DESCRIPTION AND OPERATION

EXTERIOR LIGHTING SYSTEMS DESCRIPTION AND OPERATION

The exterior lighting system consist of the following lamps:

- Automatic high beam assist
- Backup lamps
- Daytime running lamps
- Front fog lamps
- Hazard warning lamps
- Headlamps
- Park, tail, license, and marker lamps
- Stop lamps
- Turn signal lamps
- Trailer lighting

Low Beam Headlamps

The headlamps may be turned ON in 3 different ways:

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

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 vehicle operator will notice the interior backlighting for the instrument cluster and the various switches with backlighting control will dim to the level of brightness selected by the instrument panel dimmer switch.

The body control module (BCM) monitors three signal circuits from the headlamp switch. When the headlamp 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 headlamp switch is placed in the OFF position, the headlamp switch headlamps OFF signal circuit is grounded, indicating to the BCM that the exterior lamps should be turned OFF. With the headlamp switch in the PARK position, the headlamp switch park lamps ON signal circuit is grounded, indicating that the park lamps have been requested. When the

cardiagn.com

headlamp switch is placed in the HEADLAMP position, both the headlamp switch park lamps ON signal circuit and the headlamp switch headlamps ON signal circuit are grounded. The BCM responds to the inputs by illuminating the park lamps and headlamps. When the low beam headlamps are requested, the BCM applies B+ to both low beam headlamp control circuits illuminating the low beam headlamps.

High Beam Headlamps (Chevrolet)

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 3 pin high beam fuse to the high beam control circuits illuminating the left and right high beam headlamps.

High Beam Headlamps (GMC)

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 3 pin high beam fuse to the high beam control circuits and on to the left and right headlamp high beam control modules located within the headlamp assemblies. The headlamp high beam control modules respond by applying voltage to there respective high beam solenoid actuators located within the headlamp assemblies. With the left and right high beam solenoid actuators 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.

Automatic High Beam Assist (AHBA)

The automatic high beam assist (AHBA) system operates the high beam headlamps ON and OFF automatically when the system is activated and certain conditions are met. The AHBA system consists of a front camera module that detects light and is able to identify approaching vehicles on an even, straight road at a distance of greater than 0.4 km (0.25 mi). The front camera module analyzes light color, intensity, and movement. The AHBA system will turn OFF the high beam headlamps when approaching vehicle headlamps or preceding vehicle taillights are detected by the front camera module. AHBA can be deactivated when the headlamp dimmer switch is moved from the neutral position to the high beam or flash to pass positions. AHBA can be reactivated by operating the high beam select switch from the neutral position to the high beam position twice within 2 seconds.

AHBA System Activation

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

AHBA System Operation

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

- The system detects approaching traffic headlamps

cardiagn.com

- The system detects preceding traffic tail lamps
- Ambient light level too high due to towns or twilight situations
- The vehicle's speed drops below 13 mph (22 km/h)
- Delay

NOTE: **AHBA may not operate properly if any of the following conditions exist:**

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

AHBA System Deactivation

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

AHBA System Indicator

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

Daytime Running Lamps

The daytime running lamps 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

Daytime Running Lamps (Base)

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 V 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 or automatic lamp control when the headlamp switch is in the AUTO position. In daylight conditions the BCM will command the low beam headlamps ON. Any function or condition that turns on the headlamps will cancel daytime running lamps operation.

Daytime Running Lamps (GMC with SLT)

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 V 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

cardiagn.com

determine if outside lighting conditions are correct for either daytime running lights or automatic lamp control when the headlamp switch is in the AUTO position. In daylight conditions the BCM applies B+ to both daytime running lamp control circuits to the left and right multifunction light emitting diode (LED) control modules located in each headlamp assembly. The multifunction LED control modules respond the to the B+ input from the BCM by illuminating the left and right daytime running lamp LED's. Any function or condition that turns on the low beam headlamps will cancel daytime running lamps operation.

Flash to Pass

When the turn signal/multifunction switch is momentarily placed in the flash to pass position, ground is applied to the turn signal/multifunction switch. The turn signal/multifunction switch applies ground to the body control module (BCM) through the flash to pass switch signal circuit. The BCM responds to the flash to pass 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 3 pin high beam fuse. Battery voltage is applied from the high beam fuse through the high beam control circuit to the high beam headlamp assemblies. This causes the high beam headlamps to illuminate at full brightness momentarily.

Front Fog Lamps

The front fog lamp relay is supplied with battery voltage at all times. The front fog lamp switch signal circuit is grounded momentarily by pressing the front fog lamp switch. The body control module (BCM) energizes the front fog lamp relay by applying ground to the front fog lamp relay control circuit. When the front fog lamp relay is energized, the relay switch contacts close and battery voltage is applied through the front fog lamp fuse to the front fog lamp supply voltage circuit which illuminates the front fog lamps.

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 requesting both turn signal indicators to be cycled ON and OFF.

The instrument panel dimmer switch controls the brightness of the interior backlighting components. When the instrument panel dimmer switch is placed in a desired brightness position, the body control module (BCM) receives a signal from the instrument panel dimmer switch and responds by applying a pulse width modulated 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

NOTE: **Brake system does not use a brake switch, stoplight switch or brakelight switch. System uses a Brake Pedal Position Sensor to control these functions.**

The brake pedal position sensor is used to sense the action of the driver application of the brake pedal. The brake pedal position 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 V reference voltage to the brake pedal

cardiagn.com

position 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 control circuit illuminating the left and right stop lamps and the center high mounted stop lamp.

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 there respective control circuits. When a turn signal request is received by the BCM, a serial data message is sent to the instrument cluster requesting the respective turn signal indicator be pulsed ON and OFF.

Backup Lamps

Automatic Transmission

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.

Manual Transmission

The engine control module (ECM) provides a signal circuit to the backup lamp switch which is permanently grounded. With the engine running and the transmission in the reverse position, the backup lamp switch signal circuit is pulled low and the ECM responds by sending a serial data message to the body control module (BCM). The message indicates that the gear selector is in the reverse position. The BCM energizes the backup lamp relay by applying battery voltage to the backup lamp relay control circuit. When the backup lamp relay is energized, the relay switch contacts close and battery voltage is applied through the backup lamp fuses to the backup lamp control circuits which illuminates the backup lamps. Once the driver moves the gear selector out of the reverse position, a message is sent by the ECM via serial data requesting the BCM to remove battery voltage from the backup lamp relay control circuit. The engine must be running for the backup lamps to operate.

Trailer Lighting

Backup Lamps

For backup lamp operation, the backup lamp relay is supplied with battery voltage at all times. With the engine running 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 energizes the backup lamp relay by applying battery voltage to the backup lamp relay control circuit. When the backup lamp relay is energized, the relay switch contacts close and battery voltage is applied through the backup lamp fuses to the backup lamp control circuits which illuminates 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 lamp relay control circuit.

Park Lamps

cardiagn.com

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, license lamps, and trailer park lamps control circuits illuminating the park, tail, license, and trailer park lamps.

Stop Lamps

For stop lamp operation, the left and right trailer stop/turn signal lamp relay's are supplied with battery voltage at all times. The brake pedal position sensor is used to sense the action of the driver application of the brake pedal. The brake pedal position 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 V reference voltage to the brake pedal position sensor. When the variable signal reaches a voltage threshold indicating the brakes have been applied, the BCM energizes the left and right trailer stop/turn signal lamp relay's by applying voltage to the left and right stop lamp relay control circuits. With the left and right trailer stop/turn signal lamp relay's energized, the relay switch contacts close and battery voltage is applied through the left and right trailer stop/turn signal fuse's to the trailer stop lamp control circuits which illuminates the trailer stop lamps.

Turn Signal Lamps

For turn signal lamp operation, the left and right trailer stop/turn signal lamp relay's are supplied with battery voltage at all times. 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 left and right trailer stop/turn signal lamp relay control circuits energizing the relay's in an ON and OFF cycle. With the left and right trailer stop/turn signal lamp relay's energized, the relay switch contacts cycle ON and OFF applying battery voltage through the left and right trailer stop/turn signal fuse's to the trailer turn signal lamp control circuits which illuminates the trailer turn signal lamps in an ON and OFF cycle.

Trailer Lighting (Export)

The trailer lighting control module is supplied with battery voltage as well as ignition voltage from the rear body fuse block and is permanently grounded. For lighting operation, the trailer lighting control module receives serial data messages from the body control module (BCM) indicating what lamps have been activated on the vehicle. The trailer lighting control module responds by applying voltage to the appropriate control circuits for the requested lamps illuminating the lamps on the attached trailer.

For stop lamp operation, the trailer lighting control module receives an input from the center high mount stop lamp control circuit. When the brakes are applied on the vehicle, the trailer lighting control module receives the brake applied input from the center high mount stop lamp control circuit. The trailer lighting control module responds by applying voltage to the trailer stop lamp control circuit illuminating the trailer stop lamps. The trailer lighting control module also receives a serial data message from the BCM indicating that the vehicle brakes have been applied.

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 minute timer. At the end of the 10 minutes, 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

cardiagn.com

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.

INTERIOR LIGHTING SYSTEMS DESCRIPTION AND OPERATION

Interior Lamps

The interior lighting system consist of two groups. This first group includes lamps that may not be dimmed.

- Dome lamps
- Center console compartment lamps
- Reading lamps
- Sunshade mirror lamps

Dome Lamps

The dome lamp switch has 3 positions: DOOR, OFF, and ON. The ON position provides a ground for continuous operation and the dome lamp will remain illuminated until the switch is placed in either the DOOR or OFF position. When in the DOOR position, the dome lamp operation is controlled by the body control module (BCM). When any door is opened, the door ajar switch contacts close and the BCM receives a door-open input. The BCM illuminates the dome lamp when any door is opened or a door lock/unlock request is activated with the key fob. After all doors have been closed, the dome lamp will remain illuminated approximately 3 seconds after the last door closes. When the driver places the dome lamp switch in the OFF position, the dome lamp will be disabled. In the event that the dome lamp were to remain illuminated for more than 10 minutes with the ignition switch in the OFF position and no doors opened, the BCM will deactivate the dome lamp control circuit to prevent total battery discharge. The dome lamps will turn OFF using the theater dimming feature when controlled by the BCM.

Center Console Compartment Lamp

The inadvertent power supply voltage circuit from the BCM provides battery voltage to the center console compartment lamp. When the center console is opened, the center console compartment lamp switch contacts close providing a path to ground and the center console compartment lamp illuminates. If the operator inadvertently leaves the center console compartment door open with the center console compartment lamp ON, the BCM will turn all interior lamps OFF after 10 minutes has passed since any switch activation has been detected by the BCM.

Reading Lamps

The inadvertent power supply voltage circuit from the BCM provides battery positive voltage to each reading lamp. When a reading lamp switch is activated, the switch contacts close providing a path to ground and the reading lamp illuminates. If the operator inadvertently leaves a reading lamp ON, the BCM will turn all interior lamps OFF after 10 minutes has passed since any switch activation has been detected by the BCM.

Sunshade Mirror Lamps

The inadvertent power supply voltage circuit from the BCM provides battery voltage to each set of sunshade mirror lamps. When the sunshade mirror cover is opened, a switch closes providing ground and the sunshade lamps illuminate. If the operator inadvertently leaves a sunshade mirror cover open with the lamps ON, the BCM will turn all interior lamps OFF after 10 minutes has passed since any switch activation has been detected by the BCM.

cardiagn.com

Keyless Entry Interior Illumination

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

Interior Lamps Dimming

The second group includes lamps which may be dimmed. This group may use a combination of light emitting diodes (LED), incandescent lamps, and pulse width modulation (PWM) illumination.

- Dome/reading lamps - front
- Dome/reading lamps - rear
- Door lock switch - driver
- Door lock switch - passenger
- Garage door opener switch
- Headlamp switch
- HVAC control head assembly
- Multifunction switch - instrument panel
- Outside rearview mirror switch
- Park brake switch
- Radio
- Roof beacon switch
- Seat memory switch - driver
- Sliding rear window switch
- Steering wheel control switch - left
- Steering wheel control switch - right
- Sun roof switch
- Sun roof tilt switch
- Transfer case shift control switch
- Trailer brake control switch
- Window switch - driver
- Window switch - passenger

With the headlamp switch in the PARK or HEAD position, the park lamp switch signal circuit provides an input to the body control module (BCM). The BCM responds by applying voltage to the park lamps as well as the backlight dimming control circuits illuminating all components with interior backlighting. All interior backlighting turns ON at the dimming level indicated by the instrument panel dimmer switch. The instrument panel dimmer switch is a momentary type switch and utilizes a resistor ladder to increase and decrease the brightness of the interior backlighting components. The instrument panel dimmer switch provides a voltage signal to the BCM that will increase as the brightness of the lights are increased and decrease as the brightness of the lights are decreased. The BCM provides a low reference signal and a B+ circuit to the instrument panel

cardiagn.com

dimmer switch. When the instrument panel dimmer switch is held in the desired position, the dimmed voltage setting is applied from the instrument panel dimmer switch through the instrument panel dimmer switch signal circuit to the BCM. The BCM interprets the signal and applies a pulse width modulated voltage through the backlighting control circuits illuminating the interior backlighting to the requested level of brightness.

Battery Rundown Protection/Inadvertent Power

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

Article GUID: A00854563

cardiagn.com

DIAGNOSTIC INFORMATION AND PROCEDURES

DTC B1395: CONTROL MODULE VOLTAGE REFERENCE OUTPUT 1

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B1395 03

Control Module Voltage Reference Output 1 Circuit Low Voltage

DTC B1395 07

Control Module Voltage Reference Output 1 Circuit High Voltage

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Instrument Panel Dimmer Switch B+ Reference	B1395 03, B3600 03	B1395 03, B3600 03	B1395 07, B3600 07	-
Instrument Panel Dimmer Switch Signal	B1395 03, B3600 03	B1395 03, B3600 03	B1395 07, B3600 07	-
Instrument Panel Dimmer Switch Low Reference	1	1	1	-
1. Interior Backlighting Malfunction				

Circuit/System Description

The instrument panel dimmer switch is used to increase and decrease the brightness of the interior backlighting components. The instrument panel dimmer switch provides a voltage signal to the body control module (BCM) that will increase as the brightness of the lights are increased and decrease as the brightness of the lights are decreased. The BCM provides a low reference, signal, and B+ voltage reference to the instrument panel dimmer switch. When the instrument panel dimmer switch is placed in the desired position, the dimmed voltage setting is applied from the instrument panel dimmer switch through the instrument panel dimmer switch signal circuit to the BCM. The BCM interprets the signal and applies a pulse width modulated (PWM) voltage through the LED dimming 1 and dimming 2 control circuits illuminating the interior backlighting to the requested level of brightness.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.

cardiagn.com

- Park Lamps ON.

Conditions for Setting the DTC

DTC B1395 03

- The BCM detects a short to ground or an open/high resistance in the instrument panel dimmer switch B+ reference circuit.
- The BCM detects a short to ground or an open/high resistance in the instrument panel dimmer switch signal circuit.

DTC B1395 07

- The BCM detects a short to voltage in the instrument panel dimmer switch B+ reference circuit.
- The BCM detects a short to voltage in the instrument panel dimmer switch signal circuit.

Actions Taken When the DTC Sets

The BCM will not dim any interior backlighting. All interior backlighting will default to the FULL bright.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- Disconnect the negative battery cable for 30 seconds.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Diagnostic Aids

When a short to ground condition exists, the BCM goes into safe mode. The DTC will clear in most cases without removing the negative battery cable, but in order to restore the BCM to normal operating conditions the negative battery cable must be removed. The B+ reference circuit under normal operating conditions will illuminate a test lamp. When the BCM is in safe mode, a test lamp will no longer illuminate but the DTC will clear and the backlighting will dim normally.

Reference Information

Schematic Reference

Interior Lights Dimming Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Interior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**

cardiagn.com

- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the S30 Headlamp Switch, ignition ON.
2. Test for B+ between the B+ circuit terminal 12 and ground.
    - **If less than B+**
    1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.
    2. Test for infinite resistance between the B+ circuit and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the B+ circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K9 Body Control Module.
    - **If B+**
3. Verify a test lamp illuminates between the B+ circuit terminal 12 and the low reference circuit terminal 7.
    - **If the test lamp does not illuminate**
    1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.
    2. Test for less than 1 V between the low reference circuit terminal 7 and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V
    3. Test for less than 2 Ω in the low reference circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K9 Body Control Module.
    - **If the test lamp illuminates**
4. Verify a test lamp does not illuminate between the B+ circuit terminal 12 and the signal circuit terminal 11.
    - **If the test lamp illuminates**
    1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.
    2. Test for infinite resistance between the signal circuit and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance, replace the K9 Body Control Module.
    - **If the test lamp does not illuminate**
5. Test for B+ between the B+ circuit terminal 12 and the signal circuit terminal 11.
    - **If less than B+**
    1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.
    2. Test for less than 1 V between the signal circuit terminal 11 and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.

cardiagn.com

- If less than 1 V

3. Test for less than 2 Ω in the signal circuit end to end.
   - If 2 Ω or greater, repair the open/high resistance in the circuit.
   - If less than 2 Ω, replace the K9 Body Control Module.

- **If B+**

6. Test or replace the S30 Headlamp Switch.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Headlamp Switch Replacement**
- **Control Module References** for BCM replacement, programming, and setup

DTC B1480: BATTERY RUNDOWN PROTECTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B1480 02

Battery Rundown Protection Circuit Short to Ground

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Courtesy Lamps Control - Terminal 3 X7	B1480 02	1	1	-
Center Console Compartment Lamp Ground	-	1	-	-
Dome/Reading Lamps - Front Overhead Console Left Ground	-	1, 2	-	-
Dome/Reading Lamps - Front Overhead Console Right Ground	-	1, 2	-	-
Dome/Reading Lamps - 2nd Row Ground	-	1, 2	-	-
Sunshade Mirror Lamp - Left Ground	-	1	-	-
Sunshade Mirror Lamp - Right Ground	-	1	-	-
1. Courtesy Lamps Malfunction 2. Dome Lamps Malfunction				

Circuit/System Description

cardiagn.com

The body control module (BCM) supplies battery voltage to the front and rear reading lamps, left and right sunshade lamps, center console compartment lamp, and instrument panel compartment lamp via the courtesy lamp control circuit. When the instrument panel compartment, center console armrest, or a sunshade mirror is opened, the switch contacts close allowing battery voltage to flow illuminating the respective lamps. The front and rear reading lamps are controlled by individual switches that are activated by the occupants when additional cabin lighting is required. In the event that any of these courtesy lamps were to remain illuminated for more than 10 min with the ignition switch in the OFF position, the BCM will deactivate the courtesy lamp control circuit to prevent total battery discharge.

Conditions for Running the DTC

Battery voltage must be between 9-16 V.

Conditions for Setting the DTC

The BCM detects a short to ground in the courtesy lamps control circuit terminal 3 X7.

Actions Taken When the DTC Sets

The BCM will disable the circuit and all lamps controlled by the courtesy lamps control circuit will be inoperative.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- Disconnect the negative battery cable for 30 s.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Interior Lights Schematics (E29) **Interior Lights Schematics (without E29)**

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Interior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

cardiagn.com

Circuit/System Testing

1. Ignition OFF, exterior lamps OFF, disconnect the harness connectors at the components listed below.
    - E28 Center Console Compartment Lamp
    - E31L Sunshade Mirror Lamp - Left
    - E31R Sunshade Mirror Lamp - Right
    - E37B Dome/Reading Lamps - 2nd Row
    - E37EL Dome/Reading Lamps - Front Overhead Console Left
    - E37ER Dome/Reading Lamps - Front Overhead Console Right
2. Connect a test lamp between the appropriate control circuit terminal listed below and ground.
    - E28 Center Console Compartment Lamp - terminal 1
    - E31L Sunshade Mirror Lamp - Left terminal A
    - E31R Sunshade Mirror Lamp - Right terminal A
    - E37B Dome/Reading Lamps - 2nd Row terminal A
    - E37EL Dome/Reading Lamps - Front Overhead Console Left terminal 2
    - E37ER Dome/Reading Lamps - Front Overhead Console Right terminal 2
3. Verify the test lamp turns ON and OFF when commanding the Inadvertent Load ON and OFF with a scan tool.
    - **If the test lamp is always OFF**
    1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module.
    2. Test for infinite resistance between the control circuit and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K9 Body Control Module.
    - **If the test lamp is always ON**
    1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module, ignition ON.
    2. Test for less than 1 V between the control circuit terminal and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V, replace the K9 Body Control Module.
    - **If the test lamp turns ON and OFF**
4. Test or replace the appropriate courtesy lamp.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Sunshade Replacement (Crew Cab, Extended Cab)** **Sunshade Replacement (Regular Cab)**
- **Center Reading and Courtesy Lamp Replacement**
- **Control Module References** for BCM replacement, programming, and setup

DTC B2530: FRONT FOG LAMPS

cardiagn.com

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B2530 01

Front Fog Lamps Control Circuit Short to Battery

DTC B2530 02

Front Fog Lamps Control Circuit Short to Ground

DTC B2530 04

Front Fog Lamps Control Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Front Fog Lamp Switch Signal	B2740 00	1	1	-
Front Fog Lamp Relay Control	B2530 02	B2530 04	B2530 01	-
Front Fog Lamp Control	1	1	1	-
Headlamp Switch Ground	-	1	-	-
Front Fog Lamp Ground - Left	-	1	-	-
Front Fog Lamp Ground - Right	-	1	-	-
1. Front Fog Lamps Malfunction				

Circuit/System Description

The front fog lamp relay is supplied with battery voltage at all times. The front fog lamp switch signal circuit is grounded momentarily by pressing the front fog lamp switch. The body control module (BCM) energizes the front fog lamp relay by applying ground to the front fog lamp relay control circuit. When the front fog lamp relay is energized, the relay switch contacts close and battery voltage is applied through the F49UA fog lamp fuse to the front fog lamp control circuit which illuminates the front fog lamps.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- Front fog lamps ON.

Conditions for Setting the DTC

DTC B2530 01

The BCM detects a short to voltage in the front fog lamp relay control circuit for 5 s or greater.

DTC B2530 02

cardiagn.com

The BCM detects a short to ground in the front fog lamp relay control circuit.

DTC B2530 04

The BCM detects an open/high resistance in the front fog lamp relay control circuit.

Actions Taken When the DTC Sets

The front fog lamps will not operate when the park lamps are ON and the front fog lamp switch is active.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Fog Lights Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.
2. Verify a test lamp illuminates between the control circuit terminal 10 and ground.
    - **If the test lamp does not illuminate**

    1. Ignition OFF, disconnect the X3 harness connector at the X50A Fuse Block - Underhood.
    2. Test for infinite resistance between the control circuit terminal and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.

cardiagn.com

- If less than 2 Ω, replace the X50A Fuse Block - Underhood.

- **If the test lamp illuminates**

3. Ignition OFF, connect a 3 A fused jumper between the control circuit terminal 10 and ground.
4. Remove the F49UA fog lamp fuse at the X50A Fuse Block - Underhood, ignition ON.
5. Verify a test lamp illuminates between the F49UA fog lamp fuse B+ switch control terminal and ground.
    - **If the test lamp does not illuminate**
    1. Ignition OFF, disconnect the X3 harness connector at the X50A Fuse Block - Underhood, ignition ON.
    2. Test for less than 1 V between the control circuit terminal 10 and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V, replace the X50A Fuse Block - Underhood.
    - **If the test lamp illuminates**
6. Test or replace the K9 Body Control Module.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Underhood Electrical Center or Junction Block Replacement**
- **Control Module References** for BCM replacement, programming, and setup

DTC B2545: BACKUP LAMPS

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B2545 01

Backup Lamps Circuit Short to Battery

DTC B2545 02

Backup Lamps Circuit Short to Ground

DTC B2545 04

Backup Lamps Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
F7DL (BCM 5) Fuse B+	B127B 2B	B127B 2B	-	-
Backup Lamp Switch Signal	1	1	1	-

cardiagn.com

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Backup Lamp Relay Control	B2545 02	B127B 2B, B2545 04	B2545 01	-
Backup Lamp Control	1	1	1	-
Backup Lamp Relay Ground	-	1	-	-
Backup Lamp Switch Ground	-	1	-	-
Backup Lamp Ground - Left	-	1	-	-
Backup Lamp Ground - Right	-	1	-	-
1. Backup Lamps Malfunction				

Circuit/System Description

Automatic Transmission

The backup lamp relay is supplied with battery voltage at all times. With the engine running 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 energizes the backup lamp relay by applying battery voltage to the backup lamp relay control circuit. When the backup lamp relay is energized, the relay switch contacts close and battery voltage is applied through the backup lamp fuses to the backup lamp control circuits which illuminates 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 lamp relay control circuit. The engine must be running for the backup lamps to operate.

Manual Transmission

The engine control module (ECM) provides a signal circuit to the backup lamp switch which is permanently grounded. With the engine running and the transmission in the reverse position, the backup lamp switch signal circuit is pulled low and the ECM responds by sending a serial data message to the body control module (BCM). The message indicates that the gear selector is in the reverse position. The BCM energizes the backup lamp relay by applying battery voltage to the backup lamp relay control circuit. When the backup lamp relay is energized, the relay switch contacts close and battery voltage is applied through the backup lamp fuses to the backup lamp control circuits which illuminates the backup lamps. Once the driver moves the gear selector out of the reverse position, a message is sent by the ECM via serial data requesting the BCM to remove battery voltage from the backup lamp relay control circuit. The engine must be running for the backup lamps to operate.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- Engine RUNNING.
- Transmission placed in REVERSE gear.

Conditions for Setting the DTC

DTC B2545 01

The BCM detects a short to voltage in the backup lamps relay control circuit.

DTC B2545 02

cardiagn.com

The BCM detects a short to ground in the backup lamps relay control circuit.

DTC B2545 04

The BCM detects an open/high resistance in the backup lamps relay control circuit.

Actions Taken When the DTC Sets

The backup lamps will not operate.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

- **Exterior Lights Schematics**
- **Body Control System Schematics**

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module.
2. Verify a test lamp illuminates between the control circuit terminal 26 and B+.

NOTE: **The test lamp will illuminate at low intensity.**

- **If the test lamp does not illuminate**

1. Ignition OFF, disconnect the X4 harness connector at the X50A Fuse Block - Underhood, ignition ON.
2. Test for less than 1 V between the control circuit terminal 26 and ground.

cardiagn.com

- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V

3. Test for less than 2 Ω in the control circuit end to end.
   - If 2 Ω or greater, repair the open/high resistance in the circuit.
   - If less than 2 Ω, replace the X50A Fuse Block - Underhood.

- **If the test lamp illuminates**

3. Connect a 3 A fused jumper between the control circuit terminal 26 and B+, ignition ON.
4. Verify the backup lamps illuminate.
   - **If the backup lamps do not illuminate**
   1. Ignition OFF, disconnect the X4 harness connector at the X50A Fuse Block - Underhood.
   2. Test for infinite resistance between the control circuit terminal 26 and ground.
      - If less than infinite resistance, repair the short to ground on the circuit.
      - If infinite resistance, replace the X50A Fuse Block - Underhood.
   - **If the backup lamps illuminate**
5. Test or replace the K9 Body Control Module.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Underhood Electrical Center or Junction Block Replacement**
- **Control Module References** for BCM replacement, programming, and setup

DTC B255D: PASSENGER COMPARTMENT LAMP CONTROL 2

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B255D 01

Passenger Compartment Lamp Control 2 Circuit Short to Battery

DTC B255D 02

Passenger Compartment Lamp Control 2 Circuit Short to Ground

DTC B255D 04

Passenger Compartment Lamp Control 2 Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance

cardiagn.com

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Courtesy Lamps Control - Terminal 23 X1	B255D 02	B255D 04	B255D 01	-
Accent Lamp - Driver Door Ground	-	1	-	-
Accent Lamp - Driver Door Handle Ground	-	1	-	-
Accent Lamp - Left Rear Door Ground	-	1	-	-
Accent Lamp - Left Rear Door Handle Ground	-	1	-	-
Accent Lamp - Overhead Console Ground	-	1	-	-
Accent Lamp - Passenger Door Ground	-	1	-	-
Accent Lamp - Passenger Door Handle Ground	-	1	-	-
Accent Lamp - Right Rear Door Ground	-	1	-	-
Accent Lamp - Right Rear Door Handle Ground	-	1	-	-
Flood Lamp - Driver Door Handle Ground	-	1	-	-
Flood Lamp - Left Rear Door Pocket Ground	-	1	-	-
Flood Lamp - Passenger Door Handle Ground	-	1	-	-
Flood Lamp - Right Rear Door Pocket Ground	-	1	-	-
1. Interior Accent Lighting Malfunction				

Circuit/System Description

The body control module (BCM) supplies battery voltage to accent lighting lamps via the accent lamp control circuit. When a door is opened the BCM applies battery voltage to the accent lamp control circuit illuminating all of the accent lighting. The accent lighting will remain illuminated until all doors are closed and the ignition is OFF. The accent lighting remains illuminated with the ignition ON.

Conditions for Running the DTC

Battery voltage must be between 9-16 V.

Conditions for Setting the DTC

DTC B255D 01

The BCM detects a short to voltage in the courtesy lamps control circuit terminal 23 X1.

DTC B255D 02

cardiagn.com

The BCM detects a short to ground in the courtesy lamps control circuit terminal 23 X1.

DTC B255D 04

The BCM detects an open/high resistance in the courtesy lamps control circuit terminal 23 X1.

Actions Taken When the DTC Sets

The BCM will disable the courtesy lamps control circuit terminal 23 X1.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Interior Lights Schematics (E29) Interior Lights Schematics (without E29)

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Interior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

NOTE: **Each component may need to be disconnected to isolate a short to voltage, short to ground, or an open/high resistance. Use the schematics to identify the following:**

- **Courtesy lamps the vehicle is equipped with**
- **Each component's control and ground circuit terminals**
- **Component locations on the exterior courtesy lamps control circuit**

1. Ignition OFF, all doors closed, all accessories OFF, disconnect the harness connector at the inoperative component. It may take up to 2 minutes for all vehicle systems to power down.

cardiagn.com

2. Test for less than 10 Ω between the appropriate ground circuit terminal and ground.
    - **If 10 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.
    - **If less than 10 Ω**
3. Connect a test lamp between the appropriate control circuit terminal and ground.
4. Verify the test lamp turns ON and OFF when commanding the Accent Lighting 2 ON and OFF with a scan tool.
    - **If the test lamp is always OFF**
    1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.
    2. Test for infinite resistance between the control circuit and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K9 Body Control Module.
    - **If the test lamp is always ON**
    1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.
    2. Test for less than 1 V between the control circuit terminal and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V, replace the K9 Body Control Module.
    - **If the test lamp turns ON and OFF**
5. Test or replace the appropriate courtesy lamp.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Front Side Door Inside Handle Illumination Lamp Replacement**
- **Control Module References** for BCM replacement, programming, and setup

DTC B255F: INTERIOR DOOR HANDLE BACKLIGHT

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B255F 02

Interior Door Handle Backlight Circuit Short to Ground

cardiagn.com

DTC B255F 04

Interior Door Handle Backlight Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Accent Lamp Control - Terminal 22 X7	B255F 02	B255F 04	1	-
Accent Lamp Control - Terminal 23 X1	1	1	1	-
Accent Lamp - Driver Door Handle Ground	-	1	-	-
Accent Lamp - Passenger Door Handle Ground	-	1	-	-
Accent Lamp - Overhead Console Ground	-	1	-	-
1. Interior Accent Lighting Malfunction				

Circuit/System Description

The body control module (BCM) supplies battery voltage to accent lighting lamps via the accent lamp control circuit. When a door is opened the BCM applies battery voltage to the accent lamp control circuit illuminating all of the accent lighting. The accent lighting will remain illuminated until all doors are closed and the ignition is OFF. The accent lighting remains illuminated with the ignition ON.

Conditions for Running the DTC

Battery voltage must be between 9-16 V.

Conditions for Setting the DTC

DTC B255F 02

The BCM detects a short to ground in the accent lamp control circuit terminal 22 X7

DTC B255F 04

The BCM detects an open/high resistance in the accent lamp control circuit terminal 22 X7

Actions Taken When the DTC Sets

The BCM will disable the accent lamp control circuit.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- Ignition OFF, wait 30 seconds.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

cardiagn.com

Schematic Reference

Interior Lights Schematics (E29) **Interior Lights Schematics (without E29)**

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Interior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the component listed below with the inoperative LED backlighting.
    - E1C Accent Lamp - Driver Door Handle
    - E1M Accent Lamp - Passenger Door Handle
2. Connect a test lamp between the control circuit terminal 1 and ground.
3. Verify the test lamp turns ON and OFF when commanding the Accent Lighting 1 ON and OFF with a scan tool.
    - **If the test lamp is always OFF**
    1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module.
    2. Test for infinite resistance between the control circuit and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K9 Body Control Module.
    - **If the test lamp is always ON**
    1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module, ignition ON.
    2. Test for less than 1 V between the control circuit terminal and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V, replace the K9 Body Control Module.
    - **If the test lamp turns ON and OFF**
4. Test or replace the appropriate accent lamp.

cardiagn.com

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Front Side Door Inside Handle Illumination Lamp Replacement**
- **Control Module References** for BCM replacement, programming, and setup

DTC B2560: CARGO LAMPS

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B2560 01

Cargo Lamps Control Circuit Short to Battery

DTC B2560 02

Cargo Lamps Control Circuit Short to Ground

DTC B2560 04

Cargo Lamps Control Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Cargo Lamps Relay Control	B2560 02	B2560 04	B2560 01	-
Cargo Lamps Control	1	1	1	-
Cargo Lamps Switch Signal	B256B 00	1	1	-
Cargo Lamps Ground	1	1	1	-
Cargo Lamps Relay Ground	-	1	-	-
Cargo Lamps Switch Ground	-	B2560 01	-	-
1. Cargo Lamps Malfunction				

Circuit/System Description

The cargo lamp relay is supplied with battery voltage at all times. The cargo lamp switch signal circuit is grounded momentarily by pressing the cargo lamp switch. The body control module (BCM) energizes the cargo lamp relay by applying ground to the cargo lamp relay control circuit. When the cargo lamp relay is energized, the relay switch contacts close and battery voltage is applied through the F9DR fuse to the cargo lamp control circuit which illuminates the cargo lamps.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.

cardiagn.com

- Cargo lamps ON.

Conditions for Setting the DTC

DTC B2560 01

The BCM detects a short to voltage in the cargo lamp relay control circuit for 5 seconds or greater.

The BCM detects an open/high resistance in the cargo lamp switch ground circuit.

DTC B2560 02

The BCM detects a short to ground in the cargo lamp relay control circuit.

DTC B2560 04

The BCM detects an open/high resistance in the cargo lamp relay control circuit.

Actions Taken When the DTC Sets

The cargo lamps are inoperative.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

- **Exterior Lights Schematics**
- **Interior Lights Schematics (E29)** **Interior Lights Schematics (without E29)**

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Interior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

cardiagn.com

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, open and close drivers door, disconnect the X1 harness connector at the S48A Multifunction Switch - Instrument Panel. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 15 Ω between the ground circuit terminal 14 and ground.
    - **If 15 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.
    - **If less than 15 Ω**
3. Disconnect the X6 harness connector at the K9 Body Control Module, ignition ON.
4. Verify a test lamp illuminates between the control circuit terminal 26 and B+.
    - **If the test lamp does not illuminate**
    1. Ignition OFF, disconnect the X2 harness connector at the X51R Fuse Block - Instrument Panel Right, ignition ON.
    2. Test for less than 1 V between the control circuit terminal 26 and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the X51R Fuse Block - Instrument Panel Right.
    - **If the test lamp illuminates**
5. Ignition OFF, connect a 3 A fused jumper between the control circuit terminal 26 and B+, ignition ON.
6. Verify the cargo lamps illuminate.
    - **If the cargo lamps do not illuminate**
    1. Ignition OFF, disconnect the X2 harness connector at the X51R Fuse Block - Instrument Panel Right.
    2. Test for infinite resistance between the control circuit terminal and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance, replace the X51R Fuse Block - Instrument Panel Right.
    - **If the cargo lamps illuminate**
7. Test or replace the K9 Body Control Module.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Underhood Electrical Center or Junction Block Replacement**
- **Control Module References** for BCM replacement, programming, and setup

DTC B256B: CARGO LAMPS SWITCH

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.

cardiagn.com

- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B256B 00

Cargo Lamps Switch Circuit Malfunction

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Cargo Lamps Relay Control	B2560 02	B2560 04	B2560 01	-
Cargo Lamps Control	1	1	1	-
Cargo Lamps Switch Signal	B256B 00	1	1	-
Cargo Lamps Ground	1	1	1	-
Cargo Lamps Relay Ground	-	1	-	-
Cargo Lamps Switch Ground	-	B2560 01	-	-
1. Cargo Lamps Malfunction				

Circuit/System Description

The cargo lamp relay is supplied with battery voltage at all times. The cargo lamp switch signal circuit is grounded momentarily by pressing the cargo lamp switch. The body control module (BCM) energizes the cargo lamp relay by applying ground to the cargo lamp relay control circuit. When the cargo lamp relay is energized, the relay switch contacts close and battery voltage is applied through the F9DR fuse to the cargo lamp control circuit which illuminates the cargo lamps.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- Cargo lamps ON.

Conditions for Setting the DTC

The BCM detects a short to ground in the cargo lamp switch signal circuit.

Actions Taken When the DTC Sets

The cargo lamps are inoperative.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

- **Exterior Lights Schematics**

cardiagn.com

- **Interior Lights Schematics (E29) Interior Lights Schematics (without E29)**

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, open and close drivers door, disconnect the X1 harness connector at the S48A Multifunction Switch - Instrument Panel. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 15 Ω between the ground circuit terminal 14 and ground.
   - **If 15 Ω or greater**
   1. Ignition OFF.
   2. Test for less than 2 Ω in the ground circuit end to end.
      - If 2 Ω or greater, repair the open/high resistance in the circuit.
      - If less than 2 Ω, repair the open/high resistance in the ground connection.
   - **If less than 15 Ω**
3. Ignition ON.
4. Verify the scan tool Pickup Bed Cargo Lamp Command parameter is 0 %.
   - **If not 0 %**
   1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.
   2. Test for infinite resistance between the signal circuit terminal 18 and ground.
      - If less than infinite resistance, repair the short to ground on the circuit.
      - If infinite resistance, replace the K9 Body Control Module.
   - **If 0 %**
5. Install a 3 A fused jumper wire between the signal circuit terminal 18 and ground.
6. Verify the scan tool Pickup Bed Cargo Lamp Command parameter is 100 %.
   - **If not 100 %**
   1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.
   2. Test for less than 1 V between the signal circuit terminal 18 and ground.

cardiagn.com

- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V

3. Test for less than 2 Ω in the signal circuit end to end.
   - If 2 Ω or greater, repair the open/high resistance in the circuit.
   - If less than 2 Ω, replace the K9 Body Control Module.

- **If 100 %**

7. Test or replace the S48A Multifunction Switch - Instrument Panel.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Vehicle Stability Control System Switch Replacement**
- **Control Module References** for BCM replacement, programming, and setup

DTC B2575 OR B2699: HEADLAMPS CONTROL

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B2575 01

Headlamps Control Circuit Short to Battery

DTC B2575 02

Headlamps Control Circuit Short to Ground

DTC B2575 04

Headlamps Control Circuit Open

DTC B2699 01

Right Headlamp Control Circuit Short to Battery

DTC B2699 02

Right Headlamp Control Circuit Short to Ground

DTC B2699 04

Right Headlamp Control Circuit Open

Diagnostic Fault Information

Circuit	Short to	Open/High	Short to	Signal

cardiagn.com

	Ground	Resistance	Voltage	Performance
F6DL (BCM 3) Fuse B+	1	1	-	-
F6DR (BCM 4) Fuse B+	1	1	-	-
Low Beam Headlamp Control - Left	B2575 02	B2575 04	B2575 01	-
Low Beam Headlamp Control - Right	B2699 02	B2699 04	B2699 01	-
Headlamp Ground - Left	-	1	-	-
Headlamp Ground - Right	-	1	-	-
1. Headlamps Malfunction				

Circuit/System Description

With the headlamp switch in the ON position, the headlamp switch headlamp ON signal circuit is grounded through the headlamp switch. The body control module (BCM) responds by applying battery positive voltage to the left and right low beam headlamp control circuits illuminating the low beam headlamps.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- Low beam headlamps ON.

Conditions for Setting the DTC

DTC B2575 01 and B2575 04

The BCM detects a short to voltage or an open/high resistance in the left low beam headlamp control circuit.

DTC B2575 02

The BCM detects a short to ground in the left low beam headlamp control circuit.

DTC B2699 01 and B2699 04

The BCM detects a short to voltage or an open/high resistance in the right low beam headlamp control circuit.

DTC B2699 02

The BCM detects a short to ground in the right low beam headlamp control circuit.

Actions Taken When the DTC Sets

- When DTC B2575 sets, the left low beam headlamp will be inoperative.
- When DTC B2699 sets, the right low beam headlamp will be inoperative.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

cardiagn.com

Schematic Reference

- **Headlights/Daytime Running Lights (DRL) Schematics**
- **Body Control System Schematics**

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

DTC B2575

1. Ignition OFF, exterior lamps OFF, disconnect the harness connector at the appropriate component listed below. It may take up to 2 min for all vehicle systems to power down.
    - E4G Headlamp - Left Low Beam (halogen)
    - E13LA Headlamp Assembly - Left (LED)
2. Test for less than 10 Ω between the appropriate ground circuit terminal listed below and ground.
    - E4G Headlamp - Left Low Beam terminal 2 (halogen)
    - E13LA Headlamp Assembly - Left terminal 1 (LED)
    - **If 10 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.
    - **If less than 10 Ω**
3. Connect a test lamp between the appropriate control circuit terminal listed below and ground, ignition ON.
    - E4G Headlamp - Left Low Beam terminal 1 (halogen)
    - E13LA Headlamp Assembly - Left terminal 2 (LED)
4. Verify the test lamp turns ON and OFF when commanding the Left Low Beam/Daytime Running Lamp ON and OFF with a scan tool.

cardiagn.com

- **If the test lamp is always OFF**

1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.
2. Test for infinite resistance between the control circuit and ground.
    - If less than infinite resistance, repair the short to ground on the circuit.
    - If infinite resistance
3. Test for less than 2 Ω in the control circuit end to end.
    - If 2 Ω or greater, repair the open/high resistance in the circuit.
    - If less than 2 Ω, replace the K9 Body Control Module.

- **If the test lamp is always ON**

1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module, ignition ON.
2. Test for less than 1 V between the control circuit terminal and ground.
    - If 1 V or greater, repair the short to voltage on the circuit.
    - If less than 1 V, replace the K9 Body Control Module.

- **If the test lamp turns ON and OFF**

5. Test or replace the Headlamp - Left Low Beam.

DTC B2699

1. Ignition OFF, exterior lamps OFF, disconnect the harness connector at the appropriate component listed below. It may take up to 2 min for all vehicle systems to power down.
    - E4H Headlamp - Right Low Beam (halogen)
    - E13RA Headlamp Assembly - Right (LED)
2. Test for less than 10 Ω between the appropriate ground circuit terminal listed below and ground.
    - E4H Headlamp - Right Low Beam terminal 2 (halogen)
    - E13RA Headlamp Assembly - Right terminal 1 (LED)
    - **If 10 Ω or greater**

    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.

    - **If less than 10 Ω**

3. Connect a test lamp between the appropriate control circuit terminal listed below and ground, ignition ON.
    - E4H Headlamp - Right Low Beam terminal 1 (halogen)
    - E13RA Headlamp Assembly - Right terminal 2 (LED)
4. Verify the test lamp turns ON and OFF when commanding the Right Low Beam/Daytime Running Lamp ON and OFF with a scan tool.
    - **If the test lamp is always OFF**

    1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.
    2. Test for infinite resistance between the control circuit and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance

cardiagn.com

3. Test for less than 2 Ω in the control circuit end to end.
    - If 2 Ω or greater, repair the open/high resistance in the circuit.
    - If less than 2 Ω, replace the K9 Body Control Module.
- **If the test lamp is always ON**

1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module, ignition ON.
2. Test for less than 1 V between the control circuit terminal and ground.
    - If 1 V or greater, repair the short to voltage on the circuit.
    - If less than 1 V, replace the K9 Body Control Module.
- **If the test lamp turns ON and OFF**

5. Test or replace the Headlamp - Right Low Beam.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Headlamp Replacement (GMC 1500)** **Headlamp Replacement (Chevrolet - Left Side)** **Headlamp Replacement (Chevrolet - Right Side)** **Headlamp Replacement (GMC 2500, 3500)**
- **Headlamp Bulb Replacement - Left Side (GMC HD)** **Headlamp Bulb Replacement - Left Side (Chevrolet HD Low beam)** **Headlamp Bulb Replacement - Left Side (Chevrolet HD HIgh Beam)** **Headlamp Bulb Replacement - Left Side (LD)**
- **Headlamp Bulb Replacement - Right Side (GMC HD)** **Headlamp Bulb Replacement - Right Side (LD)** **Headlamp Bulb Replacement - Right Side (Chevrolet HD Low Beam)** **Headlamp Bulb Replacement - Right Side (Chevrolet HD High Beam)**
- **Control Module References** for BCM replacement, programming, and setup

DTC B257A: HEADLAMP SWITCH

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B257A 00

Headlamp Switch Input Signals Correlation Malfunction

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Headlamp Switch Park Lamps ON Signal	2	B257A 00	2	-
Headlamp Switch Headlamps OFF Signal	B257A 00	1	1	-
Headlamp Switch Headlamps ON Signal	B257A 00	1	1	-

cardiagn.com

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Headlamp Switch Ground	-	1, 2	-	-
1. Headlamps Malfunction 2. Park, License, and/or Tail Lamps Malfunction				

Circuit/System Description

For headlamp operation, the body control module (BCM) monitors three signal circuits from the headlamp switch. When the headlamp switch is in the AUTO position, the three signal circuits are unaffected and the BCM relies on the ambient light sensor input to turn the headlamps and daytime running lamps ON and OFF. When the headlamp switch is placed in the OFF position, the headlamp switch headlamps OFF signal circuit is grounded, indicating to the BCM that the exterior lamps should be turned OFF. With the headlamp switch in the PARK LAMPS position, the headlamp switch park lamps ON signal circuit is grounded, indicating that the park lamps have been requested. When the headlamp switch is in the HEADLAMP position, both the headlamp switch park lamps ON signal circuit and the headlamp switch headlamps ON signal circuit are grounded. The BCM responds by commanding the park lamps and low beam headlamps ON.

Conditions for Running the DTC

Battery voltage must be between 9-16 V.

Conditions for Setting the DTC

- The BCM detects an open/high resistance in the headlamp switch park lamps ON signal circuit.
- The BCM detects a short to ground in the headlamp switch headlamps ON signal circuit.
- The BCM detects a short to ground in the headlamp switch headlamps OFF signal circuit.

Actions Taken When the DTC Sets

- When DTC B257A 00 is present on the headlamp switch headlamps OFF signal circuit, the low beam headlamps are always OFF in the AUTO position. The headlamp switch operates in all positions other than AUTO. The AUTO headlamp defeat is inoperative.
- When DTC B257A 00 is present on the headlamp switch headlamps ON signal circuit, the low beam headlamps are always ON. The BCM disregards all headlamp switch inputs.
- When DTC B257A 00 is present on the headlamp switch park lamps ON signal circuit, the park lamps and low beam headlamps are inoperative in the PARK and HEAD positions. Headlamps and park lamps operate in AUTO position.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Headlights/Daytime Running Lights (DRL) Schematics

Connector End View Reference

cardiagn.com

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, disconnect the harness connector at the S30 Headlamp Switch. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 15 Ω between the ground circuit terminal 8 and ground.
    - **If 15 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.
    - **If less than 15 Ω**
3. Ignition ON.
4. Verify the scan tool Automatic Headlamps Disable Switch parameter is Inactive.
    - **If not Inactive**
    1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.
    2. Test for infinite resistance between the signal circuit terminal 3 and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance, replace the K9 Body Control Module.
    - **If Inactive**
5. Install a 3 A fused jumper wire between the signal circuit terminal 3 and ground.
6. Verify the scan tool Automatic Headlamps Disable Switch parameter is Active.
    - **If not Active**
    1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.
    2. Test for less than 1 V between the signal circuit terminal 3 and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V
    3. Test for less than 2 Ω in the signal circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.

cardiagn.com

- If less than 2 Ω, replace the K9 Body Control Module.

- **If Active**

7. Verify the scan tool Park Lamps Switch parameter is Inactive.
   - **If not Inactive**
   1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.
   2. Test for infinite resistance between the signal circuit terminal 5 and ground.
      - If less than infinite resistance, repair the short to ground on the circuit.
      - If infinite resistance, replace the K9 Body Control Module.
   - **If Inactive**
8. Install a 3 A fused jumper wire between the signal circuit terminal 5 and ground.
9. Verify the scan tool Park Lamps Switch parameter is Active.
   - **If not Active**
   1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.
   2. Test for less than 1 V between the signal circuit terminal 5 and ground.
      - If 1 V or greater, repair the short to voltage on the circuit.
      - If less than 1 V
   3. Test for less than 2 Ω in the signal circuit end to end.
      - If 2 Ω or greater, repair the open/high resistance in the circuit.
      - If less than 2 Ω, replace the K9 Body Control Module.
   - **If Active**
10. Verify the scan tool Headlamps On Switch parameter is Inactive.
    - **If not Inactive**
    1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.
    2. Test for infinite resistance between the signal circuit terminal 1 and ground.
       - If less than infinite resistance, repair the short to ground on the circuit.
       - If infinite resistance, replace the K9 Body Control Module.
    - **If Inactive**
11. Install a 3 A fused jumper wire between the signal circuit terminal 1 and ground.
12. Verify the scan tool Headlamps On Switch parameter is Active.
    - **If not Active**
    1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.
    2. Test for less than 1 V between the signal circuit terminal 1 and ground.
       - If 1 V or greater, repair the short to voltage on the circuit.
       - If less than 1 V
    3. Test for less than 2 Ω in the signal circuit end to end.
       - If 2 Ω or greater, repair the open/high resistance in the circuit.
       - If less than 2 Ω, replace the K9 Body Control Module.
    - **If Active**
13. Test or replace the S30 Headlamp Switch.

Repair Instructions

cardiagn.com

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Headlamp Switch Replacement**
- **Control Module References** for BCM replacement, programming, and setup

DTC B2580: HIGH BEAM CONTROL

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B2580 01

High Beam Control Circuit Short to Battery

DTC B2580 02

High Beam Control Circuit Short to Ground

DTC B2580 04

High Beam Control Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Headlamp High Beam Relay Control	B2580 02, B2580 04	B2580 02, B2580 04	B2580 01	-
High Beam Headlamp Control - Left	1	1	1	-
High Beam Headlamp Control - Right	1	1	1	-
Headlamp Assembly Ground - Left	-	1	-	-
Headlamp Assembly Ground - Right	-	1	-	-
1. Headlamps Malfunction				

Circuit/System Description

The high beam and flash to pass functions are contained within the turn signal/multifunction switch. The BCM provides the turn signal/multifunction switch with two signal circuits, the high beam signal circuit and the flash to pass signal circuit. 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 high beam fuse to the high beam control circuits illuminating the high beam headlamps.

cardiagn.com

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- High beam headlamps ON.

Conditions for Setting the DTC

DTC B2580 01

The BCM detects a short to voltage in the headlamp high beam relay control circuit.

DTC B2580 02 and DTC B2580 04

The BCM detects a short to ground or an open/high resistance in the headlamp high beam relay control circuit.

Actions Taken When the DTC Sets

The high beam headlamps and flash to pass will not operate.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Headlights/Daytime Running Lights (DRL) Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.
2. Verify a test lamp illuminates between the control circuit terminal 18 and ground.

cardiagn.com

- **If the test lamp does not illuminate**

1. Ignition OFF, disconnect the X3 harness connector at the X50A Fuse Block - Underhood.
2. Test for infinite resistance between the control circuit terminal and ground.
    - If less than infinite resistance, repair the short to ground on the circuit.
    - If infinite resistance
3. Test for less than 2 Ω in the control circuit end to end.
    - If 2 Ω or greater, repair the open/high resistance in the circuit.
    - If less than 2 Ω, replace the X50A Fuse Block - Underhood.

- **If the test lamp illuminates**

3. Ignition OFF, connect a 3 A fused jumper between the control circuit terminal 18 and ground.
4. Verify the high beam headlamps illuminate.
    - **If the high beam headlamps do not illuminate**

    1. Ignition OFF, disconnect the X3 harness connector at the X50A Fuse Block - Underhood, ignition ON.
    2. Test for less than 1 V between the control circuit terminal 18 and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V, replace the X50A Fuse Block - Underhood.

    - **If the high beam headlamps illuminate**

5. Test or replace the K9 Body Control Module.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Underhood Electrical Center or Junction Block Replacement**
- **Control Module References** for BCM replacement, programming, and setup

DTC B258A: LOW BEAM CONTROL

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B258A 01

Low Beam Control Circuit Short to Battery

DTC B258A 02

Low Beam Control Circuit Short to Ground

DTC B258A 04

Low Beam Control Circuit Open

cardiagn.com

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Headlamp Low Beam Relay Control	B258A 02, B258A 04	B258A 02, B258A 04, U1511 00, U1521 00	B258A 01, U1511 00, U1521 00	-
Low Beam Headlamp Control - Left	1	1	1	-
Low Beam Headlamp Control - Right	1	1	1	-
Headlamp Assembly Ground - Left	-	1	-	-
Headlamp Assembly Ground - Right	-	1	-	-
1. Headlamps Malfunction				

Circuit/System Description

With the headlamp switch in the ON position, the headlamp switch headlamp ON signal circuit is grounded through the headlamp switch. The body control module (BCM) responds 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 to the low beam control circuits illuminating the low beam headlamps.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- Low beam headlamps ON.

Conditions for Setting the DTC

DTC B258A 01

The BCM detects a short to voltage in the headlamp low beam relay control circuit.

DTC B258A 02 and B258A 04

The BCM detects a short to ground or an open/high resistance in the headlamp low beam relay control circuit.

Actions Taken When the DTC Sets

DTC B258A 01 or B258A 04

- The low beam headlamps will not operate.
- The driver information center will display "Left Low Beam Failure" and "Right Low Beam Failure".

DTC B258A 02

The low beam headlamps will always be ON.

Conditions for Clearing the DTC

cardiagn.com

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Headlights/Daytime Running Lights (DRL) Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.

NOTE: **The test lamp in the following step will illuminate at LOW intensity. This is normal circuit operation and does not indicate a circuit malfunction.**

2. Verify a test lamp illuminates between the control circuit terminal 13 and ground.
   - **If the test lamp does not illuminate**
   1. Ignition OFF, disconnect the X4 harness connector at the X50A Fuse Block - Underhood.
   2. Test for infinite resistance between the control circuit terminal and ground.
      - If less than infinite resistance, repair the short to ground on the circuit.
      - If infinite resistance
   3. Test for less than 2 Ω in the control circuit end to end.
      - If 2 Ω or greater, repair the open/high resistance in the circuit.
      - If less than 2 Ω, replace the X50A Fuse Block - Underhood.
   - **If the test lamp illuminates**
3. Ignition OFF, connect a 3 A fused jumper between the control circuit terminal 13 and ground.
4. Verify the low beam headlamps illuminate.
   - **If the low beam headlamps do not illuminate**

cardiagn.com

1. Ignition OFF, disconnect the X4 harness connector at the X50A Fuse Block - Underhood, ignition ON.
2. Test for less than 1 V between the control circuit terminal 13 and ground.
    - If 1 V or greater, repair the short to voltage on the circuit.
    - If less than 1 V, replace the X50A Fuse Block - Underhood.

- **If the low beam headlamps illuminate**

5. Test or replace the K9 Body Control Module.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Underhood Electrical Center or Junction Block Replacement**
- **Control Module References** for BCM replacement, programming, and setup

DTC B2600 OR B2605: DAYTIME RUNNING LAMPS CONTROL

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B2600 01

Left Daytime Running Lamps Control Circuit short to Battery

DTC B2600 02

Left Daytime Running Lamps Control Circuit Short to Ground

DTC B2600 04

Left Daytime Running Lamps Control Circuit Open

DTC B2605 01

Right Daytime Running Lamps Control Circuit short to Battery

DTC B2605 02

Right Daytime Running Lamps Control Circuit Short to Ground

DTC B2605 04

Right Daytime Running Lamps Control Circuit Open

Diagnostic Fault Information

Circuit	Short to	Open/High	Short to	Signal

cardiagn.com

	Ground	Resistance	Voltage	Performance
Ambient Light Sensor Signal	B2645 03	B2645 07	B2645 07	-
Daytime Running Lamp Control - Left	B2600 02	B2600 04	B2600 01	-
Daytime Running Lamp Control - Right	B2605 02	B2605 04	B2605 01	-
Ambient Light Sensor Low Reference	1	B2645 07, B0163 05, B0183 05,	1	-
Daytime Running Lamp Ground - Left	-	1	-	-
Daytime Running Lamp Ground - Right	-	1	-	-
1. Daytime Running Lamps Malfunction				

Circuit/System Description

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 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.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- Headlamp switch in AUTO position.

Conditions for Setting the DTC

DTC B2600 01

The BCM detects a short to voltage in the left DRL control circuit.

DTC B2600 02

The BCM detects a short to ground in the left DRL control circuit.

DTC B2600 04

The BCM detects an open/high resistance in the left DRL control circuit.

DTC B2605 01

The BCM detects a short to voltage in the right DRL control circuit.

DTC B2605 02

The BCM detects a short to ground in the right DRL control circuit.

cardiagn.com

DTC B2605 04

The BCM detects an open/high resistance in the right DRL control circuit.

Actions Taken When the DTC Sets

- When DTC B2600 sets, the left DRL will be inoperative.
- When DTC B2605 sets, the right DRL will be inoperative.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Headlights/Daytime Running Lights (DRL) Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, exterior lamps OFF, disconnect the harness connector at the appropriate E13 Headlamp Assembly.
2. Test for less than 10 Ω between the ground circuit terminal and ground.
    - **If 10 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.
    - **If less than 10 Ω**

cardiagn.com

3. Connect a test lamp between the control circuit terminal G and ground, ignition ON.
4. Verify the test lamp turns ON and OFF when commanding the appropriate Low Beam/Daytime Running Lamp Command ON and OFF with a scan tool.
    - **If the test lamp is always OFF**
    1. Ignition OFF, disconnect the appropriate harness connector listed below at the K9 Body Control Module.
        - X4 - left DRL
        - X5 - right DRL
    2. Test for infinite resistance between the control circuit and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K9 Body Control Module.
    - **If the test lamp is always ON**
    1. Ignition OFF, disconnect the appropriate harness connector listed below at the K9 Body Control Module.
        - X4 - left DRL
        - X5 - right DRL
    2. Test for less than 1 V between the control circuit terminal and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V, replace the K9 Body Control Module.
    - **If the test lamp turns ON and OFF**
5. Test or replace the appropriate E13 Headlamp Assembly.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Headlamp Replacement (GMC 1500)** **Headlamp Replacement (Chevrolet - Left Side)** **Headlamp Replacement (Chevrolet - Right Side)** **Headlamp Replacement (GMC 2500, 3500)**
- **Control Module References** for BCM replacement, programming, and setup

DTC B260D OR B260E: DAYTIME RUNNING LAMPS

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B260D 02

Left Daytime Running Lamps Control Circuit Short to Ground

cardiagn.com

DTC B260E 02

Right Daytime Running Lamps Control Circuit Short to Ground

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Ambient Light Sensor Signal	B2645 03	B2645 07	B2645 07	-
Park/Daytime Running Lamp - Left Control	B260D 02	1	1	-
Park/Daytime Running Lamp - Right Control	B260E 02	1	1	-
Ambient Light Sensor Low Reference	1	B2645 07, B0163 05, B0183 05,	1	-
Headlamp Assembly - Left Ground	-	1	-	-
Headlamp Assembly - Right Ground	-	1	-	-
1. Daytime Running Lamps Malfunction				

Circuit/System Description

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 V depending on outside lighting conditions. The body control module (BCM) provides a 5 V 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 lamps or automatic lamp control when the headlamp switch is in the AUTO position. In daylight conditions the BCM will command the designated daytime running lamps 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 daytime running lamps operation.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- Headlamp switch in AUTO position.

Conditions for Setting the DTC

DTC B260D 02

The BCM detects a short to ground in the left park/daytime running lamp control circuit.

DTC B260E 02

The BCM detects a short to ground in the right park/daytime running lamp control circuit.

Actions Taken When the DTC Sets

- When DTC B260D sets, the left park/daytime running lamp will be inoperative.
- When DTC B260E sets, the right park/daytime running lamp will be inoperative.

cardiagn.com

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Headlights/Daytime Running Lights (DRL) Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, exterior lamps OFF, disconnect the harness connector at the appropriate E13 Headlamp Assembly. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10 Ω between the appropriate ground circuit terminal listed below and ground.
    - E13LA Headlamp Assembly - Left terminal 1 (1500 with X88/Z88)
    - E13RA Headlamp Assembly - Right terminal 1 (1500 with X88/Z88)
    - E13LA Headlamp Assembly - Left terminal A (2500/3500 with Z88 and XLT)
    - E13RA Headlamp Assembly - Right terminal A (2500/3500 with Z88 and XLT)
    - **If 10 Ω or greater**

    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.

    - **If less than 10 Ω**
3. Connect a test lamp between the appropriate control circuit terminal listed below and ground, ignition ON.
    - E13LA Headlamp Assembly - Left terminal 8 (1500 with X88/Z88)

cardiagn.com

- E13RA Headlamp Assembly - Right terminal 8 (1500 with X88/Z88)
- E13LA Headlamp Assembly - Left terminal G (2500/3500 with Z88 and XLT)
- E13RA Headlamp Assembly - Right terminal G (2500/3500 with Z88 and XLT)

4. Verify the test lamp turns ON and OFF when commanding the appropriate Dedicated Daytime Running Lamp ON and OFF with a scan tool.
   - **If the test lamp is always OFF**
   1. Ignition OFF, disconnect the appropriate harness connector listed below at the K9 Body Control Module.
      - X4 - left daytime running lamp
      - X5 - right daytime running lamp
   2. Test for infinite resistance between the control circuit and ground.
      - If less than infinite resistance, repair the short to ground on the circuit.
      - If infinite resistance
   3. Test for less than 2 Ω in the control circuit end to end.
      - If 2 Ω or greater, repair the open/high resistance in the circuit.
      - If less than 2 Ω, replace the K9 Body Control Module.
   - **If the test lamp is always ON**
   1. Ignition OFF, disconnect the appropriate harness connector listed below at the K9 Body Control Module, ignition ON.
      - X4 - left daytime running lamp
      - X5 - right daytime running lamp
   2. Test for less than 1 V between the control circuit terminal and ground.
      - If 1 V or greater, repair the short to voltage on the circuit.
      - If less than 1 V, replace the K9 Body Control Module.
   - **If the test lamp turns ON and OFF**
5. Test or replace the park/daytime running lamp.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Headlamp Replacement (GMC 1500)** **Headlamp Replacement (Chevrolet - Left Side)** **Headlamp Replacement (Chevrolet - Right Side)** **Headlamp Replacement (GMC 2500, 3500)**
- **Control Module References** for BCM replacement, programming, and setup

DTC B2610: PASSENGER COMPARTMENT DIMMING 1

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B2610 02

cardiagn.com

Passenger Compartment Dimming 1 Circuit Short to Ground

DTC B2610 04

Passenger Compartment Dimming 1 Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
LED Backlight Dimming Control Terminal 8 X2	B2610 02	B2610 04	B2610 04	-
LED Backlight Dimming Control Terminal 9 X7	B2610 02	B2610 04	B2610 04	-
Dome Lamp Switch Ground	-	1	-	-
Dome/Reading Lamps - Front Overhead Console Left Ground	-	1	-	-
Dome/Reading Lamps - Front Overhead Console Right Ground	-	1	-	-
Dome/Reading Lamps - 2nd Row Ground	-	1	-	-
Door Lock Switch - Driver Ground	-	1	-	-
Door Lock Switch - Passenger Ground	-	1	-	-
Garage Door Opener Switch Ground	-	1	-	-
Headlamp Switch Ground	-	1	-	-
Multifunction Switch - Instrument Panel Ground	-	1	-	-
Passenger Air Bag Disable Indicator Ground	-	1	-	-
Roof Beacon Switch Ground	-	1	-	-
Seat Heating and Cooling Switch - Driver Ground	-	1	-	-
Seat Heating and Cooling Switch - Passenger Ground	-	1	-	-
Seat Memory Switch - Driver Ground	-	1	-	-
Sliding Rear Window Switch Ground	-	1	-	-
Steering Wheel Controls Switch - Right Ground	-	1	-	-
Steering Wheel Controls Switch - Left Ground	-	1	-	-
Trailer Brake Control Switch Ground	-	1	-	-

cardiagn.com

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Transfer Case Shift Control Switch Ground	-	1	-	-
Window Switch - Driver Ground	-	1	-	-
1. Interior Backlighting Malfunction				

Circuit/System Description

The instrument panel dimmer switch is used to increase and decrease the brightness of the interior backlighting components. The dimmer switch provides a voltage signal to the body control module (BCM) that will increase as the brightness of the lights are increased and decrease as the brightness of the lights are decreased. The BCM provides a low reference, signal, and B+ voltage reference circuits to the dimmer switch. When the dimmer switch is placed in the desired position, the dimmed voltage setting is applied from the dimmer switch through the dimmer switch signal circuit to the BCM. The BCM interprets the signal and applies a pulse width modulated (PWM) voltage through the light emitting diode (LED) dimming control circuits illuminating the interior backlighting to the requested level of brightness.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- Park lamps ON.

Conditions for Setting the DTC

DTC B2610 02

The BCM detects a short to ground in the LED backlight dimming control 1 circuit terminal 8 X2 or LED backlight dimming control 2 circuit terminal 9 X7.

DTC B2610 04

The BCM detects a short to voltage or an open/high resistance in the LED backlight dimming control 1 circuit terminal 8 X2 or LED backlight dimming control 2 circuit terminal 9 X7.

Actions Taken When the DTC Sets

The BCM will disable the LED backlight dimming control circuits.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- Disconnect the negative battery cable for 30 seconds.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Interior Lights Dimming Schematics

Connector End View Reference

cardiagn.com

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Interior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

NOTE: **Each component with backlighting may need to be disconnected to isolate a short to voltage or short to ground. Use the schematics to identify the following:**

- **Backlighting components the vehicle is equipped with**
- **Each component's control and ground circuit terminals**
- **Component locations on the backlighting control circuit**

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, open and close drivers door, disconnect the harness connector at the component with inoperative backlighting. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 15 Ω between the appropriate ground circuit terminal and ground.
   - **If 15 Ω or greater**
   1. Ignition OFF.
   2. Test for less than 2 Ω in the ground circuit end to end.
      - If 2 Ω or greater, repair the open/high resistance in the circuit.
      - If less than 2 Ω, repair the open/high resistance in the ground connection.
   - **If less than 15 Ω**
3. Connect a test lamp between the appropriate control circuit terminal and ground.
4. Verify the test lamp turns ON and OFF when commanding the LED Backlight Dimming ON and OFF with a scan tool.
   - **If the test lamp is always OFF**
   1. Ignition OFF, disconnect the appropriate harness connector listed below at the K9 Body Control Module.
      - X2 terminal 8
      - X7 terminal 9
   2. Test for infinite resistance between the control circuit and ground.
      - If less than infinite resistance, repair the short to ground on the circuit.

cardiagn.com

- If infinite resistance

3. Test for less than 2 Ω in the control circuit end to end.
    - If 2 Ω or greater, repair the open/high resistance in the circuit.
    - If less than 2 Ω, replace the K9 Body Control Module.

- **If the test lamp is always ON**

1. Ignition OFF, disconnect the appropriate harness connector listed below at the K9 Body Control Module, ignition ON.
    - X2 terminal 8
    - X7 terminal 9
2. Test for less than 1 V between the control circuit terminal and ground.
    - If 1 V or greater, repair the short to voltage on the circuit.
    - If less than 1 V, replace the K9 Body Control Module.

- **If the test lamp turns ON and OFF**

5. Test or replace the component with inoperative backlighting.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Headlamp Switch Replacement**
- **Emergency Vehicle Roof Lamp Switch Replacement**
- **Radio Control Switch Replacement - Steering Wheel**
- **Instrument Panel Airbag Arming Status Display Replacement**
- **Driver or Passenger Seat Heater Switch Replacement**
- **Front Seat Adjuster Memory Switch Replacement (with A45)**
- **Door Lock Switch Replacement - Driver Side (With A31)** **Door Lock Switch Replacement - Driver Side (Without A31)**
- **Door Lock Switch Replacement - Passenger Front (With A31)** **Door Lock Switch Replacement - Passenger Front (Without A31)**
- **Front Side Door Window Control Switch Replacement**
- **Center Reading and Courtesy Lamp Replacement**
- **Control Module References** for BCM replacement, programming, and setup

DTC B2615: PASSENGER COMPARTMENT DIMMING 2

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B2615 02

Passenger Compartment Dimming 2 Circuit Short to Ground

cardiagn.com

DTC B2615 04

Passenger Compartment Dimming 2 Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Dome Lamps Control - Terminal 1 X7	B2615 02	B2615 04	2	-
Dome/Reading Lamps - Front Overhead Console Left Ground	-	1, 2	-	-
Dome/Reading Lamps - Front Overhead Console Right Ground	-	1, 2	-	-
Dome/Reading Lamps - 2nd Row Ground	-	1, 2	-	-
1. Courtesy Lamps Malfunction 2. Dome Lamps Malfunction				

Circuit/System Description

The body control module (BCM) applies battery voltage to the dome/reading lamps through the dome/reading lamp control circuit. When any door is opened, the jam switch contacts close and the BCM receives a door-ajar input. If the BCM receives a door lock or unlock input or a rear hatch open input, the BCM will activate the dome/reading lamp control circuit, providing battery voltage to dome/reading lamps. In the event that any of these courtesy lamps were to remain illuminated for more than 10 minutes with the ignition switch in the OFF position, the BCM will deactivate the courtesy lamp control circuit to prevent total battery discharge.

Conditions for Running the DTC

Battery voltage must be between 9-16 V.

Conditions for Setting the DTC

The BCM detects a short to ground in the dome lamps control circuit terminal 1 X7.

Actions Taken When the DTC Sets

The BCM will disable the dome lamps control circuit.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Interior Lights Schematics (E29) Interior Lights Schematics (without E29)

Connector End View Reference

cardiagn.com

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Interior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, open and close drivers door, disconnect the harness connectors at the components listed below.
    - E37B Dome/Reading Lamps - 2nd Row
    - E37EL Dome/Reading Lamps - Front Overhead Console Left
    - E37ER Dome/Reading Lamps - Front Overhead Console Right
2. Test for less than 15 Ω between the appropriate ground circuit terminal listed below and ground.
    - E37B Dome/Reading Lamps - 2nd Row terminal B
    - E37EL Dome/Reading Lamps - Front Overhead Console Left terminal 4
    - E37ER Dome/Reading Lamps - Front Overhead Console Right terminal 4
    - **If 15 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.
    - **If less than 15 Ω**
3. Connect a test lamp between the appropriate control circuit terminal listed below and ground.
    - E37B Dome/Reading Lamps - 2nd Row terminal C
    - E37EL Dome/Reading Lamps - Front Overhead Console Left terminal 1
    - E37ER Dome/Reading Lamps - Front Overhead Console Right terminal 1
4. Verify the test lamp turns ON and OFF when commanding the Courtesy Lamps ON and OFF with a scan tool.
    - **If the test lamp is always OFF**
    1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module.
    2. Test for infinite resistance between the control circuit and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance

cardiagn.com

3. Test for less than 2 Ω in the control circuit end to end.
    - If 2 Ω or greater, repair the open/high resistance in the circuit.
    - If less than 2 Ω, replace the K9 Body Control Module.
- **If the test lamp is always ON**

1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module, ignition ON.
2. Test for less than 1 V between the control circuit terminal and ground.
    - If 1 V or greater, repair the short to voltage on the circuit.
    - If less than 1 V, replace the K9 Body Control Module.
- **If the test lamp turns ON and OFF**

5. Test or replace the appropriate E37 Dome/Reading Lamp.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Center Reading and Courtesy Lamp Replacement**
- **Control Module References** for BCM replacement, programming, and setup

DTC B2625: DISPLAY DIMMING PULSE WIDTH

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B2625 01

Display Dimming Pulse Width Modulation Output Circuit Short to Battery

DTC B2625 02

Display Dimming Pulse Width Modulation Output Circuit Short to Ground

DTC B2625 04

Display Dimming Pulse Width Modulation Output Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Switch Indicator LED Backlight Dimming Control Terminal 5 X1	B0987 06, B2625 02	B0987 06, B2625 04	B2625 01	-
Lane Departure Switch Amber Indicator Control	1	B0987 06	B0987 01, B0987 0B	-
Park Assist Switch Amber Indicator Control	2	2	B0968 01	-

cardiagn.com

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
1. Lane Departure Warning System Malfunction 2. Parking Assist System Malfunction				

Circuit/System Description

The instrument panel dimmer switch is used to increase and decrease the brightness of the interior backlighting components. The instrument panel dimmer switch provides a voltage signal to the body control module (BCM) that will increase as the brightness of the lights are increased and decrease as the brightness of the lights are decreased. The BCM provides a low reference, signal, and B+ voltage reference to the instrument panel dimmer switch. When the instrument panel dimmer switch is placed in the desired position, the dimmed voltage setting is applied from the instrument panel dimmer switch through the instrument panel dimmer switch signal circuit to the BCM. The BCM interprets the signal and applies a pulse width modulated (PWM) voltage through the LED dimming 1 and dimming 2 control circuits illuminating the interior backlighting to the requested level of brightness.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- Park lamps ON.

Conditions for Setting the DTC

DTC B2625 01

The BCM detects a short to voltage in the LED backlight dimming control circuit terminal 5 X1.

DTC B2625 02

The BCM detects a short to ground in the LED backlight dimming control circuit terminal 5 X1.

DTC B2625 04

The BCM detects an open/high resistance in the LED backlight dimming control circuit terminal 5 X1.

Actions Taken When the DTC Sets

The LED backlight dimming control circuit driver is shut down.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- Disconnect the negative battery cable for 30 s.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

- **Interior Lights Dimming Schematics**
- **Object Detection Schematics**

cardiagn.com

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Interior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

NOTE: **Each component with backlighting may need to be disconnected to isolate a short to voltage or short to ground. Use the schematics to identify the following:**

- **Backlighting components the vehicle is equipped with**
- **Each component's control and ground circuit terminals**
- **Component locations on the backlighting control circuit**

1. Ignition OFF, disconnect the harness connector at the S48A Multifunction Switch - Instrument Panel, ignition ON.
2. Place the dimmer switch in the HIGH position for high backlighting intensity.
3. Verify a test lamp illuminates between the control circuit terminal 2 and ground.
   - **If the test lamp does not illuminate**
   1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.
   2. Test for infinite resistance between the control circuit and ground.
      - If less than infinite resistance, repair the short to ground on the circuit.
      - If infinite resistance
   3. Test for less than 2 Ω in the control circuit end to end.
      - If 2 Ω or greater, repair the open/high resistance in the circuit.
      - If less than 2 Ω, replace the K9 Body Control Module.
   - **If the test lamp illuminates**
4. Place the dimmer switch in the LOW position for low backlighting intensity.
5. Verify a test lamp does not illuminate at FULL intensity between the control circuit terminal 2 and ground.
   - **If the test lamp illuminates at full intensity**
   1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.

cardiagn.com

2. Test for less than 1 V between the control circuit terminal and ground.
    - If 1 V or greater, repair the short to voltage on the circuit.
    - If less than 1 V, replace the K9 Body Control Module.
- **If the test lamp does not illuminate at full intensity**

6. Test or replace the S48A Multifunction Switch - Instrument Panel.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Vehicle Stability Control System Switch Replacement**
- **Control Module References** for BCM replacement, programming, and setup

DTC B263A: EXTERIOR ILLUMINATION LAMP

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B263A 02

Exterior Illumination Lamp Circuit Short to Ground

DTC B263A 04

Exterior Illumination Lamp Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Exterior Courtesy Lamps Control Terminal 8 X7	B263A 02	B263A 04	1	-
Outside Rearview Mirror Courtesy Lamp - Driver Ground	-	1	-	-
Outside Rearview Mirror Courtesy Lamp - Passenger Ground	-	1	-	-
1. Exterior Courtesy Lamps Malfunction				

Circuit/System Description

The body control module (BCM) supplies battery voltage to the exterior door handles LED backlighting and the LED lighting located under each outside rearview mirror for approach lighting. When the keyless entry transmitter is operated to the lock/unlock functions the exterior LED lighting located under each outside rearview mirror for approach lighting are commanded ON.

cardiagn.com

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- Park lamps ON.

Conditions for Setting the DTC

DTC B263A 02

The BCM detects a short to ground in the exterior courtesy lamps control circuit.

DTC B263A 04

The BCM detects an open/high resistance in the exterior courtesy lamps control circuit.

Actions Taken When the DTC Sets

The BCM will disable the exterior courtesy lamps control circuit.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Exterior Lights Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Interior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

NOTE: **Each component may need to be disconnected to isolate a short to voltage, short to ground, or an open/high resistance. Use the schematics**

cardiagn.com

to identify the following:

- **Exterior courtesy lamps the vehicle is equipped with**
- **Each component's control and ground circuit terminals**
- **Component locations on the exterior courtesy lamps control circuit**

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, open and close drivers door, disconnect the harness connector at the appropriate E8Y Outside Rearview Mirror Courtesy Lamp. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 15 Ω between the ground circuit terminal 5 and ground.
   - **If 15 Ω or greater**
   1. Ignition OFF.
   2. Test for less than 2 Ω in the ground circuit end to end.
      - If 2 Ω or greater, repair the open/high resistance in the circuit.
      - If less than 2 Ω, repair the open/high resistance in the ground connection.
   - **If less than 15 Ω**
3. Connect a test lamp between the control circuit terminal 1 and ground.
4. Verify the test lamp turns ON and OFF when commanding the Outside Rearview Mirror Courtesy Lamps ON and OFF with a scan tool.
   - **If the test lamp is always OFF**
   1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module.
   2. Test for infinite resistance between the control circuit and ground.
      - If less than infinite resistance, repair the short to ground on the circuit.
      - If infinite resistance
   3. Test for less than 2 Ω in the control circuit end to end.
      - If 2 Ω or greater, repair the open/high resistance in the circuit.
      - If less than 2 Ω, replace the K9 Body Control Module.
   - **If the test lamp is always ON**
   1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module, ignition ON.
   2. Test for less than 1 V between the control circuit terminal and ground.
      - If 1 V or greater, repair the short to voltage on the circuit.
      - If less than 1 V, replace the K9 Body Control Module.
   - **If the test lamp turns ON and OFF**
5. Test or replace the appropriate E8Y Outside Rearview Mirror Courtesy Lamp.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Outside Rearview Mirror Courtesy Lamp Replacement**
- **Control Module References** for BCM replacement, programming, and setup

DTC B2645: AMBIENT LIGHT SENSOR

cardiagn.com

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B2645 03

Ambient Light Sensor Circuit Low Voltage

DTC B2645 07

Ambient Light Sensor Circuit High Voltage

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Ambient Light Sensor Signal	B2645 03	B2645 07	B2645 07	-
Daytime Running Lamp Control - Left	B2600 02	B2600 04	B2600 01	-
Daytime Running Lamp Control - Right	B2605 02	B2605 04	B2605 01	-
Ambient Light Sensor Low Reference	1	B2645 07, B0163 05, B0183 05,	1	-
Headlamp Assembly Ground - Left	-	1	-	-
Headlamp Assembly Ground - Right	-	1	-	-
1. Daytime Running Lamps Malfunction				

Circuit/System Description

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 V depending on outside lighting conditions. The body control module (BCM) provides a 5 V 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 lamps or automatic lamp control when the headlamp switch is in the AUTO position. In daylight conditions the BCM will command the daytime running lamps 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 daytime running lamps operation.

Conditions for Running the DTC

Battery voltage must be between 9-16 V.

Conditions for Setting the DTC

DTC B2645 03

cardiagn.com

The BCM detects a short to ground in the ambient light sensor signal circuit.

DTC B2645 07

- The BCM detects a short to voltage or an open/high resistance in the ambient light sensor signal circuit.
- The BCM detects an open/high resistance in the ambient light sensor low reference circuit.

Actions Taken When the DTC Sets

- Automatic headlamp system and daytime running lamps are inoperative.
- The BCM defaults to low light status and commands the low beam headlamps ON.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Headlights/Daytime Running Lights (DRL) Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, open and close drivers door, disconnect the harness connector at the B10B Ambient Light/Sunload Sensor. It may take up to 10 min for all vehicle systems to power down.
2. Test for less than 10 Ω between the low reference circuit terminal 6 and ground.
    - **If 10 Ω or greater**
    1. Ignition OFF, disconnect the X2 harness connector at the K33 HVAC Control Module.
    2. Test for less than 2 Ω in the low reference circuit end to end.

cardiagn.com

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω, replace the K33 HVAC Control Module.

- **If less than 10 Ω**

3. Ignition ON.
4. Verify the scan tool Ambient Light Sensor parameter is greater than 4.65 V.
   - **If 4.65 V or less**
   1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.
   2. Test for infinite resistance between the signal circuit terminal 5 and ground.
      - If less than infinite resistance, repair the short to ground on the circuit.
      - If infinite resistance, replace the K9 Body Control Module.
   - **If greater than 4.65 V**
5. Install a 3 A fused jumper wire between the signal circuit terminal 5 and the low reference circuit terminal 6.
6. Verify the scan tool Ambient Light Sensor parameter is less than 0.196 V.
   - **If 0.196 V or greater**
   1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.
   2. Test for less than 1 V between the signal circuit terminal 5 and ground.
      - If 1 V or greater, repair the short to voltage on the circuit.
      - If less than 1 V
   3. Test for less than 2 Ω in the signal circuit end to end.
      - If 2 Ω or greater, repair the open/high resistance in the circuit.
      - If less than 2 Ω, replace the K9 Body Control Module.
   - **If less than 0.196 V**
7. Test or replace the B10B Ambient Light/Sunload Sensor.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Sun Load Temperature and Headlamp Automatic Control Ambient Light Sensor Replacement**
- **Control Module References** for BCM or HVAC Control Module replacement, programming, and setup

DTC B2740: FRONT FOG LAMP SWITCH

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B2740 00

Front Fog Lamp Switch Circuit Malfunction

cardiagn.com

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Front Fog Lamp Switch Signal	B2740 00	2	2	-
Front Fog Lamp Relay Control	B2530 02	B2530 04	B2530 01	-
Front Fog Lamp Control	1	1	1	-
Headlamp Switch Ground	-	2	-	-
Front Fog Lamp Ground - Left	-	1	-	-
Front Fog Lamp Ground - Right	-	1	-	-
1. Front Fog Lamps Malfunction 2. Front Fog Lamp Switch Malfunction				

Circuit/System Description

The front fog lamp relay is supplied with battery voltage at all times. The front fog lamp switch signal circuit is grounded momentarily by pressing the front fog lamp switch. The body control module (BCM) energizes the front fog lamp relay by applying ground to the front fog lamp relay control circuit. When the front fog lamp relay is energized, the relay switch contacts close and battery voltage is applied through the F49UA fog lamp fuse to the front fog lamp control circuit which illuminates the front fog lamps. With the front fog lamp switch activated the BCM sends a message via serial data to the instrument cluster requesting the instrument cluster to illuminate the front fog indicator.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- Fog lamps On.

Conditions for Setting the DTC

The BCM detects a short to ground in the front fog lamp switch signal circuit.

Actions Taken When the DTC Sets

The front fog lamps are inoperative.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Fog Lights Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

cardiagn.com

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, disconnect the harness connector at the S30 Headlamp Switch. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 15 Ω between the ground circuit terminal 8 and ground.
    - **If 15 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.
    - **If less than 15 Ω**
3. Ignition ON.
4. Verify the scan tool Front Fog Lamps Switch parameter is Inactive.
    - **If not Inactive**
    1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.
    2. Test for infinite resistance between the signal circuit terminal 10 and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance, replace the K9 Body Control Module.
    - **If Inactive**
5. Install a 3 A fused jumper wire between the signal circuit terminal 10 and ground.
6. Verify the scan tool Front Fog Lamps Switch parameter is Active.
    - **If not Active**
    1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.
    2. Test for less than 1 V between the signal circuit terminal 10 and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V
    3. Test for less than 2 Ω in the signal circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K9 Body Control Module.
    - **If Active**
7. Test or replace the S30 Headlamp Switch.

cardiagn.com

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Headlamp Switch Replacement**
- **Control Module References** for BCM replacement, programming, and setup

DTC B3596: HAZARD LAMPS REQUEST

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B3596 00

Hazard Lamps Request Circuit Malfunction

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Hazard Warning Switch Signal	B3596 00	1	1	-
Turn Signal/Multifunction Switch Ground	-	1	-	-
1. Hazard Lamps Malfunction				

Circuit/System Description

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

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- Hazard lamps ON.

Conditions for Setting the DTC

The BCM detects a short to ground in the hazard warning switch signal circuit.

Actions Taken When the DTC Sets

The hazard lamps are inoperative.

Conditions for Clearing the DTC

cardiagn.com

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Exterior Lights Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, open and close drivers door, disconnect the X2 harness connector at the S78 Turn Signal/Multifunction Switch. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 15 Ω between the ground circuit terminal C and ground.
    - **If 15 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.
    - **If less than 15 Ω**
3. Ignition ON.
4. Verify the scan tool Hazard Lamps Switch parameter is Inactive.
    - **If not Inactive**
    1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.
    2. Test for infinite resistance between the signal circuit terminal G and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance, replace the K9 Body Control Module.
    - **If Inactive**

cardiagn.com

5. Install a 3 A fused jumper wire between the signal circuit terminal G and ground.
6. Verify the scan tool Hazard Lamps Switch parameter is Active.
    - **If not Active**
    1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.
    2. Test for less than 1 V between the signal circuit terminal G and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V
    3. Test for less than 2 Ω in the signal circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K9 Body Control Module.
    - **If Active**
7. Test or replace the S78 Turn Signal/Multifunction Switch.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Turn Signal Switch Replacement**
- **Control Module References** for BCM replacement, programming, and setup

DTC B3600: PASSENGER COMPARTMENT DIMMING REQUEST

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B3600 03

Passenger Compartment Dimming Request Signal Circuit Low Voltage

DTC B3600 07

Passenger Compartment Dimming Request Signal Circuit High Voltage

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Instrument Panel Dimmer Switch B+ Reference	B1395 03, B3600 03	B1395 03, B3600 03	B1395 07, B3600 07	-
Instrument Panel Dimmer Switch Signal	B1395 03, B3600 03	B1395 03, B3600 03	B1395 07, B3600 07	-
Instrument Panel Dimmer Switch Low Reference	1	1	1	-
1. Interior Backlighting Malfunction				

cardiagn.com

Circuit/System Description

The instrument panel dimmer switch is used to increase and decrease the brightness of the interior backlighting components. The instrument panel dimmer switch provides a voltage signal to the body control module (BCM) that will increase as the brightness of the lights are increased and decrease as the brightness of the lights are decreased. The BCM provides a low reference, signal, and B+ voltage reference to the instrument panel dimmer switch. When the instrument panel dimmer switch is placed in the desired position, the dimmed voltage setting is applied from the instrument panel dimmer switch through the instrument panel dimmer switch signal circuit to the BCM. The BCM interprets the signal and applies a pulse width modulated (PWM) voltage through the LED dimming 1 and dimming 2 control circuits illuminating the interior backlighting to the requested level of brightness.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- Park Lamps ON.

Conditions for Setting the DTC

DTC B3600 03

- The BCM detects a short to ground or an open/high resistance in the instrument panel dimmer switch B+ reference circuit.
- The BCM detects a short to ground or an open/high resistance in the instrument panel dimmer switch signal circuit.

DTC B3600 07

- The BCM detects a short to voltage in the instrument panel dimmer switch B+ reference circuit.
- The BCM detects a short to voltage in the instrument panel dimmer switch signal circuit.

Actions Taken When the DTC Sets

The BCM will not dim any interior backlighting. All interior backlighting will default to the FULL bright.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- Disconnect the negative battery cable for 30 seconds.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Diagnostic Aids

When a short to ground condition exists, the BCM goes into safe mode. The DTC will clear in most cases without removing the negative battery cable, but in order to restore the BCM to normal operating conditions the negative battery cable must be removed. The B+ reference circuit under normal operating conditions will illuminate a test lamp. When the BCM is in safe mode, a test lamp will no longer illuminate but the DTC will clear and the backlighting will dim normally.

Reference Information

Schematic Reference

cardiagn.com

Interior Lights Dimming Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Interior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the S30 Headlamp Switch, ignition ON.
2. Test for B+ between the B+ circuit terminal 12 and ground.
    - **If less than B+**
    1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.
    2. Test for infinite resistance between the B+ circuit and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the B+ circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K9 Body Control Module.
    - **If B+**
3. Verify a test lamp illuminates between the B+ circuit terminal 12 and the low reference circuit terminal 7.
    - **If the test lamp does not illuminate**
    1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.
    2. Test for less than 1 V between the low reference circuit terminal 7 and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V
    3. Test for less than 2 Ω in the low reference circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K9 Body Control Module.
    - **If the test lamp illuminates**
4. Verify a test lamp does not illuminate between the B+ circuit terminal 12 and the signal circuit terminal

cardiagn.com

11.

- **If the test lamp illuminates**

1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.
2. Test for infinite resistance between the signal circuit and ground.
    - If less than infinite resistance, repair the short to ground on the circuit.
    - If infinite resistance, replace the K9 Body Control Module.

- **If the test lamp does not illuminate**

5. Test for B+ between the B+ circuit terminal 12 and the signal circuit terminal 11.

- **If less than B+**

1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.
2. Test for less than 1 V between the signal circuit terminal 11 and ground.
    - If 1 V or greater, repair the short to voltage on the circuit.
    - If less than 1 V
3. Test for less than 2 Ω in the signal circuit end to end.
    - If 2 Ω or greater, repair the open/high resistance in the circuit.
    - If less than 2 Ω, replace the K9 Body Control Module.

- **If B+**

6. Test or replace the S30 Headlamp Switch.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Headlamp Switch Replacement**
- **Control Module References** for BCM replacement, programming, and setup

DTC B3650: HIGH BEAM REQUEST SIGNAL

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B3650 08

High Beam Request Signal Circuit Performance - Signal Invalid

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Headlamp Switch Headlamps OFF Signal	B257A 00	1	1	-

cardiagn.com

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Headlamp Switch Headlamps ON Signal	B257A 00	1	1	-
Headlamp Switch Park Lamps ON Signal	2	B257A 00	2	-
Turn Signal/Multifunction Switch Flash To Pass Signal	B3806 00	1	1	-
Turn Signal/Multifunction Switch High Beam Signal	B3650 08	1	1	-
Headlamp Switch Ground	-	1,2	-	-
Turn Signal/Multifunction Switch Ground	-	1	-	-
1. Headlamps Malfunction 2. Park, License, and/or Tail Lamps Malfunction				

Circuit/System Description

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 body control module (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 high beam fuses to the high beam control circuits illuminating the high beam headlamps.

Conditions for Running the DTC

Battery voltage must be between 9-16 V.

Conditions for Setting the DTC

The BCM detects a short to ground in the turn signal/multifunction switch high beam signal circuit.

Actions Taken When the DTC Sets

The high beam headlamps will not operate.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Headlights/Daytime Running Lights (DRL) Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

cardiagn.com

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, open and close drivers door, disconnect the X1 harness connector at the S78 Turn Signal/Multifunction Switch. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 15 Ω between the ground circuit terminal 13 and ground.
    - **If 15 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.
    - **If less than 15 Ω**
3. Ignition ON.
4. Verify the scan tool High Beam Select Switch parameter is Inactive.
    - **If not Inactive**
    1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module.
    2. Test for infinite resistance between the signal circuit terminal 14 and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance, replace the K9 Body Control Module.
    - **If Inactive**
5. Install a 3 A fused jumper wire between the signal circuit terminal 14 and ground.
6. Verify the scan tool High Beam Select Switch parameter is Active.
    - **If not Active**
    1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module, ignition ON.
    2. Test for less than 1 V between the signal circuit terminal 14 and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V
    3. Test for less than 2 Ω in the signal circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K9 Body Control Module.
    - **If Active**

cardiagn.com

7. Test or replace the S78 Turn Signal/Multifunction Switch.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Turn Signal Switch Replacement**
- **Control Module References** for BCM replacement, programming, and setup

DTC B3806: HIGH BEAM AND HEADLAMP FLASH SELECT

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B3806 00

High Beam and Headlamp Flash Select Circuit Malfunction

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Headlamp Switch Headlamps OFF Signal	B257A 00	1	1	-
Headlamp Switch Headlamps ON Signal	B257A 00	1	1	-
Headlamp Switch Park Lamps ON Signal	2	B257A 00	2	-
Turn Signal/Multifunction Switch Flash To Pass Signal	B3806 00	1	1	-
Turn Signal/Multifunction Switch High Beam Signal	B3650 08	1	1	-
Headlamp Switch Ground	-	1,2	-	-
Turn Signal/Multifunction Switch Ground	-	1	-	-
1. Headlamps Malfunction 2. Park, License, and/or Tail Lamps Malfunction				

Circuit/System Description

When the turn signal/multifunction switch is momentarily placed in the flash to pass position, ground is applied to the body control module (BCM) through the flash to pass signal circuit. The BCM responds to the flash to pass 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 high beam fuses to the high beam control circuits illuminating the high beam headlamps. The high beam headlamps will only illuminate for as long at the flash to pass switch is activated.

cardiagn.com

Conditions for Running the DTC

Battery voltage must be between 9-16 V.

Conditions for Setting the DTC

The BCM detects a short to ground in the turn signal/multifunction switch flash to pass signal circuit.

Actions Taken When the DTC Sets

The high beam headlamps and the high beam indicator on the instrument cluster are always ON.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Headlights/Daytime Running Lights (DRL) Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, open and close drivers door, disconnect the X1 harness connector at the S78 Turn Signal/Multifunction Switch. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 15 Ω between the ground circuit terminal 13 and ground.
    - **If 15 Ω or greater**

    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.

cardiagn.com

- If less than 2 Ω, repair the open/high resistance in the ground connection.

- **If less than 15 Ω**

3. Ignition ON.
4. Verify the scan tool Headlamps Flash Switch parameter is Inactive.
   - **If not Inactive**
   1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module.
   2. Test for infinite resistance between the signal circuit terminal 10 and ground.
      - If less than infinite resistance, repair the short to ground on the circuit.
      - If infinite resistance, replace the K9 Body Control Module.
   - **If Inactive**
5. Install a 3 A fused jumper wire between the signal circuit terminal 10 and ground.
6. Verify the scan tool Headlamps Flash Switch parameter is Active.
   - **If not Active**
   1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module, ignition ON.
   2. Test for less than 1 V between the signal circuit terminal 10 and ground.
      - If 1 V or greater, repair the short to voltage on the circuit.
      - If less than 1 V
   3. Test for less than 2 Ω in the signal circuit end to end.
      - If 2 Ω or greater, repair the open/high resistance in the circuit.
      - If less than 2 Ω, replace the K9 Body Control Module.
   - **If Active**
7. Test or replace the S78 Turn Signal/Multifunction Switch.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Turn Signal Switch Replacement**
- **Control Module References** for BCM replacement, programming, and setup

DTC B3881 OR B3882: TRAILER LEFT/RIGHT TAIL LAMP

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B3881 02

Trailer Left Tail Lamp Circuit Short to Ground

DTC B3881 04

Trailer Left Tail Lamp Circuit Open

cardiagn.com

DTC B3882 02

Trailer Right Tail Lamp Circuit Short to Ground

DTC B3882 04

Trailer Right Tail Lamp Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Trailer Tail Lamp Control - Left	B3881 02	B3881 04	1	-
Trailer Tail Lamp Control - Right	B3882 02	B3882 04	1	-
1. Trailer Lamps Malfunction				

Circuit/System Description

The trailer lighting control module receives a serial data message from the body control module (BCM) indicating that the vehicle park lamps have been activated. The trailer lighting control module responds by applying battery voltage to the left and right trailer tail lamp control circuits illuminating the trailer tail lamps.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- Park lamps ON.

Conditions for Setting the DTC

DTC B3881 02

The trailer lighting control module detects a short to ground in the left trailer tail lamp control circuit.

DTC B3881 04

The trailer lighting control module detects an open/high resistance in the left trailer tail lamp control circuit.

DTC B3882 02

The trailer lighting control module detects a short to ground in the right trailer tail lamp control circuit.

DTC B3882 04

The trailer lighting control module detects an open/high resistance in the right trailer tail lamp control circuit.

Actions Taken When the DTC Sets

The appropriate trailer tail lamp will be inoperative.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.

cardiagn.com

- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Trailer Connector/Provision Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

DTC B3881

1. Ignition OFF.
2. Connect a test lamp between the control circuit terminal 7 at the X88 Trailer Connector and ground, ignition ON.
3. Verify the test lamp turns ON and OFF when commanding the Left Trailer Tail Lamp ON and OFF with a scan tool.
    - **If the test lamp is always OFF**
    1. Ignition OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module.
    2. Test for infinite resistance between the control circuit terminal and ground.
        - If less than infinite resistance, repair the short to ground on the circuits.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuits end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K68 Trailer Lighting Control Module.
    - **If the test lamp is always ON**
    1. Ignition OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module, ignition ON.
    2. Test for less than 1 V between the control circuit terminal and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.

cardiagn.com

- If less than 1 V, replace the K68 Trailer Lighting Control Module.
- **If the test lamp turns ON and OFF**

4. Replace the X88 Trailer Connector.

DTC B3882

1. Ignition OFF.
2. Connect a test lamp between the control circuit terminal 5 at the X88 Trailer Connector and ground, ignition ON.
3. Verify the test lamp turns ON and OFF when commanding the Right Trailer Tail Lamp ON and OFF with a scan tool.
   - **If the test lamp is always OFF**
   1. Ignition OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module.
   2. Test for infinite resistance between the control circuit terminal and ground.
      - If less than infinite resistance, repair the short to ground on the circuits.
      - If infinite resistance
   3. Test for less than 2 Ω in the control circuits end to end.
      - If 2 Ω or greater, repair the open/high resistance in the circuit.
      - If less than 2 Ω, replace the K68 Trailer Lighting Control Module.
   - **If the test lamp is always ON**
   1. Ignition OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module, ignition ON.
   2. Test for less than 1 V between the control circuit terminal and ground.
      - If 1 V or greater, repair the short to voltage on the circuit.
      - If less than 1 V, replace the K68 Trailer Lighting Control Module.
   - **If the test lamp turns ON and OFF**
4. Replace the X88 Trailer Connector.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

Control Module References for Trailer Lighting Control Module replacement, programming, and setup

DTC B3883: LICENSE PLATE LAMP

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B3883 01

License Plate Lamp Circuit Short to Battery

cardiagn.com

DTC B3883 02

License Plate Lamp Circuit Short to Ground

DTC B3883 04

License Plate Lamp Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
F17DL (BCM 1) Fuse B+	B1325 03, B3873 01, B3873 04, B3883 01, B3883 04, C0297 01,	B1325 03, B3873 01, B3873 04, B3883 01, B3883 04, C0297 01,	-	-
License Plate Lamps Control	B3883 02	B3883 01, B3883 04	B3883 01, B3883 04	-
License Plate Lamp Ground - Right	-	1	-	-
License Plate Lamp Ground - Left	-	1	-	-
1. Park, License, and/or Tail Lamps Malfunction				

Circuit/System Description

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.

Conditions for Running the DTC

Battery voltage must be between 9-16 V.

DTC B3883 01

Headlamp switch in OFF position.

DTC B3883 02 or B3883 04

Headlamp switch in AUTO, PARK or ON positions.

Conditions for Setting the DTC

DTC B3883 01 and DTC B3883 04

- The BCM detects a short to voltage or an open/high resistance in the license lamps control circuit.
- The BCM detects an open/high resistance in the license lamps ground circuit.
- The BCM detects a short to ground or an open/high resistance in the F17DL (BCM 1) fuse B+ circuit.

cardiagn.com

DTC B3883 02

The BCM detects a short to ground in the license lamps control circuit.

Actions Taken When the DTC Sets

DTC B3883 01

License lamps always ON.

DTC B3883 02 or B3883 04

License lamps inoperative.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Diagnostic Aids

When testing at the license plate lamp bulb sockets, make sure all measurements and test lamp connections are in the correct terminal location and do not come in contact with each other during testing.

Reference Information

Schematic Reference

- **Exterior Lights Schematics**
- **Body Control System Schematics**

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, exterior lamps OFF, remove both E7 License Plate Lamp bulbs.

cardiagn.com

2. Test for less than 15 Ω between each ground circuit terminal B and ground.
    - **If 15 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.
    - **If less than 15 Ω**
3. Connect a test lamp between the E7L License Plate Lamp - Left control circuit terminal A and ground, ignition ON.
4. Verify the test lamp turns ON and OFF when commanding the License Plate Lamps ON and OFF with a scan tool.
    - **If the test lamp is always OFF**
    1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.
    2. Test for infinite resistance between the control circuit and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K9 Body Control Module.
    - **If the test lamp is always ON**
    1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module, ignition ON.
    2. Test for less than 1 V between the control circuit terminal and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V, replace the K9 Body Control Module.
    - **If the test lamp turns ON and OFF**
5. Ignition OFF.
6. Connect a test lamp between the E7R License Plate Lamp - Right control circuit terminal A and ground, ignition ON.
7. Verify the test lamp turns ON and OFF when commanding the License Plate Lamps ON and OFF with a scan tool.
    - **If the test lamp is always OFF**
    1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.
    2. Test for infinite resistance between the control circuit and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
    - **If the test lamp turns ON and OFF**
8. Test or replace the appropriate E7 License Plate Lamp bulb.

Repair Instructions

cardiagn.com

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Rear License Plate Lamp Replacement**
- **Rear License Plate Lamp Bulb Replacement**
- **Control Module References** for BCM replacement, programming, and setup

DTC B3884: CENTER HIGH MOUNTED BRAKE LAMP

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B3884 01

Center High Mounted Brake Lamp Circuit Short to Battery

DTC B3884 02

Center High Mounted Brake Lamp Circuit Short to Ground

DTC B3884 04

Center High Mounted Brake Lamp Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Center High Mounted Stop Lamp Control	1	1	1	-
Stop Lamp Relay Control	B3884 02	B3884 04	B3884 01	-
Center High Mounted Stop Lamp Ground	-	1	-	-
Stop Lamp Relay Ground	-	1	-	-
1. Stop Lamps Malfunction				

Circuit/System Description

The brake pedal position sensor is used to sense the action of the driver application of the brake pedal. The brake pedal position 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 V reference voltage to the brake pedal position sensor. When the variable signal reaches a voltage threshold indicating the brakes have been applied, the BCM energizes the stop lamp relay by applying voltage to the stop lamp relay control circuit. When the stop lamp relay is energized, the relay switch contacts close and battery voltage is applied through the F38UA fuse to the center high mounted stop lamp (CHMSL) control circuit which illuminates the CHMSL.

Conditions for Running the DTC

cardiagn.com

- Battery voltage must be between 9-16 V.
- Brakes APPLIED.

Conditions for Setting the DTC

DTC B3884 01

The BCM detects a short to voltage in the stop lamp relay control circuit.

DTC B3884 02

The BCM detects a short to ground in the stop lamp relay control circuit.

DTC B3884 04

The BCM detects an open/high resistance in the stop lamp relay control circuit.

Actions Taken When the DTC Sets

The BCM will not illuminate the center high mounted stop lamp.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Exterior Lights Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module, ignition ON.

cardiagn.com

2. Verify a test lamp does not illuminate between the control circuit terminal 11 and ground.
    - **If the test lamp illuminates**
    1. Ignition OFF, disconnect the X3 harness connector at the X50A Fuse Block - Underhood, ignition ON.
    2. Test for less than 1 V between the control circuit terminal 11 and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V, replace the X50A Fuse Block - Underhood.
    - **If the test lamp does not illuminate**
3. Ignition OFF.
4. Connect a 3 A fused jumper between the control circuit terminal 11 and B+, ignition ON.
5. Verify the center high mounted stop lamp illuminates.
    - **If the center high mounted stop lamp does not illuminate**
    1. Ignition OFF, disconnect the X3 harness connector at the X50A Fuse Block - Underhood.
    2. Test for infinite resistance between the control circuit terminal and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the X50A Fuse Block - Underhood.
    - **If the center high mounted stop lamp illuminates**
6. Replace the K9 Body Control Module.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Underhood Electrical Center or Junction Block Replacement**
- **Control Module References** for BCM replacement, programming, and setup

DTC B3885 OR B3886: TRAILER LEFT/RIGHT TAIL LAMP

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B3885 02

Trailer Left Tail Lamp Circuit Short to Ground

DTC B3885 04

Trailer Left Tail Lamp Circuit Open

cardiagn.com

DTC B3886 02

Trailer Right Tail Lamp Circuit Short to Ground

DTC B3886 04

Trailer Right Tail Lamp Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Trailer Tail Lamp Control - Left	B3885 02	B3885 04	1	-
Trailer Tail Lamp Control - Right	B3886 02	B3886 04	1	-
1. Trailer Lamps Malfunction				

Circuit/System Description

The trailer lighting control module receives a serial data message from the body control module (BCM) indicating that the vehicle park lamps have been activated. The trailer lighting control module responds by applying battery voltage to the left and right trailer tail lamp control circuits illuminating the trailer tail lamps.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- Park lamps ON.

Conditions for Setting the DTC

DTC B3885 02

The trailer lighting control module detects a short to ground in the left trailer tail lamp control circuit.

DTC B3885 04

The trailer lighting control module detects an open/high resistance in the left trailer tail lamp control circuit.

DTC B3886 02

The trailer lighting control module detects a short to ground in the right trailer tail lamp control circuit.

DTC B3886 04

The trailer lighting control module detects an open/high resistance in the right trailer tail lamp control circuit.

Actions Taken When the DTC Sets

The appropriate trailer tail lamp will be inoperative.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.

cardiagn.com

- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Trailer Connector/Provision Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

DTC B3885

1. Ignition OFF.
2. Connect a test lamp between the control circuit terminal 7 at the X88 Trailer Connector and ground, ignition ON.
3. Verify the test lamp turns ON and OFF when commanding the Left Trailer Tail Lamp ON and OFF with a scan tool.
    - **If the test lamp is always OFF**
    1. Ignition OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module.
    2. Test for infinite resistance between the control circuit terminal and ground.
        - If less than infinite resistance, repair the short to ground on the circuits.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuits end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K68 Trailer Lighting Control Module.
    - **If the test lamp is always ON**
    1. Ignition OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module, ignition ON.
    2. Test for less than 1 V between the control circuit terminal and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.

cardiagn.com

- If less than 1 V, replace the K68 Trailer Lighting Control Module.
- **If the test lamp turns ON and OFF**

4. Replace the X88 Trailer Connector.

DTC B3886

1. Ignition OFF.
2. Connect a test lamp between the control circuit terminal 5 at the X88 Trailer Connector and ground, ignition ON.
3. Verify the test lamp turns ON and OFF when commanding the Right Trailer Tail Lamp ON and OFF with a scan tool.
   - **If the test lamp is always OFF**
   1. Ignition OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module.
   2. Test for infinite resistance between the control circuit terminal and ground.
      - If less than infinite resistance, repair the short to ground on the circuits.
      - If infinite resistance
   3. Test for less than 2 Ω in the control circuits end to end.
      - If 2 Ω or greater, repair the open/high resistance in the circuit.
      - If less than 2 Ω, replace the K68 Trailer Lighting Control Module.
   - **If the test lamp is always ON**
   1. Ignition OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module, ignition ON.
   2. Test for less than 1 V between the control circuit terminal and ground.
      - If 1 V or greater, repair the short to voltage on the circuit.
      - If less than 1 V, replace the K68 Trailer Lighting Control Module.
   - **If the test lamp turns ON and OFF**
4. Replace the X88 Trailer Connector.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

Control Module References for Trailer Lighting Control Module replacement, programming, and setup

DTC B3887 OR B3888: TRAILER LEFT/RIGHT TURN SIGNAL

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B3887 02

Trailer Left Turn Signal Circuit Short to Ground

cardiagn.com

DTC B3887 04

Trailer Left Turn Signal Circuit Open

DTC B3888 02

Trailer Right Turn Signal Circuit Short to Ground

DTC B3888 04

Trailer Right Turn Signal Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Trailer Turn Signal Control - Left	B3887 02	B3887 04	1	-
Trailer Turn Signal Control - Right	B3888 02	B3888 04	1	-
1. Trailer Lamps Malfunction				

Circuit/System Description

The trailer lighting control module receives a serial data message from the body control module (BCM) indicating that the vehicle left or right turn signal lamp has been activated. The trailer lighting control module responds by applying a pulsating voltage to the appropriate trailer turn signal lamp through their respective control circuit illuminating the desired trailer turn signal lamp.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- Turn Signal ACTIVE.

Conditions for Setting the DTC

DTC B3887 02

The trailer lighting control module detects a short to ground in the left trailer turn signal control circuit.

DTC B3887 04

The trailer lighting control module detects an open/high resistance in the left trailer turn signal control circuit.

DTC B3888 02

The trailer lighting control module detects a short to ground in the right trailer turn signal control circuit.

DTC B3888 04

The trailer lighting control module detects an open/high resistance in the right trailer turn signal control circuit.

Actions Taken When the DTC Sets

cardiagn.com

The appropriate trailer turn signal lamp will be inoperative.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Trailer Connector/Provision Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

DTC B3887

1. Ignition OFF.
2. Connect a test lamp between the control circuit terminal 1 at the X88 Trailer Connector and ground, ignition ON.
3. Verify the test lamp turns ON and OFF when commanding the Left Trailer Turn Signal Lamp ON and OFF with a scan tool.
    - **If the test lamp is always OFF**
    1. Ignition OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module.
    2. Test for infinite resistance between the control circuit and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K68 Trailer Lighting Control Module.
    - **If the test lamp is always ON**

cardiagn.com

1. Ignition OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module, ignition ON.
2. Test for less than 1 V between the control circuit terminal and ground.
    - If 1 V or greater, repair the short to voltage on the circuit.
    - If less than 1 V, replace the K68 Trailer Lighting Control Module.

- **If the test lamp turns ON and OFF**

4. Test or replace the X88 Trailer Connector.

DTC B3888

1. Ignition OFF.
2. Connect a test lamp between the control circuit terminal 4 at the X88 Trailer Connector and ground, ignition ON.
3. Verify the test lamp turns ON and OFF when commanding the Right Trailer Turn Signal Lamp ON and OFF with a scan tool.

- **If the test lamp is always OFF**

1. Ignition OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module.
2. Test for infinite resistance between the control circuit and ground.
    - If less than infinite resistance, repair the short to ground on the circuit.
    - If infinite resistance
3. Test for less than 2 Ω in the control circuit end to end.
    - If 2 Ω or greater, repair the open/high resistance in the circuit.
    - If less than 2 Ω, replace the K68 Trailer Lighting Control Module.

- **If the test lamp is always ON**

1. Ignition OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module, ignition ON.
2. Test for less than 1 V between the control circuit terminal and ground.
    - If 1 V or greater, repair the short to voltage on the circuit.
    - If less than 1 V, replace the K68 Trailer Lighting Control Module.

- **If the test lamp turns ON and OFF**

4. Test or replace the X88 Trailer Connector.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

Control Module References for Trailer Lighting Control Module replacement, programming, and setup

DTC B3889: TRAILER BRAKE LAMPS

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

cardiagn.com

DTC Descriptors

DTC B3889 02

Trailer Brake Lamps Circuit Short to Ground

DTC B3889 04

Trailer Brake Lamps Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Center High Mounted Stop Lamp Control - Left	2	2	2	-
Trailer Stop Lamp Control	B3889 02	B3889 04	1	-
1. Trailer Lamps Malfunction 2. Stop Lamps Malfunction				

Circuit/System Description

The brake pedal position sensor is used to sense the action of the driver application of the brake pedal. The brake pedal position 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 V reference voltage to the brake pedal position sensor. When the variable signal reaches a voltage threshold indicating the brakes have been applied, the BCM will apply battery voltage to the right and left stop lamp control circuits, engine control module (ECM), center high mounted stop lamp control circuit, and trailer lighting control module. The trailer lighting control module responds by applying battery voltage to the trailer stop lamp control circuit illuminating the trailer stop lamps.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- Brakes APPLIED.

Conditions for Setting the DTC

DTC B3889 02

The trailer lighting control module detects a short to ground in the trailer stop lamp control circuit.

DTC B3889 04

The trailer lighting control module detects an open/high resistance in the trailer stop lamp control circuit.

Actions Taken When the DTC Sets

The trailer stop lamps will be inoperative.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.

cardiagn.com

- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

- **Trailer Connector/Provision Schematics**
- **Exterior Lights Schematics**

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF.
2. Connect a test lamp between the control circuit terminal 6 at the X88 Trailer Connector and ground, ignition ON.
3. Verify the test lamp turns ON and OFF when commanding the Trailer Brake Lamps ON and OFF with a scan tool.
    - **If the test lamp is always OFF**

    1. Ignition OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module.
    2. Test for infinite resistance between the control circuit and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K68 Trailer Lighting Control Module.

    - **If the test lamp is always ON**

    1. Ignition OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module, ignition ON.
    2. Test for less than 1 V between the control circuit terminal and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.

cardiagn.com

- If less than 1 V, replace the K68 Trailer Lighting Control Module.
- **If the test lamp turns ON and OFF**

4. Test or replace the X88 Trailer Connector.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

Control Module References for Trailer Lighting Control Module replacement, programming, and setup

DTC B388B OR B388C: SECONDARY LEFT/RIGHT TAIL AND BRAKE LAMP

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B388B 02

Secondary Left Tail and Brake Lamp Circuit Short to Ground

DTC B388B 04

Secondary Left Tail and Brake Lamp Circuit Open

DTC B388C 02

Secondary Right Tail and Brake Lamp Circuit Short to Ground

DTC B388C 04

Secondary Right Tail and Brake Lamp Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Secondary Left Tail and Brake Lamp Control	B388B 02	B388B 04	-	-
Secondary Right Tail and Brake Lamp Control	B388C 02	B388C 04	-	-

Circuit/System Description

When the headlamp switch is placed in either the park or low beam position, ground is applied to the tail lamp signal circuit to the body control module (BCM). The brake pedal position sensor provides an analog voltage signal to the BCM. The BCM sends this messages to the trailer lighting converter. The trailer lighting converter responds by applying battery voltage to the left tail lamp and to the right tail lamp control circuits. This energizes the tail lamps.

cardiagn.com

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- Brake/tail lamp ON.

Conditions for Setting the DTC

DTC B388B 02

The trailer lighting control module detects a short to ground in the secondary left tail and brake lamp control circuit.

DTC B388B 04

The trailer lighting control module detects an open in the secondary left tail and brake lamp control circuit.

DTC B388C 02

The trailer lighting control module detects a short to ground in the secondary right tail and brake lamp control circuit.

DTC B388C 04

The trailer lighting control module detects an open in the secondary right tail and brake lamp control circuit.

Actions Taken When the DTC Sets

The appropriate brake/tail lamp is inoperative.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists and the ignition is cycled.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Exterior Lights Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**

cardiagn.com

- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, exterior lamps OFF, disconnect the appropriate harness connector listed below.
    - E56L Rear Multifunction Carrier Tail Lamp Assembly - Left
    - E56R Rear Multifunction Carrier Tail Lamp Assembly - Right
2. Test for less than 5 Ω between the appropriate ground circuit terminal listed below and ground.
    - E56L Rear Multifunction Carrier Tail Lamp Assembly - Left terminal C
    - E56R Rear Multifunction Carrier Tail Lamp Assembly - Right terminal B
    - **If 5 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.
    - **If less than 5 Ω**
3. Connect a test lamp between the appropriate control circuit terminal listed below and ground, ignition ON
    - E56L Rear Multifunction Carrier Tail Lamp Assembly - Left terminal B
    - E56R Rear Multifunction Carrier Tail Lamp Assembly - Right terminal C
4. Verify the test lamp turns ON and OFF when commanding the appropriate Auxiliary Tail and Brake Lamp test with a scan tool.
    - **If the test lamp is always OFF**
    1. Ignition OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module.
    2. Test for infinite resistance between the control circuit and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K68 Trailer Lighting Control Module.
    - **If the test lamp is always ON**
    1. Ignition OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module, ignition ON.
    2. Test for less than 1 V between the control circuit terminal and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V, replace the K68 Trailer Lighting Control Module.
    - **If the test lamp turns ON and OFF**
5. Test or replace the E56 Rear Multifunction Carrier Tail Lamp Assembly.

Repair Instructions

cardiagn.com

Perform the **Diagnostic Repair Verification** after completing the repair.

Control Module References for BCM or trailer lighting control module replacement, programming, and setup

DTC B388D: REAR MULTIFUNCTION CARRIER SWITCH

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B388D 05

Rear Multifunction Carrier Switch Circuit High Voltage/Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Trailer Lighting Control Module B+	1	1	-	-
Rear Multifunction Carrier Position Switch Signal	1	B388D 05	B388D 05	-
Center High Mounted Stop Lamp Control	B3884 02	2	2	B0655 5A
Rear Multifunction Carrier Backup Lamps Control	B3890 02	B3890 04	3	-
Rear Multifunction Carrier Stop Lamp Control	B3889 02	B3889 04	3	-
Rear Multifunction Carrier Turn Signal Control - Left	B3887 02	B3887 04	3	-
Rear Multifunction Carrier Turn Signal Control - Right	B3888 02	B3888 04	1	-
Rear Multifunction Carrier Fog Lamp Control	B3891 02	B3891 04	3	-
Rear Multifunction Carrier Tail Lamp Control - Left	B3885 02	B3885 04	3	-
Rear Multifunction Carrier Tail Lamp Control - Right	B3886 02	B3886 04	3	-
Rear Multifunction Carrier Position Switch Ground	-	B388D 05	-	-
Trailer Lighting Control Module Ground	-	1	-	-
Trailer Connector Grounds	-	1	-	-
1. Trailer Lamps Malfunction 2. Center High Mounted Stop Lamp Malfunction 3. Rear Multifunction Carrier Malfunction				

cardiagn.com

Circuit/System Description

The trailer lighting control module is supplied with battery voltage as well as ignition voltage from the rear body fuse block and is permanently grounded. For lighting operation, the trailer lighting control module receives serial data messages from the body control module (BCM) indicating what lamps have been activated on the vehicle. The trailer lighting control module responds by applying voltage to the appropriate control circuits for the requested lamps illuminating the lamps on the attached trailer.

For stop lamp operation, the trailer lighting control module receives an input from the center high mount stop lamp (CHMSL) control circuit. When the brakes are applied on the vehicle, the trailer lighting control module receives the brake applied input from the CHMSL control circuit. The trailer lighting control module responds by applying voltage to the trailer stop lamp control circuit illuminating the trailer stop lamps. The trailer lighting control module also receives a serial data message from the BCM indicating that the vehicle brakes have been applied.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- Ignition ON.
- Rear multifunction carrier installed.

Conditions for Setting the DTC

The trailer lighting control module detects a short to voltage or an open/high resistance in the rear multifunction carrier position switch signal circuit.

Actions Taken When the DTC Sets

The rear multifunction carrier lamps will be inoperative.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists and the ignition is cycled.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Exterior Lights Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**

cardiagn.com

- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, exterior lamps OFF, disconnect the harness connector at the appropriate component listed below. It may take up to 2 min for all vehicle systems to power down.
    - B211A Rear Multifunction Carrier Closed Position Switch
    - B211B Rear Multifunction Carrier Open Position Switch
2. Test for less than 5 Ω between the ground circuit terminal 2 and ground.
    - **If 5 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.
    - **If less than 5 Ω**
3. Ignition ON.
4. Test for 4.8-5.2 V between the signal circuit terminal 1 and ground.
    - **If less than 4.8V**
    1. Ignition OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module.
    2. Test for infinite resistance between the signal circuit terminal 1 and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K68 Trailer Lighting Control Module.
    - **If greater than 5.2 V**
    1. Ignition OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module, ignition ON.
    2. Test for less than 1 V between the signal circuit terminal 1 and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V, replace the K68 Trailer Lighting Control Module.
    - **If between 4.8-5.2 V**
5. Test or replace the B211 Rear Multifunction Carrier Position Switch.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

Control Module References for Trailer Lighting Control Module replacement, programming, and setup

cardiagn.com

DTC B388E: TRAILER LAMPS NUMBER OF INTERMITTENT SHORT CIRCUIT DETECTIONS EXCEEDED

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B388E 1B

Trailer Lamps Number of Intermittent Short Circuit Detections Exceeded Signal Cross Coupled

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Trailer Lighting Control Module B+	1	1	-	-
Rear Multifunction Carrier Position Switch Signal	1	B388D 05	B388D 05	-
Center High Mounted Stop Lamp Control	B3884 02	2	2	B0655 5A
Rear Multifunction Carrier Backup Lamps Control	B3890 02	B3890 04	3	-
Rear Multifunction Carrier Stop Lamp Control	B3889 02	B3889 04	3	-
Rear Multifunction Carrier Turn Signal Control - Left	B3887 02	B3887 04	3	-
Rear Multifunction Carrier Turn Signal Control - Right	B3888 02	B3888 04	1	-
Rear Multifunction Carrier Fog Lamp Control	B3891 02	B3891 04	3	-
Rear Multifunction Carrier Tail Lamp Control - Left	B3885 02	B3885 04	3	-
Rear Multifunction Carrier Tail Lamp Control - Right	B3886 02	B3886 04	3	-
Rear Multifunction Carrier Position Switch Ground	-	B388D 05	-	-
Trailer Lighting Control Module Ground	-	1	-	-
Trailer Connector Grounds	-	1	-	-
1. Trailer Lamps Malfunction 2. Center High Mounted Stop Lamp Malfunction 3. Rear Multifunction Carrier Malfunction				

Circuit/System Description

cardiagn.com

The trailer lighting control module is supplied with battery voltage as well as ignition voltage from the rear body fuse block and is permanently grounded. For lighting operation, the trailer lighting control module receives serial data messages from the body control module (BCM) indicating what lamps have been activated on the vehicle. The trailer lighting control module responds by applying voltage to the appropriate control circuits for the requested lamps illuminating the lamps on the attached trailer. To prevent a lighting failure, the trailer lighting control module counts and stores the number of short circuits that have occurred during system operation. These short circuits can occur on the vehicles trailer lighting circuits as well as the circuits on the operators trailer wiring. When the trailer lighting control module internal counter reaches 60% of the maximum allowed short circuits, a DTC is set as present.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- Ignition ON.

Conditions for Setting the DTC

The trailer lighting control module internal counter reaches 60% of the maximum allowed short circuits for the lighting control circuits.

Conditions for Clearing the DTC

The condition responsible for setting the DTC no longer exists and the ignition is cycled.

Diagnostic Aids

- The service technician should inform the customer about detected short circuits by the trailer lighting control module in the trailer.
- A replacement of the trailer lighting control module is recommended.

Reference Information

Schematic Reference

- **Trailer Connector/Provision Schematics**
- **Exterior Lights Schematics**

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

cardiagn.com

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON, Exterior lights ON, trailer disconnected, verify that no additional trailer lighting control module DTC's are present.
    - **If additional trailer lighting control module DTC's are present**

      Diagnose all trailer lighting control module DTC's before proceeding. Refer to **Diagnostic Trouble Code (DTC) List - Vehicle** , and **Symptoms - Lighting**.

    - **If additional trailer lighting control module DTC's are not present**
2. Verify that DTC B388E 1B is not set.
    - **If DTC B388E 1B is set**

      Test or replace the K68 Trailer Lighting Control Module.

    - **If DTC B388E 1B does not set**
3. All OK.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

Control Module References for trailer lighting control module replacement, programming, and setup

DTC B3890: TRAILER BACKUP LAMPS

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B3890 02

Trailer Backup Lamps Circuit Short to Ground

DTC B3890 04

Trailer Backup Lamps Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Trailer Backup Lamp Control	B3890 02	B3890 04	1	-
1. Trailer Lamps Malfunction				

cardiagn.com

Circuit/System Description

The trailer lighting control module receives a serial data message from the body control module (BCM) indicating that the vehicle backup lamps have been activated. The trailer lighting control module responds by applying battery voltage to the trailer backup lamp control circuit illuminating the trailer backup lamp.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- Backup lamps ON.

Conditions for Setting the DTC

DTC B3890 02

The trailer lighting control module detects a short to ground in the trailer backup lamp control circuit.

DTC B3890 04

The trailer lighting control module detects an open/high resistance in the trailer backup lamp control circuit.

Actions Taken When the DTC Sets

The trailer backup lamp will be inoperative.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Trailer Connector/Provision Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

cardiagn.com

Circuit/System Testing

1. Ignition OFF.
2. Connect a test lamp between the control circuit terminal 8 at the X88 Trailer Connector and ground, ignition ON.
3. Verify the test lamp turns ON and OFF when commanding the Trailer Backup Lamps ON and OFF with a scan tool.
    - **If the test lamp is always OFF**
    1. Ignition OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module.
    2. Test for infinite resistance between the control circuit and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K68 Trailer Lighting Control Module.
    - **If the test lamp is always ON**
    1. Ignition OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module, ignition ON.
    2. Test for less than 1 V between the control circuit terminal and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V, replace the K68 Trailer Lighting Control Module.
    - **If the test lamp turns ON and OFF**
4. Test or replace the X88 Trailer Connector.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

Control Module References for Trailer Lighting Control Module replacement, programming, and setup

DTC B3891: TRAILER FOG LAMPS

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B3891 02

Trailer Fog Lamps Circuit Short to Ground

DTC B3891 04

Trailer Fog Lamps Circuit Open

cardiagn.com

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Trailer Fog Lamp Control	B3891 02	B3891 04	1	-
1. Trailer Lamps Malfunction				

Circuit/System Description

The trailer lighting control module receives a serial data message from the body control module (BCM) indicating that the vehicle rear fog lamp have been activated. The trailer lighting control module responds by applying battery voltage to the trailer fog lamp control circuit illuminating the trailer fog lamp.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- Rear fog lamps ON.

Conditions for Setting the DTC

DTC B3891 02

The trailer lighting control module detects a short to ground in the trailer fog lamp control circuit.

DTC B3891 04

The trailer lighting control module detects an open/high resistance in the trailer fog lamp control circuit.

Actions Taken When the DTC Sets

The trailer fog lamp will be inoperative.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Trailer Connector/Provision Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**

cardiagn.com

- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF.
2. Connect a test lamp between the control circuit terminal 2 at the X88 Trailer Connector and ground, ignition ON.
3. Verify the test lamp turns ON and OFF when commanding the Trailer Fog Lamp(s) ON and OFF with a scan tool.
    - **If the test lamp is always OFF**
    1. Ignition OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module.
    2. Test for infinite resistance between the control circuit and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K68 Trailer Lighting Control Module.
    - **If the test lamp is always ON**
    1. Ignition OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module, ignition ON.
    2. Test for less than 1 V between the control circuit terminal and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V, replace the K68 Trailer Lighting Control Module.
    - **If the test lamp turns ON and OFF**
4. Test or replace the X88 Trailer Connector.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

Control Module References for Trailer Lighting Control Module replacement, programming, and setup

DTC B3948 OR B3949: FRONT TURN SIGNAL

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

cardiagn.com

DTC B3948 01

Left Front Turn Signal Circuit Short to Battery

DTC B3948 02

Left Front Turn Signal Circuit Short to Ground

DTC B3948 04

Left Front Turn Signal Circuit Open

DTC B3949 01

Right Front Turn Signal Circuit Short to Battery

DTC B3949 02

Right Front Turn Signal Circuit Short to Ground

DTC B3949 04

Right Front Turn Signal Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
F6DL (BCM 3) Fuse B+	1	1	1	-
F9DL (BCM 7) Fuse B+	1	1	1	-
F6DR (BCM 4) Fuse B+	1	1	1	-
F44DR (BCM 6) Fuse B+	1	1	1	-
Turn Signal Switch Signal - Left	1	1	1	-
Turn Signal Switch Signal - Right	1	1	1	-
Turn Signal Control - Left Front	B3948 02	B3948 04	B3948 01	-
Turn Signal Control - Right Front	B3949 02	B3949 04	B3949 01	-
Stop/Turn Signal Lamp Control - Left Rear	B3950 02, B3950 04	B3950 04	B3950 01	-
Stop/Turn Signal Lamp Control - Right Rear	B3951 02, B3951 04	B3951 04	B3951 01	-
Turn Signal Lamp Ground - Left Front	-	B3948 04	-	-
Turn Signal Lamp Ground - Right Front	-	B3949 04	-	-
Turn Signal Lamp Ground - Left Rear	-	B3950 04	-	-
Turn Signal Lamp Ground - Right Rear	-	B3951 04	-	-
Turn Signal/Multifunction Switch Ground	-	1	-	-

cardiagn.com

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
1. Turn Signal Lamps and/or Indicators Malfunction				

Circuit/System Description

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 there respective control circuits. When a turn signal request is received by the BCM, a serial data message is sent to the instrument cluster requesting the respective turn signal indicator be pulsed ON and OFF.

Conditions for Running the DTC

Battery voltage must be between 9-16 V.

Conditions for Setting the DTC

DTC B3948 01 and B3948 04

- The BCM detects an open/high resistance in the left front turn signal control circuit.
- The BCM detects an open/high resistance in the left front turn signal ground circuit.

DTC B3948 02

The BCM detects a short to ground in the left front turn signal control circuit.

DTC B3949 01 and B3949 04

- The BCM detects an open/high resistance in the right front turn signal control circuit.
- The BCM detects an open/high resistance in the right front turn signal ground circuit.

DTC B3949 02

The BCM detects a short to ground in the right front turn signal control circuit.

Actions Taken When the DTC Sets

DTC B3948

- The left front turn signal is inoperative.
- The "Left Front Turn Indicator Failure" message is displayed on the driver information center display.
- The left turn signal indicator on the instrument cluster flashes rapidly.

DTC B3949

- The right front turn signal is inoperative.
- The "Right Front Turn Indicator Failure" message is displayed on the driver information center display.
- The right turn signal indicator on the instrument cluster flashes rapidly.

cardiagn.com

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Diagnostic Aids

When testing at the turn signal lamp bulb sockets, make sure all measurements and test lamp connections are in the correct terminal location and do not come in contact with each other during testing.

Reference Information

Schematic Reference

Exterior Lights Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

DTC B3948

1. Ignition OFF, exterior lamps OFF, remove the bulb at the appropriate turn signal lamp listed below. It may take up to 2 min for all vehicle systems to power down.
    - A9A Outside Rearview Mirror - Driver
    - E4LF Turn Signal Lamp - Left Front (1500 with X88/Z88 without YE9)
    - E4N Park/Turn Signal Lamp - Left (2500/3500 with X88 - GMC)
    - E4Q Park/Turn Signal Lamp - Left Lower (2500/3500 with X88 - Chevrolet)
    - E4S Park/Turn Signal Lamp - Left Upper (2500/3500 with X88 - Chevrolet)
    - E13LA Headlamp Assembly - Left (1500 with X88/Z88 with YE9)
2. Test for less than 15 Ω between the appropriate ground circuit terminal listed below and ground.
    - A9A Outside Rearview Mirror - Driver terminal 5
    - E4LF Turn Signal Lamp - Left Front socket terminal (1500 with X88/Z88 without YE9)

cardiagn.com

- E4N Park/Turn Signal Lamp - Left socket terminal (2500/3500 with X88 - GMC)
- E4Q Park/Turn Signal Lamp - Left Lower socket terminal (2500/3500 with X88 - Chevrolet)
- E4S Park/Turn Signal Lamp - Left Upper socket terminal (2500/3500 with X88 - Chevrolet)
- E13LA Headlamp Assembly - Left terminal 1 (1500 with X88/Z88 with YE9)
- **If 15 Ω or greater**

1. Ignition OFF.
2. Test for less than 2 Ω in the ground circuit end to end.
    - If 2 Ω or greater, repair the open/high resistance in the circuit.
    - If less than 2 Ω, repair the open/high resistance in the ground connection.

- **If less than 15 Ω**

3. Connect a test lamp between the appropriate control circuit terminal listed below and ground, ignition ON.
    - A9A Outside Rearview Mirror - Driver terminal 13
    - E4LF Turn Signal Lamp - Left Front socket terminal (1500 with X88/Z88 without YE9)
    - E4N Park/Turn Signal Lamp - Left socket terminal (2500/3500 with X88 - GMC)
    - E4Q Park/Turn Signal Lamp - Left Lower socket terminal (2500/3500 with X88 - Chevrolet)
    - E4S Park/Turn Signal Lamp - Left Upper socket terminal (2500/3500 with X88 - Chevrolet)
    - E13LA Headlamp Assembly - Left terminal 7 (1500 with X88/Z88 with YE9)
4. Verify the test lamp turns ON and OFF when commanding the Left Front Turn Signal Lamp ON and OFF with a scan tool.
    - **If the test lamp is always OFF**

    1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module.
    2. Test for infinite resistance between the control circuit and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K9 Body Control Module.

    - **If the test lamp is always ON**

    1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.
    2. Test for less than 1 V between the control circuit terminal and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V, replace the K9 Body Control Module.

    - **If the test lamp turns ON and OFF**

5. Test or replace the appropriate turn signal lamp - left front.

DTC B3949

1. Ignition OFF, exterior lamps OFF, remove the bulb at the appropriate turn signal lamp listed below. It may take up to 2 min for all vehicle systems to power down.
    - A9B Outside Rearview Mirror - Passenger
    - E4RF Turn Signal Lamp - Right Front (1500 with X88/Z88 without YE9)

cardiagn.com

- E4P Park/Turn Signal Lamp - Right (2500/3500 with X88 - GMC)
- E4R Park/Turn Signal Lamp - Right Lower (2500/3500 with X88 - Chevrolet)
- E4T Park/Turn Signal Lamp - Right Upper (2500/3500 with X88 - Chevrolet)
- E13RA Headlamp Assembly - Right (1500 with X88/Z88 with YE9)

2. Test for less than 15 Ω between the appropriate ground circuit terminal listed below and ground.
    - A9B Outside Rearview Mirror - Passenger terminal 5
    - E4RF Turn Signal Lamp - Right Front socket terminal (1500 with X88/Z88 without YE9)
    - E4P Park/Turn Signal Lamp - Right socket terminal (2500/3500 with X88 - GMC)
    - E4R Park/Turn Signal Lamp - Right Lower socket terminal (2500/3500 with X88 - Chevrolet)
    - E4T Park/Turn Signal Lamp - Right Upper socket terminal (2500/3500 with X88 - Chevrolet)
    - E13RA Headlamp Assembly - Right terminal 1 (1500 with X88/Z88 with YE9)
    - **If 15 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.
    - **If less than 15 Ω**
3. Connect a test lamp between the appropriate circuit terminal listed below and ground, ignition ON.
    - A9B Outside Rearview Mirror - Passenger terminal 13
    - E4RF Turn Signal Lamp - Right Front socket terminal (1500 with X88/Z88 without YE9)
    - E4P Park/Turn Signal Lamp - Right socket terminal (2500/3500 with X88 - GMC)
    - E4R Park/Turn Signal Lamp - Right Lower socket terminal (2500/3500 with X88 - Chevrolet)
    - E4T Park/Turn Signal Lamp - Right Upper socket terminal (2500/3500 with X88 - Chevrolet)
    - E13RA Headlamp Assembly - Right terminal 7 (1500 with X88/Z88 with YE9)
4. Verify the test lamp turns ON and OFF when commanding the Right Front Turn Signal Lamp ON and OFF with a scan tool.
    - **If the test lamp is always OFF**
    1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.
    2. Test for infinite resistance between the control circuit and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K9 Body Control Module.
    - **If the test lamp is always ON**
    1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module, ignition ON.
    2. Test for less than 1 V between the control circuit terminal and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V, replace the K9 Body Control Module.
    - **If the test lamp turns ON and OFF**

cardiagn.com

5. Test or replace the appropriate turn signal lamp - right front.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Headlamp Replacement (GMC 1500)** **Headlamp Replacement (Chevrolet - Left Side)** **Headlamp Replacement (Chevrolet - Right Side)** **Headlamp Replacement (GMC 2500, 3500)**
- **Turn Signal Bulb Replacement (GMC HD - Left Side)** **Turn Signal Bulb Replacement (GMC HD - Right Side)** **Turn Signal Bulb Replacement (Chevrolet LD - Left Side)** **Turn Signal Bulb Replacement (Chevrolet LD - Right Side)** **Turn Signal Bulb Replacement (GMC LD)**
- **Control Module References** for BCM replacement, programming, and setup

DTC B3950 OR B3951: REAR TURN SIGNAL

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B3950 01

Left Rear Turn Signal Circuit Short to Battery

DTC B3950 02

Left Rear Turn Signal Circuit Short to Ground

DTC B3950 04

Left Rear Turn Signal Circuit Open

DTC B3951 01

Right Rear Turn Signal Circuit Short to Battery

DTC B3951 02

Right Rear Turn Signal Circuit Short to Ground

DTC B3951 04

Right Rear Turn Signal Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
F6DL (BCM 3) Fuse B+	1	1	1	-
F9DL (BCM 7) Fuse B+	1	1	1	-

cardiagn.com

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
F6DR (BCM 4) Fuse B+	1	1	1	-
F44DR (BCM 6) Fuse B+	1	1	1	-
Turn Signal Switch Signal - Left	1	1	1	-
Turn Signal Switch Signal - Right	1	1	1	-
Turn Signal Control - Left Front	B3948 02	B3948 04	B3948 01	-
Turn Signal Control - Right Front	B3949 02	B3949 04	B3949 01	-
Stop/Turn Signal Lamp Control - Left Rear	B3950 02, B3950 04	B3950 04	B3950 01	-
Stop/Turn Signal Lamp Control - Right Rear	B3951 02, B3951 04	B3951 04	B3951 01	-
Turn Signal Lamp Ground - Left Front	-	B3948 04	-	-
Turn Signal Lamp Ground - Right Front	-	B3949 04	-	-
Turn Signal Lamp Ground - Left Rear	-	B3950 04	-	-
Turn Signal Lamp Ground - Right Rear	-	B3951 04	-	-
Turn Signal/Multifunction Switch Ground	-	1	-	-
1. Turn Signal Lamps and/or Indicators Malfunction				

Circuit/System Description

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 there respective control circuits. When a turn signal request is received by the BCM, a serial data message is sent to the instrument cluster requesting the respective turn signal indicator be pulsed ON and OFF.

Conditions for Running the DTC

Battery voltage must be between 9-16 V.

Conditions for Setting the DTC

DTC B3950 01

The BCM detects a short to voltage in the left rear turn signal control circuit.

DTC B3950 02 and B3950 04

- The BCM detects a short to ground or an open/high resistance in the left rear turn signal control circuit.
- The BCM detects an open/high resistance in the left rear turn signal ground circuit.

DTC B3951 01

cardiagn.com

The BCM detects a short to voltage in the right rear turn signal control circuit.

DTC B3951 02 and B3951 04

- The BCM detects a short to ground or an open/high resistance in the right rear turn signal control circuit.
- The BCM detects an open/high resistance in the right rear turn signal ground circuit.

Actions Taken When the DTC Sets

DTC B3950

- The left rear turn signal is inoperative.
- The "Left Rear Turn Indicator Failure" message is displayed on the driver information center display.
- The left turn signal indicator on the instrument cluster flashes rapidly.

DTC B3951

- The right rear turn signal is inoperative.
- The "Right Rear Turn Indicator Failure" message is displayed on the driver information center display.
- The right turn signal indicator on the instrument cluster flashes rapidly.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Diagnostic Aids

When testing at the turn signal lamp bulb sockets, make sure all measurements and test lamp connections are in the correct terminal location and do not come in contact with each other during testing.

Reference Information

Schematic Reference

Exterior Lights Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

cardiagn.com

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

DTC B3950

1. Ignition OFF, exterior lamps OFF, disconnect the appropriate component listed below. It may take up to 2 min for all vehicle systems to power down.
    - E42L Tail Lamp Assembly - Left (1500 without ZW9)
    - E5AG Tail/Stop and Turn Signal Lamp - Left Upper (2500/3500 without ZW9)
    - E5S Tail/Stop and Turn Signal Lamp - Left (with ZW9)
    - E5U Tail/Stop and Turn Signal Lamp - Left Lower (2500/3500 without ZW9)
2. Test for less than 15 Ω between the appropriate ground circuit terminal listed below and ground.
    - E42L Tail Lamp Assembly - Left terminal 1 (1500 without ZW9)
    - E5AG Tail/Stop and Turn Signal Lamp - Left Upper terminal 3 (2500/3500 without ZW9)
    - E5S Tail/Stop and Turn Signal Lamp - Left socket terminal (with ZW9)
    - E5U Tail/Stop and Turn Signal Lamp - Left Lower terminal 3 (2500/3500 without ZW9)
    - **If 15 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.
    - **If less than 15 Ω**
3. Connect a test lamp between the appropriate control circuit terminal listed below and ground, ignition ON.
    - E42L Tail Lamp Assembly - Left terminal 2 (1500 without ZW9)
    - E5AG Tail/Stop and Turn Signal Lamp - Left Upper terminal 2 (2500/3500 without ZW9)
    - E5S Tail/Stop and Turn Signal Lamp - Left socket terminal (with ZW9)
    - E5U Tail/Stop and Turn Signal Lamp - Left Lower terminal 2 (2500/3500 without ZW9)
4. Verify the test lamp turns ON and OFF when commanding the Left Rear Turn Signal/Stop Lamp ON and OFF with a scan tool.
    - **If the test lamp is always OFF**
    1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module.
    2. Test for infinite resistance between the control circuit and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K9 Body Control Module.
    - **If the test lamp is always ON**
    1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.

cardiagn.com

2. Test for less than 1 V between the control circuit terminal and ground.
    - If 1 V or greater, repair the short to voltage on the circuit.
    - If less than 1 V, replace the K9 Body Control Module.
- **If the test lamp turns ON and OFF**

5. Replace the appropriate turn signal lamp - left rear.

DTC B3951

1. Ignition OFF, exterior lamps OFF, disconnect the appropriate component listed below. It may take up to 2 min for all vehicle systems to power down.
    - E42R Tail Lamp Assembly - Right (1500 without ZW9)
    - E5AH Tail/Stop and Turn Signal Lamp - Right Upper (2500/3500 without ZW9)
    - E5T Tail/Stop and Turn Signal Lamp - Right (with ZW9)
    - E5V Tail/Stop and Turn Signal Lamp - Right Lower (2500/3500 without ZW9)
2. Test for less than 15 Ω between the appropriate ground circuit terminal listed below and ground.
    - E42R Tail Lamp Assembly - Right terminal 1 (1500 without ZW9)
    - E5AH Tail/Stop and Turn Signal Lamp - Right Upper terminal 3 (2500/3500 without ZW9)
    - E5T Tail/Stop and Turn Signal Lamp - Right socket terminal (with ZW9)
    - E5V Tail/Stop and Turn Signal Lamp - Right Lower terminal 3 (2500/3500 without ZW9)
    - **If 15 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.
    - **If less than 15 Ω**
3. Connect a test lamp between the appropriate control circuit terminal listed below and ground, ignition ON.
    - E42R Tail Lamp Assembly - Right terminal 2 (1500 without ZW9)
    - E5AH Tail/Stop and Turn Signal Lamp - Right Upper terminal 2 (2500/3500 without ZW9)
    - E5T Tail/Stop and Turn Signal Lamp - Right socket terminal (with ZW9)
    - E5V Tail/Stop and Turn Signal Lamp - Right Lower terminal 2 (2500/3500 without ZW9)
4. Verify the test lamp turns ON and OFF when commanding the Right Rear Turn Signal/Stop Lamp ON and OFF with a scan tool.
    - **If the test lamp is always OFF**
    1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.
    2. Test for infinite resistance between the control circuit and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K9 Body Control Module.
    - **If the test lamp is always ON**

cardiagn.com

1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module, ignition ON.
2. Test for less than 1 V between the control circuit terminal and ground.
    - If 1 V or greater, repair the short to voltage on the circuit.
    - If less than 1 V, replace the K9 Body Control Module.
- **If the test lamp turns ON and OFF**

5. Replace the appropriate stop/turn signal lamp - right rear.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Tail Lamp Replacement (Chevrolet 1500, 2500, 3500 without GAJ)** **Tail Lamp Replacement (GMC 1500, 2500, 3500 without GAT or GFW)** **Tail Lamp Replacement (GMC 1500 with GAT or GFW)** **Tail Lamp Replacement (Chevrolet 1500 with GAJ)**
- **Stop and Tail Lamp Bulb Replacement (Chevrolet)** **Stop and Tail Lamp Bulb Replacement (GMC)**
- **Control Module References** for BCM replacement, programming, and setup

DTC C0277 OR C0890: BRAKE PEDAL POSITION SENSOR

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC C0277 06

Brake Pedal Position Sensor Circuit Low Voltage/Open

DTC C0277 07

Brake Pedal Position Sensor Circuit High Voltage

DTC C0277 09

Brake Pedal Position Sensor Circuit Too Fast Transitions

DTC C0277 12

Brake Pedal Position Sensor Circuit Below Minimum Threshold

DTC C0277 4B

Brake Pedal Position Sensor Circuit Calibration Not Learned

DTC C0890 03

Control Module Voltage Reference Output 3 Circuit Low Voltage

DTC C0890 07

cardiagn.com

Control Module Voltage Reference Output 3 Circuit High Voltage

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Brake Pedal Position Sensor 5 V Reference	C0277 06, C0890 03, U0422 00, U0422 71	C0277 06, U0422 00, U0422 71	C0277 07, C0890 07, U0422 00, U0422 71	C0277 09, C0277 12
Brake Pedal Position Sensor Signal	C0277 06, U0422 00, U0422 71	C0277 06, U0422 00, U0422 71	C0277 07, C0890 07, U0422 00, U0422 71	C0277 09, C0277 12
Brake Pedal Position Sensor Low Reference	-	C0277 07, U0422 00, U0422 71	1	-
1. Stop Lamps Malfunction				

Circuit/System Description

The brake pedal position sensor is used to sense the action of the driver application of the brake pedal. The brake pedal position 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 V reference voltage to the brake pedal position 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 relay control circuit illuminating the left and right stop lamps and the center high mounted stop lamp.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- Brakes APPLIED.

Conditions for Setting the DTC

DTC C0277 06 and C0277 12

- The BCM detects a short to ground or an open/high resistance in the brake pedal position sensor 5 V reference circuit.
- The BCM detects a short to ground or an open/high resistance in the brake pedal position sensor signal circuit.

DTC C0277 07

- The BCM detects a short to voltage in the brake pedal position sensor 5 V reference circuit.
- The BCM detects a short to voltage in the brake pedal position sensor signal circuit.
- The BCM detects an open/high resistance in the brake pedal position sensor low reference circuit.

DTC C0277 09

The BCM detects the brake pedal position sensor signal is changing faster than possible under normal operating

cardiagn.com

conditions.

DTC C0277 4B

The DTC will set when the brake pedal position sensor home position is not learned.

DTC C0890 03

The BCM detects a short to ground in the brake pedal position sensor 5 V reference circuit.

DTC C0890 07

- The BCM detects a short to voltage in the brake pedal position sensor 5 V reference circuit.
- The BCM detects a short to voltage in the brake pedal position sensor low reference circuit.

Actions Taken When the DTC Sets

- The Traction Control Malfunction indicator is commanded ON.
- "Service Stabilitrak" message on driver information center is ON.
- For DTC C0277 4B, the stop lamps may not activate at the expected brake pedal positions.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- Disconnect the negative battery cable for 30 s.
- For DTC C0277 07 the ignition must be cycled before the code can be cleared.
- For DTC C0277 4B a successful brake pedal position sensor calibration has been performed.
- A history DTC will clear once 50 malfunction-free ignition cycles have occurred.
- A DTC will not clear the current status until the next ignition cycle.

Reference Information

Schematic Reference

Exterior Lights Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

cardiagn.com

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify the scan tool Brake Pedal Position Sensor Learned Release Position parameter, located in the BCM Chassis Control Data display, is within 0.1 V of the Brake Pedal Position Sensor parameter when the brake pedal is fully released.
    - **If the difference is greater than 0.1 V**

      Perform the **Brake Pedal Position Sensor Calibration** .

    - **If the difference is less than 0.1 V**
3. Operate the vehicle within the Conditions for Running the DTC. You may also operate the vehicle within the conditions that you observed from the Freeze Frame/Failure Records data.
4. Verify the DTC does not set.
    - **If the DTC sets**

      Refer to Circuit/System Testing.

    - **If the DTC does not set**
5. All OK.

Circuit/System Testing

DTC C0277 06, C0277 07, C0277 12, C0890 03, and C0890 07

1. Ignition OFF, disconnect the harness connector at the B22 Brake Pedal Position Sensor, ignition ON.
2. Verify a test lamp illuminates between the low reference circuit terminal 1 and B+.
    - **If the test lamp does not illuminate**
    1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.
    2. Test for less than 2 Ω in the low reference circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K9 Body Control Module.
    - **If the test lamp illuminates**
3. Ignition ON.
4. Test for 4.8-5.2 V between the 5 V reference circuit terminal 2 and ground.
    - **If less than 4.8 V**
    1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.
    2. Test for infinite resistance between the 5 V reference circuit and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the 5 V reference circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.

cardiagn.com

- If less than 2 Ω, replace the K9 Body Control Module.

- **If greater than 5.2 V**

1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.
2. Test for less than 1 V between the 5 V reference circuit and ground.
    - If 1 V or greater, repair the short to voltage on the circuit.
    - If less than 1 V, replace the K9 Body Control Module.

- **If between 4.8-5.2 V**

5. Test for less than 1 V between the signal circuit terminal 3 and ground.

- **If 1 V or greater**

1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.
2. Test for less than 1 V between the signal circuit terminal 3 and ground.
    - If 1 V or greater, repair the short to voltage on the circuit.
    - If less than 1 V, replace the K9 Body Control Module.

- **If less than 1 V**

NOTE: **The scan tool Brake Pedal Applied parameter will change to Active for 2 seconds as the 3 A fused jumper wire is connected between the 5 V reference circuit and the signal circuit and then default to Inactive. This is normal operation.**

6. Install a 3 A fused jumper wire between the 5 V reference circuit terminal 2 and the signal circuit terminal 3.
7. Verify the scan tool Brake Pedal Applied parameter is Active for 2 s before defaulting to Inactive.

- **If not Active**

1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.
2. Test for infinite resistance between the signal circuit and ground.
    - If less than infinite resistance, repair the short to ground on the circuit.
    - If infinite resistance
3. Test for less than 2 Ω in the signal circuit end to end.
    - If 2 Ω or greater, repair the open/high resistance in the circuit.
    - If less than 2 Ω, replace the K9 Body Control Module.

- **If Active**

8. Test or replace the B22 Brake Pedal Position Sensor.

DTC C0277 4B

1. Verify DTC C0277 4B is not set.

- **If DTC C0277 4B is set**

1. Ignition ON
2. Perform the brake pedal position sensor calibration procedure for the K9 Body Control Module. Refer to **Brake Pedal Position Sensor Calibration** .
3. Verify the DTC does not reset while operating the vehicle under the conditions for running the DTC.

cardiagn.com

- If the DTC resets, replace the B22 Brake Pedal Position Sensor.
- If the DTC does not reset

4. All OK.

- **If DTC C0277 4B is not set**

2. All OK.

DTC C0277 09

1. Verify DTC C0277 09 is not set.
   - **If DTC C0277 09 is set**
   1. Replace the B22 Brake Pedal Position Sensor.
   2. Perform the brake pedal position sensor calibration procedure for the K9 Body Control Module. Refer to **Brake Pedal Position Sensor Calibration** .
   3. Verify the DTC does not reset while operating the vehicle under the conditions for running the DTC.
      - If the DTC resets, replace the K9 Body Control Module.
      - If the DTC does not reset
   4. All OK.
   - **If DTC C0277 09 is not set**
2. All OK.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Brake Pedal Position Sensor Calibration**
- **Brake Pedal Position Sensor Replacement**
- **Control Module References** for BCM replacement, programming, and setup

DTC C0297: BRAKE APPLIED OUTPUT

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC C0297 01

Brake Applied Output Circuit Short to Battery

DTC C0297 02

Brake Applied Output Circuit Short to Ground

Diagnostic Fault Information

cardiagn.com

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
F17DL (BCM 1) Fuse B+	B1325 03, B3873 01, B3873 04, B3883 01, B3883 04, C0297 01	B1325 03, B3873 01, B3873 04, B3883 01, B3883 04, C0297 01	-	-
Brake Applied Signal	C0297 02	1	C0297 01	-
1. Cruise Control Malfunction				

Circuit/System Description

The brake pedal position sensor is used to sense the action of the driver application of the brake pedal. The brake pedal position 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 V reference voltage to the brake pedal position sensor. When the variable signal reaches a voltage threshold indicating the brakes have been applied, the BCM will apply battery voltage to the right and left stop lamp control circuits, engine control module (ECM), and center high mounted stop lamp relay control circuit.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- Brakes APPLIED.

Conditions for Setting the DTC

DTC C0297 01

- The BCM detects a short to voltage or an open/high resistance in the brake applied signal circuit.
- The BCM detects a short to ground or an open/high resistance in the F17DL (BCM 1) fuse B+ circuit.

DTC C0297 02

The BCM detects a short to ground or an open/high resistance in the brake applied signal circuit.

Actions Taken When the DTC Sets

The cruise control system is disabled.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 50 consecutive malfunction-free ignition cycles have occurred.

Diagnostic Aids

Verify that the brake pedal position sensor is properly calibrated.

Reference Information

Schematic Reference

cardiagn.com

- **Cruise Control Schematics**
- **Body Control System Schematics**

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, disconnect the X1 harness connector at the K20 Engine Control Module.
2. Connect a test lamp between the signal circuit terminal 57 and ground, ignition ON.
3. Verify the test lamp turns ON and OFF while pressing and releasing the brake pedal.
    - **If the test lamp is always OFF**
    1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module.
    2. Test for infinite resistance between the signal circuit and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the signal circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K9 Body Control Module.
    - **If the test lamp is always ON**
    1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.
    2. Test for less than 1 V between the signal circuit terminal and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V, replace the K9 Body Control Module.
    - **If the test lamp turns ON and OFF**
4. Replace the K20 Engine Control Module.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

cardiagn.com

- **Brake Pedal Position Sensor Calibration**
- **Control Module References** for BCM or ECM replacement, programming, and setup

SYMPTOMS - LIGHTING

NOTE: **The following steps must be completed before using a symptom table.**

- Perform the **Diagnostic System Check - Vehicle** before using a symptom table in order to verify that all of the following conditions are true:
  - There are no DTCs set.
  - The control modules can communicate via the serial data link.
- Review the system description and operation in order to familiarize yourself with the system functions. Refer to the following:
  - **Exterior Lighting Systems Description and Operation**
  - **Interior Lighting Systems Description and Operation**

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the lighting system. Refer to **Checking Aftermarket Accessories** .
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.

Intermittent

Thoroughly inspect the wiring and connectors. An incomplete inspection of the wiring and connectors may result in misdiagnosis causing part replacement with the reappearance of the malfunction. If an intermittent malfunction exists, refer to **Testing for Intermittent Conditions and Poor Connections** .

Symptom List

Refer to a symptom diagnostic procedure from the following list in order to diagnose the symptom:

- **Backup Lamps Malfunction (Manual Transmission)Backup Lamps Malfunction (Automatic Transmission)**
- **Cargo Lamps Malfunction**
- **Courtesy Lamps Malfunction**
- **Daytime Running Lamps Malfunction**
- **Dome Lamps Malfunction**
- **Exterior Courtesy Lamps Malfunction**
- **Front Fog Lamps Malfunction**
- **Hazard Lamps Malfunction**
- **Headlamps Malfunction**
- **Interior Accent Lighting Malfunction**
- **Interior Backlighting Malfunction**
- **Park, License, and/or Tail Lamps Malfunction**
- **Stop Lamps Malfunction**

cardiagn.com

- **Trailer Lamps MalfunctionTrailer Lamps Malfunction (Export)**
- **Turn Signal Lamps and/or Indicators Malfunction**

BACKUP LAMPS MALFUNCTION (MANUAL TRANSMISSION)

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
F7DL (BCM 5) Fuse B+	B127B 2B	B127B 2B	-	-
Backup Lamp Switch Signal	2	2	2	-
Backup Lamp Relay Control	B2545 02	B127B 2B, B2545 04	B2545 01	-
Backup Lamp Control	1	1	1	-
Backup Lamp Relay Ground	-	1	-	-
Backup Lamp Switch Ground	-	2	-	-
Backup Lamp Ground - Left	-	1	-	-
Backup Lamp Ground - Right	-	1	-	-
1. Backup Lamps Malfunction 2. Backup Lamps Switch Malfunction				

Circuit/System Description

The engine control module (ECM) provides a signal circuit to the backup lamp switch which is permanently grounded. With the engine running and the transmission in the reverse position, the backup lamp switch signal circuit is pulled low and the ECM responds by sending a serial data message to the body control module (BCM). The message indicates that the gear selector is in the reverse position. The BCM energizes the backup lamp relay by applying battery voltage to the backup lamp relay control circuit. When the backup lamp relay is energized, the relay switch contacts close and battery voltage is applied through the backup lamp fuses to the backup lamp control circuits which illuminates the backup lamps. Once the driver moves the gear selector out of the reverse position, a message is sent by the ECM via serial data requesting the BCM to remove battery voltage from the backup lamp relay control circuit. The engine must be running for the backup lamps to operate.

Diagnostic Aids

- Disconnect the negative battery cable for 30 seconds to clear DTC's.
- When testing at the backup lamp bulb sockets, make sure all measurements and test lamp connections are in the correct terminal location and do not come in contact with each other during testing.

Reference Information

Schematic Reference

- **Exterior Lights Schematics**

cardiagn.com

- **Body Control System Schematics**

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Engine ON.
2. Verify the scan tool Reverse Position Switch parameter changes between ON and OFF while shifting the vehicle between the neutral and reverse gears.
   - **If the parameter does not change**

     Refer to Backup Lamps Switch Malfunction.

   - **If the parameter changes**
3. Verify the backup lamps turn ON and OFF when commanding the Backup Lamps ON and OFF with a scan tool.
   - **If the backup lamps do not turn ON and OFF**

     Refer to Backup Lamps Malfunction.

   - **If the backup lamps turn ON and OFF**
4. All OK.

Circuit/System Testing

Backup Lamps Switch Malfunction

1. Ignition OFF, exterior lamps OFF, disconnect the harness connector at the B16 Backup Lamp Switch. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 15 Ω between the appropriate ground circuit terminal listed below and ground.
   - Terminal A (with MQ7)
   - Terminal 1 (with M2P/MXW)
   - **If 15 Ω or greater**

cardiagn.com

1. Ignition OFF.
2. Test for less than 2 Ω in the ground circuit end to end.
    - If 2 Ω or greater, repair the open/high resistance in the circuit.
    - If less than 2 Ω, repair the open/high resistance in the ground connection.
- **If less than 15 Ω**

3. Ignition ON.
4. Verify the scan tool Reverse Position Switch parameter is Off.
    - **If not Off**
    1. Ignition OFF, disconnect the appropriate harness connector listed below at the K20 Engine Control Module.
        - X2 (with M2P/MXW)
        - X3 (with MQ7)
    2. Test for infinite resistance between the appropriate signal circuit terminal listed below and ground.
        - Terminal B (with MQ7)
        - Terminal 2 (with M2P/MXW)
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance, replace the K20 Engine Control Module.
    - **If Off**
5. Install a 3 A fused jumper wire between the signal circuit terminal 2 and ground.
6. Verify the scan tool Reverse Position Switch parameter is On.
    - **If not On**
    1. Ignition OFF, disconnect the appropriate harness connector listed below at the K20 Engine Control Module, ignition ON.
        - X2 (with M2P/MXW)
        - X3 (with MQ7)
    2. Test for less than 1 V between the signal circuit terminal and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V
    3. Test for less than 2 Ω in the signal circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K20 Engine Control Module.
    - **If On**
7. Test or replace the B16 Backup Lamp Switch.

Backup Lamps Malfunction

1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.
2. Verify a test lamp illuminates between the B+ circuit terminal 3 and ground.
    - **If the test lamp does not illuminate and the circuit fuse is good**
    1. Ignition OFF, disconnect the X2 harness connector at the X51L Fuse Block - Instrument Panel Left.
    2. Test for less than 2 Ω in the B+ circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.

cardiagn.com

- If less than 2 Ω, verify the fuse is not open and there is voltage at the fuse.

- **If the test lamp does not illuminate and the circuit fuse is open**

1. Ignition OFF, disconnect the X2 harness connector at the X51L Fuse Block - Instrument Panel Left.
2. Test for infinite resistance between the B+ circuit and ground.
    - If less than infinite resistance, repair the short to ground on the circuit.
    - If infinite resistance, replace the K9 Body Control Module.

- **If the test lamp illuminates**

3. Ignition OFF, connect the X2 harness connector at the K9 Body Control Module.
4. Ignition OFF, exterior lamps OFF, remove the appropriate E5 Backup Lamp bulb at the appropriate E5 Tail Lamp. It may take up to 2 minutes for all vehicle systems to power down.
5. Test for less than 15 Ω between the ground circuit at the socket terminal and ground.

- **If 15 Ω or greater**

1. Ignition OFF.
2. Test for less than 2 Ω in the ground circuit end to end.
    - If 2 Ω or greater, repair the open/high resistance in the circuit.
    - If less than 2 Ω, repair the open/high resistance in the ground connection.

- **If less than 15 Ω**

6. Connect a test lamp between the control circuit at the socket terminal and ground, ignition ON.
7. Verify the test lamp does not turn ON and OFF when commanding the Backup Lamps ON and OFF with a scan tool.

- **If the test lamp turns ON and OFF**

  Test or replace the appropriate E5 Backup Lamp.

- **If the test lamp does not turn ON and OFF**

8. Ignition OFF, install the E5 Backup Lamp bulb. Disconnect the X5 harness connector at the X50A Fuse Block - Underhood, ignition ON.
9. Verify the backup lamps do not illuminate.

- **If the backup lamps illuminate**

1. Ignition OFF, remove the E5 Backup Lamp bulb, ignition ON.
2. Test for less than 1 V between the control circuit at the socket terminal and ground.
    - If 1 V or greater, repair the short to voltage on the circuit.
    - If less than 1 V, replace the appropriate E5 Tail Lamp.

- **If the backup lamps do not illuminate**

10. Ignition OFF, connect a 3 A fused jumper between the control circuit terminal C1 and B+, ignition ON.
11. Verify the backup lamps illuminate.

- **If the backup lamps do not illuminate**

1. Ignition OFF, remove the 3 A fused jumper wire, remove the E5 Backup Lamp bulb.
2. Test for infinite resistance between the control circuit terminal C1 and ground.
    - If less than infinite resistance, repair the short to ground on the circuit.
    - If infinite resistance
3. Test for less than 2 Ω in the control circuit end to end.

cardiagn.com

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω, all OK.

- **If the backup lamps illuminate**

12. Ignition OFF, all vehicle systems OFF, disconnect the X2 Harness connector at the X50A Fuse Block - Underhood. It may take up to 2 minutes for all vehicle systems to power down.
13. Test for less than 15 Ω between the ground circuit terminal F2 and ground.
    - **If 15 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.
    - **If less than 15 Ω**
14. Connect the X2 and X5 harness connectors at the X50A Fuse Block - Underhood.
15. Disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.

NOTE: **The test lamp will illuminate at low intensity for the following test.**

16. Verify a test lamp illuminates between the control circuit terminal 26 and B+.
    - **If the test lamp does not illuminate**
    1. Ignition OFF, disconnect the X4 harness connector at the X50A Fuse Block - Underhood, ignition ON.
    2. Test for less than 1 V between the control circuit terminal 26 and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the X50A Fuse Block - Underhood.
    - **If the test lamp illuminates**
17. Connect a 3 A fused jumper between the control circuit terminal 26 and B+, ignition ON.
18. Verify the backup lamps illuminate.
    - **If the backup lamps do not illuminate**
    1. Ignition OFF, disconnect the X4 harness connector at the X50A Fuse Block - Underhood.
    2. Test for infinite resistance between the control circuit terminal 26 and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance, replace the X50A Fuse Block - Underhood.
    - **If the backup lamps illuminate**
19. Test or replace the K9 Body Control Module.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Tail Lamp Replacement (Chevrolet 1500, 2500, 3500 without GAJ)** **Tail Lamp Replacement (GMC**

cardiagn.com

1500, 2500, 3500 without GAT or GFW) Tail Lamp Replacement (GMC 1500 with GAT or GFW) Tail Lamp Replacement (Chevrolet 1500 with GAJ)

- Backup Lamp Bulb Replacement (Chevrolet 1500, 2500. and 3500 without GAJ) Backup Lamp Bulb Replacement (GMC 1500, 2500, 3500 without GAT or GFW) Backup Lamp Bulb Replacement (GMC 1500 with GAT or GFW) Backup Lamp Bulb Replacement (Chevrolet 1500 with GAJ)
- Underhood Electrical Center or Junction Block Replacement
- Control Module References for BCM or ECM replacement, programming, and setup

BACKUP LAMPS MALFUNCTION (AUTOMATIC TRANSMISSION)

Diagnostic Instructions

- Perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.
- Review Strategy Based Diagnosis for an overview of the diagnostic approach.
- Diagnostic Procedure Instructions provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
F7DL (BCM 5) Fuse B+	B127B 2B	B127B 2B	-	-
Backup Lamp Relay Control	B2545 02	B127B 2B, B2545 04	B2545 01	-
Backup Lamp Control	1	1	1	-
Backup Lamp Relay Ground	-	1	-	-
Backup Lamp Ground - Left	-	1	-	-
Backup Lamp Ground - Right	-	1	-	-
1. Backup Lamps Malfunction				

Circuit/System Description

The backup lamp relay is supplied with battery voltage at all times. With the engine running 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 energizes the backup lamp relay by applying battery voltage to the backup lamp relay control circuit. When the backup lamp relay is energized, the relay switch contacts close and battery voltage is applied through the backup lamp fuses to the backup lamp control circuits which illuminates 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 lamp relay control circuit. The engine must be running for the backup lamps to operate.

Diagnostic Aids

- Disconnect the negative battery cable for 30 seconds to clear DTC's.
- When testing at the backup lamp bulb sockets, make sure all measurements and test lamp connections are in the correct terminal location and do not come in contact with each other during testing.

Reference Information

cardiagn.com

Schematic Reference

- **Exterior Lights Schematics**
- **Body Control System Schematics**

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.
2. Verify a test lamp illuminates between the B+ circuit terminal 3 and ground.
    - **If the test lamp does not illuminate and the circuit fuse is good**
    1. Ignition OFF, disconnect the X2 harness connector at the X51L Fuse Block - Instrument Panel Left.
    2. Test for less than 2 Ω in the B+ circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, verify the fuse is not open and there is voltage at the fuse.
    - **If the test lamp does not illuminate and the circuit fuse is open**
    1. Ignition OFF, disconnect the X2 harness connector at the X51L Fuse Block - Instrument Panel Left.
    2. Test for infinite resistance between the B+ circuit and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance, replace the K9 Body Control Module.
    - **If the test lamp illuminates**
3. Ignition OFF, connect the X2 harness connector at the K9 Body Control Module.
4. Ignition OFF, exterior lamps OFF, remove the appropriate E5 Backup Lamp bulb at the appropriate E5 Tail Lamp. It may take up to 2 minutes for all vehicle systems to power down.
5. Test for less than 15 Ω between the ground circuit at the socket terminal and ground.
    - **If 15 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.

cardiagn.com

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω, repair the open/high resistance in the ground connection.

- **If less than 15 Ω**

6. Connect a test lamp between the control circuit at the socket terminal and ground, ignition ON.
7. Verify the test lamp does not turn ON and OFF when commanding the Backup Lamps ON and OFF with a scan tool.
   - **If the test lamp turns ON and OFF**

     Test or replace the appropriate E5 Backup Lamp.

   - **If the test lamp does not turn ON and OFF**
8. Ignition OFF, install the E5 Backup Lamp bulb. Disconnect the X5 harness connector at the X50A Fuse Block - Underhood, ignition ON.
9. Verify the backup lamps do not illuminate.
   - **If the backup lamps illuminate**
   1. Ignition OFF, remove the E5 Backup Lamp bulb, ignition ON.
   2. Test for less than 1 V between the control circuit at the socket terminal and ground.
      - If 1 V or greater, repair the short to voltage on the circuit.
      - If less than 1 V, replace the appropriate E5 Tail Lamp.
   - **If the backup lamps do not illuminate**
10. Ignition OFF, connect a 3 A fused jumper between the control circuit terminal C1 and B+, ignition ON.
11. Verify the backup lamps illuminate.
    - **If the backup lamps do not illuminate**
    1. Ignition OFF, remove the 3 A fused jumper wire, remove the E5 Backup Lamp bulb.
    2. Test for infinite resistance between the control circuit terminal C1 and ground.
       - If less than infinite resistance, repair the short to ground on the circuit.
       - If infinite resistance
    3. Test for less than 2 Ω in the control circuit end to end.
       - If 2 Ω or greater, repair the open/high resistance in the circuit.
       - If less than 2 Ω, all OK.
    - **If the backup lamps illuminate**
12. Ignition OFF, all vehicle systems OFF, disconnect the X2 Harness connector at the X50A Fuse Block - Underhood. It may take up to 2 minutes for all vehicle systems to power down.
13. Test for less than 15 Ω between the ground circuit terminal F2 and ground.
    - **If 15 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
       - If 2 Ω or greater, repair the open/high resistance in the circuit.
       - If less than 2 Ω, repair the open/high resistance in the ground connection.
    - **If less than 15 Ω**
14. Connect the X2 and X5 harness connectors at the X50A Fuse Block - Underhood.
15. Disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.

cardiagn.com

NOTE: **The test lamp will illuminate at low intensity for the following test.**

16. Verify a test lamp illuminates between the control circuit terminal 26 and B+.
    - **If the test lamp does not illuminate**
    1. Ignition OFF, disconnect the X4 harness connector at the X50A Fuse Block - Underhood, ignition ON.
    2. Test for less than 1 V between the control circuit terminal 26 and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the X50A Fuse Block - Underhood.
    - **If the test lamp illuminates**
17. Connect a 3 A fused jumper between the control circuit terminal 26 and B+, ignition ON.
18. Verify the backup lamps illuminate.
    - **If the backup lamps do not illuminate**
    1. Ignition OFF, disconnect the X4 harness connector at the X50A Fuse Block - Underhood.
    2. Test for infinite resistance between the control circuit terminal 26 and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance, replace the X50A Fuse Block - Underhood.
    - **If the backup lamps illuminate**
19. Test or replace the K9 Body Control Module.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Tail Lamp Replacement (Chevrolet 1500, 2500, 3500 without GAJ)** **Tail Lamp Replacement (GMC 1500, 2500, 3500 without GAT or GFW)** **Tail Lamp Replacement (GMC 1500 with GAT or GFW)** **Tail Lamp Replacement (Chevrolet 1500 with GAJ)**
- **Backup Lamp Bulb Replacement (Chevrolet 1500, 2500. and 3500 without GAJ)** **Backup Lamp Bulb Replacement (GMC 1500, 2500, 3500 without GAT or GFW)** **Backup Lamp Bulb Replacement (GMC 1500 with GAT or GFW)** **Backup Lamp Bulb Replacement (Chevrolet 1500 with GAJ)**
- **Underhood Electrical Center or Junction Block Replacement**
- **Control Module References** for BCM or ECM replacement, programming, and setup

CARGO LAMPS MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

cardiagn.com

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Cargo Lamps Relay Control	B2560 02	B2560 04	B2560 01	-
Cargo Lamps Control	1	1	1	-
Cargo Lamps Switch Signal	B256B 00	1	1	-
Cargo Lamps Ground	1	1	1	-
Cargo Lamps Relay Ground	-	1	-	-
Cargo Lamps Switch Ground	-	B2560 01	-	-
1. Cargo Lamps Malfunction				

Circuit/System Description

The cargo lamp relay is supplied with battery voltage at all times. The cargo lamp switch signal circuit is grounded momentarily by pressing the cargo lamp switch. The body control module (BCM) energizes the cargo lamp relay by applying ground to the cargo lamp relay control circuit. When the cargo lamp relay is energized, the relay switch contacts close and battery voltage is applied through the F9DR fuse to the cargo lamp control circuit which illuminates the cargo lamps.

Diagnostic Aids

When testing at the cargo lamp bulb sockets, make sure all measurements and test lamp connections are in the correct terminal location and do not come in contact with each other during testing.

Reference Information

Schematic Reference

- **Exterior Lights Schematics**
- **Interior Lights Schematics (E29)** **Interior Lights Schematics (without E29)**

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Interior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

cardiagn.com

1. Ignition ON.
2. Verify the scan tool Pickup Bed Cargo Lamp Command parameter changes between 0 % and 100 % while commanding the cargo lamps ON and OFF with the cargo lamp switch.
    - **If the parameter does not change between 0 % and 100 %**

      Refer to Cargo Lamp Switch Malfunction.

    - **If the parameter changes between 0 % and 100 %**
3. Verify the cargo lamps turn ON and OFF when commanding the Pickup Bed Cargo Lamp ON and OFF with a scan tool.
    - **If the cargo lamps do not turn ON and OFF**

      Refer to Cargo Lamps Malfunction.

    - **If the cargo lamps turn ON and OFF**
4. All OK.

Circuit/System Testing

Cargo Lamp Switch Malfunction

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, open and close drivers door, disconnect the X1 harness connector at the S48A Multifunction Switch - Instrument Panel. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 15 Ω between the ground circuit terminal 14 and ground.
    - **If 15 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.
    - **If less than 15 Ω**
3. Ignition ON.
4. Verify the scan tool Pickup Bed Cargo Lamp Command parameter is 0 %.
    - **If not 0 %**
    1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.
    2. Test for infinite resistance between the signal circuit terminal 18 and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance, replace the K9 Body Control Module.
    - **If 0 %**
5. Install a 3 A fused jumper wire between the signal circuit terminal 18 and ground.
6. Verify the scan tool Pickup Bed Cargo Lamp Command parameter is 100 %.
    - **If not 100 %**
    1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.
    2. Test for less than 1 V between the signal circuit terminal 18 and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.

cardiagn.com

- If less than 1 V

3. Test for less than 2 Ω in the signal circuit end to end.
    - If 2 Ω or greater, repair the open/high resistance in the circuit.
    - If less than 2 Ω, replace the K9 Body Control Module.

- **If 100 %**

7. Test or replace the S48A Multifunction Switch - Instrument Panel.

Cargo Lamps Malfunction

1. Ignition OFF, exterior lamps OFF, remove the cargo lamp bulbs from the E6 Center High Mounted Stop Lamp. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 15 Ω between the ground circuit at the socket terminal and ground.
    - **If 15 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.
    - **If less than 15 Ω**
3. Connect a test lamp between the control circuit at the socket terminal and ground, ignition ON.
4. Verify the test lamp does not turn ON and OFF when commanding the Pickup Bed Cargo Lamp ON and OFF with a scan tool.
    - **If the test lamp turns ON and OFF**

      Test or replace the appropriate cargo lamp bulb.

    - **If the test lamp does not turn ON and OFF**
5. Ignition OFF, install the cargo lamp bulbs. Disconnect the X2 harness connector at the X51R Fuse Block - Instrument Panel Right, ignition ON.
6. Verify the cargo lamps do not illuminate.
    - **If the cargo lamps illuminate**
    1. Ignition OFF, remove the cargo lamps, ignition ON.
    2. Test for less than 1 V between the control circuit terminal 11 and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V, replace the appropriate cargo lamp.
    - **If the cargo lamps do not illuminate**
7. Ignition OFF, connect a 3 A fused jumper between the control circuit terminal 11 and B+, ignition ON.
8. Verify the cargo lamps illuminate.
    - **If the cargo lamps do not illuminate**
    1. Ignition OFF, remove the 3 A fused jumper wire, remove the cargo lamps.
    2. Test for infinite resistance between the control circuit terminal 11 and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuit end to end.

cardiagn.com

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω, all OK.

- **If the cargo lamps illuminate**

9. Ignition OFF and all vehicle systems OFF. It may take up to 2 minutes for all vehicle systems to power down.
10. Test for less than 15 Ω between the X51R Fuse Block - Instrument Panel Right ground circuit terminal 5 and ground.
    - **If 15 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.
    - **If less than 15 Ω**
11. Connect the X2 harness connector at the X51R Fuse Block - Instrument Panel Right. Disconnect the X6 harness connector at the K9 Body Control Module, ignition ON.
12. Verify a test lamp illuminates between the control circuit terminal 26 and B+.
    - **If the test lamp does not illuminate**
    1. Ignition OFF, disconnect the X2 harness connector at the X51R Fuse Block - Instrument Panel Right, ignition ON.
    2. Test for less than 1 V between the control circuit terminal 26 and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the X51R Fuse Block - Instrument Panel Right.
    - **If the test lamp illuminates**
13. Ignition OFF, connect a 3 A fused jumper between the control circuit terminal 26 and B+, ignition ON.
14. Verify the cargo lamps illuminate.
    - **If the cargo lamps do not illuminate**
    1. Ignition OFF, disconnect the X2 harness connector at the X51R Fuse Block - Instrument Panel Right.
    2. Test for infinite resistance between the control circuit terminal and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance, replace the X51R Fuse Block - Instrument Panel Right.
    - **If the cargo lamps illuminate**
15. Test or replace the K9 Body Control Module.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Interior Lamp Switch Replacement**
- **High Mount Stop and Cargo Lamp Replacement**

cardiagn.com

- **High Mount Stop Lamp Bulb Replacement (Stop)** **High Mount Stop Lamp Bulb Replacement (Cargo)**
- **Underhood Electrical Center or Junction Block Replacement**
- **Control Module References** for BCM replacement, programming, and setup

COURTESY LAMPS MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Courtesy Lamps Control - Terminal 3 X7	B1480 02	1	1	-
Center Console Compartment Lamp Ground	-	1	-	-
Dome/Reading Lamps - Front Overhead Console Left Ground	-	1, 2	-	-
Dome/Reading Lamps - Front Overhead Console Right Ground	-	1, 2	-	-
Dome/Reading Lamps - 2nd Row Ground	-	1, 2	-	-
Sunshade Mirror Lamp - Left Ground	-	1	-	-
Sunshade Mirror Lamp - Right Ground	-	1	-	-
1. Courtesy Lamps Malfunction 2. Dome Lamps Malfunction				

Circuit/System Description

The body control module (BCM) supplies battery voltage to the front and rear reading lamps, left and right sunshade lamps, center console compartment lamp, and instrument panel compartment lamp via the courtesy lamp control circuit. When the instrument panel compartment, center console armrest, or a sunshade mirror is opened, the switch contacts close allowing battery voltage to flow illuminating the respective lamps. The front and rear reading lamps are controlled by individual switches that are activated by the occupants when additional cabin lighting is required. In the event that any of these courtesy lamps were to remain illuminated for more than 10 minutes with the ignition switch in the OFF position, the BCM will deactivate the courtesy lamp control circuit to prevent total battery discharge.

Reference Information

Schematic Reference

- **Interior Lights Schematics (E29)** **Interior Lights Schematics (without E29)**

cardiagn.com

- **Body Control System Schematics**

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Interior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, open and close drivers door, disconnect the harness connector at the inoperative courtesy lamp. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 15 Ω between the appropriate ground circuit terminal listed below and ground.
    - E28 Center Console Compartment Lamp - terminal 2
    - E31L Sunshade Mirror Lamp - Left - terminal B
    - E31R Sunshade Mirror Lamp - Right - terminal B
    - E37B Dome/Reading Lamps - 2nd Row - terminal B
    - E37EL Dome/Reading Lamps - Front Overhead Console Left - terminal 4
    - E37ER Dome/Reading Lamps - Front Overhead Console Right - terminal 4
    - **If 15 Ω or greater**

    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.

    - **If less than 15 Ω**
3. Connect a test lamp between the appropriate control circuit terminal listed below and ground.
    - E28 Center Console Compartment Lamp - terminal 1
    - E31L Sunshade Mirror Lamp - Left - terminal A
    - E31R Sunshade Mirror Lamp - Right - terminal A
    - E37B Dome/Reading Lamps - 2nd Row - terminal A
    - E37EL Dome/Reading Lamps - Front Overhead Console Left - terminal 2
    - E37ER Dome/Reading Lamps - Front Overhead Console Right - terminal 2

cardiagn.com

4. Verify the test lamp turns ON and OFF when commanding the Inadvertent Load ON and OFF with a scan tool.
    - **If the test lamp is always OFF**
    1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module.
    2. Test for infinite resistance between the control circuit and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K9 Body Control Module.
    - **If the test lamp is always ON**
    1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module, ignition ON.
    2. Test for less than 1 V between the control circuit terminal and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V, replace the K9 Body Control Module.
    - **If the test lamp turns ON and OFF**
5. Test or replace the appropriate courtesy lamp.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Sunshade Replacement (Crew Cab, Extended Cab)** **Sunshade Replacement (Regular Cab)**
- **Center Reading and Courtesy Lamp Replacement**
- **Control Module References** for BCM replacement, programming, and setup

DAYTIME RUNNING LAMPS MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Ambient Light Sensor Signal	B2645 03	B2645 07	B2645 07	-
Park/Daytime Running Lamp - Left Control (2500/3500 with Z88 and SLT)	B2600 02	B2600 04	B2600 01	-
Park/Daytime Running Lamp - Right Control (2500/3500 with Z88 and SLT)	B2605 02	B2605 04	B2605 01	-
Park/Daytime Running Lamp - Left Control	B260D 02	1	1	-

cardiagn.com

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Park/Daytime Running Lamp - Right Control	B260E 02	1	1	-
Ambient Light Sensor Low Reference	1	B2645 07, B0163 05, B0183 05,	1	-
Daytime Running Lamp Ground - Left	-	1	-	-
Daytime Running Lamp Ground - Right	-	1	-	-
1. Daytime Running Lamps Malfunction				

Circuit/System Description

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 V depending on outside lighting conditions. The body control module (BCM) provides a 5 V 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 lamps or automatic lamp control when the headlamp switch is in the AUTO position. In daylight conditions the BCM will command the daytime running lamps 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 daytime running lamps operation.

Reference Information

Schematic Reference

- **Headlights/Daytime Running Lights (DRL) Schematics**
- **Body Control System Schematics**

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

cardiagn.com

1. Ignition ON.
2. Verify the left daytime running lamp turns ON and OFF while commanding the Left Daytime Running Lamp ON and OFF with a scan tool.
    - **If the left daytime running lamp does not turn ON and OFF**

      Refer to Daytime Running Lamp Malfunction.

    - **If the left daytime running lamp turns ON and OFF**
3. Verify the right daytime running lamp turns ON and OFF while commanding the Right Daytime Running Lamp ON and OFF with a scan tool.
    - **If the right daytime running lamp does not turn ON and OFF**

      Refer to Daytime Running Lamp Malfunction.

    - **If the right daytime running lamp turns ON and OFF**
4. Refer to Ambient Light Sensor Malfunction.

Circuit/System Testing

Daytime Running Lamps Malfunction

1. Ignition OFF, exterior lamps OFF, disconnect the harness connector at the appropriate E13 Headlamp Assembly. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10 Ω between the appropriate ground circuit terminal listed below and ground.
    - E13LA Headlamp Assembly - Left terminal 1 (1500 with X88/Z88)
    - E13RA Headlamp Assembly - Right terminal 1 (1500 with X88/Z88)
    - E13LA Headlamp Assembly - Left terminal A (2500/3500 with Z88 and XLT)
    - E13RA Headlamp Assembly - Right terminal A (2500/3500 with Z88 and XLT)
    - **If 10 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.
    - **If less than 10 Ω**
3. Connect a test lamp between the appropriate control circuit terminal listed below and ground, ignition ON.
    - E13LA Headlamp Assembly - Left terminal 8 (1500 with X88/Z88)
    - E13RA Headlamp Assembly - Right terminal 8 (1500 with X88/Z88)
    - E13LA Headlamp Assembly - Left terminal G (2500/3500 with Z88 and XLT)
    - E13RA Headlamp Assembly - Right terminal G (2500/3500 with Z88 and XLT)
4. Verify the test lamp turns ON and OFF when commanding the appropriate Dedicated Daytime Running Lamp ON and OFF with a scan tool.
    - **If the test lamp is always OFF**
    1. Ignition OFF, disconnect the appropriate harness connector listed below at the K9 Body Control Module.

cardiagn.com

- X4 - left daytime running lamp
- X5 - right daytime running lamp

2. Test for infinite resistance between the control circuit and ground.
   - If less than infinite resistance, repair the short to ground on the circuit.
   - If infinite resistance
3. Test for less than 2 Ω in the control circuit end to end.
   - If 2 Ω or greater, repair the open/high resistance in the circuit.
   - If less than 2 Ω, replace the K9 Body Control Module.

- **If the test lamp is always ON**

1. Ignition OFF, disconnect the appropriate harness connector listed below at the K9 Body Control Module, ignition ON.
   - X4 - left daytime running lamp
   - X5 - right daytime running lamp
2. Test for less than 1 V between the control circuit terminal and ground.
   - If 1 V or greater, repair the short to voltage on the circuit.
   - If less than 1 V, replace the K9 Body Control Module.

- **If the test lamp turns ON and OFF**

5. Test or replace the park/daytime running lamp.

Ambient Light Sensor Malfunction

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, open and close drivers door, disconnect the harness connector at the B10B Ambient Light/Sunload Sensor. It may take up to 10 min for all vehicle systems to power down.
2. Test for less than 5 Ω between the low reference circuit terminal 6 and ground.
   - **If 5 Ω or greater**

   1. Ignition OFF, disconnect the X2 harness connector at the K33 HVAC Control Module.
   2. Test for less than 2 Ω in the low reference circuit end to end.
      - If 2 Ω or greater, repair the open/high resistance in the circuit.
      - If less than 2 Ω, replace the K33 HVAC Control Module.

   - **If less than 5 Ω**
3. Ignition ON.
4. Verify the scan tool Ambient Light Sensor parameter is greater than 4.65 V.
   - **If 4.65 V or less**

   1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.
   2. Test for infinite resistance between the signal circuit terminal 5 and ground.
      - If less than infinite resistance, repair the short to ground on the circuit.
      - If infinite resistance, replace the K9 Body Control Module.

   - **If greater than 4.65 V**
5. Install a 3 A fused jumper wire between the signal circuit terminal 5 and the low reference circuit terminal 6.
6. Verify the scan tool Ambient Light Sensor parameter is less than 0.196 V.

cardiagn.com

- **If 0.196 V or greater**

1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.
2. Test for less than 1 V between the signal circuit terminal 5 and ground.
    - If 1 V or greater, repair the short to voltage on the circuit.
    - If less than 1 V
3. Test for less than 2 Ω in the signal circuit end to end.
    - If 2 Ω or greater, repair the open/high resistance in the circuit.
    - If less than 2 Ω, replace the K9 Body Control Module.

- **If less than 0.196 V**

7. Test or replace the B10B Ambient Light/Sunload Sensor.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Headlamp Replacement (GMC 1500)** **Headlamp Replacement (Chevrolet - Left Side)** **Headlamp Replacement (Chevrolet - Right Side)** **Headlamp Replacement (GMC 2500, 3500)**
- **Sun Load Temperature and Headlamp Automatic Control Ambient Light Sensor Replacement**
- **Control Module References** for BCM or HVAC control module replacement, programming, and setup

DOME LAMPS MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
F9DL (BCM 7) Fuse B+	1	1	-	-
Dome Lamps Control - Terminal 1 X7	B2615 02	B2615 04	1	-
Dome Lamp Switch Cancel Signal	2	2	2	-
Dome Lamp Switch ON Signal	2	2	2	-
Dome/Reading Lamps - Front Overhead Console Left Ground	-	1	-	-
Dome/Reading Lamps - Front Overhead Console Right Ground	-	1	-	-
Dome/Reading Lamps - 2nd Row Ground	-	1	-	-
1. Dome Lamp Malfunction 2. Dome Lamp Switch Malfunction				

Circuit/System Description

cardiagn.com

The dome lamp switch has 3 positions: DOOR, OFF, and ON. The ON position provides a ground for continuous operation and the dome lamp will remain illuminated until the switch is placed in either the DOOR or OFF position. When in the DOOR position, the dome lamp operation is controlled by the body control module (BCM). When any door is opened, the door ajar switch contacts close and the BCM receives a door-open input. The BCM illuminates the dome lamp when any door is opened or a door lock/unlock request is activated with the key fob. After all doors have been closed, the dome lamp will remain illuminated approximately 3 seconds after the last door closes. When the driver places the dome lamp switch in the OFF position, the dome lamp will be disabled. In the event that the dome lamp were to remain illuminated for more than 10 minutes with the ignition switch in the OFF position, the BCM will deactivate the dome lamp control circuit to prevent total battery discharge.

Reference Information

Schematic Reference

Interior Lights Schematics (E29) **Interior Lights Schematics (without E29)**

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Interior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify the center console compartment lamp, both sunshade lamps, and ALL reading lamps operate ON/OFF when activated.
    - **If the center console compartment lamp, both sunshade lamps, and ALL reading lamps do not activate**

      Refer to **Courtesy Lamps Malfunction**.

    - **If the center console compartment lamp, both sunshade lamps, and ALL reading lamps activate**
3. Verify the scan tool Door Ajar Switch parameter changes between Active and Inactive while opening and closing each vehicle door.
    - **If the parameter does not change**

cardiagn.com

Refer to **Door Ajar Indicator Malfunction** .

- **If the parameter changes**

4. Verify the scan tool Interior/Courtesy Lighting Master Switch parameter changes between Door, On, and Cancel while placing the dome lamp switch in the Door, On, and Cancel positions.
   - **If the parameter does not change**

     Refer to Dome Lamp Switch Malfunction.

   - **If the parameter changes**
5. Verify the dome lamps turn ON and OFF while commanding the Courtesy Lamps ON and OFF with a scan tool.
   - **If the dome lamps do not turn ON and OFF**

     Refer to Dome Lamp Malfunction.

   - **If the dome lamps turn ON and OFF**
6. All OK.

Circuit/System Testing

Dome Lamp Switch Malfunction

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, open and close drivers door, disconnect the harness connector at the S12 Dome Lamp Switch. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 15 Ω between the ground circuit terminal 1 and ground.
   - **If 15 Ω or greater**
   1. Ignition OFF.
   2. Test for less than 2 Ω in the ground circuit end to end.
      - If 2 Ω or greater, repair the open/high resistance in the circuit.
      - If less than 2 Ω, repair the open/high resistance in the ground connection.
   - **If less than 15 Ω**
3. Ignition ON.
4. Verify the scan tool Interior/Courtesy Lighting Master Switch parameter is Door.
   - **If Cancel**
   1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.
   2. Test for infinite resistance between the signal circuit terminal 2 and ground.
      - If less than infinite resistance, repair the short to ground on the circuit.
      - If infinite resistance, replace the K9 Body Control Module.
   - **If On**
   1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module.
   2. Test for infinite resistance between the signal circuit terminal 3 and ground.
      - If less than infinite resistance, repair the short to ground on the circuit.
      - If infinite resistance, replace the K9 Body Control Module.

cardiagn.com

- **If Door**

5. Install a 3 A fused jumper wire between the signal circuit terminal 2 and ground.
6. Verify the scan tool Interior/Courtesy Lighting Master Switch parameter is Cancel.
    - **If not Cancel**
    1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.
    2. Test for less than 1 V between the signal circuit terminal 2 and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V
    3. Test for less than 2 Ω in the signal circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K9 Body Control Module.
    - **If Cancel**
7. Install a 3 A fused jumper wire between the signal circuit terminal 3 and ground.
8. Verify the scan tool Interior/Courtesy Lighting Master Switch parameter is On.
    - **If not On**
    1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module, ignition ON.
    2. Test for less than 1 V between the signal circuit terminal 3 and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V
    3. Test for less than 2 Ω in the signal circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K9 Body Control Module.
    - **If On**
9. Test or replace the S12 Dome Lamp Switch.

Dome Lamp Malfunction

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, open and close drivers door, disconnect the harness connector at the inoperative E37 Dome/Reading Lamps. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 15 Ω between the appropriate ground circuit terminal listed below and ground.
    - E37B Dome/Reading Lamps - 2nd Row terminal B
    - E37EL Dome/Reading Lamps - Front Overhead Console Left terminal 4
    - E37ER Dome/Reading Lamps - Front Overhead Console Right terminal 4
    - **If 15 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.
    - **If less than 15 Ω**
3. Connect a test lamp between the appropriate control circuit terminal listed below and ground.
    - E37B Dome/Reading Lamps - 2nd Row terminal C

cardiagn.com

- E37EL Dome/Reading Lamps - Front Overhead Console Left terminal 1
- E37ER Dome/Reading Lamps - Front Overhead Console Right terminal 1

4. Verify the test lamp turns ON and OFF when commanding the Courtesy Lamps ON and OFF with a scan tool.
   - **If the test lamp is always OFF**
   1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module.
   2. Test for infinite resistance between the control circuit and ground.
      - If less than infinite resistance, repair the short to ground on the circuit.
      - If infinite resistance
   3. Test for less than 2 Ω in the control circuit end to end.
      - If 2 Ω or greater, repair the open/high resistance in the circuit.
      - If less than 2 Ω, replace the K9 Body Control Module.
   - **If the test lamp is always ON**
   1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module, ignition ON.
   2. Test for less than 1 V between the control circuit terminal and ground.
      - If 1 V or greater, repair the short to voltage on the circuit.
      - If less than 1 V, replace the K9 Body Control Module.
   - **If the test lamp turns ON and OFF**
5. Test or replace the appropriate E37 Dome/Reading Lamp.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Center Reading and Courtesy Lamp Replacement**
- **Control Module References** for BCM replacement, programming, and setup

EMERGENCY VEHICLE LAMPS MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Roof Beacon Relay Switch B+	1	1	-	-
Roof Beacon Switch B+	1	1	-	-
Roof Beacon Relay Control	1	1	1	-
Roof Beacon Relay Coil Ground	-	1	-	-
Roof Beacon Relay Switch Ground	-	1	-	-

cardiagn.com

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
1. Emergency Vehicle Lamps Malfunction				

Circuit/System Description

The roof beacon switch is supplied with battery voltage at all times from the F3 DL fuse located in the left instrument panel fuse block. When the roof beacon switch is activated, voltage flows from the F3 DL fuse through the roof beacon switch to the roof beacon relay coil energizing the roof beacon relay coil. With the roof beacon relay coil energized, the roof beacon relay switch contacts close allowing battery voltage to flow from the F20 DR fuse through the roof beacon relay switch contacts to the emergency vehicle lights that the vehicle is equipped with.

Reference Information

Schematic Reference

Exterior Lights Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the S63 Roof Beacon Switch, ignition ON.
2. Verify a test lamp illuminates between the B+ circuit terminal 3 and ground.
    - **If the test lamp does not illuminate**
    1. Ignition OFF, disconnect the X3 harness connector at the X51L Fuse Block - Instrument Panel Left.
    2. Test for infinite resistance between the B+ circuit terminal 3 and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the X51L Fuse Block - Instrument Panel Left.

cardiagn.com

- **If the test lamp illuminates**

3. Ignition OFF, exterior lamps OFF, connect the harness connector at the S63 Roof Beacon Switch.
4. Disconnect the KR58 Roof Beacon Relay.
5. Test for less than 15 Ω between the ground circuit terminal A1 and ground.
    - **If 15 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.
    - **If less than 15 Ω**
6. Ignition ON.
7. Verify a test lamp illuminates between the B+ circuit terminal C1 and ground.
    - **If the test lamp does not illuminate**
    1. Ignition OFF, disconnect the X3 harness connector at the X51R Fuse Block - Instrument Panel Right.
    2. Test for infinite resistance between the B+ circuit terminal C1 and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the B+ circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the X51R Fuse Block - Instrument Panel Right.
    - **If the test lamp illuminates**
8. Ignition OFF, connect a test lamp between the control circuit terminal C2 and ground, ignition ON.
9. Verify a test lamp turns ON and OFF while turning the S63 Roof Beacon Switch ON and OFF.
    - **If the test lamp is always OFF**
    1. Ignition OFF, disconnect the harness connector at the S63 Roof Beacon Switch.
    2. Test for infinite resistance between the control circuit terminal C2 and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the S63 Roof Beacon Switch.
    - **If the test lamp is always ON**
    1. Ignition OFF, disconnect the harness connector at the S63 Roof Beacon Switch, ignition ON.
    2. Test for less than 1 V between the control circuit terminal C2 and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V, replace the S63 Roof Beacon Switch.
    - **If the test lamp turns ON and OFF**
10. Ignition OFF, exterior lamps OFF, connect the KR58 Roof Beacon Relay.
11. Disconnect the harness connector at the component with the inoperative emergency vehicle lighting.

cardiagn.com

12. Test for less than 15 Ω between the appropriate ground circuit terminal and ground.
    - **If 15 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.
    - **If less than 15 Ω**
13. Ignition OFF, connect a test lamp between the 5989 GN/BU control circuit terminal and ground, ignition ON.
14. Verify a test lamp turns ON and OFF while turning the S63 Roof Beacon Switch ON and OFF.
    - **If the test lamp is always OFF**
    1. Ignition OFF, disconnect the KR58 Roof Beacon Relay.
    2. Test for infinite resistance between the 5989 GN/BU control circuit terminal and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the KR58 Roof Beacon Relay.
    - **If the test lamp is always ON**
    1. Ignition OFF, disconnect the KR58 Roof Beacon Relay, ignition ON.
    2. Test for less than 1 V between the 5989 GN/BU control circuit terminal and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V, replace the KR58 Roof Beacon Relay.
    - **If the test lamp turns ON and OFF**
15. Test or replace the inoperative emergency vehicle lighting.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Emergency Vehicle Roof Lamp Switch Replacement**
- **Relay Replacement (Attached to Wire Harness)** **Relay Replacement (Within an Electrical Center)**

EXTERIOR COURTESY LAMPS MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance

cardiagn.com

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Exterior Courtesy Lamps Control Terminal 8 X7	B263A 02	B263A 04	1	-
Outside Rearview Mirror Courtesy Lamp - Driver Ground	-	1	-	-
Outside Rearview Mirror Courtesy Lamp - Passenger Ground	-	1	-	-
1. Exterior Courtesy Lamps Malfunction				

Circuit/System Description

The body control module (BCM) supplies battery voltage to the exterior door handles LED backlighting and the LED lighting located under each outside rearview mirror for approach lighting. When the keyless entry transmitter is operated to the lock/unlock functions the exterior LED lighting located under each outside rearview mirror for approach lighting are commanded ON.

Reference Information

Schematic Reference

Exterior Lights Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Interior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

NOTE: **Each component may need to be disconnected to isolate a short to voltage, short to ground, or an open/high resistance. Use the schematics to identify the following:**

- **Exterior courtesy lamps the vehicle is equipped with**
- **Each component's control and ground circuit terminals**

cardiagn.com

- **Component locations on the exterior courtesy lamps control circuit**

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, open and close drivers door, disconnect the harness connector at the appropriate E8Y Outside Rearview Mirror Courtesy Lamp. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 15 Ω between the ground circuit terminal 5 and ground.
   - **If 15 Ω or greater**
   1. Ignition OFF.
   2. Test for less than 2 Ω in the ground circuit end to end.
      - If 2 Ω or greater, repair the open/high resistance in the circuit.
      - If less than 2 Ω, repair the open/high resistance in the ground connection.
   - **If less than 15 Ω**
3. Connect a test lamp between the control circuit terminal 1 and ground.
4. Verify the test lamp turns ON and OFF when commanding the Outside Rearview Mirror Courtesy Lamps ON and OFF with a scan tool.
   - **If the test lamp is always OFF**
   1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module.
   2. Test for infinite resistance between the control circuit and ground.
      - If less than infinite resistance, repair the short to ground on the circuit.
      - If infinite resistance
   3. Test for less than 2 Ω in the control circuit end to end.
      - If 2 Ω or greater, repair the open/high resistance in the circuit.
      - If less than 2 Ω, replace the K9 Body Control Module.
   - **If the test lamp is always ON**
   1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module, ignition ON.
   2. Test for less than 1 V between the control circuit terminal and ground.
      - If 1 V or greater, repair the short to voltage on the circuit.
      - If less than 1 V, replace the K9 Body Control Module.
   - **If the test lamp turns ON and OFF**
5. Test or replace the appropriate E8Y Outside Rearview Mirror Courtesy Lamp.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Outside Rearview Mirror Courtesy Lamp Replacement**
- **Control Module References** for BCM replacement, programming, and setup

FRONT FOG LAMPS MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.

cardiagn.com

- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Front Fog Lamp Switch Signal	B2740 00	2	2	-
Front Fog Lamp Relay Control	B2530 02	B2530 04	B2530 01	-
Front Fog Lamp Control	1	1	1	-
Headlamp Switch Ground	-	2	-	-
Front Fog Lamp Ground - Left	-	1	-	-
Front Fog Lamp Ground - Right	-	1	-	-
1. Front Fog Lamps Malfunction 2. Front Fog Lamp Switch Malfunction				

Circuit/System Description

The front fog lamp relay is supplied with battery voltage at all times. The front fog lamp switch signal circuit is grounded momentarily by pressing the front fog lamp switch. The body control module (BCM) energizes the front fog lamp relay by applying ground to the front fog lamp relay control circuit. When the front fog lamp relay is energized, the relay switch contacts close and battery voltage is applied through the F49UA fog lamp fuse to the front fog lamp control circuit which illuminates the front fog lamps. With the front fog lamp switch activated the BCM sends a message via serial data to the instrument cluster requesting the instrument cluster to illuminate the front fog indicator.

Reference Information

Schematic Reference

Fog Lights Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

cardiagn.com

1. Ignition ON, headlamps ON.
2. Verify the scan tool Front Fog Lamps Switch parameter changes between Active and Inactive while commanding the front fog lamps ON and OFF with the front fog lamp switch.
    - **If the parameter does not change**

      Refer to Front Fog Lamp Switch Malfunction.

    - **If the parameter changes**
3. Verify the front fog lamps turn ON and OFF when commanding the Front Fog Lamps ON and OFF with a scan tool.
    - **If the front fog lamps do not turn ON and OFF**

      Refer to Front Fog Lamps Malfunction.

    - **If the front fog lamps turn ON and OFF**
4. All OK.

Circuit/System Testing

Front Fog Lamp Switch Malfunction

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, disconnect the harness connector at the S30 Headlamp Switch. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 15 Ω between the ground circuit terminal 8 and ground.
    - **If 15 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.
    - **If less than 15 Ω**
3. Ignition ON.
4. Verify the scan tool Front Fog Lamps Switch parameter is Inactive.
    - **If not Inactive**
    1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.
    2. Test for infinite resistance between the signal circuit terminal 10 and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance, replace the K9 Body Control Module.
    - **If Inactive**
5. Install a 3 A fused jumper wire between the signal circuit terminal 10 and ground.
6. Verify the scan tool Front Fog Lamps Switch parameter is Active.
    - **If not Active**
    1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.
    2. Test for less than 1 V between the signal circuit terminal 10 and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V

cardiagn.com

3. Test for less than 2 Ω in the signal circuit end to end.
    - If 2 Ω or greater, repair the open/high resistance in the circuit.
    - If less than 2 Ω, replace the K9 Body Control Module.
- **If Active**

7. Test or replace the S30 Headlamp Switch.

Front Fog Lamps Malfunction

1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.
2. Verify a test lamp illuminates between the control circuit terminal 10 and ground.
    - **If the test lamp does not illuminate**
    1. Ignition OFF, disconnect the X3 harness connector at the X50A Fuse Block - Underhood.
    2. Test for infinite resistance between the control circuit terminal and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the X50A Fuse Block - Underhood.
    - **If the test lamp illuminates**
3. Ignition OFF, remove the F49UA fog lamp fuse at the X50A Fuse Block - Underhood.
4. Connect a 3 A fused jumper between the control circuit terminal 10 and ground, ignition ON.
5. Verify a test lamp illuminates between the F49UA fog lamp fuse B+ switch control terminal and ground.
    - **If the test lamp does not illuminate**
    1. Ignition OFF, disconnect the X3 harness connector at the X50A Fuse Block - Underhood, ignition ON.
    2. Test for less than 1 V between the control circuit terminal 10 and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V, replace the X50A Fuse Block - Underhood.
    - **If the test lamp illuminates**
6. Ignition OFF, connect the X5 harness connector at the K9 Body Control Module.
7. Install the F49UA fog lamp fuse at the X50A Fuse Block - Underhood.
8. Ignition OFF, exterior lamps OFF, disconnect the harness connector at the appropriate E29 Fog Lamp.
9. Test for less than 10 Ω between the ground circuit terminal B and ground.
    - **If 10 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.
    - **If less than 10 Ω**
10. Connect a test lamp between the control circuit terminal A and ground, ignition ON.
11. Verify the test lamp turns ON and OFF when commanding the Front Fog Lamps ON and OFF with a scan tool.

cardiagn.com

- **If the test lamp is always OFF**

1. Ignition OFF, disconnect the X1 harness connector at the X50A Fuse Block - Underhood.
2. Test for infinite resistance between the control circuit and ground.
    - If less than infinite resistance, repair the short to ground on the circuit.
    - If infinite resistance
3. Test for less than 2 Ω in the control circuit end to end.
    - If 2 Ω or greater, repair the open/high resistance in the circuit.
    - If less than 2 Ω, replace the K9 Body Control Module.

- **If the test lamp is always ON**

1. Ignition OFF, disconnect the X1 harness connector at the X50A Fuse Block - Underhood, ignition ON.
2. Test for less than 1 V between the control circuit terminal and ground.
    - If 1 V or greater, repair the short to voltage on the circuit.
    - If less than 1 V, replace the K9 Body Control Module.

- **If the test lamp turns ON and OFF**

12. Test or replace the appropriate E29 Fog Lamp.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Headlamp Switch Replacement**
- **Front Fog Lamp Replacement (Chevrolet HD)** **Front Fog Lamp Replacement (GMC HD)** **Front Fog Lamp Replacement (Chevrolet LD)** **Front Fog Lamp Replacement (GMC LD)**
- **Front Fog Lamp Bulb Replacement (Chevrolet HD)** **Front Fog Lamp Bulb Replacement (GMC HD)**
- **Underhood Electrical Center or Junction Block Replacement**
- **Control Module References** for BCM or Instrument Cluster replacement, programming, and setup

HAZARD LAMPS MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Hazard Warning Switch Signal	B3596 00	1	1	-
Turn Signal/Multifunction Switch Ground	-	1	-	-
1. Hazard Lamps Malfunction				

Circuit/System Description

cardiagn.com

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

Reference Information

Schematic Reference

Exterior Lights Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify the scan tool Hazard Lamps Switch parameter changes between Active and Inactive while commanding the hazard lamps ON and OFF with the hazard warning switch.
   - **If the parameter does not change**

     Refer to Circuit/System Testing.

   - **If the parameter changes**
3. Verify all left and right turn signal lamps turn ON and OFF while commanding the hazard lamps ON and OFF with the hazard warning switch.
   - **If all turn signal lamps do not turn ON and OFF**

     Refer to **Turn Signal Lamps and/or Indicators Malfunction**

   - **If all turn signal lamps turn ON and OFF**
4. All OK.

Circuit/System Testing

cardiagn.com

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, open and close drivers door, disconnect the X2 harness connector at the S78 Turn Signal/Multifunction Switch. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 15 Ω between the ground circuit terminal C and ground.
    - **If 15 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.
    - **If less than 15 Ω**
3. Ignition ON.
4. Verify the scan tool Hazard Lamps Switch parameter is Inactive.
    - **If not Inactive**
    1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.
    2. Test for infinite resistance between the signal circuit terminal G and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance, replace the K9 Body Control Module.
    - **If Inactive**
5. Install a 3 A fused jumper wire between the signal circuit terminal G and ground.
6. Verify the scan tool Hazard Lamps Switch parameter is Active.
    - **If not Active**
    1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.
    2. Test for less than 1 V between the signal circuit terminal G and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V
    3. Test for less than 2 Ω in the signal circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K9 Body Control Module.
    - **If Active**
7. Test or replace the S78 Turn Signal/Multifunction Switch.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Turn Signal Switch Replacement**
- **Control Module References** for BCM replacement, programming, and setup

HEADLAMPS MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.

cardiagn.com

- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
F6DL (BCM 3) Fuse B+	1	1	-	-
F6DR (BCM 4) Fuse B+	1	1	-	-
Headlamp High Beam Relay Control	B2580 02, B2580 04	B2580 02, B2580 04	B2580 01	-
Low Beam Headlamp Control - Left	B2575 02	B2575 04	1	-
Low Beam Headlamp Control - Right	B2699 02	B2699 04	1	-
High Beam Headlamp Control - Left	2	2	2	-
High Beam Headlamp Control - Right	2	2	2	-
Headlamp Switch Park Lamps ON Signal	3	B257A 00	3	-
Headlamp Switch Headlamps OFF Signal	B257A 00	3	3	-
Headlamp Switch Headlamps ON Signal	B257A 00	3	3	-
Turn Signal/Multifunction Switch Flash To Pass Signal	B3806 00	4	4	-
Turn Signal/Multifunction Switch High Beam Signal	B3650 08	4	4	-
Headlamp Ground - Left	-	1	-	-
Headlamp Ground - Right	-	1	-	-
Headlamp Switch Ground	-	3	-	-
Turn Signal/Multifunction Switch Ground	-	4	-	-
1. Headlamps Malfunction - Low Beam 2. Headlamps Malfunction - High Beam 3. Headlamp Switch Malfunction 4. Turn Signal/Multifunction Switch Malfunction				

Circuit/System Description

Low Beam Headlamps

For headlamp operation, the body control module (BCM) monitors three signal circuits from the headlamp switch. When the headlamp switch is in the AUTO position, the three signal circuits are unaffected and the BCM relies on the ambient light sensor input to turn the headlamps and daytime running lamps ON and OFF. When the headlamp switch is placed in the OFF position, the headlamp switch headlamps OFF signal circuit is grounded, indicating to the BCM that the exterior lamps should be turned OFF. With the headlamp switch in the PARK LAMPS position, the headlamp switch park lamps ON signal circuit is grounded, indicating that the park lamps have been requested. When the headlamp switch is in the HEADLAMP position, both the headlamp switch park lamps ON signal circuit and the headlamp switch headlamps ON signal circuit are grounded. The BCM responds by commanding the park lamps and low beam headlamps ON. With the headlamp switch in the HEADLAMP or AUTO position, the BCM responds by applying battery positive voltage to the left and right

cardiagn.com

low beam headlamp control circuits illuminating the low beam headlamps.

High Beam Headlamps (without high beam shutters)

The high beam and flash to pass functions are contained within the turn signal/multifunction switch. The BCM provides the turn signal/multifunction switch with two signal circuits, the high beam signal circuit and the flash to pass signal circuit. 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 3 pin high beam fuse to the high beam control circuits illuminating the high beam headlamps.

High Beam Headlamps (with high beam shutters)

The high beam and flash to pass functions are contained within the turn signal/multifunction switch. The BCM provides the turn signal/multifunction switch with two signal circuits, the high beam signal circuit and the flash to pass signal circuit. 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 3 pin high beam fuse to the high beam control circuits actuating the left and right high beam solenoid actuators opening the right and left high beam shutters exposing the full headlamps for high beam operation.

Flash to Pass

When the turn signal/multifunction switch is momentarily placed in the flash to pass position, ground is applied to the BCM through the flash to pass signal circuit. The BCM responds by applying ground to the high beam relay control circuit which energizes the high beam relay illuminating the high beams for a brief moment or until the flash to pass switch is released.

Reference Information

Schematic Reference

- **Headlights/Daytime Running Lights (DRL) Schematics**
- **Body Control System Schematics**

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

cardiagn.com

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify ALL turn signals operate when activated with the turn signal switch.
    - **If the turn signals do not operate when activated**

      Refer to **Turn Signal Lamps and/or Indicators Malfunction**.

    - **If the turn signals operate when activated**
3. Verify the scan tool Headlamps On Switch parameter changes between Active and Inactive while commanding the headlamps ON and OFF with the headlamp switch.
    - **If the parameter does not change**

      Refer to Headlamp Switch Malfunction.

    - **If the parameter changes**
4. Verify the scan tool Automatic Headlamps Disable Switch parameter changes between Active and Inactive while commanding the automatic lamp control ON and OFF with the headlamp switch.
    - **If the parameter does not change**

      Refer to Headlamp Switch Malfunction.

    - **If the parameter changes**
5. Verify the scan tool Headlamps Flash Switch parameter changes between Active and Inactive while commanding the flash to pass ON and OFF with the turn signal/multifunction switch.
    - **If the parameter does not change**

      Refer to Turn Signal/Multifunction Switch Malfunction.

    - **If the parameter changes**
6. Verify the scan tool High Beam Select Switch parameter changes between Active and Inactive while commanding the high beams ON and OFF with the turn signal/multifunction switch.
    - **If the parameter does not change**

      Refer to Turn Signal/Multifunction Switch Malfunction.

    - **If the parameter changes**
7. Verify the left low beam headlamp turns ON and OFF when commanding the Left Low Beam/Daytime Running Lamp ON and OFF with a scan tool.
    - **If the left low beam headlamp does not turn ON and OFF**

      Refer to Headlamps Malfunction - Low Beam.

    - **If the left low beam headlamp turns ON and OFF**
8. Verify the right low beam headlamp turns ON and OFF when commanding the Right Low Beam/Daytime Running Lamp ON and OFF with a scan tool.

cardiagn.com

- **If the right low beam headlamp does not turn ON and OFF**

  Refer to Headlamps Malfunction - Low Beam.

- **If the right low beam headlamp turns ON and OFF**

9. Verify the high beams turn ON and OFF when commanding the High Beams ON and OFF with a scan tool.
   - **If the high beams do not turn ON and OFF**

     Refer to Headlamps Malfunction - High Beam.

   - **If the high beams turn ON and OFF**
10. Verify the high beam indicator on the instrument cluster turns ON and OFF while commanding the All Indicators Test ON and OFF with a scan tool.
    - **If the high beam indicator does not turn ON and OFF**

      Refer to High Beam Indicator Malfunction.

    - **If the high beam indicator turns ON and OFF**
11. All OK.

Circuit/System Testing

Headlamp Switch Malfunction

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, disconnect the harness connector at the S30 Headlamp Switch. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 15 Ω between the ground circuit terminal 8 and ground.
   - **If 15 Ω or greater**
   1. Ignition OFF.
   2. Test for less than 2 Ω in the ground circuit end to end.
      - If 2 Ω or greater, repair the open/high resistance in the circuit.
      - If less than 2 Ω, repair the open/high resistance in the ground connection.
   - **If less than 15 Ω**
3. Ignition ON.
4. Verify the scan tool Automatic Headlamps Disable Switch parameter is Inactive.
   - **If not Inactive**
   1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.
   2. Test for infinite resistance between the signal circuit terminal 3 and ground.
      - If less than infinite resistance, repair the short to ground on the circuit.
      - If infinite resistance, replace the K9 Body Control Module.
   - **If Inactive**
5. Install a 3 A fused jumper wire between the signal circuit terminal 3 and ground.
6. Verify the scan tool Automatic Headlamps Disable Switch parameter is Active.
   - **If not Active**
   1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.

cardiagn.com

2. Test for less than 1 V between the signal circuit terminal 3 and ground.
    - If 1 V or greater, repair the short to voltage on the circuit.
    - If less than 1 V
3. Test for less than 2 Ω in the signal circuit end to end.
    - If 2 Ω or greater, repair the open/high resistance in the circuit.
    - If less than 2 Ω, replace the K9 Body Control Module.

- **If Active**

7. Verify the scan tool Park Lamps Switch parameter is Inactive.
    - **If not Inactive**
    1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.
    2. Test for infinite resistance between the signal circuit terminal 5 and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance, replace the K9 Body Control Module.
    - **If Inactive**
8. Install a 3 A fused jumper wire between the signal circuit terminal 5 and ground.
9. Verify the scan tool Park Lamps Switch parameter is Active.
    - **If not Active**
    1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.
    2. Test for less than 1 V between the signal circuit terminal 5 and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V
    3. Test for less than 2 Ω in the signal circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K9 Body Control Module.
    - **If Active**
10. Verify the scan tool Headlamps On Switch parameter is Inactive.
    - **If not Inactive**
    1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.
    2. Test for infinite resistance between the signal circuit terminal 1 and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance, replace the K9 Body Control Module.
    - **If Inactive**
11. Install a 3 A fused jumper wire between the signal circuit terminal 1 and ground.
12. Verify the scan tool Headlamps On Switch parameter is Active.
    - **If not Active**
    1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.
    2. Test for less than 1 V between the signal circuit terminal 1 and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V
    3. Test for less than 2 Ω in the signal circuit end to end.

cardiagn.com

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω, replace the K9 Body Control Module.

- **If Active**

13. Test or replace the S30 Headlamp Switch.

Turn Signal/Multifunction Switch Malfunction

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, open and close drivers door, disconnect the harness connector at the S78 Turn Signal/Multifunction Switch. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 15 Ω between the ground circuit terminal 13 and ground.
   - **If 15 Ω or greater**
   1. Ignition OFF.
   2. Test for less than 2 Ω in the ground circuit end to end.
      - If 2 Ω or greater, repair the open/high resistance in the circuit.
      - If less than 2 Ω, repair the open/high resistance in the ground connection.
   - **If less than 15 Ω**
3. Ignition ON.
4. Verify the scan tool High Beam Select Switch parameter is Inactive.
   - **If not Inactive**
   1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module.
   2. Test for infinite resistance between the signal circuit terminal 14 and ground.
      - If less than infinite resistance, repair the short to ground on the circuit.
      - If infinite resistance, replace the K9 Body Control Module.
   - **If Inactive**
5. Install a 3 A fused jumper wire between the signal circuit terminal 14 and ground.
6. Verify the scan tool High Beam Select Switch parameter is Active.
   - **If not Active**
   1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module, ignition ON.
   2. Test for less than 1 V between the signal circuit terminal 14 and ground.
      - If 1 V or greater, repair the short to voltage on the circuit.
      - If less than 1 V
   3. Test for less than 2 Ω in the signal circuit end to end.
      - If 2 Ω or greater, repair the open/high resistance in the circuit.
      - If less than 2 Ω, replace the K9 Body Control Module.
   - **If Active**
7. Verify the scan tool Headlamps Flash Switch parameter is Inactive.
   - **If not Inactive**
   1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module.
   2. Test for infinite resistance between the signal circuit terminal 10 and ground.
      - If less than infinite resistance, repair the short to ground on the circuit.
      - If infinite resistance, replace the K9 Body Control Module.

cardiagn.com

- **If Inactive**

8. Install a 3 A fused jumper wire between the signal circuit terminal 10 and ground.
9. Verify the scan tool Headlamps Flash Switch parameter is Active.
    - **If not Active**
    1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module, ignition ON.
    2. Test for less than 1 V between the signal circuit terminal 10 and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V
    3. Test for less than 2 Ω in the signal circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K9 Body Control Module.
    - **If Active**
10. Test or replace the S78 Turn Signal/Multifunction Switch.

Headlamps Malfunction - Low Beam

1. Ignition OFF, exterior lamps OFF, disconnect the harness connector at the appropriate component listed below. It may take up to 2 min for all vehicle systems to power down.
    - E4G Headlamp - Left Low Beam (halogen)
    - E4H Headlamp - Right Low Beam (halogen)
    - E13LA Headlamp Assembly - Left (LED)
    - E13RA Headlamp Assembly - Right (LED)
2. Test for less than 10 Ω between the appropriate ground circuit terminal listed below and ground.
    - E4G Headlamp - Left Low Beam terminal 2 (halogen)
    - E4H Headlamp - Right Low Beam terminal 2 (halogen)
    - E13LA Headlamp Assembly - Left terminal 1 (LED)
    - E13RA Headlamp Assembly - Right terminal 1 (LED)
    - **If 10 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.
    - **If less than 10 Ω**
3. Connect a test lamp between the appropriate control circuit terminal listed below and ground, ignition ON.
    - E4G Headlamp - Left Low Beam terminal 1 (halogen)
    - E4H Headlamp - Right Low Beam terminal 1 (halogen)
    - E13LA Headlamp Assembly - Left terminal 2 (LED)
    - E13RA Headlamp Assembly - Right terminal 2 (LED)
4. Verify the test lamp turns ON and OFF when commanding the appropriate Low Beam/Daytime Running Lamp ON and OFF with a scan tool.
    - **If the test lamp is always OFF**

cardiagn.com

1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.
2. Test for infinite resistance between the control circuit and ground.
    - If less than infinite resistance, repair the short to ground on the circuit.
    - If infinite resistance
3. Test for less than 2 Ω in the control circuit end to end.
    - If 2 Ω or greater, repair the open/high resistance in the circuit.
    - If less than 2 Ω, replace the K9 Body Control Module.

- **If the test lamp is always ON**

1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module, ignition ON.
2. Test for less than 1 V between the control circuit terminal and ground.
    - If 1 V or greater, repair the short to voltage on the circuit.
    - If less than 1 V, replace the K9 Body Control Module.

- **If the test lamp turns ON and OFF**

5. Test or replace the Headlamp - Low Beam.

Headlamps Malfunction - High Beam

1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.
2. Verify a test lamp illuminates between the control circuit terminal 18 and ground.
    - **If the test lamp does not illuminate**

    1. Ignition OFF, disconnect the X3 harness connector at the X50A Fuse Block - Underhood.
    2. Test for infinite resistance between the control circuit terminal and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the X50A Fuse Block - Underhood.

    - **If the test lamp illuminates**

3. Ignition OFF, connect a 3 A fused jumper between the control circuit terminal 18 and ground.
4. Remove the high beam fuse (F58UA) at the X50A Fuse Block - Underhood, ignition ON.
5. Verify a test lamp illuminates between the high beam fuse (F58UA) B+ switch control terminal and ground.
    - **If the test lamp does not illuminate**

    1. Ignition OFF, disconnect the X3 harness connector at the X50A Fuse Block - Underhood, ignition ON.
    2. Test for less than 1 V between the control circuit terminal 18 and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V, replace the X50A Fuse Block - Underhood.

    - **If the test lamp illuminates**

6. Ignition OFF, connect the X5 harness connector at the K9 Body Control Module.
7. Install the high beam fuse (F58UA) at the X50A Fuse Block - Underhood.
8. Ignition OFF, exterior lamps OFF, disconnect the harness connector at the appropriate high beam

cardiagn.com

headlamp listed below. It may take up to 2 min for all vehicle systems to power down.

- E4E Headlamp - Left High Beam (2500/3500 with X88)
- E4F Headlamp - Right High Beam (2500/3500 with X88)
- E13LA Headlamp Assembly - Left
- E13RA Headlamp Assembly - Right

9. Test for less than 10 Ω between the appropriate ground circuit terminal listed below and ground.
    - E4E Headlamp - Left High Beam terminal 1 (2500/3500 with X88)
    - E4F Headlamp - Right High Beam terminal 1 (2500/3500 with X88)
    - E13LA Headlamp Assembly - Left terminal 1
    - E13RA Headlamp Assembly - Right terminal 1
    - E13LA Headlamp Assembly - Left terminal A (2500/3500 with Z88)
    - E13RA Headlamp Assembly - Right terminal A (2500/3500 with Z88)
    - **If 10 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.
    - **If less than 10 Ω**
10. Connect a test lamp between the appropriate control circuit terminal listed below and ground, ignition ON.
    - E4E Headlamp - Left High Beam terminal 1 (2500/3500 with X88)
    - E4F Headlamp - Right High Beam terminal 1 (2500/3500 with X88)
    - E13LA Headlamp Assembly - Left terminal 3
    - E13RA Headlamp Assembly - Right terminal 3
    - E13LA Headlamp Assembly - Left terminal C (2500/3500 with Z88)
    - E13RA Headlamp Assembly - Right terminal C (2500/3500 with Z88)
11. Verify the test lamp turns ON and OFF when commanding the High Beams ON and OFF with a scan tool.
    - **If the test lamp is always OFF**
    1. Ignition OFF, disconnect the X1 harness connector at the X50A Fuse Block - Underhood.
    2. Test for infinite resistance between the control circuit and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K9 Body Control Module.
    - **If the test lamp is always ON**
    1. Ignition OFF, disconnect the X1 harness connector at the X50A Fuse Block - Underhood, ignition ON.
    2. Test for less than 1 V between the control circuit terminal and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V, replace the K9 Body Control Module.

cardiagn.com

- **If the test lamp turns ON and OFF**

12. Test or replace the high beam headlamp.

High Beam Indicator Malfunction

1. Ignition ON.
2. Verify the high beam indicator turns ON and OFF when commanding the Instrument Cluster All Indicators Test ON and OFF with a scan tool.
   - **If the high beam indicator is always OFF or remains ON**

     Replace the P16 Instrument Cluster.

   - **If the high beam indicator turns ON and OFF**
3. Replace the K9 Body Control Module.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Headlamp Switch Replacement**
- **Headlamp Replacement (GMC 1500)** **Headlamp Replacement (Chevrolet - Left Side)** **Headlamp Replacement (Chevrolet - Right Side)** **Headlamp Replacement (GMC 2500, 3500)**
- **Underhood Electrical Center or Junction Block Replacement**
- **Turn Signal Switch Replacement**
- **Headlamp Bulb Replacement - Left Side (GMC HD)** **Headlamp Bulb Replacement - Left Side (Chevrolet HD Low beam)** **Headlamp Bulb Replacement - Left Side (Chevrolet HD HIgh Beam)** **Headlamp Bulb Replacement - Left Side (LD)**
- **Headlamp Bulb Replacement - Right Side (GMC HD)** **Headlamp Bulb Replacement - Right Side (LD)** **Headlamp Bulb Replacement - Right Side (Chevrolet HD Low Beam)** **Headlamp Bulb Replacement - Right Side (Chevrolet HD High Beam)**
- **Control Module References** for BCM or Instrument Cluster replacement, programming, and setup

INTERIOR ACCENT LIGHTING MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Accent Lamp Control - Terminal 22 X7	B255F 02	B255F 04	1	-
Accent Lamp Control - Terminal 23 X1	1	1	1	-

cardiagn.com

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Accent Lamp - Driver Door Handle Ground	-	1	-	-
Accent Lamp - Passenger Door Handle Ground	-	1	-	-
Accent Lamp - Overhead Console Ground	-	1	-	-
1. Interior Accent Lighting Malfunction				

Circuit/System Description

The body control module (BCM) supplies battery voltage to accent lighting lamps via the accent lamp control circuit. When a door is opened the BCM applies battery voltage to the accent lamp control circuit illuminating all of the accent lighting. The accent lighting will remain illuminated until all doors are closed and the ignition is OFF. The accent lighting remains illuminated with the ignition ON.

Reference Information

Schematic Reference

Interior Lights Schematics (E29) Interior Lights Schematics (without E29)

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Interior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, open and close drivers door, disconnect the harness connector at the component with the inoperative LED backlighting. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 15 Ω between the appropriate ground circuit terminal listed below and ground.
    - E1C Accent Lamp - Driver Door Handle terminal 2
    - E1L Accent Lamp - Overhead Console terminal 2
    - E1M Accent Lamp - Passenger Door Handle terminal 2

cardiagn.com

- **If 15 Ω or greater**

1. Ignition OFF.
2. Test for less than 2 Ω in the ground circuit end to end.
    - If 2 Ω or greater, repair the open/high resistance in the circuit.
    - If less than 2 Ω, repair the open/high resistance in the ground connection.

- **If less than 15 Ω**

3. Connect a test lamp between the appropriate control circuit terminal listed below and ground.
    - E1C Accent Lamp - Driver Door Handle terminal 1
    - E1L Accent Lamp - Overhead Console terminal 9
    - E1M Accent Lamp - Passenger Door Handle terminal 1
4. Verify the test lamp turns ON and OFF when commanding the appropriate accent lighting listed below ON and OFF with a scan tool.
    - Accent Lighting 1 - terminal 22 X7
    - Accent Lighting 2 - terminal 23 X1
    - **If the test lamp is always OFF**

    1. Ignition OFF, disconnect the appropriate harness connector listed below at the K9 Body Control Module.
        - X1
        - X7
    2. Test for infinite resistance between the control circuit and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K9 Body Control Module.

    - **If the test lamp is always ON**

    1. Ignition OFF, disconnect the appropriate harness connector listed below at the K9 Body Control Module, ignition ON.
        - X1
        - X7
    2. Test for less than 1 V between the control circuit terminal and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V, replace the K9 Body Control Module.

    - **If the test lamp turns ON and OFF**

5. Test or replace the appropriate accent lamp.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Front Side Door Inside Handle Replacement**
- **Rear Side Door Inside Handle Replacement**
- **Front Side Door Inside Handle Illumination Lamp Replacement**

cardiagn.com

- **Control Module References** for BCM replacement, programming, and setup

INTERIOR BACKLIGHTING MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Instrument Panel Dimmer Switch B+	B1395 03, B3600 03	B1395 03, B3600 03	B1395 07, B3600 07	-
Instrument Panel Dimmer Switch Signal	B1395 03, B3600 03	B1395 03, B3600 03	B1395 07, B3600 07	-
LED Backlight Dimming Control Terminal 8 X2	B2610 02	B2610 04	B2610 04	-
LED Backlight Dimming Control Terminal 9 X7	B2610 02	B2610 04	B2610 04	-
Switch Indicator LED Backlight Dimming Control Terminal 5 X1	B0987 06, B2625 02	B0987 06, B2625 04	B2625 01	-
Lane Departure Switch Amber Indicator Control	5	B0987 06	B0987 01, B0987 0B	-
Park Assist Switch Amber Indicator Control	6	6	B0968 01	-
Instrument Panel Dimmer Switch Low Reference	-	1	-	-
Dome Lamp Switch Ground	-	2	-	-
Dome/Reading Lamps - Front Overhead Console Left Ground	-	2	-	-
Dome/Reading Lamps - Front Overhead Console Right Ground	-	2	-	-
Dome/Reading Lamps - 2nd Row Ground	-	2	-	-
Door Lock Switch - Driver Ground	-	2	-	-
Door Lock Switch - Passenger Ground	-	2	-	-
Exhaust Brake Switch Ground (HD)	-	2	-	-
Garage Door Opener Switch Ground	-	2	-	-
Headlamp Switch Ground	-	1	-	-
Multifunction Switch - Instrument Panel Ground	-	3	-	-

cardiagn.com

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Passenger Air Bag Disable Indicator Ground	-	4	-	-
Roof Beacon Switch Ground	-	2	-	-
Seat Heating and Cooling Switch - Driver Ground	-	2	-	-
Seat Heating and Cooling Switch - Passenger Ground	-	2	-	-
Seat Memory Switch - Driver Ground	-	2	-	-
Sliding Rear Window Switch Ground	-	2	-	-
Steering Wheel Controls Switch - Right	-	2	-	-
Steering Wheel Controls Switch - Left	-	2	-	-
Trailer Brake Control Switch Ground	-	2	-	-
Transfer Case Shift Control Switch Ground	-	2	-	-
Window Switch - Driver Ground	-	2	-	-

1. Dimmer Switch Malfunction
2. Interior Backlighting Malfunction
3. Switch Indicator LED Backlighting Malfunction
4. Passenger Air Bag Disable Indicator Backlighting Malfunction
5. Lane Departure Switch Indicator Malfunction
6. Park Assist Switch Indicator Malfunction

Circuit/System Description

The instrument panel dimmer switch is used to increase and decrease the brightness of the interior backlighting components. The instrument panel dimmer switch provides a voltage signal to the body control module (BCM) that will increase as the brightness of the lights are increased and decrease as the brightness of the lights are decreased. The BCM provides a low reference, signal, and B+ voltage reference to the instrument panel dimmer switch. When the instrument panel dimmer switch is placed in the desired position, the dimmed voltage setting is applied from the instrument panel dimmer switch through the instrument panel dimmer switch signal circuit to the BCM. The BCM interprets the signal and applies a pulse width modulated voltage through the LED dimming 1 and dimming 2 control circuits illuminating the interior backlighting to the requested level of brightness.

Diagnostic Aids

When a fault is present in the Switch Indicator LED Backlight Dimming Control Terminal 5 X1 circuit, it is necessary to remove the negative battery cable for 30 seconds after the fault has been repaired.

Reference Information

Schematic Reference

cardiagn.com

- **Interior Lights Dimming Schematics**
- **Object Detection Schematics**

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Interior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify the scan tool LED Backlight Dimming Command parameter changes between a high percentage to a low percentage while operating the dimmer switch from high to low.
   - **If the parameter does not change**

     Refer to Dimmer Switch Malfunction.

   - **If the parameter changes**
3. Verify the switch indictor amber LED's for the components listed below turn ON and OFF while turning both switches ON and OFF.
   - S48A Multifunction Switch - Instrument Panel Park Assist
   - S48A Multifunction Switch - Instrument Panel Lane Departure
   - **If both switch indicator amber LED's do not turn ON and OFF**

     Refer to Switch Indicator LED Backlighting Malfunction.

   - **If both switch indicator amber LED's turn ON and OFF**
4. Verify all backlighting components turn ON and OFF while commanding the LED Backlight Dimming ON and OFF with a scan tool.
   - **If all backlighting components do not turn ON and OFF**

     Refer to Interior Backlighting Malfunction.

   - **If all backlighting components turn ON and OFF**
5. Verify the phrase PASSENGER AIR BAG is illuminated on the Passenger Air Bag Disable Indicator.
   - **If the phrase PASSENGER AIR BAG is not illuminated**

cardiagn.com

Refer to Passenger Air Bag Disable Indicator Backlighting Malfunction.

- **If the phrase PASSENGER AIR BAG is illuminated**

6. All OK.

Circuit/System Testing

Dimmer Switch Malfunction

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the S30 Headlamp Switch, ignition ON.
2. Test for B+ between the B+ circuit terminal 12 and ground.
   - **If less than B+**
   1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.
   2. Test for infinite resistance between the B+ circuit and ground.
      - If less than infinite resistance, repair the short to ground on the circuit.
      - If infinite resistance
   3. Test for less than 2 Ω in the B+ circuit end to end.
      - If 2 Ω or greater, repair the open/high resistance in the circuit.
      - If less than 2 Ω, replace the K9 Body Control Module.
   - **If B+**
3. Verify a test lamp illuminates between the B+ circuit terminal 12 and the low reference circuit terminal 7.
   - **If the test lamp does not illuminate**
   1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.
   2. Test for less than 1 V between the low reference circuit terminal 7 and ground.
      - If 1 V or greater, repair the short to voltage on the circuit.
      - If less than 1 V
   3. Test for less than 2 Ω in the low reference circuit end to end.
      - If 2 Ω or greater, repair the open/high resistance in the circuit.
      - If less than 2 Ω, replace the K9 Body Control Module.
   - **If the test lamp illuminates**
4. Verify a test lamp does not illuminate between the B+ circuit terminal 12 and the signal circuit terminal 11.
   - **If the test lamp illuminates**
   1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.
   2. Test for infinite resistance between the signal circuit and ground.
      - If less than infinite resistance, repair the short to ground on the circuit.
      - If infinite resistance, replace the K9 Body Control Module.
   - **If the test lamp does not illuminate**
5. Test for B+ between the B+ circuit terminal 12 and the signal circuit terminal 11.
   - **If less than B+**
   1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.
   2. Test for less than 1 V between the signal circuit terminal 11 and ground.

cardiagn.com

- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V

3. Test for less than 2 Ω in the signal circuit end to end.
   - If 2 Ω or greater, repair the open/high resistance in the circuit.
   - If less than 2 Ω, replace the K9 Body Control Module.

- **If B+**

6. Test or replace the S30 Headlamp Switch.

Interior Backlighting Malfunction

NOTE: **Each component with backlighting may need to be disconnected to isolate a short to voltage or short to ground. Use the schematics to identify the following:**

- **Backlighting components the vehicle is equipped with**
- **Each component's control and ground circuit terminals**
- **Component locations on the backlighting control circuit**

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, open and close drivers door, disconnect the harness connector at the component with inoperative backlighting. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 15 Ω between the appropriate ground circuit terminal and ground.
   - **If 15 Ω or greater**

   1. Ignition OFF.
   2. Test for less than 2 Ω in the ground circuit end to end.
      - If 2 Ω or greater, repair the open/high resistance in the circuit.
      - If less than 2 Ω, repair the open/high resistance in the ground connection.

   - **If less than 15 Ω**

3. Connect a test lamp between the appropriate control circuit terminal and ground.
4. Verify the test lamp turns ON and OFF when commanding the LED Backlight Dimming ON and OFF with a scan tool.
   - **If the test lamp is always OFF**

   1. Ignition OFF, disconnect the appropriate harness connector listed below at the K9 Body Control Module.
      - X2 terminal 8
      - X7 terminal 9
   2. Test for infinite resistance between the control circuit and ground.
      - If less than infinite resistance, repair the short to ground on the circuit.
      - If infinite resistance
   3. Test for less than 2 Ω in the control circuit end to end.
      - If 2 Ω or greater, repair the open/high resistance in the circuit.
      - If less than 2 Ω, replace the K9 Body Control Module.

   - **If the test lamp is always ON**

cardiagn.com

1. Ignition OFF, disconnect the appropriate harness connector listed below at the K9 Body Control Module, ignition ON.
    - X2 terminal 8
    - X7 terminal 9
2. Test for less than 1 V between the control circuit terminal and ground.
    - If 1 V or greater, repair the short to voltage on the circuit.
    - If less than 1 V, replace the K9 Body Control Module.

- **If the test lamp turns ON and OFF**

5. Test or replace the component with inoperative backlighting.

Switch Indicator LED Backlighting Malfunction

NOTE: **Each component with backlighting may need to be disconnected to isolate a short to voltage or short to ground. Use the schematics to identify the following:**

- **Backlighting components the vehicle is equipped with**
- **Each component's control and ground circuit terminals**
- **Component locations on the backlighting control circuit**

1. Ignition OFF, disconnect the harness connector at the S48A Multifunction Switch - Instrument Panel, ignition ON.
2. Place the dimmer switch in the HIGH position for high backlighting intensity.
3. Verify a test lamp illuminates between the control circuit terminal 2 and ground.
    - **If the test lamp does not illuminate**
    1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.
    2. Test for infinite resistance between the control circuit and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K9 Body Control Module.
    - **If the test lamp illuminates**
4. Place the dimmer switch in the LOW position for low backlighting intensity.
5. Verify a test lamp does not illuminate at FULL intensity between the control circuit terminal 2 and ground.
    - **If the test lamp illuminates at full intensity**
    1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.
    2. Test for less than 1 V between the control circuit terminal and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V, replace the K9 Body Control Module.
    - **If the test lamp does not illuminate at full intensity**
6. Test or replace the S48A Multifunction Switch - Instrument Panel.

cardiagn.com

Passenger Air Bag Disable Indicator Backlighting Malfunction

1. Ignition OFF, all doors closed, all accessories OFF, open and close drivers door, disconnect the harness connector at the P14 Passenger Air Bag Disable Indicator. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 15 Ω between the ground circuit terminal 2 and ground.
    - **If 15 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.
    - **If less than 15 Ω**
3. Connect a test lamp between the control circuit terminal 4 and ground.
4. Verify the test lamp turns ON and OFF while turning the ignition switch ON and OFF.
    - **If the test lamp is always OFF**
    1. Ignition OFF, disconnect the X3 harness connector at the X51L Fuse Block - Instrument Panel Left.
    2. Test for infinite resistance between the control circuit and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the X51L Fuse Block - Instrument Panel Left.
    - **If the test lamp is always ON**
    1. Ignition OFF, disconnect the X3 harness connector at the X51L Fuse Block - Instrument Panel Left, ignition ON.
    2. Test for less than 1 V between the control circuit terminal and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V, replace the X51L Fuse Block - Instrument Panel Left.
    - **If the test lamp turns ON and OFF**
5. Test or replace the P14 Passenger Air Bag Disable Indicator.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Headlamp Switch Replacement**
- **Emergency Vehicle Roof Lamp Switch Replacement**
- **Interior Lamp Switch Replacement**
- **Radio Control Switch Replacement - Steering Wheel**
- **Instrument Panel Airbag Arming Status Display Replacement**
- **Driver or Passenger Seat Heater Switch Replacement**
- **Front Seat Adjuster Memory Switch Replacement (with A45)**
- **Door Lock Switch Replacement - Driver Side (With A31)** **Door Lock Switch Replacement - Driver**

cardiagn.com

Side (Without A31)

- Door Lock Switch Replacement - Passenger Front (With A31) Door Lock Switch Replacement - Passenger Front (Without A31)
- Front Side Door Window Control Switch Replacement
- Center Reading and Courtesy Lamp Replacement
- Instrument Panel Airbag Arming Status Display Replacement
- Control Module References for BCM replacement, programming, and setup

PARK, LICENSE, AND/OR TAIL LAMPS MALFUNCTION

Diagnostic Instructions

- Perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.
- Review Strategy Based Diagnosis for an overview of the diagnostic approach.
- Diagnostic Procedure Instructions provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
F17DL (BCM 1) Fuse B+	B1325 03, B3873 01, B3873 04, B3883 01, B3883 04, C0297 01,	B1325 03, B3873 01, B3873 04, B3883 01, B3883 04, C0297 01,	-	-
Headlamp Switch Park Lamps ON Signal	2	B257A 00	2	-
Park Lamps Relay Control	1	1	1	-
Park Lamps - Left Control	1	1	1	-
Park Lamps - Right Control	1	1	1	-
Headlamp Switch Ground	-	2	-	-
License Plate Lamps Control	B3883 02	B3883 01, B3883 04	B3883 01, B3883 04	-
License Plate Lamp - Left Ground	-	1	-	-
License Plate Lamp - Right Ground	-	1	-	-
Roof Clearance Lamp - Left Front Outer Ground	-	1	-	-
Roof Clearance Lamp - Front Middle Ground	-	1	-	-
Roof Clearance Lamp - Right Front Outer Ground	-	1	-	-
Side Marker Lamp - Left Front Ground	-	1	-	-
Side Marker Lamp - Left Rear Ground	-	1	-	-

cardiagn.com

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Side Marker Lamp - Right Front Ground	-	1	-	-
Side Marker Lamp - Right Rear Ground	-	1	-	-
Tail Lamp - Left Ground	-	1	-	-
Tail Lamp - Right Ground	-	1	-	-
1. Park, License, and/or Tail Lamps Malfunction 2. Headlamp Switch Malfunction				

Circuit/System Description

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.

Diagnostic Aids

When testing at the park/marker/clearance/license plate lamp bulb sockets, make sure all measurements and test lamp connections are in the correct terminal location and do not come in contact with each other during testing.

Reference Information

Schematic Reference

- **Exterior Lights Schematics**
- **Body Control System Schematics**
- **Trailer Connector/Provision Schematics**

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

cardiagn.com

1. Ignition ON.
2. Verify the scan tool Park Lamp Switch parameter changes between Active and Inactive while commanding the park lamps ON and OFF with the headlamp switch.
    - **If the parameter does not change**

      Refer to Headlamp Switch Malfunction.

    - **If the parameter changes**
3. Verify the park, side marker, and roof clearance lamps turn ON and OFF when commanding the Park Lamps ON and OFF with a scan tool.
    - **If the park, side marker, and roof clearance lamps do not turn ON and OFF**

      Refer to Park Lamps Malfunction.

    - **If the park, side marker, and roof clearance lamps turn ON and OFF**
4. Verify the license plate lamps turn ON and OFF when commanding the License Plate Lamps ON and OFF with a scan tool.
    - **If the license plate lamps do not turn ON and OFF**

      Refer to License Plate Lamps Malfunction.

    - **If the license plate lamps turn ON and OFF**
5. All OK.

Circuit/System Testing

Headlamp Switch Malfunction

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, disconnect the harness connector at the S30 Headlamp Switch. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 15 Ω between the ground circuit terminal 8 and ground.
    - **If 15 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.
    - **If less than 15 Ω**
3. Ignition ON.
4. Verify the scan tool Park Lamps Switch parameter is Inactive.
    - **If not Inactive**
    1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.
    2. Test for infinite resistance between the signal circuit terminal 5 and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance, replace the K9 Body Control Module.
    - **If Inactive**
5. Install a 3 A fused jumper wire between the signal circuit terminal 5 and ground.

cardiagn.com

6. Verify the scan tool Park Lamps Switch parameter is Active.
    - **If not Active**
    1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.
    2. Test for less than 1 V between the signal circuit terminal 5 and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V
    3. Test for less than 2 Ω in the signal circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K9 Body Control Module.
    - **If Active**
7. Test or replace the S30 Headlamp Switch.

Park Lamps Malfunction

1. Ignition OFF, disconnect the KR125 Trailer Park Lamps Relay, ignition ON.
2. Verify a test lamp illuminates between the B+ circuit terminal 30 and ground.
    - **If the test lamp does not illuminate**

      Replace the X50A Fuse Block - Underhood.

    - **If the test lamp illuminates**
3. Verify a test lamp illuminates between the B+ circuit terminal 86 and ground.
    - **If the test lamp does not illuminate**

      Replace the X50A Fuse Block - Underhood.

    - **If the test lamp illuminates**
4. Ignition OFF, connect a test lamp between the control circuit terminal 85 and B+, ignition ON.
5. Verify the test lamp turns ON and OFF when commanding the Park Lamps ON and OFF with a scan tool.
    - **If the test lamp is always OFF**
    1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.
    2. Test for less than 1 V between the control circuit terminal and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V
    3. Ignition OFF.
    4. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K9 Body Control Module.
    - **If the test lamp is always ON**
    1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module.
    2. Test for infinite resistance between the control circuit terminal and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance, replace the K9 Body Control Module.

cardiagn.com

- **If the test lamp turns ON and OFF**

6. Ignition OFF, connect the KR125 Trailer Park Lamps Relay.
7. Ignition OFF, exterior lamps OFF, disconnect or remove the inoperative park/marker/roof clearance lamp.
8. Test for less than 15 Ω between the appropriate ground circuit terminal and ground.
    - **If 15 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.
    - **If less than 15 Ω**
9. Connect a test lamp between the appropriate control circuit terminal and ground, ignition ON.
10. Verify the test lamp turns ON and OFF when commanding the Park Lamps ON and OFF with a scan tool.
    - **If the test lamp is always OFF**
    1. Ignition OFF, disconnect the appropriate harness connector listed below at the X50A Fuse Block - Underhood.
        - X1 - Front Park Lamps
        - X5 - Rear Park Lamps/Trailer Park Lamps
    2. Test for infinite resistance between the control circuit and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the KR125 Trailer Park Lamps Relay.
    - **If the test lamp is always ON**
    1. Ignition OFF, disconnect the appropriate harness connector listed below at the X50A Fuse Block - Underhood, ignition ON.
        - X1 - Front Park Lamps
        - X5 - Rear Park Lamps/Trailer Park Lamps
    2. Test for less than 1 V between the control circuit terminal and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V, replace the KR125 Trailer Park Lamps Relay.
    - **If the test lamp turns ON and OFF**
11. Test or replace the inoperative park/marker/roof clearance lamp.

License Plate Lamps Malfunction

1. Ignition OFF, exterior lamps OFF, remove both E7 License Plate Lamp bulbs.
2. Test for less than 15 Ω between each ground circuit terminal B and ground.
    - **If 15 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.

cardiagn.com

- If less than 2 Ω, repair the open/high resistance in the ground connection.

- **If less than 15 Ω**

3. Connect a test lamp between the E7L License Plate Lamp - Left control circuit terminal A and ground, ignition ON.
4. Verify the test lamp turns ON and OFF when commanding the License Plate Lamps ON and OFF with a scan tool.
   - **If the test lamp is always OFF**
   1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.
   2. Test for infinite resistance between the control circuit and ground.
      - If less than infinite resistance, repair the short to ground on the circuit.
      - If infinite resistance
   3. Test for less than 2 Ω in the control circuit end to end.
      - If 2 Ω or greater, repair the open/high resistance in the circuit.
      - If less than 2 Ω, replace the K9 Body Control Module.
   - **If the test lamp is always ON**
   1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module, ignition ON.
   2. Test for less than 1 V between the control circuit terminal and ground.
      - If 1 V or greater, repair the short to voltage on the circuit.
      - If less than 1 V, replace the K9 Body Control Module.
   - **If the test lamp turns ON and OFF**
5. Ignition OFF.
6. Connect a test lamp between the E7R License Plate Lamp - Right control circuit terminal A and ground, ignition ON.
7. Verify the test lamp turns ON and OFF when commanding the License Plate Lamps ON and OFF with a scan tool.
   - **If the test lamp is always OFF**
   1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.
   2. Test for infinite resistance between the control circuit and ground.
      - If less than infinite resistance, repair the short to ground on the circuit.
      - If infinite resistance
   3. Test for less than 2 Ω in the control circuit end to end.
      - If 2 Ω or greater, repair the open/high resistance in the circuit.
   - **If the test lamp turns ON and OFF**
8. Test or replace the appropriate E7 License Plate Lamp bulb.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Headlamp Switch Replacement**
- **Rear License Plate Lamp Replacement**
- **Tail Lamp Replacement (Chevrolet 1500, 2500, 3500 without GAJ)** **Tail Lamp Replacement (GMC 1500, 2500, 3500 without GAT or GFW)** **Tail Lamp Replacement (GMC 1500 with GAT or GFW)**

cardiagn.com

Tail Lamp Replacement (Chevrolet 1500 with GAJ)

- Rear License Plate Lamp Bulb Replacement
- Relay Replacement (Attached to Wire Harness) Relay Replacement (Within an Electrical Center)
- Front Clearance Lamp Replacement (LH) Front Clearance Lamp Replacement (RH) Front Clearance Lamp Replacement (Mirror)
- Front Identification Lamp Replacement
- Rear Clearance Lamp Replacement (Front) Rear Clearance Lamp Replacement (Rear)
- Control Module References for BCM replacement, programming, and setup

STOP LAMPS MALFUNCTION

Diagnostic Instructions

- Perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.
- Review Strategy Based Diagnosis for an overview of the diagnostic approach.
- Diagnostic Procedure Instructions provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Brake Pedal Position Sensor 5 V Reference	C0277 06, C0890 03, U0422 71	C0277 06, U0422 71	C0277 07, C0890 07, U0422 71	-
Brake Pedal Position Sensor Signal	C0277 06, U0422 71	C0277 06, U0422 71	C0277 07, C0890 07, U0422 71	C0277 09
Center High Mounted Stop Lamp Control	2	2	2	-
Stop Lamp Relay Control	B3884 02	B3884 04	B3884 01	-
Stop/Turn Signal Lamp Control - Left	B3950 02, B3950 04	B3950 04	B3950 01	-
Stop/Turn Signal Lamp Control - Right	B3951 02, B3951 04	B3951 04	B3951 01	-
Brake Pedal Position Sensor Low Reference	-	C0277 07, U0422 71	1	-
Center High Mounted Stop Lamp Ground	-	2	-	-
Tail Lamp Assembly Ground - Left	-	1	-	-
Tail Lamp Assembly Ground - Right	-	1	-	-
Stop Lamp Relay Ground	-	2	-	-
1. Stop Lamps Malfunction 2. Center High Mounted Stop Lamp Malfunction				

Circuit/System Description

cardiagn.com

The brake pedal position sensor is used to sense the action of the driver application of the brake pedal. The brake pedal position 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 V reference voltage to the brake pedal position 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 relay control circuit illuminating the left and right stop lamps and the center high mounted stop lamp.

Diagnostic Aids

When testing at the stop lamp bulb sockets, make sure all measurements and test lamp connections are in the correct terminal location and do not come in contact with each other during testing.

Reference Information

Schematic Reference

Exterior Lights Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify the scan tool Brake Pedal Applied parameter changes between Active and Inactive while pressing and releasing the brake pedal.
   - **If the parameter does not change**

     Refer to Brake Pedal Position Sensor Malfunction.

   - **If the parameter changes**
3. Verify the scan tool Brake Pedal Position Sensor Learned Release Position parameter, located in the BCM Chassis Control Data display, is within 0.1 V of the Brake Pedal Position Sensor parameter when the brake pedal is fully released.
   - **If the difference is greater than 0.1 V**

cardiagn.com

Perform the **Brake Pedal Position Sensor Calibration** .

- **If the difference is less than 0.1 V**

4. Verify the left brake lamp turns ON and OFF when commanding the Left Rear Turn Signal/Stop Lamp ON and OFF with a scan tool.
   - **If the left brake lamp does not turn ON and OFF**

     Refer to Stop Lamps Malfunction.

   - **If the left brake lamp turns ON and OFF**
5. Verify the right brake lamp turns ON and OFF when commanding the Right Rear Turn Signal/Stop Lamp ON and OFF with a scan tool.
   - **If the right brake lamp does not turn ON and OFF**

     Refer to Stop Lamps Malfunction.

   - **If the right brake lamp turns ON and OFF**
6. Verify the center high mounted stop lamp turns ON and OFF when commanding the Center Stop Lamp ON and OFF with a scan tool.
   - **If the center high mounted stop does not turn ON and OFF**

     Refer to Center High Mount Stop Lamp Malfunction.

   - **If the center high mounted stop turns ON and OFF**
7. All OK.

Circuit/System Testing

Brake Pedal Position Sensor Malfunction

1. Ignition OFF, disconnect the harness connector at the B22 Brake Pedal Position Sensor, ignition ON.
2. Test for less than 1 V between the low reference circuit terminal 1 and ground.
   - **If 1 V or greater**
   1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.
   2. Test for less than 1 V between the low reference circuit and ground.
      - If 1 V or greater, repair the short to voltage on the circuit.
      - If less than 1 V, replace the K9 Body Control Module.
   - **If less than 1 V**
3. Test or replace the B22 Brake Pedal Position Sensor.

Stop Lamps Malfunction

1. Ignition OFF, exterior lamps OFF, disconnect the appropriate component listed below. It may take up to 2 min for all vehicle systems to power down.
   - E42L Tail Lamp Assembly - Left (1500 without ZW9)
   - E42R Tail Lamp Assembly - Right (1500 without ZW9)
   - E5AG Tail/Stop and Turn Signal Lamp - Left Upper (2500/3500 without ZW9)
   - E5AH Tail/Stop and Turn Signal Lamp - Right Upper (2500/3500 without ZW9)

cardiagn.com

- E5S Tail/Stop and Turn Signal Lamp - Left (with ZW9)
- E5T Tail/Stop and Turn Signal Lamp - Right (with ZW9)
- E5U Tail/Stop and Turn Signal Lamp - Left Lower (2500/3500 without ZW9)
- E5V Tail/Stop and Turn Signal Lamp - Right Lower (2500/3500 without ZW9)

2. Test for less than 15 Ω between the appropriate ground circuit terminal listed below and ground.
    - E42L Tail Lamp Assembly - Left terminal 1 (1500 without ZW9)
    - E42R Tail Lamp Assembly - Right terminal 1 (1500 without ZW9)
    - E5AG Tail/Stop and Turn Signal Lamp - Left Upper terminal 3 (2500/3500 without ZW9)
    - E5AH Tail/Stop and Turn Signal Lamp - Right Upper terminal 3 (2500/3500 without ZW9)
    - E5S Tail/Stop and Turn Signal Lamp - Left socket terminal (with ZW9)
    - E5T Tail/Stop and Turn Signal Lamp - Right socket terminal (with ZW9)
    - E5U Tail/Stop and Turn Signal Lamp - Left Lower terminal 3 (2500/3500 without ZW9)
    - E5V Tail/Stop and Turn Signal Lamp - Right Lower terminal 3 (2500/3500 without ZW9)
    - **If 15 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.
    - **If less than 15 Ω**
3. Connect a test lamp between the appropriate control circuit terminal listed below and ground, ignition ON.
    - E42L Tail Lamp Assembly - Left terminal 2 (1500 without ZW9)
    - E42R Tail Lamp Assembly - Right terminal 2 (1500 without ZW9)
    - E5AG Tail/Stop and Turn Signal Lamp - Left Upper terminal 2 (2500/3500 without ZW9)
    - E5AH Tail/Stop and Turn Signal Lamp - Right Upper terminal 2 (2500/3500 without ZW9)
    - E5S Tail/Stop and Turn Signal Lamp - Left socket terminal (with ZW9)
    - E5T Tail/Stop and Turn Signal Lamp - Right socket terminal (with ZW9)
    - E5U Tail/Stop and Turn Signal Lamp - Left Lower terminal 2 (2500/3500 without ZW9)
    - E5V Tail/Stop and Turn Signal Lamp - Right Lower terminal 2 (2500/3500 without ZW9)
4. Verify the test lamp turns ON and OFF when commanding the appropriate Rear Turn Signal/Stop Lamp ON and OFF with a scan tool.
    - **If the test lamp is always OFF**
    1. Ignition OFF, disconnect the appropriate harness connector listed below at the K9 Body Control Module.
        - X5 left stop lamp
        - X4 right stop lamp
    2. Test for infinite resistance between the control circuit and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.

cardiagn.com

- If less than 2 Ω, replace the K9 Body Control Module.

- **If the test lamp is always ON**

1. Ignition OFF, disconnect the appropriate harness connector listed below at the K9 Body Control Module, ignition ON.
    - X5 left stop lamp
    - X4 right stop lamp
2. Test for less than 1 V between the control circuit terminal and ground.
    - If 1 V or greater, repair the short to voltage on the circuit.
    - If less than 1 V, replace the K9 Body Control Module.

- **If the test lamp turns ON and OFF**

5. Test or replace the appropriate stop lamp.

Center High Mount Stop Lamp Malfunction

1. Ignition OFF, exterior lamps OFF, remove the E6 Center High Mounted Stop Lamp bulb. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 15 Ω between the ground circuit at the socket terminal and ground.
    - **If 15 Ω or greater**

    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.

    - **If less than 15 Ω**

3. Connect a test lamp between the control circuit at the socket terminal and ground, ignition ON.
4. Verify the test lamp does not turn ON and OFF when commanding the Center Stop Lamp ON and OFF with a scan tool.
    - **If the test lamp turns ON and OFF**

      Test or replace the E6 Center High Mounted Stop Lamp.

    - **If the test lamp does not turn ON and OFF**

5. Ignition OFF, install the E6 Center High Mounted Stop Lamp bulb. Disconnect the X3 harness connector at the X50A Fuse Block - Underhood, ignition ON.
6. Verify the center high mounted stop lamp does not illuminate.
    - **If the center high mounted stop lamp illuminates**

    1. Ignition OFF, remove the E6 Center High Mounted Stop Lamp bulb, ignition ON.
    2. Test for less than 1 V between the control circuit at the socket terminal and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V, replace the appropriate E6 Center High Mounted Stop Lamp.

    - **If the center high mounted stop lamp does not illuminate**

7. Ignition OFF, connect a 3 A fused jumper between the control circuit terminal M6 and B+, ignition ON.
8. Verify the center high mounted stop lamp illuminates.
    - **If the center high mounted stop lamp does not illuminate**

cardiagn.com

1. Ignition OFF, remove the 3 A fused jumper wire, remove the E6 Center High Mounted Stop Lamp bulb.
2. Test for infinite resistance between the control circuit terminal M6 and ground.
    - If less than infinite resistance, repair the short to ground on the circuit.
    - If infinite resistance
3. Test for less than 2 Ω in the control circuit end to end.
    - If 2 Ω or greater, repair the open/high resistance in the circuit.
    - If less than 2 Ω, all OK.

- **If the center high mounted stop lamp illuminates**

9. Ignition OFF, all vehicle systems OFF, disconnect the X4 Harness connector at the X50A Fuse Block - Underhood. It may take up to 2 min for all vehicle systems to power down.
10. Test for less than 15 Ω between the ground circuit terminal M5 and ground.

- **If 15 Ω or greater**

1. Ignition OFF.
2. Test for less than 2 Ω in the ground circuit end to end.
    - If 2 Ω or greater, repair the open/high resistance in the circuit.
    - If less than 2 Ω, repair the open/high resistance in the ground connection.

- **If less than 15 Ω**

11. Connect the X3 and X4 harness connectors at the X50A Fuse Block - Underhood. Disconnect the X4 harness connector at the K9 Body Control Module, ignition ON.
12. Verify a test lamp does not illuminate between the control circuit terminal 11 and ground.

- **If the test lamp illuminates**

1. Ignition OFF, disconnect the X3 harness connector at the X50A Fuse Block - Underhood, ignition ON.
2. Test for less than 1 V between the control circuit terminal 11 and ground.
    - If 1 V or greater, repair the short to voltage on the circuit.
    - If less than 1 V, replace the X50A Fuse Block - Underhood.

- **If the test lamp does not illuminate**

13. Ignition OFF.
14. Connect a 3 A fused jumper between the control circuit terminal 11 and B+, ignition ON.
15. Verify the center high mounted stop lamp illuminates.

- **If the center high mounted stop lamp does not illuminate**

1. Ignition OFF, disconnect the X3 harness connector at the X50A Fuse Block - Underhood.
2. Test for infinite resistance between the control circuit terminal and ground.
    - If less than infinite resistance, repair the short to ground on the circuit.
    - If infinite resistance
3. Test for less than 2 Ω in the control circuit end to end.
    - If 2 Ω or greater, repair the open/high resistance in the circuit.
    - If less than 2 Ω, replace the X50A Fuse Block - Underhood.

- **If the center high mounted stop lamp illuminates**

16. Replace the K9 Body Control Module.

cardiagn.com

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Tail Lamp Replacement (Chevrolet 1500, 2500, 3500 without GAJ)** **Tail Lamp Replacement (GMC 1500, 2500, 3500 without GAT or GFW)** **Tail Lamp Replacement (GMC 1500 with GAT or GFW)** **Tail Lamp Replacement (Chevrolet 1500 with GAJ)**
- **High Mount Stop Lamp Bulb Replacement (Stop)** **High Mount Stop Lamp Bulb Replacement (Cargo)**
- **Underhood Electrical Center or Junction Block Replacement**
- **Brake Pedal Position Sensor Replacement**
- **Brake Pedal Position Sensor Calibration**
- **Stop and Tail Lamp Bulb Replacement (Chevrolet)** **Stop and Tail Lamp Bulb Replacement (GMC)**
- **Control Module References** for BCM replacement, programming, and setup

TRAILER LAMPS MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Trailer Stop/Turn Signal Lamp Relay Control - Left	1	1	1	-
Trailer Stop/Turn Signal Lamp Relay Control - Right	1	1	1	-
Trailer Backup Lamps Control	1	1	1	-
Trailer Park Lamps Control	1	1	1	-
Trailer Stop/Turn Signal Lamp Control - Left	1	1	1	-
Trailer Stop/Turn Signal Lamp Control - Right	1	1	1	-
Trailer Connector Ground	-	1	-	-
1. Trailer Lamps Malfunction				

Circuit/System Description

Backup Lamps

For backup lamp operation, the backup lamp relay is supplied with battery voltage at all times. With the engine running 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 energizes the backup lamp relay by applying battery voltage to the backup lamp relay control circuit. When the backup lamp relay is energized, the relay switch contacts close and battery voltage is

cardiagn.com

applied through the backup lamp fuses to the backup lamp control circuits which illuminates 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 lamp relay control circuit.

Park 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, license lamps, and trailer park lamps control circuits illuminating the park, tail, license, and trailer park lamps.

Stop Lamps

For stop lamp operation, the left and right trailer stop/turn signal lamp relay's are supplied with battery voltage at all times. The brake pedal position sensor is used to sense the action of the driver application of the brake pedal. The brake pedal position 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 V reference voltage to the brake pedal position sensor. When the variable signal reaches a voltage threshold indicating the brakes have been applied, the BCM energizes the left and right trailer stop/turn signal lamp relay's by applying voltage to the left and right stop lamp relay control circuits. With the left and right trailer stop/turn signal lamp relay's energized, the relay switch contacts close and battery voltage is applied through the left and right trailer stop/turn signal fuse's to the trailer stop lamp control circuits which illuminates the trailer stop lamps.

Turn Signal Lamps

For turn signal lamp operation, the left and right trailer stop/turn signal lamp relay's are supplied with battery voltage at all times. 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 left and right trailer stop/turn signal lamp relay control circuits energizing the relay's in an ON and OFF cycle. With the left and right trailer stop/turn signal lamp relay's energized, the relay switch contacts cycle ON and OFF applying battery voltage through the left and right trailer stop/turn signal fuse's to the trailer turn signal lamp control circuits which illuminates the trailer turn signal lamps in an ON and OFF cycle.

Diagnostic Aids

For testing purposes, the vehicle must be diagnosed with the trailer/trailer lighting connector disconnected.

Reference Information

Schematic Reference

- **Exterior Lights Schematics**
- **Body Control System Schematics**
- **Trailer Connector/Provision Schematics**

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

cardiagn.com

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify the vehicles park lamps turn ON and OFF when commanding the Park Lamps ON and OFF with a scan tool.
   - **If the vehicles park lamps do not turn ON and OFF**

     Refer to **Park, License, and/or Tail Lamps Malfunction**.

   - **If the vehicles park lamps turn ON and OFF**
3. Verify the vehicles backup lamps turn ON and OFF when commanding the Backup Lamps ON and OFF with a scan tool.
   - **If the vehicles backup lamps do not turn ON and OFF**

     Refer to **Backup Lamps Malfunction (Manual Transmission)Backup Lamps Malfunction (Automatic Transmission)**.

   - **If the vehicles backup lamps turn ON and OFF**
4. Verify the vehicles left brake lamp turns ON and OFF when commanding the Left Brake Lamp ON and OFF with a scan tool.
   - **If the vehicles left brake lamp does not turn ON and OFF**

     Refer to **Stop Lamps Malfunction**.

   - **If the vehicles left brake lamp turns ON and OFF**
5. Verify the vehicles right brake lamp turns ON and OFF when commanding the Right Brake Lamp ON and OFF with a scan tool.
   - **If the vehicles right brake lamp does not turn ON and OFF**

     Refer to **Stop Lamps Malfunction**.

   - **If the vehicles right brake lamp turns ON and OFF**
6. Verify the vehicles left and right turn signal lamps turn ON and OFF when commanding the left and right turn signal lamps ON and OFF with the turn signal/multifunction switch.
   - **If the vehicles left or right turn signal lamps do not turn ON and OFF**

     Refer to **Turn Signal Lamps and/or Indicators Malfunction**.

cardiagn.com

- **If the vehicles left and right turn signal lamps turn ON and OFF**

7. Refer to Circuit/System Testing.

Circuit/System Testing

Trailer Backup Lamps Malfunction

1. Ignition OFF, exterior lamps OFF.
2. Test for less than 5 Ω between the ground circuit terminal B at the X88 Trailer Connector and ground.
    - **If 5 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.
    - **If less than 5 Ω**
3. Connect a test lamp between the control circuit terminal A at the X88 Trailer Connector and ground, ignition ON.
4. Verify the test lamp turns ON and OFF when commanding the Backup Lamps ON and OFF with a scan tool.
    - **If the test lamp is always OFF**
    1. Ignition OFF, disconnect the X5 harness connector at the X50A Fuse Block - Underhood.
    2. Test for infinite resistance between the control circuit and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the X50A Fuse Block - Underhood.
    - **If the test lamp is always ON**
    1. Ignition OFF, disconnect the X5 harness connector at the X50A Fuse Block - Underhood, ignition ON.
    2. Test for less than 1 V between the control circuit terminal and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V, replace the X50A Fuse Block - Underhood.
    - **If the test lamp turns ON and OFF**
5. Test or replace the X88 Trailer Connector.

Trailer Park Lamps Malfunction

1. Ignition OFF, exterior lamps OFF.
2. Test for less than 5 Ω between the ground circuit terminal B at the X88 Trailer Connector and ground.
    - **If 5 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.

cardiagn.com

- If less than 2 Ω, repair the open/high resistance in the ground connection.

- **If less than 5 Ω**

3. Connect a test lamp between the control circuit terminal F at the X88 Trailer Connector and ground, ignition ON.
4. Verify the test lamp turns ON and OFF when commanding the Park Lamps ON and OFF with a scan tool.
   - **If the test lamp is always OFF**
   1. Ignition OFF, disconnect the X5 harness connector at the X50A Fuse Block - Underhood.
   2. Test for infinite resistance between the control circuit and ground.
      - If less than infinite resistance, repair the short to ground on the circuit.
      - If infinite resistance
   3. Test for less than 2 Ω in the control circuit end to end.
      - If 2 Ω or greater, repair the open/high resistance in the circuit.
      - If less than 2 Ω, replace the X50A Fuse Block - Underhood.
   - **If the test lamp is always ON**
   1. Ignition OFF, disconnect the X5 harness connector at the X50A Fuse Block - Underhood, ignition ON.
   2. Test for less than 1 V between the control circuit terminal and ground.
      - If 1 V or greater, repair the short to voltage on the circuit.
      - If less than 1 V, replace the X50A Fuse Block - Underhood.
   - **If the test lamp turns ON and OFF**
5. Test or replace the X88 Trailer Connector.

Trailer Stop/Turn Signal Lamps Malfunction

1. Ignition OFF, exterior lamps OFF.
2. Test for less than 5 Ω between the ground circuit terminal B at the X88 Trailer Connector and ground.
   - **If 5 Ω or greater**
   1. Ignition OFF.
   2. Test for less than 2 Ω in the ground circuit end to end.
      - If 2 Ω or greater, repair the open/high resistance in the circuit.
      - If less than 2 Ω, repair the open/high resistance in the ground connection.
   - **If less than 5 Ω**
3. Disconnect the X5 harness connector at the X50A Fuse Block - Underhood, ignition ON.
4. Verify a test lamp does not illuminate between the appropriate control circuit terminal listed below and ground.
   - Terminal K5 - left stop/turn signal
   - Terminal K6 - right stop/turn signal
   - **If the test lamp illuminates**
   1. Ignition ON.
   2. Test for less than 1 V between the control circuit terminal and ground.
      - If 1 V or greater, repair the short to voltage on the circuit.
      - If less than 1 V, replace the X88 Trailer Connector.

cardiagn.com

- **If the test lamp does not illuminate**

5. Ignition OFF, connect a 3 A fused jumper between the appropriate control circuit terminal listed below and B+, ignition ON.
    - Terminal K5 - left stop/turn signal
    - Terminal K6 - right stop/turn signal
6. Verify a test lamp illuminates between the appropriate control circuit terminal listed below at the X88 Trailer Connector and ground.
    - Terminal G - left stop/turn signal
    - Terminal D - right stop/turn signal
    - **If the test lamp does not illuminate**
    1. Ignition OFF, remove the 3 A fused jumper wire.
    2. Test for infinite resistance between the control circuit terminal and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the X88 Trailer Connector.
    - **If the test lamp illuminates**
7. Ignition OFF, connect the X5 harness connector at the X50A Fuse Block - Underhood.
8. Disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.
9. Verify a test lamp illuminates between the appropriate control circuit terminal listed below and ground.
    - Terminal 8 - left stop/turn signal
    - Terminal 17 - right stop/turn signal
    - **If the test lamp does not illuminate**
    1. Ignition OFF, disconnect the X4 harness connector at the X50A Fuse Block - Underhood.
    2. Test for infinite resistance between the control circuit and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the X50A Fuse Block - Underhood.
    - **If the test lamp illuminates**
10. Connect a 3 A fused jumper between the appropriate control circuit terminal listed below and ground, ignition ON.
    - Terminal 8 - left stop/turn signal
    - Terminal 17 - right stop/turn signal
11. Verify a test lamp illuminates between the appropriate control circuit terminal listed below at the X88 Trailer Connector and ground.
    - Terminal G - left stop/turn signal
    - Terminal D - right stop/turn signal
    - **If the test lamp does not illuminate**

cardiagn.com

1. Ignition OFF, disconnect the X4 harness connector at the X50A Fuse Block - Underhood, ignition ON.
2. Test for less than 1 V between the appropriate control circuit terminal listed below and ground.
    - Terminal 8 - left stop/turn signal
    - Terminal 17 - right stop/turn signal
    - If 1 V or greater, repair the short to voltage on the circuit.
    - If less than 1 V, replace the X50A Fuse Block - Underhood.

- **If the test lamp illuminates**

12. Test or replace the K9 Body Control Module.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Underhood Electrical Center or Junction Block Replacement**
- **Wiring Harness Connector Replacement - Trailer Brake**
- **Control Module References** for BCM replacement, programming, and setup

TRAILER LAMPS MALFUNCTION (EXPORT)

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Trailer Lighting Control Module B+	1	1	-	-
Center High Mounted Stop Lamp Control	B3884 02	2	2	B0655 5A
Trailer Backup Lamps Control	B3890 02	B3890 04	1	-
Trailer Stop Lamp Control	B3889 02	B3889 04	1	-
Trailer Turn Signal Control - Left	B3887 02	B3887 04	1	-
Trailer Turn Signal Control - Right	B3888 02	B3888 04	1	-
Trailer Fog Lamps Control	B3891 02	B3891 04	1	-
Trailer Tail Lamp Control - Left	B3885 02	B3885 04	1	-
Trailer Tail Lamp Control - Right	B3886 02	B3886 04	1	-
Trailer Lighting Control Module Ground	-	1	-	-
Trailer Connector Grounds	-	1	-	-

cardiagn.com

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
1. Trailer Lamps Malfunction 2. Center High Mounted Stop Lamp Malfunction				

Circuit/System Description

The trailer lighting control module is supplied with battery voltage as well as ignition voltage from the rear body fuse block and is permanently grounded. For lighting operation, the trailer lighting control module receives serial data messages from the body control module (BCM) indicating what lamps have been activated on the vehicle. The trailer lighting control module responds by applying voltage to the appropriate control circuits for the requested lamps illuminating the lamps on the attached trailer.

For stop lamp operation, the trailer lighting control module receives an input from the center high mount stop lamp control circuit. When the brakes are applied on the vehicle, the trailer lighting control module receives the brake applied input from the center high mount stop lamp control circuit. The trailer lighting control module responds by applying voltage to the trailer stop lamp control circuit illuminating the trailer stop lamps. The trailer lighting control module also receives a serial data message from the BCM indicating that the vehicle brakes have been applied.

Diagnostic Aids

For testing purposes, the vehicle must be diagnosed with the trailer/trailer lighting connector disconnected.

Reference Information

Schematic Reference

- **Trailer Connector/Provision Schematics**
- **Exterior Lights Schematics**

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

cardiagn.com

1. Ignition ON.
2. Verify the center high mounted stop lamp on the vehicle turns ON and OFF when commanding the Center Brake Lamp ON and OFF with a scan tool.
    - **If the center high mounted stop does not turn ON and OFF**

      Refer to **Stop Lamps Malfunction**.

    - **If the center high mounted stop turns ON and OFF**

      Refer to Circuit/System Testing.

Circuit/System Testing

Trailer Backup Lamps Malfunction

1. Ignition OFF, exterior lamps OFF, disconnect the X1 and X2 harness connectors at the K68 Trailer Lighting Control Module.
2. Test for less than 5 Ω between the ground circuit terminal 1 X2 and ground.
    - **If 5 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.
    - **If less than 5 Ω**
3. Ignition ON.
4. Verify a test lamp illuminates between the B+ circuit terminals listed below and ground.
    - Terminal 3 X2
    - Terminal 13 X1
    - **If the test lamp does not illuminate**
    1. Ignition OFF, disconnect the appropriate harness connector at the X53A Fuse Block - Rear Body.
    2. Test for infinite resistance between the B+ circuit terminal and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the X53A Fuse Block - Rear Body.
    - **If the test lamp illuminates**
5. Ignition OFF, connect the X1 and X2 harness connectors at the K68 Trailer Lighting Control Module.
6. Connect a test lamp between the control circuit terminal 8 at the X88 Trailer Connector and ground, ignition ON.
7. Verify the test lamp turns ON and OFF when commanding the Trailer Backup Lamps ON and OFF with a scan tool.
    - **If the test lamp is always OFF**
    1. Ignition OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module.

cardiagn.com

2. Test for infinite resistance between the control circuit and ground.
    - If less than infinite resistance, repair the short to ground on the circuit.
    - If infinite resistance
3. Test for less than 2 Ω in the control circuit end to end.
    - If 2 Ω or greater, repair the open/high resistance in the circuit.
    - If less than 2 Ω, replace the K68 Trailer Lighting Control Module.

- **If the test lamp is always ON**

1. Ignition OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module, ignition ON.
2. Test for less than 1 V between the control circuit terminal and ground.
    - If 1 V or greater, repair the short to voltage on the circuit.
    - If less than 1 V, replace the K68 Trailer Lighting Control Module.

- **If the test lamp turns ON and OFF**

8. Test or replace the X88 Trailer Connector.

Trailer Fog Lamps Malfunction

1. Ignition OFF, exterior lamps OFF, disconnect the X1 and X2 harness connectors at the K68 Trailer Lighting Control Module.
2. Test for less than 5 Ω between the ground circuit terminal 1 X2 and ground.
    - **If 5 Ω or greater**

    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.

    - **If less than 5 Ω**

3. Ignition ON.
4. Verify a test lamp illuminates between the B+ circuit terminals listed below and ground.
    - Terminal 3 X2
    - Terminal 13 X1
    - **If the test lamp does not illuminate**

    1. Ignition OFF, disconnect the appropriate harness connector at the X53A Fuse Block - Rear Body.
    2. Test for infinite resistance between the B+ circuit terminal and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the X53A Fuse Block - Rear Body.

    - **If the test lamp illuminates**

5. Ignition OFF, connect the X1 and X2 harness connectors at the K68 Trailer Lighting Control Module.
6. Connect a test lamp between the control circuit terminal 2 at the X88 Trailer Connector and ground, ignition ON.

cardiagn.com

7. Verify the test lamp turns ON and OFF when commanding the Trailer Fog Lamp(s) ON and OFF with a scan tool.
    - **If the test lamp is always OFF**
    1. Ignition OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module.
    2. Test for infinite resistance between the control circuit and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K68 Trailer Lighting Control Module.
    - **If the test lamp is always ON**
    1. Ignition OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module, ignition ON.
    2. Test for less than 1 V between the control circuit terminal and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V, replace the K68 Trailer Lighting Control Module.
    - **If the test lamp turns ON and OFF**
8. Test or replace the X88 Trailer Connector.

Trailer Tail Lamps Malfunction

1. Ignition OFF, exterior lamps OFF, disconnect the X1 and X2 harness connectors at the K68 Trailer Lighting Control Module.
2. Test for less than 5 Ω between the ground circuit terminal 1 X2 and ground.
    - **If 5 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.
    - **If less than 5 Ω**
3. Ignition ON.
4. Verify a test lamp illuminates between the B+ circuit terminals listed below and ground.
    - Terminal 3 X2
    - Terminal 13 X1
    - **If the test lamp does not illuminate**
    1. Ignition OFF, disconnect the appropriate harness connector at the X53A Fuse Block - Rear Body.
    2. Test for infinite resistance between the B+ circuit terminal and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the X53A Fuse Block - Rear Body.

cardiagn.com

- **If the test lamp illuminates**

5. Ignition OFF, connect the X1 and X2 harness connectors at the K68 Trailer Lighting Control Module.
6. Connect a test lamp between the appropriate control circuit terminal listed below at the X88 Trailer Connector and ground, ignition ON.
    - Left tail lamp control terminal 7
    - Right tail lamp control terminal 5
7. Verify the test lamp turns ON and OFF when commanding the Left Trailer Tail Lamp ON and OFF with a scan tool.
    - **If the test lamp is always OFF**
    1. Ignition OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module.
    2. Test for infinite resistance between the control circuit and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K68 Trailer Lighting Control Module.
    - **If the test lamp is always ON**
    1. Ignition OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module, ignition ON.
    2. Test for less than 1 V between the control circuit terminal and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V, replace the K68 Trailer Lighting Control Module.
    - **If the test lamp turns ON and OFF**
8. Test or replace the X88 Trailer Connector.

Trailer Turn Signal Lamps Malfunction

1. Ignition OFF, exterior lamps OFF, disconnect the X1 and X2 harness connectors at the K68 Trailer Lighting Control Module.
2. Test for less than 5 Ω between the ground circuit terminal 1 X2 and ground.
    - **If 5 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.
    - **If less than 5 Ω**
3. Ignition ON.
4. Verify a test lamp illuminates between the B+ circuit terminals listed below and ground.
    - Terminal 3 X2
    - Terminal 13 X1
    - **If the test lamp does not illuminate**
    1. Ignition OFF, disconnect the appropriate harness connector at the X53A Fuse Block - Rear Body.

cardiagn.com

2. Test for infinite resistance between the B+ circuit terminal and ground.
    - If less than infinite resistance, repair the short to ground on the circuit.
    - If infinite resistance
3. Test for less than 2 Ω in the control circuit end to end.
    - If 2 Ω or greater, repair the open/high resistance in the circuit.
    - If less than 2 Ω, replace the X53A Fuse Block - Rear Body.

- **If the test lamp illuminates**

5. Ignition OFF, connect the X1 and X2 harness connectors at the K68 Trailer Lighting Control Module.
6. Connect a test lamp between the appropriate control circuit terminal listed below at the X88 Trailer Connector and ground, ignition ON.
    - Left turn signal lamp control terminal 1
    - Right turn signal lamp control terminal 4
7. Verify the test lamp turns ON and OFF when commanding the appropriate Trailer Turn Signal Lamp ON and OFF with a scan tool.
    - **If the test lamp is always OFF**
    1. Ignition OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module.
    2. Test for infinite resistance between the control circuit and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K68 Trailer Lighting Control Module.
    - **If the test lamp is always ON**
    1. Ignition OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module, ignition ON.
    2. Test for less than 1 V between the control circuit terminal and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V, replace the K68 Trailer Lighting Control Module.
    - **If the test lamp turns ON and OFF**
8. Test or replace the X88 Trailer Connector.

Trailer Stop Lamps Malfunction

1. Ignition OFF, exterior lamps OFF, disconnect the X1 and X2 harness connectors at the K68 Trailer Lighting Control Module.
2. Test for less than 5 Ω between the ground circuit terminal 1 X2 and ground.
    - **If 5 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.
    - **If less than 5 Ω**

cardiagn.com

3. Ignition ON.
4. Verify a test lamp illuminates between the B+ circuit terminals listed below and ground.
    - Terminal 3 X2
    - Terminal 13 X1
    - **If the test lamp does not illuminate**
    1. Ignition OFF, disconnect the appropriate harness connector at the X53A Fuse Block - Rear Body.
    2. Test for infinite resistance between the B+ circuit terminal and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the X53A Fuse Block - Rear Body.
    - **If the test lamp illuminates**
5. Ignition OFF, connect the X1 and X2 harness connectors at the K68 Trailer Lighting Control Module.
6. Connect a test lamp between the control circuit terminal 6 at the X88 Trailer Connector and ground, ignition ON.
7. Verify the test lamp turns ON and OFF when commanding the Trailer Brake Lamps ON and OFF with a scan tool.
    - **If the test lamp is always OFF**
    1. Ignition OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module.
    2. Test for infinite resistance between the control circuit and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K68 Trailer Lighting Control Module.
    - **If the test lamp is always ON**
    1. Ignition OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module, ignition ON.
    2. Test for less than 1 V between the control circuit terminal and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V, replace the K68 Trailer Lighting Control Module.
    - **If the test lamp turns ON and OFF**
8. Test or replace the X88 Trailer Connector.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

Control Module References for BCM or Trailer Lighting Control Module replacement, programming, and setup

TURN SIGNAL LAMPS AND/OR INDICATORS MALFUNCTION

cardiagn.com

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
F6DL (BCM 3) Fuse B+	1	1	1	-
F9DL (BCM 7) Fuse B+	1	1	1	-
F6DR (BCM 4) Fuse B+	1	1	1	-
F44DR (BCM 6) Fuse B+	1	1	1	-
Turn Signal Switch Signal - Left	2	2	2	-
Turn Signal Switch Signal - Right	2	2	2	-
Turn Signal Control - Left Front	B3948 02	B3948 04	B3948 01	-
Turn Signal Control - Right Front	B3949 02	B3949 04	B3949 01	-
Stop/Turn Signal Lamp Control - Left Rear	B3950 02, B3950 04	B3950 04	B3950 01	-
Stop/Turn Signal Lamp Control - Right Rear	B3951 02, B3951 04	B3951 04	B3951 01	-
Turn Signal Lamp Ground - Left Front	-	B3948 04	-	-
Turn Signal Lamp Ground - Right Front	-	B3949 04	-	-
Turn Signal Lamp Ground - Left Rear	-	B3950 04	-	-
Turn Signal Lamp Ground - Right Rear	-	B3951 04	-	-
Turn Signal/Multifunction Switch Ground	-	2	-	-
1. Turn Signal Lamps and/or Indicators Malfunction 2. Turn Signal/Multifunction Switch Malfunction				

Circuit/System Description

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 there respective control circuits. When a turn signal request is received by the BCM, a serial data message is sent to the instrument cluster requesting the respective turn signal indicator be pulsed ON and OFF.

Diagnostic Aids

When testing at the turn signal lamp bulb sockets, make sure all measurements and test lamp connections are in the correct terminal location and do not come in contact with each other during testing.

cardiagn.com

Reference Information

Schematic Reference

- **Exterior Lights Schematics**
- **Body Control System Schematics**

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify the scan tool Right Turn Signal Switch and Left Turn Signal Switch parameters change between Active and Inactive while cycling the turn signal switch between the right and left positions.
   - **If the parameters do not change**

     Refer to Turn Signal/Multifunction Switch Malfunction.

   - **If the parameters change**
3. Verify the left front turn signal lamps turn ON and OFF while commanding the Left Front Turn Signal Lamp ON and OFF with a scan tool.
   - **If the left front turn signal lamps do not turn ON and OFF**

     Refer to Turn Signal Lamps Malfunction.

   - **If the left front turn signal lamps turn ON and OFF**
4. Verify the right front turn signal lamps turn ON and OFF while commanding the Right Front Turn Signal Lamp ON and OFF with a scan tool.
   - **If the right front turn signal lamps do not turn ON and OFF**

     Refer to Turn Signal Lamps Malfunction.

   - **If the right front turn signal lamps turn ON and OFF**
5. Verify the left rear turn signal lamp turns ON and OFF while commanding the Left Rear Turn Signal/Stop

cardiagn.com

Lamp ON and OFF with a scan tool.

- **If the left rear turn signal lamp does not turn ON and OFF**

  Refer to Turn Signal Lamps Malfunction.

- **If the left rear turn signal lamp turns ON and OFF**

6. Verify the right rear turn signal lamp turns ON and OFF while commanding the Right Rear Turn Signal/Stop Lamp ON and OFF with a scan tool.
   - **If the right rear turn signal lamp does not turn ON and OFF**

     Refer to Turn Signal Lamps Malfunction.

   - **If the right rear turn signal lamp turns ON and OFF**
7. Verify the left and right turn signal indicators turn ON and OFF while commanding the All Indicators Test ON and OFF with a scan tool.
   - **If the left or right turn signal indictors do not turn ON and OFF**

     Refer to Turn Signal Indicators Malfunction.

   - **If the left and right turn signal indictors turn ON and OFF**
8. All OK.

Circuit/System Testing

Turn Signal/Multifunction Switch Malfunction

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, open and close drivers door, disconnect the harness connector at the S78 Turn Signal/Multifunction Switch. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 15 Ω between the ground circuit terminal F and ground.
   - **If 15 Ω or greater**
   1. Ignition OFF.
   2. Test for less than 2 Ω in the ground circuit end to end.
      - If 2 Ω or greater, repair the open/high resistance in the circuit.
      - If less than 2 Ω, repair the open/high resistance in the ground connection.
   - **If less than 15 Ω**
3. Ignition ON.
4. Verify the scan tool Left Turn Signal Switch parameter is Inactive.
   - **If not Inactive**
   1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module.
   2. Test for infinite resistance between the signal circuit terminal E and ground.
      - If less than infinite resistance, repair the short to ground on the circuit.
      - If infinite resistance, replace the K9 Body Control Module.
   - **If Inactive**
5. Install a 3 A fused jumper wire between the signal circuit terminal E and ground.
6. Verify the scan tool Left Turn Signal Switch parameter is Active.

cardiagn.com

- **If not Active**

1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module, ignition ON.
2. Test for less than 1 V between the signal circuit terminal E and ground.
    - If 1 V or greater, repair the short to voltage on the circuit.
    - If less than 1 V
3. Test for less than 2 Ω in the signal circuit end to end.
    - If 2 Ω or greater, repair the open/high resistance in the circuit.
    - If less than 2 Ω, replace the K9 Body Control Module.

- **If Active**

7. Verify the scan tool Right Turn Signal Switch parameter is Inactive.
    - **If not Inactive**

    1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module.
    2. Test for infinite resistance between the signal circuit terminal D and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance, replace the K9 Body Control Module.

    - **If Inactive**

8. Install a 3 A fused jumper wire between the signal circuit terminal D and ground.
9. Verify the scan tool Right Turn Signal Switch parameter is Active.
    - **If not Active**

    1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module, ignition ON.
    2. Test for less than 1 V between the signal circuit terminal D and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - If less than 1 V
    3. Test for less than 2 Ω in the signal circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K9 Body Control Module.

    - **If Active**

10. Test or replace the S78 Turn Signal/Multifunction Switch.

Turn Signal Lamps Malfunction

1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.
2. Verify a test lamp illuminates between the B+ circuit terminal 3 and ground.
    - **If the test lamp does not illuminate and the circuit fuse is good**

    1. Ignition OFF, disconnect the X2 harness connector at the X51L Fuse Block - Instrument Panel Left.
    2. Test for less than 2 Ω in the B+ circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, verify the fuse is not open and there is voltage at the fuse.

    - **If the test lamp does not illuminate and the circuit fuse is open**

    1. Ignition OFF, disconnect the X2 harness connector at the X51L Fuse Block - Instrument Panel Left.
    2. Test for infinite resistance between the B+ circuit and ground.

cardiagn.com

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance, replace the K9 Body Control Module.

- **If the test lamp illuminates**

3. Verify a test lamp illuminates between the B+ circuit terminal 2 and ground.
   - **If the test lamp does not illuminate and the circuit fuse is good**
   1. Ignition OFF, disconnect the X2 harness connector at the X51R Fuse Block - Instrument Panel Right.
   2. Test for less than 2 Ω in the B+ circuit end to end.
      - If 2 Ω or greater, repair the open/high resistance in the circuit.
      - If less than 2 Ω, verify the fuse is not open and there is voltage at the fuse.
   - **If the test lamp does not illuminate and the circuit fuse is open**
   1. Ignition OFF, disconnect the X2 harness connector at the X51R Fuse Block - Instrument Panel Right.
   2. Test for infinite resistance between the B+ circuit and ground.
      - If less than infinite resistance, repair the short to ground on the circuit.
      - If infinite resistance, replace the K9 Body Control Module.
   - **If the test lamp illuminates**
4. Ignition OFF, connect the X1 harness connector at the K9 Body Control Module.
5. Disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.
6. Verify a test lamp illuminates between the B+ circuit terminal 3 and ground.
   - **If the test lamp does not illuminate and the circuit fuse is good**
   1. Ignition OFF, disconnect the X1 harness connector at the X51L Fuse Block - Instrument Panel Left.
   2. Test for less than 2 Ω in the B+ circuit end to end.
      - If 2 Ω or greater, repair the open/high resistance in the circuit.
      - If less than 2 Ω, verify the fuse is not open and there is voltage at the fuse.
   - **If the test lamp does not illuminate and the circuit fuse is open**
   1. Ignition OFF, disconnect the X1 harness connector at the X51L Fuse Block - Instrument Panel Left.
   2. Test for infinite resistance between the B+ circuit and ground.
      - If less than infinite resistance, repair the short to ground on the circuit.
      - If infinite resistance, replace the K9 Body Control Module.
   - **If the test lamp illuminates**
7. Verify a test lamp illuminates between the B+ circuit terminal 4 and ground.
   - **If the test lamp does not illuminate and the circuit fuse is good**
   1. Ignition OFF, disconnect the X1 harness connector at the X51R Fuse Block - Instrument Panel Right.
   2. Test for less than 2 Ω in the B+ circuit end to end.
      - If 2 Ω or greater, repair the open/high resistance in the circuit.
      - If less than 2 Ω, verify the fuse is not open and there is voltage at the fuse.
   - **If the test lamp does not illuminate and the circuit fuse is open**
   1. Ignition OFF, disconnect the X1 harness connector at the X51R Fuse Block - Instrument Panel Right.

cardiagn.com

2. Test for infinite resistance between the B+ circuit and ground.
    - If less than infinite resistance, repair the short to ground on the circuit.
    - If infinite resistance, replace the K9 Body Control Module.

- **If the test lamp illuminates**

8. Ignition OFF, connect the X5 harness connector at the K9 Body Control Module.
9. Ignition OFF, exterior lamps OFF, disconnect the appropriate component listed below. It may take up to 2 min for all vehicle systems to power down.
    - A9A Outside Rearview Mirror - Driver
    - E4LF Turn Signal Lamp - Left Front (1500 with X88/Z88 without YE9)
    - E4N Park/Turn Signal Lamp - Left (2500/3500 with X88 - GMC)
    - E4Q Park/Turn Signal Lamp - Left Lower (2500/3500 with X88 - Chevrolet)
    - E4S Park/Turn Signal Lamp - Left Upper (2500/3500 with X88 - Chevrolet)
    - E13LA Headlamp Assembly - Left (1500 with X88/Z88 with YE9)
    - E42L Tail Lamp Assembly - Left (1500 without ZW9)
    - E5AG Tail/Stop and Turn Signal Lamp - Left Upper (2500/3500 without ZW9)
    - E5S Tail/Stop and Turn Signal Lamp - Left (with ZW9)
    - E5U Tail/Stop and Turn Signal Lamp - Left Lower (2500/3500 without ZW9)
    - A9B Outside Rearview Mirror - Passenger
    - E4RF Turn Signal Lamp - Right Front (1500 with X88/Z88 without YE9)
    - E4P Park/Turn Signal Lamp - Right (2500/3500 with X88 - GMC)
    - E4R Park/Turn Signal Lamp - Right Lower (2500/3500 with X88 - Chevrolet)
    - E4T Park/Turn Signal Lamp - Right Upper (2500/3500 with X88 - Chevrolet)
    - E13RA Headlamp Assembly - Right (1500 with X88/Z88 with YE9)
    - E42R Tail Lamp Assembly - Right (1500 without ZW9)
    - E5AH Tail/Stop and Turn Signal Lamp - Right Upper (2500/3500 without ZW9)
    - E5T Tail/Stop and Turn Signal Lamp - Right (with ZW9)
    - E5V Tail/Stop and Turn Signal Lamp - Right Lower (2500/3500 without ZW9)
10. Test for less than 15 Ω between the appropriate ground circuit terminal listed below and ground.
    - A9A Outside Rearview Mirror - Driver terminal 5
    - E4LF Turn Signal Lamp - Left Front socket terminal (1500 with X88/Z88 without YE9)
    - E4N Park/Turn Signal Lamp - Left socket terminal (2500/3500 with X88 - GMC)
    - E4Q Park/Turn Signal Lamp - Left Lower socket terminal (2500/3500 with X88 - Chevrolet)
    - E4S Park/Turn Signal Lamp - Left Upper socket terminal (2500/3500 with X88 - Chevrolet)
    - E13LA Headlamp Assembly - Left terminal 1 (1500 with X88/Z88 with YE9)
    - E42L Tail Lamp Assembly - Left terminal 1 (1500 without ZW9)
    - E5AG Tail/Stop and Turn Signal Lamp - Left Upper terminal 3 (2500/3500 without ZW9)
    - E5S Tail/Stop and Turn Signal Lamp - Left socket terminal (with ZW9)
    - E5U Tail/Stop and Turn Signal Lamp - Left Lower terminal 3 (2500/3500 without ZW9)
    - A9B Outside Rearview Mirror - Passenger terminal 5
    - E4RF Turn Signal Lamp - Right Front socket terminal (1500 with X88/Z88 without YE9)

cardiagn.com

- E4P Park/Turn Signal Lamp - Right socket terminal (2500/3500 with X88 - GMC)
- E4R Park/Turn Signal Lamp - Right Lower socket terminal (2500/3500 with X88 - Chevrolet)
- E4T Park/Turn Signal Lamp - Right Upper socket terminal (2500/3500 with X88 - Chevrolet)
- E13RA Headlamp Assembly - Right terminal 1 (1500 with X88/Z88 with YE9)
- E42R Tail Lamp Assembly - Right terminal 1 (1500 without ZW9)
- E5AH Tail/Stop and Turn Signal Lamp - Right Upper terminal 3 (2500/3500 without ZW9)
- E5T Tail/Stop and Turn Signal Lamp - Right socket terminal (with ZW9)
- E5V Tail/Stop and Turn Signal Lamp - Right Lower terminal 3 (2500/3500 without ZW9)
- **If 15 Ω or greater**

1. Ignition OFF.
2. Test for less than 2 Ω in the ground circuit end to end.
    - If 2 Ω or greater, repair the open/high resistance in the circuit.
    - If less than 2 Ω, repair the open/high resistance in the ground connection.

- **If less than 15 Ω**

11. Connect a test lamp between the appropriate control circuit terminal listed below and ground, ignition ON.
    - A9A Outside Rearview Mirror - Driver terminal 13
    - E4LF Turn Signal Lamp - Left Front socket terminal (1500 with X88/Z88 without YE9)
    - E4N Park/Turn Signal Lamp - Left socket terminal (2500/3500 with X88 - GMC)
    - E4Q Park/Turn Signal Lamp - Left Lower socket terminal (2500/3500 with X88 - Chevrolet)
    - E4S Park/Turn Signal Lamp - Left Upper socket terminal (2500/3500 with X88 - Chevrolet)
    - E13LA Headlamp Assembly - Left terminal 7 (1500 with X88/Z88 with YE9)
    - E42L Tail Lamp Assembly - Left terminal 2 (1500 without ZW9)
    - E5AG Tail/Stop and Turn Signal Lamp - Left Upper terminal 2 (2500/3500 without ZW9)
    - E5S Tail/Stop and Turn Signal Lamp - Left socket terminal (with ZW9)
    - E5U Tail/Stop and Turn Signal Lamp - Left Lower terminal 2 (2500/3500 without ZW9)
    - A9B Outside Rearview Mirror - Passenger terminal 13
    - E4RF Turn Signal Lamp - Right Front socket terminal (1500 with X88/Z88 without YE9)
    - E4P Park/Turn Signal Lamp - Right socket terminal (2500/3500 with X88 - GMC)
    - E4R Park/Turn Signal Lamp - Right Lower socket terminal (2500/3500 with X88 - Chevrolet)
    - E4T Park/Turn Signal Lamp - Right Upper socket terminal (2500/3500 with X88 - Chevrolet)
    - E13RA Headlamp Assembly - Right terminal 7 (1500 with X88/Z88 with YE9)
    - E42R Tail Lamp Assembly - Right terminal 2 (1500 without ZW9)
    - E5AH Tail/Stop and Turn Signal Lamp - Right Upper terminal 2 (2500/3500 without ZW9)
    - E5T Tail/Stop and Turn Signal Lamp - Right socket terminal (with ZW9)
    - E5V Tail/Stop and Turn Signal Lamp - Right Lower terminal 2 (2500/3500 without ZW9)
12. Verify the test lamp turns ON and OFF when commanding the appropriate Turn Signal Lamp ON and OFF with a scan tool.
    - **If the test lamp is always OFF**

    1. Ignition OFF, disconnect the appropriate harness connector listed below at the K9 Body Control Module.

cardiagn.com

- X5 left turn signals
- X4 right turn signals

2. Test for infinite resistance between the control circuit and ground.
   - If less than infinite resistance, repair the short to ground on the circuit.
   - If infinite resistance
3. Test for less than 2 Ω in the control circuit end to end.
   - If 2 Ω or greater, repair the open/high resistance in the circuit.
   - If less than 2 Ω, replace the K9 Body Control Module.

- **If the test lamp is always ON**

1. Ignition OFF, disconnect the appropriate harness connector listed below at the K9 Body Control Module, ignition ON.
   - X5 left turn signals
   - X4 right turn signals
2. Test for less than 1 V between the control circuit terminal and ground.
   - If 1 V or greater, repair the short to voltage on the circuit.
   - If less than 1 V, replace the K9 Body Control Module.

- **If the test lamp turns ON and OFF**

13. Test or replace the appropriate turn signal lamp.

Turn Signal Indicators Malfunction

1. Ignition ON.
2. Verify the left and right turn signal indicators turn ON and OFF while commanding the All Indicators Test ON and OFF with a scan tool.
   - **If the left or right turn signal indictors are always OFF or remain ON**

     Replace the P16 Instrument Cluster.

   - **If the left and right turn signal indictors turn ON and OFF**
3. Replace the K9 Body Control Module.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Headlamp Replacement (GMC 1500)** **Headlamp Replacement (Chevrolet - Left Side)** **Headlamp Replacement (Chevrolet - Right Side)** **Headlamp Replacement (GMC 2500, 3500)**
- **Tail Lamp Replacement (Chevrolet 1500, 2500, 3500 without GAJ)** **Tail Lamp Replacement (GMC 1500, 2500, 3500 without GAT or GFW)** **Tail Lamp Replacement (GMC 1500 with GAT or GFW)** **Tail Lamp Replacement (Chevrolet 1500 with GAJ)**
- **Turn Signal Bulb Replacement (GMC HD - Left Side)** **Turn Signal Bulb Replacement (GMC HD - Right Side)** **Turn Signal Bulb Replacement (Chevrolet LD - Left Side)** **Turn Signal Bulb Replacement (Chevrolet LD - Right Side)** **Turn Signal Bulb Replacement (GMC LD)**
- **Turn Signal Switch Replacement**
- **Turn Signal Bulb Replacement (GMC HD - Left Side)** **Turn Signal Bulb Replacement (GMC HD - Right Side)** **Turn Signal Bulb Replacement (Chevrolet LD - Left Side)** **Turn Signal Bulb**

cardiagn.com

Replacement (Chevrolet LD - Right Side) **Turn Signal Bulb Replacement (GMC LD)**

- **Stop and Tail Lamp Bulb Replacement (Chevrolet)** **Stop and Tail Lamp Bulb Replacement (GMC)**
- **Control Module References** for BCM or Instrument Cluster replacement, programming, and setup

---

Article GUID: A00854562

cardiagn.com

REPAIR INSTRUCTIONS

WIRE TO WIRE REPAIR - LIGHTING

Special Tools

- **EL-38125-10** Splice Sleeve Crimping Tool (non GMNA)
- **J-38125-5A** Ultra Torch Special Tool
- **J-38125-8** Splice Sleeve Crimping Tool (GMNA)

For equivalent regional tools, refer to **Special Tools** .

WARNING: **In order to reduce the risk of personal injury, loss of high voltage isolation to ground and higher system impedance, do not attempt to repair any HV wiring, connector, or terminal that is damaged. High voltage coaxial type cables are not repairable. Never attempt to repair a coaxial type cable. The entire cable/harness or component must be replaced. In order to maintain system integrity and personal safety, never attempt to repair any high voltage wiring, cables, or terminals. Performing this procedure on high voltage circuits may result in serious injury or death.**

NOTE: **If the wiring harness internal to the transmission is damaged, the wiring harness must be replaced. The use of splice sleeves in an attempt to repair the internal transmission wires, connectors, or terminals could result in performance issues.**

NOTE: **Do not splice wires in Door Harness Grommets.**

NOTE: **The DuraSeal splice sleeves have the following 2 critical features:**

- **A special heat shrink sleeve environmentally seals the splice. The heat shrink sleeve contains a sealing adhesive inside.**
- **A cross hatched (knurled) core crimp provides the necessary low resistance contact integrity for these sensitive, low energy circuits.**

Use only DuraSeal splice sleeves to form a one-to-one splice on all types of insulation except high voltage and specialty cables. Use DuraSeal splice sleeves where there are special requirements such as moisture sealing. Follow the instructions below in order to splice copper wire using DuraSeal splice sleeves.

Splice Sleeve Selection

Splice Sleeve Color	Crimp Tool Nest Color		Wire Gauge mm^2 / (AWG)
	3 Crimp Nests	4 Crimp Nests	
Salmon (Yellow-Pink) 19300089	Red (1) or Red/Green (1)	Red (2)	0.22-0.8/(18-26)

cardiagn.com

Splice Sleeve Color	Crimp Tool Nest Color		Wire Gauge mm^2 / (AWG)
	3 Crimp Nests	4 Crimp Nests	
Blue 19168447	Blue (2)	Blue (3)	1.0-2.0/(14-16)
Yellow 19168448	Yellow (3)	Yellow (4)	3.0-5.0/(10-12)

NOTE: **You must perform the following procedures in the listed order. Repeat the procedure if any wire strands are damaged. You must obtain a clean strip with all of the wire strands intact.**

1. Open the harness by removing any tape:
   - Use a sewing seam ripper, available from sewing supply stores, in order to cut open the harness in order to avoid wire insulation damage.
   - Use the DuraSeal splice sleeves on all types of insulation except Tefzel and coaxial.
   - Do not use the crimp and DuraSeal splice sleeve to form a splice with more than 2 wires coming together.
2. Cut as little wire off the harness as possible. You may need the extra length of wire in order to change the location of a splice.

   Adjust splice locations so that each splice is at least 40 mm (1.5 in) away from the other splices, harness branches, or connectors.

3. Strip the insulation:
   - When adding a length of wire to the existing harness, use the same size wire as the original wire.
   - Perform one of the following items in order to find the correct wire size:
     - Find the wire on the schematic and convert to regional wiring gauge size.
     - If you are unsure of the wire size, begin with the largest opening in the wire stripper and work down until achieving a clean strip of the insulation.
   - Strip approximately 5.0 mm (0.20 in) of insulation from each wire to be spliced.
   - Do not nick or cut any of the strands. Inspect the stripped wire for nicks or cut strands.
   - If the wire is damaged, repeat this procedure after removing the damaged section.
4. For high temperature wiring, slide a section of high temperature SCT1 shrink tubing down the length of wire to be spliced. Ensure that the shrink tubing will not interfere with the splice procedure.
5. Select the proper DuraSeal splice sleeve according to the wire size. Refer to the above table at the beginning of the repair procedure for the color coding of the DuraSeal splice sleeves and the crimp tool nests.

cardiagn.com

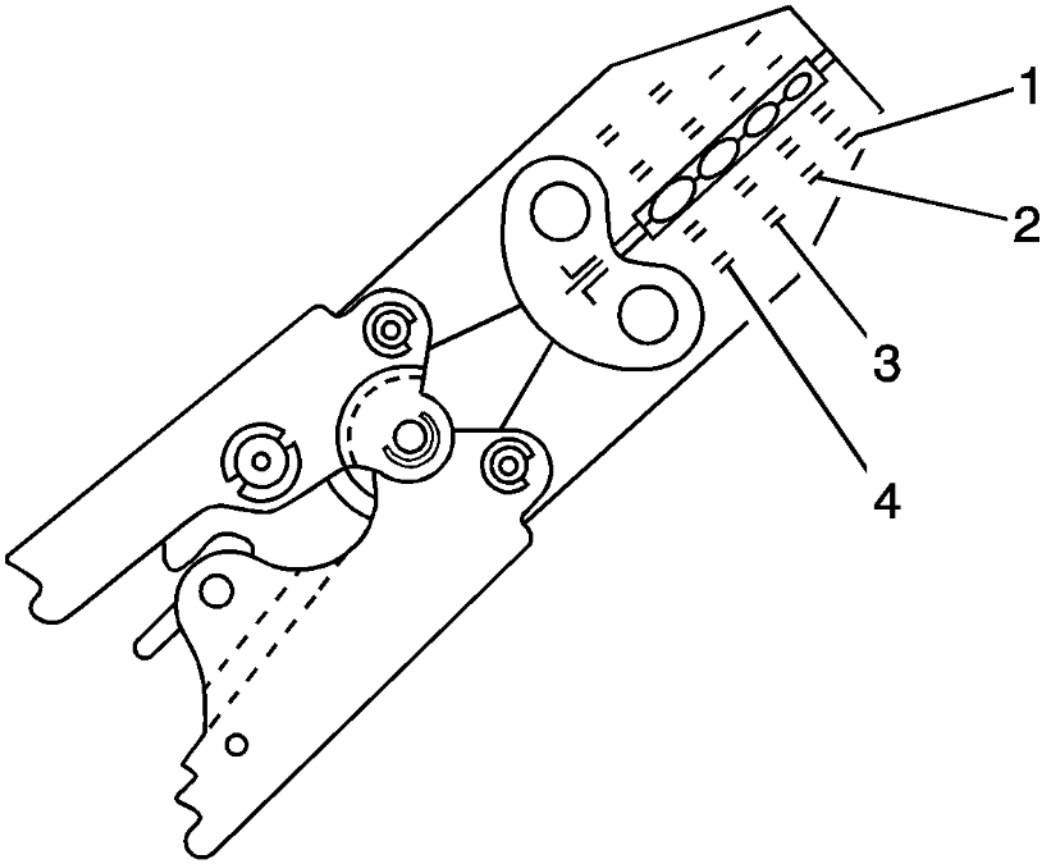


Fig. 1: Crimping Tool
Courtesy of GENERAL MOTORS COMPANY

6. The **EL-38125-10** splice sleeve crimping tool has four crimp nests. The largest crimp nest (4) is used for crimping 10 and 12 gauge wires. The second largest crimp nest (3) is used for crimping 14 and 16 gauge wires. The third largest crimp nest (2) is used for crimping 18 and 20 gauge wires. The smallest crimp nest (1) is used for crimping 22 to 26 gauge wires. The crimp nests are referenced in the table (farther above) under the crimp tool nest color.

cardiagn.com

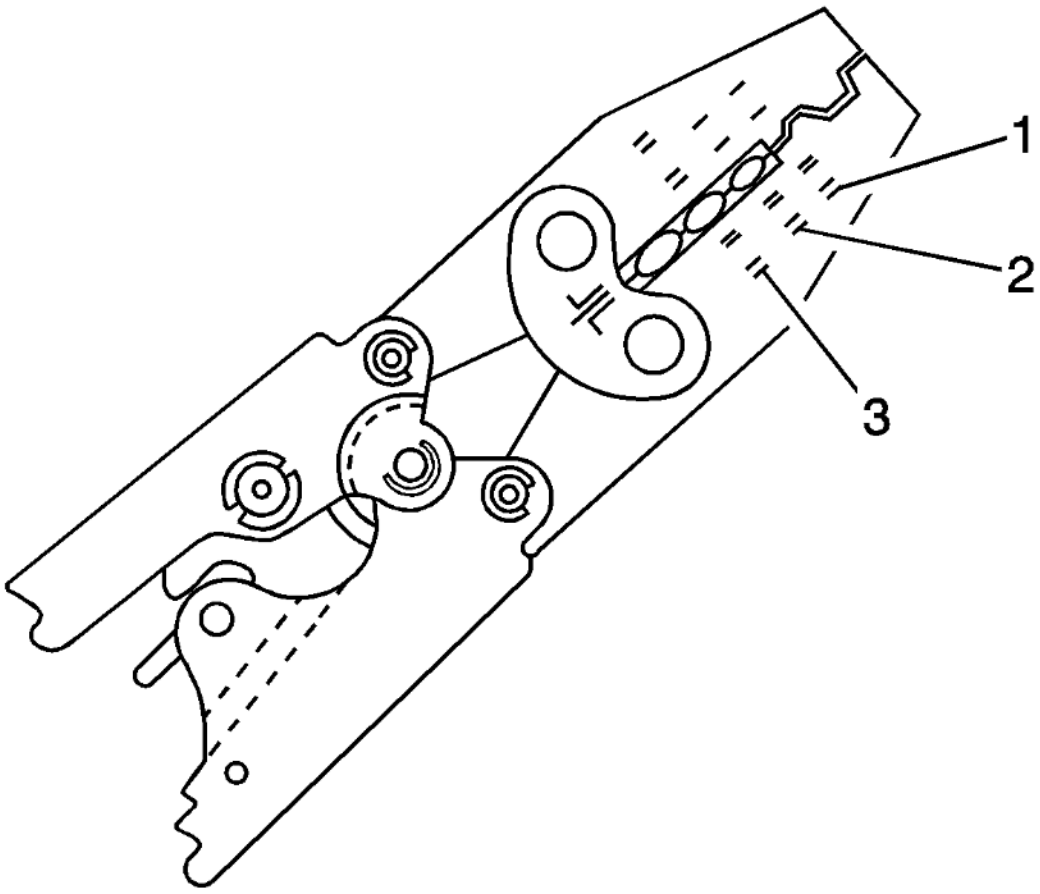


Fig. 2: Identifying Splice Crimp Tool Nests Terminal Identification
Courtesy of GENERAL MOTORS COMPANY

7. The **J-38125-8** splice sleeve crimping tool has three crimp nests. The largest crimp nest (3) is used for crimping 10 and 12 gauge wires. The second largest crimp nest (2) is used for crimping 14 and 16 gauge wires. The smallest crimp nest (1) is used for crimping 18 to 20 gauge wires. The crimp nests are referenced in the table (farther above) under the crimp tool nest color.
8. Use the splice sleeve crimp tool in order to position the DuraSeal splice sleeve in the proper color nest of the splice sleeve crimp tool. For the four crimp nest tool, use the three largest crimp nests to crimp the splice sleeves. For the three crimp nest tool, use all three crimp nests to crimp the splice sleeves. Use the four and three crimp tool diagrams (above) and the table (farther above) to match the splice sleeve with the correct crimp nest. The crimp tool diagram callout numbers match the numbers in the table (under crimp tool nest color).

cardiagn.com

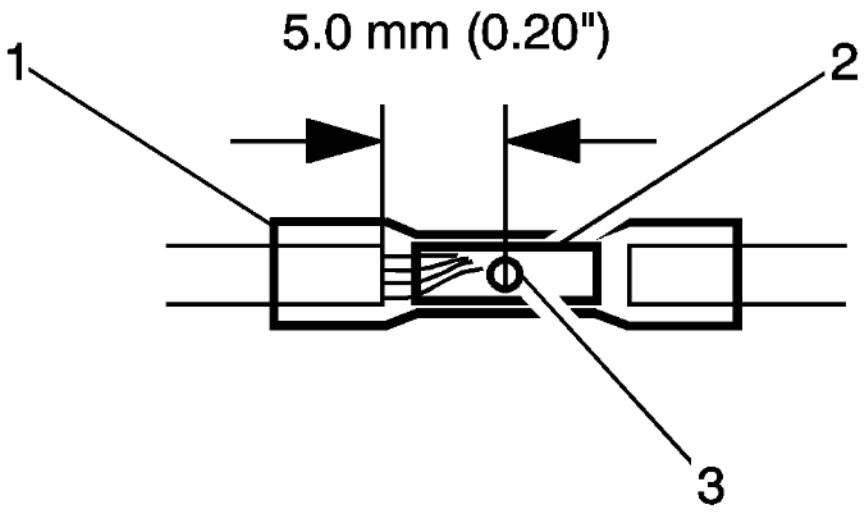


Fig. 3: Identifying Duraseal Splice Sleeve
Courtesy of GENERAL MOTORS COMPANY

9. Place the DuraSeal splice sleeve in the nest. Ensure that the crimp falls midway between the end of the barrel and the stop. The sleeve has a stop (3) in the middle of the barrel (2) in order to prevent the wire (1) from going further. Close the hand crimper handles slightly in order to firmly hold the DuraSeal splice sleeve in the proper nest.

cardiagn.com



Fig. 4: Crimped Duraseal Splice Sleeve
Courtesy of GENERAL MOTORS COMPANY

10. Insert the wire into the splice sleeve barrel until the wire hits the barrel stop. Refer to **Folded-Over Wire Repair** for splicing wires of 0.35 mm or less (22, 24, 26 gauge sizes) and for splicing wires of different gauges.
11. Tightly close the handles of the crimp tool until the crimper handles open when released.

    The crimper handles will not open until you apply the proper amount of pressure to the DuraSeal splice sleeve. Repeat steps 4 and 6 for the opposite end of the splice.

cardiagn.com



Fig. 5: Crimped Duraseal Splice Sleeve
Courtesy of GENERAL MOTORS COMPANY

12. Using the heat torch, apply heat to the crimped area of the barrel.
13. Start in the middle and gradually move the heat barrel to the open ends of the tubing:
    - The tubing will shrink completely as the heat is moved along the insulation.
    - A small amount of sealant will come out of the end of the tubing when sufficient shrinkage is achieved.

Weatherpack™ Wiring Repair

NOTE: **Some replacement pigtail connectors may be delivered without the terminated leads installed into the connector. For Weatherpack™ connectors, all terminated leads included in the package should to be installed into the connector. If the connector end view shows that a terminal is not occupied, the extra terminated lead(s) need to be installed and the end(s) sealed using a DuraSeal splice sleeve and taped back into the harness.**

cardiagn.com

1. Insert the wire into the splice sleeve barrel until the wire hits the barrel stop. Refer to **Folded-Over Wire Repair** for splicing wires of 0.35 mm or less (22, 24, 26 gauge sizes) and for splicing wires of different gauges.

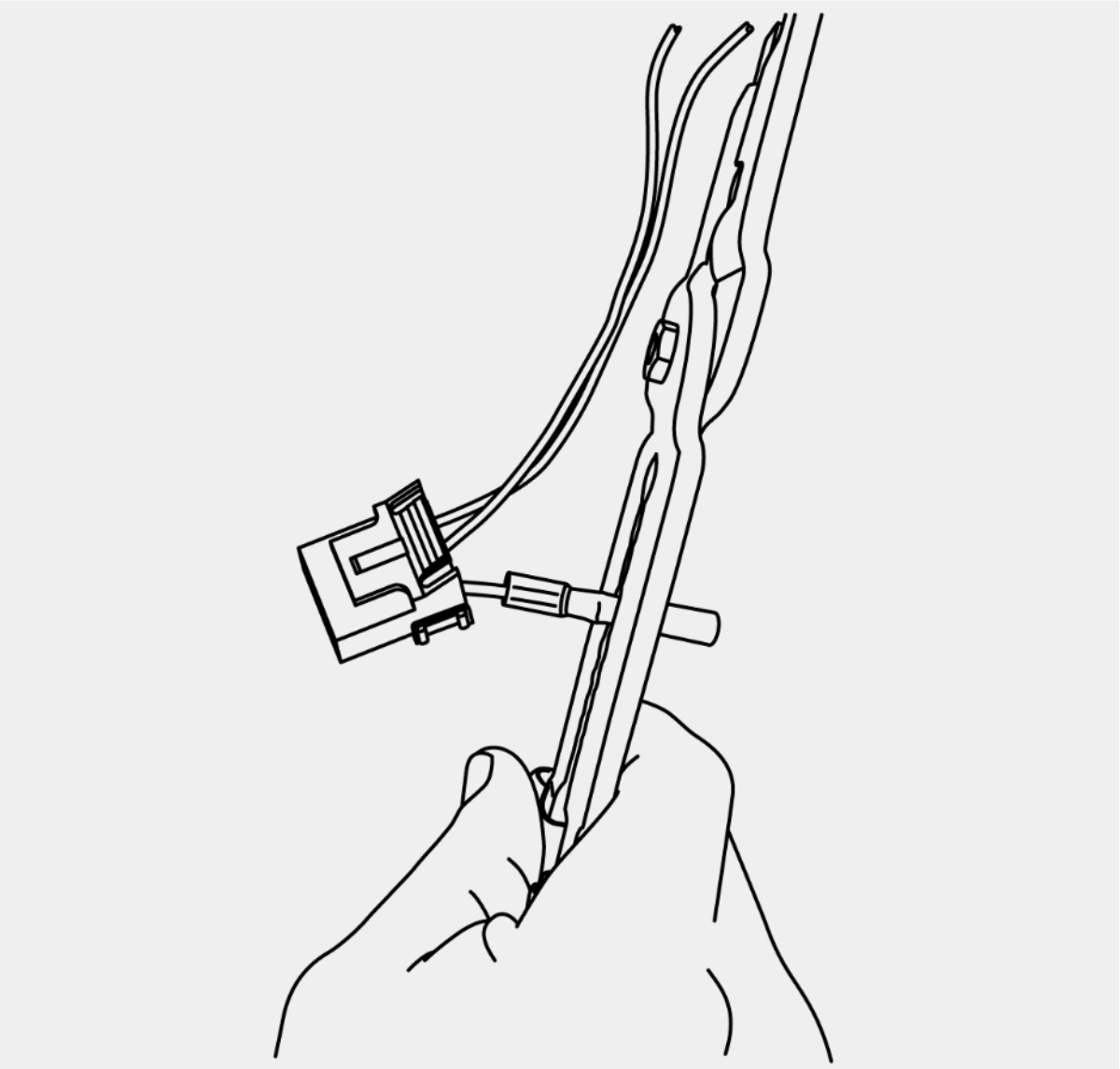


Fig. 6: Tightly Close Handles Of Crimp Tool
Courtesy of GENERAL MOTORS COMPANY

2. Tightly close the handles of the crimp tool until the crimper handles open when released.

   The crimper handles will not open until you apply the proper amount of pressure to the DuraSeal splice sleeve. Holding the DuraSEAL with one hand gently tug on the wire to ensure it is crimped in the DuraSeal.

3. Using the heat torch, apply heat to the crimped area of the barrel.

cardiagn.com

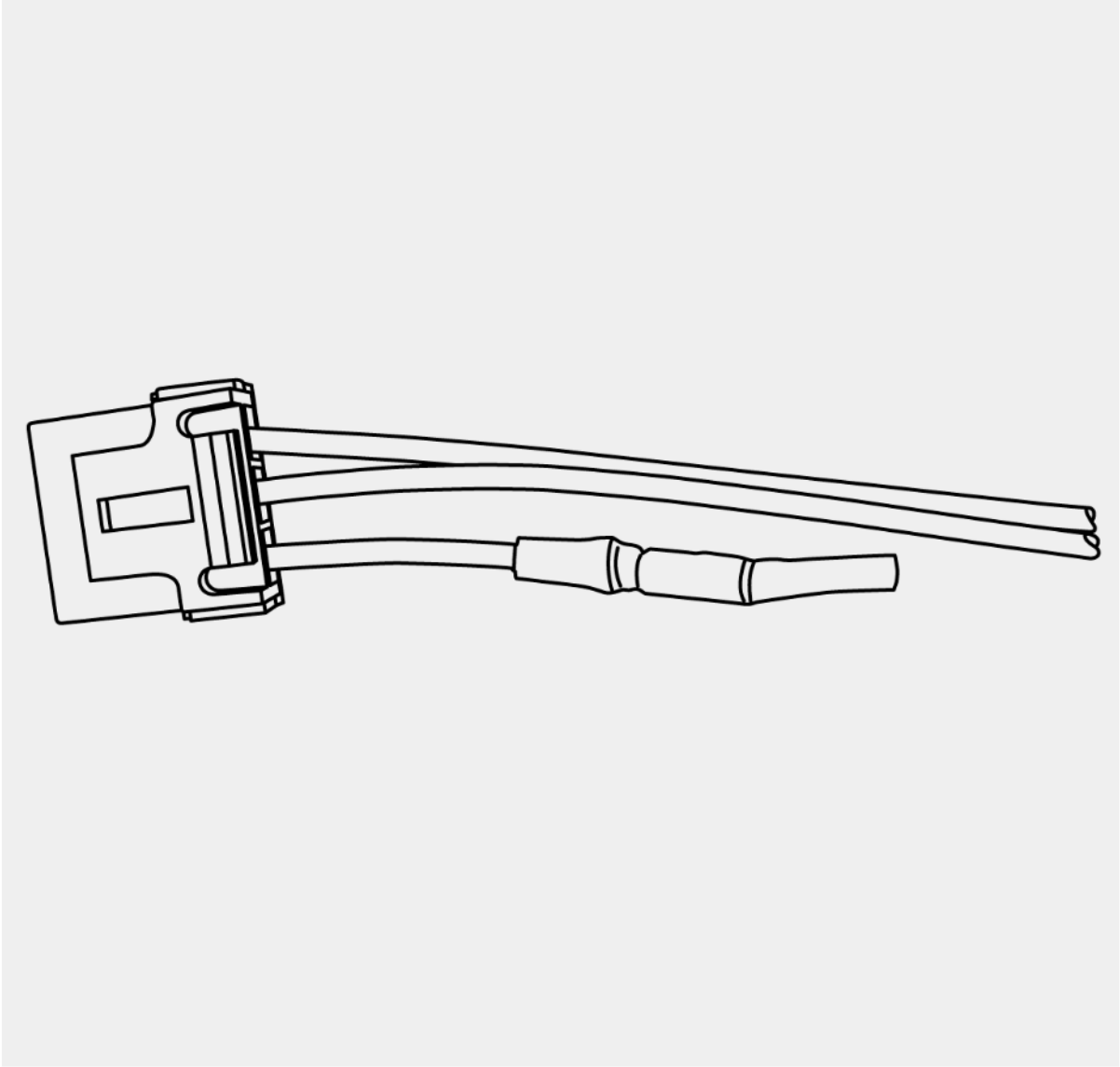


Fig. 7: Heat To Crimped Area Of Barrel
Courtesy of GENERAL MOTORS COMPANY

4. Start in the middle and gradually move the heat barrel to the open ends of the tubing:
    - The tubing will shrink completely as the heat is moved along the insulation.
    - A small amount of sealant will come out of the end of the tubing when sufficient shrinkage is achieved.

cardiagn.com

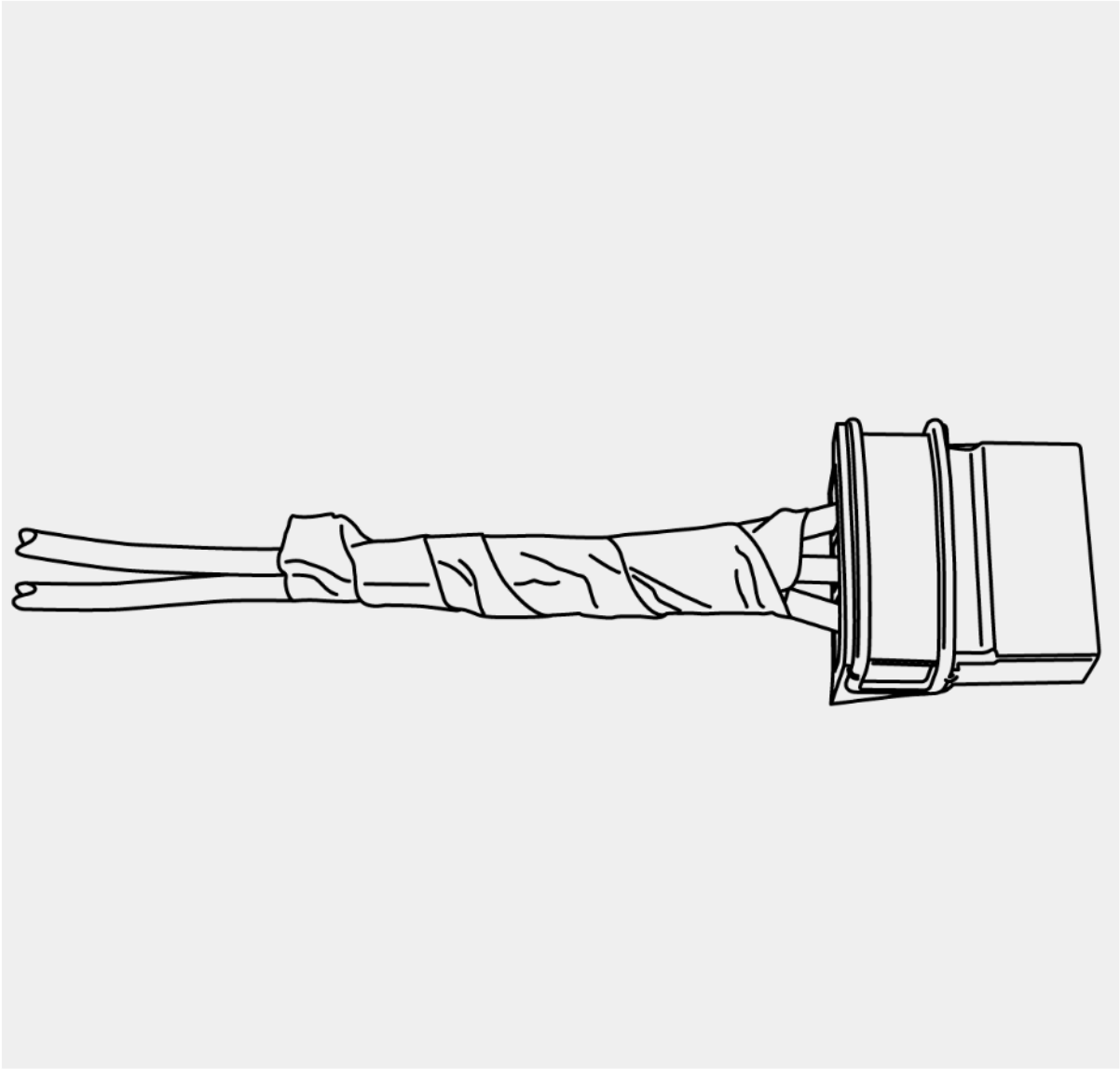


Fig. 8: Taping Extra Terminated Leads Back Into Harness
Courtesy of GENERAL MOTORS COMPANY

5. Tape the extra terminated lead(s) back into the harness.

High Temperature Wiring Repairs

Use the following procedures to perform high temperature wiring repairs:

1. Center the high temperature SCT1 shrink tube over the DuraSeal splice sleeve.
2. Using the heat torch, apply heat to the high temperature heat shrink tubing.
3. Gradually move the heat from the center to the open end of the tubing:
    - The tubing will shrink completely as the heat is moved along the insulation.
    - A small amount of sealant will come out of the end of the tubing when sufficient shrinkage is achieved.
4. Replace any reflective tape and clips that may have been removed during the repair.

CONNECTOR RECONNECTION - LIGHTING

cardiagn.com

Special Tools

EL-35616 Terminal Test Probe Kit

For equivalent regional tools, refer to **Special Tools** .

When the condition is not currently present, but is indicated in DTC history, the cause may be intermittent. An intermittent may also be the cause when there is a customer complaint, but the symptom cannot be duplicated. Refer to the Symptom Table of the system that is suspect of causing the condition before trying to locate an intermittent condition.

Most intermittent conditions are caused by faulty electrical connections or wiring. Inspect for the following items:

- Loose, corroded, or painted terminal stud/fastener
- Wiring broken inside the insulation
- Poor connection between the male and female terminal at a connector
- A terminal not seated all the way into the connector body
- Poor terminal to wire connection - Some conditions which fall under this description are poor crimps, poor solder joints, crimping over the wire insulation rather than the wire itself, and corrosion in the wire to terminal contact area, etc.
- Pierced or damaged insulation can allow moisture to enter the wiring causing corrosion. The conductor can corrode inside the insulation, with little visible evidence. Look for swollen and stiff sections of wire in the suspect circuits.
- Wiring which has been pinched, cut, or its insulation rubbed through may cause an intermittent open or short as the bare area touches other wiring or parts of the vehicle.
- Wiring that comes in contact with hot or exhaust components
- Refer to **Inducing Intermittent Fault Conditions** in order to duplicate the conditions required, in order to verify the customer concern.
- Refer to **Testing for Electrical Intermittents** for test procedures to detect intermittent open, high resistance, short to ground, and short to voltage conditions.
- Refer to **Scan Tool Snapshot Procedure** for advanced intermittent diagnosis and Vehicle Data Recorder operation.

Testing for Terminal Fretting

Some intermittent conditions can be caused by wire terminal fretting corrosion. Fretting corrosion is a build-up of insulating, oxidized wear debris that can form when there is a small motion between electrical contacts. The oxidized wear debris can pile up enough at the electrical contact spots that the electrical resistance across the connection increases. Movement between the contacting surfaces as small as 10 to 100 microns can cause fretting. To put this in perspective, a sheet of paper is about 100 microns thick, so fretting motion is small and hard to see. Vibration and thermal expansion/contraction are the main sources that create fretting motion. Since vehicles vibrate and can experience large temperature swings, they are a good source for fretting motion. Tin, copper, nickel, and iron surfaces are all susceptible to fretting corrosion. Fretting corrosion can be difficult to see but it looks like small, dark smudges on the terminals contact surface.

To correct a fretting condition disconnect the suspect connector and add dielectric grease / lubricant (Nyogel 760G or equivalent, meeting GM specification 9986087) to both sides of the connector terminals. Then reconnect the connector and wipe away any excess lubricant. This will correct the additional terminal contact resistance due to the terminal fretting corrosion.

cardiagn.com

Testing for Proper Terminal Contact

It is important to test terminal contact at the component and any inline connectors before replacing a suspect component. Mating terminals must be inspected to ensure good terminal contact. A poor connection between the male and female terminal at a connector may be the result of contamination or deformation.

Contamination may be caused by the connector halves being improperly connected. A missing or damaged connector seal, damage to the connector itself, or exposing the terminals to moisture and dirt can also cause contamination. Contamination, usually in the underhood or underbody connectors, leads to terminal corrosion, causing an open circuit or intermittently open circuit.

Deformation is caused by probing the mating side of a connector terminal without the proper adapter. Always use the **EL-35616** kit when probing connectors. Other causes of terminal deformation are improperly joining the connector halves, or repeatedly separating and joining the connector halves. Deformation, usually to the female terminal contact tang, can result in poor terminal contact causing an open or intermittently open circuit.

Testing for Proper Terminal Contact in Bussed Electrical Centers

It is very important to use the correct test adapter when testing for proper terminal contact of fuses and relays in a bussed electrical center. Use the **EL-35616** kit to test for proper terminal contact. Failure to use the **EL-35616** kit can result in improper diagnosis of the bussed electrical center.

Follow the procedure below in order to test terminal contact:

1. Separate the connector halves.
2. Visually inspect the connector halves for contamination. Contamination may result in a white or green build-up within the connector body or between terminals. This causes high terminal resistance, intermittent contact, or an open circuit. An underhood or underbody connector that shows signs of contamination should be replaced in its entirety: terminals, seals, and connector body.
3. Using an equivalent male terminal/terminated lead, verify that the retention force is significantly different between a known good terminal and the suspect terminal. Replace the female terminal in question.

Flat Wire Connectors

There are no serviceable parts for flat wire connectors on the harness side or the component side.

Follow the procedure below in order to test terminal contact:

1. Remove the component in question.
2. Visually inspect each side of the connector for signs of contamination. Avoid touching either side of the connector as oil from your skin may be a source of contamination as well.
3. Visually inspect the terminal bearing surfaces of the flat wire circuits for splits, cracks, or other imperfections that could cause poor terminal contact. Visually inspect the component side connector to ensure that all of the terminals are uniform and free of damage or deformation.
4. Insert the appropriate adapter into the flat wire harness connector in order to test the circuit in question.

Control Module/Component Voltage and Grounds

Poor voltage or ground connections can cause widely varying symptoms.

- Test all control module voltage supply circuits. Many vehicles have multiple circuits supplying voltage to a control module. Other components in the system may have separate voltage supply circuits that may

cardiagn.com

also need to be tested. Inspect connections at the module/component connectors, fuses, and any intermediate connections between the voltage source and the module/component. A test lamp or a DMM may indicate that voltage is present, but neither tests the ability of the circuit to carry sufficient current. Operate the component to test the ability of the circuit to carry sufficient current. Refer to **Circuit Testing** , and **Power Distribution Schematics (1500)** **Power Distribution Schematics ((2500/3500))** .

- Test all control module ground and system ground circuits. The control module may have multiple ground circuits. Other components in the system may have separate grounds that may also need to be tested. Inspect grounds for clean and tight connections at the grounding point (screw or stud). Inspect the connections at the component and in splice packs, where applicable. Operate the component to test the ability of the circuit to carry sufficient current. Refer to **Circuit Testing** , and **Ground Distribution Schematics (1500)** **Ground Distribution Schematics ((2500/3500))** .

Temperature Sensitivity

- An intermittent condition may occur when a component/connection reaches normal operating temperature. The condition may occur only when the component/connection is cold, or only when the component/connection is hot.
- Freeze Frame, Failure Records, Snapshot, or Vehicle Data Recorder data may help with this type of intermittent condition, where applicable.
- If the intermittent is related to heat, review the data for a relationship with the following:
  - High ambient temperatures
  - Underhood/engine generated heat
  - Circuit generated heat due to a poor connection, or high electrical load
  - Higher than normal load conditions, towing, etc.
- If the intermittent is related to cold, review the data for the following:
  - Low ambient temperatures - In extremely low temperatures, ice may form in a connection or component. Inspect for water intrusion.
  - The condition only occurs on a cold start.
  - The condition goes away when the vehicle warms up.
- Information from the customer may help to determine if the trouble follows a pattern that is temperature related.
- If temperature is suspected of causing an intermittent fault condition, attempt to duplicate the condition. Refer to **Inducing Intermittent Fault Conditions** in order to duplicate the conditions required.

Electromagnetic Interference and Electrical Noise

Some electrical components/circuits are sensitive to electromagnetic interference or other types of electrical noise. Inspect for the following conditions:

- A mis-routed harness that is too close to high voltage/high current devices such as secondary ignition components, motors, generator etc. - These components may induce electrical noise on a circuit that could interfere with normal circuit operation.
- Electrical system interference caused by a malfunctioning relay, or a control module driven solenoid or switch - These conditions can cause a sharp electrical surge. Normally, the condition will occur when the malfunctioning component is operating.
- Installation of non-factory or aftermarket add on accessories such as lights, 2-way radios, amplifiers, electric motors, remote starters, alarm systems, cell phones, etc. - These accessories may create interference in other circuits while operating and the interference would disappear when the accessory is

cardiagn.com

not operating. Refer to **Checking Aftermarket Accessories** .

- Test for an open diode across the A/C compressor clutch and for other open diodes. Some relays may contain a clamping diode.
- The generator may be allowing AC noise into the electrical system.

Incorrect Control Module

- There are only a few situations where reprogramming a control module is appropriate:
  - A new service control module is installed.
  - A control module from another vehicle is installed.
  - Revised software/calibration files have been released for this vehicle.

NOTE: **DO NOT re-program the control module with the SAME software/calibration files that are already present in the control module. This is not an effective repair for any type of concern.**

- Verify that the control module contains the correct software/calibration. If incorrect programming is found, reprogram the control module with the most current software/calibration. Refer to **Control Module References** for replacement, setup, and programming.

BRAKE PEDAL POSITION SENSOR CALIBRATION

NOTE: **Brake system does not use a brake switch, stoplight switch or brakelight switch. System uses a Brake Pedal Position Sensor to control these functions.**

Calibration Criteria

NOTE: **Do not apply the brake pedal during the brake pedal position sensor calibration procedure. Any movement of the brake pedal during this procedure will cause the calibration procedure to fail. If this occurs, the brake pedal position sensor calibration must be repeated.**

Brake pedal position sensor calibration must be performed after the brake pedal position sensor, body control module (BCM), engine control module (ECM), or hybrid powertrain control module have been serviced. The calibration procedure will set the brake pedal position sensor home value. This value is used by the BCM and ECM/HPCM to determine the action of the driver applying the brake system and to provide this information to the vehicle subsystems via serial data.

Calibration Procedure

1. Apply the parking brake.
2. Ignition ON, engine OFF, place the transmission in the PARK position for automatic transmission or NEUTRAL position for manual transmission.
3. Install a scan tool.
4. Clear all DTCs before proceeding.
5. Navigate to the Configuration/Reset Functions menu of the BCM.
6. Select the Brake Pedal Position Sensor Learn procedure and follow the directions displayed on the screen.
7. Navigate to the Configuration/Reset Functions menu of the ECM/HPCM.
8. Select the Learn Functions menu.

cardiagn.com

9. Select the Brake Pedal Position Sensor Learn procedure and follow the directions displayed on the screen.

BRAKE PEDAL POSITION SENSOR REPLACEMENT

NOTE: **Brake system does not use a brake switch, stoplight switch or brakelight switch. System uses a Brake Pedal Position Sensor to control these functions.**

Removal Procedure

1. Place the ignition switch in the OFF position.
2. Disconnect the steering column wiring harness electrical connector and position the harness aside.
3. Disconnect the brake pedal position sensor electrical connector.

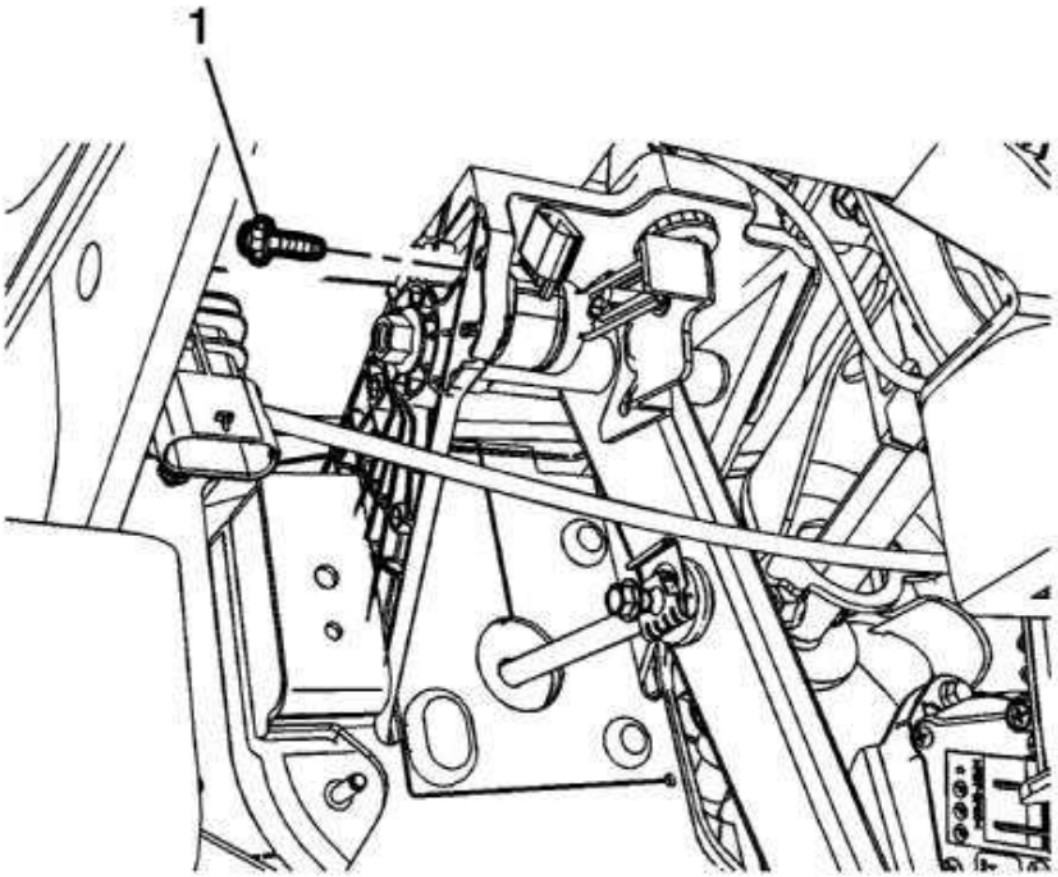


Fig. 9: Brake Pedal Position Sensor Bolt
Courtesy of GENERAL MOTORS COMPANY

4. Remove the brake pedal position sensor bolt (1).

cardiagn.com



Fig. 10: Brake Pedal Position Sensor
Courtesy of GENERAL MOTORS COMPANY

5. Remove the brake pedal position sensor (1).

Installation Procedure

cardiagn.com



Fig. 11: Brake Pedal Position Sensor
Courtesy of GENERAL MOTORS COMPANY

1. Install the brake pedal position sensor (1).

cardiagn.com

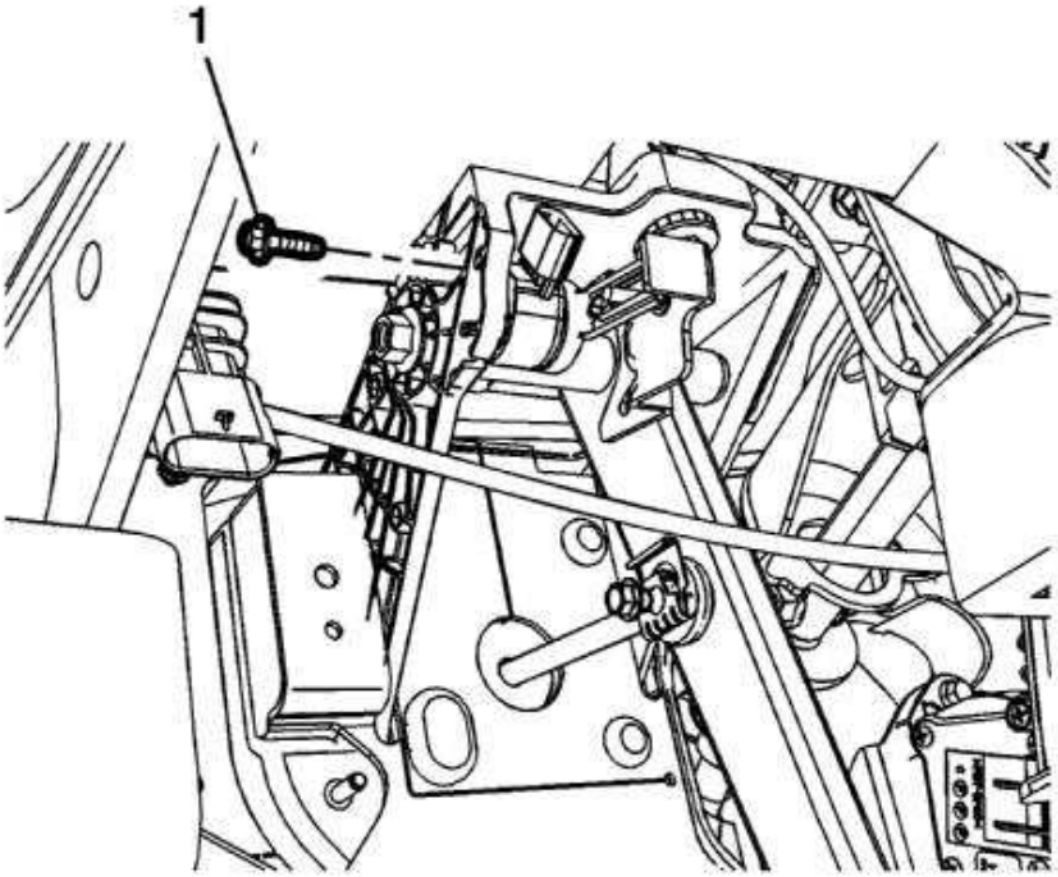


Fig. 12: Brake Pedal Position Sensor Bolt
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to Fastener Caution .

2. Install the brake pedal position sensor bolt (1).
3. Connect the brake pedal position sensor electrical connector.
4. Reposition the steering column wiring harness and connect the electrical connector.
5. Calibrate the brake pedal position sensor. Refer to **Brake Pedal Position Sensor Calibration**.

HEADLAMP SWITCH REPLACEMENT

cardiagn.com

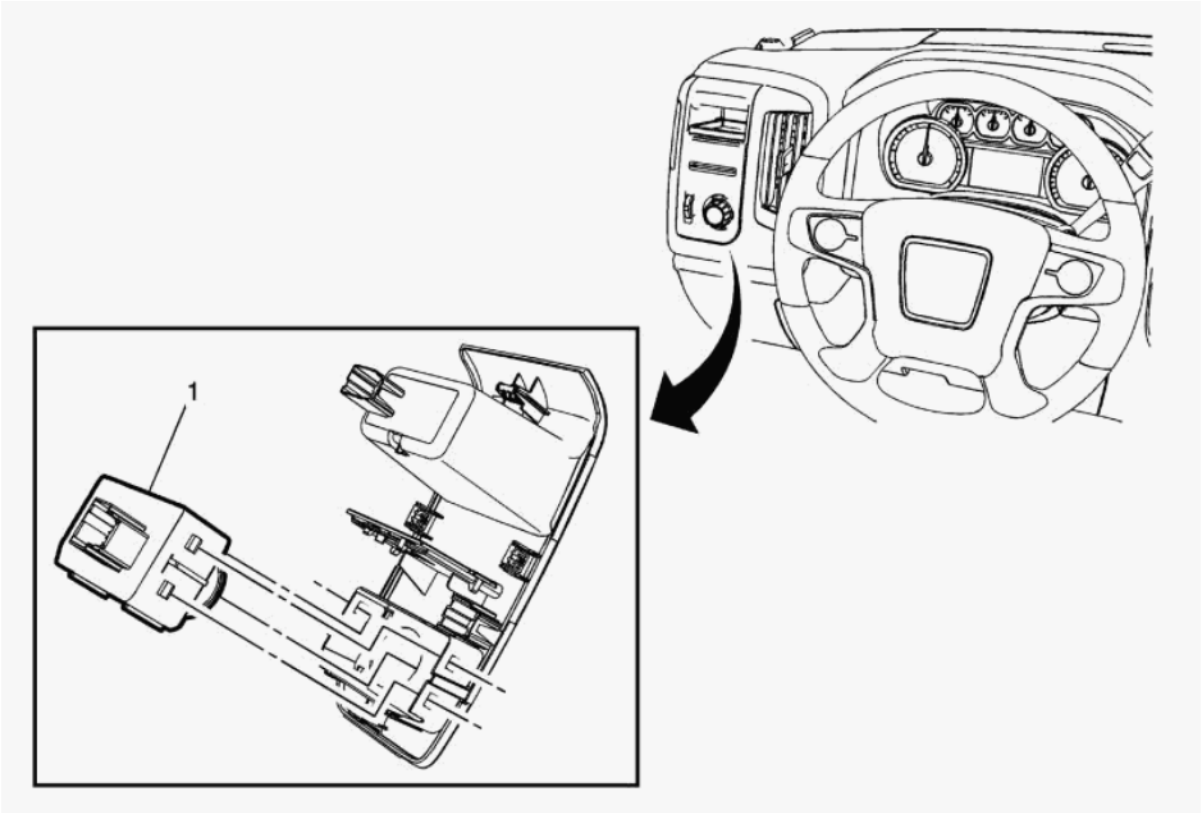


Fig. 13: Headlamp Switch
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove instrument panel center trim plate applique. Refer to **Instrument Panel Center Trim Plate Applique Replacement** .	
1	Headlamp Switch **Procedure** Using the appropriate tool gently depress tabs to remove the switch assembly from the instrument panel applique.

INTERIOR LAMP SWITCH REPLACEMENT

cardiagn.com

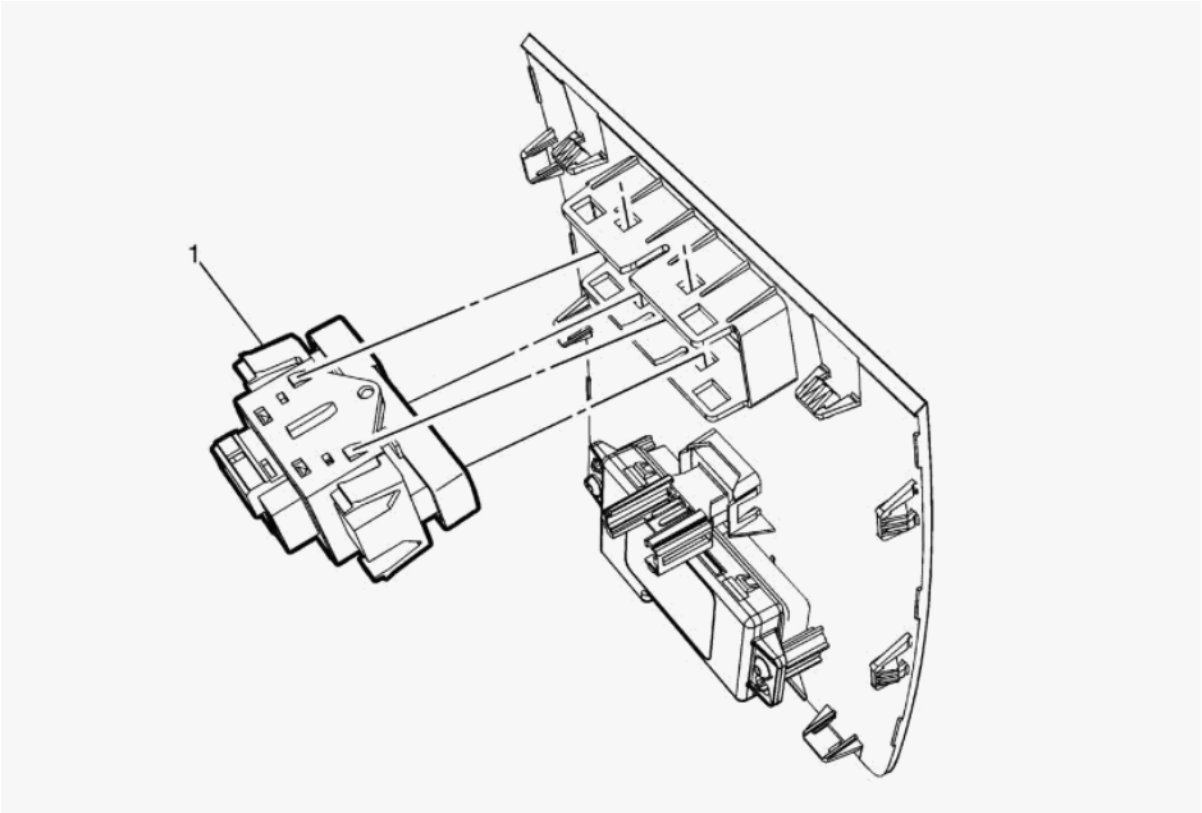


Fig. 14: Interior Lamp Switch
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the roof console opening trim plate. Refer to **Roof Console Opening Trim Plate Replacement** .	
1	Interior Lamp Switch **Procedure** Release the tabs and remove the switch.

EMERGENCY VEHICLE ROOF LAMP SWITCH REPLACEMENT

cardiagn.com

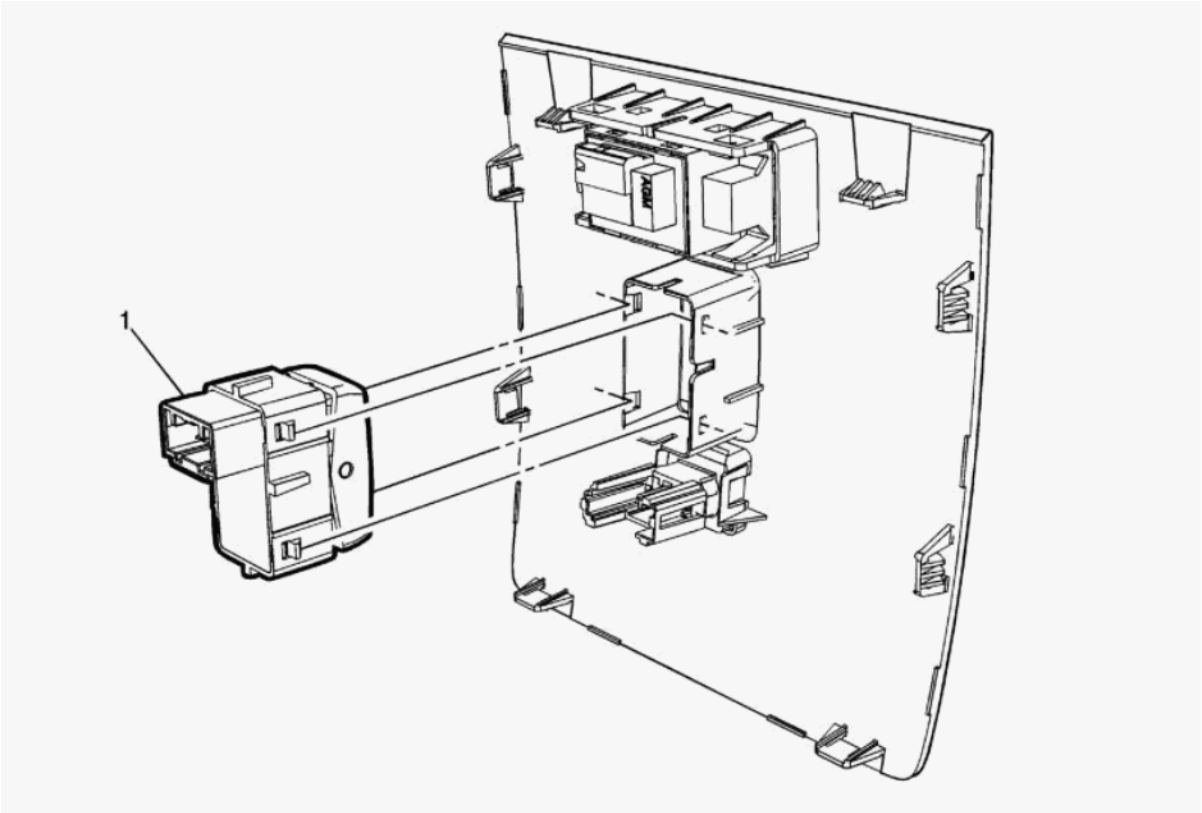


Fig. 15: Emergency Vehicle Roof Lamp Switch
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the roof console opening trim plate. Refer to **Roof Console Opening Trim Plate Replacement** .	
1	Emergency Vehicle Lamp Switch **Procedure** Release the tabs and remove the switch.

READING LAMP SWITCH PUSHBUTTON REPLACEMENT

cardiagn.com

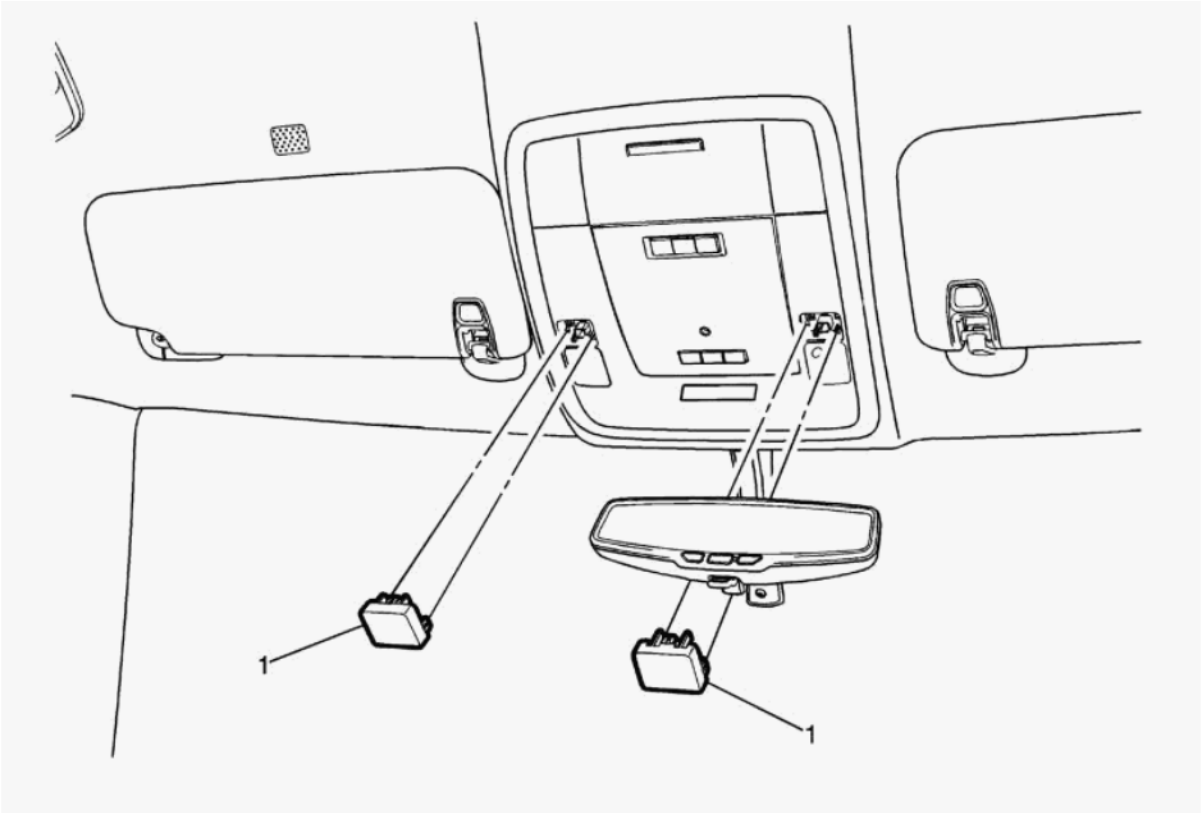


Fig. 16: Reading Lamp Switch Pushbutton (Front)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Reading Lamp Switch Pushbutton **Procedure** Using the appropriate tool, carefully release the retainers securing the switch to the roof console.

CENTER READING AND COURTESY LAMP REPLACEMENT

cardiagn.com

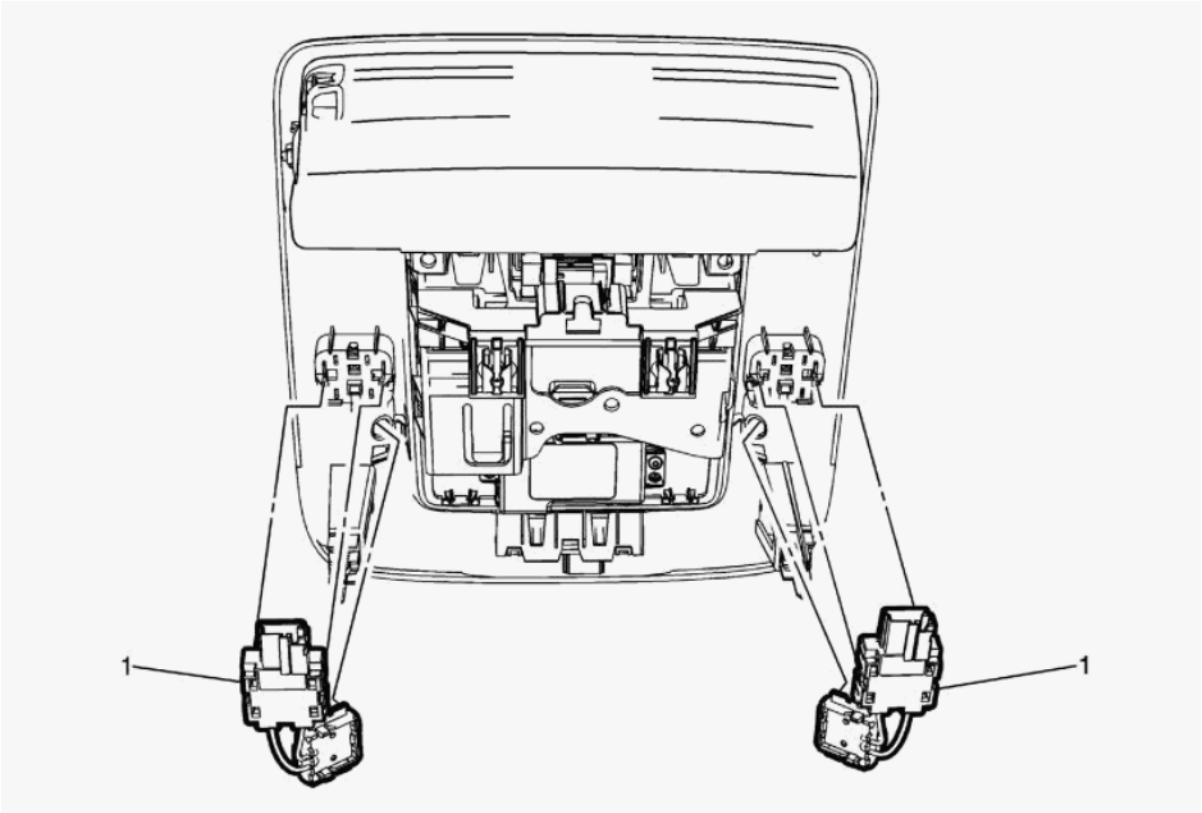


Fig. 17: Center Reading and Courtesy Lamp (Front)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the roof console. Refer to **Roof Console Replacement** .	
1	Center Reading and Courtesy Lamp (Qty : 2) **Procedure** Depress the tabs on the lamp and the switch and gently remove from the console.

OUTSIDE REARVIEW MIRROR COURTESY LAMP REPLACEMENT

cardiagn.com

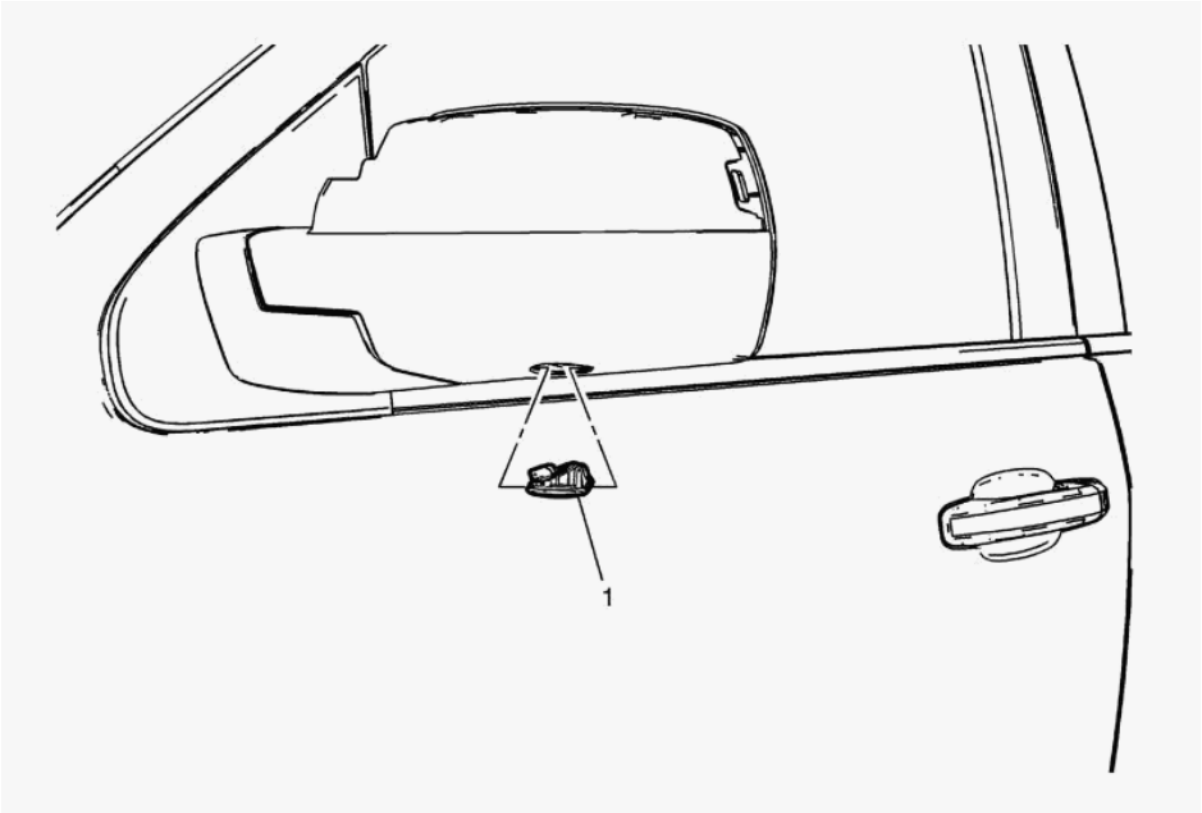


Fig. 18: Outside Rearview Mirror Courtesy Lamp
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Outside Rearview Mirror Courtesy Lamp **Procedure** 1. Use the appropriate tool to gently remove the lamp starting at end furthest from the door. Tilt lamp end and pull down to release. 2. Disconnect electrical connector.

FRONT FLOOR CONSOLE FLOOD LAMP REPLACEMENT

cardiagn.com

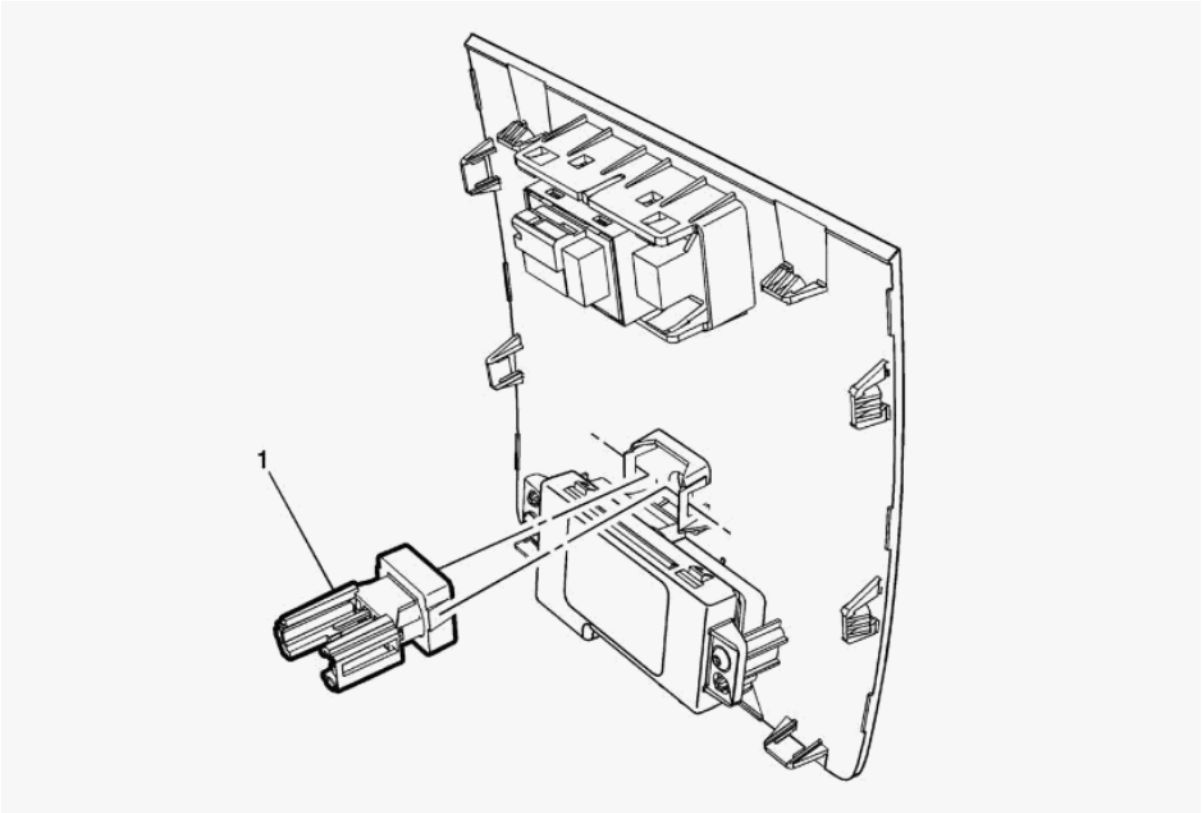


Fig. 19: Front Floor Console Flood Lamp
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the roof console opening trim plate. Refer to **Roof Console Opening Trim Plate Replacement** .	
1	Front Floor Console Flood Lamp **Procedure** Release the tabs to remove the lamp.

FRONT FLOOR CONSOLE COMPARTMENT LAMP SWITCH REPLACEMENT

cardiagn.com

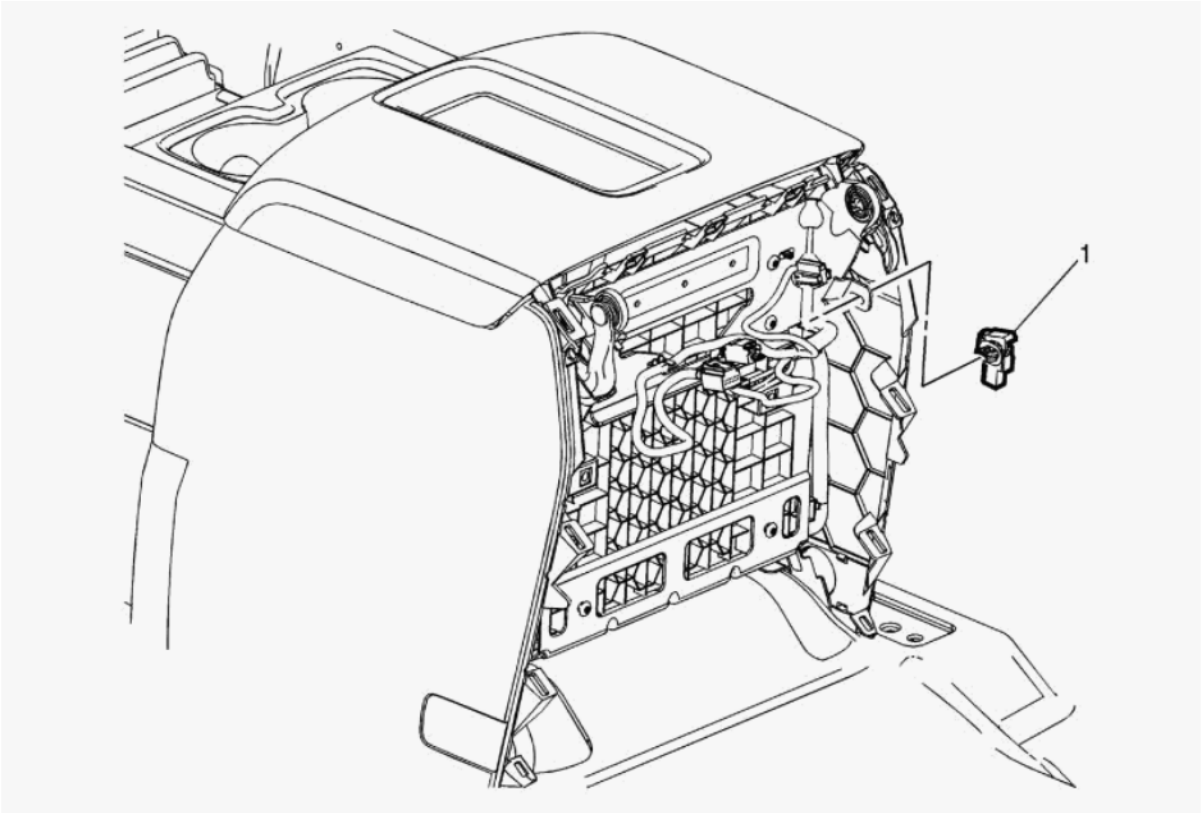


Fig. 20: Front Floor Console Compartment Lamp Switch
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the front floor console rear trim panel. Refer to **Front Floor Console Rear Trim Panel Replacement** .	
1	Front Floor Console Compartment Lamp Switch **Procedure** 1. Gently unclip lamp from bracket. 2. Disconnect the electrical connector.

FRONT SIDE DOOR INSIDE HANDLE ILLUMINATION LAMP REPLACEMENT

cardiagn.com

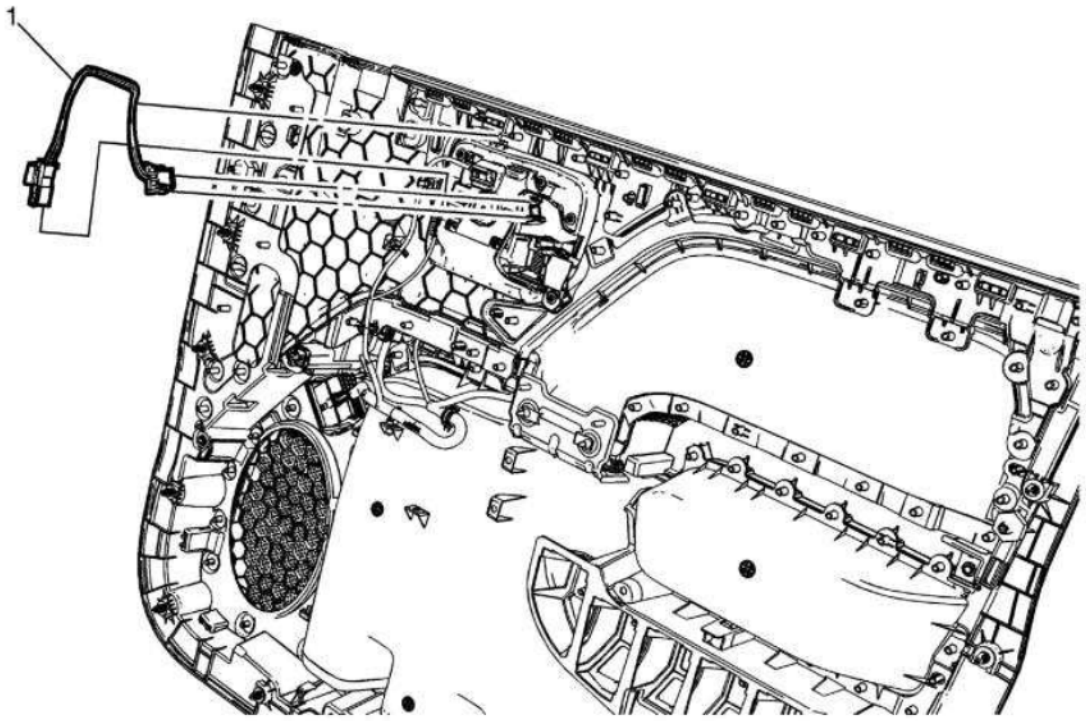


Fig. 21: Front Side Door Inside Handle Illumination Lamp (Chevrolet / GMC)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the front side door trim. Refer to **Front Side Door Trim Replacement (With A31)** **Front Side Door Trim Replacement (Without A31)** .	
1	Front Side Door Inside Handle Illumination Lamp **Procedure** 1. Disconnect the electrical connectors. 2. Unsnap lamp assembly from trim panel tabs.

REAR SEAT POSITION CENTER READING AND COURTESY LAMP REPLACEMENT

cardiagn.com

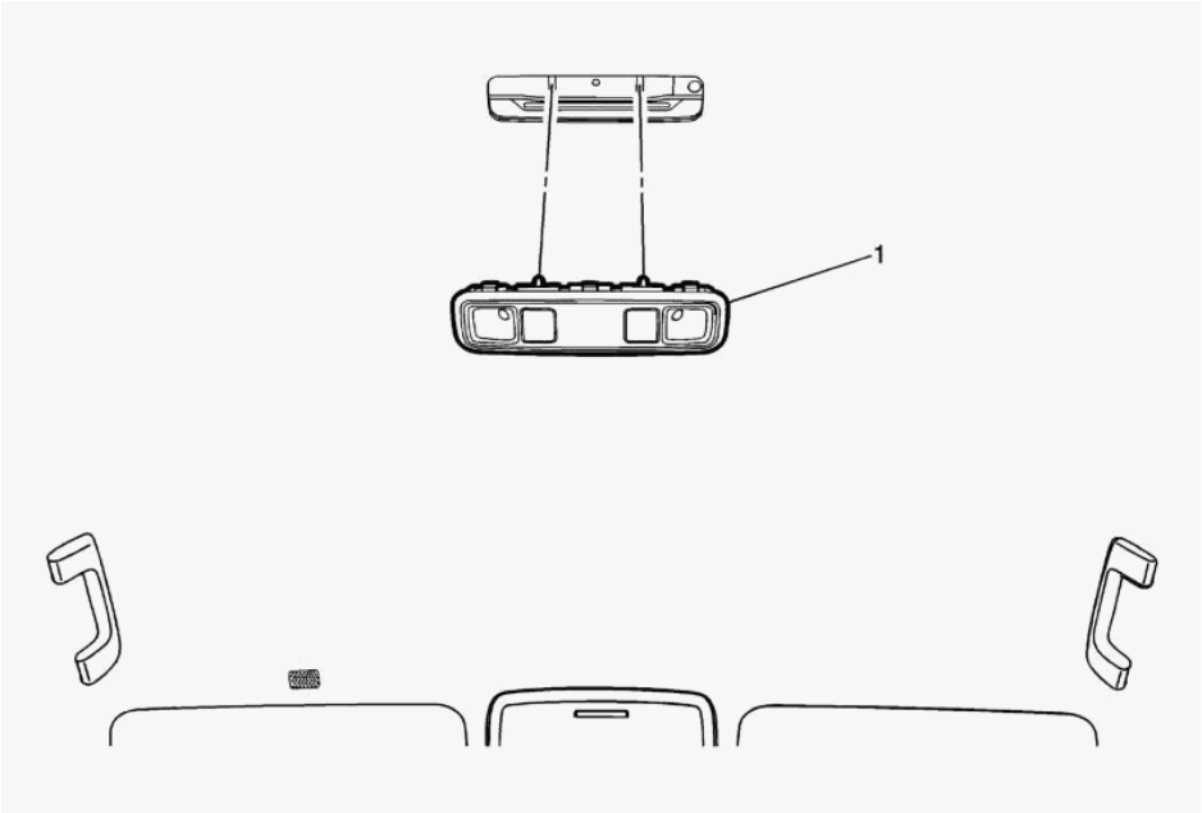


Fig. 22: Rear Seat Position Center Reading and Courtesy Lamp
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Rear Seat Position Center Reading and Courtesy Lamp **Procedures** 1. Grasp the reading and courtesy lamp assembly and pull downward to release the retainer clips securing the assembly to the headliner and the roof panel sheet metal bow. **NOTE:** **There are two retainers that secure the lamp to the roof panel sheet metal bow and three metal tension tabs that secure the lamp to the headliner.**

cardiagn.com

Callout	Component Name
	2. Disconnect the electrical connections.

HEADLAMP REPLACEMENT (GMC 1500)

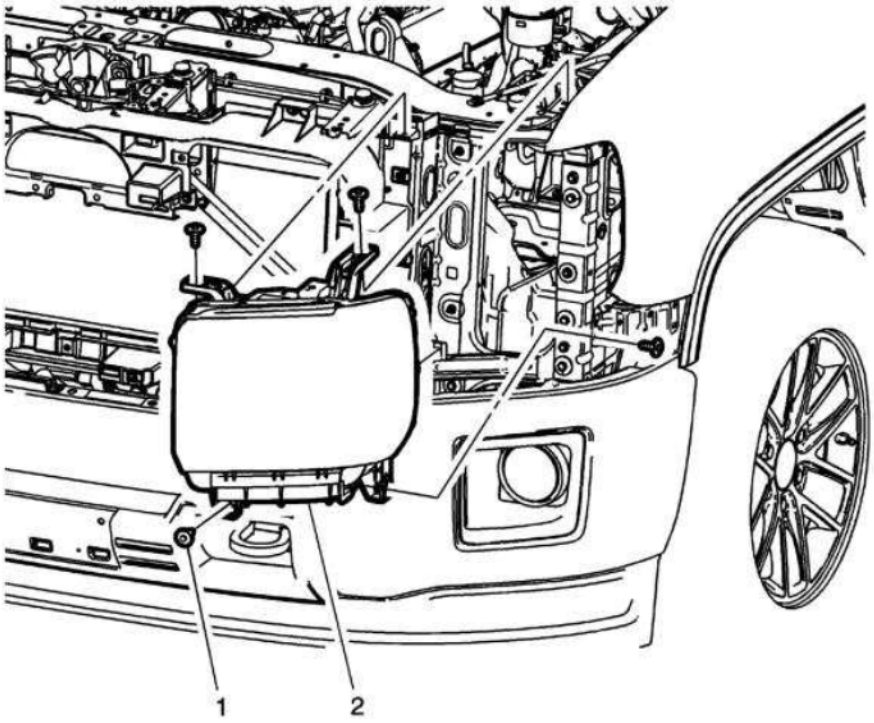


Fig. 23: Headlamp (GMC 1500)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove front grille. Refer to **Front Grille Replacement (GMC)** .	
1	Headlamp Screw (Qty: 4) **CAUTION:** **Refer to** **Fastener Caution** . **Tighten** 6 N.m (53 lb in)
2	Headlamp (GMC) **WARNING:**

cardiagn.com

Callout	Component Name
	Refer to Halogen Bulb Warning . **Procedure** Disconnect the electrical connector and remove the headlamp from the vehicle.

HEADLAMP REPLACEMENT (CHEVROLET 1500 - LEFT SIDE)

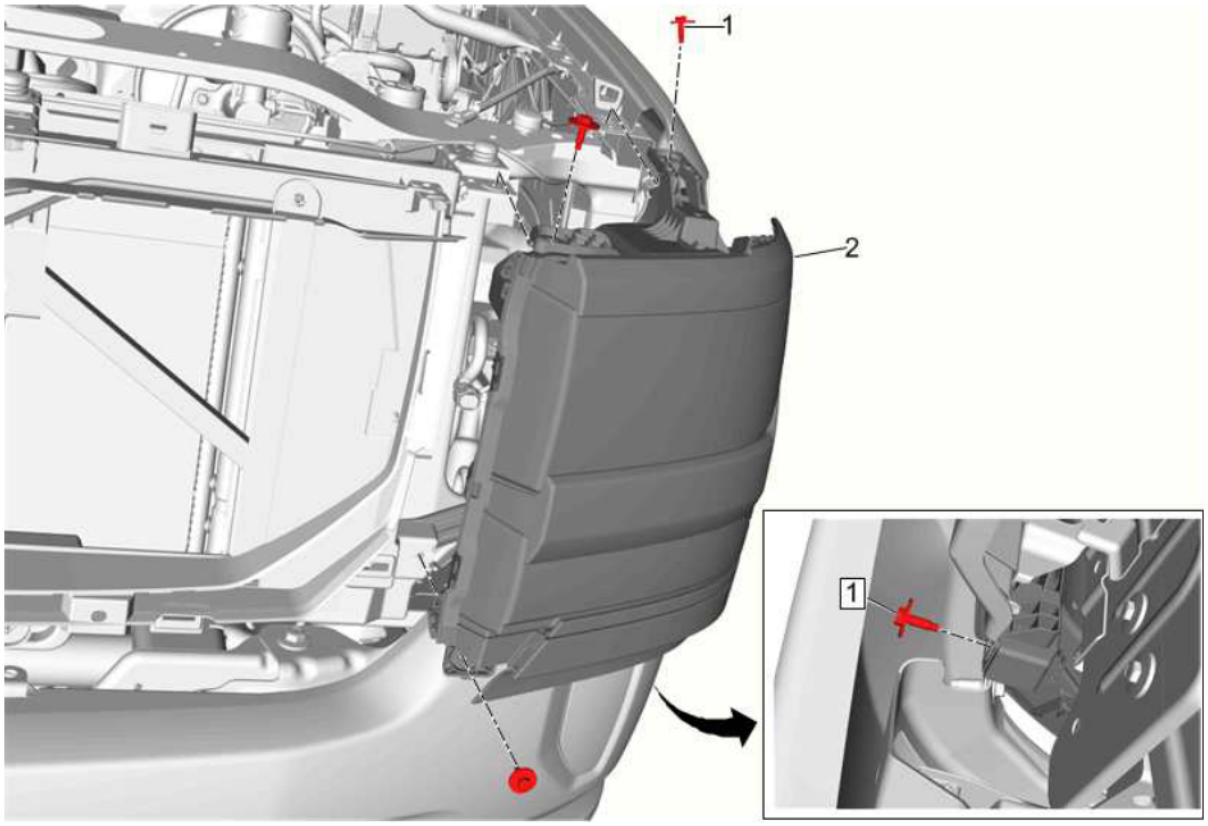


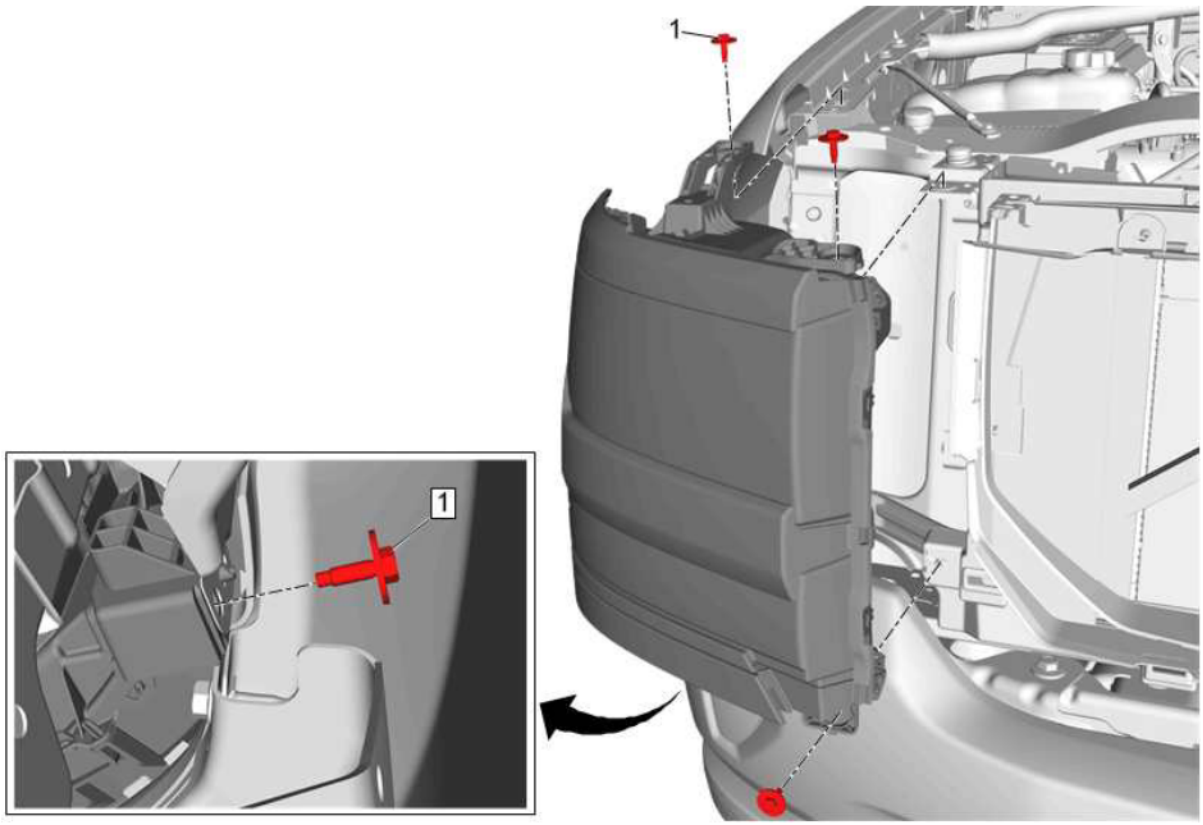
Fig. 24: Headlamp (Chevrolet 1500 - Left Side)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures 1. Front Grille Replacement (Chevrolet) 2. Front Wheelhouse Liner Replacement - Left Side	

cardiagn.com

Callout	Component Name
1	Headlamp Screw **CAUTION:** **Refer to** **Fastener Caution** . **Tighten** 6 N.m (53 lb in)
2	Headlamp **WARNING:** **Refer to** **Halogen Bulb Warning** . **Procedure** 1. Disconnect the electrical connector. 2. Transfer components as necessary.

HEADLAMP REPLACEMENT (CHEVROLET - RIGHT SIDE)



cardiagn.com

Fig. 25: Headlamp (Chevrolet 1500 - Right Side)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures 1. Front Grille Replacement (Chevrolet) 2. Front Wheelhouse Liner Replacement - Right Side	
1	Headlamp Screw **CAUTION:** **Refer to** Fastener Caution . **Tighten** 6 N.m (53 lb in)
2	Headlamp **WARNING:** **Refer to** Halogen Bulb Warning . **Procedure** 1. Disconnect the electrical connector. 2. Transfer components as necessary.

HEADLAMP REPLACEMENT (GMC 2500, 3500)

Removal Procedure

cardiagn.com

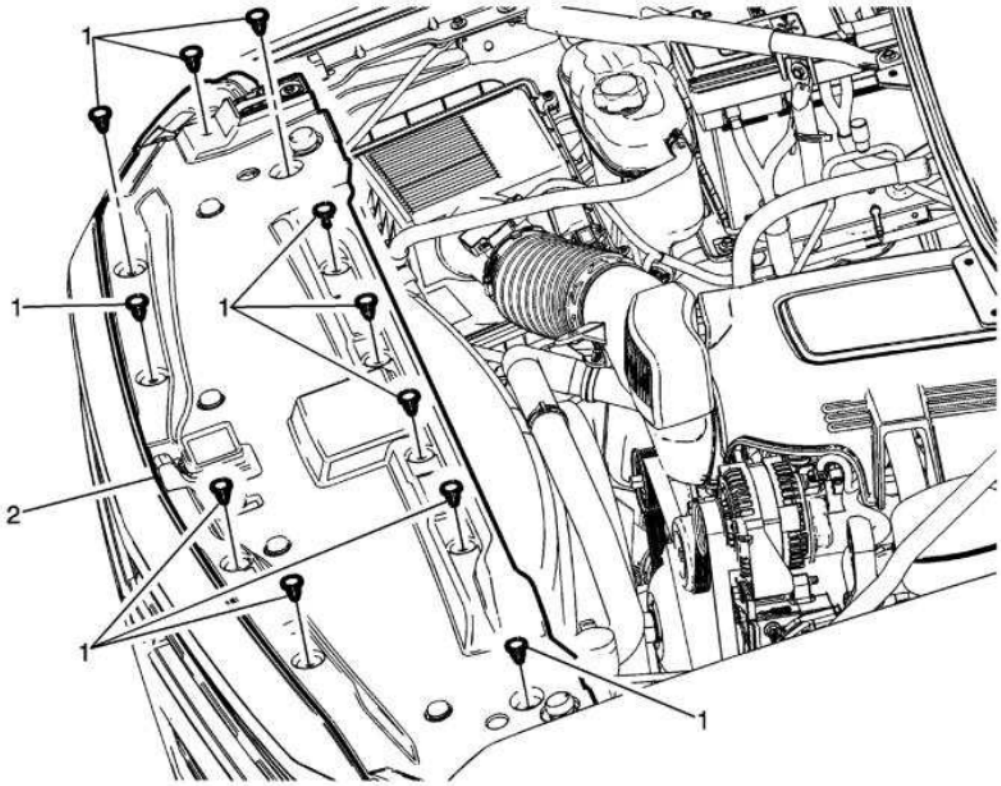


Fig. 26: Front Compartment Front Sight Shield
Courtesy of GENERAL MOTORS COMPANY

1. Front Compartment Front Sight Shield 2 - Remove - **Front Compartment Front Sight Shield Replacement**

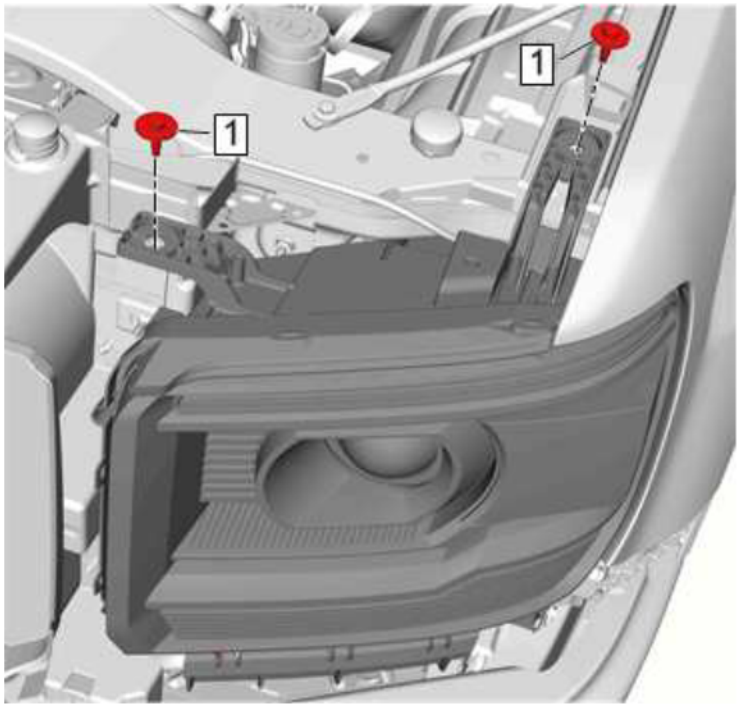


Fig. 27: Headlamp Screw
Courtesy of GENERAL MOTORS COMPANY

cardiagn.com

2. Headlamp Screw 1 - Remove

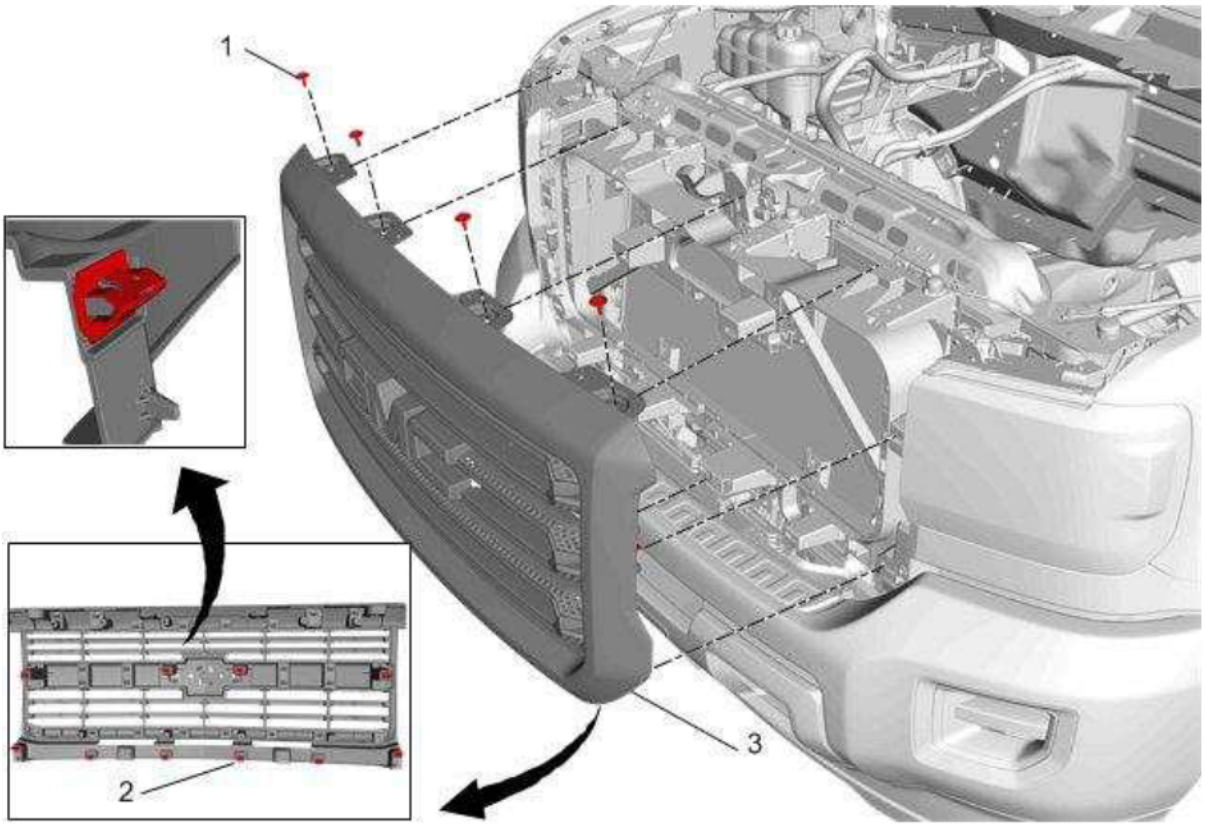
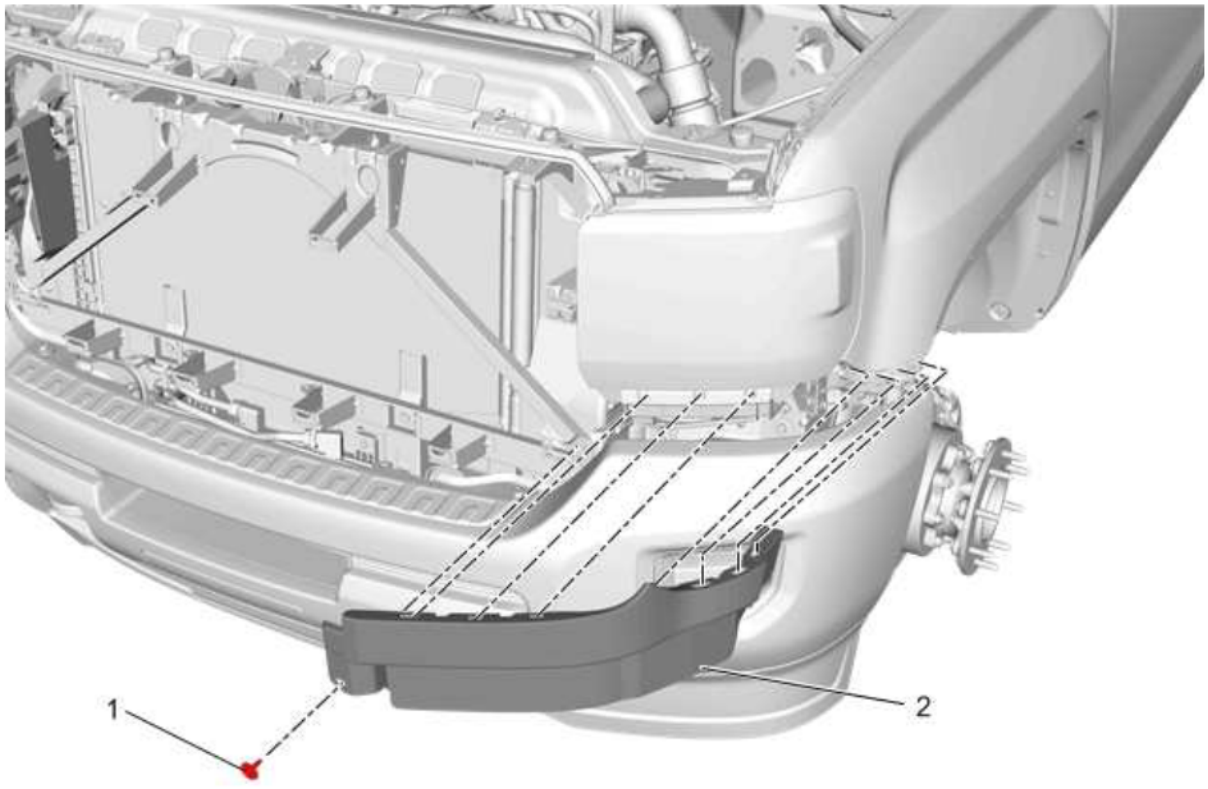


Fig. 28: Front Grille (GMC 2500 3500)
Courtesy of GENERAL MOTORS COMPANY

3. Front Grille 2 - Remove - **Front Grille Replacement (GMC 2500 3500)**



cardiagn.com

Fig. 29: Front Bumper Outer Filler (GMC 2500, 3500)
Courtesy of GENERAL MOTORS COMPANY

4. Front Bumper Outer Filler 2 - Remove - **Front Bumper Outer Filler Replacement (GMC 2500, 3500)**

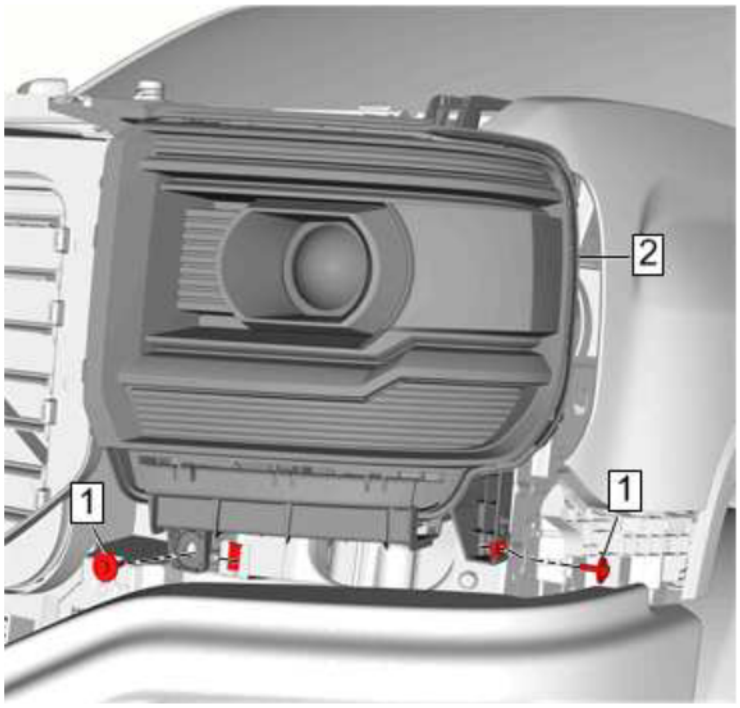


Fig. 30: Headlamp
Courtesy of GENERAL MOTORS COMPANY

5. Headlamp Screw 1 - Remove
6. Headlamp 2 - Remove
7. Transfer components as necessary.

Installation Procedure

cardiagn.com

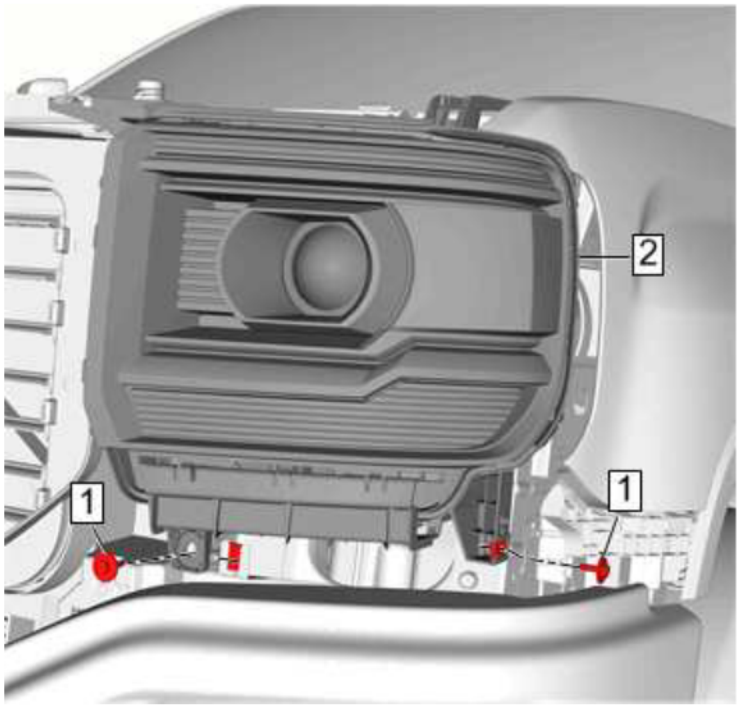
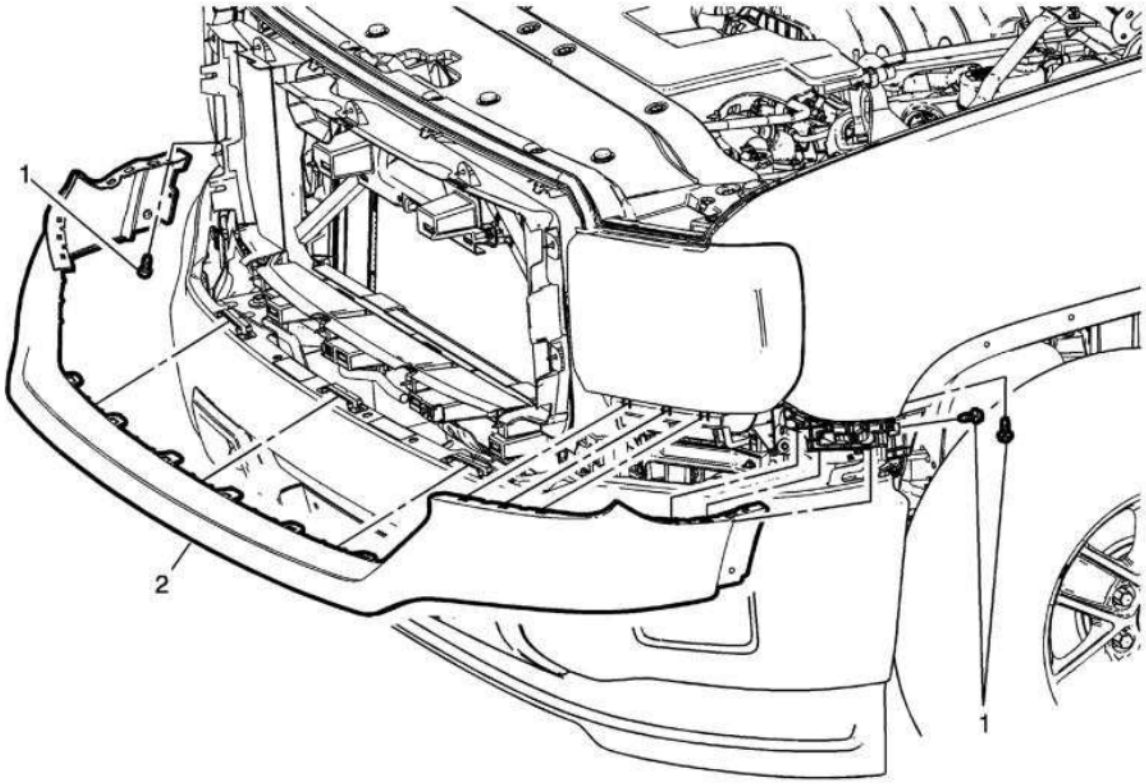


Fig. 31: Headlamp
Courtesy of GENERAL MOTORS COMPANY

1. Headlamp 2 - Install

CAUTION: **Refer to Fastener Caution .**

2. Headlamp Screw 1 - Install and tighten 6 N.m (53 lb in)



cardiagn.com

Fig. 32: Front Bumper Fascia Trim Cap (GMC)
Courtesy of GENERAL MOTORS COMPANY

3. Front Bumper Fascia Trim Cap 2 - Install - **Front Bumper Fascia Trim Cap Replacement (GMC)**

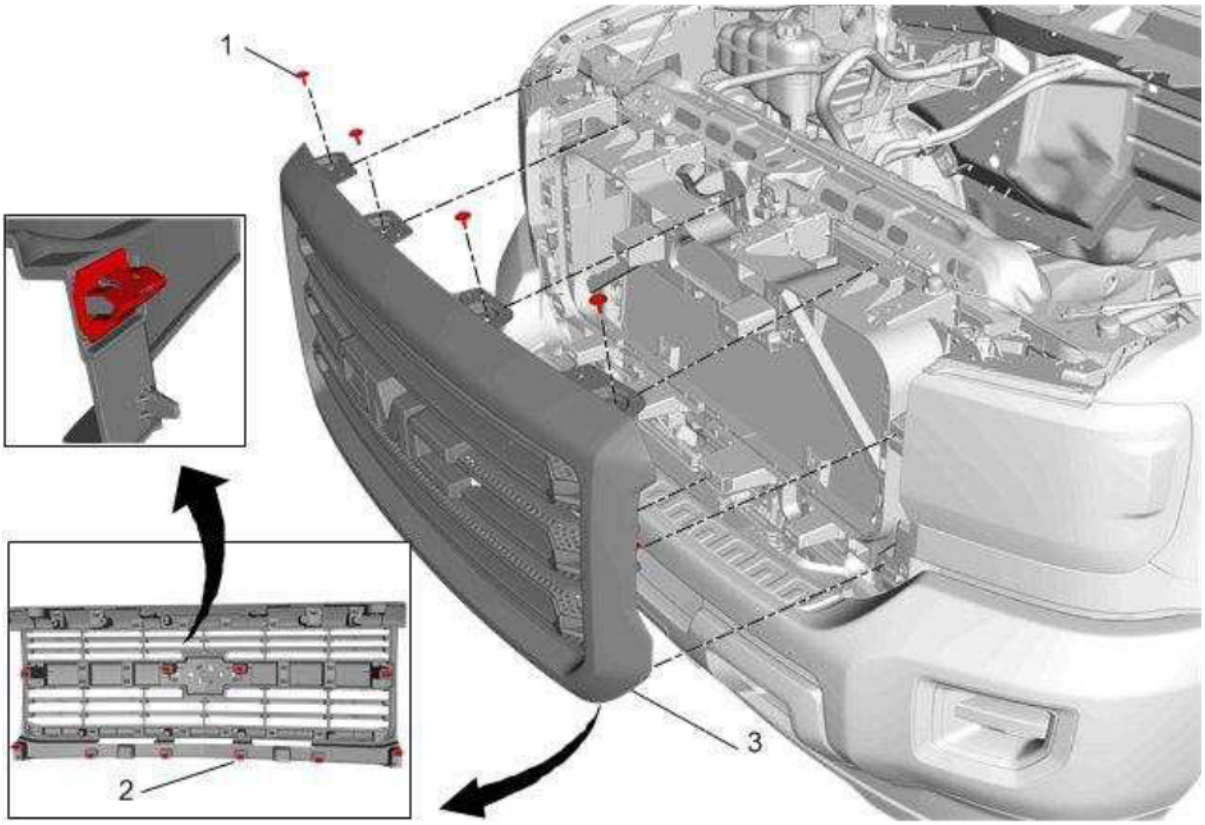
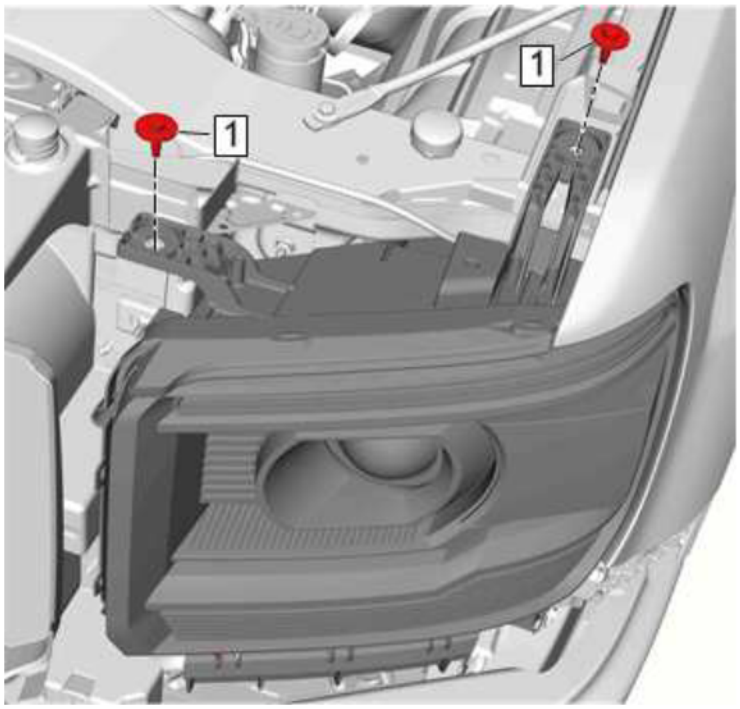


Fig. 33: Front Grille (GMC 2500 3500)
Courtesy of GENERAL MOTORS COMPANY

4. Front Grille 3 - Install - **Front Grille Replacement (GMC 2500 3500)**



cardiagn.com

Fig. 34: Headlamp Screw
Courtesy of GENERAL MOTORS COMPANY

5. Headlamp Screw 1 - Install and tighten 6 N.m (53 lb in)

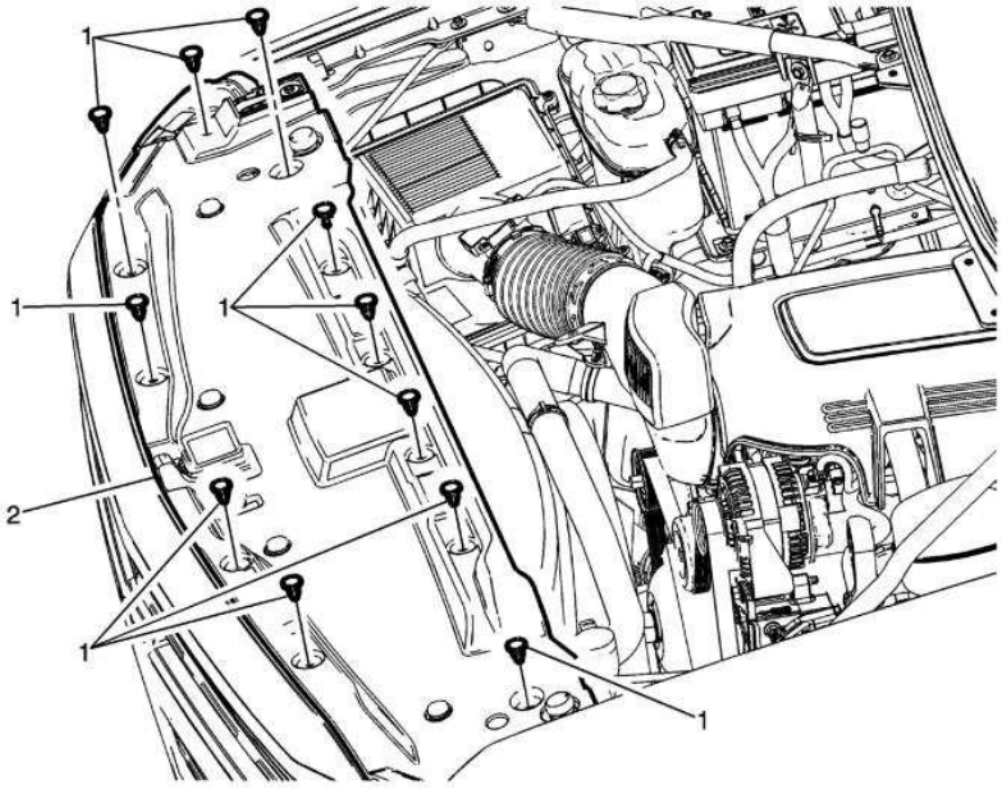


Fig. 35: Front Compartment Front Sight Shield
Courtesy of GENERAL MOTORS COMPANY

6. Front Compartment Front Sight Shield 2 - Install - **Front Compartment Front Sight Shield Replacement**

HEADLAMP BULB REPLACEMENT - LEFT SIDE (GMC HD)

cardiagn.com

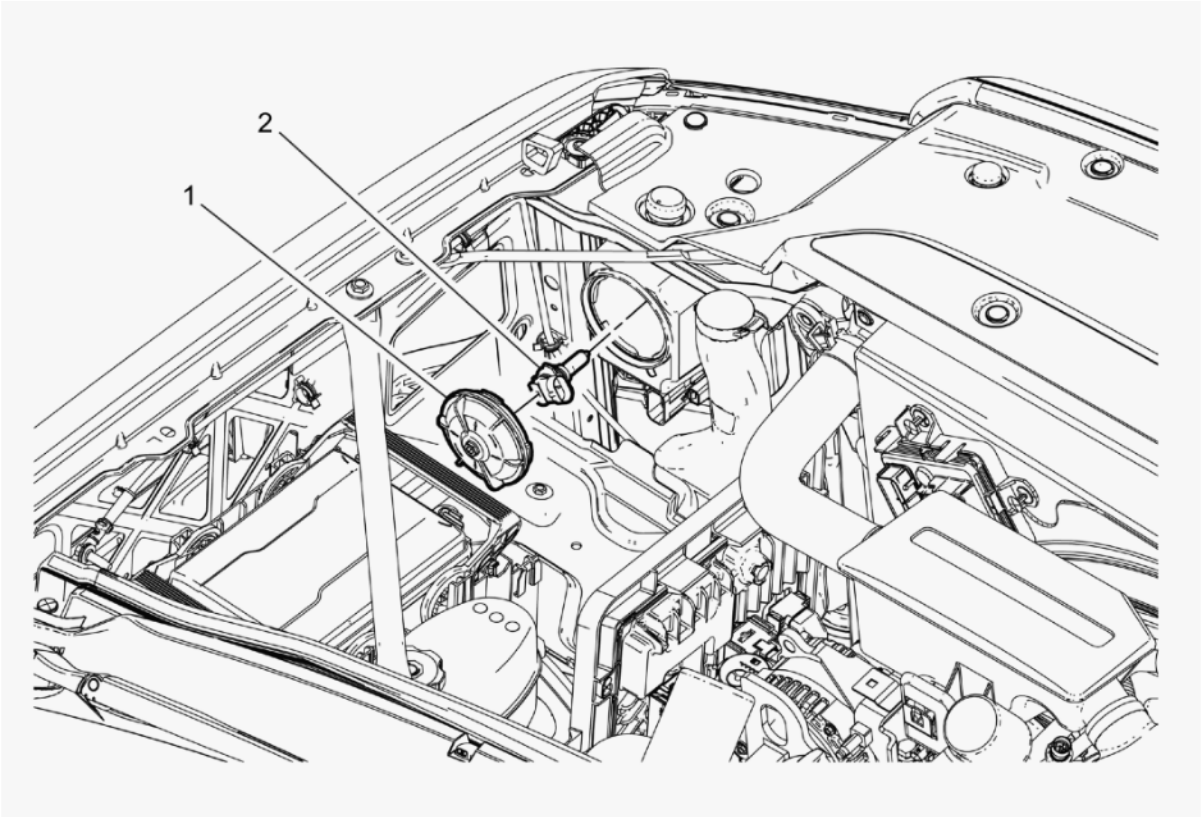


Fig. 36: Headlamp Bulb - Left Side (GMC HD)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure 1. Open and support the hood. 2. Remove the auxiliary battery if equipped. Refer to **Auxiliary Battery Replacement (Gas - K4B)** **Auxiliary Battery Replacement (Diesel)** . 3. **Front Bumper Fascia Trim Cap Replacement (GMC)**	
1	Headlamp Bulb Access Cover **Procedure** Rotate the headlamp bulb access cover counterclockwise and pull from the headlamp.
2	Headlamp Bulb **WARNING:** **Refer to Halogen Bulb Warning .** **Procedure** 1. Disconnect the electrical connector. 2. Rotate the headlamp bulb counterclockwise and pull from the headlamp.

cardiagn.com

HEADLAMP BULB REPLACEMENT - LEFT SIDE (CHEVROLET HD LOW BEAM)

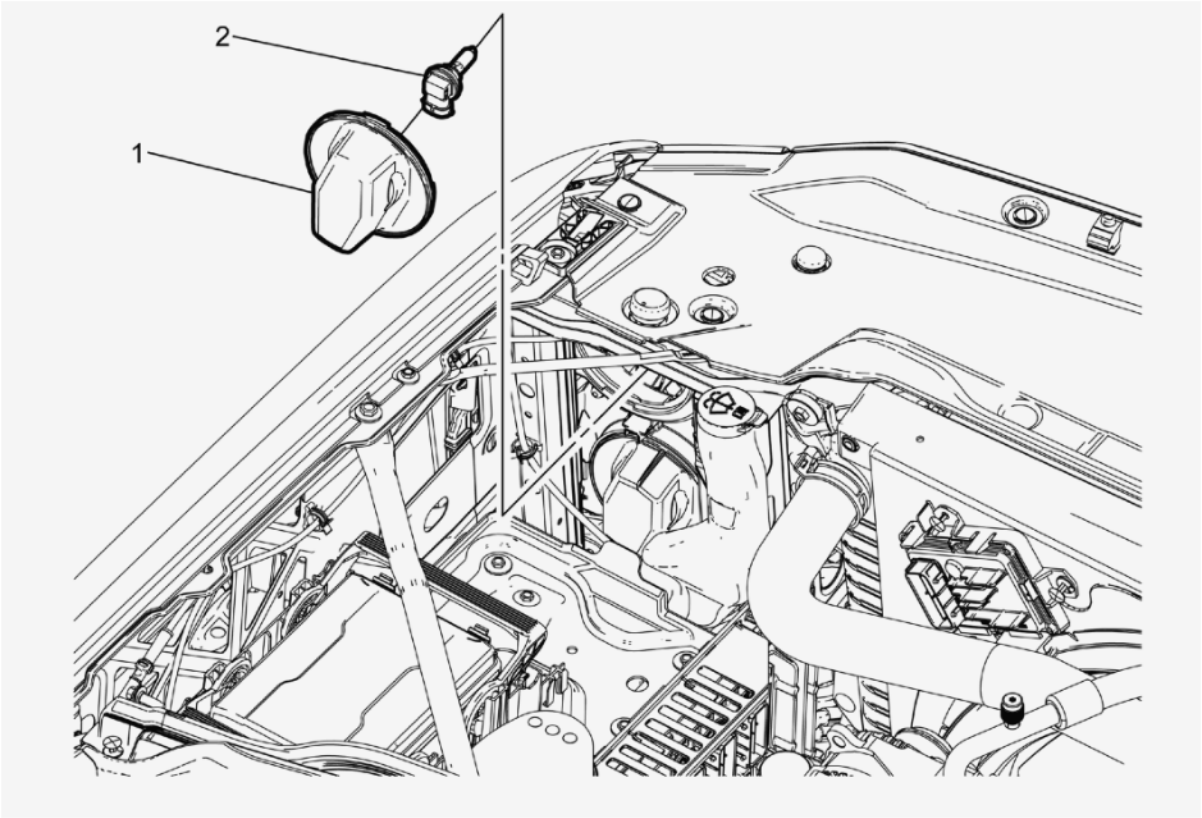


Fig. 37: Headlamp Bulb - Left Side (Low-Beam Chevrolet HD)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure 1. Open and support the hood. 2. Remove the auxiliary battery if equipped. Refer to **Auxiliary Battery Replacement (Gas - K4B)** **Auxiliary Battery Replacement (Diesel)** . 3. **Front Bumper Fascia Trim Cap Replacement (GMC)**	
1	Headlamp Bulb Access Cover **Procedure** Rotate the headlamp bulb access cover counterclockwise and pull from the headlamp.
2	Headlamp Bulb-Low Beam **WARNING:** **Refer to** **Halogen** **Bulb** **Warning** . **Procedure** 1. Disconnect the electrical connector.

cardiagn.com

Callout	Component Name
	2. Rotate the headlamp bulb counterclockwise and pull from the headlamp.

HEADLAMP BULB REPLACEMENT - LEFT SIDE (CHEVROLET HD HIGH BEAM)

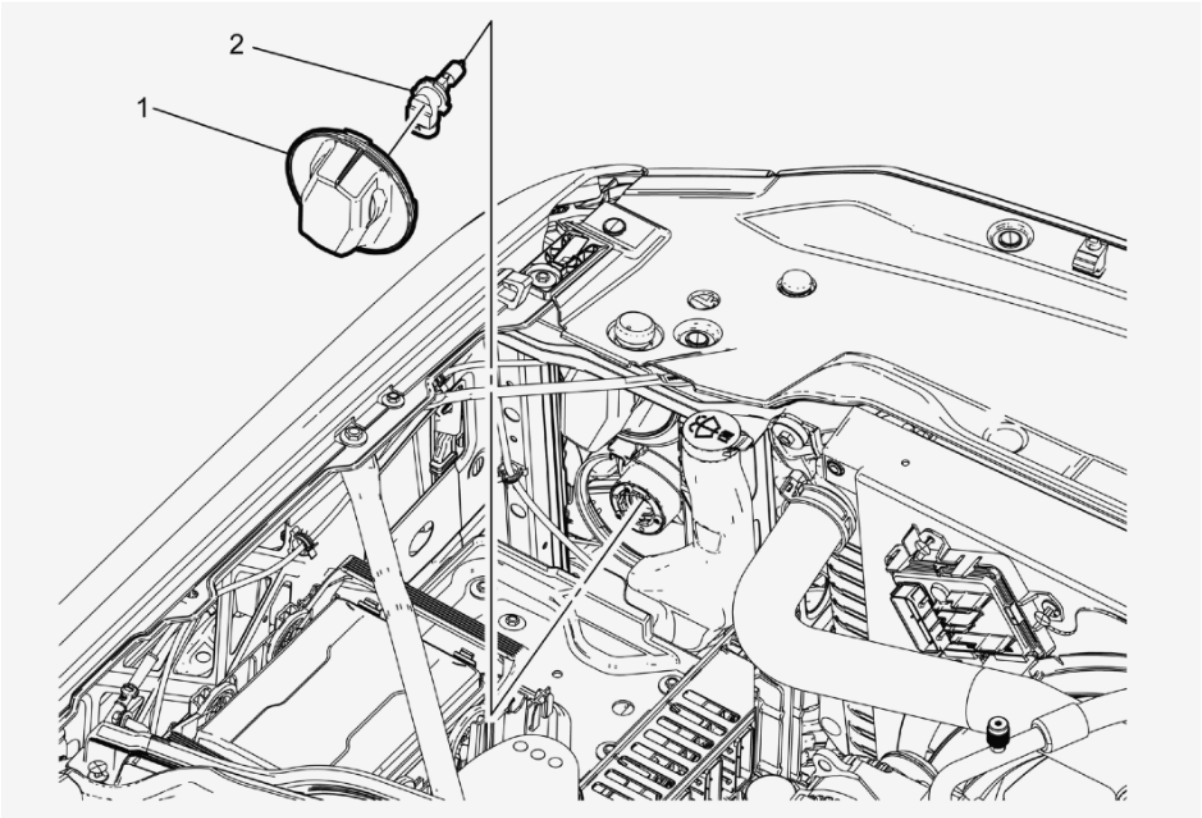


Fig. 38: Headlamp Bulb - Left Side (High-Beam Chevrolet HD)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure 1. Open and support the hood. 2. Remove the auxiliary battery if equipped. Refer to **Auxiliary Battery Replacement (Gas - K4B)** **Auxiliary Battery Replacement (Diesel)** . 3. **Front Bumper Fascia Trim Cap Replacement (GMC)**	
1	Headlamp Bulb Access Cover **Procedure** Rotate the headlamp bulb access cover counterclockwise and pull from the headlamp.
2	Headlamp Bulb-High Beam **WARNING:** **Refer to** **Halogen Bulb Warning** .

cardiagn.com

Callout	Component Name
	Procedure 1. Disconnect the electrical connector. 2. Rotate the headlamp bulb counterclockwise and pull from the headlamp.

HEADLAMP BULB REPLACEMENT - LEFT SIDE (LD)

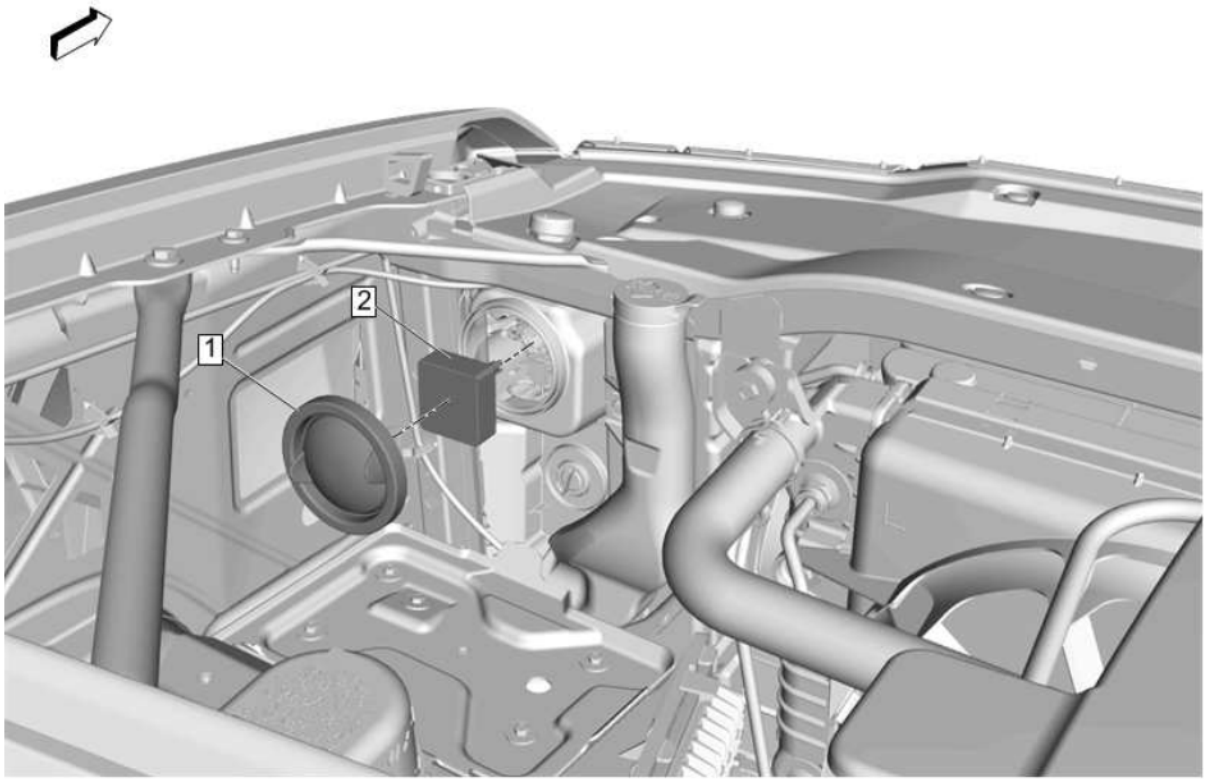


Fig. 39: Headlamp Bulb - Left Side (LD)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
WARNING: **The high intensity discharge system produces high voltage and current. In order to reduce the risk of severe shocks and burns, the**	

cardiagn.com

Callout	Component Name
battery negative cable must be disconnected any time service work is being performed on or around the high intensity discharge system. 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	

cardiagn.com

Callout	Component Name
	and the arc tube assembly. **Preliminary Procedures** 1. Open and support the hood. 2. { If equipped } **Auxiliary Battery Replacement (Gas - K4B)** **Auxiliary Battery Replacement (Diesel)**
1	Headlamp Bulb Access Cover **Procedure** Rotate the headlamp bulb access cover counterclockwise and pull from the headlamp.
2	Headlamp Bulb **Procedure** 1. Disconnect the electrical connector. 2. Rotate the bulb a quarter turn counterclockwise and remove.

HEADLAMP BULB REPLACEMENT - RIGHT SIDE (GMC HD)

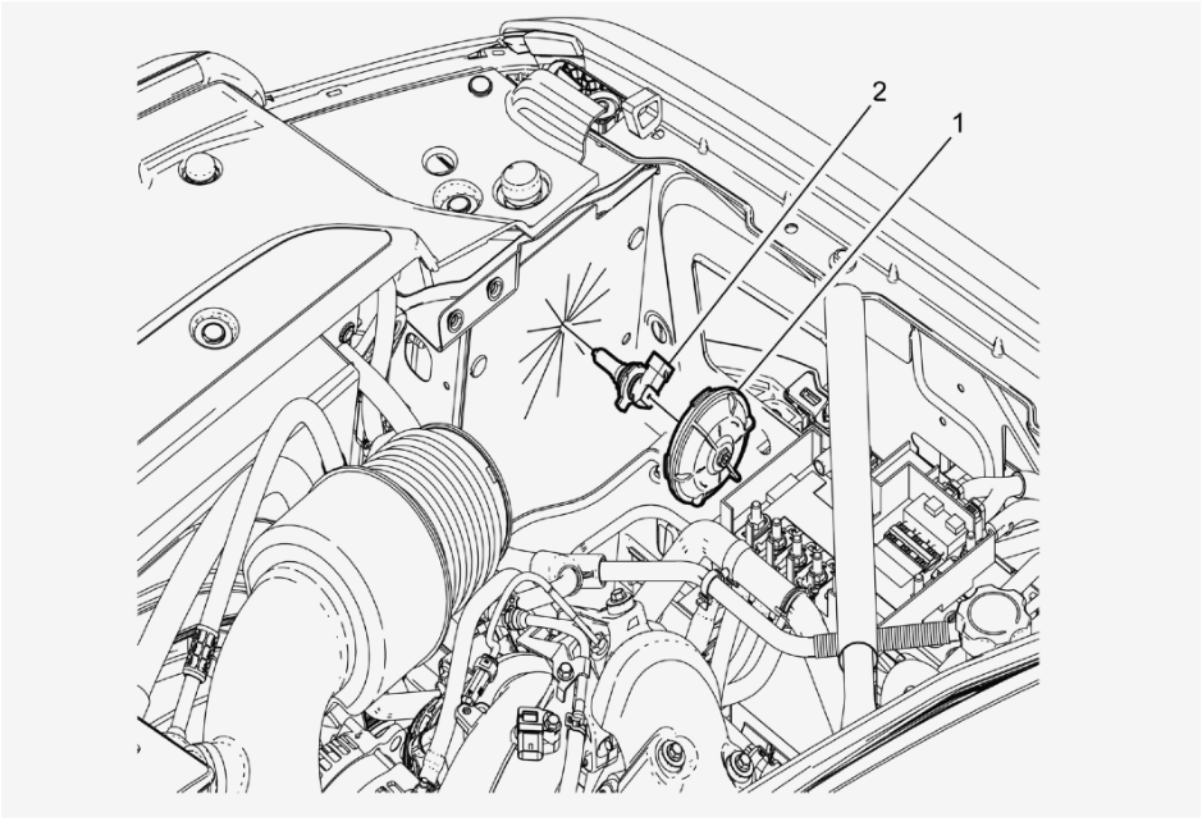


Fig. 40: Headlamp Bulb - Right Side (GMC HD)
Courtesy of GENERAL MOTORS COMPANY

cardiagn.com

Callout	Component Name
Preliminary Procedure 1. Remove the air cleaner assembly. Refer to **Air Cleaner Assembly Replacement** , (L96, LC8) or **Air Cleaner Assembly Replacement** , (L83, L86) or **Air Cleaner Assembly Replacement** (LML). 2. **Front Bumper Fascia Trim Cap Replacement (GMC)**	
1	Headlamp Bulb Access Cover **Procedure** 1. Pull back the flaps on the radiator support baffle to access the headlamp bulb access cover. 2. Rotate the headlamp bulb access cover counterclockwise and pull from the headlamp.
2	Headlamp Bulb **WARNING:** **Refer to Halogen Bulb Warning .** **Procedure** 1. Pull back the flaps on the radiator support baffle to access the headlamp bulb. 2. Disconnect the electrical connector. 3. Rotate the headlamp bulb counterclockwise and pull from the headlamp.

HEADLAMP BULB REPLACEMENT - RIGHT SIDE (LD)

cardiagn.com

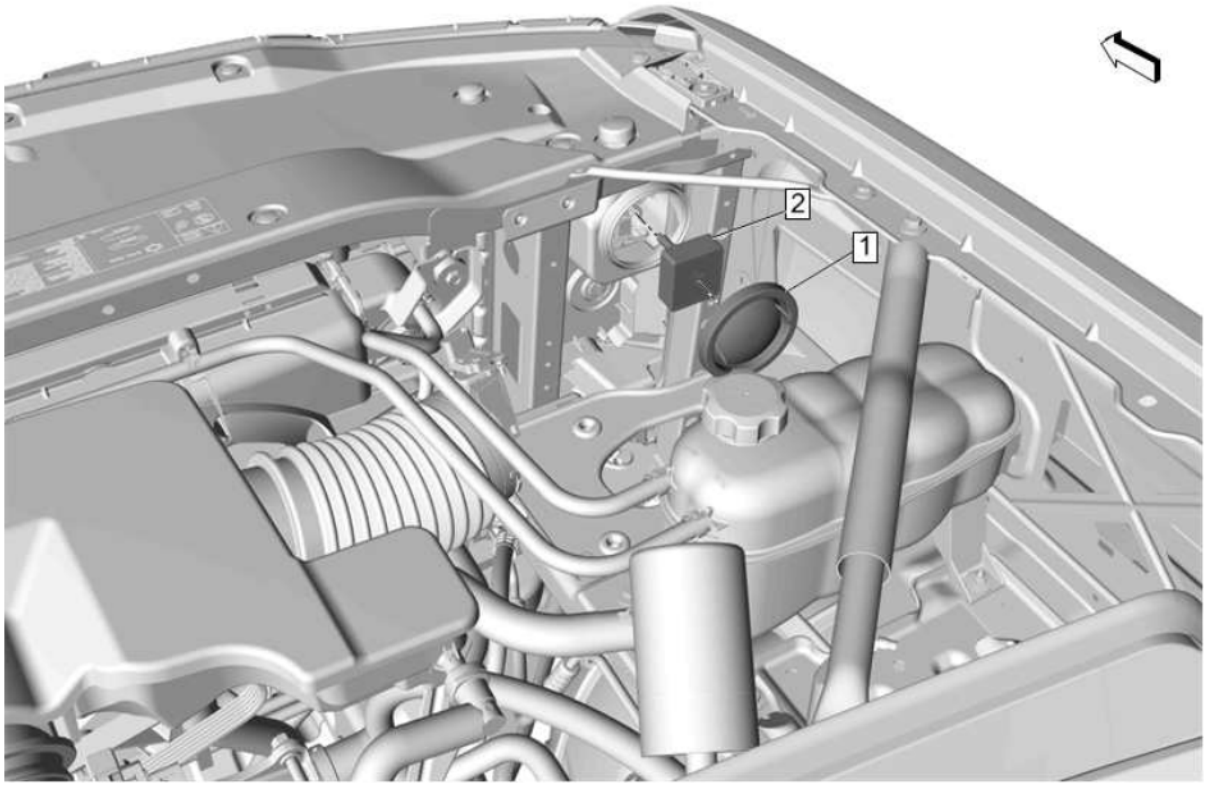


Fig. 41: Headlamp Bulb - Right Side (LD)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
WARNING: The high intensity discharge system produces high voltage and current. In order to reduce the risk of severe shocks and burns, the battery negative cable must be disconnected any time service work is being performed on	

cardiagn.com

Callout	Component Name
or around the high intensity discharge system. **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.	

Preliminary Procedures

1. Open and support the hood.
2. **Radiator Support Baffle Replacement (LV3)** **Radiator Support Baffle Replacement (L83,**

cardiagn.com

Callout	Component Name
	L86) Radiator Support Baffle Replacement (LC8, L96) Radiator Support Baffle Replacement (L8B) Radiator Support Baffle Replacement (L5P)
1	Headlamp Bulb Access Cover **Procedure** Rotate the headlamp bulb access cover counterclockwise and pull from the headlamp.
2	Headlamp Bulb **Procedure** 1. Disconnect the electrical connector. 2. Rotate the bulb a quarter turn counterclockwise and remove.

HEADLAMP BULB REPLACEMENT - RIGHT SIDE (CHEVROLET HD LOW BEAM)

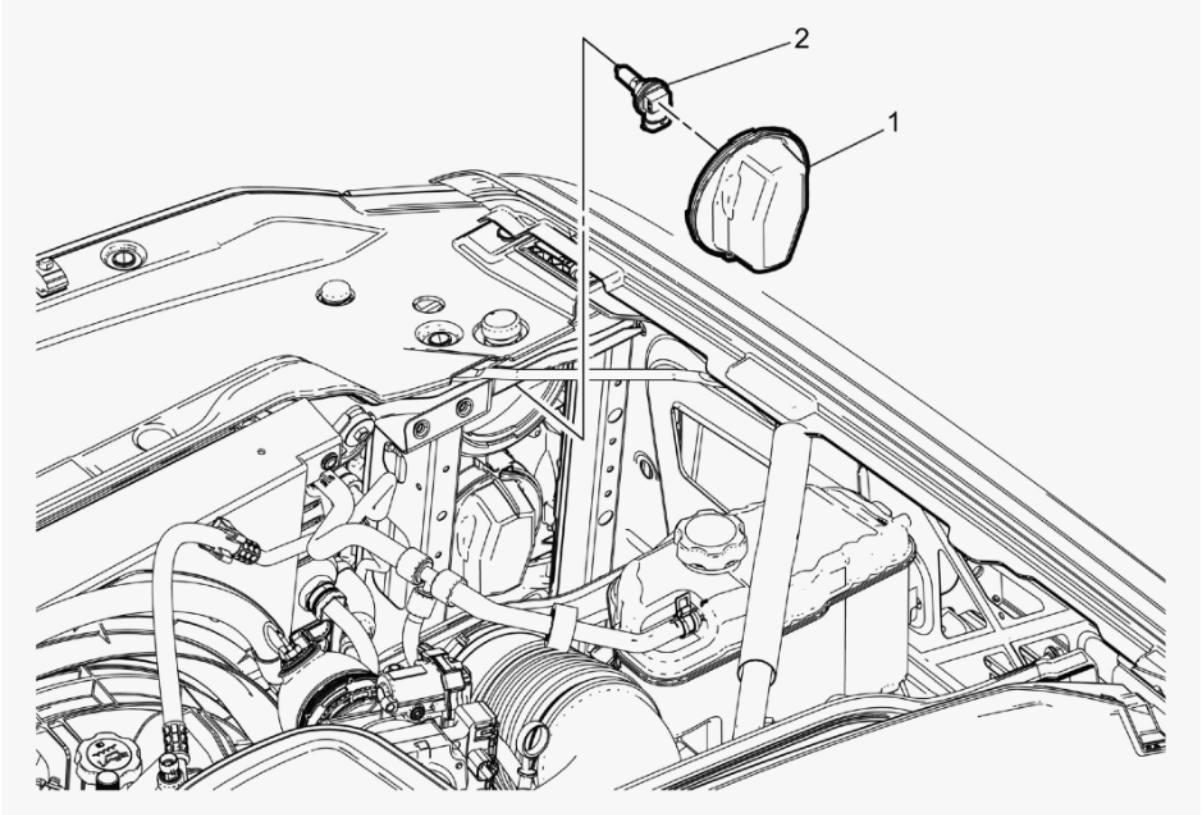


Fig. 42: Headlamp Bulb - Right Side (Low Beam Chevrolet HD)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure 1. Remove the air cleaner assembly. Refer to Air Cleaner Assembly Replacement , (L96, LC8) or Air Cleaner Assembly Replacement , (L83, L8B, L86) or Air Cleaner Assembly Replacement (LP5) 2. Remove the radiator support baffle. Refer to Radiator Support Baffle Replacement (L83, L86) Radiator Support Baffle Replacement (LC8, L96) Radiator Support Baffle Replacement	

cardiagn.com

Callout	Component Name
	(L8B) Radiator Support Baffle Replacement (L5P) .
1	Headlamp Bulb Access Cover **Procedure** Rotate the headlamp bulb access cover counterclockwise and pull from the headlamp.
2	Headlamp Bulb-Low Beam **WARNING:** **Refer to** **Halogen Bulb Warning** . **Procedure** 1. Disconnect the electrical connector. 2. Rotate the headlamp bulb counterclockwise and pull from the headlamp.

HEADLAMP BULB REPLACEMENT - RIGHT SIDE (CHEVROLET HD HIGH BEAM)

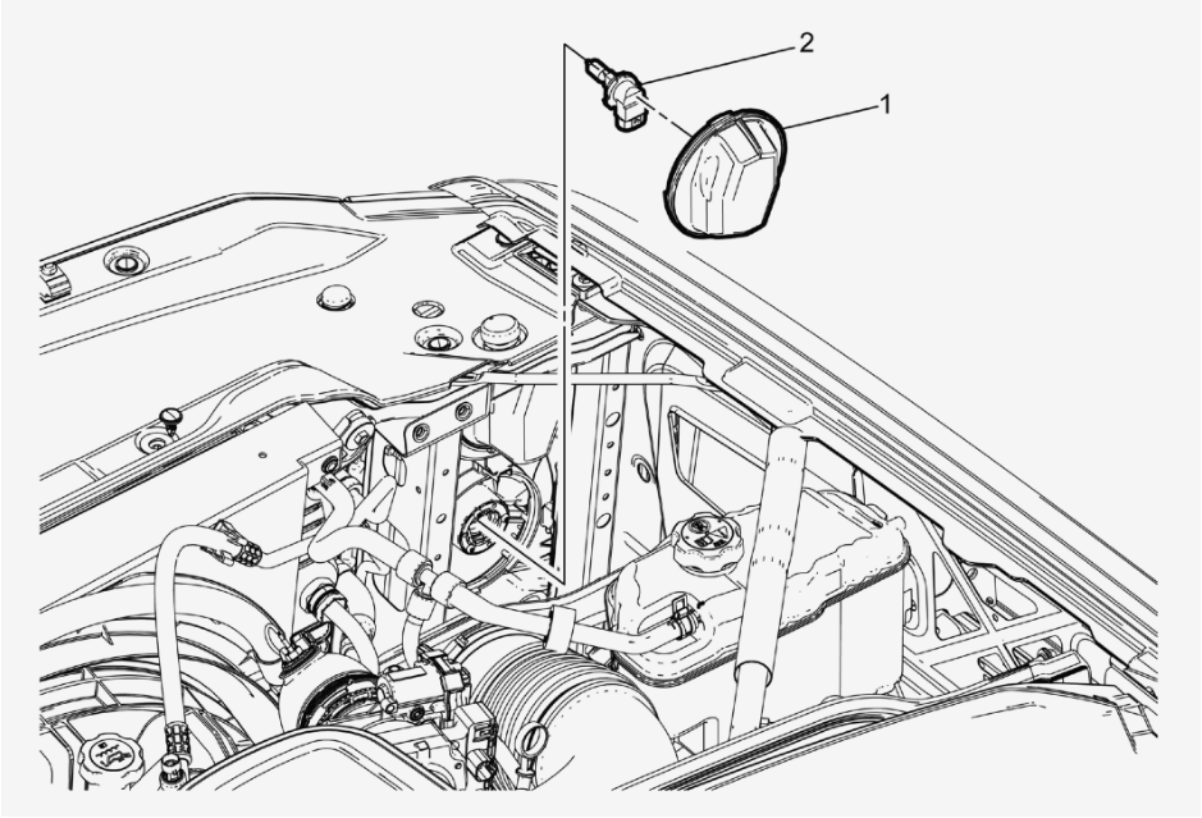


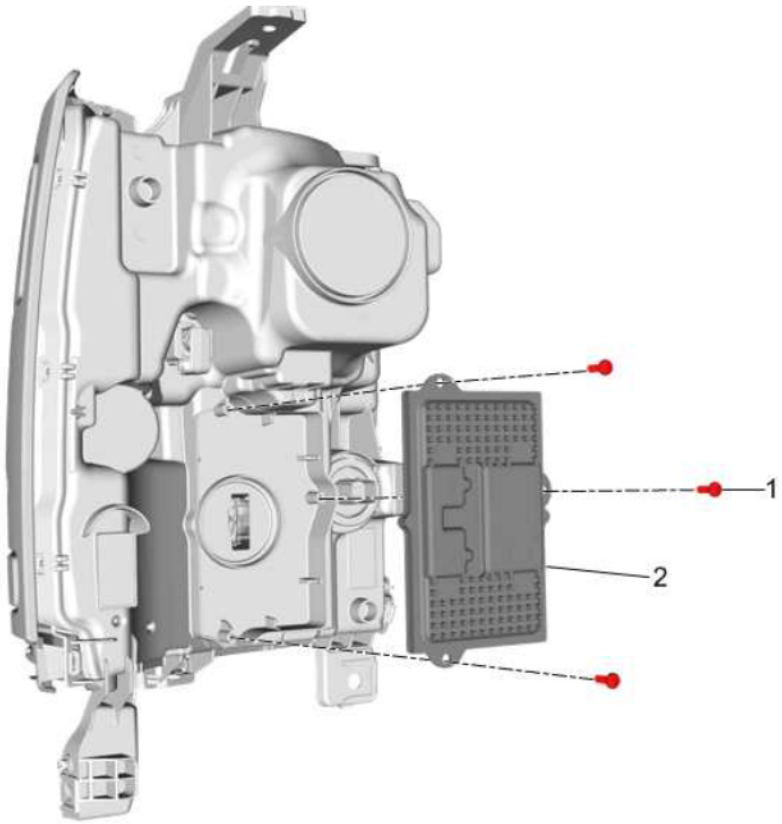
Fig. 43: Headlamp Bulb - Right Side (High Beam Chevrolet HD)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure	

cardiagn.com

Callout	Component Name
1. Remove the air cleaner assembly. Refer to **Air Cleaner Assembly Replacement** , (L96, LC8) or **Air Cleaner Assembly Replacement** , (L83, L8B, L86) or **Air Cleaner Assembly Replacement** (LP5) 2. Remove the radiator support baffle. Refer to **Radiator Support Baffle Replacement (L83, L86)** **Radiator Support Baffle Replacement (LC8, L96)** **Radiator Support Baffle Replacement (L8B)** **Radiator Support Baffle Replacement (L5P)** .	
1	Headlamp Bulb Access Cover **Procedure** Rotate the headlamp bulb access cover counterclockwise and pull from the headlamp.
2	Headlamp Bulb-High Beam **WARNING:** **Refer to** **Halogen Bulb Warning** . **Procedure** 1. Disconnect the electrical connector. 2. Rotate the headlamp bulb counterclockwise and pull from the headlamp.

HEADLAMP BALLAST REPLACEMENT (WITH T4L)



cardiagn.com

Fig. 44: Headlamp Ballast (with T4L)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Headlamp Replacement (GMC 1500)Headlamp Replacement (Chevrolet - Left Side)Headlamp Replacement (Chevrolet - Right Side)Headlamp Replacement (GMC 2500, 3500)	
1	Headlamp Screw **CAUTION:** **Refer to** Fastener Caution . **Tighten** 2.5 N.m (22 lb in)
2	Headlamp Ballast

HEADLAMP AIMING

Headlamp aiming is done with the low beam lamps. The high beam lamps will be correctly aimed if the low beam lamps are aimed properly.

Screen Method for Headlamp Aiming (Visual Aim)

The screen method requires an area set up specifically for headlamp aim.

The area should consist of a level surface large enough to allow for a vehicle and an additional 7.62 m (25 ft) as measured from the face of the headlamps to the aiming screen.

The screen should be a wall or other flat surface at least 1.52 m (5 ft) high by 3.66 m (12 ft) wide with a matte white surface well shaded from extraneous light, and 90 degrees to the floor. The screen should be provided with a permanent vertical reference line 0.61 m (2 ft) from the left edge of the screen, 2 laterally adjustable vertical tapes, and one vertically adjustable horizontal tape.

After the aiming screen has been set up and located, paint or tape a reference line on the floor 15.24 m (50 ft) from the vertical reference line on the screen. This line should be perpendicular to the aiming screen and a mark placed at 7.62 m (25 ft) from the screen.

Headlamp Aiming Procedure

1. Align the left tires of the vehicle with the reference line extending from the screen with the headlamps aligned with the reference line.
2. Remove any snow, ice or mud from the vehicle.
3. The vehicle should be fully assembled and all other work stopped while the headlamp aiming is being done.
4. The vehicle should contain cargo or be loaded to represent normal vehicle use.
5. Tires should be properly inflated.
6. Rock the vehicle to stabilize the suspension.

cardiagn.com

7. Measure from the floor to the center of the lamp bulb on the vehicle. Some lamps have an aim dot marked on the lens.
8. At the screen, measure from the floor and place the horizontal tape at the measured distance.

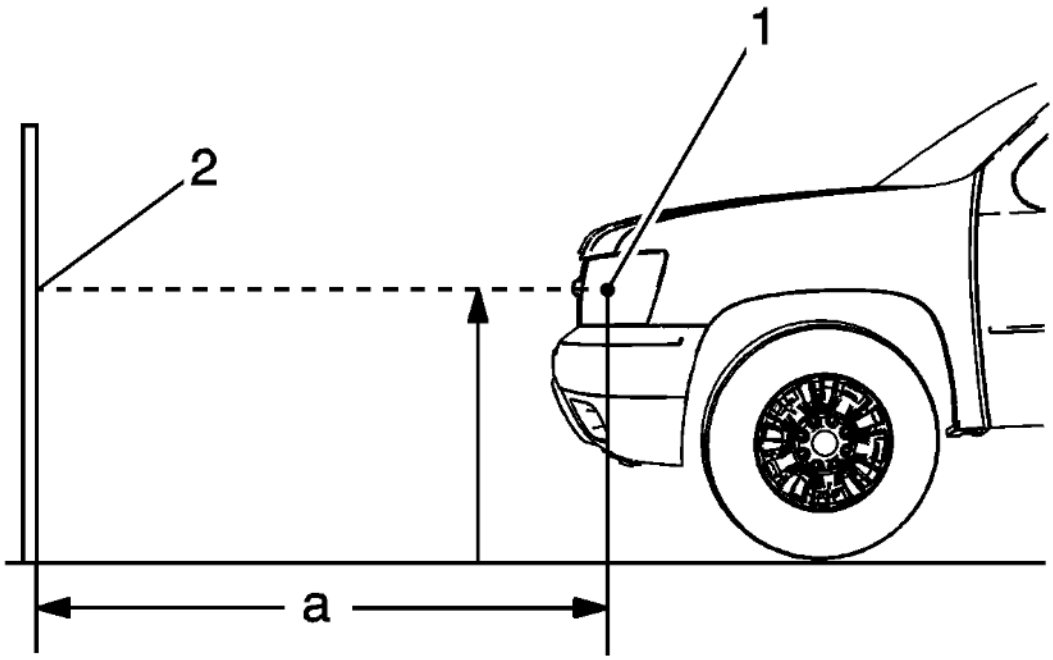


Fig. 45: View Of Left Headlamp Bulb Centerline & Measured Distance
Courtesy of GENERAL MOTORS COMPANY

9. Measure from the reference line on the floor to the left headlamp bulb centerline (1).
10. At the screen, measure from the reference line and place the vertical tape at the measured distance (2).
11. Measure from the reference line on the floor to the right headlamp bulb centerline.
12. At the screen, measure from the reference line and place the vertical tape at the measured distance.
13. Turn the headlamps ON.
14. Block the light from projecting onto the screen from the passenger side headlamp. This will allow the cutoff in the beam pattern from the drivers side to be more pronounced for easier aim verification.

IMPORTANT: DO NOT cover the headlamp, this may cause excessive heat build up.

15. On this vehicle you will be verifying the aim of the vertical cutoff on the right side of the lamp vertical bulb centerline as it is projected onto the aim board.

cardiagn.com

16. If the location of the cutoff projected onto the board differs from figure 4 then an adjustment to the beam pattern location is necessary.

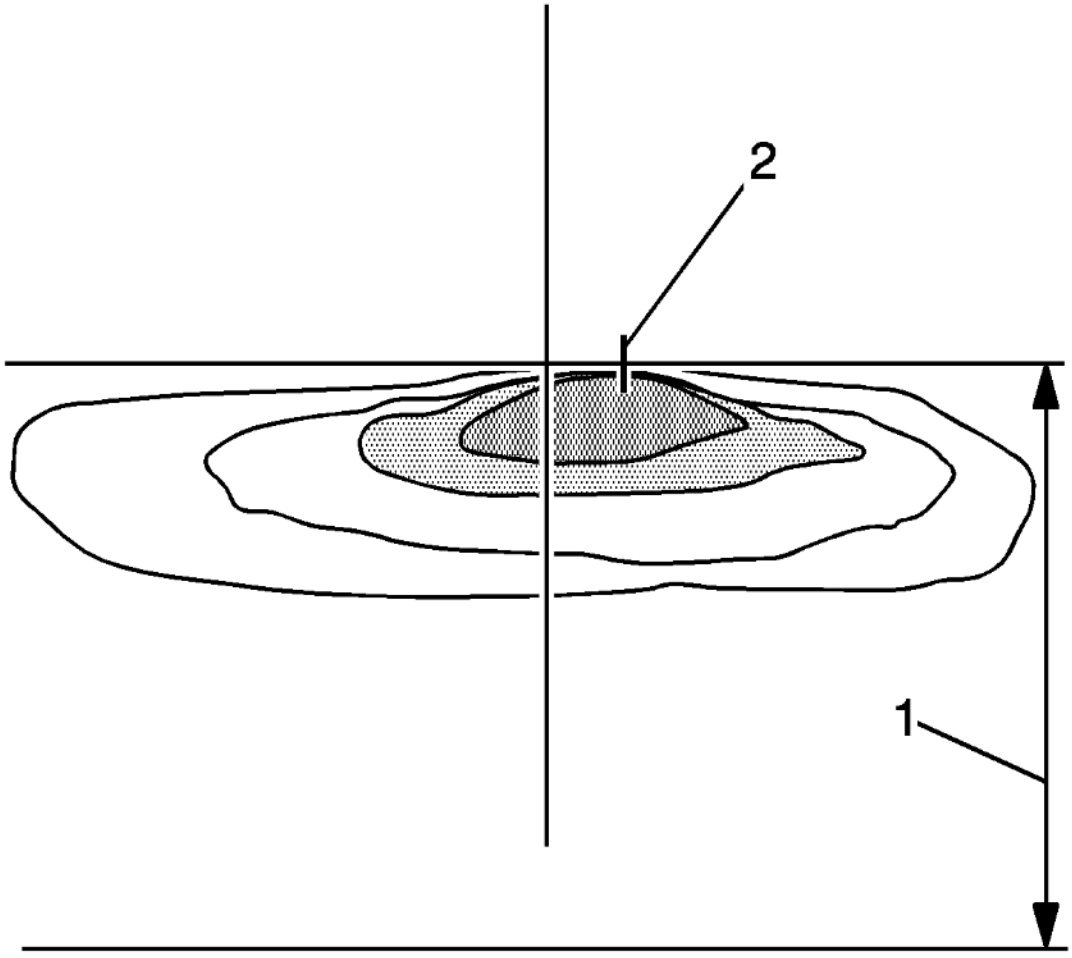


Fig. 46: Measuring Horizontal & vertical Axis
Courtesy of GENERAL MOTORS COMPANY

17. Adjust the vertical headlamp adjustment screw until the Right Gradient Line (Cutoff Line) is set at the Horizontal Axis within +/- 2.0 inches (2) measured at 7.62 m (25 ft).
18. Verify proper aim location.
19. Repeat the aiming procedure for the passengers side headlamp while blocking the light from projecting onto the screen from the drivers side headlamp.

FRONT FOG LAMP REPLACEMENT (CHEVROLET HD)

cardiagn.com

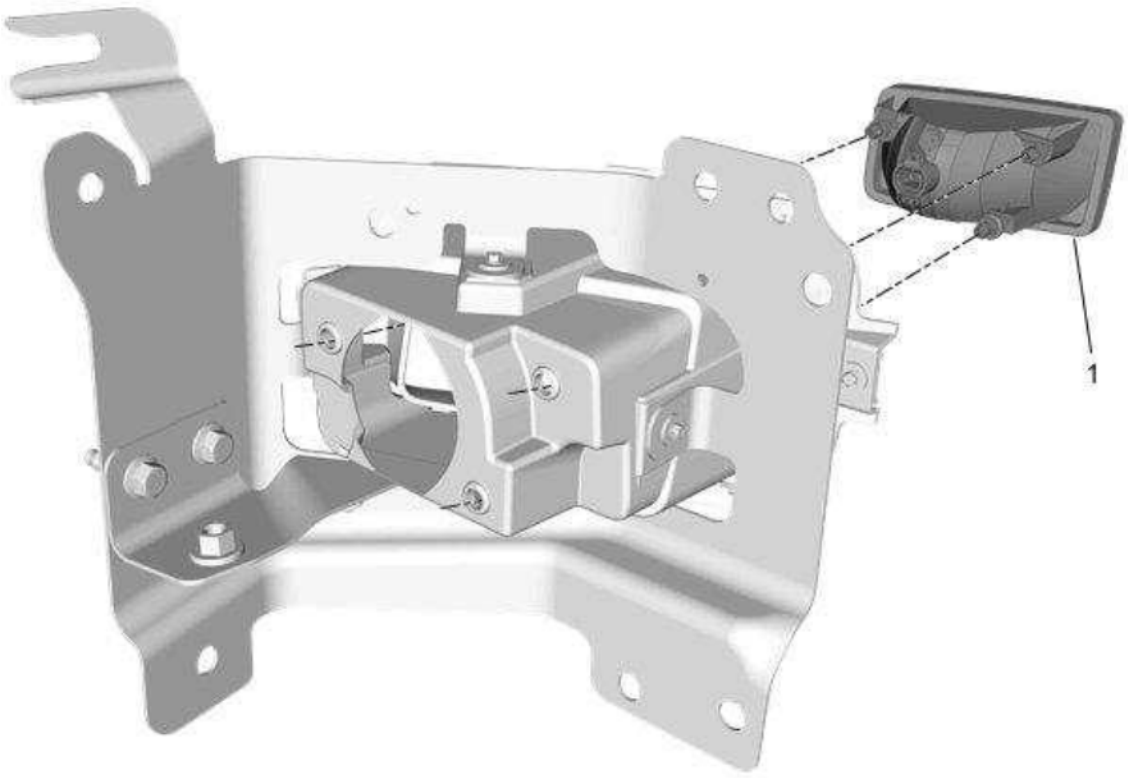


Fig. 47: Front Fog Lamp (Chevrolet HD)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the front fog lamp bezel. Refer to **Front Fog Lamp Bezel Replacement (Chevrolet)** .	
1	Front Fog Lamp **Procedure** 1. Disconnect the electrical connector. 2. Release the 3 locking tabs and pull the front fog lamp straight out from the front fog lamp housing.

FRONT FOG LAMP REPLACEMENT (GMC HD)

cardiagn.com

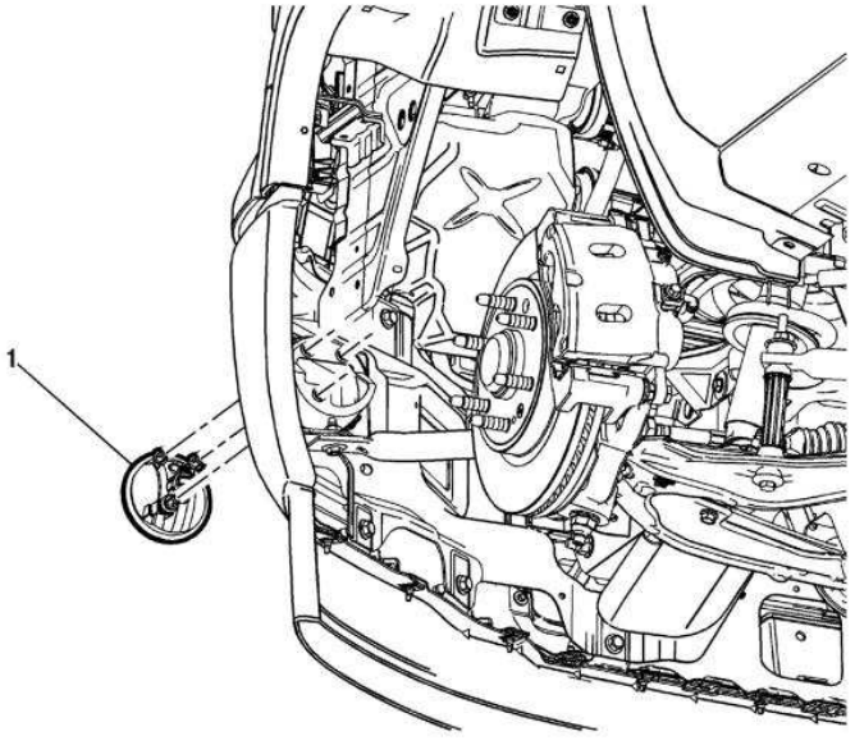


Fig. 48: Front Fog Lamp (GMC HD)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure 1. Remove the front wheelhouse liner-left side. Refer to **Front Wheelhouse Liner Replacement - Left Side** . 2. Remove the front wheelhouse liner-right side. Refer to **Front Wheelhouse Liner Replacement - Right Side** .	
1	Front Fog Lamp (GMC) **Procedure** 1. Disconnect the electrical connector. 2. Release the locking tabs and pull the front fog lamp straight from the front bumper impact bar.

FRONT FOG LAMP REPLACEMENT (CHEVROLET LD)

cardiagn.com

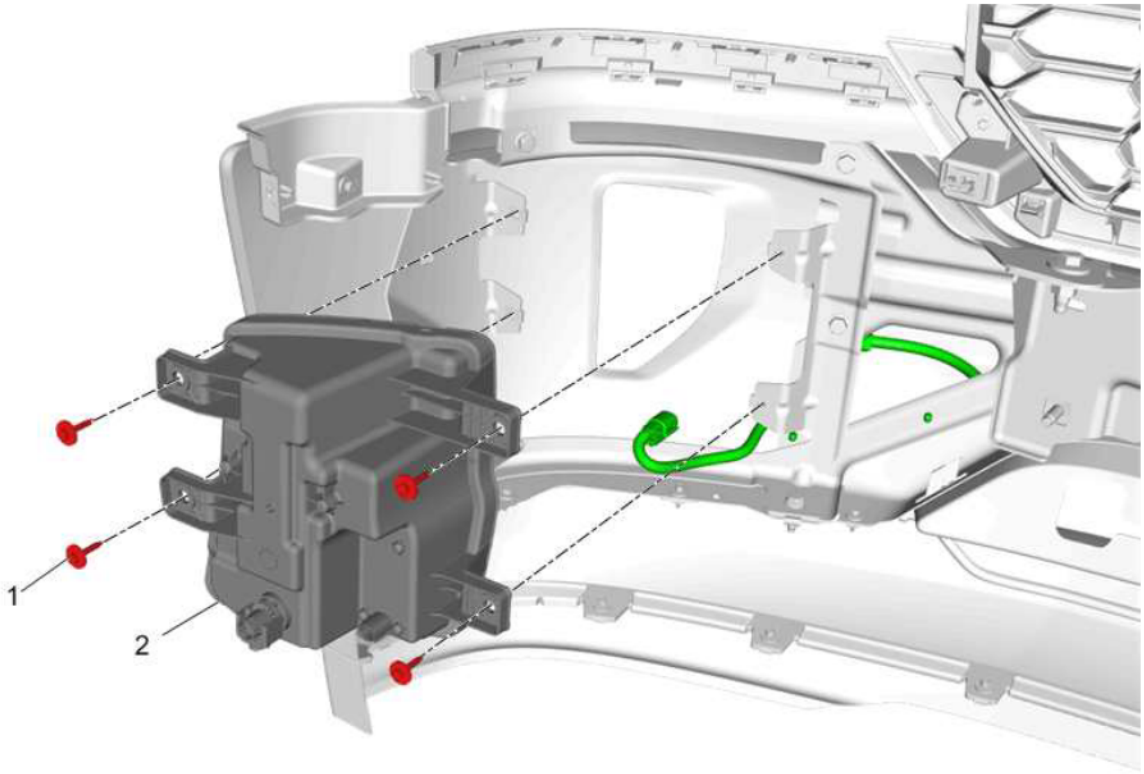


Fig. 49: Front Fog Lamp (Chevrolet LD)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure **Front Bumper Impact Bar Replacement (1500)**	
1	Front Fog Lamp Bolt **Tighten** 2.5 N.m (22 lb in)
2	Front Fog Lamp **Procedure** Disconnect the electrical connector.

FRONT FOG LAMP REPLACEMENT (GMC LD)

cardiagn.com

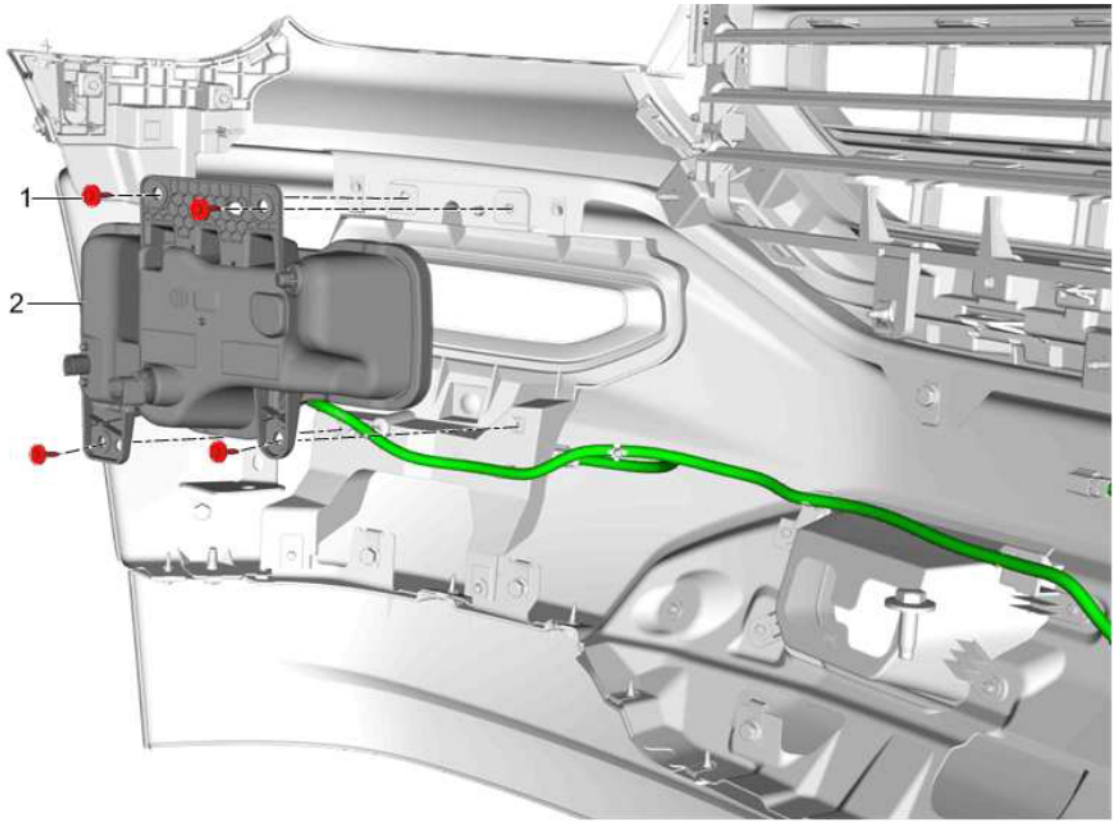


Fig. 50: Front Fog Lamp (GMC LD)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure **Front Bumper Impact Bar Bracket Replacement (To Frame End)** **Front Bumper Impact Bar Bracket Replacement (GMC To Bumper)**	
1	Front Fog Lamp Bolt **Tighten** 2.5 N.m (22 lb in)
2	Front Fog Lamp **Procedure** Disconnect the electrical connector.

FRONT FOG LAMP BULB REPLACEMENT (CHEVROLET HD)

cardiagn.com

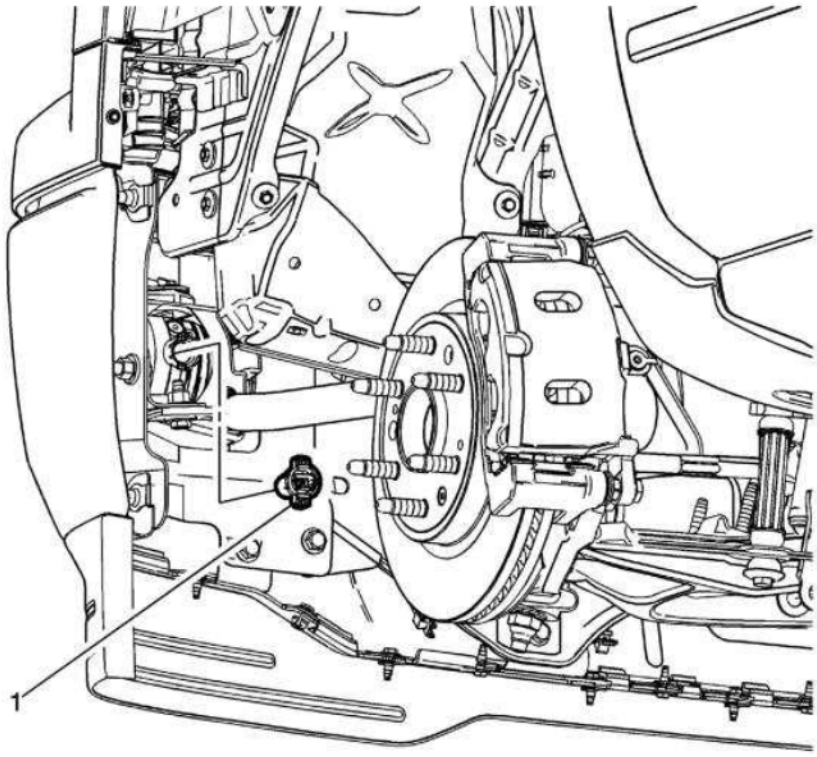


Fig. 51: Front Fog Lamp Bulb (Chevrolet HD)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure 1. Remove the front wheelhouse liner-left side. Refer to **Front Wheelhouse Liner Replacement - Left Side** . 2. Remove the front wheelhouse liner-right side. Refer to **Front Wheelhouse Liner Replacement - Right Side** .	
1	Front Fog Lamp Bulb **Procedure** 1. Disconnect the electrical connector. 2. Release the 2 locking tabs and pull the front fog lamp bulb straight from the front fog lamp.

FRONT FOG LAMP BULB REPLACEMENT (GMC HD)

cardiagn.com

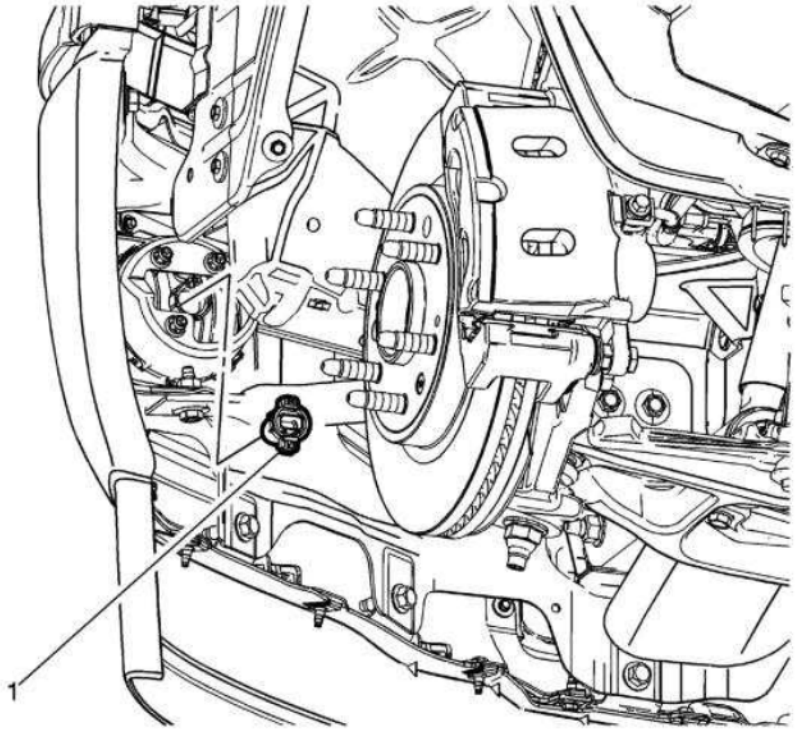


Fig. 52: Front Fog Lamp Bulb (GMC HD)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure 1. Remove the front wheelhouse liner-left side. Refer to **Front Wheelhouse Liner Replacement - Left Side** . 2. Remove the front wheelhouse liner-right side. Refer to **Front Wheelhouse Liner Replacement - Right Side** .	
1	Front Fog Lamp Bulb (GMC) **Procedure** 1. Disconnect the electrical connector. 2. Release the 2 locking tabs and pull the front fog lamp bulb straight from the front fog lamp.

FOG LAMP AIMING

The front fog lamps must be aimed for proper illumination of the road. The front fog lamp aim should be checked when a new front fog lamp assembly is installed, or if service or repairs in the front end area may have disturbed the front fog lamp mounting.

Preparation Procedure

cardiagn.com

Horizontal aim is not adjustable on this vehicle. Vertical aim is adjusted by an adjusting screw
IMPORTANT: located on the bottom rear of the fog lamp. Prior to aiming the fog lamps, perform the following steps:

1. Completely assemble all of the components on the vehicle.
2. Park the vehicle on a level surface.
3. Stop all unnecessary operations or work on the vehicle that affect the vehicle trim.
4. Close the doors and ensure that the vehicle has no load other than the driver.
5. Stabilize the suspension by rocking the vehicle sideways.
6. Ensure that the fuel level is 1/2 full.
7. Ensure that the tires are inflated to the proper pressure.
8. Ensure that the driver or a similar weight, approximately 75 kg (165 lb), is in the vehicle driver seat.

Aiming Procedure

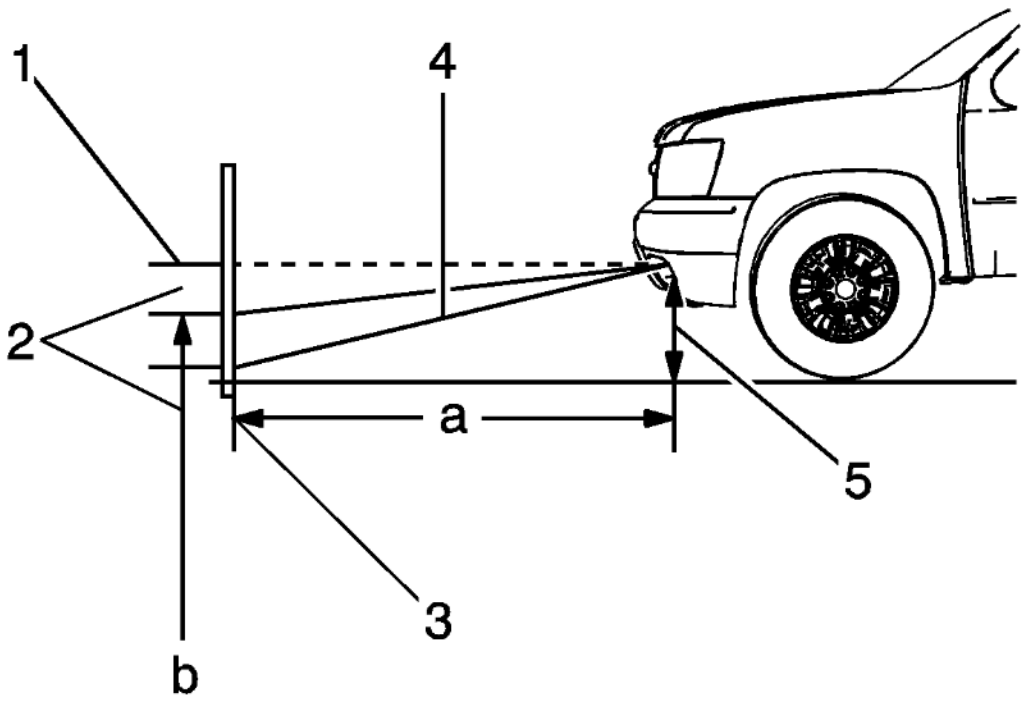


Fig. 53: Aiming Fog Lamp
Courtesy of GENERAL MOTORS COMPANY

1. Park the vehicle on a level surface 7.6 m (25 ft) (3) away from a wall or other flat surface.

cardiagn.com

2. Measure the distance from the floor to the center of the fog lamp (5).
3. Using this measurement, mark the horizontal centerline of the fog lamp (1) on the flat surface directly in front of the vehicle.
4. Remove the front portion of the front wheel liner in order to access the adjusting screw.
5. Turn ON the fog lamps.
6. Reach inside of the front portion of the fender liner in order to access the fog lamp vertical adjustment screw on the bottom of the fog lamp.
7. Adjust the fog lamp so that the top edge of the fog lamp beam pattern is 100 mm (4 in) below the horizontal centerline (2).
8. Turn OFF the fog lamps.
9. Secure the forward edge of the front fender liner.

FRONT IDENTIFICATION LAMP REPLACEMENT

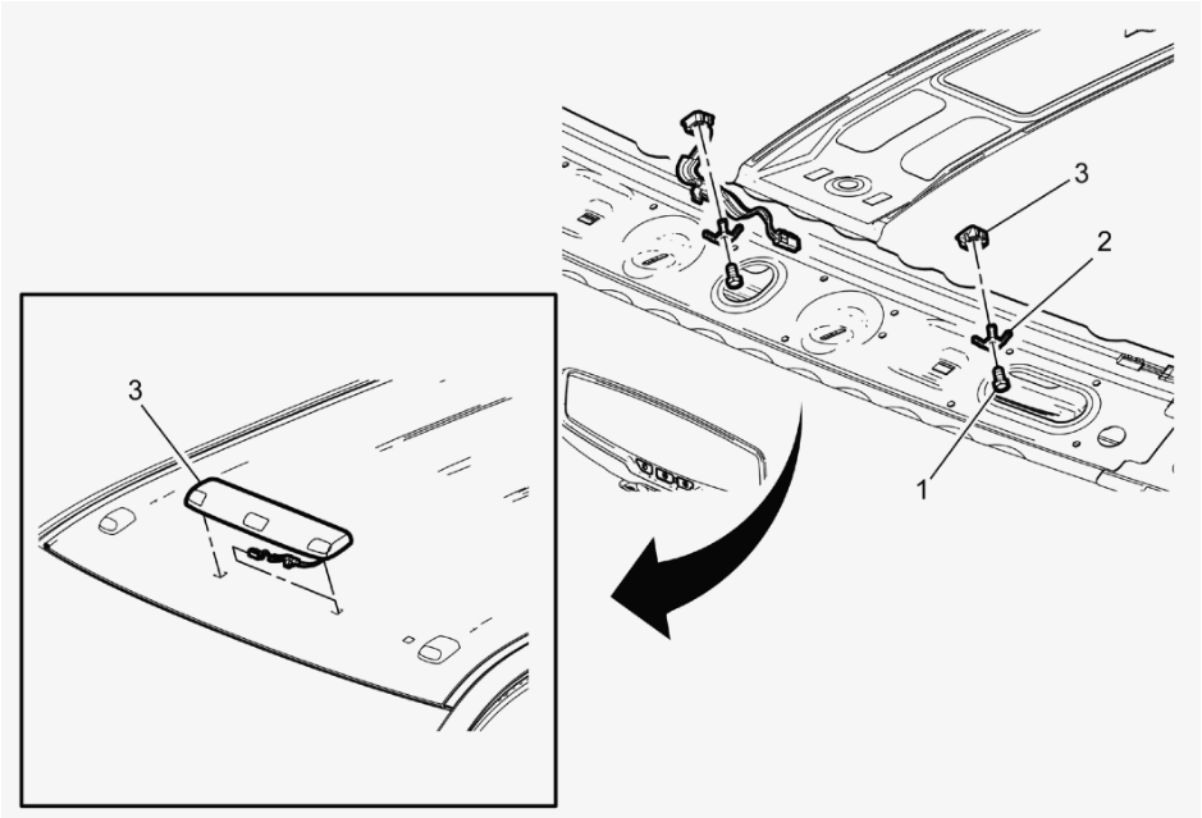


Fig. 54: Front Identification Lamp
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Partially remove the front portion of the headlining trim panel. Refer to **Headlining Trim Panel Replacement (Crew Cab Without Sunroof)** **Headlining Trim Panel Replacement (Crew Cab With Sunroof)** **Headlining Trim Panel Replacement (Extended Cab)** **Headlining Trim Panel Replacement (Regular Cab)** .	
1	Front Identification Lamp Bolt (Qty: 2) **CAUTION:**

cardiagn.com

Callout	Component Name
	Refer to Fastener Caution .
2	Front Identification Lamp Retainer
3	Front Identification Lamp **Procedure** 1. Disconnect the electrical connector. 2. Gently pull the wiring harness through the hole and remove from the vehicle.

FRONT CLEARANCE LAMP REPLACEMENT (LH)

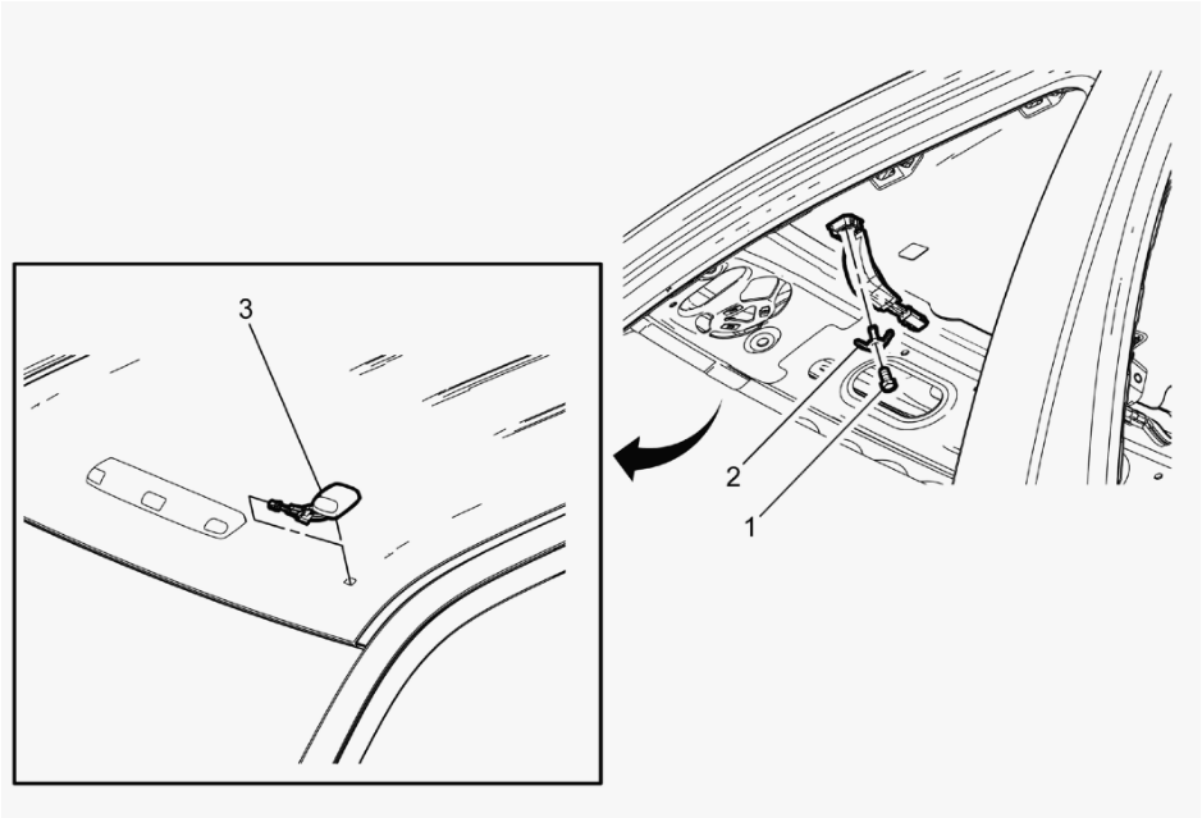


Fig. 55: Front Clearance Lamp (LH)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Partially remove the left front portion of the headlining trim panel. Refer to Headlining Trim Panel Replacement (Crew Cab Without Sunroof) Headlining Trim Panel Replacement (Crew Cab With Sunroof) Headlining Trim Panel Replacement (Extended Cab) Headlining Trim Panel Replacement (Regular Cab) .	
1	Front Clearance Lamp Bolt **CAUTION:**

cardiagn.com

Callout	Component Name
	Refer to Fastener Caution .
2	Front Clearance Lamp Retainer
3	Front Clearance Lamp **Procedure** 1. Disconnect the electrical connector. 2. Gently pull the wiring harness through the hole and remove from the vehicle.

FRONT CLEARANCE LAMP REPLACEMENT (RH)

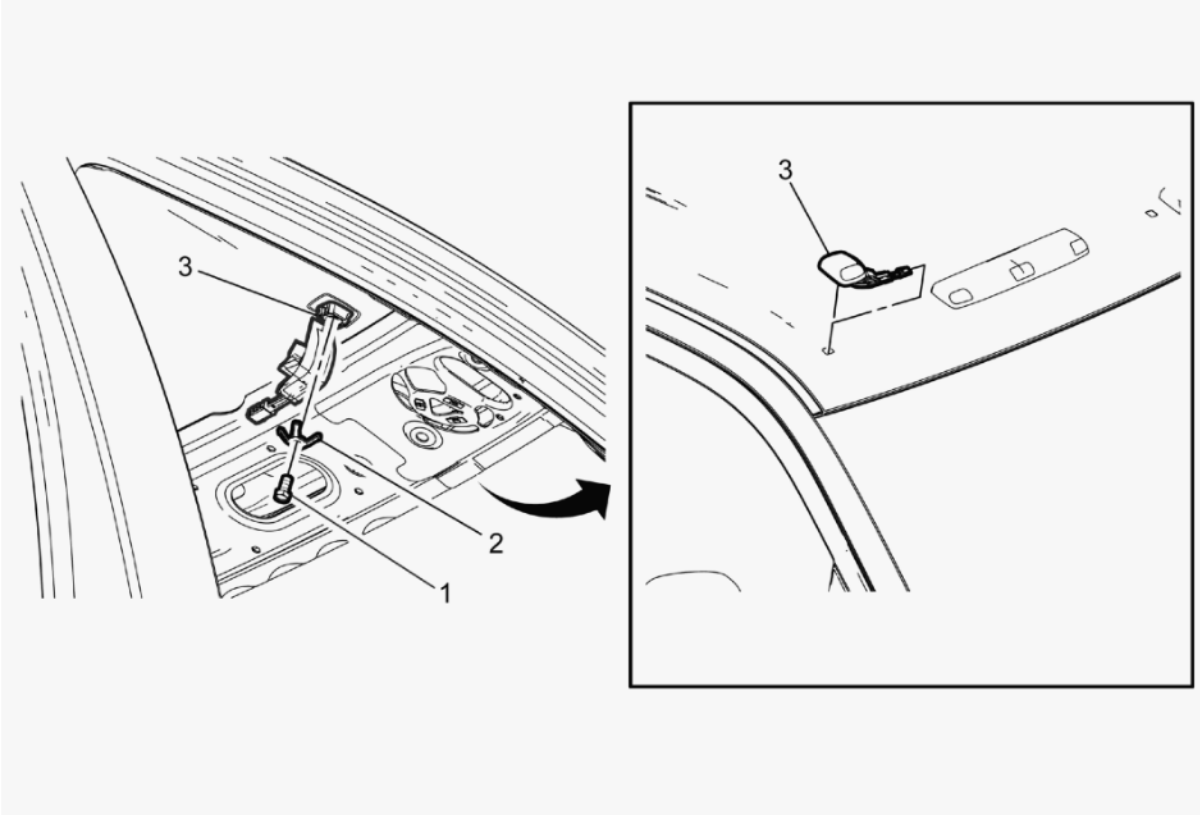


Fig. 56: Front Clearance Lamp (RH)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Partially remove the right front portion of the headlining trim panel. Refer to Headlining Trim Panel Replacement (Crew Cab Without Sunroof) Headlining Trim Panel Replacement (Crew Cab With Sunroof) Headlining Trim Panel Replacement (Extended Cab) Headlining Trim Panel Replacement (Regular Cab) .	
1	Front Clearance Lamp Bolt **CAUTION:**

cardiagn.com

Callout	Component Name
	Refer to Fastener Caution .
2	Front Clearance Lamp Retainer
3	Front Clearance Lamp **Procedure** 1. Disconnect the electrical connector. 2. Gently pull the wiring harness through the hole and remove from the vehicle.

FRONT CLEARANCE LAMP REPLACEMENT (MIRROR)

Removal Procedure

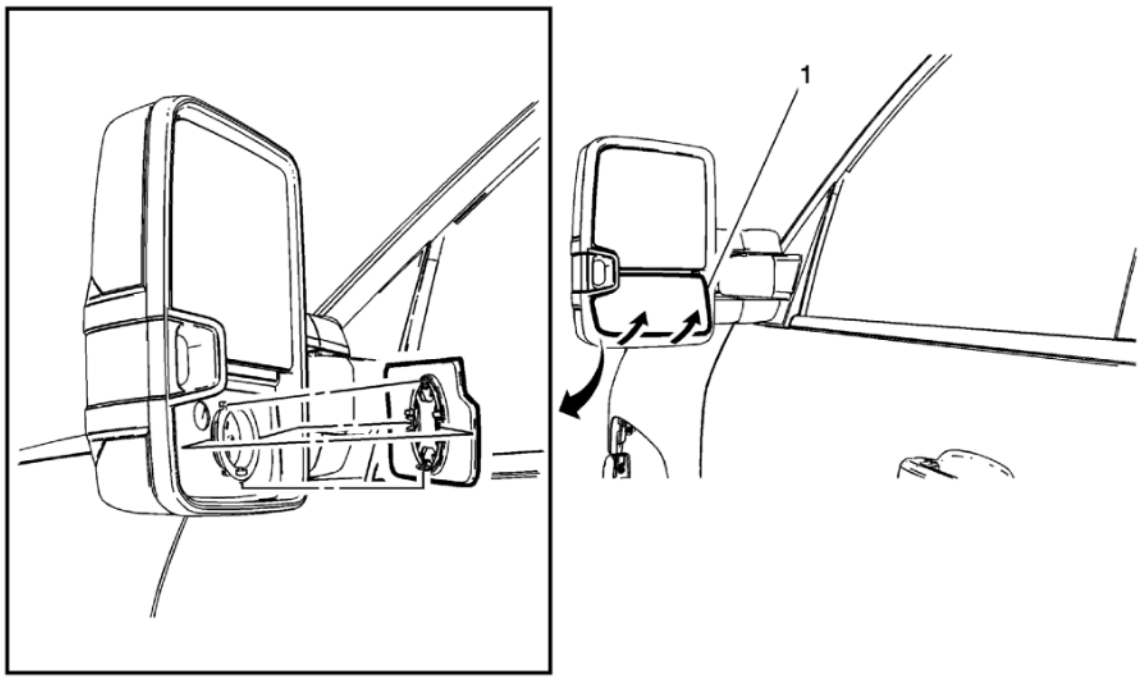


Fig. 57: Outside Rearview Mirror Glass - Lower (DQS)
Courtesy of GENERAL MOTORS COMPANY

1. Outside Rearview Mirror Glass - Lower 1 - Remove - **Outside Rearview Mirror Glass Replacement - Lower (DPN)** **Outside Rearview Mirror Glass Replacement - Lower (DQS)**

cardiagn.com

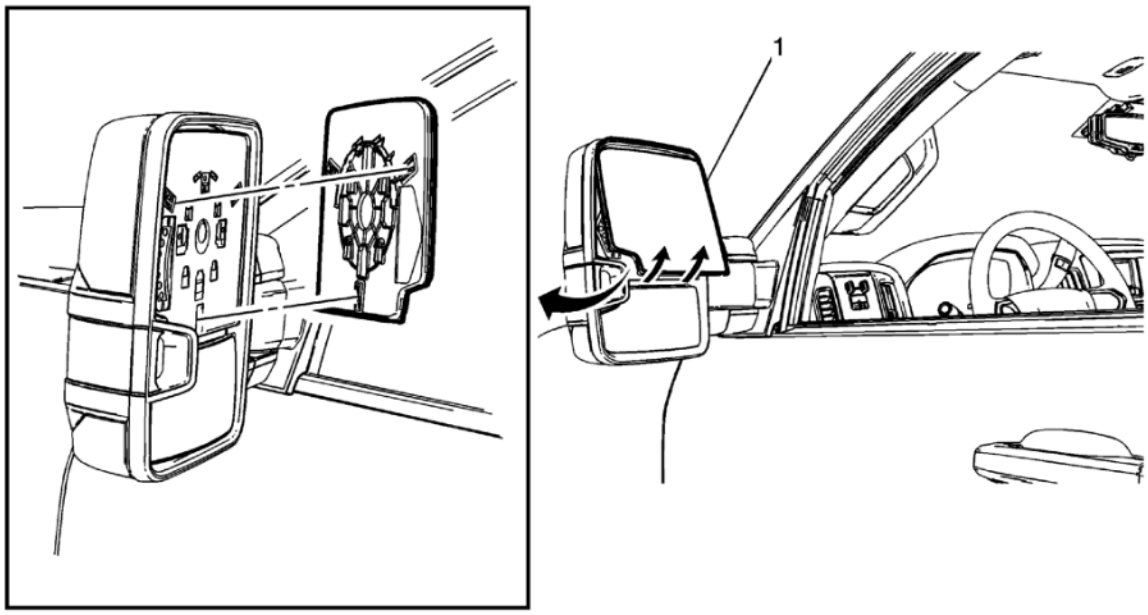


Fig. 58: Outside Rearview Mirror Glass - Upper (DQS)
Courtesy of GENERAL MOTORS COMPANY

2. Outside Rearview Mirror Glass - Upper 1 - Remove - **Outside Rearview Mirror Glass Replacement - Upper (DPN)** **Outside Rearview Mirror Glass Replacement - Upper (DQS)**
3. Disconnect the electrical connectors.

cardiagn.com

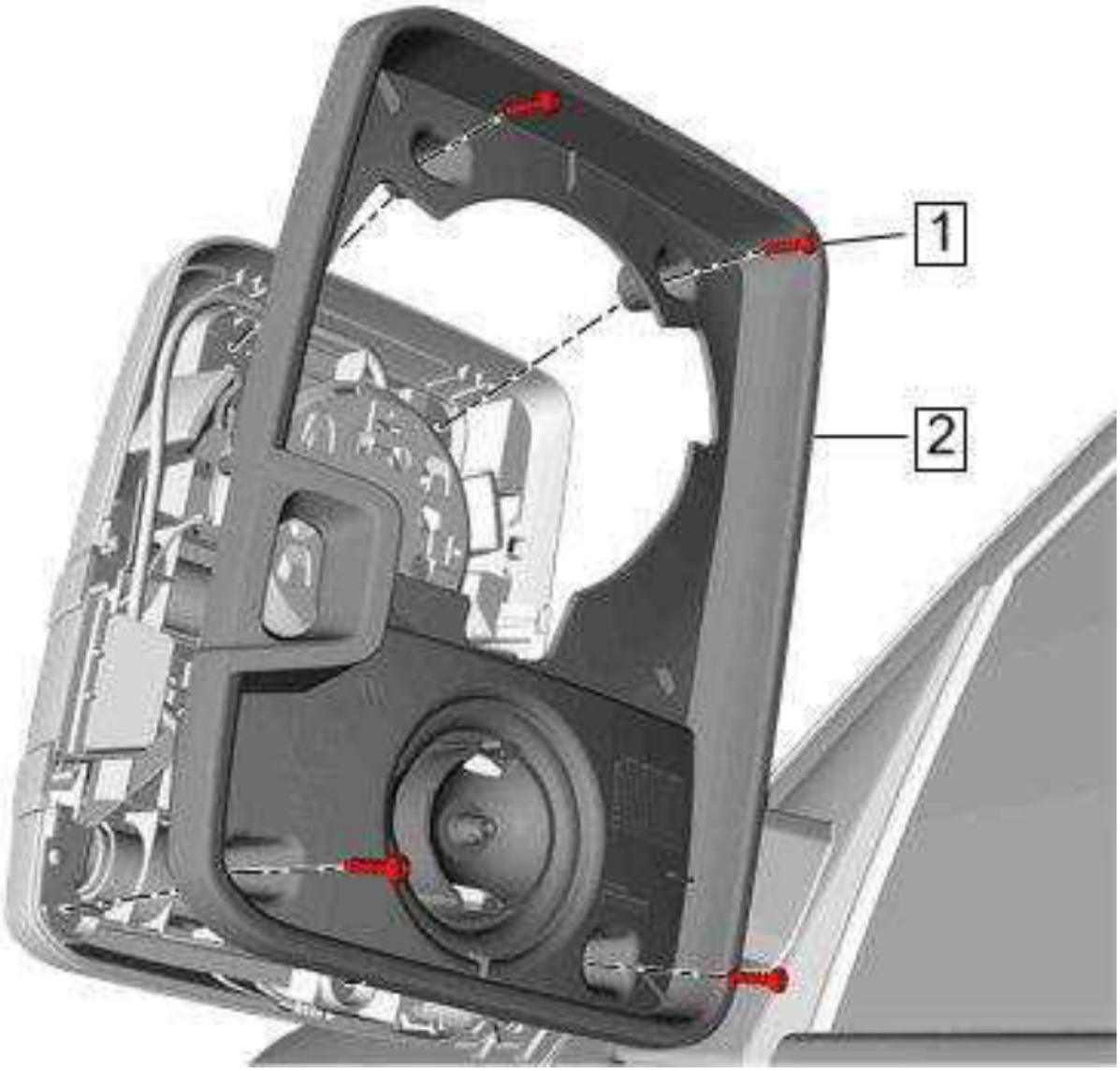


Fig. 59: Outside Rearview Mirror Bezel
Courtesy of GENERAL MOTORS COMPANY

4. Outside Rearview Mirror Bezel Screw 1 - Remove
5. Outside Rearview Mirror Bezel 2 - Remove

cardiagn.com

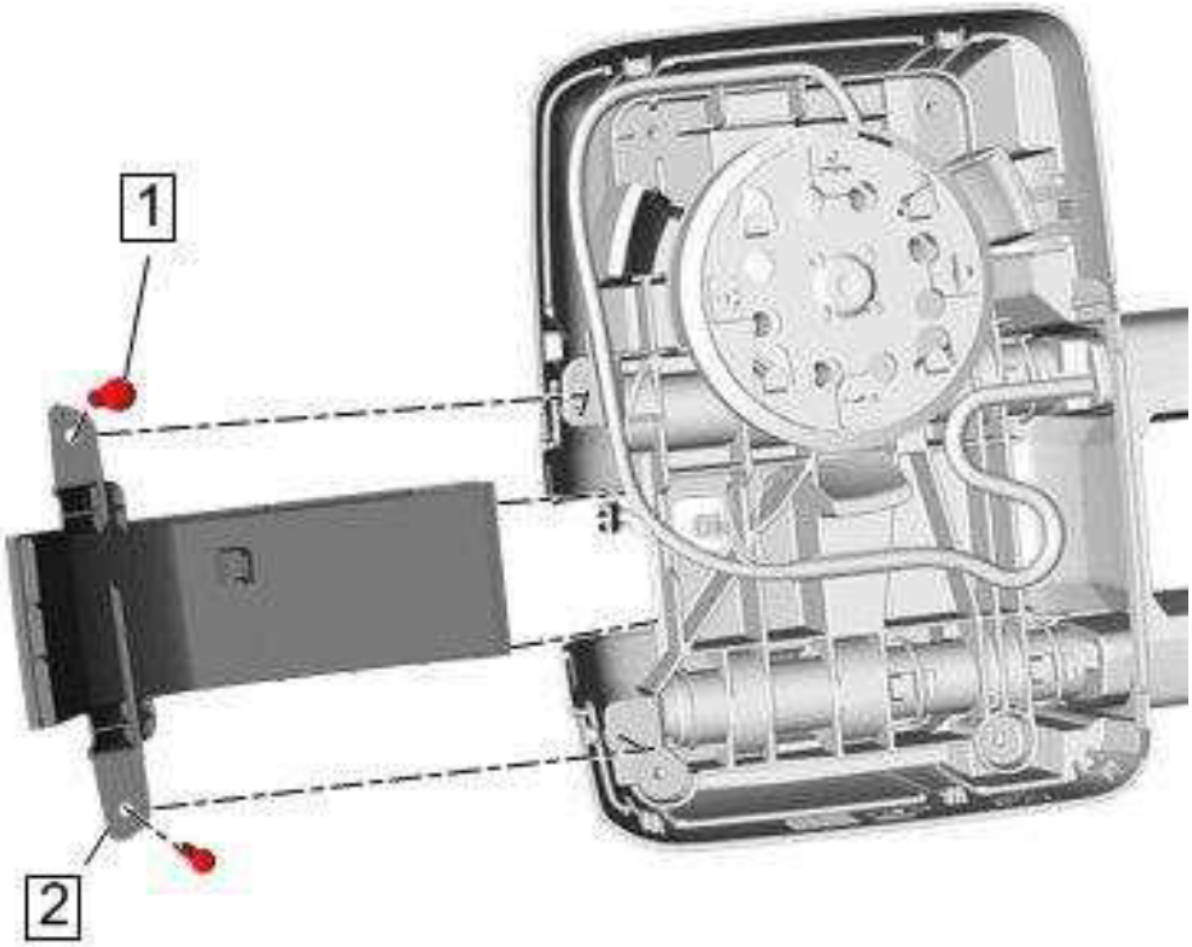


Fig. 60: Front Clearance Lamp
Courtesy of GENERAL MOTORS COMPANY

6. Outside Rearview Mirror Screw 1 - Remove
7. Front Clearance Lamp 2 - Remove

Installation Procedure

cardiagn.com

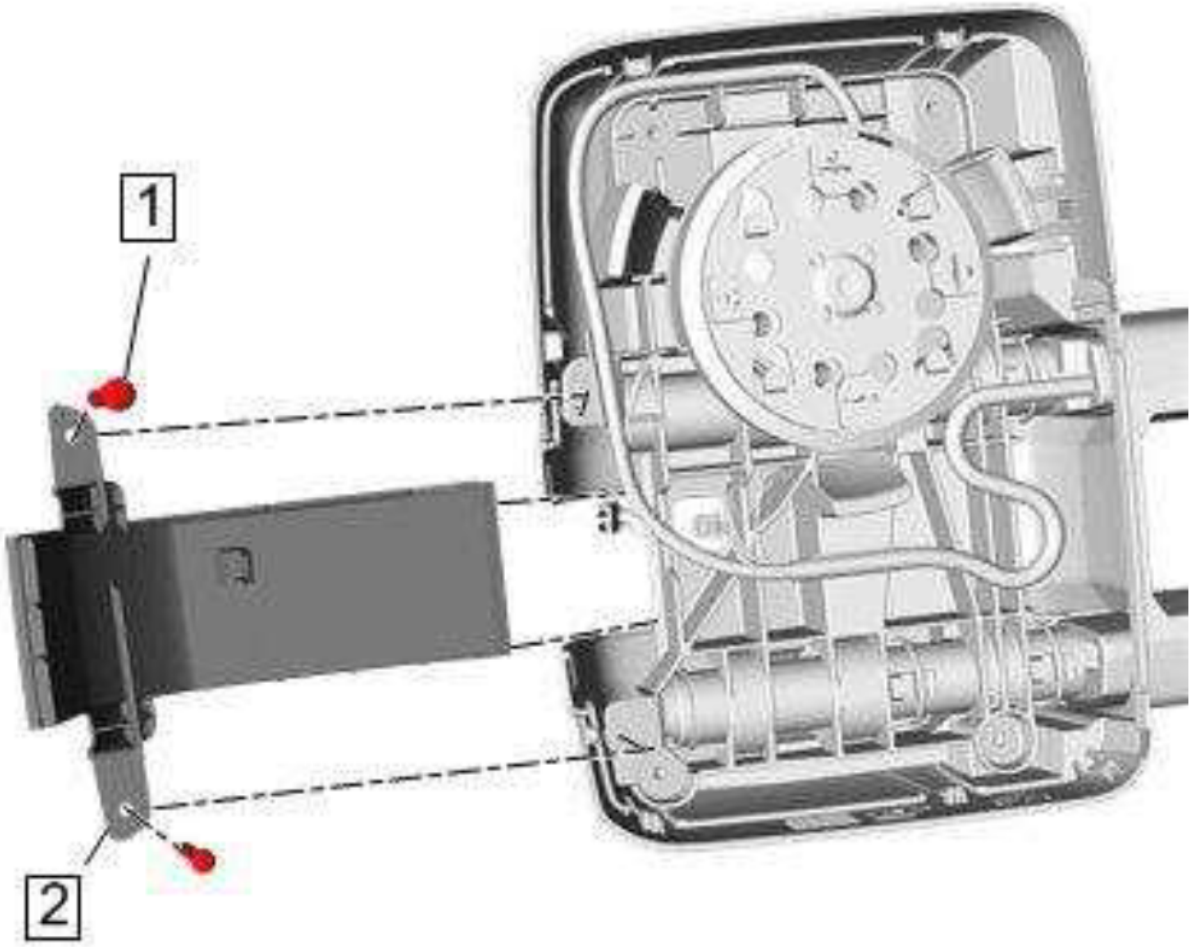


Fig. 61: Front Clearance Lamp
Courtesy of GENERAL MOTORS COMPANY

1. Front Clearance Lamp 2 - Install

CAUTION: **Refer to Fastener Caution .**

2. Outside Rearview Mirror Screw 1 - Install and tighten 0.8 N.m (7 lb in)
3. Connect the electrical connectors.

cardiagn.com

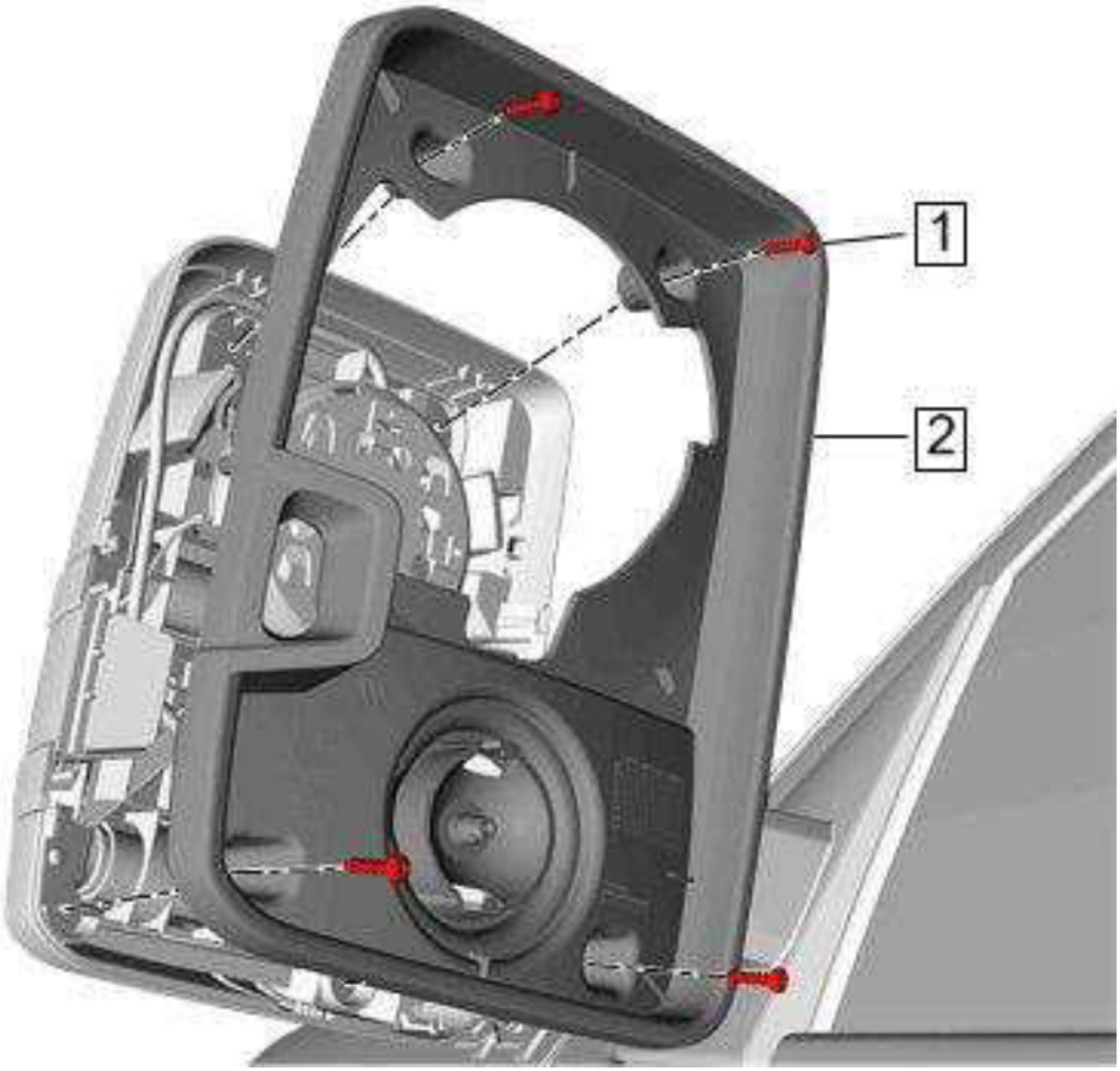


Fig. 62: Outside Rearview Mirror Bezel
Courtesy of GENERAL MOTORS COMPANY

4. Outside Rearview Mirror Bezel 2 - Remove
5. Outside Rearview Mirror Bezel Screw 1 - Remove Install and tighten 0.8 N.m (7 lb in)

cardiagn.com

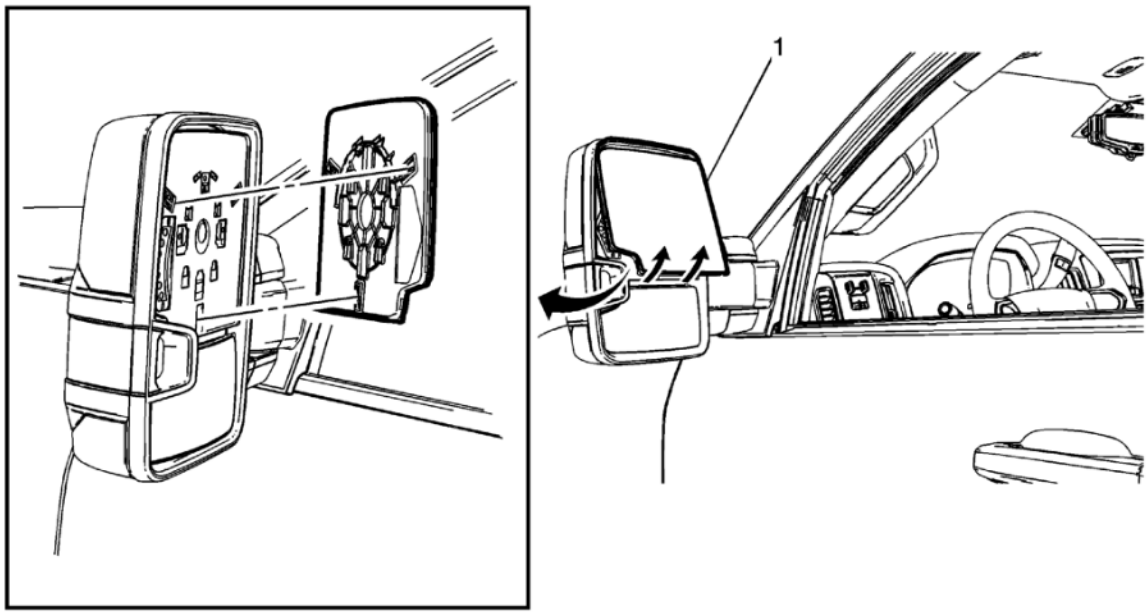
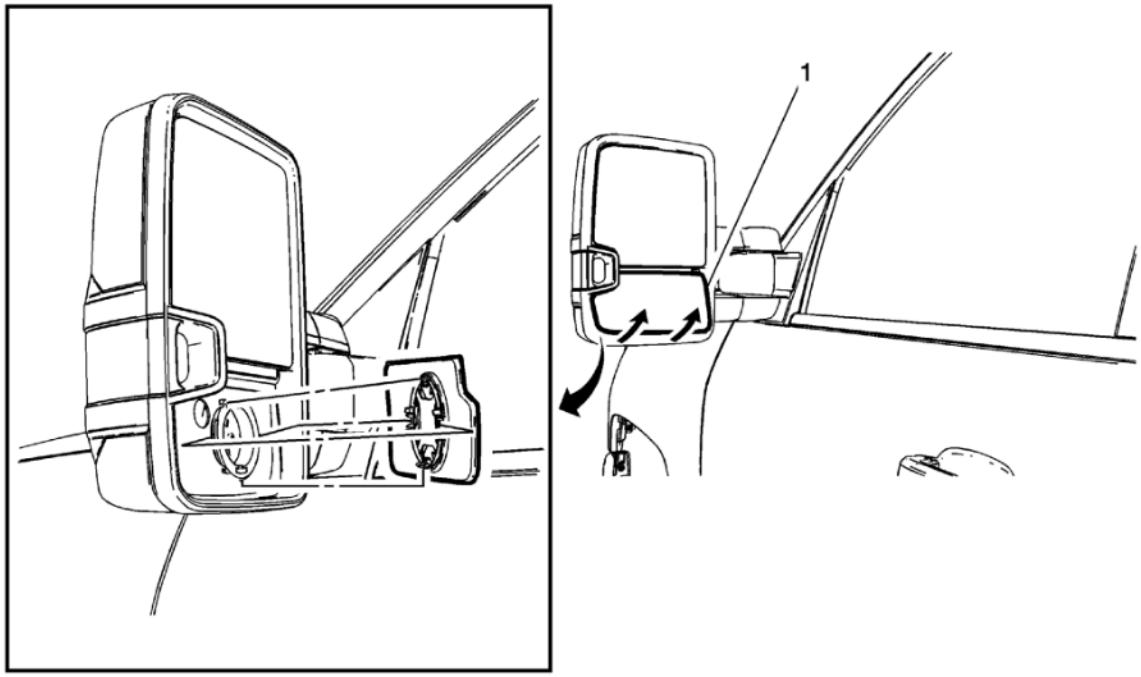


Fig. 63: Outside Rearview Mirror Glass - Upper (DQS)
Courtesy of GENERAL MOTORS COMPANY

6. Outside Rearview Mirror Glass - Upper 1 - Remove - **Outside Rearview Mirror Glass Replacement - Upper (DPN)** **Outside Rearview Mirror Glass Replacement - Upper (DQS)**



cardiagn.com

Fig. 64: Outside Rearview Mirror Glass - Lower (DQS)
Courtesy of GENERAL MOTORS COMPANY

7. Outside Rearview Mirror Glass - Lower 1 - Remove - Outside Rearview Mirror Glass Replacement - Lower (DPN) Outside Rearview Mirror Glass Replacement - Lower (DQS)

TURN SIGNAL BULB REPLACEMENT (GMC HD - LEFT SIDE)

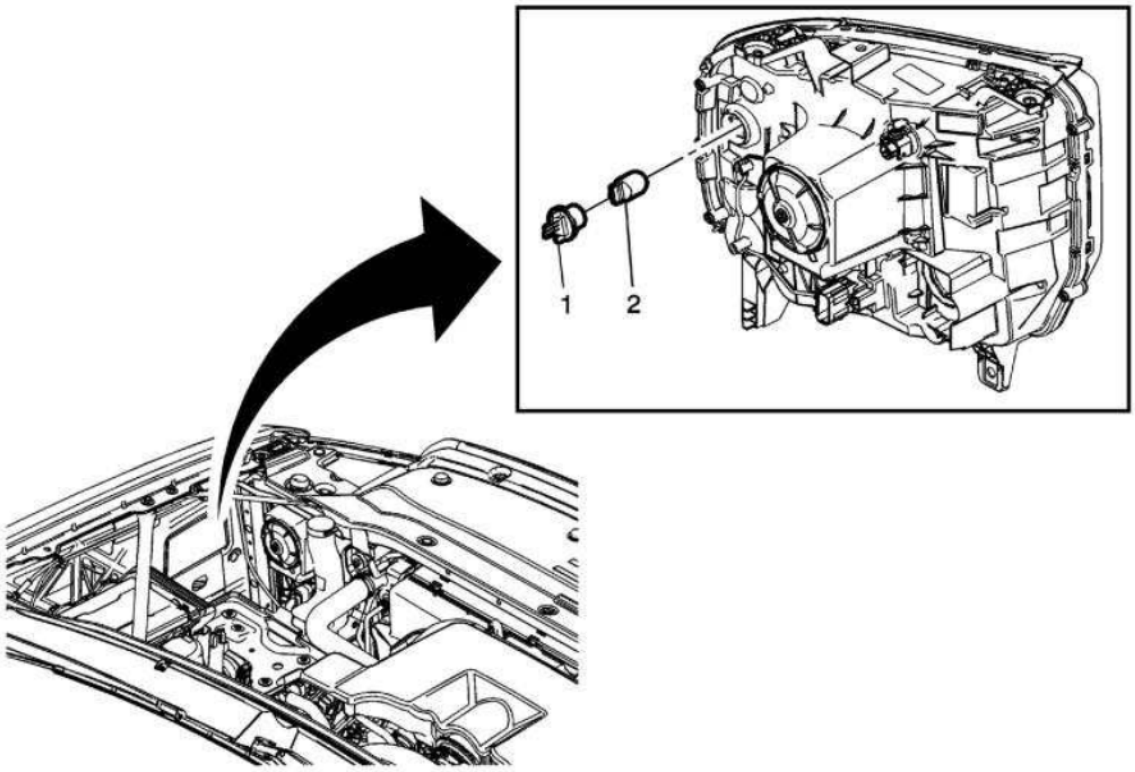


Fig. 65: Turn Signal Bulb (GMC HD - LH)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure 1. Open and support the hood. 2. Remove the auxiliary battery if equipped. Refer to Auxiliary Battery Replacement (Gas - K4B) Auxiliary Battery Replacement (Diesel) .	
1	Turn Signal Bulb Socket **Procedure** Reach through the front fender inner panel access hole and rotate the turn signal bulb socket counterclockwise and pull from the headlamp.
2	Turn Signal Bulb (GMC) (LH) **Procedure** Pull turn signal bulb straight out of the turn signal bulb socket.

TURN SIGNAL BULB REPLACEMENT (GMC HD - RIGHT SIDE)

cardiagn.com

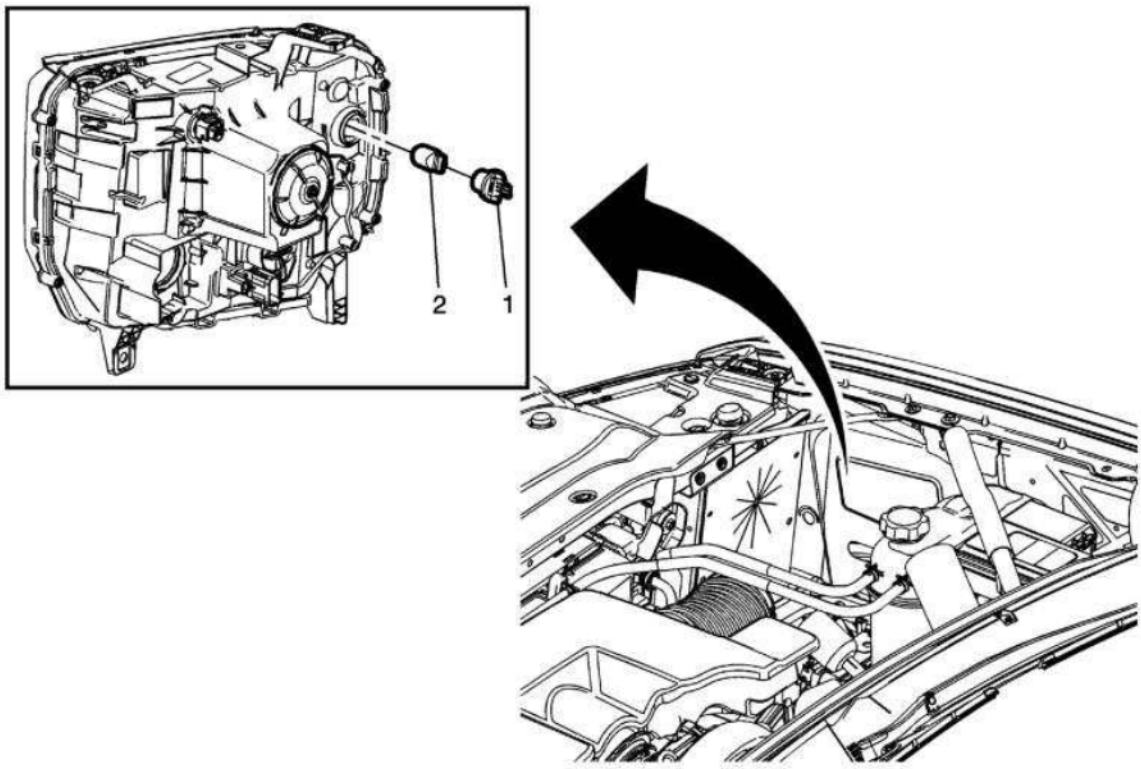


Fig. 66: Turn Signal Bulb (GMC HD - Right Side)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the air cleaner assembly. Refer to **Air Cleaner Assembly Replacement** .	
1	Turn Signal Bulb Socket **Procedure** Reach through the front fender inner panel access hole and rotate the turn signal bulb socket counterclockwise and pull from the headlamp.
2	Turn Signal Bulb (GMC) (RH) **Procedure** Pull turn signal bulb straight out of turn signal bulb socket.

TURN SIGNAL BULB REPLACEMENT (CHEVROLET LD - LEFT SIDE)

cardiagn.com

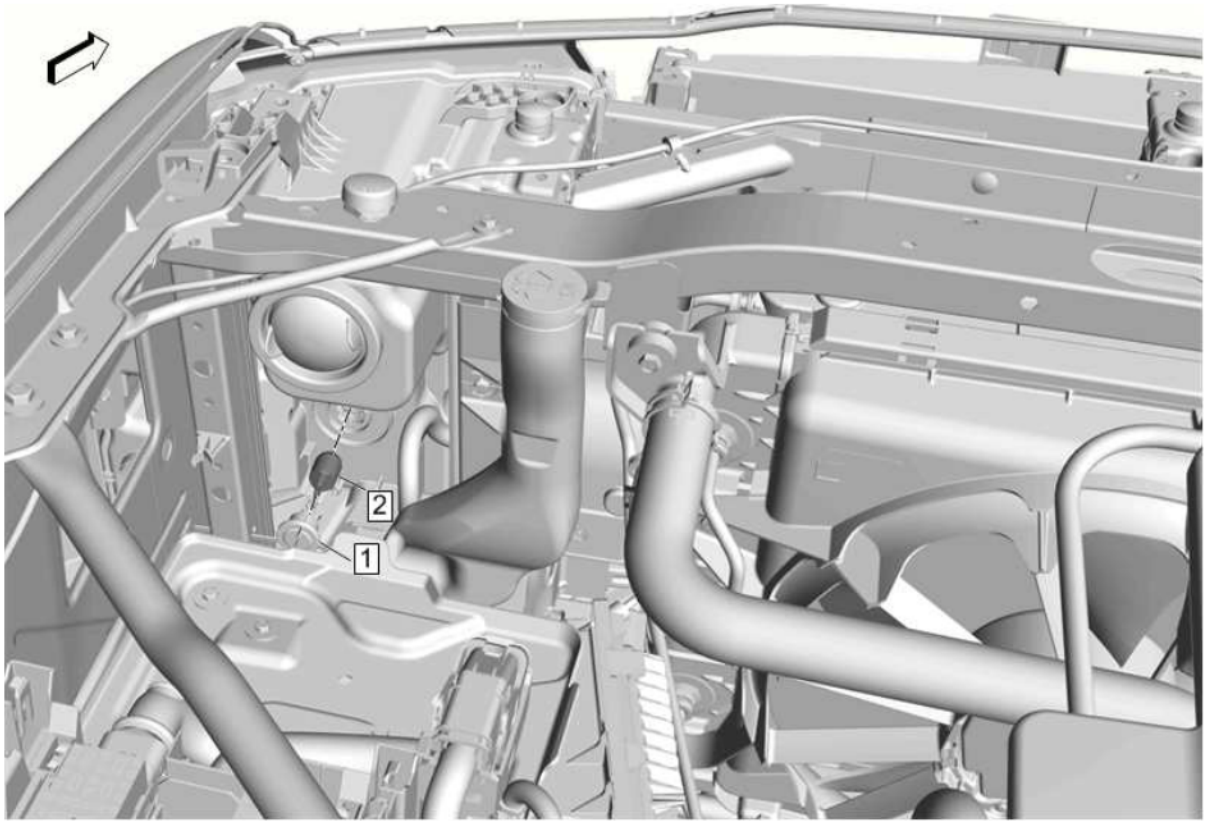


Fig. 67: Turn Signal Bulb (Chevrolet LD - Left Side)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure 1. Open and support the hood. 2. { If equipped } **Auxiliary Battery Replacement (Gas - K4B)**	
1	Turn Signal Bulb Socket **Procedure** Rotate the bulb socket a quarter turn counterclockwise and remove.
2	Turn Signal Bulb **Procedure** Pull the bulb straight from the lamp socket.

TURN SIGNAL BULB REPLACEMENT (CHEVROLET LD - RIGHT SIDE)

cardiagn.com

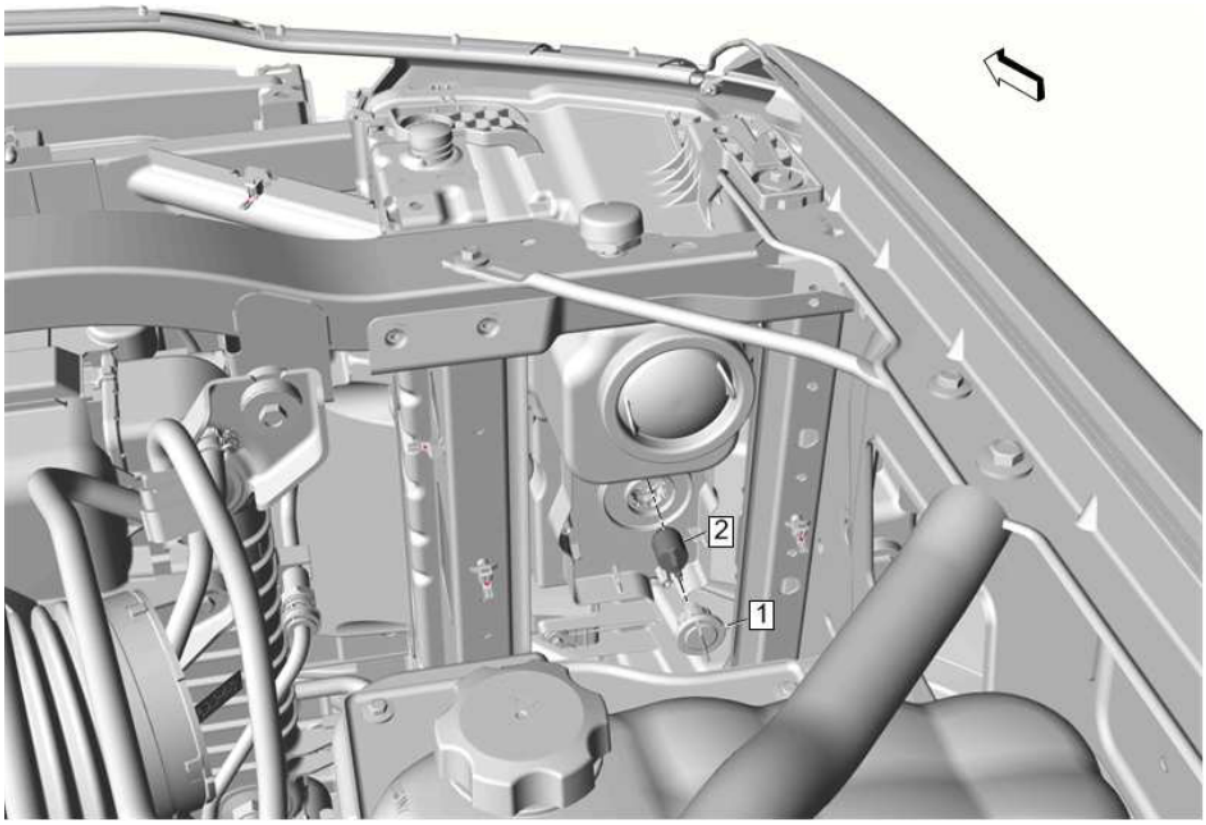


Fig. 68: Turn Signal Bulb (Chevrolet LD - Right Side)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure 1. Open and support the hood. 2. **Radiator Support Baffle Replacement (LV3)** **Radiator Support Baffle Replacement (L83, L86)** **Radiator Support Baffle Replacement (LC8, L96)** **Radiator Support Baffle Replacement (L8B)** **Radiator Support Baffle Replacement (L5P)**	
1	Turn Signal Bulb Socket **Procedure** Rotate the bulb socket a quarter turn counterclockwise and remove.
2	Turn Signal Bulb **Procedure** Pull the bulb straight from the lamp socket.

TURN SIGNAL BULB REPLACEMENT (GMC LD)

cardiagn.com

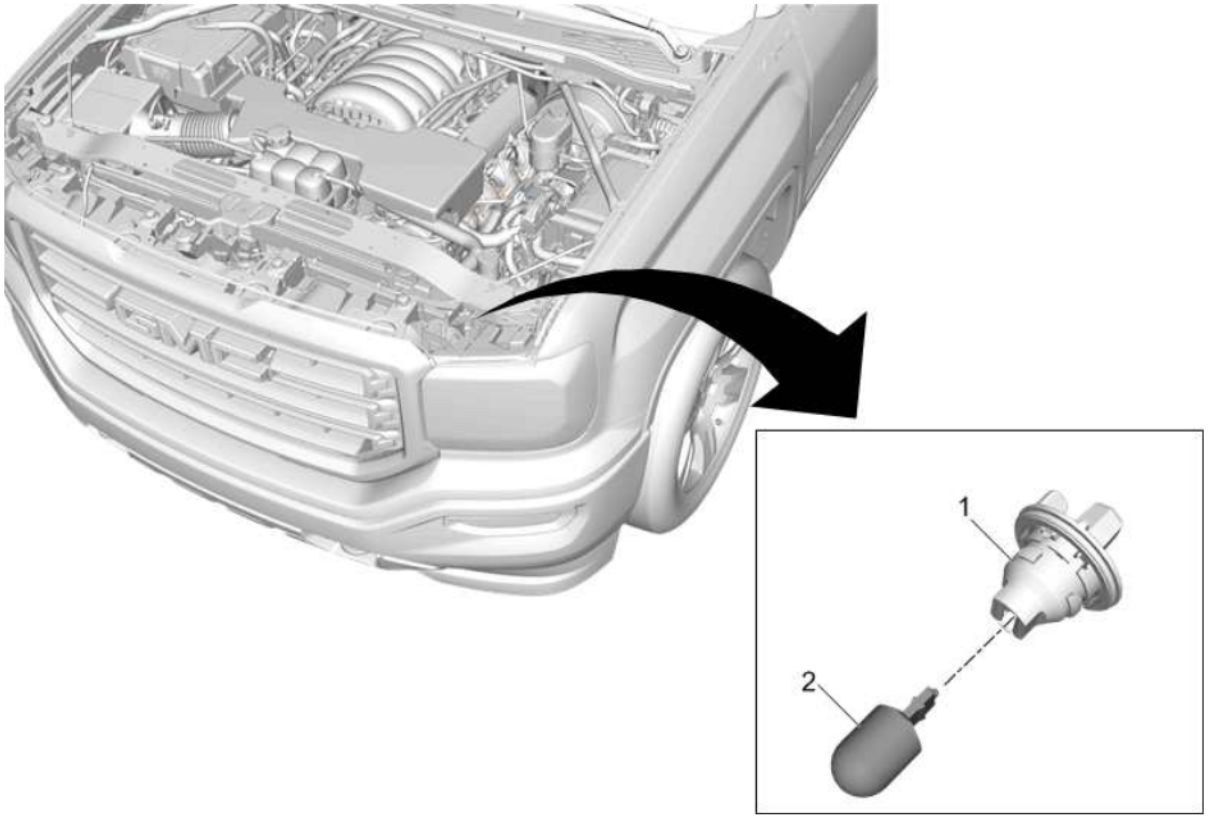


Fig. 69: Turn Signal Bulb (GMC LD)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures 1. Open and support the hood. 2. **Front Compartment Front Sight Shield Replacement**	
1	Turn Signal Bulb Socket **Procedure** 1. Using long needle nose pliers or equivalent, grasp the tab on the wireless bulb socket and hold. 2. Using appropriate box end wrench or equivalent, rotate the bulb socket counterclockwise and tilt socket to remove from headlamp.
2	Turn Signal Bulb **Procedure** Pull the bulb straight from the lamp socket.

HIGH MOUNT STOP LAMP WIRING HARNESS REPLACEMENT

cardiagn.com

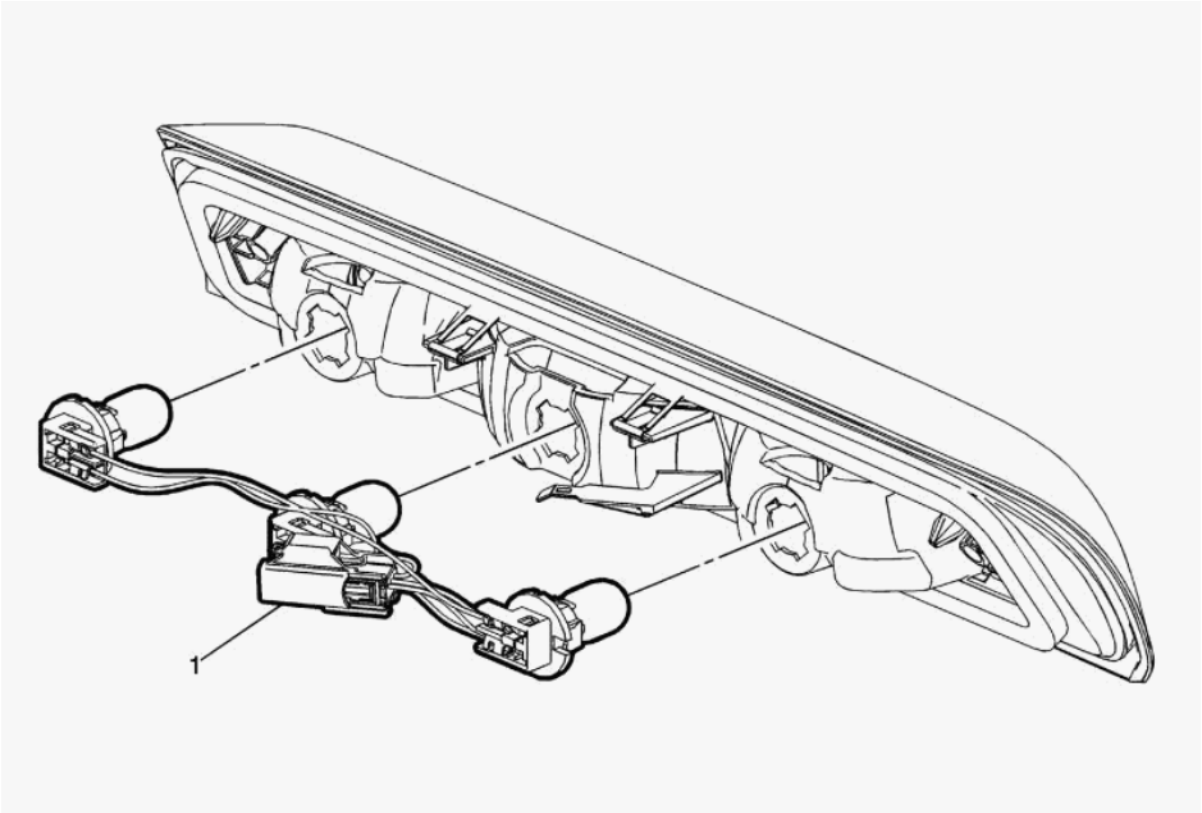


Fig. 70: High Mount Stop Lamp Wiring Harness
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the high mount stop and cargo lamp. Refer to **High Mount Stop and Cargo Lamp Replacement**.	
1	High Mount Stop Lamp Wiring Harness **Procedure** Rotate counterclockwise and pull the 3 high mount stop lamp wiring harness bulb sockets from the high mount stop and cargo lamp.

HIGH MOUNT STOP AND CARGO LAMP REPLACEMENT

cardiagn.com

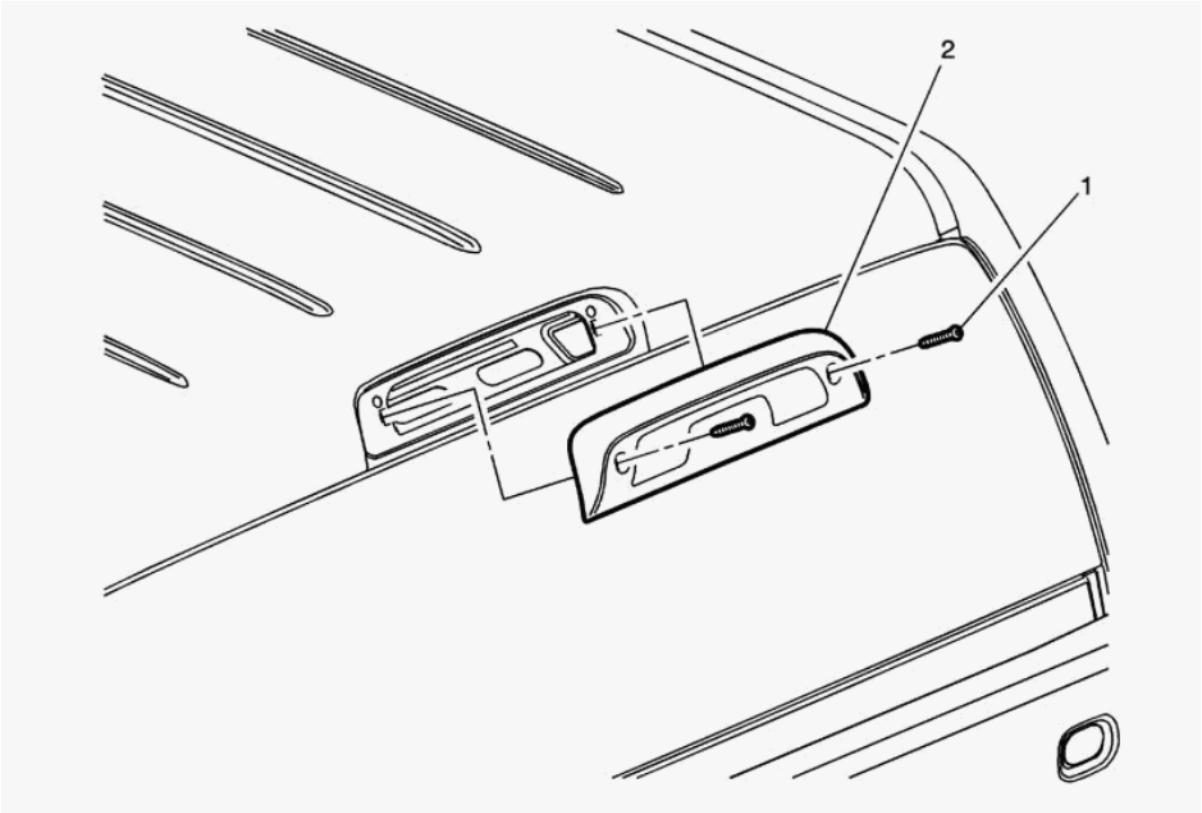


Fig. 71: High Mount Stop and Cargo Lamp
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	High Mount Stop and Cargo Lamp Screw (Qty: 2) **CAUTION:** **Refer to** **Fastener Caution** .
2	High Mount Stop and Cargo Lamp **Procedure** Pull high mount stop and cargo lamp from vehicle and disconnect the electrical connector.

HIGH MOUNT STOP LAMP BULB REPLACEMENT (STOP)

cardiagn.com

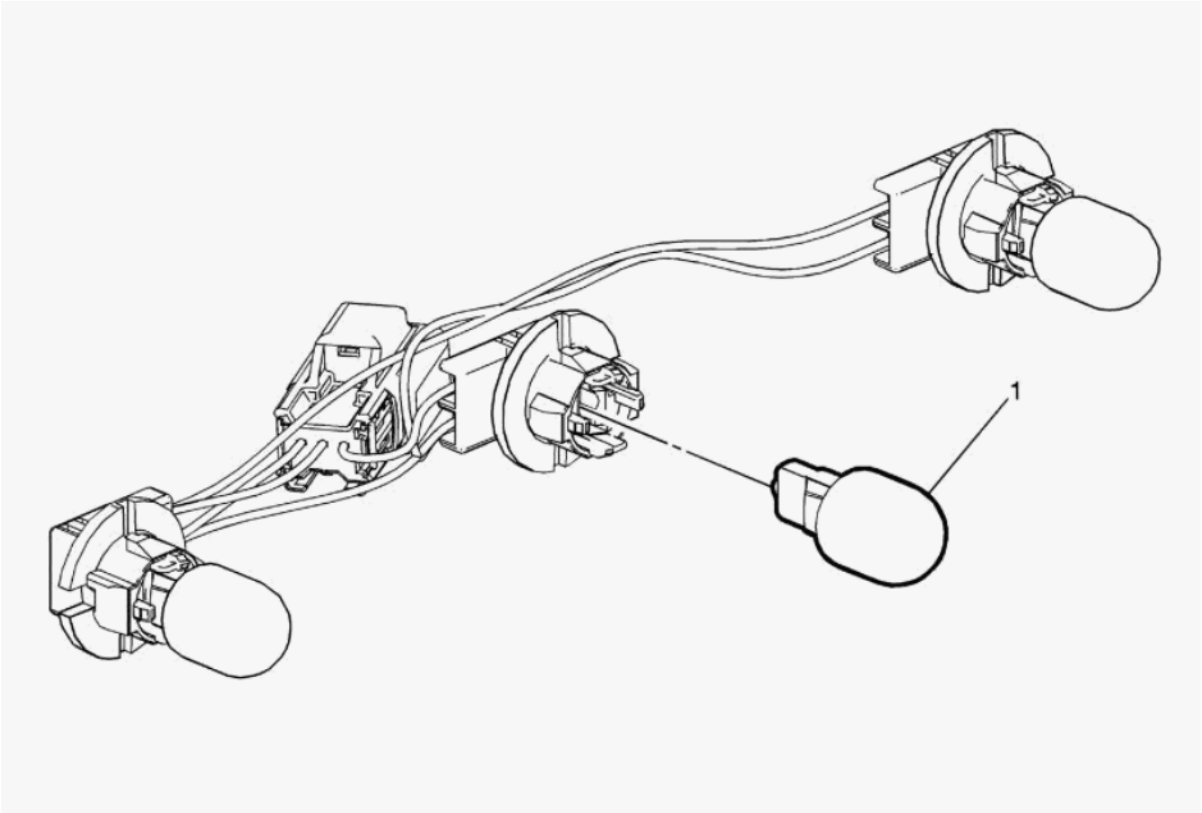


Fig. 72: High Mount Stop Lamp Bulb (Stop)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the high mount stop lamp wiring harness. Refer to **High Mount Stop Lamp Wiring Harness Replacement**.	
1	High Mount Stop Lamp Bulb (Stop) **Procedure** Pull the high mount stop lamp bulb straight out from high mount stop lamp wiring harness socket.

HIGH MOUNT STOP LAMP BULB REPLACEMENT (CARGO)

cardiagn.com

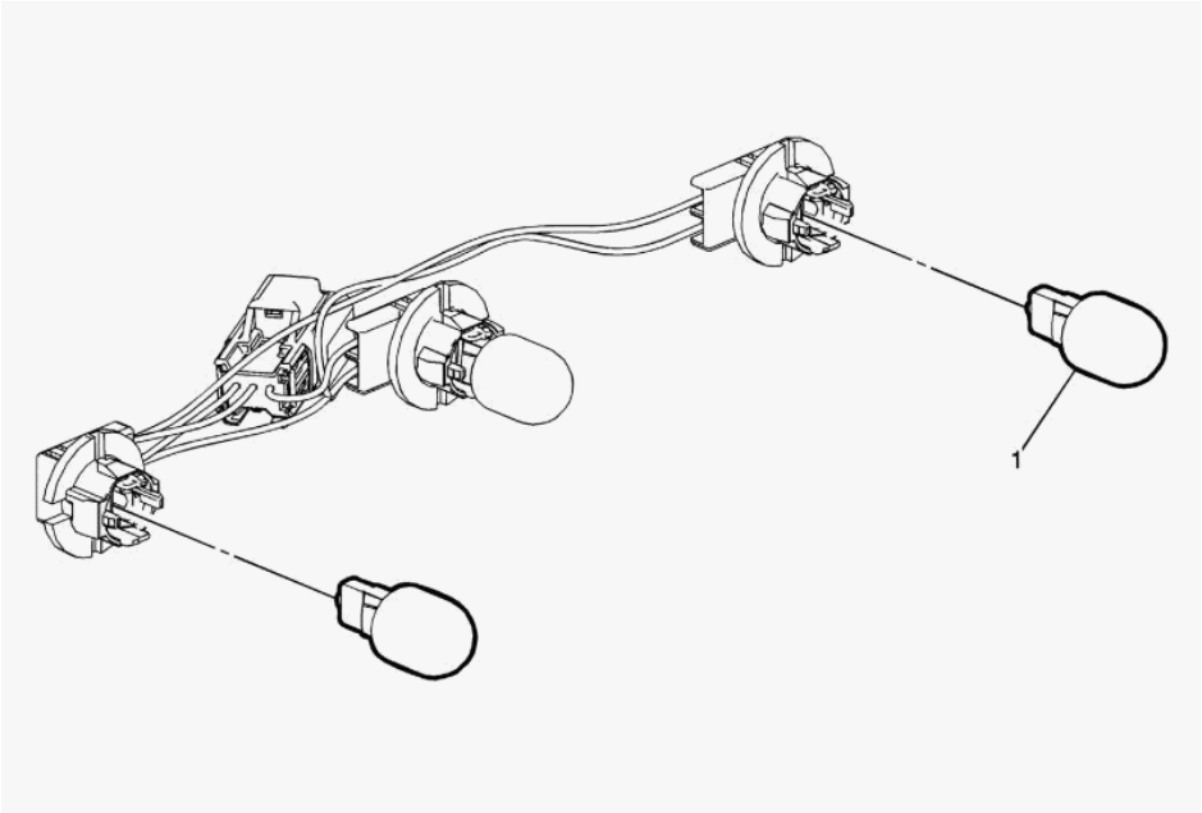


Fig. 73: High Mount Stop Lamp Bulb (Cargo)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the high mount stop lamp wiring harness. Refer to **High Mount Stop Lamp Wiring Harness Replacement**.	
1	High Mount Stop Lamp Bulb (Cargo) **Procedure** Pull the high mount stop lamp bulb straight out from high mount stop lamp wiring harness socket.

CARGO LAMP REPLACEMENT

cardiagn.com

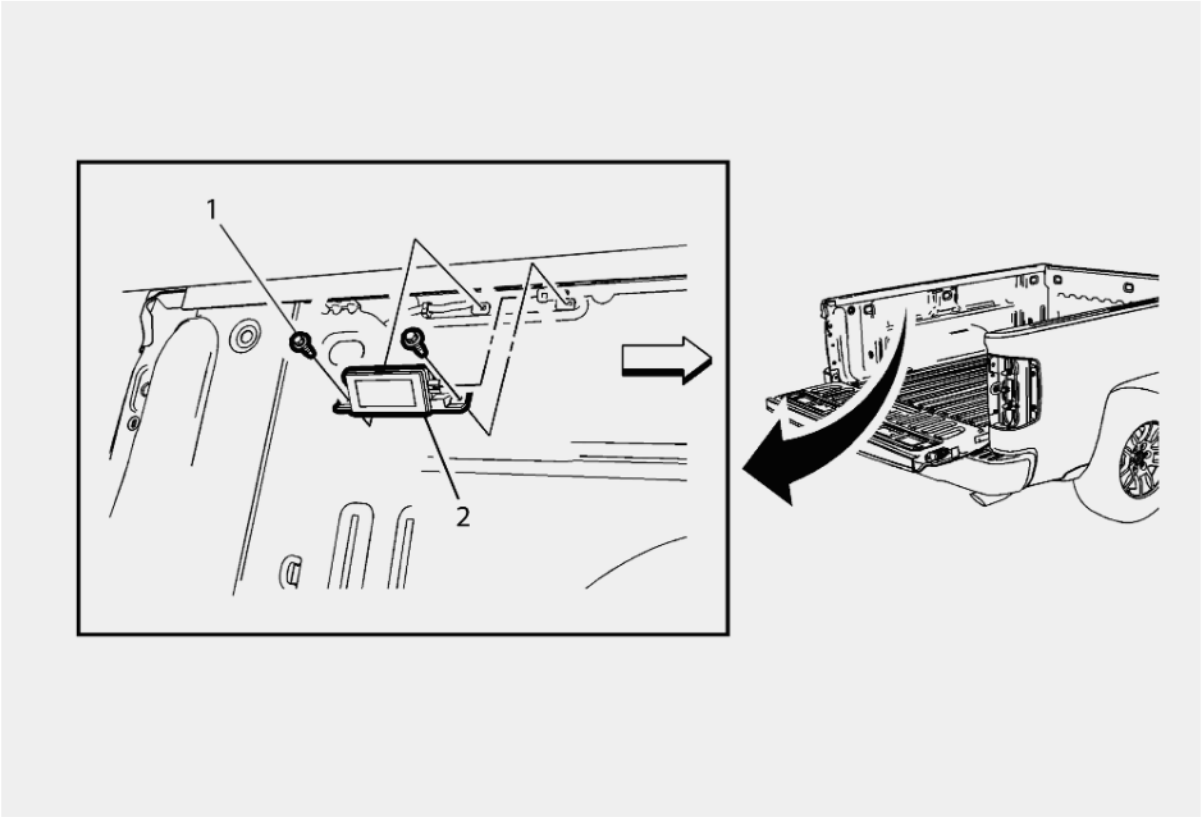


Fig. 74: Cargo Lamp
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Disconnect the electrical connector.	
1	Cargo Lamp Bolt (Qty: 2) **CAUTION:** **Refer to** **Fastener Caution** . **Tighten** 2.5 N.m (22 lb in)
2	Cargo Lamp

BACKUP LAMP BULB REPLACEMENT (CHEVROLET 1500, 2500. AND 3500 WITHOUT GAJ)

cardiagn.com

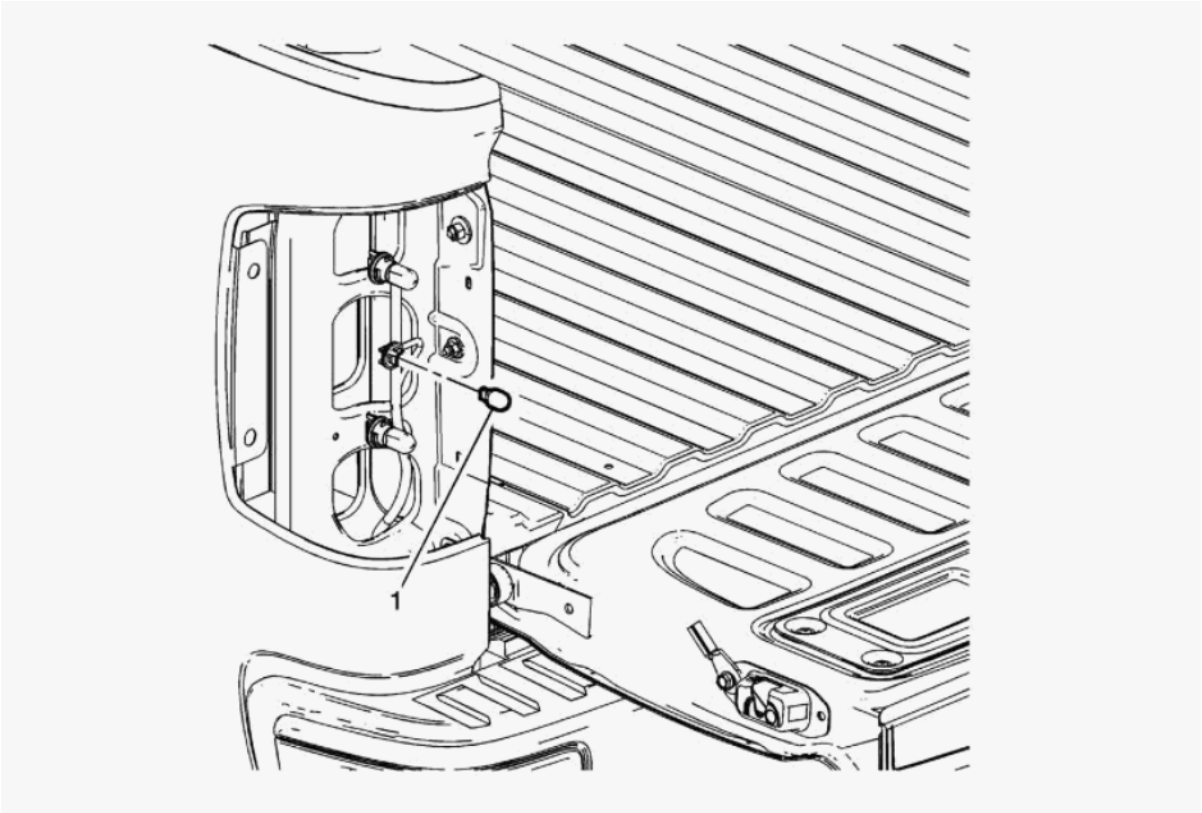


Fig. 75: Backup Lamp Bulb (Chevrolet 1500, 2500. and 3500 without GAJ)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the tail lamp. Refer to **Tail Lamp Replacement (Chevrolet 1500, 2500, 3500 without GAJ)**.	
1	Backup Lamp Bulb **Procedure** Pull the backup lamp bulb straight out from the tail lamp harness bulb socket.

BACKUP LAMP BULB REPLACEMENT (GMC 1500, 2500, 3500 WITHOUT GAT OR GFW)

cardiagn.com

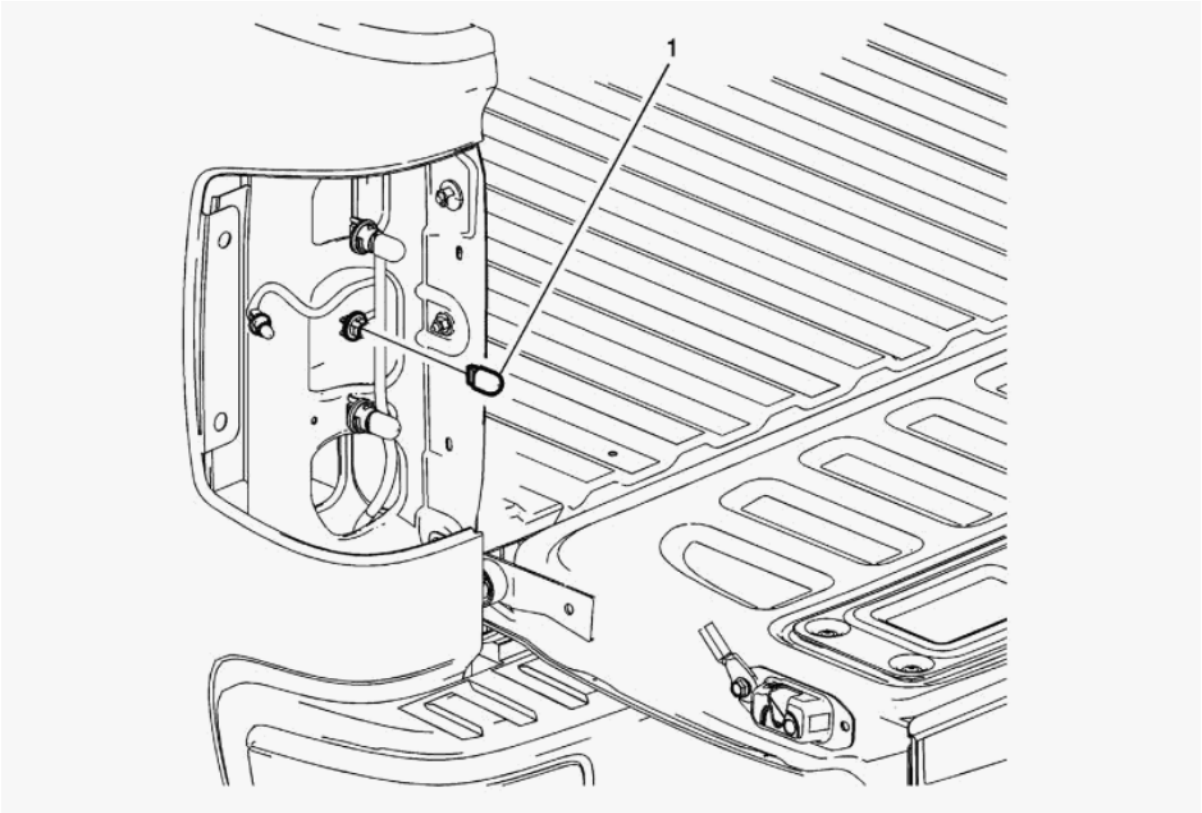


Fig. 76: Backup Lamp Bulb Replacement (GMC 1500, 2500, 3500 without GAT or GFW)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the tail lamp. Refer to **Tail Lamp Replacement (GMC 1500, 2500, 3500 without GAT or GFW)**.	
1	Backup Lamp Bulb (GMC) **Procedure** Pull the backup lamp bulb straight out from the tail lamp harness bulb socket.

BACKUP LAMP BULB REPLACEMENT (GMC 1500 WITH GAT OR GFW)

cardiagn.com

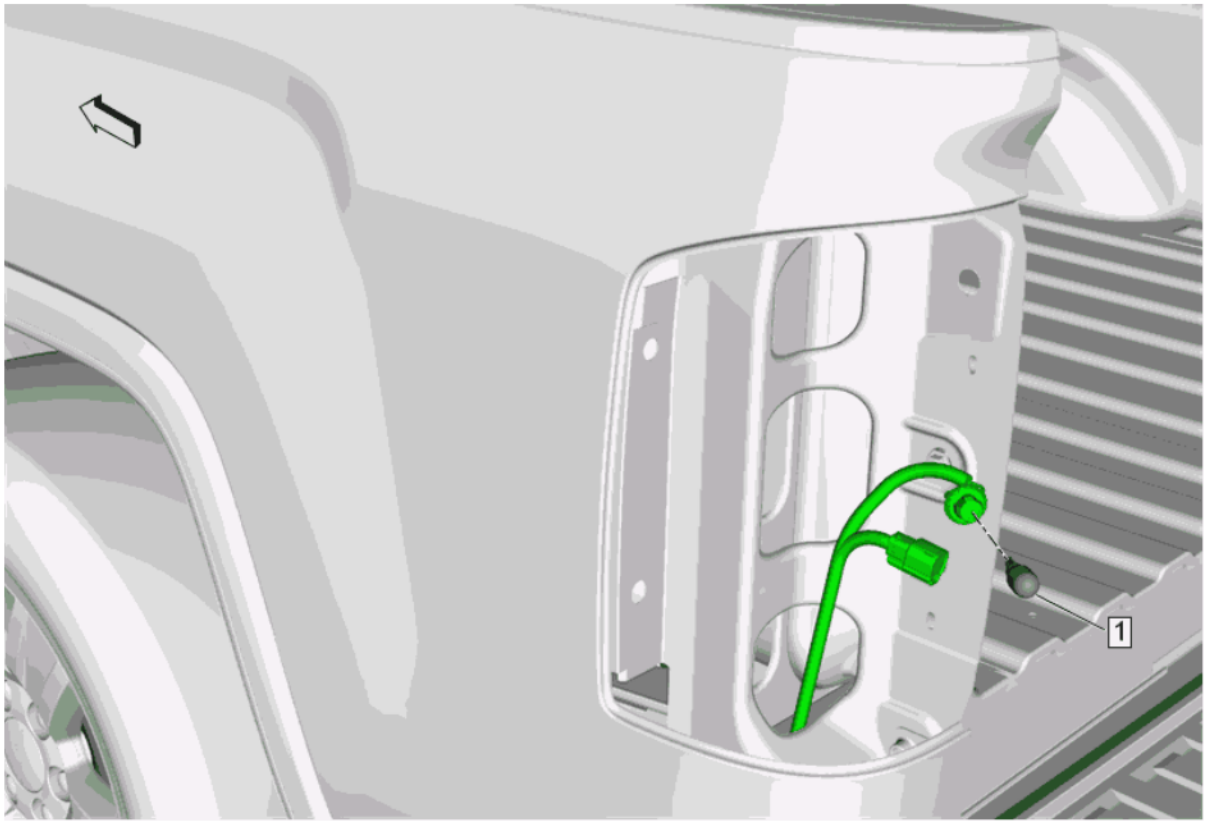


Fig. 77: Backup Lamp Bulb (GMC 1500 with GAT or GFW)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure **Tail Lamp Replacement (GMC 1500 with GAT or GFW)**	
1	Backup Lamp Bulb **Procedure** Pull the bulb from the bulb socket.

BACKUP LAMP BULB REPLACEMENT (CHEVROLET 1500 WITH GAJ)

cardiagn.com



Fig. 78: Backup Lamp Bulb (Chevrolet 1500 with GAJ)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure **Tail Lamp Replacement (Chevrolet 1500 with GAJ)**	
1	Backup Lamp Bulb **Procedure** Pull the bulb from the bulb socket.

TAIL LAMP WIRING HARNESS REPLACEMENT (LH)

cardiagn.com

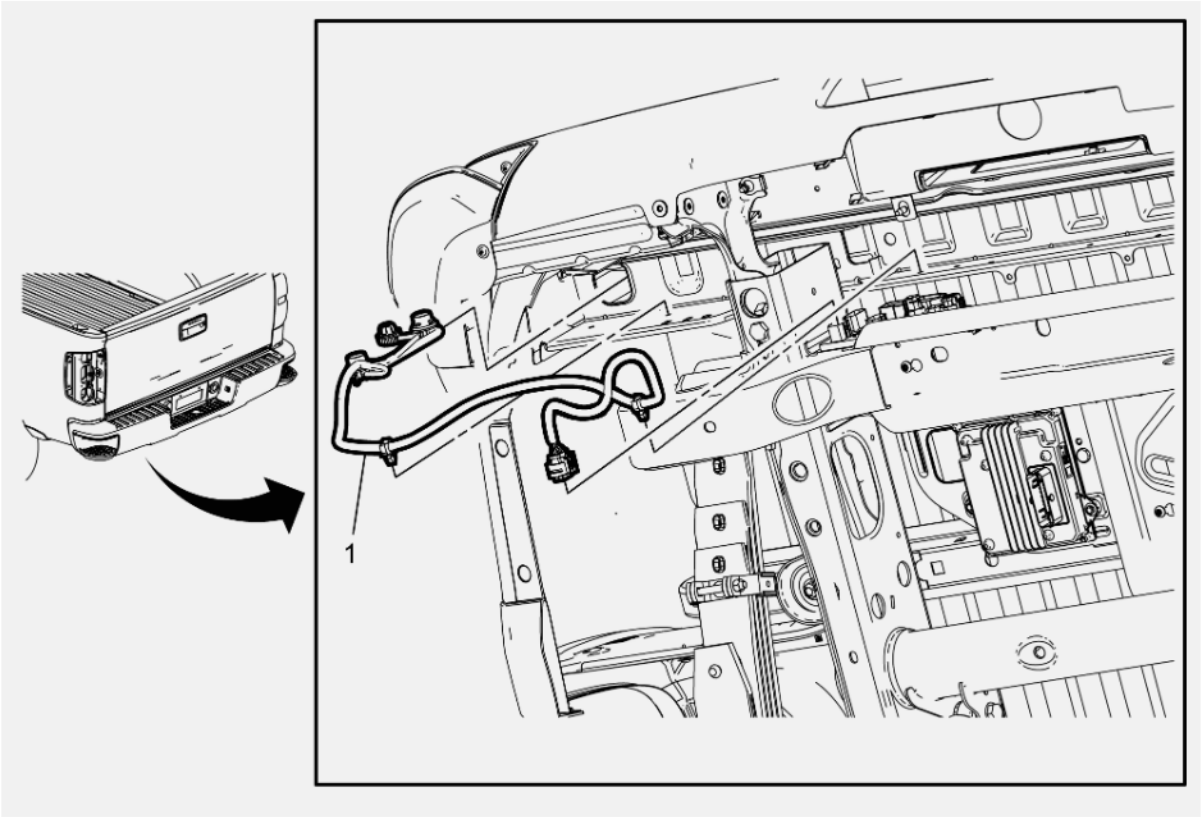


Fig. 79: Tail Lamp Wiring Harness (LH)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove tail lamp. Refer to **Tail Lamp Replacement (Chevrolet 1500, 2500, 3500 without GAJ)Tail Lamp Replacement (GMC 1500, 2500, 3500 without GAT or GFW)Tail Lamp Replacement (GMC 1500 with GAT or GFW)Tail Lamp Replacement (Chevrolet 1500 with GAJ)**.	
1	Tail Lamp Wiring Harness **Procedure** 1. Gently drop the tail lamp wiring harness down through the hole in the pickup box platform rear cross sill. 2. Use a trim type release tool to release the 2 retainers. 3. Gently feed the tail lamp wiring harness through the reinforcement pickup box platform rear cross sill. 4. Disconnect the electrical connector from the junction block and remove from vehicle.

TAIL LAMP WIRING HARNESS REPLACEMENT (RH)

cardiagn.com

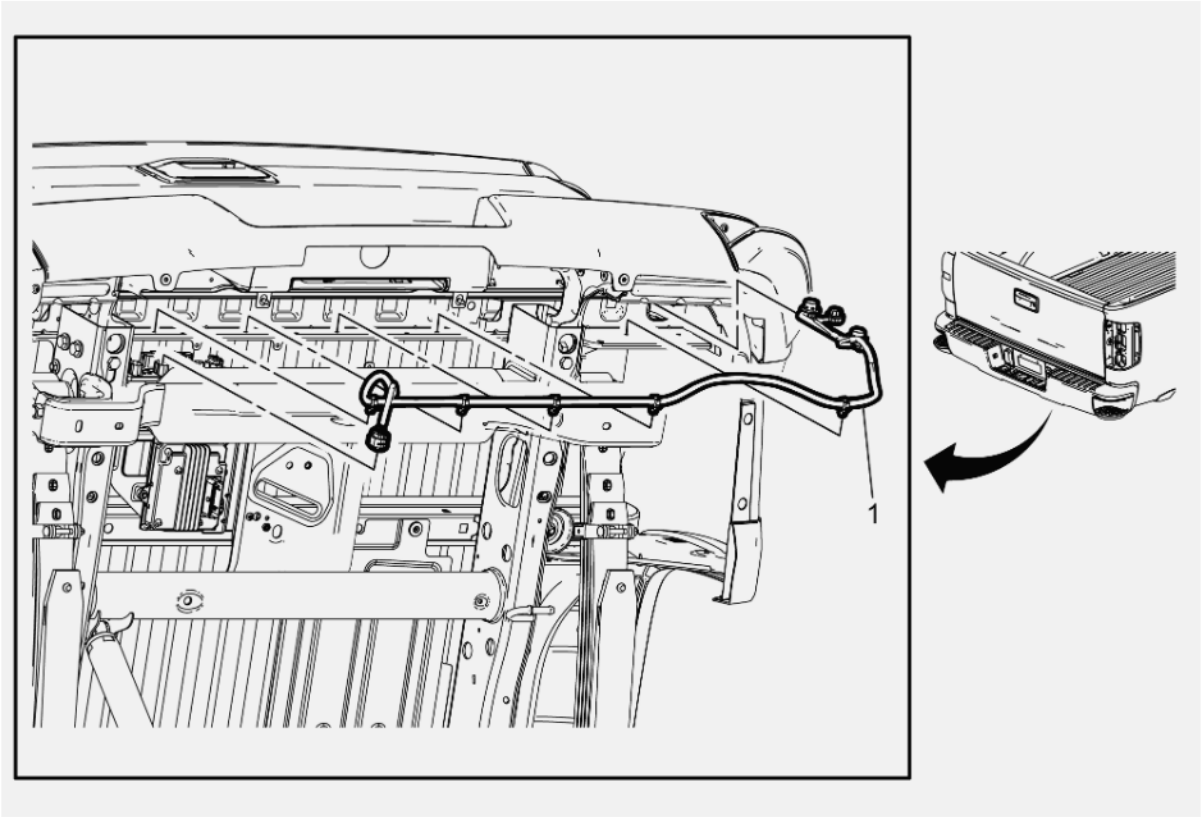


Fig. 80: Tail Lamp Wiring Harness (RH)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove tail lamp. Refer to **Tail Lamp Replacement (Chevrolet 1500, 2500, 3500 without GAJ)Tail Lamp Replacement (GMC 1500, 2500, 3500 without GAT or GFW)Tail Lamp Replacement (GMC 1500 with GAT or GFW)Tail Lamp Replacement (Chevrolet 1500 with GAJ)**.	
1	Tail Lamp Wiring Harness **Procedure** 1. Gently drop the tail lamp wiring harness down through the hole in the pickup box platform rear cross sill. 2. Use a trim type release tool to release the 5 retainers. 3. Gently feed the tail lamp wiring harness through the reinforcement pickup box platform rear cross sill. 4. Disconnect the electrical connector from the junction block and remove from vehicle.

REAR LICENSE PLATE LAMP REPLACEMENT

cardiagn.com

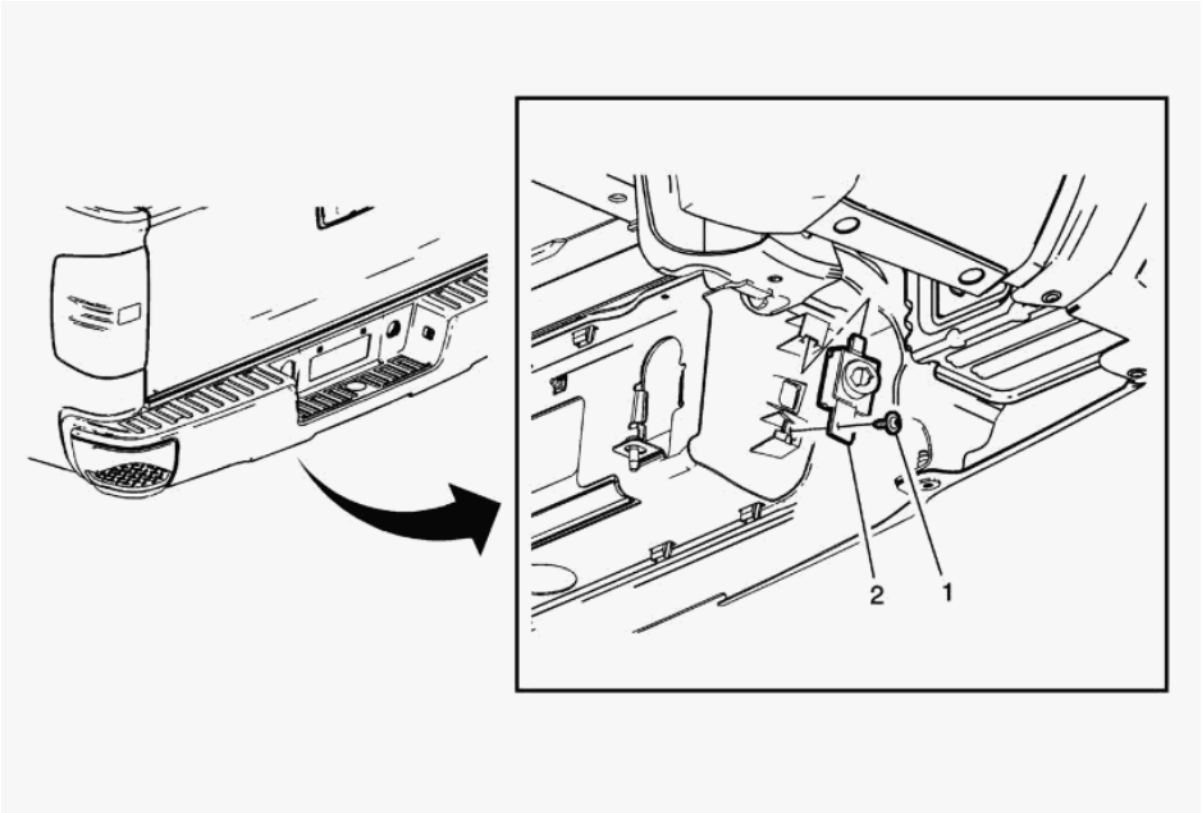


Fig. 81: Rear License Plate Lamp
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Rear License Plate Lamp Screw **CAUTION:** **Refer to** **Fastener** **Caution** .
2	Rear License Plate Lamp **Procedure** 1. Disconnect the electrical connector. 2. Depress the locking tab on the rear license plate lamp and pull from the rear bumper impact bar. 3. Transfer parts as necessary.

REAR LICENSE PLATE LAMP BULB REPLACEMENT

cardiagn.com

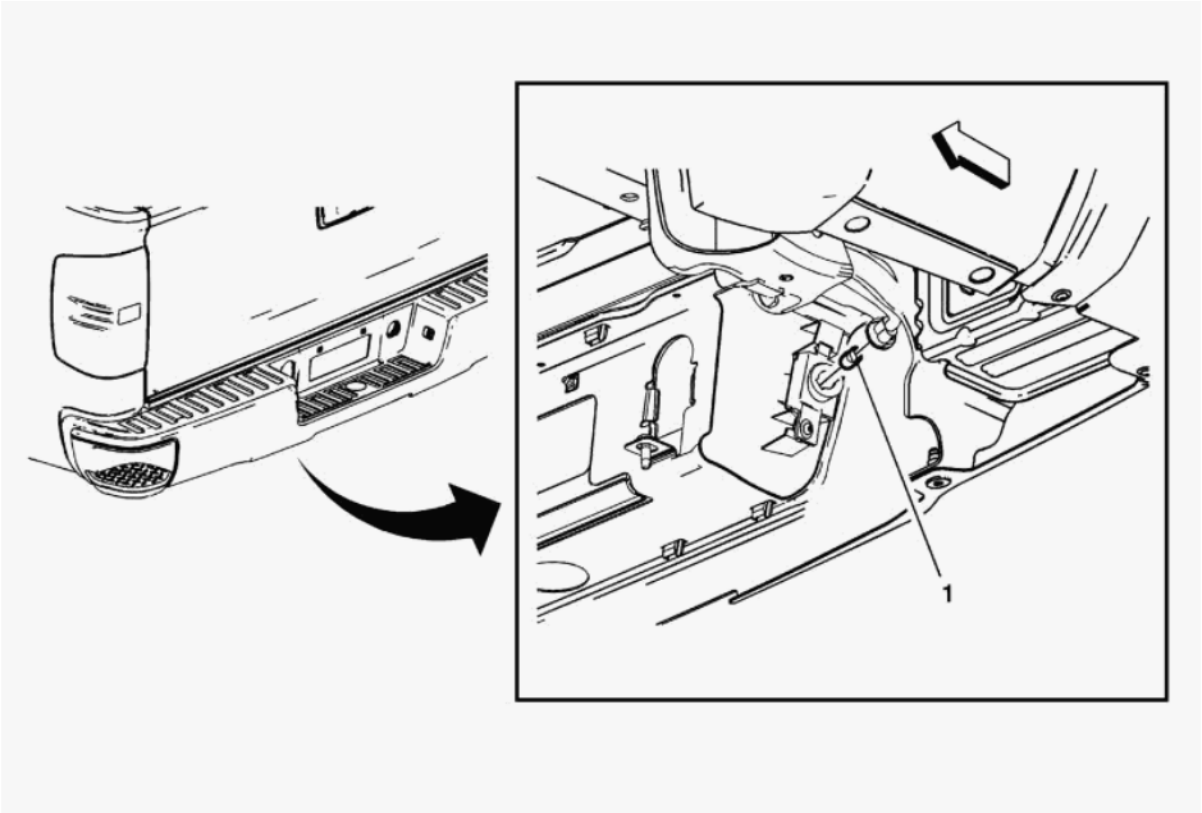


Fig. 82: Rear License Plate Lamp Bulb
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Rear License Plate Lamp Bulb **Procedure** 1. Rotate counterclockwise and pull the socket from the rear license plate lamp. 2. Pull the rear license plate lamp bulb straight out of the socket.

TAIL LAMP REPLACEMENT (CHEVROLET 1500, 2500, 3500 WITHOUT GAJ)

cardiagn.com

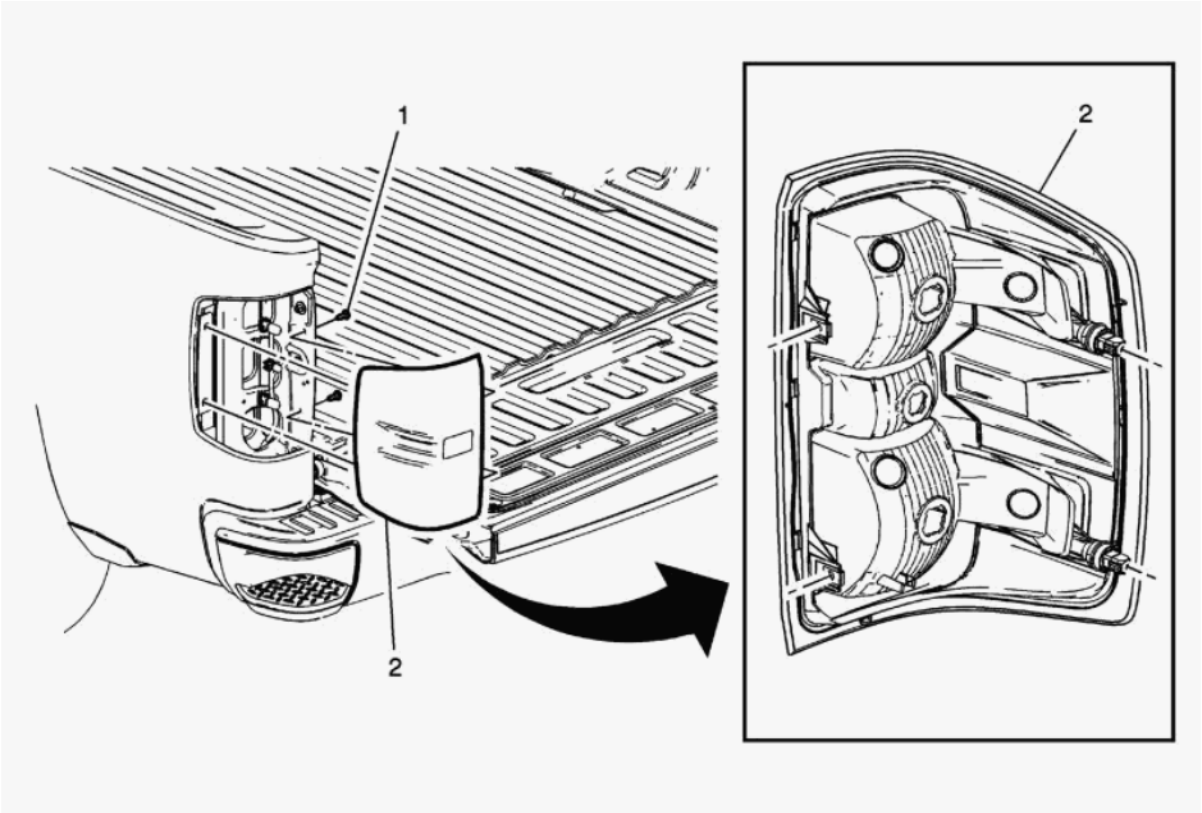


Fig. 83: Tail Lamp (Chevrolet 1500, 2500, 3500 without GAJ)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Open the endgate.	
1	Tail Lamp Screw (Qty: 2) **CAUTION:** **Refer to** **Fastener Caution** . **Tighten** 2.5 N.m (22 lb in)
2	Tail Lamp **Procedure** 1. Grasp the tail lamp and pull rearward to disengage from the pickup box side structure. 2. Rotate the tail lamp harness bulb sockets counterclockwise and pull from the tail lamp. 3. Pull harness from tail lamp retainer and remove tail lamp from the vehicle.

TAIL LAMP REPLACEMENT (GMC 1500, 2500, 3500 WITHOUT GAT OR GFW)

cardiagn.com

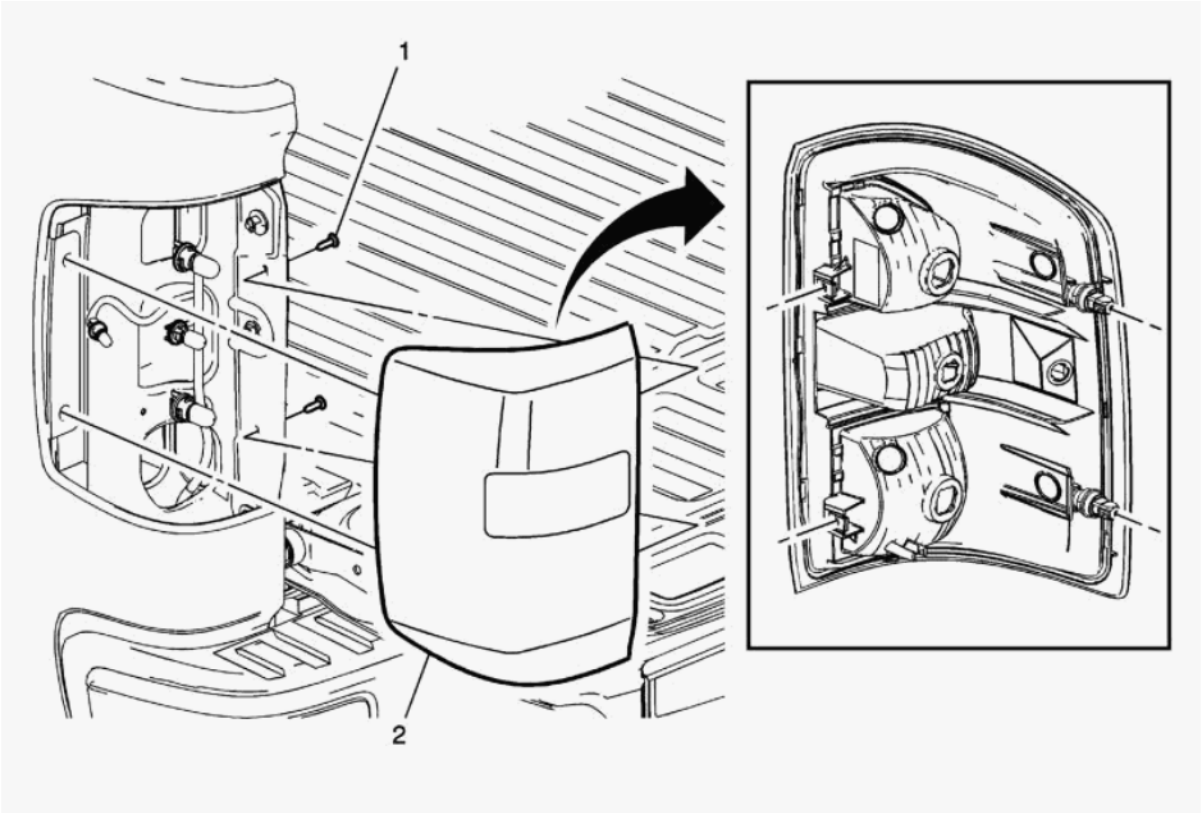


Fig. 84: Tail Lamp (GMC 1500, 2500, 3500 without GAT or GFW)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Open the endgate.	
1	Tail Lamp Screw (Qty: 2) **CAUTION:** **Refer to** **Fastener Caution** . **Tighten** 2.5 N.m (22 lb in)
2	Tail Lamp **Procedure** 1. Grasp the tail lamp and pull rearward to disengage from the pickup box side structure. 2. Rotate the tail lamp harness bulb sockets counterclockwise and pull from the tail lamp. 3. Pull harness from tail lamp retainer and remove tail lamp from the vehicle.

TAIL LAMP REPLACEMENT (GMC 1500 WITH GAT OR GFW)

cardiagn.com

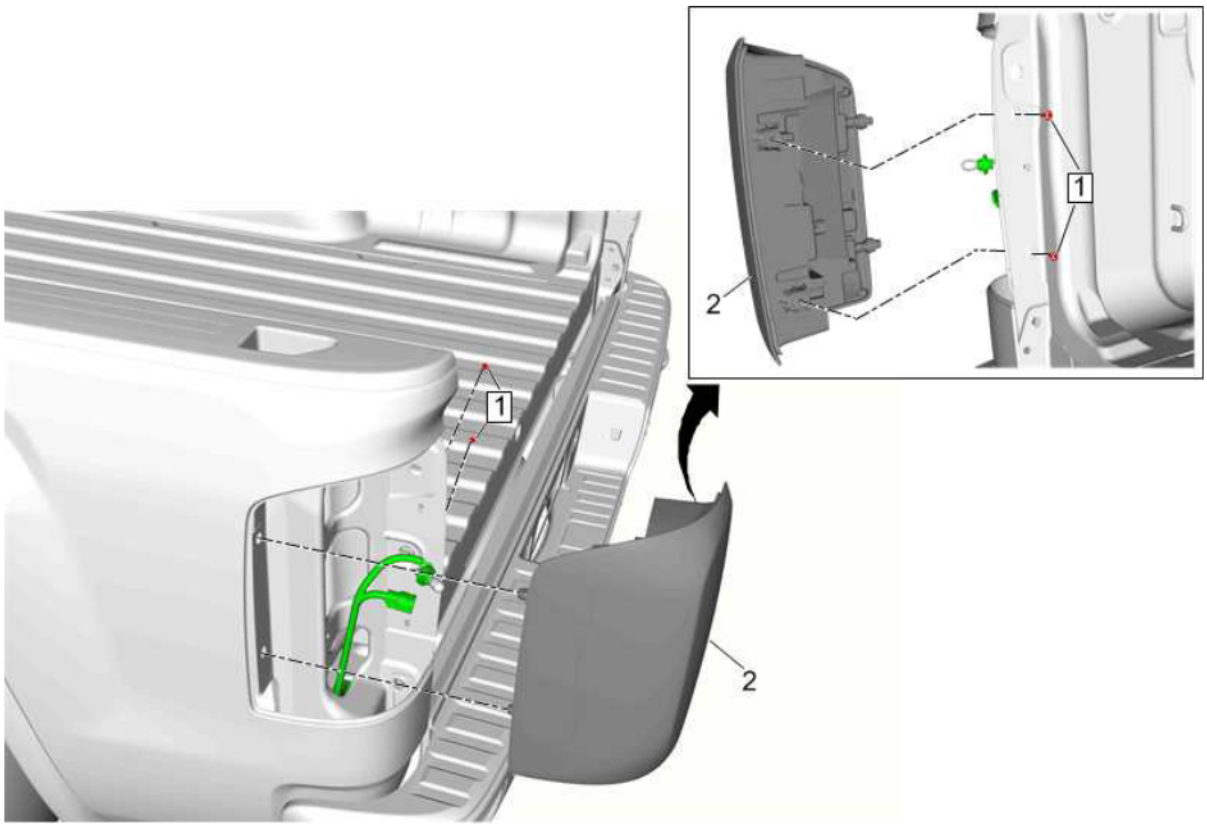


Fig. 85: Tail Lamp (GMC 1500 with GAT or GFW)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Open the endgate.	
1	Tail Lamp Screw **CAUTION:** **Refer to** **Fastener Caution** . **Tighten** 2.5 N.m (22 lb in)
2	Tail Lamp **Procedure** 1. Grasp the tail lamp and pull rearward to disengage from the pickup box side structure. 2. Disconnect the electrical connector. 3. Rotate the bulb socket a quarter turn counterclockwise and remove.

TAIL LAMP REPLACEMENT (CHEVROLET 1500 WITH GAJ)

cardiagn.com

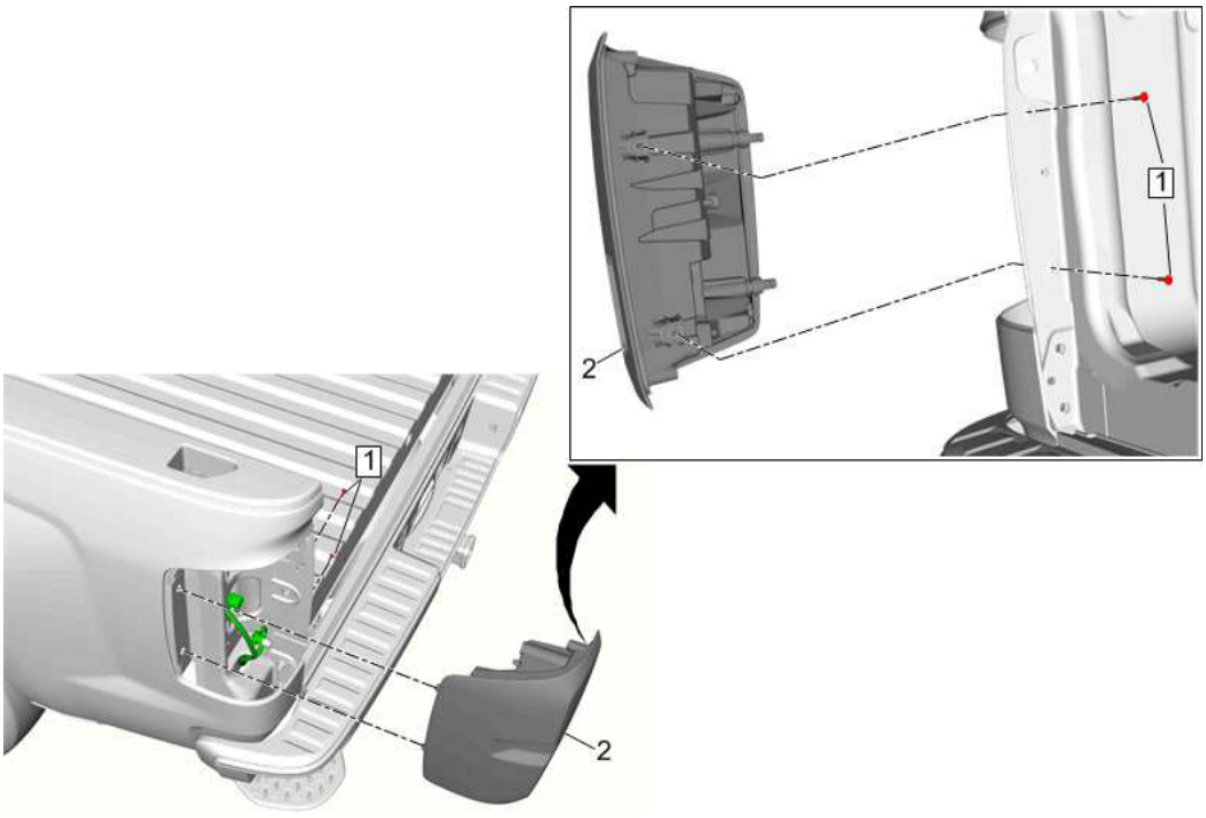


Fig. 86: Tail Lamp (Chevrolet 1500 with GAJ)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Open the endgate.	
1	Tail Lamp Screw **CAUTION:** **Refer to** **Fastener Caution** . **Tighten** 2.5 N.m (22 lb in)
2	Tail Lamp **Procedure** 1. Grasp the tail lamp and pull rearward to disengage from the pickup box side structure. 2. Disconnect the electrical connector. 3. Rotate the bulb socket a quarter turn counterclockwise and remove.

REAR CLEARANCE LAMP REPLACEMENT (FRONT)

cardiagn.com

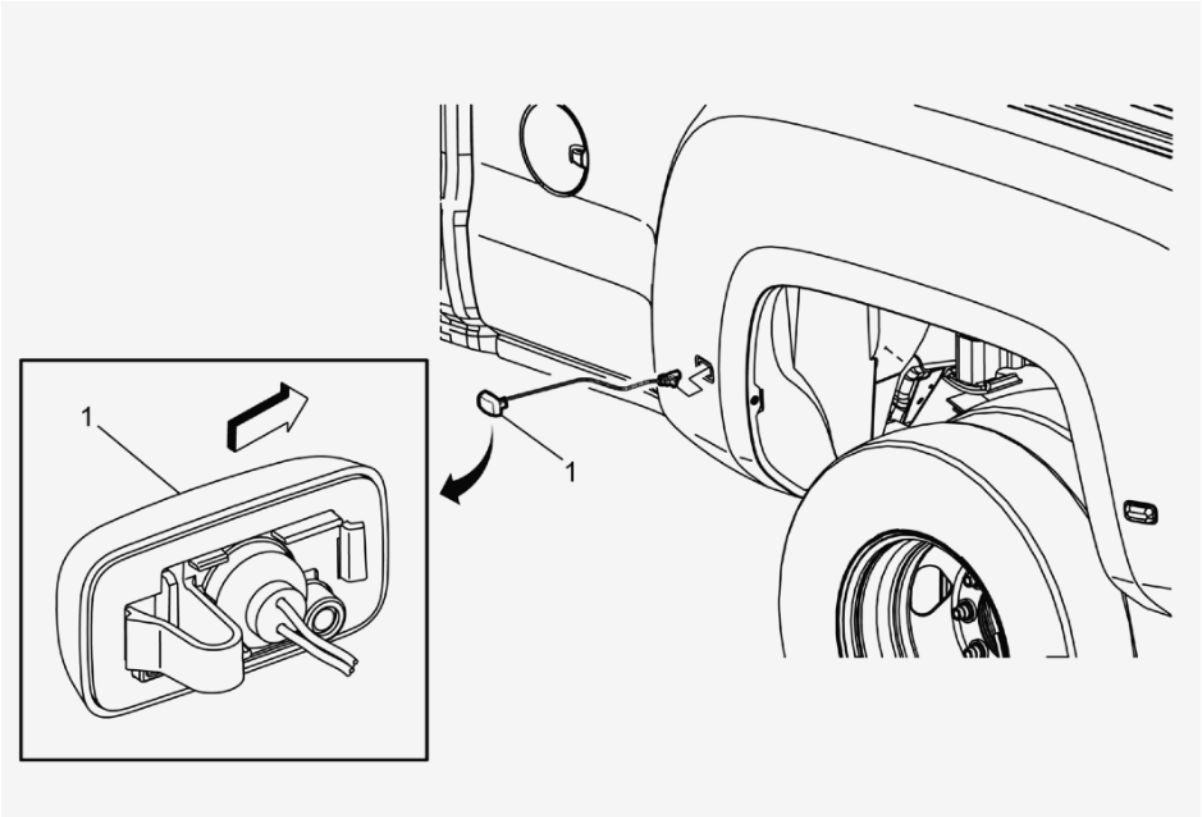


Fig. 87: Rear Clearance Lamp (Front)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Rear Clearance Lamp **Procedure** 1. Reach inside the rear fender and disconnect the electrical connector. 2. Disengage the retainer securing the connector to the pickup box wheelhouse panel. 3. From inside the wheelhouse compress the locking tab and push the rear clearance lamp outward from the fender. 4. Gently pull the wiring harness through the hole and remove from the vehicle.

REAR CLEARANCE LAMP REPLACEMENT (REAR)

cardiagn.com

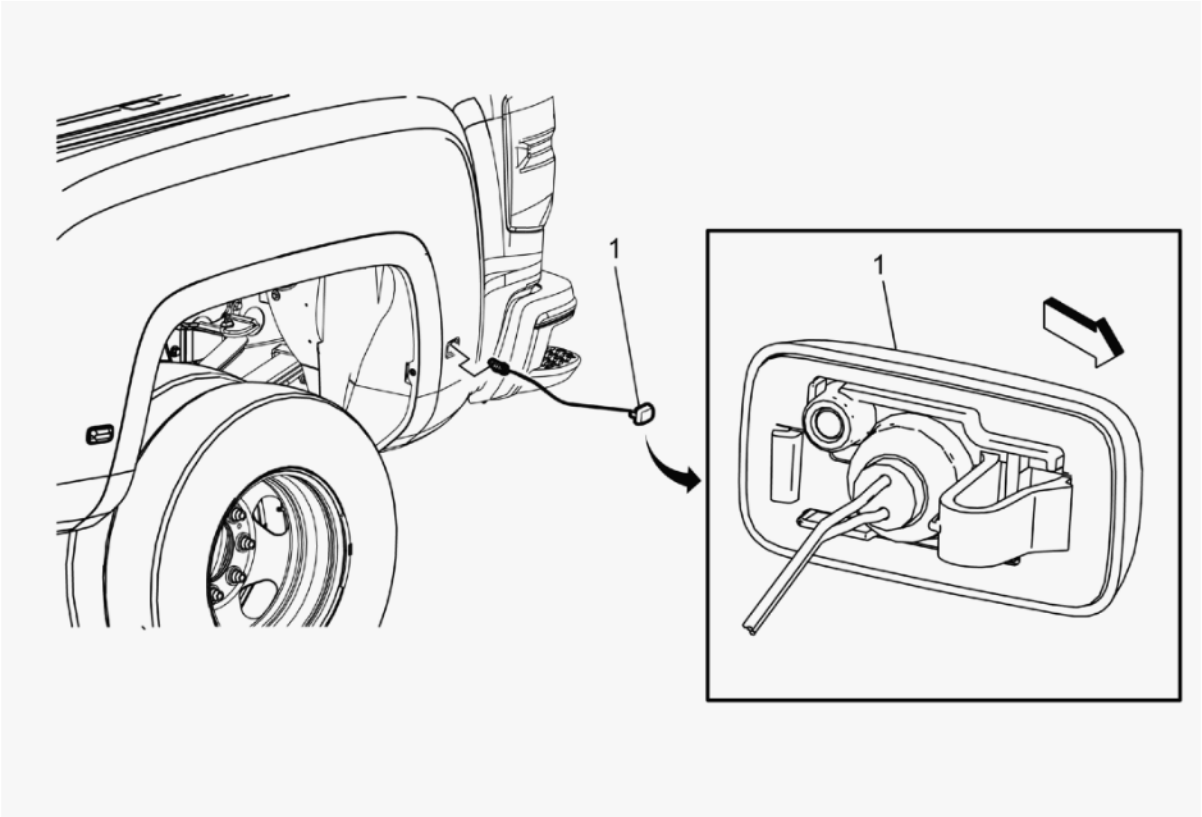


Fig. 88: Rear Clearance Lamp (Rear)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Rear Clearance Lamp **Procedure** 1. Reach inside the rear fender and disconnect the electrical connector. 2. Disengage the retainer securing the connector to the pickup box wheelhouse panel. 3. From inside the wheelhouse compress the locking tab and push the rear clearance lamp outward from the fender. 4. Gently pull the wiring harness through the hole and remove from the vehicle.

STOP AND TAIL LAMP BULB REPLACEMENT (CHEVROLET)

cardiagn.com

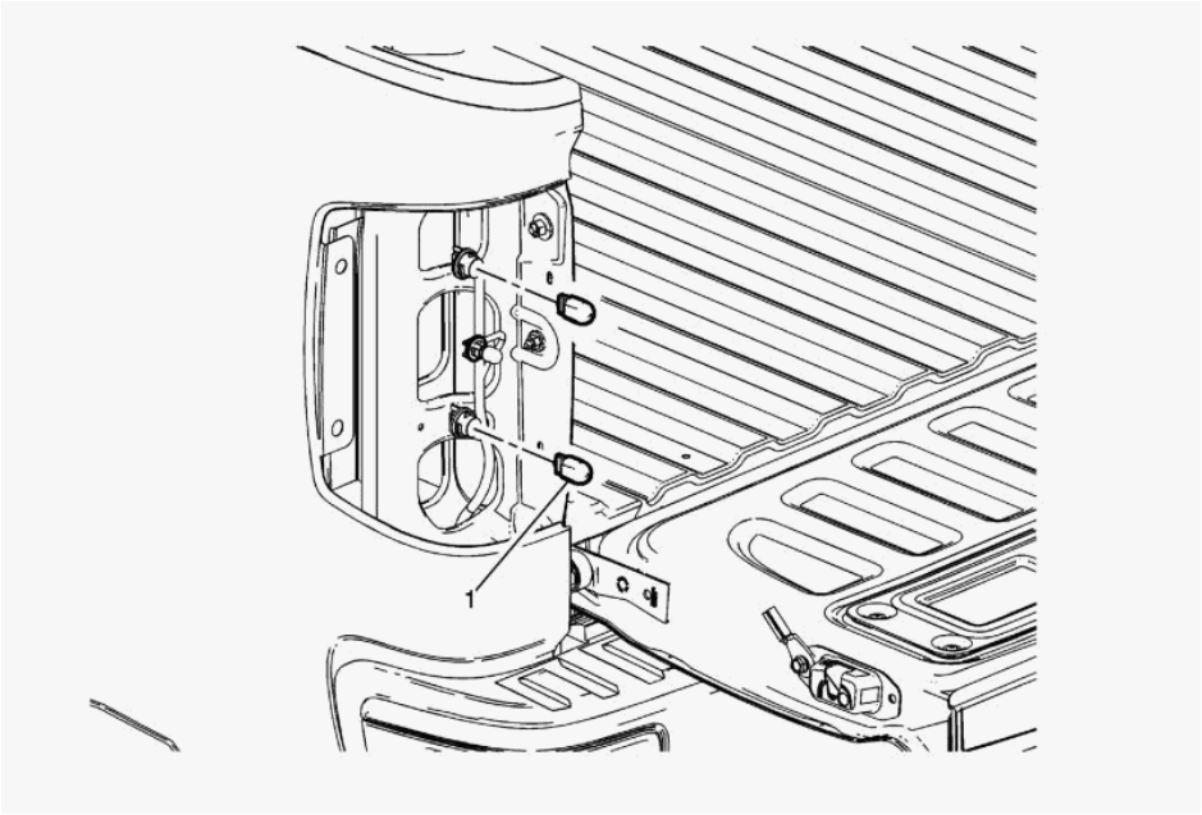


Fig. 89: Stop and Tail Lamp Bulb (Chevrolet)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the tail lamp. Refer to **Tail Lamp Replacement (Chevrolet 1500, 2500, 3500 without GAJ)Tail Lamp Replacement (Chevrolet 1500 with GAJ)**.	
1	Stop and Tail Lamp Bulb **Procedure** Pull the stop and tail lamp bulb straight out from the tail lamp harness bulb socket.

STOP AND TAIL LAMP BULB REPLACEMENT (GMC)

cardiagn.com

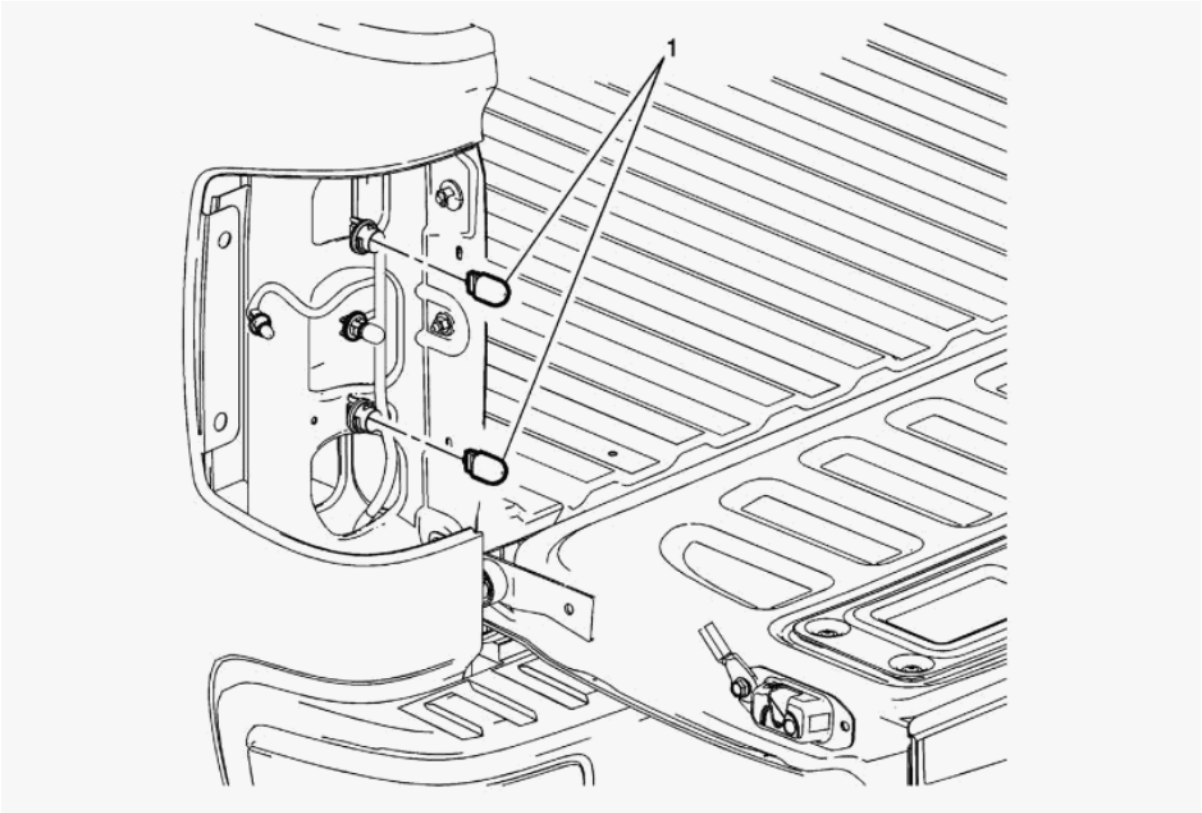


Fig. 90: Stop and Tail Lamp Bulb (GMC)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the tail lamp. Refer to **Tail Lamp Replacement (GMC 1500, 2500, 3500 without GAT or GFW)Tail Lamp Replacement (GMC 1500 with GAT or GFW)**.	
1	Stop and Tail Lamp Bulb (GMC) **Procedure** Pull the stop and tail lamp bulb straight out from the tail lamp harness bulb socket.

Article GUID: A00854564

cardiagn.com

SCHEMATIC WIRING DIAGRAMS

HEADLIGHTS/DAYTIME RUNNING LIGHTS (DRL) WIRING SCHEMATICS

Controls

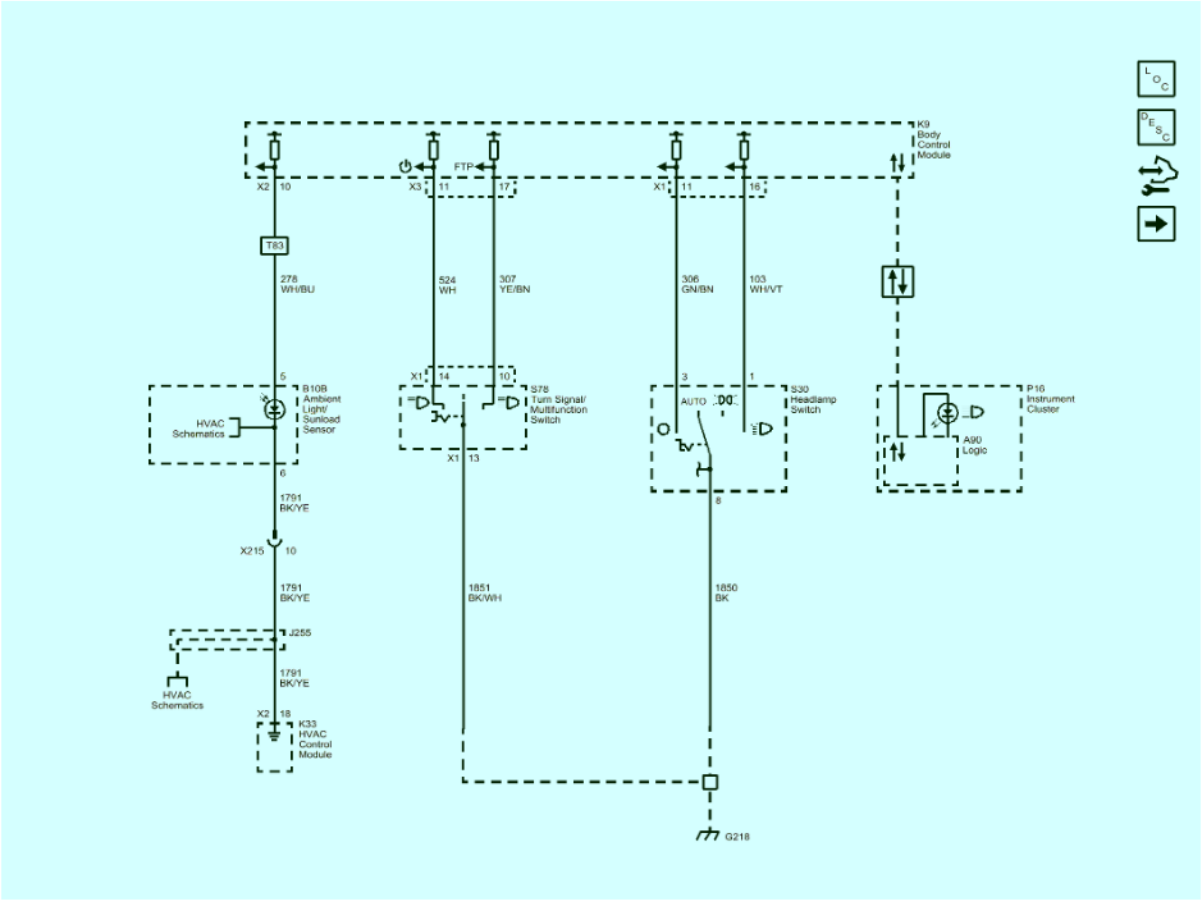


Fig. 1: Controls
Courtesy of GENERAL MOTORS COMPANY

Headlamps (1500 with X88 with T4F)

cardiagn.com

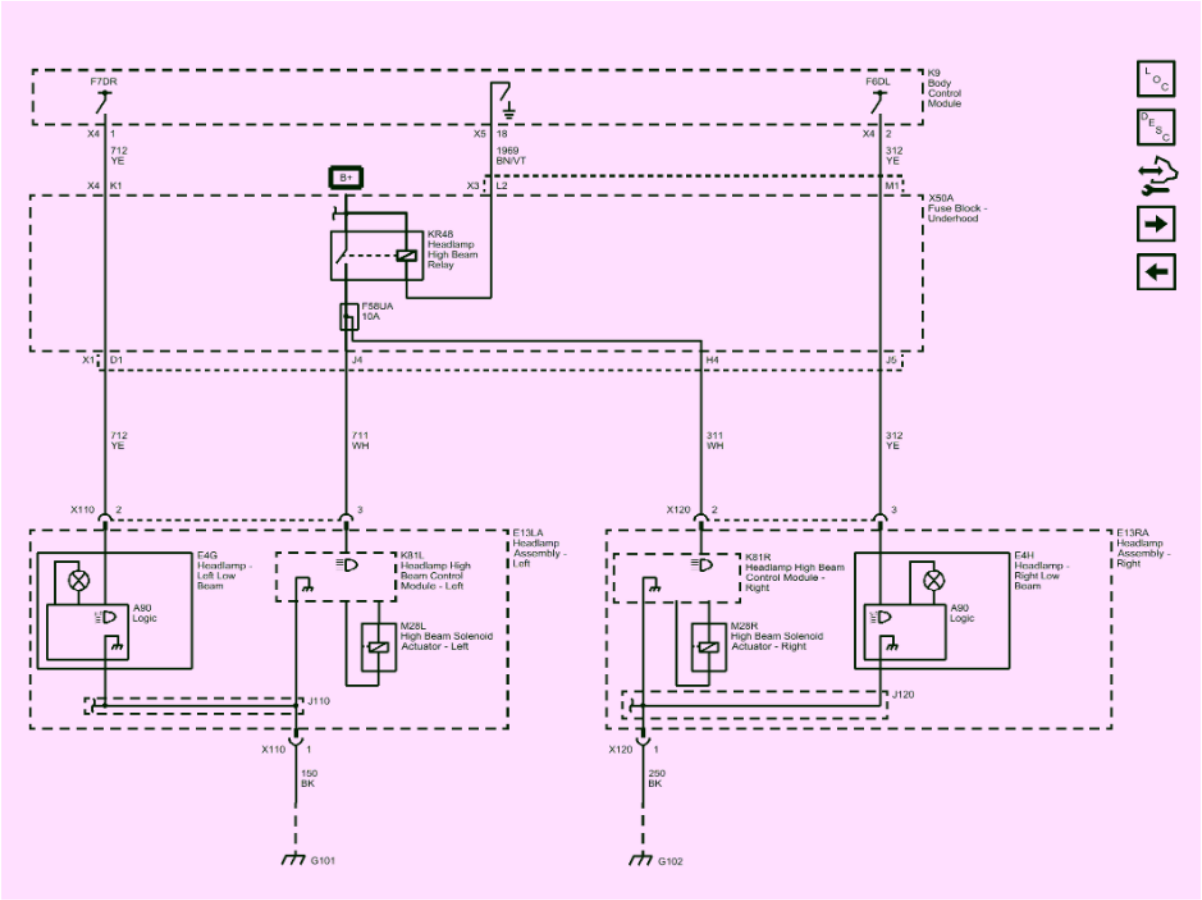


Fig. 2: Headlamps (1500 with X88 with T4F)
Courtesy of GENERAL MOTORS COMPANY

Headlamps (1500 with X88 without T4F)

cardiagn.com

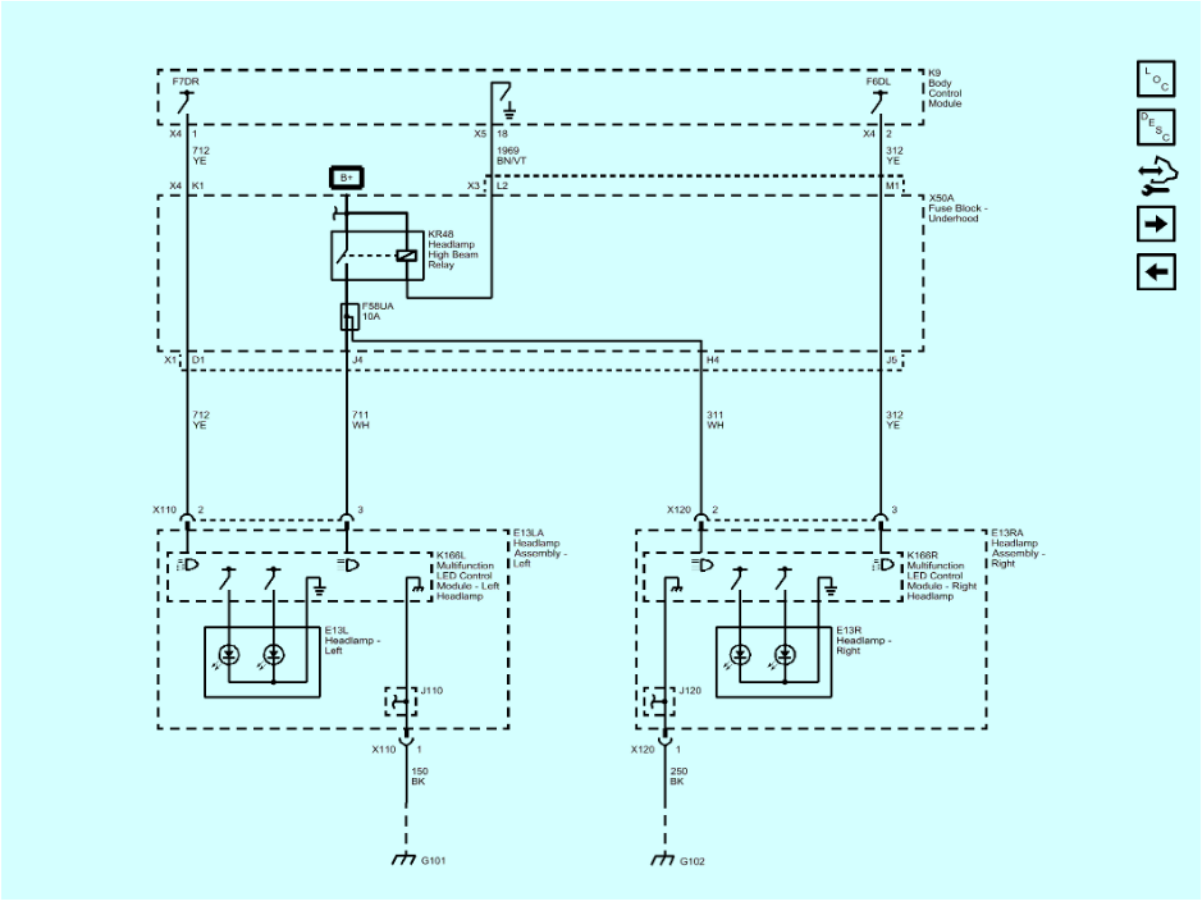


Fig. 3: Headlamps (1500 with X88 without T4F)
Courtesy of GENERAL MOTORS COMPANY

Headlamps (2500/3500 with X88)

cardiagn.com

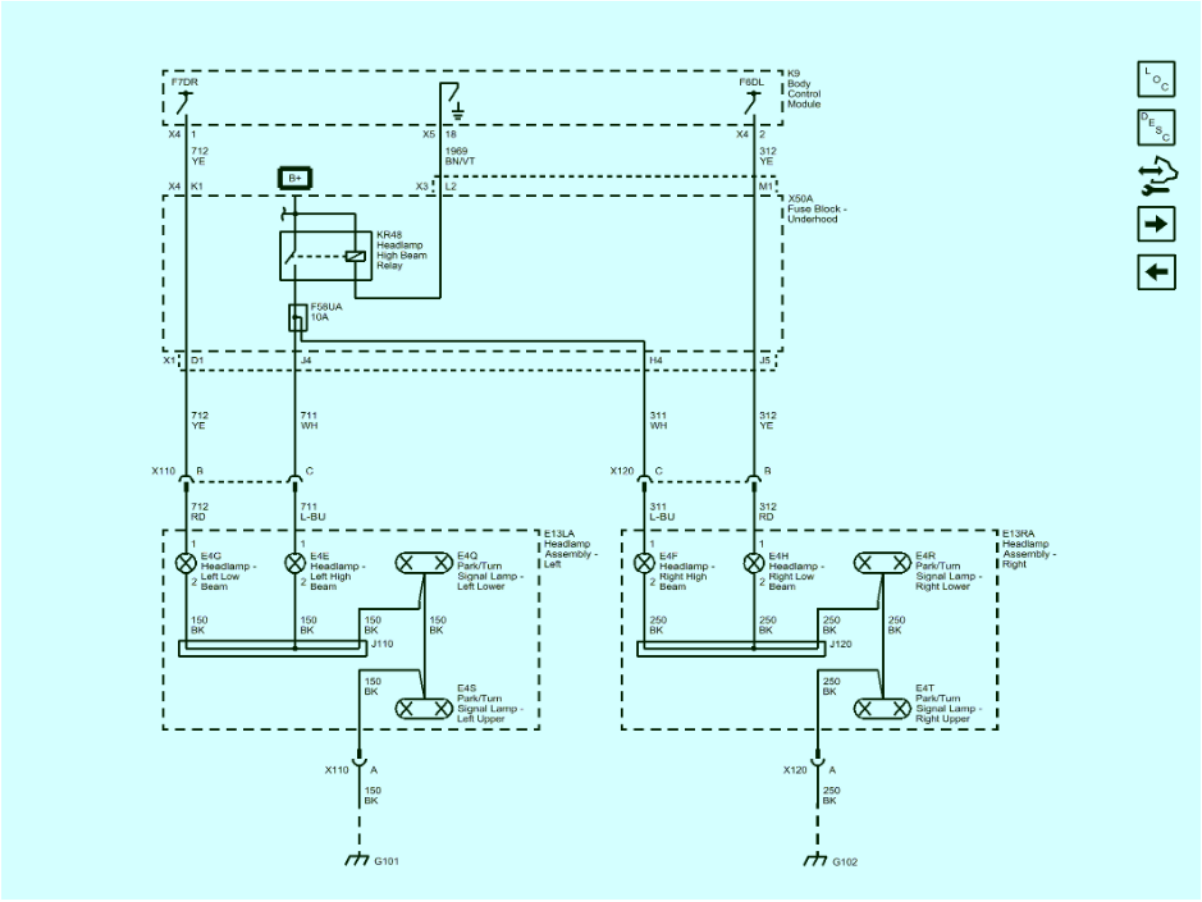


Fig. 4: Headlamps (2500/3500 with X88)
Courtesy of GENERAL MOTORS COMPANY

Headlamps (1500/Z88 and T4F)

cardiagn.com

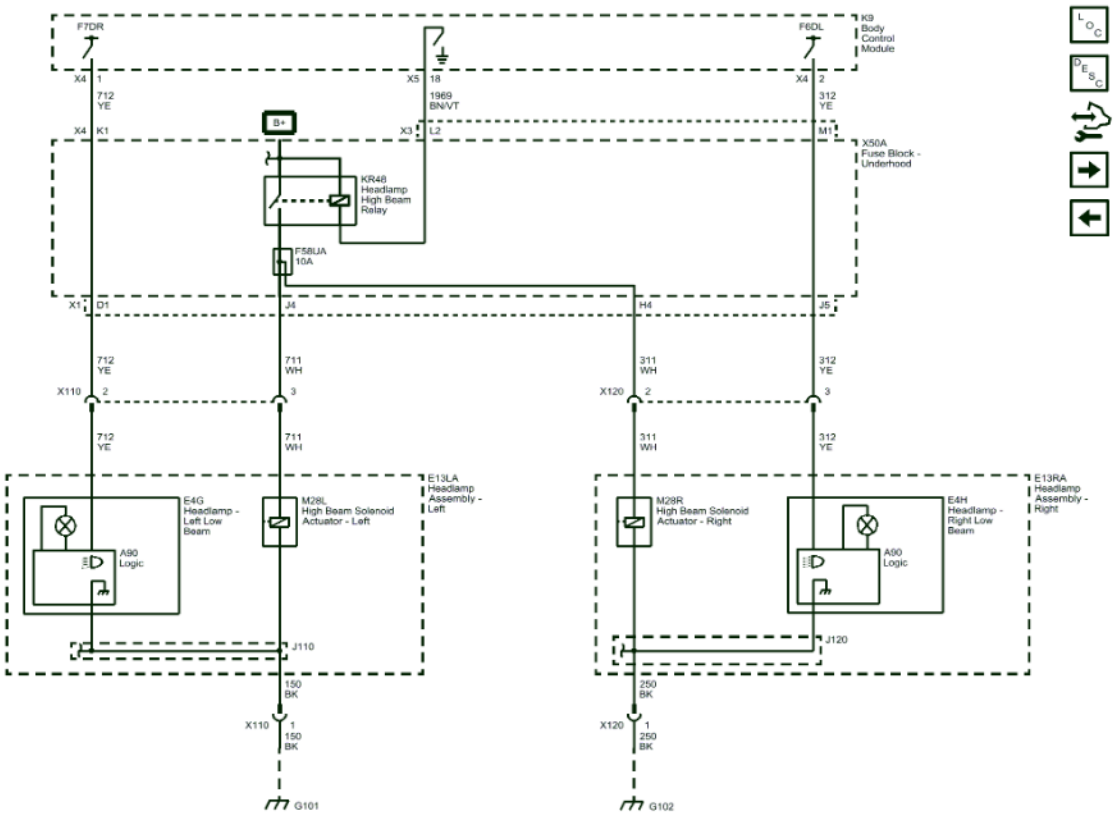


Fig. 5: Headlamps (1500/Z88 and T4F)
Courtesy of GENERAL MOTORS COMPANY

Headlamps (1500/Z88 without T4F)

cardiagn.com

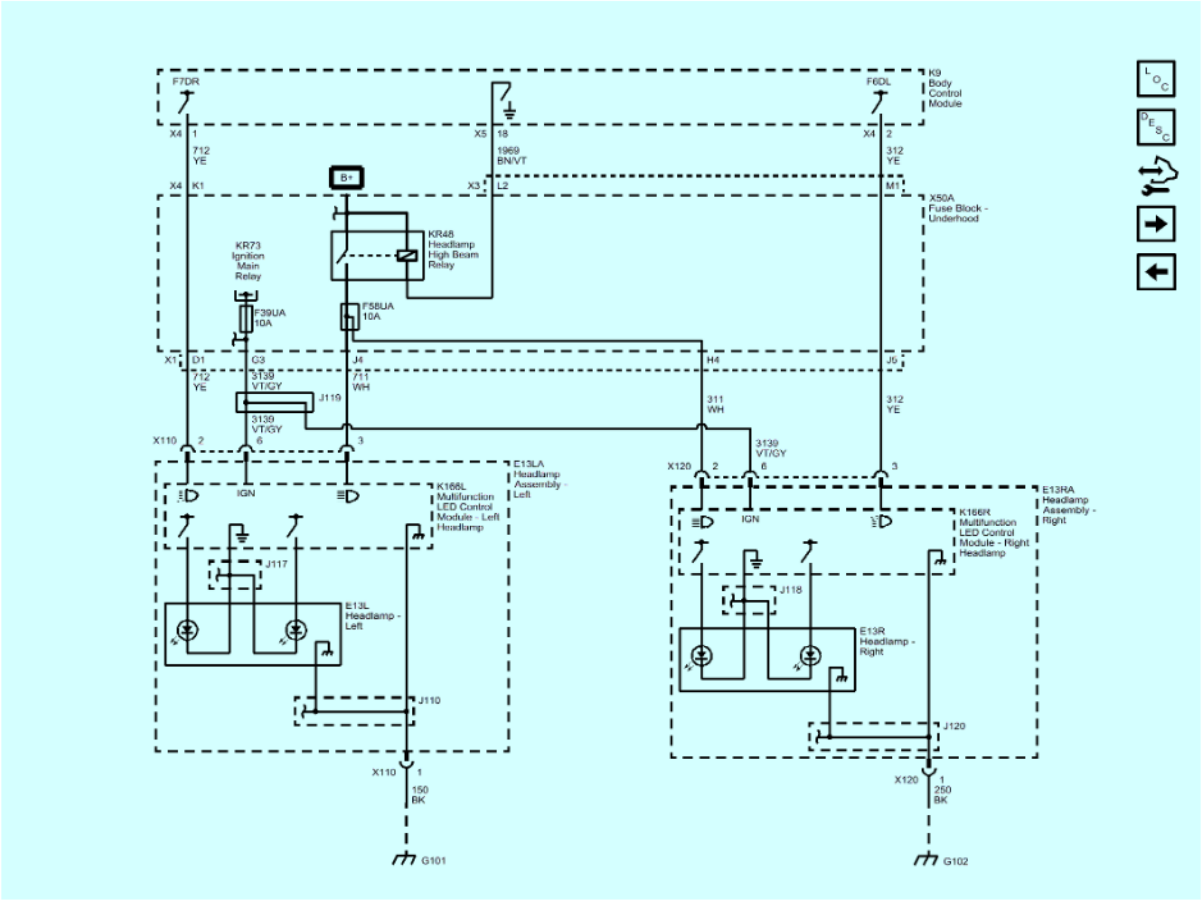


Fig. 6: Headlamps (1500/Z88 without T4F)
Courtesy of GENERAL MOTORS COMPANY

Headlamps (2500/3500 with Z88)

cardiagn.com

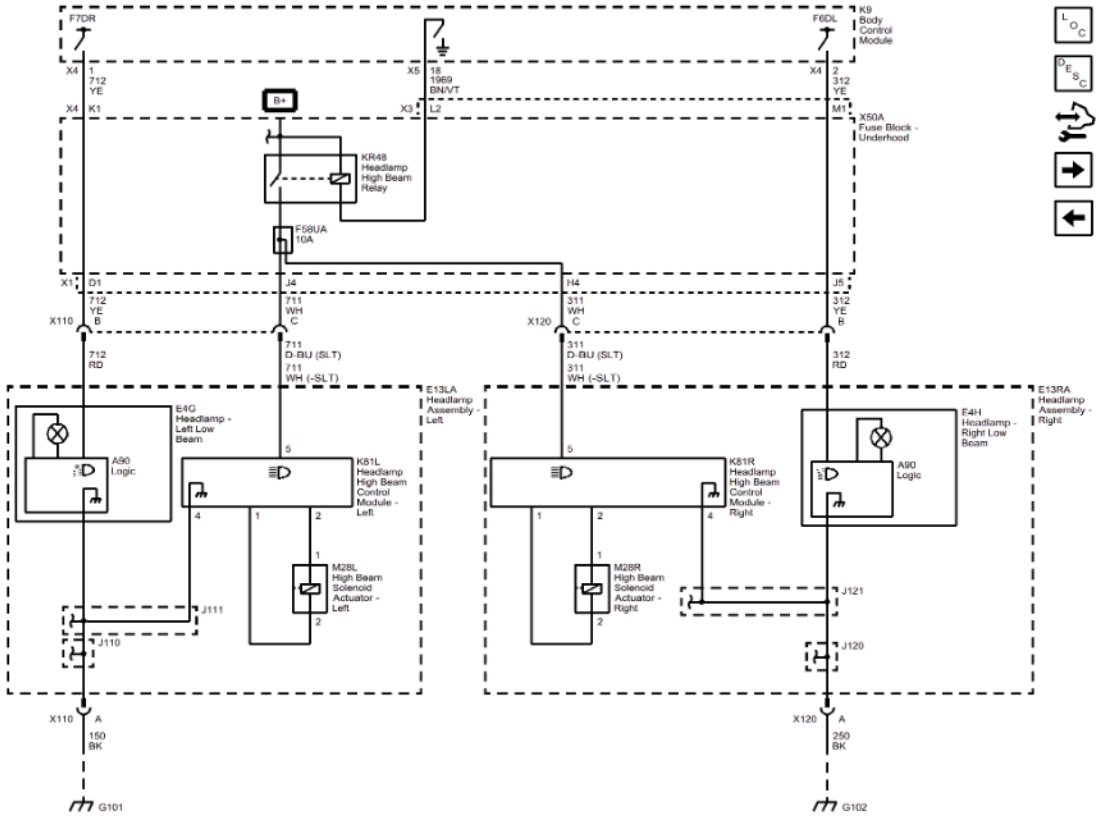


Fig. 7: Headlamps (2500/3500 with Z88)
Courtesy of GENERAL MOTORS COMPANY

Daytime Running Lamps (1500 with X88)

cardiagn.com

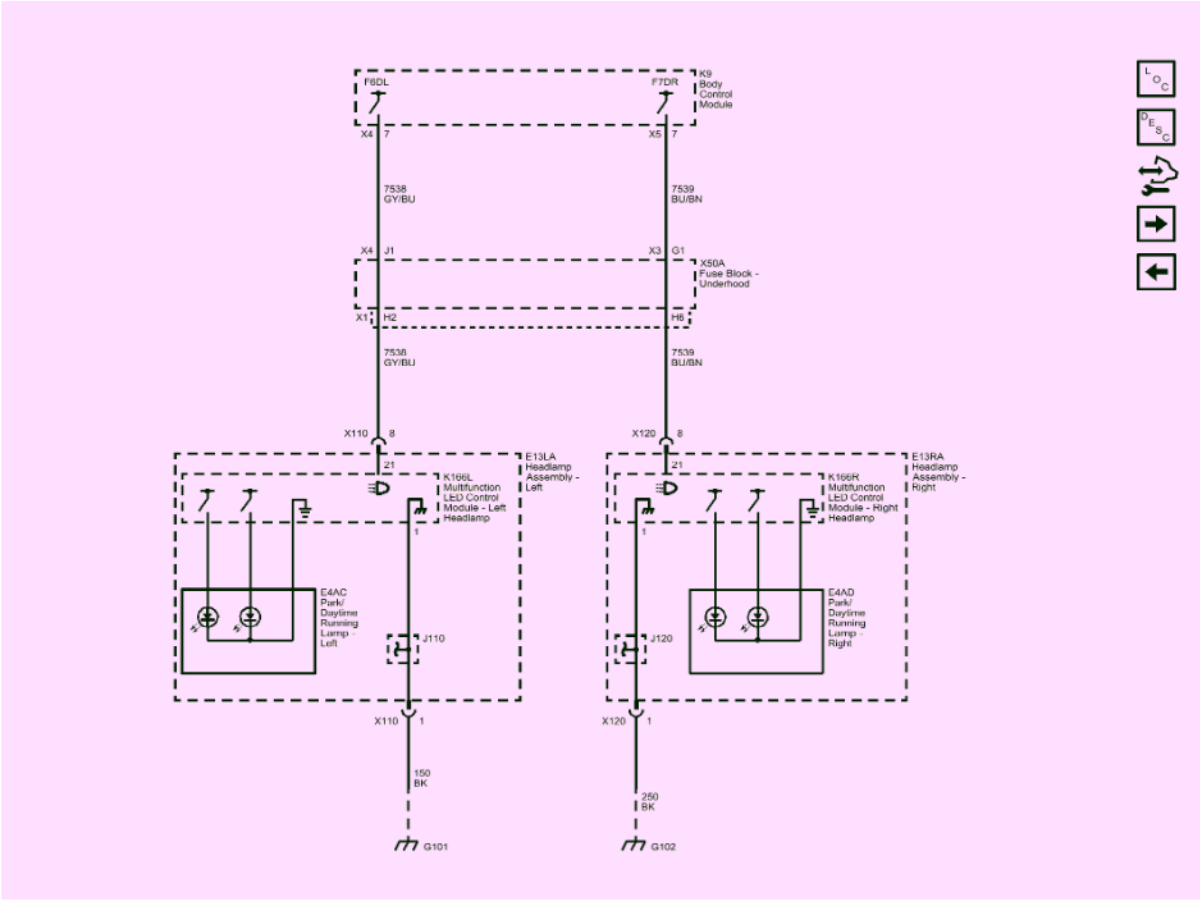


Fig. 8: Daytime Running Lamps (1500 with X88)
Courtesy of GENERAL MOTORS COMPANY

Daytime Running Lamps (1500/Z88)

cardiagn.com

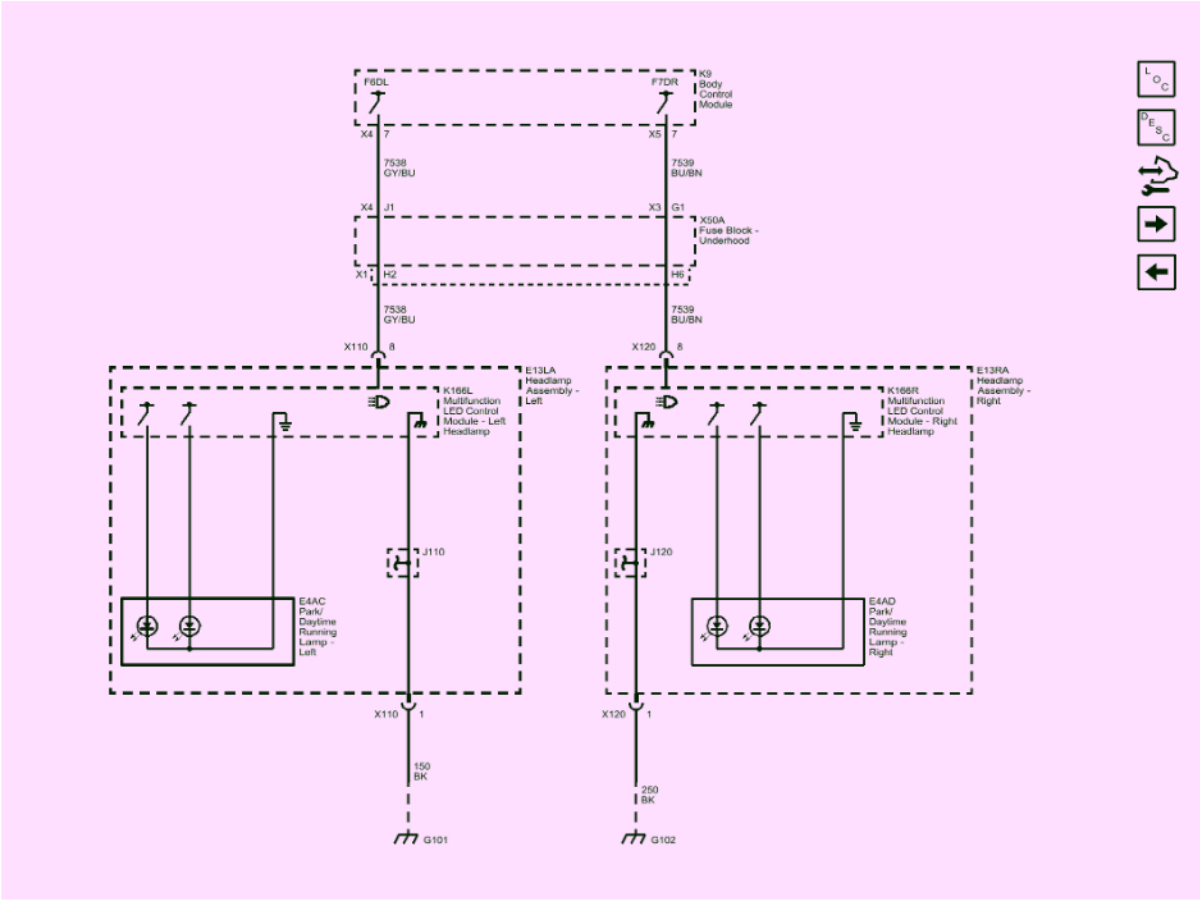


Fig. 9: Daytime Running Lamps (1500/Z88)
Courtesy of GENERAL MOTORS COMPANY

Daytime Running Lamps (2500/3500 with Z88 and SLT)

cardiagn.com

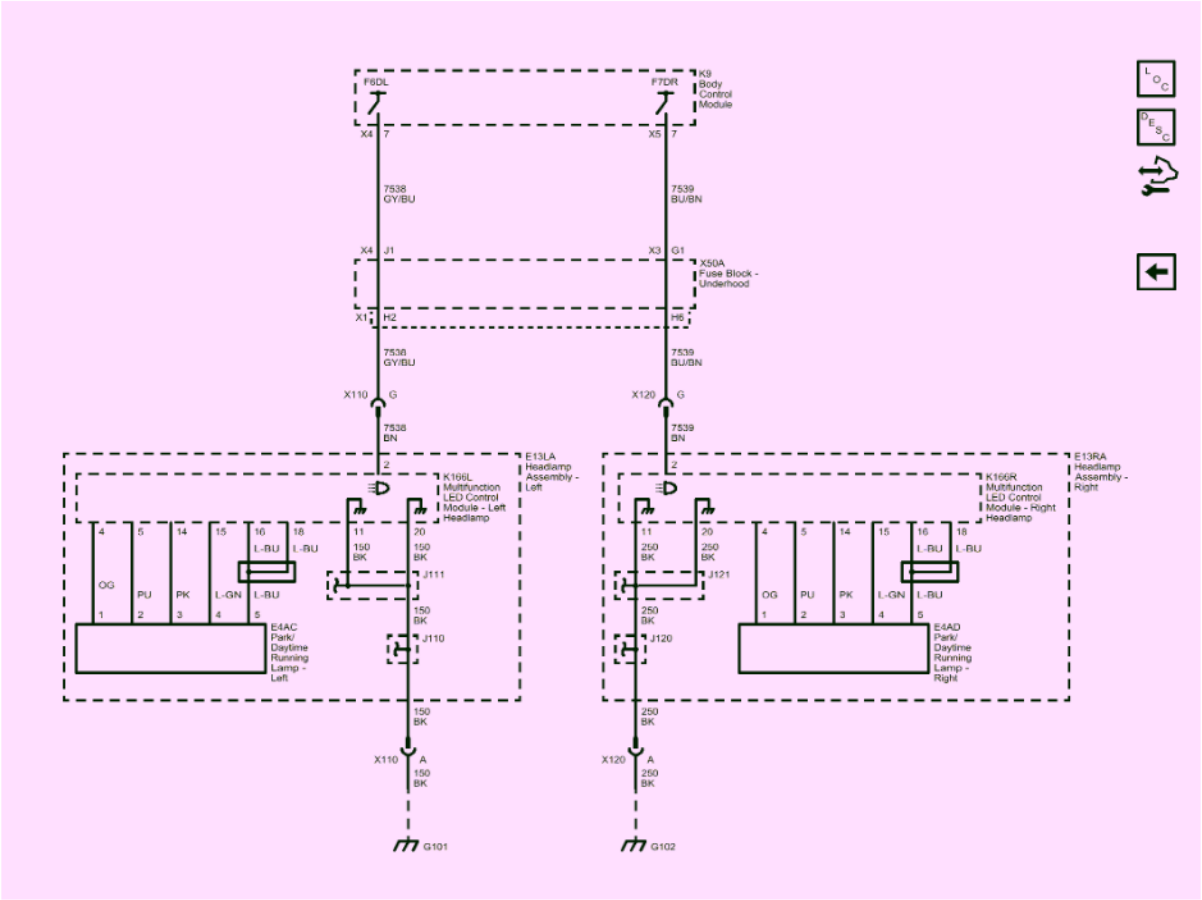


Fig. 10: Daytime Running Lamps (2500/3500 with Z88 and SLT)
Courtesy of GENERAL MOTORS COMPANY

FOG LIGHTS WIRING SCHEMATICS

Fog Lamps (T3U)

cardiagn.com

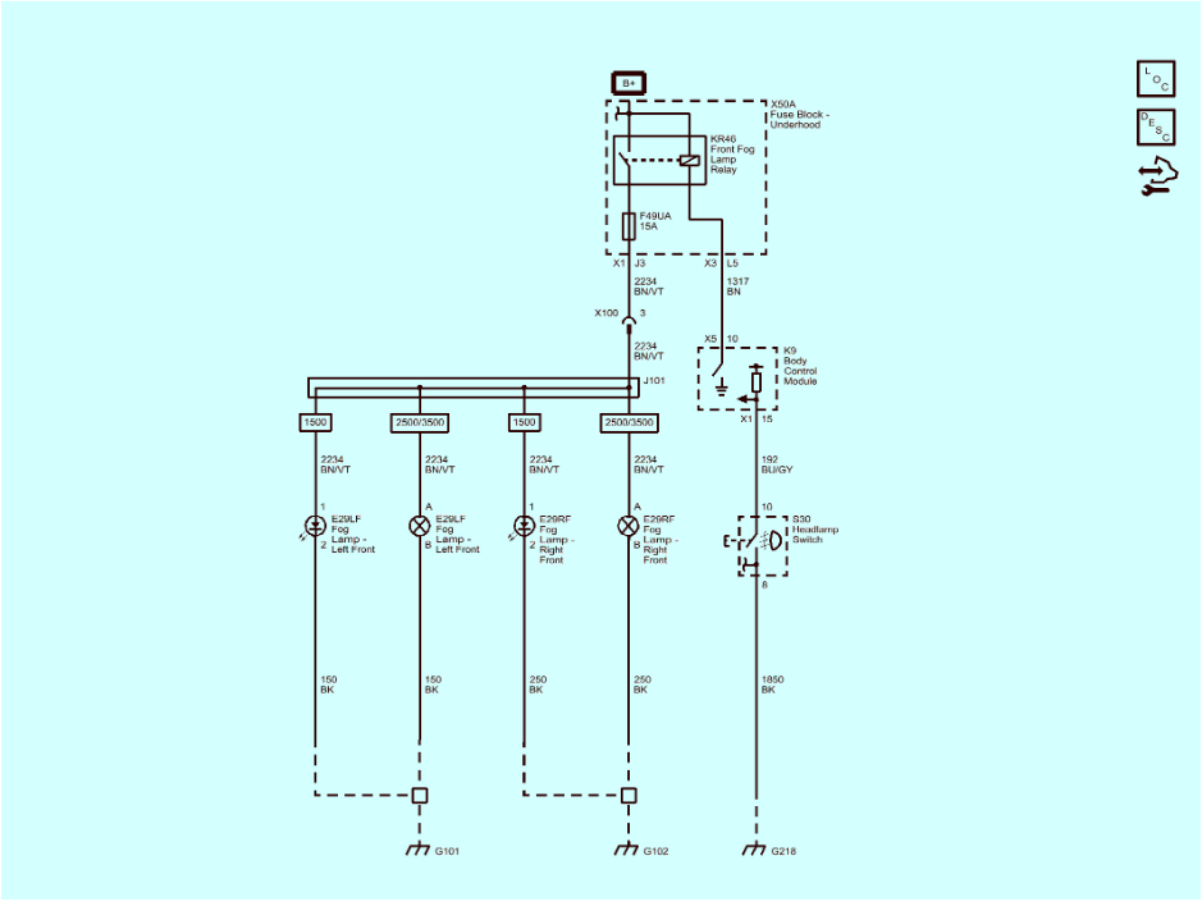


Fig. 11: Fog Lamps (T3U)
Courtesy of GENERAL MOTORS COMPANY

EXTERIOR LIGHTS WIRING SCHEMATICS

Controls

cardiagn.com

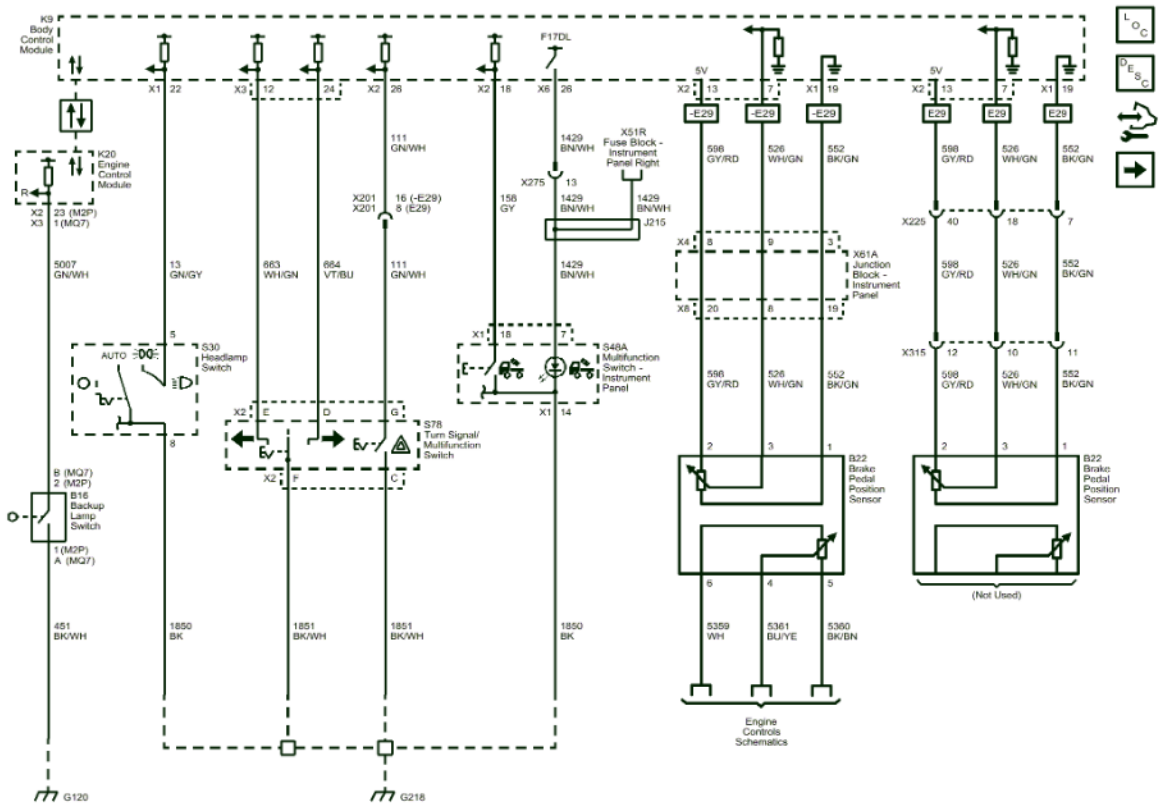


Fig. 12: Controls
Courtesy of GENERAL MOTORS COMPANY

Park Lamps (1500 with X88 with T4F)

cardiagn.com

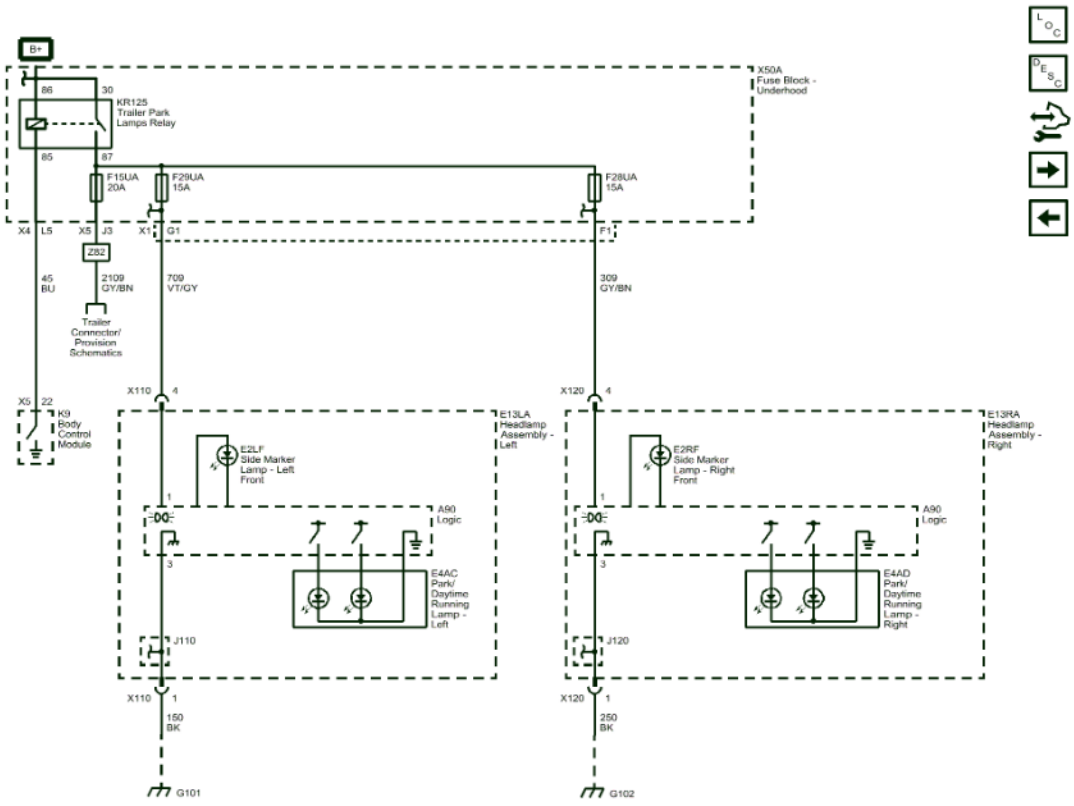


Fig. 13: Park Lamps (1500 with X88 with T4F)
Courtesy of GENERAL MOTORS COMPANY

Park Lamps (1500 with X88 without T4F)

cardiagn.com

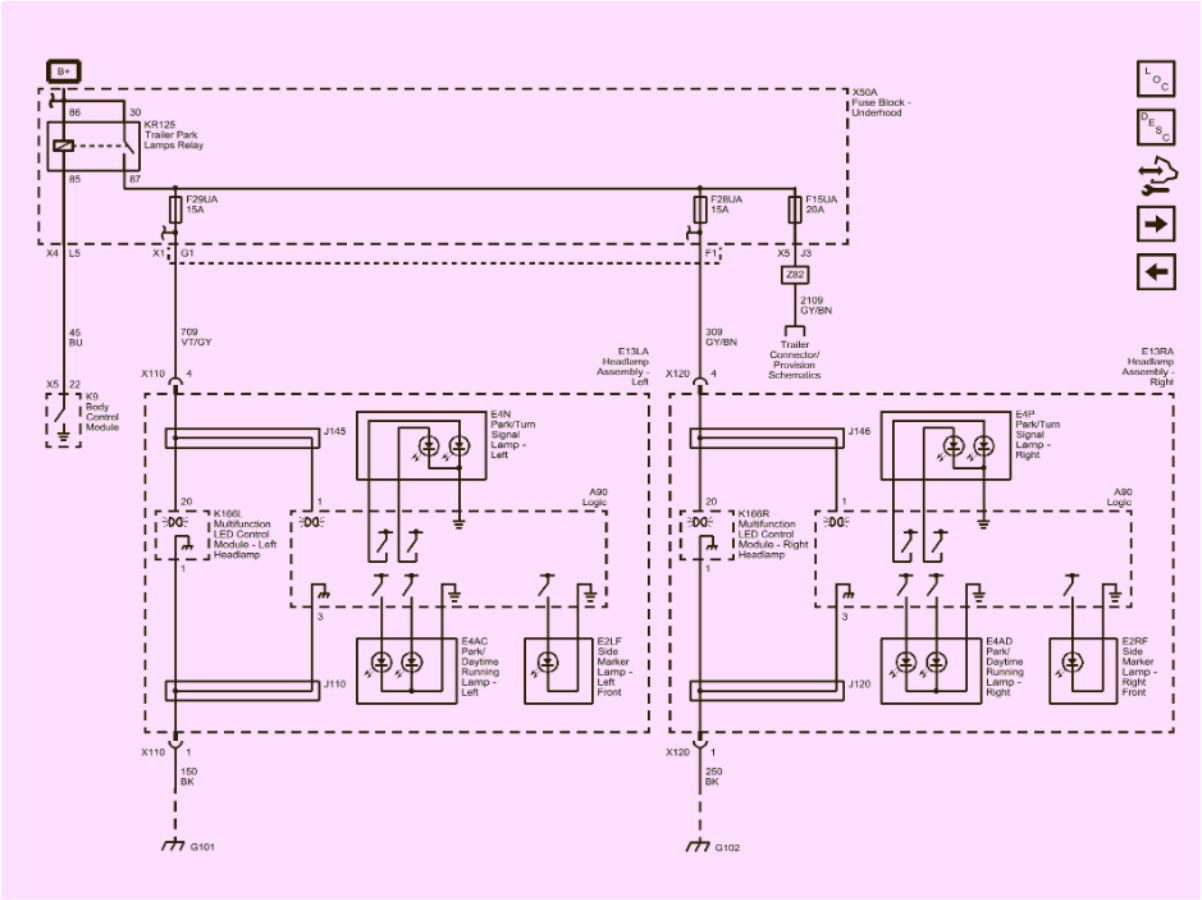


Fig. 14: Park Lamps (1500 with X88 without T4F)
Courtesy of GENERAL MOTORS COMPANY

Park Lamps (2500/3500 with Chevrolet/X88)

cardiagn.com

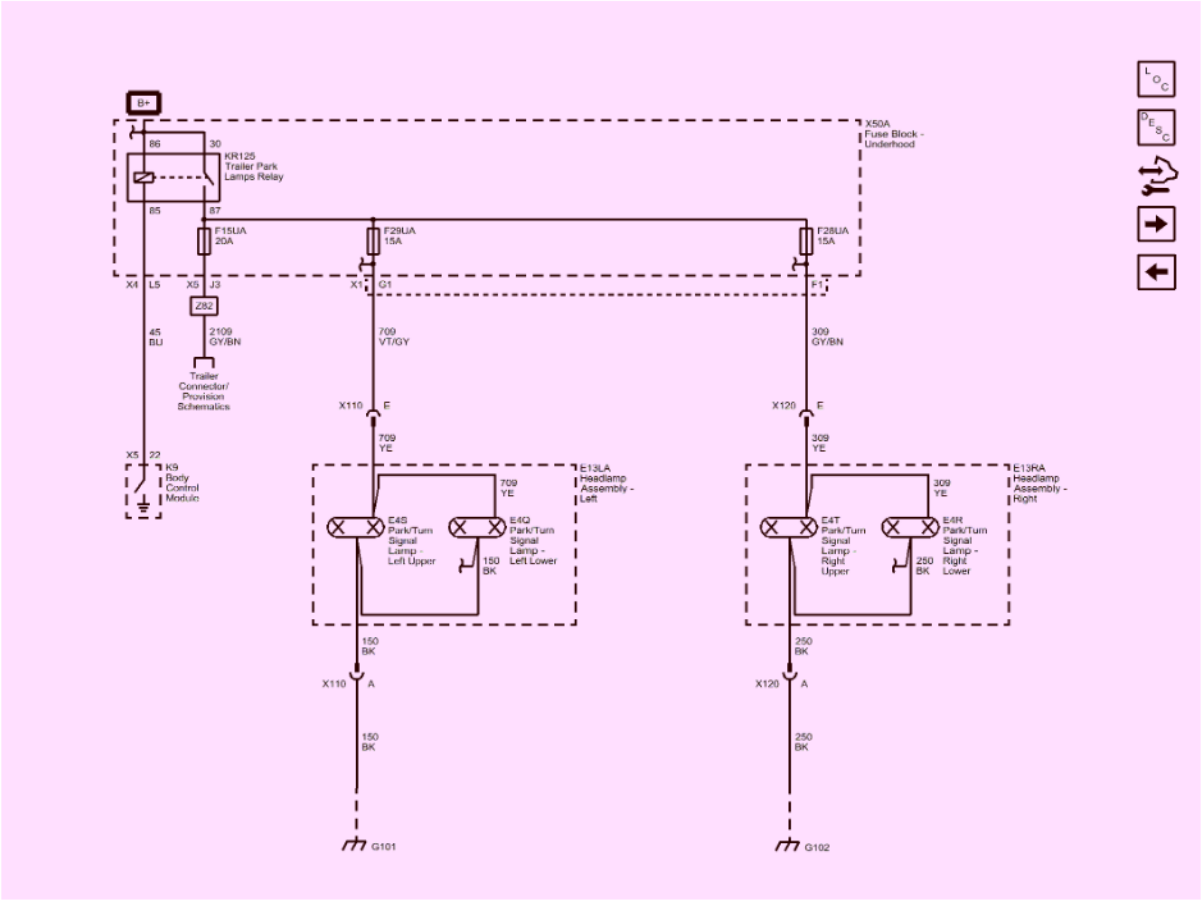


Fig. 15: Park Lamps (2500/3500 with Chevrolet/X88)
Courtesy of GENERAL MOTORS COMPANY

Park Lamps (1500/Z88)

cardiagn.com

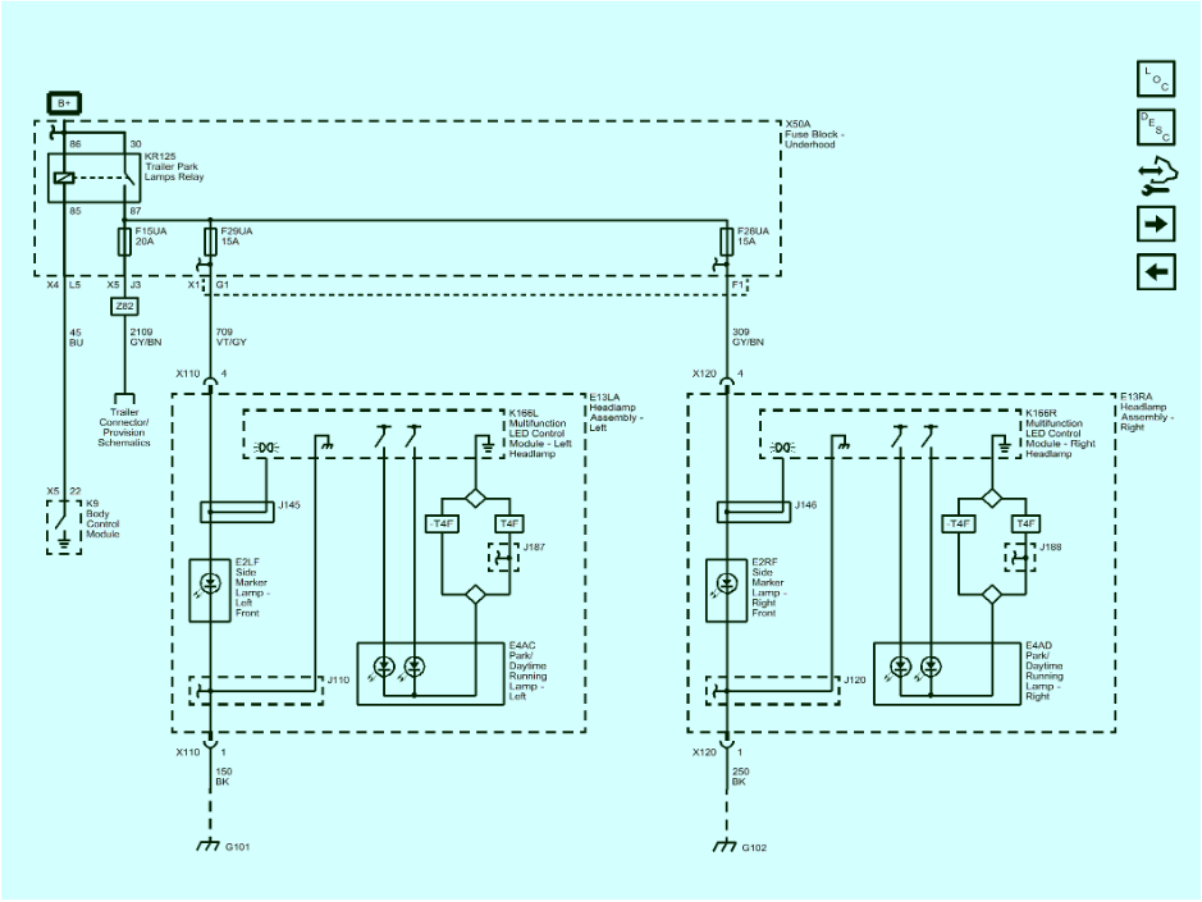


Fig. 16: Park Lamps (1500/Z88)
Courtesy of GENERAL MOTORS COMPANY

Park Lamps - Left (2500/3500 with GMC/Z88)

cardiagn.com

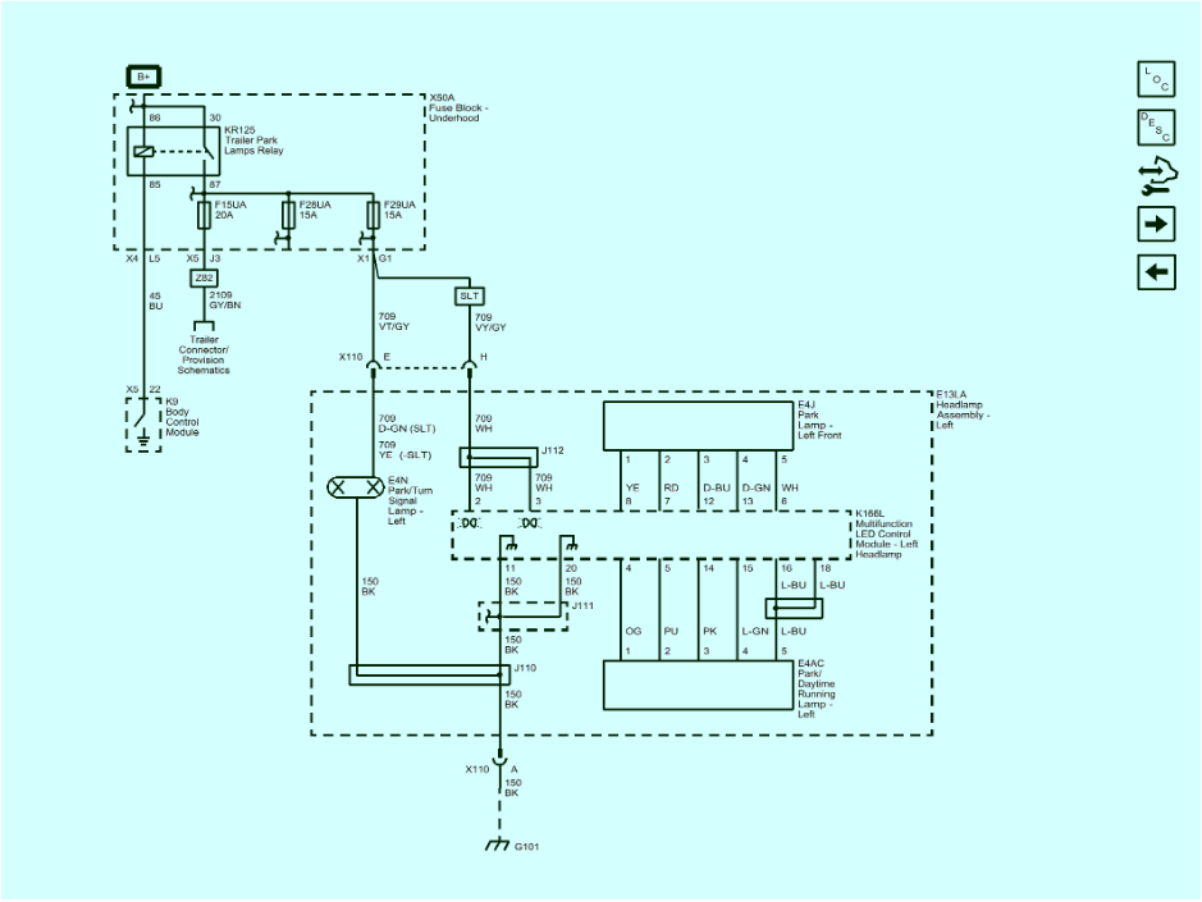


Fig. 17: Park Lamps - Left (2500/3500 with GMC/Z88)
Courtesy of GENERAL MOTORS COMPANY

Park Lamps - Right (2500/3500 with GMC/Z88)

cardiagn.com

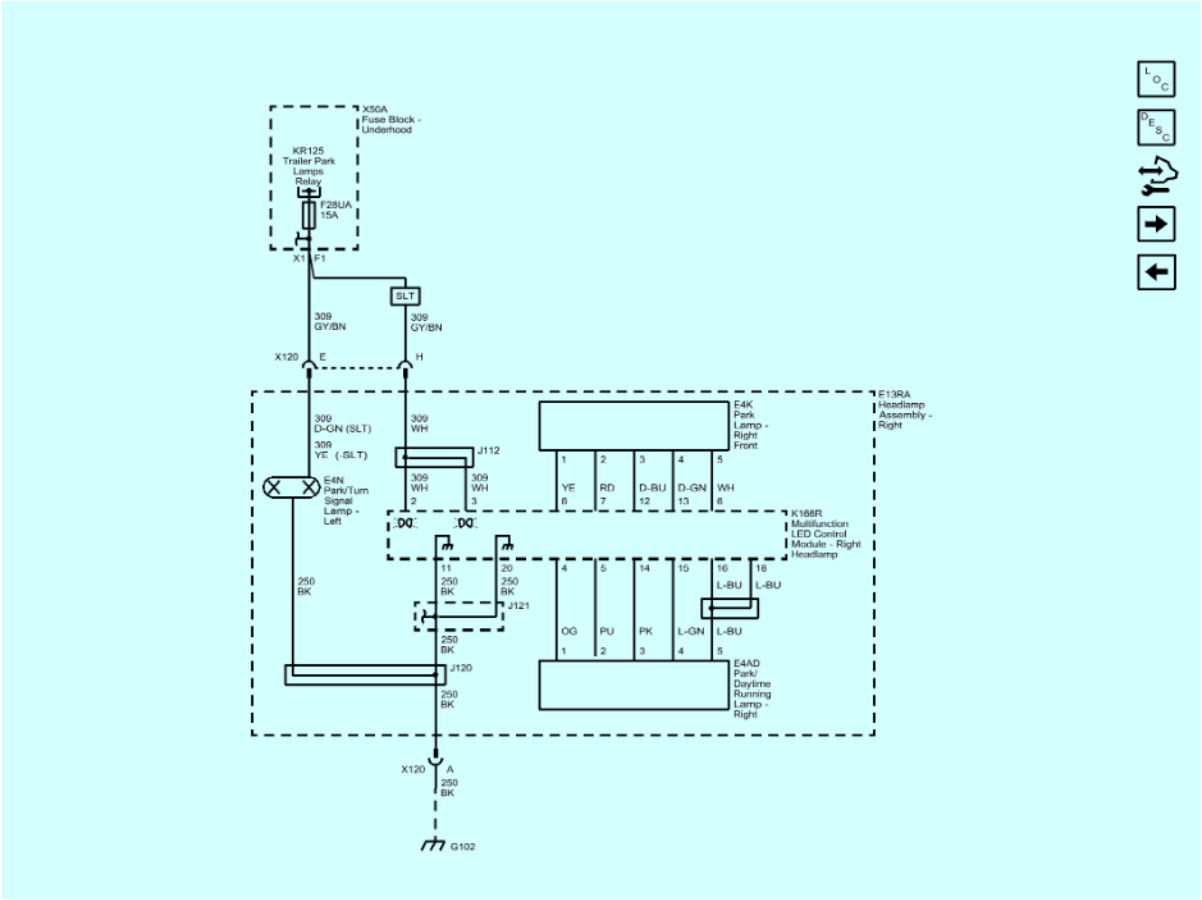


Fig. 18: Park Lamps - Right (2500/3500 with GMC/Z88)
Courtesy of GENERAL MOTORS COMPANY

Park Lamps - Mirror (DPN or DQS) and Roof (U01)

cardiagn.com

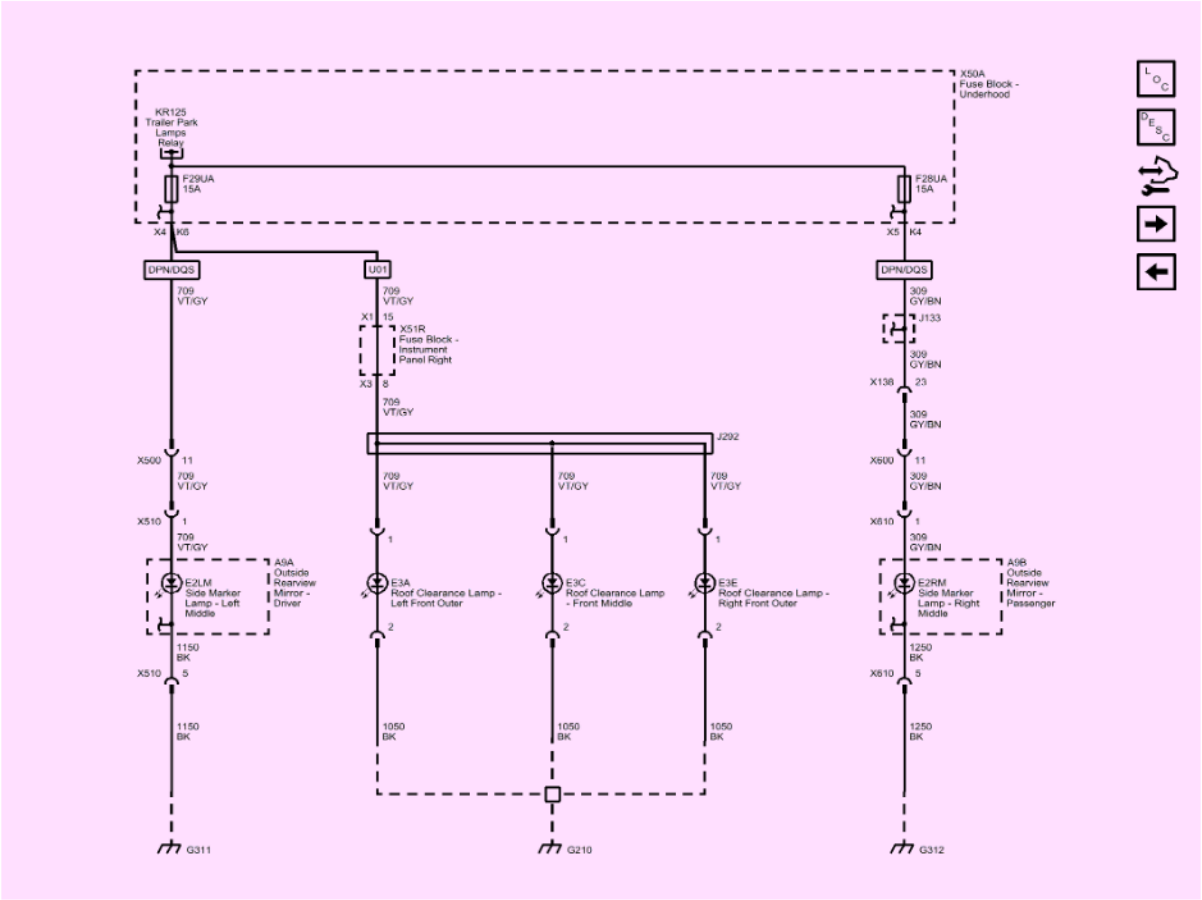


Fig. 19: Park Lamps - Mirror (DPN or DQS) and Roof (U01)
Courtesy of GENERAL MOTORS COMPANY

Park Lamps - Rear Clearance (DRW)

cardiagn.com

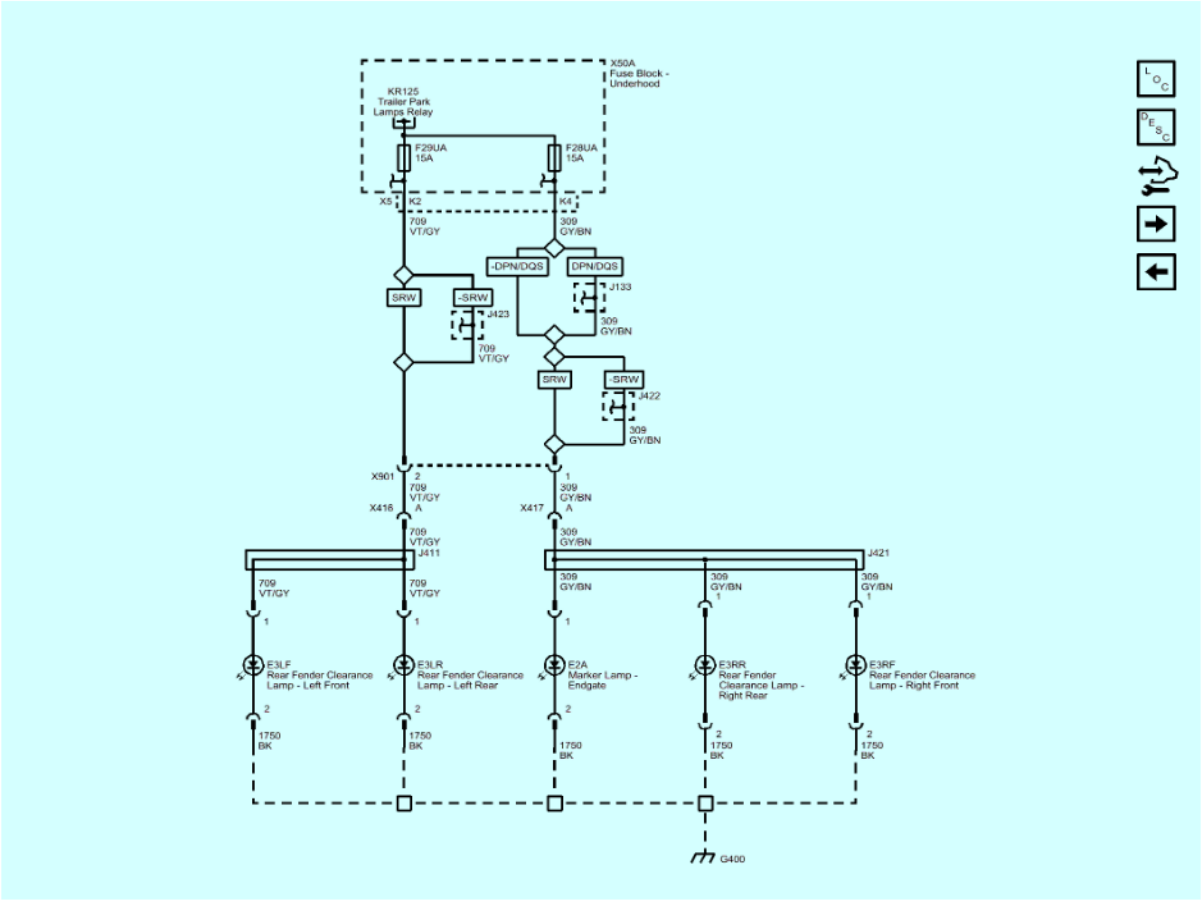


Fig. 20: Park Lamps - Rear Clearance (DRW)
Courtesy of GENERAL MOTORS COMPANY

Turn Signal Lamps - Front (1500 with X88 or Z88 with T4F)

cardiagn.com

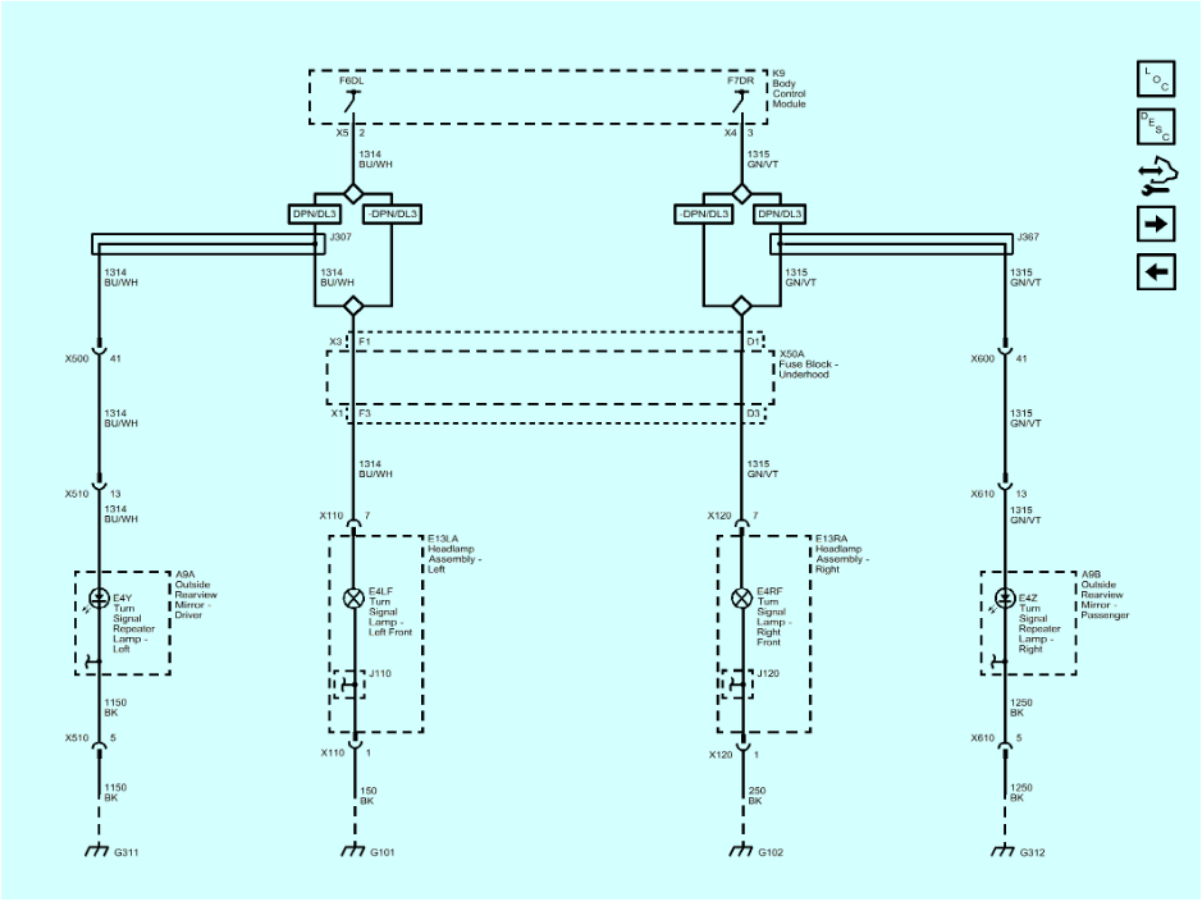


Fig. 21: Turn Signal Lamps - Front (1500 with X88 or Z88 with T4F)
Courtesy of GENERAL MOTORS COMPANY

Turn Signal Lamps - Front (1500 with X88 without T4F)

cardiagn.com

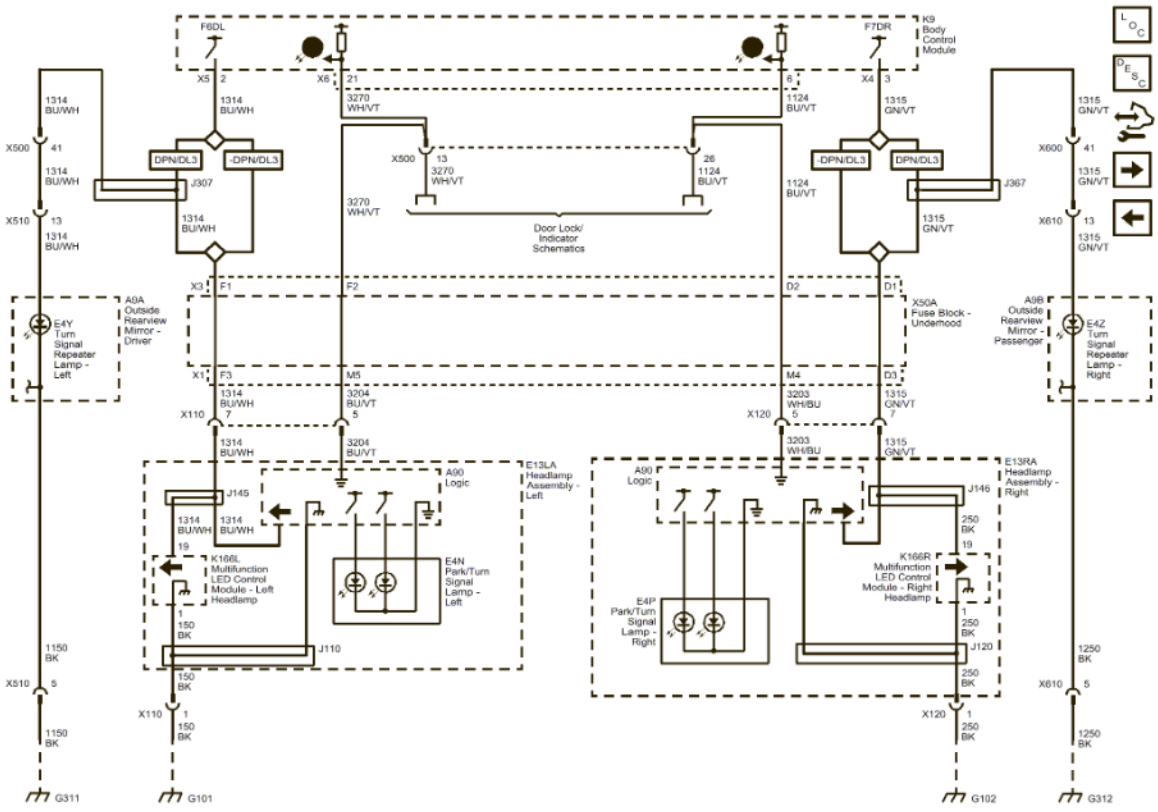


Fig. 22: Turn Signal Lamps - Front (1500 with X88 without T4F)
Courtesy of GENERAL MOTORS COMPANY

Turn Signal Lamps - Front (2500/3500 with Chevrolet/X88)

cardiagn.com

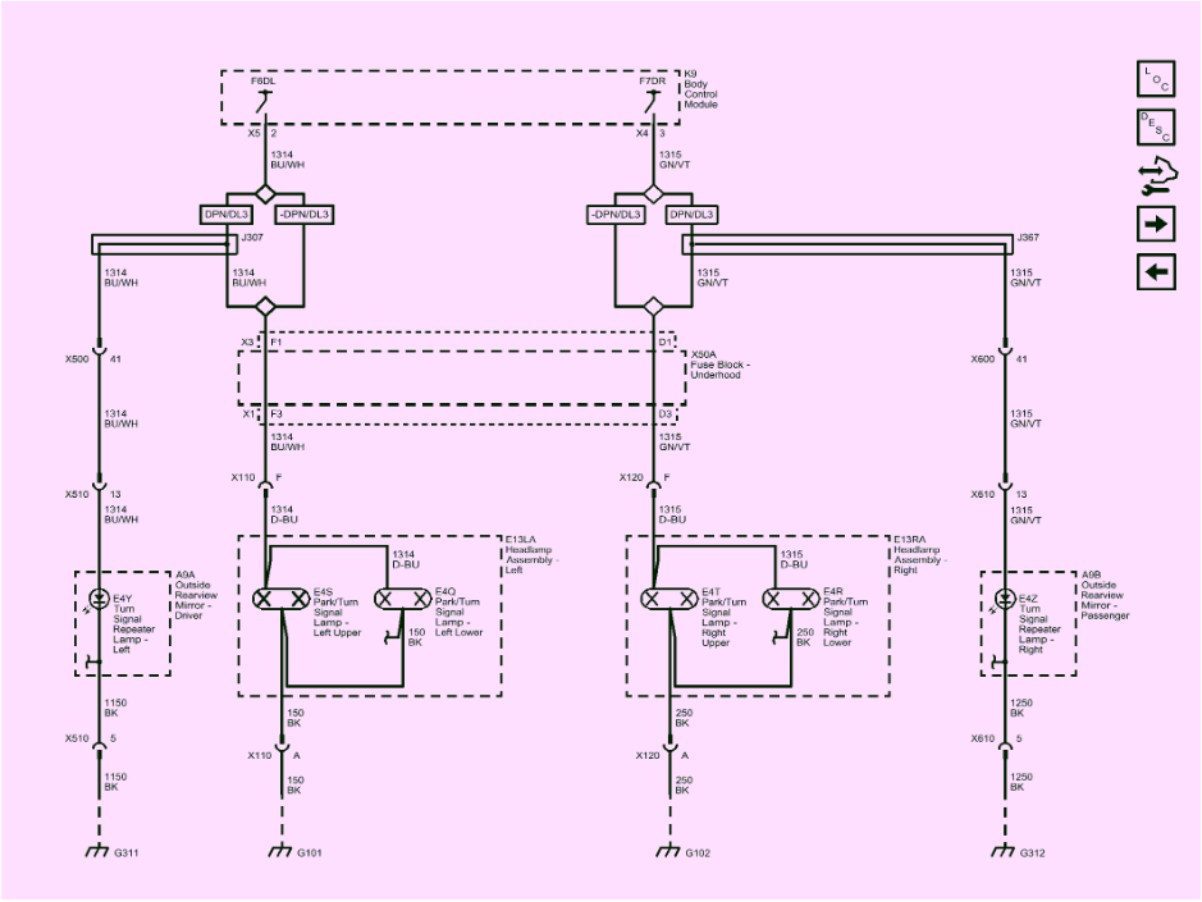


Fig. 23: Turn Signal Lamps - Front (2500/3500 with Chevrolet/X88)
Courtesy of GENERAL MOTORS COMPANY

Turn Signal Lamps - Front (1500 with Z88 without T4F)

cardiagn.com

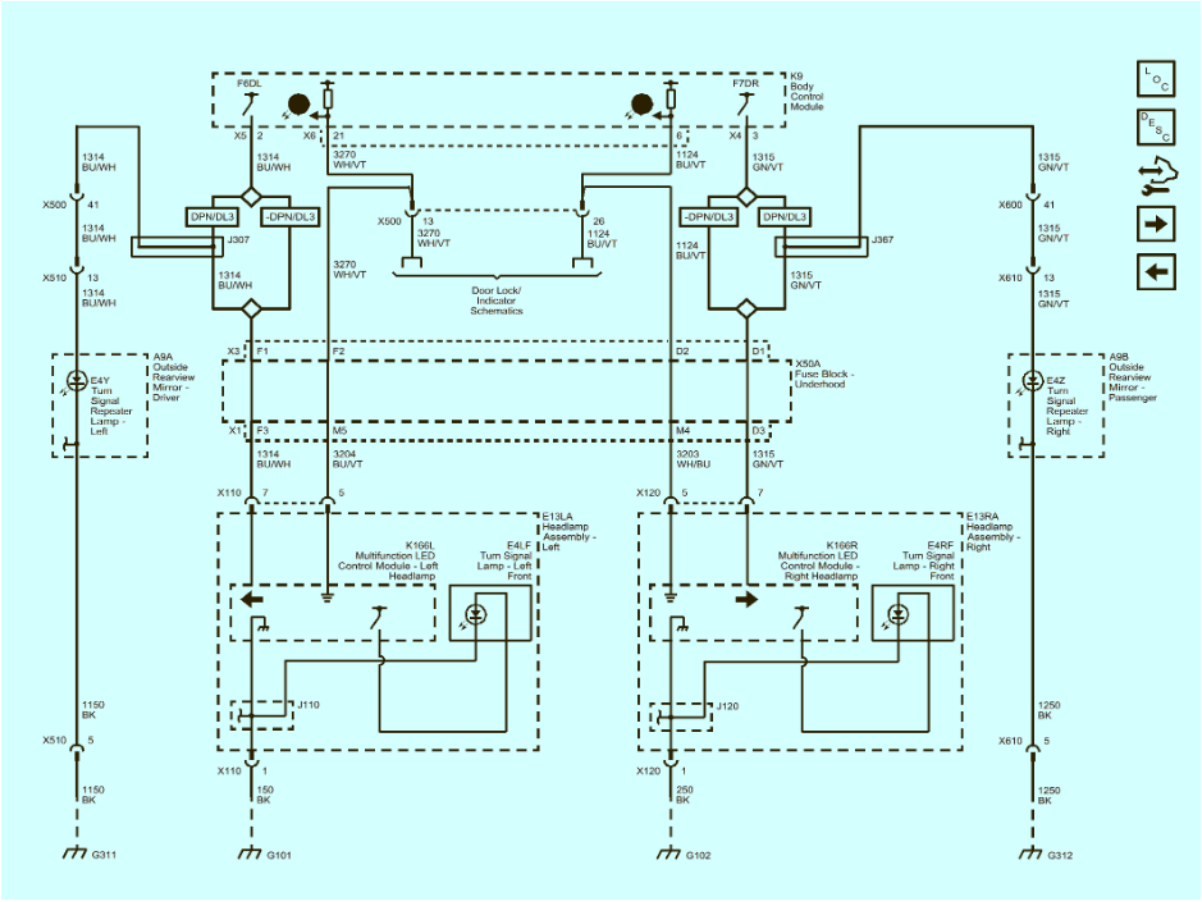


Fig. 24: Turn Signal Lamps - Front (1500 with Z88 without T4F)
Courtesy of GENERAL MOTORS COMPANY

Turn Signal Lamps - Front (2500/3500 with GMC/Z88)

cardiagn.com

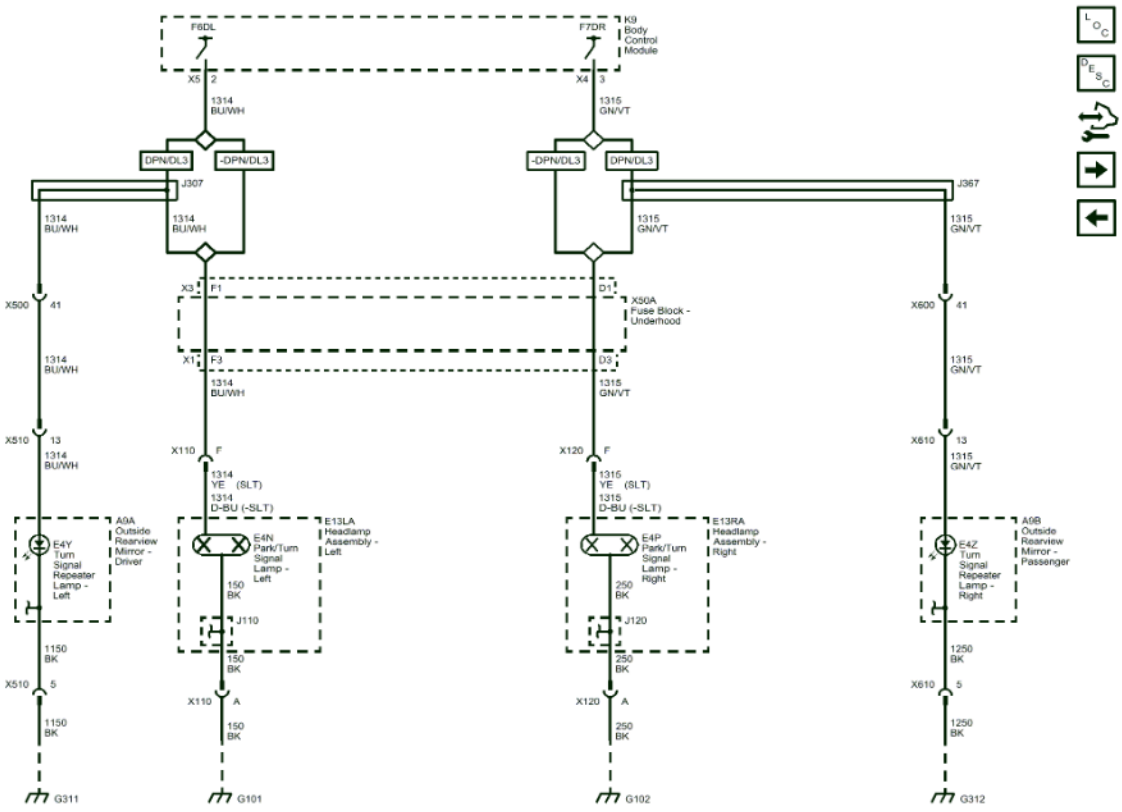


Fig. 25: Turn Signal Lamps - Front (2500/3500 with GMC/Z88)
Courtesy of GENERAL MOTORS COMPANY

Tail Lamps (LED)

cardiagn.com

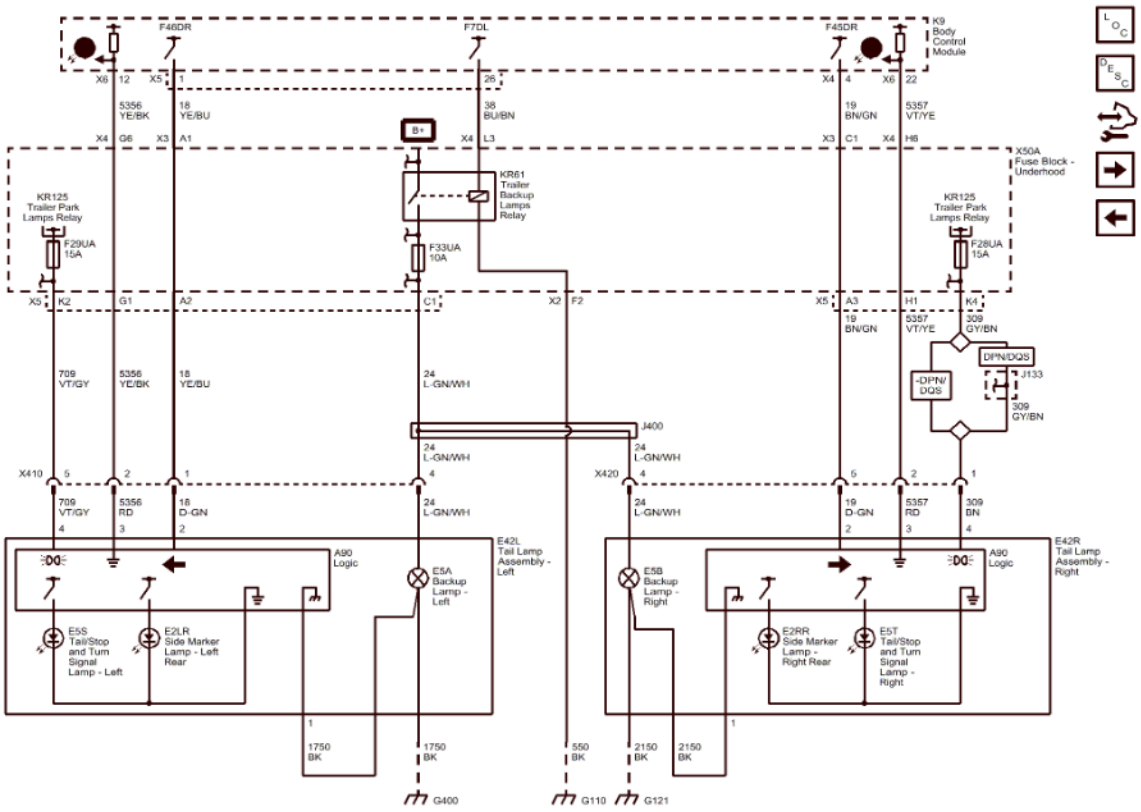


Fig. 26: Tail Lamps (LED)
Courtesy of GENERAL MOTORS COMPANY

Tail Lamps (without ZW9 or LED)

cardiagn.com

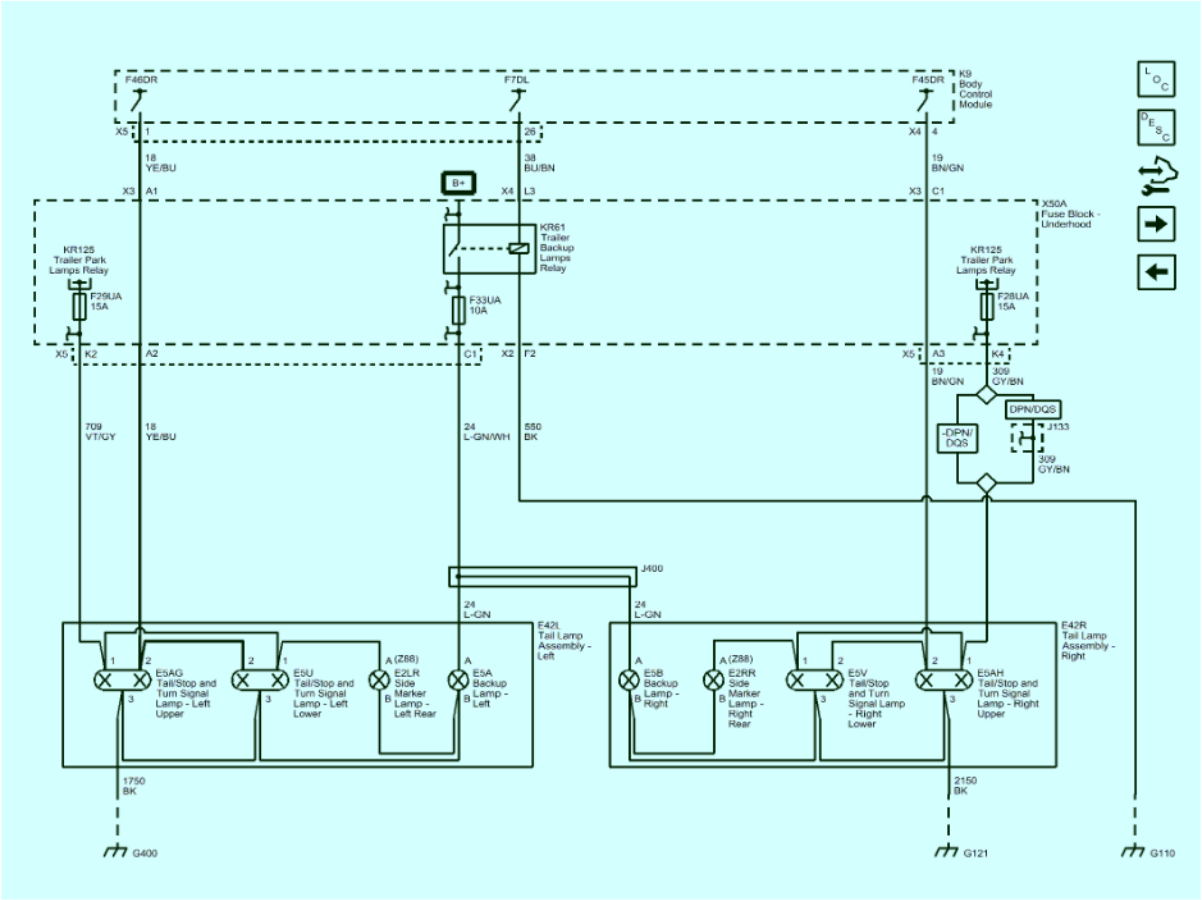


Fig. 27: Tail Lamps (without ZW9 or LED)
Courtesy of GENERAL MOTORS COMPANY

Tail Lamps (ZW9)

cardiagn.com

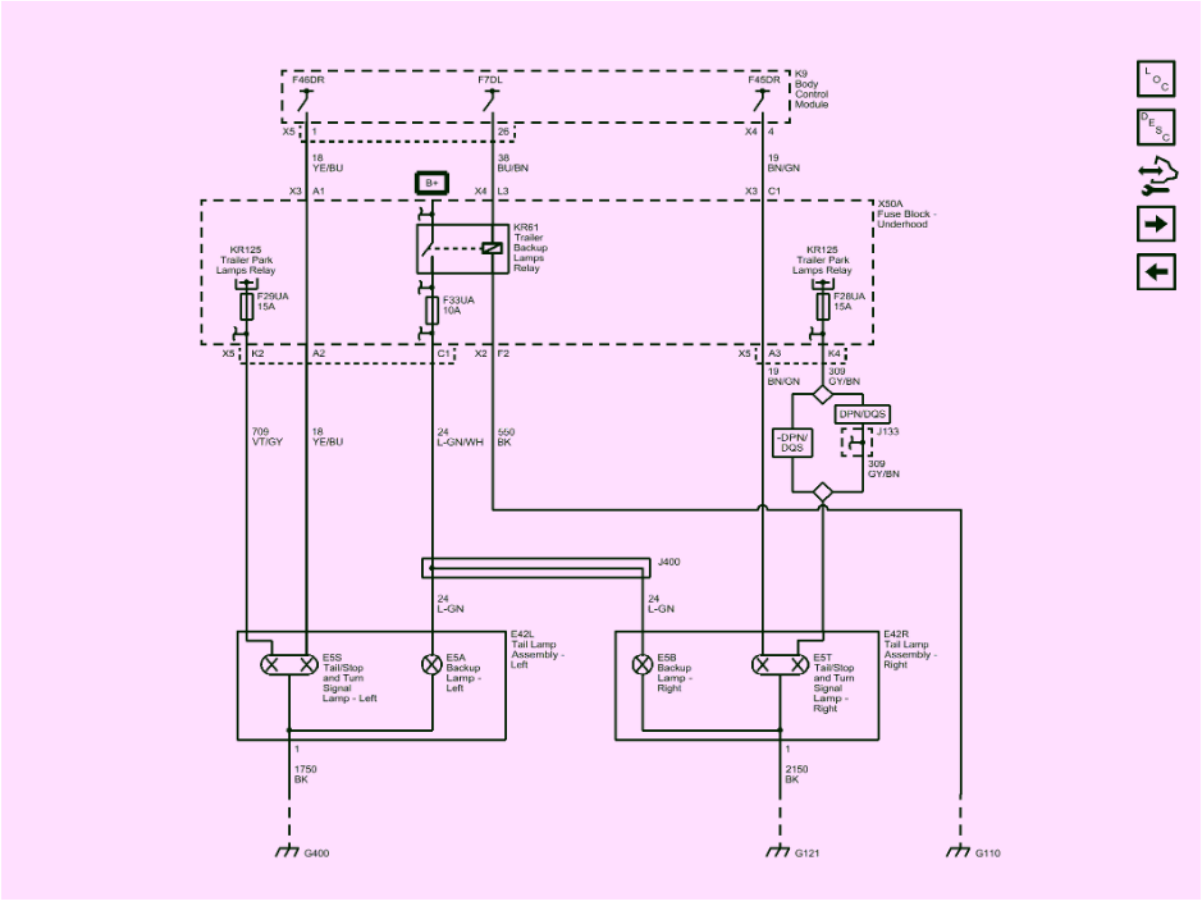


Fig. 28: Tail Lamps (ZW9)
Courtesy of GENERAL MOTORS COMPANY

Roof Cargo and Center High Mounted Stop Lamps (except E29)

cardiagn.com

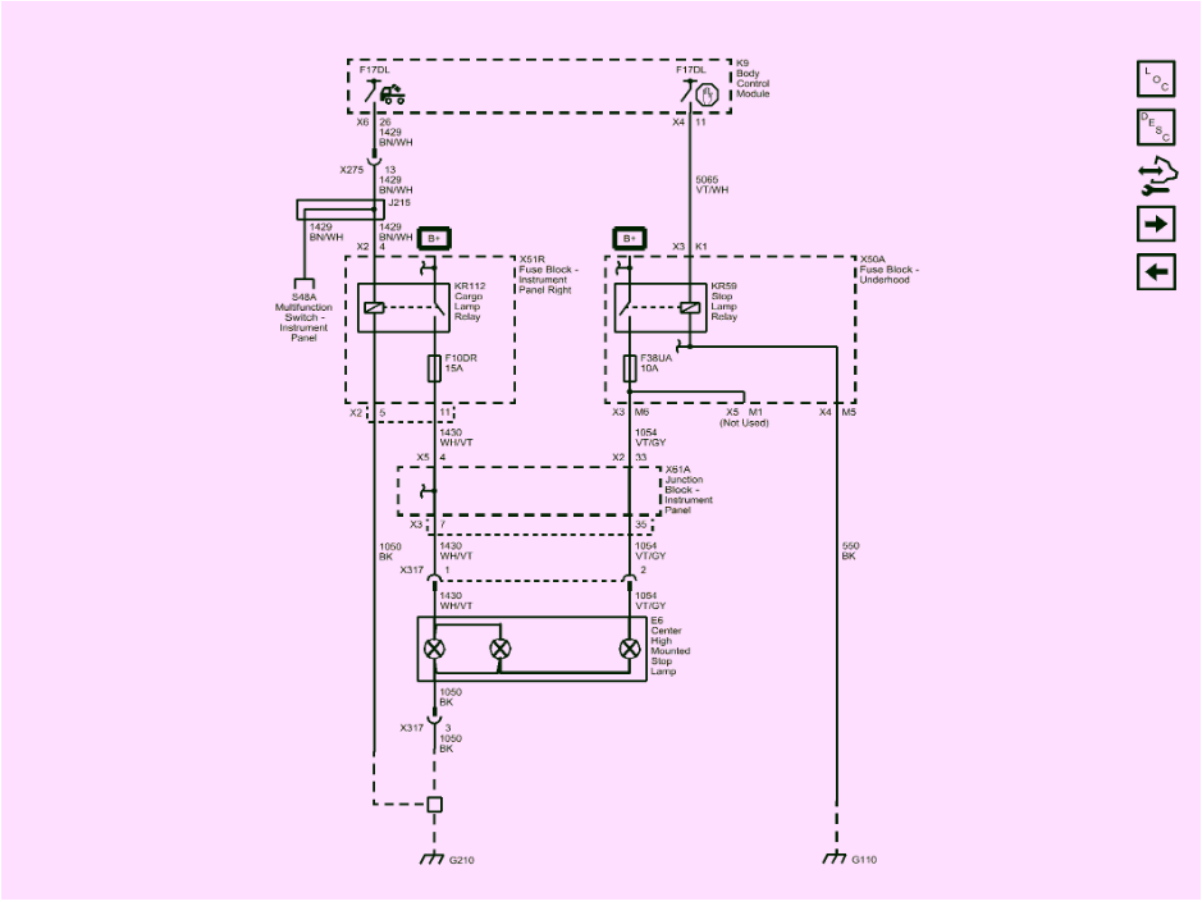


Fig. 29: Roof Cargo and Center High Mounted Stop Lamps (except E29)
Courtesy of GENERAL MOTORS COMPANY

Roof Cargo and Center High Mounted Stop Lamps (E29)

cardiagn.com

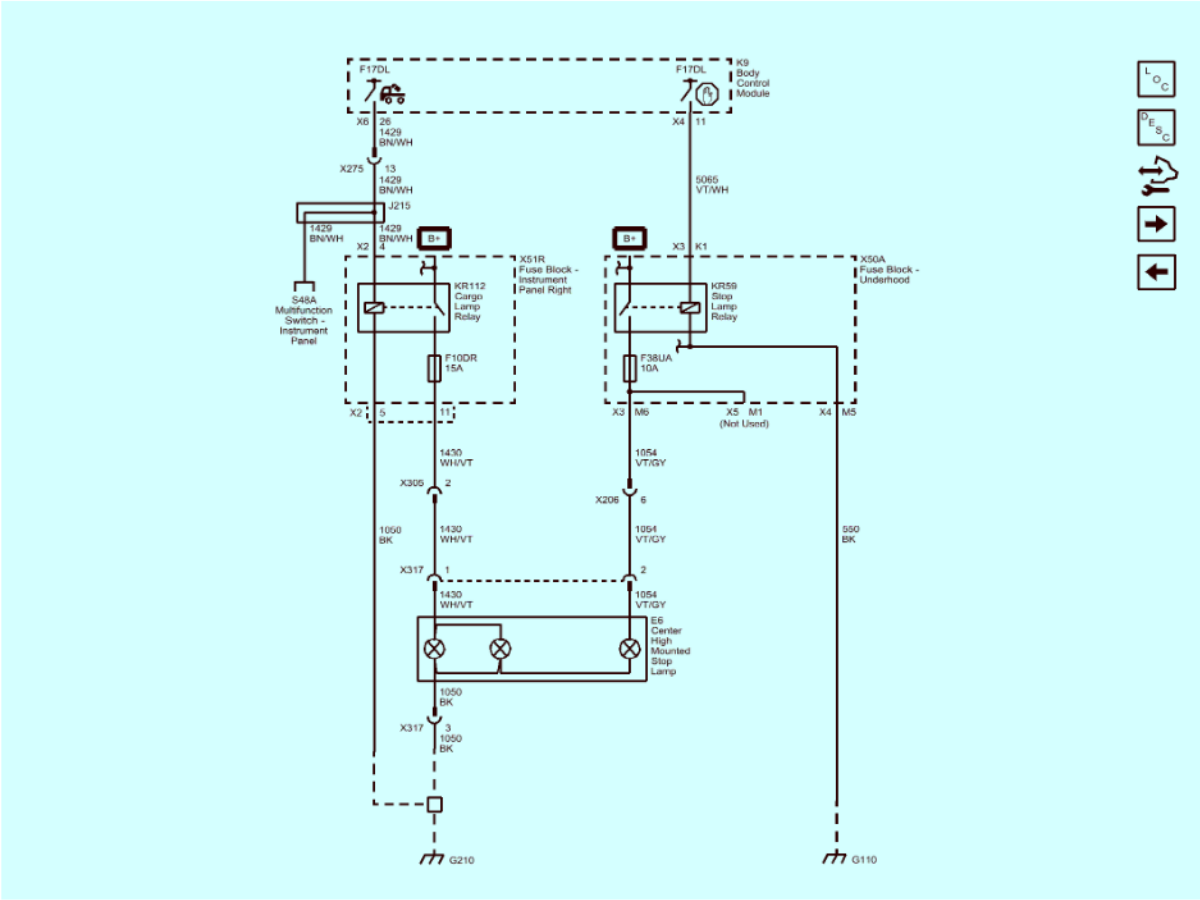


Fig. 30: Roof Cargo and Center High Mounted Stop Lamps (E29)
Courtesy of GENERAL MOTORS COMPANY

Mirror Courtesy Lamps (DL3) and License Plate Lamps

cardiagn.com

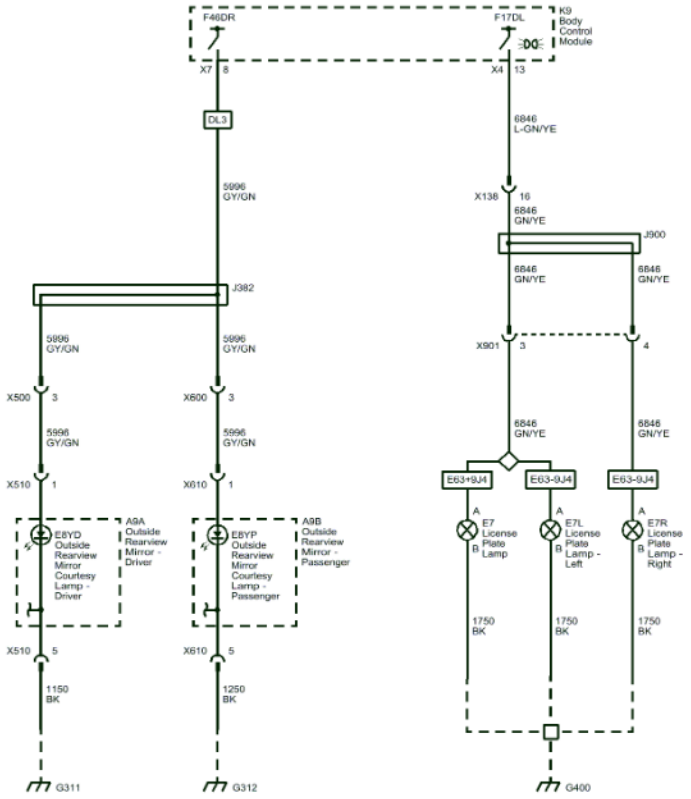


Fig. 31: Mirror Courtesy Lamps (DL3) and License Plate Lamps
Courtesy of GENERAL MOTORS COMPANY

Mirror Cargo Lamps (DPN or DQS) and Cargo Box Lamps (S0Y or UF2)

cardiagn.com

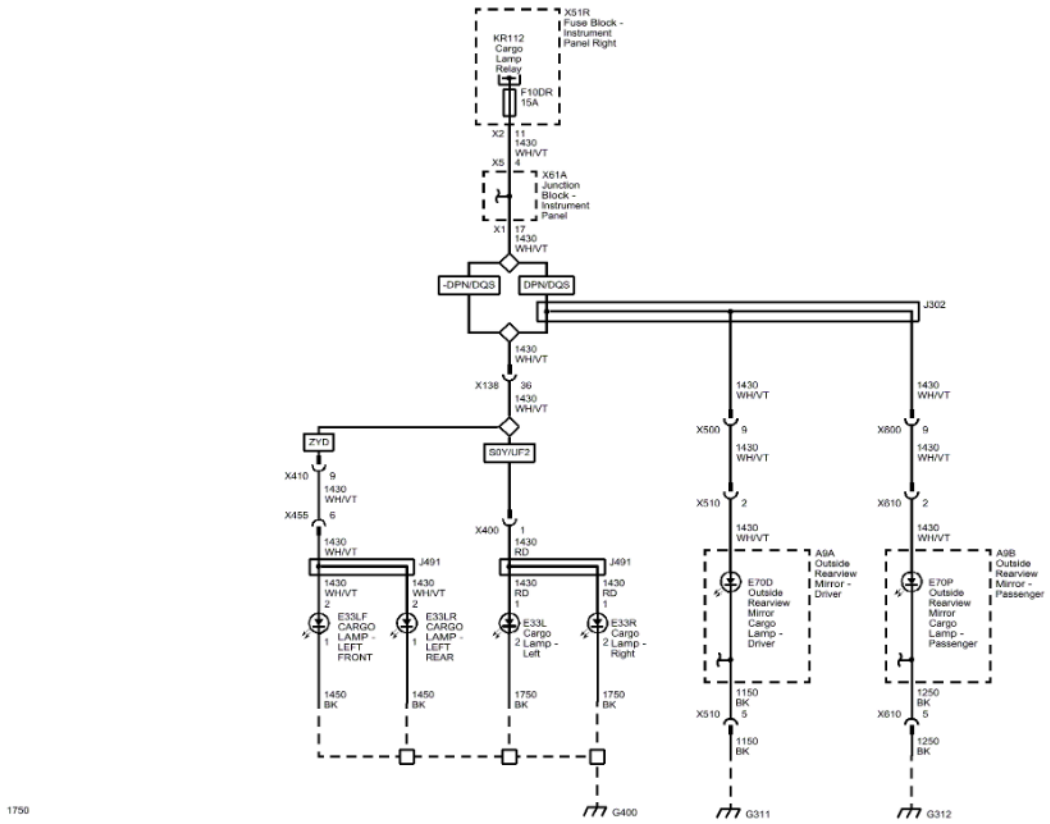


Fig. 32: Mirror Cargo Lamps (DPN or DQS) and Cargo Box Lamps (S0Y or UF2)
Courtesy of GENERAL MOTORS COMPANY

INTERIOR LIGHTS WIRING SCHEMATICS (E29)

Controls and Flood Lamps (E29)

cardiagn.com

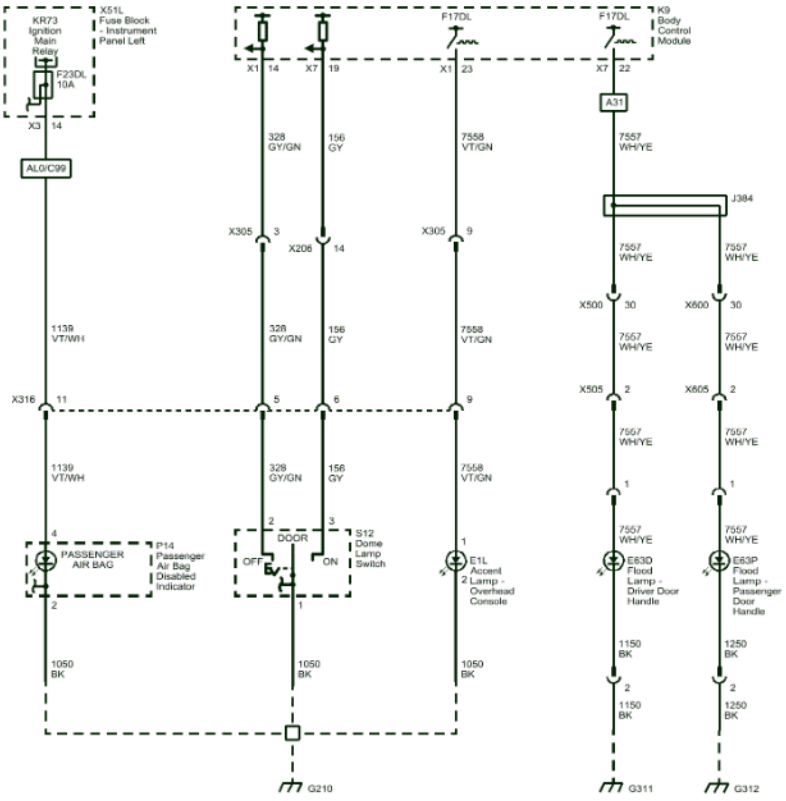


Fig. 33: Controls and Flood Lamps (E29)
Courtesy of GENERAL MOTORS COMPANY

Overhead Lamps (E29)

cardiagn.com

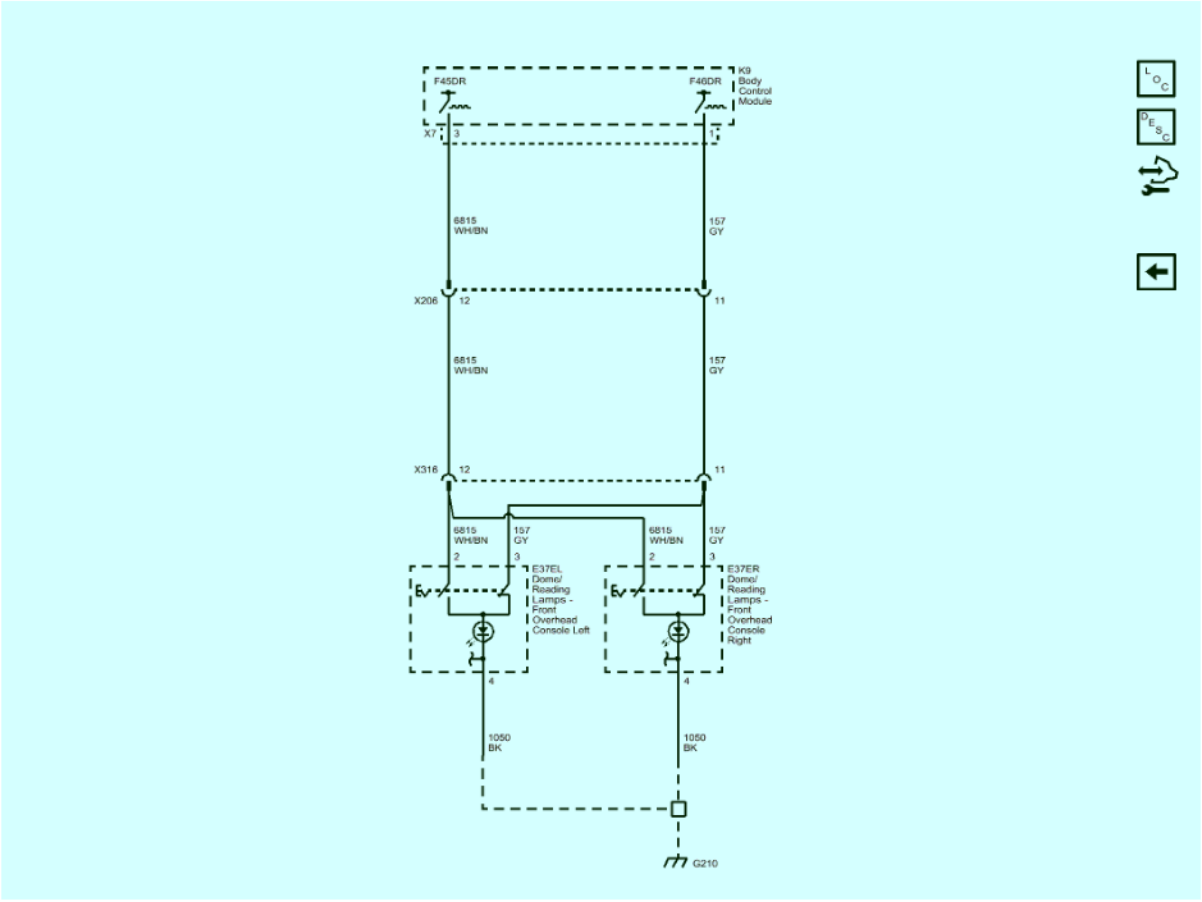


Fig. 34: Overhead Lamps (E29)
Courtesy of GENERAL MOTORS COMPANY

INTERIOR LIGHTS WIRING SCHEMATICS (WITHOUT E29)

Controls and Flood Lamps (without E29)

cardiagn.com

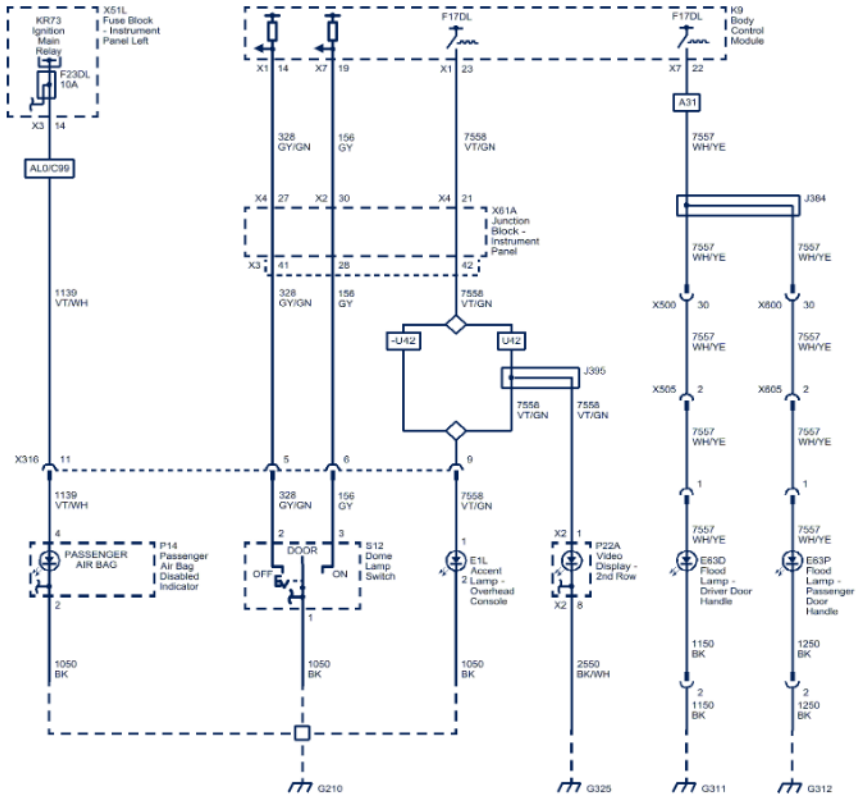


Fig. 35: Controls and Flood Lamps (without E29)
Courtesy of GENERAL MOTORS COMPANY

Floor Console Compartment and Overhead Lamps (without E29)

cardiagn.com

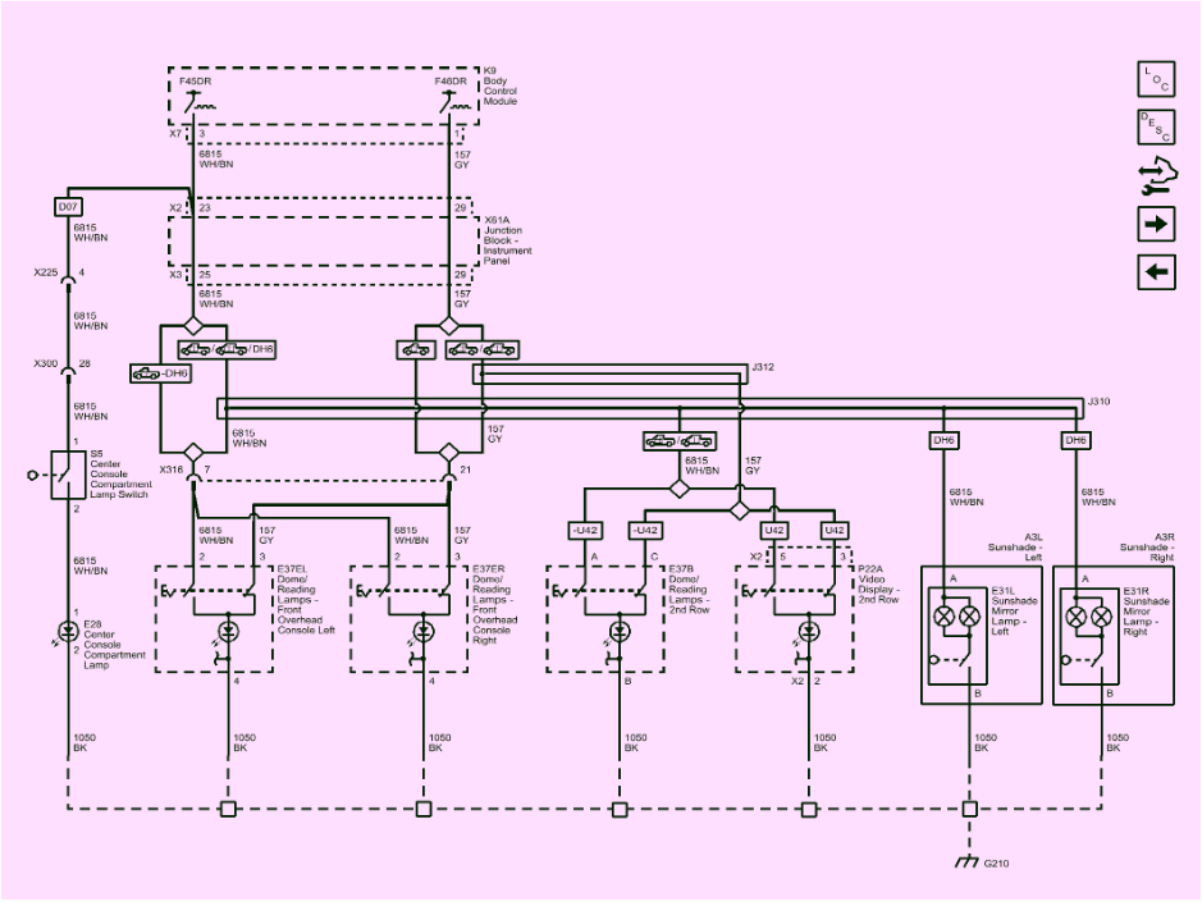


Fig. 36: Floor Console Compartment and Overhead Lamps (without E29)
Courtesy of GENERAL MOTORS COMPANY

INTERIOR LIGHTS DIMMING WIRING SCHEMATICS

Controls and Backlight - Instrument Panel

cardiagn.com

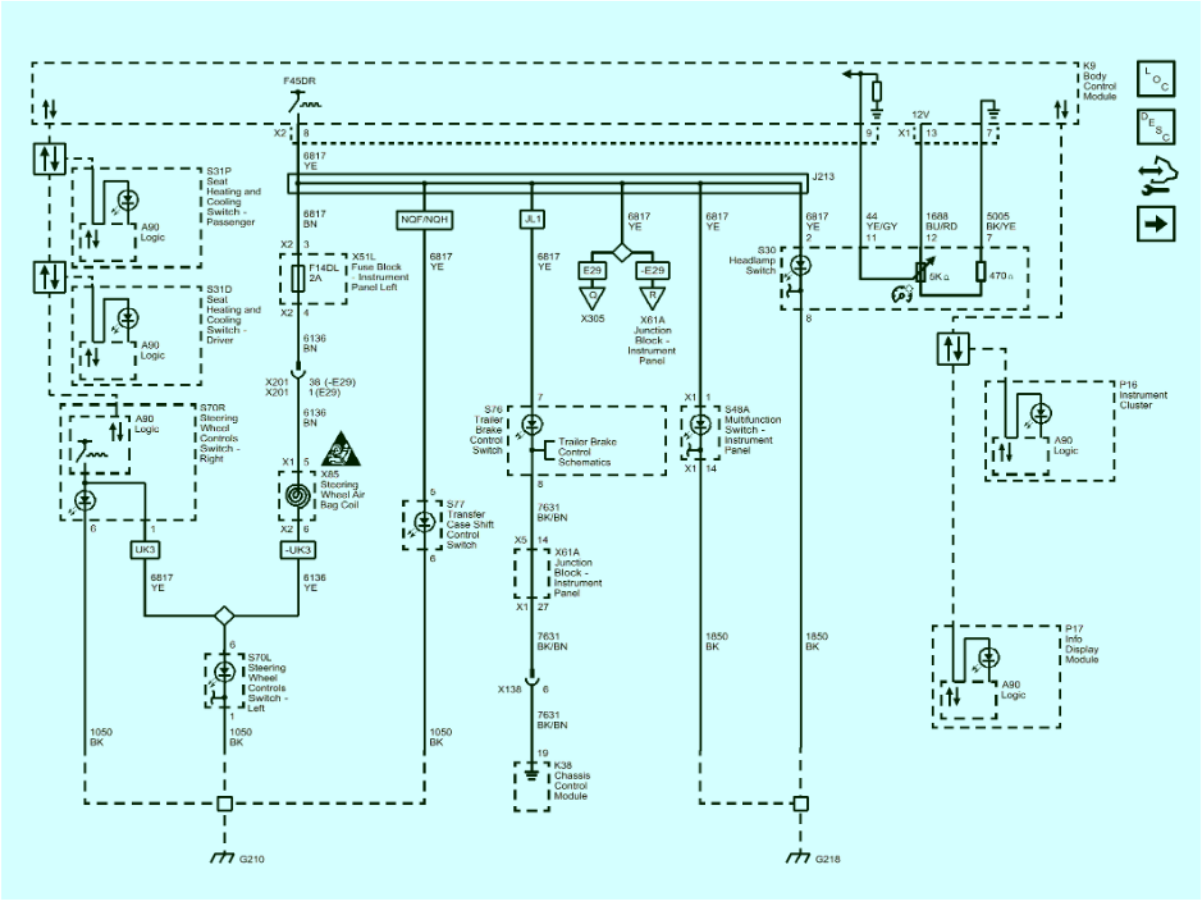


Fig. 37: Controls and Backlight - Instrument Panel
Courtesy of GENERAL MOTORS COMPANY

Backlight - Overhead Lamps

cardiagn.com

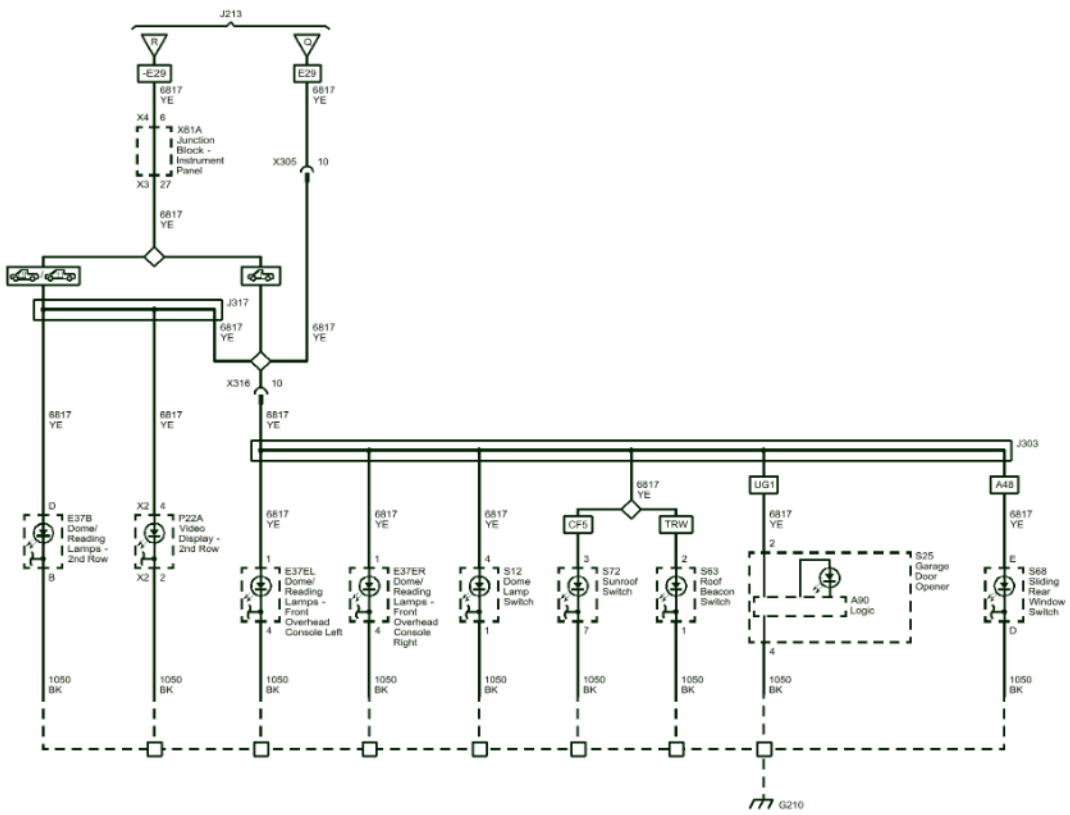


Fig. 38: Backlight - Overhead Lamps
Courtesy of GENERAL MOTORS COMPANY

Backlight - Doors

cardiagn.com

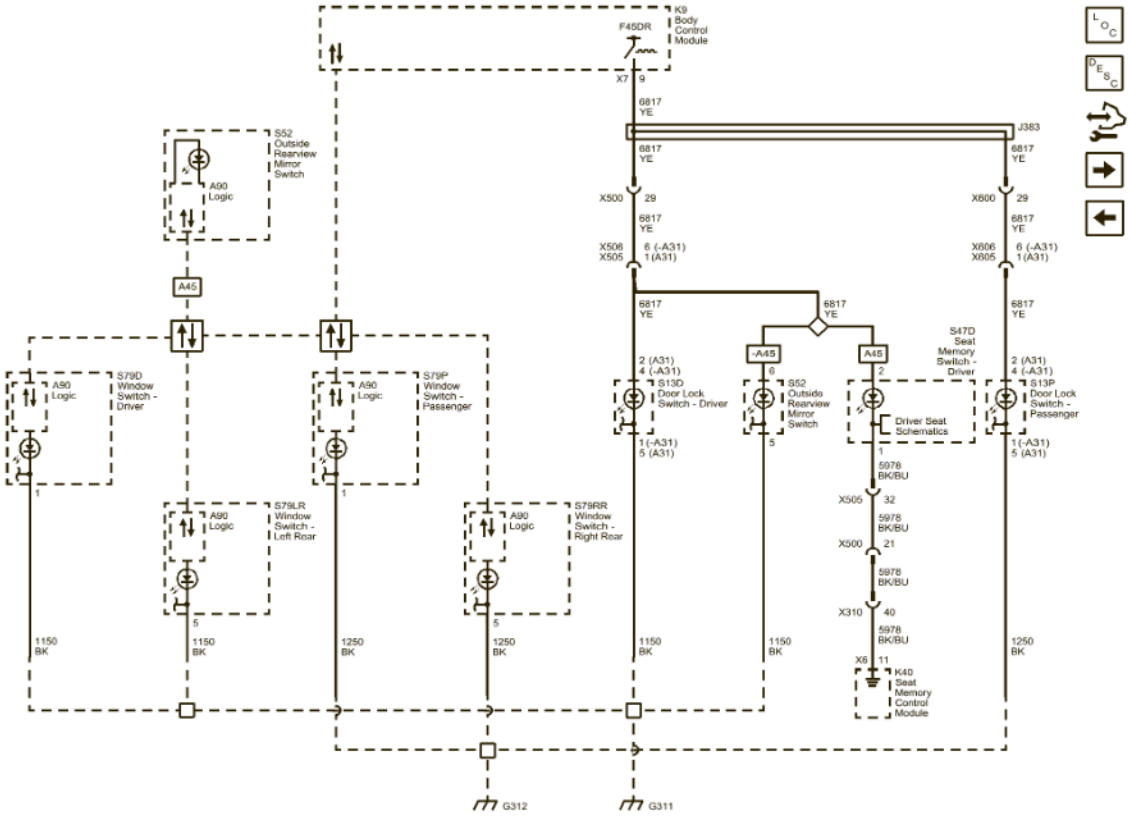


Fig. 39: Backlight - Doors
Courtesy of GENERAL MOTORS COMPANY

Indicators - Discrete

cardiagn.com

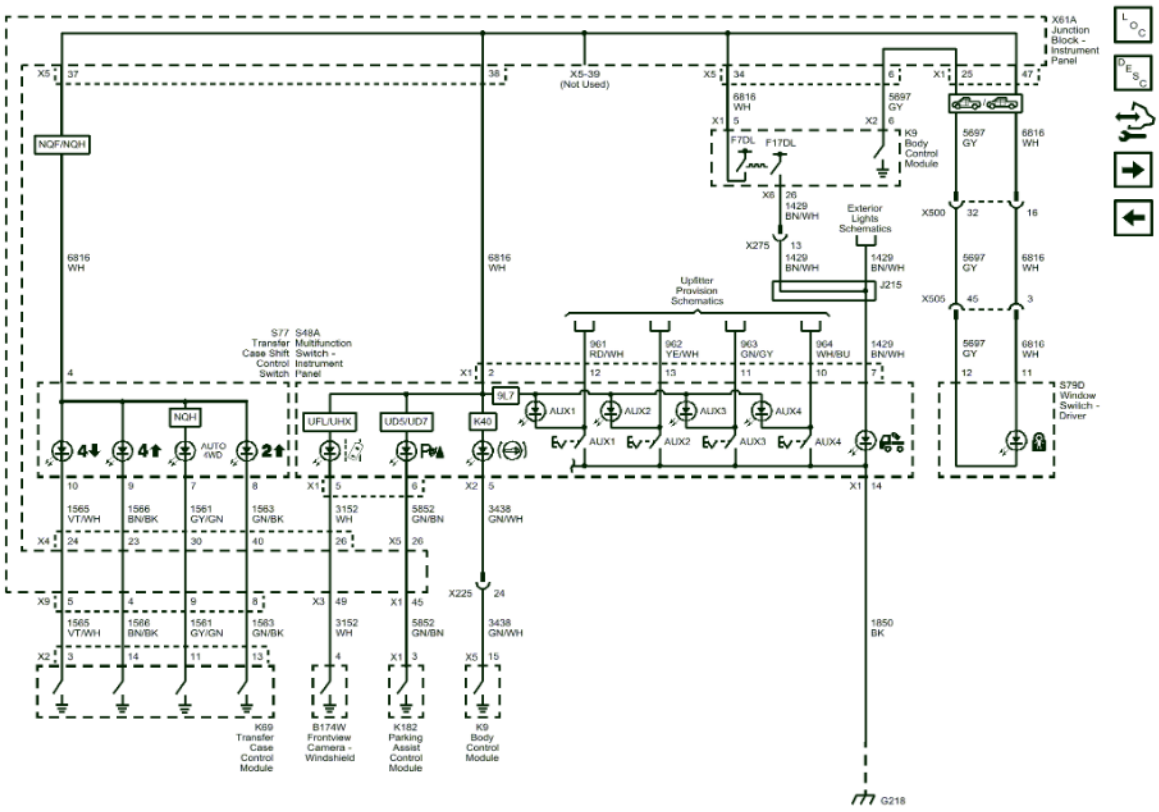


Fig. 40: Indicators - Discrete
Courtesy of GENERAL MOTORS COMPANY

Indicators - Serial Data

cardiagn.com

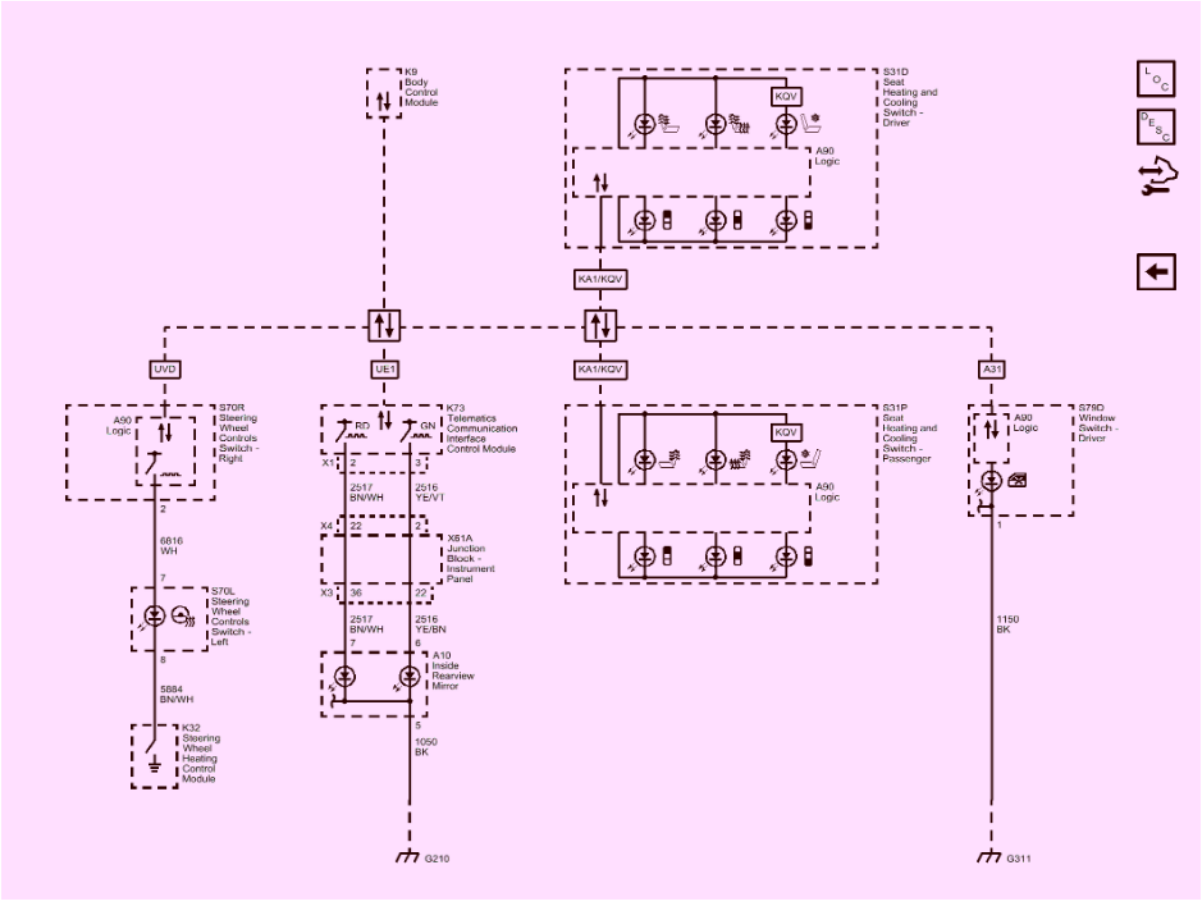


Fig. 41: Indicators - Serial Data
Courtesy of GENERAL MOTORS COMPANY

Article GUID: A00854509

cardiagn.com

SPECIFICATIONS

FASTENER SPECIFICATIONS

Reusable Threaded Fastener Tightening Specifications<

NOTE:

All fasteners listed in this table can be reused after removal.

Application	Specification Metric (English)
Cargo Lamp Bolt	2.5 N.m (22 lb in)
Headlamp Bolt	6 N.m (53 lb in)
Headlamp Screw	2.5 N.m (22 lb in)
Outside Rearview Mirror Screw	0.8 N.m (7 lb in)
Tail Lamp Screw	2.5 N.m (22 lb in)

Article GUID: A00854651

cardiagn.com