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## **Section A**

### **Body Control System Description and Operation**

The body control system consists of the body control module (BCM), communications, and various input and outputs. Some inputs, outputs and messages require other modules to interact with the BCM. The BCM also has discrete input and output terminals to control the vehicle's body functions. The BCM is wired to the high speed GMLAN serial data bus, low speed GMLAN serial data bus and Multiple LIN buses and acts as a gateway between them.

#### **Power Mode Master**

This vehicle body control module (BCM) functions as the power mode master (PMM). The ignition switch is a low current switch with multiple discrete ignition switch signals to the PMM for determining the power mode that will be sent over the serial data circuits to the other modules that need this information; the PMM will activate relays and other direct outputs of the PMM as needed. Refer to Power Mode Description and Operation for a complete description of power mode functions.

#### **Gateway**

The body control module (BCM) in this vehicle functions as a gateway or translator. The purpose of the gateway is to translate serial data messages between the GMLAN high speed bus and the GMLAN low speed bus for communication between the various modules. The gateway will interact with each network according to that network's transmission protocol.

All communication between the BCM and a scan tool is on the high speed GMLAN serial data circuits. A lost communication DTC typically is set in modules other than the module with a communication failure.

#### **Body Control**

The various body control module (BCM) input and output circuits are illustrated in the corresponding functional areas on the BCM electrical schematics. Refer to the Body Control System Schematics for more detailed information.

## Power Mode Description and Operation

### Serial Data Power Mode Master

Power to many of this vehicles circuits is controlled by the module that is designated the power mode master. This vehicles power mode master is the body control module (BCM). The BCM has multiple B+ circuits that feed into it. Each of those circuits are partitioned within the controller to drive certain outputs of the vehicle's body functions. An open or short in any one of the B+ circuits may induce multiple codes/or a section of non-functionality within the BCM with the rest of the BCM functioning normally. In this case it is useful to refer to the power distribution schematics to determine if the non-functional partition of the controller shares a common B+ circuit. The ignition switch is a low current switch with multiple discrete ignition switch signals to the power mode master for determination of the power mode that will be sent over the serial data circuits to the other modules that need this information. The power mode master will also activate relays and other direct outputs of the power mode master as needed. The power mode master determines which power mode (Off, Accessory, Run, Crank Request) is required, and reports this information to other modules via serial data. Modules which have switched voltage inputs may operate in a default mode if the power mode serial data message does not match what the individual module can see from its own connections.

The power mode master receives ignition switch signals to identify the operators desired power mode. The Power Mode Parameter tables below illustrate the correct state of these input parameters (circuits) in correspondence to the ignition switch position:

| <b>Power Mode Parameters</b>    |                               |   |   |  |
|---------------------------------|-------------------------------|---|---|--|
| <b>Ignition Switch Position</b> | <b>Power Mode Transmitted</b> | <b>Ign. Off/Run/Crank<br/>(Off/Run Crank Voltage Circuit)</b> | <b>Ignition Accessory/Run<br/>(Accessory Voltage Circuit)</b> | <b>Ignition Run/Crank<br/>(Ignition 1 Voltage Circuit)</b> |
| Off Key Out                     | Off                           | Key Out / ACC   | Inactive  | Inactive   |
| Off Key IN                      | Off                           | Key In / Off  | Inactive  | Inactive   |
| Accessory                       | Accessory                     | Key Out / ACC   | Active  | Inactive   |
| Run                             | Run                           | Run   | Active  | Active   |
| Start                           | Crank Request                 | Crank   | Inactive  | Active   |

## **Relay Controlled Power Mode**

The BCM uses the discrete ignition switch inputs Off/Run/Crank Voltage, Accessory Voltage, and Ignition 1 Voltage, to distinguish the correct power mode. The BCM, after determining the desired power mode, will activate the appropriate relays for that power mode.

The retained accessory power relay 1 and retained accessory power relay 2 remain on for a timed period after the Ignition key is removed. Refer to Retained Accessory Power Description and Operation for more information on the retained accessory power function.

## **Battery Saver Mode (Transport Mode)**

Battery saver mode (transport mode) reduces the parasitic load of some modules during overseas shipment or during vehicle storage conditions. This improves the drain time on the battery (up to 70 days without the battery going dead). When a vehicle is in transport/storage, some features may have reduced functionality while in the battery saver mode, such as disabling keyless entry, after-blow, and content theft features. Battery saver mode is initiated by turning on the hazard flashers, applying the brake pedal, and then turning the ignition key to the start position or pushing the ignition mode switch with the foot on the brake for greater than 15 seconds. The mode is disengaged by repeating the previous process. The driver information center (if equipped) will display Transport Mode is On when battery saver mode is enabled and Transport Mode is Off when battery saver mode is disabled. For vehicles not equipped with a driver information center, the battery indicator light will constantly flash on the Instrument Cluster when battery saver mode is enabled. This feature can be used as many times as necessary if the vehicle is to be stored for an extended period of time.

## **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
- Key-in-ignition
- 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:

- The ignition switch is OFF, key out.
- 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

### RAP Description and Operation

The Body Control Module (BCM) monitors the ignition switch position, battery condition, and each door ajar/open switch status to determine whether the retained accessory power should be initiated or terminated. Retained accessory power is controlled by two different methods; relay control and serial data. Some modules receive a retained accessory power message from the BCM over the serial data circuits. Serial data controlled retained accessory power is deactivated as required by their modules retained accessory power mode operation. Other subsystems are activated directly by the BCM through a relay. Components and systems that are active in retained accessory power are also activated anytime the ignition is any position other than OFF regardless of the door switch signals.

### Relay Controlled Retained Accessory Power

The BCM keeps the retained accessory power relay 1 and retained accessory power relay 2 energized during all power modes, except Off-Awake and Crank. The retained accessory power relay 1 and retained accessory power relay 2 are also energized for approximately 10 minutes after shutting the ignition OFF and removing the key, providing no door is opened.

Relay controlled retained accessory power will end when one of the following conditions is met:

- The BCM receives an input from any door ajar or open switch indicating the opening of any door after the ignition key is out of the ignition.

**Note:** If the BCM is receiving any door ajar or open signal from those switches when the ignition key is turned OFF, retained accessory power will not initiate.

- The BCM internal timer for the retained accessory power expires after approximately 10 minutes.
- The BCM detects a decrease in battery capacity below a prescribed limit.

## **Relay Controlled Retained Accessory Power (continued)**

Systems powered by the retained accessory power relay 1 and retained accessory power relay 2 during the retained accessory power mode are as follows:

**Note:** The vehicle may not be equipped with all components as listed below.

- Accessory Power Receptacle
- Cigarette Lighter Receptacle
- Sunroof Control Module
- Sunroof Switch
- Sliding Rear Window Switch
- Mobile Device Wireless Charger Module

## **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 switch that will turn off the radio during retained accessory power is the driver door open switch.

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 when the ignition key is turned off the VCIM will remain in RAP mode, and keep the radio in RAP mode until the call is terminated.

## **Back-up Alarm and Camera**

For installation of a Back-up Alarm/Camera on vehicles not equipped with 8S3 (factory back-up alarm) connections can be made at the rear body junction block (X63A).

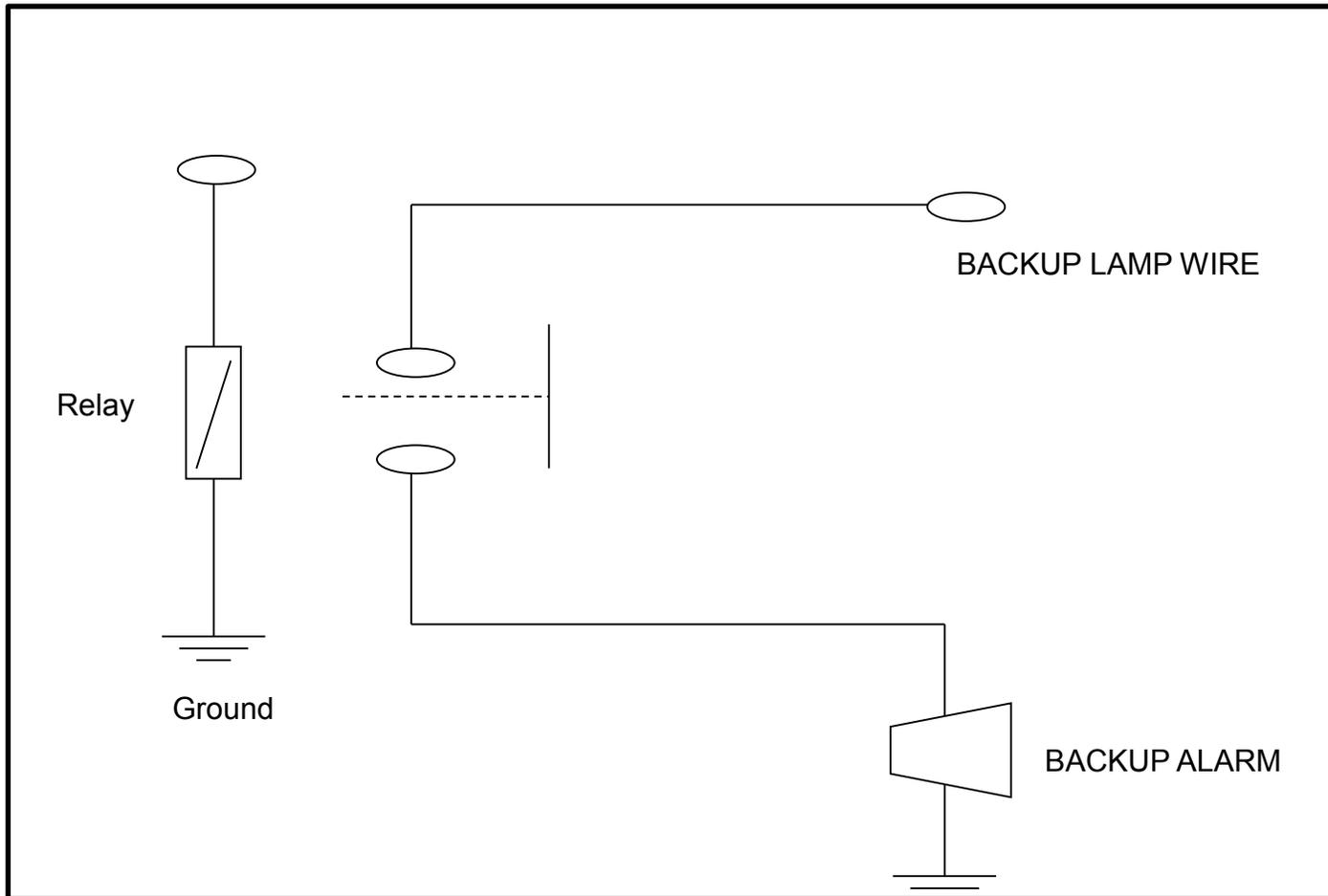
In addition to when the vehicle is operated in reverse, the back-ups are illuminated during a lighted exit and as a key fob acknowledgement. When using the back –lamps circuit to activate a back-up alarm, in which the perimeter lighting feature is set to ON for exiting, the back-up alarm will be activated during the exit lighting event. To prevent this undesired alarm (or camera) activation during the exit lighting mode use one of the two options listed below...

1. Have the vehicle' BCM (Body Control Module) reprogramming with a new calibration that includes RPO (regular production Option) code SFW. This option will suppress the activation of the Back-up lamps during the exit lighting mode operation.

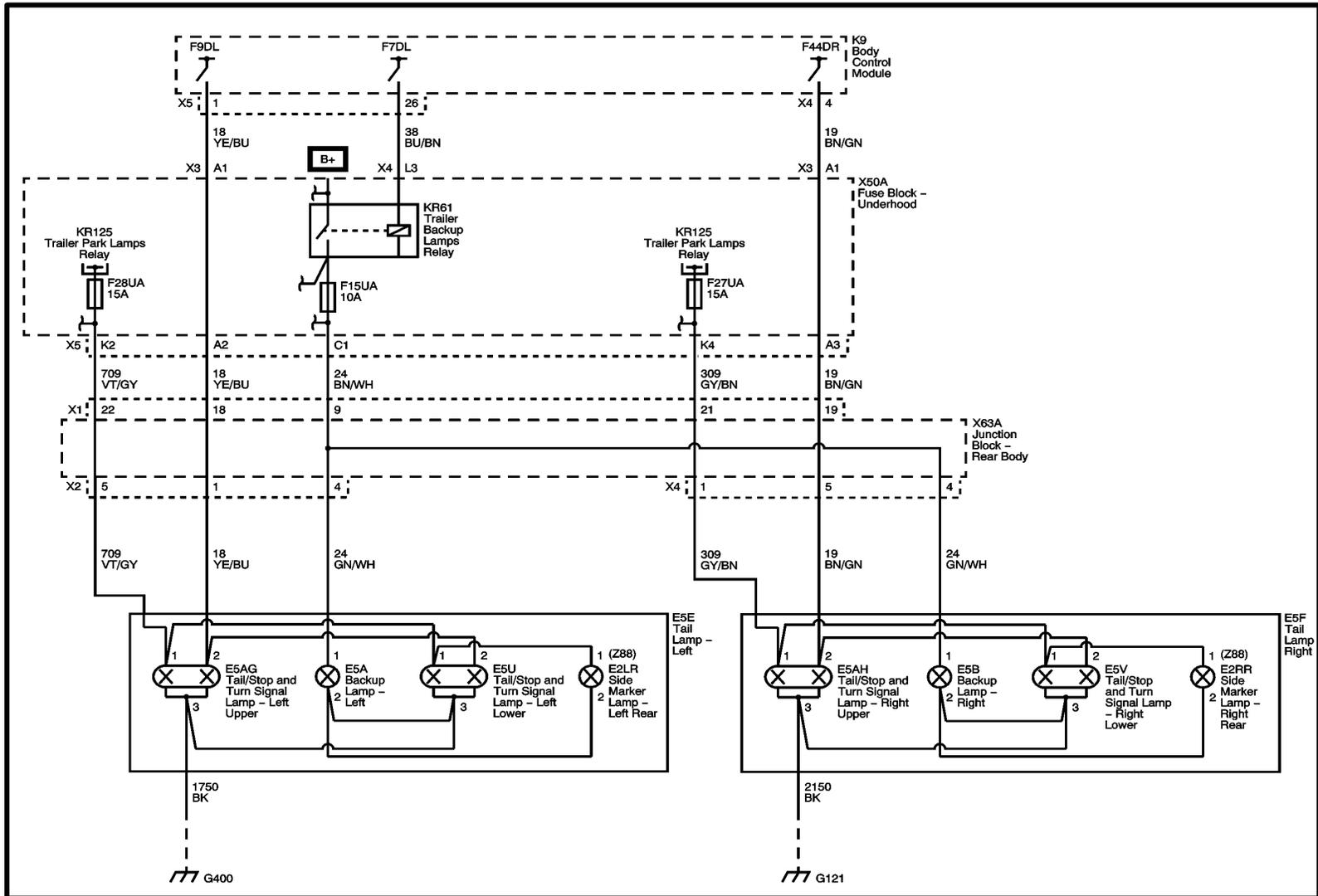
**OR**

2. Install an ignition controlled relay to which only allows for the Back-up lamp signal to be provided to the alarm/camera if the ignition is in the "RUN" mode, and the vehicle is being operated in reverse mode. (see sample schematic)

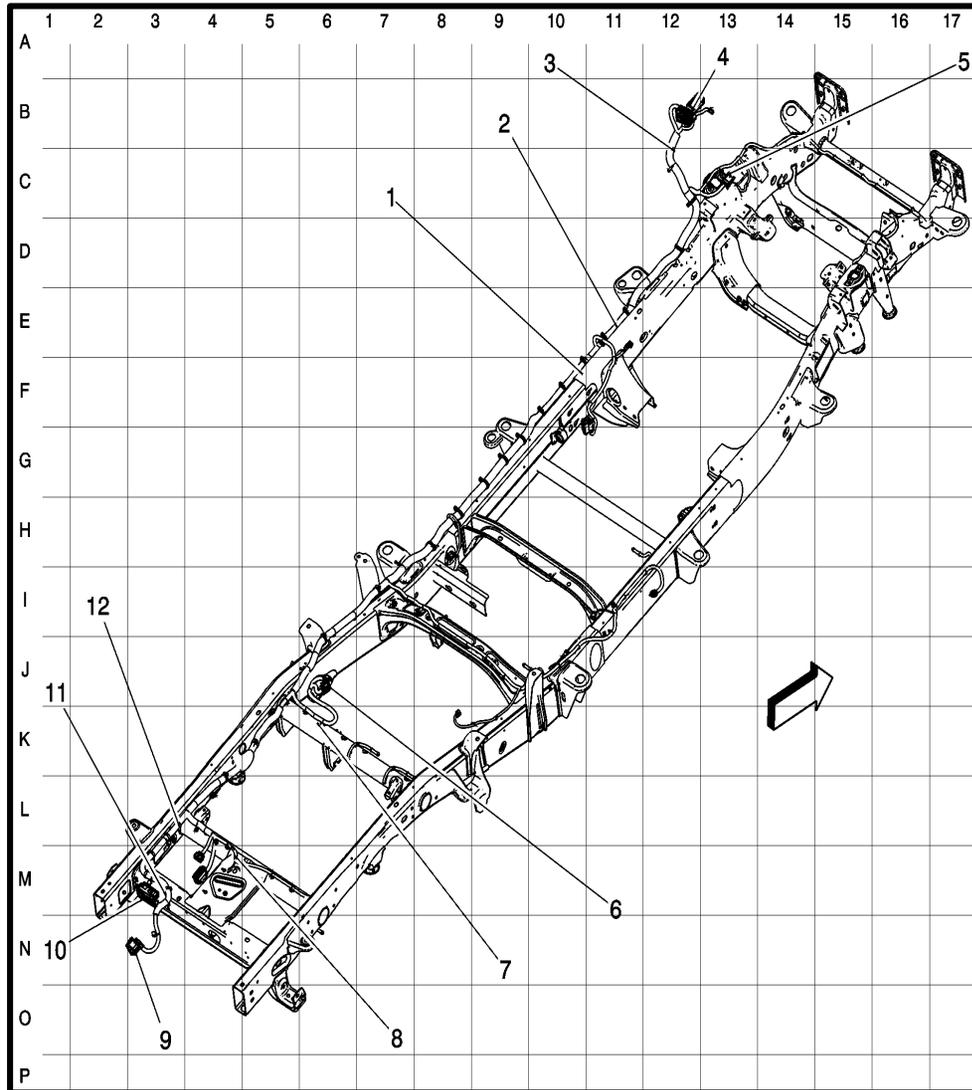
Back-up Alarm and Camera relay installation schematic



## Back-up Alarm, Camera and Lamps schematic



## Chassis Harness Routing



- (1) SP29
- (2) SP30
- (3) SP31
- (4) X185
- (5) X125
- (6) X350
- (7) J375
- (8) SP27
- (9) X88 Trailer Connector
- (10) X63A Junction Block  
– Rear Body
- (11) SP111
- (12) SP28

## Charging System Description of 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:

- It monitors the battery voltage and estimates the battery condition.
- It takes corrective actions by boosting idle speeds, and adjusting the regulated voltage.
- It performs diagnostics and driver notification.

The battery condition is estimated during ignition-off and during ignition-on. During ignition-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.

The state-of-charge can be used as a diagnostic tool to tell the customer or the dealer the condition of the battery. Throughout ignition-on, the algorithm continuously estimates state-of-charge based on adjusted net amp hours, battery capacity, initial state-of-charge, and temperature.

While running, the battery degree of discharge is primarily determined by a battery current sensor, which is integrated 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**

The Charging System Description and Operation is divided into 3 sections. The first section describes the charging system components and their integration into the electrical power management. The second section describes charging system operation. The third section describes the instrument panel cluster operation of the charge indicator, driver information center messages, and voltmeter operation.

### **Charging System Components**

#### **Generator**

The generator is a serviceable component. If there is a diagnosed failure of the generator it must be replaced as an assembly. 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 failure, the generator defaults to an output voltage of 13.8 V.

#### **Body Control Module (BCM)**

The body control module (BCM) is a GMLAN device. It communicates with the engine control module (ECM) and the instrument panel cluster for electrical power management (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 a battery current sensor, the battery positive voltage circuit, and estimated battery temperature to determine battery state of charge. The BCM performs idle boost.

#### **Battery Current Sensor**

The battery current sensor is a serviceable component that is connected to either the negative or positive battery cable at the battery. The battery current sensor is a 3-wire Hall Effect current sensor. The battery current sensor monitors the battery current. It directly inputs to the BCM. It creates a 5-volt pulse width modulation (PWM) signal of 128 Hz with a duty cycle of 0–100 percent. Normal duty cycle is between 5–95 percent. Between 0–5 percent and 95–100 percent are for diagnostic purposes.

## **Engine Control Module (ECM)**

When the engine is running, the generator turn-on signal is sent to the generator from the ECM, turning on the regulator. 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. The generator field duty terminal is connected internally to the voltage regulator and externally to the ECM. When the voltage regulator detects a charging system problem, it grounds this circuit to signal the ECM that a problem exists. The ECM monitors the generator field duty cycle signal circuit, and receives control decisions based on information from the BCM.

## **Instrument Panel Cluster**

The instrument panel cluster provides the customer notification in case a concern with the charging system. There are 2 means of notification, a charge indicator and a driver information center message of SERVICE BATTERY CHARGING SYSTEM 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
- Headlamp Mode
- Start Up Mode
- Voltage Reduction Mode

The engine control module (ECM) controls the generator through the generator turn ON signal circuit. The ECM monitors the generator performance through the generator field duty cycle signal circuit. The signal is a pulse width modulation (PWM) signal of 128 Hz with a duty cycle of 0–100 percent. Normal duty cycle is between 5–95 percent. Between 0–5 percent and 95–100 percent are for diagnostic purposes. The following table shows the commanded duty cycle and output voltage of the generator (see table next page):

| Commanded Duty Cycle | Generator Output Voltage |
|----------------------|--------------------------|
| 10%                  | 11 V                     |
| 20%                  | 11.56 V                  |
| 30%                  | 12.12 V                  |
| 40%                  | 12.68 V                  |
| 50%                  | 13.25 V                  |

## **Generator**

The generator provides a feedback signal of the generator voltage output through the generator field duty cycle signal circuit to the ECM. This information is sent to the body control module (BCM). The signal is PWM signal of 128 Hz with a duty cycle of 0–100 percent. Normal duty cycle is between 5–99 percent. Between 0–5 percent and 100 percent are for diagnostic purposes.

## **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 whenever one of the following conditions are met.

The wipers are ON for more than 3 seconds.

Climate Control Voltage Boost Mode Request via serial data is true, as sensed by the HVAC control head. 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 percent.
- Vehicle speed is greater than 145 km/h (90 mph)
- Current sensor fault exists.
- System voltage was 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 amperes and greater than –8 amperes, and the battery state-of-charge is greater than or equal to 80 percent. Its targeted generator output voltage is the open circuit voltage of the battery and can be between 12.5–13.1 V. The BCM will exit this mode and enter Charge Mode when any of the conditions described above are present.

## **Headlamp Mode**

The BCM will enter Headlamp Mode whenever the headlamps 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 seconds.

## **Voltage Reduction Mode**

The BCM will enter Voltage Reduction Mode when the calculated ambient air temperature is above 0°C (32°F). The calculated battery current is less than 1 ampere and greater than -7 amperes, and the generator field duty cycle is less than 99 percent. Its targeted generator output voltage is 12.9 V. The BCM will exit this mode once the criteria are met for Charge Mode.

## **Instrument Panel Cluster Operation**

### **Charge Indicator Operation**

The instrument panel 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:

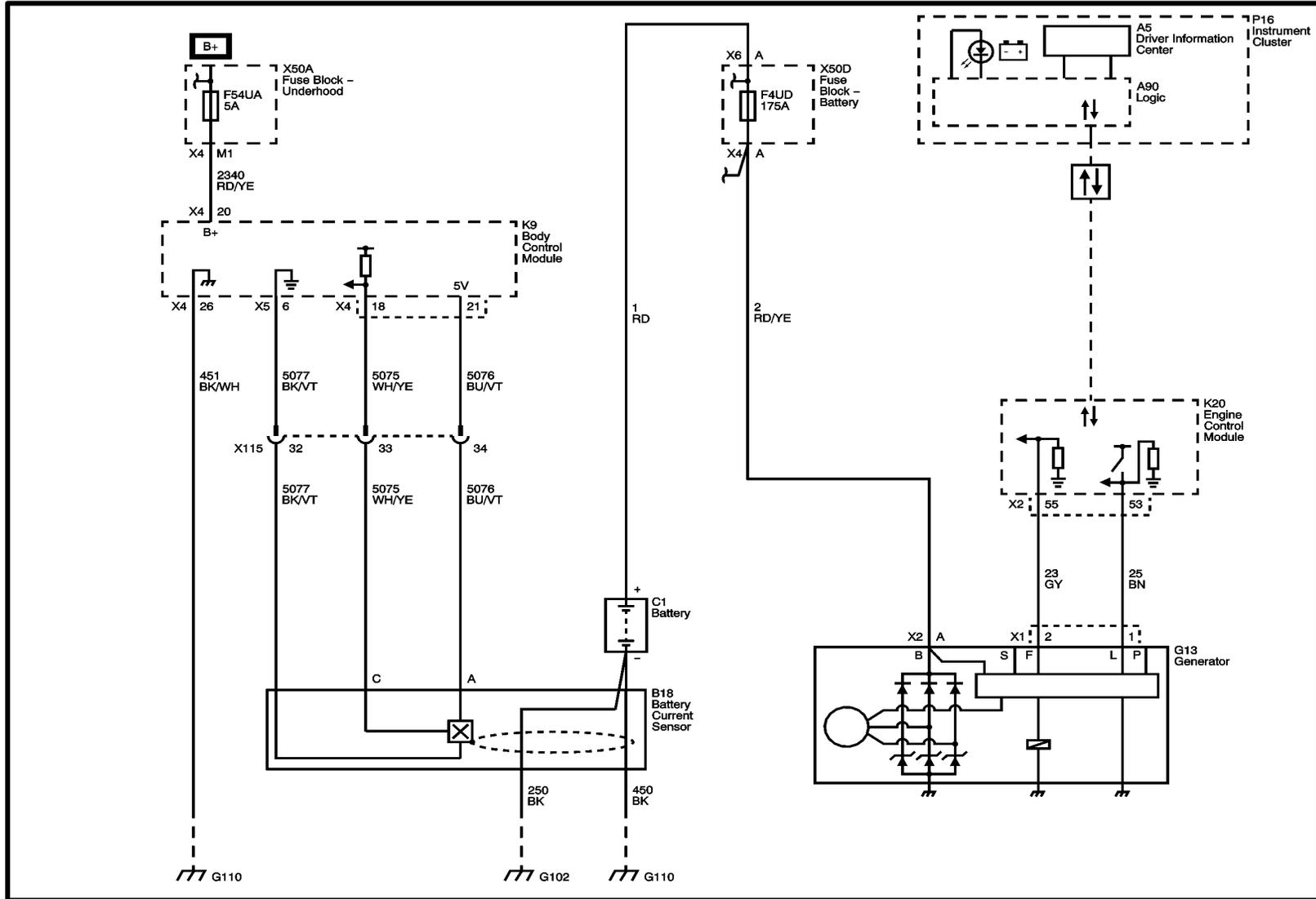
- The engine control module (ECM) detects that the generator output is less than 11 V or greater than 16 V. The instrument panel cluster receives a serial data message from the ECM requesting illumination.
- The instrument panel cluster determines that the system voltage is less than 11 V or greater than 16 V for more than 30 seconds. The instrument panel cluster receives a GMLAN message from the body control module (BCM) indicating there is a system voltage range concern.
- The instrument panel cluster performs the displays test at the start of each ignition cycle. The indicator illuminates for approximately 3 seconds.

### **Display 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 commanded ON when a charging system DTC is a current DTC. The message is turned OFF when the conditions for clearing the DTC have been met.

## Charging System schematic



## **Engine Idle Up**

### **Elevated Idle**

Is a standard option on all 6.6L Diesel Engines, which elevates the engine idle speed from base idle to 1050 RPMs when outside temperatures are below 32°F (0°C) and the engine coolant temperature is below 150°F (65°C). This feature enhances heater performance by raising the engine coolant temperature faster. It can be turned on or off, please refer to the "Duramax Diesel Supplement" Owner's Manual for more information.

### **High Idle**

An option (RPO UF3) is available on certain HD models with cruise control. This system can be used to increase your engine idle speed for whatever reason an owner wishes: more generator output at idle, belt driven add on equipment, etc. The cruise control buttons located on the left hand side of the steering wheel are used to operate the High Idle option. For more information see the Owner's Manual or online at "www.gmupfitter.com".

### **PTO (power take-off)**

An option (RPO PTO) is available only on 3500 Chassis Cab models (31xxx series) equipped with the 6.6L Diesel Engine and Allison 6-speed transmission. The PTO allows the user to create an auxiliary power source for running add-on equipment, such as salt spreaders, pumps, winches, lift buckets, etc. The dash mounted PTO switch is used to turn on the PTO and controls engine speed to values higher than normal base idle. For more information see the "Duramax Diesel Supplement" Owner's Manual or online at "www.gmupfitter.com".

### **Vehicle Regular Production Option (RPO) Content**

When attempting to determine a vehicle's option refer to the vehicle's SPID (Service Parts IDentification) label.

## **Engine Idle Up (continued)**

### **ADDING PTO OPTION TO A VEHICLE WITHOUT THE OPTION**

#### **Condition/Concern:**

Some owners may request to add the PTO option to their vehicle when it is not equipped with the option. This option is available on 3500 Chassis Cab Models with the 6.6L Diesel engine only. The PTO option is now far more integrated with the vehicle than past models and utilizes the following components:

- The Body Control Module (BCM)
- The Engine Control Module (ECM)
- The Instrument Panel Cluster (IPC)
- The PTO gear
- The PTO mode select switch
- The Power Take Off Module (PTOM)
- The remote PTO enable switch
- The PTO relay
- The Transmission Control Module (TCM)

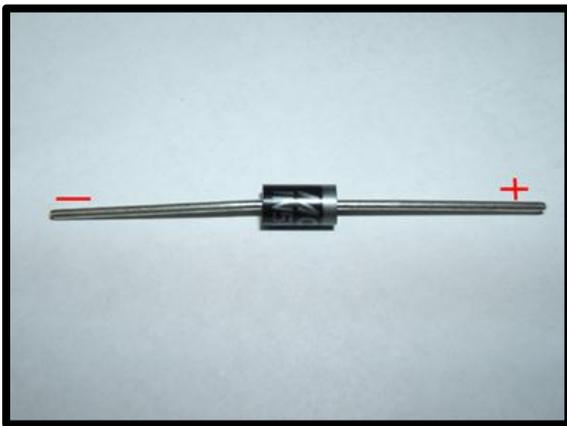
#### **Recommendation/Instructions:**

Due to the PTO's complex integration with the vehicle it is NOT recommended to add this option to any vehicle not already equipped with the OEM PTO option.

## Installation of Electrical Aftermarket Accessories

### Installation of a Diode to Suppress Voltage Spikes

When an electromechanical solenoid or relay is de-energized rapidly by a mechanical switch or semiconductor, the collapsing magnetic field produces a substantial transient voltage in its effort to disperse the stored energy and oppose the sudden change in current flow. These voltage spikes can occur at the positive terminal when the solenoid or relay is de-energized (keyed-off). If a solenoid or relay is wired onto the Run/Crank circuit of the vehicle to control aftermarket equipment, the spikes can be transmitted onto the circuit. The spikes can permanently damage the internal circuitry of the sensitive electronic components and/or control modules that are on this bussed circuit. To prevent damage to these components, the solenoid or relay *MUST* have the control circuit suppressed with a diode.

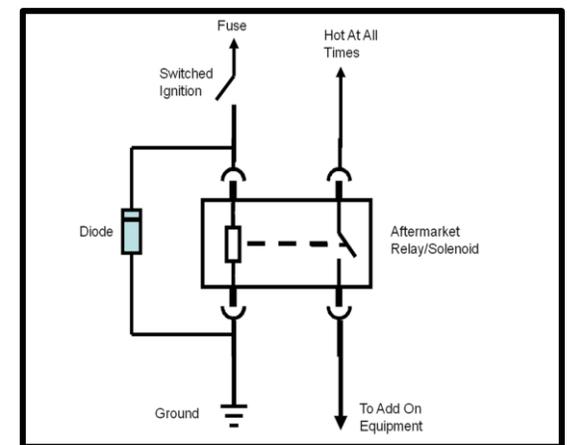


Install a diode, P/N 12112422, across the coil of the solenoid. It is important that the striped end of the diode be connected to the positive terminal of the coil and the other end of the diode be connected to ground.



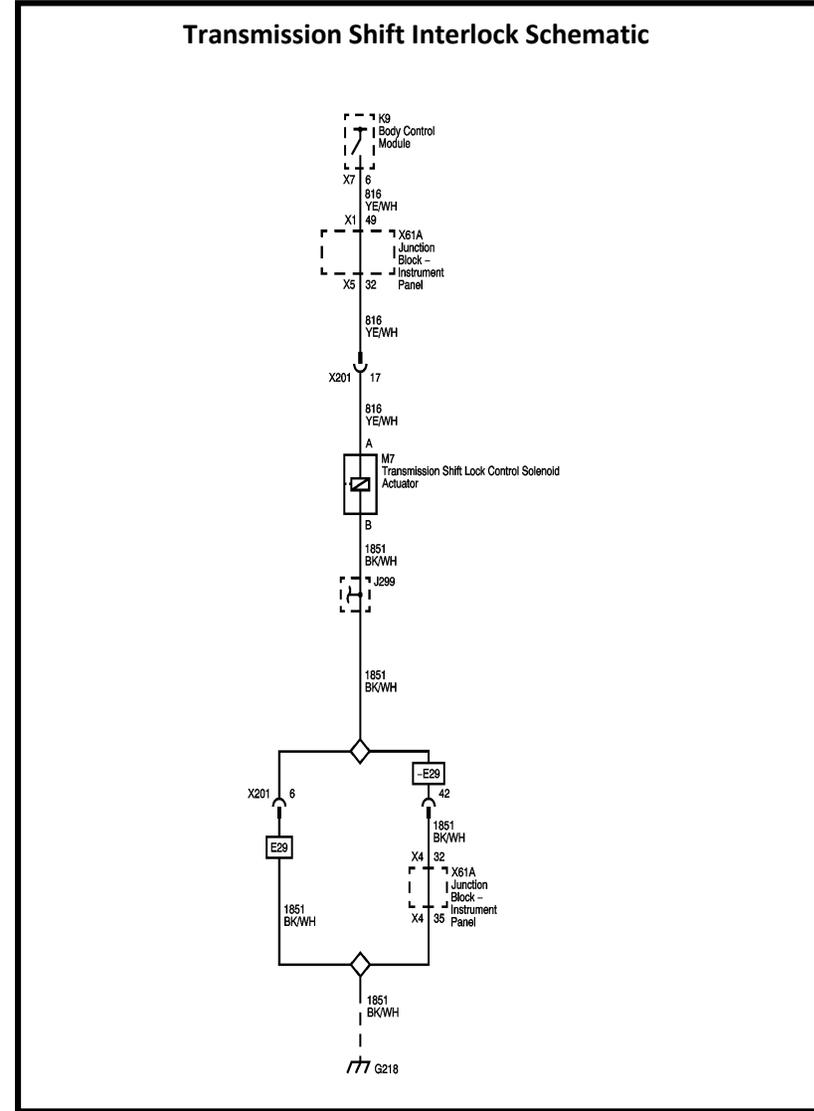
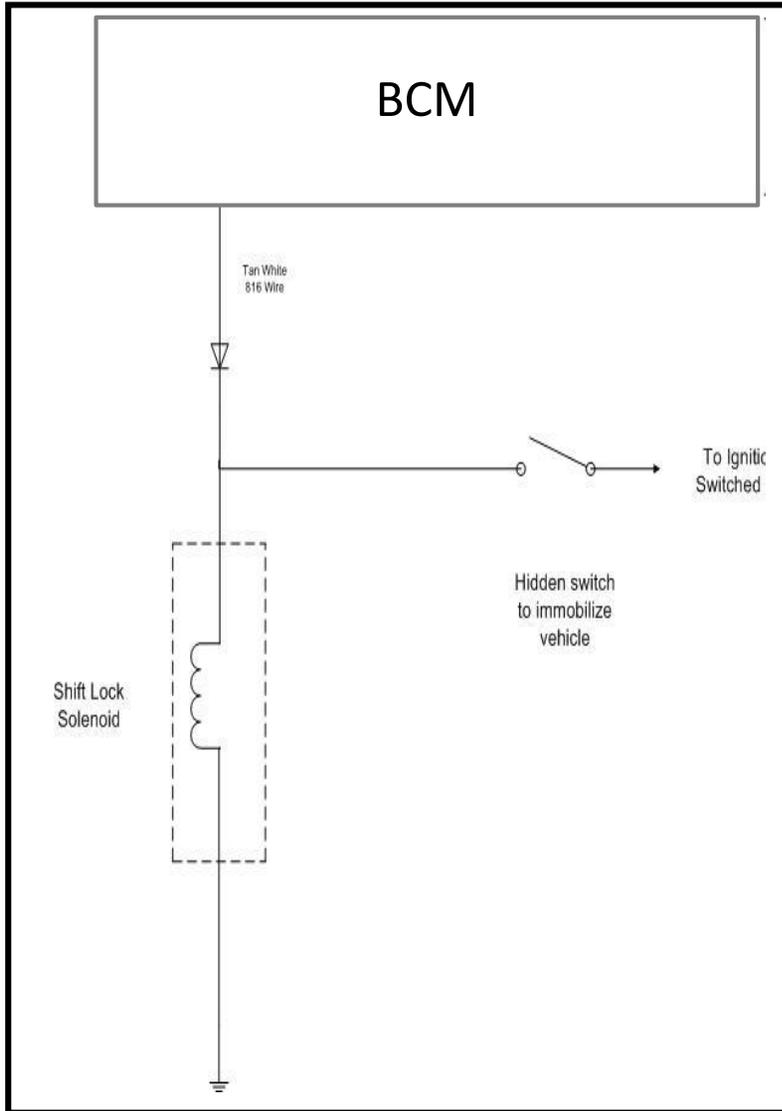
**Important: Be sure to insulate the diode with heat shrink tubing before installing as shown in the picture above.**

Notice: Some solenoids/relays may only have a positive post and will get their ground through the mounting bracket. In this case, the striped end of the diode is to be connected to the positive terminal and the other end should be connected to the ground of the solenoid/relay.



Install a diode, P/N 12112422, across the coil of the relay. It is important that the striped end of the diode be connected to the positive terminal of the coil and the other end of the diode be connected to ground. Be sure to insulate the diode with heat shrink tubing before installing.

Remote Vehicle Immobilizer



## Exterior Lighting Systems Description and Operation

The exterior lighting system consists of the following lamps:

- Adaptive forward lighting
- Automatic headlamp leveling
- Backup lamps
- Daytime running lamps (DRL)
- Hazard warning lamps
- Headlamps
- Park, tail, license, and marker lamps
- Stop lamps
- Turn signal lamps

### Low Beam Headlamps

**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.

The headlamps consist of 2 high intensity discharge (HID) arc tubes and ballast on each side of the vehicle which provide high and low beams.

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 (ALC)
- When the headlamp switch is placed in the AUTO position, with the windshield wipers ON in daylight conditions, after a 6 second delay

## **Low Beam Headlamps (continued)**

The body control module (BCM) monitors three signal circuits from the turn signal/multifunction switch. When the turn signal/multifunction switch is in the AUTO position, all three signal circuits are open. When placed in the AUTO position, the BCM monitors inputs from the ambient light sensor to determine if headlamps are required or if daytime running lamps will be activated based on outside lighting conditions. When the turn signal/multifunction switch is placed in the OFF position, the turn signal/multifunction switch headlamps OFF signal circuit is grounded, indicating to the BCM that the exterior lamps should be turned OFF. With the turn signal/multifunction switch in the PARK position, the turn signal/multifunction switch park lamps ON signal circuit is grounded, indicating that the park lamps have been requested. When the turn signal/multifunction switch is placed in the HEADLAMP position, both the turn signal/multifunction switch park lamps ON signal circuit and the turn signal/multifunction switch headlamps ON signal circuit are grounded. The BCM responds to the low beam request by applying ground to the low beam relay control circuit which energizes the low beam relay. With the low beam relay energized, the switch contacts close allowing battery voltage to flow through the low beam fuses. Battery voltage is then applied from the fuses, through the low beam control circuits to the left and right headlamp ballast located in each headlamp assembly. When battery voltage is applied to the headlamp ballast through the low beam control circuits, the ballast charge the starter to start the lamp. High intensity discharge (HID) headlamps do not have filaments like traditional bulbs, instead the starter uses a high voltage transformer to convert the input voltage into a higher voltage. This increased voltage is used in order to create an arc between the electrodes in the bulb.

The BCM will also command the low beam headlamps ON during daylight conditions when the following conditions are met:

- Headlamp switch in the AUTO position
- Windshield wipers ON
- Vehicle in any gear but PARK

When the BCM 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.

## **Run Up Of the Lamp**

Each ballast requires higher amperage in order to ensure normal startup and run up of the lamp. Run up is the term used to describe the extra power level given to the bulb. The input current during the steady state operation is lower than the start up amperage. After the lamp receives the strike from the starter and the arc is established, the ballast uses its operating voltage in order to provide the run up power needed in order to keep the lamp on. The lamp rapidly increases in intensity from a dim glow to a very high-intensity, bright light called a steady state. Within a few seconds of the arc being established in the bulb, the majority of steady state is complete. 100 percent of the steady state is completed shortly thereafter. A high watt power level is necessary in order to bring the lamp to a steady state in such a short period of time. The high watt power level allows the lamp to meet the SAE light vs. time specification.

## **When to Change the HID Bulb**

Bulb failure, end of life occurs when the bulb gets old and becomes unstable. The bulb may begin shutting itself off sporadically and unpredictably at first, perhaps only once during a 24-hour period. When the bulb begins shutting itself off occasionally, the ballast will automatically turn the bulb back on again within 0.5 seconds. The ballast will re-strike the bulb so quickly that the bulb may not appear to have shut off. As the bulb ages, the bulb may begin to shut off more frequently, eventually over 30 times per minute. When the bulb begins to shut off more frequently, the ballast receives excessive, repetitive current input. Repetitive and excessive restarts or re-strikes, without time for the ballast to cool down, will permanently damage the ballast. As a safeguard, when repetitive re-strikes are detected, the ballast will not attempt to re-strike the lamp. The ballast then shuts down and the bulb goes out.

The following symptoms are noticeable signs of bulb failure:

- Flickering light, caused in the early stages of bulb failure
- Lights go out, caused when the ballast detects excessive, repetitive bulb re-strike
- Color change—the lamp may change to a dim pink glow.

Input power to the ballast must be terminated in order to reset the ballast's fault circuitry. In order to terminate the input power to the ballast, turn the lights off and back on again. Turning the lights off and back on again resets all of the fault circuitry within the ballast until the next occurrence of excessive, repetitive bulb re-strikes. When excessive, repetitive bulb re-strikes occur, replace the starter/arc tube assembly. The ballast will begin the start-up process when the starter/arc tube assembly is replaced. Repeatedly resetting the input power can overheat the internal components and cause permanent damage to the ballast. Allow a few minutes of cool-down time in between reset attempts.

## Light Color

White light has a different color rating than regular headlamps. The range of white light that is acceptable is broad when compared to halogens. Therefore, some variation in headlight coloring between the right and left headlamp will be normal. One high intensity discharge (HID) at the end of the normal range may appear considerably different in color from one at the other end of the range. Difference in color is normal. Replace the arc tube only if the arc tube is determined to be at the bulb failure stage.

## High Beam Headlamps

When the low beam headlamps are ON and the turn signal/multifunction switch is placed in the high beam position, ground is applied to the BCM through the high beam signal circuit. The BCM responds to the high beam request by applying ground to the high beam relay control circuit which energizes the high beam relay. With the high beam relay energized, the switch contacts close allowing battery voltage to flow through the left and right high beam fuses to the high beam control circuits and on to the left and right high beam solenoid actuators within the headlamp assemblies. Once the high beam solenoid actuators are active, the solenoid shutters open in each headlamp assembly exposing the remaining portion of the headlamp that was covered by the shutters illuminating the high beams at full intensity.

## Adaptive Forward Lighting (AFL)

The AFL consists of the following components:

- Headlamp control module
- Headlamp actuator - left
- Headlamp actuator - right

Battery positive voltage is applied to the headlamp control module at all times and when the ignition switch is in the RUN and CRANK positions. The headlamp control module has an operational voltage range of about 10.5-16 volts and is only fully functional when the ignition switch is in the RUN position. The voltage input from the ignition switch wakes the headlamp control module microprocessor. The headlamp control module receives serial data messages from the engine control module (ECM), transmission control module (TCM), electronic brake control module (EBCM), and body control module (BCM) with regards to power mode, speed, steering angle, transmission gear selection, and headlamp switch status. The headlamp control module calculates the headlamp angle and sends commands to the left and right headlamp actuators. The headlamp actuators drive the headlamps to the position commanded by the headlamp control module. The headlamp control module monitors the headlamp actuator motor control circuits for proper circuit continuity and for shorts to ground or voltage.

## **Adaptive Forward Lighting (AFL) (continued)**

If a malfunction is detected, a DTC will be stored in memory and the driver will be notified with a message displayed over the driver information center (DIC) located on the instrument panel cluster (IPC).

The headlamp control module controls the left headlamp movement by 15 degrees to the left and 5 degrees to the right, and the right headlamp movement by 5 degrees to the left and 15 degrees to the right. The direction the headlamps move is controlled by the steering wheel angle and is limited by steering angles of approximately +/- 90 degrees. The AFL will not operate with the transmission in reverse or at vehicle speeds less than 2 mph. Movement of the headlamps is restricted at low vehicle speeds and full movement of the lamps is not allowed until vehicle speed is greater than approximately 30 mph. The following conditions must be met before the AFL will operate:

- Headlamp switch in the AUTO position and high or low beam headlamps must be active
- Steering angle position must be received from the EBCM with the steering signal validity bit set
- Vehicle speed must be received from the ECM with the steering signal validity bit set
- Transmission gear position must be received from the TCM with the transmission gear position validity bit set

## **Automatic Headlamp Leveling**

The Automatic Headlamp Leveling Systems consist of the following components:

- Headlamp control module
- Headlamp leveling actuator - left
- Headlamp leveling actuator - right
- Suspension position sensor - front
- Suspension position sensor - rear

The automatic headlamp leveling system automatically maintains the vertical alignment of the headlamps when the vehicle load and driving conditions change. Each headlamp assembly contains a headlamp leveling motor that is controlled by the headlamp control module. The front and rear suspension position sensors provide the headlamp control module with suspension position information. Each sensor receives a 5-volt reference, signal, and low reference circuits from the headlamp control module. The sensors are connected to the control arms of the front and rear suspension. As the vehicle travels, the suspension compresses and rebounds moving the suspension position sensor arms. This causes the signal output of the sensor to change. The headlamp control module compares the information from both suspension position sensors and adjusts the headlamp leveling as needed.

## **Daytime Running Lamps (DRL)**

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

- The ignition is in the RUN or CRANK position
- The shift lever is out of the PARK position for vehicles equipped with automatic transmissions or the parking brake is released for vehicles with manual transmissions
- The low and high beam headlamps are OFF

The ambient light 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 body control module (BCM) provides a 5-volt reference signal to the ambient light sensor and the HVAC control module provides a low reference ground. The BCM monitors the ambient light sensor signal circuit to determine if outside lighting conditions are correct for either daytime running lights (DRL) or automatic lamp control (ALC) when the headlamp switch is in the AUTO position. In daylight conditions the BCM will command the designated DRLs ON. During low light conditions the BCM will command the low beam headlamps ON. Any function or condition that turns on the headlamps will cancel DRL operation.

## **Automatic Lamp Control**

Place the turn signal/multifunction switch in the AUTO position for automatic lamp control. During automatic lamp control the headlamps will be off during daylight conditions but will turn on when the ambient light sensor detects low outside light level. The ambient light sensor is a light sensitive transistor that varies the voltage signal to the HVAC control module. The HVAC control module sends a signal to the body control module (BCM) via serial data commanding the BCM to apply ground to the headlamp low beam relay control circuit. This energizes the low beam relay, closing the switched side and applies battery voltage to the LEFT and RIGHT LOW BEAM fuses. Battery voltage is applied from the low beam fuses, through the low beam voltage supply circuits to low headlamp assemblies.

## **Flash to Pass (FTP)**

When the turn signal/multifunction switch is momentarily placed in the flash to pass (FTP) position, ground is applied to the turn signal/multifunction switch. The turn signal/multifunction switch applies ground to the body control module (BCM) through the FTP switch signal circuit. The BCM responds to the FTP request by applying ground to the high beam relay control circuit. This energizes the high beam relay, closing the switch side contacts of the high beam relay, applying battery voltage to the left and right high beam fuses. Battery voltage is applied from the high beam fuses through the high beam control circuit to the high beam headlamp assemblies. This causes the high beam headlamps to illuminate at full brightness momentarily.

## **Hazard Lamps**

The hazard flashers may be activated in any power mode. The hazard switch signal circuit is momentarily grounded when the hazard switch is pressed. The body control module (BCM) responds to the hazard switch signal input by supplying battery voltage to all four turn signal lamps in an ON and OFF duty cycle. When the hazard switch is activated, the BCM sends a serial data message to the instrument panel cluster (IPC) requesting both turn signal indicators to be cycled ON and OFF.

The I/P dimmer switch controls the brightness of the interior backlighting components. When the I/P dimmer switch is placed in a desired brightness position, the body control module (BCM) receives a signal from the I/P dimmer switch and responds by applying a pulse width modulated (PWM) voltage to the hazard switch light emitting diode (LED) backlighting control circuit illuminating the LED to the desired level of brightness.

## **Park, Tail, and License Lamps**

When the headlamp switch is placed in the HEAD or PARK position, ground is applied to the park lamp switch ON signal circuit to the body control module (BCM). The BCM responds by applying voltage to the park lamps, tail lamps, and license lamps control circuits illuminating the park, tail, and license lamps.

## **Stop Lamps**

The brake pedal position (BPP) sensor is used to sense the action of the driver application of the brake pedal. The BPP sensor provides an analog voltage signal that will increase as the brake pedal is applied. The body control module (BCM) provides a low reference signal and a 5-volt reference voltage to the BPP sensor. When the variable signal reaches a voltage threshold indicating the brakes have been applied, the BCM will apply battery voltage to the left and right stop lamp control circuits as well as the center high mounted stop lamp (CHMSL) control circuit illuminating the left and right stop lamps and the CHMSL.

## **Turn Signal Lamps**

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 body control module (BCM) through either the right turn or left turn signal switch signal circuit. The BCM responds to the turn signal switch input by applying a pulsating voltage to the front and rear turn signal lamps through their respective control circuits. When a turn signal request is received by the BCM, a serial data message is sent to the instrument panel cluster (IPC) requesting the respective turn signal indicator be pulsed ON and OFF.

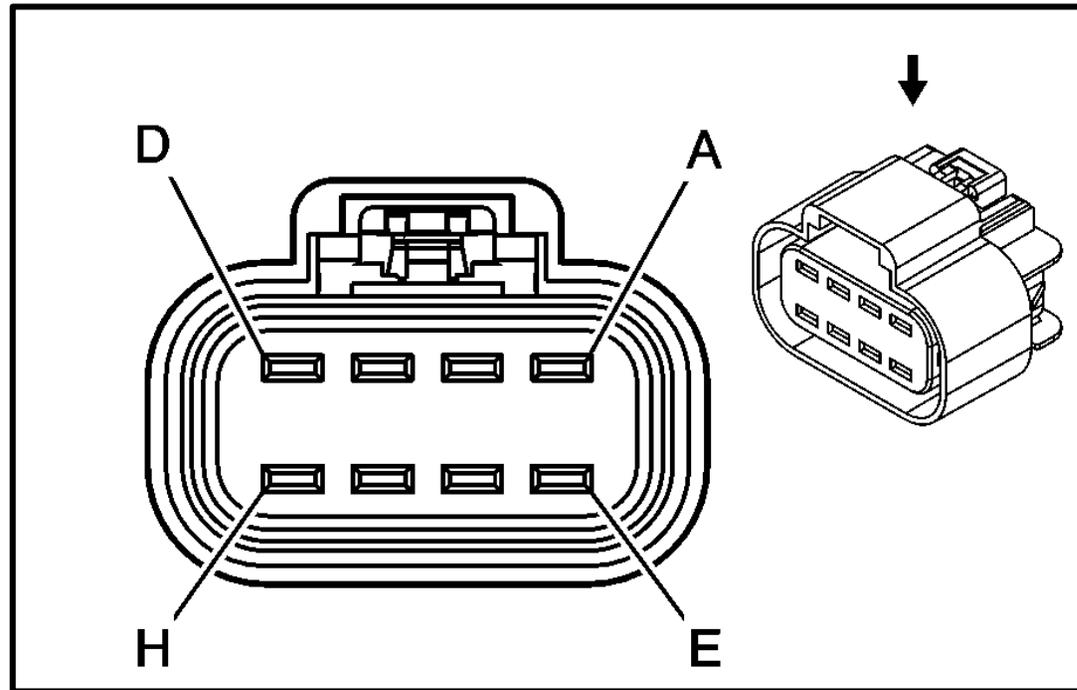
## **Backup Lamps**

With the engine ON and the transmission in the REVERSE position, the transmission control module (TCM) sends a serial data message to the body control module (BCM). The message indicates that the gear selector is in the REVERSE position. The BCM applies battery voltage to the backup lamps control circuit illuminating the backup lamps. Once the driver moves the gear selector out of the REVERSE position, a message is sent by the TCM via serial data requesting the BCM to remove battery voltage from the backup lamps control circuit. The engine must be ON for the backup lamps to operate.

## **Battery Run Down Protection/Inadvertent Power**

To provide battery run down protection, the exterior lamps will be deactivated automatically under certain conditions. The BCM monitors the state of the headlamp switch. If the park or headlamp switch is ON when the ignition switch is placed in either the CRANK or RUN position and then placed in the OFF position, the BCM initiates a 10 min timer. At the end of the 10 min, the BCM will turn off the control power output to the park lamp controls as well as the headlamp relay coils, deactivating the exterior lamps. 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 placed in 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.

## X110 Left Forward Lamp Harness to Headlamp - Connector End View and Pin-out



### Connector Part Information

- **Harness Type:** Forward Lamp
- **OEM Connector:** 15326654
- **Service Connector:** SEE NOTE
- **Description:** 8-Way F 280 GT 5.8 Series, Sealed (BK)

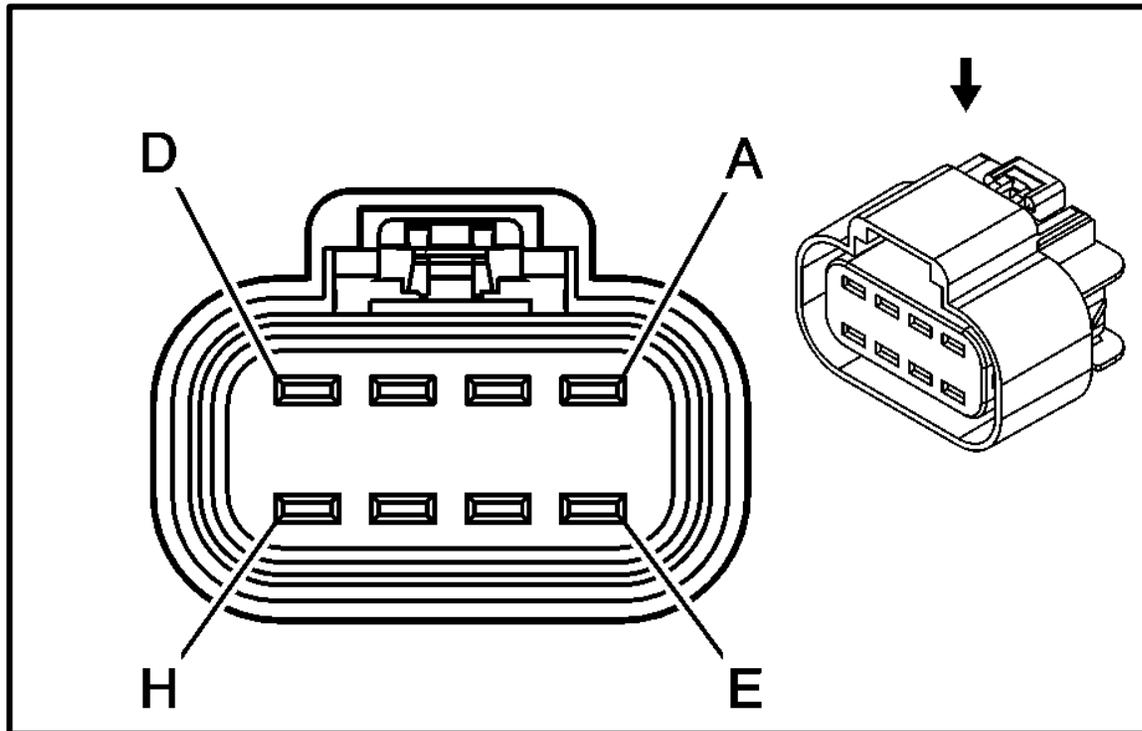
### Connector Part Information

- **Harness Type:** Left Headlamp
- **OEM Connector:** Not Available
- **Service Connector:** Service by Harness - See Part Catalog
- **Description:**

| Terminal Part Information |                 |                       |                       |                  |               |               |                  |
|---------------------------|-----------------|-----------------------|-----------------------|------------------|---------------|---------------|------------------|
| Terminal Type ID          | Terminated Lead | Diagnostic Test Probe | Terminal Removal Tool | Service Terminal | Tray          | Core Crimp    | Insulation Crimp |
| I                         | 13578906        | J-35616-4A (PU)       | J-38125-553           | 15304720         | 19            | 4             | 5                |
| II                        | 13578915        | J-35616-4A (PU)       | J-38125-553           | 15304719         | 19            | 2             | 5                |
| III                       | 13578915        | J-35616-4A (PU)       | J-38125-553           | 15304719         | 19            | E             | 5                |
| IV                        | Pending         | Pending               | Pending               | Not Available    | Not Available | Not Available | Not Available    |

| X110 Forward Lamp Harness to Headlamp - Left Harness |      |         |         |                  |        |  |     |              |                |              |                  |                     |  |
|--|------|---------|---------|------------------|--------|--|-----|--------------|----------------|--------------|------------------|---------------------|--|
| Pin  | Size | Color   | Circuit | Terminal Type ID | Option | Function                                   | Pin | Size         | Color          | Circuit      | Terminal Type ID | Option              |  |
| A  | 1.5  | BK      | 150     | I                | -      | Ground                                     | A   | 1.5          | BK             | 150          | IV               | -                   |  |
| B  | 0.75 | YE      | 712     | II               | -      | Left Headlamp Low Beam Supply Voltage      | B   | 0.75<br>0.75 | YE<br>YE       | 712<br>712   | IV               | Z88<br>X88          |  |
| C  | 0.5  | WH      | 711     | III              | -      | Left Headlamp High Beam Supply Voltage     | C   | 0.5<br>0.5   | WH<br>WH       | 711<br>711   | IV               | Z88<br>X88          |  |
| D  | -    | -       | -       | -                | -      | Not Occupied                               | D   | -            | -              | -            | -                | -                   |  |
| E  | 0.5  | VT/GY   | 709     | III              | -      | Left Park Lamp Supply Voltage              | E   | 0.5<br>0.5   | VT/GY<br>VT/GY | 709<br>709   | IV               | X88<br>Z88          |  |
| F  | 0.75 | D-BU/WH | 1314    | II               | -      | Left Front Turn Signal Lamp Supply Voltage | F   | 0.75<br>0.75 | BU/WH<br>BU/WH | 1314<br>1314 | IV               | X88<br>Z88          |  |
| G  | 0.75 | GY/D-BU | 7538    | II               | -      | Left Front DRL Supply Voltage              | G   | 0.75         | GY/BU          | 7538         | IV               | Z88/Y91/GAT/SL<br>T |  |
| H  | 0.5  | VT/GY   | 709     | III              | -      | Left Park Lamp Supply Voltage              | H   | 0.5          | VT/GY          | 709          | IV               | Z88/Y91/GAT/SL<br>T |  |

**X120 Right Forward Lamp Harness to Headlamp – Connector End View and Pin-out**



**Connector Part Information**

- **Harness Type:** Right Headlamp
- **OEM Connector:** Not Available
- **Service Connector:** Service by Harness - See Part Catalog
- **Description:**

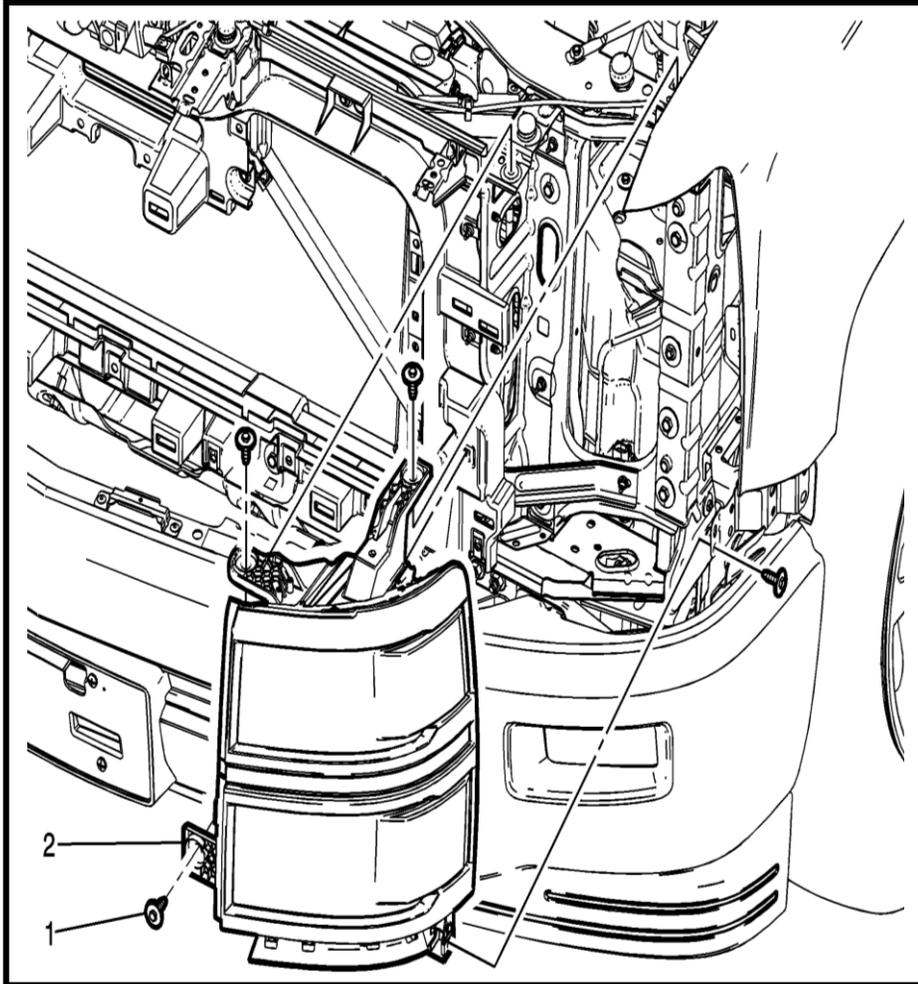
**Connector Part Information**

- **Harness Type:** Forward Lamp
- **OEM Connector:** 15326654
- **Service Connector:** SEE NOTE
- **Description:** 8-Way F 280 GT 5.8 Series, Sealed (BK)

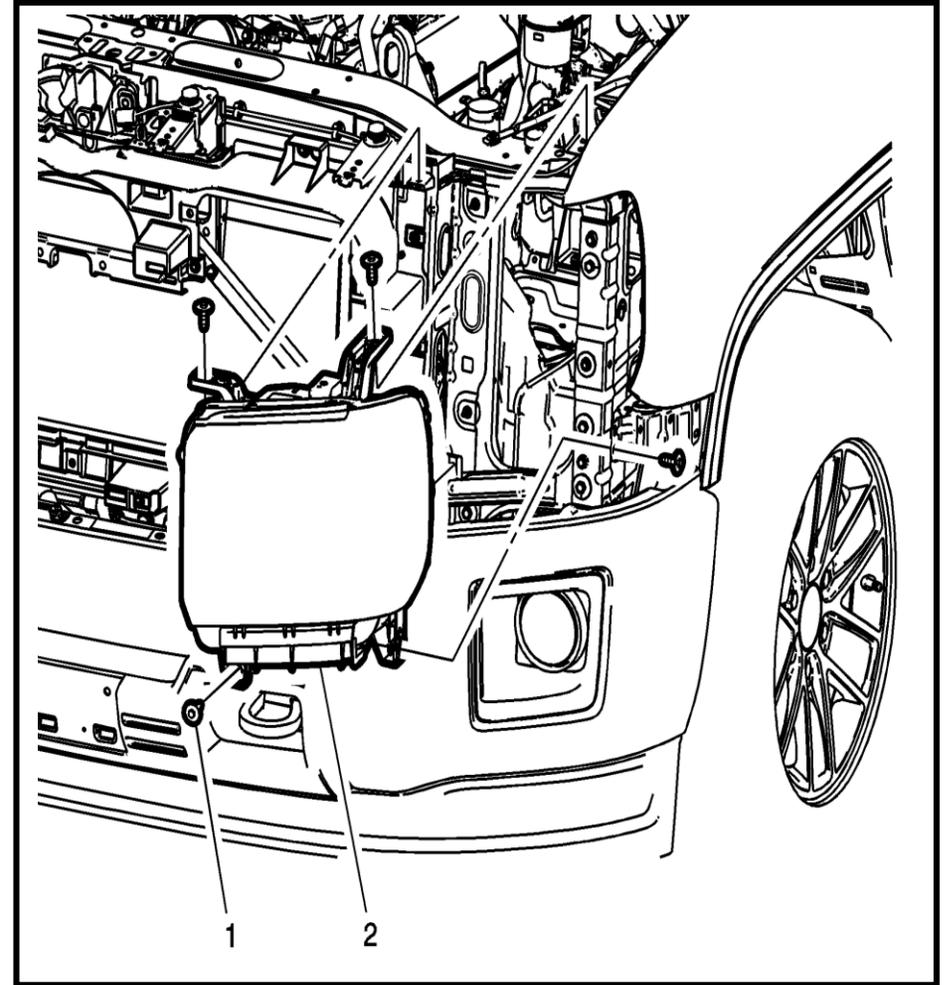
| Terminal Part Information |                 |                       |                       |                  |               |               |                  |
|---------------------------|-----------------|-----------------------|-----------------------|------------------|---------------|---------------|------------------|
| Terminal Type ID          | Terminated Lead | Diagnostic Test Probe | Terminal Removal Tool | Service Terminal | Tray          | Core Crimp    | Insulation Crimp |
| I                         | Pending         | Pending               | Pending               | Not Available    | Not Available | Not Available | Not Available    |
| II                        | 13578906        | J-35616-4A (PU)       | J-38125-553           | 15304720         | 19            | 4             | 5                |
| III                       | 13578915        | J-35616-4A (PU)       | J-38125-553           | 15304719         | 19            | 2             | 5                |
| IV                        | 13578915        | J-35616-4A (PU)       | J-38125-553           | 15304719         | 19            | E             | 5                |

| X120 Forward Lamp Harness to Headlamp - Right Harness |      |       |         |                  |                 |   |     |      |         |         |                  |        |  |
|---|------|-------|---------|------------------|-----------------|---|-----|------|---------|---------|------------------|--------|--|
| Pin   | Size | Color | Circuit | Terminal Type ID | Option          | Function                                    | Pin | Size | Color   | Circuit | Terminal Type ID | Option |  |
| A   | 1.5  | BK    | 250     | I                | -               | Ground                                      | A   | 1.5  | BK      | 250     | II               | -      |  |
| B   | 0.75 | YE    | 312     | I                | X88             | Right Headlamp Low Beam Supply Voltage      | B   | 0.75 | YE      | 312     | III              | -      |  |
|   | 0.75 | YE    | 312     |                  | Z88             | Right Headlamp Low Beam Supply Voltage      |     |      |         |         |                  |        |  |
| C   | 0.5  | WH    | 311     | I                | X88             | Right Headlamp High Beam Supply Voltage     | C   | 0.5  | WH      | 311     | IV               | -      |  |
|   | 0.5  | WH    | 311     |                  | Z88             | Right Headlamp High Beam Supply Voltage     |     |      |         |         |                  |        |  |
| D   | -    | -     | -       | -                | -               | Not Occupied                                | D   | -    | -       | -       | -                | -      |  |
| E   | 0.5  | GY/BN | 309     | I                | Z88             | Right Park Lamp Supply Voltage              | E   | 0.5  | GY/BN   | 309     | IV               | -      |  |
|   | 0.5  | GY/BN | 309     |                  | X88             | Right Park Lamp Supply Voltage              |     |      |         |         |                  |        |  |
| F   | 0.75 | GN/VT | 1315    | I                | X88             | Right Front Turn Signal Lamp Supply Voltage | F   | 0.75 | L-GN/VT | 1315    | III              | -      |  |
|   | 0.75 | GN/VT | 1315    |                  | Z88             | Right Front Turn Signal Lamp Supply Voltage |     |      |         |         |                  |        |  |
| G   | 0.75 | BU/BN | 7539    | I                | Z88/Y91/GAT/SLT | Right Front DRL Supply Voltage              | G   | 0.75 | D-BU/BN | 7539    | III              | -      |  |
| H   | 0.5  | GY/BN | 309     | I                | Z88/Y91/GAT/SLT | Right Park Lamp Supply Voltage              | H   | 0.5  | GY/BN   | 309     | IV               | -      |  |

**Headlamp Replacement**

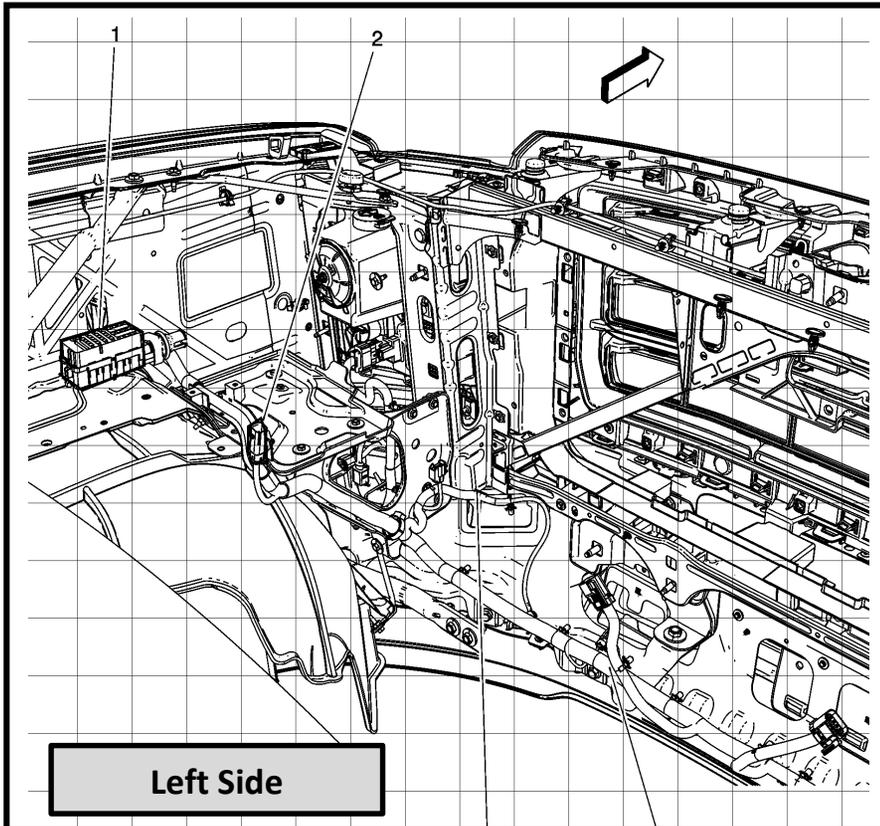


**Chevrolet**



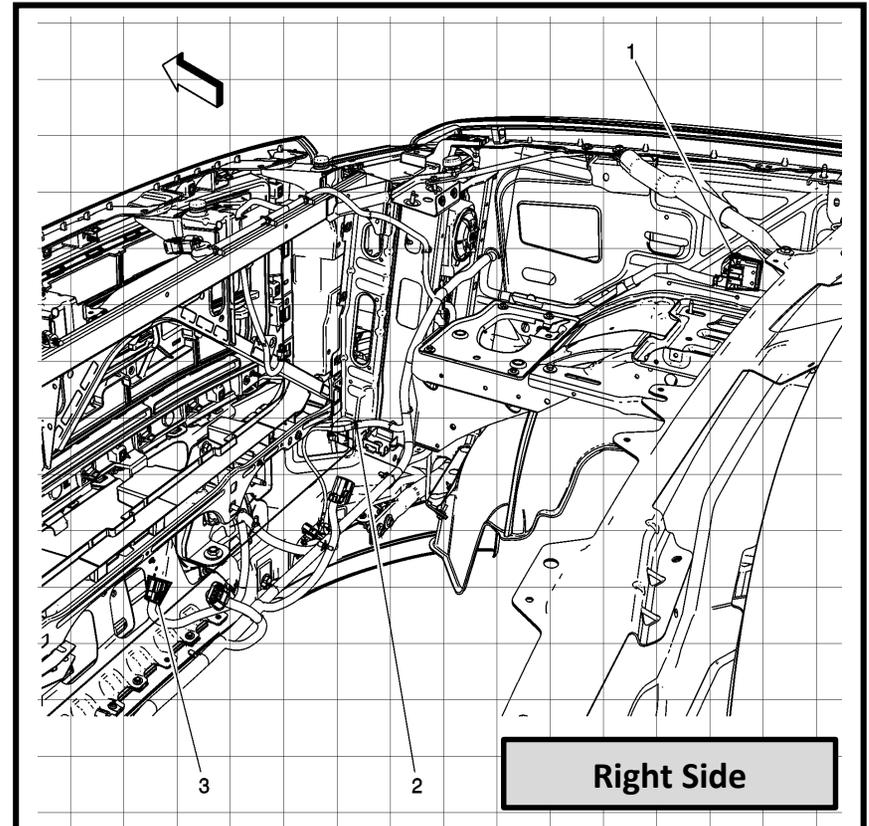
**GMC**

## Under hood Harness Routing



**Left Side**

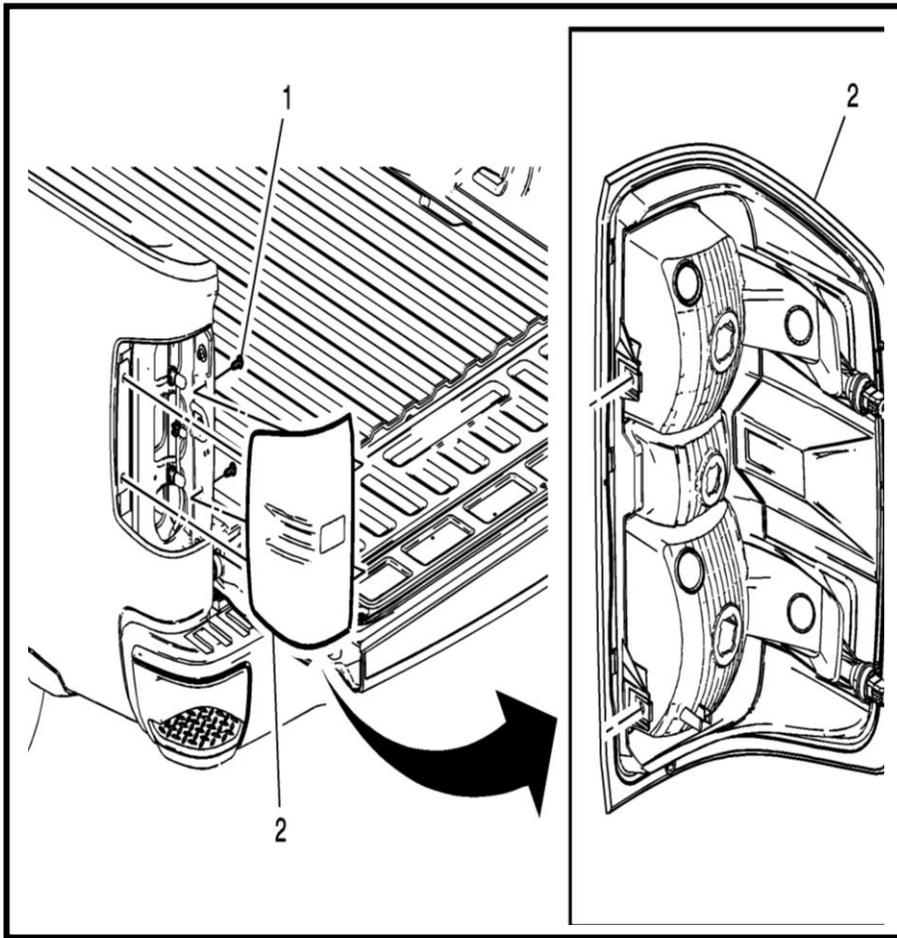
- 1) X50A Fuse Block – Underhood
- (2) X105
- (3) J130
- (4) J115



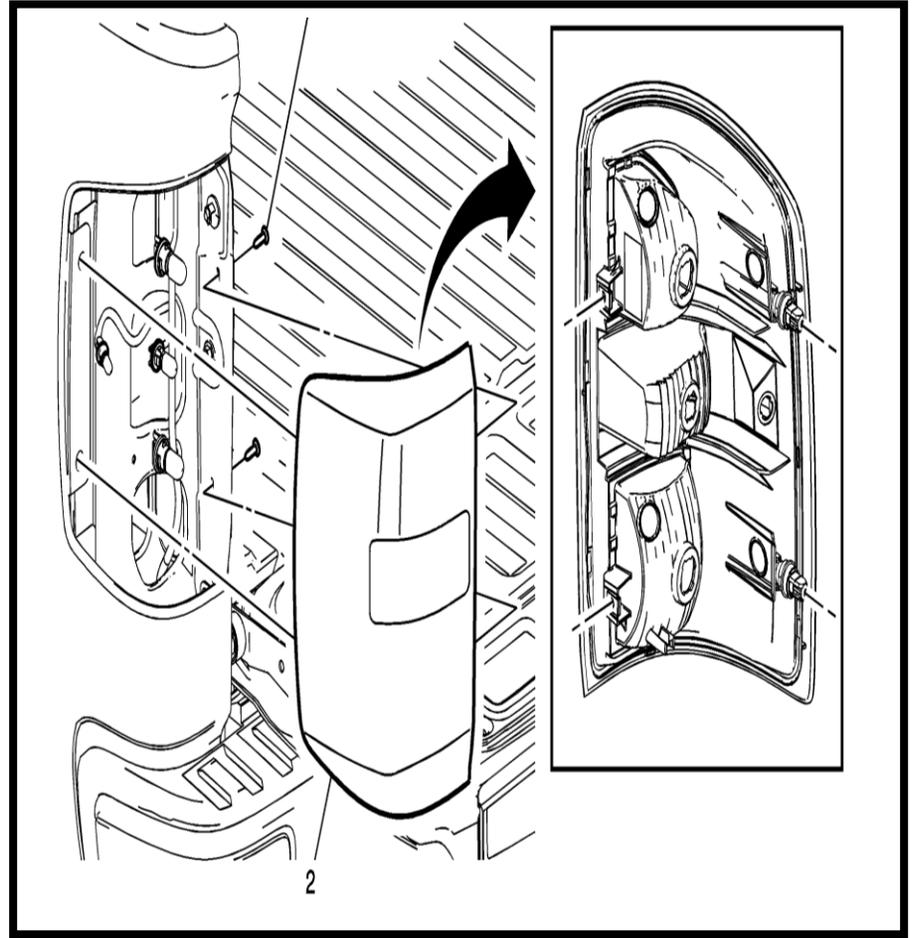
**Right Side**

- (1) X150
- (2) J125
- (3) X100

Tail lamp Replacement

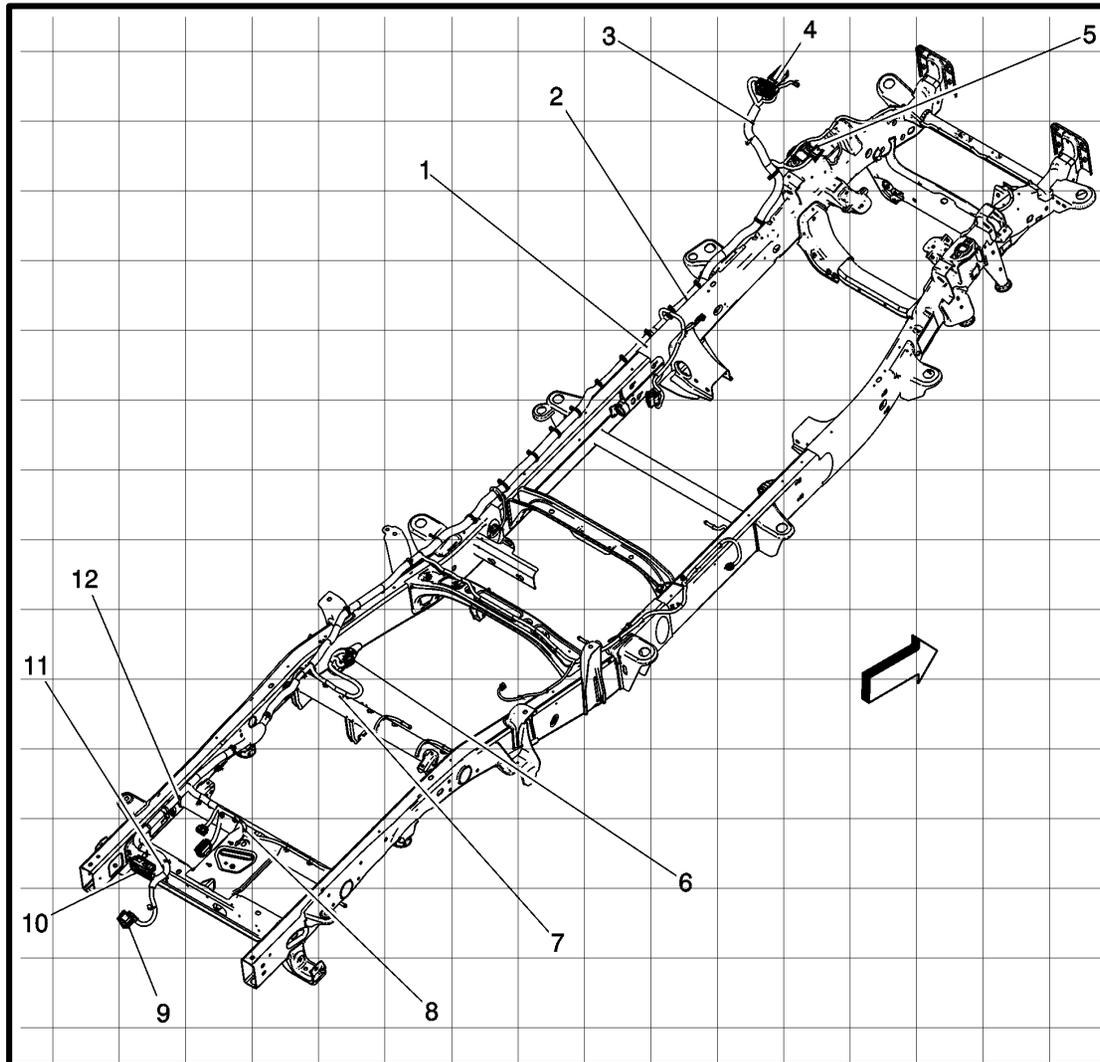


**Chevrolet**



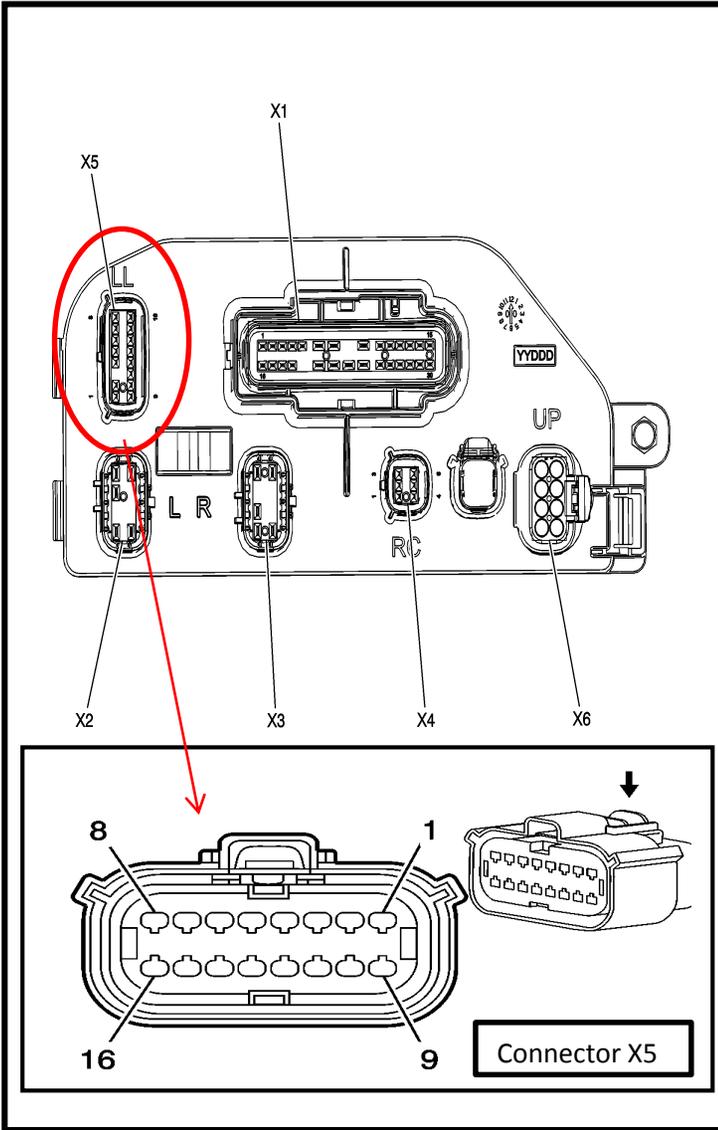
**GMC**

## Chassis Harness Routing



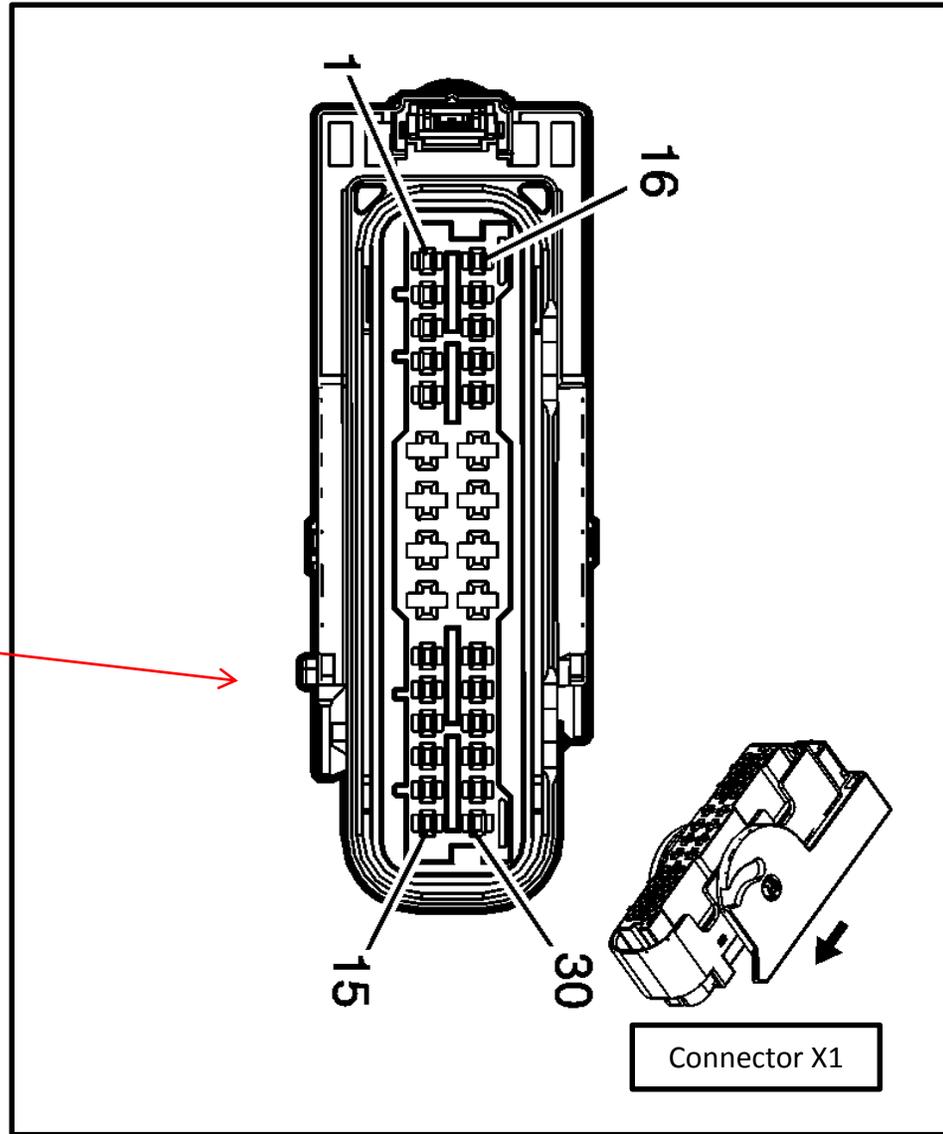
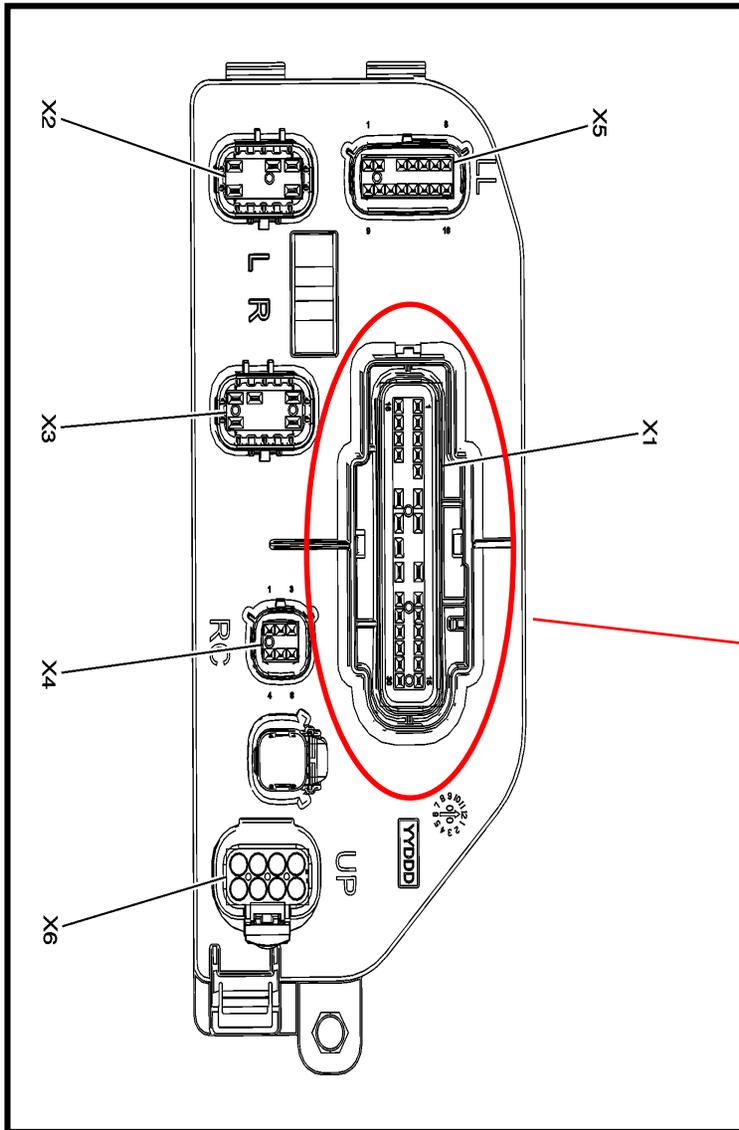
- (1) SP29
- (2) SP30
- (3) SP31
- (4) X185
- (5) X125
- (6) X350
- (7) J375
- (8) SP27
- (9) X88 Trailer Connector
- (10) X63A Junction Block  
– Rear Body
- (11) SP111
- (12) SP28

## Rear Body Junction Block X63A –Connector X5



| Pin | Size | Color       | Circuit | Function                               |
|-----|------|-------------|---------|--|
| 1   | 0.5  | BK/GY       | 2379    | Object Sensor Low Reference            |
| 2   | 0.5  | VT/GY       | 709     | Left Park Lamp Supply Voltage          |
| 4   | -    | -           | -       | Not Occupied                           |
| 5   | 0.5  | BK          | 1750    | Ground                                 |
| 6   | 0.5  | BK          | 1750    | Ground                                 |
| 7   | 0.5  | BK          | 1750    | Ground                                 |
| 8   | 0.5  | BK          | 1750    | Ground                                 |
| 9   | 0.5  | L-<br>GN/YE | 6846    | Rear License Lamp Supply Voltage       |
| 10  | 0.5  | L-<br>GN/YE | 6846    | Rear License Lamp Supply Voltage       |
| 11  | 0.5  | GY/BN       | 309     | Right Park Lamp Supply Voltage         |
| 12  | 0.5  | YE/VT       | 2378    | Right Rear Corner Object Sensor Signal |
| 13  | 0.5  | YE/WH       | 2377    | Right Rear Middle Object Sensor Signal |
| 14  | 0.5  | YE/D-<br>BU | 2376    | Left Rear Middle Object Sensor Signal  |
| 15  | 0.5  | YE          | 2375    | Left Rear Corner Object Sensor Signal  |
| 16  | 0.5  | BN/WH       | 2374    | Object Sensor Supply Voltage           |

Rear Body Junction Block X63A –Connector X1



## X63A Junction Block - Rear Body X1 Pin-outs

| <b>X63A Junction Block - Rear Body X1</b> |             |              |                |  |
|---|-------------|--------------|----------------|--|
| <b>Pin</b>                                | <b>Size</b> | <b>Color</b> | <b>Circuit</b> | <b>Function</b>                        |
| 1.  | 0.5         | YE/VT        | 2378           | Right Rear Corner Object Sensor Signal |
| 2.  | 0.5         | YE/WH        | 2377           | Right Rear Middle Object Sensor Signal |
| 3.  | 0.5         | YE/D-BU      | 2376           | Left Rear Middle Object Sensor Signal  |
| 4.  | 0.5         | YE           | 2375           | Left Rear Corner Object Sensor Signal  |
| 5.  | 0.5         | BN/WH        | 2374           | Object Sensor Supply Voltage           |
| 6.  | 1.5         | BK           | 1750           | Ground                                 |
| 7.  | 1.5         | BK           | 2150           | Ground                                 |
| 8.  | -           | -            | -              | Not Occupied                           |
| 9.  | 0.8         | L-GN/WH      | 24             | Backup Lamp Supply Voltage             |
| 10.                                       | 0.8         | WH/VT        | 1430           | Exterior Courtesy Lamp Supply Voltage  |
| 11.                                       | -           | -            | -              | Not Occupied                           |
| 12.                                       | -           | -            | -              | Not Occupied                           |
| 13.                                       | 0.5         | VT/GY        | 1054           | Stop Lamp Supply Voltage               |
| 14.                                       | -           | -            | -              | Not Occupied                           |

|     |     |         |      |  |
|-----|-----|---------|------|--|
| 15. | -   | -       | -    | Not Occupied                             |
| 16. | 0.5 | L-GN/YE | 6846 | Rear License Lamp Supply Voltage         |
| 17. | 0.5 | BK/GY   | 2379 | Object Sensor Low Reference              |
| 18. | 0.8 | YE/D-BU | 18   | Left Rear Stop/Turn Lamp Supply Voltage  |
| 19. | 0.8 | BN/L-GN | 19   | Right Rear Stop/Turn Lamp Supply Voltage |
| 20. | -   | -       | -    | Not Occupied                             |
| 21. | 0.8 | GY/BN   | 309  | Right Park Lamp Supply Voltage           |
| 22. | 0.8 | VT/GY   | 709  | Left Park Lamp Supply Voltage            |
| 23. | -   | -       | -    | Not Occupied                             |
| 24. | 1   | BK      | 1750 | Ground                                   |
| 25. | 0.5 | L-GN/WH | 24   | Backup Lamp Supply Voltage               |
| 26. | 0.5 | VT/L-GN | 1739 | Run/Crank Ignition 1 Voltage             |
| 27. | 0.5 | GY/YE   | 6972 | Camera Signal #2 +                       |
| 28. | 0.5 | WH/D-BU | 6973 | Camera Signal #2                         |
| 29. | 0.5 | BK      | 2550 | Ground                                   |
| 30. | 0.5 | BK      | 6974 | Camera Drain Wire                        |

## Bulb Replacement

| <u>Exterior Lamp</u>   | <u>Bulb Number</u> |                 |
|--|--------------------|-----------------|
|  | <u>Chevrolet</u>   | <u>GMC</u>      |
| Back-up Lamp   | 921 (W16W)         | 921 (W16W)      |
| Back-up Lamp*  | 1156               | 1156            |
| Cargo Lamp   | 921 (W16W)         | 921 (W16W)      |
| Center High-Mounted Stop lamp<br>(CHMSL)                     | 921LL              | 921LL           |
| Fog Lamp   | PS24W              | PS24W           |
| Front Turn Signal Lamp and Parking Lamp                      | 7443 LL            | 7443 LL         |
| High-Beam Headlamp (single combined bulb on GMC)             | 9005 LL            | HIR-2 (9012 LL) |
| Low-Beam Headlamp  | H11 LL             | ---             |
| Marker Lamps   | 194                | 194             |
| License Plate Lamp   | W5W LL             | W5W LL          |
| Stop lamp/Tail lamp/Turn Signal Lamp                         | 7444 LL            | 7444LL          |
| Stop lamp/Turn Signal Lamp/Tail lamp (*Chassis Cab use only) | 1157               | 1157            |

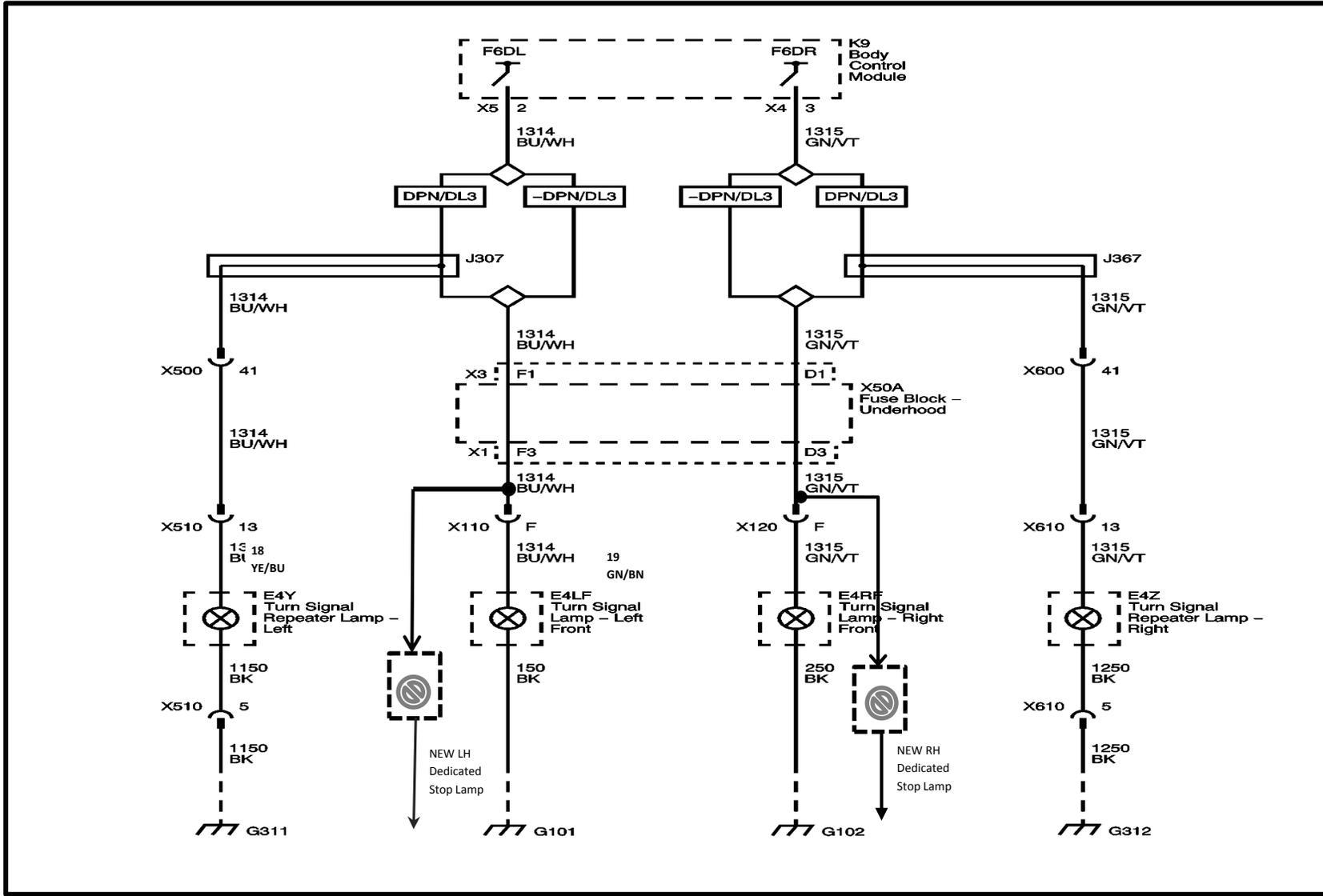
## **Rearward Lighting Separate Stop and Turn**

In order to have separated rear stop and turn you must re-wire the rear lamps at the under hood fuse block such that the Stop[ lamps are served by that of the CHMSL signal and the rear turn lamps are serve by splicing those lamp feeds to that of the front turn signal lamp feeds. Follow the steps outlined below using the schematic on the following page as a reference.

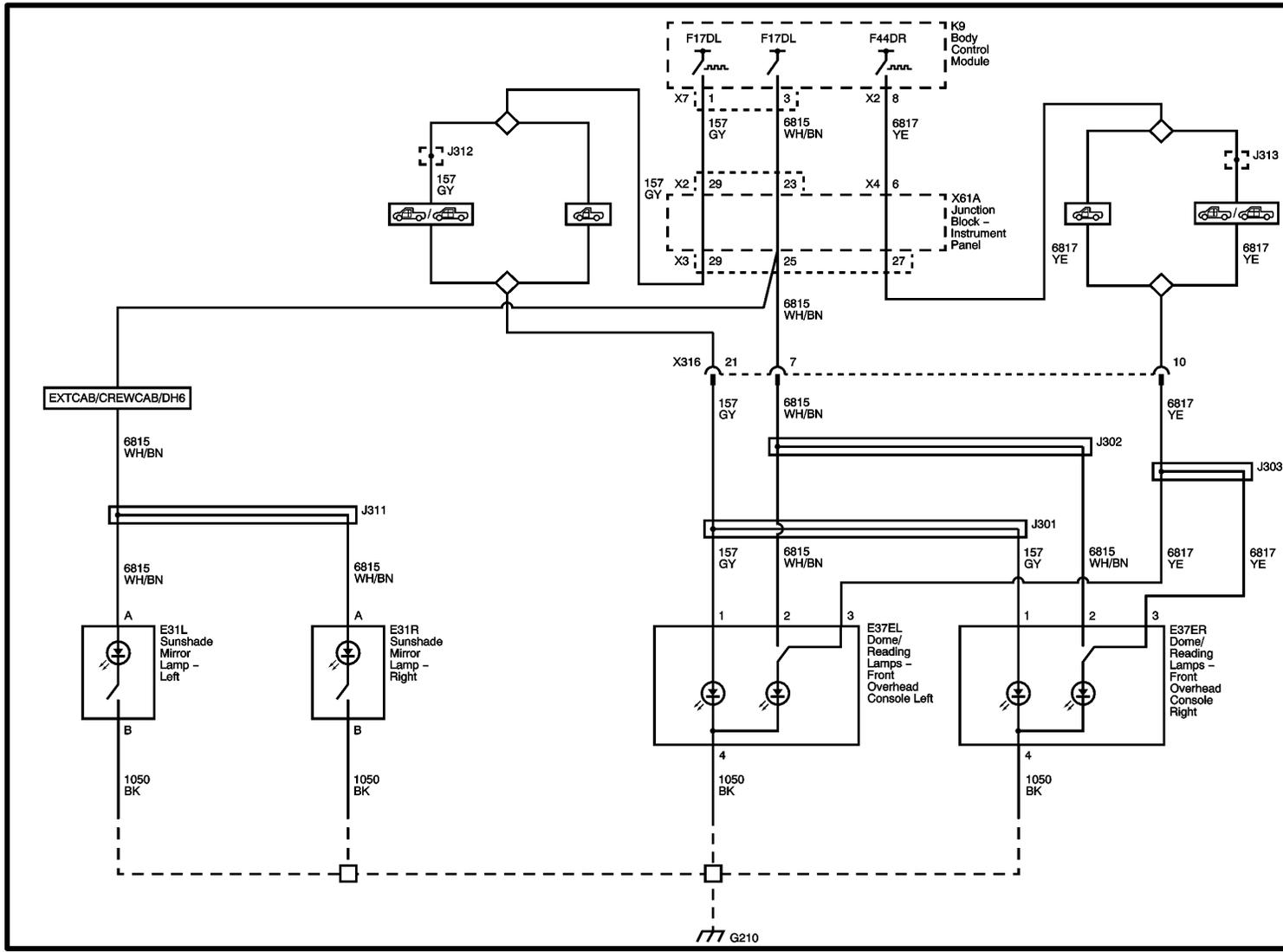
1. Prior to starting you must disconnect the rear chassis lighting connector (X63A), turn on ignition, and select either right or left hand turn signal to determine if the vehicle has been properly calibrated. If you experience a “fast flash” the vehicle is not calibrated with the ZW9 (box delete) option. The ZW9 calibration eliminates the bulb outage detection on the rear lamps and therefore also eliminates the “fast flash” when using after-market (non-OEM) taillight assemblies, including the LED style lamps.
2. Locate the Violet/Gray wire (Circuit #1054) the under-hood fuse block connector X3 /terminal M6. This is the CHSML feed and you will need to splice into this wire for your Stop lamp signal.
3. For Left Rear Turn Only locate and cut circuit 18 (Yellow/Blue wire) at the Under-hood fuse block connector X5 Terminal A2. Locate and splice to the yellow/blue wire to the blue/white wire circuit 1314 X1 terminal F3 at the under-hood fuse block.
4. For Right Rear Turn Only locate and cut circuit 19 (Green/Brown) at the Under-hood fuse block connector X5 Terminal A3. Locate and splice to the Green/Brown wire to the Green/Violet wire circuit 1315 X1 terminal D3 at the under-hood fuse block.
5. Current Limitation is 6 amps...If you current draw is more than 6 amps you must use the front turn signal circuits to energized relays provide Battery positive feed to the rear dedicated turn lamps.

**See Schematic(s) on next page**

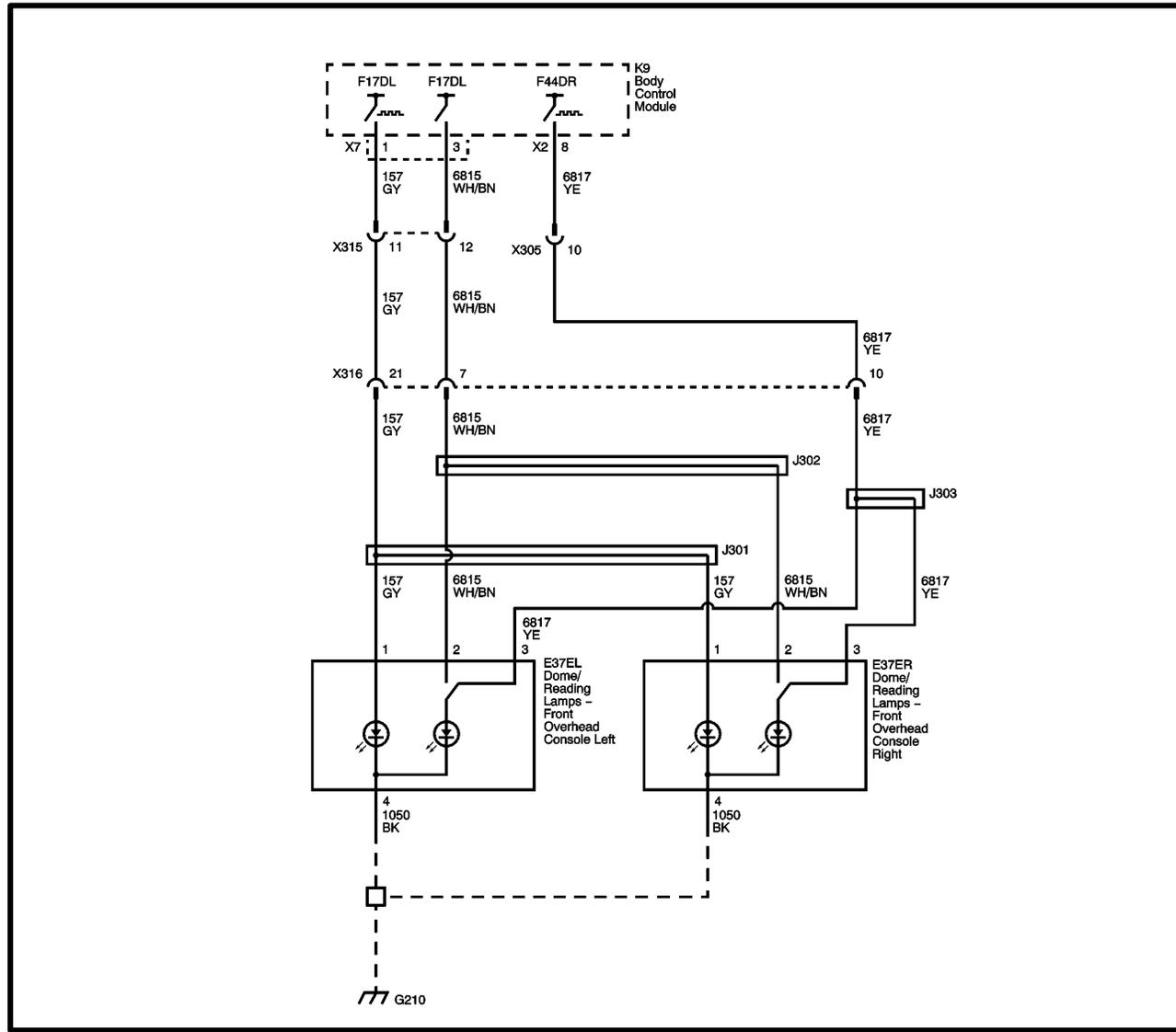
## Rearward Lighting Separate Stop and Turn (continued)



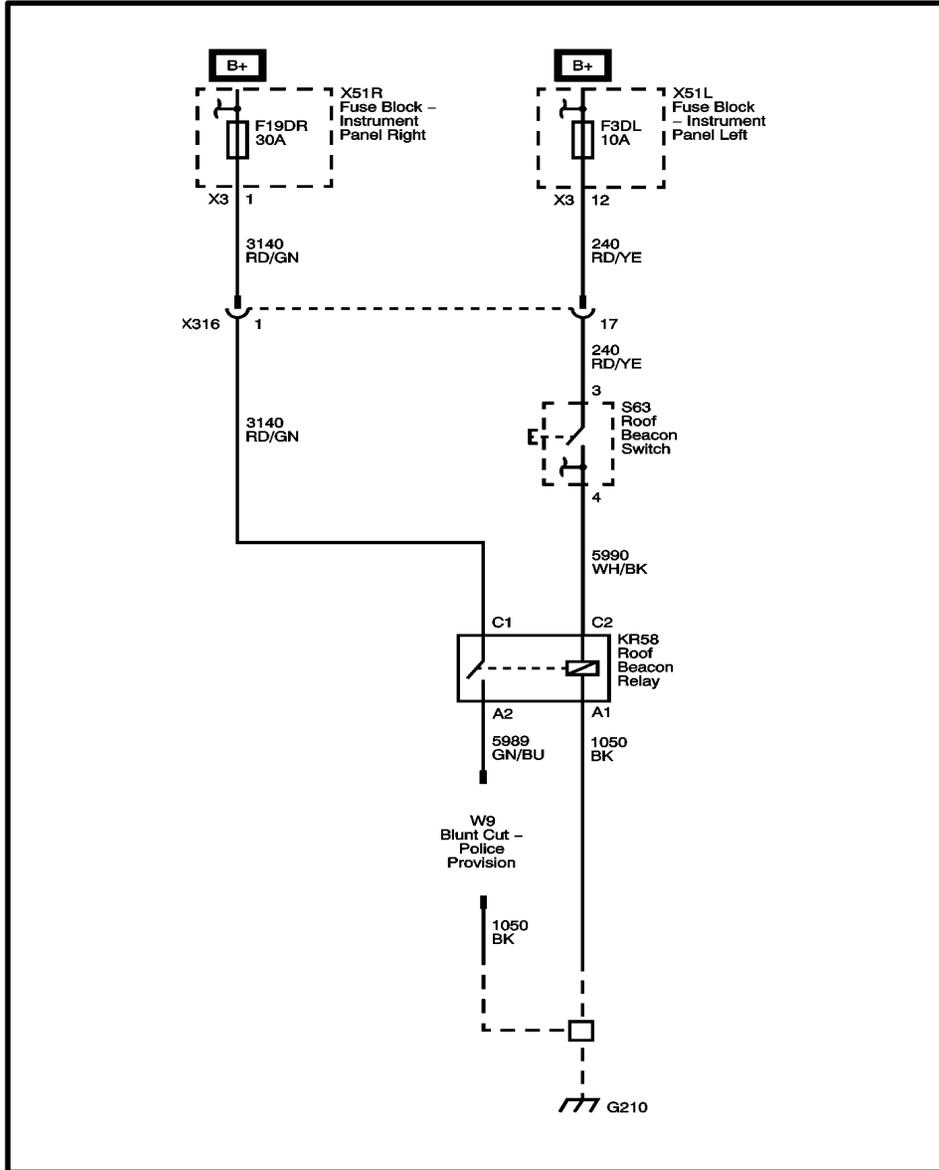
## Dome/Courtesy Lamps (-E29), DH6



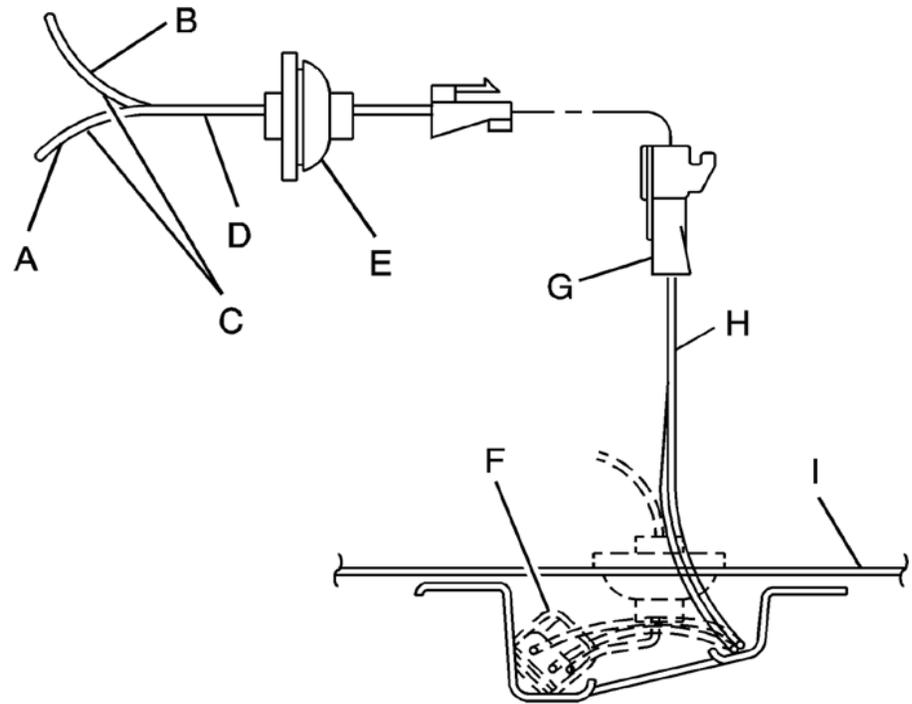
## Dome/Courtesy Lamps E29



## Roof Mounted Beacon



- A. Black Wire
- B. Orange Wire
- C. To Roof Mounted Lamp
- D. Harness Assembly
- E. Grommet (Roof)
- F. Foam Insulator (Adhesive-Backed)
- G. Harness Connector, Secondary Lock and Terminal
- H Brown Black Wire
- I. Vehicle Outer Roof Panel



## **Park Neutral Signal-Shift Lock Control**

The Automatic Transmission Shift Lock Control System is a safety device that prevents an inadvertent shift out of PARK when the engine is running. The driver must press the brake pedal before moving the shift lever out of the PARK position. The system consists of the following components:

- The Automatic Transmission Shift Lock Solenoid (serviced as the Automatic Transmission Shift Lock Actuator)
- The Body Control Module (BCM)
- The Engine Control Module (ECM)

The BCM controls the voltage to the shift lock control solenoid through the shift lock control solenoid controlled voltage circuit. The following conditions must be met before the BCM will supply voltage to the shift lock control solenoid:

- The ignition is in the ON position.
- The ECM sends an input via GMLAN serial data to the BCM when the Transmission Control Module (TCM) indicates the transmission is in the PARK position.
- The BCM receives a brake applied input from the stop lamp switch.

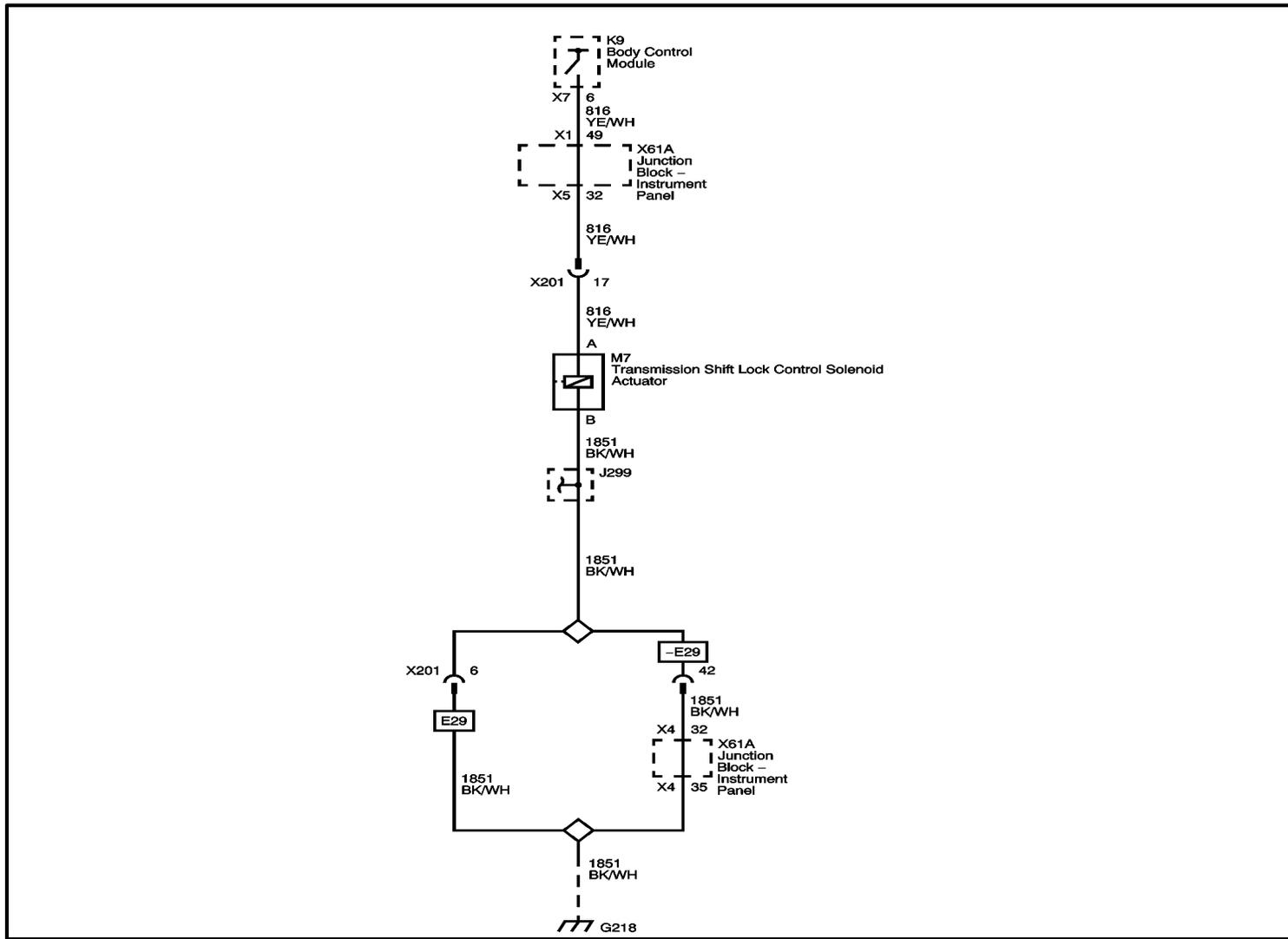
Since the shift lock control solenoid is permanently grounded, the BCM supplies voltage to the automatic transmission shift lock control solenoid, releasing the mechanical lock on the shift lever as the solenoid energizes. The energized solenoid allows the driver to move the shift lever out of the PARK position. When the brake pedal is not applied, the BCM turns the control voltage output of the shift lock control solenoid OFF, de-energizing the shift lock control solenoid. When the transmission is in the PARK position, the de-energized shift lock control solenoid will prevent shifting as the lever is mechanically locked in the PARK position.

During remote start operation, the BCM will energize the shift lock control circuit, locking the shift lever in the PARK position.

### **Note:**

***Shift Lock Control can be used as simulated Park signal, but note that the signal is deactivated if and when the brake is applied. Refer to wiring schematic on the next page for connection recommendations.***

## Shift Lock Control Schematic



## **Trailer Brake Control System**

A trailer brake control system is used to control the amount of trailer braking power that is made available to trailers with brakes that require a controlled electrical output signal for actuation.

The power output to the trailer brakes is based on both the amount of braking being applied by the vehicle's brake system and on the type of trailer brakes detected.

### **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.
- Some features of the trailer brake system may be different based on the trailer brake type characterization. An example of this is at zero speed, where pressing the service brake pedal will produce output when the trailer brakes are characterized as Electric Brakes, but not when characterized as Electric Over Hydraulic Brakes.
- 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 K133 Trailer Brake Power Control Module. The K133 Trailer Brake Power 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 trailers with surge or air 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.

**The vehicle is equipped with the following trailer braking components:**

- K38 Chassis Control Module
- K133 Trailer Brake Power Control Module
- S76 Trailer Brake Control Panel
- Manual Trailer Brake Apply
- Trailer Gain Adjustment
- Trailer Brake Driver Information Center Display

**Chassis Control Module**

The K38 Chassis Control Module (CCM) is a serviceable GMLAN module. The chassis control module sends the low power commanded duty cycle signal to the trailer brake power control module. The trailer brake power control module amplifies the signal and provides an output that is required to drive the trailer brakes.

## **Trailer Brake Power Control Module**

The K133 Trailer Brake Power Control Module (TBPM) is a solid state power switching module that supplies power to the trailer brakes at the input command duty cycle. Diagnostic messages are sent from the TBPM to the CCM on a dedicated LIN bus.

## **Trailer Brake Control Panel**

The S76 Trailer Brake Control Panel contains the trailer gain and manual apply switches. It is located on the instrument panel to the left of the steering column. Refer to the instrument panel overview 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 panel and switches are 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 Panel 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 to the left 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 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 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.

## **Hill Start Assist**

The hill start assist allows the driver to launch the vehicle without a roll back when the driver is moving their foot from the brake pedal to the accelerator pedal. Refer to the hill start assist system in the anti-lock brake system description and operation document for more information.

## **Trailer Sway Control**

The trailer sway control can detect the vehicle yaw instability, caused by an attached trailer. Refer to the trailer sway control system in the anti-lock brake system description and operation document for more information.

## **Driver Information Center Indicators and Messages (Trailer Brake System)**

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 acknowledges 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 acknowledges this message off or if the trailer harness is re-connected or repairs are completed.
- 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.

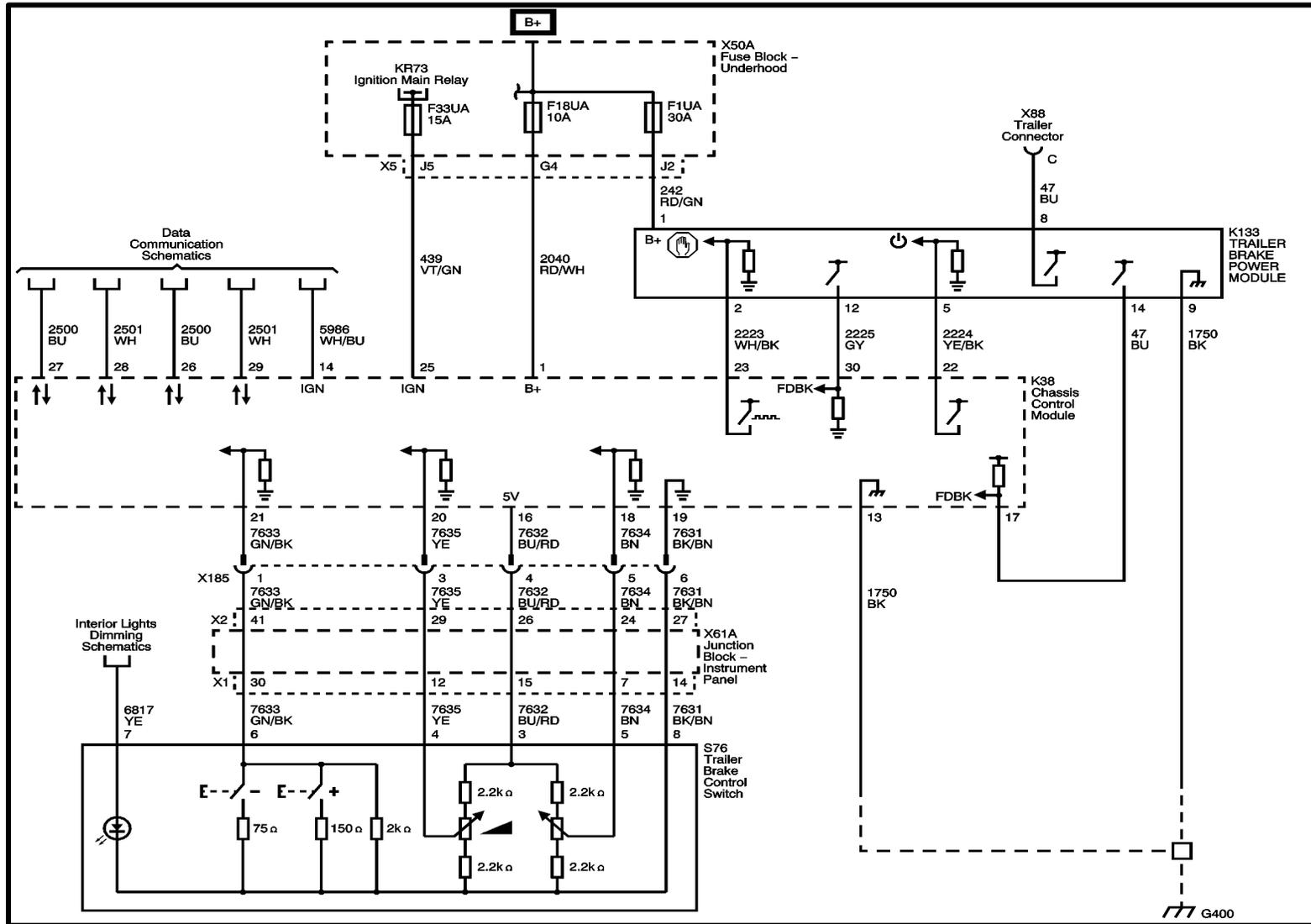
These conditions should be repaired to allow the trailer brake system to be fully functional.

## **Trailer Gain and Output Display**

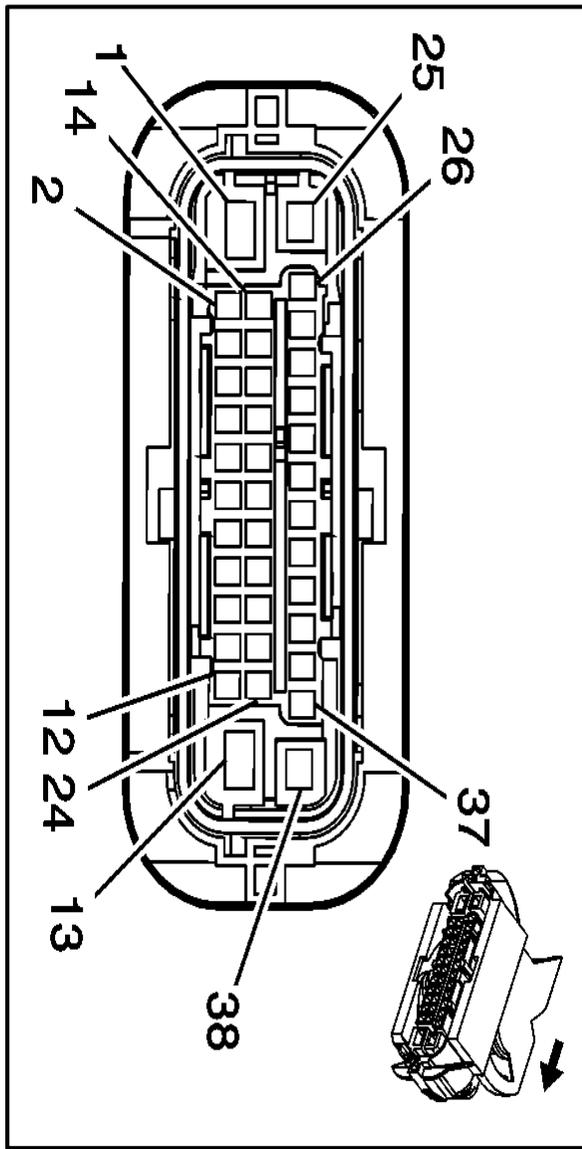
This display menu can be accessed by scrolling through the DIC menu, or any time the trailer gain +/- button is depressed, or the manual trailer brake apply lever is actuated. The trailer output is displayed from 0 to full output and indicates the output power provided to the trailer brakes, relative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

## Trailer Brake Control System Schematic

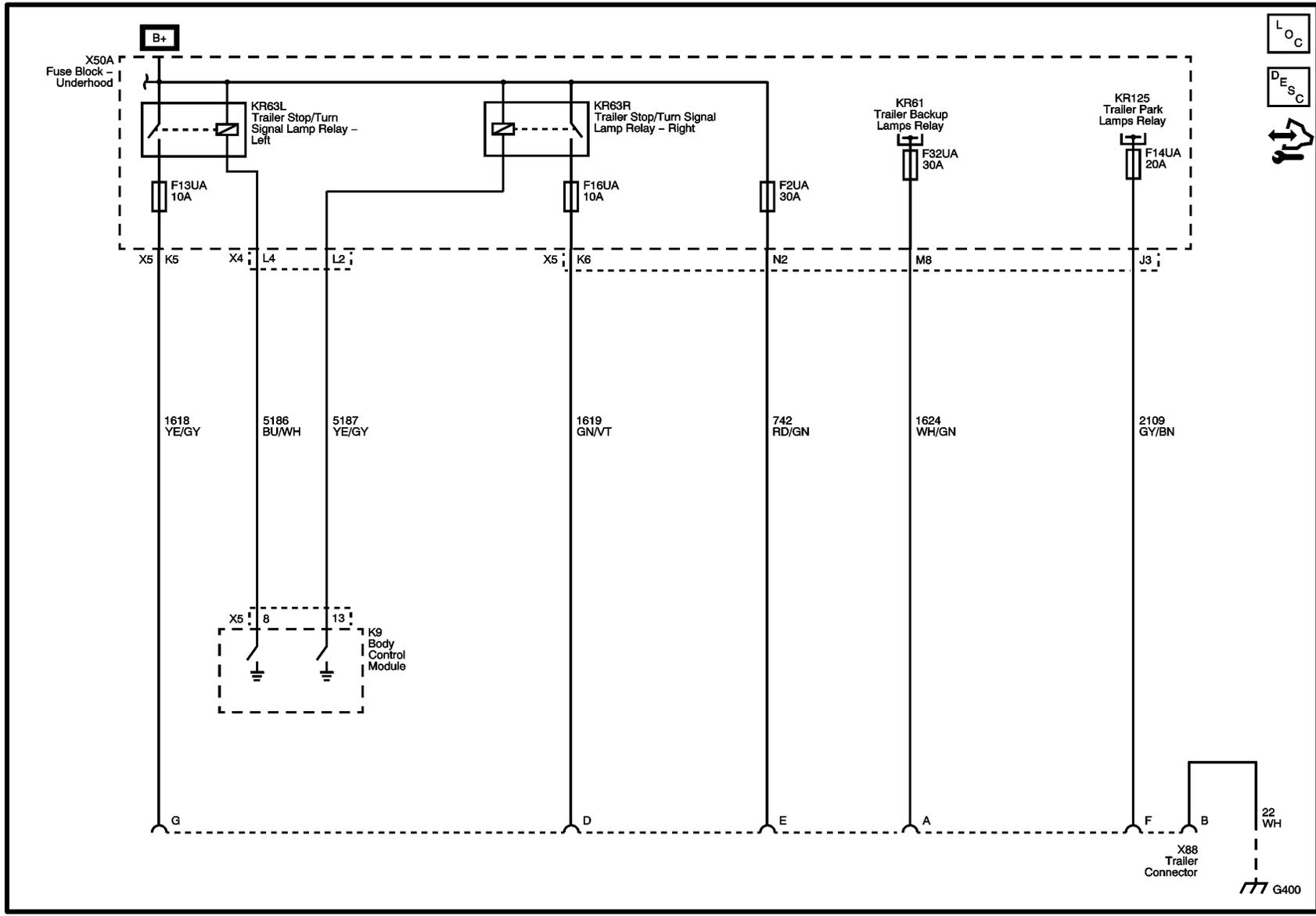


## Chassis Control Module Connector

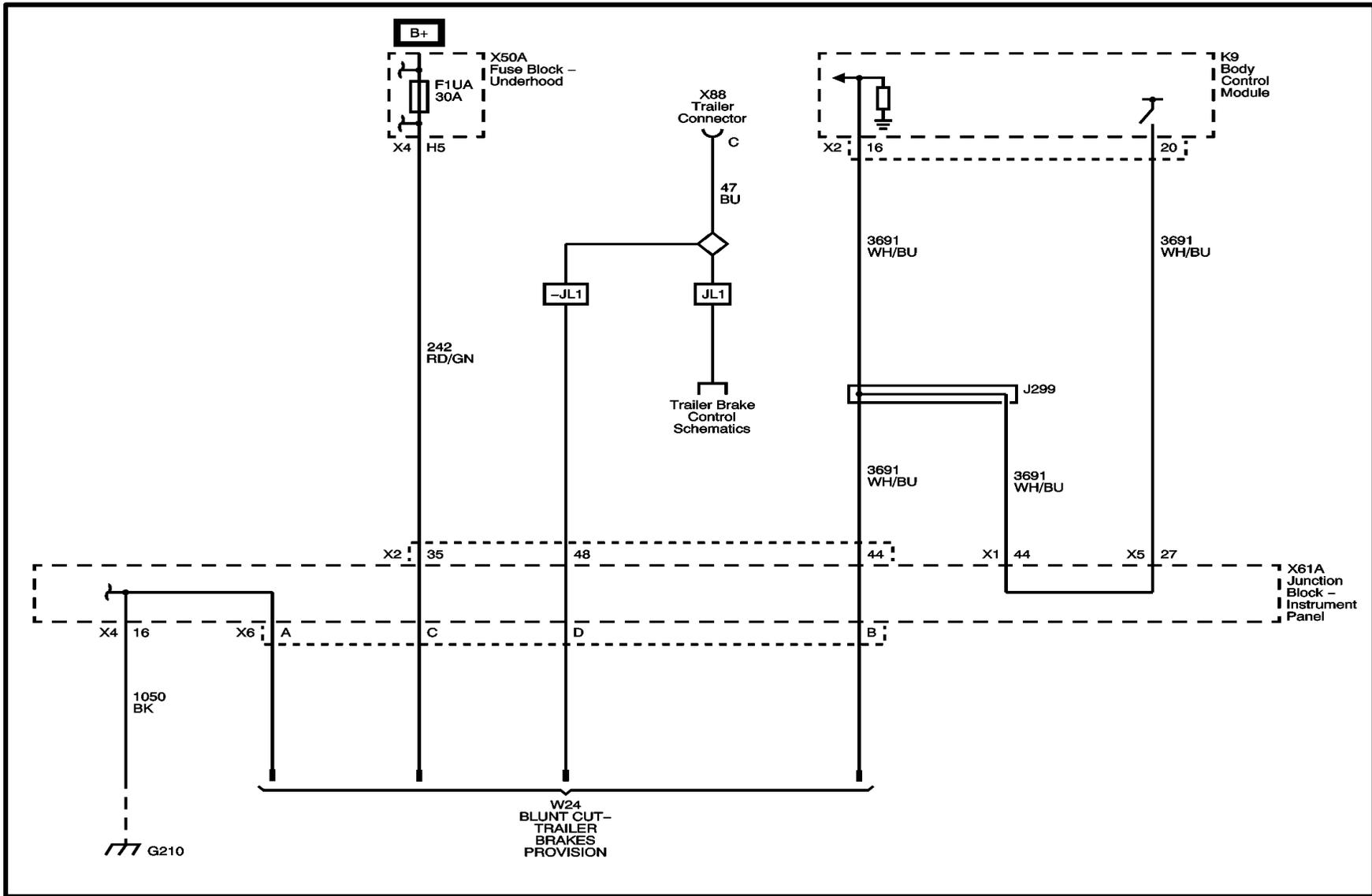


| Pin   | Size | Color   | Circuit | Function                             |
|-------|------|---------|---------|--------------------------------------|
| 1     | 2.5  | RD/VT   | 1940    | Battery Positive Voltage             |
| 2     | -    | -       | -       | Not Occupied                         |
| 3     | 0.5  | BN      | 3891    | Aero Shutter Control                 |
| 4     | 0.5  | GY      | 3890    | Aero Shutter Control 2               |
| 5     | 0.5  | D-BU    | 2500    | High Speed GMLAN Serial Data (+) (1) |
| 6     | 0.5  | D-BU    | 2500    | High Speed GMLAN Serial Data (+) (1) |
| 7     | -    | -       | -       | Not Occupied                         |
| 8     | 0.5  | VT/YE   | 5985    | Accessory Wakeup Serial Data         |
| 9-10  | -    | -       | -       | Not Occupied                         |
| 11    | 0.5  | GY      | 3890    | Aero Shutter Control 2               |
| 12    | 0.5  | BN      | 3891    | Aero Shutter Control                 |
| 13-16 | -    | -       | -       | Not Occupied                         |
| 17    | 0.5  | WH      | 2501    | High Speed GMLAN Serial Data (-) (1) |
| 18    | 0.5  | WH      | 2501    | High Speed GMLAN Serial Data (-) (1) |
| 19-20 | -    | -       | -       | Not Occupied                         |
| 21    | 0.75 | PU/L-GN | 439     | Run/Crank Ignition 1 Voltage         |
| 22-24 | -    | -       | -       | Not Occupied                         |
| 25    | 2.5  | BK      | 2150    | Ground                               |
| 26-38 | -    | -       | -       | Not Occupied                         |

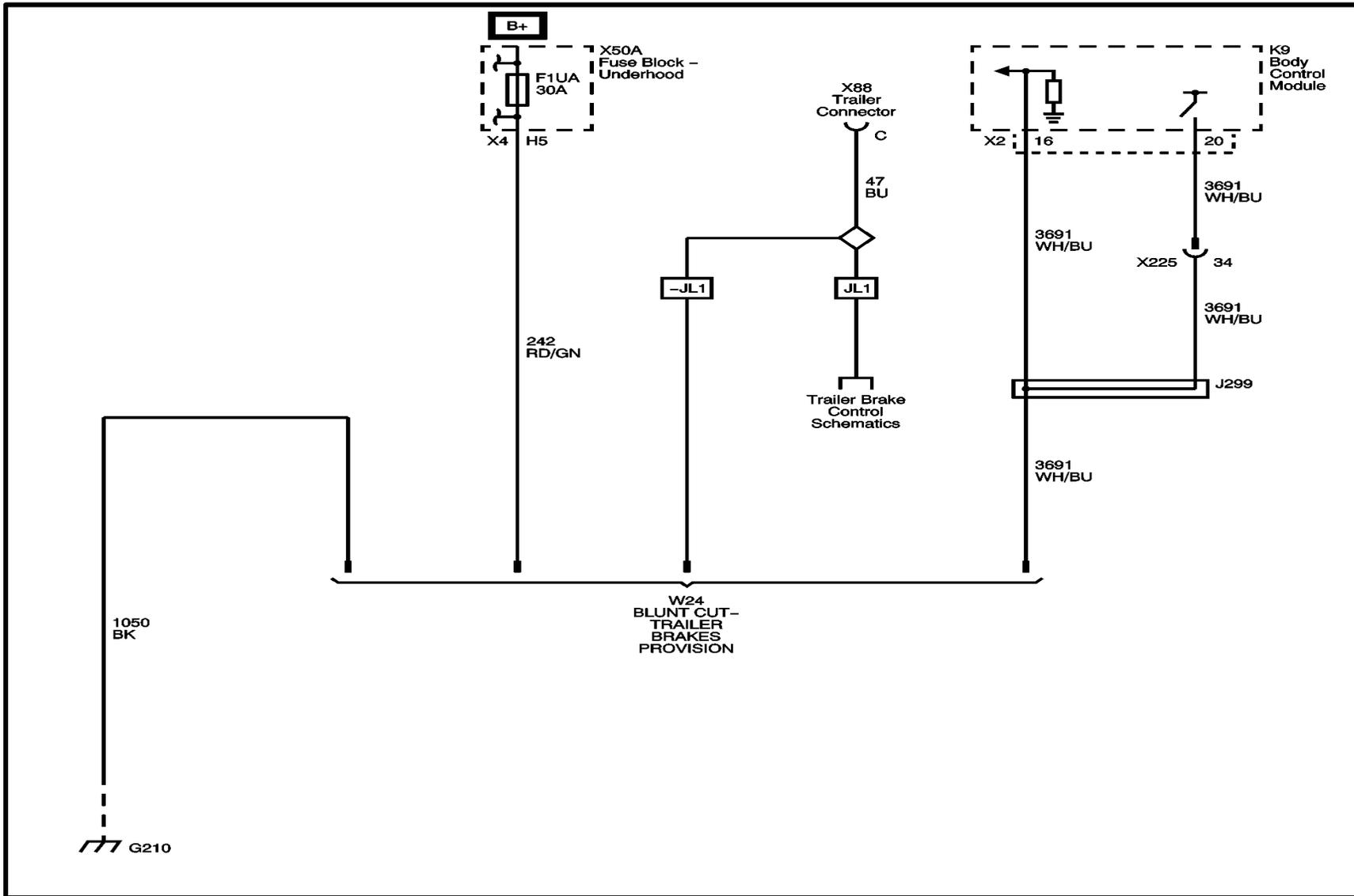
## Trailer Connector 1 of 3 (Terminals A, B, D, E, F & G)



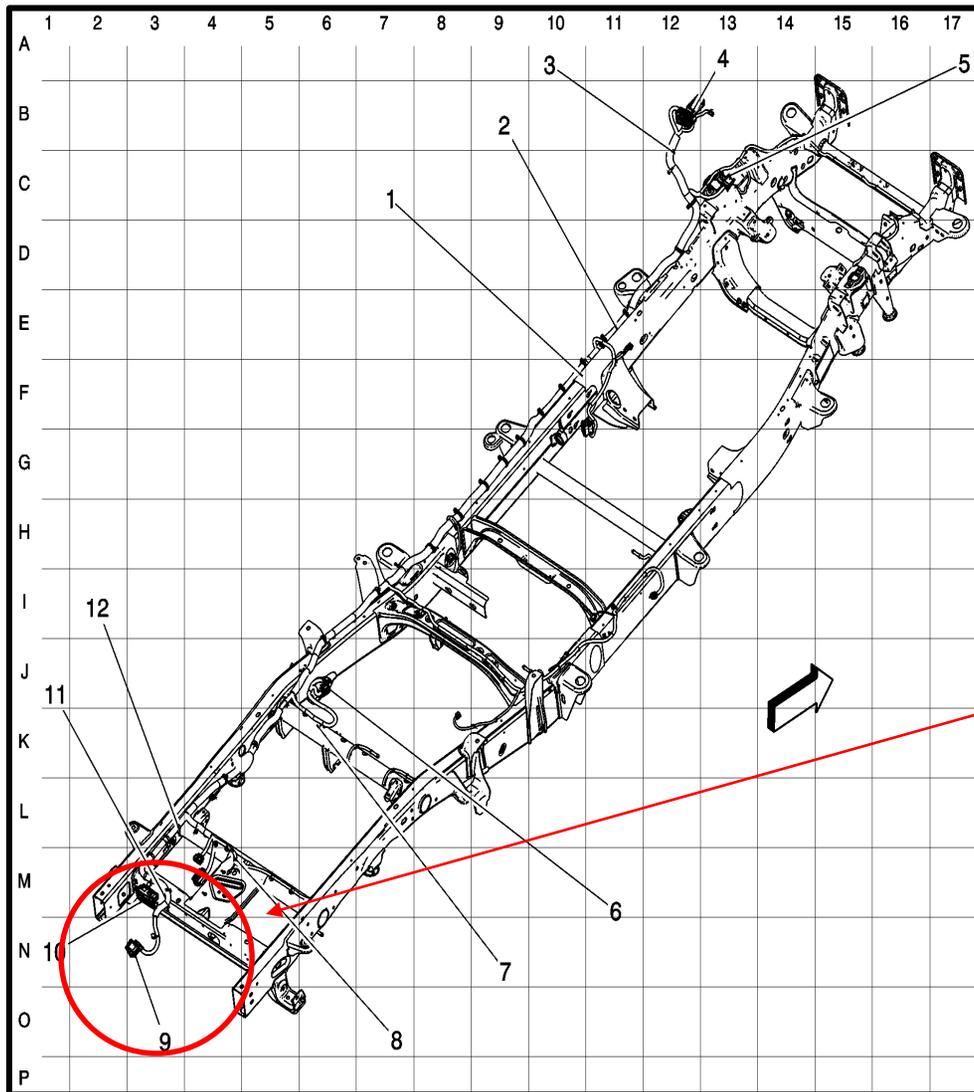
Trailer Connector 2 of 3 (Terminal C except E29)



Trailer Connector 3 of 3 (Terminal C with E29)

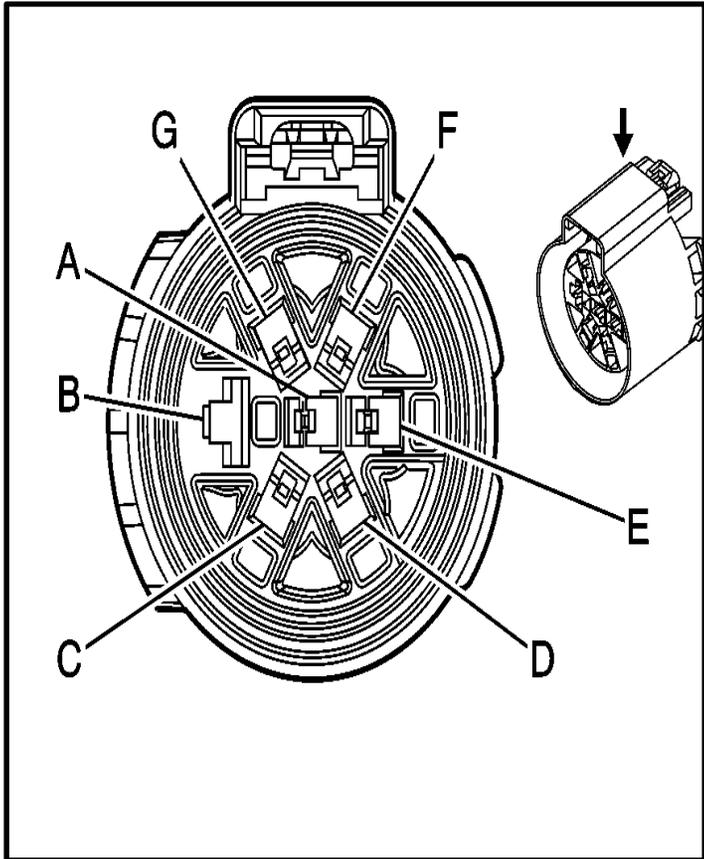


## Trailer Connector Location



- (1) SP29
- (2) SP30
- (3) SP31
- (4) X185
- (5) X125
- (6) X350
- (7) J375
- (8) SP27
- (9) X88 Trailer Connector**
- (10) X63A Junction Block – Rear Body
- (11) SP111
- (12) SP28

**Trailer Connector Pin Out**



| Pin | Size | Color   | Circuit | Function   |
|-----|------|---------|---------|--|
| A   | 0.75 | WH/L-GN | 1624    | Trailer Backup Lamp Supply Voltage               |
| B   | 5    | WH      | 22      | Trailer Ground                                   |
| C   | 2.5  | D-BU    | 47      | Trailer Auxiliary Supply Voltage                 |
| D   | 0.75 | L-GN/VT | 1619    | Right Rear Trailer Stop/Turn Lamp Supply Voltage |
| E   | 4    | RD/L-GN | 742     | Battery Positive Voltage                         |
| F   | 1.5  | GY/BN   | 2109    | Trailer Park Lamp Supply Voltage                 |
| G   | 0.75 | YE/GY   | 1618    | Left Rear Trailer Stop/Turn Lamp Supply Voltage  |

## Section B

### Understanding the Alpha Numeric Naming Convention

#### Fuse, Relay, and Block Names

If a block has text-based names on a label of some sort, those will only appear in the Electrical Center Identification Views Usage Table. Refer to the [Electrical Center Identification Views](#) topic for additional information.

#### Fuse Names

Fuse names depend on whether they are an inline fuse, or if they are located within a block. Inline fuses are assigned a component code/name, while fuses located within a block use the following strategy:

Fuse names within blocks will be identified by four characters described below:

#### 1<sup>st</sup> Character

- F = Fuse, Circuit Breaker
- R = Diodes, Resistors

#### 2<sup>nd</sup> Character

Position number within the block

#### 3<sup>rd</sup> Character

Alpha character defining the block position within the vehicle

- U = Engine Compartment (Underhood)
- D = I/P (within instrument panel)
- P = Passenger Compartment (not in I/P, can be in center console)
- R = Body Rear (Rear of the Passenger Compartment or Rear Compartment)
- **B = Battery or Auxiliary Battery**
- **H = Fuse Holder**

#### 4<sup>th</sup> Character

Alpha character (start with A, B, C,...) at the end identifying whether there is more than one block residing in the same area on the vehicle within the same vehicle publication.

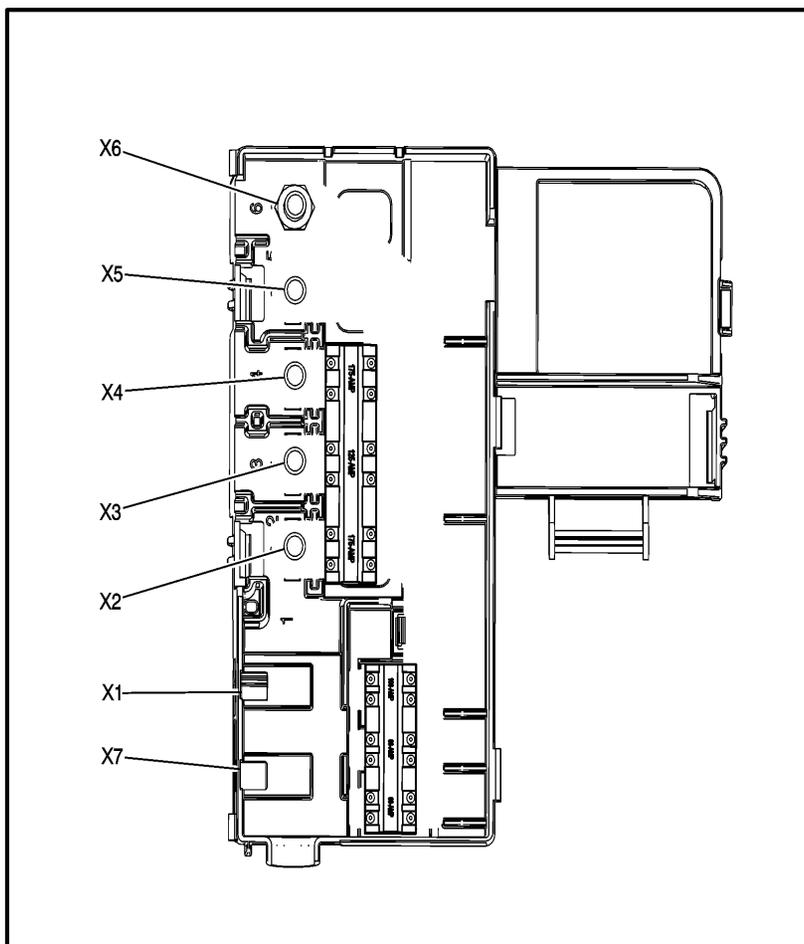
Example:

- Fuse 11 of a vehicle with a single block within the engine compartment would be F11UA
- Fuse 13 of a vehicle with two blocks within the engine compartment would be F13UA and F13UB

Only the assigned names, described above will appear on the schematic graphic. Both the assigned name and the name on the label, (if equipped) will appear in the block usage table in the Electrical Center Identification Views.

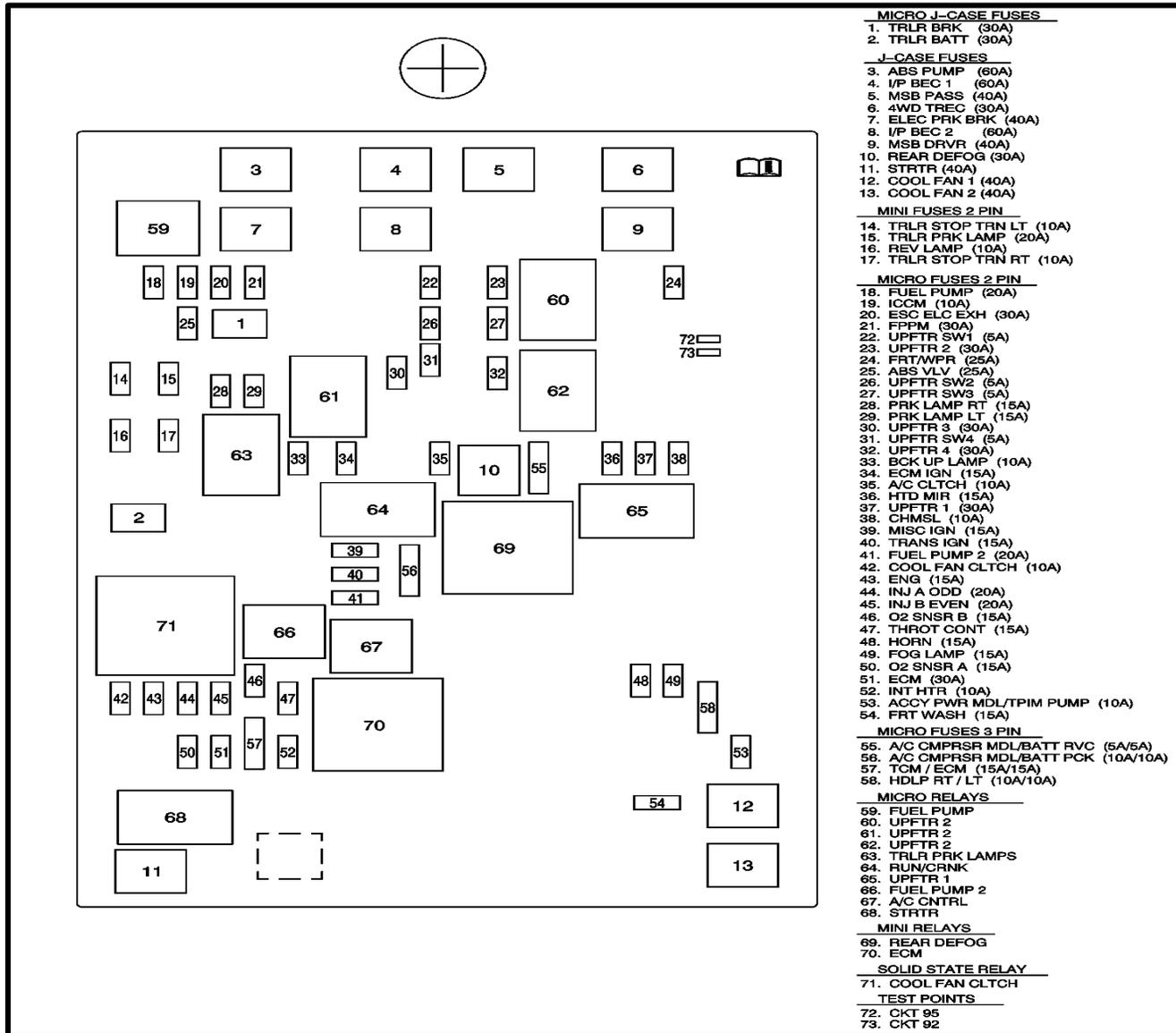
If block has fuse numbers on the label that repeat (typically based on fuse type), make the 4<sup>th</sup> character unique for each type. For example, use A for 1 type, B for second type, and so on. Additionally, if there are multiple blocks within the same zone, the 4<sup>th</sup> character can be assigned based on position. For example, if the instrument panel had two fuse blocks, one at each end, the 4<sup>th</sup> position can be L for the block on the left and R for the block on the right.

## Battery Fuse Block –Top View

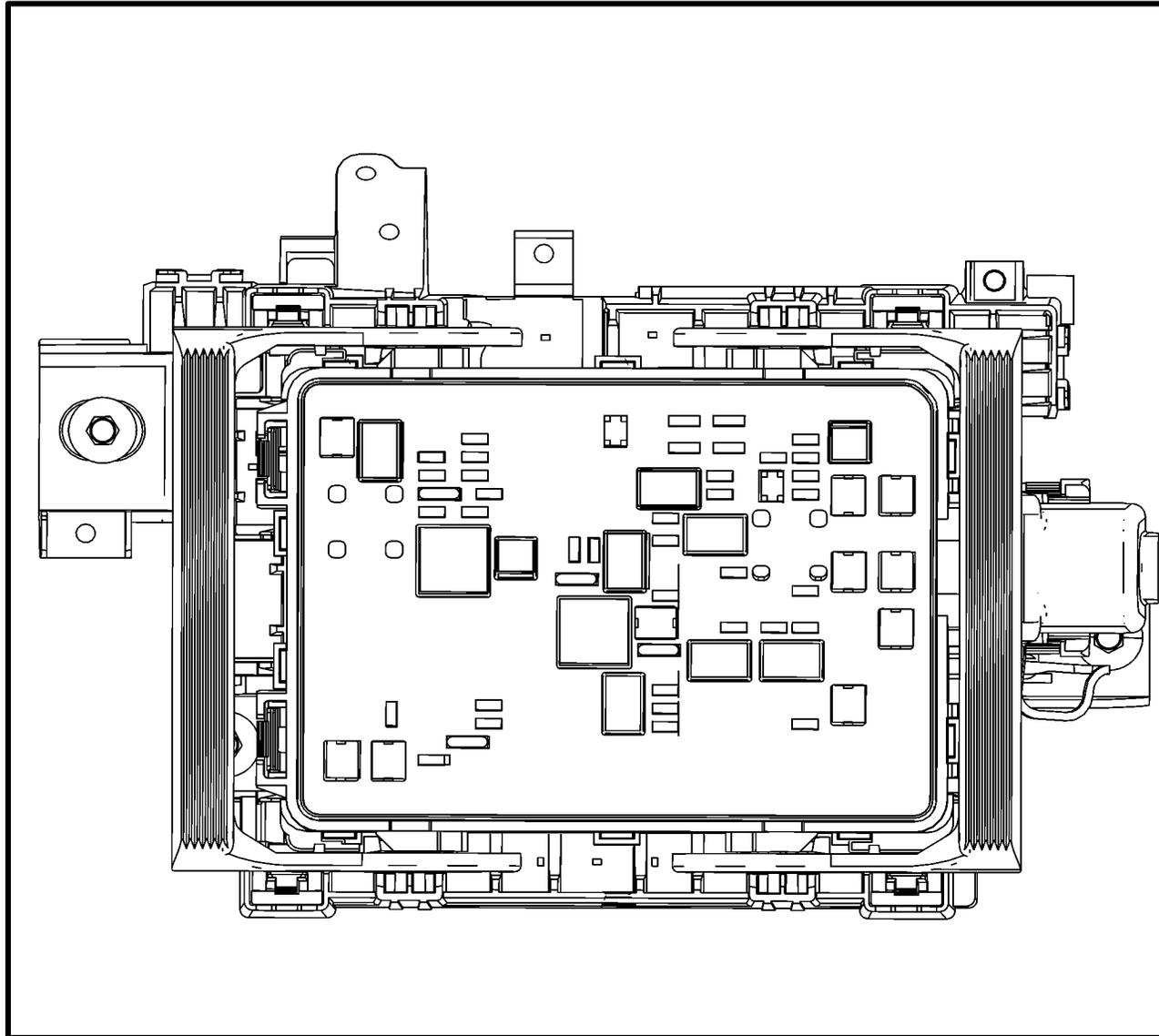


| No. | Device Assigned Name | Rating | Description  |
|-----|----------------------|--------|--|
| X1  | F4UD                 | 175A   | K34 Power Steering Control Module (K4B), M64 Starter Motor                       |
| X2  | F3UD                 | 125A   | Not Used   |
| X3  | F2UD                 | 175A   | G13 Generator (KW5), X50A Fuse Block-Underhood, X55J Fuse Holder-Generator (KW5) |
| X4  | F1UD                 | 100A   | Not Used   |
| X5  | F7UD                 | 60A    | X51R Fuse Block-Instrument Panel Right   |
| X6  | F6DA                 | 60A    | X51R Fuse Block-Instrument Panel Right   |

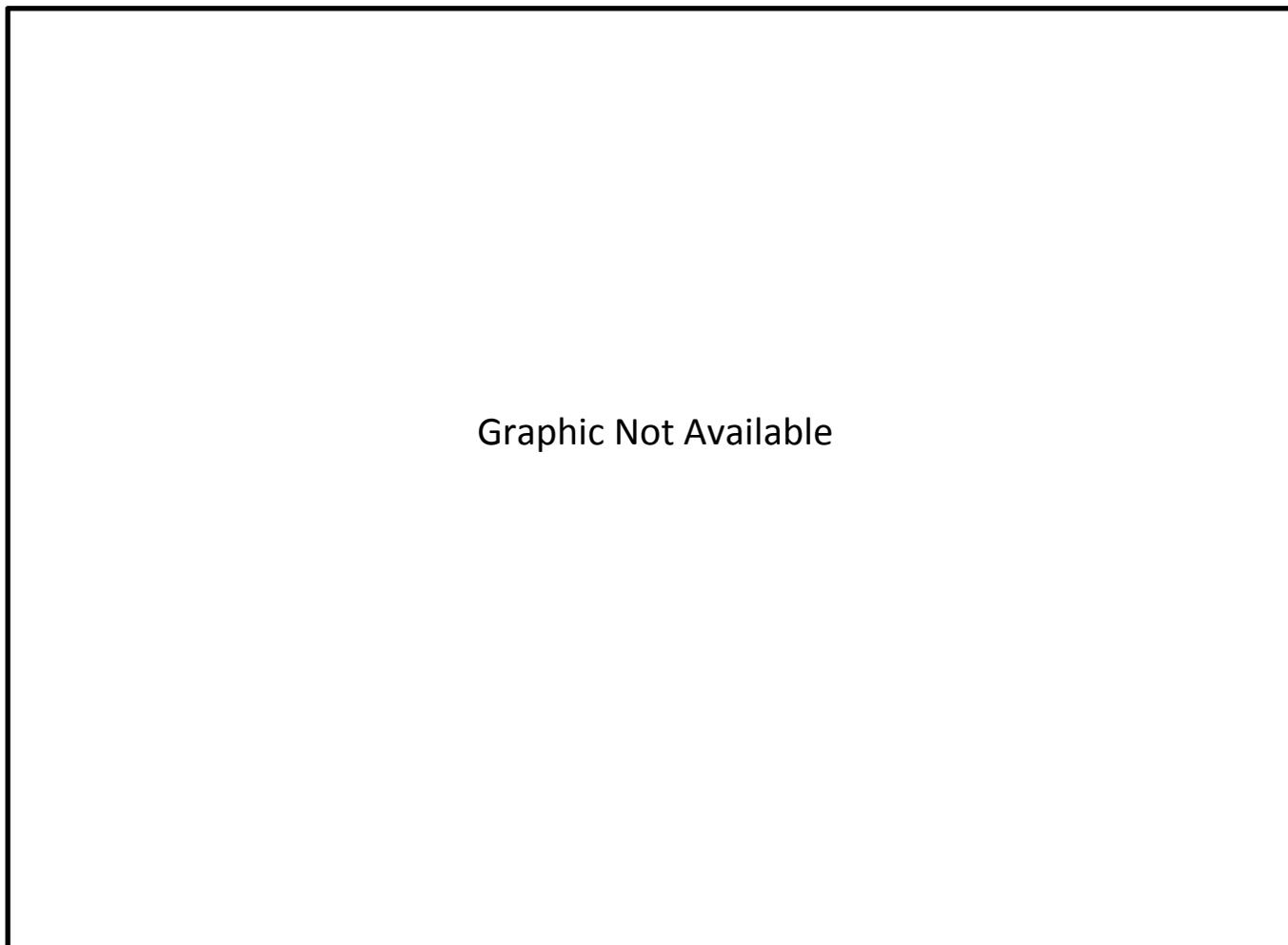
## Fuse Block (X50) Under-hood - Label



Fuse Block (X50) Under-hood - Top View



**Fuse Block (X50) Under-hood - Bottom View**



| <b>X50A Fuse Block – Under-hood Label Usage</b> |                          |                             |               |   |
|---|--------------------------|-----------------------------|---------------|---|
| <b>No.</b>                                      | <b>Device Label Name</b> | <b>Device Assigned Name</b> | <b>Rating</b> | <b>Description</b>  |
| <i>Micro J-Case Fuses</i>                       |                          |                             |               |   |
| 01  | TRLR BRK                 | F1UA                        | 30 A          | Blunt Cut (E29), X61A Junction Clock-Instrument Panel (-E29)  |
| 02  | TRLR BATT                | F2UA                        | 30 A          | C1B Battery Auxiliary (K4B), X88 Trailer Connector  |
| <i>J-Case Fuses</i>                             |                          |                             |               |   |
| 03  | ABS PUMP                 | F3UA                        | 60 A          | K17 Electronic Brake Control Module   |
| 04  | I/P BEC 1                | F4UA                        | 50 A          | F6DL, F7DL, F8DL, F9DL, F17DL, F25DL, F26DL, F34DL, F44DL, F45DL  |
| 05  | MSB PASS                 | F5UA                        | 40 A          | Not Used  |
| 06  | ELEC PRK BRK             | F6UA                        | 40 A          | Not Used  |
| 07  | IP BEC 2                 | F7UA                        | 50 A          | F3DL, F11DL, F13DL, F29DL, F38DL, F40DL, F41DL, KR74 Ignition Run Relay, KR76A Retained Accessory Power Relay 1 |
| 08  | MSB DRVR                 | F8UA                        | 40 A          | Not Used  |
| 09  | REAR DEFOG               | F9UA                        | 30 A          | E18 Rear Defogger Grid  |
| 10  | STRTR                    | F10UA                       | 40 A          | KR27 Starter Relay  |
| 11  | COOL FAN 1               | F11UA                       | 40 A          | G10L Cooling Fan Motor-Left   |
| 12  | COOL FAN 2               | F12UA                       | 40 A          | G10R Cooling Fan Motor-Right  |
| <i>Mini Fuses 2 Pin</i>                         |                          |                             |               |   |
| 13  | TRLR STOP TRN LT         | F13UA                       | 10 A          | X88 Trailer Connector   |
| 14  | TRLR PRK LAMP            | F14UA                       | 20 A          | X88 Trailer Connector   |
| 15  | REV LAMP                 | F15UA                       | 10 A          | A10 Inside Rearview Mirror, B87 Rearview Camera, E5E Tail Lamp-Left, E5F Tail Lamp-Right                        |
| 16  | TRLR STOP TRN RT         | F16UA                       | 10 A          | X88 Trailer Connector   |

| <b>X50A Fuse Block – Under-hood Label Usage</b> |                          |                             |               |  |
|---|--------------------------|-----------------------------|---------------|--|
| <b>No.</b>                                      | <b>Device Label Name</b> | <b>Device Assigned Name</b> | <b>Rating</b> | <b>Description</b>   |
| <b>Micro Fuses 2 Pin</b>                        |                          |                             |               |  |
| 17  | FUEL PUMP                | F17UA                       | 20 A          | KR23A Fuel Pump Relay  |
| 18  | ICCM                     | F18UA                       | 10 A          | K38 Chassis Control Module   |
| 19  | ESC ELC EXH              | F19UA                       | 30 A          | Not Used   |
| 20  | FPPM                     | F20UA                       | 30 A          | K111 Fuel Pump Driver Control Module   |
| 21  | UPFTR SW1                | F21UA                       | 5 A           | Not Used   |
| 22  | UPFTR 2                  | F22UA                       | 30 A          | Not Used   |
| 23  | FRT/WPR                  | F23UA                       | 25 A          | KR12B Windshield Wiper Relay, KR12C Windshield Wiper Speed Control Relay   |
| 24  | ABS VLV                  | F24UA                       | 25 A          | K17 electronic Brake Control Module  |
| 25  | UPFTR SW2                | —                           | —             | Not Used   |
| 26  | UPFTR SW3                | F26UA                       | 5 A           | Not Used   |
| 27  | PRK LMP RT               | F27UA                       | 15 A          | E5F Tail Lamp Right, E3RF Rear Fender Clearance Lamp-Right Front (-SRW). E2A Marker Lamp-Endgate (-SRW), E3RR Rear Fender Clearance Lamp-Right Rear, E4D Daytime Running Lamp-Right, E4K Park Lamp-Right Front (X88), E2RF Side Marker Lamp-Right Front (Z88)  |
| 28  | PRK LMP LT               | F28UA                       | 15 A          | E5E Tail Lamp Left, E3LF Rear Fender Clearance Lamp-Left Front (-SRW).E3A Roof Clearance Lamp-Left front Outer (U01), E3C Roof Clearance Lamp-Front Middle (U01), E3E Clearance Lamp-Right Front Outer (U01), E3LR Rear Fender Clearance Lamp-Left Rear, E4C Daytime Running Lamp-Left, E4J Park Lamp-Left Front (X88), E2LF Side Marker Lamp-Left Front (Z88) |
| 29  | UPFTR 3                  | F29UA                       | 30 A          | Not Used   |
| 30  | UPFTR SW4                | —                           | —             | Not Used   |
| 31  | UPFTR 4                  | F31UA                       | 30 A          | Not Used   |
| 32  | BCK UP LAMP              | F32UA                       | 10 A          | X88 Trailer Connector  |

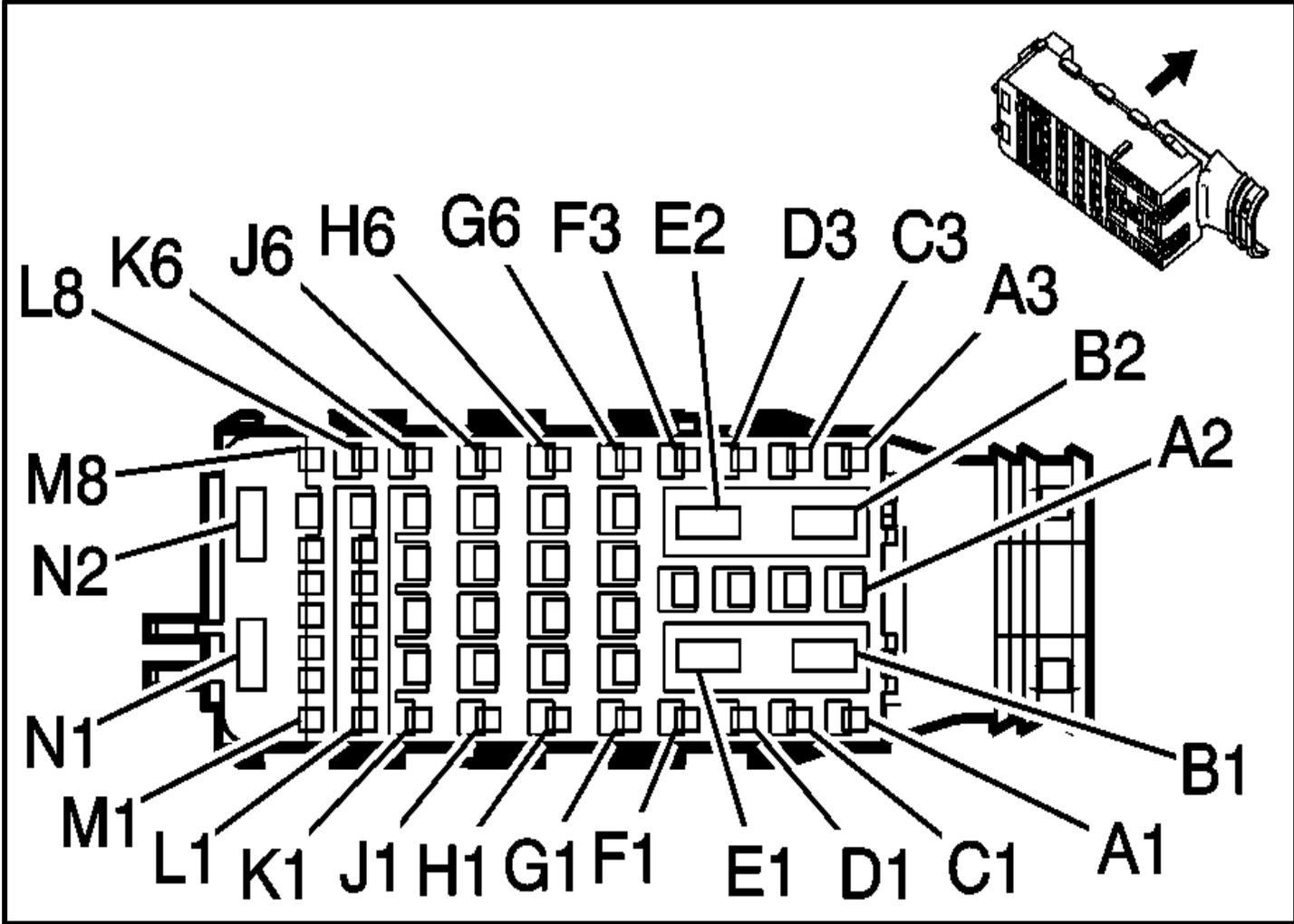
| <b>X50A Fuse Block – Under-hood Label Usage</b> |                          |                             |               |  |
|---|--------------------------|-----------------------------|---------------|--|
| <b>No.</b>                                      | <b>Device Label Name</b> | <b>Device Assigned Name</b> | <b>Rating</b> | <b>Description</b>   |
| 33  | ECM IGN                  | F33UA                       | 15 A          | K20 Engine Control Module, K38 Chassis Control Module, K111 Fuel Pump Driver Control Module,   |
| 34  | A/C CLTCH                | F34UA                       | 10 A          | KR29 A/C Compressor Clutch Relay   |
| 35  | HTD MIR                  | F35UA                       | 15 A          | E17D Outside Rearview Mirror Glass-Driver, E17P Outside Rearview Mirror Glass-Passenger  |
| 36  | UPFTR 1                  | F36UA                       | 30 A          | Not Used   |
| 37  | CHMSL                    | F37UA                       | 10 A          | E6 Center High Mounted Stop Lamp   |
| 38  | MISC IGN                 | F38UA                       | 10 A          | Not Used   |
| 39  | TRANS IGN                | F39UA                       | 15 A          | T12 Automatic Transmission Assembly, M26 Front Axle Engagement Actuator, K69 Transfer Case Control Module                                |
| 40  | FUEL PUMP 2              | —                           | —             | Not Used   |
| 41  | COOL FAN CLTCH           | —                           | —             | Not Used   |
| 42  | ENG                      | F42UA                       | 15 A          | B75C Multi Function Intake Air Sensor  |
| 43  | INJ A ODD                | F43UA                       | 20 A          | K20 Engine Control Module, T8A Ignition Coil 1, T8C Ignition Coil 3, T8E Ignition Coil 5, T8G Ignition Coil 7                            |
| 44  | INJ B EVEN               | F44UA                       | 20 A          | K20 Engine Control Module, T8B Ignition Coil 2, T8D Ignition Coil 4, T8F Ignition Coil 6, T8H Ignition Coil 8                            |
| 45  | O2 SNSR B                | F45UA                       | 15 A          | B52D Heated Oxygen Sensor Bank 1 Sensor 2, B52F Heated Oxygen Sensor-Bank 2 Sensor 2   |
| 46  | THROT CONT               | F46UA                       | 15 A          | Not Used   |
| 47  | HORN                     | F47UA                       | 15 A          | P12 Horn   |
| 48  | FOG LAMP                 | F48UA                       | 15 A          | E29LF Fog Lamp-Left Front, E29RF Fog Lamp-Right Front  |
| 49  | O2 SNSR A                | F49UA                       | 15 A          | B52C Heated Oxygen Sensor Bank 1 Sensor 1, B52E Heated Oxygen Sensor-Bank 2 Sensor 1, Q12 Evaporative Emission Purge Solenoid Valve, Q43 |

| <b>X50A Fuse Block – Under-hood Label Usage</b> |                          |                             |               |  |
|---|--------------------------|-----------------------------|---------------|--|
| <b>No.</b>                                      | <b>Device Label Name</b> | <b>Device Assigned Name</b> | <b>Rating</b> | <b>Description</b>   |
|   |                          |                             |               | Valve Lifter Oil Manifold Assembly, Q44 Engine Oil Pressure Control Solenoid Valve   |
| 50  | ECM                      | F50UA                       | 30 A          | K20 Engine Control Module  |
| 51  | INT HTR                  | F51UA                       | 10 A          | Not Used   |
| 52  | ACCY PWR MDL/TPIM PUMP   | F52UA                       | 10 A          | Not Used   |
| 53  | FRT WASH                 | F53UA                       | 15 A          | G24 Windshield Washer Pump   |
| <b>Micro Fuses 3 Pin</b>                        |                          |                             |               |  |
| 54  | A/C CMPSR MDL/BATT RVC   | F54UA                       | 5A/5A         | K20 Body Control Module  |
| 55  | A/C CMPSR MDL/BATT PCK   | F55UA                       | 10A/10A       | Not Used   |
| 56  | TCM / ECM                | F56UA                       | 15A/15A       | K20 Engine Control Module Q13 Evaporative Emission Vent Solenoid Valve, T12 Automatic Transmission Assembly  |
| 57  | HDLP RT / LT             | F57UA                       | 10A/10A       | E4E Headlamp-Left High Beam (X88), E4F Headlamp-Right High Beam (X88), M28L High Beam Solenoid Actuator-Left (Z88), M28R High Beam Solenoid Actuator-Right (Z88) |
| <b>Micro Relays</b>                             |                          |                             |               |  |
| 58  | FUEL PUMP                | KR23A Fuel Pump Relay       | —             | G12 Fuel Pump  |
| 59  | UPFTR 2                  | —                           | —             | Not Used   |
| 60  | UPFTR 3                  | —                           | —             | Not Used   |

| <b>X50A Fuse Block – Under-hood Label Usage</b>   |                          |                                     |               |  |
|---|--------------------------|-------------------------------------|---------------|--|
| <b>No.</b>  | <b>Device Label Name</b> | <b>Device Assigned Name</b>         | <b>Rating</b> | <b>Description</b>   |
| 61  | UPFTR 4                  | —                                   | —             | Not Used   |
| 62  | TRLR PRK LAMPS           | KR125 Trailer Park Lamps Relay      | —             | F14UA, F27UA, F28UA, K20 Body Control Module                 |
| 63  | RUN/CRNK                 | KR73 Ignition Main relay            | —             | F33UA, F38UA, F39UA, F55UA, K9 Body Control Module           |
| 64  | UPFTR 1                  | —                                   | —             | Not Used   |
| 65  | FUEL PUMP 2              | —                                   | —             | Not Used   |
| 66  | A/C CNTRL                | KR29 A/C Compressor Clutch Relay    | —             | Q2 A/C Compressor Clutch, K20 Engine Control Module          |
| 67  | STRTR                    | KR27 Starter Relay                  | —             | M64 Starter Motor  |
| <b>Mini Relays</b>  |                          |                                     |               |  |
| 68  | REAR DEFOG               | KR5 Rear Defogger Relay             | —             | F9UA, F35UA  |
| 69  | ECM                      | KR75 Engine Controls Ignition Relay | —             | F41UA, F42UA, F43UA, F44UA, F45UA, F46UA, F49UA, F50UA, KR29 |
| <b>Solid State Relays</b>   |                          |                                     |               |  |
| 70  | COOL FAN CLTCH           | —                                   | —             | Not Used   |
| <b>Test Points</b>  |                          |                                     |               |  |
| 71  | CKT 95                   | 71                                  | —             | —  |
| 72  | CKT 92                   | 72                                  | —             | —  |
| <b>Note:</b> Relays listed below are <b>non-serviceable Printed Circuit Board (PCB) relays</b> and are internal to the block. |                          |                                     |               |  |

| <b>X50A Fuse Block – Under-hood Label Usage</b> |                          |   |               |   |
|---|--------------------------|---|---------------|---|
| <b>No.</b>                                      | <b>Device Label Name</b> | <b>Device Assigned Name</b>                     | <b>Rating</b> | <b>Description</b>  |
| —   | —                        | KR3 Horn Relay                                  | —             | F47UA, P12 Horn   |
| —   | —                        | KR11 Windshield Washer Pump Relay               | —             | F53UA, G24 Windshield Washer Pump   |
| —   | —                        | KR12B Windshield Wiper Relay                    | —             | KR12C Windshield Wiper Speed Control Relay  |
| —   | —                        | KR12C Windshield Wiper Speed Control Relay      | —             | M75 Windshield Wiper Motor  |
| —   | —                        | KR46 Front Fog Lamp Relay                       | —             | E29LF Fog Lamp-Left Front, E29RF Fog Lamp- Right Front, F48UA   |
| —   | —                        | KR48 Headlamp High Beam Relay                   | —             | F57UA, E4E Headlamp- Left High Beam (X88), E4F Headlamp-Right High Beam (X88), M28L High Beam Solenoid Actuator-Left (Z88) M28R High Beam Solenoid Actuator-Right (Z88) |
| —   | —                        | KR59 Stop Lamp Relay                            | —             | F37UA, E6 Center High Mounted Stop Lamp   |
| —   | —                        | KR61 Trailer Backup Lamp Relay                  | —             | A10 Inside Rearview Mirror, B87 Rearview Camera, E5E Tail lamp-Left, E5F Tail lamp-Right, F15UA, F32UA, X88 Trailer Connector   |
| —   | —                        | KR63L Trailer Stop/Turn Signal Lamp Relay-Left  | —             | F13UA, X88 Trailer Connector  |
| —   | —                        | KR63R Trailer Stop/Turn Signal Lamp Relay-Right | —             | F16UA, X88 Trailer Connector  |

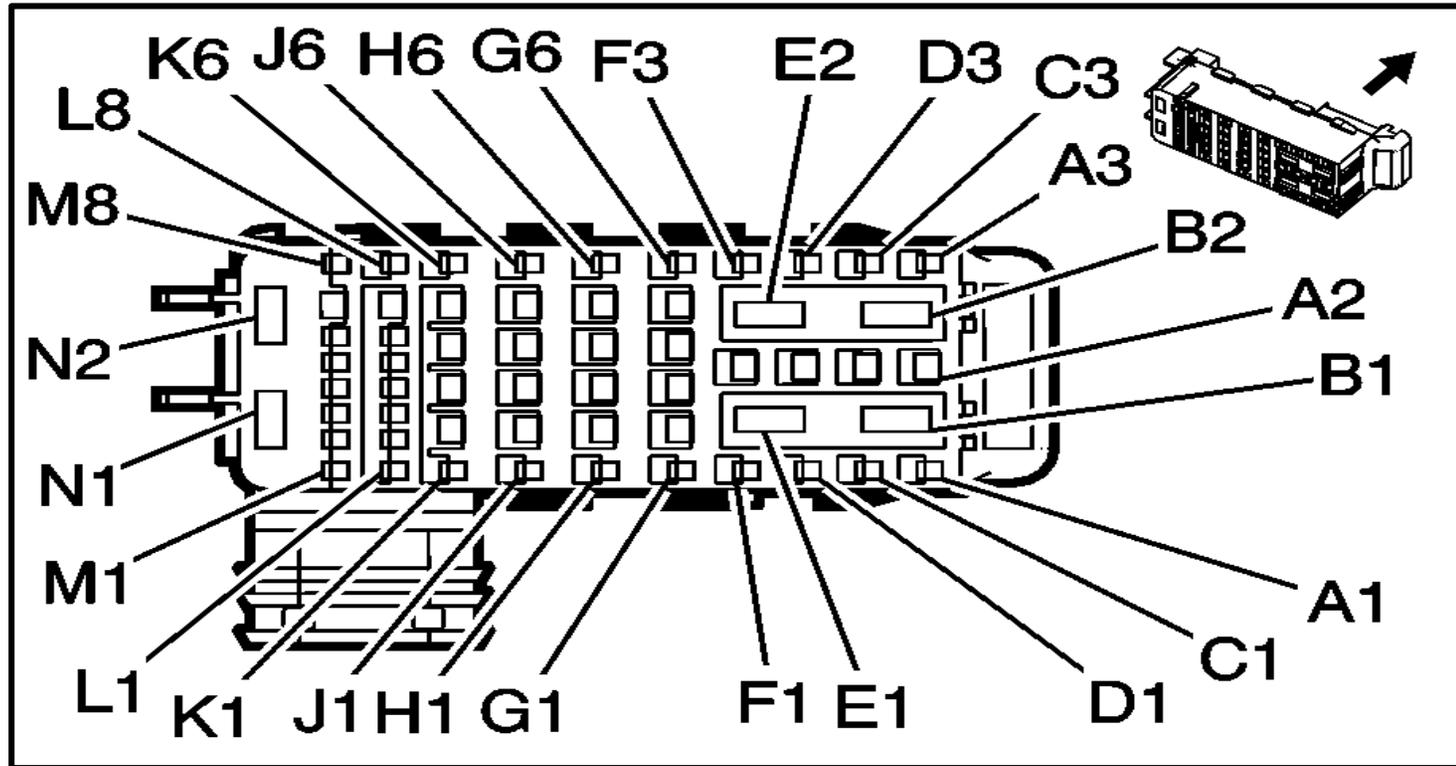
Fuse Block (X50A) Under-hood - Connector X1



## Fuse Block (X50A) Under-hood - Connector X1 (continued)

| Pin | Size | Color   | Circuit | Function                                    |
|-----|------|---------|---------|---|
| A   | -    | -       | -       | Not Occupied                                |
| B2  | 4    | RD/GY   | 642     | Battery Positive Voltage                    |
| C   | -    | -       | -       | Not Occupied                                |
| D1  | 0.75 | YE      | 712     | Left Headlamp Low Beam Supply Voltage       |
| D3  | 0.75 | L-GN/VT | 1315    | Right Front Turn Signal Lamp Supply Voltage |
| E2  | 4    | RD/WH   | 342     | Battery Positive Voltage                    |
| F1  | 0.5  | GY/BN   | 309     | Right Park Lamp Supply Voltage              |
| F2  | 0.75 | GY/VT   | 228     | Windshield Washer Pump Control              |
| F3  | 0.75 | D-BU/WH | 1314    | Left Front Turn Signal Lamp Supply Voltage  |
| G1  | 0.5  | VT/GY   | 709     | Left Park Lamp Supply Voltage               |
| G4  | 0.5  | BK      | 150     | Ground                                      |
| H2  | 0.75 | GY/D-BU | 7538    | Left Front DRL Supply Voltage               |
| H4  | 0.5  | WH      | 311     | Right Headlamp High Beam Supply Voltage     |
| H6  | 0.75 | D-BU/BN | 7539    | Right Front DRL Supply Voltage              |
| J2  | 0.75 | BN/GY   | 29      | Horn Control                                |
| J3  | 0.5  | BN/VT   | 2234    | Front Fog Lamp Supply Voltage               |
| J4  | 0.5  | WH      | 711     | Left Headlamp High Beam Supply Voltage      |
| J5  | 0.75 | YE      | 312     | Right Headlamp Low Beam Supply Voltage      |
| K-  | -    | -       | -       | Not Occupied                                |

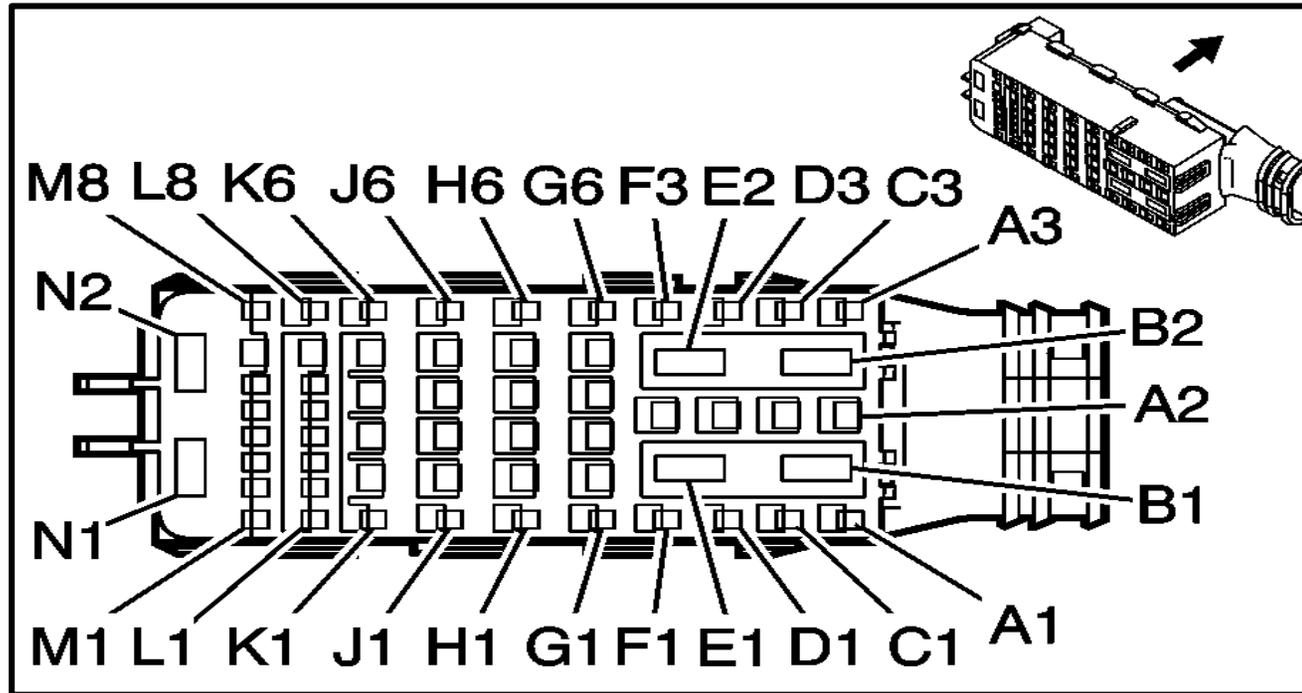
## Fuse Block (X50A) Under-hood - Connector X2



| Pin | Size | Color   | Circuit | Function                             |
|-----|------|---------|---------|--------------------------------------|
| A1  | 0.5  | WH/GY   | 459     | A/C Compressor Clutch Relay Control  |
| B   | -    | -       | -       | Not Occupied                         |
| C1  | 0.75 | BN/L-GN | 59      | A/C Compressor Clutch Supply Voltage |
| D3  | 0.5  | YE/BK   | 625     | Starter Enable Relay Control         |
| E2  | 4    | YE      | 6       | Starter Solenoid Crank Voltage       |
| F2  | 2.5  | BK      | 550     | Ground                               |

| Pin | Size | Color   | Circuit | Function                               |
|-----|------|---------|---------|--|
| G3  | 0.5  | VT/D-BU | 5293    | Powertrain Main Relay Fused Supply (4) |
| G4  | 2.5  | VT/D-BU | 5290    | Powertrain Main Relay Fused Supply (1) |
| G5  | 0.75 | RD/L-GN | 1840    | Battery Positive Voltage               |
| H2  | 0.75 | VT/D-BU | 5291    | Powertrain Main Relay Fused Supply (2) |
| H3  | 0.75 | VT/D-BU | 5293    | Powertrain Main Relay Fused Supply (4) |
| H5  | 0.5  | RD/BN   | 440     | Battery Positive Voltage               |
| H6  | 0.5  | YE      | 5991    | Powertrain Relay Coil Control          |
| J2  | 0.5  | VT/D-BU | 5294    | Powertrain Main Relay Fused Supply (5) |
| J3  | 0.75 | VT/D-BU | 5291    | Powertrain Main Relay Fused Supply (2) |
| J4  | 0.75 | VT/D-BU | 5292    | Powertrain Main Relay Fused Supply (3) |
| J5  | 0.5  | VT/D-BU | 5294    | Powertrain Main Relay Fused Supply (5) |
| K3  | 0.5  | VT/D-BU | 5291    | Powertrain Main Relay Fused Supply (2) |
| K4  | 0.75 | VT/D-BU | 5292    | Powertrain Main Relay Fused Supply (3) |
| K5  | 0.5  | VT/D-BU | 5292    | Powertrain Main Relay Fused Supply (3) |
| L7  | 0.5  | VT/BK   | 2139    | Run/Crank Ignition 1 Voltage           |
| M5  | 0.5  | GY      | 5660    | Fuel Pump Controller Data Out Signal   |
| M6  | 0.75 | BK/WH   | 451     | Signal Ground                          |
| M7  | 0.5  | VT/L-GN | 439     | Run/Crank Ignition 1 Voltage           |
| N-  | -    | -       | -       | Not Occupied                           |

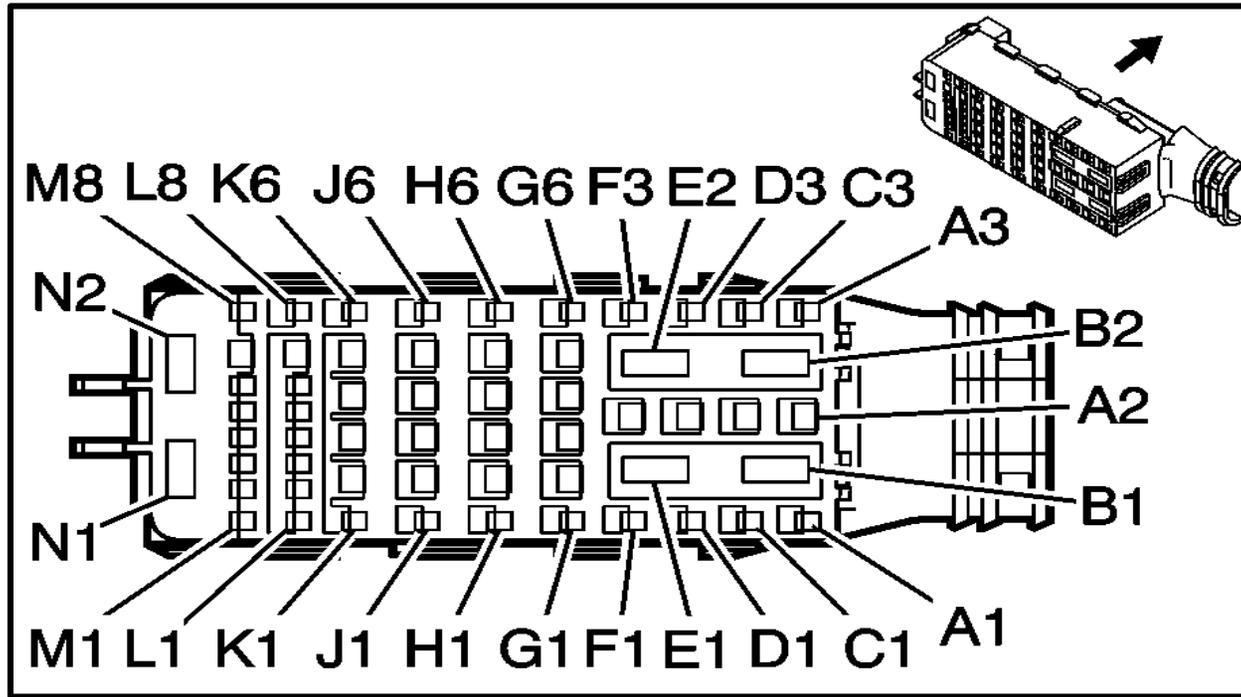
## Fuse Block (X50A) Under-hood - Connector X3



| Pin | Size | Color     | Circuit | Function                                    |
|-----|------|-----------|---------|---|
| A1  | 0.5  | YE/D-BU   | 18      | Left Rear Stop/Turn Lamp Supply Voltage     |
| B1  | 4    | RD/GY     | 1342    | Battery Positive Voltage                    |
| C1  | 0.5  | BN/L-GN   | 19      | Right Rear Stop/Turn Lamp Supply Voltage    |
| D1  | 0.75 | L-GN/VT   | 1315    | Right Front Turn Signal Lamp Supply Voltage |
| E   | -    | -         | -       | Not Occupied                                |
| F1  | 0.75 | D-BU/WH   | 1314    | Left Front Turn Signal Lamp Supply Voltage  |
| F3  | 0.5  | D-BU/L-GN | 962     |   |

| Pin | Size | Color     | Circuit | Function   |
|-----|------|-----------|---------|--|
| G1  | 0.75 | D-BU/BN   | 7539    | Right Front DRL Supply Voltage                   |
| H2  | 1    | BK        | 550     | Ground   |
| J1  | 0.35 | WH/VT     | 860     | Front Windshield Wiper Switch High Signal        |
| K1  | 0.5  | VT/WH     | 5065    | Stop Lamp Relay Coil Supply Voltage              |
| K3  | 1    | YE/BN     | 95      | Windshield Wiper Motor Low Speed Control         |
| K4  | 1    | WH        | 92      | Windshield Wiper Motor High Speed Control        |
| K6  | 0.35 | BN/GY     | 2268    | Windshield Washer Relay Control                  |
| L2  | 0.35 | BN/VT     | 1969    | Headlamp High Beam Relay Control                 |
| L4  | 0.35 | GY        | 91      | Windshield Wiper Motor Relay Coil Supply Voltage |
| L5  | 0.5  | BN/WH     | 1317    | Fog Lamp Relay Control                           |
| L6  | 0.35 | BN/WH     | 28      | Horn Relay Control                               |
| L7  | 0.5  | BN/YE     | 2267    | Mirror Heating Element Supply Voltage            |
| M1  | 0.75 | YE        | 312     | Right Headlamp Low Beam Supply Voltage           |
| M5  | 0.5  | D-BU/L-GN | 961     |  |
| M6  | 0.5  | VT/GY     | 1054    | Stop Lamp Supply Voltage                         |
| M7  | 2.5  | RD/L-GN   | 965     |  |
| N-  | -    | -         | -       | Not Occupied                                     |

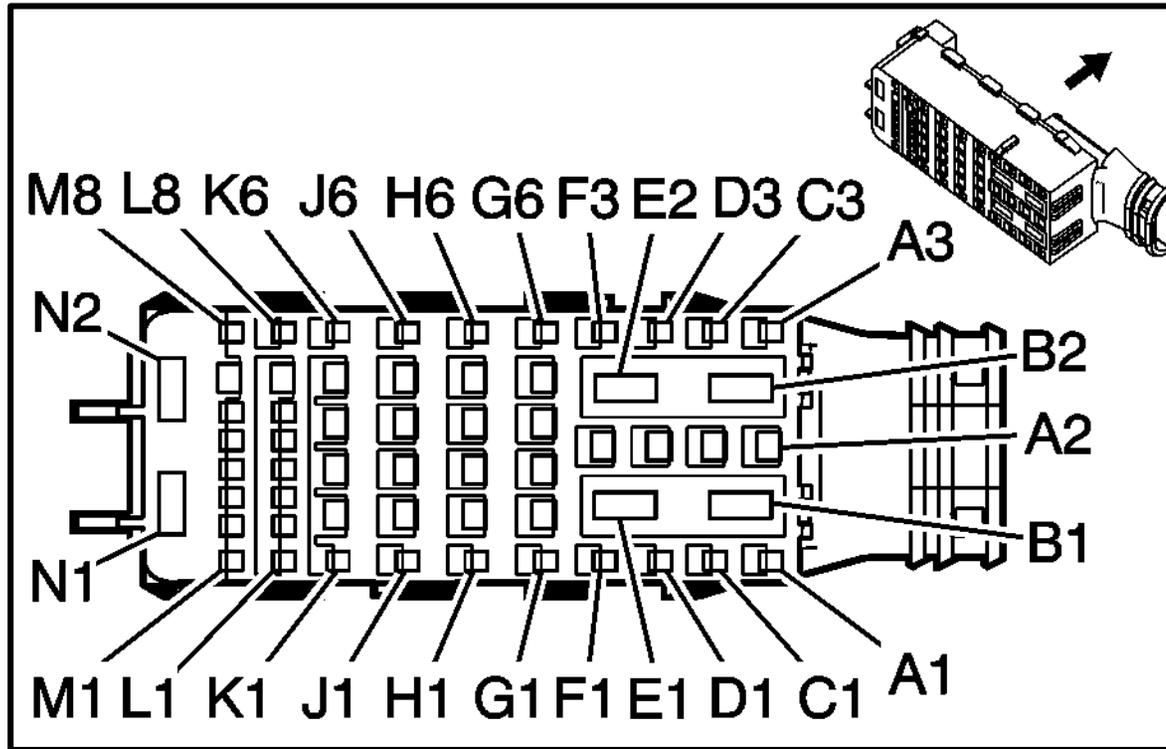
## Fuse Block (X50A) Under-hood - Connector X4



| Pin | Size | Color   | Circuit | Function                     |
|-----|------|---------|---------|------------------------------|
| A3  | 0.5  | L-GN/WH | 24      | Backup Lamp Supply Voltage   |
| B2  | 5    | RD/VT   | 842     | Battery Positive Voltage     |
| C   | -    | -       | -       | Not Occupied                 |
| D3  | 0.5  | VT/L-GN | 1739    | Run/Crank Ignition 1 Voltage |
| E2  | 5    | RD/D-BU | 42      | Battery Positive Voltage     |
| F3  | 0.35 | L-GN/WH | 24      | Backup Lamp Supply Voltage   |
| G2  | 2.5  | RD/L-GN | 966     |                              |

| Pin | Size | Color     | Circuit | Function                              |
|-----|------|-----------|---------|---------------------------------------|
| H5  | 2.5  | RD/L-GN   | 242     | Battery Positive Voltage              |
| J6  | 0.75 | BK/WH     | 451     | Signal Ground                         |
| J1  | 0.75 | GY/D-BU   | 7538    | Left Front DRL Supply Voltage         |
| K1  | 0.75 | YE        | 712     | Left Headlamp Low Beam Supply Voltage |
| K2  | 2.5  | RD/L-GN   | 968     |                                       |
| K5  | 2.5  | RD/L-GN   | 967     |                                       |
| K6  | 0.5  | VT/GY     | 709     | Left Park Lamp Supply Voltage         |
| L1  | 0.5  | D-BU/L-GN | 964     |                                       |
| L2  | 0.35 | YE/GY     | 5187    | Right Trailer Turn Signal Lamp        |
| L3  | 0.35 | D-BU/BN   | 38      | Backup Lamp Relay Control             |
| L4  | 0.35 | D-BU/WH   | 5186    | Left Trailer Turn Signal Lamp         |
| L5  | 0.35 | D-BU      | 45      | Park Lamp Relay Control               |
| L6  | 0.5  | D-BU/L-GN | 963     |                                       |
| M1  | 0.75 | RD/YE     | 2340    | Battery Positive Voltage              |
| M2  | 0.35 | BN/VT     | 193     | Rear Defog Relay Control              |
| M5  | 0.35 | L-GN/VT   | 5199    | Run/Crank Relay Coil Control          |
| N1  | 2.5  | BN/VT     | 293     | Rear Defog Element Supply Voltage     |

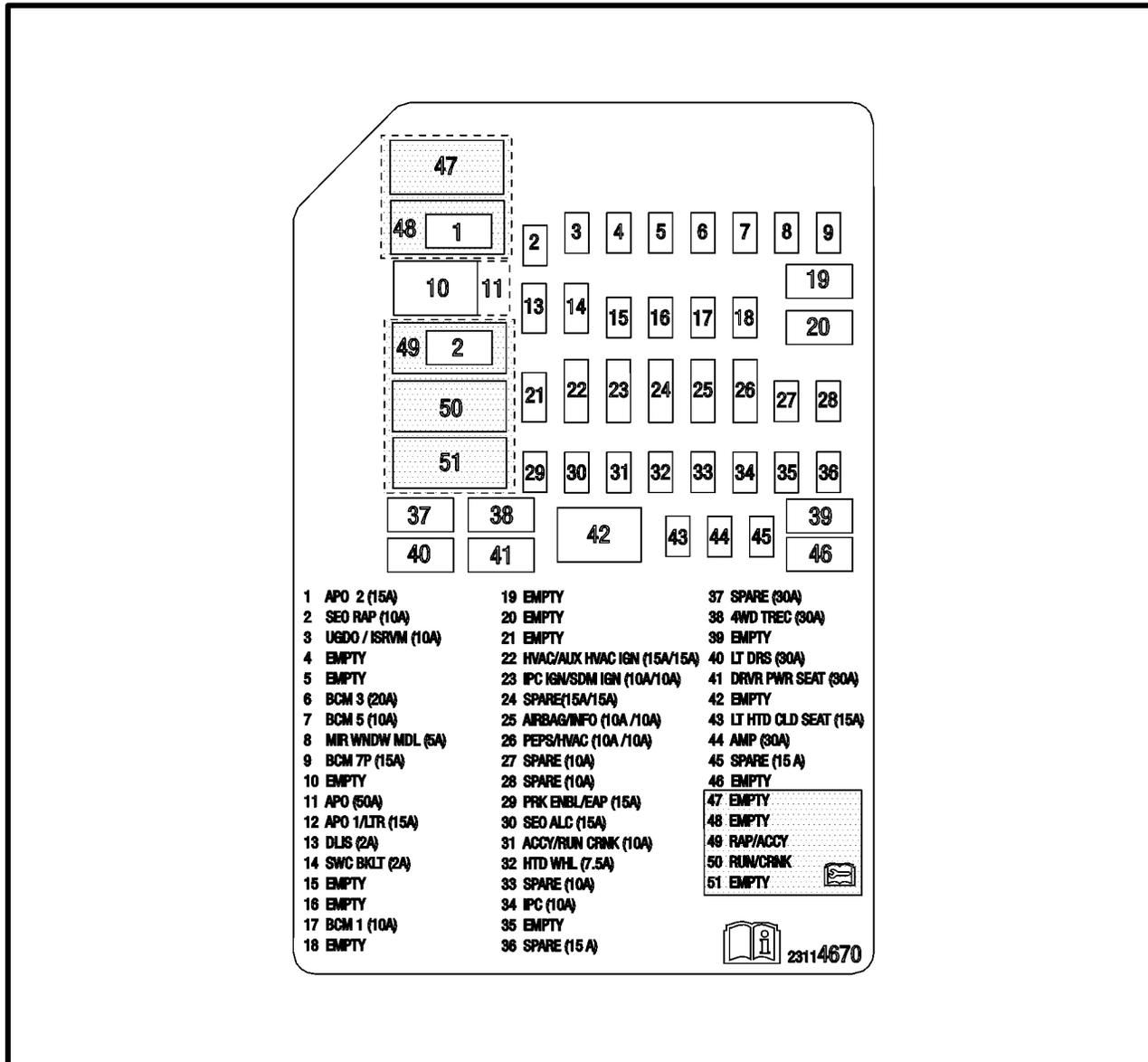
## Fuse Block (X50A) Under-hood - Connector X5



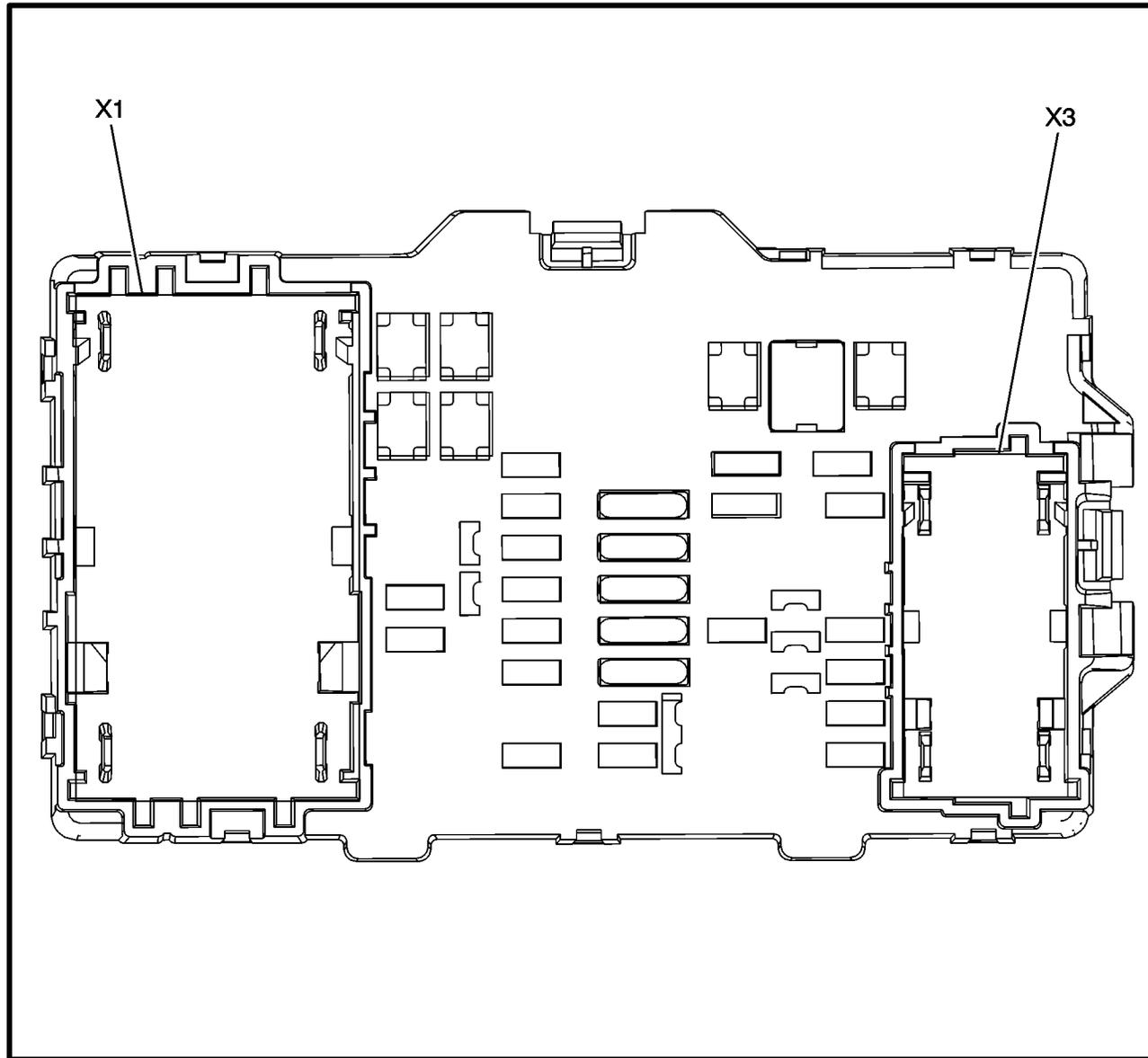
| Pin | Size | Color   | Circuit | Function                                 |
|-----|------|---------|---------|--|
| A2  | 0.75 | YE/D-BU | 18      | Left Rear Stop/Turn Lamp Supply Voltage  |
| A3  | 0.75 | BN/L-GN | 19      | Right Rear Stop/Turn Lamp Supply Voltage |
| B1  | 5    | RD/YE   | 442     | Battery Positive Voltage                 |
| C1  | 0.75 | L-GN/WH | 24      | Backup Lamp Supply Voltage               |
| D1  | 0.5  | VT/L-GN | 1739    | Run/Crank Ignition 1 Voltage             |
| E   | -    | -       | -       | Not Occupied                             |

| Pin | Size | Color   | Circuit | Function   |
|-----|------|---------|---------|--|
| F1  | 0.5  | L-GN/WH | 24      | Backup Lamp Supply Voltage                       |
| F3  | 0.5  | GY      | 3890    | Aero Shutter Control 2                           |
| G2  | 2.5  | RD/VT   | 1940    | Battery Positive Voltage                         |
| G4  | 0.75 | RD/WH   | 2040    | Battery Positive Voltage                         |
| H3  | 0.5  | RD/L-GN | 1840    | Battery Positive Voltage                         |
| H6  | 0.5  | BN      | 3891    | Aero Shutter Control                             |
| J2  | 2.5  | RD/L-GN | 242     | Battery Positive Voltage                         |
| J3  | 1.5  | GY/BN   | 2109    | Trailer Park Lamp Supply Voltage                 |
| J4  | 2.5  | RD/VT   | 1640    | Battery Positive Voltage                         |
| J5  | 0.5  | VT/L-GN | 439     | Run/Crank Ignition 1 Voltage                     |
|     | 0.75 | PU/L-GN | 439     | Run/Crank Ignition 1 Voltage                     |
| K2  | 0.75 | VT/GY   | 709     | Left Park Lamp Supply Voltage                    |
| K4  | 0.75 | GY/BN   | 309     | Right Park Lamp Supply Voltage                   |
| K5  | 0.75 | YE/GY   | 1618    | Left Rear Trailer Stop/Turn Lamp Supply Voltage  |
| K6  | 0.75 | L-GN/VT | 1619    | Right Rear Trailer Stop/Turn Lamp Supply Voltage |
| L   | -    | -       | -       | Not Occupied                                     |
| M1  | 0.5  | VT/GY   | 1054    | Stop Lamp Supply Voltage                         |
| M5  | 0.5  | GY      | 5660    | Fuel Pump Controller Data Out Signal             |
| M7  | 0.5  | VT/D-BU | 5294    | Powertrain Main Relay Fused Supply (5)           |
| M8  | 0.75 | WH/L-GN | 1624    | Trailer Backup Lamp Supply Voltage               |
| N2  | 4    | RD/L-GN | 742     | Battery Positive Voltage                         |

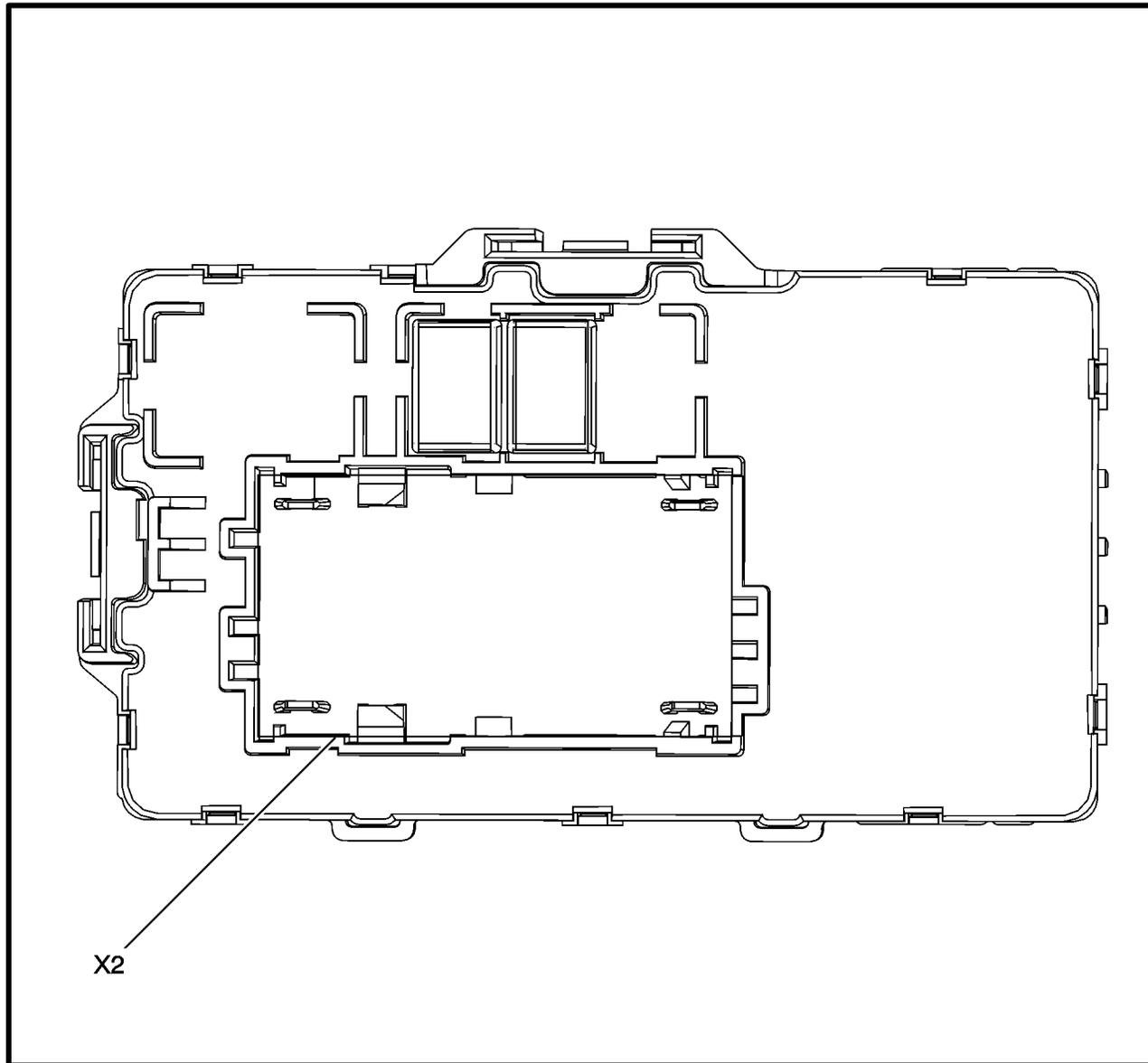
## Fuse Block (X51L) Instrument Panel Left - Label



**Fuse Block (X51L) Instrument Panel Left - Top View**

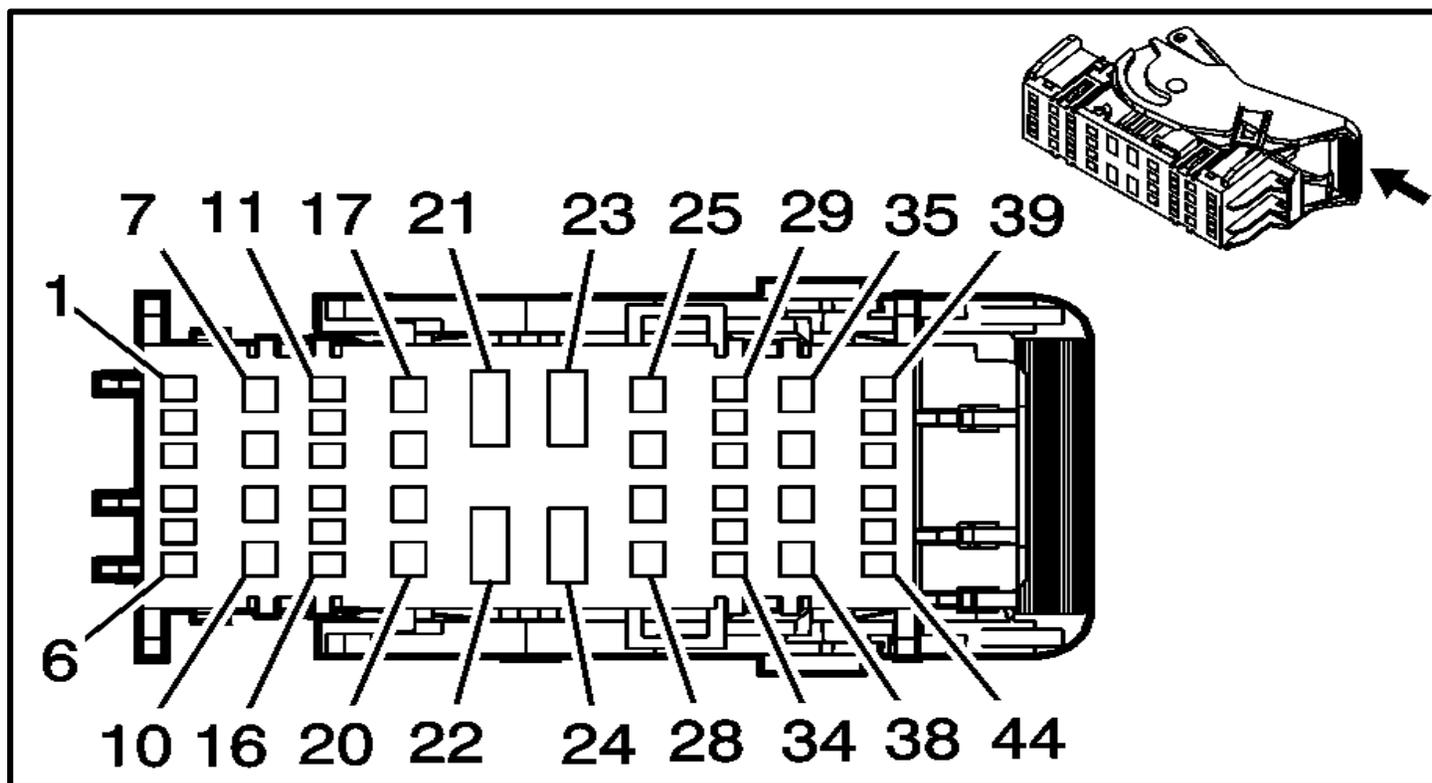


**Fuse Block (X51L) Instrument Panel Left - Bottom View**



X2

Fuse Block (X51L) Instrument Panel Left – Connector X1



## Fuse Block (X51L) Instrument Panel Left – Connector X1 Pin-out

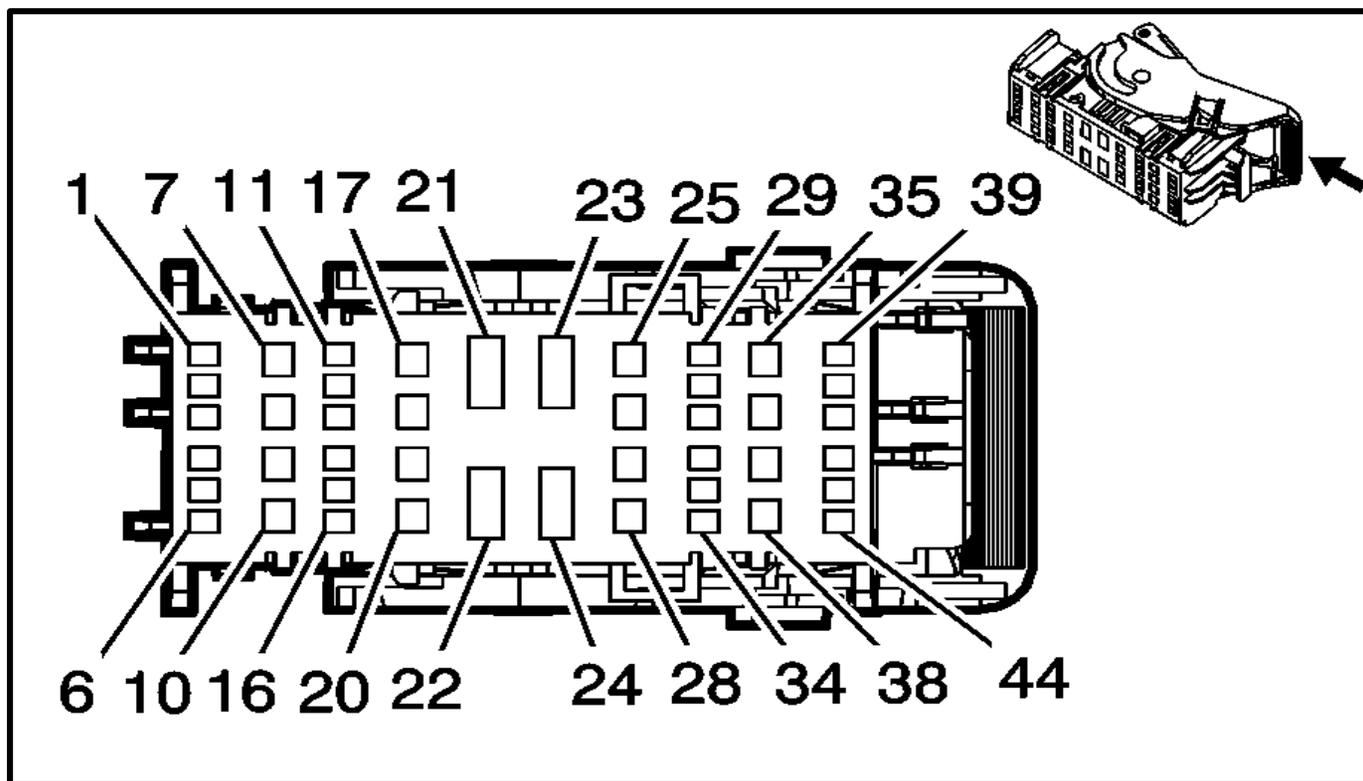
### X51L Fuse Block - Instrument Panel Left X1

| Pin   | Size | Color   | Circuit | Function                                   |
|-------|------|---------|---------|--|
| 1-3   | -    | -       | -       | Not Occupied                               |
| 4     | 0.75 | RD/L-GN | 5140    | Battery Positive Voltage                   |
| 5     | 0.5  | RD/L-GN | 4440    | Battery Positive Voltage                   |
|       | 0.35 | RD/L-GN | 4440    | Battery Positive Voltage                   |
| 6-14  | -    | -       | -       | Not Occupied                               |
| 15    | 0.35 | L-GN/GY | 5286    | Adjustable Pedal Switch Forward Signal     |
| 16    | 0.35 | RD/VT   | 1940    | Battery Positive Voltage                   |
| 17    | 2.5  | RD/YE   | 3740    | Battery Positive Voltage                   |
| 18    | 0.75 | RD/L-GN | 5140    | Battery Positive Voltage                   |
| 19    | -    | -       | -       | Not Occupied                               |
| 20    | 0.75 | L-GN/VT | 5130    | Adjustable Pedal Actuator Forward Control  |
| 21    | 5    | RD/VT   | 842     | Battery Positive Voltage                   |
| 22    | -    | -       | -       | Not Occupied                               |
| 23    | 5    | RD/D-BU | 42      | Battery Positive Voltage                   |
| 24-26 | -    | -       | -       | Not Occupied                               |
| 27    | 2.5  | RD/YE   | 5040    | Battery Positive Voltage                   |
| 28    | 0.75 | YE      | 5129    | Adjustable Pedal Actuator Rearward Control |
| 29    | -    | -       | -       | Not Occupied                               |
| 30    | 0.5  | VT/WH   | 1939    | Run/Crank Ignition 1 Voltage               |
| 31    | -    | -       | -       | Not Occupied                               |
| 32    | 0.5  | VT/L-GN | 1739    | Run/Crank Ignition 1 Voltage               |
| 33    | 0.35 | WH/GY   | 5285    | Adjustable Pedal Switch Rearward Signal    |

## X51L Fuse Block - Instrument Panel Left X1

| Pin   | Size | Color   | Circuit | Function                     |
|-------|------|---------|---------|------------------------------|
| 34-35 | -    | -       | -       | Not Occupied                 |
| 36    | 2.5  | RD/D-BU | 1842    | Battery Positive Voltage     |
| 37    | 2.5  | RD/D-BU | 1842    | Battery Positive Voltage     |
| 38-41 | -    | -       | -       | Not Occupied                 |
| 42    | 0.35 | L-GN/VT | 5199    | Run/Crank Relay Coil Control |
| 43    | 0.35 | GY/VT   | 755     | RAP Relay Coil Control       |
| 44    | 0.35 | VT/YE   | 43      | Accessory Voltage            |

Fuse Block (X51L) Instrument Panel Left – Connector X2

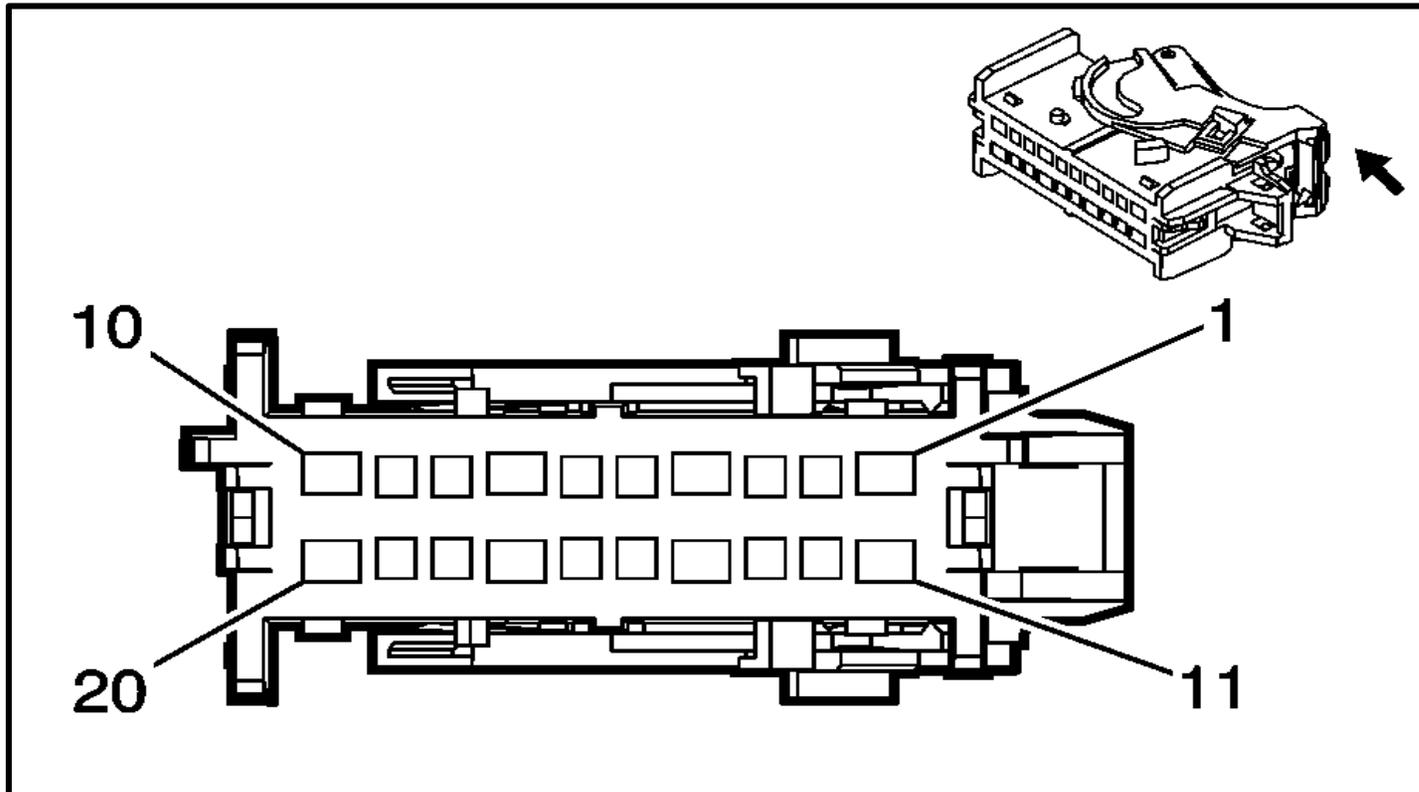


## Fuse Block (X51L) Instrument Panel Left – Connector X2 Pin-out

| X51L Fuse Block - Instrument Panel Left X2 |      |         |         |                               |
|--|------|---------|---------|-------------------------------|
| Pin  | Size | Color   | Circuit | Function                      |
| 1-2  | -    | -       | -       | Not Occupied                  |
| 3  | 0.5  | YE      | 6817    | LED Backlight Dimming Control |
| 4  | 0.35 | BN      | 6136    | Supply Voltage                |
| 5  | 0.5  | RD/D-BU | 540     | Battery Positive Voltage      |
| 6  | -    | -       | -       | Not Occupied                  |
| 7  | 0.5  | RD/BN   | 2940    | Battery Positive Voltage      |
| 8  | 1    | RD/GY   | 2140    | Battery Positive Voltage      |
| 9  | -    | -       | -       | Not Occupied                  |
| 10   | 1.5  | RD/BN   | 4240    | Battery Positive Voltage      |
| 11-14                                      | -    | -       | -       | Not Occupied                  |
| 15   | 0.5  | VT/GY   | 539     | Run/Crank Ignition 1 Voltage  |
| 16-17                                      | -    | -       | -       | Not Occupied                  |
| 18   | 0.5  | RD/WH   | 2740    | Battery Positive Voltage      |
| 19   | -    | -       | -       | Not Occupied                  |
| 20   | 1.5  | RD/WH   | 1040    | Battery Positive Voltage      |
| 21-24                                      | -    | -       | -       | Not Occupied                  |
| 25   | 0.5  | RD/VT   | 3340    | Battery Positive Voltage      |
| 26   | 0.35 | RD/D-BU | 3240    | Battery Positive Voltage      |
| 27   | -    | -       | -       | Not Occupied                  |
| 28   | 0.5  | VT/BK   | 1639    | Run/Crank Ignition 1 Voltage  |
| 29-34                                      | -    | -       | -       | Not Occupied                  |

| <b>X51L Fuse Block - Instrument Panel Left X2</b> |             |              |                |                              |
|---|-------------|--------------|----------------|------------------------------|
| <b>Pin</b>  | <b>Size</b> | <b>Color</b> | <b>Circuit</b> | <b>Function</b>              |
| 35  | 0.5         | RD/GY        | 2840           | Battery Positive Voltage     |
| 36  | -           | -            | -              | Not Occupied                 |
| 37  | 0.5         | VT/WH        | 1139           | Run/Crank Ignition 1 Voltage |
| 38  | 0.35        | VT/L-GN      | 1739           | Run/Crank Ignition 1 Voltage |
| 39-42   | -           | -            | -              | Not Occupied                 |
| 43  | 0.35        | YE           | 6812           | Out of Park Signal           |
| 44  | 0.75        | BK           | 1850           | Ground                       |

Fuse Block (X51L) Instrument Panel Left – Connector X3

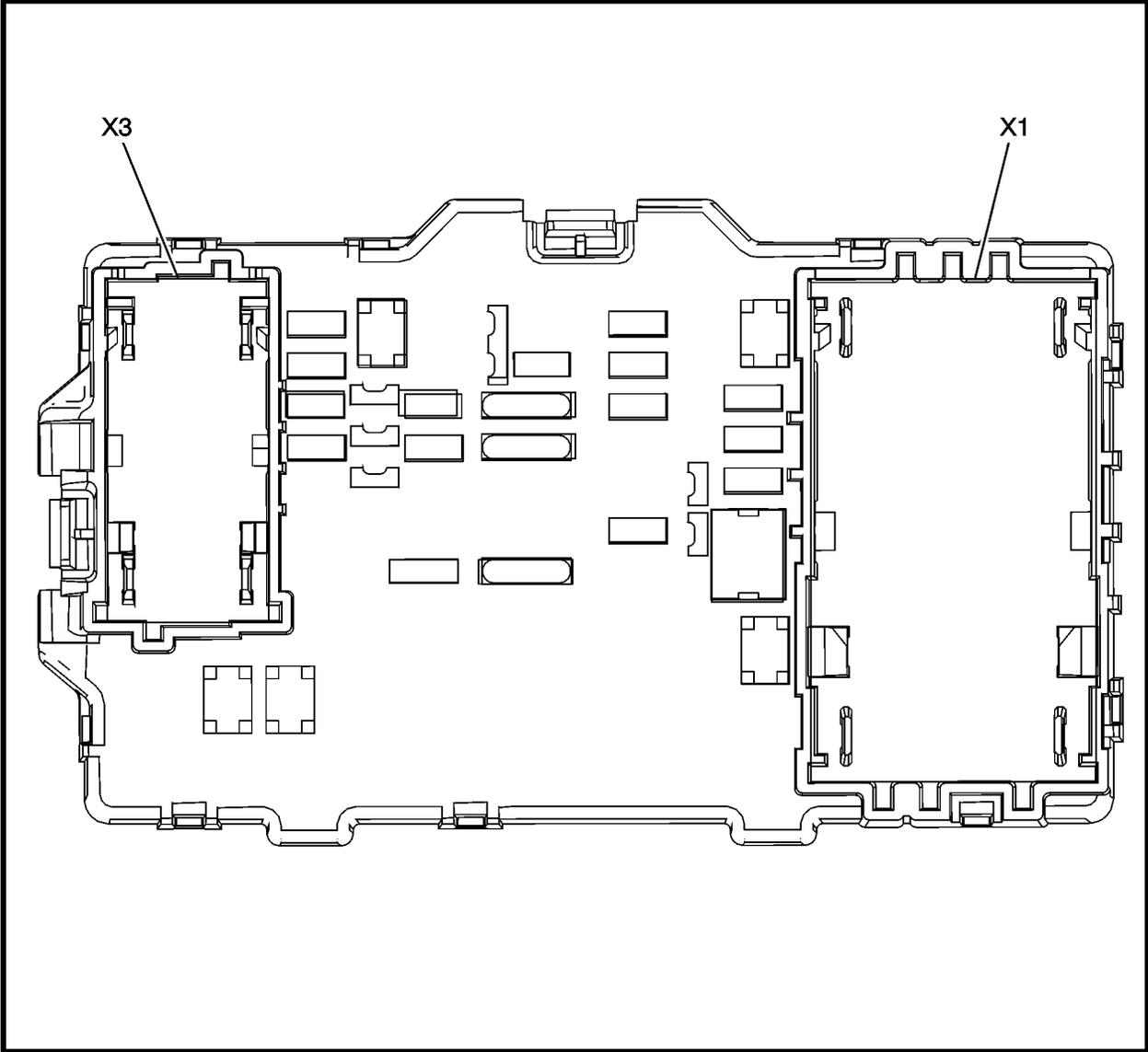


## Fuse Block (X51L) Instrument Panel – Connector X3 Pin-out

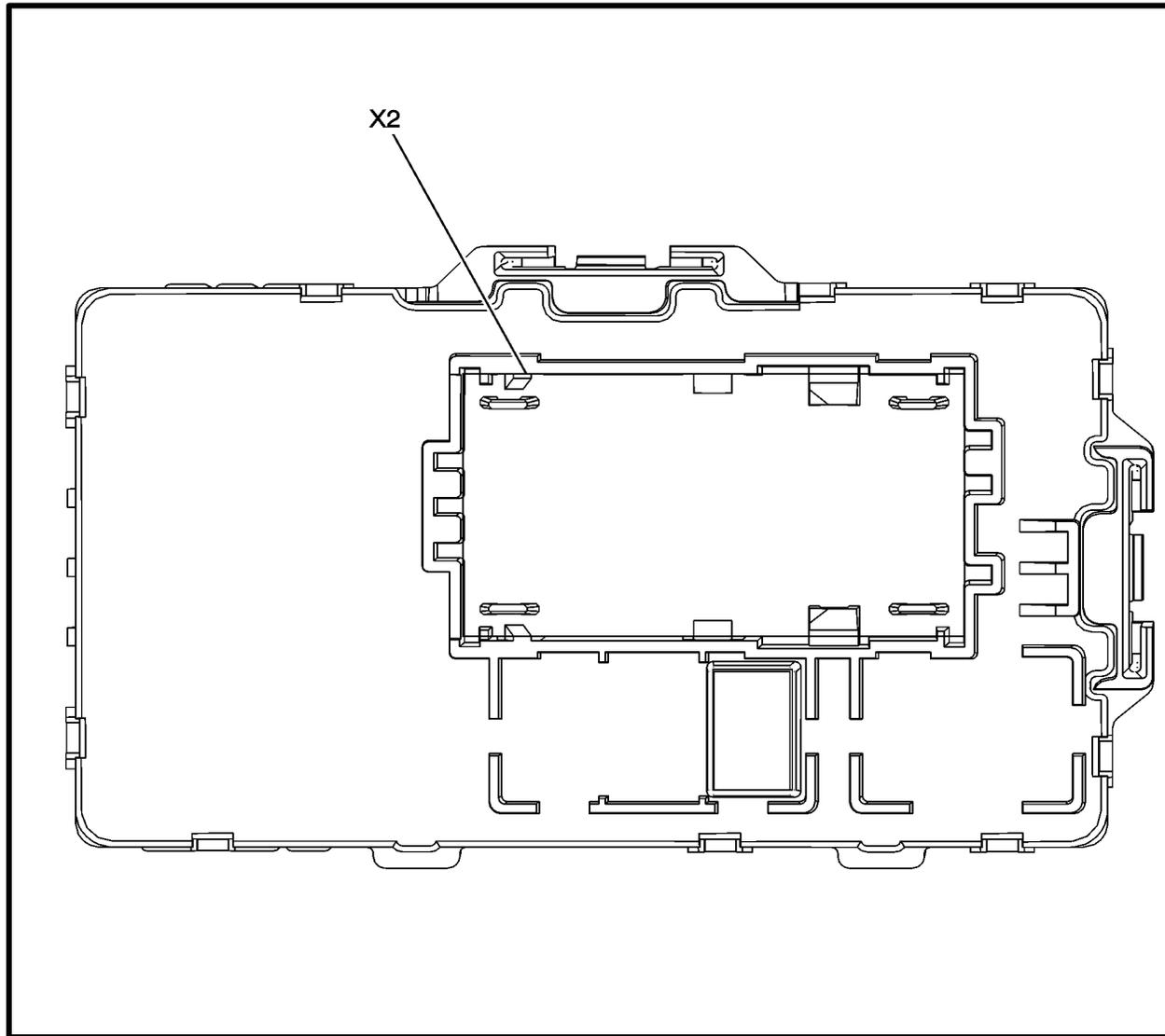
| X51L Fuse Block - Instrument Panel Left X3 |      |         |         |                              |
|--|------|---------|---------|------------------------------|
| Pin  | Size | Color   | Circuit | Function                     |
| 1-10                                       | -    | -       | -       | Not Occupied                 |
| 11   | 0.35 | VT/YE   | 43      | Accessory Voltage            |
| 12   | 0.5  | RD/YE   | 240     | Battery Positive Voltage     |
| 13   | 0.35 | VT/L-GN | 1739    | Run/Crank Ignition 1 Voltage |
| 14   | 0.35 | VT/WH   | 1139    | Run/Crank Ignition 1 Voltage |



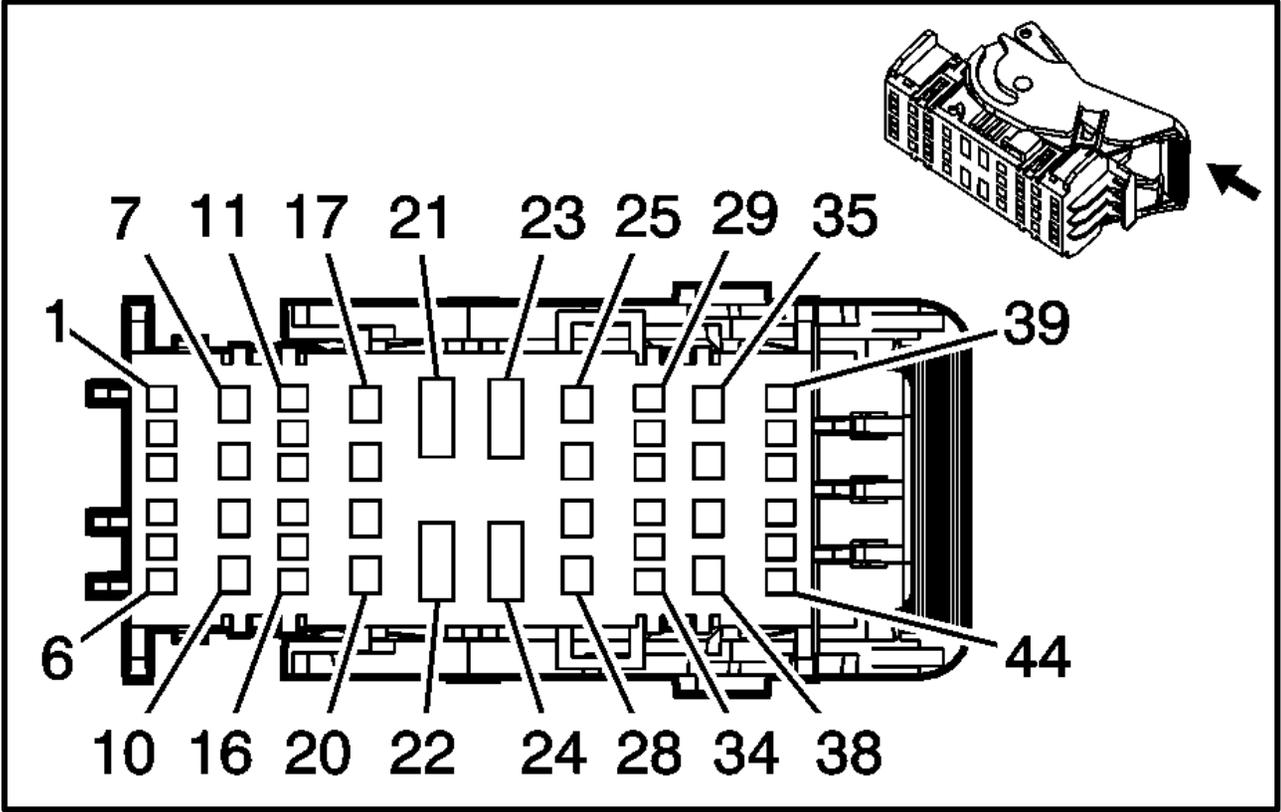
**Fuse Block (X51R) Instrument Panel Right - Top View**



**Fuse Block (X51R) Instrument Panel – Bottom View**



Fuse Block (X51R) Instrument Panel - Connector X1

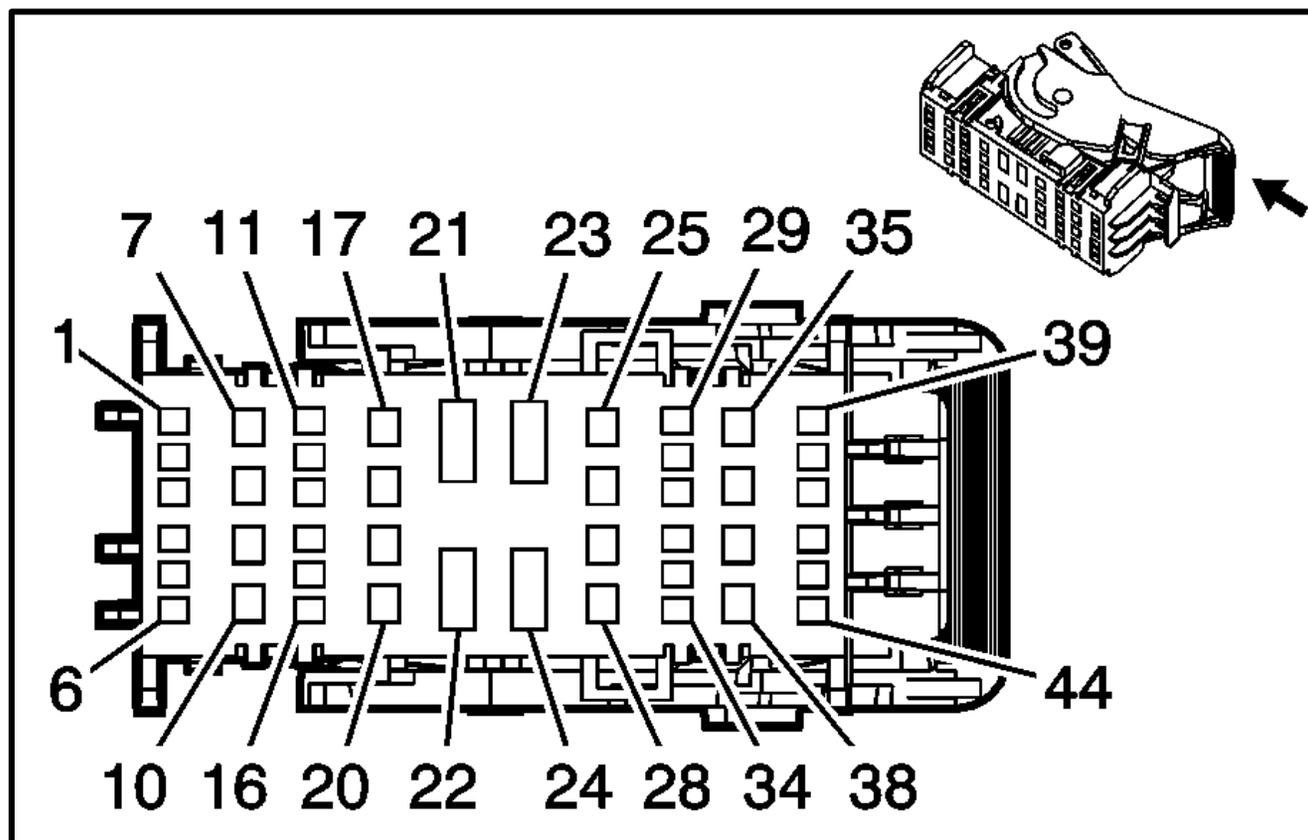


## Fuse Block (X51R) Instrument Panel - Connector X1 Pin-outs

| X51R Fuse Block - Instrument Panel Right X1 |      |         |         |  |
|---|------|---------|---------|--|
| Pin   | Size | Color   | Circuit | Function                                 |
| 1   | 0.75 | GY      | 295     | Door Lock Actuator Lock Control          |
|   | 1.5  | GY      | 295     | Door Lock Actuator Lock Control          |
| 2   | 1.5  | WH/D-BU | 3266    | Child Security Lock Motor Unlock Control |
| 3   | 0.35 | VT/YE   | 3267    | Child Security Lock Relay Control        |
| 4   | 1.5  | GY/L-GN | 3271    | Door Lock Control (2)                    |
| 5   | -    | -       | -       | Not Occupied                             |
| 6   | 0.35 | GY/VT   | 755     | RAP Relay Coil Control                   |
| 7-8   | -    | -       | -       | Not Occupied                             |
| 9   | 2.5  | GY/L-GN | 5441    | Endgate Window Regulator Down Signal     |
| 10  | 2.5  | YE/D-BU | 5442    | Endgate Window Regulator Up Signal       |
| 11  | -    | -       | -       | Not Occupied                             |
| 12  | 0.75 | RD/D-BU | 4540    | Battery Positive Voltage                 |
| 13  | 0.75 | RD/VT   | 2640    | Battery Positive Voltage                 |
| 14  | -    | -       | -       | Not Occupied                             |
| 15  | 0.5  | VT/GY   | 709     | Left Park Lamp Supply Voltage            |
| 16  | 0.5  | RD/BN   | 1140    | Battery Positive Voltage                 |
| 17  | -    | -       | -       | Not Occupied                             |
| 18  | 1.5  | RD/D-BU | 840     | Battery Positive Voltage                 |
| 19  | 2.5  | RD/WH   | 1340    | Battery Positive Voltage                 |
| 20  | 2.5  | RD/WH   | 1340    | Battery Positive Voltage                 |
| 21  | 6    | RD/L-GN | 242     | Battery Positive Voltage                 |
| 22  | 4    | RD/VT   | 542     | Battery Positive Voltage                 |

| <b>X51R Fuse Block - Instrument Panel Right X1</b> |             |              |                |                                   |
|--|-------------|--------------|----------------|-----------------------------------|
| <b>Pin</b>   | <b>Size</b> | <b>Color</b> | <b>Circuit</b> | <b>Function</b>                   |
| 23   | -           | -            | -              | Not Occupied                      |
| 24   | 6           | RD/GY        | 142            | Battery Positive Voltage          |
| 25-26  | -           | -            | -              | Not Occupied                      |
| 27   | 0.75        | RD/VT        | 340            | Battery Positive Voltage          |
| 28   | -           | -            | -              | Not Occupied                      |
| 29   | 1.5         | D-BU/WH      | 195            | Door Lock Control                 |
| 30-32  | -           | -            | -              | Not Occupied                      |
| 33   | 0.75        | RD/WH        | 3440           | Battery Positive Voltage          |
| 34-36  | -           | -            | -              | Not Occupied                      |
| 37   | 0.75        | RD/L-GN      | 6140           | Battery Positive Voltage          |
| 38   | 2.5         | RD/BN        | 1440           | Battery Positive Voltage          |
| 39   | -           | -            | -              | Not Occupied                      |
| 40   | 0.75        | GY           | 5911           | Door Lock Actuator Lock Control 2 |
| 41-42  | -           | -            | -              | Not Occupied                      |
| 43   | 0.75        | RD/L-GN      | 3140           | Battery Positive Voltage          |
| 44   | -           | -            | -              | Not Occupied                      |

Fuse Block (X51R) Instrument Panel - Connector X2

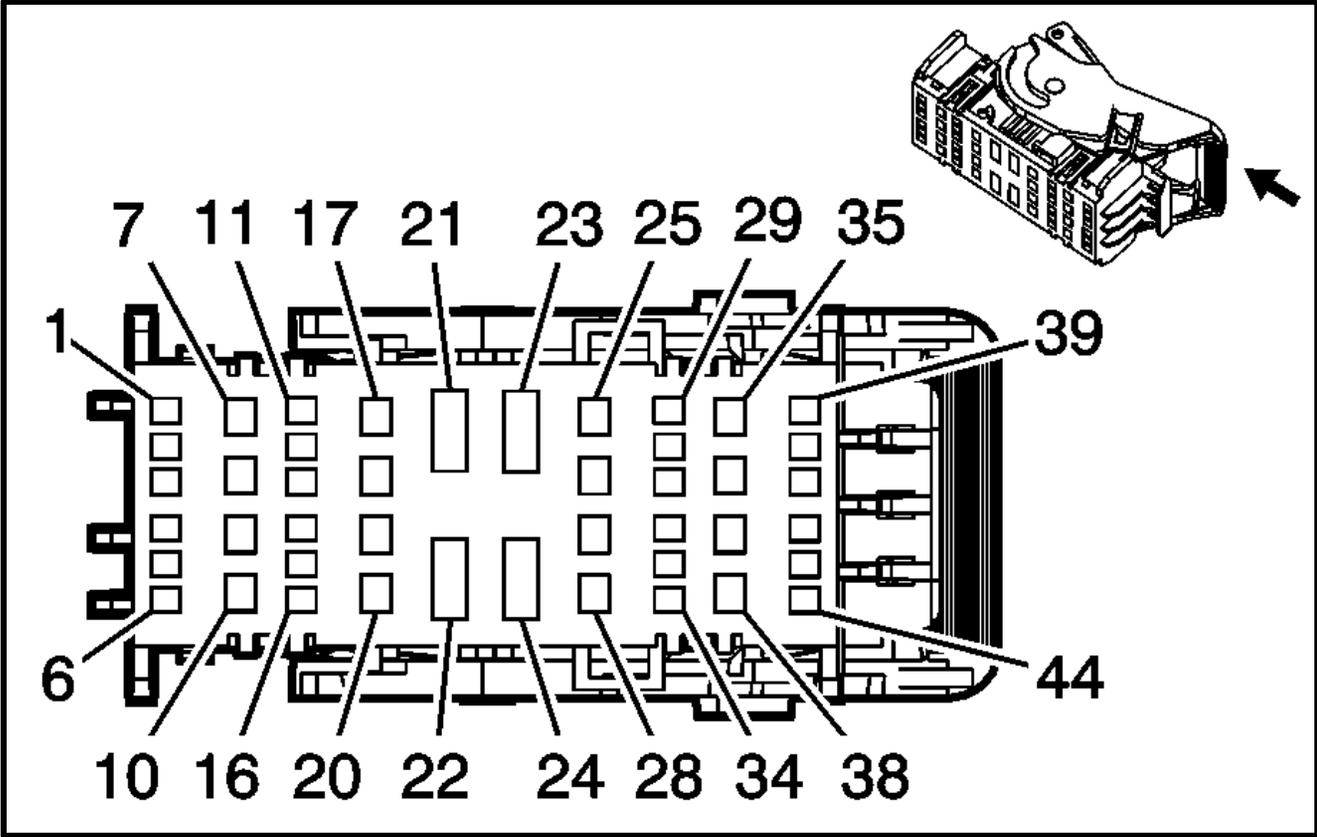


## Fuse Block (X51R) Instrument Panel - Connector X2 Pin-outs

| X51R Fuse Block - Instrument Panel Right X2 |      |         |         |  |
|---|------|---------|---------|--|
| Pin   | Size | Color   | Circuit | Function                                 |
| 1   | 0.5  | RD/L-GN | 1540    | Battery Positive Voltage                 |
| 2-3   | -    | -       | -       | Not Occupied                             |
| 4   | 0.5  | BN/WH   | 1429    | Standing Lamp Relay Control              |
| 5   | 0.5  | BK      | 1050    | Ground                                   |
| 6   | -    | -       | -       | Not Occupied                             |
| 7   | 0.75 | RD/VT   | 4040    | Battery Positive Voltage                 |
| 8   | 0.75 | RD/D-BU | 2540    | Battery Positive Voltage                 |
| 9   | -    | -       | -       | Not Occupied                             |
| 10  | 1.5  | RD/D-BU | 840     | Battery Positive Voltage                 |
| 11  | 0.75 | WH/VT   | 1430    | Exterior Courtesy Lamp Supply Voltage    |
| 12-15                                       | -    | -       | -       | Not Occupied                             |
| 16  | 0.35 | RD/YE   | 3040    | Battery Positive Voltage                 |
| 17  | 1    | RD/VT   | 340     | Battery Positive Voltage                 |
|   | 0.75 | RD/VT   | 340     | Battery Positive Voltage                 |
| 18-21                                       | -    | -       | -       | Not Occupied                             |
| 22  | 2.5  | BK      | 1050    | Ground                                   |
| 23-28                                       | -    | -       | -       | Not Occupied                             |
| 29  | 0.5  | RD/BN   | 2240    | Battery Positive Voltage                 |
| 30-31                                       | -    | -       | -       | Not Occupied                             |
| 32  | 0.35 | YE/VT   | 6191    | Power Sliding Window Switch Open Signal  |
| 33  | 0.35 | WH      | 6192    | Power Sliding Window Switch Close Signal |
| 34  | 0.5  | RD/WH   | 640     | Battery Positive Voltage                 |

| <b>X51R Fuse Block - Instrument Panel Right X2</b> |             |              |                |                          |
|--|-------------|--------------|----------------|--------------------------|
| <b>Pin</b>   | <b>Size</b> | <b>Color</b> | <b>Circuit</b> | <b>Function</b>          |
| 35   | 2.5         | RD/GY        | 4140           | Battery Positive Voltage |
| 36-37  | -           | -            | -              | Not Occupied             |
| 38   | 1.5         | RD/YE        | 2340           | Battery Positive Voltage |
| 39-44  | -           | -            | -              | Not Occupied             |

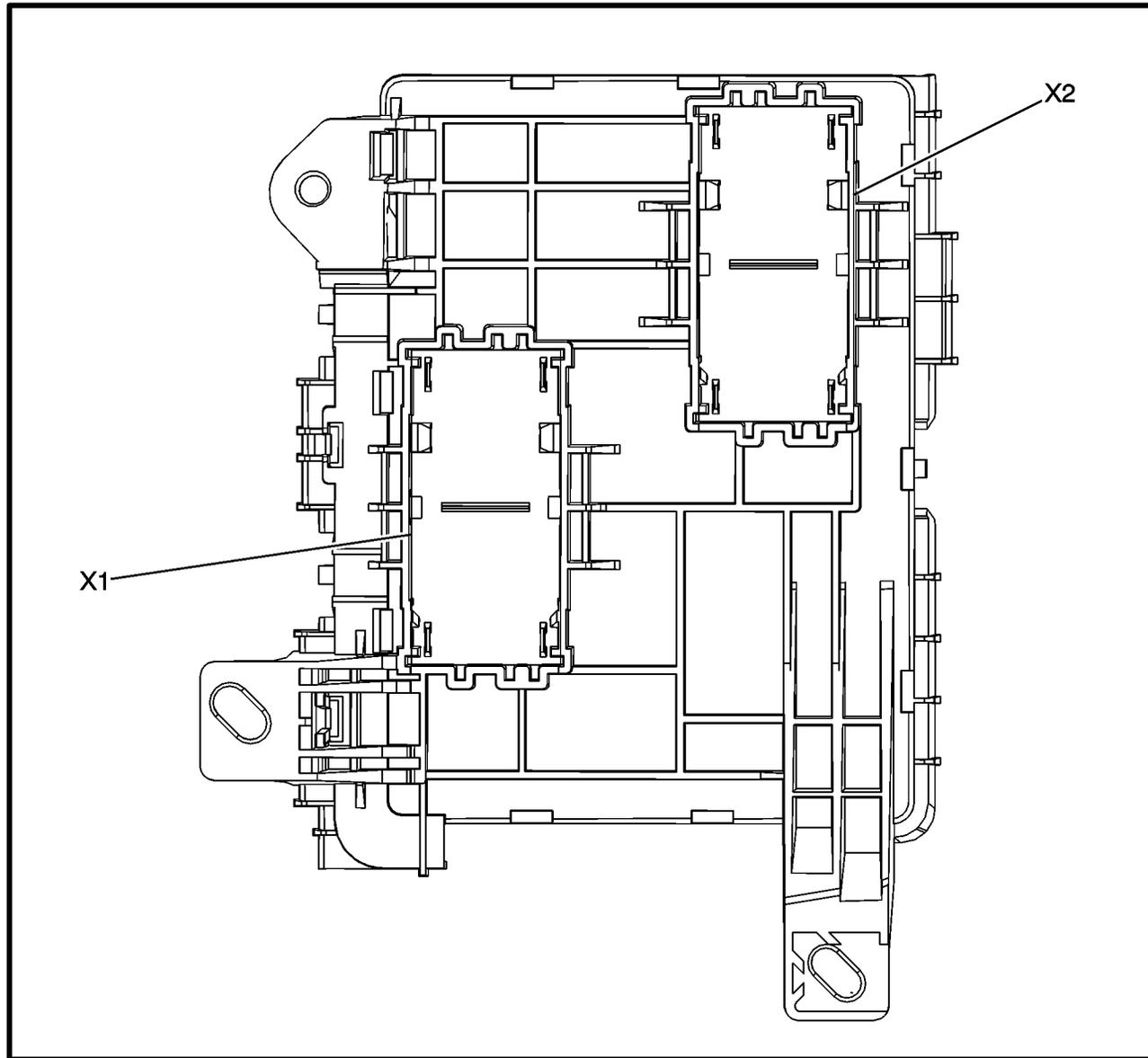
Fuse Block (X51R) Instrument Panel - Connector X3



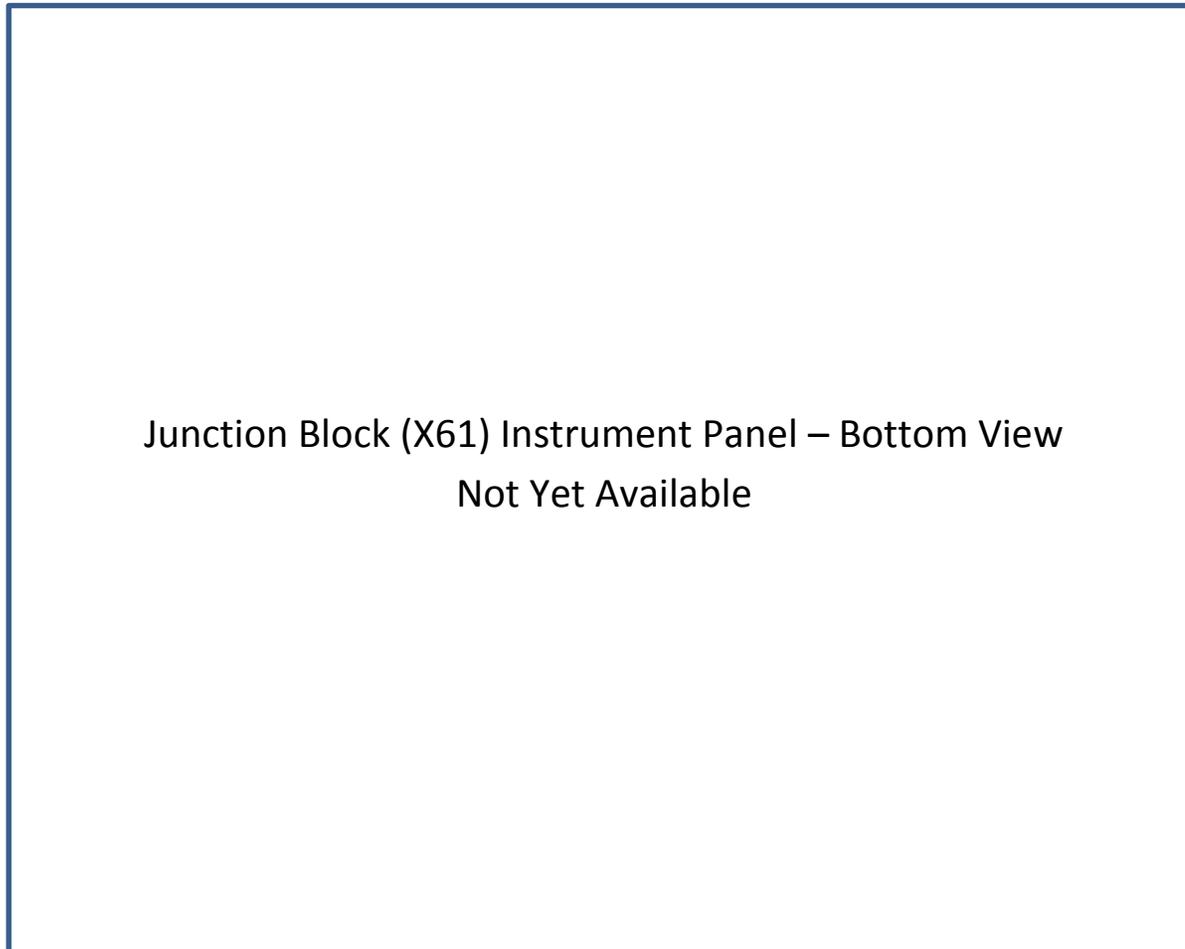
## Fuse Block (X51R) Instrument Panel - Connector X3 Pin-outs

| X51R Fuse Block - Instrument Panel Right X3 |      |         |         |                               |
|---|------|---------|---------|-------------------------------|
| Pin   | Size | Color   | Circuit | Function                      |
| 1   | 2.5  | RD/L-GN | 3140    | Battery Positive Voltage      |
| 2-7   | -    | -       | -       | Not Occupied                  |
| 8   | 0.5  | VT/GY   | 709     | Left Park Lamp Supply Voltage |
| 9   | -    | -       | -       | Not Occupied                  |
| 10  | 0.5  | BK      | 1050    | Ground                        |
|   | 2.5  | BK      | 1050    | Ground                        |
| 11-20                                       | -    | -       | -       | Not Occupied                  |

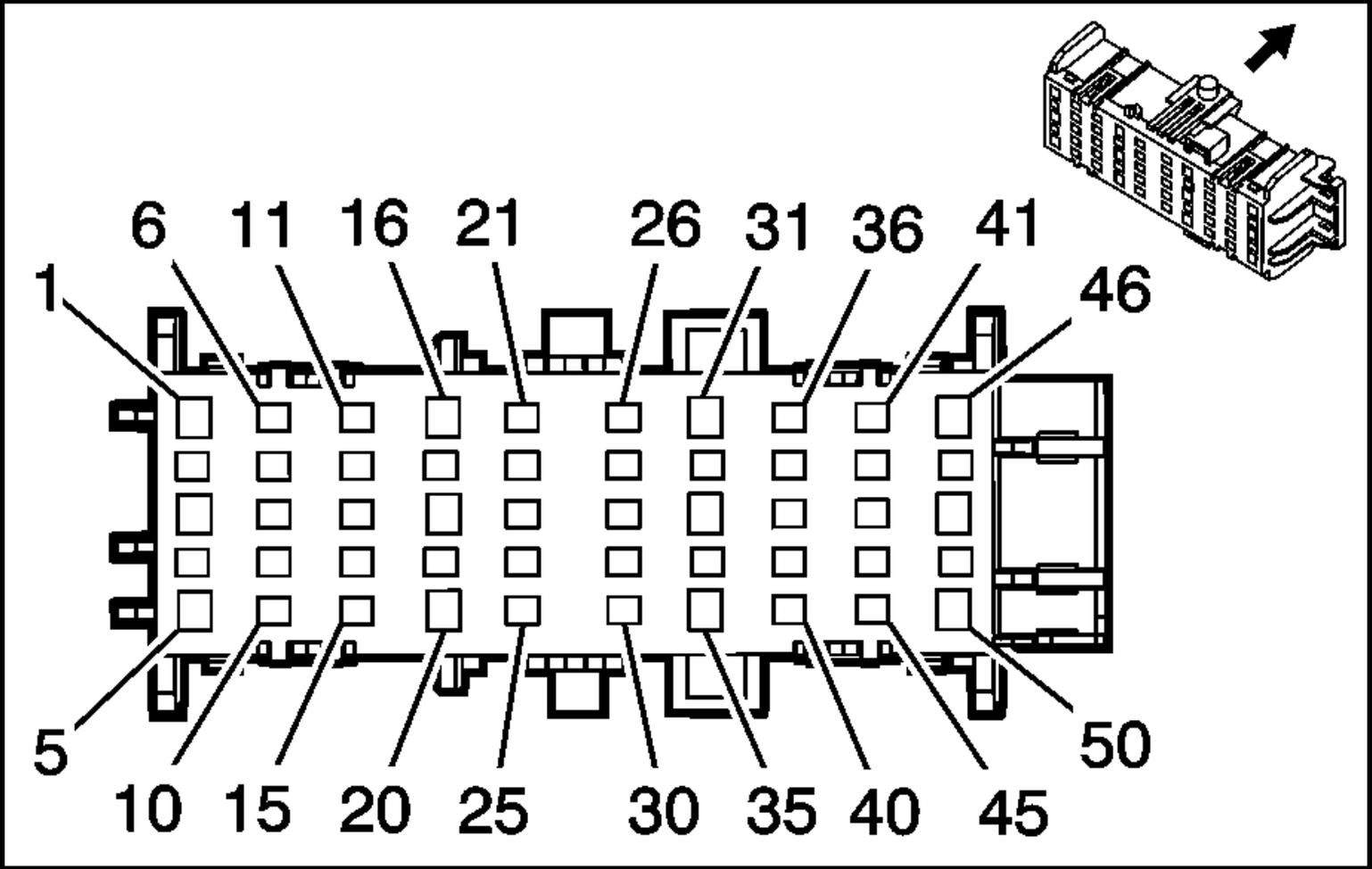
**Junction Block (X61) Instrument Panel – Top View**



**Junction Block (X61) Instrument Panel – Bottom View**



Junction Block (X61) Instrument Panel – Connector X1

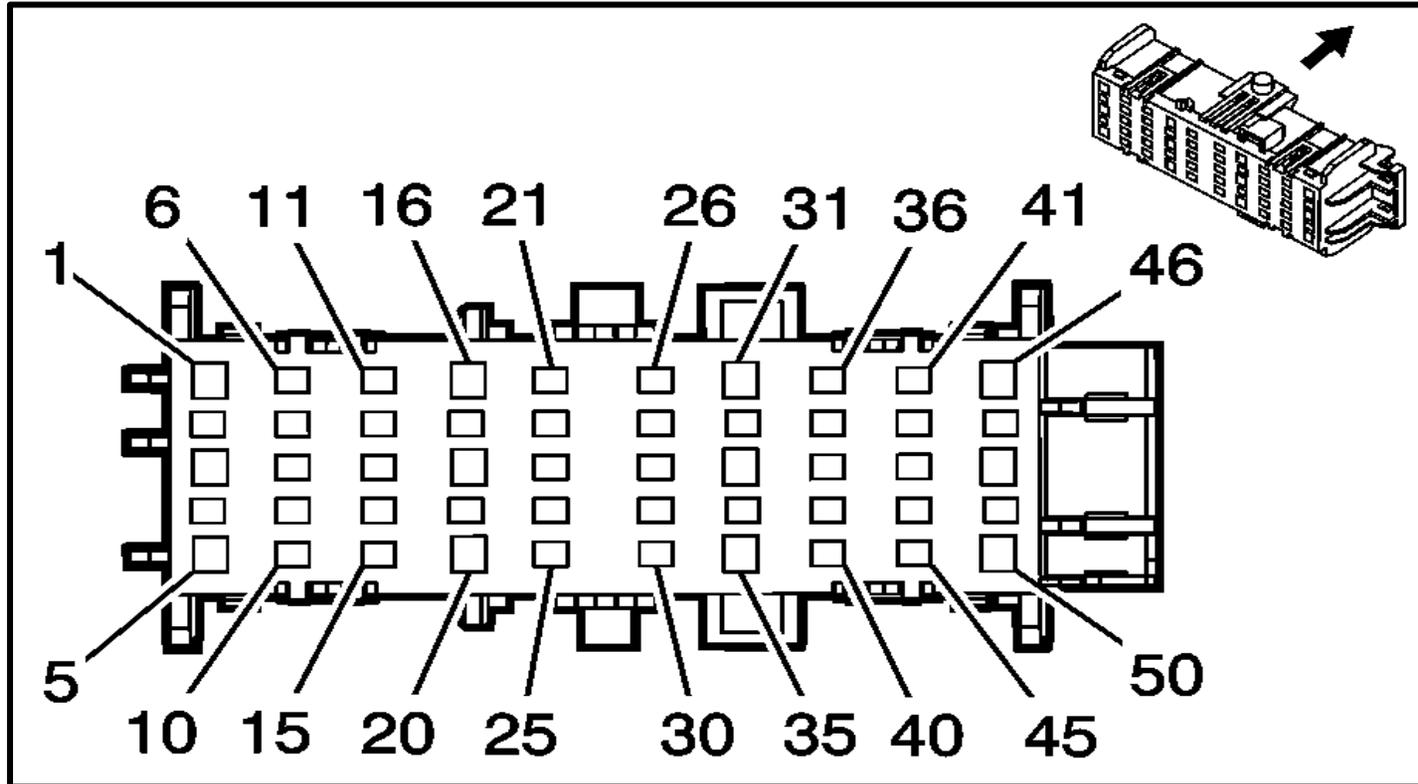


## Junction Block (X61) Instrument Panel – Connector X1 Pin-outs

| X61A Junction Block - Instrument Panel X1 |      |           |         |   |
|---|------|-----------|---------|---|
| Pin                                       | Size | Color     | Circuit | Function  |
| 1   | -    | -         | -       | Not Occupied  |
| 2   | 0.5  | GY/BK     | 1570    | Front Axle Actuator Control                                       |
| 3-10                                      | -    | -         | -       | Not Occupied  |
| 11  | 0.35 | GY/L-GN   | 2555    | Rear Park Assist Disable Signal                                   |
| 12-15                                     | -    | -         | -       | Not Occupied  |
| 16  | 2.5  | RD/L-GN   | 965     |   |
| 17  | 0.75 | WH/VT     | 1430    | Exterior Courtesy Lamp Supply Voltage                             |
| 18  | 0.5  | D-BU/YE   | 6105    | High Speed GMLAN Serial Data (+) (2)                              |
| 19  | 0.5  | D-BU/YE   | 6105    | High Speed GMLAN Serial Data (+) (2)                              |
| 20  | 0.5  | WH        | 6106    | High Speed GMLAN Serial Data (-) (2)                              |
| 21  | 0.5  | D-BU/L-GN | 961     |   |
| 22  | 0.35 | VT        | 185     | Low Washer Fluid Indicator Control                                |
| 23  | 0.35 | BN/YE     | 780     | Driver Door Lock Switch Lock Signal                               |
| 24  | 0.5  | BN        | 7634    | Integrated Trailer Brake Controller Redundant Manual Apply Signal |
| 25  | 0.35 | GY        | 5697    | Child Lockout Indicator   |
| 26  | 0.5  | D-BU/RD   | 7632    | Integrated Trailer Brake Controller Switch 5 Volt Reference       |
| 27  | 0.5  | BK/BN     | 7631    | Integrated Trailer Brake Controller Switch Low Reference          |
| 28  | 0.35 | BN/WH     | 781     | Driver Door Lock Switch Unlock Signal                             |
| 29  | 0.5  | YE        | 7635    | Integrated Trailer Brake Controller Manual Apply Signal           |
| 30  | 0.5  | D-BU/L-GN | 963     |   |
| 31  | 2.5  | RD/L-GN   | 966     |   |
| 32  | 0.5  | WH        | 6106    | High Speed GMLAN Serial Data (-) (2)                              |

| <b>X61A Junction Block - Instrument Panel X1</b> |             |              |                |  |
|--|-------------|--------------|----------------|--|
| <b>Pin</b>                                       | <b>Size</b> | <b>Color</b> | <b>Circuit</b> | <b>Function</b>                                      |
| 33   | 0.5         | VT/BN        | 300            | Run Ignition 3 Voltage                               |
| 34   | 0.5         | D-BU/L-GN    | 962            |  |
| 35   | 2.5         | RD/L-GN      | 967            |  |
| 36   | 0.35        | WH/GY        | 5285           | Adjustable Pedal Switch Rearward Signal              |
| 37   | -           | -            | -              | Not Occupied   |
| 38   | 0.5         | D-BU/L-GN    | 964            |  |
| 39   | 0.75        | D-BU/VT      | 1134           | Park Brake Switch Signal                             |
| 40   | 0.5         | L-GN         | 5060           | Low Speed GMLAN Serial Data                          |
| 41   | 0.5         | L-GN/BK      | 7633           | Integrated Trailer Brake Controller User Gain Signal |
| 42   | 0.35        | L-GN/GY      | 5286           | Adjustable Pedal Switch Forward Signal               |
| 43   | -           | -            | -              | Not Occupied   |
| 44   | 0.5         | WH/D-BU      | 3691           | Trailer Brake Apply Signal                           |
| 45   | 0.35        | L-GN/BN      | 5852           | Rear Park Assist LED Disable Signal                  |
| 46   | 0.5         | VT/WH        | 1939           | Run/Crank Ignition 1 Voltage                         |
| 47   | 0.5         | WH           | 6816           | Indicator Dimming Control                            |
| 48   | 2.5         | RD/L-GN      | 968            |  |
| 49   | 0.5         | YE/WH        | 816            | Brake Transmission Shift Interlock Solenoid Control  |
| 50   | 2.5         | BK           | 2550           | Ground   |

## Junction Block (X61) Instrument Panel – Connector X2



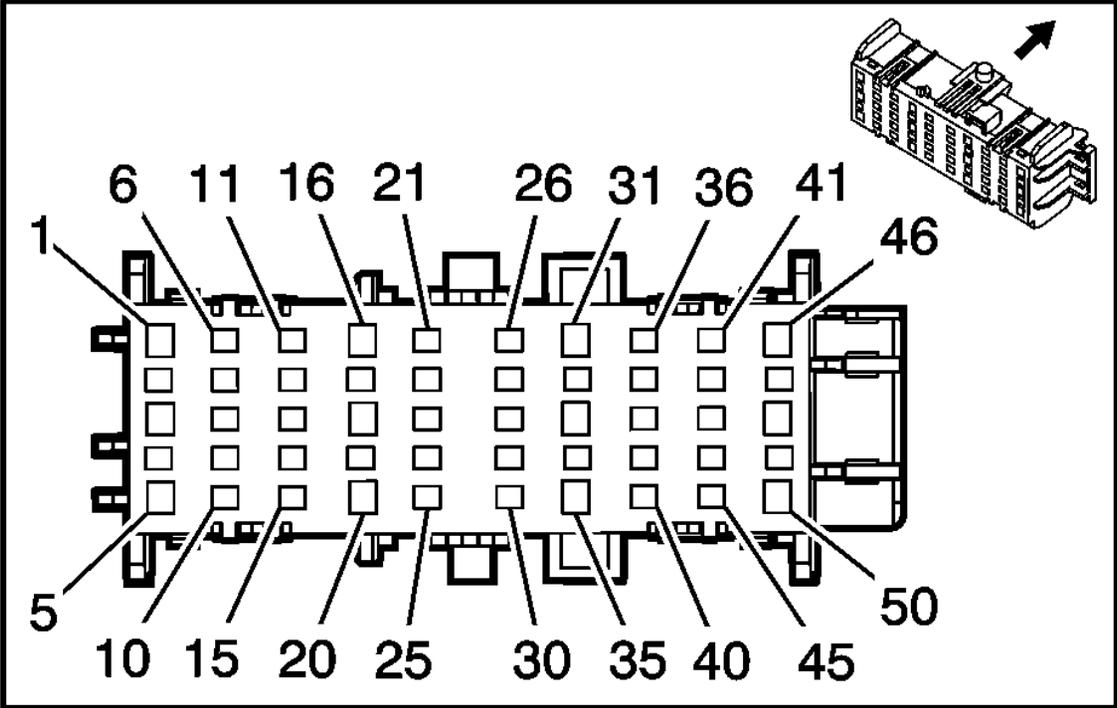
## Junction Block (X61) Instrument Panel – Connector X2 Pin-outs

| X61A Junction Block - Instrument Panel X2 |      |       |         |  |
|---|------|-------|---------|--|
| Pin                                       | Size | Color | Circuit | Function                               |
| 1-2                                       | -    | -     | -       | Not Occupied                           |
| 3   | 4    | RD/GY | 1342    | Battery Positive Voltage               |
| 4   | 0.35 | D-BU  | 2307    | Passenger Air Bag On Indicator Control |

| <b>X61A Junction Block - Instrument Panel X2</b> |             |              |                |   |
|--|-------------|--------------|----------------|---|
| <b>Pin</b>                                       | <b>Size</b> | <b>Color</b> | <b>Circuit</b> | <b>Function</b>                               |
| 5  | 0.5         | RD/L-GN      | 3140           | Battery Positive Voltage                      |
| 6  | 0.5         | WH           | 2501           | High Speed GMLAN Serial Data (-) (1)          |
| 7  | 0.5         | D-BU         | 2500           | High Speed GMLAN Serial Data (+) (1)          |
| 8  | 0.35        | WH/RD        | 6207           | Memory Sensor High Reference                  |
| 9  | 0.35        | BK/YE        | 1691           | Automatic Day/Night Mirror Low Reference      |
| 10   | 0.35        | YE/WH        | 1690           | Automatic Day/Night Mirror Signal             |
| 11   | 0.35        | D-BU         | 5952           | Adjustable Pedal Position Sensor Brake Signal |
| 12   | 1.5         | YE           | 5129           | Adjustable Pedal Actuator Rearward Control    |
|  | 0.75        | YE           | 5129           | Adjustable Pedal Actuator Rearward Control    |
| 13-14  | -           | -            | -              | Not Occupied                                  |
| 15   | 0.5         | L-GN/WH      | 24             | Backup Lamp Supply Voltage                    |
| 16   | 2.5         | YE/BN        | 1569           | Transfer Case Lock Solenoid Control           |
| 17   | -           | -            | -              | Not Occupied                                  |
| 18   | 4           | BK           | 550            | Ground  |
| 19   | 0.35        | VT/WH        | 5234           | Passenger Seat Belt Indicator                 |
| 20   | -           | -            | -              | Not Occupied                                  |
| 21   | 1.5         | L-GN/VT      | 5130           | Adjustable Pedal Actuator Forward Control     |
|  | 0.75        | L-GN/VT      | 5130           | Adjustable Pedal Actuator Forward Control     |
| 22   | 0.35        | BK/GY        | 6206           | Memory Sensor Low Reference                   |
| 23   | 0.5         | WH/BN        | 6815           | Inadvertent Power Control                     |
| 24   | 0.35        | L-GN         | 2308           | Passenger Air Bag Off Indicator Control       |
| 25   | -           | -            | -              | Not Occupied                                  |
| 26   | 0.35        | D-BU/GY      | 7473           | Incremental Encoder Impulse Signal            |

| <b>X61A Junction Block - Instrument Panel X2</b> |             |              |                |   |
|--|-------------|--------------|----------------|---|
| <b>Pin</b>                                       | <b>Size</b> | <b>Color</b> | <b>Circuit</b> | <b>Function</b>                               |
| 27   | 0.35        | VT           | 7476           | Incremental Encoder Sensor Return             |
| 28   | -           | -            | -              | Not Occupied                                  |
| 29   | 0.5         | GY           | 157            | Interior Lamp Control                         |
| 30   | 0.35        | GY           | 156            | Courtesy Lamp Switch Signal                   |
| 31   | 4           | YE/VT        | 1553           | Transfer Case Motor Counter Clockwise Control |
| 32   | 0.35        | YE           | 7474           | Incremental Encoder Direction Signal          |
| 33   | 0.5         | VT/GY        | 1054           | Stop Lamp Supply Voltage                      |
| 34   | -           | -            | -              | Not Occupied                                  |
| 35   | 2.5         | RD/L-GN      | 242            | Battery Positive Voltage                      |
| 36   | 0.35        | WH/L-GN      | 7475           | Incremental Encoder Sensor (8V) Supply        |
| 37   | 0.5         | YE/WH        | 1695           | Four Wheel Drive Wheel Lock Indicator         |
| 38   | 0.35        | VT/YE        | 5985           | Accessory Wakeup Serial Data                  |
| 39-43  | -           | -            | -              | Not Occupied                                  |
| 44   | 0.5         | WH/D-BU      | 3691           | Trailer Brake Apply Signal                    |
| 45   | -           | -            | -              | Not Occupied                                  |
| 46   | 4           | YE/GY        | 1552           | Transfer Case Motor Clockwise Control         |
| 47   | 0.5         | L-GN/GY      | 817            | Vehicle Speed Signal                          |
| 48   | 2.5         | D-BU         | 47             | Trailer Auxiliary Supply Voltage              |
| 49   | -           | -            | -              | Not Occupied                                  |
| 50   | 0.35        | VT/YE        | 43             | Accessory Voltage                             |

Junction Block (X61) Instrument Panel – Connector X3

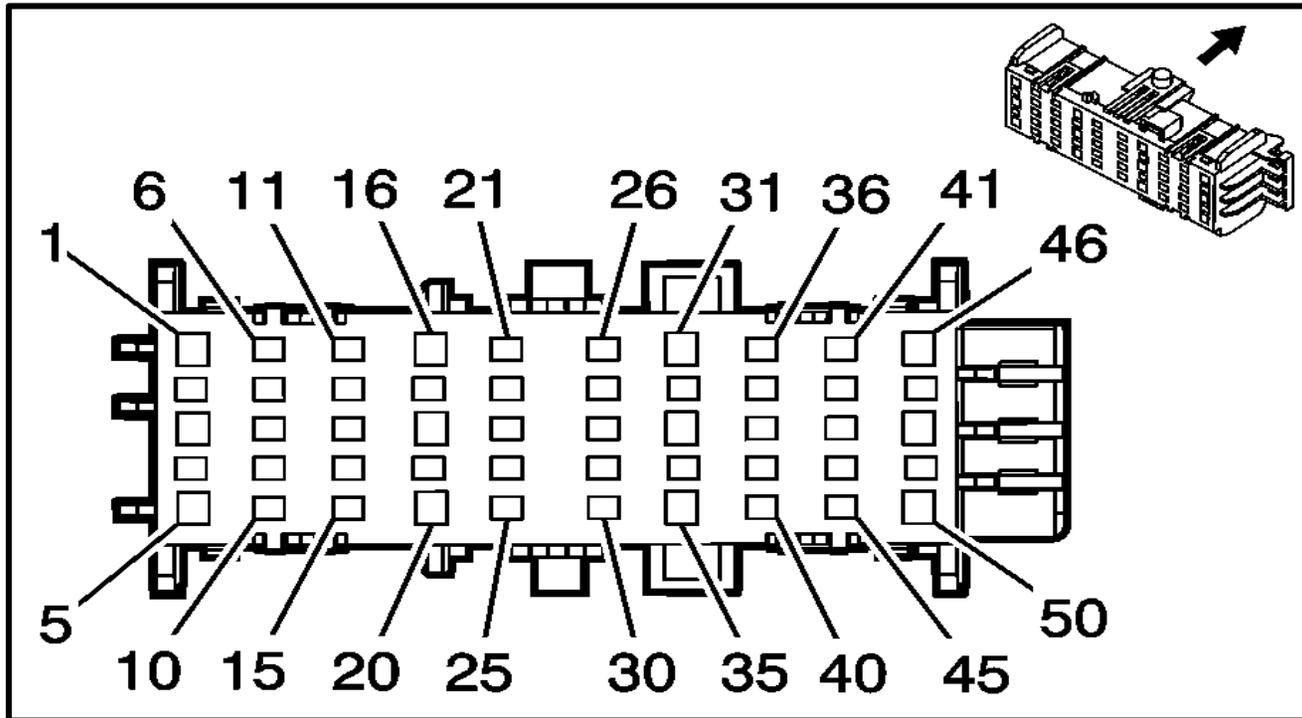


## Junction Block (X61) Instrument Panel – Connector X3 Pin-outs

| X61A Junction Block - Instrument Panel X3 |      |         |         |  |
|---|------|---------|---------|--|
| Pin                                       | Size | Color   | Circuit | Function                                 |
| 1-2                                       | -    | -       | -       | Not Occupied                             |
| 3   | 0.5  | RD/L-GN | 3140    | Battery Positive Voltage                 |
| 4   | 0.35 | D-BU    | 2307    | Passenger Air Bag On Indicator Control   |
| 5-6                                       | -    | -       | -       | Not Occupied                             |
| 7   | 0.75 | WH/VT   | 1430    | Exterior Courtesy Lamp Supply Voltage    |
| 8   | 0.35 | YE/WH   | 1690    | Automatic Day/Night Mirror Signal        |
| 9   | 0.35 | BK/YE   | 1691    | Automatic Day/Night Mirror Low Reference |
| 10-12                                     | -    | -       | -       | Not Occupied                             |
| 13  | 0.5  | L-GN/WH | 24      | Backup Lamp Supply Voltage               |
| 14-16                                     | -    | -       | -       | Not Occupied                             |
| 17  | 0.35 | L-GN/BK | 2515    | Keypad Supply Voltage                    |
| 18  | -    | -       | -       | Not Occupied                             |
| 19  | 0.35 | VT/WH   | 5234    | Passenger Seat Belt Indicator            |
| 20  | -    | -       | -       | Not Occupied                             |
| 21  | 0.35 | L-GN/WH | 2514    | Keypad Signal                            |
| 22  | 0.35 | YE/VT   | 2516    | Keypad Green LED                         |
| 23  | -    | -       | -       | Not Occupied                             |
| 24  | 0.35 | L-GN    | 2308    | Passenger Air Bag Off Indicator Control  |
| 25  | 0.5  | WH/BN   | 6815    | Inadvertent Power Control                |
| 26  | 0.35 | WH      | 6192    | Power Sliding Window Switch Close Signal |
| 27  | 0.5  | YE      | 6817    | LED Backlight Dimming Control            |
| 28  | 0.35 | GY      | 156     | Courtesy Lamp Switch Signal              |

| <b>X61A Junction Block - Instrument Panel X3</b> |             |              |                |  |
|--|-------------|--------------|----------------|--|
| <b>Pin</b>                                       | <b>Size</b> | <b>Color</b> | <b>Circuit</b> | <b>Function</b>                              |
| 29   | 0.5         | GY           | 157            | Interior Lamp Control                        |
| 30-31  | -           | -            | -              | Not Occupied                                 |
| 32   | 0.35        | YE/VT        | 6191           | Power Sliding Window Switch Open Signal      |
| 33-34  | -           | -            | -              | Not Occupied                                 |
| 35   | 0.5         | VT/GY        | 1054           | Stop Lamp Supply Voltage                     |
| 36   | 0.35        | BN/WH        | 2517           | Keypad Red LED                               |
| 37-40  | -           | -            | -              | Not Occupied                                 |
| 41   | 0.35        | GY/L-GN      | 328            | Interior Lamp Defeat Switch Signal           |
| 42   | 0.35        | VT/L-GN      | 7558           | LED Ambient Lighting Control 2               |
| 43-44  | -           | -            | -              | Not Occupied                                 |
| 45   | 0.35        | GY/WH        | 3153           | Lane Departure Warning Disable Switch Signal |
| 46   | 2.5         | BK           | 1050           | Ground                                       |
| 47   | 0.35        | L-GN         | 5060           | Low Speed GMLAN Serial Data                  |
| 48   | -           | -            | -              | Not Occupied                                 |
| 49   | 0.35        | WH           | 3152           | Lane Departure Warning Indicator Control     |
| 50   | -           | -            | -              | Not Occupied                                 |

## Junction Block (X61) Instrument Panel – Connector X4



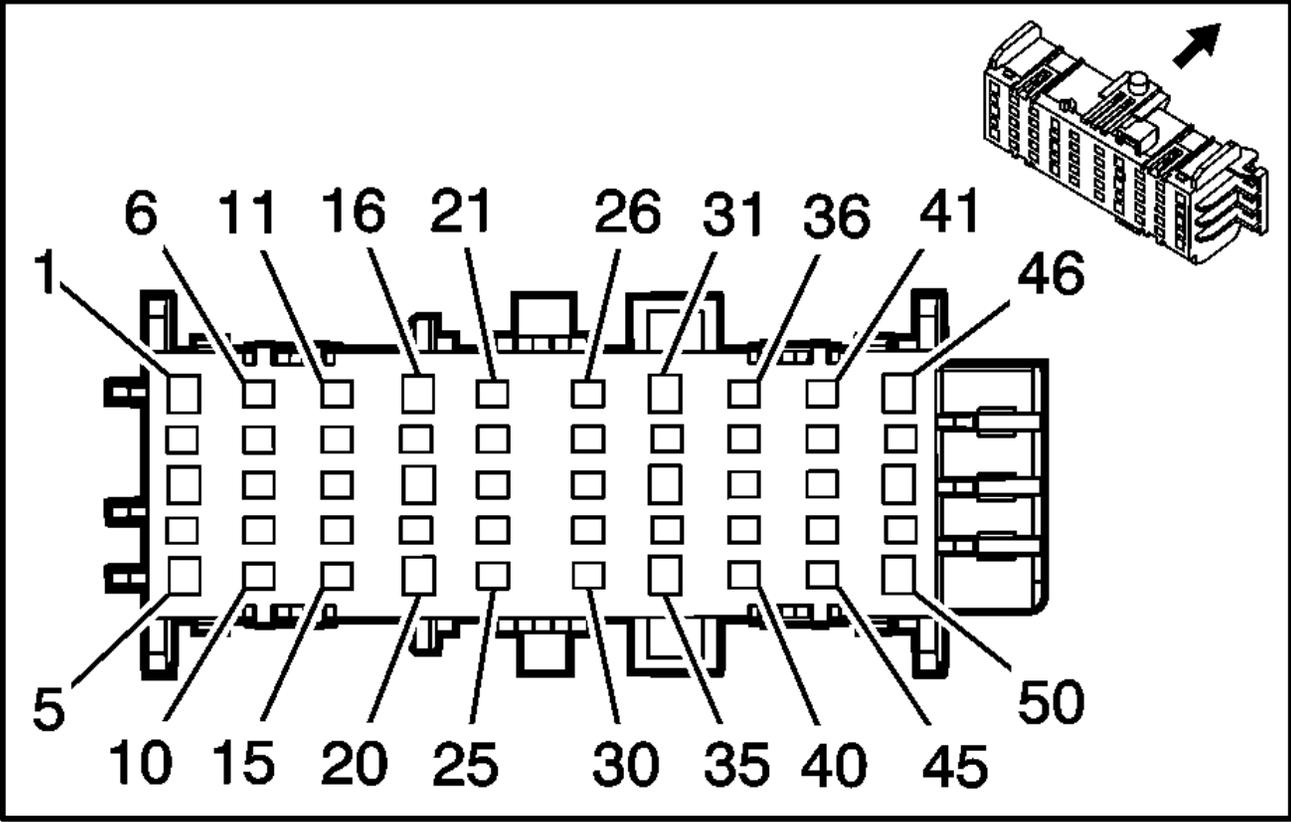
## Junction Block (X61) Instrument Panel – Connector X4 Pin-outs

| X61A Junction Block - Instrument Panel X4 |      |         |         |                                      |
|---|------|---------|---------|--------------------------------------|
| Pin                                       | Size | Color   | Circuit | Function                             |
| 1   | -    | -       | -       | Not Occupied                         |
| 2   | 0.35 | YE/VT   | 2516    | Keypad Green LED                     |
| 3   | 0.35 | BK/L-GN | 552     | Sensor Low Reference                 |
| 4   | 0.5  | WH      | 2501    | High Speed GMLAN Serial Data (-) (1) |
| 5   | 0.5  | D-BU    | 2500    | High Speed GMLAN Serial Data (+) (1) |
| 6   | 0.5  | YE      | 6817    | LED Backlight Dimming Control        |

| <b>X61A Junction Block - Instrument Panel X4</b> |             |              |                |   |
|--|-------------|--------------|----------------|---|
| <b>Pin</b>                                       | <b>Size</b> | <b>Color</b> | <b>Circuit</b> | <b>Function</b>                               |
| 7  | 0.35        | L-GN/WH      | 2514           | Keypad Signal                                 |
| 8  | 0.35        | GY/RD        | 598            | 5 Volt Reference                              |
| 9  | 0.35        | WH/L-GN      | 526            | Stop Lamp Switch Signal                       |
| 10   | 0.35        | D-BU/YE      | 1693           | Four Wheel Drive Switch Signal                |
| 11   | 0.35        | GY/WH        | 3153           | Lane Departure Warning Disable Switch Signal  |
| 12   | 0.35        | YE/VT        | 6191           | Power Sliding Window Switch Open Signal       |
| 13   | 0.35        | WH           | 6192           | Power Sliding Window Switch Close Signal      |
| 14   | 0.35        | BN           | 1560           | Neutral Indicator Control                     |
| 15   | 0.35        | GY/RD        | 6029           | Four Wheel Drive Mode Switch 5 Volt Reference |
| 16   | 2.5         | BK           | 1050           | Ground  |
| 17-18  | -           | -            | -              | Not Occupied                                  |
| 19   | 0.35        | L-GN/BK      | 2515           | Keypad Supply Voltage                         |
| 20   | -           | -            | -              | Not Occupied                                  |
| 21   | 0.5         | VT/L-GN      | 7558           | LED Ambient Lighting Control 2                |
| 22   | 0.35        | BN/WH        | 2517           | Keypad Red LED                                |
| 23   | 0.35        | BN/BK        | 1566           | 4 HI Indicator Control                        |
| 24   | 0.35        | VT/WH        | 1565           | 4 LO Indicator Control                        |
| 25   | 0.35        | VT/L-GN      | 1739           | Run/Crank Ignition 1 Voltage                  |
| 26   | 0.35        | WH           | 3152           | Lane Departure Warning Indicator Control      |
| 27   | 0.35        | GY/L-GN      | 328            | Interior Lamp Defeat Switch Signal            |
| 28-29  | -           | -            | -              | Not Occupied                                  |
| 30   | 0.35        | GY/L-GN      | 1561           | AWD Indicator Control                         |
| 31   | 1.5         | RD/YE        | 2340           | Battery Positive Voltage                      |
|  |             |              |                |   |

| <b>X61A Junction Block - Instrument Panel X4</b> |             |              |                |                        |
|--|-------------|--------------|----------------|------------------------|
| <b>Pin</b>                                       | <b>Size</b> | <b>Color</b> | <b>Circuit</b> | <b>Function</b>        |
| 32   | 0.5         | BK/WH        | 1851           | Signal Ground          |
| 33   | 0.35        | BK/WH        | 1851           | Signal Ground          |
|  | 0.75        | BK/WH        | 1851           | Signal Ground          |
| 34   | -           | -            | -              | Not Occupied           |
| 35   | 2.5         | BK/WH        | 1851           | Signal Ground          |
| 36-37  | -           | -            | -              | Not Occupied           |
| 38   | 0.5         | BK/WH        | 1851           | Signal Ground          |
| 39   | -           | -            | -              | Not Occupied           |
| 40   | 0.35        | L-GN/BK      | 1563           | 2 HI Indicator Control |
| 41   | 0.35        | BK/WH        | 1851           | Signal Ground          |
| 42-43  | -           | -            | -              | Not Occupied           |
| 44   | 0.35        | BK           | 2550           | Ground                 |
| 45   | 0.35        | BK           | 2550           | Ground                 |
| 46   | 0.75        | BK           | 2550           | Ground                 |
| 47   | 0.35        | BK           | 2550           | Ground                 |
| 48   | 0.75        | BK           | 2550           | Ground                 |
|  | 0.5         | BK           | 2550           | Ground                 |
| 49   | 0.35        | BK           | 2550           | Ground                 |
| 50   | 0.75        | BK           | 2550           | Ground                 |

Junction Block (X61) Instrument Panel – Connector X5

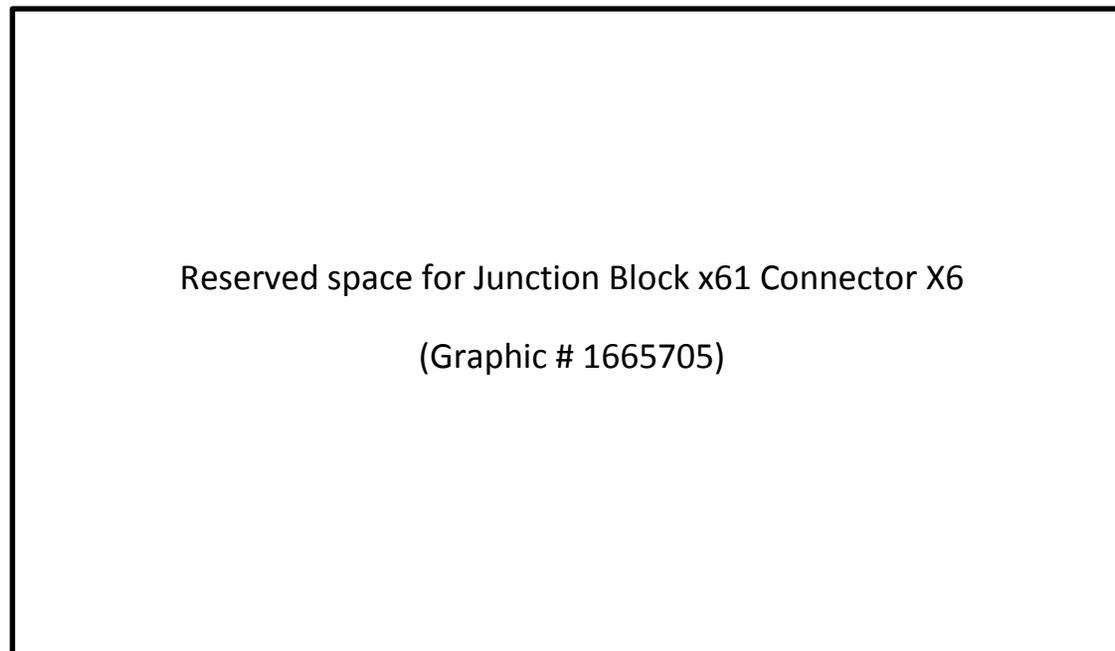


## Junction Block (X61) Instrument Panel – Connector X5 Pin-outs

| X61A Junction Block - Instrument Panel X5 |      |           |         |   |
|---|------|-----------|---------|---|
| Pin                                       | Size | Color     | Circuit | Function  |
| 1   | 0.5  | WH        | 6106    | High Speed GMLAN Serial Data (-) (2)                              |
| 2   | 0.5  | D-BU/YE   | 6105    | High Speed GMLAN Serial Data (+) (2)                              |
| 3   | 0.5  | D-BU/YE   | 6105    | High Speed GMLAN Serial Data (+) (2)                              |
| 4   | 0.75 | WH/VT     | 1430    | Exterior Courtesy Lamp Supply Voltage                             |
| 5   | -    | -         | -       | Not Occupied  |
| 6   | 0.35 | GY        | 5697    | Child Lockout Indicator   |
| 7   | 0.5  | BN        | 7634    | Integrated Trailer Brake Controller Redundant Manual Apply Signal |
| 8   | 0.35 | BN/YE     | 780     | Driver Door Lock Switch Lock Signal                               |
| 9   | 0.35 | VT        | 185     | Low Washer Fluid Indicator Control                                |
| 10  | 0.5  | D-BU/L-GN | 961     |   |
| 11  | 0.5  | D-BU/L-GN | 963     |   |
| 12  | 0.5  | YE        | 7635    | Integrated Trailer Brake Controller Manual Apply Signal           |
| 13  | 0.35 | BN/WH     | 781     | Driver Door Lock Switch Unlock Signal                             |
| 14  | 0.5  | BK/BN     | 7631    | Integrated Trailer Brake Controller Switch Low Reference          |
| 15  | 0.5  | D-BU/RD   | 7632    | Integrated Trailer Brake Controller Switch 5 Volt Reference       |
| 16  | -    | -         | -       | Not Occupied  |
| 17  | 0.5  | D-BU/L-GN | 962     |   |
| 18  | 0.5  | VT/BN     | 300     | Run Ignition 3 Voltage  |
| 19  | 0.5  | WH        | 6106    | High Speed GMLAN Serial Data (-) (2)                              |
| 20-21                                     | -    | -         | -       | Not Occupied  |
| 22  | 0.5  | D-BU/VT   | 1134    | Park Brake Switch Signal  |
| 23  | 0.5  | D-BU/L-GN | 964     |   |

| <b>X61A Junction Block - Instrument Panel X5</b> |             |              |                |  |
|--|-------------|--------------|----------------|--|
| <b>Pin</b>                                       | <b>Size</b> | <b>Color</b> | <b>Circuit</b> | <b>Function</b>                                      |
| 24   | -           | -            | -              | Not Occupied   |
| 25   | 0.35        | WH/GY        | 5285           | Adjustable Pedal Switch Rearward Signal              |
| 26   | 0.35        | L-GN/BN      | 5852           | Rear Park Assist LED Disable Signal                  |
| 27   | 0.5         | WH/D-BU      | 3691           | Trailer Brake Apply Signal                           |
| 28   | -           | -            | -              | Not Occupied   |
| 29   | 0.35        | L-GN/GY      | 5286           | Adjustable Pedal Switch Forward Signal               |
| 30   | 0.5         | L-GN/BK      | 7633           | Integrated Trailer Brake Controller User Gain Signal |
| 31   | 0.35        | BK           | 2550           | Ground   |
| 32   | 0.5         | YE/WH        | 816            | Brake Transmission Shift Interlock Solenoid Control  |
| 33   | -           | -            | -              | Not Occupied   |
| 34   | 0.5         | WH           | 6816           | Indicator Dimming Control                            |
| 35-36  | -           | -            | -              | Not Occupied   |
| 37   | 0.35        | WH           | 6816           | Indicator Dimming Control                            |
| 38   | 0.35        | WH           | 6816           | Indicator Dimming Control                            |
| 39-44  | -           | -            | -              | Not Occupied   |
| 45   | 0.35        | GY/L-GN      | 2555           | Rear Park Assist Disable Signal                      |
| 46-50  | -           | -            | -              | Not Occupied   |

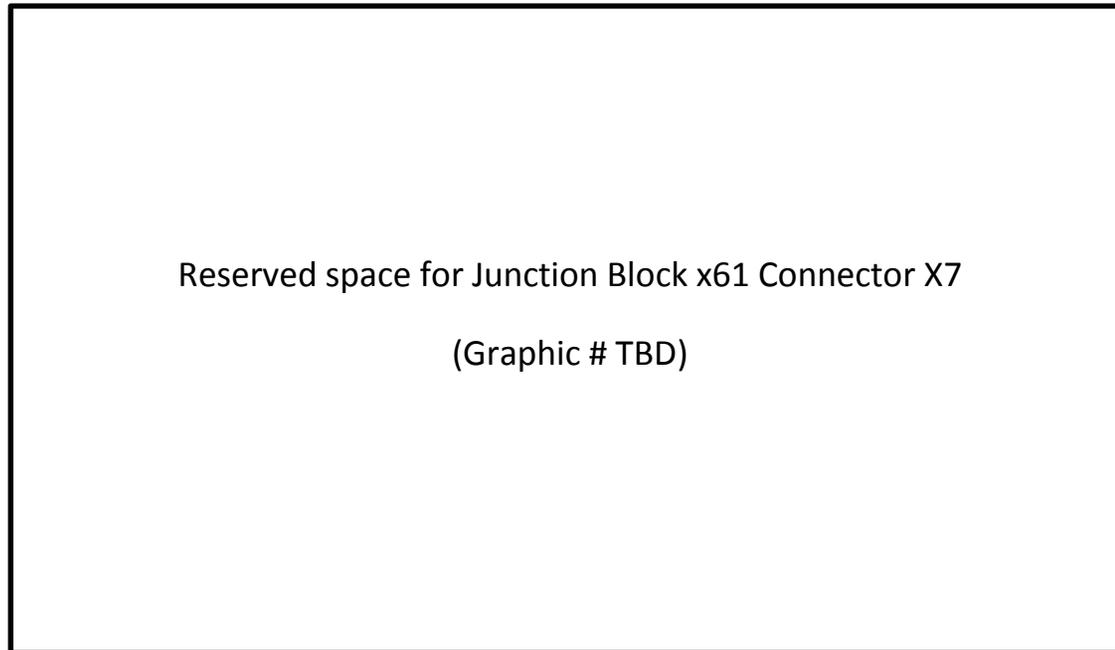
## Junction Block (X61) Instrument Panel – Connector X6



## Junction Block (X61) Instrument Panel – Connector X6 Pin-outs

| X61A Junction Block - Instrument Panel X6 |      |       |         |                                  |
|---|------|-------|---------|----------------------------------|
| Pin                                       | Size | Color | Circuit | Function                         |
| A   | 0.5  | BK    | 1050    | Ground                           |
| B   | 0.5  | WH/BU | 3691    | Trailer Brake Apply Signal       |
| C   | 2.5  | RD/GN | 242     | Battery Positive Voltage         |
| D   | 2.5  | BU    | 47      | Trailer Auxiliary Supply Voltage |

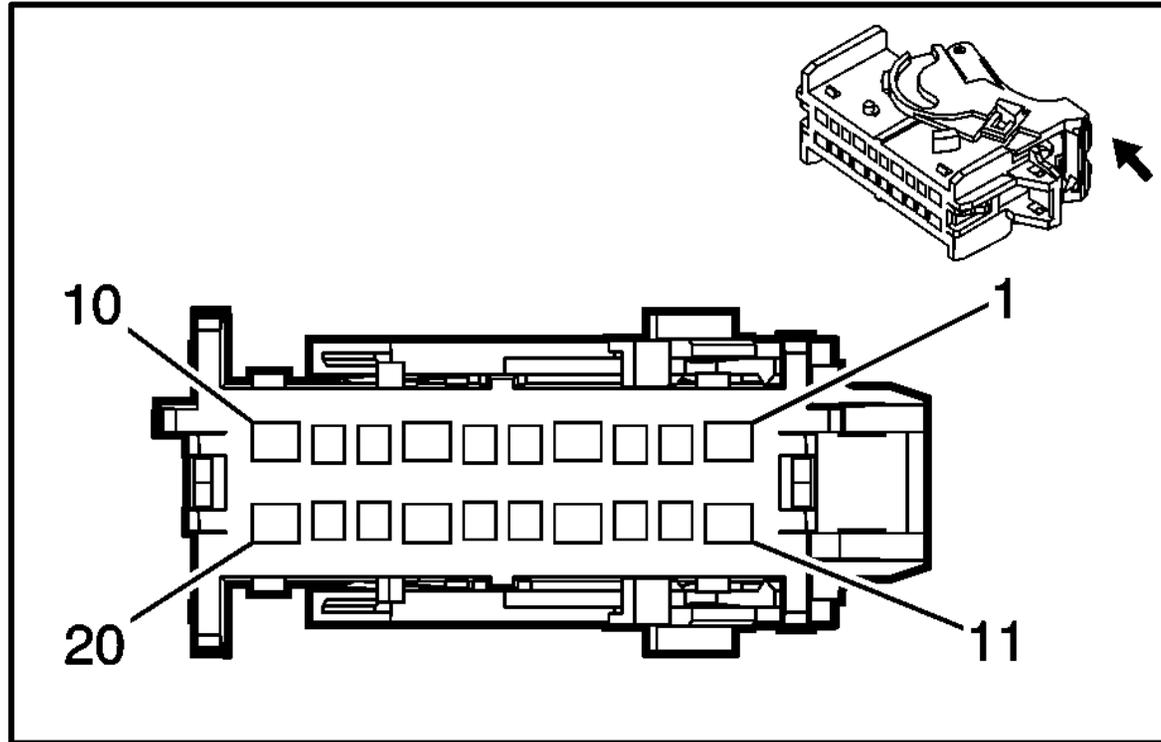
**Junction Block (X61) Instrument Panel – Connector X7**



## Junction Block (X61) Instrument Panel – Connector X7 Pin-outs

| X61A Junction Block - Instrument Panel X7 |      |       |         |                              |                  |        |
|---|------|-------|---------|------------------------------|------------------|--------|
| Pin                                       | Size | Color | Circuit | Function                     | Terminal Type ID | Option |
| 1   | 0    |       | 968     |                              |                  | 9L7    |
| 2-3                                       | -    | -     | -       | Not Occupied                 | -                | -      |
| 4   | 0    |       | 967     |                              |                  | 9L7    |
| 5-6                                       | -    | -     | -       | Not Occupied                 | -                | -      |
| 7   | 0    | RD/YE | 2340    | Battery Positive Voltage     |                  | -      |
| 8   | 0    | VT/YE | 43      | Accessory Voltage            |                  | -      |
| 9   | 0    | GN    | 5060    | Low Speed GMLAN Serial Data  |                  | -      |
| 10  | 0    | BK    | 1050    | Ground                       |                  | -      |
| 11  | 0    | VT/WH | 1939    | Run/Crank Ignition 1 Voltage |                  | -      |
| 12-13                                     | -    | -     | -       | Not Occupied                 | -                | -      |
| 14  | 0    |       | 966     |                              |                  | 9L7    |
| 15-16                                     | -    | -     | -       | Not Occupied                 | -                | -      |
| 17  | 0    | RD/YE | 2340    | Battery Positive Voltage     |                  | -      |
| 18  | -    | -     | -       | Not Occupied                 | -                | -      |
| 19  | 0    | GN/GY | 817     | Vehicle Speed Signal         |                  | -      |
| 20  | 0    |       | 965     |                              |                  | 9L7    |

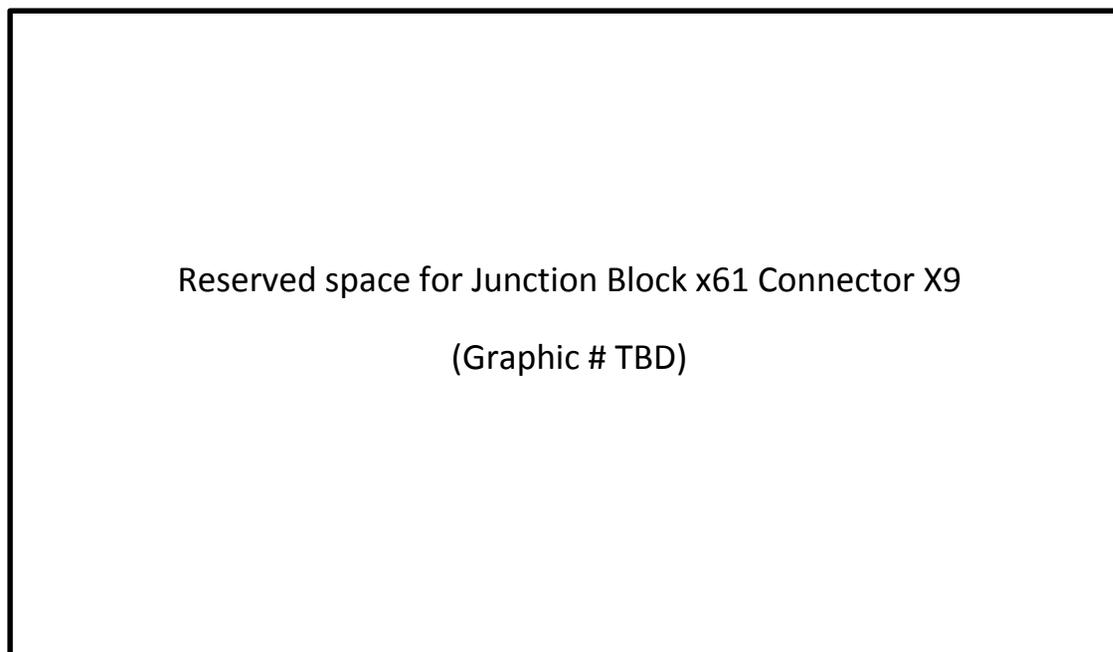
Junction Block (X61) Instrument Panel – Connector X8



## Junction Block (X61) Instrument Panel – Connector X8 Pin-outs

| X61A Junction Block - Instrument Panel X8 |      |       |         |   |
|---|------|-------|---------|---|
| Pin                                       | Size | Color | Circuit | Function                                      |
| 1-7                                       | -    | -     | -       | Not Occupied                                  |
| 8   | 0.5  | WH/GN | 526     | Stop Lamp Switch Signal                       |
| 9   | 0.5  | WH    | 2501    | High Speed GMLAN Serial Data (-) (1)          |
|   | 0.5  | WH    | 2501    | High Speed GMLAN Serial Data (-) (1)          |
| 10  | 0.5  | BU    | 2500    | High Speed GMLAN Serial Data (+) (1)          |
|   | 0.5  | BU    | 2500    | High Speed GMLAN Serial Data (+) (1)          |
| 11  | -    | -     | -       | Not Occupied                                  |
| 12  | 0.5  | WH    | 2501    | High Speed GMLAN Serial Data (-) (1)          |
|   | 0.5  | WH    | 2501    | High Speed GMLAN Serial Data (-) (1)          |
| 13  | 0.5  | BU    | 2500    | High Speed GMLAN Serial Data (+) (1)          |
|   | 0.5  | BU    | 2500    | High Speed GMLAN Serial Data (+) (1)          |
| 14  | 0.5  | WH/RD | 6207    | Memory Sensor High Reference                  |
| 15  | 0.5  | BU    | 5952    | Adjustable Pedal Position Sensor Brake Signal |
| 16  | 1.5  | YE    | 5129    | Adjustable Pedal Actuator Rearward Control    |
| 17  | 0.5  | BK/GY | 6206    | Memory Sensor Low Reference                   |
| 18  | 1.5  | GN/VT | 5130    | Adjustable Pedal Actuator Forward Control     |
| 19  | 0.5  | BK/GN | 552     | Sensor Low Reference                          |
| 20  | 0.5  | GY/RD | 598     | 5 Volt Reference                              |

## Junction Block (X61) Instrument Panel – Connector X9



## Junction Block (X61) Instrument Panel – Connector X9 Pin-outs

| X61A Junction Block - Instrument Panel X9 |      |       |         |   |
|---|------|-------|---------|---|
| Pin                                       | Size | Color | Circuit | Function                                      |
| 1   | 2.5  | YE/BN | 1569    | Transfer Case Lock Solenoid Control           |
| 2   | 0.35 | BU/YE | 1693    | Four Wheel Drive Switch Signal                |
|   | 0.35 | BU/YE | 1693    | Four Wheel Drive Switch Signal                |
| 3   | 0.35 | GY/RD | 6029    | Four Wheel Drive Mode Switch 5 Volt Reference |
|   | 0.35 | GY/RD | 6029    | Four Wheel Drive Mode Switch 5 Volt Reference |

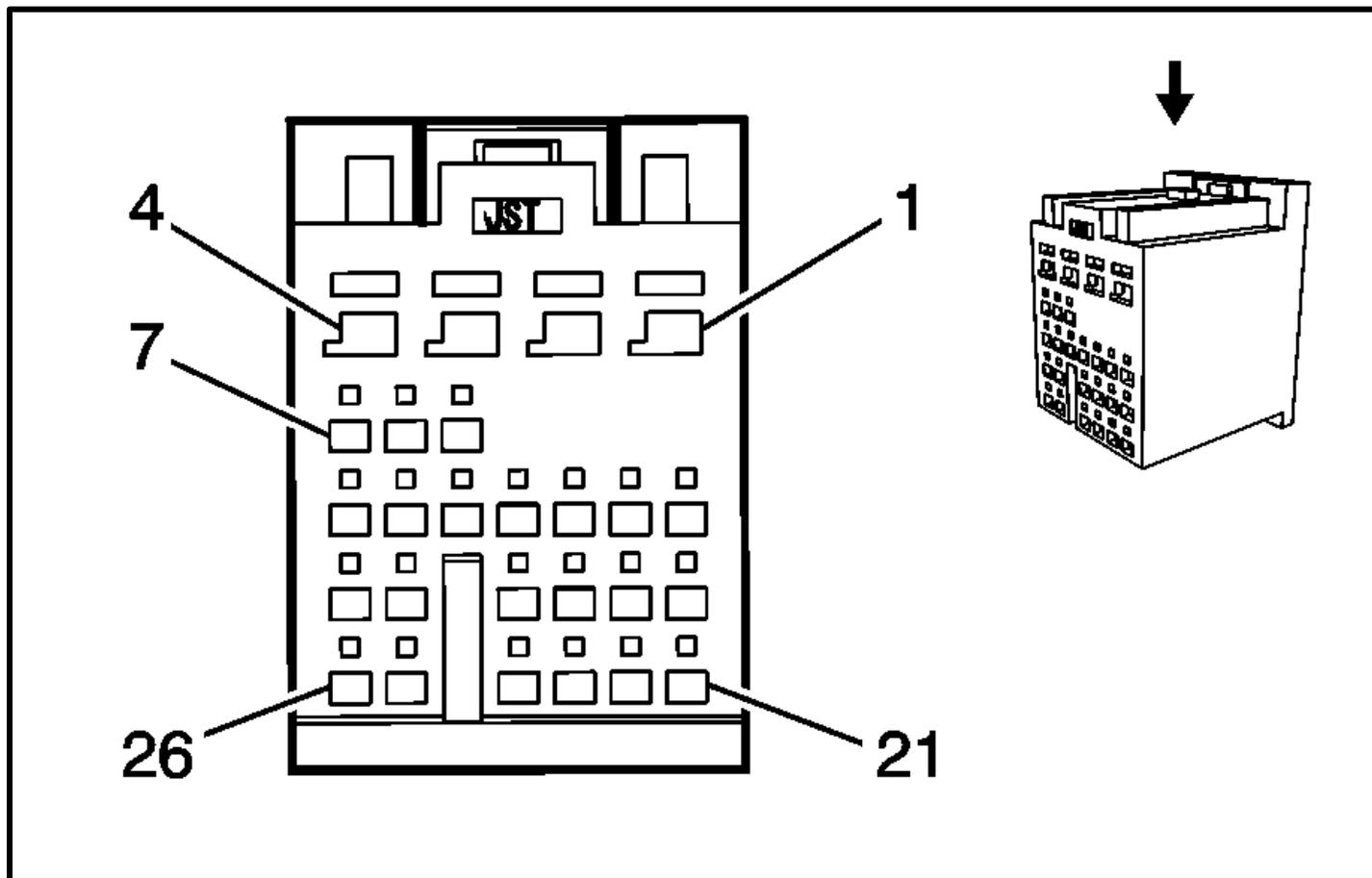
| <b>X61A Junction Block - Instrument Panel X9</b> |             |              |                |                              |
|--|-------------|--------------|----------------|------------------------------|
| <b>Pin</b>                                       | <b>Size</b> | <b>Color</b> | <b>Circuit</b> | <b>Function</b>              |
| 4  | 0.35        | BN/BK        | 1566           | 4 HI Indicator Control       |
|  | 0.35        | BN/BK        | 1566           | 4 HI Indicator Control       |
| 5  | 0.35        | VT/WH        | 1565           | 4 LO Indicator Control       |
|  | 0.35        | VT/WH        | 1565           | 4 LO Indicator Control       |
| 6  | 0.35        | VT/GN        | 1739           | Run/Crank Ignition 1 Voltage |
|  | 0.35        | VT/GN        | 1739           | Run/Crank Ignition 1 Voltage |
| 7  | 0.35        | VT/YE        | 5985           | Accessory Wakeup Serial Data |
|  | 0.35        | VT/YE        | 5985           | Accessory Wakeup Serial Data |
| 8  | 0.35        | GN/BK        | 1563           | 2 HI Indicator Control       |
|  | 0.35        | GN/BK        | 1563           | 2 HI Indicator Control       |
| 9  | 0.35        | GY/GN        | 1561           | AWD Indicator Control        |
| 10   | 0.5         | GY/BK        | 1570           | Front Axle Actuator Control  |
|  | 0.5         | GY/BK        | 1570           | Front Axle Actuator Control  |
| 11   | 3           | RD/GY        | 1342           | Battery Positive Voltage     |
|  | 3           | RD/GY        | 1342           | Battery Positive Voltage     |
| 12   | 0.35        | BN           | 1560           | Neutral Indicator Control    |
|  | 0.35        | BN           | 1560           | Neutral Indicator Control    |

| <b>X61A Junction Block - Instrument Panel X9</b> |             |              |                |   |
|--|-------------|--------------|----------------|---|
| <b>Pin</b>                                       | <b>Size</b> | <b>Color</b> | <b>Circuit</b> | <b>Function</b>                               |
| 13   | 0.35        | VT           | 7476           | Incremental Encoder Sensor Return             |
|  | 0.35        | VT           | 7476           | Incremental Encoder Sensor Return             |
| 14   | 3           | BK           | 550            | Ground  |
|  | 3           | BK           | 550            | Ground  |
| 15   | 0.35        | BU/GY        | 7473           | Incremental Encoder Impulse Signal            |
|  | 0.35        | BU/GY        | 7473           | Incremental Encoder Impulse Signal            |
| 16   | 0.35        | YE           | 7474           | Incremental Encoder Direction Signal          |
|  | 0.35        | YE           | 7474           | Incremental Encoder Direction Signal          |
| 17   | 4           | YE/VT        | 1553           | Transfer Case Motor Counter Clockwise Control |
|  | 4           | YE/VT        | 1553           | Transfer Case Motor Counter Clockwise Control |
| 18   | 0.35        | WH/GN        | 7475           | Incremental Encoder Sensor (8V) Supply        |
|  | 0.35        | WH/GN        | 7475           | Incremental Encoder Sensor (8V) Supply        |
| 19   | 0.5         | YE/WH        | 1695           | Four Wheel Drive Wheel Lock Indicator         |
|  | 0.5         | YE/WH        | 1695           | Four Wheel Drive Wheel Lock Indicator         |
| 20   | 4           | YE/GY        | 1552           | Transfer Case Motor Clockwise Control         |
|  | 4           | YE/GY        | 1552           | Transfer Case Motor Clockwise Control         |

**Section C**

**K9 Body Control Module**

K9 Body Control Module (BCM) – Connector X1

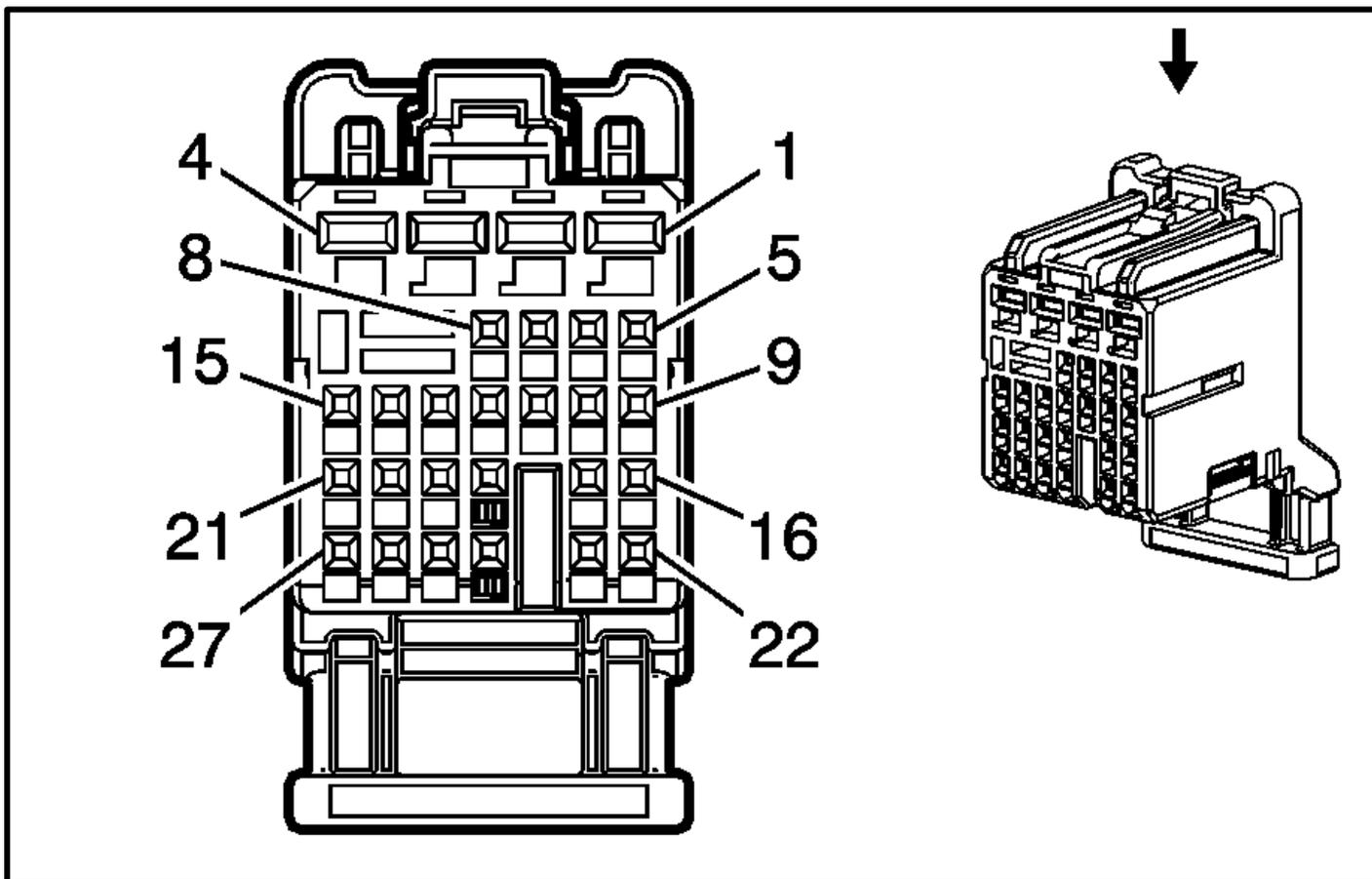


## K9 Body Control Module (BCM) – Connector X1 Pin-outs

| K9 Body Control Module X1 |      |         |         |   |
|---------------------------|------|---------|---------|---|
| Pin                       | Size | Color   | Circuit | Function  |
| 1                         | 0.75 | BK      | 1850    | Ground  |
| 2                         | 0.75 | RD/D-BU | 2540    | Battery Positive Voltage                          |
| 3                         | 1    | RD/GY   | 2140    | Battery Positive Voltage                          |
| 4                         | 0.5  | RD/BN   | 2240    | Battery Positive Voltage                          |
| 5                         | 0.5  | WH      | 6816    | Indicator Dimming Control                         |
| 6                         | -    | -       | -       | Not Occupied                                      |
| 7                         | 0.35 | BK/YE   | 5005    | Instrument Panel Lamp Dimmer Switch Low Reference |
| 8-9                       | -    | -       | -       | Not Occupied                                      |
| 10                        | 0.5  | D-BU/VT | 1134    | Park Brake Switch Signal                          |
| 11                        | 0.35 | L-GN/BN | 306     | Headlamp Switch Headlamps Off Signal Control      |
| 12                        | -    | -       | -       | Not Occupied                                      |
| 13                        | 0.35 | D-BU/RD | 1688    | 5 Volt Reference                                  |
| 14                        | 0.35 | GY/L-GN | 328     | Interior Lamp Defeat Switch Signal                |
| 15                        | 0.35 | D-BU/GY | 192     | Front Fog Lamp Switch Signal                      |
| 16                        | 0.35 | WH/VT   | 103     | Headlamp Switch On Signal                         |
| 17-18                     | -    | -       | -       | Not Occupied                                      |
| 19                        | 0.35 | BK/L-GN | 552     | Sensor Low Reference                              |
| 20                        | -    | -       | -       | Not Occupied                                      |
| 21                        | 0.35 | GY      | 728     | Security Indicator Control                        |
| 22                        | 0.35 | L-GN/GY | 13      | Headlamp Switch Park Lamp Signal                  |

| K9 Body Control Module X1 |      |         |         |   |
|---------------------------|------|---------|---------|---|
| Pin                       | Size | Color   | Circuit | Function                                |
| 23                        | 0.5  | VT/L-GN | 7558    | LED Ambient Lighting Control 2          |
| 24                        | 0.5  | WH      | 2501    | High Speed GMLAN Serial Data (-) (1)    |
| 25                        | 0.5  | D-BU    | 2500    | High Speed GMLAN Serial Data (+) (1)    |
| 26                        | 0.35 | D-BU/WH | 3275    | Remote Function Actuator Receive Signal |

K9 Body Control Module (BCM) – Connector X2

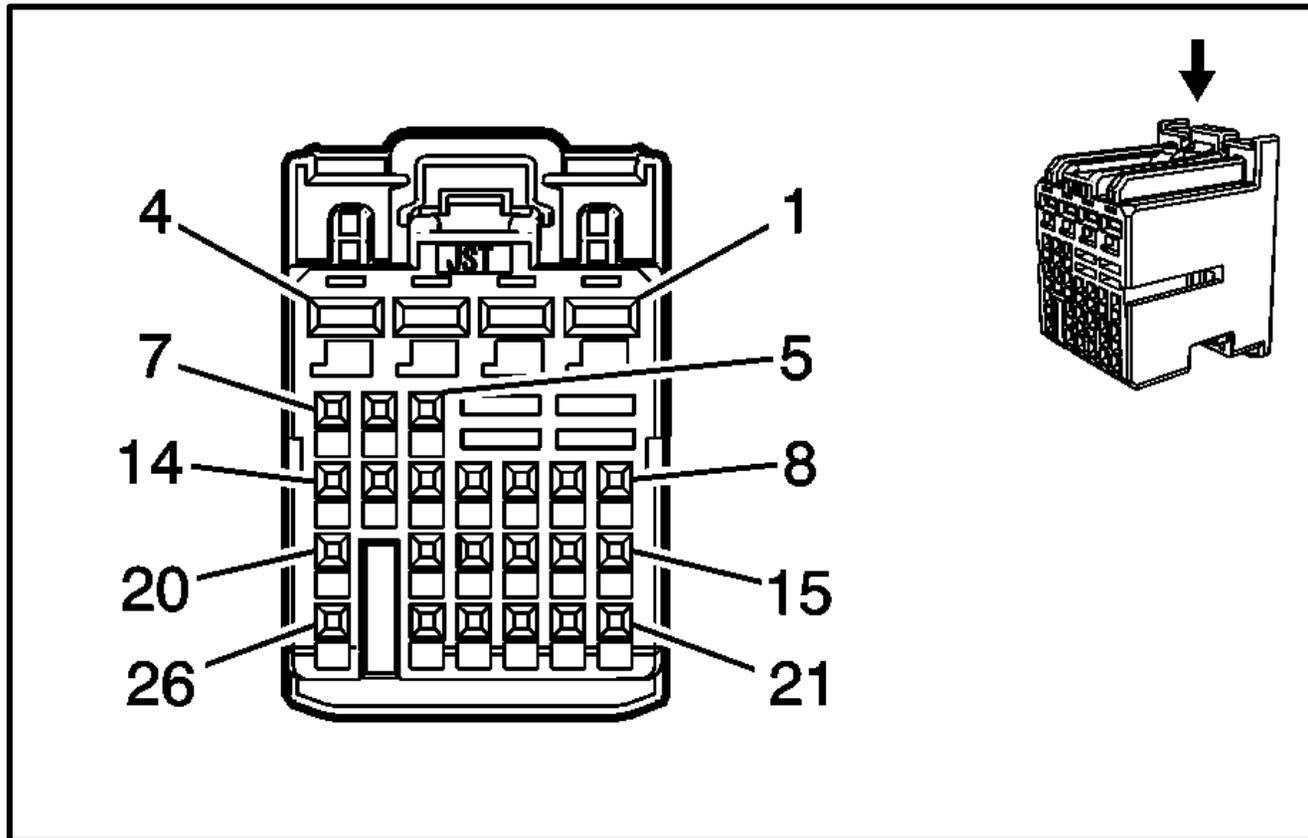


## K9 Body Control Module (BCM) – Connector X2 Pin-outs

| K9 Body Control Module X2 |      |         |         |  |
|---------------------------|------|---------|---------|--|
| Pin                       | Size | Color   | Circuit | Function                                   |
| 1                         | 0.5  | RD/WH   | 2740    | Battery Positive Voltage                   |
| 2                         | 0.75 | BK      | 1850    | Ground                                     |
| 3                         | 0.5  | RD/BN   | 2940    | Battery Positive Voltage                   |
| 4                         | 0.75 | RD/VT   | 4040    | Battery Positive Voltage                   |
| 5                         | -    | -       | -       | Not Occupied                               |
| 6                         | 0.35 | GY      | 5697    | Child Lockout Indicator                    |
| 7                         | 0.35 | WH/L-GN | 526     | Stop Lamp Switch Signal                    |
| 8                         | 0.5  | YE      | 6817    | LED Backlight Dimming Control              |
| 9                         | 0.35 | YE/GY   | 44      | Instrument Panel Lamp Dimmer Switch Signal |
| 10                        | 0.35 | WH/D-BU | 278     | Ambient Light Sensor Signal                |
| 11-12                     | -    | -       | -       | Not Occupied                               |
| 13                        | 0.35 | GY/RD   | 598     | 5 Volt Reference                           |
| 14                        | 0.35 | D-BU/VT | 1788    | Traction Control Switch Signal (1)         |
| 15                        | 0.35 | BN/WH   | 781     | Driver Door Lock Switch Unlock Signal      |
| 16                        | 0.35 | GY      | 3273    | Remote Function Actuator Return            |
| 17                        | -    | -       | -       | Not Occupied                               |
| 18                        | 0.5  | GY      | 158     | Cargo Lamp Switch Signal                   |
| 19                        | 0.35 | BN/YE   | 780     | Driver Door Lock Switch Lock Signal        |
| 20                        | 0.5  | WH/D-BU | 3691    | Trailer Brake Apply Signal                 |
| 21                        | 0.5  | L-GN/GY | 6135    | Linear Interconnect Network Bus 4          |

| K9 Body Control Module X2 |      |         |         |  |
|---------------------------|------|---------|---------|--|
| Pin                       | Size | Color   | Circuit | Function                                 |
| 22-24                     | -    | -       | -       | Not Occupied                             |
| 25                        | 0.35 | GY/WH   | 3272    | Remote Function Actuator Supply Voltage  |
| 26                        | 0.35 | L-GN/WH | 111     | Hazard Switch Signal                     |
| 27                        | 0.35 | YE/L-GN | 3274    | Remote Function Actuator Transmit Signal |

K9 Body Control Module (BCM) – Connector X4

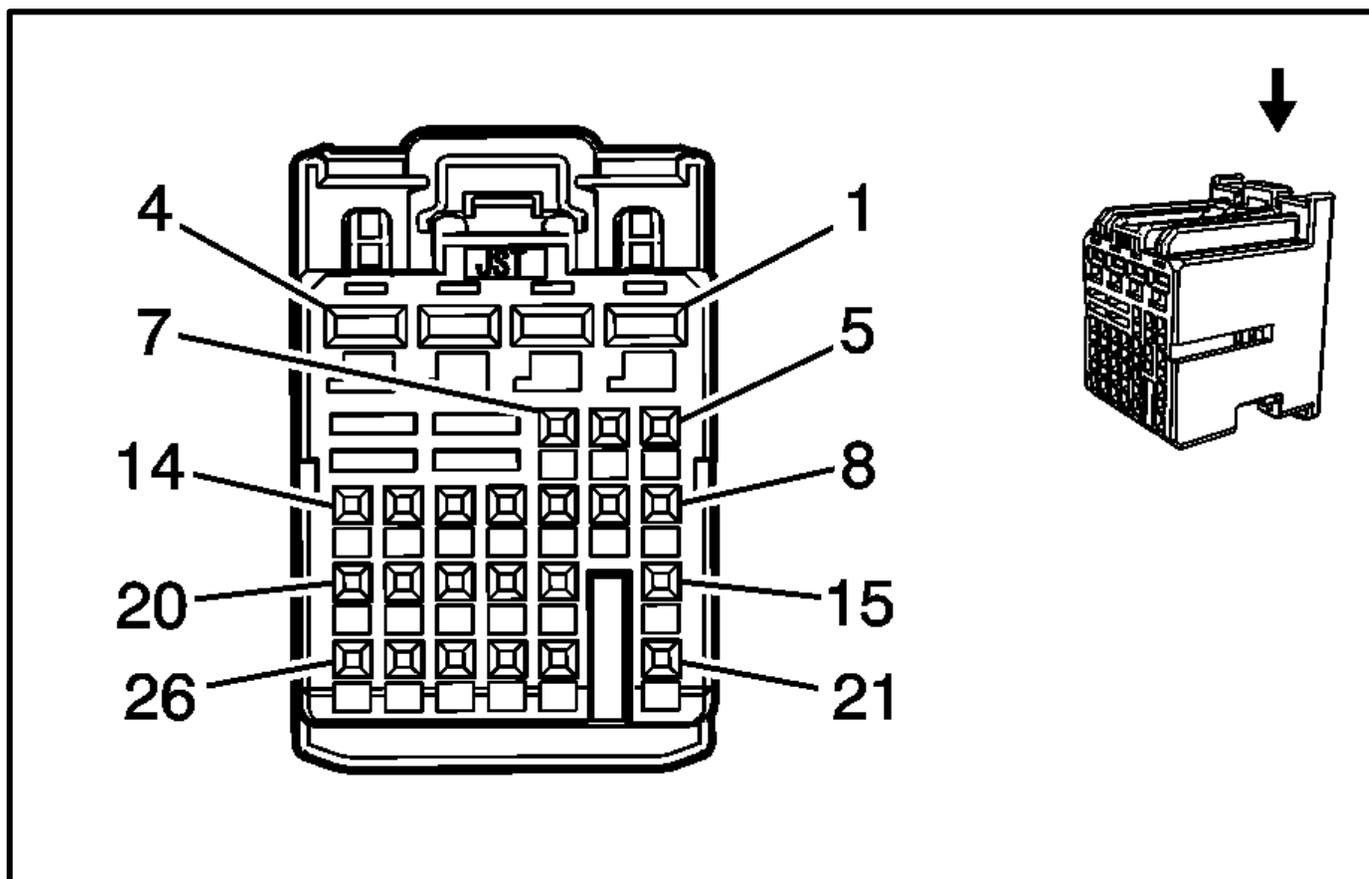


## K9 Body Control Module (BCM) – Connector X4 Pin-outs

| K9 Body Control Module X4 |      |         |         |  |
|---------------------------|------|---------|---------|--|
| Pin                       | Size | Color   | Circuit | Function   |
| 1                         | 0.75 | YE      | 712     | Left Headlamp Low Beam Supply Voltage            |
| 2                         | 0.75 | YE      | 312     | Right Headlamp Low Beam Supply Voltage           |
| 3                         | 0.75 | L-GN/VT | 1315    | Right Front Turn Signal Lamp Supply Voltage      |
| 4                         | 0.5  | BN/L-GN | 19      | Right Rear Stop/Turn Lamp Supply Voltage         |
| 5-6                       | -    | -       | -       | Not Occupied                                     |
| 7                         | 0.75 | GY/D-BU | 7538    | Left Front DRL Supply Voltage                    |
| 8-10                      | -    | -       | -       | Not Occupied                                     |
| 11                        | 0.5  | VT/WH   | 5065    | Stop Lamp Relay Coil Supply Voltage              |
| 12                        | 0.35 | GY/VT   | 755     | RAP Relay Coil Control                           |
| 13                        | 0.5  | L-GN/YE | 6846    | Rear License Lamp Supply Voltage                 |
| 14                        | 0.35 | BN/GY   | 2268    | Windshield Washer Relay Control                  |
| 15                        | 0.35 | L-GN/VT | 5199    | Run/Crank Relay Coil Control                     |
| 16                        | 0.35 | GY      | 91      | Windshield Wiper Motor Relay Coil Supply Voltage |
| 17                        | 0.5  | BN/L-GN | 196     | Windshield Wiper Motor Park Switch Signal        |
| 18                        | 0.35 | WH/YE   | 5075    | Current Sensor Signal                            |
| 19                        | 0.35 | D-BU/YE | 6844    | ABS/TCS Hill Descent Control Switch Signal       |
| 20                        | 0.75 | RD/YE   | 2340    | Battery Positive Voltage                         |
| 21                        | 0.35 | D-BU/VT | 5076    | Current Sensor Supply Voltage                    |
| 22                        | 0.35 | VT/YE   | 5985    | Accessory Wakeup Serial Data                     |
| 23                        | 0.5  | WH/D-BU | 5986    | Serial Data Communication Enable                 |

| <b>K9 Body Control Module X4</b> |             |              |                |                              |
|----------------------------------|-------------|--------------|----------------|------------------------------|
| <b>Pin</b>                       | <b>Size</b> | <b>Color</b> | <b>Circuit</b> | <b>Function</b>              |
| 24                               | 0.5         | BN/L-GN      | 109            | Hood Ajar Switch Signal      |
| 25                               | 0.5         | L-GN/YE      | 2081           | Exhaust Brake Switch Control |
| 26                               | 0.75        | BK/WH        | 451            | Signal Ground                |

K9 Body Control Module (BCM) – Connector X5

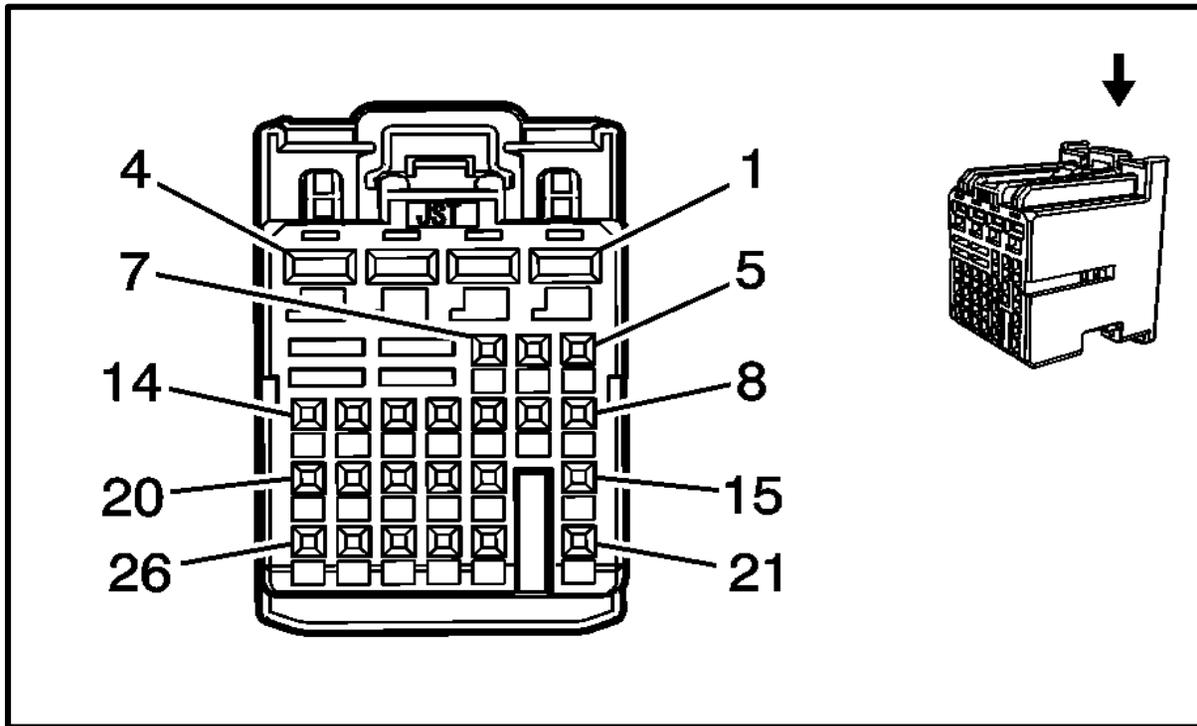


## K9 Body Control Module (BCM) – Connector X5 Pin-outs

| K9 Body Control Module X5 |      |         |         |  |
|---------------------------|------|---------|---------|--|
| Pin                       | Size | Color   | Circuit | Function                                   |
| 1                         | 0.5  | YE/D-BU | 18      | Left Rear Stop/Turn Lamp Supply Voltage    |
| 2                         | 0.75 | D-BU/WH | 1314    | Left Front Turn Signal Lamp Supply Voltage |
| 3                         | 0.75 | RD/L-GN | 5140    | Battery Positive Voltage                   |
| 4                         | 0.75 | RD/WH   | 3440    | Battery Positive Voltage                   |
| 5                         | -    | -       | -       | Not Occupied                               |
| 6                         | 0.35 | BK/VT   | 5077    | Current Sensor Low Reference               |
| 7                         | 0.75 | D-BU/BN | 7539    | Right Front DRL Supply Voltage             |
| 8                         | 0.35 | D-BU/WH | 5186    | Left Trailer Turn Signal Lamp              |
| 9                         | -    | -       | -       | Not Occupied                               |
| 10                        | 0.5  | BN/WH   | 1317    | Fog Lamp Relay Control                     |
| 11                        | -    | -       | -       | Not Occupied                               |
| 12                        | 0.35 | WH/D-BU | 6311    | Cruise/ETC/TCC Brake Signal                |
| 13                        | -    | -       | -       | Not Occupied                               |
| 14                        | 0.5  | VT/BN   | 300     | Run Ignition 3 Voltage                     |
| 15                        | 0.35 | L-GN/WH | 3438    | Exhaust Brake Switch Signal                |
| 16                        | 0.35 | VT/YE   | 3267    | Child Security Lock Relay Control          |
| 17                        | 0.35 | YE/GY   | 5187    | Right Trailer Turn Signal Lamp             |
| 18                        | 0.35 | BN/VT   | 1969    | Headlamp High Beam Relay Control           |
| 19                        | 0.35 | BN/WH   | 28      | Horn Relay Control                         |
| 20-21                     | -    | -       | -       | Not Occupied                               |

| K9 Body Control Module X5 |      |         |         |   |
|---------------------------|------|---------|---------|---|
| Pin                       | Size | Color   | Circuit | Function                                  |
| 22                        | 0.35 | D-BU    | 45      | Park Lamp Relay Control                   |
| 23                        | 0.35 | YE      | 6812    | Out of Park Signal                        |
| 24                        | 0.35 | WH/VT   | 860     | Front Windshield Wiper Switch High Signal |
| 25                        | -    | -       | -       | Not Occupied                              |
| 26                        | 0.35 | D-BU/BN | 38      | Backup Lamp Relay Control                 |

## *K9 Body Control Module (BCM) – Connector X6*

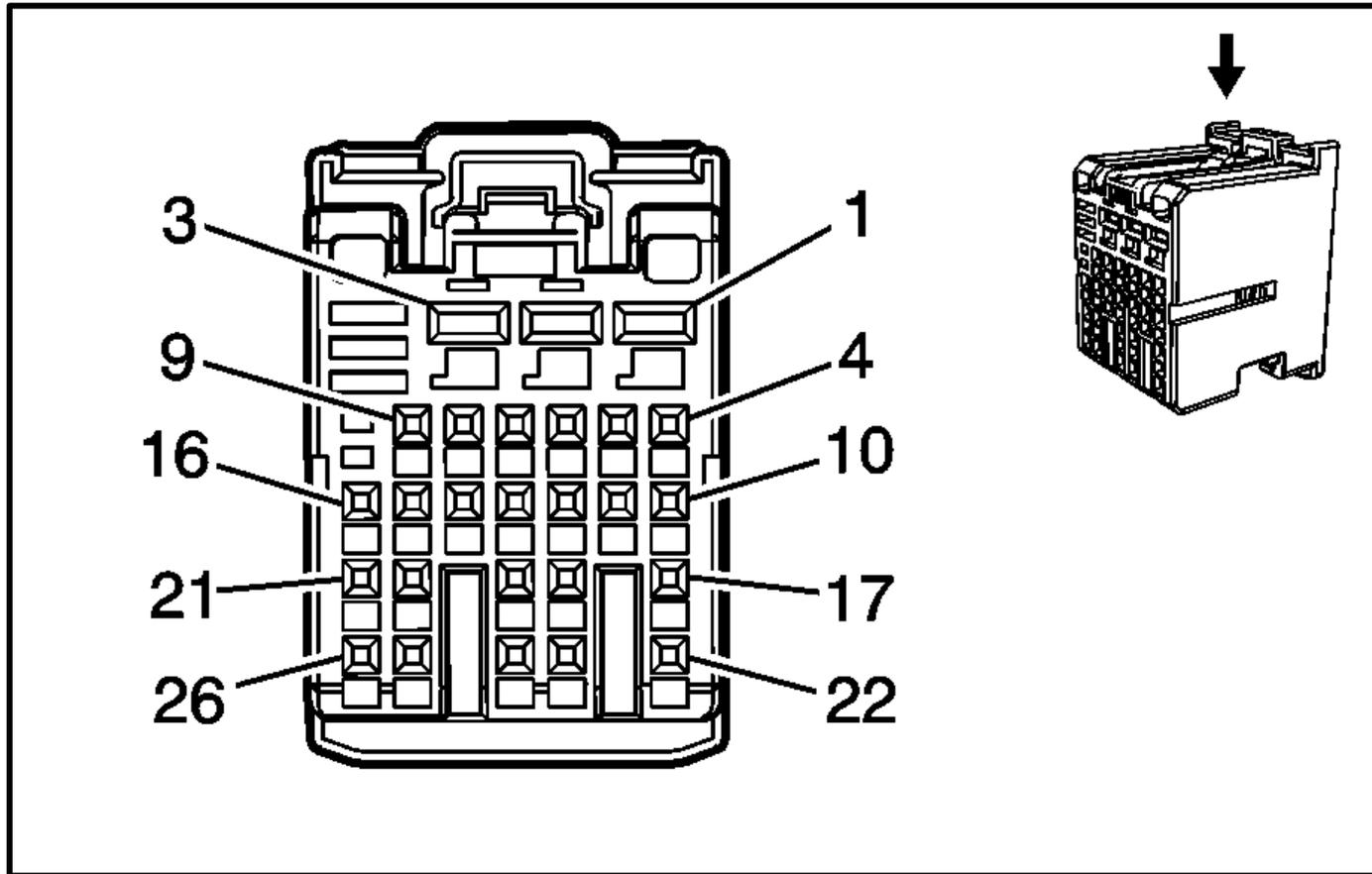


## *K9 Body Control Module (BCM) – Connector X6 Pin-outs*

| K9 Body Control Module X6 |      |         |         |                       |
|---------------------------|------|---------|---------|-----------------------|
| Pin                       | Size | Color   | Circuit | Function              |
| 1                         | 1.5  | D-BU/WH | 195     | Door Lock Control     |
| 2                         | 1.5  | GY/L-GN | 3271    | Door Lock Control (2) |
| 3                         | 1.5  | BK      | 1850    | Ground                |

| <b>K9 Body Control Module X6</b> |             |              |                |                                       |
|----------------------------------|-------------|--------------|----------------|---------------------------------------|
| <b>Pin</b>                       | <b>Size</b> | <b>Color</b> | <b>Circuit</b> | <b>Function</b>                       |
| 4                                | 0.75        | BN/YE        | 294            | Door Lock Actuator Unlock Control     |
|                                  | 1.5         | BN/YE        | 294            | Door Lock Actuator Unlock Control     |
| 5                                | -           | -            | -              | Not Occupied                          |
| 6                                | 0.35        | D-BU/VT      | 1124           | Door Lock Key Switch Unlock Signal    |
| 7                                | -           | -            | -              | Not Occupied                          |
| 8                                | 0.35        | VT/WH        | 5908           | Passenger Seat Vent Motor Control (1) |
| 9                                | 0.5         | L-GN/D-BU    | 6133           | Linear Interconnect Network Bus 2     |
| 10                               | 0.5         | L-GN/YE      | 6134           | Linear Interconnect Network Bus 3     |
| 11-16                            | -           | -            | -              | Not Occupied                          |
| 17                               | 0.35        | L-GN/VT      | 5906           | Driver Seat Vent Motor Control (1)    |
| 18-20                            | -           | -            | -              | Not Occupied                          |
| 21                               | 0.35        | WH/VT        | 3270           | Driver Door Lock Motor Status         |
| 22-23                            | -           | -            | -              | Not Occupied                          |
| 24                               | 0.5         | D-BU         | 2500           | High Speed GMLAN Serial Data (+) (1)  |
| 25                               | 0.5         | WH           | 2501           | High Speed GMLAN Serial Data (-) (1)  |
| 26                               | 0.5         | BN/WH        | 1429           | Standing Lamp Relay Control           |
| 27                               | -           | -            | -              | Not Occupied                          |

*K9 Body Control Module (BCM) – Connector X7*

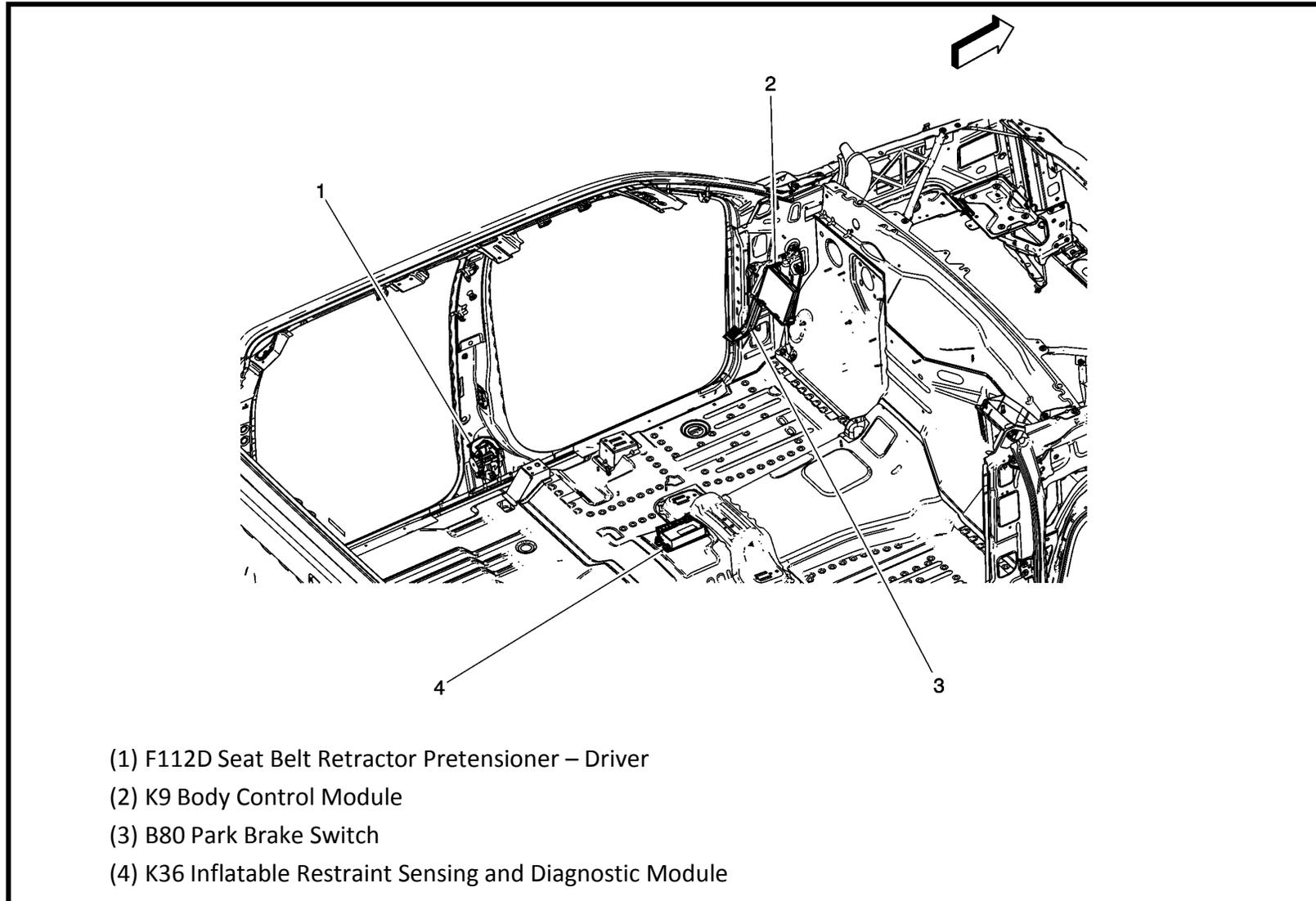


## **K9 Body Control Module (BCM) – Connector X7 Pin-outs**

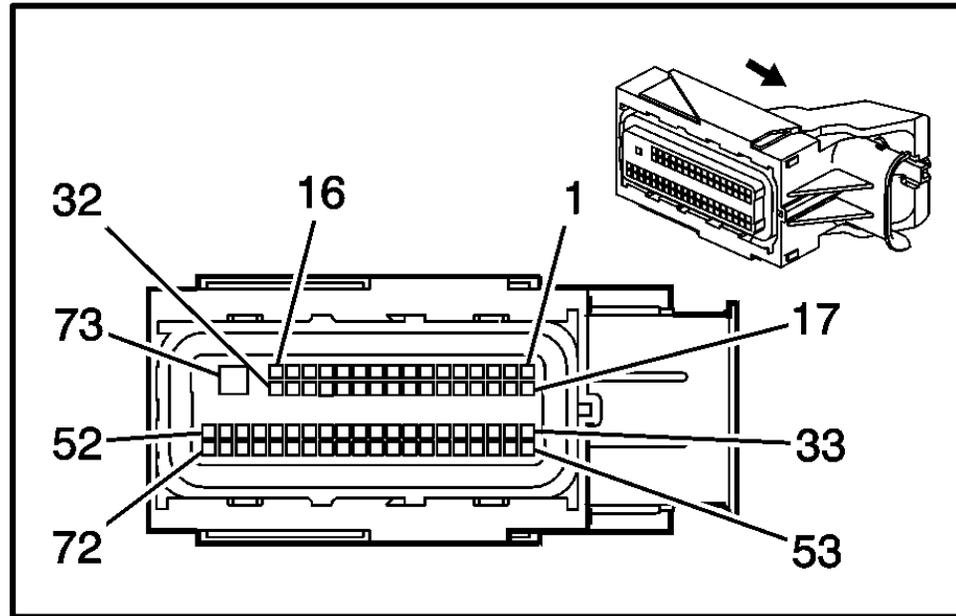
| <b>K9 Body Control Module X7</b> |             |              |                |  |
|----------------------------------|-------------|--------------|----------------|--|
| <b>Pin</b>                       | <b>Size</b> | <b>Color</b> | <b>Circuit</b> | <b>Function</b>  |
| 1                                | 0.5         | GY           | 157            | Interior Lamp Control                                      |
| 2                                | -           | -            | -              | Not Occupied   |
| 3                                | 0.5         | WH/BN        | 6815           | Inadvertent Power Control                                  |
| 4-5                              | -           | -            | -              | Not Occupied   |
| 6                                | 0.5         | YE/WH        | 816            | Brake Transmission Shift Interlock Solenoid Control        |
| 7                                | -           | -            | -              | Not Occupied   |
| 8                                | 0.5         | GY/L-GN      | 5996           | Driver Outside Rear View Mirror Puddle Lamp Supply Voltage |
| 9                                | 0.5         | YE           | 6817           | LED Backlight Dimming Control                              |
| 10-11                            | -           | -            | -              | Not Occupied   |
| 12                               | 0.35        | BN/WH        | 3269           | Child Security Lock Motor Status Signal Left Rear          |
| 13                               | -           | -            | -              | Not Occupied   |
| 14                               | 0.35        | GY           | 746            | Right Front Door Ajar Switch Signal                        |
| 15                               | 0.35        | YE/BN        | 3265           | Child Security Lock Switch Signal                          |
| 16                               | 0.5         | WH/D-BU      | 3691           | Trailer Brake Apply Signal                                 |
| 17                               | -           | -            | -              | Not Occupied   |
| 18                               | 0.35        | GY/BK        | 3268           | Child Security Lock Motor Status Signal Right Rear         |
| 19                               | 0.35        | GY           | 156            | Courtesy Lamp Switch Signal                                |
| 20                               | -           | -            | -              | Not Occupied   |
| 21                               | 0.35        | YE/VT        | 244            | Passenger Door Lock Switch Lock Control                    |
| 22                               | 0.35        | WH/YE        | 7557           | LED Ambient Lighting Control 1                             |

| <b>K9 Body Control Module X7</b> |             |              |                |   |
|----------------------------------|-------------|--------------|----------------|---|
| <b>Pin</b>                       | <b>Size</b> | <b>Color</b> | <b>Circuit</b> | <b>Function</b>                           |
| 23                               | 0.5         | L-GN         | 5060           | Low Speed GMLAN Serial Data               |
| 24                               | 0.35        | BN/VT        | 245            | Passenger Door Lock Switch Unlock Control |
| 25                               | 0.35        | GY           | 745            | Left Front Door Ajar Switch Signal        |
| 26                               | -           | -            | -              | Not Occupied                              |

## **K9 Body Control Module (BCM) – Component Location**



## **K20 Engine Control Module (ECM) – Connector X1**



## **K20 Engine Control Module (ECM) – Connector X1 Pin-outs**

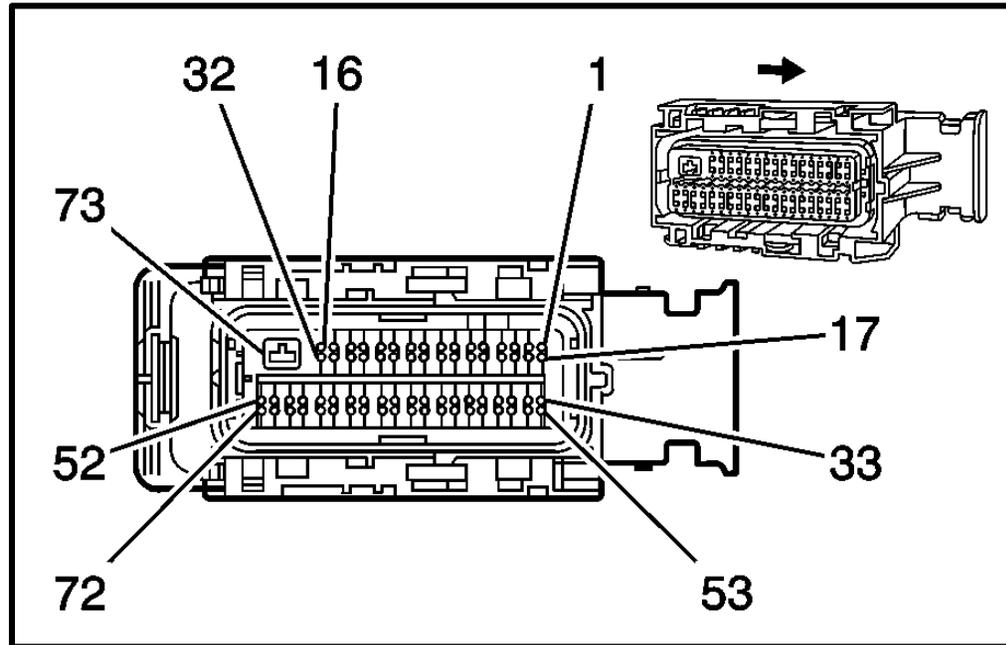
| <b>K20 Engine Control Module X1</b> |             |              |                |  |
|-------------------------------------|-------------|--------------|----------------|--|
| <b>Pin</b>                          | <b>Size</b> | <b>Color</b> | <b>Circuit</b> | <b>Function</b>                                      |
| 1                                   | -           | -            | -              | Not Occupied   |
| 2                                   | 0.5         | D-BU/WH      | 7446           | Fuel Line Pressure Sensor Signal                     |
| 3                                   | -           | -            | -              | Not Occupied   |
| 4                                   | 0.5         | YE/WH        | 3200           | Throttle Inlet Absolute Pressure Sensor Signal       |
| 5                                   | 0.5         | WH/RD        | 3201           | Throttle Inlet Absolute Pressure Sensor 5V Reference |
| 6                                   | 0.5         | L-GN         | 380            | A/C Refrigerant Pressure Sensor Signal               |
| 7                                   | -           | -            | -              | Not Occupied   |

| <b>K20 Engine Control Module X1</b> |             |              |                |   |
|-------------------------------------|-------------|--------------|----------------|---|
| <b>Pin</b>                          | <b>Size</b> | <b>Color</b> | <b>Circuit</b> | <b>Function</b>                                 |
| 8                                   | 0.5         | BK/YE        | 7447           | Fuel Line Pressure Sensor Low Reference         |
| 9                                   | 0.5         | D-BU/WH      | 890            | Fuel Tank Pressure Sensor Signal                |
| 10                                  | 0.5         | YE/RD        | 2709           | Fuel Tank Pressure Sensor 5 Volt Reference      |
| 11-12                               | -           | -            | -              | Not Occupied                                    |
| 13                                  | 0.5         | D-BU/GY      | 636            | Outside Ambient Air Temperature Sensor Signal   |
| 14                                  | 0.5         | WH/RD        | 1164           | Accelerator Pedal Position 5 Volt Reference (1) |
| 15                                  | 0.5         | YE/WH        | 1161           | Accelerator Pedal Position Signal (1)           |
| 16-20                               | -           | -            | -              | Not Occupied                                    |
| 21                                  | 0.5         | BN/RD        | 2700           | A/C Pressure Sensor 5 Volt Reference            |
| 22                                  | 0.5         | BK/BN        | 5514           | A/C Refrigerant Pressure Sensor Low Reference   |
| 23                                  | -           | -            | -              | Not Occupied                                    |
| 24                                  | 0.5         | BN/RD        | 7445           | Fuel Line Pressure Sensor 5V Reference          |
| 25                                  | 0.5         | D-BU/VT      | 1589           | Primary Fuel Level Sensor Signal                |
| 26                                  | 0.5         | BK/L-GN      | 6281           | Fuel Level Sensor Low Reference                 |
| 27-29                               | -           | -            | -              | Not Occupied                                    |
| 30                                  | 0.5         | BK/D-BU      | 1271           | Accelerator Pedal Position Low Reference (1)    |
| 31                                  | -           | -            | -              | Not Occupied                                    |
| 32                                  | 0.5         | WH/GY        | 459            | A/C Compressor Clutch Relay Control             |
| 33                                  | 0.5         | BN/RD        | 1274           | Accelerator Pedal Position 5 Volt Reference (2) |
| 34                                  | 0.5         | L-GN/WH      | 1162           | Accelerator Pedal Position Signal (2)           |
| 35                                  | -           | -            | -              | Not Occupied                                    |
| 36                                  | 0.5         | D-BU/BK      | 7493           | High Speed GMLAN Serial Data (+)(3)             |
| 37                                  | 0.5         | WH           | 7494           | High Speed GMLAN Serial Data (-)(3)             |
| 38                                  | 0.5         | WH           | 1579           | Fuel Temperature/Composition Signal             |

| <b>K20 Engine Control Module X1</b> |             |              |                |  |
|-------------------------------------|-------------|--------------|----------------|--|
| <b>Pin</b>                          | <b>Size</b> | <b>Color</b> | <b>Circuit</b> | <b>Function</b>                              |
| 39                                  | 0.5         | D-BU         | 2500           | High Speed GMLAN Serial Data (+) (1)         |
| 40                                  | 0.5         | WH           | 2501           | High Speed GMLAN Serial Data (-) (1)         |
| 41-43                               | -           | -            | -              | Not Occupied                                 |
| 44                                  | 0.5         | GY           | 5660           | Fuel Pump Controller Data Out Signal         |
| 45                                  | -           | -            | -              | Not Occupied                                 |
| 46                                  | 0.5         | BN/WH        | 419            | Check Engine Indicator Control               |
| 47                                  | 0.5         | GY/RD        | 6109           | Clutch Apply Sensor Voltage Reference        |
|                                     | 0.5         | WH           | 5359           | Brake Apply Sensor Supply Voltage            |
| 48                                  | 0.5         | YE           | 6111           | Clutch Apply Sensor Signal                   |
|                                     | 0.5         | D-BU/YE      | 5361           | Brake Apply Sensor Signal                    |
| 49-50                               | -           | -            | -              | Not Occupied                                 |
| 51                                  | 0.5         | VT/L-GN      | 439            | Run/Crank Ignition 1 Voltage                 |
| 52                                  | 0.5         | RD/BN        | 440            | Battery Positive Voltage                     |
| 53                                  | 0.5         | BK/PU        | 1272           | Accelerator Pedal Position Low Reference (2) |
| 54-56                               | -           | -            | -              | Not Occupied                                 |
| 57                                  | 0.5         | WH/D-BU      | 6311           | Cruise/ETC/TCC Brake Signal                  |
| 58                                  | -           | -            | -              | Not Occupied                                 |
| 59                                  | 0.5         | BN/YE        | 473            | High Speed Cooling Fan Relay Control         |
| 60                                  | 0.5         | YE/WH        | 1695           | Four Wheel Drive Wheel Lock Indicator        |
| 61                                  | 0.5         | GY/BK        | 1694           | Four Wheel Drive Low Signal                  |
| 62                                  | 0.5         | VT/D-BU      | 5291           | Powertrain Main Relay Fused Supply (2)       |
| 63                                  | 0.5         | YE/BK        | 625            | Starter Enable Relay Control                 |
| 64-65                               | -           | -            | -              | Not Occupied                                 |

| <b>K20 Engine Control Module X1</b> |             |              |                |  |
|-------------------------------------|-------------|--------------|----------------|--|
| <b>Pin</b>                          | <b>Size</b> | <b>Color</b> | <b>Circuit</b> | <b>Function</b>                        |
| 66                                  | 0.5         | WH           | 1310           | EVAP Canister Vent Solenoid Control    |
| 67                                  | 0.5         | VT/D-BU      | 5292           | Powertrain Main Relay Fused Supply (3) |
| 68                                  | 0.5         | BK/GY        | 6110           | Clutch Apply Sensor Low Reference      |
|                                     | 0.5         | BK/BN        | 5360           | Brake Apply Sensor Low Reference       |
| 69                                  | -           | -            | -              | Not Occupied                           |
| 70                                  | 0.5         | VT/YE        | 5985           | Accessory Wakeup Serial Data           |
| 71                                  | -           | -            | -              | Not Occupied                           |
| 72                                  | 0.5         | YE           | 5991           | Powertrain Relay Coil Control          |
| 73                                  | 2.5         | VT/D-BU      | 5290           | Powertrain Main Relay Fused Supply (1) |

## **K20 Engine Control Module (ECM) – Connector X2**



## **K20 Engine Control Module (ECM) – Connector X2 Pin-outs**

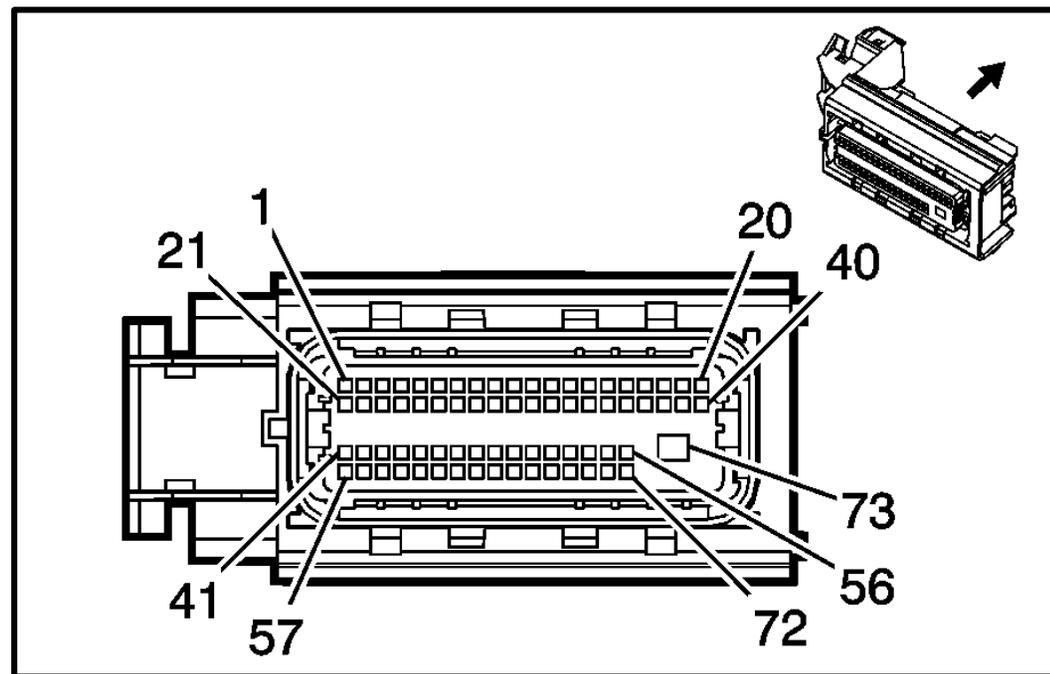
| <b>K20 Engine Control Module X2</b> |             |              |                |  |
|-------------------------------------|-------------|--------------|----------------|--|
| <b>Pin</b>                          | <b>Size</b> | <b>Color</b> | <b>Circuit</b> | <b>Function</b>                            |
| 1-2                                 | -           | -            | -              | Not Occupied                               |
| 3                                   | 0.5         | BK/L-GN      | 2919           | Fuel Rail Pressure Sensor Low Reference    |
| 4                                   | -           | -            | -              | Not Occupied                               |
| 5                                   | 0.5         | GY/BK        | 3096           | Output Speed (Digital) 5V Sensor Reference |
| 6                                   | 0.5         | VT/WH        | 821            | Vehicle Speed Sensor Signal                |
| 7                                   | 0.5         | BK/L-GN      | 822            | Vehicle Speed Sensor Low Reference         |

| <b>K20 Engine Control Module X2</b> |             |              |                |  |
|-------------------------------------|-------------|--------------|----------------|--|
| <b>Pin</b>                          | <b>Size</b> | <b>Color</b> | <b>Circuit</b> | <b>Function</b>                                    |
| 8                                   | 0.5         | BN/WH        | 6354           | Output Speed High (Replicated TOS) Input Signal    |
|                                     | 0.5         | L-GN         | 3098           | Output Speed (Digital) Signal                      |
| 9                                   | -           | -            | -              | Not Occupied                                       |
| 10                                  | 0.5         | VT/GY        | 3110           | Heated Oxygen Sensor High Signal Bank 1 Sensor (1) |
| 11                                  | 0.5         | VT/WH        | 3210           | Heated Oxygen Sensor High Signal Bank 2 Sensor (1) |
| 12                                  | 0.5         | VT/D-BU      | 3120           | Heated Oxygen Sensor High Signal Bank 1 Sensor (2) |
| 13                                  | 0.5         | VT/L-GN      | 3220           | Heated Oxygen Sensor High Signal Bank 2 Sensor (2) |
| 14                                  | -           | -            | -              | Not Occupied                                       |
| 15                                  | 0.5         | GY/D-BU      | 7564           | Humidity Sensor Signal                             |
| 16                                  | 0.5         | BN/WH        | 582            | Throttle Actuator Control Close                    |
| 17                                  | -           | -            | -              | Not Occupied                                       |
| 18                                  | 0.5         | BN/RD        | 2917           | Fuel Rail Pressure Sensor (5) Volt Reference       |
| 19                                  | 0.5         | D-BU/WH      | 2918           | Fuel Rail Pressure Sensor Signal                   |
| 20                                  | -           | -            | -              | Not Occupied                                       |
| 21                                  | 0.5         | WH/BK        | 3097           | Output Speed (Digital) 5V Sensor Return            |
| 22                                  | -           | -            | -              | Not Occupied                                       |
| 23                                  | 0.5         | L-GN/WH      | 5007           | Reverse Switch Signal                              |
| 24-25                               | -           | -            | -              | Not Occupied                                       |
| 26                                  | 0.5         | WH/BK        | 3111           | Heated Oxygen Sensor Low Signal Bank 1 Sensor (1)  |
| 27                                  | 0.5         | YE/WH        | 3211           | Heated Oxygen Sensor Low Signal Bank 2 Sensor (1)  |
| 28                                  | 0.5         | WH/YE        | 3121           | Heated Oxygen Sensor Low Signal Bank 1 Sensor (2)  |
| 29                                  | 0.5         | YE/D-BU      | 3221           | Heated Oxygen Sensor Low Signal Bank 2 Sensor (2)  |
| 30-31                               | -           | -            | -              | Not Occupied                                       |

| <b>K20 Engine Control Module X2</b> |             |              |                |   |
|-------------------------------------|-------------|--------------|----------------|---|
| <b>Pin</b>                          | <b>Size</b> | <b>Color</b> | <b>Circuit</b> | <b>Function</b>   |
| 32                                  | 0.5         | YE           | 581            | Throttle Actuator Control Open                            |
| 33                                  | -           | -            | -              | Not Occupied  |
| 34                                  | 0.5         | BN/RD        | 2701           | Throttle Position Sensor 5 Volt Reference                 |
| 35                                  | -           | -            | -              | Not Occupied  |
| 36                                  | 0.75        | VT/GY        | 496            | Knock Sensor Signal (1)                                   |
| 37                                  | 0.75        | WH/GY        | 1876           | Knock Sensor Signal (2)                                   |
| 38-39                               | -           | -            | -              | Not Occupied  |
| 40                                  | 0.5         | VT/D-BU      | 6091           | Crankshaft Position Sensor Replicated Signal              |
| 41                                  | 0.5         | GY/WH        | 3113           | Heated Oxygen Sensor Heater Low Control Bank 1 Sensor (1) |
| 42                                  | 0.5         | GY/WH        | 3122           | Heated Oxygen Sensor Heater Low Control Bank 1 Sensor (2) |
| 43                                  | 0.5         | L-GN/WH      | 432            | Manifold Absolute Pressure Sensor Signal                  |
| 44                                  | 0.5         | GY/RD        | 2704           | Manifold Absolute Pressure Sensor 5 Volt Reference        |
| 45-48                               | -           | -            | -              | Not Occupied  |
| 49                                  | 0.5         | WH/D-BU      | 6289           | Induction Air Temperature Sensor Signal                   |
| 50                                  | -           | -            | -              | Not Occupied  |
| 51                                  | 0.5         | L-GN/D-BU    | 428            | EVAP Canister Purge Solenoid Control                      |
| 52                                  | 0.5         | L-GN/WH      | 492            | Mass Air Flow Sensor Signal                               |
| 53                                  | 0.5         | BN           | 25             | Charge Indicator Control                                  |
| 54                                  | 0.5         | BK/BN        | 2752           | Throttle Position Sensor Low Reference                    |
| 55                                  | 0.5         | GY           | 23             | Generator Field Duty Cycle Signal                         |
| 56                                  | 0.75        | BK/YE        | 1716           | Knock Sensor Low Reference (1)                            |
| 57                                  | 0.75        | BK/GY        | 2303           | Knock Sensor Low Reference (2)                            |
| 58                                  | 0.5         | WH/GY        | 1786           | Transmission Park/Neutral Signal (1)                      |
| 59                                  | 0.5         | D-BU         | 179            | Oil Pump Command Signal                                   |

| <b>K20 Engine Control Module X2</b> |             |              |                |   |
|-------------------------------------|-------------|--------------|----------------|---|
| <b>Pin</b>                          | <b>Size</b> | <b>Color</b> | <b>Circuit</b> | <b>Function</b>   |
| 60                                  | 0.5         | BN/L-GN      | 1174           | Oil Level Switch Signal                                   |
| 61                                  | 0.5         | L-GN/YE      | 3212           | Heated Oxygen Sensor Heater Low Control Bank 2 Sensor (1) |
| 62                                  | 0.5         | WH/BN        | 3223           | Heated Oxygen Sensor Heater Low Control Bank 2 Sensor (2) |
| 63                                  | 0.5         | BK/L-GN      | 469            | Manifold Absolute Pressure Sensor Low Reference           |
| 64                                  | -           | -            | -              | Not Occupied  |
| 65                                  | 0.5         | BK/D-BU      | 61             | Outside Ambient Temperature Sensor Low Reference          |
| 66-68                               | -           | -            | -              | Not Occupied  |
| 69                                  | 0.5         | WH/YE        | 3202           | Throttle Inlet Absolute Pressure Sensor 5V Return         |
| 70                                  | 0.5         | D-BU/WH      | 3630           | Throttle Position Sensor (SENT1) Signal                   |
| 71-72                               | -           | -            | -              | Not Occupied  |
| 73                                  | 2.5         | BK/WH        | 451            | Signal Ground   |

## **K20 Engine Control Module (ECM) – Connector X3**



## **K20 Engine Control Module (ECM) – Connector X3 Pin-outs**

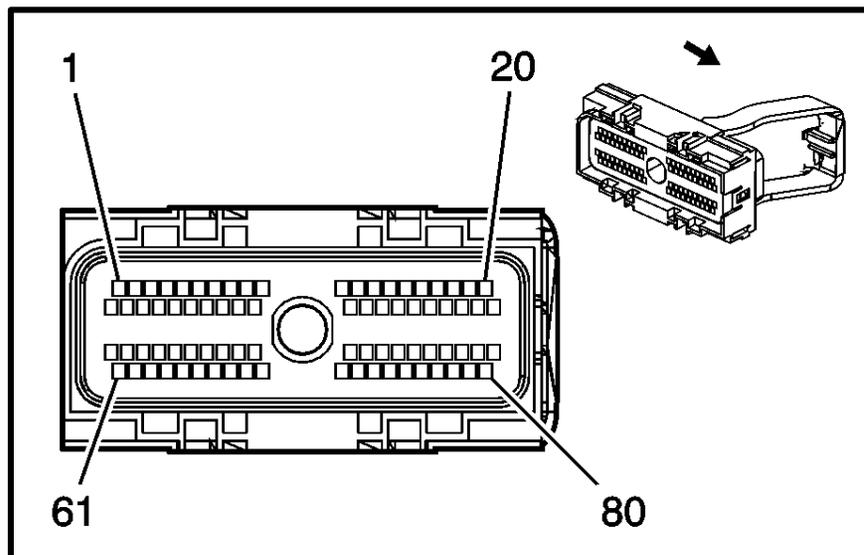
| <b>K20 Engine Control Module X3</b> |             |              |                |  |
|-------------------------------------|-------------|--------------|----------------|--|
| <b>Pin</b>                          | <b>Size</b> | <b>Color</b> | <b>Circuit</b> | <b>Function</b>                          |
| 1                                   | 0.5         | YE/BN        | 331            | Oil Pressure Sensor Signal               |
| 2                                   | 0.5         | WH/RD        | 2705           | Oil Pressure Sensor 5 Volt Reference     |
| 3                                   | 0.5         | BN/YE        | 2161           | Fuel Rail Pressure Sensor #2 Signal      |
| 4-7                                 | -           | -            | -              | Not Occupied                             |
| 8                                   | 0.5         | D-BU         | 410            | Engine Coolant Temperature Sensor Signal |
| 9                                   | -           | -            | -              | Not Occupied                             |

| <b>K20 Engine Control Module X3</b> |             |              |                |   |
|-------------------------------------|-------------|--------------|----------------|---|
| <b>Pin</b>                          | <b>Size</b> | <b>Color</b> | <b>Circuit</b> | <b>Function</b>                                 |
| 10                                  | 0.5         | VT/D-BU      | 6270           | Crankshaft 60X Sensor Voltage                   |
| 11                                  | 0.5         | L-GN/D-BU    | 2123           | Ignition Control (3)                            |
| 12                                  | 0.5         | YE/D-BU      | 2124           | Ignition Control (4)                            |
| 13                                  | 0.5         | D-BU/WH      | 2122           | Ignition Control (2)                            |
|                                     | 0.5         | D-BU/GY      | 2125           | Ignition Control (5)                            |
| 14                                  | 0.5         | L-GN/D-BU    | 2123           | Ignition Control (3)                            |
|                                     | 0.5         | BN/D-BU      | 2126           | Ignition Control (6)                            |
| 15                                  | 0.5         | BK/GY        | 2130           | Ignition Control Low Reference Bank 2           |
| 16                                  | 0.75        | YE           | 7301           | High Pressure Fuel Pump Actuator High - Control |
| 17                                  | 0.5         | BK/PU        | 2755           | Oil Pressure Sensor Low Reference               |
| 18-23                               | -           | -            | -              | Not Occupied                                    |
| 24                                  | 0.5         | BK/BN        | 2761           | Coolant Temperature Sensor Low Reference        |
| 25                                  | 0.5         | BK/PU        | 6272           | Crankshaft 60X Sensor Low Reference             |
| 26                                  | 0.5         | L-GN         | 6271           | Crankshaft 60X Sensor Signal                    |
| 27                                  | 0.5         | YE/D-BU      | 2124           | Ignition Control (4)                            |
|                                     | 0.5         | D-BU/WH      | 2122           | Ignition Control (2)                            |
| 28                                  | 0.5         | D-BU/GY      | 2125           | Ignition Control (5)                            |
|                                     | 0.5         | L-GN/GY      | 2127           | Ignition Control (7)                            |
| 29                                  | 0.5         | BN/D-BU      | 2126           | Ignition Control (6)                            |
|                                     | 0.5         | VT/WH        | 2128           | Ignition Control (8)                            |
| 30                                  | 0.5         | D-BU/VT      | 2121           | Ignition Control (1)                            |

| <b>K20 Engine Control Module X3</b> |             |              |                |  |
|-------------------------------------|-------------|--------------|----------------|--|
| <b>Pin</b>                          | <b>Size</b> | <b>Color</b> | <b>Circuit</b> | <b>Function</b>  |
| 31                                  | 0.5         | BK/D-BU      | 2129           | Ignition Control Low Reference Bank 1                      |
| 32                                  | 0.75        | VT/BK        | 7300           | High Pressure Fuel Pump Actuator Low - Control             |
| 33                                  | 0.5         | YE/VT        | 5275           | Camshaft Position Intake Sensor (1)                        |
| 34                                  | 0.5         | GY/D-BU      | 5300           | Camshaft Position Intake Sensor Supply Voltage (1)         |
| 35-38                               | -           | -            | -              | Not Occupied   |
| 39                                  | 0.5         | VT/BN        | 5284           | Camshaft Phaser Intake Solenoid (1)                        |
| 40-42                               | -           | -            | -              | Not Occupied   |
| 43                                  | 0.5         | GY           | 5493           | Cylinder Shutoff Solenoid Control (3)                      |
| 44                                  | 0.5         | YE/D-BU      | 5494           | Cylinder Shutoff Solenoid Control (4)                      |
| 45                                  | 0.75        | GY/D-BU      | 4804           | Direct Fuel Injector (DFI) High Voltage Control Cylinder 4 |
| 46                                  | 0.75        | GY/D-BU      | 4804           | Direct Fuel Injector (DFI) High Voltage Control Cylinder 4 |
|                                     | 0.75        | D-BU         | 4802           | Direct Fuel Injector (DFI) High Voltage Control Cylinder 2 |
| 47                                  | 0.75        | L-GN         | 4803           | Direct Fuel Injector (DFI) High Voltage Control Cylinder 3 |
|                                     | 0.75        | PU/L-GN      | 4806           | Direct Fuel Injector (DFI) High Voltage Control Cylinder 6 |
| 48                                  | 0.75        | PU/L-GN      | 4806           | Direct Fuel Injector (DFI) High Voltage Control Cylinder 6 |
|                                     | 0.75        | GY           | 4808           | Direct Fuel Injector (DFI) High Voltage Control Cylinder 8 |
| 49                                  | 0.75        | L-GN         | 4803           | Direct Fuel Injector (DFI) High Voltage Control Cylinder 3 |
| 50                                  | 0.75        | WH/L-GN      | 4805           | Direct Fuel Injector (DFI) High Voltage Control Cylinder 5 |
|                                     | 0.75        | YE/GY        | 4807           | Direct Fuel Injector (DFI) High Voltage Control Cylinder 7 |
| 51                                  | 0.75        | D-BU         | 4802           | Direct Fuel Injector (DFI) High Voltage Control Cylinder 2 |
|                                     | 0.75        | WH/L-GN      | 4805           | Direct Fuel Injector (DFI) High Voltage Control Cylinder 5 |

| <b>K20 Engine Control Module X3</b> |             |              |                |  |
|-------------------------------------|-------------|--------------|----------------|--|
| <b>Pin</b>                          | <b>Size</b> | <b>Color</b> | <b>Circuit</b> | <b>Function</b>  |
| 52                                  | 0.75        | BN           | 4801           | Direct Fuel Injector (DFI) High Voltage Control Cylinder 1 |
| 53                                  | 0.5         | BK/L-GN      | 5301           | Camshaft Position Intake Sensor Low Reference (1)          |
| 54-58                               | -           | -            | -              | Not Occupied   |
| 59                                  | 0.5         | BK/BN        | 6753           | Cam Phaser W Return Low Reference                          |
| 60-62                               | -           | -            | -              | Not Occupied   |
| 63                                  | 0.5         | D-BU         | 5491           | Cylinder Shutoff Solenoid Control (1)                      |
| 64                                  | 0.5         | L-GN         | 5492           | Cylinder Shutoff Solenoid Control (2)                      |
| 65                                  | 0.75        | D-BU/WH      | 4904           | Direct Fuel Injector (DFI) High Voltage Supply Cylinder 4  |
| 66                                  | 0.75        | D-BU/WH      | 4904           | Direct Fuel Injector (DFI) High Voltage Supply Cylinder 4  |
|                                     | 0.75        | D-BU/GY      | 4902           | Direct Fuel Injector (DFI) High Voltage Supply Cylinder 2  |
| 67                                  | 0.75        | L-GN/GY      | 4903           | Direct Fuel Injector (DFI) High Voltage Supply Cylinder 3  |
|                                     | 0.75        | PU/GY        | 4906           | Direct Fuel Injector (DFI) High Voltage Supply Cylinder 6  |
| 68                                  | 0.75        | PU/GY        | 4906           | Direct Fuel Injector (DFI) High Voltage Supply Cylinder 6  |
|                                     | 0.75        | GY/WH        | 4908           | Direct Fuel Injector (DFI) High Voltage Supply Cylinder 8  |
| 69                                  | 0.75        | L-GN/GY      | 4903           | Direct Fuel Injector (DFI) High Voltage Supply Cylinder 3  |
| 70                                  | 0.75        | L-GN/WH      | 4905           | Direct Fuel Injector (DFI) High Voltage Supply Cylinder 5  |
|                                     | 0.75        | WH/YE        | 4907           | Direct Fuel Injector (DFI) High Voltage Supply Cylinder 7  |
| 71                                  | 0.75        | D-BU/GY      | 4902           | Direct Fuel Injector (DFI) High Voltage Supply Cylinder 2  |
|                                     | 0.75        | L-GN/WH      | 4905           | Direct Fuel Injector (DFI) High Voltage Supply Cylinder 5  |
| 72                                  | 0.75        | BN/WH        | 4901           | Direct Fuel Injector (DFI) High Voltage Supply Cylinder 1  |
| 73                                  | 2.5         | BK/WH        | 451            | Signal Ground  |

## ***K71 Transmission Control Module (TCM) – Connector***



## ***K71 Transmission Control Module (TCM) – Connector X1 Pin-outs***

| <b>K71 Transmission Control Module</b> |             |              |                |                                      |
|--|-------------|--------------|----------------|--------------------------------------|
| <b>Pin</b>                             | <b>Size</b> | <b>Color</b> | <b>Circuit</b> | <b>Function</b>                      |
| 1                                      | -           | -            | -              | Not Occupied                         |
| 2                                      | 0.5         | VT/BK        | 2139           | Run/Crank Ignition 1 Voltage         |
| 3-5                                    | -           | -            | -              | Not Occupied                         |
| 6                                      | 0.5         | BU           | 2500           | High Speed GMLAN Serial Data (+) (1) |
| 7-8                                    | -           | -            | -              | Not Occupied                         |
| 9                                      | 0.75        | BK/WH        | 451            | Signal Ground                        |
| 10                                     | 0.75        | RD/GN        | 1840           | Battery Positive Voltage             |

| <b>K71 Transmission Control Module</b> |             |              |                |   |
|--|-------------|--------------|----------------|---|
| <b>Pin</b>                             | <b>Size</b> | <b>Color</b> | <b>Circuit</b> | <b>Function</b>                                 |
| 11                                     | 0.75        | YE           | 1228           | Transmission Force Motor Supply Voltage (1)     |
| 12-13                                  | -           | -            | -              | Not Occupied                                    |
| 14                                     | 0.5         | GY           | 773            | Transmission Position Switch Bit 3 Signal       |
| 15-16                                  | -           | -            | -              | Not Occupied                                    |
| 17                                     | 0.75        | VT/GY        | 1224           | Transmission Fluid Pressure Switch Signal Bit 1 |
| 18-19                                  | -           | -            | -              | Not Occupied                                    |
| 20                                     | 0.5         | BK/BU        | 1984           | Transmission Turbine Speed Switch Low Reference |
| 21-24                                  | -           | -            | -              | Not Occupied                                    |
| 25                                     | 0.5         | BN/VT        | 6399           | Replicated TOS Signal                           |
| 26                                     | -           | -            | -              | Not Occupied                                    |
| 27                                     | 0.5         | WH           | 2501           | High Speed GMLAN Serial Data (-) (1)            |
| 28-32                                  | -           | -            | -              | Not Occupied                                    |
| 33                                     | 0.75        | YE/BK        | 1223           | 2 Shift Solenoid Valve Control                  |
| 34                                     | 0.5         | WH           | 776            | Transmission Position Switch Parity Bit Signal  |
| 35                                     | -           | -            | -              | Not Occupied                                    |
| 36                                     | 0.75        | BN/BK        | 2469           | Transmission Force Motor Return (2)             |
| 37-39                                  | -           | -            | -              | Not Occupied                                    |
| 40                                     | 0.5         | BK/GN        | 822            | Vehicle Speed Sensor Low Reference              |
| 41-42                                  | -           | -            | -              | Not Occupied                                    |
| 43                                     | 0.5         | VT/YE        | 5985           | Accessory Wakeup Serial Data                    |
| 44-46                                  | -           | -            | -              | Not Occupied                                    |
| 47                                     | 0.5         | WH           | 2501           | High Speed GMLAN Serial Data (-) (1)            |
| 48-50                                  | -           | -            | -              | Not Occupied                                    |
| 51                                     | 0.75        | WH/BN        | 2527           | Shift Solenoid Control (5)                      |

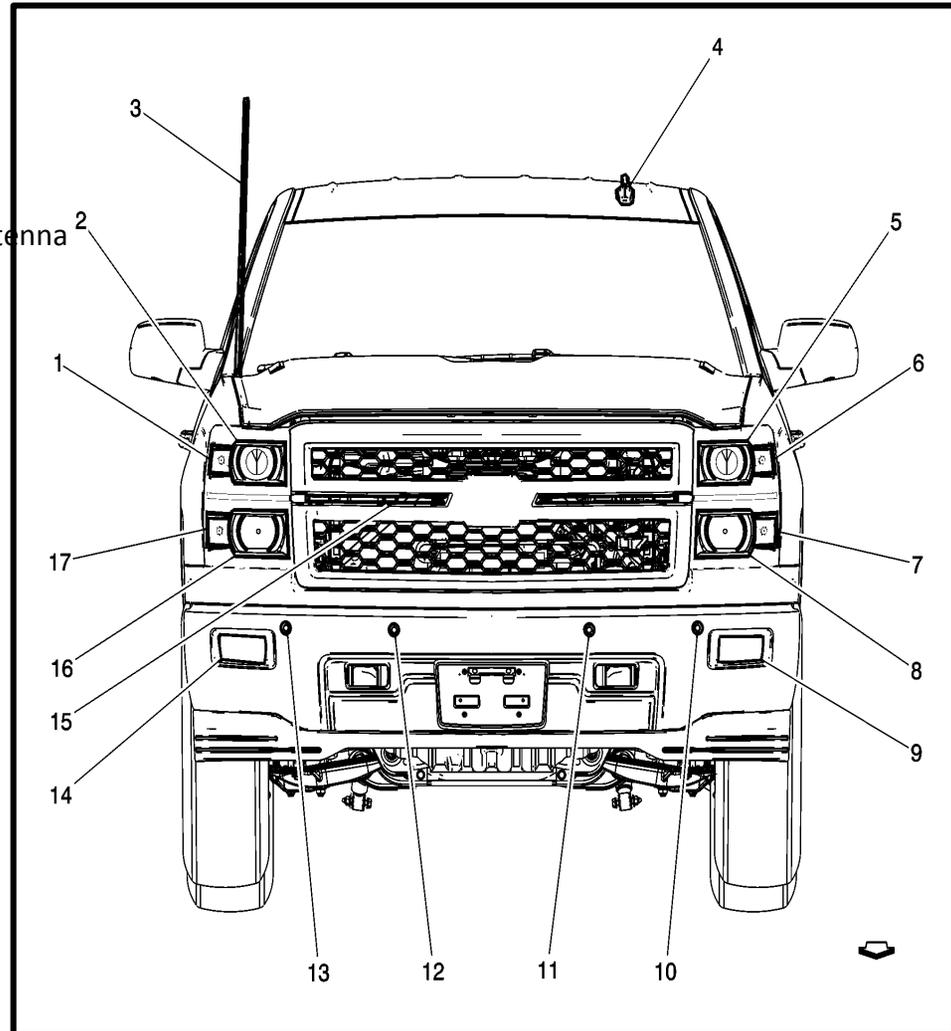
| <b>K71 Transmission Control Module</b> |             |              |                |   |
|--|-------------|--------------|----------------|---|
| <b>Pin</b>                             | <b>Size</b> | <b>Color</b> | <b>Circuit</b> | <b>Function</b>                                     |
| 52                                     | 0.75        | WH/GN        | 1222           | 1 Shift Solenoid Valve Control                      |
| 53                                     | 0.5         | YE           | 772            | Transmission Position Switch Bit 2 Signal           |
| 54                                     | 0.75        | YE/BK        | 1227           | Transmission Temperature Sensor Signal              |
| 55                                     | 0.75        | VT/BK        | 1229           | Transmission Force Motor Return (1)                 |
| 56                                     | -           | -            | -              | Not Occupied  |
| 57                                     | 0.75        | WH/BN        | 1226           | Transmission Fluid Pressure Switch Signal Bit 3     |
| 58                                     | 0.75        | BK/BU        | 2762           | Transmission Fluid Temperature Sensor Low Reference |
| 59                                     | -           | -            | -              | Not Occupied  |
| 60                                     | 0.5         | VT/WH        | 821            | Vehicle Speed Sensor Signal                         |
| 61-62                                  | -           | -            | -              | Not Occupied  |
| 63                                     | 0.5         | VT/BK        | 2139           | Run/Crank Ignition 1 Voltage                        |
| 64-65                                  | -           | -            | -              | Not Occupied  |
| 66                                     | 0.5         | BU           | 2500           | High Speed GMLAN Serial Data (+) (1)                |
| 67-68                                  | -           | -            | -              | Not Occupied  |
| 69                                     | 0.75        | BK/WH        | 451            | Signal Ground                                       |
| 70                                     | 0.75        | RD/GN        | 1840           | Battery Positive Voltage                            |
| 71                                     | 0.75        | BN/VT        | 323            | Shift Solenoid Supply Voltage                       |
| 72                                     | -           | -            | -              | Not Occupied  |
| 73                                     | 0.5         | BN/WH        | 771            | Transmission Position Switch Bit 1 Signal           |
| 74                                     | 0.75        | GN/WH        | 1530           | Transmission Mainline Pressure Solenoid Control     |
| 75-76                                  | -           | -            | -              | Not Occupied  |
| 77                                     | 0.75        | GN/BK        | 2529           | Transmission Fluid Pressure Switch Signal Bit 4     |
| 78                                     | 0.75        | BN/VT        | 418            | Torque Converter Clutch PWM Solenoid Control        |
| 79                                     | 0.75        | GN/VT        | 1225           | Transmission Fluid Pressure Switch Signal Bit 2     |

| <b>K71 Transmission Control Module</b> |             |              |                |  |
|--|-------------|--------------|----------------|--|
| <b>Pin</b>                             | <b>Size</b> | <b>Color</b> | <b>Circuit</b> | <b>Function</b>                          |
| 80                                     | 0.5         | WH/BK        | 1983           | Transmission Turbine Speed Switch Signal |

## Component Locations

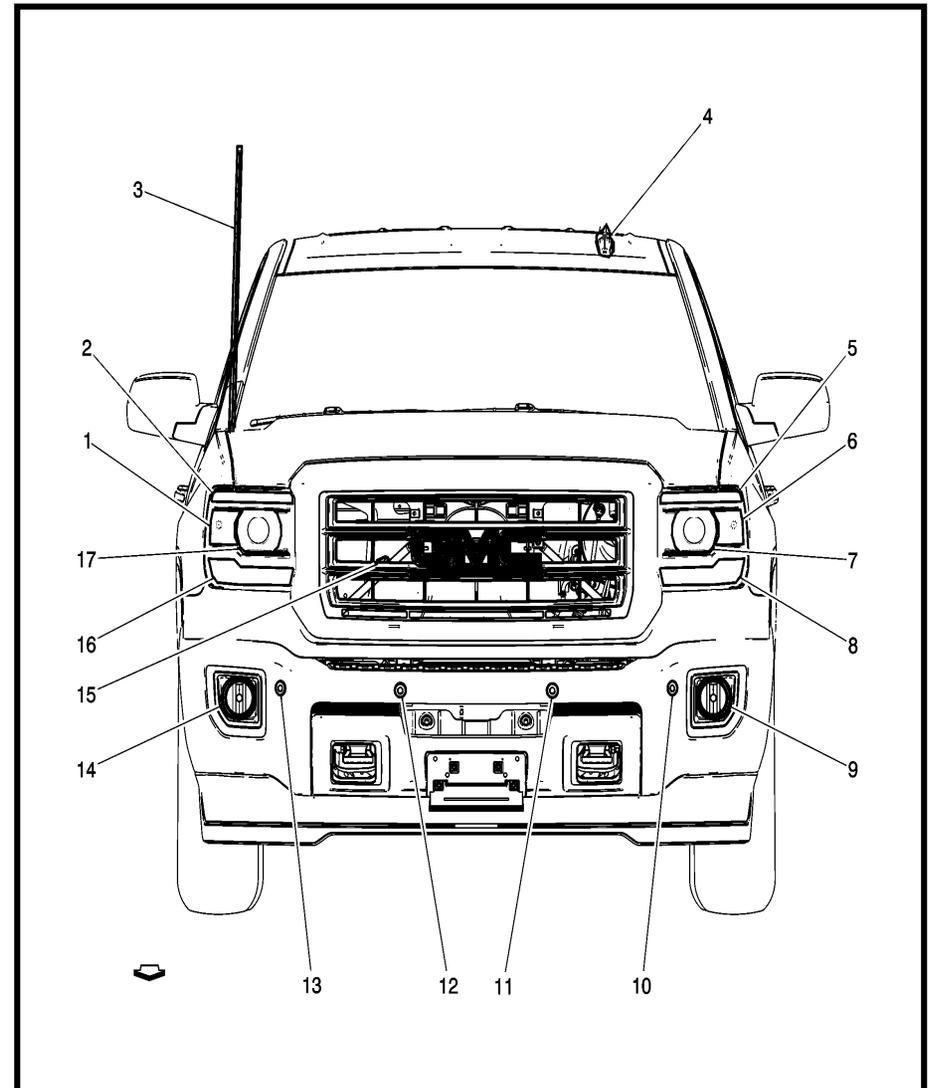
### Front of Vehicle - Chevrolet

- (1) E4T Park/Turn Signal Lamp – Right Upper (X88)
- (2) E4H Headlamp – Right Low Beam
- (3) T4E Cellular Phone and Navigation Antenna
- (4) T4G Cellular Phone, Navigation and Digital Radio Antenna
- (5) E4G Headlamp – Left Low Beam
- (6) E4S Park/Turn Signal Lamp – Left Upper (X88)
- (7) E4Q Park/Turn Signal Lamp – Left Lower (X88)
- (8) E4E Headlamp – Left High Beam (X88)
- (9) E29LF Fog Lamp – Left Front (T3U)
- (10) B78A Front Object Sensor – Left Outer (UD5)
- (11) B78C Front Object Sensor – Left Middle (UD5)
- (12) B78D Front Object Sensor – Right Middle (UD5)
- (13) B78B Front Object Sensor – Right Outer (UD5)
- (14) E29RF Fog Lamp – Right Front (T3U)
- (15) B9 Ambient Air Temperature Sensor
- (16) E4F Headlamp – Right High Beam (X88)

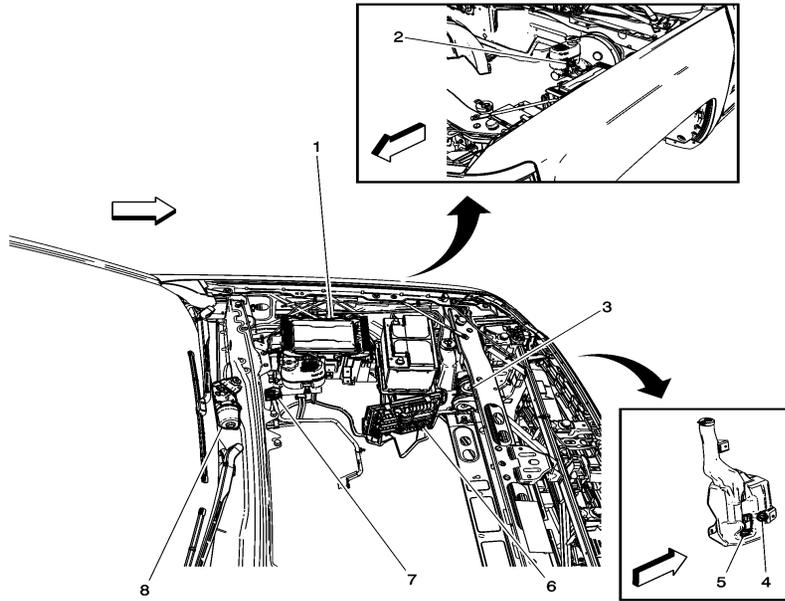


## Front of Vehicle - GMC

- (1) E4P Park/Turn Signal Lamp – Right (Z88)
- (2) E4J Park Lamp – Left Front
- (3) T4E Cellular Phone and Navigation Antenna
- (4) T4G Cellular Phone, Navigation and Digital Radio Antenna
- (5) E4K Park Lamp – Right Front
- (6) E4G Headlamp – Left Low Beam
- (7) E4N Park/Turn Signal Lamp – Left (Z88)
- (8) E4D Daytime Running Lamp – Right (Y91)
- (9) E29LF Fog Lamp – Left Front (T3U)
- (10) B78A Front Object Sensor – Left Outer (UD5)
- (11) B78C Front Object Sensor – Left Middle (UD5)
- (12) B78D Front Object Sensor – Right Middle (UD5)
- (13) B78A Front Object Sensor – Right Outer (UD5)
- (14) E29RF Fog Lamp – Right Front (T3U)
- (15) B9 Ambient Air Temperature Sensor
- (16) E4C Daytime Running Lamp – Left (Y91)
- (17) E4H Headlamp – Right Low Beam

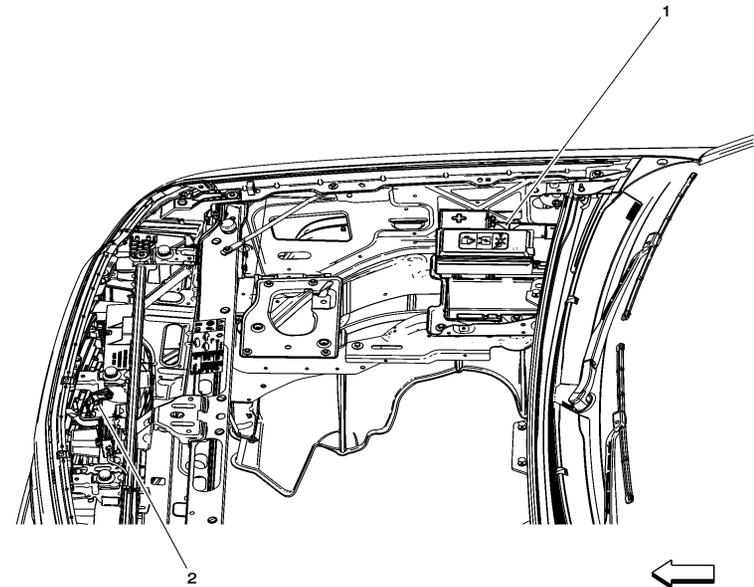


## Left Side of Engine Compartment Components



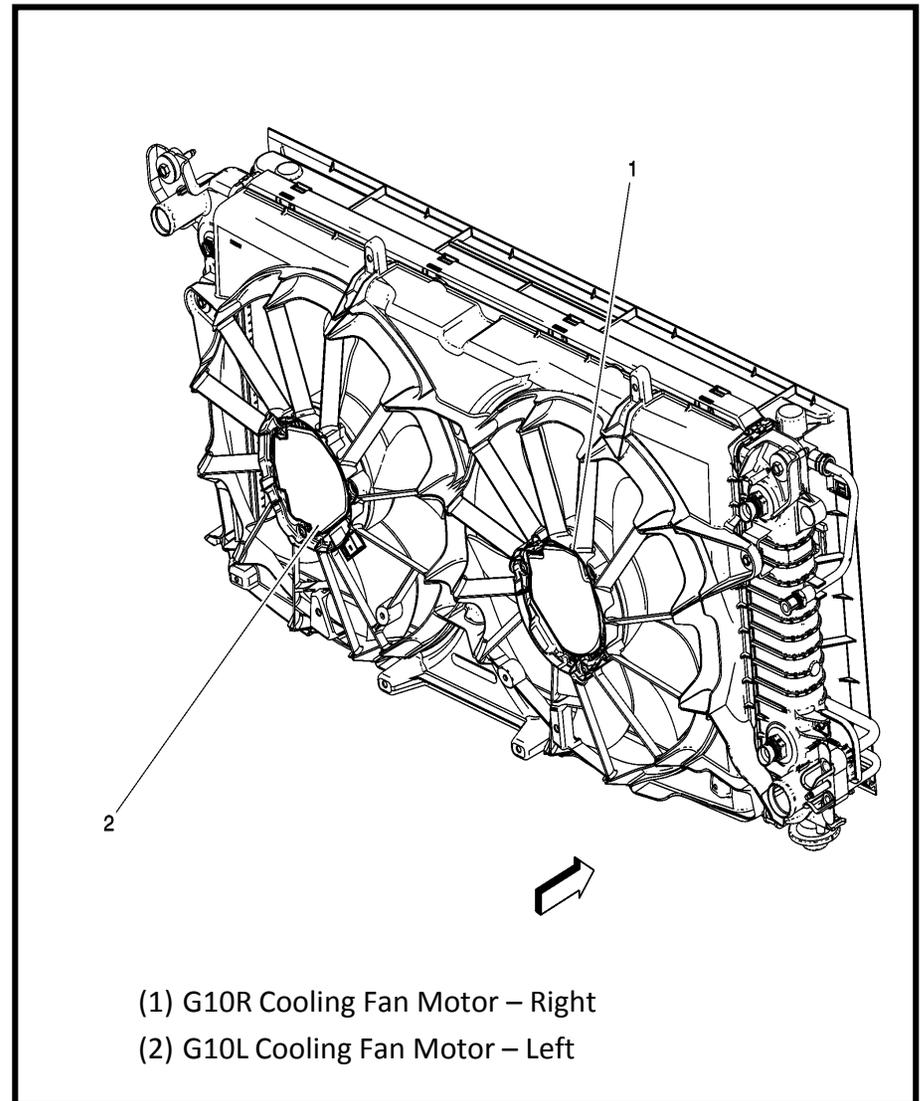
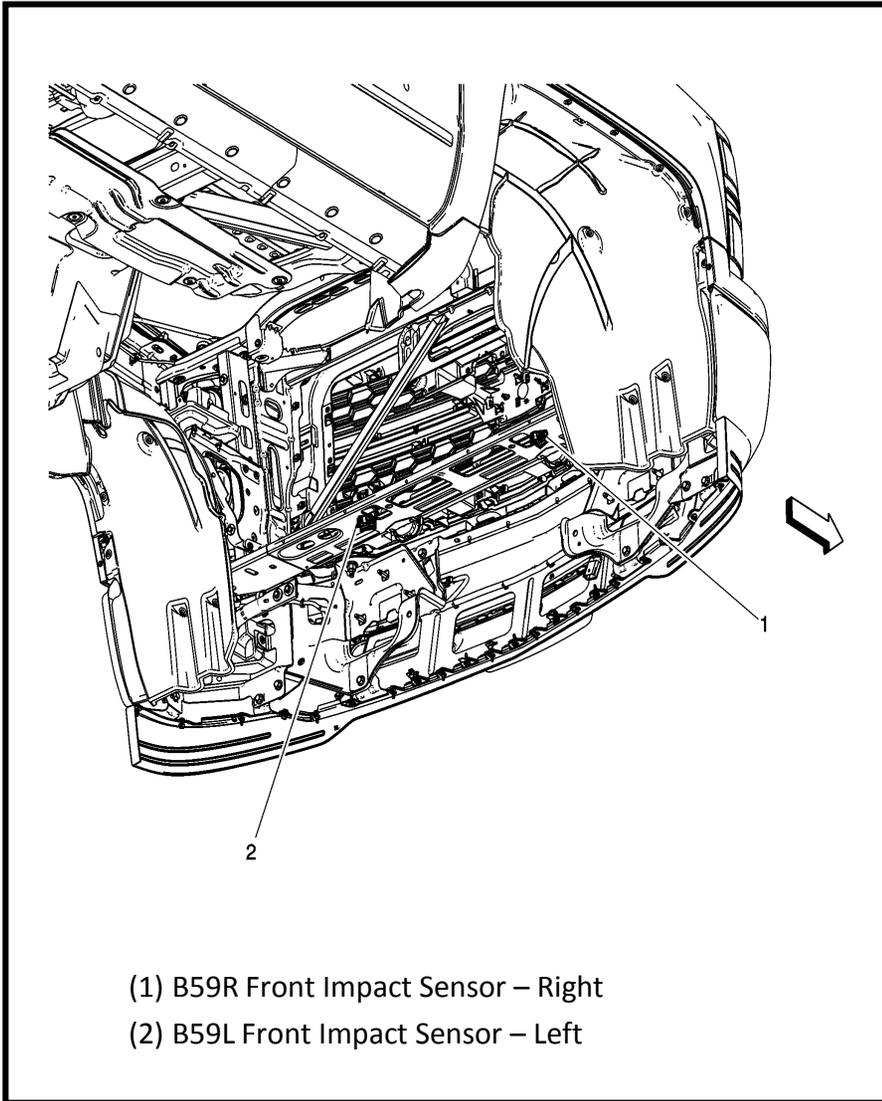
- (1) X50A Fuse Block – Under hood
- (2) B20 Brake Fluid Level Switch
- (3) P12 Horn
- (4) B118B Windshield Washer Fluid Level Switch
- (5) G24 Windshield Washer Pump
- (6) K20 Engine Control Module
- (7) B19B Brake Booster Vacuum Sensor
- (8) M75 Windshield Wiper Motor

## Right Side of Engine Compartment Components

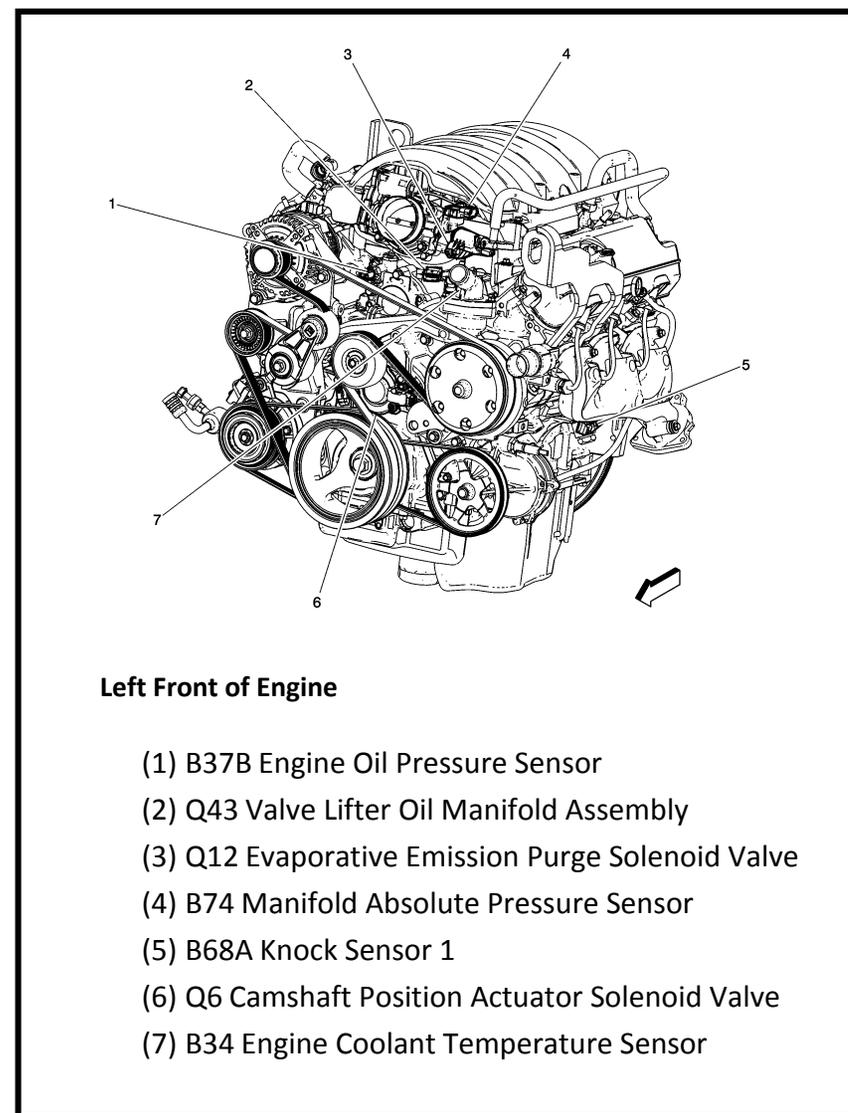
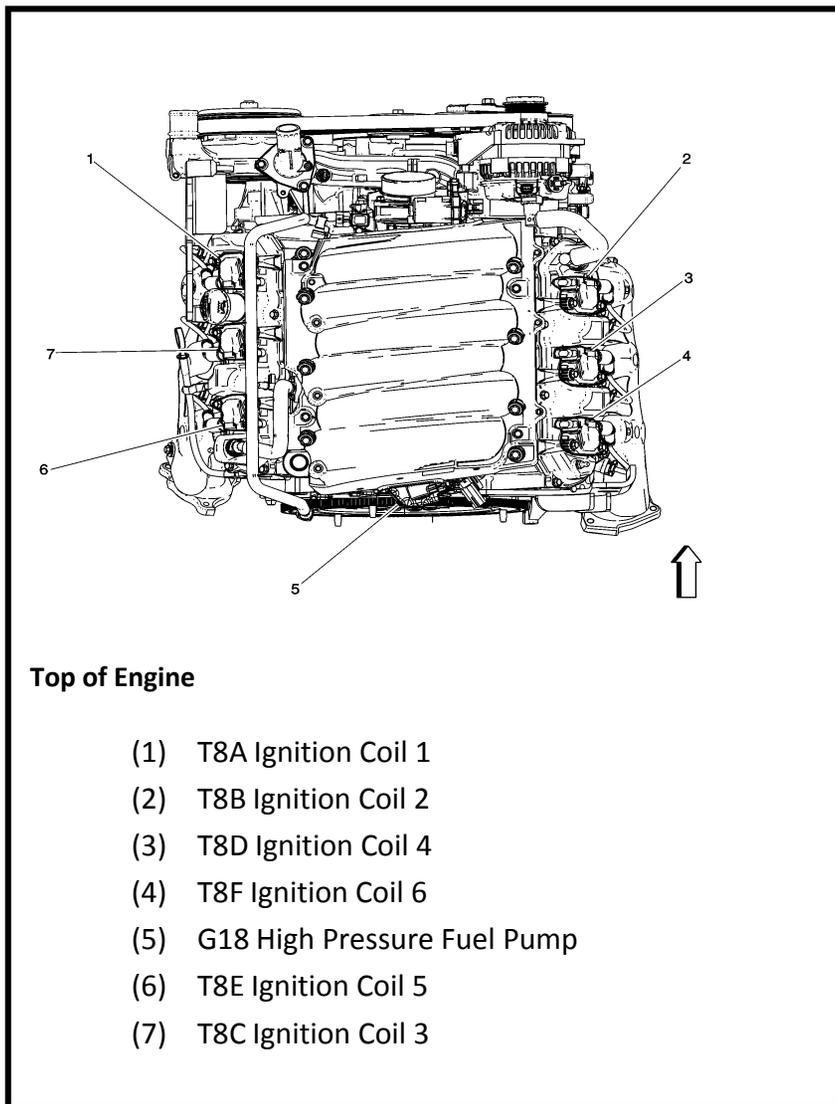


- (1) C1 Battery
- (2) B55 Hood Ajar Switch

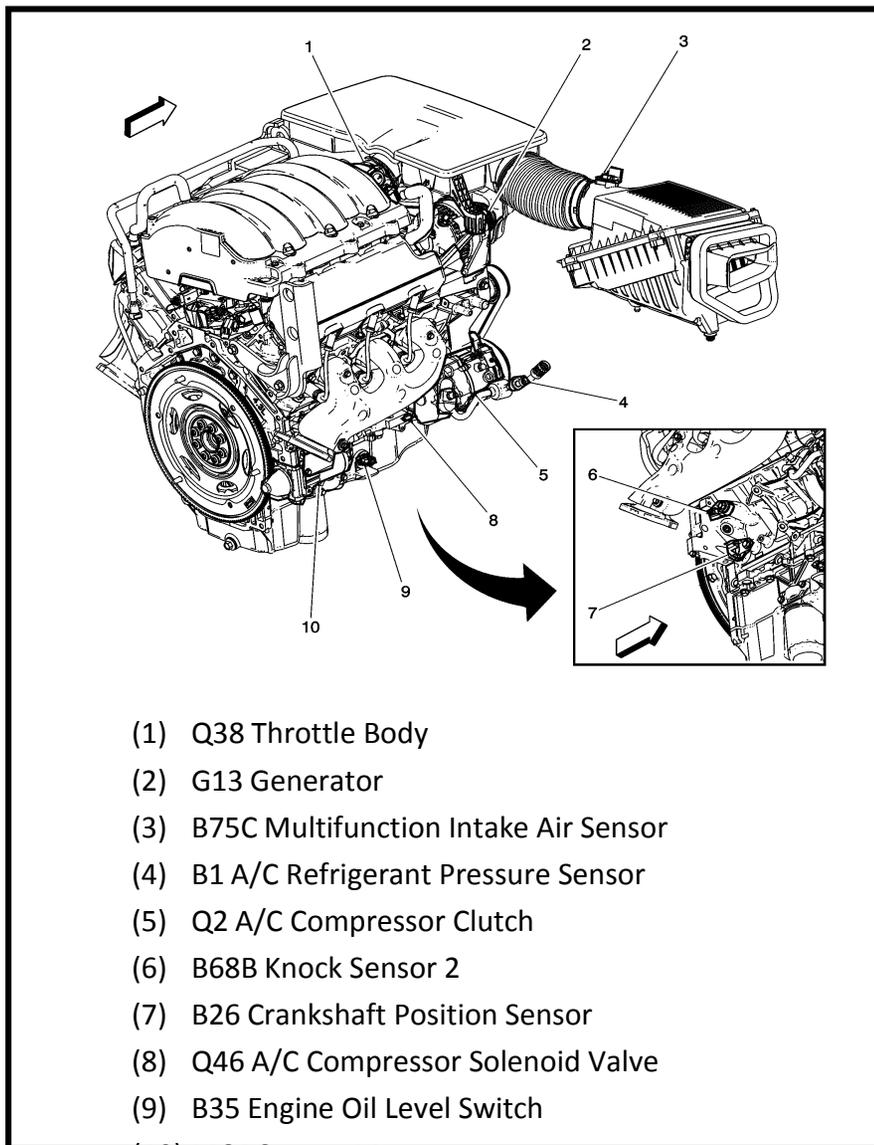
## Underside of Engine Compartment & Cooling Fans



## Engine Component Views (Top & Left Front)

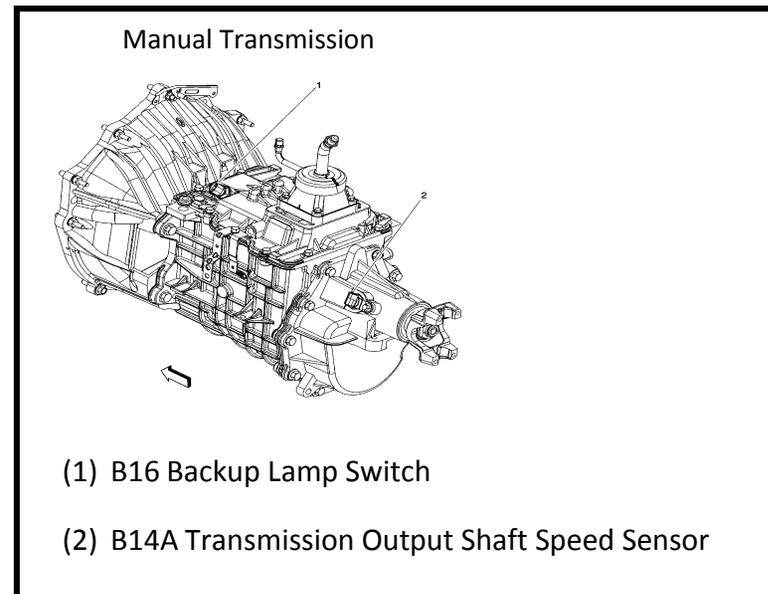


## Engine Component Views (Right Rear, Manual Transmission & Transfer Case)

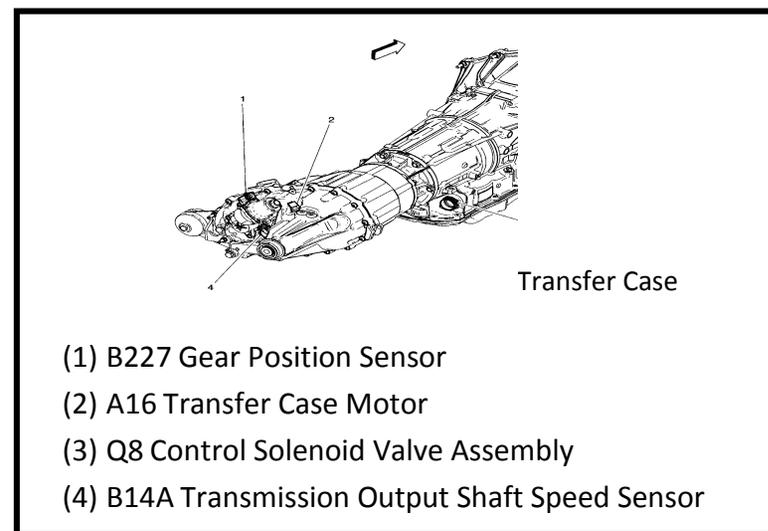


- (1) Q38 Throttle Body
- (2) G13 Generator
- (3) B75C Multifunction Intake Air Sensor
- (4) B1 A/C Refrigerant Pressure Sensor
- (5) Q2 A/C Compressor Clutch
- (6) B68B Knock Sensor 2
- (7) B26 Crankshaft Position Sensor
- (8) Q46 A/C Compressor Solenoid Valve
- (9) B35 Engine Oil Level Switch

(10) M64 Starter Motor



- (1) B16 Backup Lamp Switch
- (2) B14A Transmission Output Shaft Speed Sensor

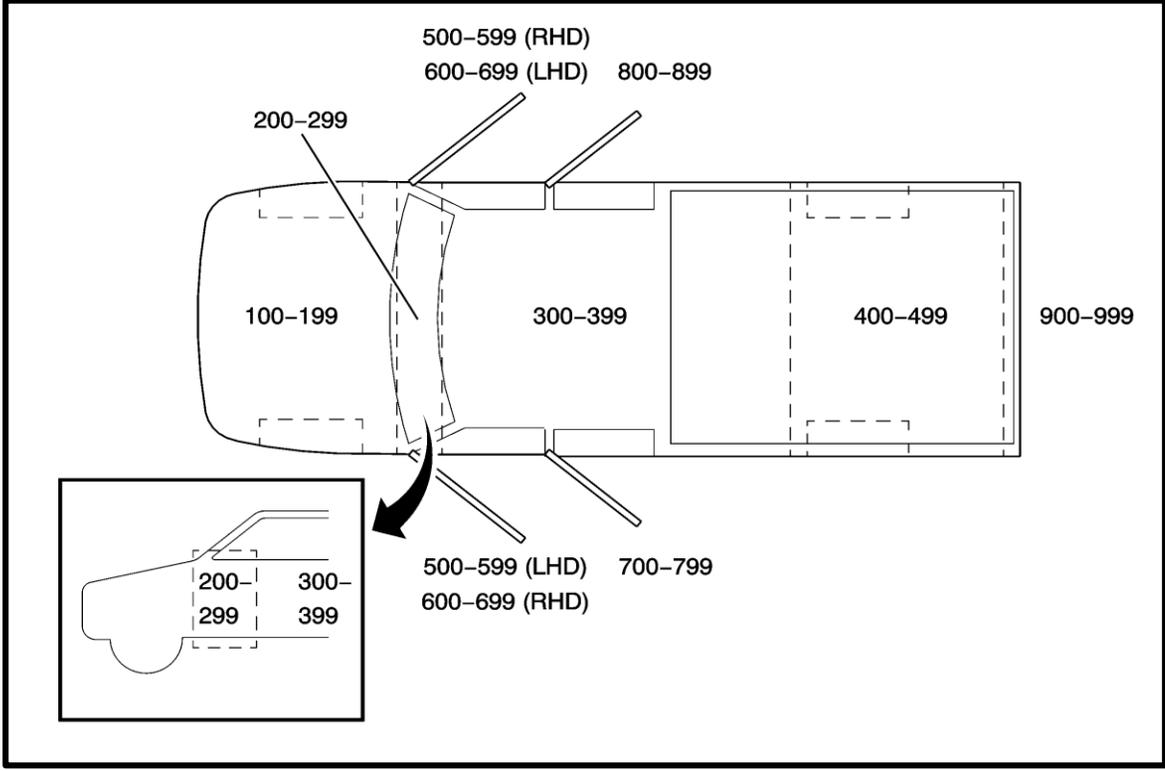


- (1) B227 Gear Position Sensor
- (2) A16 Transfer Case Motor
- (3) Q8 Control Solenoid Valve Assembly
- (4) B14A Transmission Output Shaft Speed Sensor

# Section D

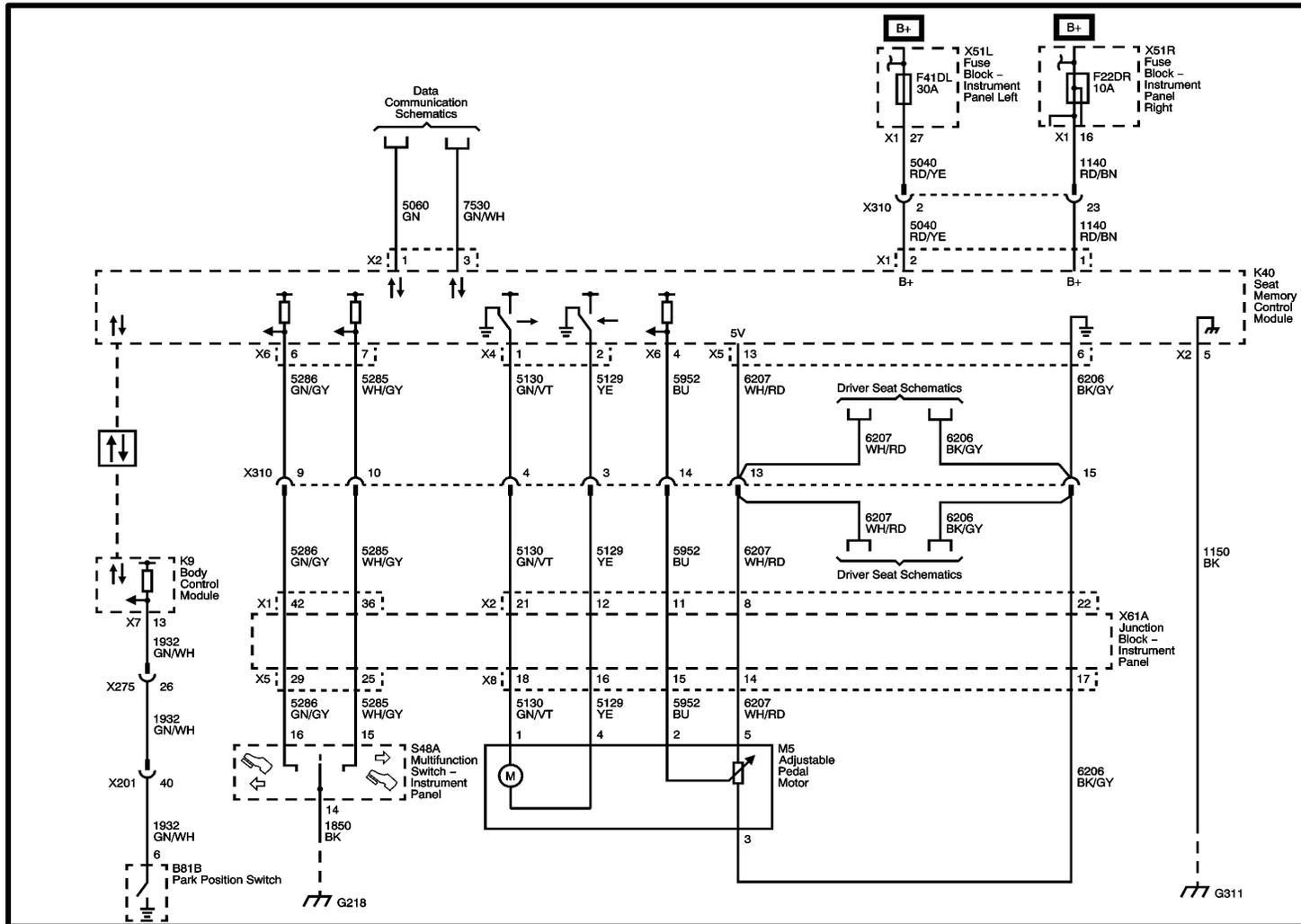
## Electrical System - Vehicle Zoning Strategy

All grounds, in-line connectors, and splices have identifying numbers that correspond to where they are located in the vehicle. The following table explains the numbering system.

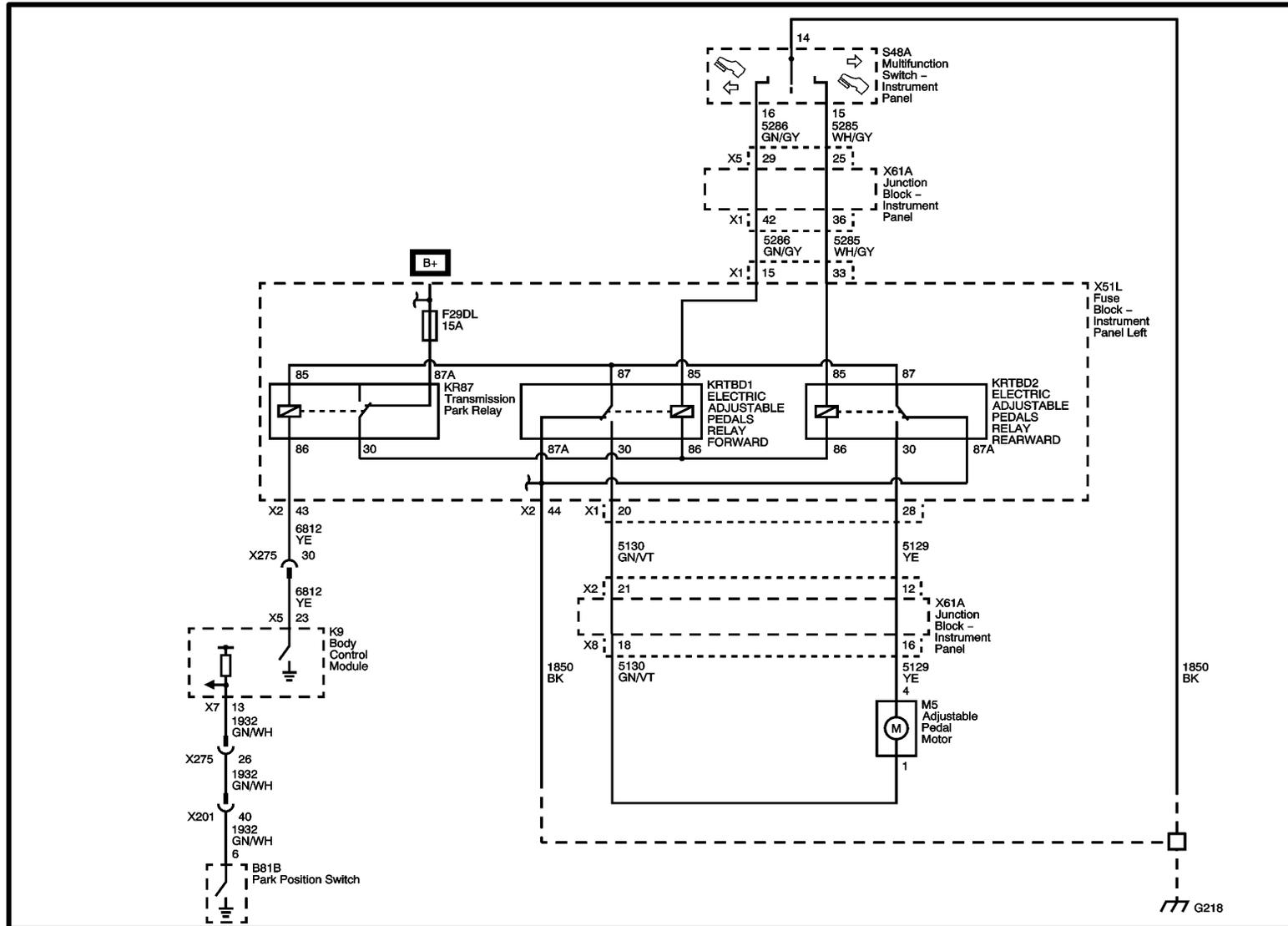


| <b>Vehicle Zoning Strategy</b> |   |
|--------------------------------|---|
| <b>Callout Numbers</b>         | <b>Zone Description</b>   |
| 100-199                        | Engine compartment (all forward of the instrument panel)  |
| 200-299                        | Within the instrument panel area (between the bulkhead and the front plane of the instrument panel) |
| 300-399                        | Passenger compartment (from the instrument panel to the rear of the cab)                            |
| 400-499                        | Truck bed/chassis (from the rear of the cab to the rear of the vehicle)                             |
| 500-599                        | Inline harness connectors to or within the driver door  |
| 600-699                        | Inline harness connectors to or within the front passenger door                                     |
| 700-799                        | Inline harness connectors to or within the left rear door   |
| 800-899                        | Inline harness connectors to or within the right rear door  |
| 900-999                        | Inline harness connectors to or within the end/tailgate   |

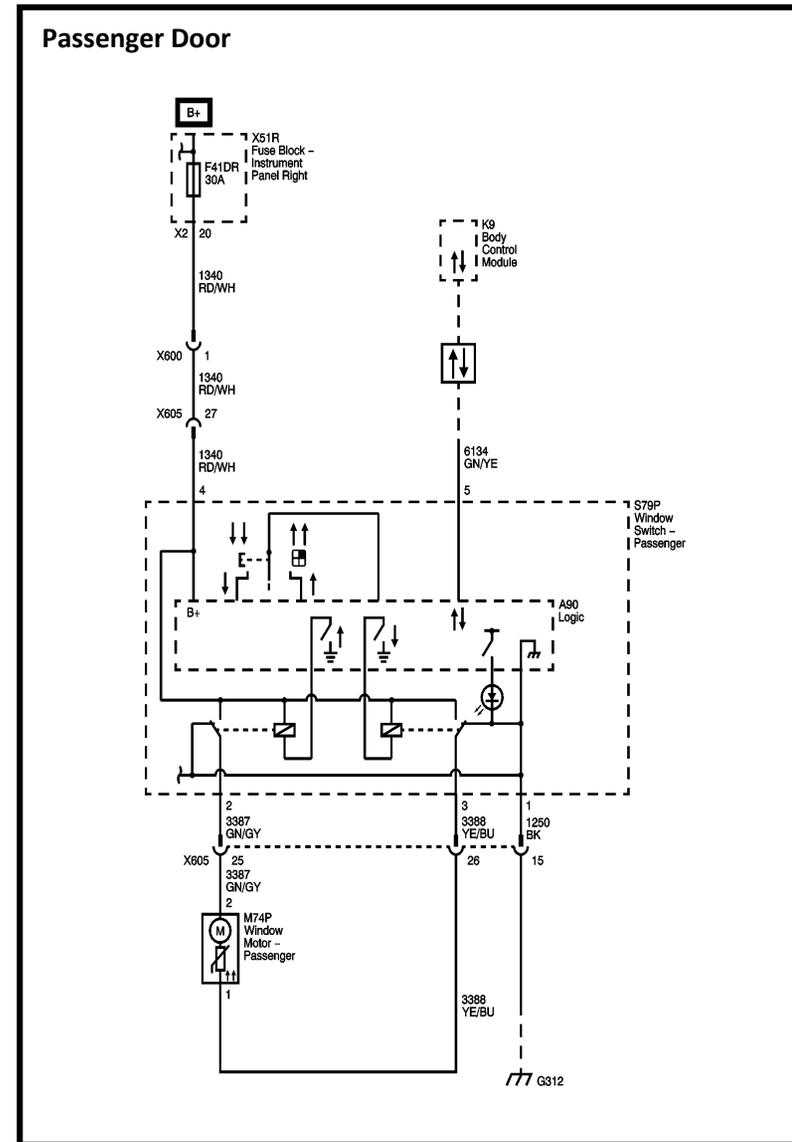
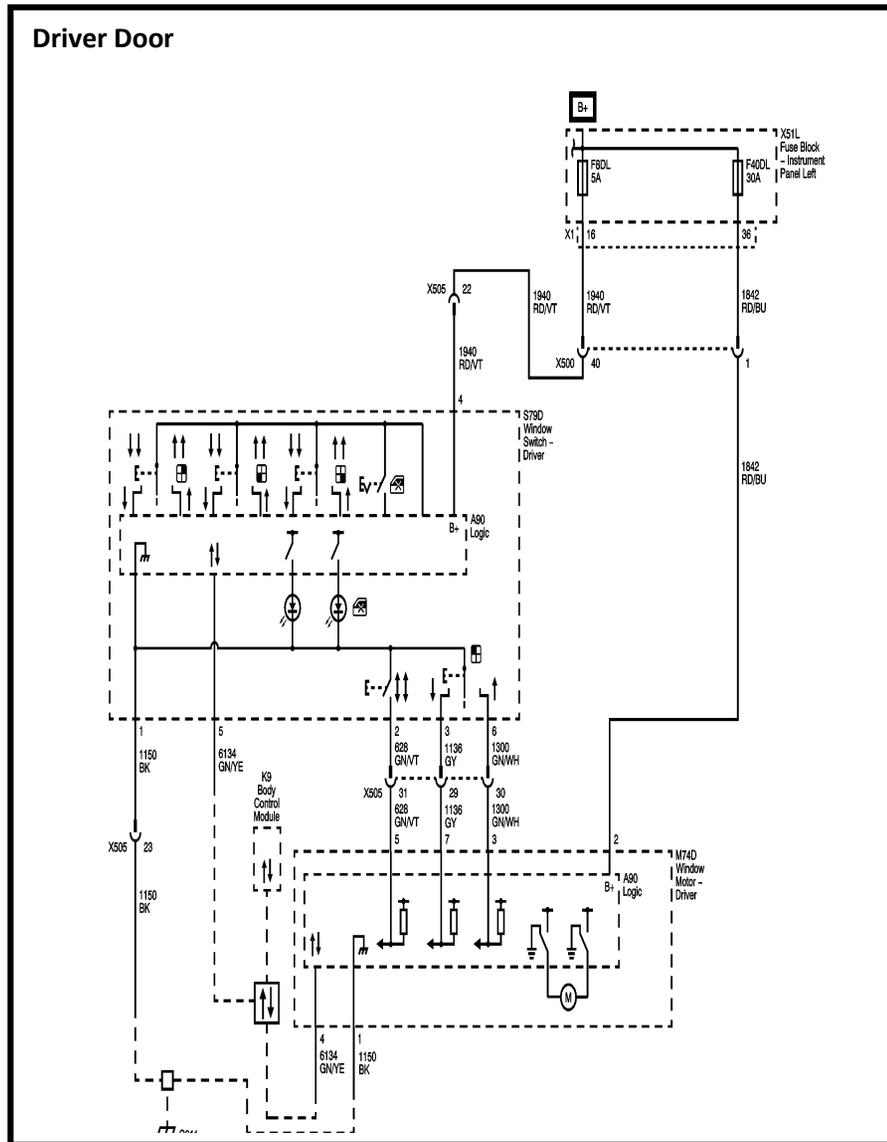
## Adjustable Pedals (With A45)



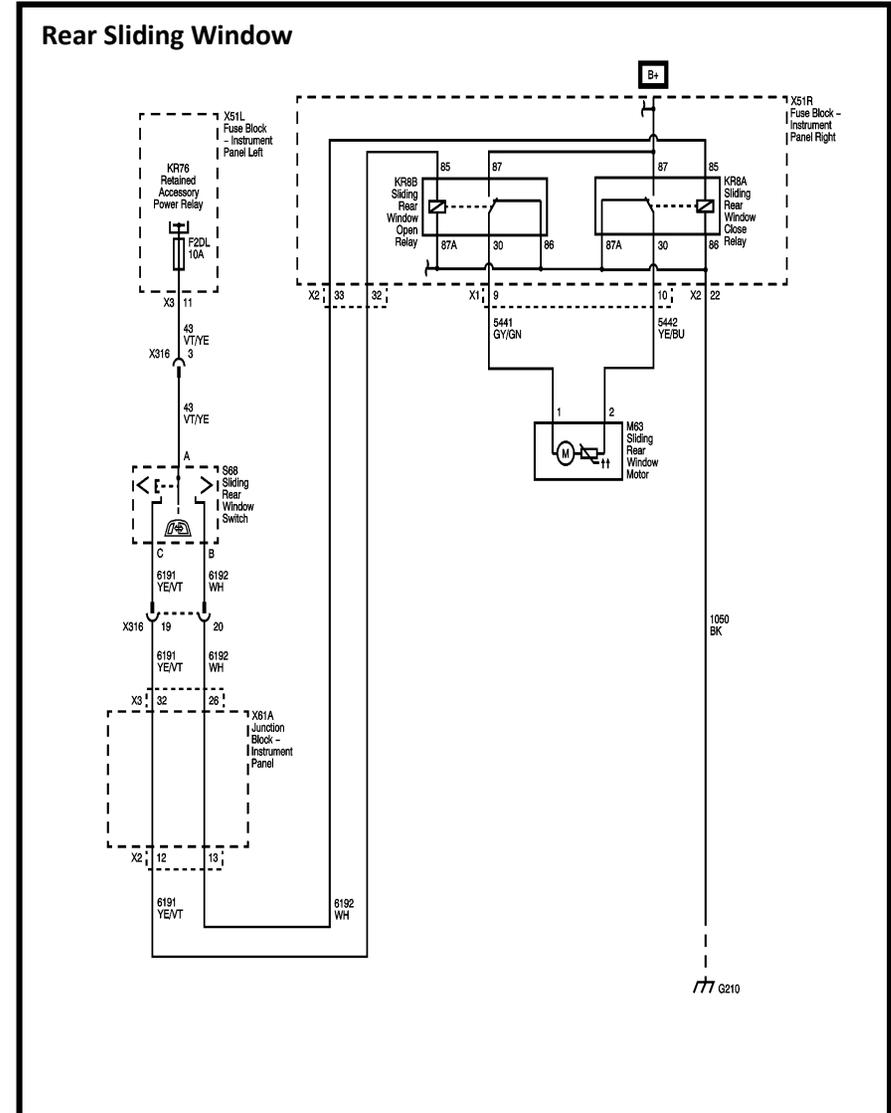
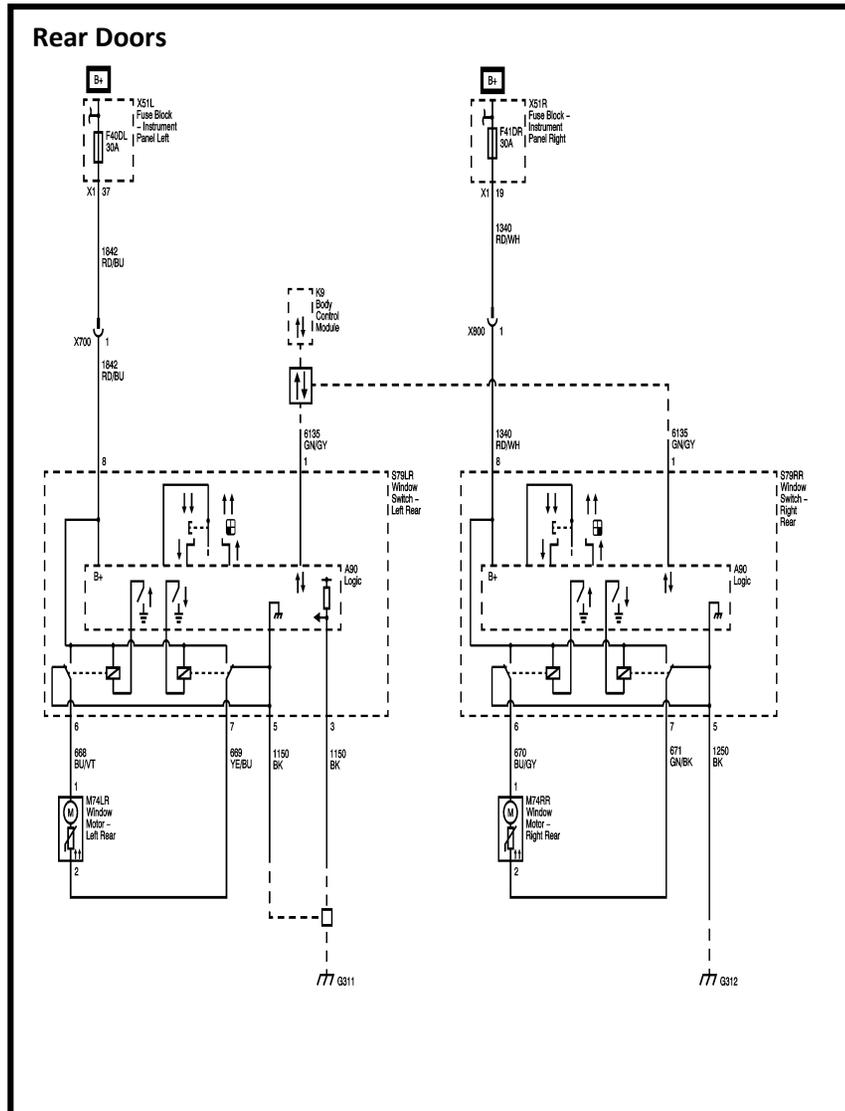
## Adjustable Pedals (Without A45)



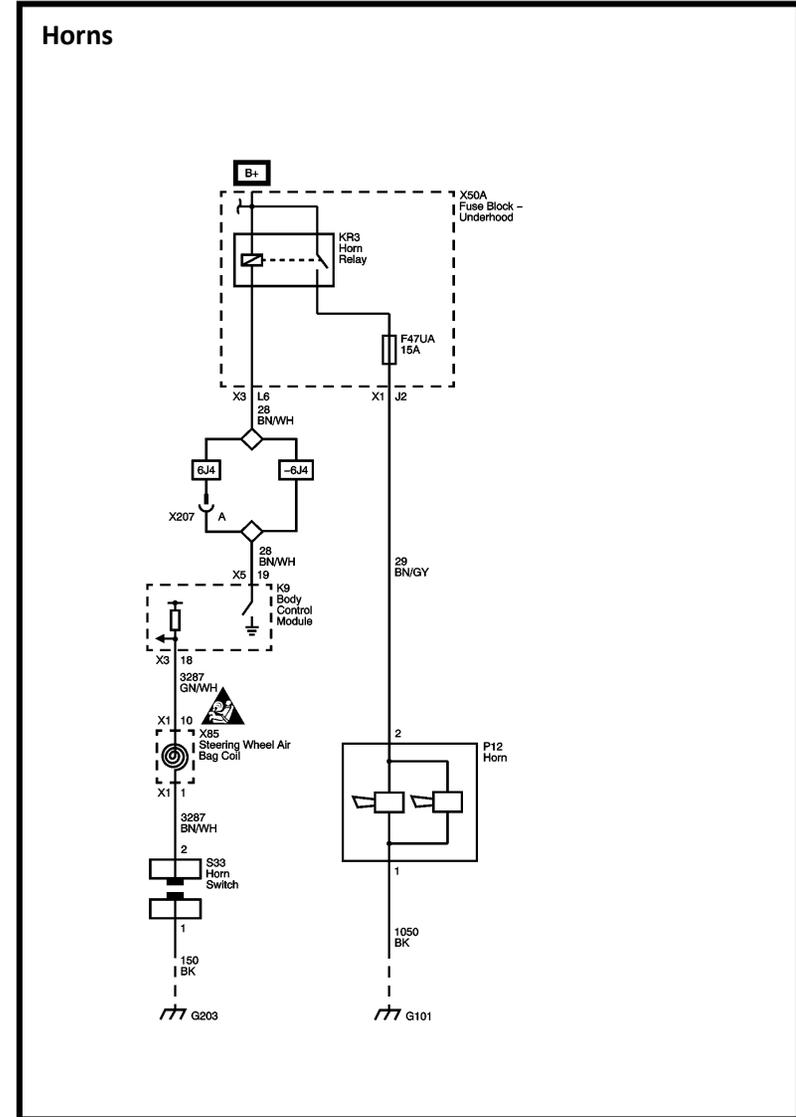
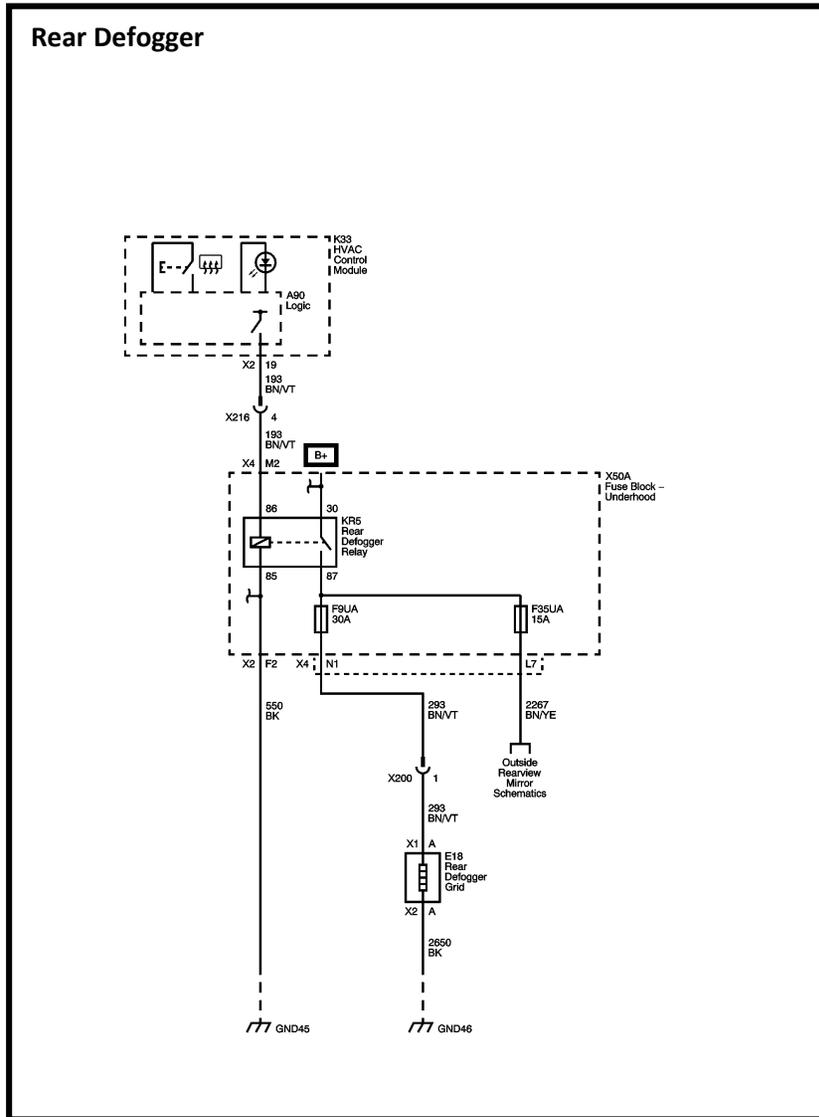
## Fixed and Moveable Windows –Front Doors



## Fixed and Moveable Windows – Rear Doors & Rear Sliding Window

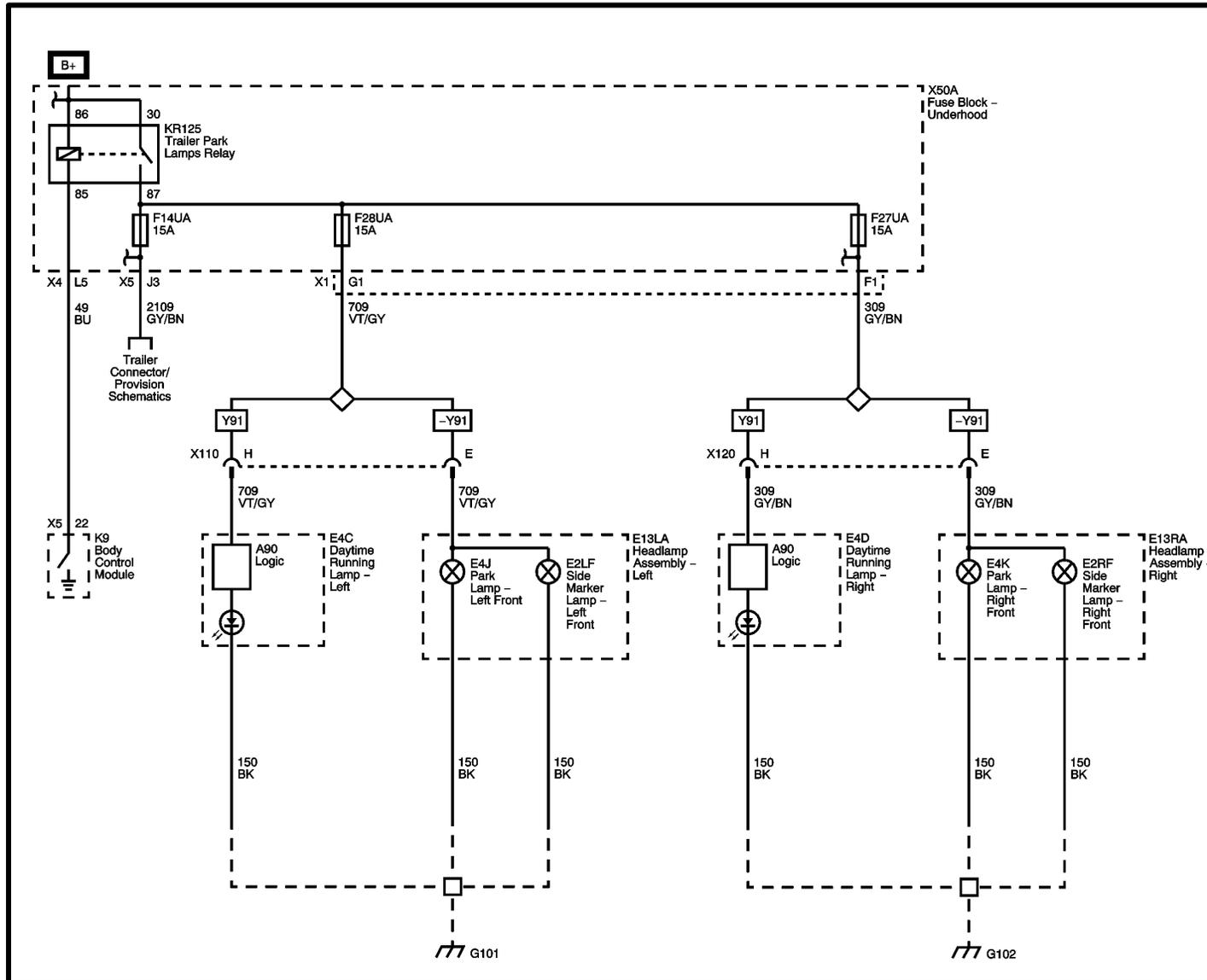


## Rear Defogger/Horns

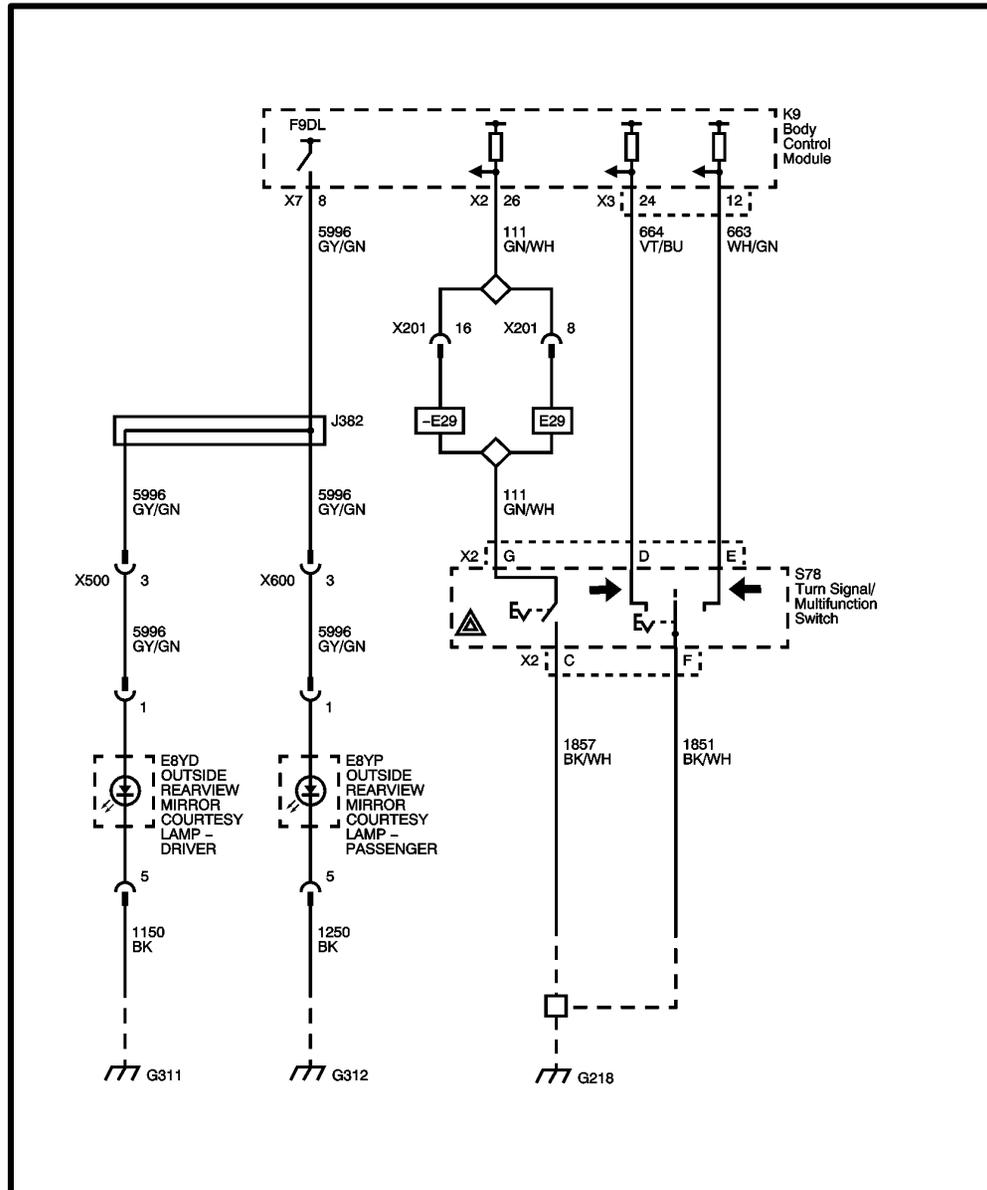




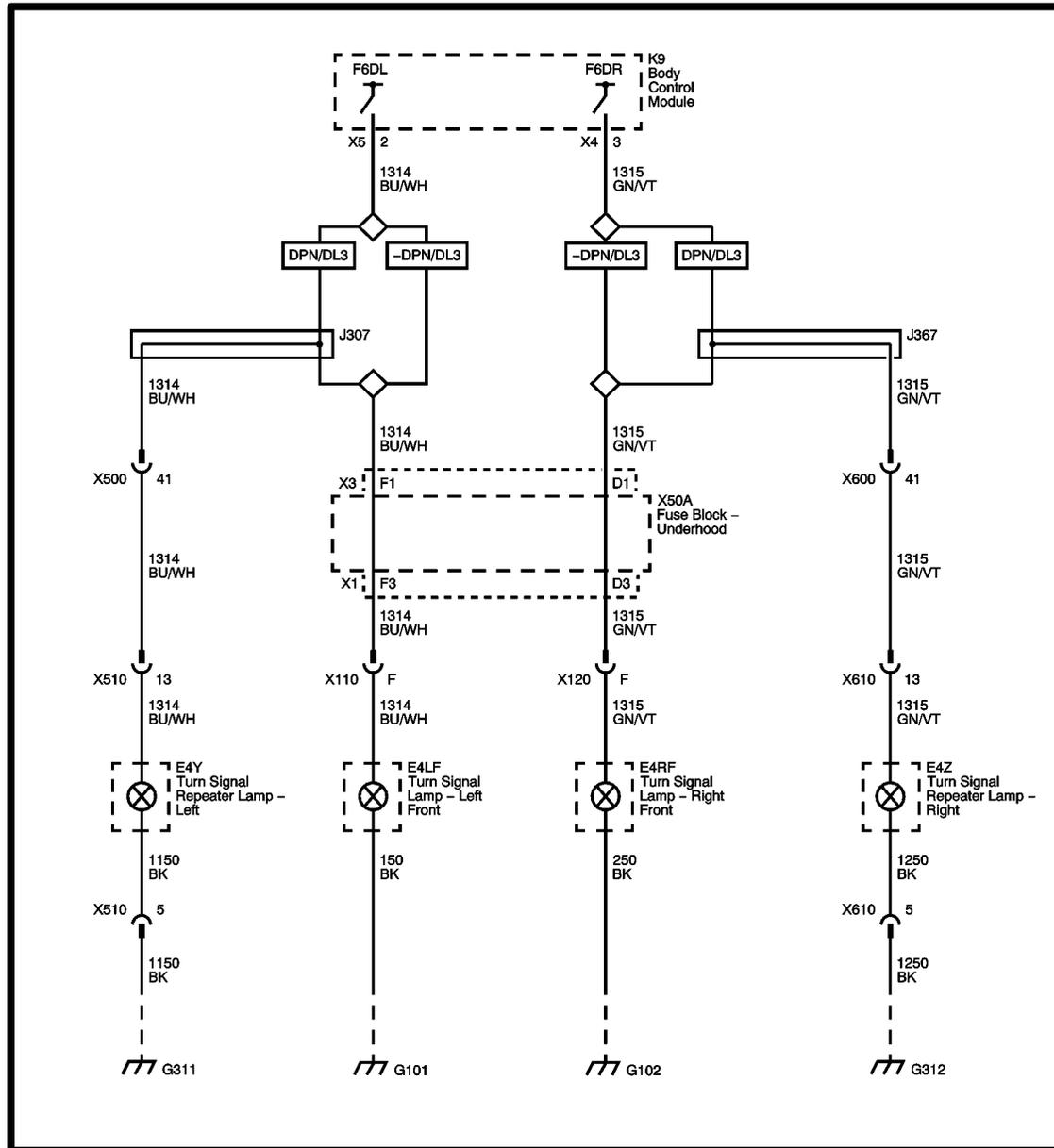
## Exterior Lighting – Park Lamps and Controls



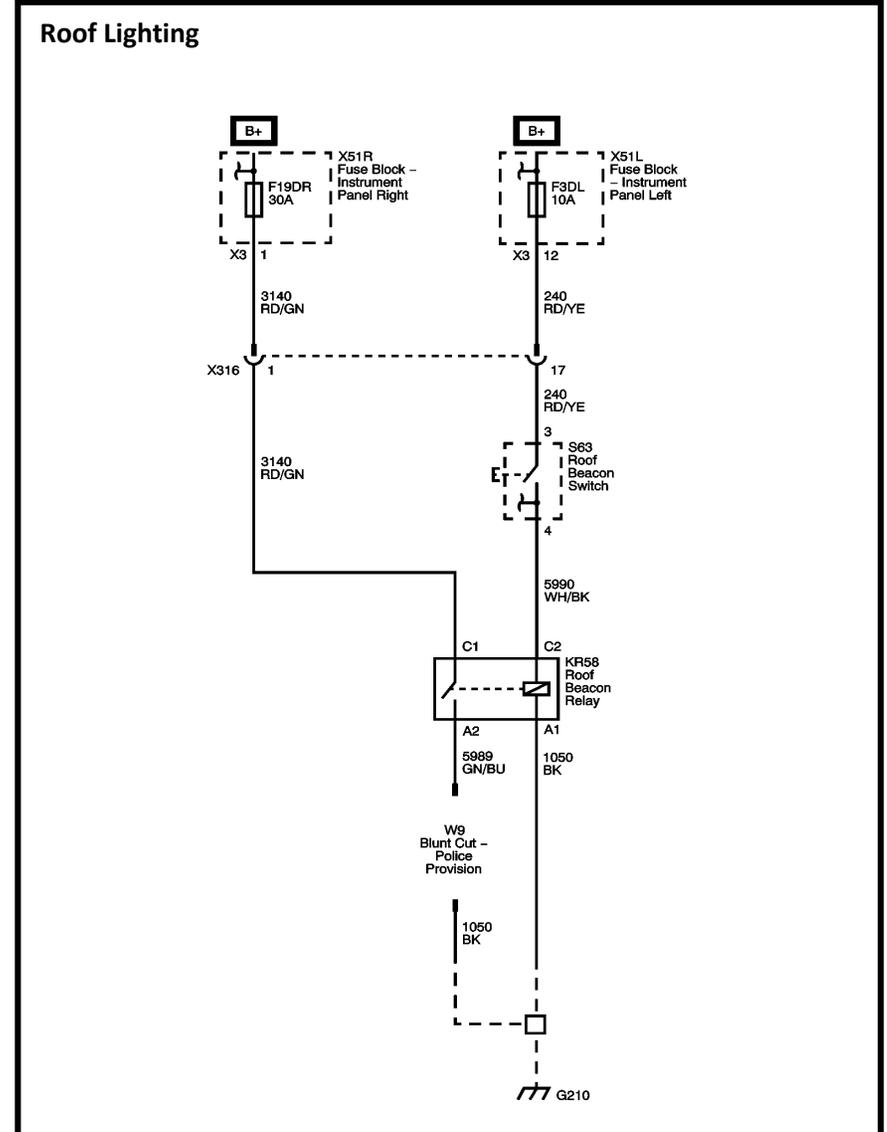
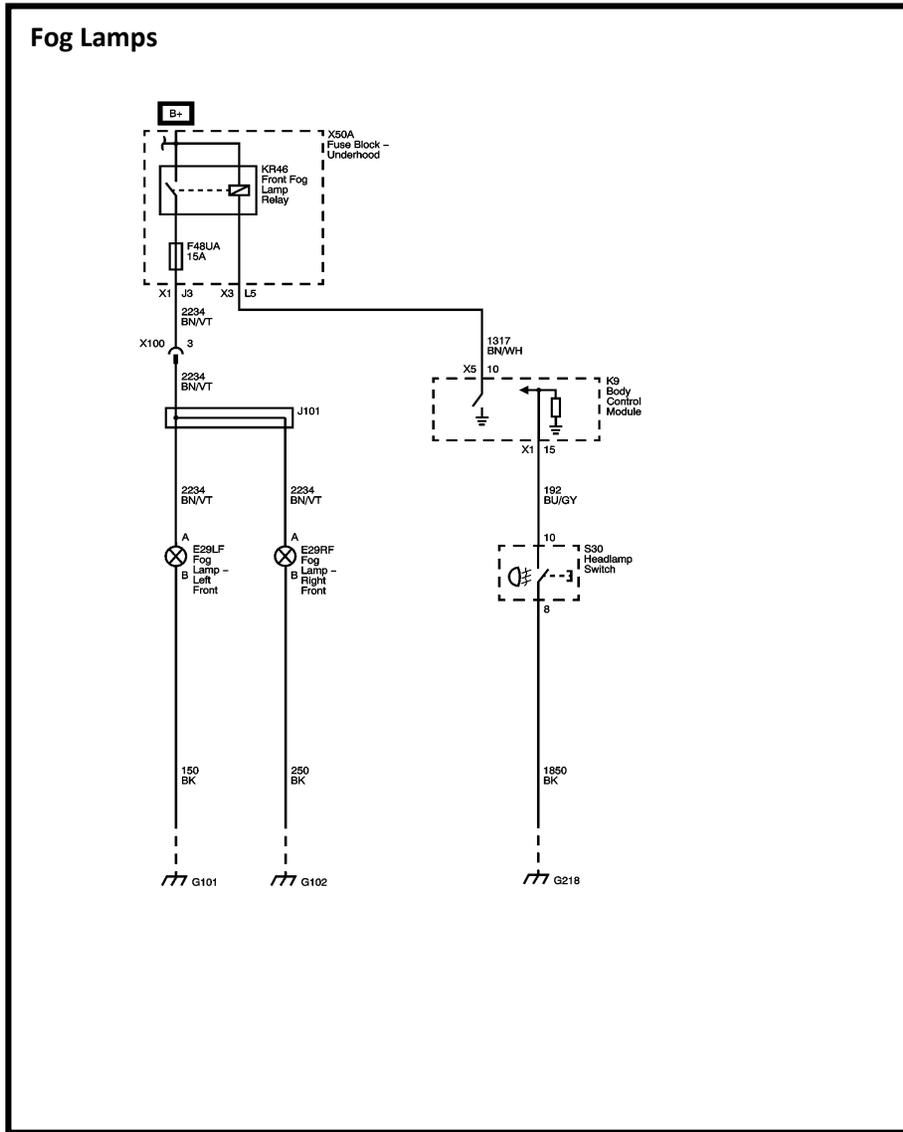
Exterior Lighting – Outside Mirror Lamps and Controls



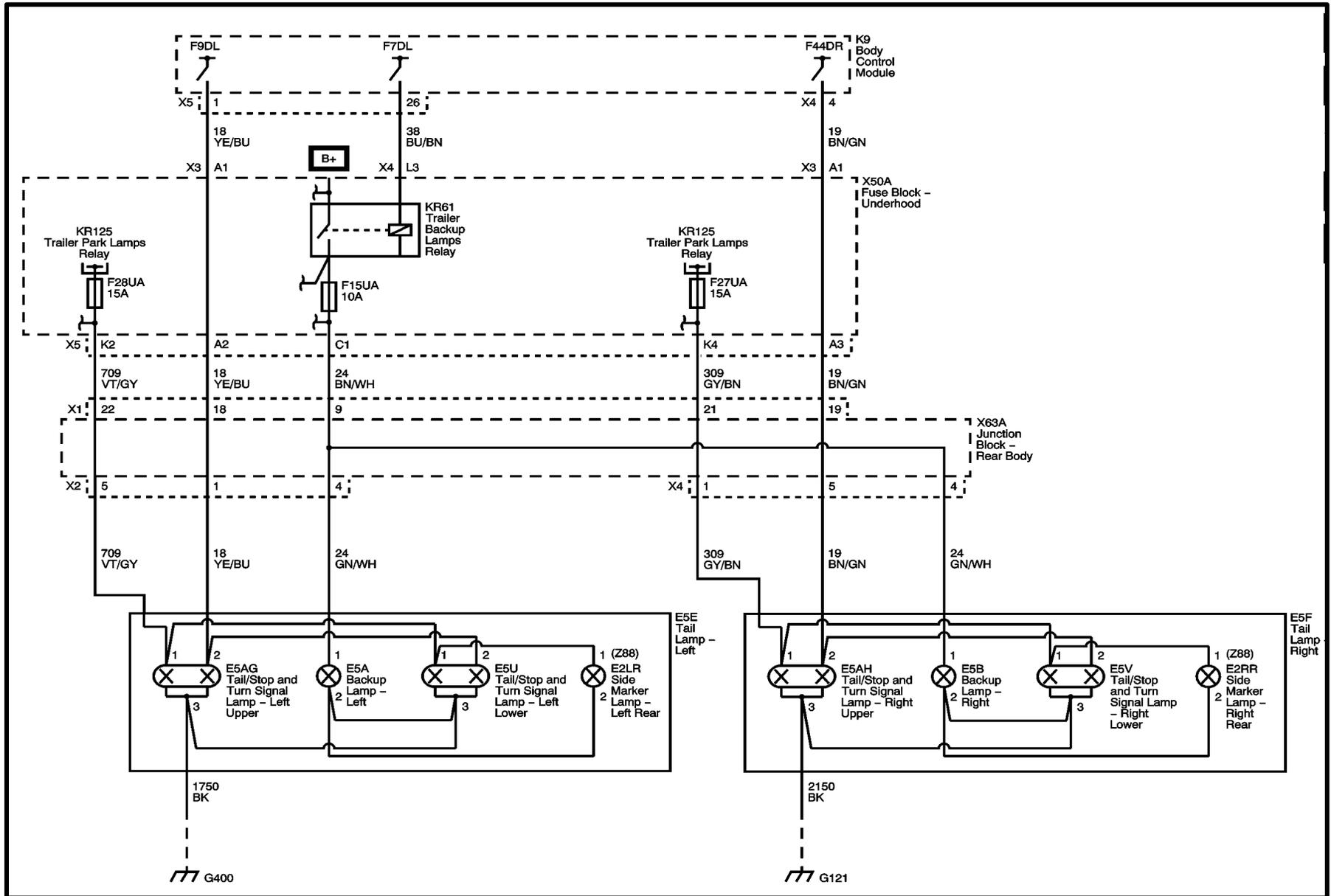
## Exterior Lighting – Turn Signal Lamps



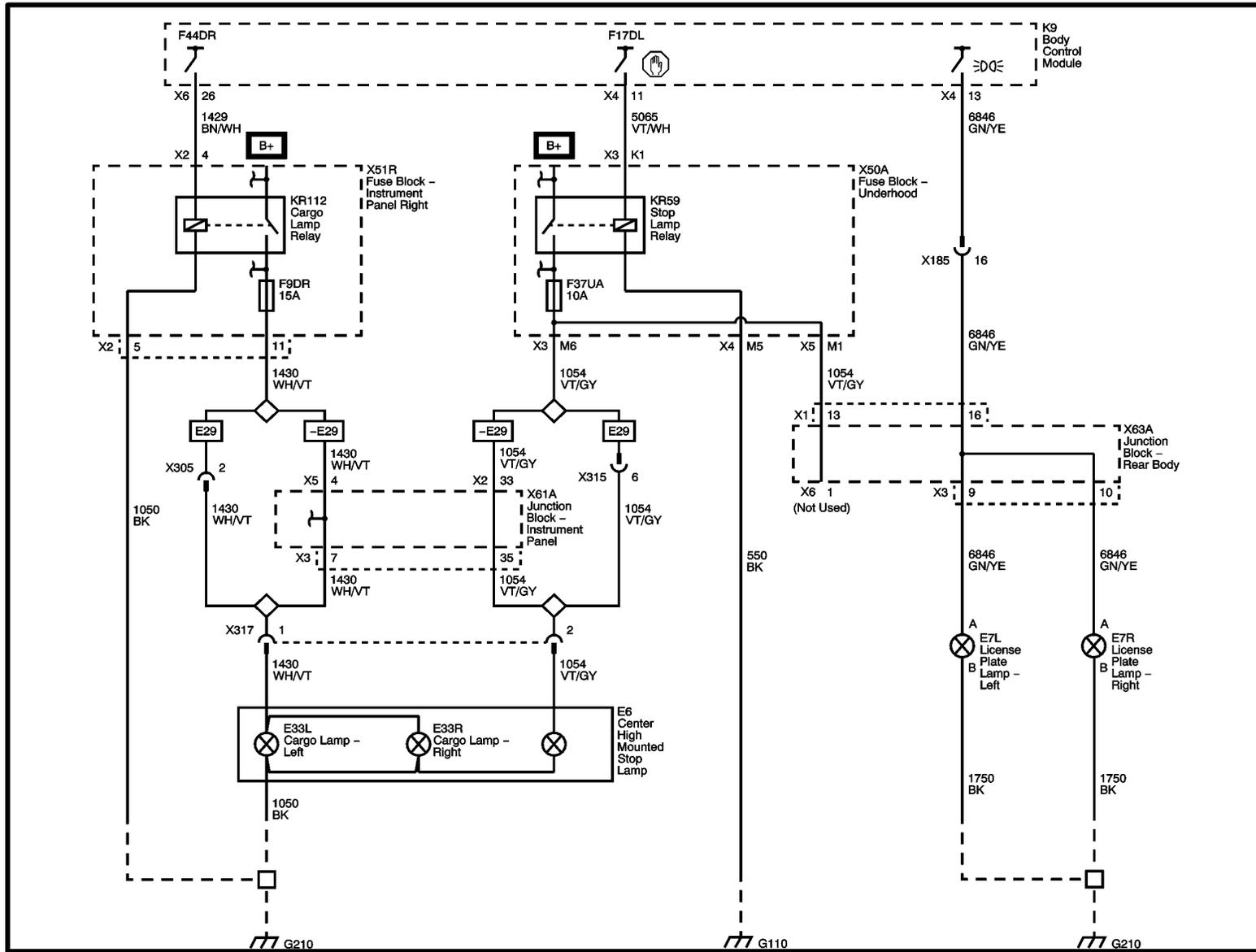
## Exterior Lighting – Fog Lamps and Roof Lighting



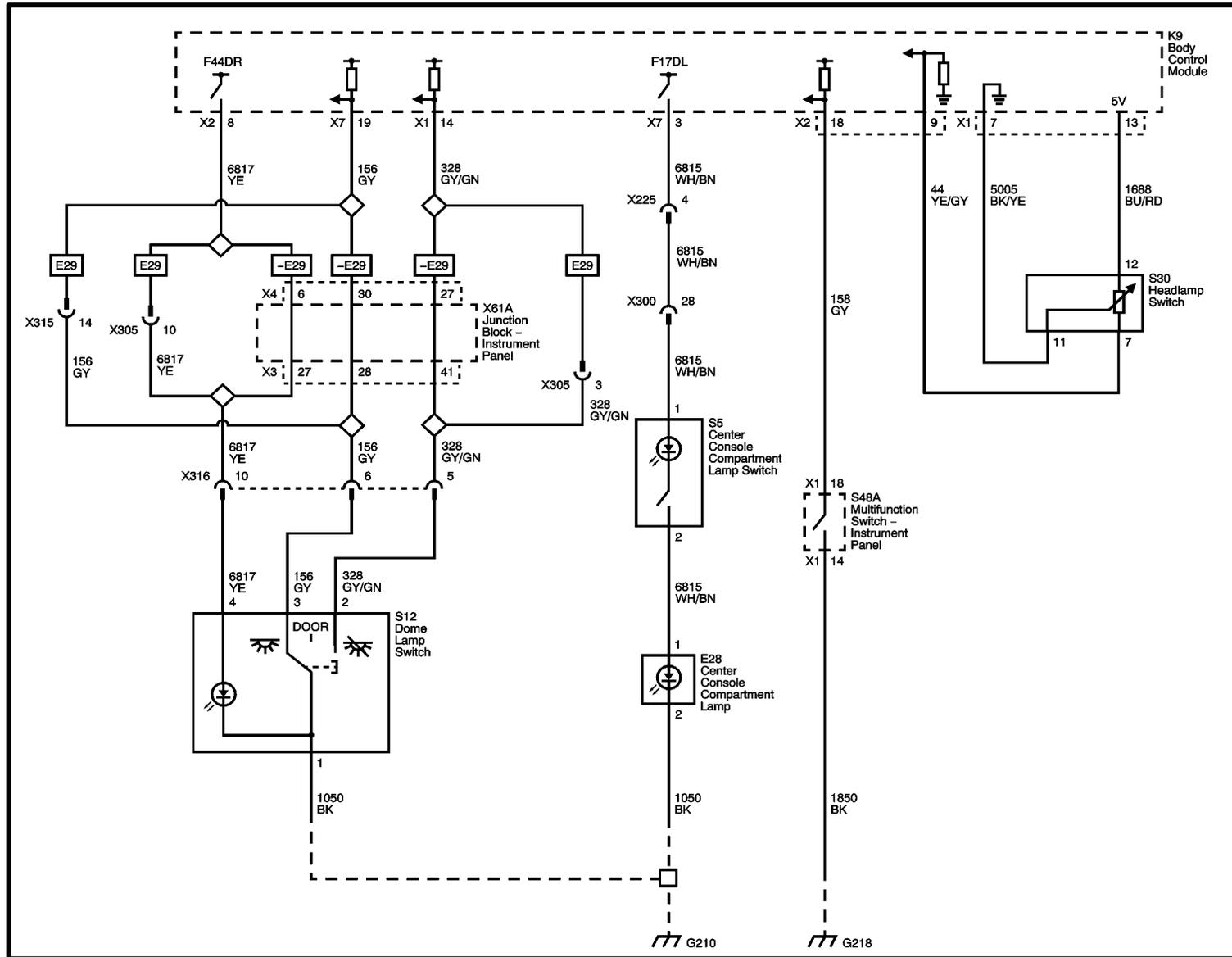
## Exterior Lighting – Tail lamps



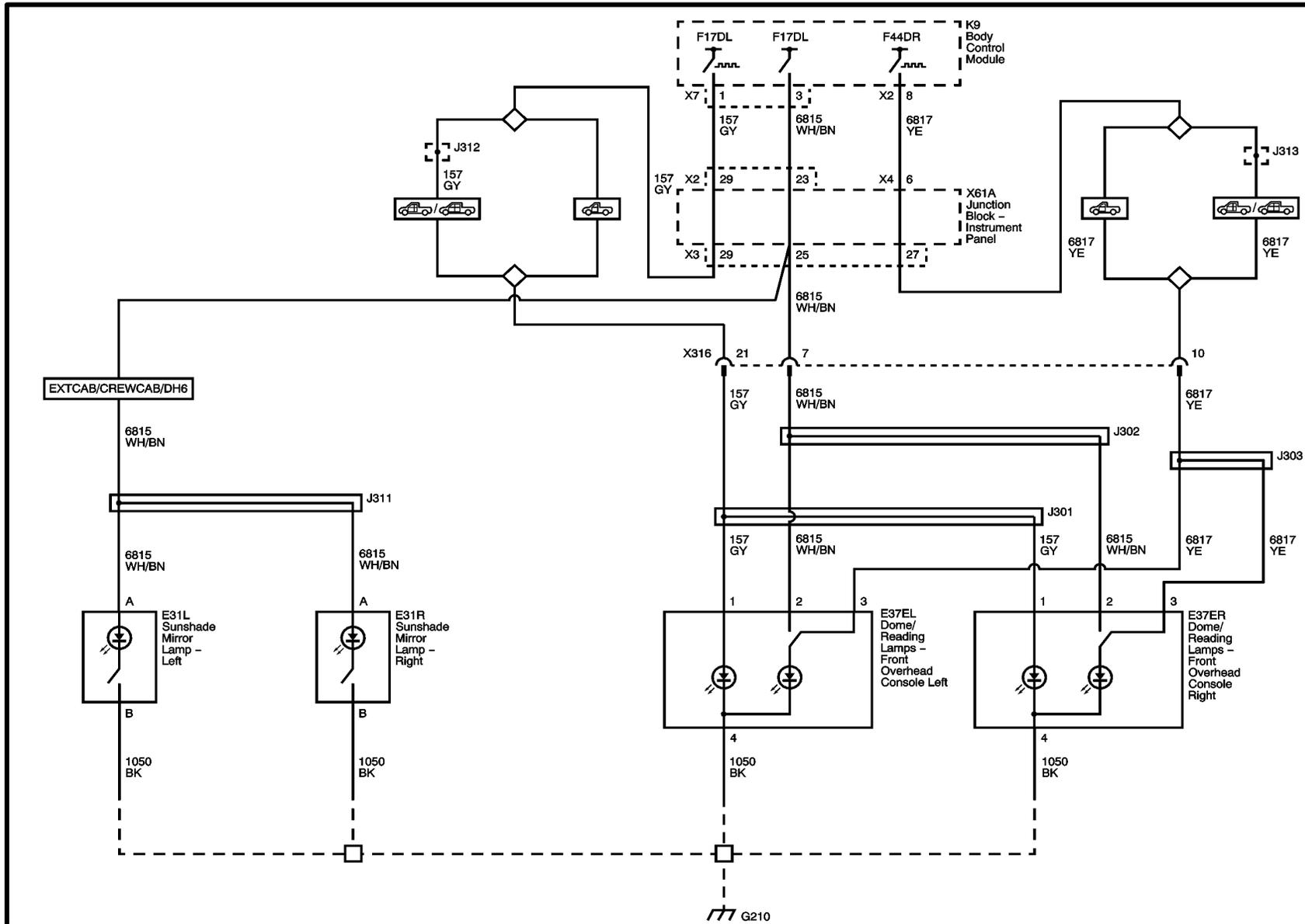
## Exterior Lighting – CHMSL and License Plate lamps



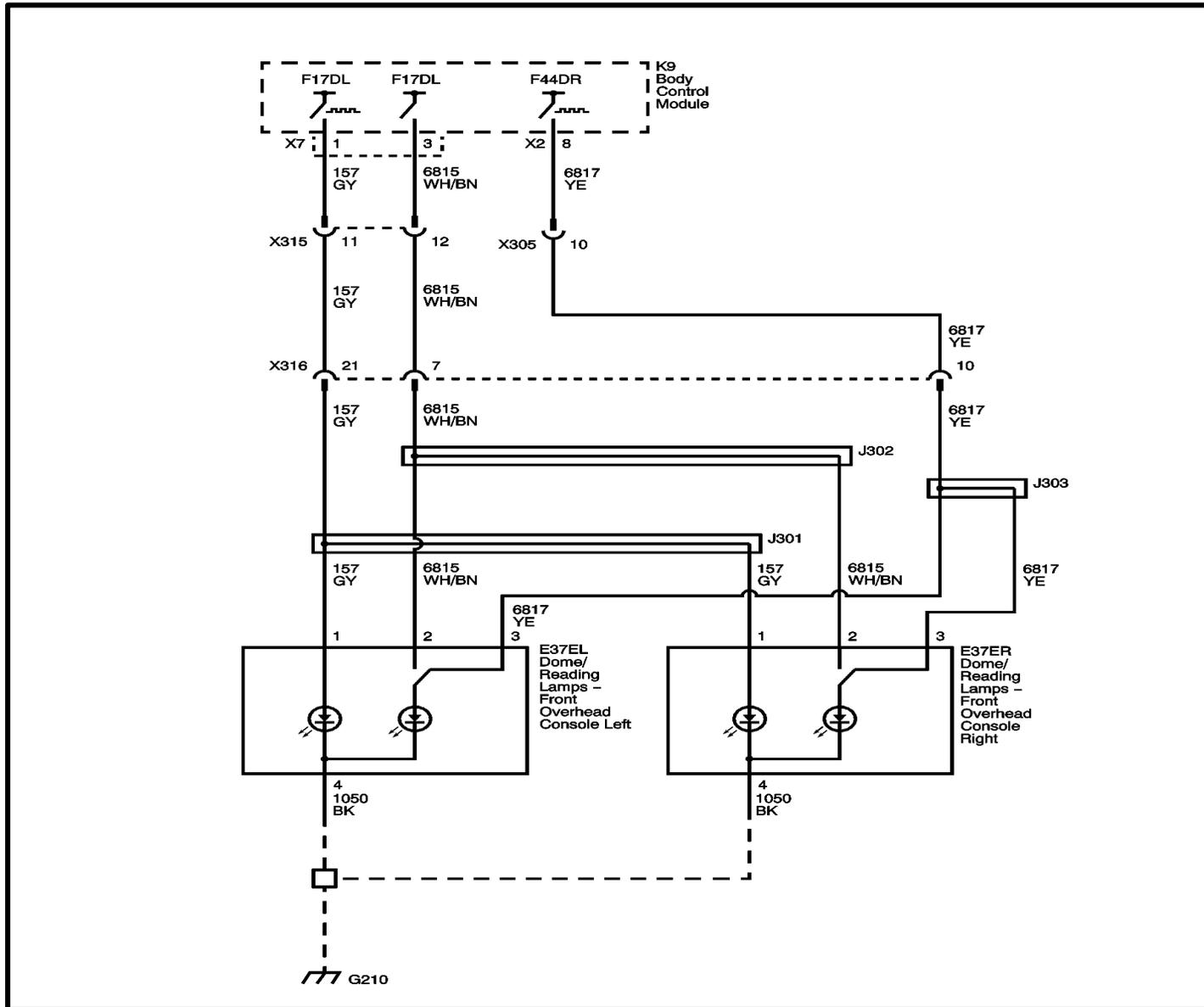
## Interior Lighting – Controls (DD7)



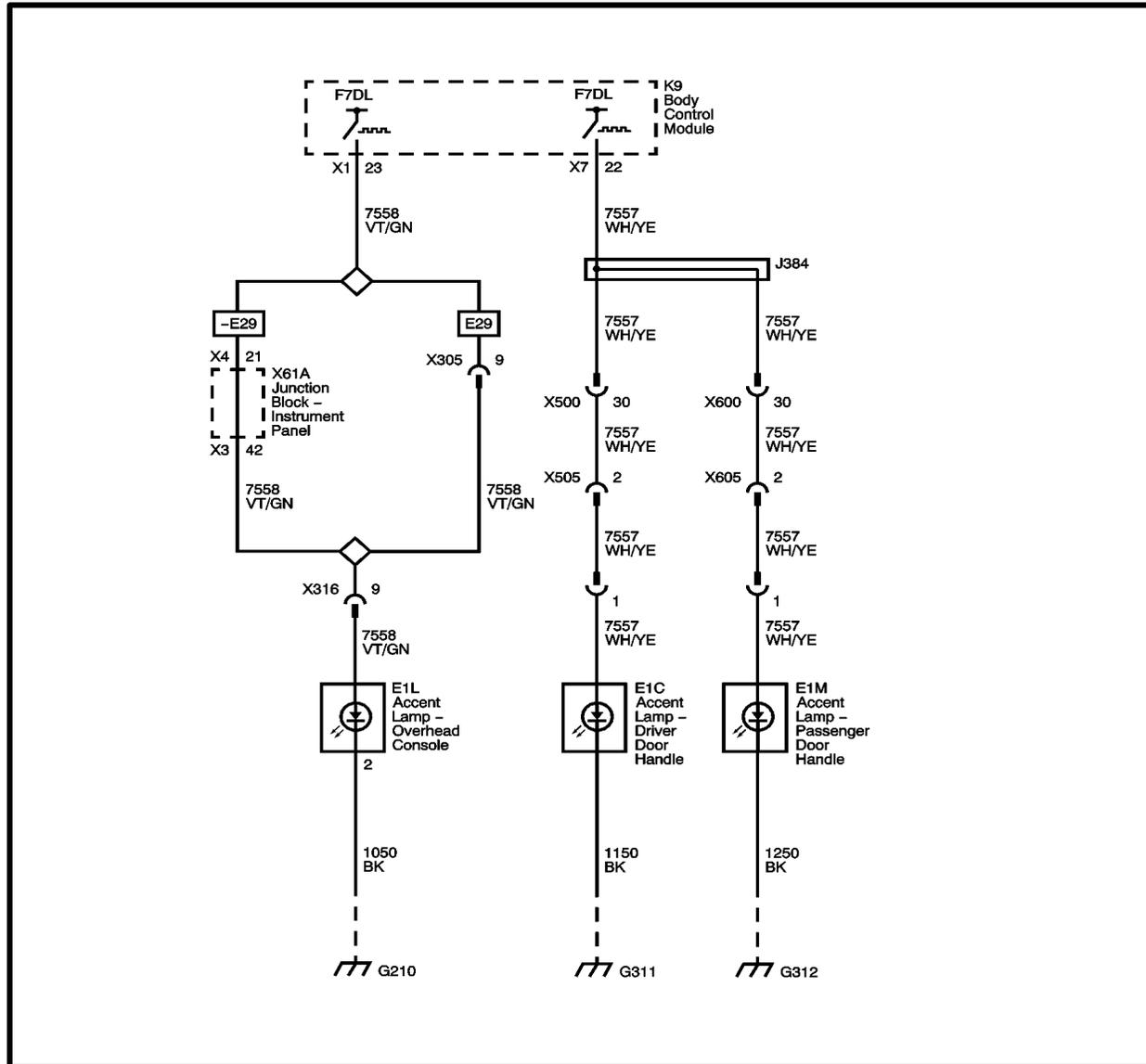
## Interior Lighting – Front Dome Lamps (-E29), DH6



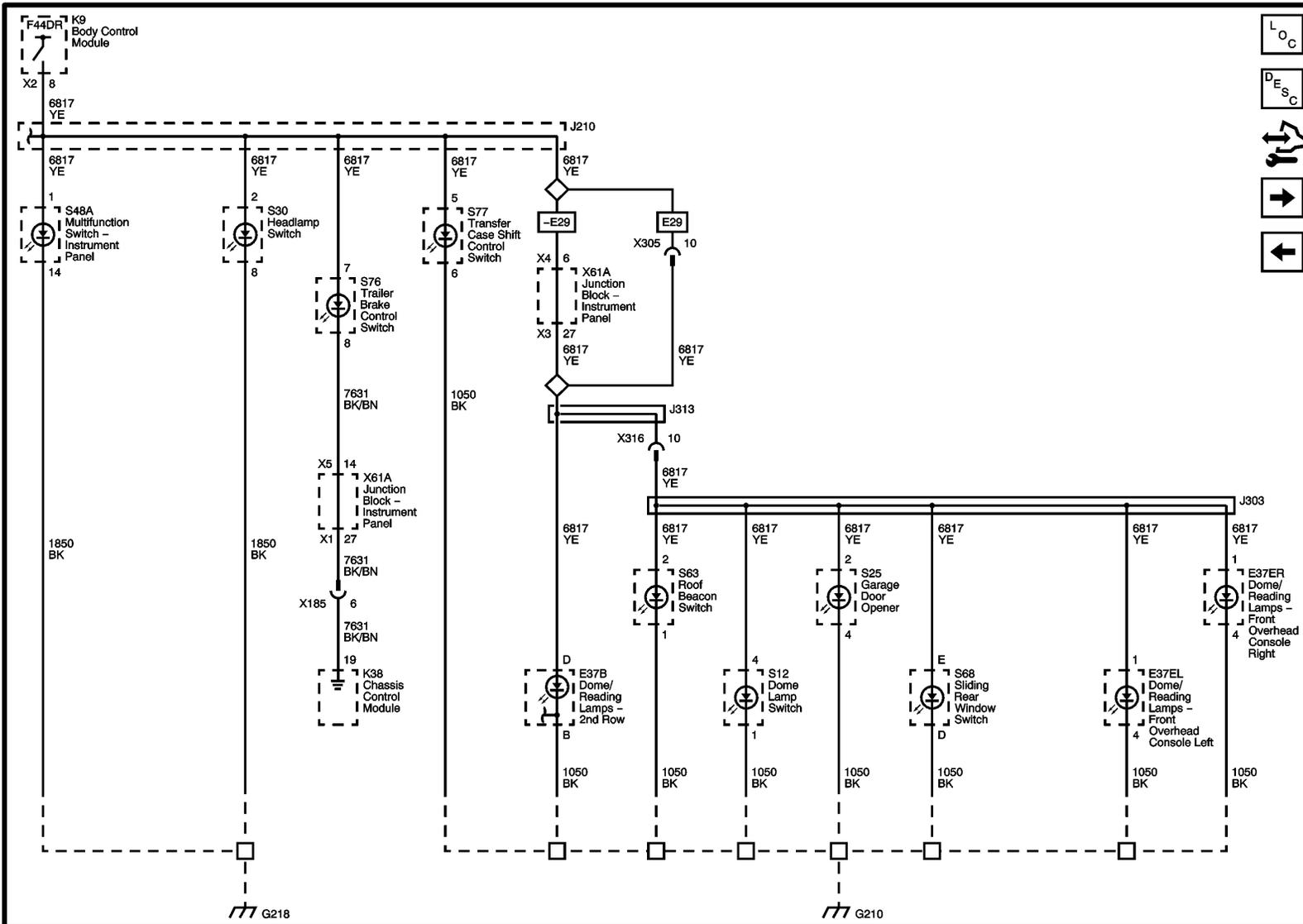
## Interior Lighting – Front Dome Lamps (E29)



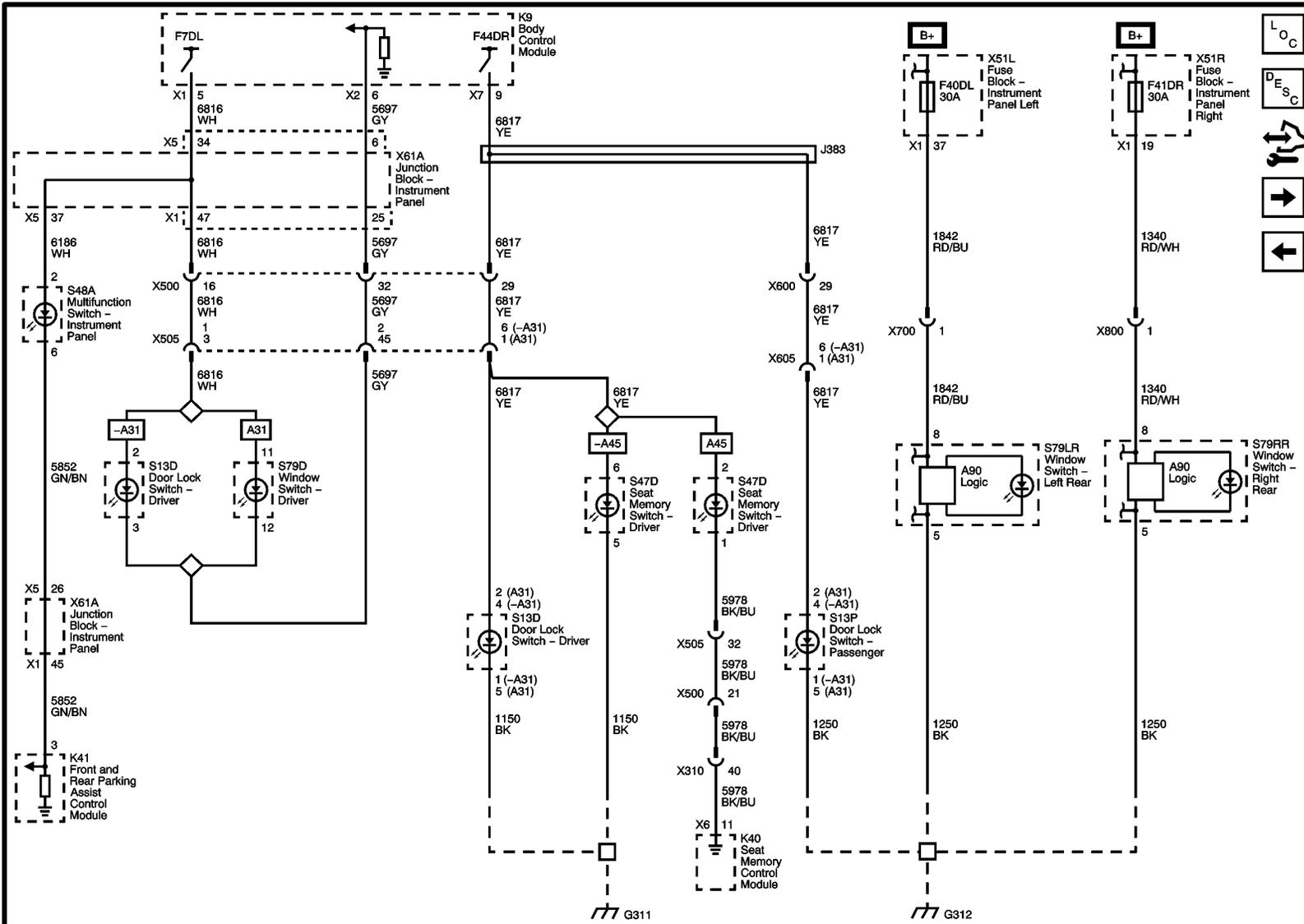
## Interior Lighting – Accent Lamps



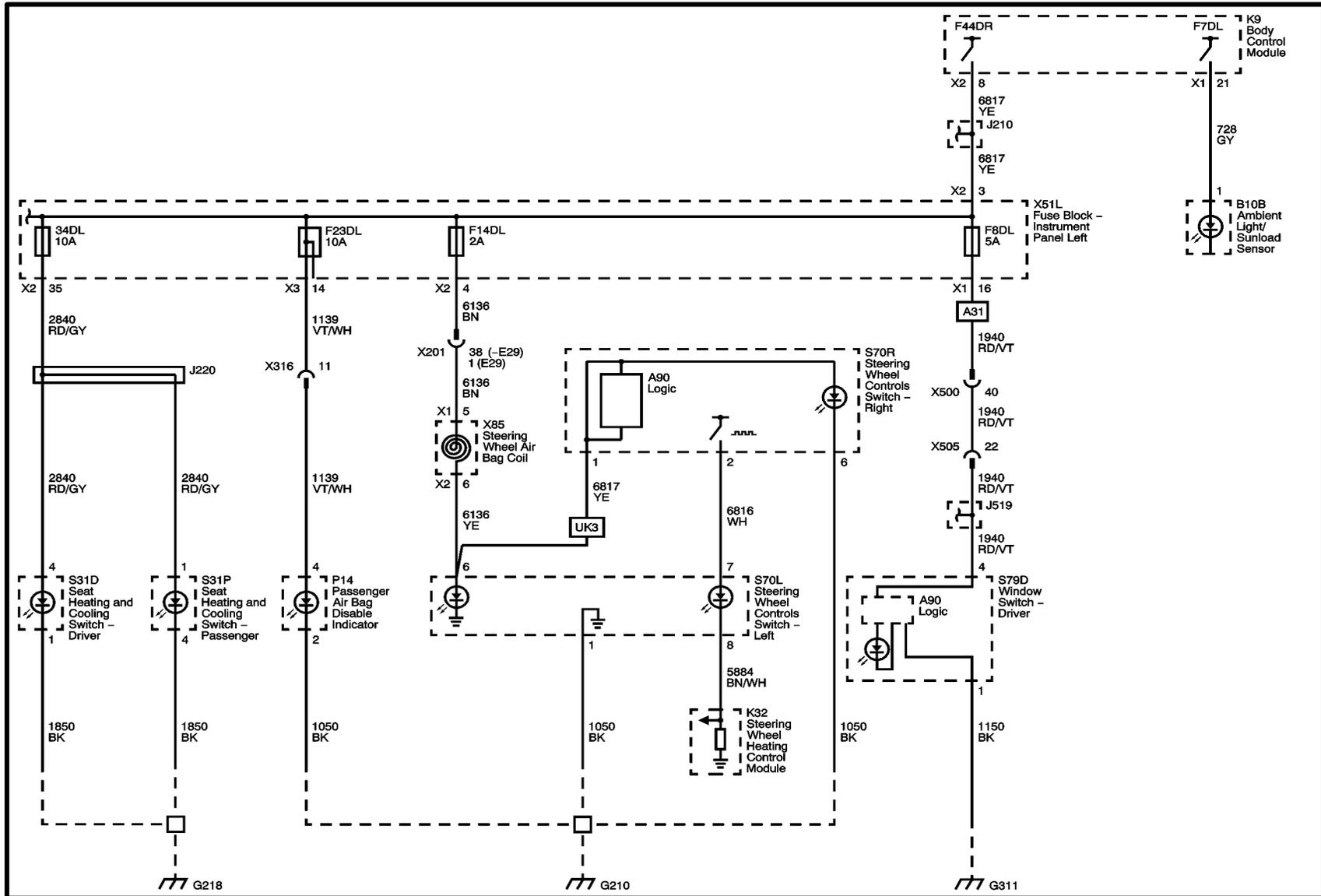
## Interior Lighting – Dimming (1 of 3)



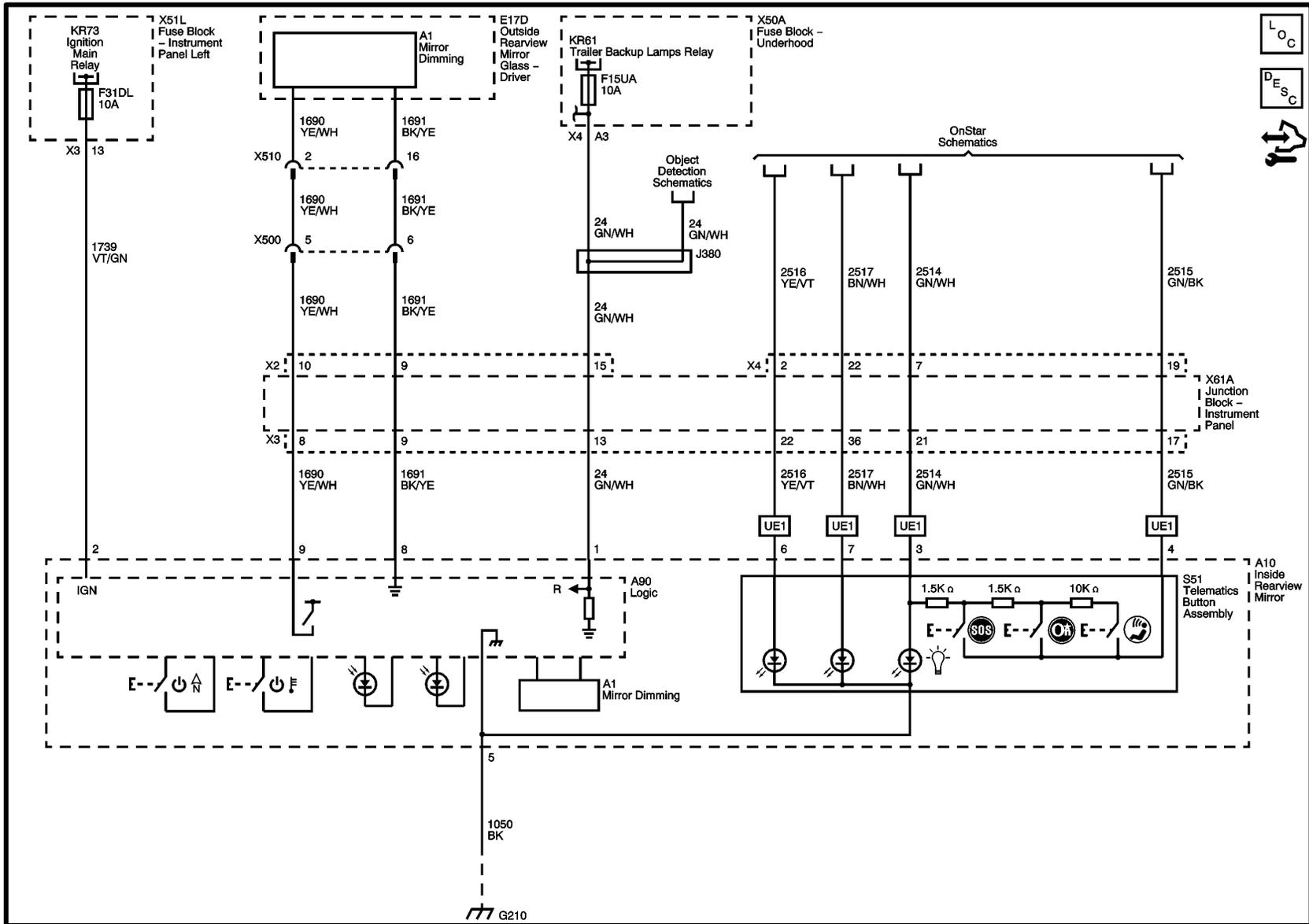
## Interior Lighting – Dimming (2 of 3)



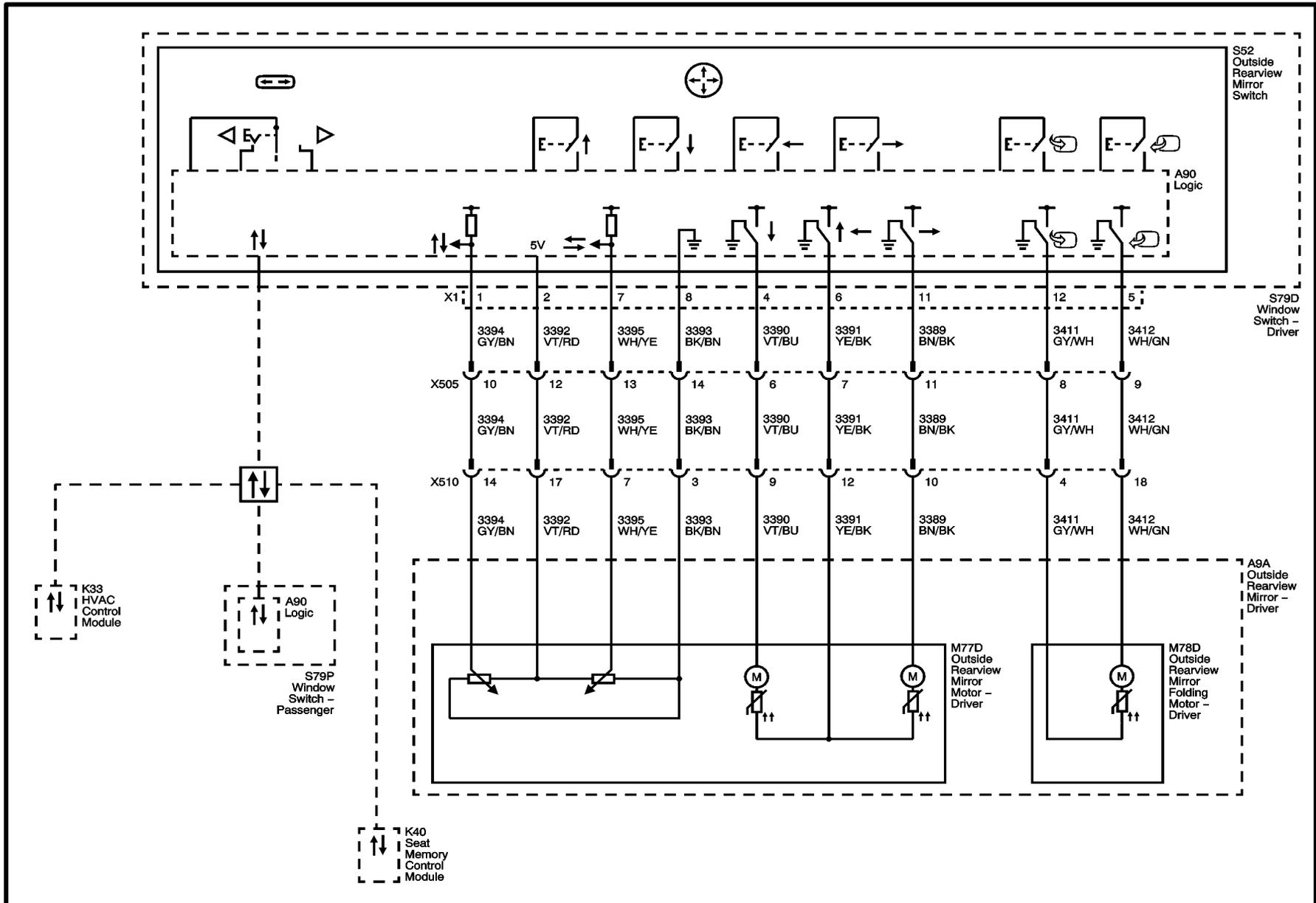
## Interior Lighting – Dimming (3 of 3)



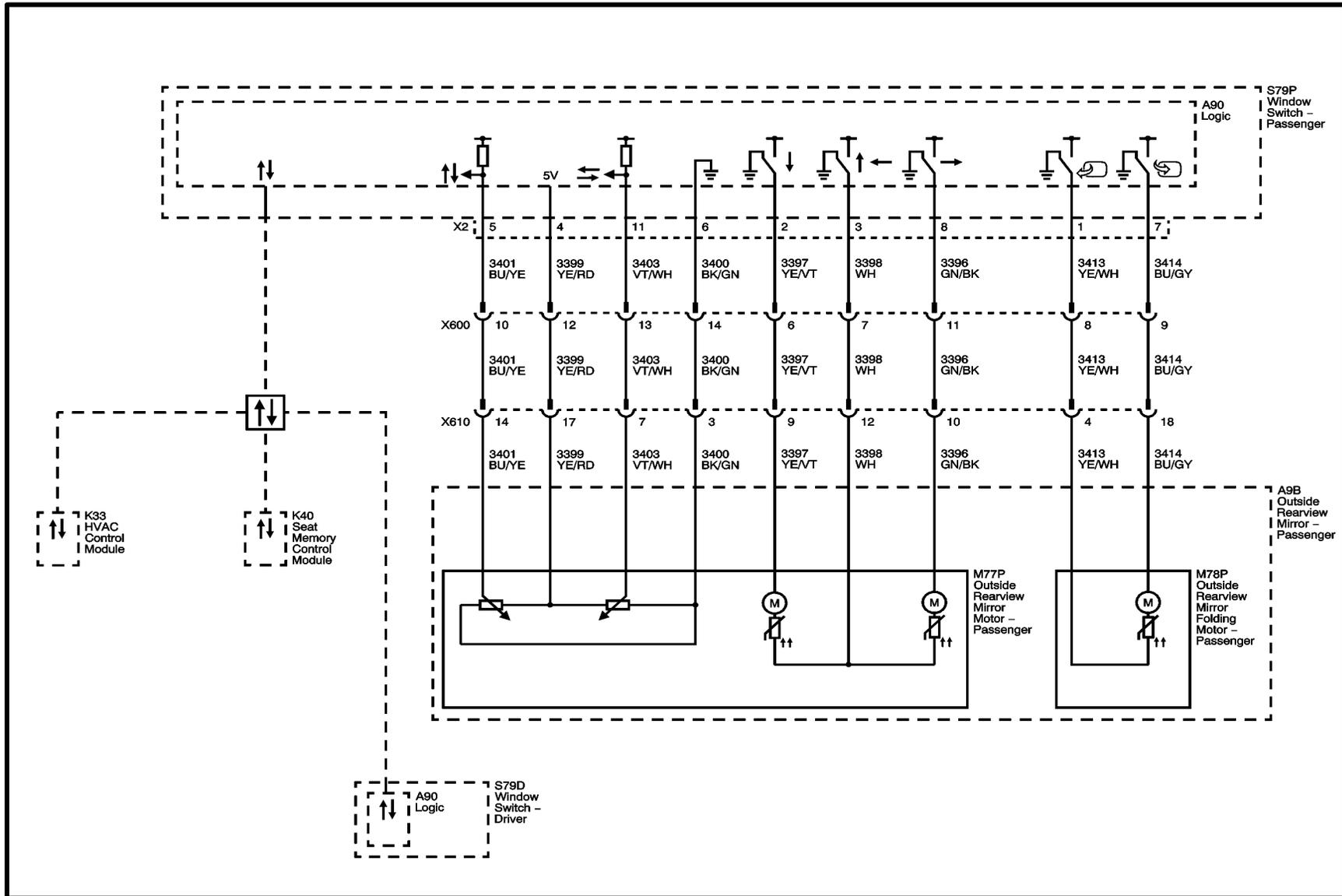
## Mirrors – Inside Rearview (DD8)



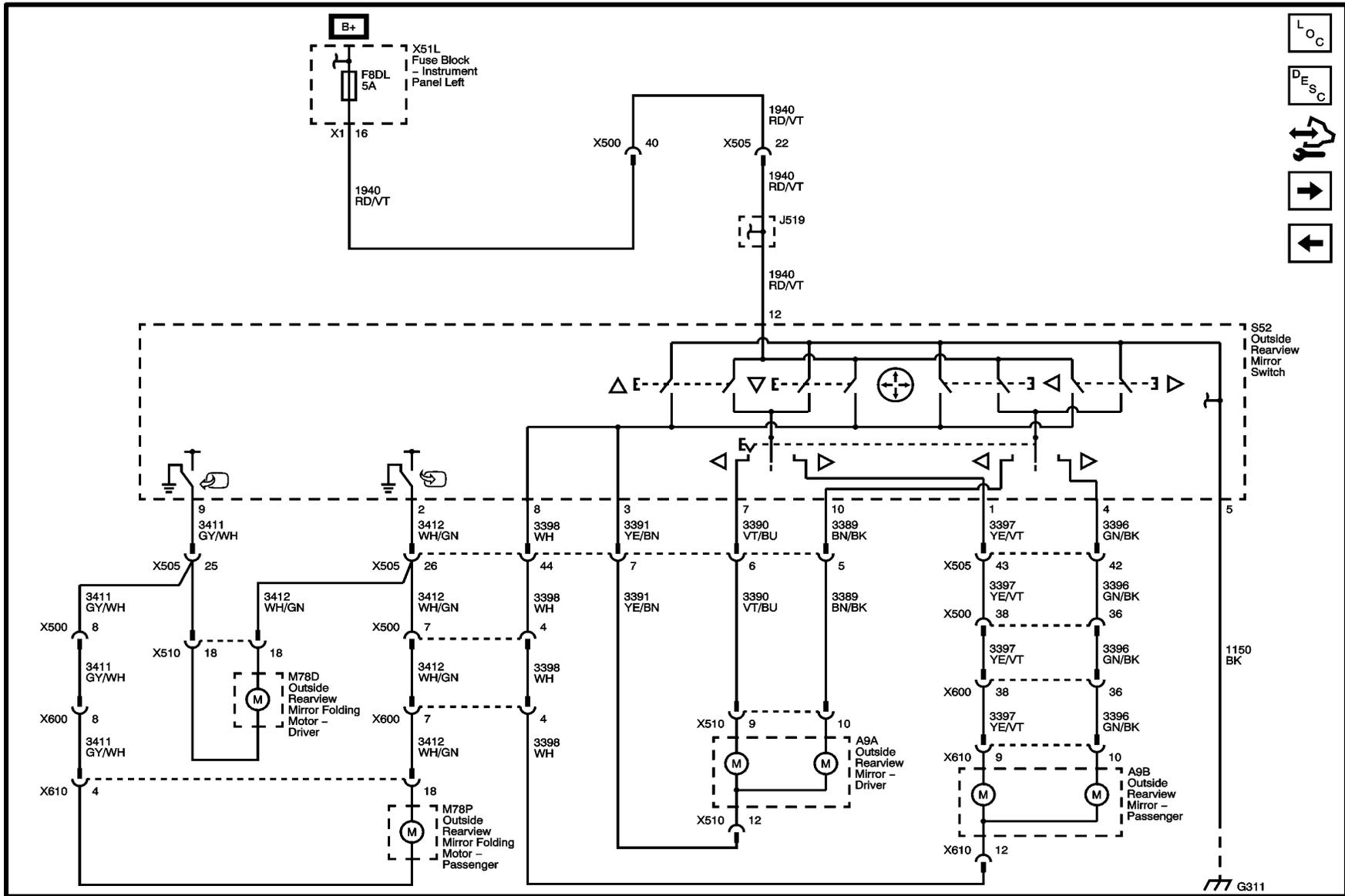
## Mirrors – Outside Rearview Driver (with A45)



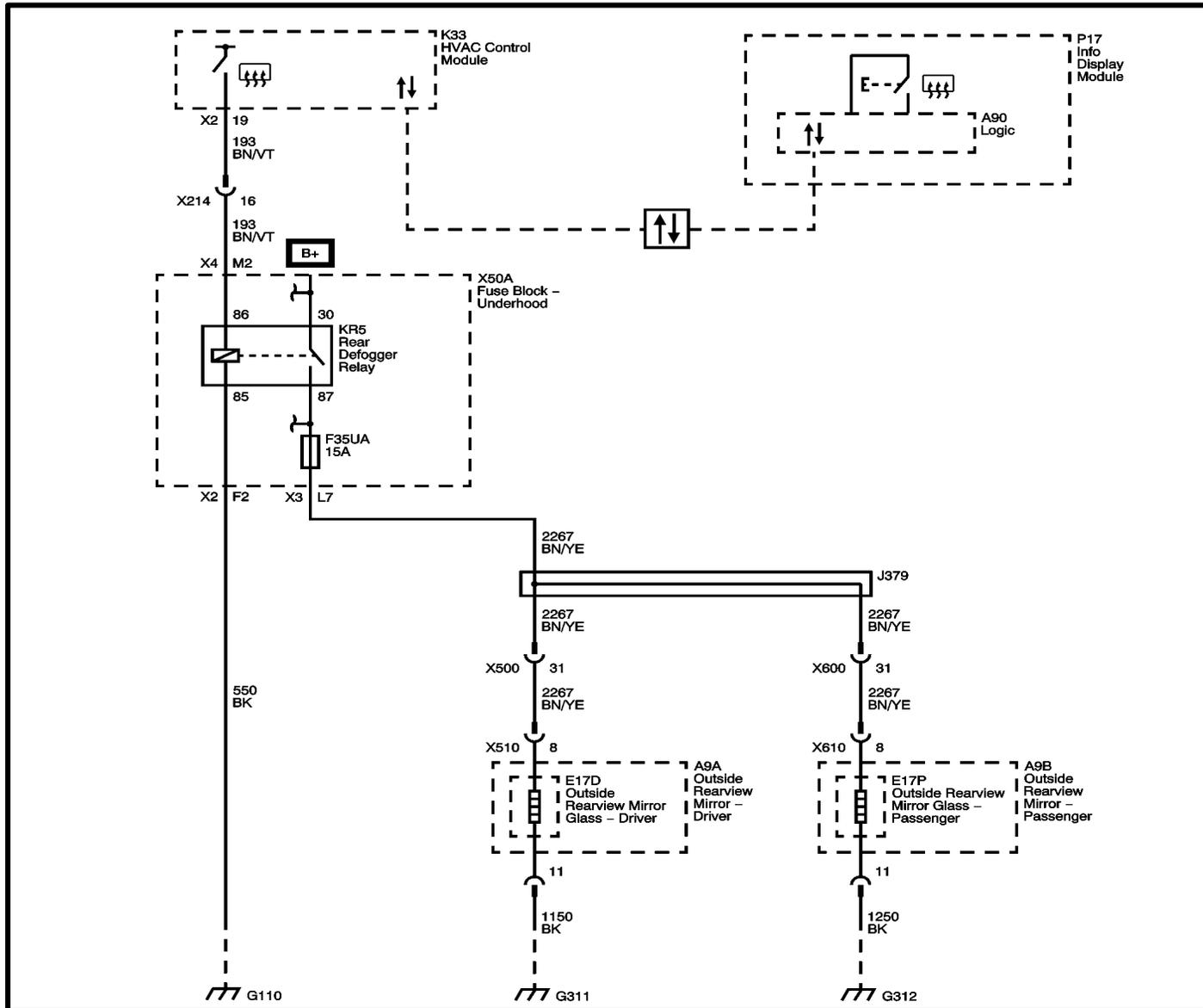
## Mirrors – Outside Rearview Passenger (with A45)



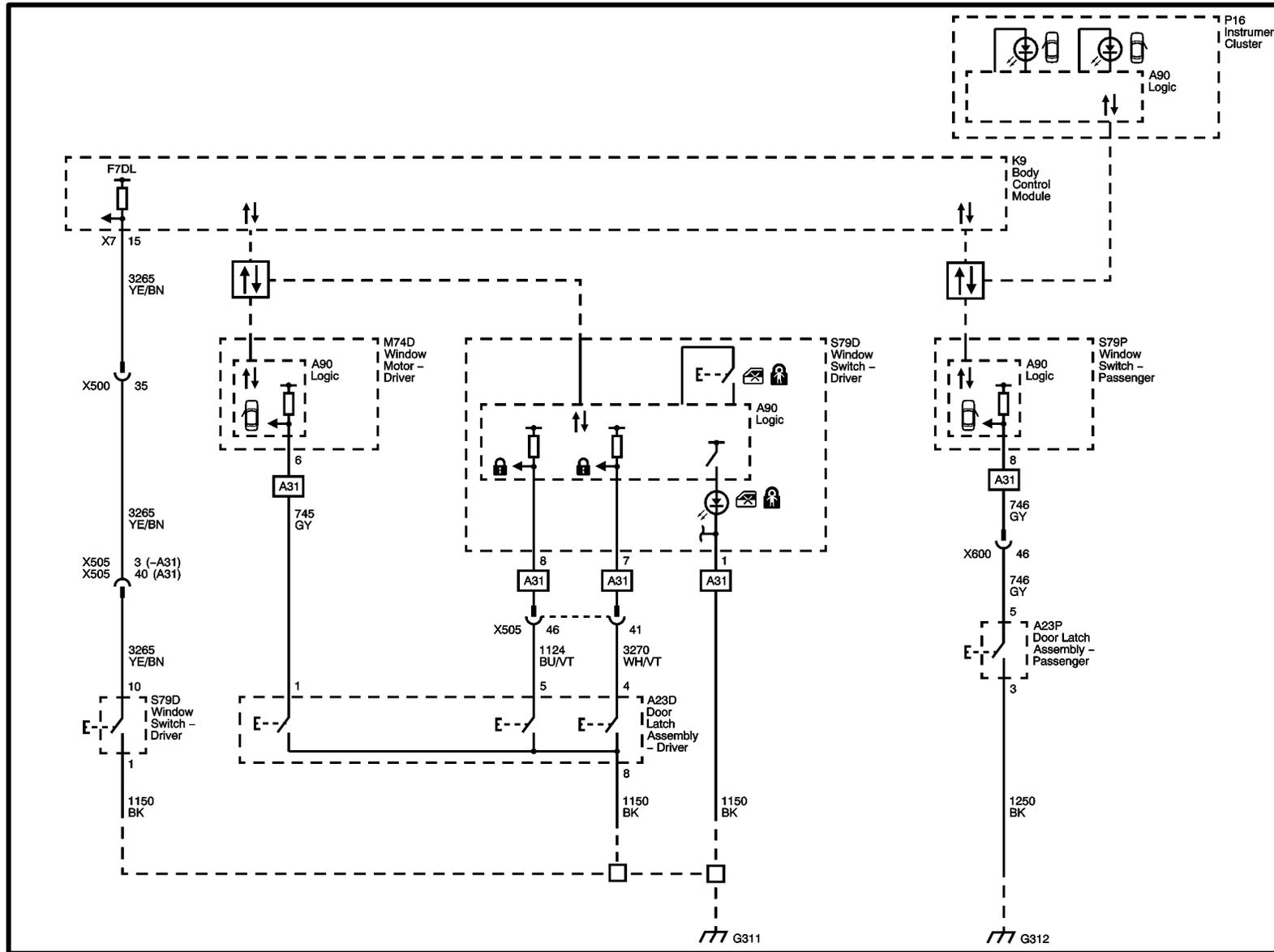
## Mirrors – Outside Rearview Position Controls (without A45)



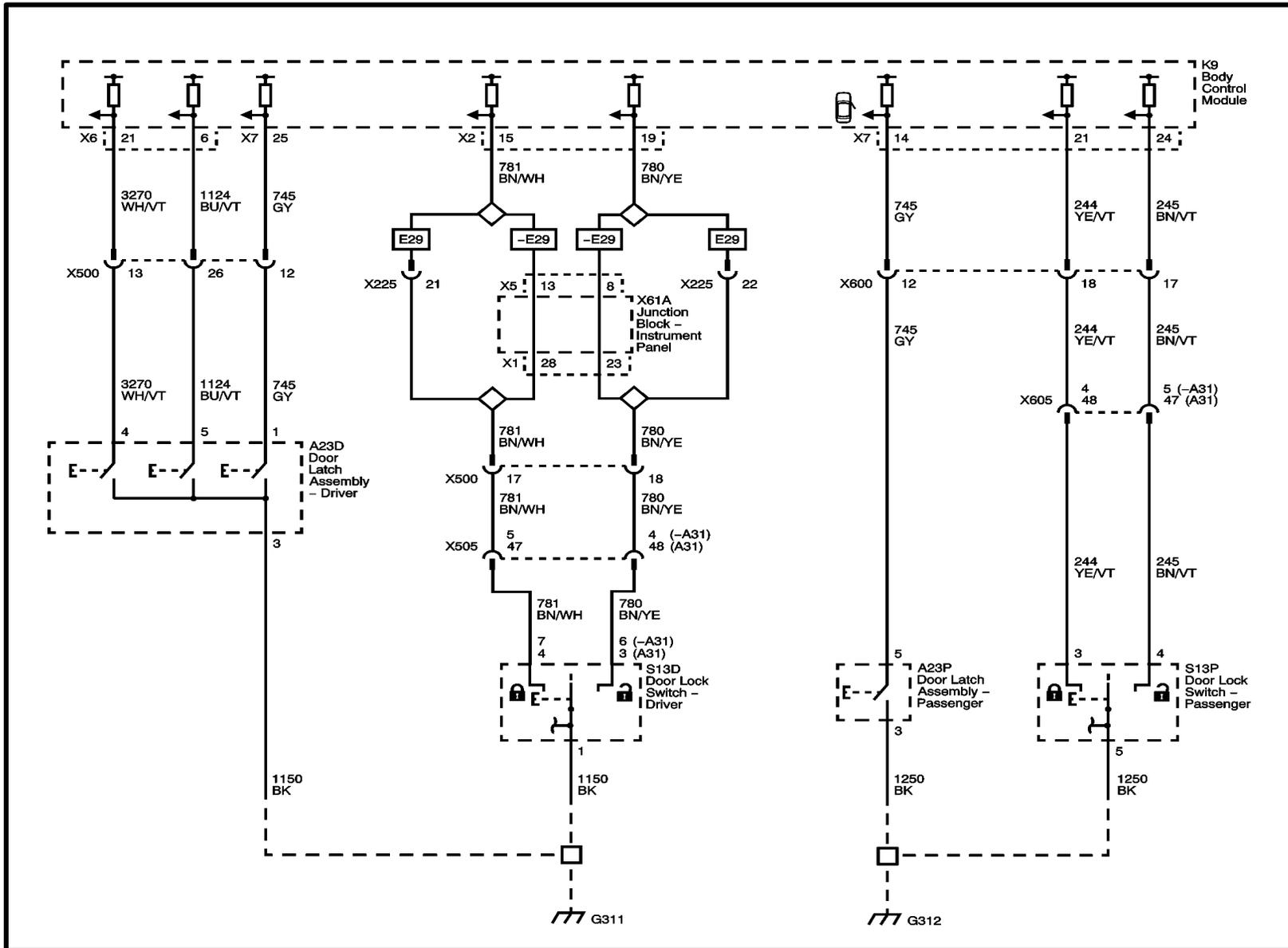
## Mirrors – Outside Rearview Heat (DL8, DL3 or DPN)



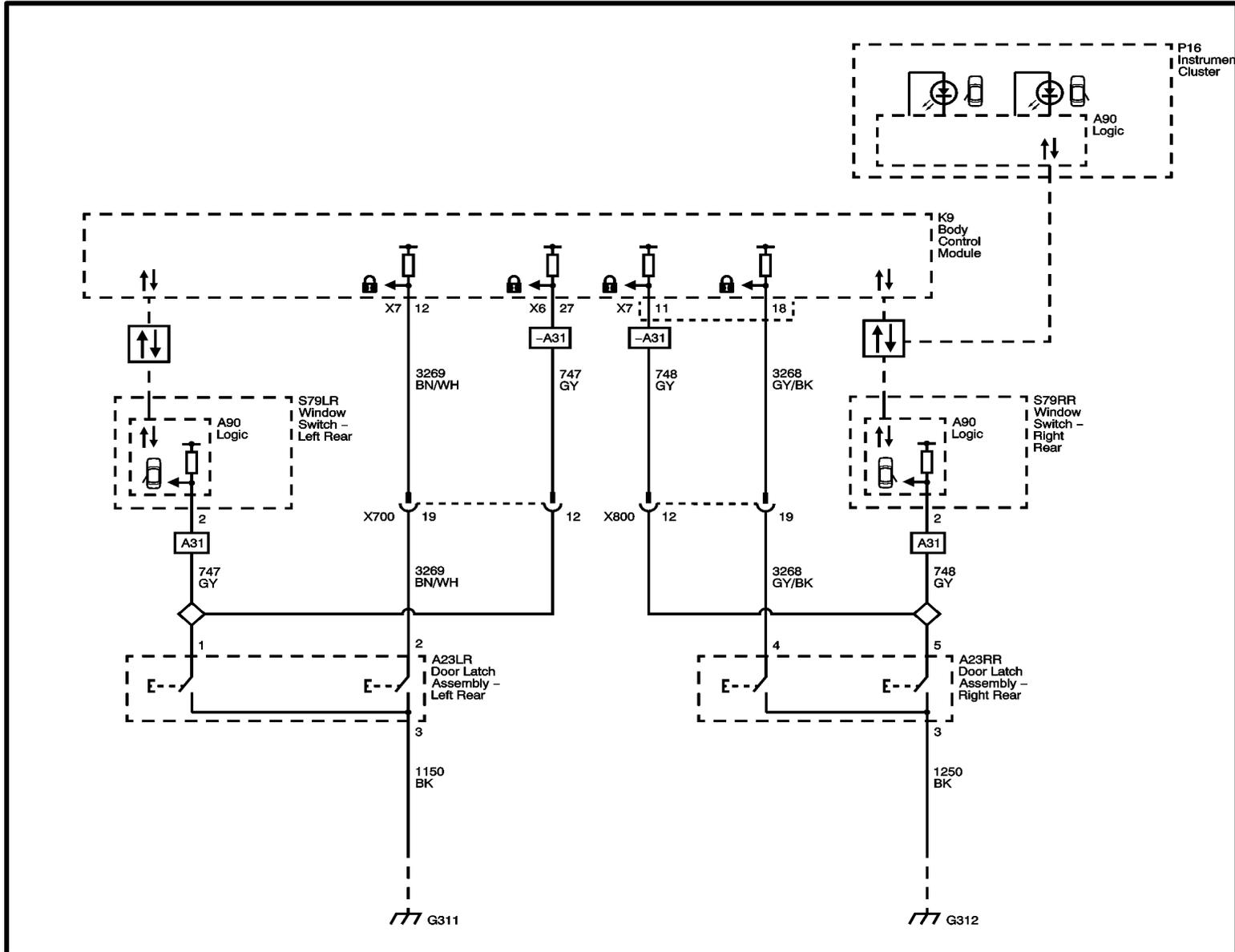
## Vehicle Access - Front Switches and Indicators (1 of 2)



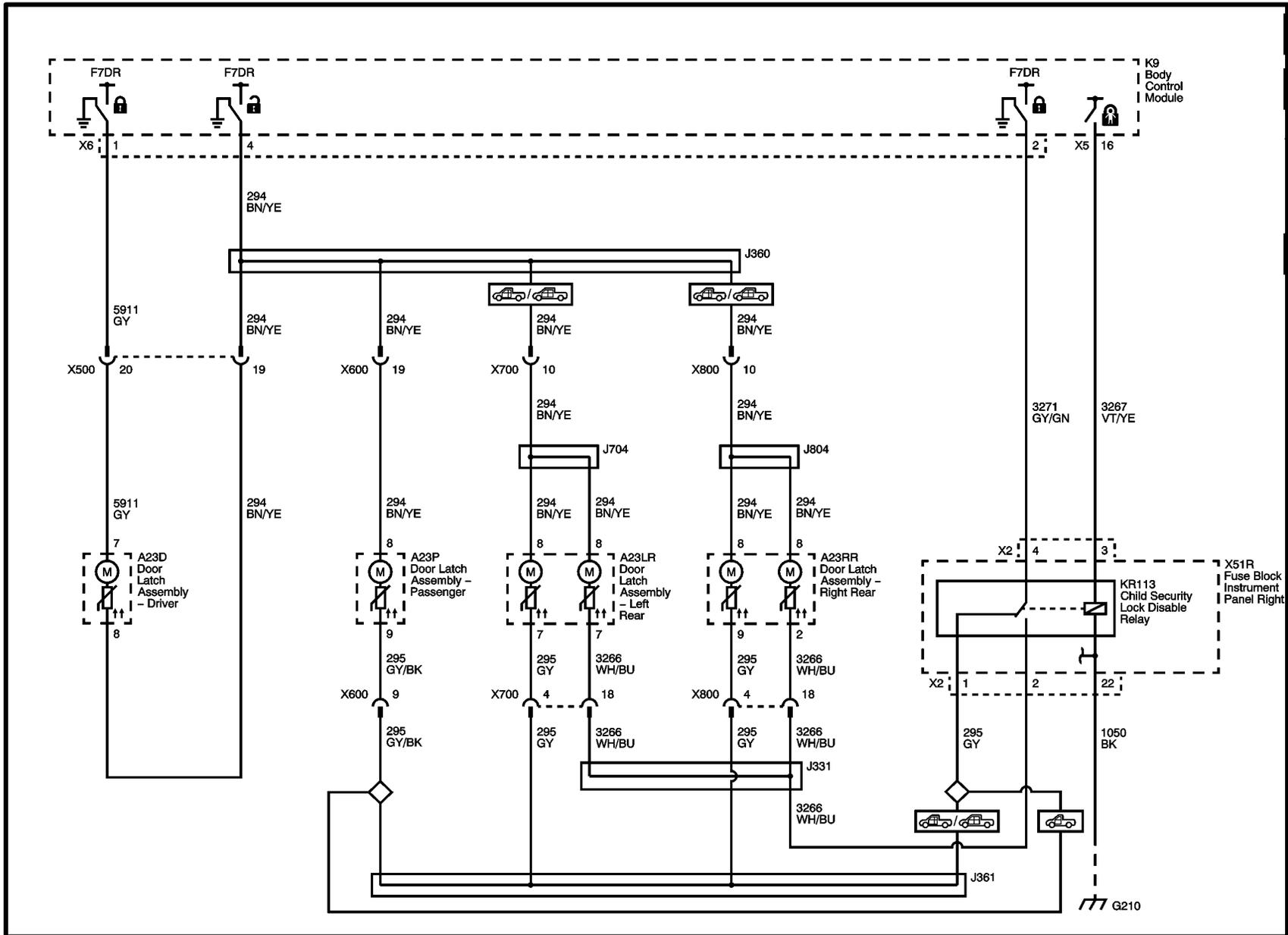
## Vehicle Access - Front Switches and Indicators (2 of 2)



## Vehicle Access - Rear Switches and Indicators

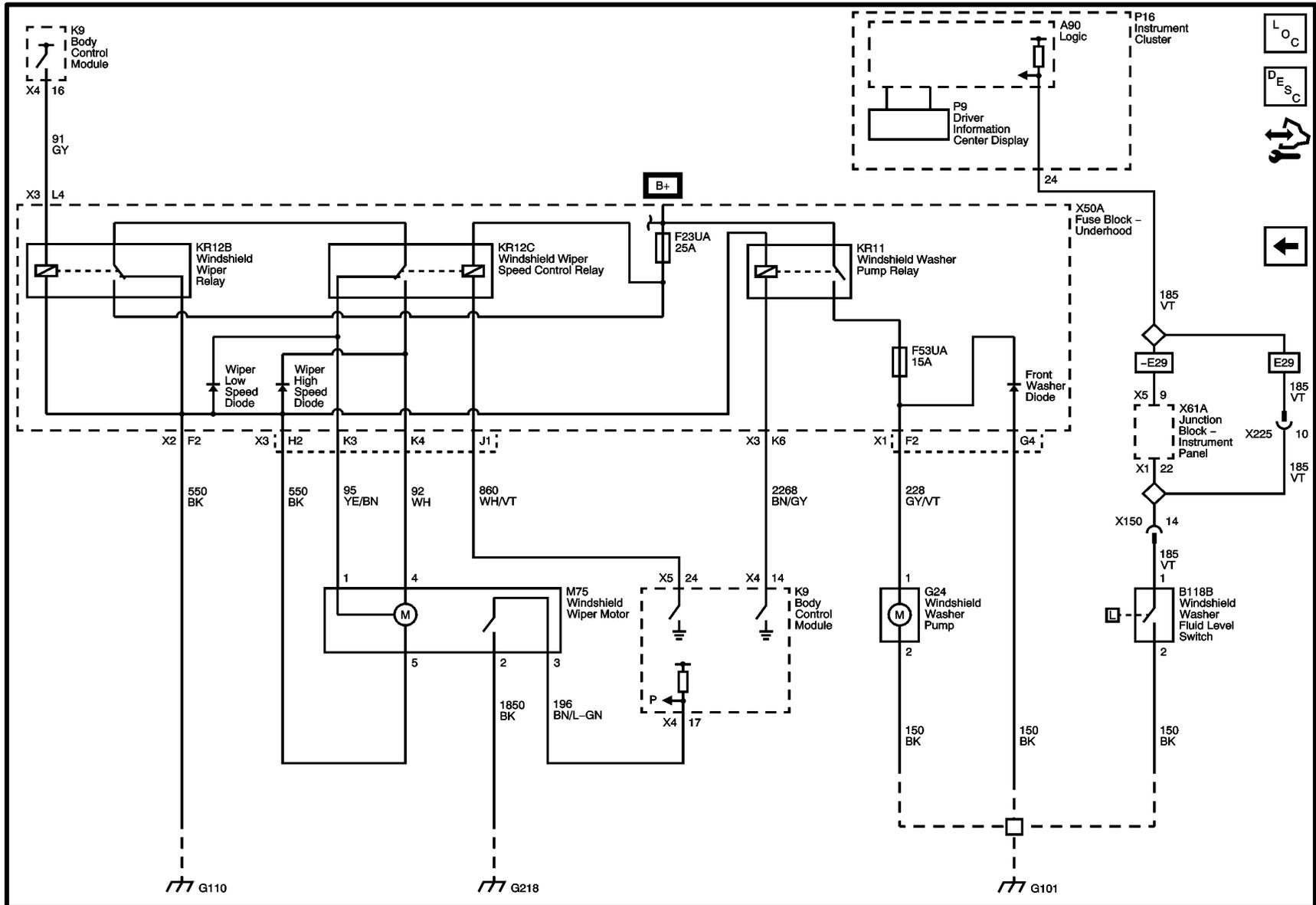


## Vehicle Access – Actuators

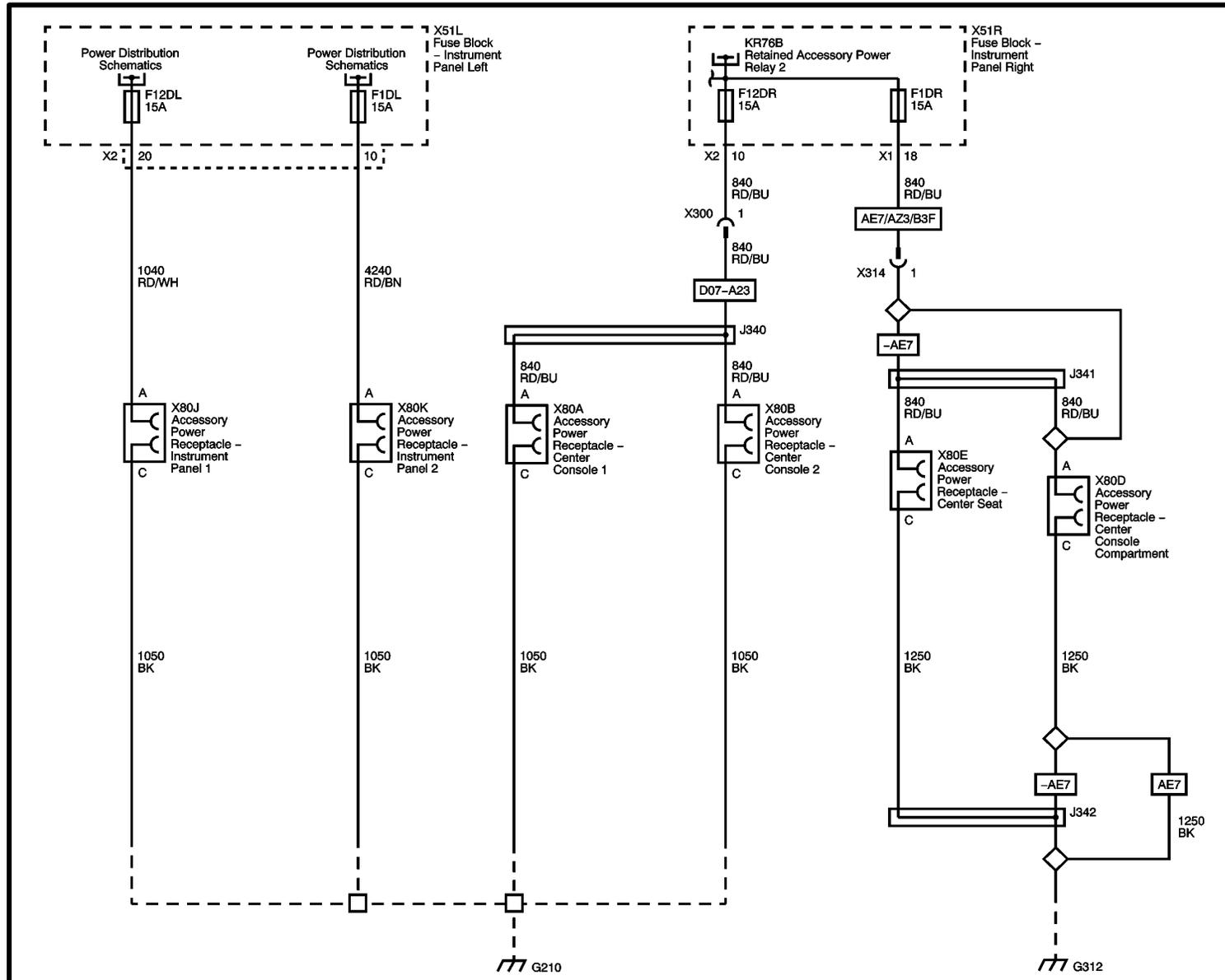




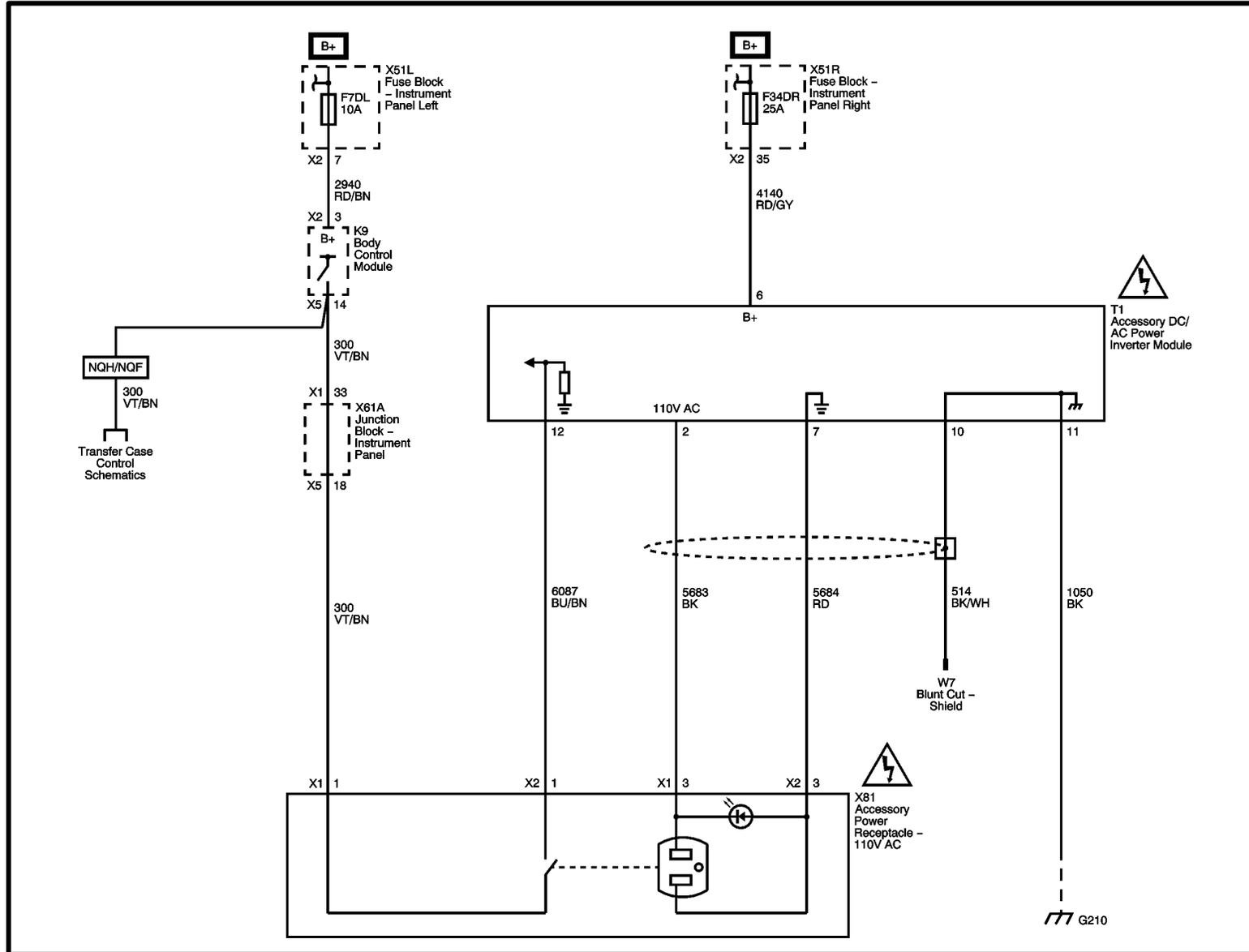
## Wipers and Washers – Motor and Washers



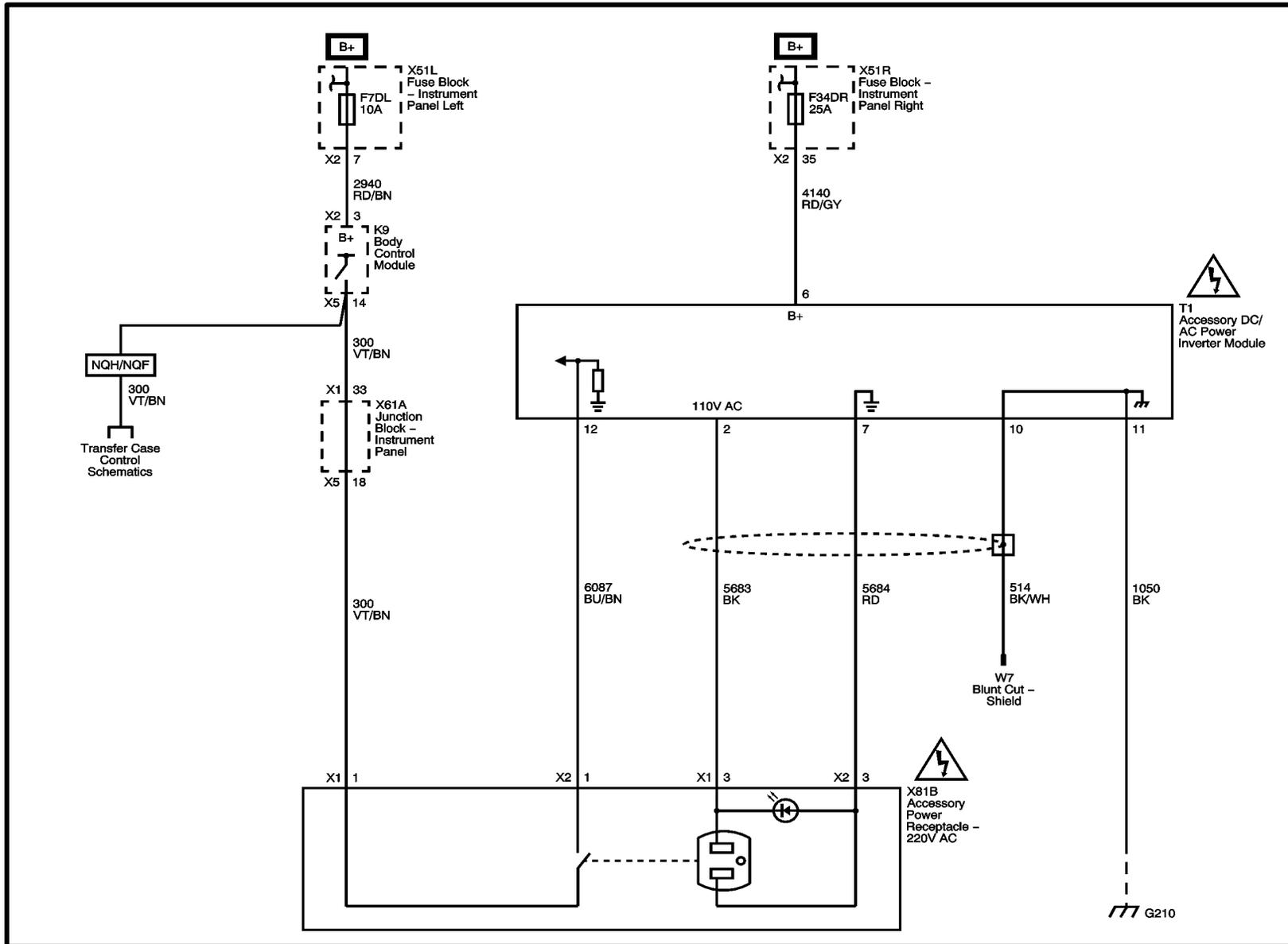
## Cigar Lighter/Power Outlets – 12V DC



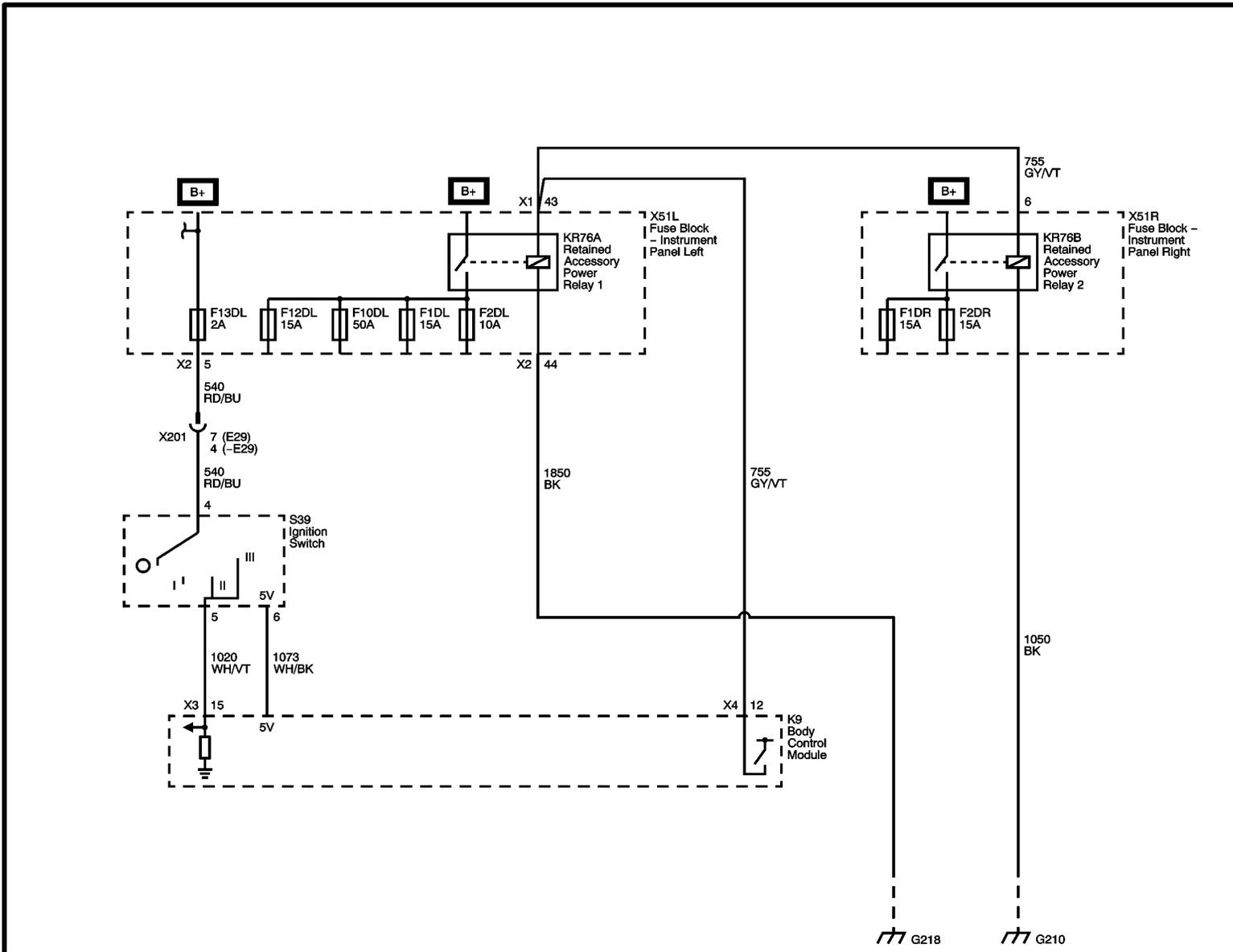
## Cigar Lighter/Power Outlets – 110V AC



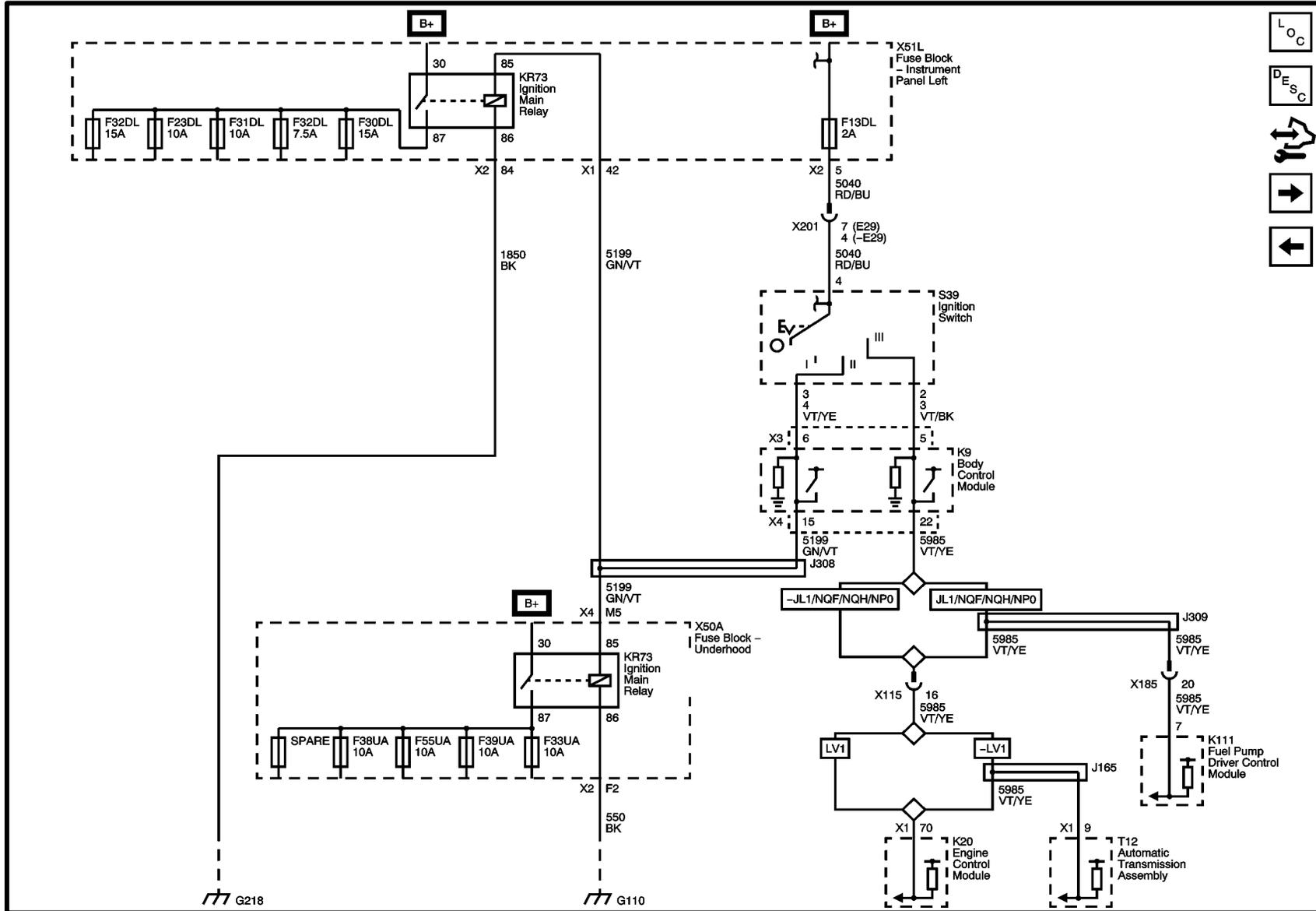
## Cigar Lighter/Power Outlets – 220V AC



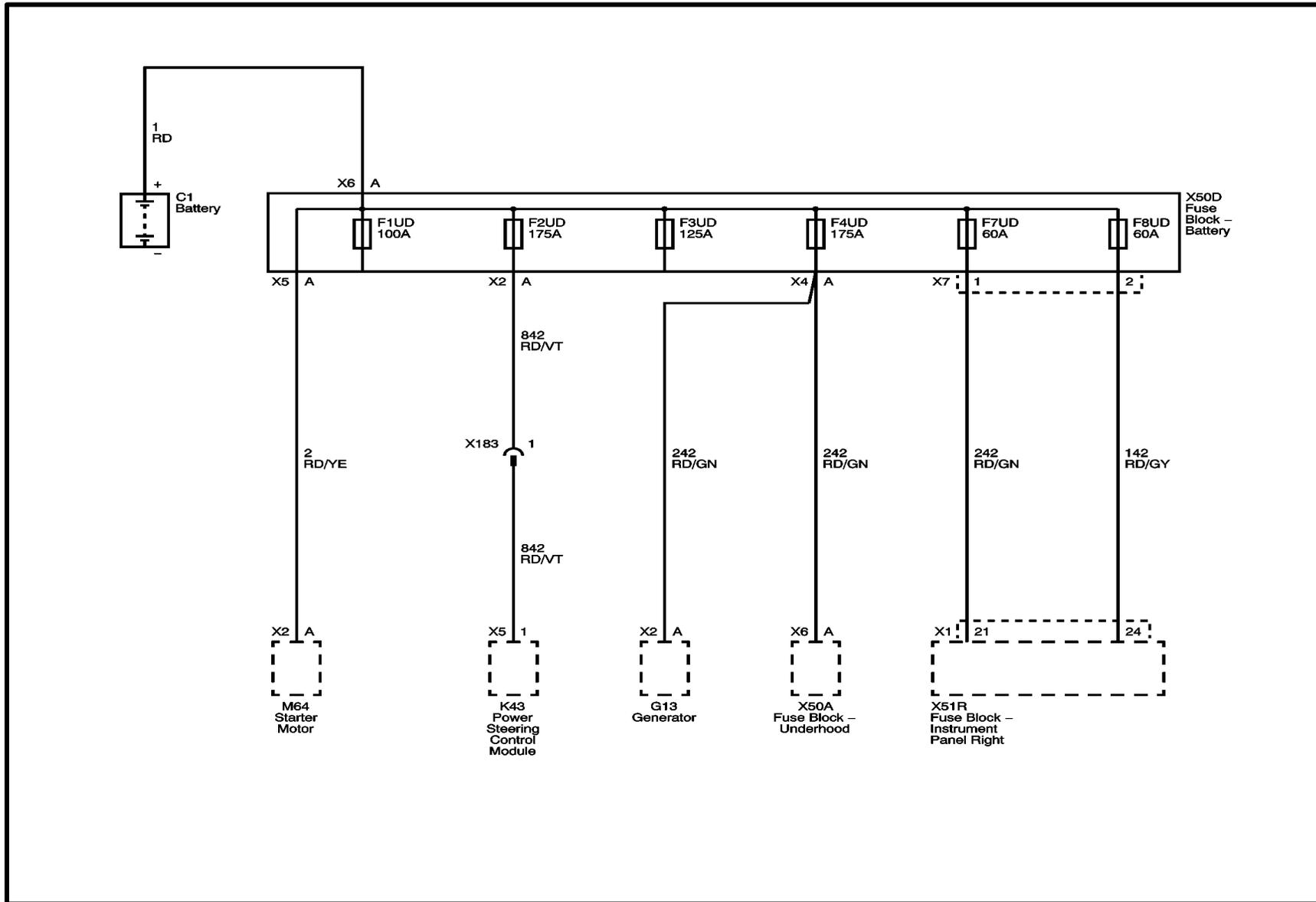
## Power Moding Schematics - Ignition Off, Ignition I and Retained Accessory



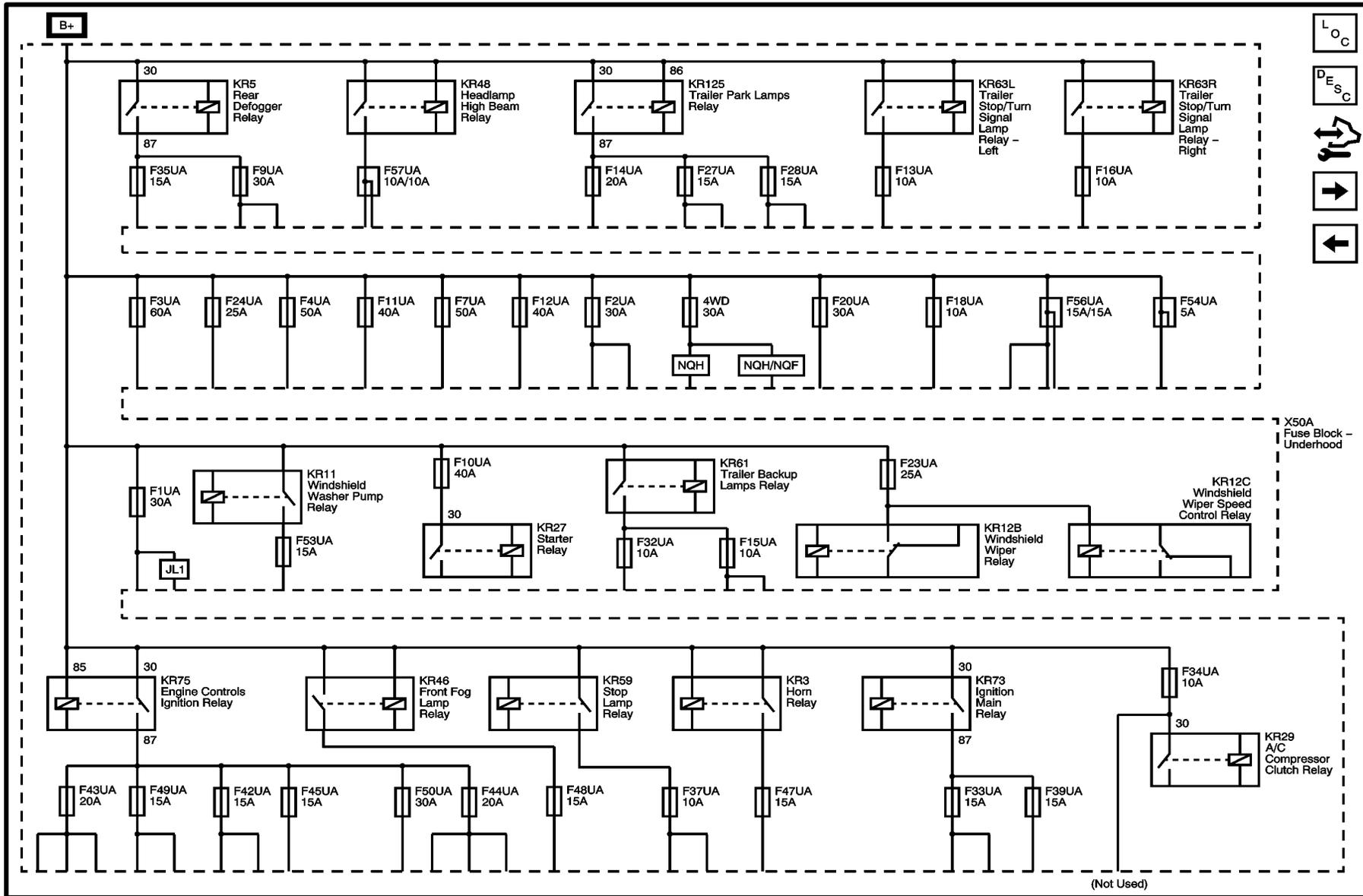
## Power Moding Schematics - Ignition II and Ignition III



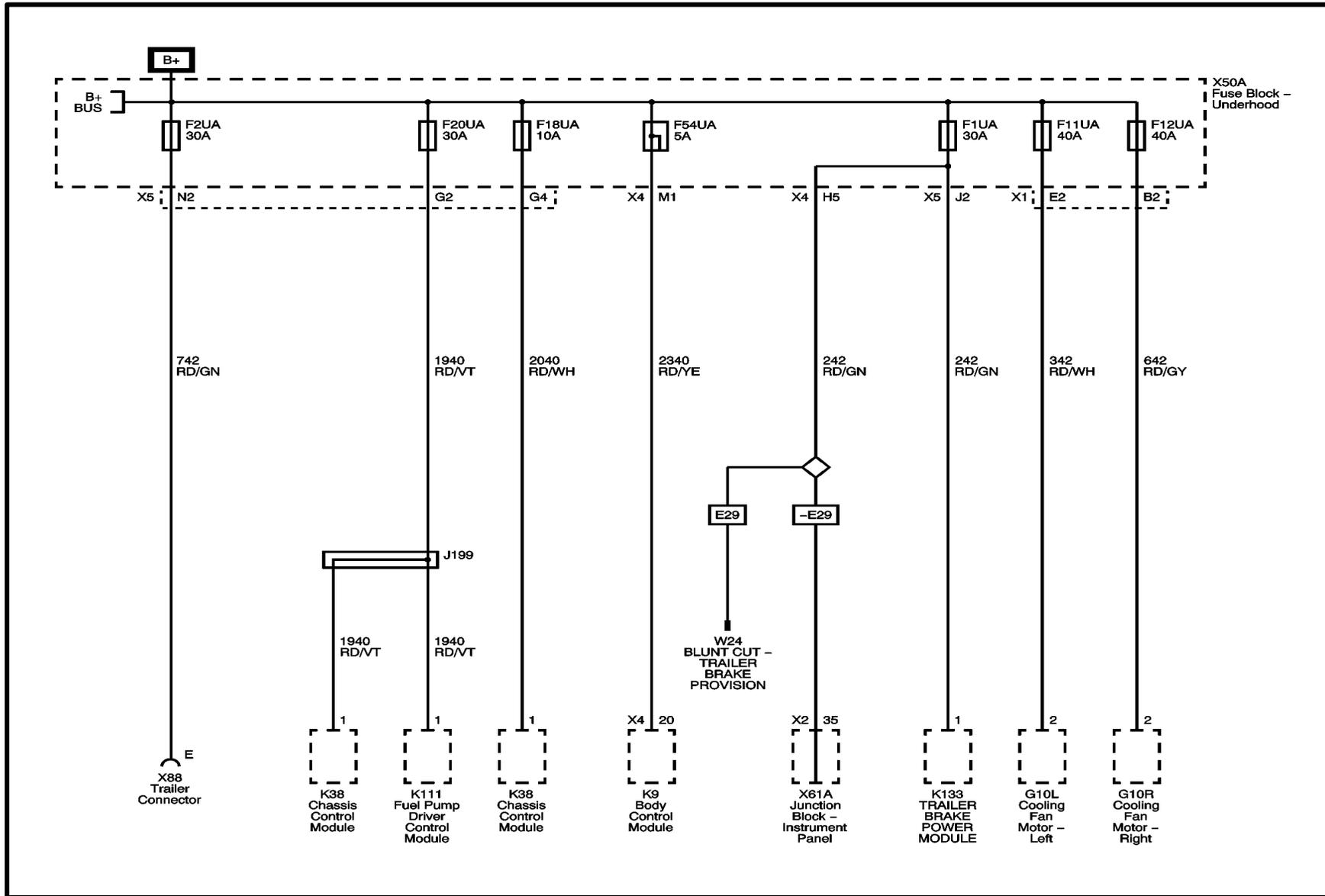
Power Distribution Schematics - X50D Fuse Block - Battery



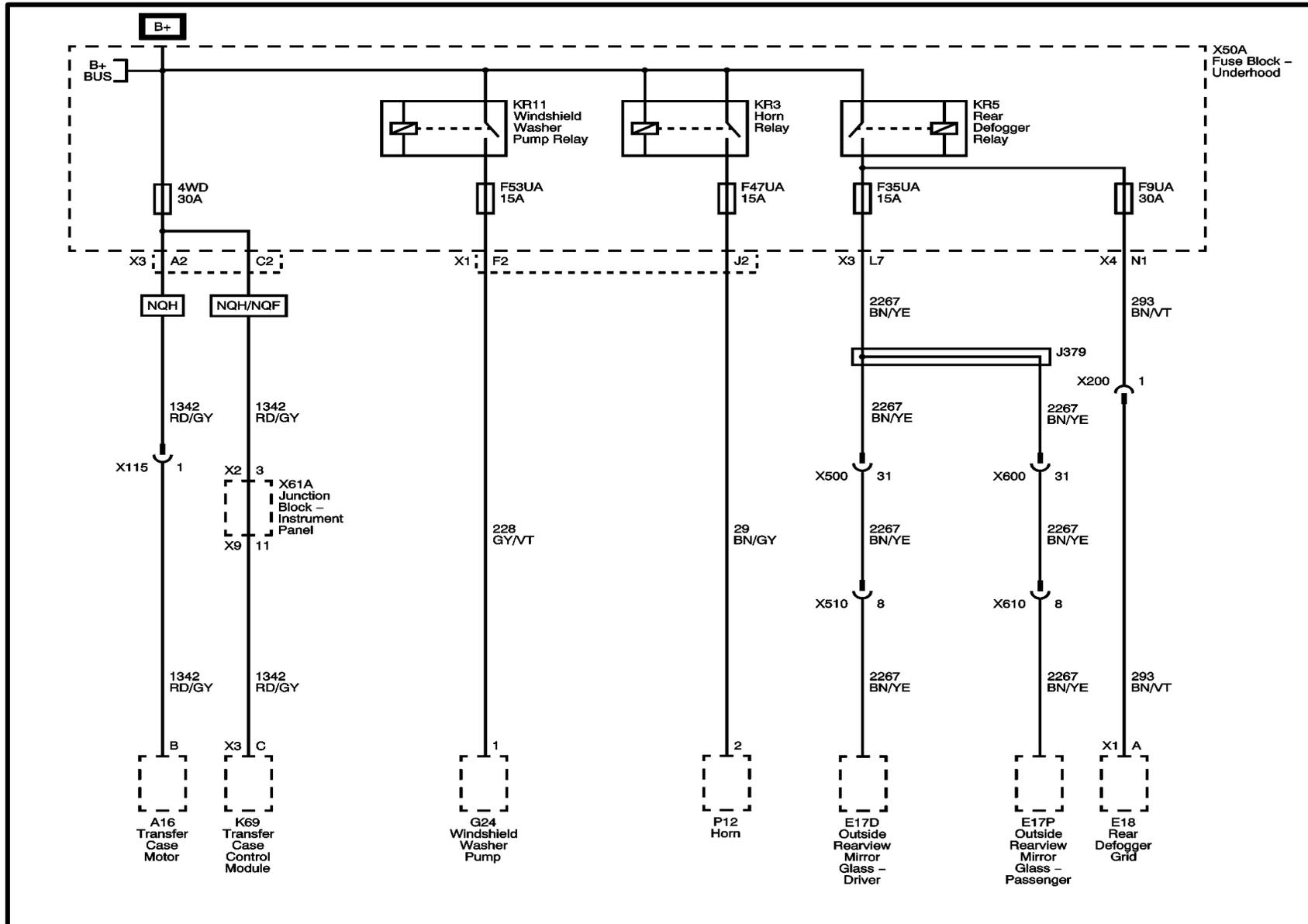
## Power Distribution Schematics X50A Fuse Block – Under-hood Bussing



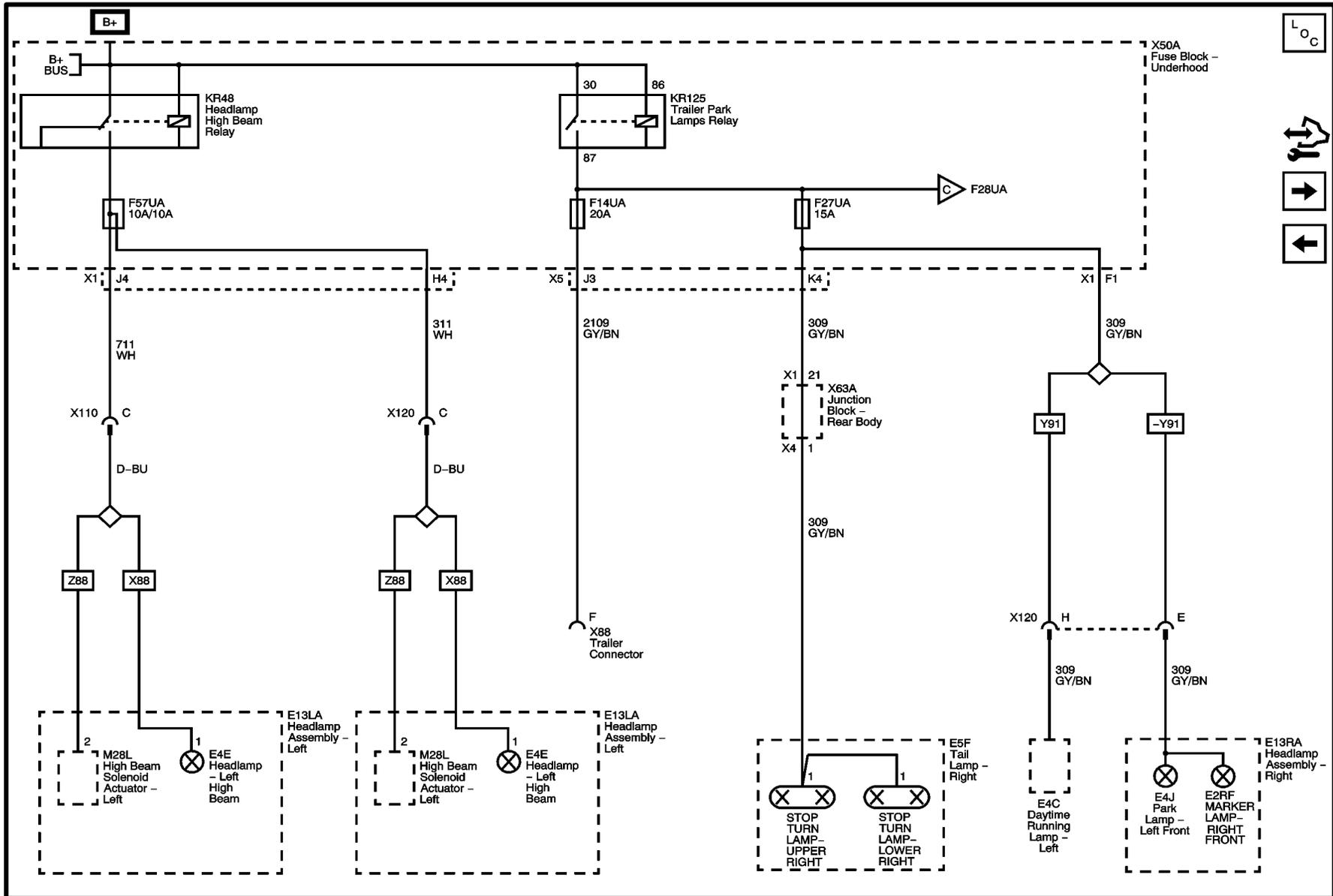
## Power Distribution Schematics - F1UA, F2UA, F11UA, F12UA, F18UA, F20UA and F54UA



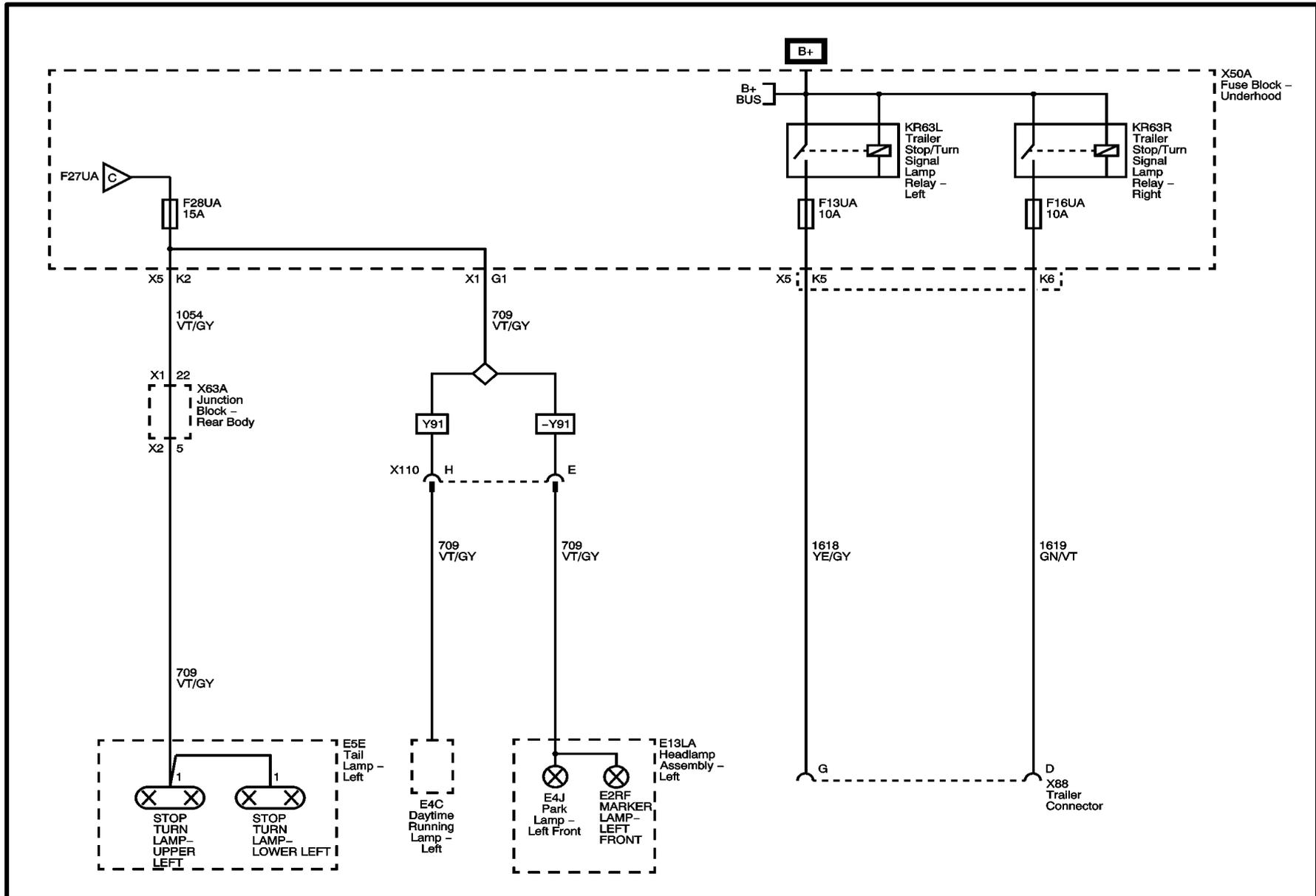
## Power Distribution Schematics - 4WD Fuse, F9UA, F35UA, F47UA and F53UA



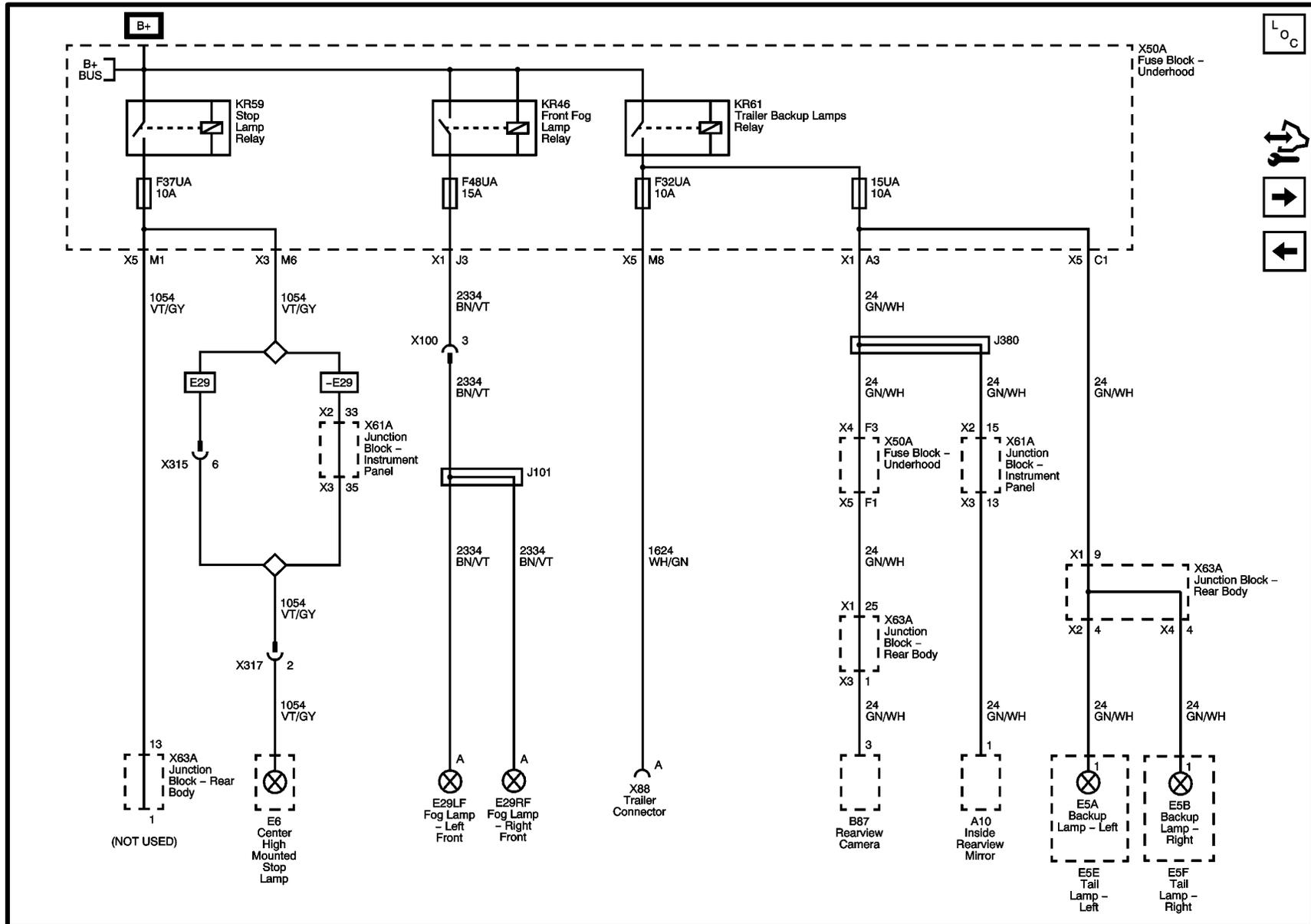
## Power Distribution Schematics - F14UA, F27UA and F57UA



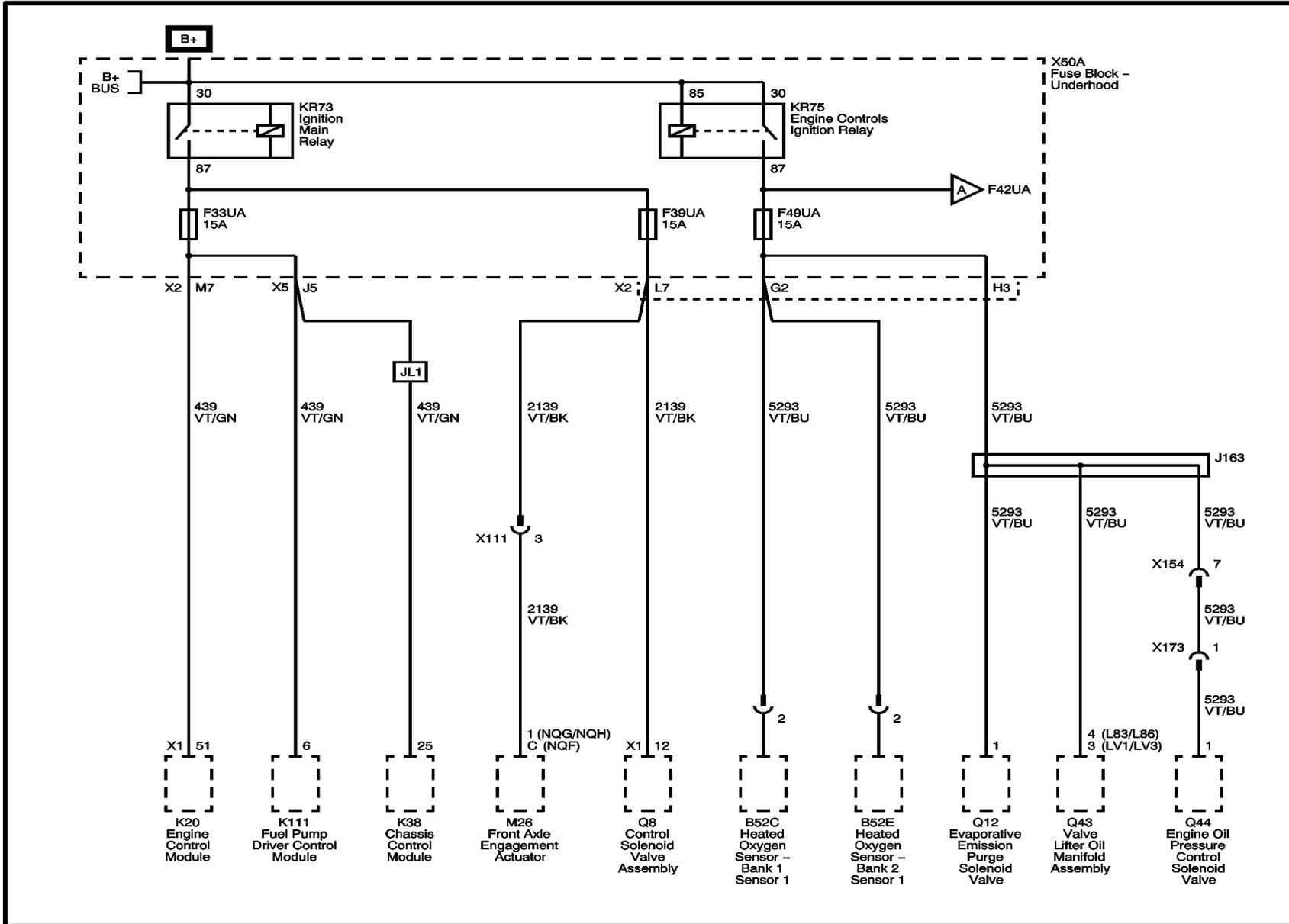
## Power Distribution Schematics - F13UA, F16U and F28UA



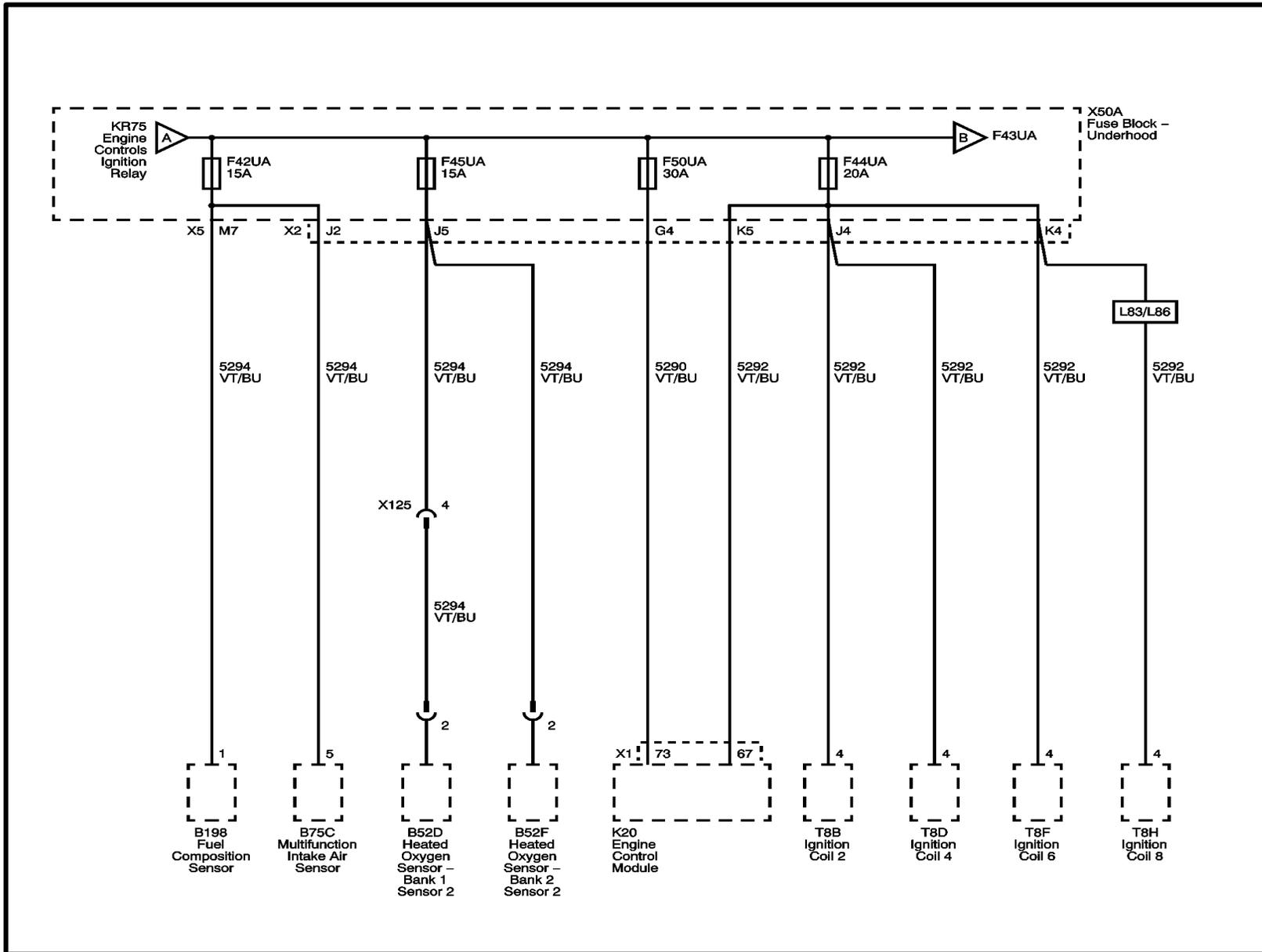
## Power Distribution Schematics - F15UA, F32UA, F37UA and F48UA



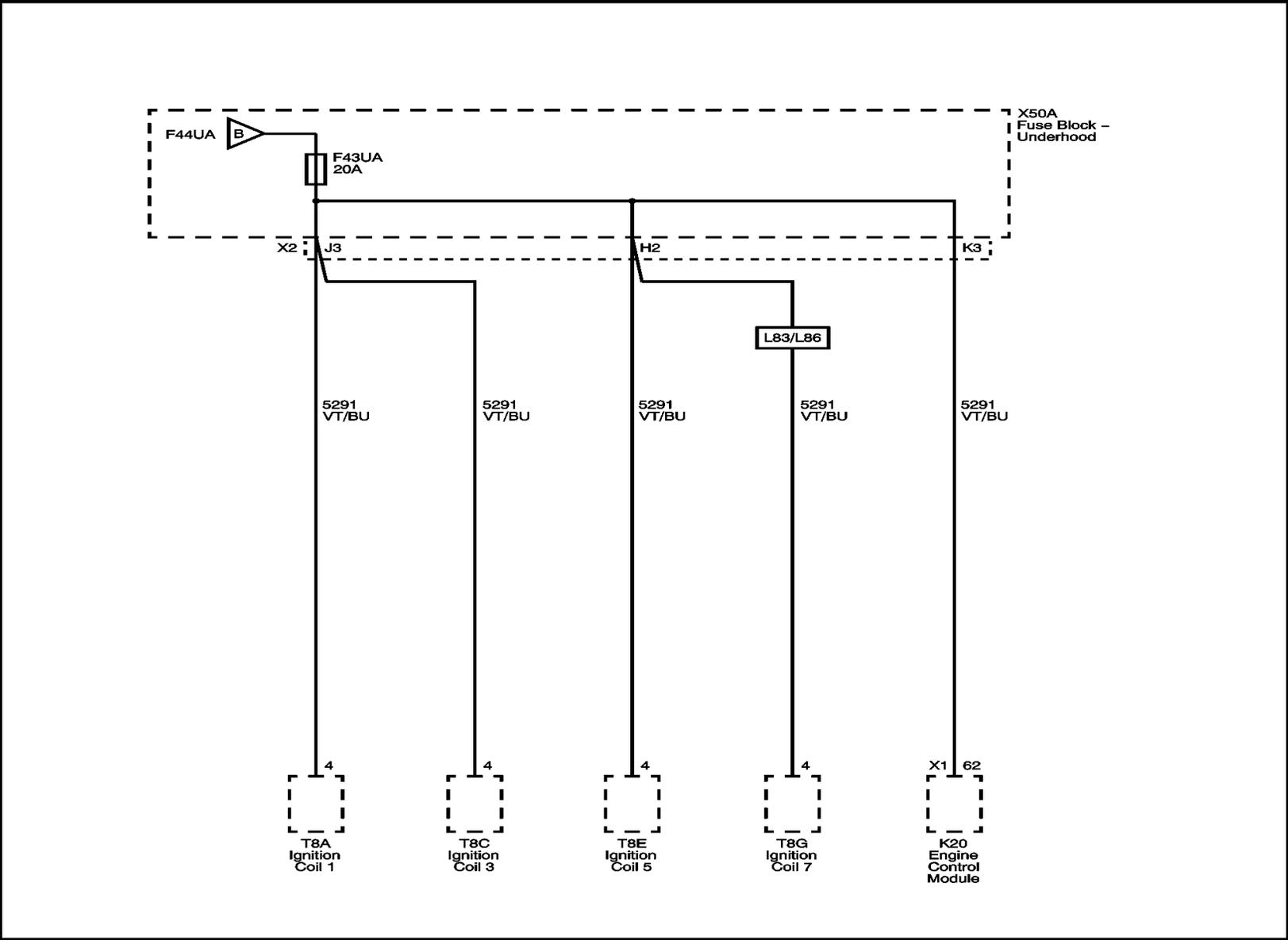
## Power Distribution Schematics - F33UA, F39UA and F49UA



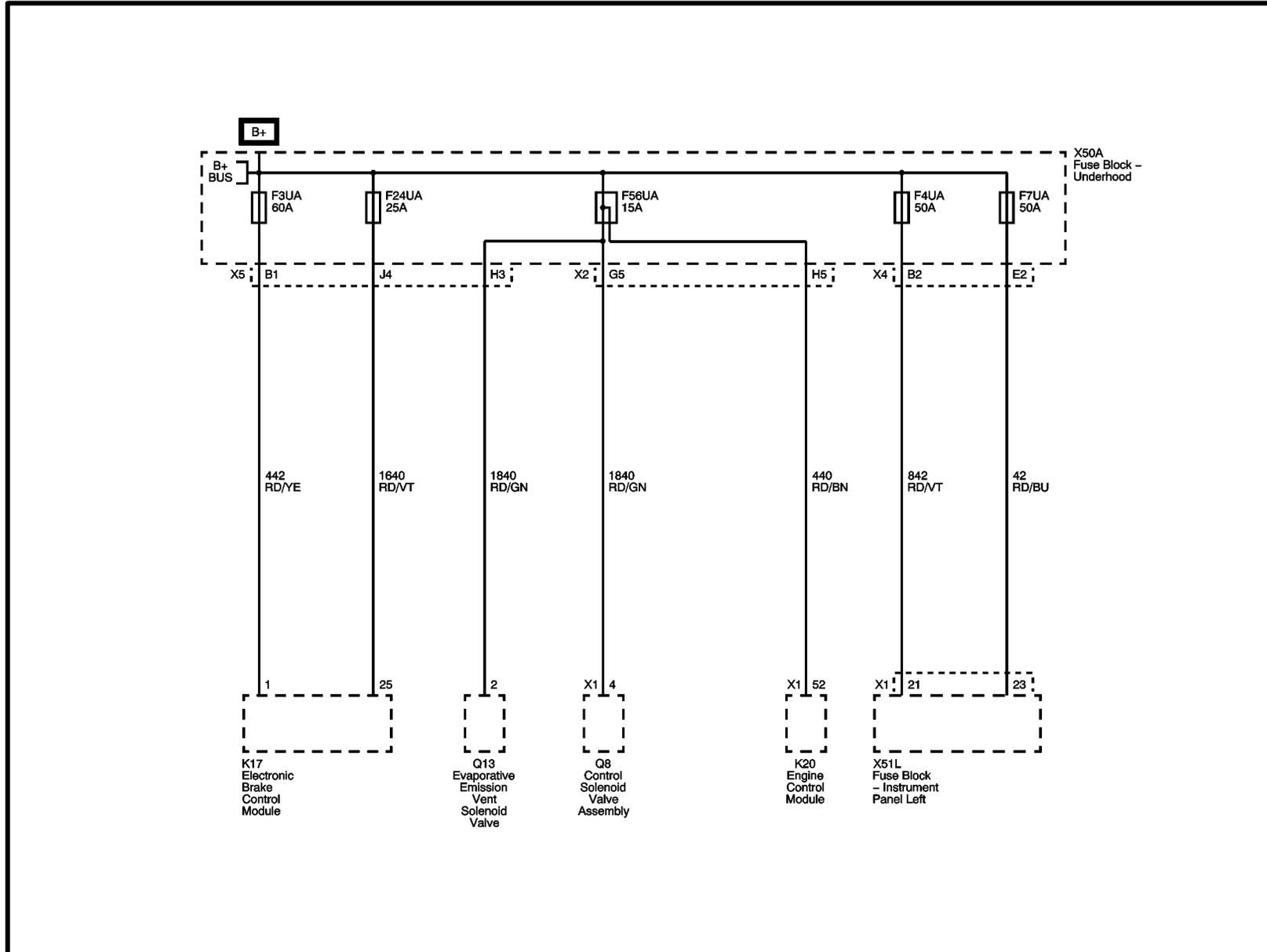
## Power Distribution Schematics - F42UA, F44UA, F45UA and F50UA



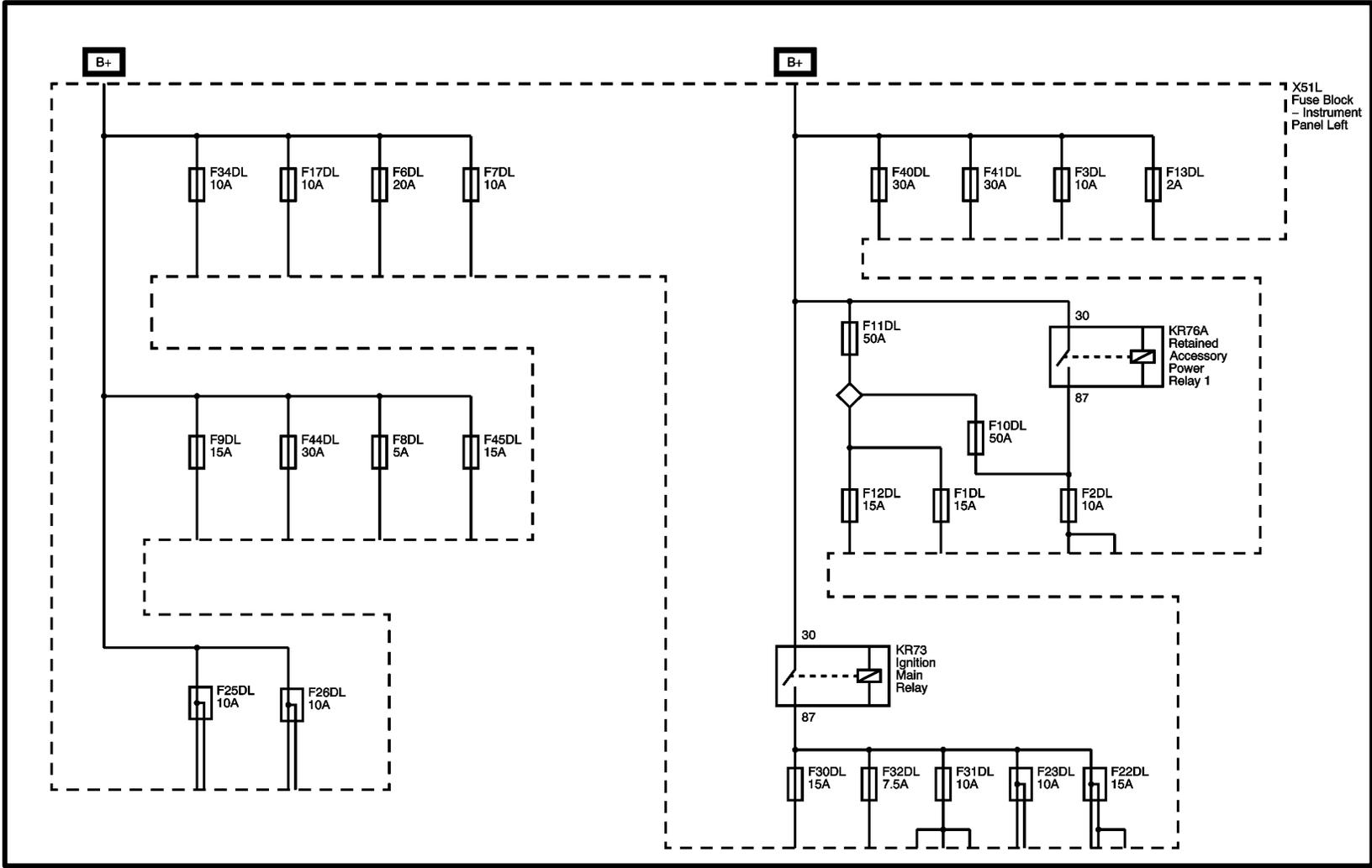
Power Distribution Schematics - F43UA



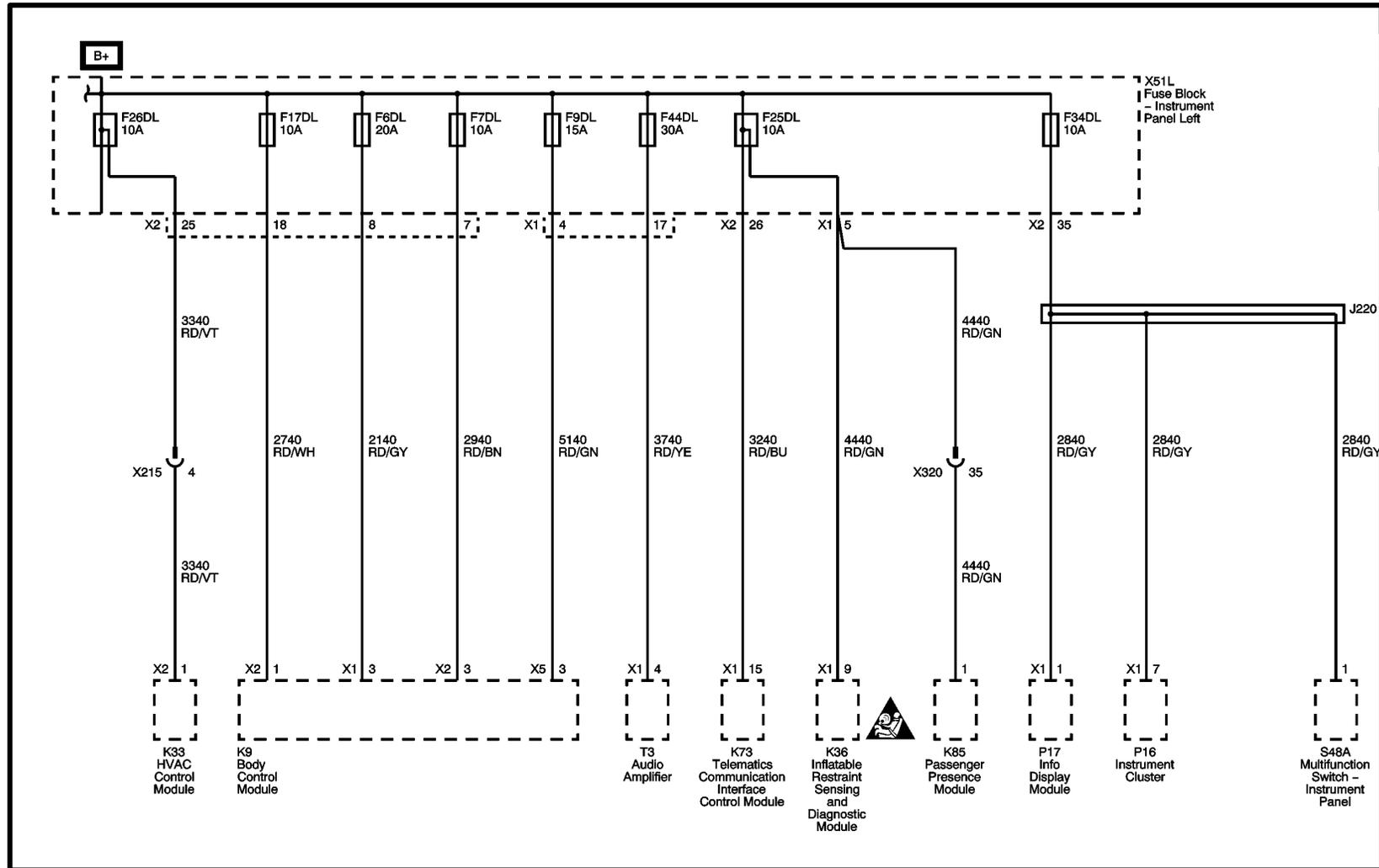
## Power Distribution Schematics - F3UA, F4UA, F7UA, F24UA and F56UA



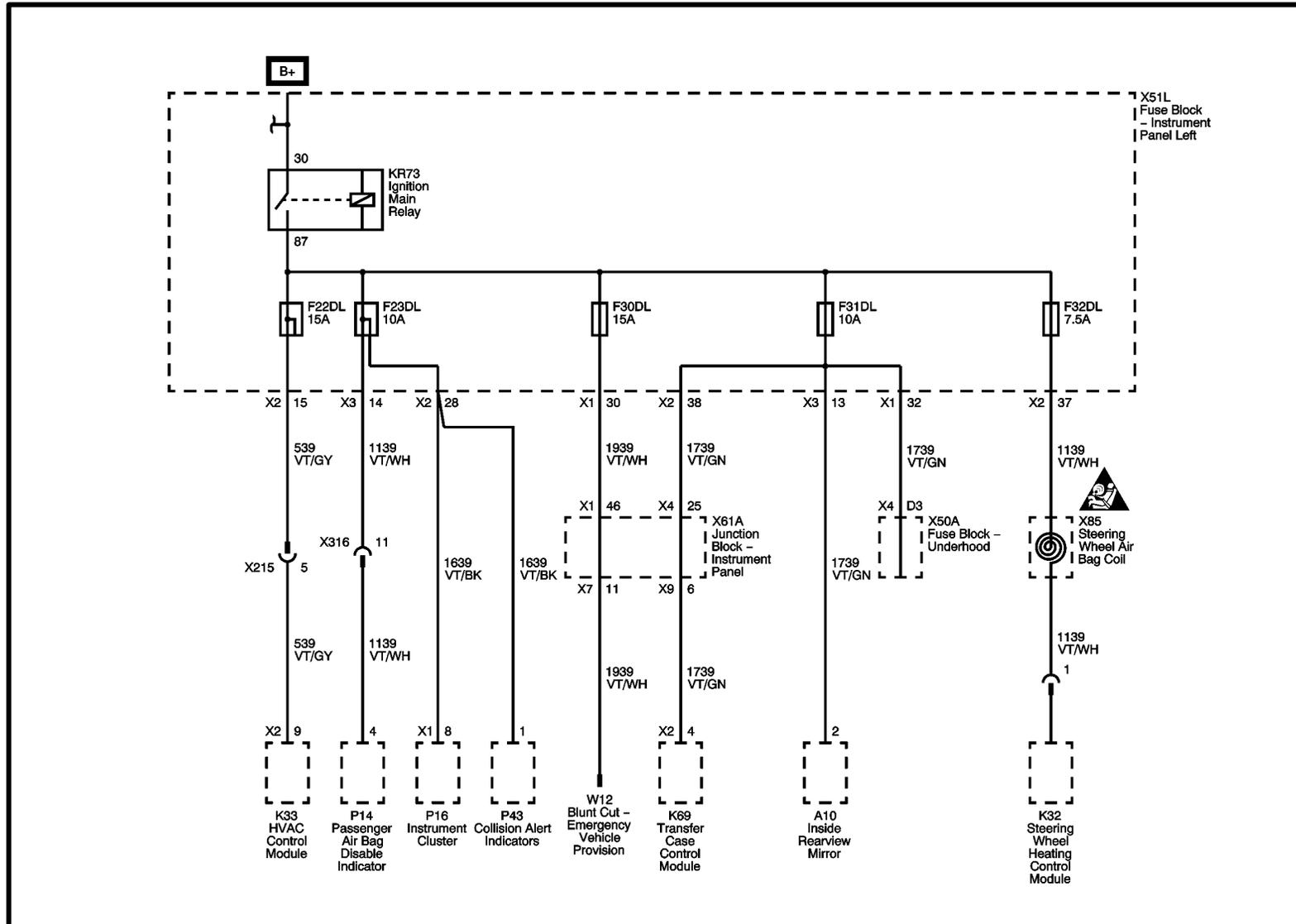
**Power Distribution Schematics - X51L Fuse Block - Instrument Panel Left Bussing**



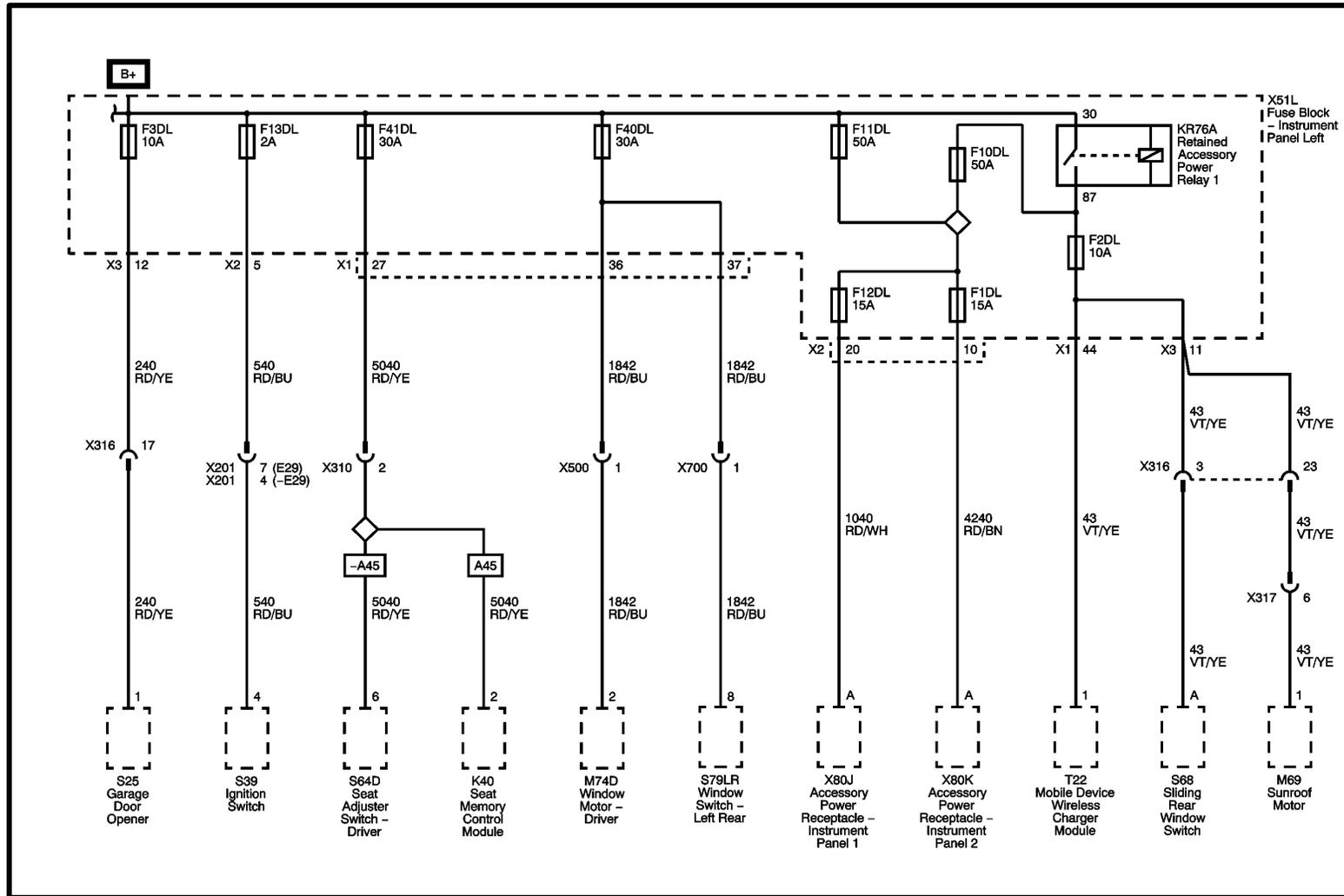
## Power Distribution Schematics - F6DL, F7DL, F9DL, F17DL, F25DL, F26DL, F34DL and F44DL



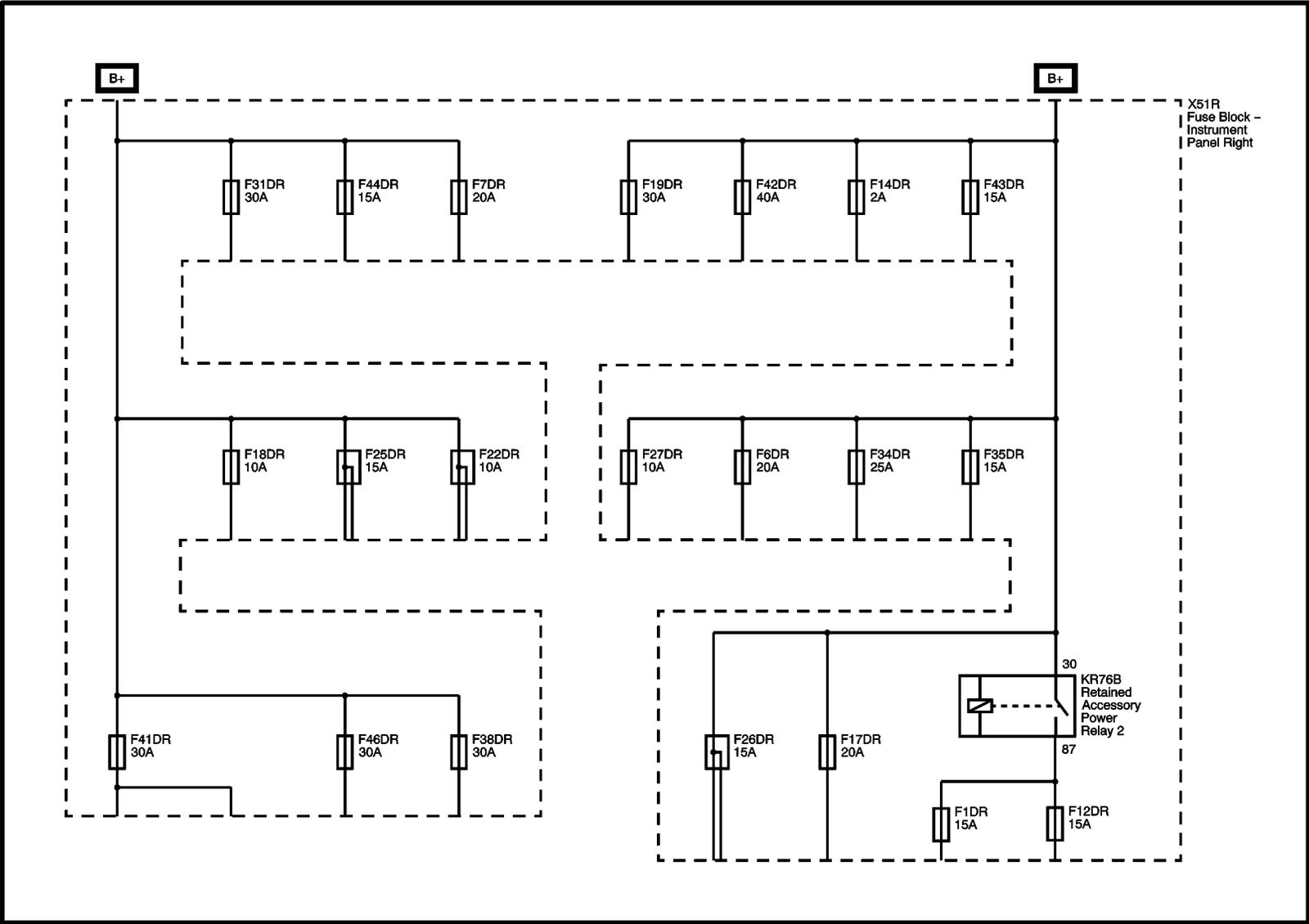
## Power Distribution Schematics - F22DL, F23DL, F30DL, F31DL and F32DL



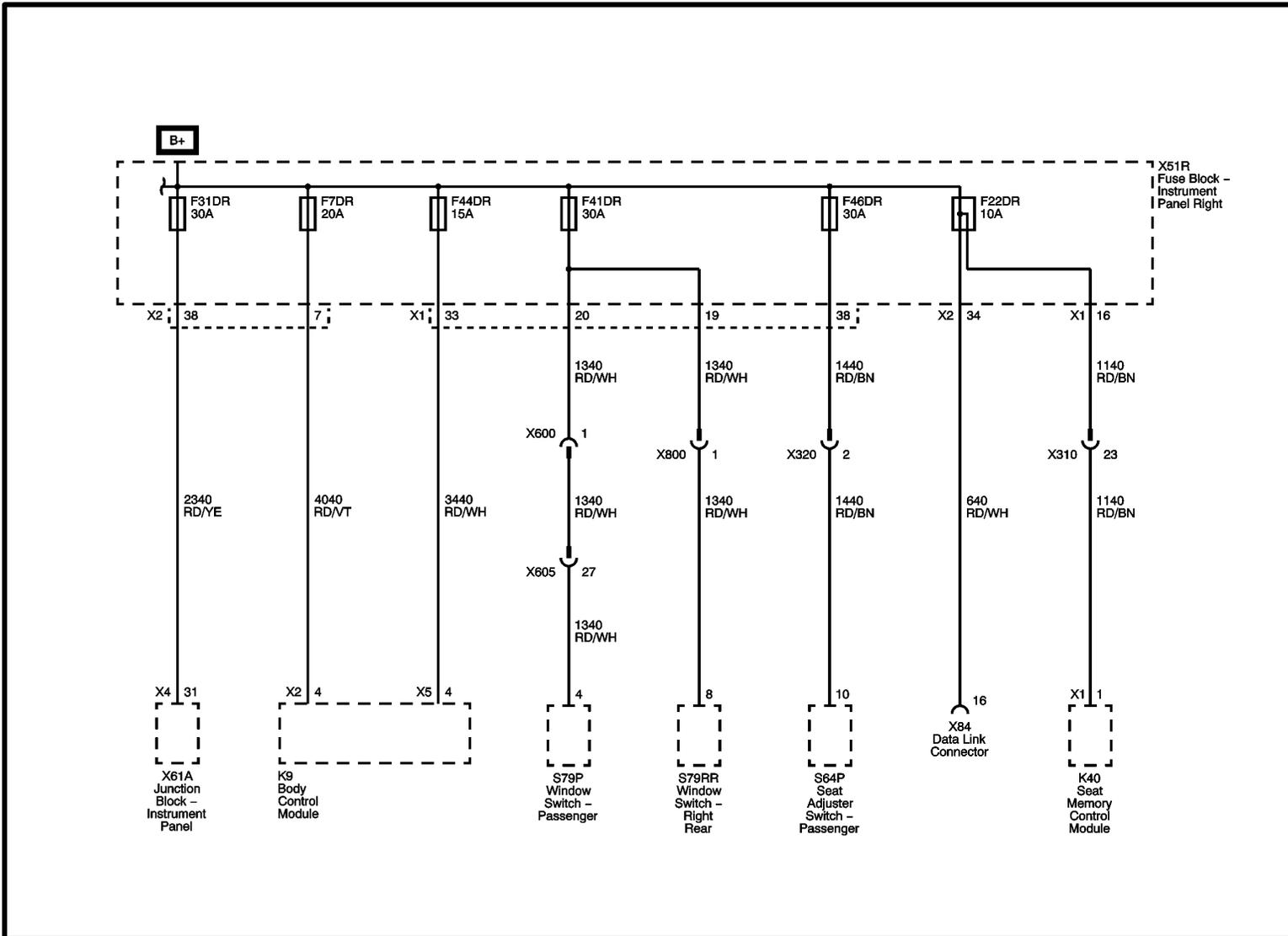
## Power Distribution Schematics - F1DL, F2DL, F3DL, F10DL, F11DL, F12DL, F13DL, F40DL and F41DL



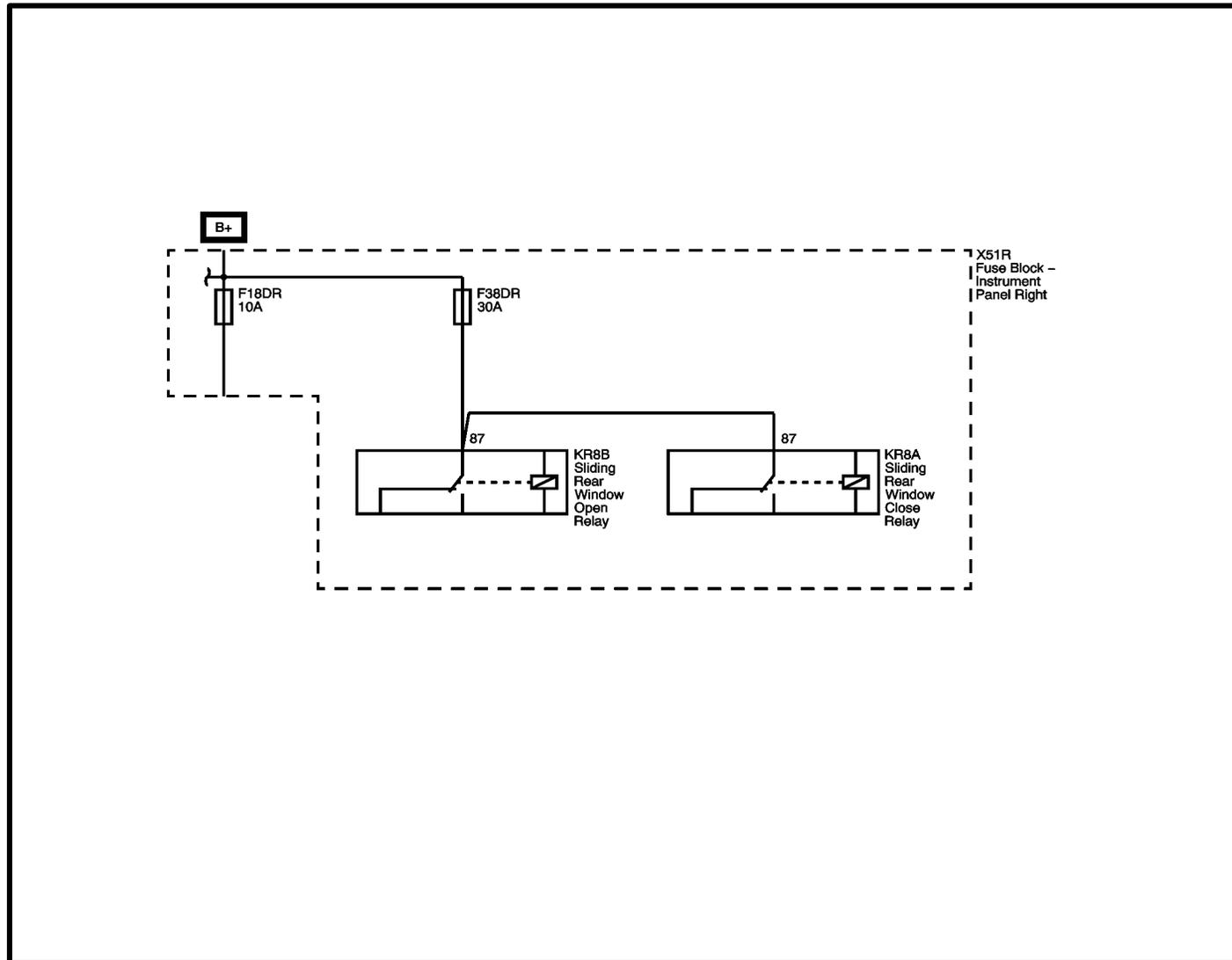
Power Distribution Schematics - X51R Fuse Block - Instrument Panel Right Bussing



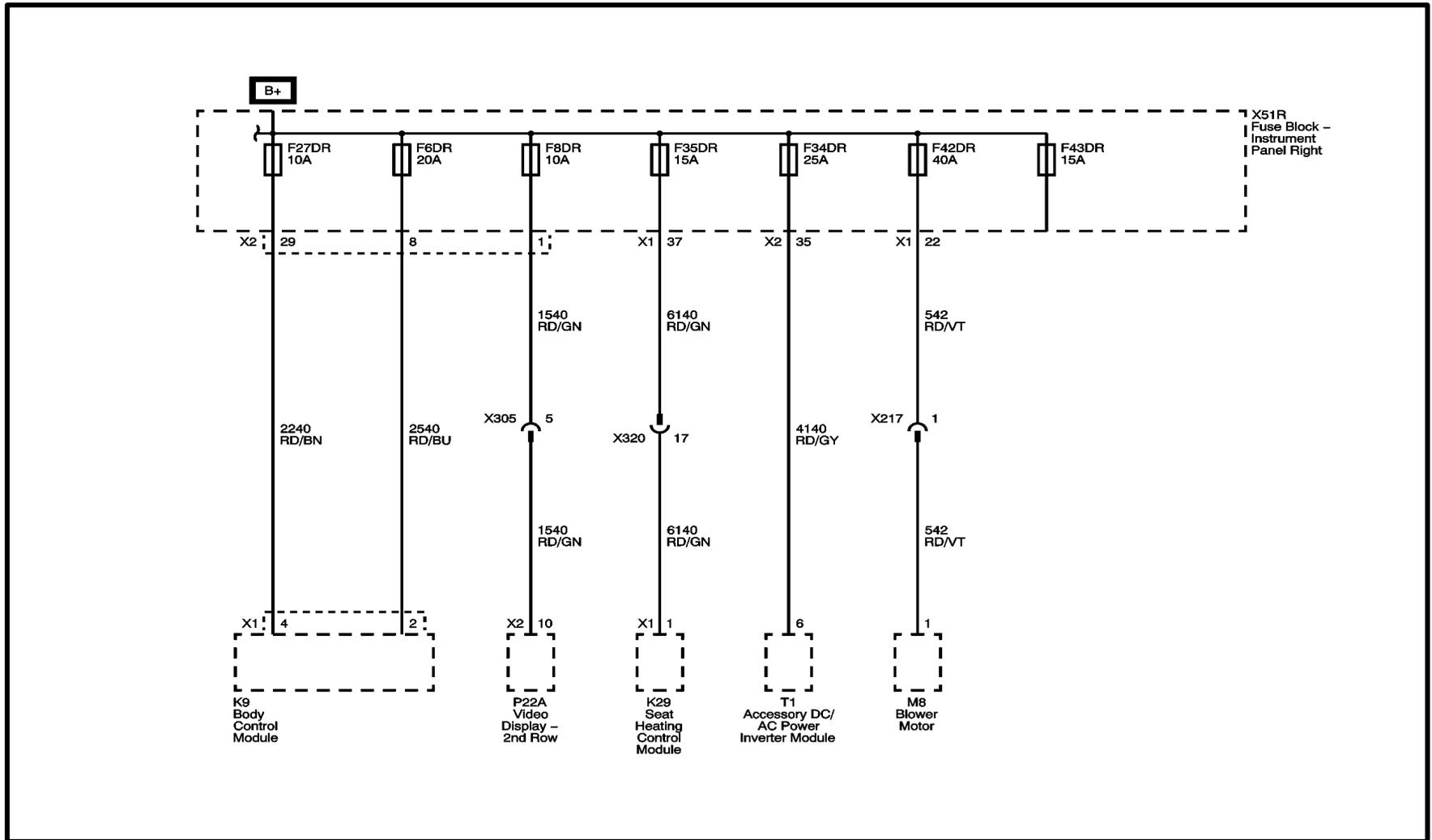
## Power Distribution Schematics - F7DR, F22DR, F31DR, F41DR, F44DR and F46DR



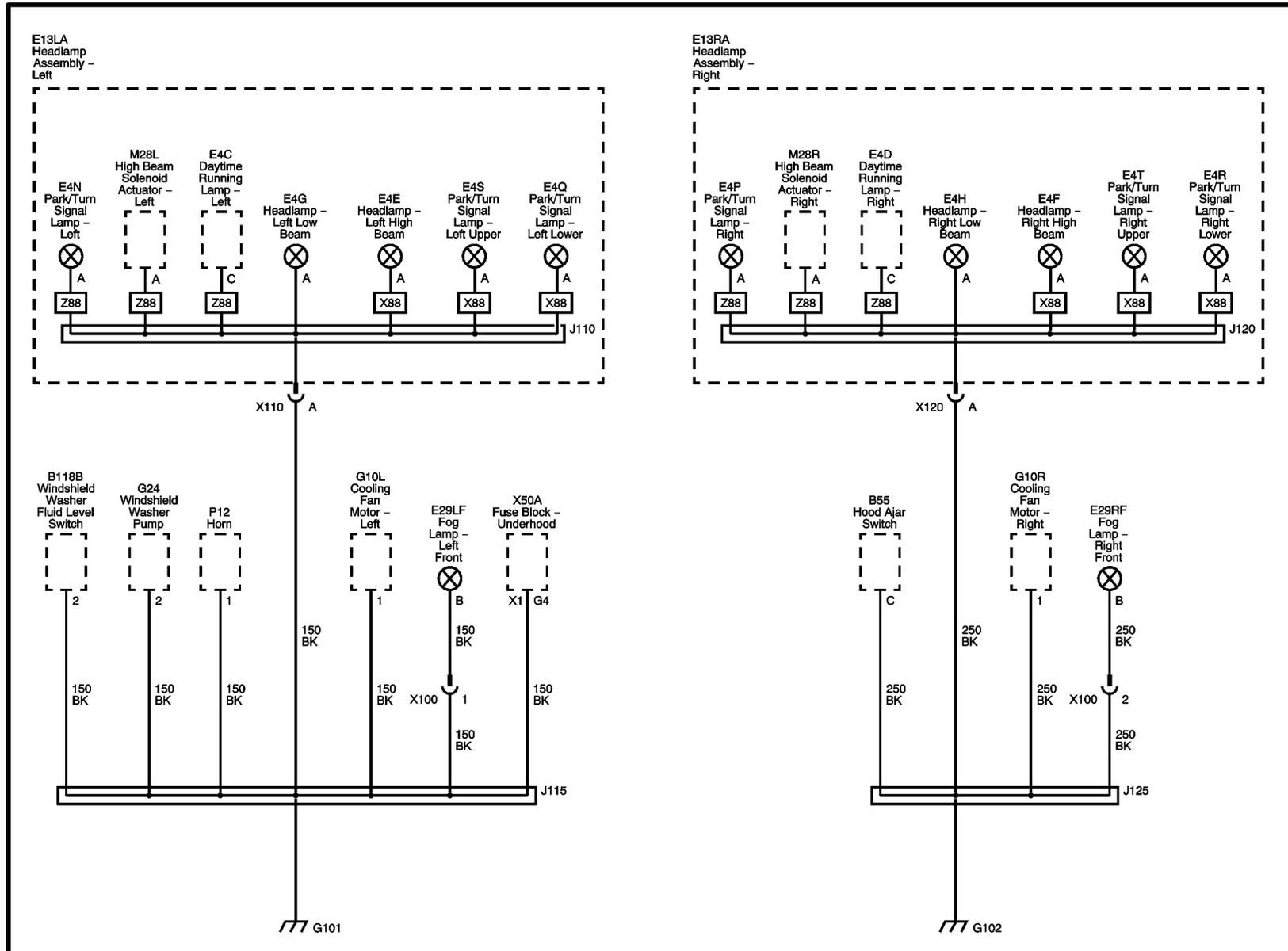
## Power Distribution Schematics - F18DR, F25DR and F38DR



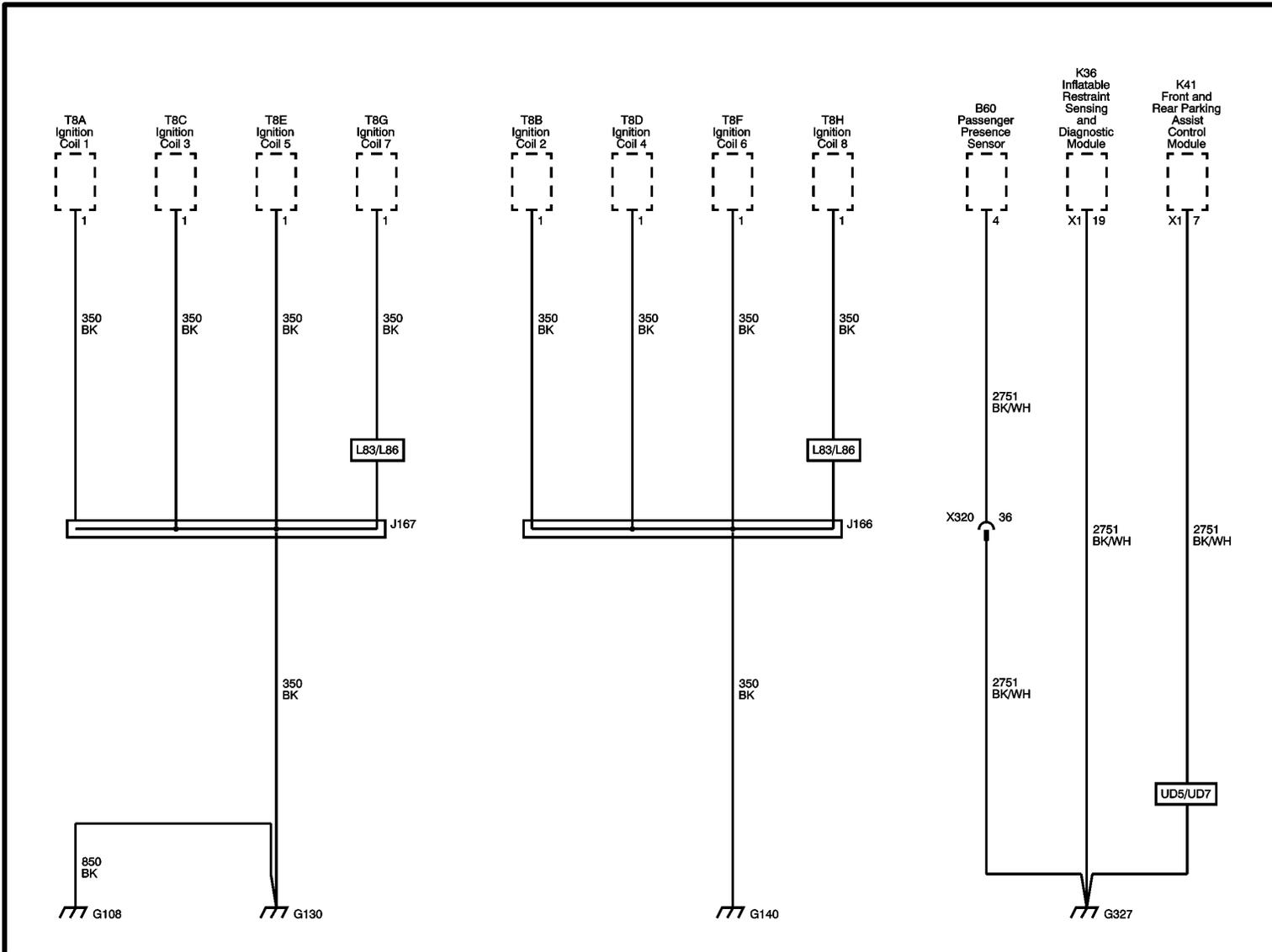
## Power Distribution Schematics - F6DR, F8DR, F27DR, F34DR, F35DR, F42DR and F43DR



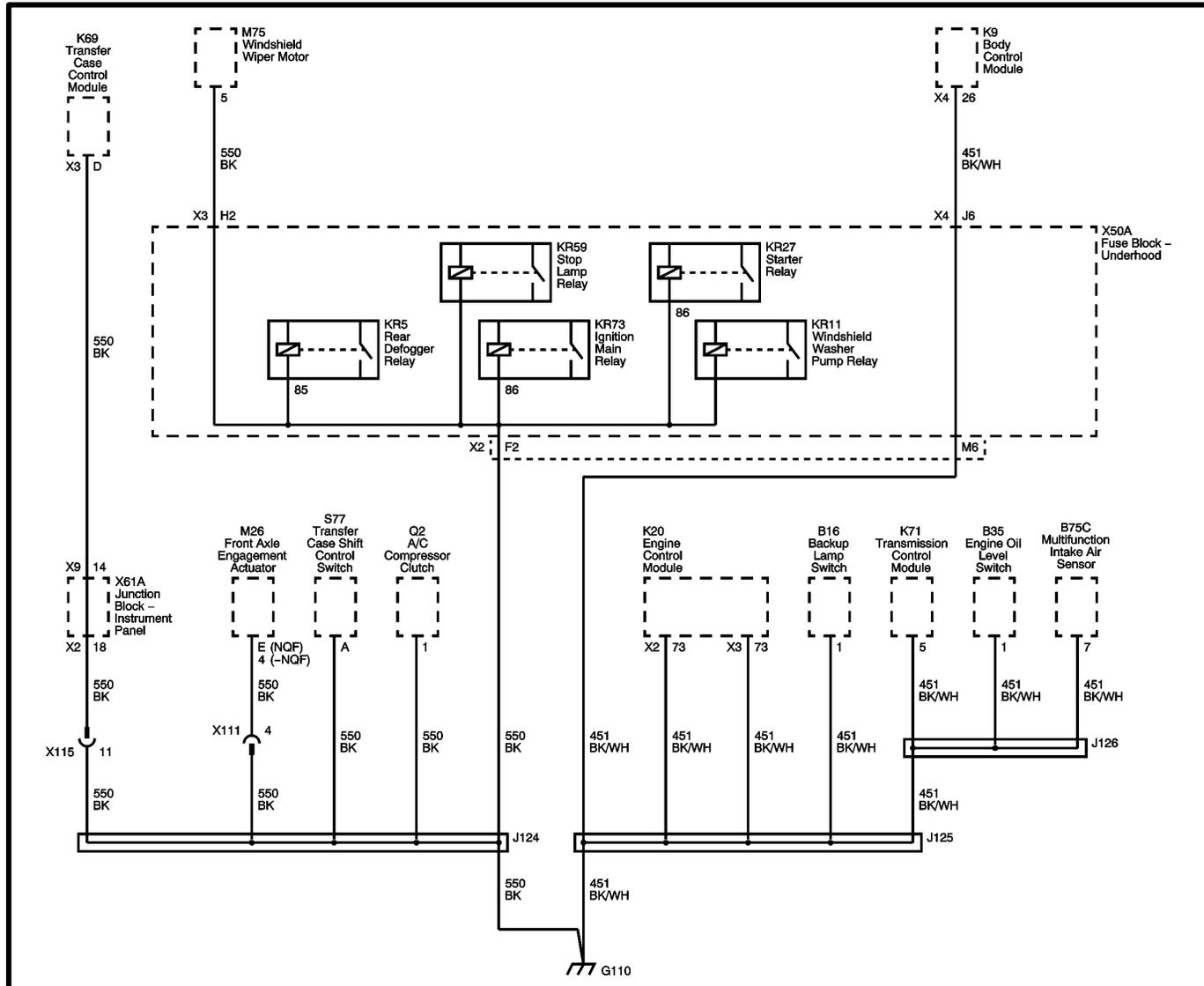
## Ground Distribution Schematics - G101 and G102



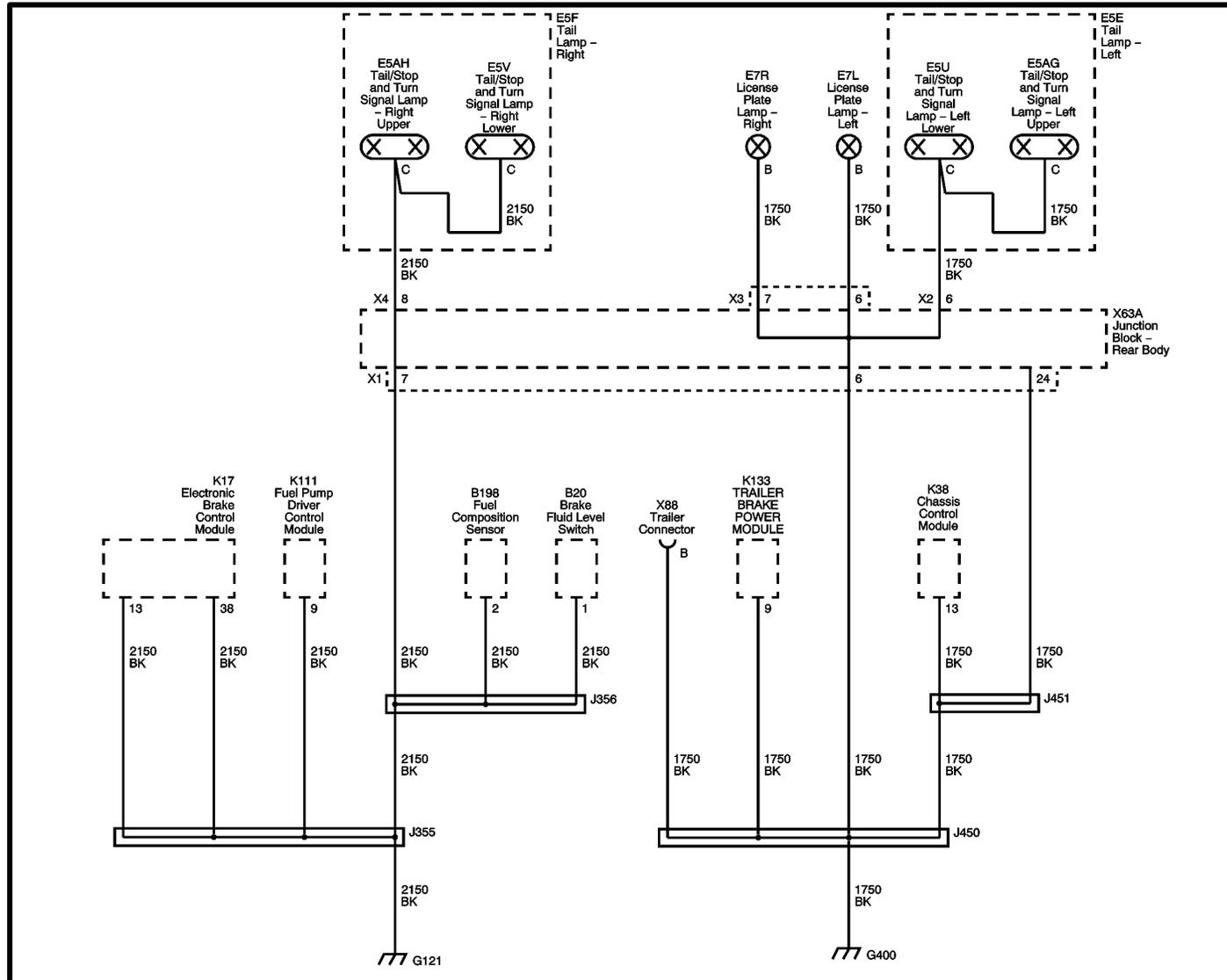
## Ground Distribution Schematics - G108, G130, G140 and G327



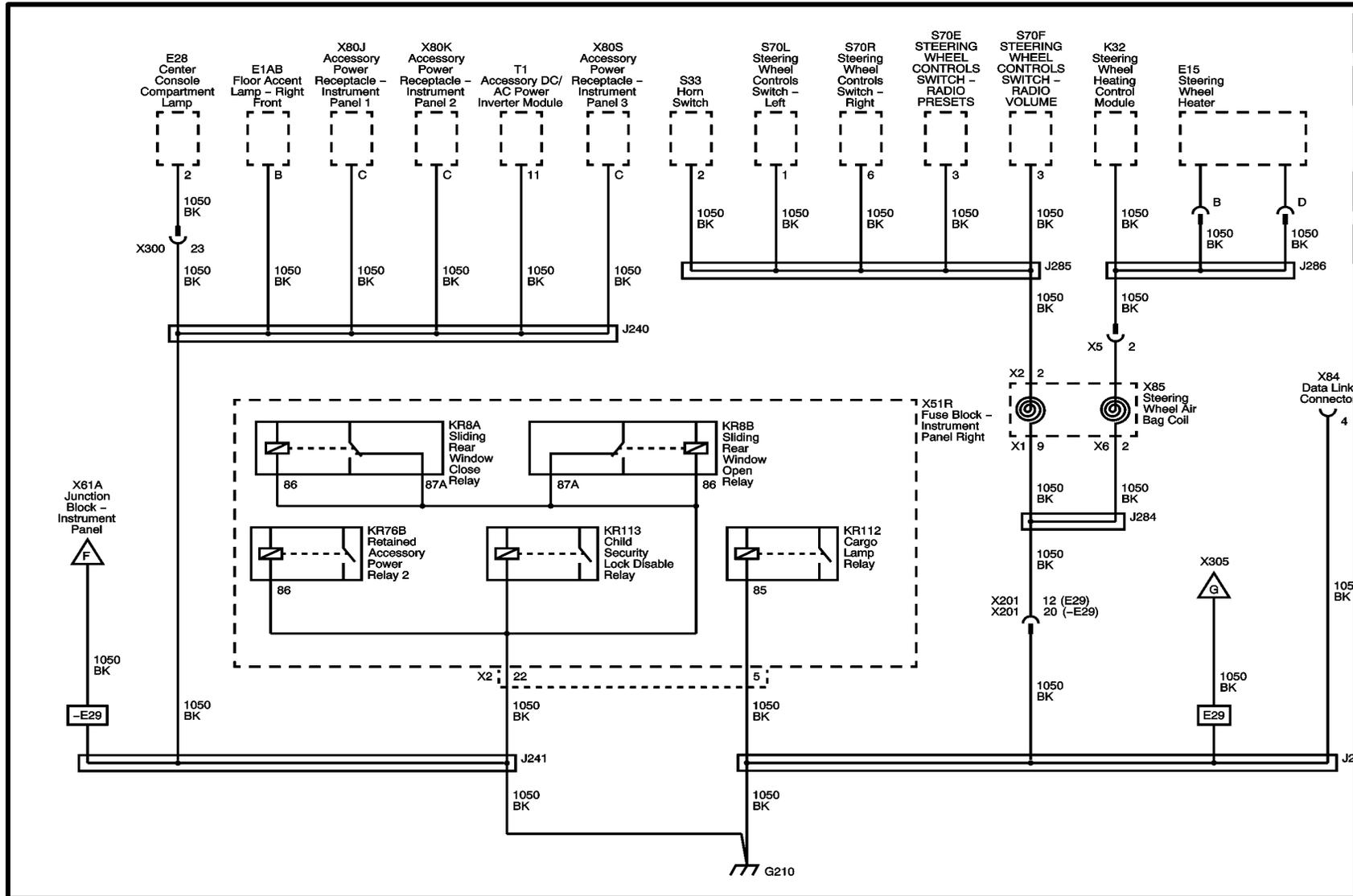
## Ground Distribution Schematics - G110



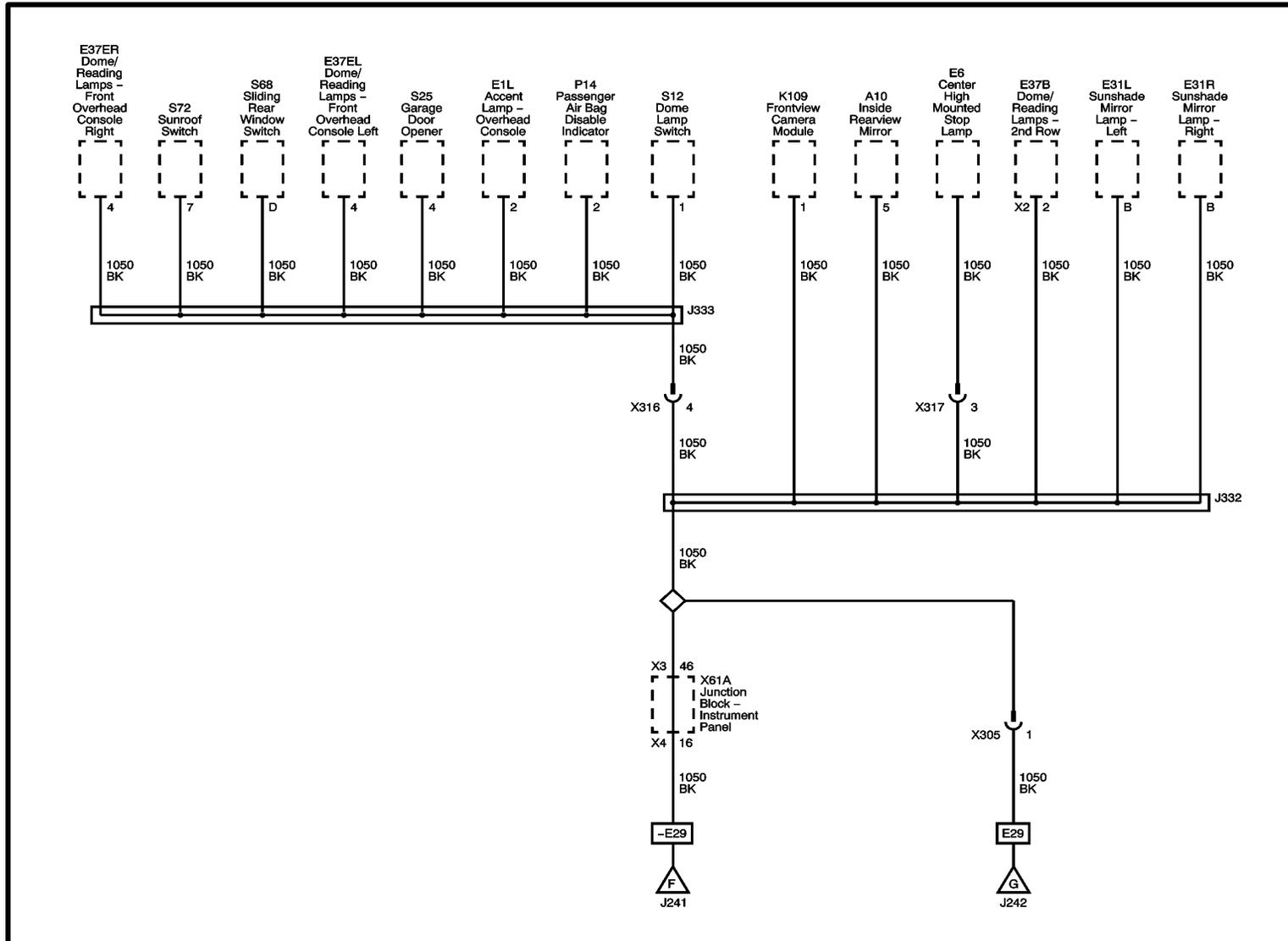
## Ground Distribution Schematics - G121 and G400



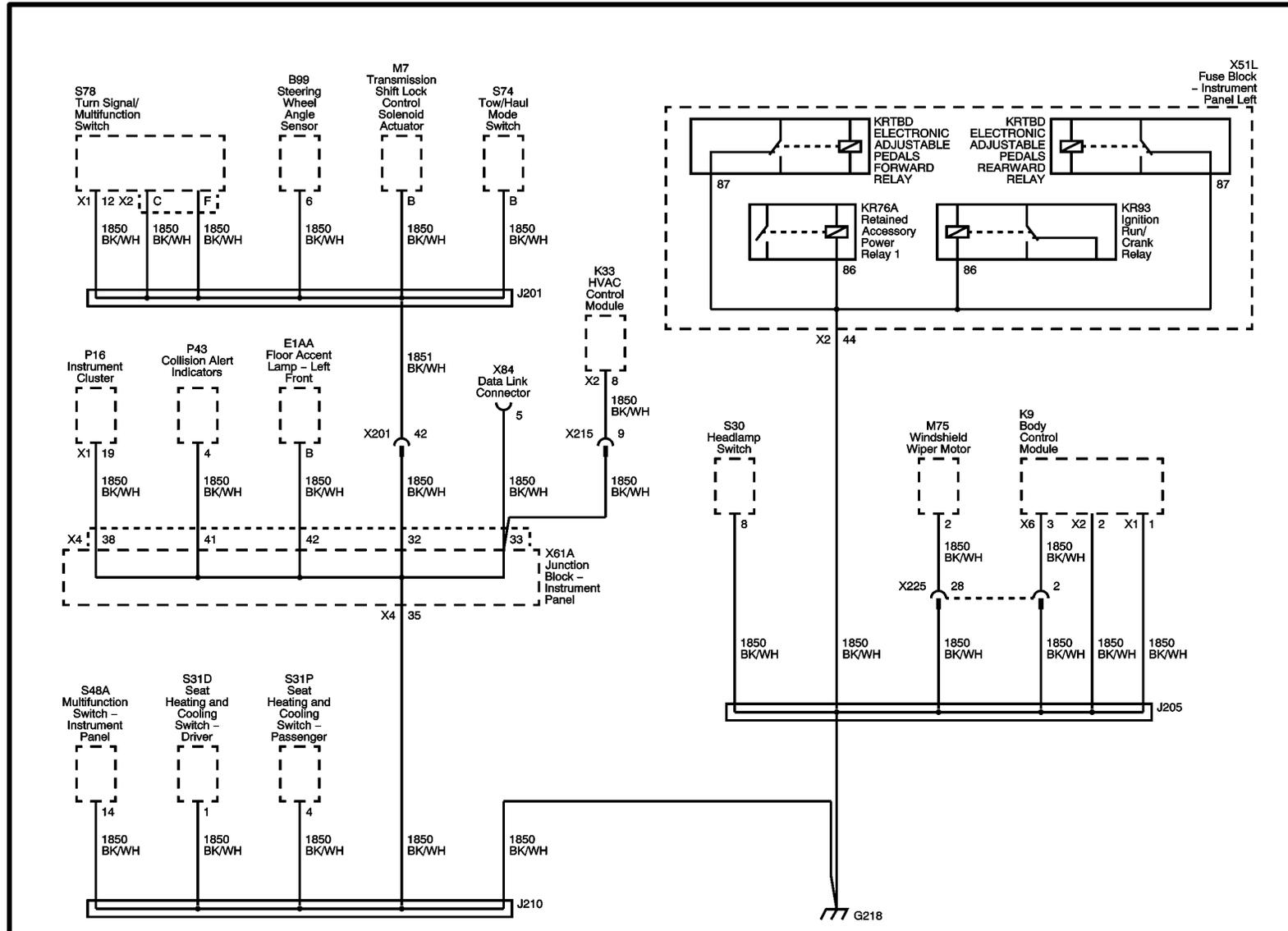
## Ground Distribution Schematics - G210 (1 of 2)



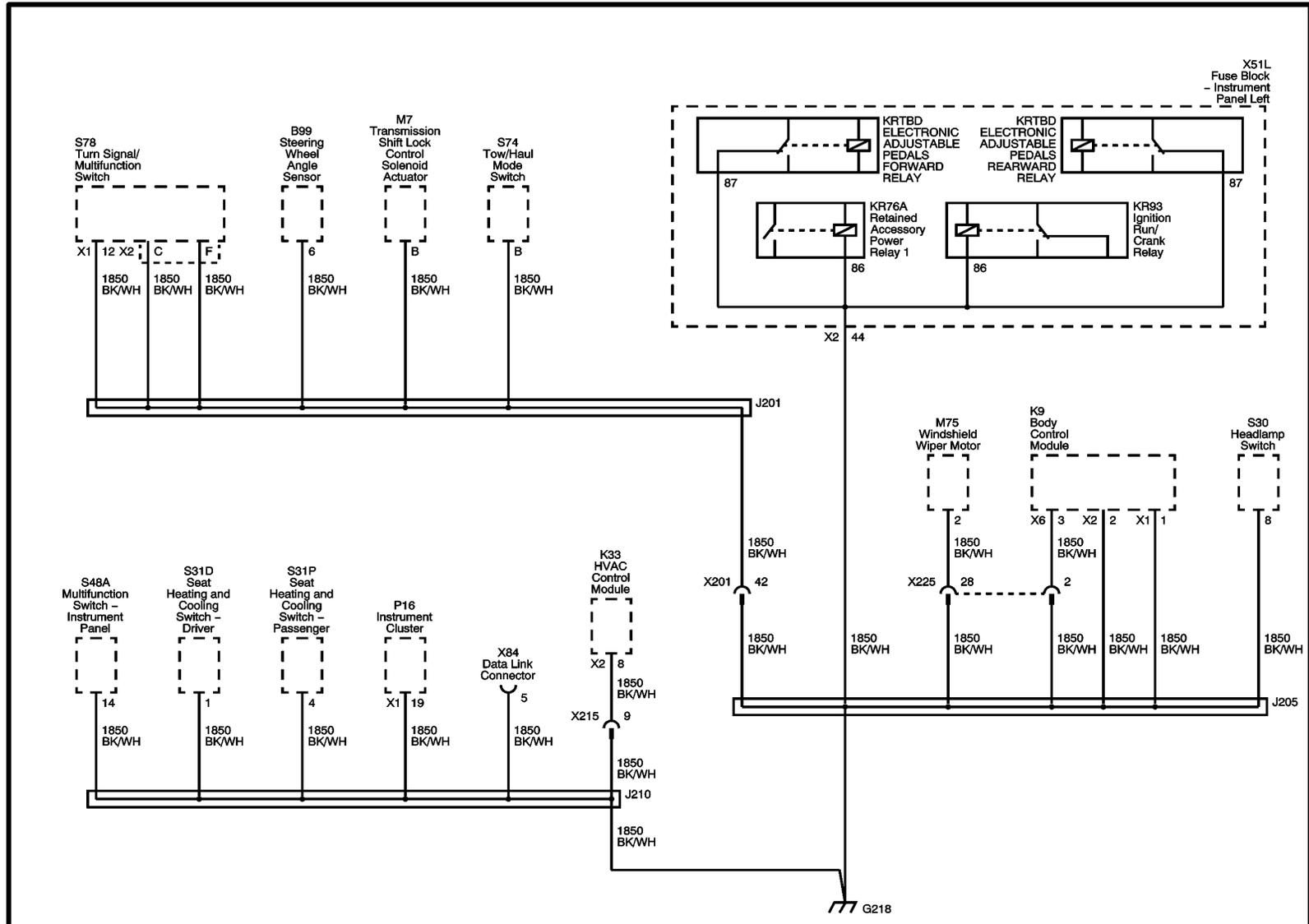
## Ground Distribution Schematics - G210 (2 of 2)



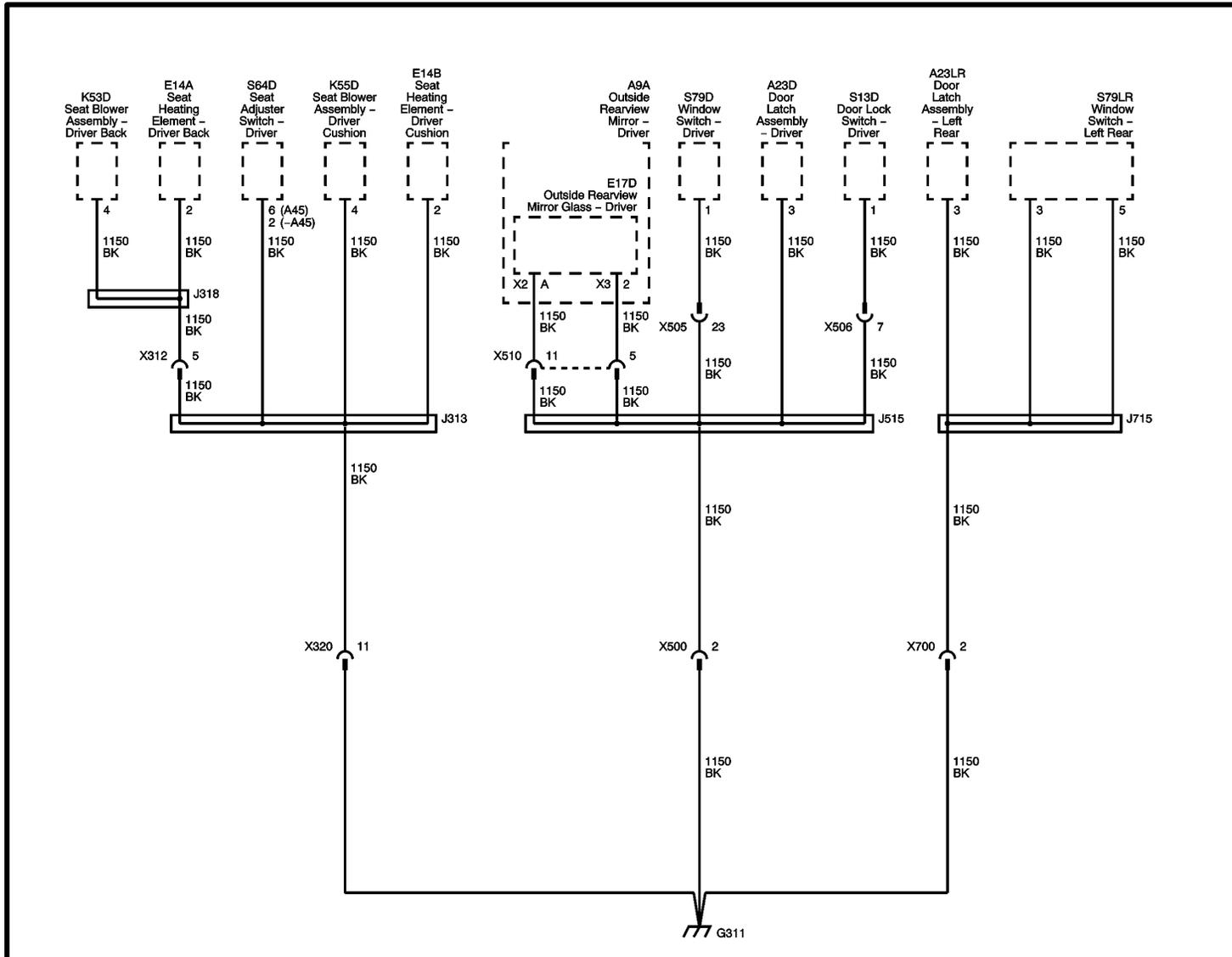
## Ground Distribution Schematics - G218 (except E29)



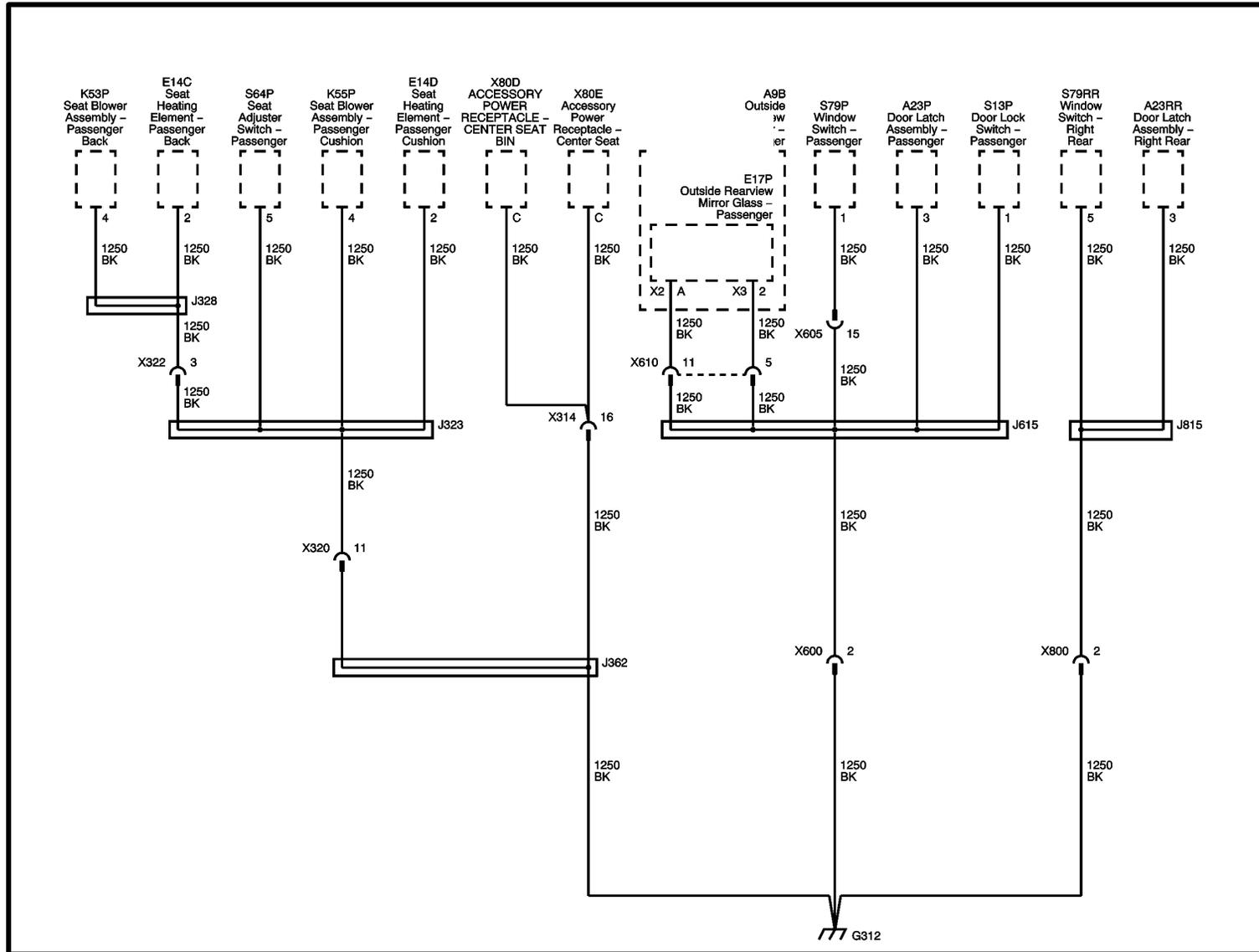
## Ground Distribution Schematics - G218 (E29)



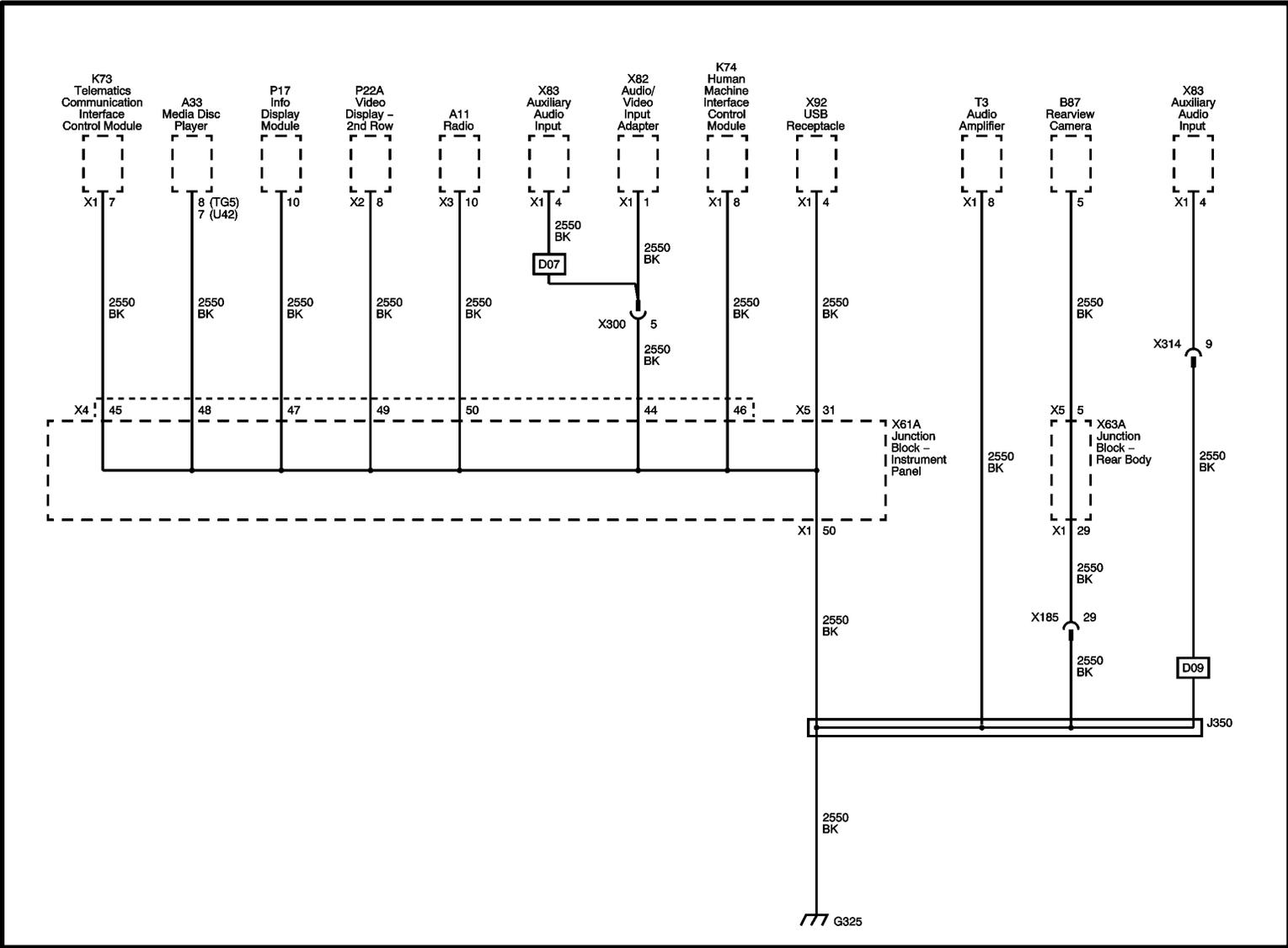
## Ground Distribution Schematics - G311



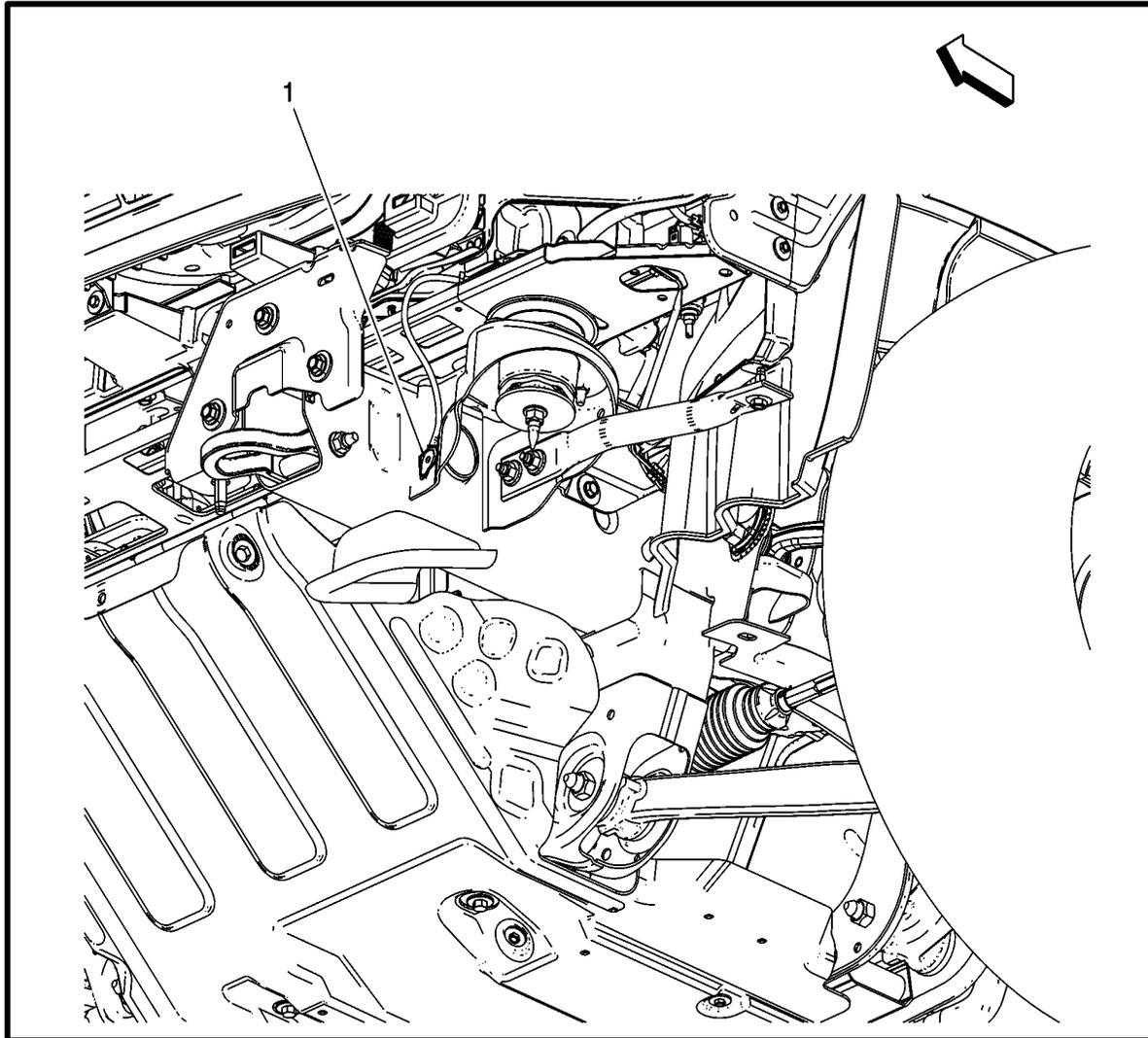
## Ground Distribution Schematics - G312



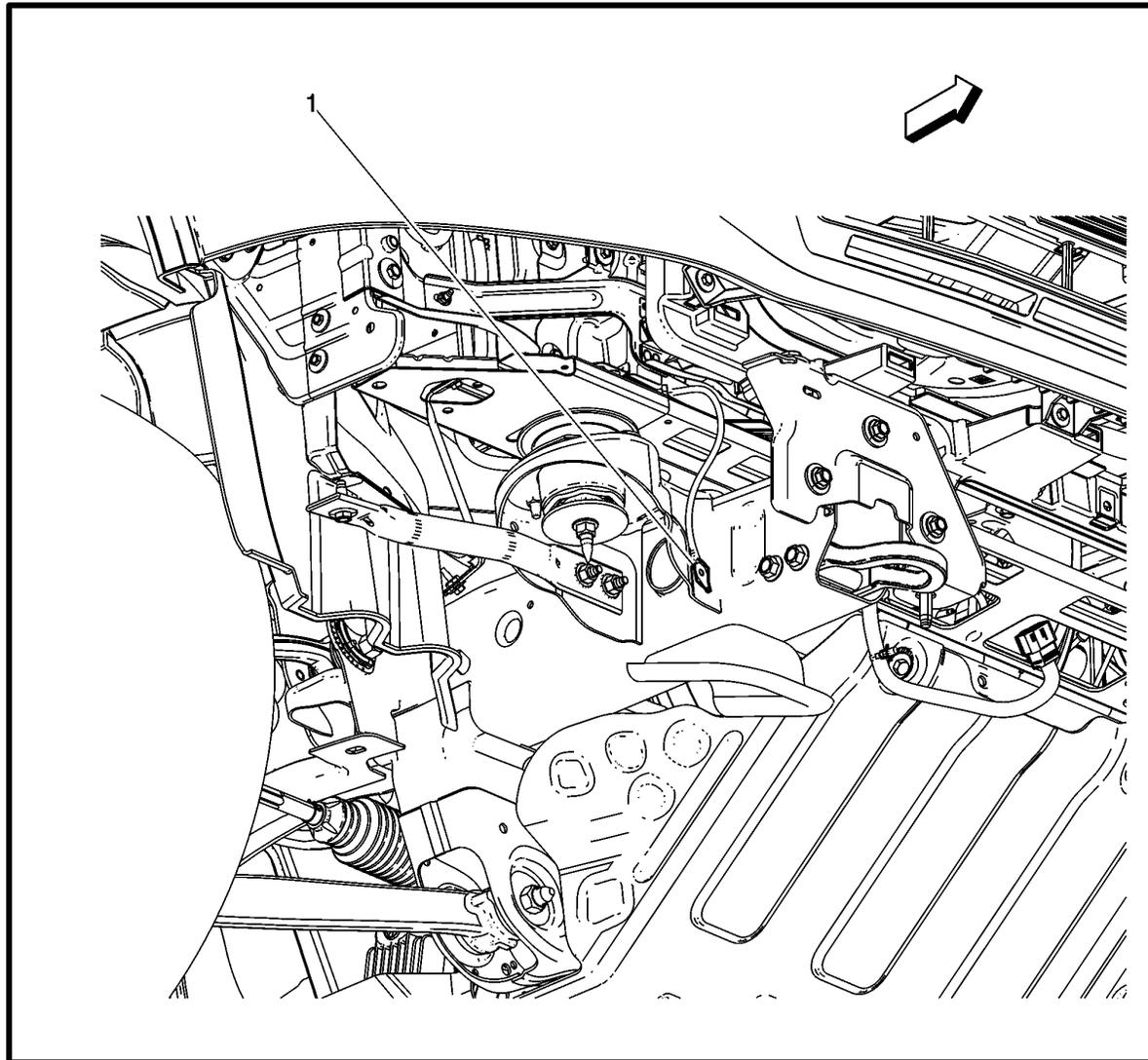
Ground Distribution Schematics - G325



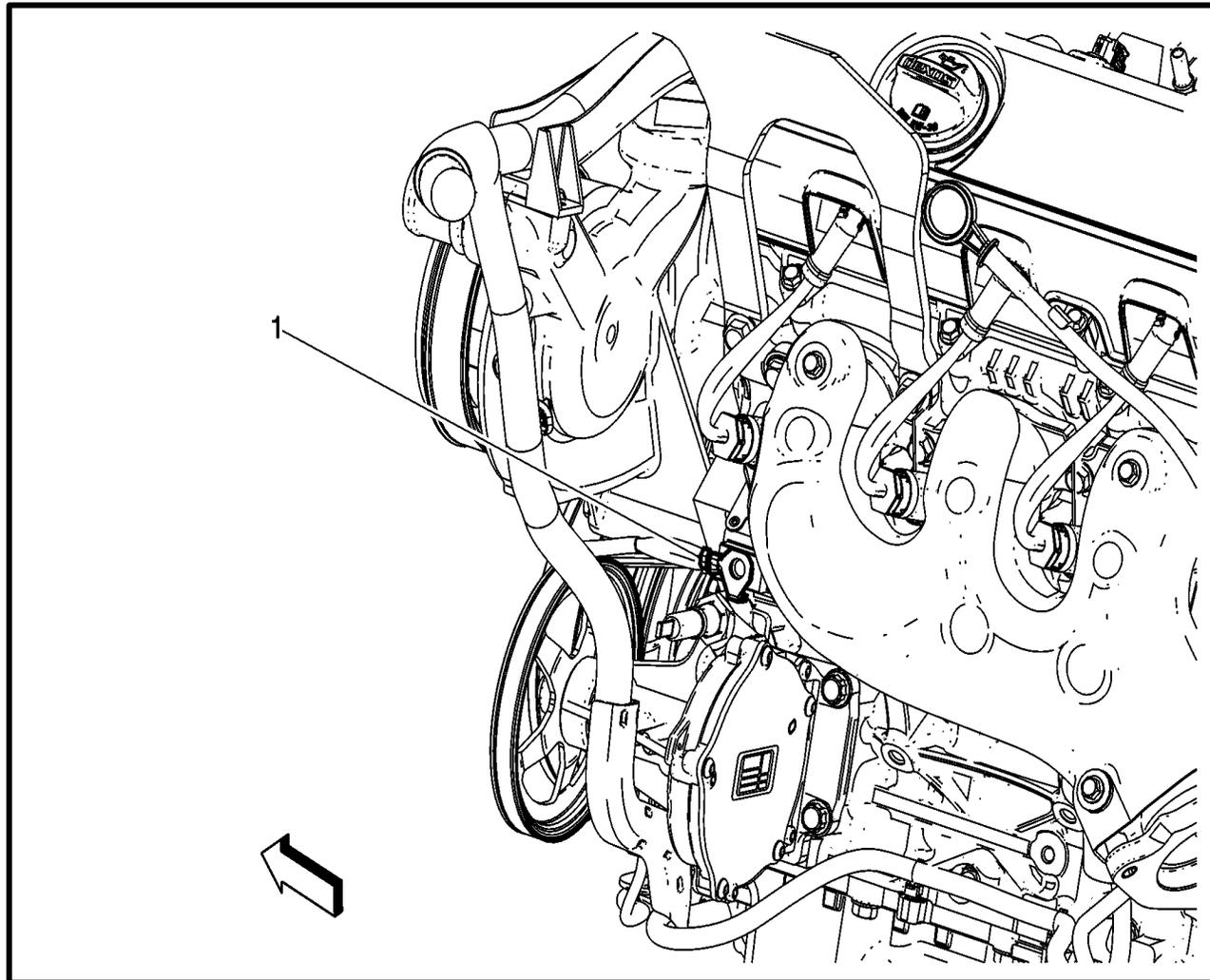
Ground Location Views – G101



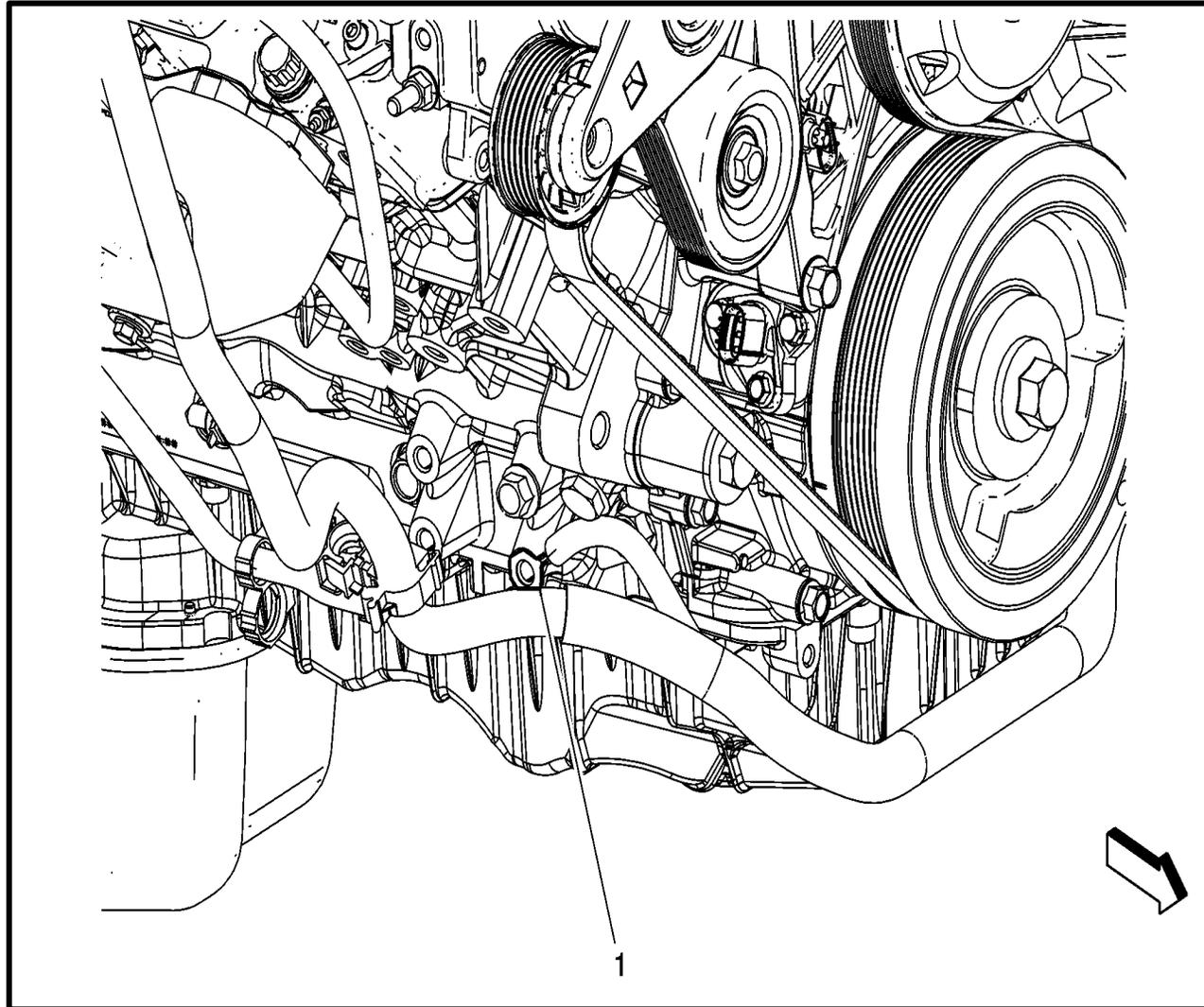
Ground Location Views G102



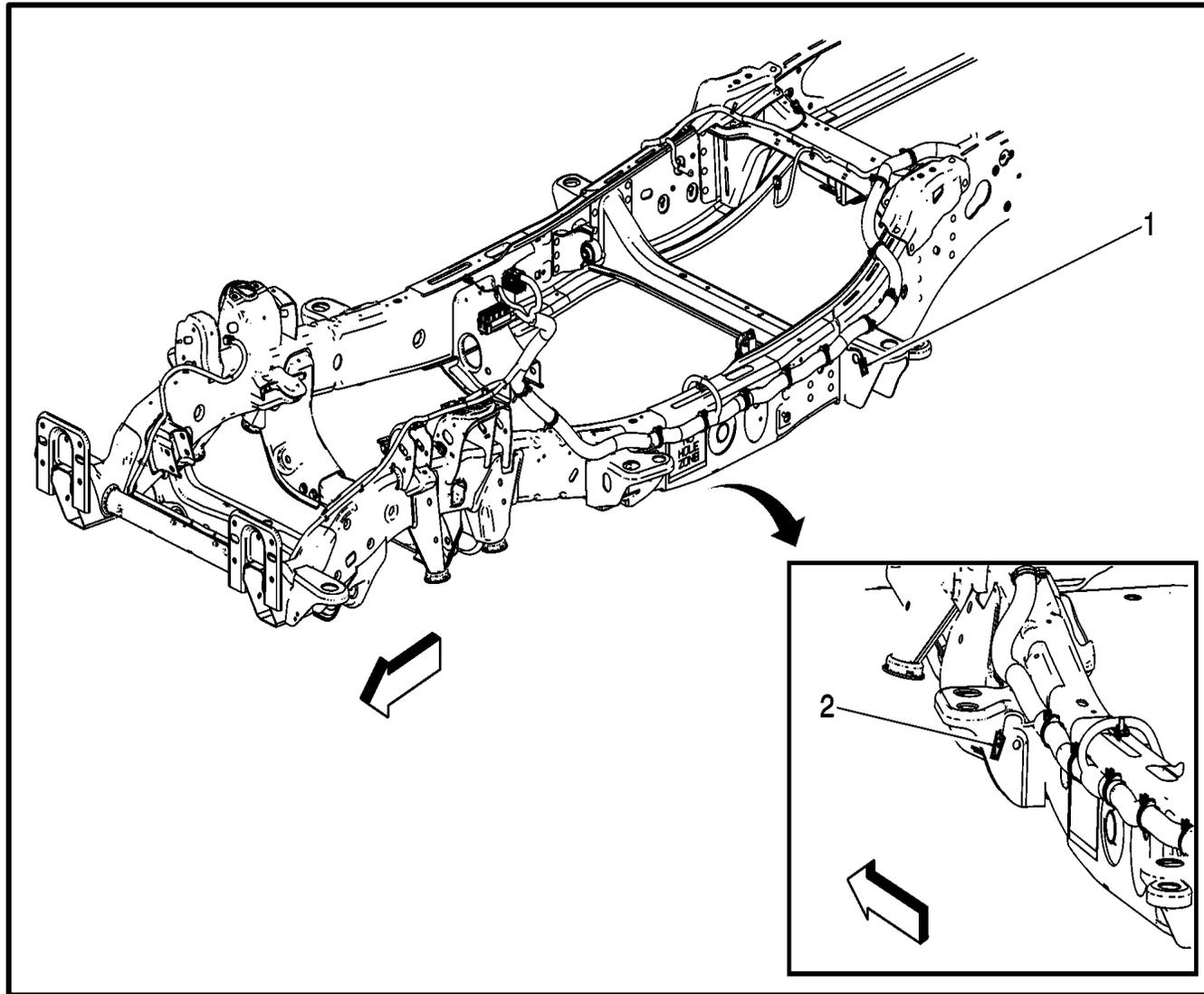
Ground Location Views G110



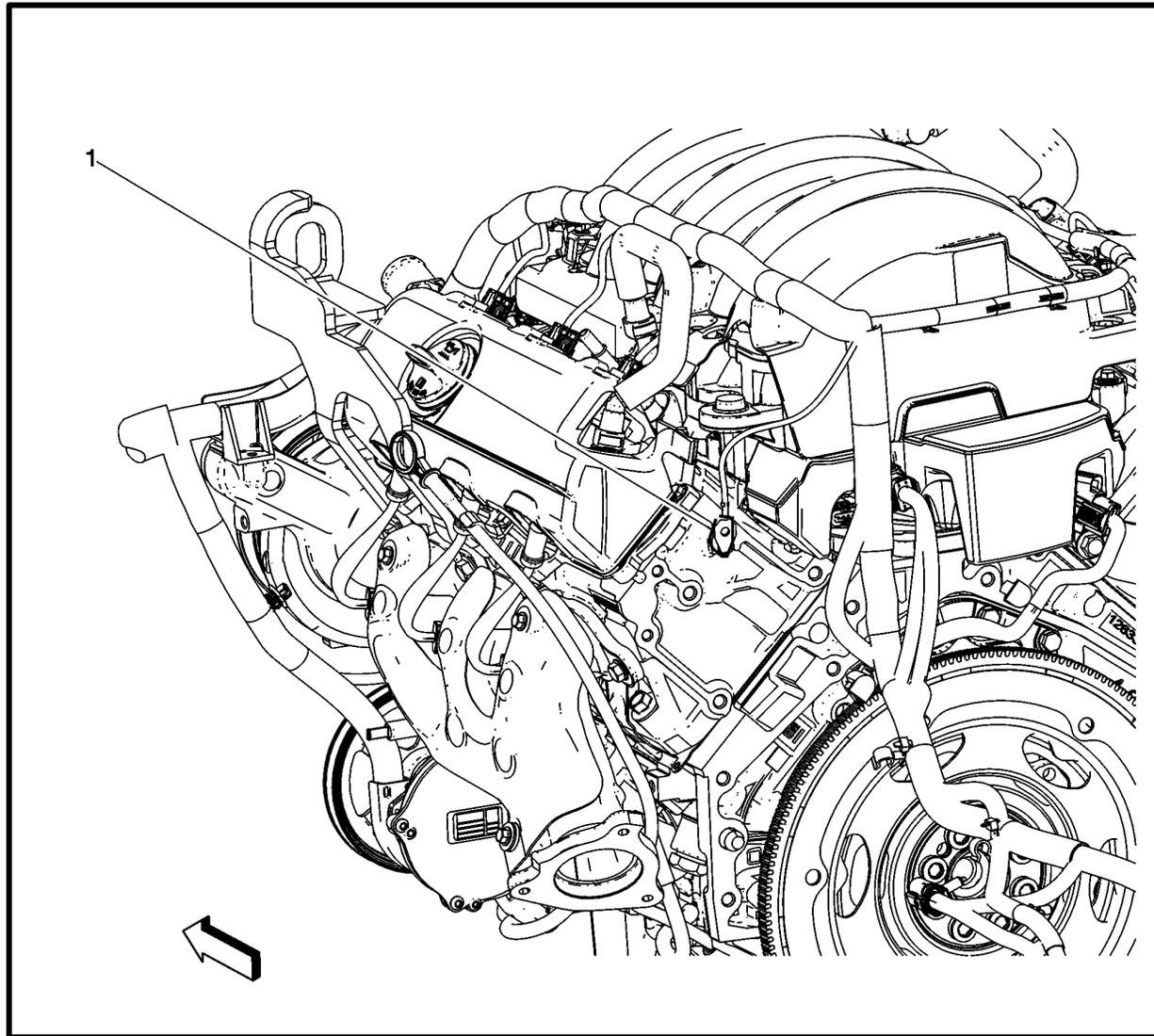
Ground Location Views G120



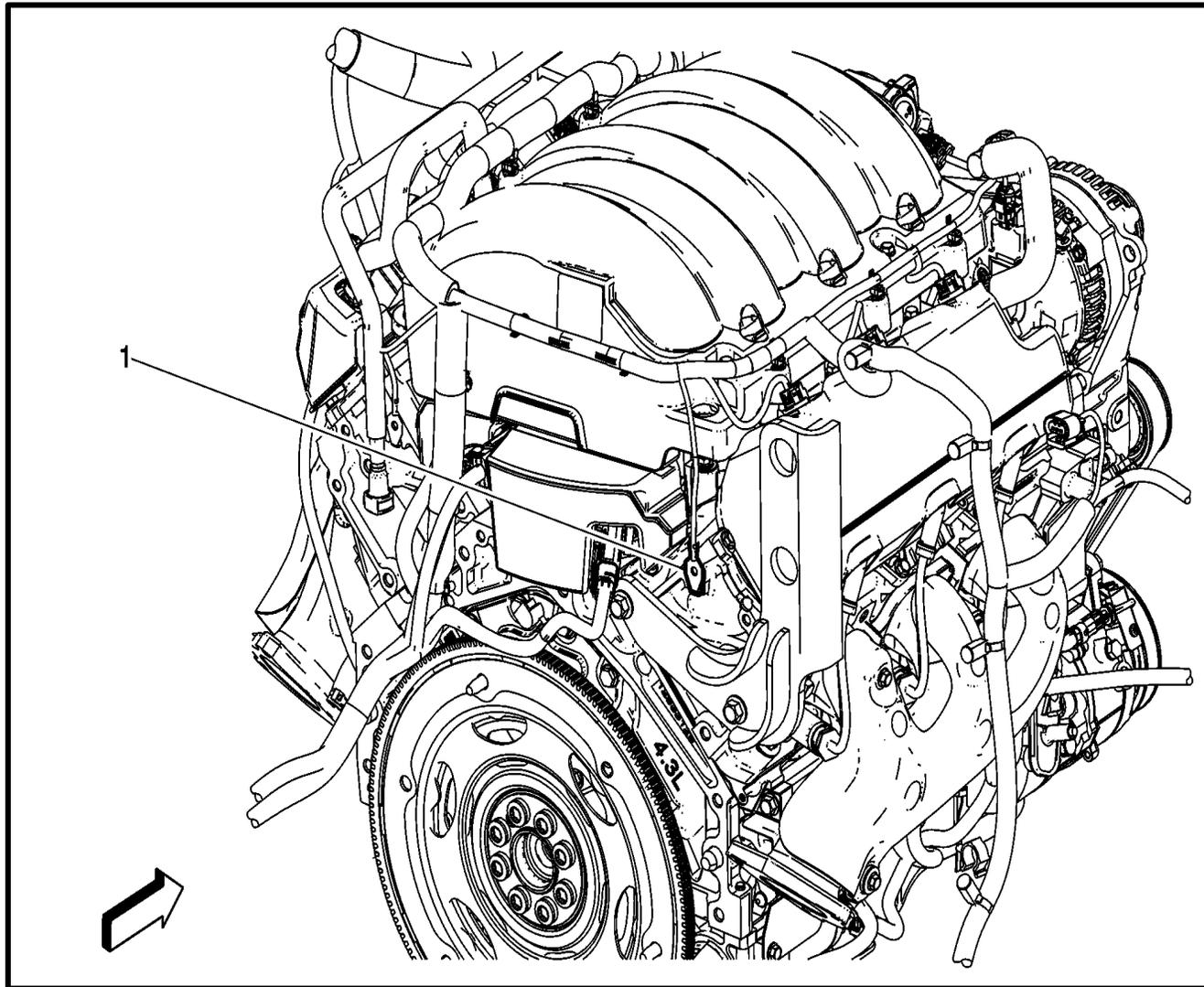
Ground Location Views G121 and G400



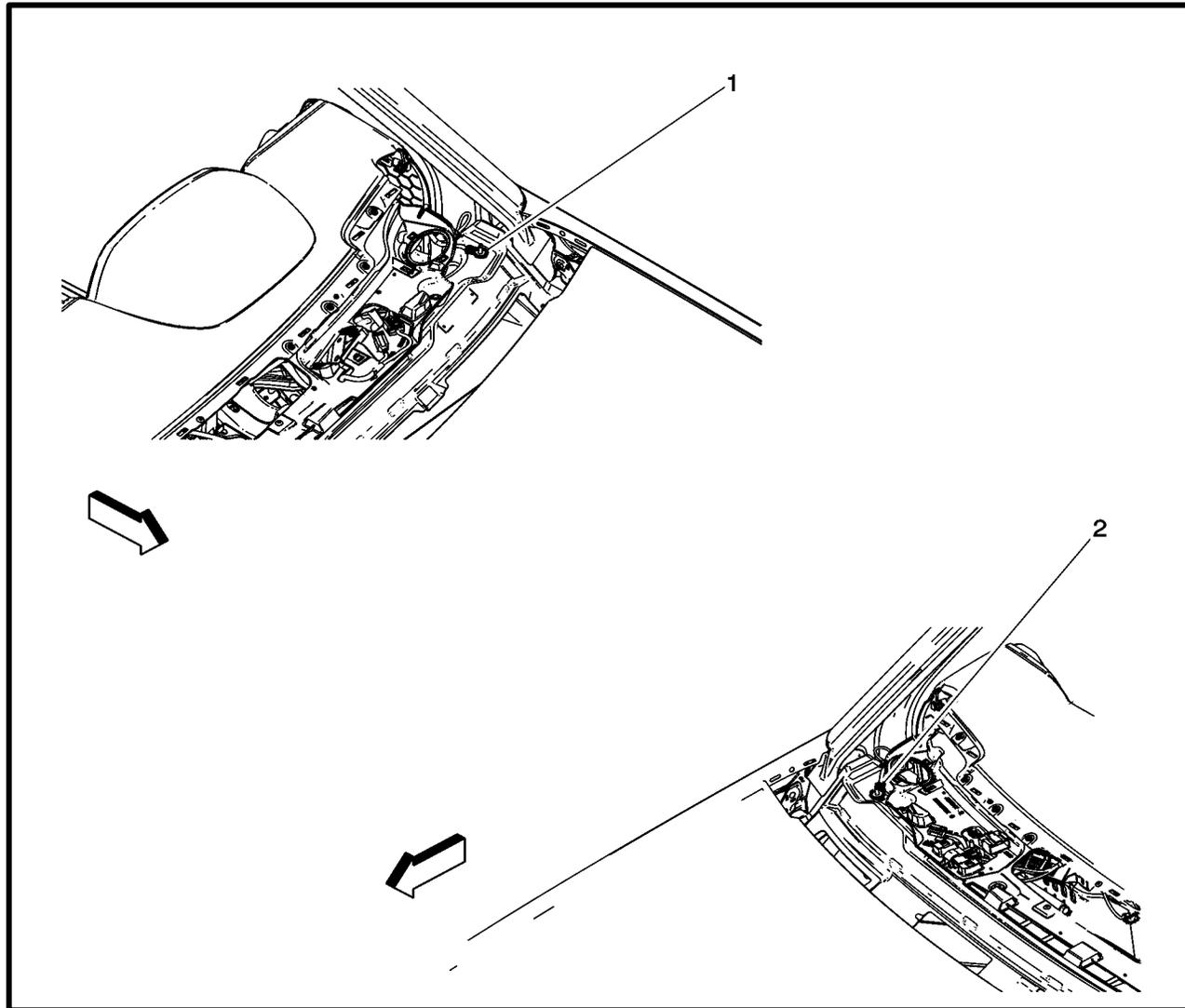
Ground Location Views G130



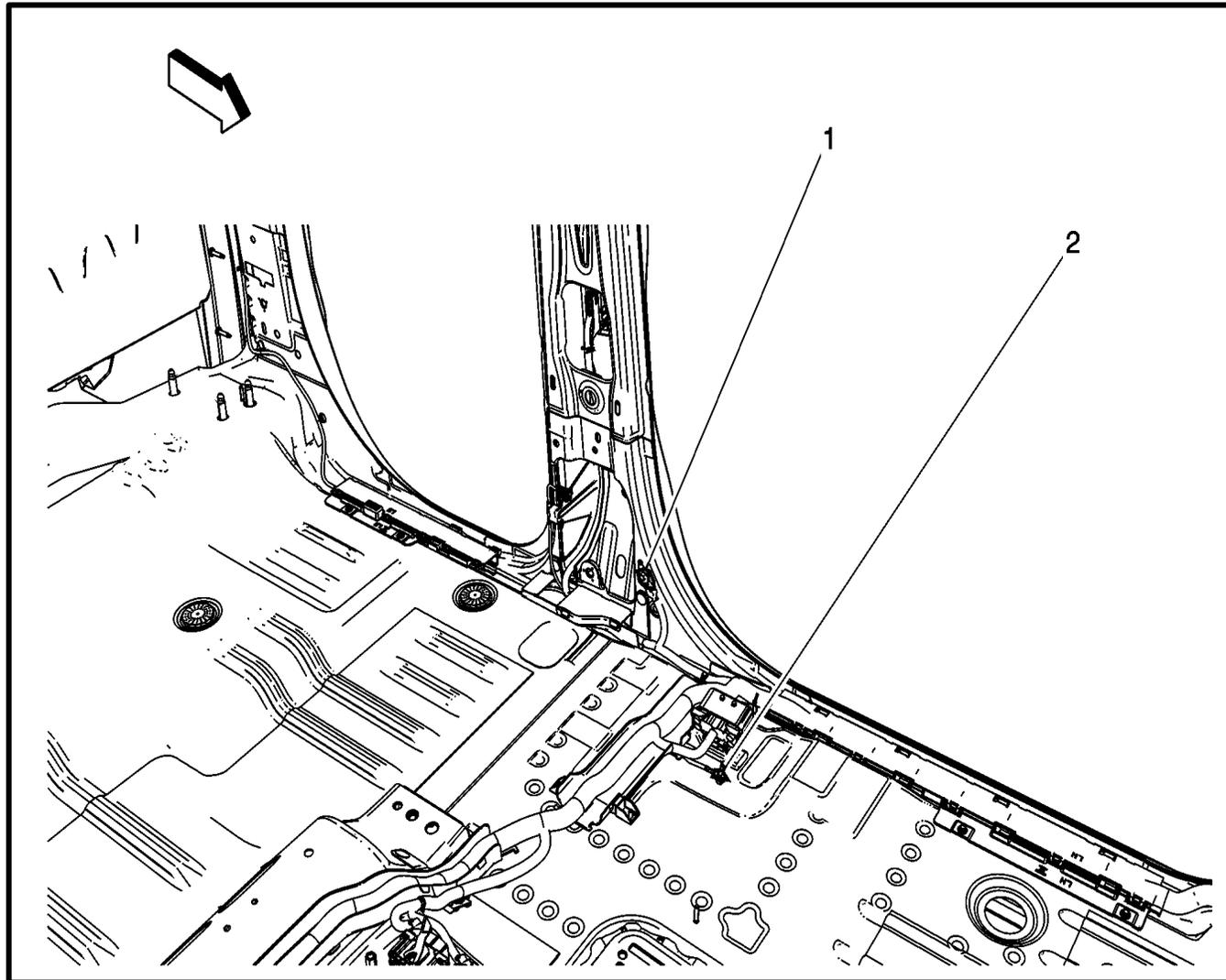
Ground Location Views G140



Ground Location Views G210 and G218



Ground Location Views G311 and G325



Ground Location Views G312 and G327

