


7155438

Items
(1) E2RF Front Side Marker Lamp - Right
(2) E13RA Front Headlamp - Right
(3) B174G Front View Driver Information Camera - Grille (UV2)
(4) E13LA Front Headlamp - Left
(5) E2LF Front Side Marker Lamp - Left
(6) E29LF Front Fog Lamp - Left (T3U)
(7) B306AB Front Parking Assist Alarm Outer Sensor - Left
(8) B306BB Front Parking Assist Alarm Sensor - Left Middle
(9) B306CB Front Parking Assist Alarm Sensor - Right Middle

Items
(10) B306DB Front Parking Assist Alarm Outer Sensor - Right
(11) E29RF Front Fog Lamp - Right (T3U)

Front of Vehicle Components (GRZ - ULV)

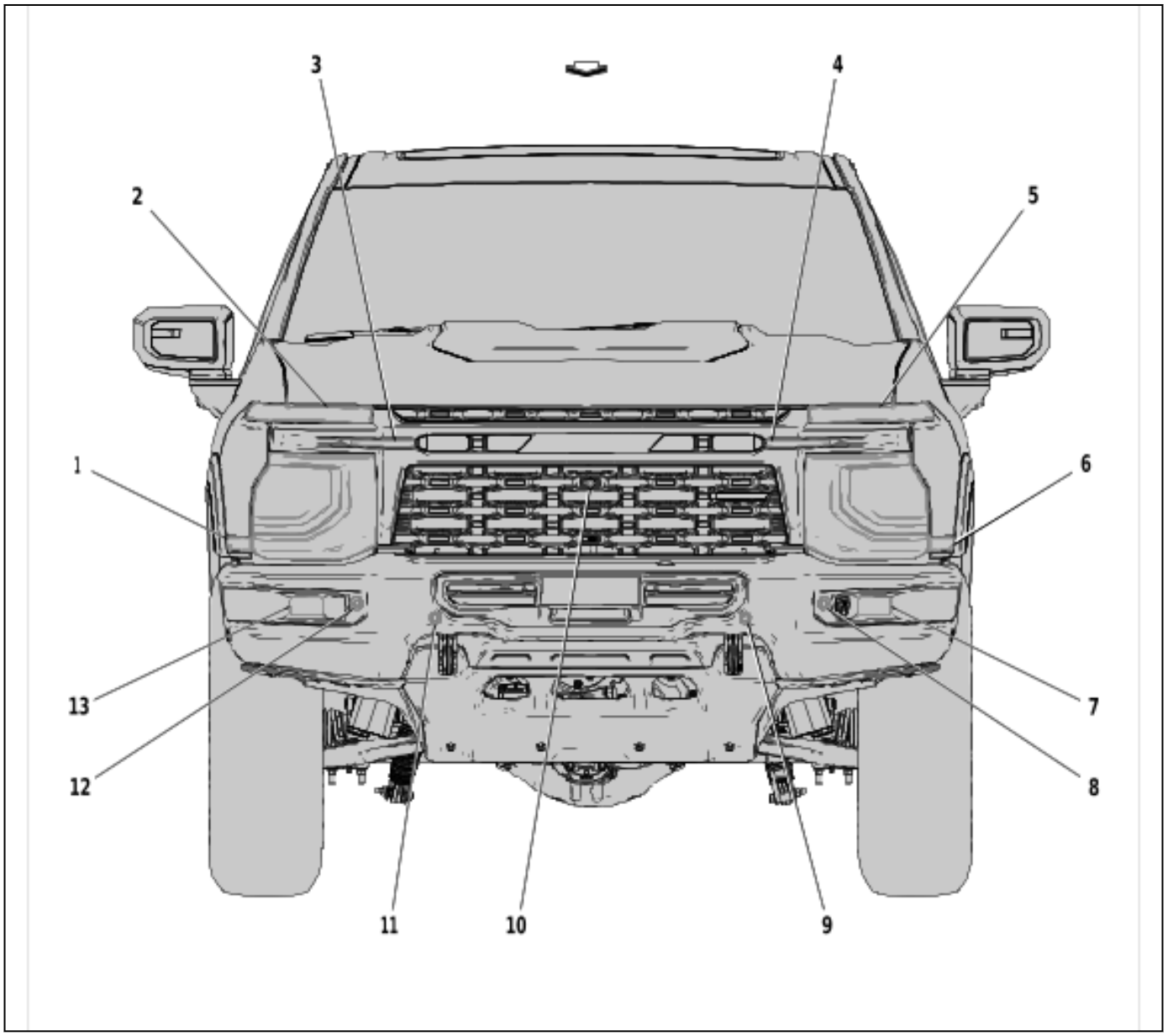


7155439

Items
(1) E2RF Front Side Marker Lamp - Right
(2) E13RA Front Headlamp - Right
(3) E135R Front Bumper Fascia Auxiliary Signal Lamp - Right (GRZ)
(4) E135L Front Bumper Fascia Auxiliary Signal Lamp - Left (GRZ)
(5) E13LA Front Headlamp - Left
(6) E2LF Front Side Marker Lamp - Left

Items
(7) B306AB Front Parking Assist Alarm Outer Sensor - Left
(8) E29LF Front Fog Lamp - Left (T3U)
(9) B306BB Front Parking Assist Alarm Sensor - Left Middle
(10) B174G Front View Driver Information Camera - Grille (UV2)
(11) B306CB Front Parking Assist Alarm Sensor - Right Middle
(12) E29RF Front Fog Lamp - Right (T3U)
(13) B306DB Front Parking Assist Alarm Outer Sensor - Right

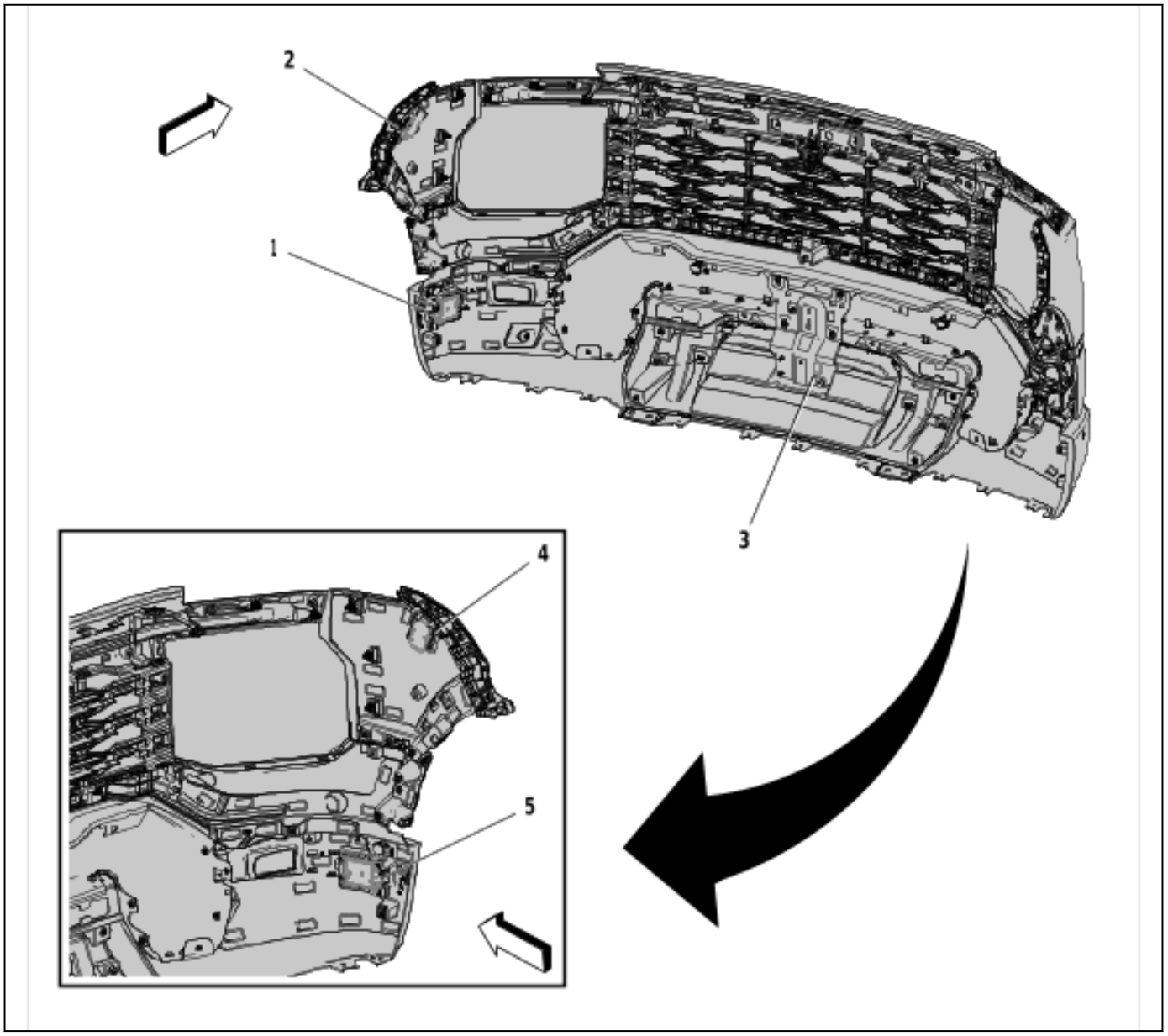
Front of Vehicle Components (ULV)



7155440

Items
(1) E2RF Front Side Marker Lamp - Right
(2) E13RA Front Headlamp - Right
(3) E135R Front Bumper Fascia Auxiliary Signal Lamp - Right (GRZ)
(4) E135L Front Bumper Fascia Auxiliary Signal Lamp - Left (GRZ)
(5) E13LA Front Headlamp - Left
(6) E2LF Front Side Marker Lamp - Left
(7) E29LF Front Fog Lamp - Left (T3U)
(8) B306AB Front Parking Assist Alarm Outer Sensor - Left
(9) B306BB Front Parking Assist Alarm Sensor - Left Middle
(10) B174G Front View Driver Information Camera - Grille (UV2)
(11) B306CB Front Parking Assist Alarm Sensor - Right Middle
(12) B306DB Front Parking Assist Alarm Outer Sensor - Right
(13) E29RF Front Fog Lamp - Right (T3U)

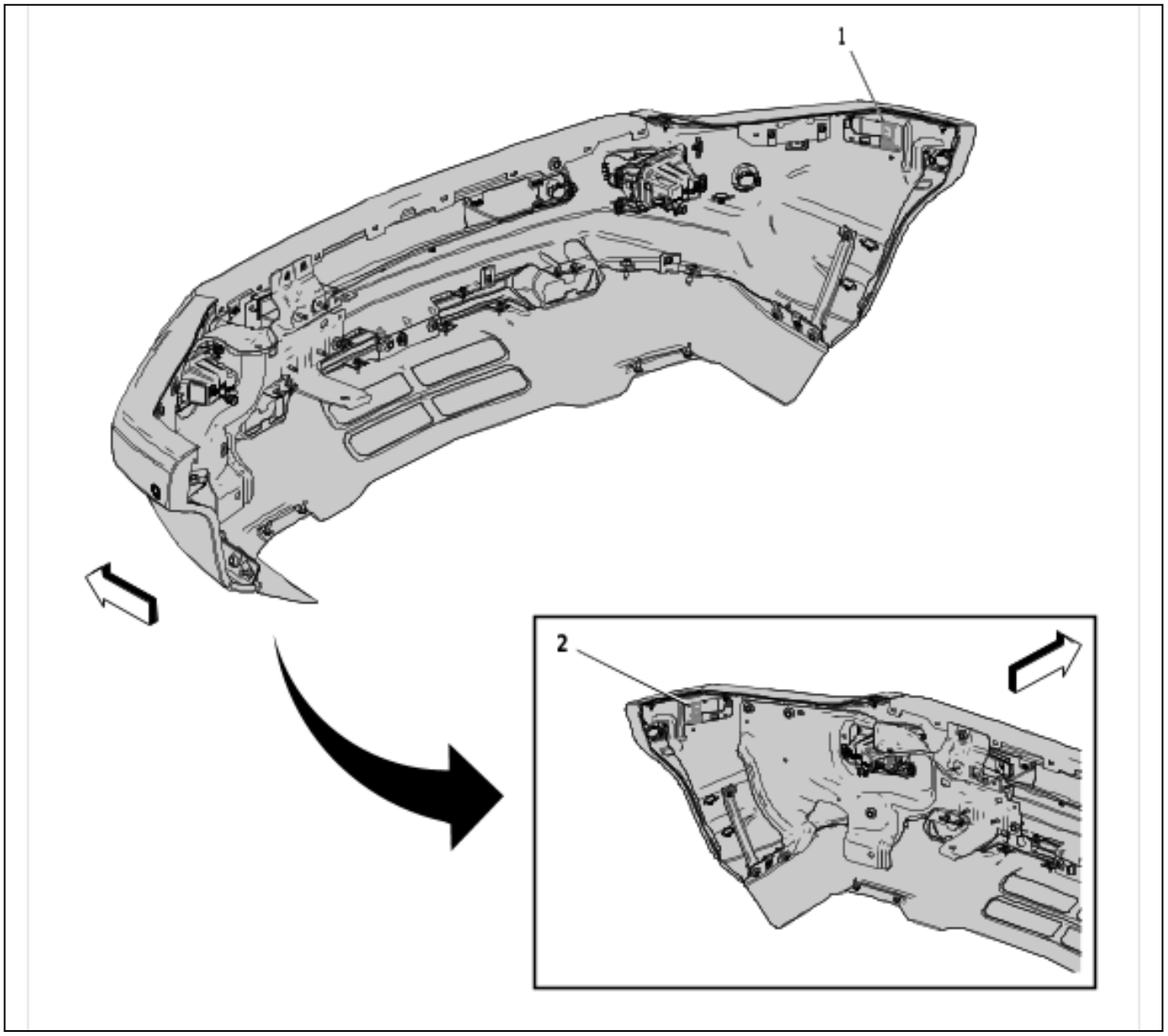
Behind Front Fascia Components (- GRZ)



7155441

Items
(1) B233LF Short Range Radar Sensor - Left Front (UK0 / UKL)
(2) B342C UHF Low Energy Remote Control Access Sensor Transceiver 3 (BOK / BOR / BOY)
(3) B233B Forward Range Radar Sensor - Long Range
(4) B342A UHF Low Energy Remote Control Access Sensor Transceiver 1 (BOK / BOR / BOY)
(5) B233RF Short Range Radar Sensor - Right Front (UK0 / UKL)

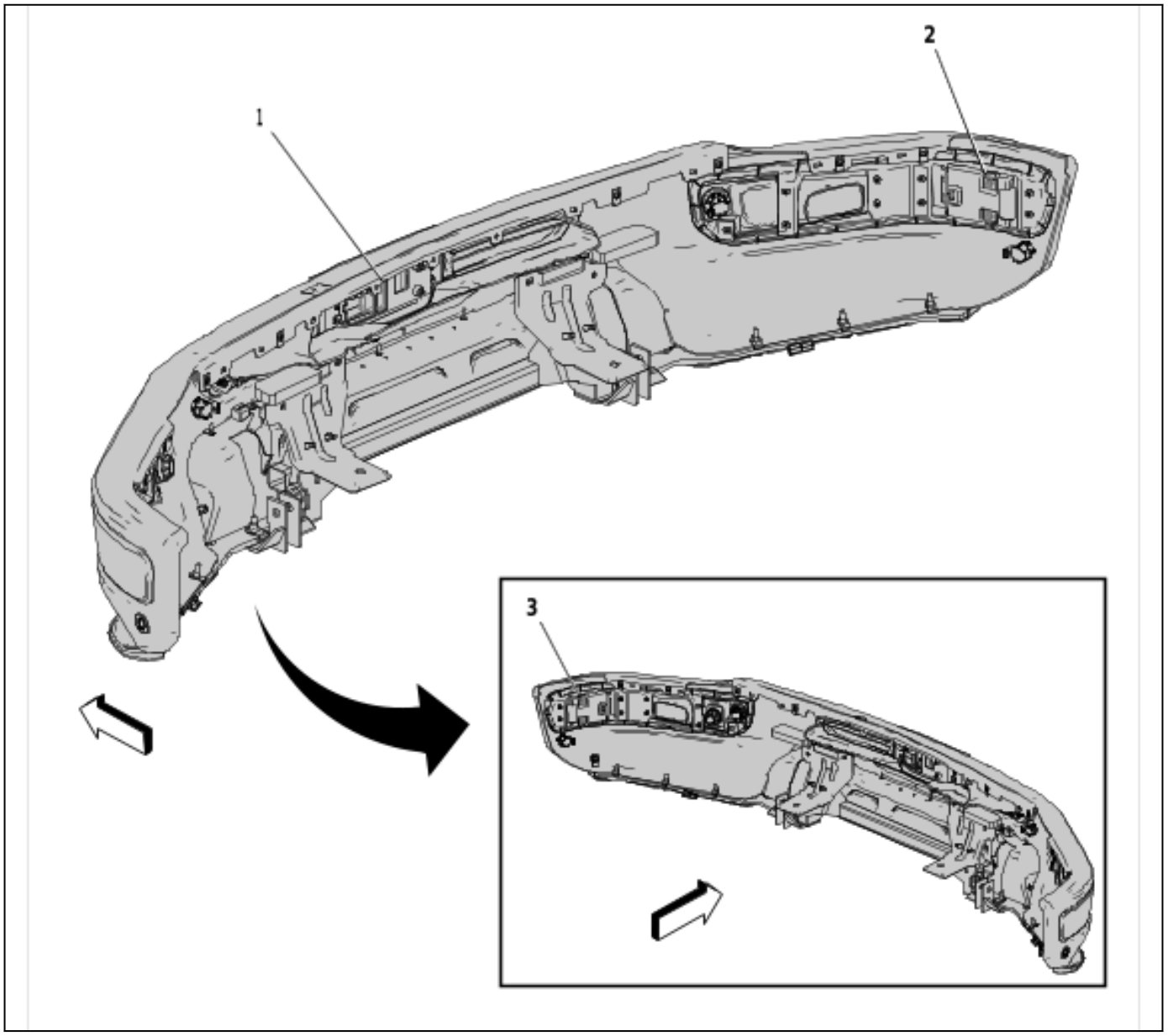
Behind Front Fascia Components (GRZ - ULV)



7155442

Items
(1) B233RF Short Range Radar Sensor - Right Front (UK0 / UKL)
(2) B233LF Short Range Radar Sensor - Left Front (UK0 / UKL)

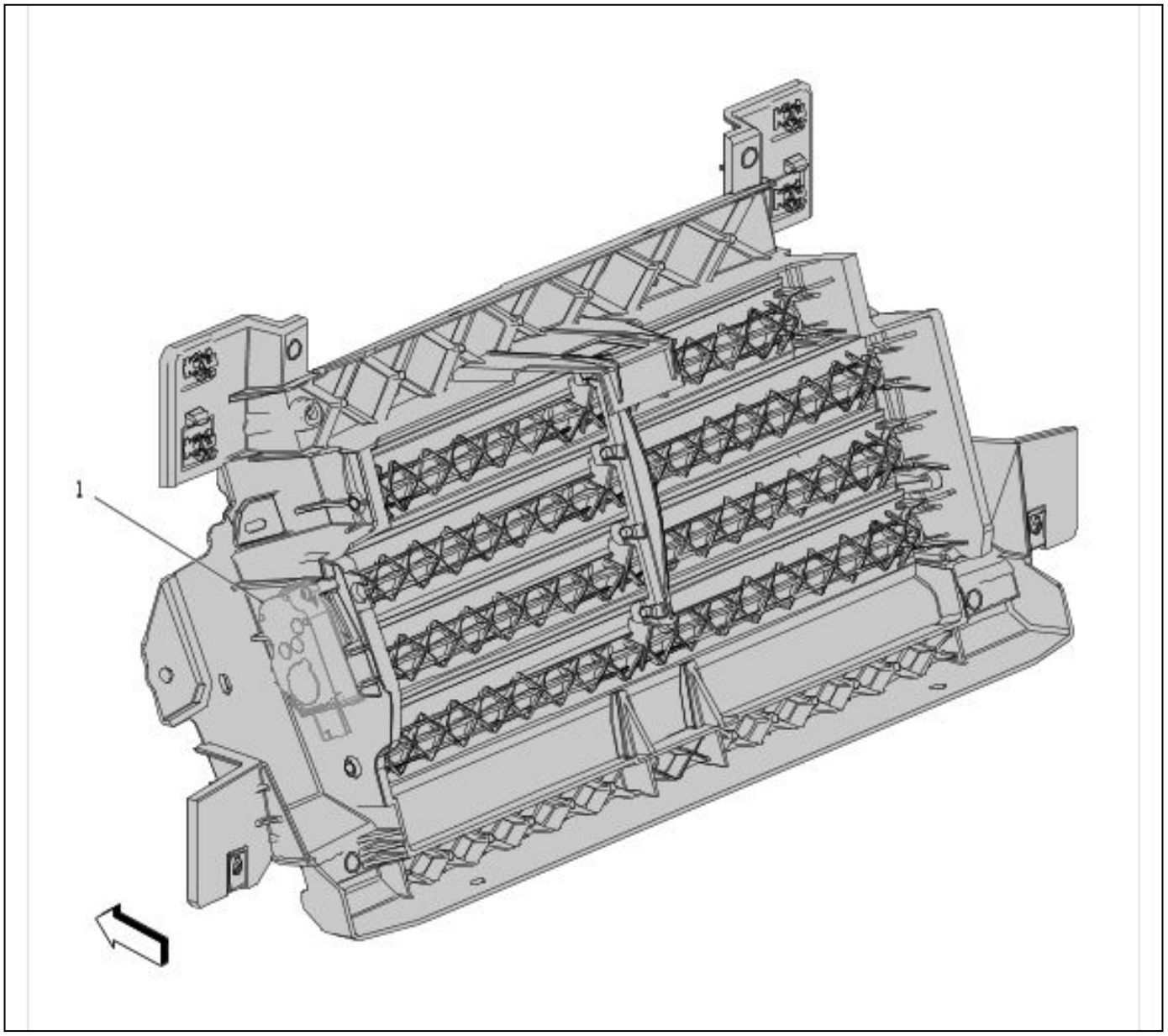
Behind Front Fascia Components (ULV)



7155443

Items
(1) B233B Forward Range Radar Sensor - Long Range
(2) B233RF Short Range Radar Sensor - Right Front (UK0 / UKL)
(3) B233LF Short Range Radar Sensor - Left Front (UK0 / UKL)

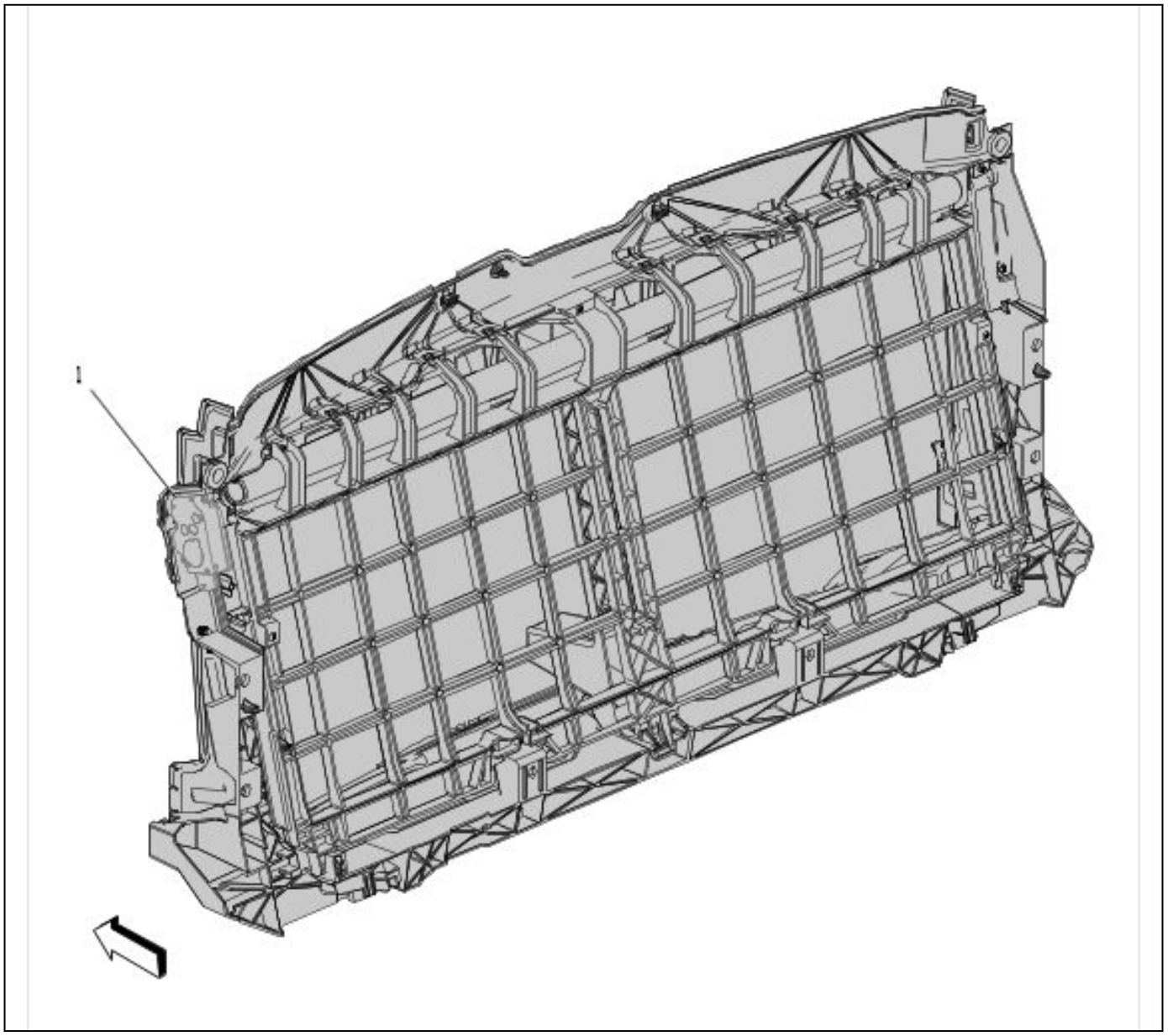
Lower Aero Shutter Components (WMI)



7166407

Items
(1) M96B Active Grille Air Shutter Actuator 2 (WMI)

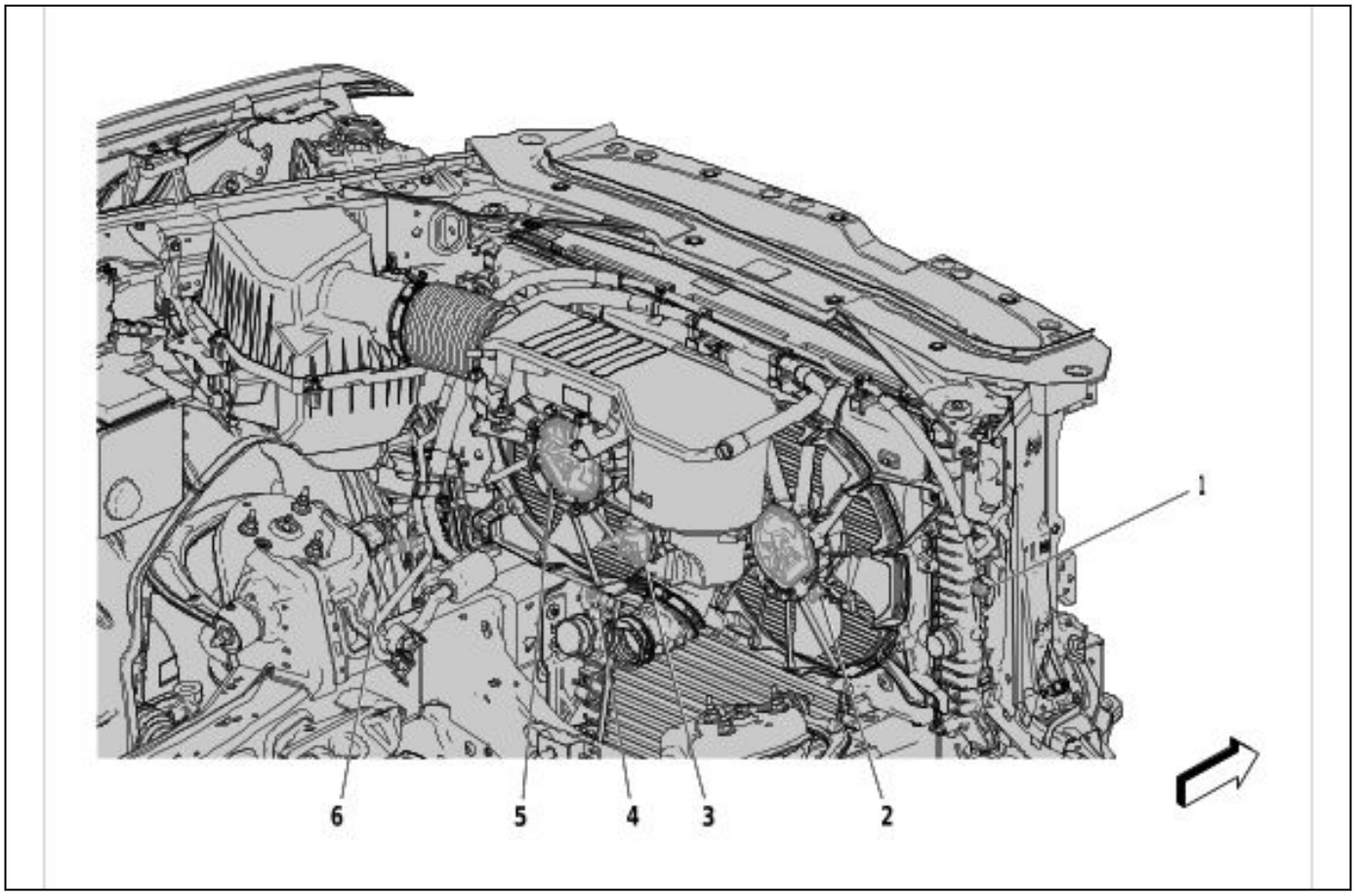
Upper Aero Shutter Components (VTI / WMI)



7166408

Items
(1) M96A Active Grille Air Shutter Actuator 1 (VTI / WMI)

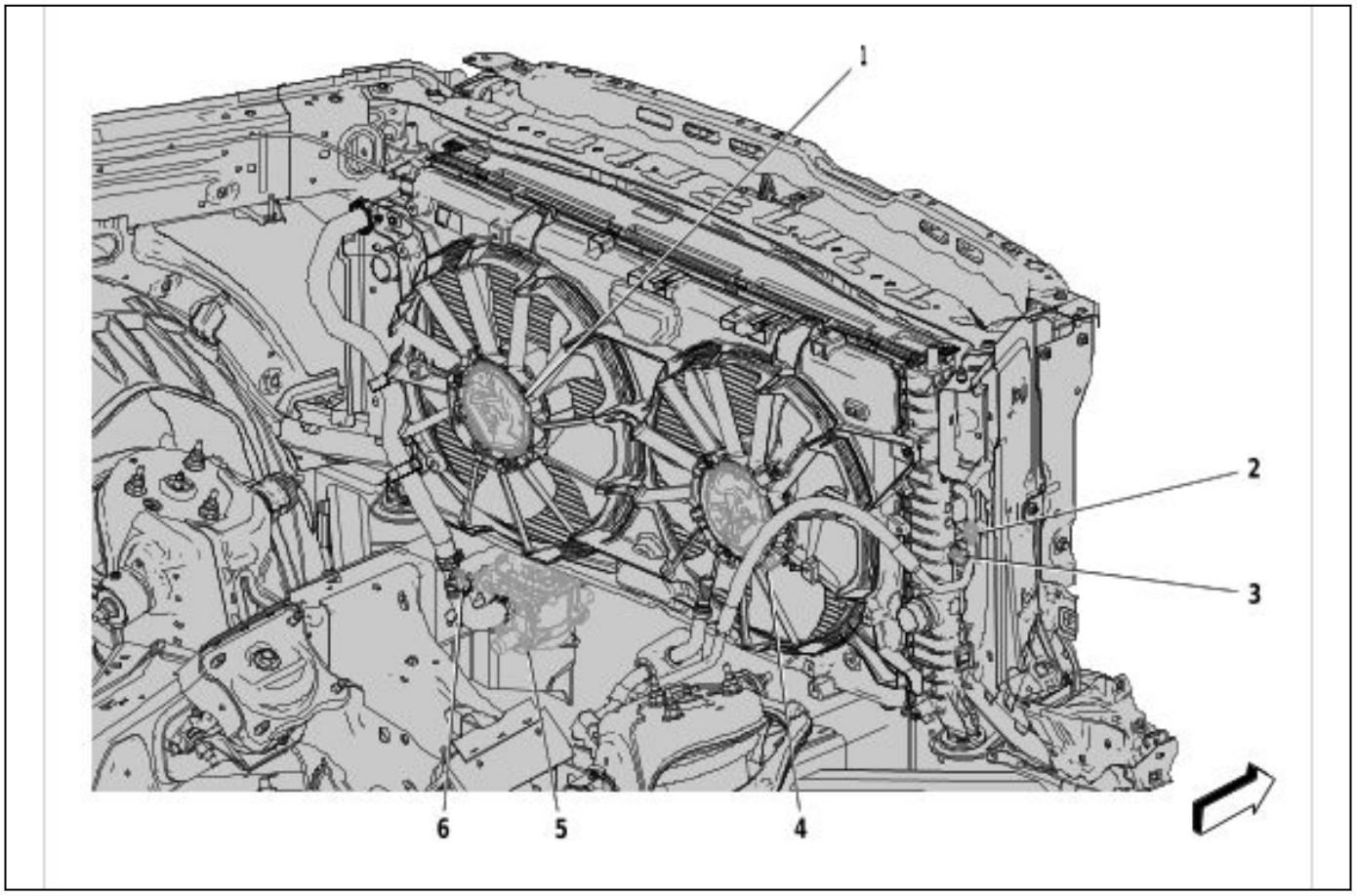
Engine Compartment Components - Radiator Area (L4B)



7163714

Items
(1) B203 Radiator Coolant Temperature Sensor
(2) G10R Cooling Fan Motor - Right
(3) Q12 Evaporative Emission Canister Purge Solenoid Valve (FJW)
(4) B111 Turbocharger/Supercharger Boost Pressure Sensor (L4B)
(5) G10L Cooling Fan Motor - Left
(6) B1 Air Conditioning Refrigerant Pressure Sensor

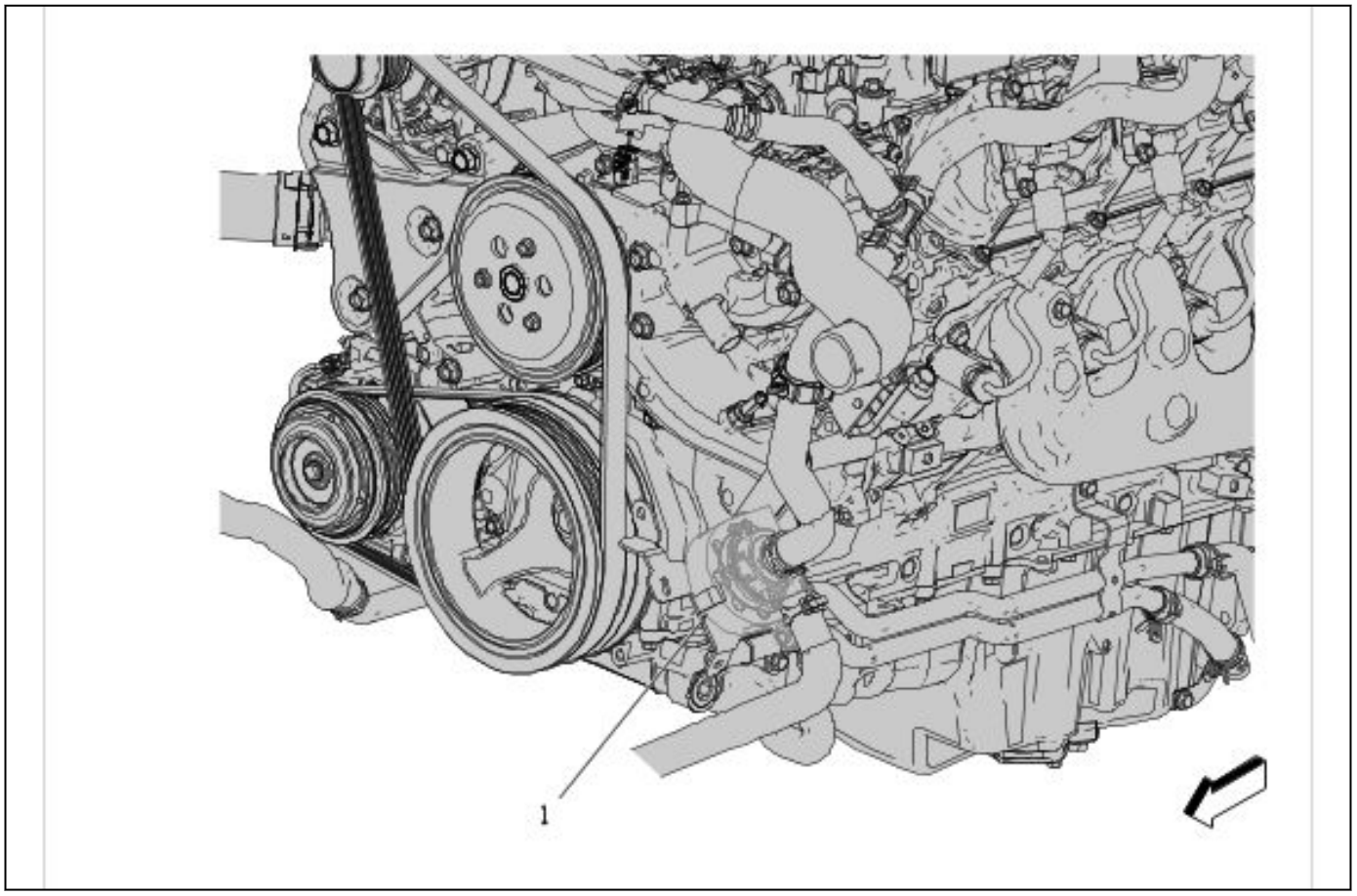
Engine Compartment Components - Radiator Area (L76 / L78)



7163715

Items
(1) G10L Cooling Fan Motor - Left
(2) B1 Air Conditioning Refrigerant Pressure Sensor
(3) B203 Radiator Coolant Temperature Sensor
(4) G10R Cooling Fan Motor - Right
(5) Q97O Engine Coolant Flow Control Valve - Oil (L4B / L76 / L78)
(6) B34C Engine Coolant Temperature Sensor 3 (L76 / L78)

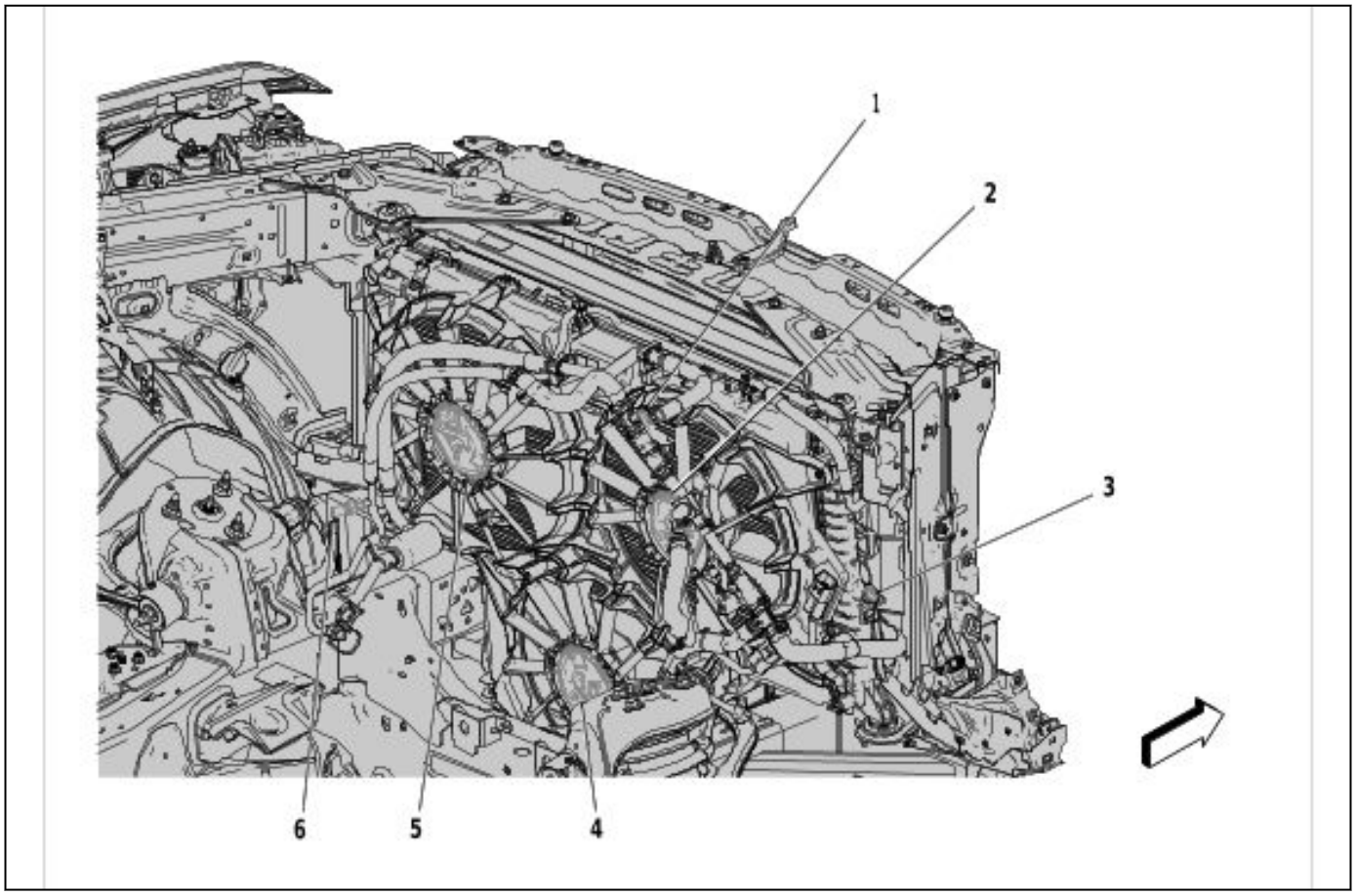
Heater Coolant Pump (L76 / L78)



7166355

Items
(1) G17 Heater Coolant Pump (L76 / L78 / LZ0)

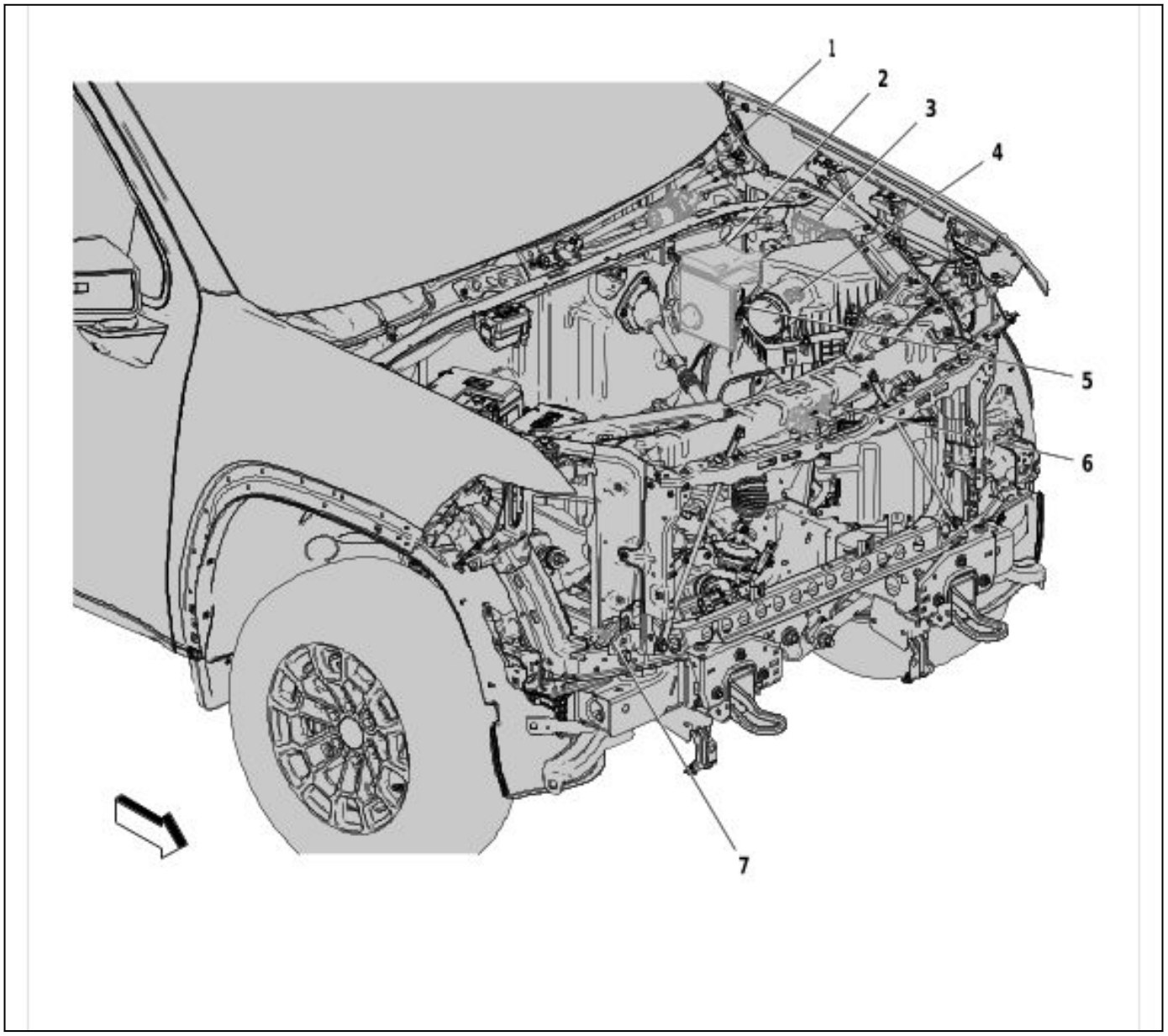
Engine Compartment Components - Radiator Area (LZ0)



7163716

Items
(1) B34K Charge Air Cooler Coolant Temperature Sensor - Inlet (LZ0)
(2) G10R Cooling Fan Motor - Right
(3) B203 Radiator Coolant Temperature Sensor
(4) G10LW Cooling Fan Motor - Lower (LZ0)
(5) G10L Cooling Fan Motor - Left
(6) B1 Air Conditioning Refrigerant Pressure Sensor

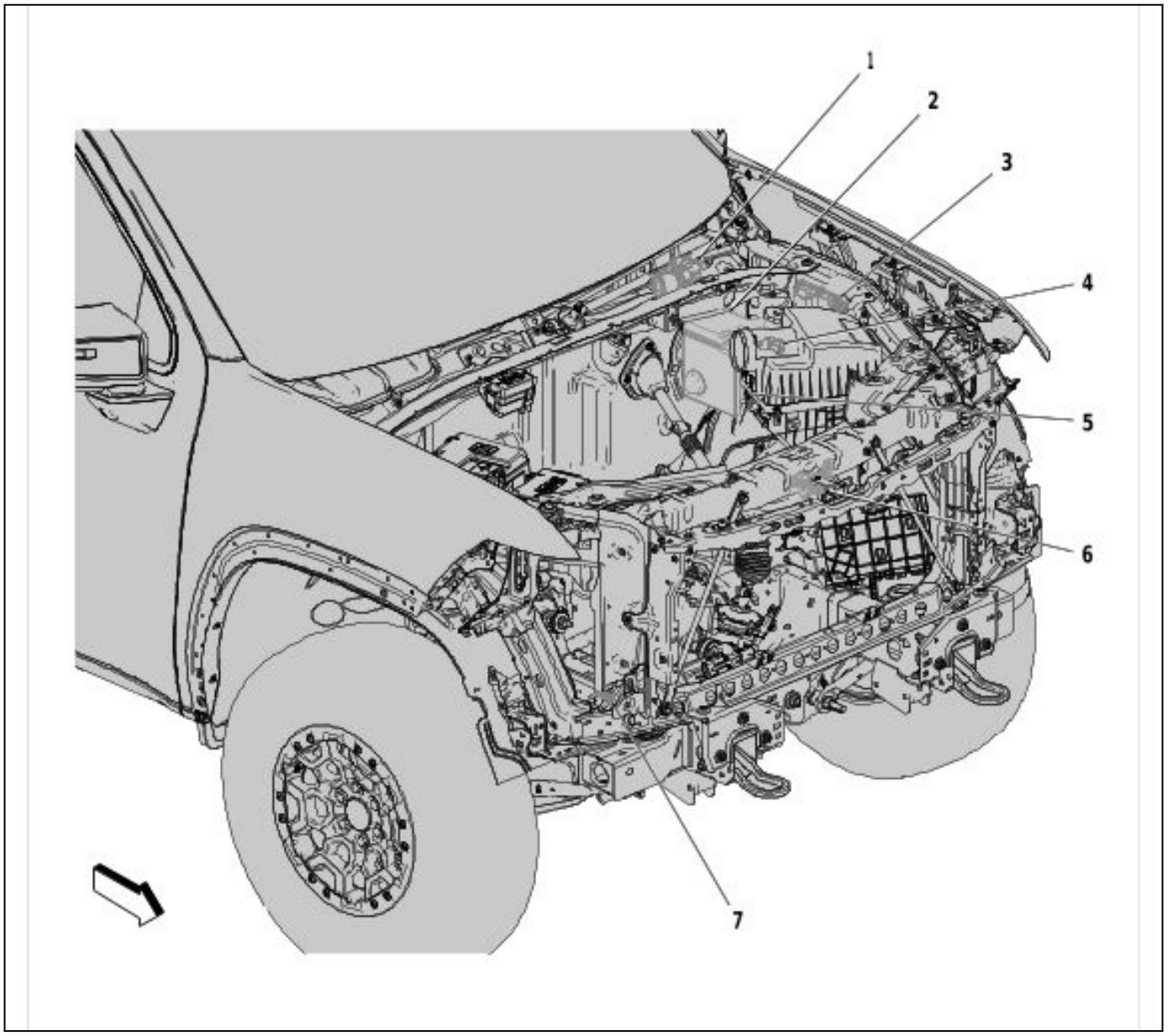
Engine Compartment Components - Left Side (L4B / L76 / L78)



7163717

Items
(1) M75 Windshield Wiper Motor
(2) B20A Brake Fluid Level Indicator Switch
(3) K69 Transfer Case Control Module (F48)
(4) B75 Mass Airflow Sensor
(5) K160 Brake System Control Module
(6) B55 Engine Compartment Cover Switch
(7) B58R Airbag Front End Discriminating Sensor - Right

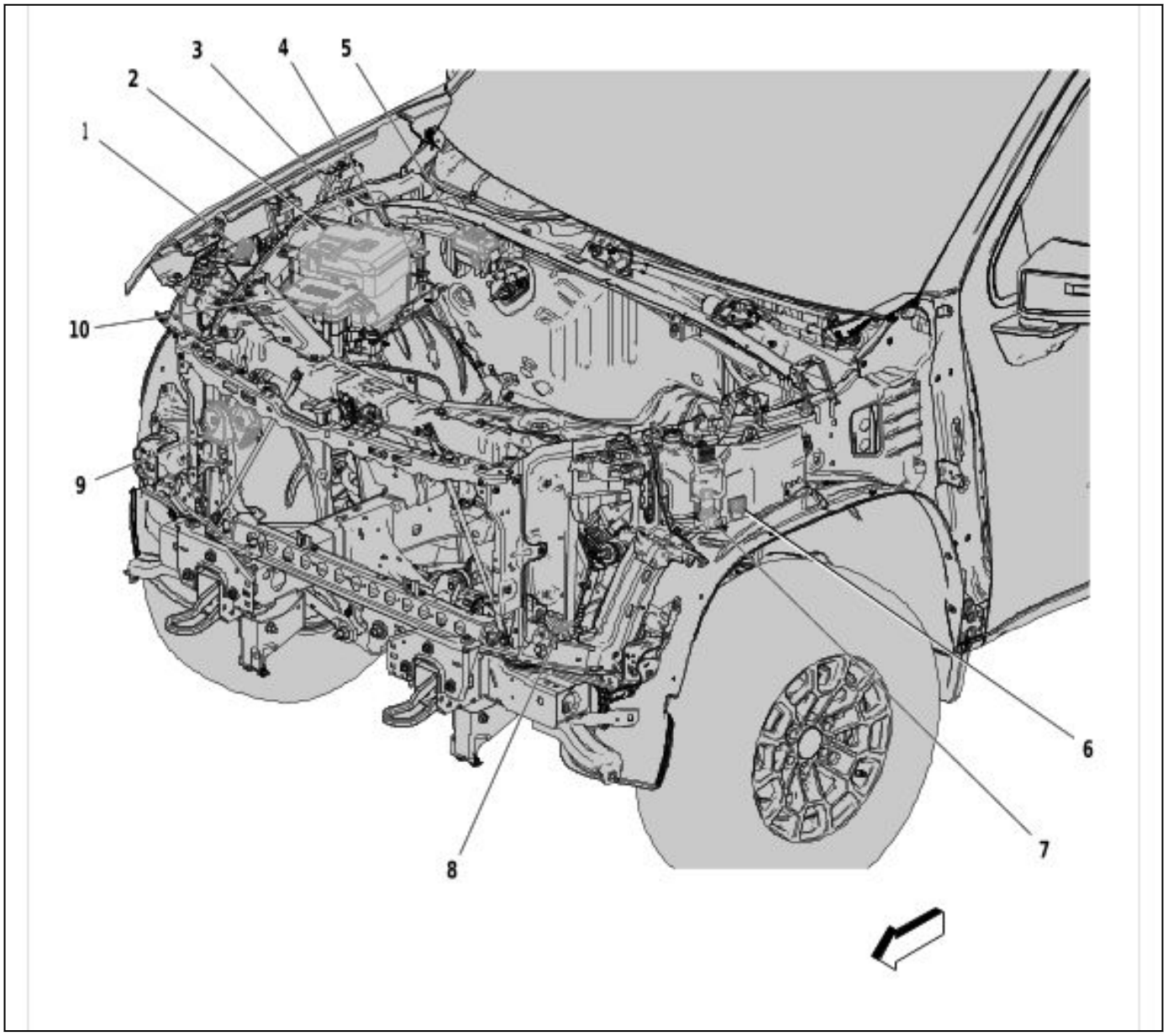
Engine Compartment Components - Left Side (LZ0)



7163718

Items
(1) M75 Windshield Wiper Motor
(2) B20A Brake Fluid Level Indicator Switch
(3) K69 Transfer Case Control Module (F48)
(4) B75 Mass Airflow Sensor
(5) K160 Brake System Control Module
(6) B55 Engine Compartment Cover Switch
(7) B58R Airbag Front End Discriminating Sensor - Right

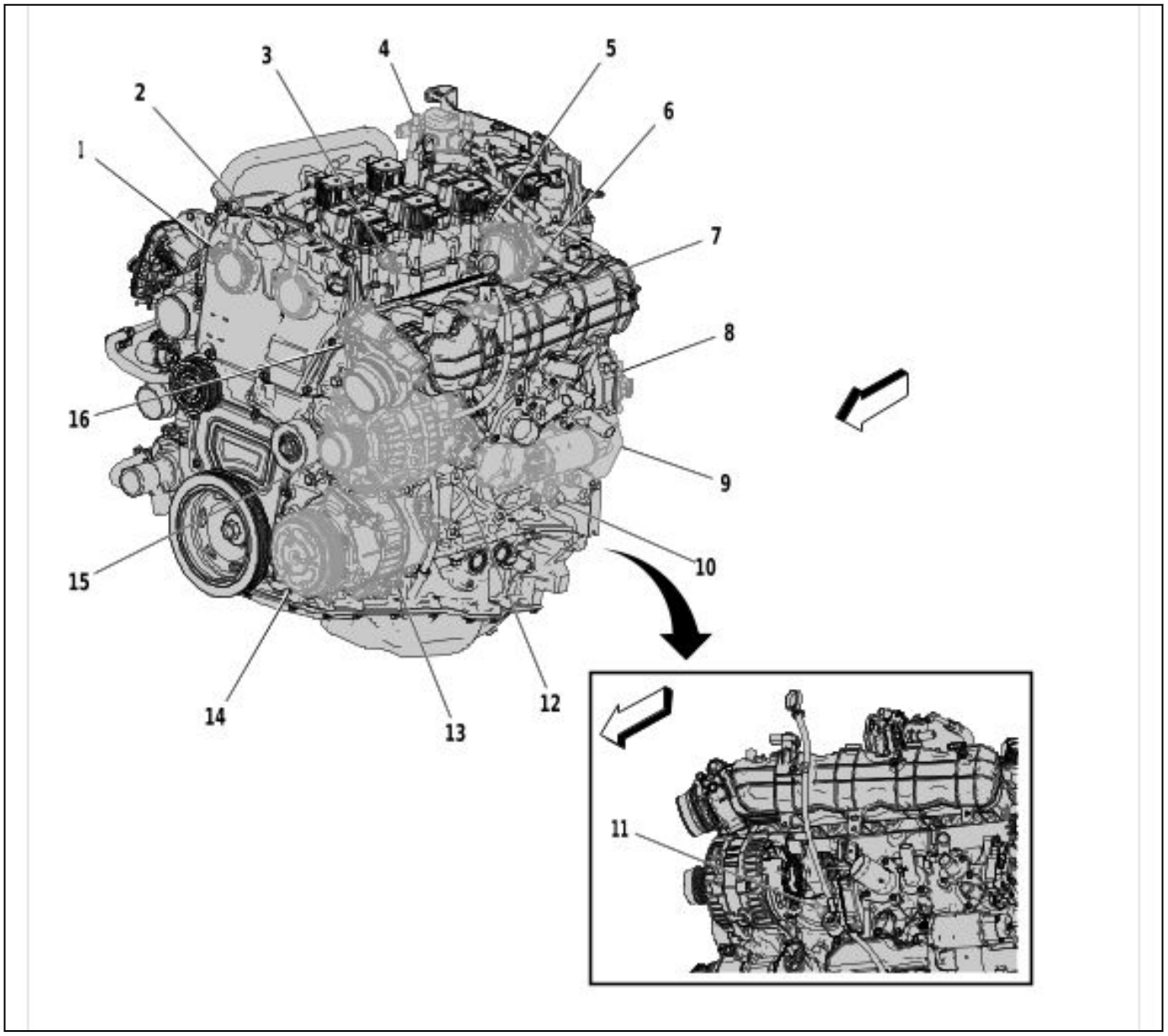
Engine Compartment Components - Right Side



7163719

Items
(1) K71 Transmission Control Module (L76 / L78 / LZ0)
(2) X50B Battery Distribution Engine Compartment Fuse Block
(3) B110 Battery Monitor Module
(4) C1 Battery
(5) X52P Wiring Harness Auxiliary Junction Block (VBP)
(6) B118 Windshield Washer Solvent Container Level Sensor
(7) G24 Windshield Washer Pump
(8) B58L Airbag Front End Discriminating Sensor - Left
(9) P13 Horn
(10) X50A Engine Wiring Harness Junction Block

Engine Components - Left Front (L4B)

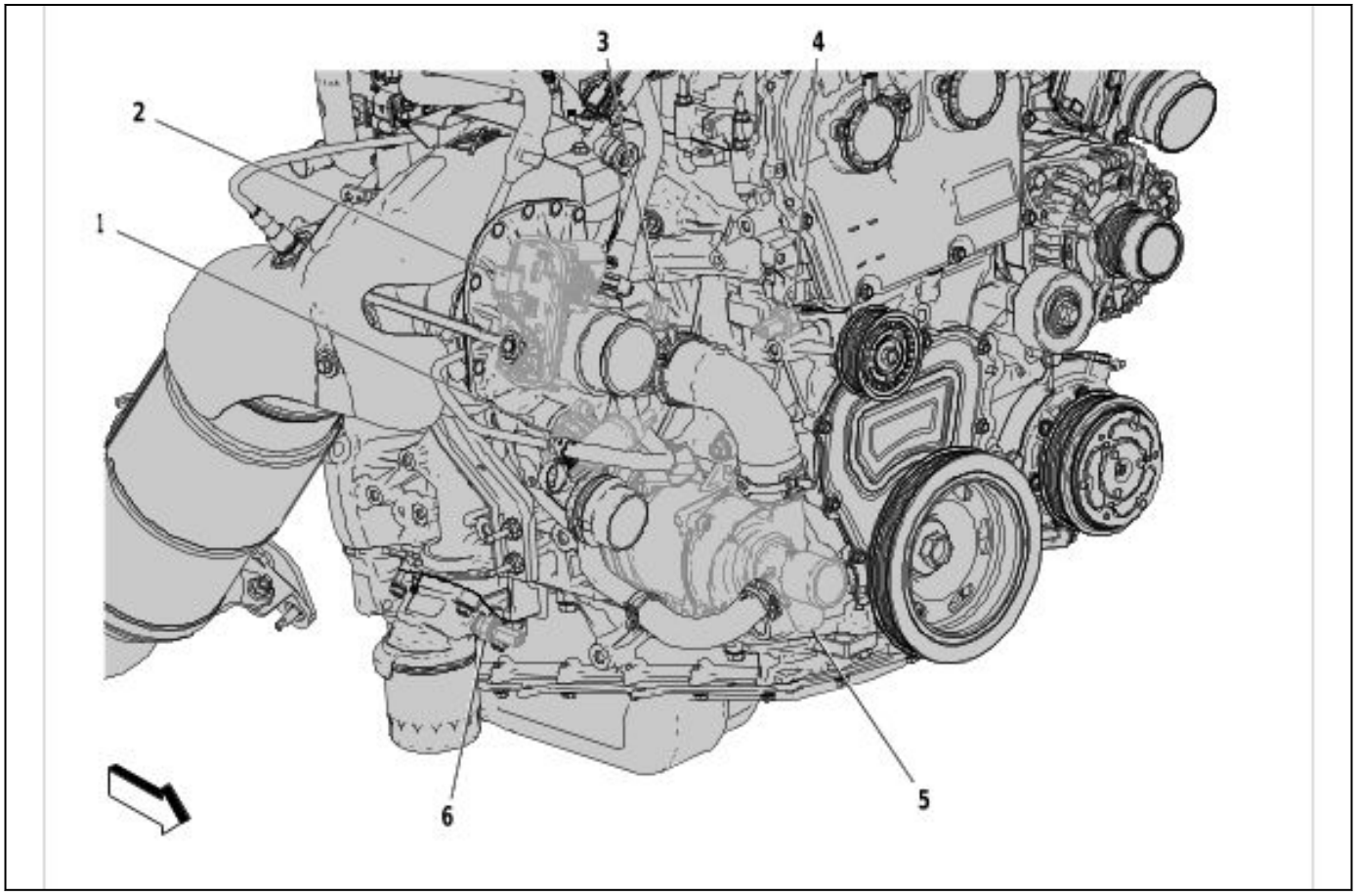


7163720

Items
(1) Q6E Camshaft Position Actuator Solenoid Valve - Exhaust (L4B)
(2) Q6F Camshaft Position Actuator Solenoid Valve - Intake (L4B)
(3) B338A Intake Camshaft Profile Sleeve Position Sensor 1 (L4B)
(4) G18 Fuel Pump - High Pressure (L4B / L76 / L78)
(5) B338B Intake Camshaft Profile Sleeve Position Sensor 2 (L4B)
(6) G58 Evaporative Emission Canister Purge Pump (L4B)
(7) B65 Manifold Absolute Pressure and Intake Air Temperature Sensor (L4B / LZ0)
(8) Q97O Engine Coolant Flow Control Valve - Oil (L4B / L76 / L78)
(9) M64 Starter

Items
(10) B26 Crankshaft Position Sensor
(11) B34F Engine Coolant Temperature Sensor 6 (L4B / L76 / L78)
(12) Q97R Engine Coolant Flow Control Valve - Radiator (L4B / L76 / L78)
(13) G1 Air Conditioning Compressor
(14) Q2 Air Conditioning Clutch
(15) G13 Generator
(16) Q38 Throttle Body (L4B / L76 / L78)

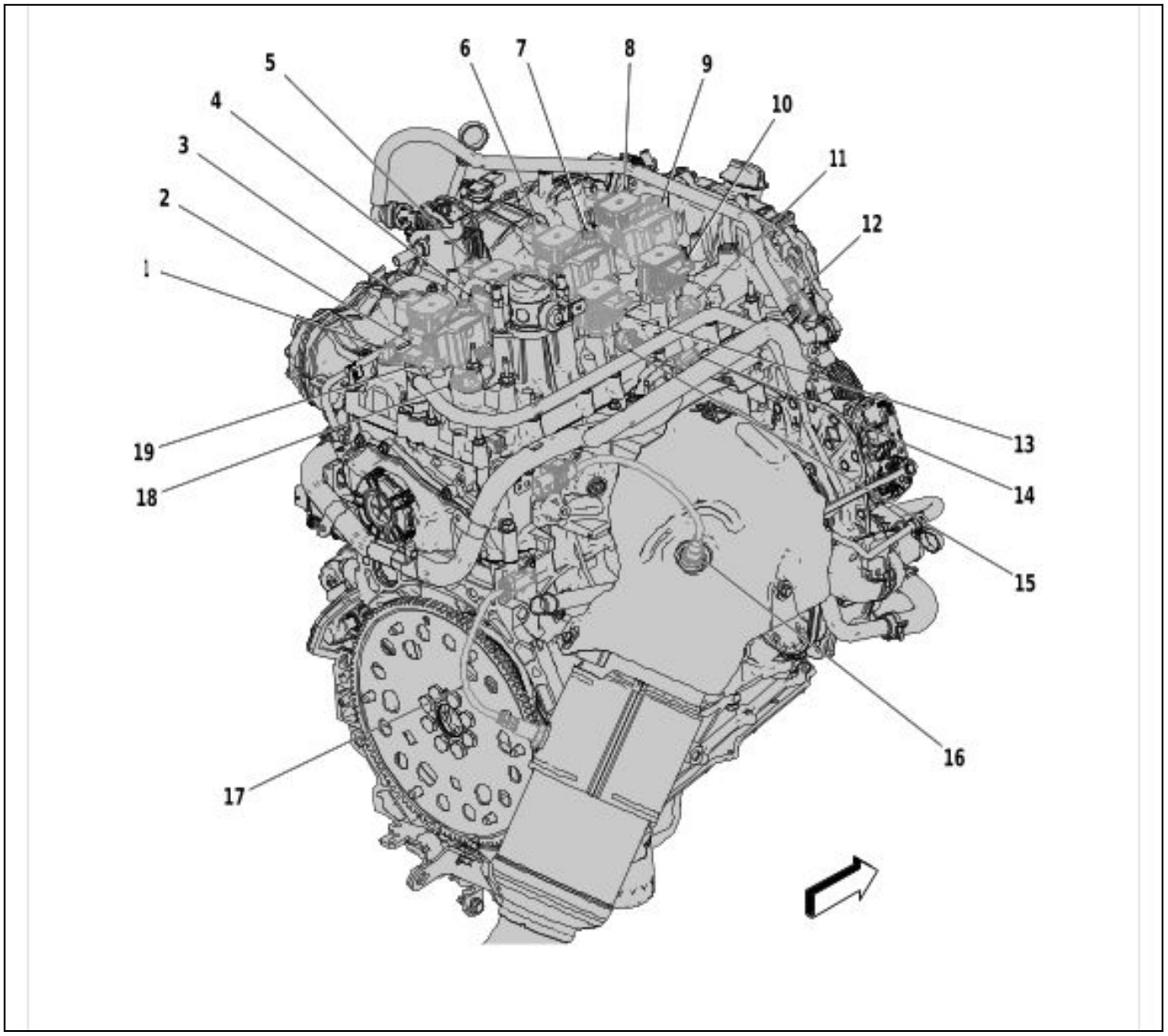
Engine Components - Right Front (L4B)



7163721

Items
(1) Q40 Turbocharger Bypass Valve Solenoid (L4B)
(2) M128 Turbocharger Wastegate Actuator (L4B)
(3) B34B Engine Coolant Temperature Sensor 2
(4) B37B Engine Oil Pressure Sensor
(5) G59 Engine Coolant Pump (L4B)
(6) B36 Engine Oil Temperature Sensor

Engine Components - Right Rear (L4B)

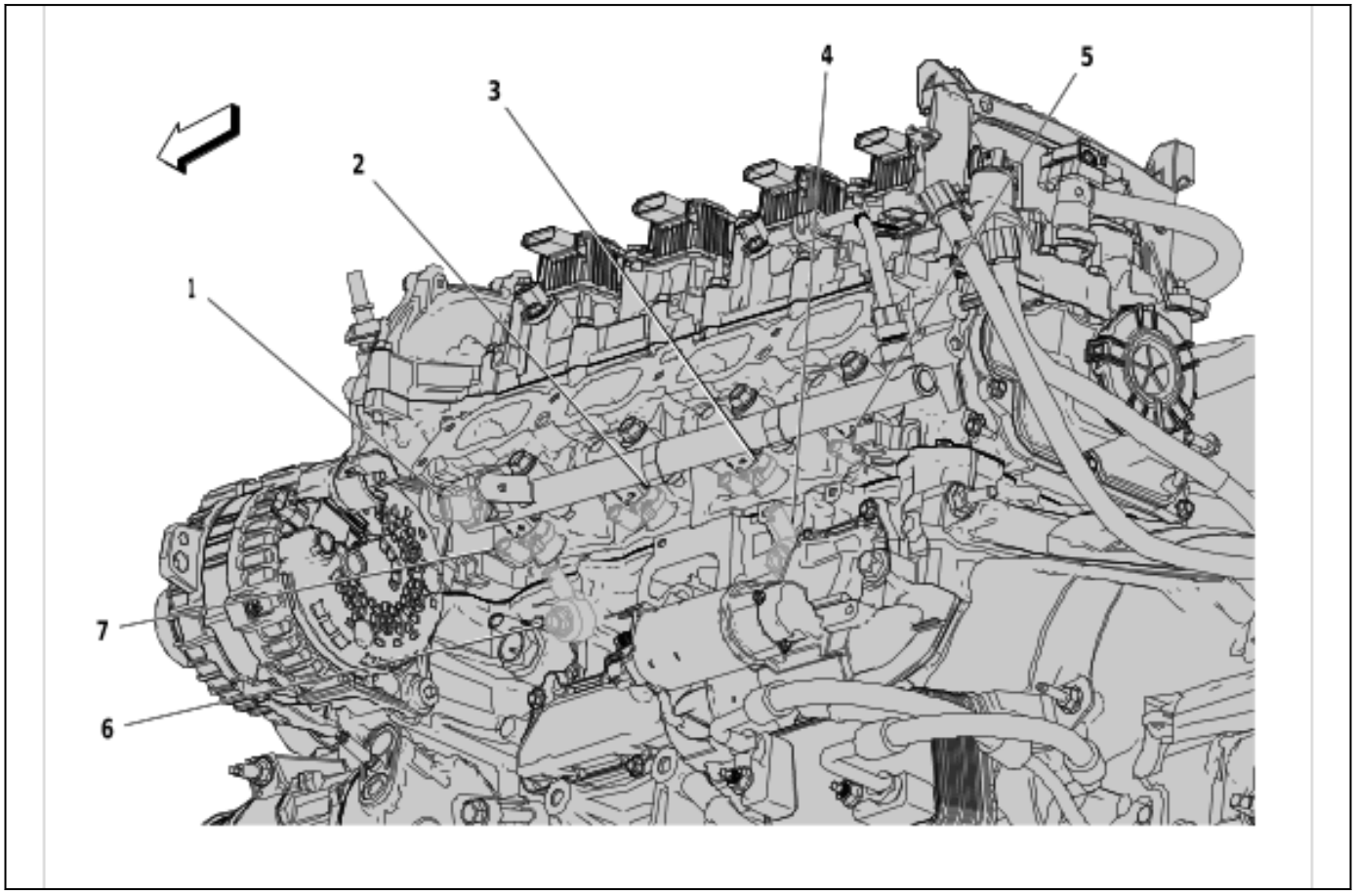


7163722

Items
(1) B23F Camshaft Position Sensor - Intake (L4B / L76 / L78)
(2) T8D Ignition Coil 4 (L4B / L76 / L78)
(3) M129D Intake Camshaft Profile Actuator 4 (L4B)
(4) T8C Ignition Coil 3 (L4B / L76 / L78)
(5) M129C Intake Camshaft Profile Actuator 3 (L4B)
(6) M129B Intake Camshaft Profile Actuator 2 (L4B)
(7) T8B Ignition Coil 2 (L4B / L76 / L78)
(8) M129A Intake Camshaft Profile Actuator 1 (L4B)
(9) T8A Ignition Coil 1 (L4B / L76 / L78)
(10) M130B Exhaust Camshaft Profile Actuator 2 (L4B)
(11) B339A Exhaust Camshaft Profile Sleeve Position Sensor 1 (L4B)

Items
(12) B283 Evaporative Emission Canister Purge Pump Pressure Sensor (L4B)
(13) M130C Exhaust Camshaft Profile Actuator 3 (L4B)
(14) B34E Engine Coolant Temperature Sensor 5 (L4B / L76 / L78)
(15) B339B Exhaust Camshaft Profile Sleeve Position Sensor 2 (L4B)
(16) B52A Heated Oxygen Sensor 1 (L4B)
(17) B52B Heated Oxygen Sensor 2 (L4B)
(18) B23E Camshaft Position Sensor - Exhaust (L4B / LZ0)
(19) B321 Crankcase Pressure Sensor (L4B / LZ0)

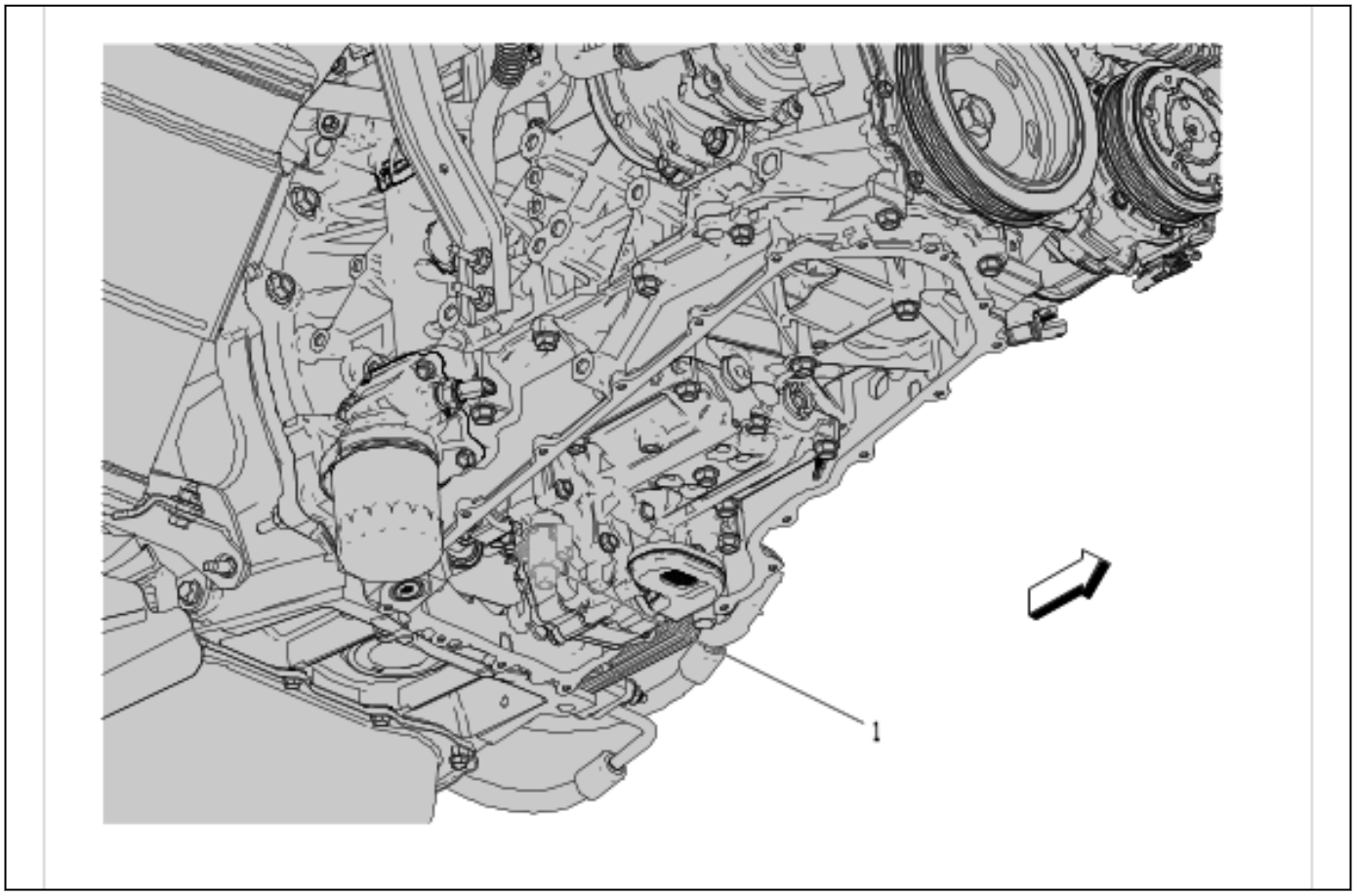
Engine Components - Fuel Injectors (L4B)



7166356

Items
(1) B310 Fuel Pressure and Temperature Sensor (L4B / L76 / L78)
(2) Q17B Fuel Injector 2
(3) Q17C Fuel Injector 3
(4) B68B Knock Sensor 2 (L4B / L76 / L78)
(5) Q17D Fuel Injector 4
(6) B68A Knock Sensor 1 (L4B / L76 / L78)
(7) Q17A Fuel Injector 1

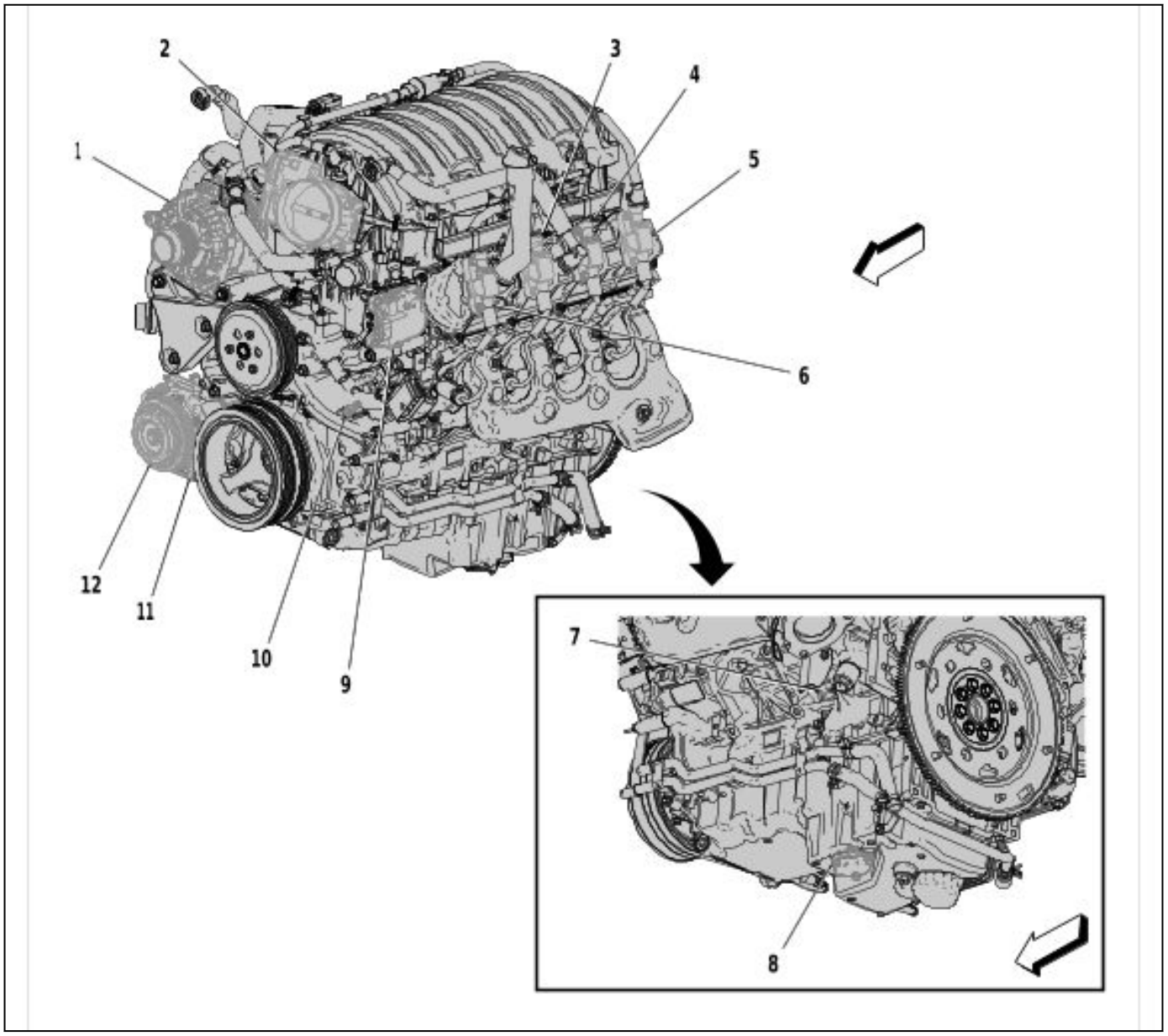
Engine Components - Oil Pan (L4B)



7166357

Items
(1) Q44 Engine Oil Pressure Control Solenoid Valve

Engine Components - Left Front (L76 / L78)

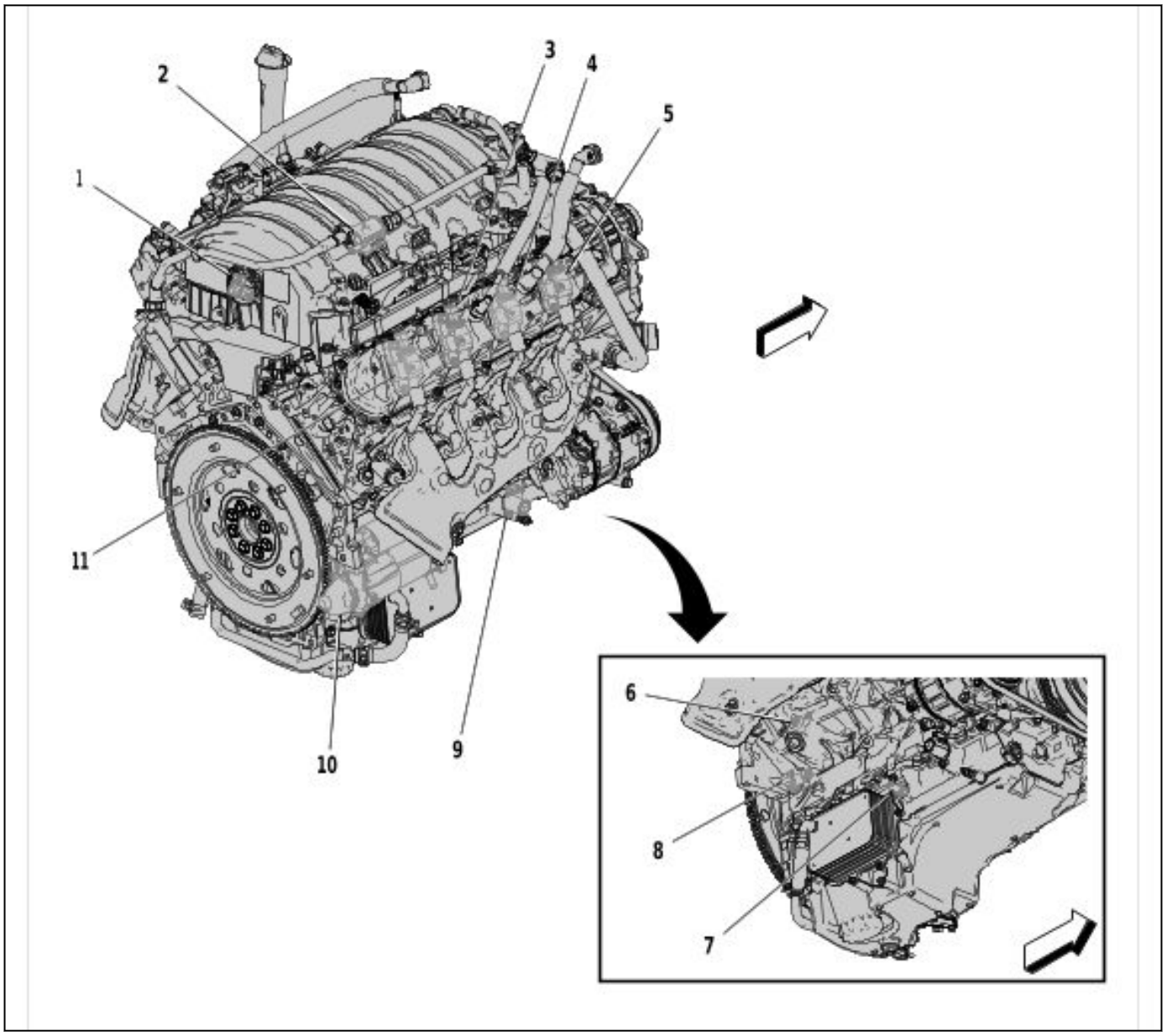


7163723

Items
(1) G13 Generator
(2) Q38 Throttle Body (L4B / L76 / L78)
(3) T8C Ignition Coil 3 (L4B / L76 / L78)
(4) T8E Ignition Coil 5 (L76 / L78)
(5) T8G Ignition Coil 7 (L76 / L78)
(6) T8A Ignition Coil 1 (L4B / L76 / L78)
(7) B68A Knock Sensor 1 (L4B / L76 / L78)
(8) B35C Engine Oil Level and Temperature Sensor (L76 / L78)
(9) Q97R Engine Coolant Flow Control Valve - Radiator (L4B / L76 / L78)
(10) B34B Engine Coolant Temperature Sensor 2

Items
(11) G1 Air Conditioning Compressor
(12) Q2 Air Conditioning Clutch

Engine Components - Right Rear (L76 / L78)

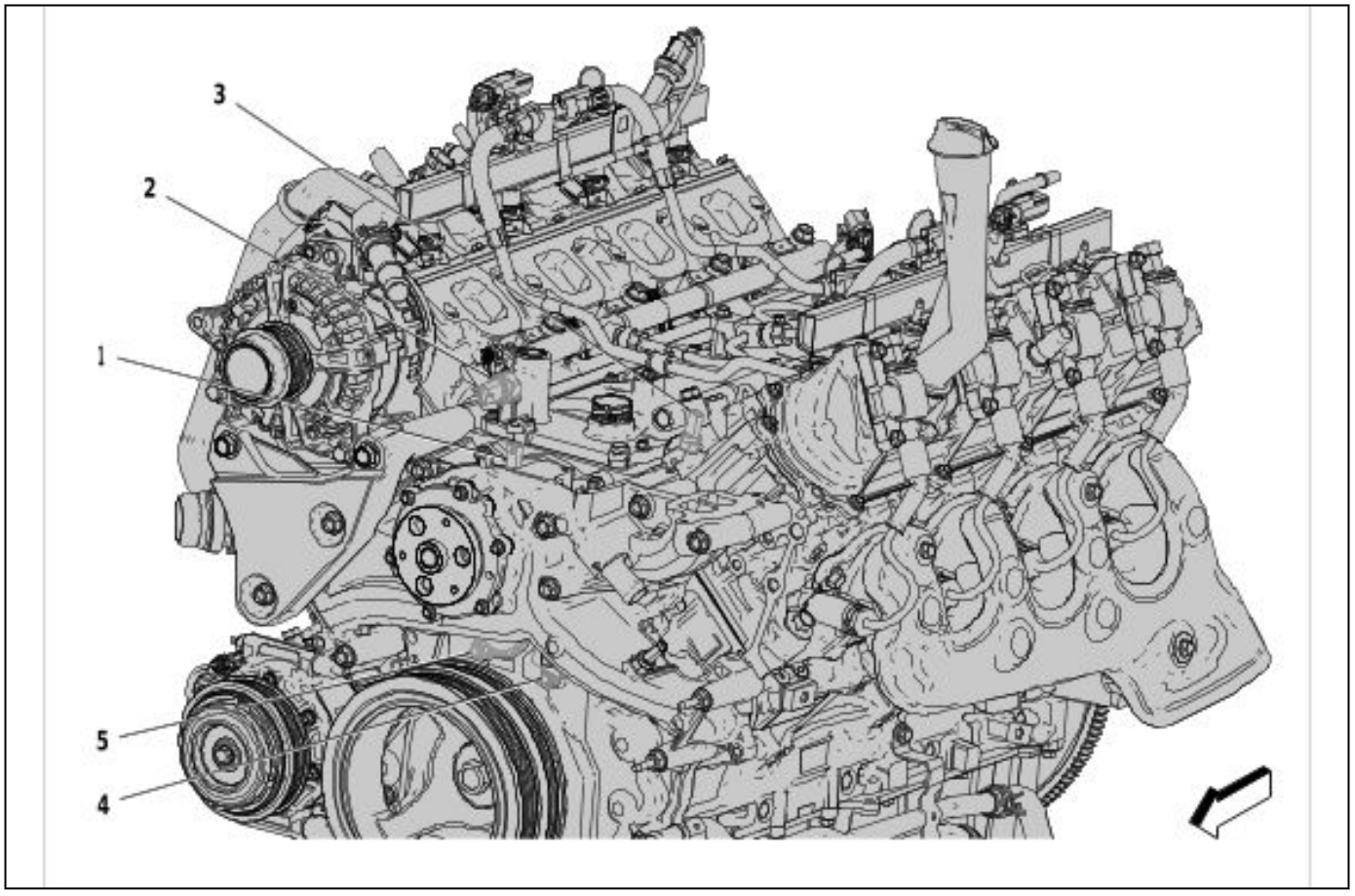


7163724

Items
(1) B74 Manifold Absolute Pressure Sensor (L76 / L78)
(2) Q12 Evaporative Emission Canister Purge Solenoid Valve (FJW)
(3) T8F Ignition Coil 6 (L76 / L78)
(4) T8D Ignition Coil 4 (L4B / L76 / L78)
(5) T8B Ignition Coil 2 (L4B / L76 / L78)
(6) B68B Knock Sensor 2 (L4B / L76 / L78)
(7) B36 Engine Oil Temperature Sensor
(8) B26 Crankshaft Position Sensor

Items
(9) Q44 Engine Oil Pressure Control Solenoid Valve
(10) M64 Starter
(11) T8H Ignition Coil 8 (L76 / L78)

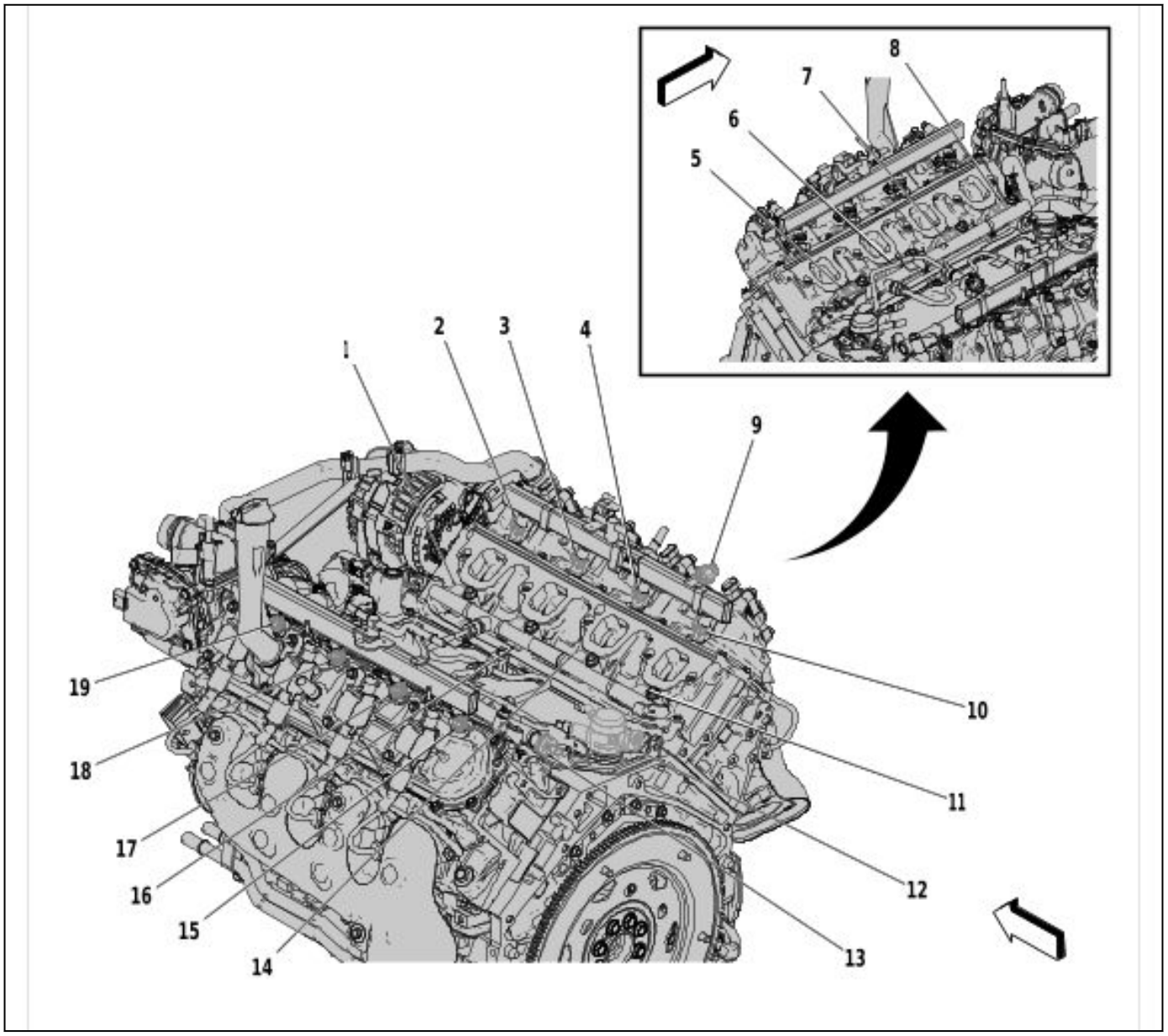
Engine Components - Front Cover (L76 / L78)



7166358

Items
(1) B34F Engine Coolant Temperature Sensor 6 (L4B / L76 / L78)
(2) B37B Engine Oil Pressure Sensor
(3) B34E Engine Coolant Temperature Sensor 5 (L4B / L76 / L78)
(4) B23F Camshaft Position Sensor - Intake (L4B / L76 / L78)
(5) Q6 Camshaft Position Actuator Solenoid Valve (L76 / L78)

Engine Components - Fuel Injectors (L76 / L78)

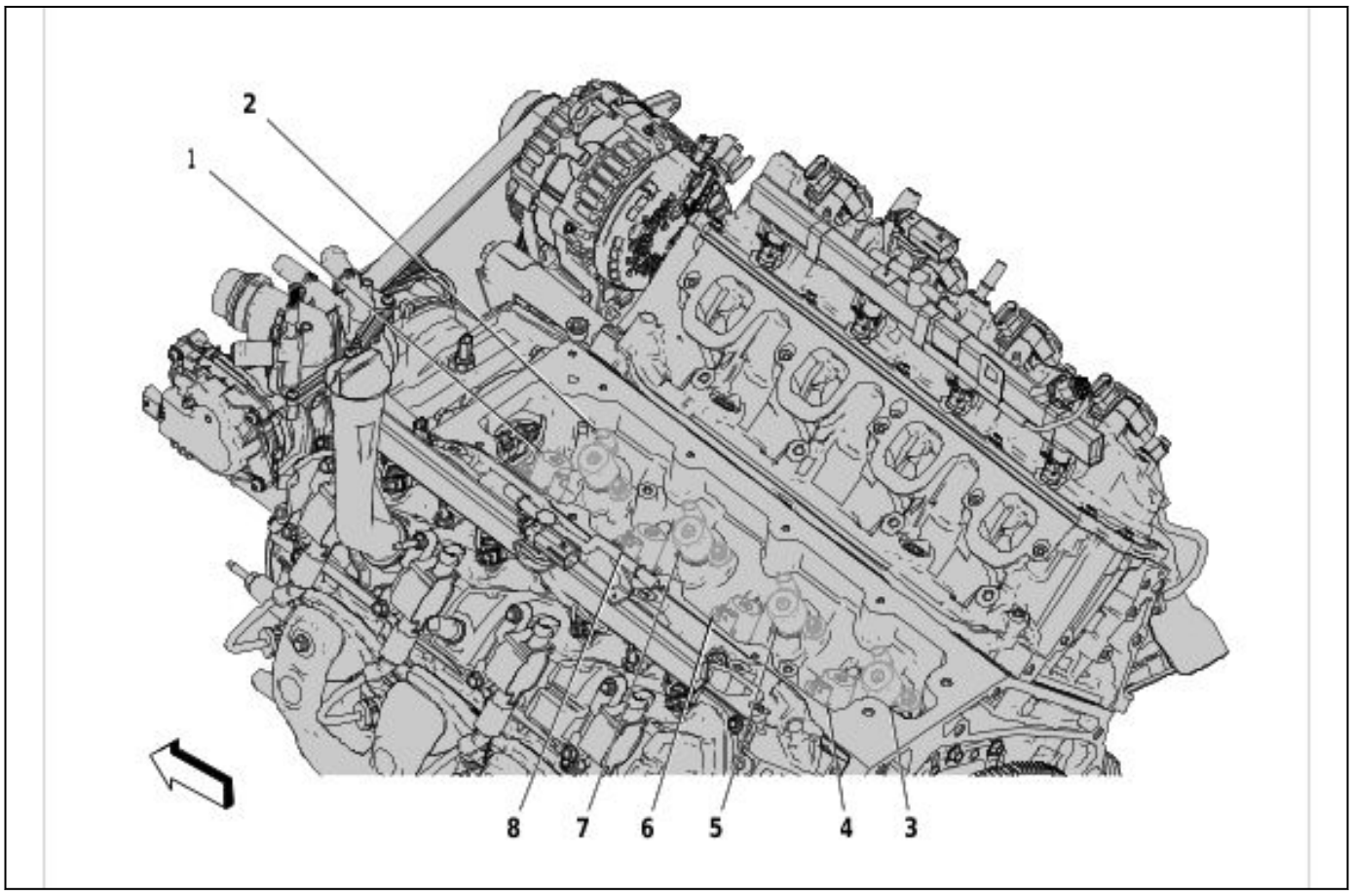


7166359

Items
(1) Q17B Fuel Injector 2
(2) Q17K Fuel Injector - Cylinder 2 Injector 2 (L76 / L78)
(3) Q17M Fuel Injector - Cylinder 4 Injector 2 (L76 / L78)
(4) Q17P Fuel Injector - Cylinder 6 Injector 2 (L76 / L78)
(5) Q17G Fuel Injector 7 (L76 / L78)
(6) Q17E Fuel Injector 5 (L76 / L78 / LZ0)
(7) Q17C Fuel Injector 3
(8) Q17A Fuel Injector 1
(9) B310L Fuel Pressure and Temperature Sensor - Low (L76 / L78)
(10) Q17R Fuel Injector - Cylinder 8 Injector 2 (L76 / L78)
(11) Q17H Fuel Injector 8 (L76 / L78)
(12) G18 Fuel Pump - High Pressure (L4B / L76 / L78)

Items
(13) B310 Fuel Pressure and Temperature Sensor (L4B / L76 / L78)
(14) Q17F Fuel Injector 6 (L76 / L78 / LZ0)
(15) Q17Q Fuel Injector - Cylinder 7 Injector 2 (L76 / L78)
(16) Q17D Fuel Injector 4
(17) Q17N Fuel Injector - Cylinder 5 Injector 2 (L76 / L78)
(18) Q17L Fuel Injector - Cylinder 3 Injector 2 (L76 / L78)
(19) Q17J Fuel Injector - Cylinder 1 Injector 2 (L76 / L78)

Engine Components - Below Valley Cover (L76 / L78)

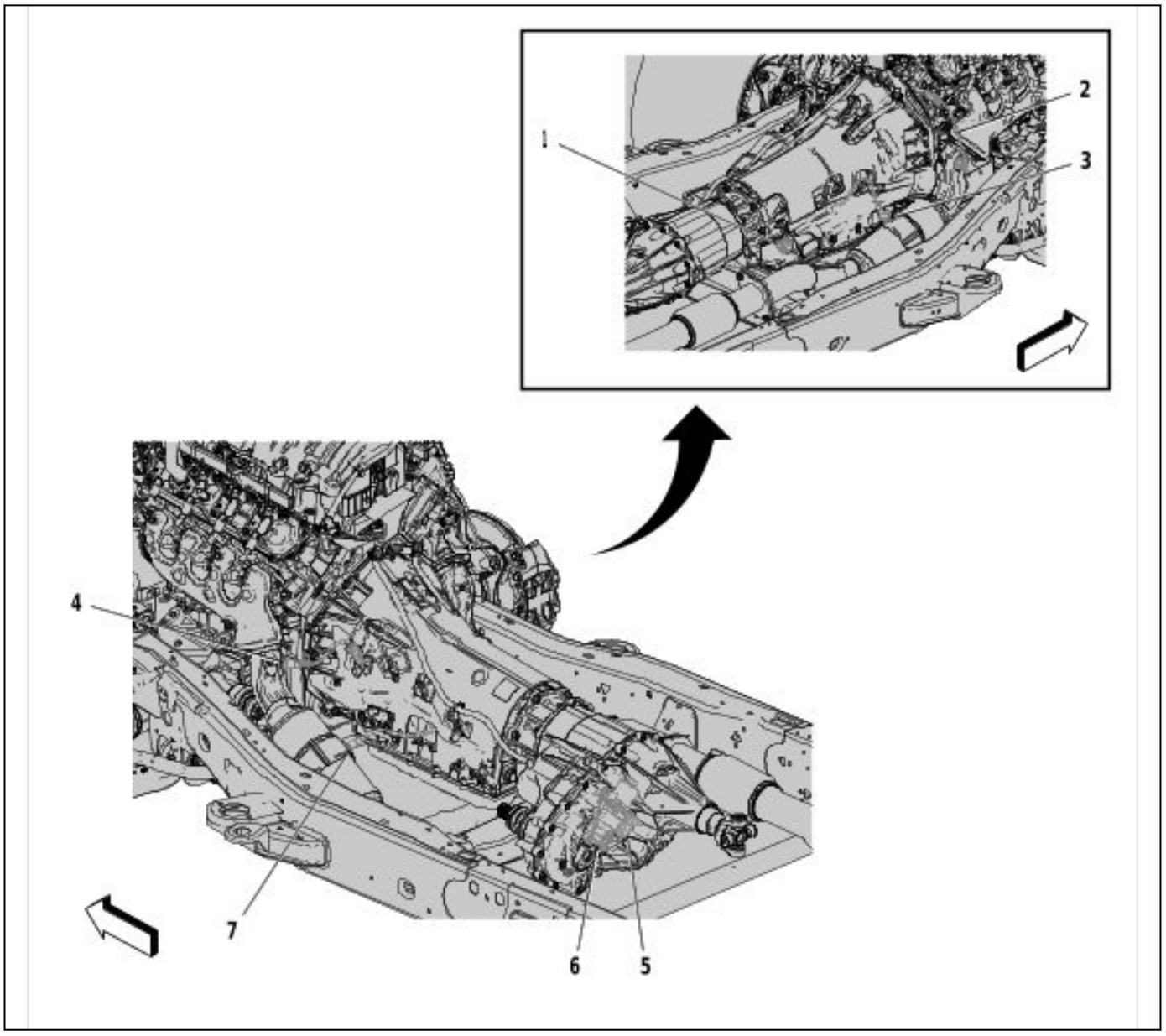


7166360

Items
(1) Q83AA Valve Lifter Oil Solenoid Valve - Cylinder 1 (L76 / L78)
(2) Q83AB Valve Lifter Oil Solenoid Valve - Cylinder 2 (L76 / L78)
(3) Q83AH Valve Lifter Oil Solenoid Valve - Cylinder 8 (L76 / L78)
(4) Q83AG Valve Lifter Oil Solenoid Valve - Cylinder 7 (L76 / L78)
(5) Q83AF Valve Lifter Oil Solenoid Valve - Cylinder 6 (L76 / L78)
(6) Q83AE Valve Lifter Oil Solenoid Valve - Cylinder 5 (L76 / L78)

Items
(7) Q83AD Valve Lifter Oil Solenoid Valve - Cylinder 4 (L76 / L78)
(8) Q83AC Valve Lifter Oil Solenoid Valve - Cylinder 3 (L76 / L78)

Transmission Area Components (L76 / L78)

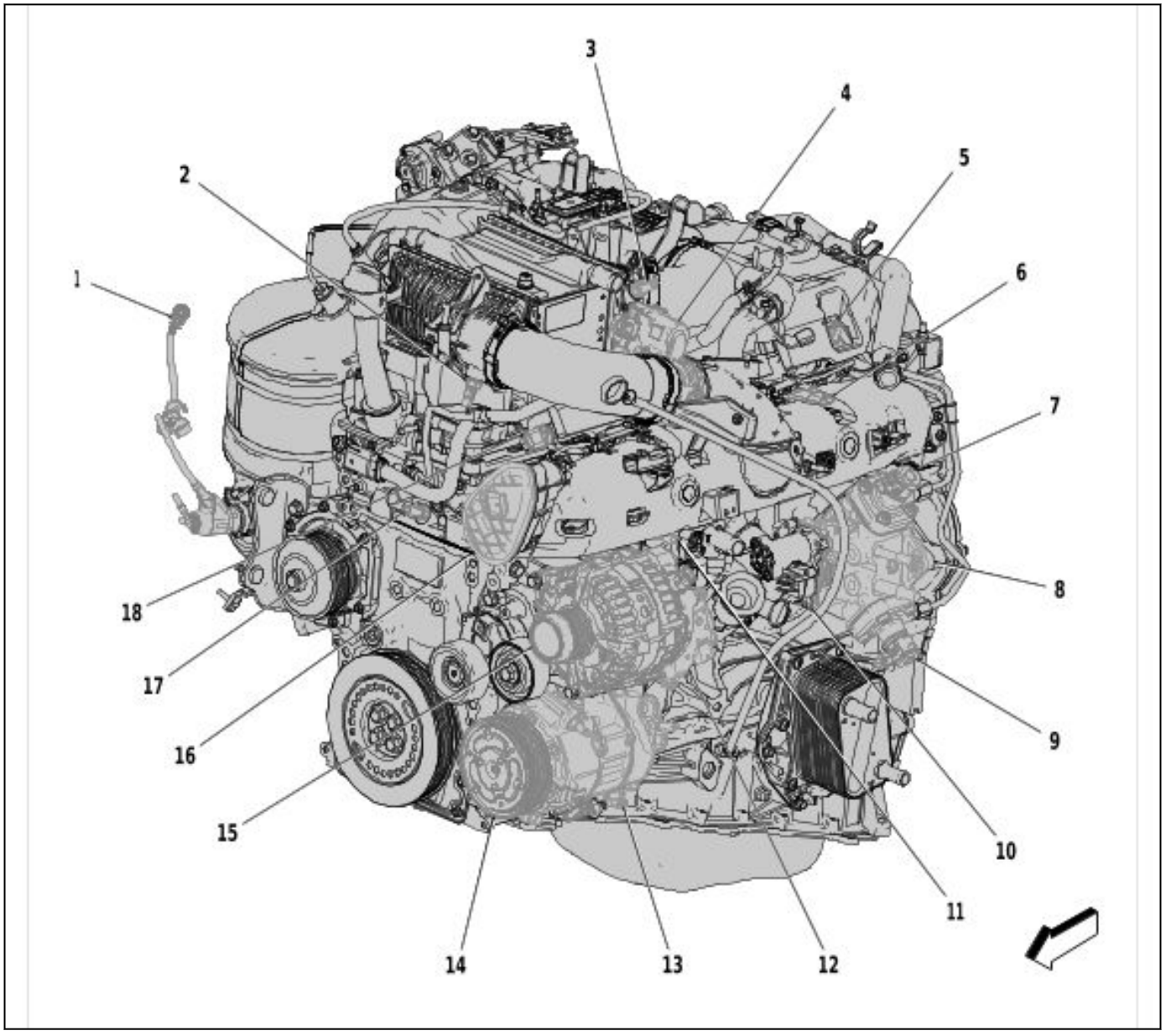


7163725

Items
(1) T12 Automatic Transmission
(2) B52E Heated Oxygen Sensor - Bank 2 Sensor 1 (L76 / L78)
(3) B52F Heated Oxygen Sensor - Bank 2 Sensor 2 (L76 / L78)
(4) B52C Heated Oxygen Sensor - Bank 1 Sensor 1 (L76 / L78)
(5) B139 Transfer Case Two/Four Wheel Drive Actuator Position Sensor (F48)

Items
(6) A16 Transfer Case Four Wheel Drive Actuator (F48)
(7) B52D Heated Oxygen Sensor - Bank 1 Sensor 2 (L76 / L78)

Engine Components - Left Front (LZ0)

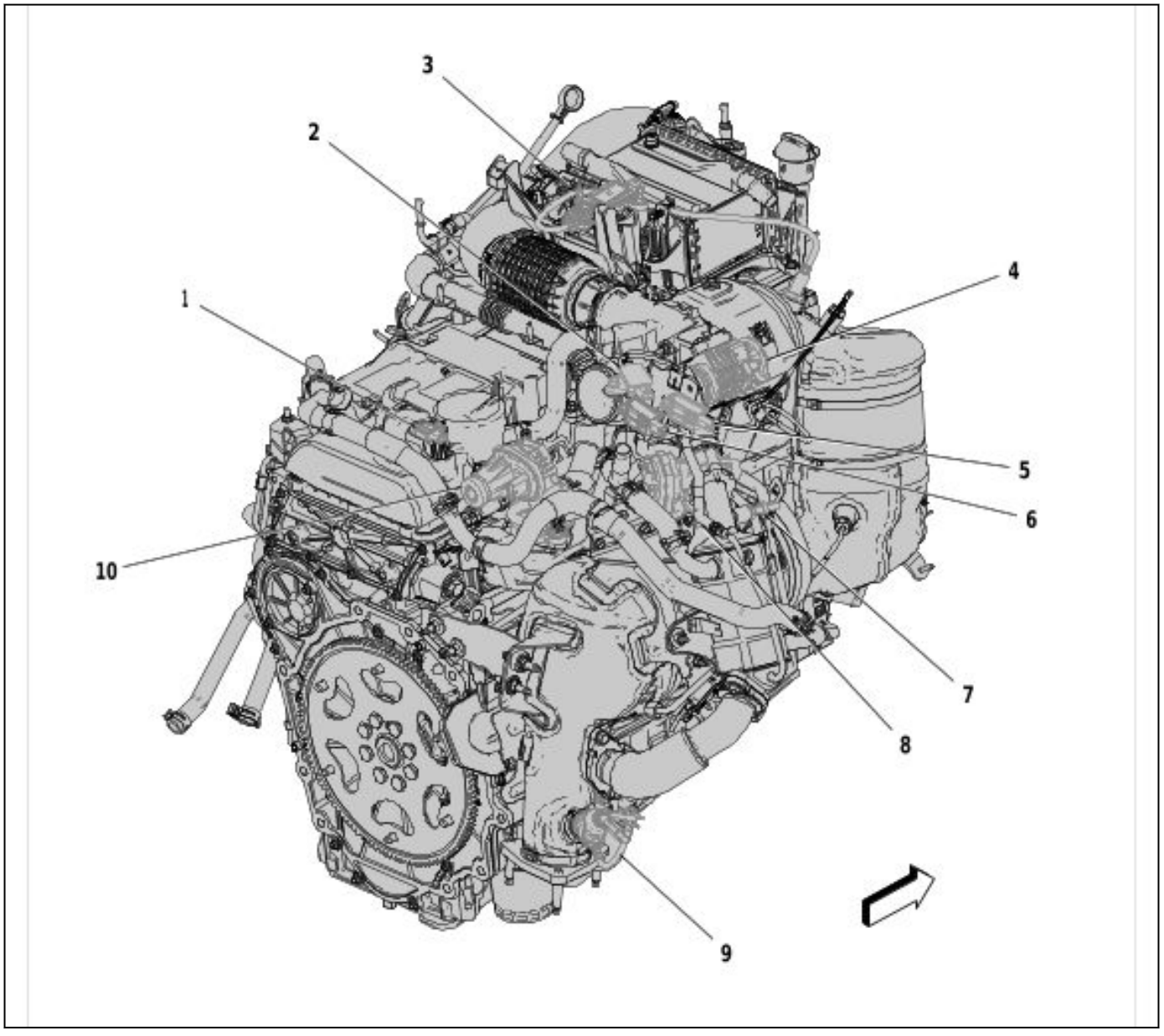


7163726

Items
(1) Q61 Reductant Fluid Injector (LZ0)
(2) B193B Charge Air Cooler Air Temperature Sensor - Outlet (LZ0)
(3) B193A Charge Air Cooler Air Temperature Sensor - Inlet (LZ0)
(4) Q20 Intake Airflow Control Valve (LZ0)
(5) Q18B Fuel Pressure Regulator 2 (LZ0)
(6) B65 Manifold Absolute Pressure and Intake Air Temperature Sensor (L4B / LZ0)

Items
(7) Q18C Fuel Pressure Regulator 3 (LZ0)
(8) G18 Fuel Pump - High Pressure
(9) Q18A Fuel Pressure Regulator 1 (LZ0)
(10) Q97F Engine Coolant Flow Control Valve - Flow Control (LZ0)
(11) B34 Engine Coolant Temperature Sensor (LZ0)
(12) Q97M Engine Coolant Flow Control Valve - Main (LZ0)
(13) G1 Air Conditioning Compressor
(14) Q2 Air Conditioning Clutch
(15) G13 Generator
(16) Q22 Intake Manifold Tuning Solenoid Valve (LZ0)
(17) B96 Cylinder Head Temperature Sensor (LZ0)
(18) B47B Fuel Rail Pressure Sensor (LZ0)

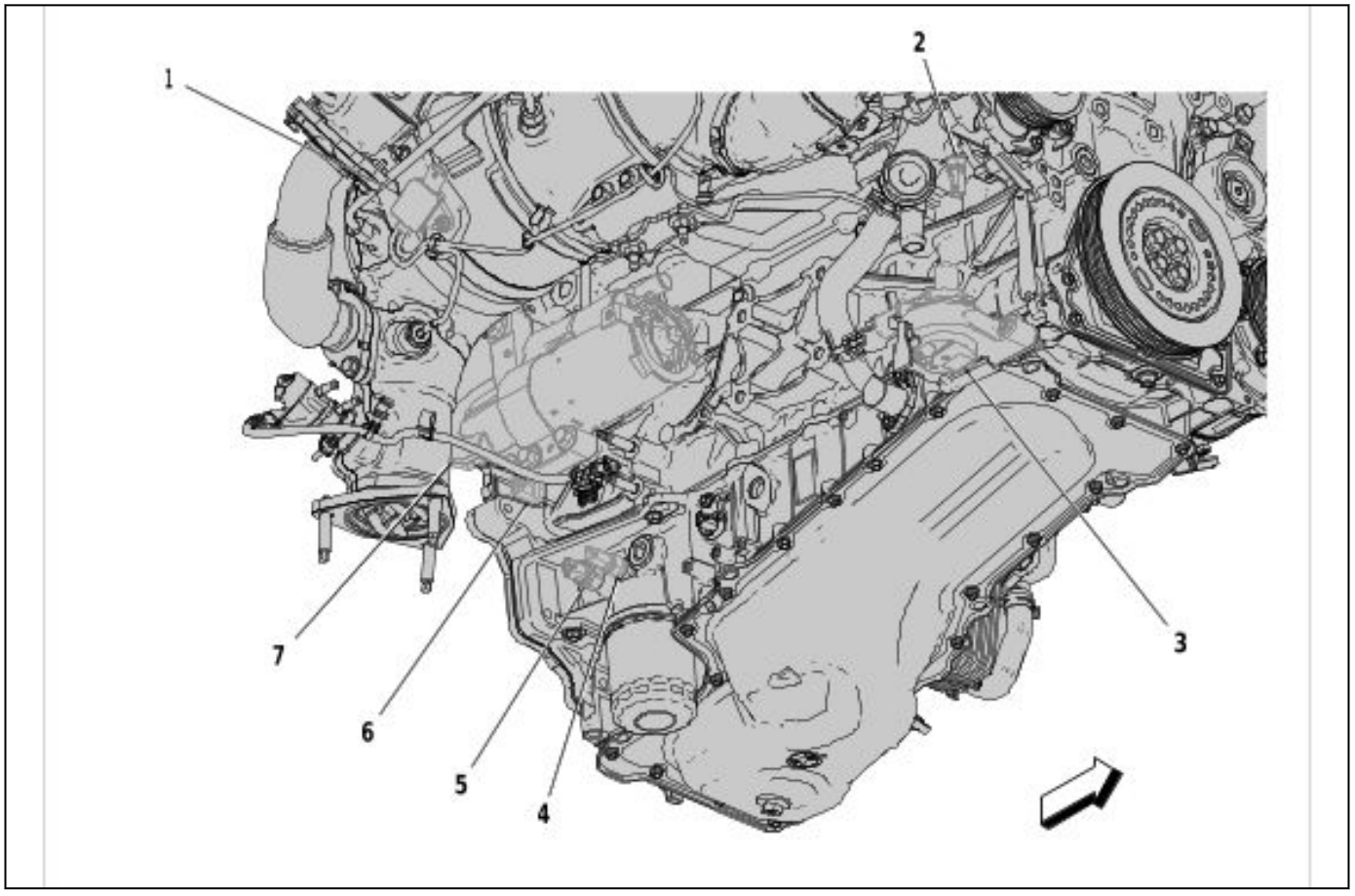
Engine Components - Right Rear (LZ0)



7163727

Items
(1) B321 Crankcase Pressure Sensor (L4B / LZ0)
(2) B359B Exhaust Gas Temperature Sensor Module 2 (LZ0)
(3) B195A Nitrogen Oxides Sensor 1 (LZ0)
(4) M103 Turbocharger Vane Position Actuator (LZ0)
(5) B345R Exhaust Pressure Differential Sensor - Exhaust Gas Recirculation (LZ0)
(6) B345P Exhaust Pressure Differential Sensor - Particulate Filter (LZ0)
(7) B130C Exhaust Gas Recirculation Temperature Sensor 3 (LZ0)
(8) Q14B Exhaust Gas Recirculation Valve 2 (LZ0)
(9) Q61B Reductant Fluid Injector 2 (LZ0)
(10) Q14A Exhaust Gas Recirculation Valve 1 (LZ0)

Engine Components - Lower Right Side (LZ0)

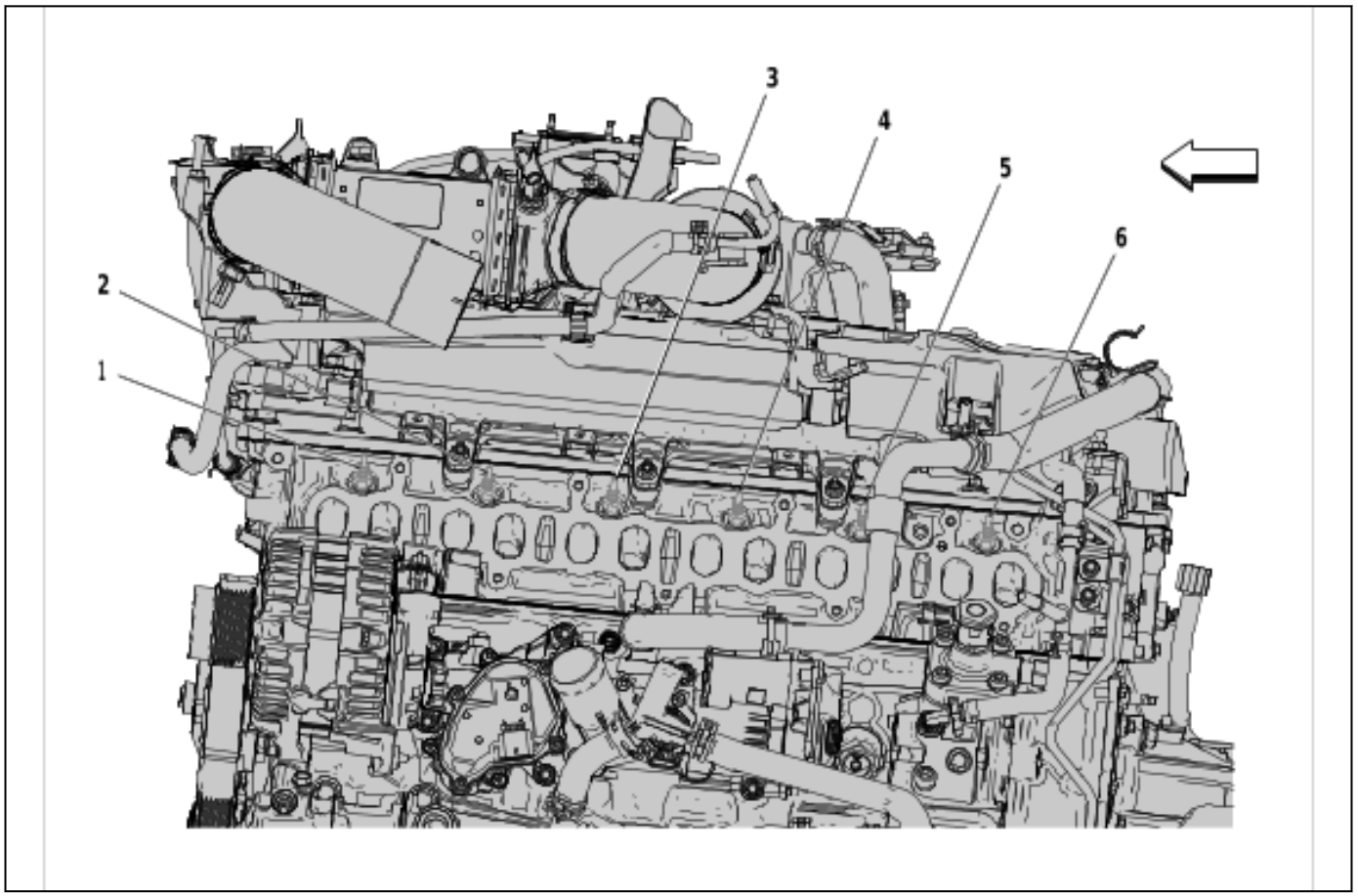


7163728

Items
(1) B359 Exhaust Gas Temperature Sensor Module (LZ0)
(2) B34B Engine Coolant Temperature Sensor 2
(3) G17 Heater Coolant Pump (L76 / L78 / LZ0)
(4) B36 Engine Oil Temperature Sensor
(5) B37B Engine Oil Pressure Sensor

Items
(6) B26 Crankshaft Position Sensor
(7) M64 Starter

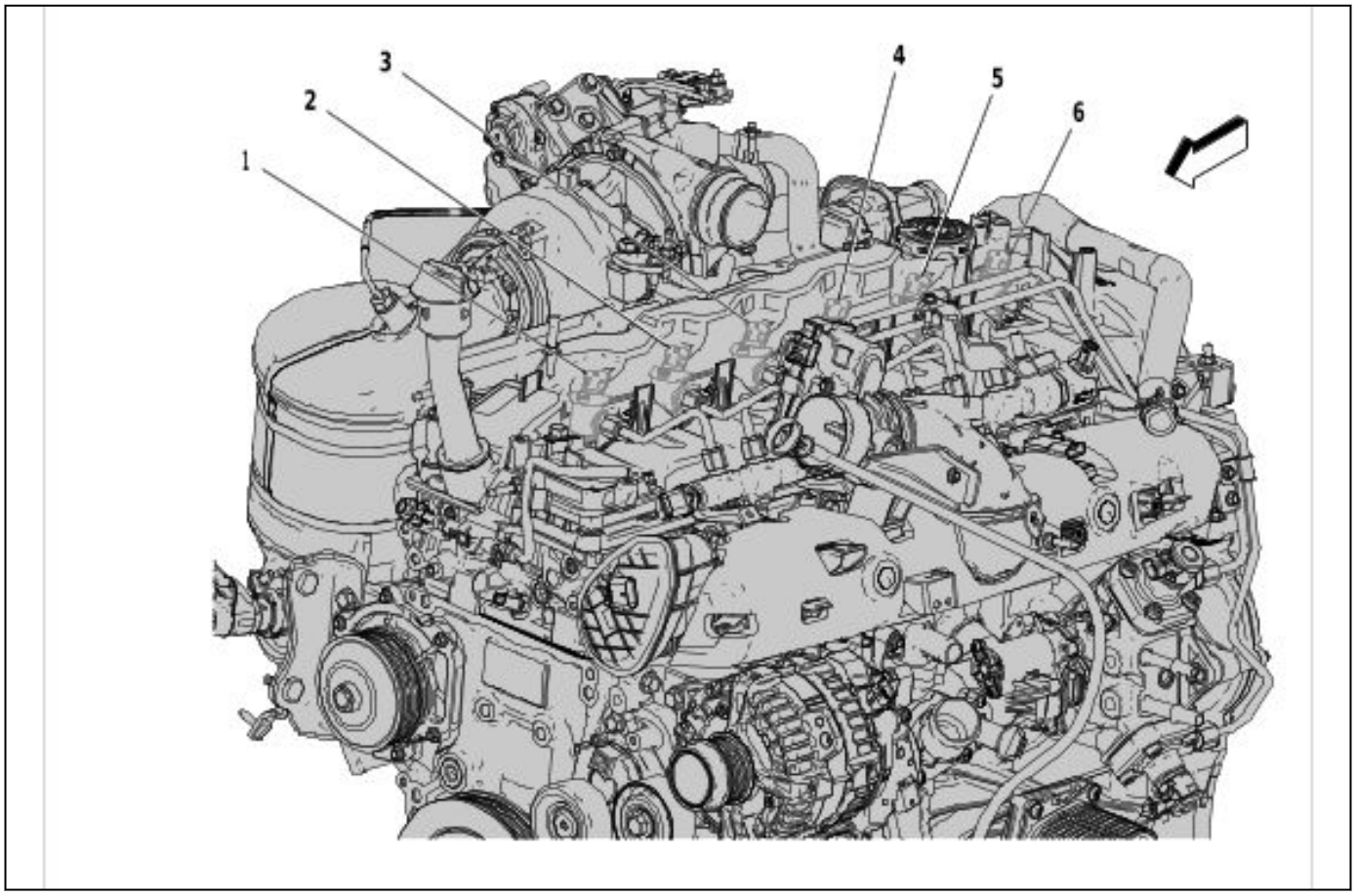
Engine Components - Glow Plugs (LZ0)



7166361

Items
(1) E12A Glow Plug 1 (LZ0)
(2) E12B Glow Plug 2 (LZ0)
(3) E12C Glow Plug 3 (LZ0)
(4) E12D Glow Plug 4 (LZ0)
(5) E12E Glow Plug 5 (LZ0)
(6) E12F Glow Plug 6 (LZ0)

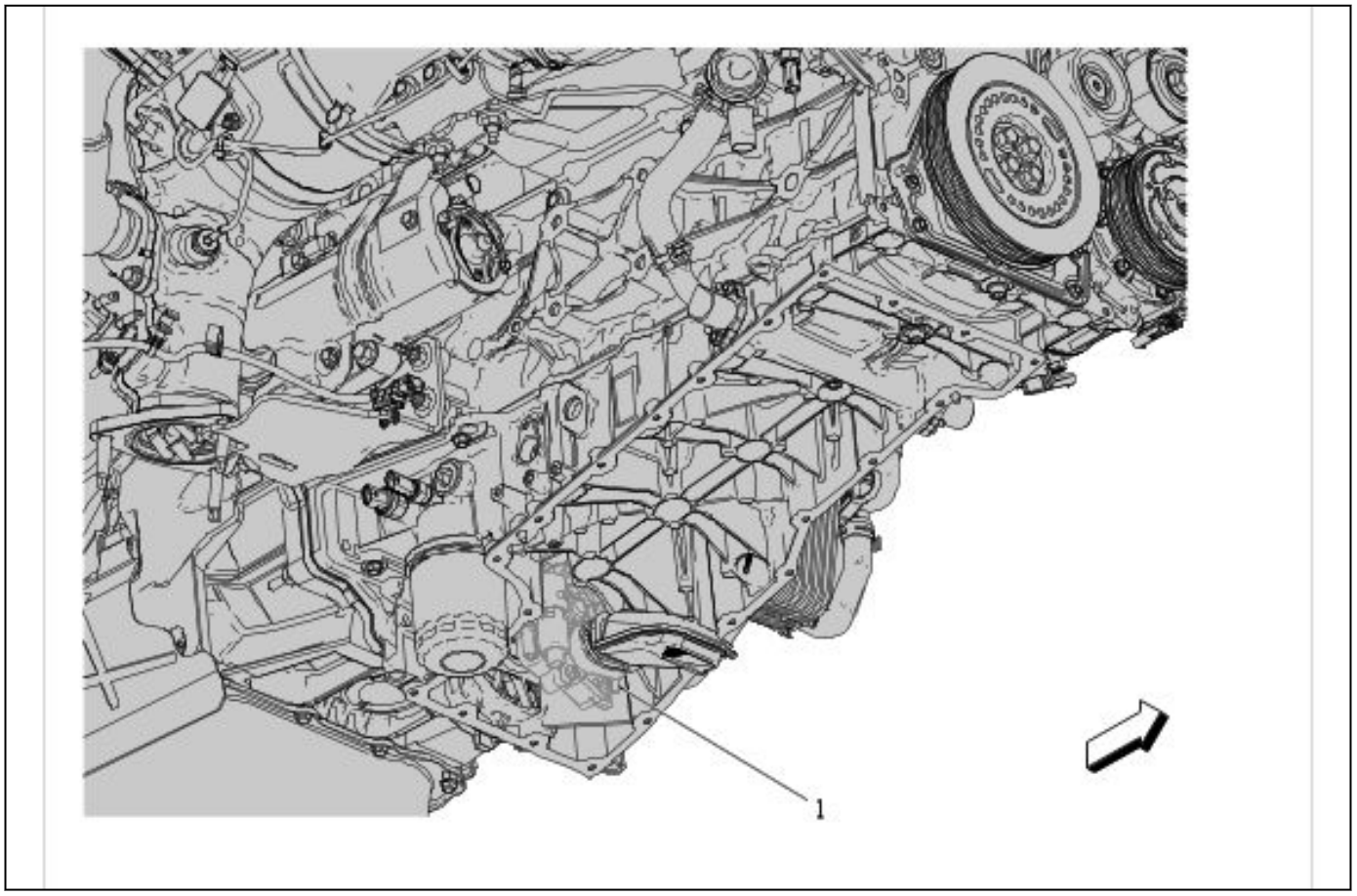
Engine Components - Fuel Injectors (LZ0)



7166362

Items
(1) Q17A Fuel Injector 1
(2) Q17B Fuel Injector 2
(3) Q17C Fuel Injector 3
(4) Q17D Fuel Injector 4
(5) Q17E Fuel Injector 5 (L76 / L78 / LZ0)
(6) Q17F Fuel Injector 6 (L76 / L78 / LZ0)

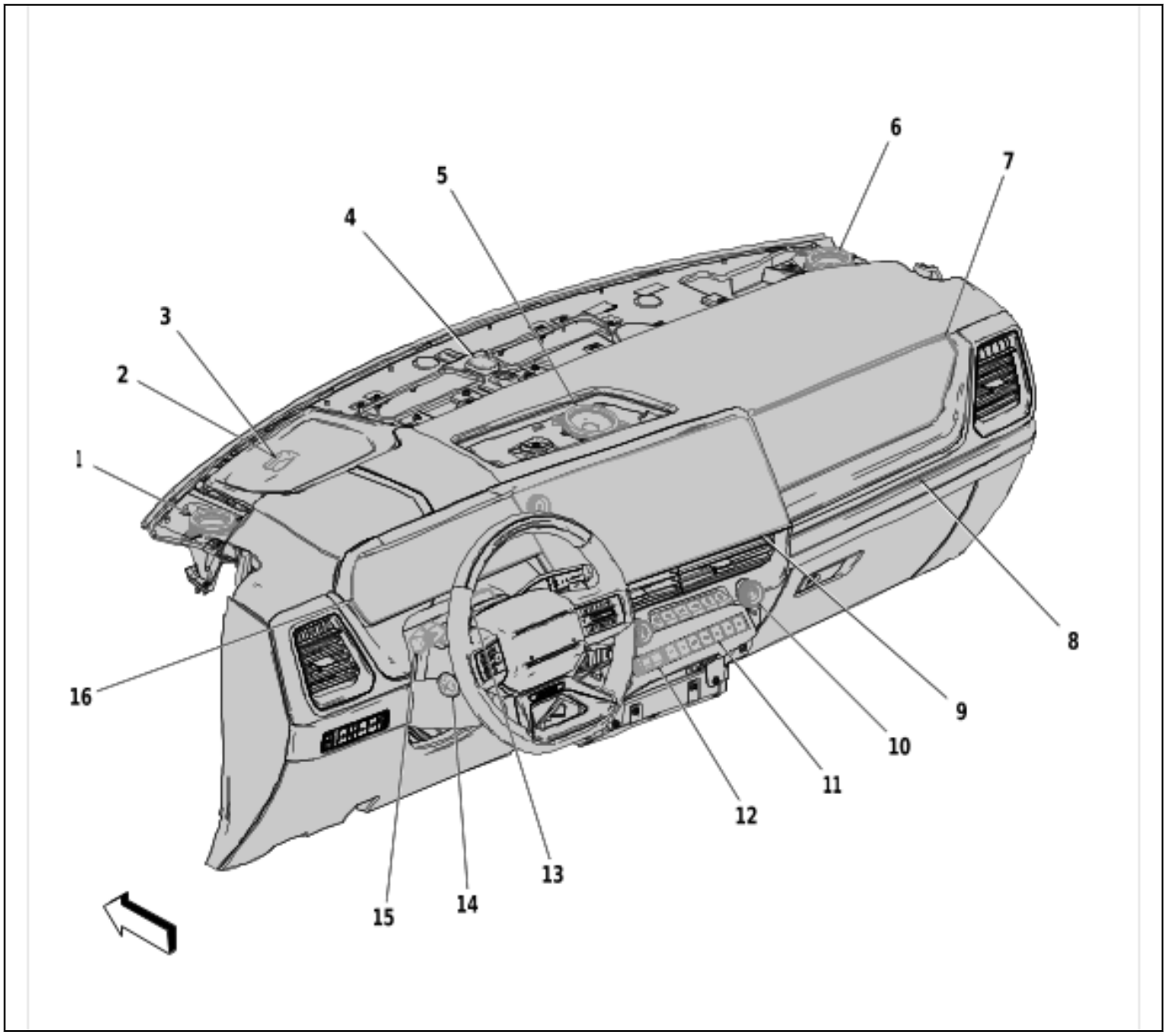
Engine Components - Oil Pan (LZ0)



7166363

Items
(1) Q44 Engine Oil Pressure Control Solenoid Valve

Instrument Panel Components - Upper

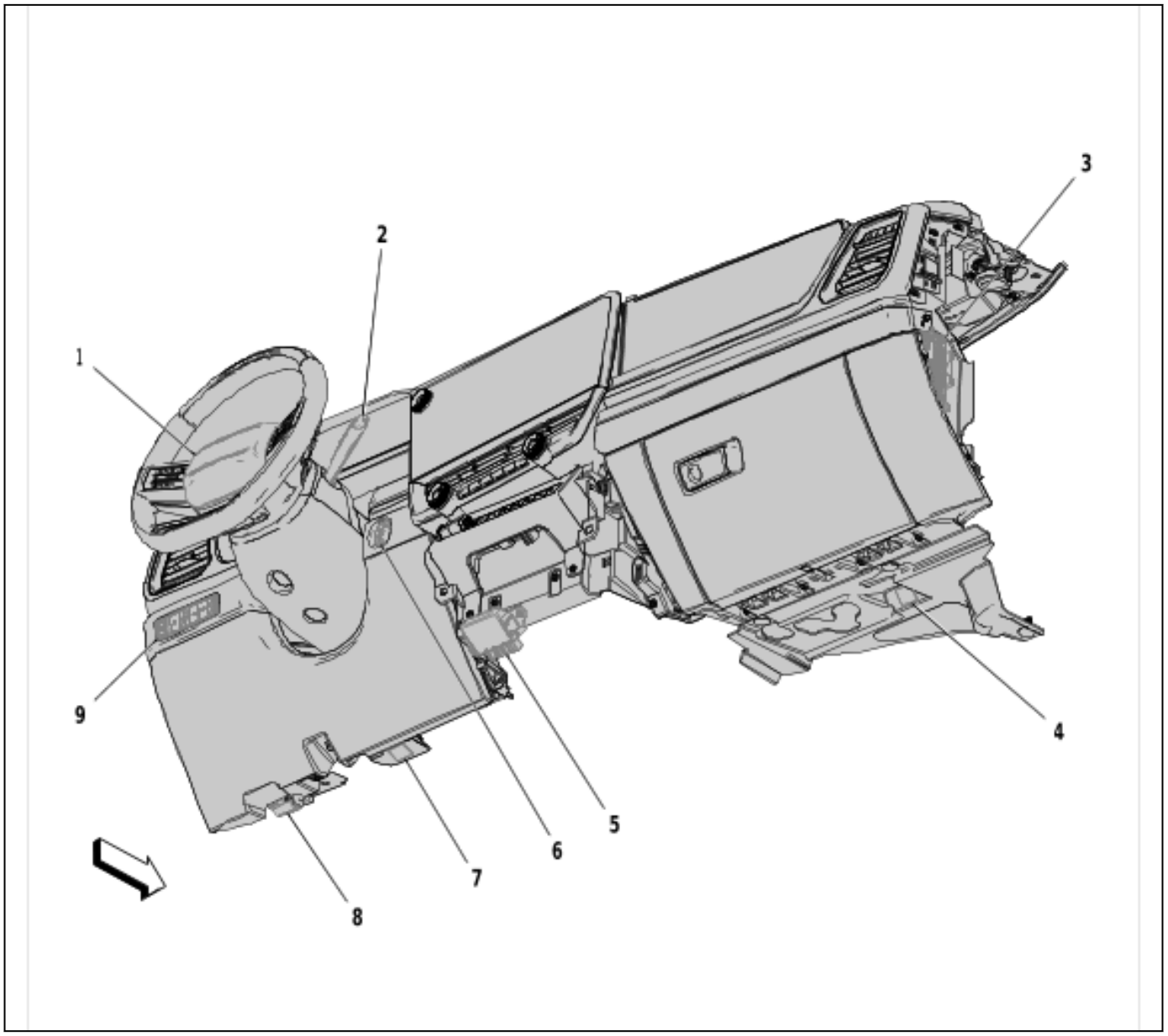


7185174

Items
(1) P19J Radio Front Speaker - Instrument Panel Left
(2) P29 Head-Up Display (UV6)
(3) P43 Forward Collision Alert Display (UIT)
(4) B10D Sun Load and Ambient Light and Security Indicator Sensor
(5) P19B Radio Front Center Speaker (UQA)
(6) P19W Radio Front Speaker - Instrument Panel Right
(7) P62 Occupant Display (USN)
(8) E1H Instrument Panel Light Conductor Lamp - Right (C70 / C85)
(9) A22 Radio Control
(10) A26 Heater and Air Conditioning User Interface Control - Front

Items
(11) S126 Ride Control Switch
(12) S76 Trailer Brake Control Switch
(13) B292 Driver Monitoring Camera (ULM)
(14) S71 Steering Column Tilt Wheel and Telescope Switch (N38)
(15) S78 Turn Signal Switch
(16) P16 Instrument Panel Cluster Control Module

Instrument Panel Components - Lower

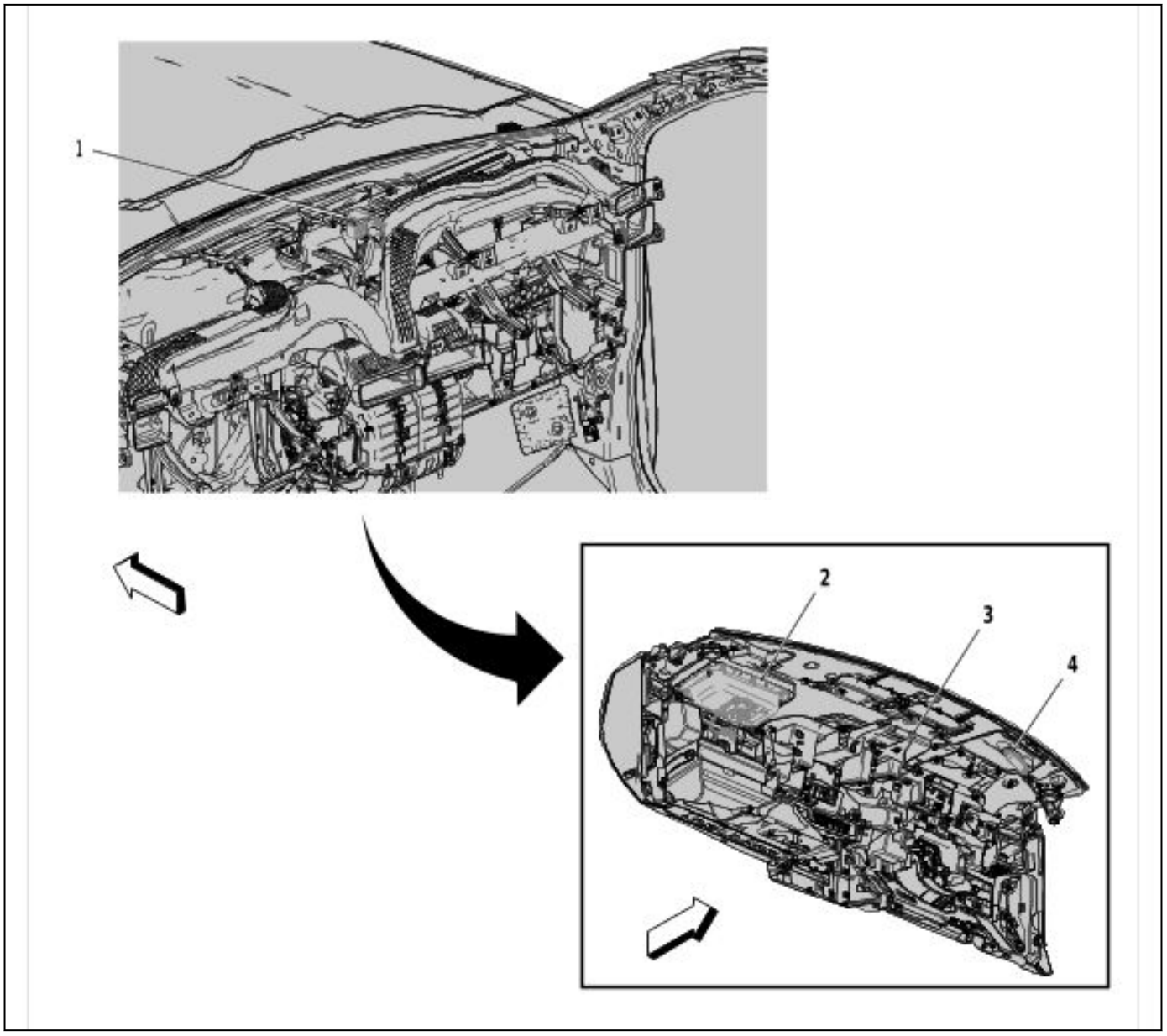


7185175

Items
(1) F107 Steering Wheel Airbag
(2) S3B Automatic Transmission Electronic Control
(3) X51R Instrument Panel Wiring Harness Junction Block - Right

Items
(4) E1AB Front Floor Flood Lamp - Right (C70 / C85)
(5) K183 UHF Short Range Low Energy Remote Control Access Transceiver (BOK / BOR / BOY)
(6) S39 Ignition and Start Switch
(7) E1AA Front Floor Flood Lamp - Left (C70 / C85)
(8) X84 Data Link Connector
(9) S171 Instrument Panel Center Accessory Function Switch

Instrument Panel Components - Behind

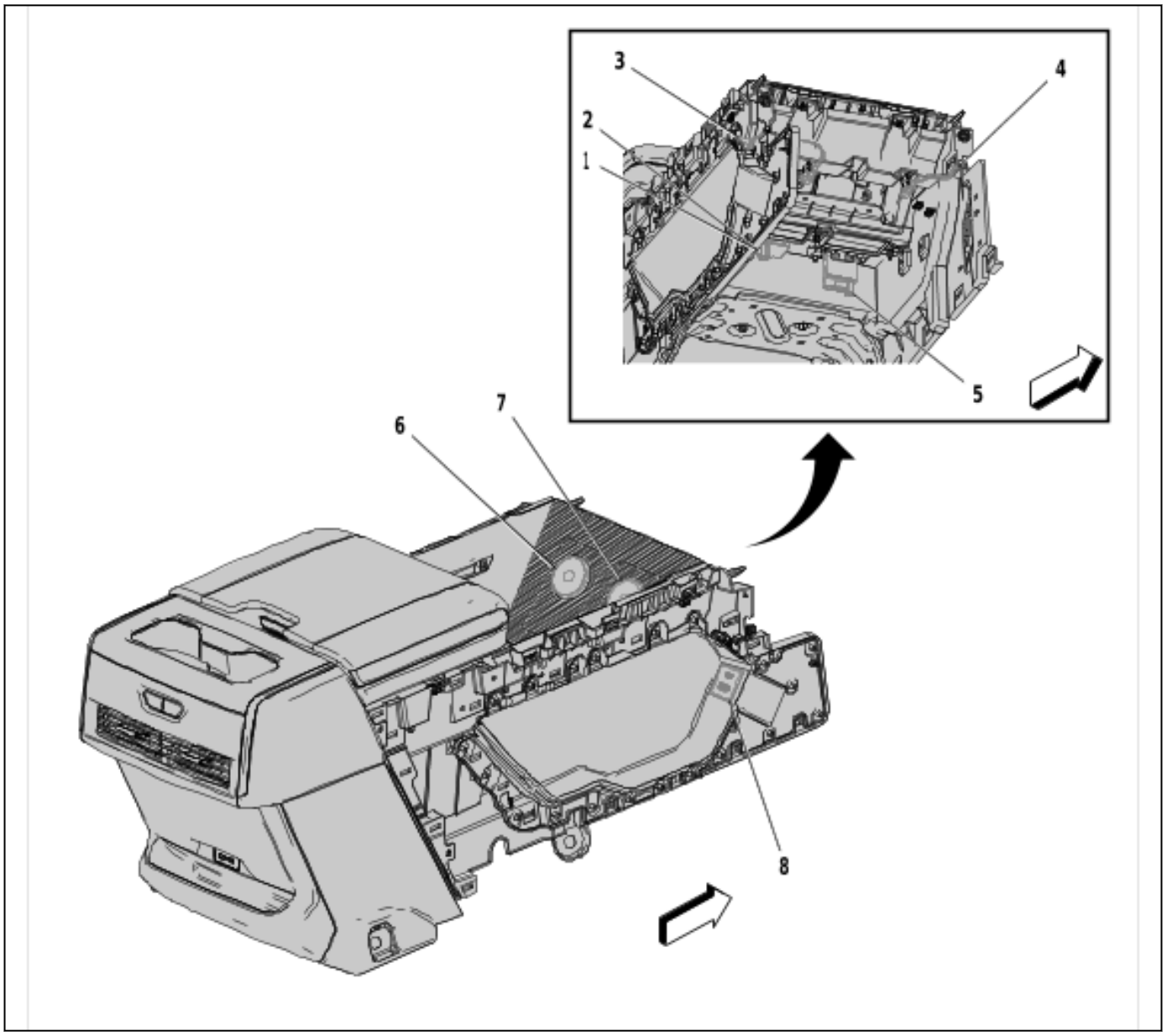


7185176

Items
(1) T4TA Auxiliary Wireless Communication Interface Antenna
(2) F101 Instrument Panel Airbag

Items
(3) T10J Low Frequency Instrument Panel Antenna
(4) P43 Forward Collision Alert Display (UIT)

Front Floor Console Components - Front (D07 / DCK)

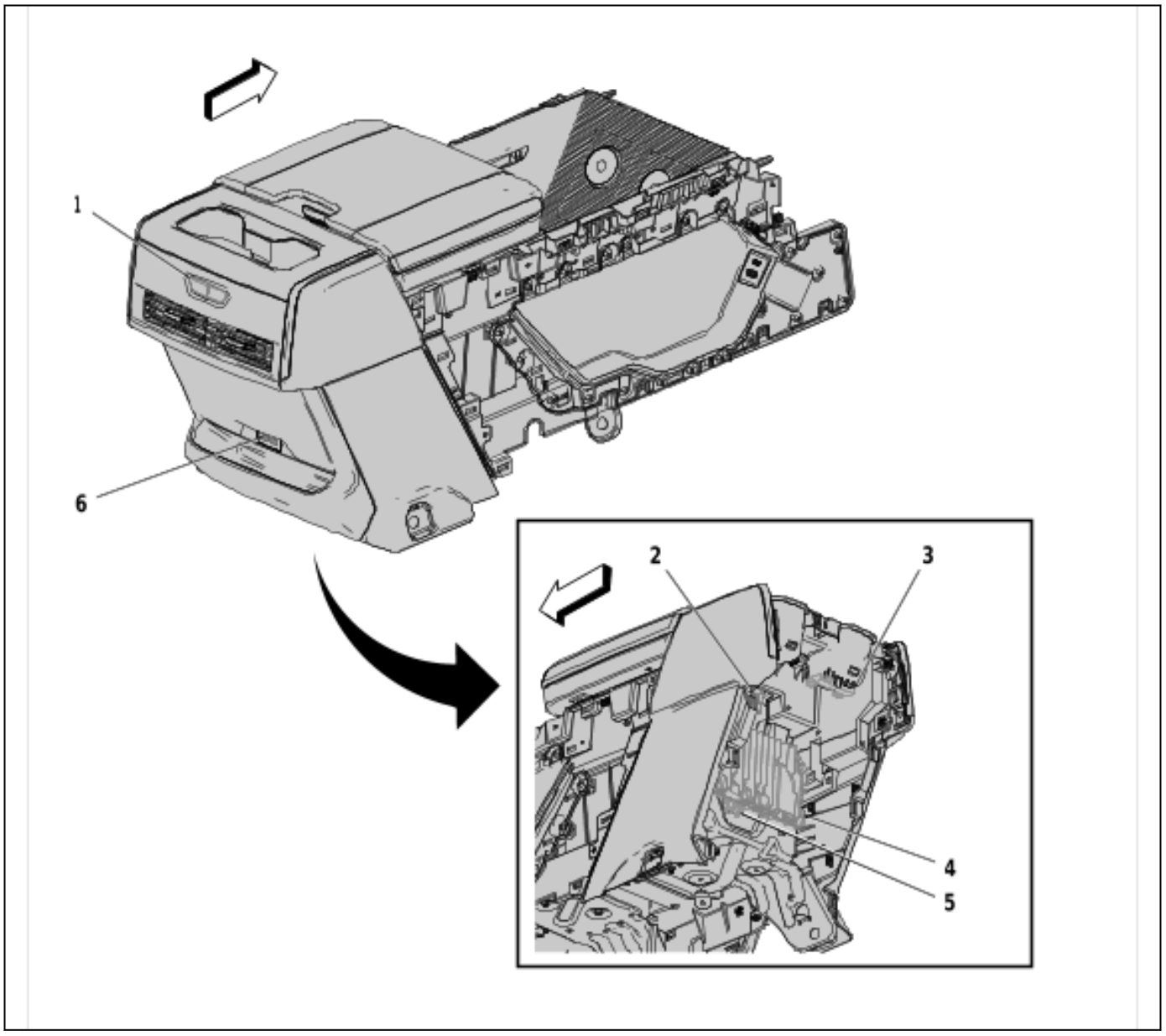


7185177

Items
(1) X81AC Accessory Power Receptacle - Floor Console 110V AC (KFG)
(2) X81BC Accessory Power Receptacle - Floor Console 220V AC (KFH)
(3) E55FCR Front Floor Console Map Pocket Illumination Lamp - Right (C85)
(4) E55FCL Front Floor Console Map Pocket Illumination Lamp - Left (C85)
(5) X83BFC Audio/Video Receptacle - Floor Console Front (D07 / DCK)

Items
(6) T22 Wireless Accessory Charging Module (K7A / K7B)
(7) T22FR Wireless Accessory Charging Module - Front Right (K7B)
(8) X83FP Audio/Video and USB Receptacle (USN)

Front Floor Console Components - Rear (D07 / DCK)

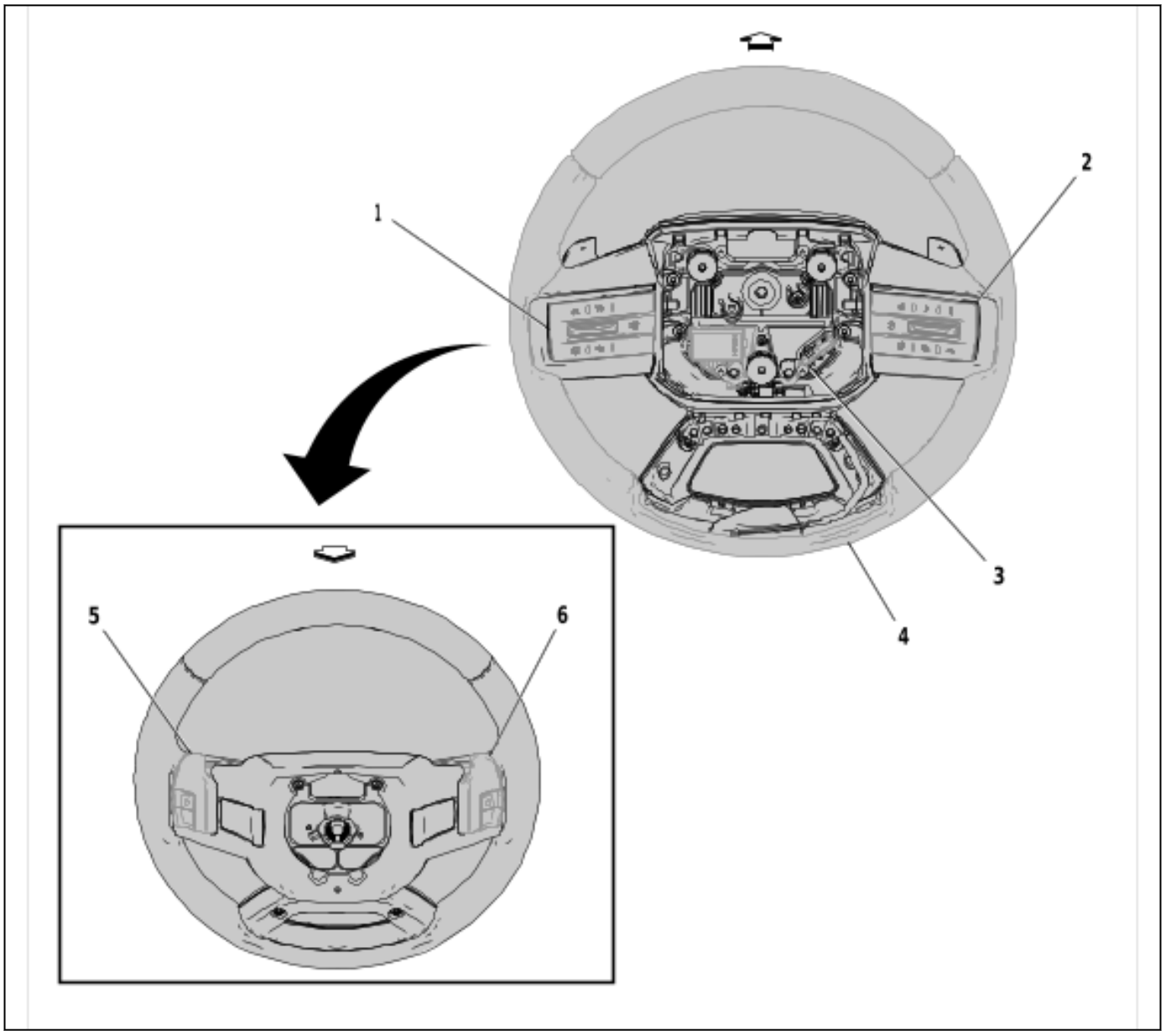


7185178

Items
(1) S32R Rear Seat Heater Switch (KCB)
(2) X83BCR Audio/Video Receptacle - Floor Console Rear (D07 / DCK)
(3) T10U Low Frequency Console Antenna - Front
(4) K299 Audio/Video Interface Module (USN)

Items
(5) E28 Front Floor Console Compartment Lamp (D07 / DCK)
(6) X92CD Dual Charge Only Receptacle - Floor Console Rear ((D07 / DCK) & UBI)

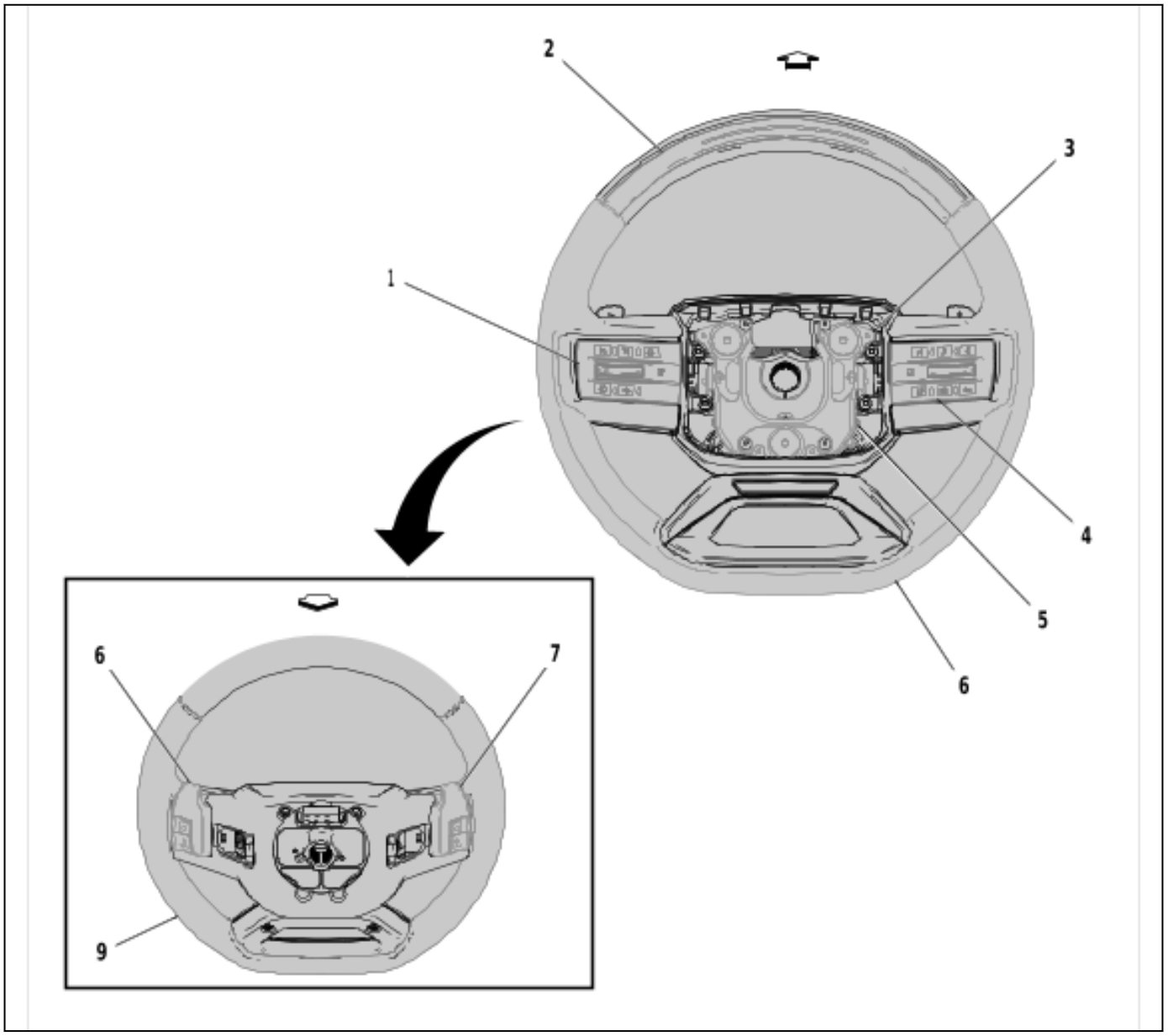
Steering Wheel Components (- ULM)



7190455

Items
(1) S70L Cruise Control Switch
(2) S70R Radio Control Switch - Steering Wheel
(3) K32 Heated Steering Wheel Module (KI3 - ULM)
(4) E15 Steering Wheel Heater (KI3)
(5) S2R Automatic Transmission Manual Shift Auxiliary Position Switch - Right
(6) S2L Automatic Transmission Manual Shift Auxiliary Position Switch - Left

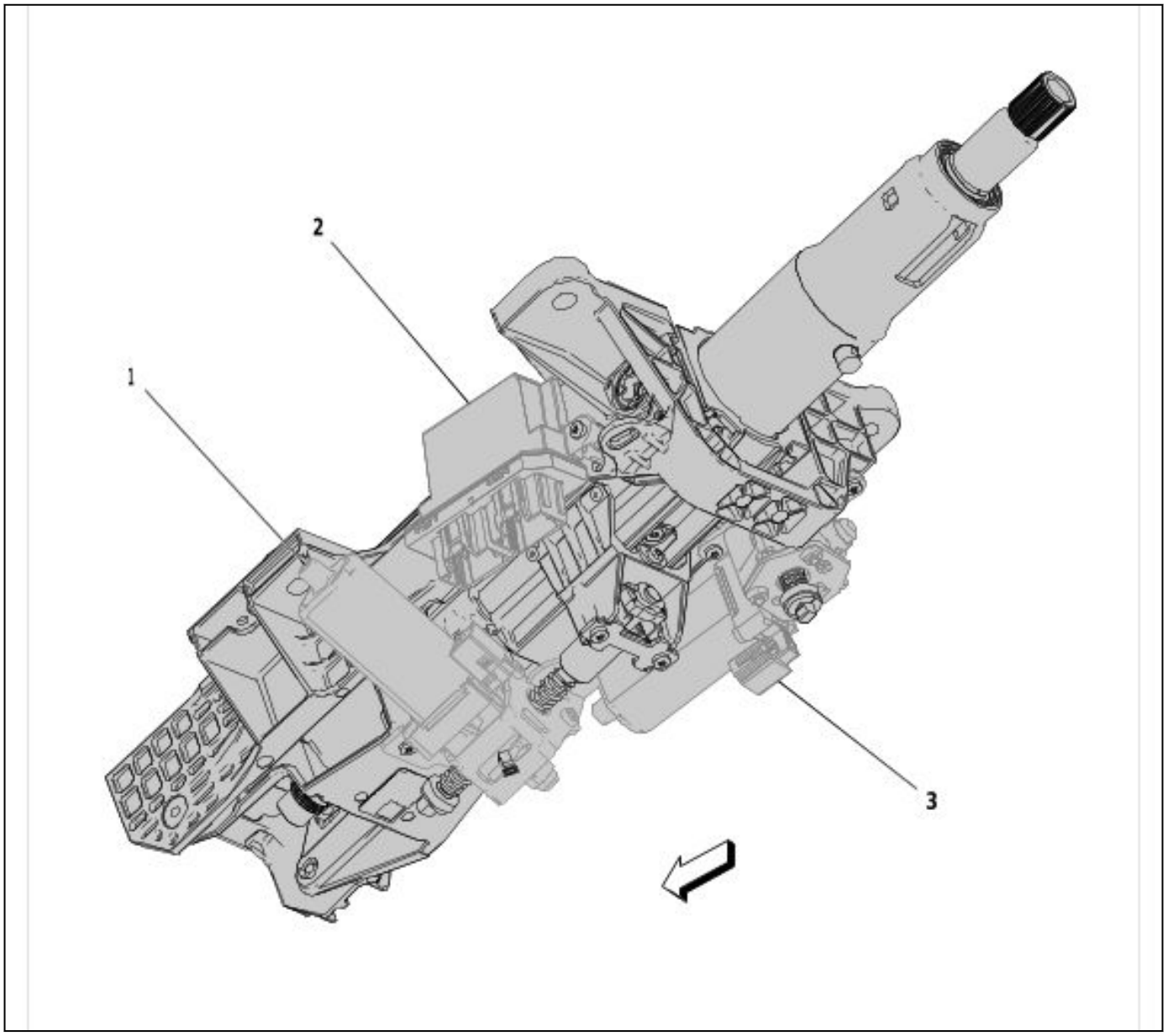
Steering Wheel Components (ULM)



7190456

Items
(1) S70L Cruise Control Switch
(2) P51 Steering Wheel LED Display (ULM)
(3) S33 Steering Wheel Horn Contact
(4) S70R Radio Control Switch - Steering Wheel
(5) K180S Driver Monitoring System Module - Steering Wheel (ULM)
(6) E15 Steering Wheel Heater (KI3)
(6) S2R Automatic Transmission Manual Shift Auxiliary Position Switch - Right
(7) S2L Automatic Transmission Manual Shift Auxiliary Position Switch - Left
(9) B307 Steering Wheel Touch Sensor (ULM)

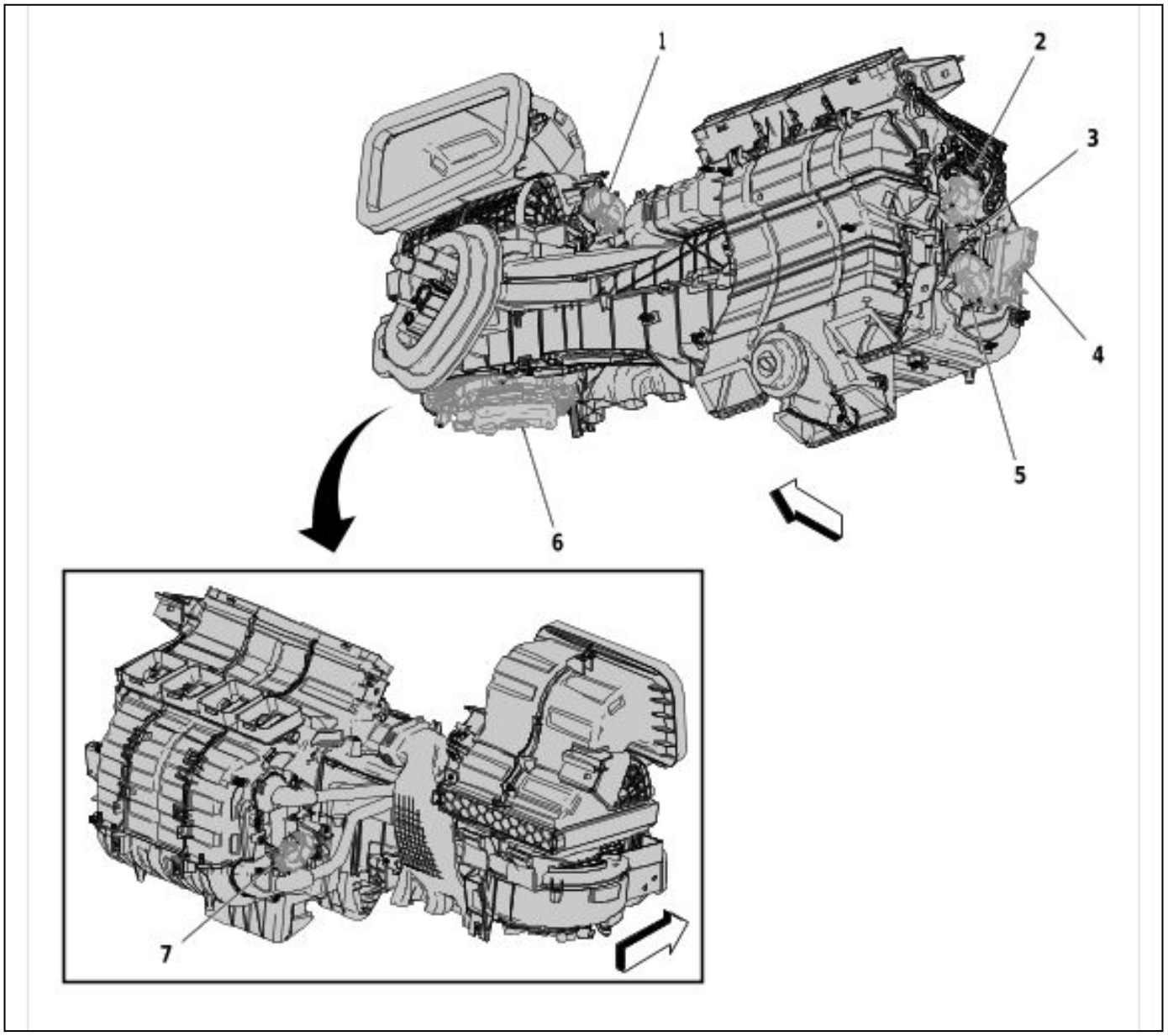
Steering Column Components (N38)



7190457

Items
(1) M65 Steering Column Telescope Actuator (N38)
(2) K99 Steering Column Control Module (N38)
(3) M68 Steering Column Tilt Wheel Actuator (N38)

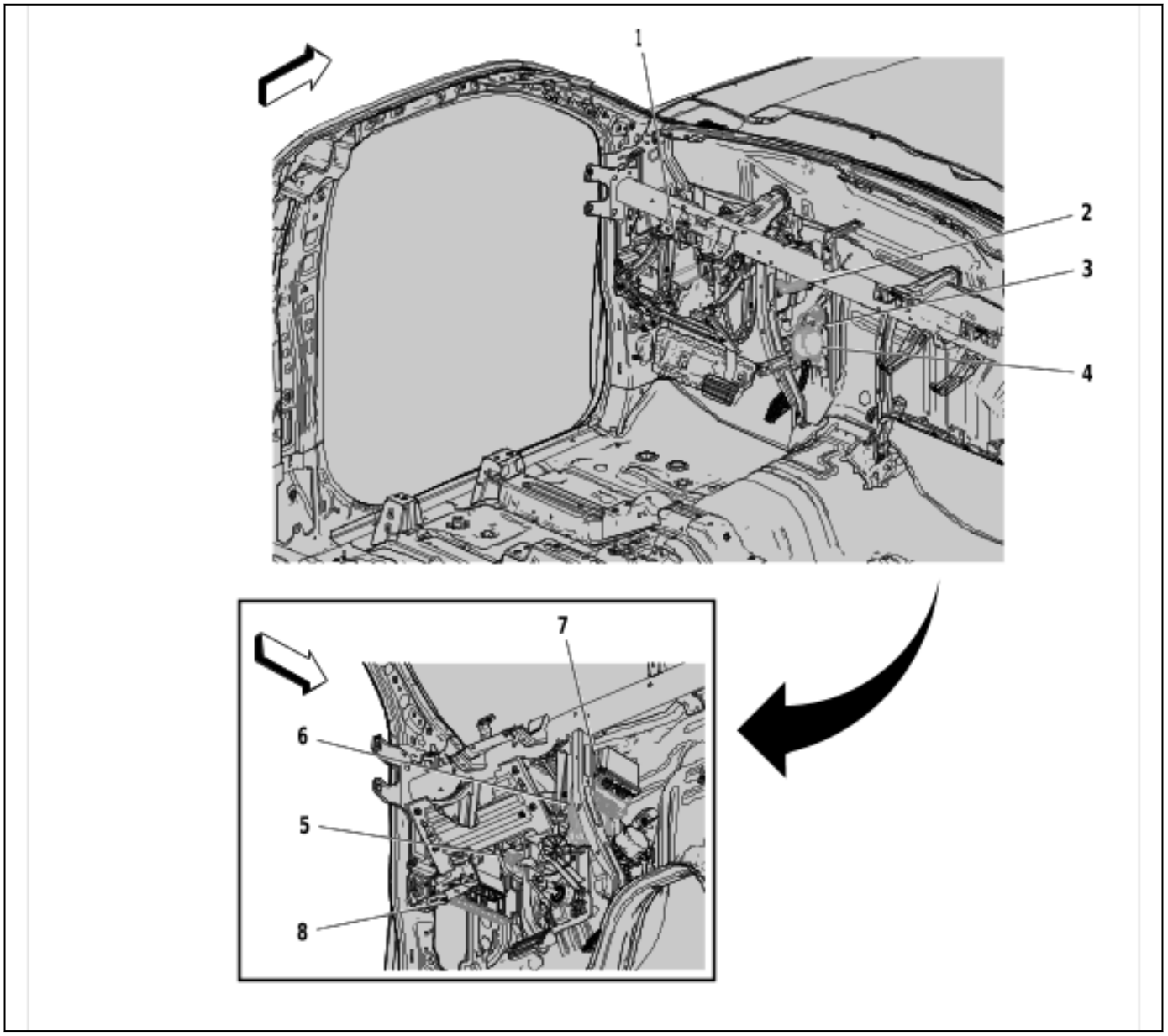
HVAC Assembly Components



7188706

Items
(1) M4P Programmable Air Inlet Valve Actuator
(2) M37P Programmable Mode Valve Actuator
(3) B39 Air Conditioning Evaporator Air Temperature Sensor
(4) E40 Air Heater (C32)
(5) M6PL Programmable Temperature Valve Actuator - Left
(6) M8 Blower Motor
(7) M6PR Programmable Temperature Valve Actuator - Right (CJ2)

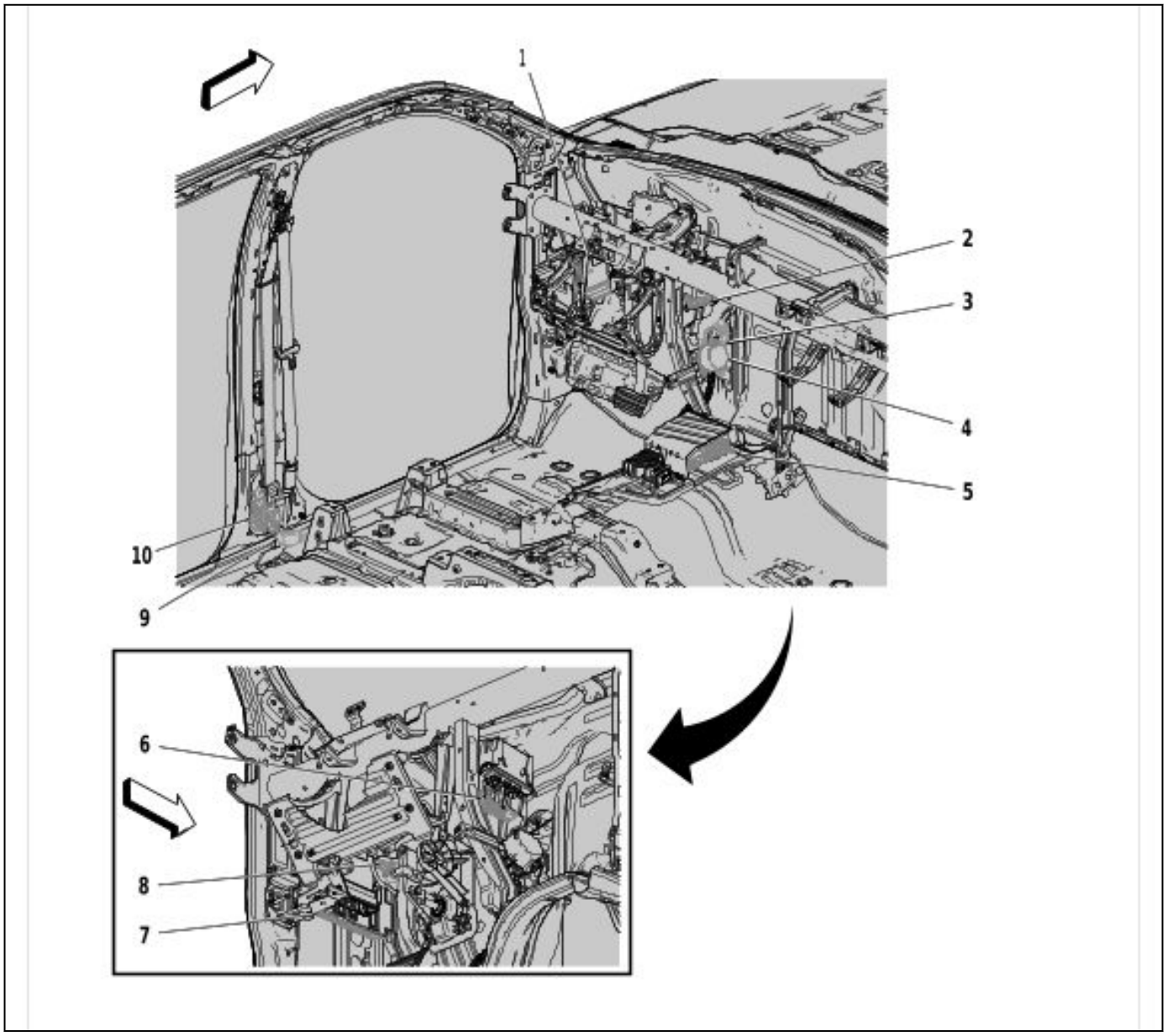
Passenger Compartment Components - Left Front - 2-Door



7182722

Items
(1) K219 Lighting Control Module
(2) K56U Special Purpose Vehicle Control Module (KGU)
(3) B107 Accelerator Pedal Position Sensor
(4) P50 Regulatory Emergency Call Backup Speaker (UER)
(5) B22 Brake Pedal Position Sensor
(6) K73 Telematic Control Module
(7) K56 Serial Data Gateway Module
(8) K9 Body Control Module

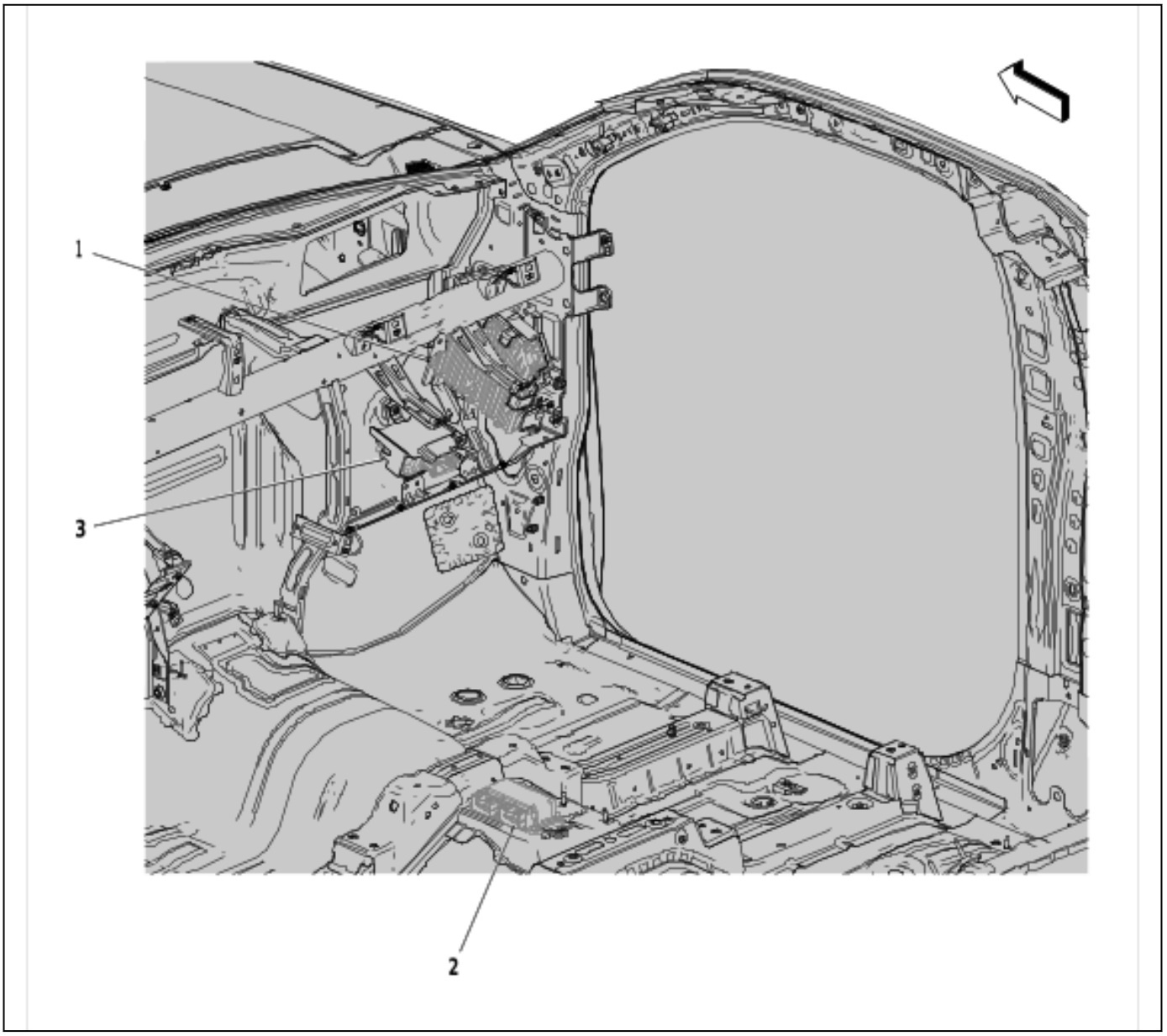
Passenger Compartment Components - Left Front - 4-Door



7197440

Items
(1) K219 Lighting Control Module
(2) K56U Special Purpose Vehicle Control Module (KGU)
(3) B107 Accelerator Pedal Position Sensor
(4) P50 Regulatory Emergency Call Backup Speaker (UER)
(5) T3 Audio Amplifier (UQA)
(6) K56 Serial Data Gateway Module
(7) K9 Body Control Module
(8) B22 Brake Pedal Position Sensor
(9) F113D Front Seat Belt Anchor Plate Tensioner - Driver
(10) F112D Front Seat Belt Retractor - Driver

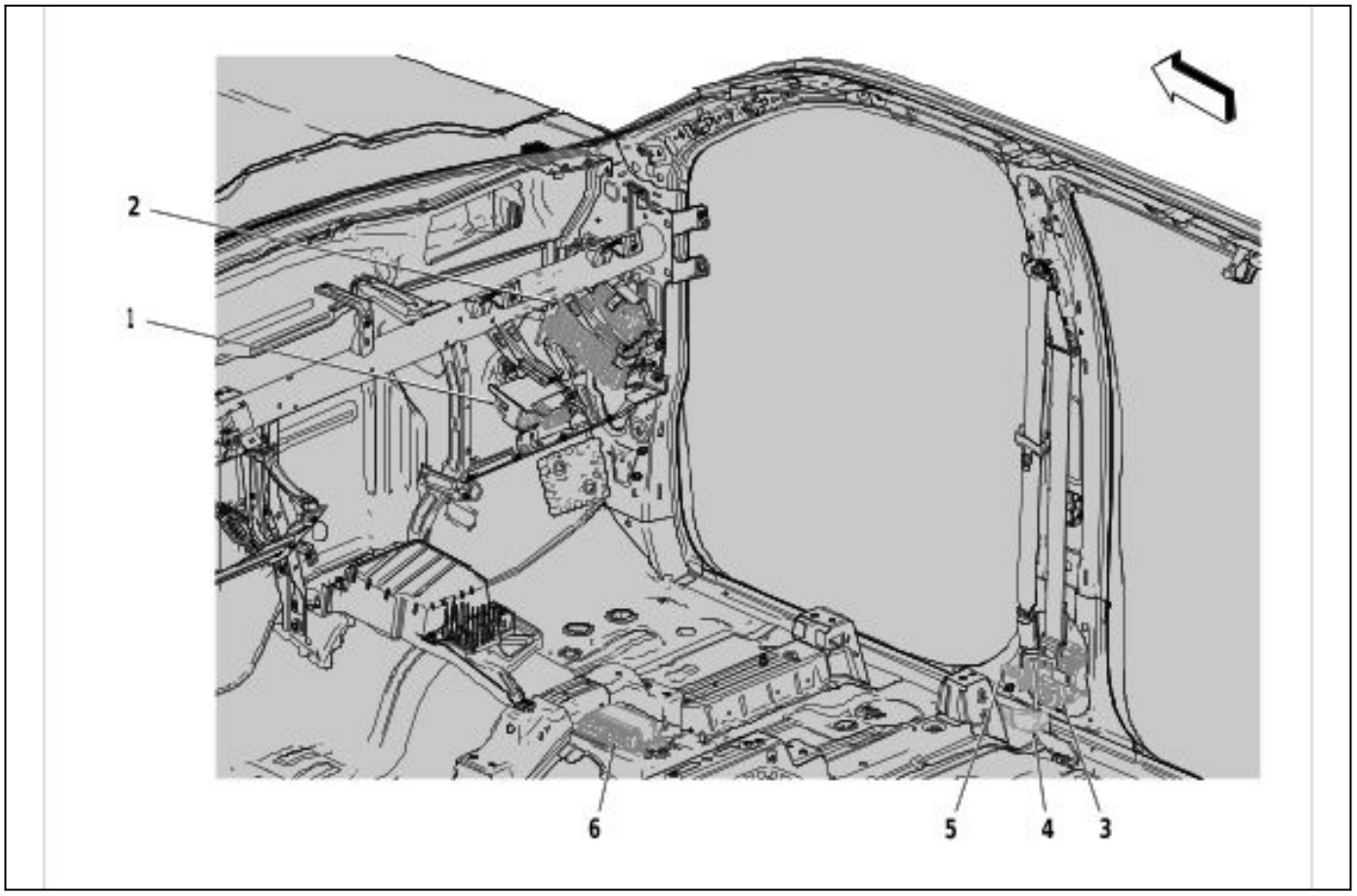
Passenger Compartment Components - Right Front - 2-Door



7182724

Items
(1) A11 Radio
(2) K36 Restraints Control Module
(3) T19 Multifunction Power Supply Converter

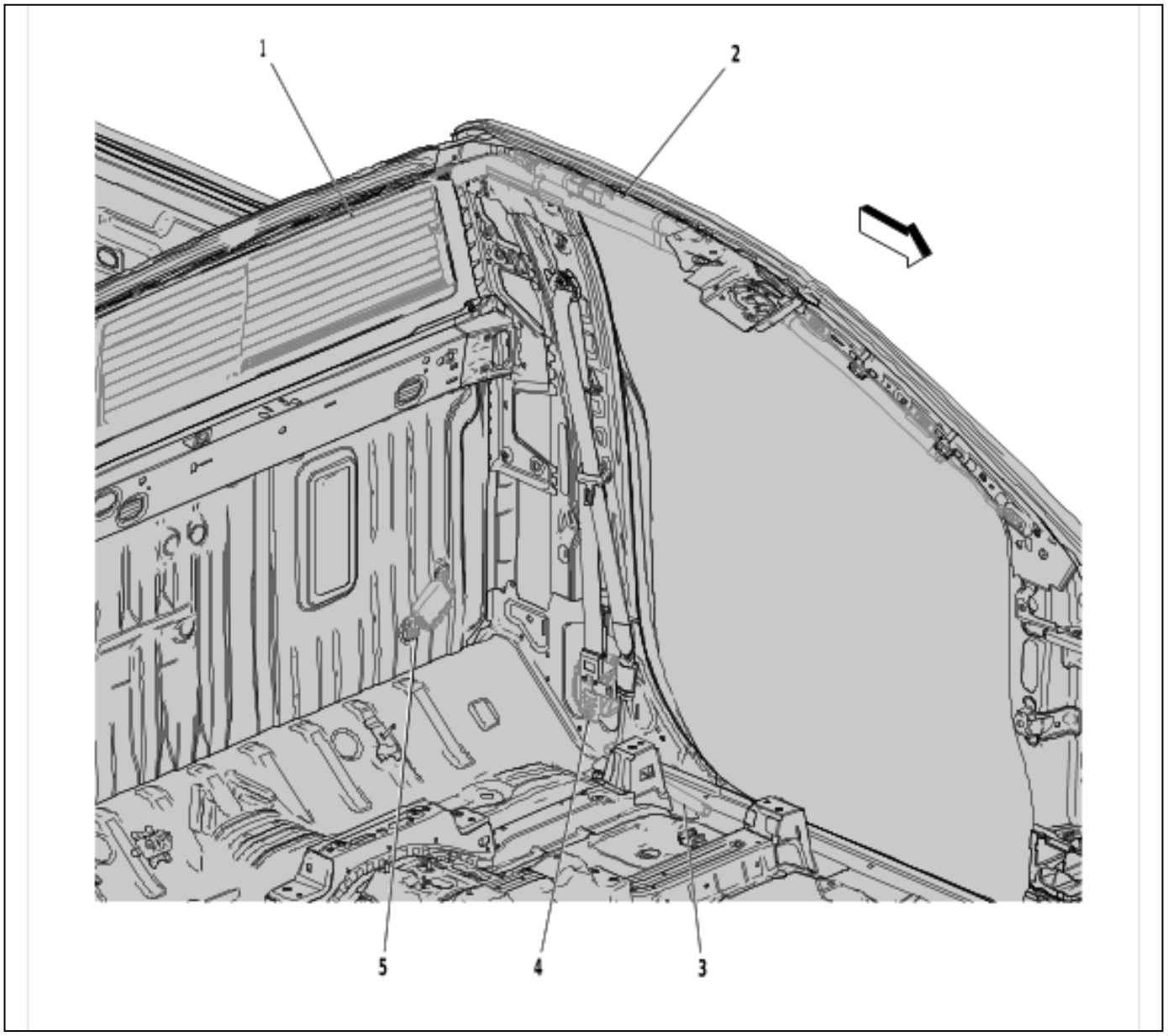
Passenger Compartment Components - Right Front - 4-Door



7182725

Items
(1) T19 Multifunction Power Supply Converter
(2) A11 Radio
(3) F112P Front Seat Belt Retractor - Passenger
(4) F113P Front Seat Belt Anchor Plate Tensioner - Passenger
(5) B61P Seat Belt Tension Sensor - Passenger
(6) K36 Restraints Control Module

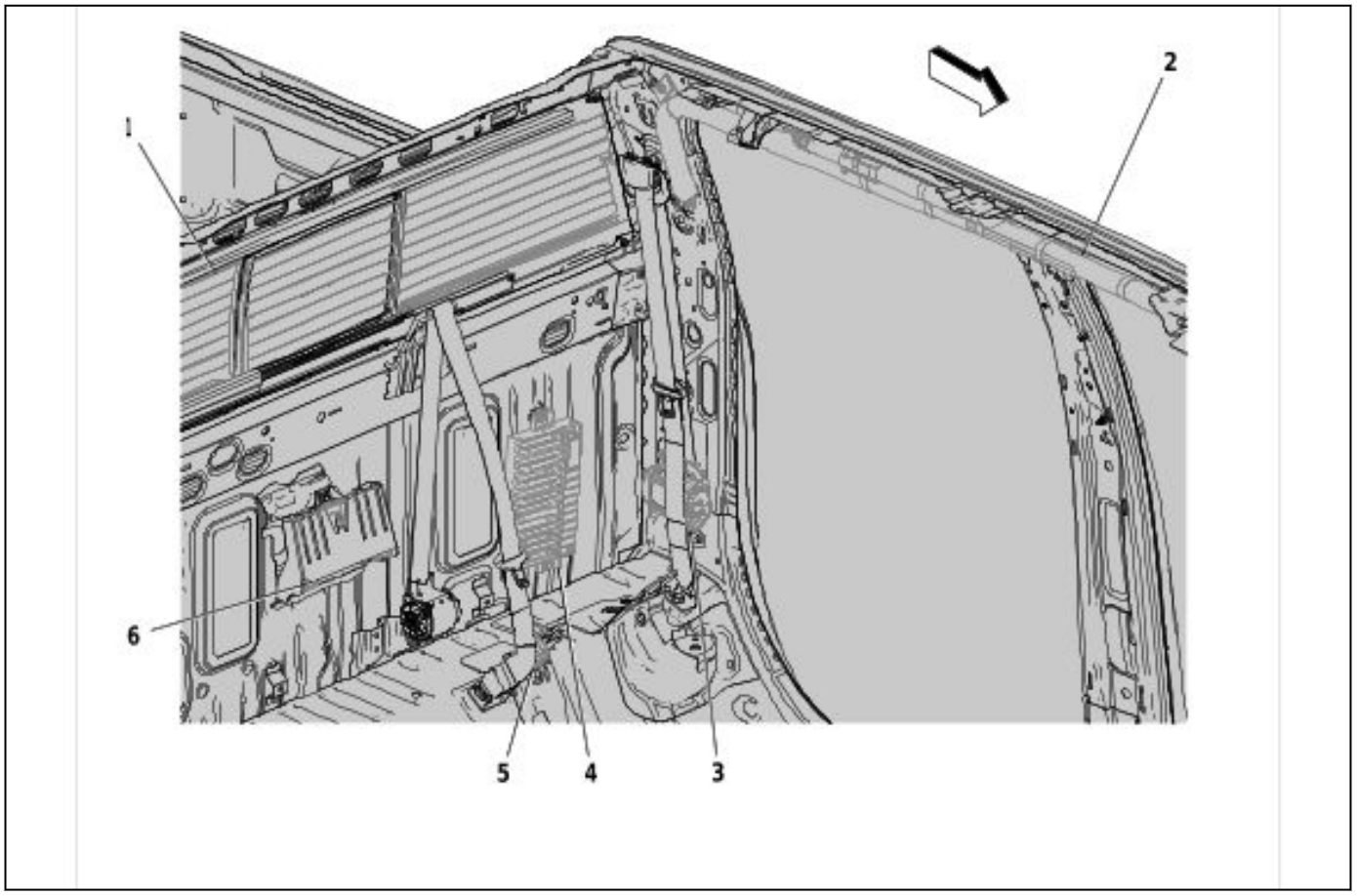
Passenger Compartment Components - Left Rear - 2-Door



7182726

Items
(1) E18 Rear Window Defogger Grid (C49)
(2) F105LF Front Row Roof Rail Airbag - Left (2-Door)
(3) F113D Front Seat Belt Anchor Plate Tensioner - Driver
(4) F112D Front Seat Belt Retractor - Driver
(5) K182 Parking Assist Control Module

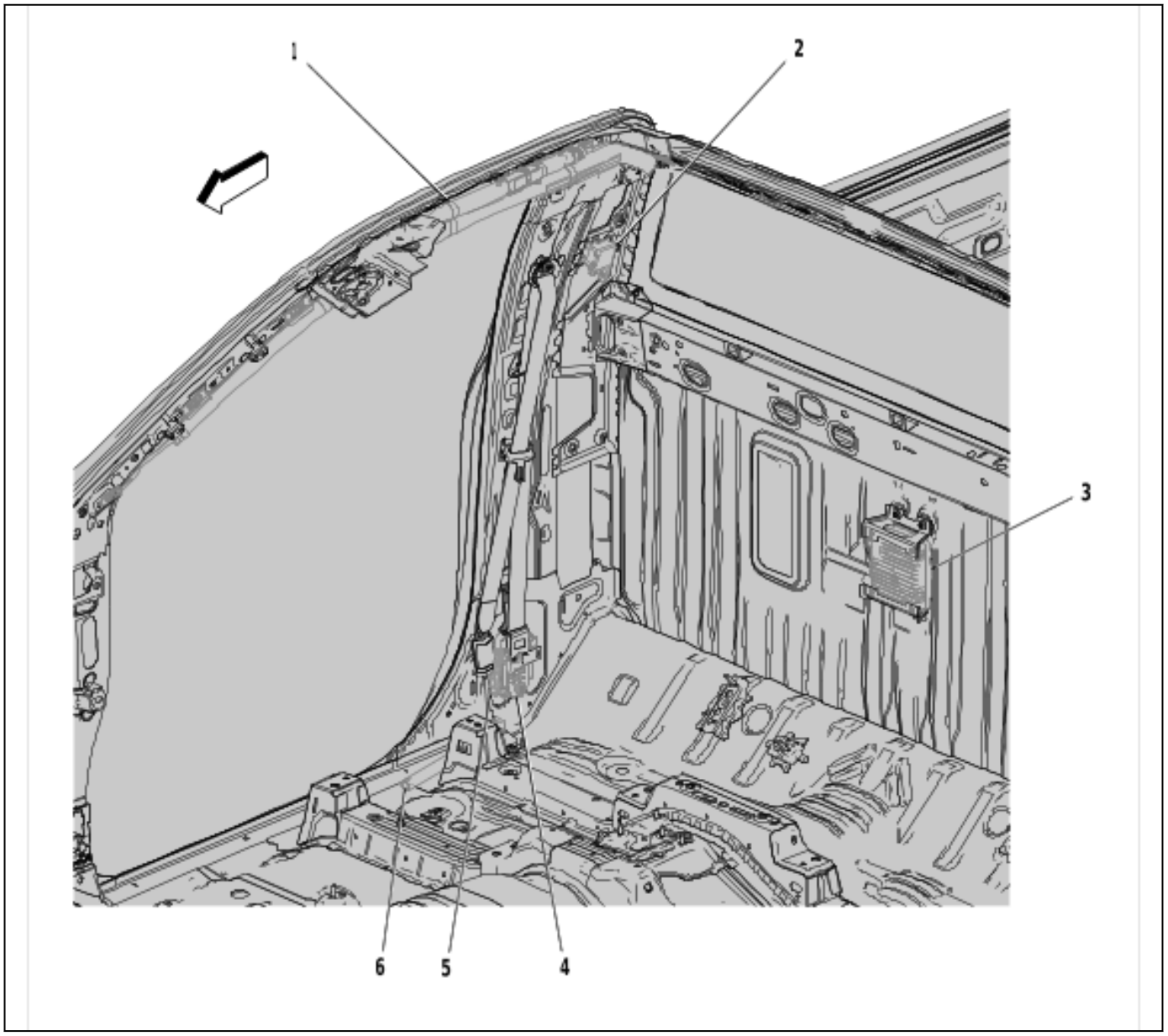
Passenger Compartment Components - Left Rear - 4-Door



7182727

Items
(1) E18 Rear Window Defogger Grid (C49)
(2) F105L Front and Rear Row Roof Rail Airbag - Left (4-Door)
(3) F112LR Rear Seat Belt Retractor - Left (4-Door)
(4) K124 Image Processing Module (UK0 / UKL)
(5) B153LR Rear Seat Belt Buckle - Left (4-Door)
(6) K73 Telematic Control Module

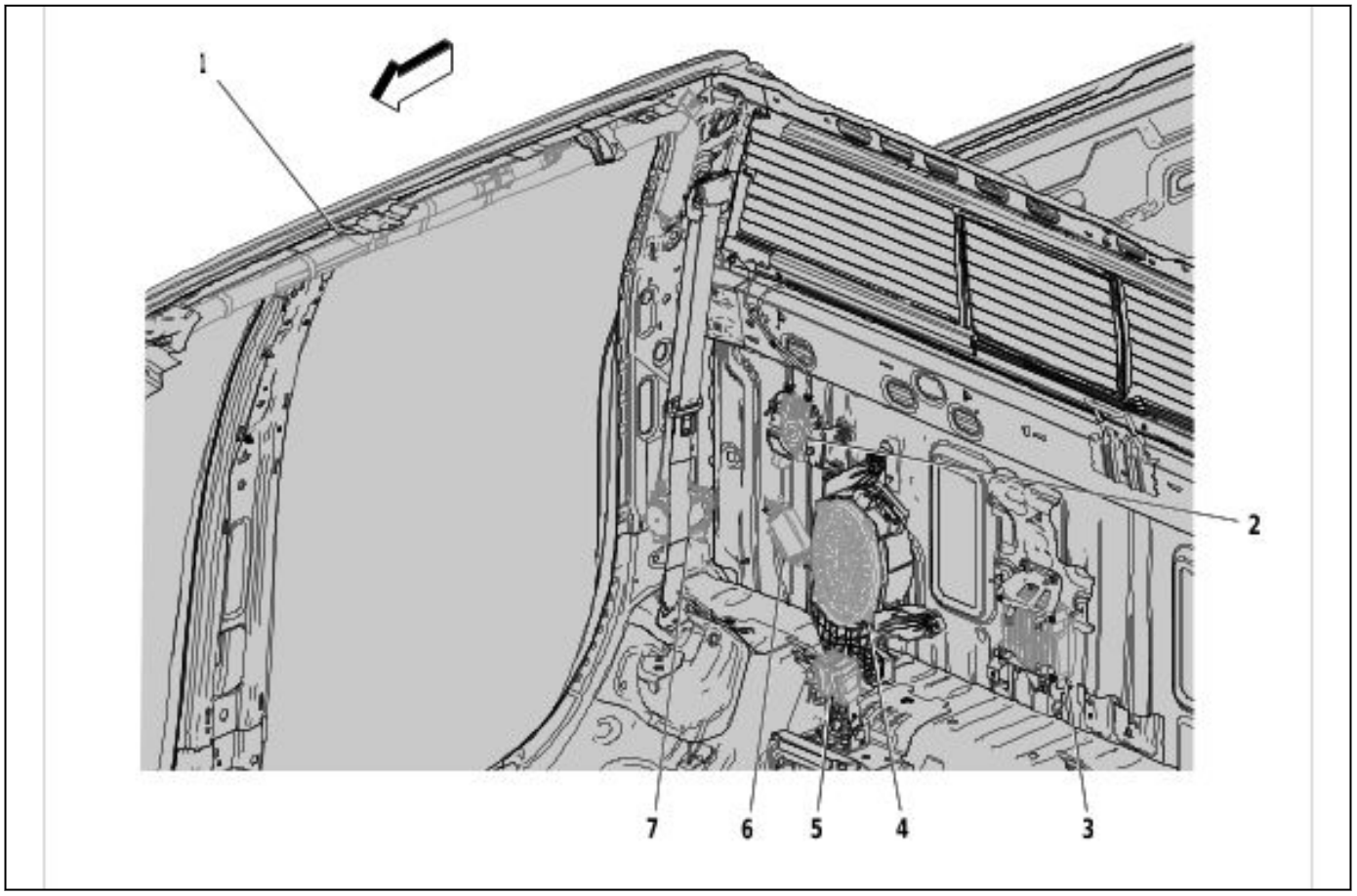
Passenger Compartment Components - Right Rear - 2-Door



7182728

Items
(1) F105RF Front Row Roof Rail Airbag - Right (2-Door)
(2) K77 Remote Function Actuator Module
(3) T1 DC/AC Converter Control Module (KC9 / KCA / KFG / KFH / KI4 / KI5)
(4) F112P Front Seat Belt Retractor - Passenger
(5) B61P Seat Belt Tension Sensor - Passenger
(6) F113P Front Seat Belt Anchor Plate Tensioner - Passenger

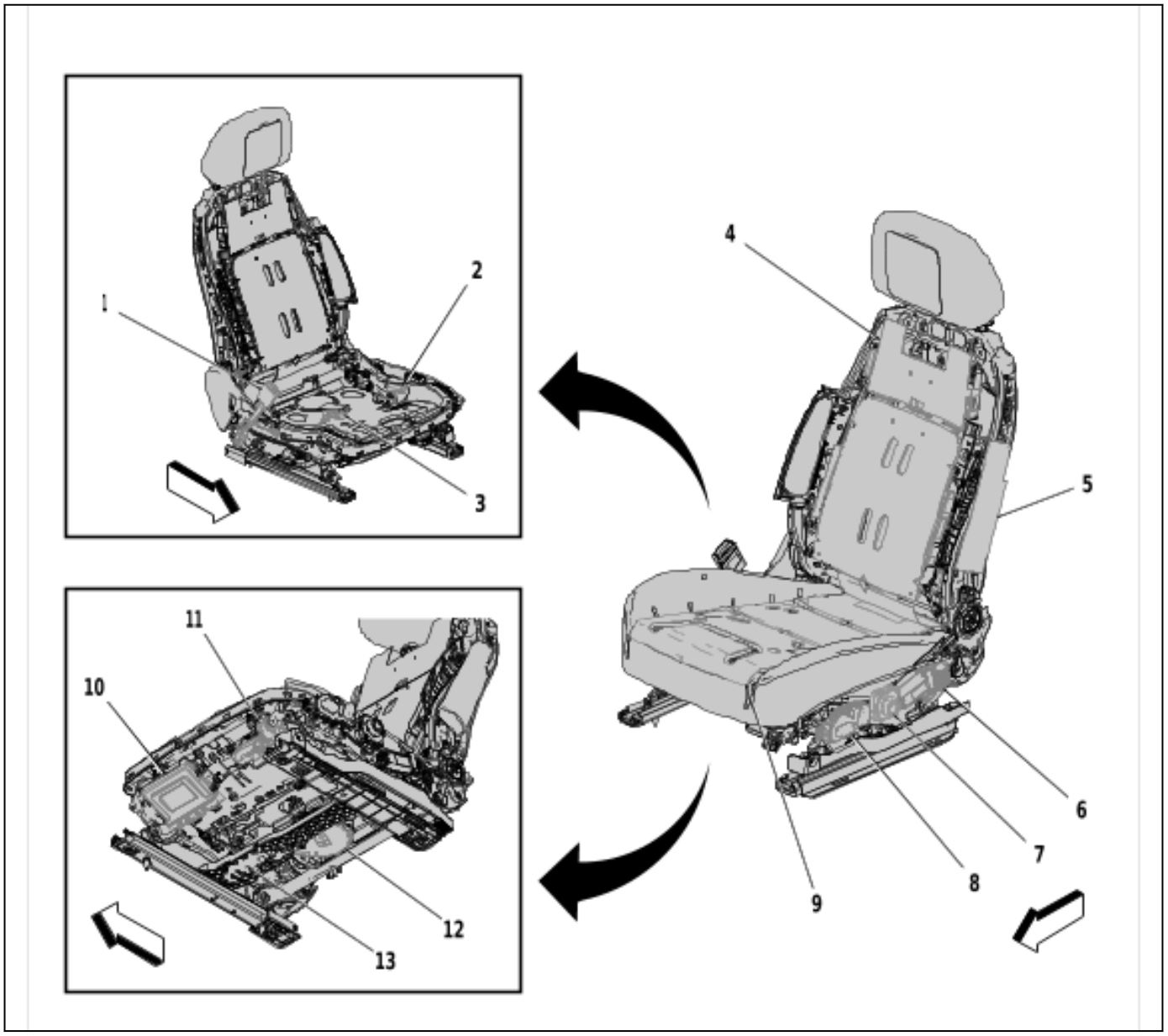
Passenger Compartment Components - Right Rear - 4-Door



7182729

Items
(1) F105R Front and Rear Row Roof Rail Airbag - Right (4-Door)
(2) M63 Rear Sliding Window Motor (A48)
(3) T1 DC/AC Converter Control Module (KC9 / KCA / KFG / KFH / KI4 / KI5)
(4) P19LA Radio Rear Compartment Speaker (UQA)
(5) B153RR Rear Seat Belt Buckle - Right (4-Door)
(6) K182 Parking Assist Control Module
(7) F112RR Rear Seat Belt Retractor - Right (4-Door)

Driver Seat Components

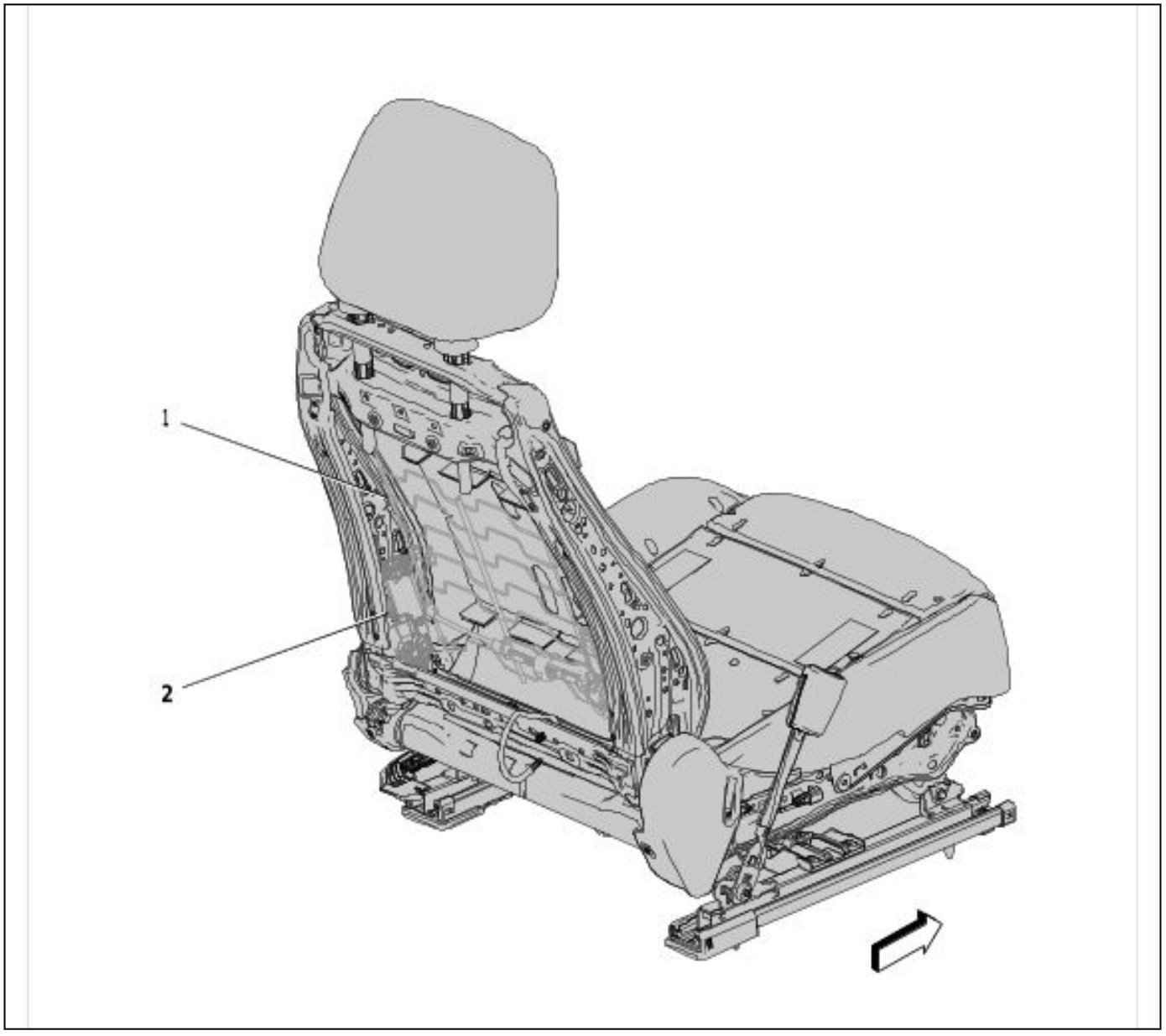


7166278

Items
(1) B153D Front Seat Belt Buckle - Driver
(2) P45L Front Seat Lane Departure Warning Actuator - Left
(3) P45R Front Seat Lane Departure Warning Actuator - Right
(4) E14A Front Seat Back Heater - Driver (KAM)
(5) F106D Front Seat Outboard Seat Back Airbag - Driver
(6) M55D Front Seat Vertical Adjuster Actuator - Driver (A2X)
(7) S65D Front Seat Lumbar Switch - Driver (A2X)
(8) S64D Front Seat Adjuster Switch - Driver (A2X)
(9) E14B Front Seat Cushion Heater - Driver (KAM)
(10) K40D Driver Seat Adjuster Memory Module (A45)
(11) M50D Front Seat Tilt Adjuster Actuator - Driver (A2X)

Items
(12) M73D Front Seat Cushion Ventilation Blower - Driver (KU9)
(13) M51D Front Seat Adjuster Actuator - Driver (A2X)

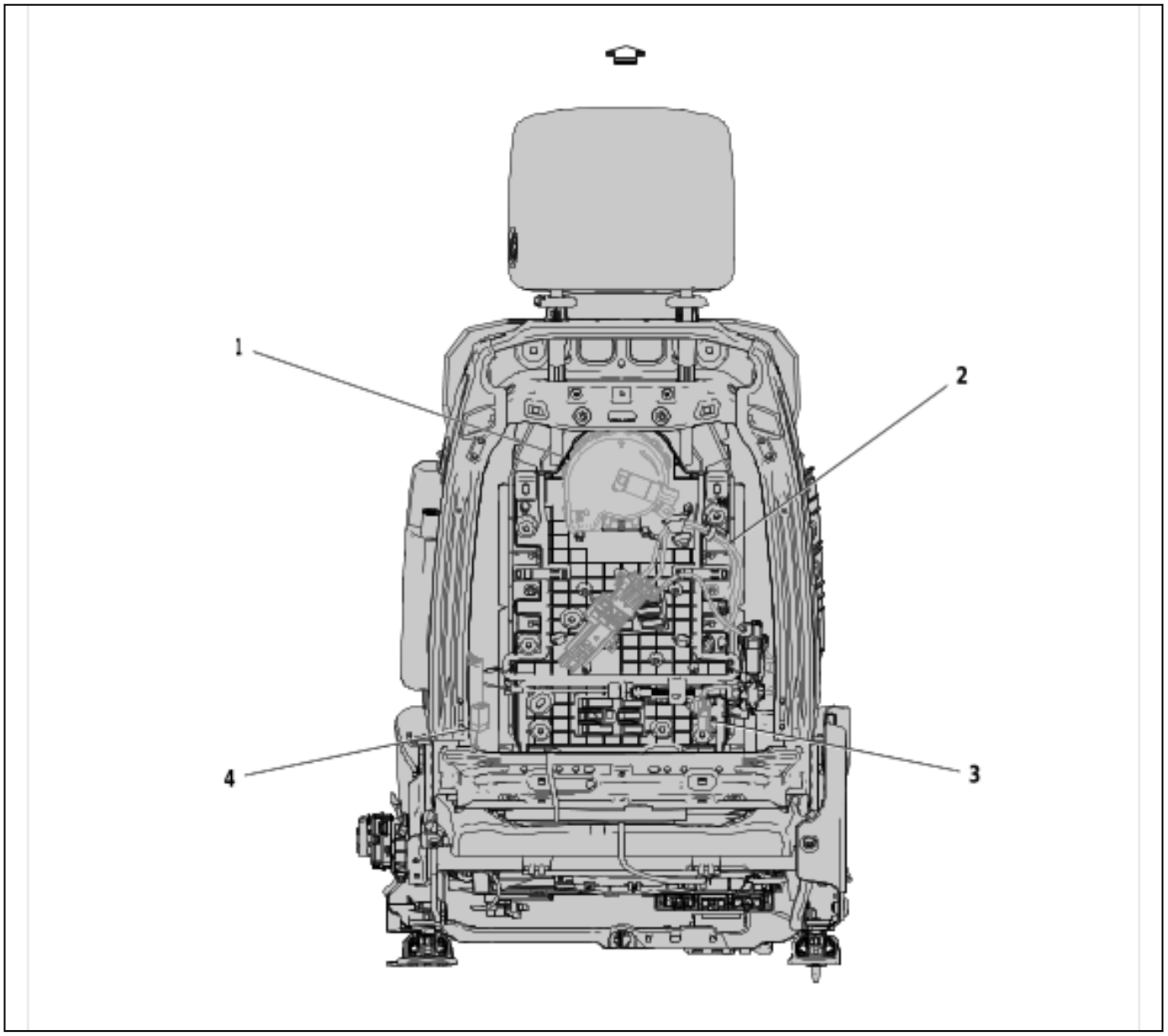
Driver Seat Back Components (A2X - AVK)



7166279

Items
(1) M53D Front Seat Back Lumbar Motor - Driver (A2X - AVK)
(2) M56D Front Seat Recliner Actuator - Driver (A2X)

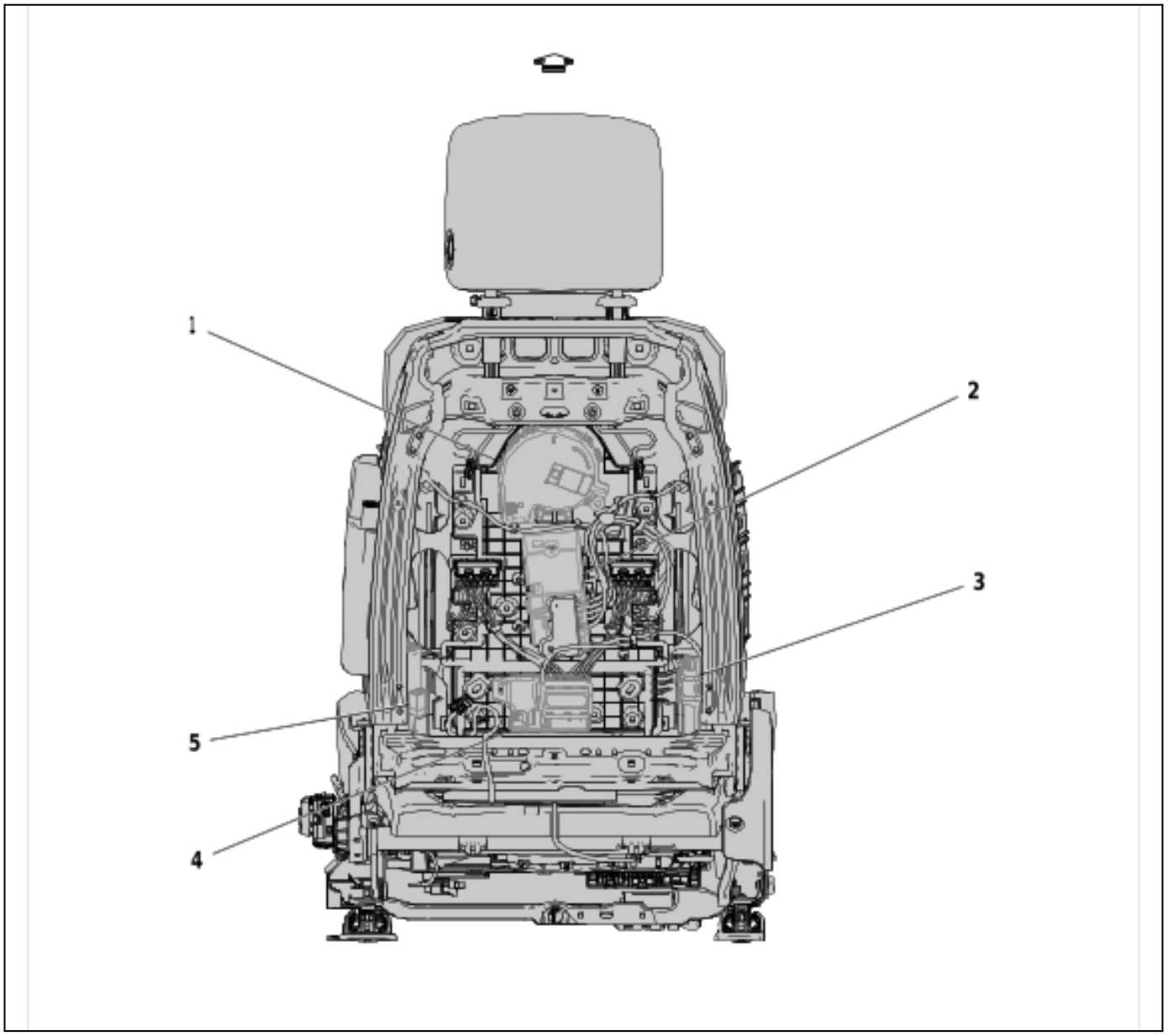
Driver Seat Back Components (AVK - AF6)



7166280

Items
(1) M73A Front Seat Back Ventilation Blower - Driver (KU9)
(2) K134D Front Seat Bolster Memory Module - Driver (AVK - AF6)
(3) G31D Front Seat Back Lumbar Pump - Driver (AVK)
(4) M56D Front Seat Recliner Actuator - Driver (A2X)

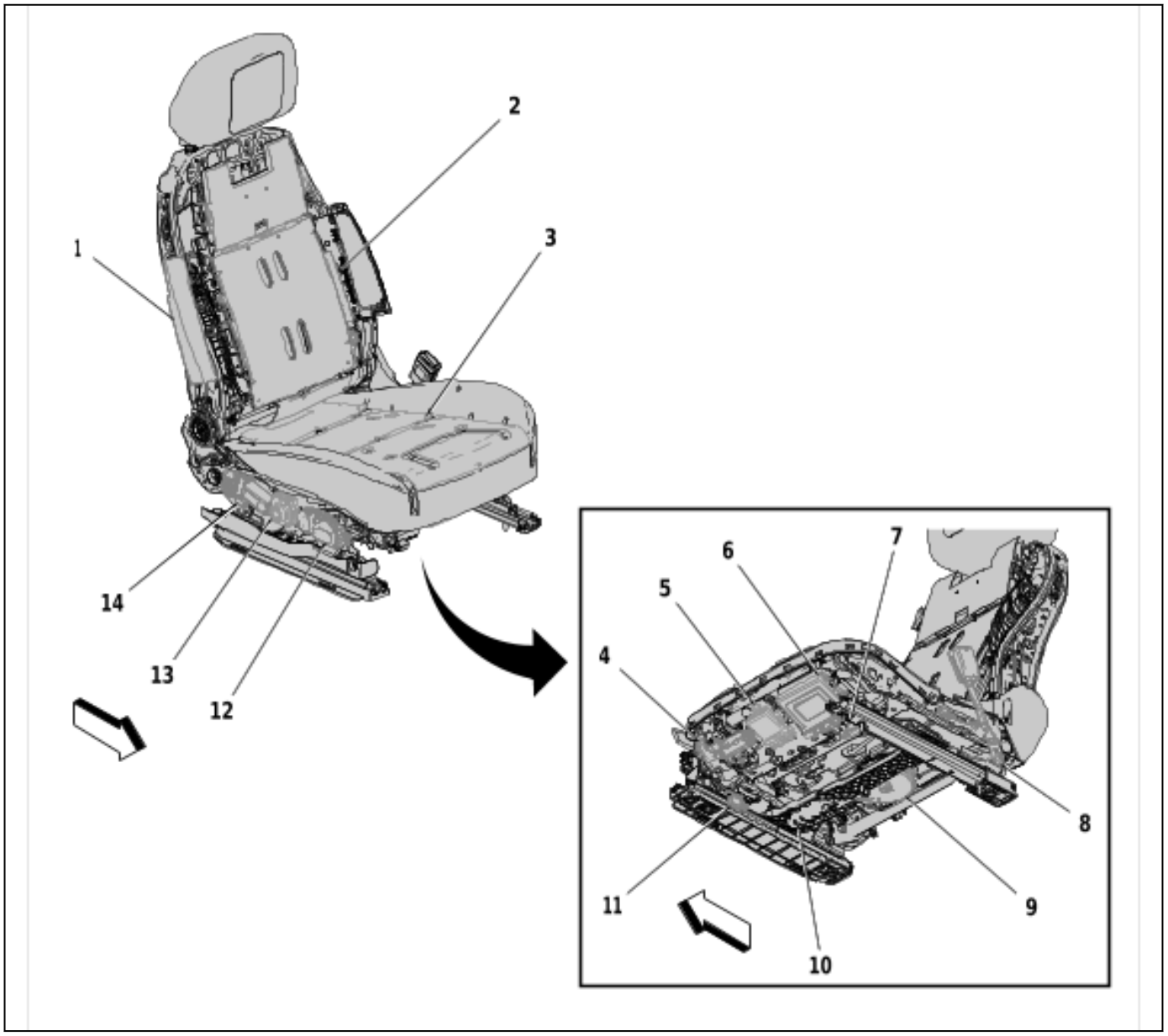
Driver Seat Back Components (AF6)



7166281

Items
(1) M73A Front Seat Back Ventilation Blower - Driver (KU9)
(2) K134DP Front Seat Bolster Memory Module - Driver Primary (AF6)
(3) G31D Front Seat Back Lumbar Pump - Driver (AVK)
(4) K134DS Front Seat Bolster Memory Module - Driver Secondary (AF6)
(5) M56D Front Seat Recliner Actuator - Driver (A2X)

Passenger Seat Components

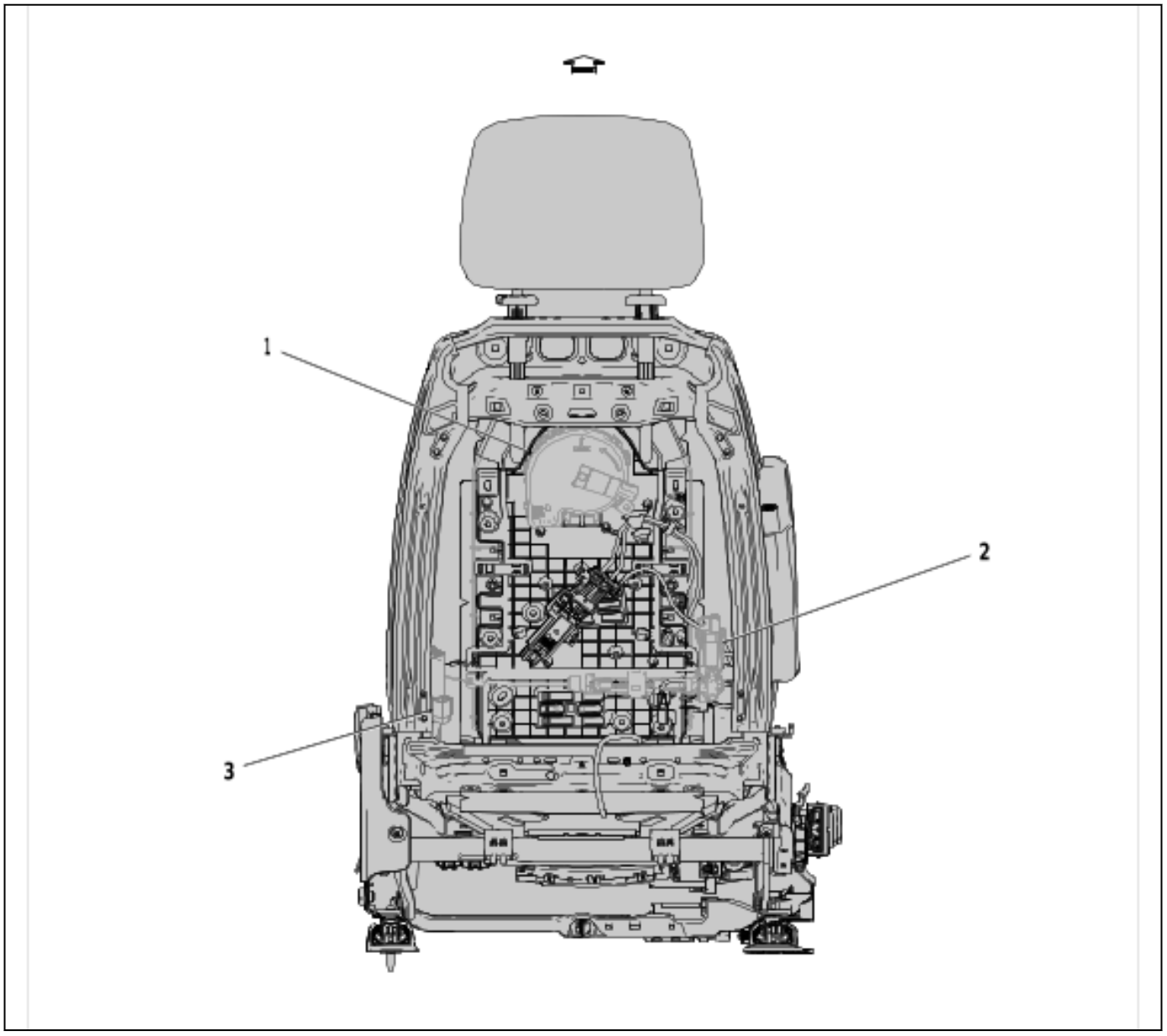


7166282

Items
(1) F106P Front Seat Outboard Seat Back Airbag - Passenger
(2) E14C Front Seat Back Heater - Passenger (KAM)
(3) E14D Front Seat Cushion Heater - Passenger (KAM)
(4) M50P Front Seat Tilt Adjuster Actuator - Passenger (A7K)
(5) K29FV Front Seat Heater Vent Control Module (KAM)
(6) K40P Passenger Seat Adjuster Memory Module (AHH / AKE)
(7) K85P Restraints Occupant Classification System Module - Passenger
(8) B153P Front Seat Belt Buckle - Passenger
(9) M73P Front Seat Cushion Ventilation Blower - Passenger (KU9)

Items
(10) M51P Front Seat Adjuster Actuator - Passenger (A7K)
(11) B62P Airbag Front Seat Position Sensor - Passenger
(12) S64P Front Seat Adjuster Switch - Passenger (A7K)
(13) S65P Front Seat Lumbar Switch - Passenger (A7K)
(14) M55P Front Seat Vertical Adjuster Actuator - Passenger (A7K)

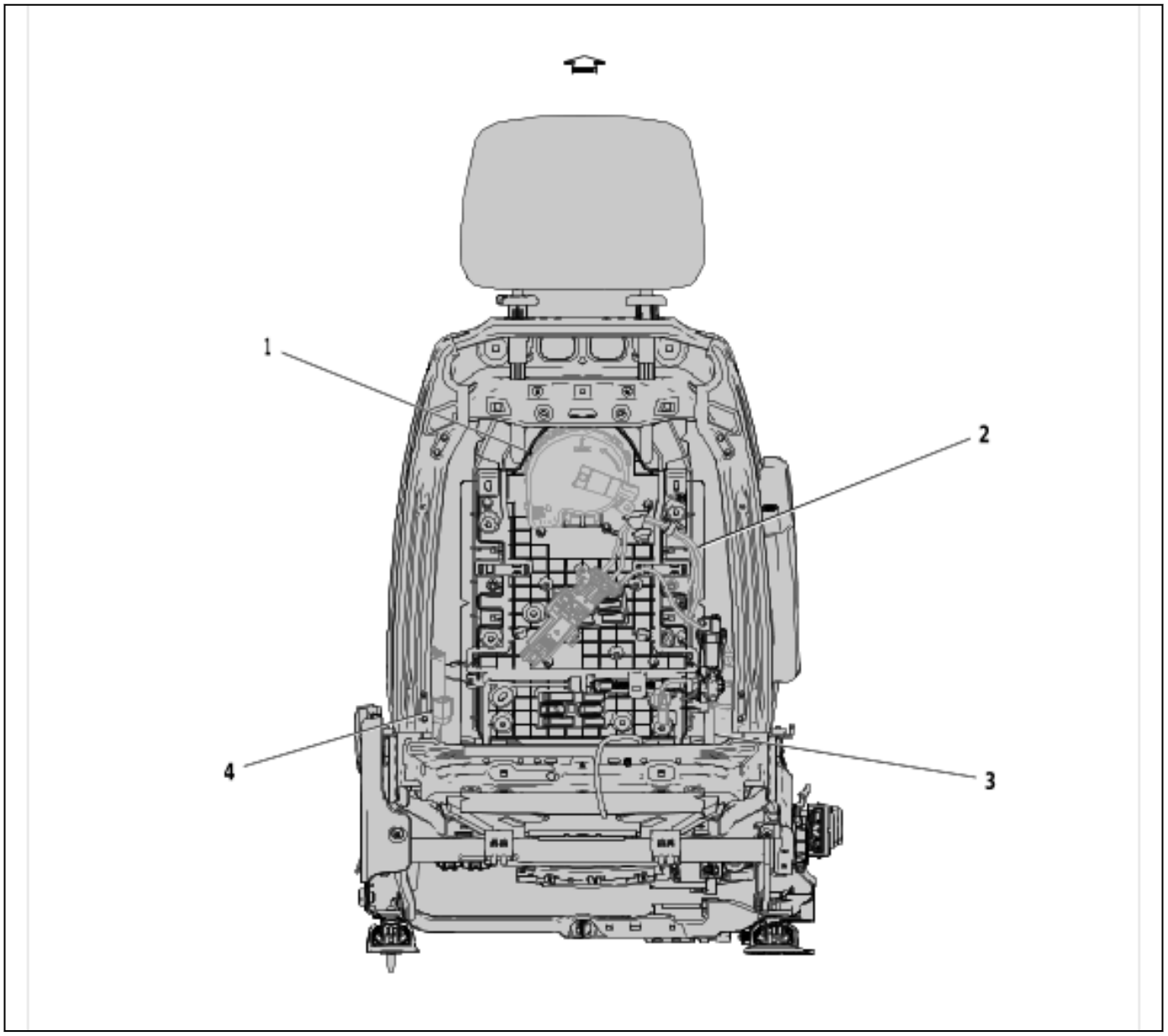
Passenger Seat Back Components (A7K - AVU)



7166283

Items
(1) M73B Front Seat Back Ventilation Blower - Passenger (KU9)
(2) M53P Front Seat Back Lumbar Motor - Passenger (A7K - AVU)
(3) M56P Front Seat Recliner Actuator - Passenger (A7K)

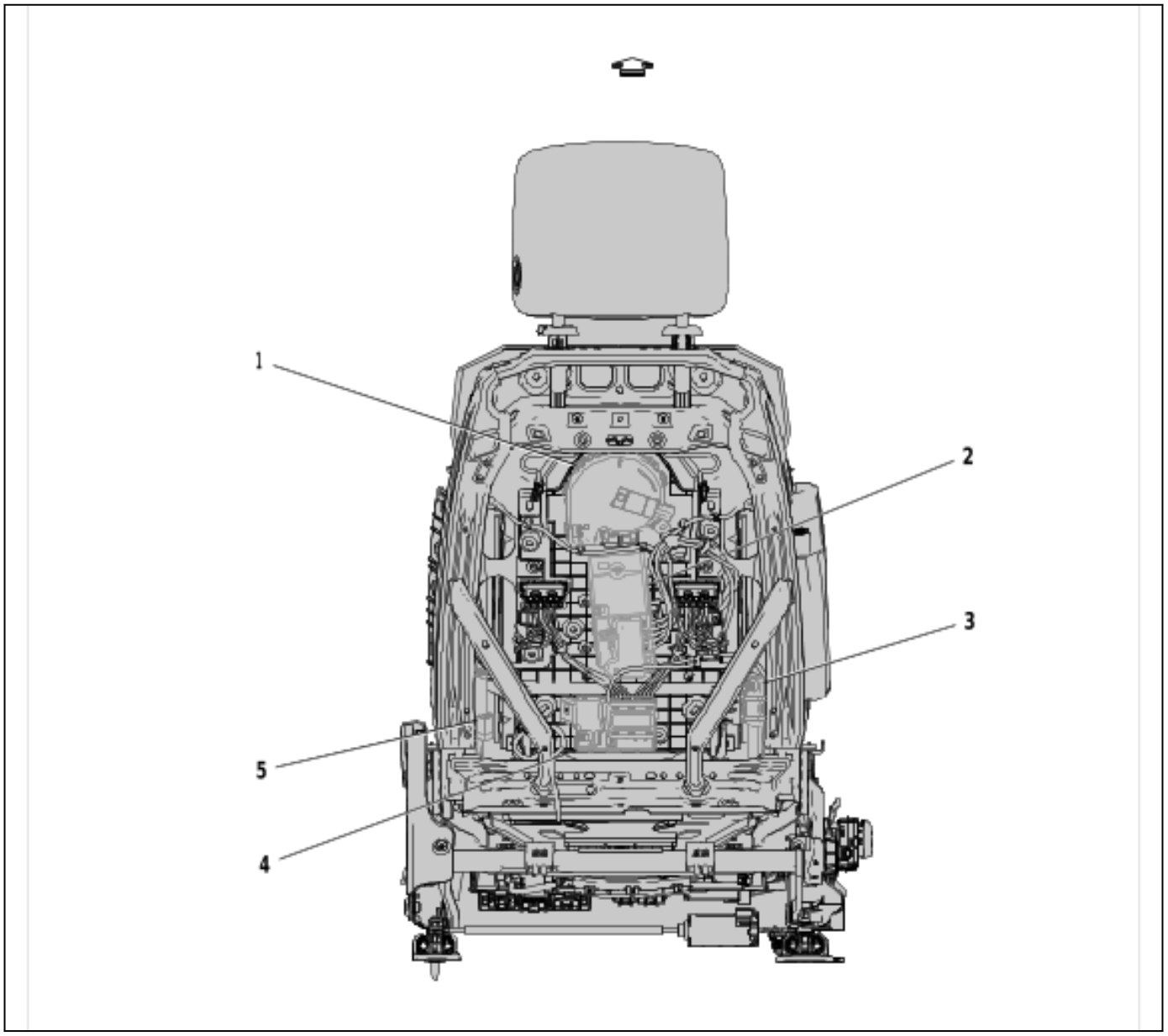
Passenger Seat Back Components (AVU - (AHH / AKE))



7166284

Items
(1) M73B Front Seat Back Ventilation Blower - Passenger (KU9)
(2) K104P Front Seat Bladder Control Module - Passenger (AVU - (AHH / AKE))
(3) G31P Front Seat Back Lumbar Pump - Passenger (AVU)
(4) M56P Front Seat Recliner Actuator - Passenger (A7K)

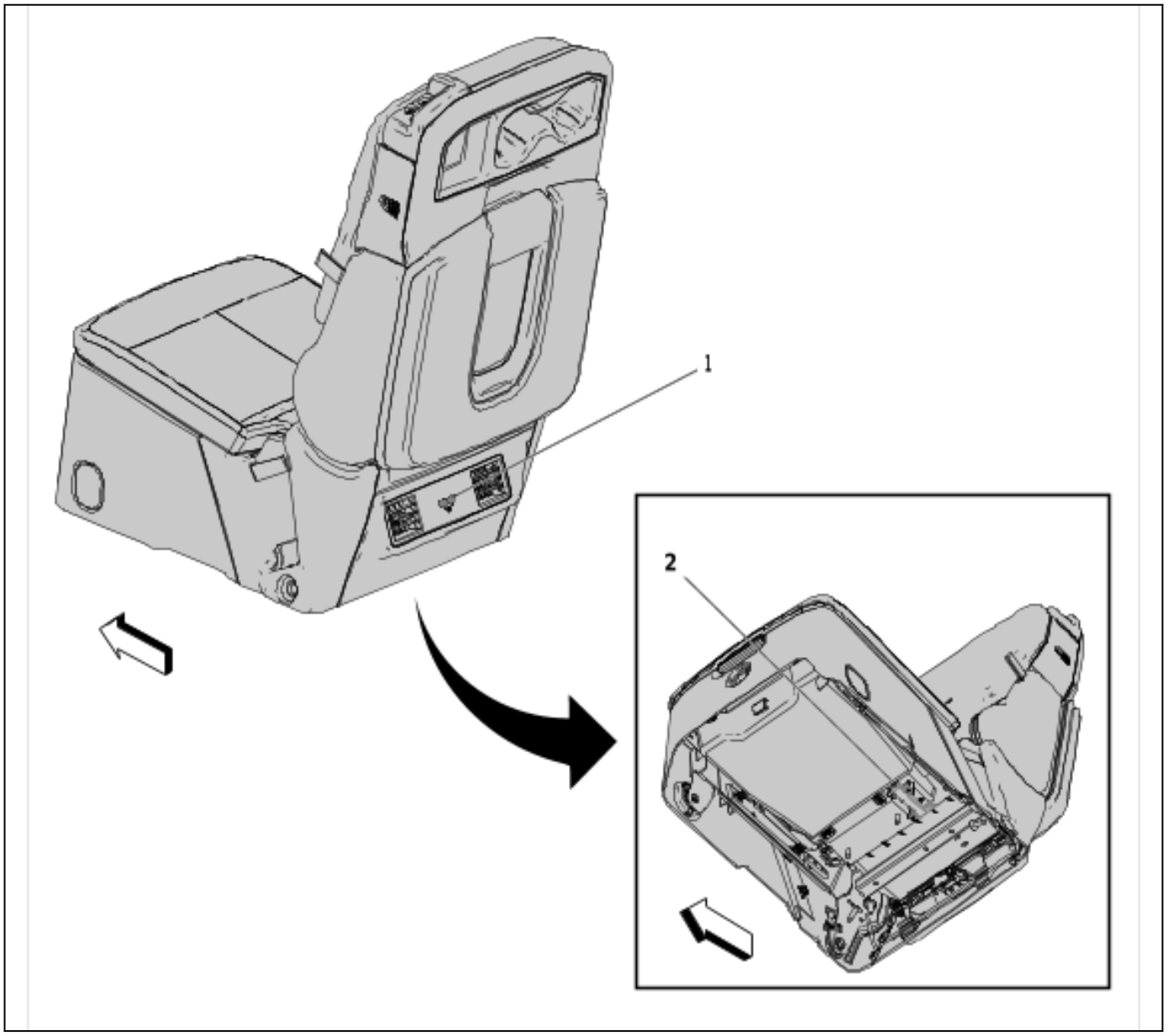
Passenger Seat Back Components (AHH / AKE)



7166285

Items
(1) M73B Front Seat Back Ventilation Blower - Passenger (KU9)
(2) K134PP Front Seat Bolster Memory Module - Passenger Primary (AHH / AKE)
(3) G31P Front Seat Back Lumbar Pump - Passenger (AVU)
(4) K134PS Front Seat Bolster Memory Module - Passenger Secondary (AHH / AKE)
(5) M56P Front Seat Recliner Actuator - Passenger (A7K)

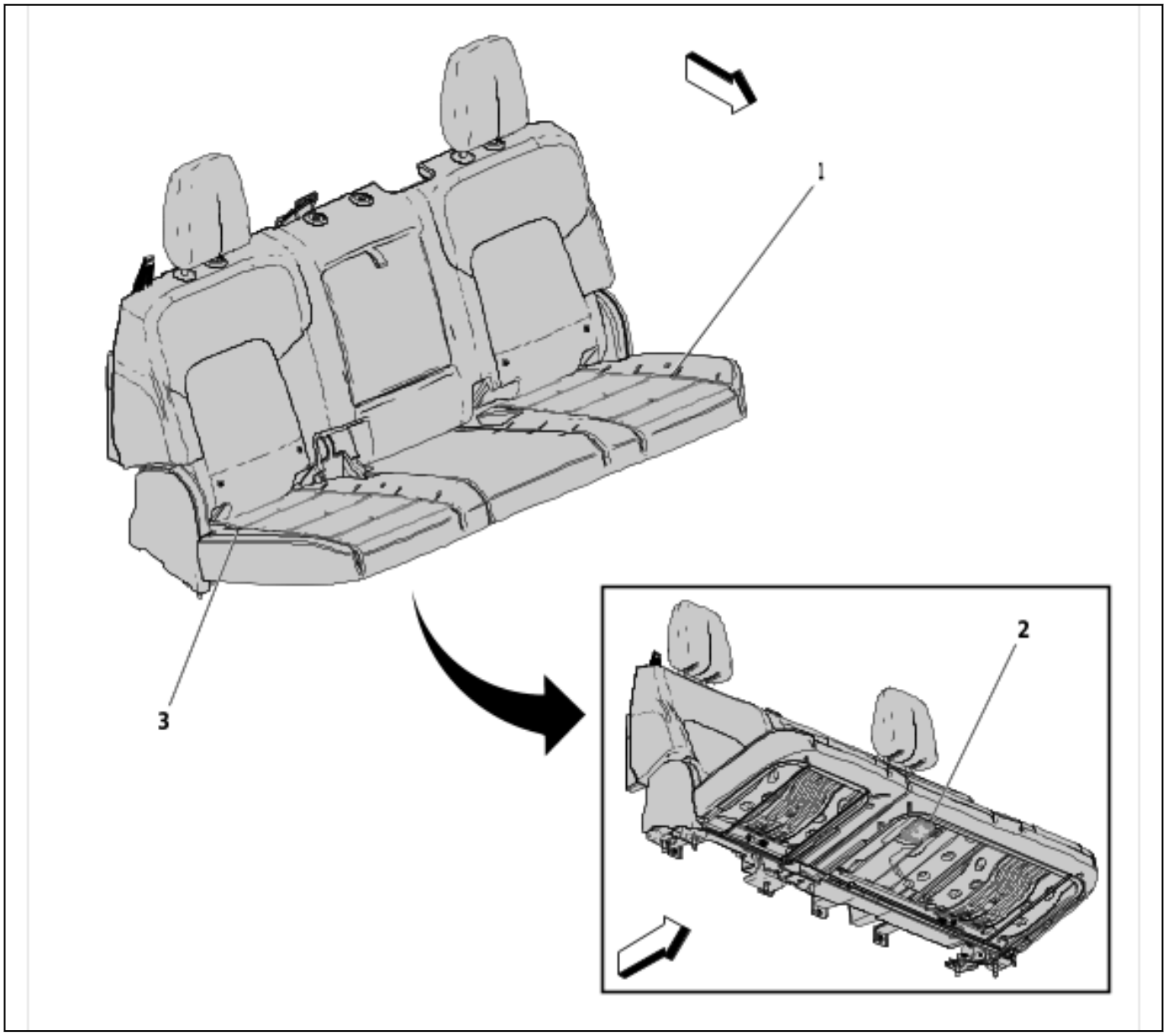
Center Seat Components (AZ3 - 5Y1)



7166286

Items
(1) X92FSR Dual Charge Only Receptacle - Front Center Seat Rear Cover (AZ3 & UBI)
(2) T10U Low Frequency Console Antenna - Front

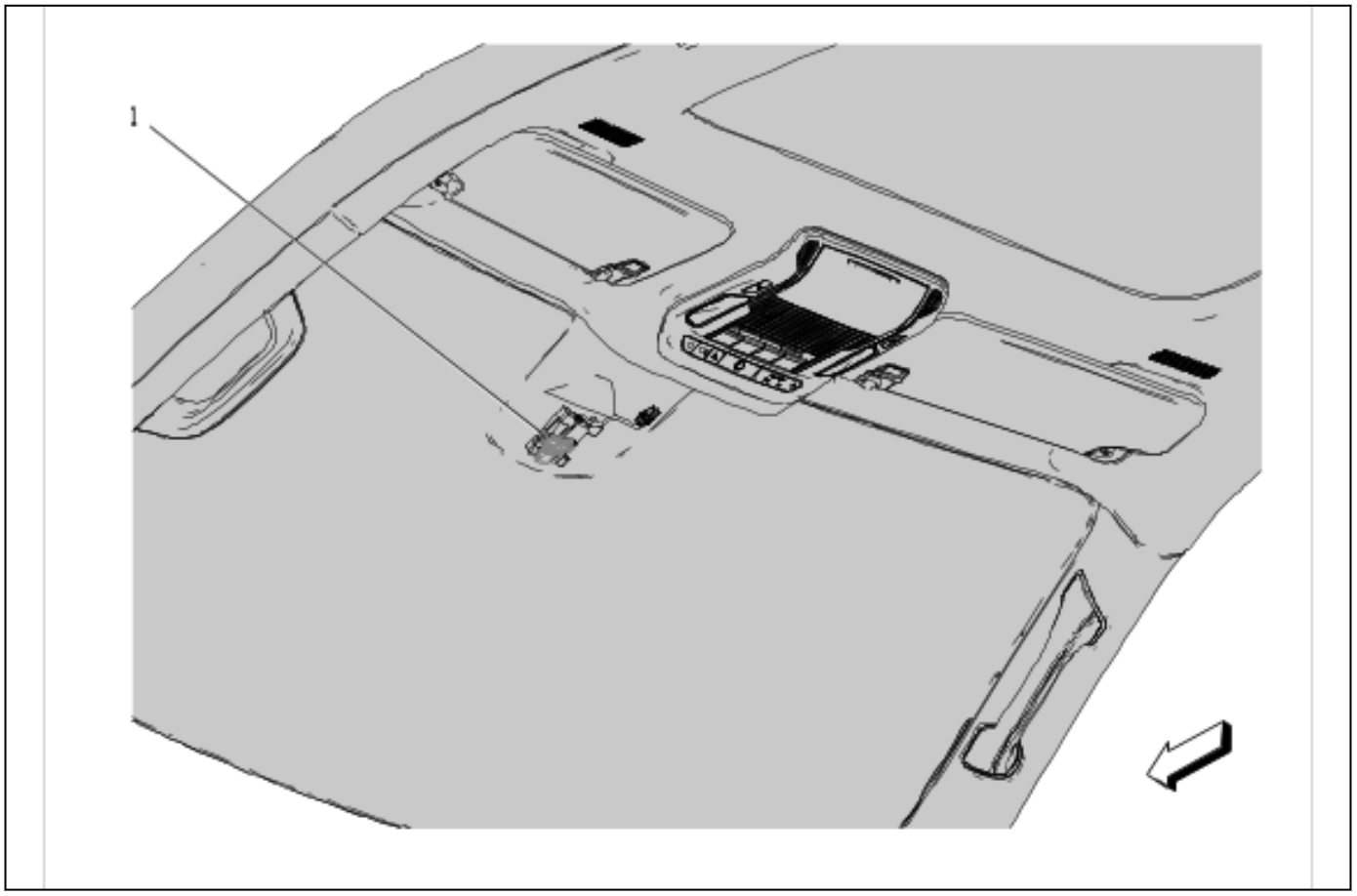
Rear Seat Components (KCB)



7166287

Items
(1) E14F Rear Seat Cushion Heater - Left Rear (KCB)
(2) K234 Rear Seat Heater Vent Control Module (KCB)
(3) E14H Rear Seat Cushion Heater - Right Rear (KCB)

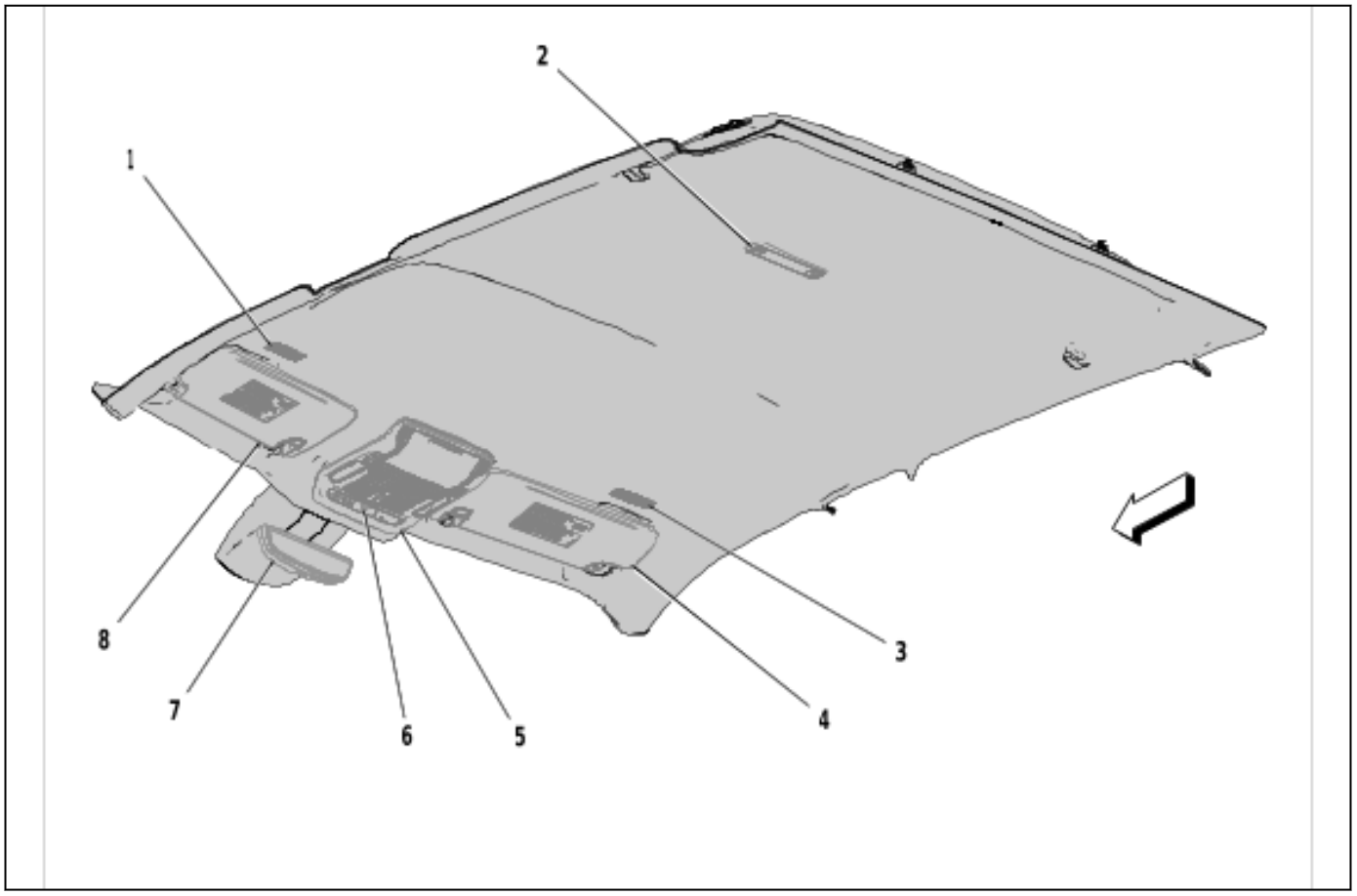
Windshield Components - Behind Inside Rearview Mirror (ASV)



7188707

Items
(1) B117A Windshield Outside Moisture/Ambient Light and Humidity Sensor (ASV)

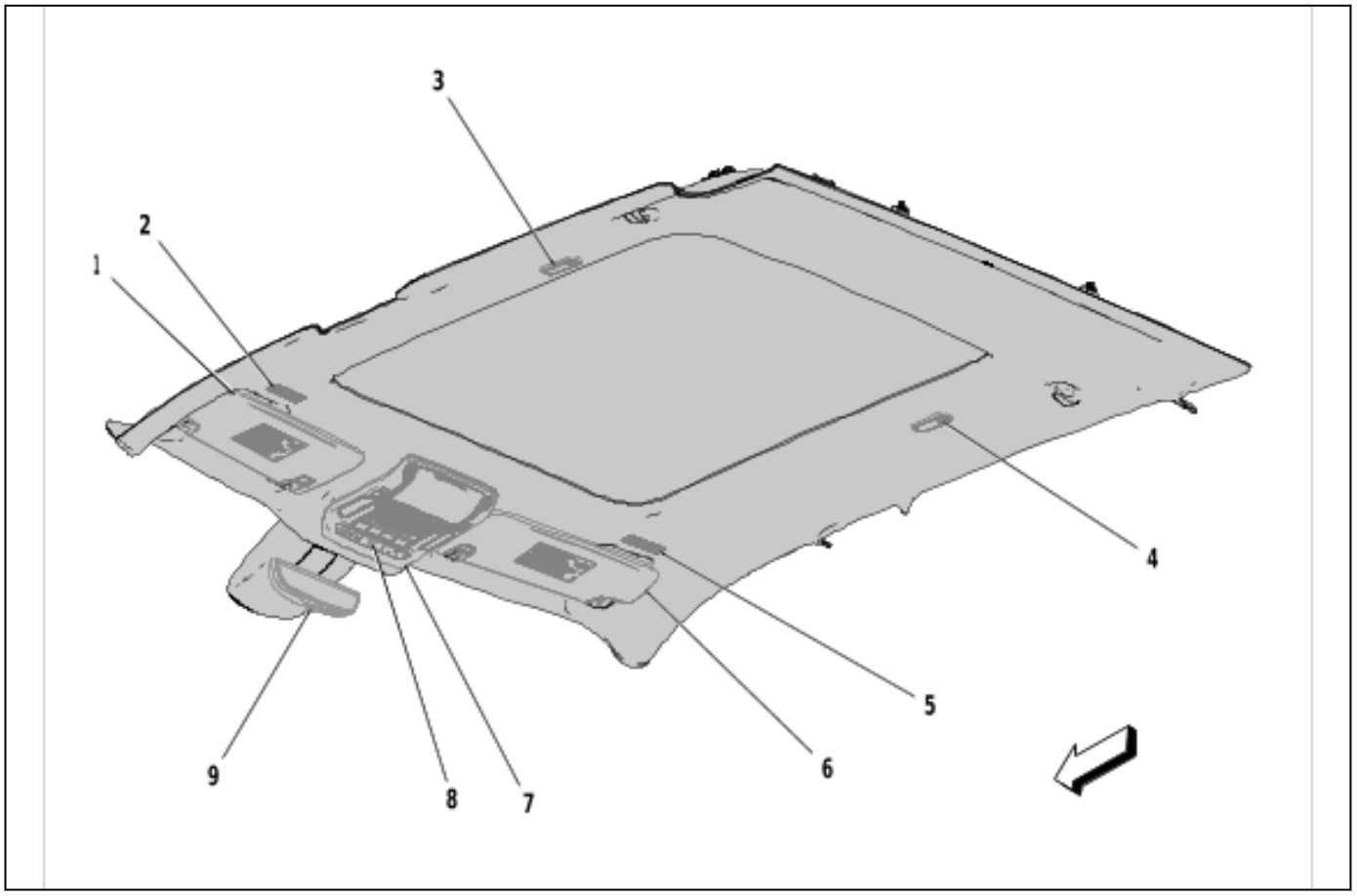
Headliner Components - Bottom (- CAJ)



7175716

Items
(1) B396LF Mobile Telephone Headliner Microphone - Left Front
(2) E37SMC Rear Seat Position Center Reading and Courtesy Lamp (4-Door - CAJ)
(3) B396RF Mobile Telephone Headliner Microphone - Right Front
(4) A3R Sunshade - Right
(5) A103 Roof Console
(6) B350B Interior View Camera (UCV)
(7) A10 Inside Rearview Mirror
(8) A3L Sunshade - Left

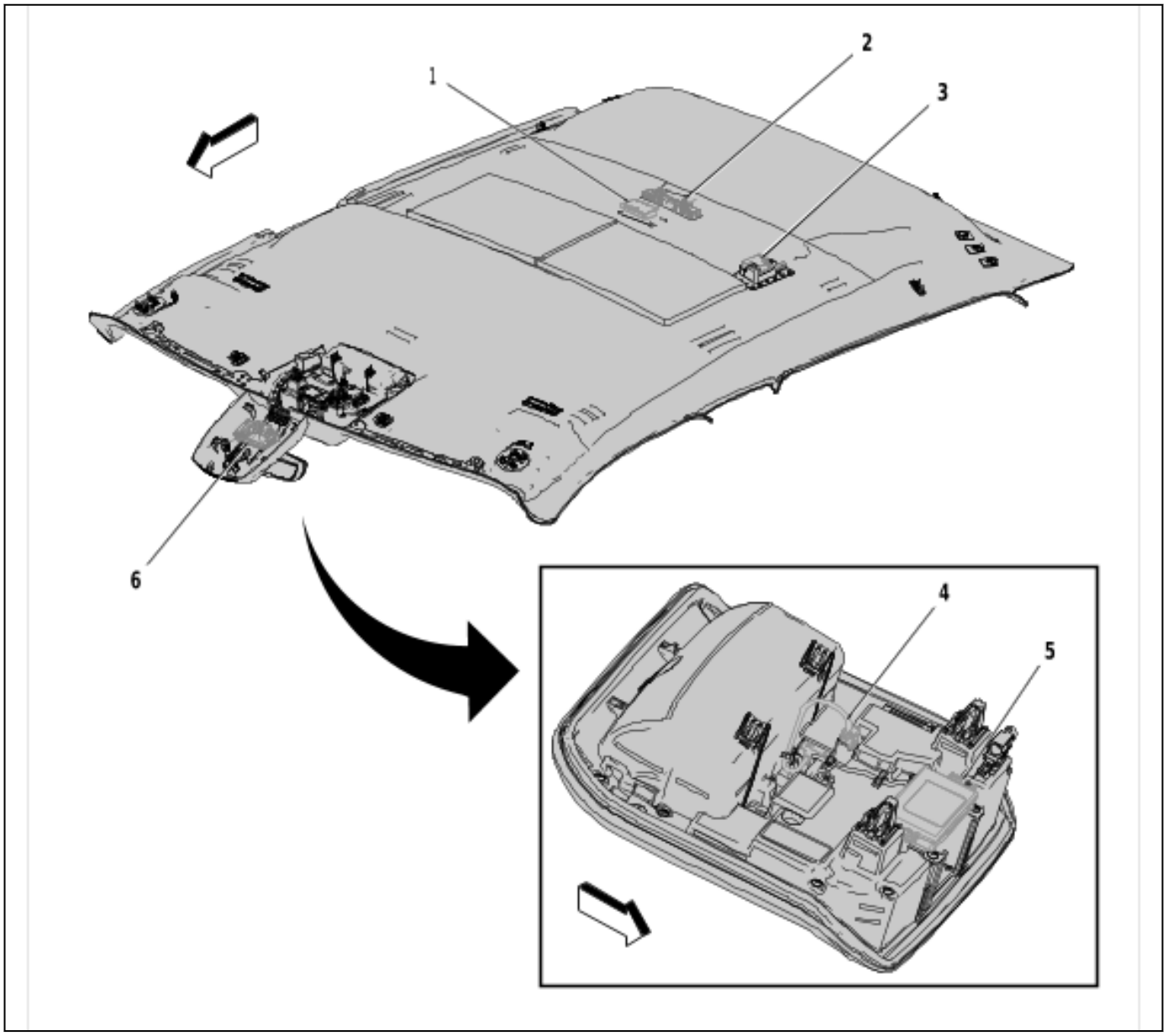
Headliner Components - Bottom (CAJ)



7175717

Items
(1) A3L Sunshade - Left
(2) B396LF Mobile Telephone Headliner Microphone - Left Front
(3) E37H Roof Rail Rear Seat Position Reading and Courtesy Lamp - Left (CAJ)
(4) E37J Roof Rail Rear Seat Position Reading and Courtesy Lamp - Right (CAJ)
(5) B396RF Mobile Telephone Headliner Microphone - Right Front
(6) A3R Sunshade - Right
(7) A103 Roof Console
(8) B350B Interior View Camera (UCV)
(9) A10 Inside Rearview Mirror

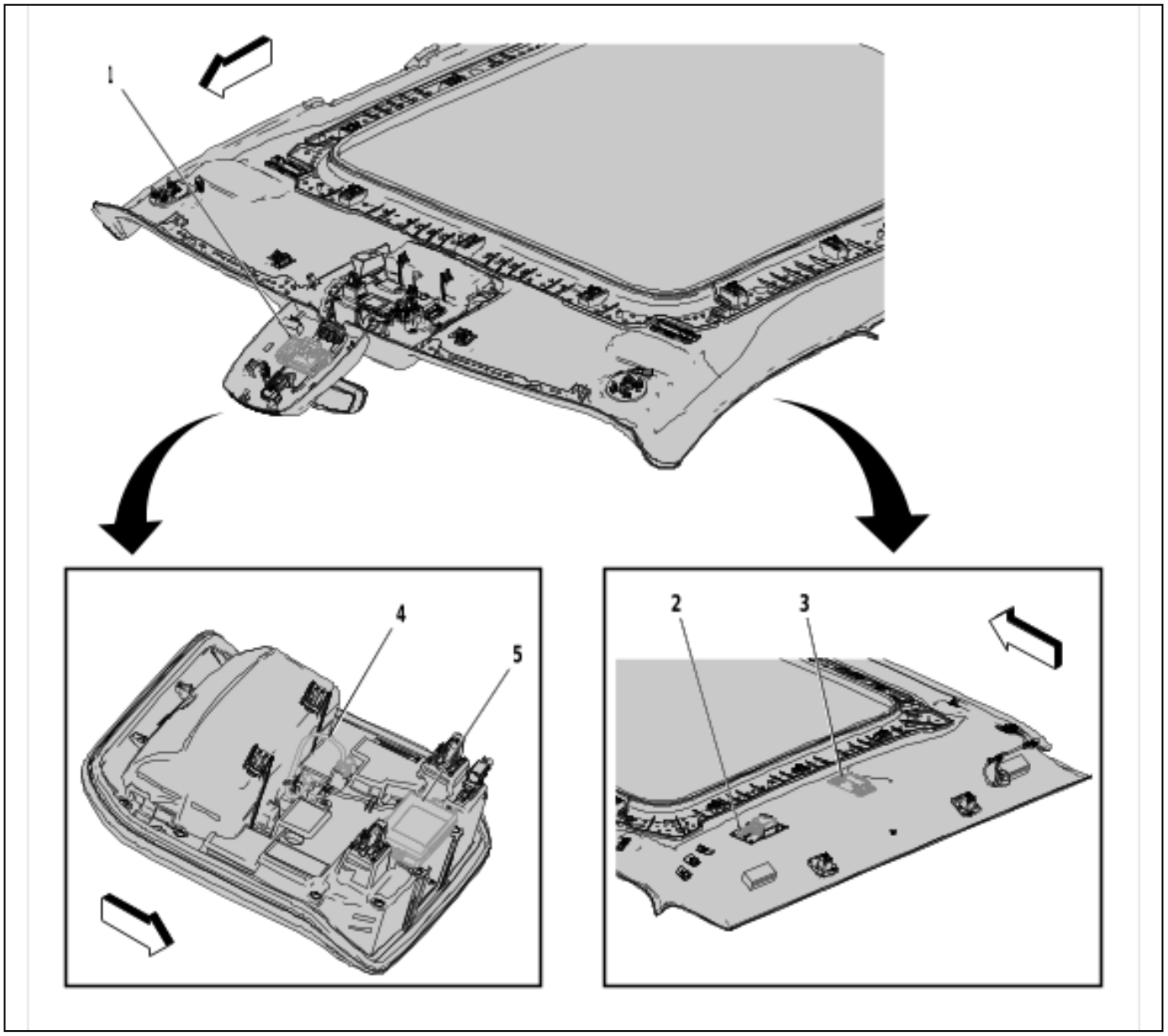
Headliner Components - Top (- CAJ)



7175718

Items
(1) B342E UHF Low Energy Remote Control Access Sensor Transceiver 5 (BOK / BOR / BOY)
(2) E37SMC Rear Seat Position Center Reading and Courtesy Lamp (4-Door - CAJ)
(3) K77 Remote Function Actuator Module
(4) B24 Mobile Telephone Microphone
(5) S25 Garage Door Opener Transmitter (UG1)
(6) B174W Front View Camera - Windshield

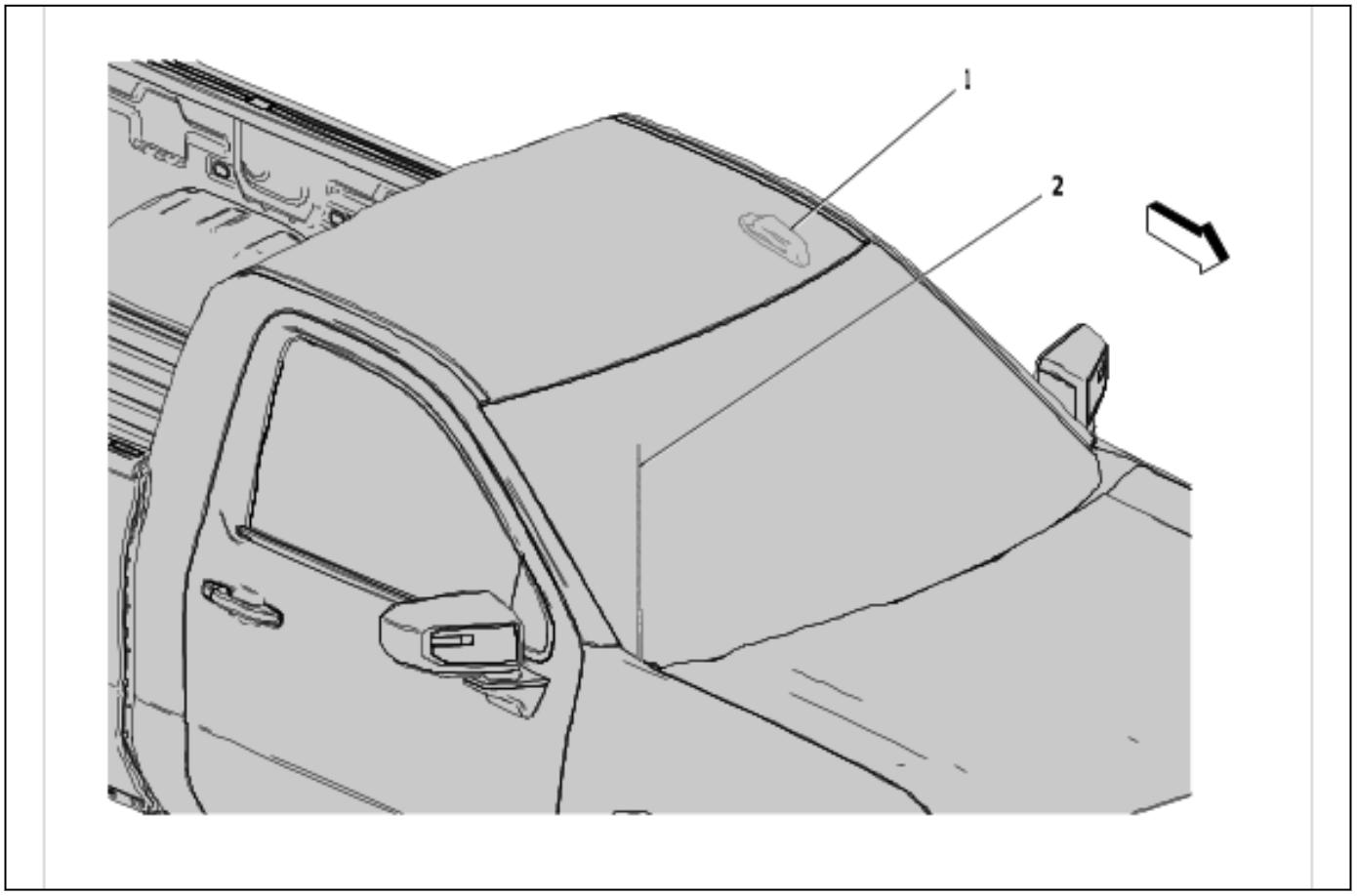
Headliner Components - Top (CAJ)



7175719

Items
(1) B174W Front View Camera - Windshield
(2) K77 Remote Function Actuator Module
(3) B342E UHF Low Energy Remote Control Access Sensor Transceiver 5 (BOK / BOR / BOY)
(4) B24 Mobile Telephone Microphone
(5) S25 Garage Door Opener Transmitter (UG1)

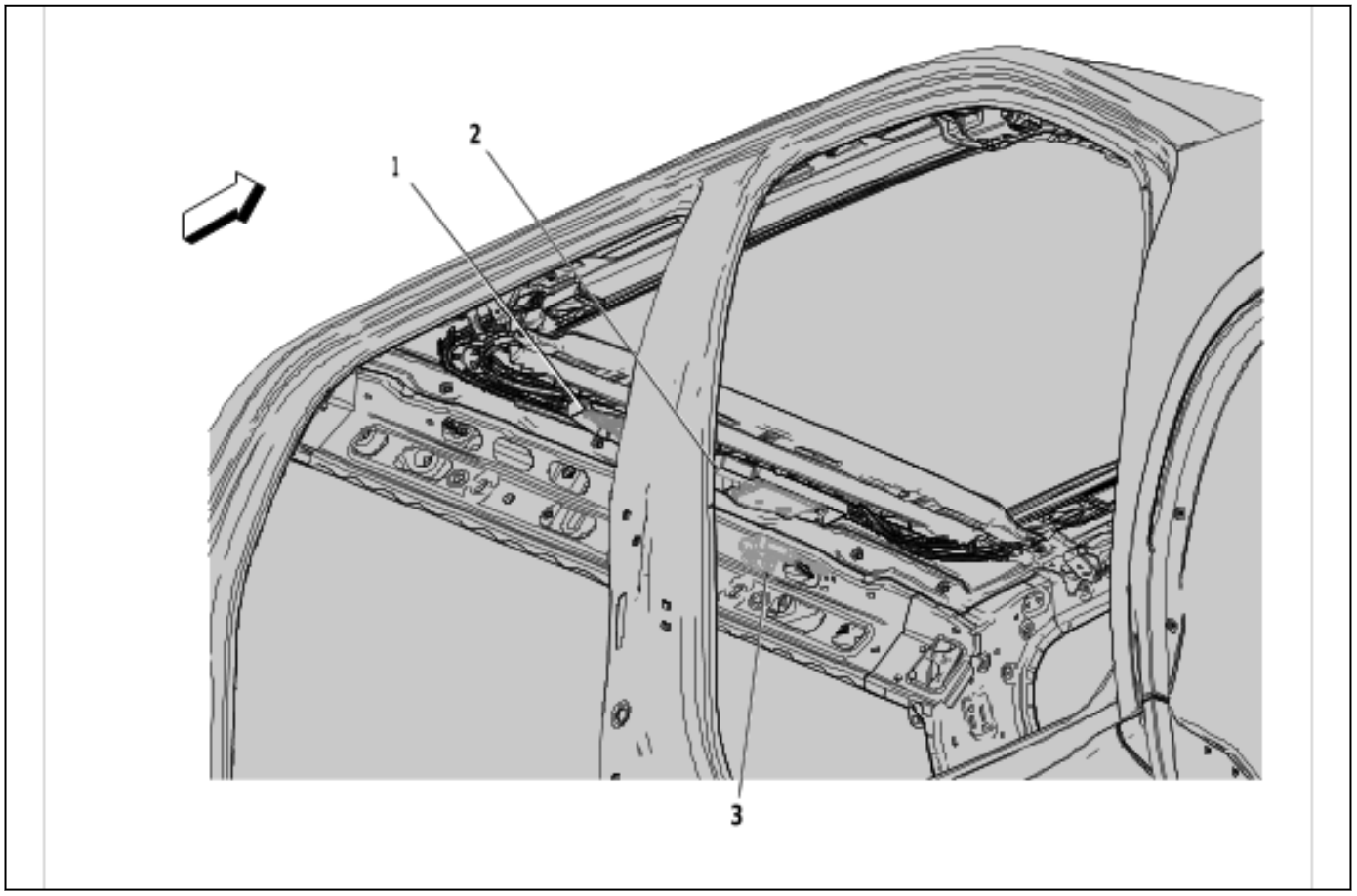
Roof Components - 2-Door



7185179

Items
(1) T4P High Frequency Antenna (2-Door)
(2) T4M Radio Antenna (2-Door)

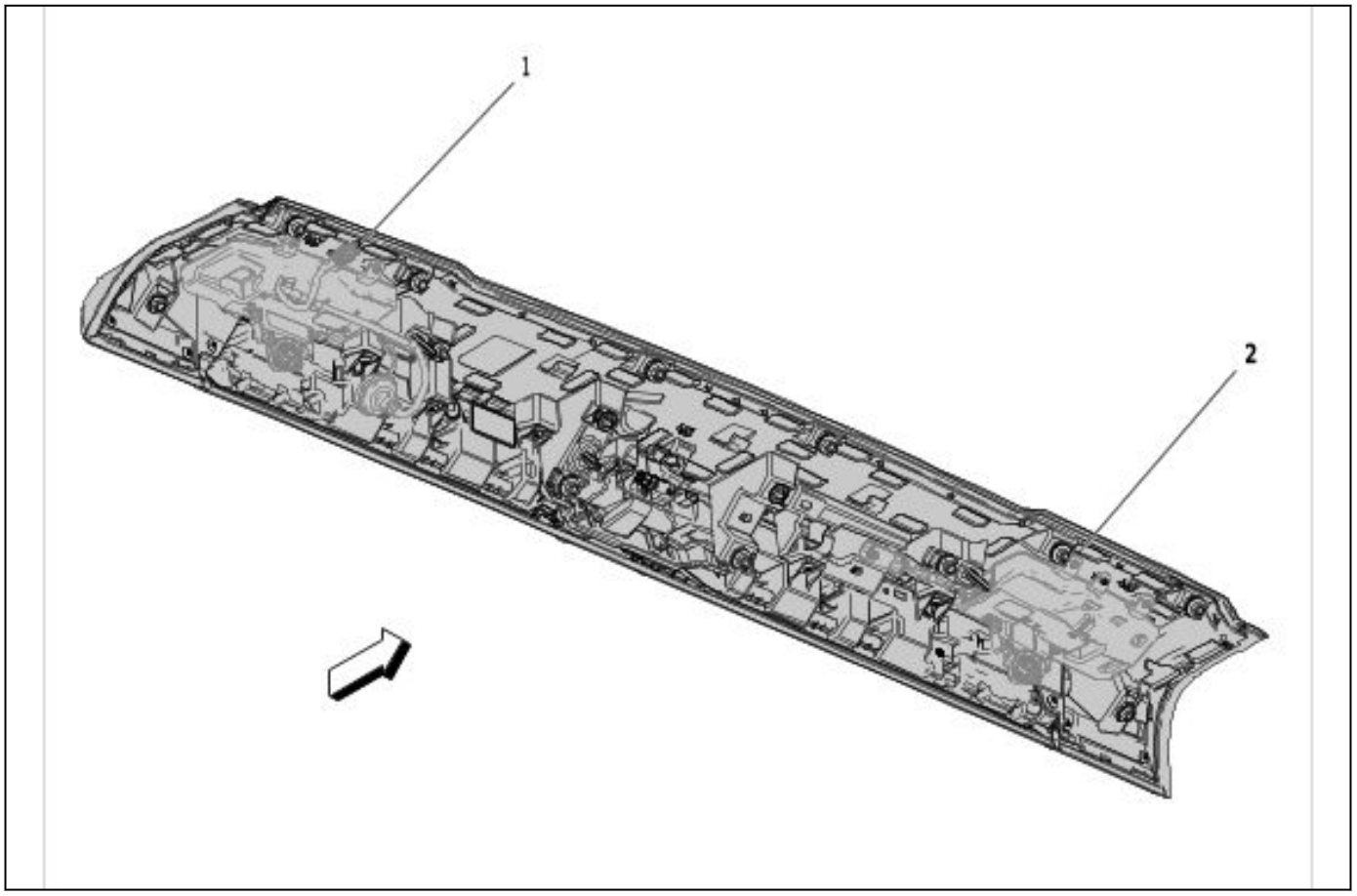
Sunroof Components (CAJ)



7155444

Items
(1) M81 Sunroof Sunshade Motor (CAJ)
(2) K61 Sunroof Control Module (CAJ)
(3) R44 Radio AM Antenna Signal Filter Module - Center High Mounted Stop Lamp (4-Door)

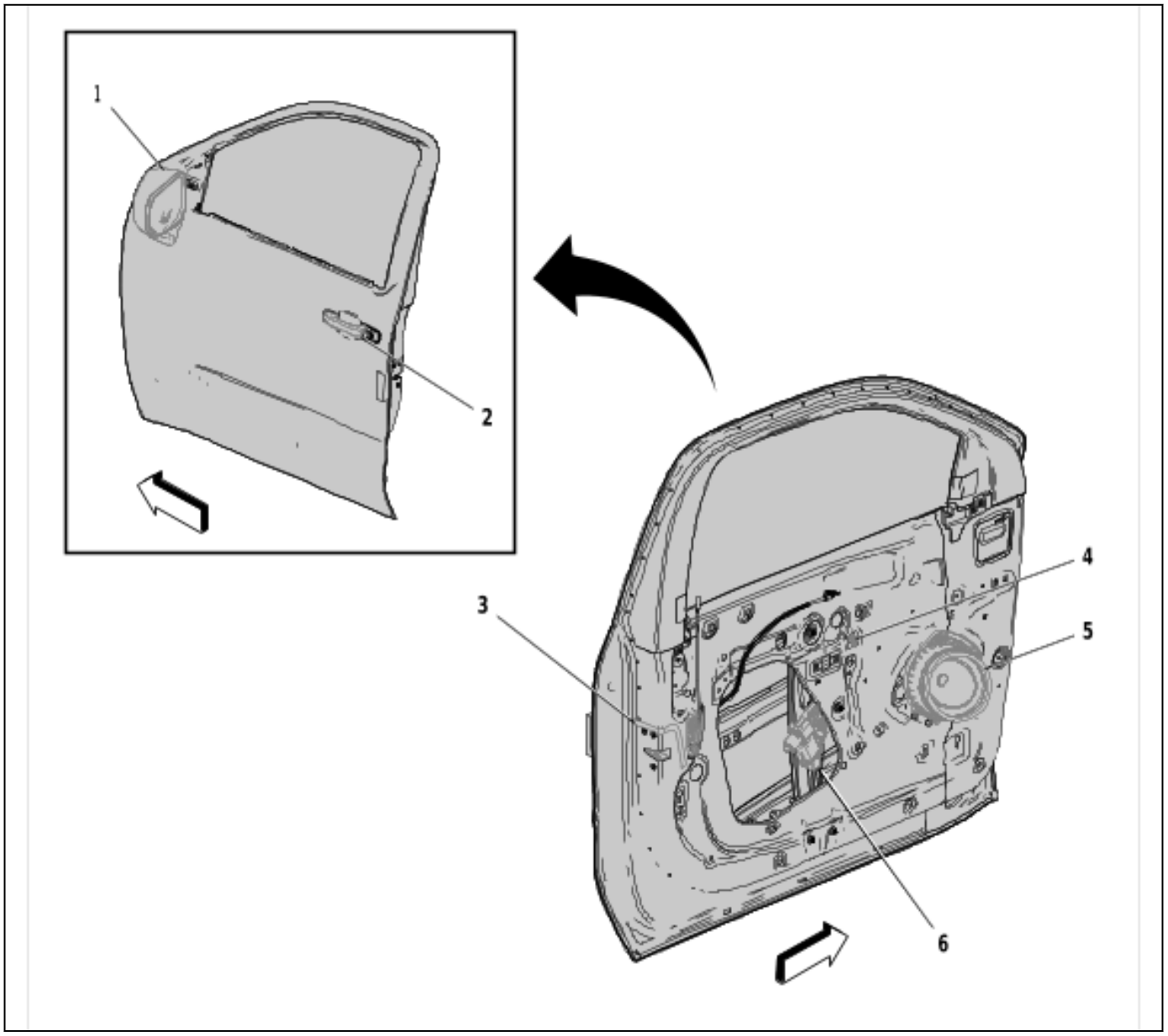
Roof Rear Spoiler Components - 4-Door



7155445

Items
(1) T55RR Roof Rear Spoiler Antenna Module - Right (4-Door)
(2) T55LR Roof Rear Spoiler Antenna Module - Left (4-Door)

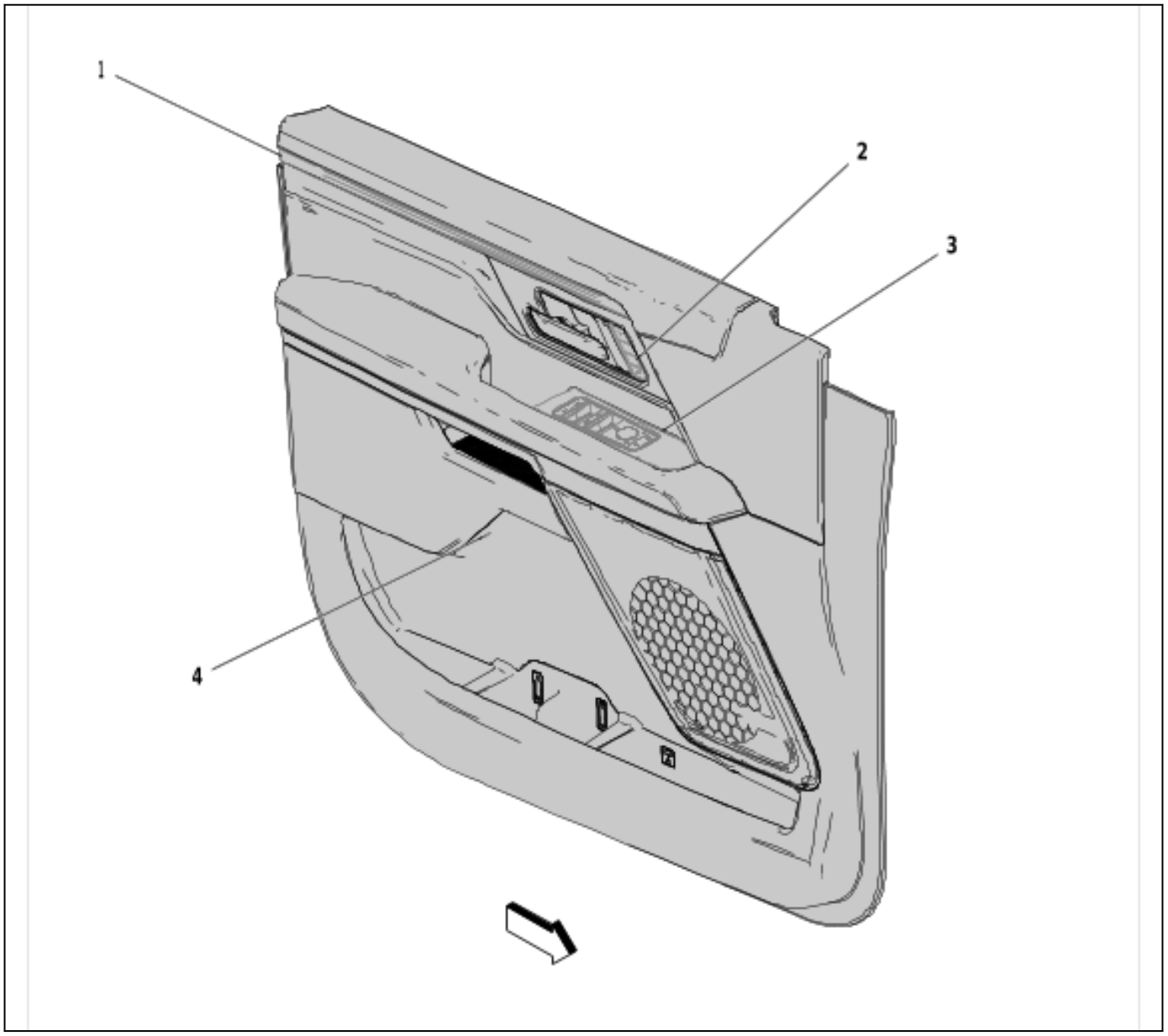
Driver Door Components



7166288

Items
(1) A9A Outside Rearview Mirror - Driver
(2) A24D Front Side Door Outside Handle - Left
(3) A23D Front Side Door Latch - Driver
(4) B63LF Airbag Side Impact Sensor - Left Front Door
(5) P19AG Radio Front Side Door Speaker - Left
(6) M74D Front Side Door Window Regulator Motor - Driver

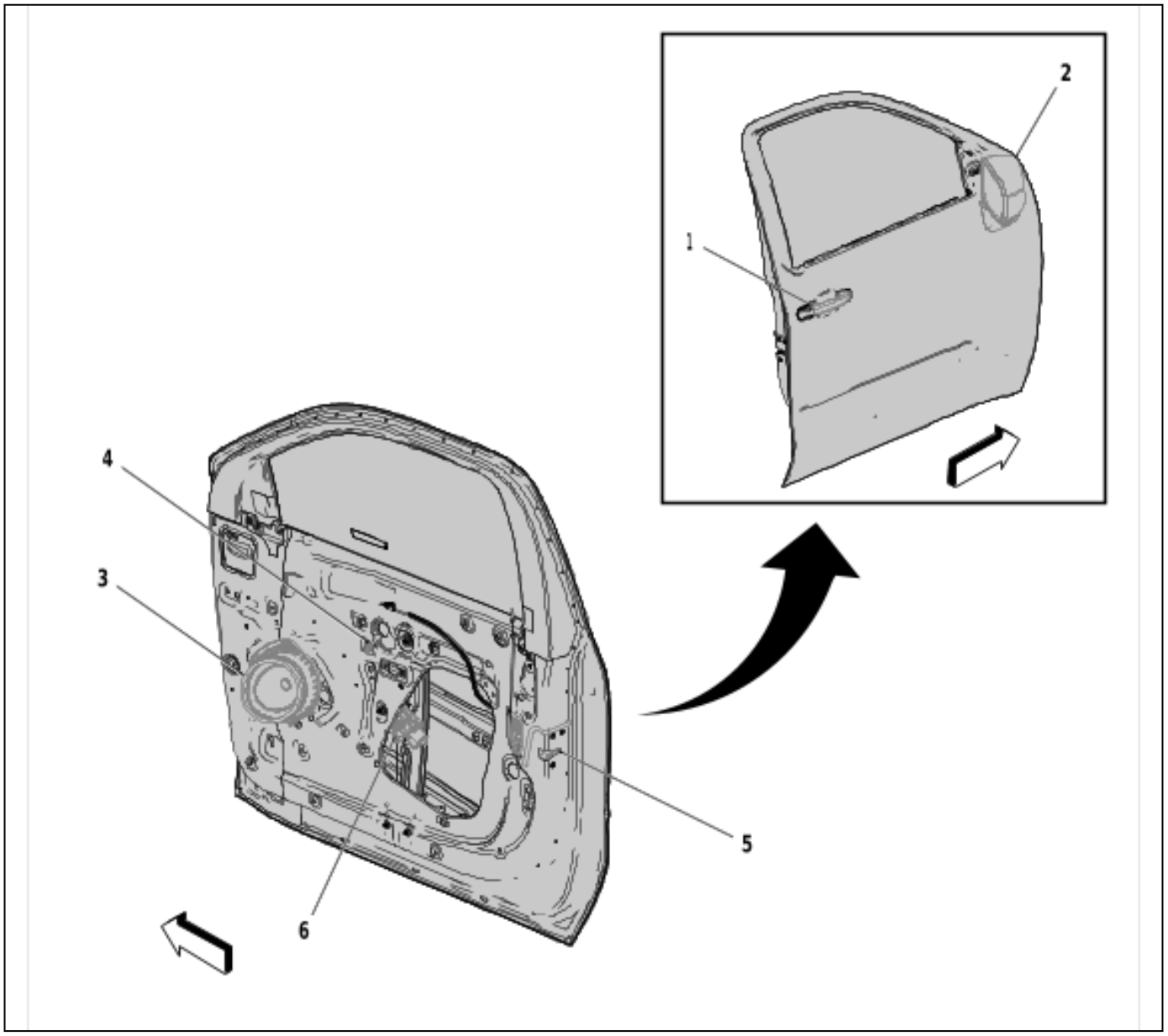
Driver Door Trim Components



7166289

Items
(1) E1D Front Side Door Light Conductor Lamp - Driver Trim Panel (C70 / C85)
(2) S47D Front Seat Adjuster Memory Switch - Driver (A45)
(3) S79D Front Side Door Window Control Switch - Driver
(4) E55LF Front Side Door Map Pocket Illumination Lamp - Left (C85)

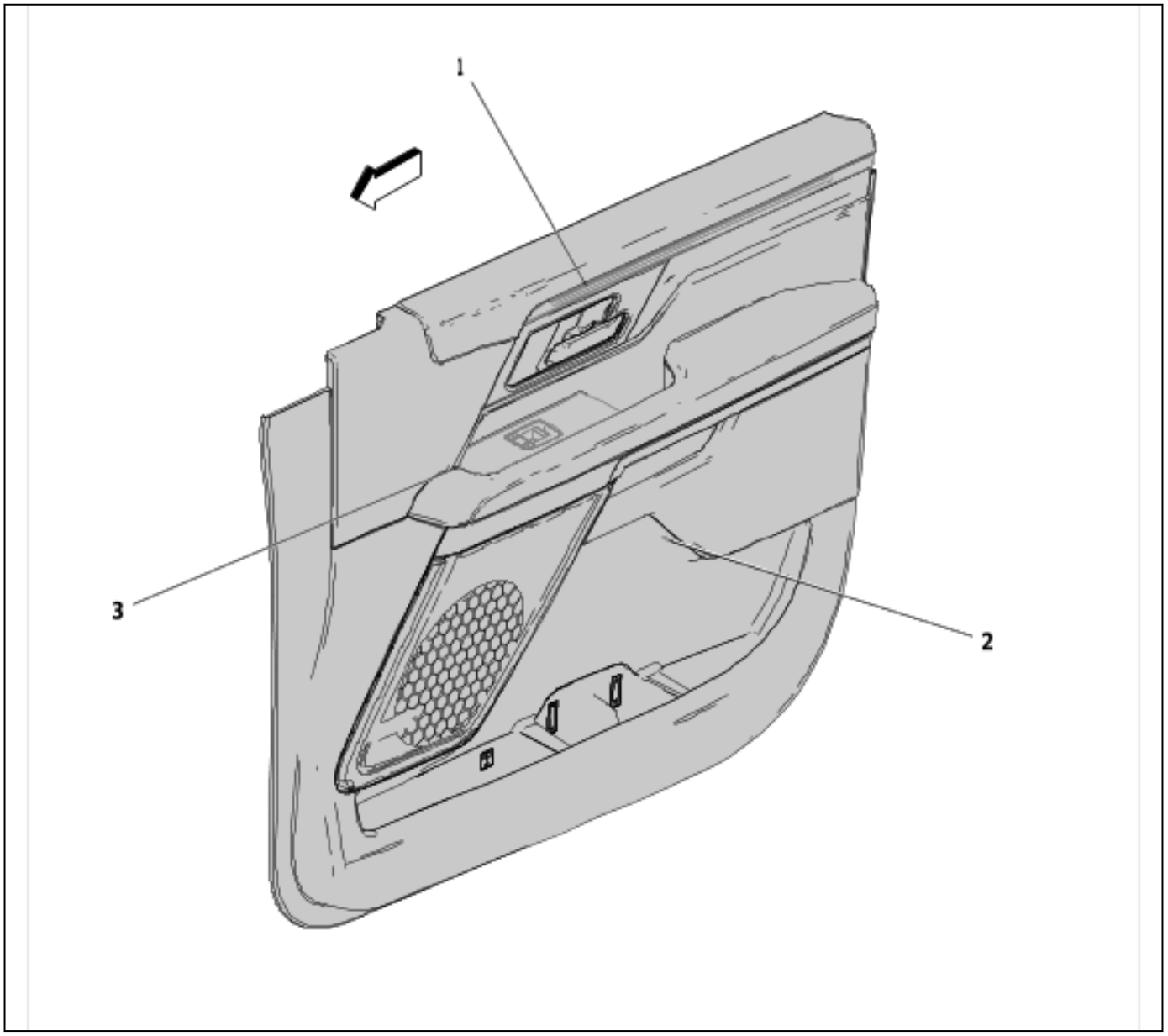
Passenger Door Components



7166290

Items
(1) A24P Front Side Door Outside Handle - Right
(2) A9B Outside Rearview Mirror - Passenger
(3) P19AH Radio Front Side Door Speaker - Right
(4) B63RF Airbag Side Impact Sensor - Right Front Door
(5) A23P Front Side Door Latch - Passenger
(6) M74P Front Side Door Window Regulator Motor - Passenger

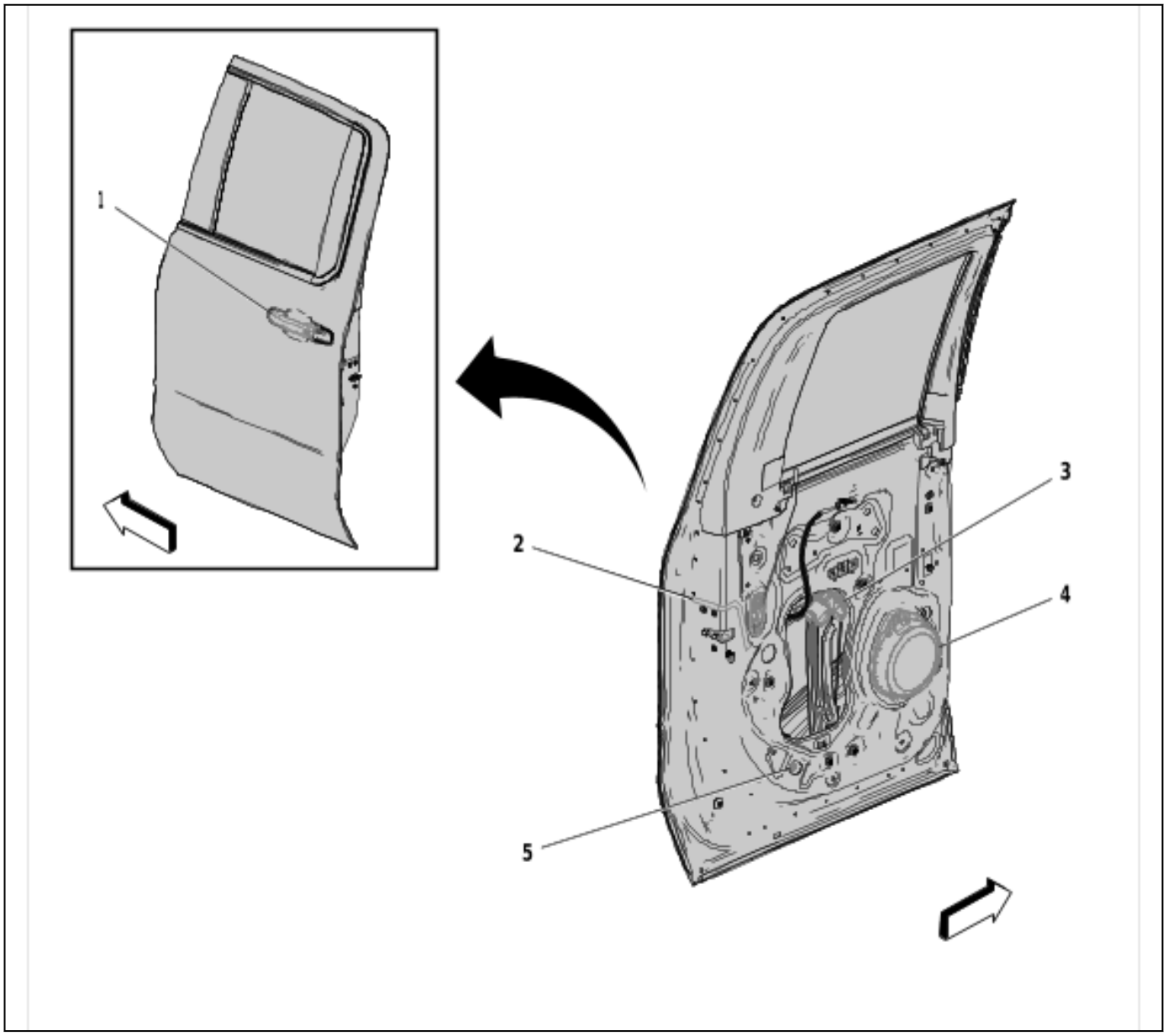
Passenger Door Trim Components



7166291

Items
(1) E1P Front Side Door Light Conductor Lamp - Passenger Trim Panel (C70 / C85)
(2) E55RF Front Side Door Map Pocket Illumination Lamp - Right (C85)
(3) S79P Front Side Door Window Switch - Passenger

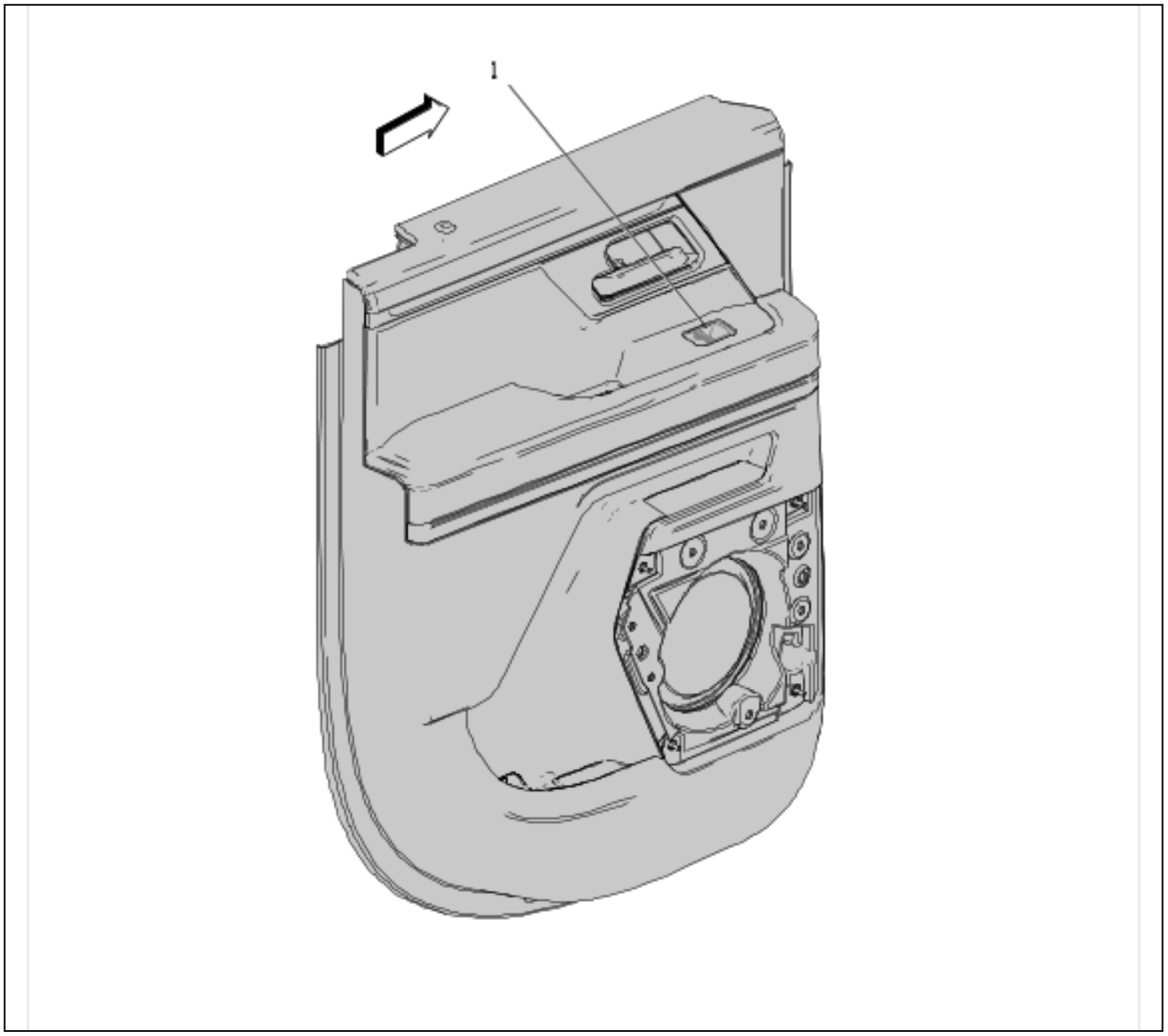
Left Rear Door Components - Double Cab



7166292

Items
(1) A24LR Rear Side Door Outside Handle - Left (4-Door)
(2) A23LR Rear Side Door Latch - Left (4-Door)
(3) M74LR Rear Side Door Window Regulator Motor - Left (4-Door)
(4) P19AL Radio Rear Side Door Speaker - Left (4-Door)
(5) B63LR Airbag Side Impact Rear Sensor - Left Door (4-Door)

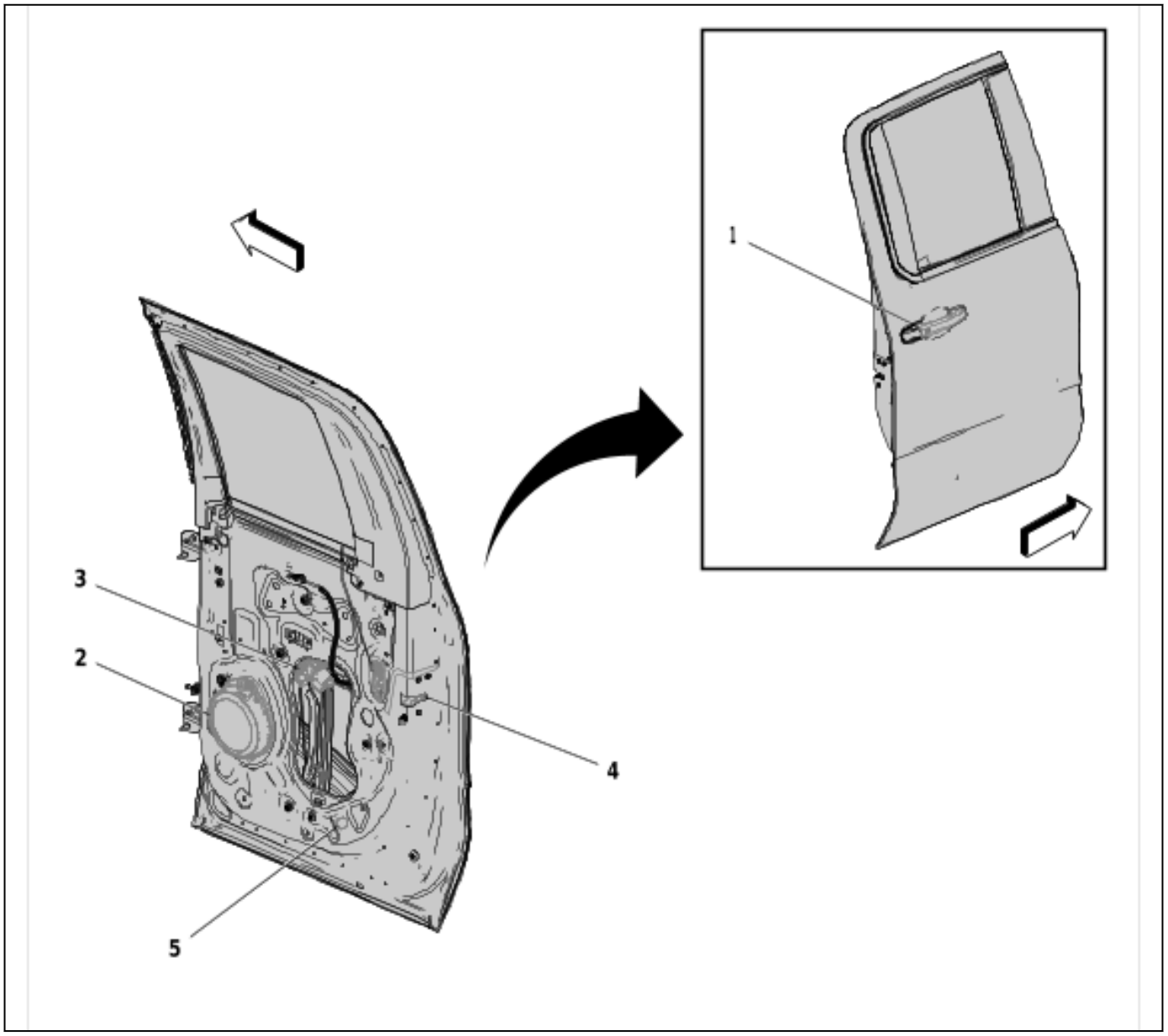
Left Rear Door Trim Components - Double Cab



7166293

Items
(1) S79LR Rear Side Door Window Switch - Left (4-Door)

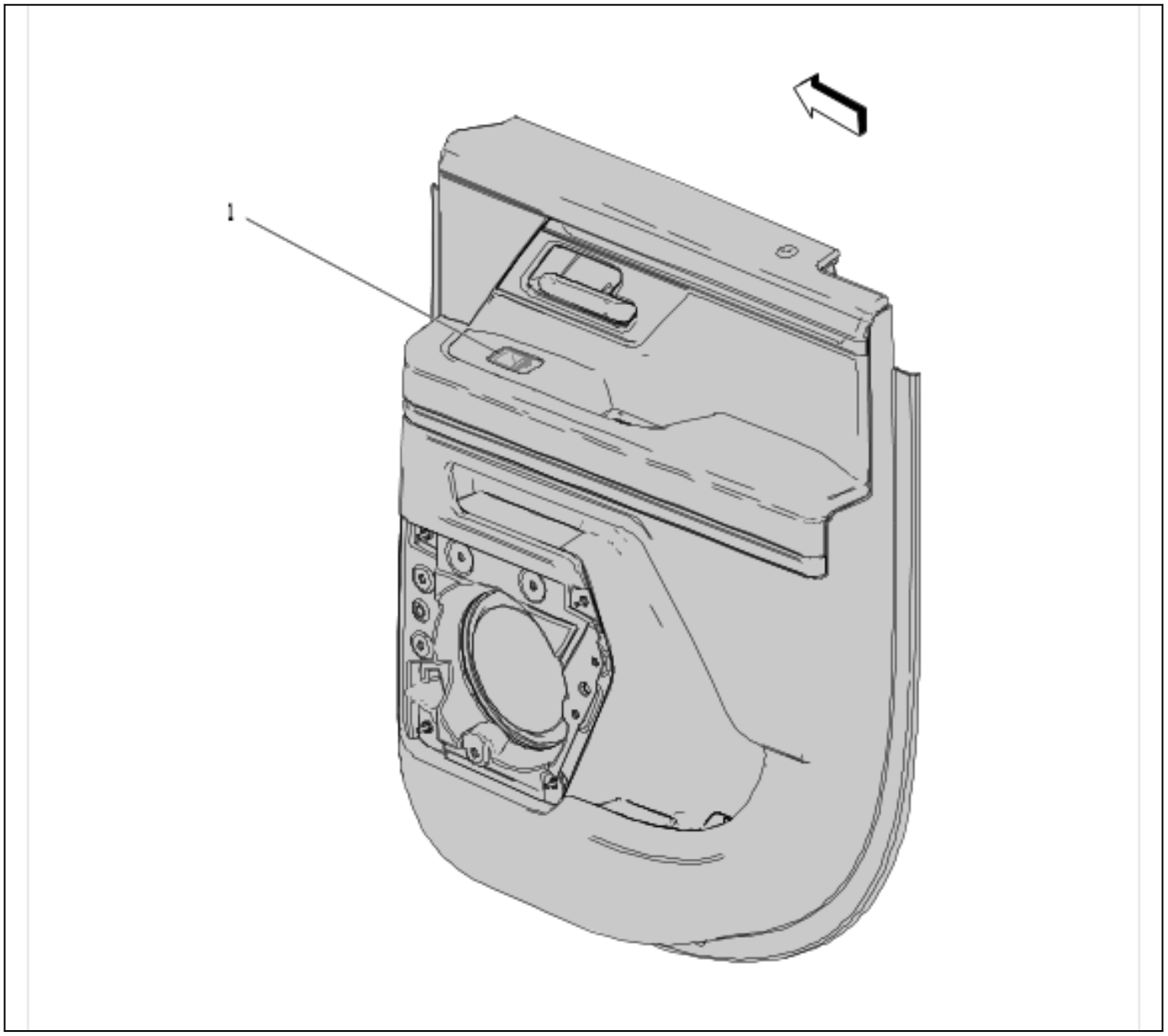
Right Rear Door Components - Double Cab



7166294

Items
(1) A24RR Rear Side Door Outside Handle - Right (4-Door)
(2) P19AM Radio Rear Side Door Speaker - Right (4-Door)
(3) M74RR Rear Side Door Window Regulator Motor - Right (4-Door)
(4) A23RR Rear Side Door Latch - Right (4-Door)
(5) B63RR Airbag Side Impact Rear Sensor - Right Door (4-Door)

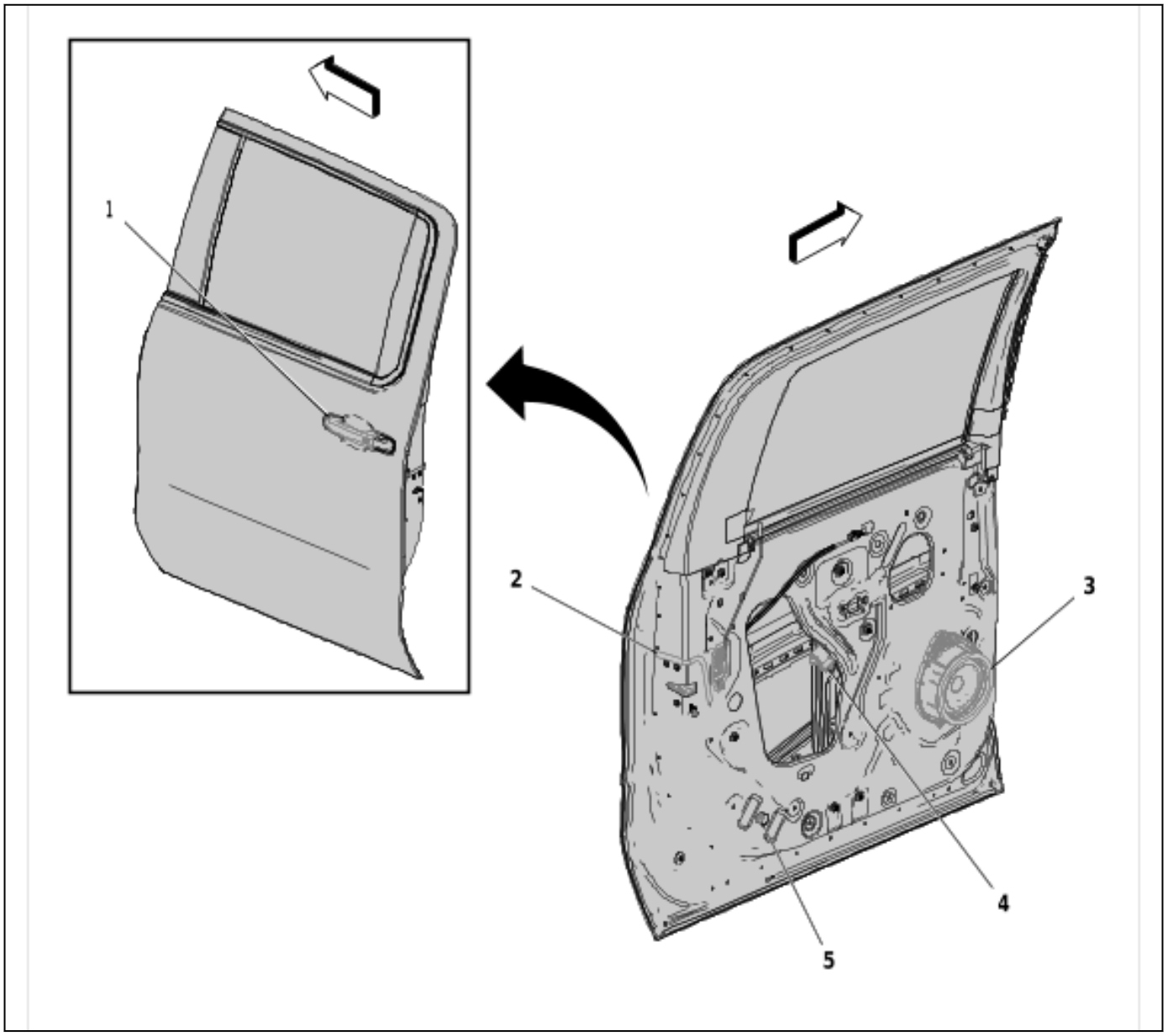
Right Rear Door Trim Components - Double Cab



7166295

Items
(1) S79RR Rear Side Door Window Switch - Right (4-Door)

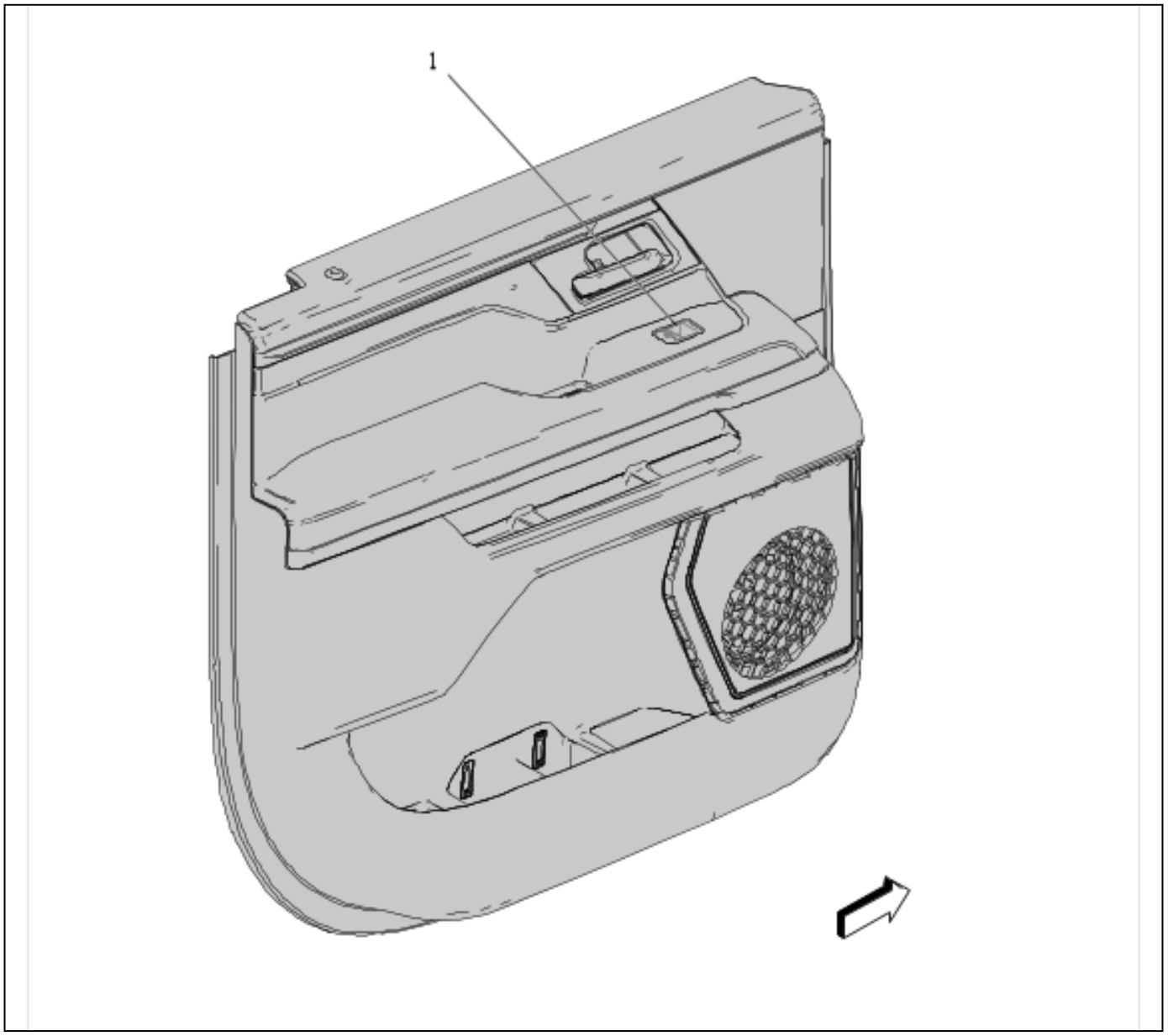
Left Rear Door Components - Crew Cab



7166296

Items
(1) A24LR Rear Side Door Outside Handle - Left (4-Door)
(2) A23LR Rear Side Door Latch - Left (4-Door)
(3) P19AL Radio Rear Side Door Speaker - Left (4-Door)
(4) M74LR Rear Side Door Window Regulator Motor - Left (4-Door)
(5) B63LR Airbag Side Impact Rear Sensor - Left Door (4-Door)

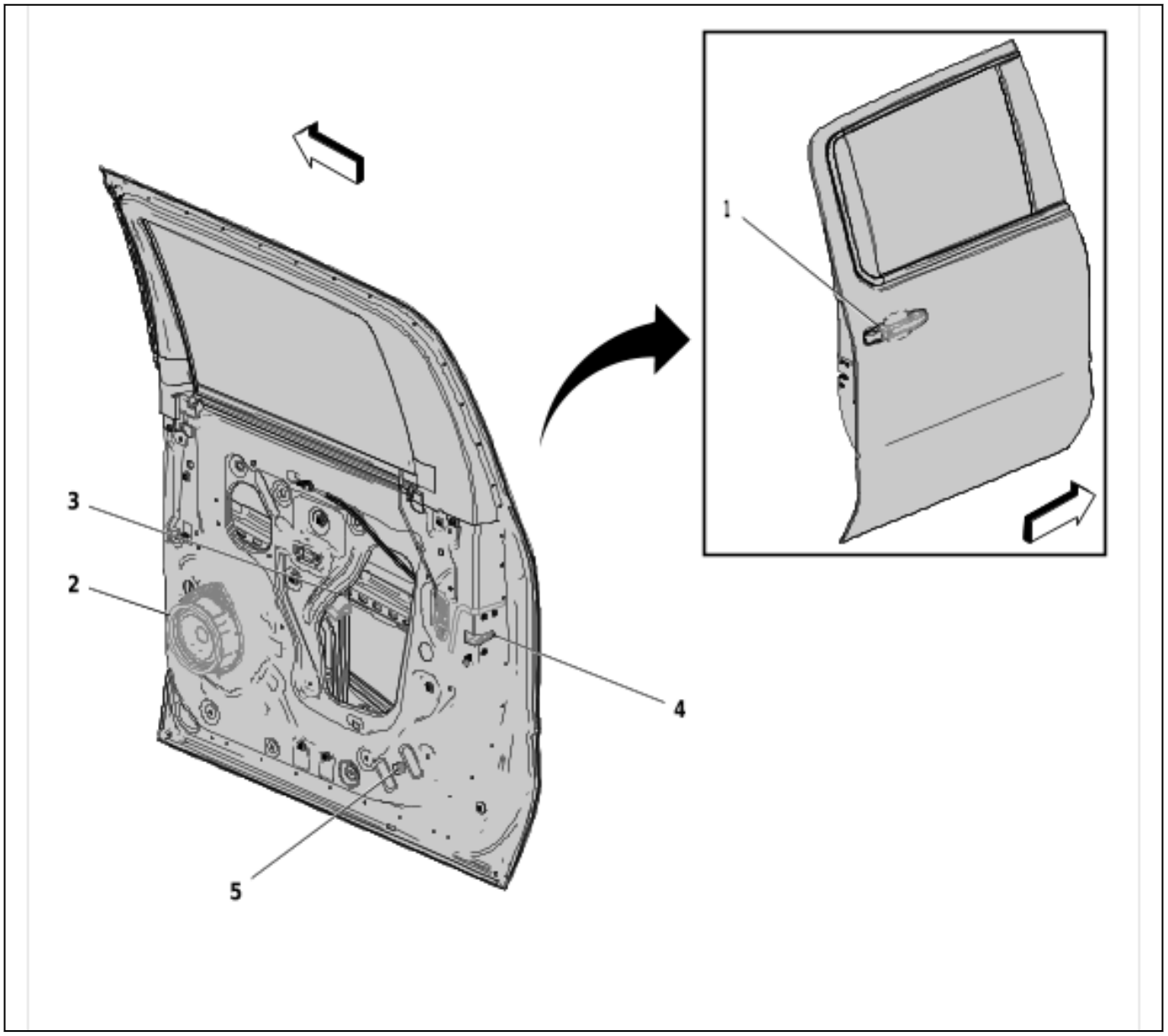
Left Rear Door Trim Components - Crew Cab



7166297

Items
(1) S79LR Rear Side Door Window Switch - Left (4-Door)

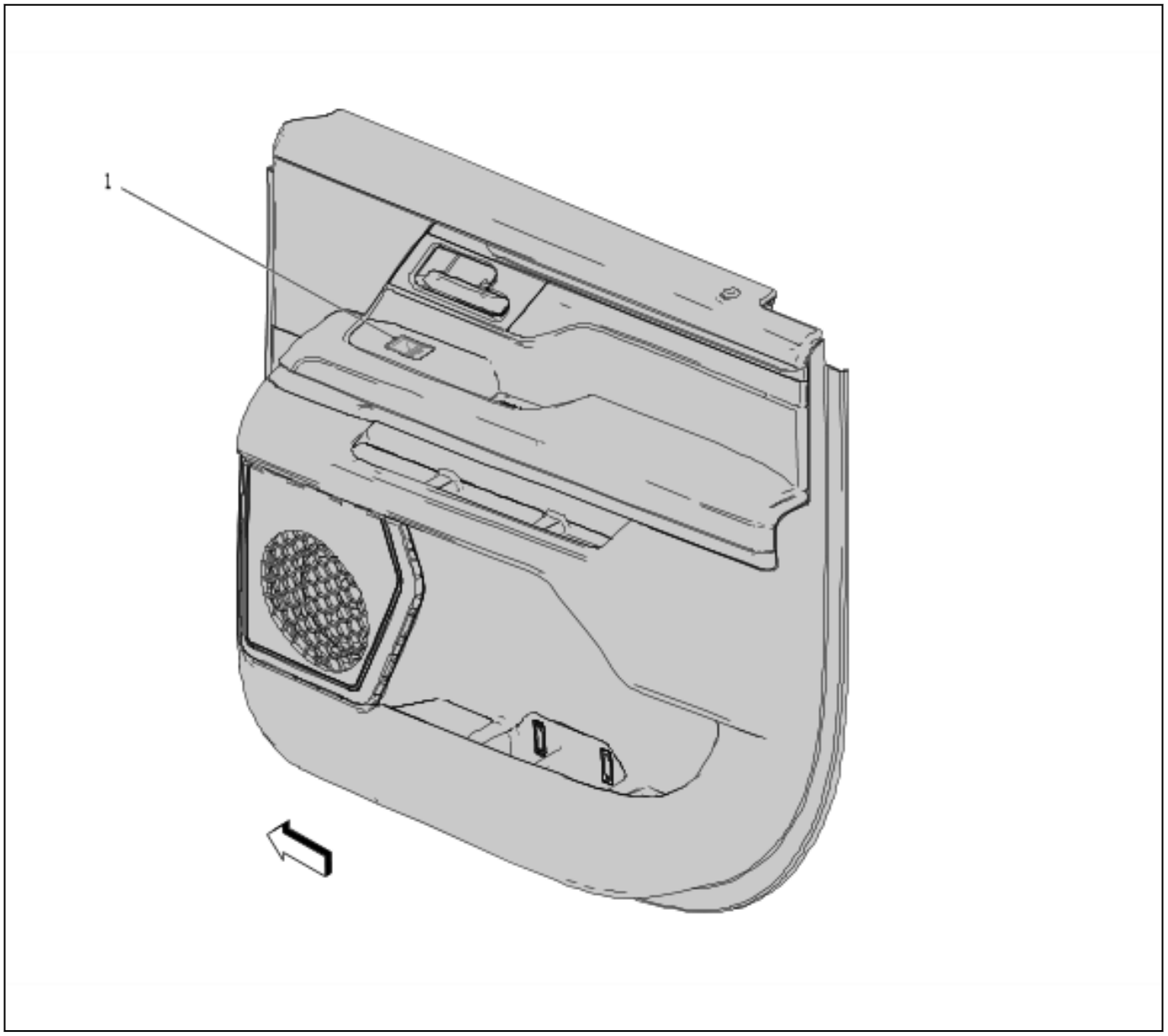
Right Rear Door Components - Crew Cab



7166298

Items
(1) A24RR Rear Side Door Outside Handle - Right (4-Door)
(2) P19AM Radio Rear Side Door Speaker - Right (4-Door)
(3) M74RR Rear Side Door Window Regulator Motor - Right (4-Door)
(4) A23RR Rear Side Door Latch - Right (4-Door)
(5) B63RR Airbag Side Impact Rear Sensor - Right Door (4-Door)

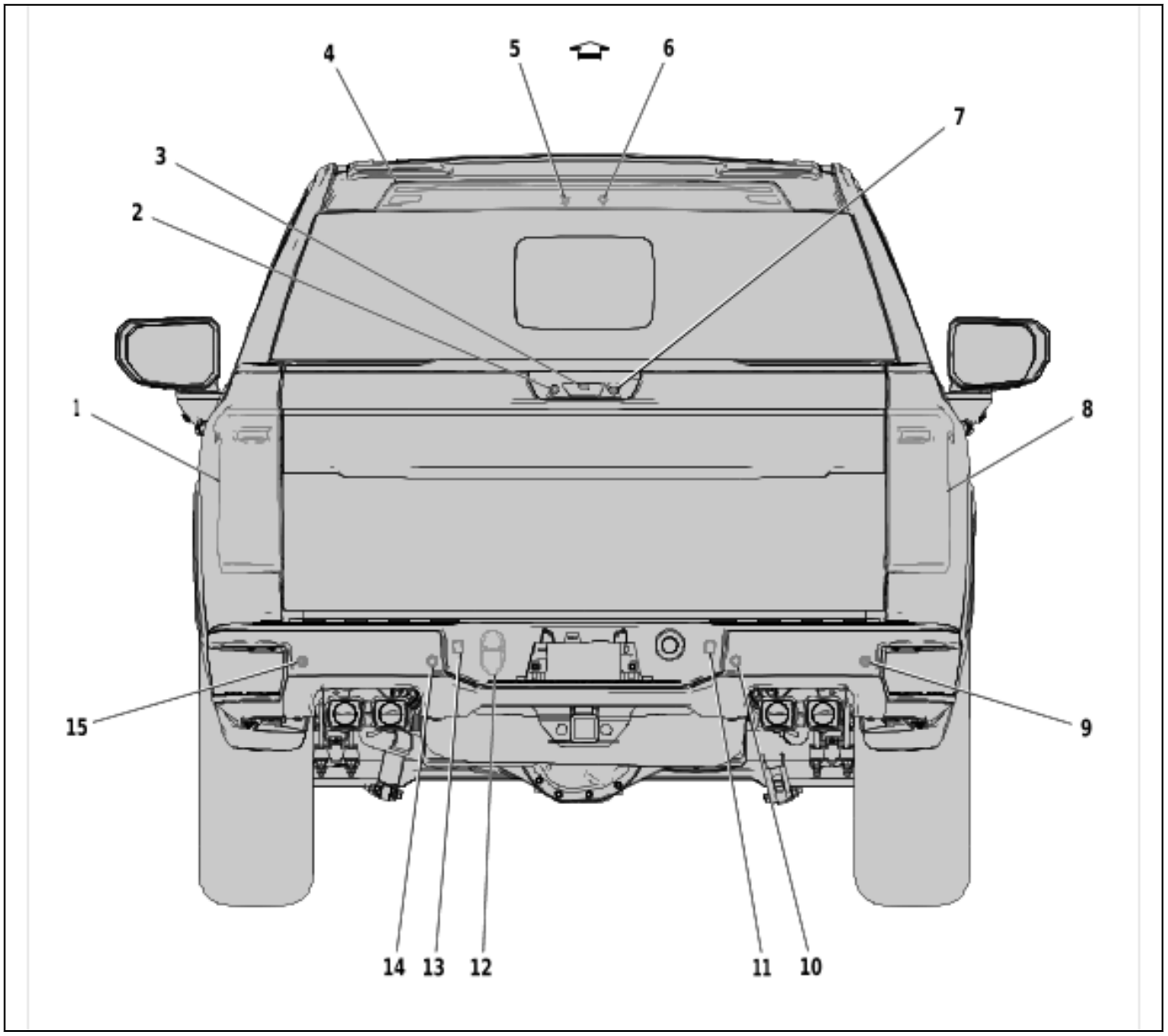
Right Rear Door Trim Components - Crew Cab



7166299

Items
(1) S79RR Rear Side Door Window Switch - Right (4-Door)

Rear of Vehicle Components

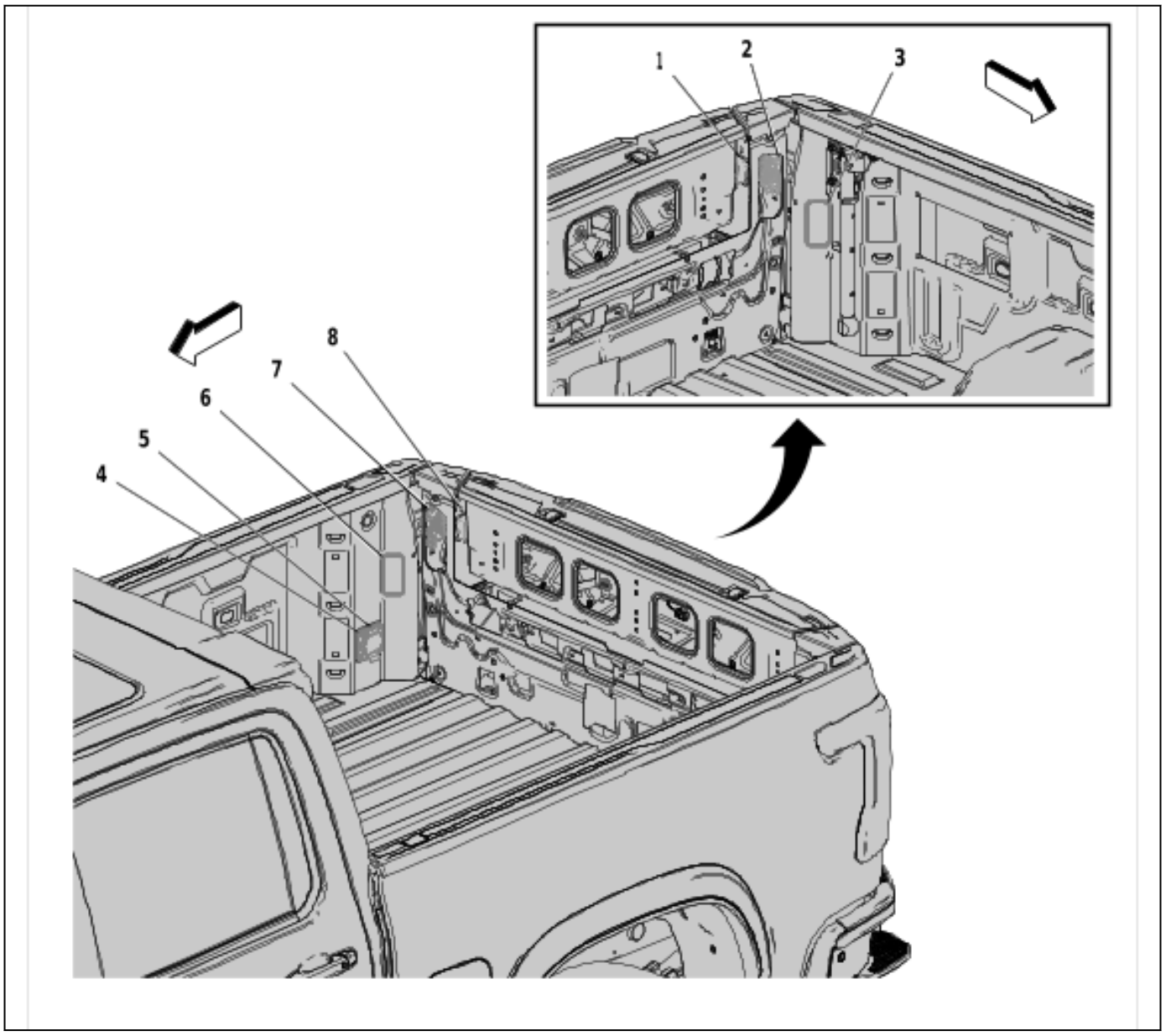


7155446

Items
(1) E42L Rear Body Structure Stop Lamp - Left
(2) B87 Rearview Driver Information Camera
(3) S159E Liftgate Exterior Release Switch - Endgate (QT5 / QT6)
(4) E6A High Mount Stop and Cargo Lamp
(5) B352 Video Display Inside Rearview Mirror Camera (DRZ)
(6) B87CA Auxiliary Rearview Camera - Cargo Area (UVN)
(7) E33THX Cargo Lamp - Rear Closure Auxiliary (QT5 / QT6)
(8) E42R Rear Body Structure Stop Lamp - Right
(9) B306HB Rear Parking Assist Alarm Outer Sensor - Right
(10) B306GB Rear Parking Assist Alarm Sensor - Right Middle

Items
(11) E7R Rear License Plate Lamp - Right
(12) X88B Tow Vehicle Electrical Receptacle
(13) E7L Rear License Plate Lamp - Left
(14) B306FB Rear Parking Assist Alarm Sensor - Left Middle
(15) B306EB Rear Parking Assist Alarm Outer Sensor - Left

Pickup Box Components

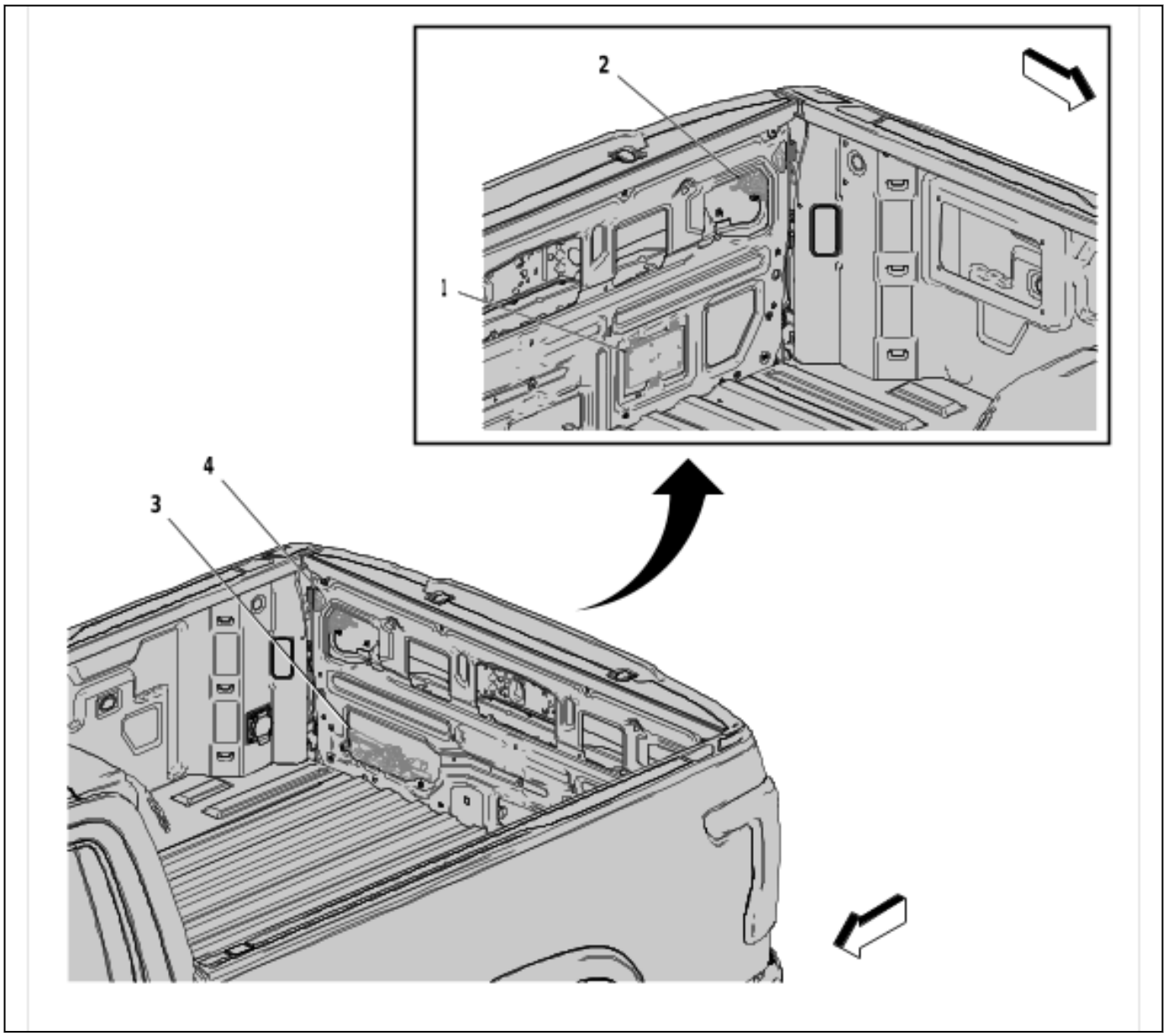


7155447

Items
(1) A100L Pickup Box Auxiliary Endgate Latch - Left (QK2)
(2) A99L Pickup Box Endgate Latch - Left (QT5)
(3) E33L Cargo Lamp - Left (UF2)
(4) X81AP Pickup Box Accessory Power Receptacle - 110V AC (KC9)

Items
(5) X81BP Pickup Box Accessory Power Receptacle - 220V AC (KCA)
(6) E33R Cargo Lamp - Right (UF2)
(7) A99R Pickup Box Endgate Latch - Right (QT5)
(8) A100R Pickup Box Auxiliary Endgate Latch - Right (QK2)

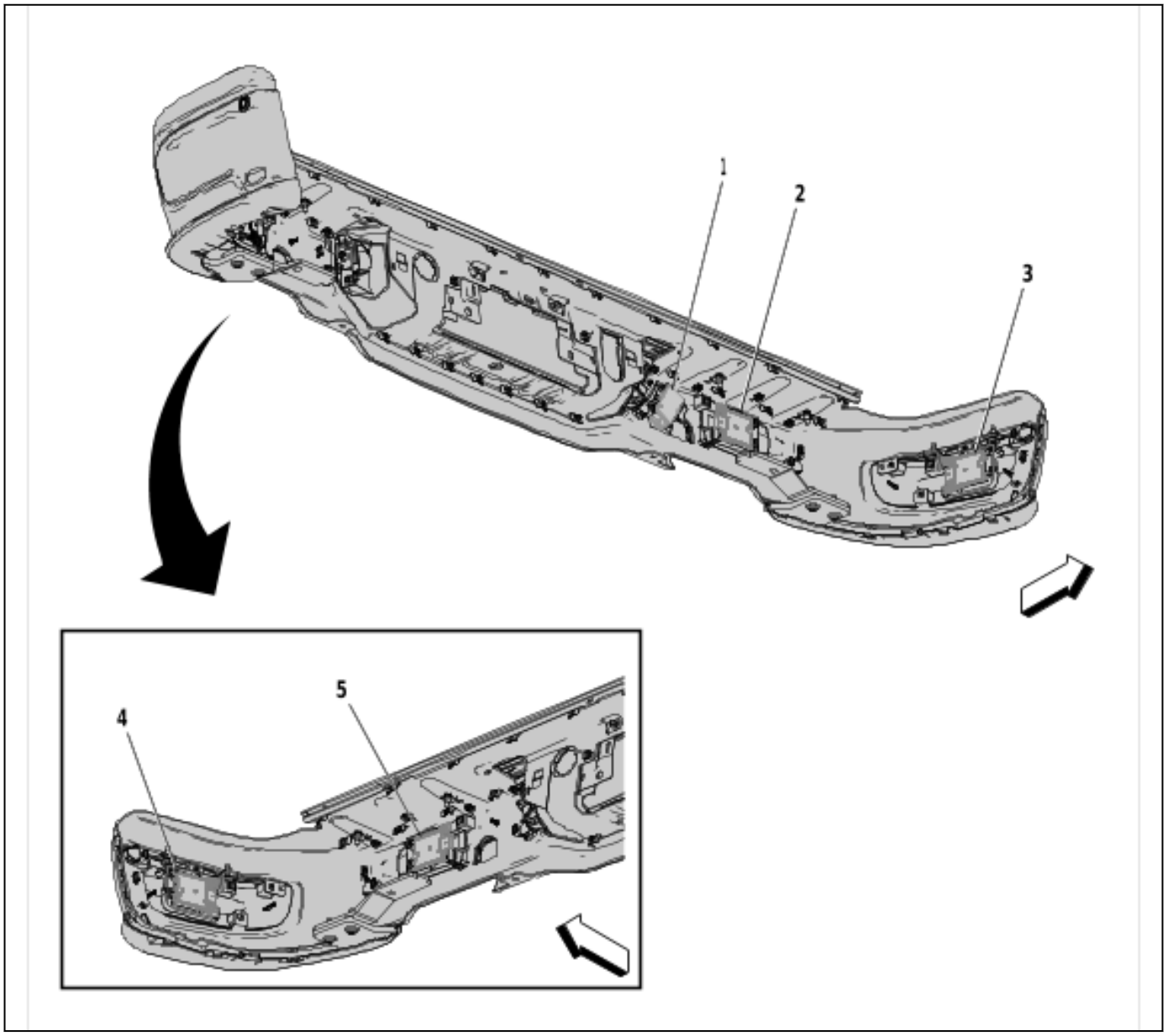
Tailgate Components (QT6)



7155448

Items
(1) K194 Rear Gate Module (QT6)
(2) M151L Pickup Box Endgate Cinch Latch Actuator - Left (QT6)
(3) M125 Pickup Box Endgate Power Assist Actuator (QT6)
(4) M151R Pickup Box Endgate Cinch Latch Actuator - Right (QT6)

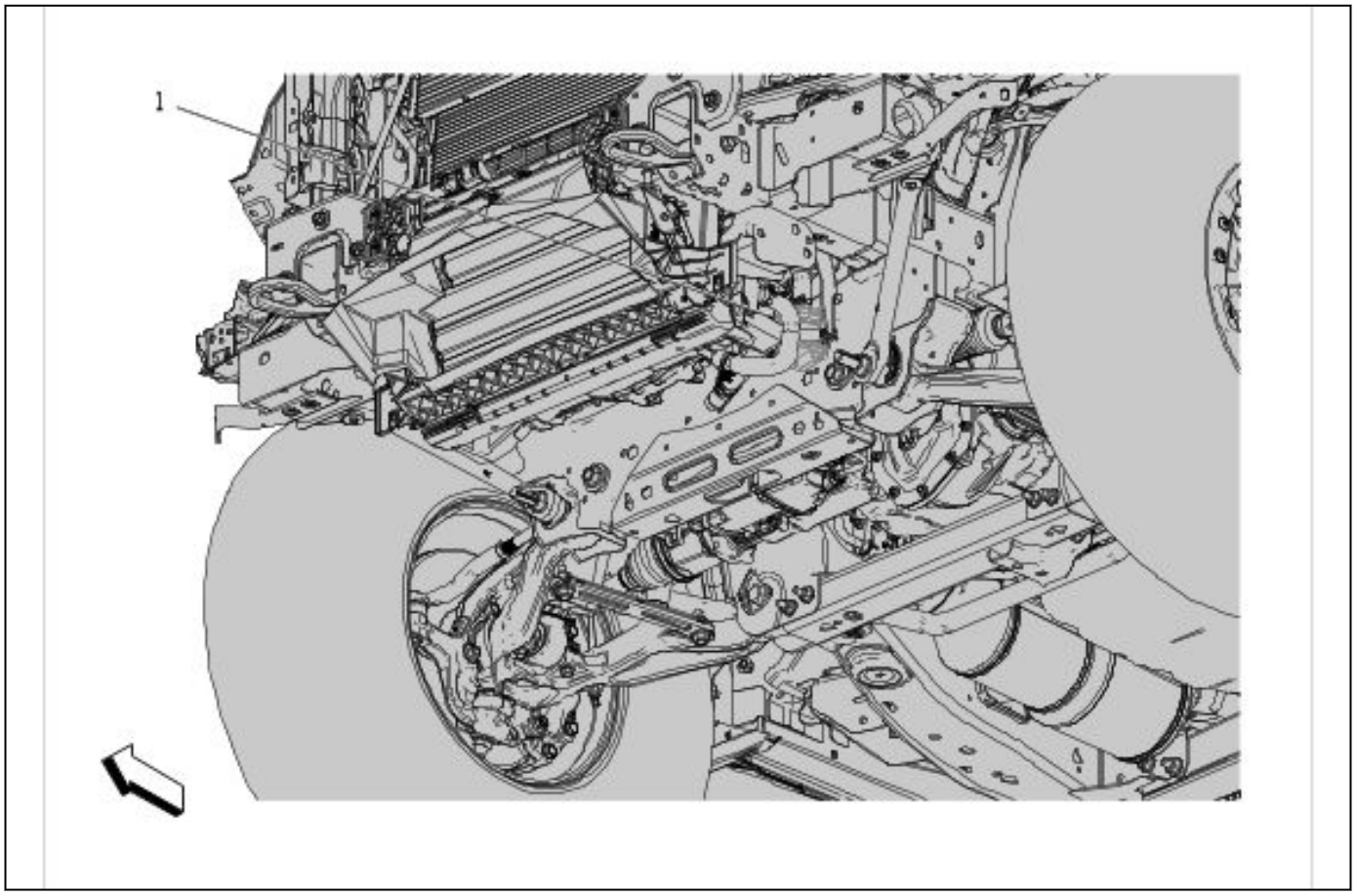
Behind Rear Fascia Components



7155449

Items
(1) B342F UHF Low Energy Remote Control Access Sensor Transceiver 6 (BOK / BOR / BOY)
(2) B233LR Short Range Radar Rear Sensor - Left
(3) B233SL Short Range Radar Rear Side Sensor - Left
(4) B233SR Short Range Radar Rear Side Sensor - Right
(5) B233RR Short Range Radar Rear Sensor - Right

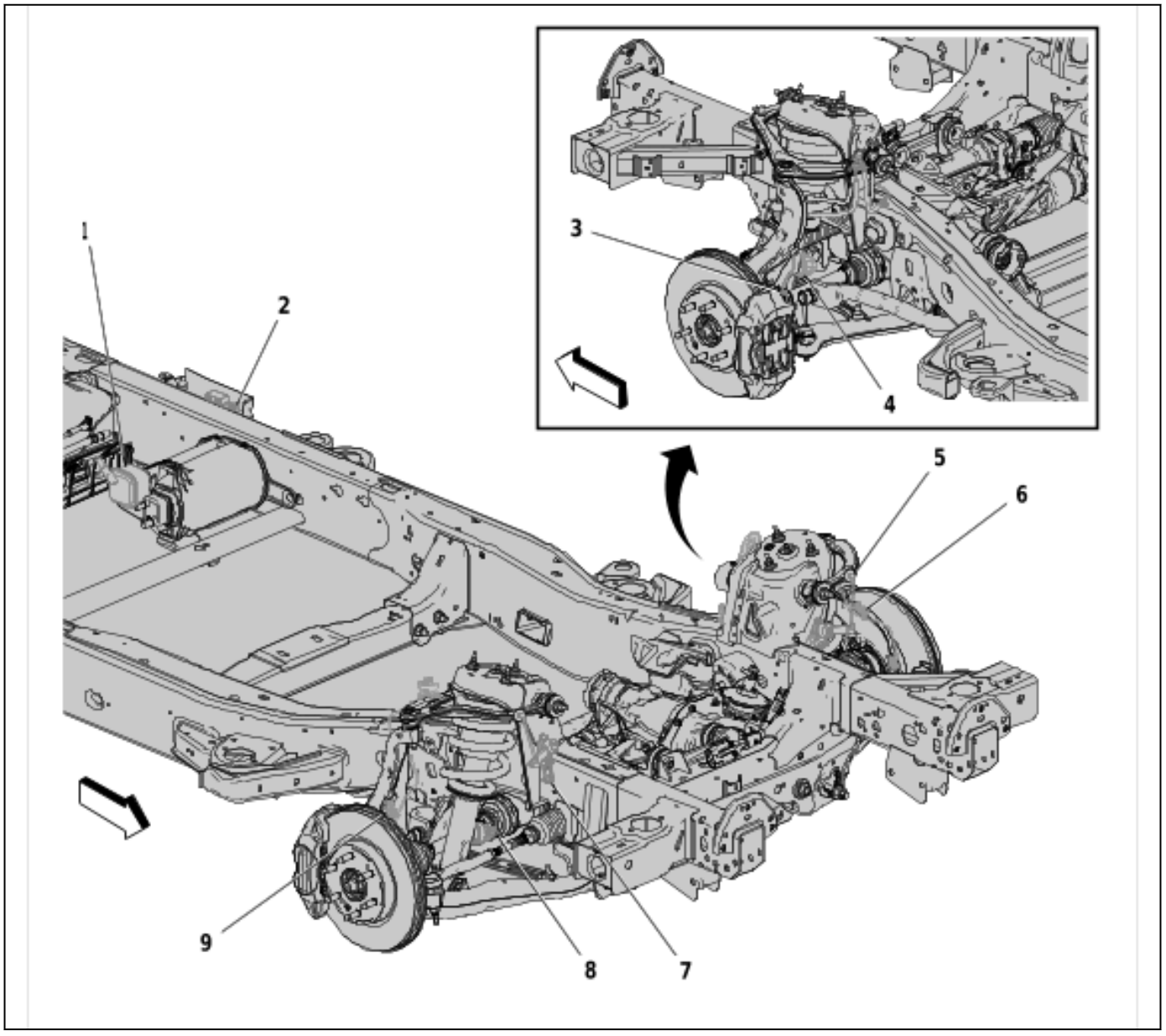
Charge Air Cooler Coolant Pump (LZ0)



7166364

Items
(1) M10 Charge Air Cooler Coolant Pump (LZ0)

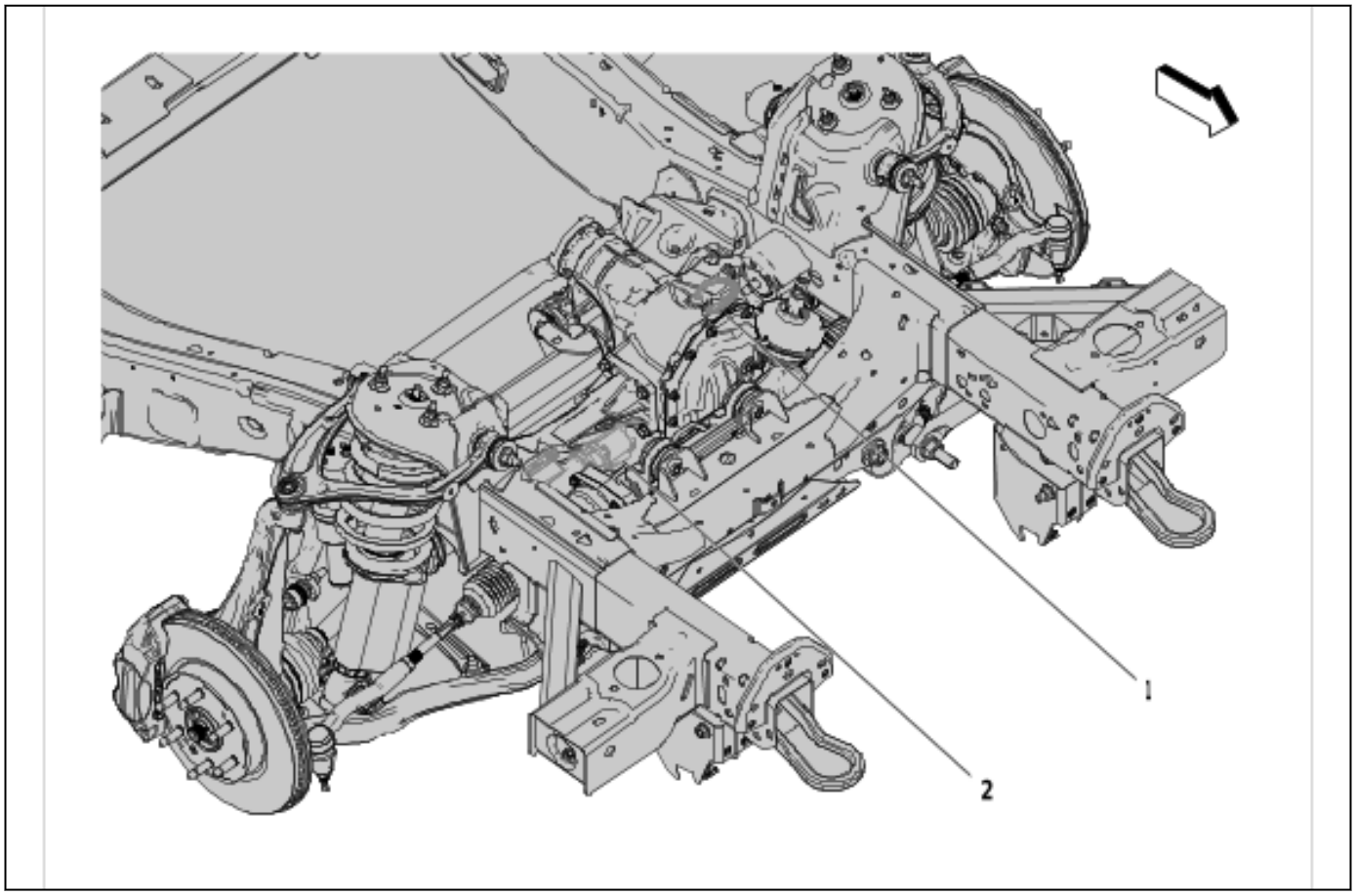
Frame Components - Front



7175720

Items
(1) Q13 Evaporative Emission Canister Vent Solenoid Valve (FJW)
(2) K19 Suspension Control Module (Z45)
(3) B172LF Front Disc Brake Pad Wear Sensor - Left (JBP)
(4) Q37LFB Front Shock Absorber Actuator - Left (Z45)
(5) B152LF Front Suspension Automatic Forward Lighting Position Sensor - Left (Z45)
(6) B5LF Front Wheel Speed Sensor - Left
(7) B11RF Front Suspension 4 Corner Leveling System Position Sensor - Right (Z45)
(8) Q37RFB Front Shock Absorber Actuator - Right (Z45)
(9) B5RF Front Wheel Speed Sensor - Right

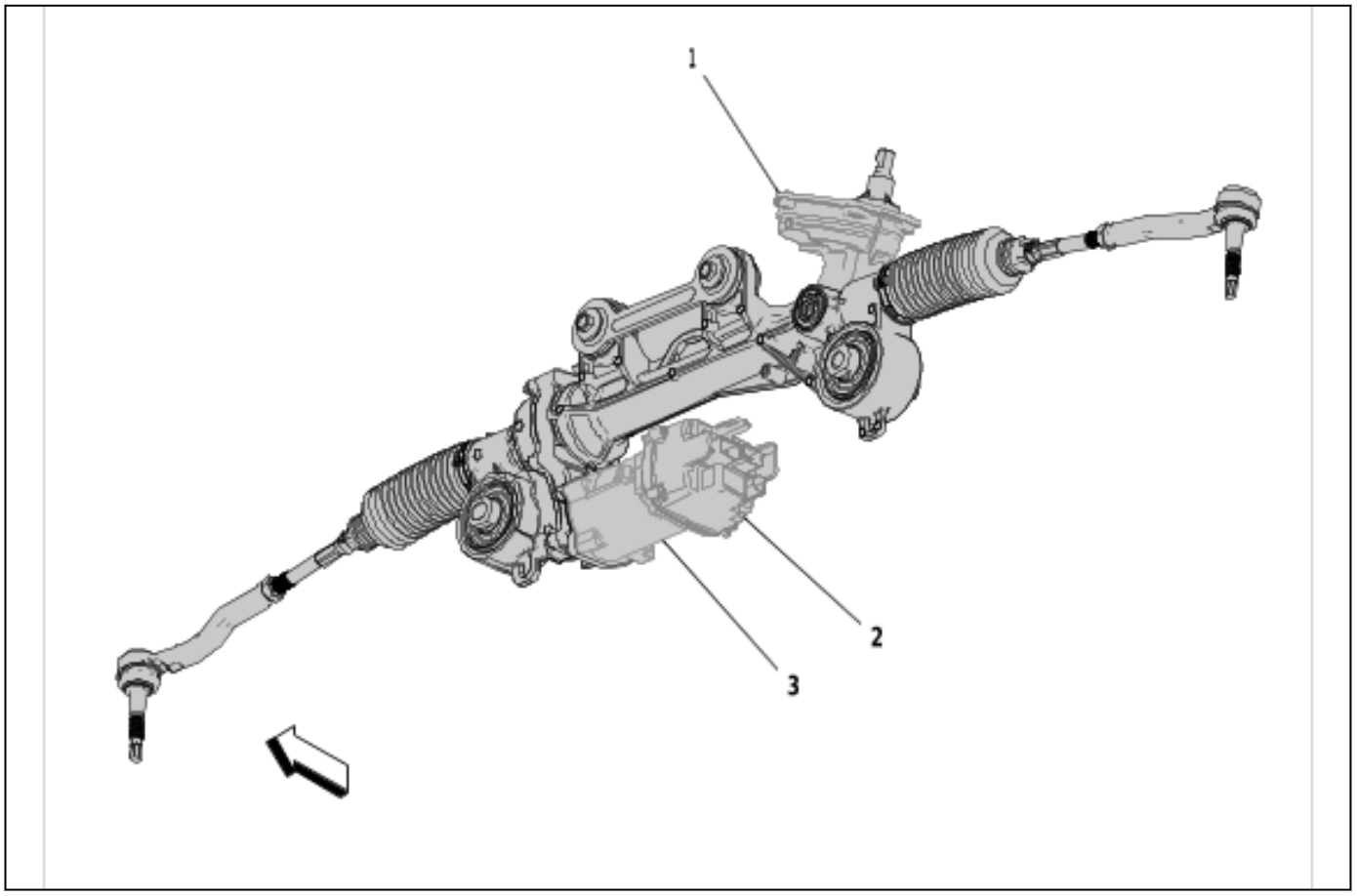
Front Axle Components (F48)



7166365

Items
(1) Q9F Differential Locking Actuator - Front (G93)
(2) M26 Front Drive Axle Actuator (F48)

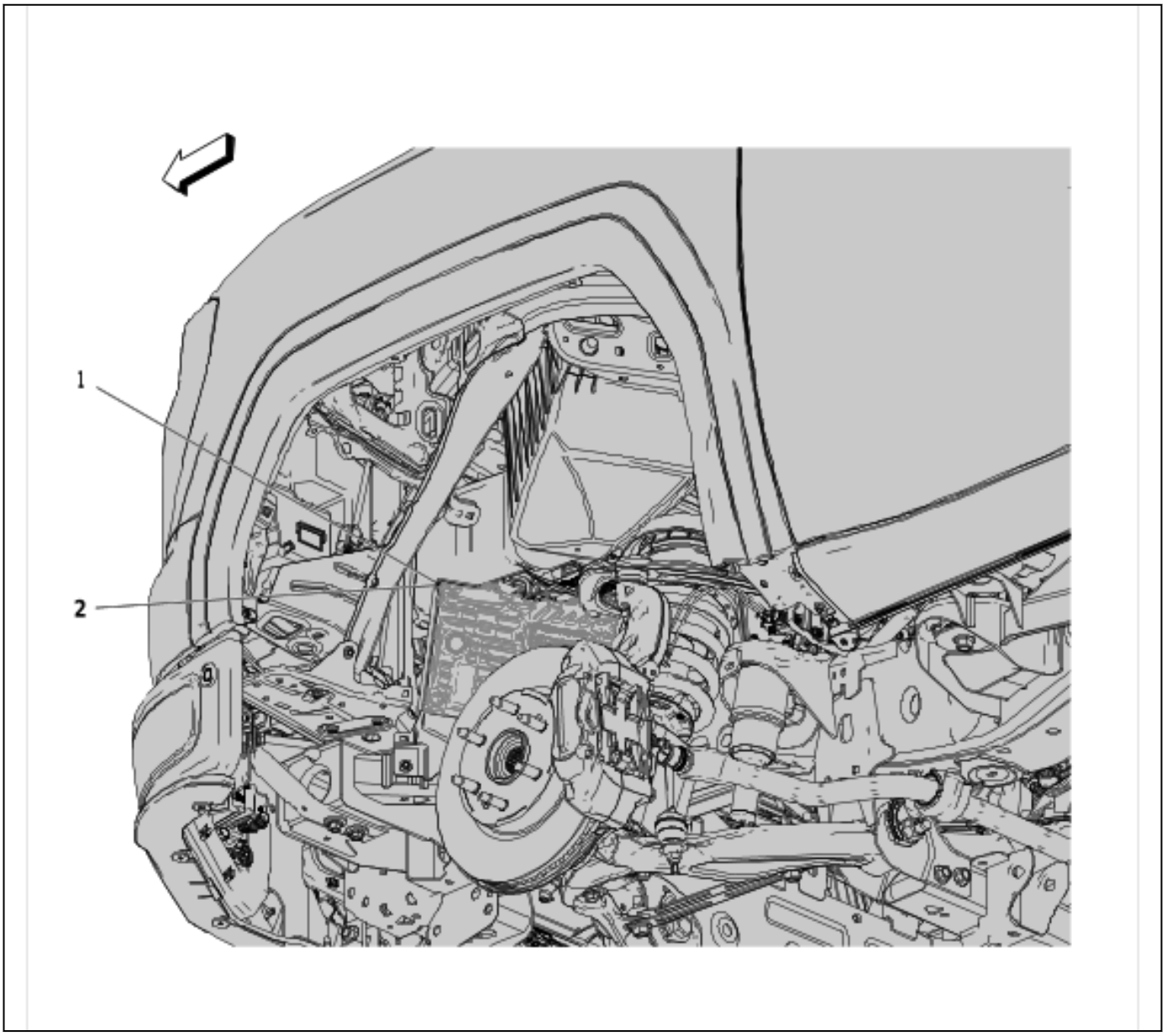
Steering Gear Components



7166366

Items
(1) B137B Power Steering Shaft Torque/Position Sensor
(2) K43 Power Steering Control Module
(3) M38 Power Steering Assist Motor

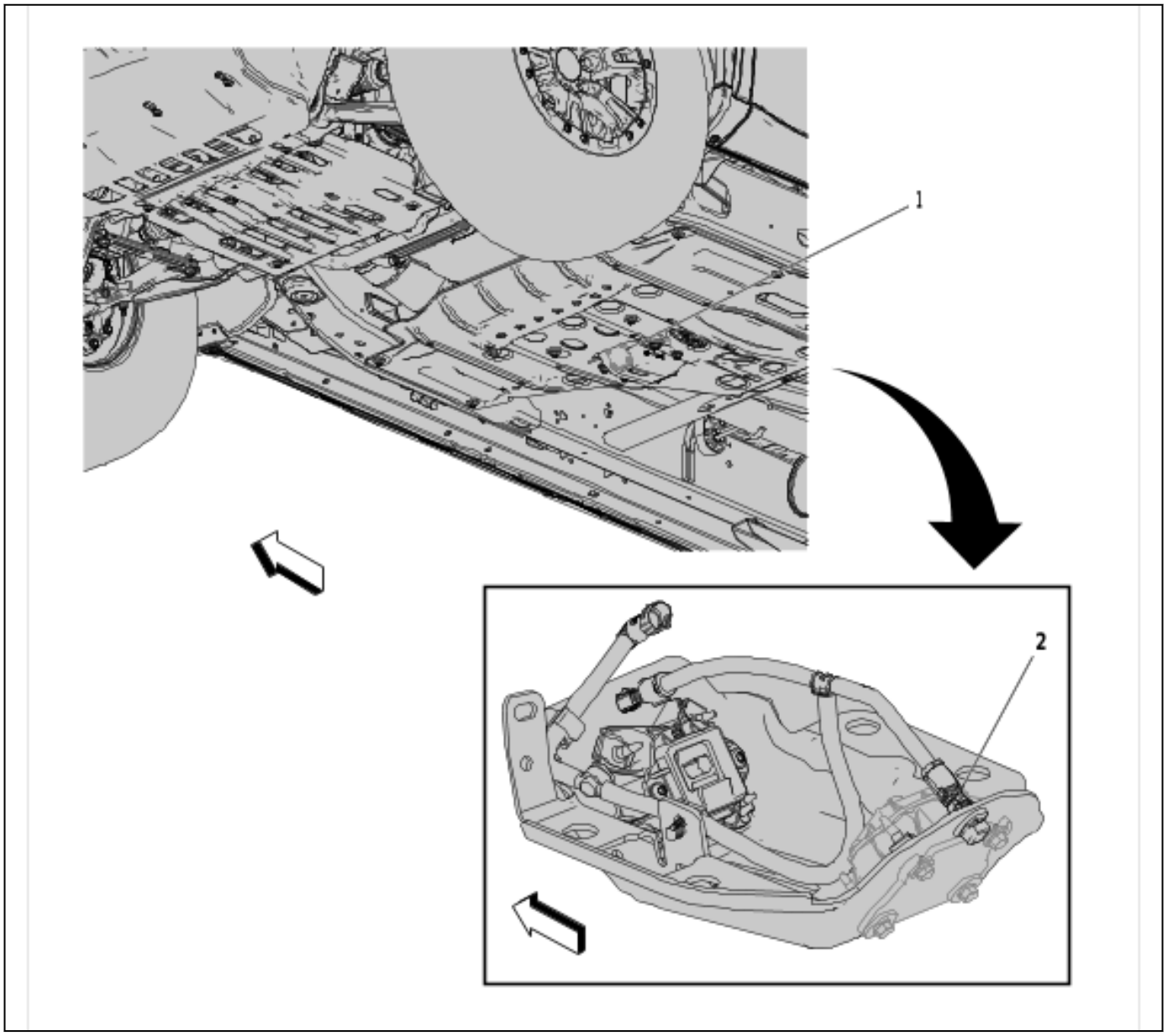
Left Front Wheelhouse Components



7198989

Items
(1) K45 Powertrain Control Module (L4B)
(2) K20 Engine Control Module (L76 / L78 / LZ0)

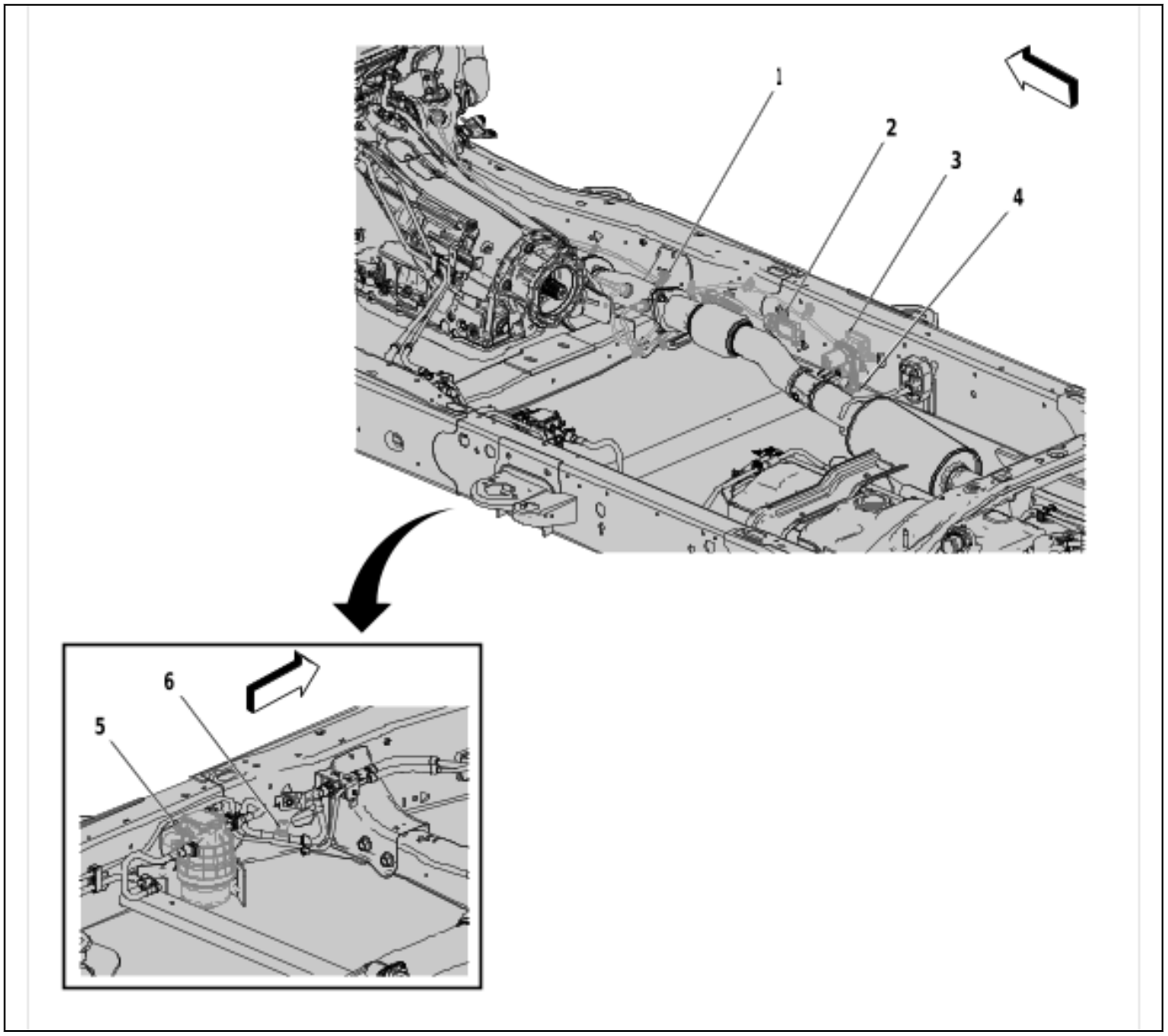
Underbody Cameras (UXA)



7198482

Items
(1) B385 Front View Underbody Camera (UXA)
(2) B384 Rearview Underbody Camera (UXA)

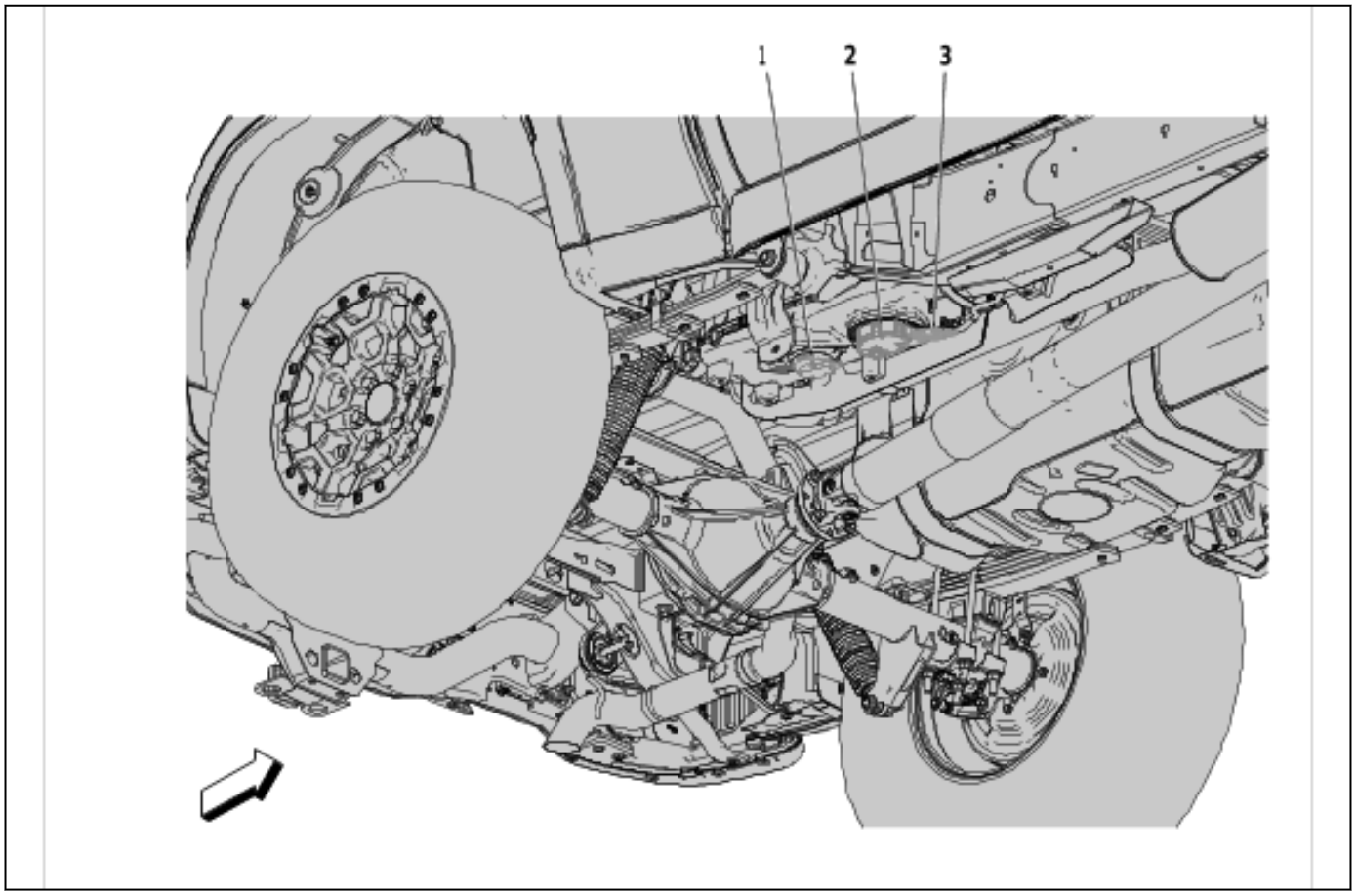
Frame Components - Middle (LZ0)



7175721

Items
(1) B195B Nitrogen Oxides Sensor 2 (LZ0)
(2) B195C Nitrogen Oxides Sensor 3 (LZ0)
(3) B136 Exhaust Particulate Matter Sensor (LZ0)
(4) M122 Exhaust Pressure Regulator Valve (LZ0)
(5) R29 Fuel Filter (LZ0)
(6) B47 Fuel Pressure Sensor

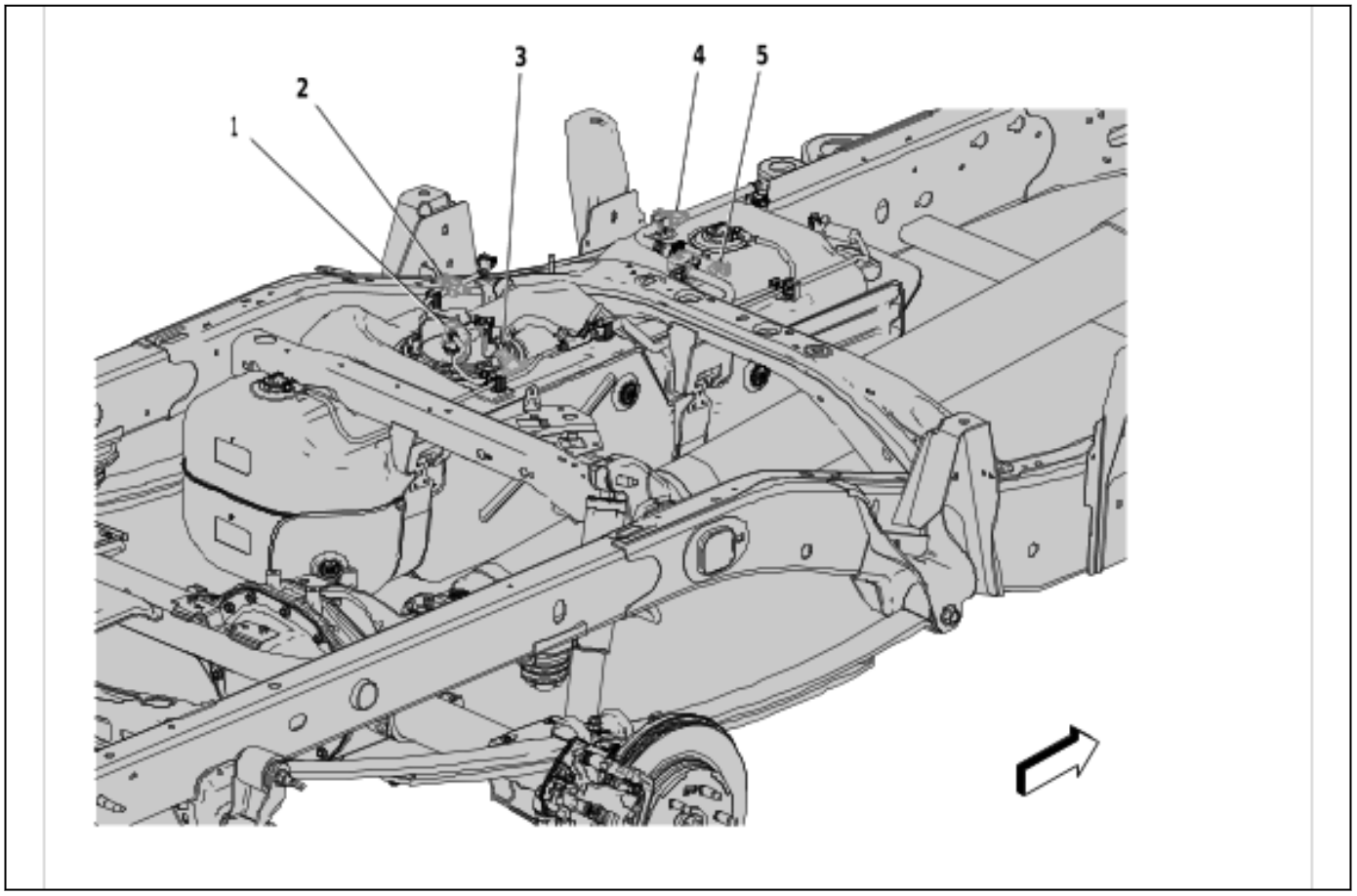
Reductant Tank Components (LZ0)



7166367

Items
(1) B212 Reductant Tank Fluid Sensor (LZ0)
(2) A38 Reductant Tank Fluid Supply Pump Module (LZ0)
(3) E52 Reductant Heater 2 - Injector Supply Pipe (LZ0)

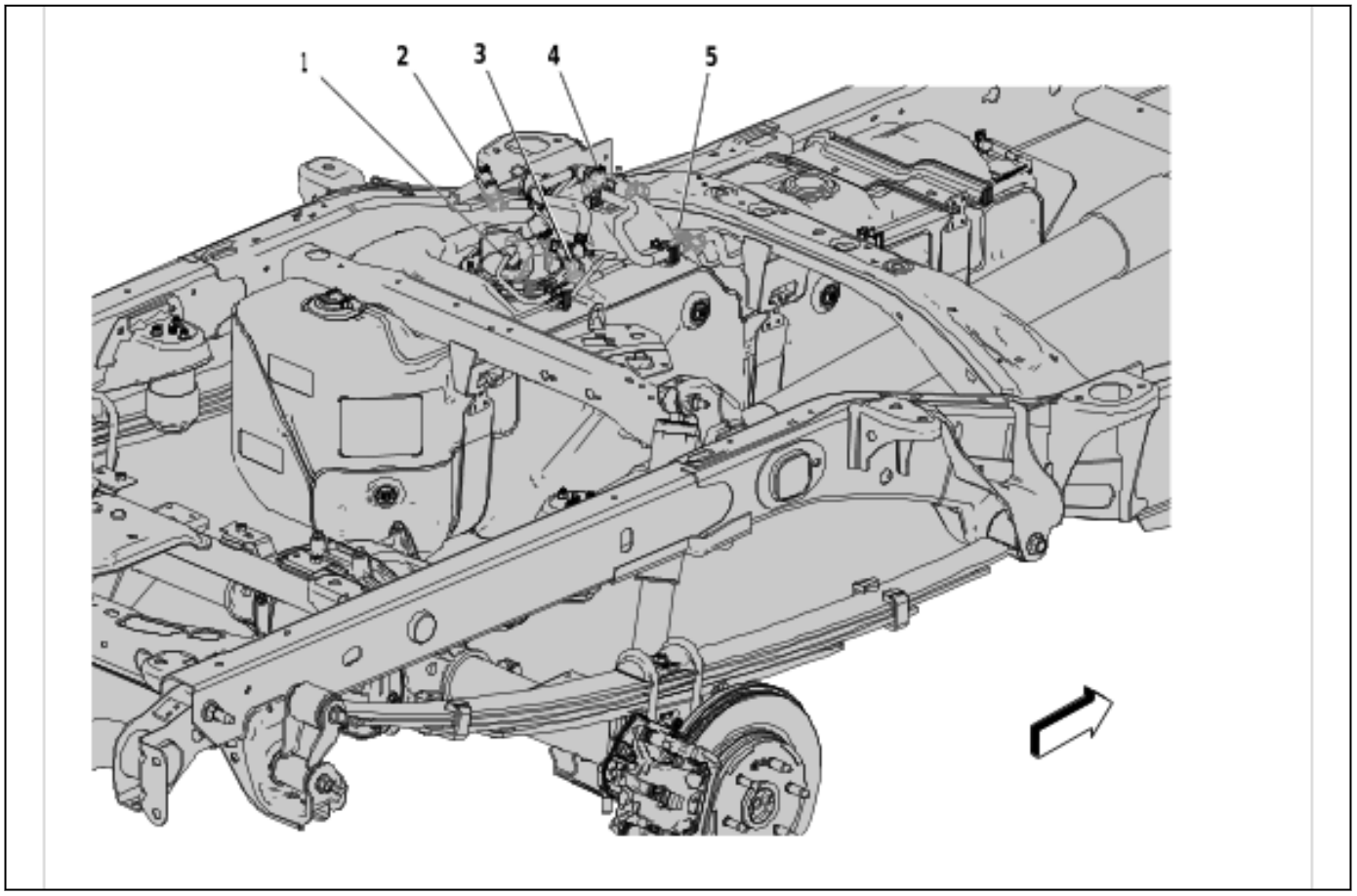
Fuel Tank Components - 2-Door



7175722

Items
(1) A7 Fuel Tank Fuel Pump Module
(2) B150 Fuel Tank Pressure Sensor (FJW)
(3) B47 Fuel Pressure Sensor
(4) B394 Evaporative Emission Canister Purge System Pressure Sensor (FJW)
(5) Q64 Evaporative Emission System Switching Valve (FJW)

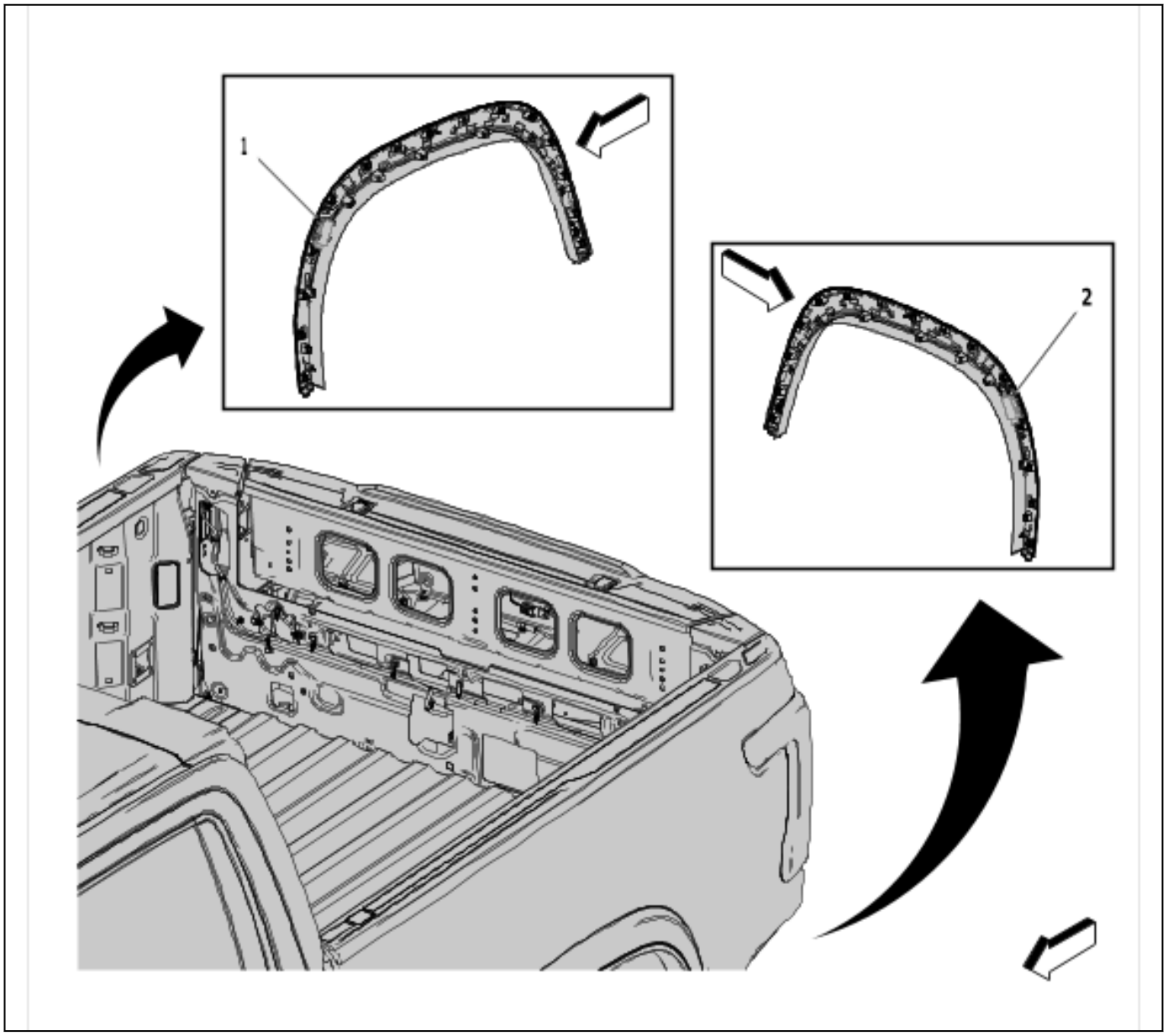
Fuel Tank Components - 4-Door



7175723

Items
(1) A7 Fuel Tank Fuel Pump Module
(2) B150 Fuel Tank Pressure Sensor (FJW)
(3) B47 Fuel Pressure Sensor
(4) Q64 Evaporative Emission System Switching Valve (FJW)
(5) B394 Evaporative Emission Canister Purge System Pressure Sensor (FJW)

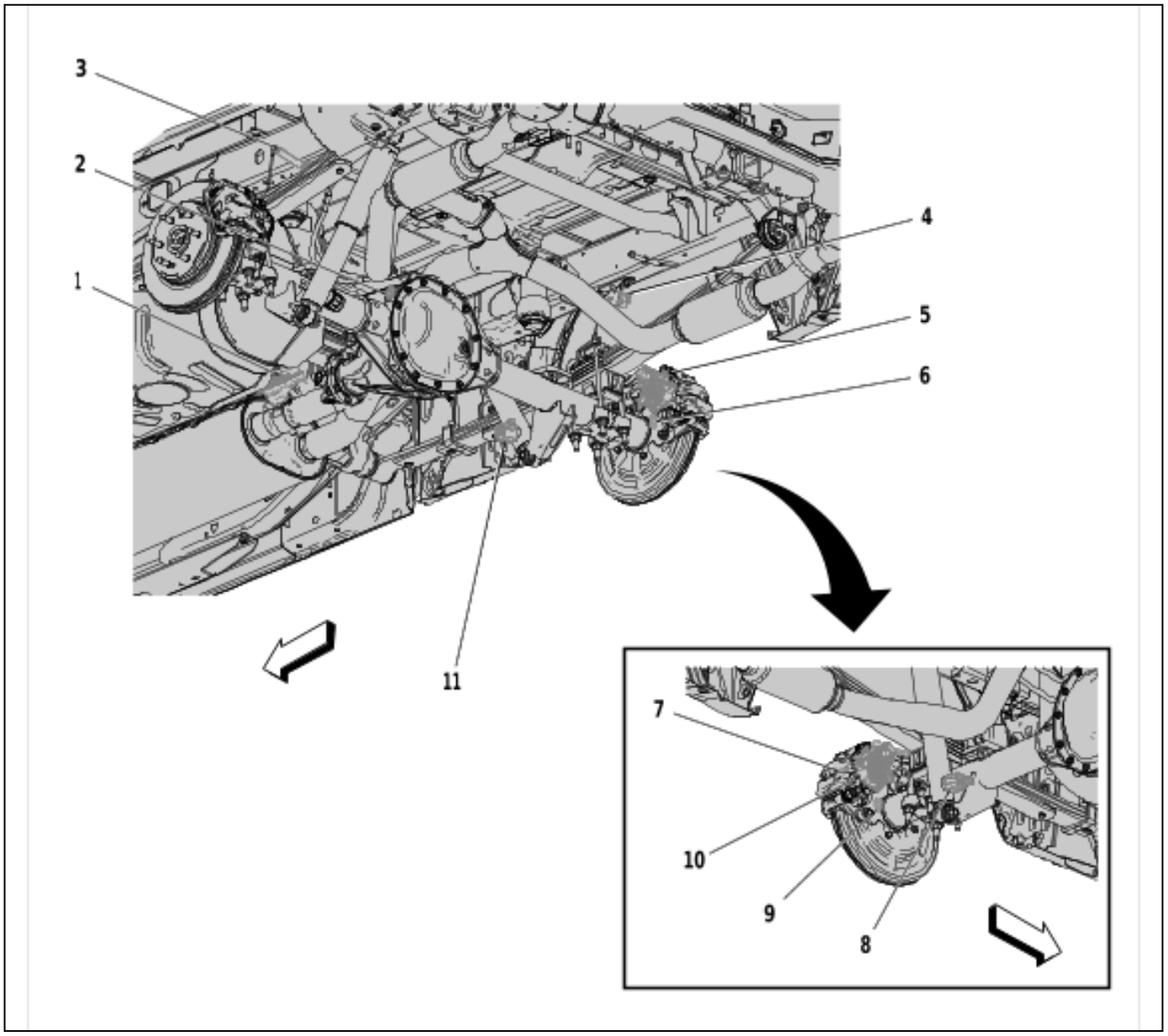
Rear Fender Flare Components (BOK / BOR / BOY)



7155450

Items
(1) B342B UHF Low Energy Remote Control Access Sensor Transceiver 2 (BOK / BOR / BOY)
(2) B342D UHF Low Energy Remote Control Access Sensor Transceiver 4 (BOK / BOR / BOY)

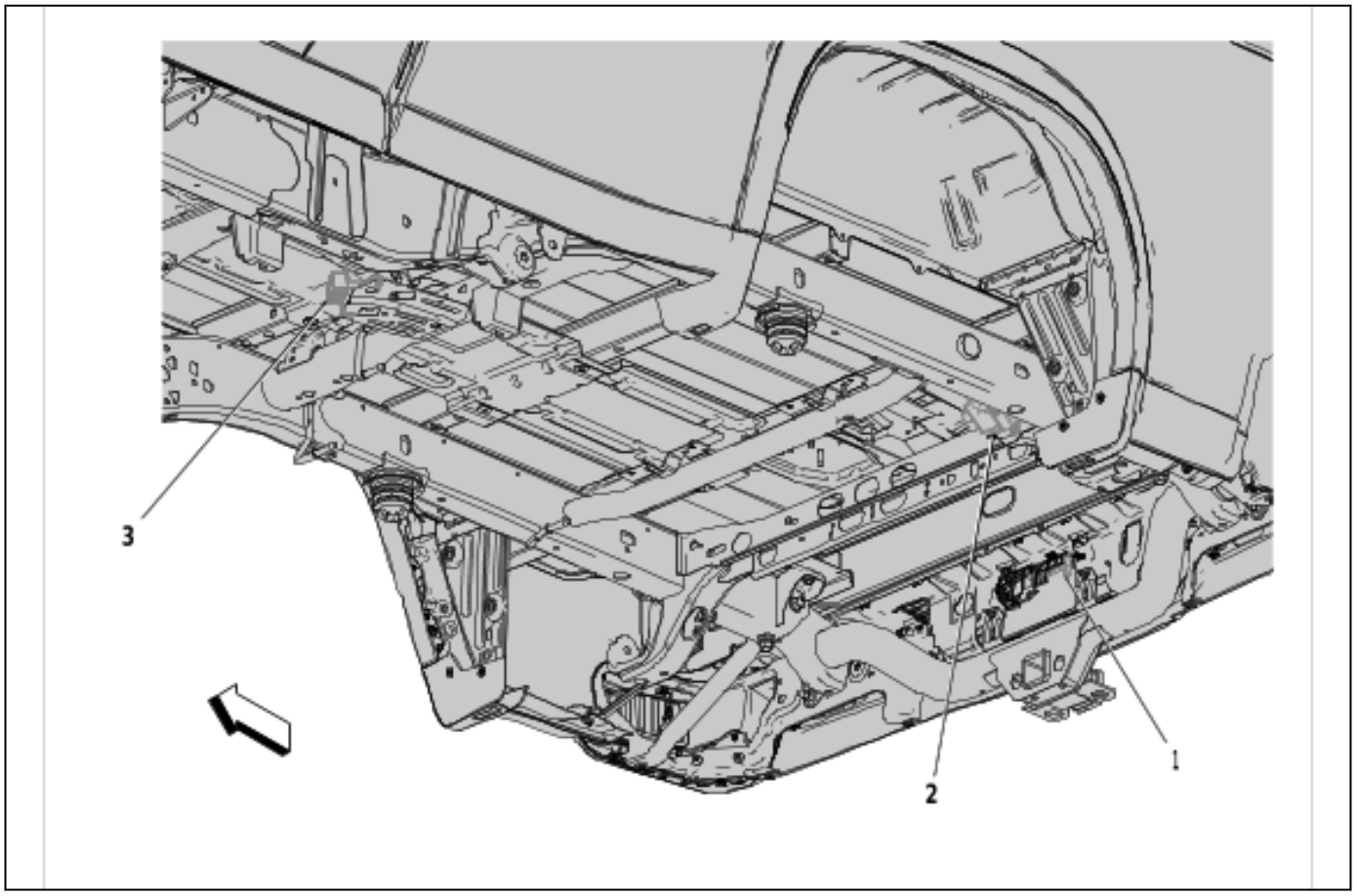
Rear Axle Components



7175724

Items
(1) M106 Exhaust Control Valve Actuator (NPP)
(2) Q9R Differential Locking Actuator - Rear (G94)
(3) B152R Rear Suspension Automatic Forward Lighting Leveling Position Sensor (Z45)
(4) B11RR Rear Suspension 2 or 4 Corner Air Leveling Position Sensor - Right (Z45)
(5) M104R Parking Brake Actuator - Right
(6) B5RR Rear Wheel Speed Sensor - Right
(7) B172LR Rear Disc Brake Pad Wear Sensor - Left (JBP)
(8) Q37LRB Rear Shock Absorber Actuator - Left (Z45)
(9) B5LR Rear Wheel Speed Sensor - Left
(10) M104L Parking Brake Actuator - Left
(11) Q37RRB Rear Shock Absorber Actuator - Right (Z45)

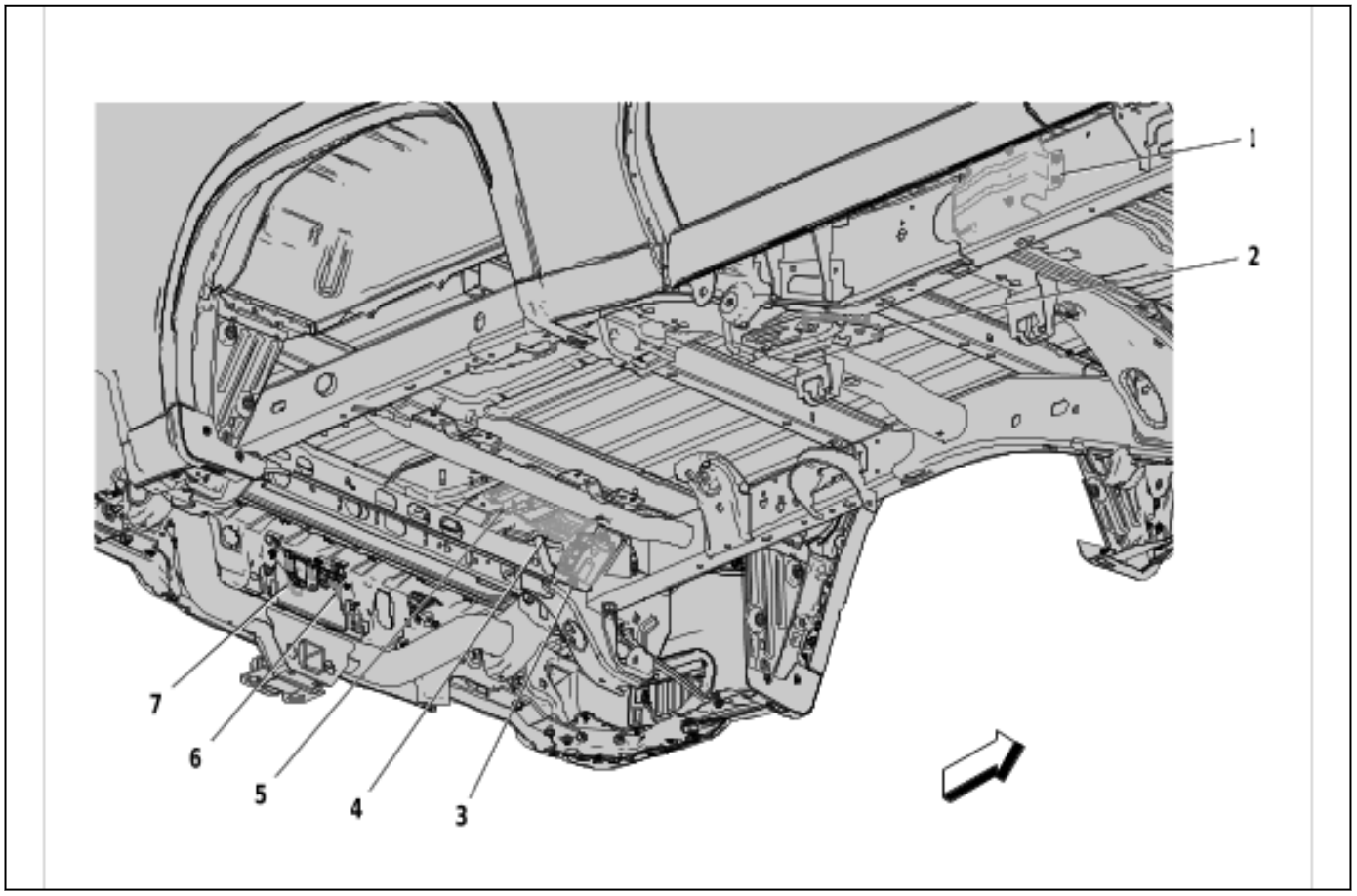
Frame Components - Rear - 2-Door



7175725

Items
(1) T10G Low Frequency Rear Bumper Antenna (ATH)
(2) K67 Trailer Brake Control Module
(3) K111 Fuel Pump Power Control Module

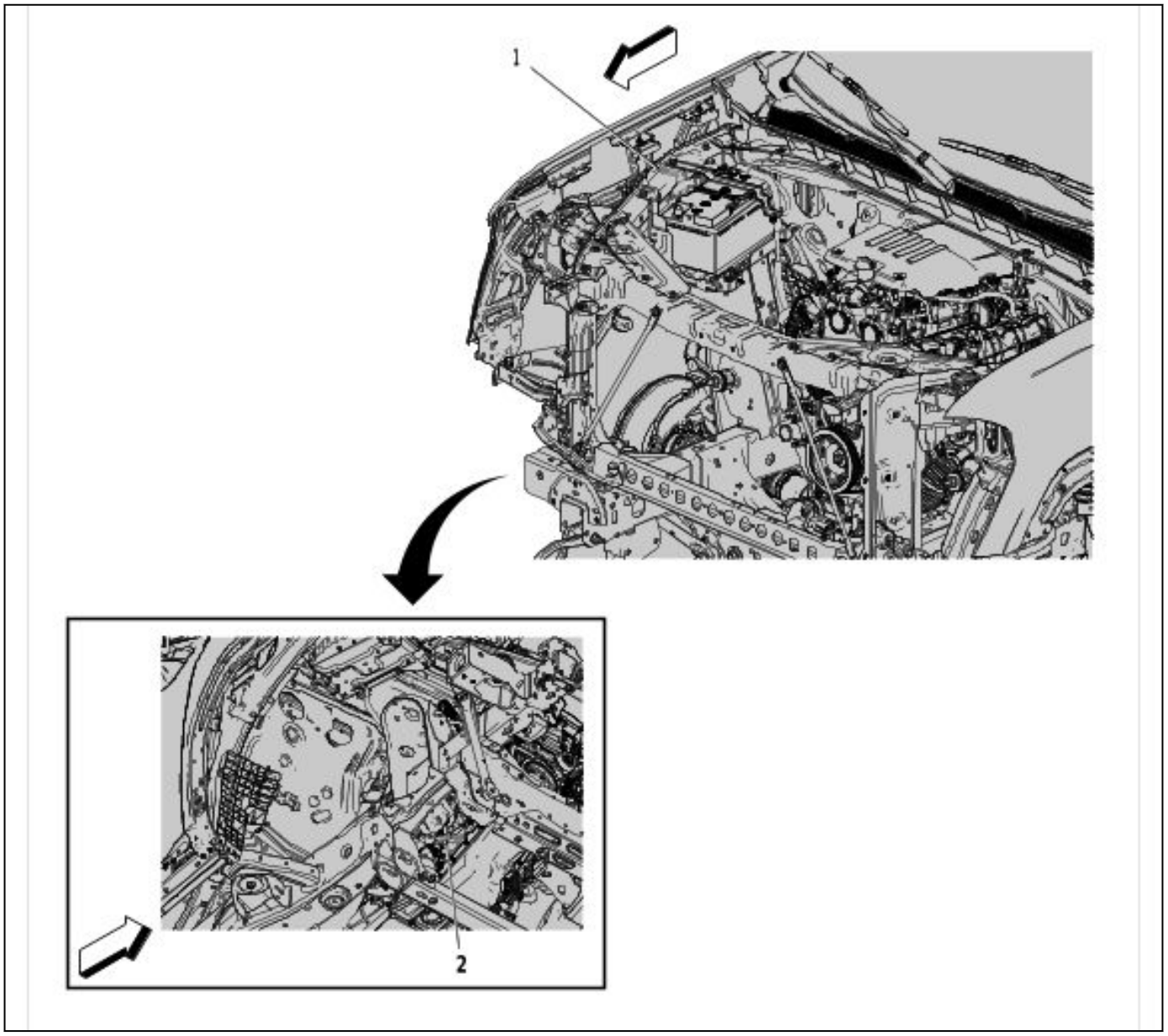
Frame Components - Rear - 4-Door



7175726

Items
(1) K4 Running Board Control Module (B3L)
(2) K111 Fuel Pump Power Control Module
(3) K67 Trailer Brake Control Module
(4) K38 Chassis Control Module (G93 / G94)
(5) K68 Trailer Lamp Control Module (UET)
(6) T10G Low Frequency Rear Bumper Antenna (ATH)
(7) K214 Trailer Tire Pressure Indicator Module (UET)

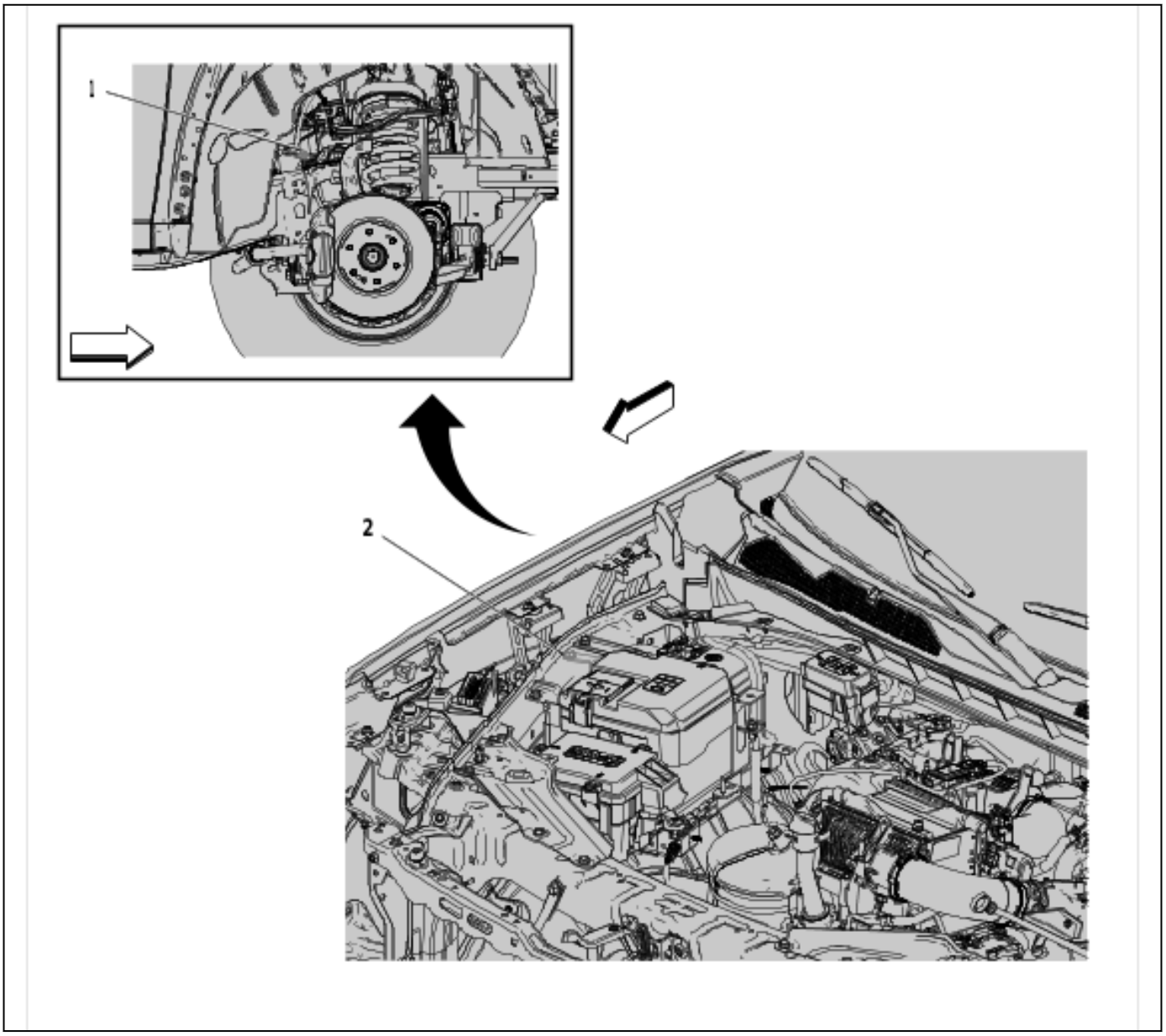
G101 and G105 (L4B)



7197793

Items
(1) G101 Battery Negative Cable
(2) G105 Battery Negative Cable

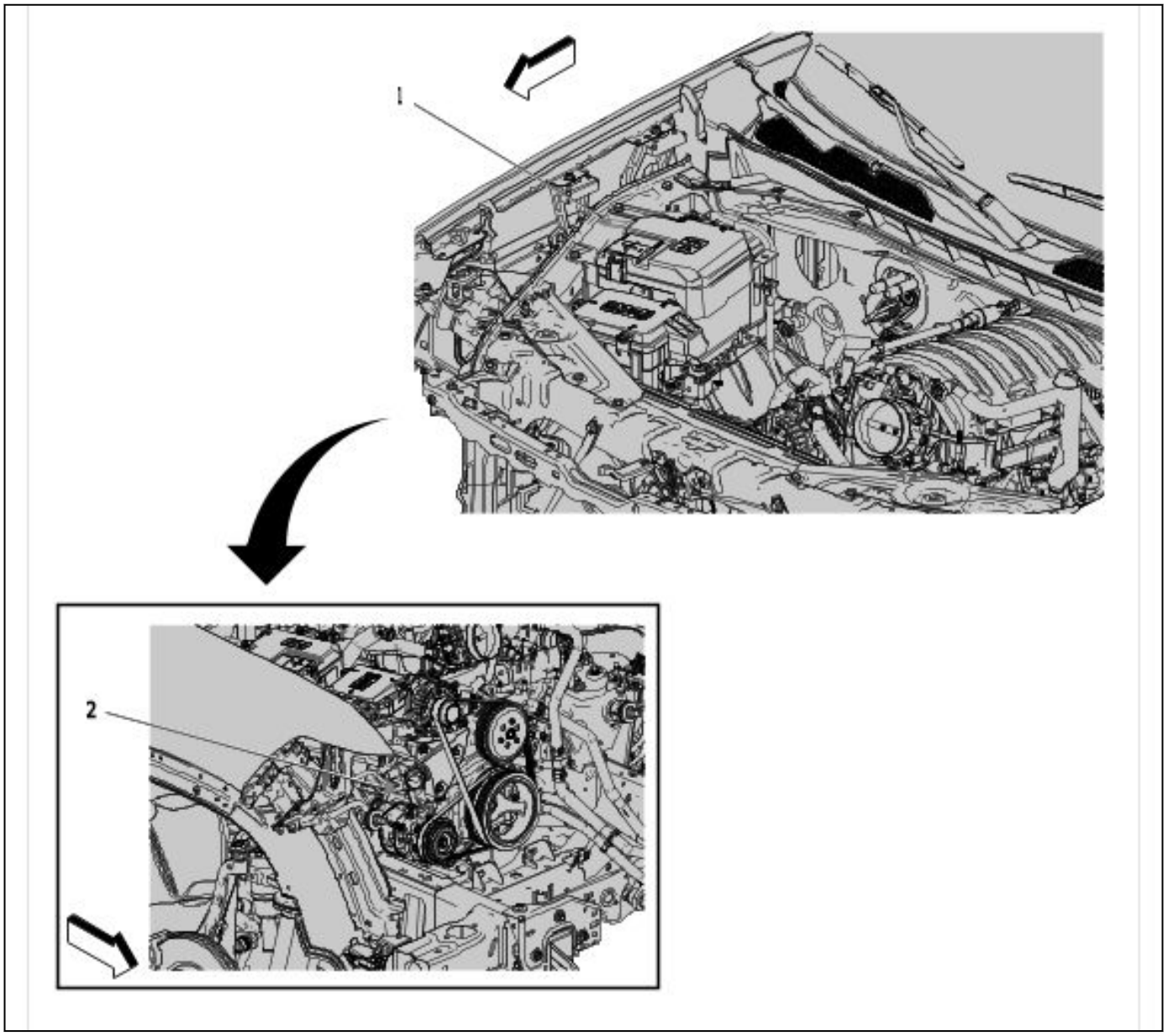
G101 and G105 (LZ0)



7166368

Items
(1) G105 Battery Negative Cable
(2) G101 Battery Negative Cable

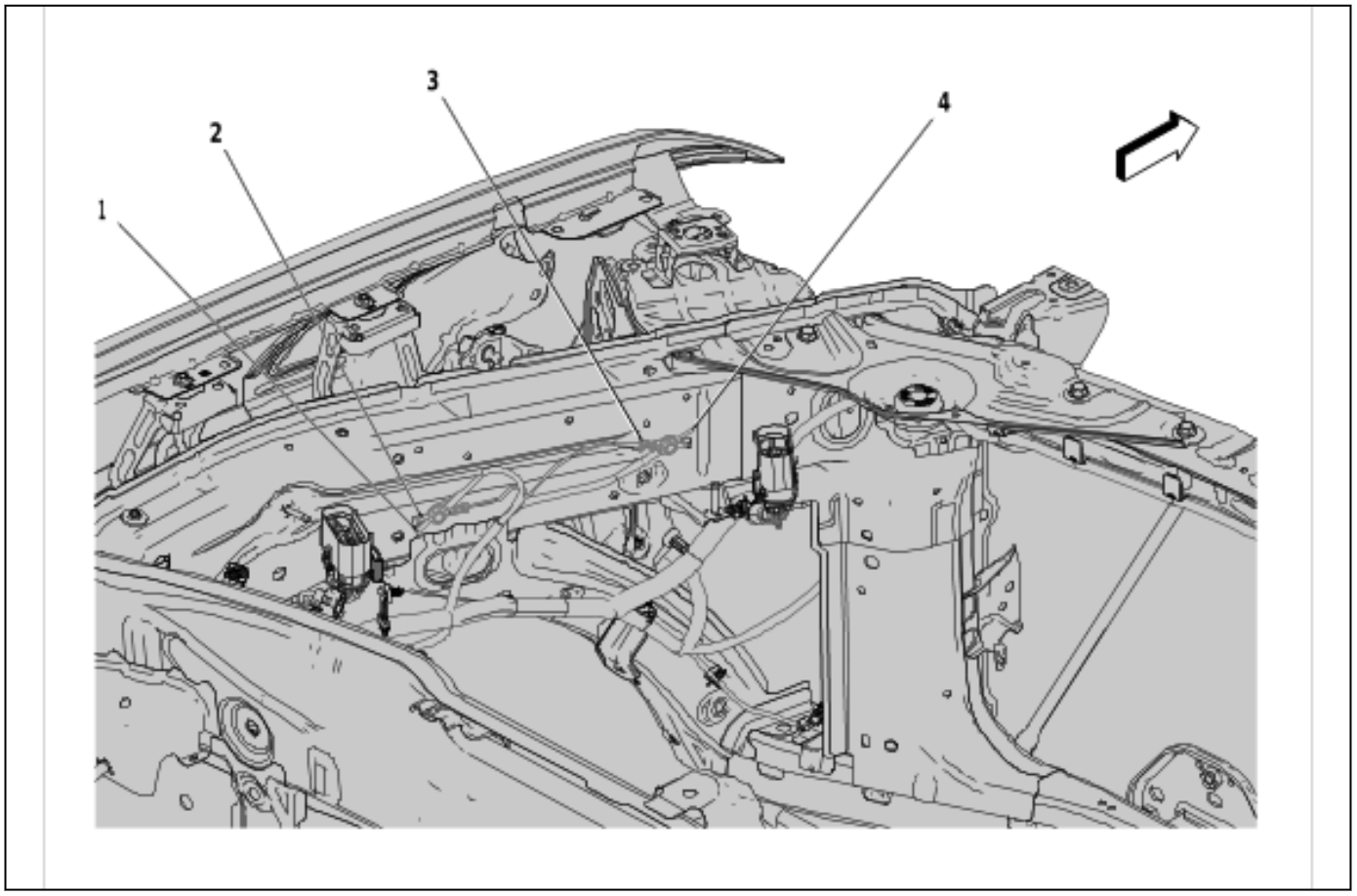
G101 and G105 (L76 / L78)



7166369

Items
(1) G101 Battery Negative Cable
(2) G105 Battery Negative Cable

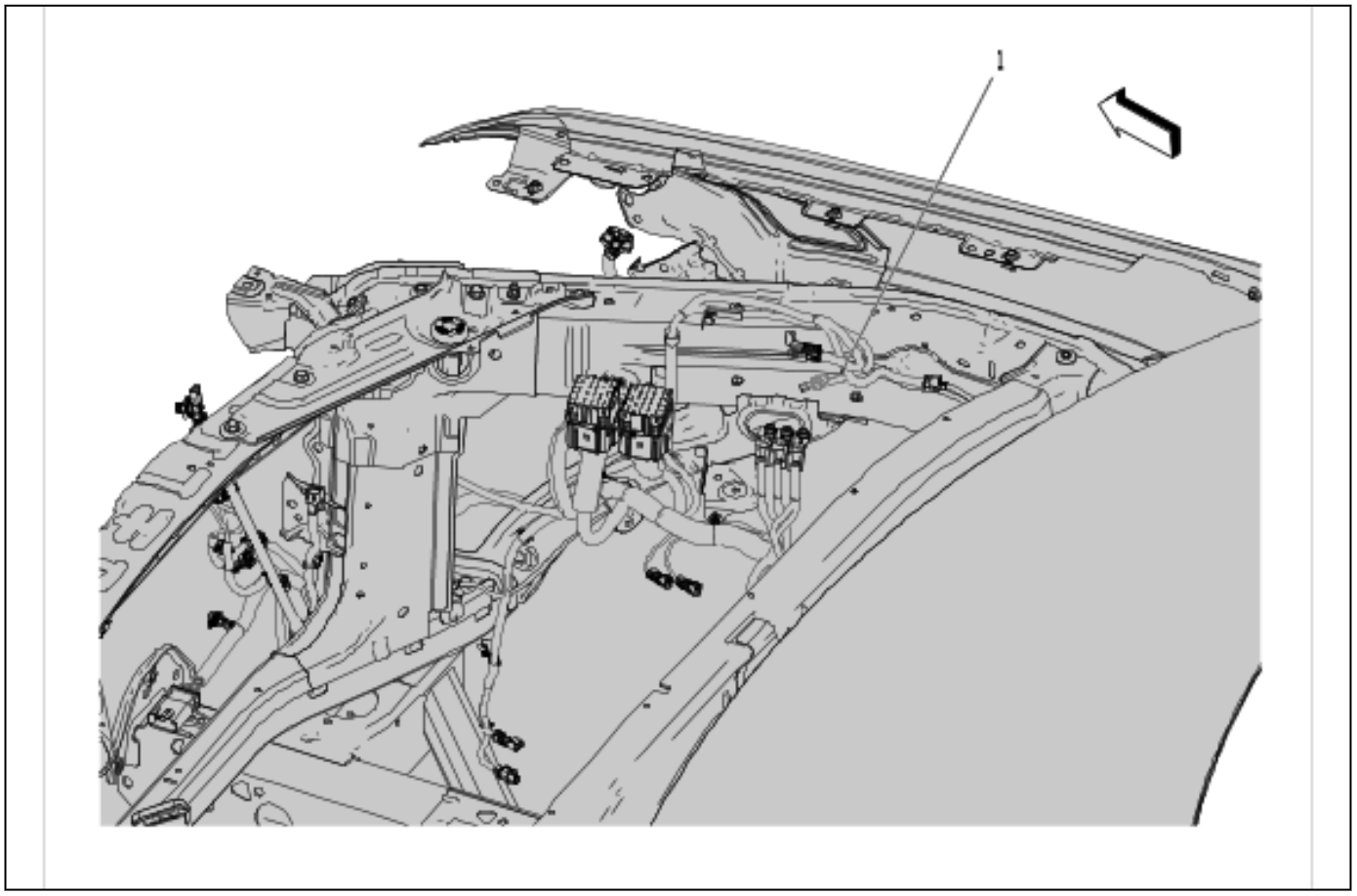
G102A, G102B, G103A, and G103B



7182731

Items
(1) G103A Body Wiring Harness
(2) G103B Body Wiring Harness
(3) G102B Body Wiring Harness
(4) G102A Body Wiring Harness

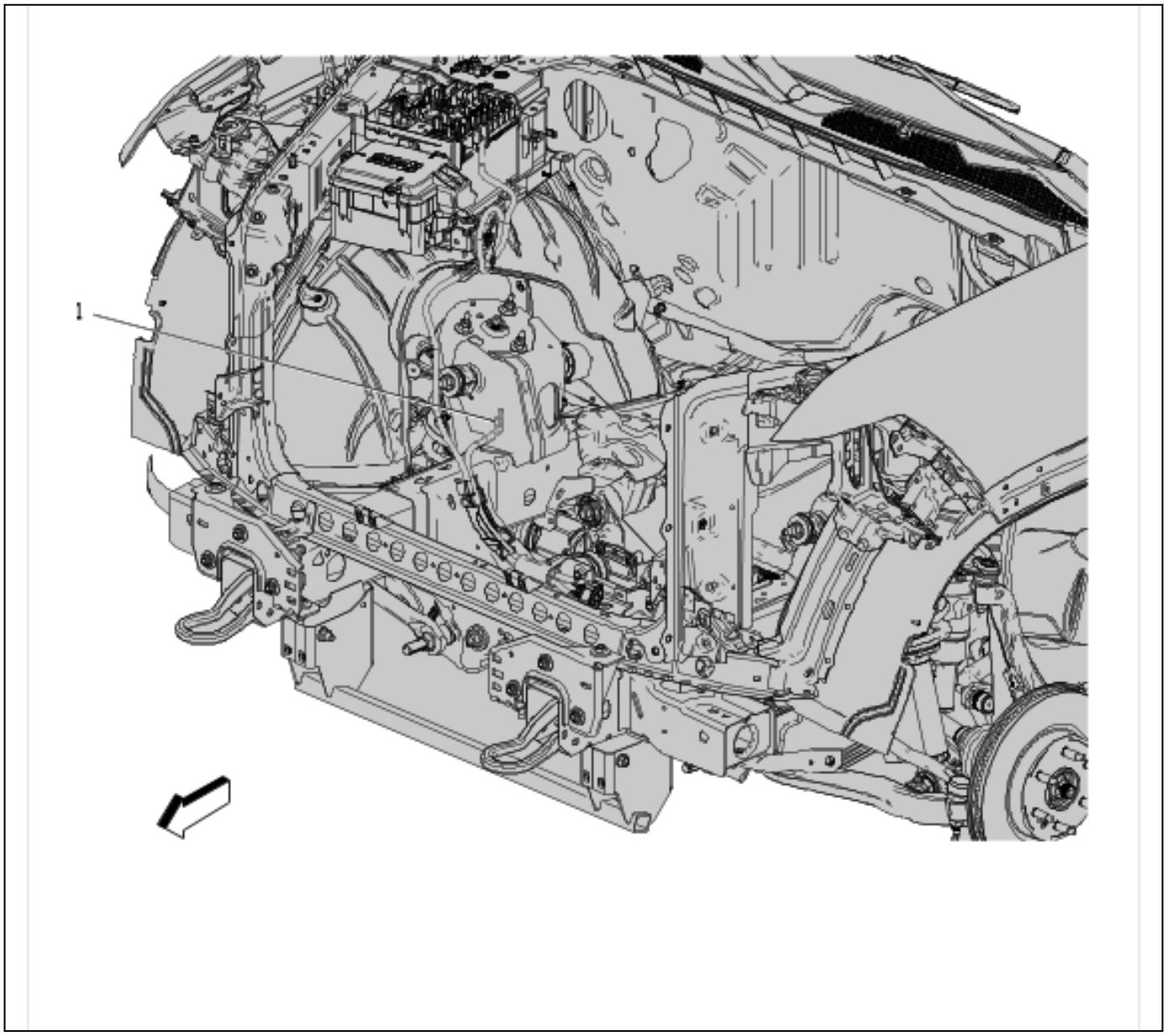
G104



7182730

Items
(1) G104 Body Wiring Harness

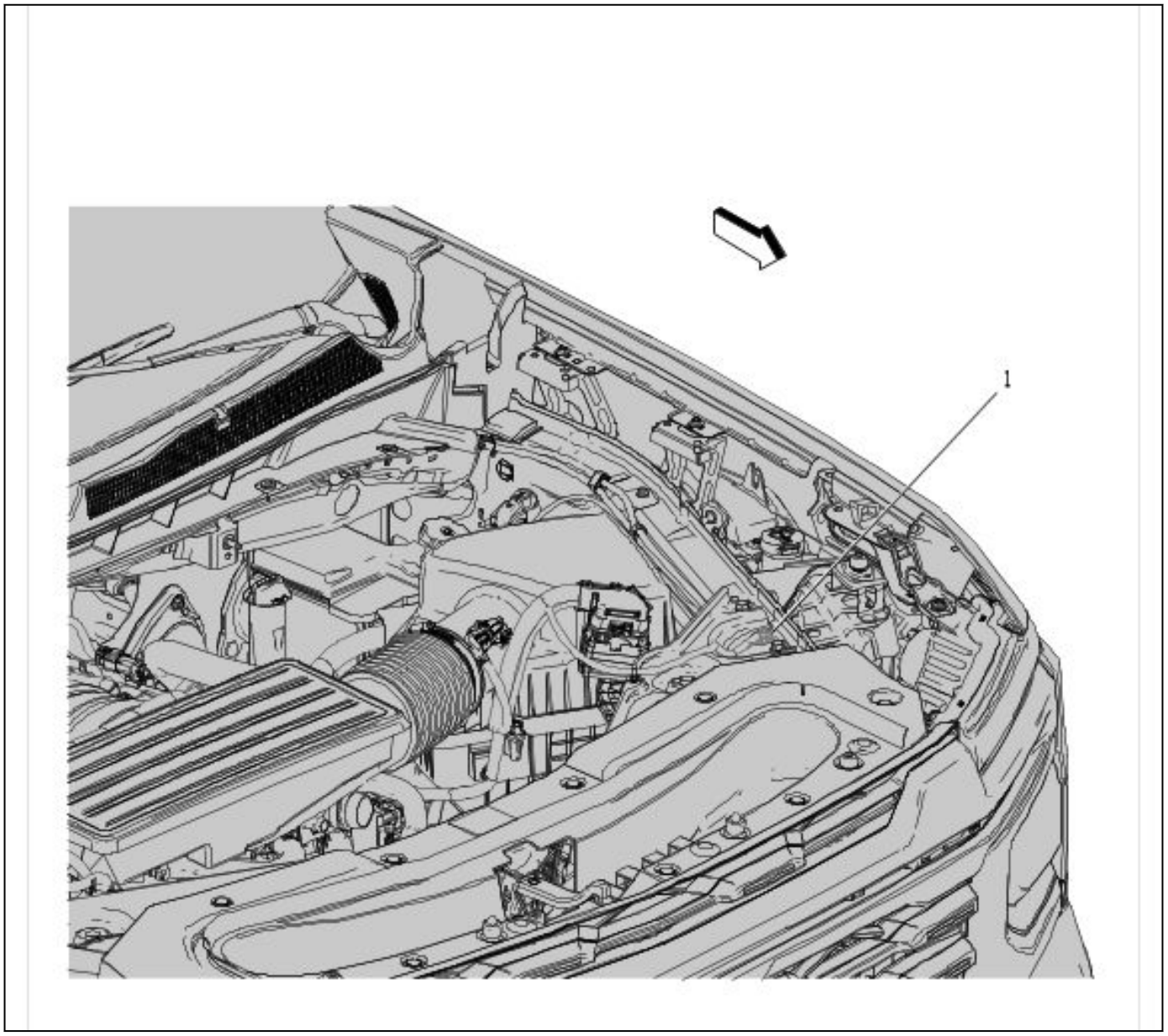
G106



7166370

Items
(1) G106 Power Steering Wiring Harness

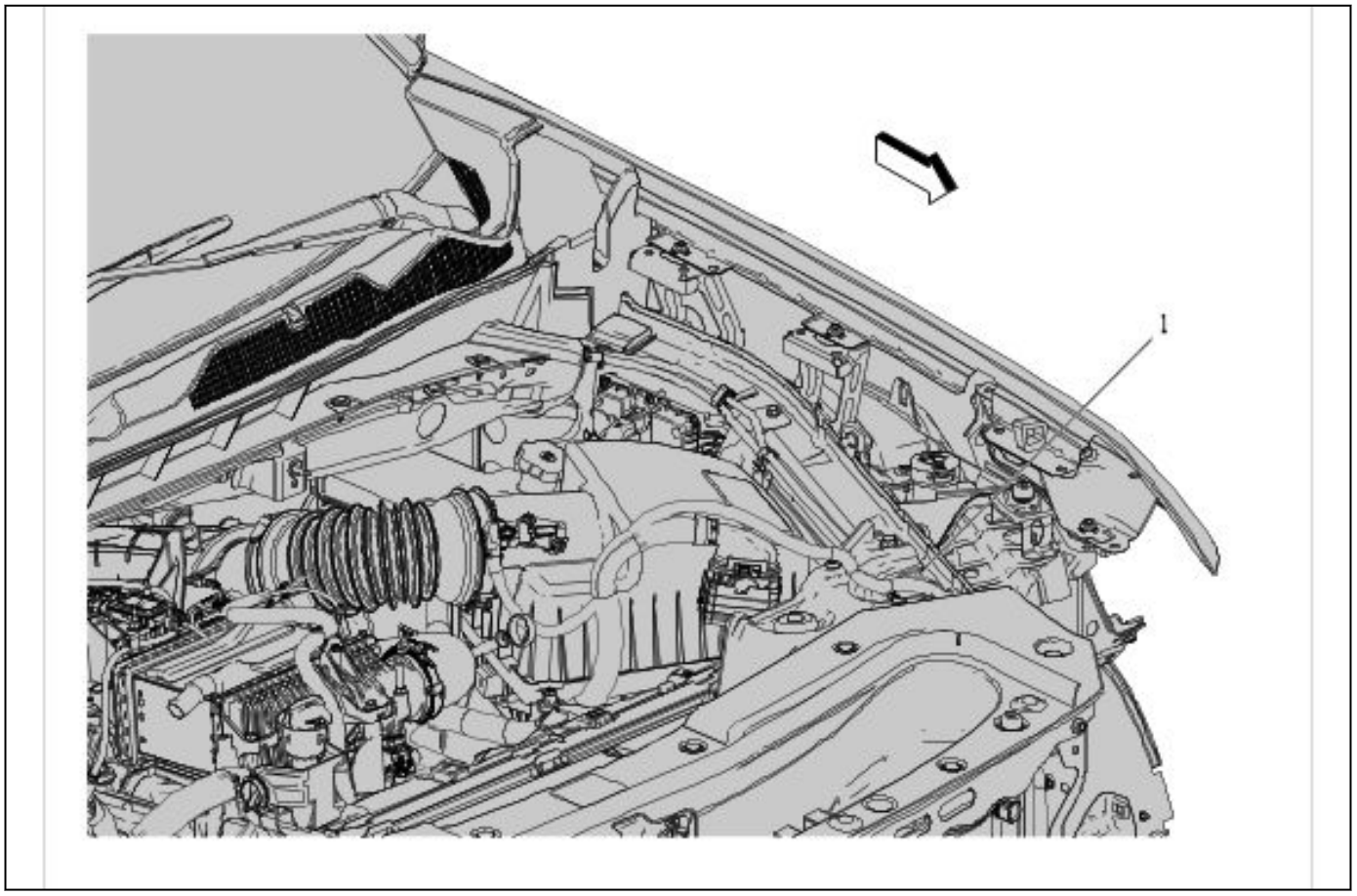
G173 (L76 / L78)



7163729

Items
(1) G173 Engine Wiring Harness (L76 / L78)

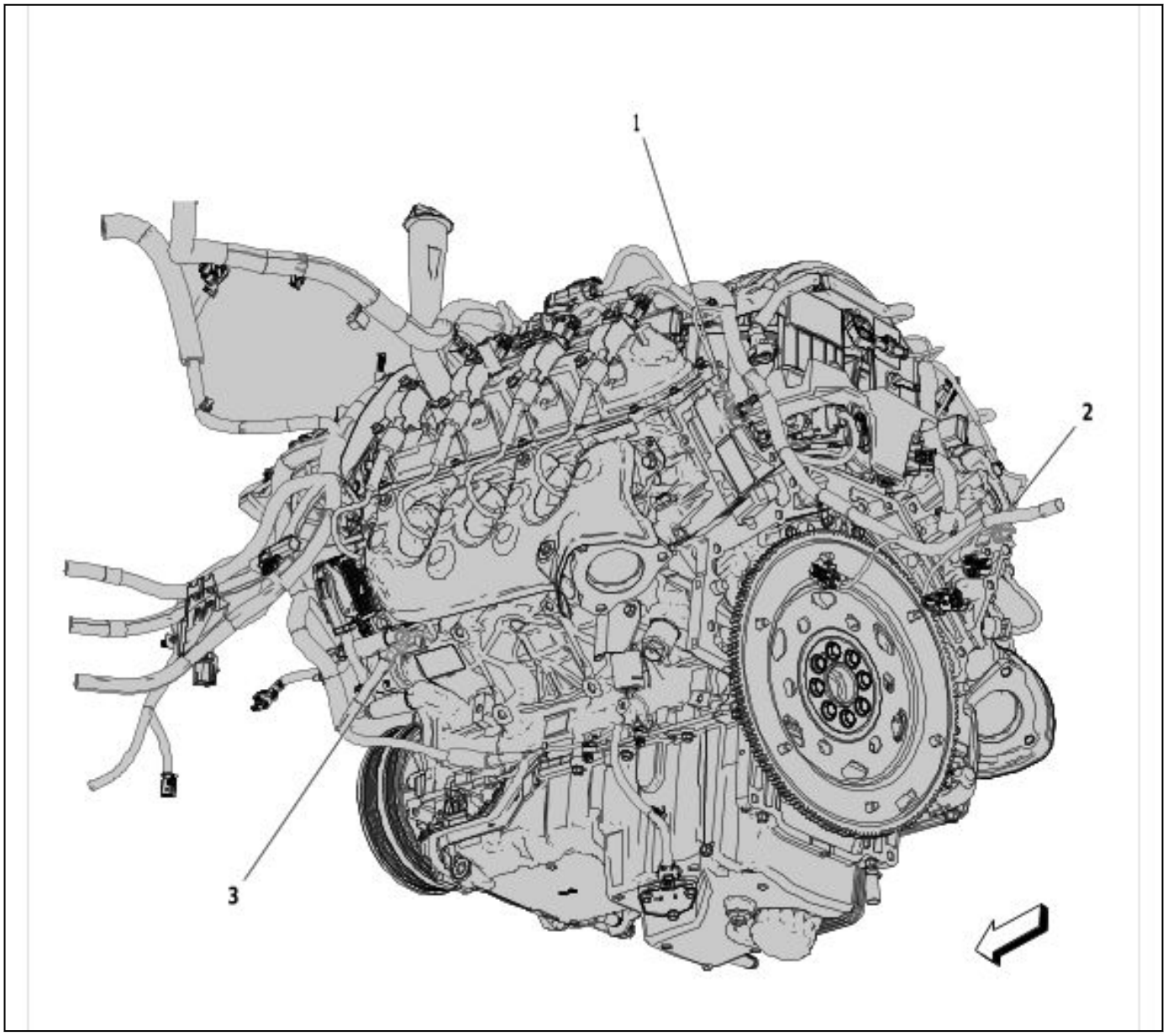
G175 (LZ0)



7163730

Items
(1) G175 Engine Wiring Harness (L76 / L78 / LZ0)

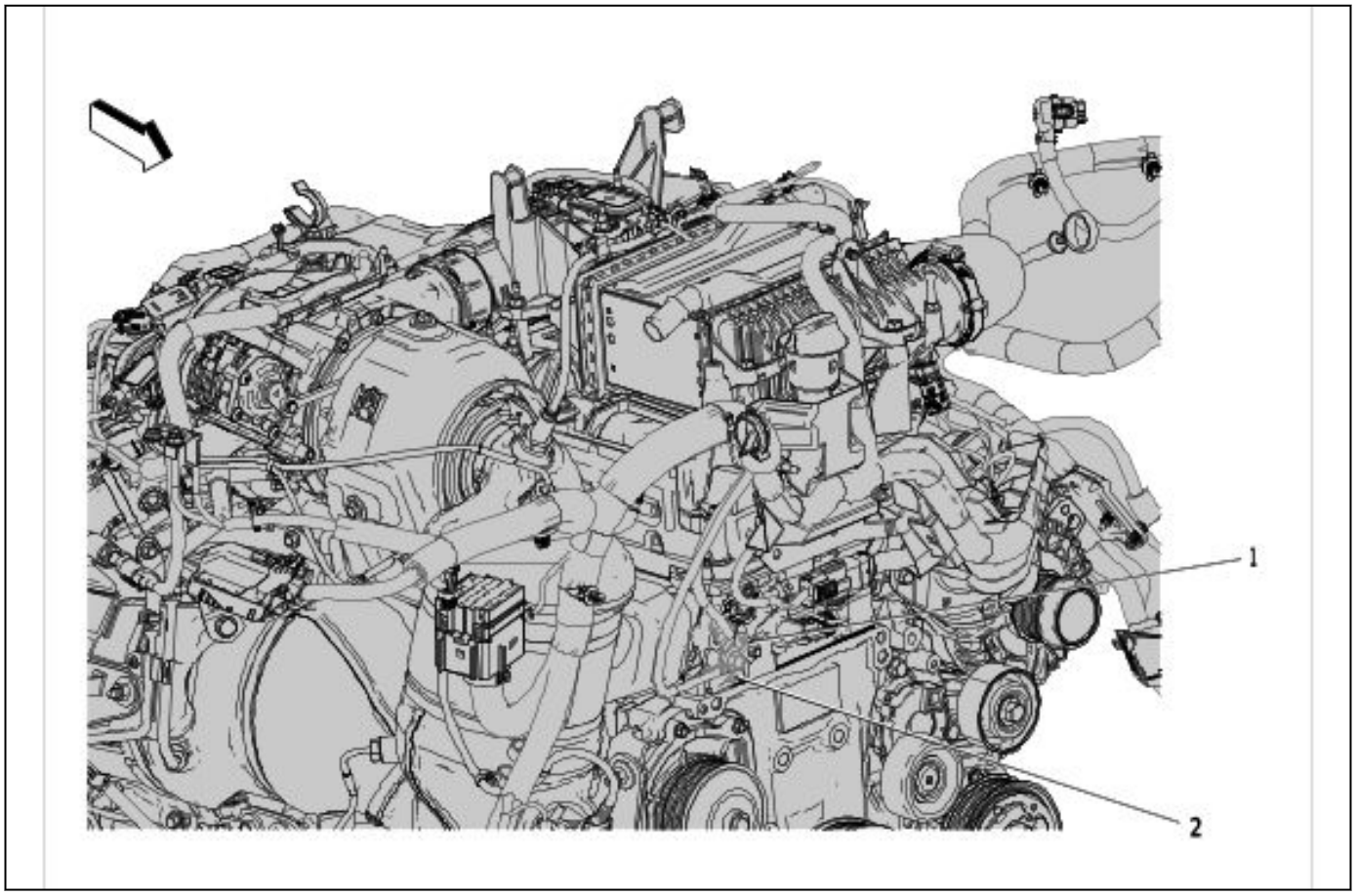
G175, G176, and G179 (L76 / L78)



7163731

Items
(1) G175 Engine Wiring Harness (L76 / L78 / LZ0)
(2) G176 Engine Wiring Harness (L76 / L78)
(3) G179 Engine Wiring Harness (L76 / L78)

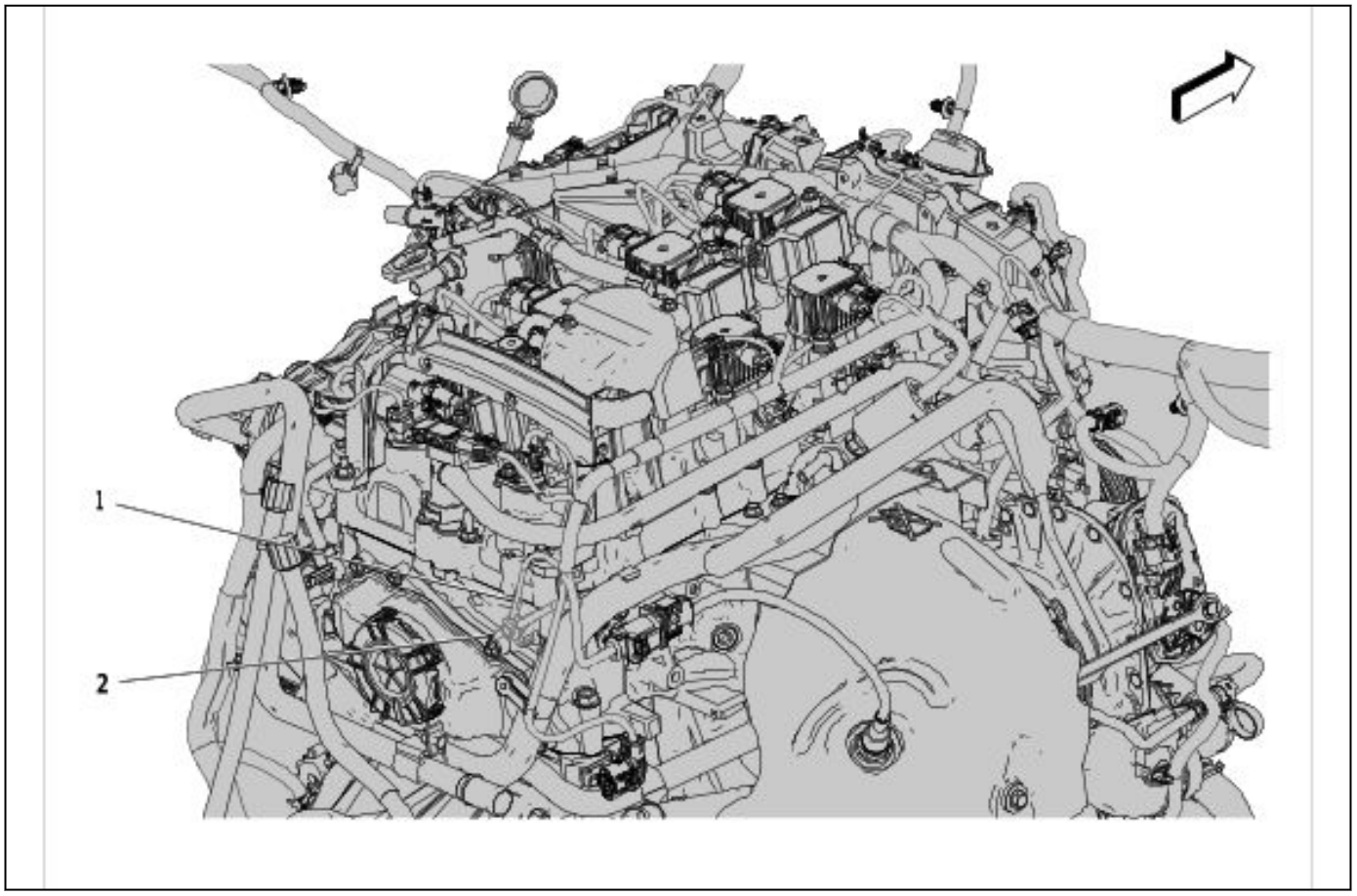
G176A and G177B (LZ0)



7163732

Items
(1) G176A Engine Wiring Harness (LZ0)
(2) G177B Engine Wiring Harness (L4B / LZ0)

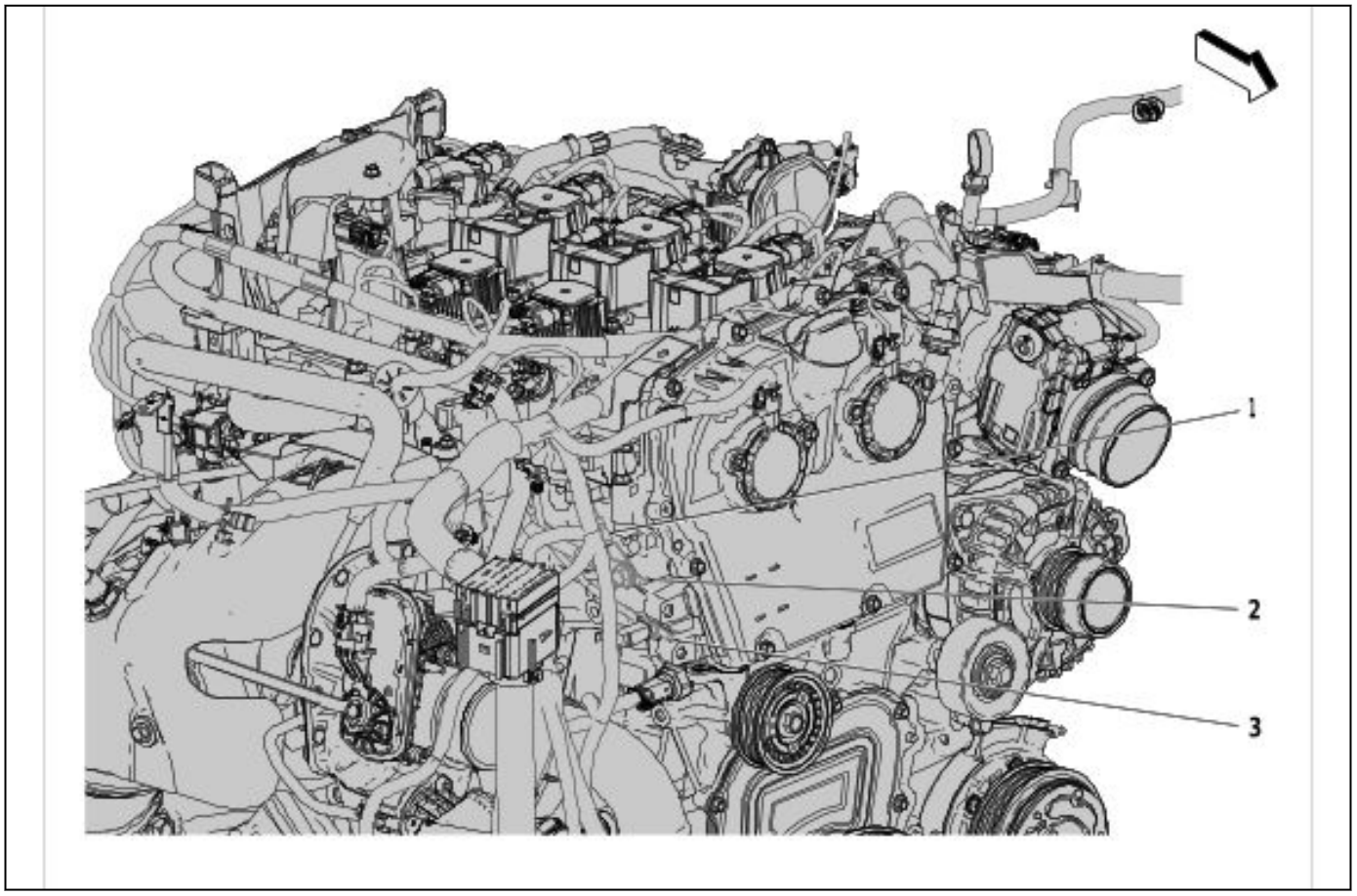
G177A and G177B (L4B)



7163733

Items
(1) G177B Engine Wiring Harness (L4B / LZ0)
(2) G177A Engine Wiring Harness (L4B)

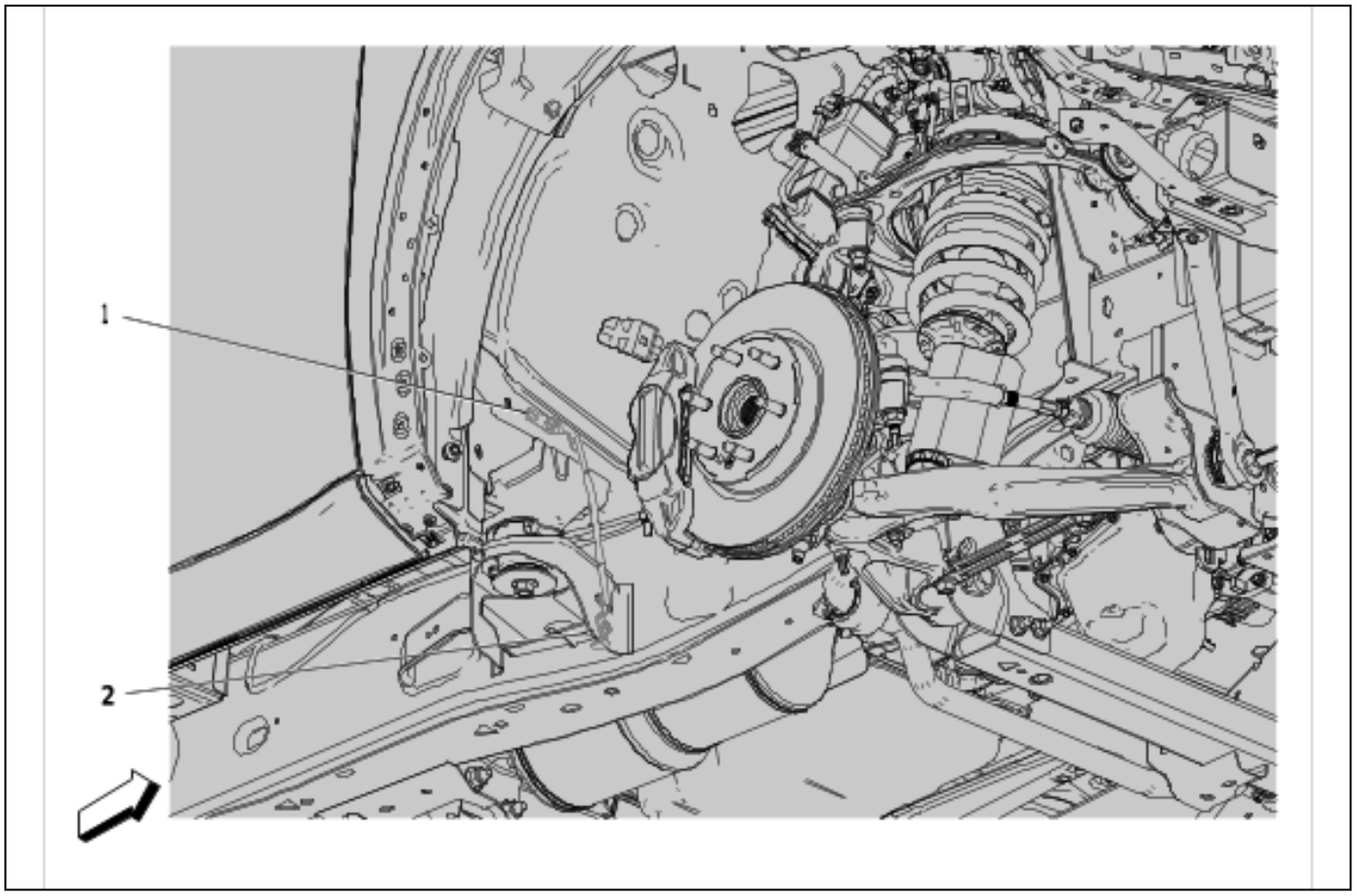
G178B, G179A, G179B (L4B)



7163734

Items
(1) G179B Engine Wiring Harness (L4B)
(2) G179A Engine Wiring Harness (L4B)
(3) G178B Engine Wiring Harness (L4B)

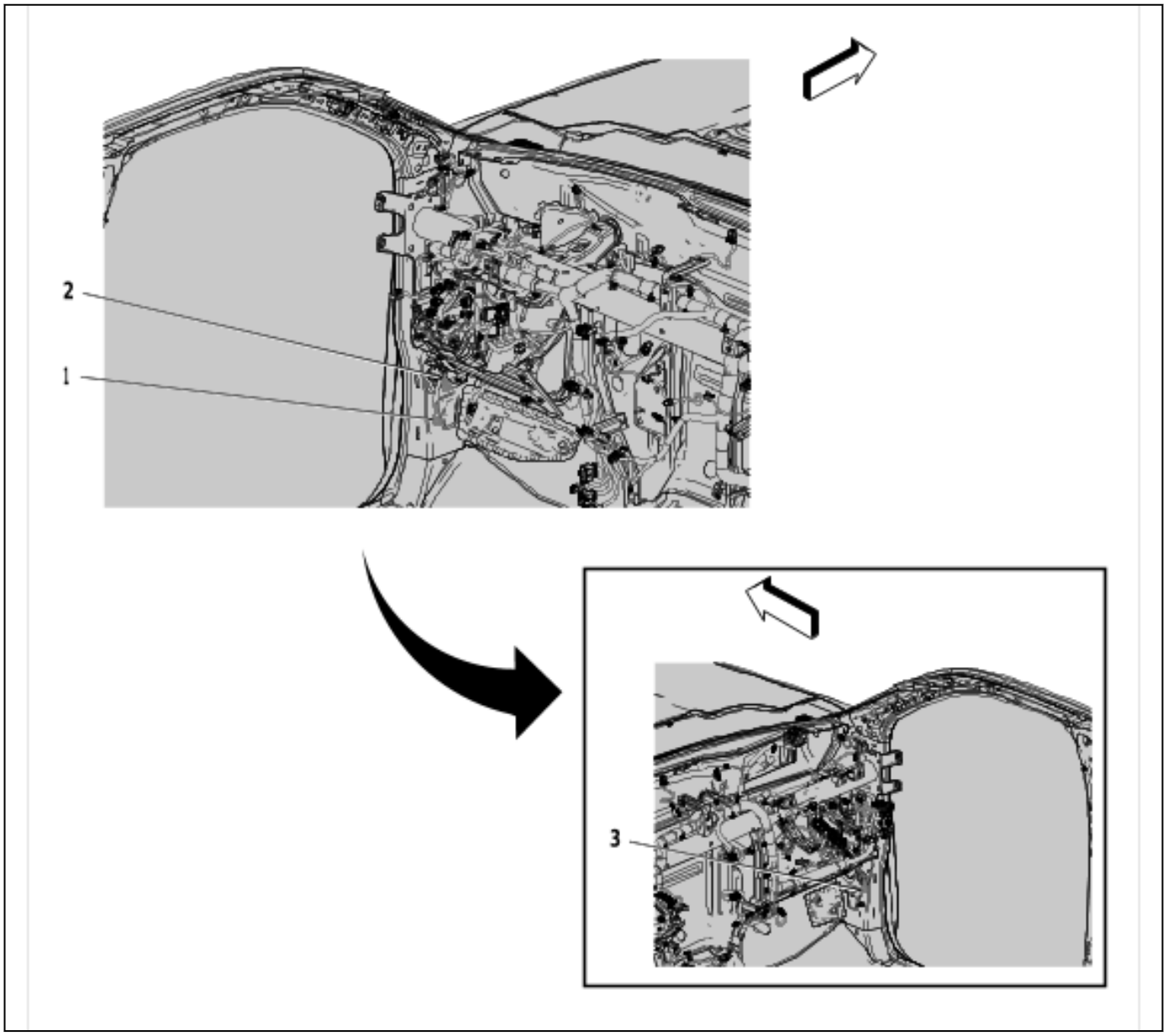
G1000 and G1001



7166371

Items
(1) G1000 Ground Strap
(2) G1001 Ground Strap

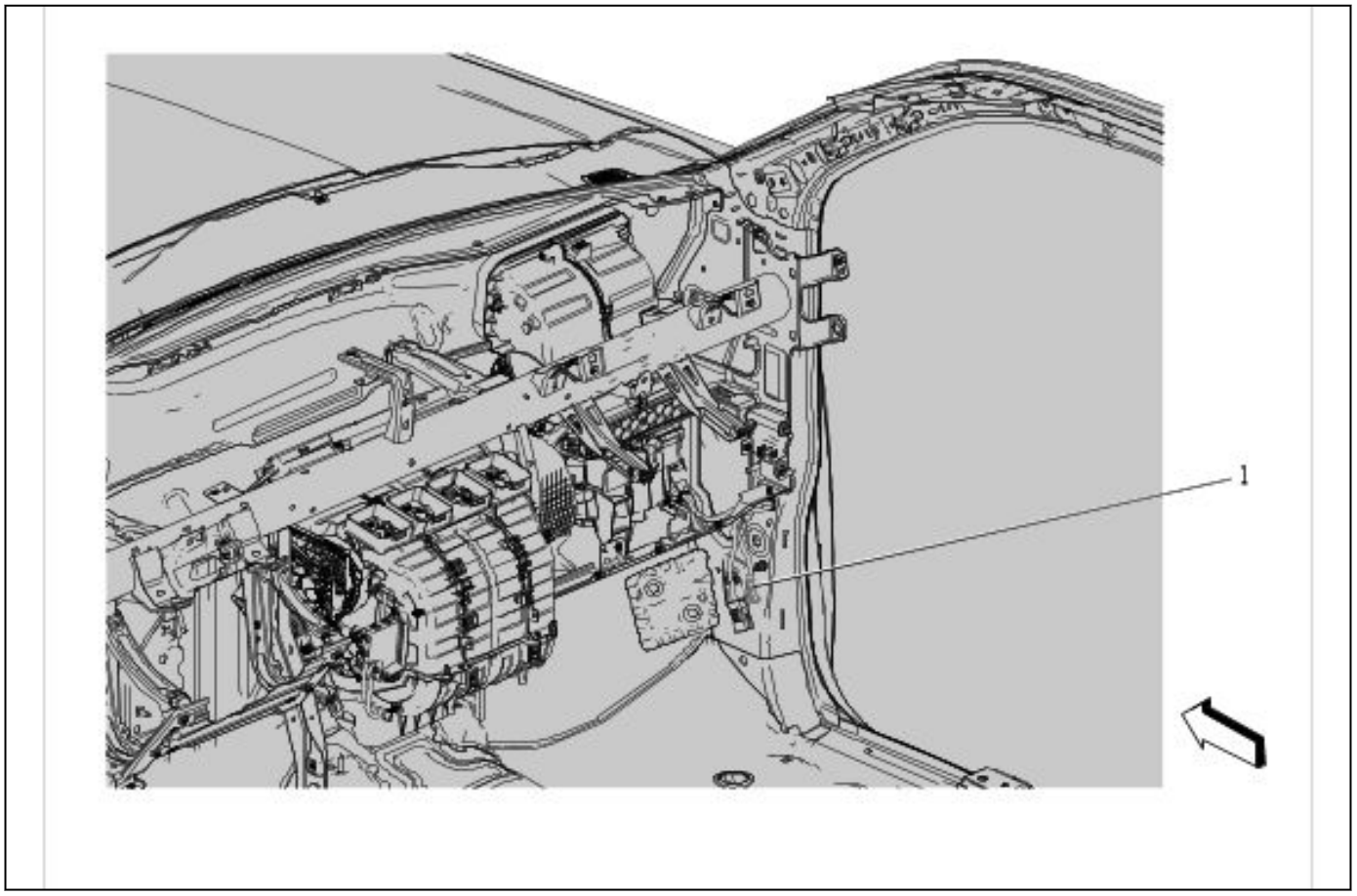
G200, G201, and G203



7188709

Items
(1) G203 Instrument Panel Wiring Harness
(2) G201 Instrument Panel Wiring Harness
(3) G200 Instrument Panel Wiring Harness

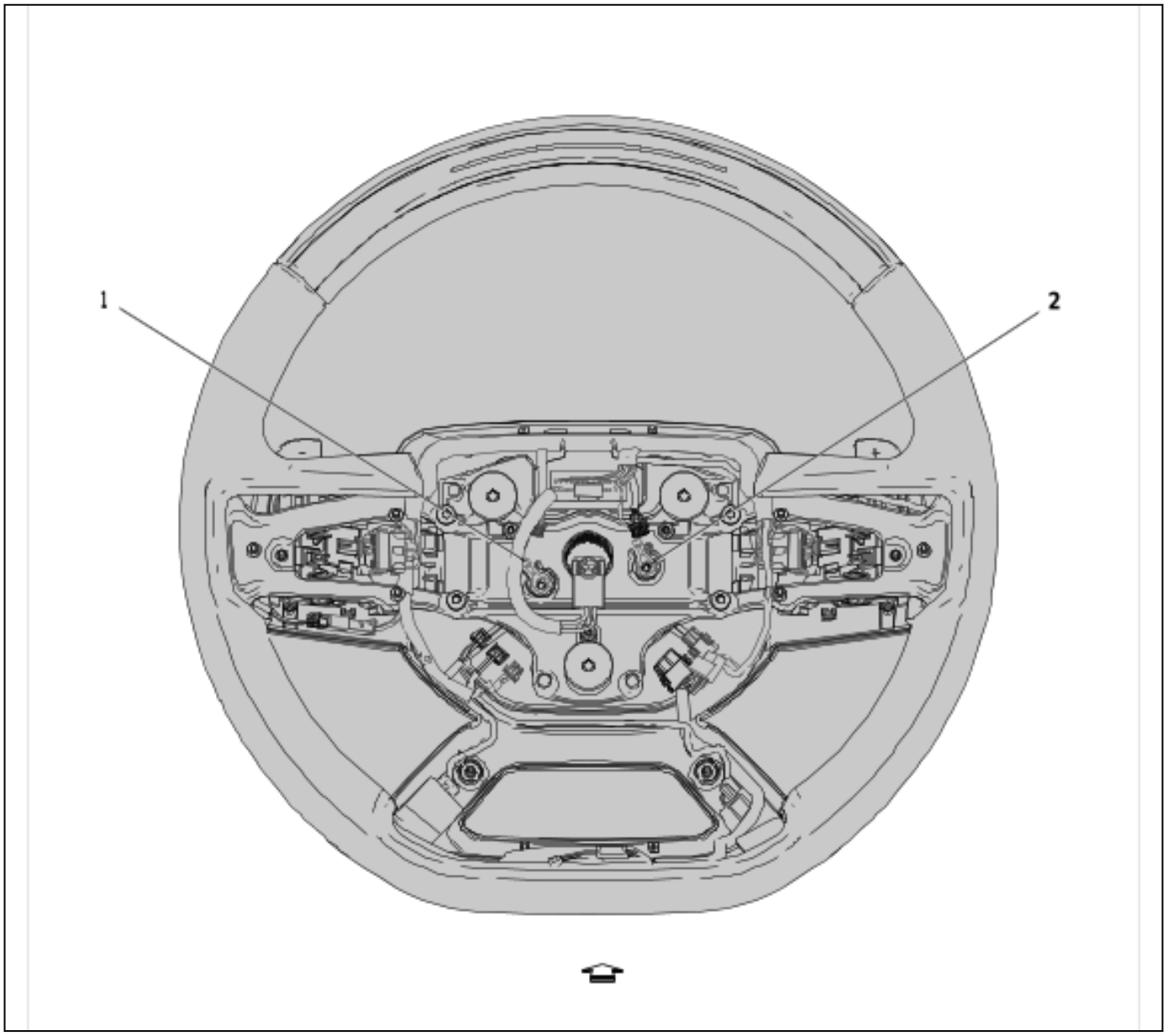
G202 (C32)



7198990

Items
(1) G202 Air Heater Wiring Harness (C32)

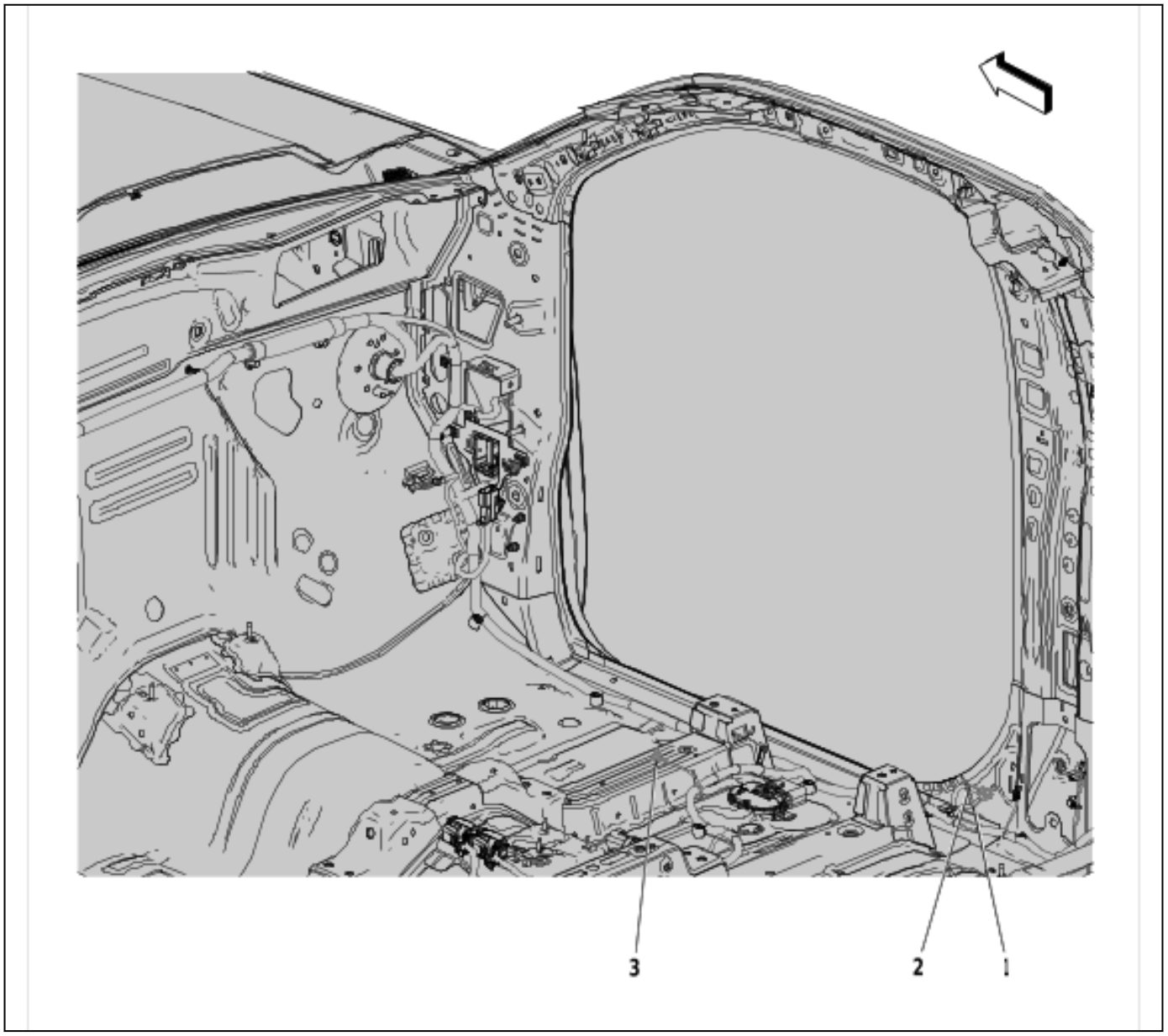
G298 and G299



7190458

Items
(1) G298 Steering Wheel Horn Switch Wiring Harness (ULM)
(2) G299 Steering Wheel Horn Switch Wiring Harness

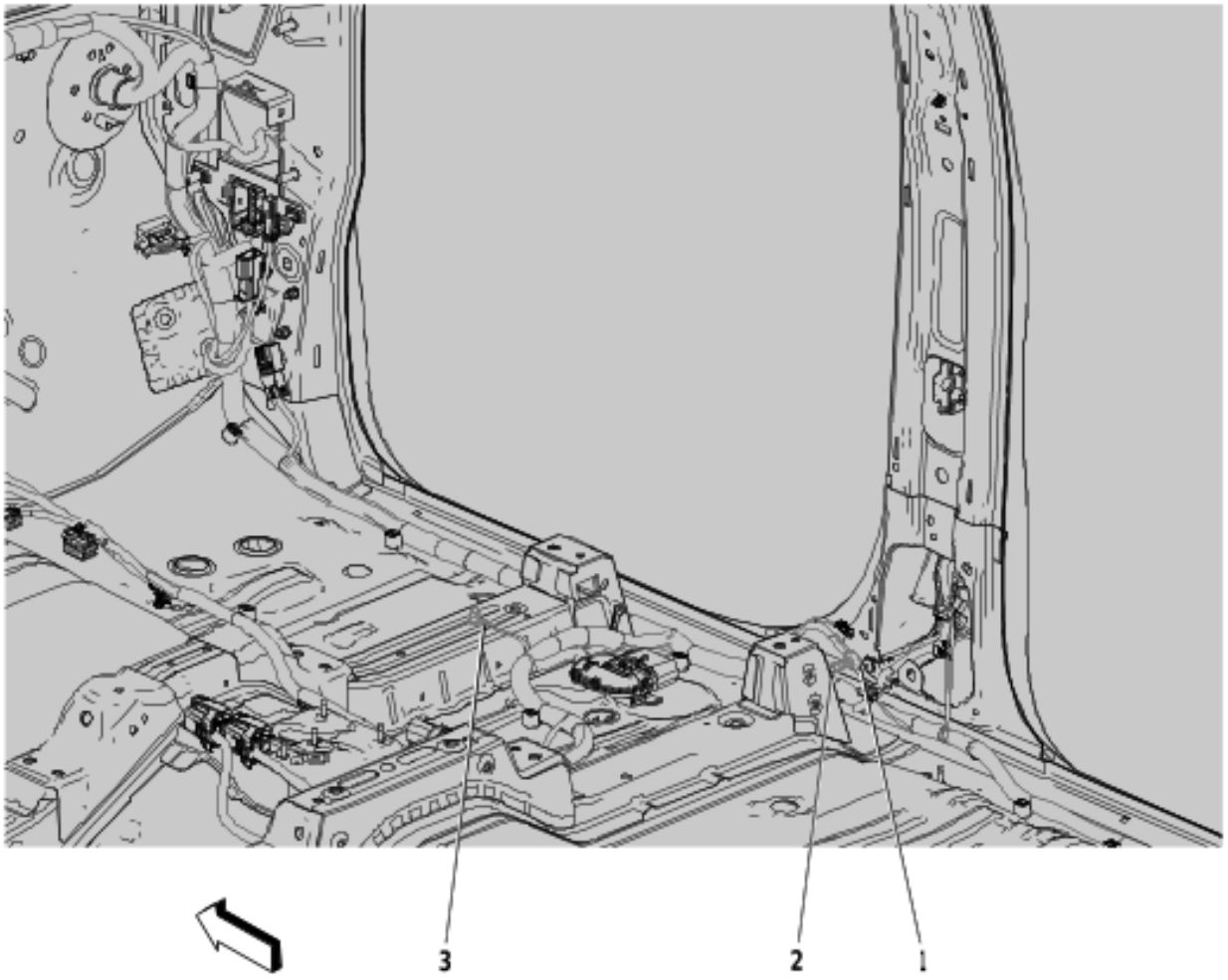
G300, G300B, and G303_SDM - 2-Door



7182732

Items
(1) G300 Body Wiring Harness
(2) G300B Body Wiring Harness
(3) G303_SDM Body Wiring Harness

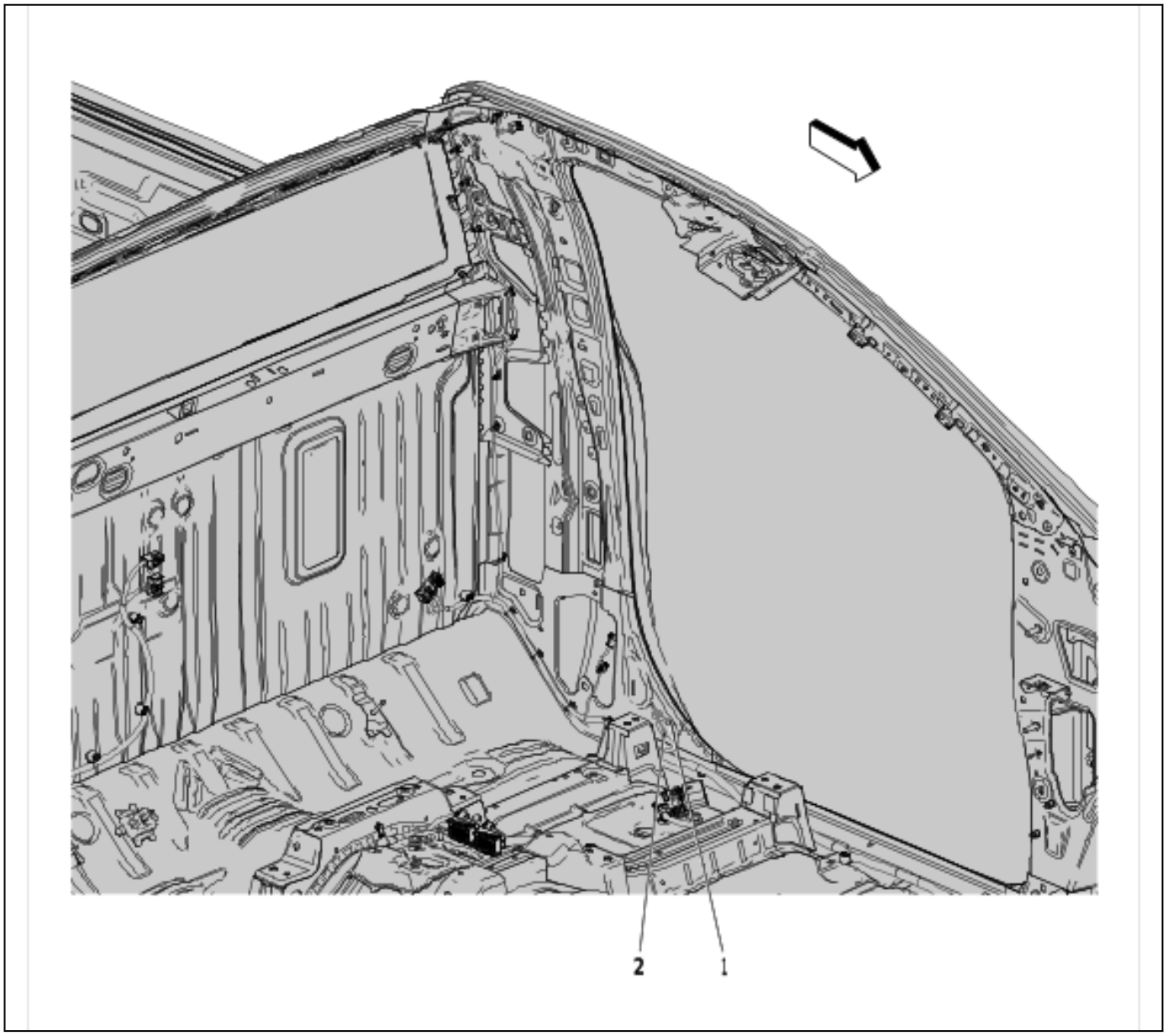
G300, G300B, and G303_SDM - 4-Door



7182733

Items
(1) G300B Body Wiring Harness
(2) G300 Body Wiring Harness
(3) G303_SDM Body Wiring Harness

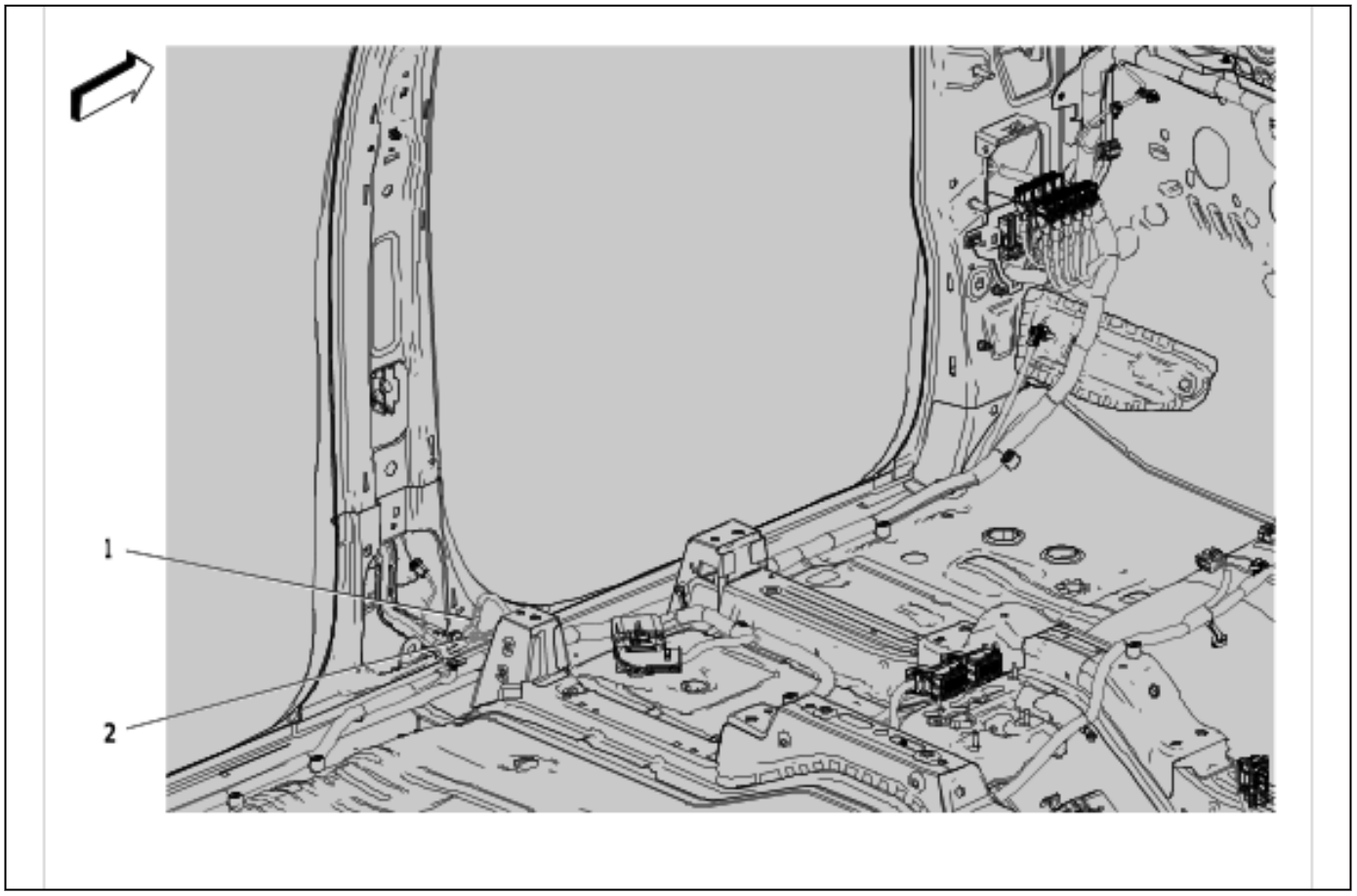
G301 and G301A - 2-Door



7182734

Items
(1) G301 Body Wiring Harness
(2) G301A Body Wiring Harness

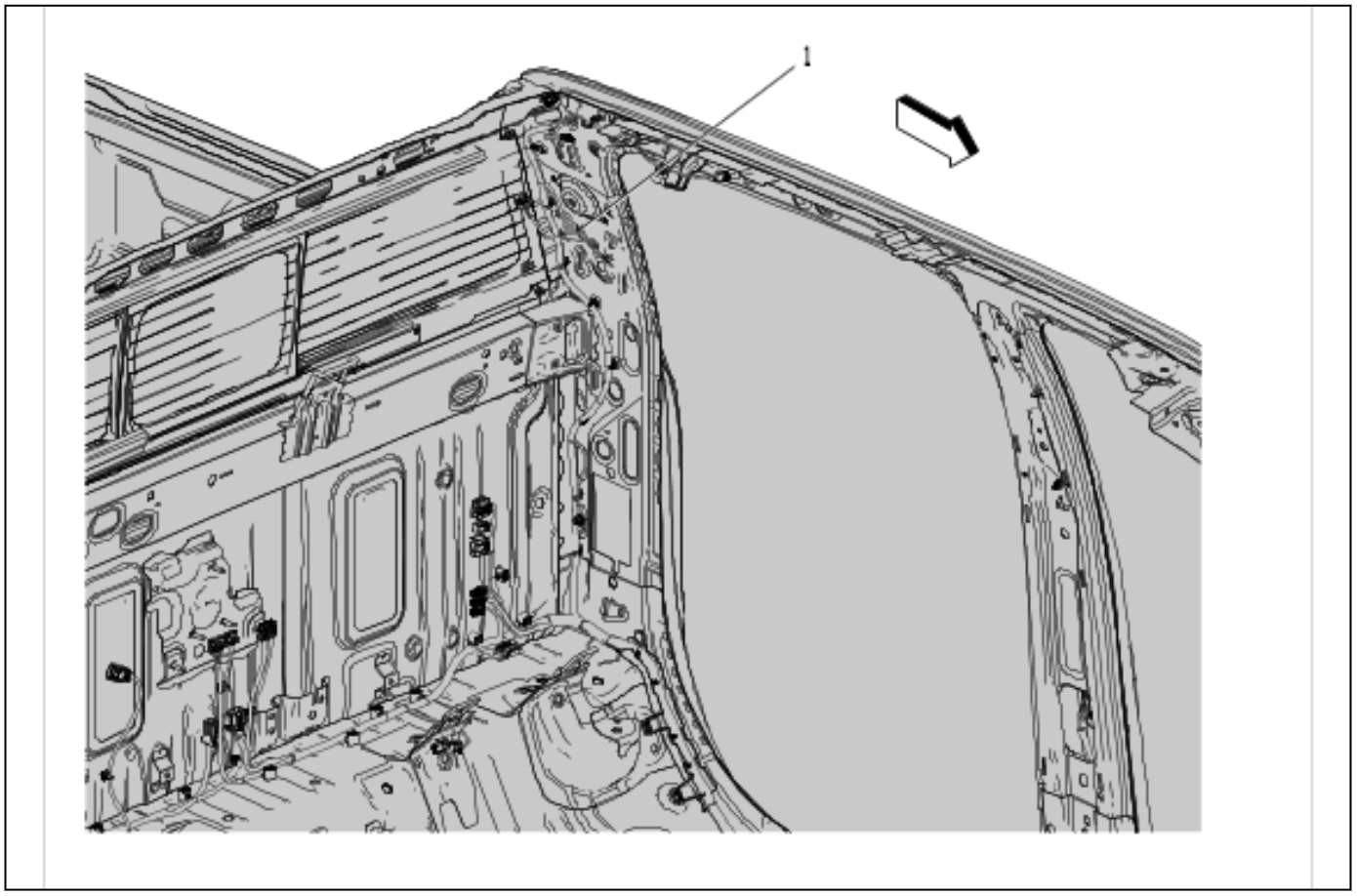
G301 and G301A - 4-Door



7182735

Items
(1) G301 Body Wiring Harness
(2) G301A Body Wiring Harness

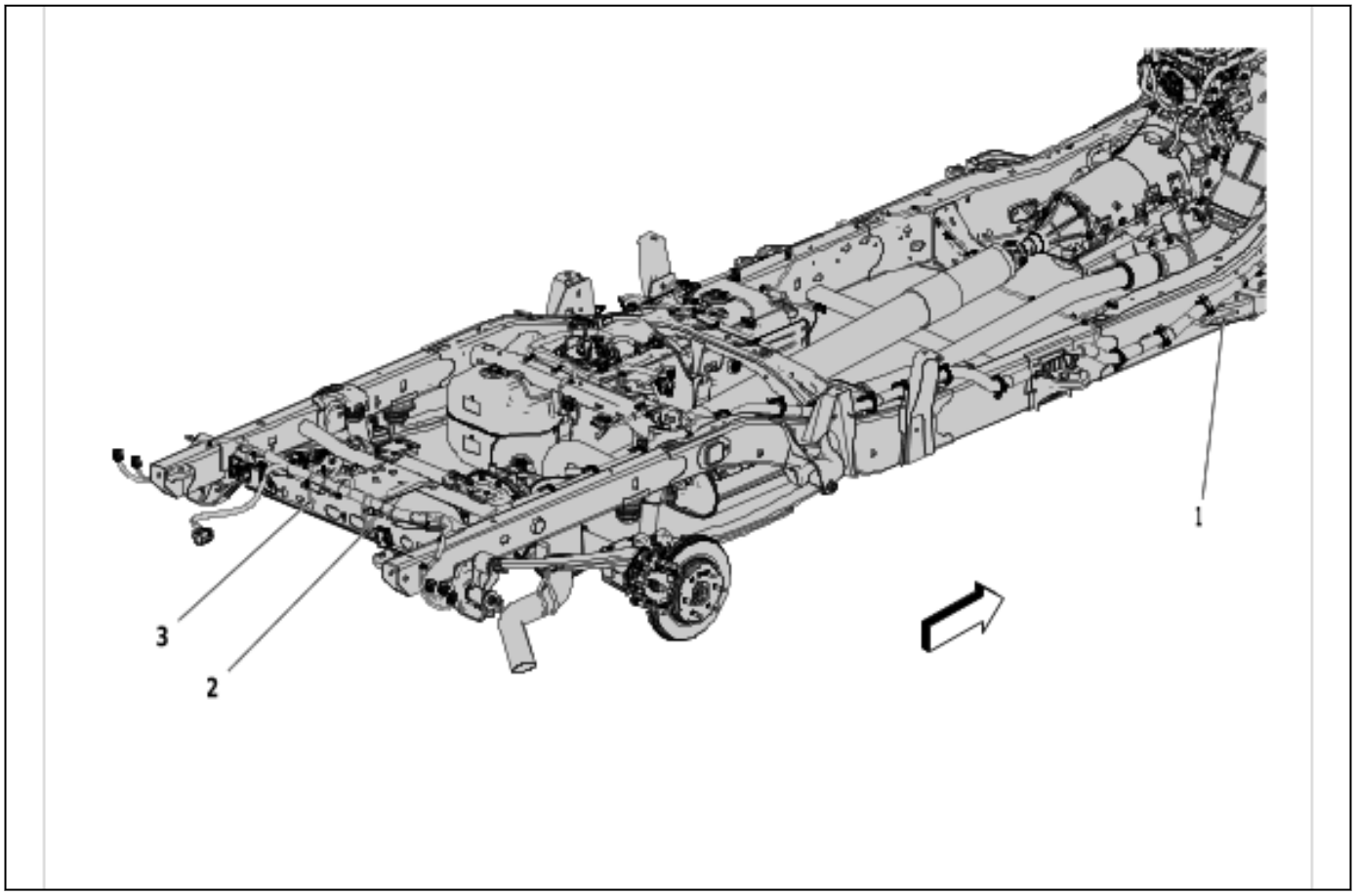
G304 - 4-Door



7182736

Items
(1) G304 Body Wiring Harness (4-Door)

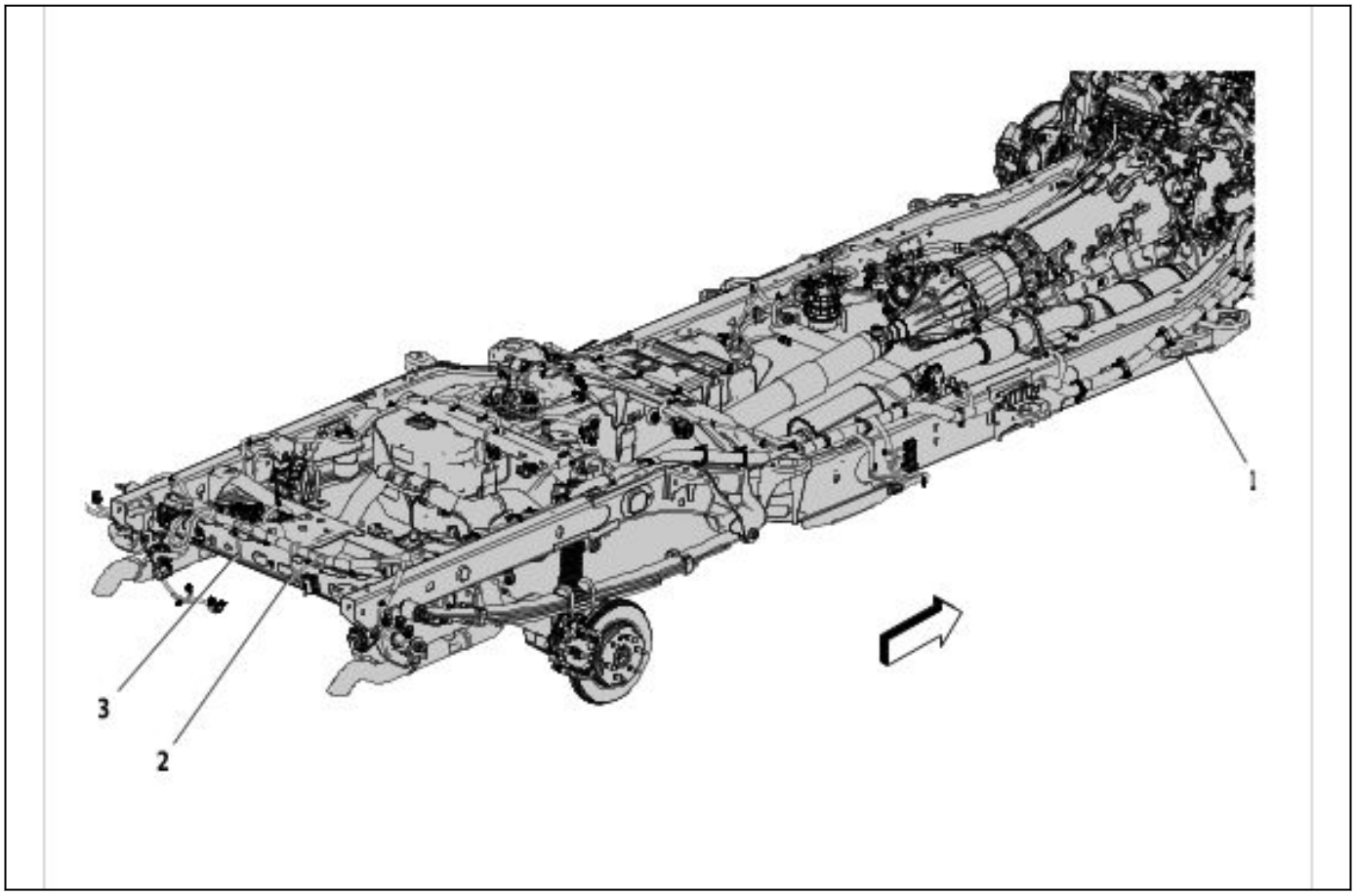
G402, G404, and G407 - 2-Door



7175727

Items
(1) G402 Chassis Wiring Harness
(2) G404 Chassis Wiring Harness
(3) G407 Chassis Wiring Harness

G402, G404, and G407 - 4-Door



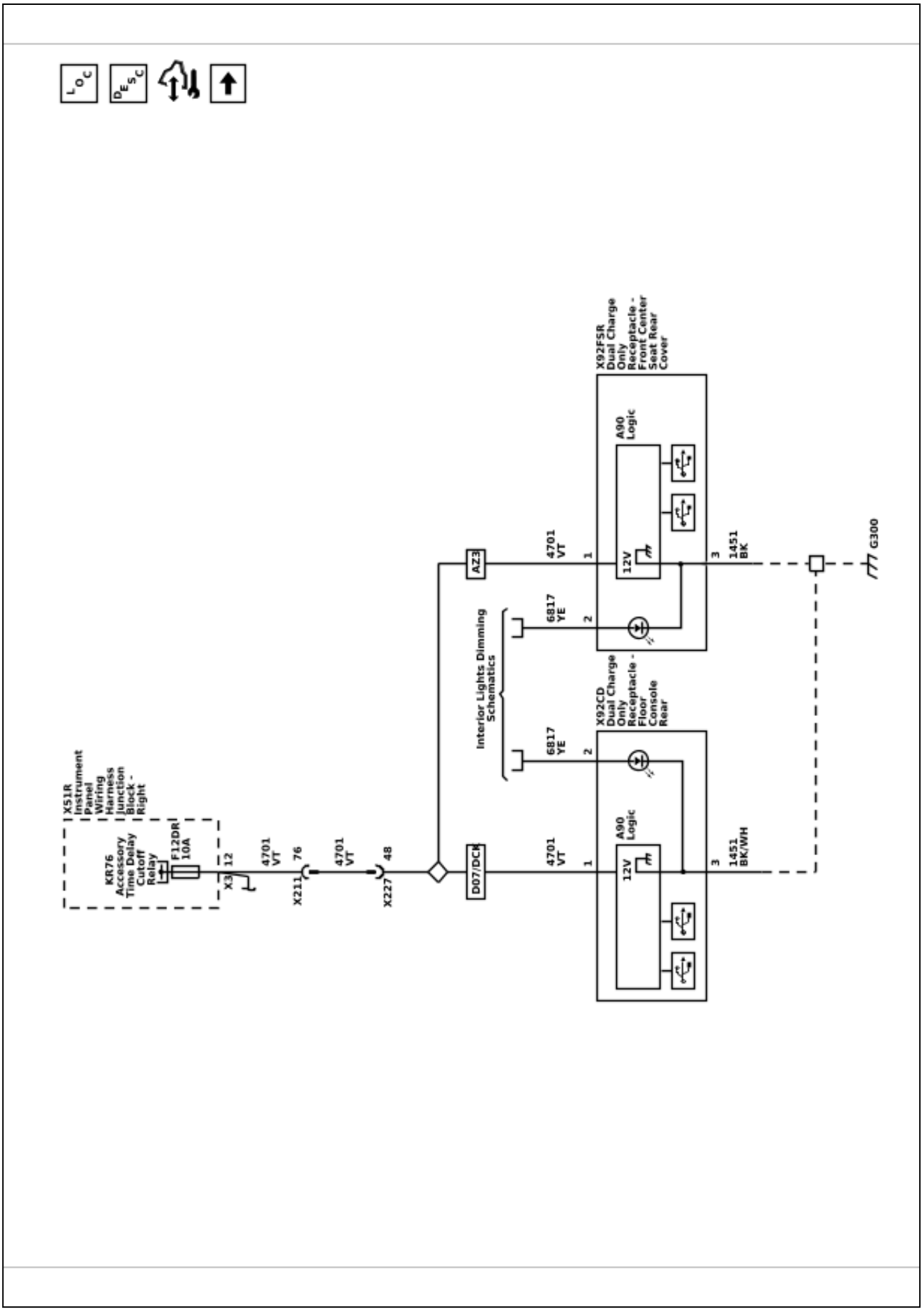
7175728

Items
(1) G402 Chassis Wiring Harness
(2) G404 Chassis Wiring Harness
(3) G407 Chassis Wiring Harness

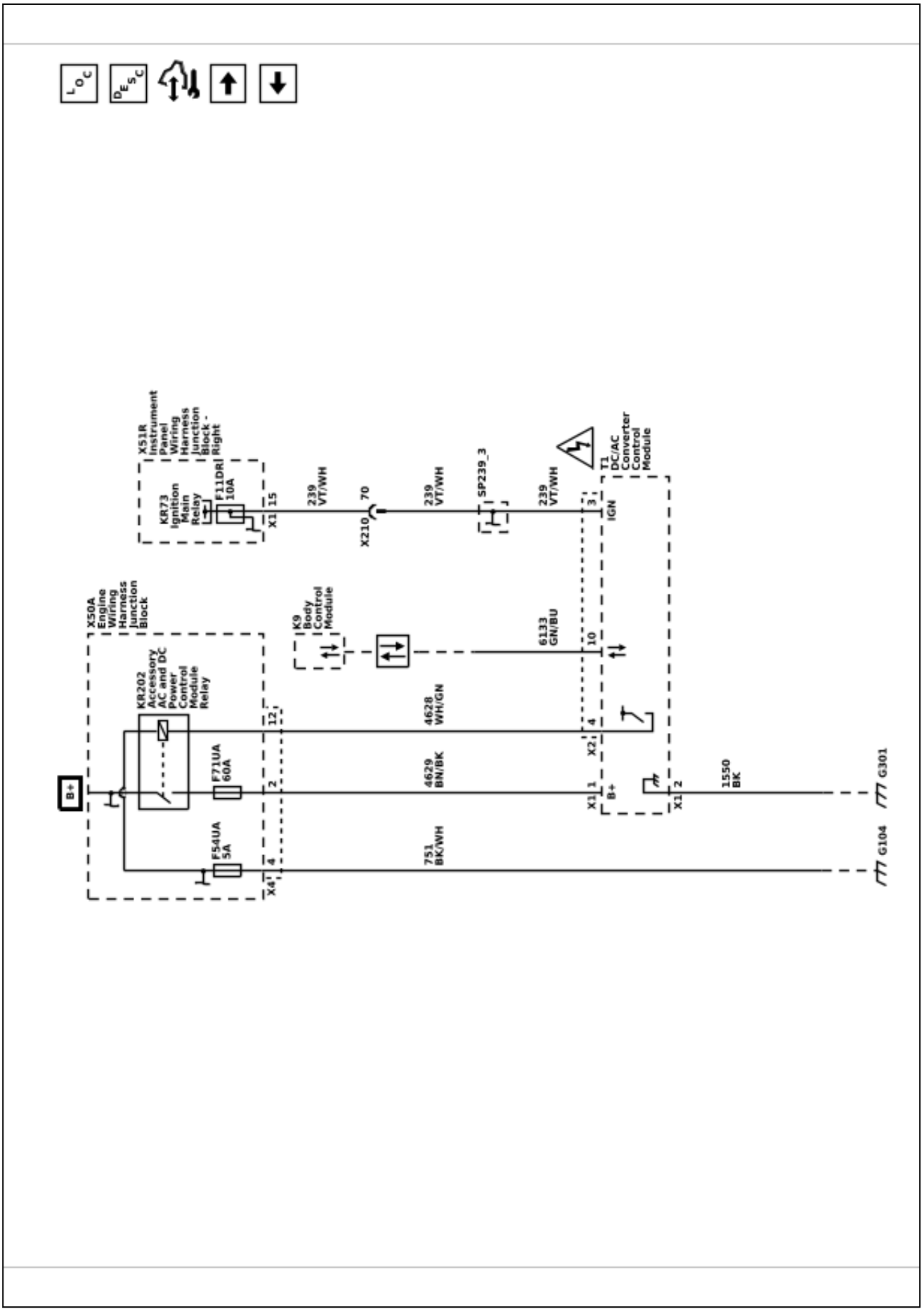
Power Outlets

Schematic and Routing Diagrams

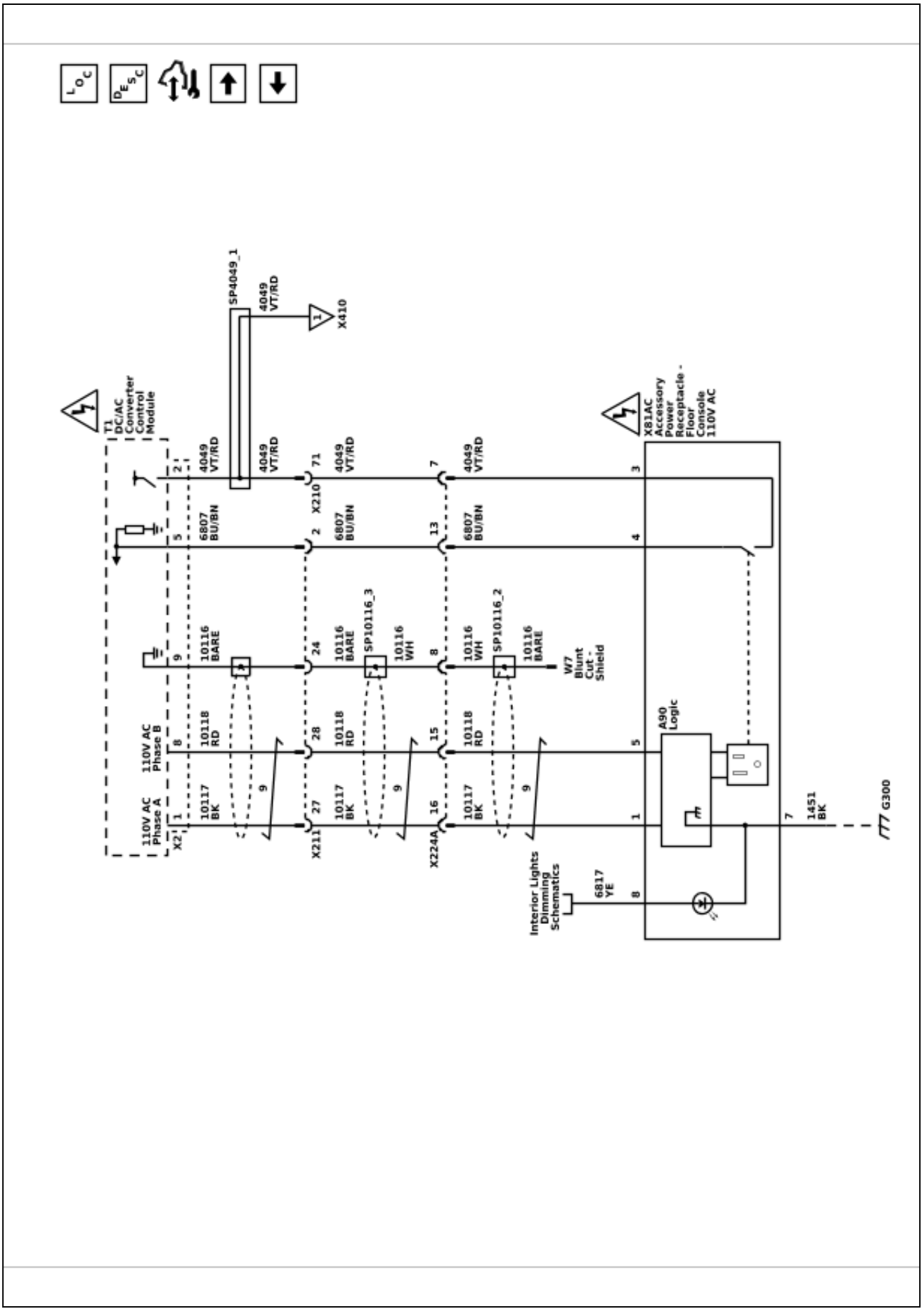
Cigar Lighter/Power Outlet Schematics (USB Charge Receptacles (UBI))



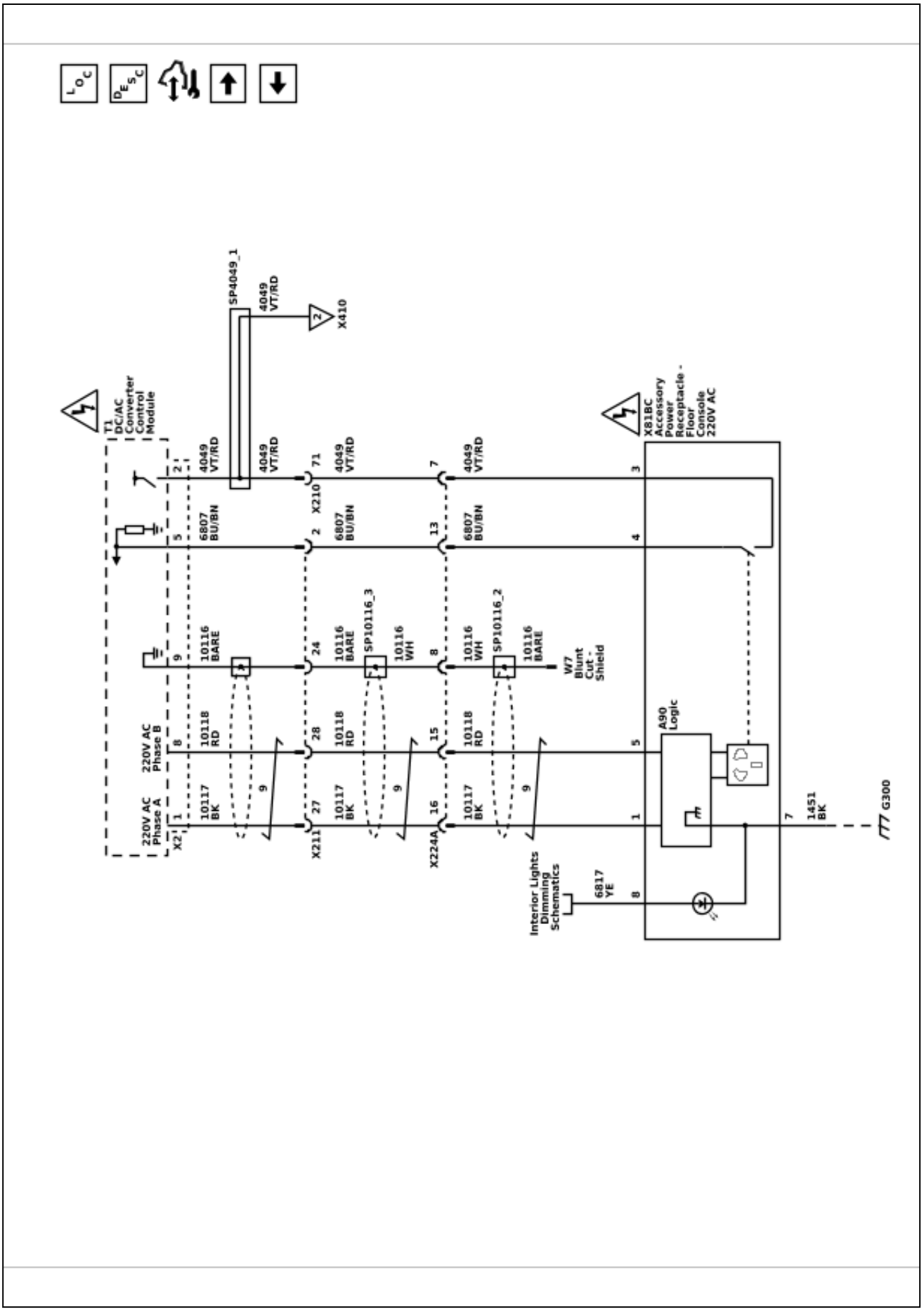
Cigar Lighter/Power Outlet Schematics (Inverter Module Power, Ground, and Serial Data (KC9 / KCA / KFG / KFH / KI4 / KI5))



Cigar Lighter/Power Outlet Schematics (110V AC Accessory Power Receptacle - Floor Console (KFG))

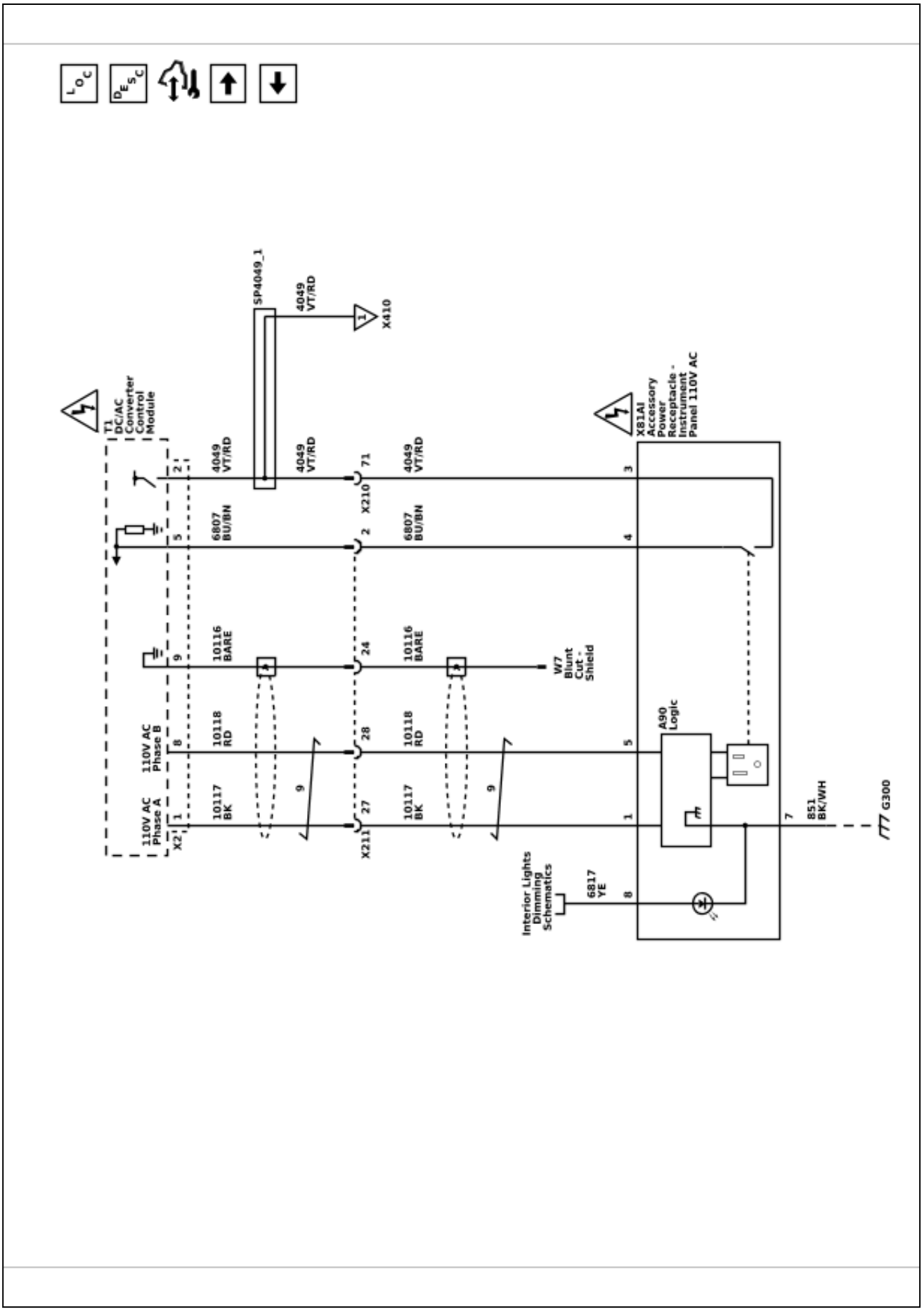


Cigar Lighter/Power Outlet Schematics (220V AC Accessory Power Receptacle - Floor Console (KFH))

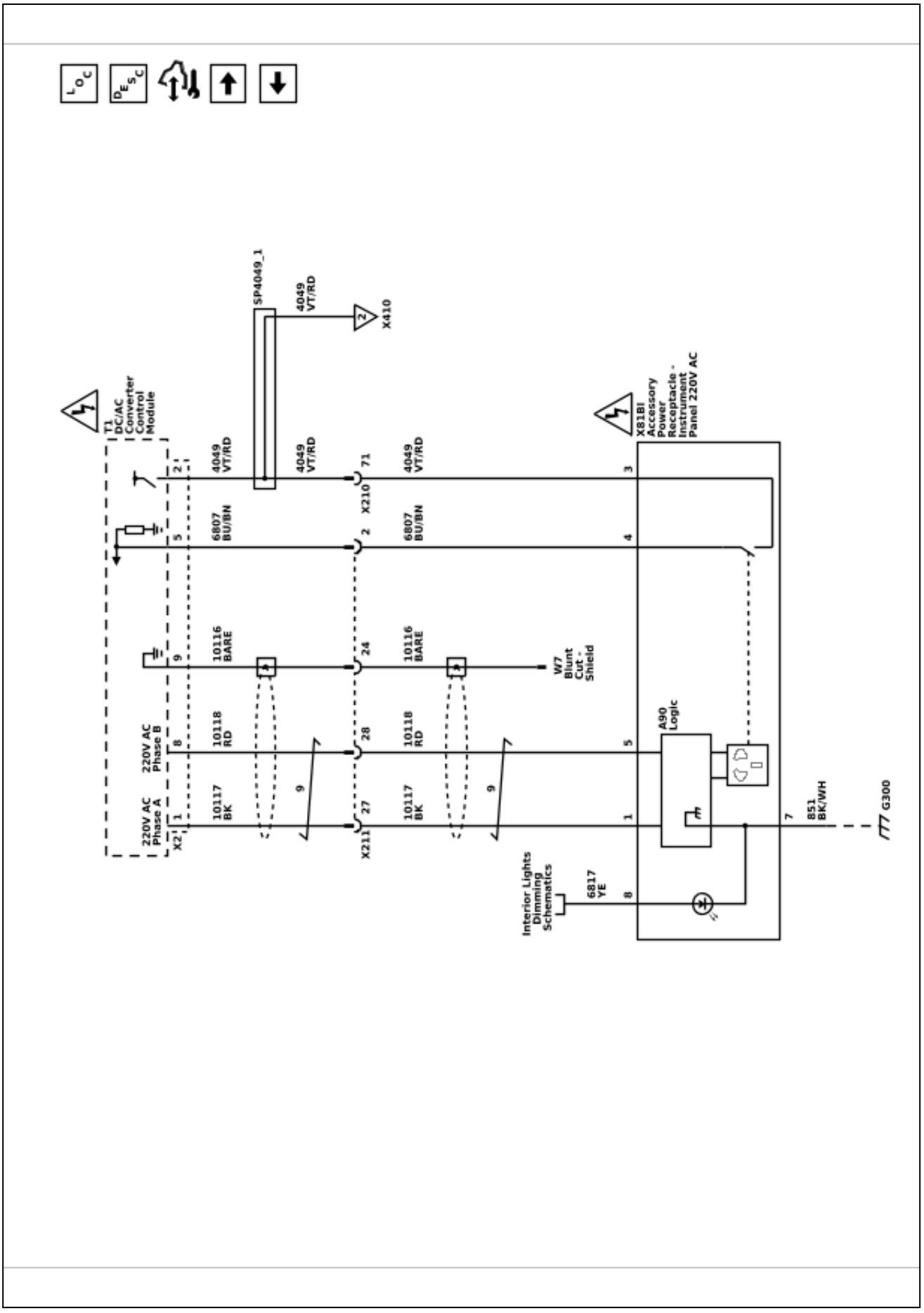


7157947

Cigar Lighter/Power Outlet Schematics (110V AC Accessory Power Receptacle - Instrument Panel (KI4))

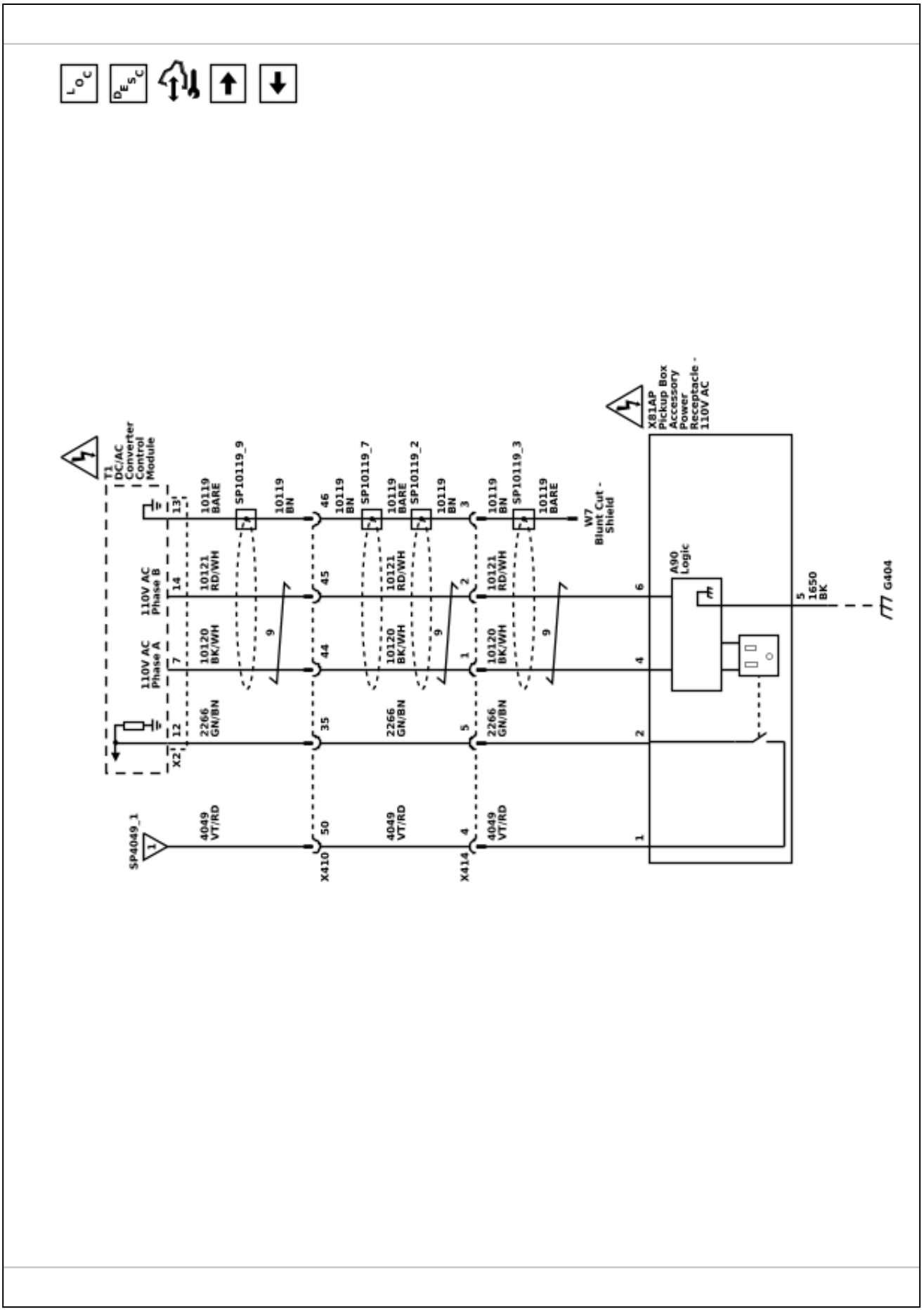


Cigar Lighter/Power Outlet Schematics (220V AC Accessory Power Receptacle - Instrument Panel (KI5))

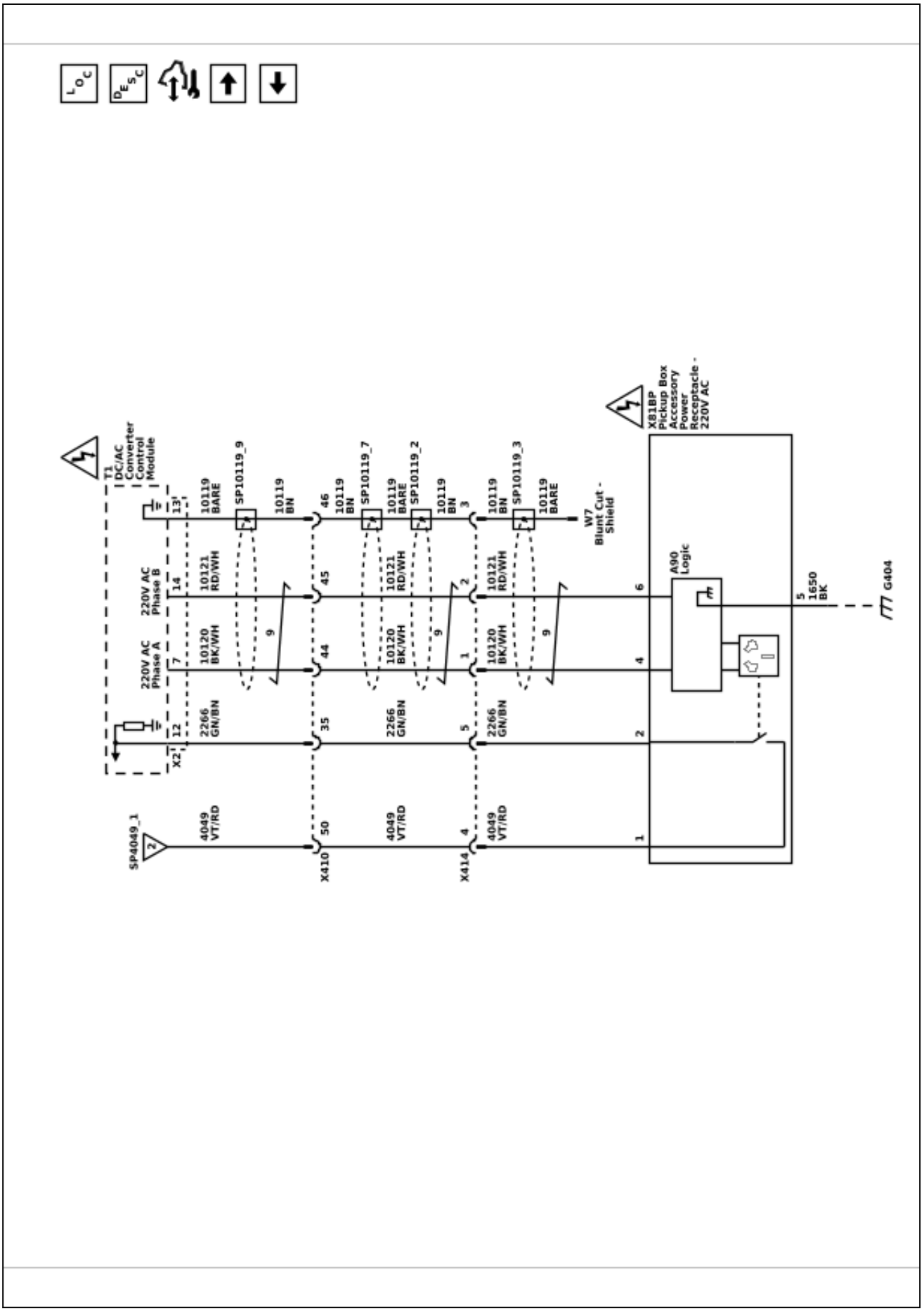


7157949

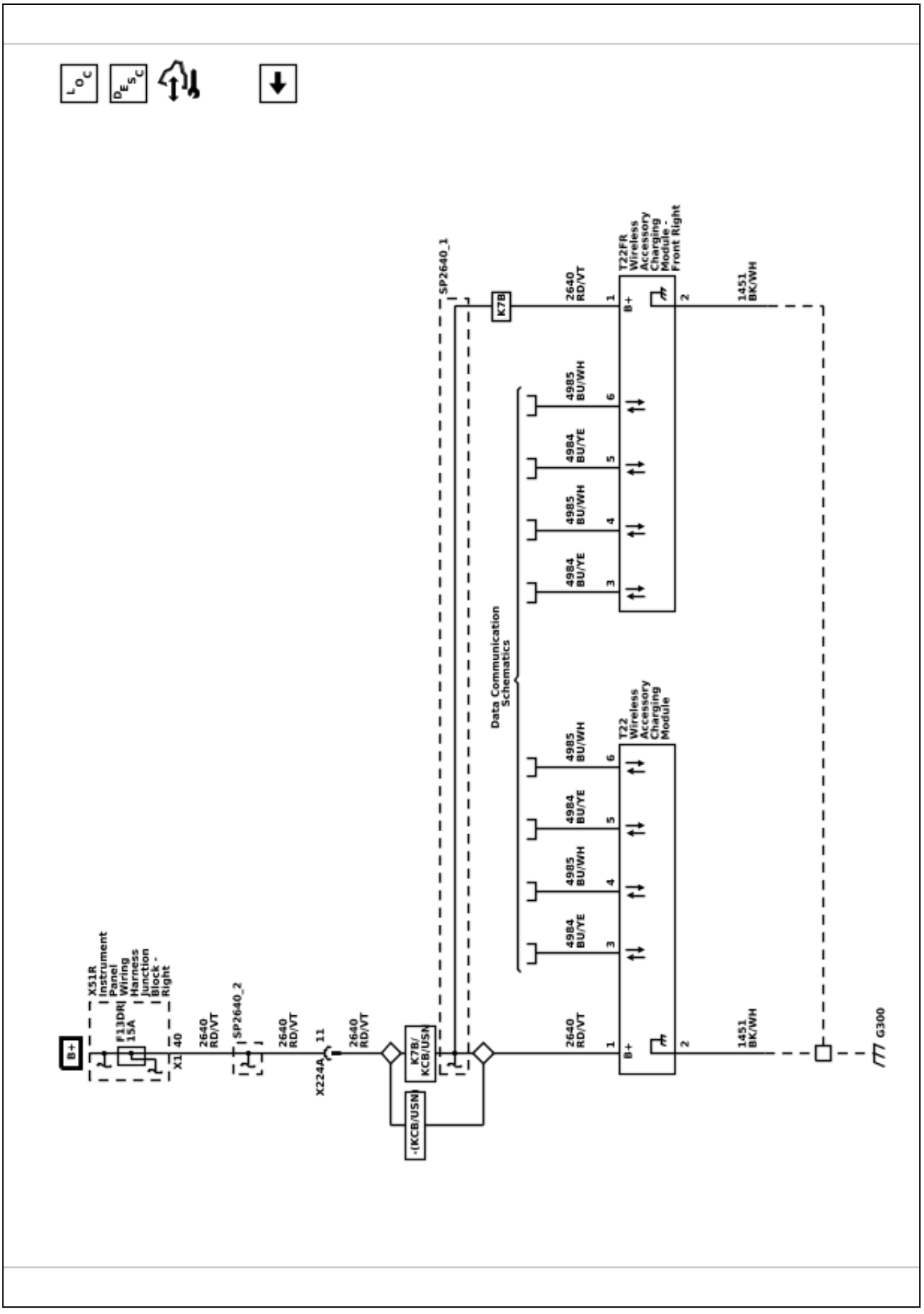
Cigar Lighter/Power Outlet Schematics (110V AC Accessory Power Receptacle - Pickup Box (KC9))



Cigar Lighter/Power Outlet Schematics (220V AC Accessory Power Receptacle - Pickup Box (KCA))



Cigar Lighter/Power Outlet Schematics (Wireless Charging (K7A))



Description and Operation

Mobile Device Wireless Charger Description and Operation

Mobile Device Wireless Charging System

The Mobile Device Wireless Charging System (WCS) is an system for wirelessly charging mobile devices. It is capable of charging the batteries of compatible mobile devices. A compatible device is one that is compliant with Power Matters Alliance (PMA), Wireless Power Consortium (WPC) Standard, or Alliance for Wireless Power (A4WP), meaning that it is equipped with a PMA, WPC, or A4WP wireless charge “receiver” that will work with the charge “transmitter” installed in the vehicle. The devices may utilize built-in charging circuitry or an adapter (external plug-in device which contains the charging circuitry). To check for phone or other device compatibility, refer to GM Total Connect.

Warning: Remove all objects from the charging pad before charging your mobile device. Objects, such as coins, keys, rings, paper clips, or cards, between the phone and charging pad will become very hot. On the rare occasion that the charging system does not detect an object, and the object gets wedged between the phone and charger, remove the phone and allow the object to cool before removing it from the charging pad, to prevent burns.

Charging

To charge a device, place it on the charging surface in the vehicle. There is a charging coil located in the center of the charging surface. The device has a charging coil typically near the center of the device. These coils must be lined up in order for charging to proceed. When the interruptible retained accessory power (IRAP) relay is closed (this is true typically when vehicle ignition is in Run or Accessory position), the WCS will detect the device, establish communications with the device to confirm it is a compatible device, and then deliver charging power to the device via wireless interface. The WCS will be able to deliver 5W to 15W of power as requested by the compatible device. It shall only enter a charging state if communication is established and a compatible device is identified.

The WCS shall not enter a charging state if there is no communication established with a compatible device. Due to differences in objects, a foreign object detection protocol is employed to detect a non-compliant device and hold power transfer initiation until the non-compliant object has been removed and a compliant object has been detected. The charger monitors its internal temperature and will shut down if the charger temperature exceeds 185F (85C).

Indicator

The K9 Body Control Module will detect the device battery is charging and send a serial data message on the GMLAN bus to the radio display. The radio display will indicate a device is currently charging by displaying a lightning bolt over the phone icon. When the indicator is toggling on and off this indicates a thermal limit has been reached and the device will not charge. For more information refer to the owners manual.

Cooling

The Wireless Charge modules (WCM) are cooled by the HVAC system. There is a dedicated vent that cools the module.

Power Outlets Description and Operation

USB Receptacle Description and Operation

The vehicle is fitted with USB charge port receptacles. These USB receptacles are for charging devices only and are not connected the vehicle infotainment system(s). The USB receptacles are controlled by an ignition operated relay and are operational when the ignition is either On or the Accessory positions.

AC Power Outlet System Description and Operation

The alternating current (AC) accessory power outlet system consists of the accessory DC/AC power inverter module and the AC power receptacle(s). The accessory DC/AC power inverter module converts 12 V direct current (DC) battery power to 110–120 V at 60 Hz (KI4) or 220–230 V at 50 Hz (KI5) AC power to operate AC powered devices. The accessory DC/AC power inverter module can provide up to 400 watts of power. The accessory power receptacle provides the typical connection for AC powered devices.

The accessory DC/AC power inverter module receives fuse protected battery voltage and is connected to the 12 V electrical system ground. The body control module communicates with the accessory DC/AC power inverter module via LIN serial data. The BCM provides power mode information, and the DC/AC power inverter sends information back to the BCM, including its operating status, output voltage/current, relay status, and any internal faults. The BCM acts as the Power Mode Master and determines whether the vehicle is in an allowable state, typically Ignition/Vehicle ON or Run/Propulsion Active. The BCM can command the power inverter OFF when a fault or invalid operating condition is detected, such as a change in power mode or the inverter reporting an operational error. The outlet(s) will be disabled and the outlet indicator will flash when a device is connected.

The accessory power receptacle(s) contain an internal switch, that detects when a device is plugged into the receptacle. When a device is plugged into the receptacle, the normally open switch in the receptacle closes, sending a signal back to the DC/AC power inverter module. When the accessory DC/AC power inverter module detects the signal from the receptacle, the inverter module begins to supply AC power to the receptacle after approximately a 1.5 s delay.

AC Power Outlet System Fault Protection

The accessory DC/AC power inverter module monitors it's operation and the receptacle(s) for faults. When a fault is detected, the module will disable operation of the receptacles. The module will turn ON again, after the condition is corrected, and the device is disconnected from the outlet, and then reconnected to the outlet after waiting approximately 3 seconds.

System Voltage Shutdown

The accessory DC/AC power inverter module will turn OFF if the B+ supply voltage is greater than 16.5 V or less than 11 V.

Power Inverter Internal Shutdown

The module will turn OFF if the internal temperature exceeds 85°C (185°F)

Receptacle Isolation Fault Protection

The accessory DC/AC power inverter module contains a ground fault circuit interrupter (GFCI). GFCI monitors the AC voltage circuit for a short to vehicle chassis ground. If an AC voltage short to ground is detected, the accessory DC/AC power inverter module will turn OFF.

Receptacle Overload

The accessory DC/AC power inverter module will turn OFF if the current in the AC voltage circuit is greater than 3.8 A for 1 s , or 2.5 A for 10 s.

Wiring Systems and Power Management

Schematic and Routing Diagrams

How to Use Electrical Schematics

Information Overview

The following explains some of the key parts of the GM wiring diagrams. Included are:

- Color Abbreviations
- Electronic Delivery Navigation Features

Color Abbreviations

The following sequence is used when depicting wire colors:

1. Color modifier of the wire, such as light or dark (if applicable)
2. Primary color of the wire
3. Secondary color of the wire (tracer/stripe)

Wire insulation and connector body colors in schematic information are abbreviated with a two character code as listed below.

Abbreviation	Color	Abbreviation	Color
AM	Amber	OG	Orange
BARE	Bare	PK	Pink
BG	Beige	PU	Purple
BK	Black	RD	Red
BN	Brown	RU	Rust
BU	Blue	SR	Silver
CL	Clear	TL	Teal
CR	Cream	TN	Tan
CU	Curry	TQ	Turquoise
GD	Gold	VT	Violet
GN	Green	WH	White
GY	Gray	YE	Yellow
NA	Natural	—	—
Color Modifiers			
L	Light	D	Dark

Additionally, industry standard cable types are not identified by color, but are listed by cable type as follows:

Abbreviation	Cable Type
COAX	Coax Cable
ENET	Ethernet
FW	Flat Wire
HDMI	High Definition Multimedia Interface
LVDS	Low-voltage Differential Signaling
TWINAX	Twinax Cable
USB	Universal Serial Bus

Electronic Delivery Navigation Features

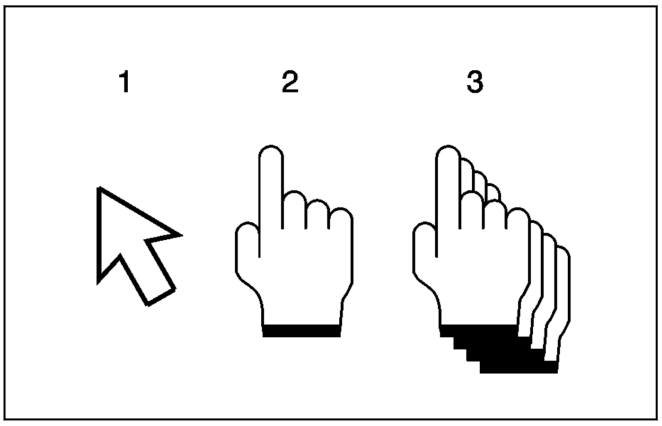
The schematics information has been enhanced for electronic delivery and the following explains the features that are now available.

The enhanced features are categorized into three types:

- Mouse-overs, which are active when the mouse pointer is placed over the activated area

- Hotspots (links to other information), which are active by placing the mouse pointer over the activated area and clicking the left mouse button
- Hotspot Target Highlighting, which is when linking from one graphic to another graphic, the point of interest will be highlighted in red. This feature is available only when linking from a schematic graphic to a component locator/harness routing view, or when linking from a schematic to an electrical center identification view

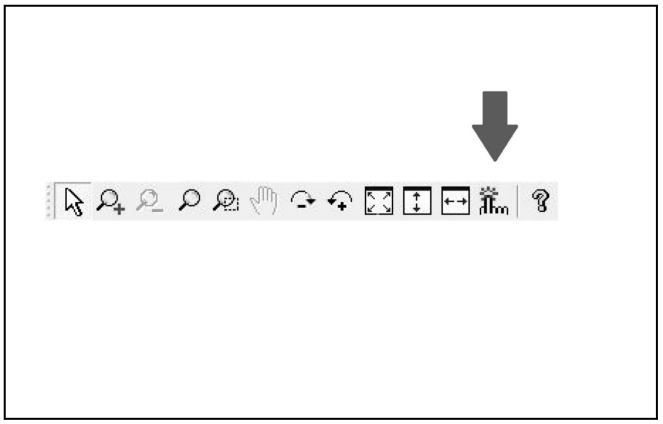
Depending on the amount of information that is linked to from a hotspot, the mouse pointer changes shape.



3819127

1. Basic mouse pointer – this means there are no hotspots available, but there may be a mouse-over available.
2. Single hand pointer – this means there is a mouse-over and hotspot link to a single document. Clicking on these areas will automatically take you to the target link.
3. Multiple hand pointer – this means there is a mouse-over and hotspot link to a multiple document. Clicking on these areas will bring up a pop-up menu that will display all available links. You may then select one of the available links clicking on one of the displayed links.

To see which areas of the schematic information have an available hotspot and/or a mouse-over, select and hold down the highlight hotspots button of the cgm viewer. This will highlight all areas of the graphic that have an available hotspot and/or a mouse-over in red. Once the button is released, the areas of the graphic will no longer be highlighted.



3819130

Each type of schematic related information has some level of these features. The schematic related information consists of the following information types:

- Schematics
- Connector End Views
- Component Locator Views
- Harness Routing Views
- Electrical Center Identification Views
- Master Electrical Component List
- Master Electrical Schematic Icons
- Schematics RPO Code List
- Circuit Number/Wire Colors
- Wire Lines
- Connector Cavities

Schematics

An electrical schematic hotspot is an activated icon or area in the schematic that can be cursor selected to link to additional information. Additionally, each of the hotspots in schematics has a mouse-over.

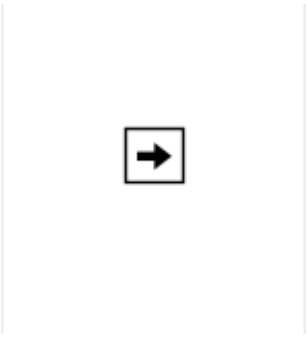
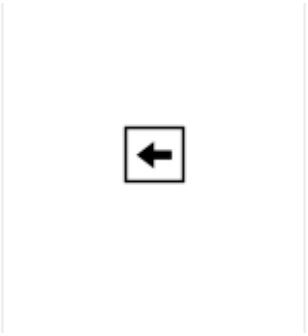
Hotspots in schematics are categorized into three types:

- Schematic Navigational Icon Hotspots
- Schematic Informational Icon Hotspots
- Schematic Navigational Hotspots

Schematic Navigational Icon Hotspots

The following lists icons that may appear on the upper right corner of a schematic that have an available mouse-over and hotspot.

Icon	Mouse-Over	Hotspot Link to Information
 1990537	Master Electrical Component List	Links to the vehicle Master Electrical Component List that shows all electrical components and harness items on the vehicle and has links to any available views
 1990538	Title of the subsystem description and operation	Links to the System Description and Operation
 1988674	Control Module References	Links to the Control Module References table

Icon	Mouse-Over	Hotspot Link to Information
 1990541	Title of the next schematic page	Links to the next schematic of the subsystem schematics
 1990542	Title of the previous schematic page	Links to the previous schematic of the subsystem schematics

Schematic Informational Icon Hotspots

The following lists the icons that may appear anywhere on a schematic that have an available mouse-over and hotspot.

Icon	Mouse-Over	Hotspot Link to Information
Danger  1988672	Master Electrical Schematic Icons	Links to the vehicle Master Electrical Schematic Icons list that describes the message for the icon.
High Voltage  1988673	Master Electrical Schematic Icons	Links to the vehicle Master Electrical Schematic Icons list that describes the message for the icon.
Caution  1990543	Master Electrical Schematic Icons	Links to the vehicle Master Electrical Schematic Icons list that describes the message for the icon.
Supplemental Restraint  1988667	Master Electrical Schematic Icons	Links to the vehicle Master Electrical Schematic Icons list that describes the message for the icon.

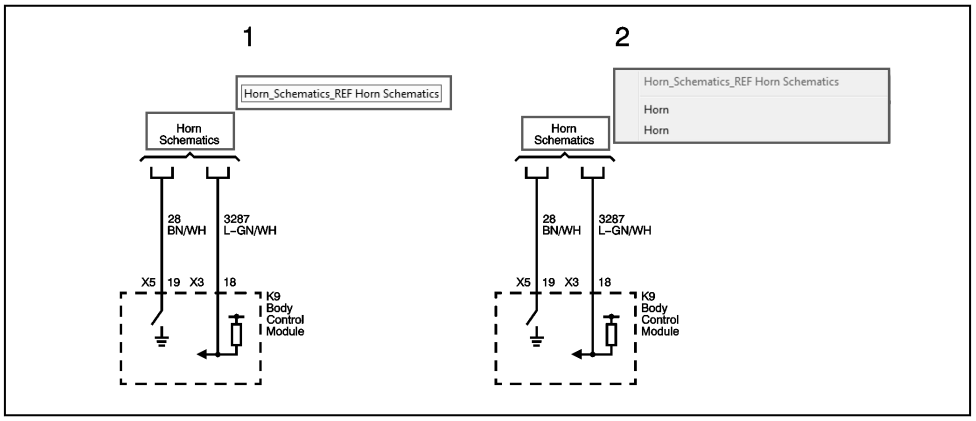
Icon	Mouse-Over	Hotspot Link to Information
Pedestrian Impact  3814889	Master Electrical Schematic Icons	Links to the vehicle Master Electrical Schematic Icons list that describes the message for the icon.
Additional Information  1988670	Master Electrical Schematic Icons	Links to the vehicle Master Electrical Schematic Icons list that describes the message for the icon.

Schematic Navigational Hotspots

In addition to the navigational icons, schematics have other active hotspots that link to supporting information such as related schematics, component locator views, harness routing views, and connector end views.

These hotspots can be either text based or symbol based. The following are the items that will have a mouse-over and hotspot.

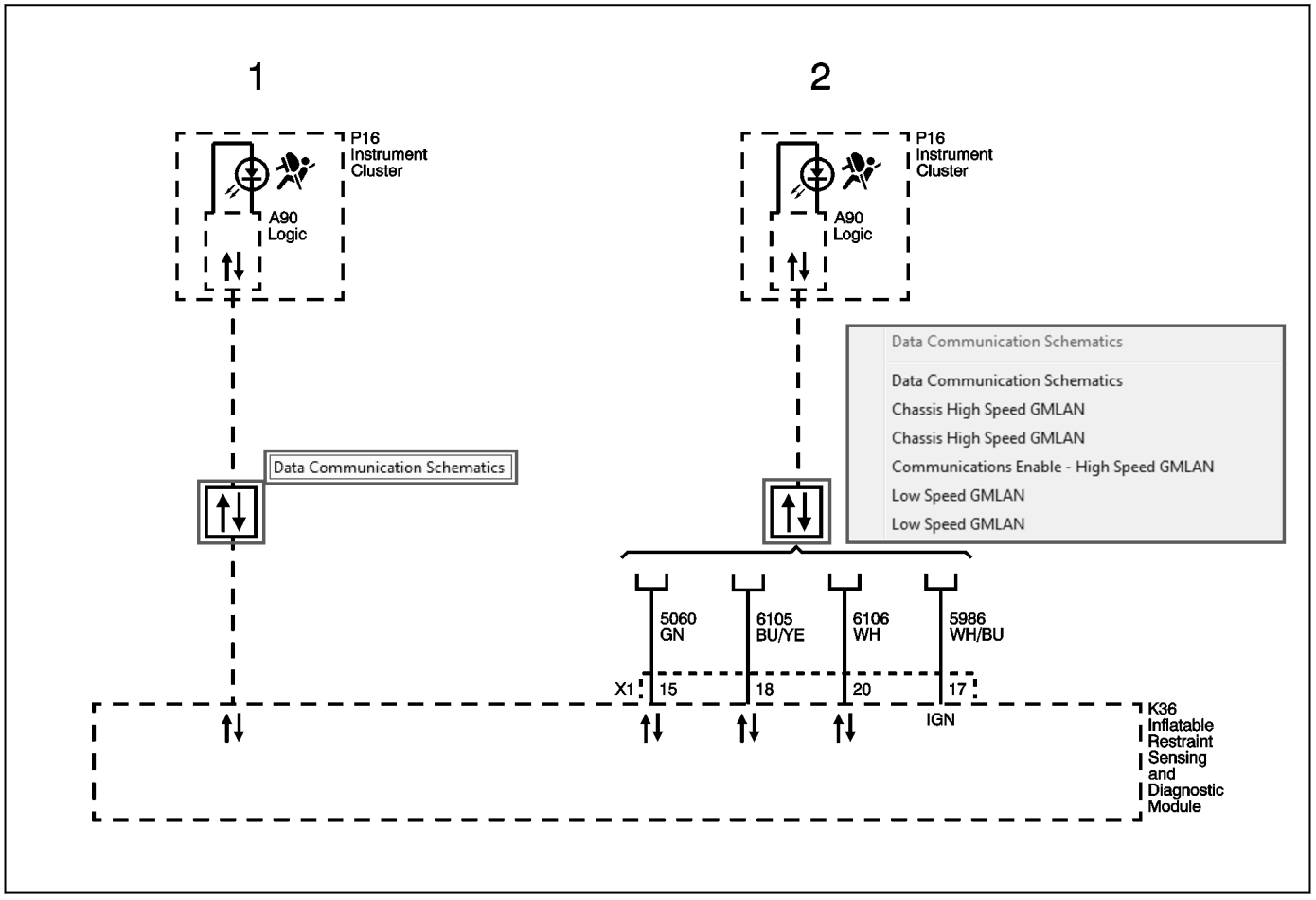
Schematic Title Circuit References



3814891

1. **Mouse-over:** Displays the title of the schematic page linked to.
2. **Hotspot Link to Information:** Links to the individual subsystem schematic page(s) that shows the circuit in detail. If multiple circuits are included, or if the circuit is shown in multiple schematics, a menu will appear when the link is selected. This menu includes links to all schematics that contain the same circuit number as the circuit being referenced. Additionally, when the target schematic is opened, the referenced circuit will be highlighted to draw visual attention. Note that when there are multiple target links, the links may appear to be duplicate in the menu, however, they are not. The exact same title is repeated for each circuit number that is pointing to the same target schematic. A future update will include the circuit number before the link description to further assist in link selection.

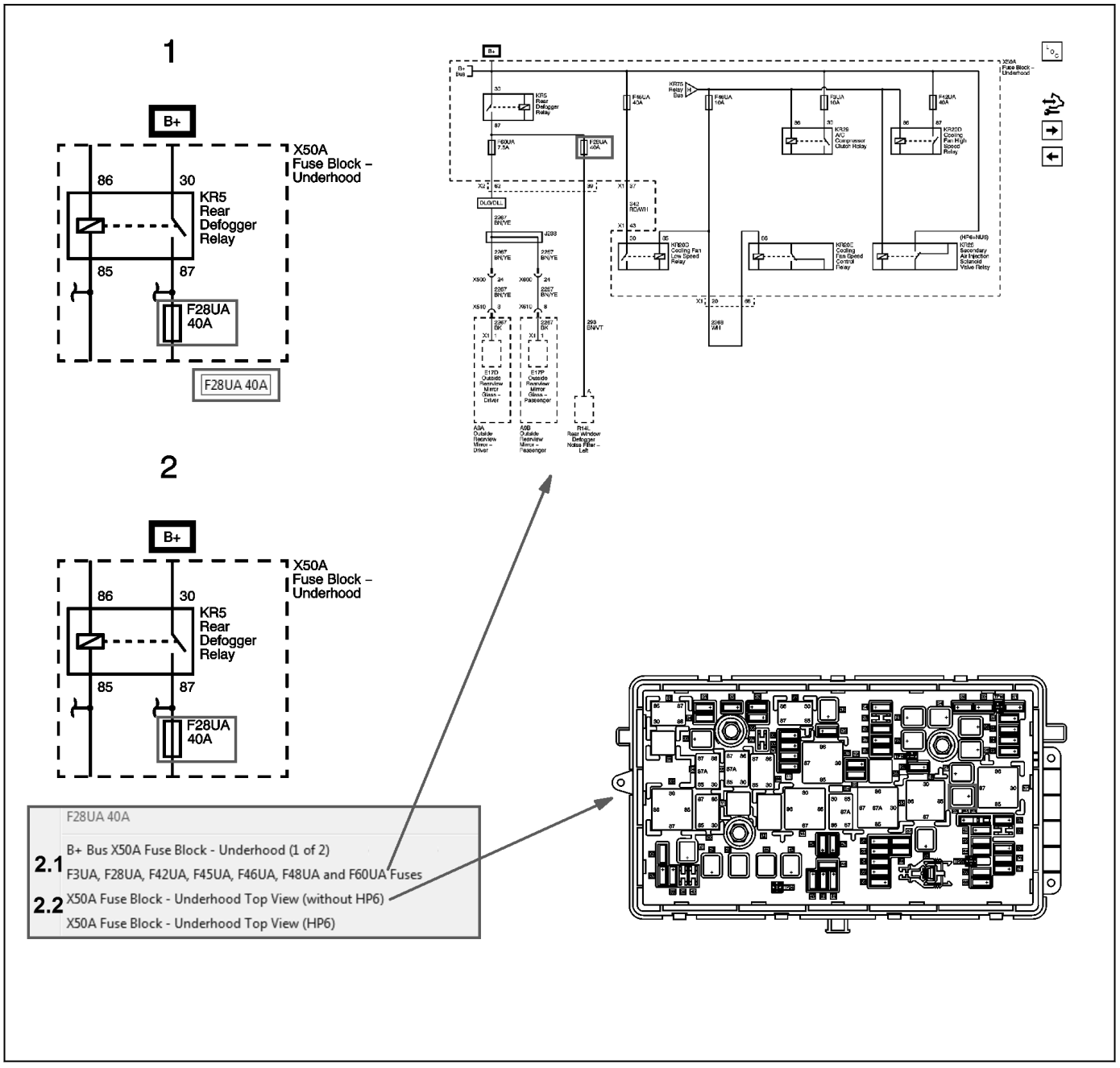
Serial Data Functional Circuit Icon



3818612

1. **Mouse-over:** Displays the schematic title Data Communication Schematics.
2. **Hotspot Link to Information:**
   - ⇒ When a dashed serial data wire and icon are shown without any circuit numbers, the serial data circuit icon will link to the complete list of Data Communication schematic pages, and not a specific schematic. This is due to no circuit numbers are shown.
   - ⇒ When a circuit wire(s) are shown with circuit numbers, a menu will appear when the link is selected. This menu includes links to the list of Data Communication schematic pages as well as links to the individual schematics that contain the same circuit number as the circuit being referenced. Additionally, when the target schematic is opened, the referenced circuit will be highlighted to draw visual attention. Note that when there are multiple target links, the links may appear to be duplicate in the menu, however, they are not. The exact same title is repeated for each circuit number that is pointing to the same target schematic. A future update will include the circuit number before the link description to further assist in link selection.

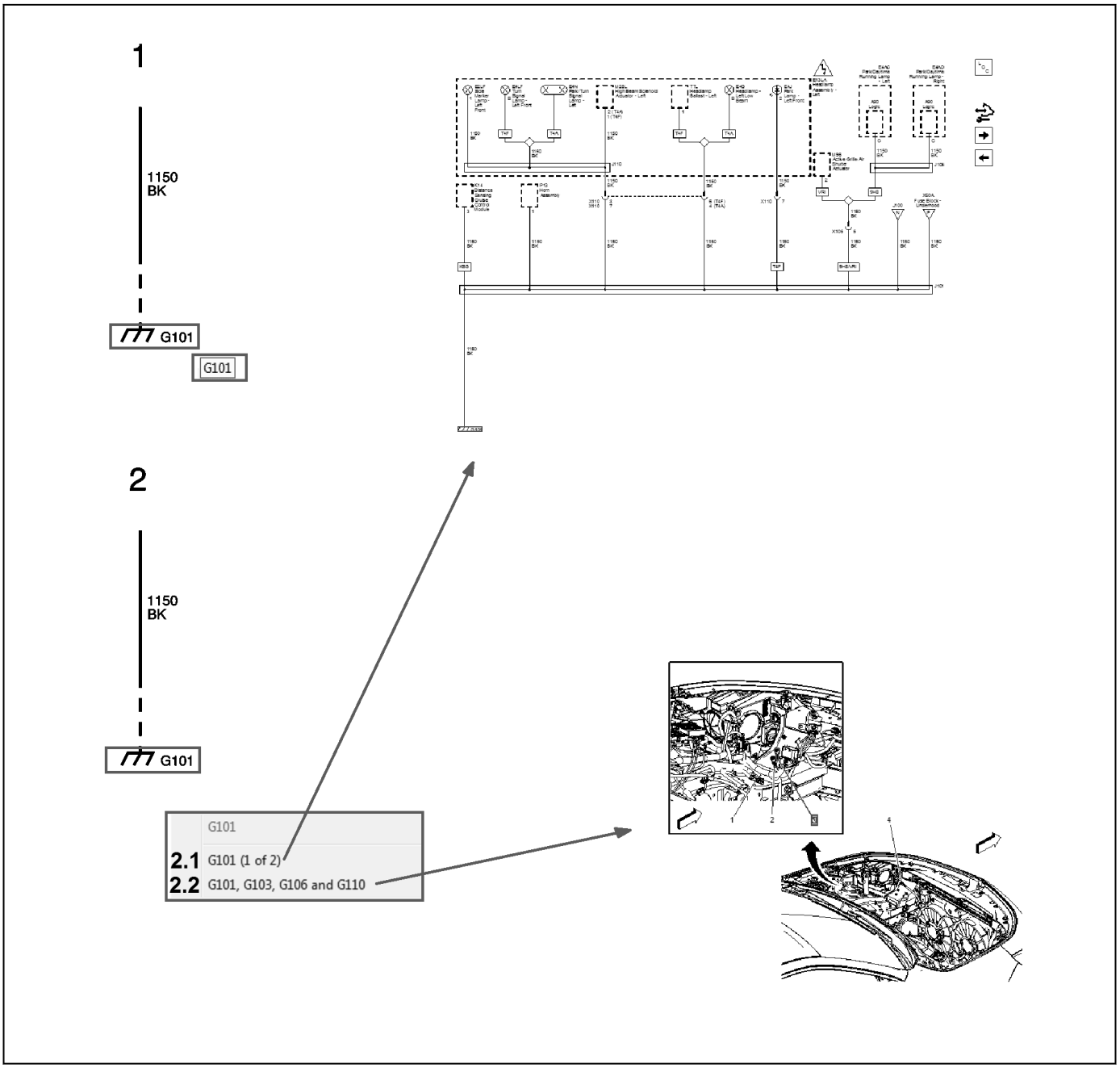
Fuse/Circuit Breaker Symbol and Name within Subsystem Schematics



3818725

1. **Mouse-over:** Displays the code and the amperage of the protection device.
2. **Hotspot Link to Information:**
   ⇒ When multiple links are available, a menu will appear when the link is selected. This menu includes all available links in a structured sequence.
   2.1. Links to the individual schematic page(s) within the Power Distribution Schematics where the circuits are shown in detail. Additionally, when the target schematic is opened, the circuit protection device will be highlighted to draw visual attention.
   2.2. Links to individual fuse block top or bottom view(s) within the Electrical Center Identification Views and will show where the device is located in the fuse block. Additionally, when the target view is opened, the device outline will be highlighted for visual attention.

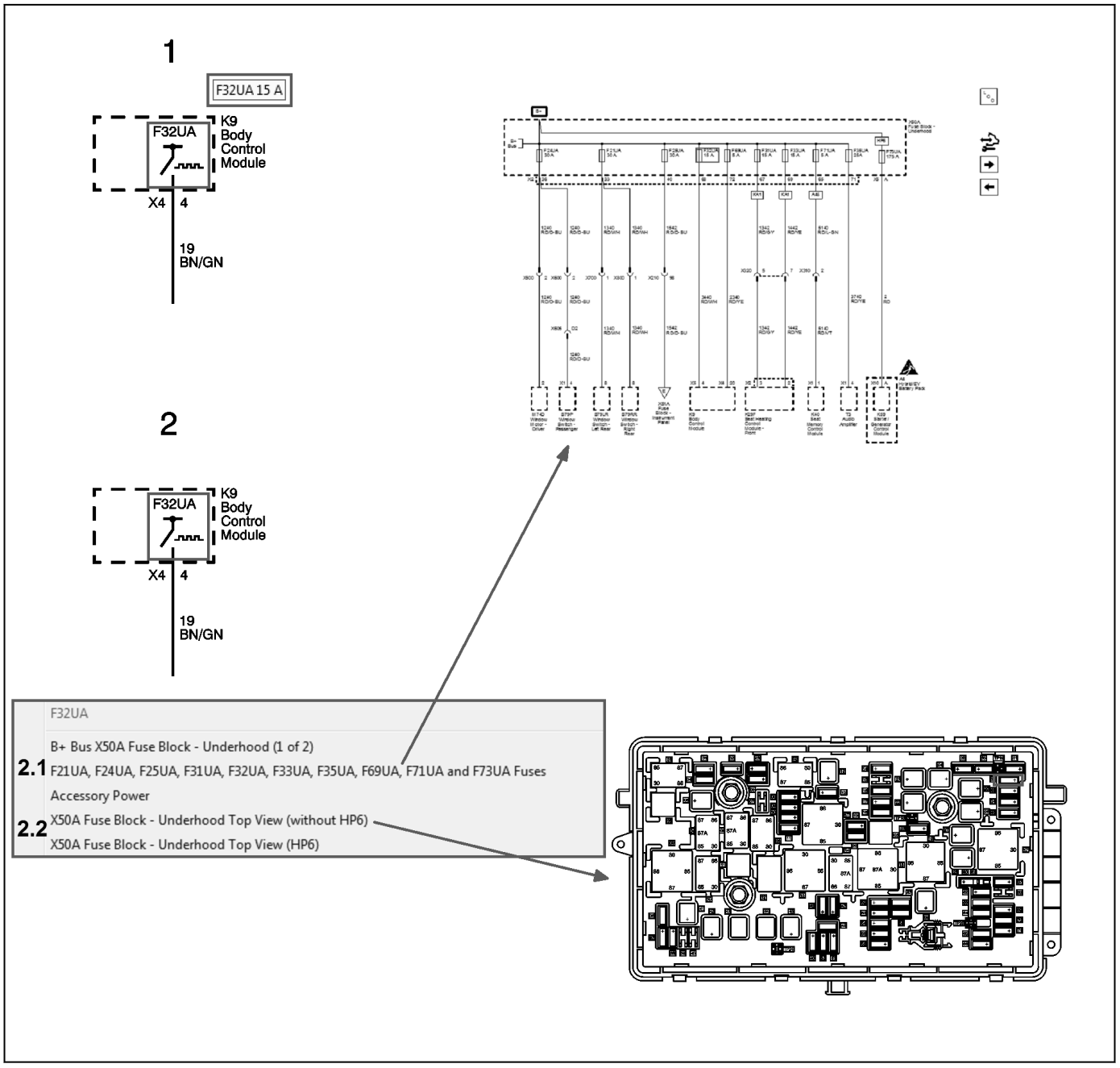
Ground Symbol/Name in Subsystem Schematics



3818918

1. **Mouse-over:** Displays the ground number.
2. **Hotspot Link to Information:**
   - ⇒ When multiple links are available, a menu will appear when the link is selected. This menu includes all available links in a structured sequence.
   - 2.1. Links to the individual schematic page(s) within the Ground Distribution Schematics where the circuits are shown in detail. Additionally, when the target schematic is opened, the ground will be highlighted to draw visual attention.
   - 2.2. Links to the individual locator view(s) within the Ground Views and will show where the ground is located on the vehicle. Additionally, when the target view is opened, the ground and callout leader line/number will be highlighted to draw visual attention.

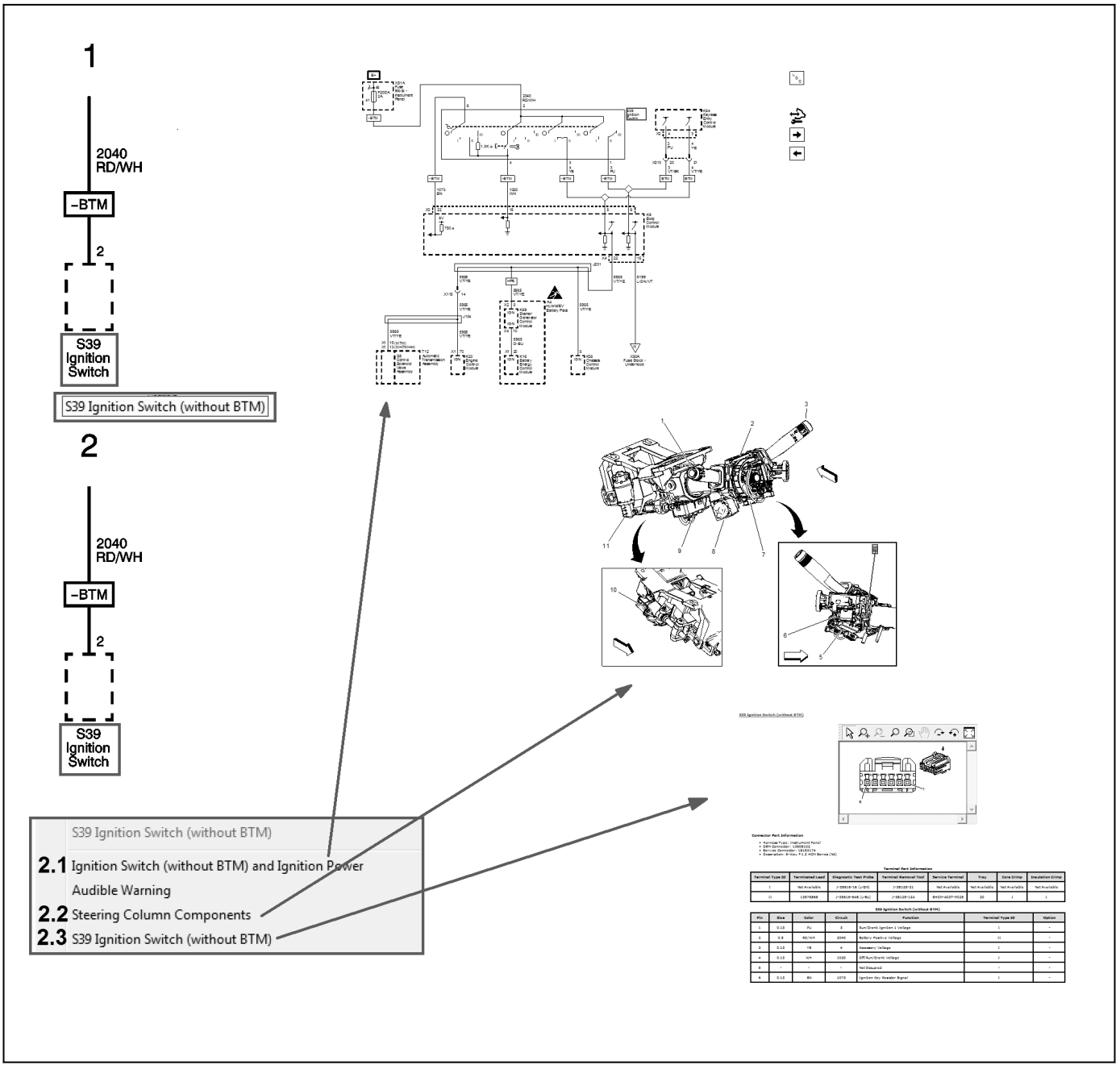
Body Control Module High-Side Driver Output Symbol/Driver Source Fuse Name in Subsystem Schematics



3819026

1. **Mouse-over:** Displays the code of the protection device that supplies the high-side driver output circuit.
2. **Hotspot Link to Information:**
   ⇒ When multiple links are available, a menu will appear when the link is selected. This menu includes all available links in a structured sequence.
   2.1. Links to the individual schematic page(s) within the Power Distribution Schematics where the circuits are shown in detail. Additionally, when the target schematic is opened, the circuit protection device will be highlighted to draw visual attention.
   2.2. Links to individual fuse block top or bottom view(s) within the Electrical Center Identification Views and will show where the device is located in the fuse block. Additionally, when the target view is opened, the device outline will be highlighted for visual attention.

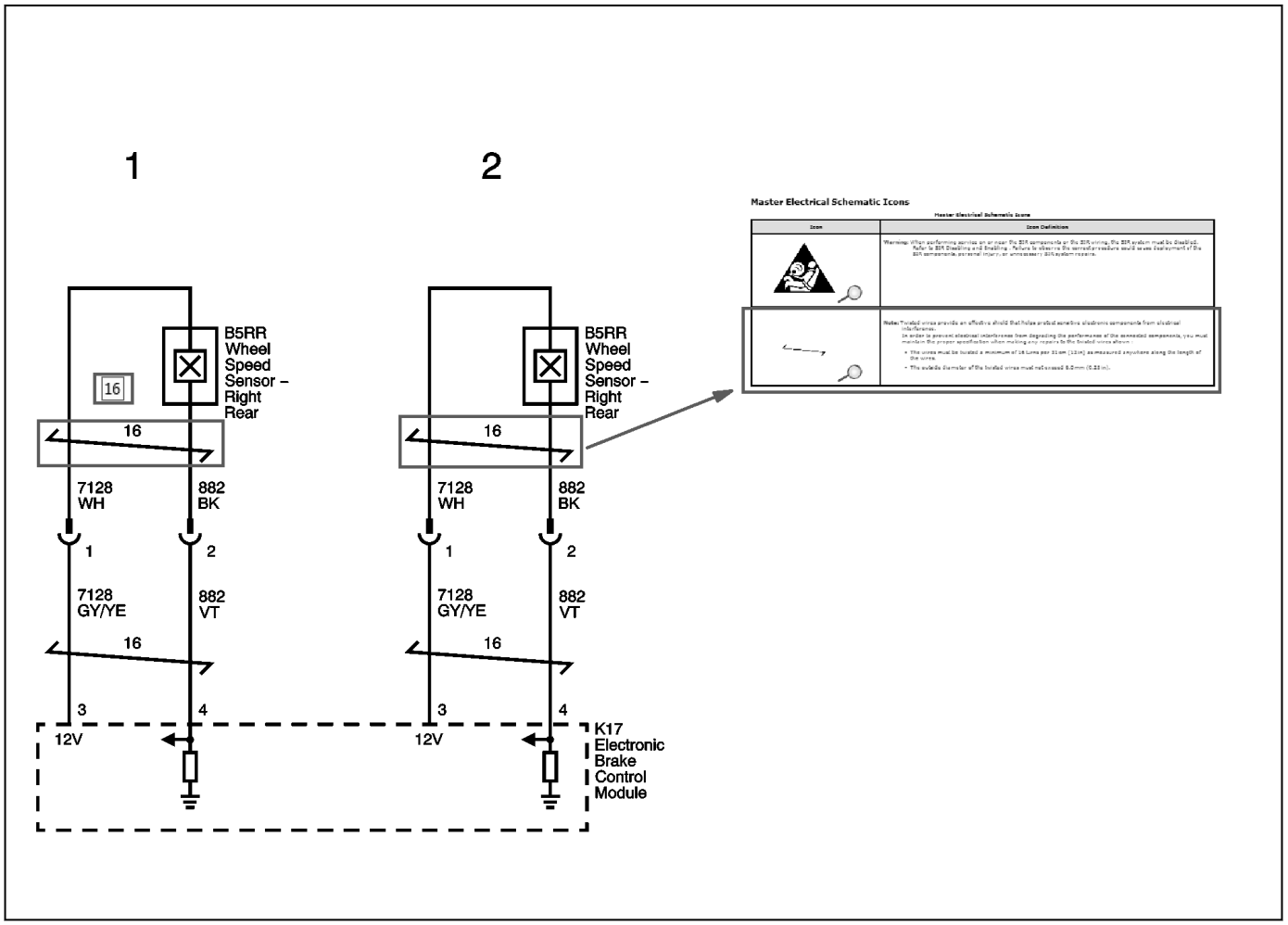
Component Name in Power and Ground Distribution Schematics



3819063

1. **Mouse-over:** Displays the code and name of the component.
2. **Hotspot Link to Information:**
   ⇒ When multiple links are available, a menu will appear when the link is selected. This menu includes all available links in a structured sequence.
   2.1. Links to the individual schematic page(s) within the Subsystem Schematic(s) where the circuits are shown in detail. Additionally, when the target schematic is opened, the component code and name will be highlighted to draw visual attention.
   2.2. Links to the individual locator view(s) within the applicable component view category and will show where the component is located on the vehicle. Additionally, when the target view is opened, the component and callout leader line/number will be highlighted to draw visual attention.
   2.3. Links to individual connector end view(s) within the Component Connector End Views.

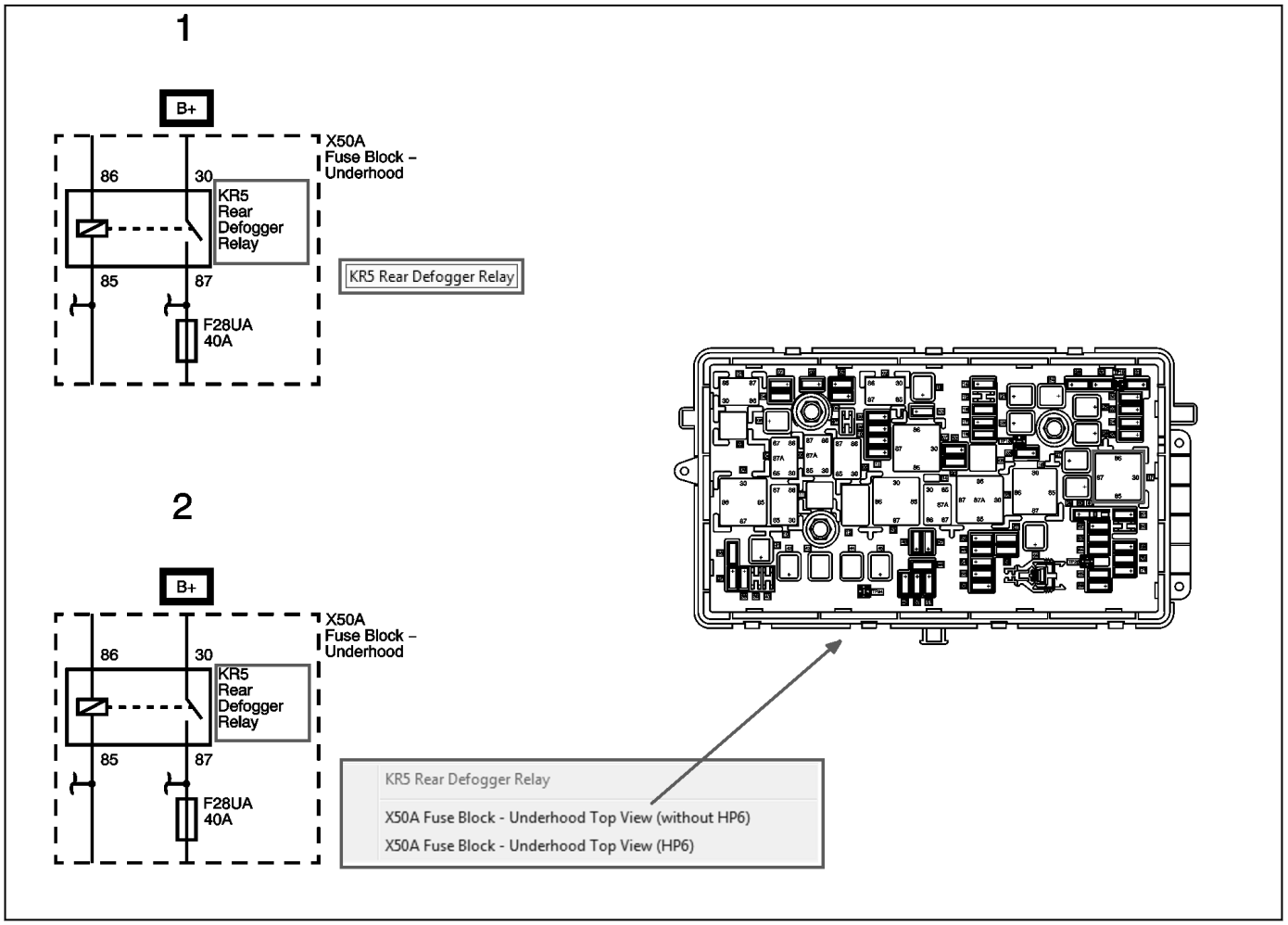
Twisted Pair Symbols



3819064

1. **Mouse-over:** Displays the repair specification for the number of twists of the wire within the specified distance.
2. **Hotspot Link to Information:** Links to the Master Electrical Schematic Icons list that shows the icon along with the repair specification details for the wire.

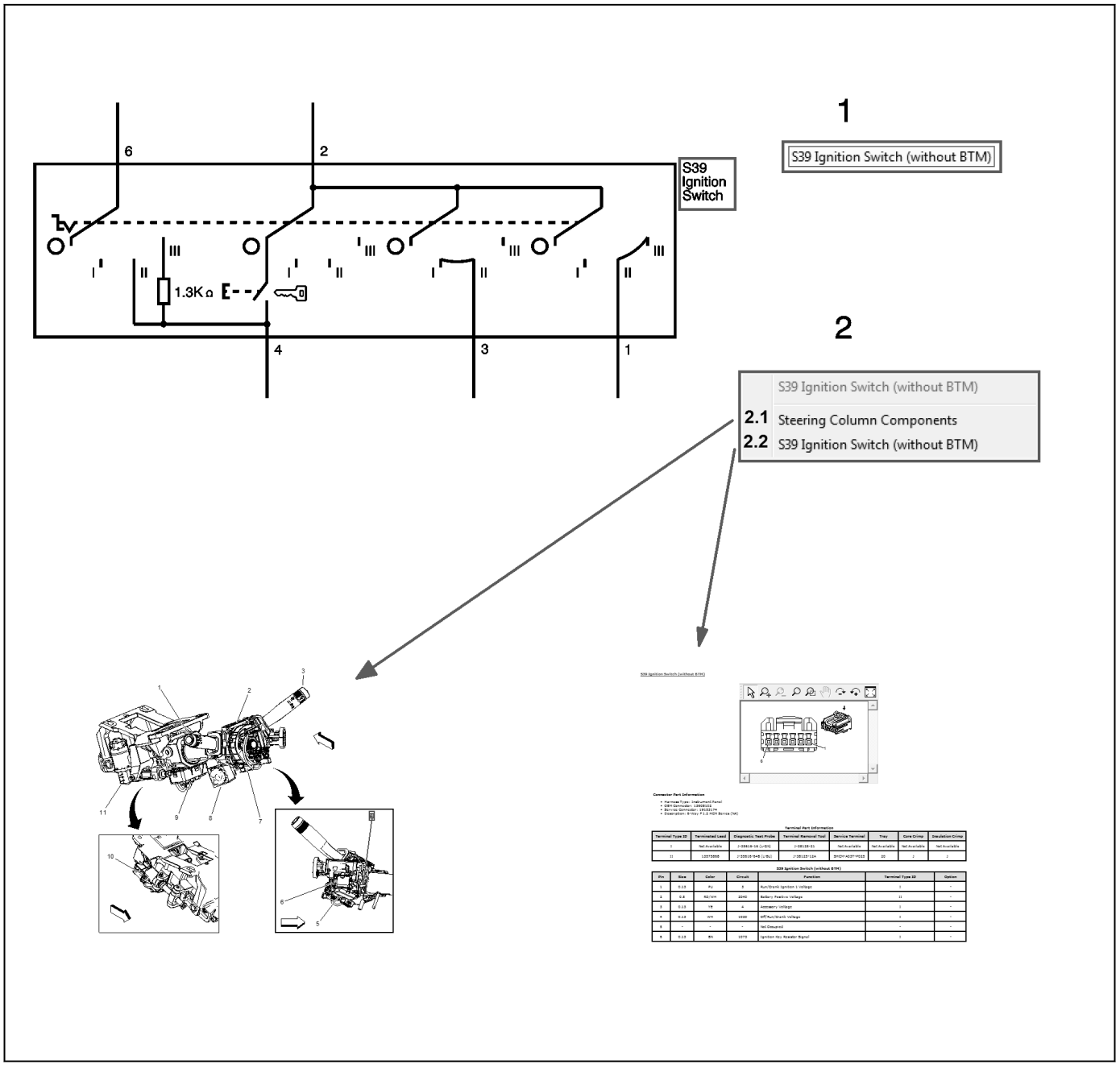
Relay Name (located within a block)



3819124

1. **Mouse-over:** Displays the relay code and name.
2. **Hotspot Link to Information:** Links to individual fuse block top or bottom view(s) within the Electrical Center Identification Views and will show where the device is located in the fuse block. Additionally, when the target view is opened, the device outline will be highlighted for visual attention.

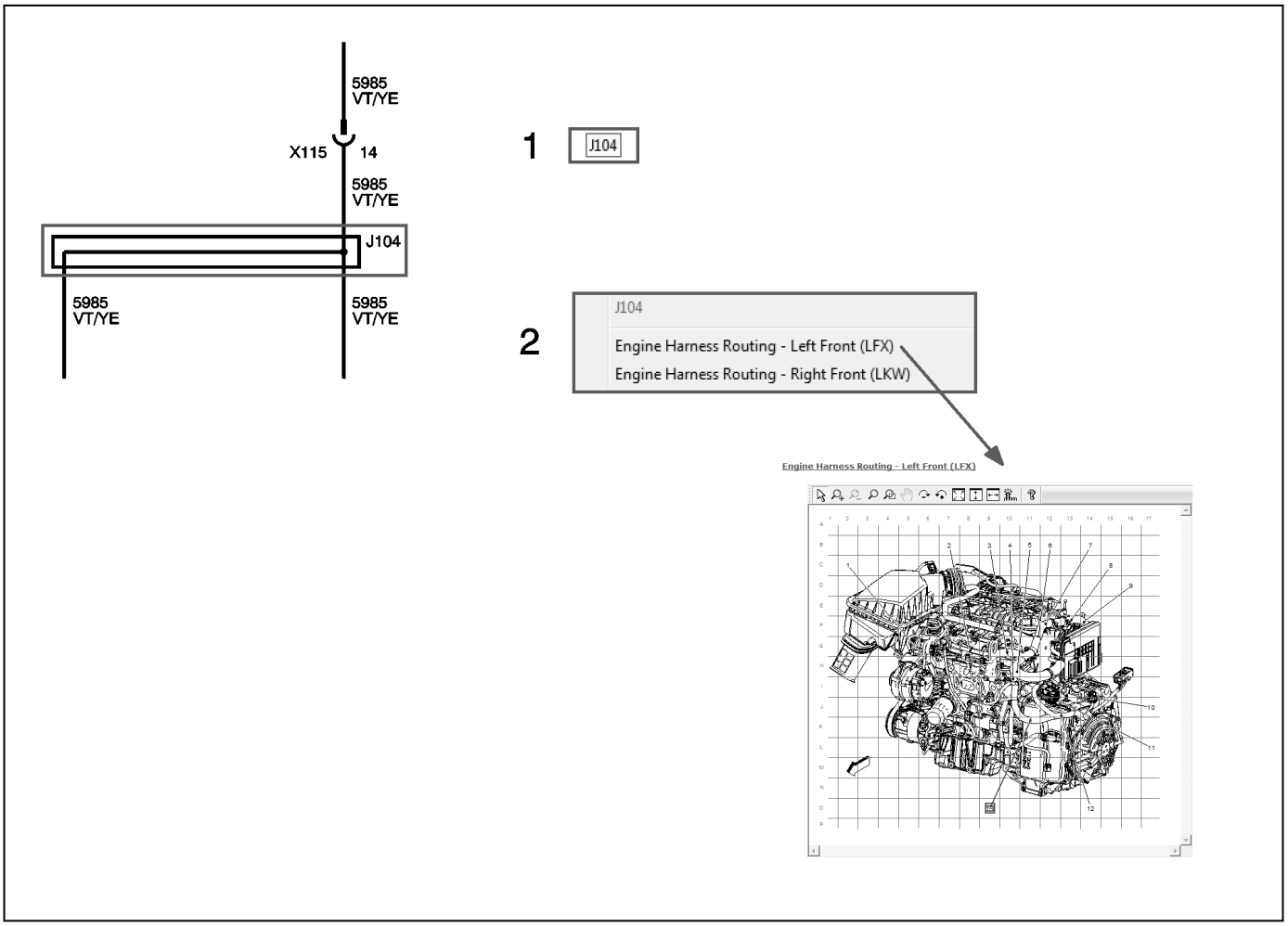
Component Name in Subsystem Schematics



3819141

1. **Mouse-over:** Displays the code and name of the component.
2. **Hotspot Link to Information:**
   ⇒ When multiple links are available, a menu will appear when the link is selected. This menu includes all available links in a structured sequence.
   2.1. Links to the individual locator view(s) within the applicable component view category and will show where the component is located on the vehicle. Additionally, when the target view is opened, the component and callout leader line/number will be highlighted to draw visual attention.
   2.2. Links to individual connector end view(s) within the Component Connector End Views.

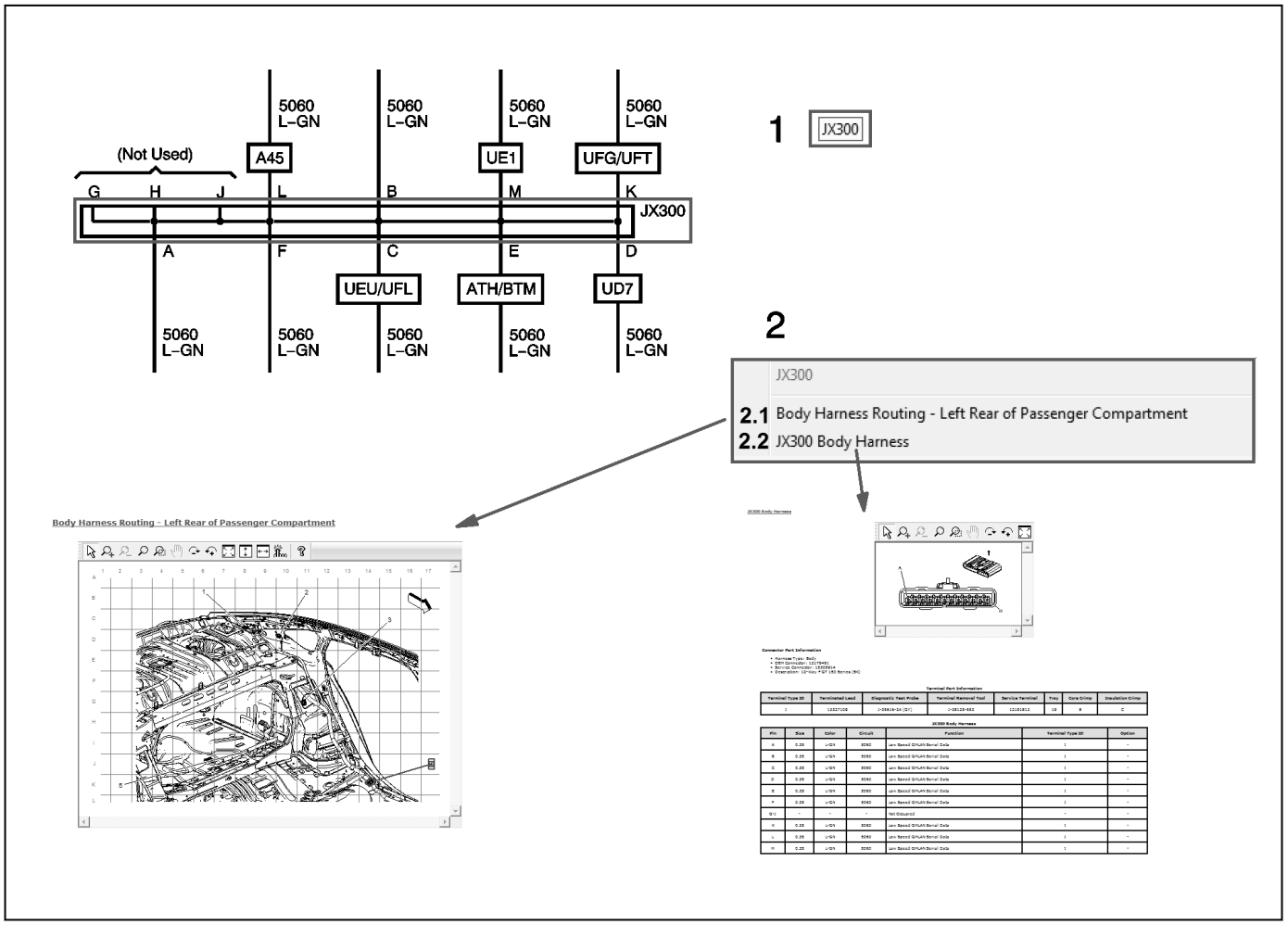
Splice Names



3819287

1. **Mouse-over:** Displays the code of the harness splice.
2. **Hotspot Link to Information:** Links to the individual harness routing view(s) within the Harness Routing Views and will show where the harness item is located on the vehicle harness. Additionally, when the target view is opened, the harness item and callout leader line/number will be highlighted to draw visual attention.

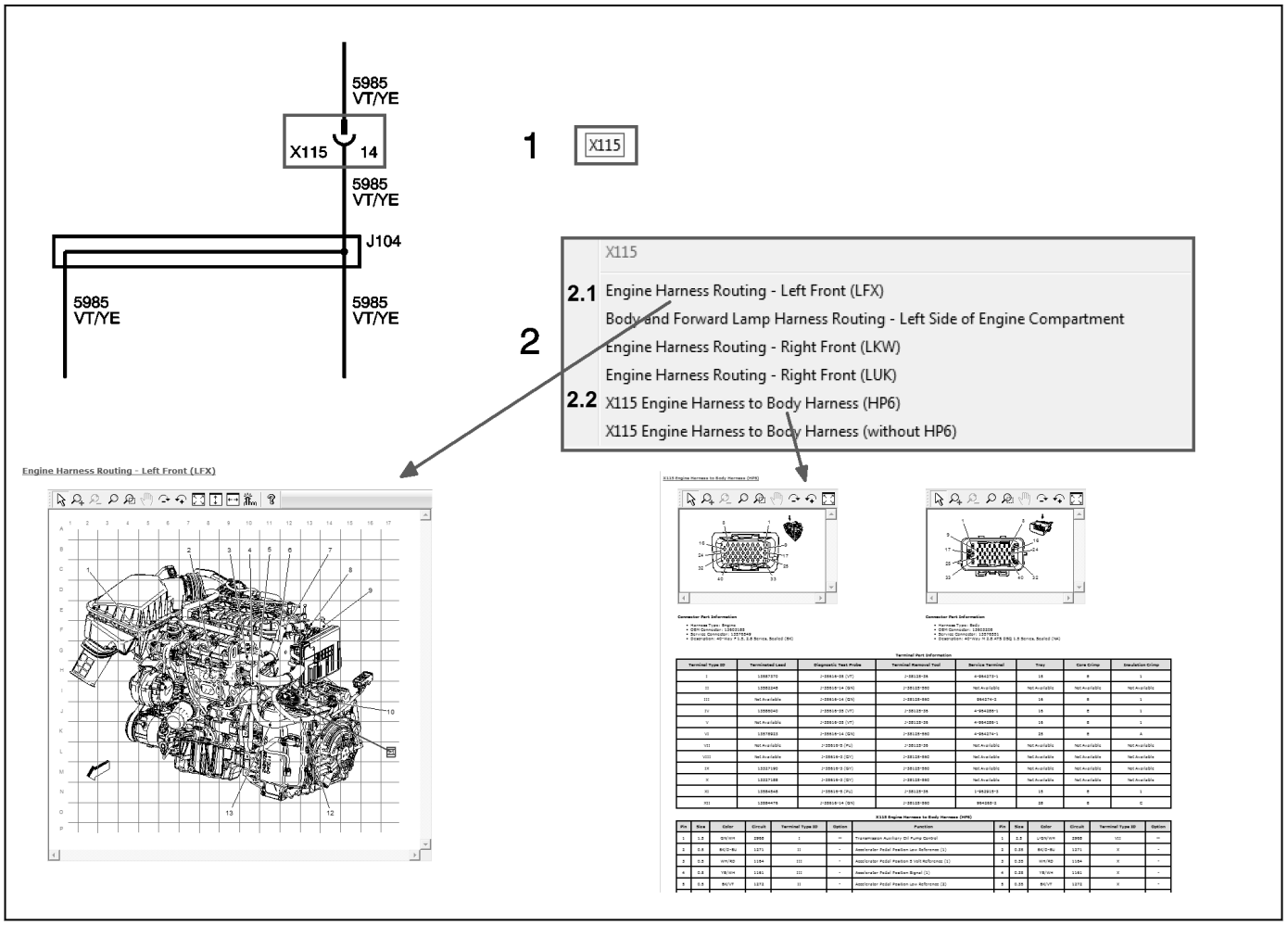
Splice Pack Names



3819454

1. **Mouse-over:** Displays the code of the harness splice pack.
2. **Hotspot Link to Information:**
   ⇒ When multiple links are available, a menu will appear when the link is selected. This menu includes all available links in a structured sequence.
   2.1. Links to the individual harness routing view(s) within the Harness Routing Views and will show where the harness item is located on the vehicle harness. Additionally, when the target view is opened, the harness item and callout leader line/number will be highlighted to draw visual attention.
   2.2. Links to individual connector end view(s) within the Splice Pack Connector End Views.

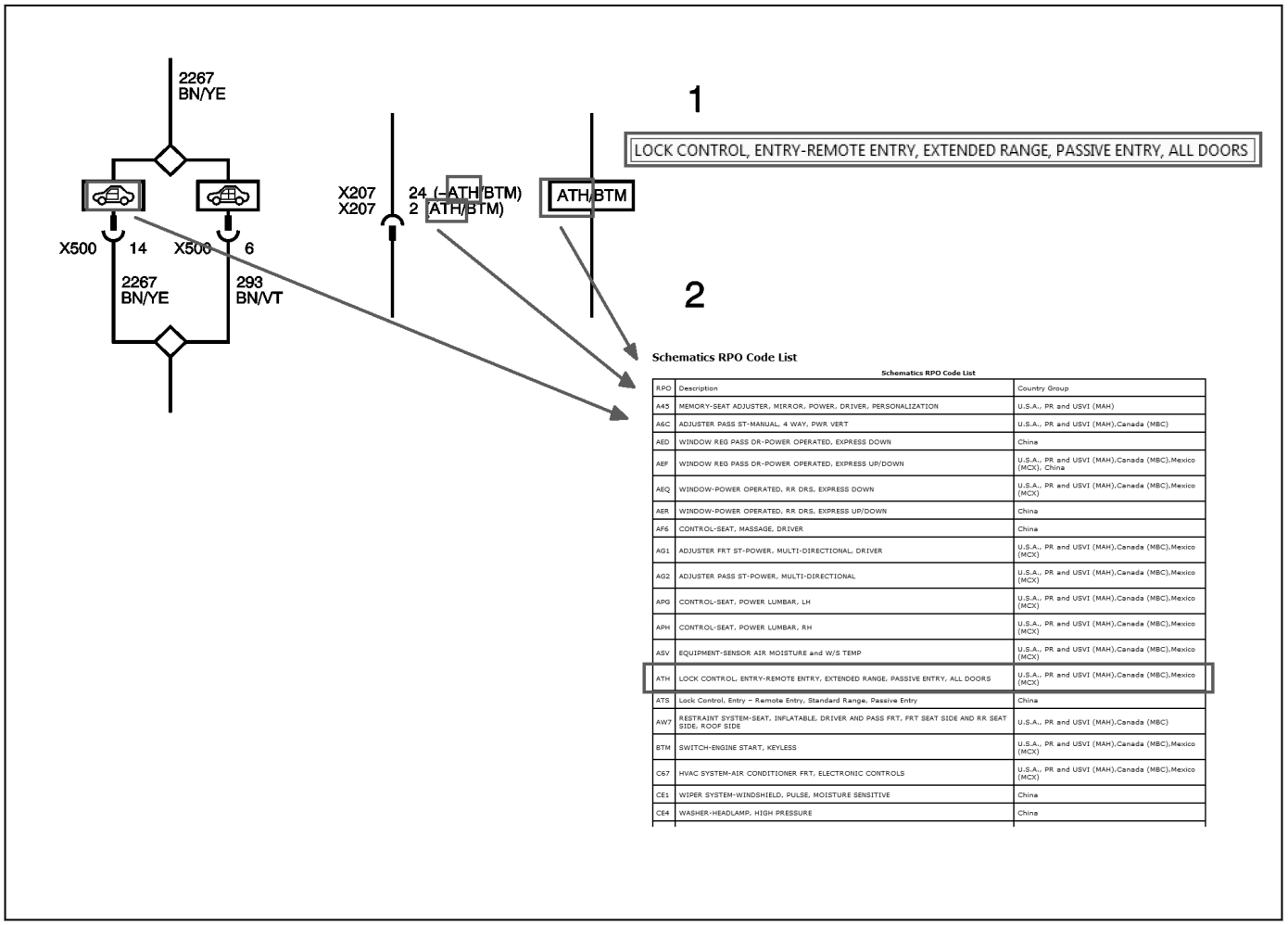
Inline Harness Connector Names



3819345

1. **Mouse-over:** Displays the code of the inline harness connector.
2. **Hotspot Link to Information:**
   ⇒ When multiple links are available, a menu will appear when the link is selected. This menu includes all available links in a structured sequence.
   2.1. Links to the individual harness routing view(s) within the Harness Routing Views and will show where the harness item is located on the vehicle harness. Additionally, when the target view is opened, the harness item and callout leader line/number will be highlighted to draw visual attention.
   2.2. Links to individual connector end view(s) within the Inline Harness Connector End Views.

Regular Production Option (RPO) Codes/Icons



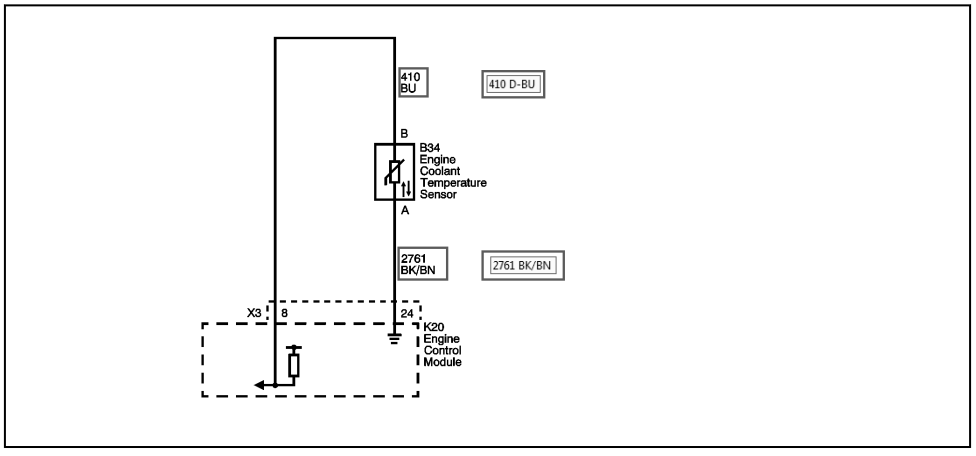
Schematics RPO Code List

RPO	Description	Country Group
A45	MEMORY-SEAT ADJUSTER, MIRROR, POWER, DRIVER, PERSONALIZATION	U.S.A., PR and USVI (MAH)
A6C	ADJUSTER PASS ST-MANUAL, 4 WAY, PWR VERT	U.S.A., PR and USVI (MAH),Canada (MBC)
AED	WINDOW REG PASS DR-POWER OPERATED, EXPRESS DOWN	China
AEF	WINDOW REG PASS DR-POWER OPERATED, EXPRESS UP/DOWN	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX), China
AEQ	WINDOW-POWER OPERATED, RR DRS, EXPRESS DOWN	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX)
AER	WINDOW-POWER OPERATED, RR DRS, EXPRESS UP/DOWN	China
AF6	CONTROL-SEAT, MASSAGE, DRIVER	China
AG1	ADJUSTER FRT ST-POWER, MULTI-DIRECTIONAL, DRIVER	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX)
AG2	ADJUSTER PASS ST-POWER, MULTI-DIRECTIONAL	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX)
APG	CONTROL-SEAT, POWER LUMBAR, LH	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX)
APH	CONTROL-SEAT, POWER LUMBAR, RH	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX)
ASV	EQUIPMENT-SENSOR AIR MOISTURE and W/S TEMP	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX)
ATH	LOCK CONTROL, ENTRY-REMOTE ENTRY, EXTENDED RANGE, PASSIVE ENTRY, ALL DOORS	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX)
ATS	Lock Control, Entry – Remote Entry, Standard Range, Passive Entry	China
AW7	RESTRAINT SYSTEM-SEAT, INFLATABLE, DRIVER AND PASS FRT, FRT SEAT SIDE AND RR SEAT SIDE, ROOF SIDE	U.S.A., PR and USVI (MAH),Canada (MBC)
BTM	SWITCH-ENGINE START, KEYLESS	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX)
C67	HVAC SYSTEM-AIR CONDITIONER FRT, ELECTRONIC CONTROLS	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX)
CE1	WIPER SYSTEM-WINDSHIELD, PULSE, MOISTURE SENSITIVE	China
CE4	WASHER-HEADLAMP, HIGH PRESSURE	China

3819777

1. **Mouse-over:** Displays the description of the RPO code as well as the country group names where the option is possible to order. Note that each RPO shown will have its own mouse-over and description. Also note that the mouse-over does not include any symbols indicating with (shown as a + sign if combined option) or without (shown as a – sign to mean without/except).
2. **Hotspot Link to Information:** Links to the Schematics RPO Code List that shows the RPO, the description of the option, and the country group names where the option is possible to order.

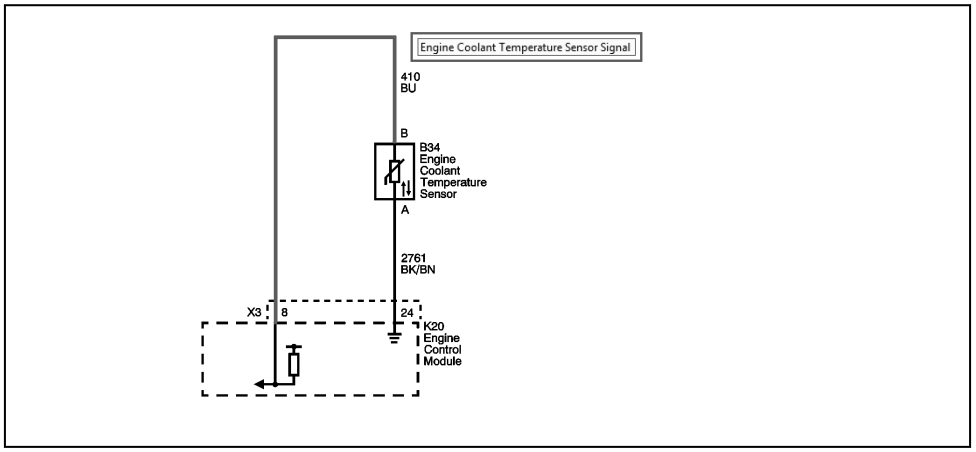
Circuit Number/Wire Colors



3819880

1. **Mouse-over:** Displays the circuit number (if shown) and the color abbreviation of the wire insulation. Refer to Color Abbreviations for an explanation of each wire color abbreviation. A future update may spell out the wire colors in all languages.
2. **Hotspot Link to Information:** None at this time.

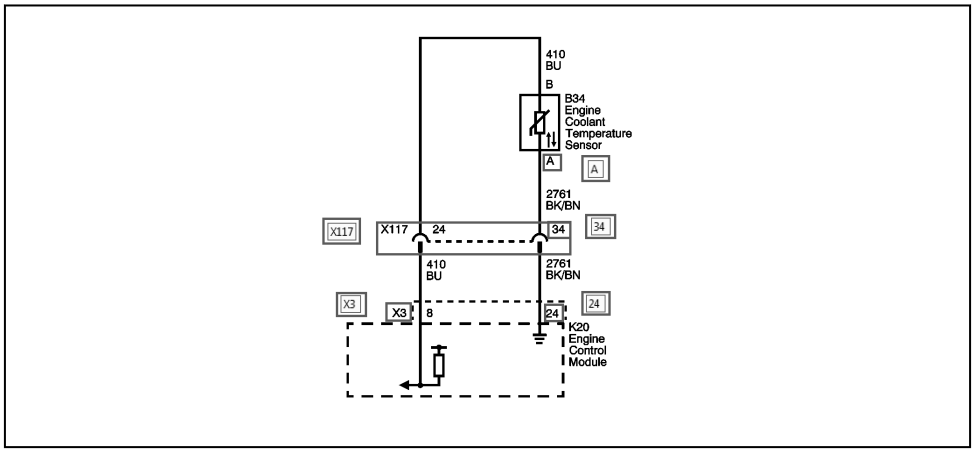
Wire Lines



3819888

1. **Mouse-over:** Displays the circuit function of the wire as used on the vehicle. This same function is shown in the connector end view pinout table for the component the wire connects. Note if there is no circuit number shown, the circuit will not have an associated mouse-over.
2. **Hotspot Link to Information:** None at this time. A future update may include links to harness routing views to show the routing of the circuit within the vehicle harness.

Connector Identifiers and Cavities



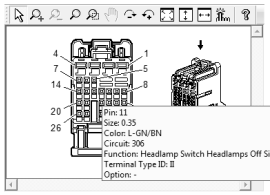
3819889

1. **Mouse-over:** Displays the cavity (pin) identifier (letter/number) for the connection at the component or inline harness connection.
2. **Hotspot Link to Information:** None at this time.

Connector End Views

Connector end view graphics now have mouse-overs to show the wire details of each of the populated cavities. Additionally, the terminal part information has been restructured into an easier to read table.

K9 Body Control Module X1



Connector Part Information

- Harness Type: Instrument Panel
- OEM Connector: 13631051
- Service Connector: 13576639
- Description: 26-Way F 64 Series (NA)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray	Core Crimp	Insulation Crimp
I	13327199	J-35616-35 (VT)	J-38125-12A	SNAC-A061T-M2.8	20	E	A
II	13327195	J-35616-64B (L-BU)	J-38125-12A	SNAC3-A021T-M0.64	20	J	J
III	13579954	J-35616-64B (L-BU)	J-38125-12A	Not Available	Not Available	Not Available	Not Available

K9 Body Control Module X1

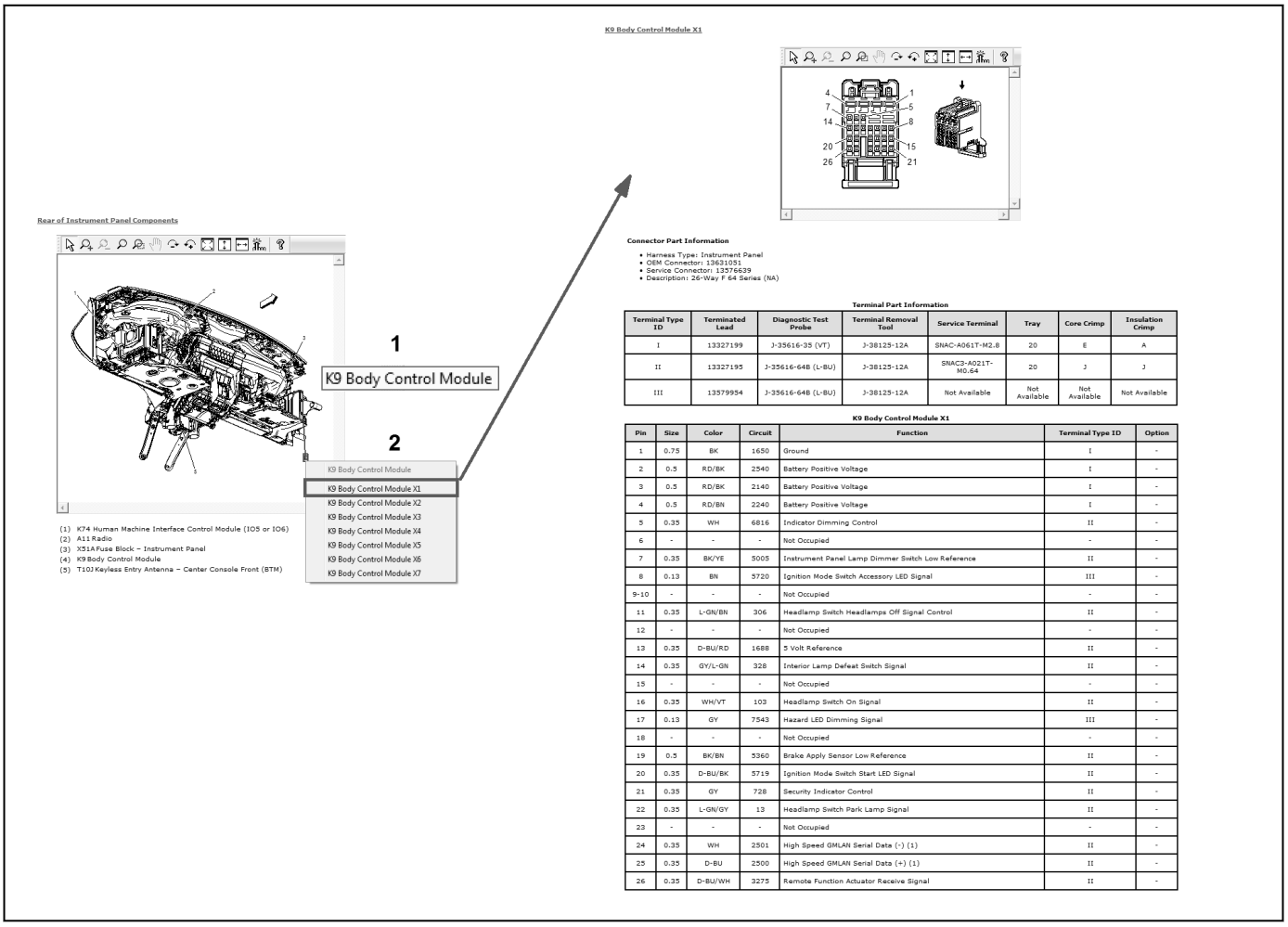
Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.75	BK	1650	Ground	I	-
2	0.5	RD/BK	2540	Battery Positive Voltage	I	-
3	0.5	RD/BK	2140	Battery Positive Voltage	I	-
4	0.5	RD/BN	2240	Battery Positive Voltage	I	-
5	0.35	WH	6816	Indicator Dimming Control	II	-
6	-	-	-	Not Occupied	-	-
7	0.35	BK/YE	5005	Instrument Panel Lamp Dimmer Switch Low Reference	II	-
8	0.13	BN	5720	Ignition Mode Switch Accessory LED Signal	III	-
9-10	-	-	-	Not Occupied	-	-
11	0.35	L-GN/BN	306	Headlamp Switch Headlamps Off Signal Control	II	-
12	-	-	-	Not Occupied	-	-
13	0.35	D-BU/RD	1688	5 Volt Reference	II	-
14	0.35	GY/L-GN	328	Interior Lamp Defeat Switch Signal	II	-
15	-	-	-	Not Occupied	-	-
16	0.35	WH/VT	103	Headlamp Switch On Signal	II	-
17	0.13	GY	7543	Hazard LED Dimming Signal	III	-
18	-	-	-	Not Occupied	-	-
19	0.5	BK/BN	5360	Brake Apply Sensor Low Reference	II	-
20	0.35	D-BU/BK	5719	Ignition Mode Switch Start LED Signal	II	-
21	0.35	GY	728	Security Indicator Control	II	-
22	0.35	L-GN/GY	13	Headlamp Switch Park Lamp Signal	II	-
23	-	-	-	Not Occupied	-	-
24	0.35	WH	2501	High Speed GMLAN Serial Data (-) (1)	II	-
25	0.35	D-BU	2500	High Speed GMLAN Serial Data (+) (1)	II	-
26	0.35	D-BU/WH	3275	Remote Function Actuator Receive Signal	II	-

3819951

1. **Mouse-over:** Displays all of the pinout table information for each column including Pin, Size, Color, Circuit, Function, Terminal Type ID, and Option. Note, that not used/not occupied cavities will not have a mouse-over at all. For not used/not occupied cavities, the connector graphic will appear to have a mouse-over, but no information will be displayed in a pop-up menu.
2. **Hotspot Link to Information:** None at this time. A future update may include links to individual subsystem schematic(s) for each circuit.

Component Locator Views

Component locator views now have links to component connector end views.



Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray	Core Crimp	Insulation Crimp
I	13327199	J-35616-35 (VT)	J-38125-12A	SNAC-A061T-M2.8	20	E	A
II	13327195	J-35616-64B (L-BU)	J-38125-12A	SNAC3-A021T-M0.64	20	J	J
III	13579954	J-35616-64B (L-BU)	J-38125-12A	Not Available	Not Available	Not Available	Not Available

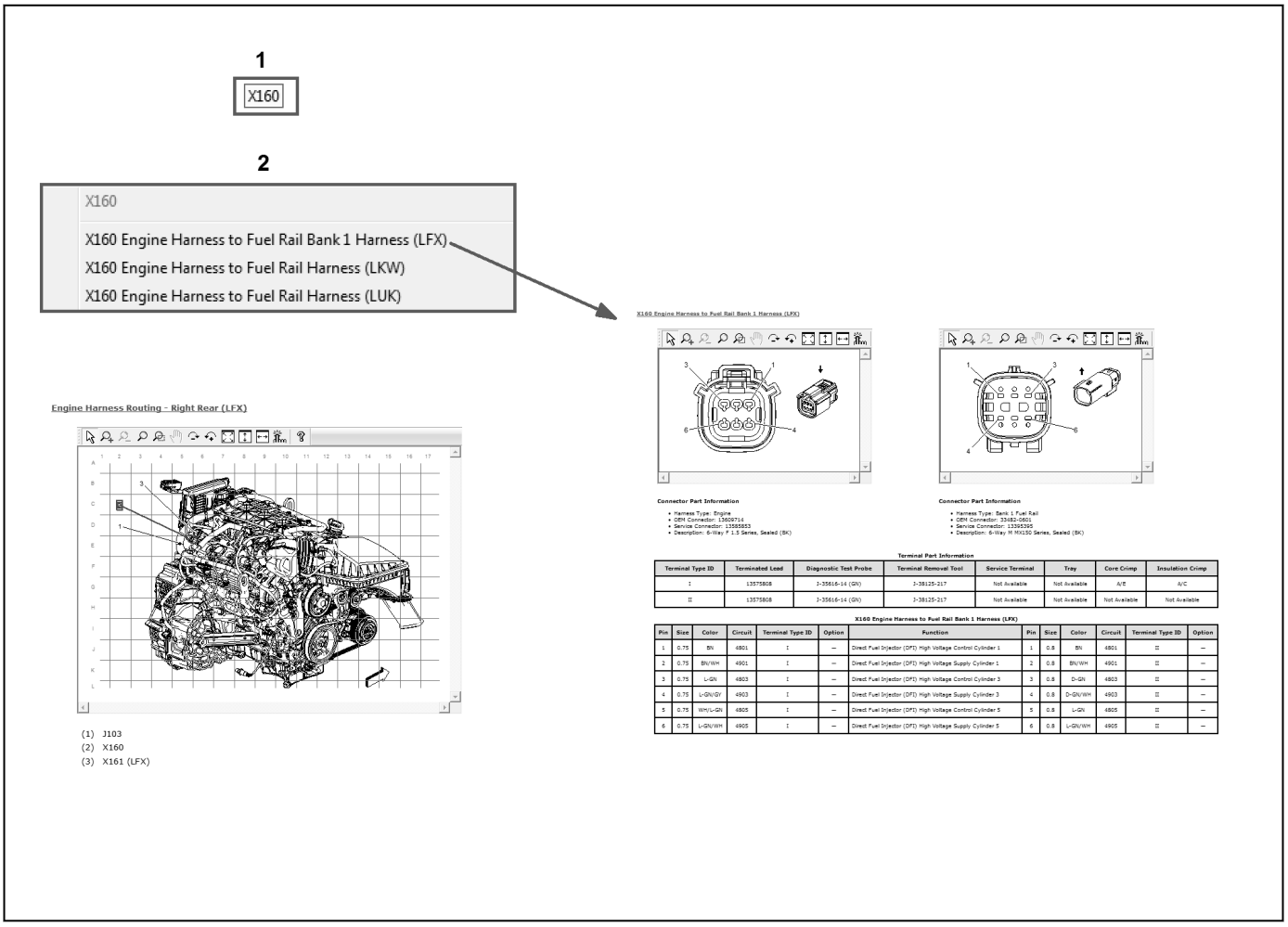
Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.75	BK	1650	Ground	I	-
2	0.5	RD/BK	2540	Battery Positive Voltage	I	-
3	0.5	RD/BK	2140	Battery Positive Voltage	I	-
4	0.5	RD/BN	2240	Battery Positive Voltage	I	-
5	0.35	WH	6816	Indicator Dimming Control	II	-
6	-	-	-	Not Occupied	-	-
7	0.35	BK/YE	5005	Instrument Panel Lamp Dimmer Switch Low Reference	II	-
8	0.13	BN	5720	Ignition Mode Switch Accessory LED Signal	III	-
9-10	-	-	-	Not Occupied	-	-
11	0.35	L-GN/BN	306	Headlamp Switch Headlamps Off Signal Control	II	-
12	-	-	-	Not Occupied	-	-
13	0.35	D-BU/RD	1688	5 Volt Reference	II	-
14	0.35	GY/L-GN	328	Interior Lamp Defeat Switch Signal	II	-
15	-	-	-	Not Occupied	-	-
16	0.35	WH/VT	103	Headlamp Switch On Signal	II	-
17	0.13	GY	7543	Hazard LED Dimming Signal	III	-
18	-	-	-	Not Occupied	-	-
19	0.5	BK/BN	5360	Brake Apply Sensor Low Reference	II	-
20	0.35	D-BU/BK	5719	Ignition Mode Switch Start LED Signal	II	-
21	0.35	GY	728	Security Indicator Control	II	-
22	0.35	L-GN/GY	13	Headlamp Switch Park Lamp Signal	II	-
23	-	-	-	Not Occupied	-	-
24	0.35	WH	2501	High Speed GMLAN Serial Data (-) (1)	II	-
25	0.35	D-BU	2500	High Speed GMLAN Serial Data (+) (1)	II	-
26	0.35	D-BU/WH	3275	Remote Function Actuator Receive Signal	II	-

3819952

1. **Mouse-over:** Displays the code and name of the component.
2. **Hotspot Link to Information:** Links to individual connector end view(s) within Component Connector End Views.

Harness Routing Views

Harness routing views now have links to splice pack and inline harness connector end views.



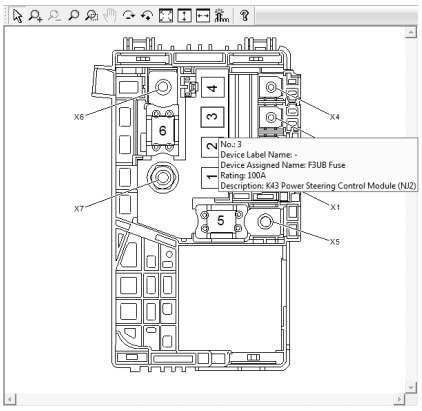
3819958

1. **Mouse-over:** Displays the code of the harness item.
2. **Hotspot Link to Information:** Links to individual splice pack connector end view(s) within Splice Pack Connector End Views for splice packs and to the individual inline harness connector end view(s) within Inline Harness Connector End Views for inline harness connectors.

Electrical Center Identification Views

Electrical center identification views (top and bottom/ front and back) graphics now have mouse-overs to show the function details of each of utilized devices. Note that the label view will not have any mouse-overs or links at all.

X50D Fuse Block - Battery Top View



X50D Fuse Block - Battery Usage

No.	Device Label Name	Device Assigned Name	Rating	Description
1	-	F1UB Fuse	60A	X51A Fuse Block - Instrument Panel
2	-	F2UB Fuse	60A	X51A Fuse Block - Instrument Panel
3	-	F3UB Fuse	100A	K43 Power Steering Control Module (NJ2)
4	-	F4UB Fuse	80A	K43 Power Steering Control Module (NJ1)
5	-	F5UB Fuse	250A	X50A Fuse Block - Underhood
6	-	F6UB Fuse	300A	G13 Generator (without HP6), M64 Starter Motor

3820005

1. **Mouse-over:** Displays all of the usage table information for each column including No., Device Label Name, Device Assigned Name, Rating, and Description. Note, that not used/not occupied devices will not have a mouse-over at all. For not used/not occupied devices, the device graphic may appear to have a mouse-over, but no information will be displayed in a pop-up screen.
2. **Hotspot Link to Information:** None at this time.

Master Electrical Component List

While the master electrical component list format has not changed, it will continue to have links to component locator, harness routing, and connector end views for each of the available electrical devices within the vehicle.

Master Electrical Component List

Master Electrical Component List

Code	Name	Option	Location	Locator View	Connector End View
A3L	Sunshade – Left	–	In the passenger compartment, left front, mounted to the headliner at left front	–	–
A3R	Sunshade – Right	–	In the passenger compartment, right front, mounted to the headliner at right front	–	–
A4	Hybrid/EV battery pack	HP6	In the luggage compartment, right behind rear of the seats	Right Side of Luggage Compartment Components	–
A7	Fuel Pump and Level Sensor Assembly	–	In the vehicle underbody, below rear seats, mounted to fuel tank	Fuel Tank Components	A7 Fuel Pump and Level Sensor Assembly
A9A	Outside Rearview Mirror – Driver	–	On outside of driver door, front middle, forward of window opening	Driver Door Components	–
A9B	Outside Rearview Mirror – Passenger	–	On outside of passenger door, front middle, forward of window opening	Passenger Door Components	–
A10	Inside Rearview Mirror	DD8	In the passenger compartment, front center, mounted to top of windshield	Headliner Components	A10 Inside Rearview Mirror (DD8)
A11	Radio	–	In the passenger compartment, front right in instrument panel, near instrument panel courtesy lamp - right	Rear of Instrument Panel Components	• A11 Radio X1 • A11 Radio X2 • A11 Radio X4 • A11 Radio X6 (U2K or U2M) • A11 Radio X7 (IO3) • A11 Radio X8 (IO3)
A14D	Seat Lumbar Support Pump – Driver	–	In the passenger compartment, left forward of center, in driver seat back outboard side	Driver Seat Components	A14D Seat Lumbar Support Pump - Driver
A14P	Seat Lumbar Support Pump – Passenger	APH	In the passenger compartment, right forward of center, in the passenger seat back outboard side	Passenger Seat Components	A14P Seat Lumbar Support Pump - Passenger (APH)
A15	Starter/Generator	HP6	In the engine compartment, right front of engine	–	• A15 Starter/Generator X1 (HP6) • A15 Starter/Generator X2 (HP6)
A22	Radio Controls	–	In the passenger compartment, center front, part of the info display module, in instrument panel, above HVAC controls	Front of Instrument Panel Components	–
A23D	Door Latch Assembly – Driver	–	Inside the driver door, at rear below middle	Driver Door Components	A23D Door Latch Assembly - Driver
A23LR	Door Latch Assembly – Left Rear	–	Inside the left rear door, at rear below middle	Left Rear Door Components	A23LR Door Latch Assembly - Left Rear
A23P	Door Latch Assembly – Passenger	–	Inside the passenger door, at rear below middle	Passenger Door Components	A23P Door Latch Assembly - Passenger
A23RR	Door Latch Assembly – Right Rear	–	Inside the right rear door, at rear below middle	Right Rear Door Components	A23RR Door Latch Assembly - Right Rear
A24D	Door Handle Assembly – Driver Exterior	ATH	On the outside of driver door, rear middle	Driver Door Components	A24D Door Handle Assembly - Driver Exterior (ATH)
A24LR	Door Handle Assembly - Left Rear Exterior	ATH	On the outside of left rear door, rear middle	Left Rear Door Components	A24LR Door Handle Assembly - Left Rear Exterior (ATH)
A24P	Door Handle Assembly – Passenger Exterior	ATH	On the outside of passenger door, rear middle	Passenger Door Components	A24P Door Handle Assembly - Passenger Exterior (ATH)
A24RR	Door Handle Assembly - Right Rear Exterior	ATH	On the outside of right rear door, rear middle	Right Rear Door Components	A24RR Door Handle Assembly - Right Rear Exterior (ATH)
A26	HVAC Controls	–	In the passenger compartment, front center, on instrument panel, below radio controls	Front of Instrument Panel Components	A26 HVAC Controls
A33	Media Disc Player	–	In the passenger compartment, front center, on instrument panel, below and forward of radio controls	–	A33 Media Disc Player
B1	A/C Refrigerant Pressure Sensor	–	At the front of vehicle, right of center, front of A/C condenser, mounted to right side near bottom	Radiator Assembly Components	• B1 A/C Refrigerant Pressure Sensor (LFX or L0K) • B1 A/C Refrigerant Pressure Sensor (LKW)
B5LF	Wheel Speed Sensor – Left Front	–	At the left front suspension, mounted to knuckle, rearward of axle	Fuel Composition Sensor, Wheel Speed Sensors and Parking Brake	B5LF Wheel Speed Sensor - Left Front
B5LR	Wheel Speed Sensor – Left Rear	–	At the left rear suspension, mounted to knuckle, forward side	Fuel Composition Sensor, Wheel Speed Sensors and Parking Brake	B5LR Wheel Speed Sensor - Left Rear
B5RF	Wheel Speed Sensor – Right Front	–	At the right front suspension, mounted to knuckle, rearward of axle	Fuel Composition Sensor, Wheel Speed Sensors and Parking Brake	B5RF Wheel Speed Sensor - Right Front
B5RR	Wheel Speed Sensor – Right Rear	–	At the right rear suspension, mounted to knuckle, forward side	Fuel Composition Sensor, Wheel Speed Sensors and Parking Brake	B5RR Wheel Speed Sensor - Right Rear
B7D	Air Temperature Sensor – Duct Left Lower	CJ2	In the passenger compartment, within the instrument panel, center front, left side middle of HVAC assembly	HVAC Assembly Components (CJ2)	B7D Air Temperature Sensor - Duct Left Lower (CJ2)
B7E	Air Temperature Sensor – Duct Right Lower	CJ2	In the passenger compartment, within the instrument panel, center front, right side middle of HVAC assembly	HVAC Assembly Components (CJ2)	B7E Air Temperature Sensor - Duct Right Lower (CJ2)
B7H	Air Temperature Sensor – Duct Left Upper	CJ2	In the passenger compartment, within the instrument panel, center front, left side top of HVAC assembly	HVAC Assembly Components (CJ2)	B7H Air Temperature Sensor - Duct Left Upper (CJ2)
B7J	Air Temperature Sensor – Duct Right Upper	CJ2	In the passenger compartment, within the instrument panel, center front, right side top of HVAC assembly	HVAC Assembly Components (CJ2)	B7J Air Temperature Sensor - Duct Right Upper (CJ2)
B9	Ambient Air Temperature Sensor	–	At the front of vehicle, left of center, mounted to rear of lower grille	Front of Vehicle Components	B9 Ambient Air Temperature Sensor
B10B	Ambient Light/Sunload Sensor	–	In the passenger compartment, center front, in instrument panel, rear of windshield defroster outlet	Front of Instrument Panel Components	B10B Ambient Light/Sunload Sensor
B12A	Transmission Fluid Pressure Switch	–	In the engine compartment, part of the control solenoid valve assembly, mounted to the valve body inside the transmission	–	–
B13	Transmission Fluid Temperature Sensor	–	In the engine compartment, part of the control solenoid valve assembly, mounted to the valve body inside the transmission	–	–

3820020

1. **Mouse-over:** None at this time.
2. **Hotspot Link to Information:**

⇒ A future update may include links to individual subsystem schematic(s) for each component/ harness item.

⇒ **Components**

− Links to individual locator view within one of the eight component view categories and will show where the component is located in the vehicle.

− Links to individual connector end view(s) within Component Connector End Views.

⇒ **Electrical Centers (Fuse Blocks)**

− Links to individual locator view within one of the eight component view categories and will show where the component is located in the vehicle.

− Links to individual connector end view(s) within Electrical Center Identification Views.

⇒ **Inline Harness Connectors**

− Links to individual harness routing view(s) within Harness Routing Views and will show where the harness item is located on the vehicle harness.

− Links to individual connector end view(s) within Inline Harness Connector End Views.

⇒ **Grounds**

- Links to individual locator view within Ground Views component view and will show where the ground is located in the vehicle.

⇒ **Splices**

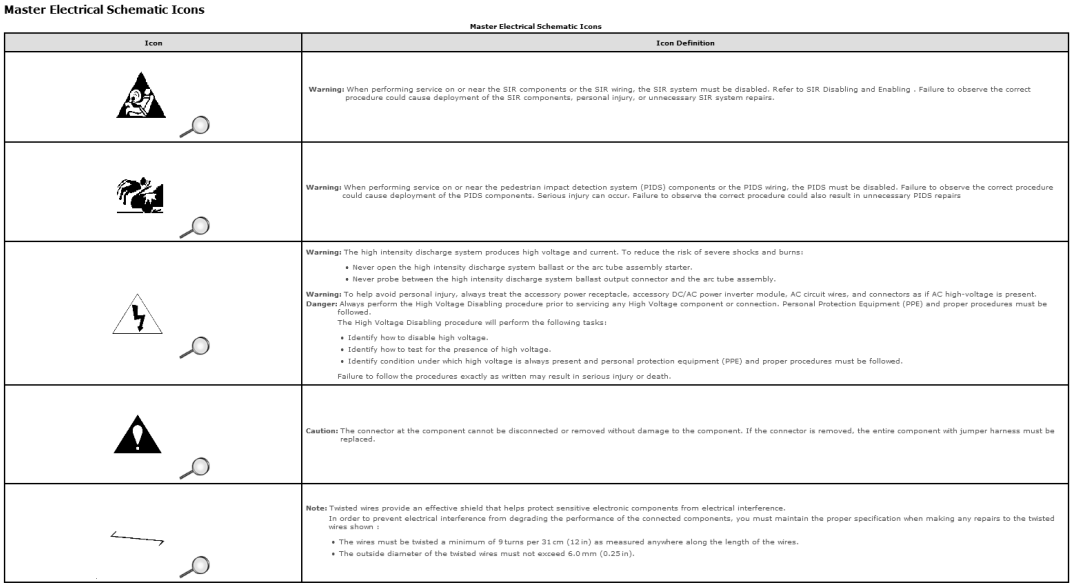
- Links to individual harness routing view(s) within Harness Routing Views and will show where the harness item is located on the vehicle harness.

⇒ **Splice Packs**

- Links to individual harness routing view(s) within Harness Routing Views and will show where the harness item is located on the vehicle harness.
- Links to individual connector end view(s) within Splice Pack Connector End Views.

Master Electrical Schematic Icons

While the master electrical schematic icons list format has not changed, it will continue to include icons used in the vehicle schematics along with the message for the icon.



Master Electrical Schematic Icons

Master Electrical Schematic Icons

Icon	Icon Definition
	Warning: When performing service on or near the SIR components or the SIR wiring, the SIR system must be disabled. Refer to SIR Disabling and Enabling . Failure to observe the correct procedure could cause deployment of the SIR components, personal injury, or unnecessary SIR system repairs.
	Warning: When performing service on or near the pedestrian impact detection system (PIDS) components or the PIDS wiring, the PIDS must be disabled. Failure to observe the correct procedure could cause deployment of the PIDS components. Serious injury can occur. Failure to observe the correct procedure could also result in unnecessary PIDS repairs
	Warning: The high intensity discharge system produces high voltage and current. To reduce the risk of severe shocks and burns: • Never open the high intensity discharge system ballast or the arc tube assembly starter. • Never probe between the high intensity discharge system ballast output connector and the arc tube assembly. **Warning:** To help avoid personal injury, always treat the accessory power receptacle, accessory DC/AC power inverter module, AC circuit wires, and connectors as if AC high-voltage is present. **Danger:** Always perform the High Voltage Disabling procedure prior to servicing any High Voltage component or connection. Personal Protection Equipment (PPE) and proper procedures must be followed. The High Voltage Disabling procedure will perform the following tasks: • Identify how to disable high voltage. • Identify how to test for the presence of high voltage. • Identify condition under which high voltage is always present and personal protection equipment (PPE) and proper procedures must be followed. Failure to follow the procedures exactly as written may result in serious injury or death.
	Caution: The connector at the component cannot be disconnected or removed without damage to the component. If the connector is removed, the entire component with jumper harness must be replaced.
	Note: Twisted wires provide an effective shield that helps protect sensitive electronic components from electrical interference. In order to prevent electrical interference from degrading the performance of the connected components, you must maintain the proper specification when making any repairs to the twisted wires shown : • The wires must be twisted a minimum of 9 turns per 31 cm (12 in) as measured anywhere along the length of the wires. • The outside diameter of the twisted wires must not exceed 6.0 mm (0.25 in).

3820510

1. **Mouse-over:** None at this time.
2. **Hotspot Link to Information:** None at this time.

Schematic RPO Code List

The schematic RPO code list only includes RPOs shown in schematics and also includes the country groupings for the options. This list is in addition to the vehicle RPO Code List that is included in General Information.

Schematics RPO Code List

Schematics RPO Code List

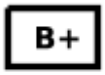
RPO	Description	Country Group
A45	MEMORY-SEAT ADJUSTER, MIRROR, POWER, DRIVER, PERSONALIZATION	U.S.A., PR and USVI (MAH)
A6C	ADJUSTER PASS ST-MANUAL, 4 WAY, PWR VERT	U.S.A., PR and USVI (MAH),Canada (MBC)
AED	WINDOW REG PASS DR-POWER OPERATED, EXPRESS DOWN	China
AEF	WINDOW REG PASS DR-POWER OPERATED, EXPRESS UP/DOWN	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX), China
AEQ	WINDOW-POWER OPERATED, RR DRS, EXPRESS DOWN	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX)
AER	WINDOW-POWER OPERATED, RR DRS, EXPRESS UP/DOWN	China
AF6	CONTROL-SEAT, MASSAGE, DRIVER	China
AG1	ADJUSTER FRT ST-POWER, MULTI-DIRECTIONAL, DRIVER	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX)
AG2	ADJUSTER PASS ST-POWER, MULTI-DIRECTIONAL	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX)
APG	CONTROL-SEAT, POWER LUMBAR, LH	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX)
APH	CONTROL-SEAT, POWER LUMBAR, RH	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX)
ASV	EQUIPMENT-SENSOR AIR MOISTURE and W/S TEMP	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX)
ATH	LOCK CONTROL, ENTRY-REMOTE ENTRY, EXTENDED RANGE, PASSIVE ENTRY, ALL DOORS	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX)
ATS	Lock Control, Entry – Remote Entry, Standard Range, Passive Entry	China
AW7	RESTRAINT SYSTEM-SEAT, INFLATABLE, DRIVER AND PASS FRT, FRT SEAT SIDE AND RR SEAT SIDE, ROOF SIDE	U.S.A., PR and USVI (MAH),Canada (MBC)
BTM	SWITCH-ENGINE START, KEYLESS	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX)
C67	HVAC SYSTEM-AIR CONDITIONER FRT, ELECTRONIC CONTROLS	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX)
CE1	WIPER SYSTEM-WINDSHIELD, PULSE, MOISTURE SENSITIVE	China
CE4	WASHER-HEADLAMP, HIGH PRESSURE	China
CF5	ROOF-SUN, GLASS, SLIDING, ELEC	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX)
CJ2	HVAC SYSTEM-AIR CONDITIONER FRT, AUTO TEMP CONT, AUX TEMP CONT	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX)
CZ2	COUNTRY-CHINA	China
DD8	MIRROR I/S R/V-LT SENSITIVE	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX)
EF7	COUNTRY-UNITED STATES OF AMERICA (USA)	U.S.A., PR and USVI (MAH)
F45	CHASSIS-CONTINUOUSLY VARIABLE REAL TIME DAMPING	U.S.A., PR and USVI (MAH),Canada (MBC)
FHS	VEHICLE FUEL-GASOLINE E85	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX)
HP6	HYBRID PROPULSION-ELECTRIC, PARALLEL, 14KW CONTINUOUS POWER	U.S.A., PR and USVI (MAH),Canada (MBC)
J71	BRAKE PARKING-POWER OPERATED	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX)
KA1	HEATER SEAT FRT-DRVR and PASS	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX)
KD4	RECEPTACLE-ELECTRICAL, FRT CONSOLE	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX)
K16	RECEPTACLE-ELECTRICAL, FRT CONSOLE RR 110 VOLT	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX)
KRJ	CONTROL-CONSOLE, INFOTAINMENT, REDUNDANT CONTROLS, JOYSTICK	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX)
KTA	AUDIO INTERFACE-	China
KU1	VENTILATED SEAT DRVR-FRONT	U.S.A., PR and USVI (MAH)
KU3	VENTILATED SEAT PASS-FRONT	U.S.A., PR and USVI (MAH)
LAF	ENGINE-GAS, 4 CYL, 2.4L, SIDI,DOHC, VVT, ALUM, GM - DO NOT USE AFTER 2013, USE LEA	China
LDK	ENGINE-GAS, 4 CYL, 2.0L, DI, DOHC, TURBO-HO, VARIABLE CAMSHAFT PHASING - DO NOT USE AFTER 2013, USE LHU	China
LHU	ENGINE-GAS, 2.0L, SIDI, L4, DOHC TURBO, E85 MAX, ALUM	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX)
LLU	ENGINE-GAS, 4 CYL, 1.6L, MFI, DOHC, TURBO, PT-JV, 132KW	China
LTD	ENGINE-GAS, 4 CYL, 2.0L, MFI, ALUM, DOHC, SGM	China
LUK	ENGINE-GAS, 4 CYL, 2.4L, DI, ALUM, DOHC, BAS, ECOTEC	U.S.A., PR and USVI (MAH),Canada (MBC)
MDK	TRANSMISSION-AUTO 6 SPD, AISIN-WARNER, A6-AF40, ELECTRONIC, GEN2	U.S.A., PR and USVI (MAH),Canada (MBC)
MH8	TRANSMISSION-AUTO 6 SPD, HMD, X23F	U.S.A., PR and USVI (MAH),Canada (MBC)
MHH	TRANSMISSION-AUTO 6 SPD, HMD, GM, BAS+, 6T40, HYBRID, FWD	U.S.A., PR and USVI (MAH),Canada (MBC)
MHK	TRANSMISSION-AUTO 6 SPD, 6T50	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX)
MR6	TRANSMISSION-MAN 6 SPD, OPEL, 83MM, 3.92 1ST, 0.62 6TH (F40 WR), REDUCE HELIX	U.S.A., PR and USVI (MAH),Canada (MBC)
NJ1	STEERING-POWER, NON-VARIABLE RATIO, ELECTRIC	U.S.A., PR and USVI (MAH),Canada (MBC)
NU6	EMISSION SYSTEM-CALIFORNIA, PZEV	U.S.A., PR and USVI (MAH)
NV7	STEERING-POWER, VARIABLE EFFORT	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX)
NXC	STEERING-POWER, VARIABLE EFFORT, REDUCED RACK TRAVEL	U.S.A., PR and USVI (MAH),Canada (MBC)
T4A	HEADLAMPS-HALOGEN	U.S.A., PR and USVI (MAH),Canada (MBC)

3820023

1. **Mouse-over:** None at this time.
2. **Hotspot Link to Information:** None at this time.

Electrical Schematic Symbols

Voltage Indicators

Symbol	Description
 1988677	Battery Voltage
 1988679	Ignition Switch– Off Position
 1988682	Ignition Switch– Accessory Position
 1988686	Ignition Switch– Run Position
 1988691	Ignition Switch– Start Position

General Icons

Symbol	Description
 1990537	Master Component List Icon This icon is used on the schematic to link to the Master Electrical Component List.
 1990538	Description and Operation Icon This icon is used on the schematic to link to the Description and Operation of that particular system.

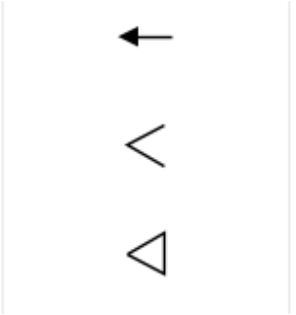
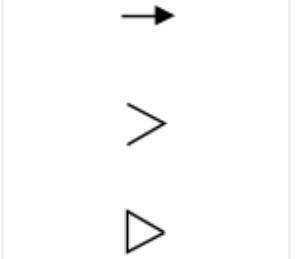
Symbol	Description
 1988674	Computer Programming Icon This icon is used on the schematic to link to Control Module References, which identifies which components need programming upon replacement.
 1990541	Next Schematic Page Icon This icon is used on the schematic to navigate to the next schematic in the subsystem.
 1990542	Previous Schematic Page Icon This icon is used on the schematic to navigate to the previous schematic in the subsystem.
 1988667	Supplemental Inflatable Restraint (SIR) or Supplemental Restraint System (SRS) Icon This icon is used to alert the technician that the system contains SIR/SRS components that require certain precautions before servicing.

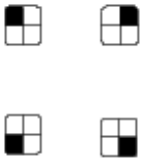
Symbol	Description
 1988670	Information Icon This icon is used to alert the technician that there is additional information that will aid in servicing a system.
 1988672	Danger Icon This icon is intended to alert the technician that a component within the system contains labeling with the same icon. This icon is used when a source component has potential for 60 volts DC or greater or has potential for 42 volts AC or greater.
 1988673	High Voltage Icon This icon is intended to alert the technician that a component within the system contains labeling with the same icon. This icon is used when a component/circuit has potential for 60 volts DC or greater or has potential for 42 volts AC or greater.

Symbol	Description
 1990543	Caution Icon This icon is used to advise the technician to use caution when servicing this component. This icon may be used when a component/circuit has a voltage range potential between 30-60 volts DC or 15-42 volts AC.
 1988675	Functional Serial Data Communication This icon is used to show the technician that the serial data circuit detail is shown incomplete. It also provides an active link to the Data Communication Schematics were the circuit is shown complete.

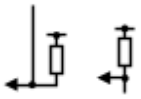
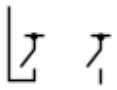
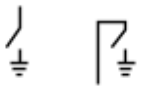
Switch Position Icons

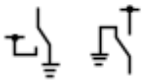
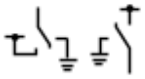
Symbol	Description
 1989016	Generic Up Arrows
 1990554	Generic Down Arrows

Symbol	Description
 1990555	Generic Left Arrows
 1990556	Generic Right Arrows
 1990557	Generic Express Down Arrows
 1990558	On/Off Icon
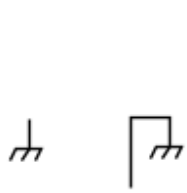
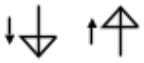
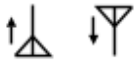
Symbol	Description
 1990559	Generic Lock Icon
 1990560	Generic Unlock Icon
 1989018	Generic Window Switch Positions– 4 Door
 1989020	Generic Window Switch Positions– 2 Door

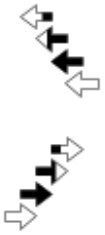
Module Circuit Function Icons

Symbol	Description
 1988774	I/O Pull-Down Resistors (−)
 1990567	I/O Pull-Up Resistors (+)
 1988775	I/O High-Side Drive Switch (+)
 1990568	I/O Low-Side Drive Switch (−)

Symbol	Description
 1990570	I/O Bidirectional Switch (+/−)
 6535609	I/O Bidirectional Switch (+/−) Neutral State
1990571	Pulse-Width Modulation Symbol
 1990573	Battery Voltage

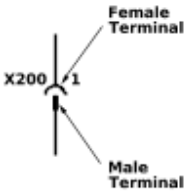
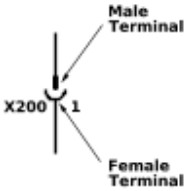
Symbol	Description
 1990574	Ignition Voltage
 1990576	Voltage Reference
 1990577	A/C Voltage
 1988986	Low Reference

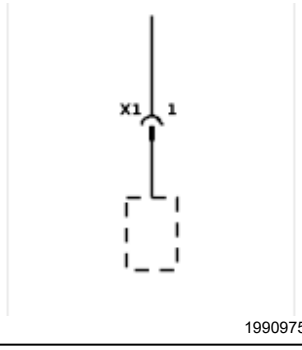
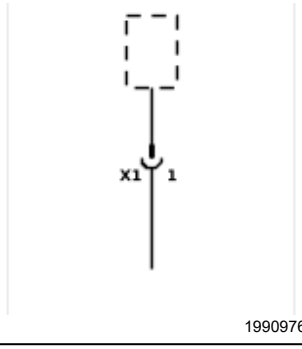
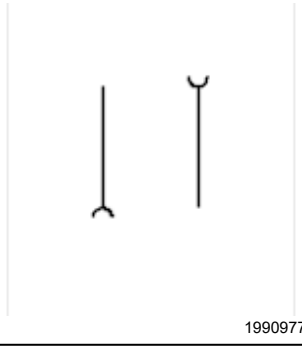
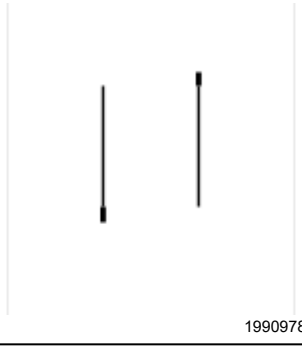
Symbol	Description
 1990578	Ground
 1990579	Serial Data
 1988973	Antenna Signal– In
 1988974	Antenna Signal– Out

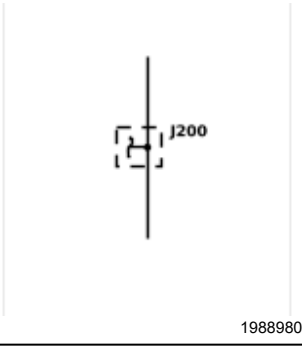
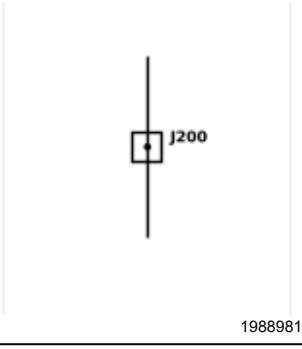
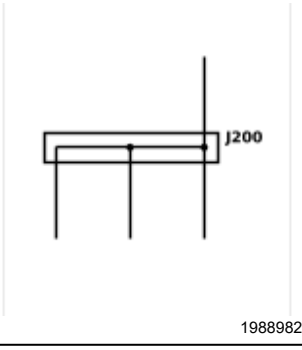
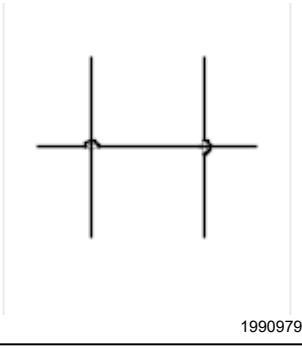
Symbol	Description
 2161152	Brake Apply
 5371975	Bulb Out
 6659366	Approach Lighting Animation
 6659367	Sequential Turn Signal Animation

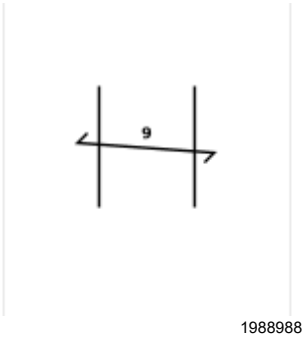
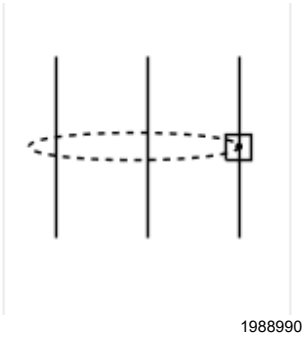
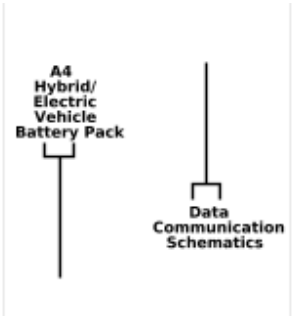
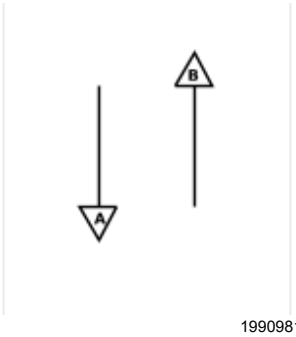
Harness Components

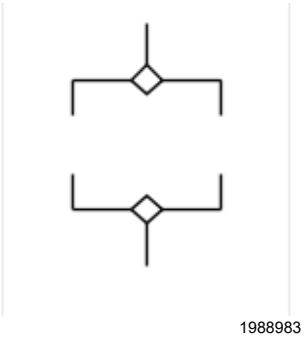
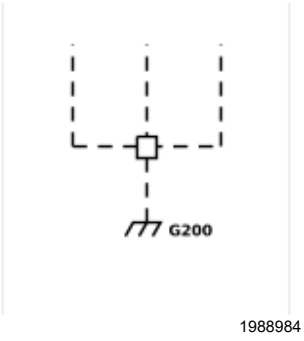
Symbol	Description
 1988731	Fuse
 1988733	Fuse Supplied by a Relay
 1988740	Circuit Breaker
 1988745	Fusible Link

Symbol	Description
 1988987	Ground
 1988746	Case Ground
 1988977	Inline Harness Connector
 1990974	Inline Harness Connector

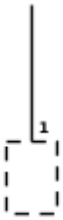
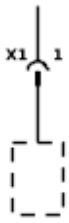
Symbol	Description
 1990975	Pigtail Connection
 1990976	Pigtail Connection
 1990977	Provisional or Diagnostic Connector
 1990978	Blunt Cut Wire

Symbol	Description
 1988980	Incomplete Physical Splice
 1988981	Complete Physical Splice– 2 Wires
 1988982	Complete Physical Splice– 3 or more wires
 1990979	Wire Crosses

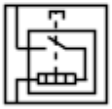
Symbol	Description
 1988988	Twisted Wires
 1988990	Shield
 1990980	Circuit References
 1990981	Circuit Continuation Arrowheads

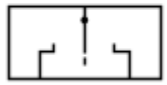
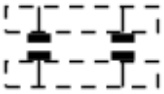
Symbol	Description
 1988983	Option Breakpoint
 1988984	Ground Circuit Connection
 1988985	Connector Shorting Clip

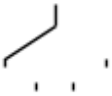
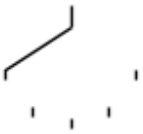
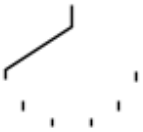
Component Parts

Symbol	Description
 1988694	Partial Component When a component is represented in a dashed box, the component or its wiring is not shown in its entirety.
 1988698	Entire Component When a component is represented in a solid box the component or its wiring is shown in its entirety.
 1988712	Connector Directly Attached to Component
 1988715	Pigtail Connector

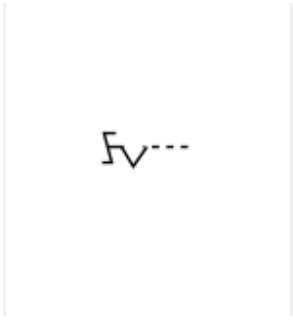
Switches and Relays

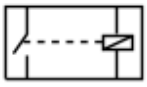
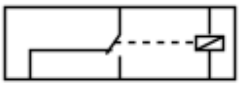
Symbol	Description
 1991015	Accessory Power Outlet
 1991016	Cigar Lighter
 1988991	Switch– 2 Position Normally Open
 1988992	Switch– 2 Position Normally Closed

Symbol	Description
 1988993	Switch– Rocker
 1991017	Switch– Contact Plate (1 Wire)
 1988994	Switch– Contact Plate (2 Wire)
 1991018	Switch– 3 Position

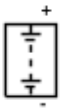
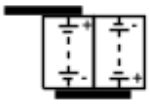
Symbol	Description
 1988995	Switch– 4 Position
 1991019	Switch– 5 Position
 1991021	Switch– 6 Position
 1988997	Switch Actuator– Push (Momentary)

Symbol	Description
 1988998	Switch Actuator– Push (Latching)
 1988999	Switch Actuator– Pull (Momentary)
 1989000	Switch Actuator– Pull (Latching)
 1989001	Switch Actuator– Rotate (Momentary)

Symbol	Description
 1989002	Switch Actuator– Rotate (Latching)
 1989003	Switch Actuator– Slide (Momentary)
 1989004	Switch Actuator– Slide (Latching)
 1989007	Switch Actuator– Pressure (Momentary)

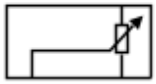
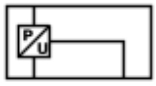
Symbol	Description
 1989010	Switch Actuator– Temperature (Momentary)
 1989013	Switch Actuator– Volume (Latching)
 1988975	4-Pin Single Pole/Throw Relay– Normally Open
 1990539	5-Pin Relay– Normally Closed

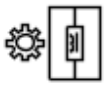
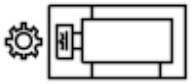
Devices and Sensors

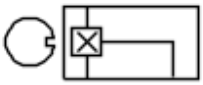
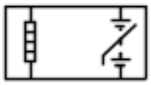
Symbol	Description
 1988751	Battery
 1988753	Battery Assembly– Hybrid
 1988717	Single Filament Light Bulb
 1988719	Double Filament Light Bulb

Symbol	Description
 1988722	Light Emitting Diode (LED)
 1988725	Photo Sensor
 1990988	Gauge
 1988776	Diode

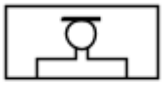
Symbol	Description
 1988748	Capacitor
 1988755	Resistor
 1988759	Variable Resistor
 1990991	Variable Resistor– NTC

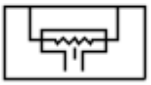
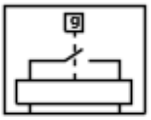
Symbol	Description
 1990992	Breakable Wire
 1988778	Heating Element
 1988771	Position Sensor
 1988773	Pressure Sensor

Symbol	Description
 1990993	Knock Sensor
 1990994	Inductive Type Sensor– 2-Wire
 1990996	Inductive Type Sensor– 3-Wire
 1990998	Hall Effect Sensor– 2-Wire

Symbol	Description
 1990999	Hall Effect Sensor– 3-Wire
 1991000	Oxygen Sensor– 2-Wire
 1991001	Heated Oxygen Sensor– 4-Wire
 1988970	Solenoid– Actuator

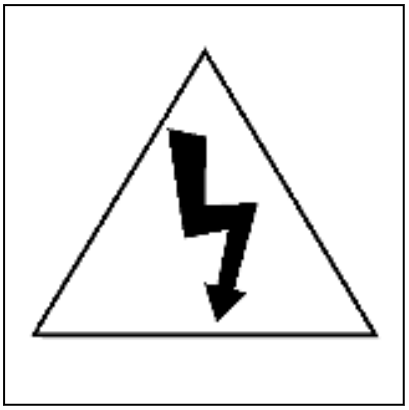
Symbol	Description
 1988971	Solenoid– Valve
 1988972	Clutch
 1988779	Motor
 1991003	Motor with PTC

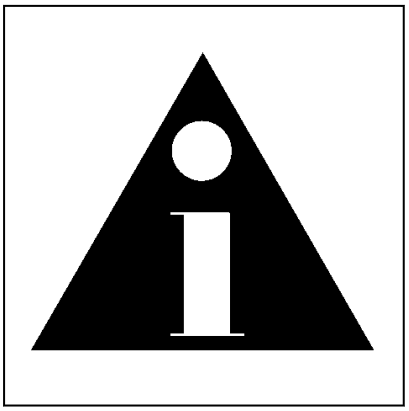
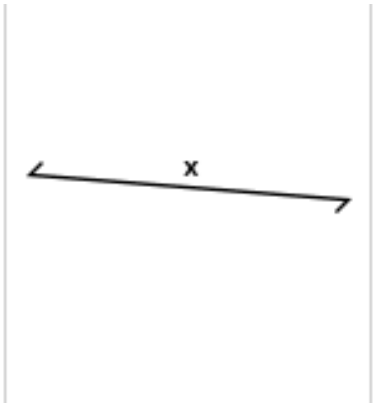
Symbol	Description
 1988729	Antenna
 1991005	Speaker
 1991006	Horn
 1991007	Microphone

Symbol	Description
 1991008	Airbag
 1991009	SIR Coil
 1991010	SIR Impact Sensor

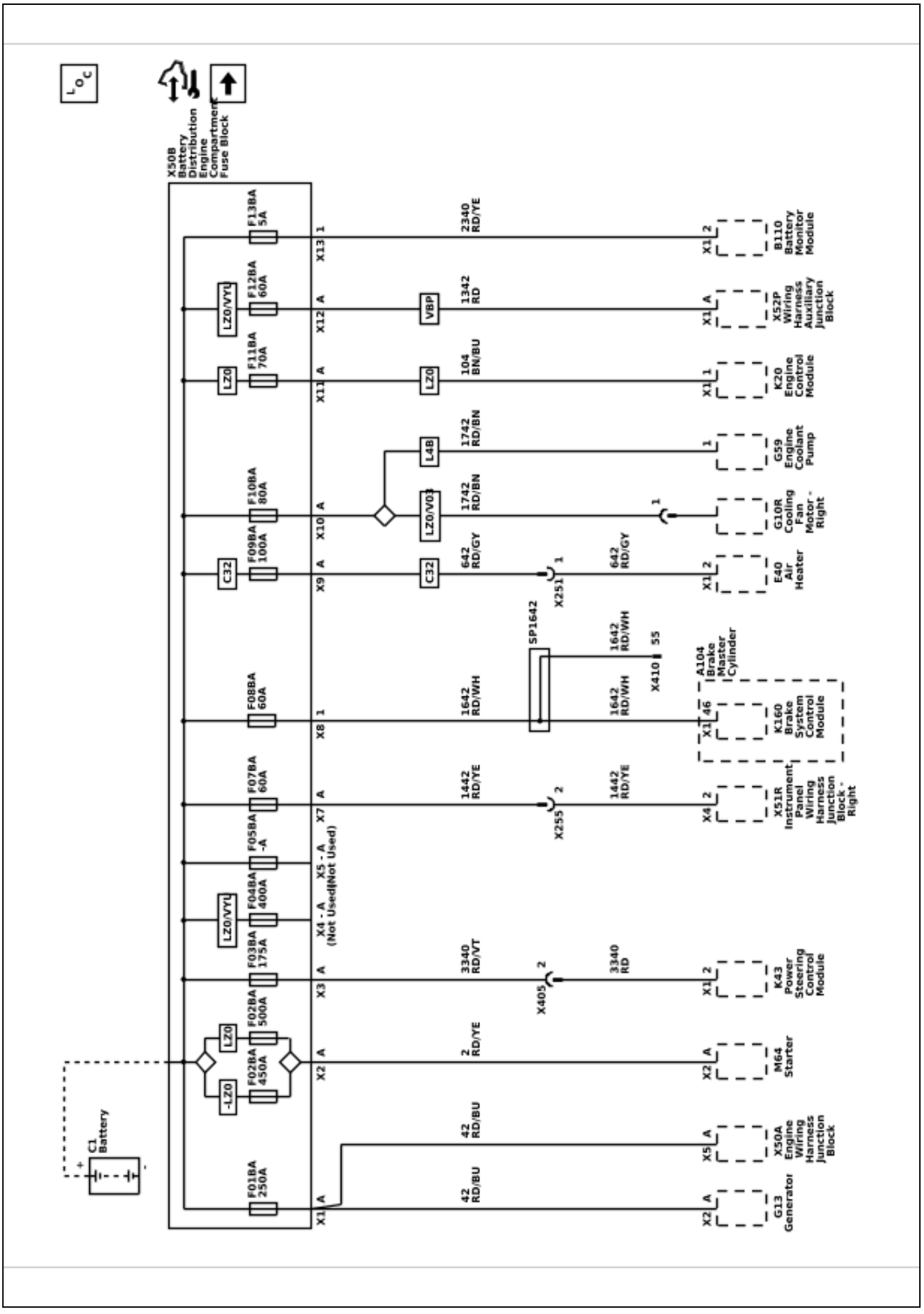
Master Electrical Schematic Icons

Master Electrical Schematic Icons

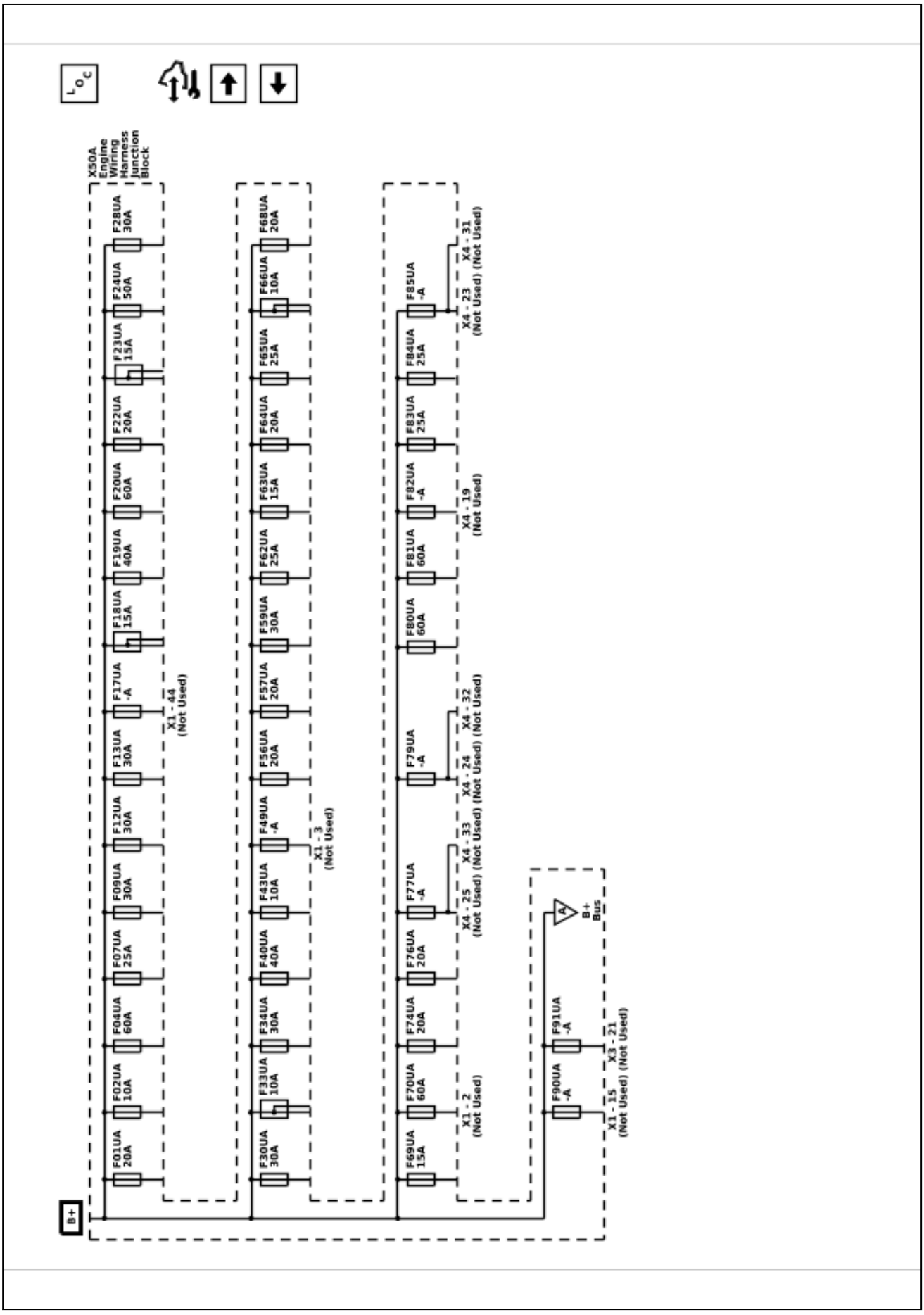
Icon	Icon Definition
 19386	***Warning: When performing service on or near the SIR components or the SIR wiring, the SIR system must be disabled. Refer to SIR Disabling and Enabling . Failure to observe the correct procedure could cause deployment of the SIR components, personal injury, or unnecessary SIR system repairs.***
 296943	***Warning: To help avoid personal injury, always treat the accessory power receptacle, accessory DC/AC power inverter module, AC circuit wires, and connectors as if AC high-voltage is present.*** ***Danger: Always perform the High Voltage Disabling procedure prior to servicing any High Voltage component or connection. Personal Protection Equipment (PPE) and proper procedures must be followed.The High Voltage Disabling procedure will perform the following tasks:*** ***Identify how to disable high voltage.*** ***Identify how to test for the presence of high voltage.*** ***Identify condition under which high voltage is always present and personal protection equipment (PPE) and proper procedures must be followed.*** ***Failure to follow the procedures exactly as written may result in serious injury or death.***

Icon	Icon Definition
 1822496	**X52P Wiring Harness Auxiliary Junction Block:** **Note:** This relay and fuse center comes with relays and 10A fuses populated. They may be replaced when add on accessories are installed in accordance to the restrictions below. Total current draw of this relay and fuse center must not exceed 60 amps. Fuse size selection must be based on host OEM wiring size. Maximum fuse value must not exceed 25 amps.
 902886	**Note:** Twisted-pair wires provide an effective shield that helps protect sensitive electronic components from electrical interference.In order to prevent electrical interference from degrading the performance of the connected components, you must maintain the proper specification when making any repairs to the twisted-pair wires shown : The wires must be twisted a minimum of 9 turns per 31 cm (12 in) as measured anywhere along the length of the wires. The outside diameter of the twisted wires must not exceed 6.0 mm (0.25 in).

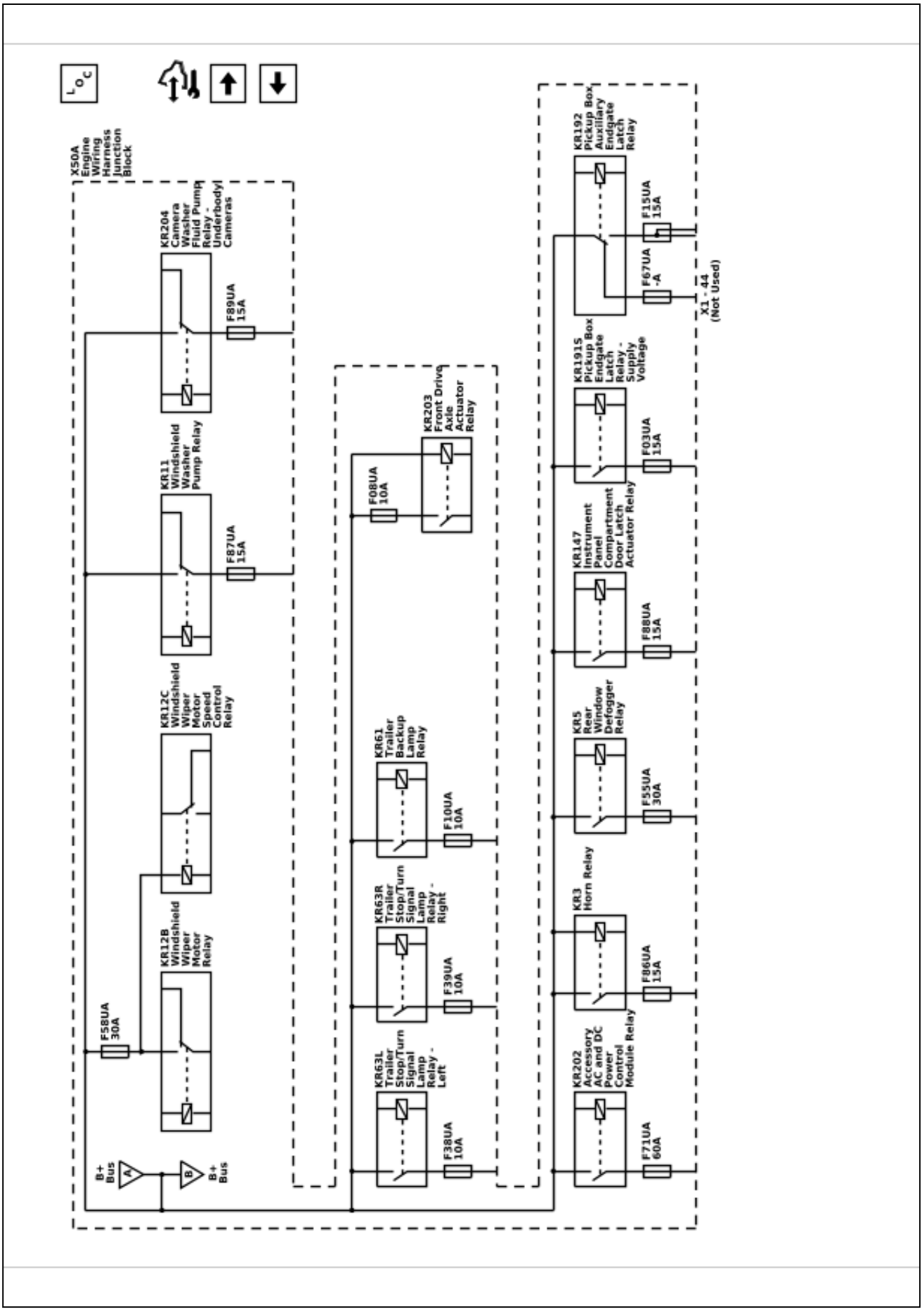
Power Distribution Schematics (B+ Bus - X50B Battery Distribution Engine Compartment Fuse Block)



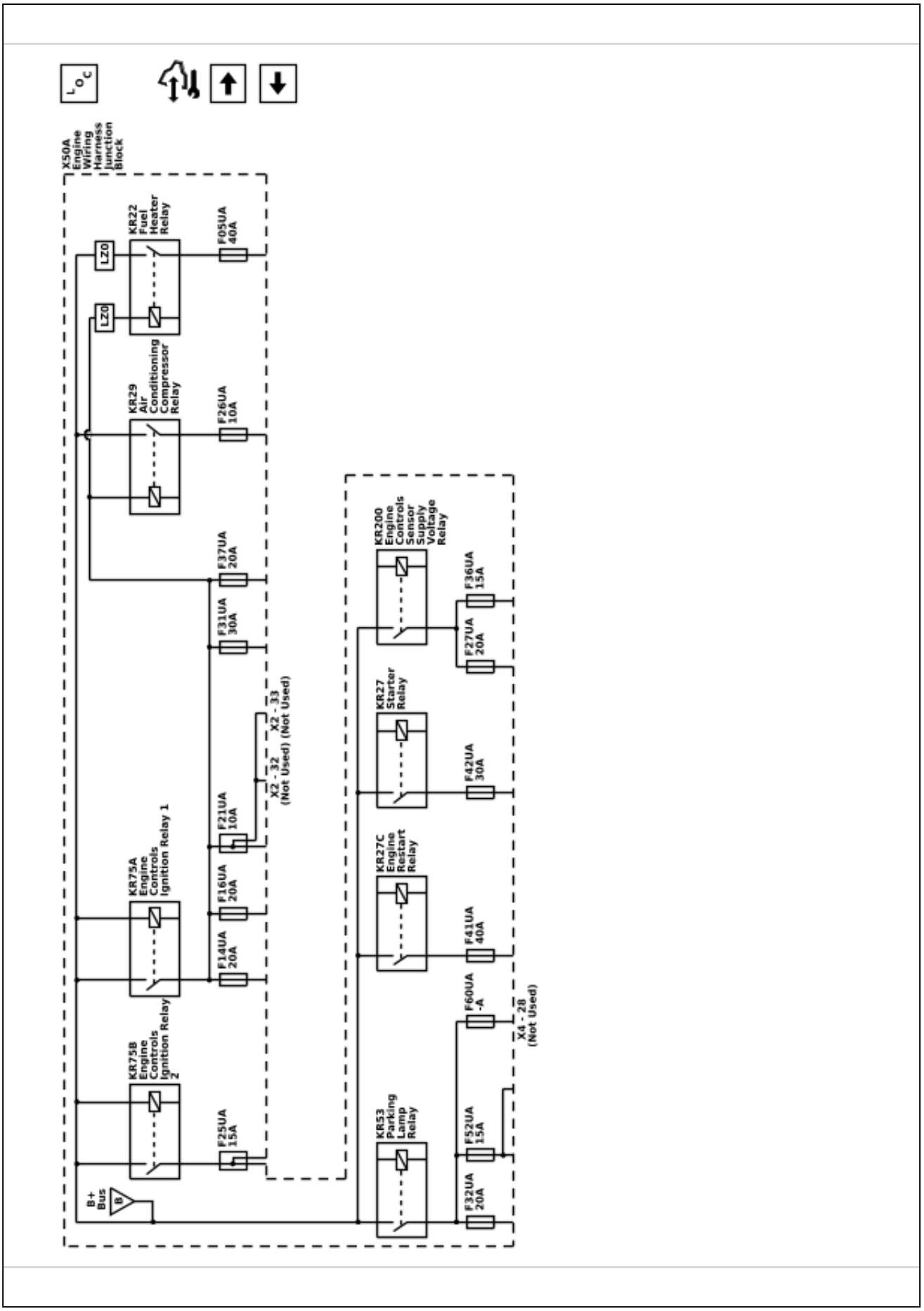
Power Distribution Schematics (B+ Bus - X50A Engine Wiring Harness Junction Block - Fuses)



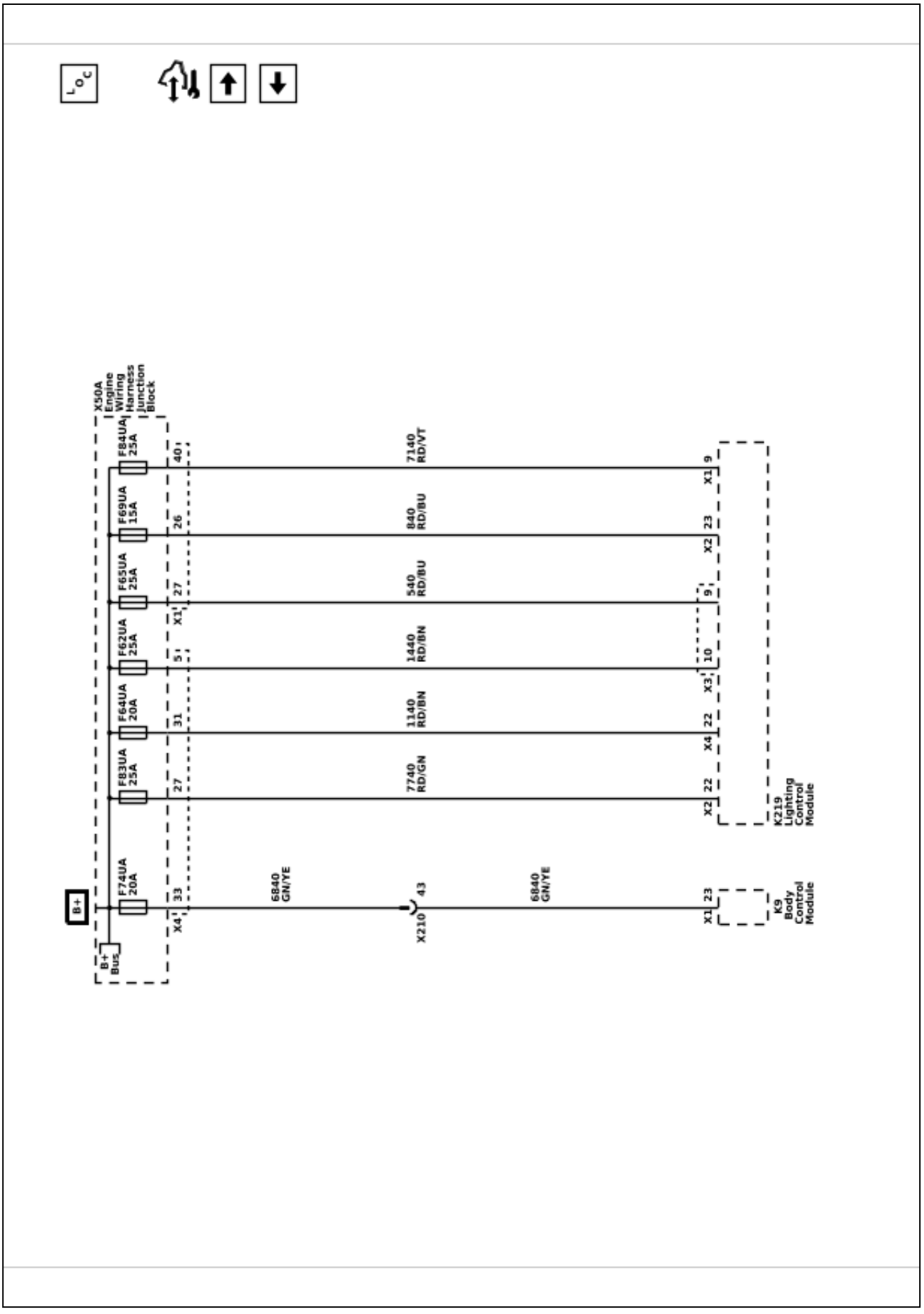
Power Distribution Schematics (B+ Bus - X50A Engine Wiring Harness Junction Block - Relays 1 of 2)



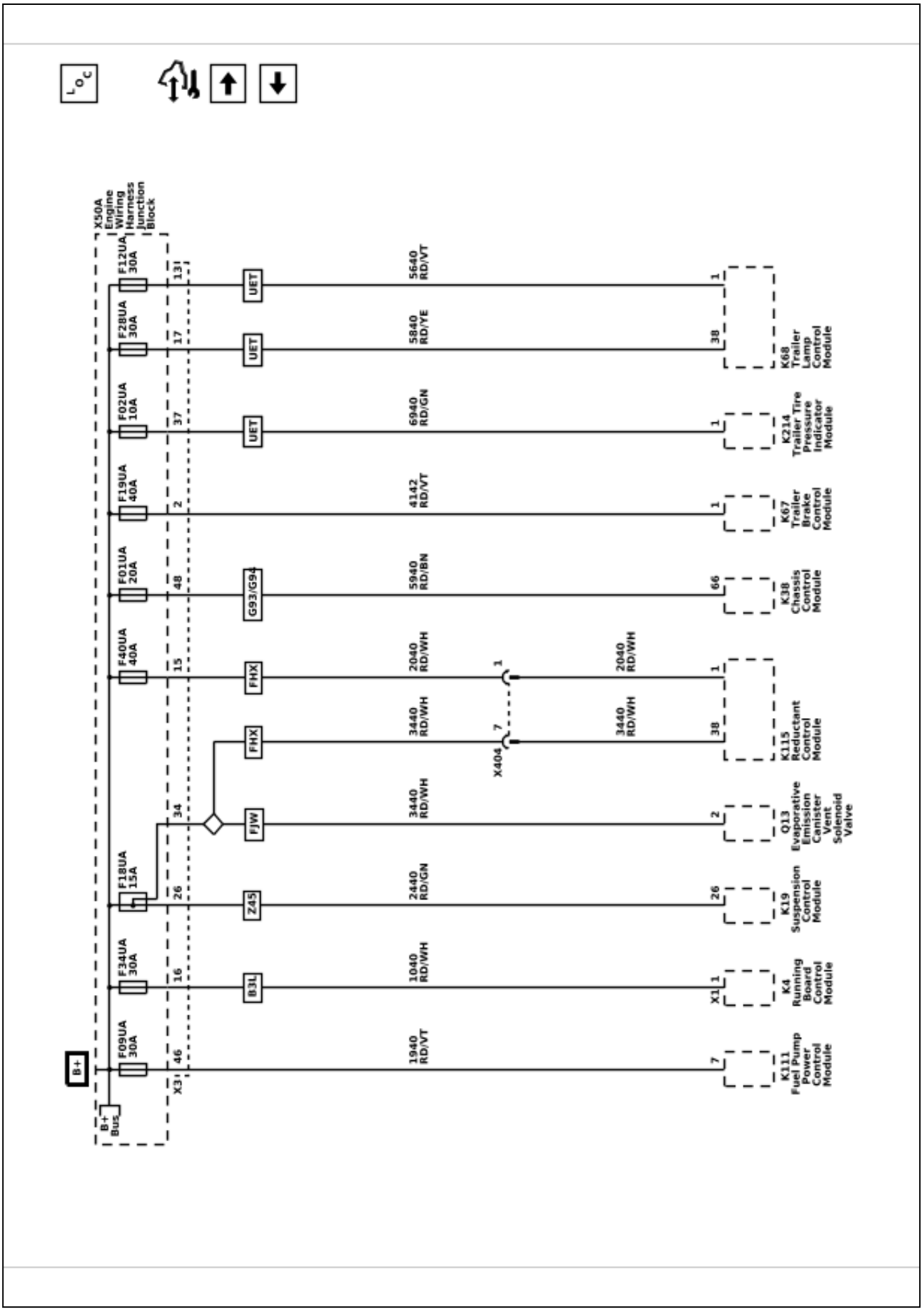
Power Distribution Schematics (B+ Bus - X50A Engine Wiring Harness Junction Block - Relays 2 of 2)



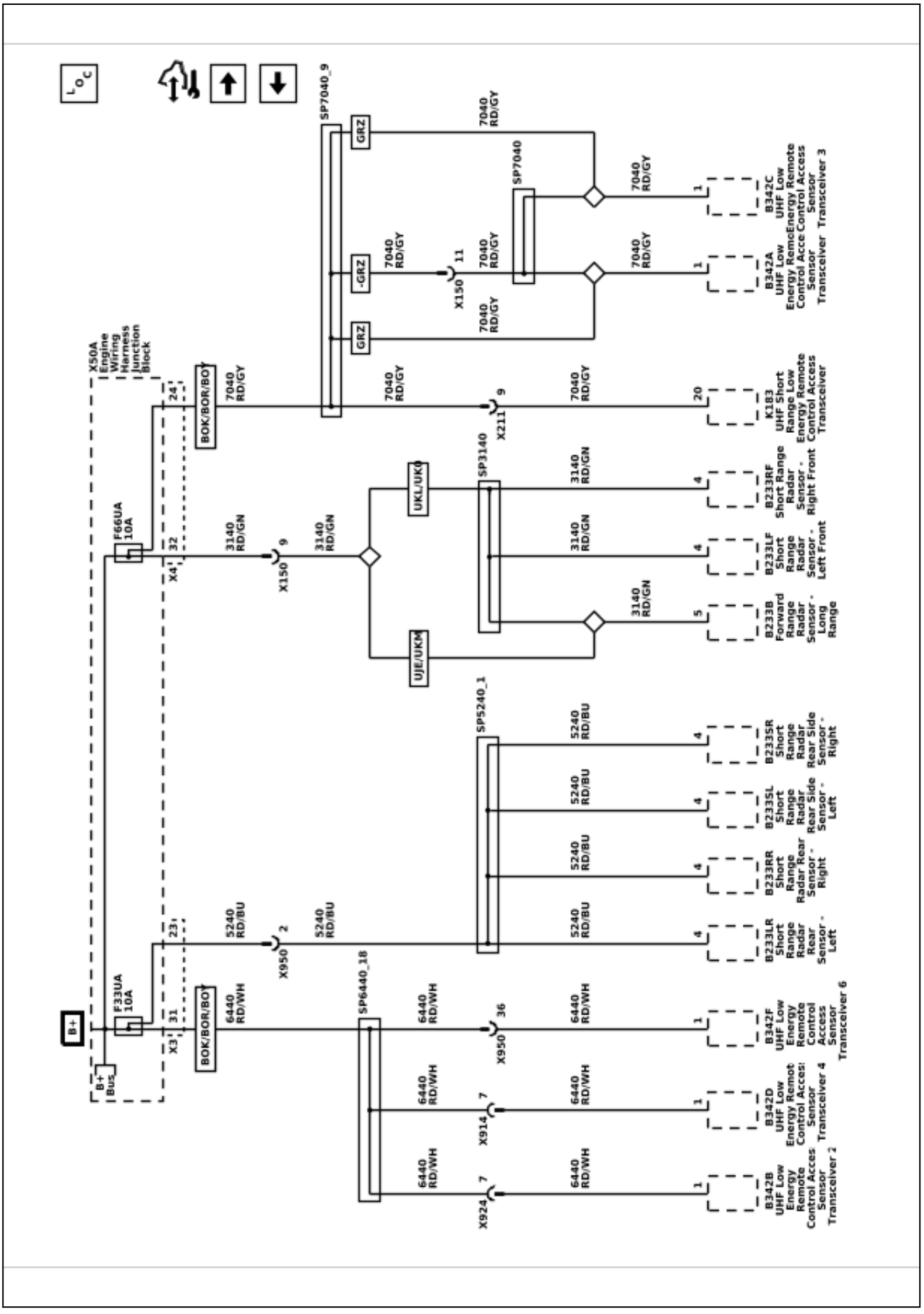
Power Distribution Schematics (F62UA, F64UA, F65UA, F69UA, F74UA, F83UA, and F84UA Fuses)



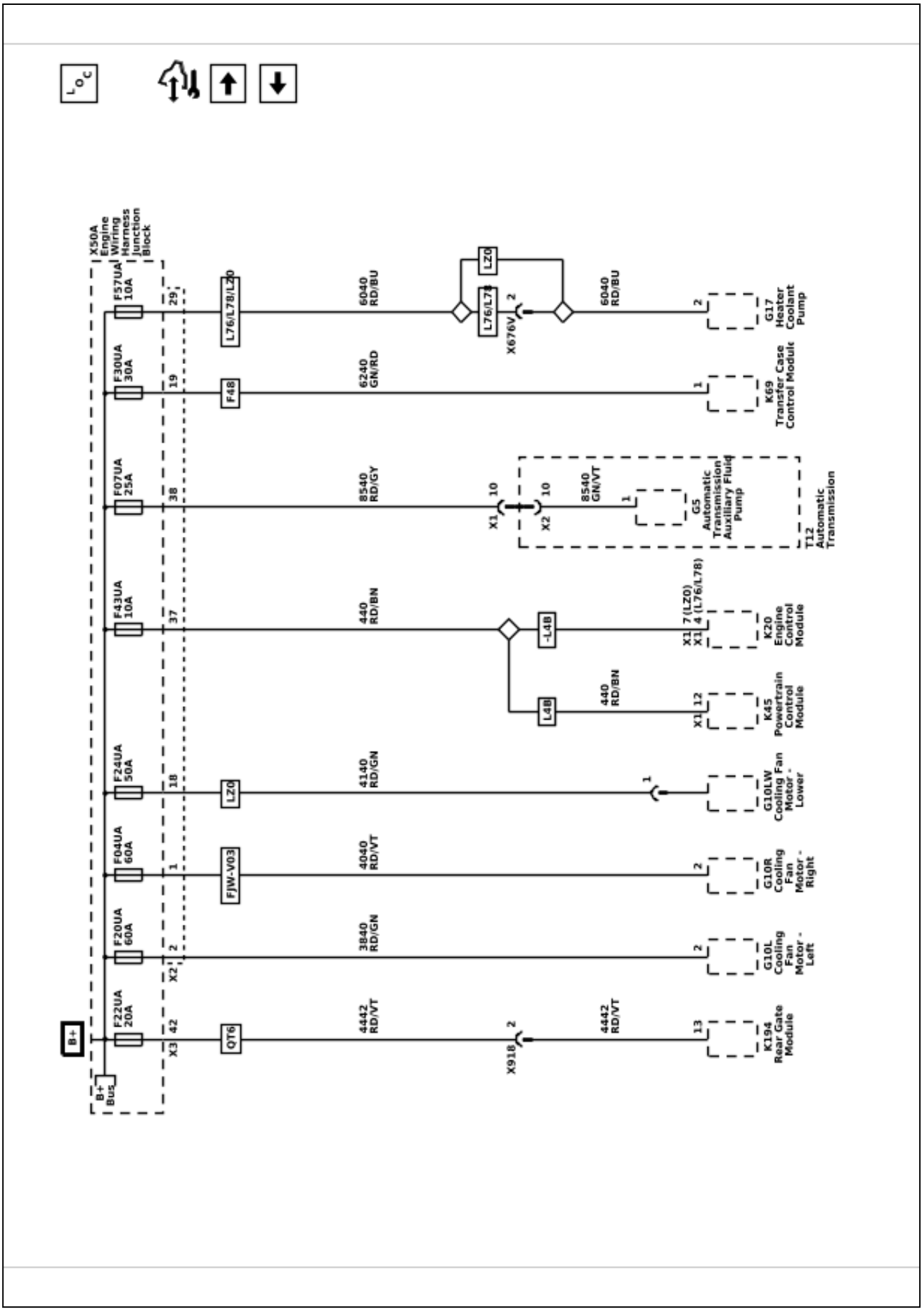
Power Distribution Schematics (F01UA, F02UA, F09UA, F12UA, F18UA, F19UA, F28UA, F34UA, and F40UA Fuses)



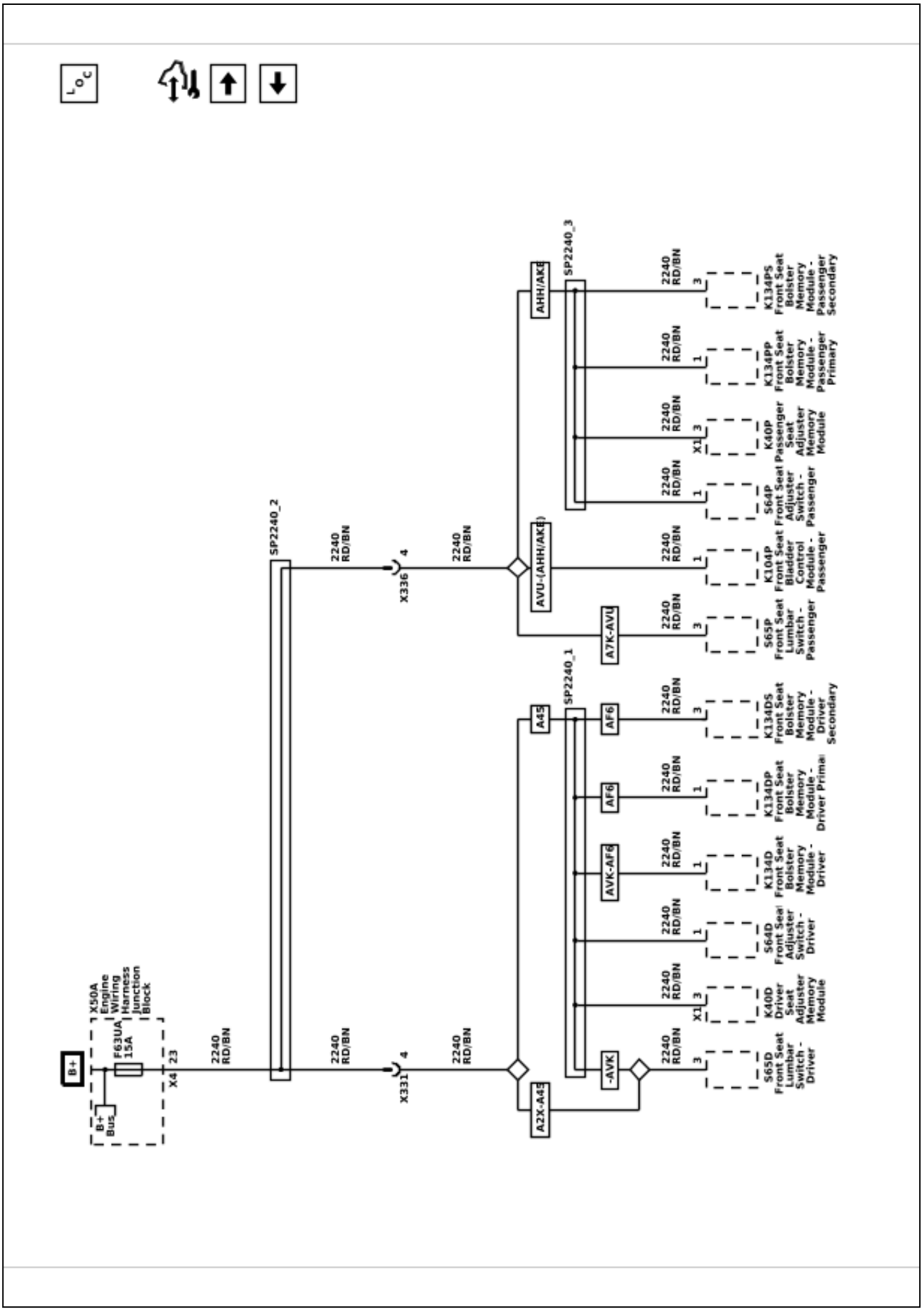
Power Distribution Schematics (F33UA, and F66UA Fuses)



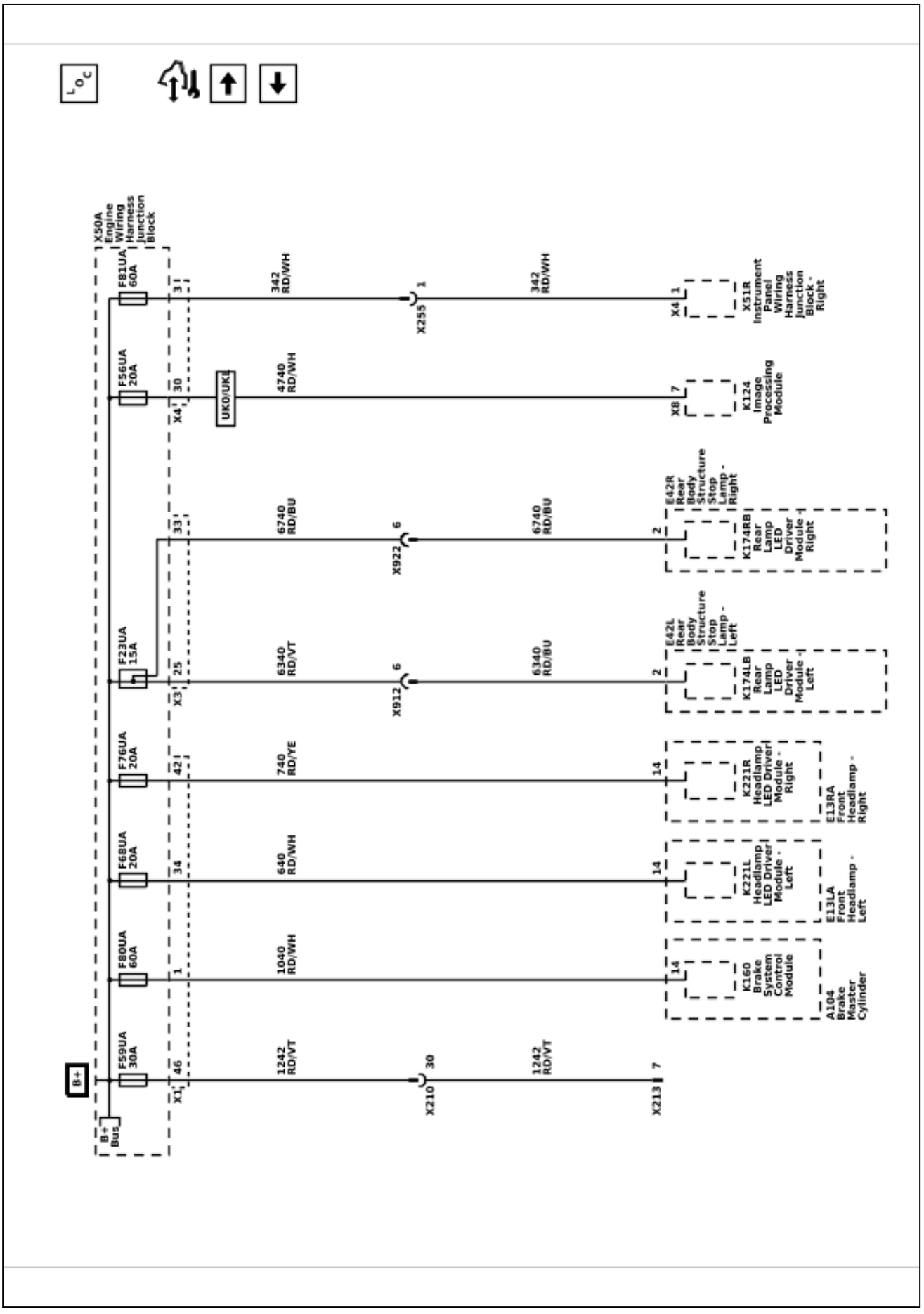
Power Distribution Schematics (F04UA, F07UA, F20UA, F22UA, F24UA, F30UA, F43UA, and F57UA Fuses)



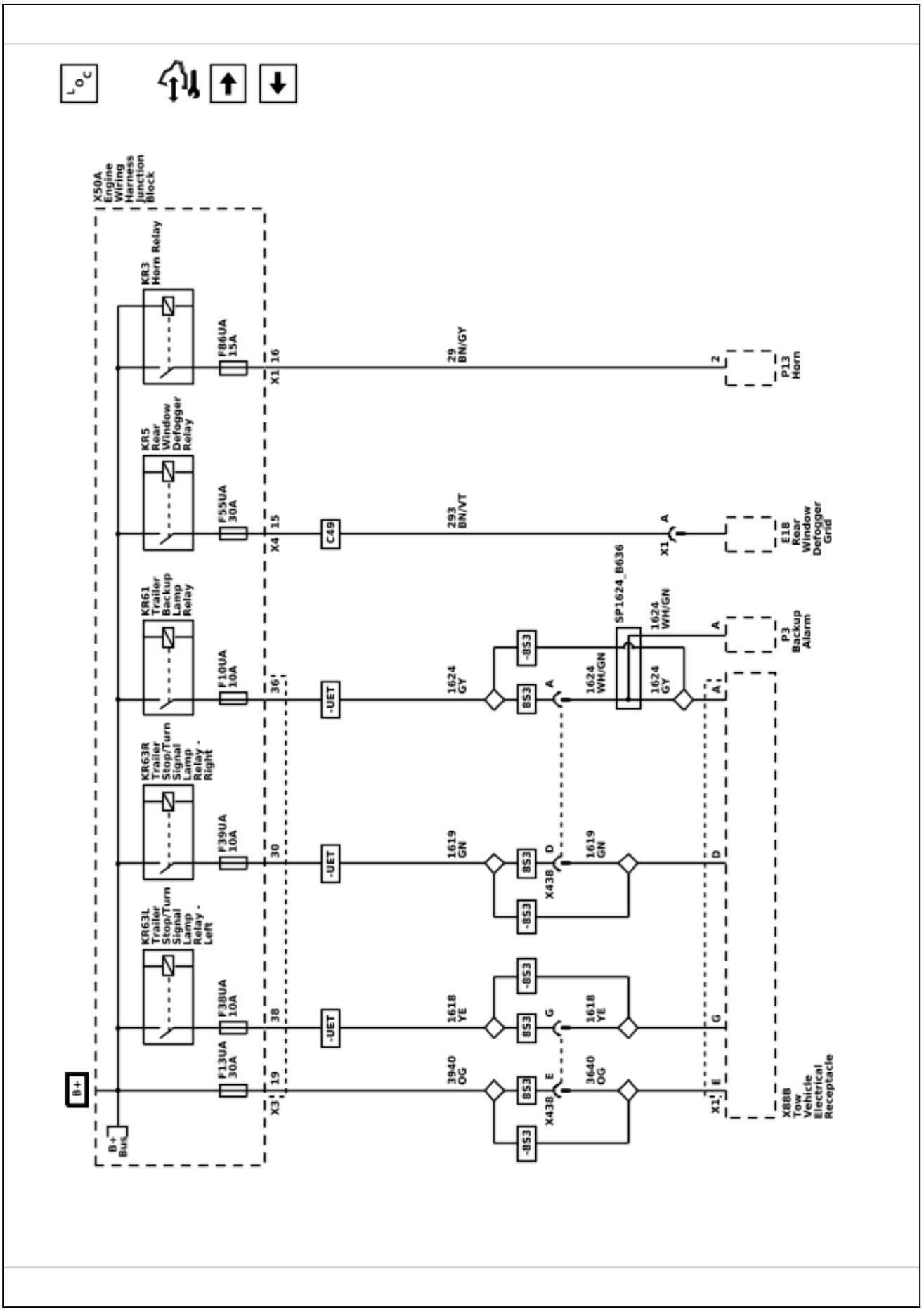
Power Distribution Schematics (F63UA Fuse)



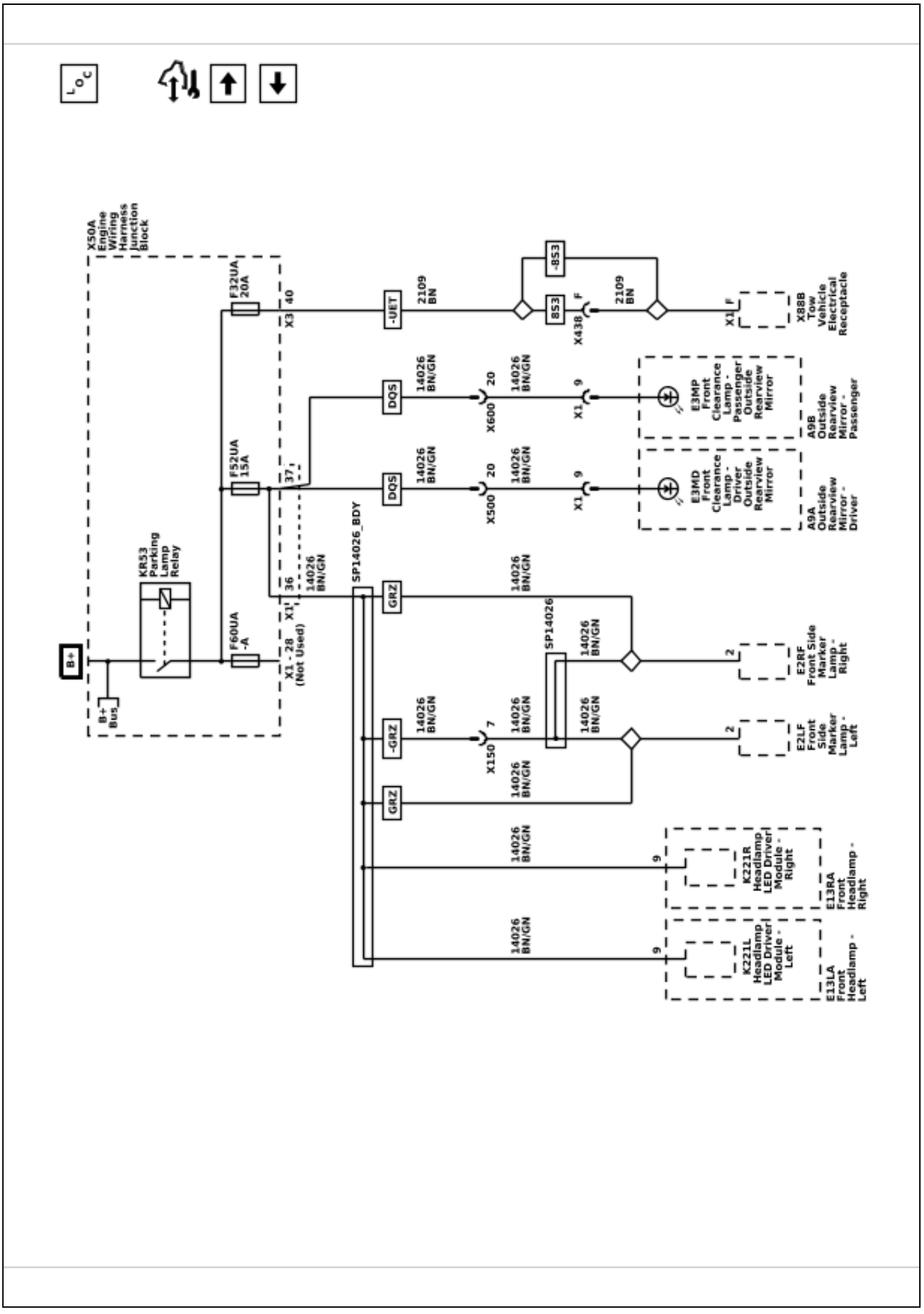
Power Distribution Schematics (F23UA, F56UA, F59UA, F68UA, F76UA, F80UA, and F81UA Fuses)



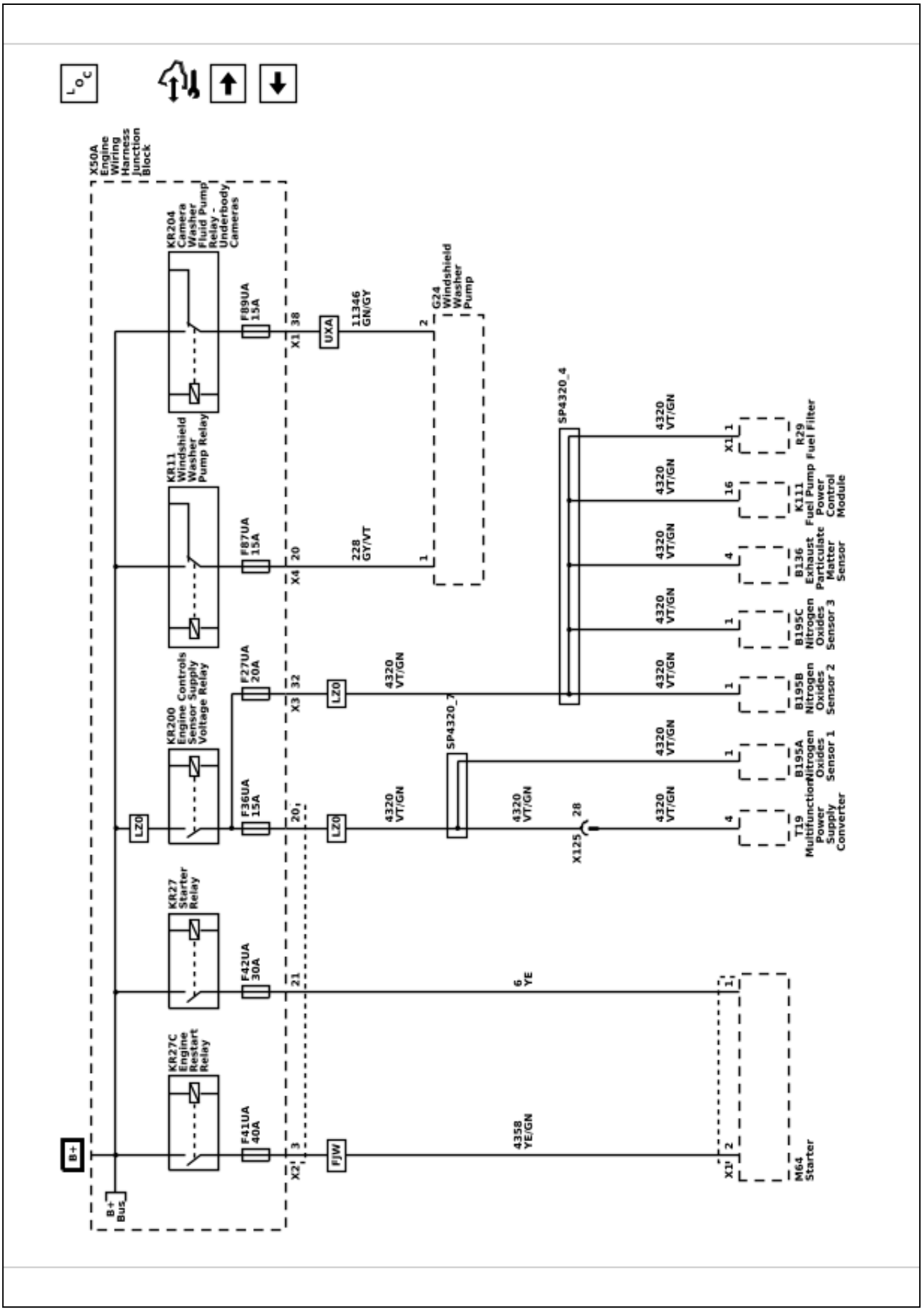
Power Distribution Schematics (F10UA, F13UA, F38UA, F39UA, F55UA, and F86UA Fuses)



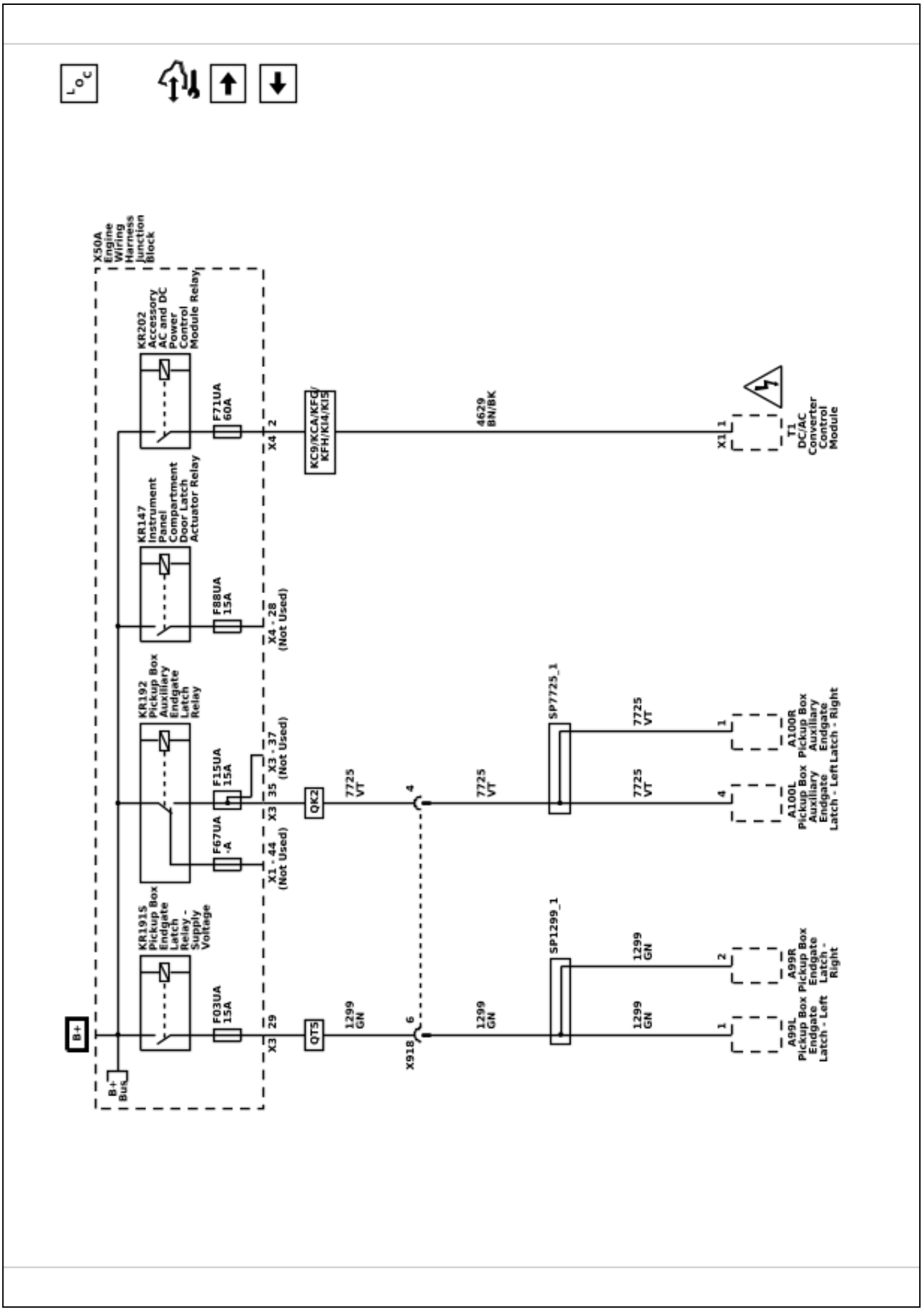
Power Distribution Schematics (F32UA, F52UA, and F60UA Fuses)



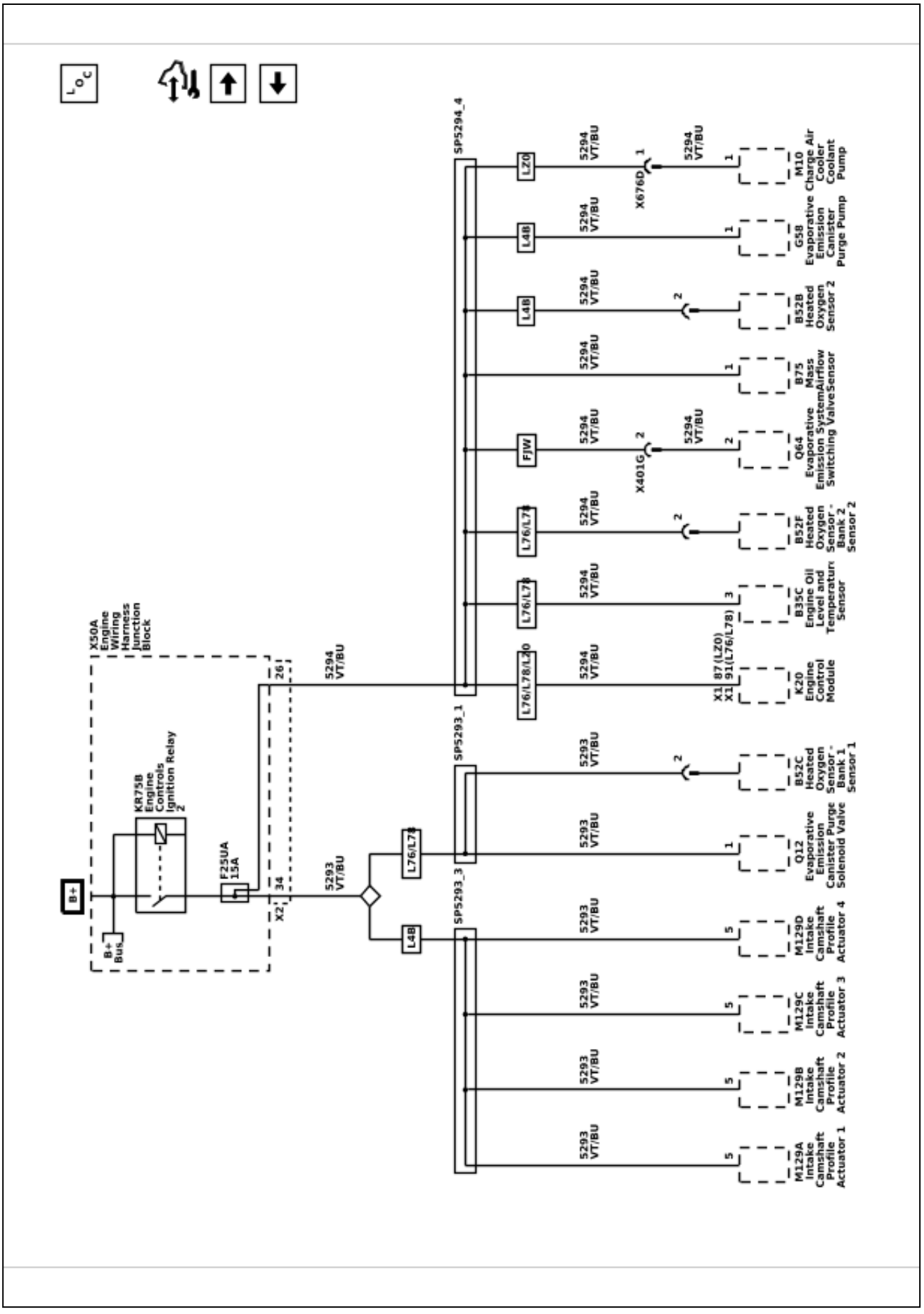
Power Distribution Schematics (F27UA, F36UA, F41UA, F42UA, F87UA, and F89UA Fuses)



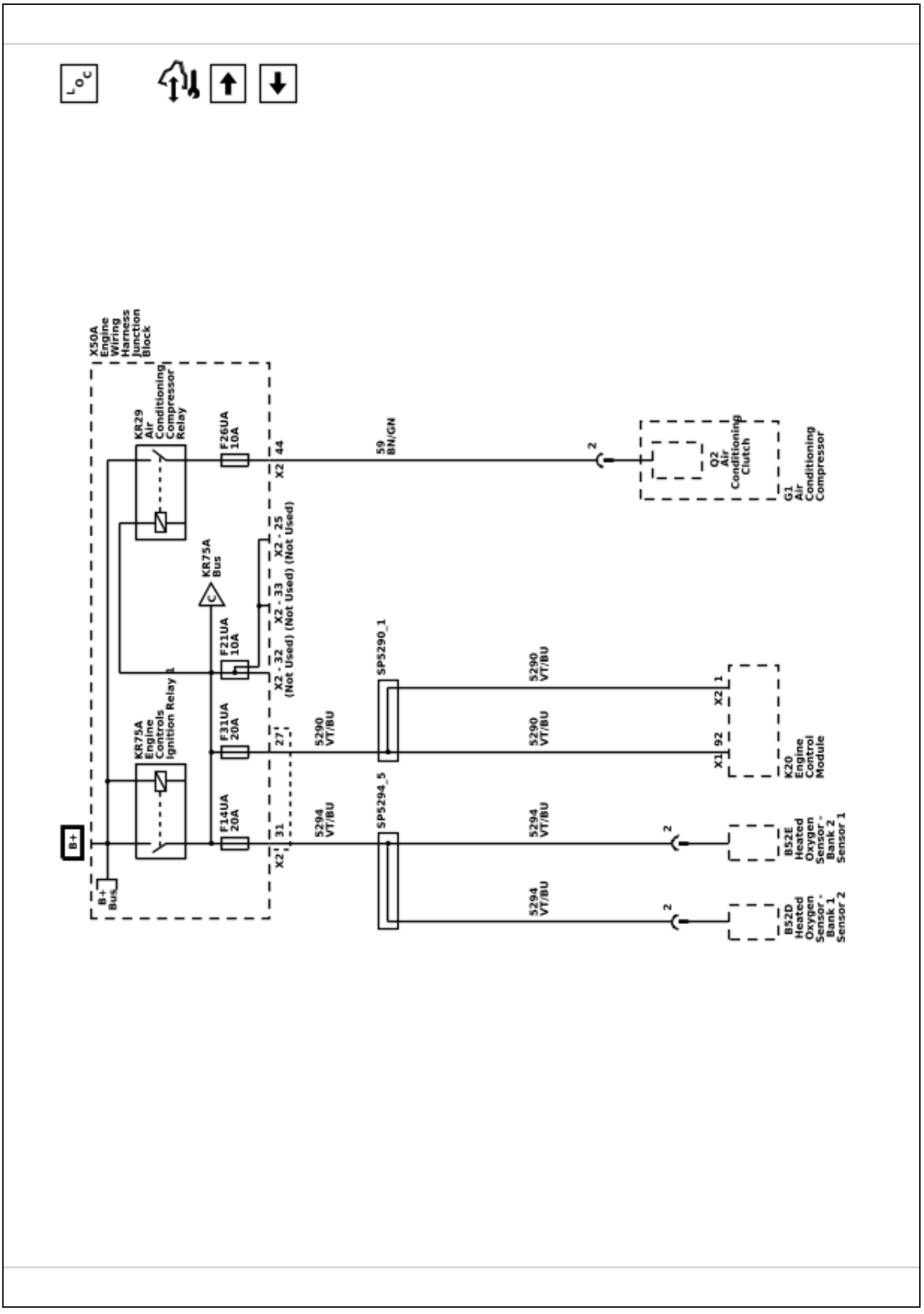
Power Distribution Schematics (F03UA, F15UA, F67UA, F71UA, and F88UA Fuses)



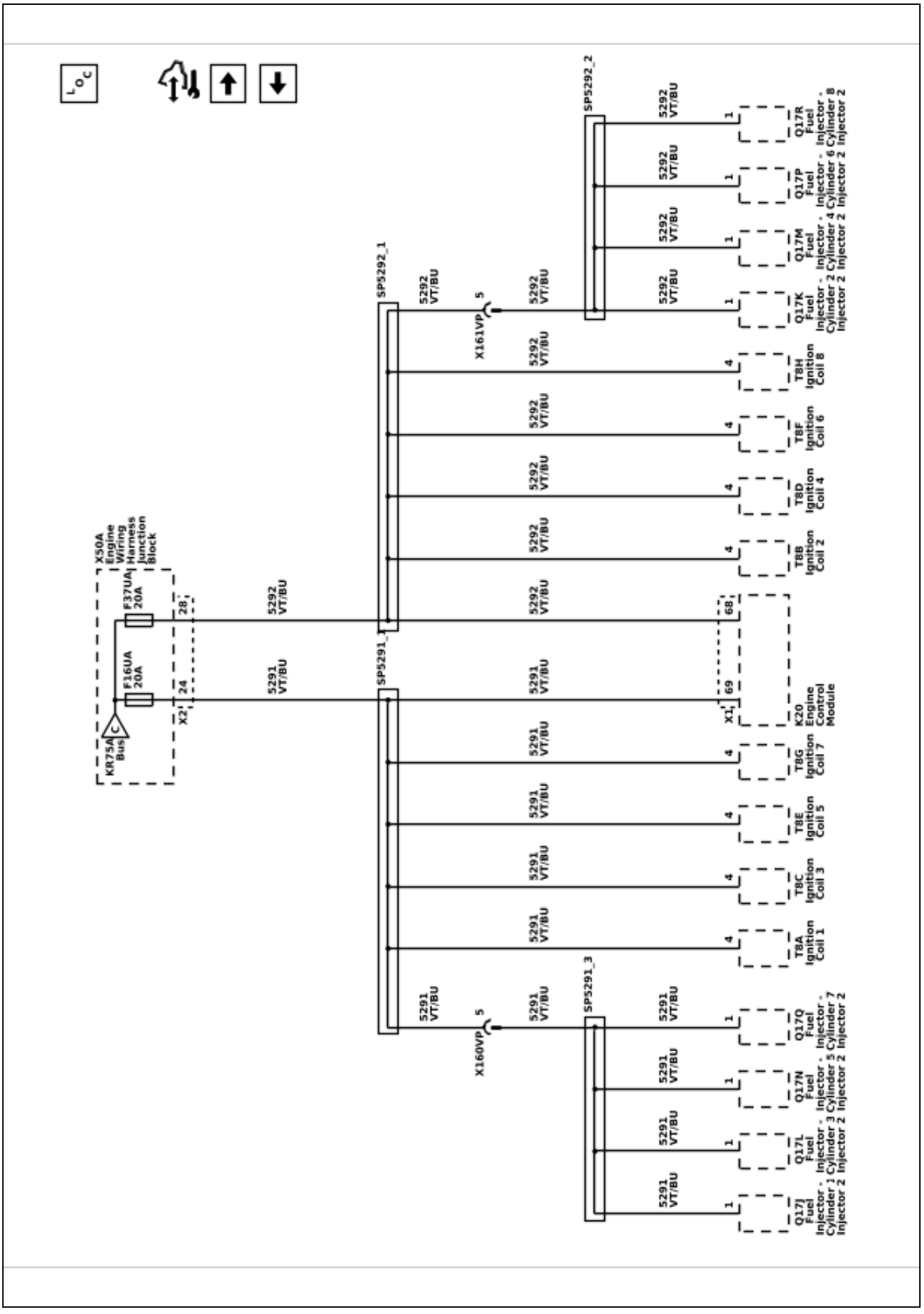
Power Distribution Schematics (F25UA Fuse)



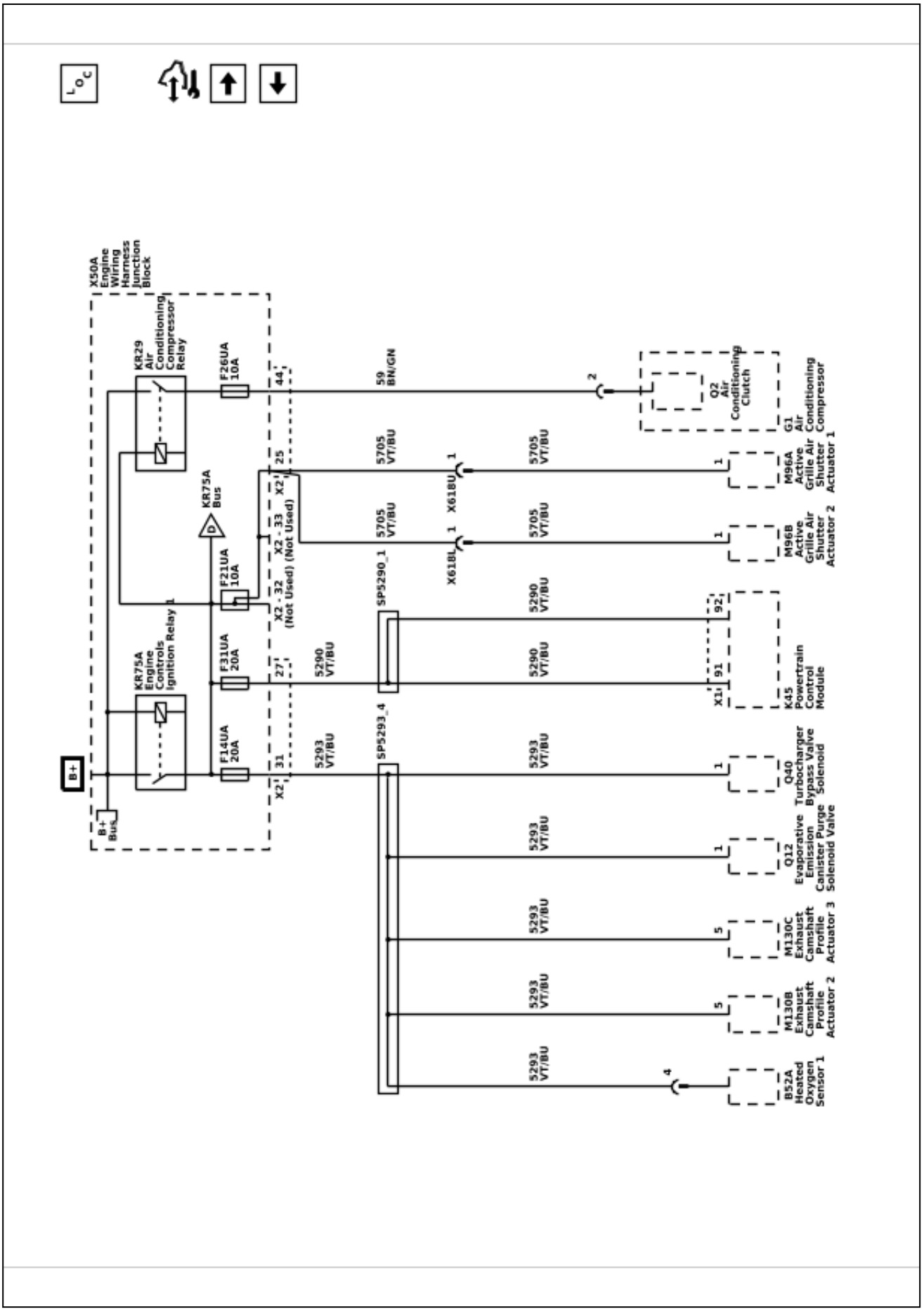
Power Distribution Schematics (F14UA, F21UA, F26UA, and F31UA Fuses (L76 / L78))



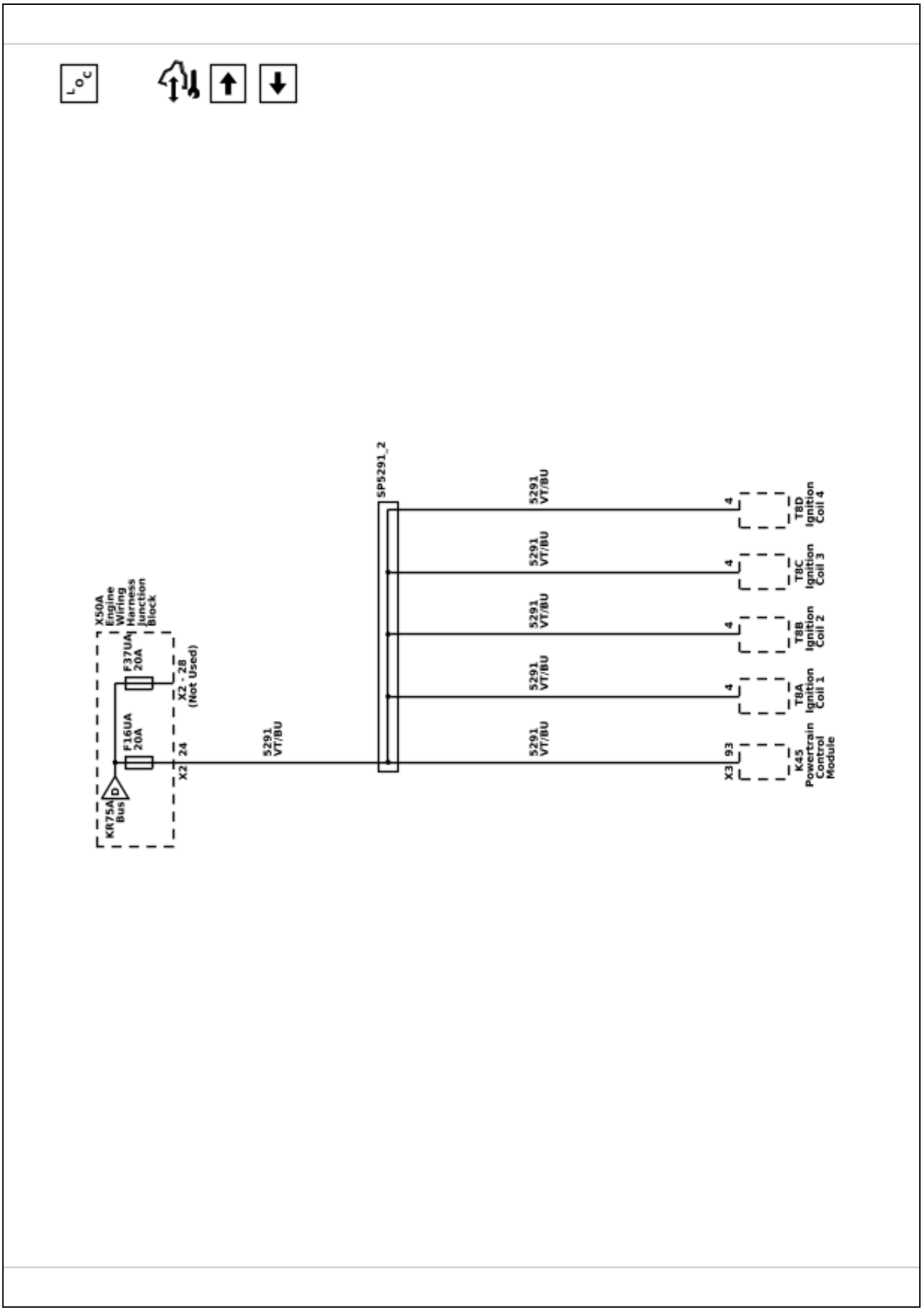
Power Distribution Schematics (F16UA and F37UA Fuses (L76 / L78))



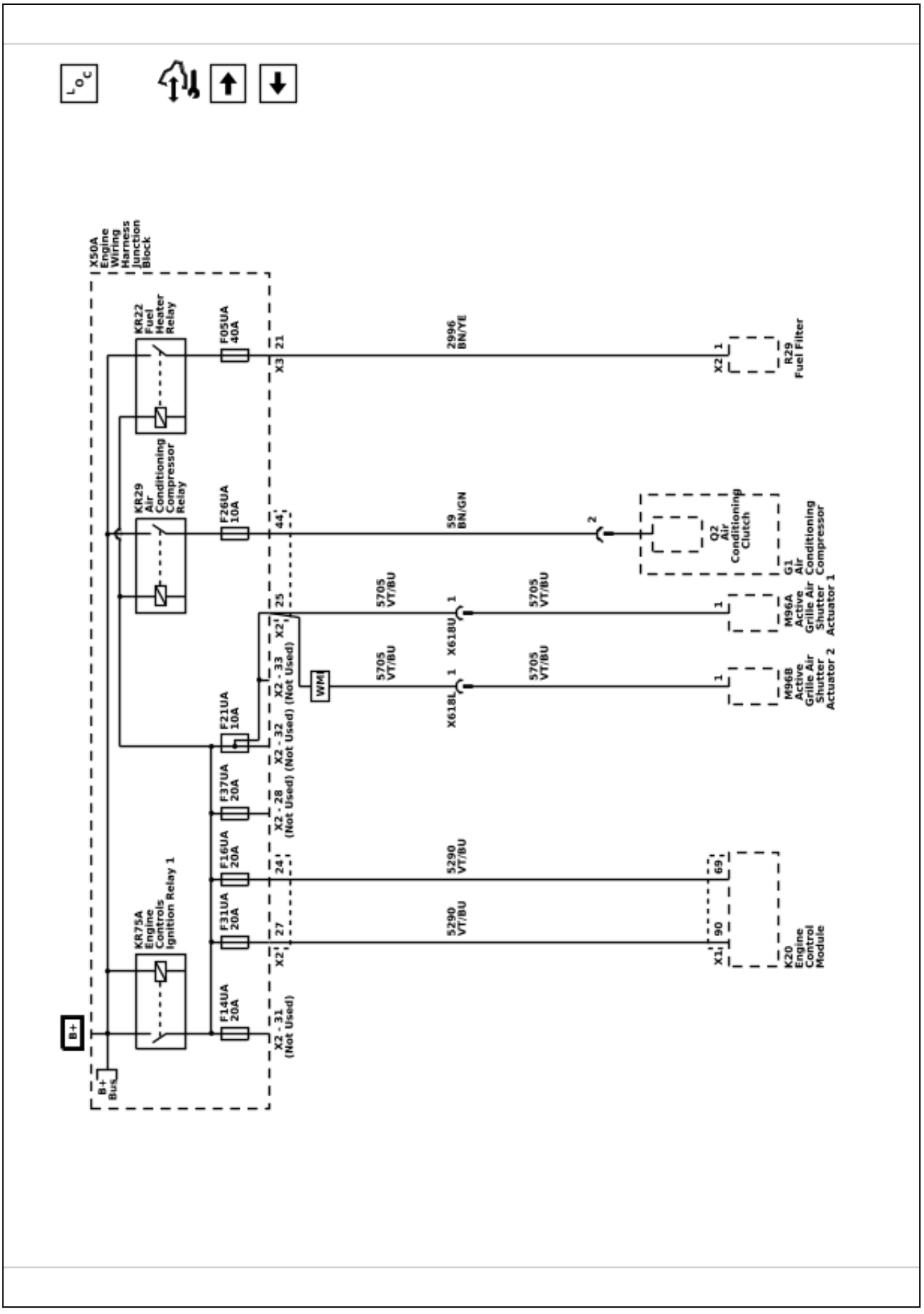
Power Distribution Schematics (F14UA, F21UA, F26UA, and F31UA Fuses (L4B))



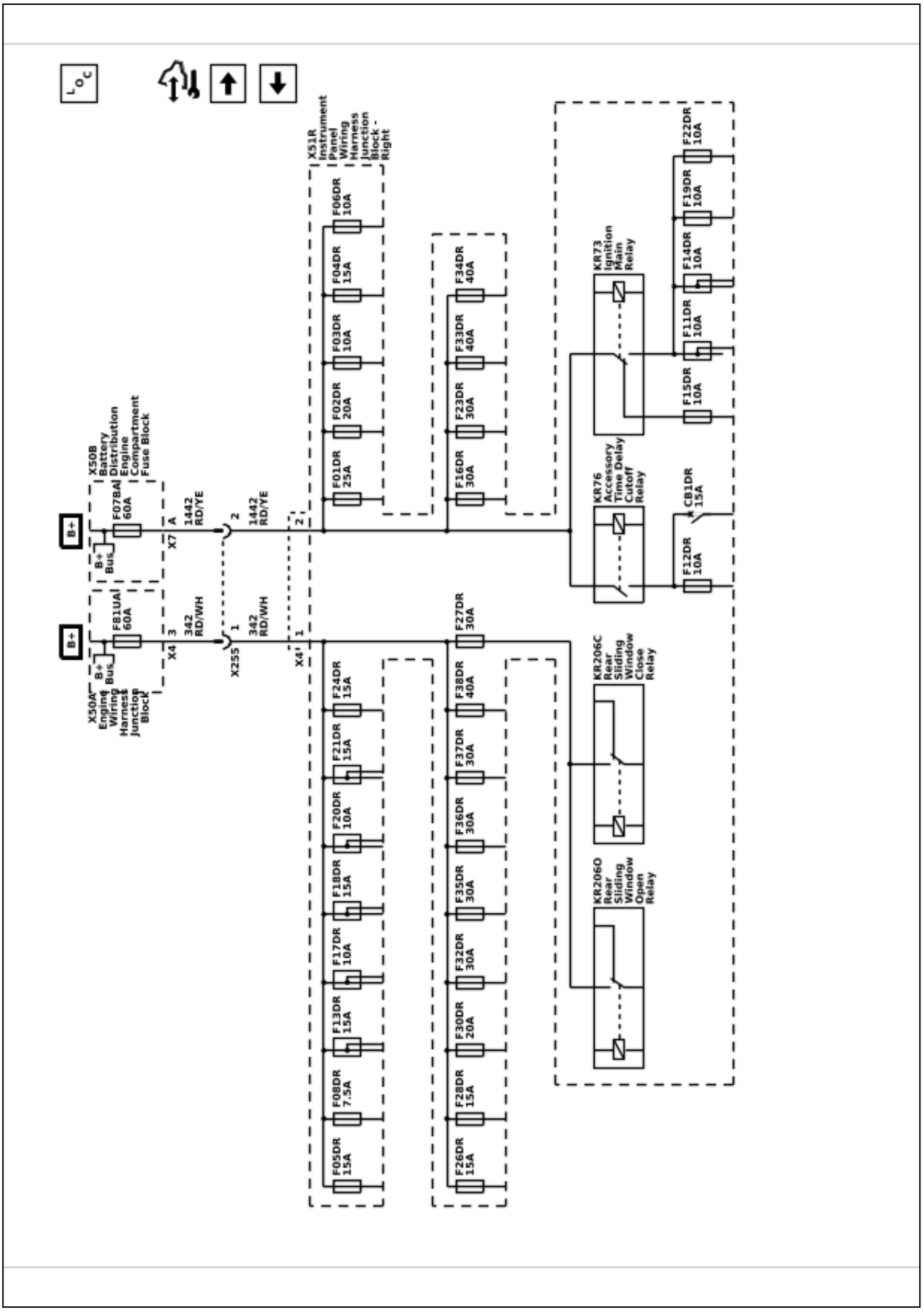
Power Distribution Schematics (F16UA and F37UA Fuses (L4B))



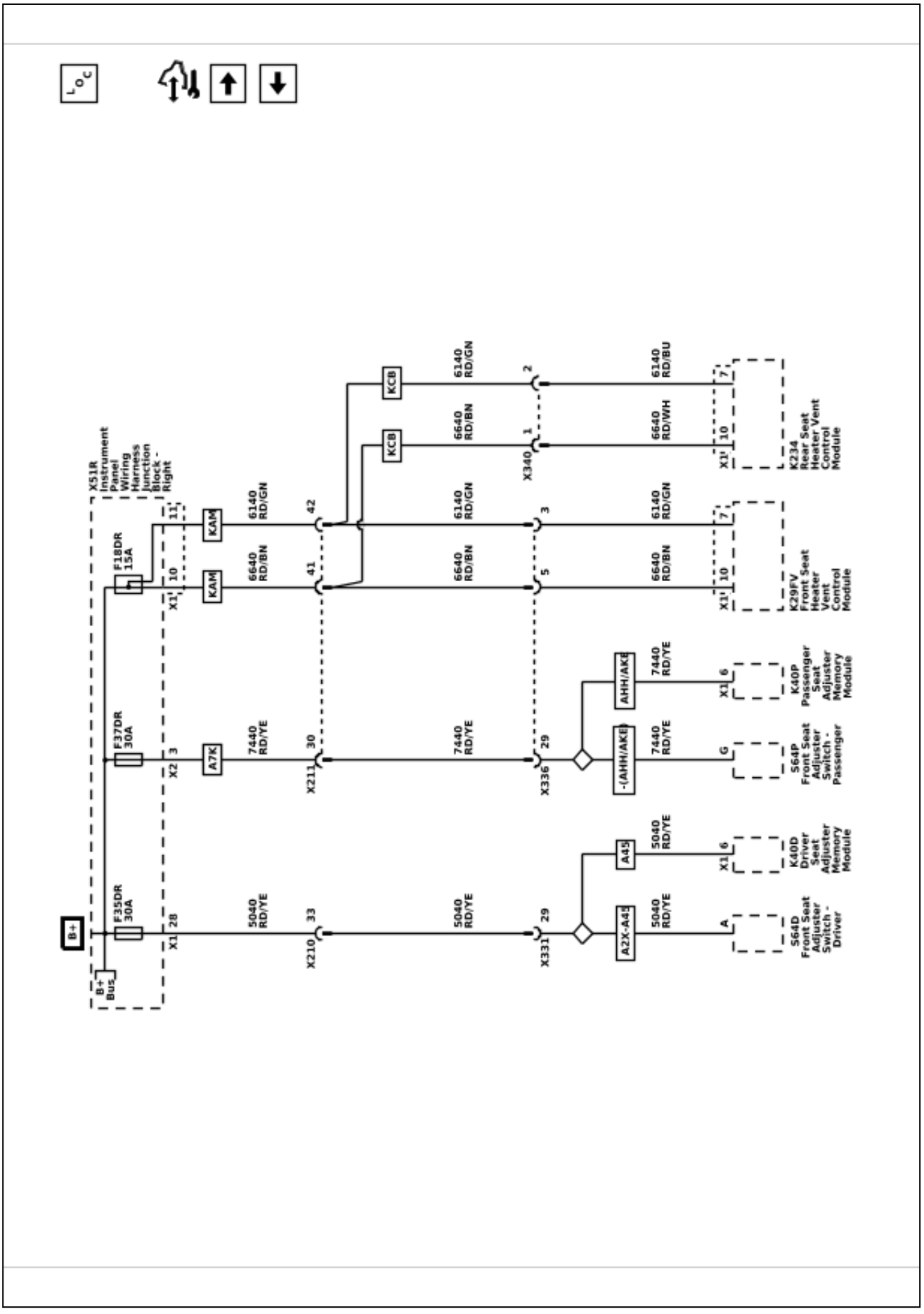
Power Distribution Schematics (F05UA, F14UA, F16UA, F21UA, F26UA, F31UA, and F37UA Fuses (LZ0))



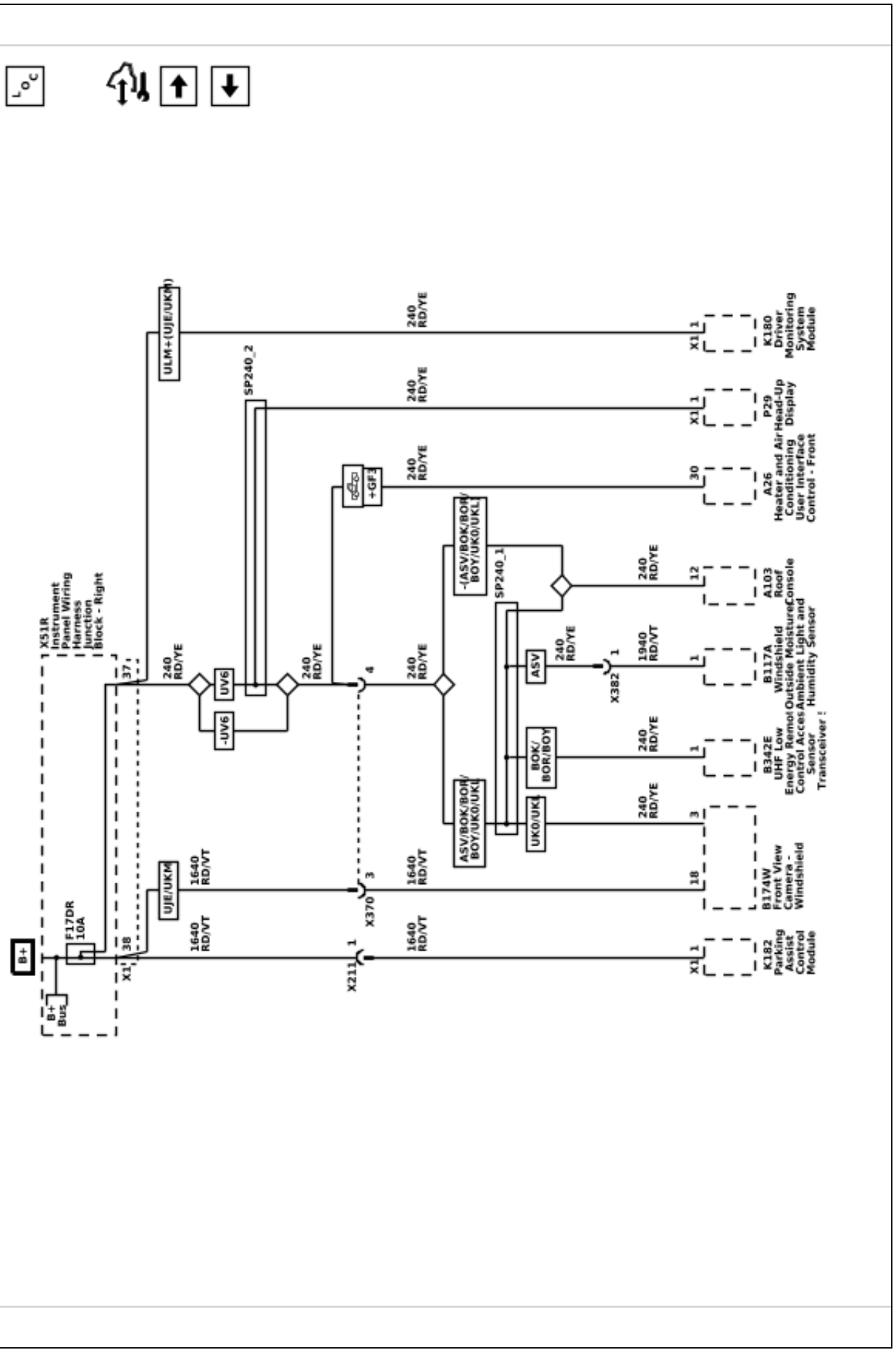
Power Distribution Schematics (B+ Bus - X51R Instrument Panel Wiring Harness Junction Block - Right)



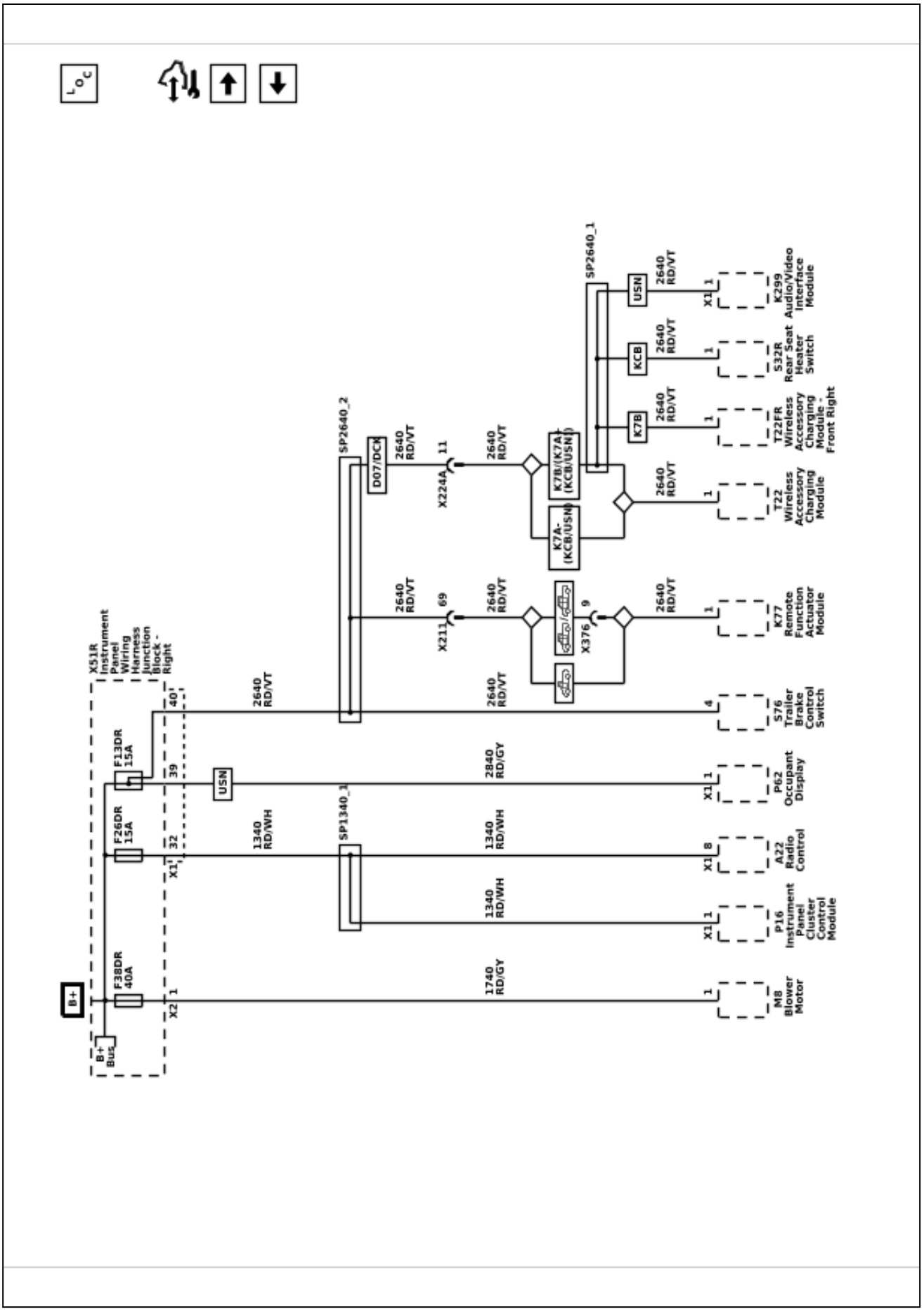
Power Distribution Schematics (F18DR, F35DR, and F37DR Fuses)



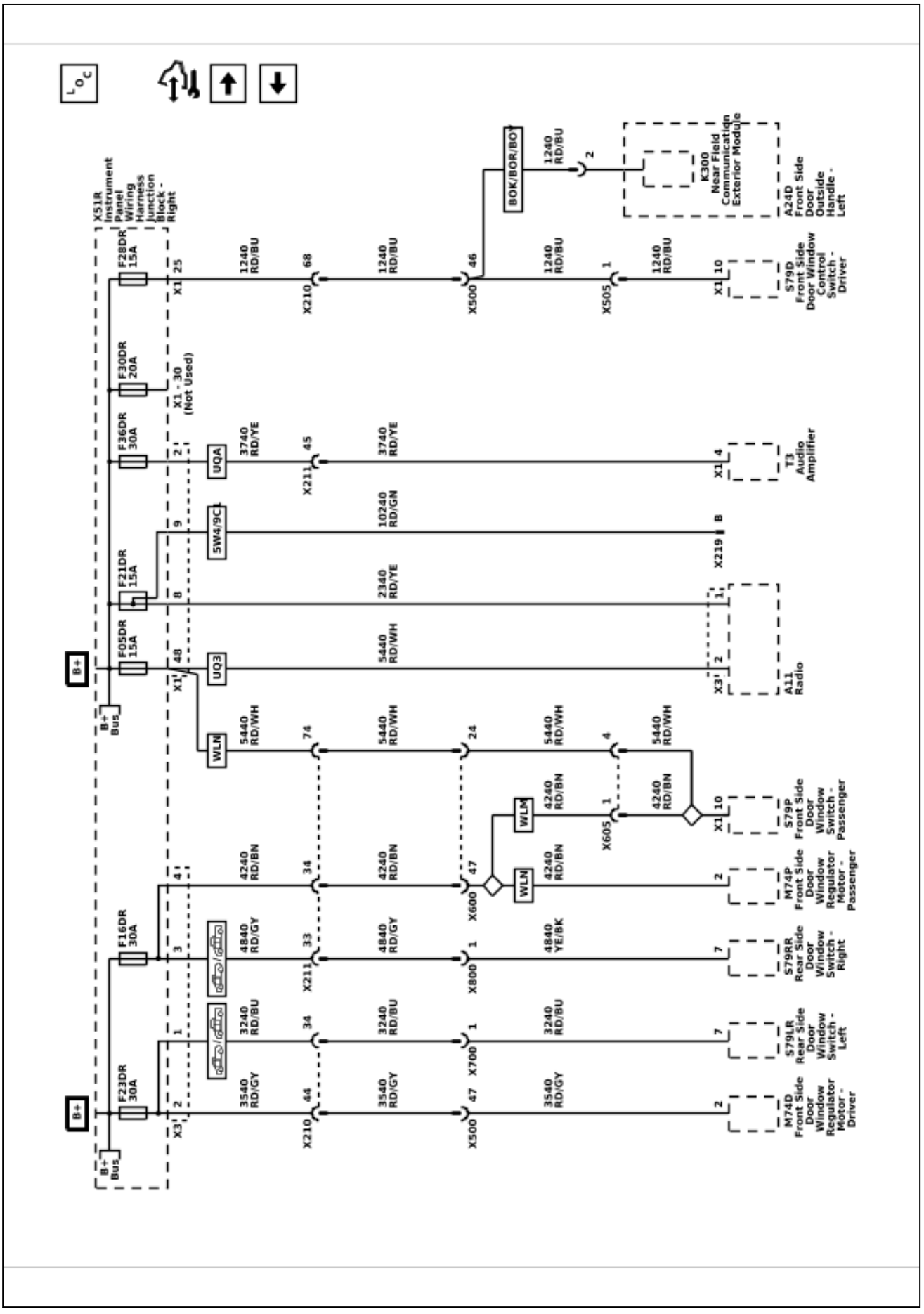
Power Distribution Schematics (F17DR Fuse)



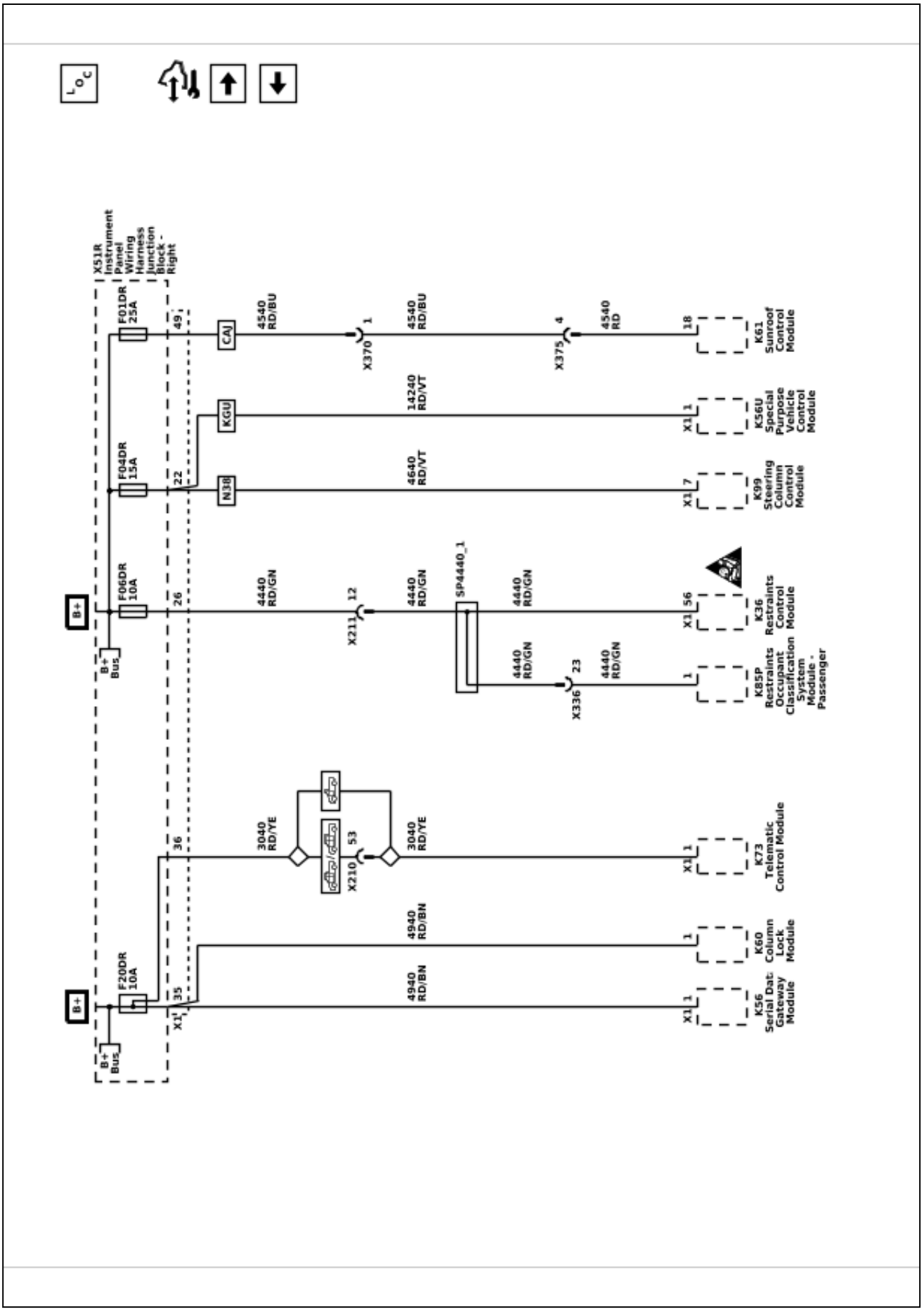
Power Distribution Schematics (F13DR, F26DR, and F38DR Fuses)



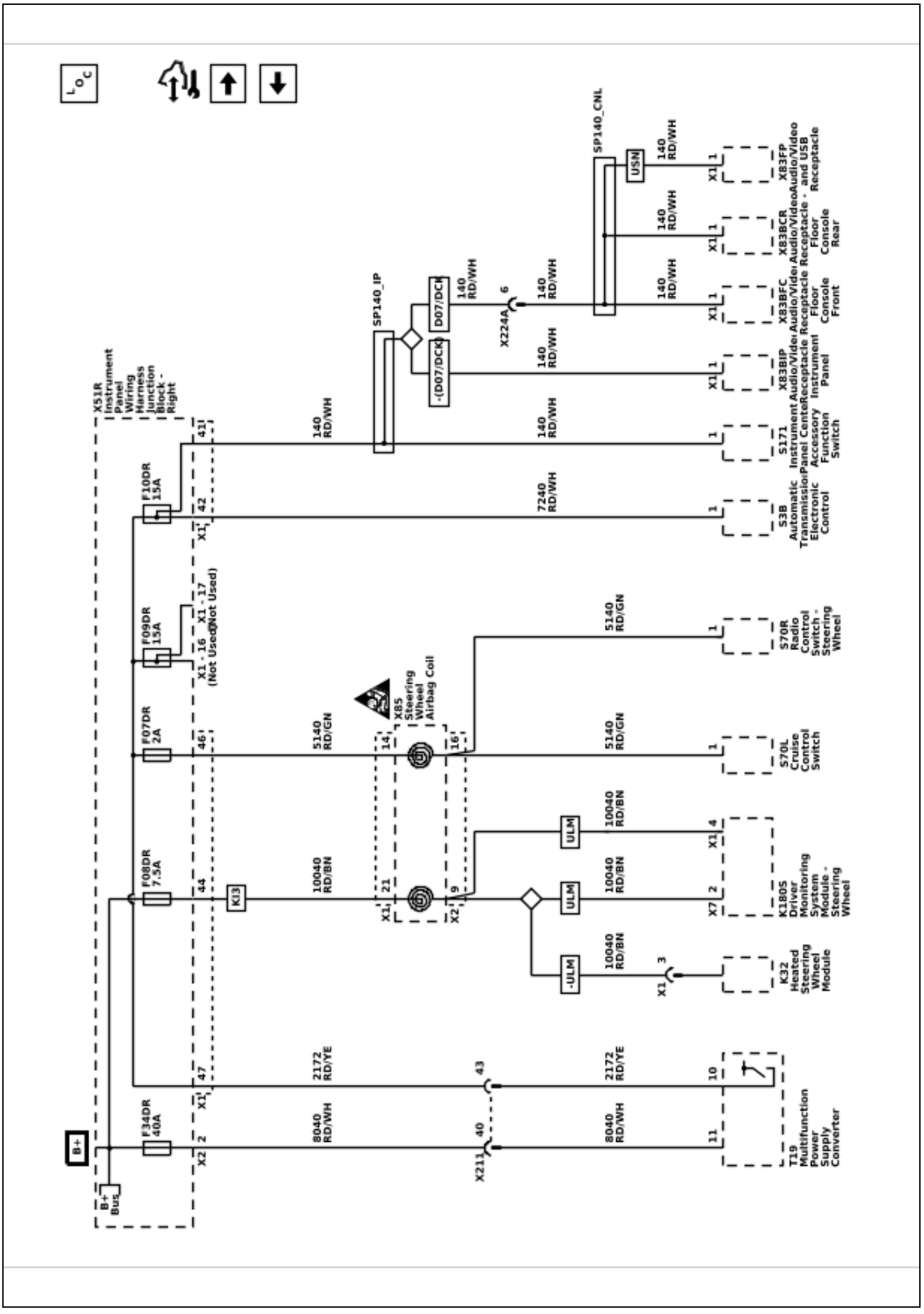
Power Distribution Schematics (F05DR, F16DR, F21DR, F23DR, F28DR, F30DR, and F36DR Fuses)



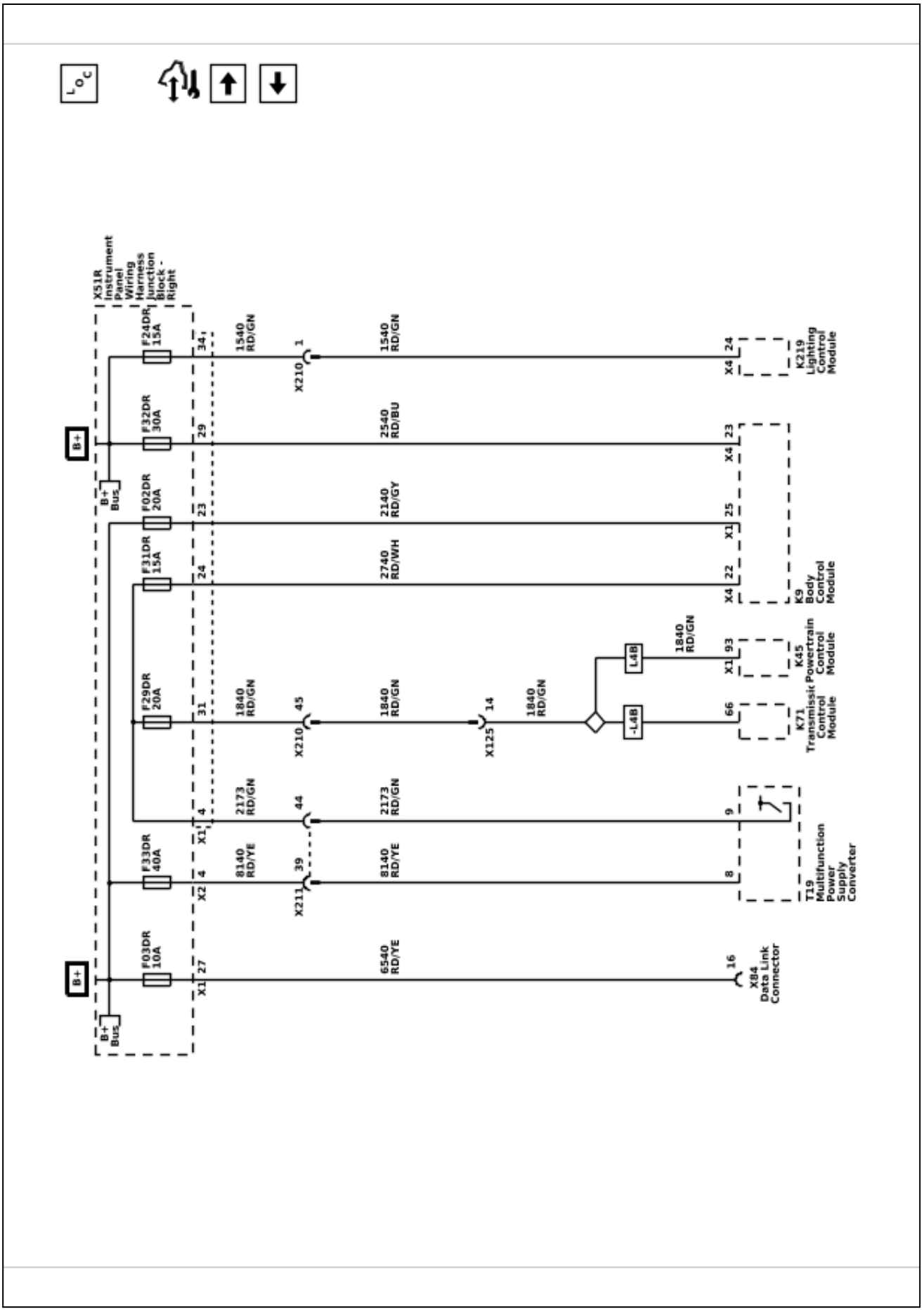
Power Distribution Schematics (F01DR, F04DR, F06DR, and F20DR Fuses)



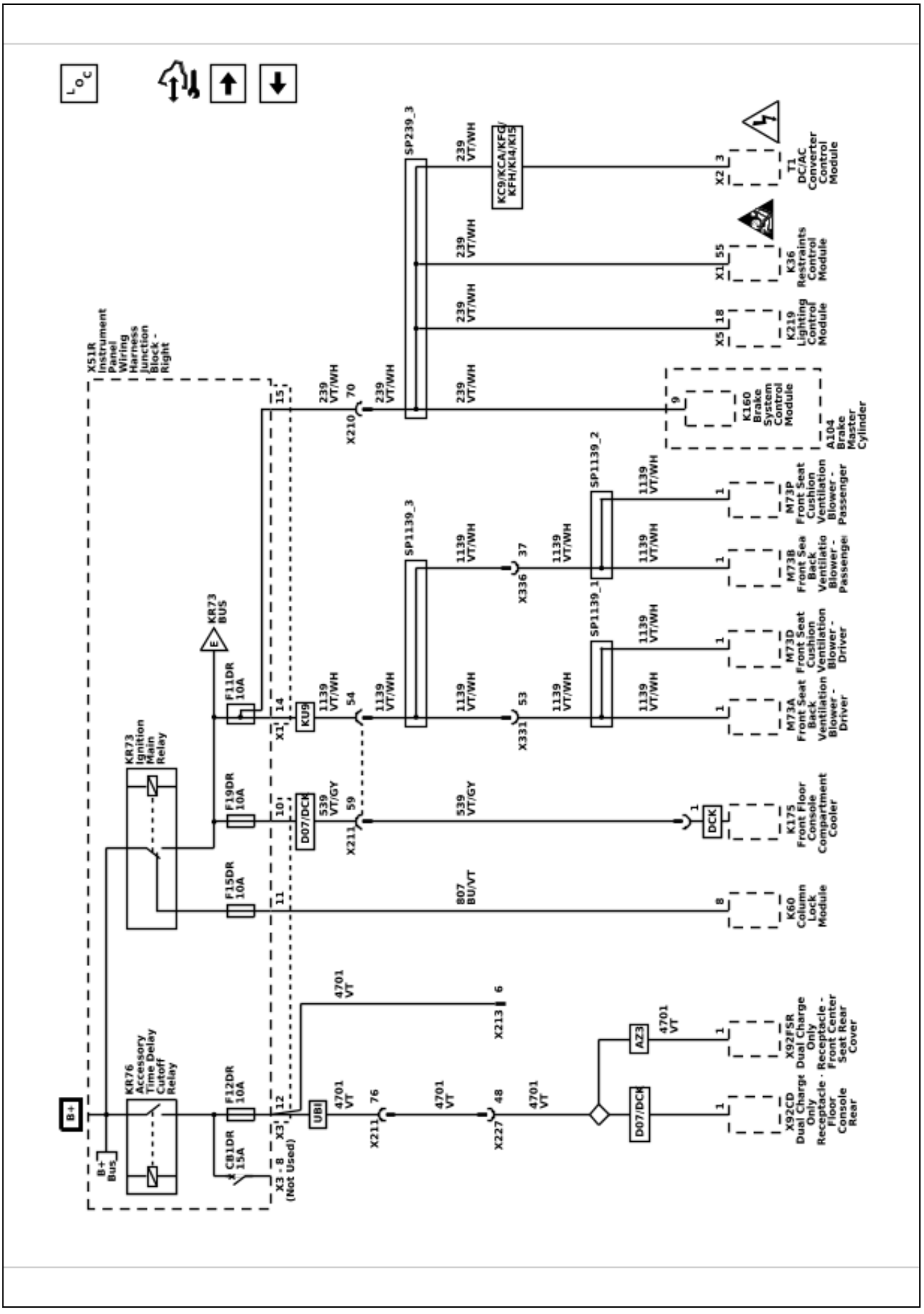
Power Distribution Schematics (F07DR, F08DR, F09DR, F10DR, and F34DR Fuses)



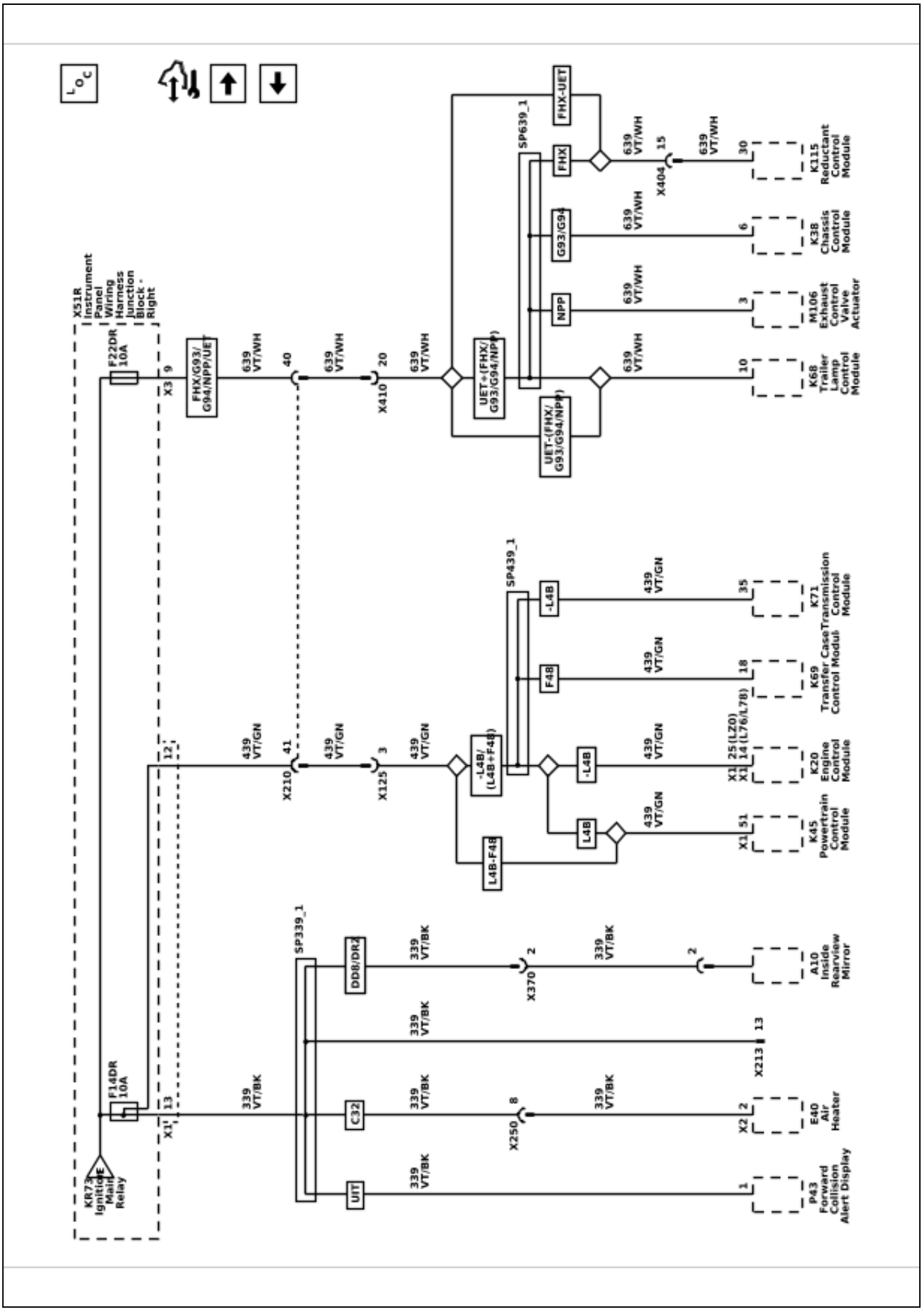
Power Distribution Schematics (F02DR, F03DR, F24DR, F29DR, F31DR, F32DR, and F33DR Fuses)



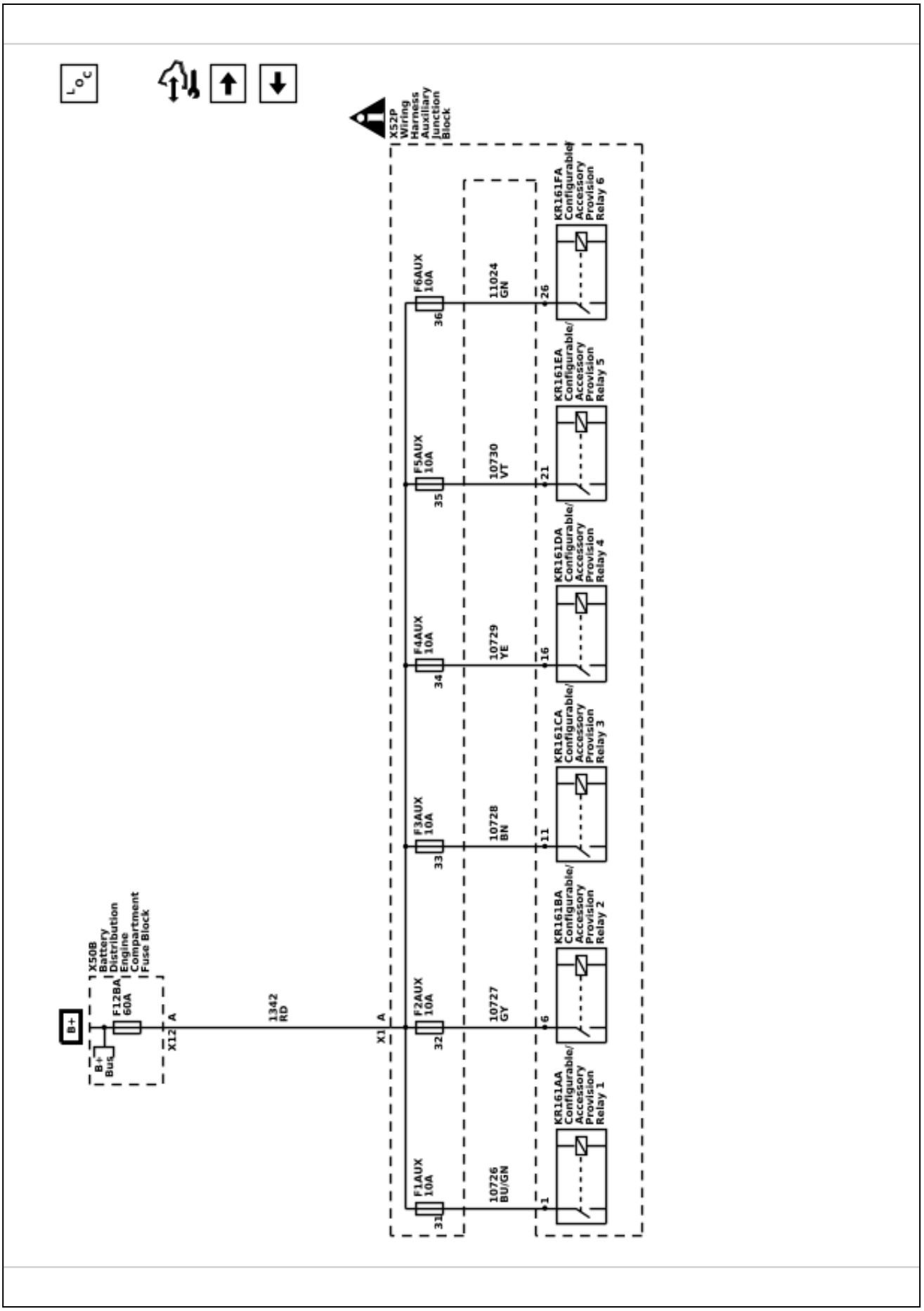
Power Distribution Schematics (CB1DR Circuit Breaker, F11DR, F12DR, F15DR, and F19DR Fuses)



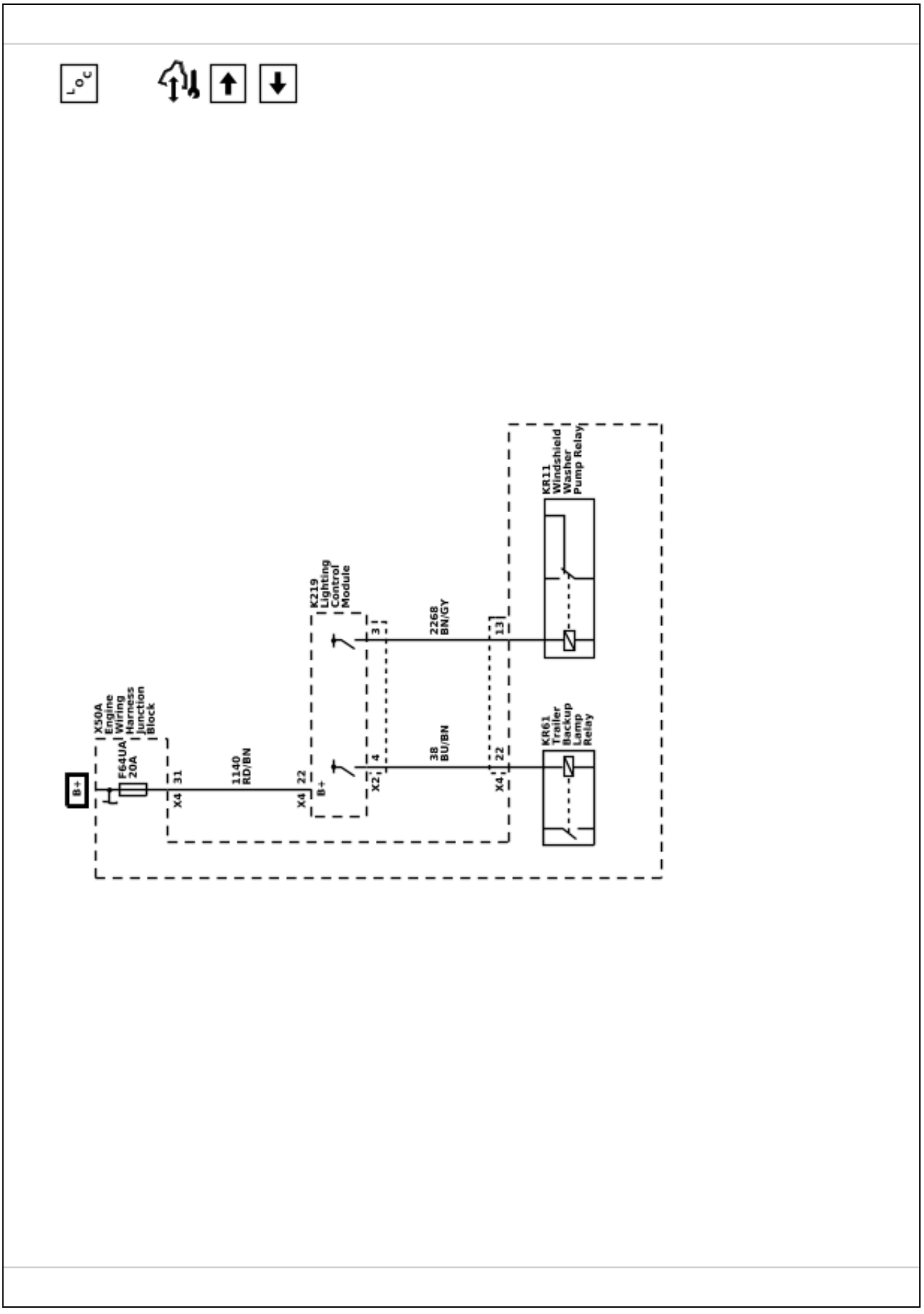
Power Distribution Schematics (F14DR and F22DR Fuses)



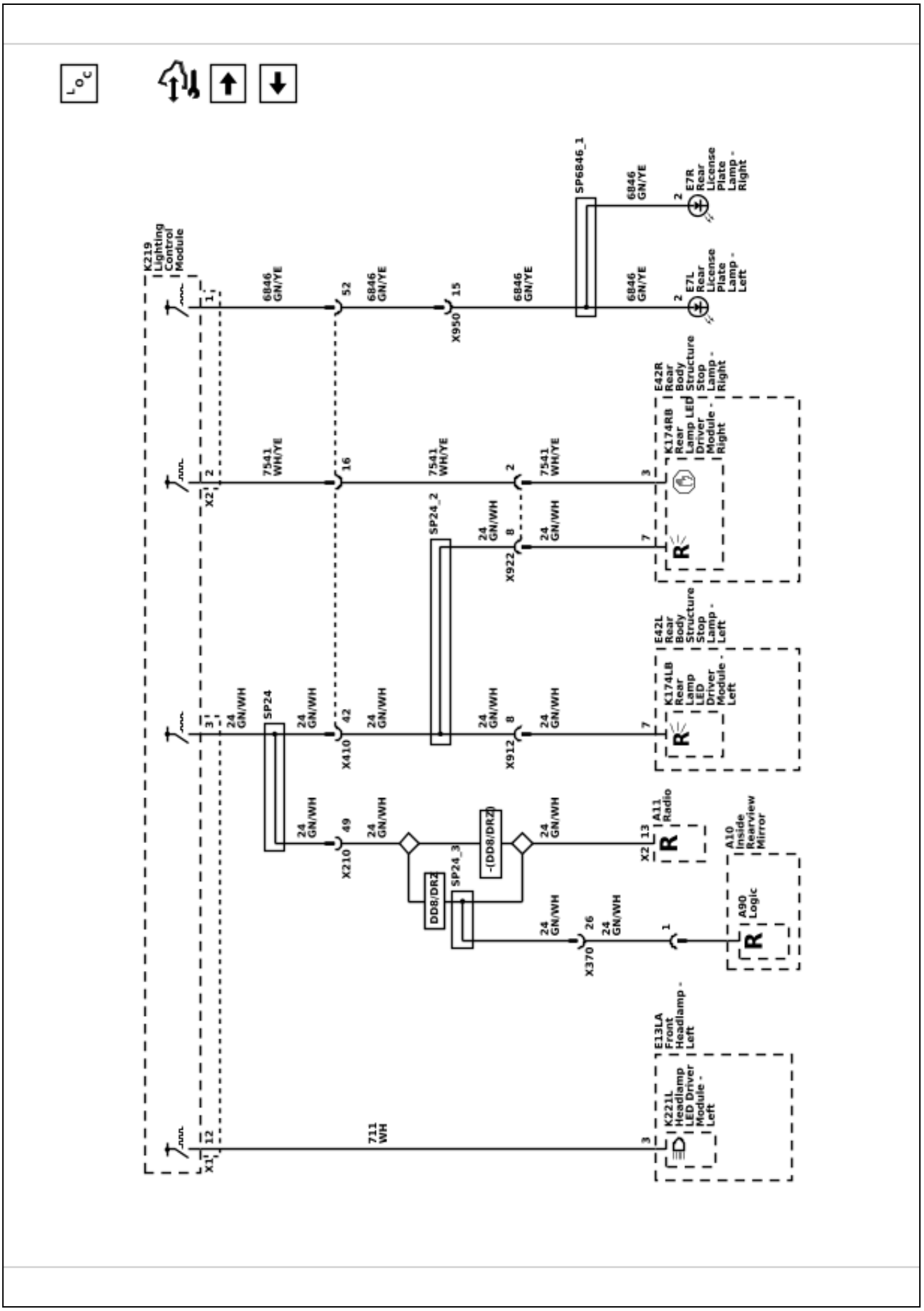
Power Distribution Schematics (B+ Bus - X52P Wiring Harness Auxiliary Junction Block (VBP))



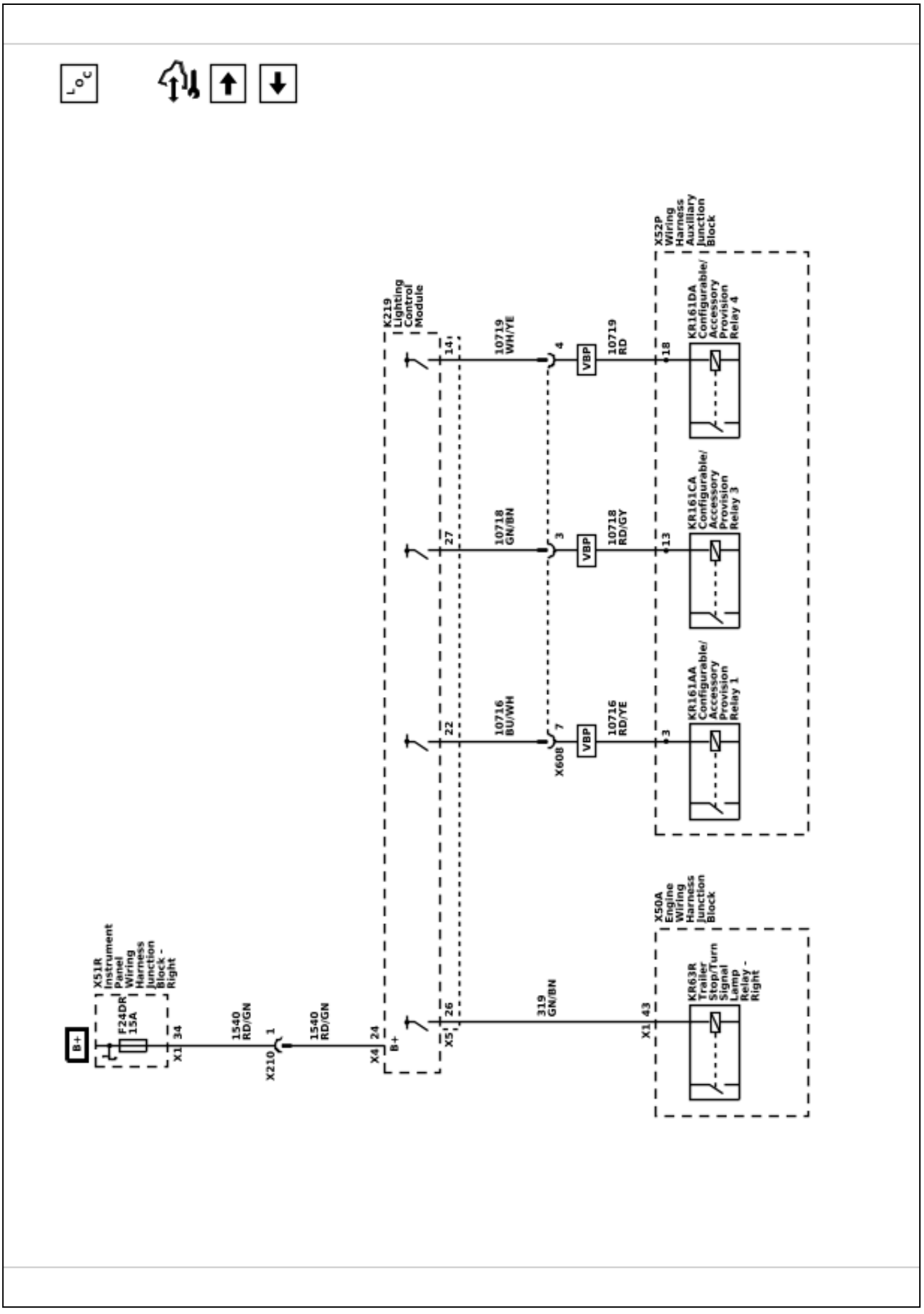
Power Distribution Schematics (F69UA Fuse and Lighting Control Module Fused Outputs - 1 of 2)



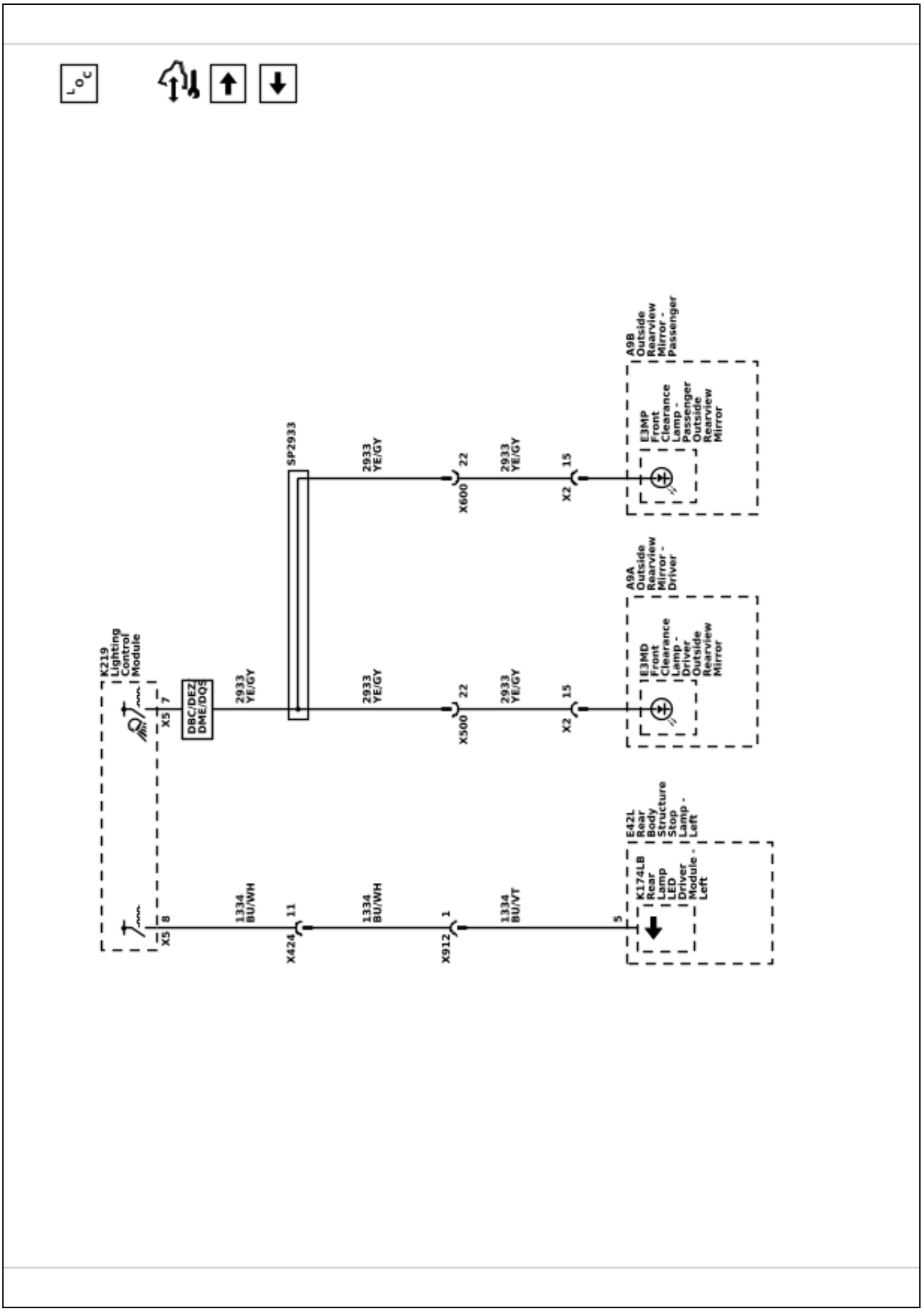
Power Distribution Schematics (F69UA Fuse and Lighting Control Module Fused Outputs - 2 of 2)



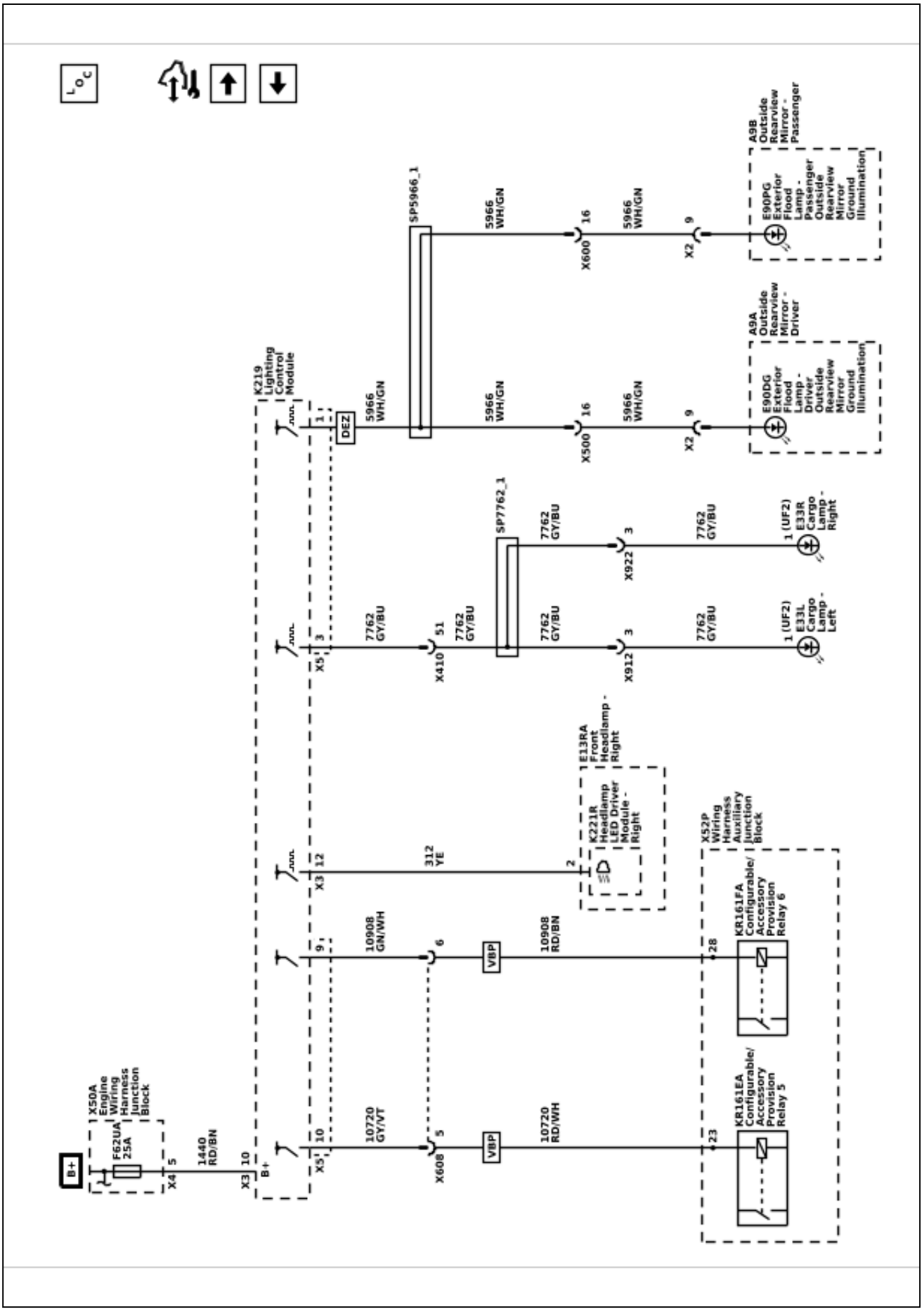
Power Distribution Schematics (F24DR Fuse and Lighting Control Module Fused Outputs - 1 of 2)



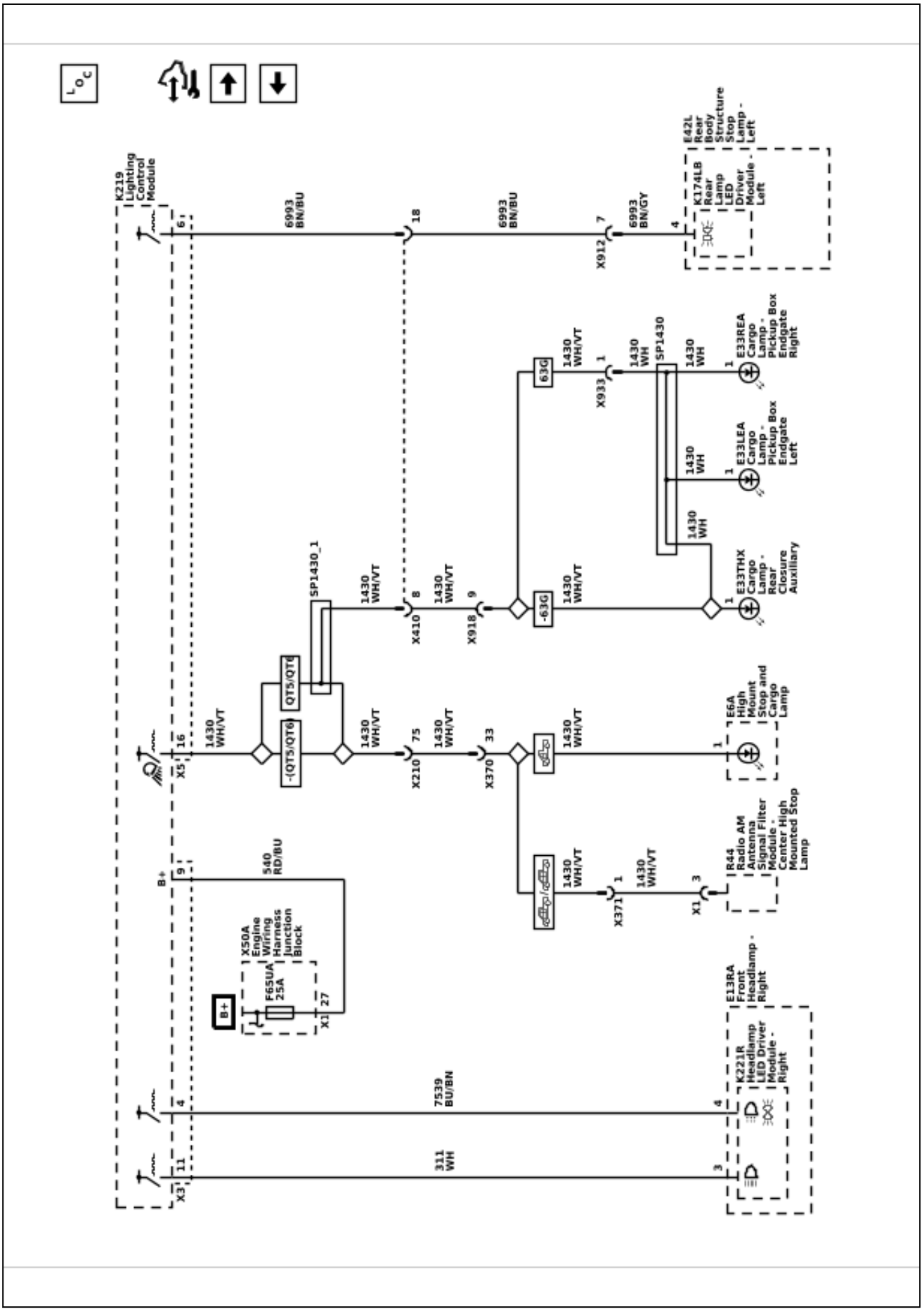
Power Distribution Schematics (F24DR Fuse and Lighting Control Module Fused Outputs - 2 of 2)



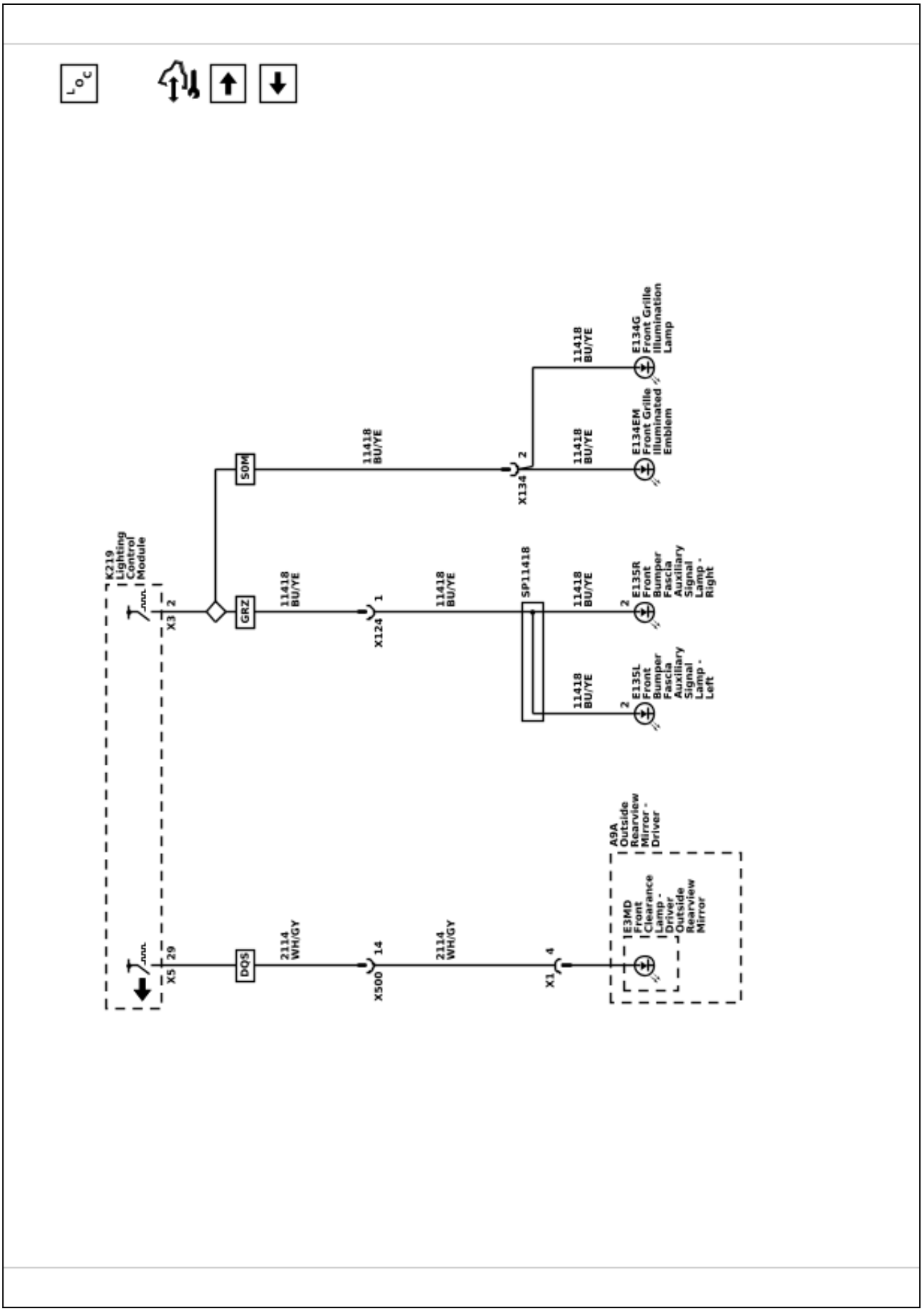
Power Distribution Schematics (F62UA Fuse and Lighting Control Module Fused Outputs)



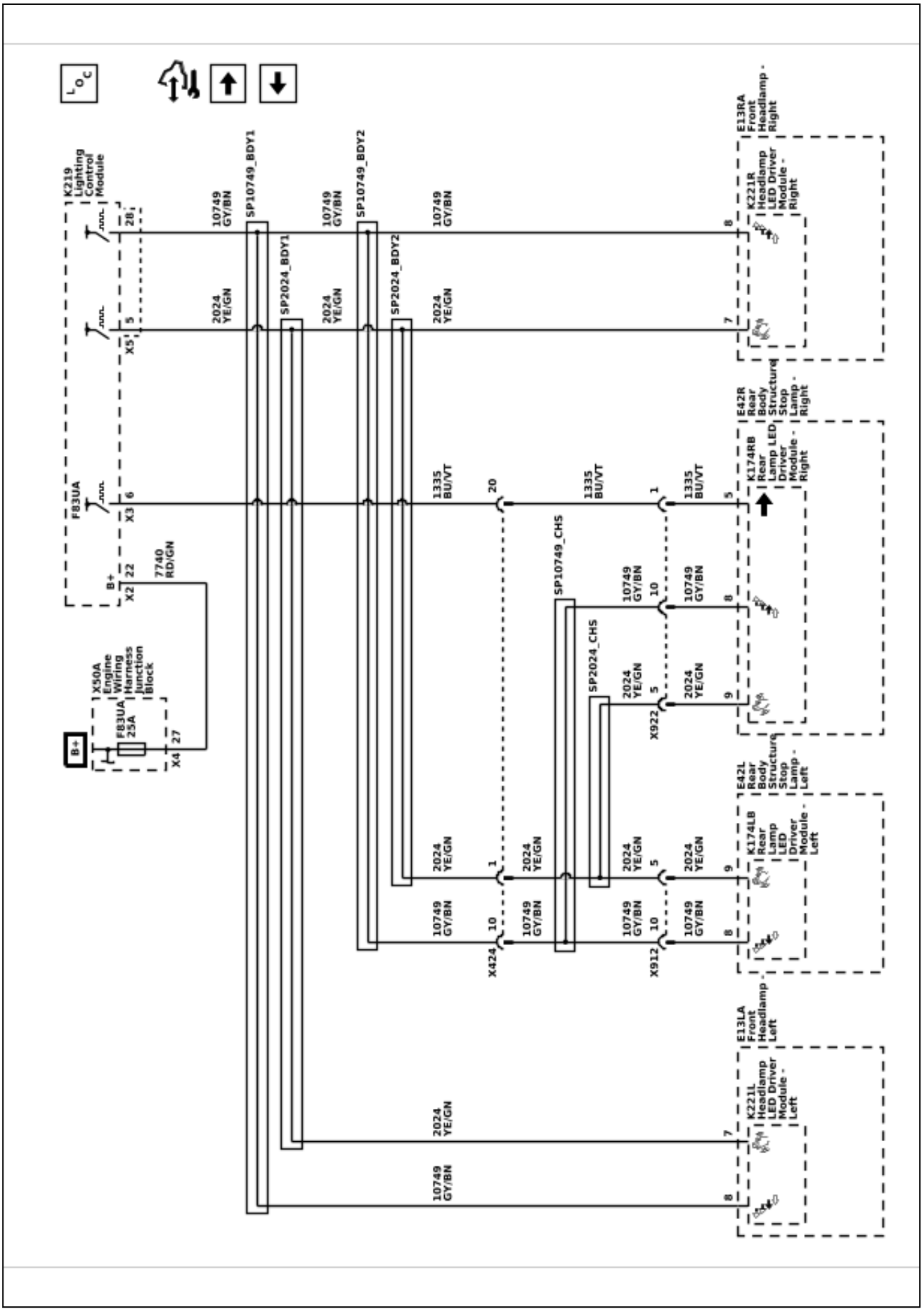
Power Distribution Schematics (F65UA Fuse and Lighting Control Module Fused Outputs - 1 of 2)



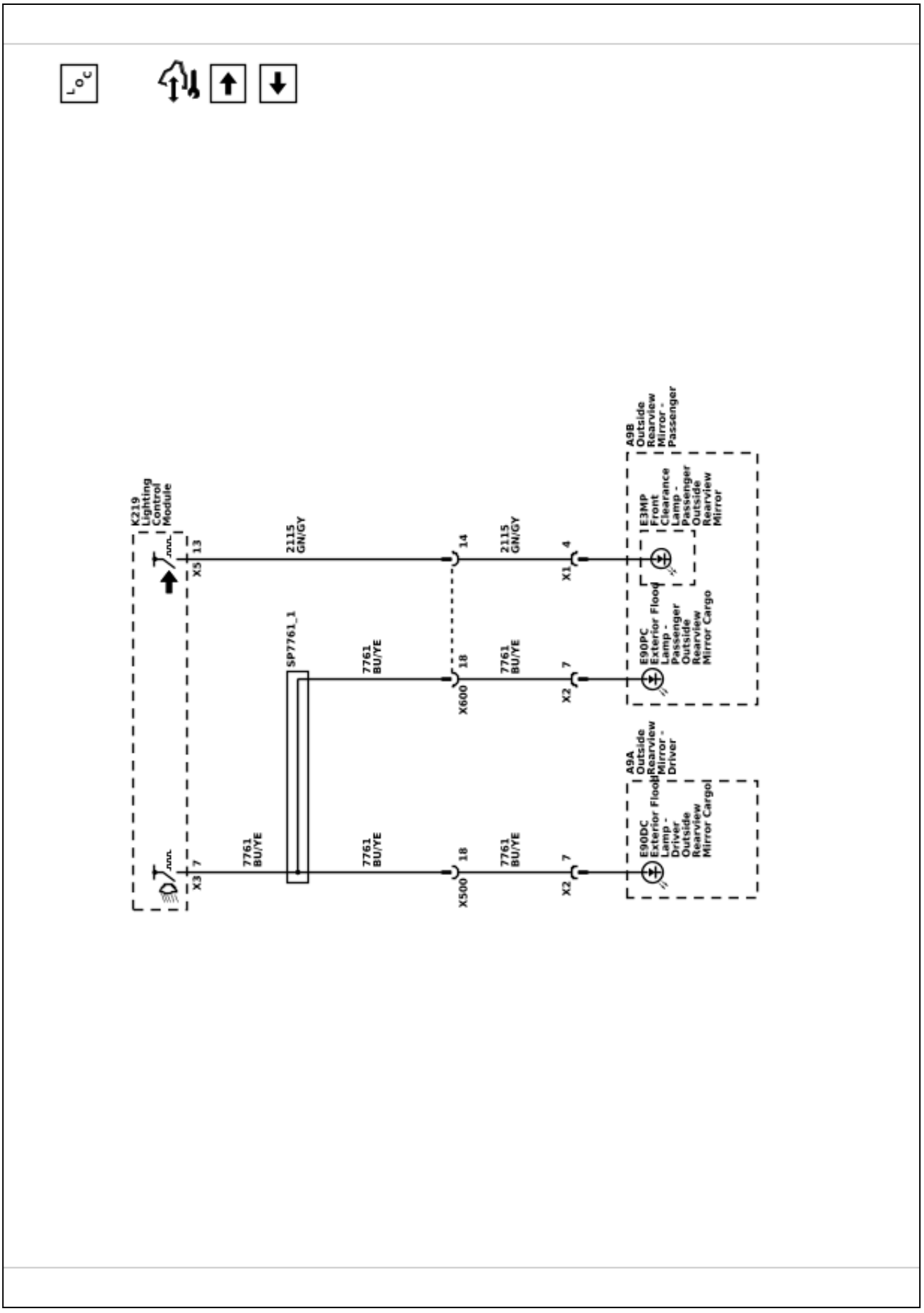
Power Distribution Schematics (F65UA Fuse and Lighting Control Module Fused Outputs - 2 of 2 (DQS / GRZ / S0M))



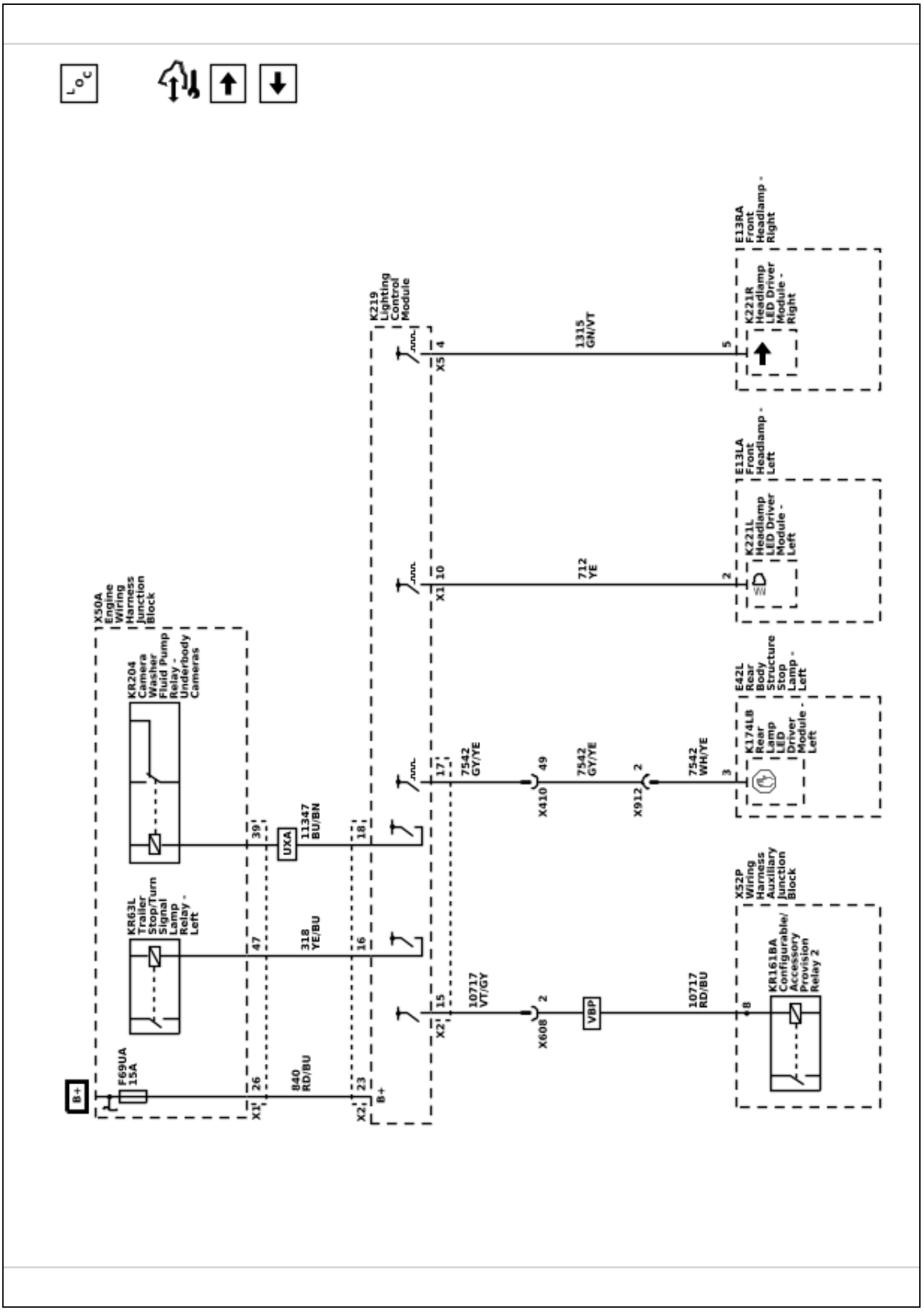
Power Distribution Schematics (F83UA Fuse and Lighting Control Module Fused Outputs - 1 of 2)



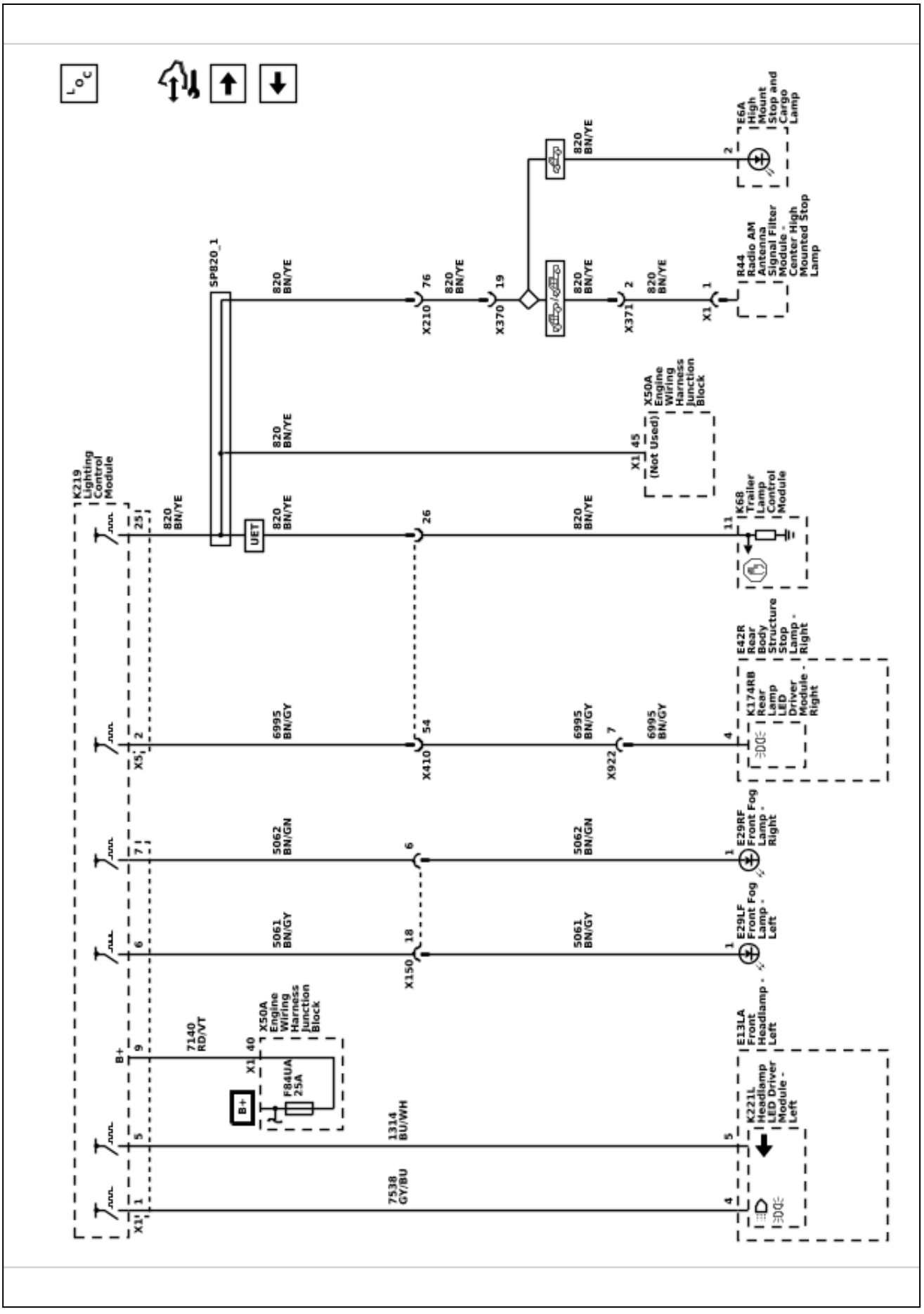
Power Distribution Schematics (F83UA Fuse and Lighting Control Module Fused Outputs - 2 of 2 (DQS))



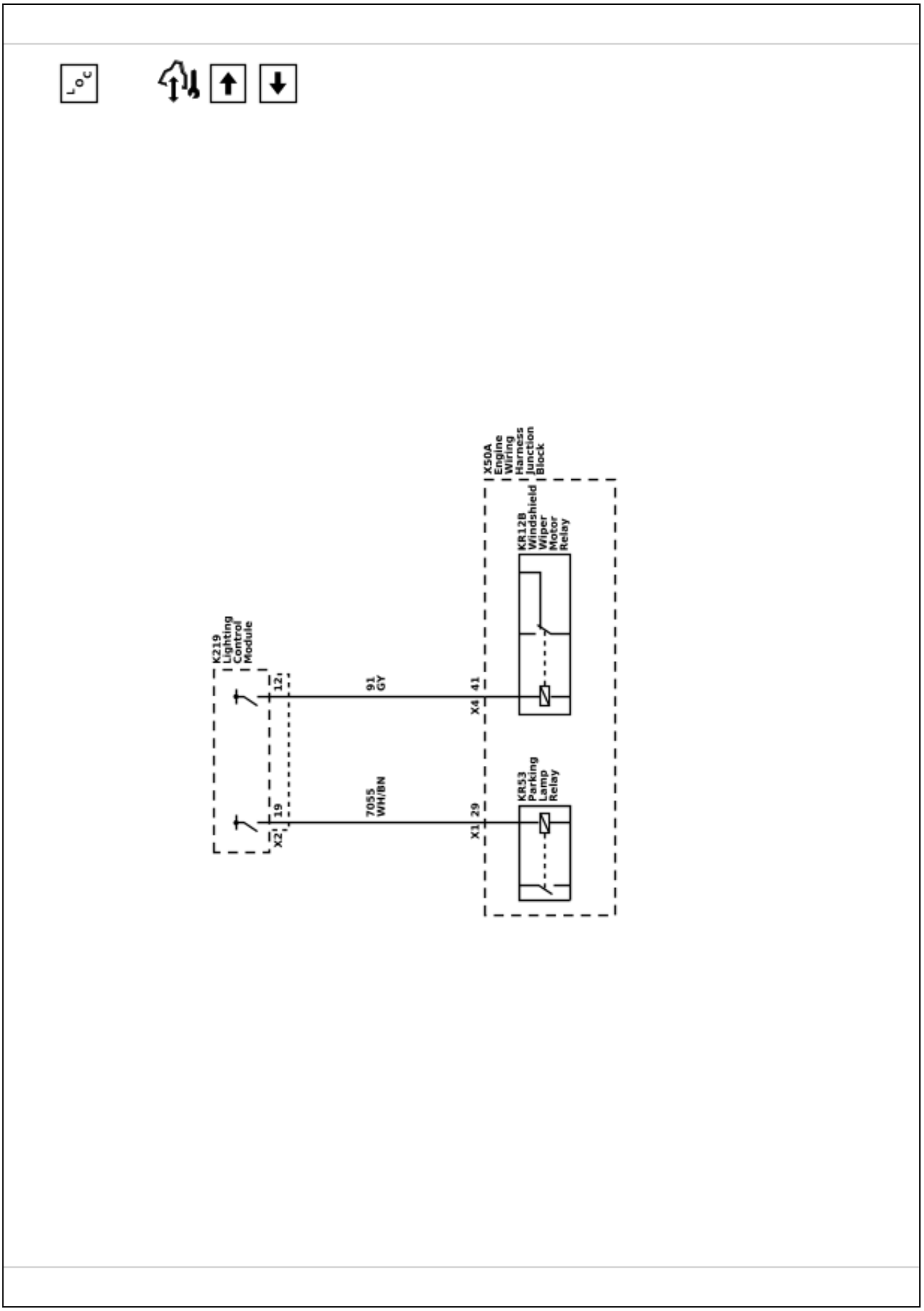
Power Distribution Schematics (F69UA Fuse and Lighting Control Module Fused Outputs)



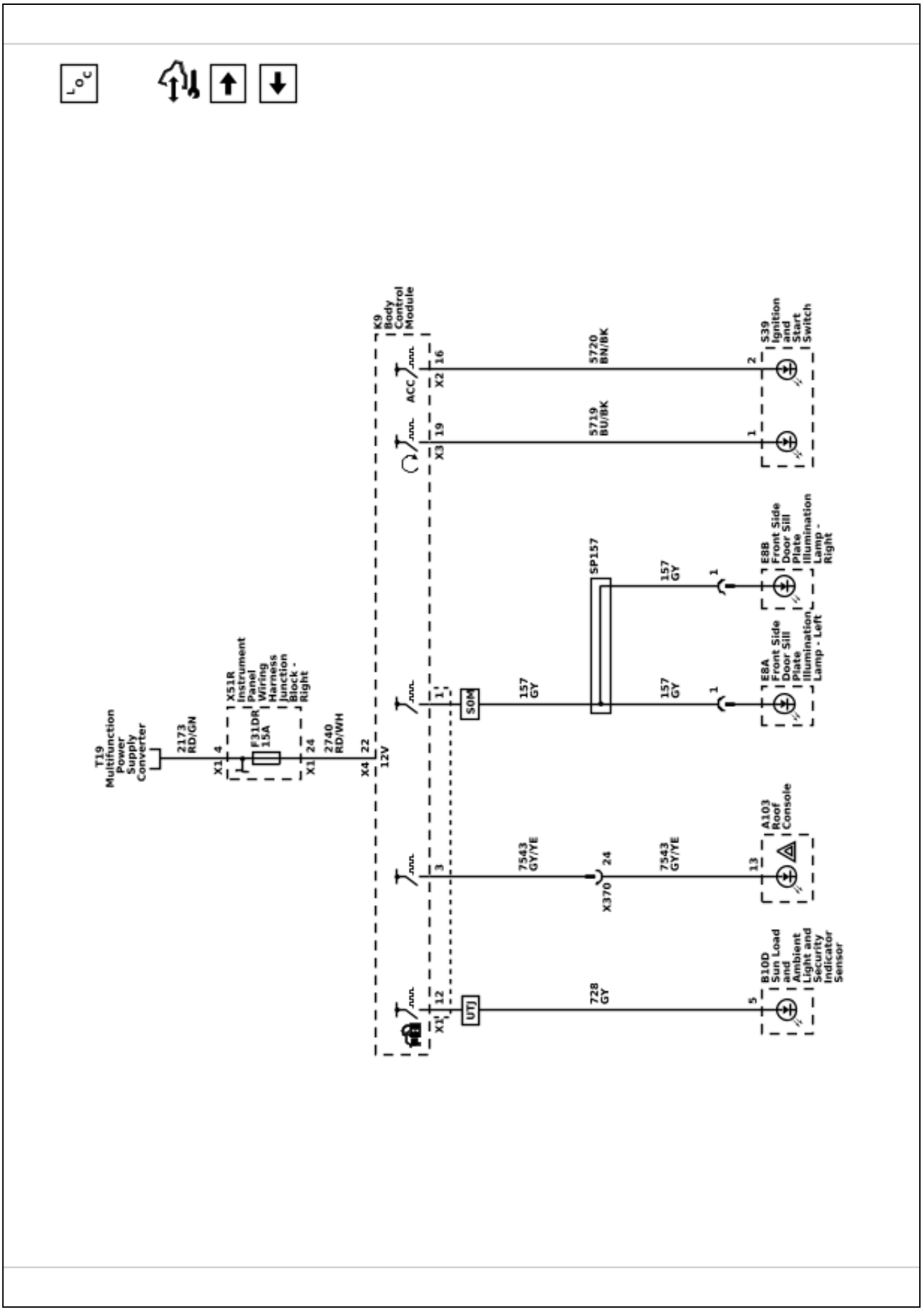
Power Distribution Schematics (F84UA Fuse and Lighting Control Module Fused Outputs)



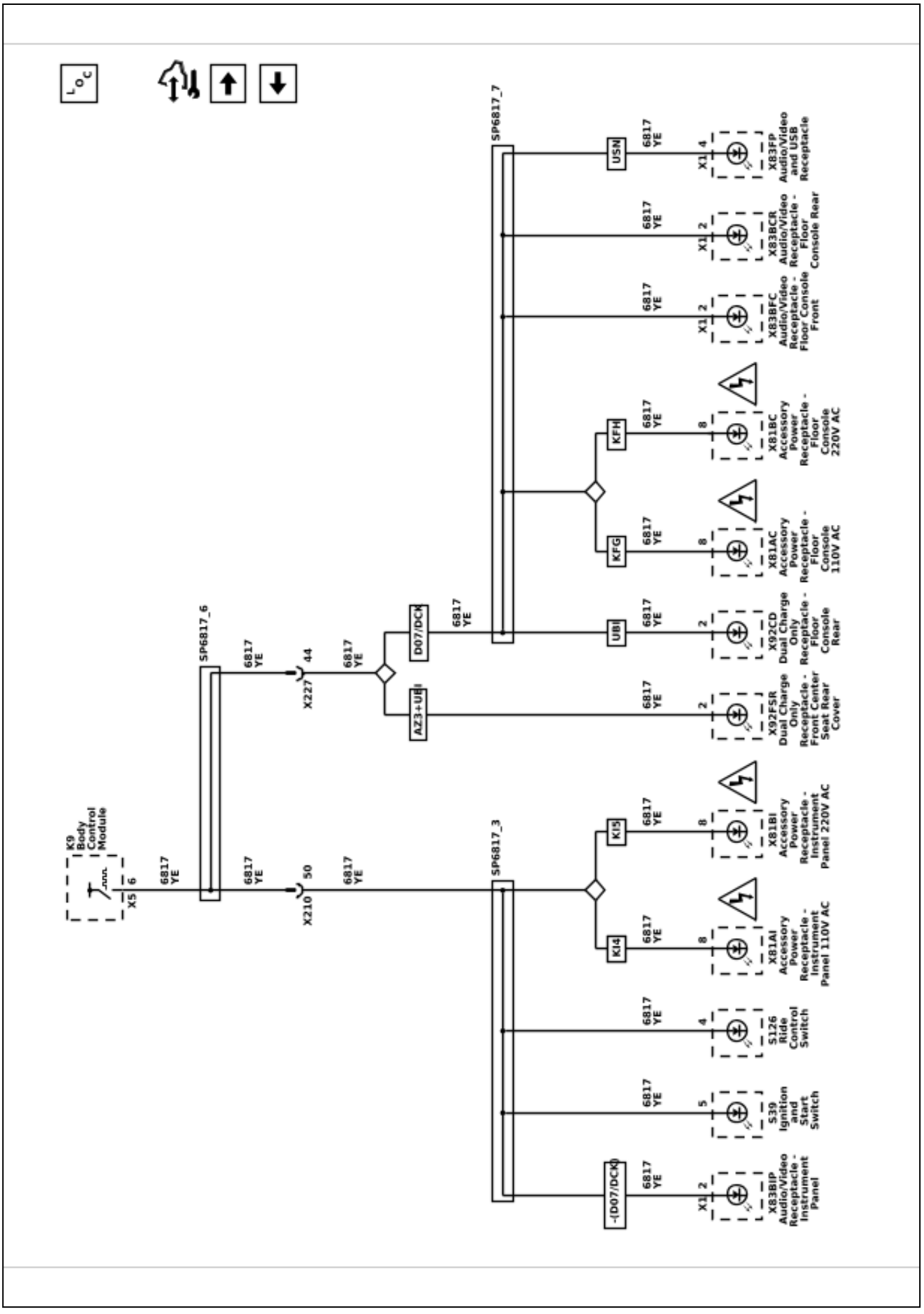
Power Distribution Schematics (F69UA and F24DR Fuses and Lighting Control Module Redundant Fused Outputs)



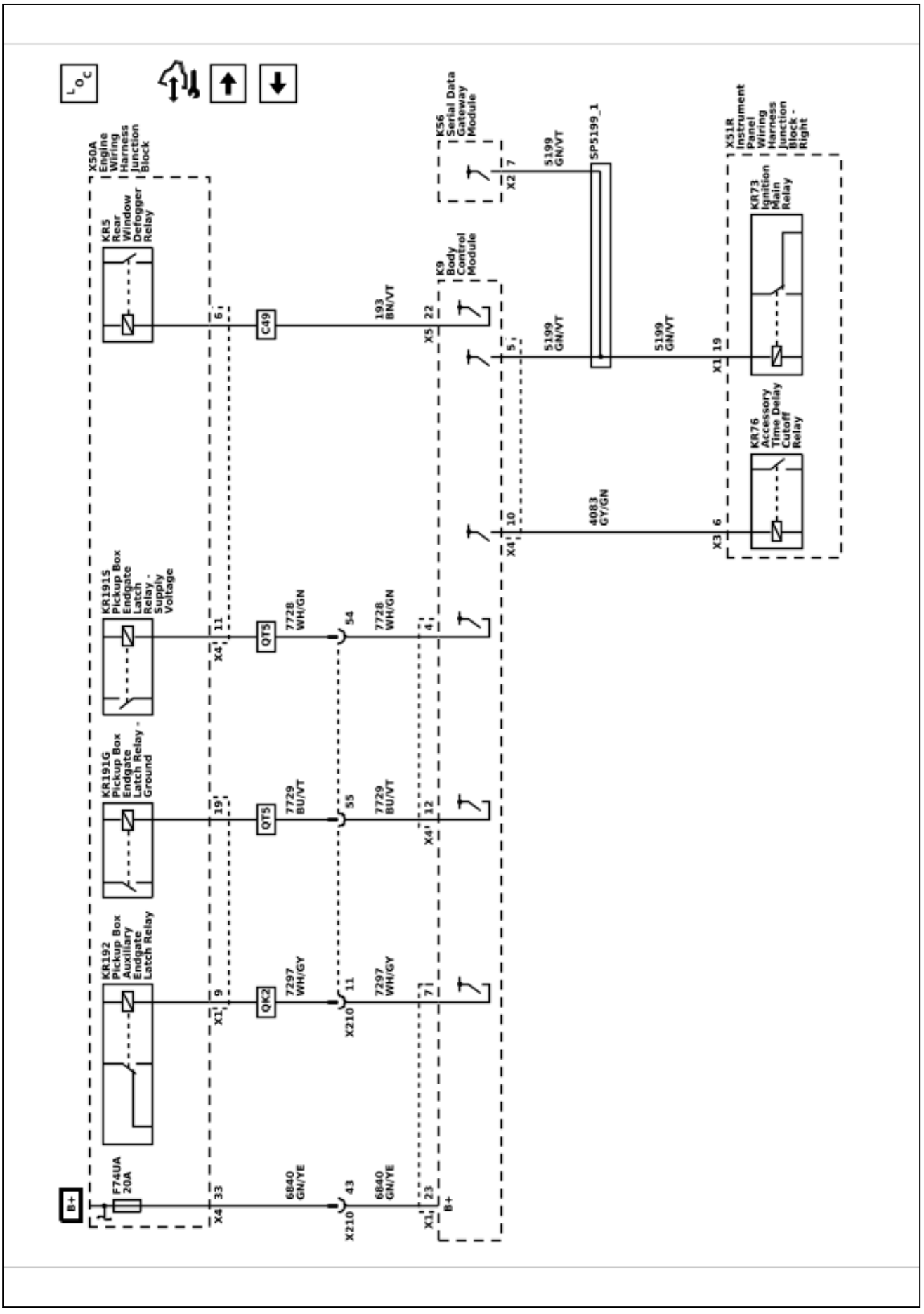
Power Distribution Schematics (F31DR Fuse and Body Control Module Fused Outputs - 1 of 2)



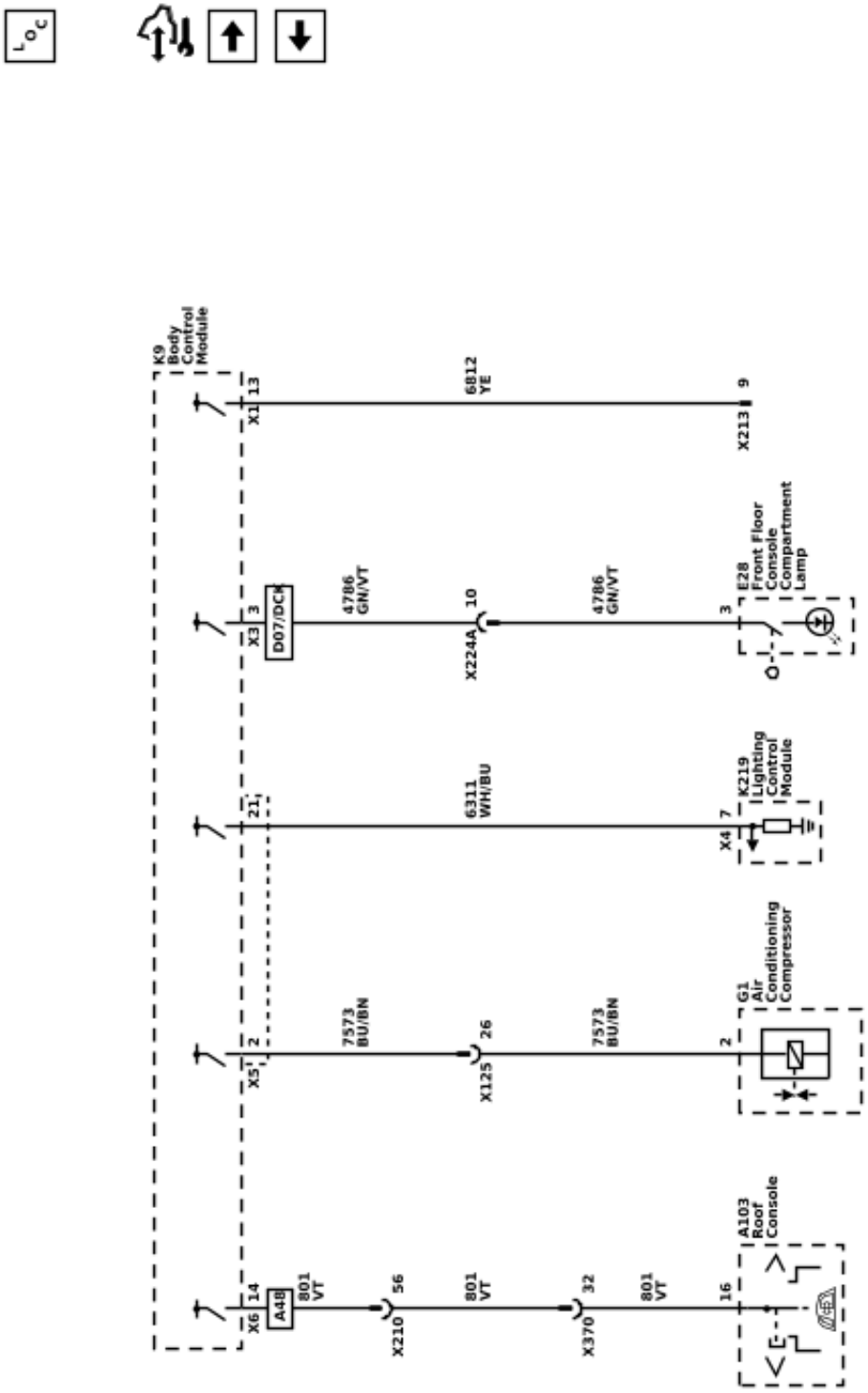
Power Distribution Schematics (F31DR Fuse and Body Control Module Fused Outputs - 2 of 2)



Power Distribution Schematics (F74UA Fuse and Body Control Module Fused Outputs - 1 of 2)

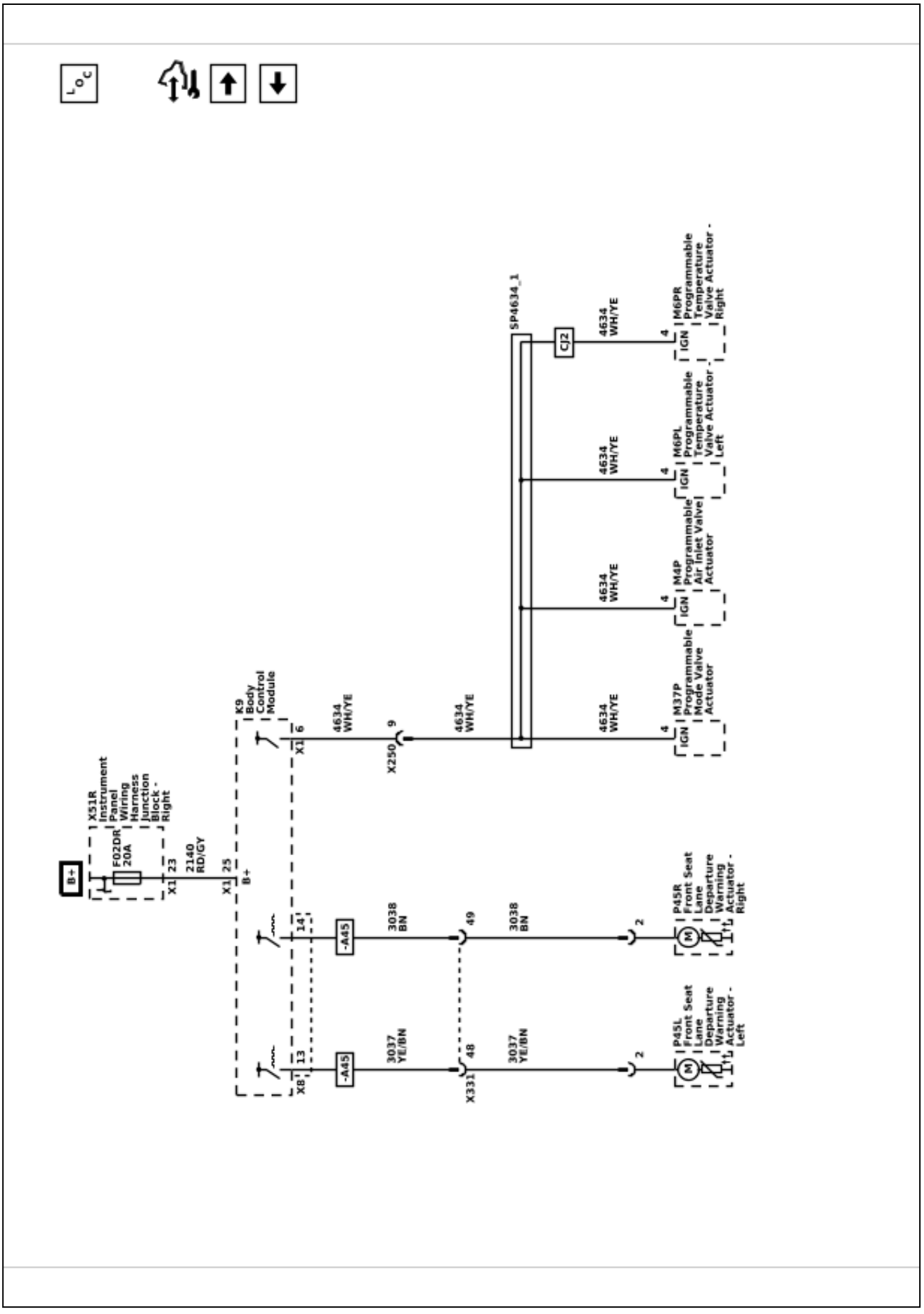


Power Distribution Schematics (F74UA Fuse and Body Control Module Fused Outputs - 2 of 2)

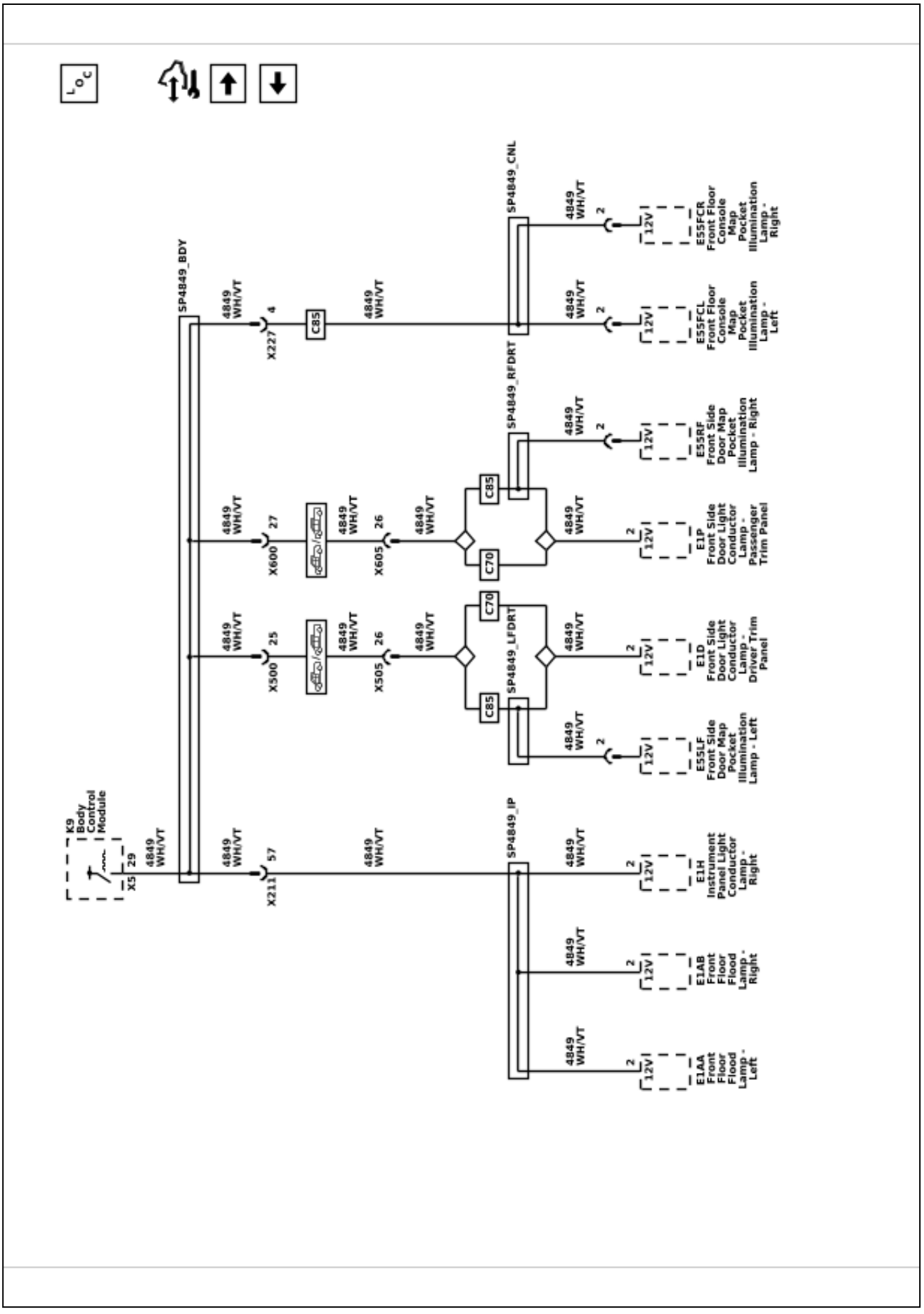


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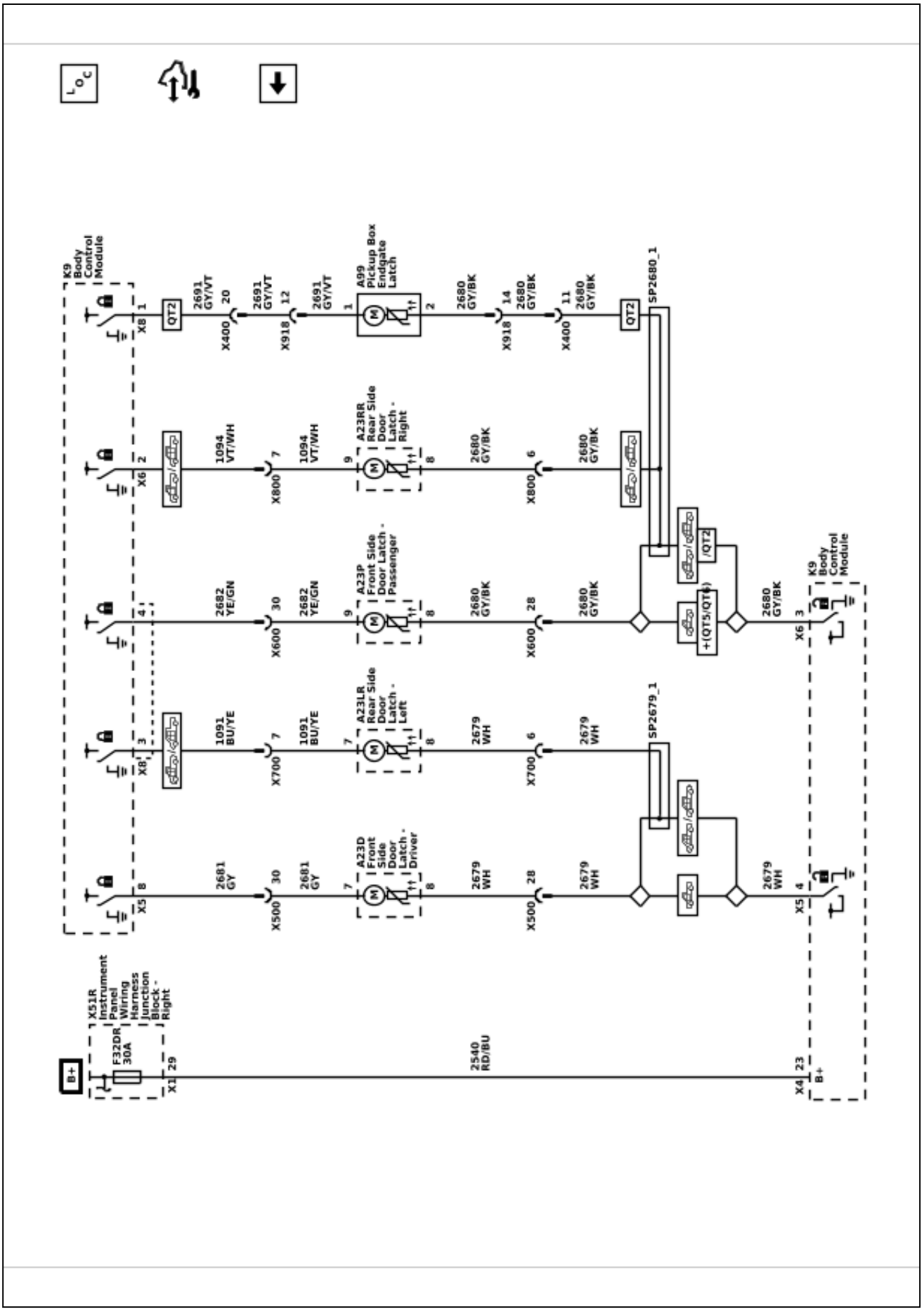
Power Distribution Schematics (F02DR Fuse and Body Control Module Fused Outputs - 1 of 2)



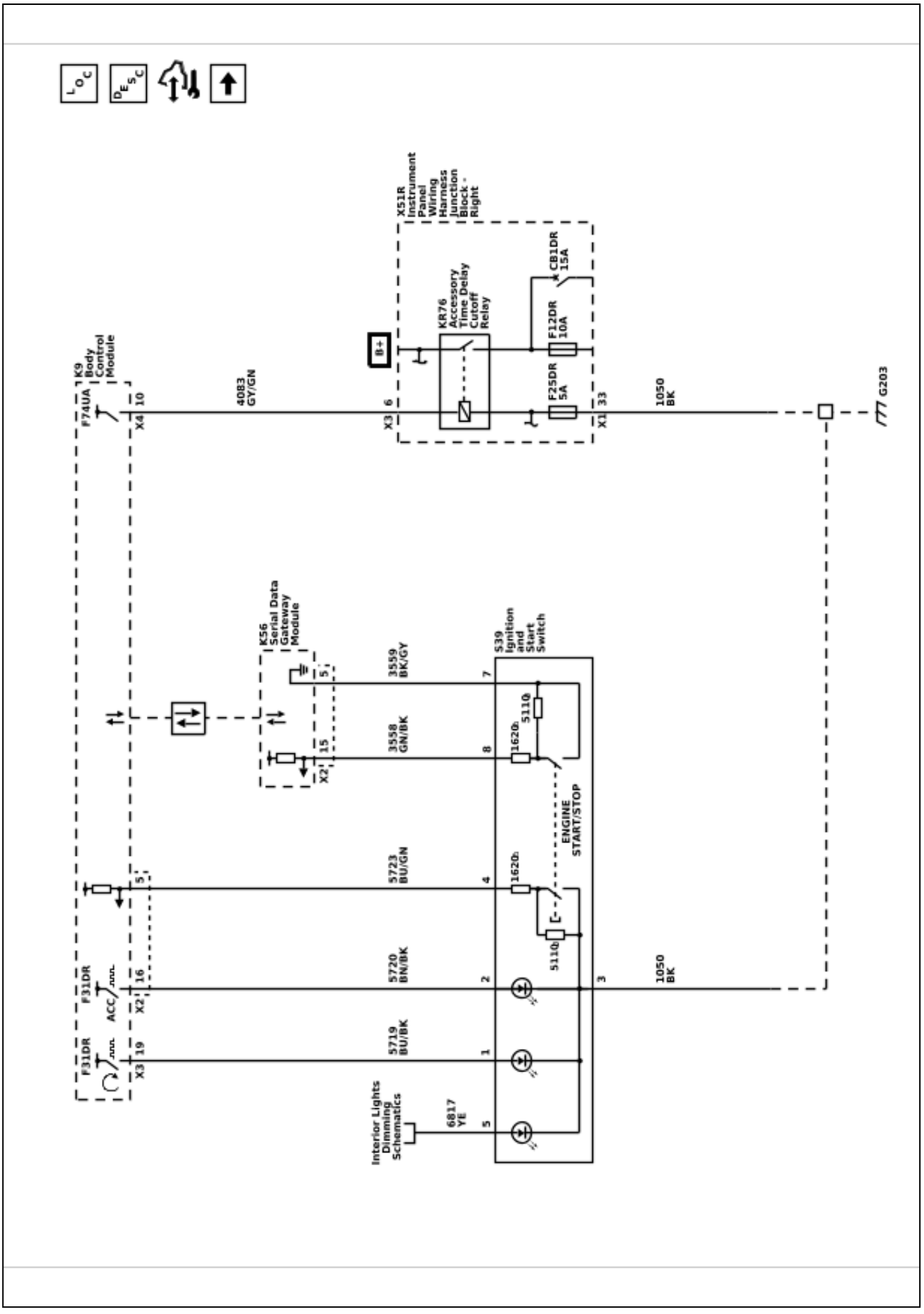
Power Distribution Schematics (F02DR Fuse and Body Control Module Fused Outputs - 2 of 2 (C70 / C85))



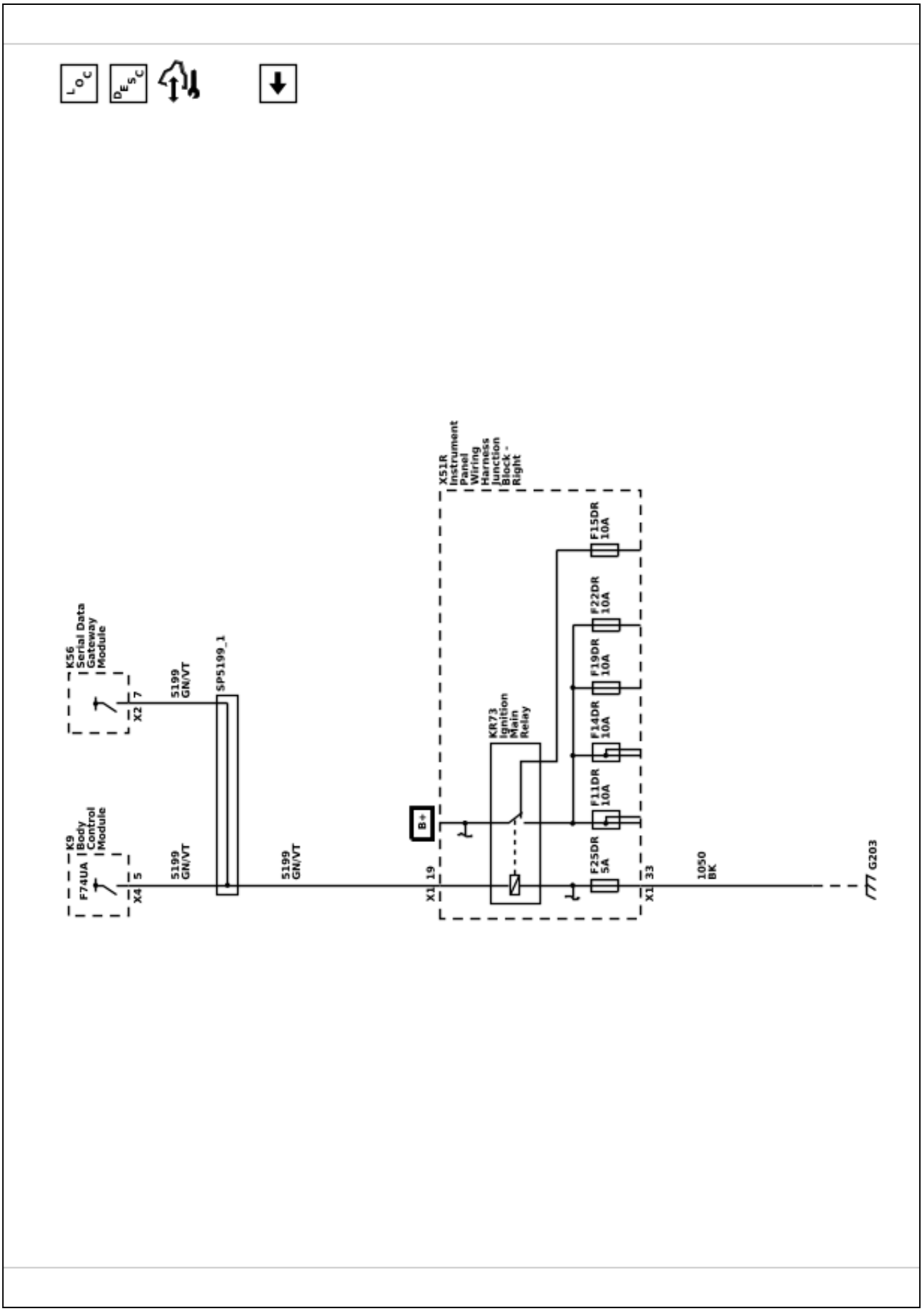
Power Distribution Schematics (F32DR Fuse and Body Control Module Fused Outputs)



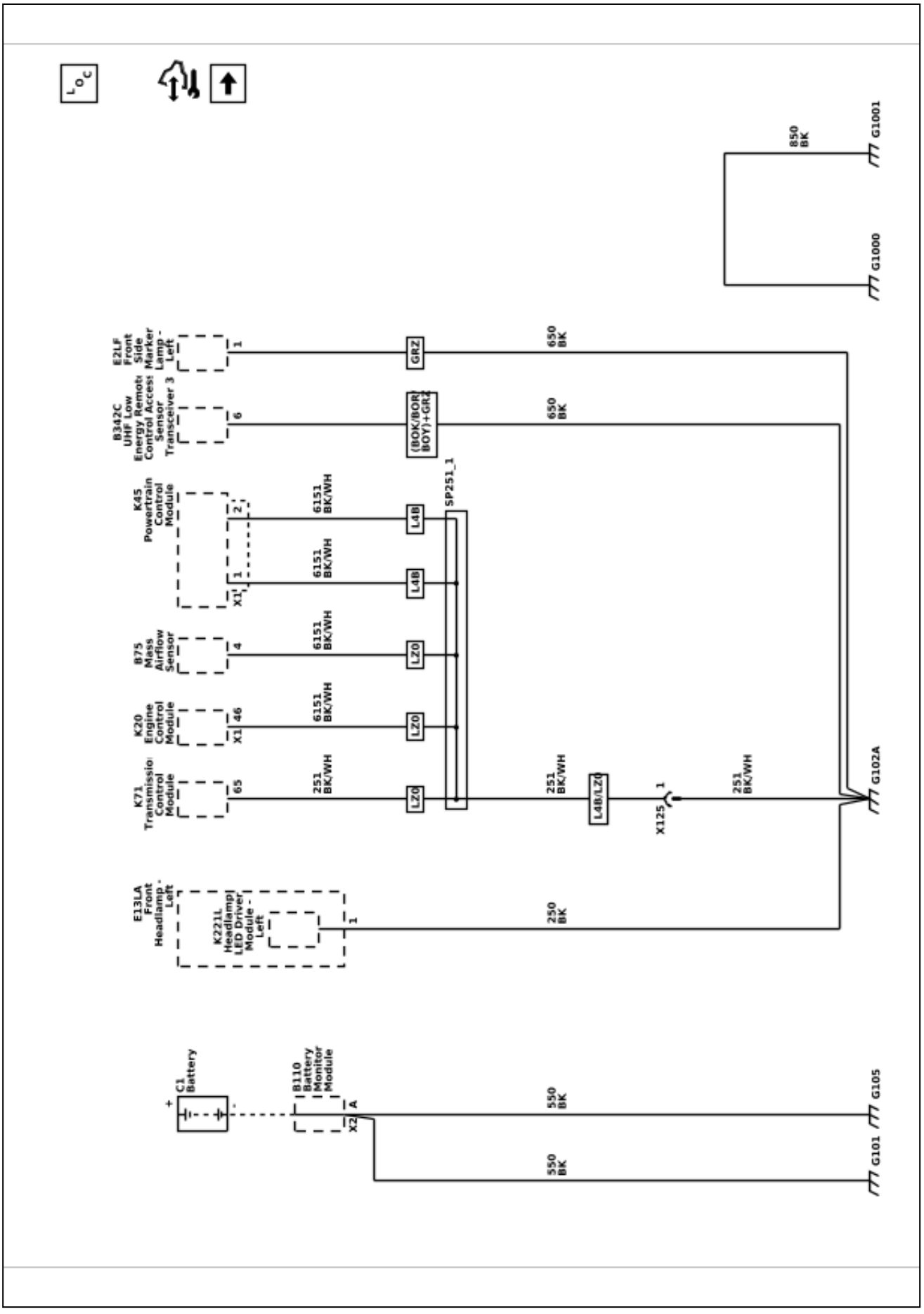
Power Moding Schematics (On/Off Vehicle Switch and Retained Accessory Power)



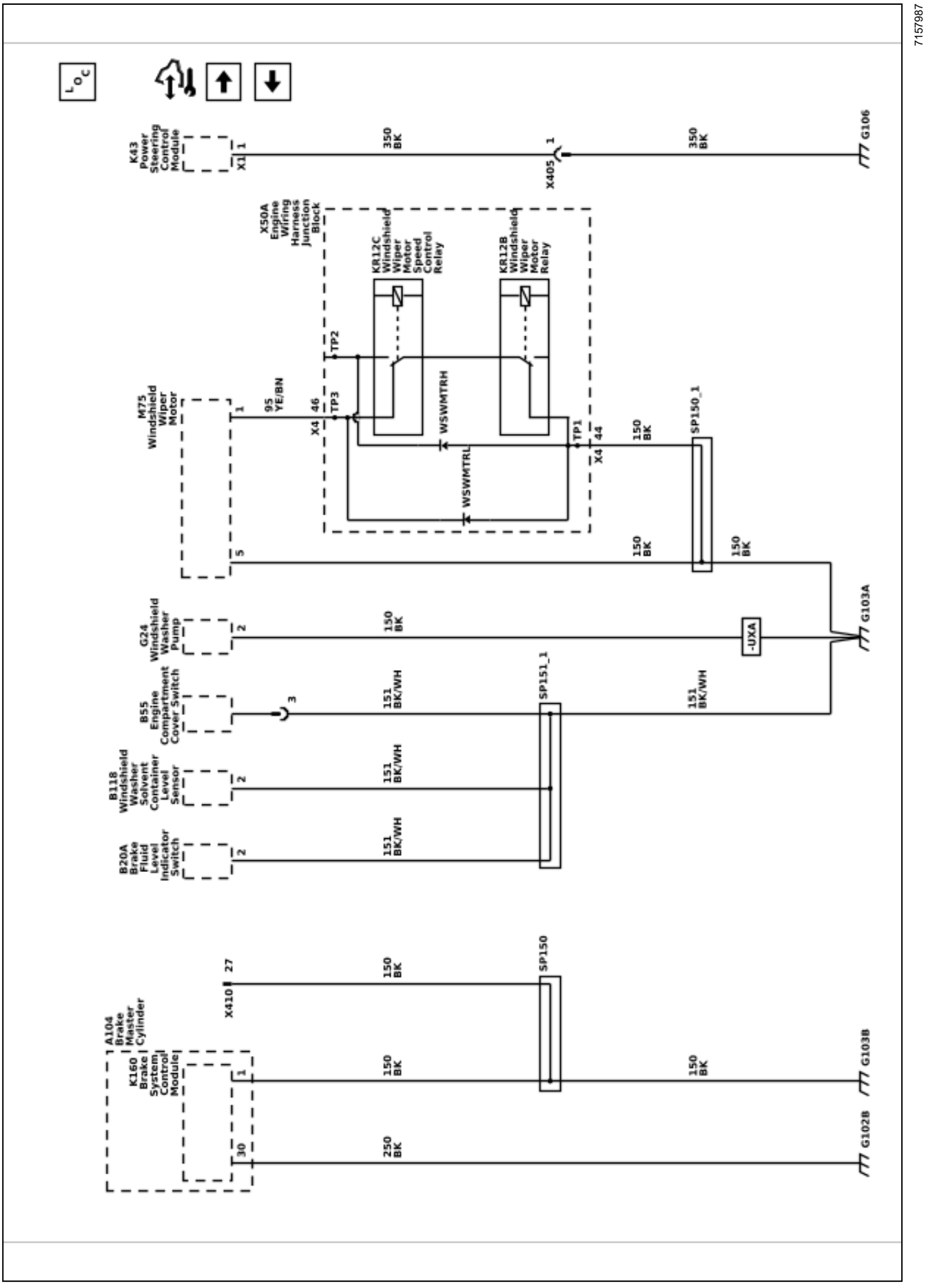
Power Moding Schematics (Ignition Main Relay)



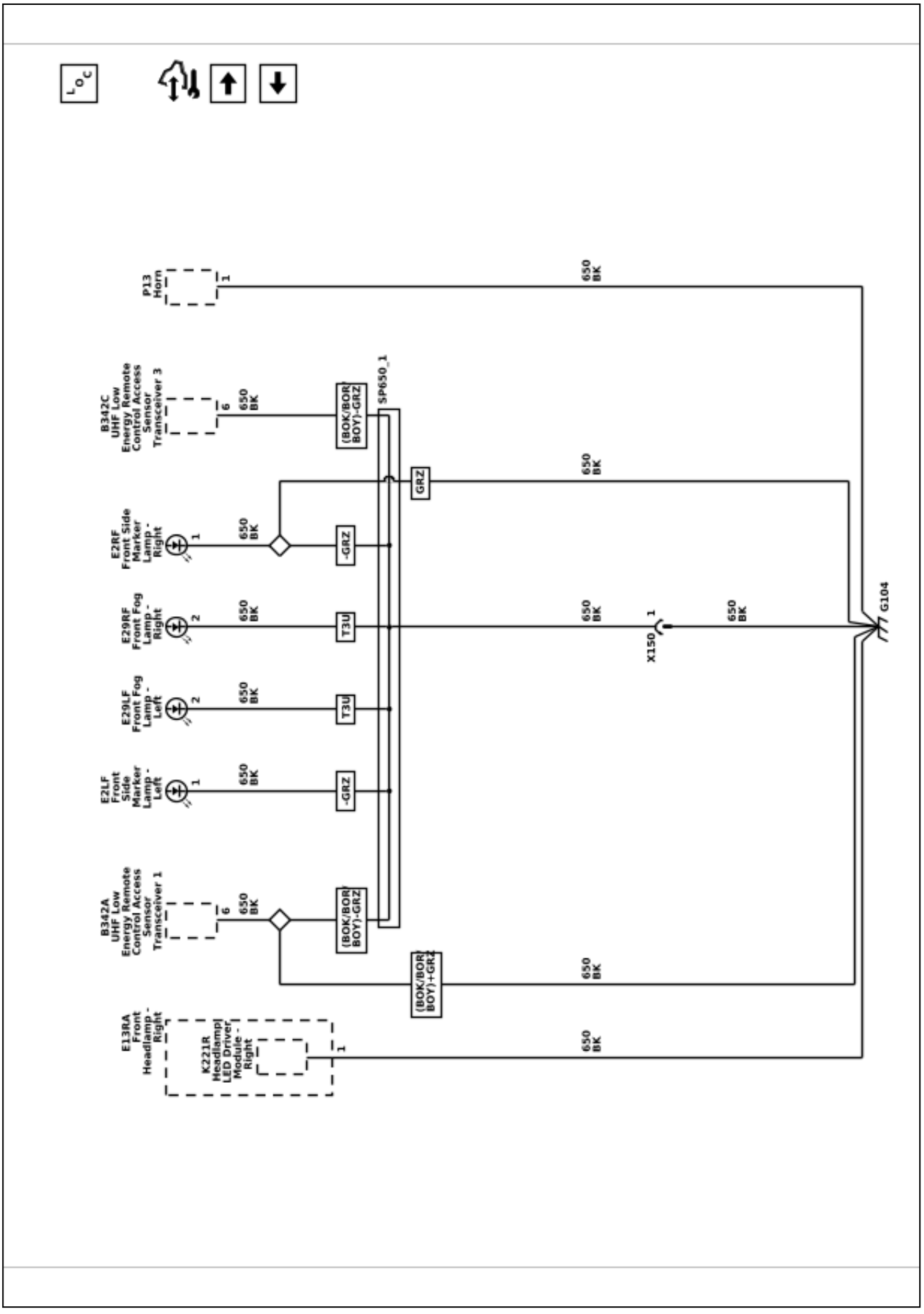
Ground Distribution Schematics (G101, G102A, G105, G1000, and G1001)



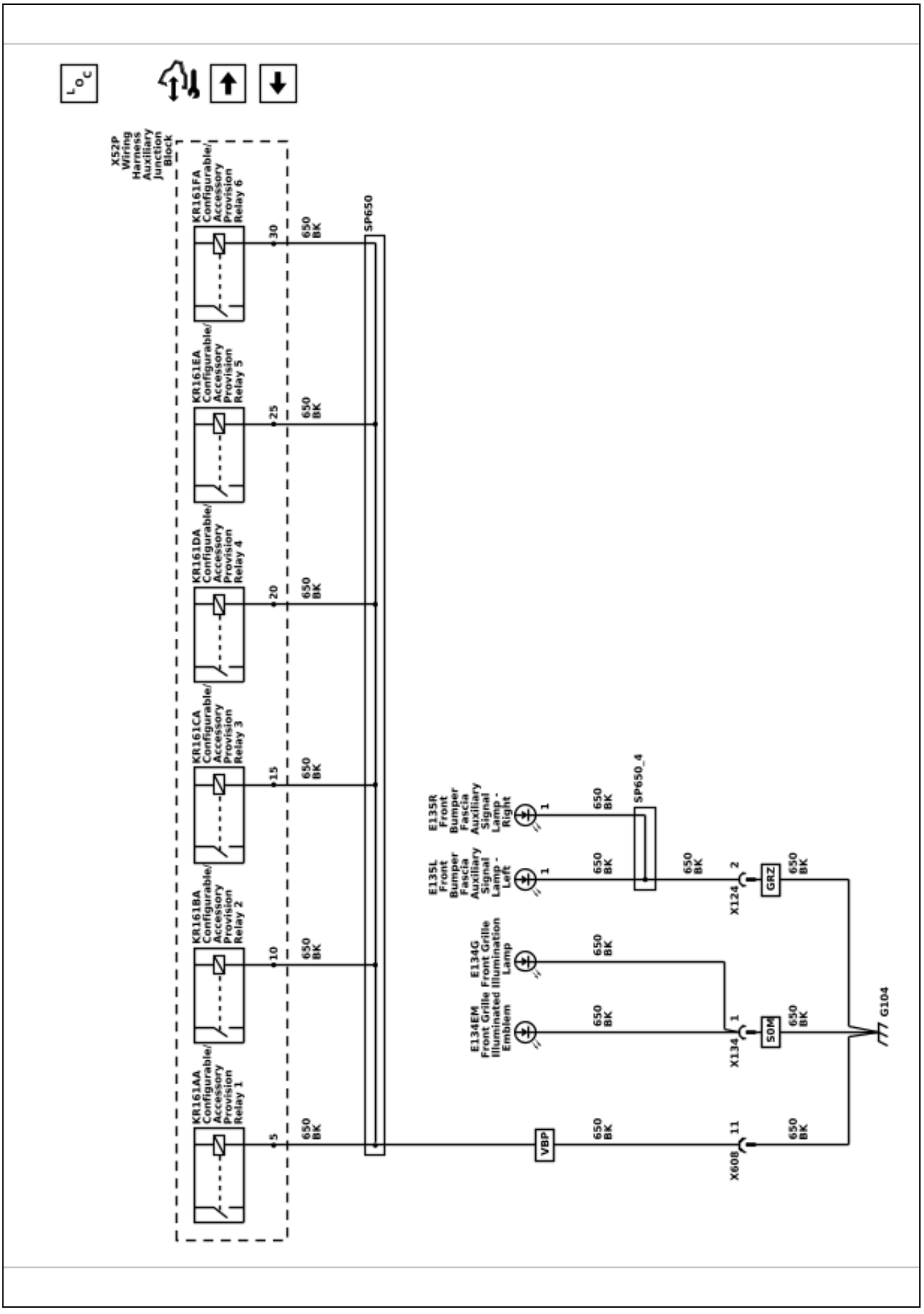
Ground Distribution Schematics (G102B, G103A, G103B, and G106)



Ground Distribution Schematics (G104 - 1 of 4)

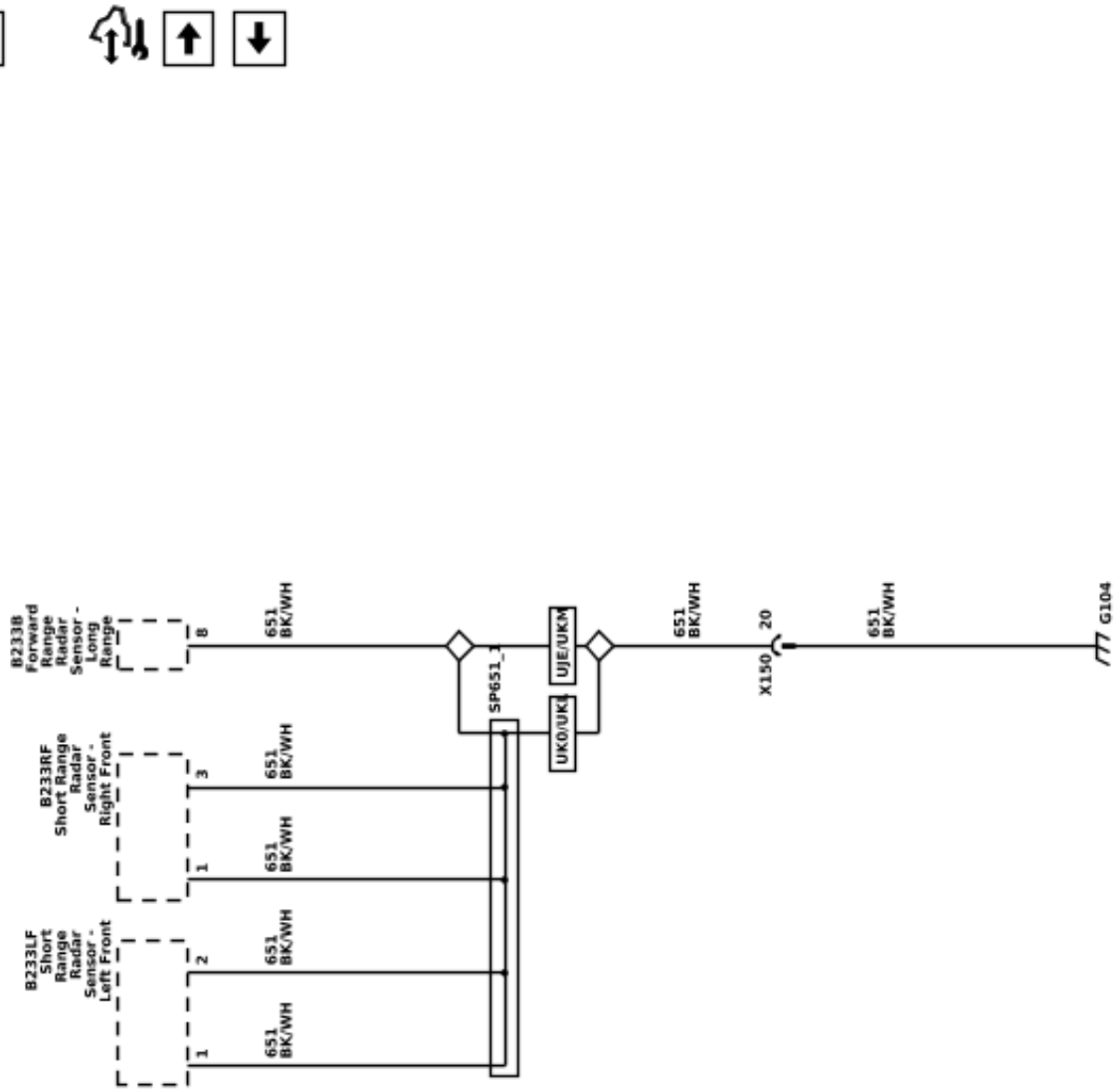


Ground Distribution Schematics (G104 - 2 of 4)

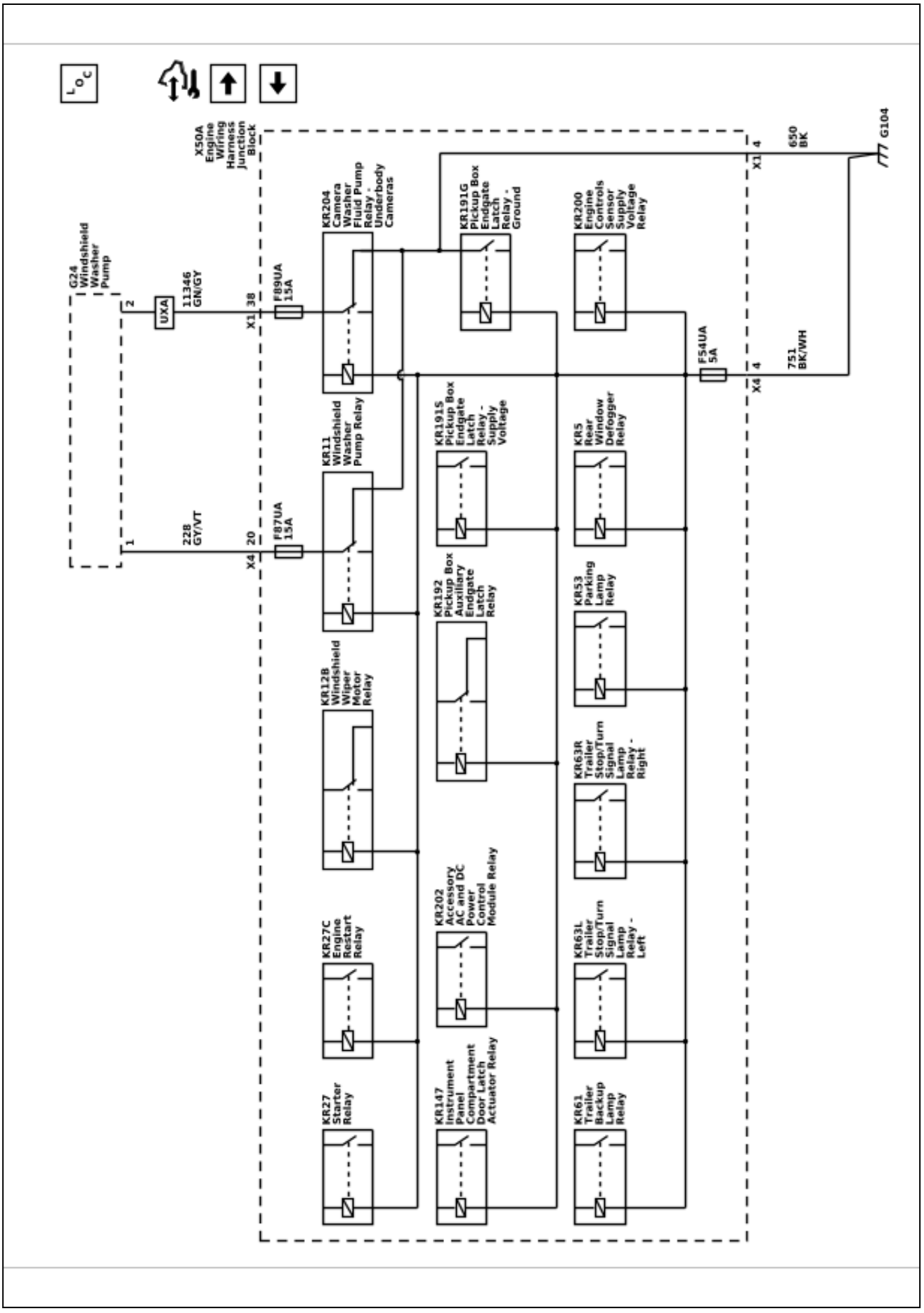


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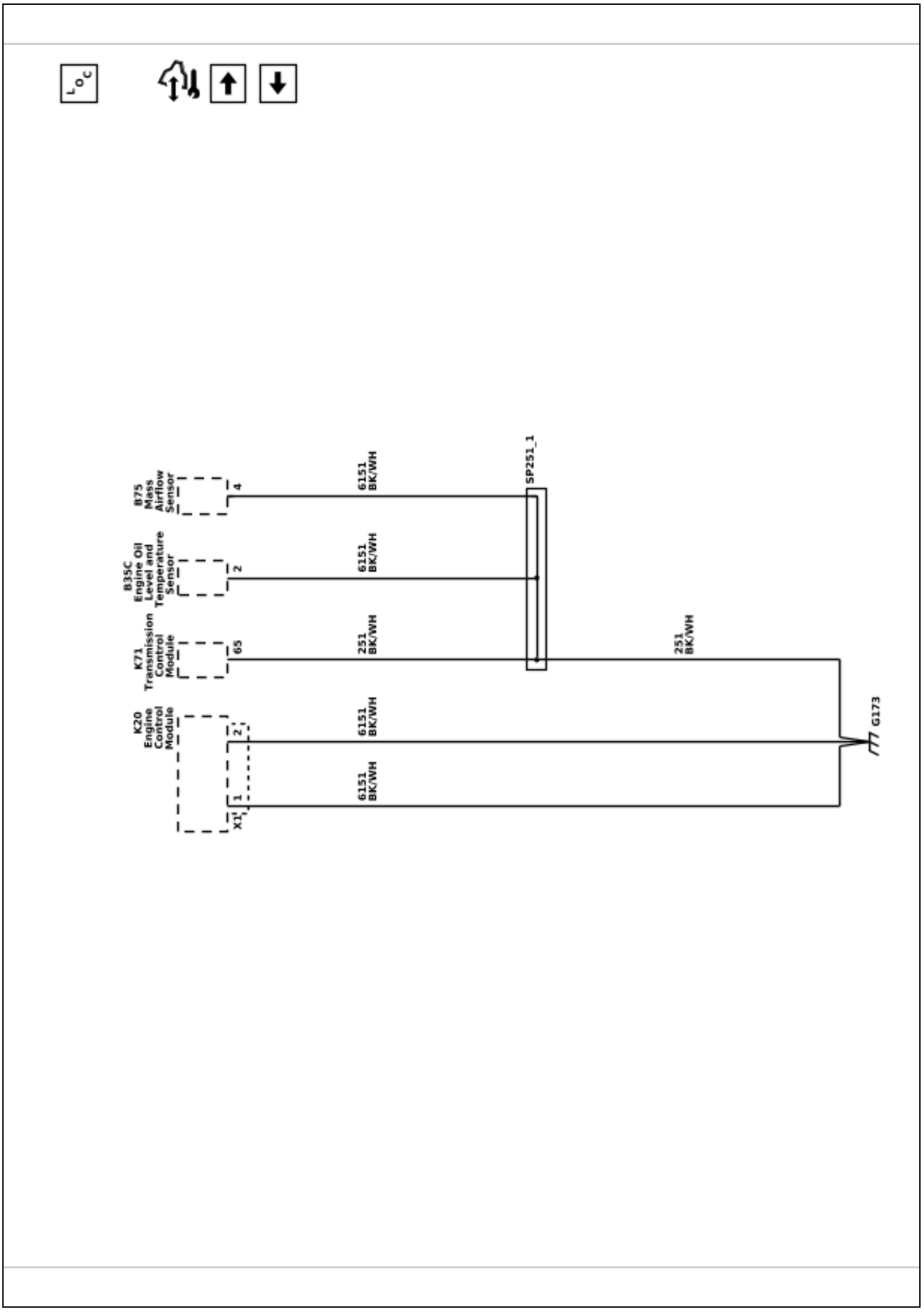
Ground Distribution Schematics (G104 - 3 of 4)



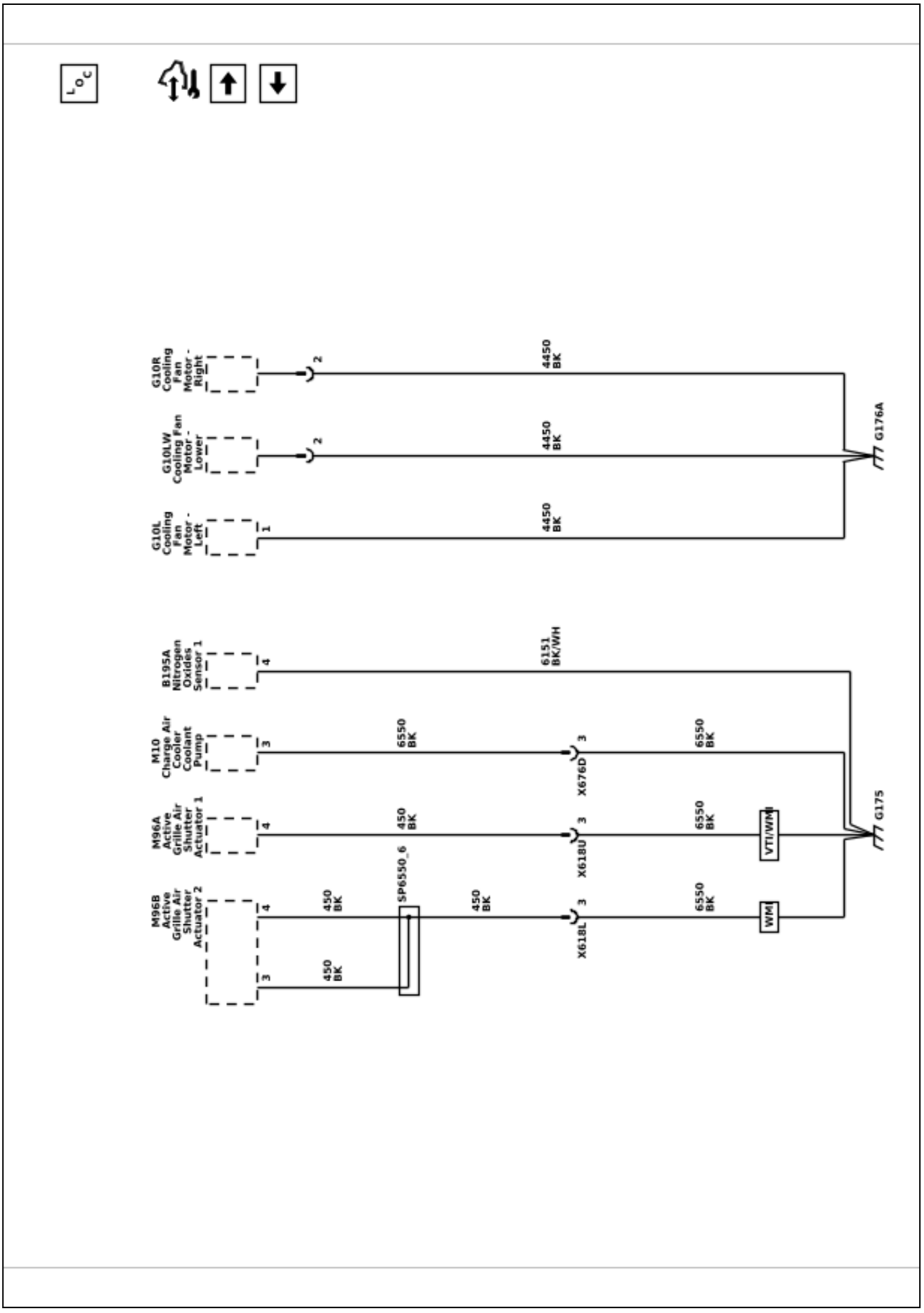
Ground Distribution Schematics (G104 - 4 of 4)



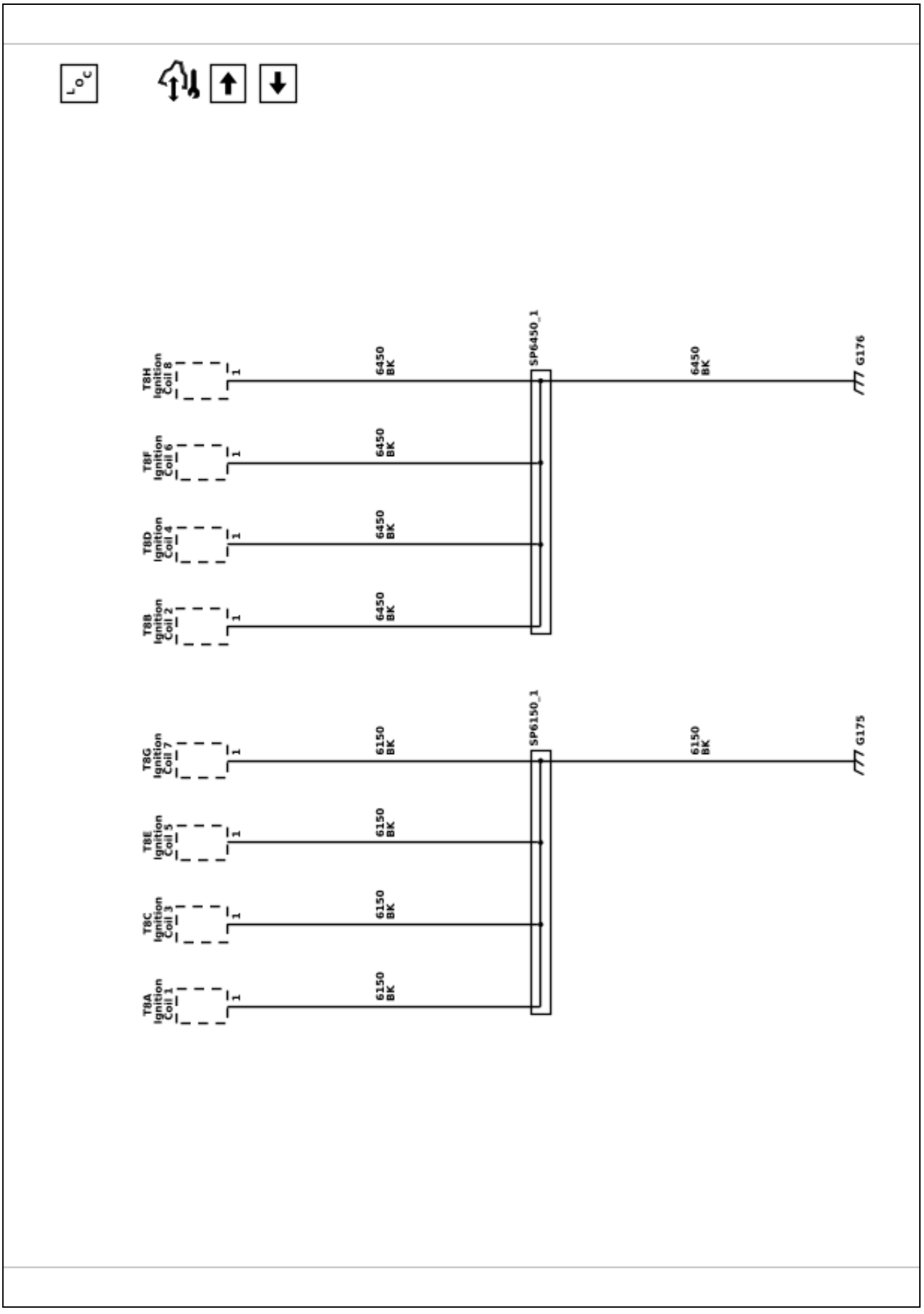
Ground Distribution Schematics (G173 (L76 / L78))



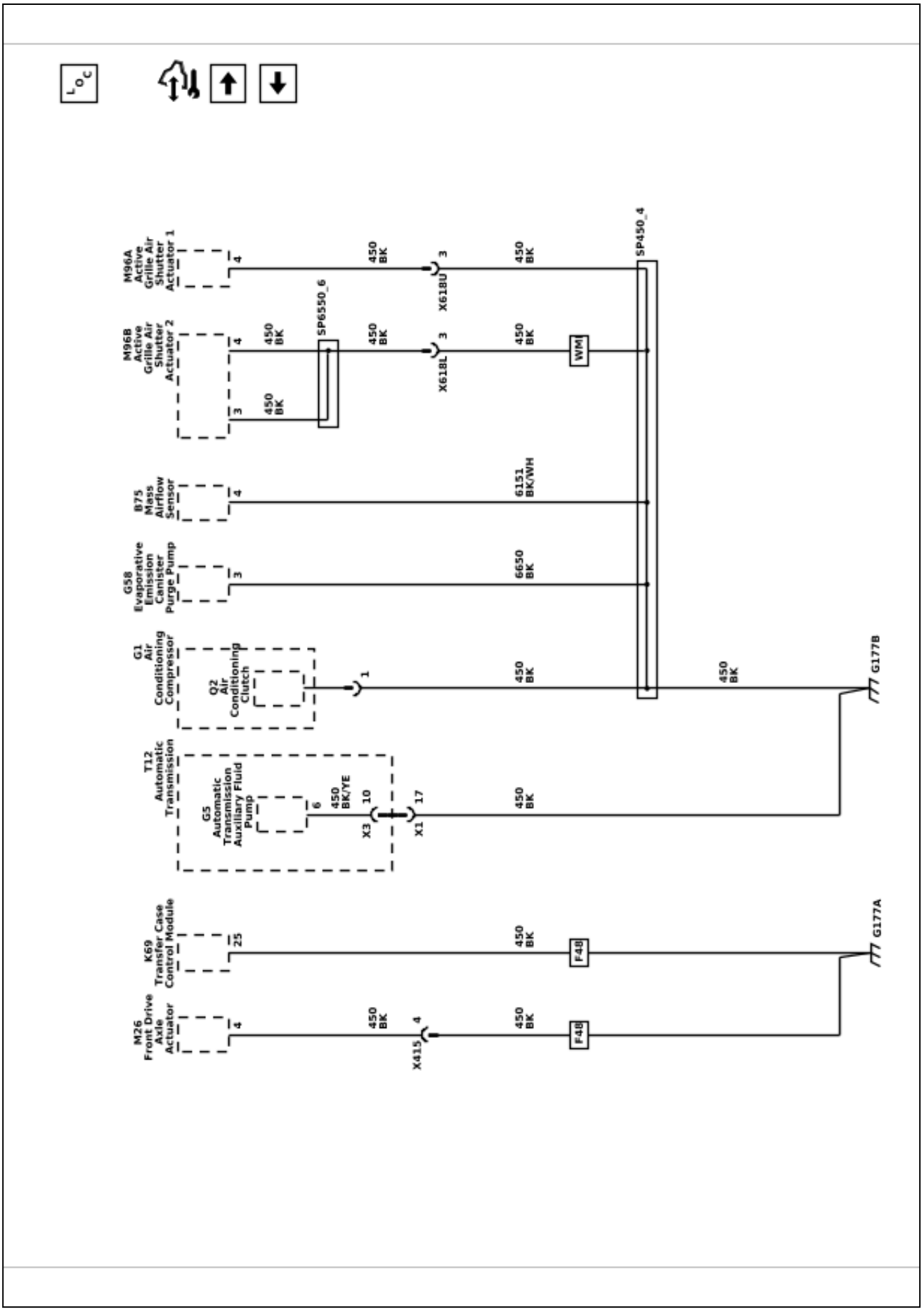
Ground Distribution Schematics (G175 and G176A (LZ0))



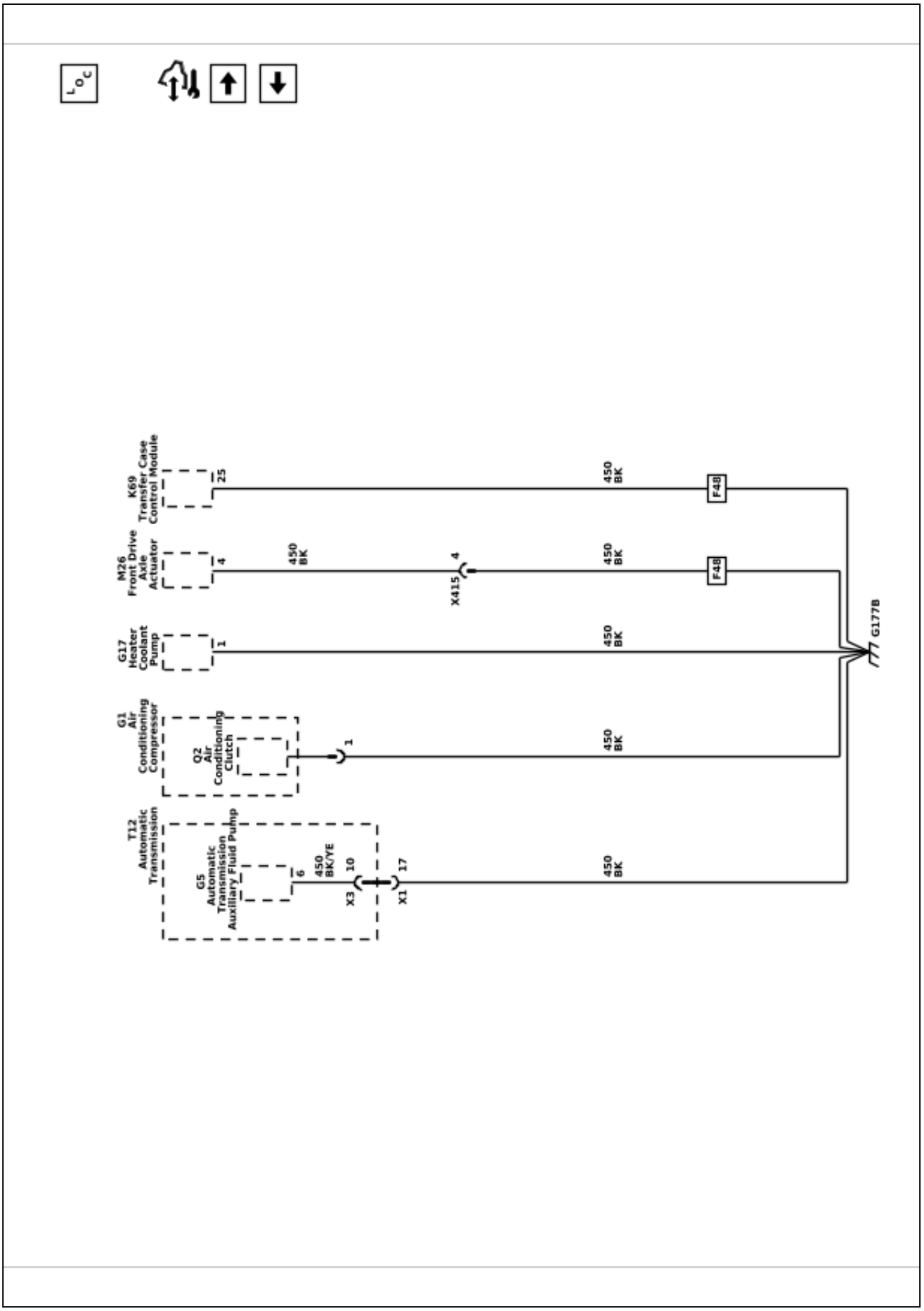
Ground Distribution Schematics (G175 and G176 (L76 / L78))



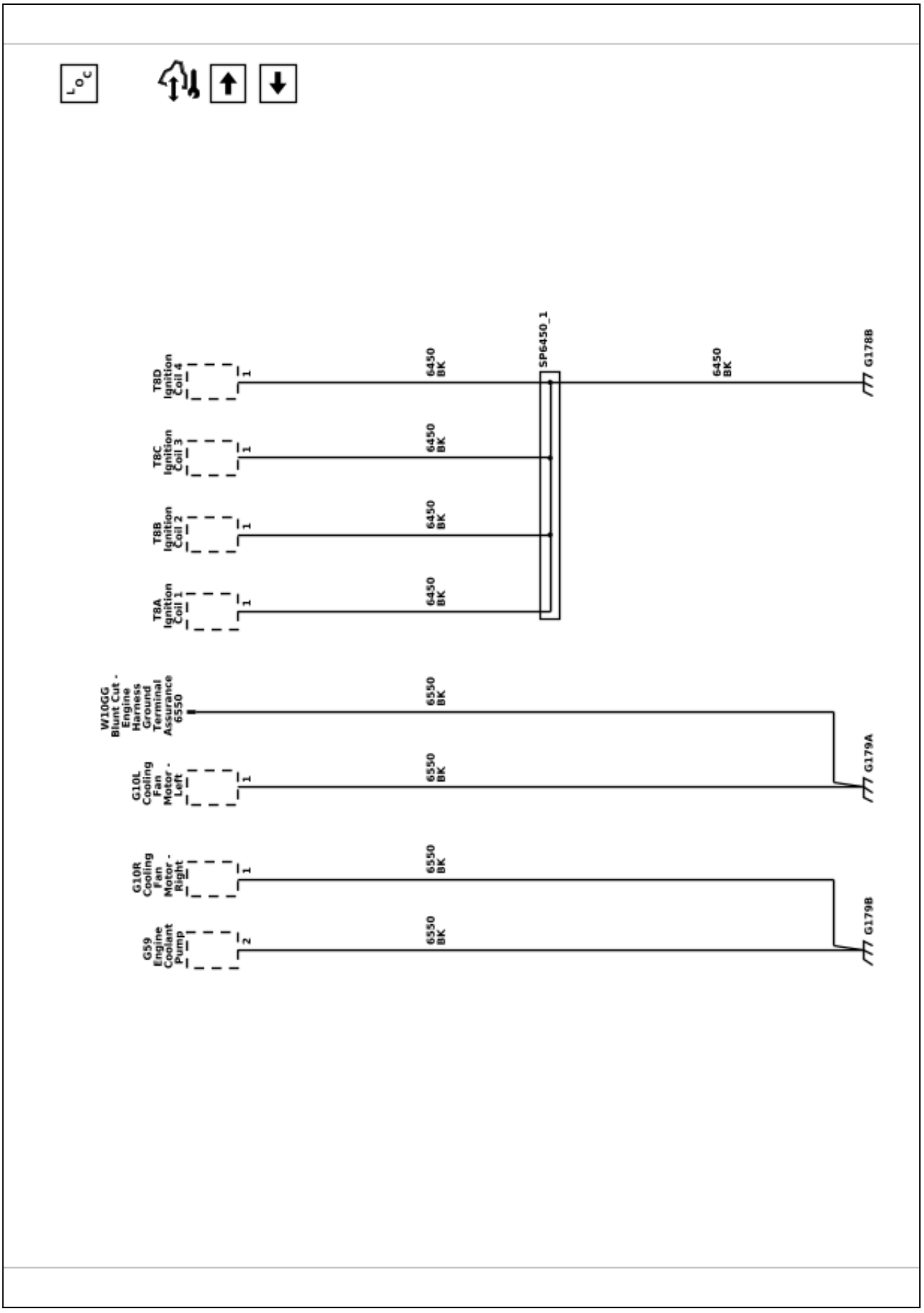
Ground Distribution Schematics (G177A and G177B (L4B))



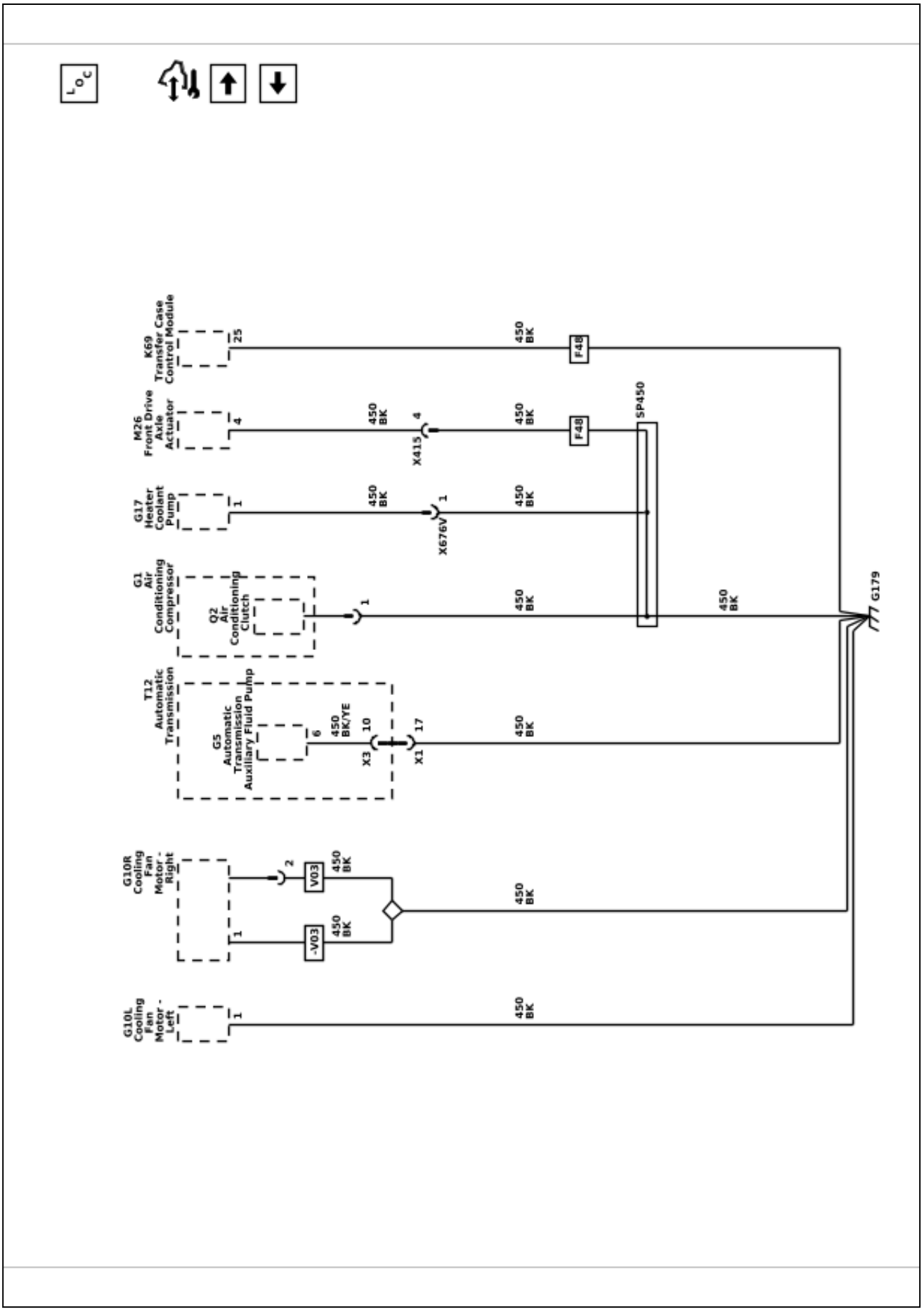
Ground Distribution Schematics (G177B (LZ0))



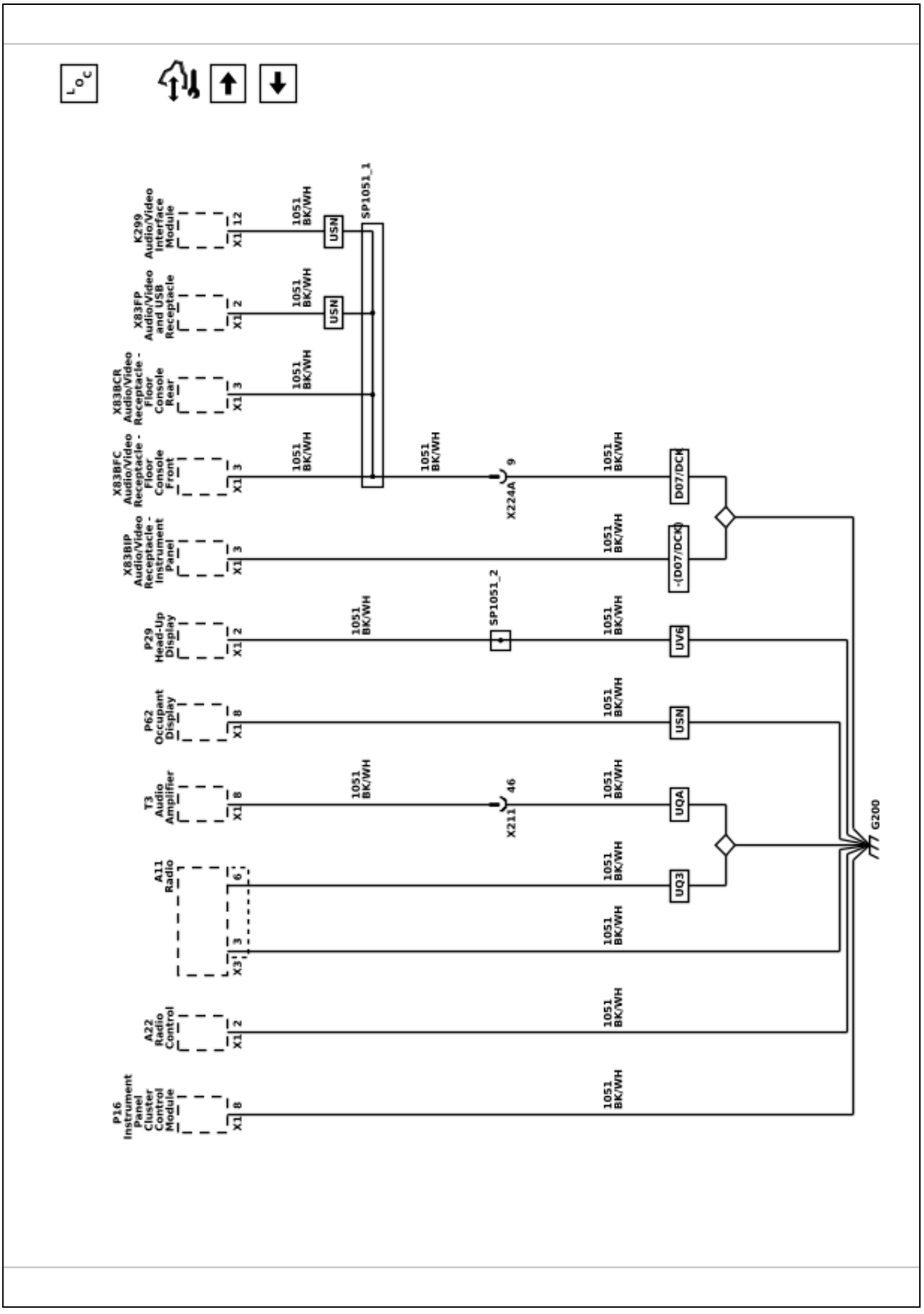
Ground Distribution Schematics (G178B, G179A, and G179B (L4B))



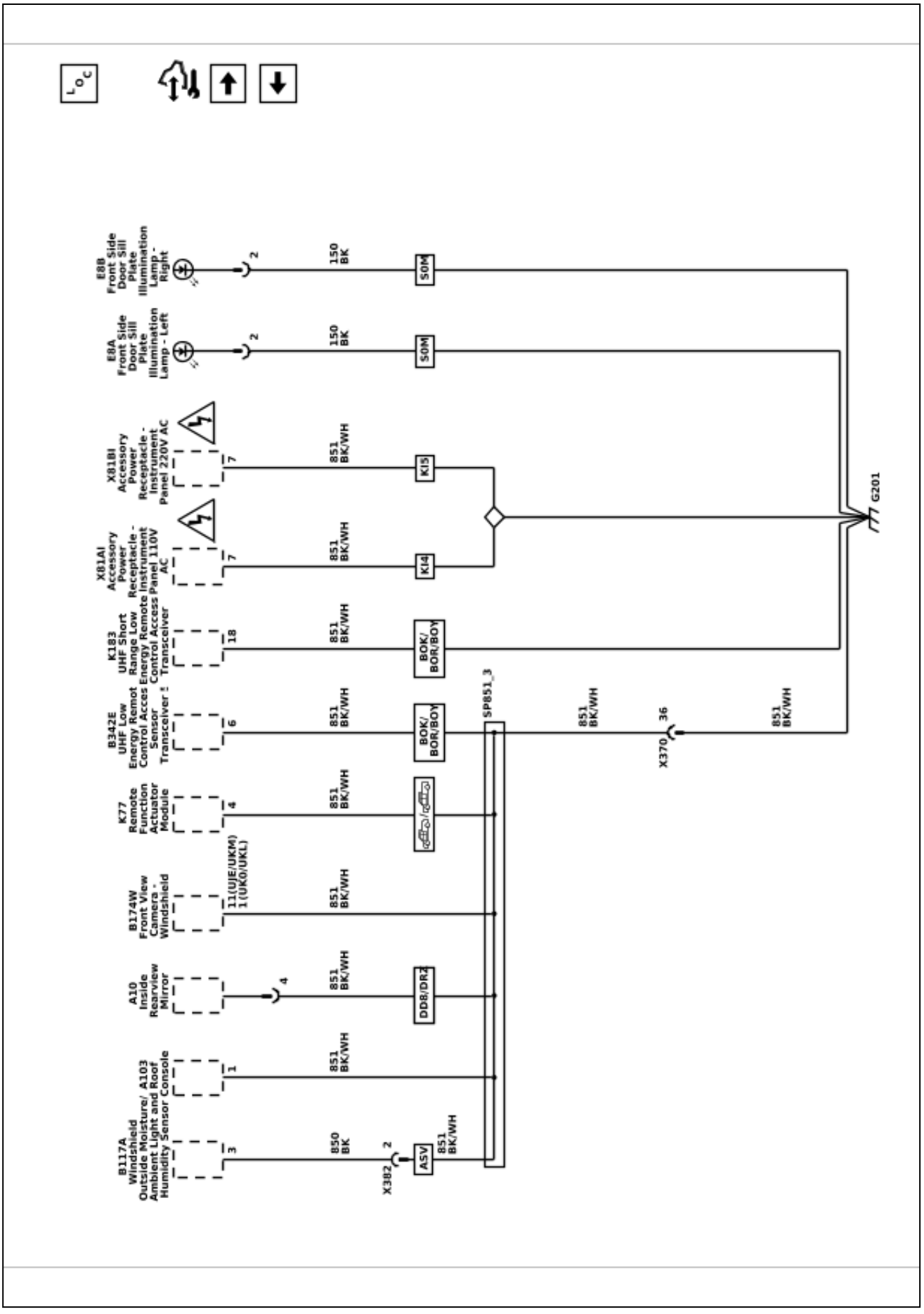
Ground Distribution Schematics (G179 (L76 / L78))



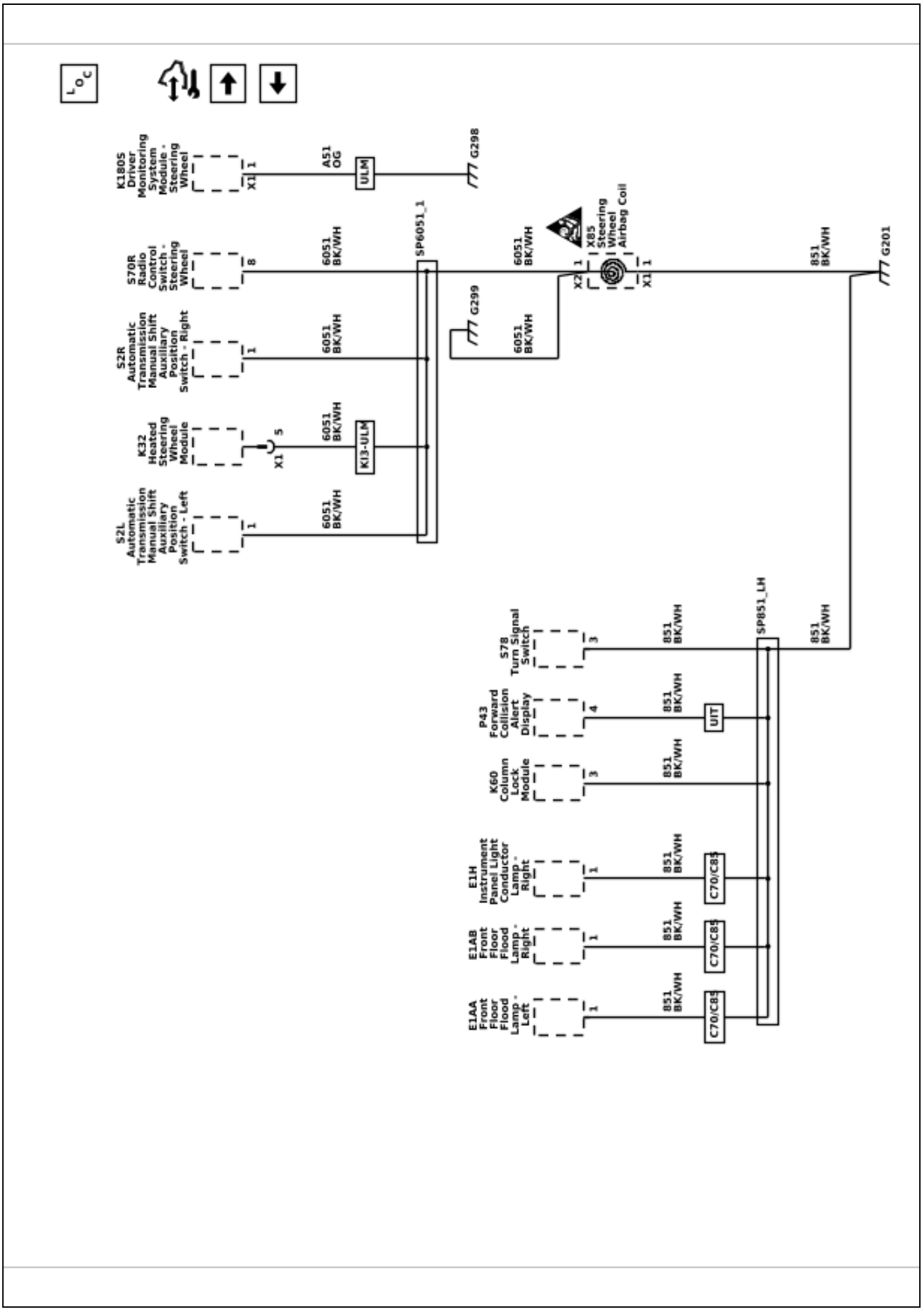
Ground Distribution Schematics (G200)



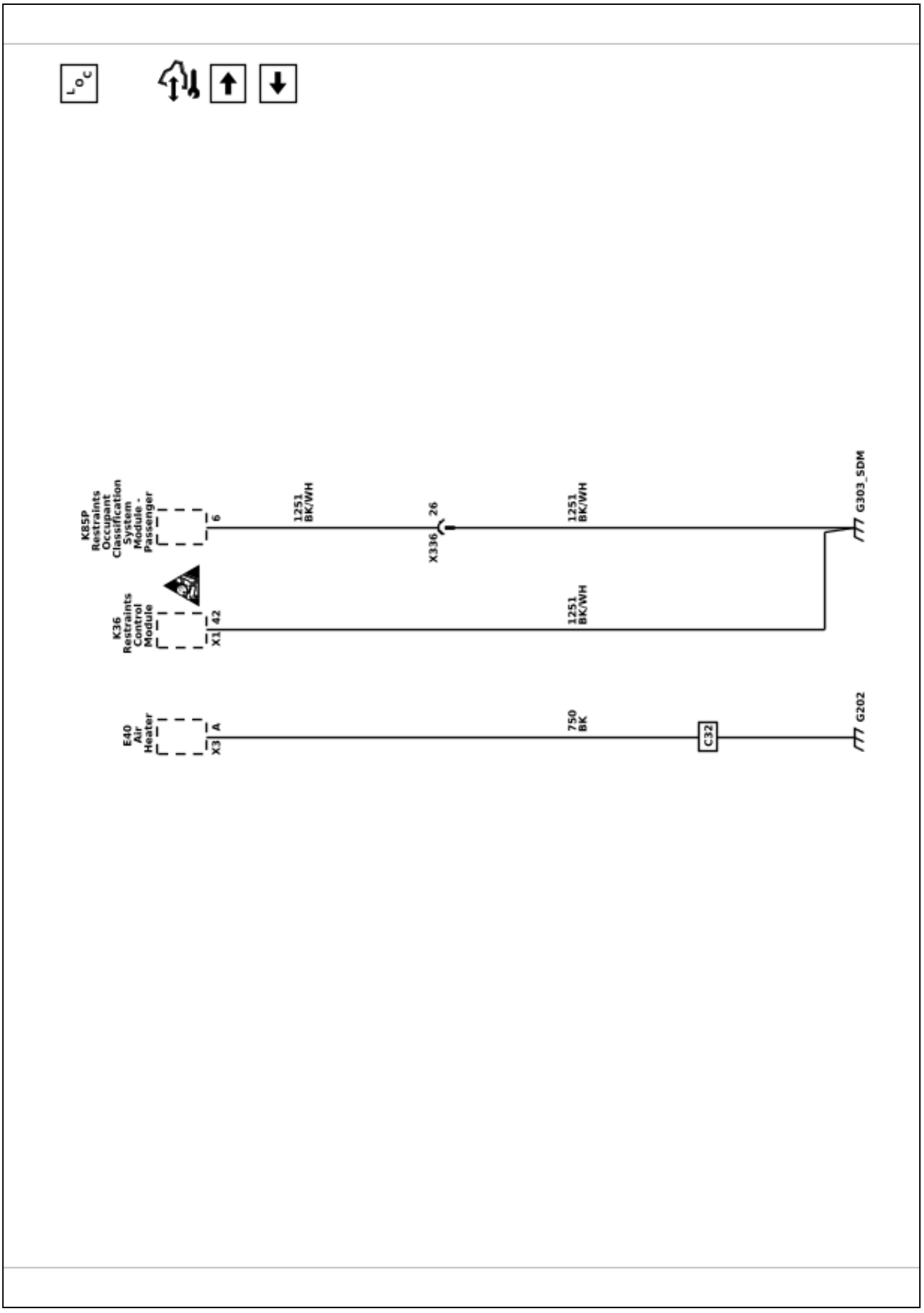
Ground Distribution Schematics (G201 - 1 of 2)



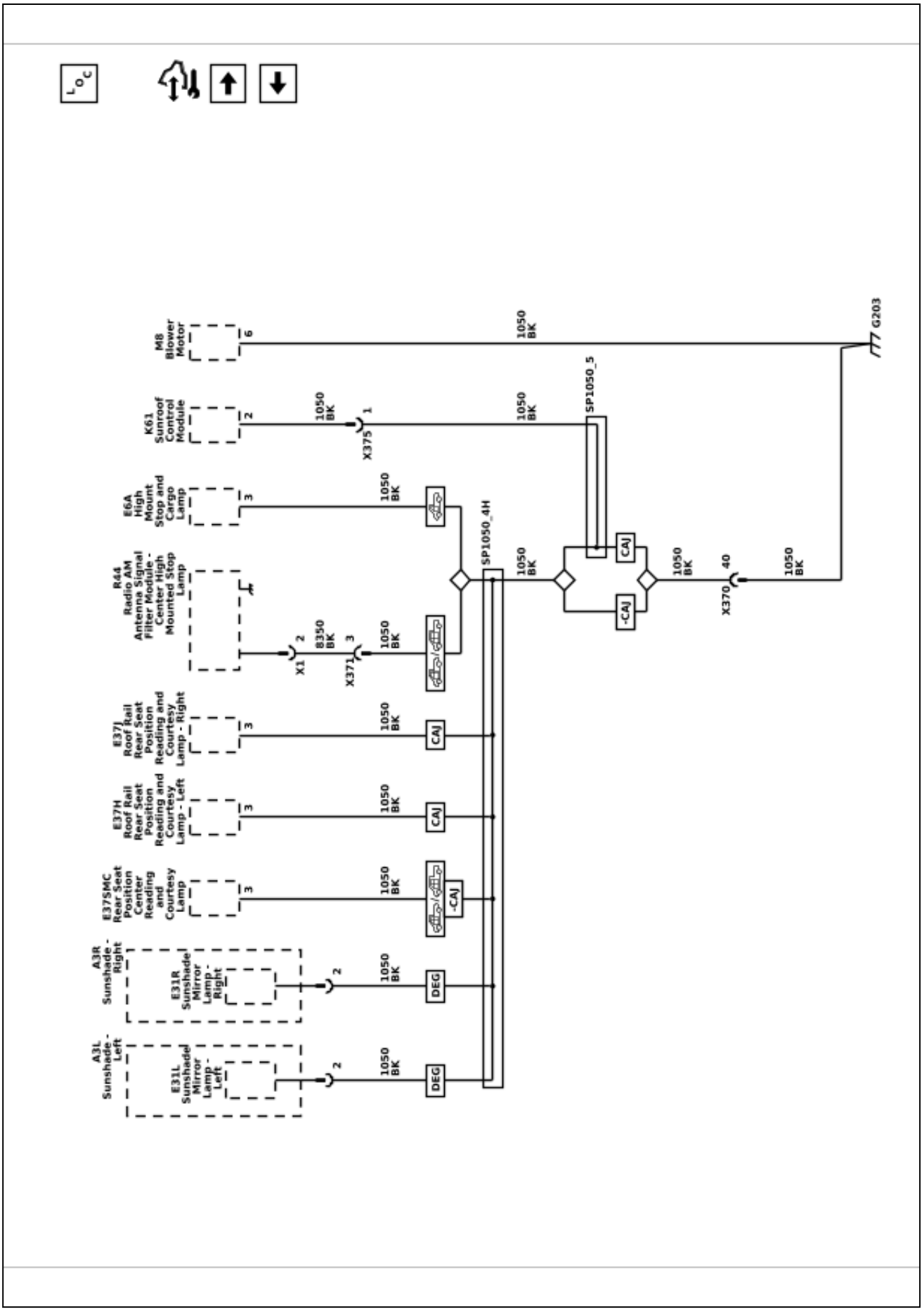
Ground Distribution Schematics (G201 - 2 of 2, G298, and G299)



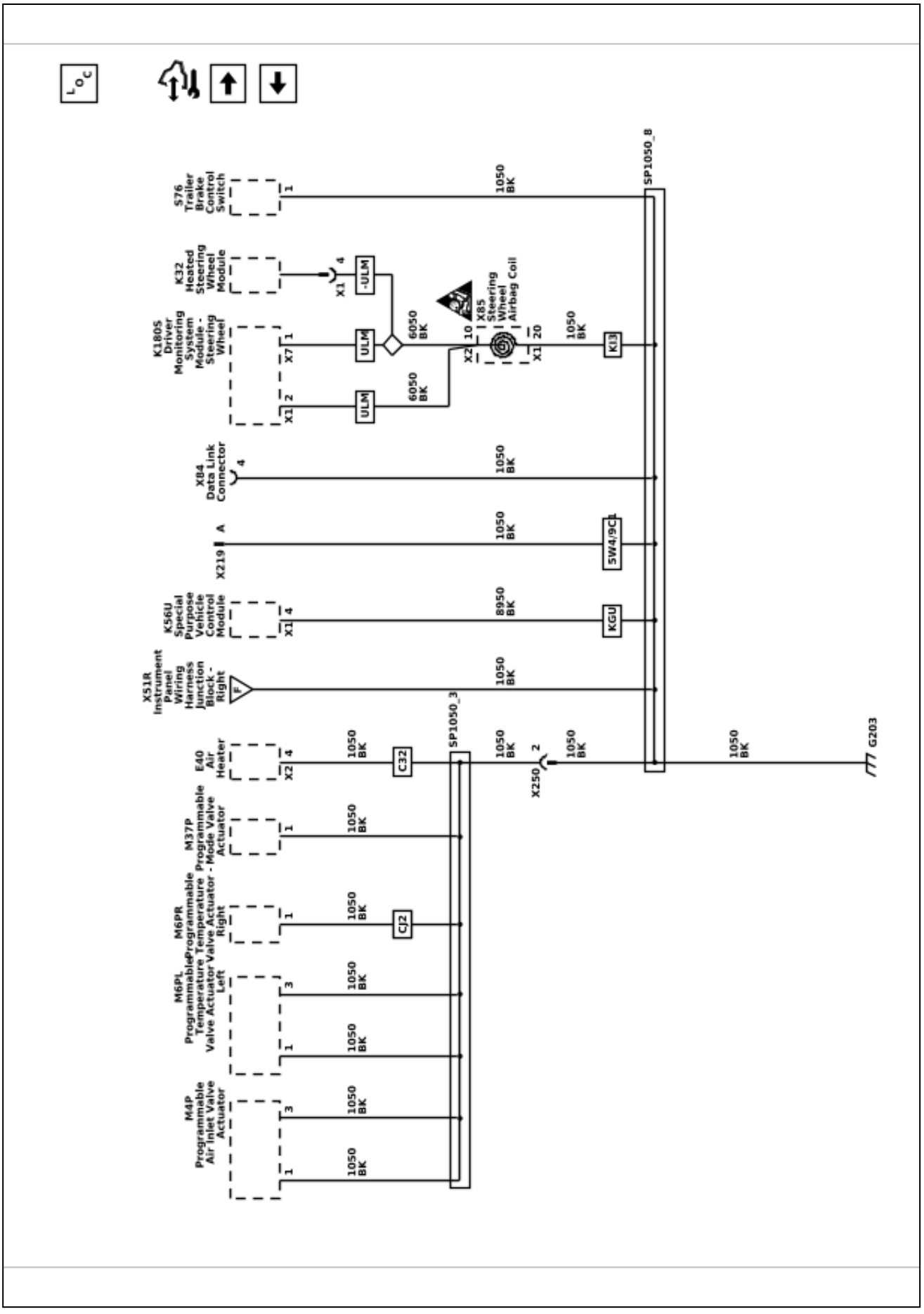
Ground Distribution Schematics (G202 and G303_SDM)



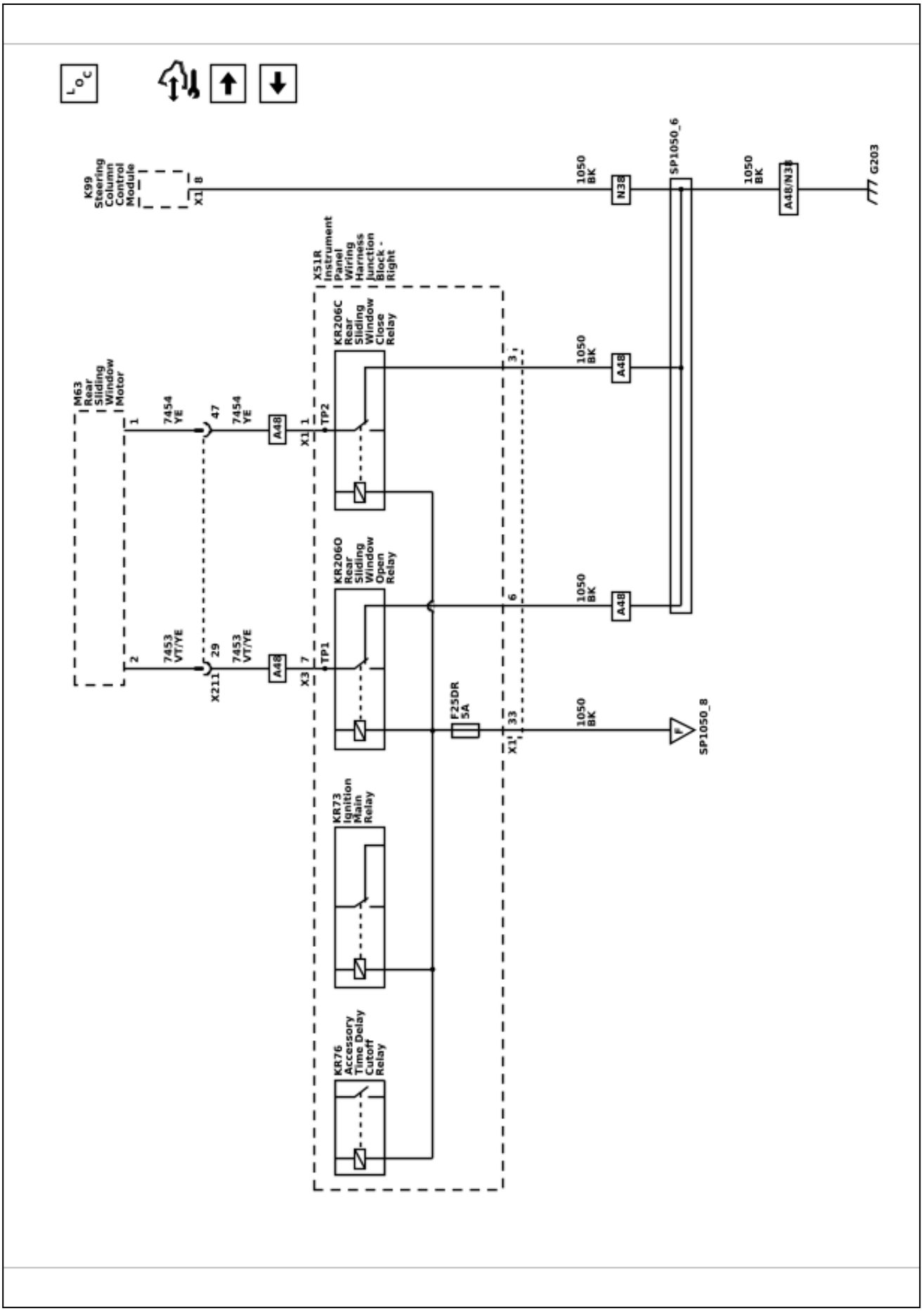
Ground Distribution Schematics (G203 - 1 of 4)



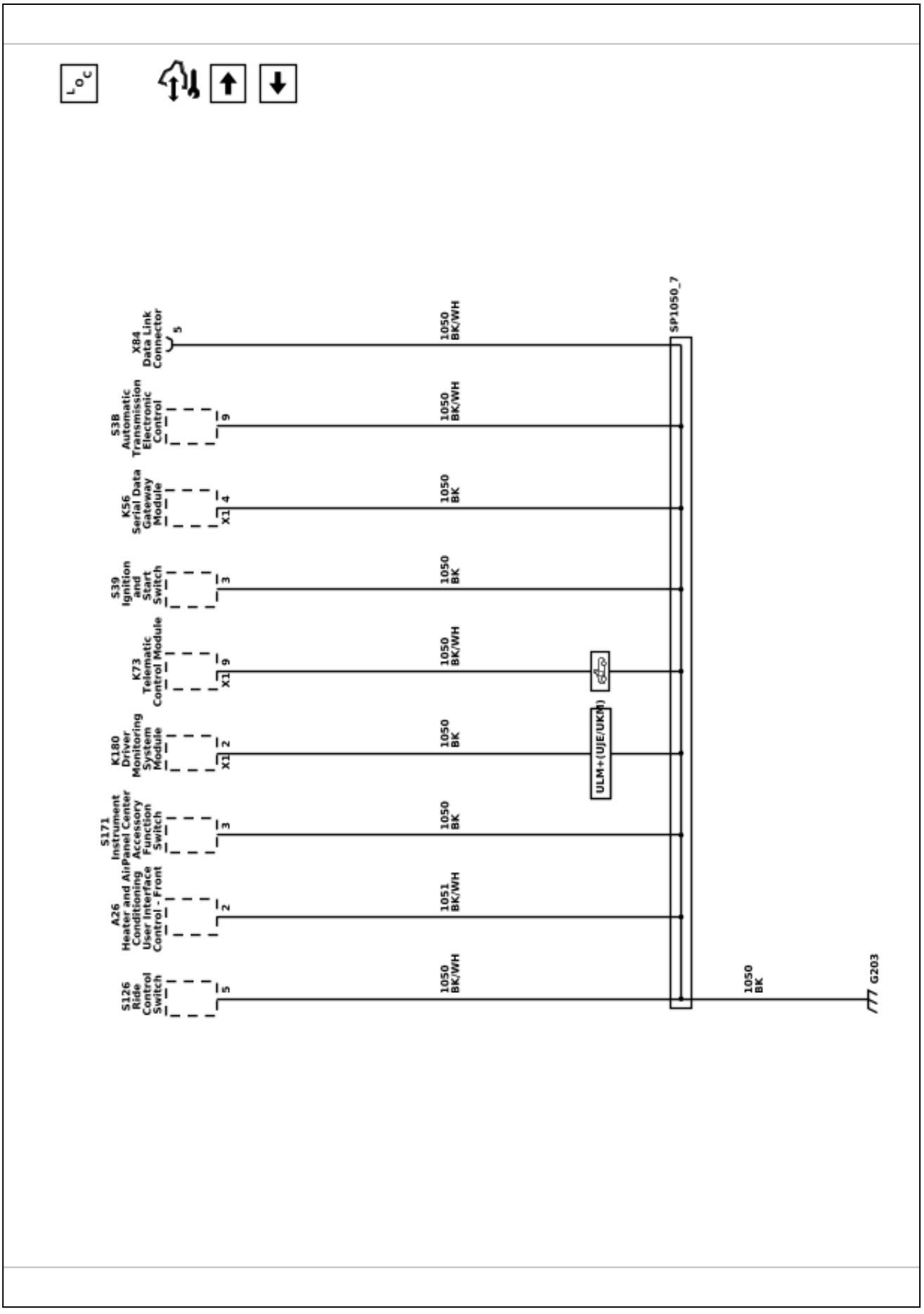
Ground Distribution Schematics (G203 - 2 of 4)



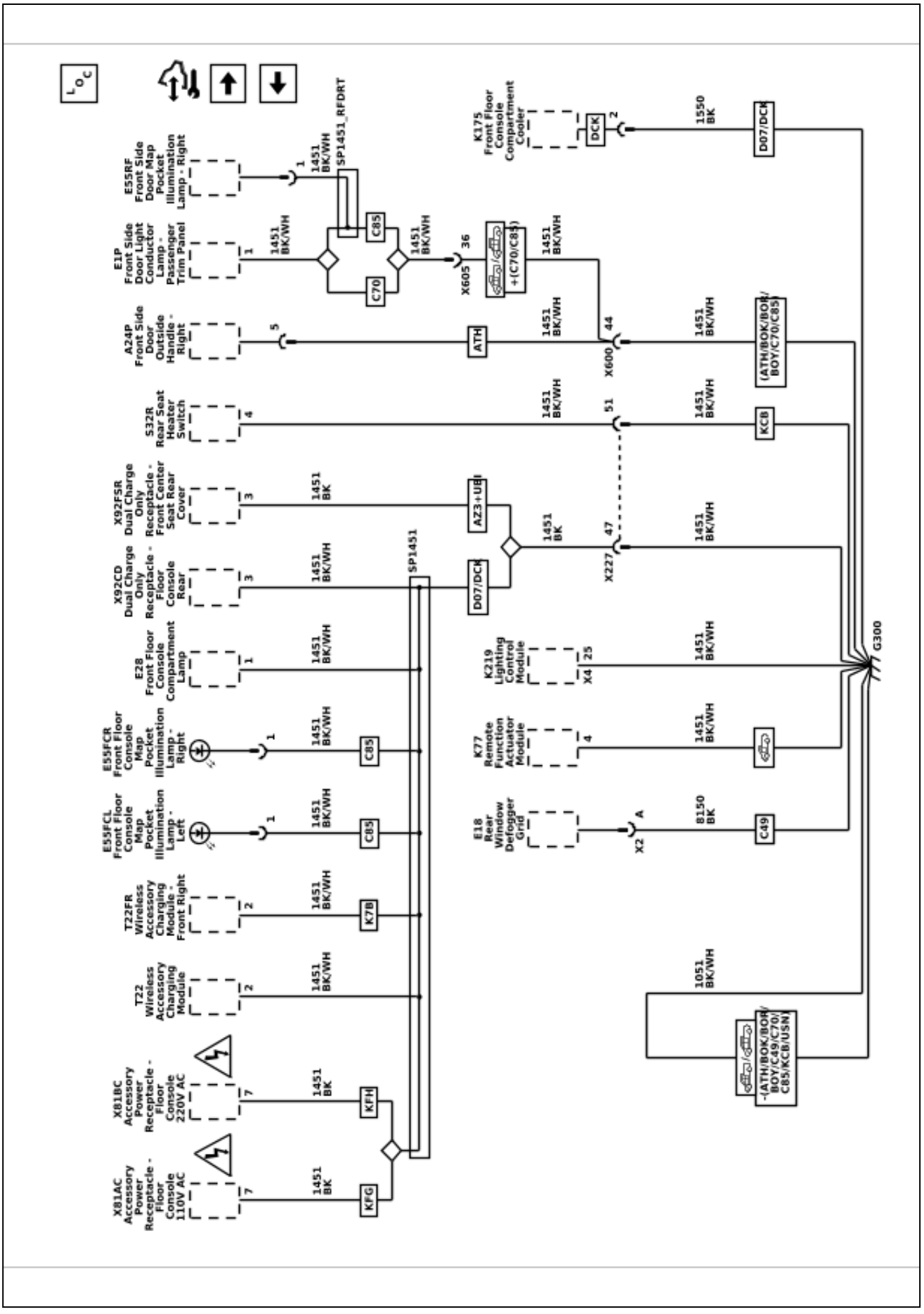
Ground Distribution Schematics (G203 - 3 of 4)



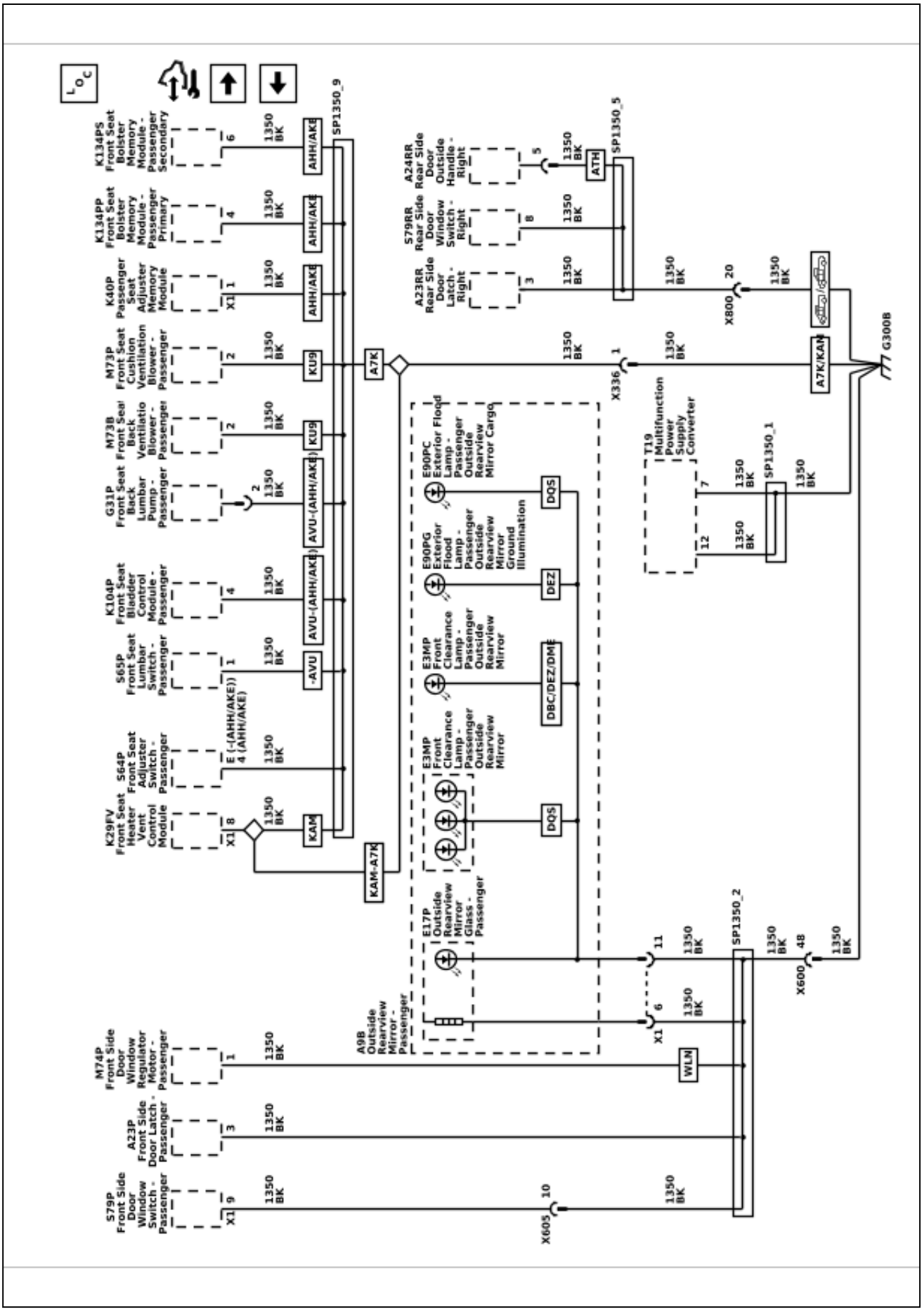
Ground Distribution Schematics (G203 - 4 of 4)



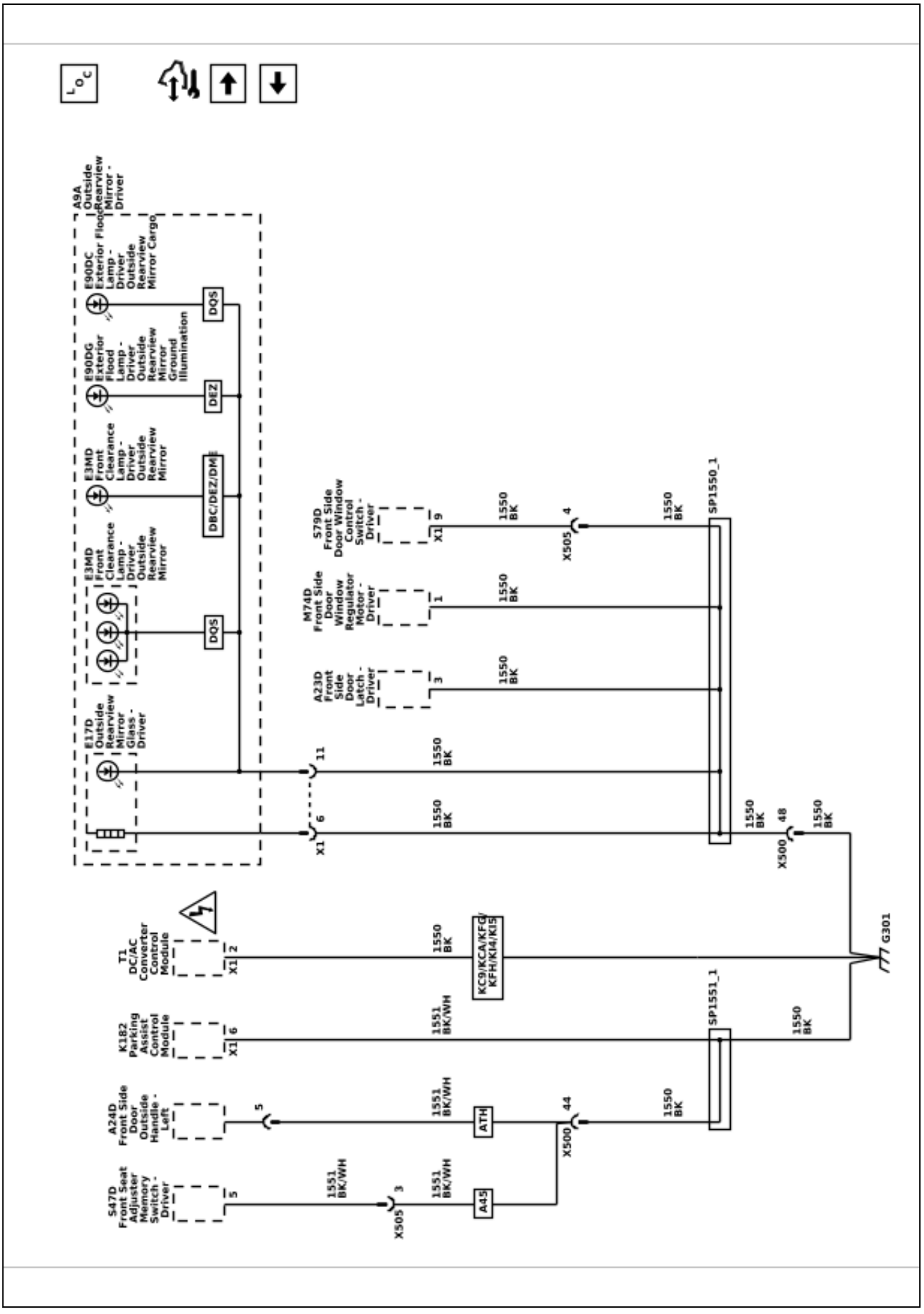
Ground Distribution Schematics (G300)



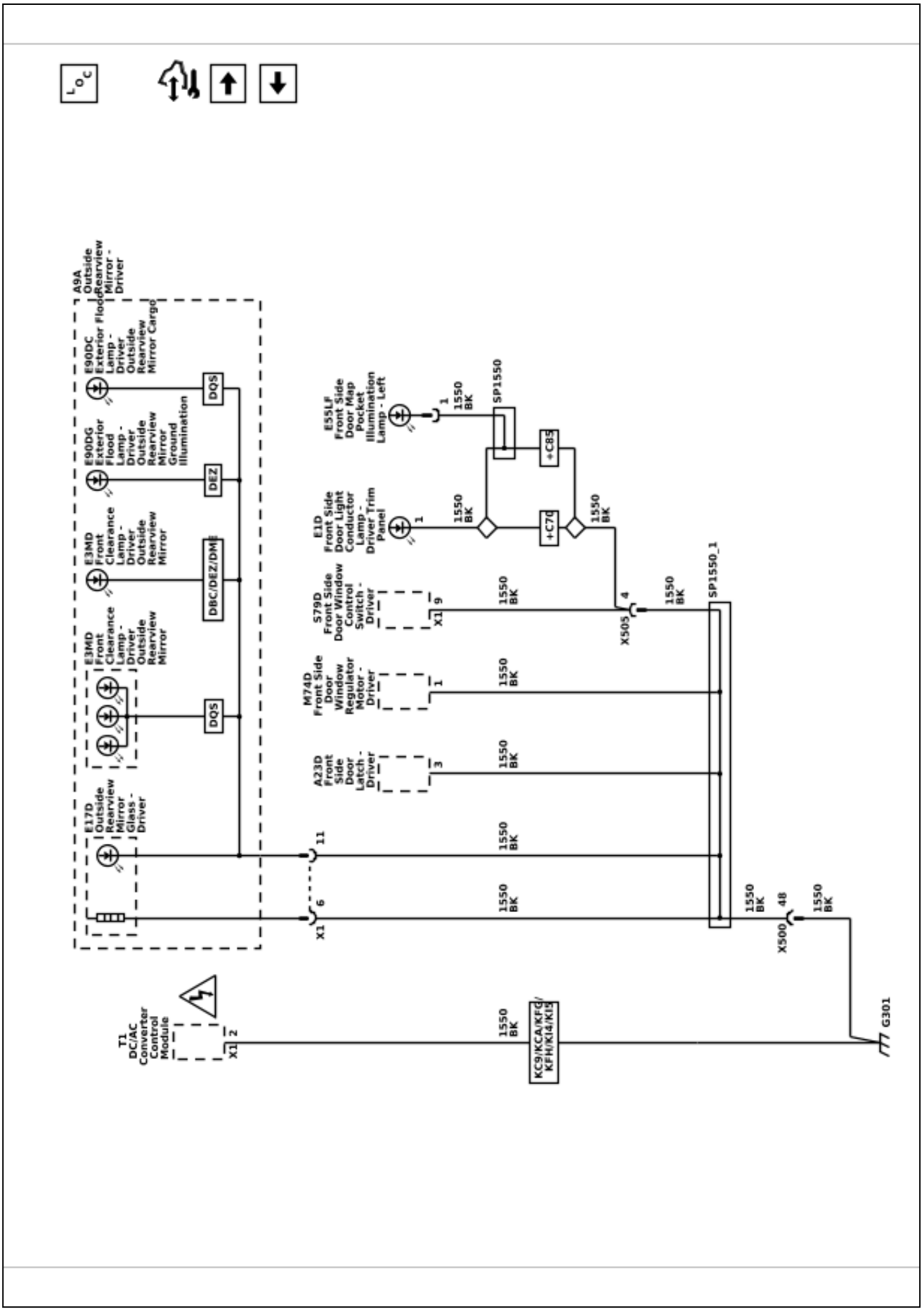
Ground Distribution Schematics (G300B)



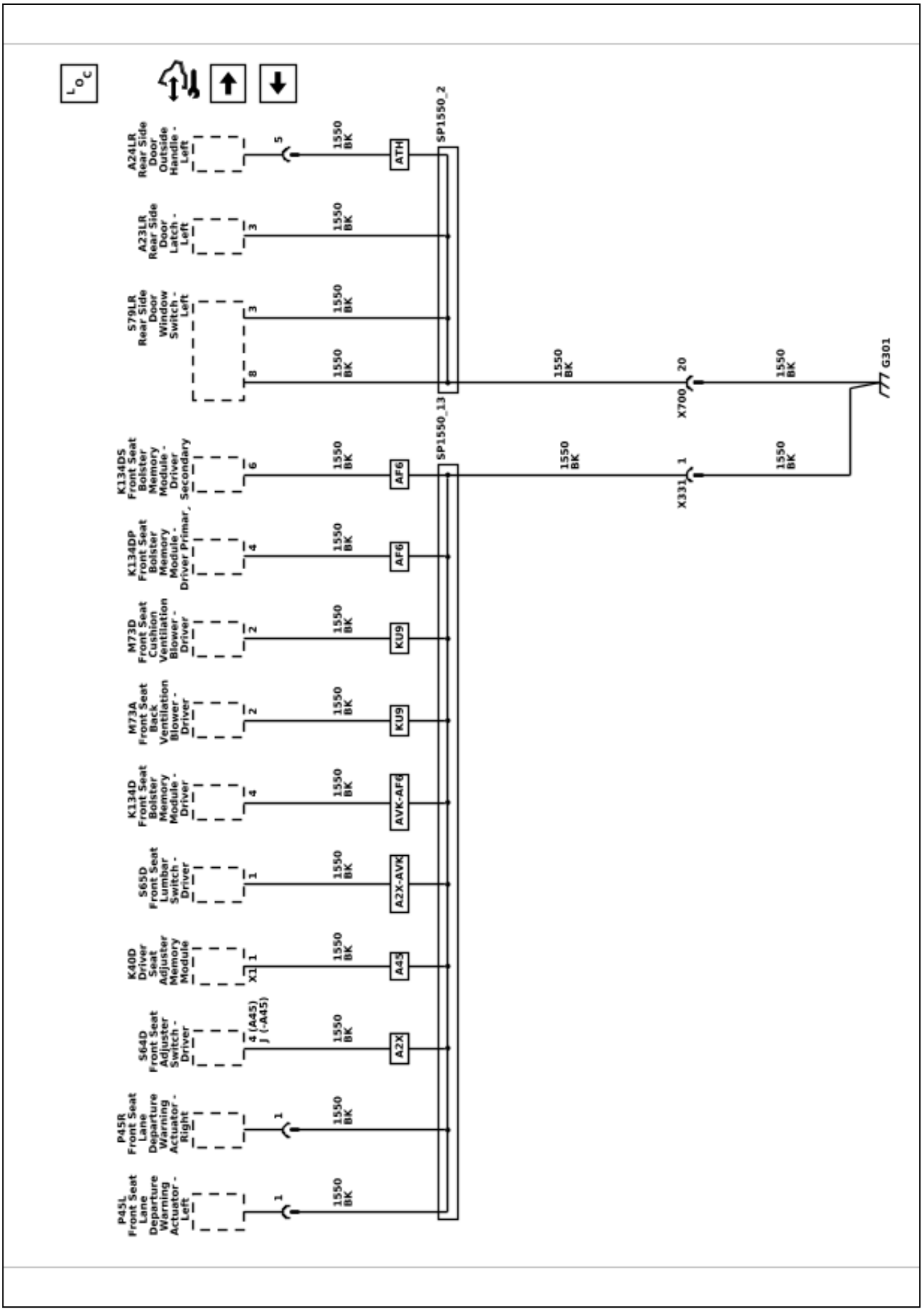
Ground Distribution Schematics (G301 - 2-Door)



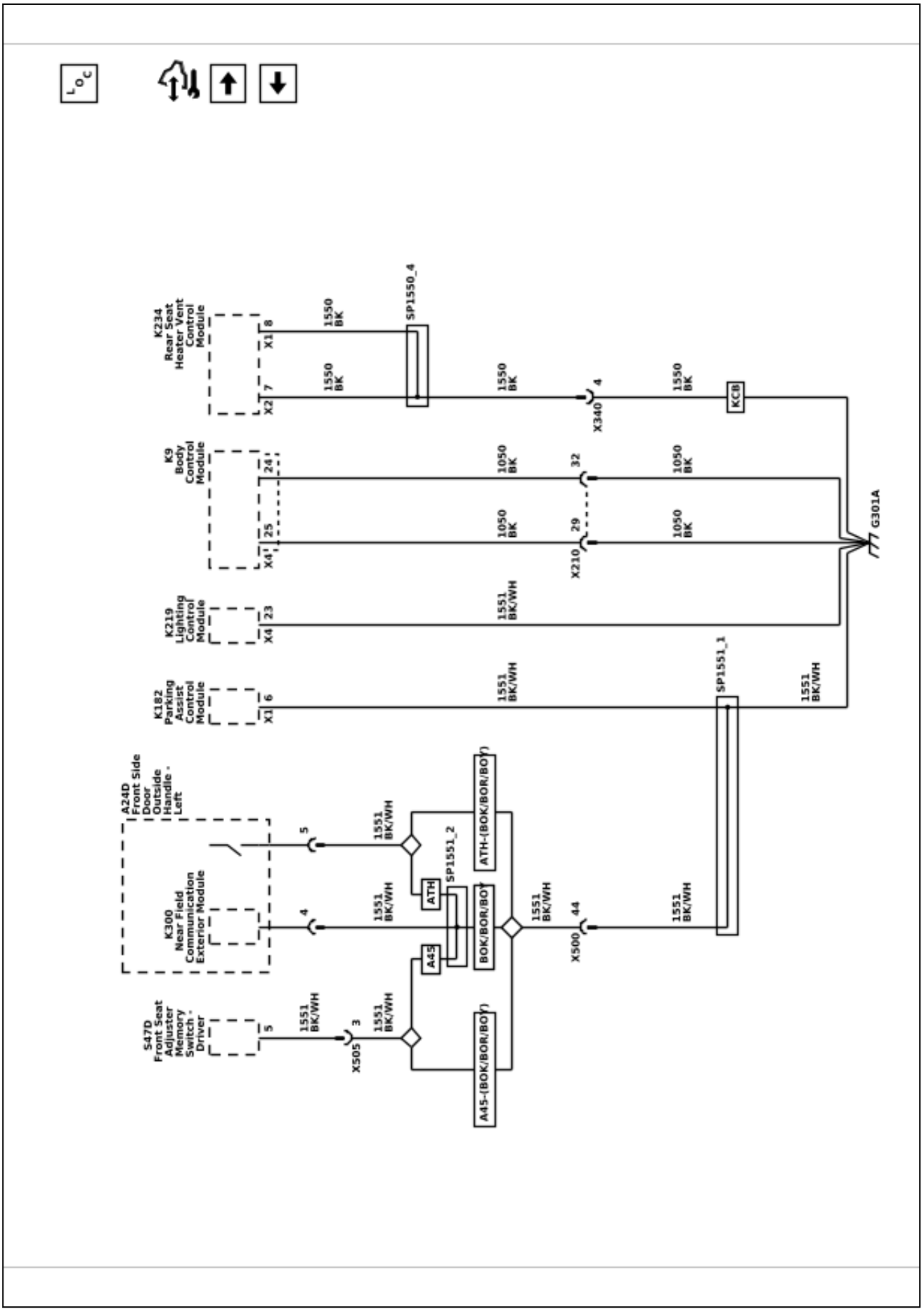
Ground Distribution Schematics (G301 - 1 of 2 - 4-Door)



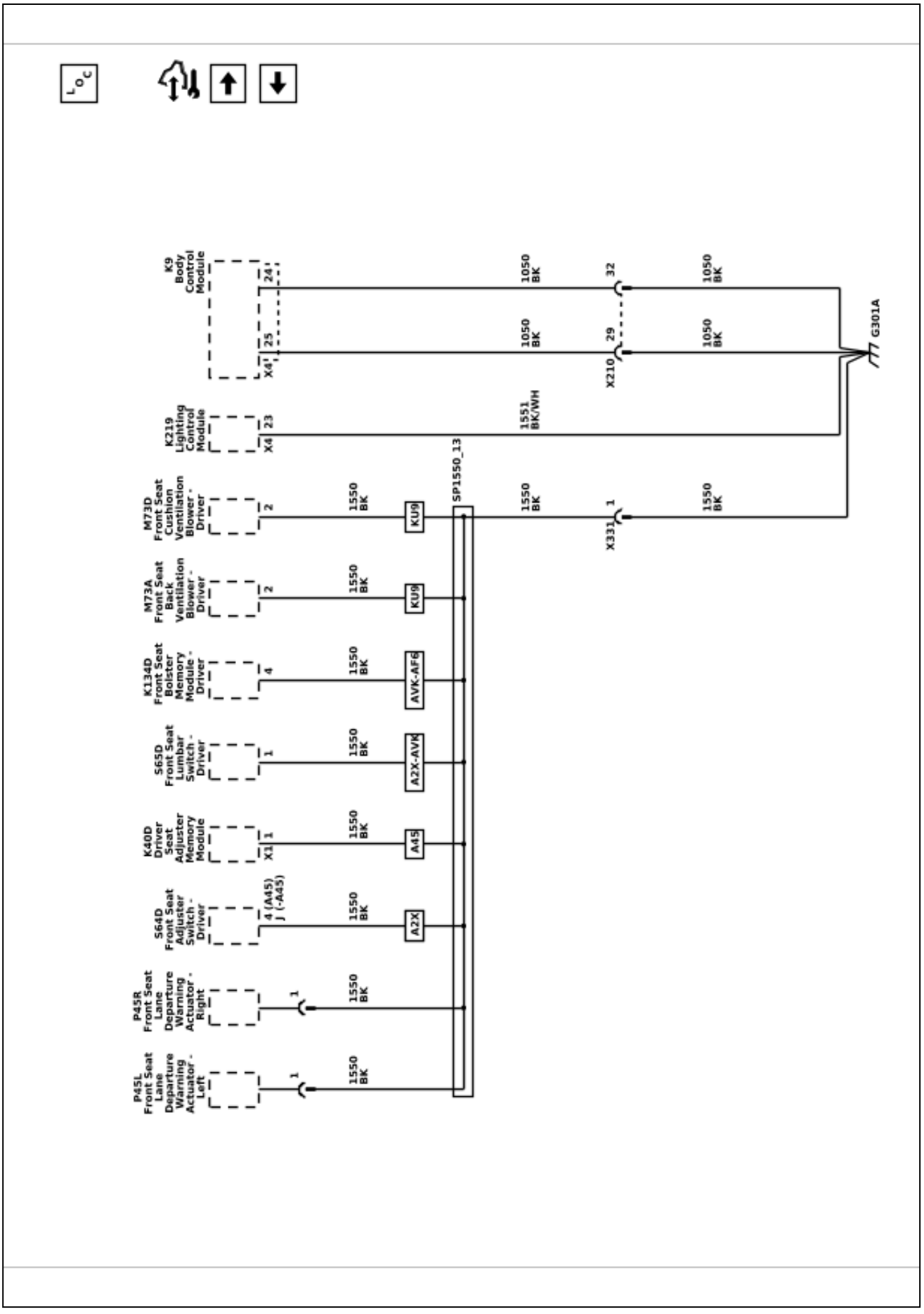
Ground Distribution Schematics (G301 - 2 of 2 - 4-Door)



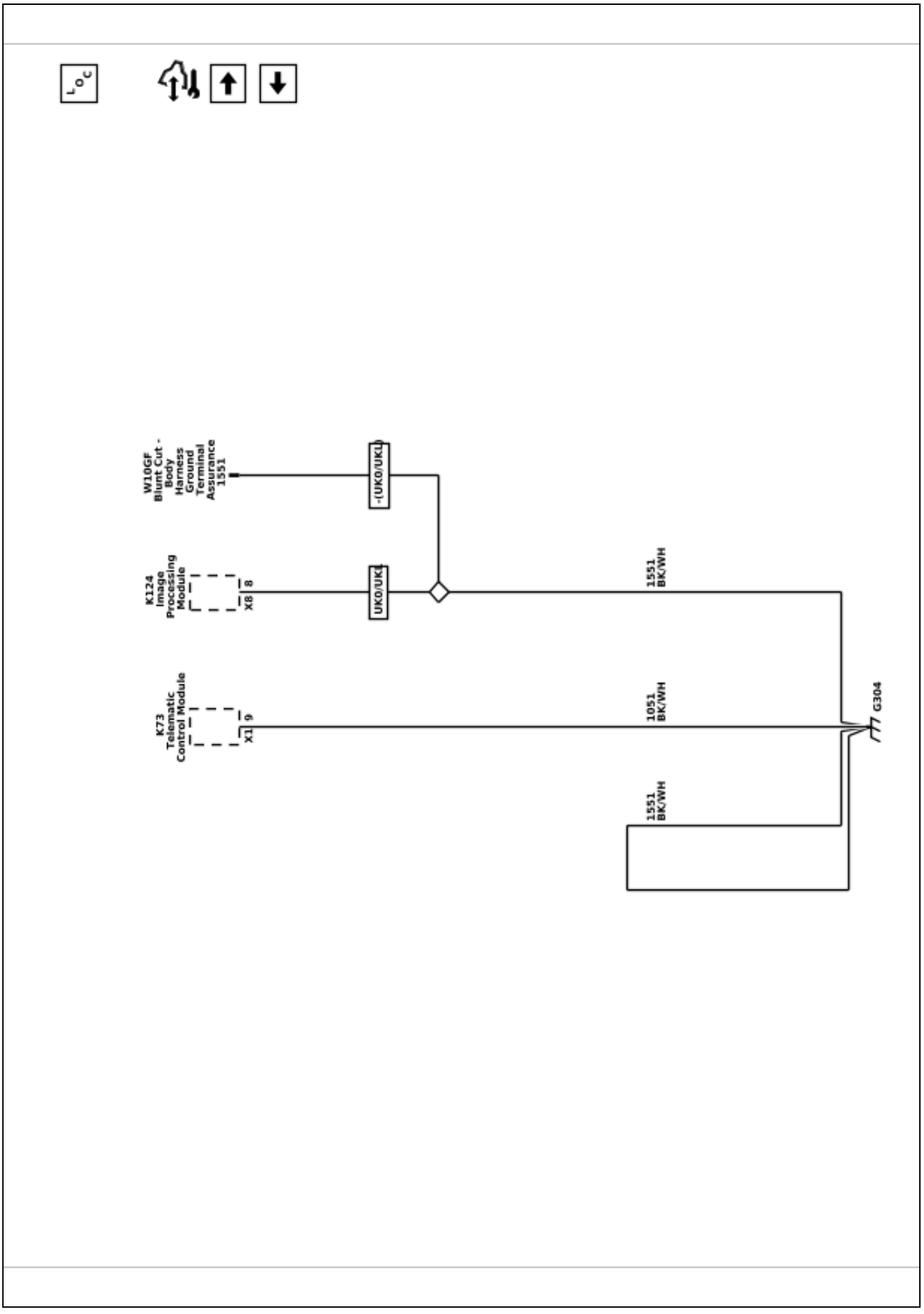
Ground Distribution Schematics (G301A - 4-Door)



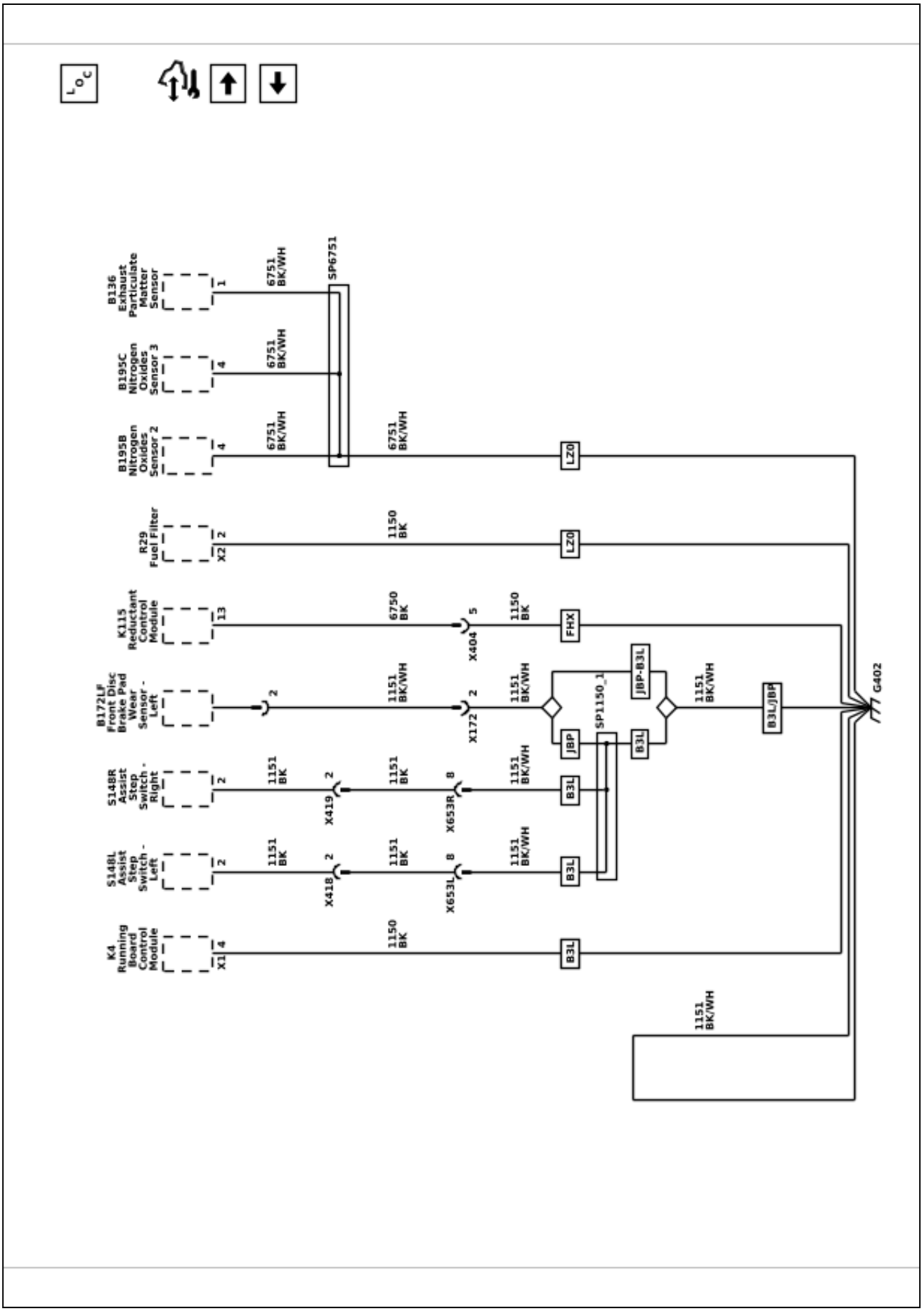
Ground Distribution Schematics (G301A - 2-Door)



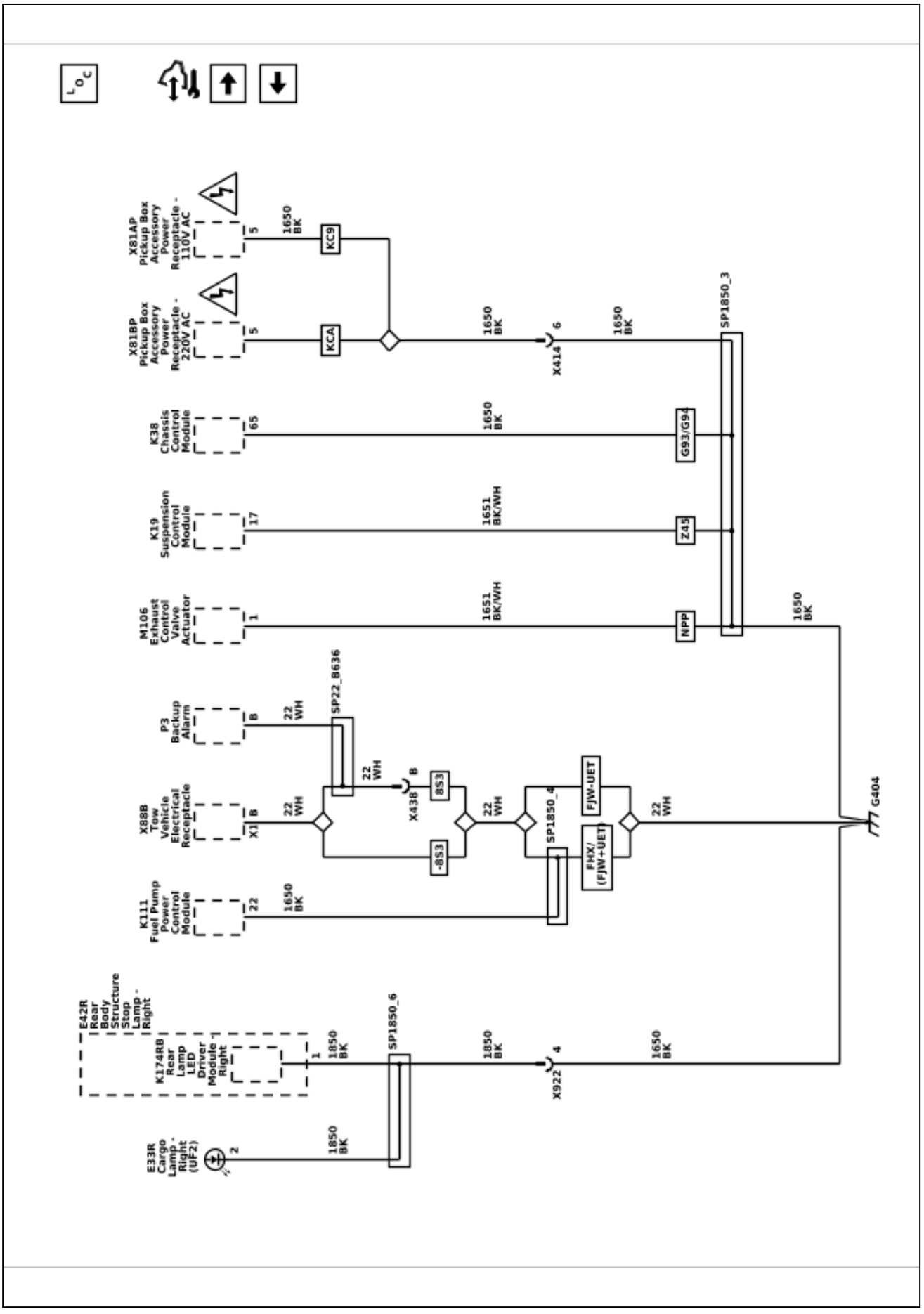
Ground Distribution Schematics (G304 - 4-Door)



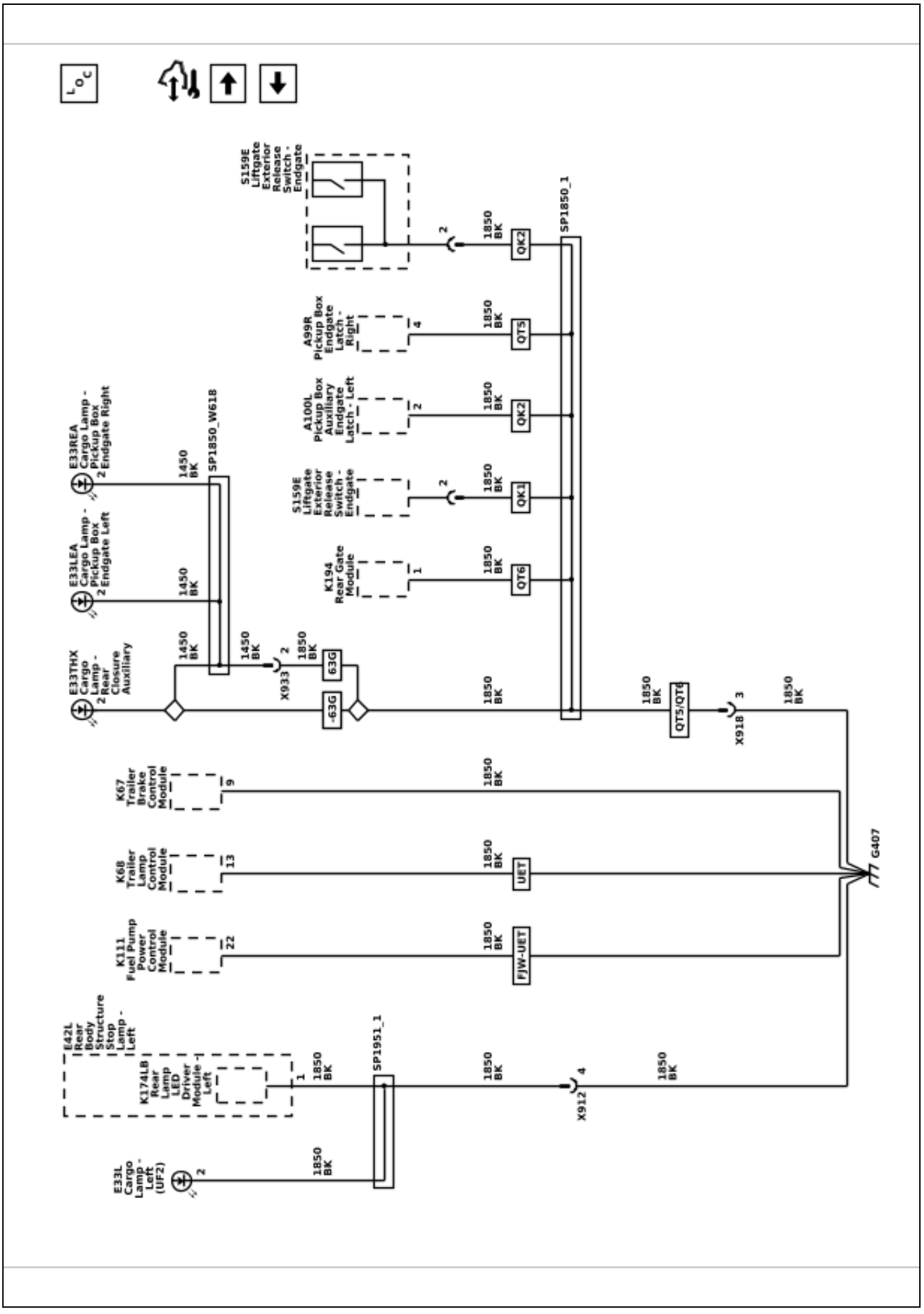
Ground Distribution Schematics (G402)



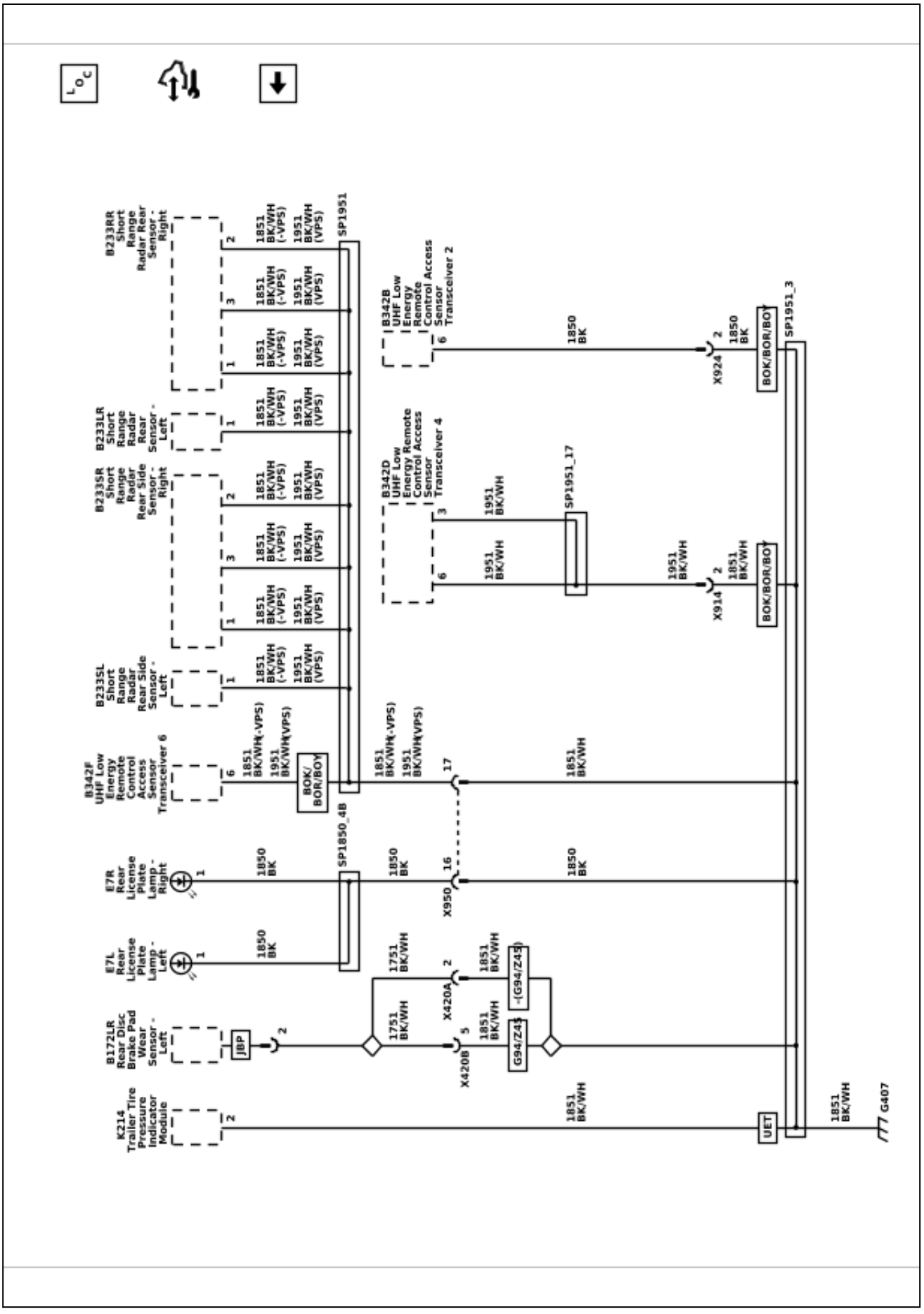
Ground Distribution Schematics (G404)



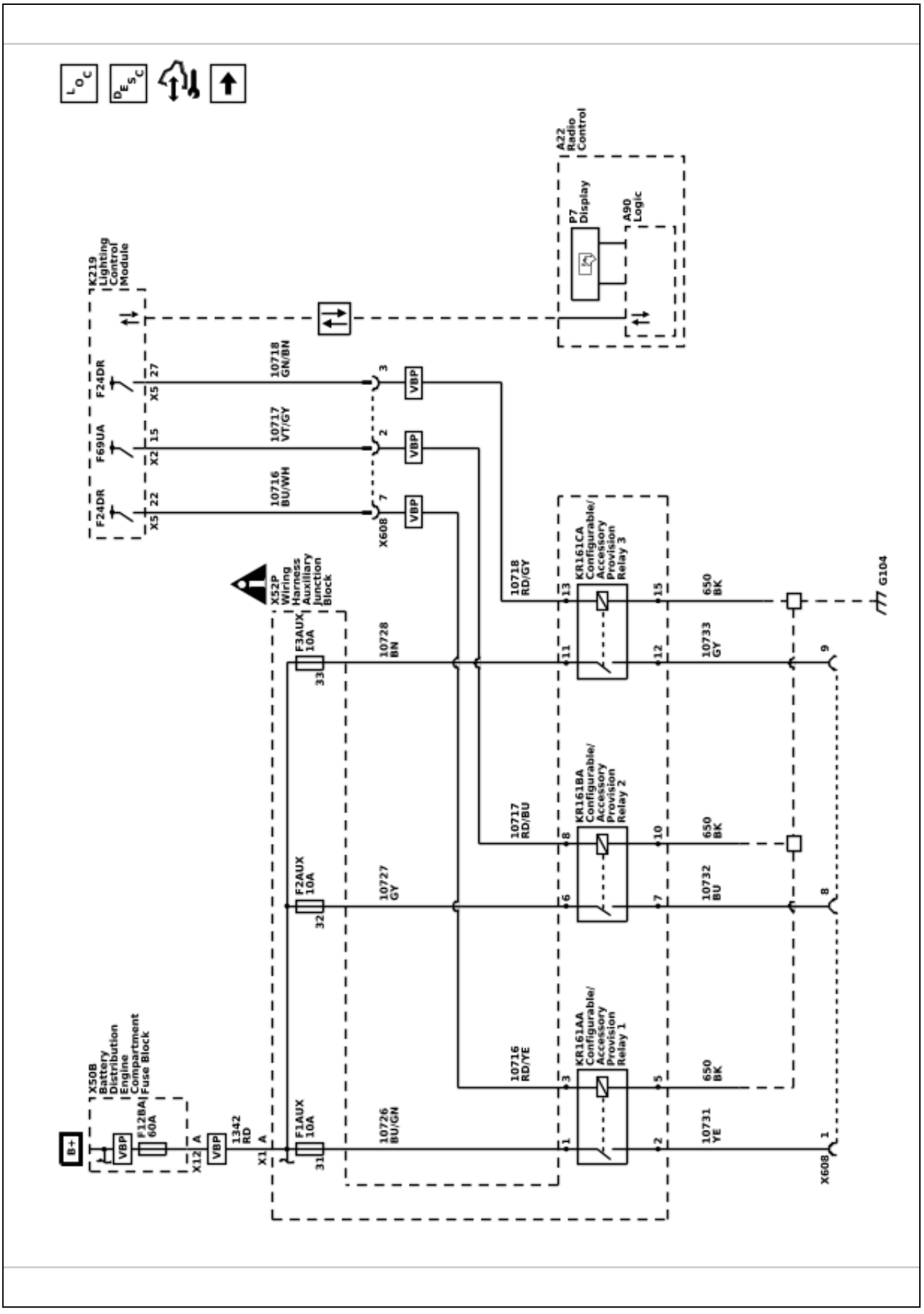
Ground Distribution Schematics (G407 - 1 of 2)



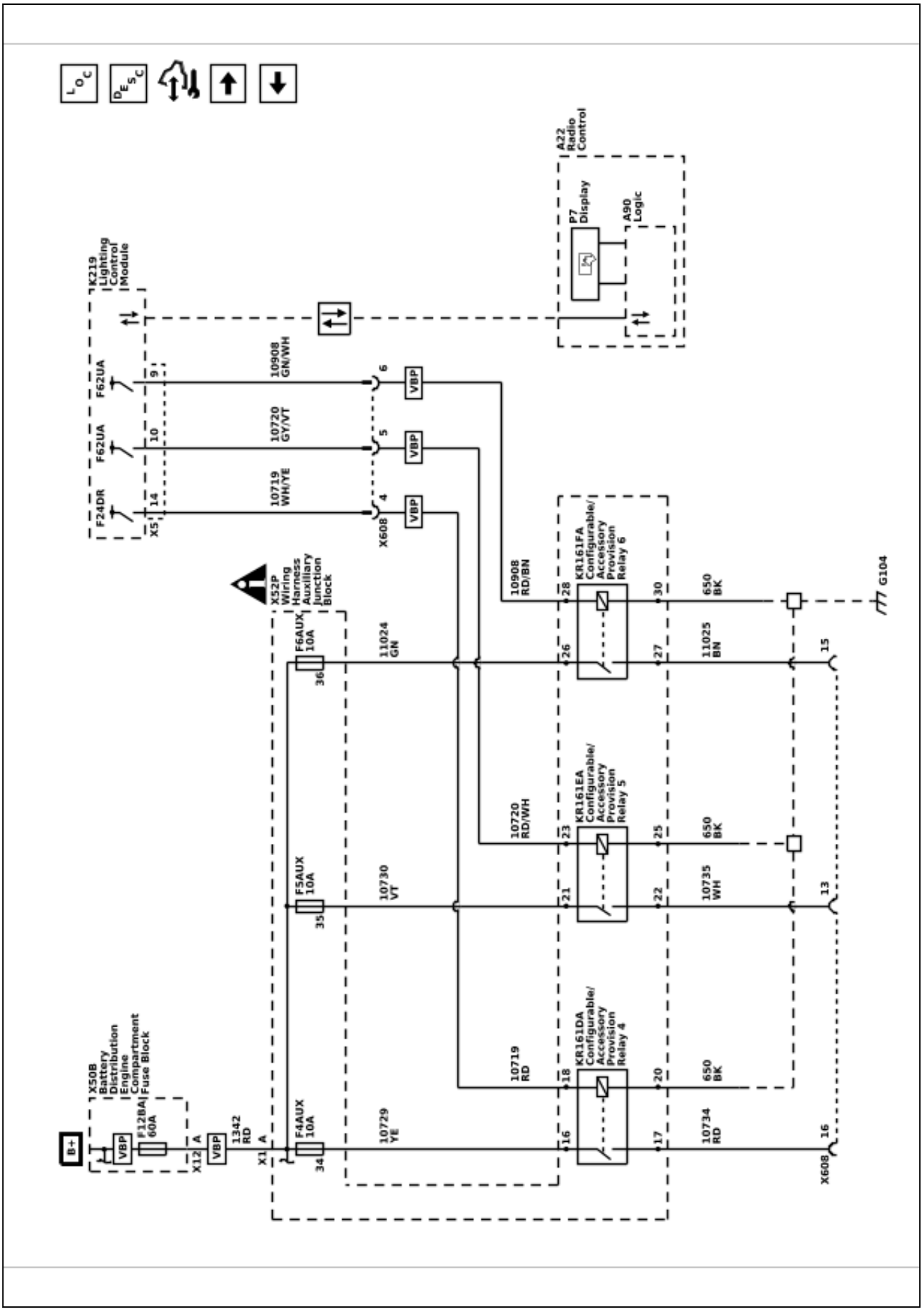
Ground Distribution Schematics (G407 - 2 of 2)



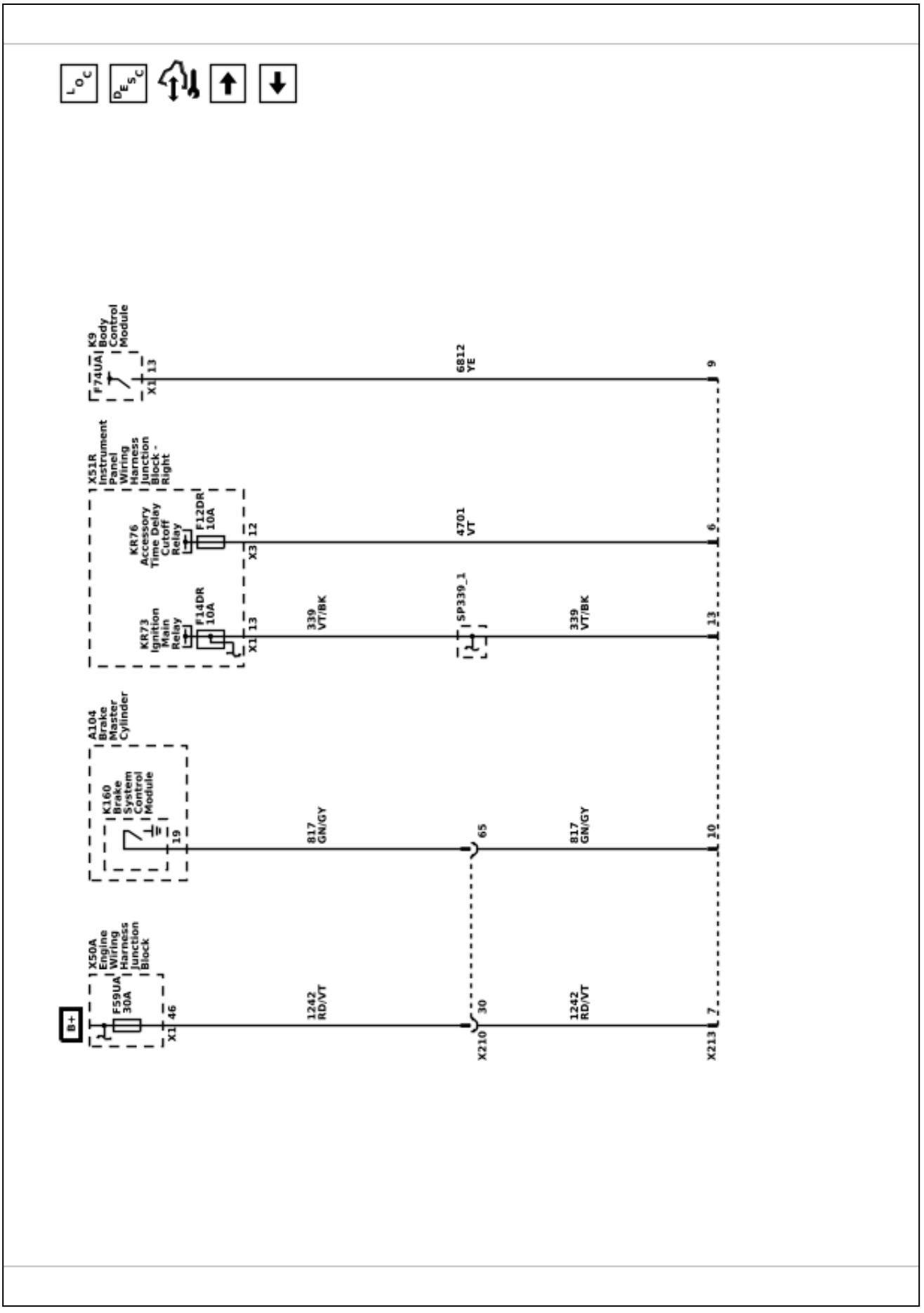
Upfitter Provision Schematics (Configurable/Accessory Provision 1, 2, and 3)



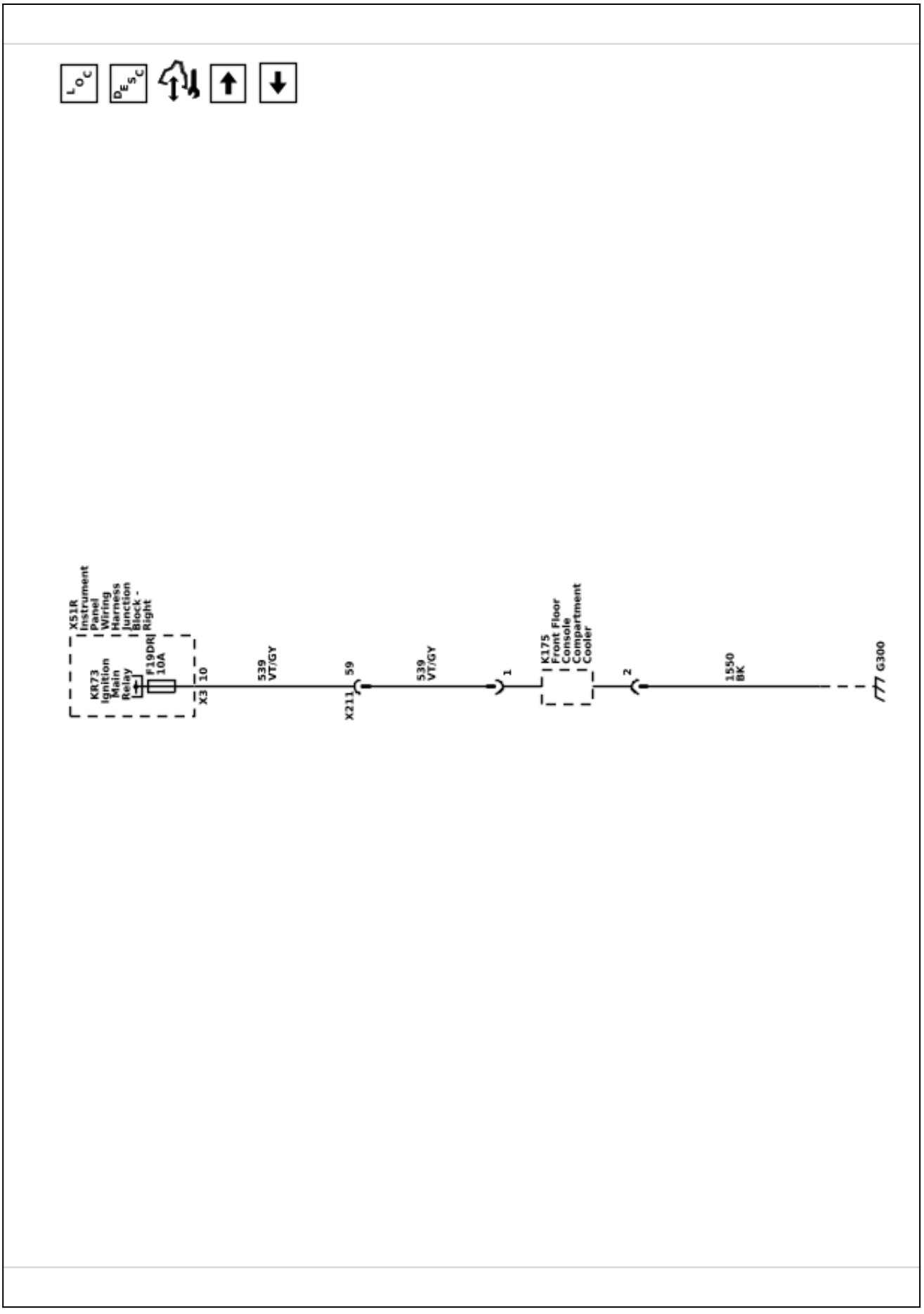
Upfitter Provision Schematics (Configurable/Accessory Provision 4, 5, and 6)



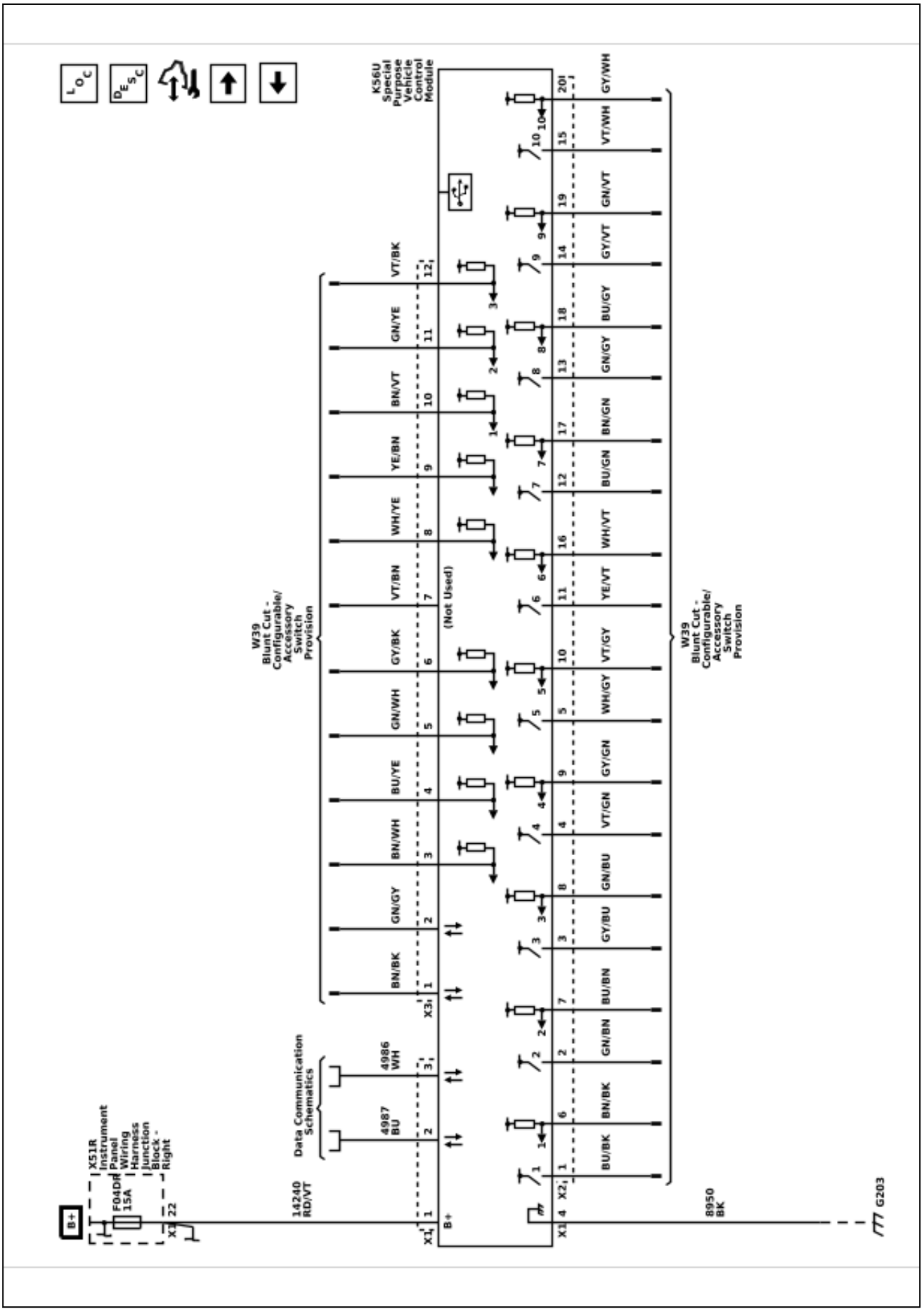
Upfitter Provision Schematics (Upfitter Provisions - X213)



Upfitter Provision Schematics (Front Console Cooler (DCK))

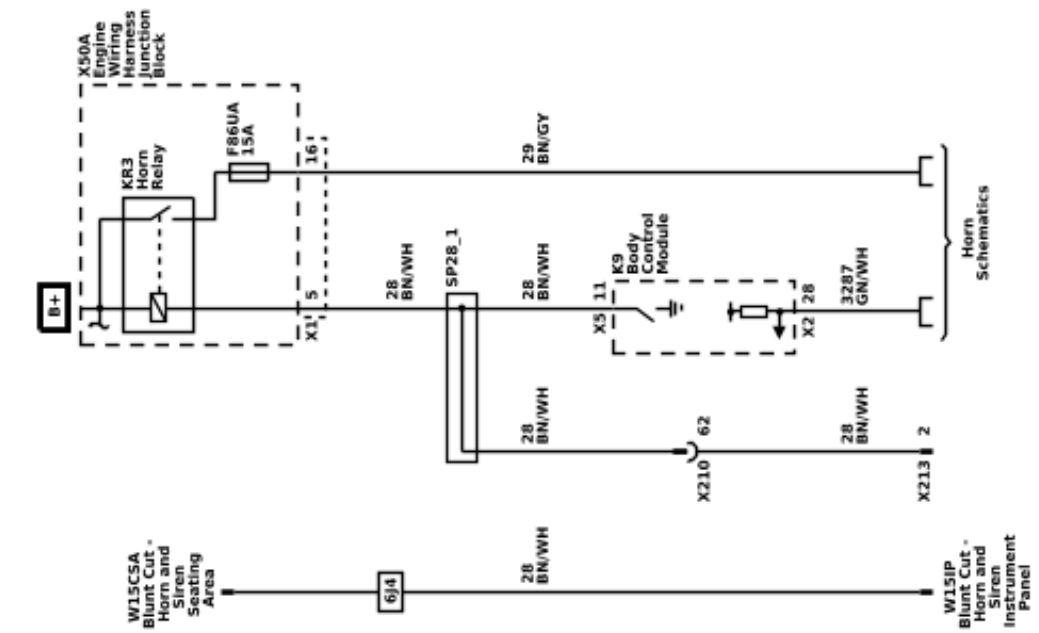


Upfitter Provision Schematics (Special Purpose Vehicle Control Module (KGU))

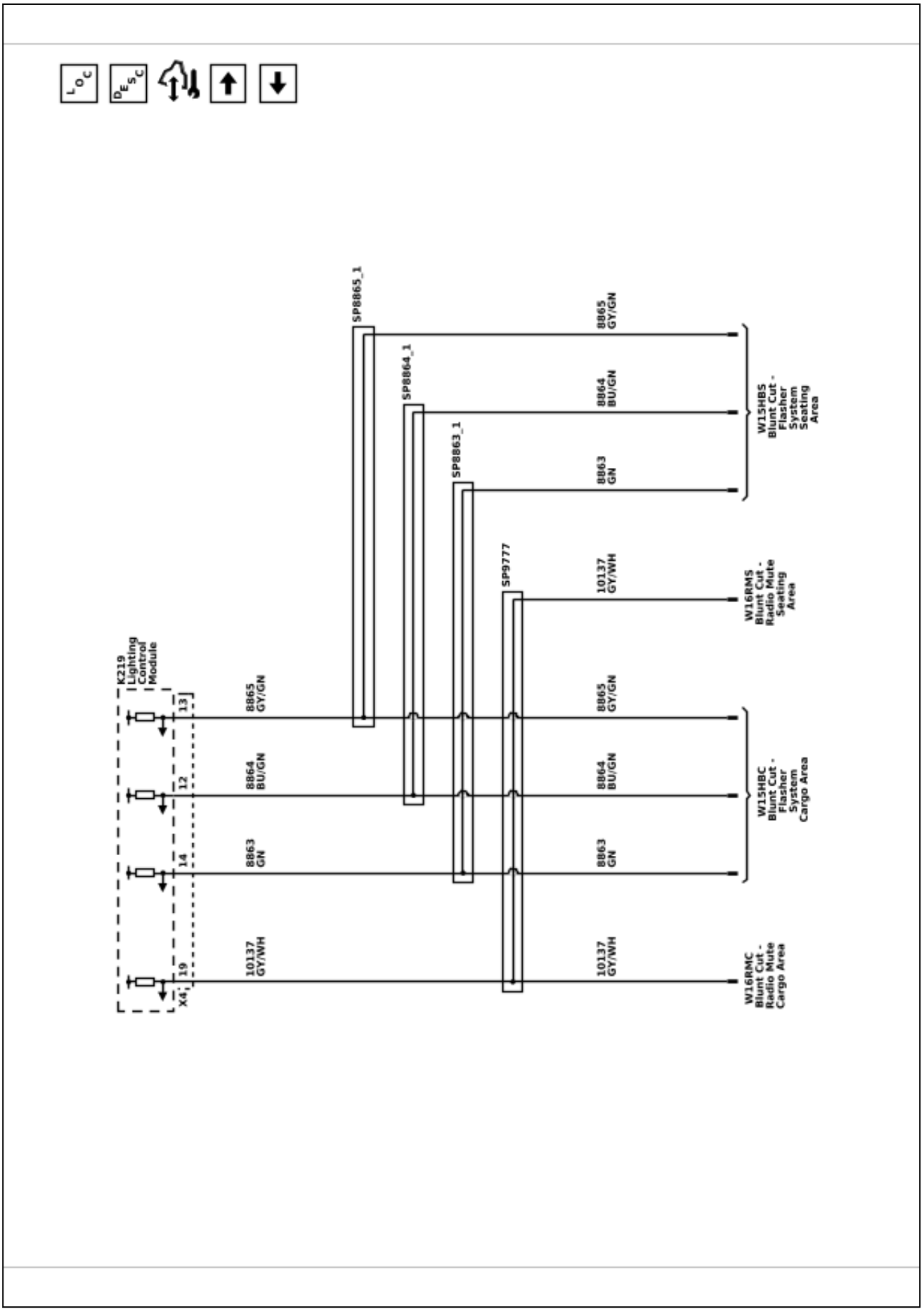


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Upfitter Provision Schematics (Horn Provision (5W4 / 9C1))

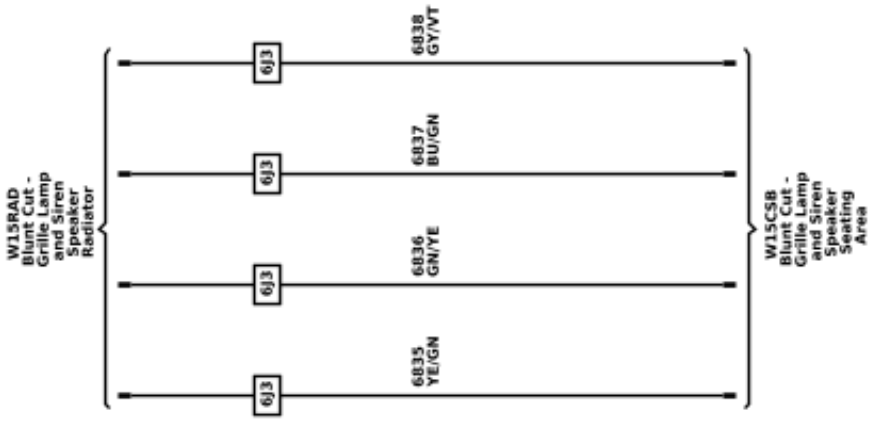


Upfitter Provision Schematics (Radio Mute, High Beam and Tail Light Flash Provision (5W4 / 9C1))

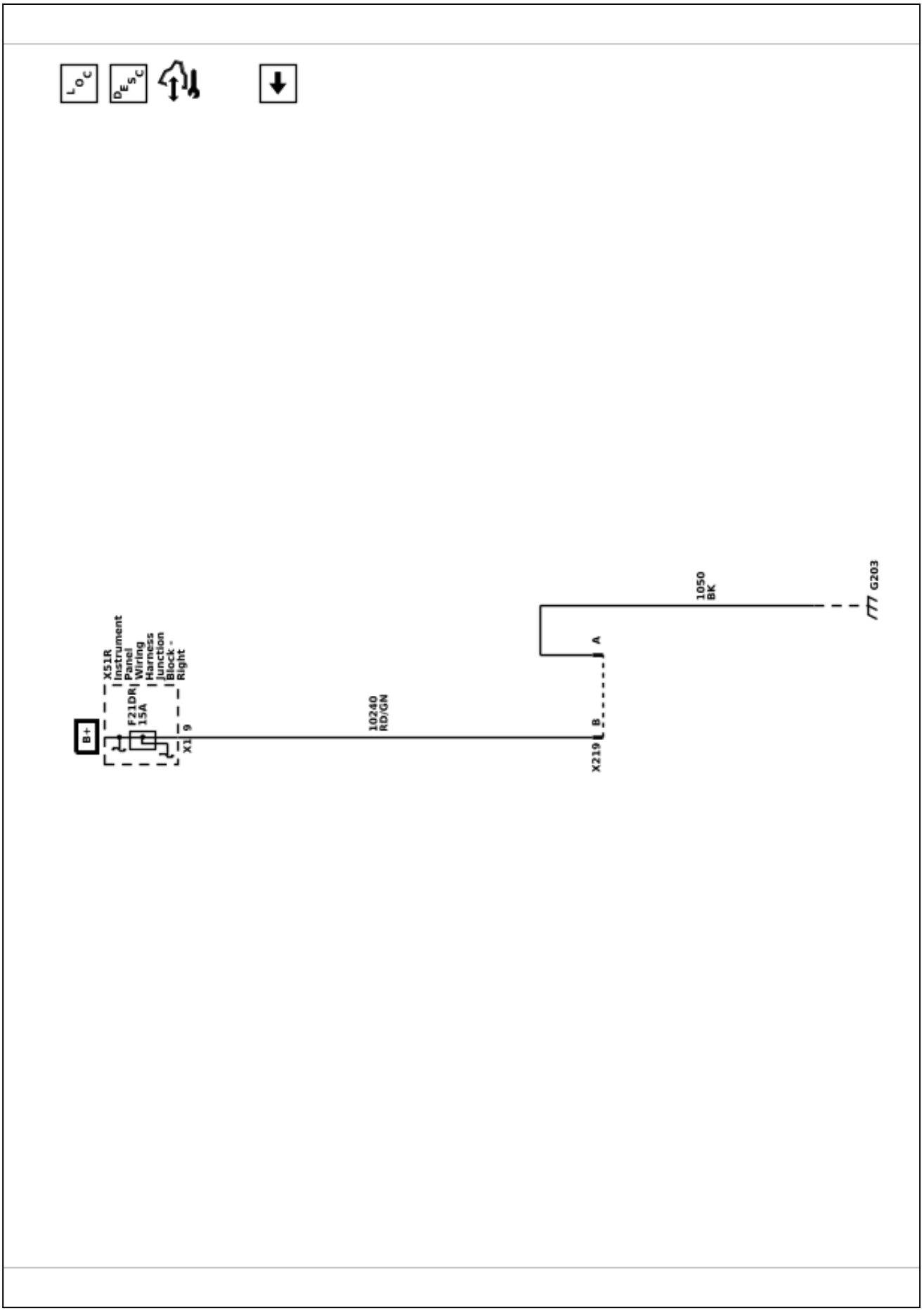


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Upfitter Provision Schematics (Grille Lights and Siren Speaker Provisions (5W4 / 9C1))



Upfitter Provision Schematics (Spot Light Provision (5W4 / 9C1))



Component Locator

Master Electrical Component List

Master Electrical Component List

Code	Name	Option	Location	Locator View	Connector End View
A3L	Sunshade - Left	—	In the passenger compartment, upper front left, near corner of headliner.	• •	
A3R	Sunshade - Right	—	In the passenger compartment, upper front right, near corner of headliner.	• •	
A7	Fuel Tank Fuel Pump Module	—	Under the vehicle, left side near middle, mounted to top of fuel tank.	• •	
A9A	Outside Rearview Mirror - Driver	—	Mounted on the outside of the driver door, at front middle.		• •
A9B	Outside Rearview Mirror - Passenger	—	Mounted on the outside of the passenger door, at front middle.		• •
A10	Inside Rearview Mirror	—	In the passenger compartment, at top center of windshield, below B174W Front View Camera - Windshield.	• •	
A11	Radio	—	In the instrument panel, right side, in bracket attached to instrument panel tie-bar near a-pillar.	• •	• • • • • • • • • • • • • • •
A16	Transfer Case Four Wheel Drive Actuator	F48	Under the vehicle, left of center near middle, mounted to rear of transfer case.		
A22	Radio Control	—	In the instrument panel, at upper rear center.		• •
A23D	Front Side Door Latch - Driver	—	In the driver door, at the middle rear.		
A23LR	Rear Side Door Latch - Left	4-Door	In the left rear door, at the middle rear.	• •	
A23P	Front Side Door Latch - Passenger	—	In the passenger door, at the middle rear.		

Code	Name	Option	Location	Locator View	Connector End View
A23RR	Rear Side Door Latch - Right	4-Door	In the right rear door, at the middle rear.	• •	
A24D	Front Side Door Outside Handle - Left	—	Mounted on the outside of the driver door, at rear, below window.		• • •
A24LR	Rear Side Door Outside Handle - Left	4-Door	Mounted on the outside of the left rear door, at rear, below window.	• •	
A24P	Front Side Door Outside Handle - Right	—	Mounted on the outside of the passenger door, at rear, below window.		• •
A24RR	Rear Side Door Outside Handle - Right	4-Door	Mounted on the outside of the right rear door, at rear, below window.	• •	
A26	Heater and Air Conditioning User Interface Control - Front	—	In the instrument panel, at center middle, below A22 Radio Control.		
A38	Reductant Tank Fluid Supply Pump Module	LZ0	Under the vehicle, right side rear of middle, mounted in the bottom of the reductant tank, near middle.		
A99	Pickup Box Endgate Latch	QT2	At rear of the vehicle, inside endgate at upper center.	—	
A99L	Pickup Box Endgate Latch - Left	QT5	At left rear of vehicle, inside endgate, at left latch.		
A99R	Pickup Box Endgate Latch - Right	QT5	At right rear of vehicle, inside endgate, at right latch.		
A100L	Pickup Box Auxiliary Endgate Latch - Left	QK2	At left rear of vehicle, inside endgate, at left inner latch.		
A100R	Pickup Box Auxiliary Endgate Latch - Right	QK2	At right rear of vehicle, inside endgate, at right inner latch.		
A103	Roof Console	—	In the passenger compartment, upper front center, between sunshades.	• •	
A104	Brake Master Cylinder	—	In the engine compartment, left rear, mounted to bulkhead.	—	—
B1	Air Conditioning Refrigerant Pressure Sensor	—	• (L4B / LZ0) In the engine compartment, left side, mounted to A/C high pressure line, near G1 Air Conditioning Compressor. • (L76 / L78) In the engine compartment, right front, mounted to A/C high pressure line, near air conditioning condenser.	• • •	
B5LF	Front Wheel Speed Sensor - Left	—	At left front wheelhouse, attached to front of steering knuckle near wheel hub assembly.		

Code	Name	Option	Location	Locator View	Connector End View
B5LR	Rear Wheel Speed Sensor - Left	—	At left rear wheelhouse, attached to inboard side of left axle tube flange.		
B5RF	Front Wheel Speed Sensor - Right	—	At right front wheelhouse, attached to front of steering knuckle near wheel hub assembly.		
B5RR	Rear Wheel Speed Sensor - Right	—	At right rear wheelhouse, attached to inboard side of right axle tube flange.		
B9	Ambient Air Temperature Sensor	—	At right front door of vehicle, within A9B Outside Rearview Mirror - Passenger.	—	—
B10D	Sun Load and Ambient Light and Security Indicator Sensor	—	In the instrument panel, front center, between defrost outlets.		
B11RF	Front Suspension 4 Corner Leveling System Position Sensor - Right	Z45	At right front wheelhouse, attached to outboard side of frame forward of shock tower.		
B11RR	Rear Suspension 2 or 4 Corner Air Leveling Position Sensor - Right	Z45	At right rear wheelhouse, attached to bottom of frame rail above rear axle.		
B13	Automatic Transmission Fluid Temperature Sensor	—	Under the vehicle, inside T12 Automatic Transmission, attached to valve body.	—	
B14A	Automatic Transmission Output Speed Sensor	—	Under the vehicle, inside T12 Automatic Transmission, attached to case above valve body.	—	
B14C	Automatic Transmission Input Speed Sensor	—	Under the vehicle, inside T12 Automatic Transmission, attached to case above valve body.	—	
B14DA	Automatic Transmission Intermediate Speed Sensor 1	—	Under the vehicle, inside T12 Automatic Transmission, attached to case above valve body.	—	
B14DB	Automatic Transmission Intermediate Speed Sensor 2	—	Under the vehicle, inside T12 Automatic Transmission, attached to case above valve body.	—	
B20A	Brake Fluid Level Indicator Switch	—	In the engine compartment, left rear, mounted to brake fluid reservoir.	• •	
B22	Brake Pedal Position Sensor	—	In the instrument panel, left side, mounted to brake pedal hanger, near pivot.	• •	
B23E	Camshaft Position Sensor - Exhaust	L4B / LZ0	• (L4B) On the engine, right rear, mounted to top of camshaft carrier at right rear. • (LZ0) On the engine, right rear, mounted to right side of cylinder head.		

Code	Name	Option	Location	Locator View	Connector End View
B23F	Camshaft Position Sensor - Intake	L4B / L76 / L78	• (L4B) On the engine, mounted to top of camshaft carrier at left rear. • (L76 / L78) On the engine, lower front left of center, attached to timing cover, above crankshaft pulley.	• •	• •
B24	Mobile Telephone Microphone	—	In the passenger compartment, upper front center, attached to top of A103 Roof Console at middle left of center.	• •	
B26	Crankshaft Position Sensor	—	• (L4B) On the engine, left rear, mounted to engine block, below M64 Starter. • (L76 / L78) On the engine, right rear of engine block, behind M64 Starter. • (LZ0) On the engine, right rear of engine block, below M64 Starter.	• • •	• • •
B34	Engine Coolant Temperature Sensor	LZ0	On the engine, left side near front of engine block, between intake manifold and Q97 Engine Coolant Flow Control Valve.		
B34B	Engine Coolant Temperature Sensor 2	—	• (L4B) On the engine, right front, attached to coolant pipe above G59 Engine Coolant Pump. • (L76 / L78) On the engine, left front middle, attached to water pump at left top.(LZ0) On the engine, right front, mounted to water pump inlet pipe.	• • •	• •
B34C	Engine Coolant Temperature Sensor 3	L76 / L78	In the engine compartment, lower left front, attached to coolant hose near Q97O Engine Coolant Flow Control Valve - Oil, below radiator.		
B34E	Engine Coolant Temperature Sensor 5	L4B / L76 / L78	• (L4B) On the engine, right side, mounted to exhaust manifold outlet pipe, right of the camshaft carrier. • (L76 / L78) On the engine, front left of center, attached to left cylinder head.	• •	• •
B34F	Engine Coolant Temperature Sensor 6	L4B / L76 / L78	• (L4B) On the engine, attached to left side of engine block, rear of G13 Generator. • (L76 / L78) On the engine, front near center, attached to top of water pump near rear.	• •	• •

Code	Name	Option	Location	Locator View	Connector End View
B34K	Charge Air Cooler Coolant Temperature Sensor - Inlet	LZ0	In the engine compartment, right front, mounted to charge air cooler coolant hose, near G10R Cooling Fan Motor - Right.		
B35C	Engine Oil Level and Temperature Sensor	L76 / L78	On the engine, bottom left rear, attached to oil pan.		
B36	Engine Oil Temperature Sensor	—	• (L4B) On the engine, right side near rear, mounted to engine oil filter housing. • (L76 / L78) On the engine, lower right side near middle, attached to oil pan forward of oil cooler. • (LZ0) On the engine, lower right rear, attached to lower crankcase extension above oil filter, forward of B37B Engine Oil Pressure Sensor.	•	•
B37B	Engine Oil Pressure Sensor	—	• (L4B) On the engine, right front, mounted to upper right side of the engine block, near timing cover. • (L76 / L78) On the engine, front right of center, below intake manifold, attached to engine block valley cover at front. • (LZ0) On the engine, lower right rear, attached to lower crankcase extension above oil filter, rear of B36 Engine Oil Temperature Sensor.	•	•
B39	Air Conditioning Evaporator Air Temperature Sensor	—	In the instrument panel, left of center, mounted to left side of HVAC assembly between actuators.		
B46	Fuel Level Sensor	—	Under the vehicle, inside fuel tank, part of A7 Fuel Tank Fuel Pump Module.	—	—
B47	Fuel Pressure Sensor	—	• (FJW) Under the vehicle, left side near middle, part of fuel supply pipe, near A7 Fuel Tank Fuel Pump Module at top of fuel tank. • (FHX) Under the vehicle, left side near middle, part of fuel supply pipe, forward of R29 Fuel Filter.	•	•
B47B	Fuel Rail Pressure Sensor	LZ0	On the engine, upper front left of center, mounted to front of fuel rail.		
B52A	Heated Oxygen Sensor 1	L4B	In the engine compartment, right rear, mounted to catalytic converter at inlet pipe.		

Code	Name	Option	Location	Locator View	Connector End View
B52B	Heated Oxygen Sensor 2	L4B	In the engine compartment, right rear, mounted to middle of catalytic converter.		
B52C	Heated Oxygen Sensor - Bank 1 Sensor 1	L76 / L78	In the engine compartment, lower left rear, mounted to catalytic converter at inlet pipe.		
B52D	Heated Oxygen Sensor - Bank 1 Sensor 2	L76 / L78	Under the vehicle, left side near front, mounted to middle of catalytic converter.		
B52E	Heated Oxygen Sensor - Bank 2 Sensor 1	L76 / L78	In the engine compartment, lower right rear, mounted to catalytic converter at inlet pipe.		
B52F	Heated Oxygen Sensor - Bank 2 Sensor 2	L76 / L78	Under the vehicle, right side near front, mounted to middle of catalytic converter.		
B55	Engine Compartment Cover Switch	—	In the engine compartment, at front center, part of the hood latch assembly.	• •	
B58L	Airbag Front End Discriminating Sensor - Left	—	In the engine compartment, left front, attached to top of lower radiator core support.		
B58R	Airbag Front End Discriminating Sensor - Right	—	In the engine compartment, right front, attached to top of lower radiator core support.	• •	
B61P	Seat Belt Tension Sensor - Passenger	—	In the passenger compartment, right side, in base of B-pillar, F112P Front Seat Belt Retractor - Passenger.	• •	
B62P	Airbag Front Seat Position Sensor - Passenger	—	In the passenger seat, mounted to seat track, outboard side forward of middle.		
B63LF	Airbag Side Impact Sensor - Left Front Door	—	In the left front door, mounted to inner door panel, below middle of window opening.		
B63LR	Airbag Side Impact Rear Sensor - Left Door	4-Door	In the left rear door, mounted to inner door panel, below rear of access hole.	• •	
B63RF	Airbag Side Impact Sensor - Right Front Door	—	In the right front door, mounted to inner door panel, below middle of window opening.		
B63RR	Airbag Side Impact Rear Sensor - Right Door	4-Door	In the right rear door, mounted to inner door panel, below rear of access hole.	• •	
B65	Manifold Absolute Pressure and Intake Air Temperature Sensor	L4B / LZ0	• (L4B) On the engine, left front attached to top of intake manifold near Q38 Throttle body. • (LZ0) On the engine, left side near rear, mounted to top of intake manifold, rear of inlet.	• •	• •

Code	Name	Option	Location	Locator View	Connector End View
B68A	Knock Sensor 1	L4B / L76 / L78	• (L4B) On the engine, left side of engine block, mounted below Q17A Fuel Injector 1 and Q17B Fuel Injector 2. • (L76 / L78) On the engine, left rear of engine block, behind heat shield below exhaust manifold.	•	•
B68B	Knock Sensor 2	L4B / L76 / L78	• (L4B) On the engine, left side of engine block, mounted below Q17C Fuel Injector 3and Q17D Fuel Injector 4. • (L76 / L78) On the engine, right rear of engine block, above M64 Starter.	•	•
B74	Manifold Absolute Pressure Sensor	L76 / L78	On the engine, rear upper center, attached to intake manifold.		
B75	Mass Airflow Sensor	—	In the engine compartment, left side, mounted to upper front of air cleaner assembly at outlet.	•	
B87	Rearview Driver Information Camera	—	At rear vehicle, at top center of the tailgate, mounted left tailgate release handle/ switch.		•
B87CA	Auxiliary Rearview Camera - Cargo Area	UVN	At rear of cab, at top center above rear window, attached to E6A High Mount Stop and Cargo Lamp right of center.		
B96	Cylinder Head Temperature Sensor	LZ0	On the engine, front center, mounted to cylinder head, near accessory drive.		
B107	Accelerator Pedal Position Sensor	—	In the passenger compartment, left front, in driver foot well, part of accelerator pedal.	•	
B110	Battery Monitor Module	—	In the engine compartment, right side near rear, attached to C1 Battery at negative post.		•
B111	Turbocharger/ Supercharger Boost Pressure Sensor	L4B	In the engine compartment, lower left front, mounted to the top left side of the intercooler.		
B117A	Windshield Outside Moisture/ Ambient Light and Humidity Sensor	ASV	In the passenger compartment, front center, at top of windshield.		
B118	Windshield Washer Solvent Container Level Sensor	—	At the left front of vehicle, above wheelhouse, at outer bottom near front of washer fluid reservoir.		
B130C	Exhaust Gas Recirculation Temperature Sensor 3	LZ0	On the engine, upper right rear, near turbocharger, attached to exhaust gas recirculation cooler at outlet.		

Code	Name	Option	Location	Locator View	Connector End View
B136	Exhaust Particulate Matter Sensor	LZ0	Under the vehicle, right side near middle, attached to inboard side of frame, rear of B195C Nitrogen Oxides Sensor 3 and transmission crossmember.		
B137B	Power Steering Shaft Torque/ Position Sensor	—	Under the vehicle, in the engine compartment, left front, part of power steering gear, near steering shaft.		
B139	Transfer Case Two/Four Wheel Drive Actuator Position Sensor	F48	Under the vehicle, left of center near middle, mounted to rear of transfer case.		
B150	Fuel Tank Pressure Sensor	FJW	• Under the vehicle, left side near middle, part of evaporative emissions pipe, near A7 Fuel Tank Fuel Pump Module at top of fuel tank. •	• •	
B152LF	Front Suspension Automatic Forward Lighting Position Sensor - Left	Z45	At left front wheelhouse, attached to outboard side of frame forward of shock tower.		
B152R	Rear Suspension Automatic Forward Lighting Leveling Position Sensor	Z45	At left rear wheelhouse, attached to bottom of frame rail above rear axle.		
B153D	Front Seat Belt Buckle - Driver	—	In the passenger compartment, inboard side of driver seat, at rear.		
B153LR	Rear Seat Belt Buckle - Left	4-Door	In the passenger compartment, rear left of center, attached to floor below rear seat.		
B153P	Front Seat Belt Buckle - Passenger	—	In the passenger compartment, inboard side of passenger seat, at rear.		
B153RR	Rear Seat Belt Buckle - Right	4-Door	In the passenger compartment, rear right of center, attached to floor below rear seat.		
B172LF	Front Disc Brake Pad Wear Sensor - Left	JBP	At left front wheelhouse, attached to brake pad in brake caliper.		
B172LR	Rear Disc Brake Pad Wear Sensor - Left	JBP	At left rear wheelhouse, attached to brake pad in brake caliper.		
B174G	Front View Driver Information Camera - Grille	UV2	At front of vehicle, at center middle of grille.	• • •	
B174W	Front View Camera - Windshield	—	In the passenger compartment, at top center of windshield, above A10 Inside Rearview Mirror.	• •	• •
B193A	Charge Air Cooler Air Temperature Sensor - Inlet	LZ0	On the engine, top near center middle, attached to charge air cooler at left side of inlet.		

Code	Name	Option	Location	Locator View	Connector End View
B193B	Charge Air Cooler Air Temperature Sensor - Outlet	LZ0	On the engine, front near center, attached to charge air cooler at bottom of outlet.		
B194	Reductant Pressure Sensor	LZ0	Under the vehicle, right side rear of middle, part of A38 Reductant Tank Fluid Supply Pump Module, inside reductant tank.	—	—
B195A	Nitrogen Oxides Sensor 1	LZ0	On the engine, top near front center, attached to bracket at rear of charge air cooler.		
B195B	Nitrogen Oxides Sensor 2	LZ0	Under the vehicle, right side near middle, attached to inboard side of frame, rear of transmission crossmember.		
B195C	Nitrogen Oxides Sensor 3	LZ0	Under the vehicle, right side near middle, attached to inboard side of frame, rear of B195B Nitrogen Oxides Sensor 2 and transmission crossmember.		
B203	Radiator Coolant Temperature Sensor	—	In the engine compartment, right front, attached to the right side of the radiator.	• • •	
B212	Reductant Tank Fluid Sensor	LZ0	Under the vehicle, right side rear of middle, mounted in the bottom of the reductant tank, near rear.		
B214	Reductant Tank Temperature Sensor	LZ0	Under the vehicle, right side rear of middle, part of A38 Reductant Tank Fluid Supply Pump Module, inside reductant tank.	—	—
B225L	Side View Driver Information Camera - Left	UV2	At left front door of vehicle, within A9A Outside Rearview Mirror - Driver, at bottom.	—	
B225R	Side View Driver Information Camera - Right	UV2	At right front door of vehicle, within A9B Outside Rearview Mirror - Passenger, at bottom.	—	
B233B	Forward Range Radar Sensor - Long Range	—	At front of the vehicle, attached to bracket below front impact bar, at center.	• •	
B233LF	Short Range Radar Sensor - Left Front	UK0 / UKL	At left front of the vehicle, mounted to backside of front bumper, forward of wheelhouse.	• • •	
B233LR	Short Range Radar Rear Sensor - Left	—	At rear of the vehicle, left side, mounted to backside of rear bumper, between park assist sensors.		
B233RF	Short Range Radar Sensor - Right Front	UK0 / UKL	At right front of the vehicle, mounted to backside of the front bumper, forward of wheelhouse.	• • •	

Code	Name	Option	Location	Locator View	Connector End View
B233RR	Short Range Radar Rear Sensor - Right	—	At rear of the vehicle, right side, mounted to backside of rear bumper, between park assist sensors.		
B233SL	Short Range Radar Rear Side Sensor - Left	—	At left rear of the vehicle, mounted to backside of rear bumper, rear of wheelhouse.		
B233SR	Short Range Radar Rear Side Sensor - Right	—	At right rear of the vehicle, mounted to backside of rear bumper, rear of wheelhouse.		
B283	Evaporative Emission Canister Purge Pump Pressure Sensor	L4B	In the engine compartment, front near center, attached to pipe near Q12 Evaporative Emission Canister Purge Solenoid Valve at rear of air cleaner outlet duct elbow.		
B292	Driver Monitoring Camera	ULM	In the steering column, mounted to top of upper steering column trim.		
B306AB	Front Parking Assist Alarm Outer Sensor - Left	—	At front left of vehicle near corner, attached to front bumper, below E13LA Front Headlamp - Left.	• • •	
B306BB	Front Parking Assist Alarm Sensor - Left Middle	—	At front of vehicle, left of center, attached to front bumper, below grille.	• • •	
B306CB	Front Parking Assist Alarm Sensor - Right Middle	—	At front of vehicle, right of center, attached to front bumper, below grille.	• • •	
B306DB	Front Parking Assist Alarm Outer Sensor - Right	—	At front right of vehicle near corner, attached to front bumper, below E13RA Front Headlamp - Right.	• • •	
B306EB	Rear Parking Assist Alarm Outer Sensor - Left	—	At rear left of vehicle near corner, attached to rear bumper, near corner step.		
B306FB	Rear Parking Assist Alarm Sensor - Left Middle	—	At rear of vehicle, left of center, attached to rear bumper, near center step.		
B306GB	Rear Parking Assist Alarm Sensor - Right Middle	—	At rear of vehicle, right of center, attached to rear bumper, near center step.		
B306HB	Rear Parking Assist Alarm Outer Sensor - Right	—	At rear right of vehicle near corner, attached to rear bumper, near corner step.		
B307	Steering Wheel Touch Sensor	ULM	In the steering wheel rim.		—

Code	Name	Option	Location	Locator View	Connector End View
B310	Fuel Pressure and Temperature Sensor	L4B / L76 / L78	• (L4B) On the engine, left side near front, mounted to the fuel rail. • (L76 / L78) On the engine, rear left of center, below intake manifold, attached to rear of left direct fuel injector rail.	• •	• •
B310L	Fuel Pressure and Temperature Sensor - Low	L76 / L78	On the engine, right side rear, attached to right port injection fuel rail at top near rear.		
B315A	Transmission Range Control Valve 1 Position Switch	—	Under the vehicle, inside T12 Automatic Transmission, attached to valve body.	—	
B316	Transmission Park Valve Position Switch	—	Under the vehicle, inside T12 Automatic Transmission, attached to valve body.	—	
B321	Crankcase Pressure Sensor	L4B / LZ0	• (L4B) On the engine, rear center, attached to emissions pipe at rear center of camshaft carrier. • (LZ0) On the engine, rear right of center, attached to camshaft cover.	• •	• •
B338A	Intake Camshaft Profile Sleeve Position Sensor 1	L4B	On the engine, mounted to camshaft carrier at left front, left of M129A Intake Camshaft Profile Actuator 1.		
B338B	Intake Camshaft Profile Sleeve Position Sensor 2	L4B	On the engine, mounted to camshaft carrier at left near middle, left of M129C Intake Camshaft Profile Actuator 3.		
B339A	Exhaust Camshaft Profile Sleeve Position Sensor 1	L4B	On the engine, mounted to camshaft carrier at right near middle, right of M130B Exhaust Camshaft Profile Actuator 2.		
B339B	Exhaust Camshaft Profile Sleeve Position Sensor 2	L4B	On the engine, mounted to camshaft carrier at right near middle, right of M130C Exhaust Camshaft Profile Actuator 3.		
B342A	UHF Low Energy Remote Control Access Sensor Transceiver 1	BOK / BOR / BOY	At right front of vehicle, attached to backside of front bumper outer filler - right.		• •
B342B	UHF Low Energy Remote Control Access Sensor Transceiver 2	BOK / BOR / BOY	At right side of vehicle near rear, attached to backside of fender flare at upper front.		
B342C	UHF Low Energy Remote Control Access Sensor Transceiver 3	BOK / BOR / BOY	At left front of vehicle, attached to backside of front bumper outer filler - left.		• •
B342D	UHF Low Energy Remote Control Access Sensor Transceiver 4	BOK / BOR / BOY	At left side of vehicle near rear, attached to backside of fender flare at upper front.		

Code	Name	Option	Location	Locator View	Connector End View
B342E	UHF Low Energy Remote Control Access Sensor Transceiver 5	BOK / BOR / BOY	• (CAJ) In the passenger compartment, upper center rear, attached to top of headliner rear of sunroof opening. • (- CAJ) In the passenger compartment, upper center rear of middle, attached to top of headliner forward of E37SMC Rear Seat Position Center Reading and Courtesy Lamp.	• •	
B342F	UHF Low Energy Remote Control Access Sensor Transceiver 6	BOK / BOR / BOY	At rear of vehicle, left side, attached to backside of rear bumper, left of B306FB Rear Parking Assist Alarm Sensor - Left Middle.		
B345P	Exhaust Pressure Differential Sensor - Particulate Filter	LZ0	On the engine, upper right near middle, attached to bracket near turbocharger compressor inlet, lower position.		
B345R	Exhaust Pressure Differential Sensor - Exhaust Gas Recirculation	LZ0	On the engine, upper right near middle, attached to bracket near turbocharger compressor inlet, upper outboard position.		
B350B	Interior View Camera	UCV	In the passenger compartment, upper front center, attached to A103 Roof Console at front center.	• •	
B352	Video Display Inside Rearview Mirror Camera	DRZ	At rear of cab, at top center above rear window, attached to E6A High Mount Stop and Cargo Lamp left of center.		
B359	Exhaust Gas Temperature Sensor Module	LZ0	In the engine compartment, right rear, mounted to exhaust shield, near bottom of exhaust gas recirculation cooler.		
B359B	Exhaust Gas Temperature Sensor Module 2	LZ0	On the engine, upper right near middle, attached to bracket near turbocharger compressor inlet, upper inboard position.		
B384	Rearview Underbody Camera	UXA	Under the vehicle, center forward of middle, attached to underbody camera bracket at rear.		
B385	Front View Underbody Camera	UXA	Under the vehicle, center forward of middle, attached to underbody camera bracket at front.		

Code	Name	Option	Location	Locator View	Connector End View
B394	Evaporative Emission Canister Purge System Pressure Sensor	FJW	• (2-Door) Under the vehicle, left side near middle, part of evaporative emissions pipe, attached to top of fuel tank, near front. • (4-Door) Under the vehicle, left side near middle, part of evaporative emissions pipe, attached to top of fuel tank, forward of A7 Fuel Tank Fuel Pump Module.	•	
B396LF	Mobile Telephone Headliner Microphone - Left Front	—	In the passenger compartment, upper front left, rear of A3L Sunshade - Left.	•	
B396RF	Mobile Telephone Headliner Microphone - Right Front	—	In the passenger compartment, upper front right, rear of A3R Sunshade - Right.	•	
C1	Battery	—	In the engine compartment, right side, below X50D Fuse Block - Battery.		—
E1AA	Front Floor Flood Lamp - Left	C70 / C85	In the instrument panel, lower left side, attached to knee bolster below steering column.		
E1AB	Front Floor Flood Lamp - Right	C70 / C85	In the instrument panel, lower right side, attached to closeout panel below instrument panel compartment.		
E1D	Front Side Door Light Conductor Lamp - Driver Trim Panel	C70 / C85	In the driver door trim, mounted to light conductor on backside of trim panel, near top.		
E1H	Instrument Panel Light Conductor Lamp - Right	C70 / C85	In the instrument panel, right side middle, above instrument panel compartment.		
E1P	Front Side Door Light Conductor Lamp - Passenger Trim Panel	C70 / C85	In the passenger door trim, mounted to light conductor on backside of trim panel, near top.		
E2LF	Front Side Marker Lamp - Left	—	At the left front corner of vehicle, rear of E13LA Front Headlamp - Left.	•	•
E2RF	Front Side Marker Lamp - Right	—	At the right front corner of vehicle, rear of E13RA Front Headlamp - Right.	•	•
E3MD	Front Clearance Lamp - Driver Outside Rearview Mirror	DBC / DEZ / DME / DQS	At left front door of vehicle, within A9A Outside Rearview Mirror - Driver.	—	—
E3MP	Front Clearance Lamp - Passenger Outside Rearview Mirror	DBC / DEZ / DME / DQS	At right front door of vehicle, within A9B Outside Rearview Mirror - Passenger.	—	—

Code	Name	Option	Location	Locator View	Connector End View
E6A	High Mount Stop and Cargo Lamp	—	At rear of cab, at top center above rear window.		• •
E7L	Rear License Plate Lamp - Left	—	At rear of vehicle, left of center, mounted to rear bumper at left side of center step.		
E7R	Rear License Plate Lamp - Right	—	At rear of vehicle, right of center, mounted to rear bumper at right side of center step.		
E8A	Front Side Door Sill Plate Illumination Lamp - Left	S0M	In the passenger compartment, at left front sill plate.	—	
E8B	Front Side Door Sill Plate Illumination Lamp - Right	S0M	In the passenger compartment, at right front sill plate.	—	
E12A	Glow Plug 1	LZ0	On the engine, upper left front, attached to cylinder head above intake ports of cylinder 1.		
E12B	Glow Plug 2	LZ0	On the engine, upper left near front, attached to cylinder head above intake ports of cylinder 2.		
E12C	Glow Plug 3	LZ0	On the engine, upper left forward of middle, attached to cylinder head above intake ports of cylinder 3.		
E12D	Glow Plug 4	LZ0	On the engine, upper left rear of middle, attached to cylinder head above intake ports of cylinder 4.		
E12E	Glow Plug 5	LZ0	On the engine, upper left near rear, attached to cylinder head above intake ports of cylinder 5.		
E12F	Glow Plug 6	LZ0	On the engine, upper left rear, attached to cylinder head above intake ports of cylinder 6.		
E13LA	Front Headlamp - Left	—	At the left front corner of vehicle.	• • •	
E13RA	Front Headlamp - Right	—	At the right front corner of vehicle.	• • •	
E14A	Front Seat Back Heater - Driver	KAM	In the driver seat back, between the pad and the upholstery.		
E14B	Front Seat Cushion Heater - Driver	KAM	In the driver seat cushion, between the pad and the upholstery.		
E14C	Front Seat Back Heater - Passenger	KAM	In the passenger seat back, between the pad and the upholstery.		

Code	Name	Option	Location	Locator View	Connector End View
E14D	Front Seat Cushion Heater - Passenger	KAM	In the passenger seat cushion, between the pad and the upholstery.		
E14F	Rear Seat Cushion Heater - Left Rear	KCB	In the rear seat cushion, at left side, between the pad and the upholstery.		
E14H	Rear Seat Cushion Heater - Right Rear	KCB	In the rear seat cushion, at right side, between the pad and the upholstery.		
E15	Steering Wheel Heater	KI3	In the steering wheel rim.	• •	—
E17D	Outside Rearview Mirror Glass - Driver	—	At left front door of vehicle, within A9A Outside Rearview Mirror - Driver, at rear.	—	—
E17P	Outside Rearview Mirror Glass - Passenger	—	At right front door of vehicle, within A9B Outside Rearview Mirror - Passenger, at rear.	—	—
E18	Rear Window Defogger Grid	C49	At rear of passenger compartment, part of rear window glass.	• •	• •
E28	Front Floor Console Compartment Lamp	D07 / DCK	In the floor console, at lower rear of floor console compartment.		
E29LF	Front Fog Lamp - Left	T3U	At front left corner, attached to front bumper, below E13LA Front Headlamp - Left.	• • •	
E29RF	Front Fog Lamp - Right	T3U	At front right corner, attached to front bumper, below E13RA Front Headlamp - Right.	• • •	
E31L	Sunshade Mirror Lamp - Left	DEG	In the passenger compartment, upper front left, near corner of headliner, part of A3L Sunshade - Left.	—	—
E31R	Sunshade Mirror Lamp - Right	DEG	In the passenger compartment, upper front right, near corner of headliner, part of A3R Sunshade - Right.	—	—
E33L	Cargo Lamp - Left	UF2	At left rear of vehicle, in the inside corner of pickup box at middle.		
E33LEA	Cargo Lamp - Pickup Box Endgate Left	63G	At rear of vehicle, attached to inner tailgate left of center, behind fold-out step.	—	
E33R	Cargo Lamp - Right	UF2	At right rear of vehicle, in the inside corner of pickup box at middle.		
E33REA	Cargo Lamp - Pickup Box Endgate Right	63G	At rear of vehicle, attached to inner tailgate right of center, behind fold-out step.	—	
E33THX	Cargo Lamp - Rear Closure Auxiliary	QT5 / QT6	At rear of vehicle, at top center of the tailgate, mounted right of tailgate release switch.		• •

Code	Name	Option	Location	Locator View	Connector End View
E37H	Roof Rail Rear Seat Position Reading and Courtesy Lamp - Left	CAJ	In the passenger compartment, upper left side, between door opening and sunroof opening.		
E37J	Roof Rail Rear Seat Position Reading and Courtesy Lamp - Right	CAJ	In the passenger compartment, upper right side, between door opening and sunroof opening.		
E37SMC	Rear Seat Position Center Reading and Courtesy Lamp	4-Door - CAJ	In the passenger compartment, upper center near rear, attached to headliner.	• •	
E40	Air Heater	C32	In the instrument panel, left of center, mounted to left side of HVAC assembly rear of actuators.		
E42L	Rear Body Structure Stop Lamp - Left	—	At left rear corner of the pickup box.		
E42R	Rear Body Structure Stop Lamp - Right	—	At right rear corner of the pickup box.		
E52	Reductant Heater 2 - Injector Supply Pipe	LZ0	Under the vehicle, right side rear of middle, part of reductant pipe, at reductant tank.		
E53A	Reductant Heater 1 - Tank	LZ0	Under the vehicle, right side rear of middle, part of A38 Reductant Tank Fluid Supply Pump Module, inside reductant tank.	—	—
E53C	Reductant Heater 3 - Tank	LZ0	Under the vehicle, right side rear of middle, part of A38 Reductant Tank Fluid Supply Pump Module, inside reductant tank.	—	—
E55FCL	Front Floor Console Map Pocket Illumination Lamp - Left	C85	In the floor console, left side front, above map pocket.		
E55FCR	Front Floor Console Map Pocket Illumination Lamp - Right	C85	In the floor console, right side front, above map pocket.		
E55LF	Front Side Door Map Pocket Illumination Lamp - Left	C85	In the driver door trim panel, near middle, above map pocket.		
E55RF	Front Side Door Map Pocket Illumination Lamp - Right	C85	In the passenger door panel, near middle, above map pocket.		
E90DC	Exterior Flood Lamp - Driver Outside Rearview Mirror Cargo	DQS	At left front door of vehicle, within A9A Outside Rearview Mirror - Driver.	—	—

Code	Name	Option	Location	Locator View	Connector End View
E90DG	Exterior Flood Lamp - Driver Outside Rearview Mirror Ground Illumination	DEZ	At left front door of vehicle, within A9A Outside Rearview Mirror - Driver.	—	—
E90PC	Exterior Flood Lamp - Passenger Outside Rearview Mirror Cargo	DQS	At right front door of vehicle, within A9B Outside Rearview Mirror - Passenger.	—	—
E90PG	Exterior Flood Lamp - Passenger Outside Rearview Mirror Ground Illumination	DEZ	At right front door of vehicle, within A9B Outside Rearview Mirror - Passenger.	—	—
E134EM	Front Grille Illuminated Emblem	S0M	At front of vehicle, emblem at center of grille.	—	—
E134G	Front Grille Illumination Lamp	S0M	At front of vehicle, upper center of grille.	—	—
E135L	Front Bumper Fascia Auxiliary Signal Lamp - Left	GRZ	At front of vehicle, left side, in grille crossbar.	• •	
E135R	Front Bumper Fascia Auxiliary Signal Lamp - Right	GRZ	At front of vehicle, right side, in grille crossbar.	• •	
F101	Instrument Panel Airbag	—	In the instrument panel, upper right side, attached to backside of instrument panel trim.		
F105L	Front and Rear Row Roof Rail Airbag - Left	4-Door	In the passenger compartment, left side, along roof rail and A-pillar.		
F105LF	Front Row Roof Rail Airbag - Left	2-Door	In the passenger compartment, left side, along roof rail and A-pillar.		
F105R	Front and Rear Row Roof Rail Airbag - Right	4-Door	In the passenger compartment, right side, along roof rail and A-pillar.		
F105RF	Front Row Roof Rail Airbag - Right	2-Door	In the passenger compartment, right side, along roof rail and A-pillar.		
F106D	Front Seat Outboard Seat Back Airbag - Driver	—	In the driver seat back, mounted to outboard side of frame behind trim.		
F106P	Front Seat Outboard Seat Back Airbag - Passenger	—	In the passenger seat back, mounted to outboard side of frame behind trim.		
F107	Steering Wheel Airbag	—	In the steering wheel, mounted to center.		
F112D	Front Seat Belt Retractor - Driver	—	In the passenger compartment, left side, in base of B-pillar.	• •	
F112LR	Rear Seat Belt Retractor - Left	4-Door	In the passenger compartment, left rear, at base of C-pillar.		

Code	Name	Option	Location	Locator View	Connector End View
F112P	Front Seat Belt Retractor - Passenger	—	In the passenger compartment, right side, in base of B-pillar.	• •	• •
F112RR	Rear Seat Belt Retractor - Right	4-Door	In the passenger compartment, right rear, at base of C-pillar.		
F113D	Front Seat Belt Anchor Plate Tensioner - Driver	—	In the passenger compartment, left side, mounted to floor near B-pillar.	• •	
F113P	Front Seat Belt Anchor Plate Tensioner - Passenger	—	In the passenger compartment, right side, mounted to floor near B-pillar.	• •	
G1	Air Conditioning Compressor	—	• (L4B / LZ0) In the engine compartment, mounted to engine at lower left front. • (L76 / L78) In the engine compartment, mounted to engine at lower right front.	• • •	
G5	Automatic Transmission Auxiliary Fluid Pump	—	Under the vehicle, inside T12 Automatic Transmission, attached to case rear of valve body.	—	
G10L	Cooling Fan Motor - Left	—	In the engine compartment, front left of center, in radiator fan shroud, at left side.	• • •	
G10LW	Cooling Fan Motor - Lower	LZ0	In the engine compartment, front center, in radiator fan shroud, lower center.		
G10R	Cooling Fan Motor - Right	—	In the engine compartment, front right of center, in radiator fan shroud, at right side.	• • •	• •
G12	Fuel Pump	—	Under the vehicle, inside fuel tank, part of A7 Fuel Tank Fuel Pump Module.	—	—
G13	Generator	—	• (L4B / LZ0) In the engine compartment, mounted to front left middle of engine at accessory drive. • (L76 / L78) In the engine compartment, mounted to upper front right of engine at accessory drive.	• • •	• • • • • •
G17	Heater Coolant Pump	L76 / L78 / LZ0	• (L76 / L78) On the engine, lower front left of engine block. • (LZ0) On the engine, lower right front, attached to lower crankcase extension.	• •	• •

Code	Name	Option	Location	Locator View	Connector End View
G18	Fuel Pump - High Pressure	—	• (L4B) On the engine, rear right of center, mounted to top of camshaft carrier. • (L76 / L78) On the engine, rear center, below intake manifold, attached to engine block valley cover. • (LZ0) On the engine, left rear, mounted to engine block at left side of bellhousing.	• • •	• •
G24	Windshield Washer Pump	—	At the left front of vehicle, above wheelhouse, at outer bottom near front of washer fluid reservoir.		
G31D	Front Seat Back Lumbar Pump - Driver	AVK	In the driver seat back, mounted inboard to right side of frame, near bottom.	• •	
G31P	Front Seat Back Lumbar Pump - Passenger	AVU	In the passenger seat back, mounted inboard to right side of frame, near bottom.	• •	
G33	Reductant Pump	LZ0	Under the vehicle, right side rear of middle, part of A38 Reductant Tank Fluid Supply Pump Module, inside reductant tank.	—	—
G58	Evaporative Emission Canister Purge Pump	L4B	On the engine, left of center, mounted to the left of camshaft carrier, above intake manifold.		
G59	Engine Coolant Pump	L4B	On the engine, right front, mounted to engine block below turbocharger.		
K4	Running Board Control Module	B3L	Under right side of vehicle near middle, attached to outboard side of frame forward of rear cab mount.		• • •
K9	Body Control Module	—	In the instrument panel, left side, mounted in bracket near A-pillar, left position.	• •	• • • • • • • •
K19	Suspension Control Module	Z45	Under the vehicle, left side near middle, attached to outboard side of frame, near front of fuel tank.		
K20	Engine Control Module	L76 / L78 / LZ0	In the engine compartment, left front, behind E13LA Front Headlamp - Left.		• • • • •

Code	Name	Option	Location	Locator View	Connector End View
K29FV	Front Seat Heater Vent Control Module	KAM	In the passenger seat cushion, mounted to frame at front middle of bottom.		• •
K32	Heated Steering Wheel Module	KI3 - ULM	In the steering wheel, mounted to hub, behind S33 Steering Wheel Horn Contact.		• •
K36	Restraints Control Module	—	In the passenger compartment, center, mounted to floor between the front seats.	• •	• •
K38	Chassis Control Module	G93 / G94	Under rear of vehicle, left side, mounted to the bracket above the spare tire, left position.		
K40D	Driver Seat Adjuster Memory Module	A45	In the driver seat cushion, mounted to frame at inboard front of bottom.		• • •
K40P	Passenger Seat Adjuster Memory Module	AHH / AKE	In the passenger seat cushion, mounted to frame at inboard front of bottom.		• • •
K43	Power Steering Control Module	—	Under the vehicle, near front center, part of the steering gear assembly, attached to M38 Power Steering Assist Motor.		• • •
K45	Powertrain Control Module	L4B	In the engine compartment, left front, behind E13LA Front Headlamp - Left.		• • •
K56	Serial Data Gateway Module	—	In the instrument panel, left side, mounted to bracket on instrument panel tie-bar, left position, to right of steering column.	• •	• • •
K56U	Special Purpose Vehicle Control Module	KGU	In the instrument panel, left side, mounted to bracket on instrument panel tie-bar, right position, to right of steering column.	• •	• • •
K60	Column Lock Module	—	In the instrument panel, lower left front, mounted to top of steering column, near bulkhead.	—	
K61	Sunroof Control Module	CAJ	At rear of passenger compartment, attached to sunroof frame left of center, above headliner.		
K67	Trailer Brake Control Module	—	Under rear of vehicle, left side, attached to bracket at frame rail, forward of rear frame crossmember.	• •	
K68	Trailer Lamp Control Module	UET	Under rear of vehicle, left side, mounted to the bracket above the spare tire, right position.		
K69	Transfer Case Control Module	F48	In the engine compartment, left rear corner, left of K160 Brake System Control Module	• •	

Code	Name	Option	Location	Locator View	Connector End View
K71	Transmission Control Module	L76 / L78 / LZ0	In the engine compartment, right front, rear of E13RA Front Headlamp - Right.		
K73	Telematic Control Module	—	• (2-Door) In the instrument panel, left side, mounted to instrument panel tie-bar, to right of steering column. • (4-Door) At rear of passenger compartment, center, in bracket attached to rear bulkhead, behind center rear seat position.	•	•
K77	Remote Function Actuator Module	—	• (2-Door) In the passenger compartment, upper right rear, attached to B-pillar. • (4-Door & CAJ) In the passenger compartment, upper left rear, attached to top of headliner near corner of sunroof opening. • (4-Door - CAJ) In the passenger compartment, upper left side rear of middle, attached to top of headliner.	•	•
K85P	Restraints Occupant Classification System Module - Passenger	—	In the passenger seat cushion, inboard side near middle.		
K99	Steering Column Control Module	N38	In the instrument panel, left side, mounted to left side of steering column		•
K104P	Front Seat Bladder Control Module - Passenger	AVU - (AHH / AKE)	In the passenger seat back, center middle, mounted to back of lumbar assembly.		
K111	Fuel Pump Power Control Module	—	Under the vehicle, center near rear, mounted to top of bracket at front of the frame crossmember forward of rear axle.	•	
K115	Reductant Control Module	LZ0	Under the vehicle, right side near middle, mounted to right side of reductant tank.	—	
K124	Image Processing Module	UK0 / UKL	In the passenger compartment, rear left, attached to rear bulkhead, behind left rear seat position.		•
K124AA	Image Processing Module 1 - Processor 1	UK0 / UKL	In the passenger compartment, rear left, part of K124 Image Processing Module, attached to rear bulkhead, behind left rear seat position.	—	—

Code	Name	Option	Location	Locator View	Connector End View
K124AB	Image Processing Module 1 - Processor 2	UK0 / UKL	In the passenger compartment, rear left, part of K124 Image Processing Module, attached to rear bulkhead, behind left rear seat position.	—	—
K134D	Front Seat Bolster Memory Module - Driver	AVK - AF6	In the driver seat back, center middle, mounted to back of lumbar assembly.		
K134DP	Front Seat Bolster Memory Module - Driver Primary	AF6	In the driver seat back, center middle, mounted to back of lumbar assembly.		
K134DS	Front Seat Bolster Memory Module - Driver Secondary	AF6	In the driver seat back, lower center, mounted to back of lumbar assembly.		
K134PP	Front Seat Bolster Memory Module - Passenger Primary	AHH / AKE	In the passenger seat back, center middle, mounted to back of lumbar assembly.		
K134PS	Front Seat Bolster Memory Module - Passenger Secondary	AHH / AKE	In the passenger seat back, lower center, mounted to back of lumbar assembly.		
K160	Brake System Control Module	—	In the engine compartment, left rear, attached to brake master cylinder.	• •	
K174LB	Rear Lamp LED Driver Module - Left	—	At left rear corner of the pickup box, mounted to E42L Rear Body Structure Stop Lamp - Left.	—	—
K174RB	Rear Lamp LED Driver Module - Right	—	At right rear corner of the pickup box, mounted to E42R Rear Body Structure Stop Lamp - Right.	—	—
K175	Front Floor Console Compartment Cooler	DCK	In the floor console compartment.	—	
K180	Driver Monitoring System Module	ULM & UJE	In the passenger compartment, within the instrument panel, left side, mounted in bracket above K9 Body Control Module and K219 Exterior Lighting Control Module	—	• •
K180S	Driver Monitoring System Module - Steering Wheel	ULM	In the steering wheel, mounted to hub, behind S33 Steering Wheel Horn Contact.		• • • • • • •

Code	Name	Option	Location	Locator View	Connector End View
K182	Parking Assist Control Module	—	• (2-Door) In the passenger compartment, rear left, attached to rear bulkhead, behind left front seat position. • (4-Door) In the passenger compartment, rear right, attached to rear bulkhead, behind right rear seat position.	•	•
K183	UHF Short Range Low Energy Remote Control Access Transceiver	BOK / BOR / BOY	In the instrument panel, lower left of center, forward of floor console.		
K194	Rear Gate Module	QT6	At rear of vehicle, left of center, inside endgate near bottom, behind closeout panel.		
K212	Gear Shift Control Module	—	In the steering column, right side, internal to S3B Automatic Transmission Electronic Control.	—	—
K214	Trailer Tire Pressure Indicator Module	UET	At rear of vehicle, center, attached to rear bumper forward of license plate, right of T10G Low Frequency Rear Bumper Antenna.		
K219	Lighting Control Module	—	In the instrument panel, left side, mounted in bracket near A-pillar, right position.	•	•
K221L	Headlamp LED Driver Module - Left	—	At the left front corner of vehicle, mounted to E13LA Front Headlamp - Left	—	—
K221R	Headlamp LED Driver Module - Right	—	At the right front corner of vehicle, mounted to E13RA Front Headlamp - Right	—	—
K234	Rear Seat Heater Vent Control Module	KCB	In the rear seat cushion, below center position.		•
K299	Audio/Video Interface Module	USN	In the floor console, inside, rear of the floor console compartment.		•
K300	Near Field Communication Exterior Module	BOK / BOR / BOY	Mounted on the outside of the driver door, at rear, below window, part of A24D Front Side Door Outside Handle - Left.	—	—
M4P	Programmable Air Inlet Valve Actuator	—	In the instrument panel, right side, mounted to left side of air inlet of HVAC assembly.		
M6PL	Programmable Temperature Valve Actuator - Left	—	In the instrument panel, left of center, mounted to left side of HVAC assembly, lower actuator.		

Code	Name	Option	Location	Locator View	Connector End View
M6PR	Programmable Temperature Valve Actuator - Right	CJ2	In the instrument panel, right of center, mounted to right side of HVAC assembly, at center of assembly.		
M8	Blower Motor	—	In the instrument panel, right side, mounted to bottom of air inlet of HVAC assembly.		
M10	Charge Air Cooler Coolant Pump	LZ0	In the engine compartment, lower left front, attached to bracket rear of engine auxiliary radiator.		
M26	Front Drive Axle Actuator	F48	Under the vehicle, at front axle, attached to front of right axle shaft housing.		
M37P	Programmable Mode Valve Actuator	—	In the instrument panel, left of center, mounted to left side of HVAC assembly, upper actuator.		
M38	Power Steering Assist Motor	—	Under the vehicle, near front center, part of and attached to steering gear assembly.		—
M50D	Front Seat Tilt Adjuster Actuator - Driver	A2X	In the driver seat, mounted to front outboard corner of seat cushion frame.		
M50P	Front Seat Tilt Adjuster Actuator - Passenger	A7K	In the passenger seat, mounted to front outboard corner of seat cushion frame.		
M51D	Front Seat Adjuster Actuator - Driver	A2X	In the driver seat, mounted to seat track, right middle at bottom.		
M51P	Front Seat Adjuster Actuator - Passenger	A7K	In the passenger seat, mounted to seat track, right middle at bottom.		
M53D	Front Seat Back Lumbar Motor - Driver	A2X - AVK	In the driver seat back, at lower right of lumber assembly.		
M53P	Front Seat Back Lumbar Motor - Passenger	A7K - AVU	In the passenger seat back, at lower right of lumber assembly.		
M55D	Front Seat Vertical Adjuster Actuator - Driver	A2X	In the driver seat, mounted to outboard side of seat cushion frame, at rear.		
M55P	Front Seat Vertical Adjuster Actuator - Passenger	A7K	In the passenger seat, mounted to outboard side of seat cushion frame, at rear.		
M56D	Front Seat Recliner Actuator - Driver	A2X	In the driver seat back, mounted inboard to left side of frame, at bottom.	• • •	
M56P	Front Seat Recliner Actuator - Passenger	A7K	In the passenger seat back, mounted inboard to left side of frame, at bottom.	• • •	

Code	Name	Option	Location	Locator View	Connector End View
M63	Rear Sliding Window Motor	A48	In the passenger compartment, rear right, attached to rear bulkhead, above K182 Parking Assist Control Module, behind right rear seat position.		
M64	Starter	—	• (L4B) On the engine, lower left rear, mounted to engine block. • (L76 / L78 / LZ0) On the engine, lower right rear, mounted to engine block.	• • • •	• • • • •
M65	Steering Column Telescope Actuator	N38	In the instrument panel, left side, mounted to left side of steering column		
M68	Steering Column Tilt Wheel Actuator	N38	In the instrument panel, left side, mounted to right side of steering column		
M73A	Front Seat Back Ventilation Blower - Driver	KU9	In the driver seat back, behind the pad, above middle.	• •	
M73B	Front Seat Back Ventilation Blower - Passenger	KU9	In the passenger seat back, behind the pad, above middle.	• • •	
M73D	Front Seat Cushion Ventilation Blower - Driver	KU9	In the driver seat cushion, below the pad, rear of middle.		
M73P	Front Seat Cushion Ventilation Blower - Passenger	KU9	In the passenger seat cushion, below the pad, rear of middle.		
M74D	Front Side Door Window Regulator Motor - Driver	—	Inside the driver door, behind trim panel, near center of the door.		
M74LR	Rear Side Door Window Regulator Motor - Left	4-Door	Inside the left rear door, behind trim panel, near center of the door.	• •	
M74P	Front Side Door Window Regulator Motor - Passenger	—	Inside the passenger door, behind trim panel, near center of the door.		• •
M74RR	Rear Side Door Window Regulator Motor - Right	4-Door	Inside the right rear door, behind trim panel, near center of the door.	• •	
M75	Windshield Wiper Motor	—	At left rear of engine compartment, below wiper cowl, near bottom left of windshield.	• •	
M77D	Outside Rearview Mirror Actuator - Driver	—	At left front door of vehicle, within A9A Outside Rearview Mirror - Driver, behind E17D Outside Rearview Mirror Glass - Driver.	—	—
M77P	Outside Rearview Mirror Actuator - Passenger	—	At right front door of vehicle, within A9B Outside Rearview Mirror - Passenger, behind E17P Outside Rearview Mirror Glass - Passenger.	—	—

Code	Name	Option	Location	Locator View	Connector End View
M78D	Outside Rearview Mirror Folding Actuator - Driver	DBC / DEZ / DME / DQS	At left front door of vehicle, within A9A Outside Rearview Mirror - Driver, at folding pivot.	—	—
M78P	Outside Rearview Mirror Folding Actuator - Passenger	DBC / DEZ / DME / DQS	At right front door of vehicle, within A9B Outside Rearview Mirror - Passenger, at folding pivot.	—	—
M81	Sunroof Sunshade Motor	CAJ	At rear of passenger compartment, attached to sunroof frame right of center, above headliner.		
M95L	Assist Step Motor - Left	B3L	Under the vehicle, left rear of cab, mounted to body at rear of assist step.	—	—
M95R	Assist Step Motor - Right	B3L	Under the vehicle, right rear of cab, mounted to body at rear of assist step.	—	—
M96A	Active Grille Air Shutter Actuator 1	VTI / WMI	At the front of vehicle, left side, attached to left side of upper grille air shutter assembly.		
M96B	Active Grille Air Shutter Actuator 2	WMI	At the front of vehicle, left side, attached to left side of lower grille air shutter assembly.		
M103	Turbocharger Vane Position Actuator	LZ0	On the engine, right side near upper front, mounted to turbocharger.		
M104L	Parking Brake Actuator - Left	—	At left rear wheelhouse, attached to inboard side of brake caliper.		
M104R	Parking Brake Actuator - Right	—	At right rear wheelhouse, attached to inboard side of brake caliper.		
M106	Exhaust Control Valve Actuator	NPP	Under the vehicle, right side near rear, attached to pipe at muffler left outlet.		
M122	Exhaust Pressure Regulator Valve	LZ0	Under the vehicle, right side, attached to right side of exhaust pipe, near front of fuel tank.		
M123	Transmission Park Valve Lock Solenoid Actuator	MHU	Under the vehicle, inside T12 Automatic Transmission, attached to valve body.	—	
M125	Pickup Box Endgate Power Assist Actuator	QT6	At right rear of vehicle, inside the endgate, lower right corner.		
M128	Turbocharger Wastegate Actuator	L4B	In the engine compartment, right side of engine, mounted to front of turbocharger compressor.		
M129A	Intake Camshaft Profile Actuator 1	L4B	On the engine, mounted to camshaft carrier left of center near front, above cylinder 1, left of T8A Ignition Coil 1.		

Code	Name	Option	Location	Locator View	Connector End View
M129B	Intake Camshaft Profile Actuator 2	L4B	On the engine, mounted to camshaft carrier left of center near middle, above cylinder 2, left of T8B Ignition Coil 2.		
M129C	Intake Camshaft Profile Actuator 3	L4B	On the engine, mounted to camshaft carrier left of center near middle, above cylinder 3, left of T8C Ignition Coil 3.		
M129D	Intake Camshaft Profile Actuator 4	L4B	On the engine, mounted to camshaft carrier left of center near rear, above cylinder 4, left of T8D Ignition Coil 4.		
M130B	Exhaust Camshaft Profile Actuator 2	L4B	On the engine, mounted to camshaft carrier right of center near middle, above cylinder 2, right of T8B Ignition Coil 2.		
M130C	Exhaust Camshaft Profile Actuator 3	L4B	On the engine, mounted to camshaft carrier right of center near middle, above cylinder 3, right of T8C Ignition Coil 3.		
M151L	Pickup Box Endgate Cinch Latch Actuator - Left	QT6	At left rear of the vehicle, inside endgate near top, left side latch.		
M151R	Pickup Box Endgate Cinch Latch Actuator - Right	QT6	At right rear of the vehicle, inside endgate near top, right side latch.		
P3	Backup Alarm	—	Under rear of vehicle.	—	
P13	Horn	—	At front of vehicle, right side, mounted to right front of radiator core support.		
P16	Instrument Panel Cluster Control Module	—	In the instrument panel, above steering column.		• •
P19AG	Radio Front Side Door Speaker - Left	—	In the left front door, at front middle of door, behind door trim panel.		
P19AH	Radio Front Side Door Speaker - Right	—	In the right front door, at front middle of door, behind door trim panel.		
P19AL	Radio Rear Side Door Speaker - Left	4-Door	In the left rear door, near lower front corner of door, behind door trim panel.	• •	
P19AM	Radio Rear Side Door Speaker - Right	4-Door	In the right rear door, near lower front corner of door, behind door trim panel.	• •	
P19B	Radio Front Center Speaker	UQA	In the instrument panel, upper center middle, below radio front center speaker grille.		
P19J	Radio Front Speaker - Instrument Panel Left	—	In the instrument panel, upper left front, below instrument panel extension.		• •

Code	Name	Option	Location	Locator View	Connector End View
P19LA	Radio Rear Compartment Speaker	UQA	In the passenger compartment, rear right, attached to rear bulkhead, at floor, behind right rear seat position.		
P19W	Radio Front Speaker - Instrument Panel Right	—	In the instrument panel, upper right front, below instrument panel extension.		• •
P29	Head-Up Display	UV6	In the instrument panel, left front, forward of P16 Instrument Panel Cluster Control Module.		• •
P43	Forward Collision Alert Display	UIT	In the instrument panel, left front, forward of P16 Instrument Panel Cluster Control Module.	• •	
P45L	Front Seat Lane Departure Warning Actuator - Left	—	In the driver seat cushion, on the left side.		
P45R	Front Seat Lane Departure Warning Actuator - Right	—	In the driver seat cushion, on the right side.		
P50	Regulatory Emergency Call Backup Speaker	UER	In the instrument panel, left side, mounted to instrument panel tie-bar, to right of accelerator pedal.	• •	
P51	Steering Wheel LED Display	ULM	In the steering wheel rim, at top, facing driver.		
P62	Occupant Display	USN	In the instrument panel, right side rear, above instrument panel compartment.		• •
Q2	Air Conditioning Clutch	—	• (L4B / LZ0) In the engine compartment, mounted to front of G1 Air Conditioning Compressor on engine at lower left front. • (L76 / L78) In the engine compartment, mounted to front of G1 Air Conditioning Compressor on engine at lower right front.	• • •	
Q6	Camshaft Position Actuator Solenoid Valve	L76 / L78	On the engine, lower front center, attached to timing cover, above crankshaft pulley.		
Q6E	Camshaft Position Actuator Solenoid Valve - Exhaust	L4B	On the engine, front right of center, attached to timing cover at exhaust camshaft.		
Q6F	Camshaft Position Actuator Solenoid Valve - Intake	L4B	On the engine, front left of center, attached to timing cover at intake camshaft.		
Q9F	Differential Locking Actuator - Front	G93	Under the vehicle, at front axle, inside front differential housing.		
Q9R	Differential Locking Actuator - Rear	G94	Under the vehicle, at rear axle, inside rear differential housing.		

Code	Name	Option	Location	Locator View	Connector End View
Q12	Evaporative Emission Canister Purge Solenoid Valve	FJW	• (L4B) In the engine compartment, front near center, attached to air cleaner outlet duct elbow at rear near turbocharger. • (L76 / L78) On the engine, upper right of center, near rear, attached to intake manifold.	• •	
Q13	Evaporative Emission Canister Vent Solenoid Valve	FJW	Under the vehicle, left side near middle, attached to evaporative emission canister, forward of fuel tank.		
Q14A	Exhaust Gas Recirculation Valve 1	LZ0	On the engine, right rear top, mounted to exhaust manifold, near cylinder 6.		
Q14B	Exhaust Gas Recirculation Valve 2	LZ0	On the engine, upper right rear, near turbocharger, attached to exhaust gas recirculation cooler at top.		
Q17A	Fuel Injector 1	—	• (L4B) On the engine, left side of cylinder head, mounted to cylinder head below intake manifold, at cylinder 1. • (L76 / L78) On the engine, left of center front, below intake manifold, attached to cylinder head at bottom of cylinder 1 intake port. • (LZ0) On the engine, top center front, mounted to camshaft cover above cylinder 1.	• • •	• • •
Q17B	Fuel Injector 2	—	• (L4B) On the engine, left side of cylinder, mounted to cylinder head below intake manifold, at cylinder 2. • (L76 / L78) On the engine, right of center front, below intake manifold, attached to cylinder head at bottom of cylinder 2 intake port. • (LZ0) On the engine, top center near front, mounted to camshaft cover above cylinder 2.	• • •	• • •

Code	Name	Option	Location	Locator View	Connector End View
Q17C	Fuel Injector 3	—	• (L4B) On the engine, left side of engine, mounted to cylinder head below intake manifold, near cylinder 3. • (L76 / L78) On the engine, left of center near front, below intake manifold, attached to cylinder head at bottom of cylinder 3 intake port. • (LZ0) On the engine, top center forward of middle, mounted to camshaft cover above cylinder 3.	• • •	• • •
Q17D	Fuel Injector 4	—	• (L4B) On the engine, left side of cylinder head, mounted to cylinder head below intake manifold, at cylinder 4. • (L76 / L78) On the engine, right of center near front, below intake manifold, attached to cylinder head at bottom of cylinder 4 intake port. • (LZ0) On the engine, top center rear of middle, mounted to camshaft cover above cylinder 4.	• • •	• • •
Q17E	Fuel Injector 5	L76 / L78 / LZ0	• (L76 / L78) On the engine, left of center near rear, below intake manifold, attached to cylinder head at bottom of cylinder 5 intake port. • (LZ0) On the engine, top center near rear, mounted to camshaft cover above cylinder 5.	• •	• •
Q17F	Fuel Injector 6	L76 / L78 / LZ0	• (L76 / L78) On the engine, right of center near rear, below intake manifold, attached to cylinder head at bottom of cylinder 6 intake port. • (LZ0) On the engine, top center rear, mounted to camshaft cover above cylinder 6.	• •	• •
Q17G	Fuel Injector 7	L76 / L78	On the engine, left of center rear, below intake manifold, attached to cylinder head at bottom of cylinder 7 intake port.		
Q17H	Fuel Injector 8	L76 / L78	On the engine, right of center rear, below intake manifold, attached to cylinder head at bottom of cylinder 8 intake port.		
Q17J	Fuel Injector - Cylinder 1 Injector 2	L76 / L78	On the engine, left side front, attached to rocker cover above cylinder 1 intake port.		

Code	Name	Option	Location	Locator View	Connector End View
Q17K	Fuel Injector - Cylinder 2 Injector 2	L76 / L78	On the engine, right side front, attached to rocker cover above cylinder 2 intake port.		
Q17L	Fuel Injector - Cylinder 3 Injector 2	L76 / L78	On the engine, left side near front, attached to rocker cover above cylinder 3 intake port.		
Q17M	Fuel Injector - Cylinder 4 Injector 2	L76 / L78	On the engine, right side near front, attached to rocker cover above cylinder 4 intake port.		
Q17N	Fuel Injector - Cylinder 5 Injector 2	L76 / L78	On the engine, left side near rear, attached to rocker cover above cylinder 5 intake port.		
Q17P	Fuel Injector - Cylinder 6 Injector 2	L76 / L78	On the engine, right side near rear, attached to rocker cover above cylinder 6 intake port.		
Q17Q	Fuel Injector - Cylinder 7 Injector 2	L76 / L78	On the engine, left side rear, attached to rocker cover above cylinder 7 intake port.		
Q17R	Fuel Injector - Cylinder 8 Injector 2	L76 / L78	On the engine, right side rear, attached to rocker cover above cylinder 8 intake port.		
Q18A	Fuel Pressure Regulator 1	LZ0	On the engine, left rear middle, below Q18C Fuel Pressure Regulator 3, attached to G12DS High Pressure Diesel Fuel Pump at bottom.		
Q18B	Fuel Pressure Regulator 2	LZ0	On the engine, top left rear, mounted attached to rear of fuel rail.		
Q18C	Fuel Pressure Regulator 3	LZ0	On the engine, left rear middle, above Q18A Fuel Pressure Regulator 1, attached to G12DS High Pressure Diesel Fuel Pump at top.		
Q20	Intake Airflow Control Valve	LZ0	On the engine, top left of center, between charge air cooler outlet and intake manifold.		
Q22	Intake Manifold Tuning Solenoid Valve	LZ0	On the engine, front left, attached to front of intake manifold.		
Q37LFB	Front Shock Absorber Actuator - Left	Z45	At left front wheelhouse, part of left front shock absorber.		
Q37LRB	Rear Shock Absorber Actuator - Left	Z45	Under the vehicle, left rear, part of left rear shock absorber.		
Q37RFB	Front Shock Absorber Actuator - Right	Z45	At right front wheelhouse, part of right front shock absorber.		
Q37RRB	Rear Shock Absorber Actuator - Right	Z45	Under the vehicle, right rear, part of right rear shock absorber.		

Code	Name	Option	Location	Locator View	Connector End View
Q38	Throttle Body	L4B / L76 / L78	• (L4B) On the engine, left front attached to front of intake manifold. • (L76 / L78) On the engine, front center attached to front of intake manifold.	•	•
Q40	Turbocharger Bypass Valve Solenoid	L4B	In the engine compartment, right side of engine, mounted to front of turbocharger compressor, below turbocharger compressor inlet.		
Q44	Engine Oil Pressure Control Solenoid Valve	—	• (L4B / LZ0) In the engine, rear center, within lower oil pan, attached to oil pump. • (L76 / L78) On the engine, right side near front, above oil pan, rear of G1 Air Conditioning Compressor.	•	•
Q61	Reductant Fluid Injector	LZ0	In the engine compartment, right front, mounted to diesel particulate filter at front.		
Q61B	Reductant Fluid Injector 2	LZ0	In the engine compartment, right rear, below exhaust gas recirculation cooler fed pipe.		
Q64	Evaporative Emission System Switching Valve	FJW	• (2-Door) Under the vehicle, left side near middle, attached to top of fuel tank, near front. • (4-Door) Under the vehicle, left side near middle, attached to top of fuel tank, forward of A7 Fuel Tank Fuel Pump Module.	•	
Q77A	Transmission Control Solenoid Valve 1	—	Under the vehicle, inside T12 Automatic Transmission, attached to valve body.	—	
Q77B	Transmission Control Solenoid Valve 2	—	Under the vehicle, inside T12 Automatic Transmission, attached to valve body.	—	
Q77C	Transmission Control Solenoid Valve 3	—	Under the vehicle, inside T12 Automatic Transmission, attached to valve body.	—	
Q77D	Transmission Control Solenoid Valve 4	—	Under the vehicle, inside T12 Automatic Transmission, attached to valve body.	—	
Q77E	Transmission Control Solenoid Valve 5	—	Under the vehicle, inside T12 Automatic Transmission, attached to valve body.	—	
Q77F	Transmission Control Solenoid Valve 6	—	Under the vehicle, inside T12 Automatic Transmission, attached to valve body.	—	

Code	Name	Option	Location	Locator View	Connector End View
Q77G	Transmission Control Solenoid Valve 7	—	Under the vehicle, inside T12 Automatic Transmission, attached to valve body.	—	
Q77H	Transmission Control Solenoid Valve 8	—	Under the vehicle, inside T12 Automatic Transmission, attached to valve body.	—	
Q77J	Transmission Control Solenoid Valve 9	—	Under the vehicle, inside T12 Automatic Transmission, attached to valve body.	—	
Q83AA	Valve Lifter Oil Solenoid Valve - Cylinder 1	L76 / L78	In the engine, below engine block valley cover, left of center front, at cylinder 1 valve lifters.		
Q83AB	Valve Lifter Oil Solenoid Valve - Cylinder 2	L76 / L78	In the engine, below engine block valley cover, right of center front, at cylinder 2 valve lifters.		
Q83AC	Valve Lifter Oil Solenoid Valve - Cylinder 3	L76 / L78	In the engine, below engine block valley cover, left of center near front, at cylinder 3 valve lifters.		
Q83AD	Valve Lifter Oil Solenoid Valve - Cylinder 4	L76 / L78	In the engine, below engine block valley cover, right of center near front, at cylinder 5 valve lifters.		
Q83AE	Valve Lifter Oil Solenoid Valve - Cylinder 5	L76 / L78	In the engine, below engine block valley cover, left of center near rear, at cylinder 5 valve lifters.		
Q83AF	Valve Lifter Oil Solenoid Valve - Cylinder 6	L76 / L78	In the engine, below engine block valley cover, right of center near rear, at cylinder 6 valve lifters.		
Q83AG	Valve Lifter Oil Solenoid Valve - Cylinder 7	L76 / L78	In the engine, below engine block valley cover, left of center rear, at cylinder 7 valve lifters.		
Q83AH	Valve Lifter Oil Solenoid Valve - Cylinder 8	L76 / L78	In the engine, below engine block valley cover, right of center rear, at cylinder 8 valve lifters.		
Q97	Engine Coolant Flow Control Valve	L4B / LZ0	• (L4B) On the left side of engine, rear of G13 Generator, above M64 Starter. • (LZ0) On the left side of engine, rear of G13 Generator, below intake manifold.	—	—
Q97F	Engine Coolant Flow Control Valve - Flow Control	LZ0	On the left side of engine, forward of G12DS High Pressure Diesel Fuel Pump, part of Q97 Engine Coolant Flow Control Valve, at rear.		
Q97M	Engine Coolant Flow Control Valve - Main	LZ0	On the left side of engine, rear of G13 Generator, part of Q97 Engine Coolant Flow Control Valve, at front.		

Code	Name	Option	Location	Locator View	Connector End View
Q97O	Engine Coolant Flow Control Valve - Oil	L4B / L76 / L78	• (L4B) On the left side of engine, above M64 Starter, part of Q97 Engine Coolant Flow Control Valve, at rear. • (L76 / L78) In the engine compartment, lower left front, mounted to inboard side of left frame rail below radiator.	• •	• •
Q97R	Engine Coolant Flow Control Valve - Radiator	L4B / L76 / L78	• (L4B) On the left side of engine, behind the G13 Generator, part of Q97 Engine Coolant Flow Control Valve, at front. • (L76 / L78) On the engine, upper front left, forward of left rocker cover.	• •	• •
R6AD	Terminating Resistor - High Speed CAN Bus 4	QT2 / QT5	• (QK1) At rear of vehicle, lower center, in endgate • (QK2) At rear of vehicle, left of center, below rear of pickup box, attached to harness.	• •	
R29	Fuel Filter	LZ0	Under the vehicle, left side near middle, mounted to inboard side of frame rail, forward fuel tank.		• •
R44	Radio AM Antenna Signal Filter Module - Center High Mounted Stop Lamp	4-Door	At rear of passenger compartment, attached to body at left, above headliner and rear window.		• •
S2L	Automatic Transmission Manual Shift Auxiliary Position Switch - Left	—	In the steering wheel, mounted to rear trim, at left side paddle.	• •	
S2R	Automatic Transmission Manual Shift Auxiliary Position Switch - Right	—	In the steering wheel, mounted to rear trim, at right side paddle.	• •	
S3B	Automatic Transmission Electronic Control	—	In the steering column, right side stalk.		
S25	Garage Door Opener Transmitter	UG1	In the passenger compartment, upper front center, attached to top of A103 Roof Console at front center.	• •	—
S32R	Rear Seat Heater Switch	KCB	In the floor console, upper rear center.		
S33	Steering Wheel Horn Contact	—	In the steering wheel, behind the F107 Steering Wheel Airbag.		
S39	Ignition and Start Switch	—	In the instrument panel, left side rear, right of steering column.		
S47D	Front Seat Adjuster Memory Switch - Driver	A45	In the driver door trim panel, forward of inside door release handle.		

Code	Name	Option	Location	Locator View	Connector End View
S64D	Front Seat Adjuster Switch - Driver	A2X	In the driver seat, mounted to outboard side of seat cushion trim, at front.		• •
S64P	Front Seat Adjuster Switch - Passenger	A7K	In the passenger seat, mounted to outboard side of seat cushion trim, at front.		• •
S65D	Front Seat Lumbar Switch - Driver	A2X	In the driver seat, mounted to outboard side of seat cushion trim, at middle.		• •
S65P	Front Seat Lumbar Switch - Passenger	A7K	In the passenger seat, mounted to outboard side of seat cushion trim, at middle.		• • •
S70L	Cruise Control Switch	—	In the steering wheel, switch attach at left spoke.	• •	
S70R	Radio Control Switch - Steering Wheel	—	In the steering wheel, switch attach at right spoke.	• •	
S71	Steering Column Tilt Wheel and Telescope Switch	N38	In the passenger compartment, left front, on left side of the steering column shroud.		
S76	Trailer Brake Control Switch	—	In the instrument panel, lower center, below A26 Heater and Air Conditioning User Interface Control - Front.		
S78	Turn Signal Switch	—	In the steering column, left side stalk.		
S79D	Front Side Door Window Control Switch - Driver	—	In the driver door trim panel, at front of arm rest.		• •
S79LR	Rear Side Door Window Switch - Left	4-Door	In the left rear door trim panel, at front of arm rest.	• •	
S79P	Front Side Door Window Switch - Passenger	—	In the passenger door panel, at front of arm rest.		• •
S79RR	Rear Side Door Window Switch - Right	4-Door	In the right rear door trim panel, at front of arm rest.	• •	
S126	Ride Control Switch	—	In the instrument panel, lower center, below A26 Heater and Air Conditioning User Interface Control - Front.		
S148L	Assist Step Switch - Left	B3L	Under the vehicle, left rear of cab, mounted to rear of assist step.	—	
S148R	Assist Step Switch - Right	B3L	Under the vehicle, right rear of cab, mounted to rear of assist step.	—	
S159E	Liftgate Exterior Release Switch - Endgate	QT5 / QT6	At rear vehicle, at top center of the tailgate.		• •
S171	Instrument Panel Center Accessory Function Switch	—	In the instrument panel, left side rear, left of steering column.		

Code	Name	Option	Location	Locator View	Connector End View
T1	DC/AC Converter Control Module	KC9 / KCA / KFG / KFH / KI4 / KI5	• (2-Door) In the passenger compartment, rear center, in bracket attached to rear bulkhead, near middle, behind center rear seat position. • (4-Door) In the passenger compartment, rear center, in bracket attached to rear bulkhead, near floor, behind center rear seat position.	• •	• •
T3	Audio Amplifier	UQA	In the passenger compartment, front center, below floor console, in bracket attached to transmission tunnel, near bulkhead.		• • •
T4M	Radio Antenna	2-Door	At right side of vehicle, at front right of cab.		—
T4P	High Frequency Antenna	2-Door	At left side of vehicle, at front left of roof.		• •
T4TA	Auxiliary Wireless Communication Interface Antenna	—	In the instrument panel, upper front right of center, below instrument panel, at right defroster outlet.		
T8A	Ignition Coil 1	L4B / L76 / L78	• (L4B) On the engine, mounted to camshaft carrier at center near front, above cylinder 1. • (L76 / L78) On the engine, upper left front, mounted to rocker cover above cylinder 1.	• •	• •
T8B	Ignition Coil 2	L4B / L76 / L78	• (L4B) On the engine, mounted to camshaft carrier at center near middle, above cylinder 2. • (L76 / L78) On the engine, upper right front, mounted to rocker cover above cylinder 2.	• •	• •
T8C	Ignition Coil 3	L4B / L76 / L78	• (L4B) On the engine, mounted to camshaft carrier at center near middle, above cylinder 3. • (L76 / L78) On the engine, upper left, near front, mounted to rocker cover above cylinder 3.	• •	• •
T8D	Ignition Coil 4	L4B / L76 / L78	• (L4B) On the engine, mounted to camshaft carrier at center near rear, above cylinder 4. • (L76 / L78) On the engine, upper right, near front, mounted to rocker cover above cylinder 4.	• •	• •
T8E	Ignition Coil 5	L76 / L78	On the engine, upper left, near rear, mounted to rocker cover above cylinder 5.		

Code	Name	Option	Location	Locator View	Connector End View
T8F	Ignition Coil 6	L76 / L78	On the engine, upper right, near rear, mounted to rocker cover above cylinder 6.		
T8G	Ignition Coil 7	L76 / L78	On the engine, upper left rear, mounted to rocker cover above cylinder 7.		
T8H	Ignition Coil 8	L76 / L78	On the engine, upper right rear, mounted to rocker cover above cylinder 8.		
T10G	Low Frequency Rear Bumper Antenna	ATH	At rear of vehicle, center, attached to rear bumper forward of license plate.	• •	
T10J	Low Frequency Instrument Panel Antenna	—	In the instrument panel, upper front left of center, below instrument panel, rear of left defroster outlet.		
T10U	Low Frequency Console Antenna - Front	—	• (AZ3 - 5Y1) In the center seat, rear lower, attached to bottom of cushion. • (- AZ3) In the floor console, attached to bottom of rear cupholders. • (5Y1) In the passenger compartment, center front.	• •	• •
T12	Automatic Transmission	—	Under the vehicle, center forward of middle, mounted to the rear of the engine		• • •
T19	Multifunction Power Supply Converter	—	In the instrument panel, right side, in bracket attached bulkhead near A-pillar.	• •	
T22	Wireless Accessory Charging Module	K7A / K7B	In the floor console, front near center, at front of bin.		
T22FR	Wireless Accessory Charging Module - Front Right	K7B	In the floor console, front right of center, at front of bin.		
T35A	Radio Antenna Amplifier	2-Door	At right side of vehicle, near front right of cab, attached to body structure behind fender.	—	
T55LR	Roof Rear Spoiler Antenna Module - Left	4-Door	At rear left of cab, attached to backside of roof spoiler.		
T55RR	Roof Rear Spoiler Antenna Module - Right	4-Door	At rear right of cab, attached to backside of roof spoiler.		
W10GF	Blunt Cut - Body Harness Ground Terminal Assurance 1551	4-Door - (UK0 / UKL)	In the passenger compartment, left rear upper, in branch to left D-pillar, approximately 9.4 cm (3.7 in) below breakout to E18 Rear Window Defogger Grid X1.		—

Code	Name	Option	Location	Locator View	Connector End View
W10GG	Blunt Cut - Engine Harness Ground Terminal Assurance 6550	L4B	On the engine, right side near rear, in bundle at top right of engine, approximately 7.7 cm (3 in) rear of breakout to G18 Fuel Pump - High Pressure.	—	—
W15CSA	Blunt Cut - Horn and Siren Seating Area	(5W4 / 9C1) & 6J4	In the passenger compartment, right front, near inboard front of passenger seat.		—
W15CSB	Blunt Cut - Grille Lamp and Siren Speaker Seating Area	(5W4 / 9C1) & 6J3	In the passenger compartment, right front, near inboard front of passenger seat.		—
W15HBC	Blunt Cut - Flasher System Cargo Area	5W4 / 9C1	In the vehicle.	—	—
W15HBS	Blunt Cut - Flasher System Seating Area	5W4 / 9C1	In the passenger compartment, right front, near inboard front of passenger seat.	—	—
W15IP	Blunt Cut - Horn and Siren Instrument Panel	(5W4 / 9C1) & 6J4	In the instrument panel, left side near steering column.		—
W15RAD	Blunt Cut - Grille Lamp and Siren Speaker Radiator	(5W4 / 9C1) & 6J3	In the engine compartment, right side near rear.		—
W16RMC	Blunt Cut - Radio Mute Cargo Area	5W4 / 9C1	In the vehicle.	—	—
W16RMS	Blunt Cut - Radio Mute Seating Area	5W4 / 9C1	In the passenger compartment, right front, near inboard front of passenger seat.	—	—
W39	Blunt Cut - Configurable/ Accessory Switch Provision	KGU	In the instrument panel, left side approximately 30.5 cm (12 in) from K56U Special Purpose Vehicle Control Module.	—	—
X50A	Engine Wiring Harness Junction Block	—	In the engine compartment, right front, forward of C1 Battery.		*Electrical Center Identification Views 8-40*
X50B	Battery Distribution Engine Compartment Fuse Block	—	In the engine compartment, right side, attached to top of C1 Battery.		*Electrical Center Identification Views 8-40*
X51R	Instrument Panel Wiring Harness Junction Block - Right	—	In the instrument panel, right end, behind outer trim cover.		*Electrical Center Identification Views 8-40*
X52P	Wiring Harness Auxiliary Junction Block	VBP	In the engine compartment, rear right, attached to plenum front panel.		*Electrical Center Identification Views 8-40*
X81AC	Accessory Power Receptacle - Floor Console 110V AC	KFG	In the floor console, right middle, at bottom of bin.		
X81AI	Accessory Power Receptacle - Instrument Panel 110V AC	KI4	In the instrument panel, lower near center, below S126 Ride Control Switch	—	

Code	Name	Option	Location	Locator View	Connector End View
X81AP	Pickup Box Accessory Power Receptacle - 110V AC	KC9	At right rear of vehicle, inside pickup box near lower corner.		
X81BC	Accessory Power Receptacle - Floor Console 220V AC	KFH	In the floor console, right middle, at bottom of bin.		
X81BI	Accessory Power Receptacle - Instrument Panel 220V AC	KI5	In the instrument panel, lower near center, below S126 Ride Control Switch	—	
X81BP	Pickup Box Accessory Power Receptacle - 220V AC	KCA	At right rear of vehicle, inside pickup box near lower corner.		
X83BCR	Audio/Video Receptacle - Floor Console Rear	D07 / DCK	In the floor console, at upper rear of floor console compartment.		• •
X83BFC	Audio/Video Receptacle - Floor Console Front	D07 / DCK	In the floor console, left middle, at bottom of bin.		• • •
X83BIP	Audio/Video Receptacle - Instrument Panel	- (D07 / DCK)	In the instrument panel, rear right of center, right of S126 Ride Control Switch.	—	• •
X83FP	Audio/Video and USB Receptacle	USN	In the floor console, right side at front.		• •
X84	Data Link Connector	—	In the passenger compartment, at the bottom of the driver side of the instrument panel		
X85	Steering Wheel Airbag Coil	—	In the steering column, forward of the steering wheel.	—	• •
X88B	Tow Vehicle Electrical Receptacle	—	At rear of vehicle, left of center, between E7L Rear License Plate Lamp - Left and license plate		• • • •
X92CD	Dual Charge Only Receptacle - Floor Console Rear	(D07 / DCK) & UBI	In the floor console, lower rear center.		
X92FSR	Dual Charge Only Receptacle - Front Center Seat Rear Cover	AZ3 & UBI	In the center seat, rear lower trim between HVAC outlets.		
X122	Front View Camera Wiring Harness to Body Wiring Harness	UV2	At front of vehicle, right side, attached to lower backside of grille near E13RA Front Headlamp - Right	• • •	
X124	Front View Camera Wiring Harness to Body Wiring Harness	GRZ	At front of vehicle, right side, attached to middle backside of grille near E13RA Front Headlamp - Right	• •	
X125	Engine Wiring Harness to Body Wiring Harness	—	In the engine compartment, left side near front, near upper body structure, above wheelhouse.	• • •	

Code	Name	Option	Location	Locator View	Connector End View
X129	Engine Wiring Harness to Oil Pump Flow Control Solenoid Valve Harness	LZ0	On the engine, lower right near middle, mounted in lower crankcase extension forward of oil filter.	• •	
X134	Front Grille Lamp to Accessory Grille Lamp	S0M	At front of vehicle.	—	
X144	Engine Wiring Harness to Oil Pump Flow Control Solenoid Valve Harness	L4B	On the engine, lower left front, mounted in lower crankcase extension at front.	• •	
X147	Chassis Wiring Harness to Power Steering Control Module Wiring Harness - Data	—	At left front of frame, attached to front crossmember, near left frame rail.	• •	
X150	Front Object Alarm Sensor Wiring Harness to Body Wiring Harness	—	At front right of vehicle, above frame rail rear of front impact bar mount.	• • • •	
X160D	Engine Wiring Harness to Fuel Injector Wiring Harness	LZ0	On the engine, front near center, attached to bracket at front of camshaft cover.	• •	
X160G	Engine Wiring Harness to Fuel Injector Wiring Harness	L4B	On the engine, left side near front, below intake manifold.	• •	
X160VD	Engine Wiring Harness to Fuel Injector Wiring Harness - Bank 1 Direct	L76 / L78	On the engine, rear left of center, attached to left direct fuel injection rail at rear.	• •	
X160VP	Engine Wiring Harness to Fuel Injector Wiring Harness - Bank 1 Port	L76 / L78	On the engine, upper left side, near middle, attached to left port fuel injection rail at middle.	• •	
X161VD	Engine Wiring Harness to Fuel Injector Wiring Harness - Bank 2 Direct	L76 / L78	On the engine, rear right of center, attached to right direct fuel injection rail at rear.	• •	
X161VP	Engine Wiring Harness to Fuel Injector Wiring Harness - Bank 2 Port	L76 / L78	On the engine, upper right side near middle, attached to right port fuel injection rail at middle.		
X163	Engine Wiring Harness to Diesel Glow Plug Wiring Harness	LZ0	On the engine, left front, attached to intake manifold, near top.	• •	
X172	Chassis Wiring Harness to Front Disc Brake Pad Wear Sensor Harness	—	At left front wheelhouse, attached to top of frame rear of shock tower.	• •	

Code	Name	Option	Location	Locator View	Connector End View
X176	Automatic Transmission Wiring Harness - Case to Automatic Transmission Wiring Harness - Control	—	Under the vehicle, inside T12 Automatic Transmission.	—	
X210	Instrument Panel Wiring Harness to Body Wiring Harness	—	In the passenger compartment, left front, in the A-pillar, below instrument panel.	• • •	
X211	Instrument Panel Wiring Harness to Body Wiring Harness	—	In the passenger compartment, right front, in the A-pillar, below instrument panel.	• • •	
X213	Upfitter Wiring Harness to Instrument Panel Wiring Harness	—	In the instrument panel, left side, near body control module.		
X214	Instrument Panel Wiring Harness to Body Wiring Harness	4-Door	In the passenger compartment, right front, attached to A-pillar, rear of X211, below instrument panel.	• •	
X217	Instrument Panel Wiring Harness Extension Harness to Body Wiring Harness	TRG	In the passenger compartment, right front, attached to A-pillar, below X255 and instrument panel.		
X218	Instrument Panel Wiring Harness to Body Wiring Harness	—	In the passenger compartment, lower left front, attached to bulkhead reinforcement.	• • •	• • •
X219	Spot Light Wiring Harness to Instrument Panel Wiring Harness	5W4 / 9C1	In the instrument panel, left front. At A-pillar near bottom corner of windshield.		
X224A	Instrument Panel Wiring Harness to Front Floor Console Wiring Harness	D07 / DCK	In the passenger compartment, front left of center, at left front of floor console, top position of 4.	• •	
X224B	Instrument Panel Wiring Harness to Front Floor Console Wiring Harness	USN	In the passenger compartment, front left of center, at left front of floor console, lower middle position of 4.	• •	
X225	Front Floor Console Wiring Harness to Instrument Panel Wiring Harness	USN	In the passenger compartment, front left of center, at left front of floor console, bottom position of 4.	• •	
X226	Front Floor Console Wiring Harness to Instrument Panel Wiring Harness	D07 / DCK	In the passenger compartment, front left of center, at left front of floor console, upper middle position of 4.	• •	
X227	Front Floor Console Wiring Harness to Body Wiring Harness	D07 / DCK	In the passenger compartment, right of center, near inboard seat track of passenger seat.	• • • •	• • •

Code	Name	Option	Location	Locator View	Connector End View
X227	Front Seat Wiring Harness - Center to Body Wiring Harness	5Y1 / AZ3	In the passenger compartment, right of center, near inboard seat track of passenger seat.	• • • •	• • •
X250	Instrument Panel Wiring Harness to HVAC Assembly Wiring Harness	—	In the instrument panel, left of center, at left side of HVAC assembly.		
X251	HVAC Assembly Wiring Harness - Electric Heater to Body Wiring Harness	C32	In the passenger compartment, lower right front, attached to A-pillar at bottom.		
X255	Instrument Panel Wiring Harness to Body Wiring Harness	—	In the passenger compartment, right front, attached to A-pillar, below X211 and instrument panel.	• • •	
X309	Roof Rear Spoiler Wiring Harness to Body Wiring Harness	4-Door	In the passenger compartment, left rear upper corner, above the headliner.	• •	
X331	Front Seat Wiring Harness - Driver to Body Wiring Harness	—	In the passenger compartment, left side, beneath driver seat, near outboard seat track.	• • • •	• •
X336	Front Seat Wiring Harness - Passenger to Body Wiring Harness	—	In the passenger compartment, right side, beneath passenger seat, near outboard seat track.	• • • •	• •
X340	Body Wiring Harness to Rear Seat Heater Control Wiring Harness	KCB	In the passenger compartment, lower left rear, behind rear seat, at rear seat left attachment to body.	• •	
X370	Dome Lamp Wiring Harness to Instrument Panel Wiring Harness	—	In the instrument panel, right side, below windshield, near A-pillar.	• • • • •	
X371	Roof Rear Spoiler Wiring Harness to Dome Lamp Wiring Harness	4-Door	In the passenger compartment, left rear upper corner, attached to top of headliner, right position, near corner.	• • • •	
X373	Body Wiring Harness to Dome Lamp Wiring Harness	4-Door	In the passenger compartment, left rear upper corner, attached to top of headliner, left position, near corner.	• • • •	
X375	Dome Lamp Wiring Harness to Sunroof Wiring Harness	CAJ	In the passenger compartment, front center, attached to sunroof frame, above A103 Roof Console.	• •	

Code	Name	Option	Location	Locator View	Connector End View
X376	Body Wiring Harness to Dome Lamp Wiring Harness	4-Door	In the passenger compartment, right rear upper corner, attached to top of headliner, right position, near corner.	• • • •	
X382	Headlamp Automatic Control Ambient Light Sensor Wiring Harness to Dome Lamp Wiring Harness	ASV	In the passenger compartment, upper front center, attached to windshield near A10 Inside Rearview Mirror.	• • • • •	
X393	Dome Lamp Wiring Harness to Instrument Panel Wiring Harness	4-Door / UCV	In the passenger compartment, front left, attached to A-pillar, left of windshield.	• • • • •	
X400	Body Wiring Harness to Chassis Wiring Harness	—	In the engine compartment, left side near rear, above wheelhouse.	• •	
X401D	Engine Wiring Harness to Chassis Wiring Harness	LZ0	At left front of frame, above front crossmember, near left frame rail.		
X401G	Engine Wiring Harness to Chassis Wiring Harness	L4B / L76 / L78	At left front of frame, above front crossmember, near left frame rail.	• • •	
X402A	Body Wiring Harness to Chassis Wiring Harness	—	At right front of frame, attached to harness at front of shock tower.	• •	
X402E	Body Wiring Harness to Chassis Wiring Harness	UXA	At right front of frame, attached to harness at front of shock tower, rear of X402A.	• •	
X403	Chassis Wiring Harness to Underbody Camera Wiring Harness	UXA	Under the vehicle, near center middle, attached to rear of transmission crossmember.	• •	
X404	Chassis Wiring Harness to Emission Reduction Fluid Tank Reservoir Wire Harness	FHX / LZ0	Under the vehicle, right side near middle, attached to rear of frame crossmember near rear of cab.		
X405	Power Steering Wiring Harness to Power Steering Wiring Harness Extension Harness	—	At front of frame, near center, attached to front crossmember, above steering gear.	• •	
X410	Chassis Wiring Harness to Body Wiring Harness	—	In the engine compartment, left side near rear, near upper body structure, above wheelhouse.	• •	

Code	Name	Option	Location	Locator View	Connector End View
X414	Chassis Wiring Harness to Chassis Rear Wiring Harness	—	Under the right rear corner of vehicle, attached to bottom of pickup box below E42R Rear Body Structure Stop Lamp - Right.	• • •	
X415	Front Axle Wiring Harness to Engine Wiring Harness	F48	At left front of frame, attached to shock tower, near inboard side.	• • • •	
X416F	Front Axle Wiring Harness to Chassis Wiring Harness	G93	At left front of frame, attached to shock tower, near rear.	• •	
X416L	Chassis Wiring Harness to Electronic Suspension Strut Wiring Harness Extension Harness - Left	Z45	At left front wheelhouse, attached to outboard side of frame forward of shock tower.	• •	
X416R	Chassis Wiring Harness to Electronic Suspension Strut Wiring Harness Extension Harness - Right	Z45	At right front wheelhouse, attached to outboard side of frame forward of shock tower.	• •	
X418	Assist Step Motor - Left to Assist Step Wire - Left	B3L	Under the vehicle, left rear of cab, forward of left rear wheel, between left frame rail and assist step	—	
X419	Assist Step Motor - Right to Assist Step Wire - Right	B3L	Under the vehicle, right rear of cab, forward of right rear wheel, between right frame rail and assist step	—	
X420A	Chassis Rear Wiring Harness Extension Harness to Chassis Wiring Harness	- (G94 / Z45)	Under the vehicle, near rear right of center, attached to bracket on rear of the frame crossmember forward of the rear axle, forward of X420R.	• • •	
X420B	Chassis Wiring Harness to Chassis Rear Wiring Harness Extension Harness	G94 / Z45	Under the vehicle, near rear right of center, attached to bracket on rear of the frame crossmember forward of the rear axle, forward of X420R.	• •	
X420R	Chassis Rear Wiring Harness Extension Harness to Chassis Wiring Harness	—	Under the vehicle, near rear right of center, attached to bracket on rear of the frame crossmember forward of the rear axle, rear of X420A or X420B.	• • •	
X424	Body Wiring Harness to Chassis Wiring Harness	—	At right front of frame, attached to harness at rear of shock tower.	• •	
X438	Chassis Wiring Harness to Backup Alarm Wiring Harness	8S3	Under rear of vehicle, left side, near X88B	—	

Code	Name	Option	Location	Locator View	Connector End View
X500	Front Side Door Door Wiring Harness - Driver to Body Wiring Harness	—	At left front door jamb, at front between hinges.		
X505	Front Side Door Door Wiring Harness - Driver to Front Side Door Door Lock Door Wiring Harness - Driver	—	In the driver door, near middle, behind the driver door trim panel.	• •	
X572	Instrument Panel Wiring Harness to Radio Antenna Wiring Harness	4-Door & U2Q	In the passenger compartment, right front lower, attached to A-pillar, near ground studs.		
X600	Front Side Door Door Wiring Harness - Passenger to Body Wiring Harness	—	At right front door jamb, at front between hinges.		
X605	Front Side Door Door Wiring Harness - Passenger to Front Side Door Door Lock Door Wiring Harness - Passenger	—	In the passenger door, near middle, behind the passenger door trim panel.	• •	
X608	Auxiliary Battery Wiring Harness to Body Wiring Harness	—	In the right front wheelhouse, between wheelhouse liner and E13RA Front Headlamp - Right.	• •	
X618L	Engine Wiring Harness to Air Shutter Wiring Harness - Lower	WMI	At the front of vehicle, left side, near upper left of lower grille air shutter assembly.	• • •	
X618U	Engine Wiring Harness to Air Shutter Wiring Harness - Upper	VTI / WMI	At the front of vehicle, left side, near upper left of upper grille air shutter assembly.	• • •	
X653L	Assist Step Motor - Left to Chassis Wiring Harness	B3L	Under the vehicle, left rear of cab, outboard of frame forward of rear cab mount.		
X653R	Assist Step Motor - Right to Chassis Wiring Harness	B3L	Under the vehicle, right rear of cab, outboard of frame forward of rear cab mount.		
X676D	Engine Wiring Harness to Charge Air Cooler Pump Wiring Harness	LZ0	In the left front wheelhouse, attached to frame above lower control arm front mount.	• •	
X676V	Engine Wiring Harness to Heater Coolant Pump Wiring Harness	L76 / L78	In the engine compartment, left of center, near lower front, attached to bracket left of crankshaft pulley.	• •	
X700	Rear Side Door Door Wiring Harness - Left to Body Wiring Harness	4-Door	At left rear door jamb, at front between hinges.	• •	

Code	Name	Option	Location	Locator View	Connector End View
X800	Rear Side Door Door Wiring Harness - Right to Body Wiring Harness	4-Door	At right rear door jamb, at front between hinges.	• •	
X912	Chassis Wiring Harness to Tail Lamp Wiring Harness	—	Under left rear corner of vehicle, attached to bottom of pickup box below E42L Rear Body Structure Stop Lamp - Left.	• • •	
X914	Chassis Wiring Harness to Rear Lamp Wiring Harness - Left	BOK / BOR / BOY	Under left rear corner of vehicle, attached to bottom of pickup box below E42L Rear Body Structure Stop Lamp - Left, near frame.	• • •	
X918	Chassis Wiring Harness to Endgate Wiring Harness	—	Under rear of vehicle, left side, attached to bracket on rear of the rear frame crossmember, right position.	• • • •	
X919	Endgate Wiring Harness to Chassis Wiring Harness	—	Under rear of vehicle, left side, attached to bracket on rear of the rear frame crossmember, left position.	• • • •	
X922	Chassis Wiring Harness to Tail Lamp Wiring Harness	—	Under the right rear corner of vehicle, attached to bottom of pickup box below E42R Rear Body Structure Stop Lamp - Right.	• • •	
X924	Chassis Wiring Harness to Rear Lamp Wiring Harness - Right	BOK / BOR / BOY	Under the right rear corner of vehicle, attached to bottom of pickup box below E42R Rear Body Structure Stop Lamp - Right, near frame.	• • •	
X933	Endgate Wiring Harness to Accessory Wiring Harness - Endgate Step	63G	At rear of vehicle, inside inner tailgate near center, near E33THX Cargo Lamp - Rear Closure Auxiliary.	—	
X944	Engine Wiring Harness to Engine Coolant Temperature Sensor Harness	LZ0	On the engine, left front, attached to intake manifold, at left side.	• •	
X950	Rear Object Alarm Sensor Wiring Harness to Chassis Wiring Harness	—	Under rear of vehicle, right side, attached to rear of the rear frame crossmember.	• • •	
X961	Engine Wiring Harness to Engine Wiring Harness Extension Harness	L76 / L78	On the engine, front left, at front of left cylinder head.	• •	
X963	Engine Wiring Harness Extension Harness to Valve Rocker Arm Oil Control Valve Harness	L76 / L78	On the engine, front near center, below intake manifold, at front of engine block valley cover.	• •	

Code	Name	Option	Location	Locator View	Connector End View
X985	Roof Rear Spoiler Wiring Harness to Dome Lamp Wiring Harness	4-Door	In the passenger compartment, left rear upper corner, attached to top of headliner, middle position, near corner.	• • • •	
G1000	Ground Strap	—	At left front wheelhouse, at rear, attached to body forward of body mount.		—
G1001	Ground Strap	—	At left front wheelhouse, at rear, attached to frame at front of body mount.		—
G101	Battery Negative Cable	—	In the engine compartment, right side rear of middle, attached to body structure near C1 Battery.	• • •	—
G102A	Body Wiring Harness	—	In the engine compartment, left side near front, attached to inboard side of upper body structure, rear of X125, stacked with G102B.		—
G102B	Body Wiring Harness	—	In the engine compartment, left side near front, attached to inboard side of upper body structure, rear of X125, stacked with G102A.		—
G103A	Body Wiring Harness	—	In the engine compartment, left side near middle, attached to inboard side of upper body structure, forward of X410, stacked with G103B.		—
G103B	Body Wiring Harness	—	In the engine compartment, left side near middle, attached to inboard side of upper body structure, forward of X410, stacked with G103A.		—
G104	Body Wiring Harness	—	In the engine compartment, right side, attached to inboard side of upper body structure, near X50B Battery Distribution Engine Compartment Fuse Block.		—
G105	Battery Negative Cable	—	• (L4B) On the engine, lower right middle, attached to lower crankcase extension forward of oil filter. • (L76 / L78) On the engine, right side near front, attached to engine block above G1 Air conditioning Compressor. • (LZ0) On the engine, right side near rear, attached to engine block.	• • •	—
G106	Power Steering Wiring Harness	—	At right front of frame, attached to shock tower at front, above right frame rail.		—
G173	Engine Wiring Harness	L76 / L78	In the engine compartment, left front, near top left of radiator support.		—

Code	Name	Option	Location	Locator View	Connector End View
G175	Engine Wiring Harness	L76 / L78 / LZ0	• (L76 / L78) On the engine, left rear, attached to rear of left cylinder head. • (LZ0) In the engine compartment, left front, near top left of radiator support.	• •	—
G176	Engine Wiring Harness	L76 / L78	On the engine, right rear, attached to rear of right cylinder head.		—
G176A	Engine Wiring Harness	LZ0	On the engine, front right, attached to cylinder head to right of B96 Cylinder Head Temperature Sensor, stacked with G177B		—
G177A	Engine Wiring Harness	L4B	On the engine, rear right, attached to cylinder head near top, stacked with G177B.		—
G177B	Engine Wiring Harness	L4B / LZ0	• (L4B) On the engine, rear right, attached to cylinder head near top, stacked with G177A. • (LZ0) On the engine, front right, attached to cylinder head to right of B96 Cylinder Head Temperature Sensor, stacked with G176A	• •	—
G178B	Engine Wiring Harness	L4B	On the engine, right front, attached to cylinder head near bottom, below G179A and G179B.		—
G179	Engine Wiring Harness	L76 / L78	On the engine, left front middle, attached to engine block near cylinder head.		—
G179A	Engine Wiring Harness	L4B	On the engine, right front, attached to cylinder head near middle, above G178B, stacked with G179B.		—
G179B	Engine Wiring Harness	L4B	On the engine, right front, attached to cylinder head near middle, above G178B, stacked with G179A.		—
G200	Instrument Panel Wiring Harness	—	In the passenger compartment, right front, below instrument panel, attached to A-pillar, upper position.		—
G201	Instrument Panel Wiring Harness	—	In the passenger compartment, left front, below instrument panel, attached to A-pillar, upper position.		—
G202	Air Heater Wiring Harness	C32	In the passenger compartment, right front, below instrument panel, attached to A-pillar, lower position.		—

Code	Name	Option	Location	Locator View	Connector End View
G203	Instrument Panel Wiring Harness	—	In the passenger compartment, left front, below instrument panel, attached to A-pillar, lower position.		—
G298	Steering Wheel Horn Switch Wiring Harness	ULM	In the steering wheel, attached to hub left of wheel hub bolt.		—
G299	Steering Wheel Horn Switch Wiring Harness	—	In the steering wheel, attached to hub right of wheel hub bolt.		—
G300	Body Wiring Harness	—	In the passenger compartment, right side, at base of B-pillar, stacked with G300B.		—
G300B	Body Wiring Harness	—	In the passenger compartment, right side, at base of B-pillar, stacked with G300.		—
G301	Body Wiring Harness	—	In the passenger compartment, left side, at base of B-pillar, stacked with G301A.		—
G301A	Body Wiring Harness	—	In the passenger compartment, left side, at base of B-pillar, stacked with G301.		—
G303_SDM	Body Wiring Harness	—	In the passenger compartment, right side, under passenger seat, attached to floor reinforcement below front of seat.		—
G304	Body Wiring Harness	4-Door	In the passenger compartment, left rear, attached to C-pillar, below seat belt D-ring.		—
G402	Chassis Wiring Harness	—	Under right side of vehicle, near right front wheelhouse, attached to rear of body mount.		—
G404	Chassis Wiring Harness	—	Under rear of vehicle, right of center, attached to rear of the rear frame crossmember, near X950.		—
G407	Chassis Wiring Harness	—	Under rear of vehicle, near center, attached to rear of the rear frame crossmember.		—
SP22_B636	Backup Alarm Wiring Harness	8S3	Under rear of vehicle, in breakout to P3 Backup Alarm, approximately 11 cm (4.3 in) from tee.	—	—

Code	Name	Option	Location	Locator View	Connector End View
SP24	Body Wiring Harness	—	• (2-Door) In the passenger compartment, left front near bulkhead, in left main bundle, approximately 18 cm (7.1 in) below of breakout to B22 Brake Pedal Position Sensor. • (4-Door) In the passenger compartment, left front near bulkhead, in left main bundle, approximately 6.6 cm (2.6 in) above breakout to X500.	• •	—
SP24_2	Chassis Wiring Harness	—	Under the vehicle, right rear, in main bundle, approximately 5 cm (2 in) forward of breakout to X922.	• •	—
SP24_3	Instrument Panel Wiring Harness	DD8 / DRZ	In the instrument panel, right side, in branch to X370, approximately 7 cm (2.8 in) from upper right bundle.	—	—
SP28_1	Body Wiring Harness	5W4 / 9C1	In the passenger compartment, front right at bulkhead, in cross-car bundle at bulkhead, approximately 33.7 cm (13.3 in) left of breakout of right main bundle to engine compartment.		—
SP140_CNL	Front Floor Console Wiring Harness	D07 / DCK	In the floor console, left front, in branch to X224A and X226, approximately 8.4 cm (3.3 in) from breakout to X226.		—
SP140_IP	Instrument Panel Wiring Harness	—	In the instrument panel, left side, in main bundle, approximately 11.2 cm (4.4 in) left of breakout to S39 Ignition and Start Switch.		—
SP150	Body Wiring Harness	—	In the engine compartment, left rear, in breakout to K160 Brake System Control Module approximately 5.6 cm (2.2 in) from left main bundle.		—
SP150_1	Body Wiring Harness	—	In the wiper cowl, left side, in breakout to M75 Windshield Wiper Motor, approximately 25 cm (9.8 in) from breakout to B20A Brake Fluid Level Indicator Switch.		—
SP151_1	Body Wiring Harness	—	In the engine compartment, left front, in left main bundle, approximately 5.5 cm (2.2 in) rear of breakout to X125.		—
SP157	Accessory Wiring Harness - Sill Plate	S0M	In the passenger compartment, left side, in the branch to K9 Body Control Module.	—	—

Code	Name	Option	Location	Locator View	Connector End View
SP239_3	Body Wiring Harness	—	• (2-Door) In the passenger compartment, left front, in left main bundle, approximately 15.8 cm (6.2 in) below breakout to X210. • (4-Door) In the passenger compartment, left front, in left main bundle, approximately 15.5 cm (6.1 in) above breakout to X218.	• •	—
SP240_1	Dome Lamp Wiring Harness	ASV / BOK / BOR / BOY / UK0 / UKL	In the passenger compartment, upper front right, in windshield header bundle, approximately 6.5 cm (2.6 in) left of breakout to X370.	• • • •	—
SP240_2	Instrument Panel Wiring Harness	UV6	In the instrument panel, left side, in main bundle, approximately 8.5 cm (3.3 in) right of head-up display branch.		—
SP251_1	Engine Wiring Harness	—	• (L4B) In the engine compartment, left front, in breakout to K45 Powertrain Control Module X3, approximately 3.5 cm (1.4 in) from main bundle. • (L76 / L89) In the engine compartment, upper left front, in branch to X125, approximately 12 cm (4.7 in) from breakout to B75 Mass Airflow Sensor toward main bundle. • (LZ0) In the engine compartment, left front, in branch to X125 and air shutters, approximately 17.2 cm (6.8 in) from left main bundle.	• • •	—
SP339_1	Instrument Panel Wiring Harness	—	In the instrument panel, right side, in lower right bundle, approximately 28.8 cm (11.3 in) left of breakout to M8 Blower Motor.		—
SP407_1	Instrument Panel Wiring Harness	—	In the instrument panel, left side, in branch to K9 Body Control Module, approximately 16.8 cm (6.6 in) from breakout to X84 Data Link Connector.		—

Code	Name	Option	Location	Locator View	Connector End View
SP439_1	Engine Wiring Harness	- L4B / (L4B & F48)	• (L4B & F48) On the engine, front left of center, in main bundle, approximately 2.5 cm (1 in) right of branch to coils and transmission. • (L76 / L78) On the engine, front near center, in right main bundle, approximately 9.9 cm (3.9 in) from breakout to Q38 Throttle Body. • (LZ0) On the engine, front near center, in branch to Q20 Intake Airflow Control Valve, approximately 5.8 cm (2.3 in) from main bundle.	• • •	—
SP450	Engine Wiring Harness	L76 / L78	On the engine, lower left front, in main bundle, approximately 15.8 cm (6.2 in) rear of breakouts to G179 and X961.		—
SP450_4	Engine Wiring Harness	L4B	On the engine, right side near rear, in bundle at top right of engine, approximately 5 cm (2 in) rear of breakout to G18 Fuel Pump - High Pressure.		—
SP460_1	Engine Wiring Harness	—	• (L4B) On the engine, left side middle, in main bundle, approximately 14.3 cm (5.6 in) rear of branch to Q38 Throttle Body and X160G. • (L76 / L78) On the engine, front left, in main bundle, approximately 6.4 cm (2.5 in) below breakout to Q97R Engine Coolant Flow Control Valve - Radiator. • (LZ0) On the engine, left side middle, in bundle leading over top of engine, approximately 9 cm (3.5 in) from left main bundle.	• • •	—

Code	Name	Option	Location	Locator View	Connector End View
SP480_1	Engine Wiring Harness	—	• (L4B) In the engine compartment, left front, in branch leading to X125, approximately 1.7 cm (0.7 in) forward of breakout to Q38 Throttle Body. • (L76 / L78) On the engine, left front, in main bundle, approximately 2.5 cm (1 in) from breakouts to K20 Engine Control Module and X125, toward T8A Ignition Coil 1. • (LZ0) On the engine, left side middle, in left main bundle, approximately 9.4 cm (3.7 in) forward of breakout to B65 Manifold Absolute Pressure and Intake Air Temperature Sensor.	• • •	—
SP548_1	Engine Wiring Harness	—	• (L4B) On the engine, left rear, in branch to coils and transmission, approximately 15 cm (5.9 in) rear of breakout to T8D Ignition Coil 4. • (L76 / L78) On the engine, lower left front, in main bundle, approximately 5 cm (2 in) forward of breakouts to G179 and X961. • (LZ0) On the engine, left side middle, in bundle leading over top of engine, approximately 4.5 cm (1.8 in) from left main bundle.	• • •	—
SP548_2	Engine Wiring Harness	LZ0	On the engine, top rear of middle, in bundle crossing top of engine, approximately 5 cm (2 in) right of breakout to Q18B Fuel Pressure Regulator 2.		—
SP580_1	Engine Wiring Harness	—	• (L4B) On the engine, left side middle, in main bundle, approximately 9.3 cm (3.7 in) rear of branch to Q38 Throttle Body and X160G. • (L76 / L78) In the engine compartment, left front, in breakout to K20 Engine Control Module X3, approximately 5.3 cm (2.1 in) from breakouts to K20 Engine Control Module. • (LZ0) On the engine, left side middle, in left main bundle, approximately 5 cm (2 in) rear of bundle leading over top of engine.	• • •	—

Code	Name	Option	Location	Locator View	Connector End View
SP625_3	Engine Wiring Harness	—	• (L4B) In the engine compartment, right front, in branch leading to X50A Engine Wiring Harness Junction Block, approximately 4.4 cm (1.7 in) left of breakout to M128 Turbocharger Wastegate Actuator. • (L76 / L89) In the engine compartment, upper left front, in branch to X125, approximately 7 cm (2.8 in) from main bundle. • (LZ0) On the engine, front left, in main bundle, approximately 5.1 cm (2 in) above of branch to Q22 Intake Manifold Tuning Solenoid Valve.	•	—
SP626_W140_1	Engine Wiring Harness	—	• (L4B) In the engine compartment, left front, in branch leading to X125, approximately 10.9 cm (4.3 in) forward of breakout to Q38 Throttle Body. • (L76 / L78) On the engine, left front, in main bundle, approximately 7.5 cm (3 in) from breakouts to K20 Engine Control Module and X125, toward T8A Ignition Coil 1. • (LZ0) On the engine, left side middle, in bundle leading over top of engine, approximately 13.9 cm (5.5 in) from left main bundle.	•	—
SP626_W53_1	Body Wiring Harness	—	In the passenger compartment, left front at bulkhead, in cross-car bundle at bulkhead, approximately 5 cm (2 in) right of breakout of left main bundle to engine compartment.	•	—
SP639_1	Chassis Wiring Harness	UET & (FHX / G93 / G94 / NPP)	Under the vehicle, right side rear of middle, in main bundle, approximately 107 cm (42.1 in) rear of branch leading to R29 Fuel Filter.		—
SP650	Auxiliary Battery Wiring Harness	VBP	In the engine compartment, right rear, near X52P Wiring Harness Auxiliary Junction Block.	—	—

Code	Name	Option	Location	Locator View	Connector End View
SP650_1	Front Object Alarm Sensor Wiring Harness	—	• (- GRZ) At front left of vehicle, in main bundle, approximately 27.5 cm (10.8 in) left of breakout to B306BB Front Parking Assist Alarm Sensor - Left Middle. • (GRZ & VH6) At front of vehicle, left of center, in main bundle, approximately 10.5 cm (4.1 in) left of breakout to B233B Forward Range Radar Sensor - Long Range. • (GRZ & VHU) At front of vehicle, left of center, in main bundle, approximately 11.9 cm (4.7 in) left of breakout to B233B Forward Range Radar Sensor - Long Range.	• • •	—
SP650_4	Front View Camera Wiring Harness	GRZ	At front of vehicle, right side, in bundle approximately 12.5 cm (4.9 in) right of breakout to B174G Front View Driver Information Camera - Grille		—
SP651_1	Front Object Alarm Sensor Wiring Harness	UK0 / UKL	• (- GRZ) At front right of vehicle, in main bundle, approximately 29.6 cm (11.7 in) left of breakout to B306DB Front Parking Assist Alarm Outer Sensor - Right. • (GRZ & VH6) At front of vehicle, left of center, in main bundle, approximately 28.4 cm (11.2 in) left of breakout to B233B Forward Range Radar Sensor - Long Range. • (GRZ & VHU) At front of vehicle, left of center, in main bundle, approximately 17.3 cm (6.8 in) left of breakout to B233B Forward Range Radar Sensor - Long Range.	• • •	—
SP820_1	Body Wiring Harness	—	• (2-Door) In the passenger compartment, left front at bulkhead, in left main bundle, approximately 16.1 cm (6.3 in) left of breakout of left main bundle to engine compartment. • (4-Door) In the passenger compartment, left front at bulkhead, in left main bundle, approximately 13 cm (5.1 in) right of breakout to B22 Brake Pedal Position Sensor.	• •	—

Code	Name	Option	Location	Locator View	Connector End View
SP851_3	Dome Lamp Wiring Harness	—	In the passenger compartment, upper front right, in windshield header bundle, approximately 26.5 cm (10.4 in) left of breakout to X370.	• • • •	—
SP851_LH	Instrument Panel Wiring Harness	—	In the instrument panel, left side, in main bundle, approximately 20.2 cm (8 in) left of breakout to S39 Ignition and Start Switch.		—
SP1050_3	Heater Wiring Harness	—	In the instrument panel, in bundle on HVAC assembly.	—	—
SP1050_4H	Dome Lamp Wiring Harness	—	• (Regular cab) In the passenger compartment, upper front right, in windshield header bundle, approximately 36.4 cm (14.3 in) left of breakout to X370. • (Double Cab) In the passenger compartment, upper right side, in right side bundle, approximately 62.6 cm (24.6 in) rear of breakout to B396RF Mobile Telephone Headliner Microphone - Right Front. • (Crew Cab - CAJ) In the passenger compartment, upper right side, in right side bundle, approximately 77.3 cm (30.4 in) rear of breakout to B396RF Mobile Telephone Headliner Microphone - Right Front. • (Crew Cab & CAJ) In the passenger compartment, upper right rear, in right side bundle, approximately 11.7 cm (4.6 in) rear of breakout to E37J Roof Rail Rear Seat Position Reading and Courtesy Lamp - Right.	• • • •	—
SP1050_5	Dome Lamp Wiring Harness	CAJ	In the passenger compartment, upper front right, in windshield header bundle, approximately 21.5 cm (8.5 in) left of breakout to X370.		—
SP1050_6	Instrument Panel Wiring Harness	A48 / N38	In the instrument panel, right side, in lower right bundle, approximately 7.7 cm (3 in) right of branch to lower center components.		—
SP1050_7	Instrument Panel Wiring Harness	—	In the instrument panel, left side, in steering column branch, approximately 4 cm (1.6 in) from main bundle.		—

Code	Name	Option	Location	Locator View	Connector End View
SP1050_8	Instrument Panel Wiring Harness	—	In the instrument panel, right side, in main bundle, approximately 4 cm (1.6 in) right of breakout to B10D Sun Load and Ambient Light and Security Indicator Sensor.		—
SP1051_1	Front Floor Console Wiring Harness	D07 / DCK	In the floor console, in main bundle, approximately 15.1 cm (5.9 in) forward of breakout to high voltage power outlet.		—
SP1051_2	Instrument Panel Wiring Harness	UV6	In the instrument panel, left side, in head-up display branch, approximately 6.5 cm (2.6 in) from main bundle.		—
SP1139_1	Front Seat Wiring Harness - Driver	KU9	Under driver seat, in bundle at near rear of cushion, approximately 13 cm (5.1 in) right of breakout to M73D Front Seat Cushion Ventilation Blower - Driver.		—
SP1139_2	Front Seat Wiring Harness - Passenger	KU9	Under passenger seat, in bundle at near rear of cushion, approximately 13.5 cm (5.1 in) right of breakout to M73P Front Seat Cushion Ventilation Blower - Passenger.	• •	—
SP1139_3	Body Wiring Harness	KU9	in the passenger compartment, right side front, near door sill, in right main bundle, approximately 6.7 cm (2.6 in) forward of cross-car bundle by front seats.	• •	—
SP1150_1	Chassis Wiring Harness	B3L	Under the vehicle, right near rear, in main bundle, approximately 17.9 cm (7 in) rear of branch leading to X653L.		—
SP1299_1	Endgate Wiring Harness Routing	QT5	• (QK1) At rear of vehicle, in endgate, in breakout to A99R Pickup Box Endgate Latch - Right, approximately 15.5 cm (6.1 in) from main bundle. • (QK2) At rear of vehicle, in endgate, in branch to left endgate latches, approximately 20.1 cm (7.9 in) from branch to chassis inlines.	• •	—
SP1340_1	Instrument Panel Wiring Harness	—	In the instrument panel, left side, in main bundle, approximately 15.2 cm (6 in) left of breakout to S39 Ignition and Start Switch.		—

Code	Name	Option	Location	Locator View	Connector End View
SP1350_1	Body Wiring Harness	—	in the passenger compartment, right side front, near door sill, in right main bundle, approximately 39.2 cm (15.4 in) forward of cross-car bundle by front seats.	• •	—
SP1350_2	Front Side Door Door Wiring Harness - Passenger	—	In the passenger door, in main bundle approximately 7 cm (2.8 in) forward of breakout to X605.		—
SP1350_5	Rear Side Door Door Wiring Harness - Right	4-Door	• (Crew Cab) In the right rear door, approximately 20 cm (7.9 in) rear of breakout to S79RR Rear Side Door Window Switch - Right. • (Double Cab) In the right rear door, approximately 11.9 cm (4.7 in) forward of breakout to A24RR Rear Side Door Outside Handle - Right.	• •	—
SP1350_9	Front Seat Wiring Harness - Passenger	A7K	• (- (AHH / AKE)) Under passenger seat, in bundle at near front, approximately 4.5 cm (1.8 in) right of breakouts to K29FV Front Seat Heater Vent Control Module. • (AHH / AKE) Under passenger seat, in bundle at near rear of cushion, approximately 3.5 cm (1.4 in) right of breakout to M73P Front Seat Cushion Ventilation Blower - Passenger.	• •	—
SP1363_1	Body Wiring Harness	—	In the passenger compartment, right of center, in cross-car bundle by front seats, approximately 11.2 cm (4.4 in) right of breakout to K36 Restraints Control Module X2.	• •	—
SP1363_5	Front Seat Wiring Harness - Passenger	—	• (- (AHH / AKE)) Under passenger seat, in bundle near inboard side, approximately 3.5 cm (1.4 in) forward of branch to seat back - inboard side. • (AHH / AKE) Under passenger seat, in bundle at near front, approximately 5 cm (2 in) right of breakout to B153P Front Seat Belt Buckle - Passenger.	• •	—
SP1430	Accessory Wiring Harness - Endgate Step	63G	At rear of vehicle, inside inner tailgate near center, in main bundle.	—	—

Code	Name	Option	Location	Locator View	Connector End View
SP1430_1	Body Wiring Harness	QT5 / QT6	In the passenger compartment, left front at bulkhead, in left main bundle, approximately 4.3 cm (1.7 in) right of breakout to B107 Accelerator Pedal Position Sensor.	• •	—
SP1449	Instrument Panel Wiring Harness	—	In the instrument panel, left of center, in main bundle, approximately 21 cm (8.3 in) right of breakout to S39 Ignition and Start Switch.		—
SP1451	Front Floor Console Wiring Harness	D07 / DCK	In the floor console, in main bundle, approximately 13 cm (5.1 in) forward of breakout to X227.		—
SP1451_RFDRT	Front Side Door Door Lock Door Wiring Harness - Passenger	C85	In the passenger door trim, in breakout to E1P Front Side Door Light Conductor Lamp - Passenger Trim Panel, approximately 13.8 cm (5.4 in) from main bundle.		—
SP1550	Front Side Door Door Lock Door Wiring Harness - Driver	C85	In the engine compartment, left front, in the breakout to E13LA Front Headlamp - Left, approximately 14.7 cm (5.8 in) from breakout to B58L Airbag Front End Discriminating Sensor - Left.		—
SP1550_1	Front Side Door Door Wiring Harness - Driver	—	In the driver door, in main bundle approximately 7 cm (2.8 in) forward of breakout to X505.		—
SP1550_13	Front Seat Wiring Harness - Driver	—	• (- A45) Under driver seat, in bundle at near front, approximately 3 cm (1.2 in) left of breakout to P45L Front Seat Lane Departure Warning Actuator - Left. • (A45) Under driver seat, in bundle at near front, approximately 8 cm (3.1 in) right of breakout to P45L Front Seat Lane Departure Warning Actuator - Left.	• •	—
SP1550_2	Rear Side Door Door Wiring Harness - Left	4-Door	• (Crew Cab) In the left rear door, approximately 20 cm (7.9 in) rear of breakout to S79LR Rear Side Door Window Switch - Left. • (Double Cab) In the left rear door, approximately 11.9 cm (4.7 in) forward of breakout to A24LR Rear Side Door Outside Handle - Left.	• •	—

Code	Name	Option	Location	Locator View	Connector End View
SP1550_4	Rear Seat Heater Control Wiring Harness	KCB	In the rear seat cushion, in breakout to X340, approximately 5 cm (2 in) from breakout to E14F Rear Seat Cushion Heater - Left Rear.	—	—
SP1551_1	Body Wiring Harness	—	In the passenger compartment, left side front, near door sill, in left main bundle, approximately 15 cm (5.9 in) forward of cross-car bundle by front seats.	• •	—
SP1551_2	Front Side Door Door Wiring Harness - Driver	(BOK / BOR / BOY) & (A45 / ATH)	In the driver door, in main bundle approximately 12.5 cm (4.9 in) rear of breakout to B63LF Airbag Side Impact Sensor - Left Front Door.		—
SP1552_1	Engine Wiring Harness	F48	• (L4B) Under the vehicle, left of center forward of middle, in branch to transmission, approximately 5 cm (2 in) rear of breakout to T12 Automatic Transmission X1. • (L76 / L78) Under the vehicle, near center forward of middle, in left main bundle, approximately 13.2 cm (5.2 in) rear of branch to T12 Automatic Transmission X1. • (LZ0) Under the vehicle, near center forward of middle, in branch to transfer case, approximately 20.1 cm (7.9 in) from branch to T12 Automatic Transmission X1.	• • •	—
SP1552_2	Engine Wiring Harness	F48	• (L4B) In the engine compartment, left rear, in breakout to K69 Transfer Case Control Module, approximately 10.2 cm (4 in) from main bundle. • (L76 / L78) In the engine compartment, left rear, in breakout to K69 Transfer Case Control Module, approximately 16.8 cm (6.6 in) from breakout to T8C Ignition Coil 3. • (LZ0) In the engine compartment, left rear, in breakout to K69 Transfer Case Control Module, approximately 29.6 cm (11.7 in) from main bundle.	• • •	—

Code	Name	Option	Location	Locator View	Connector End View
SP1553_1	Engine Wiring Harness	F48	• (L4B) Under the vehicle, left of center forward of middle, in branch to transmission, approximately 10 cm (3.9 in) rear of breakout to T12 Automatic Transmission X1. • (L76 / L78) Under the vehicle, near center forward of middle, in left main bundle, approximately 20.7 cm (8.1 in) rear of branch to T12 Automatic Transmission X1. • (LZ0) Under the vehicle, near center forward of middle, in branch to transfer case, approximately 13.1 cm (5.2 in) from branch to T12 Automatic Transmission X1.	• • •	—
SP1624_B636	Backup Alarm Wiring Harness	8S3	Under rear of vehicle, in breakout to P3 Backup Alarm, approximately 17 cm (6.7 in) from tee.	—	—
SP1642	Body Wiring Harness	—	In the engine compartment, left rear, in left main bundle approximately 10.5 cm (4.1 in) rear of breakout to K160 Brake System Control Module.		—
SP1850_1	Endgate Wiring Harness Routing	QT5 / QT6	• (QK1) At rear of vehicle, left of center, below pickup box, in branch to chassis inlines, approximately 29.7 cm (11.7 in) from breakout to X919, toward endgate. • (QK2) At rear of vehicle, in endgate, in main bundle, approximately 19.4 cm (7.6 in) from branch to chassis inlines	• •	—
SP1850_3	Chassis Wiring Harness	—	Under the vehicle, rear near center, forward of rear cross member, in the breakout to K67 Trailer Brake Control Module, approximately 15 cm (5.9 in) from main bundle.		—
SP1850_4	Chassis Wiring Harness	FHX / (FJW & UET)	Under the vehicle, rear near center, above rear cross member, in main bundle, approximately 4.5 cm (1.8 in) left of breakout to K67 Trailer Brake Control Module.		—

Code	Name	Option	Location	Locator View	Connector End View
SP1850_4B	Rear Object Alarm Sensor Wiring Harness	—	• (- VPS) At rear left of vehicle, in main bundle, approximately 4.1 cm (1.6 in) left of breakout to B306EB Rear Parking Assist Alarm Outer Sensor - Left. • (VPS) At rear of vehicle, near center, in main bundle, approximately 5 cm (2 in) left of breakout to X950.		—
SP1850_6	Tail Lamp Wiring Harness - Right	—	At right rear of vehicle, approximately 15 cm (5.9 in) from breakout to E33R Cargo Lamp - Right.		—
SP1850_W618	Accessory Wiring Harness - Endgate Step	63G	At rear of vehicle, inside inner tailgate near center, in main bundle.	—	—
SP1951	Rear Object Alarm Sensor Wiring Harness	—	• (- VPS) At rear of vehicle, near center, in main bundle, approximately 36.3 cm (14.3 in) left of breakout to X950. • (VPS) At rear of vehicle, near center, in main bundle, approximately 37 cm (14.6 in) left of breakout to X950.		—
SP1951_1	Tail Lamp Wiring Harness - Left	—	At left rear of vehicle, approximately 15 cm (5.9 in) from breakout to E33L Cargo Lamp - Left.		—
SP1951_17	Rear Lamp Wiring Harness - Left	BOK / BOR / BOY	At left rear of vehicle, approximately 74 cm (29.1 in) from B342D UHF Low Energy Remote Control Access Sensor Transceiver 4.		—
SP1951_3	Chassis Wiring Harness	—	Under the vehicle, rear left of center, above rear cross member, in main bundle, approximately 4 cm (1.6 in) left of breakout to G407.		—
SP2024_BDY1	Body Wiring Harness	—	• (2-Door) In the engine compartment, left front, in the breakout to E13LA Front Headlamp - Left, approximately 29.4 cm (11.6 in) from breakout to B58L Airbag Front End Discriminating Sensor - Left. • (4-Door) In the engine compartment, left front, in the breakout to E13LA Front Headlamp - Left, approximately 14.7 cm (5.8 in) from breakout to B58L Airbag Front End Discriminating Sensor - Left.		—

Code	Name	Option	Location	Locator View	Connector End View
SP2024_BDY2	Body Wiring Harness	—	In the engine compartment, right front, in the breakout to E13RA Front Headlamp - Right, approximately 28.1 cm (11.1 in) from breakout to B58L Airbag Front End Discriminating Sensor - Left.		—
SP2024_CHS	Chassis Wiring Harness	—	• (FHX) Under the vehicle, right near rear, in main bundle, approximately 99.6 cm (39.2 in) rear of branch to R29 Fuel Filter. • (FJW) Under the vehicle, right near rear, in main bundle, approximately 99.6 cm (39.2 in) rear of breakout to Q13 Evaporative Emission Canister Vent Solenoid Valve.	• •	—
SP2078_1	Front Seat Wiring Harness - Driver	KAM	• (- A45) Under driver seat, in bundle near outboard side, approximately 4 cm (1.6 in) forward of branch to seat back - outboard side. • (A45) Under driver seat, in bundle near outboard side, approximately 3 cm (1.2 in) forward of branch to seat back - outboard side.	• •	—
SP2080_5	Front Seat Wiring Harness - Driver	KAM	• (- A45) Under driver seat, in bundle near outboard side, approximately 11.5 cm (4.5 in) forward of branch to seat back - outboard side. • (A45) Under driver seat, in bundle near outboard side, approximately 10 cm (3.9 in) forward of branch to seat back - outboard side.	• •	—
SP2129	Engine Wiring Harness	L4B	On the engine, front left of center, in branch to coils and transmission, approximately 4.8 cm (1.9 in) rear of breakout to T8B Ignition Coil 2.		—
SP2129_L76	Engine Wiring Harness	L76 / L78	On the engine, left front, in left main bundle, approximately 2.8 cm (1.1 in) rear of breakout to T8A Ignition Coil 1.		—
SP2130_L76	Engine Wiring Harness	L76 / L78	On the engine, right front, in branch to right bank coils, approximately 14.5 cm (5.7 in) rear of breakout to T8D Ignition Coil 4.		—
SP2240_1	Front Seat Wiring Harness - Driver	A45	Under driver seat, in bundle near outboard side, approximately 9.5 cm (3.7 in) rear of branch to seat cushion - outboard side.		—

Code	Name	Option	Location	Locator View	Connector End View
SP2240_2	Body Wiring Harness	—	In the passenger compartment, left side front, in cross-car bundle by front seats, approximately 15 cm (5.9 in) from left main bundle.	• •	—
SP2240_3	Front Seat Wiring Harness - Passenger	AHH / AKE	Under passenger seat, in bundle near inboard side, approximately 7 cm (4.1 in) rear of breakout to B153P Front Seat Belt Buckle - Passenger.		—
SP2374_1	Rear Object Alarm Sensor Wiring Harness	—	• (- VPS) At rear of vehicle, near center, in main bundle, approximately 26.3 cm (10.4 in) left of breakout to X950. • (VPS) At rear of vehicle, near center, in main bundle, approximately 27 cm (10.6 in) left of breakout to X950.		—
SP2379_1	Rear Object Alarm Sensor Wiring Harness	—	• (- VPS) At rear of vehicle, near center, in main bundle, approximately 31.8 cm (12.5 in) left of breakout to X950. • (VPS) At rear of vehicle, near center, in main bundle, approximately 32 cm (12.6 in) left of breakout to X950.		—
SP2480_1	Front Seat Wiring Harness - Passenger	KAM	Under passenger seat, in bundle at near rear of cushion, approximately 10 cm (3.9 in) right of breakout to M73P Front Seat Cushion Ventilation Blower - Passenger.	• •	—
SP2640_1	Front Floor Console Wiring Harness	K7B / (K7A & (KCB / USN))	In the floor console, in main bundle, approximately 14 cm (5.5 in) forward of breakout to E28 Front Floor Console Compartment Lamp.		—
SP2640_2	Instrument Panel Wiring Harness	—	In the instrument panel, left side, in main bundle, approximately 10.8 cm (4.3 in) left of breakout to S39 Ignition and Start Switch.		—
SP2679_1	Body Wiring Harness	4-Door	In the passenger compartment, left side near B-pillar, in left main bundle, approximately 9 cm (3.5 in) forward of breakouts to G301 and G301A		—
SP2680_1	Body Wiring Harness	4-Door / QT2	In the passenger compartment, right of center, in cross-car bundle by front seats, approximately 3.2 cm (1.3 in) left of breakout to X227.	• •	—

Code	Name	Option	Location	Locator View	Connector End View
SP2733_1	Body Wiring Harness	—	In the passenger compartment, left front at bulkhead, in left main bundle, approximately 5 cm (2 in) left of breakout of left main bundle to engine compartment.	• •	—
SP2852_1	Heater Wiring Harness	—	In the instrument panel, in bundle on HVAC assembly.	—	—
SP2854_1	Dome Lamp Wiring Harness	CAJ	In the passenger compartment, upper front right, in windshield header bundle, approximately 31.5 cm (12.4 in) left of breakout to X370.		—
SP2857_1	Body Wiring Harness	KCB	In the passenger compartment, left front, near door sill, in left main bundle, approximately 26.7 cm (10.5 in) forward of cross-car bundle by front seats.		—
SP2861_BDY	Body Wiring Harness	C70 / C85	In the passenger compartment, right side front, in cross-car bundle near front seats, approximately 10.7 cm (4.2 in) right of breakout to X336.	• •	—
SP2861_IP	Instrument Panel Wiring Harness	C70 / C85	In the instrument panel, right side, in upper right bundle, approximately 4 cm right of branch to lower center components and lower right bundle.		—
SP2862_1	Body Wiring Harness	—	In the passenger compartment, left side front, near door sill, in left main bundle, approximately 31.6 cm (12.4 in) forward of cross-car bundle by front seats.	• •	—
SP2933	Body Wiring Harness	DBC / DEZ / DME / DQS	in the passenger compartment, right side front, near door sill, in right main bundle, approximately 28.2 cm (11.1 in) forward of cross-car bundle by front seats.	• •	—

Code	Name	Option	Location	Locator View	Connector End View
SP3140	Front Object Alarm Sensor Wiring Harness	UKL / UK0	• (- GRZ) At front of vehicle, near center, in main bundle, approximately 18.4 cm (7.2 in) left of breakout to X150. • (GRZ & VH6) At front of vehicle, right of center, in main bundle, approximately 6 cm (2.4 in) right of breakout to X150. • (GRZ & VHU) At front of vehicle, near center, in main bundle, approximately 11.8 cm (4.6 in) left of branch to X150 and B306CB Front Parking Assist Alarm Sensor - Right Middle.	• • •	—
SP3758_1	Front Seat Wiring Harness - Driver	AVK	Under driver seat, in bundle near outboard side, approximately 6 cm (2.4 in) rear of branch to seat cushion - outboard side.		—
SP4049_1	Body Wiring Harness	KFG / KFH / KI4 / KI5	In the passenger compartment, left front at bulkhead, in left main bundle, approximately 10.3 cm (4.1 in) below of breakout to B22 Brake Pedal Position Sensor.	• •	—
SP4054_3	Chassis Wiring Harness	FHX	Under the vehicle, right side forward of middle, in branch leading to R29 Fuel Filter, approximately 10.9 cm (4.3 in) from main bundle.		—
SP4054_4	Engine Wiring Harness	FHX	In the engine compartment, left front, in branch to X125 and air shutters, approximately 12.2 cm (4.8 in) from left main bundle.		—
SP4055_3	Chassis Wiring Harness	FHX	Under the vehicle, right side forward of middle, in branch leading to R29 Fuel Filter, approximately 10.9 cm (4.3 in) from main bundle.		—
SP4055_4	Engine Wiring Harness	FHX	On the engine, left front, in main bundle, approximately 11 cm (4.3 in) left of branch to Q22 Intake Manifold Tuning Solenoid Valve.		—
SP4116_1	Front Seat Wiring Harness - Passenger	AHH / AKE	Under passenger seat, in bundle at near front, approximately 2.5 cm (1 in) right of branch to K40P Passenger Seat Adjuster Memory Module.		—
SP4170_W22	Automatic Transmission Wiring Harness - Case	—	Under the vehicle, inside T12 Automatic Transmission, in branch to speed sensors, approximately 11 cm (4.3 in) from breakouts.	—	—

Code	Name	Option	Location	Locator View	Connector End View
SP4171_ W22	Automatic Transmission Wiring Harness - Case	—	Under the vehicle, inside T12 Automatic Transmission, in branch to speed sensors, approximately 6.8 cm (2.7 in) from breakouts.	—	—
SP4320_1	Body Wiring Harness	FJW	In the passenger compartment, left front at bulkhead, in left main bundle, approximately 10 cm (3.9 in) left of breakout of left main bundle to engine compartment.	• •	—
SP4320_4	Chassis Wiring Harness	FHX	Under the vehicle, right side forward of middle, in main bundle, approximately 5 cm (2 in) rear of branch leading to R29 Fuel Filter.	—	—
SP4320_7	Engine Wiring Harness	FHX	On the engine, front center, in main bundle, approximately 5 cm (2 in) left of branch to Q20 Intake Airflow Control Valve.		—
SP4440_1	Body Wiring Harness	—	in the passenger compartment, right side front, near door sill, in right main bundle, approximately 13.2 cm (5.2 in) forward of cross-car bundle by front seats.	• •	—
SP4621_1	Engine Wiring Harness	—	• (L4B) In the engine compartment, left front, in branch leading to X125, approximately 6 cm (2.4 in) rear of breakout to X125. • (L76 / L78) On the engine, front near center, in right main bundle, approximately 4.9 cm (1.9 in) from breakout to Q38 Throttle Body. • (LZ0) On the engine, left front, in main bundle, approximately 10.7 cm (4.2 in) forward of breakout to X163.	• • •	—
SP4622_L76	Engine Wiring Harness	L76 / L78	In the engine compartment, upper left front, in branch to X125, approximately 3.4 cm (1.3 in) from main bundle.		—
SP4622_LZ0	Engine Wiring Harness	LZ0	On the engine, top rear of middle, in bundle crossing top of engine, approximately 5 cm (2 in) left of harness split to turbo area branch.		—
SP4623	Engine Wiring Harness	LZ0	On the engine, front left, in main bundle, approximately 5.1 cm (2 in) left of branch to Q22 Intake Manifold Tuning Solenoid Valve.		—

Code	Name	Option	Location	Locator View	Connector End View
SP4623_2	Engine Wiring Harness	L76 / L78	In the engine compartment, lower left front, in breakout to K20 Engine Control Module X1, approximately 9.2 cm (3.6 in) from breakouts to K20 Engine Control Module.	—	—
SP4634_1	Heater Wiring Harness	—	In the instrument panel, in bundle on HVAC assembly.	—	—
SP4849_BDY	Body Wiring Harness	C70 / C85	In the passenger compartment, right of center, in cross-car bundle by front seats, approximately 14.8 cm (5.8 in) left of breakout to X227.	• •	—
SP4849_CNL	Front Floor Console Wiring Harness	C85	In the floor console, right side, in breakout to X227, approximately 5 cm (2 in) from main bundle.		—
SP4849_IP	Instrument Panel Wiring Harness	C70 / C85	In the instrument panel, right side, in main bundle, approximately 15.7 cm (6.2 in) right of breakout to B10D Sun Load and Ambient Light and Security Indicator Sensor.		—
SP4849_LFDRT	Front Side Door Door Lock Door Wiring Harness - Driver	C85	In the driver door trim, in branch to E1D Front Side Door Light Conductor Lamp - Driver Trim Panel, approximately 13.8 cm (5.4 in) from main bundle.		—
SP4849_RFDRT	Front Side Door Door Lock Door Wiring Harness - Passenger	C85	In the passenger door trim, in breakout to E1P Front Side Door Light Conductor Lamp - Passenger Trim Panel, approximately 24.6 cm (9.7 in) from main bundle.		—
SP5199_1	Instrument Panel Wiring Harness	—	In the instrument panel, left side, in branch to K9 Body Control Module, approximately 6.7 cm (2.6 in) from breakout to X84 Data Link Connector.		—
SP5214_1	Front Object Alarm Sensor Wiring Harness	—	• (- GRZ) At front left of vehicle, in main bundle, approximately 37.5 cm (14.8 in) left of breakout to B306BB Front Parking Assist Alarm Sensor - Left Middle. • (GRZ & VH6) At front of vehicle, near center, in main bundle, approximately 10.5 cm (4.1 in) left of breakout to X150. • (GRZ & VHU) At front of vehicle, near center, in main bundle, approximately 41 cm (16.1 in) left of branch to X150 and B306CB Front Parking Assist Alarm Sensor - Right Middle.	• • •	—

Code	Name	Option	Location	Locator View	Connector End View
SP5240_1	Rear Object Alarm Sensor Wiring Harness	—	• (- VPS) At rear of vehicle, near center, in main bundle, approximately 15 cm (5.9 in) left of breakout to X950. • (VPS) At rear of vehicle, near center, in main bundle, approximately 15.7 cm (6.2 in) left of breakout to X950.		—
SP5290_1	Engine Wiring Harness	L4B / L76 / L78	• (L4B) In the engine compartment, front left of center, in main bundle, approximately 4.5 cm (1.8 in) from breakouts to K45 Powertrain Control Module. • (L76 / L78) On the engine, front left of center, in right main bundle, approximately 9 cm (3.5 in) from main bundle.	• •	—
SP5291_1	Engine Wiring Harness	L76 / L78	On the engine, left front, in left main bundle, approximately 9.6 cm (3.8 in) rear of branch to T8C Ignition Coil 3.		—
SP5291_2	Engine Wiring Harness	L4B	On the engine, front left of center, in branch to coils and transmission, approximately 3.9 cm (1.5 in) rear of main bundle.		—
SP5291_3	Fuel Injector Wiring Harness - Bank 1 Port	L76 / L78	On the engine left near middle upper, in bundle between Q17L Fuel Injector - Cylinder 3 Injector 2 and Q17N Fuel Injector - Cylinder 5 Injector 2.		—
SP5292_1	Engine Wiring Harness	L76 / L78	On the engine, right front, in branch to right bank coils, approximately 11.6 cm (4.6 in) rear of breakout to T8B Ignition Coil 2.		—
SP5292_2	Fuel Injector Wiring Harness - Bank 2 Port	L76 / L78	On the engine right near middle upper, in bundle between Q17M Fuel Injector - Cylinder 4 Injector 2 and Q17P Fuel Injector - Cylinder 6 Injector 2.		—
SP5293_1	Engine Wiring Harness	L76 / L78	On the engine, right front, in branch to right bank coils, approximately 5 cm (2 in) rear of breakout to T8B Ignition Coil 2.		—
SP5293_3	Engine Wiring Harness	L4B	On the engine, front near center, in main bundle, approximately 2.5 cm (1 in) left of breakout to Q6E Camshaft Position Actuator Solenoid Valve - Exhaust.		—

Code	Name	Option	Location	Locator View	Connector End View
SP5293_4	Engine Wiring Harness	L4B	On the engine, right side near rear, in bundle at top right of engine, approximately 8.7 cm (3.4 in) forward of breakout to B23E Camshaft Position Sensor - Exhaust.		—
SP5294_4	Engine Wiring Harness	—	• (L4B) Under the vehicle, left of center forward of middle, in branch to transmission, approximately 68.8 cm (27.1 in). • (L76 / L78) On the engine, left rear, in left main bundle, approximately 9.5 cm (3.7 in) forward of breakout to B52C Heated Oxygen Sensor - Bank 1 Sensor 1. • (LZ0) On the engine, left front, in main bundle, approximately 5.7 cm (2.2 in) forward of breakout to X163.	• • •	—
SP5294_5	Engine Wiring Harness	L76 / L78	In the engine compartment, right side near middle, in right main bundle, approximately 11 cm (4.3 in) rear of breakout to X50A Engine Wiring Harness Junction Block X2.		—
SP5906_1	Front Seat Wiring Harness - Driver	KU9	Under driver seat, in bundle at near rear of cushion, approximately 9.5 cm (3.7 in) right of breakout to M73D Front Seat Cushion Ventilation Blower - Driver.		—
SP5908_1	Front Seat Wiring Harness - Passenger	KU9	• (- (AHH / AKE)) Under passenger seat, in bundle near inboard side, approximately 10.5 cm (4.1 in) forward of branch to seat back - inboard side. • (AHH / AKE) Under passenger seat, in bundle near inboard side, approximately 9 cm (4.1 in) forward of branch to seat back - inboard side.	• •	—
SP5966_1	Body Wiring Harness	DEZ	• (2-Door) In the passenger compartment, left side, near door sill, in left main bundle, approximately 37.5 cm (14.8 in) forward of cross-car bundle by front seats. • (4-Door) In the passenger compartment, left front, near door sill, in left main bundle, approximately 25.9 cm (10.2 in) rear of breakout to X218.	• •	—
SP6051_1	Steering Wheel Horn Switch Wiring Harness	—	In the steering wheel.	—	—

Code	Name	Option	Location	Locator View	Connector End View
SP6134_1	Front Side Door Door Wiring Harness - Driver	—	• (2-Door) In the driver door, in main bundle approximately 14.3 cm (5.6 in) rear of breakout to P19AG Radio Front Side Door Speaker - Left. • (4-Door) In the driver door, in main bundle approximately 15.2 cm (6 in) rear of breakout to P19AG Radio Front Side Door Speaker - Left.		—
SP6134_2	Body Wiring Harness	—	in the passenger compartment, right side front, near door sill, in right main bundle, approximately 23.2 cm (9.1 in) forward of cross-car bundle by front seats.	•	—
SP6134_3	Front Side Door Door Wiring Harness - Passenger	WLN	In the passenger door, in main bundle approximately 15.2 cm (6 in) rear of breakout to P19AH Radio Front Side Door Speaker - Right.		—
SP6135_1	Body Wiring Harness	4-Door	In the passenger compartment, left front, near door sill, in left main bundle, approximately 8.5 cm (3.3 in) forward of cross-car bundle by front seats.		—
SP6150_1	Engine Wiring Harness	L76 / L78	On the engine, left front, in left main bundle, approximately 16 cm (6.3 in) rear of branch to T8C Ignition Coil 3.		—
SP6387_ETRS	Automatic Transmission Wiring Harness - Control	—	Under the vehicle, inside T12 Automatic Transmission, in branch to B315A Transmission Range Control Valve 1 Position Switch, between breakout to B316 Transmission Park Valve Position Switch and X176.	—	—
SP6387_W22	Automatic Transmission Wiring Harness - Case	—	Under the vehicle, inside T12 Automatic Transmission, in branch to X176, approximately 3 cm (1.2 in) from B14A Automatic Transmission Output Speed Sensor toward T12 Automatic Transmission X2 and X3.	—	—
SP6388_ETRS	Automatic Transmission Wiring Harness - Control	—	Under the vehicle, inside T12 Automatic Transmission, in branch to B315A Transmission Range Control Valve 1 Position Switch, between breakout to B316 Transmission Park Valve Position Switch and Q77J Transmission Control Solenoid Valve 9.	—	—

Code	Name	Option	Location	Locator View	Connector End View
SP6388_ETRS_2	Automatic Transmission Wiring Harness - Control	—	Under the vehicle, inside T12 Automatic Transmission, in branch to B13 Automatic Transmission Fluid Temperature Sensor, between breakouts to B13 Automatic Transmission Fluid Temperature Sensor and Q77B Transmission Control Solenoid Valve 2.	—	—
SP6440_18	Chassis Wiring Harness	BOK / BOR / BOY	Under the vehicle, rear left of center, above rear cross member, in main bundle, approximately 3.5 cm (1.4 in) right of breakout to G407.		—
SP6450_1	Engine Wiring Harness	L4B / L76 / L78	• (L4B) On the engine, front near center, in main bundle, approximately 6.6 cm (2.6 in) right of breakout to Q6F Camshaft Position Actuator Solenoid Valve - Intake. • (L76 / L78) On the engine, right front, in branch to right bank coils, approximately 9.8 cm (3.9 in) rear of breakout to T8D Ignition Coil 4.	• •	—
SP6550_6	Air Shutter Wiring Harness - Lower	WMI	At front of vehicle, lower left of center, approximately 17.4 cm (6.9 in) from M96B Active Grille Air Shutter Actuator 2.		—
SP6581_1	Front Object Alarm Sensor Wiring Harness	—	• (- GRZ) At front right of vehicle, in main bundle, approximately 24.6 cm (9.7 in) left of breakout to B306DB Front Parking Assist Alarm Outer Sensor - Right. • (GRZ & VH6) At front of vehicle, left of center, in main bundle, approximately 27 cm (10.6 in) right of breakout to B306BB Front Parking Assist Alarm Sensor - Left Middle. • (GRZ & VHU) At front of vehicle, near center, in main bundle, approximately 26.4 cm (10.4 in) left of branch to X150 and B306CB Front Parking Assist Alarm Sensor - Right Middle.	• • •	—
SP6751	Chassis Wiring Harness	LZ0	Under the vehicle, near right front corner of cab, approximately 15.5 cm (6.1 in) forward of breakout to G402.		—

Code	Name	Option	Location	Locator View	Connector End View
SP6817_3	Instrument Panel Wiring Harness	—	In the instrument panel, left of center, in main bundle, approximately 11.7 cm (4.6 in) left of breakout to B10D Sun Load and Ambient Light and Security Indicator Sensor.		—
SP6817_6	Body Wiring Harness	—	• (2-Door) In the passenger compartment, under driver seat, in cross-car bundle by front seats, approximately 27 cm (10.6 in) right of breakout to X331. • (4-Door) In the passenger compartment, under driver seat, in cross-car bundle by front seats, approximately 27.5 cm (10.8 in) left of breakout to K36 Restraints Control Module X1.	• •	—
SP6817_7	Front Floor Console Wiring Harness	D07 / DCK	In the floor console, in main bundle, approximately 8.7 cm (3.4 in) forward of breakout to X227.		—
SP6846_1	Rear Object Alarm Sensor Wiring Harness	—	• (- VPS) At rear of vehicle, near center, in main bundle, approximately 13.2 cm (5.2 in) right of breakout to E7L Rear License Plate Lamp - Left. • (VPS) At rear of vehicle, near center, in main bundle, approximately 42 cm (16.5 in) right of breakout to E7L Rear License Plate Lamp - Left.		—
SP7040	Front Object Alarm Sensor Wiring Harness	(BOK / BOR / BOY) - GRZ	At front right of vehicle, in main bundle, approximately 14.6 cm (5.7 in) left of breakout to B306DB Front Parking Assist Alarm Outer Sensor - Right.		—
SP7040_9	Body Wiring Harness	BOK / BOR / BOY	In the passenger compartment, front right at bulkhead, in cross-car bundle at bulkhead, approximately 13.5 cm (5.3 in) left of breakout of right main bundle to engine compartment.		—
SP7444_1	Chassis Wiring Harness	—	Under the vehicle, in branch to A7 Fuel Tank Fuel Pump Module approximately 14.1 cm (5.6 in) from connector.		—
SP7444_4	Chassis Wiring Harness	—	Under the vehicle, in breakout to K111 Fuel Pump Power Control Module approximately 30.2 cm (11.9 in) from branch to A7 Fuel Tank Fuel Pump Module.	• •	—

Code	Name	Option	Location	Locator View	Connector End View
SP7725_1	Endgate Wiring Harness Routing	QK2	At rear of vehicle, in endgate, in branch to left endgate latches, approximately 49.1 cm (19.3 in) from latch breakouts.		—
SP7730_1	Endgate Wiring Harness Routing	QT5	• (QK1) At rear of vehicle, in endgate, in main bundle, approximately 10.6 cm (4.2 in) below breakouts to latches. • (QK2) At rear of vehicle, in endgate, in branch to left endgate latches, approximately 12.9 cm (5.1 in) from branch to chassis inlines.	• •	—
SP7761_1	Body Wiring Harness	DQS	in the passenger compartment, right front, near door sill, in right main bundle, approximately 34.1 cm (13.4 in) forward of cross-car bundle by front seats.		—
SP7762_1	Chassis Wiring Harness	—	Under the vehicle, right rear, in main bundle, approximately 3.4 cm (1.3 in) left of breakout to X950.	• •	—
SP8014_1	Engine Wiring Harness	F48	• (L4B) Under the vehicle, left of center forward of middle, in branch to transmission, approximately 20 cm (7.9 in) rear of breakout to T12 Automatic Transmission X1. • (L76 / L78) In the engine compartment, left rear, in breakout to K69 Transfer Case Control Module, approximately 39.9 cm (15.7 in) from breakout to T8C Ignition Coil 3. • (LZ0) In the engine compartment, left rear, in breakout to K69 Transfer Case Control Module, approximately 9.9 cm (3.9 in) from main bundle.	• • •	—

Code	Name	Option	Location	Locator View	Connector End View
SP8015_1	Engine Wiring Harness	F48	• (L4B) Under the vehicle, left of center forward of middle, in branch to transmission, approximately 15 cm (5.9 in) rear of breakout to T12 Automatic Transmission X1. • (L76 / L78) In the engine compartment, left rear, in breakout to K69 Transfer Case Control Module, approximately 21.5 cm (8.5 in) from breakout to T8C Ignition Coil 3. • (LZ0) Under the vehicle, near center forward of middle, in branch to transfer case, approximately 6.1 cm (2.4 in) from branch to T12 Automatic Transmission X1.	• • •	—
SP8863_1	Emergency Vehicle Upfitter Wiring Harness	5W4 / 9C1	In the vehicle.	—	—
SP8864_1	Emergency Vehicle Upfitter Wiring Harness	5W4 / 9C1	In the vehicle.	—	—
SP8865_1	Emergency Vehicle Upfitter Wiring Harness	5W4 / 9C1	In the vehicle.	—	—
SP8924_CNL	Front Floor Console Wiring Harness	C85	In the floor console, in main bundle, approximately 11.1 cm (4.4 in) rear of breakout to E55FCR Front Floor Console Map Pocket Illumination Lamp - Right.		—
SP9777	Emergency Vehicle Upfitter Wiring Harness	5W4 / 9C1	In the vehicle.	—	—
SP10116_2	Front Floor Console Wiring Harness	KFG / KFH	In the floor console, left front, in breakout to X224A, approximately 5.6 cm (2.2 in) from breakout to X226.		—
SP10116_3	Instrument Panel Wiring Harness	KFG / KFH	In the instrument panel, left of center, in branch to floor console, approximately 4.3 cm (1.7 in) from breakout to console inlines toward main bundle.		—
SP10119_2	Chassis Wiring Harness	KC9 / KCA	Under the vehicle, right rear, in branch to X414, approximately 24 cm (9.4 in) from main bundle.	• •	—
SP10119_3	Chassis Rear Wiring Harness Routing	KC9 / KCA	At right rear corner of vehicle, below HV power outlet, approximately 25 cm (9.8 in) from X414.		—
SP10119_7	Chassis Wiring Harness	KC9 / KCA	In the engine compartment, left side, in breakout to X410, approximately 34.3 cm (13.5 in) from breakout to X400.		—

Code	Name	Option	Location	Locator View	Connector End View
SP10119_9	Body Wiring Harness	KC9 / KCA	• (2-Door) In the engine compartment, left rear, in breakout to X410, approximately 7.1 cm (2.8 in) from left main bundle. • (4-Door) In the engine compartment, left rear, in breakout to X410, approximately 5.4 cm (2.1 in) from left main bundle		—
SP10597	Engine Wiring Harness	L4B / L76 / L78	• (L4B) On the engine, left side middle, in main bundle, approximately 4.8 cm (1.9 in) rear of branch to Q38 Throttle Body and X160G. • (L76 / L78) On the engine, left front, in main bundle, approximately 5.7 cm (2.2 in) from branch to right side of engine, toward breakouts to K20 Engine Control Module and X125.	• •	—
SP10599	Engine Wiring Harness	L4B / L76 / L78	• (L4B) In the engine compartment, front left of center, in main bundle, approximately 17.5 cm (6.9 in) from breakouts to K45 Powertrain Control Module. • (L76 / L78) On the engine, left front, in left main bundle, approximately 14.6 cm (5.7 in) rear of branch to T8C Ignition Coil 3.	• •	—
SP10652_1	Instrument Panel Wiring Harness	—	In the instrument panel, right side, in lower right bundle, approximately 23.9 cm (9.4 in) left of breakout to M8 Blower Motor.		—
SP10667_1	Engine Wiring Harness	L4B / L76 / L78	• (L4B) On the engine, front near center, in main bundle, approximately 6 cm (2.4 in) left of breakout to Q6E Camshaft Position Actuator Solenoid Valve - Exhaust. • (L76 / L78) On the engine, left front, in left main bundle, approximately 15.3 cm (6 in) rear of branch to T8C Ignition Coil 3.	• •	—

Code	Name	Option	Location	Locator View	Connector End View
SP10749_BDY1	Body Wiring Harness	—	• (2-Door) In the engine compartment, left front, in the breakout to E13LA Front Headlamp - Left, approximately 33.4 cm (13.1 in) from breakout to B58L Airbag Front End Discriminating Sensor - Left. • (4-Door) In the engine compartment, left front, in the breakout to E13LA Front Headlamp - Left, approximately 34.9 cm (13.7 in) from breakout to B58L Airbag Front End Discriminating Sensor - Left.		—
SP10749_BDY2	Body Wiring Harness	—	In the engine compartment, right front, in the breakout to E13RA Front Headlamp - Right, approximately 32.1 cm (12.6 in) from breakout to B58L Airbag Front End Discriminating Sensor - Left.		—
SP10749_CHS	Chassis Wiring Harness	—	Under the vehicle, right near rear, in main bundle, approximately 35.5 cm (14 in) forward of branch leading to fuel tank.	• •	—
SP10807	Engine Wiring Harness	L4B	In the engine compartment, front left of center, in main bundle, approximately 12.5 cm (4.9 in) from breakouts to K45 Powertrain Control Module.		—
SP10808	Engine Wiring Harness	L4B	In the engine compartment, left front, in breakout to K45 Powertrain Control Module X3, approximately 4 cm (1.6 in) from main bundle.		—
SP10809_11	Engine Wiring Harness	L4B	On the engine, front near center, in main bundle, approximately 3.1 cm (1.2 in) right of breakout to Q6F Camshaft Position Actuator Solenoid Valve - Intake.		—
SP11418	Front View Camera Wiring Harness	GRZ	At front of vehicle, right side, in bundle approximately 12.5 cm (4.9 in) right of breakout to B174G Front View Driver Information Camera - Grille	—	—

Code	Name	Option	Location	Locator View	Connector End View
SP14026	Front Object Alarm Sensor Wiring Harness	- GRZ	At front left of vehicle, in main bundle, approximately 22.5 cm (8.9 in) left of breakout to B306BB Front Parking Assist Alarm Sensor - Left Middle.		—
SP14026_ BDY	Body Wiring Harness	—	• (2-Door) In the passenger compartment, left front at bulkhead, in left main bundle, approximately 24.6 cm (9.7 in) left of breakout of left main bundle to engine compartment. • (4-Door) In the passenger compartment, left front at bulkhead, in left main bundle, approximately 4.4 cm (1.7 in) right of breakout to B22 Brake Pedal Position Sensor.	• •	—

Description and Operation

Power Mode Description and Operation

Serial Data Power Mode Master

The K9 Body Control Module (BCM) is the Power Mode Master and the K56 Serial Data Gateway Module is the Back-Up Power Mode Master.

The Power Mode Master uses various vehicle status conditions and inputs to determine the desired vehicle power mode state. The Power Mode (Off, Accessory, Run, Propulsion, Start) is communicated to other modules via Serial Data and other electrical signals in order to provide the proper feature operation for the appropriate power mode.

If the Power Mode Master cannot control or determine the correct Power Mode, the Backup Power Mode Master will take over and become the vehicle Power Mode Master and place the vehicle into the proper Power Mode by communicating with other modules via Serial Data to provide the proper electrical signals to provide the proper feature operation for the appropriate power mode.

S38 On/Off Vehicle Switch

There are 5 power modes to convey driver intent:

- OFF – A low power mode that allows maximum stand time until next start
- ACCY – Allows use of certain features that require operator authorization (Power windows for example). Propulsion is specifically disallowed.
- RUN – All features enabled except propulsion (motive force)
- PROPULSION – All features enabled
- START - This will transition to PROPULSION, including turning off non-essential loads to provide additional power for starting.

Power Mode States

Customer Action	Expected Vehicle Power Mode	S38 Vehicle On/Off Switch BCM Scan Tool Parameter	S38 Vehicle On/Off Switch Voltages
Vehicle OFF, S38 On/Off Vehicle Switch not pressed, Transmitter in Range	Vehicle Off Mode	Inactive	1.4 – 3.0 V (Switch Pressed) 3.35 – 4.26 V (Switch Released) 4.5 — 5.0 V (Switch Disconnected)
Vehicle OFF, S38 On/Off Vehicle Switch not pressed, Transmitter out of Range/Away from vehicle	Vehicle Off Mode	Inactive	
Vehicle in any Power Mode EXCEPT OFF, then Press the S38 On/Off Vehicle Switch Foot On or Off the Brake Pedal, Transmitter in Vehicle	Vehicle Off Mode	Active (pushed) / Inactive (not pushed)	

Customer Action	Expected Vehicle Power Mode	S38 Vehicle On/Off Switch BCM Scan Tool Parameter	S38 Vehicle On/Off Switch Voltages
Vehicle in Propulsion Mode, momentarily Press and Release the S38 On/Off Vehicle Switch Foot On or Off the Brake Pedal, Transmitter out of Range/Away from vehicle	Run Mode, With DIC Message No Remote Detected Press Brake to Restart	Active (pushed) Inactive (not pushed)	
Vehicle Off Power Mode, then Press the S38 On/Off Vehicle Switch for less than 5 s with foot Off the Brake Pedal; Transmitter in Vehicle	Vehicle Accessory Mode	Active (pushed) / Inactive (not pushed)	
Vehicle Off Power Mode, then S38 On/Off Vehicle Switch with foot On the Brake Pedal; Transmitter in Vehicle	Vehicle Start/Propulsion Mode (vehicle cranks then engine running (for Internal Combustion Engine) or Propulsion System Active for EV) power mode timeout is enabled	Active (pushed) / Inactive (not pushed)	
Vehicle Off Power Mode, then S38 On/Off Vehicle Switch with foot On the Brake Pedal for 5 to 10 s; Transmitter in Vehicle	Vehicle Start/Propulsion Mode (vehicle cranks then Propulsion Mode Active) power mode timeout will be disabled.	Active (pushed) / Inactive (not pushed)	
Vehicle OFF Power Mode, then Press and Hold the S38 On/Off Vehicle Switch for 5 s with foot Off the Brake Pedal; Transmitter in Vehicle	Vehicle Run Mode (Ignition ON without the Propulsion system Active)	Active (pushed) / Inactive (not pushed)	
Vehicle Propulsion Mode with vehicle speed detected above 4 km/h (2.5 MPH) press and hold S38 On/Off Vehicle Switch for 2 s or press and release it 2 times within 5 S.	Vehicle will transition from Propulsion Mode to Run Mode (Ignition On Propulsion system Inactive).	Active (pushed) / Inactive (not pushed)	
NOTE: If the transmitter is not moved for more than 1 hour it will become inactive.			

Automatic Power Mode Timeouts

Note: If the Transmitter/Fob remains stationary and is not moved for one hour, it will go to sleep and may create a fob not in range condition.

This system is designed to prevent batteries from going dead in the event the ignition is left on while unattended, it is also designed to shut the vehicle off if left running unattended. After a Power Mode timeout, the Power Mode Master is responsible for shutting down the or transitioning the vehicle into the low parasitic sleep state “OFF” Power Mode. This Power Mode timeout strategy uses Vehicle Speed, Vehicle Power Mode, Parked Status and other Vehicle Conditions to make the timeout determination.

Accessory Power Mode

The Accessory Power Mode will timeout after approximately 5 minutes. The timer will Start once the system has determined it is in the Accessory Power Mode status. After the timer expires the Power Mode will change to the OFF Power Mode.

Run Power Mode

If the conditions listed below are met the Run Power Mode will timeout after approximately 40 minutes if the transmitter is in range, or 20 minutes if the transmitter is out of range. The timer will Start once the system has determined it is in the Run Power Mode status and all of the following conditions are met. After the timer expires the Power mode will change to OFF Power Mode.

If any of the following conditions are not met and/or if there is a change in the Brake Pedal or Clutch Pedal status, the Run Mode timeout timer will be disabled, and the timer will restart after all of the conditions are met again.

- Vehicle in Run Mode (Vehicle powered up S38 On/Off Vehicle Switch Green indicator on Propulsion Mode Inactive)
- Propulsion is Inactive
- Vehicle in Park.
- Vehicle Speed is 0 KM/MPH.
- Fast Idle is inactive (If Equipped).

- PTO Remote Start Status is inactive (If Equipped).
- Particulate Filter Cleaning Status is Inactive (if Equipped)
- S38 Vehicle On/Off switch is held for more than 5 to 10 seconds while starting the vehicle. The actual time may vary based on model and/or year.

Propulsion Power Mode
If the following conditions listed below are met the Propulsion Power Mode will timeout after approximately 30 minutes if the transmitter is in range, or 15 minutes if the transmitter is out of range. The timer will Start once the system has determined it is in the Propulsion Power Mode status and all of the following conditions are met. After the timer expires the Power mode will change to the OFF Power Mode.

The Propulsion Power Mode timeout can be disabled with the vehicle in Off Power Mode, apply and continue to hold the brake pedal, then press and hold the S38 Vehicle On/Off switch for 5 to 10 seconds (the actual time may vary based on model and/or year). A DIC message will be displayed when Power Mode timeout is disabled.

If any of the following conditions are not met and/or if there is a change in the Brake Pedal or Clutch Pedal status, the Propulsion Mode timeout timer will be disabled, and the timer will restart after all of the conditions are met again.

- Vehicle in Propulsion Mode (Propulsion Active).
- Vehicle in Park.
- Vehicle Speed is 0 KM/MPH.
- Fast Idle is Inactive (If Equipped).
- PTO Remote Start Status is inactive (If Equipped).
- Particulate Filter Cleaning Status is Inactive (if Equipped)
- S38 Vehicle On/Off switch iss held for more than 5 to 10 seconds while starting the vehicle. The actual time may vary based on model and/or year.

Relay Controlled Power Mode

The BCM uses discrete push button switch inputs, transmitter in range status, current power mode state, and brake pedal position state to distinguish the correct power mode (Off, Accessory Mode, Run Mode, Start/Propulsion Mode). The BCM, after determining the desired power mode, will activate the appropriate relays for that power mode.

The retained accessory power relay remains on for a timed period after the Ignition Mode is OFF. Refer to *Retained Accessory Power Description and Operation 8-1224* for more information on the retained accessory power function.

Push Button Start

The ignition mode switch has 2 LEDs that indicate the vehicle power mode Amber for Accessory Mode and Green for Run or Start/Propulsion Modes. When the vehicle is in the OFF mode, both LED's will be OFF. Momentarily pressing the S38 On/Off Vehicle Switch button once, brake pedal not applied, the vehicle will enter into the Accessory Mode and the Amber LED will illuminate. The Accessory Mode will timeout after approximately 5 min to help reduce battery drain. With the ignition OFF, brake pedal not pressed, then pressing and holding the S38 On/Off Vehicle Switch for 5 s will place the vehicle in Run Mode (Ignition ON without the Propulsion Mode Active). The vehicle will stay powered up for approximately 40 minutes if the transmitter is in range, or 20 minutes if the transmitter is out of range, and the Green LED will illuminate.

With the ignition OFF brake pedal pressed, then press and release the S38 On/Off Vehicle Switch, the vehicle will enter Start/Propulsion Mode and the Green LED will illuminate, the engine will crank and the engine will be running for Internal Combustion Engines (ICE), or Propulsion mode will go Active on Electric Vehicles (EV). The Propulsion Mode will timeout after approximately 30 minutes if the transmitter is in range, or 15 minutes if the transmitter is out of range. The timer will stop when the vehicle is shifted out of PARK or the brake pedal is pressed and released, the timer will reset after the vehicle is placed back in PARK with the Propulsion Mode Active.

Both LED's have the voltage supplied from the body control module (BCM). The ignition mode switch sends the ignition mode switch status to the passive entry passive start module (PEPS) and to the BCM. The PEPS module sends a redundant signal to the BCM with the ignition mode switch status.

Transport Mode

Transport Mode is designed to reduce the parasitic load of some modules during shipping and/or during vehicle storage. Some features may be disabled or have reduced functionality while Transport Mode is ON. Transport Mode is enabled and disabled by either of the following methods:

- With the Scan Tool Diagnostics > Body Control Module > Control Functions > Power Mode.
- Turning the hazard flashers ON, apply and hold the brake pedal, then press and hold the ignition mode switch for greater than 15 s. For vehicles equipped with a DIC a message Transport Mode On when it is enabled and Transport Mode Off when it is disabled will be displayed for a predetermined amount of time. For vehicles equipped without a DIC, the battery indicator light will constantly flash on the Instrument Cluster when Transport Mode is enabled.

Battery Saver Mode

There are 7 different Battery Saver Modes. Battery Saver Modes 1 to 3 occur in Accessory and Run Power Modes (vehicle on propulsion system Inactive) if the battery voltage drops below approximately 11.5 V. Battery Saver Modes 4 to 7 occur in the Off Power Mode only. Battery Saver Modes 4 to 7 may set DTC's.

- Battery Saver Mode 1: DIC message "Battery Low, Start Vehicle", 4 chimes
- Battery Saver Mode 2: DIC message "Battery Low, Start Vehicle", Load Shed Level 3 is activated
- Battery Saver Mode 3: DIC message "Battery Low, Start Vehicle", Radio/Infotainment shut off, Load Shed Level 3 active
- Battery Saver Mode 4: Battery Saver Mode Ignition Off – Parasitic Current draw of 100 mA or greater
- Battery Saver Mode 5: Battery Saver Mode Ignition Off – Parasitic Current draw of 1 A or greater
- Battery Saver Mode 6: Battery Saver Mode Ignition Off – Battery Voltage less than 12.0 V
- Battery Saver Mode 7: Battery Saver Mode Ignition Off – Battery Voltage less than 11.6 V

Load Shedding

Prior to Load shedding Idle Boost will occur, the idle speeds will be increased by 25 to 300 RPM to help maintain a normal battery voltage. Idle Boost may be noticeable to the driver. If the battery voltage continues to drop below a normal state then load shedding will go active and it will start to reduce electric loads for components that will not impact the safe operation of vehicle. At load shed levels 2 and 3 a DIC message will be displayed "Reducing Features To Save Battery". When load shedding is active the customer may begin to notice features starting to have reduced functions or may become inoperative. Examples of affected loads are radio, HVAC blower(s) front and rear (if equipped), heated/ventilated seats, heated mirrors, rear defogger and other devices with heavy electrical draws. Idle Boost and load shed levels can be observed with the scan tool.

Idle Boost 1
Idle is increased by 25-100 RPM and generally is not noticeable to most drivers.

Idle Boost 2
Idle is increased by 50–200 RPM and generally is not noticeable to most drivers.

Idle Boost 3
Idle is increased by 100–300 RPM and may be noticeable to most drivers.

Load Shed Level 1
Reduces load current by 25%.

Load Shed Level 2
Reduces load current by 50%.

Load Shed Level 3
Electric loads for components that will not impact the safe operation of vehicle will be turned Off.

BCM Awake/Sleep States

The BCM is able to control or perform all of the BCM functions in the awake state. The BCM enters the sleep state when active control or normal monitoring of system functions has stopped and a time limit has passed. The BCM must detect certain wake-up inputs before entering the awake state. The BCM monitors for these inputs during the sleep state.

The BCM will enter the awake state if any of the following wake-up inputs are detected:

- Activity on the serial data line
- Detection of a battery reconnect
- Any door open signal
- Headlamps ON
- Ignition ON

- Park lamps ON
- Keyless entry or remote start message

The BCM will enter a sleep state when all of the following conditions exist:

- Ignition OFF, transmitter is out of range
- No activity exists on the serial data line.
- No outputs are commanded.
- No delay timers are actively counting.
- No wake-up inputs are present.

If all these conditions are met, the BCM will enter a low power or sleep condition.

Retained Accessory Power Description and Operation

Retained Accessory Power

The Retained Accessory Power (RAP) & Interruptible RAP (IRAP) Circuits are controlled by the K9 Body Control Module (BCM). The BCM is the Power Mode Master, it utilizes various Vehicle inputs to determine the Vehicle Power Mode and sends this information via Serial Data and providing associated electrical signals to the entire vehicle for proper feature operation.

The BCM monitors the vehicles power modes, and door ajar/open switch status to determine whether the retained accessory power should be initiated and remain active or be terminated. The RAP output is optional based on the vehicles option contents. When utilized, the RAP Output control can be used to control a RAP Relay, it may provide direct power, or a serial data message to vehicle devices/modules from the BCM.

Retained Accessory Power Relay Coil Control Circuit (If Equipped)

The BCM keeps the device or relay (if equipped) energized during all power modes, except Off-Awake and Crank. The device(s) remain active for approximately 10 min after the Vehicle is placed into the OFF Power Mode, provided none of the doors are opened.

Retained accessory power will end when one of the following conditions are met:

- The BCM receives an input from any door ajar switch indicating the opening of the door after the OFF Power Mode is achieved.

Note: If the BCM receives a door open/ajar active signal when the vehicle is placed into the OFF Power Mode, the retained accessory power will not initiate.

- The BCM internal timer for the retained accessory power expires after approximately 10 min.

Systems powered by the retained accessory power control circuit during the retained accessory power mode are as follows:

Note: The vehicle may not be equipped with all components as listed below.

- 12 V Accessory Power Receptacle
- Cigarette Lighter Receptacle
- Window Switches
- Sunroof Control Module (If Equipped)
- Sunroof Switch (If Equipped)
- Mobile Device Wireless Charger Module
- Mobile Telephone Control Module (If Equipped)
- Traffic Data Receiver (If Equipped)
- Transmission Shift Lever Position Indicator (w/floor mounted console gear shift)

Serial Data Controlled Retained Accessory Power

Retained accessory power systems controlled by serial data are as follows:

Radio
Radio retained accessory power activation/termination is the same as relay operation with one exception; the only door that will turn the radio off during retained accessory power is the driver door open/ajar switch. The USB Ports will function the same as the radio.

Vehicle Communication Interface Module (VCIM) (Onstar®) (If Equipped)
VCIM RAP activation/termination is the same as radio operation with 1 exception; if there is an active call and the vehicle is placed in the OFF Power Mode, the VCIM will remain in RAP mode, and keep the radio in RAP mode until the call is terminated.

Interruptible Retained Accessory Power

The Power Mode Master (PMM) Controls components as needed If equipped with a RAP relay, the BCM controls the Retained Accessory Power with an exception, Interruptible Retained Accessory Power (IRAP) is deactivated during transmitter authentication. During Transmitter Authentication the PMM will deactivate components including IRAP to prevent Radio Frequency (RF) Interference (RFI) that may cause a “NO REMOTE DETECTED” message to be displayed on the drivers information center.

Note: If transmitter Authentication occurs while in Run or Propulsion Modes, it is normal to for IRAP to be interrupted momentarily (i.e. items connected to auxiliary power ports or chargers may momentarily go off then come back on).

If a remote transmitter was not been previously detected, Transmitter Authentication can occurs under any of the following conditions:

- The drivers side front door is opened.
- The drivers side rear door is opened.
- The S38 Vehicle On/Off Switch is pressed.

Special Purpose Vehicle Module Description and Operation

Special Purpose Vehicle Module

The K56U Special Purpose Vehicle Module is an interface module that allows the Upfitter to interface with GM vehicle's secure CAN networks to request predefined actions and to indirectly monitor key vehicle data that is available on the vehicle network.

The module is available to be ordered by dealer or as an Accessory to be installed. If ordered by the dealer it will be installed and programmed by the assembly plant with the output controls disabled. If ordered as an Accessory it will need to be installed on the vehicle, programmed and configured.

Input Controls

The Input Controls are Defaulted on and a GM approved Upfitter Switch must be installed to operate the appropriate Output control that must be enabled by the Upfitter. The input circuits may set a DTC if a non approved switch is installed.

Switches
There are 5 predefined functions that may be requested by switching analog inputs to the required input voltage range.

Refer to *https://www.gmupfitter.com/* for details on all available options

Output Controls

The SPVM has ten outputs that can be configured with a user interface to allow outputs to be switched ON or OFF based on the data that is monitored and available from the GM vehicle network.

Input/Output Configuration

Inputs:

- Battery Power
- Ground
- High Speed CAN (hi/lo)
- 10 Analog Inputs (0.5A Maximum load)

Outputs:

- High Speed CAN (hi/lo)
- 10 Digital Outputs

Module Configuration

Refer to *https://www.gmupfitter.com/*

Section 9

Roof

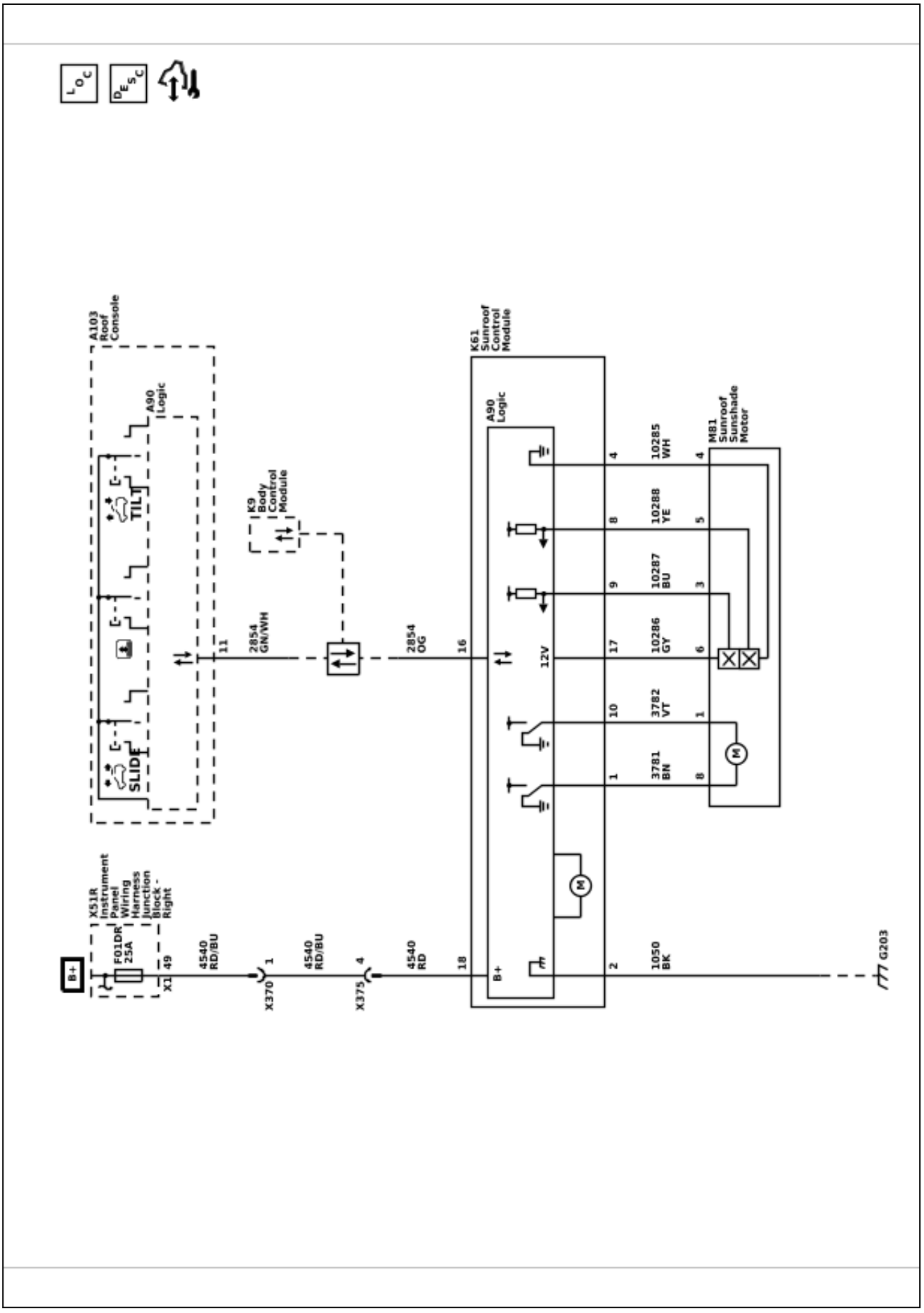
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Sunroof Description and Operation 9-4

Roof

Sunroof

Schematic and Routing Diagrams

Sunroof Schematics (Sunroof)



Description and Operation

Sunroof Description and Operation

Note: Not all sunroof systems use an electrically controlled sunshade.

To view the locations of the sunroof system components, refer to *Master Electrical Component List 8-1143*

The sunroof system consists of a glass panel, sunshade, sunroof motor/module, sunshade motor/module or manual sunshade, sunroof slide and/or tilt switches, sunshade switch, and the body control module (BCM). The electrical portion of the system controls the movement of the sunroof and sunshade (if equipped). The BCM communicates with the sunroof and sunshade motor/module to enable or disable sunroof and sunshade operation. The sunroof and sunshade motors/modules provide system status and diagnostic information to the BCM for diagnostic reporting and operational purposes. The sunroof and sunshade are each controlled by the integrated motor/controller containing the necessary electronics, motor, hall effect position sensors, as well as the interface to the driver control switches. Each motor/controller is capable of controlling motion based on control switch activation and commands from the BCM. The sunroof and sunshade operation is interdependent on some vehicles, in which case they are controlled by the BCM. If the system is overloaded, the power supply is temporarily cut off.

Sunroof and Sunshade Control Switches

The sunroof slide, tilt, and sunshade slide open/close operations are controlled by switches. Some switches may support express open/close operation. Not all vehicles are equipped with all three switches and the behavior of the sunroof for each switch press is vehicle dependent. Some vehicles may have a tilt switch while others may have a vent feature linked to the slide switch. Not all vehicles are equipped with an electrically controlled sunshade, thus lacking the sunshade switch.

System Protection

Normal operation of the sunroof system may be altered when system protection is engaged.

Obstacle or Blockage Detection

Obstacle detection is active when moving in the closing direction and while the sunroof or sunshade opening is approximately 4–200 mm (0.16–7.87 in). When an obstacle is detected in this range, the motion in the closing direction will stop and the sunroof/sunshade will reverse direction for a short distance. The reversal will complete regardless of operating mode. If the travel is outside the range defined above, the sunroof/sunshade motor will continue closing until it detects a motor stall condition or the system is at one of the defined stops.

Motor Stall

If the sunroof or sunshade is moving in the open or close direction and stops moving for 350 ms while a command is active, and no obstacle has been detected, the motor will be turned off to prevent overheating.

Sunroof System Thermal Protection

The sunroof/sunshade controllers have a thermal protection algorithm to protect the sunroof/sunshade controls and motors from damage due to overheating conditions resulting from immoderate switch actuations. The thermal protection algorithm will cause any new sunroof/sunshade open commands to be ignored until the motors cool. A defined number of close requests are allowed during an over temperature condition. If the thermal protection is triggered during an obstacle detection event, the sunroof/sunshade reversal will finish first.

Sunroof and Sunshade Coordination

For vehicles with an electrically controlled sunshade, the BCM will command the sunshade to open to predefined positions based on the requested sunroof position. This interaction may also prohibit the sunshade from closing past these points depending on the sunroof position. Faults on the sunroof or sunshade motor/module circuits will disable the system.

Opening

If the sunroof is opened anywhere between the fully closed and vent position, the BCM will command the sunshade to a minimum open position provided that the sunshade is not opened adequately at the time of the sunroof command. If the sunroof receives an open or express open command beyond vent position, the BCM will command the sunshade to open approximately halfway if the sunshade is not opened adequately. This position corresponds to a point behind the leading edge of a fully opened sunroof glass.

Closing

The sunshade can only be closed completely with the sunshade switch if the sunroof is completely closed. If the sunroof is opened past the vent position, the sunshade will not be allowed to close past the halfway point.

Service Tool Commanded Open

When a service tool commands the sunshade to open, it results in the sunshade moving to the half way position or to the fully open position depending on the calibration. If the half way point is calibrated on, this position is as far as the sunshade can be opened with the service tool. To go beyond this point a switch activation must be used.

Rear Sunshade Operation

If equipped, the rear window sunshade is controlled by a switch with open, close, express open, and express close functionality.

Section 10

Safety and Security

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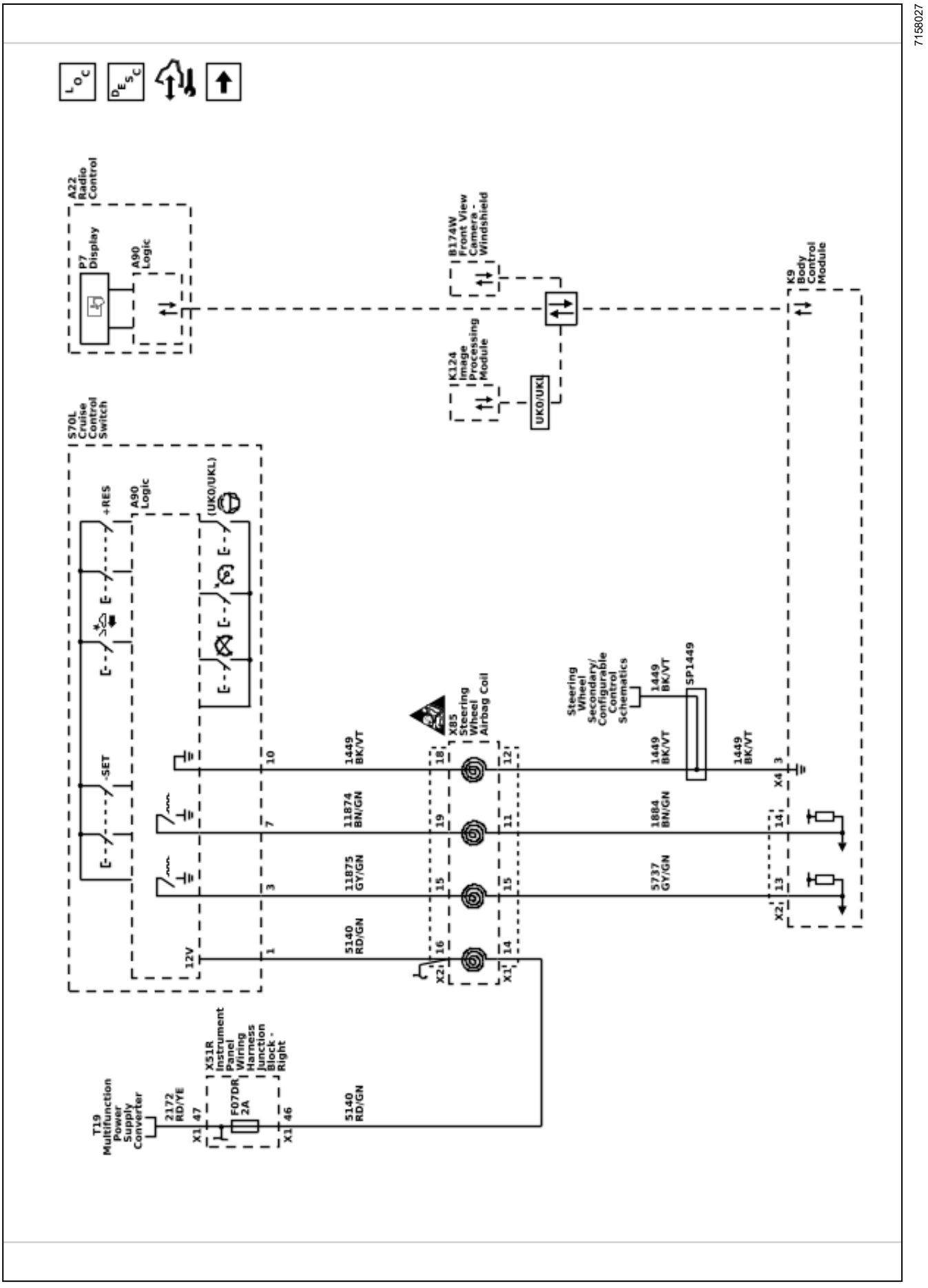
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Safety and Security

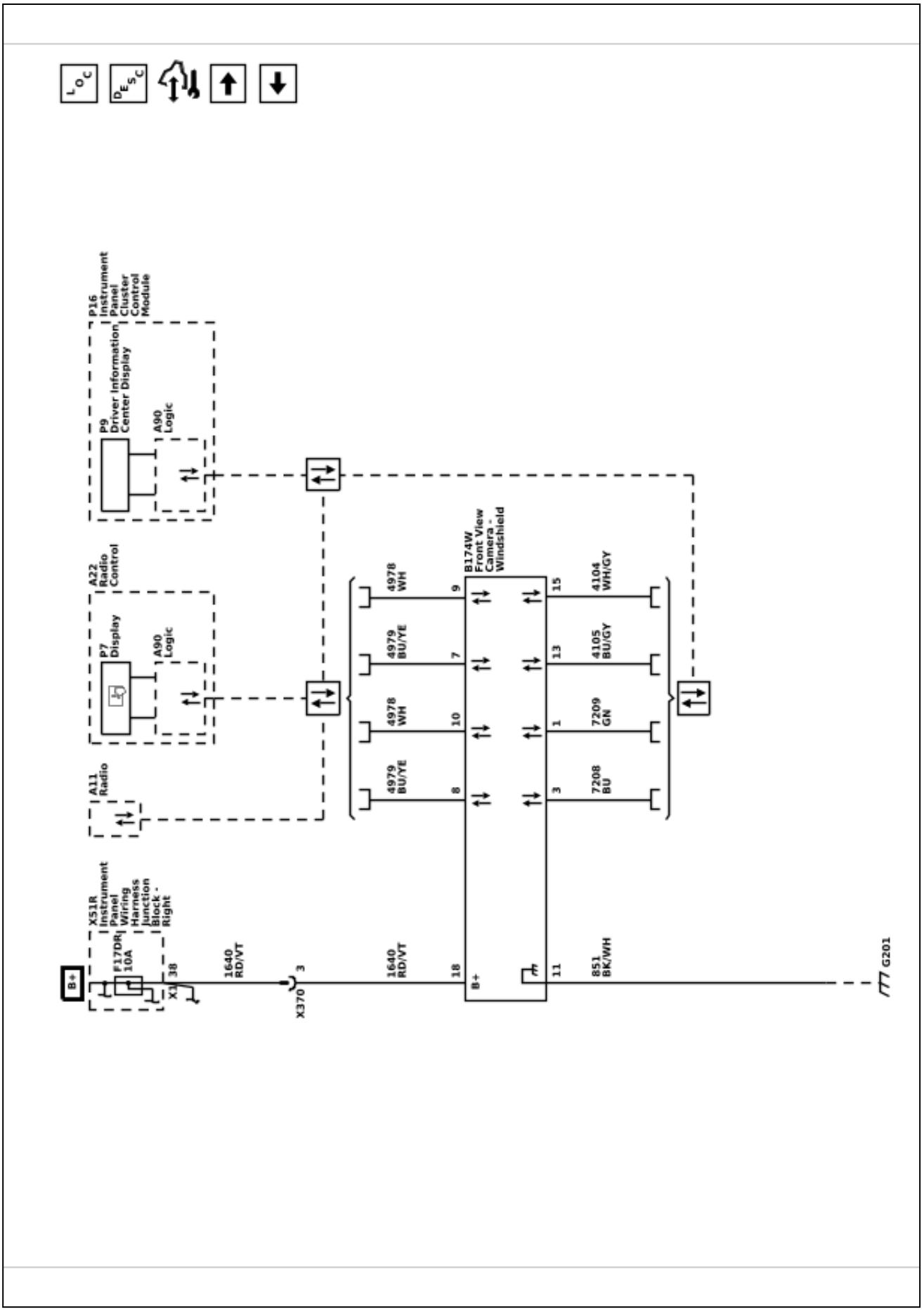
Driver Assistance Systems

Schematic and Routing Diagrams

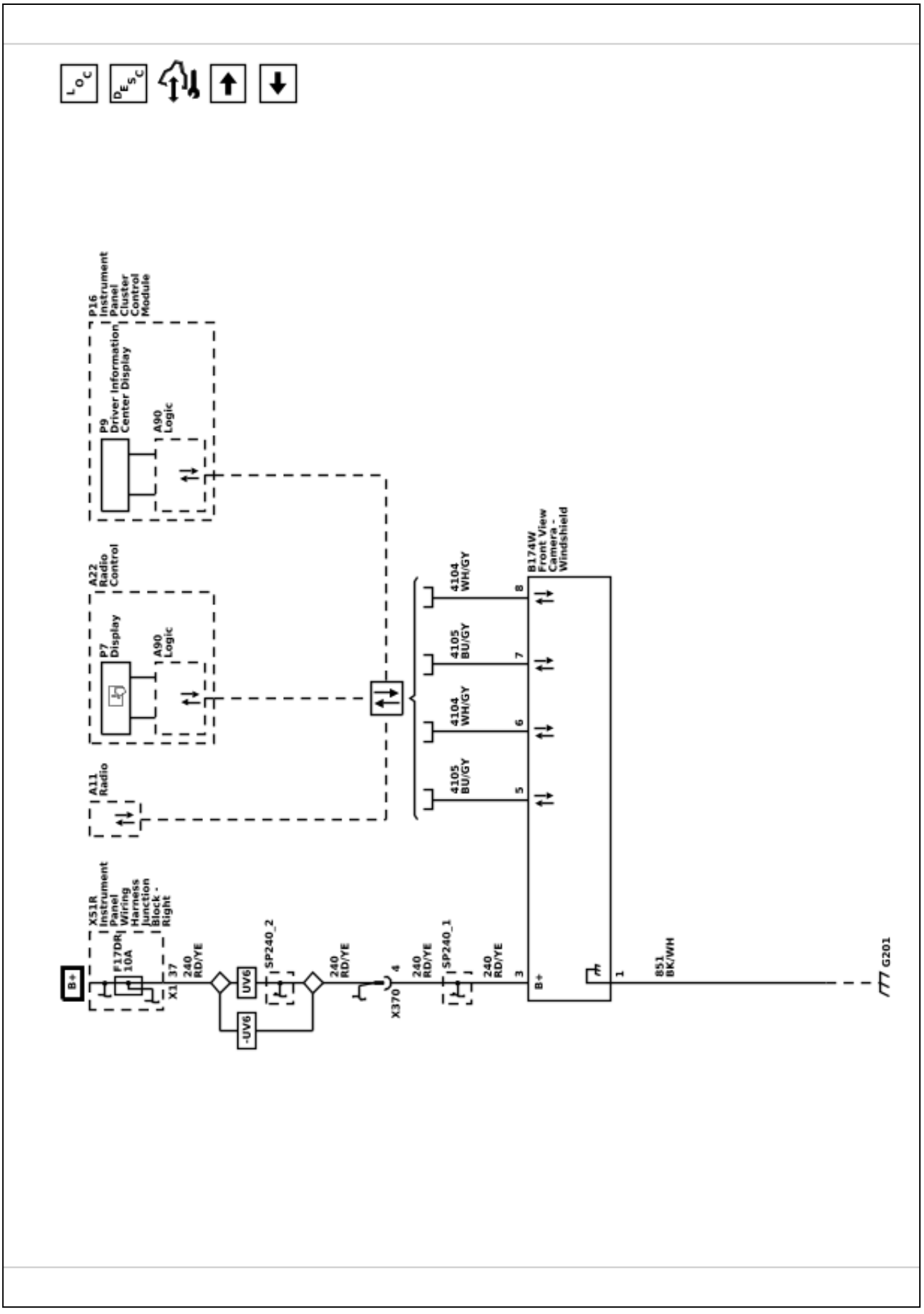
Driver Assistance Systems Schematics (Controls - Forward Collision Alert and Super Cruise)



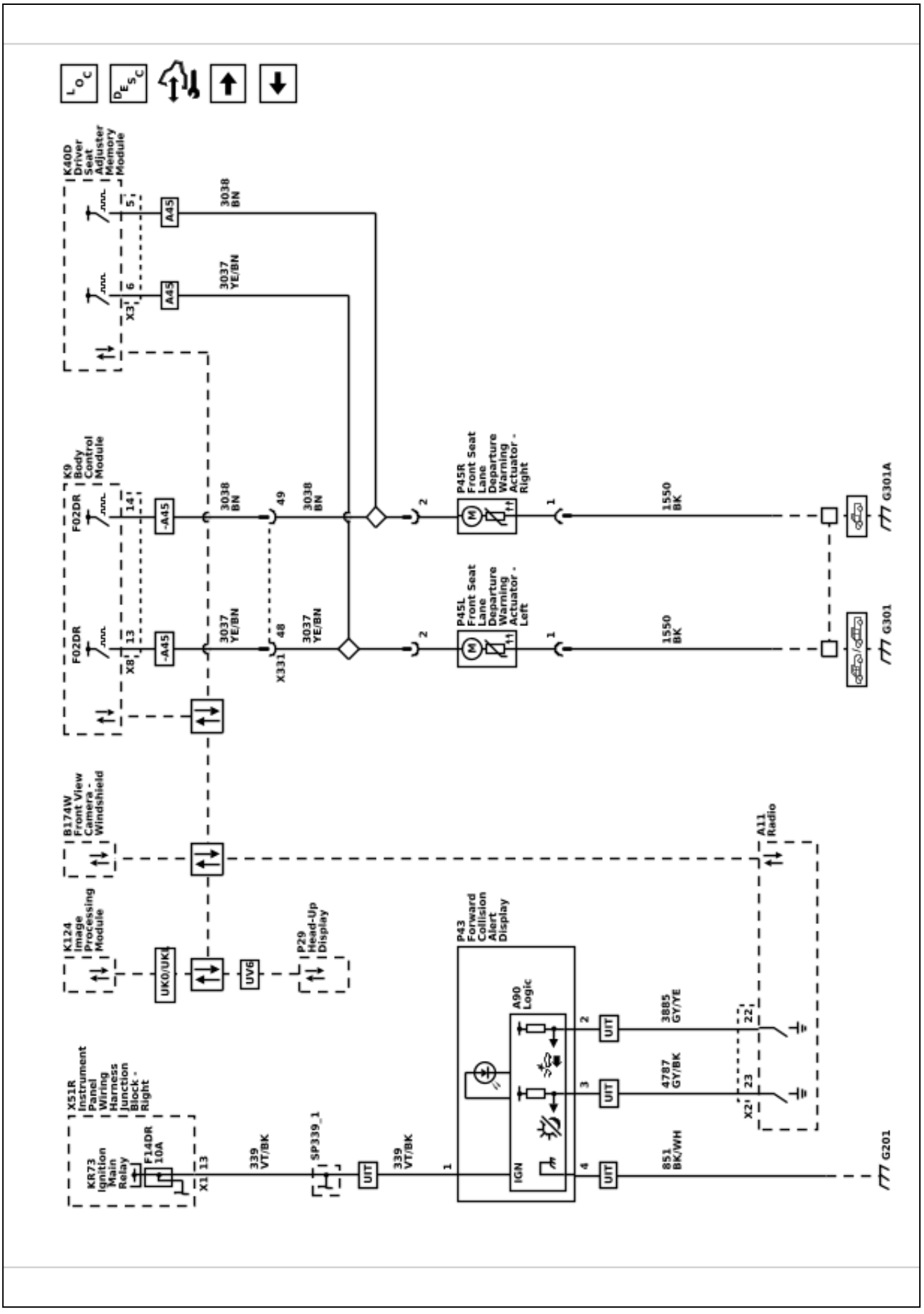
Driver Assistance Systems Schematics (Camera - Forward Collision Alert and Lane Keep Assist (UJE / UKM))



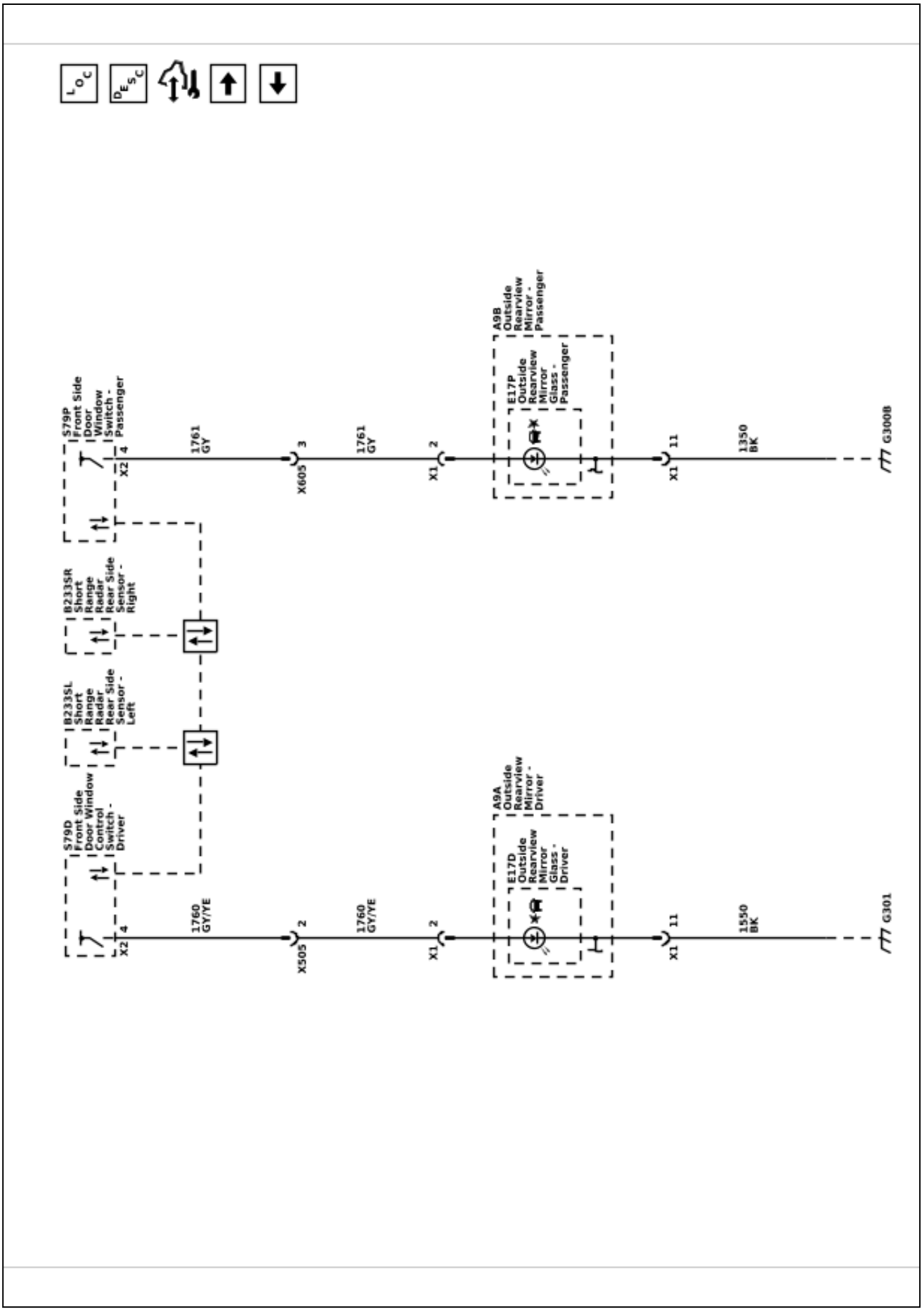
Driver Assistance Systems Schematics (Camera - Forward Collision Alert and Lane Keep Assist (UK0 / UKL))



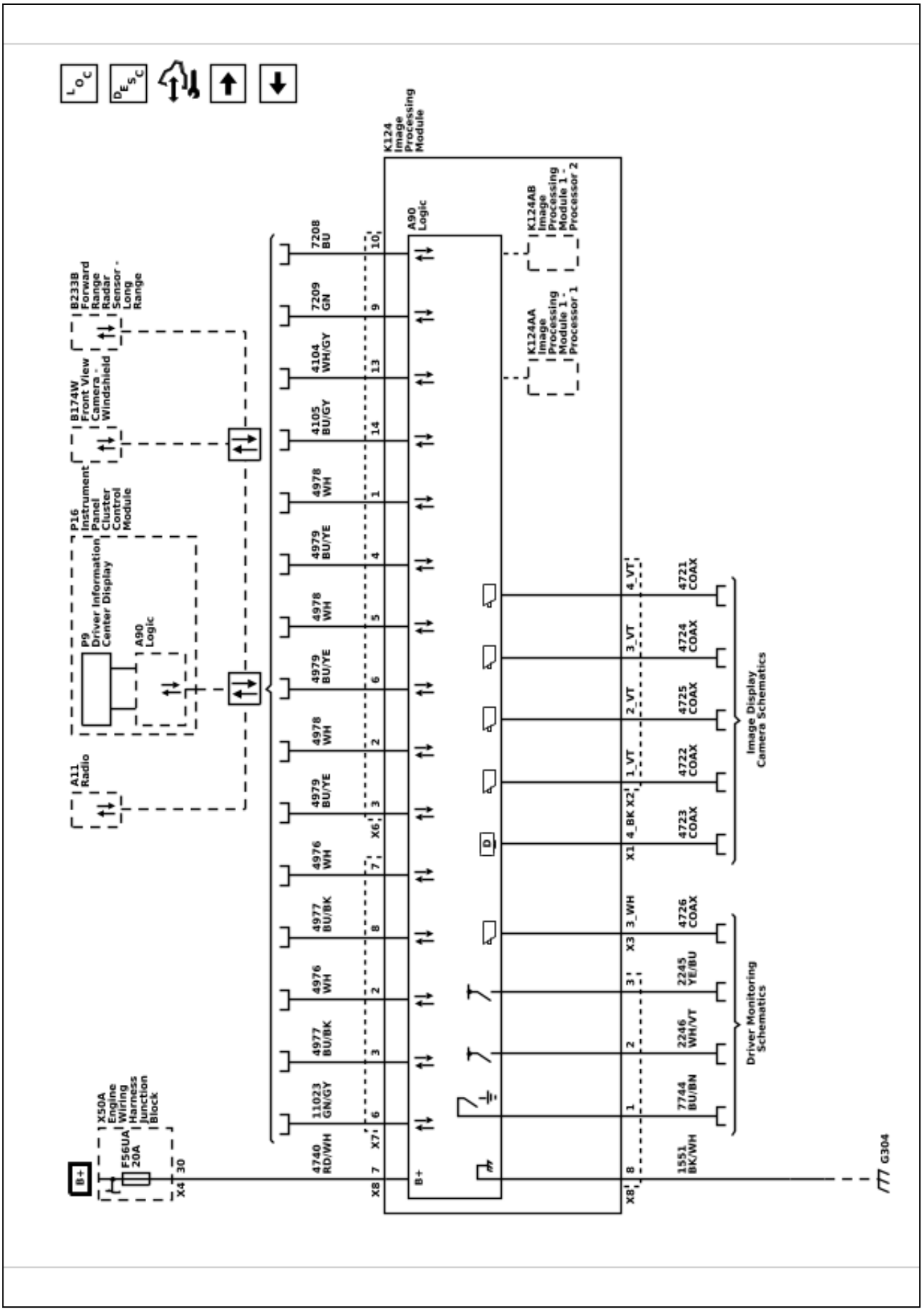
Driver Assistance Systems Schematics (Collision Alert Indicators and Safety Alert Seat)



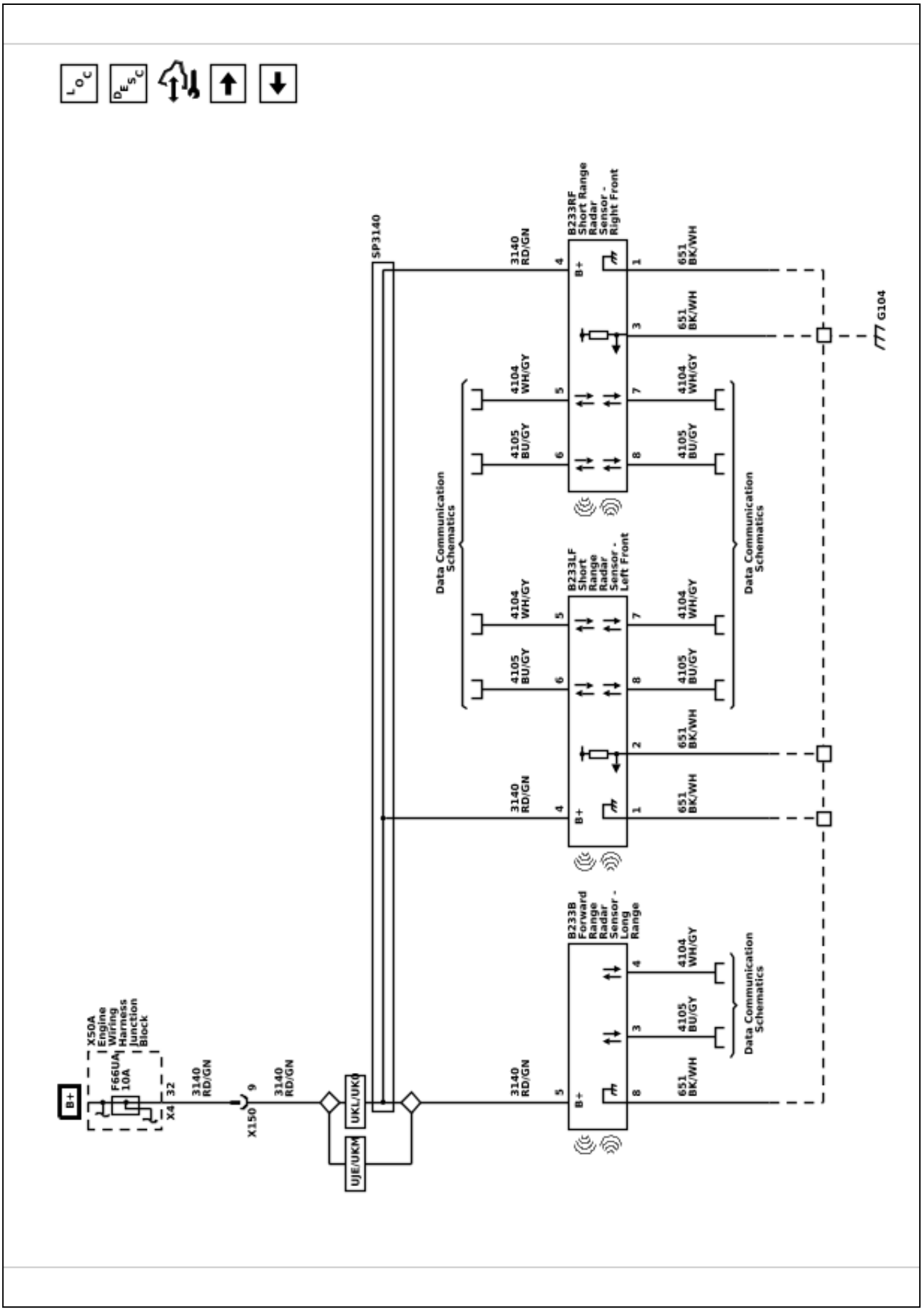
Driver Assistance Systems Schematics (Side Blind Zone Indicators)



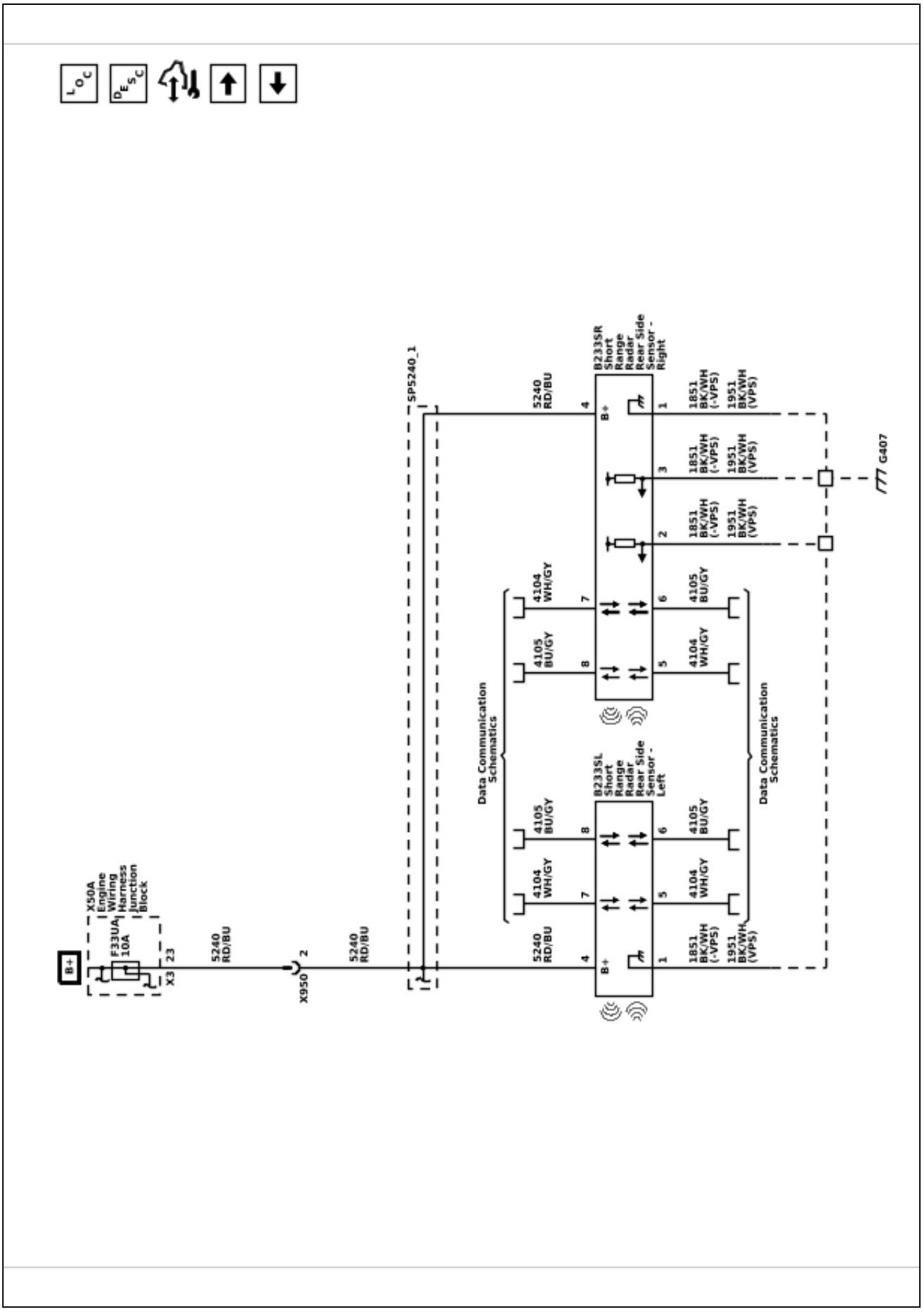
Driver Assistance Systems Schematics (Collision Mitigation - Module Power, Ground, Serial Data, and References (UK0 / UKL))



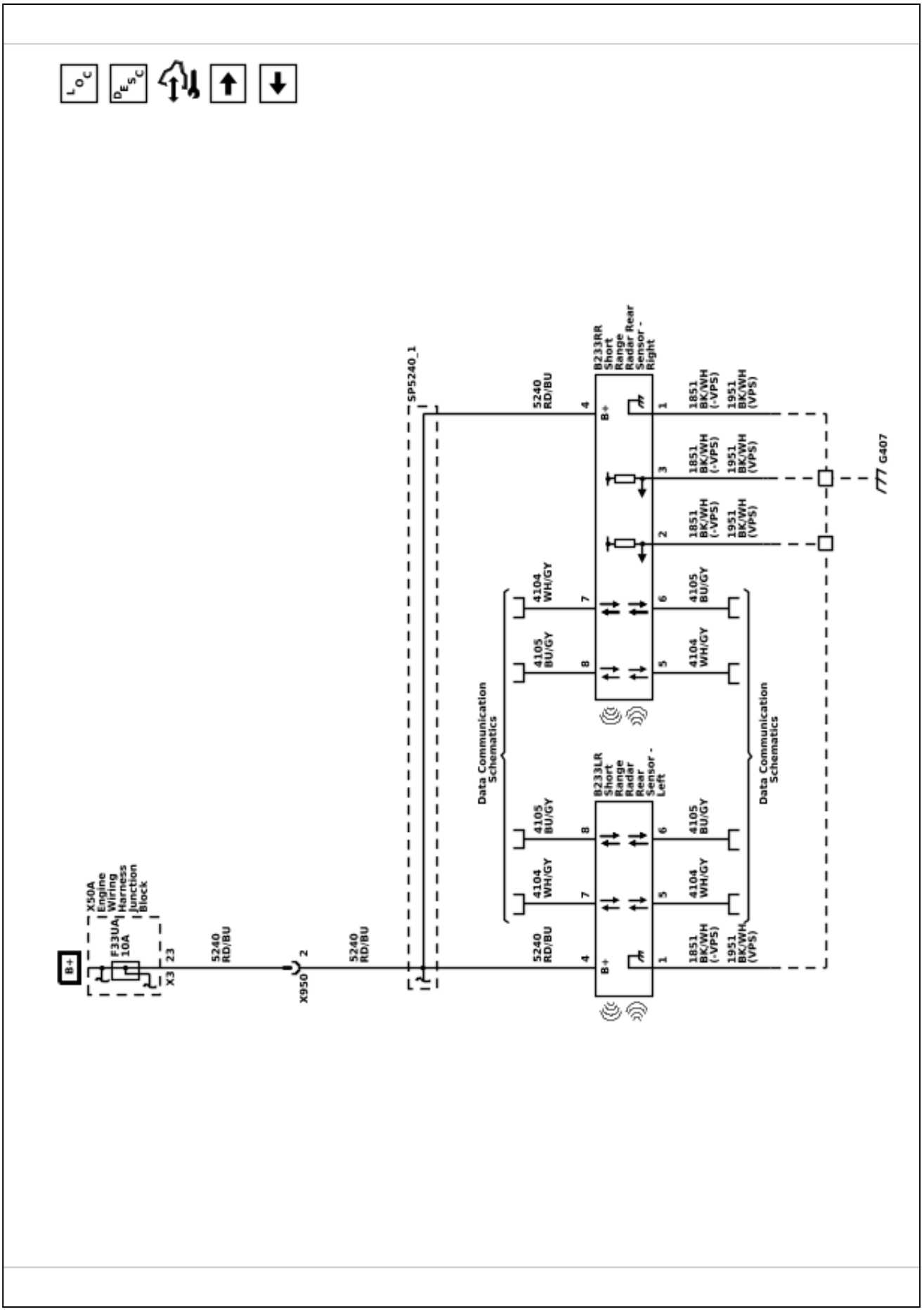
Driver Assistance Systems Schematics (Collision Mitigation - Front Radars)



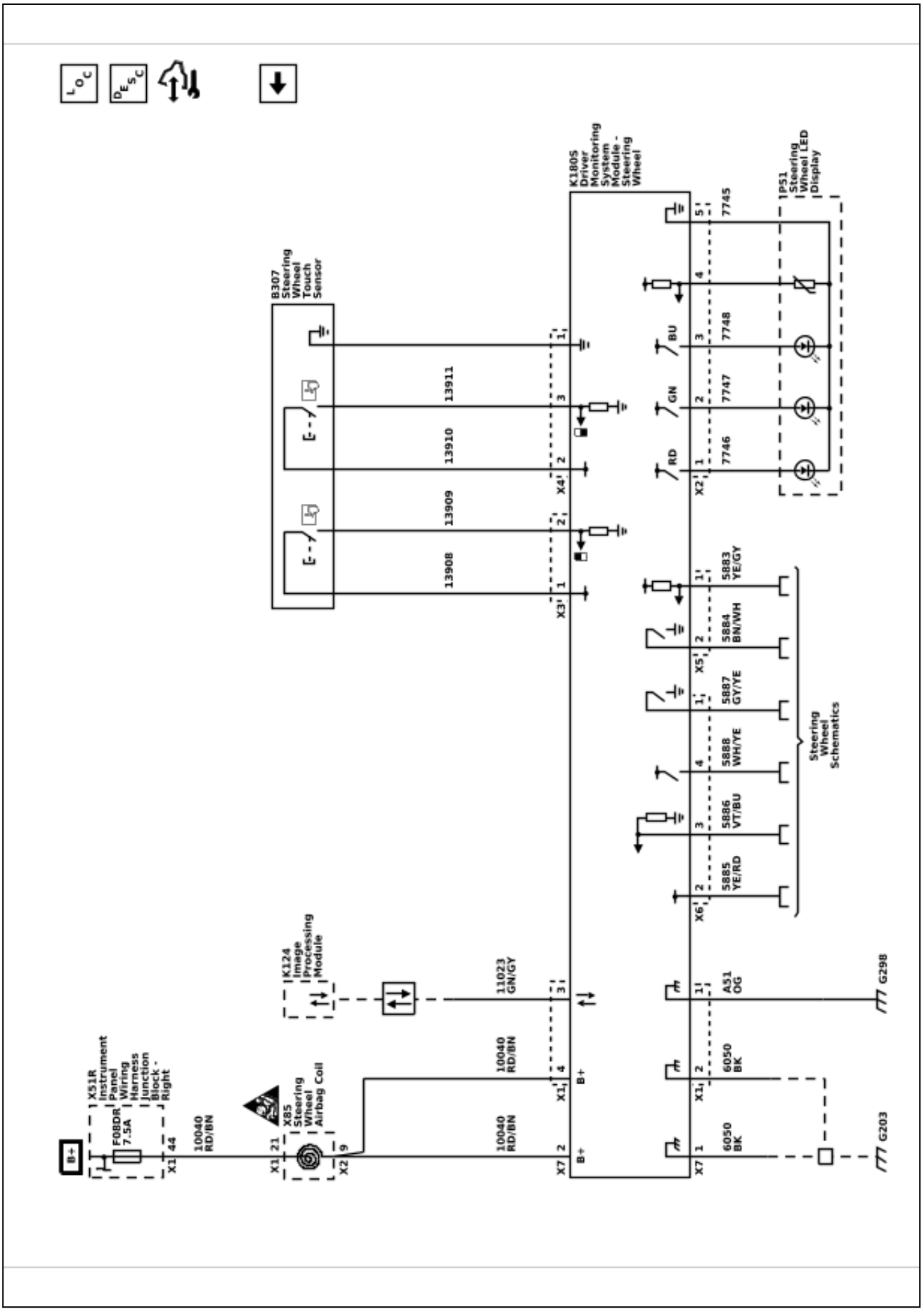
Driver Assistance Systems Schematics (Collision Mitigation - Side Radars)



Driver Assistance Systems Schematics (Collision Mitigation - Rear Radars)



Driver Assistance Systems Schematics (Super Cruise / Driver Attention Assist - Steering Wheel Lightbar and Touch Sensors (ULM))



Description and Operation

Forward Collision Alert Description and Operation (without UGN)

Forward Collision Alert (UEU)

The forward collision alert system is a convenience feature of the B174W Front View Camera - Windshield that can warn drivers of a possible front-end collision situation with a vehicle they are following. The B174W Front View Camera - Windshield is located behind the windshield, looking out at the road ahead and detecting vehicles directly ahead. When a vehicle is detected ahead, a green icon is displayed. This indicator will turn amber if the driver is following too closely. If the system detects that the driver is seconds away from a possible front-end collision, it sends an alert. The P43 Forward Collision Alert Display, which includes a series of red collision alert LEDs, will flash. An audible alert sound will simultaneously sound. If the vehicle is equipped with safety alert seat (HS1), both sides of the seat will pulse. The forward collision alert system can be set to "far," "medium," or "near" timing using the forward collision alert switch and can be turned off using this control or through the vehicle personalization.

Forward collision alert does not provide a warning to help avoid a crash unless it detects a vehicle. Forward collision alert may not detect a vehicle ahead if the B174W Front View Camera - Windshield is blocked by dirt, snow, or ice, or if the windshield is damaged. It may also not detect a vehicle on winding or hilly roads, or in conditions that can limit visibility such as fog, rain, or snow, or if the headlamps or windshield are not cleaned or in proper condition. Keep the windshield, headlamps, and B174W Front View Camera - Windshield area clean and in good repair.

Forward collision alert may provide unnecessary alerts for turning vehicles, vehicles in other lanes, objects that are not vehicles, or shadows. These alerts are normal operation and the vehicle does not need service.

Automatic Emergency Braking (UHY)

Automatic Emergency Braking detects vehicles ahead in your path that are traveling in the same direction and may help reduce crash severity or avoid the crash altogether by applying the brakes automatically or enhancing the driver’s braking in some emergency front-end collision situations . It can provide braking assist, such as brake system pre-fill, or automatically brake the vehicle if an imminent collision is determined. This can help avoid or lessen the severity of crashes when driving in a forward gear. Depending on the situation, the vehicle may automatically brake moderately or hard. Automatic Emergency Braking can only occur if a vehicle is detected. When a vehicle is detected ahead, a green icon is displayed. The Automatic Emergency Braking system works when driving in a forward gear between 8 km/h (5 mph) and 60 km/h (37 mph). It can detect vehicles up to approximately 60 m (197 ft) away.

If the system detects that the driver is seconds away from a possible front-end collision with the vehicle it is following, it will first send an alert. If the driver doesn’t respond quickly or the situation happens suddenly, Automatic Emergency Braking enhances the driver’s braking or automatically applies the brakes. Drivers can override automatic braking at any time by pressing the accelerator or by braking. If the system slows a vehicle to a complete stop, the electronic parking brake will apply. The electronic parking brake can be release in typical fashion by pressing the electronic parking brake switch.

Through vehicle personalization, the Automatic Emergency Braking can be been set to the ALERT setting or turned completely off. This setting disables most automatic braking. The driver information center will display FORWARD COLLISION SYSTEM REDUCED or AUTOMATIC COLLISION PREP REDUCED. This is normal operation when the Automatic Emergency Braking or forward collision alert system is set to OFF or ALERT. This message is not present when the Automatic Emergency Braking or forward collision alert system are set to ALERT and BRAKE.

Forward Collision Alert/Automatic Emergency Braking Components

- B174W Front View Camera - Windshield
- P16 Instrument Panel Cluster Control Module
- P43 Forward Collision Alert Display (without UV6)
- P29 Head-Up Display (with UV6)
- Forward Collision Alert Switch
- Infotainment System
- Safety Alert Seat (with HS1)

B174W Front View Camera - Windshield

The B174W Front View Camera - Windshield detects vehicles in front of the vehicle. The B174W Front View Camera - Windshield communicates with the P16 Instrument Cluster via serial data to illuminate the appropriate amber or green vehicle ahead indicator or P43 Forward Collision Alert Display. The B174W Front View Camera - Windshield also communicates via serial data with the infotainment system to request audible alerts.

P16 Instrument Panel Cluster Control Module

The P16 Instrument Panel Cluster Control Module communicates via serial data with the B174W Front View Camera - Windshield and will illuminate the amber or green vehicle ahead indicator as requested by the B174W Front View Camera - Windshield. The P16

Instrument Panel Cluster Control Module also controls the P43 Forward Collision Alert Display.

P43 Forward Collision Alert Display (without UV6)
The P43 Forward Collision Alert Display are a series of red LEDs that will flash when approaching another vehicle too rapidly. The P43 Forward Collision Alert Display are located in the upper instrument panel area and reflect off the windshield when illuminated.

The P43 Forward Collision Alert Display receive power and ground and are discretely controlled by the P16 Instrument Cluster through a pair of low control circuits. When requested by the B174W Front View Camera - Windshield, the P16 Instrument Cluster will pulse the low control circuits, flashing the LEDs as a visual alert that another vehicle is being approached too rapidly.

P29 Head-Up Display (with UV6)
The P16 Instrument Cluster controls the P29 Head-Up Display via serial data. The P16 Instrument Cluster will command the P29 Head-Up Display to flash the collision alert indicator as a visual alert when approaching another vehicle too rapidly as requested by the B174W Front View Camera - Windshield.

Forward Collision Alert Switch
The forward collision alert switch provides an input to the B174W Front View Camera - Windshield to select the alert timing sensitivity when approaching another vehicle too rapidly. The forward collision alert switch is part of the S70L Cruise Control Switch and provides inputs to the K9 Body Control Module, which then communicates with the B174W Front View Camera - Windshield via serial data.

The K9 Body Control Module applies voltage and monitors a low signal voltage from the normally open switch. When the switch is pressed, the signal circuit is pulled low through a specific series of resistors, indicating that the system has been requested to change the alert timing sensitivity. The first button press will show the current alert timing setting on the driver information center. With every subsequent button press, the alert timing sensitivity is changed.

Infotainment System
The infotainment system controls the audible alerts for the forward collision alert system. If the vehicle is approaching another vehicle too rapidly, the B174W Front View Camera - Windshield will command the infotainment system issue an audible alert to the driver.

Safety Alert Seat (with HS1)
The K9 Body Control Module (without A45) or K40D Driver Seat Adjuster Memory Module (with A45) controls the haptic alert provided by the seats. If the vehicle is approaching another vehicle too quickly, the B174W Front View Camera - Windshield will command the control module to pulse both sides of the seat.

Forward Collision Alert and Forward Automatic Braking Operational Checks

If the forward collision alert system is off, inoperative, or not functioning, check the following:

- Verify there are no active driver information center messages and that no DTCs are set.
- Verify that the system is enabled through vehicle personalization. Vehicle personalization allows the system to be set to “Off,” “Beeps,” ”Alert,” “Safety Alert Seat,” or “Alert & Brake”.
- Attempt to replicate the customer concern. While driving, if the vehicle-ahead telltale display illuminates green when following a vehicle above 8 km/h (5 mph) , forward collision alert is operating properly.

If the driver is receiving false forward collision alerts, check the following:

- Verify the B174W Front View Camera - Windshield is not blocked by dirt, snow, or ice, and the windshield is not damaged.
- The system may be identifying vehicles farther ahead than the customer is expecting. Forward collision alert detects vehicles within a distance of approximately 60 m (197 ft) and operates at speeds above 8 km/h (5 mph).
- Forward collision alert may provide unnecessary alerts to turning vehicles, vehicles in other lanes, objects that are not vehicles, or shadows. These alerts are normal operation and the vehicle does not need service.

If forward collision alert beeps, but the seat does not vibrate, check the following:

- Verify the vehicle is equipped with safety alert seat (RPO HS1).
- Verify there are no active driver information center messages and that no DTCs are set.
- Verify that the system is enabled through vehicle personalization: It may be set to “Beeps” or “Alert Only” instead of “Safety Alert Seat” or “Alert & Brake”.

If FORWARD COLLISION SYSTEM REDUCED or AUTOMATIC COLLISION PRE REDUCED is displayed on the driver information center, check the following:

- Verify that the system is enabled through vehicle personalization: It may be set to “Alert Only” instead of ”Off” or Alert & Brake”.

If SERVICE FRONT CAMERA is displayed on the driver information center, check the following:

- Verify there are no active driver information center messages and that no DTCs are set.

- If the message is only displayed upon startup, check the following:
  - Verify the B174W Front View Camera - Windshield is not blocked by dirt, snow, or ice, and the windshield is not damaged.
  - Verify the vehicle is not parked closed to a wall or the B174W Front View Camera - Windshield is not in an over-temperature condition, such as sitting for long periods in high ambient temperatures and direct sun.
- If the message is displayed beyond startup, check the following:
  - Verify there are no active driver information center messages and that no DTCs are set.

If FRONT CAMERA IS BLOCKED is displayed on the driver information center, check the following:

- Check for any other driver information center service messages.
- Verify the B174W Front View Camera - Windshield is not blocked by dirt, snow, or ice, and the windshield is not damaged.

If SERVICE DRIVER ASSIST is displayed on the driver information center, check the following:

- Check for any other driver information center service messages.
- Verify there are no active driver information center messages and that no DTCs are set.

Forward Collision Alert Description and Operation (with UGN)

On vehicles equipped with RPO UGN, forward collision alert is an integrated of the active safety system. Refer to [Link target (target-id 283825-) not found] .

Lane Keep Assist Description and Operation

The lane keep assist system is a convenience feature that utilizes the B174W Front View Camera - Windshield maintains the vehicle location between identified lane markings. The B174W Front View Camera - Windshield is located behind the windshield, looking out at the road ahead and detecting any lane markings. If the vehicle begins to approach an identified lane marking, automatic correction will be applied by the electric power steering to move the vehicle back toward the center the lane. An integrated function of lane keep assist is lane departure warning. When the vehicle unintentionally leaves a detected lane, visual and audible or haptic (if equipped) alerts are given to the driver. The visual alert cannot be changed, but the driver can select between audible or haptic alerts in the vehicle personalization menus.

Lane Keep Assist System Components

The lane keep assist system is made up of the following components:

- B174W Front View Camera - Windshield
- Driver Information Display
- Multi-axis acceleration sensor (part of the K36 Restraints Control Module)
- Steering wheel angle sensor (part of the K43 Power Steering Control Module)
- K43 Power Steering Control Module
- Lane keep assist switch
- Infotainment system
- Safety alert seat (with HS1)

B174W Front View Camera - Windshield
The B174W Front View Camera - Windshield detects visual queues such as lane markings. When it is determined that the vehicle is approach an identified lane marking, automatic correction will be applied by the electric power steering to move the vehicle back toward the center the lane. Using the multi-axis acceleration sensor and steering wheel angle sensor, the B174W Front View Camera - Windshield determines the vehicles path and compares this to it's own intended path based on lane markings. The B174W Front View Camera - Windshield will then request the K43 Power Steering Control Module to perform the appropriate steering correction. The B174W Front View Camera - Windshield receives an input via serial data from the lane keep assist switch and controls the lane keep assist switch indicator output.

Driver Information Display
Based on vehicle configuration, the P53 Driver Information Display, P16 Instrument Panel Cluster Control Module, or A105 Instrument Panel Multifunction Human-Machine Interface Control Module contains green and amber lane keep assist indicators. These indicate to the driver the current status of the lane keep assist system and are controlled via serial data by the B174W Front View Camera - Windshield. When the vehicle speed is above the minimum required speed (refer to owner manual) and the system has detected the required lane markings and is ready to assist, the green indicator will be illuminated on the driver information display. If the vehicle has unintentionally left the lane, the amber indicator will flash.

Multi-axis Acceleration Sensor
The steering intervention is based on the forward looking sensor outputs, such as lateral offset of the vehicle, relative yaw angle and time to line crossing. Over that, other vehicle dynamics signals are needed, e.g. velocity, steering angle, yaw rate for the purpose of a driver suppression. The multi-axis acceleration sensor measures vehicle dynamics signals such as

velocity and yaw rate for the purpose of determining the vehicles path. The multi-axis acceleration sensor is an integrated part of the K36 Restraints Control Module.

Steering Wheel Angle Sensor
The steering intervention is based on the forward looking sensor outputs, such as lateral offset of the vehicle, relative yaw angle and time to line crossing. Over that, other vehicle dynamics signals are needed, e.g. velocity, steering angle, yaw rate for the purpose of a driver suppression. The steering wheel angle sensor measures vehicle dynamics signals such as steering angle for the purpose of determining the vehicles path. The steering wheel angle sensor is an integrated part of the steering gear and K43 Power Steering Control Module.

K43 Power Steering Control Module
The K43 Power Steering Control Module uses a torque sensor to detect driver inputs and relays that information to the B174W Front View Camera - Windshield. The electric power steering is used to maintain lane centering.

Lane Keep Assist Switch
The lane keep assist switch provides an input to the B174W Front View Camera - Windshield via serial data to turn the lane keep assist system on and off. The B174W Front View Camera - Windshield provides a signal voltage to the normally open momentary switch. When the switch is pressed, the signal circuit is pulled to ground, indicating to the B174W Front View Camera - Windshield that the system has been requested to turn ON or OFF. The lane keep assist switch also contains the lane keep assist switch indicator, which is controlled by the B174W Front View Camera - Windshield to indicate the ON and OFF status of the lane keep assist system. When the system has been enabled by the lane keep assist switch, the B174W Front View Camera - Windshield applies ground to the switch indicator via serial data and illuminates the LED. The location of the lane keep assist switch can vary with different vehicles. For the exact location please refer to the vehicle owner's manual.

Infotainment system
The radio controls the audible alert for the lane keep assist. If the vehicle has unintentionally left the lane, the radio will command three beeps as an audible alert to the driver.

Safety Alert Seat (with HS1)
The K9 Body Control Module (without A45) or K40D Driver Seat Adjuster Memory Module (with A45) controls the haptic alert provided by the seats. If the vehicle has unintentionally left the lane and the K43 Power Steering Control Module determines the corrective action requires an above threshold amount of effort, three pulses to the left or right side of the seat will be commanded, depending on the lane departure direction.

Lane Keep Assist Operation

Lane keep assist with lane departure warning provides gentle steering wheel input and alerts to help prevent drivers from unintentionally drifting out of their intended lane.

There is two stages of warning/intervention for the driver: The first stage is the steering push back, if the lane keep assist system detects that the vehicle will cross the lane marking despite it is intervening, a second stage warning shall be issued. The second stage warning is a chime or a haptic alert through the safety alert seat (if equipped). If a haptic seat vibration is used as stage 2 warning, the vibration will occur on the side of the seat, where the lane departure occurred.

System operation can be described by the following modes:

- Off State: The system has been turned off by the driver using the lane keep assist switch. The lane keep assist indicator will not be illuminated.
- Not Ready To Assist: The system is enabled and the lane keep assist indicator is illuminated, but not ready to assist when any of the following conditions is true:
  - Vehicle speed is less than required for lane keep assist operation. Refer to Owner's Manual for operational speed.
  - The system cannot detect lane markings. This may be because there are no lane markings, as on a country road or that the lane markings cannot be determined due to snow, rain, or other driving conditions.
  - The windshield area in front of the camera or the camera lens is blocked by fog, dirt, damage to the windshield or other elements that may prevent the camera from detecting lane markings.
- Ready To Assist: The system is enabled and ready to warn of the unintentional lane crossing. The system is ready to assist when the green lane keep assist indicator is illuminated on the driver information display.

Lane Crossing Alerts
- When one of the following conditions are met, the system will not give alerts:
  - The correct turn signal is activated. An activated turn signal is interpreted as an intentional lane crossing.
  - The operator makes an intentional steering maneuver.

  - The operator makes an intentional accelerating maneuver.
  - The operator makes an intentional braking maneuver.
- Lane crossing alert consists of the following:
  - The amber lane keep assist indicator will flash.
  - “push-back” steering torque input (or nudge) from electric power steering to help prevent a lane departure
  - Three chimes are activated through the radio or three pulses to the left or right side of the active safety seat (if equipped).

Hands-on Steering Assist/Hands On Lane Centering Assist (if equipped)

Hands-on Steering Assist operates similar to Lane Keep Assist but provides continuous lateral assistance to help keep the vehicle in the center of the lane while Adaptive Cruise Control is engaged. Hands-on Steering Assist utilized the steering wheel touch sensors and driver monitoring camera to ensure the driver actively has their hands on the steering wheel and has eyes on the road.

Hands-on Steering Assist must be enabled in infotainment vehicle settings, Adaptive Cruise Control engaged, and road lanes visible by the Front view Camera-Windshield: in order for the Hands-on Steering Assist to operate.

System states:

- Standby: (white Hands-On steering wheel icon with white lane keep assist lines) feature not engaged due to possible environmental or driver reasons.
- Active: (green Hands-On steering wheel icon with green lane keep assist lines) feature is active and controlling
- Lane Departure Warning: (amber Hands-On steering wheel icon with flashing amber lane keep assist lines) activated when the vehicle moves outside of a predefined threshold of the lane. The system detects that the vehicle is drifting toward or beyond the lane markings.
- Environmental degrades : (amber Hands-On steering wheel icon with white lane keep assist lines) operation degrades are currently alerting for environmental reasons such as lane line confidence low, exceeds road curvature limit, etc.
- Driver Override: (white Hands-On steering wheel icon with white lane keep assist lines) driver has taken control from Hands On Lane Centering Assist.

If the system senses the driver is not meeting necessary requirements (hands on wheel, eyes on road) driver warnings will escalate and can deactivate Hands-on Steering Assist. If this occurs three times, the Hands-on Steering Assist will be unavailable for the remainder of the Ignition/Vehicle On cycle.

Safety Alert Seat Description and Operation

The safety alert seat uses pulsing driver seat vibrations to intuitively communicate the direction of a possible crash threat. Two P45 Front Seat Lane Departure Warning Actuators are utilized to create the vibration and are located on the left and right sides of the seat cushion. Utilizing two motors allows the vibration to be localized to the left or right side of the seat, depending on the side of the vehicle generating the alert, or to vibrate both simultaneously.

Note: The following systems may not be available on all vehicles.

The following systems utilize the safety alert seat:

- Lane Departure Warning and Lane Keep Assist – Utilizes left or right-side pulses to alert drivers if they unintentionally drift out of their lane
- Rear Cross Traffic Alert – Utilizes left or right-side pulses to the direction of an approaching vehicle
- Forward Collision Alert – Simultaneously pulses on both sides to warn drivers of a possible collision with the vehicle that they’re following
- Front Pedestrian Braking – Simultaneously pulses on both sides to warn drivers of a possible collision with a pedestrian
- Front Parking Assist, Rear Parking Assist, and Backing Warning (part of the Rear Automatic Braking system) – Simultaneously pulses on both sides to warn drivers of a possible low-speed collision

Safety Alert Seat Components

The active safety seat utilizes the following components:

- K9 Body Control Module (without A45)
- K40D Driver Seat Adjuster Memory Module (with A45)
- P45L Front Seat Lane Departure Warning Actuator - Left
- P45R Front Seat Lane Departure Warning Actuator - Right

K9 Body Control Module (without A45)

The K9 Body Control Module receives serial data messages from other modules and provides voltage to control the P45 Front Seat Lane Departure Warning Actuators. The K9 Body Control Module will pulse the left, right, or both P45 Front Seat Lane Departure

Warning Actuators with the number of pulses requested over serial data. The K9 Body Control Module monitors the control circuits for open, short to ground, and short to voltage conditions and will set DTCs if a circuit fault is detected.

K40D Driver Seat Adjuster Memory Module (with A45)
The K40D Driver Seat Adjuster Memory Module receives serial data messages from other modules and provides voltage to control the P45 Front Seat Lane Departure Warning Actuators. The K40D Driver Seat Adjuster Memory Module will pulse the left, right, or both P45 Front Seat Lane Departure Warning Actuators with the number of pulses requested over serial data. The K40D Driver Seat Adjuster Memory Module monitors the control circuits for open, short to ground, and short to voltage conditions and will set DTCs if a circuit fault is detected.

P45 Front Seat Lane Departure Warning Actuator
The P45 Front Seat Lane Departure Warning Actuator is DC motor located in the driver's seat bottom cushion. Two P45 Front Seat Lane Departure Warning Actuators are used in the seat bottom cushion, positioned on the left and right side. An offset weight is attached to the motor. When activated, the spinning offset weight creates a vibration felt by the driver through the seat cushion.

Each P45 Front Seat Lane Departure Warning Actuator receives a constant chassis ground. The motor is controlled by the K9 Body Control Module (without A45) or K40D Driver Seat Adjuster Memory Module (with A45) by providing voltage through a dedicated control circuit. When an alert is required, the control module will apply voltage, activating the P45 Front Seat Lane Departure Warning Actuator

Side Blind Zone Alert Description and Operation (UKL/UK0)

The side blind zone alert system detects and reports "objects of interest" on either side of the vehicle, within a specified "blind spot" zone. The system is designed to alert the driver, with a visual display placed on the side view mirror, to the presence of objects of interest that may not be visible in the inside rearview mirror and outside rear view mirrors. Although this system is intended to help drivers avoid lane change collisions, it does not replace driver vision and therefore should be considered a lane change aid. Even with the side blind zone alert system, the driver must check carefully for objects outside of the reporting zone (e.g., a fast approaching vehicle) before changing lanes. In the event that the system senses a malfunction through its diagnostic routines, the system will be disabled and the driver will be visually notified.

When the system detects a vehicle in the side blind zone while driving forward, an amber warning symbol will light up in the appropriate outside mirror. This indicates that it may be unsafe to change lanes. If the driver then activates the turn signal, the amber warning symbol starts flashing as an extra warning not to change lanes.

Side blind zone alert is active when the vehicle is out of park, or the parking brake is off on manual transmission vehicles, and at any speed up to approximately 140 km/h (87 MPH). If a vehicle is detected in the blind zone, the warning symbols will illuminate on the appropriate side. When the vehicle is started, both outside mirror indicators will briefly illuminate to indicate that the system is operating. The warning symbols will vary brightness based on the ambient light conditions.

Side Blind Zone Alert Components

- B233SL Short Range Radar Rear Side Sensor - Left
- B233SR Short Range Radar Rear Side Sensor - Right
- K9 Body Control Module
- S79D Front Side Door Window Control Switch - Driver
- S79P Front Side Door Window Switch - Passenger
- A9A Outside Rearview Mirror – Driver
- A9B Outside Rearview Mirror – Passenger
- Safety Alert Seat (HS1)

B233 Short Range Radar Rear Side Sensor
The B233SL Short Range Radar Rear Side Sensor - Left and B233SR Short Range Radar Rear Side Sensor - Right are located on each side of the vehicle behind the rear fascia and are not directly visible from outside the vehicle. The sensors use radar to determine the presence of objects nearby. Both radar sensors communicate with the vehicle via serial data. The B233SL Short Range Radar Rear Side Sensor - Left and B233SR Short Range Radar Rear Side Sensor - Right also communicate with one another on a private serial data bus. When an object is detected in the side blind zone, the B233SL Short Range Radar Rear Side Sensor - Left and B233SR Short Range Radar Rear Side Sensor - Right will send a message to the K9 Body Control Module to illuminate the appropriate side blind zone alert indicator.

K9 Body Control Module
The B233SL Short Range Radar Rear Side Sensor - Left and B233SR Short Range Radar Rear Side Sensor - Right will send a CAN message to the K9 Body Control Module when requesting the driver or passenger indicator be illuminated. The K9 Body Control Module then sends a LIN message to the S79D Front Side Door Window Control Switch - Driver

or S79P Front Side Door Window Switch - Passenger with the indicator request.

S79 Front Side Door Window Control Switch
The B233SL Short Range Radar Rear Side Sensor - Left and B233SR Short Range Radar Rear Side Sensor - Right will send a CAN message to the K9 Body Control Module when requesting the driver or passenger indicator be illuminated. The K9 Body Control Module then sends a LIN message to the S79D Front Side Door Window Control Switch - Driver or S79P Front Side Door Window Switch - Passenger with the indicator request. The S79D Front Side Door Window Control Switch - Driver or S79P Front Side Door Window Switch - Passenger will apply voltage to the indicator control circuit to illuminate the appropriate indicator.

A9 Outside Rearview Mirror
The A9A Outside Rearview Mirror – Driver and A9B Outside Rearview Mirror – Passenger each contain an icon that is backlit with high intensity, amber-colored LED's located on the mirror surface. The display brightness adapts to day/night conditions. The P43D Side Object Detection Indicator – Driver and P43P Side Object Detection Indicator – Passenger in the appropriate A9 Outside Rearview Mirror is illuminated if the specific B218 Side Obstacle Detection Control Module detects a vehicle in the side blind zone to inform the driver that there is a vehicle driving in the blind spot zone.

Safety Alert Seat (HS1)
The K40 Seat Memory Control Module (with A45) or K9 Body Control Module (without A45) controls the P45 Front Seat Lane Departure Warning Actuators. The P45 Front Seat Lane Departure Warning Actuators provide haptic alert to the driver. If an object is detected, the system will command pulses to the P45LR Seat Haptic Movement Motor – Driver Left Rear or P45RR Seat Haptic Movement Motor – Driver Right Rear, depending on the location of the object, as an alert to the driver.

Side Blind Zone Alert Operation

When the vehicle is started, both A9 Outside Rearview Mirror indicators will briefly illuminate to indicate that the system is operating. The system is designed to detect objects of interest as small as a 125cc motorcycle with rider. The detection zone starts at the outside rearview mirror and extends out to 3.5 m (11 ft) at the back corner of the vehicle and 3 m (10 ft) behind the vehicle at a height of 0.5 m (1.5 ft) and 2.0 m (6 ft) above the ground. The system may illuminate an indicator due to guardrails, signs, trees, shrubs, and other non-moving objects. This is normal system operation; the vehicle does not need service.

When the system detects a vehicle in the side blind zone or lane change alert area while driving forward, independent if passing a vehicle or being passed, an amber warning symbol will illuminate in the appropriate A9 Outside Rearview Mirror. This indicates that it may be unsafe to change lanes. If the driver then activates the turn signal, the amber warning symbol starts flashing as an extra warning not to change lanes.

Foul weather may affect the operation of the side blind zone and lane change alert systems. Occasional missed alerts can occur under normal circumstances and will increase in wet conditions. The number of missed alerts will increase with increased rainfall or road spray. Heavy rainfall, as well as mud, dirt, snow, ice, or slush build-up on the rear fascia, can completely disable the system.

If the vehicle is towing a trailer or has an object such as a bicycle rack attached to the rear of the vehicle, the side blind zone and lane change alert systems may not function properly and the indicators may illuminate intermittently or remain illuminated all the time.

Lane Change Alert Operation

An integrated function of the side blind zone alert system is lane change alert. Lane change alert supplements the side blind zone alert system by detecting approaching vehicles on either side of the vehicle that may not yet be in the side blind zone alert area. The detection zone for lane change alert starts at the outside rearview mirror and extends out to 3.5 m (11 ft) at the back corner of the vehicle and up to 70 m (230 ft) behind the vehicle at a height between 0.5 m (1.5 ft) and 2.0 m (6 ft) above the ground. The system determines when the indicator will illuminate based on the rate of closure, or approach speed, of an approaching vehicle. As the rate of closure become faster, the indicator will illuminate sooner.

Rear Cross Traffic Alert Operation

Rear cross traffic alert displays a red warning triangle with a left or right pointing arrow on the infotainment display to warn of traffic coming from the left or right. This system detects objects coming from up to 20 m (65 ft) from the left or right side of the vehicle. When an object is detected, either three beeps sound from the left or right or three safety alert seat pulses occur on the left or right side, depending on the direction of the detected vehicle.

Driver Information Center Messages

SIDE BLIND ZONE ALERT OFF or LANE CHANGE ALERT OFF

This message indicates that the system has been disabled through the driver information center. Refer to the vehicle owner's manual for instructions on how to set personalization options on the driver information center.

SERVICE SIDE DETECTION SYSTEM

This message indicates that the system requires service. When the message is displayed, the indicators will remain illuminated at all times, notifying the driver that the side blind zone system should not be relied upon when changing lanes. Since the sensors are also used for rear cross traffic alert, this feature will also be inoperative.

SIDE DETECTION SYSTEM UNAVAILABLE

This message indicates that the system has been temporarily disabled because the sensor is blocked or can otherwise not accurately detect vehicles or objects. Such instances may be mud, dirt, snow, ice, or slush build-up on the rear fascia, heavy rainfall, excessive road spray, fascia damage or stickers. An over or under-voltage condition or over-temperaure will also cause the message to display.

The rear cross traffic alert system will read the GPS latitude and longitude on the serial data bus and calculate if the vehicle is within a Radio Astronomy zone. These zones are located in Europe and Japan and require the sensors to be turned off. The "Side Detection System Unavailable" message will be displayed to the driver when this occurs.

The system is continuously fine tuning the radar alignment. If the B233SL Short Range Radar Rear Side Sensor - Left or B233SR Short Range Radar Rear Side Sensor - Right is removed or significantly disturbed, such as removing the rear fascia or sensor bracket, an initial alignment is automatically performed by the system to enable system operation. However, the SIDE DETECTION SYSTEM UNAVAILABLE may remain for several hours of driving as the system fine tunes the radar alignment to ensure satisfactory alert performance.

Side Blind Zone Alert Description and Operation (without UKL/UK0)

The side blind zone alert system detects and reports "objects of interest" on either side of the vehicle, within a specified "blind spot" zone. The system is designed to alert the driver, with a visual display placed on the side view mirror, to the presence of objects of interest that may not be visible in the inside rearview mirror and outside rear view mirrors. Although this system is intended to help drivers avoid lane change collisions, it does not replace driver vision and therefore should be considered a lane change aid. Even with the side blind zone alert system, the driver must check carefully for objects outside of the reporting zone (e.g., a fast approaching vehicle) before changing lanes. In the event that the system senses a malfunction through its diagnostic routines, the system will be disabled and the driver will be visually notified.

When the system detects a vehicle in the side blind zone while driving forward, an amber warning symbol will light up in the appropriate outside mirror. This indicates that it may be unsafe to change lanes. If the driver then activates the turn signal, the amber warning symbol starts flashing as an extra warning not to change lanes.

Side blind zone alert is active when the vehicle is out of park, or the parking brake is off on manual transmission vehicles, and at any speed up to approximately 140 km/h (87 MPH). If a vehicle is detected in the blind zone, the warning symbols will illuminate on the appropriate side. When the vehicle is started, both outside mirror indicators will briefly illuminate to indicate that the system is operating. The warning symbols will vary brightness based on the ambient light conditions.

Side Blind Zone Alert Components

- B233LR Short Range Radar Rear Sensor - Left
- B233RR Short Range Radar Rear Sensor - Right
- K9 Body Control Module
- S79D Front Side Door Window Control Switch - Driver
- S79P Front Side Door Window Switch - Passenger
- A9A Outside Rearview Mirror – Driver
- A9B Outside Rearview Mirror – Passenger
- Safety Alert Seat (HS1)

B233 Short Range Radar Rear Side Sensor
The B233LR Short Range Radar Rear Sensor - Left and B233RR Short Range Radar Rear Sensor - Right are located on each side of the vehicle behind the rear fascia and are not directly visible from outside the vehicle. The sensors use radar to determine the presence of objects nearby. Both radar sensors communicate with the vehicle via serial data. The

B233LR Short Range Radar Rear Sensor - Left and B233RR Short Range Radar Rear Sensor - Right also communicate with one another on a private serial data bus. When an object is detected in the side blind zone, the B233LR Short Range Radar Rear Sensor - Left and B233RR Short Range Radar Rear Sensor - Right will send a message to the K9 Body Control Module to illuminate the appropriate side blind zone alert indicator.

K9 Body Control Module
The B233LR Short Range Radar Rear Sensor - Left and B233RR Short Range Radar Rear Sensor - Right will send a CAN message to the K9 Body Control Module when requesting the driver or passenger indicator be illuminated. The K9 Body Control Module then sends a LIN message to the S79D Front Side Door Window Control Switch - Driver or S79P Front Side Door Window Switch - Passenger with the indicator request.

S79 Front Side Door Window Control Switch
The B233LR Short Range Radar Rear Sensor - Left and B233RR Short Range Radar Rear Sensor - Right will send a CAN message to the K9 Body Control Module when requesting the driver or passenger indicator be illuminated. The K9 Body Control Module then sends a LIN message to the S79D Front Side Door Window Control Switch - Driver or S79P Front Side Door Window Switch - Passenger with the indicator request. The S79D Front Side Door Window Control Switch - Driver or S79P Front Side Door Window Switch - Passenger will apply voltage to the indicator control circuit to illuminate the appropriate indicator.

A9 Outside Rearview Mirror
The A9A Outside Rearview Mirror – Driver and A9B Outside Rearview Mirror – Passenger each contain an icon that is backlit with high intensity, amber-colored LED’s located on the mirror surface. The display brightness adapts to day/night conditions. The Side Object Detection Indicator – Driver and Side Object Detection Indicator – Passenger in the appropriate A9 Outside Rearview Mirror is illuminated if the specific B233 Short Range Radar Rear Sensor detects a vehicle in the side blind zone to inform the driver that there is a vehicle driving in the blind spot zone.

Safety Alert Seat (HS1)
The K40 Seat Memory Control Module (with A45) or K9 Body Control Module (without A45) controls the P45 Front Seat Lane Departure Warning Actuators. The P45 Front Seat Lane Departure Warning Actuators provide haptic alert to the driver. If an object is detected, the system will command pulses to the P45LR Seat Haptic Movement Motor – Driver Left Rear or P45RR Seat Haptic Movement Motor – Driver Right Rear, depending on the location of the object, as an alert to the driver.

Side Blind Zone Alert Operation

When the vehicle is started, both A9 Outside Rearview Mirror indicators will briefly illuminate to indicate that the system is operating. The system is designed to detect objects of interest as small as a 125cc motorcycle with rider. The detection zone starts at the outside rearview mirror and extends out to 3.5 m (11 ft) at the back corner of the vehicle and 3 m (10 ft) behind the vehicle at a height of 0.5 m (1.5 ft) and 2.0 m (6 ft) above the ground. The system may illuminate an indicator due to guardrails, signs, trees, shrubs, and other non-moving objects. This is normal system operation; the vehicle does not need service.

When the system detects a vehicle in the side blind zone or lane change alert area while driving forward, independent if passing a vehicle or being passed, an amber warning symbol will illuminate in the appropriate A9 Outside Rearview Mirror. This indicates that it may be unsafe to change lanes. If the driver then activates the turn signal, the amber warning symbol starts flashing as an extra warning not to change lanes.

Foul weather may affect the operation of the side blind zone and lane change alert systems. Occasional missed alerts can occur under normal circumstances and will increase in wet conditions. The number of missed alerts will increase with increased rainfall or road spray. Heavy rainfall, as well as mud, dirt, snow, ice, or slush build-up on the rear fascia, can completely disable the system.

If the vehicle is towing a trailer or has an object such as a bicycle rack attached to the rear of the vehicle, the side blind zone and lane change alert systems may not function properly and the indicators may illuminate intermittently or remain illuminated all the time.

Lane Change Alert Operation

An integrated function of the side blind zone alert system is lane change alert. Lane change alert supplements the side blind zone alert system by detecting approaching vehicles on either side of the vehicle that may not yet be in the side blind zone alert area. The detection zone for lane change alert starts at the outside rearview mirror and extends out to 3.5 m (11 ft) at the back corner of the vehicle and up to 70 m (230 ft) behind the vehicle at a height between 0.5 m (1.5 ft) and 2.0 m (6 ft) above the ground. The system determines when the indicator will illuminate based on the rate of closure, or approach speed, of an approaching vehicle. As the rate of closure become faster, the indicator will illuminate sooner.

Rear Cross Traffic Alert Operation

Rear cross traffic alert displays a red warning triangle with a left or right pointing arrow on the infotainment display to warn of traffic coming from the left or right. This system detects objects coming from up to 20 m (65 ft) from the left or right side of the vehicle. When an object is detected, either three beeps sound from the left or right or three safety alert seat pulses occur on the left or right side, depending on the direction of the detected vehicle.

Driver Information Center Messages

SIDE BLIND ZONE ALERT OFF or LANE CHANGE ALERT OFF

This message indicates that the system has been disabled through the driver information center. Refer to the vehicle owner's manual for instructions on how to set personalization options on the driver information center.

SERVICE SIDE DETECTION SYSTEM

This message indicates that the system requires service. When the message is displayed, the indicators will remain illuminated at all times, notifying the driver that the side blind zone system should not be relied upon when changing lanes. Since the sensors are also used for rear cross traffic alert, this feature will also be inoperative.

SIDE DETECTION SYSTEM UNAVAILABLE

This message indicates that the system has been temporarily disabled because the sensor is blocked or can otherwise not accurately detect vehicles or objects. Such instances may be mud, dirt, snow, ice, or slush build-up on the rear fascia, heavy rainfall, excessive road spray, fascia damage or stickers. An over or under-voltage condition or over-temperaure will also cause the message to display.

The rear cross traffic alert system will read the GPS latitude and longitude on the serial data bus and calculate if the vehicle is within a Radio Astronomy zone. These zones are located in Europe and Japan and require the sensors to be turned off. The "Side Detection System Unavailable" message will be displayed to the driver when this occurs.

The system is continuously fine tuning the radar alignment. If the B233LR Short Range Radar Rear Sensor - Left and B233RR Short Range Radar Rear Sensor - Right is removed or significantly disturbed, such as removing the rear fascia or sensor bracket, an initial alignment is automatically performed by the system to enable system operation. However, the SIDE DETECTION SYSTEM UNAVAILABLE may remain for several hours of driving as the system fine tunes the radar alignment to ensure satisfactory alert performance.

Super Cruise Description and Operation

Note: ONSTAR SERVICE PLAN REQUIRED An active OnStar service plan that includes Emergency Services is **required for Super Cruise operation. The terms and conditions must also be signed for OnStar, otherwise Super Cruise will not operate**.Verify the OnStar system is not damaged and is operating properly. An Onstar Blue Button press is recommended. Refer to: [Link target (target-id 149641-) not found] . The message "Unavailable GPS Signal Lost" may display if OnStar is not completely set up. This includes such details as the OnStar account does not have the Terms and Conditions signed off.

Super Cruise is a combination of many systems and modules running simultaneously .It is a comprehensive feature set designed to help a driver avoid collisions or reduce crash damage while driving, backing, and parking. The K124 Image Processing Module is the primary controller for the active safety system. The K124 Image Processing Module communicates on multiple serial data busses to share information with various control modules throughout the vehicle. The K124 Image Processing Module uses various sensors and control modules to monitor the vehicle surroundings and take deliberate action to avoid collisions or reduce crash damage. Super Cruise tightly integrates the forward collision alert, adaptive cruise control, parking assist, and active emergency braking systems into a single cohesive system.

Super Cruise is available only on limited-access freeways that are separated from opposing traffic.

Super Cruise is designed to be available and engage only under the following conditions:

- Adaptive Cruise Control (ACC) is ON

  Refer to [Link target (target-id 283816-) not found]
- Forward Collision System set to alert and brake

  Refer to *Forward Collision Alert Description and Operation (with UGN) 10-16* *Forward Collision Alert Description and Operation (without UGN) 10-14*
- The vehicle is on a limited-access freeway

- Camera or radar sensors are not covered, obstructed, or damaged
- The system detects that the driver appears attentive
- The lane markings are clearly visible – lane markings may be obscured, for example, by glare or poor weather conditions
- Teen Driver is not active
- DTC B1AD2 may set in the supplemental restraint system if the SuperCruise switch is depressed without a driver in the driver's seat.

How the System Works

Driver Attention Camera
To ensure safety, drivers must pay attention to the road at all times. Our proprietary head tracking software helps make sure your eyes are on the road, and alerts you when you need to pay more attention or take back control.

Steering Wheel Light Bar
If the steering wheel light bar flashes green, the system has detected that the driver may not be paying sufficiently close attention. Refer to *Driver Monitoring Description and Operation 10-29*

The flashing will stop when the system detects that sufficiently close attention to the road has resumed.

If the steering wheel light bar flashes green for too long, Super Cruise will alert the driver to take control of steering immediately by flashing the light bar red. Also, either beeps will sound or the Safety Alert Seat will vibrate. See "Collision/Detection Systems" under Vehicle Personalization in the Owner's Manual. Take over steering, then Super Cruise will disengage. To re-engage Super Cruise, press the Super Cruise button on the steering wheel.

If the steering wheel light bar flashes red for too long, a voice command will tell you to take control of the vehicle.

Take control of the steering immediately; Adaptive Cruise Control and Super Cruise will disengage.

A Driver Information Center (DIC) message will indicate that Super Cruise is locked out. Super Cruise cannot be re-engaged until the next ignition cycle.

Continued failure to take over steering will cause the vehicle to slow in your lane of travel and eventually brake to a stop and an OnStar® advisor will be called. The brake lights and hazard warning flashers will come on.

Steering Wheel Touch Sensors
There are three touch zones on the steering wheel to detect where the driver's hands are during vehicle operation. Touch sensing zone 1 is defined as the rear surface of the steering wheel closest to the windshield. Touch sensing zone 2 is defined as the front left surface of the steering wheel closest to the driver. Touch sensing zone 3 is defined as the front Right surface of the steering wheel closest to the driver. There is no touch sensors on the light bar at the top center of the wheel.

K124 Image Processing Module

Automated Driving Mapping Downloads
Map database updates and GPS enhancement data are periodically downloaded to the K124 Image Processing Module, using the vehicle's OnStar Wi-Fi hotspot. If a mobile device with its own Wi-Fi hotspot uses the same SSID and password as the vehicle, the vehicle may connect to the mobile device to download the data. To prevent downloading using a mobile device data plan, use a different SSID and password for the vehicle's Wi-Fi hotspot and the mobile device, or disable the Wi-Fi hotspot of the mobile device when inside the vehicle. To change the Wi-Fi hotspot SSID and password, go to Settings > Wi-Fi.

Automated Driving Mapping Database
Super Cruise uses a LiDAR-scanned map database, which governs system use and enables it only in areas where appropriate road conditions are detected. The advanced map data restricts Super Cruise use to divided, limited-access freeways with defined entry and exit ramps. MAP UPDATES Super Cruise map updates are automatically downloaded via the vehicle's OnStar Wi-Fi hotspot. The Wi-Fi option should always be turned on. Super Cruise will be disabled if the map reaches 7 months old. To turn on Wi-Fi, go to Settings > Wi-Fi.

For more information on Super Cruise, refer to: *http://www.cadillac.com/world-of-cadillac/innovation/super-cruise.html*

Super Cruise Messages on the Driver Information Center Summary

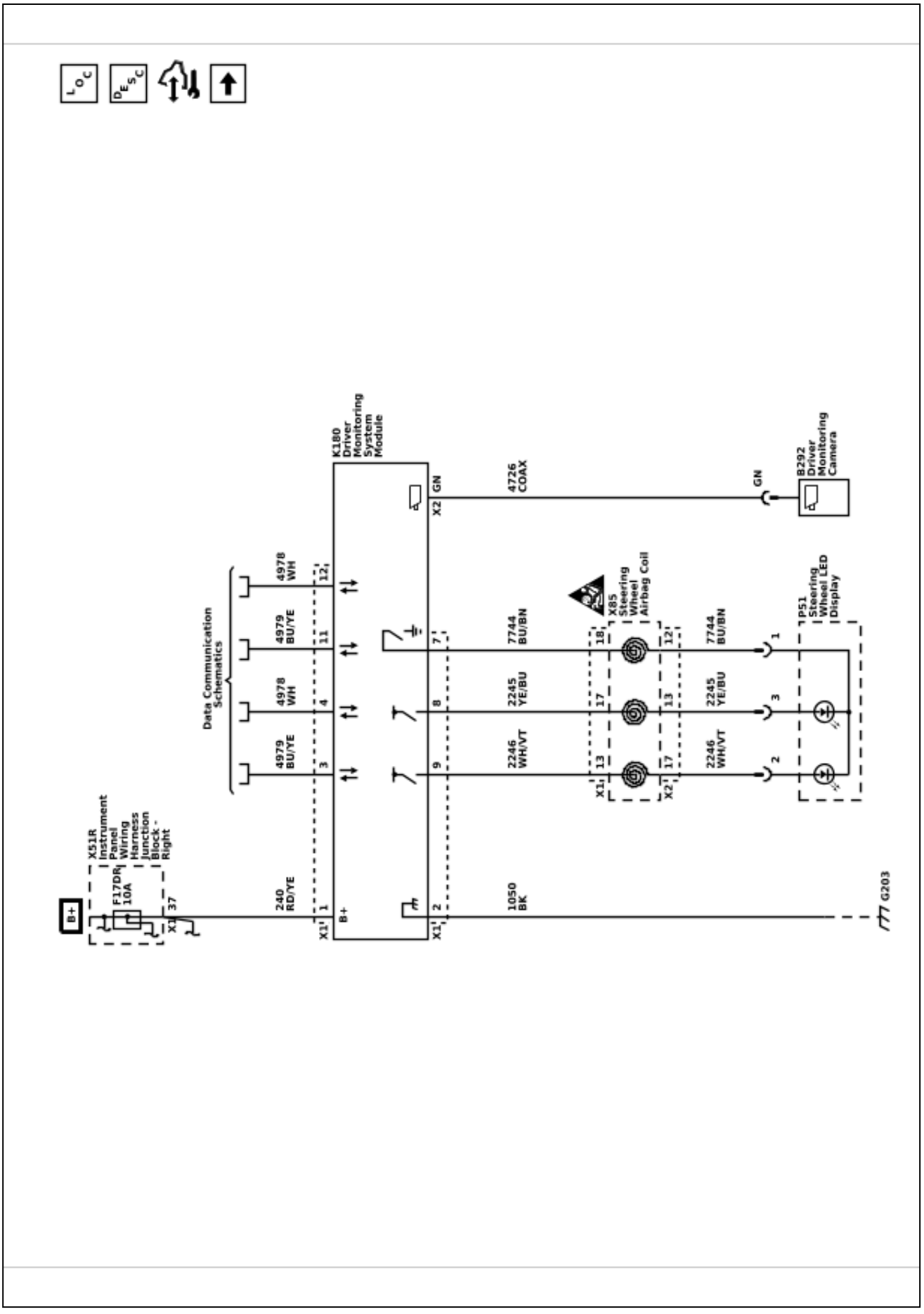
Unavailable Turn on Adaptive Cruise Control	Adaptive Cruise Control must be on before Super Cruise can be enabled. • Set speed is not required before enabling Super Cruise. • Adaptive Cruise Control is not required to be engaged before enabling Super Cruise.
Unavailable Set Forward Collision Setting to Alert and Brake	Super Cruise is disabled unless Alert and Brake is selected. 1. Select the Settings menu, then Vehicle, then Collision/Detection Systems, and then Forward Collision System. 2. Set Forward Collision to Alert and Brake.

Unavailable No Road Information	• There is no map information available for that portion of a controlled access road. Recent road reconstruction may turn off Super Cruise for that section of road until new map information is available. • The vehicle is not on the correct type of road. A controlled access freeway is required for Super Cruise. • There are lanes entering or exiting on both the left and right side of the freeway. • The vehicle is approaching a freeway interchange. The message will appear for 10 seconds or less.
Unavailable Sensors Can't Find Lane Lines	• Rain or snow is inhibiting the system's ability to see lane lines. • Direct sunlight is on the front camera at dawn or dusk. • There are missing or poor lane line markings on the road. • There is sun glare on the road surface. • There is heavy rain, puddles, or road spray.
Unavailable Sensor Can't See Face Clearly	• Sun is shining into the Driver Attention System (DAS) camera. • Dawn or dusk sun glare is on the driver's face. • Cups, food, hands, or other objects are obscuring the DAS view of the driver's face. • The steering column is pointed too high or low for the DAS to see the driver. Adjust the steering column or the seat if the message occurs frequently.
Unavailable Looking Away From Road for Too Long	The driver monitoring system detects that the driver is not looking at the road.
Unavailable Center Vehicle In Lane	The Super Cruise system has determined that the vehicle is not centered in the lane lines. Once the vehicle has been centered in the lane lines, the white will display in the instrument cluster indicating that Super Cruise is available.
Unavailable Driving Too Fast	The vehicle is traveling faster than 137 km/h (85 mph). The maximum Super Cruise speed in curves will vary based on how sharp the curve is. The vehicle will automatically decrease speed if needed.
Unavailable Driving in Exit Lane	The Super Cruise system has detected that the vehicle is in an exit lane.
Unavailable GPS Signal Lost	• There is poor reception in isolated areas. • Reception is being blocked by buildings or other large structures.
Unavailable You Have Taken Vehicle Control	• The brake pedal is being pressed. • The Adaptive Cruise Control has been canceled or turned off.
Unavailable Sensor Blocked	Clear snow, ice, dirt, or other contaminants from the front and rear areas of the vehicle.
Unavailable Sharp Curve	Some curves are too sharp to be navigated by the Super Cruise system. Super Cruise will be available after the curve is traveled.
Super Cruise Unavailable	Super Cruise is unavailable for reasons not described in other messages.
Super Cruise Locked Out See Owner's Manual	The driver did not take control of the vehicle when prompted by the Super Cruise system. The Super Cruise system will be disabled until the ignition is turned off and back on.

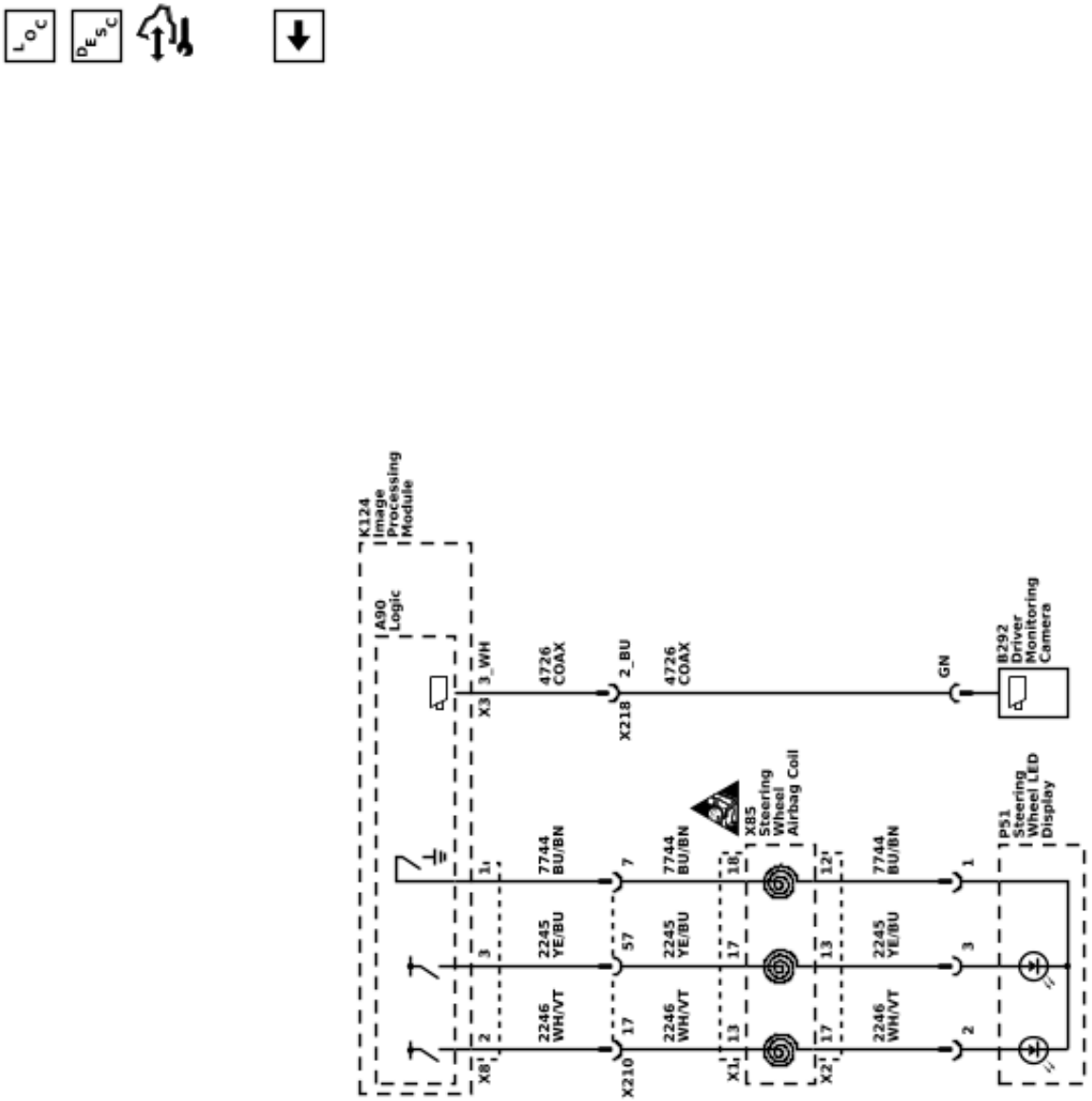
Driver Monitoring and Occupant Detection

Schematic and Routing Diagrams

Driver Monitoring Schematics (Driver Monitoring System (UJE))



Driver Monitoring Schematics (Driver Monitoring System (UK0 / UKL))



7158038

Description and Operation

Driver Monitoring Description and Operation

System Operation

The driver monitoring system is part of the Adaptive Cruise Control with Lane Following (RPO: UKL) feature.

The driver monitoring system (DMS) utilizes an infrared camera located on the steering column, and infrared illumination provided by IR LEDs embedded in the steering wheel to monitor the driver and provide an estimate of the driver's attention state to the Image Processing Module. The resultant image of the Driver is not visible to the driver or GM Service. The driver monitoring system is used as an input to enable/disable the SuperCruise system; therefore driver monitoring system should only be active when its function is requested by the Image Processing Module. For many drivers, the driver monitoring system IR LEDs may be visible as a dim red glow when the system is active.

The driver monitoring system requires the IR illumination LEDs to be illuminated for operation. The LEDs turned on by K124 Image Processing Module command and will only be illuminated when the Adaptive Cruise Control (ACC) with Lane Following is engaged by the customer.

Additionally, all the video signal circuits are twisted and shielded to prevent any interference that may lead to a loss of video signal resolution and cause a degraded video image. These circuits must not be spliced/removed from shielding or will cause image degradation.

Driver Monitoring Components

The Driver Monitoring system consists of the following components:

- Driver Monitoring Camera
- Driver Monitoring Control Module
- Driver Monitoring Indicators

Driver Monitoring System Outputs

Driver Monitoring System will monitor driver's head position and area of interest and notify Image Processing Module of the driver's attention state. Possible attention states are:

- On Road
- Off Road
- Lap Zone (a special case of Off Road)
- Center Console (a special case of Off Road)
- PVOE (Eyes Closed): eyes closed or eyes not visible
- Unknown: This value indicates that the driver cannot be tracked or driver's visual attention state cannot be estimated, for whatever reason
- Invalid: This value indicates that the driver monitor system is not presently attempting to determine the driver's attention state due to, either a fault is present in the system, or the system has not completed a self-diagnostic and therefore cannot provide a trustworthy output

Driver Monitoring System Operation

In order for the driver monitor system to function correctly, the driver's face must be oriented such the camera can view that facial features from above the eyes to below the mouth. See the driver interaction section below for helping customers understand conditions that might prevent the system from recognizing a driver. When assessing the driver's area of attention (where the driver is looking), the driver monitor system primarily uses the orientation of the face, and uses the eyes/eyelids as a secondary input. Therefore, if a driver looks at a location with the eyes only (without turning his/her head) driver monitor system will most likely report where the face is oriented as if the eyes are straight forward. This is critical if the driver is required to look at a small area of interest such as the center console; the face must be distinctly oriented towards the center console region for driver monitor system to acknowledge a glance, such as for a driver alertness check glance.

The driver monitor system Control Module receives constant power from a direct connection to battery; a constant ground signal; and a wake-up signal (COMM_ENABLE) and GM_LAN communication from the Image Processing Module. The Control Module supplies power and command signal to the driver monitor system camera, and the camera provides live images and camera exposure information to the Control Module through a co-axial cable connection. The Control Module also provides power and control signals to the IR LEDs located within the steering wheel.

The Image Processing Module wakes/puts to sleep up the driver monitor system system through a COMM_ENABLE signal; a high signal wakes the driver monitor system, and low signal puts the driver monitor system to sleep.

Once the driver monitor system is awake, the Image Processing Module forces the driver monitor system IR LEDs to an OFF state if the driver monitor system function is not required (SuperCruise is not requested by the driver). In this case, driver monitor system will report over GM-LAN that driver monitor system is unavailable (driver monitor system_Available = FALSE).

Once the driver requests SuperCruise function, the Image Processing Module will allow driver monitor system to control the IR LEDs. Once IR LED control is allowed, the driver monitor system will begin to attempt to track the driver, and report driver attention state as described above.

During normal operation of driver monitor system, because of normal, transient behavior of the driver, it will be normal for the driver monitor system to occasionally report “Unknown” driver attention state, such as if the driver turns their face away from the camera, or moves their head out of camera view.

If the driver monitor system is unable to track the head and/or eyes for an extended period of time, which can be due to driver behavior and/or appearance, the driver monitor system may conclude that it is unable to safely track and report the driver attention. In this case, the driver monitor system will report that it is unavailable for use (driver monitor system_Available = FALSE). This will cause the SuperCruise function to disengage, and the IR LEDs will be forced off by the Image Processing Module again. The driver monitor system will not resume operation again until the Image Processing Module once again returns control of the IR LEDs to the driver monitor system.

The video signal is shielded to prevent any interference that may lead to a loss of video signal resolution which could degrade the system performance and cause the driver monitor system to lose track of the driver’s facial features. The video circuit must not be spliced/removed from shielding or the image could be degraded and driver monitor system performance negatively affected

Driver Monitoring – Driver Interaction

If a customer complains that Adaptive Cruise Control (ACC) with Lane Following (LF) is not engaging as they would expect or lighting the steering wheel mounted light bar yellow or red too often, and there are no DTC codes set with any of the related components, the system may be turning off because the driver is not recognized. Careful questioning of the driver about their driving habits and when the condition occurs made aid in resolving the issue to their satisfaction.

For best system performance, follow these guidelines:

- Do not block the driver monitor system camera with personal items
- Do not block the indicators on the steering wheel
- When the driver is seated and using the feature, the driver’s head must be above the steering wheel rim. Driver must also be able to reach the steering wheel to control the vehicle while ACC/LF is in use, driver monitor system will not recognize a driver seated in an excessively reclined seat.
- As noted in the Owner’s Manual, if the driver’s head height is similar to the steering wheel rim, lowering the steering wheel tilt may improve the driver monitor system ability to recognize the driver.
- Driver’s face must not be fully or partially obscured, such as by clothing, hair, hand gestures or held items (food, phone, cigarettes, etc.)
- Sunglasses may reduce the systems ability to track the driver, avoid glasses with reflective lenses. Not all sunglasses will work with the system.
- Avoid apparel that covers the face and/or eyes.

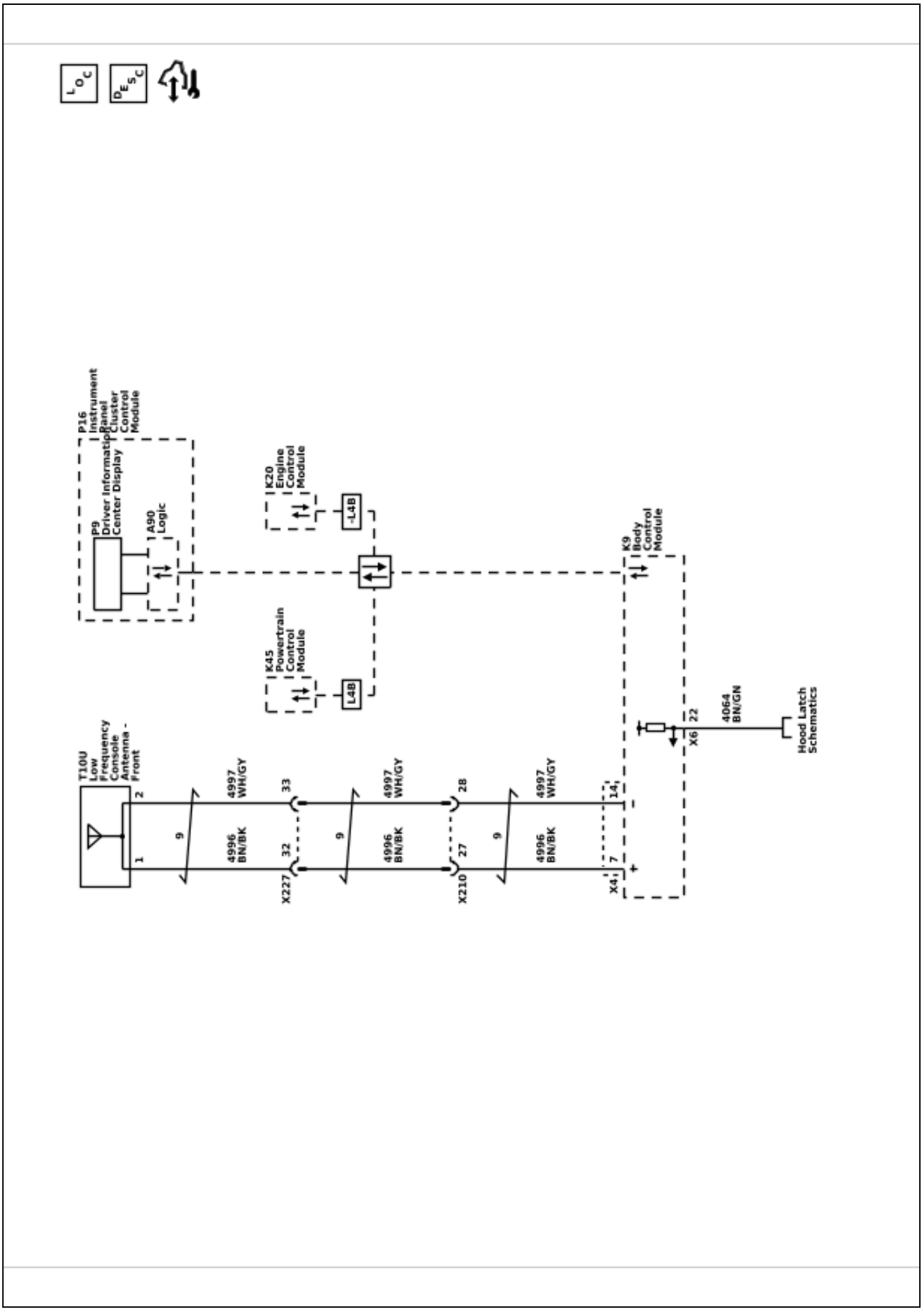
Driver Monitoring Camera Cleaning

The driver monitor system is designed to function without any periodic maintenance. However, over the course of time and normal vehicle use it is possible that the camera lens cover may become dirty and affect camera performance. If the camera lens cover requires cleaning, it may be cleaned with a soft cloth and normal household non-abrasive cleaners, such as glass cleaner. Never use any abrasive cloths and/or abrasive cleaners to clean the camera lens cover. Never use corrosive chemicals of any kind on the camera lens cover.

Immobilizer

Schematic and Routing Diagrams

Immobilizer Schematics (Immobilizer)



Description and Operation

Immobilizer Description and Operation

The immobilizer system functions are provided by the Steering Column Lock Module, the Body Control Module (BCM), and the Engine Control Module (ECM), as well as any control modules which store and report the environment identifier. The Body Control Module uses low frequency antennas in different locations on the vehicle to determine the location of the transmitter. Multiple transmitting antennas are used to ensure complete coverage of the vehicle interior and rear compartment. These antennas transmit to the keyless entry transmitter.

When the vehicle Stop/Start switch is pressed, the low frequency antennas emit a challenge to the keyless entry transmitter. The transmitter receives this challenge and emits it's response as an RF message. The BCM then compares this value to a value stored in memory. The BCM also monitors various control modules to determine if the stored environment identifiers match.

If the correct transponder is detected, the electric steering column is unlocked, and there is no start disable from OnStar the BCM will send the prerelease allowed message via serial data to the ECM. The vehicle will be allowed up to 3 seconds run time. If the theft check is incorrect, the environment identifier check fails, the incorrect transponder is detected, the electric steering column is locked, or there is a start disable from OnStar, the BCM will send a negative response and the ECM will not start the vehicle or will immediately shut off the vehicle if prerelease allowed the vehicle to start.

If RF communication is interrupted, a "No Remote Detected" message will be displayed on the DIC. In these cases, the transmitter can be placed in the transmitter pocket. The immobilizer coil antenna is located in the immediate vicinity of the transmitter pocket. Placing the transmitter in the pocket/slot will create a low powered coupling between the transmitter and immobilizer coil antenna, allowing communications to occur and enabling vehicle starting.

The components of the immobilizer system are as follows:

- BCM
- ECM
- Steering column lock control module
- Immobilizer coil antenna
- Low frequency antenna
- Ignition key/Keyless entry transmitter
- Security indicator
- Various control modules which store and report the environment identifier

Body Control Module (BCM)

The immobilizer system is an integral part of the BCM and is controlled internally within the BCM. The BCM can learn up to 8 keys (transponder values). The BCM uses low frequency antennas in three different locations on the vehicle to determine the location of the transmitter. Multiple antennas are used to ensure complete coverage of the vehicle interior and rear compartment. The BCM monitors the ignition mode switch. When the ignition mode is changed, the BCM will command, or “ping”, the low frequency antenna.

The BCM uses the following inputs:

- Environment identifier exchange with various modules
- Encrypted code from the vehicle key, received by the immobilizer coil antenna if the keyless entry transmitter signal isn’t detected as indicated by the “No Remote Detected” message
- Encrypted code from the vehicle key

The BCM uses the following outputs:

- Prerelease Allowed signal communication with ECM
- Challenge/Response with ECM

When a transponder value is received by the BCM, the BCM will compare this value to the learned key code stored in memory. The BCM then performs one of the following functions:

- If the encrypted code value matches the values stored in the BCM memory, the BCM will send the Prerelease Allowed signal to the ECM via serial data.
- If the encrypted code unique value does not match the value stored in the BCM, the BCM will send the start disable message to the ECM via serial data.
- If the BCM is unable to receive the vehicle key encrypted code value, the BCM will not send any messages to the ECM.

Engine Control Module (ECM)

The ECM receives the BCM Prerelease Allowed signal and simultaneously the ECM sends a challenge to the BCM via the serial data circuit upon seeing the vehicle transition from OFF to any other power mode. Both the ECM and BCM perform a calculation on this challenge. If the calculated response from the BCM equals the calculation performed by the ECM, the ECM will allow vehicle starting.

Low Frequency Antenna

When commanded, or “pinged”, the low frequency antenna broadcast a challenge to the keyless entry transmitter. Because of the low power of the antenna, this challenge is only broadcast in an approximate three meter range of the antenna. Multiple antenna are used to ensure complete coverage of the vehicle interior and rear compartment.

Steering Column Lock Control Module

On vehicles with electronic steering column lock that use a steering column lock control module the immobilizer system will prevent vehicle starting if there is a fault or no communication with the steering column lock control module.

Keyless Entry Transmitter

Each keyless entry transmitter contains a transponder with a unique encrypted value. The transponder's encrypted value is fixed and unable to be changed. The immobilizer system uses the keyless entry transmitter transponder value to determine if a valid keyless entry transmitter is being used to start the vehicle. At least two keyless entry transmitters must be learned to the vehicle at any time.

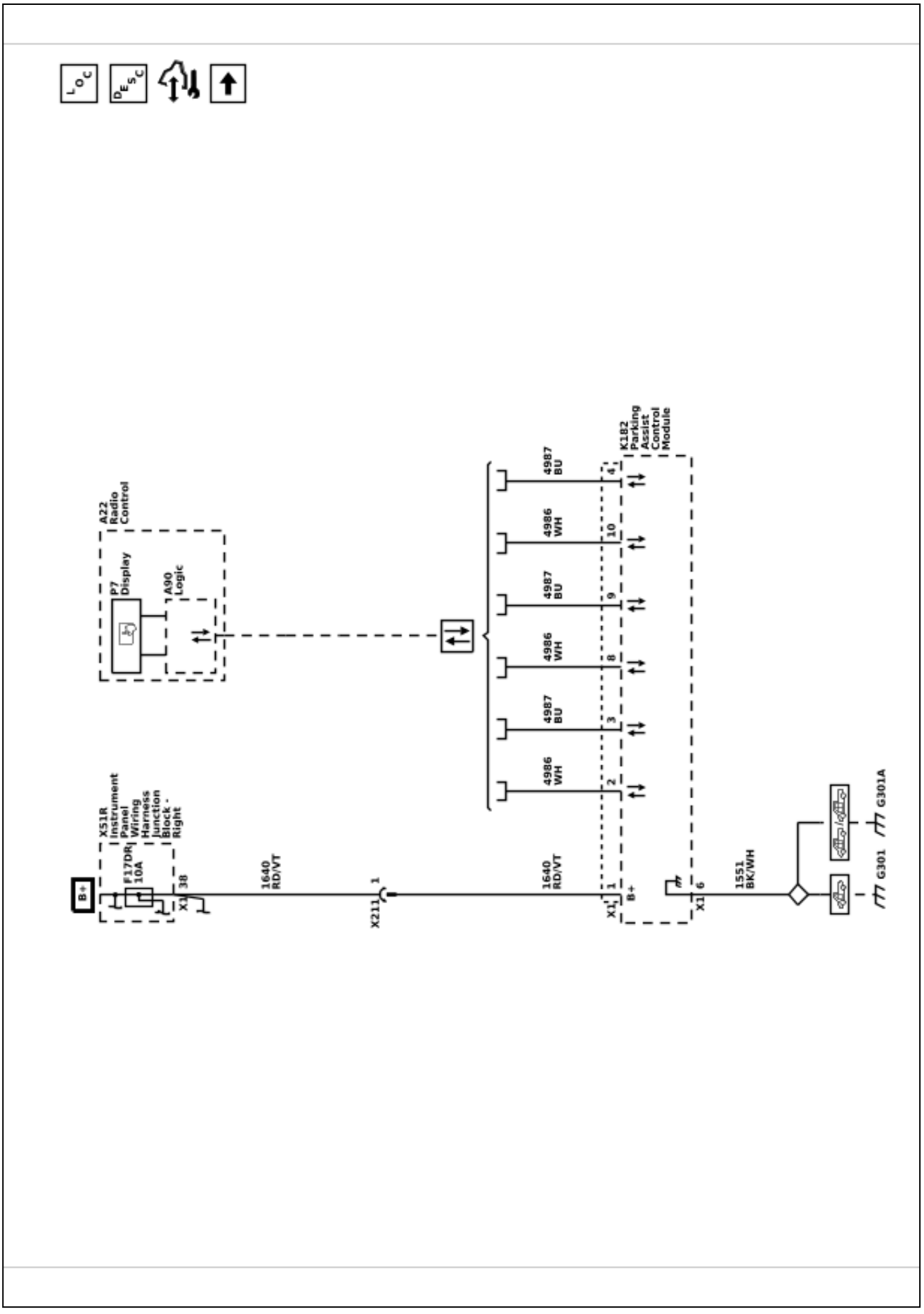
Security Indicator

The BCM will command the Instrument Cluster to illuminate the security indicator when the vehicle is ON to indicate a fault has occurred within the immobilizer system.

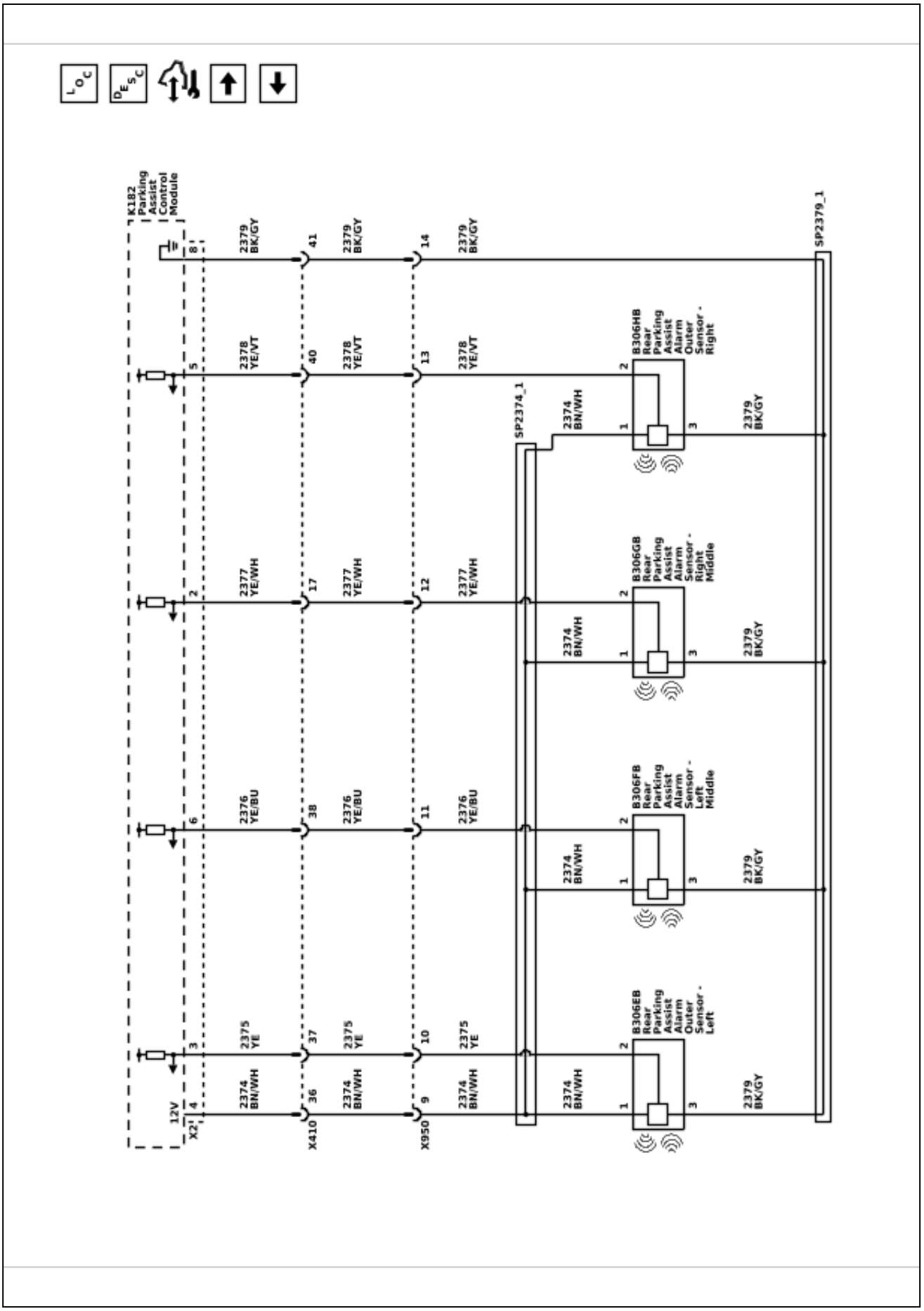
Parking Assistance Systems

Schematic and Routing Diagrams

Parking Assistance Systems Schematics (Park Assist - Power, Ground, and Serial Data)

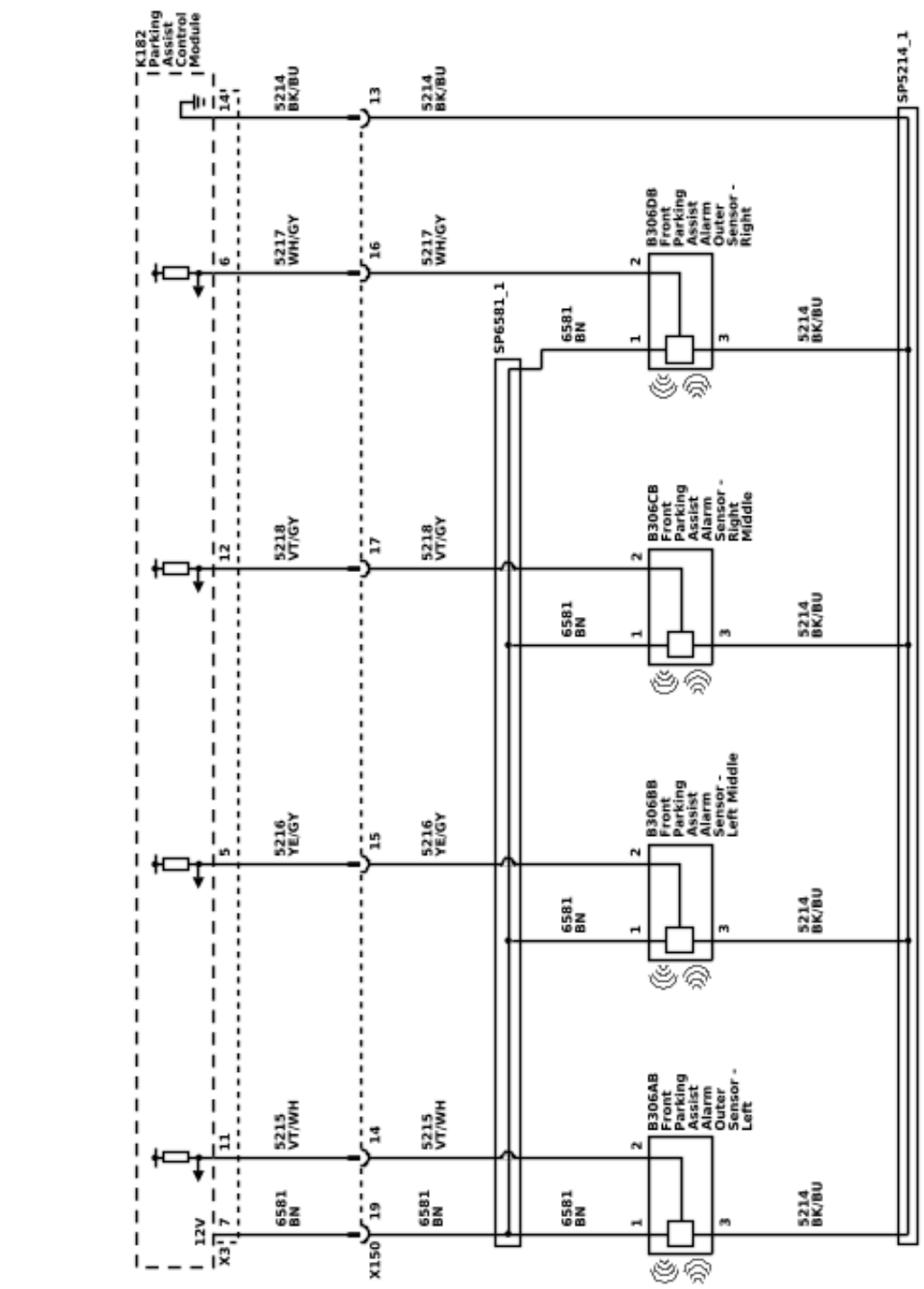


Parking Assistance Systems Schematics (Park Assist - Rear Sensors)



7158041

Parking Assistance Systems Schematics (Park Assist - Front Sensors)



7158042

Description and Operation

Parking Assist Description and Operation (UD5)

The parking assist system can help drivers avoid certain objects in their path during low-speed parking. The distance and location of the object is determined by four object sensors located in the rear fascia. The parking assist system may not detect all children, pedestrians, bicyclists, animals or objects below the bumper. Drivers should remember to always check the area around the vehicle before shifting into REVERSE. The parking assist system will not stop or slow down a vehicle. It does not engage a vehicle's throttle or braking. No safety system can take the place of an alert and engaged driver.

The parking assist system is made up of the following components:

- K182 Parking Assist Control Module
- B306 Parking Assist Alarm Sensors
- Infotainment system

K182 Parking Assist Control Module

The K182 Parking Assist Control Module provides a reference voltage and a low reference to the B166/B306 Parking Assist Alarm Sensors. The K182 Parking Assist Control Module receives individual signals from each of the four B166/B306 Parking Assist Alarm Sensors and determines the location and distance of an object based on these inputs. When an object is detected, the K182 Parking Assist Control Module will send a serial data message to the infotainment system requesting an audible alert.

B166/B306 Parking Assist Alarm Sensors

The B166/B306 Parking Assist Alarm Sensors are located in the rear fascia of the vehicle. The sensors are used to determine the distance between an object and the bumper. Each sensor emits an ultrasonic frequency which is reflected off any object located behind the vehicle. These reflections are received by the sensors. The time difference between the emission of the frequency and when the reflection is received is known as sensor echo time; it is used to determine the distance to the object. The sensors report this information to the K182 Parking Assist Control Module.

Infotainment System

The infotainment system controls the audible alert for the parking assist system. If the an object is detected the infotainment system will command beeps as an audible alert to the driver.

Rear Parking Assist Operation

The rear parking assist system uses four B166/B306 Parking Assist Alarm Sensors located on the rear fascia and functions when the transmission is in REVERSE. When a driver is backing up at a low speed, up to about 11 km/h (7 mph), the B166/B306 Parking Assist Alarm Sensors may detect objects up to 1.8 m (6 ft) behind the vehicle. When an object is within the measuring range of the B166/B306 Parking Assist Alarm Sensors, the ultrasonic pulse is reflected and is received by the sending or a neighboring sensor. The sensor converts this signal into a voltage signal and sends this signal to the K182 Parking Assist Control Module. The K182 Parking Assist Control Module evaluates the received sensor signals.

When an object is within 0.6 m (2 ft) of the rear bumper, 5 repeating low-pitched beeps are played from the rear speakers, followed by a continuous tone. If the vehicle is equipped with the Safety Alert Seat (HS1), it will pulse 5 times on both sides.

Some vehicles may have a park assist display on the P16 Instrument Panel Cluster Module with bars that show "distance to object," driving direction, and object location information for the parking assist system. As the vehicle gets closer to the detected object, distance-to-object information and caution triangles may be displayed that changes from yellow to amber to red.

The parking assist system can be turned on and off using the parking assist switch.

The K182 Parking Assist Control Module carries out a self test and monitors the sensors for electrical and mechanical faults. Monitored is the power supply of each sensor and the sensor signals. Mud, ice and snow may cause obstruction of the function of the sensors. The K182 Parking Assist Control Module also determines if the correct type of sensor is installed. If any of these tests fails, a DTC with corresponding symptom is set and the parking assist system is deactivated.

Parking Assist System Messages

SERVICE PARKING ASSIST or SERVICE DRIVER ASSIST

The driver information center displays SERVICE PARKING ASSIST or SERVICE DRIVER ASSIST when the K182 Parking Assist Control Module detects a malfunction in the parking assist system and the system is disabled.

PARK ASSIST OFF

The PARK ASSIST OFF message is displayed in the driver information center when the parking assist system is disabled due to conditions that disable or inhibit the system. The K182 Parking Assist Control Module requests the driver information center display PARK ASSIST OFF when it detects such a condition.

Parking Assist System Operational Checks

The scan tool Parking Assist Disable History 1–8 data can be used to diagnose a malfunction within the parking assist system or an intermittent concern. The following is a brief description of potential causes which may aid in diagnosis. For each potential issue, perform an appropriate inspect of the component or system and refer to the specific service information subsection related to that system for further diagnosis:

- Disable by Switch – The parking assist system has been disabled through the parking assist switch.
- Disabled by Customization Menu – The parking assist system has been disabled through the vehicle personalization menu.
- Vehicle Speed Too High – The vehicle is travelling too fast in reverse at speeds of greater than 8 km/h (5 mph).
- Vehicle Speed Invalid – The vehicle is unable to determine the vehicle speed.
- Steering Angle Signal Invalid – The vehicle is unable to determine the steering angle.
- Front Attached Object Detected – An object has been determined to be attached to the front of the vehicle. Common items such as a brush guards, light bars, and license plates may cause this concern. Additionally, damage to the front of the vehicle or a misaligned sensor may cause this concern. If the vehicle is damaged in a manner that causes the sensor to detect the bumper itself, the parking assist control module will interpret this as an attached object and disable the system. Carefully inspect the bumper, bumper mounting surface, and sensor retainers before continuing with normal diagnosis. After the detected cause has been addressed the vehicle must be driven at speed greater than 40 km/h (25 MPH).
- Rear Attached Object Detected – An object has been determined to be attached to the rear of the vehicle. Common items such as a hitch receiver, trailer, or a bicycle rack may cause this concern. Additionally, damage to the rear of the vehicle or a misaligned sensor may cause this concern. If the vehicle is damaged in a manner that causes the sensor to detect the bumper itself, the parking assist control module will interpret this as an attached object and disable the system. Carefully inspect the bumper, bumper mounting surface, and sensor retainers before continuing with normal diagnosis. After the detected cause has been addressed the vehicle must be driven at speed greater than 40 km/h (25 MPH).
- Front And Rear Attached Object Detected – An object has been determined to be attached to the front and rear of vehicle.
- Parking Assist Alarm Sensor Blocked – One of the following conditions may be present:
  - One or more of the sensors may be blocked by snow, mud, ice, or other debris. This might happen after going through a car wash in cold weather.
  - Silicone insulator surrounding sensor maybe missing, cut, or twisted.
  - Improperly installed sensor, sensor maybe be crooked due to a tight wire harness.
  - One or more of the sensors may be scratched or the paint maybe chipped.
  - Excessive paint thickness on a sensor may cause an excessive sensor ring time. When replacing or refinishing a sensor, do not apply an excessive amount of paint or clear coat.
- Haptic Seat Malfunction – A fault exists with the safety alert seat. Check for DTCs.
- Chime Malfunction – A fault exists with the vehicle chime. Check for DTCs.
- Parking Assist Switch Malfunction – A fault exists with the parking assist switch. Check for DTCs.
- Invalid Gear – The vehicle has determine a plausibility fault exists with the transmission range.
- Incorrect Power Mode – The vehicle is in an incorrect power mode for parking assist operation.

Parking Assist Description and Operation (UD7)

The parking assist system can help drivers avoid certain objects in their path during low-speed parking. The distance and location of the object is determined by four object sensors located in the rear fascia. The parking assist system may not detect all children, pedestrians, bicyclists, animals or objects below the bumper. Drivers should remember to always check the area around the vehicle before shifting into REVERSE. The parking assist system will not stop or slow down a vehicle. It does not engage a vehicle's throttle or braking. No safety system can take the place of an alert and engaged driver.

The parking assist system is made up of the following components:

- K182 Parking Assist Control Module
- B306 Parking Assist Alarm Sensors
- K9 Body Control Module
- Parking Assist Switch
- Parking Assist Switch Indicator
- Safety Alert Seat (with HS1)
- Infotainment system

K182 Parking Assist Control Module
The K182 Parking Assist Control Module provides a reference voltage and a low reference to the B306 Parking Assist Alarm Sensors. The K182 Parking Assist Control Module receives individual signals from each of the four B306 Parking Assist Alarm Sensors and determines the location and distance of an object based on these inputs. When an object is detected, the K182 Parking Assist Control Module will send a serial data message to the infotainment system requesting an audible alert.

B306 Parking Assist Alarm Sensors
The B306 Parking Assist Alarm Sensors are located in the rear fascia of the vehicle. The sensors are used to determine the distance between an object and the bumper. Each sensor emits an ultrasonic frequency which is reflected off any object located behind the vehicle. These reflections are received by the sensors. The time difference between the emission of the frequency and when the reflection is received is known as sensor echo time; it is used to determine the distance to the object. The sensors report this information to the K182 Parking Assist Control Module.

K9 Body Control Module
The K9 Body Control Module monitors the parking assist switch and control the parking assist switch indicator. When the parking assist switch is pressed, a serial data message is sent to the K182 Parking Assist Control Module indicating the driver is requesting the system be enabled or disabled. The K182 Parking Assist Control Module responds with a message that the system has been enabled or disabled. The K9 Body Control Module will respond by turning the parking assist switch indicator on or off.

On vehicles with HS1, without A45, the K9 Body Control Module also controls the P45 Seat Haptic Movement Motors for Safety Alert Seat operation.

Parking Assist Switch (if equipped)
The parking assist system can be activated and deactivated by pressing the parking assist switch. The K9 Body Control Module applies voltage and monitors the parking assist switch signal circuit. The parking assist switch is a normally open switch. With the switch open, voltage seen at the K9 Body Control Module is high. When the parking assist switch is pressed, the switch is closed and the signal circuit is pulled to ground. With the switch closed, voltage seen at the K9 Body Control Module is low. The K9 Body Control Module will respond to this by sending a serial data message to the K182 Parking Assist Control Module to enable or disable the system.

Virtual Parking Assist Switch (if equipped)
The parking assist system can be activated and deactivated via a selection on the infotainment display. The K182 Parking Assist Control Module receives the request via serial data and will respond to this by activating or deactivating the parking assist function.

The infotainment system controls the audible alert for the parking assist system. If an object is detected the infotainment system will command beeps as an audible alert to the driver.

Parking Assist Switch Indicator
When the parking assist system is enabled, the K9 Body Control Module will illuminate the indicator on the switch. The indicator receives a constant ground and is controlled through a PWM voltage control circuit by the K9 Body Control Module.

Safety Alert Seat (with HS1, without A45)
The K9 Body Control Module controls the P45 Seat Haptic Movement Motors. The P45 Seat Haptic Movement Motors provide haptic alert to the driver. If an object is detected, the K9 Body Control Module will command pulses to the P45 Seat Haptic Movement Motors as an alert to the driver.

Safety Alert Seat (with HS1 and A45)
The K40D Driver Seat Adjuster Memory Module controls the P45 Seat Haptic Movement Motors. The P45 Seat Haptic Movement Motors provide haptic alert to the driver. If an object is detected, the K40D Driver Seat Adjuster Memory Module will command pulses to the P45 Seat Haptic Movement Motors as an alert to the driver.

Infotainment System
The infotainment system controls the audible alert for the parking assist system. If the an object is detected the infotainment system will command beeps as an audible alert to the driver.

Rear Parking Assist Operation

The rear parking assist system uses four B306 Parking Assist Alarm Sensors located on the rear fascia and functions when the transmission is in REVERSE. When a driver is backing up at a low speed, up to about 11 km/h (7 mph), the B306 Parking Assist Alarm Sensors may detect objects up to 1.8 m (6 ft) behind the vehicle. When an object is within the measuring range of the B306 Parking Assist Alarm Sensors, the ultrasonic pulse is reflected and is received by the sending or a neighboring sensor. The sensor converts this signal into a voltage signal and sends this signal to the K182 Parking Assist Control Module. The K182 Parking Assist Control Module evaluates the received sensor signals.

When an object is within 0.6 m (2 ft) of the rear bumper, 5 repeating low-pitched beeps are played from the rear speakers, followed by a continuous tone. If the vehicle is equipped with the Safety Alert Seat (HS1), it will pulse 5 times on both sides.

Some vehicles may have a park assist display on the P16 Instrument Panel Cluster Module with bars that show "distance to object," driving direction, and object location information for the parking assist system. As the vehicle gets closer to the detected object, distance-to-object information and caution triangles may be displayed that changes from yellow to amber to red.

The parking assist system can be turned on and off using the parking assist switch.

The K182 Parking Assist Control Module carries out a self test and monitors the sensors for electrical and mechanical faults. Monitored is the power supply of each sensor and the sensor signals. Mud, ice and snow may cause obstruction of the function of the sensors. The K182 Parking Assist Control Module also determines if the correct type of sensor is installed. If any of these tests fails, a DTC with corresponding symptom is set and the parking assist system is deactivated.

Parking Assist System Messages

SERVICE PARKING ASSIST or SERVICE DRIVER ASSIST
The driver information center displays SERVICE PARKING ASSIST or SERVICE DRIVER ASSIST when the K182 Parking Assist Control Module detects a malfunction in the parking assist system and the system is disabled.

PARK ASSIST OFF
The PARK ASSIST OFF message is displayed in the driver information center when the parking assist system is disabled due to conditions that disable or inhibit the system. The K182 Parking Assist Control Module requests the driver information center display PARK ASSIST OFF when it detects such a condition.

Parking Assist System Operational Checks

The scan tool Parking Assist Disable History 1–8 data can be used to diagnose a malfunction within the parking assist system or an intermittent concern. The following is a brief description of potential causes which may aid in diagnosis. For each potential issue, perform an appropriate inspect of the component or system and refer to the specific service information subsection related to that system for further diagnosis:

- Disable by Switch – The parking assist system has been disabled through the parking assist switch.
- Disabled by Customization Menu – The parking assist system has been disabled through the vehicle personalization menu. Note: the Parking Assist system customization menu may not be available on all vehicles based on vehicle option content.
- Vehicle Speed Too High – The vehicle is travelling too fast in reverse at speeds of greater than 8 km/h (5 mph).
- Vehicle Speed Invalid – The vehicle is unable to determine the vehicle speed.
- Steering Angle Signal Invalid – The vehicle is unable to determine the steering angle.
- Front Attached Object Detected – An object has been determined to be attached to the front of the vehicle. Common items such as brush guards, light bars, and license plates may cause this concern. Additionally, damage to the front of the vehicle or a misaligned sensor may cause this concern. If the vehicle is damaged in a manner that causes the sensor to detect the bumper itself, the parking assist control module will interpret this as an attached object and disable the system. Carefully inspect the bumper, bumper mounting surface, and sensor retainers before continuing with normal diagnosis. After the detected cause has been addressed the vehicle must be driven at speed greater than 40 km/h (25 MPH).
- Rear Attached Object Detected – An object has been determined to be attached to the rear of the vehicle. Common items such as a hitch receiver, trailer, or a bicycle rack may cause this concern. Additionally, damage to the rear of the vehicle or a misaligned sensor may cause this concern. If the vehicle is damaged in a manner that causes the sensor to detect the bumper itself, the parking assist control module will interpret this as an attached object and disable the system. Carefully inspect the bumper, bumper mounting surface, and sensor retainers before continuing with normal diagnosis. After the detected cause has been addressed the vehicle must be driven at speed greater than 40 km/h (25 MPH).
- Front And Rear Attached Object Detected – An object has been determined to be attached to the front and rear of vehicle.
- Parking Assist Alarm Sensor Blocked – One of the following conditions may be present:
  - One or more of the sensors may be blocked by snow, mud, ice, or other debris. This might happen after going through a car wash in cold weather.
  - Silicone insulator surrounding sensor maybe missing, cut, or twisted.
  - Improperly installed sensor, sensor maybe be crooked due to a tight wire harness.
  - One or more of the sensors may be scratched or the paint maybe chipped.

  - Excessive paint thickness on a sensor may cause an excessive sensor ring time. When replacing or refinishing a sensor, do not apply an excessive amount of paint or clear coat.
- Haptic Seat Malfunction – A fault exists with the safety alert seat. Check for DTCs.
- Chime Malfunction – A fault exists with the vehicle chime. Check for DTCs.
- Parking Assist Switch Malfunction – A fault exists with the parking assist switch. Check for DTCs.
- Invalid Gear – The vehicle has determine a plausibility fault exists with the transmission range.
- Incorrect Power Mode – The vehicle is in an incorrect power mode for parking assist operation.

Parking Assist Description and Operation (UKZ)

Note: The automatic parking assist system can steer the vehicle automatically. Be aware that, in some unlikely situations, the vehicle steering wheel and wheels/tires may move without warning. Please be especially aware of situations when vehicle front tires are lifted above the ground on a vehicle hoist as the wheels could move without warning. Please exercise special care if any work is performed with the vehicle running and in gear while elevated on a hoist.

In addition to the eight B166/B306 Parking Assist Alarm Sensors used for front and rear park assist, the automatic parking assist system uses two additional B166/B306 Parking Assist Alarm Sensors located on the front fascia and two additional B166/B306 Parking Assist Alarm Sensors located on the rear fascia. These sensors face toward the side of the vehicle and are used to aid the driver in positioning the vehicle in a parallel parking maneuver.

Note: Any malfunction in the parking assist system may disable automatic parking assist. Automatic parking assist will not operate if the parking assist system is disabled.

Automatic Parking Assist Components

The parking assist system is made up of the following components:

- K182 Parking Assist Control Module
- B174W Front View Camera - Windshield
- K124 Image Processing Module (with UKL)
- B166/B306 Parking Assist Alarm Sensors
- K9 Body Control Module
- Parking Assist Switch
- Parking Assist Switch Indicator
- Automatic Parking Assist Switch
- Safety Alert Seat (with HS1)
- Infotainment System

K182 Parking Assist Control Module
The K182 Parking Assist Control Module provides a reference voltage and a low reference to the B166/B306 Parking Assist Alarm Sensors. The K182 Parking Assist Control Module receives individual signals from each of the four B166/B306 Parking Assist Alarm Sensors and determines the location and distance of an object based on these inputs. When an object is detected, the K182 Parking Assist Control Module will send a serial data message to the infotainment system requesting an audible alert.

B166/B306 Parking Assist Alarm Sensors
The B166/B306 Parking Assist Alarm Sensors are located in the front and rear fascia of the vehicle. The sensors are used to determine the distance between an object and the bumper. Each sensor emits an ultrasonic frequency which is reflected off any object located behind the vehicle. These reflections are received by the sensors. The time difference between the emission of the frequency and when the reflection is received is known as sensor echo time; it is used to determine the distance to the object. The sensors report this information to the K182 Parking Assist Control Module.

K9 Body Control Module
The K9 Body Control Module monitors the parking assist switch and control the parking assist switch indicator. When the parking assist switch is pressed, a serial data message is sent to the K182 Parking Assist Control Module indicating the driver is requesting the system be enabled or disabled. The K182 Parking Assist Control Module responds with a message that the system has been enabled or disabled. The K9 Body Control Module will respond by turning the parking assist switch indicator on or off.

The K9 Body Control Module also monitors the automatic parking assist switch. When the automatic parking assist switch is pressed, a serial data message is sent to the K182 Parking Assist Control Module indicating the driver is requesting the advance parking assist function. The K182 Parking Assist Control Module responds by beginning to search for a suitable parking space if conditions are correct.

On vehicles with HS1, without A45, the K9 Body Control Module also controls the P45 Seat Haptic Movement Motors for Safety Alert Seat operation.

Parking Assist Switch (if equipped)
The parking assist system can be activated and deactivated by pressing the parking assist switch. The K9 Body Control Module applies voltage and monitors the parking assist switch signal circuit. The parking assist switch is a normally open switch. With the switch open, voltage seen at the K9 Body Control Module is

high. When the parking assist switch is pressed, the switch is closed and the signal circuit is pulled to ground. With the switch closed, voltage seen at the K9 Body Control Module is low. The K9 Body Control Module will respond to this by sending a serial data message to the K182 Parking Assist Control Module to enable or disable the system.

Automatic Parking Assist Switch (if equipped)
The automatic parking assist system can be activated and deactivated by pressing the automatic parking assist switch. The K9 Body Control Module applies voltage and monitors the automatic parking assist switch signal circuit. The automatic parking assist switch is a normally open switch. With the switch open, voltage seen at the K9 Body Control Module is high. When the automatic parking assist switch is pressed, the switch is closed and the signal circuit is pulled to ground. With the switch closed, voltage seen at the K9 Body Control Module is low. The K9 Body Control Module will respond to this by sending a serial data message to the K182 Parking Assist Control Module to enable or disable the system.

Virtual Parking Assist Switch (if equipped)
The parking assist system can be activated and deactivated via a selection on the infotainment display. The K182 Parking Assist Control Module receives the request via serial data and will respond to this by activating or deactivating the parking assist function.

The infotainment system controls the audible alert for the parking assist system. If an object is detected the infotainment system will command beeps as an audible alert to the driver.

Parking Assist Switch Indicator (if equipped)
When the parking assist system is enabled, the K124 Image Processing Module will illuminate the indicator on the switch. Depending on electrical configuration, the indicator is controlled through a control circuit by the K124 Image Processing Module or K9 Body Control Module.

Safety Alert Seat (with HS1, without A45)
The K9 Body Control Module controls the P45 Seat Haptic Movement Motors. The P45 Seat Haptic Movement Motors provide haptic alert to the driver. If an object is detected, the K9 Body Control Module will command pulses to the P45 Seat Haptic Movement Motors as an alert to the driver.

Safety Alert Seat (with HS1 and A45)
The K40D Driver Seat Adjuster Memory Module controls the P45 Seat Haptic Movement Motors. The P45 Seat Haptic Movement Motors provide haptic alert to the driver. If an object is detected, the K40D Driver Seat Adjuster Memory Module will command pulses to the P45 Seat Haptic Movement Motors as an alert to the driver.

Infotainment System
The parking assist system can be activated and deactivated via a selection on the infotainment display. The K182 Parking Assist Control Module will respond to this by activating or deactivating the parking assist function.

The infotainment system controls the audible alert for the parking assist system. If the an object is detected the infotainment system will command beeps as an audible alert to the driver.

Parking Assist Operation

The rear parking assist system uses four B166/B306 Parking Assist Alarm Sensors located on the rear fascia and functions when the transmission is in REVERSE. When a driver is backing up at a low speed, up to about 11 km/h (7 mph), the B166/B306 Parking Assist Alarm Sensors may detect objects up to 1.8 m (6 ft) behind the vehicle. When an object is within the measuring range of the B166/B306 Parking Assist Alarm Sensors, the ultrasonic pulse is reflected and is received by the sending or a neighboring sensor. The sensor converts this signal into a voltage signal and sends this signal to the K182 Parking Assist Control Module. The K182 Parking Assist Control Module evaluates the received sensor signals.

When an object is within 0.6 m (2 ft) of the rear bumper, 5 repeating low-pitched beeps are played from the rear speakers, followed by a continuous tone. If the vehicle is equipped with the Safety Alert Seat (HS1), it will pulse 5 times on both sides.

The front parking assist system uses four B306 Parking Assist Alarm Sensors located on the front fascia and functions when the vehicle is moving forward at low speeds. When a driver is driving forward at a low speed, up to about 11 km/h (7 mph), the B166/B306 Parking Assist Alarm Sensors may detect objects up to 1.8 m (6 ft) in front of the vehicle. When an object is within the measuring range of the B166/B306 Parking Assist Alarm Sensors, the ultrasonic pulse is reflected and is received by the sending or a neighboring sensor. The sensor converts this signal into a voltage signal and sends this signal to the K182 Parking Assist Control Module. The K182 Parking Assist Control Module evaluates the received sensor signals.

When an object is within 0.3 m (1 ft) of the front bumper, 5 repeating low-pitched beeps are played from the front speakers, followed by a continuous tone. If the vehicle is equipped with the Safety Alert Seat (HS1), it will pulse 5 times on both sides. The tone for front parking assist is higher pitched than the tone for rear parking assist.

Some vehicles may have a park assist display on the P16 Instrument Panel Cluster Module with bars that show "distance to object," driving direction, and object location information for the parking assist system. As the vehicle gets closer to the detected object, distance-to-object information and caution triangles may be displayed that changes from yellow to amber to red.

The parking assist system can be turned on and off using the parking assist switch.

The K182 Parking Assist Control Module carries out a self test and monitors the sensors for electrical and mechanical faults. Monitored is the power supply of each sensor and the sensor signals. Mud, ice and snow may cause obstruction of the function of the sensors. The K182 Parking Assist Control Module also determines if the correct type of sensor is installed. If any of these tests fails, a DTC with corresponding symptom is set and the parking assist system is deactivated.

Automatic Parking Assist Operation

The automatic parking assist system aids the driver when attempting a parking maneuver. The K182 Parking Assist Control Module uses the four additional side-facing B306 Parking Assist Alarm Sensors located in the front and rear fascia, along with the eight typical forward and rearward-facing B306 Parking Assist Alarm Sensors, to guide the driver into a parking space.

Note: The driver seat belt must be buckled for the Automatic Parking Assist to operate. Unbuckling the seat belt during Automatic Parking Assist operation can cause the system to stop and not complete the parking maneuver.

The automatic parking assist switch is used to initiate the parking assist system when traveling at speeds below approximately 30 km/h (18 mph) (refer to owners manual for exact speed). While driving along a row of vehicles (UKZ/UFN/UFV) or line-marked parking spots (UFN/UFV) in which the driver wishes to park, the parking assist is activated by a switch or the infotainment screen. This will enable the automatic parking assist system and the K182 Parking Assist Control Module will begin seeking potential parking spots using the B306 Parking Assist Alarm Sensors.

When a parking spot of suitable size is found, the K182 Parking Assist Control Module will display a stop message on the driver information center. The driver accepts the decision by stopping the vehicle. The system calculates the optimal path into the parking spot and will then guide the vehicle into the chosen spot by taking over the shifting, steering, and braking control from the driver. Once in the parking spot, the K182 Parking Assist Control Module will center the vehicle in the spot.

If the automatic parking assist system is unable to complete a parking maneuver, a message indicating that the maneuver has been aborted will be displayed on the driver information center. Vehicle control will be given back to the driver once the brake or parking brake is applied.

Remote Auto Parking (with UKB)

If equipped, the vehicle can complete the automatic parking maneuvers while the driver authorizes the maneuver via the vehicle app on a compatible mobile phone outside of the vehicle. The driver can also activate an automatic parallel or perpendicular unparking maneuver via the vehicle app. The driver must always be prepared to cancel the automatic maneuver if necessary.

Remote Auto Parking works the same way and has the same limitations as the standard automatic parking assist feature described above. The main difference is that you must instead exit the vehicle and use the vehicle app.

Parking Assist System Messages

SERVICE PARKING ASSIST or SERVICE DRIVER ASSIST

The driver information center displays SERVICE PARKING ASSIST or SERVICE DRIVER ASSIST when the K182 Parking Assist Control Module detects a malfunction in the parking assist system and the system is disabled.

PARK ASSIST OFF

The PARK ASSIST OFF message is displayed in the driver information center when the parking assist system is disabled due to conditions that disable or inhibit the system. The K182 Parking Assist Control Module requests the driver information center display PARK ASSIST OFF when it detects such a condition.

Parking Assist System Operational Checks

The scan tool Parking Assist Disable History 1–8 data can be used to diagnose a malfunction within the parking assist system or an intermittent concern. The following is a brief description of potential causes which may aid in diagnosis. For each potential issue, perform an appropriate inspect of the component or system and refer to the specific service information subsection related to that system for further diagnosis:

- Disable by Switch – The parking assist system has been disabled through the parking assist switch.
- Disabled by Customization Menu – The parking assist system has been disabled through the vehicle personalization menu. Note: the Parking Assist system customization menu may not be available on all vehicles based on vehicle option content.

- Vehicle Speed Too High – The vehicle is travelling too fast in reverse at speeds of greater than 8 km/h (5 mph).
- Vehicle Speed Invalid – The vehicle is unable to determine the vehicle speed.
- Steering Angle Signal Invalid – The vehicle is unable to determine the steering angle.
- Front Attached Object Detected – An object has been determined to be attached to the front of the vehicle. Common items such as a brush guards, light bars, and license plates may cause this concern. Additionally, damage to the front of the vehicle or a misaligned sensor may cause this concern. If the vehicle is damaged in a manner that causes the sensor to detect the bumper itself, the parking assist control module will interpret this as an attached object and disable the system. Carefully inspect the bumper, bumper mounting surface, and sensor retainers before continuing with normal diagnosis. After the detected cause has been addressed the vehicle must be driven at speed greater than 40 km/h (25 MPH).
- Rear Attached Object Detected – An object has been determined to be attached to the rear of the vehicle. Common items such as a hitch receiver, trailer, or a bicycle rack may cause this concern. Additionally, damage to the rear of the vehicle or a misaligned sensor may cause this concern. If the vehicle is damaged in a manner that causes the sensor to detect the bumper itself, the parking assist control module will interpret this as an attached object and disable the system. Carefully inspect the bumper, bumper mounting surface, and sensor retainers before continuing with normal diagnosis. After the detected cause has been addressed the vehicle must be driven at speed greater than 40 km/h (25 MPH).
- Front And Rear Attached Object Detected – An object has been determined to be attached to the front and rear of vehicle.
- Parking Assist Alarm Sensor Blocked – One of the following conditions may be present:
  - One or more of the sensors may be blocked by snow, mud, ice, or other debris. This might happen after going through a car wash in cold weather.
  - Silicone insulator surrounding sensor maybe missing, cut, or twisted.
  - Improperly installed sensor, sensor maybe be crooked due to a tight wire harness.
  - One or more of the sensors may be scratched or the paint maybe chipped.
  - Excessive paint thickness on a sensor may cause an excessive sensor ring time. When replacing or refinishing a sensor, do not apply an excessive amount of paint or clear coat.
- Haptic Seat Malfunction – A fault exists with the safety alert seat. Check for DTCs.
- Chime Malfunction – A fault exists with the vehicle chime. Check for DTCs.
- Parking Assist Switch Malfunction – A fault exists with the parking assist switch. Check for DTCs.
- Invalid Gear – The vehicle has determine a plausibility fault exists with the transmission range.
- Incorrect Power Mode – The vehicle is in an incorrect power mode for parking assist operation.

Automatic Parking Assist System Operational Checks

The scan tool Automatic Parking Assist Disable History 1–8 data can be used to diagnose a malfunction within the parking assist system or an intermittent concern. The following is a brief description of potential causes which may aid in diagnosis. For each potential issue, perform an appropriate inspect of the component or system and refer to the specific service information subsection related to that system for further diagnosis:

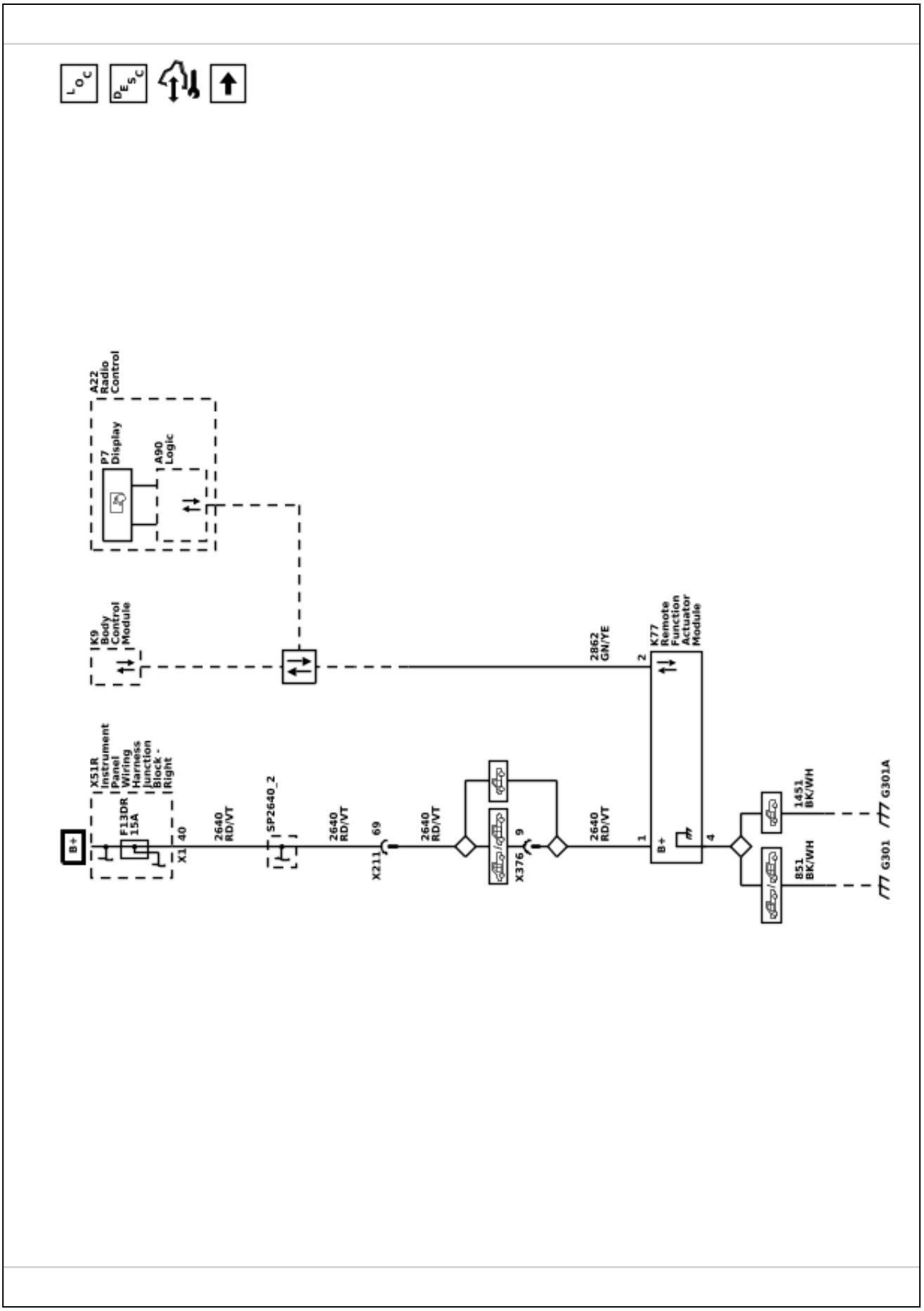
- Automatic Parking Assist Switch Pressed – The automatic parking assist switch has been pressed a second time, aborting the function.
- Automatic Parking Assist Switch Malfunction – The automatic parking assist is stuck closed or has been held down.
- Interrupted by Driver – The Automatic parking assist operation has been aborted by the driver by interfacing with the steering, brake, or accelerator.
- Info Display Control Malfunction – The Automatic parking assist system is not able to provide instructions on the driver information center
- Door Open – A door has been opened.
- Parking Brake Malfunction – A malfunction has been detected in the electric parking brake system.
- Vehicle Dynamics System Status Not Plausible – An implausible scenario between the steering angle sensor, yaw sensor, and lateral/longitudinal accelerometer has been determined.
- Steering Response Malfunction – The steering system has not responded as expected to a steering command.
- Automatic Brake Response Malfunction
- Transmission Response Malfunction – The transmission has not responded as expected to a shift command.

- Automatic Braking Apply Response Not Plausible – An implausible scenario between a brake apply command and vehicle deceleration has been determined.
- Vehicle Movement Detected During Brake Applied Request – Vehicle movement has occurred while the brakes are commanded to apply.
- Chime Malfunction – A fault exists with the vehicle chime. Check for DTCs.
- Wheel Speed Direction Signal Invalid – Identified wheel directional travel does not match intended travel direction.
- Vehicle Speed Invalid – The vehicle is unable to determine the vehicle speed.
- Attached Object Detected – An object has been determined to be attached to the front and rear of vehicle.
- Parking Maneuver Vehicle Speed Exceeded – The vehicle has exceeded the maximum allowable speed for the parking maneuver.
- Vehicle Speed Too High to Search for a Parking Space – The vehicle has exceeded the maximum allowable speed to search for a suitable parking spot.
- Number of Parking Maneuvers Exceeded – The maximum number of parking attempts for a single maneuver has been exceeded.
- Parking Space Too Small – The vehicle has determined the space for the attempted parking maneuver is too small.
- Vehicle Not Following Parking Space Path – The vehicle is unable to follow the intended path of the parking maneuver.
- Yaw Angle Above Threshold – The expected yaw angle for the parking maneuver has been exceeded.
- Steering Angle Deviation Above Threshold – The expected steering angle for the parking maneuver has been exceeded.
- Object Detected on Both Sides of Vehicle – An object has been detected on both the left and right side of the vehicle.
- Object Detected in Alert Zone – An object has been detected in the vehicle's path.
- Sensor Blocked – One of the following conditions may be present:
  - One or more of the sensors may be blocked by snow, mud, ice, or other debris. This might happen after going through a car wash in cold weather.
  - Silicone insulator surrounding sensor maybe missing, cut, or twisted.
  - Improperly installed sensor, sensor maybe be crooked due to a tight wire harness.
  - One or more of the sensors may be scratched or the paint maybe chipped.
  - Excessive paint thickness on a sensor may cause an excessive sensor ring time. When replacing or refinishing a sensor, do not apply an excessive amount of paint or clear coat.
- Steering Angle Signal Invalid – The vehicle is unable to determine the steering angle.
- Invalid Gear – The vehicle has determine a plausibility fault exists with the transmission range.
- Incorrect Power Mode – The vehicle is in an incorrect power mode for parking assist operation.

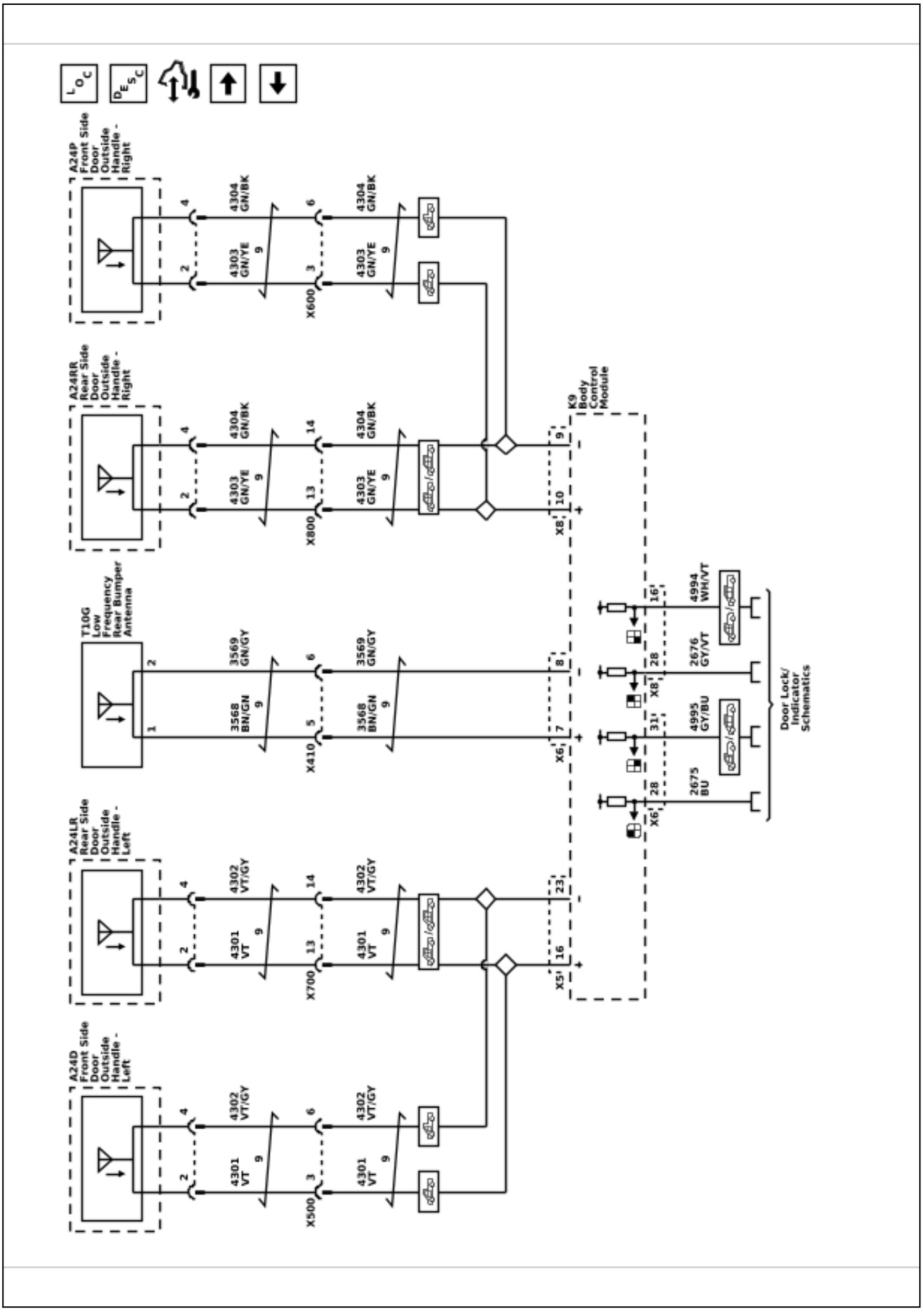
Remote Functions

Schematic and Routing Diagrams

Remote Function Schematics (Keyless Entry - Active)



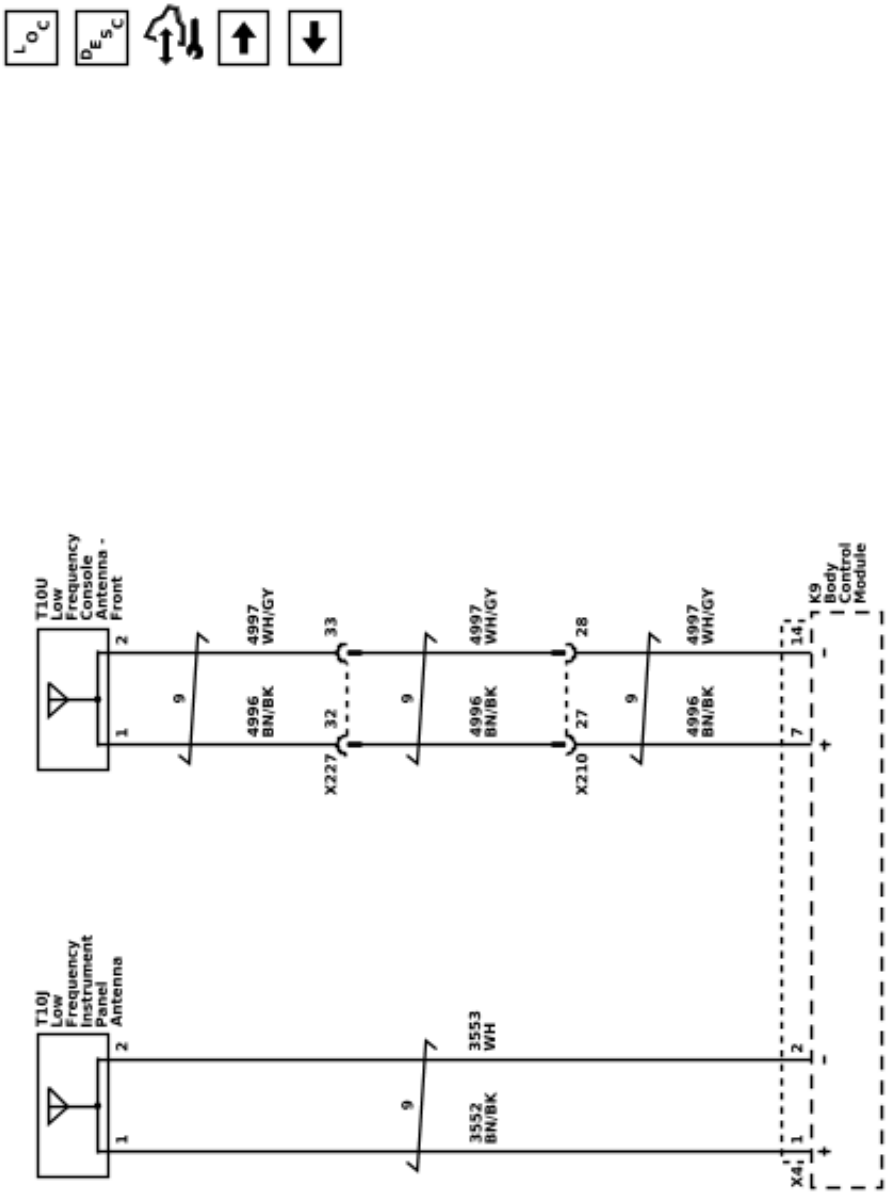
Remote Function Schematics (Keyless Entry - Passive (ATH))



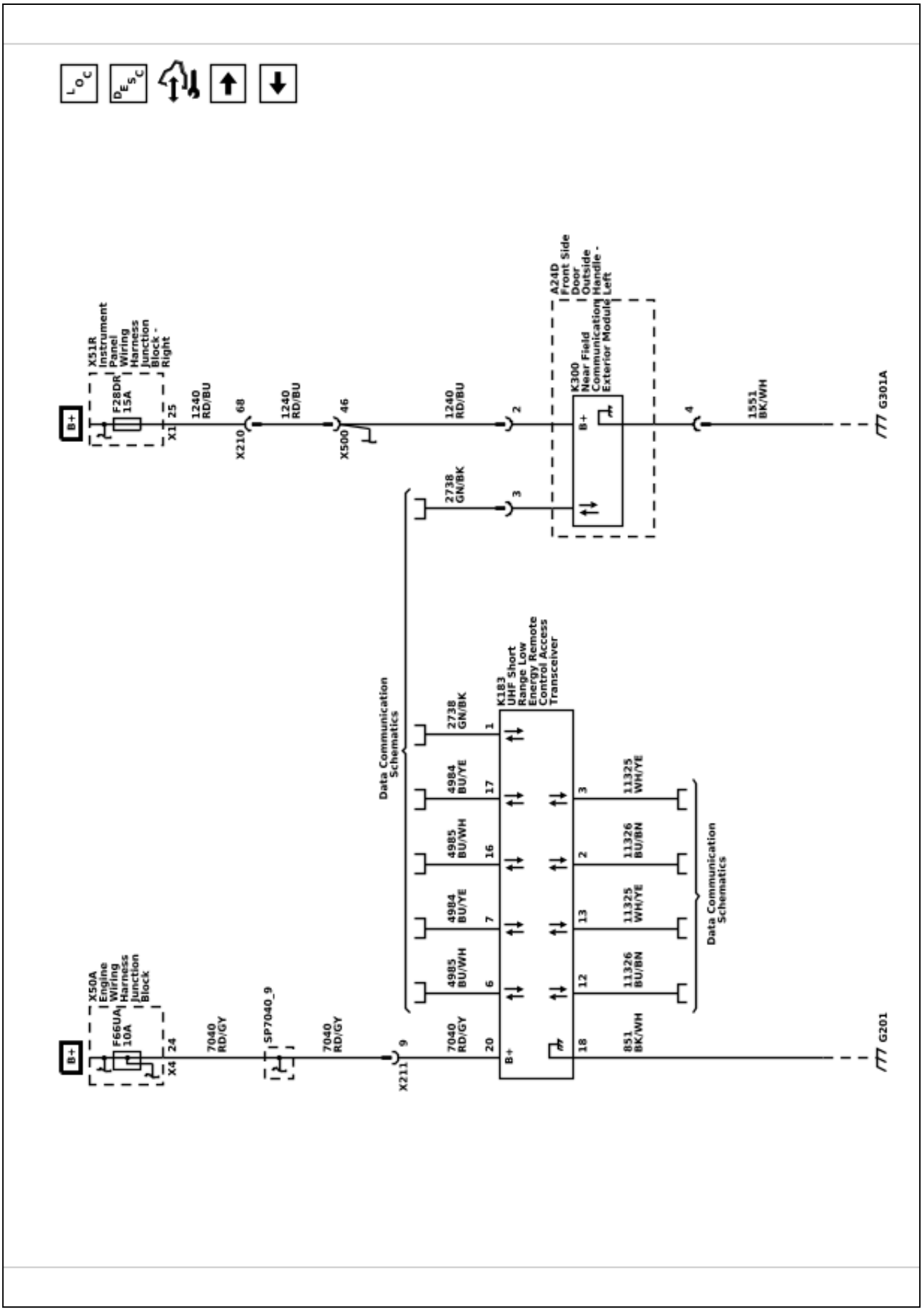
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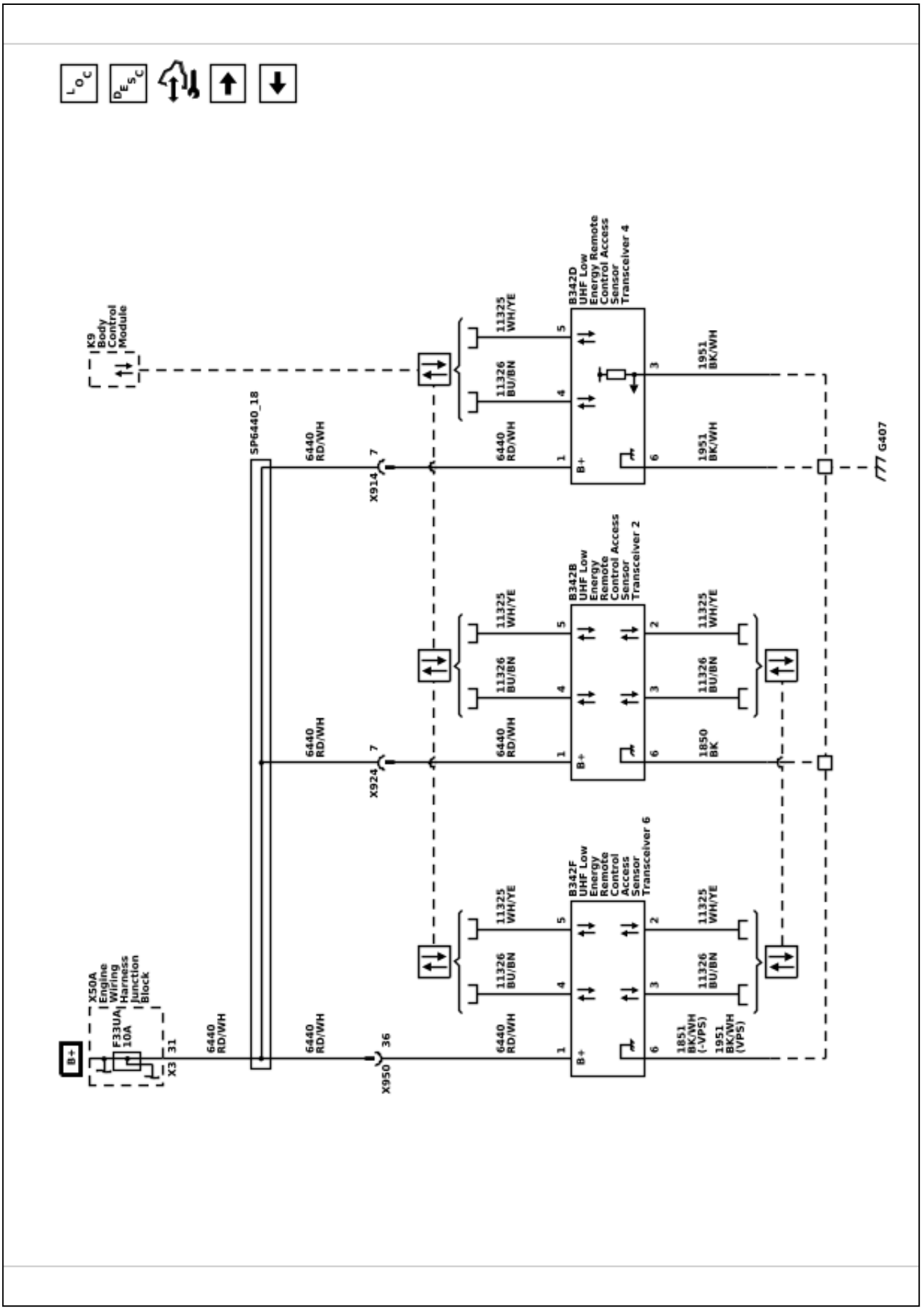
Remote Function Schematics (Keyless Start)



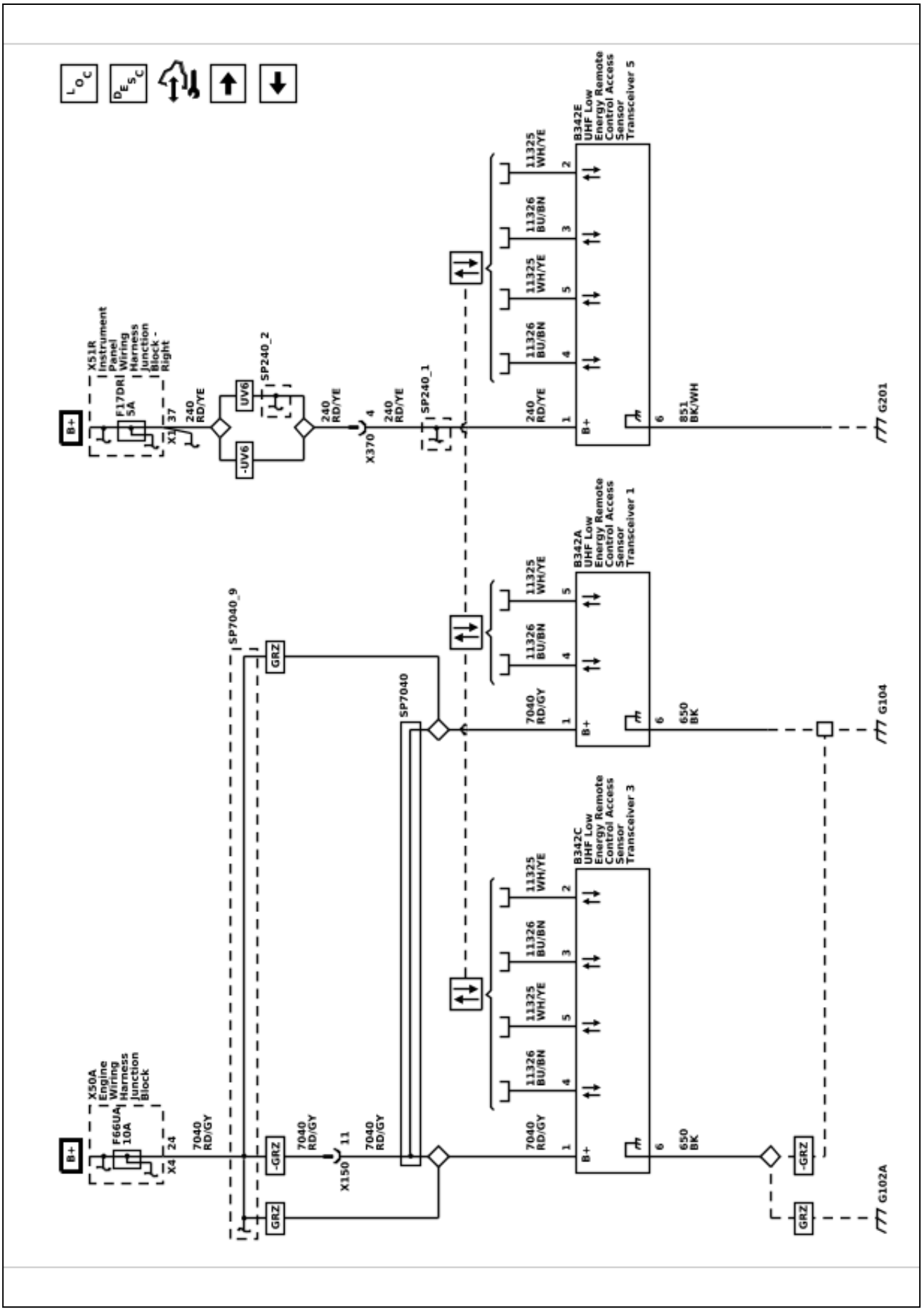
Remote Function Schematics (Keyless Entry - Virtual Key Modules (BOK / BOR / BOY))



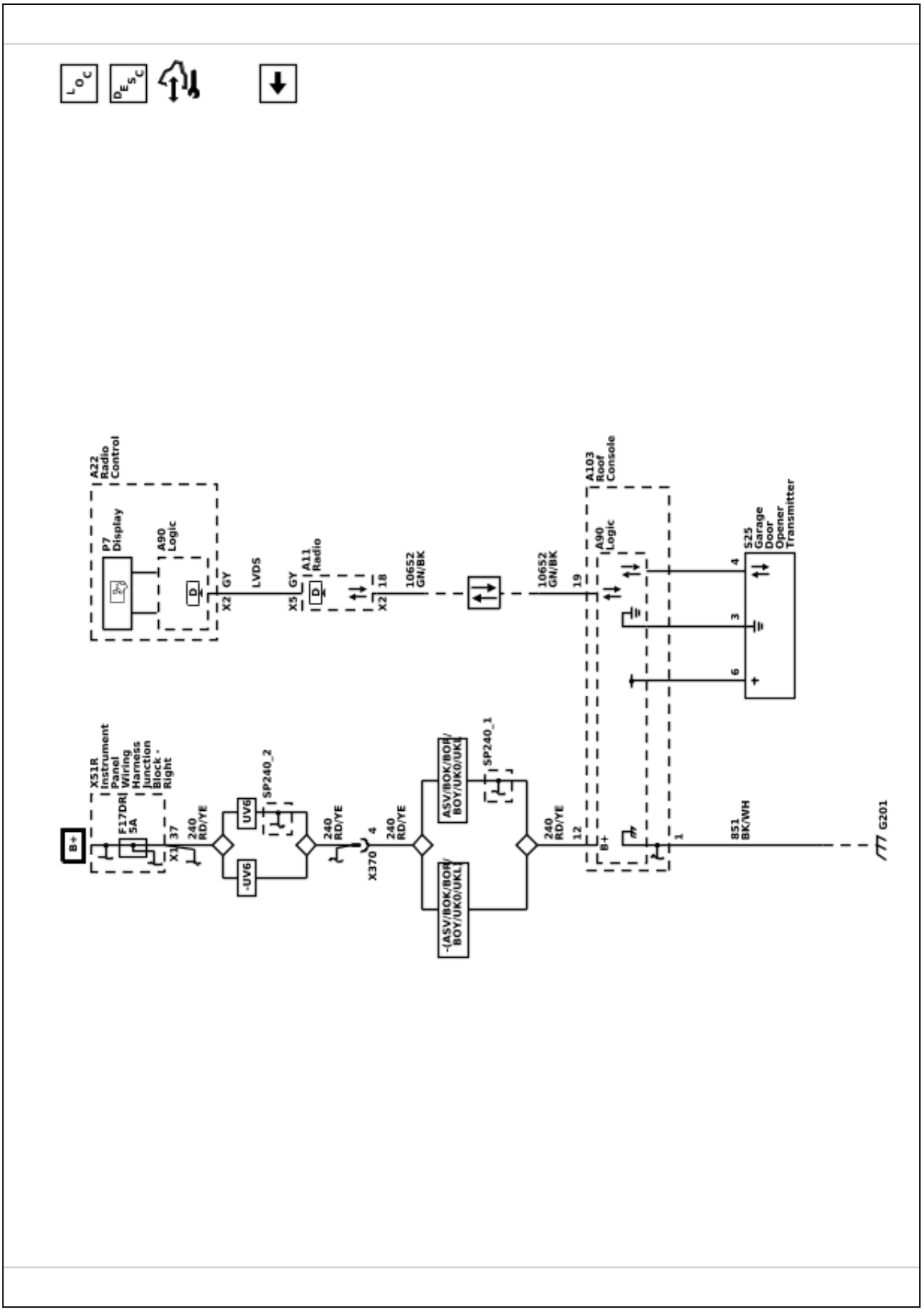
Remote Function Schematics (Keyless Entry - Virtual Key Transceivers - 1 of 2 (BOK / BOR / BOY))



Remote Function Schematics (Keyless Entry - Virtual Key Transceivers - 2 of 2 (BOK / BOR / BOY))



Remote Function Schematics (Garage Door Opener (UG1))



Description and Operation

Front Side Door Access Control Transmitter Description and Operation

Front Side Door Access Control Transmitter Description and Operation

The Front Side Door Access Control Transmitter is an accessory offered to be used as a vehicle entry device. Similar to the Keyless Entry Transmitter, the Front Side Door Access Control Transmitter will send a radio frequency signal to the Remote Function Actuator. Next, the Remote Function Actuator sends a signal to the Body Control Module via LIN communication. The BCM will interpret this signal and either lock or unlock the vehicle as a result. A low transmitter battery or radio frequency interference from aftermarket devices, such as 2-way radios, power inverters, computers, etc., may cause a system malfunction. High radio frequency traffic areas, such as gas stations that use pay-at-the-pump radio frequency transponders, may also cause interference that could lead to a malfunction.

Like the Keyless Entry Transmitter, the Front Side Door Access Control Transmitter is programmed to the vehicle's Body Control Module. This means the Front Side Door Access Control Transmitter will populate one of the 8 programmable spaces in the BCM for Keyless Entry Transmitters. The Front Side Door Access Control Transmitter will need to be reprogrammed in the event of BCM replacement. This can only be achieved with the Master Code. If the Master Code is not retrievable, a new Front Side Door Access Control Transmitter with accompanying wallet card will need to be programmed to the new BCM.

The Front Side Door Access Control Transmitter has 5 buttons depicting numbers from 0 to 9. Each button represents a character of a 5 digit code that the vehicle owner may program, which will be referred to as a personal code. The user has 3 attempts to input the correct access code before the Front Side Door Access Control Transmitter enters lockout mode for 1 minute. This will occur up to 2 more times if the incorrect access code is entered repeatedly. After that, any additional 3 attempts will cause the Front Side Door Access Control Transmitter to enter lockout mode for 23 minutes. There is an LED light at the top of the Front Side Door Access Control Transmitter that provides feedback to the user. Each Front Side Door Access Control Transmitter is sold with a wallet card that contains a master code that may be used for keyless entry as well as programming a personal code. The master code will always allow operation of the Front Side Door Access Control Transmitter and may be used to program a new personal code. Entering the 5 digit access code will unlock the driver door. Pressing the 3/4 key within 5 seconds of entering the 5 digit access code with unlock all doors. Pressing the 7/8 and 9/0 button will lock all doors. To change the personal code, refer to the wallet card included with the Front Side Door Access Control Transmitter.

The Front Side Door Access Control Transmitter contains a button cell battery that is not serviceable. Once the battery exceeds the expected lifetime, the Front Side Door Access Control Transmitter will need to be replaced. A new Front Side Door Access Control Transmitter will come with new wallet card.

Garage Door Opener Description and Operation

The garage door opener is fixed and rolling code capable. Rolling code is a system that allows the code that the customers receiver receives from the garage door opener to change every time the garage door opener is used within operating range of the receiver. Rolling code programming requires the customer to push a learn/program button on the garage door opener receiver at their home. This button is usually located on the receiver unit under a cover (light cover) on one end of the unit. The customer must follow the garage door opener manufacturers instructions to program/learn the receiver to accept the Universal Home Remote System as an authorized opener for their unit . When the receiver and the garage door opener are initially programmed together, a code is established and a new code is created for every new transmission. The software in the receiver recognizes the garage door opener and accepts the new code.

The garage door opener is compatible with most, but not all types and brands of transmitters.

The garage door opener is a transmitter operating between 288–434 MHz. The power and range of the transmitter is limited to comply with laws governing the generation of radio frequency interference. The transmitter is programmed by the user to accept the signal generated by the user's transmitters.

The garage door opener has 3 buttons that may be programmed for individual transmitter/receiver combinations to control up to 3 garage door openers, security gates, lighting systems, etc. Each button represents a transmitter code section of the transmitter, which operates separately from any other button, and may be considered a separate transmitter. Operation consists of simply pressing a button to activate the corresponding transmitter.

The garage door opener does not need any programming after it is replaced. However, for the opener function it must be programmed to the customer’s garage door or other devices such as a gate. The programming can only be performed at the device being programmed, it cannot be programmed at a service facility. Instructions for programming are listed in the Garage Door Opener Malfunction document in a Diagnostic Aid.

Note: Do not use the garage door opener (GDO) with any garage door opener that does not have the stop and reverse safety feature. This includes any garage door opener model manufactured before April 1, 1982.

Key Card System Description and Operation

Description and Operation

The Key Card system is a method of vehicle access that utilizes Near Field Communication (NFC) technology to verify the correct key is presented to the vehicle. Upon presentation, the vehicle will either lock or unlock as well as allow vehicle starting within a 2 minute time limit from when the card was first presented. A user would present their Key Card to the K300 Near Field Communication Exterior Module, which is typically located behind an applique. For specific K300 location, a user may refer to the Owner’s Manual, or the location is depicted on the Key Card itself. When a user presents a Key Card to the specified applique, the K183 UHF Short Range Low Energy Remote Control Access Transceiver will begin authenticating the Key Card via K300 as a pass-through component. If the information sent to the K183 UHF Short Range Low Energy Remote Control Access Transceiver matches the information stored in the K9 Body Control Module, vehicle access and power moding will be allowed. To power mode the vehicle while using Key Card, a user must do so within 2 minutes of tapping the Key Card to the specified applique.

Unlike the Digital Key system that utilizes the user’s mobile device, Key Card is a standalone system that only shares the K183 UHF Short Range Low Energy Remote Control Access Transceiver as a control module. A Key Card must be learned to the vehicle prior to being used. This procedure can be accessed through Techline Connect. A vehicle has the capability of learning up to 8 Key Cards.

The Key Card system uses the following components:

- Key Card
- K183 UHF Short Range Low Energy Remote Control Access Transceiver
- K300 Near Field Communication Backup Module

Key Card

Caution: Placing the key card on the wireless charger may damage the card. If they key card is damaged, it may not unlock or lock or start the vehicle. Do not place the key card on the wireless charger.

The key card is a card that utilizes Near Field Communication (NFC) technology to create a secure method of vehicle entry and power moding. The key card can only interface with the vehicle through the K300 Near Field Communication Exterior Module. To lock or unlock the vehicle, tap the Key Card on the key card placement location, either the driver door handle or b-pillar applique depending on vehicle application, once. Unlocking the vehicle with the key card will start the 2–minute timer to allow changes to the vehicle power mode. On EVs, putting the vehicle in service mode with the key card will stop the 2–minute timer.

When using the key card and no other key, the vehicle may display a DIC message indicating there is no other key detected. This is by design, as the key card is only meant to be a backup to the Digital Key system. For vehicles with Passive Power Moding, after the 2–minute timer is stopped the vehicle will change power modes from service mode to propulsion mode when the brake pedal is pressed, even if the key card has been removed from the vehicle.

K183 UHF Short Range Low Energy Remote Control Access Transceiver

The K183 UHF Short Range Low Energy Remote Control Access Transceiver, also referred to as Virtual Key Module (VKM) is the primary control module for the Digital Key system. It receives a constant B+ voltage and ground. The UHF Short Range Low Energy Remote Control Access Transceiver communicates with the vehicle via AUTOSAR CAN Bus 5 and with each UHF Low Energy Remote Control Access Sensor Transceiver via Virtual Key Private CAN. The UHF Short Range Low Energy Remote Control Access Transceiver acts as the serial data master to the UHF Low Energy Remote Control Access Sensor Transceiver. The UHF Short Range Low Energy Remote Control Access Transceiver is typically located in a central location of the vehicle interior, often in the center console area. This is to ensure consistent wireless communication coverage in the interior of the vehicle. The UHF Short Range Low Energy Remote Control Access Transceiver takes information gathered from the UHF Low Energy Remote Control Access Sensor Transceiver, as well as information from its own BLE RSSI chip and calculates the position of the mobile devices with respect to the vehicle. Mobile devices position is communicated to BCM in order to allow lock/unlock/starting in the designated zones.

K300 Near Field Communication Exterior Module

The K300 Near Field Communication Exterior Module is a LIN module that serves the purpose of pulling data from the Key Card. This data is then sent via LIN to the Near Field Communication module where the data is either verified or rejected. If the data from the Key Card is verified to be correct, vehicle entry will be permitted.

Keyless Entry System Description and Operation

Keyless Entry System Description and Operation – Active

The keyless entry system is a vehicle entry device. The keyless entry system is used in conjunction with the door locks to unlock the vehicle. Keyless entry will lock/unlock a door or open the rear compartment lid when a corresponding button on the keyless entry transmitter is pressed. This is accomplished by the transmitter sending a radio frequency to the remote control door lock receiver that has a direct link to the body control module (BCM). The BCM interprets the signal and activates the requested function or requests the appropriate ECU to activate the function via a serial data message. A low transmitter battery or radio frequency interference from aftermarket devices, such as 2-way radios, power inverters, computers, etc., may cause a system malfunction. High radio frequency traffic areas, such as gas stations that use pay-at-the-pump radio frequency transponders, may also cause interference that could lead to a malfunction. Keyless entry allows you to operate the following features:

- Door lock/unlock
- Rear compartment lid release
- Illuminated entry lamps
- Panic alarm/vehicle locator
- Remote vehicle start
- Passive keyless entry able/disable
- Automatic window express down, if equipped
- Automatic window express up, if equipped
- Automatic power mirror folding/unfolding, if equipped

Keyless Entry System Description and Operation – Passive

Passive keyless entry allows entry to a locked vehicle without pressing any buttons on the keyless entry transmitter. The passive entry system uses low frequency antennas in several different areas on the vehicle to determine the location of the transmitter. When passively opening a locked door or the rear compartment, you must have a programmed transmitter with you in your pocket, purse, or briefcase within a one meter range.

When an exterior door handle button is pressed or the rear compartment touch pad is pressed, the body control module activates the low frequency antenna which sends out a challenge to the keyless entry transmitter. Because of the low frequency, communication range is limited. The antenna will emit the challenge in a one meter range. The transmitter must be within this range to receive the challenge. The transmitter receives this challenge and emits it's response as an RF message, which is received by the remote control door lock receiver. If the response is correct, entry into the vehicle will be allowed.

As a customer convenience feature, the keyless entry system will notify the driver if the transmitter has been left in the vehicle after exiting by chirping the vehicle horn three times and displaying a message on the DIC. This may be turned off using vehicle personalization. Also, if the transmitter is left in the vehicle after the central door lock switch has been used to lock the vehicle, the driver door will remain unlocked after exiting the vehicle. This is intended to prevent locking the transmitter in the vehicle and being unable to access it.

Keyless Entry System Description and Operation – Keyless Start

The keyless start portion of the keyless entry system allows vehicle starting, having only the transmitter as your key. The keyless start system uses low frequency antennas in three different locations on the vehicle to

determine the location of the transmitter. Multiple antenna are used to ensure complete coverage of the vehicle interior and rear compartment. When using the keyless start system, a programmed transmitter must be in the vehicle's interior, in the driver's pocket, purse, or briefcase.

When the ignition mode switch is pressed, the low frequency antennas emit a challenge to the keyless entry transmitter. The transmitter receives this challenge and emits it's response as an RF message, which is received by the remote control door lock receiver. If the response is correct, vehicle starting will be allowed. If RF communication is interrupted, a “No Remote Detected” message will be displayed on the DIC. In these cases, the transmitter can be placed in the transmitter pocket located in the center console. The immobilizer antenna coil is located directly beneath the transmitter pocket. Placing the transmitter in the pocket will create a low powered coupling between the transmitter and immobilizer antenna, allowing communications to occur and enabling vehicle starting. If the key has been idle the DIC may display “Key In Sleep Mode, Move Key, Then Start”. In this case move the vehicle key to start the vehicle.

The keyless entry system has the following components:

- Keyless entry integrated key/transmitter
- Driver and passenger side antennas
- Driver and passenger door handle switches (part of the door handle assembly)
- Rear fascia antenna
- Immobilizer antenna coil (front console antenna function)
- Rear console antenna
- Rear Compartment Antenna (If Equipped)
- Body control module (BCM)
- Remote control door lock receiver

Keyless Entry Transmitters

By operating any of the exterior door handle buttons or the start/stop switch, a nearby transmitter is challenged by a keyless entry antenna. The transmitter will send an RF response to the remote control door lock receiver, which communicates with the BCM. The BCM will interpret this communication and either allow or deny vehicle entry or starting.

Side Antennas

The keyless entry side antennas are used to transmit low frequency communications to the keyless entry transmitters.

The keyless entry side antennas are located in the driver and passenger body sides. The antennas are controlled by the body control module. When the exterior door handle button is pressed, the respective antenna will send out a challenge to the keyless entry transmitter, which begins the passive entry communications.

Rear Fascia Antenna

The rear fascia antenna is used to transmit low frequency communication to the keyless entry transmitters for entry to rear compartment.

The rear fascia antenna is located behind the rear fascia. The antenna is controlled by the body control module. When the rear compartment touch pad is pressed, the antenna sends out a challenge to the keyless entry transmitter, which begins the passive entry communications.

Immobilizer Coil Antenna

This antenna is located in the front of the center console.

The Immobilizer antenna coil is used for vehicle starting functions and for learning vehicle keys. When the ignition mode switch is pressed, the antenna is energized or "pinged". This emits a low frequency challenge signal that is received by the keyless entry transmitter. The transmitter will then reply to this challenge with a response and, if correct, vehicle starting will occur. If the transmitter battery is dead, weak, or the RF signal is being interrupted, the transmitter may be placed in the pocket to create a low powered coupling between the transmitter and immobilizer coil antenna, allowing communications to occur and enabling vehicle starting.

Rear Console Antenna

This antenna is located in the rear of the center console.

The rear console antenna is used for vehicle starting functions. When the ignition mode switch is pressed, the antenna is energized or "pinged". This emits a low frequency challenge signal that is received by the keyless entry transmitter. The transmitter will then reply to this challenge with a response and, if correct, vehicle starting will occur.

Rear Compartment Antenna (If Equipped)

This antenna is located near the center of the rear compartment area.

The rear compartment antenna is used for vehicle starting functions. When the ignition mode switch is pressed, the antenna is energized or "pinged". This emits a low frequency challenge signal that is received by the keyless entry transmitter. The transmitter will then reply to this challenge with a response and, if correct, vehicle starting will occur.

OnStar® Remote Link

A vehicle operator may have the ability to perform some of the keyless entry functions using applications on personal devices such as smart phones. Refer to *OnStar Description and Operation 5-21*.

Body Control Module (BCM)

The BCM is a multi-function module that performs the following functions:

- Receive and authenticate active transmitter and keyless start/entry signals from the remote control door lock receiver
- Determines the function requested by the transmitter signal
- Performs the function requested by the transmitter signal
- Activating vehicle antennas for passive keyless entry functions
- Activating vehicle antennas for keyless start functions
- Backup control for the ECM accessory wakeup and the run/crank relay
- If equipped, controls the electronic steering column lock
- Receiver of the exterior door handle switch inputs and door open switch (not the door ajar switch)
- Ignition mode switch monitoring

Unlock Driver Door Only – Active

Momentarily press the transmitter UNLOCK button in order to perform the following functions:

- Unlock only the driver door or all doors, if enabled through personalization
- Illuminate the interior lamps for a determined length of time, or until the ignition is turned ON
- Flash the exterior lights, if enabled through personalization
- Disarm the Content Theft Deterrent (CTD) system
- Deactivate the CTD system when in the alarm mode

Unlock All Doors – Second Operation – Active

Momentarily press the transmitter UNLOCK button a second time, within 5 seconds of the first press, to perform the following function:

Unlock the remaining doors

Unlock Driver Door Only – Passive

If enabled through personalization, approach the driver door with a valid keyless entry transmitter and press the door handle button to perform the following functions:

- Unlock and open only the driver door
- Disarm the CTD system, if equipped
- Deactivate the CTD system when in the alarm mode

Unlock All Doors – Passive

Approach any non driver door (front or rear) or, if enabled through personalization, the driver door with a valid keyless entry transmitter and press the door handle button to perform the following functions:

- Unlock all vehicle doors
- Disarm the CTD system, if equipped
- Deactivate the CTD system when in the alarm mode

Lock All Doors – Active

Press the transmitter LOCK button to perform the following functions:

- Lock all vehicle doors
- Immediately turn off the interior lamps
- Flash the exterior lights, if enabled through personalization
- Chirp the horn, if enabled through personalization
- Arm the CTD system

Lock All Doors – Passive

Exit the vehicle (with ignition off) with the keyless entry transmitter to automatically perform the following functions, if equipped.

- Lock all vehicle doors after a delay
- Flash the exterior lights, if enabled through personalization
- Chirp horn, if enabled through personalization
- Arm the CTD system

When all doors are closed, they can also be locked from the exterior by operating a front door handle button or touch pad while having a valid transmitter within range. Vehicles equipped with a rear door button can also lock all doors from the rear doors.

Rear Compartment Lid Release – Active (If Equipped)

If the vehicle transaxle is in PARK or NEUTRAL, a double press of the transmitter rear compartment release button will open the rear compartment lid.

Rear Compartment Lid Release – Passive (If Equipped)

Approach the rear of a locked vehicle with a valid keyless entry transmitter. Press the rear compartment lid release touch pad. The rear compartment lid will open.

Tailgate Release – Passive (If Equipped)

Approach the rear of a locked vehicle with a valid keyless entry transmitter. Press the tailgate release touch pad. The rear tailgate will open.

Vehicle Locator/Panic Alarm/Active

A single press of the panic button performs the following functions. Some functions may be dependent on personalization settings:

- Pulses the horn three times
- Flashes the exterior lamps three times

A press and hold of the panic button performs the following functions:

- Pulses the horn and flashes the parking lamps for 30 second or until the following conditions occur:
  - The panic button is pressed
  - The ignition switch is turned to the RUN position with a valid key

Remote Vehicle Start/Active (If Equipped)

The remote vehicle start function allows engine starting while not in the vehicle. It also allows the vehicle HVAC system and other vehicle systems to enable, providing a comfortable vehicle upon entry. The remote vehicle start sequence begins by pressing and releasing the remote vehicle start button on the keyless entry transmitter twice. The turn signal lamps will illuminate to indicate the vehicle has received the remote start request. Each time a remote vehicle start is performed, the vehicle doors are locked, however they may then be unlocked/locked with the transmitter at any time. Once activated, the engine is allowed to run for 15 minutes. The remote start operation can be repeated as many times as desired up to a total run time of 30 minutes. The remote vehicle start event may be cancelled at any time by pressing only the remote vehicle start button on the transmitter or by entering the vehicle and turning ON the hazard lamps.

Hood Ajar Switch/Active

The hood switch provides status of the hood to the BCM for remote vehicle start purposes. The switch is integrated into the hood latch assembly. The hood ajar switch provides 2 separate inputs to the BCM. These separate inputs allow the BCM to actively monitor for a hood ajar switch fault.

Remote Vehicle Start Circuit Description/ Active

The BCM receives a signal from the keyless entry transmitter indicating a remote vehicle start request. The BCM and ECM use the following inputs to verify the system is ready to enable a remote vehicle start event:

- Vehicle is not in valet mode
- Vehicle is in park
- Keyless entry transmitter is not in the vehicle
- The hood is closed
- The hazard switch is OFF
- Vehicle power mode is OFF
- The malfunction indicator lamp (MIL) is not commanded ON by the ECM
- Remote start timer does not equal 0 (the 30 minute maximum time has not been used)

When the BCM determines all conditions meet those required for a remote vehicle start event, a message is sent via serial data to the ECM. While the ECM is in remote vehicle start mode it will cut fuel to the engine if any of the following monitored conditions occur:

- Vehicle speed is greater than 0
- Transmission is not in P
- Excessive engine coolant temperature
- Low oil pressure
- Engine crank time is greater than 30 seconds
- Excessive engine speed
- Accelerator pedal position too high
- Immobilizer system indicates a theft attempt

If any conditions prevent a remote start or cause a remote start operation to be cancelled there is a record of the cause in the scan tool.

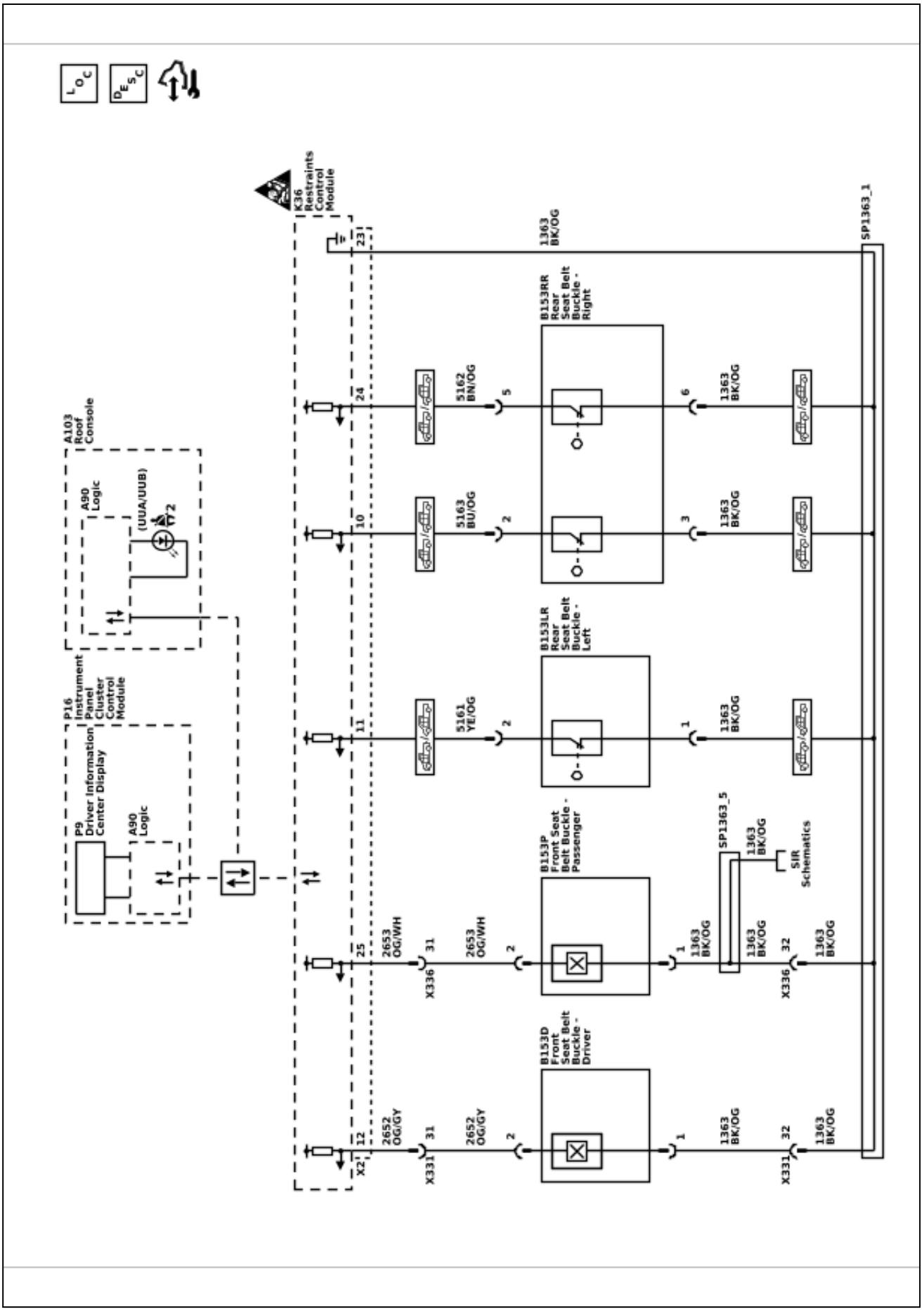
Keyless Entry Personalization

Vehicle lock/unlock functions and remote vehicle start settings may be personalized for the vehicle. This includes the capability of turning the passive entry system completely off. For functional descriptions and programming instructions, refer to the vehicle owners manual.

Seat Belts

Schematic and Routing Diagrams

Seat Belt Schematics (Seat Belt Switches and Indicator)



Description and Operation

Seat Belt System Description and Operation

Restraint System

The primary means of occupant restraint are the front and rear seat belts. Seat belts help to keep the occupants inside the passenger compartment and gradually reduce the impact forces during the following events:

- Frontal impact
- Rear impact
- Side impact
- Rollover event

All seat belt retractors have emergency locks. The retractors remain unlocked during normal operation and under normal driving conditions to allow free movement of the upper body of each occupant. The seat belt webbing is locked into position by a pendulum, which causes a locking bar to engage a cog on the spool of the retractor mechanism, when the following conditions occur:

- Rapid extraction of the seat belt webbing from the retractor
- Abrupt change in vehicle velocity
- Operation of the vehicle on a steep slope

The seat belts have an automatic locking (cinch) feature. The cinch feature is activated when the seat belt webbing is completely extended from the retractor. It prevents the webbing from extending beyond the position at which it can retract. Use of the cinch feature is recommended for securing a child seat. The cinch feature may be cancelled by allowing the webbing to wind back completely into the retractor. After the cinch feature is cancelled, the webbing is unlocked. This vehicle is also equipped with a Supplemental Inflatable Restraint (SIR) system. Refer to *Supplemental Inflatable Restraint System Description and Operation 10-72*.

Motorized Seat Belts

A motorized seat belt is a seat belt with a motor coupled to the shoulder belt retractor. The motor performs a reversible, pretightening action (retraction) to reduce the slack in the seat belt. The motorized seat belt provides the driver and passenger a sense of safety and, in the case of severe braking or a crash, more quickly couples the occupant to the vehicle, enhancing the safety to the occupant.

Motorized seat belts monitor vehicle information to determine when to perform each of the following retractions

- Full retraction for such situations but not limited to: panic braking and or skidding
- Dynamic support for lateral and longitudinal dynamics
- Slack removal when the vehicle speed above enable speed

Preconditions for motorized seat belt retractions

- Seat belt buckle is latched
- Vehicle speed greater than or equal to 25 kph (16 mph)
- All messages on serial data are received as valid

Triggers that may cause motorized seat belt retractions

- Emergency Braking
- Sudden Emergency / Panic Braking
- High Vehicle Deceleration Detection
- Ice Braking Detection
- Oversteer and Understeer

Motorized seat belt inputs

- Vehicle Power Mode
- Transmission Gear
- Wheel Speeds
- Vehicle Acceleration
- Accelerator Pedal Position
- Steering Wheel Angle and Gradient
- Yaw Rate and Lat/Long Acceleration
- Brake Pedal Position, Gradient, Pressure, Initial Travel
- Vehicle Stability

Motorized seat belt output signals

- Driver information center message – motorized seat belt Failed “Service Automatic Seatbelt Tightening”
- Driver information center message – motorized seat belt Unavailable “Automatic Seatbelt Tightening Unavailable”

Motorized seat belt retractions are inhibited when seat belt unbuckled.

Driver and passenger motorized seat belts operate independently.

Front Seat Belt System

The front seat belt system includes the driver and passenger seat belts, seat belt reminder indicators, retractors, and anchor pretensioners. They are all part of the SIR system, refer to *Supplemental Inflatable Restraint System Description and Operation 10-72* . The driver seat belt reminder indicator is controlled by a switch in the driver seat belt buckle. The passenger seat belt reminder indicator is controlled by a switch in the passenger seat belt buckle and the Restraint Occupant Classification System Module. For more on the Restraint Occupant Classification System Module, refer to *Supplemental Inflatable Restraint System Description and Operation 10-72*. When the vehicle is on, the seat belt reminder indicator and tone alarm will operate in the following cases:

- The driver seat belt is unbuckled.
- The passenger seat belt is unbuckled while the seat is occupied.

Rear Seat Belt System

The rear seat belt system includes the following components:

- The rear seat belt retractor located at the wheel-house panel and attached to the floor panel.
- The rear seat belt buckles and the center seat belt buckle attached to the seat.

Child Seat Restraint System

Warning: A child in a rear-facing child restraint can be seriously injured if the front passenger air bag inflates, because the back of a rear-facing child restraint would be very close to the inflating air bag. NEVER use a rear-facing child restraint in this vehicle. If a forward-facing child restraint is suitable for your child, ALWAYS move the front passenger seat as far back as it will go and then install the child restraint. Be sure the child restraint position does not conflict with any additional requirements provided by the manufacturer. For more information, refer to the vehicle owner's manual and the instructions that came with the child restraint.

All vehicles are equipped with a dual-mode type retractor with emergency and automatic locking features. The automatic locking feature is for the restraint of a child seat. The child seat can be secured by pulling the seat belt all the way out to lock it, then tightening the seat belt around the child seat. If the child seat has a top strap, the child seat should be anchored. This applies to the seats designed with the top strap provision and for the vehicles sold in Canada. To ensure the correct top strap angle, the child seat is only to be used at the seating position for which the top strap anchor is installed. The child seat should be installed and secured according to the manufacturer's directions.

Seat Belt Reminder Indicators

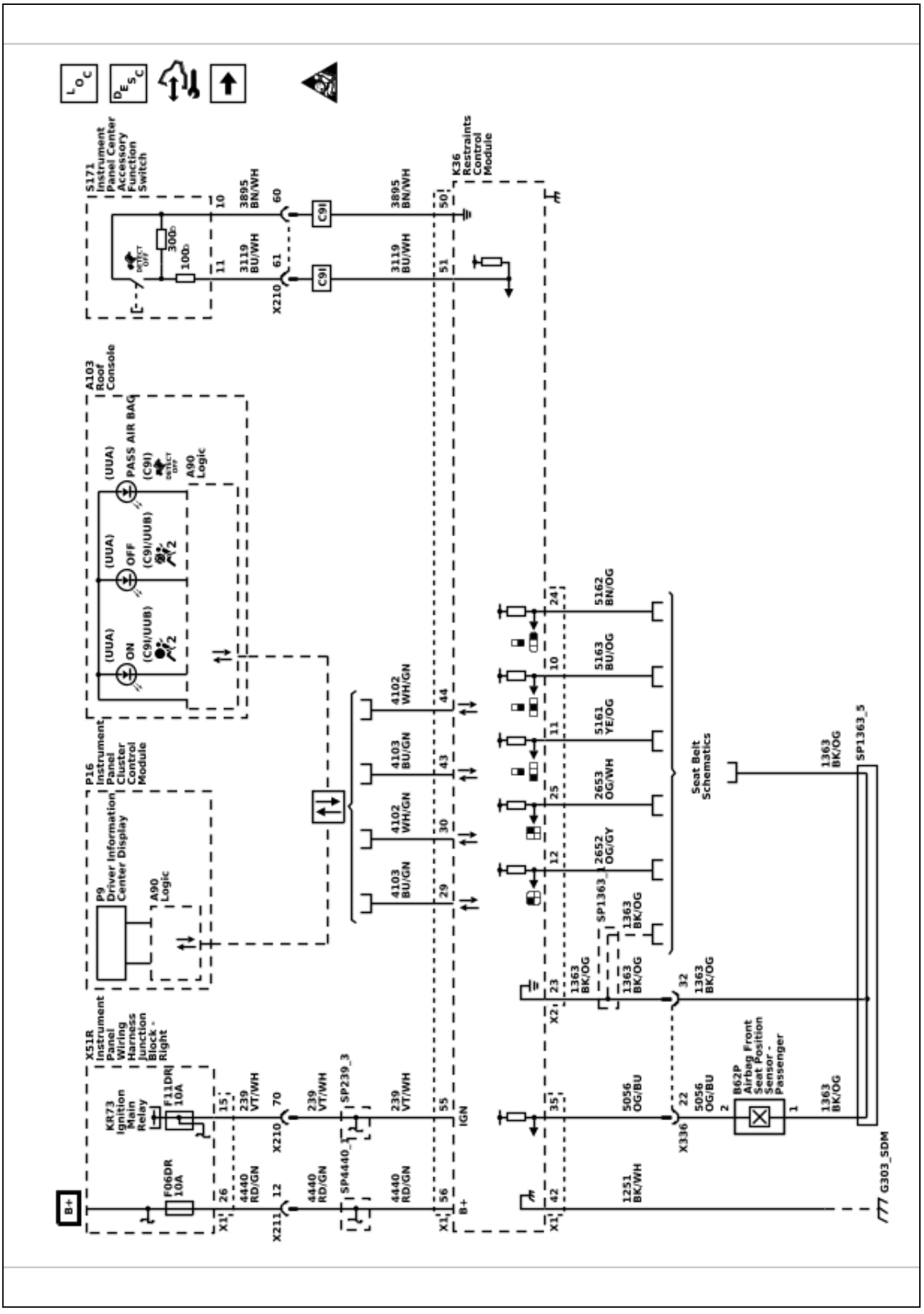
There is a driver seat belt reminder indicator located on the instrument cluster and a passenger seat belt reminder located on the overhead console. There also may have a rear seat belt reminder located in the instrument cluster. The state of the seat belt reminder indicators is determined by the Restraints Control Module. The seat belt reminder indicator illuminates under the following conditions:

- The Restraints Control Module sends the status of the driver seat belt to the instrument cluster via serial data. The passenger seat belt status is sent to the driver information center via serial data. The rear seat belt status is sent to the driver information center via serial data. If any of the seat belts are unfastened, the instrument cluster will send a message requesting a chime sound to be turned ON after a system check.

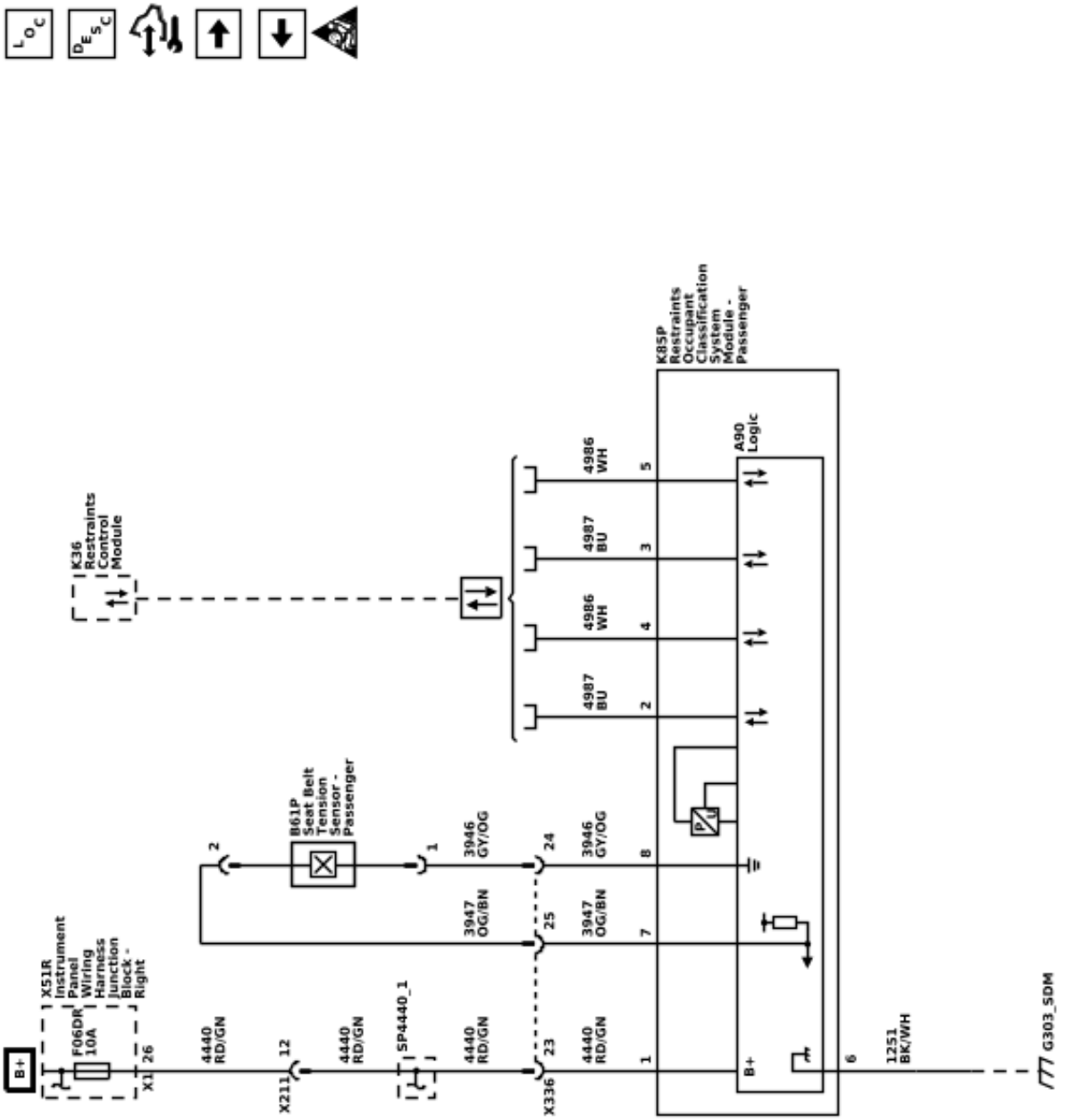
Supplemental Restraints

Schematic and Routing Diagrams

SIR Schematics (Power, Ground, Serial Data, Indicators, Seat Position Sensor, and Subsystem References)

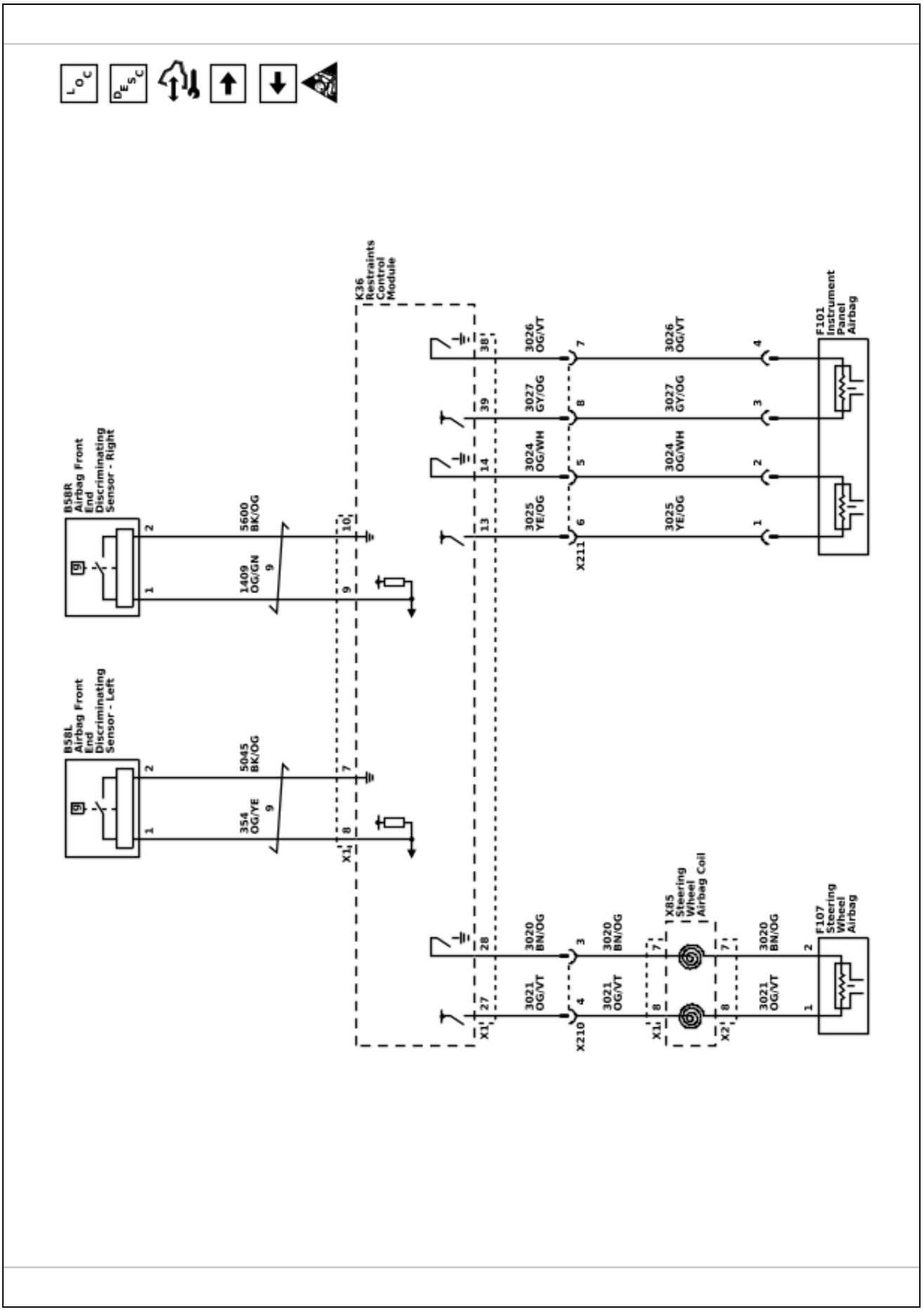


SIR Schematics (Passenger Presence Module)

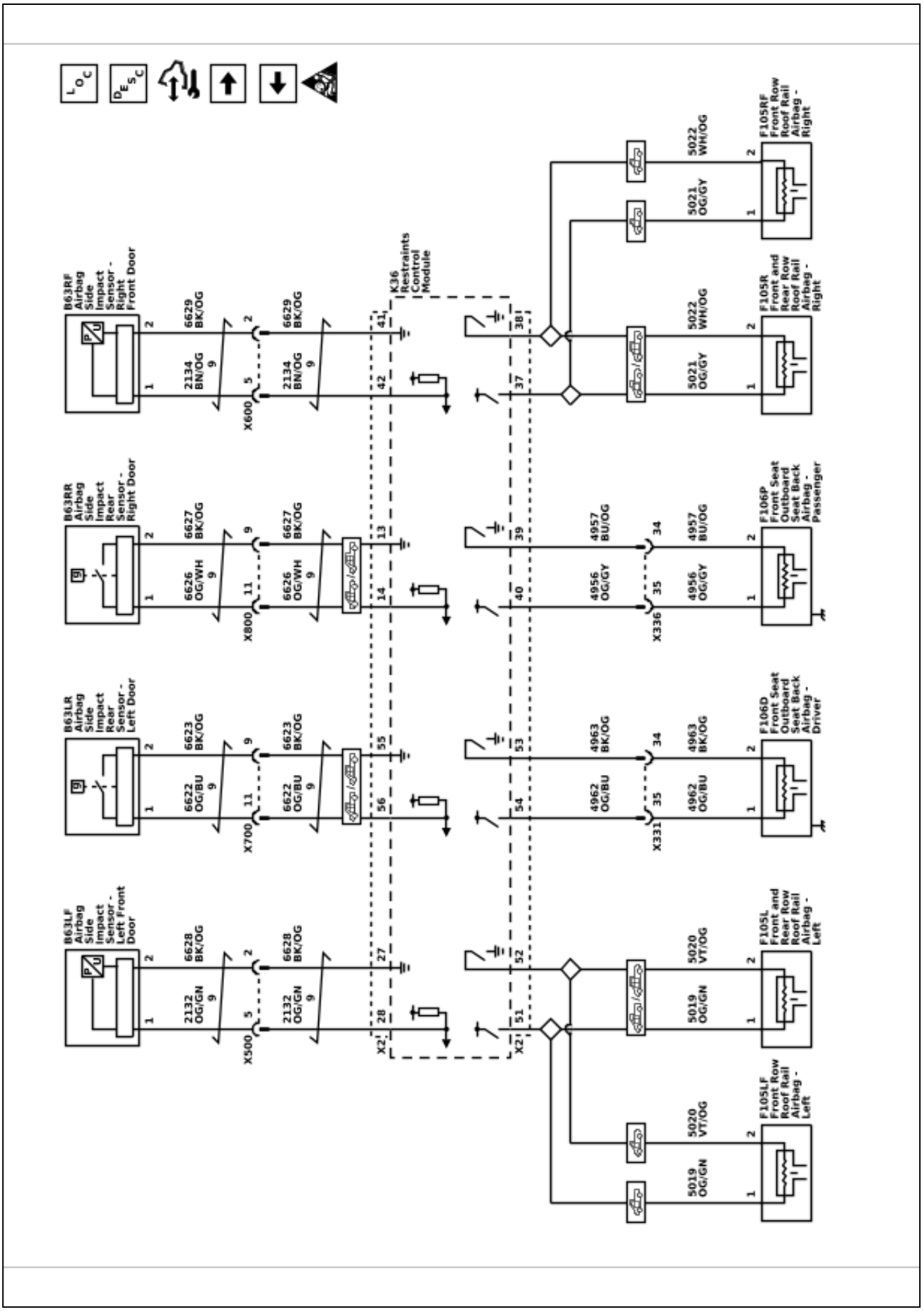


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SIR Schematics (Frontal Impact Sensing and Air Bag Deployment)

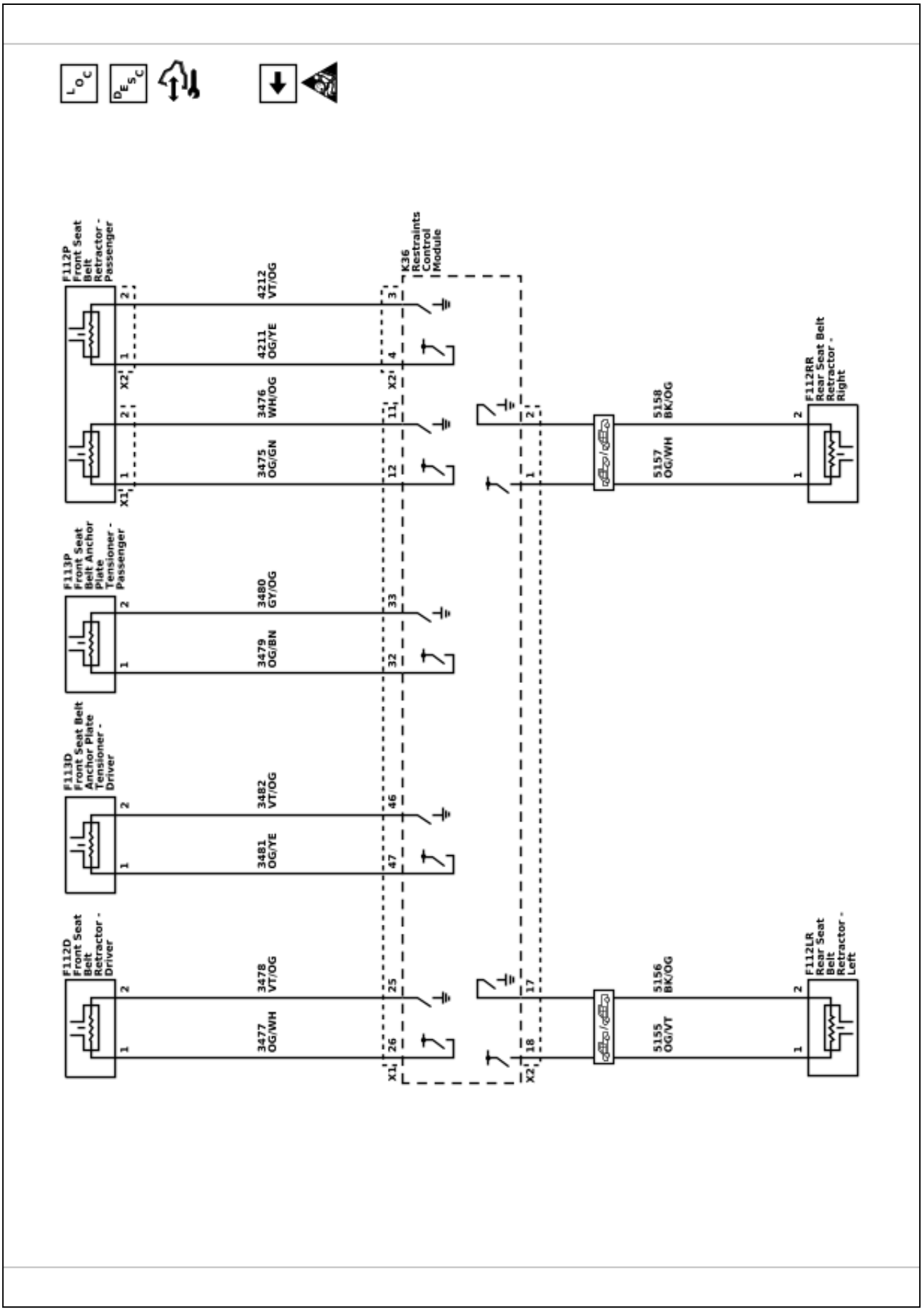


SIR Schematics (Side Impact Sensing and Air Bag Deployment)



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SIR Schematics (Seat Belt Tensioners)



Description and Operation

Supplemental Inflatable Restraint System Description and Operation

The supplemental inflatable restraint (SIR) system, comprised of the Restraints Control module (RCM), impact sensors, Airbags, Restraint Occupant Classification System Module, and seat belt Pretensioners, supplements the protection offered by the seat belts. The RCM determines the severity of a collision using data collected from impact sensors located at strategic points on the vehicle. The RCM processes the information provided by the sensors to provide the safest combination of Airbag and pretensioner deployment. The RCM will deploy the Airbags and Pretensioners if it detects a collision of sufficient force. If the force of the impact is not sufficient to warrant Airbag deployment, the RCM may still deploy the seat belt Pretensioners. The RCM contains a sensing device that translates vehicle acceleration to an electrical signal. The RCM compares these signals to the threshold values stored in memory. If the signals exceed the stored threshold value, the RCM will determine the severity of the event and may deploy restraints. The RCM continuously monitors the deployment loops and electrical components for malfunctions. Upon detection of a circuit malfunction, the RCM will set a DTC and illuminate the SIR system Airbag indicator.

Note: The SIR System may be active up to 30 seconds after the ignition transitions to OFF.

The supplemental inflatable restraint system utilizes the following components:

- Restraints Control Module
- Airbag Indicator
- Airbags
- Seat Belt Pretensioners
- Impact Sensors
- Restraints Occupant Classification System Module (AL0)
- Passenger Airbag Indicator (C99 / AL0)
- Passenger Airbag Disable Switch (C99)
- Seat Belt Tension Sensor
- Seat Belt Indicators
- Event Data Recorder (EDR) Data
- Non-locked event storage overwrite mechanism and over writable event types

Restraints Control Module
The RCM is the control unit for the SIR system. The RCM contains internal sensors in addition to the external impact sensors. The RCM contains sensors which translate vehicle acceleration into an electrical signal, which may be used by other modules. In the event of a collision, the RCM compares the signals from the internal and external impact sensors to a threshold value stored in memory. When the generated signals exceed the stored value, the RCM will cause current to flow through the appropriate deployment loops to deploy the restraints. The RCM records the SIR system status when a deployment occurs and illuminates the SIR system Airbag indicator. The RCM performs continuous diagnostic monitoring of the SIR system electrical components and circuitry when the ignition is ON. If the RCM detects a malfunction, a DTC will set and the RCM will command the instrument cluster to illuminate the SIR system Airbag indicator, notifying the driver that a malfunction exists. If power is lost during a collision, the RCM maintains a limited energy reserve for deployment of the Airbags. It is important when disabling the SIR system for servicing or rescue operations to allow the limited energy reserve to dissipate, which could take up to 2 minutes.

Airbag Indicator
The SIR system Airbag indicator, located in the instrument cluster, is used to notify the driver of SIR system malfunctions and verify that the RCM is communicating with the instrument cluster. When the ignition is turned ON, the RCM is active. The instrument cluster will momentarily turn on the SIR system Airbag indicator. While the indicator is on, the RCM conducts tests on all SIR system components and circuits. If no malfunctions are detected the RCM will communicate with the instrument cluster through the serial data circuit and command the SIR system Airbag indicator to turn OFF. The RCM provides continuous monitoring of the SIR system components and circuits by conducting a sequence of checks. If a malfunction is detected the RCM will set a DTC and command the instrument cluster to illuminate the SIR system Airbag indicator via serial data. The presence of an SIR system malfunction could result in non-deployment of the inflatable restraints or deployment in conditions that normally would not warrant deployment. The SIR system Airbag indicator will remain on for the duration of the malfunction or until the system has been repaired.

Airbags
The vehicle will contain a number of Airbags, depending on vehicle available and optional equipment:

- Steering wheel
- Instrument panel
- Driver seat
- Passenger seat
- Instrument Panel Lower Airbag
- Passenger knee
- Left roof rail
- Right roof rail

To view the locations of the Airbags refer to: *Master Electrical Component List 8-1143*.

Airbags contain a housing, inflatable Airbag, an initiating device, a canister of gas generating material and, in some cases, stored compressed gas. Each Airbag has a discrete deployment loop to supply current and deploy the Airbag. The current passing through the Airbags ignite the material in the canister producing a rapid generation of gas and is some cases, the release of compressed gas. The gas produced from this reaction rapidly inflates the Airbag. Once the Airbag is inflated, it deflates through the Airbag vent holes and/or the bag fabric.

The steering wheel and instrument panel Airbag will either be a dual-stage or a single stage design. A dual-stage Airbag uses two stages of deployment, which varies the amount of restraint to the occupant according to the collision severity. For moderate frontal collisions, the Airbag deploys at less than full deployment which consists of stage 1 of the Airbag. During a more severe frontal collision, a full deployment is initiated which consists of stage 1 and stage 2 of the Airbag.

Seat Belt Pretensioners
The vehicle will contain a number of seat belt Pretensioners, depending on vehicle available and optional equipment:

- Driver – Seat belt anchor
- Driver – Seat belt retractor
- Passenger – Seat belt anchor
- Passenger – Seat belt retractor
- Rear Outboard Left/Right Passenger – Seat belt retractor

To view the locations of the Airbags refer to: *Master Electrical Component List 8-1143*.

The seat belt Pretensioners consist of a housing, seat belt retractor, seat belt anchor, seat belt webbing, initiator, and a canister of gas generating materials. The initiator is part of the seat belt pretensioner deployment loop. When the vehicle is involved in a collision of sufficient force, the RCM causes current to flow through the seat belt deployment loops to the initiator. Current passing through the initiator ignites the material in the canister producing a rapid generation of gas. The gas produced from this reaction deploys the seat belt Pretensioners which removes the slack in the seat belts. Depending on the severity of the collision, the seat belt Pretensioners may deploy without the frontal inflator modules deploying, or they will deploy immediately before the frontal inflator modules deploy.

Impact Sensors
The vehicle will contain a number of impact sensors, depending on vehicle available and optional equipment:

- Front Impact Sensor — Left
- Front Impact Sensor — Right
- Side Impact Sensor — Left Front
- Side Impact Sensor — Right Front
- Side Impact Sensor — Left Middle
- Side Impact Sensor — Right Middle
- Side Impact Sensor — Left Rear
- Side Impact Sensor — Right Rear

To view the locations of the Airbags refer to: *Master Electrical Component List 8-1143*.

The impact sensors contain a sensing device which monitors vehicle acceleration or pressure to detect collisions that are severe enough to warrant Airbag deployment. The impact sensors are not part of the deployment loop, but instead provide input to the RCM.

Restraints Occupant Classification System Module
The Restraints Occupant Classification System Module is used to monitor the type of occupant that is sitting in the front passenger seat and communicate the status to the RCM. The RCM then uses this information to determine whether to enable or suppress the deployment of the passenger instrument panel Airbag. The Restraints Occupant Classification System Module consists of an electronic control module, a sensor mat in the seat, Seat Belt Tension Sensor (if equipped), and a harness.

Passenger Airbag Indicator
The passenger Airbag indicator identifies the status of the instrument panel Airbag. The RCM will momentarily turn on the passenger Airbag indicators after ignition is turned ON. If an occupant is not detected in the passenger seat or the occupant type is not suitable for Airbag deployment, the Restraints Control module will illuminate the passenger Airbag OFF indicator. If an occupant is detected in the passenger seat, the Restraints Control module will illuminate the passenger Airbag ON indicator.

Seat Belt Tension Sensor
The seat belt tension sensor (if equipped) is mounted on the passenger seat belt retractor to measure the seat belt tension. If the shoulder portion of a passenger seat belt is fully extended, the infant car seat restraint locking feature may be engaged, disabling the passenger Airbag.

Passenger Airbag Disable Switch
The passenger Airbag disable switch provides the means to manually disable the ability for the passenger instrument panel Airbag to deploy. The vehicle has a

passenger Airbag status indicator to inform the driver when the passenger Airbag is on or off based on the disable switch position.

Seat Belt Indicators
The seat belt indicators are controlled by the RCM. For further information on seat belt indicators refer to: *Seat Belt System Description and Operation 10-64*.

Event Data Recorder (EDR) Data
The vehicle is equipped with an event data recorder (EDR). When a specific collision or similar condition occurs (such as airbag deployment or hitting a road obstacle), the recorder records the data related to vehicle dynamics and safety systems within a short period of time, such as the status of occupant safety components, status of accelerator/brake pedals, vehicle speed, etc., helping understand the operating conditions of vehicle systems.

The data elements recorded by EDR mainly include the following data:

No.	Data Element	Data Source	Collection Method
A1	Longitudinal delta V	EDR acceleration sensor in EDR controller	None
A2	Maximum recorded longitudinal delta V	EDR acceleration sensor in EDR controller	None
A3	Time to maximum recorded longitudinal delta V	EDR acceleration sensor in EDR controller	None
A4	Clipping flag	Since B1 lateral acceleration has been recorded, it is not necessary to record the clipping flag	None
A5	Vehicle velocity	Wheel speed sensor, transmitted via CAN bus after calculation	CAN bus
A6	Service brake, on or off	Brake pedal position sensor, transmitted via CAN bus after calculation	CAN bus
A7	Driver safety belt status	Driver seat belt buckle	Hard wire
A8	Accelerator pedal position, percentage of fully open position	Accelerator pedal position sensor, transmitted via CAN bus after calculation	CAN bus
A9	Revolution Per Minute (RPM)	Engine crankshaft position sensor, transmitted via CAN bus after calculation *Not required for electric vehicles	CAN bus *Not required for electric vehicles
A10	Power-on cycle at event	EDR controller	None
A11	Power-on cycle at reading	EDR controller	None
A12	Complete status of event data record	EDR controller	None
A13	Time interval from this event to the last event	EDR controller	None
A14	Vehicle Identification Number(VIN)	EDR controller	None
A15	ECU hardware number	EDR controller	None
A16	ECU serial number	EDR controller	None
A17	ECU software number	EDR controller	None
B1	Longitudinal acceleration	EDR acceleration sensor in EDR controller	None

No contents related to intelligent control are available now for Level A elements above.

The recorded vehicle speed data is obtained from the on-board CAN bus. They are obtained by a vehicle speed sensor connected to other modules on the vehicle (such as engine control or transmission control module or new energy control, etc.), and transmitted and released via CAN bus after calculation.

The above data can be extracted by purchased general on-board diagnostic tools that meet the requirements in SAE J1962 and ISO 15765 and their referenced standards.

Non-locked event storage overwrite mechanism and over writable event types

Locking Conditions:

- Deployment event of irreversible restraints will be permanently locked.

- Non-deployment events will be locked, but become non-locked events after 255 ignition cycles.

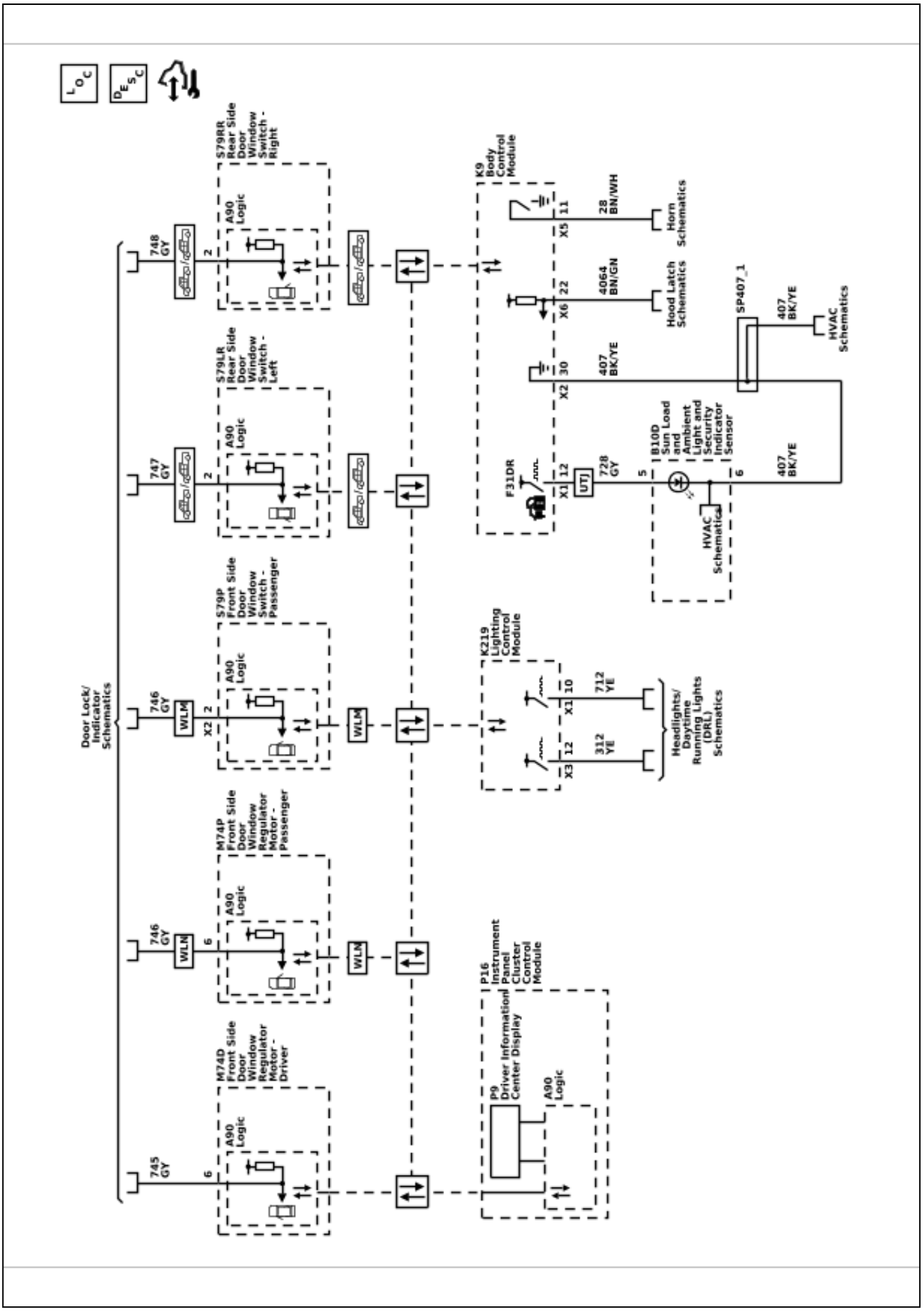
Overwrite Mechanism:

- Permanently locked events will not be overwritten. Only the non-locked EDR events can be overwritten, overwriting the earliest event first.
- If the EDR storage space is insufficient, the deployment events of irreversible restraints can overwrite any non-deployment events.
- If the EDR storage space is insuficcient, the non-deployment events can overwrite any non-deployment events that become non-locked after 255 ignition cycles.

Theft Deterrent

Schematic and Routing Diagrams

Theft Deterrent System Schematics (Content Theft Deterrent)



Description and Operation

Theft Systems Description and Operation

When armed, the content theft deterrent system is designed to deter vehicle content theft by pulsing the horns and exterior lamps for approximately 30 seconds when an unauthorized vehicle entry is detected. However, the content theft deterrent system does not affect engine starting.

An unauthorized entry can be any of the following with the content theft deterrent system armed:

- Unauthorized entry into the engine area
- Unauthorized entry into the vehicle compartments
- When any door is opened without using the UNLOCK command from a keyless entry transmitter
- After a battery reconnect, if the battery was disconnected with the content theft deterrent system armed

The components of the content theft deterrent system are:

- Body Control Module (BCM)
- Remote control door lock receiver
- Security indicator
- Door ajar switches
- Hood ajar switch
- Liftgate ajar switch, if equipped
- Intrusion sensor, if equipped
- Intrusion sensor disable switch, if equipped
- Glass breakage sensor, if equipped
- Alarm siren, if equipped

Arming the Content Theft Deterrent System

Use the following procedure in order to arm the system:

1. Place the vehicle in P (park).
2. Ignition OFF/Vehicle OFF.
3. Open any door.

Note: The system is not armed if the doors are locked manually; the power door lock switch or remote keyless entry transmitter must be used to arm the content theft deterrent system.

4. Lock the doors with the power door lock switch or by pressing the LOCK button on the transmitter. The system is in standby mode and will not start the arming timer until all doors are closed.
5. The system will begin the arm sequence immediately after the last door is closed. If the keyless entry transmitter is used to arm the system after the vehicle doors are closed, the arm sequence will begin as soon as the LOCK command is received from the transmitter.
6. Pressing the LOCK button on the keyless entry transmitter a second time will bypass the delayed arming function and force the system to arm.

Locking the Vehicle Without Arming the Content Theft Deterrent System

Locking the vehicle may be accomplished without arming the content theft deterrent system. Use of the manual door locks will lock the vehicle, but will not arm the content theft deterrent system.

Disarming an Armed System/Silencing an Alarm

If system arming has been requested by the power door lock switch or the keyless entry transmitter, it must be disarmed.

Note: Disconnecting the battery or removing fuses does not disable the arm or alarm modes, since the BCM stores the content theft deterrent mode status in memory.

- To disarm the content theft deterrent system in standby mode, perform one of the following:
  - Press the UNLOCK button on the keyless entry transmitter.
  - Approach the vehicle with a valid keyless entry transmitter and pull the vehicle door handle.
  - Turn the ignition ON/Vehicle ON.
- To disarm the content theft deterrent system in the armed mode (non-event) or when activated (during an alarm event):
  - Press the UNLOCK button on the keyless entry transmitter.
  - Turn the ignition ON/Vehicle ON.

Content Theft Deterrent Circuit Description

The following is a description of each component used in the content theft deterrent system:

Body Control Module
The content theft deterrent system is an internal function of the BCM which utilizes serial data and various switch inputs information to perform content theft deterrent functions. When the BCM detects an unauthorized entry, it activates the horns and exterior lamps. The BCM has 4 basic modes (disarmed, standby, armed, and alarm) for operating the content theft deterrent system. The different modes are described below.

1. The BCM has the content theft deterrent system in a disarmed mode until the following conditions are detected:

- Ignition OFF/Vehicle OFF.
- Doors locked by either the power door lock switch or the LOCK button on the transmitter.

2. The BCM enters the standby mode when the above conditions are detected. If a door was already opened when the arm mode was requested, the standby mode does not start the timer until the last door is closed.
3. When the last door is closed, a 15 second timer is activated. Once the timer has expired, the BCM enters the armed mode. After this delay, any unauthorized entry will activate the alarm mode.
4. When the BCM detects an unauthorized entry, the BCM enters the alarm mode. The BCM activates the horns and exterior lamps for 30 seconds. This is followed by a three minute time-out with the horn no longer active. If no new intrusions are detected after the time-out, the horn is not active. The system must be disarmed or the intrusion condition removed after the time-out for the system to exit alarm mode.

Remote Control Door Lock Receiver
The keyless entry system can arm and disarm the content theft deterrent system. When the remote control door lock receiver receives a door lock or unlock signal from the transmitter, the remote control door lock receiver sends a message to the BCM via serial data to perform the appropriate arm/disarm functions.

Security Indicator
The security LED is illuminated on the upper I/P by the BCM. The content theft deterrent system uses the security LED to inform the driver of system status prior to arming.

Door Ajar Switches
The content theft deterrent system uses the door ajar switches as a status indicator to activate the alarm. The door ajar switches are monitored by the body control module via a discrete input from each door ajar switch. If the BCM receives a signal indicating a door is opened when the content theft deterrent system is armed, the BCM activates the alarm.

Hood Ajar Switch
The content theft deterrent system uses the hood ajar switch as a status indicator to activate the alarm. The BCM monitors the hood ajar switch via a discrete input from the switch. If the BCM receives a signal indicating the hood has been opened when the content theft deterrent system is armed, the BCM activates the alarm.

Liftgate Ajar Switch
The content theft deterrent system uses the liftgate ajar switch as a status indicator to activate the alarm. The BCM monitors the liftgate ajar switch via a discrete input from the switch. If the BCM receives a signal indicating the liftgate has been opened when content theft deterrent system is armed, the BCM activates the alarm.

Intrusion Sensor
The intrusion sensor is located in the overhead console and uses two ultrasonic sensors to detect any motion inside the vehicle. If motion is detected inside the vehicle while the content theft deterrent system is armed, the system will transition to the alarm mode. The intrusion sensor also acts as an inclination sensor. The inclination sensor determines the vehicles level when the content theft deterrent system is armed. If the vehicle level is changed while the system is armed, such as being lifted by a tow truck or raised with a jack, the alarm will be activated. The intrusion sensor can be disabled using the intrusion sensor disable switch. The intrusion sensor disable switch also shows the intrusion sensor status using a status LED.

Glass Breakage Sensor
The glass breakage sensors (if equipped) are located on the rear side windows and are supplied battery voltage at all times. The BCM monitors the glass breakage sensor signal circuit. If the rear side glass is broken, the glass breakage sensor signal circuit will open and the BCM will enter the alarm mode.

Alarm Siren
The content theft deterrent system uses the alarm siren as an audible alert device to alert individuals near the vehicle that a vehicle intrusion is occurring. The siren is supplied battery voltage and ground for operation and communicates with the body control module (BCM) via a dedicated LAN circuit.

Inputs
The BCM monitors the following inputs for content theft deterrent:

- Door ajar switches
- Keyless entry transmitter LOCK/UNLOCK buttons; a message from the remote control door lock receiver
- Immobilizer status—The BCM uses the immobilizer status for disarming the system or silencing an alarm when the correct vehicle key is used to start the vehicle
- Liftgate ajar switch
- Hood ajar switch
- Intrusion sensor
- Glass breakage sensor

Outputs
The BCM controls the following for content theft deterrent:

- Horn relay
- Exterior lamps
- Alarm siren

Section 11

Seats

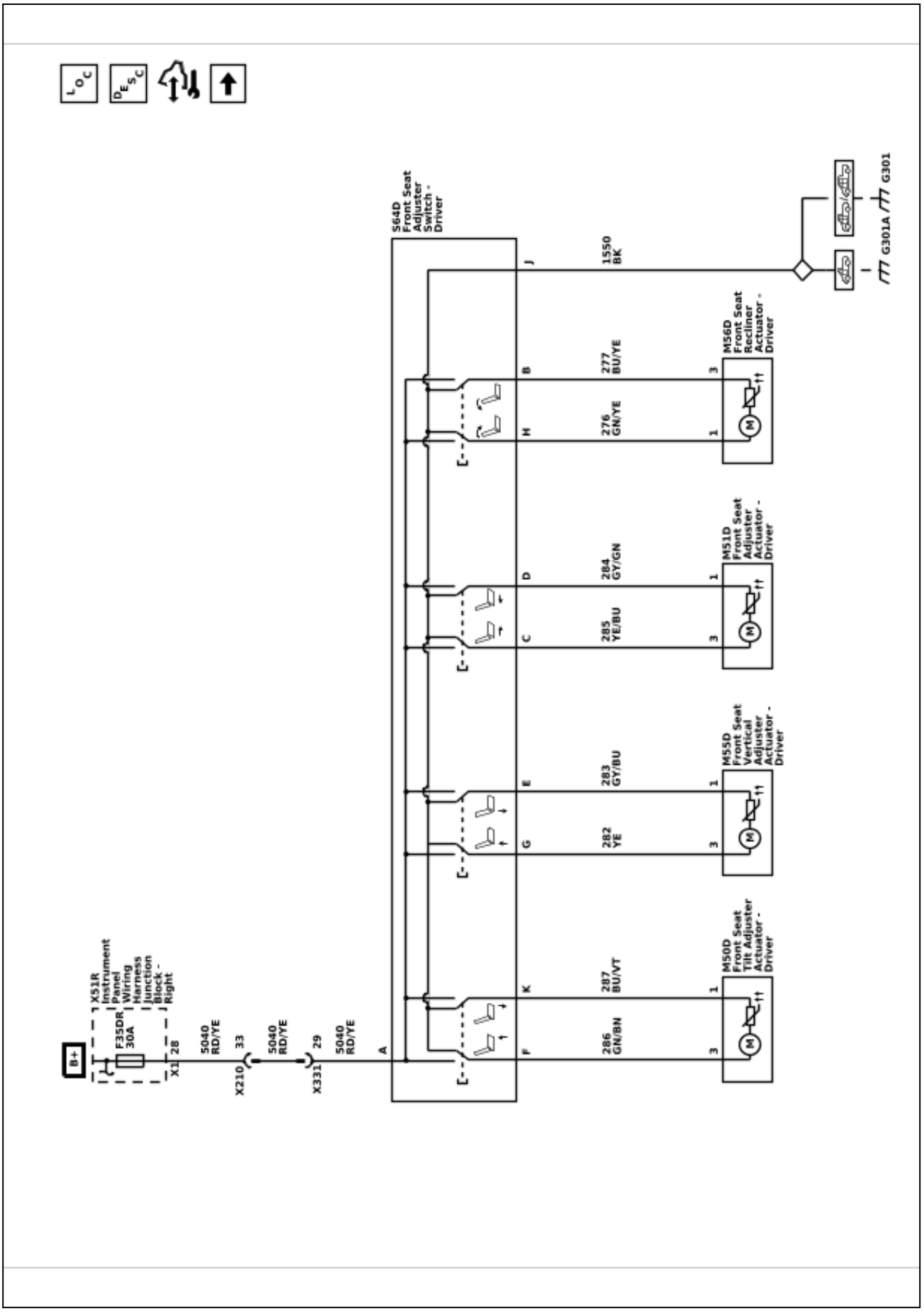
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Seats

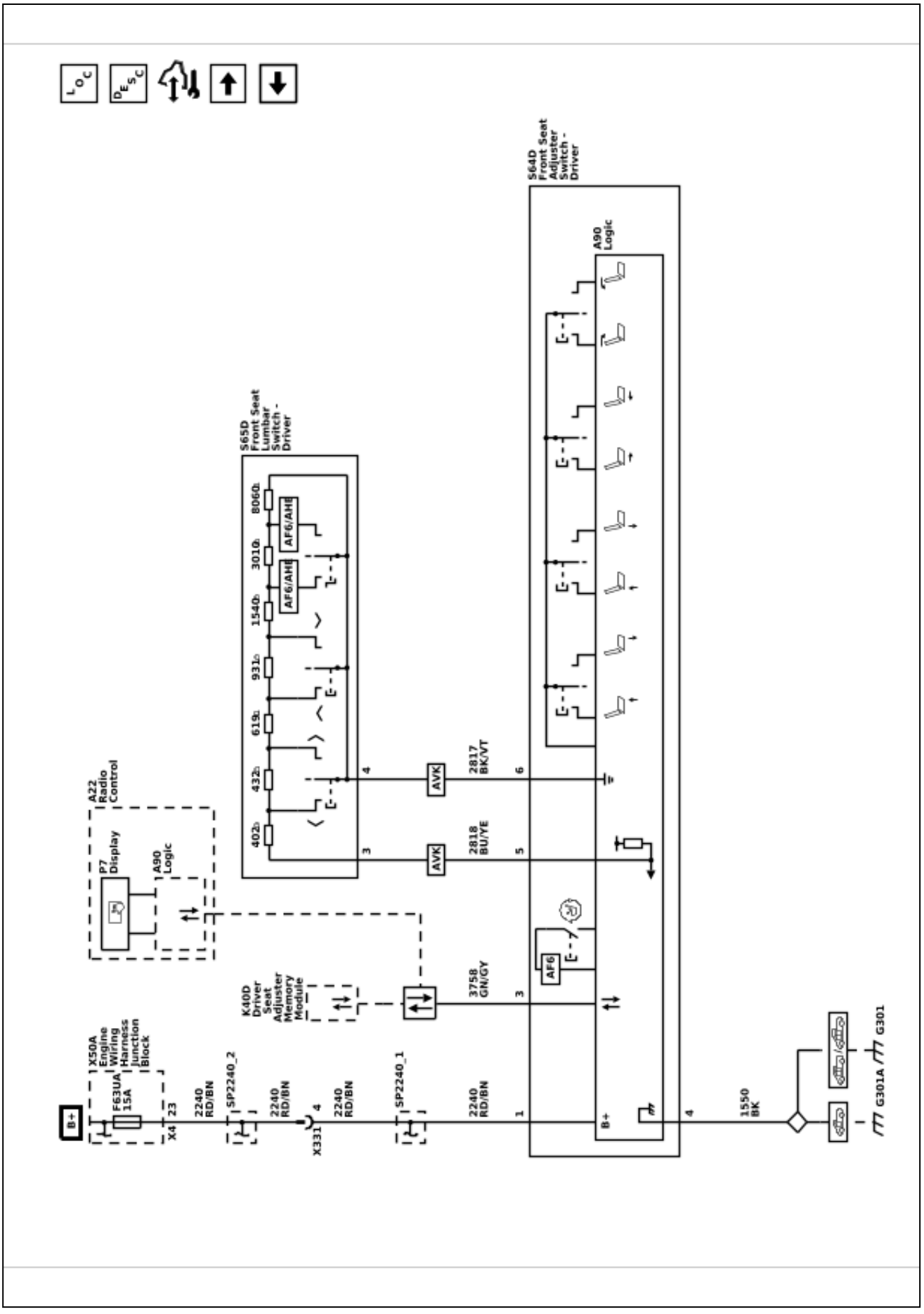
Power Seats

Schematic and Routing Diagrams

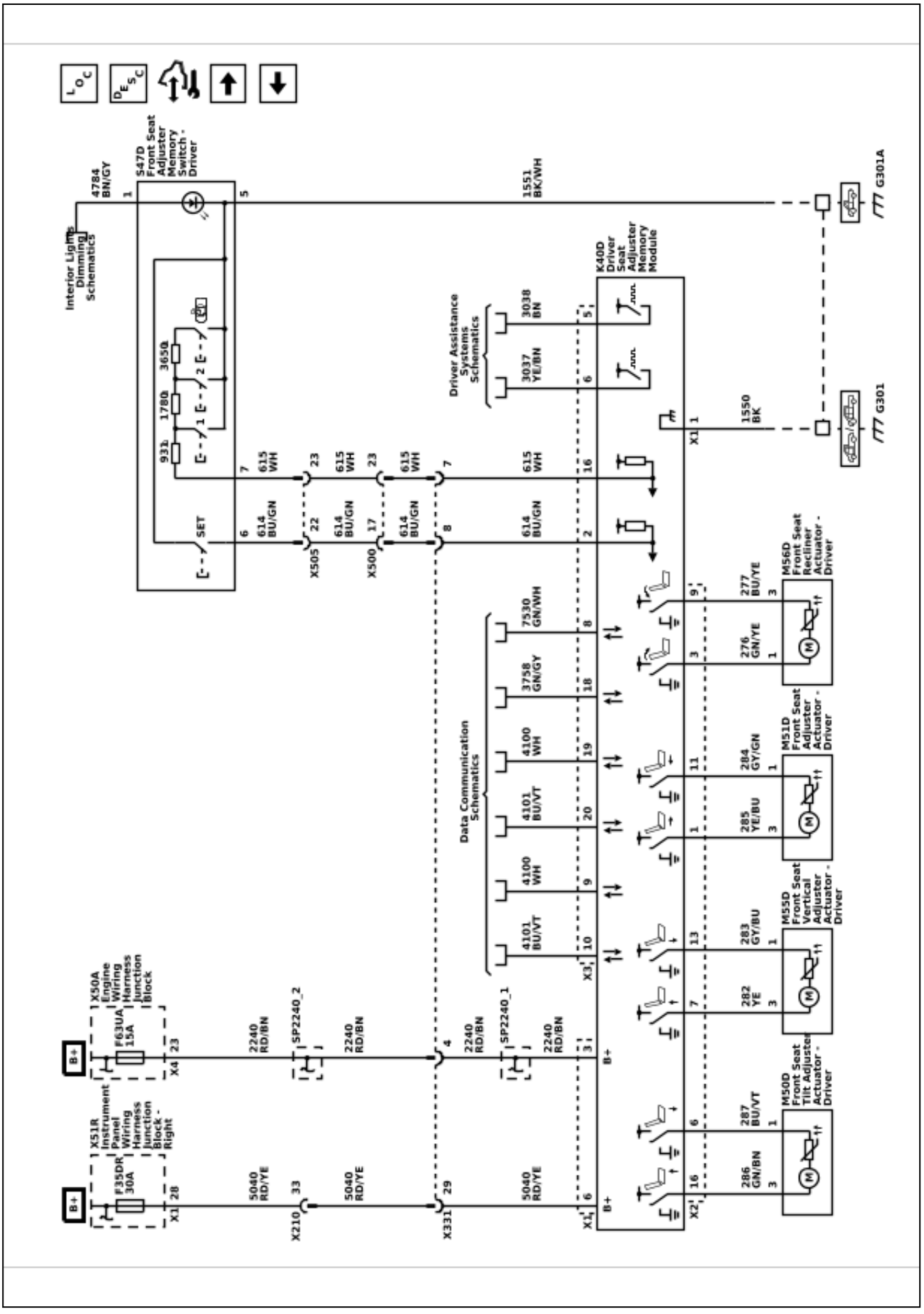
Driver Seat Schematics (Seat Adjuster Switch and Motors (- A45))



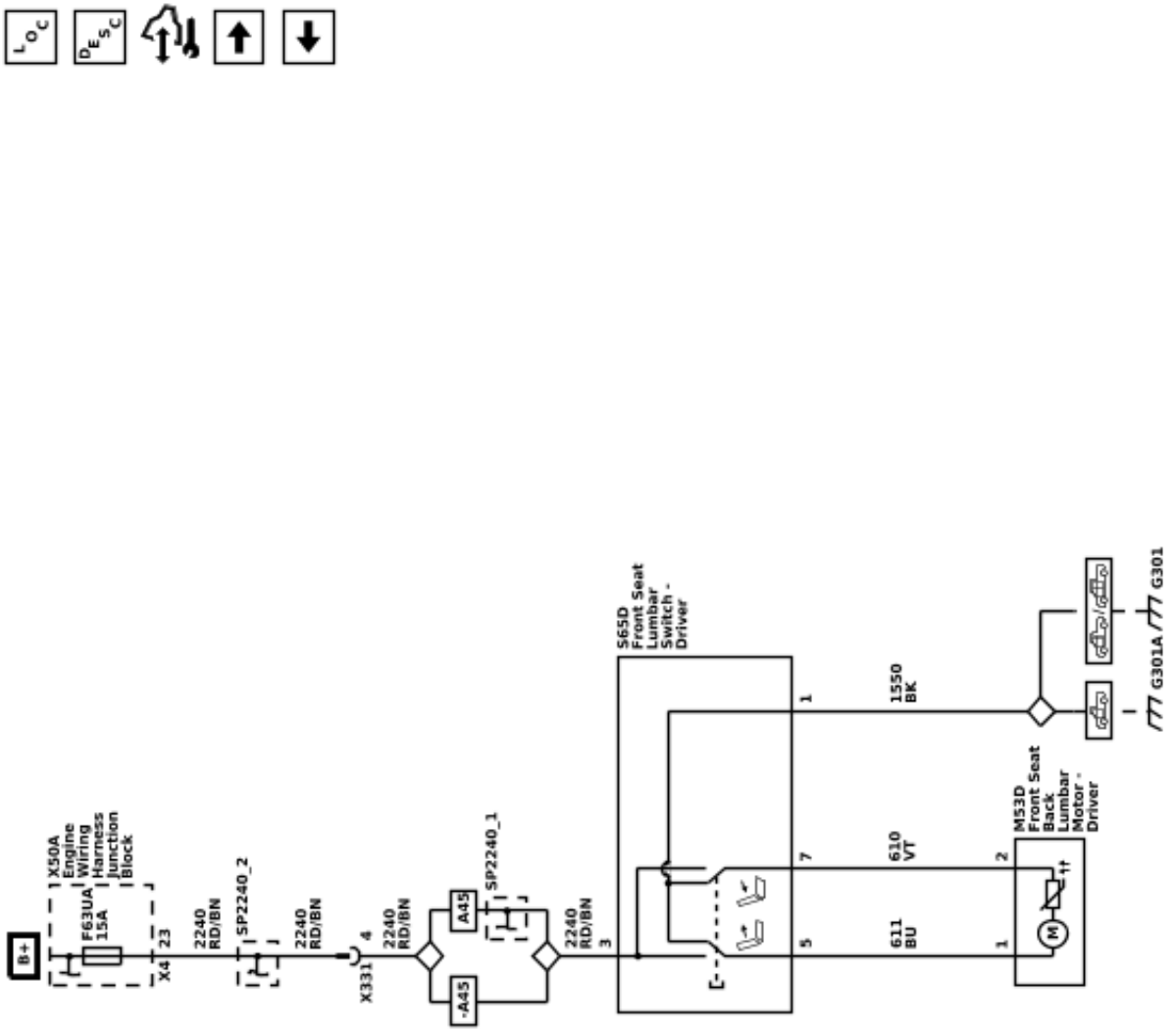
Driver Seat Schematics (Seat Adjuster, and Seat Lumbar Switches (A45))



Driver Seat Schematics (Memory Module Power, Ground, Serial Data, Position Motors, and Memory Controls (A45))

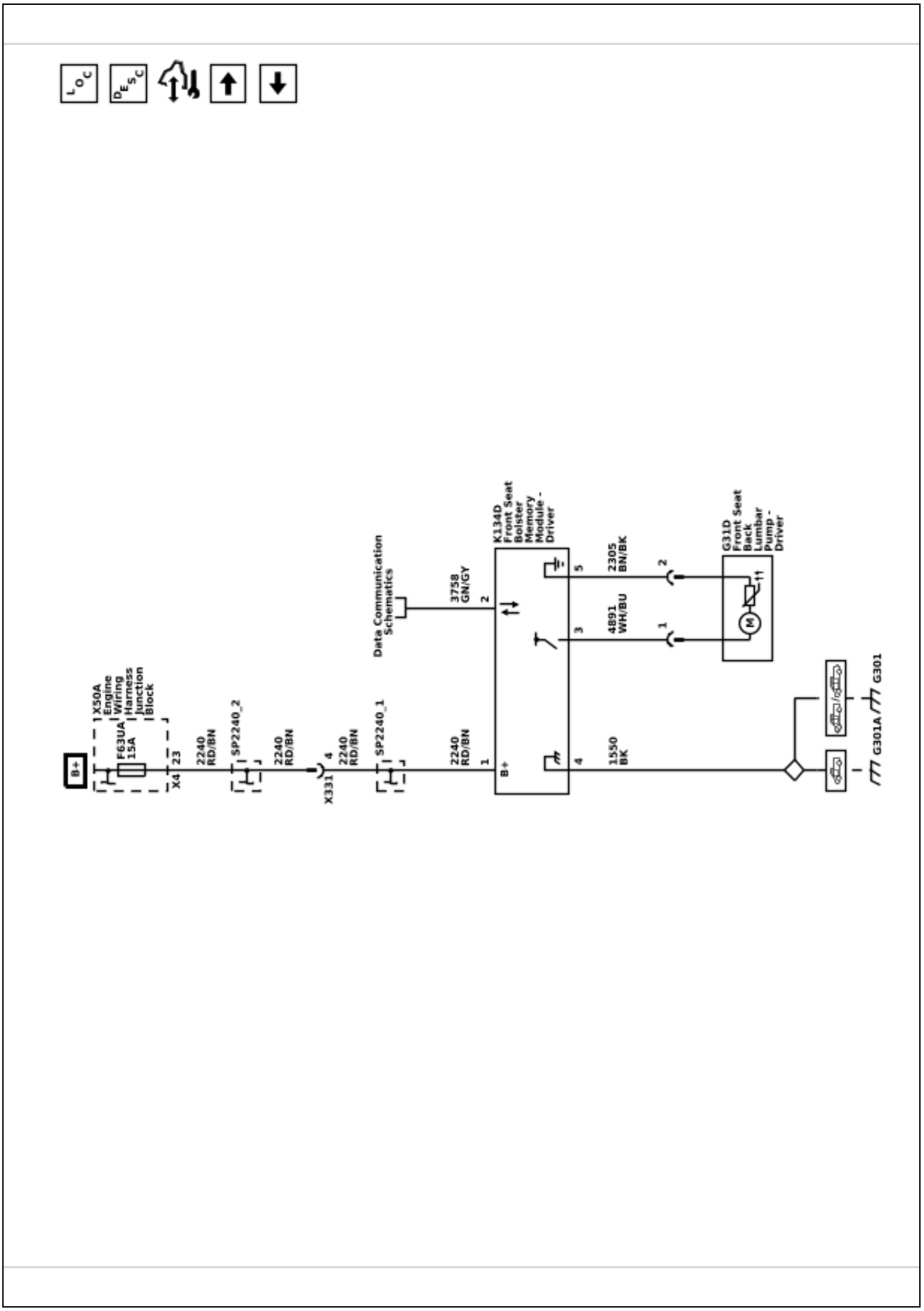


Driver Seat Schematics (2-way Lumbar (- AVK))

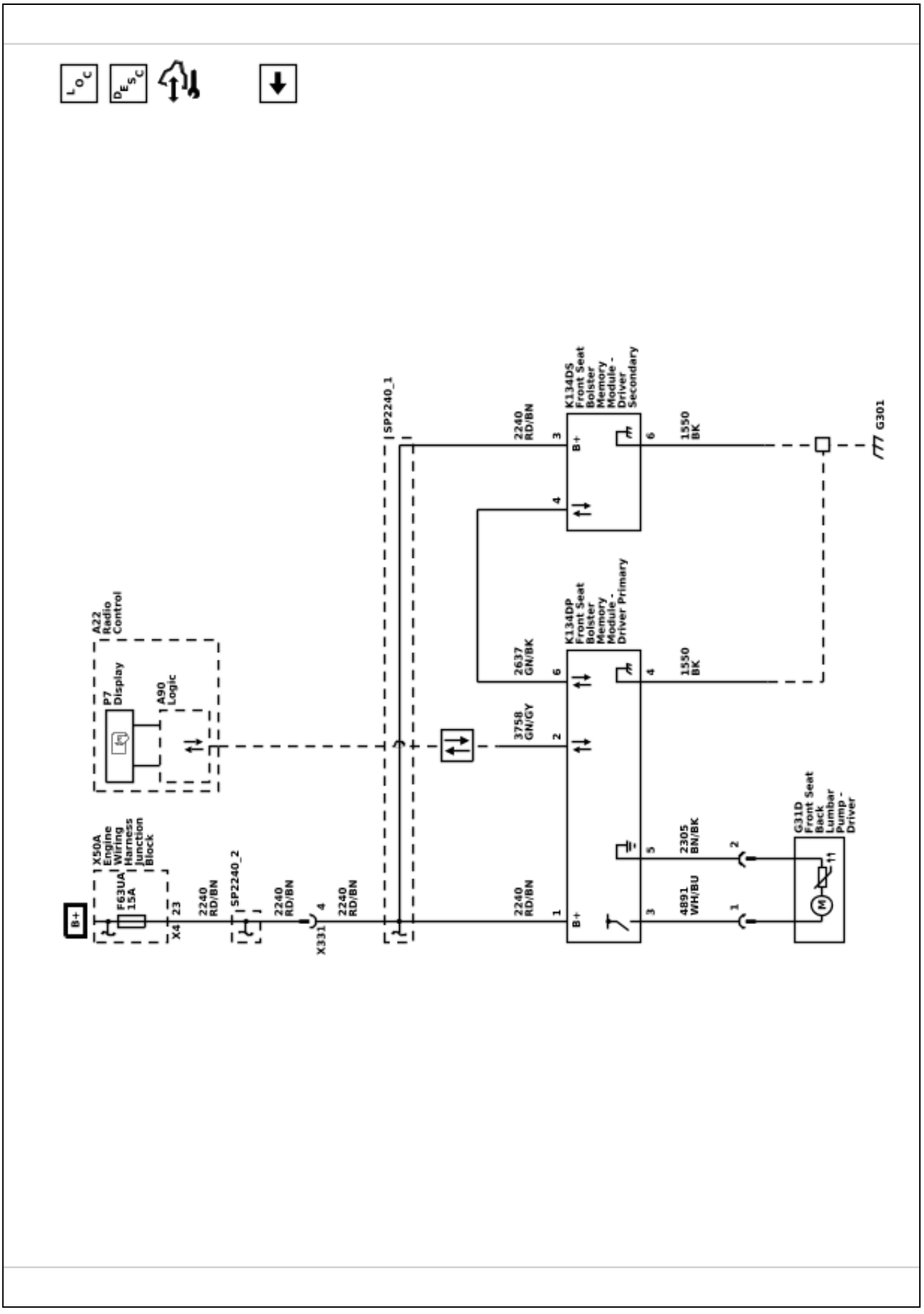


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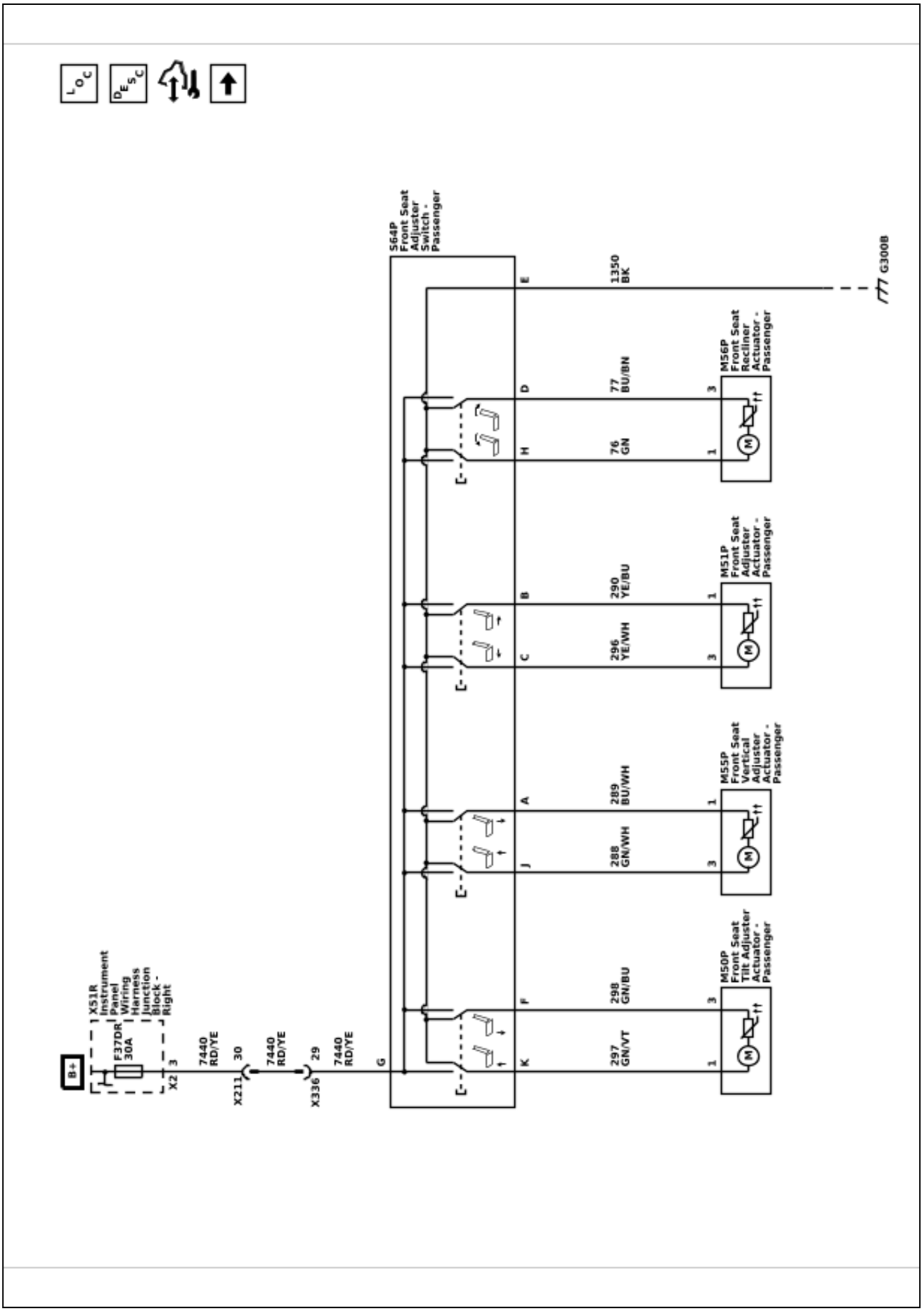
Driver Seat Schematics (4-way Lumbar (AVK - AF6))



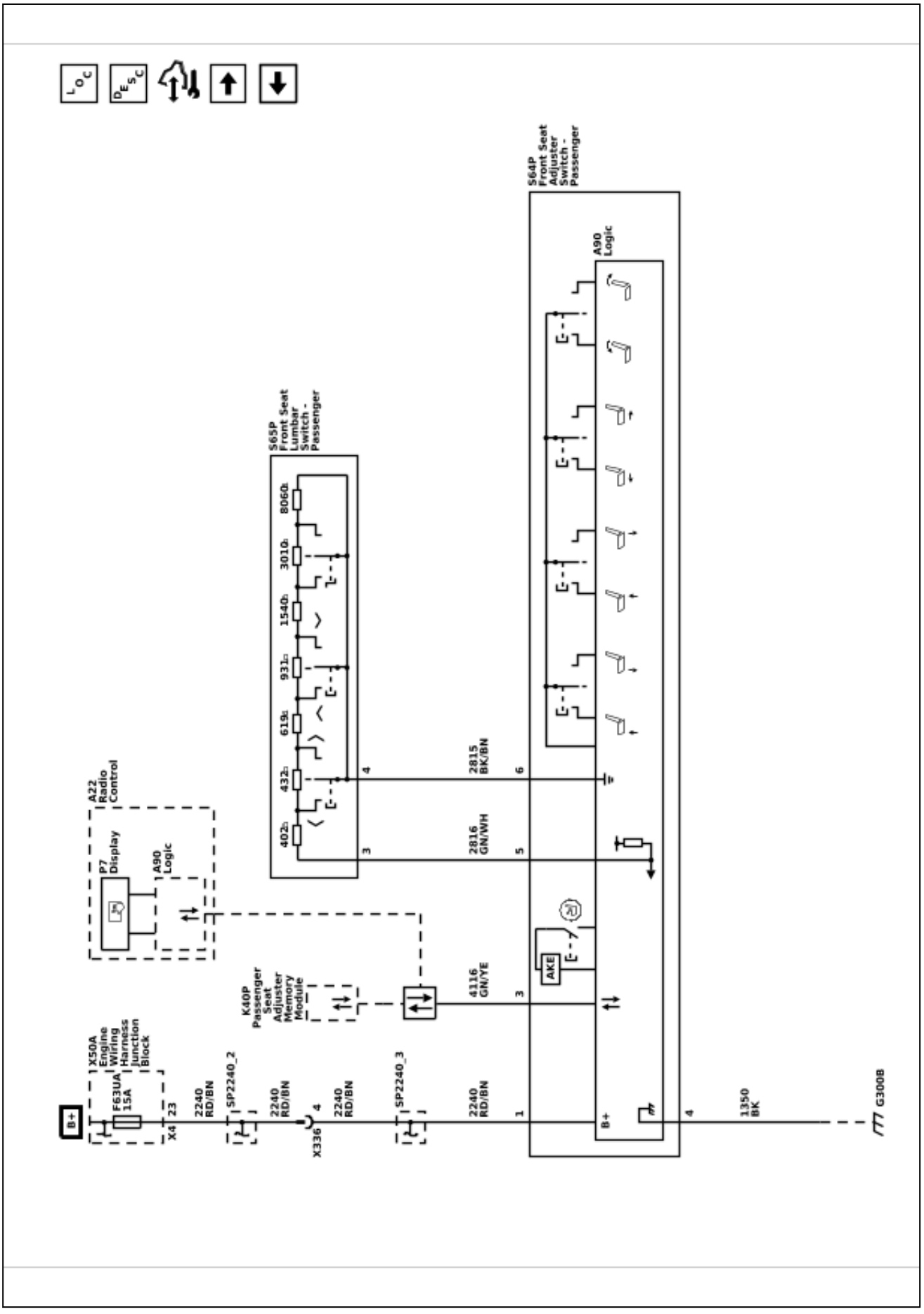
Driver Seat Schematics (4-way Lumbar, Bolster, and Massage (AF6))



Passenger Seat Schematics (Seat Adjuster Switch and Motors (- (AHH / AKE)))

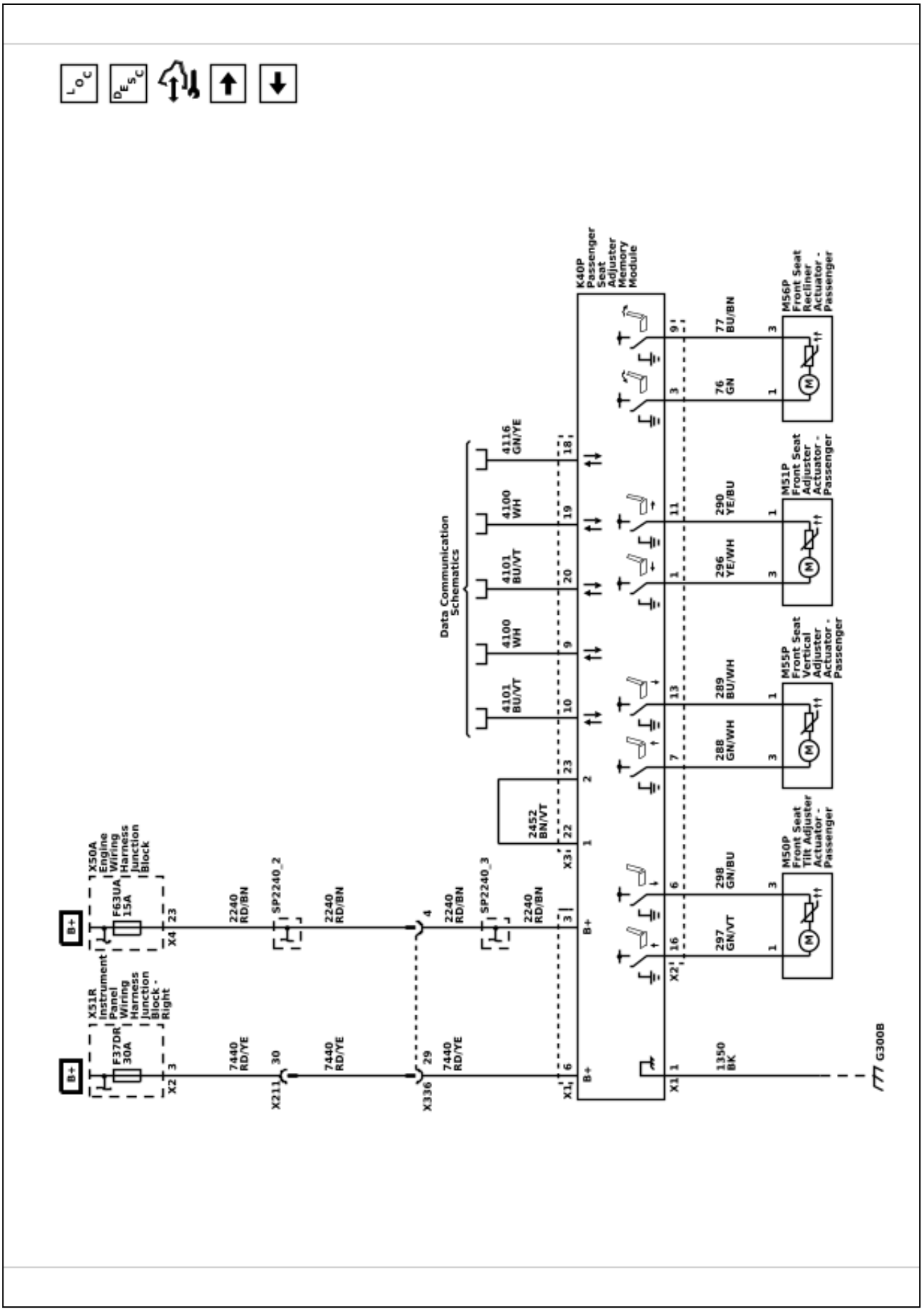


Passenger Seat Schematics (Seat Adjuster, and Seat Lumbar Switches (AHH / AKE))

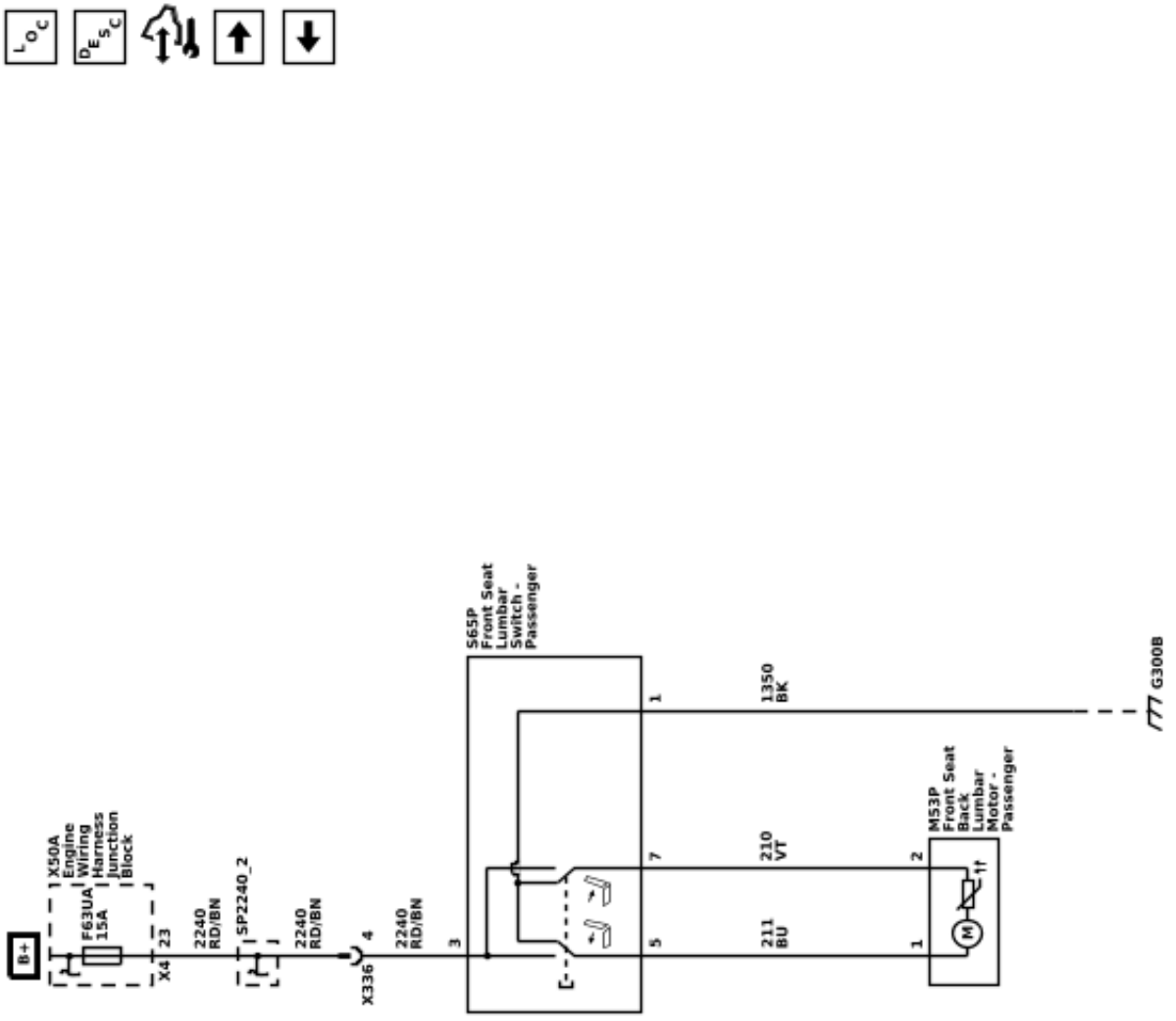


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Passenger Seat Schematics (Memory Module Power, Ground, Serial Data, and Position Motors (AHH / AKE))

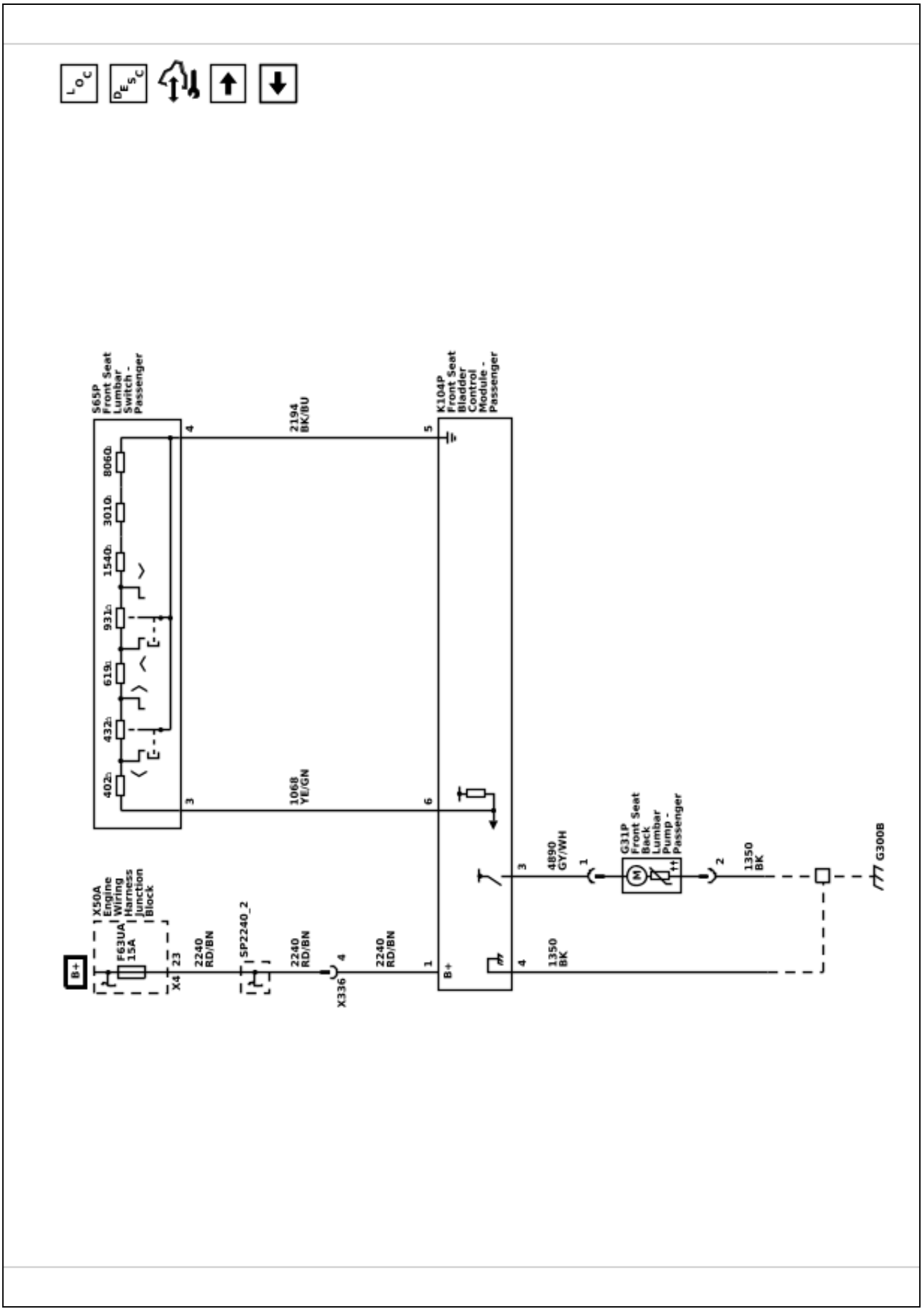


Passenger Seat Schematics (2-way Lumbar (- AVU))

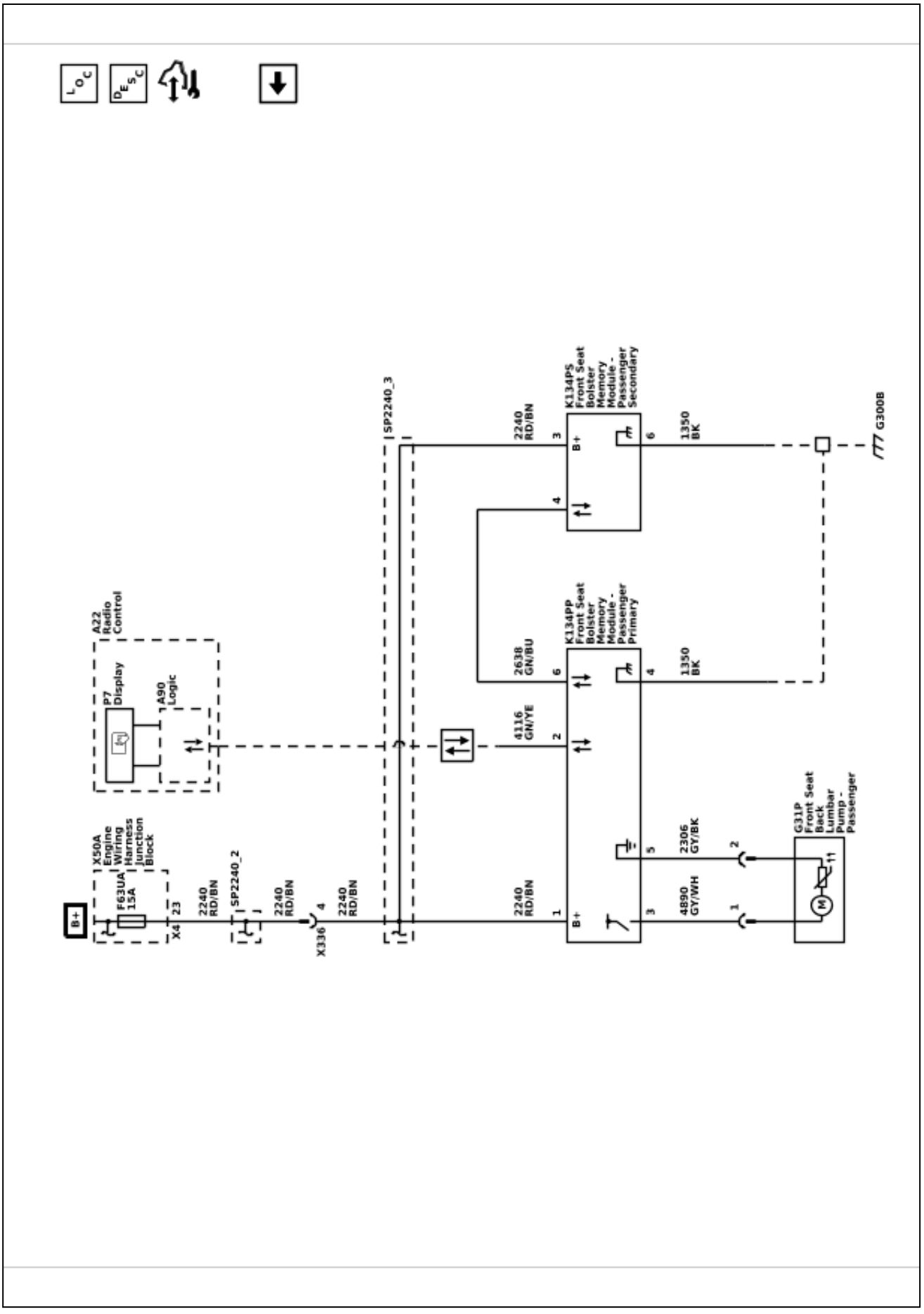


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Passenger Seat Schematics (4-way Lumbar (AVU - (AHH / AKE)))



Passenger Seat Schematics (4-way Lumbar, Bolster, and Massage (AHH / AKE))



Description and Operation

Lumbar Support Description and Operation (2-Way)

Lumbar Support Components

The power seat lumbar support systems consist of the following components:

- S65 Front Seat Lumbar Switch
- M53 Front Seat Back Lumbar Motor

The seat lumbar switch provides both power and ground to the lumbar support motor. The motor contains an electronic circuit breaker (PTC) that will reset only after voltage has been removed from the motor. The motor moves the lumbar support forward and rearward.

When the lumbar switch is operated to move the lumbar support rearward, battery positive voltage is applied through the lumbar rearward switch contacts and the lumbar motor rearward control circuit to the lumbar support motor. The motor is grounded through the lumbar forward switch contacts and the lumbar motor forward control circuit to the motor. The motor runs to drive the lumbar support rearward away from the occupant's back until the switch is released. Moving the lumbar support forward works similarly to moving the lumbar support rearward, except that battery positive voltage and ground are applied on opposite circuits causing the motor to run in the opposite direction.

Lumbar Support Description and Operation (4-Way)

Lumbar Support Components

The driver and front passenger pneumatic lumbar support system each consist of the following components:

- Front Seat Lumbar Switch
- Front Seat Back Lumbar Pump

Circuit Description

Battery voltage is supplied at all times to the G31 Front Seat Back Lumbar Pump through a 10 A fuse located in the fuse block. Ground is also supplied at all times the Seat Lumbar/Bolster Pump.

The S65 Front Seat Lumbar Switch is a resistive ladder switch. The Front Seat Back Lumbar Pump supplies the Front Seat Lumbar Switch with a signal and low reference circuits. When a lumbar switch is pressed, the signal circuit from the Front Seat Back Lumbar Pump is pulled low through the switch contacts and series of resistors indicating the lumbar support request. In response to this request, the Front Seat Back Lumbar Pump energizes its internal inflate solenoid and applies battery voltage through the lumbar support pump control circuit to the pump. The pump runs to inflate the appropriate support bladder until the switch is released.

Description of Operation

The following describes the lumbar support operation and how the seat lumbar support control module responds to each of the lumbar support switch inputs:

- When the lumbar support switch pressed in the FORWARD direction, the seat lumbar support control module will command the lumbar support pump ON and the upper and lower lumbar support bladders should inflate until the bladders are 100% inflated or the switch is released.
- When pressing the lumbar support switch in the REARWARD direction, the seat lumbar support control module will slowly deflate the upper and lower lumbar support bladders until the switch is released or both bladders are 100% deflated.
- When the lumbar support switch is pressed in the UP direction, the seat lumbar support control module will slowly inflate the upper lumbar support bladder until the switch is released or the bladder is 100% inflated.
- When the lumbar support switch is pressed in the DOWN direction, the seat lumbar support control module will slowly deflate the upper lumbar bladder while it inflates the lower lumbar bladder. The seat lumbar support control module will continue this operation until the switch is released or the upper lumbar bladder is 100% deflated and the lower lumbar bladder is 100% inflated.

Lumbar Support/Massage Description and Operation

Lumbar Support Components

The driver and front passenger pneumatic lumbar support system each consists of the following components:

- Front Seat Adjuster Switch
- Front Seat Bladder Control Module
- Front Seat Back Lumbar Pump

Circuit Description

Battery voltage is supplied at all times to the Front Seat Bladder Control Module through a 10 A fuse located in the fuse block. Ground is also supplied at all times to the Front Seat Bladder Control Module and the Front Seat Back Lumbar Pump.

The driver Front Seat Adjuster Switch is a LIN device. The Front Seat Adjuster Switch communicates with the Front Seat Bladder Control Module via serial data. When a lumbar switch is pressed, the Front Seat Adjuster Switch sends a serial data message indicating the lumbar support request. In response to this request, the Front Seat Bladder Control Module energizes its internal inflate solenoid and applies battery voltage through the lumbar support pump control circuit to the pump. The pump runs to inflate the appropriate support bladder until the switch is released.

Description of Operation

The following describes the lumbar support operation and how the Front Seat Bladder Control Module responds to each of the lumbar support switch inputs:

- When the lumbar support switch is pressed in the FORWARD direction, the Front Seat Bladder Control Module will command the lumbar support pump ON and the upper and lower lumbar support bladders should inflate until the bladders are 100% inflated or the switch is released.
- When pressing the lumbar support switch in the REARWARD direction, the Front Seat Bladder Control Module will slowly deflate the upper and lower lumbar support bladders until the switch is released or both bladders are 100% deflated.
- When the lumbar support switch is pressed in the UP direction, the Front Seat Bladder Control Module will slowly inflate the upper lumbar support bladder until the switch is released or the bladder is 100% inflated.
- When the lumbar support switch is pressed in the DOWN direction, the Front Seat Bladder Control Module will slowly deflate the upper lumbar bladder while it inflates the lower lumbar bladder. The Front Seat Bladder Control Module will continue this operation until the switch is released or the upper lumbar bladder is 100% deflated and the lower lumbar bladder is 100% inflated.

Memory Seats Description and Operation

The memory seat system consists of the following components:

- Front Seat Adjuster Switch
- Seat Adjuster Memory Module
- Seat horizontal motor
- Seat front vertical motor
- Seat rear vertical motor
- Seat recline motor

Front Seat Adjuster Switch

Ground is supplied at all times to the Front Seat Adjuster Switch. Battery positive voltage is supplied at all times to the Front Seat Adjuster Switch through a 10 A fuse located in the fuse block. When the Front Seat Adjuster Switches are pressed, the appropriate signal message is sent to the Seat Adjuster Memory Module, via a LIN message. The Seat Adjuster Memory Module then commands the appropriate seat motor to move in response to the switch signal message.

Front Seat Adjuster Memory Switch

The Front Seat Adjuster Memory Switch is contained within the door lock switch assembly. The Front Seat Adjuster Memory Switch is a resistive ladder switch connected through circuits directly to the Seat Adjuster Memory Module. The memory module monitors inputs from the Front Seat Adjuster Memory Switch to determine commands. The set switch circuit is supplied battery voltage, and the other buttons are supplied a 5 V reference from the memory module. The switch receives power for the lights from the lighting circuits, and ground from the door harness.

Seat Adjuster Memory Module Power and Grounds

Battery positive voltage is supplied at all times to the Seat Adjuster Memory Module through a 40 A fuse located in the fuse block. This voltage is used by the module to apply power to the seat motor when commanded ON. Battery positive voltage is also applied at all times to the Seat Adjuster Memory Module through a 10 A fuse located in the fuse block. This voltage is used to power up the module. Ground is provided to the Seat Adjuster Memory Module through the module ground circuit and ground connection.

Seat Motors

There are 4 motors that move the position of the seat. These are the seat horizontal motor, seat front vertical motor, seat rear vertical motor, and the seat back recline motor. The horizontal motor moves the entire seat forward and rearward. The seat front vertical motor moves the front of the seat cushion up or down. The seat rear vertical motor moves the rear of the seat cushion up and down. The recline motor moves the angle of the seat back forward or rearward.

The Seat Adjuster Memory Module controls all seat motors via half bridges that are connected to a single power rail internal to the module. The module connects each of the seat motor outputs together when a seat motor is not in operation. The Seat Adjuster Memory Module continually checks the motor control circuits for shorts to ground or voltage. If a fault is detected with a motor control circuit movement of the related motor is inhibited. All of the motors operate independently of each other. Each motor contains an electronic circuit breaker (PTC), which will reset only after voltage has been removed from the motor.

All seat motors are reversible. For example, when a seat switch is pressed to move the entire seat forward, a signal is sent from the Front Seat Adjuster Switch to the Seat Adjuster Memory Module, via the LIN message. In response to this signal, the module applies battery voltage through the seat horizontal motor forward control circuit and ground through the seat horizontal motor rearward control circuit to the motor. The motor runs in order to drive the entire seat forward. Moving the entire seat rearward works similarly to moving the entire seat forward, except that battery voltage and ground are applied on the opposite circuits causing the motor to run in the opposite direction. All of the motors are powered this way.

Position Detection

Note: There are no physical position sensors used to detect the seat position and movement.

To monitor the seat position, the Seat Adjuster Memory Module counts the electrical pulses of each seat motor. During seat motor operation, the electrical pulses are counted and the direction of the seat movement is monitored to determine the seat position.

The Seat Adjuster Memory Module determines seat position by keeping a running counter where movement in the forward/upward direction adds counts and movement in the rearward/down direction subtracts counts.

The value of these counters, which represent seat positions, are stored in memory for future seat memory recall operation. During a memory seat position recall, the Seat Adjuster Memory Module moves the seat in such a way to return it to the stored counter value.

Memory Functions

Note: The Seat Adjuster Memory Module does not store the mirror and column positions. The seat memory control sends a serial data messages to the respective modules to recall their locally stored memory position.

In all power modes except crank, memory recalls can be initiated by pressing and holding one of the memory position buttons until the seat reaches the stored memory position associated with the activated button. This is called a supervised recall.

The seat memory switch is supplied ground at all times. The Seat Adjuster Memory Module supplies set and memory recall signal circuits to the seat memory switch. When a memory recall switch is pressed, the signal circuit from the Seat Adjuster Memory Module is pulled low through the switch contacts and a series of resistors indicating the memory recall request. In response to this signal, the Seat Adjuster Memory Module commands the appropriate seat motors to move to the pre-recorded seat positions stored in memory.

Refer to the Owner’s Manual for storing memory positions.

Seat Entry Memory Recall and Seat Exit Memory Recall

The Seat Adjuster Memory Module will not perform Seat Entry Memory Recall and Seat Exit Memory Recall functions unless these options are enabled in vehicle personalization using the radio/HVAC controls.

Refer to Instruments and Controls/Vehicle Personalization in the Owner's Manual for the following memory personalization options:

- Seat Entry Memory Recall
- Seat Exit Memory Recall

The radio/HVAC controls reports the seat memory recall option settings to the Seat Adjuster Memory Module via serial data message. The module will then store the memory recall option setting and examine it before making a memory seat adjustment. The seat memory recall option setting stored within the module will not change until the seat memory recall option setting in vehicle personalization is changed.

Memory Store and Recall Conditions

Note: Memory function requires a position be saved to the activated memory switch that is being recalled.

Memory Store Preconditions:
- RUN power mode
- No Stuck or Active Switches (seat, mirror, column, HUD)
- No SIR Disable
- No Load Shed 3
- No output motor drive faults detected
- No position plausibility faults detected
- No child lockout – rear
- Not limit switch fault
- No memory switch fault
- Memory ID is 1 or 2

Memory Recall Preconditions:
- No Stuck or Active Switches (seat, mirror, column, HUD)
- No SIR Disable
- No Load Shed 3
- No output motor drive faults detected
- No position plausibility faults detected
- No child lockout – rear
- Not limit switch fault
- No memory switch fault
- Memory ID is 1 or 2
- LIN communications Active
- Not currently performing a memory store
- A position has been saved to the recalled memory position

Memory Recall Termination Conditions:
- Precondition no longer met
- Active memory button changed
- Recall completed
- Exceed the max allowed recall time (30 seconds)
- OTA Programming Requested

Auto Memory Recall Preconditions:
Note: Auto Memory Recall is suspended during Start power mode.
- Valid Memory ID and Driver ID
- Valid Power Mode
- No Active or Stuck Switches
- No SIR disable
- Vehicle is Stopped
- No Load Shed 3
- No ASIL – A output fault detected
- No position plausibility faults detected
- No child lockout – rear
- Not limit switch fault
- No memory switch fault
- A position has been saved to the recalled memory position
- Enabled for Current Driver

Auto Memory Recall Termination Conditions:
- Precondition no longer met, except being Parked
- Exceed any recall completion times
- Ignition On terminates Seat Exit Memory
- Ignition Off terminates Seat Entry Memory
- OTA Programming Requested

Memory Recall Termination Data Displays:

The termination causes can be viewed through the Seat Memory Recall History data displays. The following are possible memory recall termination causes:

- No Recall Requested
- Seat Entry/Exit Recall Completed
- Memory Button 1 Recall Initiated
- Memory Button 1 Recall Completed
- Memory Button 2 Recall Initiated
- Memory Button 2 Recall Completed
- Memory Button Exit Recall Initiated

- Memory Button Exit Recall Completed
- Memory switch stuck or Invalid
- Memory Switch (Not including SET) out of Range
- Memory SET switch Active or 1, 2, Exit switch changed
- Seat Switch Active or Stuck
- Mirror Switch Active or Stuck
- HUD Switch Active or Stuck
- No Position 1 stored
- No Position 2 Stored
- No Position Exit Stored
- Load Shed 3
- Sir Disabled
- Limit Switch Active or Fault
- Seat Entry – Not Parked terminated
- Invalid Power Mode
- Seat Forward Rearward Motor Control Fault
- Seat Front Up/Down Motor Control Fault
- Seat Rear Up/Down Motor Control Fault
- Recline Forward Rearward Motor Control Fault
- Seat Front Up/Down Motor Position Fault
- Seat Rear Up/Down Motor Position Fault
- Recline Forward Rearward Motor Position Fault

Power Seats System Description and Operation (Memory)

The passenger power seat actuators controlled by a Seat Adjuster Memory Module consists of the following components:

- Seat adjuster switch
- Seat adjuster memory module
- Seat horizontal motor
- Seat front vertical motor
- Seat rear vertical motor
- Seat recline motor

Front Seat Adjuster Switch

Ground is supplied at all times to the Front Seat Adjuster Switch. Battery positive voltage is supplied at all times to the Front Seat Adjuster Switch through a 10 A fuse located in the fuse block. When the Front Seat Adjuster Switches are pressed, the appropriate signal message is sent to the Seat Adjuster Memory Module, via a LIN message. The Seat Adjuster Memory Module then commands the appropriate seat motor to move in response to the switch signal message.

Seat Adjuster Memory Module Power and Grounds

Battery positive voltage is supplied at all times to the Seat Adjuster Memory Module through a 30 A fuse located in the fuse block. This voltage is used by the module to apply power to the seat motor when commanded ON. Battery positive voltage is also applied at all times to the Seat Adjuster Memory Module through a 10 A fuse located in the fuse block. This voltage is used to power up the module. Ground is provided to the Seat Adjuster Memory Module through the module ground circuit and ground connection.

Seat Actuators

There are 4 actuators that move the position of the seat. These are the seat horizontal motor, seat front vertical motor, seat rear vertical motor, and the seat back recline motor. The horizontal motor moves the entire seat forward and rearward. The seat front vertical motor moves the front of the seat cushion up or down. The seat rear vertical motor moves the rear of the seat cushion up and down. The recline motor moves the angle of the seat back forward or rearward.

The Seat Adjuster Memory Module controls all seat actuators via half bridges that are connected to a single power rail internal to the module. The module connects each of the seat motor outputs together when a seat motor is not in operation. The Seat Adjuster Memory Module continually checks the motor control circuits for shorts to ground or voltage. If a fault is detected with a motor control circuit movement of the related motor is inhibited. All of the actuators operate independently of each other. Each motor contains an electronic circuit breaker (PTC), which will reset only after voltage has been removed from the motor.

All seat actuators are reversible. For example, when a seat switch is pressed to move the entire seat forward, a signal is sent from the Front Seat Adjuster Switch to the Seat Adjuster Memory Module, via the LIN message. In response to this signal, the module applies battery voltage through the seat horizontal motor forward control circuit and ground through the seat horizontal motor rearward control circuit to the motor. The motor runs in order to drive the entire seat forward. Moving the entire seat rearward works similarly to moving the entire seat forward, except that battery voltage and ground are applied on the opposite circuits causing the motor to run in the opposite direction. All of the actuators are powered this way.

Power Seats System Description and Operation (Non-Memory)

The driver and passenger power seat systems each consist of the following components:

- Seat adjuster switch
- Seat horizontal motor
- Seat front vertical motor (If Equipped)
- Seat rear vertical motor
- Seat recline motor

Seat Motors

The seat switches provide both power and ground to the selected seat motors.

All of the seat motors operate independently of each other. Each motor contains an electronic circuit breaker (PTC) that opens in the event of a circuit overload and will reset only after voltage has been removed from the circuit. There are four seat position motors and two lumbar motors. These are the horizontal motor, front vertical motor, rear vertical motor, and the seat back recline motor. The seat horizontal motor moves the entire seat forward and rearward. The seat vertical motors may operate independently to tilt the front or rear of the seat cushion up or down. Both motors can also run simultaneously to move the entire seat up or down. The recline motor moves the angle of the seat back forward or rearward.

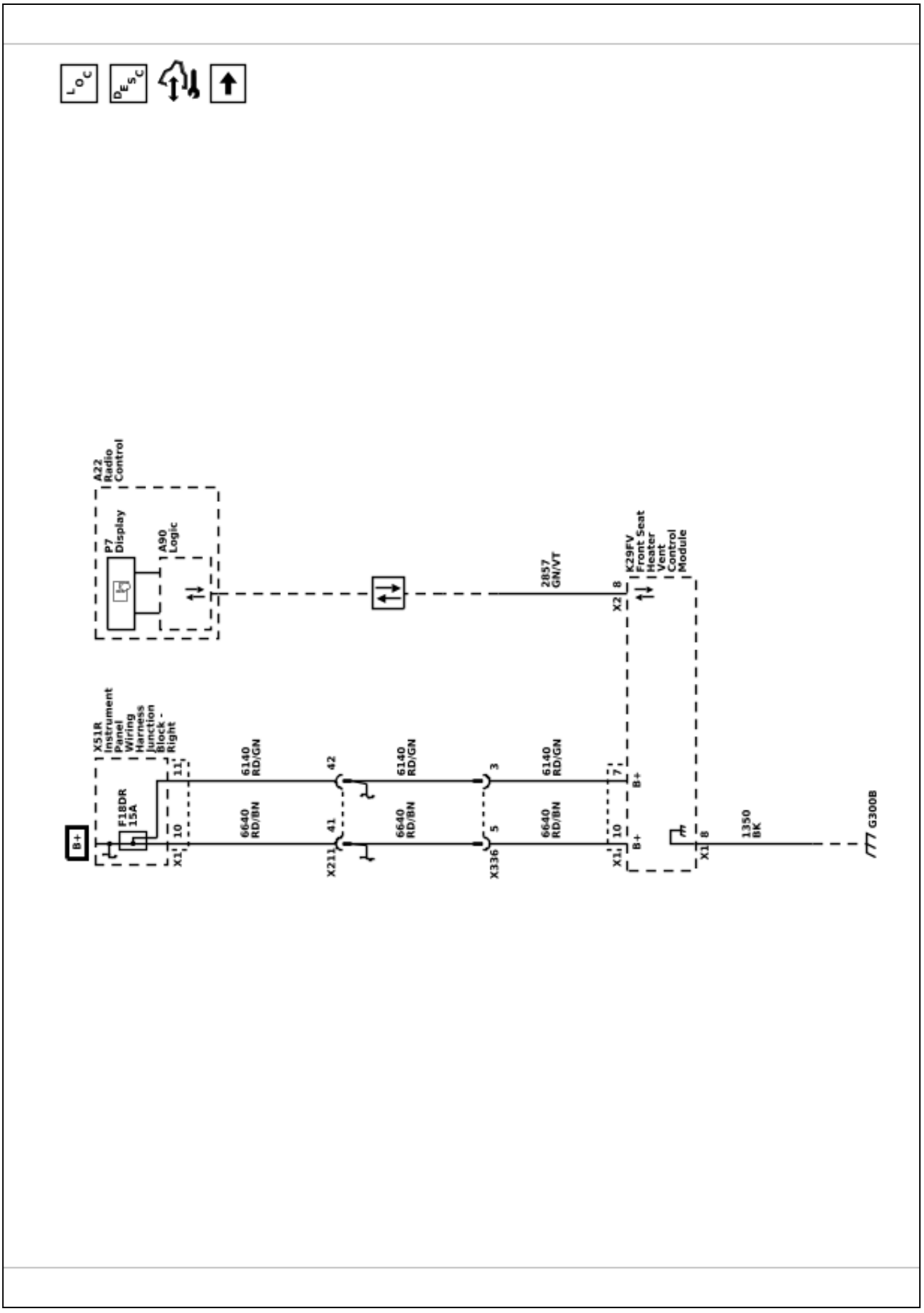
Seat Operation

All seat motors are reversible. For example, when the seat horizontal forward switch is pressed to move the entire seat forward, battery voltage is applied through the switch contacts and the seat horizontal motor forward control circuit to the motor. With the horizontal motor rearward switch contacts closed to the switch ground circuit, the motor runs in order to drive the entire seat forward until the switch is released. Moving the entire seat rearward works similarly to moving the entire seat forward, except that battery voltage and ground are applied on opposite circuits causing the motor to run in the opposite direction. All seat motors are powered this way.

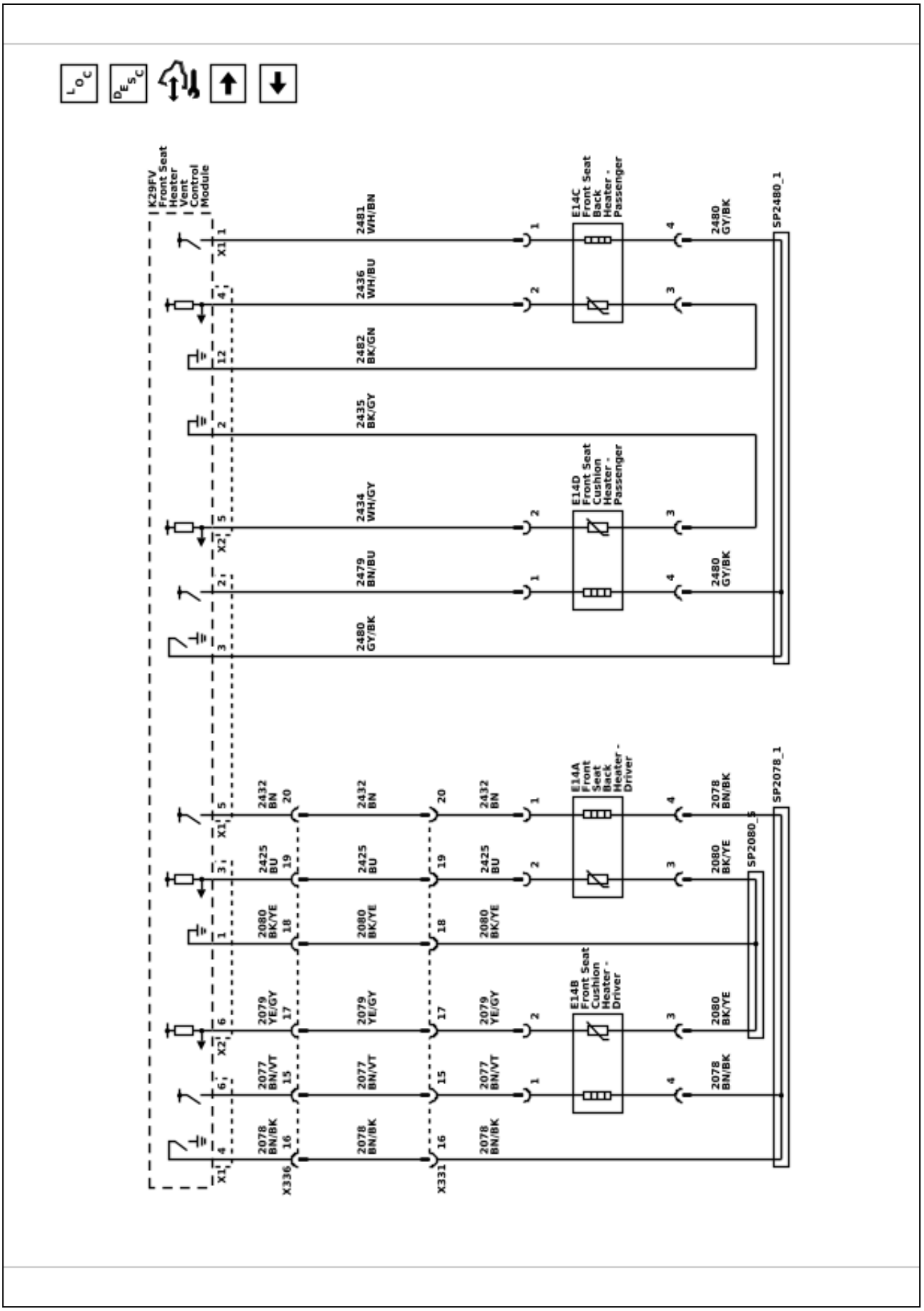
Seat Heating and Cooling

Schematic and Routing Diagrams

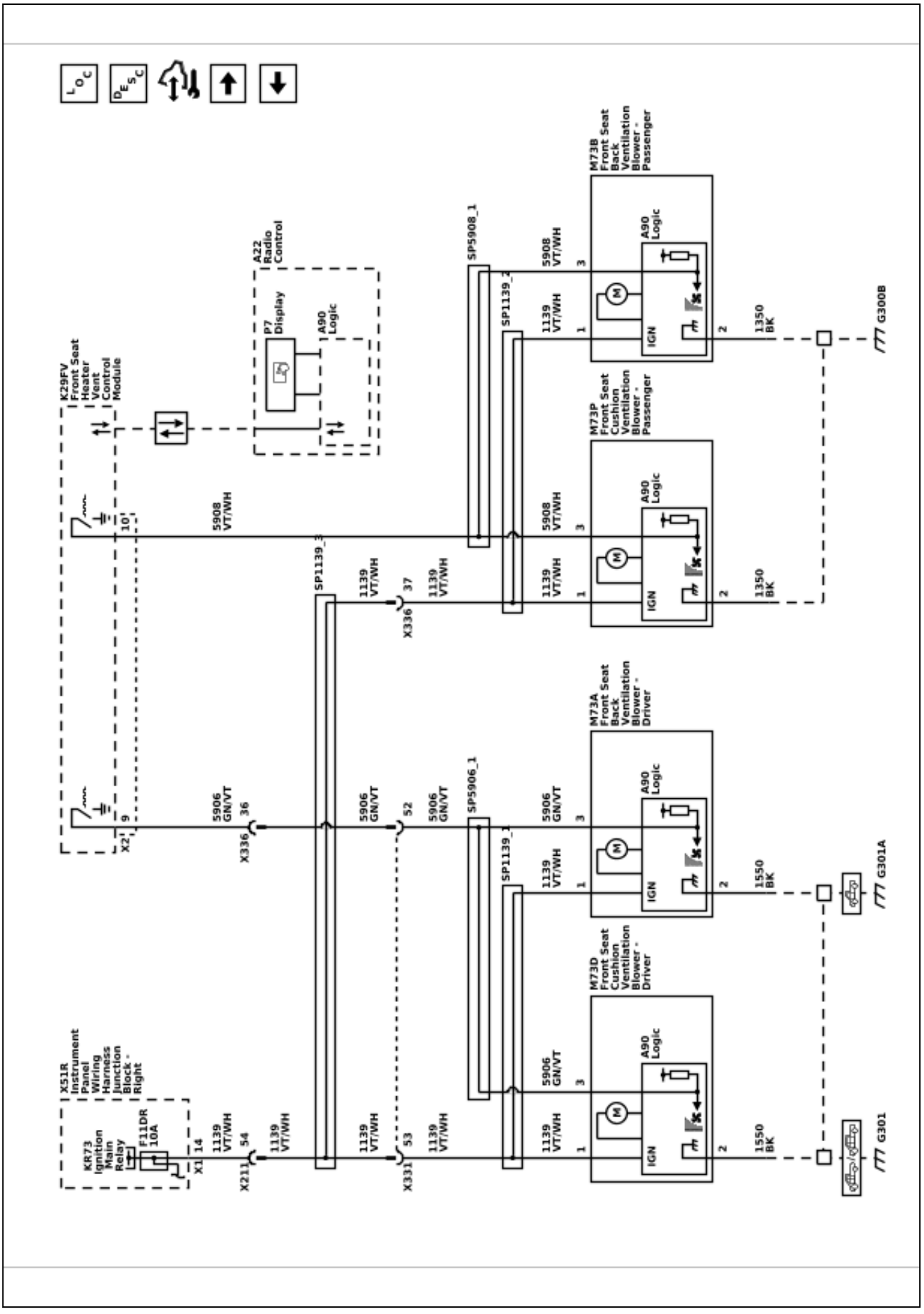
Heated/Cooled Seat Schematics (Power, Ground, Serial Data, and Controls - Front)



Heated/Cooled Seat Schematics (Heated Seats - Front)

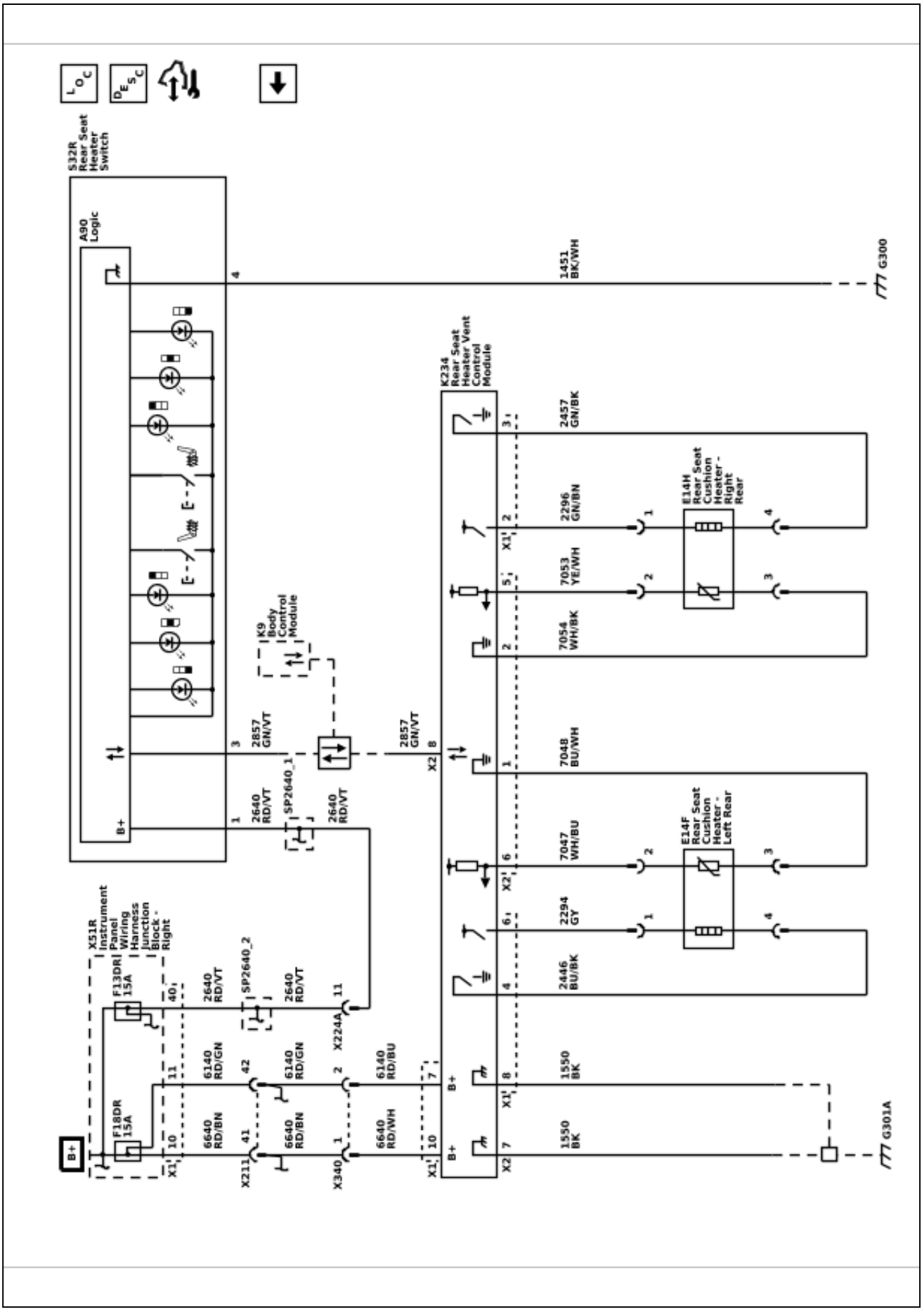


Heated/Cooled Seat Schematics (Ventilated Seats - Front (KU9))



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Heated/Cooled Seat Schematics (Heated Seats - Rear (KCB))



Description and Operation

Heated/Vented Seat Description and Operation

Heated and Vented Seat Components

The heated/vented seat system consists of the following components:

- Heated and vented seat switches
- Body control module (BCM)
- Front seat heater control module Heat and Vent Seat Module (HVSM)
- Driver and passenger seat cushion heating elements
- Driver and passenger seat cushion temperature sensors
- Driver and passenger seat back heating elements
- Driver and passenger seat back temperature sensors
- Driver and passenger seat cushion blower motors
- Driver and passenger seat back blower motors

Heated/Vented Seat Controls

The front driver and passenger seat heating and ventilation switches may be located in the front Heat Vent and Air Conditioning (HVAC) User Interface Control, on the door or in the center console.

To use the system, the engine must be running and the seat-heating or ventilation controls must be activated and there must be no faults present. If equipped, the system cycles through these settings: **High** → **Medium** → **Low** → **Off**.

The Body Control Module (BCM) acts as the system’s controller. It receives the driver’s or passenger’s seat-control request from HVAC Serial communication data line and determines the selected operating mode. The BCM then sends a LIN message to the Heat/Vent Seat Module (HVSM). This module operates the seat heating pads or ventilation motors as requested. The BCM then sends the message back to HVAC to provide the operator with feedback of the operating status of the system by turning on/keeping on the indicator lights or other method of illumination to show to the occupant the heated seats are turned on.

REMOTE START: The Body Control Module (BCM) uses functional checks (faults, Diagnostic Trouble Codes, etc.) and air temperature to determine if Heated seats are allowed to turn on (if enabled in settings for Remote Start); heated seats will turn on in remote start as long as the air temperature is below an agreed upon temperature threshold.

IGNITION ON: The Body Control Module (BCM) uses functional checks (faults, Diagnostic Trouble Codes, etc.) to determine if Heated seats are allowed to turn on when requested by customer; this feature is designed to keep the heated seat occupant safe in various conditions. In some cases, the heated seats may turn on but with limited power as part of the system's safety control.

Automatic Step-Down

Automatic Step-Down is a BCM controlled function of the heated seat system. When a heated seat mode is selected, the output will be reduced after a period of time. This function steps the heated seat down from High setting to Medium setting as a redundant safety measure. This will cause the indicator to display a reduced level while the feature is active.

Heated Seat Operation

The Heat and Vent Seat Module controls heated seat operation for the driver and passenger seats. There are two modes for heated seat operation: “seat back and cushion” heat mode and “seat back only” heat mode. When active, power is applied to the seat cushion and back heater elements through individual pulse width modulated (PWM) voltage supply control circuits.

Each individual heater element is switched to ground by the module through a common low side drive control circuit.

When inactive the Heat and Vent Seat Module connects the heating element low side outputs to a common reference point internal to the module which is biased to approximately 3.5 V. The module uses this biased voltage in order to check the high side and low side control circuits for a short to battery or ground before enabling the driver and passenger seat heating elements.

During heated seat operation, the Heat and Vent Seat Module interrupts control of the heating elements every 10 s for approximately 10 ms to make this biased voltage check.

With both the seat cushion and seat back heater elements disconnected, if the high side output of the module is measured it will display a low current 12 V bleed off voltage. This bleed off voltage does not have a meaningful diagnostic purpose. With the heater element connected you would just see the 3.5 V biased voltage from this circuit

Heated Seat Elements

The heated seat elements are made up of resistive wiring which create heat when supplied power and ground. The temperature sensor (thermistors) are packaged with the heating element but contain separate circuitry. The elements are designed to flex with movement and weight, and resistance should not change with occupancy. Depending upon vehicle build, the seat back and cushions may be connected through shared circuitry. Element design and output temperatures vary between seat designs and will not be comparable between multiple vehicles.

Temperature Regulation

The seat back and cushion temperature sensors (thermistors) are packaged with the seat heating elements located just under the seat covers. The Heat and Vent Seat Module supplies each temperature sensor with a 5 V reference signal circuit and a low reference circuit. The module monitors the voltage from the signal circuit to determine the temperature of the seat.

The temperature sensor varies in resistance based on the temperature of the heating element causing the signal voltage to change. Once the module senses the seat reached the set temperature, it will then begin to regulate the current flow through the heater elements in order to maintain the desired seat temperature based on the feedback voltage from the sensor.

If the heated seats are on high, automatic step-down may become active after a calibratable determined period of time.

Vented Seat Operation

Each vented seat consists of 2 blower motors; one in the seat back and one in the seat cushion. During vented seat operation, the vented seat blower motors draw cabin air through channels in the foam pad and small holes in the seat covers to pull heat away from the occupant.When the Heat and Vent Seat Module receives a ventilation seat command, it sends a low-side drive pulse width modulation (PWM) signal to the motor control circuit in the seat blower motors. The logic in the blower motors sets the blower speed to the PWM set point. The blower motors run, causing a cooling effect to the occupant.

Load Shed Management

The electrical power management function is designed to monitor the vehicle electrical load and determine when the battery is potentially in a high discharge condition. The heated seat system is one of the vehicle loads that is subject to reduction during a battery discharge condition.For more information on load management refer to *Electrical Power Management Description and Operation 6-186*.

Rear Heated Seats Description and Operation

Rear Heated Seat Components

The rear heated seat system consists of the following components:

- Rear Seat Heater Switch
- Body Control Module
- Rear Seat Heater Vent Control Module
- Rear Seat Heating Elements
- Rear Seat Temperature Sensors (Thermistors)

Rear Heated Seat Controls

The left and right heated seats are operated by the Rear Seat Heater Switches. To operate the heated seats, the engine must be running. The BCM is the rear heated seat system master. It monitors heated seat switch inputs to determine user requested operating mode. Based on the requested operating mode, the BCM sends a LIN Bus serial data message to the Rear Seat Heater Vent Control Module how to drive the heating elements. The BCM also controls the indicators used to provide the operator with feedback as to the operating status of the system. Following user input, the system will cycle through High, Medium, Low, and then back to Off again. The BCM also controls the seat temperature and mode indicators, via the serial data line, used to provide the operator with feedback as to the operating status of the system.

Automatic Step-Down

Automatic Step-Down is a software controlled feature of the heated seat system. When a heated seat mode is selected, the output may be reduced after a period of time or if a temperature value is exceeded. This may result in the indicator displaying a reduced value when active. The Rear Seat Heater Vent Control Module will reduce the pulse width modulated voltage or turn the heating element circuits off when Automatic Step-Down is active.

Heated Seat Operation

The Rear Seat Heater Vent Control Module controls heated seat operation for the rear seats. When active, power is applied to the seat cushion heater elements through a single pulse width modulated (PWM) voltage supply control circuit. Both heater elements share a common constant ground circuit.

When inactive the Rear Seat Heater Vent Control Module connects the heating element low side outputs to a common reference point internal to the module which is biased to approximately 3.5 V. The module uses this biased voltage in order to check the high side and low side control circuits for a short to battery or ground before enabling the driver and passenger seat heating elements. During heated seat operation, the Rear Seat Heater Vent Control Module interrupts control of the heating elements every 10 s for approximately 10 ms to make this biased voltage check.

Heated Seat Elements

The heated seat elements are made up of grids of resistive wiring which create heat when supplied power and ground. The temperature sensor (thermistors) are packaged with the heating element but contain separate circuitry. The elements are designed to flex with movement and weight, and resistance should not change with occupancy. Depending upon vehicle build, the seat cushions may be connected through shared circuitry. Element design and output temperatures vary between seat designs, and will not be comparable between multiple vehicles.

Temperature Regulation

The seat cushion temperature sensors (thermistors) are packaged with the seat heating elements located just under the seat covers. The Rear Seat Heater Vent Control Module supplies each temperature sensor with a 5 V reference signal circuit and a low reference circuit. The module monitors the voltage from the signal circuit to determine the temperature of the seat.

The temperature sensor varies in resistance based on the temperature of the heating element causing the signal voltage to change. Once the module senses the seat reached the set temperature, it will then begin regulate the current flow through the heater elements in order to maintain the desired seat temperature based on the feedback voltage from the sensor.

If the heated seats are on high, automatic step-down may become active after a software determined period of time or if a temperature value has been met.

Section 12

Steering

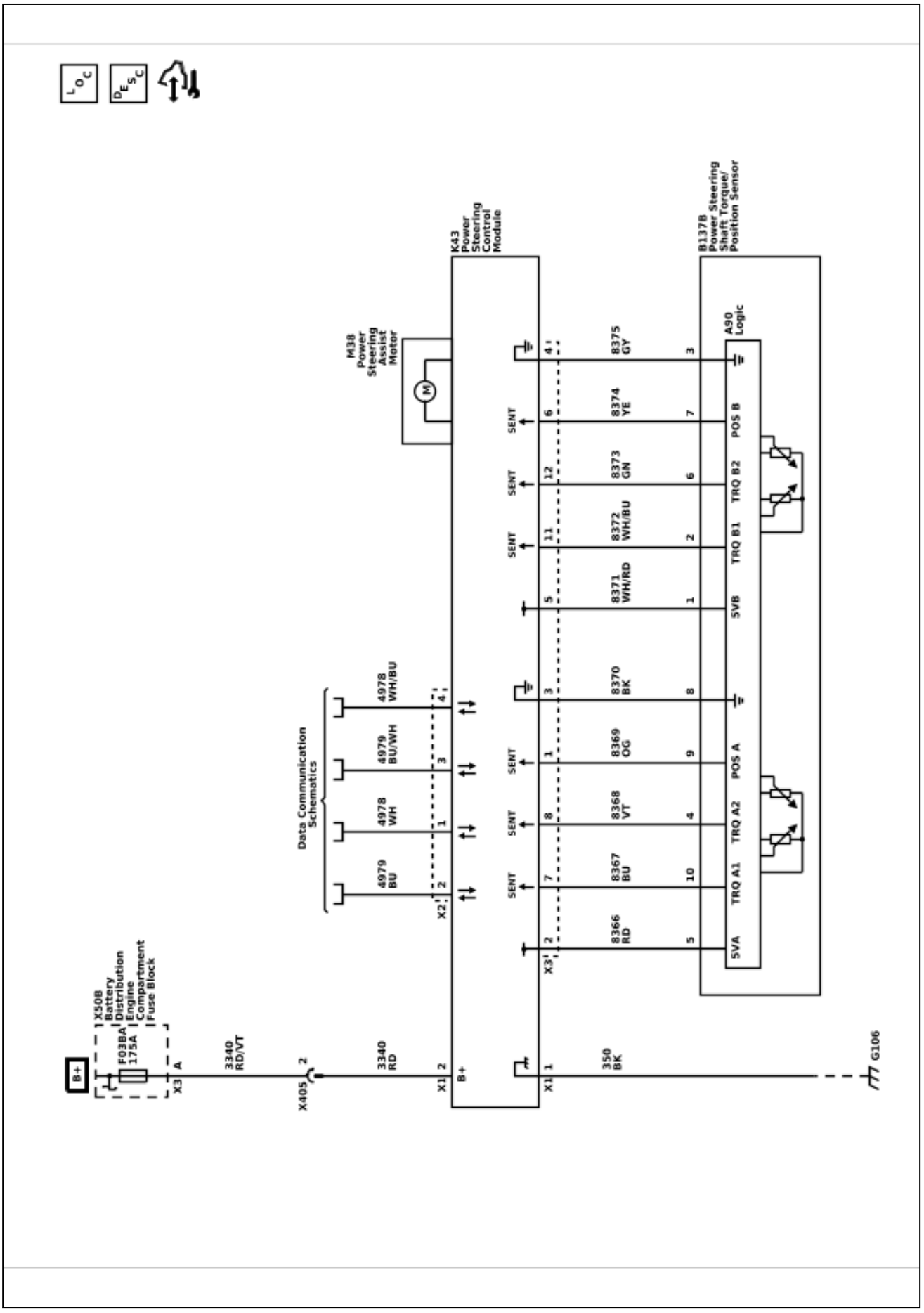
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Steering

Power Steering

Schematic and Routing Diagrams

Power Steering Schematics (Electric Power Steering)



Description and Operation

Power Steering System Description and Operation

The belt driven electronic power steering system consists of the following components:

- A belt drive and a ball nut mechanism
- A power pack; containing the power steering control module, its sensors, the power steering motor
- A torque sensor
- The steering gear (rack and pinion)

The belt driven electric power steering system reduces the amount of effort needed to steer the vehicle by utilizing the power steering control module to control the power steering motor to maneuver the steering rack. The power steering control module uses input from the torque sensor, motor rotational sensor, battery voltage circuit and GMLAN serial data circuit to determine the level of motor assist. Vehicle speed and engine speed from the GMLAN serial data circuit is also used to adjust the amount of steering assist needed to steer the vehicle. At low speeds more assist is provided for easy turning during parking maneuvers. At higher speeds less assist is provided for improved road feel and directional stability

To account for mechanical wear in the steering gear, the electronic power steering system contains a feature called Center Compensation. The power steering control module learns the amount of friction contained within the steering gear and as parts begin to wear mechanically, it will add torque compensation to maintain the original feel of the steering gear.

The torque sensor is attached to the steering gear housing near the input shaft, and is critical to proper operation of the electronic power steering system. As the steering wheel is turned and torque is applied to the steering shaft, the torque sensor monitors the amount of input torque.

The power steering control module responds to the torque sensor and motor rotational sensor by commanding current to the power steering motor.

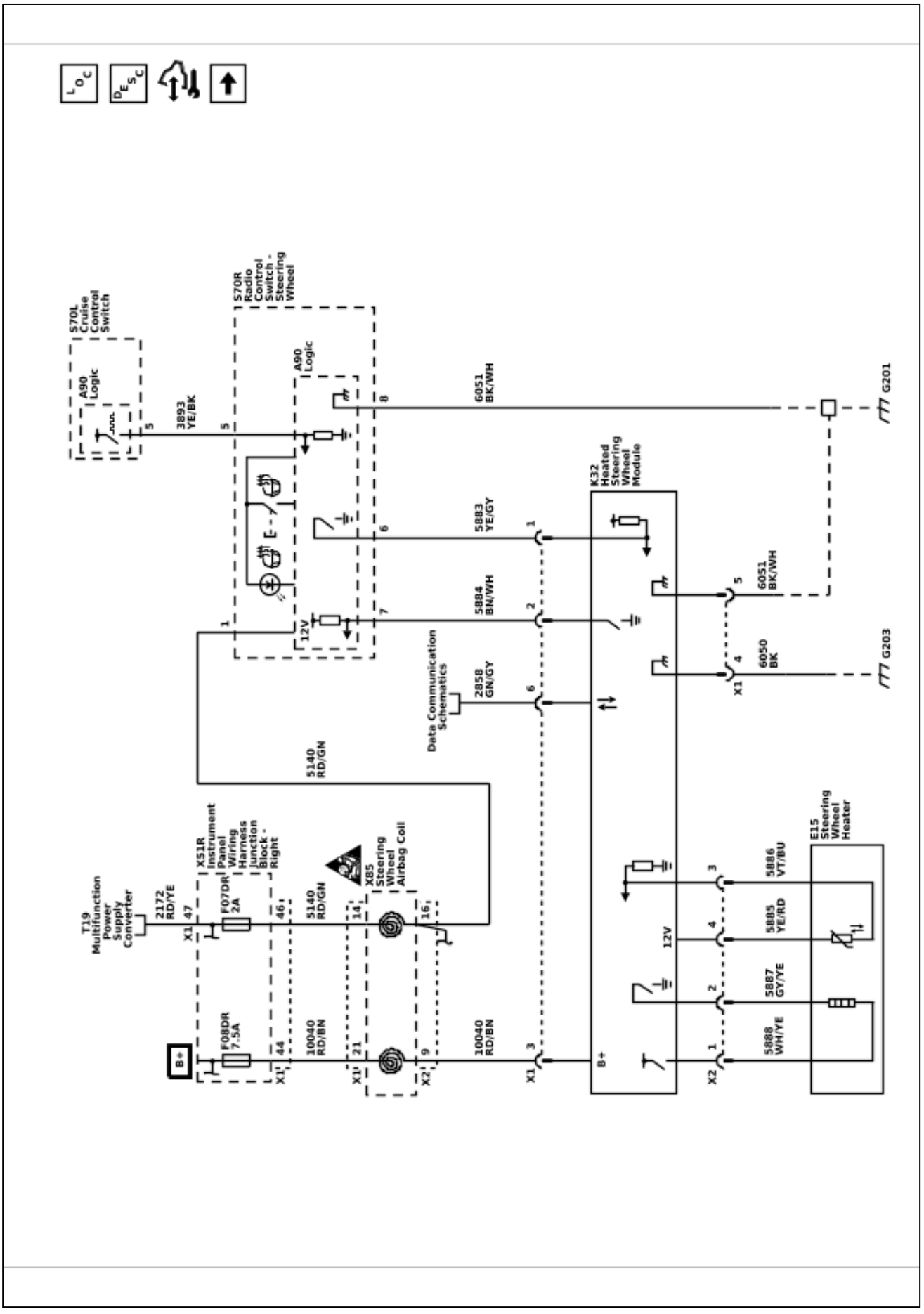
The power steering control module and motor are attached to the base of the steering gear housing, and applies power assist through the belt drive and ball nut mechanism to the steering rack. The ball nut mechanism translates the rotational movement of the belt drive system to lateral movement of the steering rack. The power steering control module has the ability to detect malfunctions within the electric power steering system. Any malfunction detected that disables steering assist will cause the SERVICE POWER STEERING message to be displayed on the driver information center. Additionally, the power steering control module calculates an internal system temperature which is used to protect the power steering system from damage caused by high temperature. When the calculated temperature exceeds a pre-determined level the amount of current commanded to the power steering motor is reduced. This will result in a temporary reduced level of assist. Full assist will return once the calculated temperature drops below the pre-determined level.

The power steering system contains two torque sensors and two steering angle sensors for redundancy in order to limit situations where total loss of assist occur. If a malfunction occurs in only one of the two sensors, the power steering system will continue to provide steering assist for a short period of time.

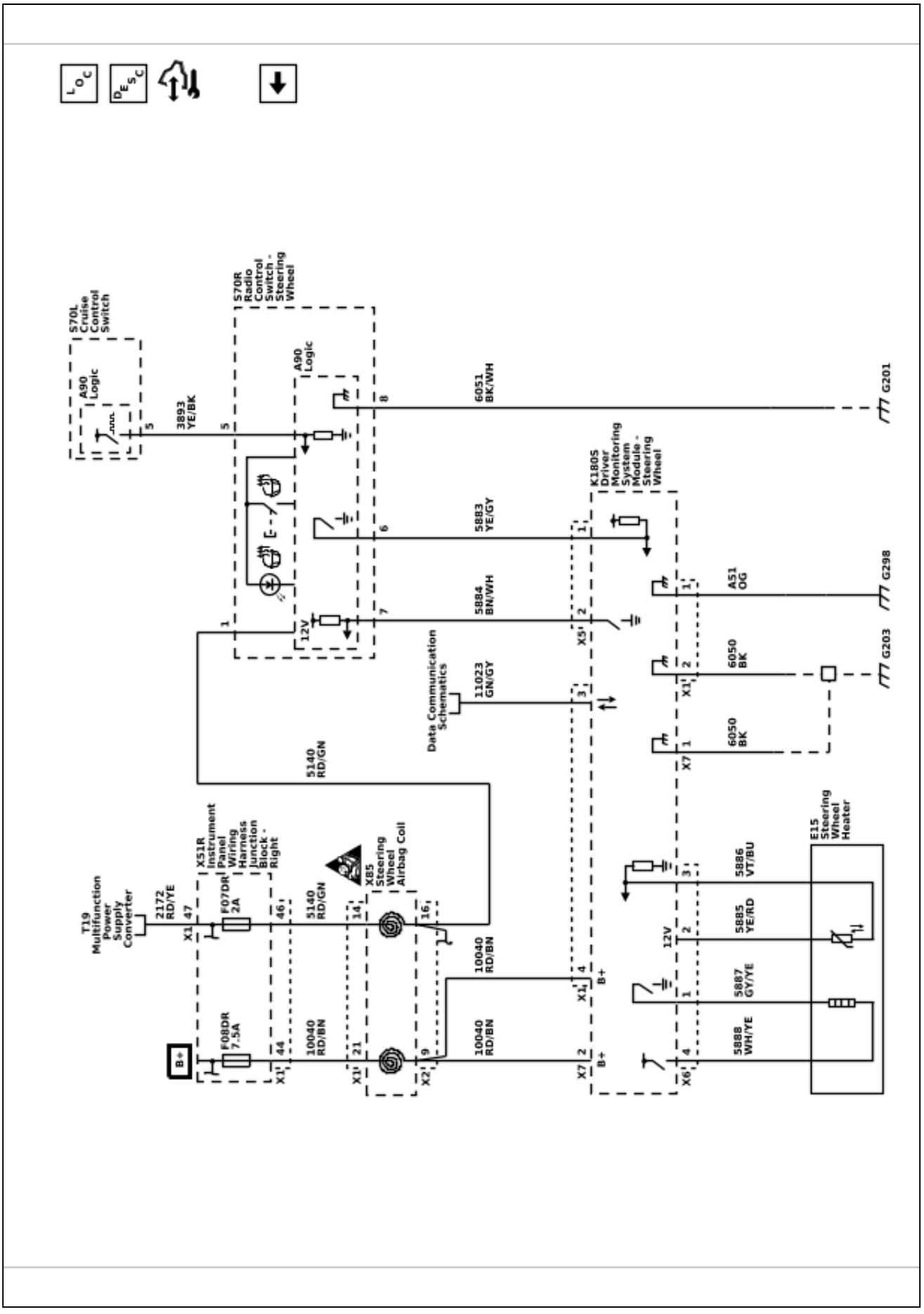
Steering Wheel and Column

Schematic and Routing Diagrams

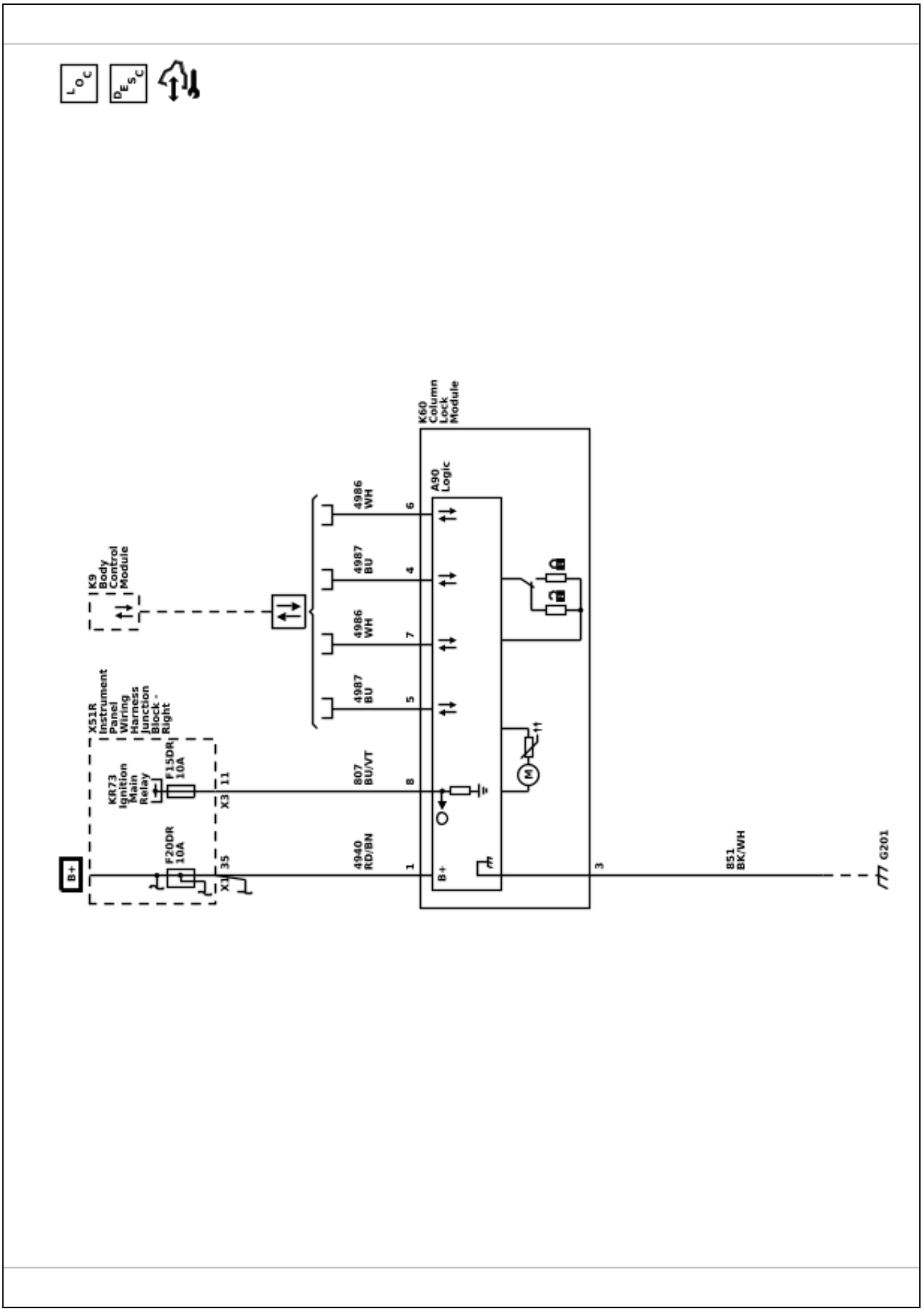
Steering Wheel Schematics (Heated Steering Wheel (- ULM))



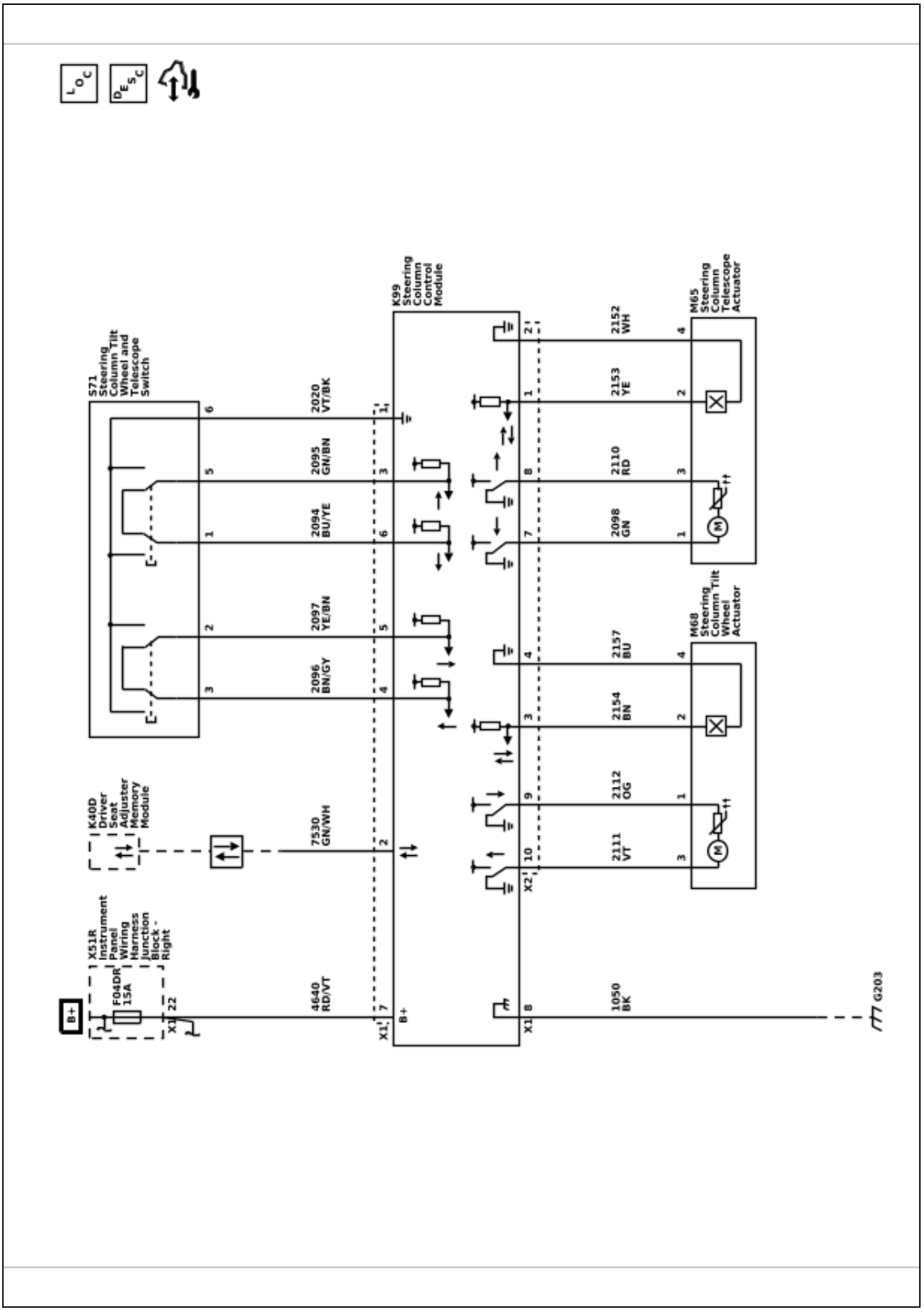
Steering Wheel Schematics (Heated Steering Wheel (ULM))



Column Lock Schematics (Steering Column Lock)



Tilt/Telescoping Steering Column Schematics (Tilt/Telescoping Steering Column)



Description and Operation

Steering Wheel and Column Description and Operation

Column Lock

The Column Lock Module (CLM) controls the steering wheel theft deterrent lock function, which allows the column to be electronically locked. When a valid key is used to start the vehicle, the BCM recognizes this and will send the encrypted password to the CLM. The CLM will compare its own stored password to the encrypted password sent by the BCM. If the data matches, the steering column will be unlocked.

In order for the steering column to be locked the CLM has to see 3 inputs.

1. The BCM power mode is OFF.
2. The vehicle is stationary based on zero speed reported from all ABS wheel speed sensors.
3. The driver or passenger door is opened reported by the PEPS module.

When the CLM receives these inputs, the steering column will be locked.

The CLM monitors the column lock system and will set DTC codes when the module detects malfunctions within the system. When a malfunction occurs the driver information center (DIC) will display the Service Column Lock Now message indicating DTC codes are set within the CLM. The immobilizer system will prevent vehicle starting if there is a fault or no communication with the CLM.

Tilt/Telescoping Description

The steering column has a tilt/telescoping control system that consists of an electronic control module capable of LIN message communication, a steering column power assembly with positioning actuators and sensors, and a steering column control switch.

Column Position Module has two versions of operation:

1. N38 – Power Steering Column-Tilt/Telescope, and A45 – Memory Seats

   The column position module will wake up either by the LIN bus or by the tilt/telescope steering column switch. The memory seat module is the master and column position module is the slave. All DTCs and the data from column position module are reported through the LIN bus and stored in the memory seat module.

2. N38 – Power Steering Column-Tilt/Telescope Only

   The column position module will wake up with the tilt/telescope steering column switch. No DTCs or data is available. Vehicle symptoms will cause the customer to bring the vehicle in for service.

Tilt/Telescoping Switch Operation
The tilt/telescope steering column has a four-position switch. The switch may be used to adjust the position of the steering wheel in or out which is telescope and up or down which is tilt. The position of the column may be changed as follows:

- Press the switch up to tilt the column up.
- Press the switch down to tilt the column down.
- Press the switch forward and the column moves toward the front of the vehicle.
- Press the switch rearward and the column moves toward the rear of the vehicle.

Actuators
Both the tilt and telescoping actuators are reversible. For example, the tilt actuator moves the column both up and down. When the column position module receives an input to move the column up, the column position module supplies battery positive voltage and ground to the tilt actuator in order to move the column up. When the column position module receives a column down input, the column position module supplies battery positive voltage and ground to the same actuator, but with reverse polarity. When the voltage polarity is reversed, the actuator runs in the opposite direction and moves the column down.

Position Sensors with A45 Memory Seats
Two position sensors are Hall Effect sensors and are used by the column position module. The column position module provides a 5 V reference voltage and a ground to both the tilt and telescoping position sensors. The sensor feedback circuit voltage varies from 0–5 V. Each sensor is part of the actuator assembly. When the actuator rotates, the voltage of the sensor varies on the scan tool. The column position module monitors the feedback voltage to determine the column position.

Without the A45 Memory Seat option, scan tool data is not available.

Tilt/Telescoping Memory with A45 Memory Seats
Memory settings and the personalization of steering wheel positions are available with the tilt/telescoping steering column only with the A45 Memory Seat option. The data stored consists of entry positions and exit positions. The entry position is the position that the steering column moves in when the ignition is turned ON. The exit position is the direction that the steering column moves in when the ignition is turned OFF and the driver's door is opened. The memory seat module stores memory positions and commands column position module to move actuators to specific positions through a LIN message.

An initial memory setting is set in the memory seat module at the assembly plant. This setting may be changed by the customer at any time.

Without the A45 Memory Seat option, memory settings, personalization, and the entry and exit function is not available.

Driver Safety

The steering wheel and column has safety features to protect the driver. The following components may be mounted on or near the steering column:

Energy-Absorbing Steering Column: The energy-absorbing steering column compresses in the event of a front-end collision, which reduces the chance of injury to the driver. The energy-absorbing feature, collapsible steering shaft, and break away mounting features help reduce the injury in the event of an accident.

Heated Steering Wheel (Without UKL)

The heated steering wheel system consists of a heated steering wheel, a heated steering wheel switch, and a steering wheel heat module. The heated steering wheel includes non-serviceable heating elements and a temperature sensor. The heating elements and sensor are located in the left and right sides of the rim of the steering wheel. The heated steering wheel switch is located in the left steering wheel control switch assembly. The steering wheel heat control module is located at the bottom of the steering wheel center hub. When the switch is pressed, the switch signal circuit is grounded and the heat module turns the heated steering wheel on. The system then remains on until the customer turns it off. The wheels normal operating temperature is 32°C (89.6°F). The wheel takes approximately 3 to 4 minutes to reach the normal operating temperature. The wheel will take longer to heat up if the vehicle temperature is below -21°C (-5.8°F). The built-in temperature sensor provides input to the controller to limit the temperature to the normal operating temperature. The wheel will not operate if the vehicle temperature is at or above 32°C (89.6°F).

The heated steering wheel control module is on the LIN bus. This allows the heated steering wheel to be activated during remote vehicle start.

If the vehicle has been in a collision, the BCM will disable the heated steering wheel until the [Link target (target-id 373381-) not found] procedure has been performed. Replacement of the K9 Body Control Module may be required to restore proper heated steering wheel operation if the [Link target (target-id 373381-) not found] was not performed prior to replacing the K36 Restraints Control Module.

Heated Steering Wheel (With UKL)

The heated steering wheel system consists of a heated steering wheel, a heated steering wheel switch, and a steering wheel heat module. The heated steering wheel includes non-serviceable heating elements and a temperature sensor. The heating elements and sensor are located in the left and right sides of the rim of the steering wheel. The heated steering wheel switch is located in the HVAC Control assembly. The steering wheel heat control module is located at the bottom of the steering wheel center hub. When the switch is pressed, the switch signal circuit is grounded and the heat module turns the heated steering wheel on. The system then remains on until the customer turns it off. The wheels normal operating temperature is 32°C (89.6°F). The wheel takes approximately 3 to 4 minutes to reach the normal operating temperature. The wheel will take longer to heat up if the vehicle temperature is below -21°C (-5.8°F). The built-in temperature sensor provides input to the controller to limit the temperature to the normal operating temperature. The wheel will not operate if the vehicle temperature is at or above 32°C (89.6°F).

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Section 13

Suspension

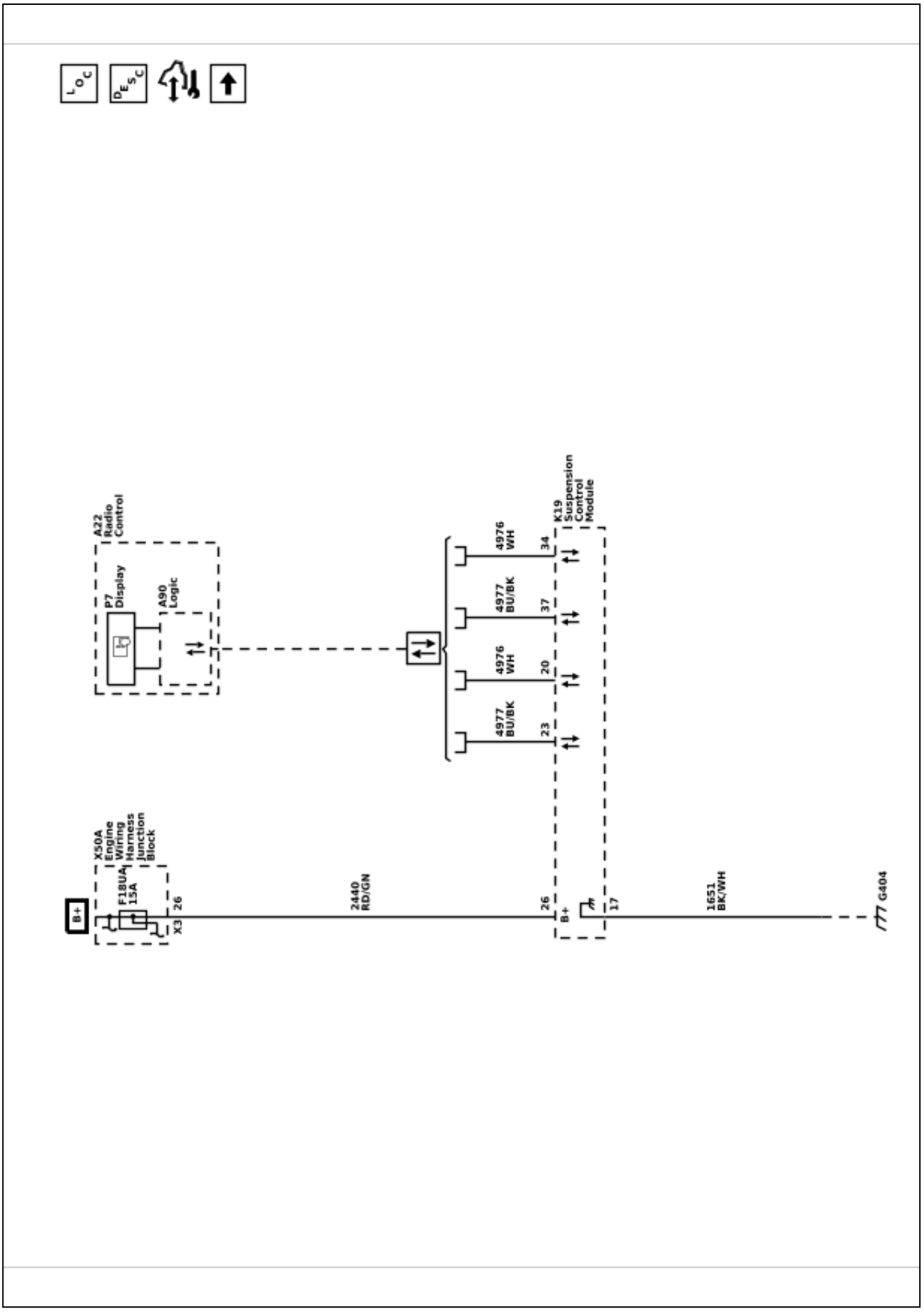
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Suspension

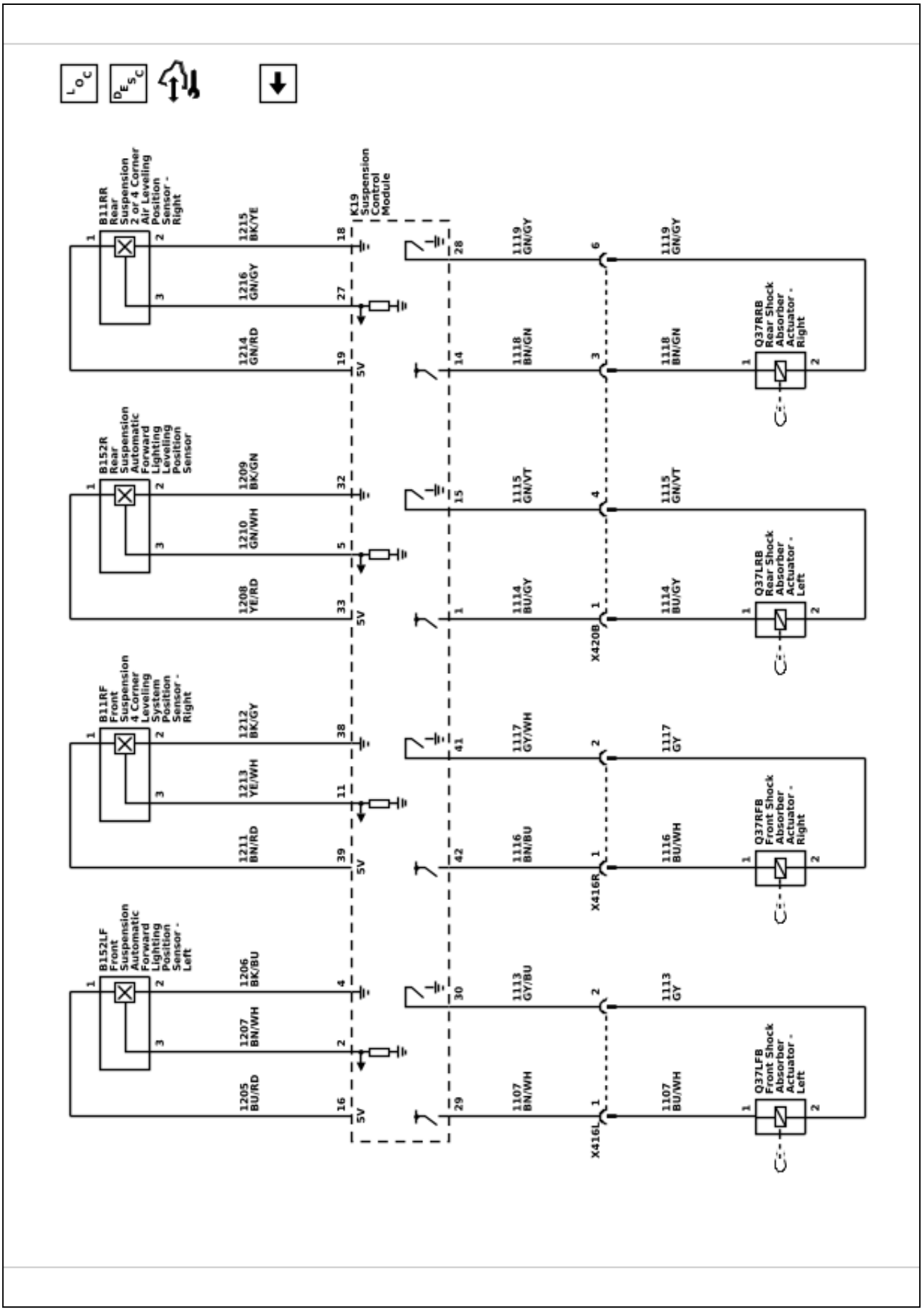
Suspension Controls

Schematic and Routing Diagrams

Electronic Suspension Control Schematics (Electronic Suspension - Power, Ground, Serial Data, and Controls)



Electronic Suspension Control Schematics (Position Sensors and Actuators)



Description and Operation

Electronic Suspension Control Description and Operation

The electronic suspension control system, individually controls the damping force of each of the 4 shock absorbers in order to keep the vehicle's body as calm as possible. Changes of the damping forces can be accomplished within milliseconds. Suspension characteristics can be changed at any time by activating the sport mode or tour mode.

The electronic suspension control system consists of the following major components:

- The suspension control module
- Four corner vertical accelerometers
- Four shock absorber actuators, which are integrated within the shock absorbers

The suspension control module controls the damping forces according to the following factors:

- Vehicle speed
- Steering wheel position
- Engine torque
- Brake pressure

The suspension control module evaluates these inputs in order to separately control the shock absorbers, providing an enhanced ride and comfort level over the widest possible range of operating conditions.

Suspension Control Module

The suspension control module controls the system functions and detects failures. The suspension control module receives input information by the four suspension vertical accelerometers that are directly connected to the module and by other systems through the serial data. The suspension control module commands variable levels of current to each shock absorber actuator.

Suspension Vertical Accelerometers

The suspension control module supplies a common 5 V reference and a ground circuit to each of the four corner vertical accelerometers. The accelerometers supply a signal of 0.3–4.7 V to the suspension control module.

Shock Absorber Actuators

The shock absorber actuators are integrated within the shock absorbers. The electronic suspension control system uses a proportional valve that is located in the external bypass of the displacement module.

Adjustment is performed by current control. The current range is 0–5 A. The actuators respond to commands of the suspension control module within milliseconds.

Driver Information Center Message

The electronic suspension control system uses the instrument cluster for the display functions instead. When the suspension control module detects a fault that sets a DTC, it sends a message on the serial data line to the instrument cluster, which will display the following message:

SERVICE SUSPENSION SYSTEM

The suspension control module has the ability to store DTCs as current or history codes. Most electronic suspension control system malfunctions will display a message in the instrument cluster and set a DTC. As long as the DTC is present, the message will be displayed.

Actions taken when a fault is detected will remain until the ignition is turned OFF, even if the fault condition is not present anymore.

If a fault is no longer present, the DTC will be stored as a history code. After 40 consecutive malfunction-free ignition cycles the DTC will be deleted.

Section 14

Transmission

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Schematic and Routing Diagrams **14-17**

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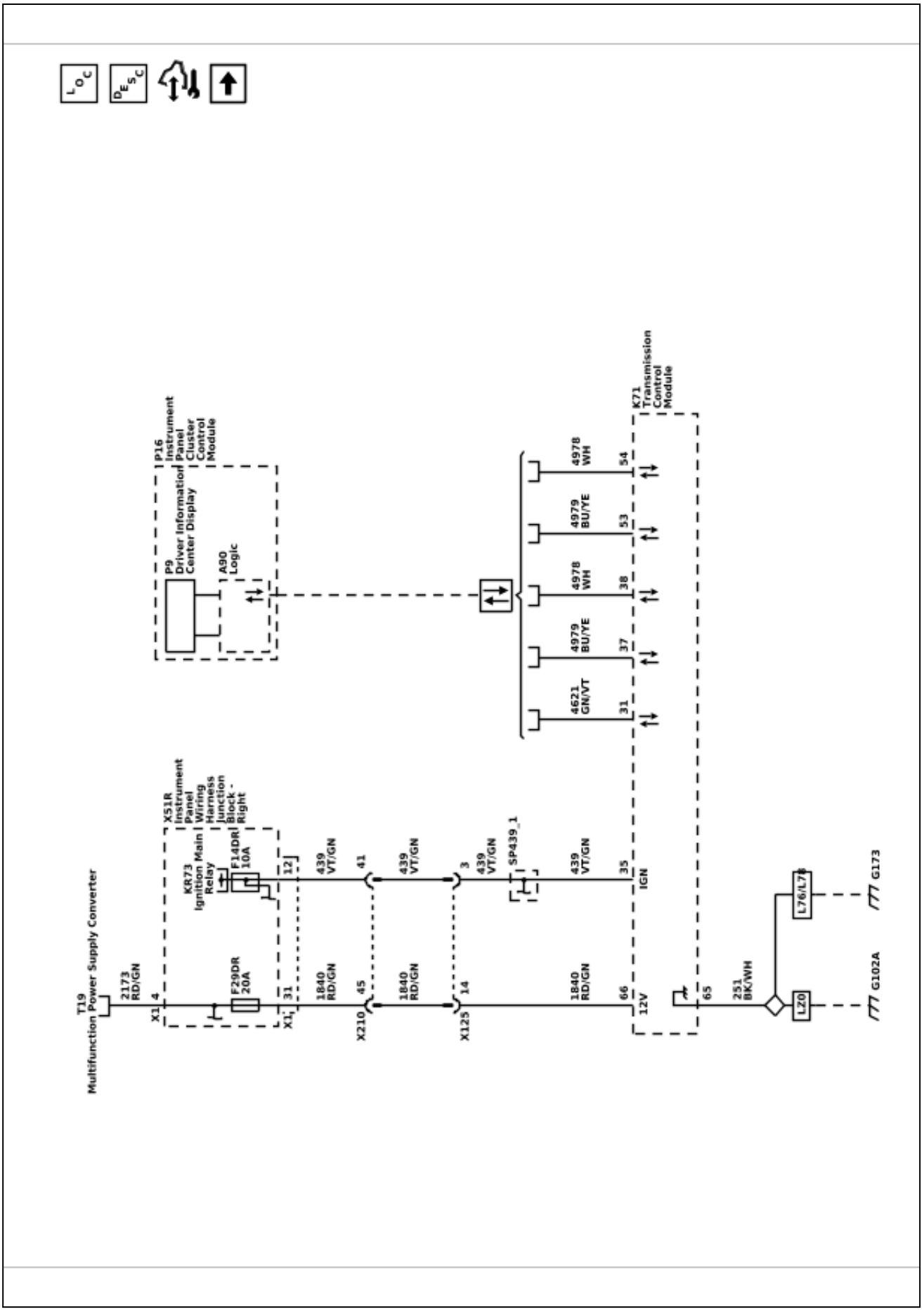
Transfer Case Control Schematics 14-22

Transmission

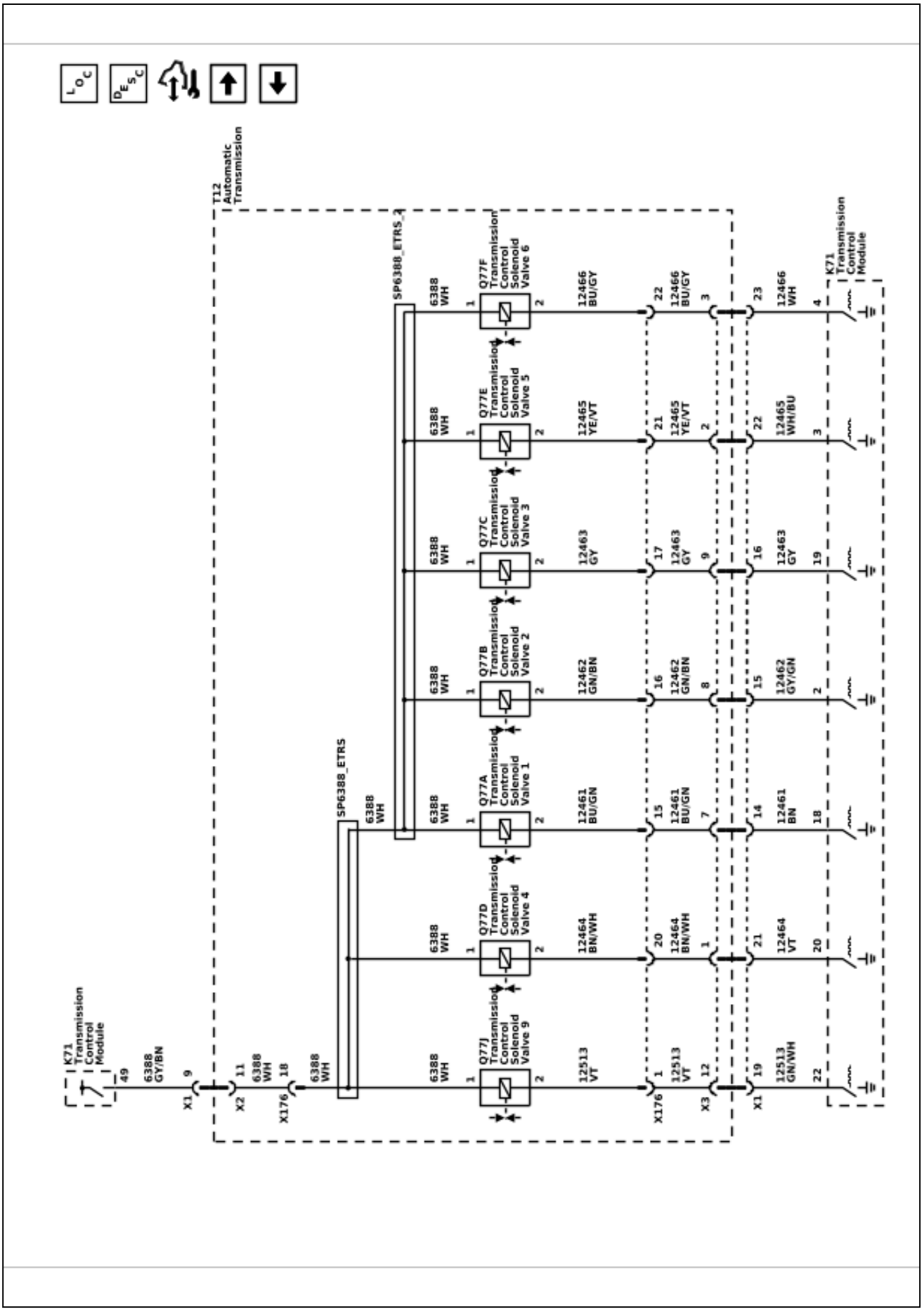
Automatic Transmission - 10L80

Schematic and Routing Diagrams

Automatic Transmission Controls Schematics (Transmission Control Module Power, Ground, Serial Data, and MIL)

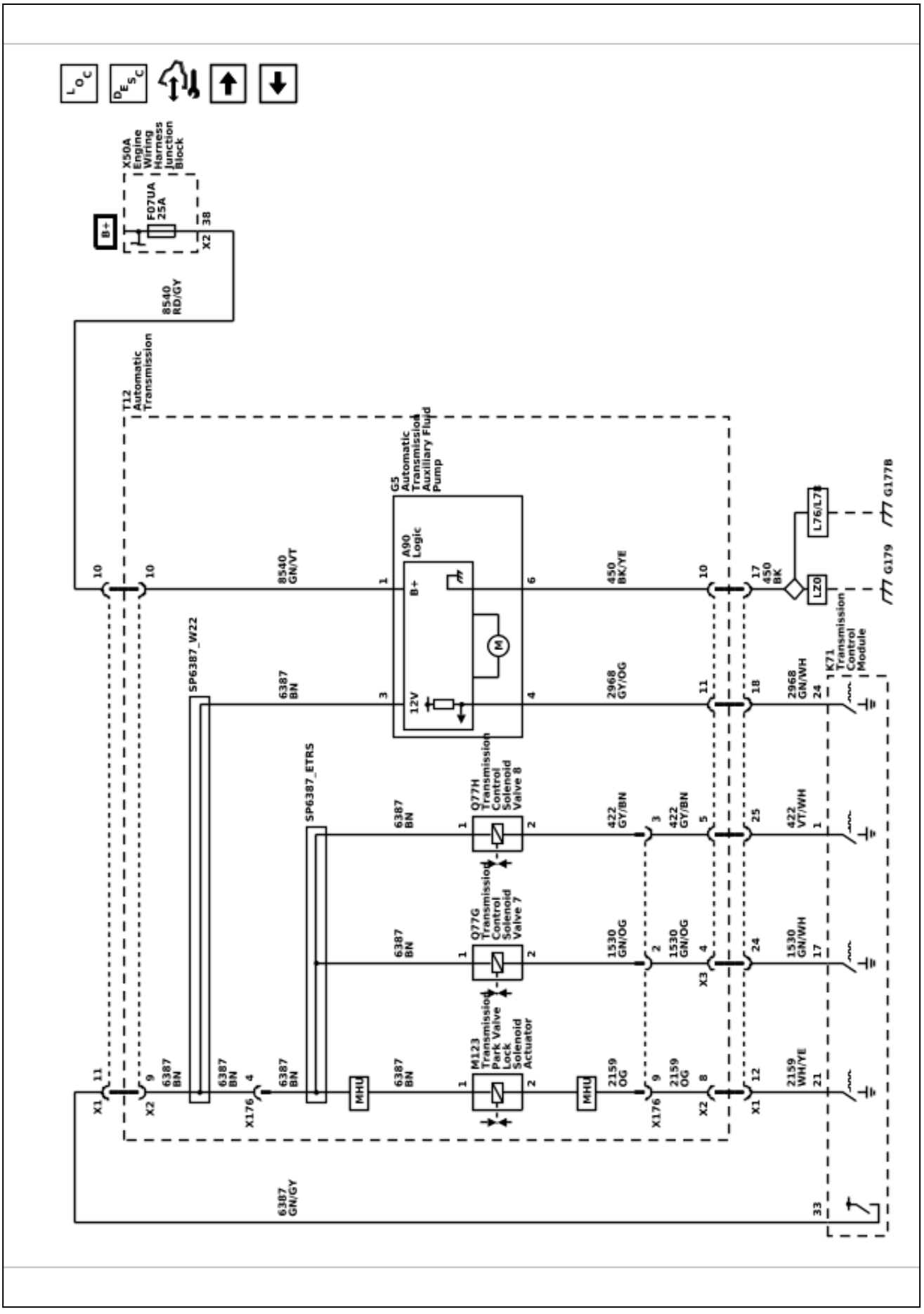


Automatic Transmission Controls Schematics (Pressure and Shift Controls - 1 of 2)



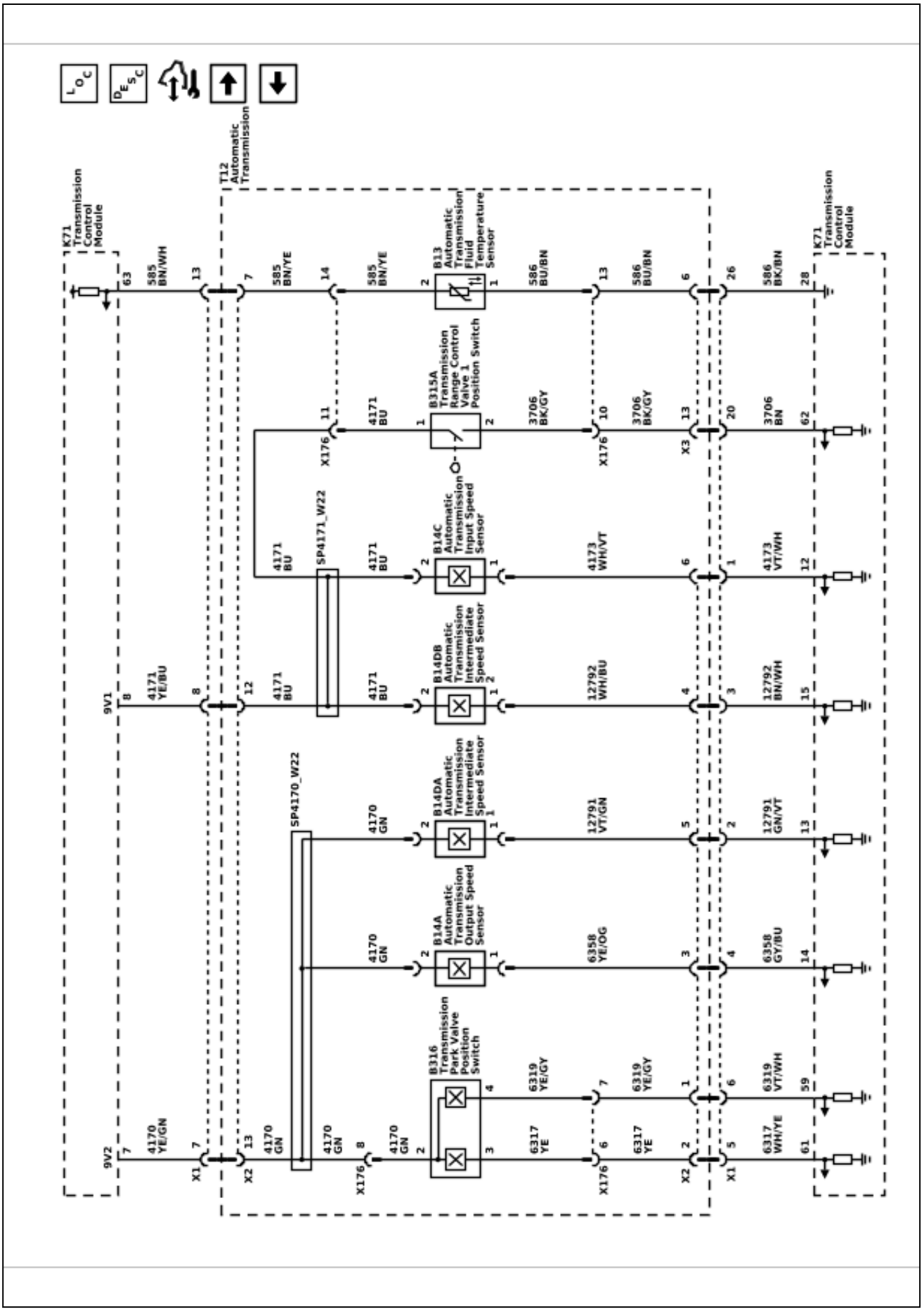
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Automatic Transmission Controls Schematics (Pressure and Shift Controls - 2 of 2)



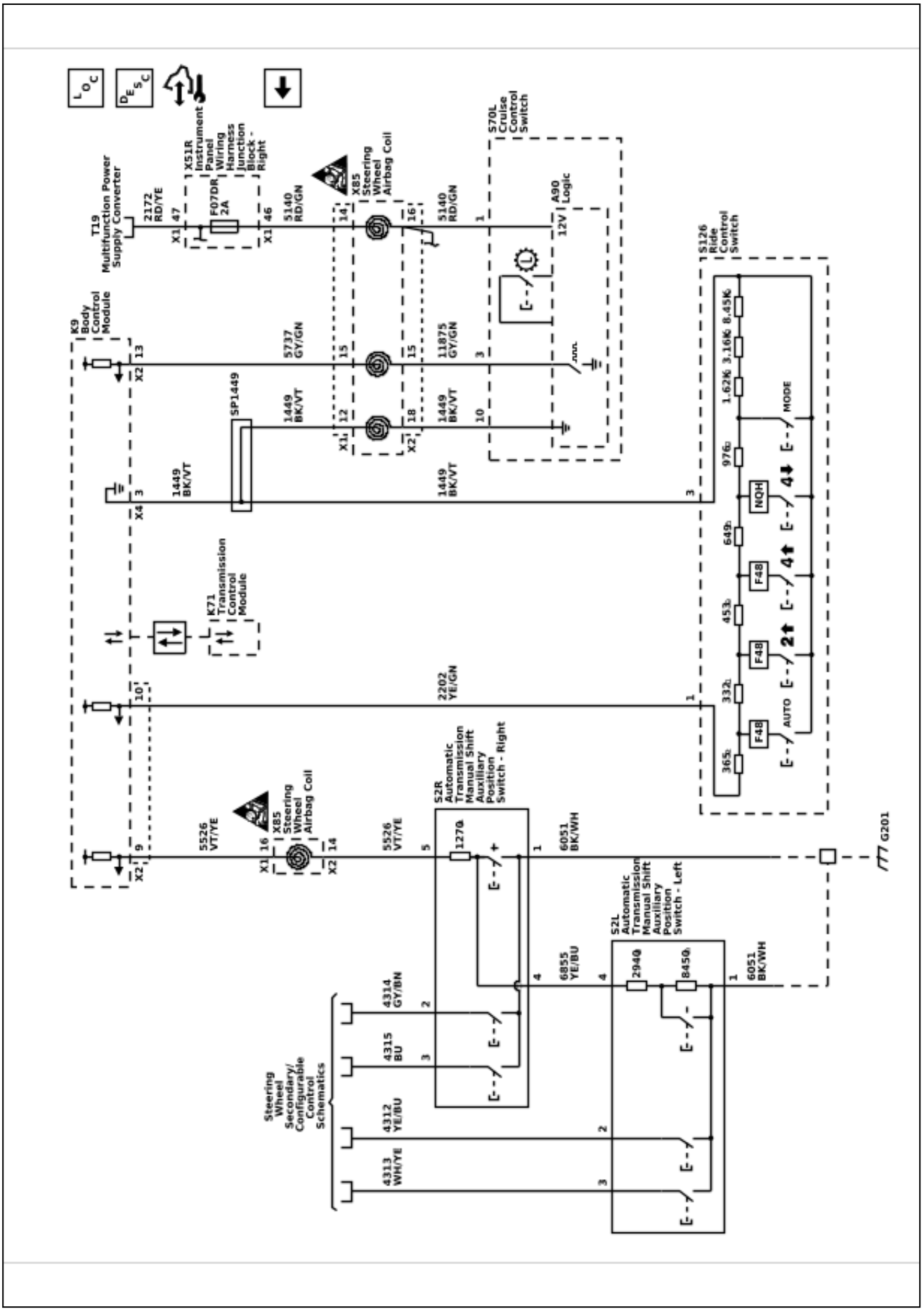
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Automatic Transmission Controls Schematics (Speed, Temperature, and Park Valve Inputs)

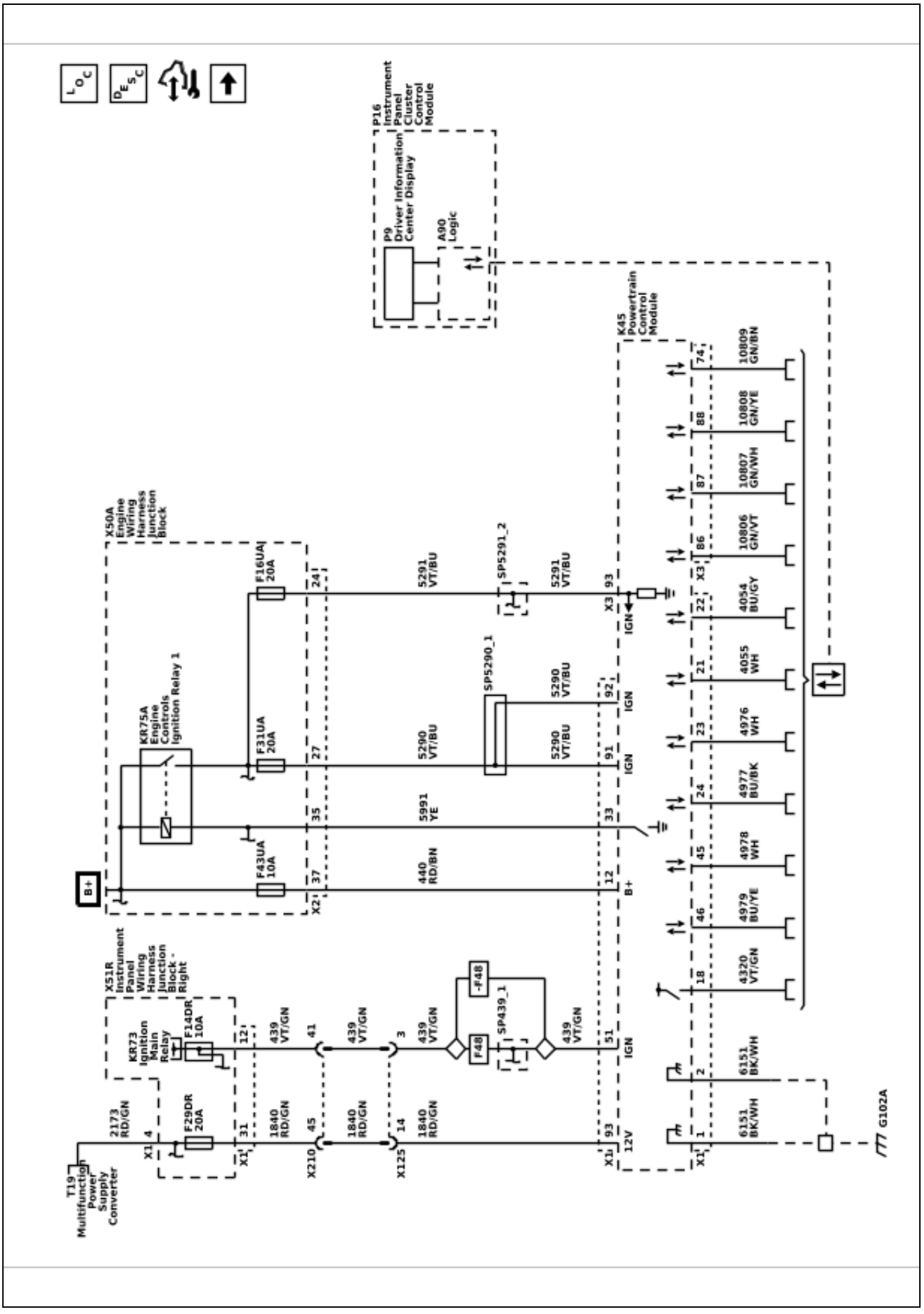


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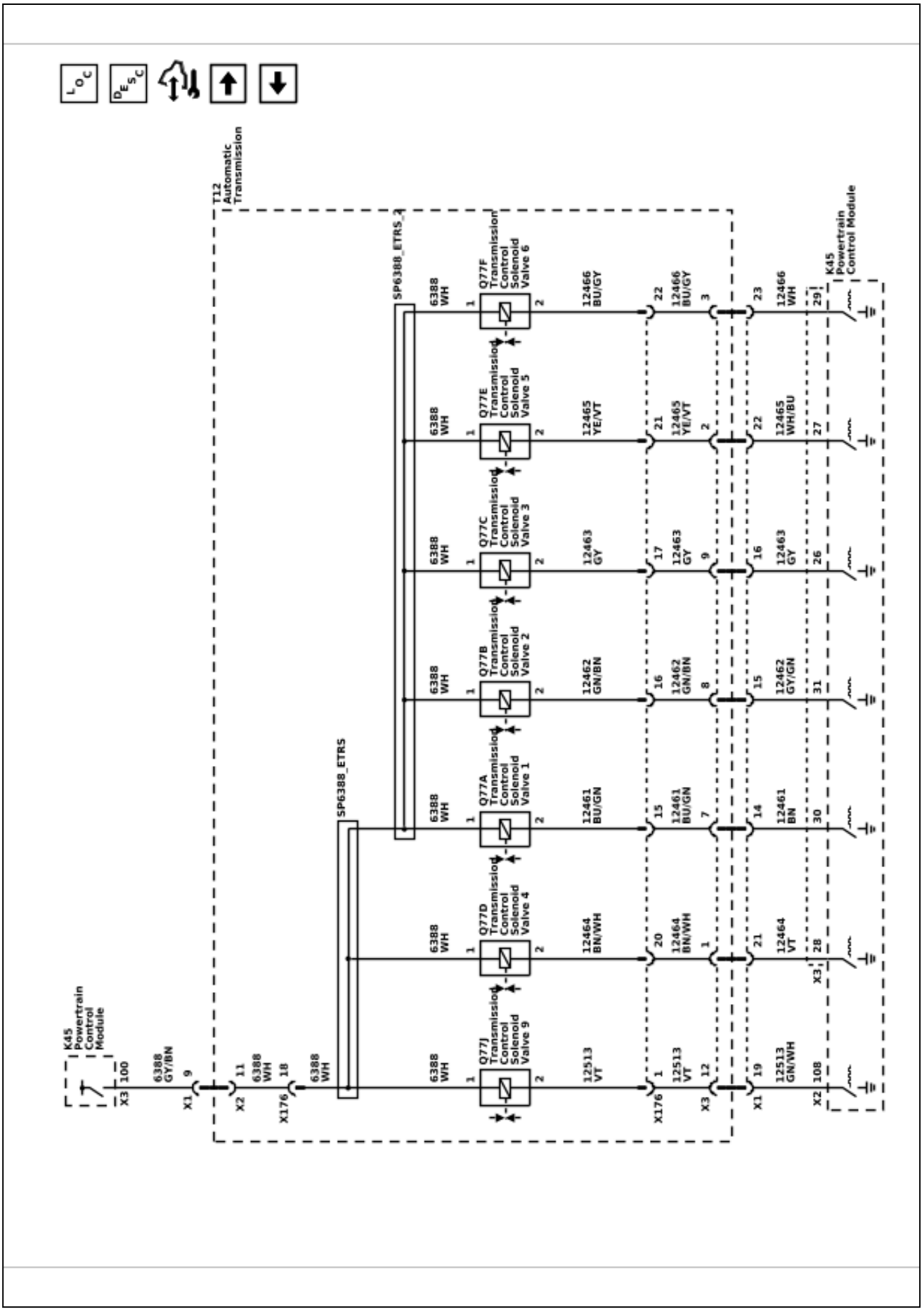
Automatic Transmission Controls Schematics (Tap Up/Tap Down Switches and Controls)



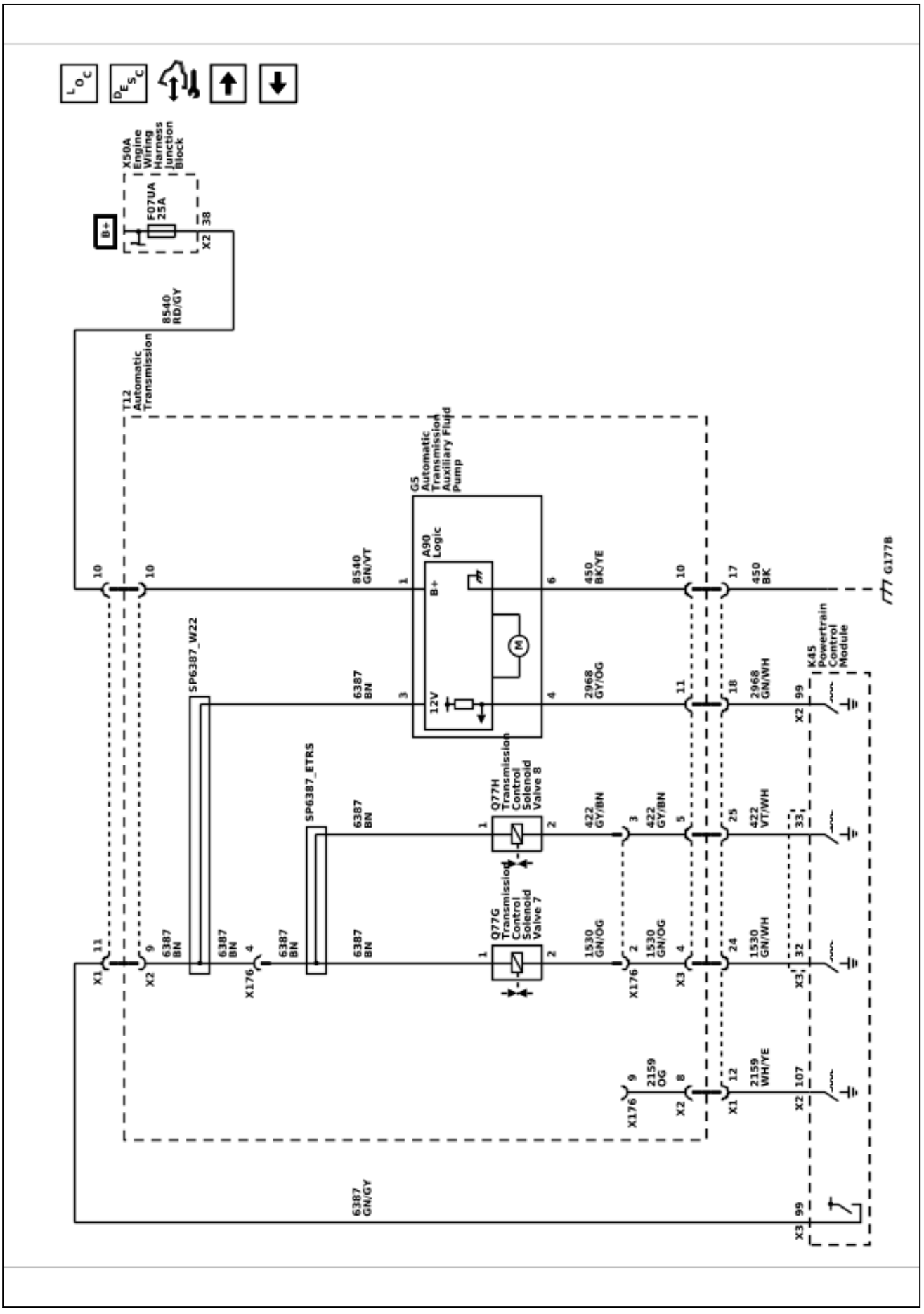
Automatic Transmission Controls Schematics (Powertrain Control Module Power, Ground, Serial Data, and MIL)



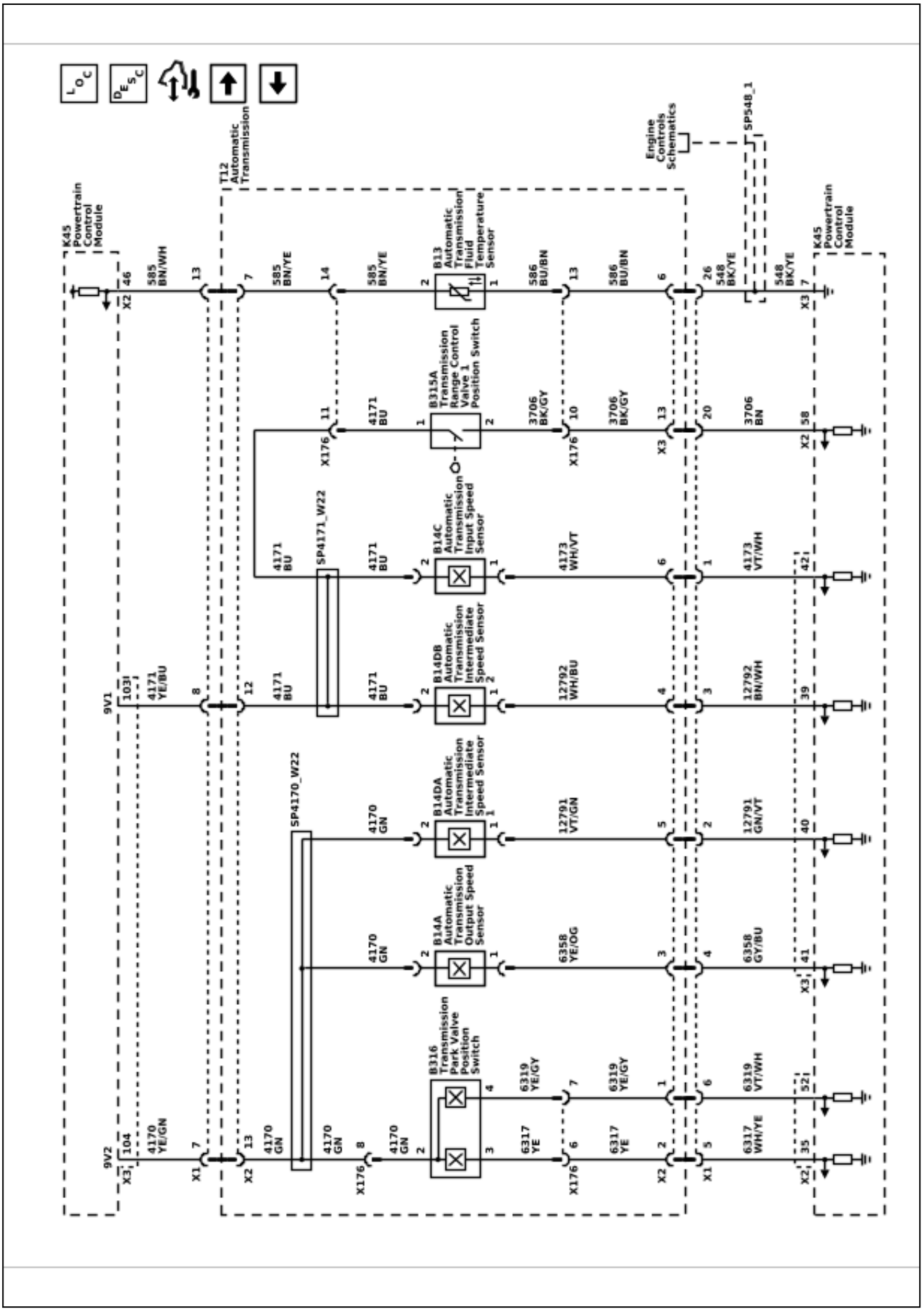
Automatic Transmission Controls Schematics (Pressure and Shift Controls - 1 of 2)



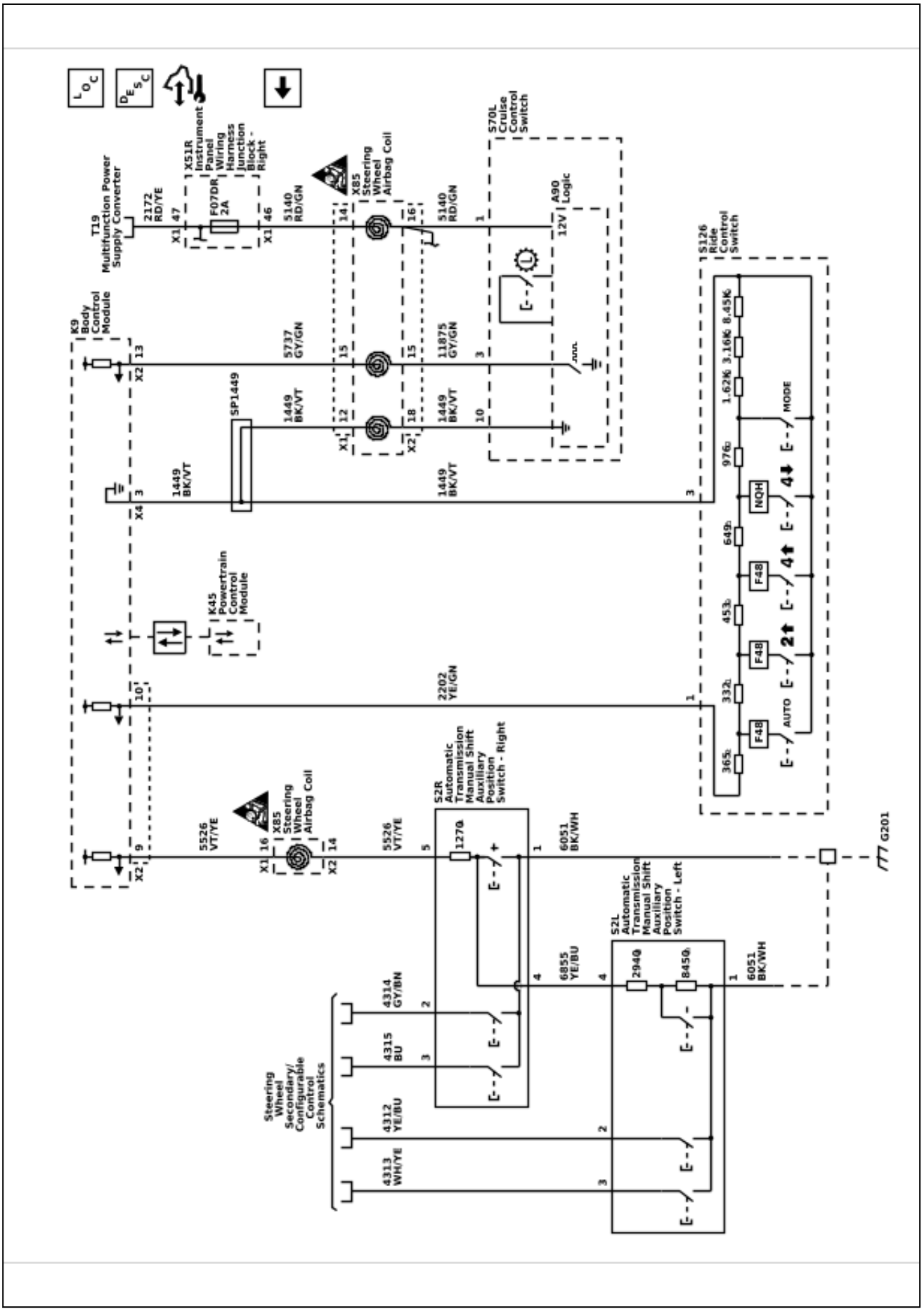
Automatic Transmission Controls Schematics (Pressure and Shift Controls - 2 of 2)



Automatic Transmission Controls Schematics (Speed, Temperature, and Park Valve Inputs)



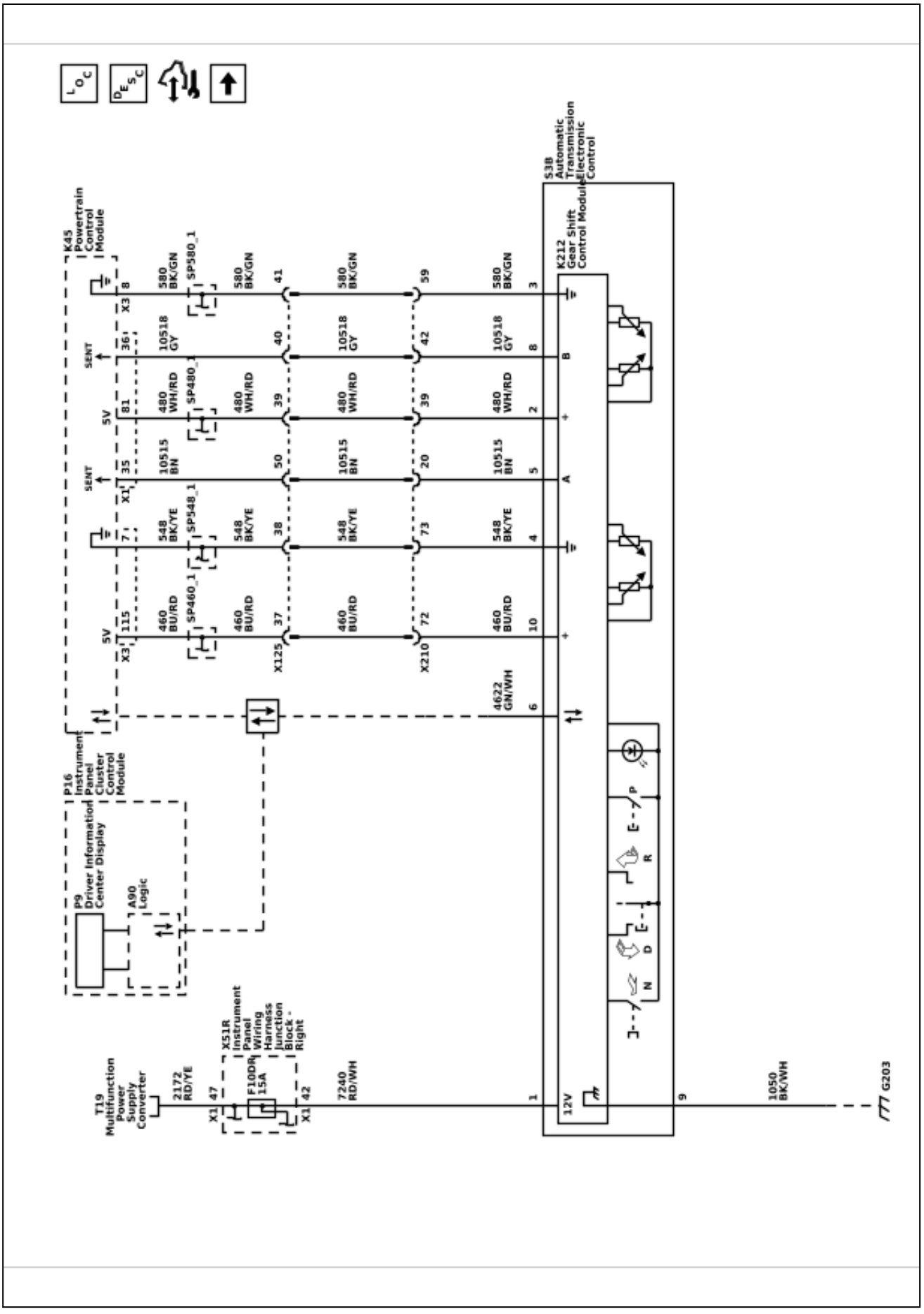
Automatic Transmission Controls Schematics (Tap Up/Tap Down Switches and Controls)



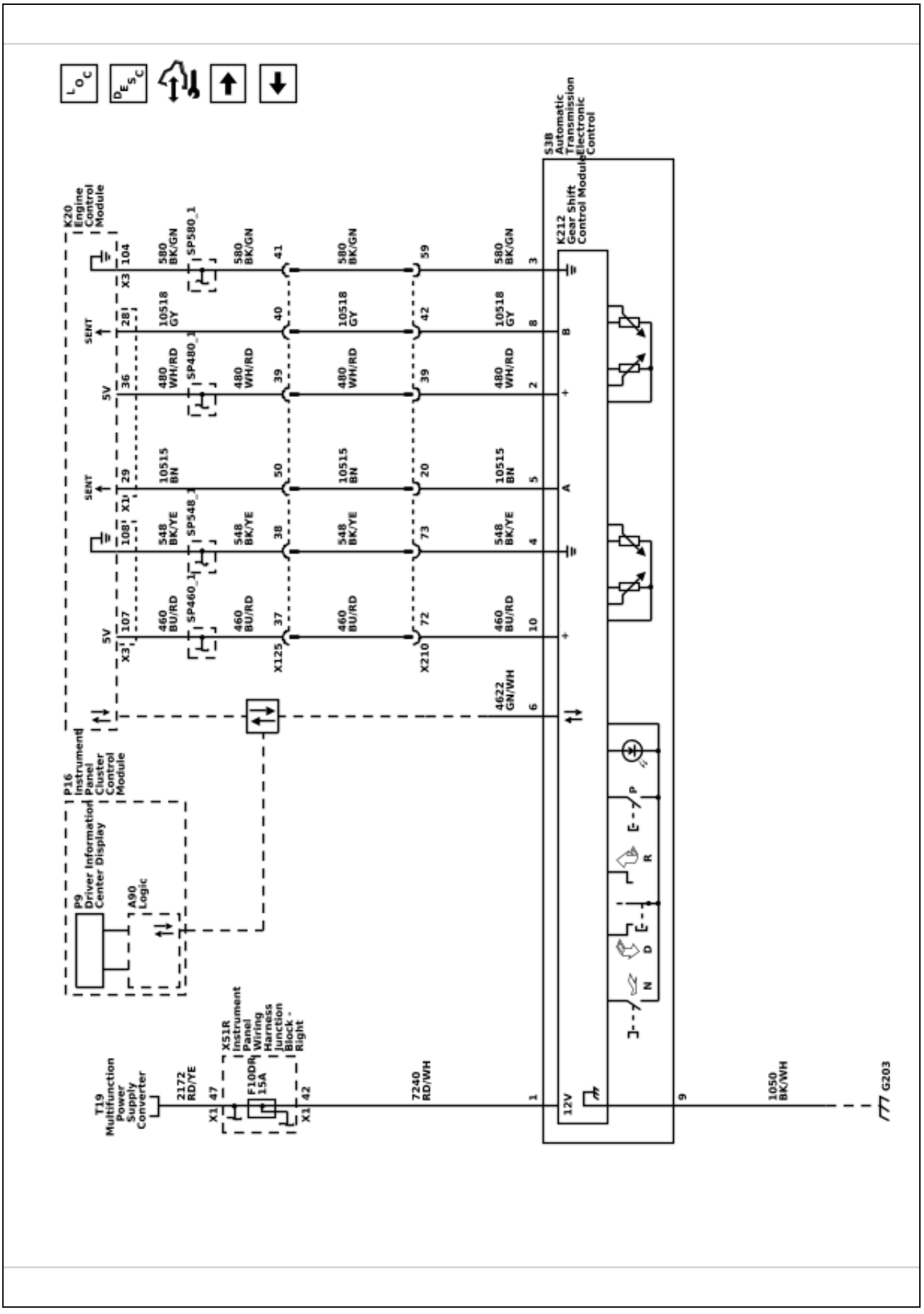
Electronic Transmission Range Select

Schematic and Routing Diagrams

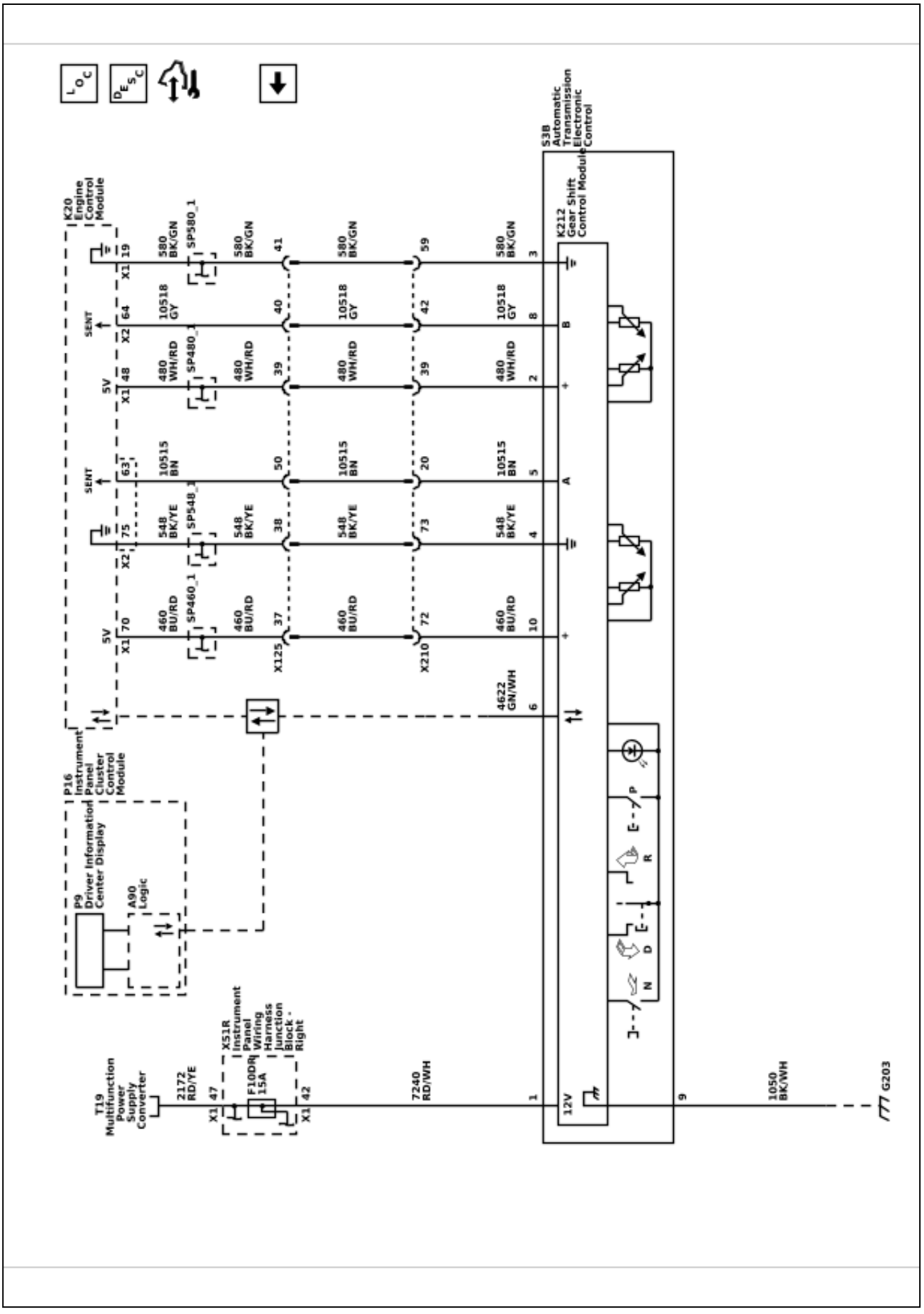
Electronic Transmission Range Selector Schematics (Electronic Shift Controls (L4B))



Electronic Transmission Range Selector Schematics (Electronic Shift Controls (L76 / L78))



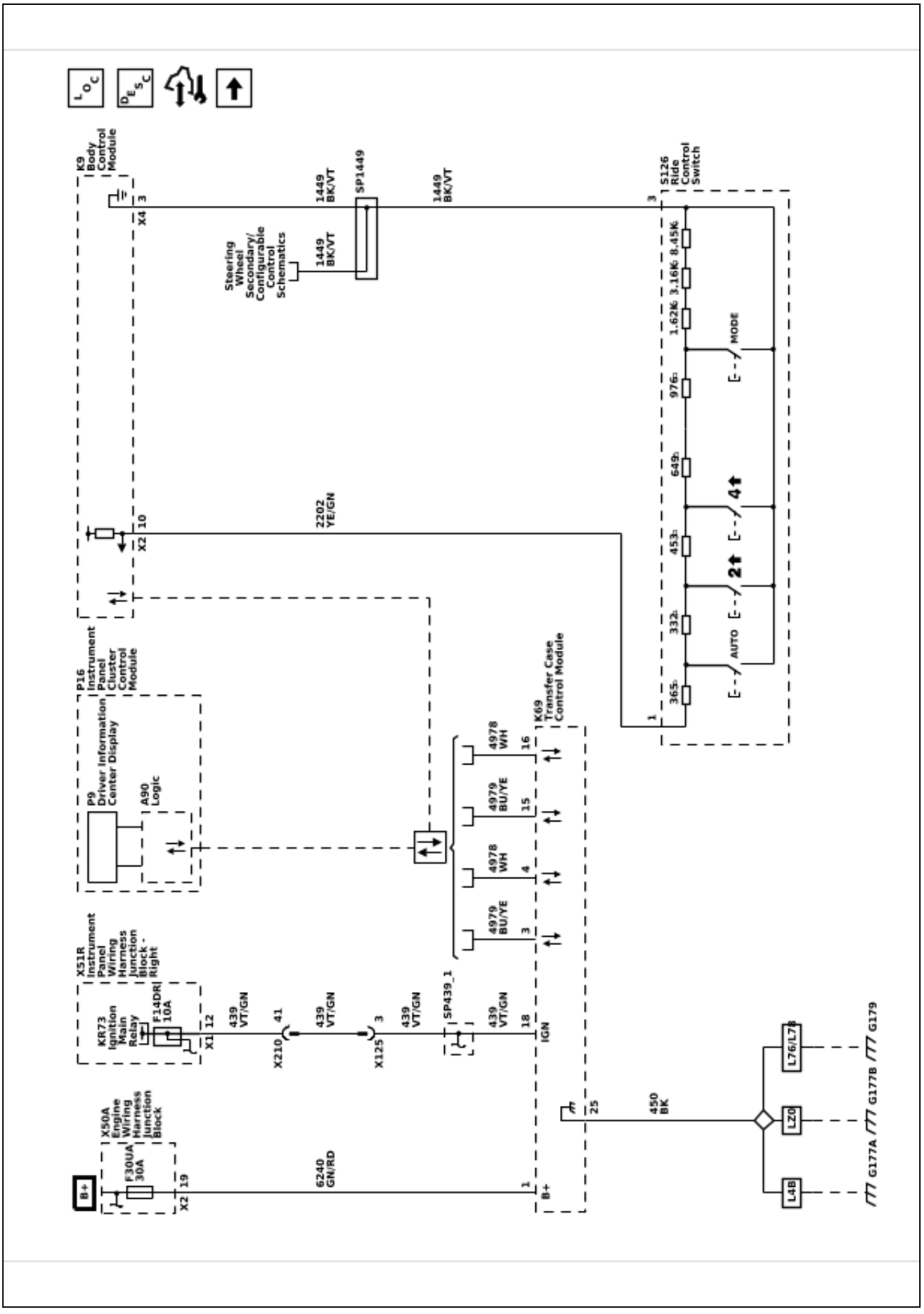
Electronic Transmission Range Selector Schematics (Electronic Shift Controls (LZ0))



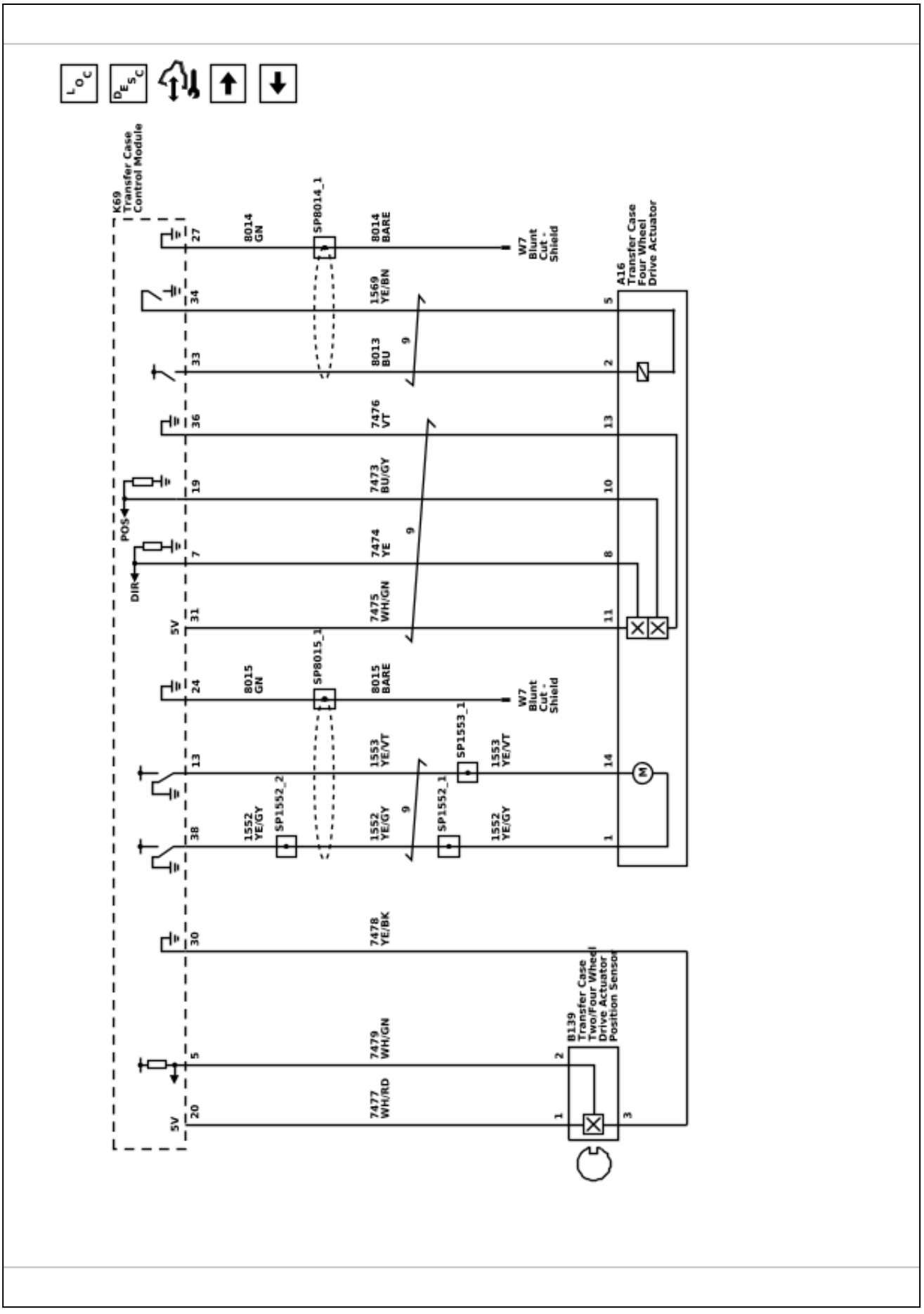
Transfer Case - MP 3015

Schematic and Routing Diagrams

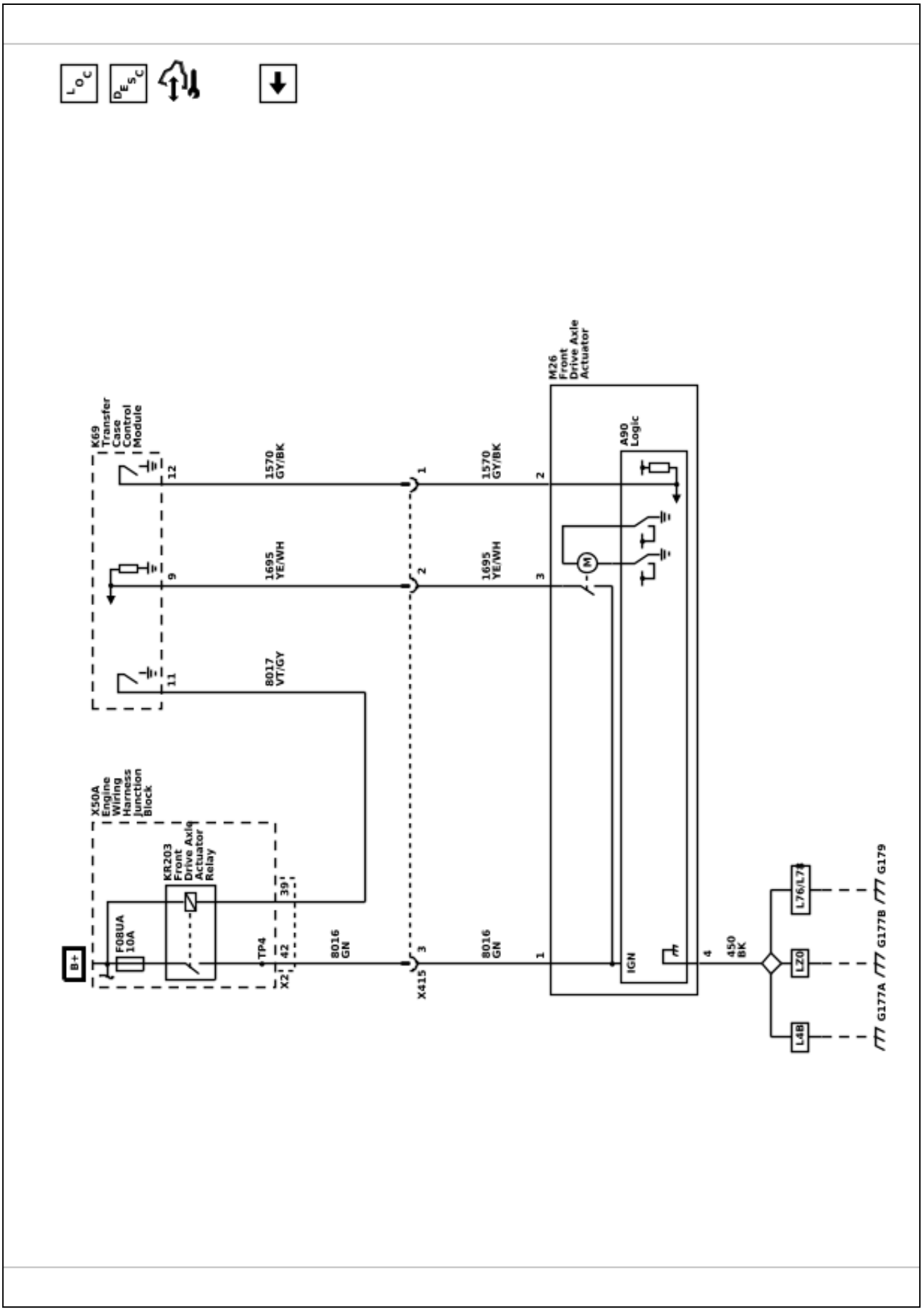
Transfer Case Control Schematics (Power, Ground, Serial Data, and Shift Controls)



Transfer Case Control Schematics (Transfer Case Controls)



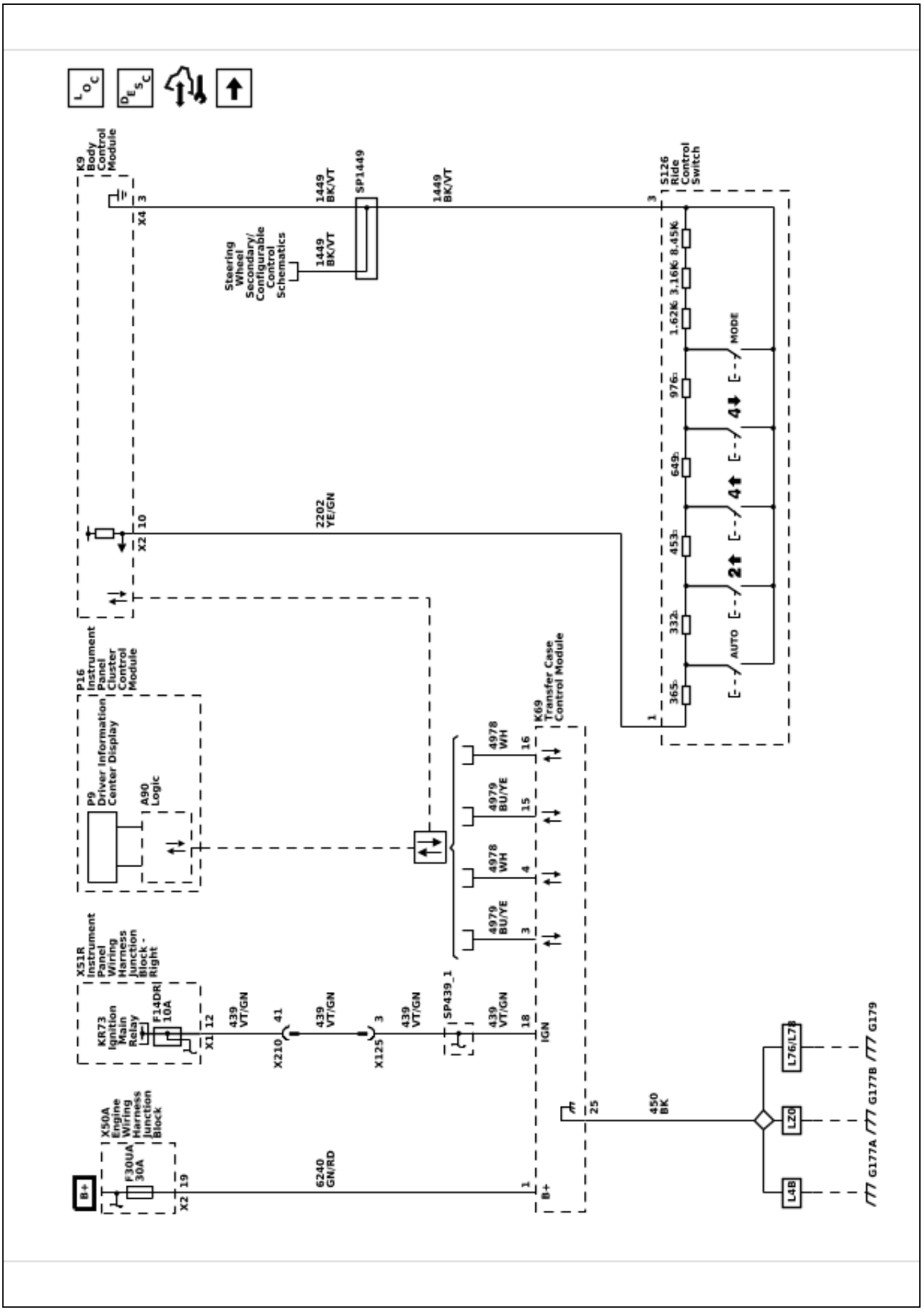
Transfer Case Control Schematics (Front Axle Controls)



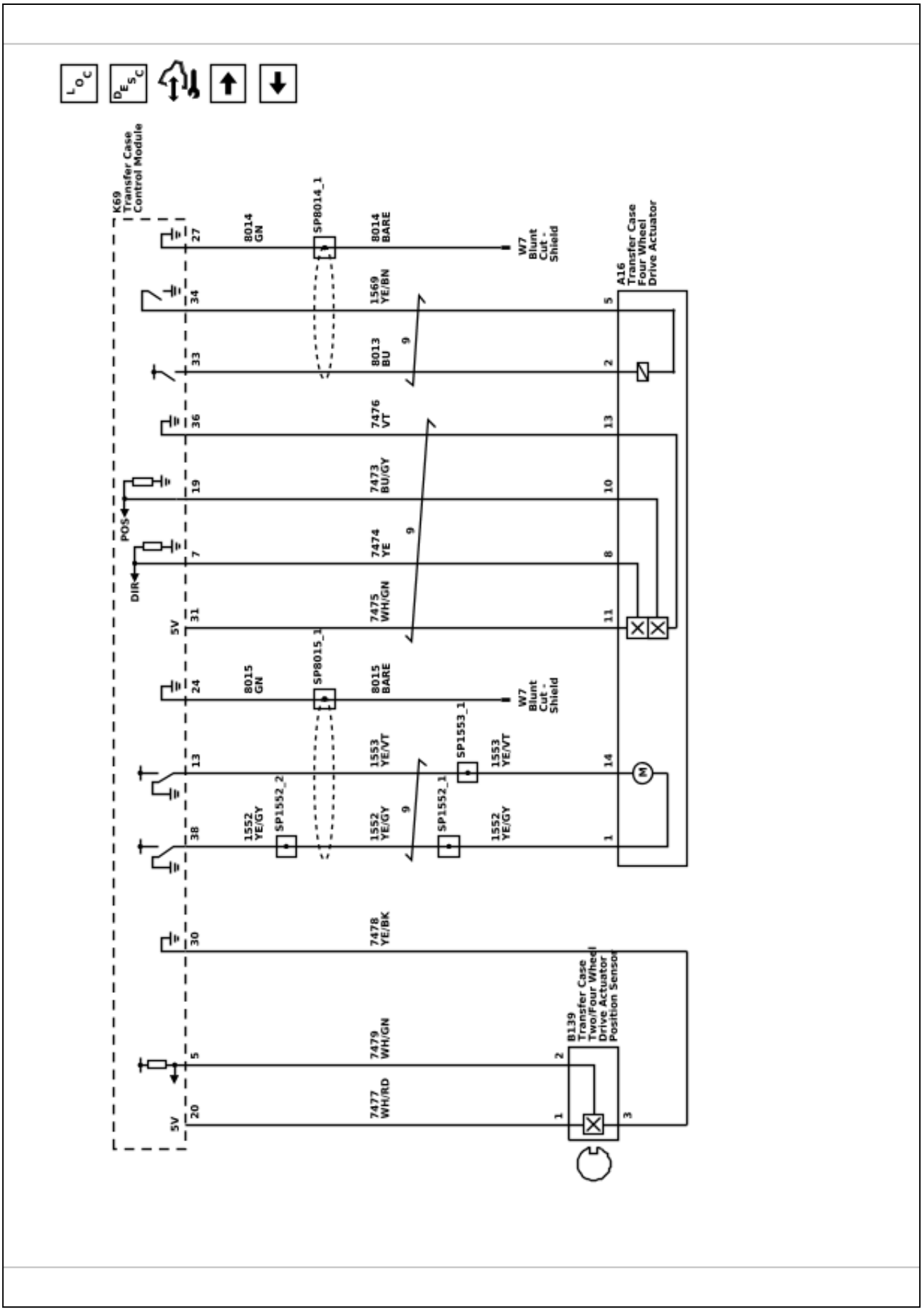
Transfer Case - MP 3025

Schematic and Routing Diagrams

Transfer Case Control Schematics (Power, Ground, Serial Data, and Shift Controls)



Transfer Case Control Schematics (Transfer Case Controls)



Transfer Case Control Schematics (Front Axle Controls)

