

Exterior Lighting Systems Description and Operation

The exterior lighting system consist of the following lamps:

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

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

Low Beam Headlamps (with T4A)

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 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.

Low Beam Headlamps (with T4F)

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.

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Run Up Of The Lamp

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

percent of the steady state is completed shortly thereafter. A high watt power level is necessary in order to bring the lamp to a steady state in such a short period of time. The high watt power level allows the lamp to meet the SAE light vs. time specification.

When To Change The HID Bulb

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

The following symptoms are noticeable signs of bulb failure:

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

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

Light Color

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

High Beam Headlamps (with T4A/T4F without F19)

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 (with T4F/F19)

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 high beam solenoid actuators within the headlamp assemblies. Once the high beam solenoid actuators are active, the solenoid shutters open in each headlamp assembly exposing the remaining portion of the headlamp that was covered by the shutters illuminating the high beams at full intensity.

Adaptive Forward Lighting (AFL)

The AFL consist of the following components:

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

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

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

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

Automatic Headlamp Leveling

The Automatic Headlamp Leveling Systems consist of the following components:

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

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

Daytime Running Lamps

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

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 or automatic lamp control when the headlamp switch is in the AUTO position. In daylight conditions the BCM will command the designated daytime running lights 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 lights operation.

Flash to Pass (FTP)

When the turn signal/multifunction switch is momentarily placed in the flash to pass (FTP) position, ground is applied to the turn signal/multifunction switch. The turn signal/multifunction switch applies ground to the body control module (BCM) through the FTP

switch signal circuit. The BCM responds to the FTP request by applying ground to the high beam relay control circuit. This energizes the high beam relay, closing the switch side contacts of the high beam relay, applying battery voltage to the 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.

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 (PWM) voltage to the hazard switch light emitting diode (LED) backlighting control circuit illuminating the LED to the desired level of brightness.

Park, Tail, and License Lamps

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

Stop Lamps

The brake pedal position 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 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 their respective control circuits. When a turn signal request is received by the BCM, a serial data message is sent to the instrument panel requesting the respective turn signal indicator be pulsed ON and OFF.

Backup Lamps

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

Battery Run Down Protection/Inadvertent Power

To provide battery run down protection, the exterior lamps will be deactivated automatically under certain conditions. The BCM monitors the state of the headlamp switch. If the park or headlamp switch is ON when the ignition switch is placed in either the CRANK or RUN position and then placed in the OFF position, the BCM initiates a 10 min timer. At the end of the 10 min, the BCM will turn off the control power output to the park lamp controls as well as the headlamp relay coils, deactivating the exterior lamps. This feature will be cancelled if any power mode other than OFF becomes active. The BCM will disable battery run down protection if any of the following conditions exist. The park or headlamp switch is placed in the ON to OFF position, and back to the ON position during battery run down protection. The BCM determined that the park or headlamp switch was not active when the ignition was turned OFF.

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
- I/P compartment lamps
- Reading lamps
- Rear compartment courtesy lamp
- 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.

Instrument Panel (I/P) Compartment Lamp

The inadvertent power supply voltage circuit from the BCM provides battery voltage to the I/P compartment (glove box) lamp. When the I/P compartment is opened, the I/P compartment lamp switch contacts close providing a path to ground and the I/P compartment

lamp illuminates. If the operator inadvertently leaves the I/P compartment door open with the I/P 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. The I/P compartment lamp is permanently grounded at ground G204.

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.

Rear Compartment Courtesy Lamp

When the rear compartment is opened, the rear compartment lid latch opens providing a rear compartment open input signal to the BCM. The BCM responds by applying battery voltage to the rear compartment courtesy lamp control circuit illuminating the rear compartment courtesy lamp.

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.

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
- Headlamp switch
- Hazard switch
- HVAC control head assembly
- Ignition mode switch
- Multifunction switch – instrument panel
- Outside rearview mirror switch
- Park brake switch
- Radio
- Rear compartment lid unlatch switch
- Steering wheel control switch – left
- Steering wheel control switch – right
- Sun roof switch
- Sun roof tilt switch
- 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 (I/P) dimmer switch. The instrument panel (I/P) dimmer switch is a momentary type switch and utilizes a resistor ladder to increase and decrease the brightness of the interior backlighting components. The I/P 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 I/P dimmer switch. When the I/P dimmer switch is held in the desired position, the dimmed voltage setting is applied from the I/P dimmer switch through the I/P dimmer switch signal circuit to the BCM. The BCM interprets the signal and applies a pulse width modulated (PWM) 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.

DTC B1461 or B1462

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 B1461 00

Left Headlamp Horizontal Motor Circuit Malfunction

DTC B1462 00

Right Headlamp Horizontal Motor Circuit Malfunction

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Headlamp Control Module B+ Fuse (F64 UA)	U0181 00	U0181 00	—	—
Headlamp Leveling Actuator – Left B+ Fuse (F53 UA)	U1513 00, U1514 00, U1523 00, U1524 00, B3843 05	U1513 00, U1514 00, U1523 00, U1524 00, B3843 05	—	—
Headlamp Leveling Actuator – Right B+ Fuse (F53 UA)	U1513 00, U1514 00, U1523 00, U1524 00, B3843 05	U1513 00, U1514 00, U1523 00, U1524 00, B3843 05	—	—

Headlamp Control Module Ground	—	1	—	—
Headlamp Leveling Actuator – Left Ground	—	1	—	—
Headlamp Leveling Actuator – Right Ground	—	1	—	—
1. Adaptive Forward Lighting Malfunction				

Circuit/System Description

Battery positive voltage is applied to the headlamp control module at all times. The headlamp control module has a normal operational voltage range of about 12.5–16 V and is only fully functional with the ignition switch is in the RUN position and the headlamp switch in the AUTOMATIC LIGHT position. The communications enable signal from the body control module (BCM) wakes the headlamp control module microprocessor. The headlamp control module receives serial data messages from the engine control module (ECM), transmission control module (TCM), electronic brake control module (EBCM), and BCM with information regarding power mode, speed, steering angle, transmission gear selection, and headlamp switch status. The headlamp control module calculates the headlamp angle and sends commands to the left and right adaptive forward lighting system headlamp actuators. The headlamp actuators drive the headlamps to the position commanded by the headlamp control module. The headlamp control module monitors the headlamp actuator motor control circuits for proper circuit continuity and for shorts to ground or voltage. If a malfunction is detected, a DTC will be stored in memory and the driver will be notified with a message displayed over the driver information center located on the instrument cluster.

Conditions for Running the DTC

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

Conditions for Setting the DTC

DTC B1461 00

The headlamp control module detects an internal malfunction in the left headlamp adaptive actuator.

DTC B1462 00

The headlamp control module detects an internal malfunction in the right headlamp adaptive actuator.

Actions Taken When the DTC Sets

- When DTC B1461 or DTC B1462 sets, the headlamp control module will attempt to return the lamps to a nominal position and disable all requests to all headlamp actuators.
- The driver information center will display "Adaptive Forward Lighting" and "Headlamp Leveling Malfunction".
- On vehicles equipped with both AFL and headlamp leveling, the headlamp leveling system will be disabled.

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 50 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](#)

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 M29 Headlamp Leveling Actuator.
 2. Test for less than 15 Ω between the ground circuit terminal 2 and ground.
- ⇒ **If 15 Ω or greater**

2.1. Ignition OFF.

2.2. Test for less than $2\ \Omega$ in the ground circuit end to end.

⇒ If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.

⇒ If less than $2\ \Omega$, repair the open/high resistance in the ground connection.

↓ **If less than $15\ \Omega$**

3. Ignition ON.

4. Verify a test lamp illuminates between the B+ circuit terminal 1 and ground.

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

4.1. Ignition OFF, disconnect the X2 harness connector at the X50A Fuse Block – Underhood.

4.2. 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

4.3. Test for less than $2\ \Omega$ in the control circuit end to end.

⇒ If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.

⇒ If less than $2\ \Omega$, replace the X50A Fuse Block – Underhood.

↓ **If the test lamp illuminates**

5. Test or replace the K26 Headlamp Control Module.

6. Ignition ON.

7. Verify the appropriate headlamp operates to the LEFT and RIGHT positions when commanding the appropriate Headlamp Horizontal Motor control LEFT and RIGHT with a scan tool.

⇒ If the appropriate headlamp does not operate LEFT and RIGHT, test or replace the appropriate E13 Headlamp Assembly.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- [Headlamp Replacement](#)
- [Control Module References](#) for Headlamp Control Module replacement, programming, and setup

DTC B1480

[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 2 X7	B1480 02	1	1	—
Dome Lamps Control	B2615 02	B2615 04	2	—
Center Console Compartment Lamp	—	1	—	—
Instrument Panel Compartment Lamp Ground	—	1	—	—
Dome/Reading Lamps - Left Front Ground	—	1, 2	—	—
Dome/Reading Lamps - Left Rear Ground	—	1, 2	—	—
Dome/Reading Lamps - Right Front Ground	—	1, 2	—	—
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Dome/Reading Lamps - Right Rear 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 and no doors opened, 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.

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

Reference Information

Schematic Reference

- [Interior Lights Schematics](#)

- [Body Control System Schematics](#)

Connector End View Reference

[Component Connector End Views](#)

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, exterior lamps OFF, disconnect the harness connectors at the components listed below.
 - E27 instrument panel compartment lamp
 - E28 center console compartment lamp
 - E3L sunshade mirror lamp – left
 - E3R sunshade mirror lamp – right
 - E37LF dome/reading lamps – left front
 - E37RF dome/reading lamps – right front
 - E37LR dome/reading lamps – left rear
 - E37RR dome/reading lamps – right rear
2. Connect a test lamp between the appropriate control circuit terminal listed below and ground.
 - E27 instrument panel compartment lamp – terminal 1
 - E28 center console compartment lamp – terminal 1
 - E31LF sunshade mirror lamp – left terminal A

- E31RF sunshade mirror lamp – right terminal A
- E37LF dome/reading lamps – left front terminal 1
- E37RF dome/reading lamps – right front terminal 1
- E37LR dome/reading lamps – left rear terminal 1
- E37RR dome/reading lamps – right rear terminal 1

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**

3.1. Ignition OFF, disconnect the X7 harness connector at the K9 body control module.

3.2. 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

3.3. 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**

3.1. Ignition OFF, disconnect the X7 harness connector at the K9 body control module, ignition ON.

3.2. 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.

- [Instrument Panel Compartment Lamp Replacement](#)
- [Sunshade Replacement](#)
- [Control Module References](#) for BCM replacement, programming, and setup

DTC B2530

[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 and Instrument Panel Dimmer Switch B+	B257B 03, B1405 03	B257B 03	—	—
Front Fog Lamp and Instrument Panel Dimmer Switch Signal	B257B 03	B257B 03	1	—
Front Fog Lamp Relay Control	B2530 02, B2530 04	B2530 02, B2530 04	B2530 01	—

Front Fog Lamp Control	1	1	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 switch is an input to the body control module (BCM) and is contained in the headlamp switch assembly. The BCM supplies voltage to the front fog lamp switch via the front fog lamp and instrument panel dimmer switch B+ circuit. When the front fog lamp switch is pressed, voltage from the B+ circuit is pulled down through the front fog lamp switch resistor. The front fog lamp resistor is part of the resistor ladder that also provides the dimming signals for the instrument panel dimmer switches. The BCM receives the voltage signal through the front fog lamp and instrument panel dimmer switch signal circuit.

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 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 seconds or greater.

DTC B2530 02

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

DTC B2530 04

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

Actions Taken When the DTC Sets

DTC B2530 01 and B2530 04

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

DTC B2530 02

The front fog lamps 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

[Fog Lights Schematics](#)

Connector End View Reference

[Component Connector End Views](#)

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 13 and ground.

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

- 2.1. Ignition OFF, disconnect the X1 harness connector at the X50A Fuse Block – Underhood.
- 2.2. 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
- 2.3. Test for less than $2\ \Omega$ in the control circuit end to end.
 - ⇒ If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.
 - ⇒ If less than $2\ \Omega$, 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. Remove the front fog lamp fuse at the X50A Fuse Block – Underhood, ignition ON.
5. Verify a test lamp illuminates between the front fog lamp fuse B+ switch control terminal and ground.

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

- 5.1. Ignition OFF, disconnect the X1 harness connector at the X50A Fuse Block – Underhood, ignition ON.
- 5.2. 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 test lamp illuminates**

6. Test or replace the K9 Body Control Module.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- [Body Front Wiring Harness Fuse Block Replacement](#)
- [Control Module References](#) for BCM replacement, programming, and setup

DTC B2540

[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 B2540 02

Rear Fog Lamps Control Circuit Short to Ground

[Diagnostic Fault Information](#)

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Rear Fog Lamp and Instrument Panel Dimmer Switch B+	B257B 03, B1405 03	B257B 03	—	—
Rear Fog Lamp and Instrument Panel Dimmer Switch Signal	B257B 03	B257B 03	1	—
Rear Fog Lamp Control	B2540 02	1	1	—
Fog Lamp – Left Rear Ground	—	1	—	—
Fog Lamp – Right Rear Ground	—	1	—	—
1. Rear Fog Lamps Malfunction				

Circuit/System Description

The rear fog lamp switch is an input to the body control module (BCM) and is contained in the headlamp switch assembly. The BCM supplies voltage to the rear fog lamp switch via the rear fog lamp and instrument panel dimmer switch B+ circuit. When the rear fog lamp switch is pressed, voltage from the B+ circuit is pulled down through the rear fog lamp switch resistor. The rear fog lamp resistor is part of the resistor ladder that also provides the dimming signals for the instrument panel dimmer switches. The BCM receives the voltage signal through the rear fog lamp and instrument panel dimmer switch signal circuit. The body control module responds by applying voltage to the rear fog lamp control circuit illuminating the rear fog lamps.

Conditions for Running the DTC

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

Conditions for Setting the DTC

B2540 02

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

Actions Taken When the DTC Sets

The rear fog lamps will not operate when the park lamps are ON and the rear 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.

Diagnostic Aids

When testing at the rear fog lamp bulb socket, 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

[Fog Lights Schematics](#)

Connector End View Reference

[Component Connector End Views](#)

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 E29 Fog Lamp – Rear.
2. Test for less than 10 Ω between the ground circuit at the socket terminal and ground.
⇒ **If 10 Ω or greater**
 - 2.1. Ignition OFF.
 - 2.2. 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 control circuit at the socket terminal and ground, ignition ON.
4. Verify the test lamp turns ON and OFF when commanding the Rear Fog Lamp Relay Command ON and OFF with a scan tool.
⇒ **If the test lamp is always OFF**
 - 4.1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module.
 - 4.2. 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
 - 4.3. 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**

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

4.2. 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 inoperative E29 Fog Lamp - Rear.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

[Control Module References](#) for BCM or Instrument Cluster replacement, programming, and setup

DTC B2545

[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
BCM 6 Fuse B+	B2545 01, B2545 04	B2545 01, B2545 04	—	—
Backup Lamps Control	B2545 02	B2545 01, B2545 04	1	—
Backup Lamp Ground – Left	—	1	—	—
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Backup Lamp Ground – Right	—	1	—	—
1. Backup Lamps Malfunction				

Circuit/System Description

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 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 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 and B2545 04

- The BCM detects an open/high resistance in the backup lamps control circuit.
- The BCM detects a short to ground or an open/high resistance in the F32UA fuse B+ circuit.

DTC B2545 02

The BCM detects a short to ground in the backup lamps 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](#)

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 B+ circuit terminal 4 and ground.
 - ⇒ **If the test lamp does not illuminate and the circuit fuse is good**
 - 2.1. Ignition OFF, disconnect the X2 harness connector at the X50A fuse block – underhood.
 - 2.2. 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**
 - 2.1. Ignition OFF, disconnect the X2 harness connector at the X50A fuse block – underhood.
 - 2.2. 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 X5 harness connector at the K9 body control module.
4. Ignition OFF, exterior lamps OFF, disconnect the harness connector at the appropriate E5 backup lamp.
5. Test for less than 5 Ω between the ground circuit terminal B and ground.

⇒ **If 5 Ω or greater**

- 5.1. Ignition OFF.
- 5.2. 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**

6. Connect a test lamp between the control circuit terminal A and ground, ignition ON.
7. 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**

- 7.1. Ignition OFF, disconnect the X7 harness connector at the K9 body control module.
- 7.2. 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
- 7.3. 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**

- 7.1. Ignition OFF, disconnect the X7 harness connector at the K9 body control module, ignition ON.
- 7.2. 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**

8. Test or replace the appropriate E5 backup lamp.

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- [Backup Lamp Bulb Replacement](#)
- [Control Module References](#) for BCM replacement, programming, and setup

DTC B256A

[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 B256A 01

Liftgate Lamp Control Circuit Short to Battery

DTC B256A 02

Liftgate Lamp Control Circuit Short to Ground

DTC B256A 04

Liftgate Lamp Control Circuit Open

[Diagnostic Fault Information](#)

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
F24DA (BCM 2) Fuse B+	B147F 01, B147F 04, B270A 01, B3867 01, B3867 04	B147F 01, B147F 04, B270A 01, B3867 01, B3867 04	—	—
Rear Compartment Courtesy Lamp Control	B256A 02	B256A 04	B256A 01	—
Rear Compartment Courtesy Lamp Ground	© 2014 General Motors. All rights reserved.		—	—

1. Rear Compartment Lamp Malfunction

Circuit/System Description

The body control module (BCM) applies battery voltage to the rear compartment courtesy lamp through the rear compartment lamp control circuit. When the BCM receives a rear compartment lid open input from the rear compartment lid latch, the BCM applies battery voltage to the rear compartment lamp control circuit illuminating the rear compartment courtesy lamp. In the event that the rear compartment 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 rear compartment lamp control circuit to prevent total battery discharge.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- Rear compartment OPEN.

Conditions for Setting the DTC

DTC B256A 01

The BCM detects a short to voltage in the rear compartment lamp control circuit.

DTC B256A 02

The BCM detects a short to ground in the rear compartment lamp control circuit.

DTC B256A 04

The BCM detects an open/high resistance in the rear compartment lamp control circuit.

Actions Taken When the DTC Sets

The rear compartment lamp will not operate when the rear compartment is open.

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](#)

Connector End View Reference

[Component Connector End Views](#)

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 E8S rear compartment courtesy lamp.
2. Test for less than 5 Ω between the ground circuit terminal 2 and ground.

⇒ **If 5 Ω or greater**

- 2.1. Ignition OFF.
- 2.2. 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 1 and ground, ignition ON.
4. Verify the test lamp turns ON and OFF when commanding the Trunk Lamp ON and OFF with a scan tool.

⇒ **If the test lamp is always OFF**

- 4.1. Ignition OFF, disconnect the X7 harness connector at the K9 body control module.
- 4.2. 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

4.3. Test for less than $2\ \Omega$ in the control circuit end to end.

⇒ If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.

⇒ If less than $2\ \Omega$, replace the K9 body control module.

⇒ **If the test lamp is always ON**

4.1. Ignition OFF, disconnect the X7 harness connector at the K9 body control module, ignition ON.

4.2. 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 E8S rear compartment courtesy lamp.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- [Cargo Center Courtesy Lamp Bulb Replacement](#)
- [Control Module References](#) for BCM replacement, programming, and setup

DTC B2570

[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 B2570 02

Trunk Lamp Control Circuit Short to Ground

DTC B2570 04

Trunk Lamp Control Circuit Open

[Diagnostic Fault Information](#)

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
F9DA (BCM 4) Fuse B+	1	1	—	—
Rear Compartment Courtesy Lamp Control	B2570 02	B2570 04	B2570 04	—
Rear Compartment Courtesy Lamp Ground	—	1	—	—
1. Rear Compartment Lamp Malfunction				

[Circuit/System Description](#)

The body control module (BCM) applies battery voltage to the rear compartment courtesy lamp through the rear compartment lamp control circuit. When the BCM receives a rear compartment lid open input from the rear compartment lid latch, the BCM applies battery

voltage to the rear compartment lamp control circuit illuminating the rear compartment courtesy lamp. In the event that the rear compartment lamp were to remain illuminated for more than 10 min with the ignition switch in the OFF position and no doors opened, the BCM will deactivate the rear compartment lamp control circuit to prevent total battery discharge.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- Rear compartment OPEN.

Conditions for Setting the DTC

DTC B2570 02

The BCM detects a short to ground in the rear compartment courtesy lamp control circuit.

DTC B2570 04

The BCM detects a short to voltage or an open/high resistance in the rear compartment courtesy lamp control circuit.

Actions Taken When the DTC Sets

The rear compartment lamp is 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

[Interior Lights Schematics](#)

Connector End View Reference

[Component Connector End Views](#)

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, exterior lamps OFF, disconnect the harness connector at the E8S Rear Compartment Courtesy Lamp. 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 2 and ground.
 - ⇒ **If 15 Ω or greater**
 - 2.1. Ignition OFF.
 - 2.2. 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, ignition ON.
4. Verify the test lamp turns ON and OFF when commanding the Trunk Lamp ON and OFF with a scan tool.
 - ⇒ **If the test lamp is always OFF**
 - 4.1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module.
 - 4.2. 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
 - 4.3. 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**
 - 4.1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module, ignition ON.

4.2. 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 E8S Rear Compartment Courtesy Lamp.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

[Control Module References](#) for BCM replacement, programming, and setup

DTC B2575 or B2699

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

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

F8DA (BCM 3) Fuse B+	B2575 01, B2575 04	B2575 01, B2575 04	—	—
F9DA (BCM 4) Fuse B+	B2699 01, B2699 04	B2699 01, B2699 04	—	—
Low Beam Headlamp Control – Left	B2575 02	B2575 01, B2575 04	1	—
Low Beam Headlamp Control – Right	B2699 02	B2699 01, B2699 04	1	—
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 an open/high resistance in the left low beam headlamp control circuit.
- The BCM detects a short to ground or an open/high resistance in the F8DA fuse B+ 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 an open/high resistance in the right low beam headlamp control circuit.
- The BCM detects a short to ground or an open/high resistance in the F9DA fuse B+ 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

Schematic Reference

[Headlights/Daytime Running Lights \(DRL\) Schematics](#)

Connector End View Reference

[Component Connector End Views](#)

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[Exterior Lighting Systems Description and Operation](#)

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- [Circuit Testing](#)
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- [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, 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**
 - 2.1. Ignition OFF, disconnect the X1 harness connector at the X51A fuse block – instrument panel.
 - 2.2. Test for less than $2\ \Omega$ in the B+ circuit end to end.
 - ⇒ If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.
 - ⇒ If less than $2\ \Omega$, 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**
 - 2.1. Ignition OFF, disconnect the X1 harness connector at the X51A fuse block – instrument panel.
 - 2.2. 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 X1 harness connector at the K9 body control module.
4. Ignition OFF, exterior lamps OFF, disconnect the harness connector at the E13L headlamp - left.
5. Test for less than $5\ \Omega$ between the ground circuit terminal A and ground.
 - ⇒ **If $5\ \Omega$ or greater**
 - 5.1. Ignition OFF.
 - 5.2. Test for less than $2\ \Omega$ in the ground circuit end to end.
 - ⇒ If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.
 - ⇒ If less than $2\ \Omega$, repair the open/high resistance in the ground connection.
 - ↓ **If less than $5\ \Omega$**
6. Connect a test lamp between the control circuit terminal C and ground, ignition ON.
7. Verify the test lamp turns ON and OFF when commanding the Left Low Beam/Daytime Running Lamp ON and OFF with a scan tool.

⇒ **If the test lamp is always OFF**

7.1. Ignition OFF, disconnect the X4 harness connector at the K9 body control module.

7.2. 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

7.3. 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**

7.1. Ignition OFF, disconnect the X4 harness connector at the K9 body control module, ignition ON.

7.2. 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**

8. Test or replace the E13L headlamp bulb – left.

DTC B2699

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 2 and ground.

⇒ **If the test lamp does not illuminate and the circuit fuse is good**

2.1. Ignition OFF, disconnect the X1 harness connector at the X51A fuse block – instrument panel.

2.2. 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**

2.1. Ignition OFF, disconnect the X1 harness connector at the X51A fuse block – instrument panel.

2.2. 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 X1 harness connector at the K9 body control module.
4. Ignition OFF, exterior lamps OFF, disconnect the harness connector at the E13R headlamp - right.
5. Test for less than 5 Ω between the ground circuit terminal A and ground.

⇒ **If 5 Ω or greater**

- 5.1. Ignition OFF.
- 5.2. 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**

6. Connect a test lamp between the control circuit terminal C and ground, ignition ON.
7. 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**

- 7.1. Ignition OFF, disconnect the X4 harness connector at the K9 body control module.
- 7.2. 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
- 7.3. 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**

- 7.1. Ignition OFF, disconnect the X4 harness connector at the K9 body control module, ignition ON.
- 7.2. 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**

8. Test or replace the E13R headlamp bulb - right.

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- [Headlamp Replacement](#)
- [High Beam Headlamp Bulb Replacement](#)
- [Low Beam Headlamp Bulb Replacement](#)
- [Control Module References](#) for BCM replacement, programming, and setup

DTC B257A

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	—
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 (open) and the BCM relies on the ambient light sensor input to

turn the headlamps and daytime running lamps (DRLs) 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 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 ON 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

[Component Connector End Views](#)

Description and Operation

[Exterior Lighting Systems Description and Operation](#)

Electrical Information Reference

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- [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 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 6 and ground.
⇒ **If 15 Ω or greater**
 - 2.1. Ignition OFF.
 - 2.2. 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**
 - 4.1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.
 - 4.2. 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.

6. Verify the scan tool Automatic Headlamps Disable Switch parameter is Active.

⇒ **If not Active**

6.1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.

6.2. 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

6.3. 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**

7.1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.

7.2. 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**

8. Install a 3 A fused jumper wire between the signal circuit terminal 3 and ground.

9. Verify the scan tool Park Lamps Switch parameter is Active.

⇒ **If not Active**

9.1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.

9.2. 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

9.3. 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**

10.1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.

10.2. Test for infinite resistance between the signal circuit terminal 4 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 4 and ground.

12. Verify the scan tool Headlamps On Switch parameter is Active.

⇒ **If not Active**

12.1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.

12.2. Test for less than 1 V between the signal circuit terminal 4 and ground.

⇒ If 1 V or greater, repair the short to voltage on the circuit.

↓ If less than 1 V

12.3. 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

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- [Headlamp Switch Replacement](#)
- [Control Module References](#) for BCM replacement, programming, and setup

DTC B257B

[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 B257B 03

Lighting Control Switch Signal Low Voltage

DTC B257B 07

Lighting Control Switch Signal High Voltage

[Diagnostic Fault Information](#)

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
I/P Dimmer Switch B+	B257B 03, B1405 03	B257B 03	—	—
I/P Dimmer Switch Signal	B257B 03	B257B 03	B257B 07	—
LED Backlight Dimming Control Terminal 8 X2	1	1	1	—
LED Backlight Dimming Control Terminal 9 X7	1	1	1	—
Accent Lamp Backlight Dimming Control Terminal 22 X7	1	1	1	—

1. Interior Backlighting Malfunction

Circuit/System Description

The instrument panel (I/P) dimmer switch is used to increase and decrease the brightness of the interior backlighting components. The I/P 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 a B+ circuit to the I/P dimmer switch. When the I/P dimmer switch is placed in the desired position, the dimmed voltage setting is applied from the I/P dimmer switch through the I/P 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 1, dimming 2, and accent lamp 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 B257B 03

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

DTC B257B 07

The BCM detects a short to voltage in the I/P 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 level selected prior to the fault being present.

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 Dimming Schematics](#)

- [Fog Lights Schematics](#)

Connector End View Reference

[Component Connector End Views](#)

Description and Operation

[Interior Lighting Systems Description and Operation](#)

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- [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 1 and ground.

⇒ **If less than B+**

- 2.1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module.
- 2.2. 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
- 2.3. 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 does not illuminate between the B+ circuit terminal 1 and the signal circuit terminal 12.

⇒ **If the test lamp illuminates**

3.1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.

3.2. 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**

4. Test for B+ between the B+ circuit terminal 1 and the signal circuit terminal 12.

⇒ **If less than B+**

4.1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.

4.2. Test for less than 1 V between the signal circuit terminal 12 and ground.

⇒ If 1 V or greater, repair the short to voltage on the circuit.

↓ If less than 1 V

4.3. 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+**

5. 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 B2580

[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

Headlamp High Beam Control Circuit Short to Battery

DTC B2580 02

Headlamp High Beam Control Circuit Short to Ground

DTC B2580 04

Headlamp 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 Ground – Left	—	1	—	—

Headlamp 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 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.
- 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

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

DTC B2580 04

The BCM detects an open 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](#)

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- [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 X50A Fuse Block – Underhood.
2. Connect a test lamp between the control circuit terminal 3 and B+, ignition ON.
3. 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**
 - 3.1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.
 - 3.2. 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
 - 3.3. Ignition OFF.
 - 3.4. Test for less than 2 Ω in the control circuit end to end.

⇒ If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.

⇒ If less than $2\ \Omega$, replace the K9 Body Control Module.

⇒ **If the test lamp is always ON**

3.1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module.

3.2. 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.

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

4. Test or replace the X50A Fuse Block – Underhood.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- [Body Front Wiring Harness Fuse Block Replacement](#)
- [Control Module References](#) for BCM replacement, programming, and setup

DTC B2585 or B3867

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 B2585 01

Left Park Lamps Control Circuit Short to Battery

DTC B2585 02

Left Park Lamps Control Circuit Short to Ground

DTC B2585 04

Left Park Lamps Control Circuit Open

DTC B3867 01

Right Park Lamps Control Circuit Short to Battery

DTC B3867 02

Right Park Lamps Control Circuit Short to Ground

DTC B3867 04

Right Park Lamps Control Circuit Open

Diagnostic Fault Information

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

Headlamp Switch Park Lamps ON Signal	2	B257A 00	2	—
License Plate Lamp Control	1	1	1	—
Park Lamps Control - Left	1	1	1	—
Park Lamps Control - Right	1	1	1	—
Headlamp Switch Ground	—	2	—	—
License Plate Lamp Ground - Left	—	1	—	—
License Plate Lamp Ground - Right	—	1	—	—
Park Lamp Ground - Left Front	—	1	—	—
Park Lamp Ground - Right Front	—	1	—	—
Side Marker Lamp Ground - Left Front	—	1	—	—
Side Marker Lamp Ground - Right Front	—	1	—	—
Tail Lamp Ground - Left	—	1	—	—
Tail Lamp Ground - Right	—	1	—	—
Tail/Stop Lamps Ground - Left	—	1	—	—
Tail/Stop Lamps Ground - Right	—	1	—	—
1. Park, License, and/or Tail Lamps Malfunction 2. Park Lamps Switch Malfunction				

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.
- Park lamps ON.

Conditions for Setting the DTC

DTC B2585 01 and B2585 04

The BCM detects a short to voltage or an open/high resistance in the left park lamps control circuit.

DTC B2585 02

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

DTC B3867 01 and B3867 04

The BCM detects a short to voltage or an open/high resistance in the right park lamps control circuit.

DTC B3867 02

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

Actions Taken When the DTC Sets

DTC B2585 01

The left park lamps are always ON.

DTC B2585 02 and B2585 04

The left park lamps are always OFF.

DTC B3867 01

The right park lamps are always ON.

DTC B3867 02 and B3867 04

The right park lamps are always OFF.

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](#)

Description and Operation

[Exterior Lighting Systems Description and Operation](#)

Electrical Information Reference

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- [Wiring Repairs](#)

Scan Tool Reference

[Control Module References](#) for scan tool information

Circuit/System Testing

DTC B2585

1. Ignition OFF, exterior lamps OFF, disconnect the harness connector at the appropriate left park lamp.
2. Test for less than 15 Ω between the appropriate ground circuit terminal listed below and ground.
 - E4N left front park lamp – terminal B

- E2LF left front side marker lamp – terminal B
- E5AA left tail/stop lamp – terminal 2
- E5E left tail lamp – terminal 2
- E2LR left rear side marker lamp – terminal B

⇒ **If 15 Ω or greater**

2.1. Ignition OFF.

2.2. 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.

- E4N left front park lamp – terminal A
- E2LF left front side marker lamp – terminal A
- E5AA left tail/stop lamp – terminal 1
- E5E left tail lamp – terminal 1
- E2LR left rear side marker lamp – terminal A

4. Verify the test lamp turns ON and OFF when commanding the Left Park Lamps ON and OFF with a scan tool.

⇒ **If the test lamp is always OFF**

4.1. Ignition OFF, disconnect the X4 harness connector at the K9 body control module.

4.2. 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

4.3. 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**

4.1. Ignition OFF, disconnect the X4 harness connector at the K9 body control module, ignition ON.

4.2. 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 left park lamp.

DTC B3867

1. Ignition OFF, exterior lamps OFF, disconnect the harness connector at the appropriate right park lamp.

2. Test for less than 15 Ω between the appropriate ground circuit terminal listed below and ground.

- E4P right front park lamp – terminal B
- E2RF right front side marker lamp – terminal B
- E5AB right tail/stop lamp – terminal 2
- E5F right tail lamp – terminal 2
- E2RR right rear side marker lamp – terminal B

⇒ **If 15 Ω or greater**

2.1. Ignition OFF.

2.2. 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.

- E4P right front park lamp – terminal A
- E2RF right front side marker lamp – terminal A
- E5AB right tail/stop lamp – terminal 1
- E5F right tail lamp – terminal 1
- E2RR right rear side marker lamp – terminal A

4. Verify the test lamp turns ON and OFF when commanding the Right Park Lamps ON and OFF with a scan tool.

⇒ **If the test lamp is always OFF**

4.1. Ignition OFF, disconnect the X4 harness connector at the K9 body control module.

4.2. 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

4.3. Test for less than $2\ \Omega$ in the control circuit end to end.

⇒ If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.

⇒ If less than $2\ \Omega$, replace the K9 body control module.

⇒ **If the test lamp is always ON**

4.1. Ignition OFF, disconnect the X4 harness connector at the K9 body control module, ignition ON.

4.2. 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 right park lamp.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- [Front Turn Signal Lamp Bulb Replacement](#)
- [Tail Lamp Replacement](#)
- [Tail Lamp Bulb Replacement](#)
- [Stop and Tail Lamp Bulb Replacement](#)
- [Control Module References](#) for BCM replacement, programming, and setup

DTC B258A

[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

[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	B258A 01	—
Low Beam Headlamp Control – Left	1	1	1	—
Low Beam Headlamp Control – Right	1	1	1	—
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 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

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

DTC B258A 04

The BCM detects an open 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.

DTC B258A 02

The low beam headlamps will always be 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](#)

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 KR49 Headlamp Low Beam Relay.
2. Connect a test lamp between the control circuit terminal 85 and B+, ignition ON.
3. Verify the test lamp turns ON and OFF when commanding the Low Beams ON and OFF with a scan tool.

⇒ **If the test lamp is always OFF**

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

3.2. 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

3.3. Ignition OFF.

3.4. Test for less than $2\ \Omega$ in the control circuit end to end.

⇒ If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.

⇒ If less than $2\ \Omega$, replace the K9 Body Control Module.

⇒ **If the test lamp is always ON**

3.1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module.

3.2. 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.

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

4. Test or replace the KR49 Headlamp Low Beam Relay.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- [Relay Replacement](#)
- [Control Module References](#) for BCM replacement, programming, and setup

DTC B2600 or B2605

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

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

F9DA Fuse B+	1	1	—	—
F23DA Fuse B+	1	1	—	—
Ambient Light Sensor Signal	B2645 03	B2645 07	B2645 07	—
Daytime Running Lamp Control - Left (T4F)	B2600 02	B2600 04	B2600 01	—
Daytime Running Lamp Control - Right (T4F)	B2605 02	B2605 04	B2605 01	—
Ambient Light Sensor Low Reference	—	B2645 07	1	—
Daytime Running Lamp Ground - Left (T4F)	—	1	—	—
Daytime Running Lamp Ground - Right (T4F)	—	1	—	—
1. Daytime Running Lamps Malfunction				

Circuit/System Description

The ambient light sensor is used to monitor outside lighting conditions. The body control module (BCM) provides a 5-volt reference signal to the ambient light sensor. Depending on outside lighting conditions, the ambient light sensor provides a voltage signal to the BCM that will vary between 0.2 and 4.9 volts. 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 headlamp system control when the headlamp switch is in the AUTO position. In daylight conditions, the BCM will command the DRLs ON by applying voltage to the DRL control circuits illuminating the DRLs. 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.

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](#)

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 E4 daytime running lamp.
2. Test for less than $5\ \Omega$ between the ground circuit terminal and ground.

⇒ **If $5\ \Omega$ or greater**

2.1. Ignition OFF.

2.2. Test for less than $2\ \Omega$ in the ground circuit end to end.

⇒ If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.

⇒ If less than $2\ \Omega$, repair the open/high resistance in the ground connection.

↓ **If less than $5\ \Omega$**

3. Connect a test lamp between the control circuit terminal and ground, ignition ON.
4. Verify the test lamp turns ON and OFF when commanding the appropriate Dedicated Daytime Running Lamp Command ON and OFF with a scan tool.

⇒ **If the test lamp is always OFF**

4.1. Ignition OFF, disconnect the X5 harness connector at the K9 body control module.

4.2. 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

4.3. Test for less than $2\ \Omega$ in the control circuit end to end.

⇒ If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.

⇒ If less than $2\ \Omega$, replace the K9 body control module.

⇒ **If the test lamp is always ON**

4.1. Ignition OFF, disconnect the X5 harness connector at the K9 body control module, ignition ON.

4.2. 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 E4 daytime running lamp.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- [Daytime Running Lamp Replacement](#)
- [Control Module References](#) for BCM replacement, programming, and setup

DTC B2610

[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

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
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	1	—
LED Backlight Dimming Control Terminal 9 X7	B2610 02	B2610 04	1	—
Instrument Panel Dimmer Switch Low Reference	B2610 02	B2610 04	1	—

Dome Lamp Switch Ground	—	1	—	—
Dome/Reading Lamps – Left Roof Rail Ground	—	1	—	—
Dome/Reading Lamps – Right Roof Rail Ground	—	1	—	—
Dome/Reading Lamps – Rear Ground	—	1	—	—
Door Lock Switch – Driver Ground	—	1	—	—
Door Lock Switch – Passenger Ground	—	1	—	—
Garage Door Opener Ground	—	1	—	—
Headlamp Switch Ground	—	1	—	—
Head – Up Display Module Ground	—	1	—	—
Ignition Mode Switch Ground	—	1	—	—
Instrument Panel Dimmer Switch Ground	—	1	—	—
Multifunction Switch 1 – Instrument Panel Ground	—	1	—	—
Multifunction Switch 2 – Instrument Panel Ground	—	1	—	—
Outside Rearview Mirror Switch Ground	—	1	—	—
Park Brake Control Switch Ground	—	1	—	—
Rear window Sunshade Switch Ground	—	1	—	—
Seat Heating Switch – Left Rear Ground	—	1	—	—
Seat Heating Switch – Right Rear Ground	—	1	—	—

Sunroof Switch Ground	—	1	—	—
1. Interior Backlighting Malfunction				

Circuit/System Description

The instrument panel (I/P) dimmer switch is used to increase and decrease the brightness of the interior backlighting components. The I/P 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 I/P dimmer switch. When the I/P dimmer switch is placed in the desired position, the dimmed voltage setting is applied from the I/P dimmer switch through the I/P 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 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.
- 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

[Component Connector End Views](#)

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, all doors closed, all accessories OFF, 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**

- 2.1. Ignition OFF.
- 2.2. Test for less than 2 Ω in the ground circuit end to end.

- ⇒ If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.
- ⇒ If less than $2\ \Omega$, repair the open/high resistance in the ground connection.

↓ **If less than $15\ \Omega$**

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**

- 4.1. Ignition OFF, disconnect the appropriate harness connector listed below at the K9 Body Control Module.

- X2 terminal 8
- X7 terminal 9

- 4.2. 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

- 4.3. Test for less than $2\ \Omega$ in the control circuit end to end.

⇒ If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.

⇒ If less than $2\ \Omega$, replace the K9 Body Control Module.

⇒ **If the test lamp is always ON**

- 4.1. Ignition OFF, disconnect the appropriate harness connector listed below at the K9 Body Control Module, ignition ON.

- X2 terminal 8
- X7 terminal 9

- 4.2. 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.

- [Dome and Reading Lamp Replacement](#)
- [Headlamp Switch Replacement](#)

- [Sunroof Switch Replacement](#)
- [Steering Wheel Spoke Lower Cover Replacement](#)
- [Ride Control Switch Replacement](#)
- [Control Module References](#) for BCM replacement, programming, and setup

DTC B2615

[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 B2615 02

Passenger Compartment Dimming 2 Circuit Short to Ground

[Diagnostic Fault Information](#)

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Dome Lamps Control Terminal 1 X7	B2615 02	B2615 02	1	—
Cargo Lamp – Left Ground (with U25)	—	1	—	—
Cargo Lamp – Right Ground (with U25)	—	1	—	—
Door Courtesy Lamp – Driver Ground (with C90)	—	1	—	—
Door Courtesy Lamp – Left Rear Ground (with C90)	—	1	—	—
Door Courtesy Lamp – Passenger Ground (with C90)	—	1	—	—
Door Courtesy Lamp – Right Rear Ground (with				

C90)	—	1	—	—
Dome/Reading Lamps - Front Ground	—	1	—	—
Dome/Reading Lamps - Rear Ground	—	1	—	—
Instrument Panel Courtesy Lamp – Left Ground (with U29)	—	1	—	—
Instrument Panel Courtesy Lamp – Right Ground (with U29)	—	1	—	—
1. Dome Lamps Malfunction				

Circuit/System Description

The body control module (BCM) applies battery voltage to the dome/courtesy lamps through the dome/courtesy lamps control circuit terminal 1 X7. 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/courtesy lamps control circuit, providing battery voltage to dome/courtesy lamps. In the event that any of these dome/courtesy lamps were to remain illuminated for more than 10 min with the ignition switch in the OFF position, the BCM will deactivate the dome/courtesy lamps 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/courtesy lamps control circuit terminal 1 X7.

Actions Taken When the DTC Sets

The BCM will disable the dome/courtesy lamps control circuit terminal 1 X7.

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](#)

Connector End View Reference

[Component Connector End Views](#)

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 lighting component may need to be disconnected to isolate a short to ground. Use the schematics to identify the following:

- Lighting components the vehicle is equipped with
- Each component's control and ground circuit terminals
- Component locations on the lighting control circuit

1. Ignition OFF, all doors closed, all accessories OFF, open and close drivers door, disconnect the harness connector at the appropriate component listed below. It may take up to 2 min for all vehicle systems to power down.

- E33L Cargo Lamp – Left (with U25)
- E33R Cargo Lamp – Right (with U25)
- E8D Door Courtesy Lamp – Driver (with C90)

- E8LR Door Courtesy Lamp – Left Rear (with C90)
- E8P Door Courtesy Lamp – Passenger (with C90)
- E8RR Door Courtesy Lamp – Right Rear (with C90)
- E37F Dome/Reading Lamps – Front
- E37R Dome/Reading Lamps – Rear
- E8J Instrument Panel Courtesy Lamp – Left (with U29)
- E8K Instrument Panel Courtesy Lamp – Right (with U29)

2. Test for less than 10 Ω between the appropriate ground circuit terminal listed below and ground.

- E33L Cargo Lamp – Left terminal 2 (with U25)
- E33R Cargo Lamp – Right terminal 2 (with U25)
- E8D Door Courtesy Lamp – Driver terminal 2 (with C90)
- E8LR Door Courtesy Lamp – Left Rear terminal 2 (with C90)
- E8P Door Courtesy Lamp – Passenger terminal 2 (with C90)
- E8RR Door Courtesy Lamp – Right Rear terminal 2 (with C90)
- E37F Dome/Reading Lamps – Front terminal 1
- E37R Dome/Reading Lamps – Rear terminal 1
- E8J Instrument Panel Courtesy Lamp – Left terminal 2 (with U29)
- E8K Instrument Panel Courtesy Lamp – Right terminal 2 (with U29)

⇒ **If 10 Ω or greater**

2.1. Ignition OFF.

2.2. 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.

- E33L Cargo Lamp – Left terminal 1 (with U25)
- E33R Cargo Lamp – Right terminal 1 (with U25)
- E8D Door Courtesy Lamp – Driver terminal 1 (with C90)
- E8LR Door Courtesy Lamp – Left Rear terminal 1 (with C90)

- E8P Door Courtesy Lamp – Passenger terminal 1 (with C90)
- E8RR Door Courtesy Lamp – Right Rear terminal 1 (with C90)
- E37F Dome/Reading Lamps – Front terminal 4
- E37R Dome/Reading Lamps – Rear terminal 2
- E8J Instrument Panel Courtesy Lamp – Left terminal 1 (with U29)
- E8K Instrument Panel Courtesy Lamp – Right terminal 1 (with U29)

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**

4.1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module.

4.2. 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

4.3. 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**

4.1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module, ignition ON.

4.2. 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 dome/courtesy lamp.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- [Dome and Reading Lamp Replacement](#)
- [Front Side Door Courtesy Lamp Replacement](#)
- [Rear Side Door Courtesy Lamp Replacement](#)
- [Front Floor Courtesy Lamp Replacement](#)

- [Cargo Center Courtesy Lamp Replacement](#)
- [Control Module References](#) for BCM replacement, programming, and setup

DTC B2625

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	B2625 02	B2625 04	B2625 01	—

Circuit/System Description

The instrument panel (I/P) dimmer switch is used to increase and decrease the brightness of the interior backlighting components. The I/P 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 I/P dimmer switch. When the I/P dimmer switch is placed in the desired position, the dimmed voltage setting is

applied from the I/P dimmer switch through the I/P dimmer switch signal circuit to the BCM. The BCM interprets the signal and applies a pulse width modulated (PWM) voltage through the LED backlight dimming control circuit illuminating the LED 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

The BCM detects a short to ground 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.
- 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

[Component Connector End Views](#)

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 connectors at the components listed below.
 - S48C multifunction switch 1 – instrument panel
 - S48D multifunction switch 2 – instrument panel
 - S32LR seat heating switch – left rear
 - S32RR seat heating switch – right rear
2. Connect a test lamp between the appropriate control circuit terminal listed below and ground.
 - S48C multifunction switch 1 – instrument panel terminal 3
 - S48D multifunction switch 2 – instrument panel terminal 3
 - S32LR seat heating switch – left rear terminal 6
 - S32RR seat heating switch – right rear terminal 6
3. 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**

- 3.1. Ignition OFF, disconnect the X1 harness connector at the K9 body control module.
- 3.2. 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
- 3.3. 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**

- 3.1. Ignition OFF, disconnect the X1 harness connector at the K9 body control module, ignition ON.
- 3.2. 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 component with the inoperative backlighting.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

[Control Module References](#) for BCM replacement, programming, and setup

DTC B263A

[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	B263A 02	B263A 04	1	—
Outside Rearview Mirror – Driver Ground	—	1	—	—
Outside Rearview Mirror – 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 LED lighting located under each outside rearview mirror for approach lighting are commanded ON.

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](#)

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
- 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.
2. Test for less than 15 Ω between the appropriate ground circuit terminal listed below and ground.
 - A9A Outside Rearview Mirror – Driver terminal 5
 - A9B Outside Rearview Mirror – Passenger terminal 5

⇒ **If 15 Ω or greater**

- 2.1. Ignition OFF.
- 2.2. 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.
 - A9A Outside Rearview Mirror – Driver terminal 10
 - A9B Outside Rearview Mirror – Passenger terminal 10
4. Verify the test lamp turns ON and OFF when commanding the Exterior Courtesy Lamps ON and OFF with a scan tool.

⇒ **If the test lamp is always OFF**

- 4.1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module.

4.2. 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

4.3. 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**

4.1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module, ignition ON.

4.2. 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 component.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- [Outside Rearview Mirror Glass Replacement](#)
- [Control Module References](#) for BCM replacement, programming, and setup

DTC B2645

[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	—
Daytime Running Lamp Ground - Left	—	1	—	—
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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.

Conditions for Setting the DTC

DTC B2645 03

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](#)

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 B10B Ambient Light/Sunload Sensor. It may take up to 2 minutes 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**
 - 2.1. Ignition OFF, disconnect the X2 harness connector at the K33 HVAC Control Module.
 - 2.2. 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 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**

4.1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.

4.2. 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**

6.1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.

6.2. 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

6.3. 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 B2652

[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 B2652 02

Passenger Compartment Dimming 3 Circuit Short to Ground

[Diagnostic Fault Information](#)

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
F2DA (BCM 2) Fuse B+	1	1	1	—
Accent Lamp Control – Terminal 7 X6	B2652 02	1	1	—
Accent Lamp - Left Instrument Panel Ground	—	1	—	—
Accent Lamp - Instrument Panel Ground	—	1	—	—
Accent Lamp - Right Instrument Panel Ground	—	1	—	—
1. Interior Accent Lighting Malfunction				

[Circuit/System Description](#)

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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+ 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 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

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

Actions Taken When the DTC Sets

The BCM will disable the accent 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](#)

Connector End View Reference

[Component Connector End Views](#)

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 accent lamp may need to be disconnected to isolate the short to ground. Use the schematic to identify the following:
- All accent lamps equipped with the vehicle
 - Component locations on the accent light control circuit
 - Each component's control circuit terminals

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, disconnect the X1 harness connector at the appropriate E1 Accent 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 1 and ground.

⇒ **If 15 Ω or greater**

- 2.1. Ignition OFF.
- 2.2. 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 2 and ground, ignition ON.
4. 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**

- 4.1. Ignition OFF, disconnect the X6 harness connector at the K9 Body Control Module.
- 4.2. 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
- 4.3. 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**

4.1. Ignition OFF, disconnect the X6 harness connector at the K9 Body Control Module, ignition ON.

4.2. 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 E1 Accent Lamp

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

[Control Module References](#) for BCM replacement, programming, and setup

DTC B3410 or B3420

[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 B3410 01

AHLD Front Axle Sensor Signal Circuit Short to Battery

DTC B3410 06

AHLD Front Axle Sensor Signal Circuit Low Voltage/Open

DTC B3420 01

AHLD Rear Axle Sensor Signal Circuit Short to Battery

DTC B3420 06

AHLD Rear Axle Sensor Signal Circuit Low Voltage/Open

[Diagnostic Fault Information](#)

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Headlamp Control Module B+	1	1	—	—
Headlamp Leveling Actuator – Left B+ (F53 UA)	1	1	—	—
Headlamp Leveling Actuator – Right B+ (F53 UA)	1	1	—	—

Suspension Position Sensor 5V Reference – Left Front	B3415 02	1	B3415 01	—
Suspension Position Sensor 5V Reference – Left Rear	B3415 02	1	B3415 01	—
Suspension Position Sensor Signal – Left Front	B3410 06	B3410 06	B3410 01	B3410 08
Suspension Position Sensor Signal – Left Rear	B3420 06	B3420 06	B3420 01	B3420 08
Suspension Position Sensor Low Reference – Left Front	—	1	—	—
Suspension Position Sensor Low Reference – Left Rear	—	1	—	—
Headlamp Control Module Ground	—	1	—	—
Headlamp Leveling Actuator – Left Ground	—	1	—	—
Headlamp Leveling Actuator – Right Ground	—	1	—	—
1. Headlamp Leveling Malfunction				

Circuit/System Description

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

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.

- Engine RUNNING.
- Headlamps ON.

Conditions for Setting the DTC

DTC B3410 01

The headlamp control module detects a short to voltage in the front suspension position sensor signal circuit.

DTC B3410 06

The headlamp control module detects a short to ground or an open/high resistance in the front suspension position sensor signal circuit.

DTC B3420 01

The headlamp control module detects a short to voltage in the rear suspension position sensor signal circuit.

DTC B3420 06

The headlamp control module detects a short to ground or an open/high resistance in the rear suspension position sensor signal circuit.

Actions Taken When the DTC Sets

- The headlamp control module disables the headlamp leveling system.
- The driver information center (DIC) will display AFL Lamps Need Service.
- On vehicles equipped with both AFL and headlamp leveling, the AFL system will remain active.

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.

Reference Information

Schematic Reference

[Headlights/Daytime Running Lights \(DRL\) Schematics](#)

Connector End View Reference

[Component Connector End Views](#)

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[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 appropriate B152L suspension position sensor, ignition ON.
2. Verify a test lamp illuminates between the low reference circuit terminal 2 and B+.

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

- 2.1. Ignition OFF, disconnect the harness connector at the K26 headlamp control module.
- 2.2. Test for less than $2\ \Omega$ in the low reference circuit end to end.
 - ⇒ If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.
 - ⇒ If less than $2\ \Omega$, replace the K26 headlamp 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 1 and ground.

⇒ **If less than 4.8 V**

- 4.1. Ignition OFF, disconnect the harness connector at the K26 headlamp control module.
- 4.2. 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
- 4.3. Test for less than $2\ \Omega$ in the 5 V reference circuit end to end.
 - ⇒ If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.

⇒ If less than 2 Ω , replace the K26 headlamp control module.

⇒ **If greater than 5.2 V**

4.1. Ignition OFF, disconnect the harness connector at the K26 headlamp control module, ignition ON.

4.2. 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 K26 headlamp control module.

↓ **If between 4.8–5.2 V**

5. Verify the appropriate scan tool Leveling Position Sensor parameter is less than 1 V.

⇒ **If 1 V or greater**

5.1. Ignition OFF, disconnect the harness connector at the K26 headlamp control module, ignition ON.

5.2. 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 K26 headlamp control module.

↓ **If less than 1 V**

6. Install a 3 A fused jumper wire between the 5-volt reference circuit terminal 1 and the signal circuit terminal 3.

7. Engine RUNNING, verify the appropriate scan tool Leveling Position Sensor parameter is greater than 4.8 V.

⇒ **If less than 4.8 V**

7.1. Ignition OFF, disconnect the harness connector at the K26 headlamp control module.

7.2. 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

7.3. 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 K26 headlamp control module.

↓ **If 4.8 V or greater**

8. Test or replace the appropriate B152L suspension position sensor.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- [Electronic Suspension Front Position Sensor Replacement](#)
- [Electronic Suspension Rear Position Sensor Replacement - Left Side](#)
- [Electronic Suspension Rear Position Sensor Replacement - Right Side](#)
- [Control Module References](#) for headlamp control module replacement, programming, and setup

DTC B3415

[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 B3415 01

AHLD Front Axle Sensor Supply Circuit Short to Battery

DTC B3415 02

AHLD Front Axle Sensor Supply Circuit Short to Ground

[Diagnostic Fault Information](#)

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Headlamp Control Module B+	1	1	—	—
Headlamp Leveling Actuator – Left B+ (F53 UA)	1	1	—	—
Headlamp Leveling Actuator – Right B+ (F53 UA)	1	1	—	—
Suspension Position Sensor 5V Reference – Left Front	B3415 02	1	B3415 01	—
Suspension Position Sensor 5V Reference – Left Rear	B3415 02	1	B3415 01	—

Suspension Position Sensor Signal – Left Front	B3410 06	B3410 06	B3410 01	B3410 08
Suspension Position Sensor Signal – Left Rear	B3420 06	B3420 06	B3420 01	B3420 08
Suspension Position Sensor Low Reference – Left Front	—	1	—	—
Suspension Position Sensor Low Reference – Left Rear	—	1	—	—
Headlamp Control Module Ground	—	1	—	—
Headlamp Leveling Actuator – Left Ground	—	1	—	—
Headlamp Leveling Actuator – Right Ground	—	1	—	—
1. Headlamp Leveling Malfunction				

Circuit/System Description

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

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- Engine RUNNING.
- Headlamps ON.

Conditions for Setting the DTC

DTC B3415 01

The headlamp control module detects a short to voltage in the suspension position sensor 5V reference circuit.

DTC B3415 02

The headlamp control module detects a short to ground or an open/high resistance in the suspension position sensor 5V reference circuit.

Actions Taken When the DTC Sets

- The headlamp control module disables the headlamp leveling system.
- The driver information center (DIC) will display AFL Lamps Need Service.
- On vehicles equipped with both AFL and headlamp leveling, the AFL system will remain active.

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.

Reference Information

Schematic Reference

[Headlights/Daytime Running Lights \(DRL\) Schematics](#)

Connector End View Reference

[Component Connector End Views](#)

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[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 appropriate B152L suspension position sensor, ignition ON.
2. Verify a test lamp illuminates between the low reference circuit terminal 2 and B+.

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

- 2.1. Ignition OFF, disconnect the harness connector at the K26 headlamp control module.
- 2.2. Test for less than $2\ \Omega$ in the low reference circuit end to end.
 - ⇒ If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.
 - ⇒ If less than $2\ \Omega$, replace the K26 headlamp 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 1 and ground.

⇒ **If less than 4.8 V**

- 4.1. Ignition OFF, disconnect the harness connector at the K26 headlamp control module.
- 4.2. 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
- 4.3. Test for less than $2\ \Omega$ in the 5 V reference circuit end to end.
 - ⇒ If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.
 - ⇒ If less than $2\ \Omega$, replace the K26 headlamp control module.

⇒ **If greater than 5.2 V**

- 4.1. Ignition OFF, disconnect the harness connector at the K26 headlamp control module, ignition ON.
- 4.2. 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 K26 headlamp control module.

↓ **If between 4.8–5.2 V**

5. Verify the appropriate scan tool Leveling Position Sensor parameter is less than 1 V.

⇒ **If 1 V or greater**

5.1. Ignition OFF, disconnect the harness connector at the K26 headlamp control module, ignition ON.

5.2. 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 K26 headlamp control module.

↓ **If less than 1 V**

6. Install a 3 A fused jumper wire between the 5-volt reference circuit terminal 1 and the signal circuit terminal 3.

7. Engine RUNNING, verify the appropriate scan tool Leveling Position Sensor parameter is greater than 4.8 V.

⇒ **If less than 4.8 V**

7.1. Ignition OFF, disconnect the harness connector at the K26 headlamp control module.

7.2. 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

7.3. 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 K26 headlamp control module.

↓ **If 4.8 V or greater**

8. Test or replace the appropriate B152L suspension position sensor.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- [Electronic Suspension Front Position Sensor Replacement](#)
- [Electronic Suspension Rear Position Sensor Replacement - Left Side](#)
- [Electronic Suspension Rear Position Sensor Replacement - Right Side](#)
- [Control Module References](#) for headlamp control module replacement, programming, and setup

DTC B3435 or B3440

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 B3435 00

AHLD Left Servo Driver Circuit

DTC B3435 03

AHLD Left Servo Driver Circuit Short to Ground

DTC B3440 00

AHLD Right Servo Driver Circuit

DTC B3440 03

AHLD Right Servo Driver Circuit Short to Ground

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
LIN Serial Data – Left Headlamp Leveling Actuator	B3440 03, U1511 00, U1521 00, U1531 00	B3440 03, U1511 00, U1521 00, U1531 00	B3440 03, U1511 00, U1521 00, U1531 00	—
	B3435 00, U1512	B3435 00, U1512	B3435 00, U1512	

LIN Serial Data – Right Headlamp Leveling Actuator	00, U1522 00, U1532 00	00, U1522 00, U1532 00	00, U1522 00, U1532 00	—
Headlamp Control Module B+	1	1	—	—
Headlamp Leveling Actuator – Left B+ (F53 UA)	B3435 03	B3435 03	B3435 00	—
Headlamp Leveling Actuator – Right B+ (F53 UA)	B3440 03	B3440 03	B3440 00	—
Suspension Position Sensor 5V Reference – Left Front	B3415 02	1	B3415 01	—
Suspension Position Sensor 5V Reference – Left Rear	B3415 02	1	B3415 01	—
Suspension Position Sensor Signal – Left Front	B3410 06	B3410 06	B3410 01	B3410 08
Suspension Position Sensor Signal – Left Rear	B3420 06	B3420 06	B3420 01	B3420 08
Suspension Position Sensor Low Reference – Left Front	—	1	—	—
Suspension Position Sensor Low Reference – Left Rear	—	1	—	—
Headlamp Control Module Ground	—	1	—	—
Headlamp Leveling Actuator – Left Ground	—	B3435 03	—	—
Headlamp Leveling Actuator – Right Ground	—	B3440 03	—	—
1. Headlamp Leveling Malfunction				

Circuit/System Description

Each headlamp assembly contains a headlamp leveling actuator that is controlled by the headlamp leveling control module. The front and rear suspension position sensors provide the headlamp leveling control with suspension position information. Each sensor receives a 5 V reference, signal, and low reference circuits from the headlamp leveling control module. The sensors are connected to the control arms of the front and rear suspension. As the vehicle travels, the suspension compresses and rebounds moving the suspension position sensor arms. This causes the signal output of the sensor to change. The headlamp leveling control module compares the information from both suspension position sensors and adjusts the headlamp leveling as needed. The headlamp leveling control module communicates with the left and right headlamp leveling actuators via the LIN serial data circuit.

Conditions for Running the DTC

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

Conditions for Setting the DTC

DTC B3435 00

- The headlamp leveling control module detects a short to ground or an open/high resistance in the left headlamp leveling actuator LIN bus circuit.
- The headlamp leveling control module detects an open/high resistance in the left headlamp leveling actuator ground circuit.

DTC B3435 03

- The headlamp leveling control module detects a short to ground or an open/high resistance in the left headlamp leveling actuator B+ circuit..
- The headlamp leveling control module detects an open/high resistance in the left headlamp leveling actuator ground circuit.

DTC B3440 00

- The headlamp leveling control module detects a short to ground or an open/high resistance in the right headlamp leveling actuator LIN bus circuit.
- The headlamp leveling control module detects an open/high resistance in the right headlamp leveling actuator ground circuit.

DTC B3440 03

- The headlamp leveling control module detects a short to ground or an open/high resistance in the right headlamp leveling actuator B+ circuit..
- The headlamp leveling control module detects an open/high resistance in the right headlamp leveling actuator ground circuit.

Actions Taken When the DTC Sets

- When DTC B3435 or DTC B3440 sets, the headlamp leveling control module will attempt to return the lamps to a nominal position and disable all requests to all headlamp actuators.
- The instrument cluster will display Headlamp Leveling Malfunction – Contact Service.

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 50 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](#)

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 M29 headlamp leveling actuator.
2. Test for less than 5 Ω between the ground circuit terminal 2 and ground.

⇒ **If 5 Ω or greater**

2.1. Ignition OFF.

2.2. 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 terminal 1 and ground.

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

4.1. Ignition OFF, disconnect the X2 harness connector at the X50A fuse block – underhood.

4.2. 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

4.3. 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**

5. Test or replace the K26 headlamp control module.

6. Ignition ON.

7. Verify the appropriate headlamp operates to the UP and DOWN positions when commanding the DHL Motor Control UP and DOWN with a scan tool.

⇒ If the appropriate headlamp does not operate UP and DOWN, test or replace the appropriate headlamp assembly.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- [Headlamp Replacement](#)
- [Control Module References](#) for headlamp leveling control module replacement, programming, and setup

DTC B3596

[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	1	1	1	B3596 00
Hazard Warning Switch LED Backlighting Control	2	2	2	—
Hazard Warning Switch Ground	—	1, 2	—	—
1. Hazard Lamps Malfunction 2. Hazard Warning Switch Backlighting 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 hazard warning switch input is Active for longer than 60 seconds.

Actions Taken When the DTC Sets

The hazard 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](#)

Connector End View Reference

[Component Connector End Views](#)

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 S48C multifunction switch 1 – Instrument Panel. It may take up to 2 minutes for all vehicle systems to power down.

2. Test for less than 5 Ω between the ground circuit terminal 5 and ground.

⇒ **If 5 Ω or greater**

2.1. Ignition OFF.

2.2. 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 the scan tool Hazard Lamps Switch parameter is Inactive.

⇒ **If not Inactive**

4.1. Ignition OFF, disconnect the X2 harness connector at the K9 body control module.

4.2. Test for infinite resistance between the signal circuit terminal 7 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 7 and the ground circuit terminal 5.

6. Verify the scan tool Hazard Lamps Switch parameter is Active.

⇒ **If not Active**

6.1. Ignition OFF, disconnect the X2 harness connector at the K9 body control module, ignition ON.

6.2. Test for less than 1 V between the signal circuit terminal 7 and ground.

⇒ If 1 V or greater, repair the short to voltage on the circuit.

↓ If less than 1 V

6.3. 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 S48C multifunction switch 1 – Instrument Panel.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

[Control Module References](#) for BCM replacement, programming, and setup

DTC B3650

[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	—
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	—	—
Turn Signal/Multifunction Switch Ground	—	1	—	—

- | |
|--|
| <ol style="list-style-type: none">1. Headlamps Malfunction2. 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](#)

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 S78 Turn Signal/Multifunction 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 3 and ground.
 - ⇒ **If 15 Ω or greater**
 - 2.1. Ignition OFF.
 - 2.2. 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**
 - 4.1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module.
 - 4.2. 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 Inactive**
5. Install a 3 A fused jumper wire between the signal circuit terminal 2 and the ground circuit terminal 3.
6. Verify the scan tool High Beam Select Switch parameter is Active.
 - ⇒ **If not Active**
 - 6.1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module, ignition ON.

6.2. 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

6.3. 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 B3806

[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
Turn Signal/Multifunction Switch Headlamps OFF Signal	B257A 00	1	1	—
Turn Signal/Multifunction Switch Headlamps ON Signal	B257A 00	1	1	—
Turn Signal/Multifunction 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	—
Turn Signal/Multifunction Switch Ground	—	1	—	—

- | |
|--|
| <ol style="list-style-type: none">1. Headlamps Malfunction2. 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 as the flash to pass switch is activated.

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 lamps and the high beam indicator on the instrument panel cluster (IPC) 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](#)

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[Exterior Lighting Systems Description and Operation](#)

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- [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 driver door, disconnect the harness connector at the S78 Turn Signal/Multifunction 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 6 and ground.

⇒ **If 15 Ω or greater**

2.1. Ignition OFF.

2.2. 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 Headlamps Flash Switch parameter is Inactive.

⇒ **If not Inactive**

4.1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module.

4.2. Test for infinite resistance between the signal circuit terminal 12 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 12 and ground.

6. Verify the scan tool Headlamps Flash Switch parameter is Active.

⇒ **If not Active**

6.1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module, ignition ON.

6.2. Test for less than 1 V between the signal circuit terminal 12 and ground.

⇒ If 1 V or greater, repair the short to voltage on the circuit.

↓ If less than 1 V

6.3. 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

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 01

Left Tail Lamp Circuit Short to Battery

DTC B3881 02

Left Tail Lamp Circuit Short to Ground

DTC B3881 04

Left Tail Lamp Circuit Open

DTC B3882 01

Right Tail Lamp Circuit Short to Battery

DTC B3882 02

Right Tail Lamp Circuit Short to Ground

DTC B3882 04

Right Tail Lamp Circuit Open

Diagnostic Fault Information

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

Turn Signal/Multifunction Switch Park Lamps ON Signal	1	B257A 00	1	—
Park Lamps Control - Left Rear	B3881 02	B3881 01, B3881 04	B3881 01, B3881 04	—
Park Lamps Control - Right Rear	B3882 02	B3882 01, B3882 04	B3882 01, B3882 04	—
Tail Lamp Ground - Left	—	1	—	—
Tail Lamp Ground - Right	—	1	—	—
Turn Signal/Multifunction Switch Ground	—	1	—	—
1. Park, License, and/or Tail Lamps Malfunction				

Circuit/System Description

When the turn signal/multifunction 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 and license lamps control circuits illuminating the park and license lamps.

Conditions for Running the DTC

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

Conditions for Setting the DTC

DTC B3881 01 and B3881 04

The BCM detects a short to voltage or an open/high resistance in the left rear park lamp control circuit.

DTC B3881 02

The BCM detects a short to ground in the left rear park lamp control circuit.

DTC B3882 01 and B3882 04

The BCM detects a short to voltage or an open/high resistance in the right rear park lamp control circuit.

DTC B3882 02

The BCM detects a short to ground in the right rear park lamp control circuit.

Actions Taken When the DTC Sets

DTC B3881 01

The left rear park lamp is always ON.

DTC B3881 02 and B3881 04

The left rear park lamp is inoperative.

DTC B3882 01

The right rear park lamp is always ON.

DTC B3882 02 and B3882 04

The right rear park lamp is 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](#)

Connector End View Reference

[Component Connector End Views](#)

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 E42 tail lamp assembly
2. Test for less than $5\ \Omega$ between the ground circuit terminal A and ground.
⇒ **If $5\ \Omega$ or greater**
 - 2.1. Ignition OFF.
 - 2.2. Test for less than $2\ \Omega$ in the ground circuit end to end.
⇒ If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.
⇒ If less than $2\ \Omega$, repair the open/high resistance in the ground connection.
- ⇓ **If less than $5\ \Omega$**
3. Connect a test lamp between the control circuit terminal C and ground, ignition ON.
4. Verify the test lamp turns ON and OFF when commanding the appropriate Rear Park lamp ON and OFF with a scan tool.
⇒ **If the test lamp is always OFF**
 - 4.1. Ignition OFF, disconnect the X4 harness connector at the K9 body control module.
 - 4.2. 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
 - 4.3. Test for less than $2\ \Omega$ in the control circuit end to end.
⇒ If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.
⇒ If less than $2\ \Omega$, replace the K9 body control module.
- ⇒ **If the test lamp is always ON**

4.1. Ignition OFF, disconnect the X4 harness connector at the K9 body control module, ignition ON.

4.2. 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 tail/side marker lamp.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- [Tail Lamp Bulb Replacement](#)
- [Control Module References](#) for BCM replacement, programming, and setup

DTC B3883

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

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
F8DA (BCM 1) Fuse B+	U1814 02, B097C 02, B151D 03, B3265 01, B3265 04, B3873 01, B3873 04 B3883 01, B3883 01, C0297 01	U1814 02, B097C 02, B151D 03, B3265 01, B3265 04, B3873 01, B3873 04 B3883 01, B3883 01, C0297 01	—	—
© 2014 General Motors. All rights reserved.			B3883 01, B3883	B3883 01, B3883

License Plate Lamp Control	B3883 02	04	04	—
License Plate Lamp Ground – Right	—	B3883 01, B3883 04	—	—
License Plate Lamp Ground – Left	—	B3883 01, B3883 04	—	—

Circuit/System Description

When the turn signal/multifunction 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

Turn signal/multifunction switch in OFF position.

DTC B3883 02 or B3883 04

Turn signal/multifunction 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 a short to ground or an open/high resistance in the F8DA (BCM 1) fuse B+ circuit.
- The BCM detects an open/high resistance in the license lamps ground circuit.

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.

Reference Information

Schematic Reference

- [Exterior Lights Schematics](#)
- [Body Control System Schematics](#)

Connector End View Reference

[Component Connector End Views](#)

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.
2. Test for less than 15 Ω between each ground circuit terminal 2 and ground.

⇒ **If 15 Ω or greater**

2.1. Ignition OFF.

2.2. 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 1 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**

4.1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.

4.2. 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

4.3. 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**

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

4.2. 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 1 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**

7.1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.

7.2. 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

7.3. Test for less than $2\ \Omega$ in the control circuit end to end.

⇒ If $2\ \Omega$ 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.

[Control Module References](#) for BCM replacement, programming, and setup

DTC B3884

[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 B3884 02

Center High Mounted Brake Lamp Circuit Short to Ground

[Diagnostic Fault Information](#)

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Center High Mounted Stop Lamp Control	B3884 02	1	1	—
Center High Mounted Stop Lamp 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 will apply battery voltage to the right and left stop lamp control circuits, engine control module (ECM), and center high mounted stop lamp control circuit.

[Conditions for Running the DTC](#)

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

Conditions for Setting the DTC

DTC B3884 02

The BCM detects a short to ground in the center high mounted stop lamp 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](#)

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 E6 Center High Mounted Stop Lamp.
2. Test for less than 15 Ω between the ground circuit terminal 2 and ground.

⇒ **If 15 Ω or greater**

- 2.1. Ignition OFF.
- 2.2. 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, ignition ON.
4. Verify the test lamp turns ON and OFF when commanding the Center Stop Lamp ON and OFF with a scan tool.

⇒ **If the test lamp is always OFF**

- 4.1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.
- 4.2. 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
- 4.3. 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**

- 4.1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module, ignition ON.
- 4.2. 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 E6 Center High Mounted Stop Lamp.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- [High Mount Stop Lamp Replacement](#)
- [Control Module References](#) for BCM replacement, programming, and setup

DTC B3948 or B3949

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 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

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

F2DA (BCM 7) Fuse B+	1	1	—	—
F9DA (BCM 4) Fuse B+	1	1	—	—
F23DA (BCM 3) Fuse B+	1	1	—	—
F32UA (BCM 6) Fuse B+	U0152D 00	U0152D 00	—	—
Turn Signal Switch Signal – Left	1	1	1	—
Turn Signal Switch Signal – Right	1	1	1	—
Turn Signal Control – Left Front	B3948 02	B3948 01, B3948 04	1	—
Turn Signal Control – Left Rear	B3950 02	B3950 01, B3950 04	1	—
Turn Signal Control – Right Front	B3949 02	B3949 01, B3949 04	1	—
Turn Signal Control – Right Rear	B3951 02	B3951 01, B3951 04	1	—
Outside Rearview Mirror – Driver Ground	—	1	—	—
Outside Rearview Mirror – Passenger Ground	—	1	—	—
Turn Signal Lamp Ground – Left Front	—	B3948 01, B3948 04	—	—
Turn Signal Lamp Ground – Right Front	—	B3949 01, B3949 04	—	—
		B3950 01, B3950		

Turn Signal Lamp Ground – Left Rear	—	04	—	—
Turn Signal Lamp Ground – Right Rear	—	B3951 01, 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 their respective control circuits. When a turn signal request is received by the BCM, a serial data message is sent to the instrument panel cluster (IPC) requesting the respective turn signal indicator be pulsed ON and OFF.

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 (DIC) 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 (DIC) 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.

Reference Information

Schematic Reference

[Exterior Lights Schematics](#)

Connector End View Reference

[Component Connector End Views](#)

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, disconnect the harness connector at the appropriate component listed below.
 - E4LF Turn Signal Lamp – Left Front with T4F
 - E4N Park/Turn Signal Lamp – Left with T4A
 - A9A Outside Rearview Mirror – Driver
2. Test for less than 10 Ω between the appropriate ground circuit terminal listed below and ground.
 - E4LF Turn Signal Lamp – Left Front terminal B with T4F
 - E4N Park/Turn Signal Lamp – Left terminal B with T4A
 - A9A Outside Rearview Mirror – Driver terminal 5

⇒ **If 10 Ω or greater**

- 2.1. Ignition OFF.
- 2.2. 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.
 - E4LF Turn Signal Lamp – Left Front terminal A with T4F
 - E4N Park/Turn Signal Lamp – Left terminal A with T4A
 - A9A Outside Rearview Mirror – Driver terminal 13
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**
 - 4.1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module.
 - 4.2. 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

4.3. 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**

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

4.2. 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.

DTC B3949

1. Ignition OFF, exterior lamps OFF, disconnect the harness connector at the appropriate component listed below.

- E4RF Turn Signal Lamp – Right Front with T4F
- E4P Park/Turn Signal Lamp – Right with T4A
- A9B Outside Rearview Mirror – Passenger

2. Test for less than 10 Ω between the appropriate ground circuit terminal listed below and ground.

- E4RF Turn Signal Lamp – Right Front terminal B with T4F
- E4P Park/Turn Signal Lamp – Right terminal B with T4A
- A9B Outside Rearview Mirror – Passenger terminal 5

⇒ **If 10 Ω or greater**

2.1. Ignition OFF.

2.2. 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.

- E4RF Turn Signal Lamp – Right Front terminal A with T4F
- E4P Park/Turn Signal Lamp – Right terminal A with T4A
- A9B Outside Rearview Mirror – Passenger terminal 13

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**

4.1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.

4.2. 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

4.3. 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**

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

4.2. 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 – right.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- [Front Side Turn Signal Lamp Replacement](#)
- [Front Turn Signal Lamp Bulb Replacement](#)
- [Control Module References](#) for BCM replacement, programming, and setup

DTC B3950 or B3951

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

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

F2DA (BCM 7) Fuse B+	1	1	—	—
F9DA (BCM 4) Fuse B+	1	1	—	—
F23DA (BCM 3) Fuse B+	1	1	—	—
F32UA (BCM 6) Fuse B+	U0152D 00	U0152D 00	—	—
Turn Signal Switch Signal – Left	1	1	1	—
Turn Signal Switch Signal – Right	1	1	1	—
Turn Signal Control – Left Front	B3948 02	B3948 01, B3948 04	1	—
Turn Signal Control – Left Rear	B3950 02	B3950 01, B3950 04	1	—
Turn Signal Control – Right Front	B3949 02	B3949 01, B3949 04	1	—
Turn Signal Control – Right Rear	B3951 02	B3951 01, B3951 04	1	—
Outside Rearview Mirror – Driver Ground	—	1	—	—
Outside Rearview Mirror – Passenger Ground	—	1	—	—
Turn Signal Lamp Ground – Left Front	—	B3948 01, B3948 04	—	—
Turn Signal Lamp Ground – Right Front	—	B3949 01, B3949 04	—	—
		B3950 01, B3950		

Turn Signal Lamp Ground – Left Rear	—	04	—	—
Turn Signal Lamp Ground – Right Rear	—	B3951 01, 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 their respective control circuits. When a turn signal request is received by the BCM, a serial data message is sent to the instrument panel cluster (IPC) requesting the respective turn signal indicator be pulsed ON and OFF.

Conditions for Running the DTC

Battery voltage must be between 9-16 V.

Conditions for Setting the DTC

DTC B3950 01 and B3950 04

- The BCM detects 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 B3950 02

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

DTC B3951 01 and B3951 04

- The BCM detects 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.

DTC B3951 02

The BCM detects a short to ground in the right rear turn signal control 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 (DIC) 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 (DIC) 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.

Reference Information

Schematic Reference

[Exterior Lights Schematics](#)

Connector End View Reference

[Component Connector End Views](#)

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 B3950

1. Ignition OFF, exterior lamps OFF, disconnect the E5S Tail/Stop and Turn Signal Lamp – Left.
2. Test for less than 10 Ω between the ground circuit terminal G and ground.

⇒ **If 10 Ω or greater**

- 2.1. Ignition OFF.
- 2.2. 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 control circuit terminal A and ground, ignition ON.
4. Verify the test lamp turns ON and OFF when commanding the Left Rear Turn Signal Lamp ON and OFF with a scan tool.

⇒ **If the test lamp is always OFF**

- 4.1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module.
- 4.2. 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
- 4.3. 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**

- 4.1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.
- 4.2. 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 E5S Tail/Stop and Turn Signal Lamp – Left.

DTC B3951

1. Ignition OFF, exterior lamps OFF, remove the E5T Tail/Stop and Turn Signal Lamp – Right.

2. Test for less than 10 Ω between the ground circuit terminal G and ground.

⇒ **If 10 Ω or greater**

2.1. Ignition OFF.

2.2. 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 control circuit terminal A and ground, ignition ON.

4. Verify the test lamp turns ON and OFF when commanding the Right Rear Turn Signal Lamp ON and OFF with a scan tool.

⇒ **If the test lamp is always OFF**

4.1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.

4.2. 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

4.3. 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**

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

4.2. 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 E5T Tail/Stop and Turn Signal Lamp – Right.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- [Rear Turn Signal Lamp Bulb Replacement](#)
- [Control Module References](#) for BCM replacement, programming, and setup

DTC C0277 or C0890

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 4B

Brake Pedal Position Sensor Circuit Calibration Not Learned

DTC C0890 03

Control Module Voltage Reference Output 3 Circuit Low Voltage

DTC C0890 07

Control Module Voltage Reference Output 3 Circuit High Voltage

Diagnostic Fault Information

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

F8DA (BCM 1) Fuse B+	B1325 03, B3265 01, B3265 04, B3873 01, B3873 04, B3883 01, B3883 04, C0297 01	B1325 03, B3265 01, B3265 04, B3873 01, B3873 04, B3883 01, B3883 04, C0297 01	—	—
Brake Pedal Position Sensor 5 V Reference	C0277 06, C0890 03, U0140 71, U0422 00, U0422 71	C0277 06, U0140 71, U0422 00, U0422 71	C0890 07, U0140 71, U0422 00, U0422 71	—
Brake Pedal Position Sensor Signal	C0277 06, U0140 71, U0422 00, U0422 71	C0277 06, U0140 71, U0422 00, U0422 71	C0890 07, U0140 71, U0422 00, U0422 71	C0277 09
Brake Pedal Position Sensor Low Reference	—	C0277 07, U0140 71, U0422 00, U0422 71	1	—
1. Stop Lamps Malfunction				

Circuit/System Description

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

Conditions for Running the DTC

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

Conditions for Setting the DTC

DTC C0277 06

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

DTC C0277 07

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

DTC C0277 09

The BCM detects the BPP sensor signal is changing faster than possible under normal operating conditions.

DTC C0277 4B

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

DTC C0890 03

- The BCM detects a short to ground in the BPP sensor 5 V reference circuit.
- The BCM detects a short to ground or an open/high resistance in the F23DA (BCM 1) fuse B+ circuit.

DTC C0890 07

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

Actions Taken When the DTC Sets

- The Traction Control indicator is commanded 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 seconds.
- 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](#)

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 C0277 06, C0277 07, 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

- 2.1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.
- 2.2. 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**

4.1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.

4.2. 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

4.3. 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.

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

⇒ **If greater than 5.2 V**

4.1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.

4.2. 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**

5.1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.

5.2. 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-volt 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-volt reference circuit terminal 2 and the signal circuit terminal 3.

7. Verify the scan tool Brake Pedal Applied parameter is Active for 2 seconds before defaulting to Inactive.

⇒ **If not Active**

7.1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.

7.2. 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

7.3. 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**

1.1. Ignition ON

1.2. Perform the BPP sensor recalibration procedure for the K9 Body Control Module. Refer to [Brake Pedal Position Sensor Calibration](#).

1.3. Verify the DTC does not reset while operating the vehicle under the conditions for running the DTC.

⇒ If the DTC resets, replace the B22 Brake Pedal Position Sensor.

↓ If the DTC does not reset

1.4. 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**

1.1. Replace the B22 Brake Pedal Position Sensor.

1.2. Perform the BPP sensor recalibration procedure for the K9 Body Control Module. Refer to [Brake Pedal Position Sensor Calibration](#).

1.3. 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

1.4. 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

[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](#)

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
F8DA (BCM 1) Fuse B+	B1325 03, B3265 01, B3265 04, B3873 01, B3873 04, B3883 01, B3883 04, C0297 01	B1325 03, B3265 01, B3265 04, B3873 01, B3873 04, B3883 01, B3883 04, C0297 01	—	—
Brake Applied Signal	C0297 02	1	C0297 01	—
1. Cruise Control Malfunction				

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[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 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 F8DA (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

- [Cruise Control Schematics](#)
- [Body Control System Schematics](#)

Connector End View Reference

[Component Connector End Views](#)

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**

- 3.1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module.
- 3.2. 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
- 3.3. 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**

- 3.1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.
- 3.2. 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.

- [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:

- [Adaptive Forward Lighting Malfunction](#)
- [Backup Lamps Malfunction](#)
- [Courtesy Lamps Malfunction](#)
- [Daytime Running Lamps Malfunction](#)
- [Dome Lamps Malfunction](#)

- [Exterior Courtesy Lamps Malfunction](#)
- [Hazard Lamps Malfunction](#)
- [Headlamps Malfunction](#)
- [Headlamp Leveling Malfunction](#)
- [Interior Backlighting Malfunction](#)
- [Park, License, and/or Tail Lamps Malfunction](#)
- [Rear Compartment Lamp Malfunction](#)
- [Stop Lamps Malfunction](#)
- [Turn Signal Lamps and/or Indicators Malfunction](#)

Adaptive Forward 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
Headlamp Control Module B+	1	1	—	—
Headlamp Leveling Actuator – Left B+ (F53 UA)	1	1	—	—
Headlamp Leveling Actuator – Right B+ (F53 UA)	1	1	—	—
Headlamp Control Module Ground	—	1	—	—
Headlamp Leveling Actuator – Left Ground	—	1	—	—
Headlamp Leveling Actuator – Right Ground	—	1	—	—
1. Adaptive Forward Lighting Malfunction				

[Circuit/System Description](#)

Battery positive voltage is applied to the headlamp control module at all times. The headlamp control module has a normal operational voltage range of about 12.5–16 V and is only fully functional with the ignition switch is in the RUN position and the headlamp switch in the AUTOMATIC LIGHT position. The communication Enable Signal from the body control module (BCM) wakes the headlamp control module microprocessor. The headlamp control module receives serial data messages from the engine control module (ECM), transmission

control module (TCM), electronic brake control module (EBCM), and BCM with information regarding power mode, speed, steering angle, transmission gear selection, and headlamp switch status. The headlamp control module calculates the headlamp angle and sends commands to the left and right adaptive forward lighting system headlamp actuators. The headlamp actuators drive the headlamps to the position commanded by the headlamp control module. The headlamp control module monitors the headlamp actuator motor control circuits for proper circuit continuity and for shorts to ground or voltage. If a malfunction is detected, a DTC will be stored in memory and the driver will be notified with a message displayed over the driver information center located on the instrument cluster.

Reference Information

Schematic Reference

[Headlights/Daytime Running Lights \(DRL\) Schematics](#)

Connector End View Reference

[Component Connector End Views](#)

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 M29 headlamp leveling actuator.
2. Test for less than 5 Ω between the ground circuit terminal 2 and ground.

⇒ **If 5 Ω or greater**

2.1. Ignition OFF.

2.2. 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 terminal 1 and ground.

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

4.1. Ignition OFF, disconnect the X2 harness connector at the X50A fuse block – underhood.

4.2. 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

4.3. 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**

5. Test or replace the K26 headlamp control module.

6. Ignition ON.

7. Verify the appropriate headlamp operates to the LEFT and RIGHT positions when commanding the appropriate Headlamp Horizontal Motor control LEFT and RIGHT with a scan tool.

⇒ If the appropriate headlamp does not operate LEFT and RIGHT, test or replace the appropriate headlamp assembly.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- [Headlamp Replacement](#)
- [Control Module References](#) for headlamp control module replacement, programming, and setup

Backup 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
BCM 6 Fuse B+	B2545 01, B2545 04,	B2545 01, B2545 04,	—	—
Backup Lamps Control	B2545 02	B2545 01, B2545 04	1	—
Backup Lamp - Left Ground	—	1	—	—
Backup Lamp - Right Ground	—	1	—	—
1. Backup Lamps Malfunction				

Circuit/System Description

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 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 running for the backup lamps to operate.

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Reference Information

Schematic Reference

[Exterior Lights Schematics](#)

Connector End View Reference

[Component Connector End Views](#)

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 E5 backup lamp.
2. Test for less than 5 Ω between the ground circuit terminal B and ground.
⇒ **If 5 Ω or greater**
 - 2.1. Ignition OFF.
 - 2.2. 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 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**

4.1. Ignition OFF, disconnect the X7 harness connector at the K9 body control module.

4.2. 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

4.3. 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**

4.1. Ignition OFF, disconnect the X7 harness connector at the K9 body control module, ignition ON.

4.2. 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 E5 backup lamp.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- [Backup Lamp Bulb 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 Lamp Control – Terminal 2 X7	1	1	1	—
Courtesy Lamp Control – Terminal A X1	2	2	2	—
Center Console Compartment Lamp Ground	—	1	—	—
Dome/Reading Lamps – Left Front Ground	—	2	—	—
Dome/Reading Lamps – Left Rear Ground	—	2	—	—
Dome/Reading Lamps – Right Front Ground	—	2	—	—
Dome/Reading Lamps – Right Rear Ground	—	2	—	—
Instrument Panel Compartment Lamp Ground	—	1	—	—
Sunshade – Left Ground	—	1	—	—
Sunshade – Right Ground	—	1	—	—

- | |
|--|
| <ol style="list-style-type: none">1. Courtesy Lamps Malfunction2. Reading Lamps Malfunction |
|--|

Circuit/System Description

The body control module (BCM) supplies battery voltage to the dome/reading lamps, left and right sunshade lamps, and instrument panel compartment lamp via the courtesy lamp control circuits. When the instrument panel compartment, center console compartment lamp, or a sunshade mirror is opened, the switch contacts close allowing battery voltage to flow illuminating the respective lamps. The front 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 and no doors opened, the BCM will deactivate the courtesy lamp control circuits to prevent total battery discharge.

Reference Information

Schematic Reference

[Interior Lights Schematics](#)

Connector End View Reference

[Component Connector End Views](#)

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, 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 5 Ω between the appropriate ground circuit terminal listed below and ground.

- A3L Sunshade – Left – terminal B
- A3R Sunshade – Right – terminal B
- E27 Instrument Panel Compartment Lamp – terminal 2
- E28 Center Console Compartment Lamp terminal 1
- E37LF Dome/Reading Lamps – Left Front terminal 6
- E37LR Dome/Reading Lamps – Left Rear terminal 6
- E37RF Dome/Reading Lamps – Right Front terminal 6
- E37RR dome/reading lamps – right rear terminal 6

⇒ **If 5 Ω or greater**

2.1. Ignition OFF.

2.2. 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.

- A3L Sunshade – Left – terminal A
- A3R Sunshade – Right – terminal A
- E27 Instrument Panel Compartment Lamp – terminal 1
- E28 Center Console Compartment Lamp terminal 2
- E37LF Dome/Reading Lamps – Left Front terminal 1
- E37LR Dome/Reading Lamps – Left Rear terminal 1
- E37RF Dome/Reading Lamps – Right Front terminal 1
- E37RR Dome/Reading Lamps – Right Rear terminal 1

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**

4.1. Ignition OFF, disconnect the appropriate harness connector listed below at the K9 Body Control Module.

- X1 – reading lamps

- X7 – courtesy lamps

4.2. 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

4.3. 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**

4.1. Ignition OFF, disconnect the appropriate harness connector listed below at the K9 Body Control Module, ignition ON.

- X1 – reading lamps
- X7 – courtesy lamps

4.2. 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.

- [Reading Lamp Bulb Replacement](#)
- [Dome and Reading Lamp Replacement](#)
- [Dome and Reading Lamp Bulb Replacement](#)
- [Instrument Panel Compartment 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	—
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.

Reference Information

Schematic Reference

- [Headlights/Daytime Running Lights \(DRL\) Schematics](#)
- [HVAC Schematics](#)
- [Body Control System Schematics](#)

Connector End View Reference

[Component Connector End Views](#)

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 daytime running lamps turn ON and OFF while commanding the Daytime Running Lamps ON and OFF with a scan tool.
 - ⇒ **If the daytime running lamps do not turn ON and OFF**
Refer to Daytime Running Lamp Malfunction.
 - ⇓ **If the daytime running lamps turn ON and OFF**

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.
2. Test for less than $5\ \Omega$ between the ground circuit terminal and ground.
 - ⇒ **If $5\ \Omega$ or greater**
 - 2.1. Ignition OFF.
 - 2.2. Test for less than $2\ \Omega$ in the ground circuit end to end.
 - ⇒ If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.
 - ⇒ If less than $2\ \Omega$, repair the open/high resistance in the ground connection.
 - ↓ **If less than $5\ \Omega$**
3. Connect a test lamp between the control circuit terminal 1 and ground, ignition ON.
4. Verify the test lamp turns ON and OFF when commanding the Daytime Running Lamps ON and OFF with a scan tool.
 - ⇒ **If the test lamp is always OFF**
 - 4.1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module.
 - 4.2. 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
 - 4.3. Test for less than $2\ \Omega$ in the control circuit end to end.
 - ⇒ If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.
 - ⇒ If less than $2\ \Omega$, replace the K9 Body Control Module.
 - ⇒ **If the test lamp is always ON**
 - 4.1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.
 - 4.2. 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.

Ambient Light Sensor Malfunction

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, disconnect the harness connector at the B10B Ambient Light/Sunload Sensor. It may take up to 2 minutes for all vehicle systems to power down.

2. Test for less than $10\ \Omega$ between the low reference circuit terminal 6 and ground.

⇒ **If $10\ \Omega$ or greater**

2.1. Ignition OFF, disconnect the X2 harness connector at the K33 HVAC Control Module.

2.2. Test for less than $2\ \Omega$ in the low reference circuit end to end.

⇒ If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.

⇒ If less than $2\ \Omega$, replace the K33 HVAC Control Module.

↓ **If less than $10\ \Omega$**

3. Ignition ON.

4. Verify the scan tool Ambient Light Sensor parameter is greater than 4.65 V.

⇒ **If 4.65 V or less**

4.1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.

4.2. 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**

6.1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.

6.2. 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

6.3. Test for less than $2\ \Omega$ in the signal circuit end to end.

⇒ If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.

⇒ If less than $2\ \Omega$, 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.

- [Daytime Running Lamp Replacement](#)
- [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
BCM 6 Fuse B+	B2545 01, B2545 04	B2545 01, B2545 04	—	—
Dome Lamp Control	1	1	1	—
Dome Lamp Switch Cancel Signal	2	2	2	—
Dome Lamp Switch ON Signal	2	2	2	—
Dome Lamp Switch Ground	—	1, 2	—	—
1. Dome Lamp Malfunction 2. Dome Lamp Switch Malfunction				

[Circuit/System Description](#)

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.

Reference Information

Schematic Reference

[Interior Lights Schematics](#)

Connector End View Reference

[Component Connector End Views](#)

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 Door Ajar Sw. parameter changes between Active and Inactive while opening and closing each vehicle door.
⇒ **If the parameter does not change**
Refer to [Door Ajar Indicator Malfunction](#).
⇓ **If the parameter changes**
3. 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**

4. 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**

5. All OK.

Circuit/System Testing

Dome Lamp Switch Malfunction

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, 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**

2.1. Ignition OFF.

2.2. 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**

4.1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.

4.2. 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**

4.1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module.

4.2. 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 Door**

5. Install a 3 A fused jumper wire between the signal circuit terminal 2 and the ground circuit terminal 1.

6. Verify the scan tool Interior/Courtesy Lighting Master Switch parameter is Cancel.

⇒ **If not Cancel**

6.1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.

6.2. 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

6.3. 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 the ground circuit terminal 1.

8. Verify the scan tool Interior/Courtesy Lighting Master Switch parameter is On.

⇒ **If not On**

8.1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module, ignition ON.

8.2. 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

8.3. 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, 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 ground circuit terminal 6 and ground.

⇒ **If 15 Ω or greater**

2.1. Ignition OFF.

2.2. 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 2 and ground.

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**

4.1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module.

4.2. 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

4.3. 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**

4.1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module, ignition ON.

4.2. 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.

- [Dome and Reading Lamp Replacement](#)

- [Control Module References](#) for BCM replacement, programming, and setup

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
Exterior Courtesy Lamps Control	B263A 02	B263A 04	1	—
Outside Rearview Mirror – Driver Ground	—	1	—	—
Outside Rearview Mirror – 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 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

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[Component Connector End Views](#)

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
- 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.
2. Test for less than 15 Ω between the appropriate ground circuit terminal listed below and ground.
 - A9A Outside Rearview Mirror – Driver terminal 5
 - A9B Outside Rearview Mirror – Passenger terminal 5

⇒ **If 15 Ω or greater**

2.1. Ignition OFF.

2.2. 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.
 - A9A Outside Rearview Mirror – Driver terminal 10
 - A9B Outside Rearview Mirror – Passenger terminal 10
4. Verify the test lamp turns ON and OFF when commanding the Exterior Courtesy Lamps ON and OFF with a scan tool.
 - ⇒ **If the test lamp is always OFF**
 - 4.1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module.
 - 4.2. 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
 - 4.3. 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**
 - 4.1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module, ignition ON.
 - 4.2. 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 component.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- [Outside Rearview Mirror Glass 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.
- [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
F23DA (BCM 1) Fuse B+	C0890 03, B101E 43, B1405 03, B1529 03, U0121 00	C0890 03, B101E 43, B1405 03, B1529 03, U0121 00	—	—
Front Fog Lamp and I/P Dimmer Switch B+	B257B 03, B1405 03	B257B 03	—	—
Front Fog Lamp and I/P Dimmer Switch Signal	B257B 03	B257B 03	2	—
Front Fog Lamp Relay Control	B2530 02	B2530 04	B2530 01	—
Front Fog Lamp Control	1	1	1	—
Front Fog Lamp Ground – Left	—	1	—	—
Front Fog Lamp Ground – Right	—	1	—	—

1. Front Fog Lamps Malfunction
2. Front Fog Lamp Switch Malfunction

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Circuit/System Description

The front fog lamp switch is an input to the body control module (BCM) and is contained in the headlamp switch assembly. The BCM supplies voltage to the front fog lamp switch via the front fog lamp and I/P dimmer switch B+ circuit. When the front fog lamp switch is pressed, voltage from the B+ circuit is pulled down through the front fog lamp switch resistor. The front fog lamp resistor is part of the resistor ladder that also provides the dimming signals for the I/P dimmer switches. The BCM receives the voltage signal through the front fog lamp and I/P dimmer switch signal circuit.

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 F48UA fuse to the front fog lamp control circuit which illuminates the front fog lamps.

Reference Information

Schematic Reference

[Fog Lights Schematics](#)

Connector End View Reference

[Component Connector End Views](#)

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, 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. Verify the front fog lamp indicator on the instrument cluster turns ON and OFF while commanding the front fog lamps ON and OFF with the front fog lamp switch.
⇒ **If the front fog lamp indicator does not turn ON and OFF**
Refer to Front Fog Lamp Indicator Malfunction.
↓ **If the front fog lamp indicator turns ON and OFF**
5. All OK.

Circuit/System Testing

Front Fog Lamp 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 1 and ground.
⇒ **If less than B+**
 - 2.1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module.
 - 2.2. 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
 - 2.3. 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 does not illuminate between the B+ circuit terminal 1 and the signal circuit terminal 12.

⇒ **If the test lamp illuminates**

3.1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.

3.2. 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**

4. Test for B+ between the B+ circuit terminal 1 and the signal circuit terminal 12.

⇒ **If less than B+**

4.1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.

4.2. Test for less than 1 V between the signal circuit terminal 12 and ground.

⇒ If 1 V or greater, repair the short to voltage on the circuit.

↓ If less than 1 V

4.3. 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+**

5. Test or replace the S30 Headlamp Switch.

Front Fog Lamps Malfunction

1. Ignition OFF, disconnect the X1 harness connector at the X50A Fuse Block – Underhood.

2. Connect a test lamp between the control circuit terminal 13 and B+, ignition ON.

3. Verify the test lamp turns ON and OFF when commanding the Front Fog Lamps ON and OFF with a scan tool.

⇒ **If the test lamp is always OFF**

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

3.2. 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

3.3. Ignition OFF.

3.4. 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**

3.1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module.

3.2. 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.

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

4. Ignition OFF, connect the X1 harness connector at the X50A Fuse Block – Underhood.

5. Disconnect the harness connector at the appropriate E29 Fog Lamp, ignition OFF, exterior lamps OFF.

6. Test for less than 5 Ω between the ground circuit terminal B and ground.

⇒ **If 5 Ω or greater**

6.1. Ignition OFF.

6.2. 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**

7. Connect a test lamp between the control circuit terminal A and ground, ignition ON.

8. Verify the test lamp turns ON and OFF when commanding the Front Fog Lamps ON and OFF with a scan tool.

⇒ **If the test lamp is always OFF**

8.1. Ignition OFF, disconnect the X1 harness connector at the X50A Fuse Block – Underhood.

8.2. 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

8.3. 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**

8.1. Ignition OFF, disconnect the X1 harness connector at the X50A Fuse Block – Underhood, ignition ON.

8.2. 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**

9. Test or replace the appropriate E29 Fog Lamp.

Front Fog Lamp Indicator Malfunction

1. Ignition ON.

2. Verify the front fog lamp indicator turns ON and OFF when commanding the Instrument Cluster All Indicators Test ON and OFF with a scan tool.

⇒ **If the front fog lamp indicator is always OFF or remains ON**

Replace the P16 Instrument Cluster.

↓ **If the front fog lamp 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](#)
- [Front Fog Lamp Replacement](#)
- [Body Front Wiring Harness Fuse Block Replacement](#)
- [Control Module References](#) for BCM or Instrument Cluster replacement, programming, and setup

Rear 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.
- [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
Rear Fog Lamp and Instrument Panel Dimmer Switch B+	B257B 03, B1405 03	B257B 03	—	—
Rear Fog Lamp and Instrument Panel Dimmer Switch Signal	B257B 03	B257B 03	1	—
Rear Fog Lamp Control	B2540 02	B2540 04	B2540 01	—
Fog Lamp – Left Rear Ground	—	1	—	—
Fog Lamp – Right Rear Ground	—	1	—	—
1. Rear Fog Lamps Malfunction				

[Circuit/System Description](#)

The rear fog lamp switch is an input to the body control module (BCM) and is contained in the headlamp switch assembly. The BCM supplies voltage to the rear fog lamp switch via the rear fog lamp and instrument panel dimmer switch B+ circuit. When the rear fog lamp switch is pressed, voltage from the B+ circuit is pulled down through the rear fog lamp switch resistor. The rear fog lamp resistor is part of the resistor ladder that also provides the dimming signals for the instrument panel dimmer switches. The BCM receives the

voltage signal through the rear fog lamp and instrument panel dimmer switch signal circuit. The body control module responds by applying voltage to the rear fog lamp control circuit illuminating the rear fog lamps.

Reference Information

Schematic Reference

[Fog Lights Schematics](#)

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- [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, park lamps ON.
2. Verify the scan tool Rear Fog Lamp Switch parameter changes between Active and Inactive while commanding the rear fog lamp ON and OFF with the rear fog lamp switch.
⇒ **If the parameter does not change**
Refer to Rear Fog Lamp Switch Malfunction.
⇓ **If the parameter changes**
3. Verify the rear fog lamps turn ON and OFF when commanding the Rear Fog Lamp ON and OFF with a scan tool.
⇒ **If the rear fog lamps do not turn ON and OFF**
Refer to Rear Fog Lamp Malfunction.

↓ **If the rear fog lamps turn ON and OFF**

4. Verify the rear fog lamp indicator on the headlamp switch turns ON and OFF while commanding the rear fog lamp ON and OFF with the rear fog lamp switch.

⇒ **If the rear fog lamp indicator does not turn ON and OFF**

Refer to Rear Fog Lamp Indicator Malfunction.

↓ **If the rear fog lamp indicator turns ON and OFF**

5. All OK.

Circuit/System Testing

Rear Fog Lamp 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 1 and ground.

⇒ **If less than B+**

2.1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module.

2.2. 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

2.3. 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 does not illuminate between the B+ circuit terminal 1 and the signal circuit terminal 12.

⇒ **If the test lamp illuminates**

3.1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.

3.2. 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**

4. Test for B+ between the B+ circuit terminal 1 and the signal circuit terminal 12.

⇒ **If less than B+**

4.1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.

4.2. Test for less than 1 V between the signal circuit terminal 12 and ground.

⇒ If 1 V or greater, repair the short to voltage on the circuit.

↓ If less than 1 V

4.3. 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+**

5. Test or replace the S30 Headlamp Switch.

Rear Fog Lamps Malfunction

1. Ignition OFF, exterior lamps OFF, remove the appropriate E29 Fog Lamp – Rear.

2. Test for less than 10 Ω between the ground circuit terminal 1 and ground.

⇒ **If 10 Ω or greater**

2.1. Ignition OFF.

2.2. 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 control circuit terminal 2 and ground, ignition ON.

4. Verify the test lamp turns ON and OFF when commanding the Rear Fog Lamp ON and OFF with a scan tool.

⇒ **If the test lamp is always OFF**

4.1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module.

4.2. 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

4.3. 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**

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

4.2. 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 inoperative E29 Fog Lamp - Rear.

Rear Fog Lamp Indicator Malfunction

1. Ignition ON.

2. Verify the rear fog lamp indicator turns ON and OFF when commanding the Instrument Cluster All Indicators Test ON and OFF with a scan tool.

⇒ **If the rear fog lamp indicator is always OFF or remains ON**

Replace the P16 Instrument Cluster.

↓ **If the rear fog lamp indicator turns ON and OFF**

3. Replace the K9 Body Control Module.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

[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	1	1	1	B3596 00
Hazard Warning Switch LED Backlighting Control	2	2	2	—
Hazard Warning Switch Ground	—	1, 2	—	—
1. Hazard Lamps Malfunction 2. Hazard Warning Switch Backlighting 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.

The instrument panel dimmer switch controls are located on the headlamp switch assembly and are used to increase and decrease 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 (PWM) voltage to the hazard warning switch LED backlighting control circuit illuminating the LED to the desired level of brightness.

Reference Information

Schematic Reference

[Exterior Lights Schematics](#)

Connector End View Reference

[Component Connector End Views](#)

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 Hazard Warning Switch Malfunction.
 - ⇓ **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. Verify the hazard warning switch backlighting turns ON and OFF while commanding the Hazard Lamps Switch Backlight ON and OFF with a scan tool.

⇒ **If the hazard warning switch backlighting does not turn ON and OFF**

Refer to Hazard Warning Switch Backlighting Malfunction.

↓ **If the hazard warning switch backlighting turns ON and OFF**

5. All OK.

Hazard Warning Switch Malfunction

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, disconnect the harness connector at the S48C multifunction switch 1 – instrument panel. It may take up to 2 minutes for all vehicle systems to power down.

2. Test for less than 5 Ω between the ground circuit terminal 5 and ground.

⇒ **If 5 Ω or greater**

2.1. Ignition OFF.

2.2. 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 the scan tool Hazard Lamps Switch parameter is Inactive.

⇒ **If not Inactive**

4.1. Ignition OFF, disconnect the X2 harness connector at the K9 body control module.

4.2. Test for infinite resistance between the signal circuit terminal 7 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 7 and ground.

6. Verify the scan tool Hazard Lamps Switch parameter is Active.

⇒ **If not Active**

6.1. Ignition OFF, disconnect the X2 harness connector at the K9 body control module, ignition ON.

6.2. Test for less than 1 V between the signal circuit terminal 7 and ground.

⇒ If 1 V or greater, repair the short to voltage on the circuit.

↓ If less than 1 V

6.3. 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 S48C multifunction switch 1 – instrument panel.

Hazard Warning Switch Backlighting Malfunction

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, disconnect the harness connector at the S48C multifunction switch 1 – instrument panel. It may take up to 2 minutes for all vehicle systems to power down.

2. Test for less than 5 Ω between the ground circuit terminal 5 and ground.

⇒ **If 5 Ω or greater**

2.1. Ignition OFF.

2.2. 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 9 and ground, ignition ON.

4. Verify the test lamp turns ON and OFF when commanding the Hazard Lamps Switch Backlight ON and OFF with a scan tool.

⇒ **If the test lamp is always OFF**

4.1. Ignition OFF, disconnect the X1 harness connector at the K9 body control module.

4.2. 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

4.3. 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**

- 4.1. Ignition OFF, disconnect the X1 harness connector at the K9 body control module, ignition ON.
- 4.2. 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 S48C multifunction switch 1 – instrument panel.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

[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.
- [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
Headlamp Low Beam Relay Control	B258A 02, B258A 04	B258A 02, B258A 04	B258A 01	—
Headlamp High Beam Relay Control	B2580 02, B2580 04	B2580 02, B2580 04	B2580 01	—
Low Beam Headlamp Control – Left (with T4A)	B2575 02	B2575 01, B2575 04	1	—
Low Beam Headlamp Control – Right (with T4A)	B2699 02	B2699 01, B2699 04	1	—
Low Beam Headlamp Control – Left (with T4F)	1	1	1	—
Low Beam Headlamp Control – Right (with T4F)	1	1	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	3	3	—
Turn Signal/Multifunction Switch High Beam Signal	B3650 08	3	3	—
Headlamp Switch Ground	—	1	—	—
Headlamp Ground – Left	—	1	—	—
Headlamp Ground – Right	—	1	—	—
Turn Signal/Multifunction Switch Ground	—	3	—	—
1. Headlamps Malfunction – Low Beam 2. Headlamps Malfunction – High Beam 3. Turn Signal/Multifunction Switch Malfunction				

Circuit/System Description

Low Beam Headlamps – with T4A

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 low beam headlamp control circuits illuminating the low beam headlamps.

Low Beam Headlamps – with T4F

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 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 low beam request by applying ground to the low beam relay control circuit which energizes the low beam relay. With the low beam relay energized, the switch contacts close allowing battery voltage to flow through the low beam fuses to the low beam control circuits illuminating the low beam headlamps.

High Beam Headlamps – with T4A and T4F without F19

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 left and right high beam fuses to the high beam control circuits illuminating the high beam headlamps.

High Beam Headlamps – with T4F/F19

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 left and right high beam fuses 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.

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](#)

Connector End View Reference

[Component Connector End Views](#)

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 Headlamps On Switch parameter changes between Active and Inactive while commanding the headlamp 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 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**
4. 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**

5. 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**
6. Verify the left low beam/daytime running lamp turn ON and OFF when commanding the Left Low Beam/Daytime Running Lamp ON and OFF with a scan tool.
 - ⇒ **If the left low beam/daytime running lamp does not turn ON and OFF**
Refer to Headlamps Malfunction – Low Beam.
 - ↓ **If the left low beam/daytime running lamp turns ON and OFF**
7. Verify the right low beam/daytime running lamp turn ON and OFF when commanding the Right Low Beam/Daytime Running Lamp ON and OFF with a scan tool.
 - ⇒ **If the right low beam/daytime running lamp does not turn ON and OFF**
Refer to Headlamps Malfunction – Low Beam.
 - ↓ **If the right low beam/daytime running lamp turns ON and OFF**
8. 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**
9. 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**
10. All OK.

Circuit/System Testing

Headlamp 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 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 6 and ground.

⇒ **If 15 Ω or greater**

2.1. Ignition OFF.

2.2. 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**

4.1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.

4.2. 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.

6. Verify the scan tool Automatic Headlamps Disable Switch parameter is Active.

⇒ **If not Active**

6.1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.

6.2. 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

6.3. 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**

7.1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.

7.2. 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**

8. Install a 3 A fused jumper wire between the signal circuit terminal 3 and ground.

9. Verify the scan tool Park Lamps Switch parameter is Active.

⇒ **If not Active**

9.1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.

9.2. 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

9.3. 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**

10.1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.

10.2. Test for infinite resistance between the signal circuit terminal 4 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 4 and ground.

12. Verify the scan tool Headlamps On Switch parameter is Active.

⇒ **If not Active**

12.1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.

12.2. Test for less than 1 V between the signal circuit terminal 4 and ground.

⇒ If 1 V or greater, repair the short to voltage on the circuit.

↓ If less than 1 V

12.3. Test for less than 2 Ω in the signal circuit end to end.

⇒ If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.

⇒ If less than $2\ \Omega$, 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 $15\ \Omega$ between the ground circuit terminal 3 and ground.

⇒ **If $15\ \Omega$ or greater**

2.1. Ignition OFF.

2.2. Test for less than $2\ \Omega$ in the ground circuit end to end.

⇒ If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.

⇒ If less than $2\ \Omega$, repair the open/high resistance in the ground connection.

↓ **If less than $15\ \Omega$**

3. Ignition ON.

4. Verify the scan tool High Beam Select Switch parameter is Inactive.

⇒ **If not Inactive**

4.1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module.

4.2. 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 Inactive**

5. Install a 3 A fused jumper wire between the signal circuit terminal 2 and ground.

6. Verify the scan tool High Beam Select Switch parameter is Active.

⇒ **If not Active**

6.1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module, ignition ON.

6.2. 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

6.3. 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**

7.1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module.

7.2. Test for infinite resistance between the signal circuit terminal 4 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 4 and ground.

9. Verify the scan tool Headlamps Flash Switch parameter is Active.

⇒ **If not Active**

9.1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module, ignition ON.

9.2. Test for less than 1 V between the signal circuit terminal 4 and ground.

⇒ If 1 V or greater, repair the short to voltage on the circuit.

↓ If less than 1 V

9.3. 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 (with T4A)

1. Ignition OFF, exterior lamps OFF, disconnect the harness connector at the appropriate E4G Headlamp – Low Beam.

2. Test for less than 15 Ω between the ground circuit terminal B and ground.

⇒ **If 15 Ω or greater**

2.1. Ignition OFF.

2.2. Test for less than $2\ \Omega$ in the ground circuit end to end.

⇒ If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.

⇒ If less than $2\ \Omega$, repair the open/high resistance in the ground connection.

↓ **If less than $15\ \Omega$**

3. Connect a test lamp between the control circuit terminal A and ground, ignition ON.

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.

⇒ **If the test lamp is always OFF**

4.1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.

4.2. 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

4.3. Test for less than $2\ \Omega$ in the control circuit end to end.

⇒ If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.

⇒ If less than $2\ \Omega$, replace the K9 Body Control Module.

⇒ **If the test lamp is always ON**

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

4.2. 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 E4G Headlamp – Low Beam.

Headlamps Malfunction – Low Beam (with T4F)

1. Ignition OFF, disconnect the KR49 Headlamp Low Beam Relay, ignition ON

2. 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**

3. 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**

4. 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 Low Beams ON and OFF with a scan tool.

⇒ **If the test lamp is always OFF**

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

5.2. 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

5.3. Ignition OFF.

5.4. 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**

5.1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module.

5.2. 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.

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

6. Ignition OFF, exterior lamps OFF, connect the KR49 Headlamp Low Beam Relay.

7. Disconnect the harness connector at the appropriate E13 Headlamp – Assembly.

8. Test for less than 15 Ω between the ground circuit terminal 2 and ground.

⇒ **If 15 Ω or greater**

8.1. Ignition OFF.

8.2. 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 control circuit terminal 7 and ground, ignition ON.
10. Verify the test lamp turns ON and OFF when commanding the Low Beams ON and OFF with a scan tool.

⇒ **If the test lamp is always OFF**

10.1. Ignition OFF, disconnect the X5 harness connector at the X50A Fuse Block – Underhood.

10.2. 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

10.3. 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 KR49 Headlamp Low Beam Relay.

⇒ **If the test lamp is always ON**

10.1. Ignition OFF, disconnect the X5 harness connector at the X50A Fuse Block – Underhood, ignition ON.

10.2. 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 KR49 Headlamp Low Beam Relay.

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

11. Ignition OFF, replace the appropriate T7 Headlamp Ballast.
12. Ignition ON, verify the appropriate low beam headlamp illuminates when commanded ON with the headlamp switch.

⇒ **If the low beam headlamp does not illuminate**

12.1. Replace the E4 Headlamp – Low Beam bulb.

↓ **If the low beam headlamp illuminates**

13. All OK.

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**

2.1. Ignition OFF, disconnect the X2 harness connector at the X50A Fuse Block – Underhood.

2.2. 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

2.3. Test for less than $2\ \Omega$ in the control circuit end to end.

⇒ If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.

⇒ If less than $2\ \Omega$, 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 (F65UA) at the X50A Fuse Block – Underhood, ignition ON.

5. Verify a test lamp illuminates between the high beam fuse (F65UA) B+ switch control terminal and ground.

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

5.1. Ignition OFF, disconnect the X2 harness connector at the X50A Fuse Block – Underhood, ignition ON.

5.2. 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 (F65UA) at the X50A Fuse Block – Underhood.

8. Ignition OFF, exterior lamps OFF, disconnect the harness connector at the appropriate component listed below.

- E4E Headlamp – Left High Beam
- E4F Headlamp – Right High Beam
- M28L High Beam Solenoid Actuator – Left
- M28R High Beam Solenoid Actuator – Right

9. Test for less than $15\ \Omega$ between the appropriate ground circuit terminal listed below and ground.

- E4E Headlamp – Left High Beam terminal B
- E4F Headlamp – Right High Beam terminal B
- M28L High Beam Solenoid Actuator – Left terminal 3
- M28R High Beam Solenoid Actuator – Right terminal 3

⇒ **If $15\ \Omega$ or greater**

9.1. Ignition OFF.

9.2. Test for less than $2\ \Omega$ in the ground circuit end to end.

⇒ If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.

⇒ If less than $2\ \Omega$, repair the open/high resistance in the ground connection.

↓ **If less than $15\ \Omega$**

10. Connect a test lamp between the appropriate control circuit terminal listed below and ground, ignition ON, low beams ON.

- E4E Headlamp – Left High Beam terminal 1
- E4F Headlamp – Right High Beam terminal 1
- M28L High Beam Solenoid Actuator – Left terminal 1
- M28R High Beam Solenoid Actuator – Right terminal 1

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**

11.1. Ignition OFF, disconnect the appropriate harness connector listed below at the X50A Fuse Block – Underhood.

- X2 – with T4A
- X5 – with T4F

11.2. 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

11.3. Test for less than $2\ \Omega$ in the control circuit end to end.

⇒ If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.

⇒ If less than $2\ \Omega$, replace the K9 Body Control Module.

⇒ **If the test lamp is always ON**

11.1. Ignition OFF, disconnect the appropriate harness connector listed below at the X50A Fuse Block – Underhood, ignition ON.

- X2 – with T4A
- X5 – with T4F

11.2. 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 E4 Headlamp High Beam or M28 High Beam Solenoid Actuator.

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 Ballast Replacement](#)
- [Relay Replacement](#)
- [Turn Signal Switch Replacement](#)
- [Headlamp Replacement](#)
- [High Beam Headlamp Bulb Replacement](#)
- [Low Beam Headlamp Bulb Replacement](#)
- [Body Front Wiring Harness Fuse Block Replacement](#)
- [Control Module References](#) for BCM or Instrument Cluster replacement, programming, and setup

Headlamp Leveling 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
LIN Serial Data – Left Headlamp Leveling Actuator	B3440 03, U1511 00, U1521 00, U1531 00	B3440 03, U1511 00, U1521 00, U1531 00	B3440 03, U1511 00, U1521 00, U1531 00	—
LIN Serial Data – Right Headlamp Leveling Actuator	B3435 00, U1512 00, U1522 00, U1532 00	B3435 00, U1512 00, U1522 00, U1532 00	B3435 00, U1512 00, U1522 00, U1532 00	—
Headlamp Control Module B+	1	1	—	—
Headlamp Leveling Actuator – Left B+ (F53 UA)	B3435 03	B3435 03	B3435 00	—
Headlamp Leveling Actuator – Right B+ (F53 UA)	B3440 03	B3440 03	B3440 00	—
Suspension Position Sensor 5V Reference – Left Front	B3415 02	1	B3415 01	—
Suspension Position Sensor 5V Reference – Left Rear	B3415 02	1	B3415 01	—

Suspension Position Sensor Signal – Left Front	B3410 06	B3410 06	B3410 01	B3410 08
Suspension Position Sensor Signal – Left Rear	B3420 06	B3420 06	B3420 01	B3420 08
Suspension Position Sensor Low Reference – Left Front	—	1	—	—
Suspension Position Sensor Low Reference – Left Rear	—	1	—	—
Headlamp Control Module Ground	—	1	—	—
Headlamp Leveling Actuator – Left Ground	—	B3435 03	—	—
Headlamp Leveling Actuator – Right Ground	—	B3440 03	—	—
1. Headlamp Leveling Malfunction				

Circuit/System Description

Each headlamp assembly contains a headlamp leveling actuator that is controlled by the headlamp leveling control module. The front and rear suspension position sensors provide the headlamp leveling control with suspension position information. Each sensor receives a 5 V reference, signal, and low reference circuits from the headlamp leveling control module. The sensors are connected to the control arms of the front and rear suspension. As the vehicle travels, the suspension compresses and rebounds moving the suspension position sensor arms. This causes the signal output of the sensor to change. The headlamp leveling control module compares the information from both suspension position sensors and adjusts the headlamp leveling as needed. The headlamp leveling control module communicates with the left and right headlamp leveling actuators via the LIN serial data circuit.

Reference Information

Schematic Reference

[Headlights/Daytime Running Lights \(DRL\) Schematics](#)

Connector End View Reference

[Component Connector End Views](#)

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 Front Leveling Position Sensor Voltage parameter is between 0.5 and 4.9 V.
⇒ **If the parameter is not between 0.5 and 4.9 V**
Refer to Headlamp Leveling Sensor Malfunction.
↓ **If the parameter is between 0.5 and 4.9 V**
3. Verify the scan tool Rear Leveling Position Sensor Voltage parameter is between 0.5 and 4.9 V.
⇒ **If the parameter is not between 0.5 and 4.9 V**
Refer to Headlamp Leveling Sensor Malfunction.
↓ **If the parameter is between 0.5 and 4.9 V**
4. Verify the left and right headlamps operate to the UP and DOWN positions when commanding the DHL Motor Control UP and DOWN with a scan tool.
⇒ **If the left and right headlamps do not operate UP and DOWN**
Refer to Headlamp Leveling Actuator Malfunction
↓ **If the left and right headlamps operate UP and DOWN**
5. All OK.

[Circuit/System Testing](#)

Headlamp Leveling Actuator Malfunction

1. Ignition OFF, exterior lamps OFF, disconnect the harness connector at the appropriate M29 headlamp leveling actuator.

2. Test for less than 5 Ω between the ground circuit terminal 2 and ground.

⇒ **If 5 Ω or greater**

2.1. Ignition OFF.

2.2. 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 terminal 1 and ground.

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

4.1. Ignition OFF, disconnect the X2 harness connector at the X50A fuse block – underhood.

4.2. 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

4.3. 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**

5. Test or replace the K26 headlamp control module.

6. Ignition ON.

7. Verify the appropriate headlamp operates to the UP and DOWN positions when commanding the DHL Motor Control UP and DOWN with a scan tool.

⇒ If the appropriate headlamp does not operate UP and DOWN, test or replace the appropriate headlamp assembly.

Headlamp Leveling Sensor Malfunction

1. Ignition OFF, disconnect the harness connector at the appropriate B152L suspension position sensor, ignition ON.

2. Verify a test lamp illuminates between the low reference circuit terminal 2 and B+.

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

2.1. Ignition OFF, disconnect the harness connector at the K26 headlamp control module.

- 2.2. Test for less than $2\ \Omega$ in the low reference circuit end to end.
⇒ If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.
⇒ If less than $2\ \Omega$, replace the K26 headlamp 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 1 and ground.

⇒ **If less than 4.8 V**

4.1. Ignition OFF, disconnect the harness connector at the K26 headlamp control module.

4.2. 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

4.3. Test for less than $2\ \Omega$ in the 5 V reference circuit end to end.

⇒ If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.

⇒ If less than $2\ \Omega$, replace the K26 headlamp control module.

⇒ **If greater than 5.2 V**

4.1. Ignition OFF, disconnect the harness connector at the K26 headlamp control module, ignition ON.

4.2. 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 K26 headlamp control module.

↓ **If between 4.8–5.2 V**

5. Verify the appropriate scan tool Leveling Position Sensor parameter is less than 1 V.

⇒ **If 1 V or greater**

5.1. Ignition OFF, disconnect the harness connector at the K26 headlamp control module, ignition ON.

5.2. 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 K26 headlamp control module.

↓ **If less than 1 V**

6. Install a 3 A fused jumper wire between the 5-volt reference circuit terminal 1 and the signal circuit terminal 3.

7. Engine RUNNING, verify the appropriate scan tool Leveling Position Sensor parameter is greater than 4.8 V.

⇒ **If less than 4.8 V**

7.1. Ignition OFF, disconnect the harness connector at the K26 headlamp control module.

7.2. 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

7.3. 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 K26 headlamp control module.

↓ **If 4.8 V or greater**

8. Test or replace the appropriate B152L suspension position sensor.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- [Electronic Suspension Front Position Sensor Replacement](#)
- [Electronic Suspension Rear Position Sensor Replacement - Left Side](#)
- [Electronic Suspension Rear Position Sensor Replacement - Right Side](#)
- [Headlamp Replacement](#)
- [Control Module References](#) for headlamp control module 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 7 X6	B255F 02	B255F 04	1	—
Accent Lamp - Driver Door Handle Ground	—	1	—	—
Accent Lamp - Passenger Door Handle Ground	—	1	—	—
Accent Lamp - Right Rear Door Handle Ground	—	1	—	—
Accent Lamp - Left Rear Door Handle 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](#)

Connector End View Reference

[Component Connector End Views](#)

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, 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 10 Ω between the appropriate ground circuit terminal listed below and ground.
 - E1C Accent Lamp – Driver Door Handle terminal 2
 - E1M Accent Lamp – Passenger Door Handle terminal 2
 - E1E Accent Lamp – Left Rear Door Handle terminal 2
 - E1F Accent Lamp – Right Rear Door Handle terminal 2

⇒ **If 10 Ω or greater**

2.1. Ignition OFF.

2.2. 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.
 - E1C Accent Lamp – Driver Door Handle terminal 1
 - E1M Accent Lamp – Passenger Door Handle terminal 1
 - E1E Accent Lamp – Left Rear Door Handle terminal 1
 - E1F Accent Lamp – Right Rear Door Handle terminal 1
4. 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**
 - 4.1. Ignition OFF, disconnect the X6 harness connector at the K9 Body Control Module.
 - 4.2. 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
 - 4.3. 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**
 - 4.1. Ignition OFF, disconnect the X6 harness connector at the K9 Body Control Module, ignition ON.
 - 4.2. 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.

[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	2	—
LED Backlight Dimming Control Terminal 9 X7	2	2	2	—
Switch Indicator LED Backlight Dimming Control Terminal 5 X1	B2625 02	B2625 04	B2625 01	—
Instrument Panel Dimmer Switch Low Reference	1	1	1	—
Door Lock Switch – Driver	—	2	—	—
Door Lock Switch – Passenger	—	2	—	—
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Dome Lamp Switch Ground	—	2	—	—
Dome/Reading Lamps – Left Front Ground	—	2	—	—
Dome/Reading Lamps – Rear Ground	—	2	—	—
Dome/Reading Lamps – Right Front Ground	—	2	—	—
Garage Door Opener Ground	—	2	—	—
Instrument Panel Dimmer Switch Ground	—	2	—	—
Ignition Mode Switch Ground	—	2	—	—
Multifunction Switch – Instrument Panel Ground	—	2	—	—
Multifunction Switch – Center Console Ground	—	2	—	—
Outside Rearview Mirror Switch Ground	—	2	—	—
Park Brake Control Switch Ground	—	2	—	—
Rear Compartment Lid Unlatch Switch – Interior	—	2	—	—
Seat Memory Switch – Driver	—	2	—	—
Multifunction Switch – Instrument Panel Ground	—	3	—	—
1. Dimmer Switch Malfunction 2. Interior Backlighting Malfunction 3. Switch Indicator LED Backlighting Malfunction				

Circuit/System Description

The instrument panel (I/P) dimmer switch is used to increase and decrease the brightness of the interior backlighting components. The

I/P 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 a B+ circuit to the I/P dimmer switch. When the I/P dimmer switch is placed in the desired position, the dimmed voltage setting is applied from the I/P dimmer switch through the I/P 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 1 and dimming 2 control circuits as well as the switch indicator LED control circuit illuminating the interior backlighting and switch indicator LED's to the requested level of brightness.

Reference Information

Schematic Reference

[Interior Lights Dimming Schematics](#)

Connector End View Reference

[Component Connector End Views](#)

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 indicator LED's for the components listed below turn ON and OFF while commanding the LED Backlight Dimming ON and OFF with a scan tool.
 - S48A Multifunction Switch – Instrument Panel Park Assist
 - S48A Multifunction Switch 2 – Instrument Panel Lane Departure

⇒ **If the switch indicator LED's do not turn ON and OFF**
Refer to Switch Indicator LED Backlighting Malfunction.

↓ **If the switch indicator 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. 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 1 and ground.

⇒ **If less than B+**

 - 2.1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module.
 - 2.2. 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
 - 2.3. 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 does not illuminate between the B+ circuit terminal 1 and the signal circuit terminal 12.

⇒ **If the test lamp illuminates**

 - 3.1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.
 - 3.2. 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**

4. Test for B+ between the B+ circuit terminal 1 and the signal circuit terminal 12.

⇒ **If less than B+**

4.1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.

4.2. Test for less than 1 V between the signal circuit terminal 12 and ground.

⇒ If 1 V or greater, repair the short to voltage on the circuit.

↓ If less than 1 V

4.3. 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+**

5. 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, 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 10 Ω between the ground circuit terminal and ground.

⇒ **If 10 Ω or greater**

2.1. Ignition OFF.

2.2. 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 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**

- 4.1. Ignition OFF, disconnect the appropriate harness connector at the K9 Body Control Module.
- 4.2. 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
- 4.3. Test for less than $2\ \Omega$ in the control circuit end to end.
 - ⇒ If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.
 - ⇒ If less than $2\ \Omega$, replace the K9 Body Control Module.

⇒ **If the test lamp is always ON**

- 4.1. Ignition OFF, disconnect the appropriate harness connector at the K9 Body Control Module, ignition ON.
- 4.2. 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, scan tool disconnected, all doors closed, all accessories OFF, disconnect the 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 $15\ \Omega$ between the appropriate ground circuit terminal listed below and ground.
 - S48A Multifunction Switch – Instrument Panel terminal 4
 - S48A Multifunction Switch – Instrument Panel terminal 6 with UFL

⇒ **If $15\ \Omega$ or greater**

2.1. Ignition OFF.

2.2. Test for less than $2\ \Omega$ in the ground circuit end to end.

⇒ If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.

⇒ If less than $2\ \Omega$, repair the open/high resistance in the ground connection.

↓ **If less than $15\ \Omega$**

3. Connect a test lamp between the control circuit terminal 3 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**

4.1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.

4.2. 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

4.3. Test for less than $2\ \Omega$ in the control circuit end to end.

⇒ If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.

⇒ If less than $2\ \Omega$, replace the K9 Body Control Module.

⇒ **If the test lamp is always ON**

4.1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.

4.2. 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 switch indicator LED backlighting.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- [Dome and Reading Lamp Replacement](#)
- [Headlamp Switch Replacement](#)
- [Sunroof Switch Replacement](#)
- [Steering Wheel Spoke Lower Cover Replacement](#)

- [Ride Control Switch 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
F8DA (BCM 1) Fuse B+	B1325 03, B3265 01, B3265 04, B3873 01, B3873 04, B3883 01, B3883 04, C0297 02	B1325 03, B3265 01, B3265 04, B3873 01, B3873 04, B3883 01, B3883 04, C0297 02	—	—
Turn Signal/Multifunction Switch Park Lamps ON Signal	2	B257A 00	2	—
Park Lamps Control – Left	1	1	1	—
Park Lamps Control – Right	1	1	1	—
License Plate Lamp Control	B3883 02	B3883 01, B3883 04	B3883 01	—
Side Marker Lamps Control - Left	1	1	1	—
Side Marker Lamps Control - Right	1	1	1	—

Rear Tail Lamp Control – Left	B3881 02	1	1	—
Rear Tail Lamp Control – Right	B3882 02	1	1	—
License Plate Lamp Ground - Left	—	B3883 01, B3883 04	—	—
License Plate Lamp Ground - Right	—	B3883 01, B3883 04	—	—
Side Marker Lamp Ground - Left Front	—	1	—	—
Side Marker Lamp Ground - Left Rear	—	1	—	—
Side Marker Lamp Ground - Right Front	—	1	—	—
Side Marker Lamp Ground - Right Rear	—	1	—	—
Tail/Stop Lamps Ground - Left	—	1	—	—
Tail/Stop Lamps Ground - Right	—	1	—	—
Turn Signal/Multifunction Switch Ground	—	2	—	—
1. Park, License, and/or Tail Lamps Malfunction 2. Turn Signal/Multifunction 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.

Reference Information

Schematic Reference

- [Exterior Lights Schematics](#)
- [Body Control System Schematics](#)

Connector End View Reference

[Component Connector End Views](#)

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 Park Lamp Switch parameter changes between Active and Inactive while commanding the park lamps 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**
3. Verify the left park lamps turn ON and OFF when commanding the Left Park Lamps ON and OFF with a scan tool.
⇒ **If the left park lamps do not turn ON and OFF**
Refer to Park Lamps Malfunction.
⇓ **If the left park lamps turn ON and OFF**
4. Verify the right park lamps turn ON and OFF when commanding the Right Park Lamps ON and OFF with a scan tool.
⇒ **If the right park lamps do not turn ON and OFF**

Refer to Park Lamps Malfunction.

↓ **If the right park lamps turn ON and OFF**

5. 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**

6. All OK.

Circuit/System Testing

Turn Signal/Multifunction Switch Malfunction

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, disconnect the harness connector at the S78 Turn Signal/Multifunction Switch. It may take up to 2 minutes for all vehicle systems to power down.

2. Test for less than 10 Ω between the ground circuit terminal 6 and ground.

⇒ **If 10 Ω or greater**

2.1. Ignition OFF.

2.2. 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. Ignition ON.

4. Verify the scan tool Park Lamps Switch parameter is Inactive.

⇒ **If not Inactive**

4.1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.

4.2. Test for infinite resistance between the signal circuit terminal 7 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 7 and the ground circuit terminal 6.

6. Verify the scan tool Park Lamps Switch parameter is Active.

⇒ **If not Active**

6.1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.

6.2. Test for less than 1 V between the signal circuit terminal 7 and ground.

⇒ If 1 V or greater, repair the short to voltage on the circuit.

↓ If less than 1 V

6.3. 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.

Park Lamps Malfunction

1. Ignition OFF, exterior lamps OFF, trunk latch latched, disconnect the harness connector at the appropriate park lamp.

2. Test for less than 5 Ω between the appropriate ground circuit terminal listed below and ground.

- E2LF Side Marker Lamp – Left Front socket terminal
- E2LR Side Marker Lamp – Left Rear terminal 1
- E4AC Park/Daytime Running Lamp – Left Front terminal C
- E4J Park Lamp – Left Front terminal 7
- E4N Park/Turn Signal Lamp – Left socket terminal
- E5E Tail Lamp – Left terminal 2
- E5S Tail/Stop and Turn Signal Lamp – Left terminal G
- E2RF Side Marker Lamp – Right Front socket terminal
- E2RR Side Marker Lamp – Right Rear terminal 1
- E4AD Park/Daytime Running Lamp – Right Front terminal C
- E4K Park Lamp – Right Front terminal 7
- E4P Park/Turn Signal Lamp – Right socket terminal
- E5F Tail Lamp – Right terminal 2
- E5T Tail/Stop and Turn Signal Lamp – Right terminal G

⇒ **If 5 Ω or greater**

2.1. Ignition OFF.

2.2. Test for less than $2\ \Omega$ in the ground circuit end to end.

⇒ If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.

⇒ If less than $2\ \Omega$, repair the open/high resistance in the ground connection.

↓ **If less than $5\ \Omega$**

3. Connect a test lamp between the appropriate control circuit terminal listed below and ground, ignition ON.

- E2LF Side Marker Lamp – Left Front socket terminal
- E2LR Side Marker Lamp – Left Rear terminal 1
- E4AC Park/Daytime Running Lamp – Left Front terminal B
- E4J Park Lamp – Left Front terminal 5/3
- E4N Park/Turn Signal Lamp – Left socket terminal
- E5E Tail Lamp – Left terminal 1
- E5S Tail/Stop and Turn Signal Lamp – Left terminal B
- E2RF Side Marker Lamp – Right Front socket terminal
- E2RR Side Marker Lamp – Right Rear terminal 2
- E4AD Park/Daytime Running Lamp – Right Front terminal B
- E4K Park Lamp – Right Front terminal 3/5
- E4P Park/Turn Signal Lamp – Right socket terminal
- E5F Tail Lamp – Right terminal 1
- E5T Tail/Stop and Turn Signal Lamp – Right terminal B

4. Verify the test lamp turns ON and OFF when commanding the appropriate Park Lamps ON and OFF with a scan tool.

⇒ **If the test lamp is always OFF**

4.1. Ignition OFF, disconnect the appropriate harness connector listed below at the K9 Body Control Module.

- X4 – Left Marker/Tail Lamps
- X7 – Right Marker/Tail Lamps

4.2. 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

4.3. Test for less than $2\ \Omega$ 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**

4.1. Ignition OFF, disconnect the appropriate harness connector listed below at the K9 Body Control Module.

- X4 – Left Marker/Tail Lamps
- X7 – Right Marker/Tail Lamps

4.2. 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 park lamp.

License Plate Lamps Malfunction

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

2. Test for less than 5 Ω between the ground circuit terminal 2 and ground.

⇒ **If 5 Ω or greater**

2.1. Ignition OFF.

2.2. 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 E7L License Plate Lamp – Left control circuit terminal 1 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**

4.1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.

4.2. 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

4.3. Test for less than 2 Ω in the control circuit end to end.

⇒ If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.

⇒ If less than $2\ \Omega$, replace the K9 Body Control Module.

⇒ **If the test lamp is always ON**

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

4.2. 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. Connect a test lamp between the E7R License Plate Lamp – Right control circuit terminal 1 and ground, ignition ON.

6. 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**

6.1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.

6.2. 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

6.3. Test for less than $2\ \Omega$ in the control circuit end to end.

⇒ If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.

⇒ If less than $2\ \Omega$, replace the K9 Body Control Module.

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

7. Test or replace the appropriate E7 License Plate Lamp.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- [Front Position Lamp Bulb Replacement](#)
- [Daytime Running Lamp Replacement](#)
- [Turn Signal Switch Replacement](#)
- [Rear License Plate Lamp Replacement](#)
- [Tail Lamp Replacement](#)
- [Stop and Tail Lamp Bulb Replacement](#)

- [Control Module References](#) for BCM replacement, programming, and setup

Rear Compartment Lamp 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
F9DA (BCM 4) Fuse B+	1	1	—	—
Rear Compartment Courtesy Lamp Control	B2570 02	B2570 04	B2570 04	—
Rear Compartment Courtesy Lamp Ground	—	1	—	—
1. Rear Compartment Lamp Malfunction				

[Circuit/System Description](#)

The body control module (BCM) applies battery voltage to the rear compartment courtesy lamp through the rear compartment lamp control circuit. When the BCM receives a rear compartment lid open input from the rear compartment lid latch, the BCM applies battery voltage to the rear compartment lamp control circuit illuminating the rear compartment courtesy lamp. In the event that the rear compartment lamp were to remain illuminated for more than 10 min with the ignition switch in the OFF position and no doors opened, the BCM will deactivate the rear compartment lamp control circuit to prevent total battery discharge.

[Reference Information](#)

Schematic Reference

[Interior Lights Schematics](#)

Connector End View Reference

[Component Connector End Views](#)

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, exterior lamps OFF, disconnect the harness connector at the E8S Rear Compartment Courtesy Lamp. 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 2 and ground.
⇒ **If 15 Ω or greater**
 - 2.1. Ignition OFF.
 - 2.2. 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, ignition ON.
4. Verify the test lamp turns ON and OFF when commanding the Trunk Lamp ON and OFF with a scan tool.
⇒ **If the test lamp is always OFF**
 - 4.1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module.
 - 4.2. 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

4.3. Test for less than $2\ \Omega$ in the control circuit end to end.

⇒ If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.

⇒ If less than $2\ \Omega$, replace the K9 Body Control Module.

⇒ **If the test lamp is always ON**

4.1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module, ignition ON.

4.2. 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 E8S Rear Compartment Courtesy Lamp.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

[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
BCM 1 Fuse B+	C0890 03, B101E 43, B1405 03, B1529 03, U0121 00	C0890 03, B101E 43, B1405 03, B1529 03, U0121 00	—	—
Brake Pedal Position Sensor 5 V Reference	C0277 06, C0890 03, U0140 71	C0277 06, U0140 71	C0277 07, C0890 07, U0140 71	—
Brake Pedal Position Sensor Signal	C0277 06, U0140 71	C0277 06, U0140 71	C0277 07, C0890 07, U0140 71	C0277 09
Center High Mounted Stop Lamp Control	2	2	2	—
Stop Lamp Control – Left	1	1	1	—
Stop Lamp Control – Right	1	1	1	—
Brake Pedal Position Sensor Low Reference	—	C0277 07, U0140 71	1	—

Center High Mounted Stop Lamp Ground	—	2	—	—
Stop Lamp Ground – Left	—	1	—	—
Stop Lamp Ground – Right	—	1	—	—
1. Stop Lamps Malfunction 2. Center High Mounted Stop Lamp Malfunction				

Circuit/System Description

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

Reference Information

Schematic Reference

[Exterior Lights Schematics](#)

Connector End View Reference

[Component Connector End Views](#)

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 left brake lamp turns ON and OFF when commanding the Left Brake 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**
4. Verify the right brake lamp turns ON and OFF when commanding the Right Brake 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**
5. Verify the center high mounted stop lamp 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 Center High Mount Stop Lamp Malfunction.
 - ⇓ **If the center high mounted stop turns ON and OFF**
6. 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**
 - 2.1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.

2.2. 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 E5 Tail/Stop and Turn Signal Lamp.

2. Test for less than 10 Ω between the ground circuit at the socket terminal and ground.

⇒ **If 10 Ω or greater**

2.1. Ignition OFF.

2.2. 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 control circuit at the socket terminal and ground, ignition ON.

4. Verify the test lamp turns ON and OFF when commanding the appropriate Brake Lamp ON and OFF with a scan tool.

⇒ **If the test lamp is always OFF**

4.1. Ignition OFF, disconnect the appropriate harness connector listed below at the K9 Body Control Module.

- X4 left stop lamp
- X5 right stop lamp

4.2. 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

4.3. 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**

4.1. Ignition OFF, disconnect the appropriate harness connector listed below at the K9 Body Control Module.

- X4 left stop lamp
- X5 right stop lamp

4.2. 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 E5 Tail/Stop and Turn Signal Lamp.

Center High Mount Stop Lamp Malfunction

1. Ignition OFF, exterior lamps OFF, trunk latch latched, disconnect the harness connector at the E6 Center High Mounted Stop Lamp.

2. Test for less than 10 Ω between the ground circuit terminal B and ground.

⇒ **If 10 Ω or greater**

2.1. Ignition OFF.

2.2. 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 control circuit terminal A and ground, ignition ON.

4. Verify the test lamp turns ON and OFF when commanding the Center Brake Lamp ON and OFF with a scan tool.

⇒ **If the test lamp is always OFF**

4.1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.

4.2. 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

4.3. 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**

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

4.2. 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 E6 Center High Mounted Stop Lamp.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- [High Mount Stop Lamp Replacement](#)
- [Brake Pedal Position Sensor Replacement](#)
- [Brake Pedal Position Sensor Calibration](#)
- [Tail Lamp Replacement](#)
- [Tail Lamp Bulb Replacement](#)
- [Control Module References](#) for BCM replacement, programming, and setup

Turn Signal Lamps and/or Indicators 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
F2DA (BCM 7) Fuse B+	1	1	—	—
F9DA (BCM 4) Fuse B+	1	1	—	—
F23DA (BCM 3) Fuse B+	1	1	—	—
F32UA (BCM 6) Fuse B+	U0152D 00	U0152D 00	—	—
Turn Signal Switch Signal – Left	2	2	2	—
Turn Signal Switch Signal – Right	2	2	2	—
Turn Signal Control – Left Front	B3948 02	B3948 01, B3948 04	1	—
Turn Signal Control – Left Rear	B3950 02	B3950 01, B3950 04	1	—
Turn Signal Control – Right Front	B3949 02	B3949 01, B3949 04	1	—

Turn Signal Control – Right Rear	B3951 02	B3951 01, B3951 04	1	—
Outside Rearview Mirror – Driver Ground	—	1	—	—
Outside Rearview Mirror – Passenger Ground	—	1	—	—
Turn Signal Lamp Ground – Left Front	—	B3948 01, B3948 04	—	—
Turn Signal Lamp Ground – Right Front	—	B3949 01, B3949 04	—	—
Turn Signal Lamp Ground – Left Rear	—	B3950 01, B3950 04	—	—
Turn Signal Lamp Ground – Right Rear	—	B3951 01, 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 panel cluster (IPC) requesting the respective turn signal indicator be pulsed ON and OFF.

Reference Information

Schematic Reference

[Exterior Lights Schematics](#)

Connector End View Reference

[Component Connector End Views](#)

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 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 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 indicators do not turn ON and OFF**

Refer to Turn Signal Indicators Malfunction.

↓ **If the left and right turn signal indicators 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, disconnect the harness connector at the S78 Turn Signal/Multifunction 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 6 and ground.

⇒ **If 15 Ω or greater**

2.1. Ignition OFF.

2.2. 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**

4.1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module.

4.2. 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 the ground circuit terminal 6.

6. Verify the scan tool Left Turn Signal Switch parameter is Active.

⇒ **If not Active**

6.1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module, ignition ON.

6.2. 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

6.3. 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**

7.1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module.

7.2. Test for infinite resistance between the signal circuit terminal 4 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 4 and the ground circuit terminal 6.

9. Verify the scan tool Right Turn Signal Switch parameter is Active.

⇒ **If not Active**

9.1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module, ignition ON.

9.2. Test for less than 1 V between the signal circuit terminal 4 and ground.

⇒ If 1 V or greater, repair the short to voltage on the circuit.

↓ If less than 1 V

9.3. 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 2 and ground.

⇒ **If the test lamp does not illuminate and the circuit fuse is good**

2.1. Ignition OFF, remove the F9DA fuse from the X51A Fuse Block – Instrument Panel.

2.2. 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**

2.1. Ignition OFF, remove the F9DA fuse from the X51A Fuse Block – Instrument Panel.

2.2. 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. 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**

3.1. Ignition OFF, remove the F23DA fuse from the X51A Fuse Block – Instrument Panel.

3.2. 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**

3.1. Ignition OFF, remove the F23DA fuse from the X51A Fuse Block – Instrument Panel.

3.2. 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**

6.1. Ignition OFF, remove the F2DA fuse from the X51A Fuse Block – Instrument Panel.

6.2. Test for less than $2\ \Omega$ in the B+ circuit end to end.

⇒ If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.

⇒ If less than $2\ \Omega$, 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**

6.1. Ignition OFF, remove the F2DA fuse from the X51A Fuse Block – Instrument Panel.

6.2. 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**

7.1. Ignition OFF, disconnect the X1 harness connector at the X50A Fuse Block – Underhood.

7.2. Test for less than $2\ \Omega$ in the B+ circuit end to end.

⇒ If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.

⇒ If less than $2\ \Omega$, 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**

7.1. Ignition OFF, disconnect the X1 harness connector at the X50A Fuse Block – Underhood.

7.2. 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 harness connector at the appropriate turn signal lamp.

10. Test for less than 10 Ω between the appropriate ground circuit terminal listed below and ground.

- A9A Outside Rearview Mirror – Driver terminal 5
- A9B Outside Rearview Mirror – Passenger terminal 5
- E4LF Turn Signal Lamp – Left Front terminal B
- E4N Park/Turn Signal Lamp – Left terminal 7/8
- E4P Park/Turn Signal Lamp – Right terminal 7/8
- E4RF Turn Signal Lamp – Right Front terminal B
- E5S Tail/Stop and Turn Signal Lamp – Left terminal G
- E5T Tail/Stop and Turn Signal Lamp – Right terminal G

⇒ **If 10 Ω or greater**

10.1. Ignition OFF.

10.2. 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**

11. Connect a test lamp between the appropriate control circuit terminal listed below and ground.

- A9A Outside Rearview Mirror – Driver terminal 13
- A9B Outside Rearview Mirror – Passenger terminal 13
- E4LF Turn Signal Lamp – Left Front terminal A
- E4N Park/Turn Signal Lamp – Left terminal 2
- E4P Park/Turn Signal Lamp – Right terminal 2
- E4RF Turn Signal Lamp – Right Front terminal A
- E5S Tail/Stop and Turn Signal Lamp – Left terminal A
- E5T Tail/Stop and Turn Signal Lamp – Right terminal A

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**

12.1. Ignition OFF, disconnect the appropriate harness connector listed below at the K9 Body Control Module.

- X5 left turn signals
- X4 right turn signals

12.2. 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

12.3. 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**

12.1. 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

12.2. 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 indicators are always OFF or remain ON**

Replace the P16 Instrument Cluster.

↓ **If the left and right turn signal indicators turn ON and OFF**

3. Replace the K9 Body Control Module.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- [Auxiliary Side Front Turn Signal Lamp Bulb Replacement](#)
- [Rear Turn Signal Lamp Bulb Replacement](#)
- [Turn Signal Switch Replacement](#)
- [Turn Signal Bulb Replacement](#)
- [Front Side Turn Signal Lamp Replacement](#)
- [Front Turn Signal Lamp Bulb Replacement](#)
- [Control Module References](#) for BCM or Instrument Cluster replacement, programming, and setup

Brake Pedal Position Sensor Calibration

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.
9. Select the Brake Pedal Position Sensor Learn procedure and follow the directions displayed on the screen.

Brake Pedal Position Sensor Replacement

Removal Procedure

1. Remove the right side instrument panel lower trim panel insulator. Refer to [Instrument Panel Lower Trim Panel Insulator Replacement - Right Side](#).
2. Disconnect the brake pedal position sensor electrical connector.



3. Remove the brake pedal position sensor bolt (1).



4. Remove the brake pedal position sensor (1).

[Installation Procedure](#)



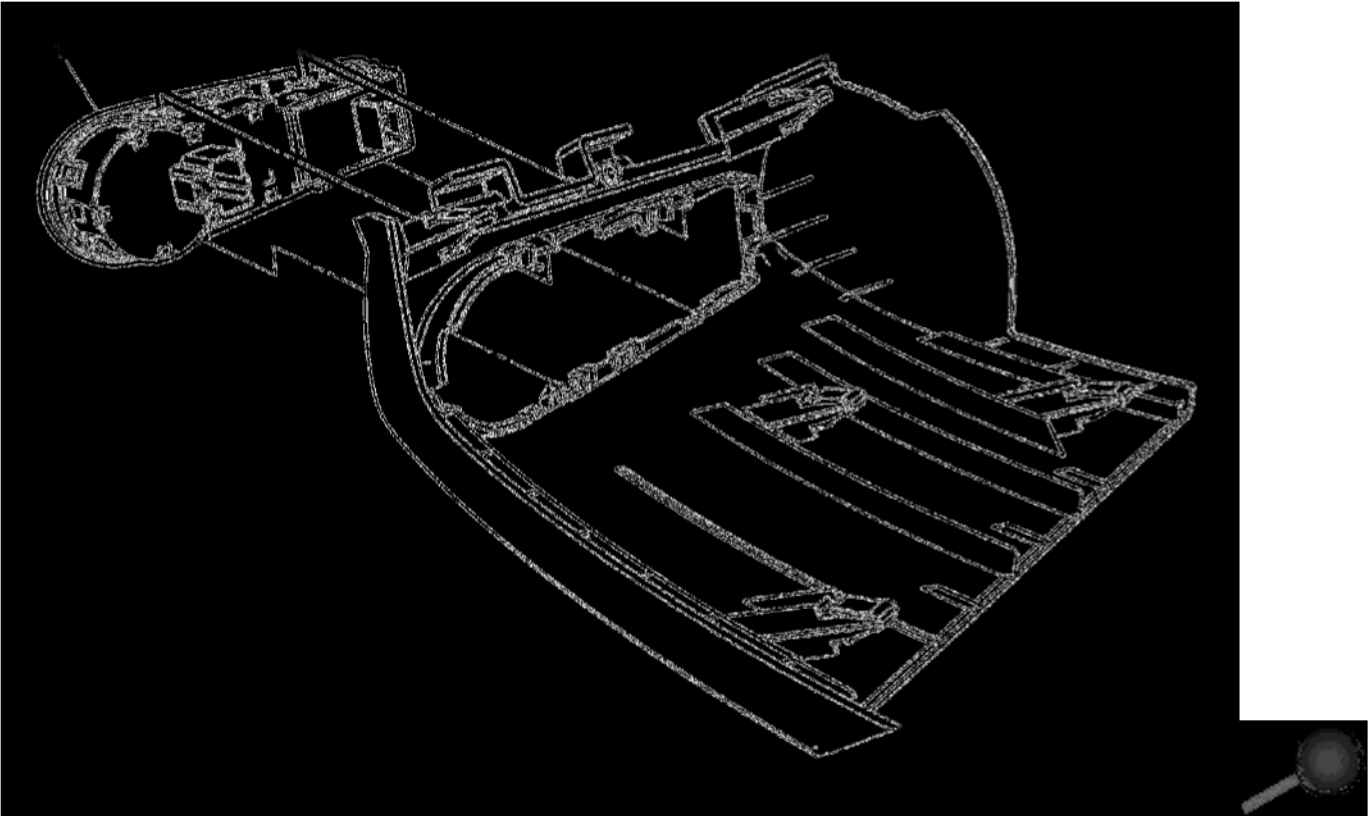
1. Align the locating pin on the brake pedal position sensor with the brake pedal bracket and install the brake pedal position sensor (1).
2. Ensure the fork of the brake pedal position sensor arm is aligned with the pin on the brake pedal arm.



Caution: Refer to [Fastener Caution](#).

3. Install the brake pedal position sensor bolt (1) and tighten to **3 N•m (27 lb in)**.
4. Connect the brake pedal position sensor electrical connector.
5. Calibrate the brake pedal position sensor. Refer to [Brake Pedal Position Sensor Calibration](#).
6. Install the right side instrument panel lower trim panel insulator. Refer to [Instrument Panel Lower Trim Panel Insulator Replacement - Right Side](#).

Headlamp Switch Replacement

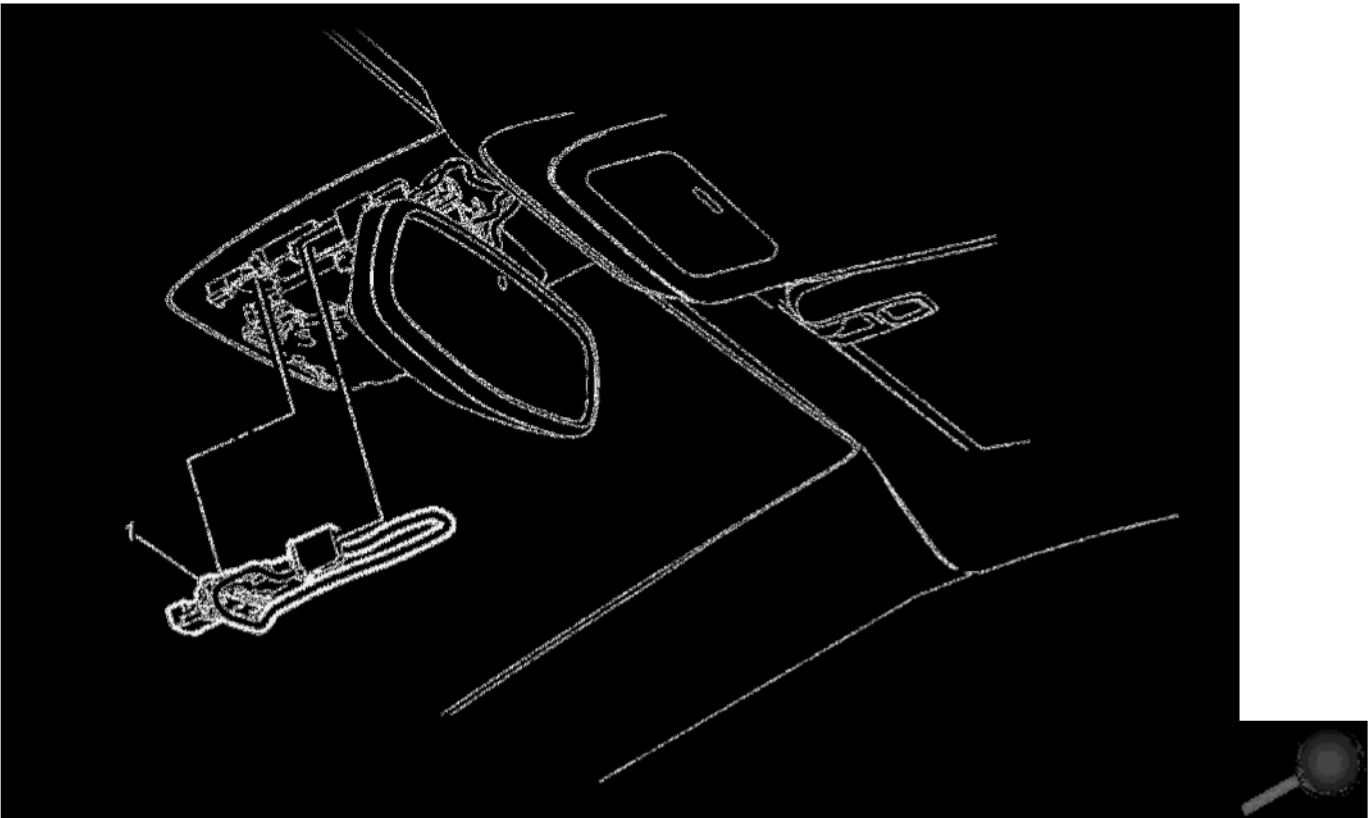


Headlamp Switch Replacement

Callout	Component Name
Preliminary Procedure Remove the instrument panel lower trim panel. Refer to Instrument Panel Lower Trim Panel Replacement .	
1	Headlamp Switch Procedure

Depress tabs to remove the switch assembly from the instrument panel trim.

Windshield Outside Moisture and Headlamp Automatic Control Ambient Light Sensor Replacement

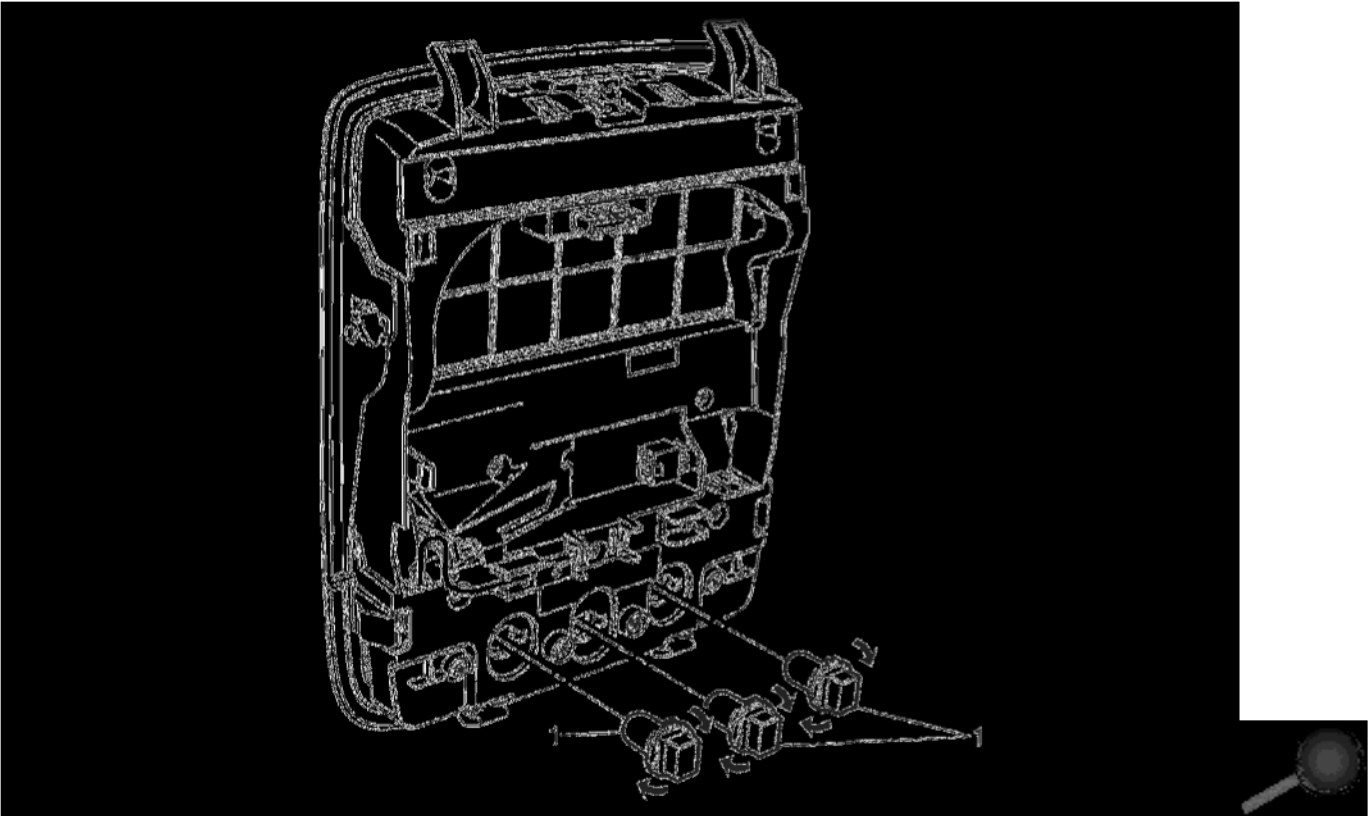


Windshield Outside Moisture and Headlamp Automatic Control Ambient Light Sensor Replacement

Callout	Component Name
Preliminary Procedures	
1. Remove the windshield multifunction sensor mount bracket cover. Refer to Windshield Multifunction Sensor Mount Bracket Cover Replacement .	

1	Windshield Outside Moisture and Headlamp Automatic Control Ambient Light Sensor Procedures 1. Unlatch the sensor from the inside rear view mirror support bracket. 2. Disconnect the electrical connection.
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Reading Lamp Bulb Replacement

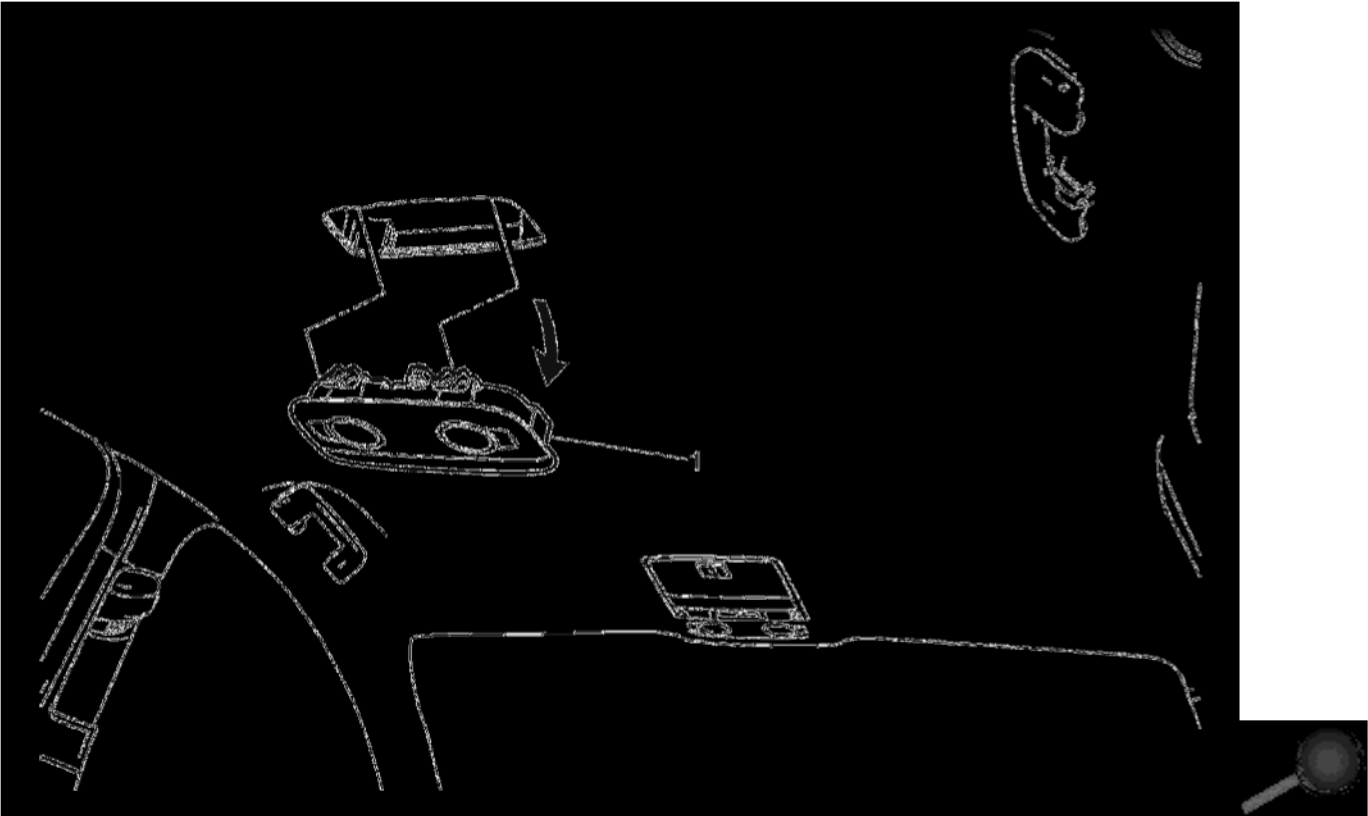


Reading Lamp Bulb Replacement

Callout	Component Name
Preliminary Procedure Remove the roof console. Refer to Roof Console Replacement .	
1	Reading Lamp Bulb (Qty: 3) Procedure

Turn the bulb counter clockwise to remove from the roof console assembly.

Dome and Reading Lamp Replacement



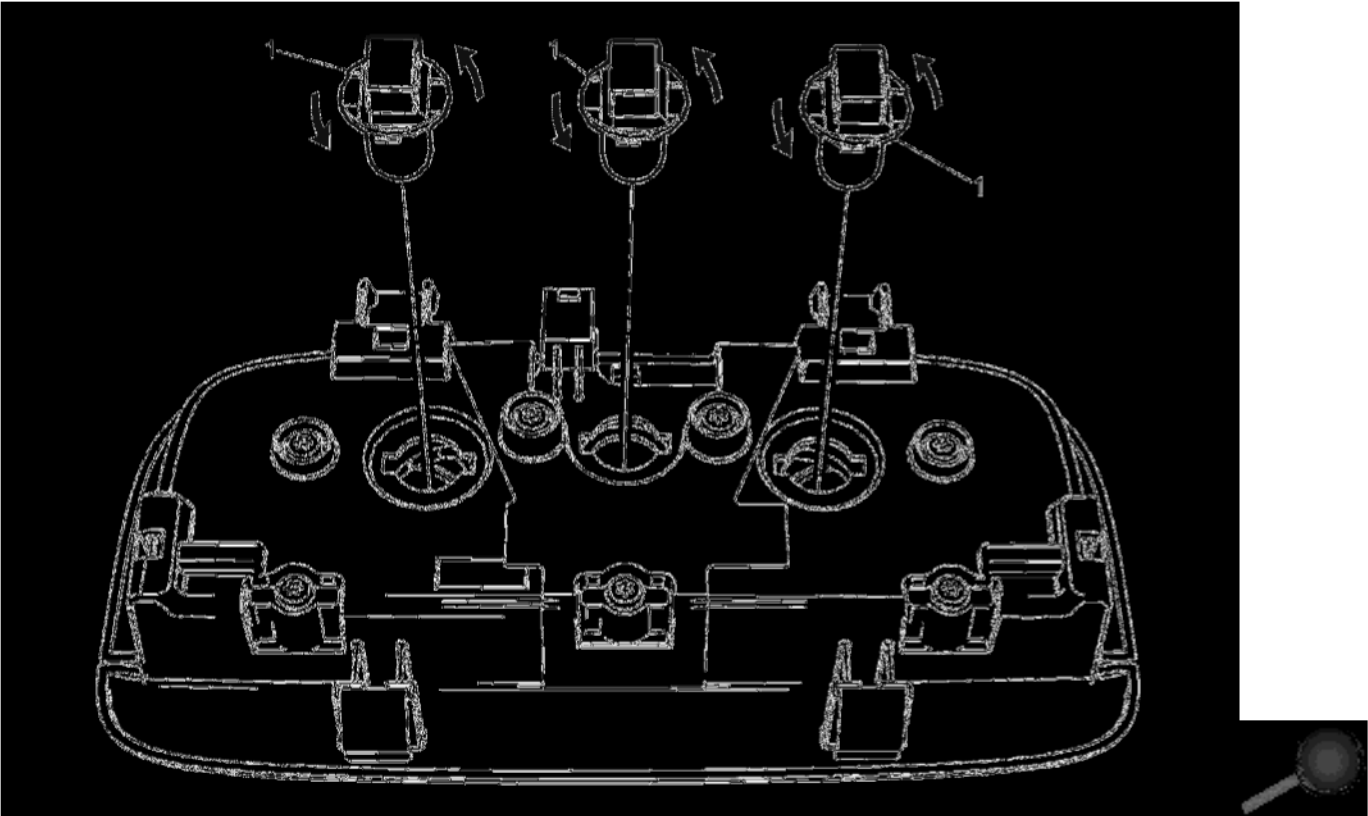
Dome and Reading Lamp Replacement

Callout	Component Name
1	Dome and Reading Lamp Procedure © 2014 General Motors. All rights reserved. Grasp the front of the right and left sides of the dome and reading lamp assembly and pull downward using equal force on each side in order to release the two retainer clips securing the lamp assembly to the headlining

assembly. Pivot the assembly rearwards to release the rear two retainer clips.

2. Disconnect the electrical connections.

Dome and Reading Lamp Bulb Replacement

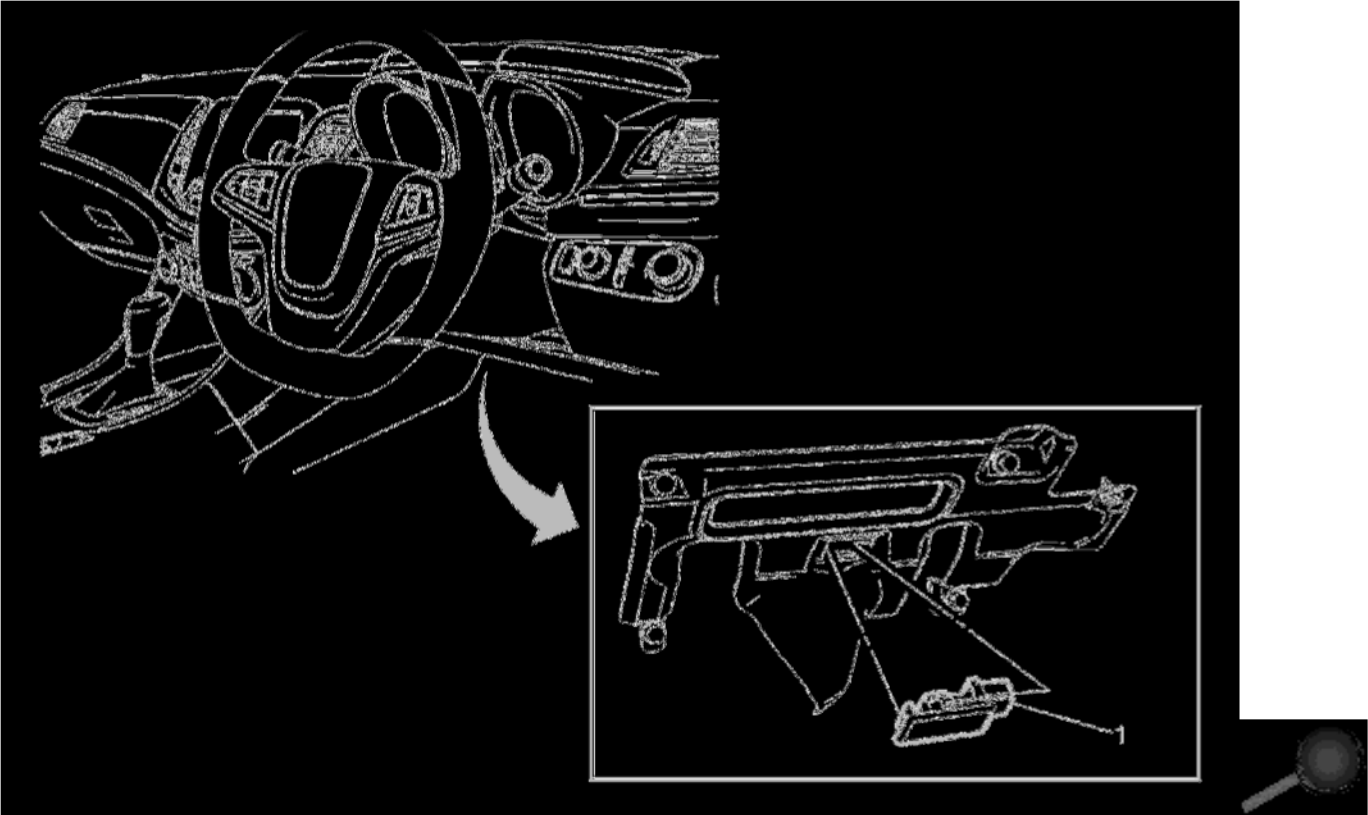


Dome and Reading Lamp Bulb Replacement

Callout	Component Name
Preliminary Procedure Remove the dome and reading lamp. Refer to Dome and Reading Lamp Replacement .	
1	© 2014 General Motors. All rights reserved. Dome and Reading Lamp Bulb (Qty: 3) Procedure

Turn the bulb counter clockwise to remove from the lamp assembly.

Front Floor Courtesy Lamp Replacement (Right Side)

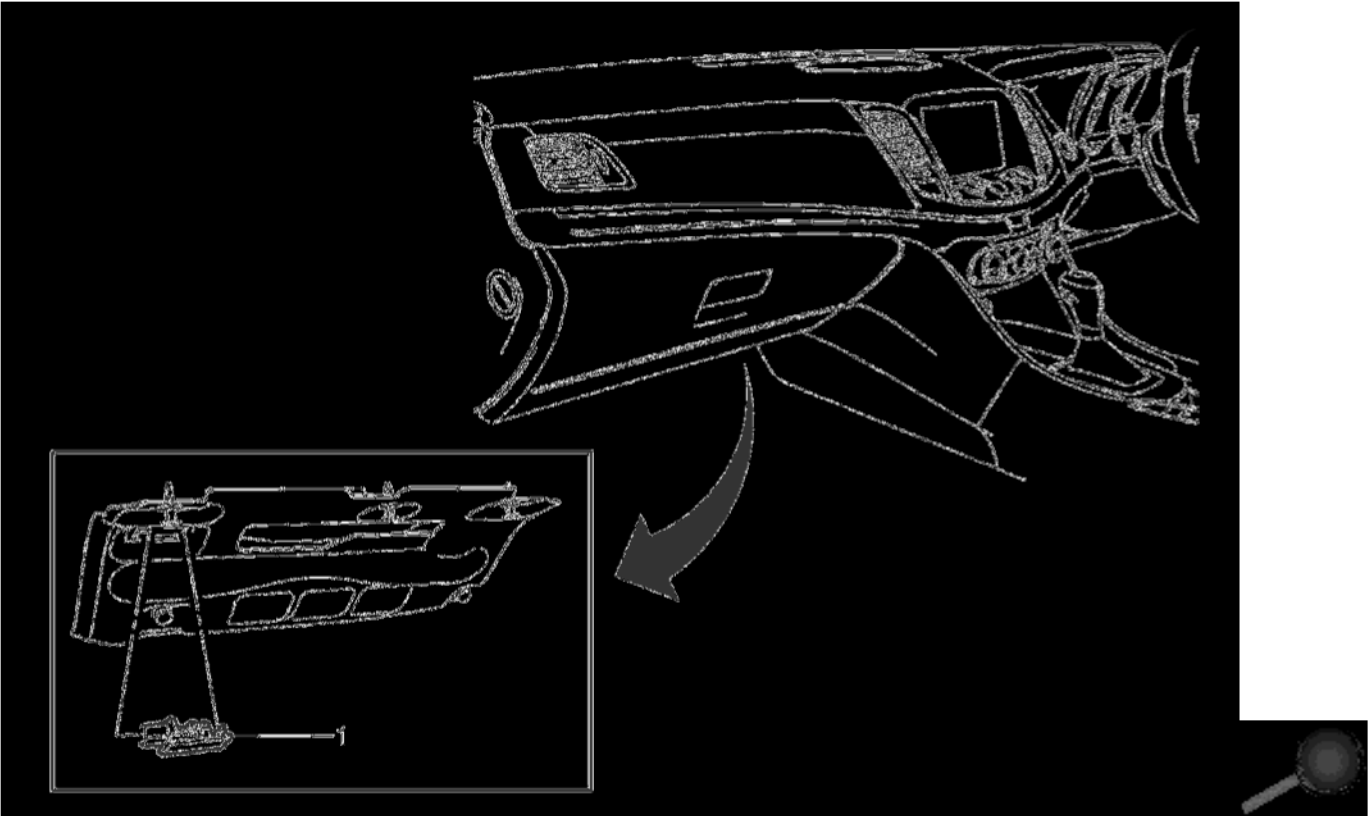


Front Floor Courtesy Lamp Replacement

Callout	Component Name
1	Front Floor Courtesy Lamp Procedure 1. Use a plastic flat bladed trim tool in order to release the lamp assembly from the instrument panel insulator. 2. Disconnect the electrical connection.



Front Floor Courtesy Lamp Replacement (Left Side)

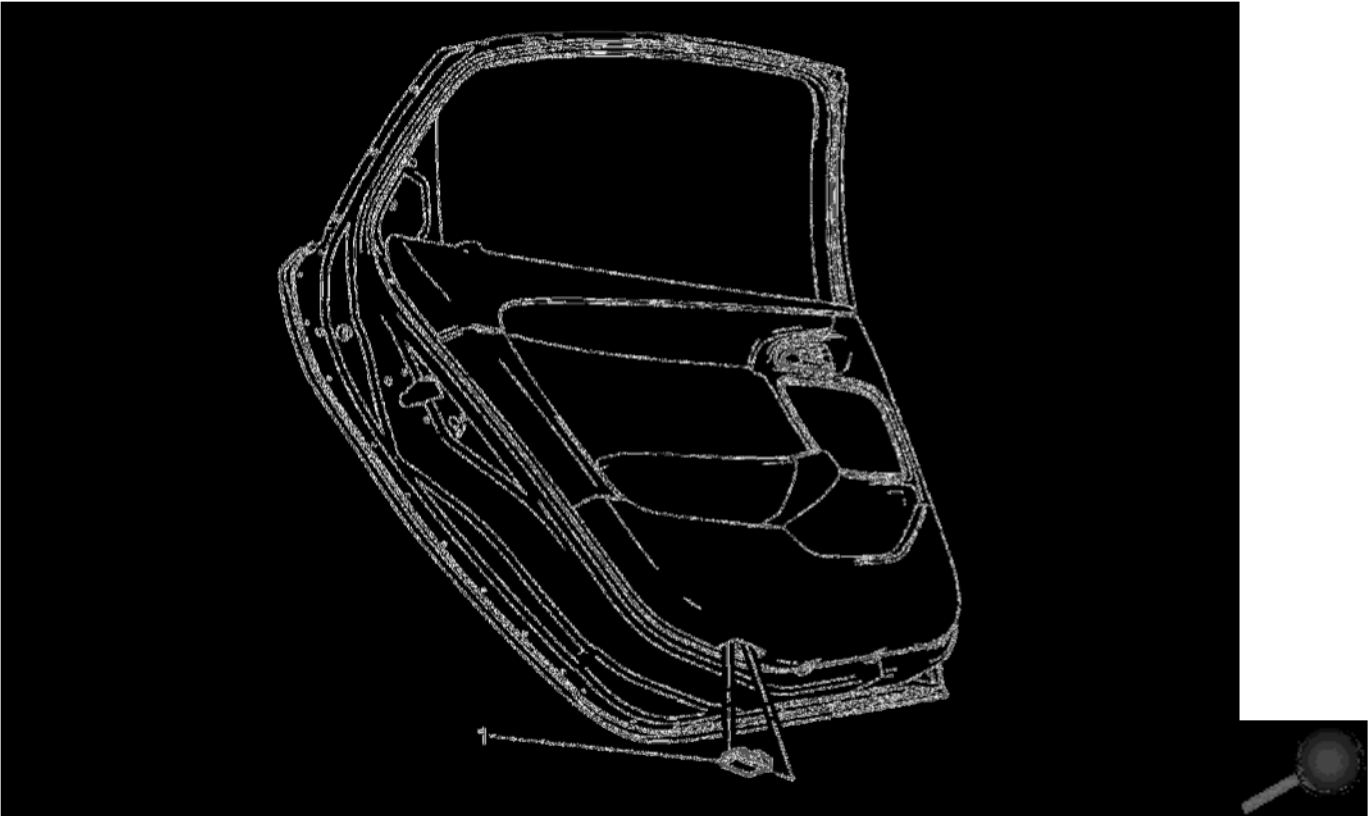


Front Floor Courtesy Lamp Replacement

Callout	Component Name
1	Front Floor Courtesy Lamp Procedure 1. Use a plastic flat bladed trim tool in order to release the lamp assembly from the instrument panel insulator. 2. Disconnect the electrical connection.



Rear Side Door Courtesy Lamp Replacement

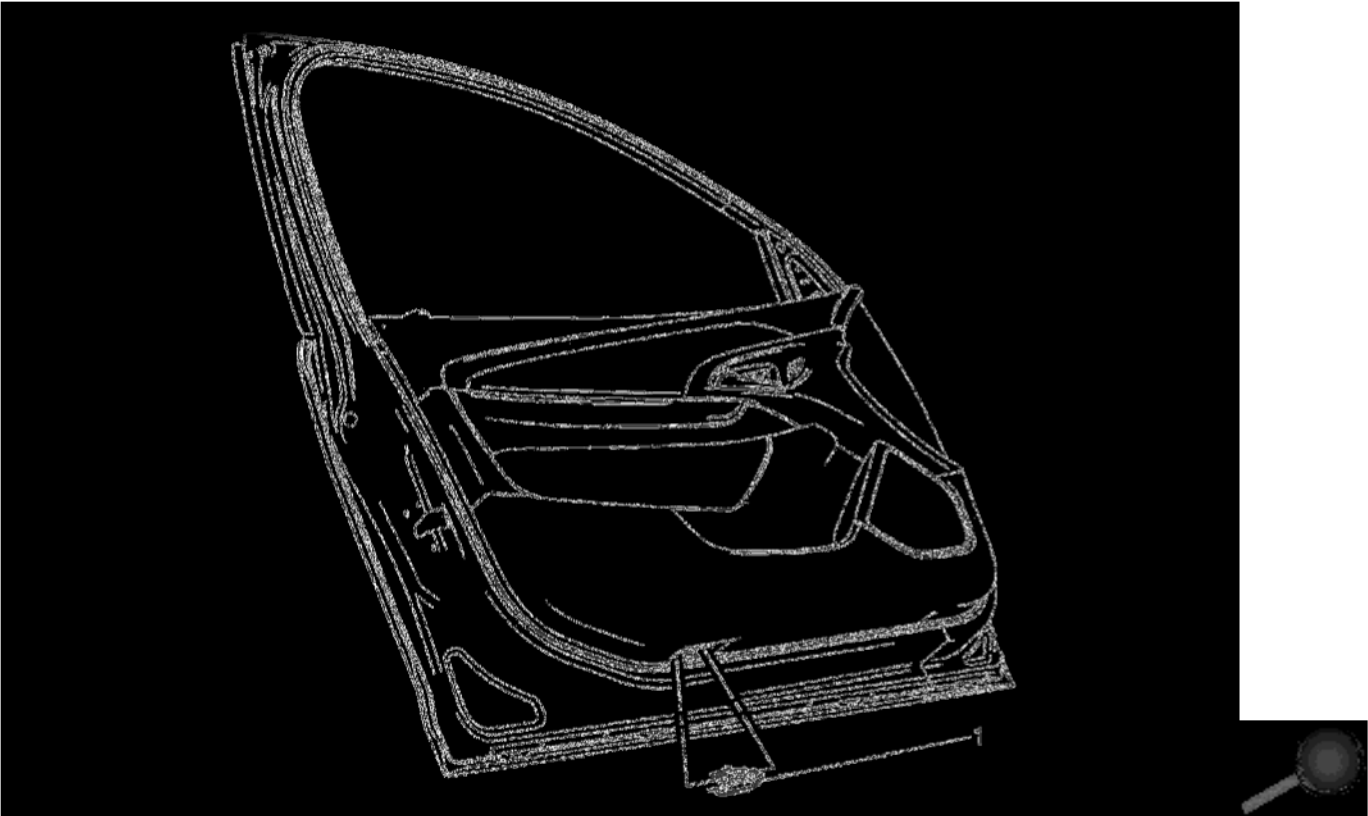


Rear Side Door Courtesy Lamp Replacement

Callout	Component Name
1	Rear Side Door Courtesy Lamp Procedure © 2014 General Motors. All rights reserved. 1. Use a flat-bladed tool to remove the door courtesy lamp from the door trim panel. 2. Disconnect the electrical connector.



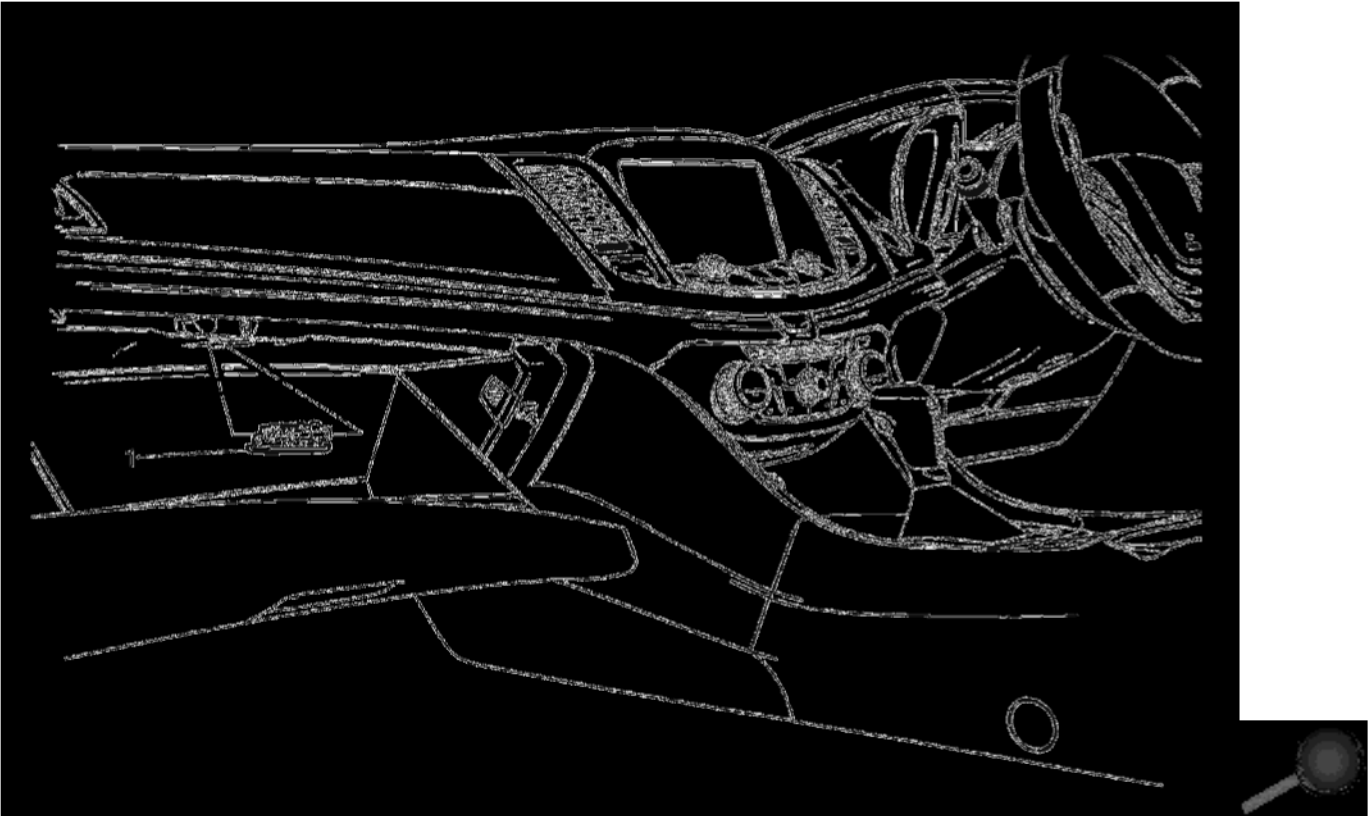
Front Side Door Courtesy Lamp Replacement



Front Side Door Courtesy Lamp Replacement

Callout	Component Name
1	Front Side Door Courtesy Lamp Procedure 1. Use a flat-bladed tool to remove the door courtesy lamp from the door trim panel. 2. Disconnect the electrical connector.

Instrument Panel Compartment Lamp Replacement

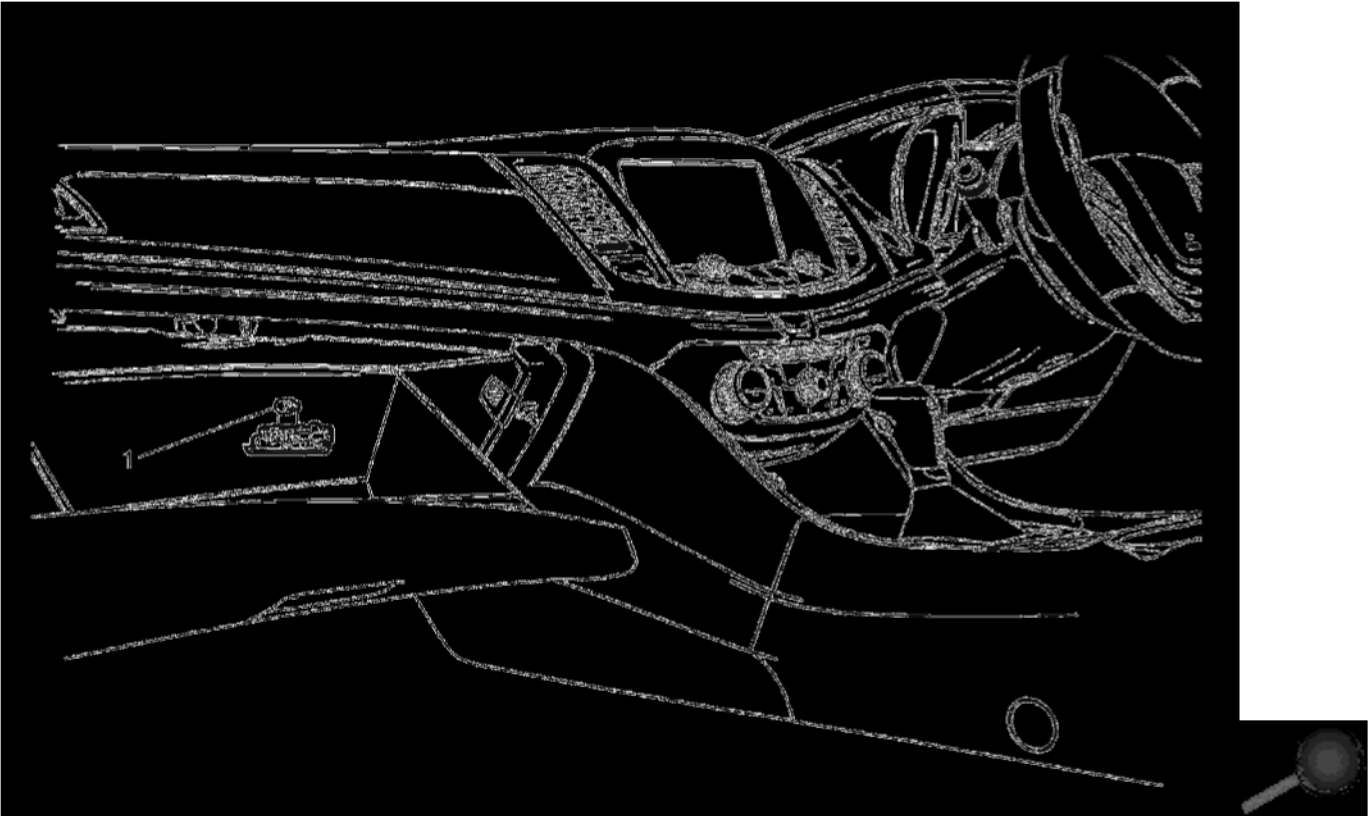


Instrument Panel Compartment Lamp Replacement

Callout	Component Name
1	Instrument Panel Compartment Lamp Procedure © 2014 General Motors. All rights reserved. 1. Open the compartment door and using a plastic flat bladed trim tool release the lamp assembly from the instrument panel compartment.

2. Disconnect the electrical connection.

Instrument Panel Compartment Lamp Bulb Replacement

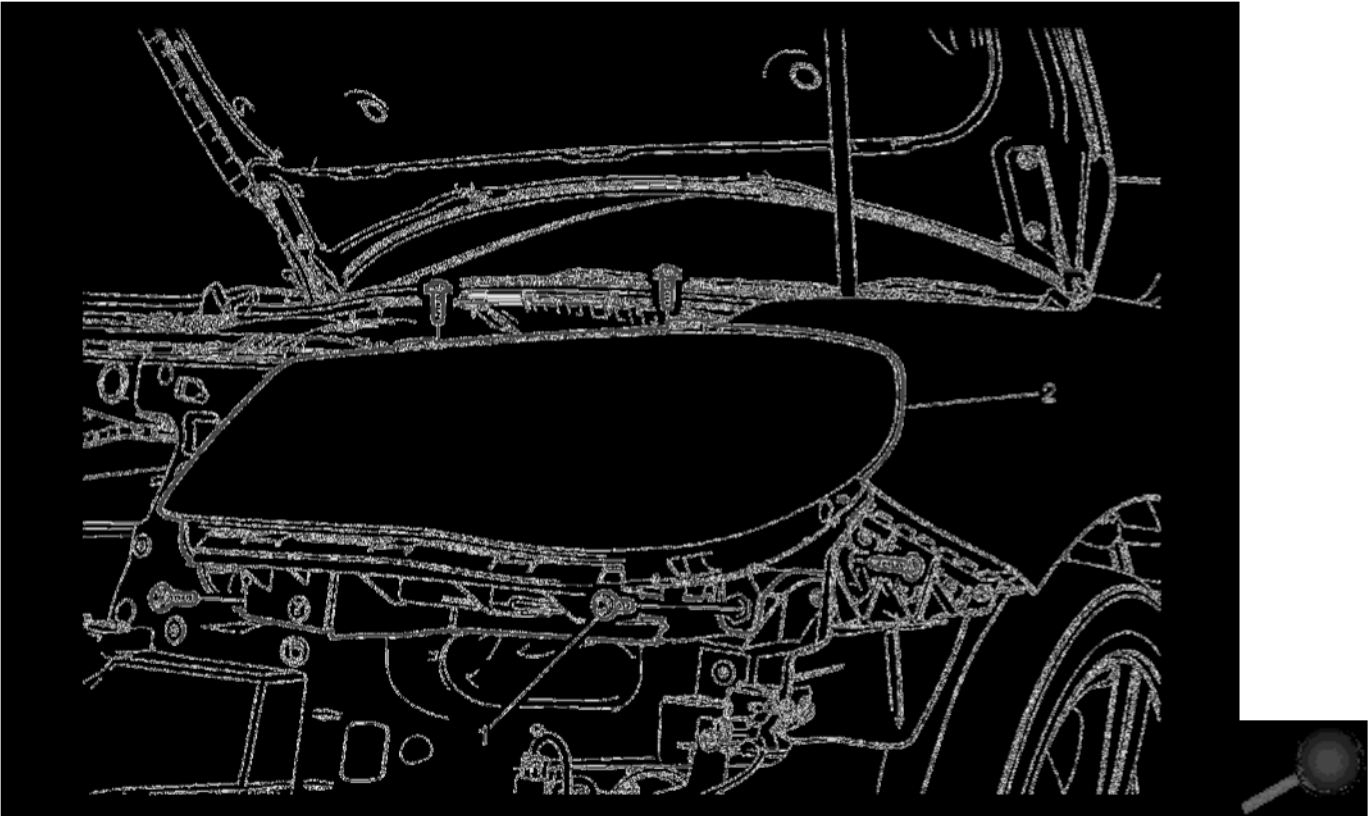


Instrument Panel Compartment Lamp Bulb Replacement

Callout	Component Name
Preliminary Procedure Remove the instrument panel compartment lamp. Refer to Instrument Panel Compartment Lamp Replacement .	
1	Instrument Panel Compartment Lamp Bulb Procedure

Gently bend back the contact lever that secures the bulb to remove.

Headlamp Replacement (Short Wheelbase, Ute)



Headlamp Replacement

Callout	Component Name
Preliminary Procedure	
1. Remove the front bumper fascia. Refer to Front Bumper Fascia Replacement .	
2. Remove the radiator air upper baffle and deflector. Refer to Radiator Air Upper Baffle and Deflector Replacement .	

1	Headlamp Screw (Qty: 5) Caution: Refer to Fastener Caution .
2	Headlamp Procedure 1. Disconnect the electrical wiring harness. 2. Remove the headlamp. 3. Aim the headlamp after installation. Refer to Headlamp Aiming.

Headlamp Replacement (Long Wheelbase)

Removal Procedure

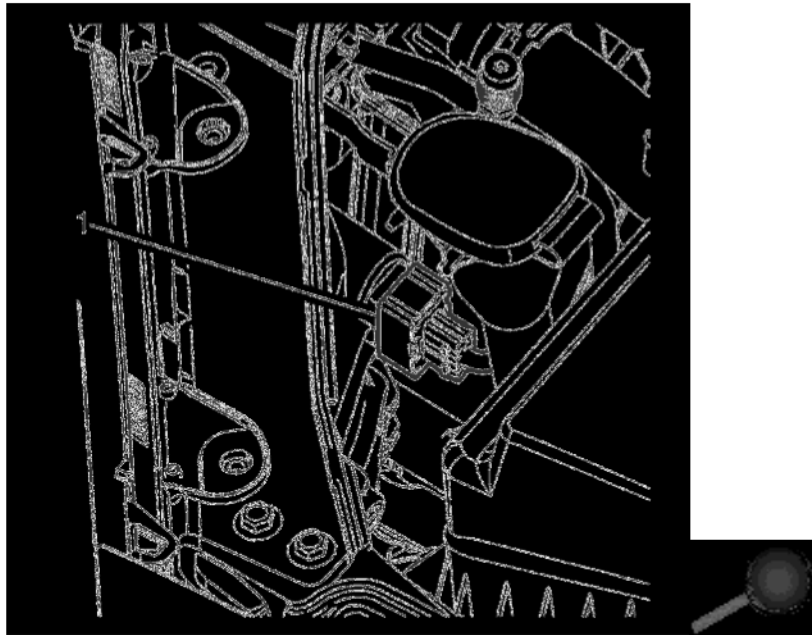
Warning: The high intensity discharge system produces high voltage and current. In order to reduce the risk of severe shocks and burns, the battery negative cable must be disconnected any time service work is being performed on or around the high intensity discharge system.

Warning: The high intensity discharge system produces high voltage and current. To reduce the risk of severe shocks and burns:

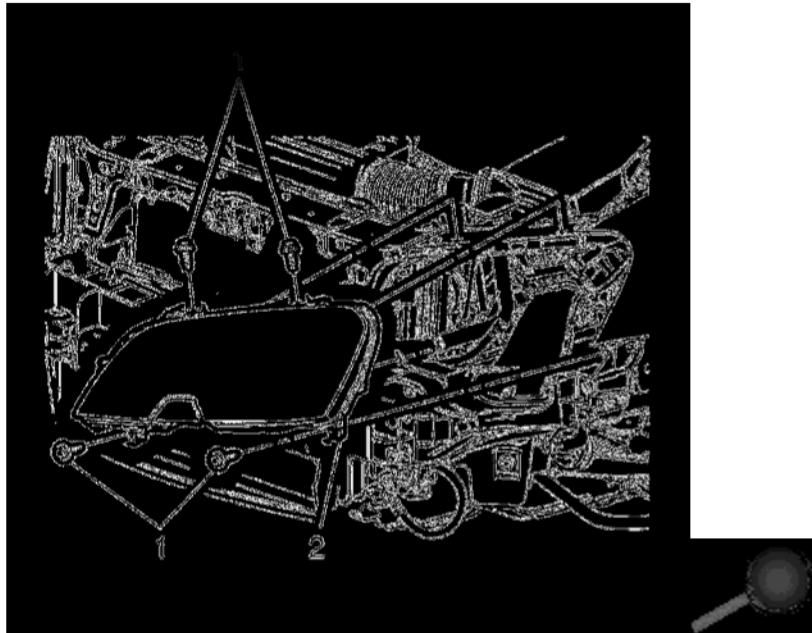
- Never open the high intensity discharge system ballast or the arc tube assembly starter.
- Never probe between the high intensity discharge system ballast output connector and the arc tube assembly.

Warning: Refer to [Battery Disconnect Warning](#).

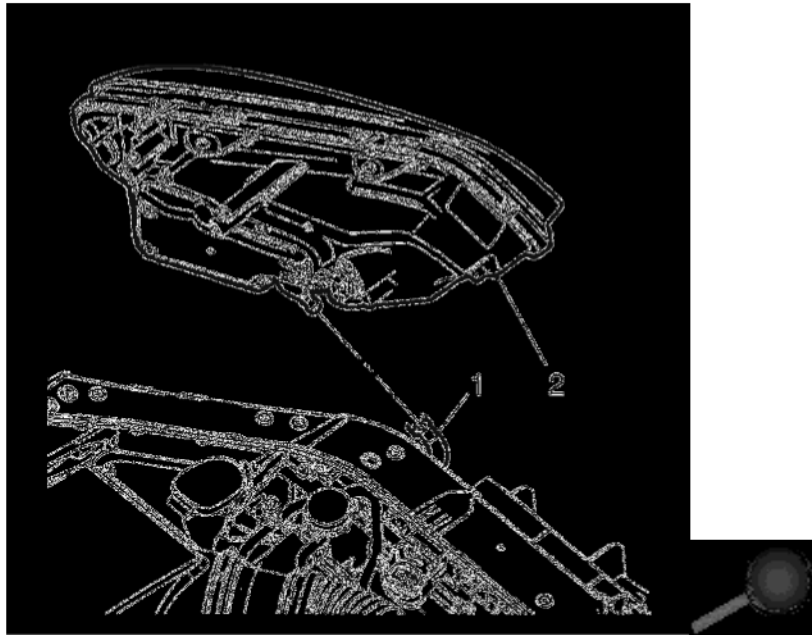
1. Disconnect the battery ground cable. Refer to [Battery Negative Cable Disconnection and Connection](#).
2. Remove the front bumper fascia. Refer to [Front Bumper Fascia Replacement](#).
3. Remove the front bumper fascia support bracket. Refer to [Front Bumper Fascia Reinforcement Replacement](#)



4. Disconnect the headlamp electrical connector (1).

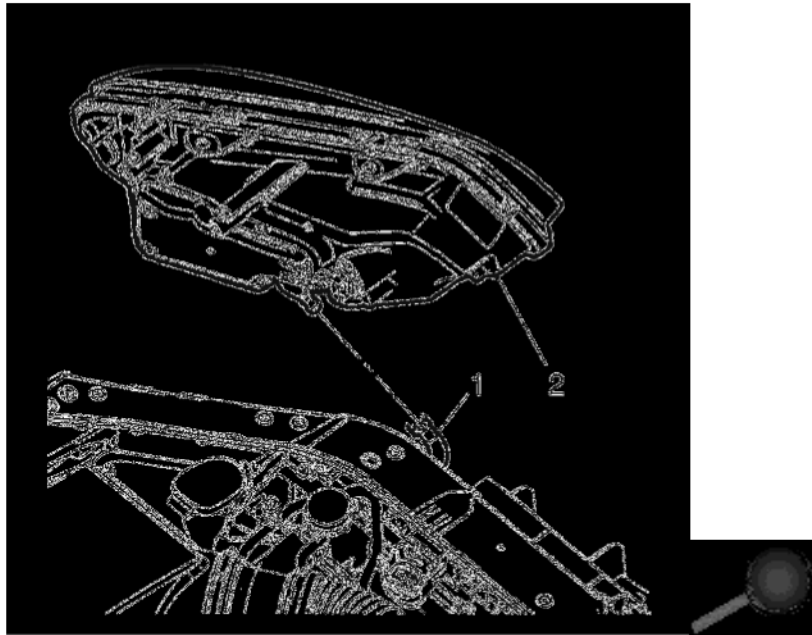


5. Remove the headlamp bolts (1) to release the headlamp (2) from the front end panel module carrier.

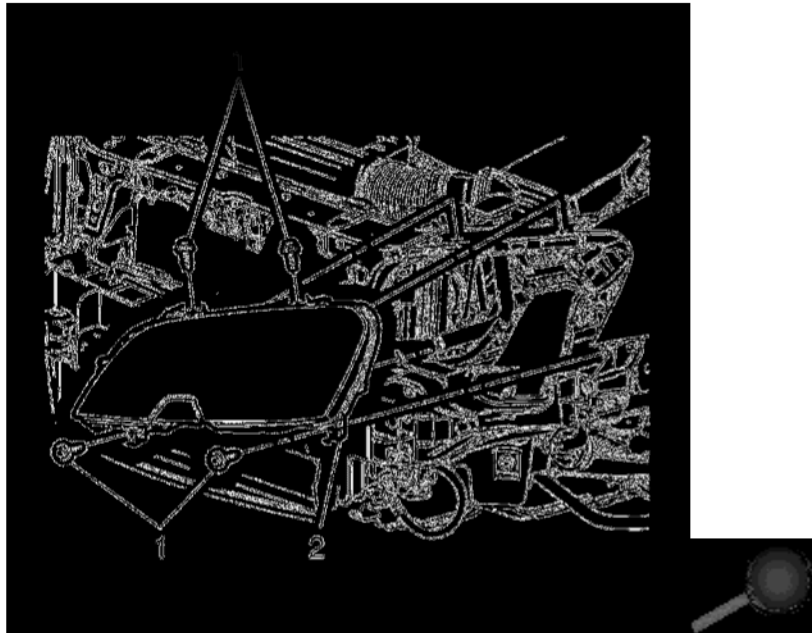


6. Pull the headlamp (2) away from the front end panel module carrier and disconnect the headlamp washer nozzle hose (1).
7. Remove the headlamp (2) from the vehicle.

[Installation Procedure](#)



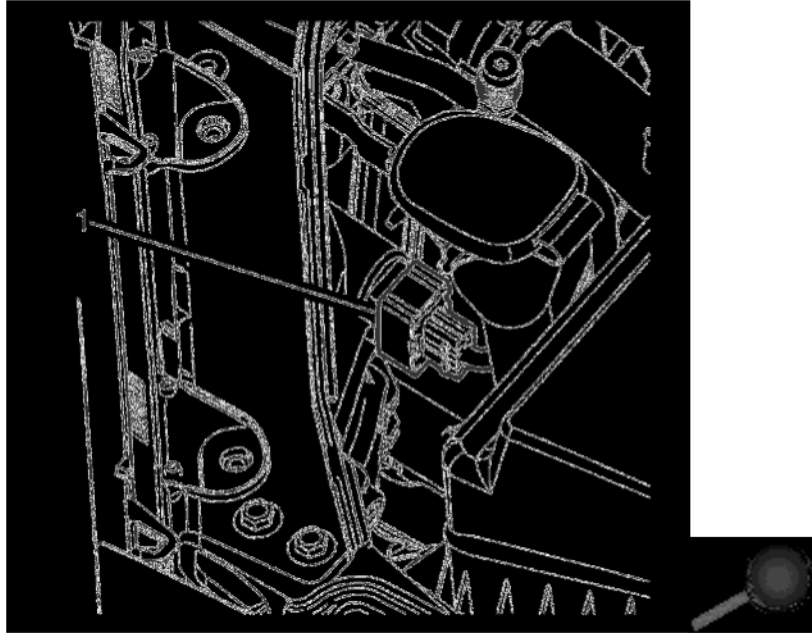
1. Position the headlamp (2) and reconnect the headlamp washer nozzle hose (1).



2. Install the headlamp (2).

Caution: Refer to [Fastener Caution](#).

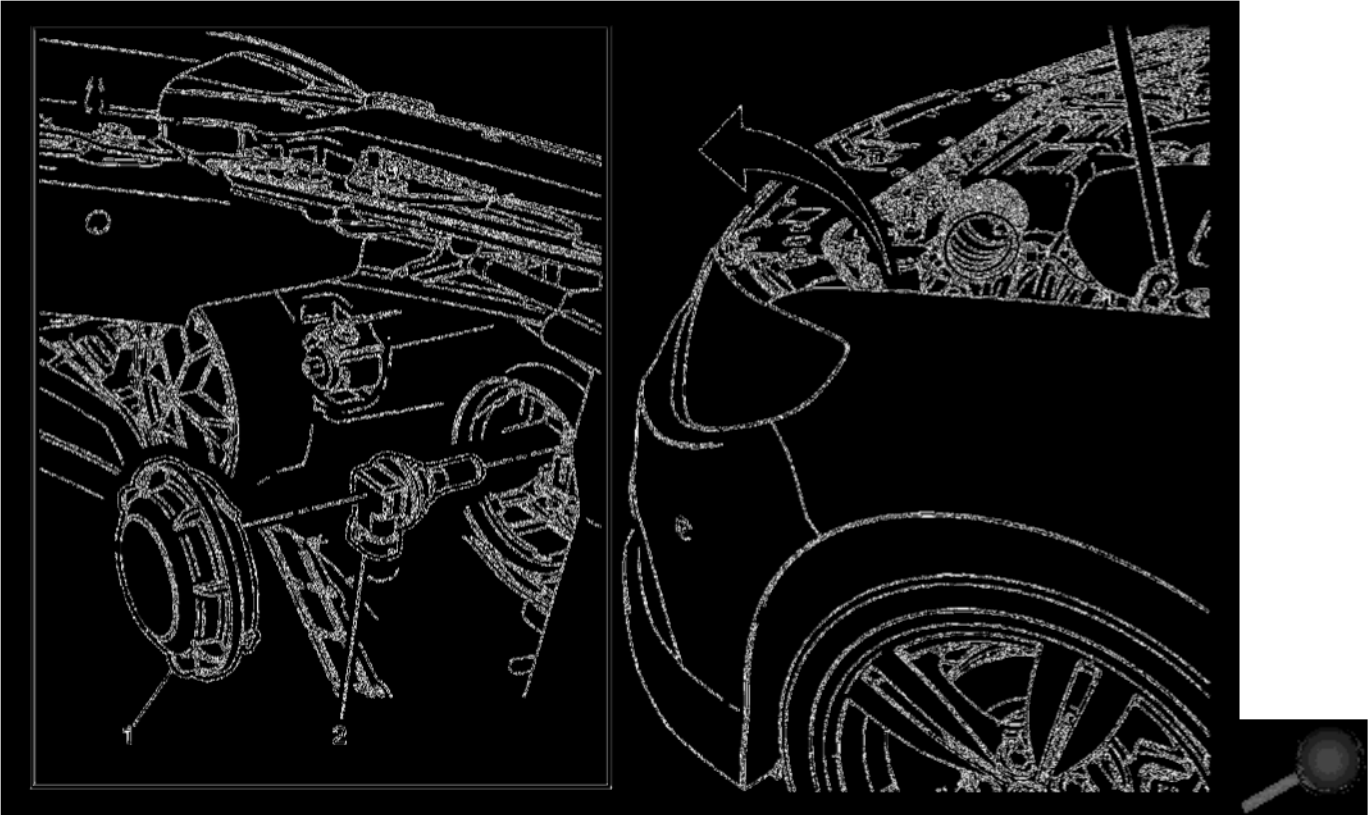
3. Clean the headlamp bolt threads (1) and apply LOCTITE™ 243 or equivalent. Tighten to **4 N•m (35 lb in)**.



Note: Make sure the headlamp electrical connector locking tab is correctly engaged. Failure to do so may cause an inoperative headlamp assembly or intermittent condition.

4. Connect the headlamp assembly electrical connector (1).
5. Install the front bumper fascia. Refer to [Front Bumper Fascia Replacement](#).
6. Connect the battery ground cable. Refer to [Battery Negative Cable Disconnection and Connection](#).
7. Check all vehicle lights for correct operation.
8. Adjust the headlamps. Refer to [Headlamp Aiming](#).

High Beam Headlamp Bulb Replacement (L77/LS3/LSA Left Side)

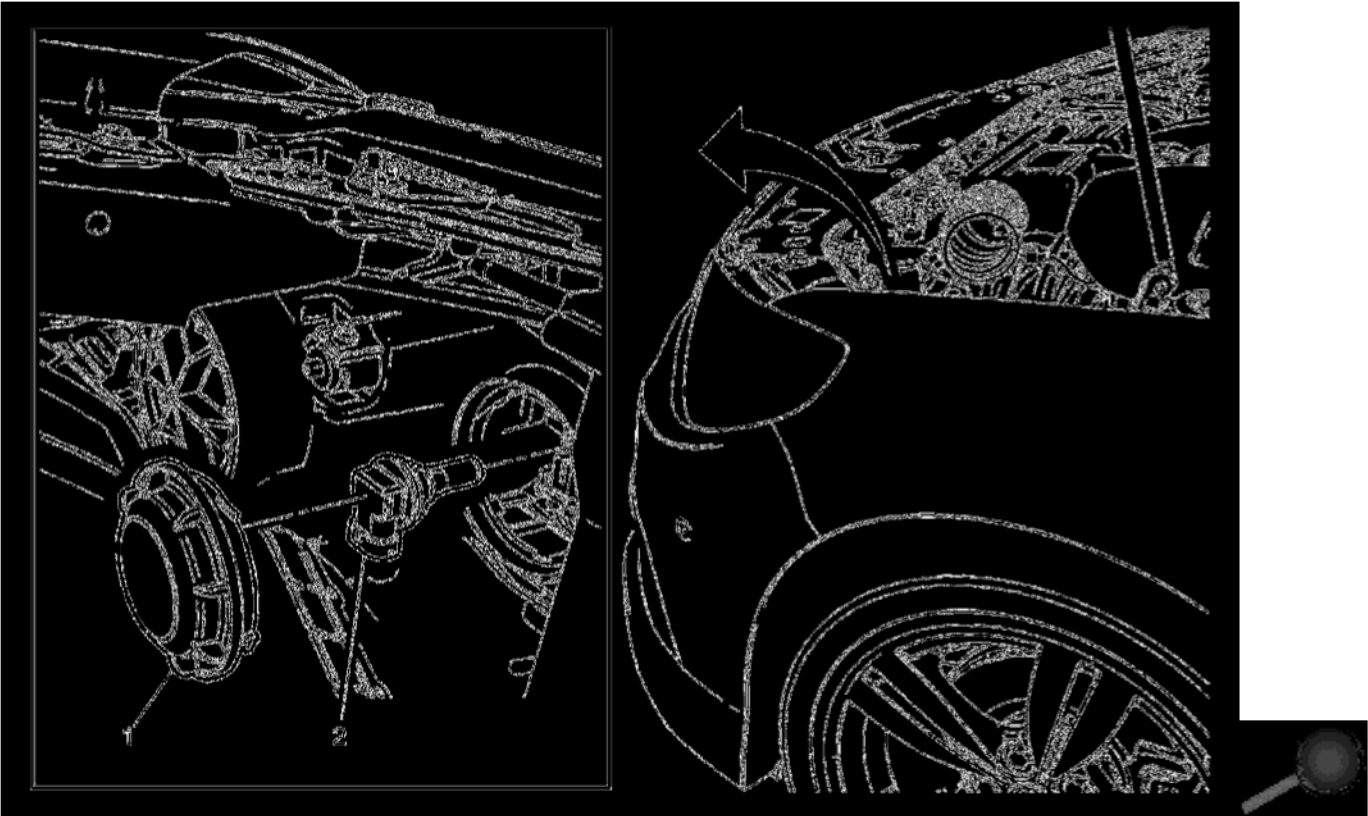


High Beam Headlamp Bulb Replacement

Callout	Component Name
Preliminary Procedure	
1. Open and support the hood. 2. Remove the air cleaner assembly. Refer to Air Cleaner Assembly Replacement .	

1	Headlamp Bulb Access Hole Cover Procedure Rotate the headlamp bulb access hole 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.

High Beam Headlamp Bulb Replacement (LFW/LFX/LWR Left Side)

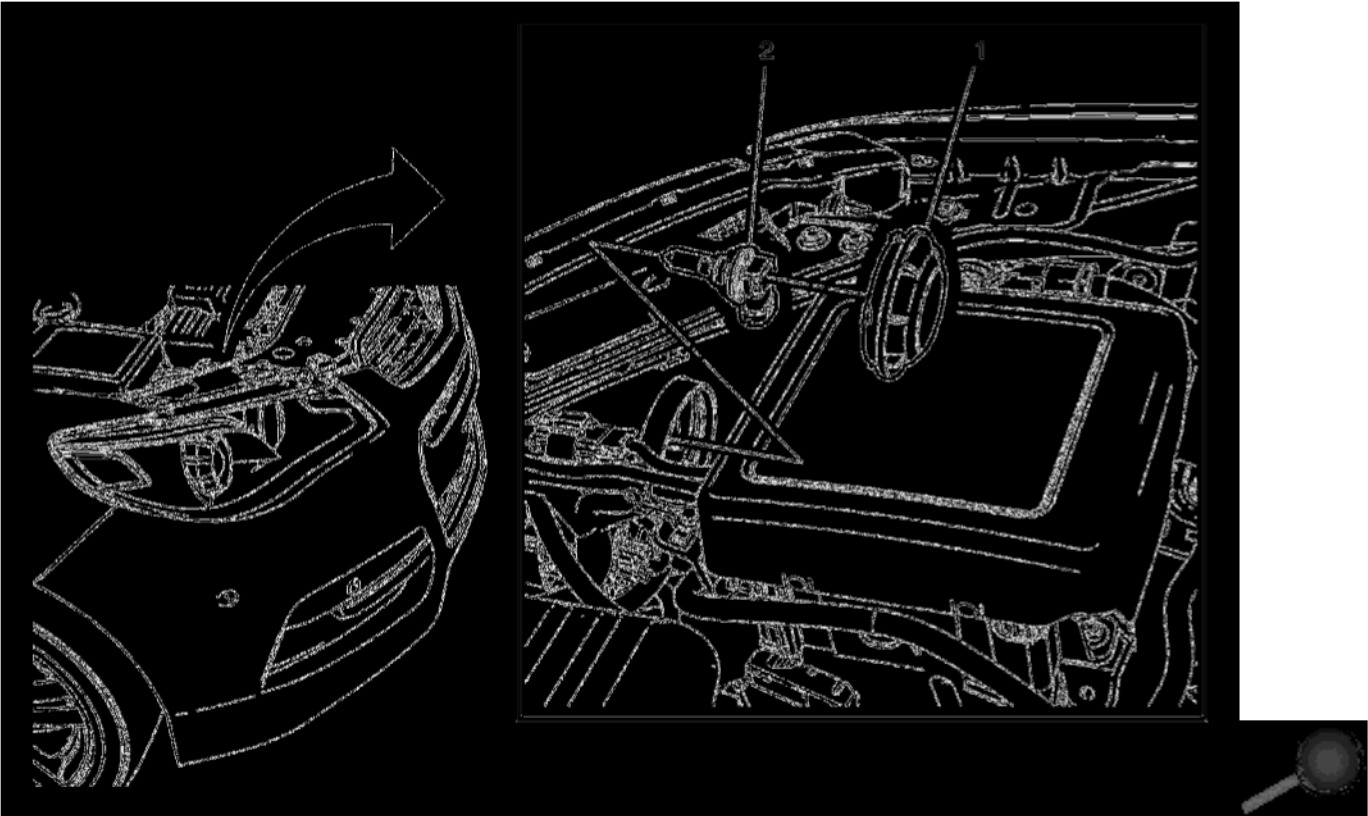


High Beam Headlamp Bulb Replacement

Callout	Component Name
Preliminary Procedure	
1. Open and support the hood. 2. Remove the air cleaner assembly. Refer to Air Cleaner Assembly Replacement .	

1	Headlamp Bulb Access Hole Cover Procedure Rotate the headlamp bulb access hole 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.

High Beam Headlamp Bulb Replacement (Right Side)

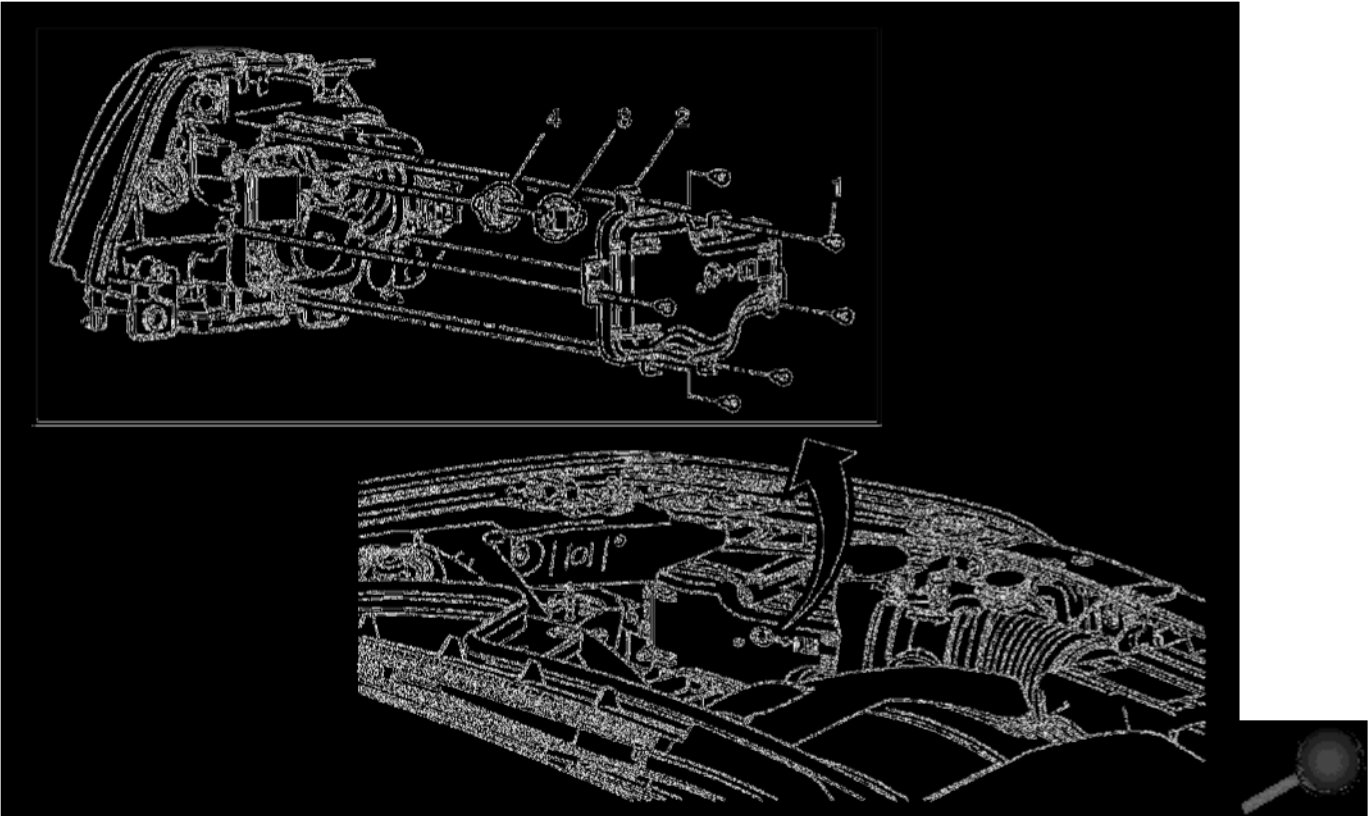


High Beam Headlamp Bulb Replacement

Callout	Component Name
Preliminary Procedure Open and support the hood.	
1	Headlamp Bulb Access Hole Cover Procedure

	Rotate the headlamp bulb access hole 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.

High Beam Headlamp Bulb Replacement (Left Side, Long Wheelbase)



High Beam Headlamp Bulb Replacement

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 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: © 2014 General Motors. All rights reserved.	

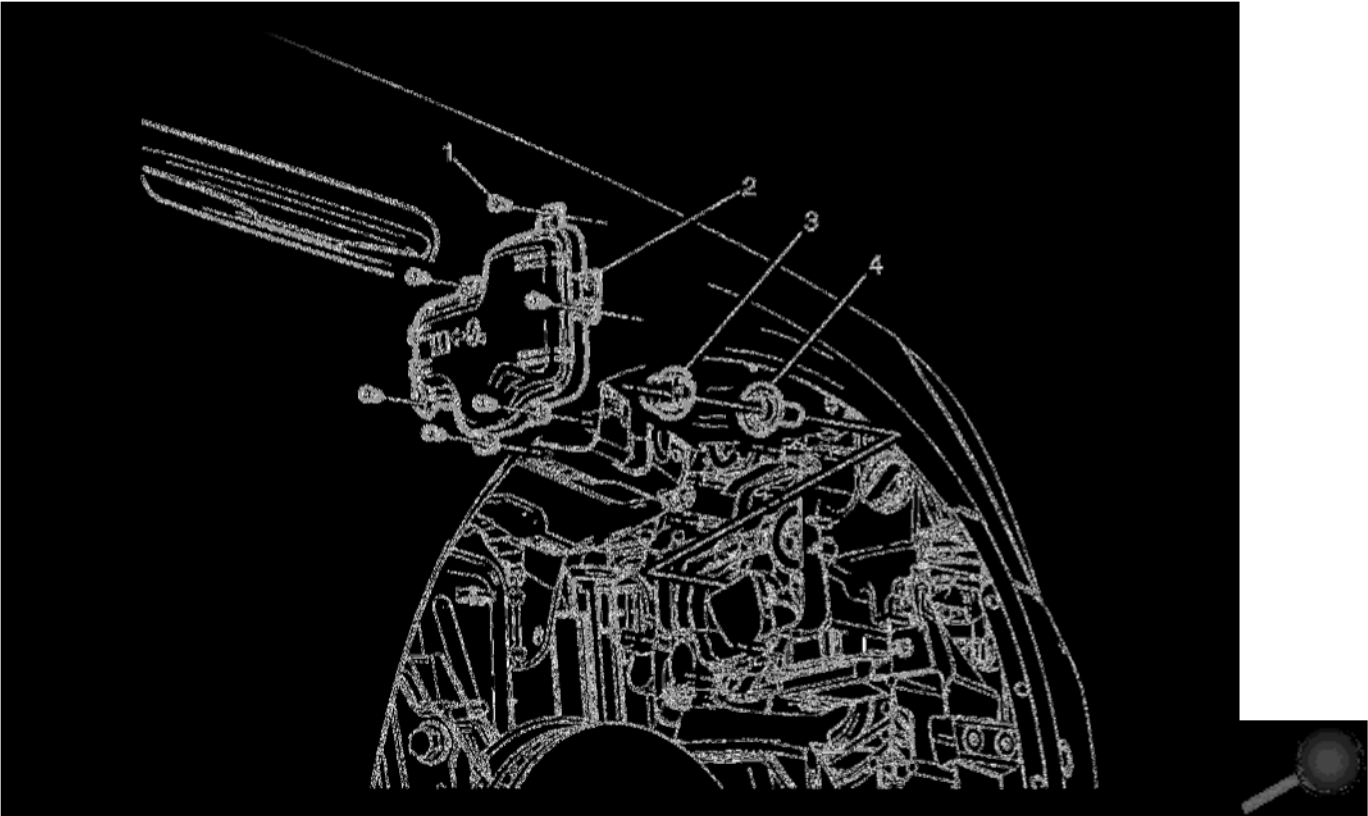
- Never open the high intensity discharge system ballast or the arc tube assembly starter.
- Never probe between the high intensity discharge system ballast output connector and the arc tube assembly.

Preliminary Procedure

1. Open and support the hood.
2. Remove the air cleaner assembly. Refer to [Air Cleaner Assembly Replacement](#).

1	Headlamp Bulb Access Cover Bolt (Qty: 6) Caution: Refer to Fastener Caution .
2	Headlamp Bulb Access Cover
3	High Beam Headlamp Bulb Retainer Procedure Compress the high beam headlamp retainer and release from the screws.
4	High Beam Headlamp Bulb Warning: Refer to Halogen Bulb Warning . Procedure 1. Disconnect the electrical connector. 2. Pull the high beam headlamp bulb straight back and remove from the headlamp.

High Beam Headlamp Bulb Replacement (Right Side, Long Wheelbase)



High Beam Headlamp Bulb Replacement

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 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:	

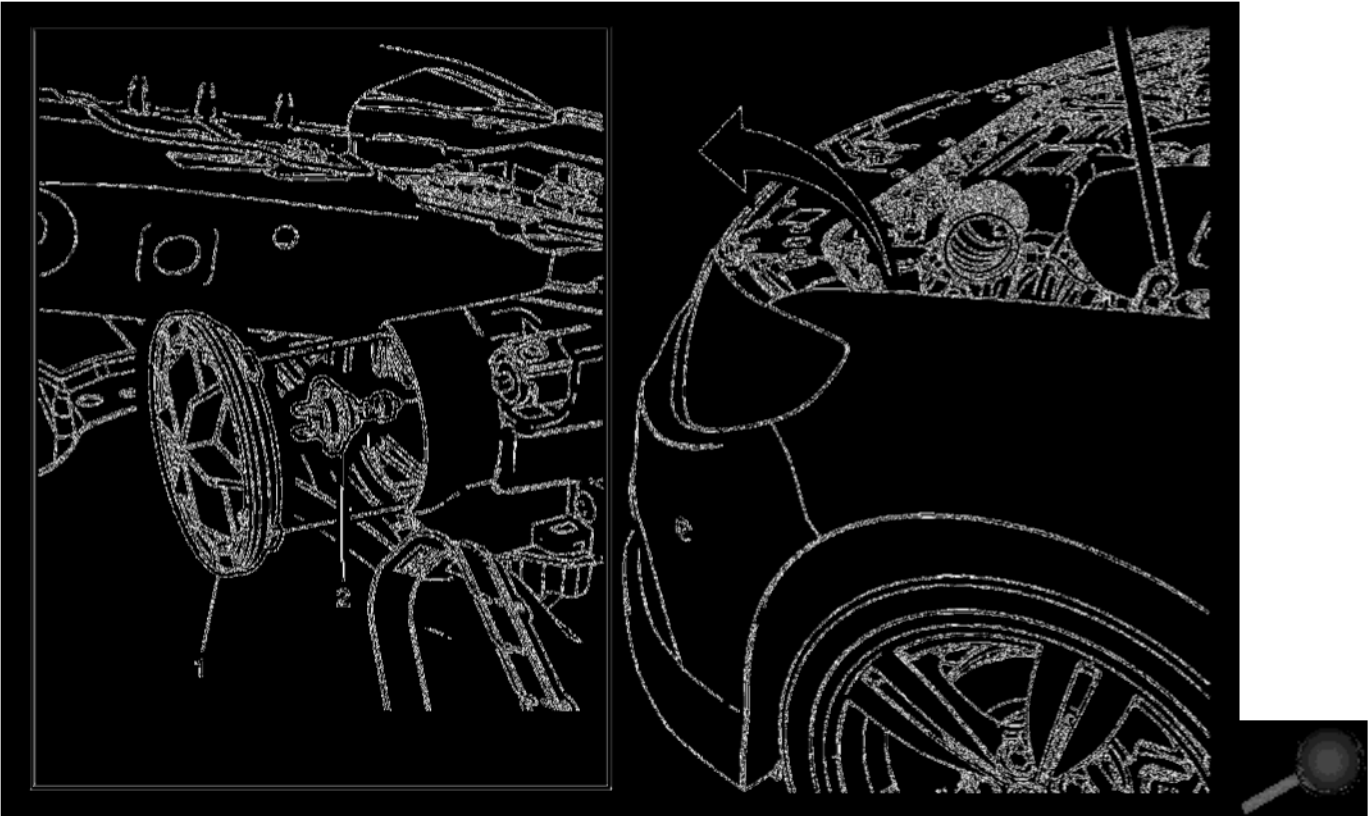
- Never open the high intensity discharge system ballast or the arc tube assembly starter.
- Never probe between the high intensity discharge system ballast output connector and the arc tube assembly.

Preliminary Procedure

1. Remove the coolant recovery reservoir filler tube. Refer to [Coolant Recovery Reservoir Replacement](#).
2. Remove the front wheelhouse liner. Refer to [Front Wheelhouse Liner Replacement](#).

1	Headlamp Bulb Access Cover Bolt (Qty: 6) Caution: Refer to Fastener Caution .
2	Headlamp Bulb Access Cover
3	High Beam Headlamp Bulb Retainer Procedure Compress the high beam headlamp retainer and release from the screws.
4	High Beam Headlamp Bulb Warning: Refer to Halogen Bulb Warning . Procedure 1. Disconnect the electrical connector. 2. Pull the high beam headlamp bulb straight back and remove from the headlamp.

Low Beam Headlamp Bulb Replacement (L77/LS3/LSA Left Side)

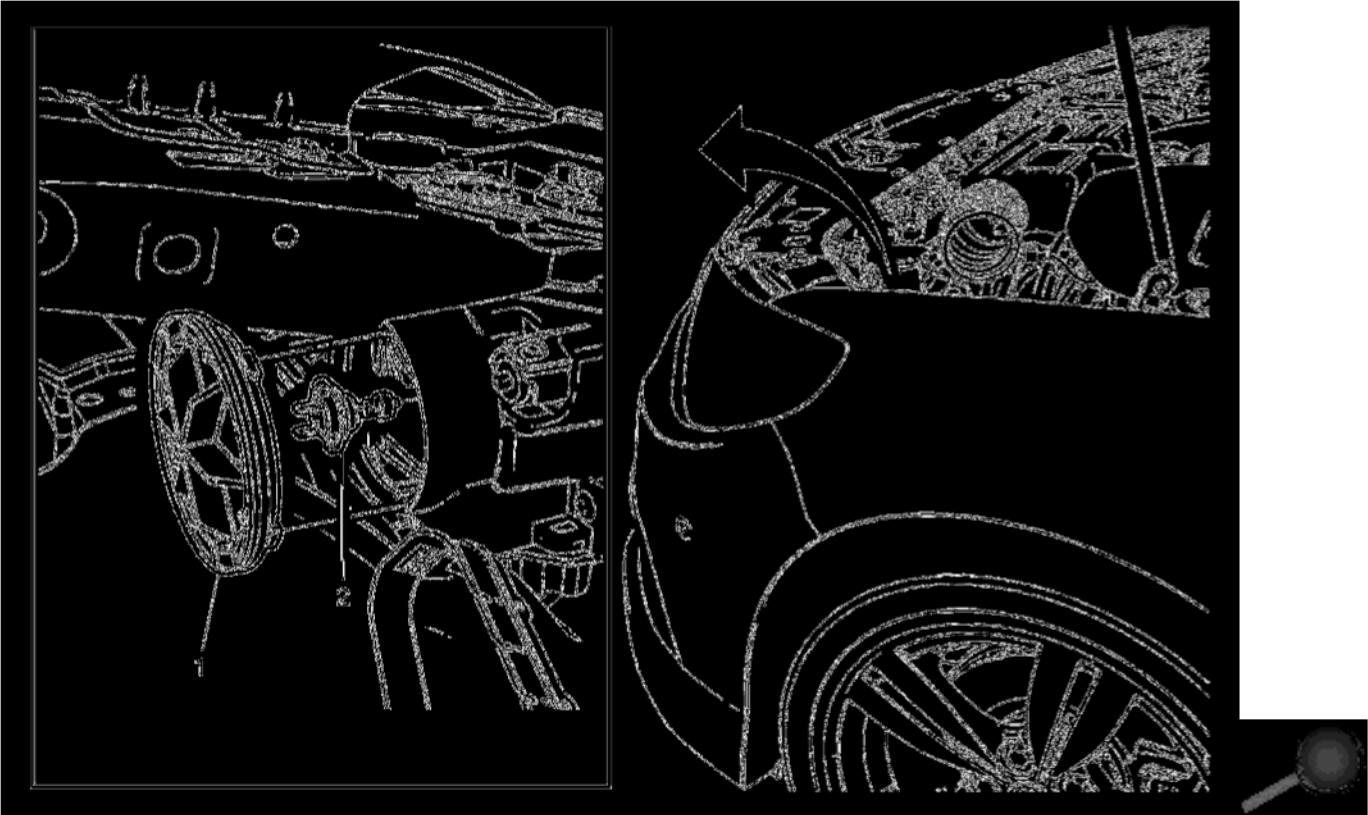


Low Beam Headlamp Bulb Replacement

Callout	Component Name
Preliminary Procedure 1. Open and support the hood. 2. Remove the air cleaner assembly. Refer to Air Cleaner Assembly Replacement.	

1	Headlamp Bulb Access Hole Cover Procedure Rotate the headlamp bulb access hole 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.

Low Beam Headlamp Bulb Replacement (LFW/LFX/LWR Left Side)

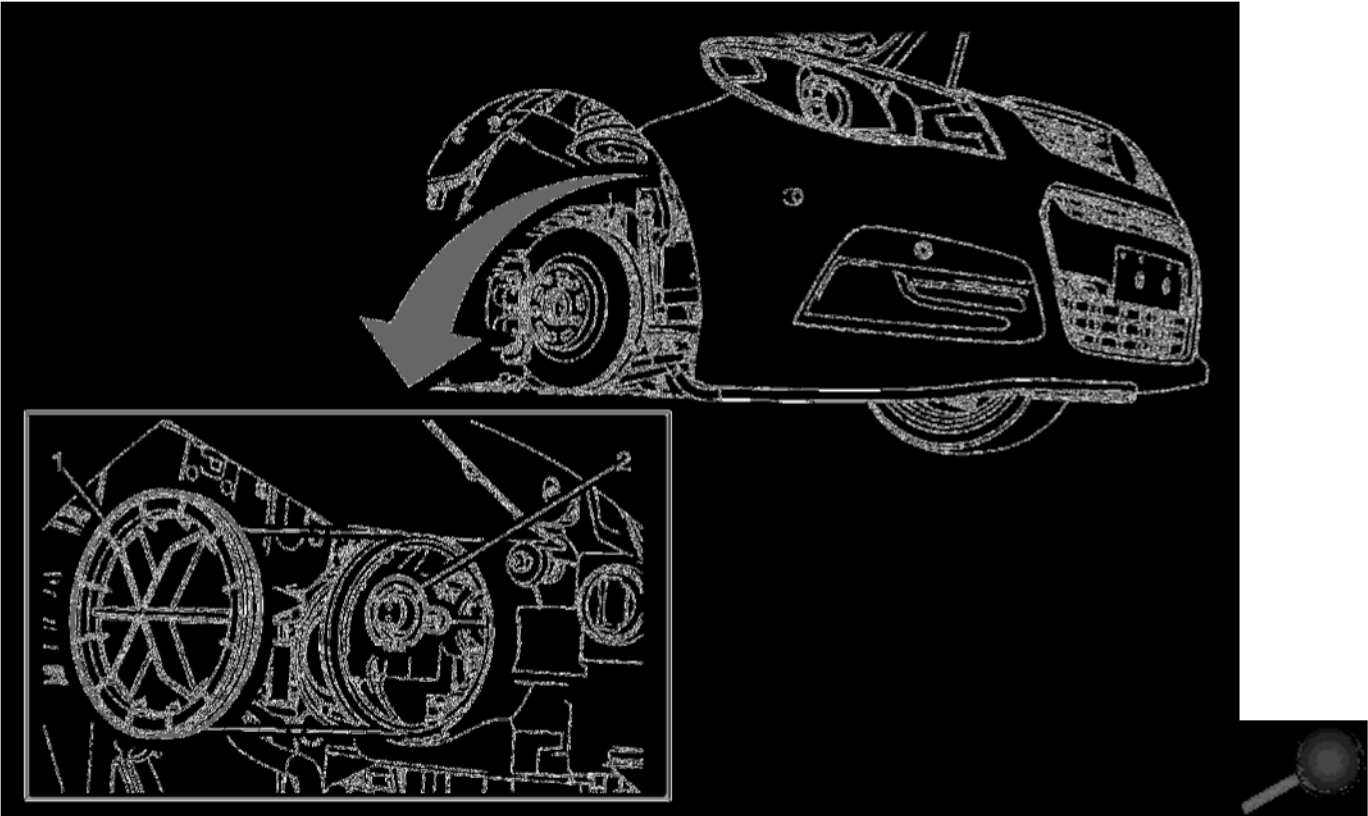


Low Beam Headlamp Bulb Replacement

Callout	Component Name
Preliminary Procedure 1. Open and support the hood. 2. Remove the air cleaner assembly. Refer to Air Cleaner Assembly Replacement.	

1	Headlamp Bulb Access Hole Cover Procedure Rotate the headlamp bulb access hole 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.

Low Beam Headlamp Bulb Replacement (Right Side)

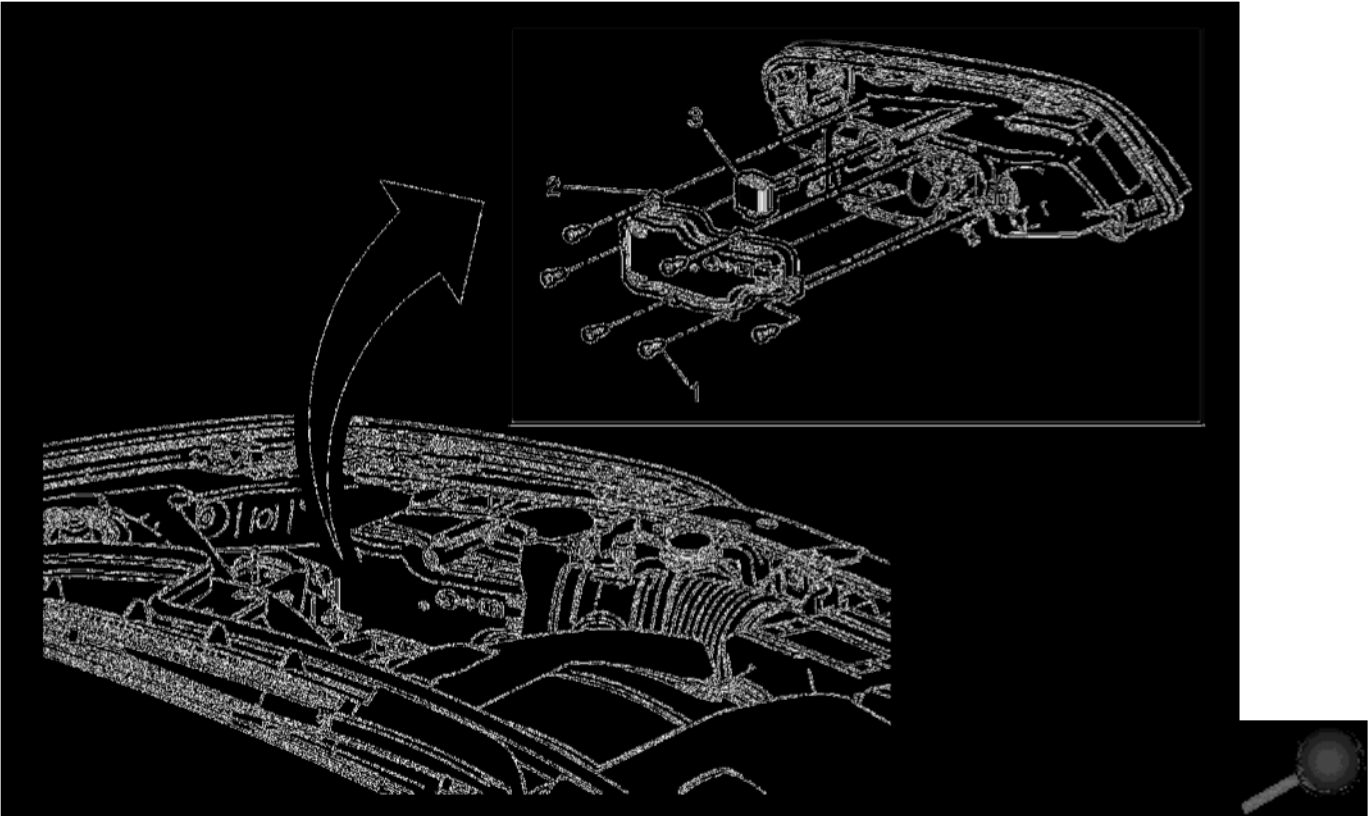


Low Beam Headlamp Bulb Replacement

Callout	Component Name
Preliminary Procedure Remove the front wheelhouse liner. Refer to Front Wheelhouse Liner Replacement .	
1	Headlamp Bulb Access Hole Cover Procedure

	Rotate the headlamp bulb access hole 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.

Low Beam Headlamp Bulb Replacement (Left Side, Long Wheelbase)



Low Beam Headlamp Bulb Replacement

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 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: © 2014 General Motors. All rights reserved.	

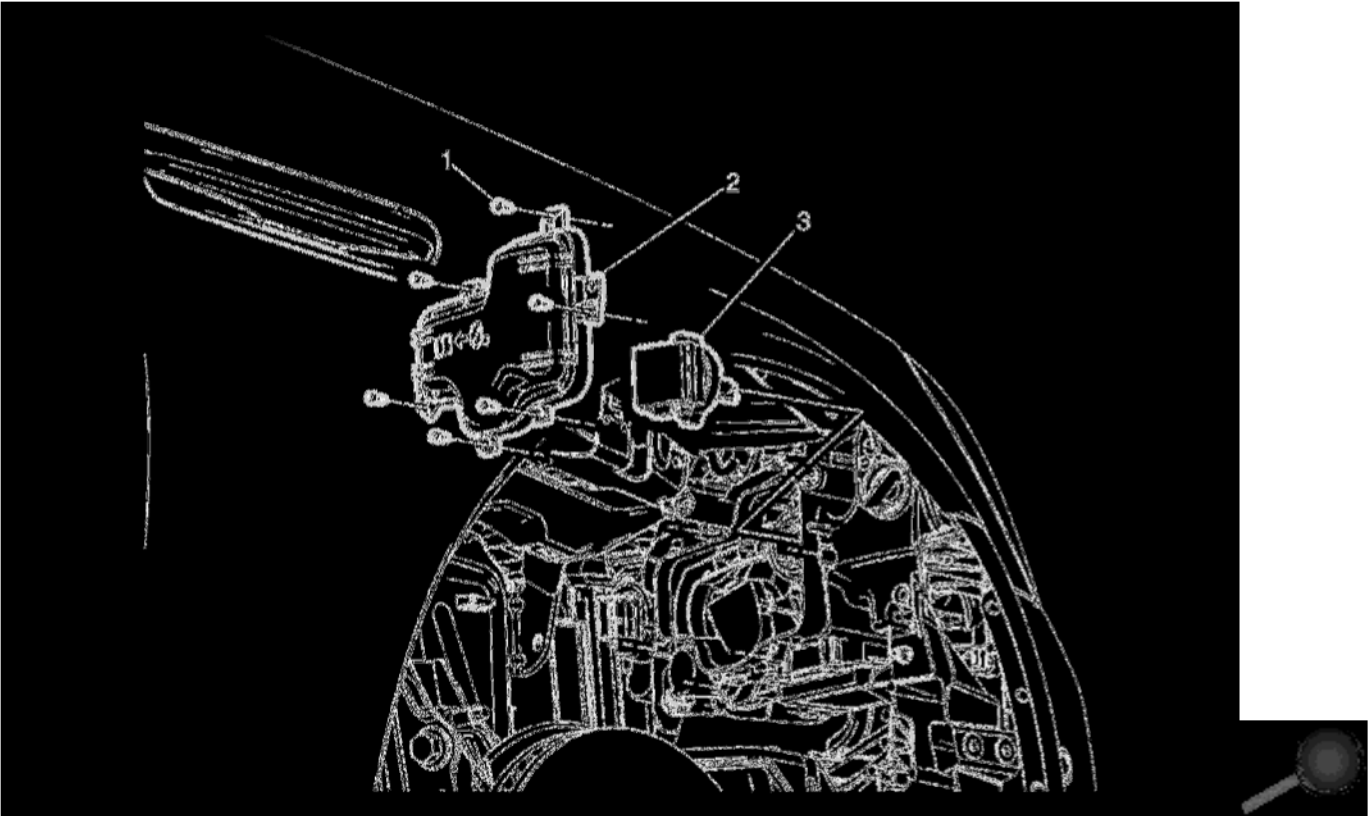
- Never open the high intensity discharge system ballast or the arc tube assembly starter.
- Never probe between the high intensity discharge system ballast output connector and the arc tube assembly.

Preliminary Procedure

1. Open and support the hood.
2. Remove the air cleaner assembly. Refer to [Air Cleaner Assembly Replacement](#).

1	Headlamp Bulb Access Hole Cover Bolt (Qty: 6) Caution: Refer to Fastener Caution .
2	Headlamp Bulb Access Hole Cover
3	Low Beam Headlamp Bulb Procedure 1. Disconnect the electrical connector. 2. Rotate the low beam headlamp bulb counterclockwise and pull from the headlamp.

Low Beam Headlamp Bulb Replacement (Right Side, Long Wheelbase)



Low Beam Headlamp Bulb Replacement

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 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:	

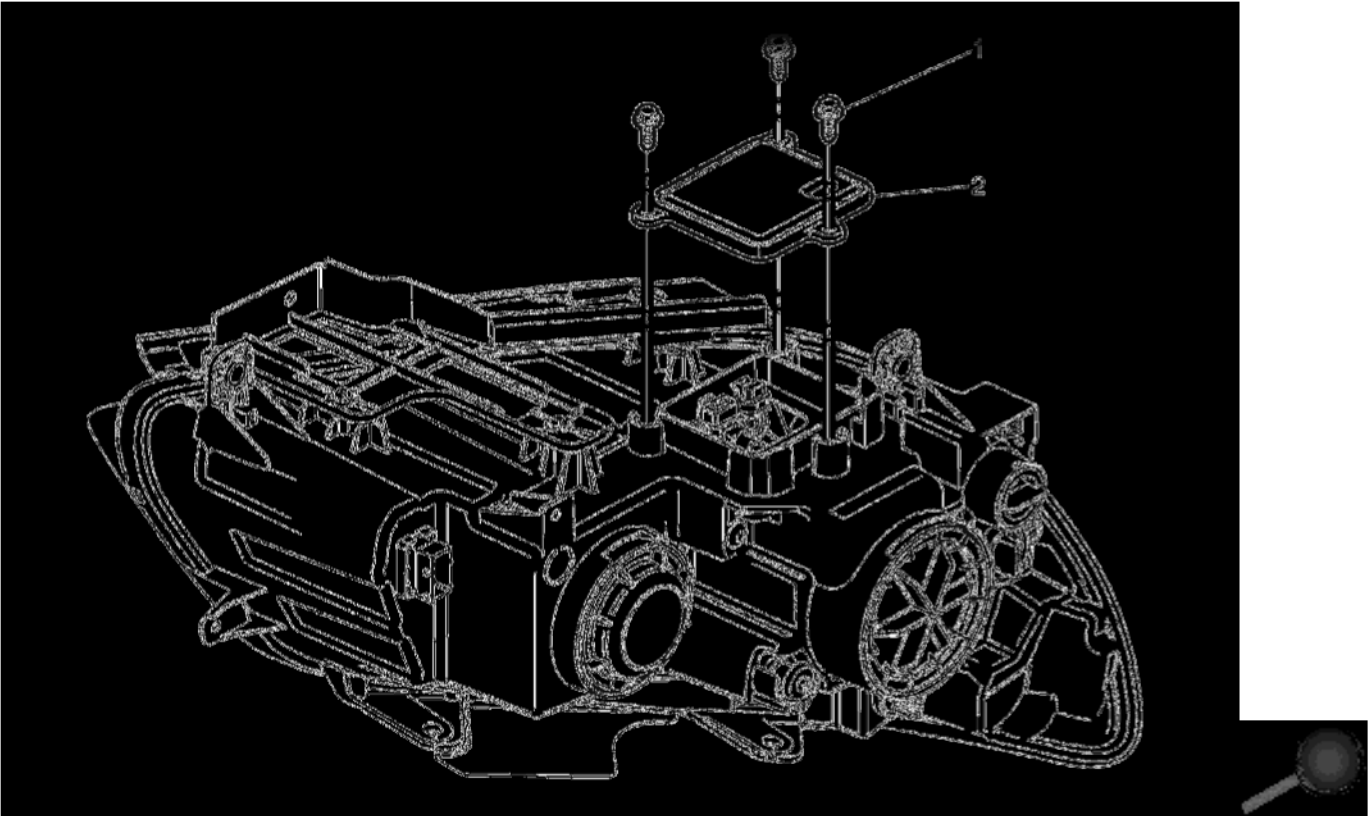
- Never open the high intensity discharge system ballast or the arc tube assembly starter.
- Never probe between the high intensity discharge system ballast output connector and the arc tube assembly.

Preliminary Procedure

1. Remove the coolant recovery reservoir filler tube. Refer to [Coolant Recovery Reservoir Replacement](#).
2. Remove the front wheelhouse liner. Refer to [Front Wheelhouse Liner Replacement](#).

1	Headlamp Bulb Access Cover Bolt (Qty: 6) Caution: Refer to Fastener Caution .
2	Headlamp Bulb Access Cover
3	Low Beam Headlamp Bulb Procedure 1. Disconnect the electrical connector. 2. Rotate the low beam headlamp bulb counterclockwise and pull from the headlamp.

Headlamp Ballast Replacement (Short Wheelbase, Ute)



Headlamp Ballast Replacement

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 or around the high intensity discharge system. © 2014 General Motors. All rights reserved. Warning: The high intensity discharge system produces high voltage and current. To reduce the risk of severe shocks and burns:	

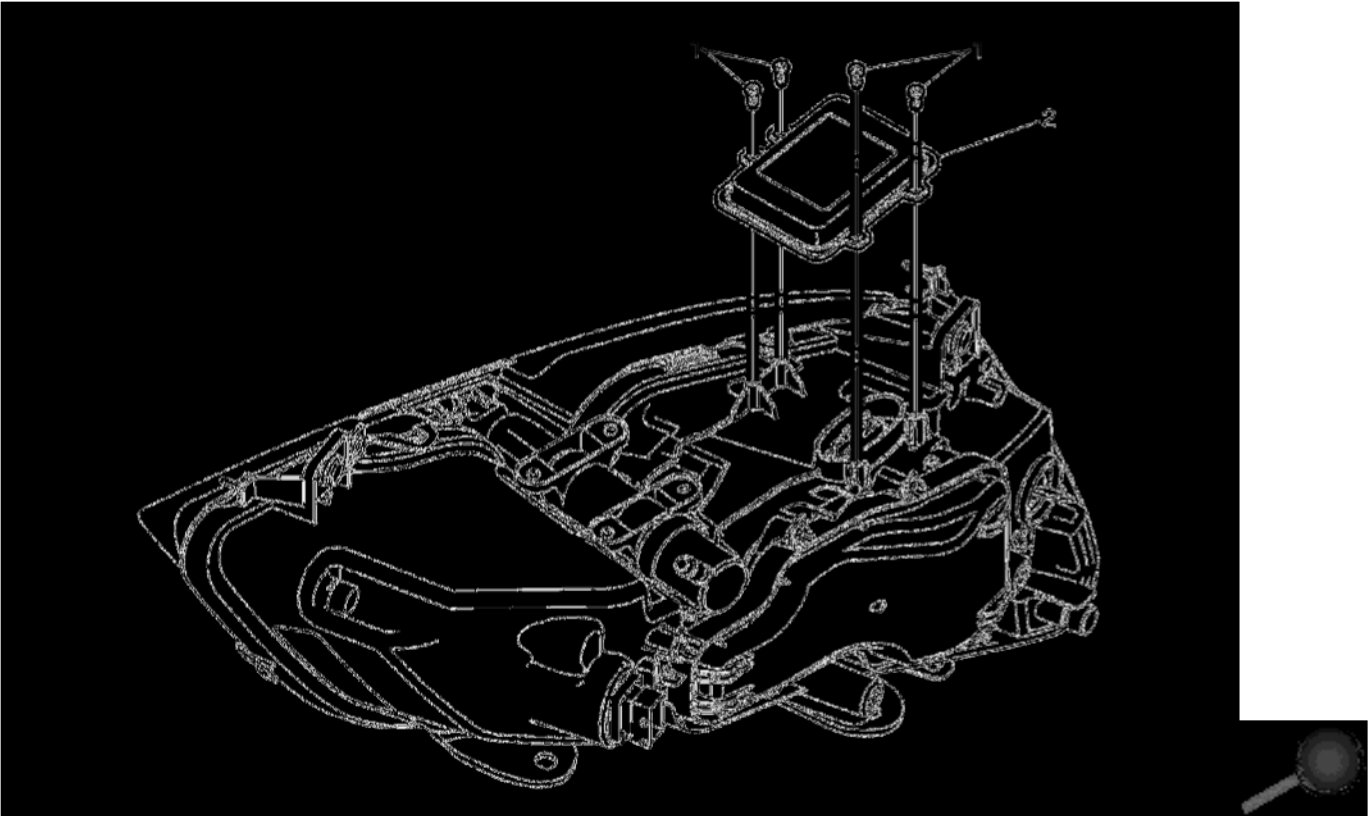
- Never open the high intensity discharge system ballast or the arc tube assembly starter.
- Never probe between the high intensity discharge system ballast output connector and the arc tube assembly.

Preliminary Procedure

Remove the headlamp. Refer to [Headlamp Replacement](#).

1	Headlamp Ballast Screw (Qty: 3) Caution: Refer to Fastener Caution .
2	Headlamp Ballast Procedure Firmly pull the headlamp ballast from headlamp to disengage the electrical connectors.

Headlamp Ballast Replacement (Long Wheelbase)



Headlamp Ballast Replacement

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 or around the high intensity discharge system. © 2014 General Motors. All rights reserved. Warning: The high intensity discharge system produces high voltage and current. To reduce the risk of severe shocks and burns:	

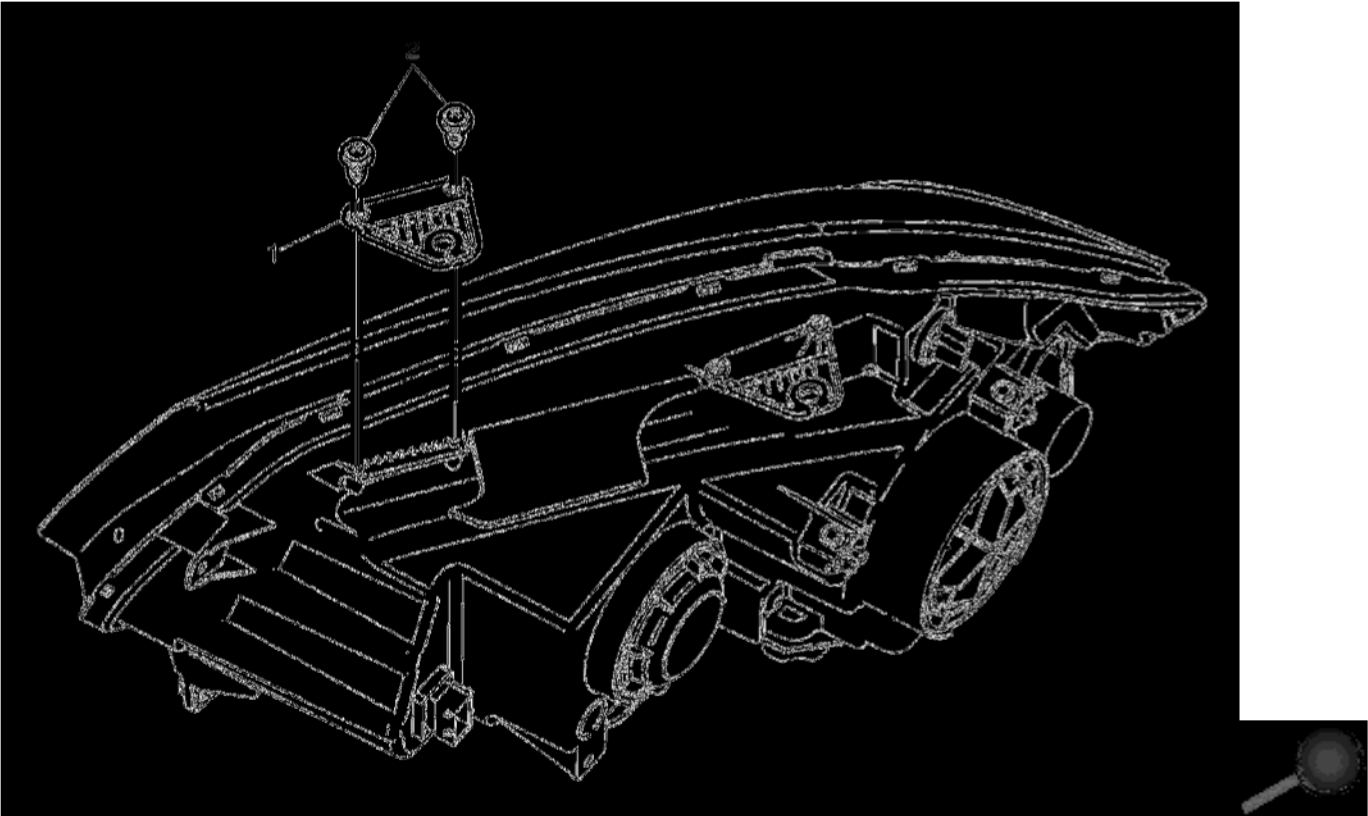
- Never open the high intensity discharge system ballast or the arc tube assembly starter.
- Never probe between the high intensity discharge system ballast output connector and the arc tube assembly.

Preliminary Procedure

Remove the headlamp. Refer to [Headlamp Replacement](#).

1	Headlamp Ballast Screw (Qty: 4) Caution: Refer to Fastener Caution .
2	Headlamp Ballast Procedure Firmly pull the headlamp ballast from the headlamp to disengage the electrical connectors.

Headlamp Bracket Replacement (SWB, Wagon, Ute)



Headlamp Bracket Replacement

Callout	Component Name
Preliminary Procedure Remove the headlamp. Refer to Headlamp Replacement .	
	Headlamp Housing Bracket Procedure

1	1. Cut the attachment tab as shown. 2. Test fit and align mounting holes on headlamp housing bracket and trim if needed.
2	Headlamp Housing Bracket Screw (Qty: 2) Caution: Refer to Fastener Caution. Tighten 0.7 N•m(6 lb in)

Headlamp Aiming (LHD)

Headlamp Aiming

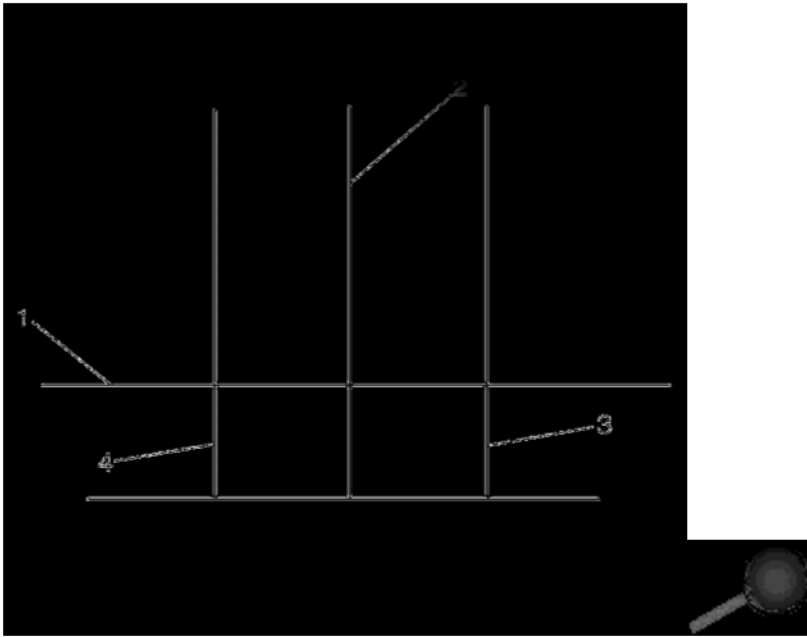
Note: Some state and local laws specify requirements for headlamp aim. All of these laws must be complied with when performing any headlamp aiming operations.

Headlamp aim should be checked:

- When a new headlamp capsule is installed.
- If service or repairs to the front end area have (or may have) disturbed the headlamps or their mounting.

Prior to aiming the headlamps, the following workshop area and equipment are needed:

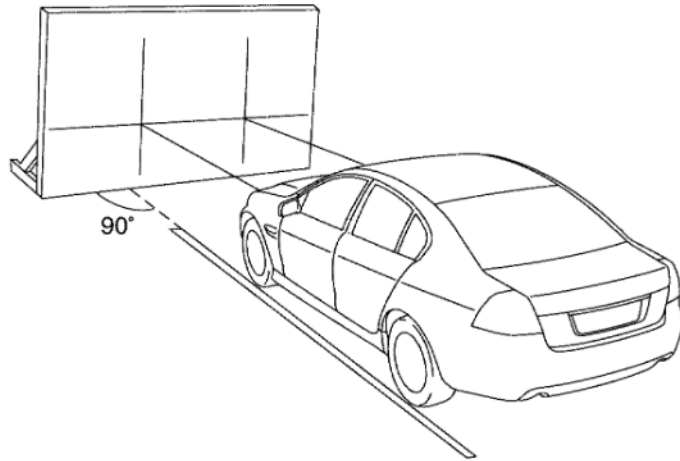
- The area must consist of a level surface large enough to mark reference line the length of a vehicle and an additional 7.62 m (25 ft) measured from the face of the lamps to the front of the aiming screen.
- The screen will be 1.52 m (5 ft) high x 3.66 m (12 ft) wide with a matte white surface well shaded from extraneous light, and correctly adjusted to the floor on which the vehicle stands. Provisions should be made to align the screen parallel with the vehicle.



- The screen must be provided with a fixed vertical centre-line (2) that corresponds to the centre of the vehicle, two laterally adjustable vertical lines (3 and 4) corresponding to the centre of the low beam bulb on each side of the vehicle and one vertically adjustable horizontal line (1) that corresponds to the centre of the front low beam bulb.
- If a regular commercial aiming screen is not available, the screen may consist of a vertical wall having a clear uninterrupted area approximately 1.83 m (6 ft) high and 3.66 m (12 ft) wide. The surface should be finished with a washable non-gloss white paint.

Prior to aiming the headlamps, the following steps must be taken:

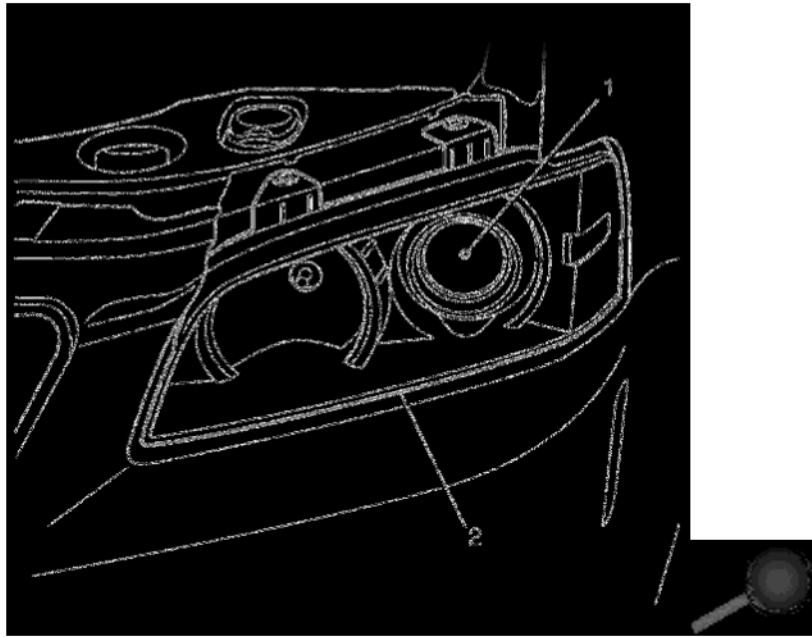
1. Remove any snow, ice or mud from the vehicle.
2. The vehicle must have a full tank of gas.
3. Stop all other work on the vehicle.
4. If any service has been performed on the vehicle, make sure that all of the components are back in their original place.
5. The vehicle must be on a level surface.



6. The vehicle's left tires must be parallel to the reference line with the face of the headlamps extending 7.62 m (25 ft) from the front of the aiming screen.
7. DO NOT load any cargo in the vehicle.
8. The vehicle must contain 1 person or 72.56 kg (160 lb) on the driver's seat.
9. Inflate the tires to the correct pressure.
10. Simulate the vehicle loads if the intended use of the vehicle is for hauling heavy loads or towing a trailer.
11. Rock the vehicle in order to stabilize the suspension.

Headlamp Aiming Procedure

1. Open the hood.

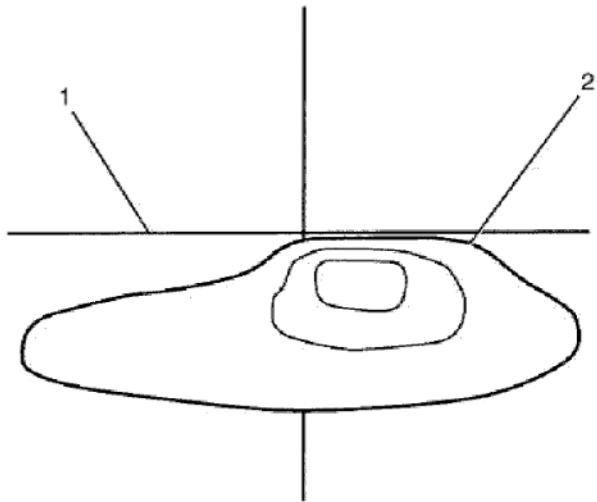


Note: Left headlamp shown. Right headlamp similar.

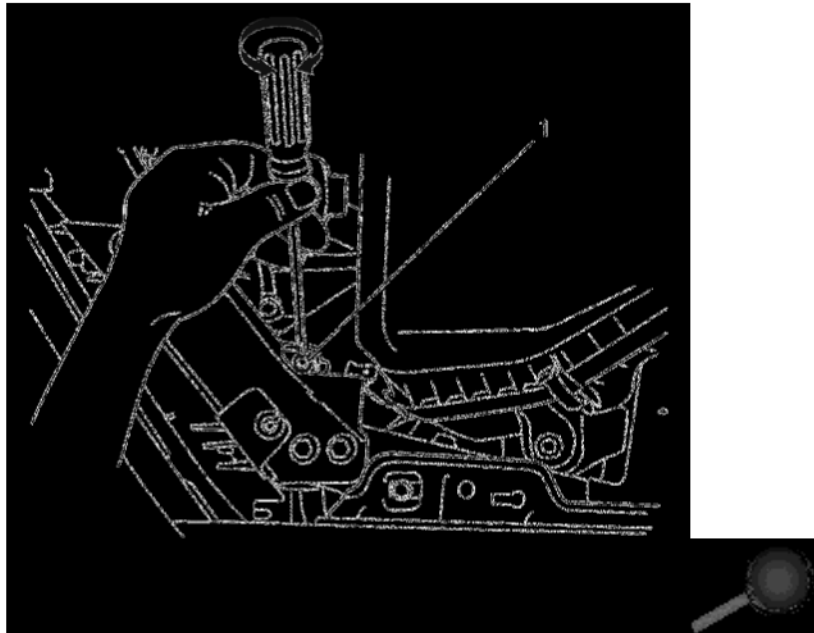
2. Locate the aim dot (1) on the low-beam side of the headlamp lens (2).
3. Measure the distance from the ground to the aim dot (1). Record the distance.
4. Repeat for the right headlamp.
5. At the screen, measure from the floor and place the horizontal tape at the recorded distances from steps 3 and 4.
6. Measure from the reference line on the floor to the left headlamp bulb centerline. Record the distance.
7. At the screen, measure from the reference line and place the vertical tape at the recorded distance from step 6.
8. Measure from the reference line on the floor to the right headlamp bulb centerline. Record the distance.
9. At the screen, measure from the reference line and place the vertical tape at the recorded distance from step 8.

Caution: Do not cover a headlamp to improve beam cut-off when aiming. Covering a headlamp may cause excessive heat build-up which may cause damage to the headlamp.

10. Turn the low beam headlamps to the ON position and block the light from projecting onto the screen from the right headlamp.



11. The top edge of the beam cut-off (2) should be positioned at the bottom edge of the horizontal tape line (1).



Note: Horizontal headlamp adjustment does not exist.

Note: To adjust the vertical aim of the headlamps, use a suitable tool to turn the headlamp adjuster (1) clockwise to raise the beam or counter-clockwise to lower the beam.

12. Adjust the vertical aim of the headlamps to the specifications required by the state and the local authorities, or as shown in step 11.
13. Repeat steps 11 and 12 for the right hand headlamp while blocking the light from projecting onto the screen from the left headlamp.
14. Close the hood.

Headlamp Aiming (RHD)

[Headlamp Aiming](#)

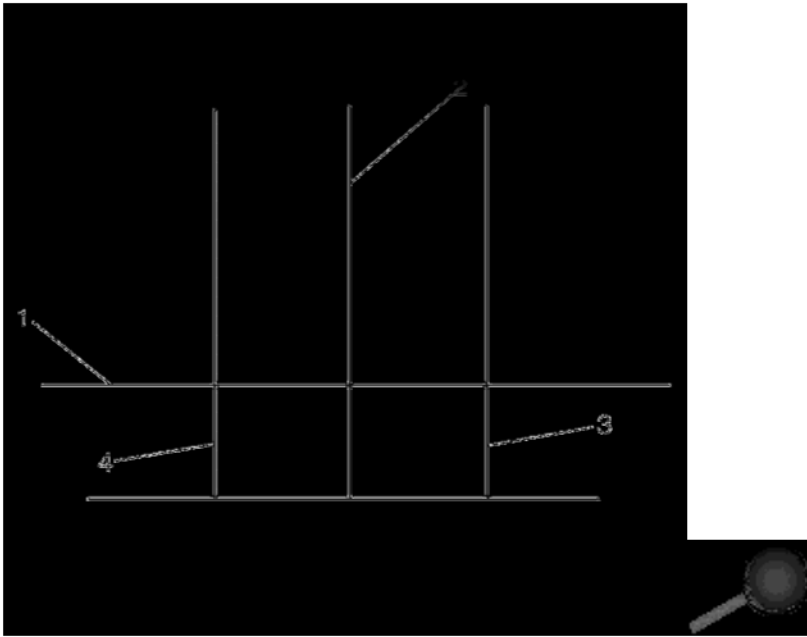
Note: Some state and local laws specify requirements for headlamp aim. All of these laws must be complied with when performing any headlamp aiming operations.

Headlamp aim should be checked:

- When a new headlamp capsule is installed.
- If service or repairs to the front end area have (or may have) disturbed the headlamps or their mounting.

Prior to aiming the headlamps, the following workshop area and equipment are needed:

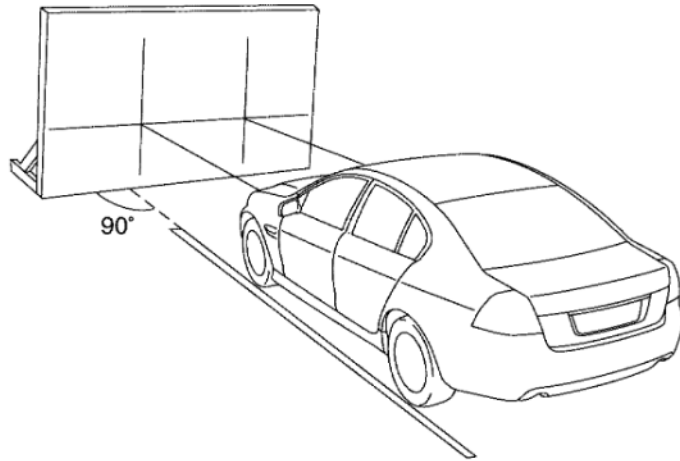
- The area must consist of a level surface large enough to a mark reference line the length of a vehicle and an additional 7.62 m (25 ft) measured from the face of the lamps to the front of the aiming screen.
- The screen will be 1.52 m (5 ft) high x 3.66 m (12 ft) wide with a matte white surface well shaded from extraneous light, and correctly adjusted to the floor on which the vehicle stands. Provisions should be made to align the screen parallel with the vehicle.



- The screen must be provided with a fixed vertical centre-line (2) that corresponds to the centre of the vehicle, two laterally adjustable vertical lines (3 and 4) corresponding to the centre of the low beam bulb on each side of the vehicle and one vertically adjustable horizontal line (1) that corresponds to the centre of the front low beam bulb.
- If a regular commercial aiming screen is not available, the screen may consist of a vertical wall having a clear uninterrupted area approximately 1.83 m (6 ft) high and 3.66 m (12 ft) wide. The surface should be finished with a washable non-gloss white paint.

Prior to aiming the headlamps, the following steps must be taken:

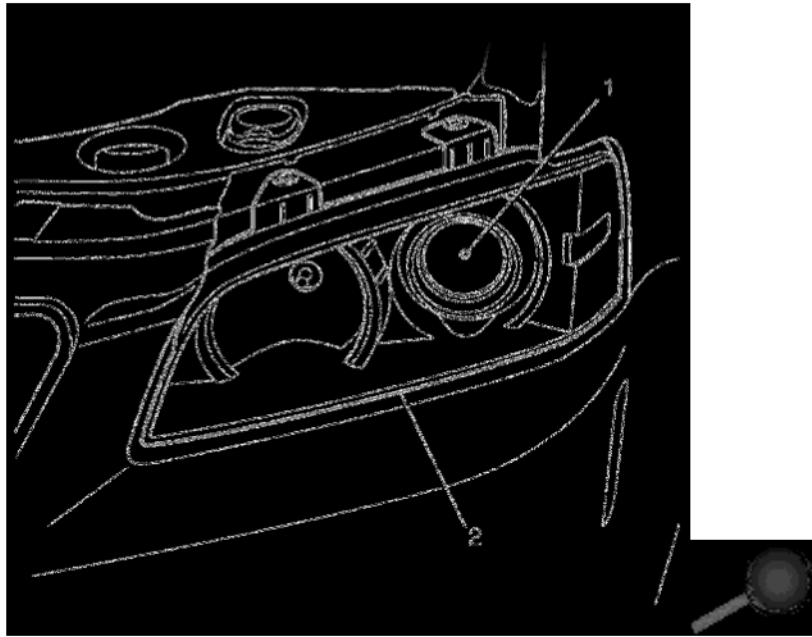
1. Remove any snow, ice or mud from the vehicle.
2. The vehicle must have a full tank of fuel.
3. Stop all other work on the vehicle.
4. If any service has been performed on the vehicle, make sure that all of the components are back in their original place.
5. The vehicle must be on a level surface.



6. The vehicle's left tires must be parallel to the reference line with the face of the headlamps extending 7.62 m (25 ft) from the front of the aiming screen.
7. DO NOT load any cargo in the vehicle.
8. The vehicle must contain 1 person or 72.56 kg (160 lb) on the driver's seat.
9. Inflate the tires to the correct pressure.
10. Simulate the vehicle loads if the intended use of the vehicle is for hauling heavy loads or towing a trailer.
11. Rock the vehicle in order to stabilize the suspension.

Headlamp Aiming Procedure

1. Open the hood.

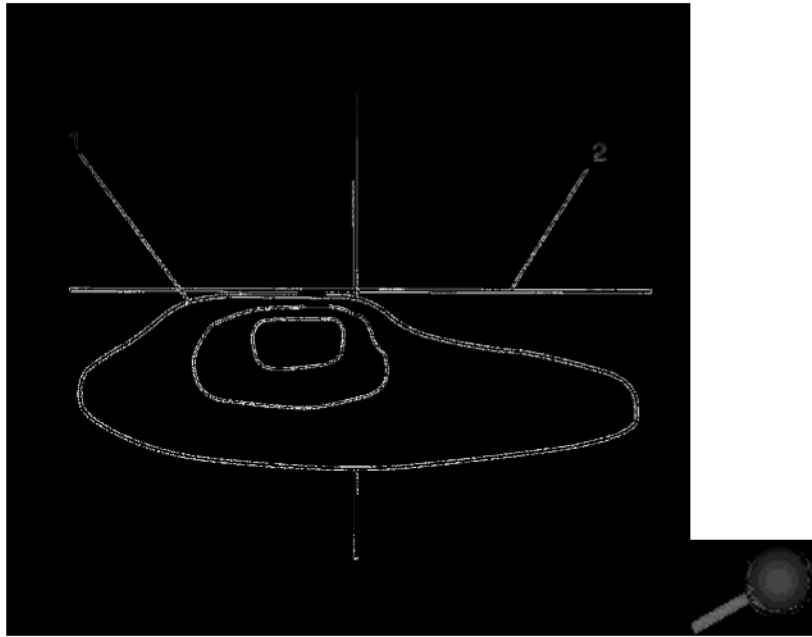


Note: Left headlamp shown. Right headlamp similar.

2. Locate the aim dot (1) on the low-beam side of the headlamp lens (2).
3. Measure the distance from the ground to the aim dot (1). Record the distance.
4. Repeat for the right headlamp.
5. At the screen, measure from the floor and place the horizontal tape at the recorded distances from steps 3 and 4.
6. Measure from the reference line on the floor to the left headlamp bulb centerline. Record the distance.
7. At the screen, measure from the reference line and place the vertical tape at the recorded distance from step 6.
8. Measure from the reference line on the floor to the right headlamp bulb centerline. Record the distance.
9. At the screen, measure from the reference line and place the vertical tape at the recorded distance from step 8.

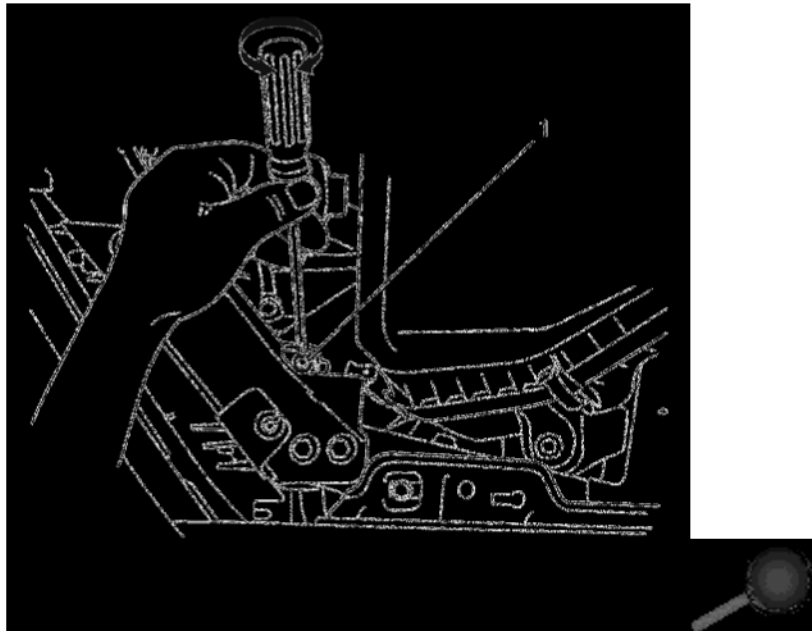
Caution: Do not cover a headlamp to improve beam cut-off when aiming. Covering a headlamp may cause excessive heat build-up which may cause damage to the headlamp.

10. Turn the low beam headlamps to the ON position and block the light from projecting onto the screen from the right headlamp.



Note: This is for right hand drive (RHD) variants only.

11. The top edge of the beam cut-off (2) should be positioned at the bottom edge of the horizontal tape line (1).

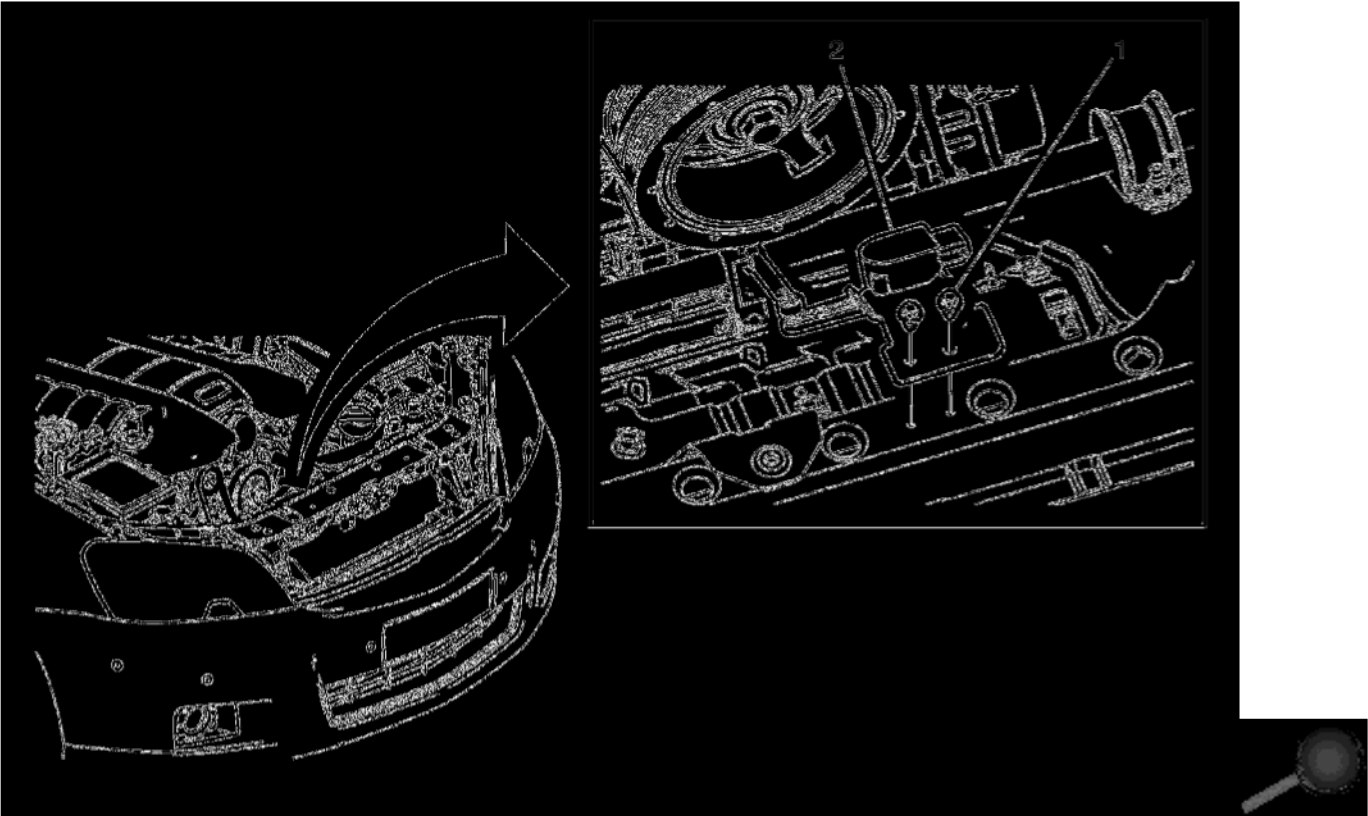


Note: Horizontal headlamp adjustment does not exist.

Note: To adjust the vertical aim of the headlamps, use a suitable tool to turn the headlamp adjuster (1) counter-clockwise to raise the beam or clockwise to lower the beam.

12. Adjust the vertical aim of the headlamps to the specifications required by the state and the local authorities, or as shown in step 11.
13. Repeat step 11 for the right hand headlamp while blocking the light from projecting onto the screen from the left headlamp.
14. Close the hood.

Headlamp Leveling Front Suspension Height Sensor Replacement (Long Wheelbase)

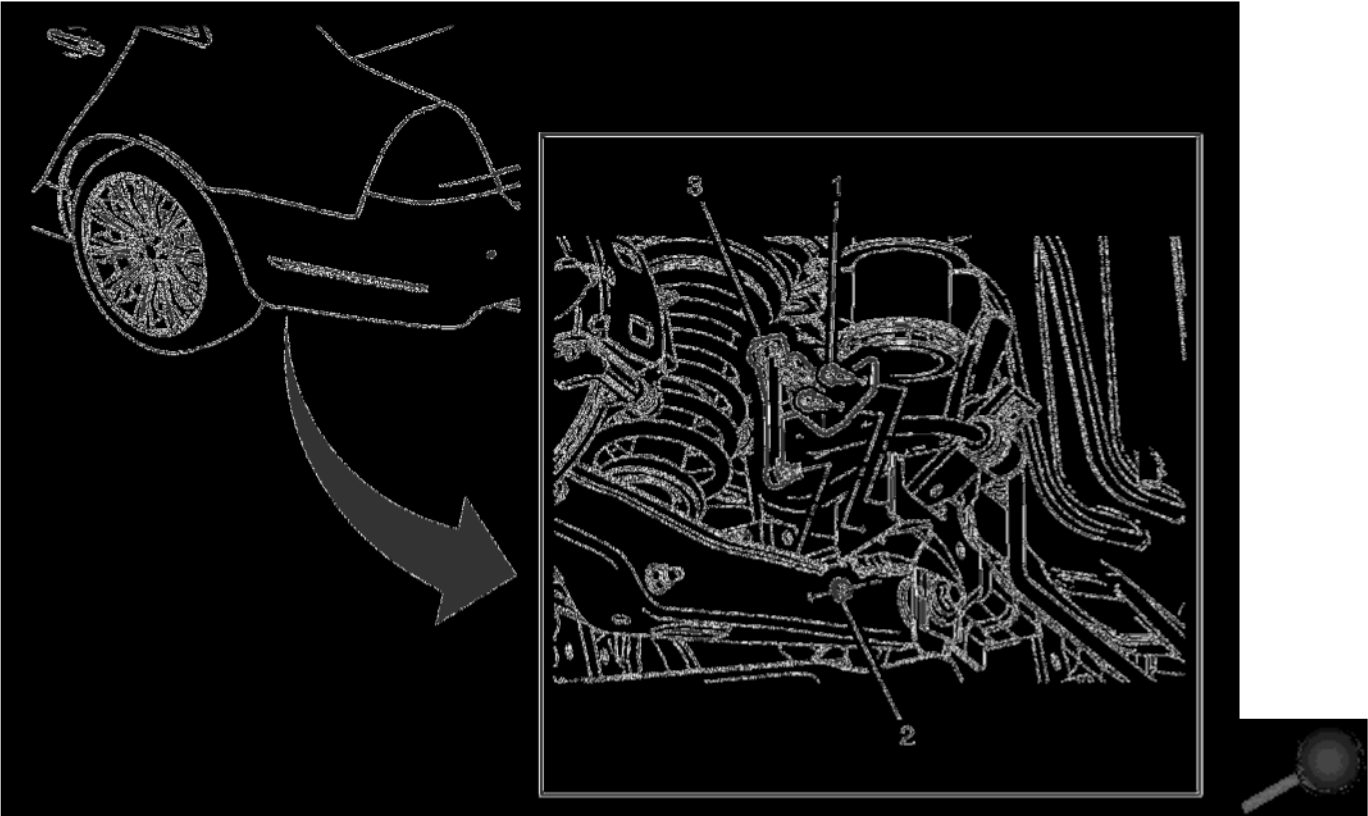


Headlamp Leveling Front Suspension Height Sensor Replacement

Callout	Component Name
Preliminary Procedure Open and support the hood.	

1	Headlamp Leveling Front Suspension Height Sensor Bolt (Qty: 2) Caution: Refer to Fastener Caution. Tighten 9 N•m(80 lb in)
2	Headlamp Leveling Front Suspension Height Sensor Procedure 1. Disconnect the electrical connector. 2. With a suitable pry tool release the headlamp leveling front suspension height sensor arm from the ball screw.

Headlamp Leveling Rear Suspension Height Sensor Replacement (Long Wheelbase)

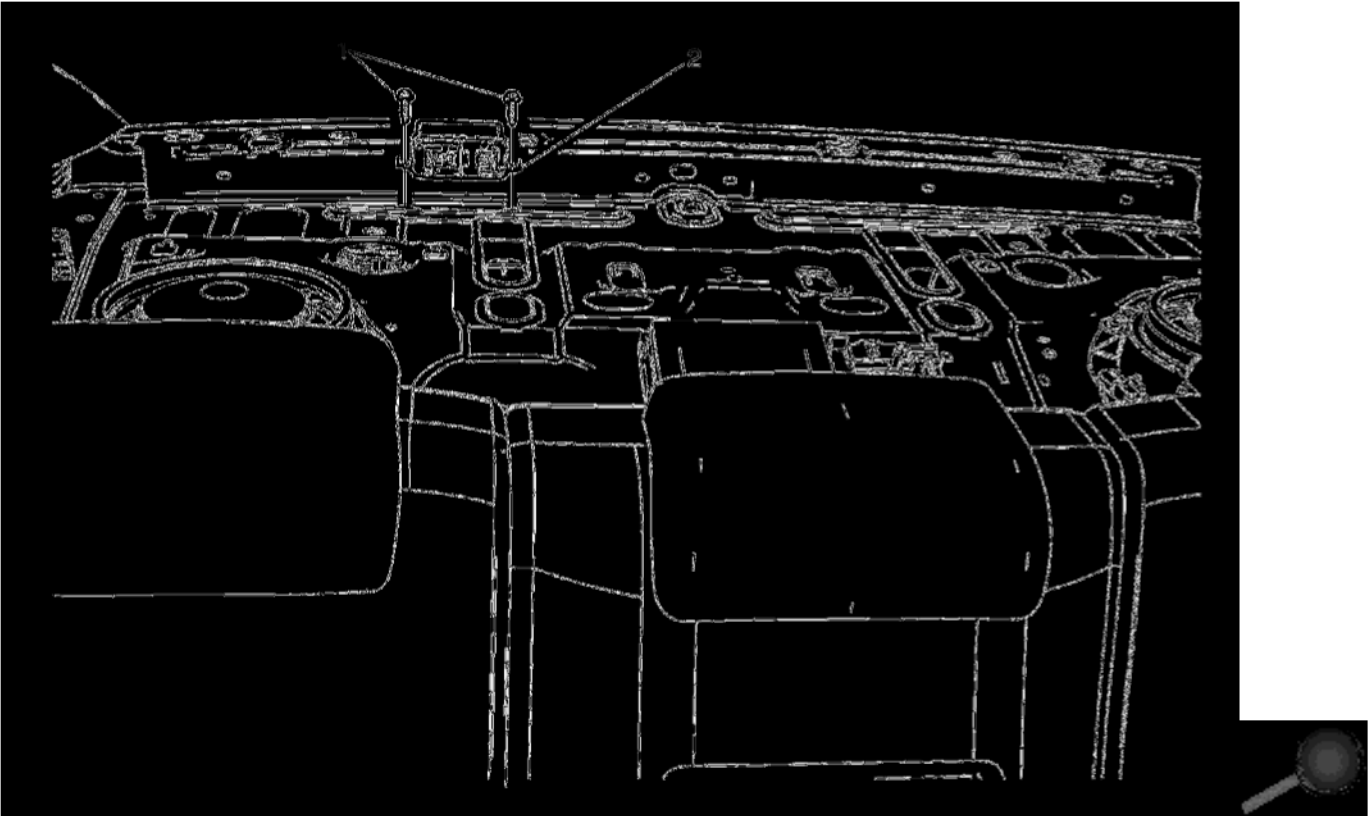


Headlamp Leveling Rear Suspension Height Sensor Replacement

Callout	Component Name
Preliminary Procedure Raise and support the vehicle.	

1	Headlamp Leveling Rear Suspension Height Sensor Bolt (Qty: 2) Caution: Refer to Fastener Caution . Tighten 7 N•m(62 lb in)
2	Headlamp Leveling Rear Suspension Height Sensor Nut Caution: Refer to Fastener Caution .
3	Headlamp Leveling Rear Suspension Height Sensor

Headlamp Control Module Replacement

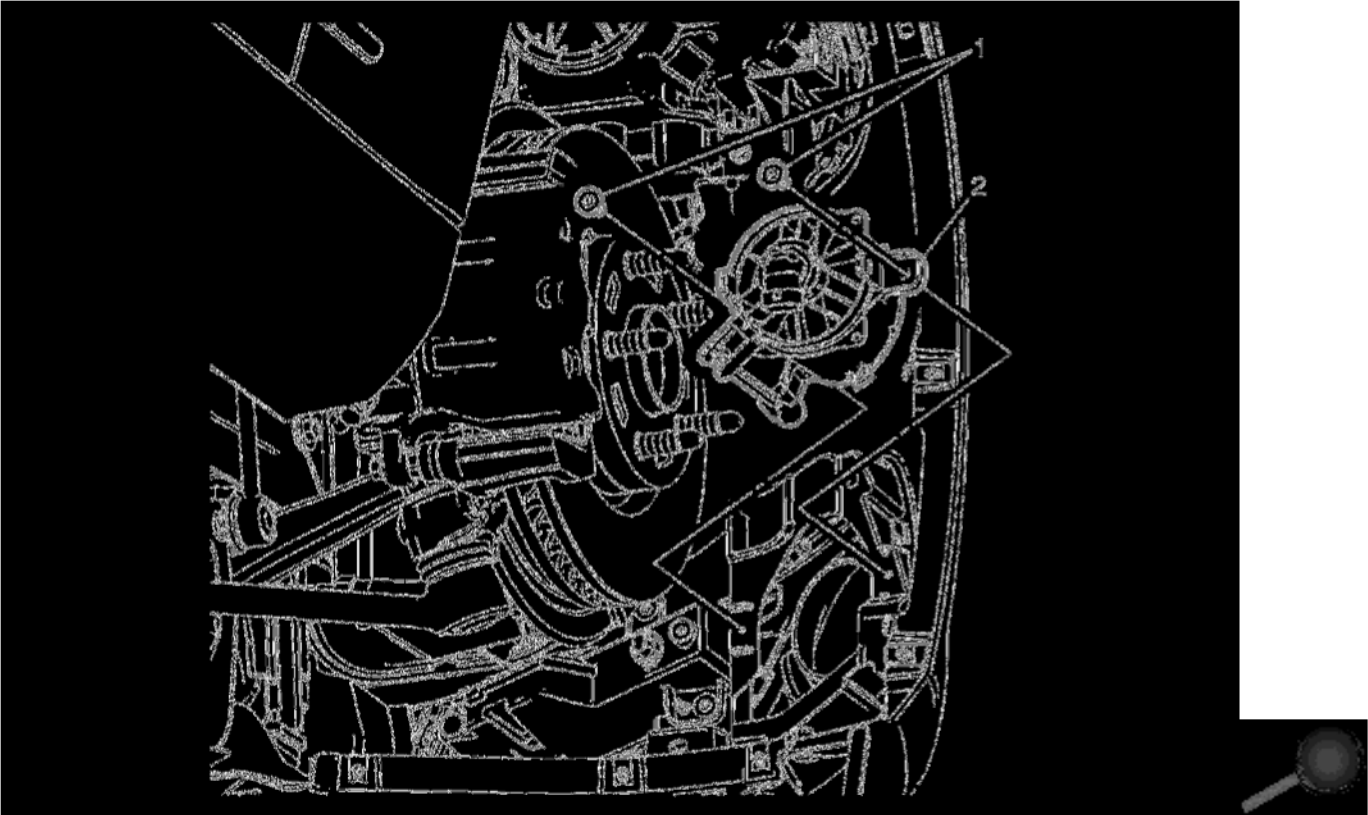


Headlamp Control Module Replacement

Callout	Component Name
Preliminary Procedure Remove the rear window trim panel. Refer to Rear Window Panel Trim Replacement . © 2014 General Motors. All rights reserved.	
1	Headlamp Control Module Fasteners (Qty: 2) Caution: Refer to Fastener Caution .

2	Headlamp Control Module Procedure 1. Disconnect the electrical connector. 2. For programming and set up information, refer to Control Module References.
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Front Fog Lamp Replacement (Calais, SS)

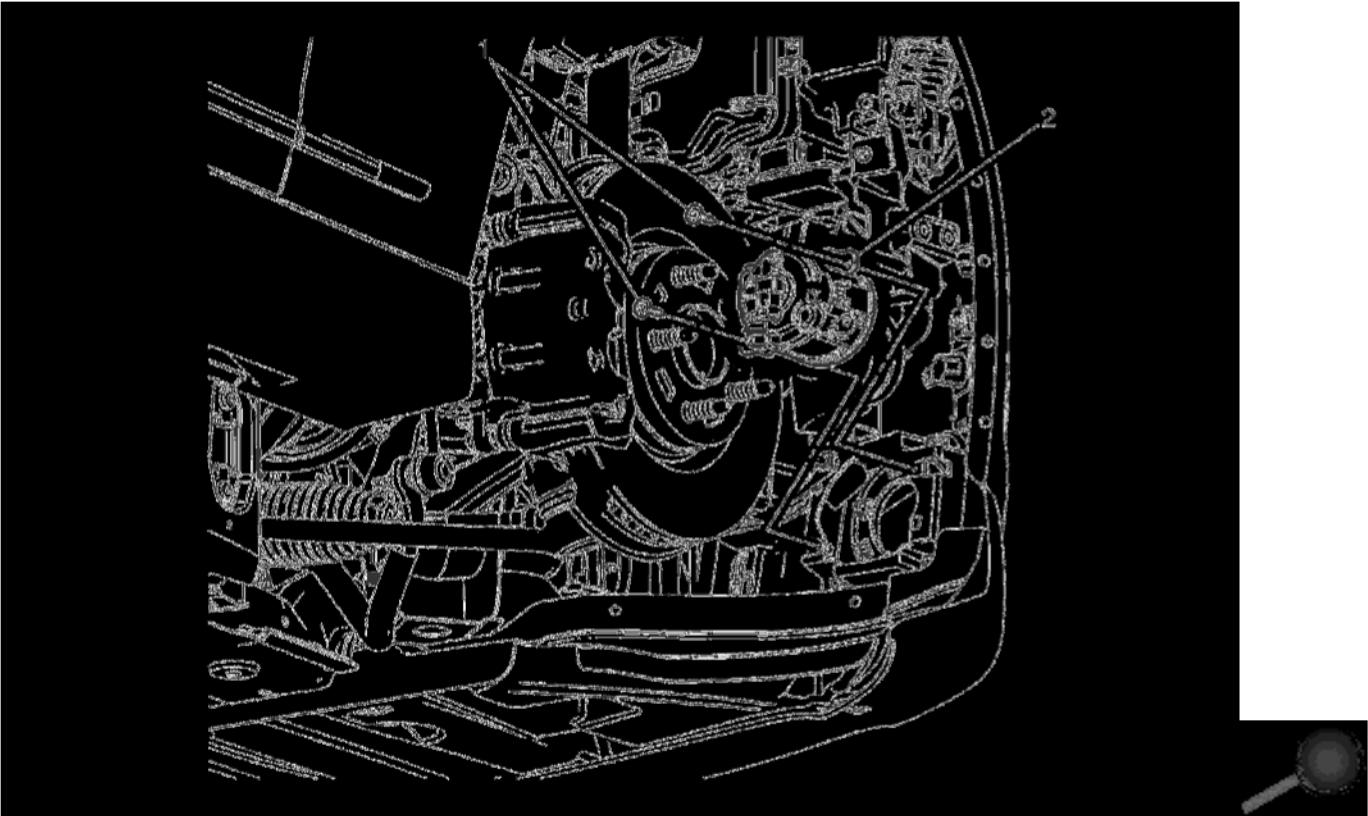


Front Fog Lamp Replacement

Callout	Component Name
Preliminary Procedure Remove the front wheelhouse liner. Refer to Front Wheelhouse Liner Replacement . © 2014 General Motors. All rights reserved.	
1	Front Fog Lamp Screw (Qty: 2) Caution: Refer to Fastener Caution .

2	Front Fog Lamp Procedure 1. Disconnect the electrical connector. 2. Pull the front fog lamp straight out from the front bumper fascia. 3. After installation aim the fog lamps. Refer to Fog Lamp Aiming.
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Front Fog Lamp Replacement (Long Wheelbase)

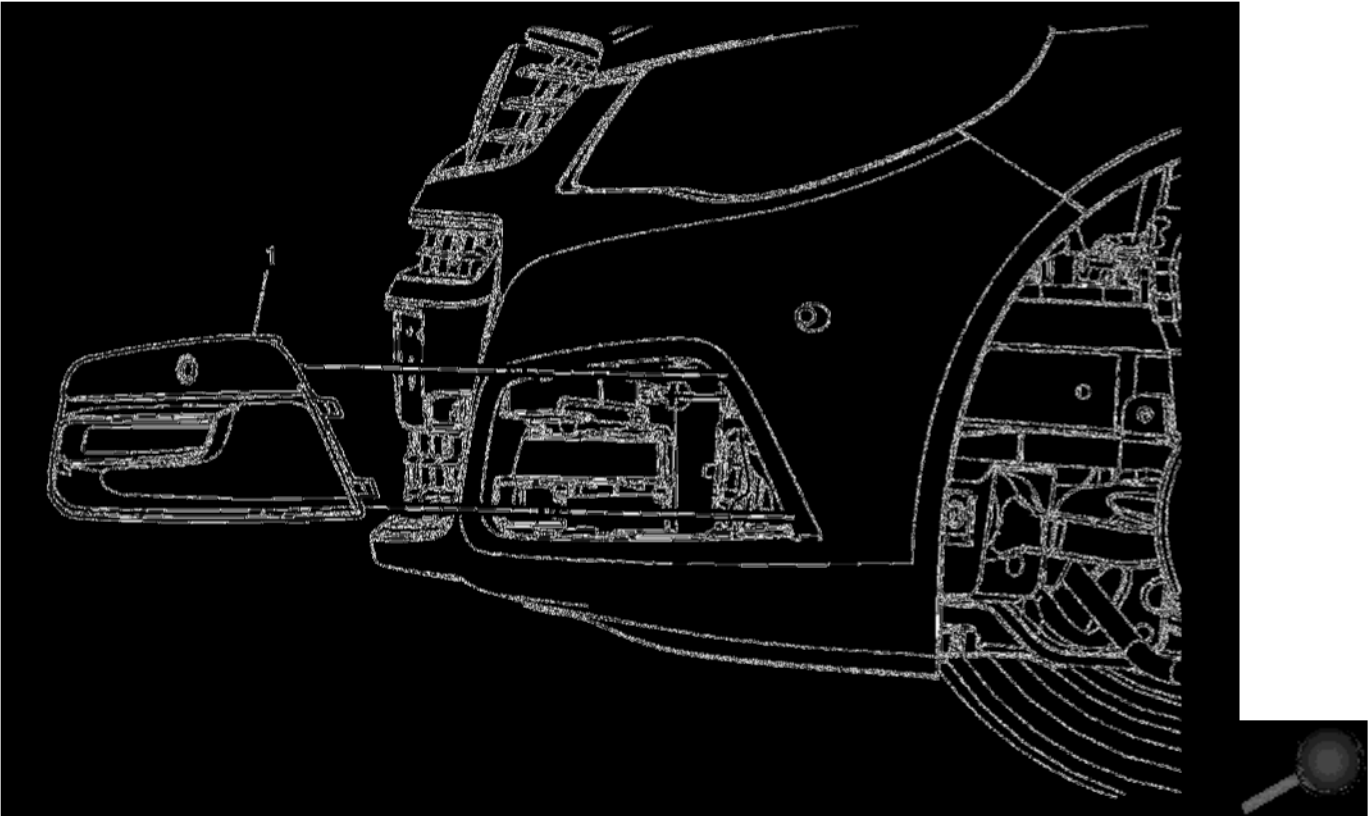


Front Fog Lamp Replacement

Callout	Component Name
Preliminary Procedure Remove the front wheelhouse liner. Refer to Front Wheelhouse Liner Replacement . © 2014 General Motors. All rights reserved.	
1	Front Fog Lamp Screw (Qty: 2) Caution: Refer to Fastener Caution .

2	Front Fog Lamp Procedure 1. Disconnect the electrical connector. 2. Pull the front fog lamp straight out from the front bumper fascia. 3. After installation aim the fog lamps. Refer to Fog Lamp Aiming.
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Front Fog Lamp Opening Cover Replacement (Short Wheelbase SS and SV6)



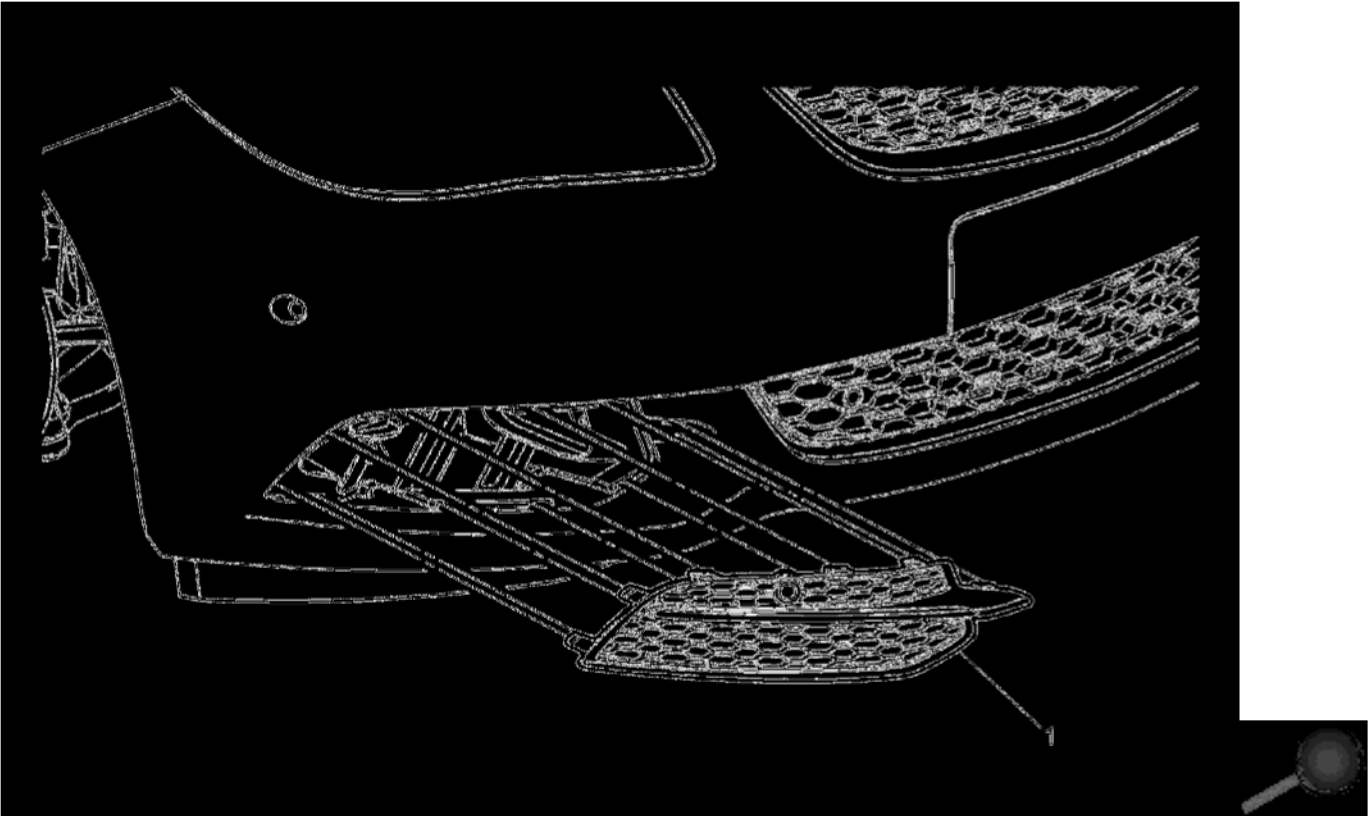
Front Fog Lamp Opening Cover Replacement

Callout	Component Name
Preliminary Procedure Remove the front wheelhouse liner. Refer to Front Wheelhouse Liner Replacement .	
	Front Fog Lamp Opening Cover Procedure

1

1. Disconnect the electrical connector.
2. Release the 11 locking tabs from the front bumper fascia and pull forward.

Front Fog Lamp Opening Cover Replacement (Evoke)



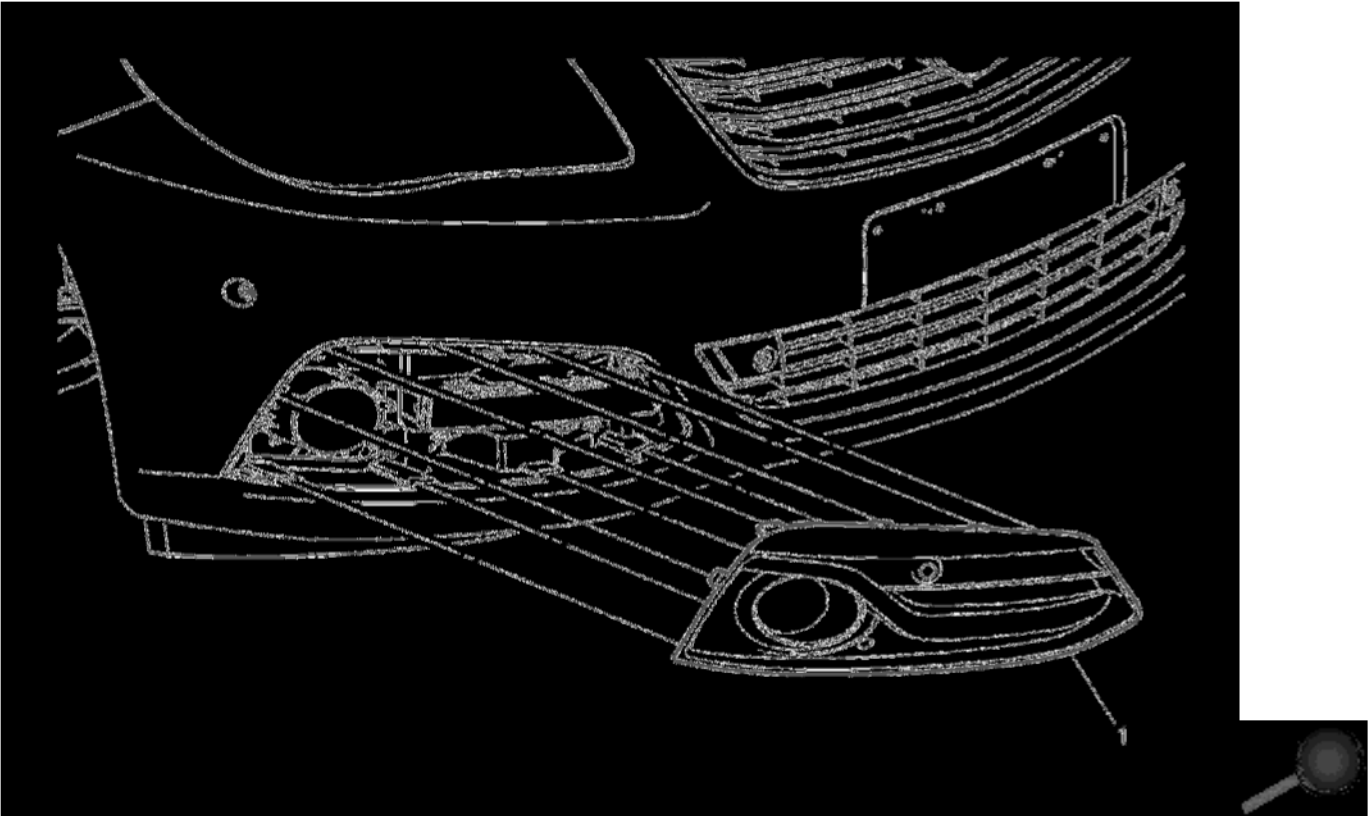
Front Fog Lamp Opening Cover Replacement

Callout	Component Name
Preliminary Procedure Remove the front wheelhouse liner. Refer to Front Wheelhouse Liner Replacement . © 2014 General Motors. All rights reserved.	
	Front Fog Lamp Opening Cover Procedure

1

1. Disconnect the electrical connector.
2. Release the 11 locking tabs from the front bumper fascia and pull forward.

Front Fog Lamp Opening Cover Replacement (Short Wheelbase Calais and SS)

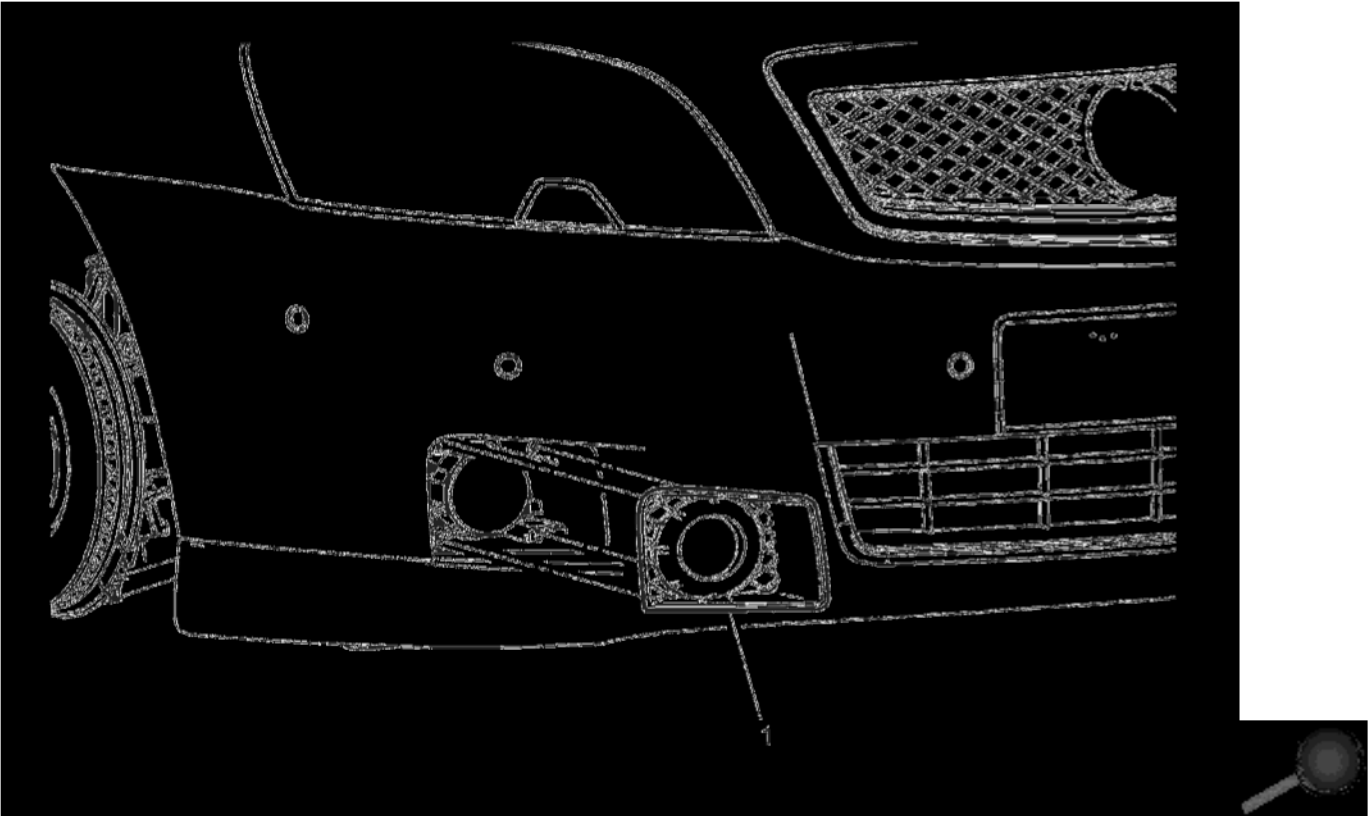


Front Fog Lamp Opening Cover Replacement

Callout	Component Name
Preliminary Procedure	
1. Remove the front wheelhouse liner. Refer to Front Wheelhouse Liner Replacement .	
2. Remove the front fog lamp. Refer to Front Fog Lamp Replacement .	
3. Remove the front daytime running lamp. Refer to Daytime Running Lamp Replacement .	

1	Front Fog Lamp Opening Cover Procedure 1. Disconnect the electrical connector. 2. Release the 9 locking tabs from the front bumper fascia and pull forward.
---	--

Front Fog Lamp Opening Cover Replacement (Long Wheelbase)



Front Fog Lamp Opening Cover Replacement

Callout	Component Name
Preliminary Procedure Remove the front wheelhouse liner. Refer to Front Wheelhouse Liner Replacement .	
	Front Fog Lamp Opening Cover Procedure

1

1. Disconnect the electrical connector.
2. Release the 4 locking tabs from the front bumper fascia and pull forward.

Fog Lamp Aiming (Calais)

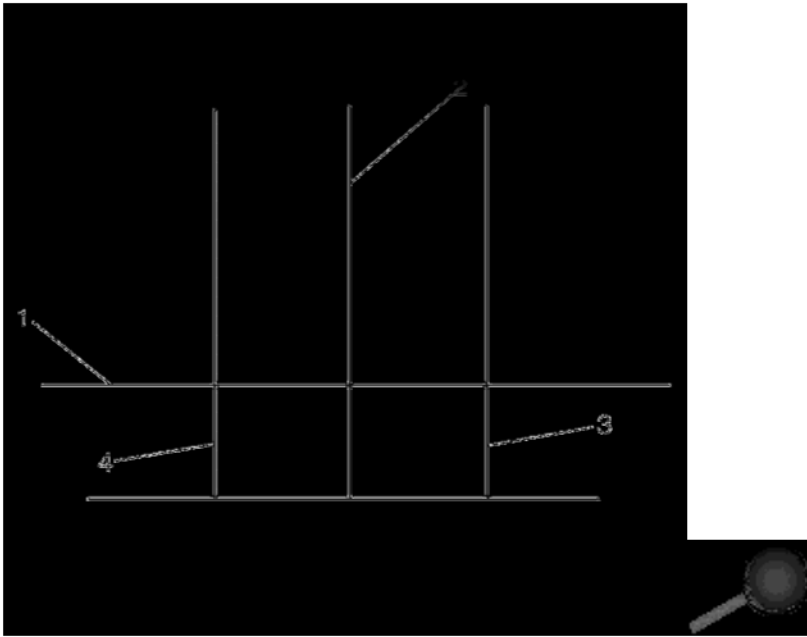
Aiming Procedure

The front fog lamps must be aimed for correct illumination of the road. The front fog lamp aim should be checked:

- At least once a year
- When a new front fog lamp assembly or bulb is installed
- If service or repairs to the front end area have (or may have) disturbed the fog lamp mounting

Prior to aiming the front fog lamps, the following workshop area and equipment are needed:

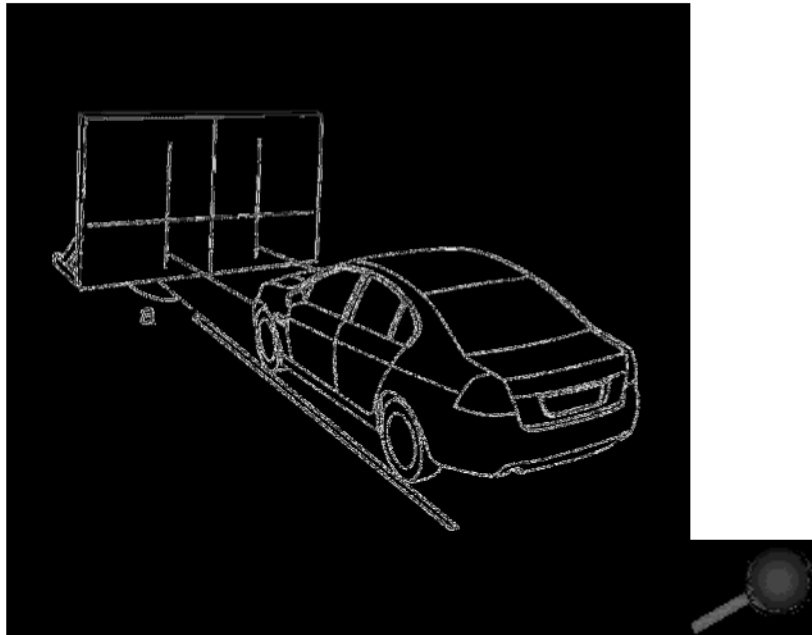
- The area must consist of a level surface large enough to mark a reference line the length of a vehicle and an additional 7.62 m (25 ft) measured from the face of the lamps to the front of the aiming screen.
- The screen will be 1.52 m (5 ft) high x 3.66 m (12 ft) wide with a matte white surface well shaded from extraneous light, and correctly adjusted to the floor on which the vehicle stands. Provisions should be made to align the screen parallel with the vehicle.



- The screen must be provided with a fixed vertical centre-line (2) that corresponds to the centre of the vehicle, two laterally adjustable vertical lines (3 and 4) corresponding to the centre of the front fog lamp bulb on each side of the vehicle and one vertically adjustable horizontal line (1) that corresponds to the centre of the front fog lamp bulb.
- If a regular commercial aiming screen is not available, the screen may consist of a vertical wall having a clear uninterrupted area approximately 1.83 m (6 ft) high and 3.66 m (12 ft) wide. The surface should be finished with a washable non-gloss white paint.

Prior to aiming the front fog lamps, the following steps must be taken:

1. Remove any snow, ice or mud from the vehicle.
2. The vehicle must have a full tank of gas.
3. Stop all other work on the vehicle.
4. If any service has been performed on the vehicle, make sure that all of the components are back in their original place.
5. The vehicle must be on a level surface.



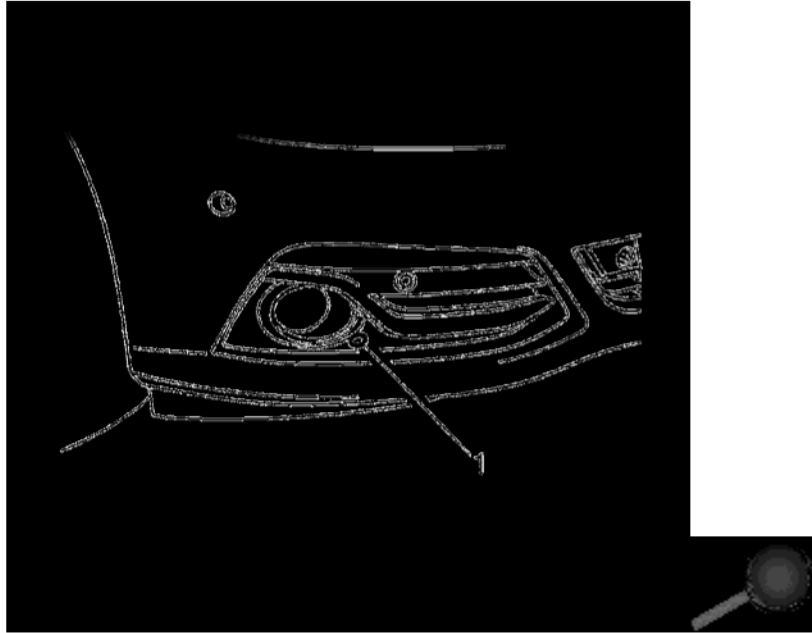
6. The vehicle left tires must be parallel to reference line with the face of the front fog lamps extending 7.62 m (25 ft) from the front of the aiming screen.
7. DO NOT load any cargo in the vehicle.
8. The vehicle must contain 1 person or 72.56 kg (160 lb) on the driver's seat.
9. Inflate the tires to the correct pressure.
10. Simulate the vehicle loads if the intended use of the vehicle is for hauling heavy loads or towing a trailer.
11. Rock the vehicle in order to stabilize the suspension.

Adjustment Procedure

1. Measure the distance from the ground to the centre of the front fog lamp. Record the distance.
2. Repeat for the right front fog lamp.
3. At the screen, measure from the floor and place the horizontal tape at the recorded distances from steps 1 and 2.
4. Measure from the reference line on the floor to the left front fog lamp bulb centre-line. Record the distance.
5. At the screen, measure from the reference line and place the vertical tape at the recorded distance from step 4.
6. Measure from the reference line on the floor to the right front fog lamp bulb centre-line. Record the distance.
7. At the screen, measure from the reference line and place the vertical tape at the recorded distance from step 6.

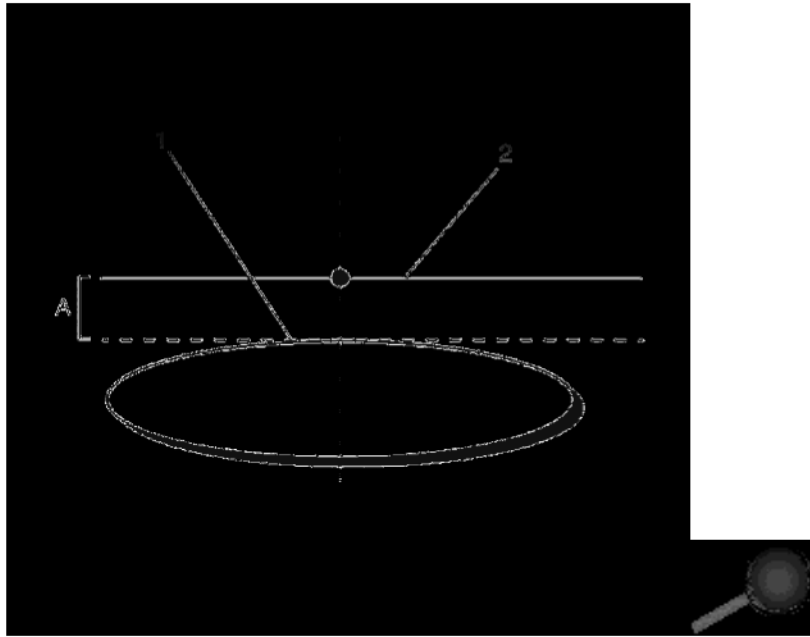
Note: DO NOT cover the headlamps, this may cause excessive heat buildup.

8. Turn the front fog lamps to the ON position and block the light from projecting onto the screen from the headlamps and the right front fog lamp.



Note: Right front fog lamp shown. Left front fog lamp similar.

9. Access the driving lamp vertical adjuster through the opening (1) in the front bumper fascia.



Note: Horizontal headlamp adjustment does not exist.

Note: To adjust the vertical aim of the front fog lamps, use a suitable tool to turn the front fog lamp adjuster clockwise to raise the beam or counter-clockwise to lower the beam.

10. Adjust the vertical aim of the front fog lamp so that distance (A), from the horizontal centre-line (2) to the top edge of the high intensity zone on the screen (1), is 102 mm (4 in).

Note: DO NOT cover the headlamps, this may cause excessive heat buildup.

11. Repeat steps 9 and 10 for the right front fog lamp while blocking the light from projecting onto the screen from the headlamps and the left hand front fog lamp.
12. Turn OFF the front fog lamps.

Fog Lamp Aiming (Long Wheelbase)

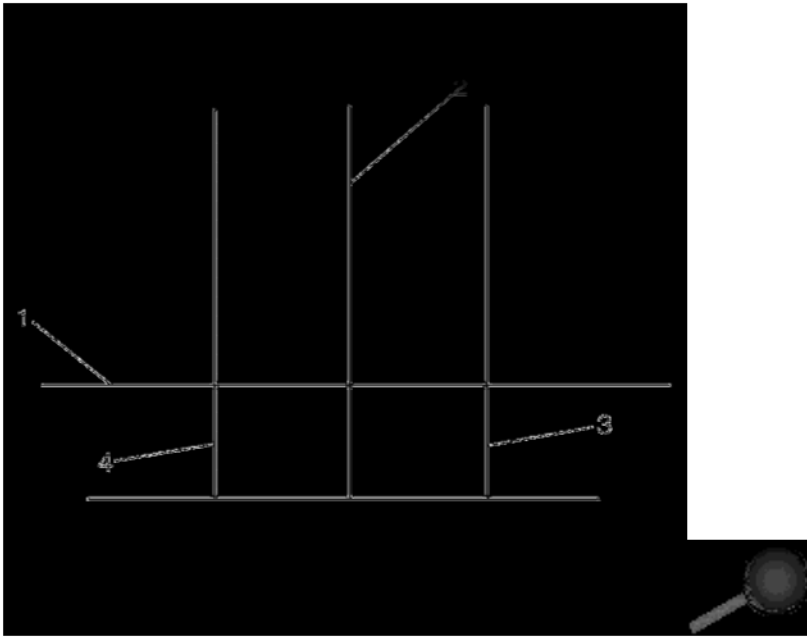
Aiming Procedure

The front fog lamps must be aimed for correct illumination of the road. The front fog lamp aim should be checked:

- At least once a year.
- When a new front fog lamp assembly or bulb is installed.
- If service or repairs to the front end area have (or may have) disturbed the fog lamp mounting.

Prior to aiming the front fog lamps, the following workshop area and equipment are needed:

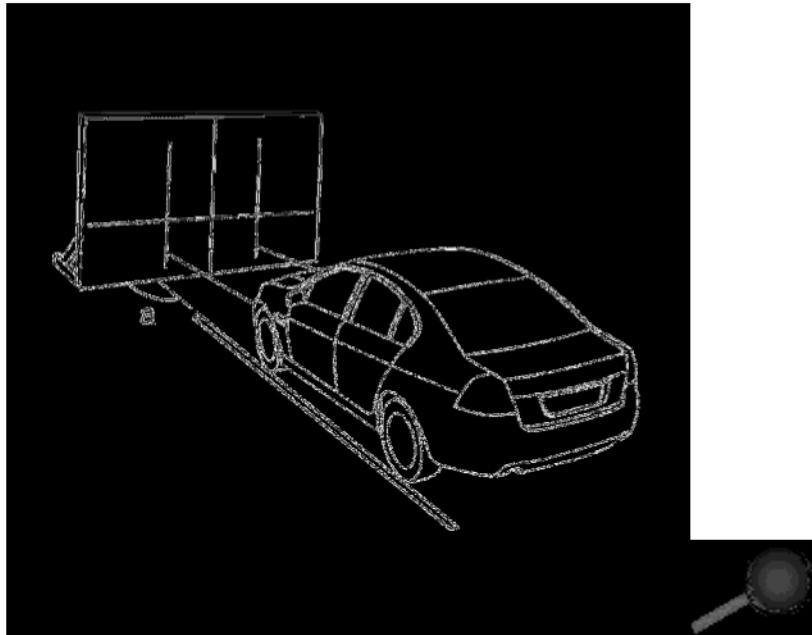
- The area must consist of a level surface large enough to mark a reference line the length of a vehicle and an additional 7.62 m (25 ft) measured from the face of the lamps to the front of the aiming screen.
- The screen will be 1.52 m (5 ft) high x 3.66 m (12 ft) wide with a matte white surface well shaded from extraneous light, and correctly adjusted to the floor on which the vehicle stands. Provisions should be made to align the screen parallel with the vehicle.



- The screen must be provided with a fixed vertical centre-line (2) that corresponds to the centre of the vehicle, two laterally adjustable vertical lines (3 and 4) corresponding to the centre of the front fog lamp bulb on each side of the vehicle and one vertically adjustable horizontal line (1) that corresponds to the centre of the front fog lamp bulb.
- If a regular commercial aiming screen is not available, the screen may consist of a vertical wall having a clear uninterrupted area approximately 1.83 m (6 ft) high and 3.66 m (12 ft) wide. The surface should be finished with a washable non-gloss white paint.

Prior to aiming the front fog lamps, the following steps must be taken:

1. Remove any snow, ice or mud from the vehicle.
2. The vehicle must have a full tank of gas.
3. Stop all other work on the vehicle.
4. If any service has been performed on the vehicle, make sure that all of the components are back in their original place.
5. The vehicle must be on a level surface.



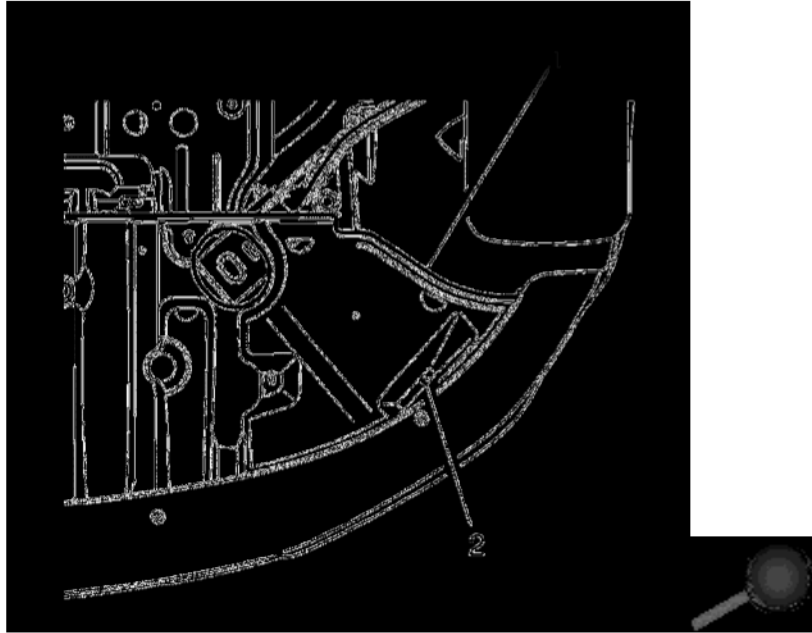
6. The vehicle left tires must be parallel to reference line with the face of the front fog lamps extending 7.62 m (25 ft) from the front of the aiming screen.
7. DO NOT load any cargo in the vehicle.
8. The vehicle must contain 1 person or 72.56 kg (160 lb) on the driver's seat.
9. Inflate the tires to the correct pressure.
10. Simulate the vehicle loads if the intended use of the vehicle is for hauling heavy loads or towing a trailer.
11. Rock the vehicle in order to stabilize the suspension.

Adjustment Procedure

1. Measure the distance from the ground to the centre of the front fog lamp. Record the distance.
2. Repeat for the right front fog lamp.
3. At the screen, measure from the floor and place the horizontal tape at the recorded distances from steps 1 and 2.
4. Measure from the reference line on the floor to the left front fog lamp bulb centre-line. Record the distance.
5. At the screen, measure from the reference line and place the vertical tape at the recorded distance from step 4.
6. Measure from the reference line on the floor to the right front fog lamp bulb centre-line. Record the distance.
7. At the screen, measure from the reference line and place the vertical tape at the recorded distance from step 6.

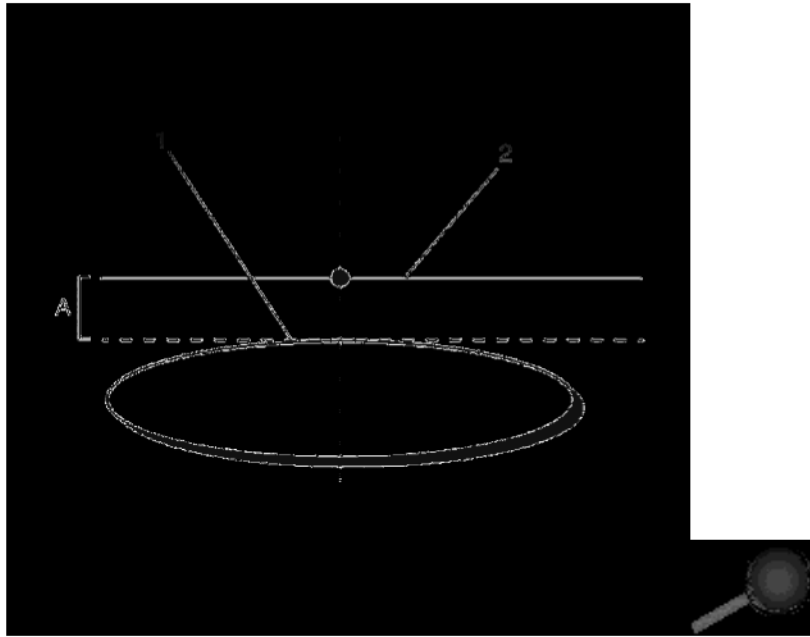
Note: DO NOT cover the headlamps, this may cause excessive heat buildup.

8. Turn the front fog lamps to the ON position and block the light from projecting onto the screen from the headlamps and the right front fog lamp.



Note: Right front fog lamp shown. Left front fog lamp similar.

9. Access the front fog lamp adjuster (2) through the opening in the front air deflector (1).



Note: Horizontal headlamp adjustment does not exist.

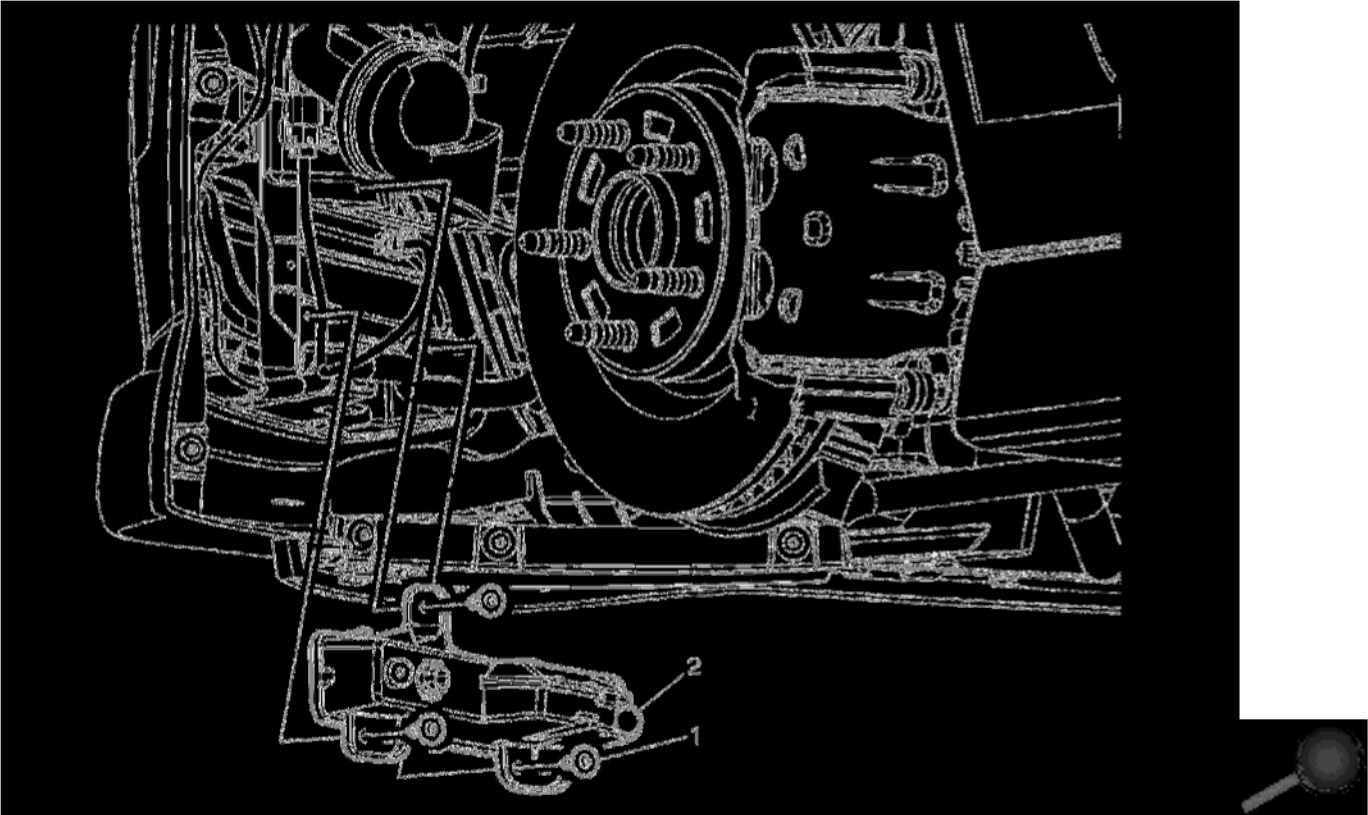
Note: To adjust the vertical aim of the front fog lamps, use a suitable tool to turn the front fog lamp adjuster clockwise to raise the beam or counter-clockwise to lower the beam.

10. Adjust the vertical aim of the front fog lamp so that distance (A), from the horizontal centre-line (2) to the top edge of the high intensity zone on the screen (1), is 102 mm (4 in).

Note: DO NOT cover the headlamps, this may cause excessive heat buildup.

11. Repeat steps 9 and 10 for the right front fog lamp while blocking the light from projecting onto the screen from the headlamps and the left hand front fog lamp.
12. Turn OFF the front fog lamps.

Daytime Running Lamp Replacement

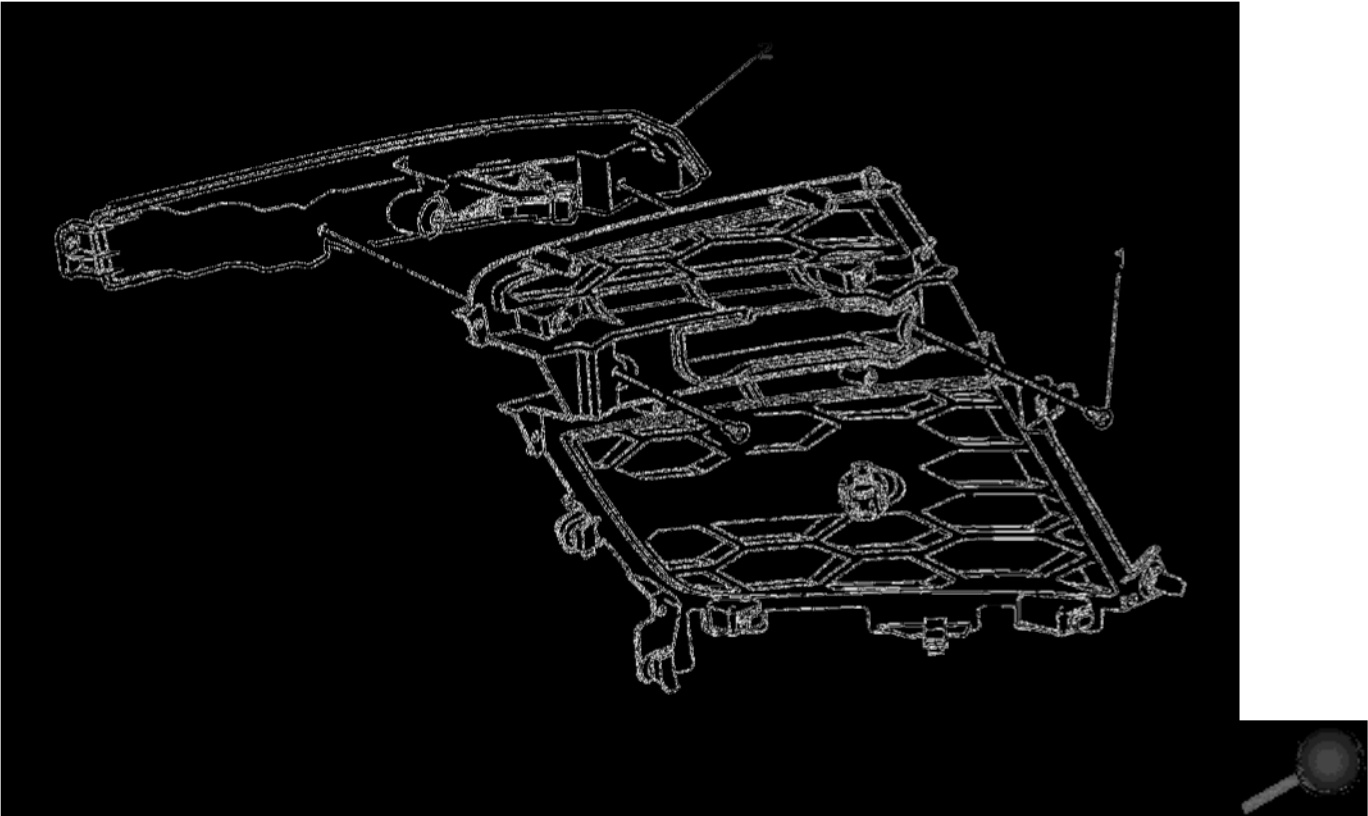


Daytime Running Lamp Replacement

Callout	Component Name
Preliminary Procedure Remove the front wheel liner. Refer to Front Wheelhouse Liner Replacement .	
1	Front Bumper Upper Fascia Bolt (Qty: 3) Caution: Refer to Fastener Caution .

2	Daytime Running Lamp Procedure Disconnect the electrical connector from the daytime running lamp bulb socket.
---	---

Daytime Running Lamp Replacement (GTS)

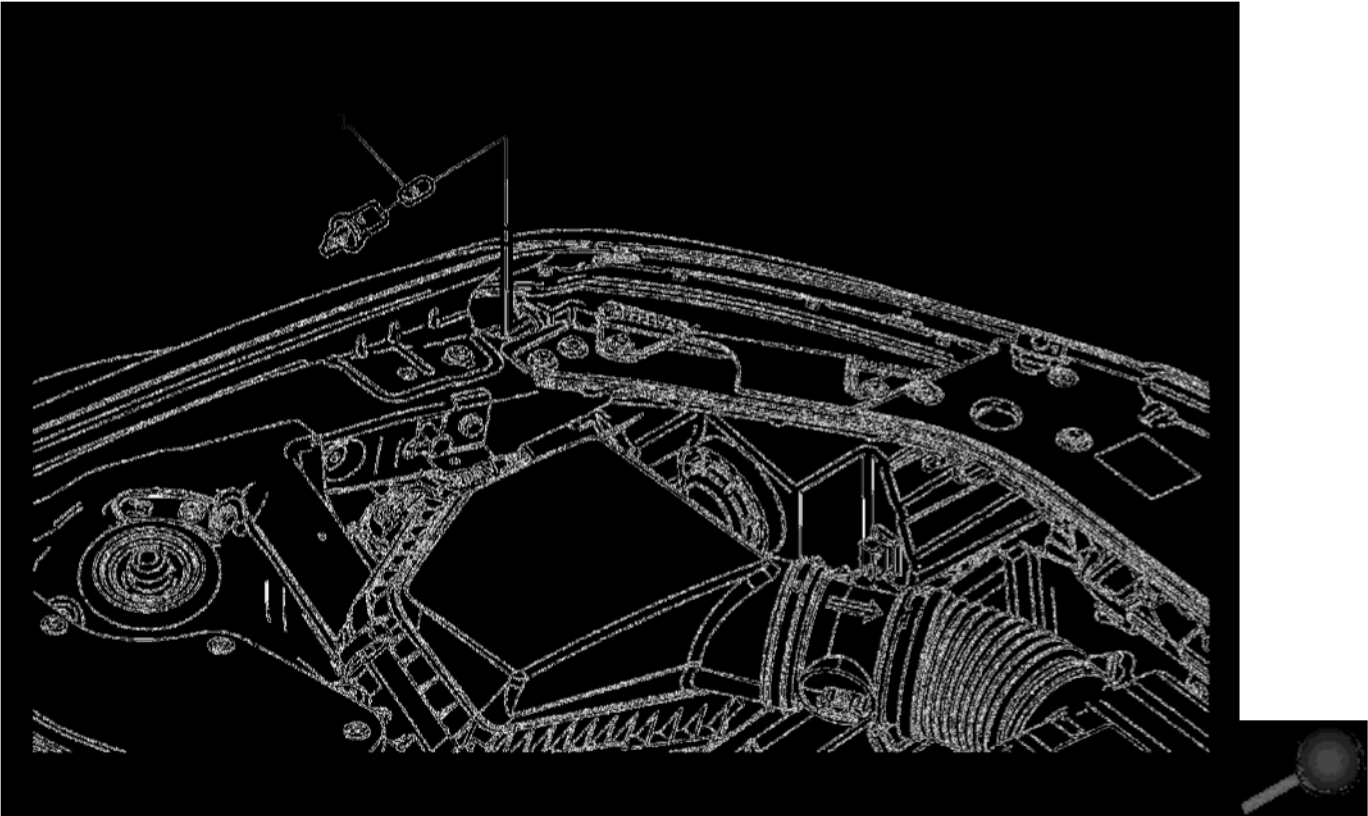


Daytime Running Lamp Replacement

Callout	Component Name
Preliminary Procedure Remove the front lower grille. Refer to Front Lower Grille Replacement .	
1	Front Lower Grille Screw (Qty: 2) Caution: Refer to Fastener Caution .

2	Daytime Running Lamp Note: The (DRL) is only serviceable as a complete unit. Procedure Remove the daytime running lamp from the front lower grille assembly.
---	--

Front Position Lamp Bulb Replacement (Short Wheelbase, Ute)

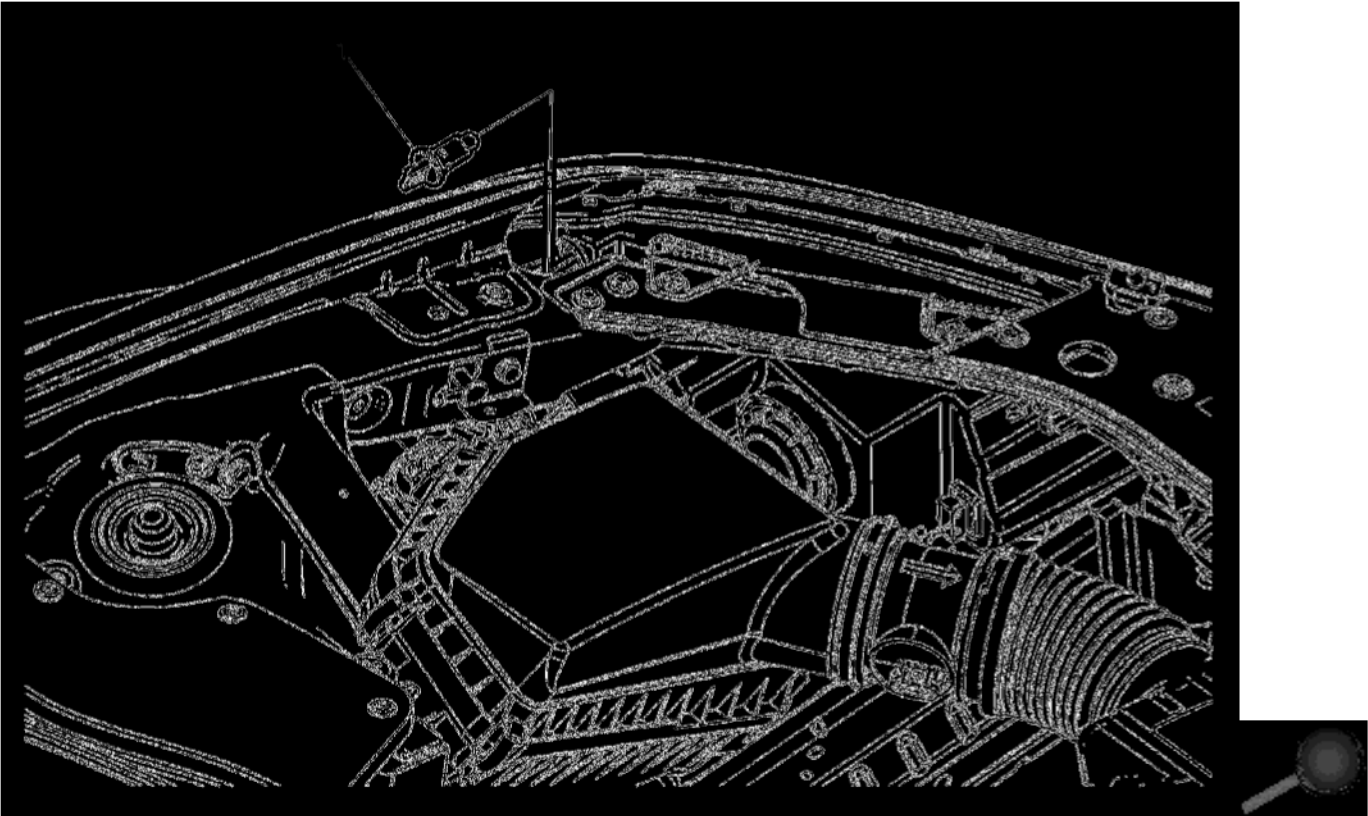


Front Position Lamp Bulb Replacement

Callout	Component Name
Preliminary Procedure Remove the front position lamp bulb socket. Refer to Front Position Lamp Bulb Socket Replacement .	
1	Front Position Lamp Bulb Procedure

Pull the front position lamp bulb straight out from the front position lamp bulb socket.

Front Position Lamp Bulb Socket Replacement (Short Wheelbase, Ute)

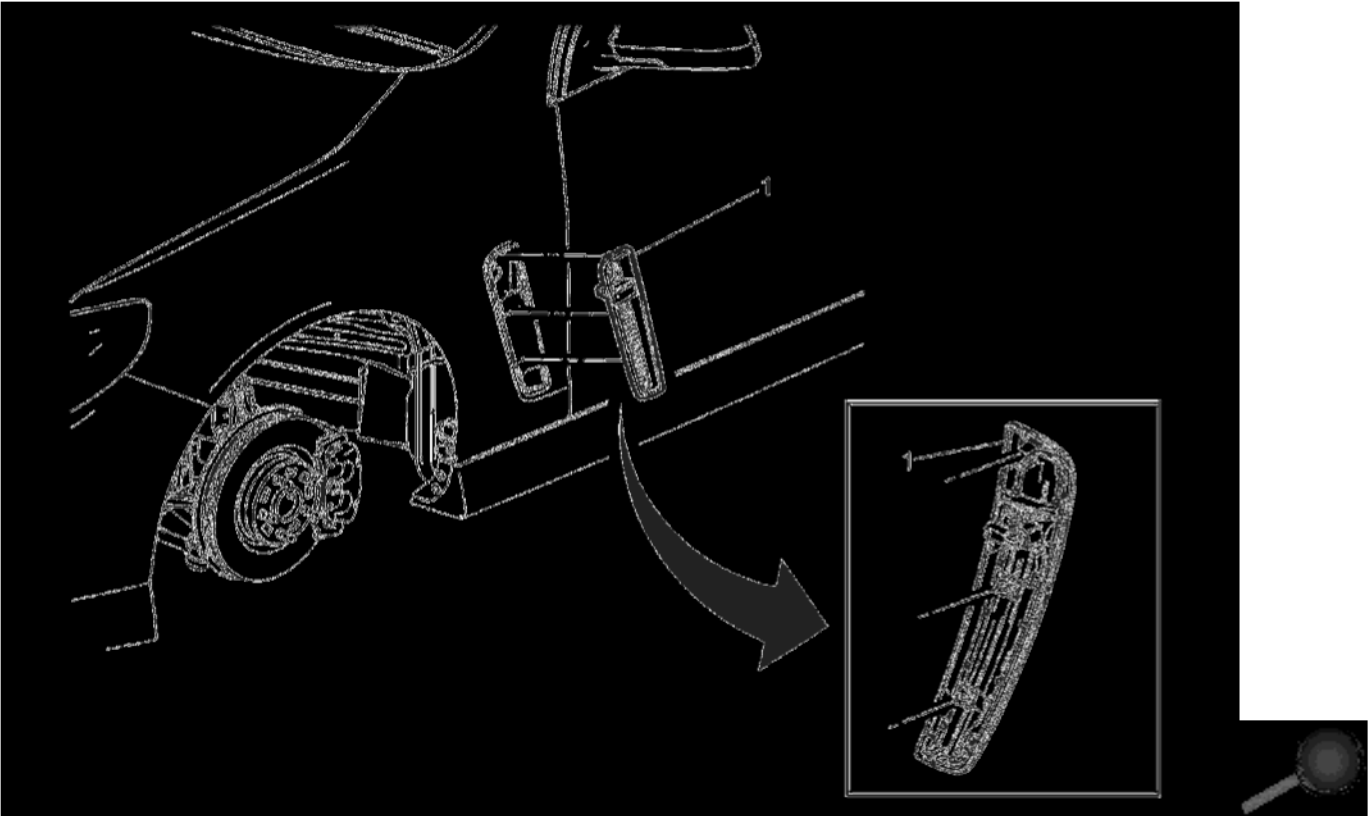


Front Position Lamp Bulb Socket Replacement

Callout	Component Name
Preliminary Procedure Open and support the hood.	
1	Front Position Lamp Bulb Socket Procedure

Rotate the front position lamp bulb socket counter-clockwise and remove from the headlamp.

Front Side Turn Signal Lamp Replacement



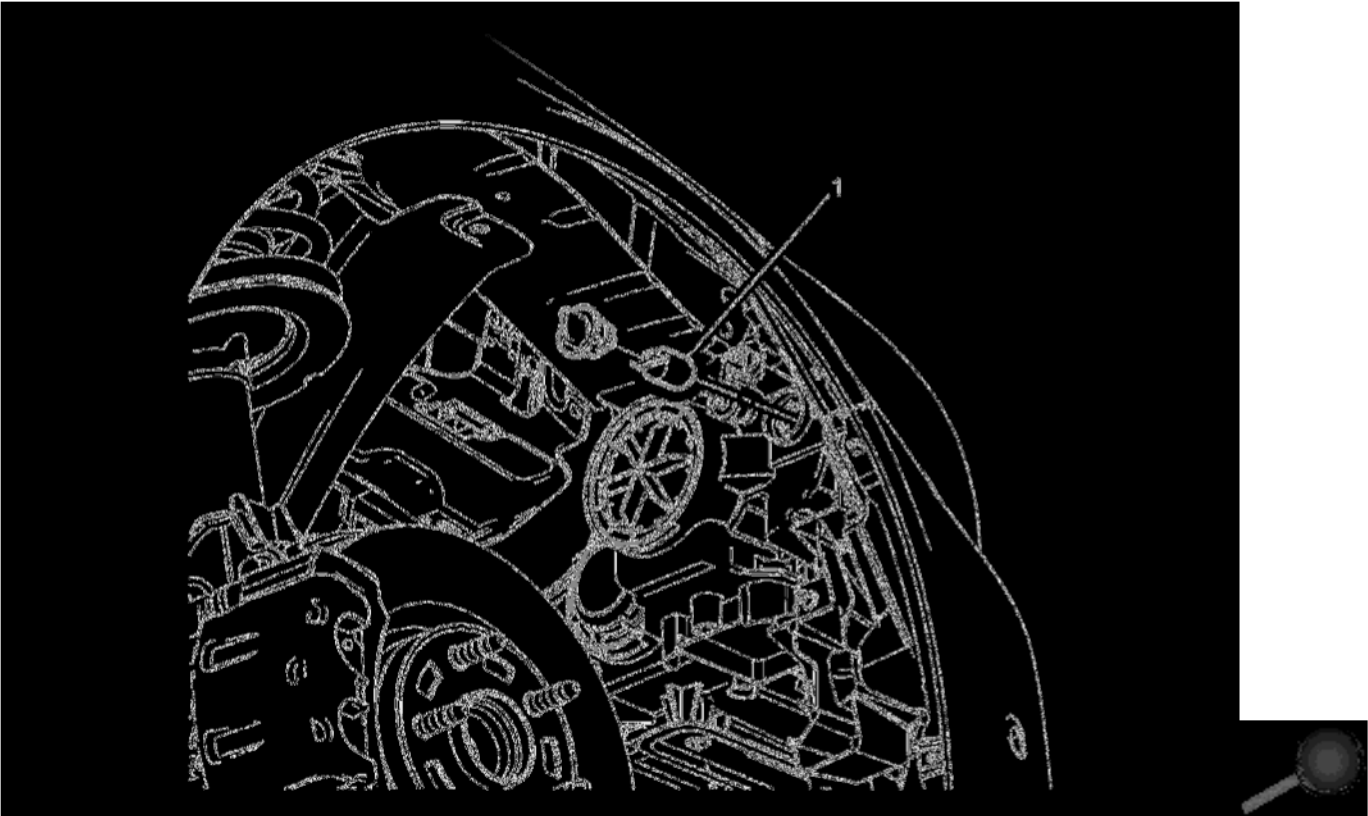
Front Side Turn Signal Lamp Replacement

Callout	Component Name
Preliminary Procedure Remove the front wheelhouse liner. Refer to Front Wheelhouse Liner Replacement .	
	Front Side Turn Signal Lamp Procedure

1

1. Disconnect the electrical connector.
2. With a flat bladed tool depress the top retaining tab and release from front fender.
3. With a trim type release tool release the 2 remaining retainers and pull the front side turn signal lamp from the vehicle.

Front Turn Signal Lamp Bulb Replacement (Short Wheelbase, Ute)

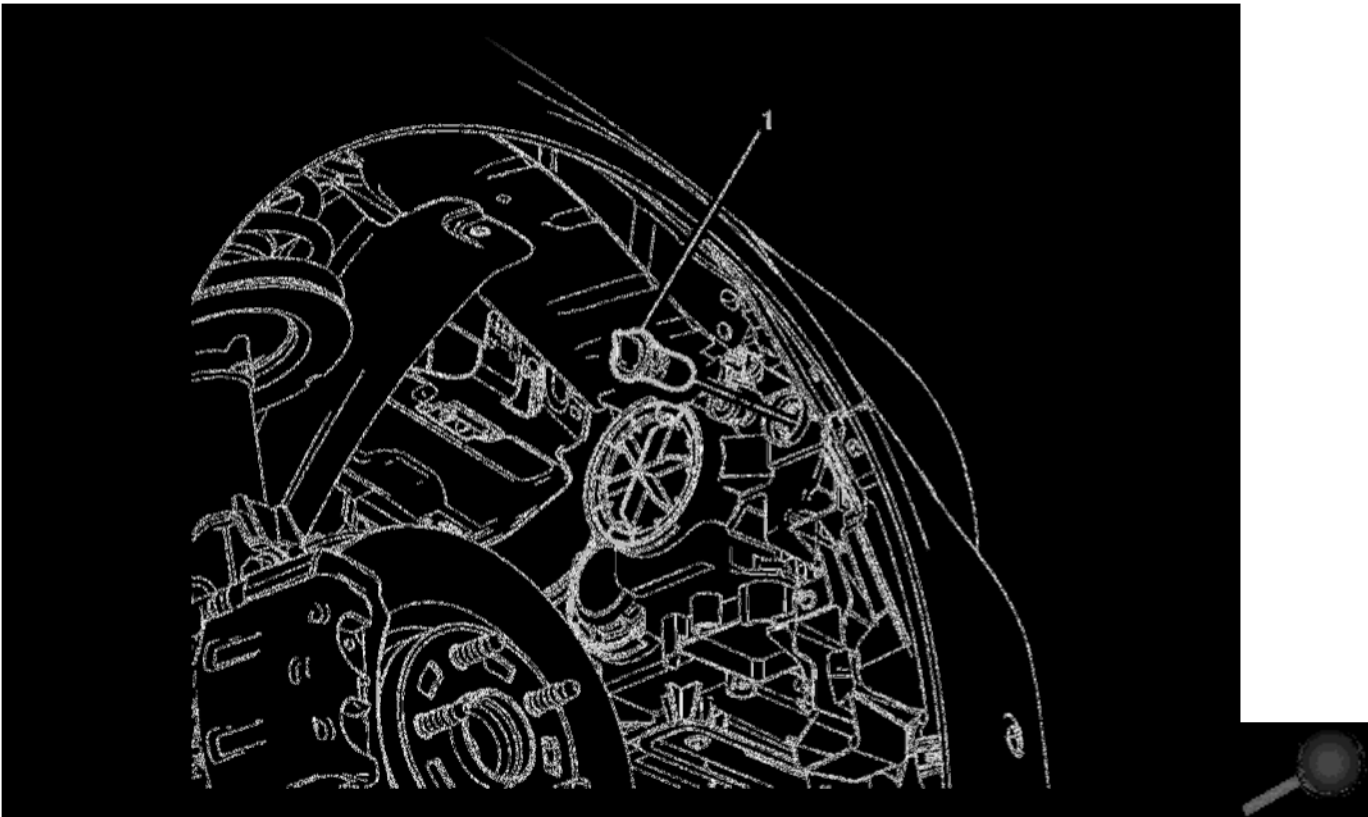


Front Turn Signal Lamp Bulb Replacement

Callout	Component Name
Preliminary Procedure Remove the front turn signal lamp bulb socket. Refer to Front Turn Signal Lamp Bulb Socket Replacement . © 2014 General Motors. All rights reserved.	
1	Front Turn Signal Lamp Bulb Procedure

Pull the front turn signal lamp bulb straight out from the front turn signal lamp bulb socket.

Front Turn Signal Lamp Bulb Socket Replacement (Short Wheelbase, Ute)

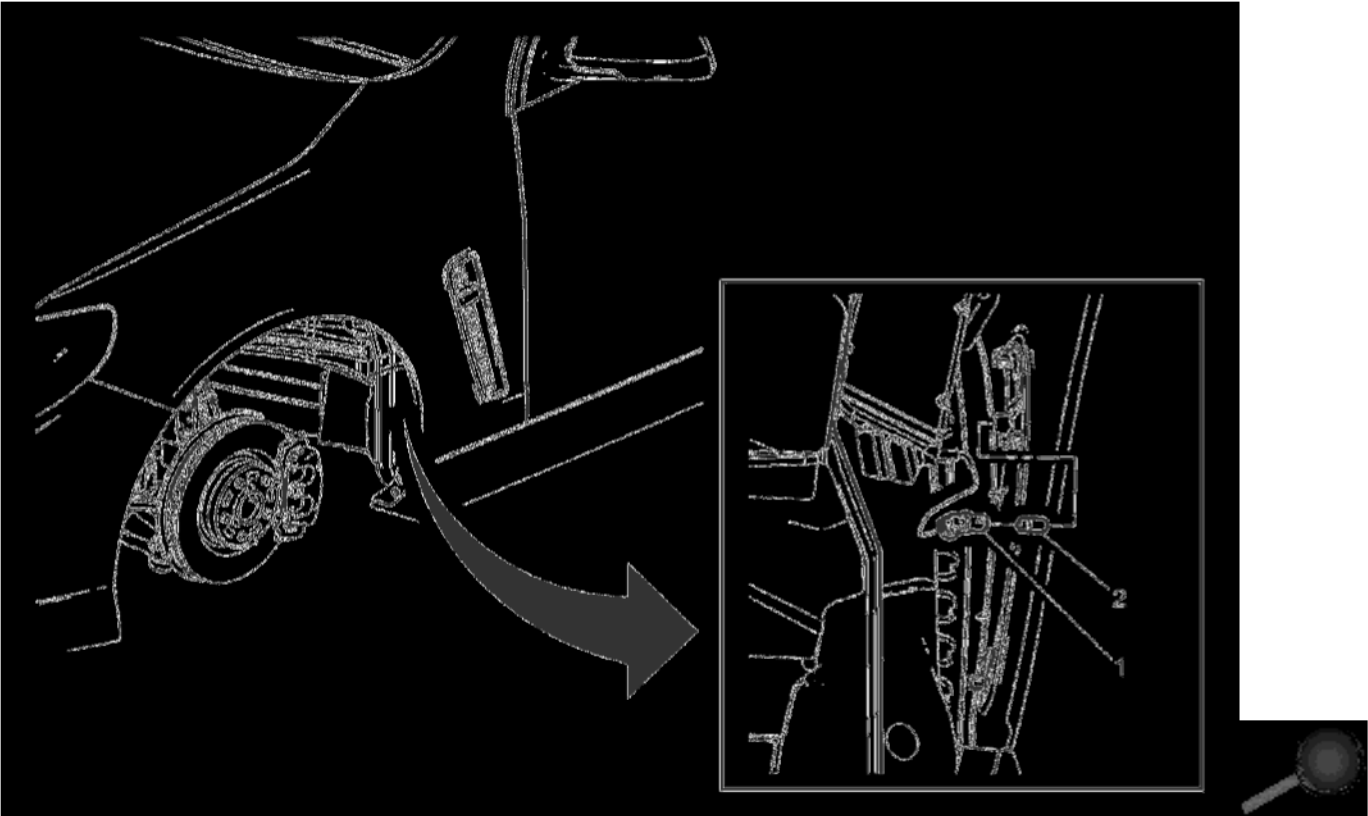


Front Turn Signal Lamp Bulb Socket Replacement

Callout	Component Name
Preliminary Procedure Remove the front wheelhouse liner. Refer to Front Wheelhouse Liner Replacement .	
1	Front Turn Signal Lamp Bulb Socket Procedure Rotate the front turn signal lamp bulb socket counterclockwise and remove from the headlamp.

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Auxiliary Side Front Turn Signal Lamp Bulb Replacement

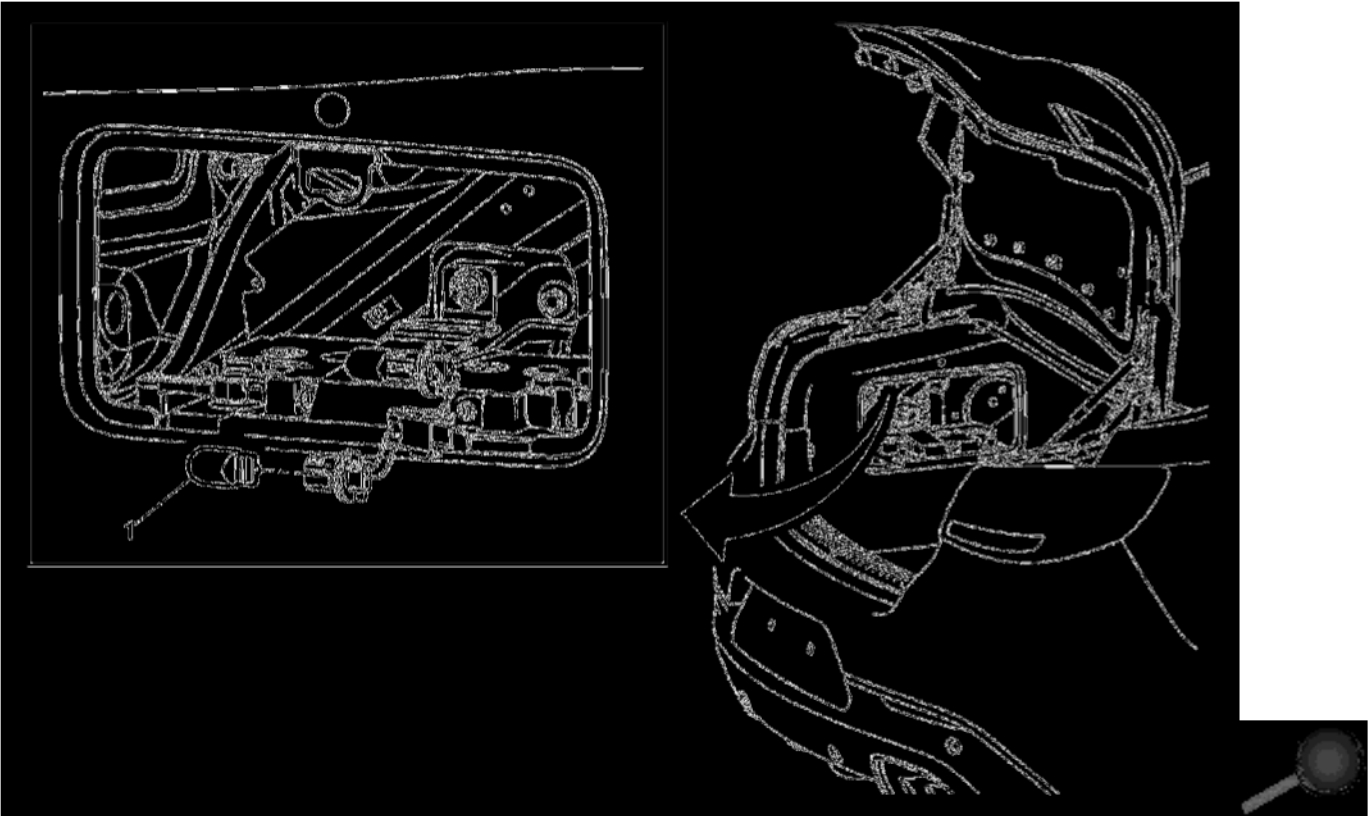


Auxiliary Side Front Turn Signal Lamp Bulb Replacement

Callout	Component Name
Preliminary Procedure Remove the front wheelhouse liner. Refer to Front Wheelhouse Liner Replacement .	
1	Front Side Turn Signal Socket Procedure

	Turn the front side turn signal lamp socket clockwise and pull from the front side turn signal lamp.
2	Front Side Turn Signal Bulb Procedure Pull the front side turn signal lamp bulb straight out from the front side turn signal lamp bulb socket.

Turn Signal Bulb Replacement (Short Wheelbase, Body Side, Left Side)

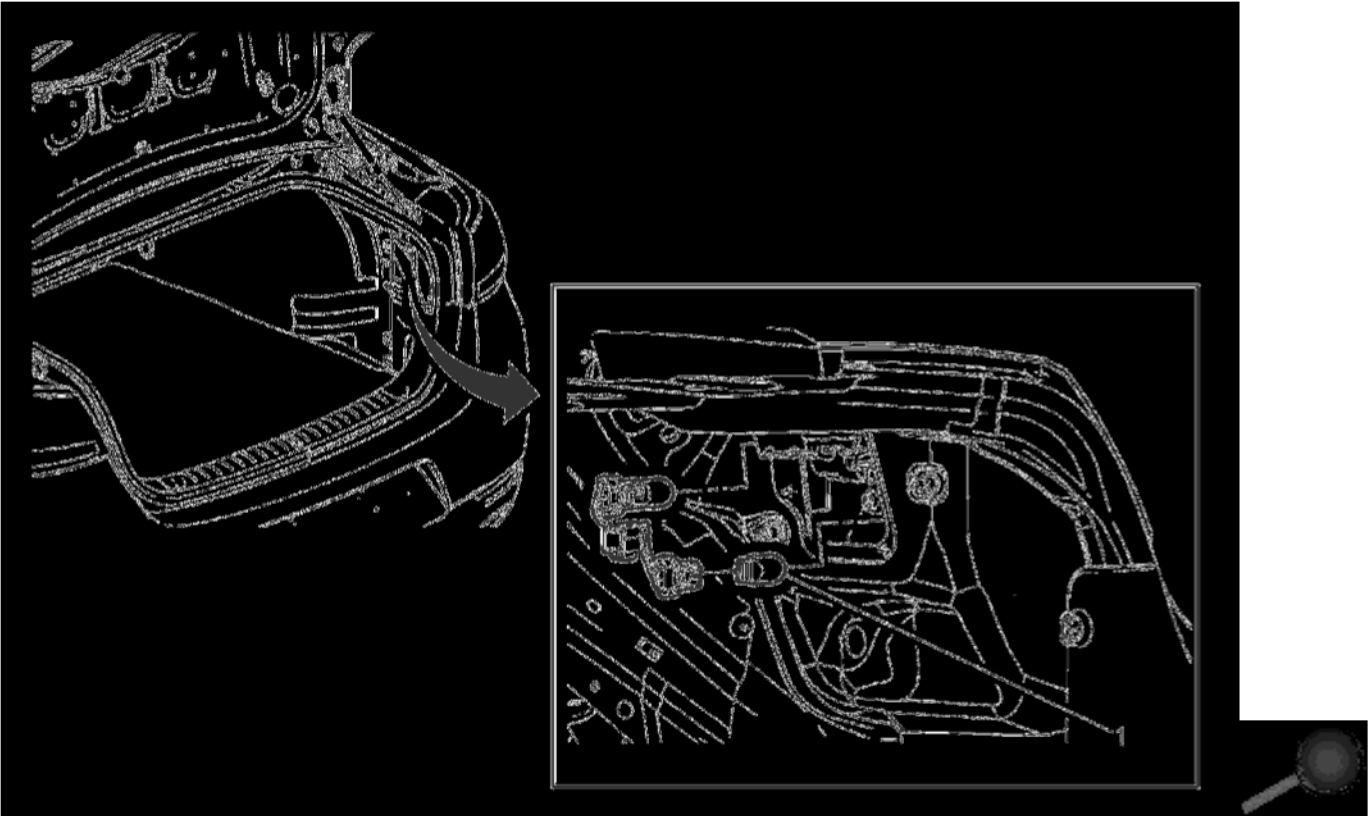


Turn Signal Bulb Replacement

Callout	Component Name
Preliminary Procedure Remove the rear lamp wiring harness. Refer to Rear Lamp Wiring Harness Replacement .	
1	Turn Signal Bulb Procedure

Pull the turn signal bulb straight out from the rear lamp wiring harness.

Turn Signal Bulb Replacement (Short Wheelbase, Body Side, Right Side)



Turn Signal Bulb Replacement

Callout	Component Name
Preliminary Procedure Remove the rear lamp wiring harness. Refer to Rear Lamp Wiring Harness Replacement .	
1	Turn Signal Bulb Procedure

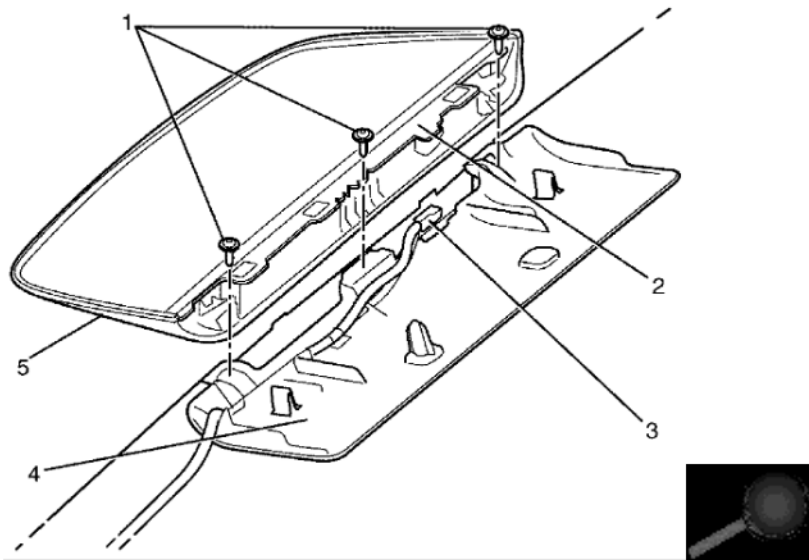
Pull the turn signal bulb straight out from the rear lamp wiring harness.

High Mount Stop Lamp Replacement (Sedan)

Removal Procedure

Warning: Refer to [Battery Disconnect Warning](#).

1. Disconnect the battery negative cable. Refer to [Battery Negative Cable Disconnection and Connection](#).
2. Remove the headlining trim panel. Refer to [Headlining Trim Panel Replacement](#).

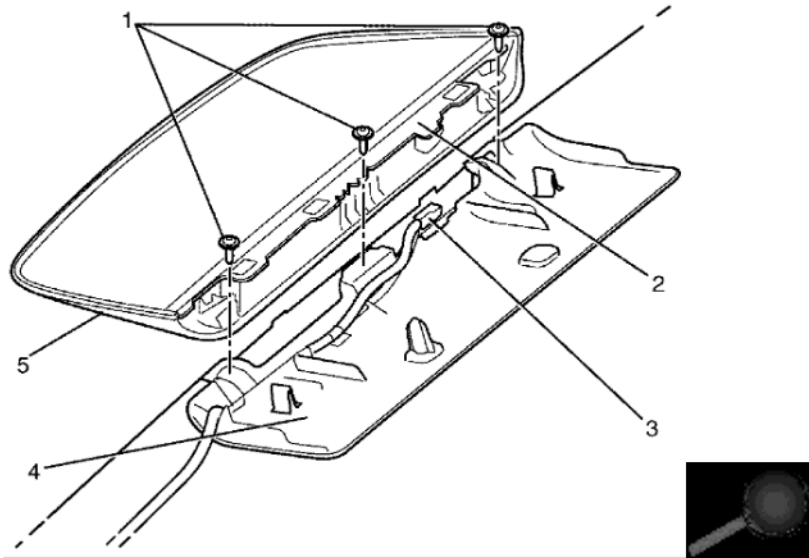


3. Disconnect the high mount stop lamp bulb electrical harness connector (3).
4. Remove the high mount stop lamp to headlining retaining screws (1).
5. Remove the high mount stop lamp (5) from the headlining (4).
6. Remove the high mount stop lamp bulb. Refer to [High Mount Stop Lamp Bulb Replacement](#).

Installation Procedure

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1. Install the high mount stop lamp bulb. Refer to [High Mount Stop Lamp Bulb Replacement](#).



2. Install the high mount stop lamp (5) to the headlining (4).

Caution: Refer to [Fastener Caution](#).

3. Install the high mount stop lamp to headlining retaining screws (1) and tighten to **2 N·m (18 lb in)**.

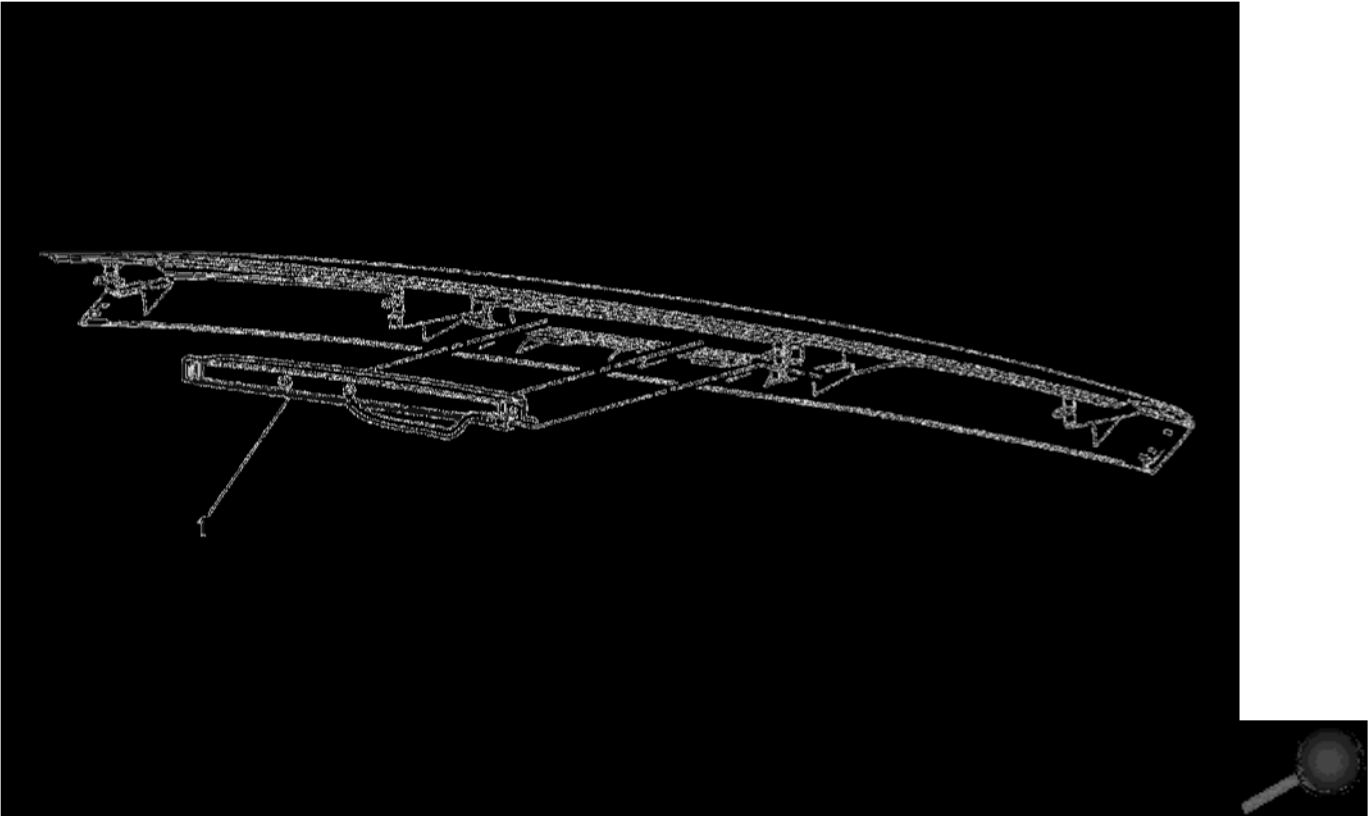
4. Connect the high mount stop lamp bulb electrical harness connector (3).

5. Install the headlining trim panel. Refer to [Headlining Trim Panel Replacement](#).

6. Connect the battery negative cable. Refer to [Battery Negative Cable Disconnection and Connection](#).

7. Check the operation of the high mount stop lamp.

High Mount Stop Lamp Replacement (Ute)



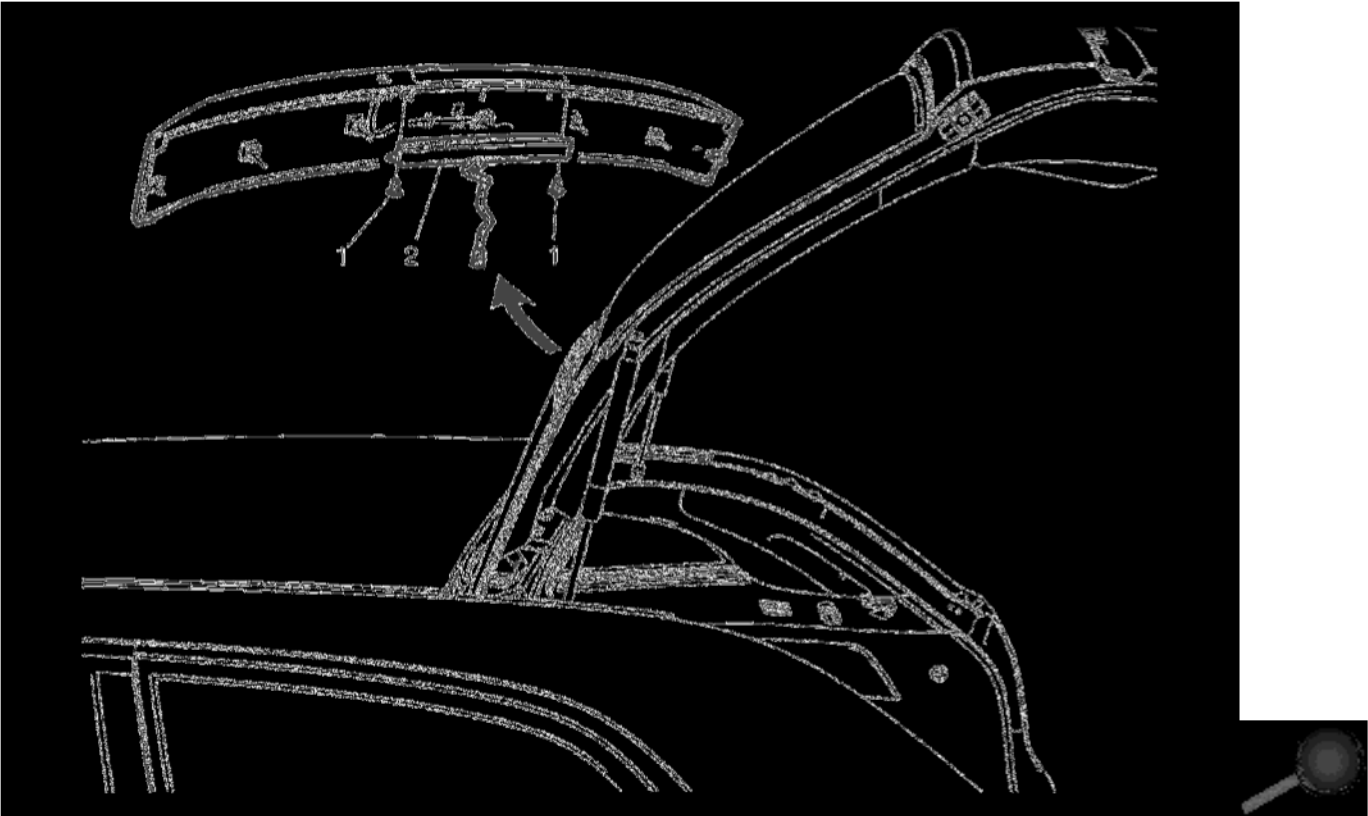
High Mount Stop Lamp Replacement

Callout	Component Name
Preliminary Procedure Remove the rear window upper reveal molding. Refer to Quarter Window Rear Reveal Molding Replacement .	
	High Mount Stop Lamp Procedure

1

1. Disconnect the electrical connector and release connector from retainer.
2. Release the 2 locking tabs and pull high mount stop lamp from the rear window upper reveal molding.

High Mount Stop Lamp Replacement (Sportwagon)



High Mount Stop Lamp Replacement

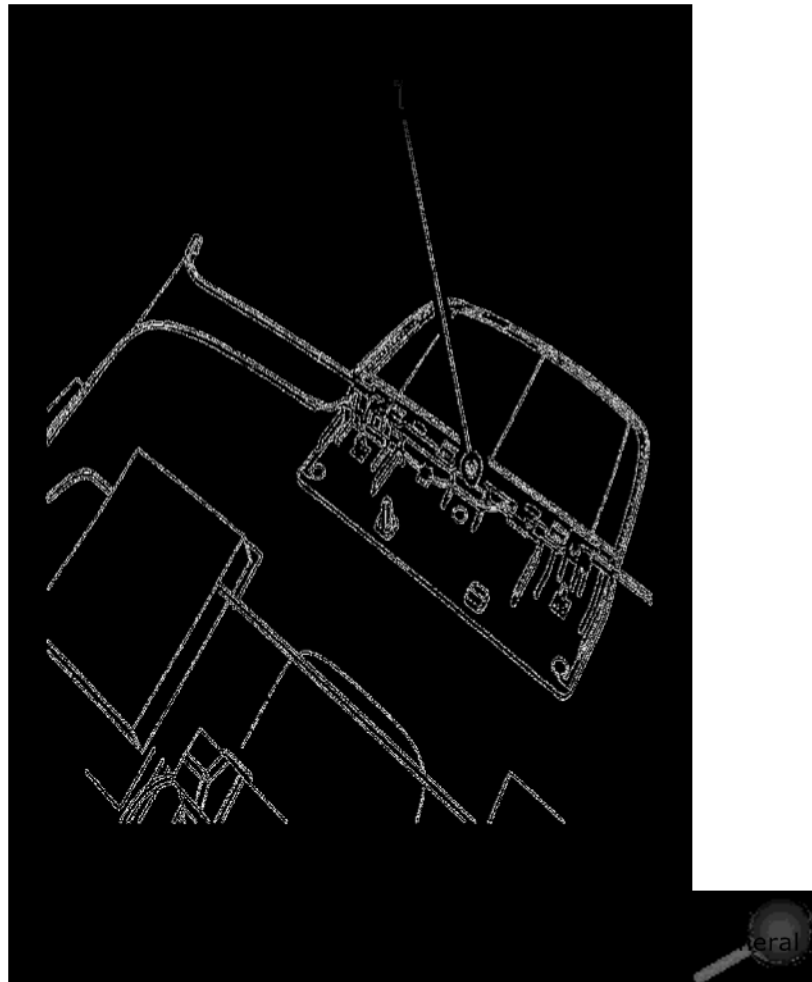
Callout	Component Name
Preliminary Procedure Remove the rear spoiler. Refer to c Rear End Spoiler Replacement .	
1	High Mount Stop Lamp Screw (Qty: 2) Caution: Refer to Fastener Caution .

2	High Mount Stop Lamp Procedure 1. Disconnect the electrical connector and feed through the grommet to remove. 2. Pull the high mount stop lamp from the rear spoiler.
---	--

High Mount Stop Lamp Bulb Replacement

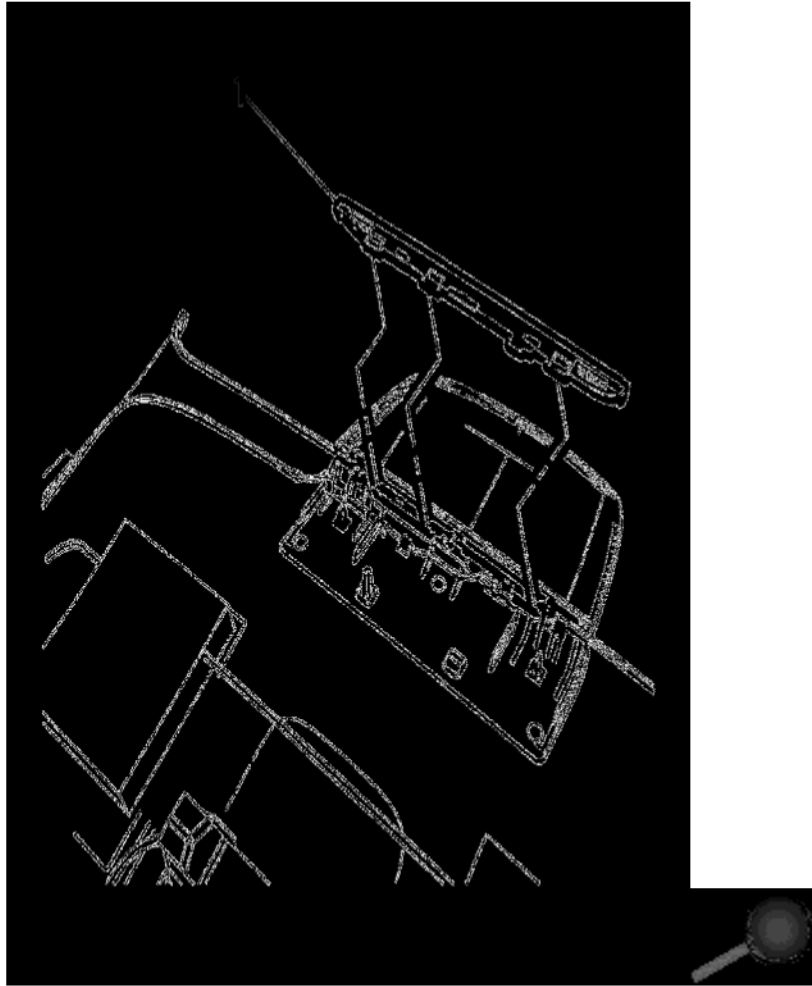
Removal Procedure

1. It is only necessary to lower the headliner. Only do the steps in the headliner replacement procedure that will lower the headliner enough to gain access to the lamp (PCB). Refer to [Headlining Trim Panel Replacement](#).

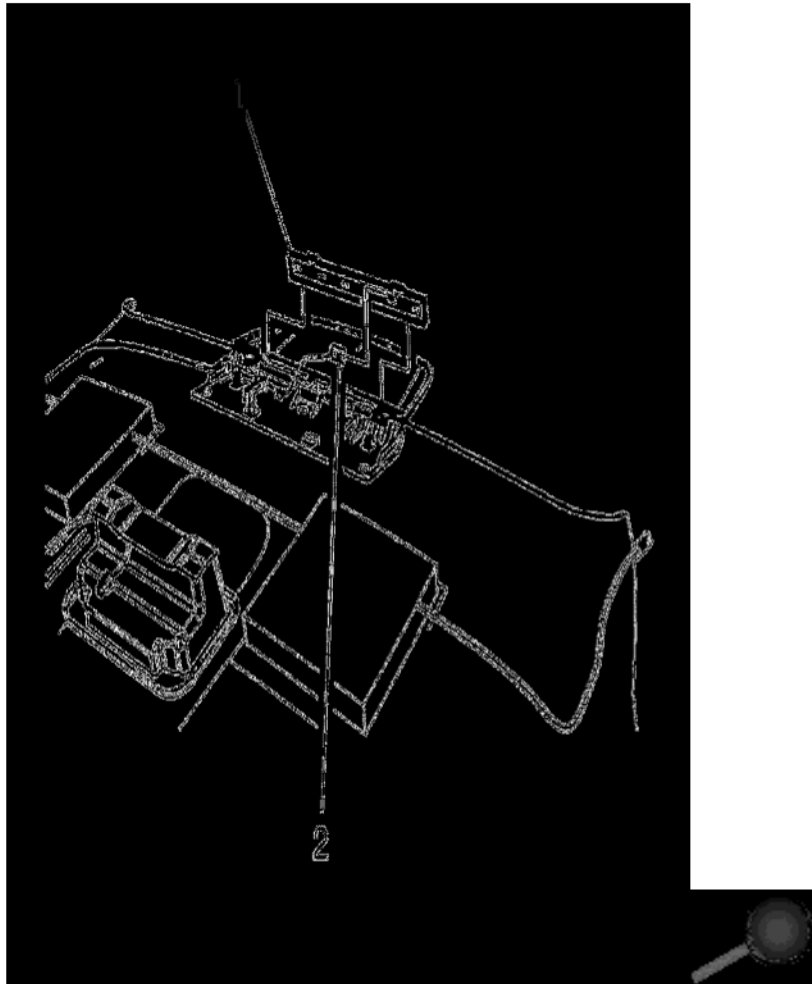


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2. Loosen the center screw (1) 3–4 turns, but do not remove the screw from the housing.

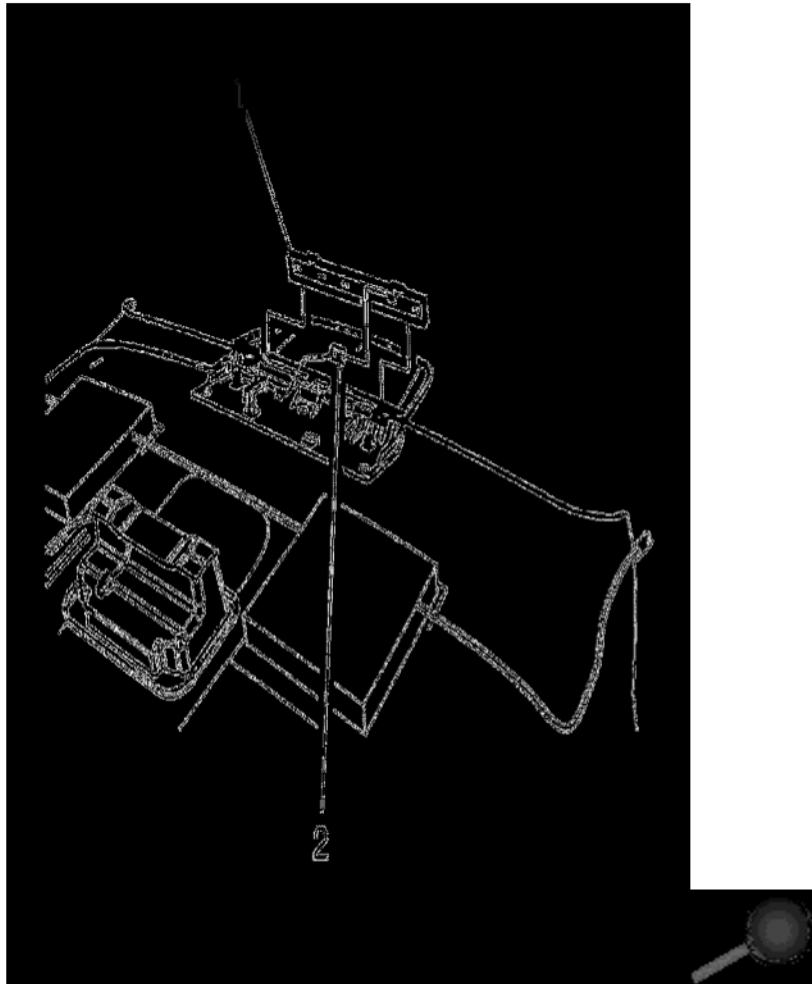


3. Release the 3 retainer clips on the high mounted stop lamp lens (1) and remove the lens (1) from the high mounted stop lamp housing.

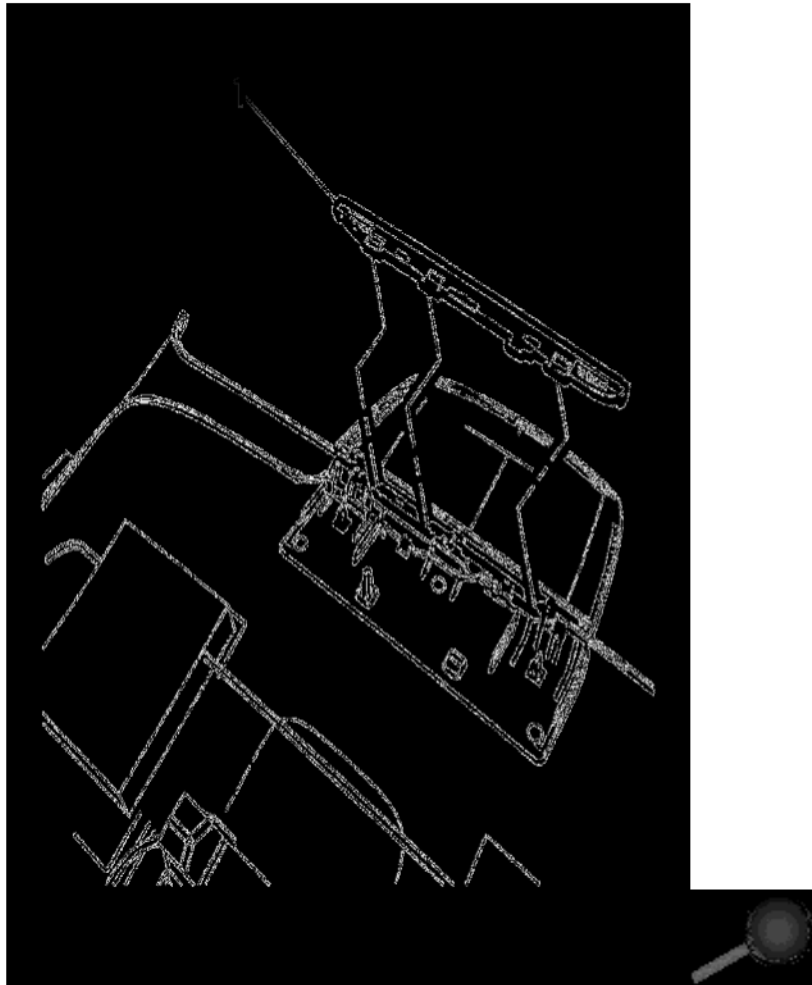


4. Remove the lamp (PCB) (1) from the high mounted stop housing and disconnect the electrical connector (2) from the lamp (PCB) (1).

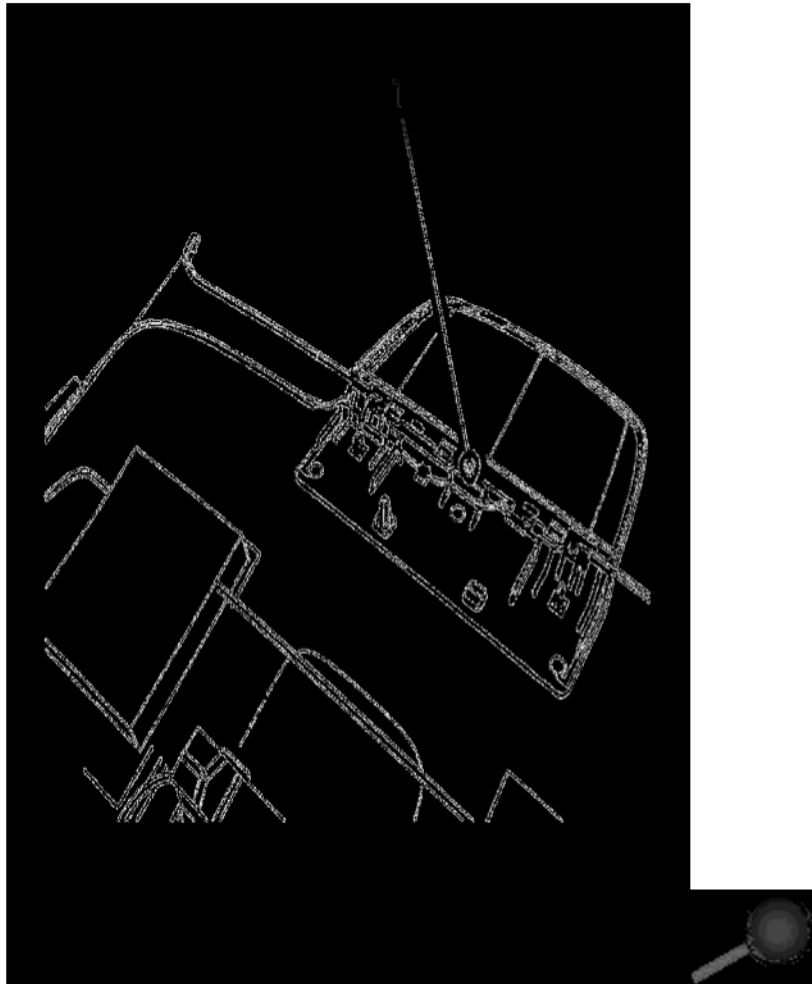
[Installation Procedure](#)



1. Install the new lamp (PCB) (1) to the high mounted stop housing and connect the electrical connector (2) to the lamp (PCB) (1).



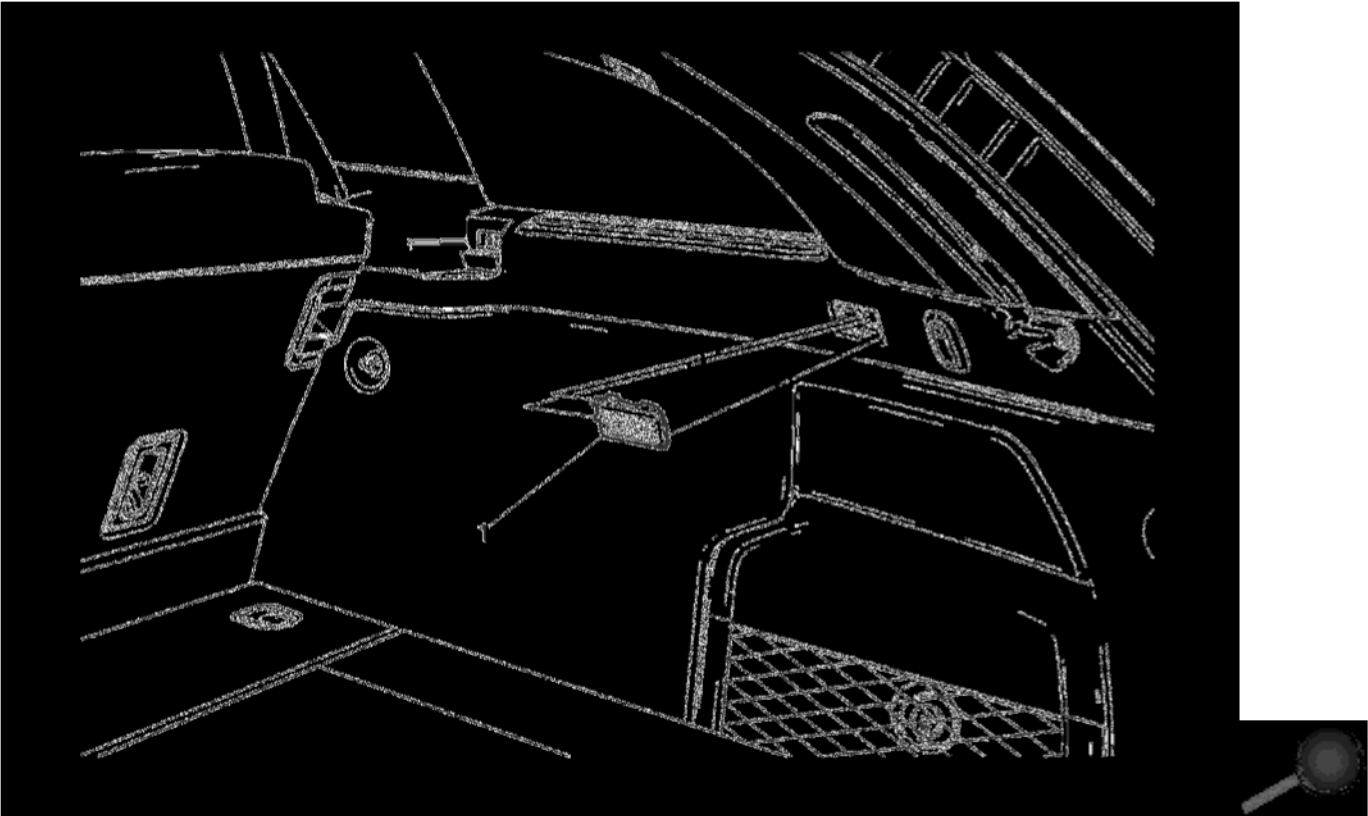
2. Install the high mounted stop lamp lens (1) to the high mounted stop lamp housing. Ensure the 3 retainer clips are fully seated.



Caution: Refer to [Fastener Caution](#).

3. Hand tighten the center screw (1) in the high mounted stop lamp housing.
4. Inspect the operation of the high mount stop lamp before reinstalling the headliner.
5. Install the headliner to the vehicle. Refer to [Headlining Trim Panel Replacement](#).

Cargo Center Courtesy Lamp Replacement (Sportwagon)



Cargo Center Courtesy Lamp Replacement

Callout	Component Name
1	Cargo Center Courtesy Lamp Procedure 1. Use a plastic flat bladed trim tool in order to release the lamp assembly from the rear compartment trim. 2. Disconnect the electrical connection.



Cargo Center Courtesy Lamp Replacement (Ute)

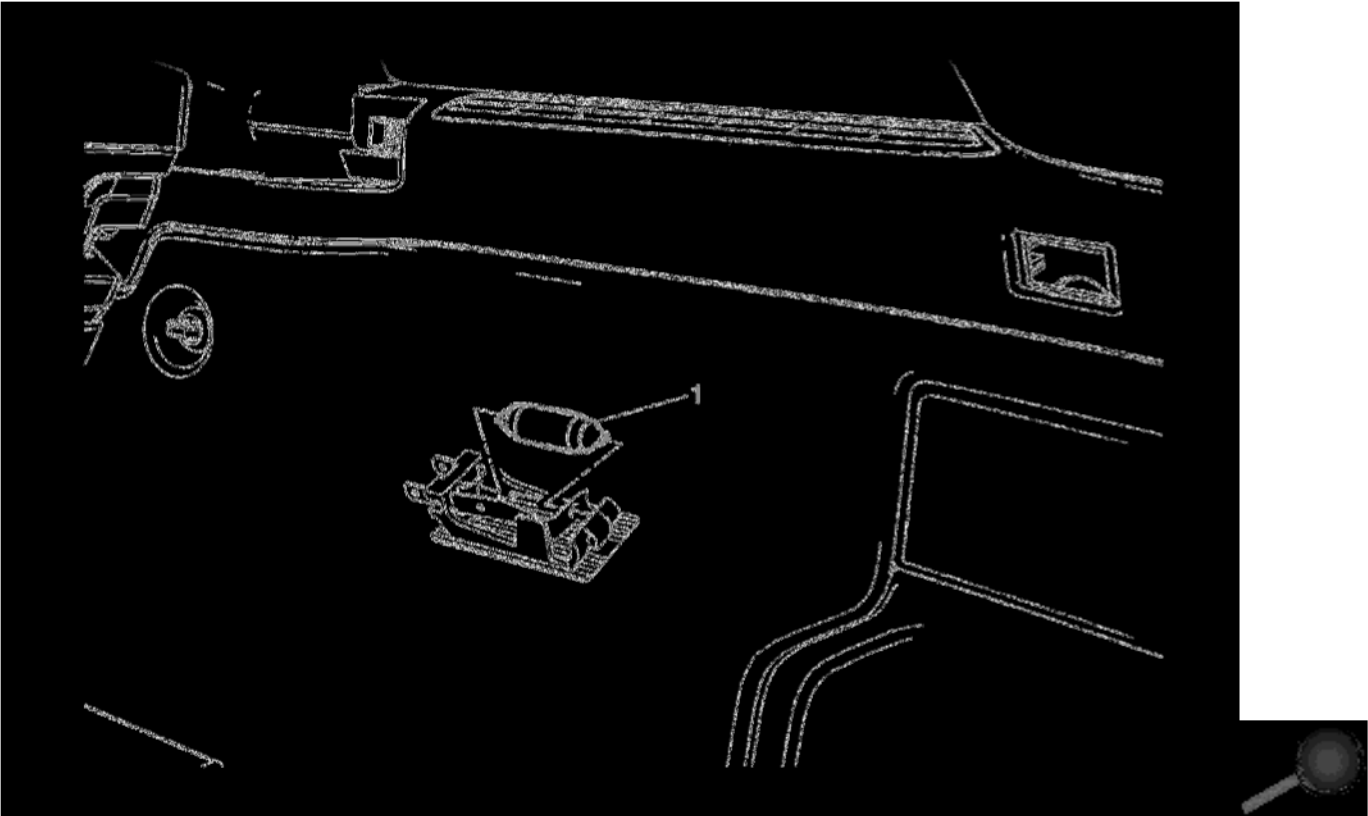


Cargo Center Courtesy Lamp Replacement

Callout	Component Name
1	Cargo Center Courtesy Lamp Procedure 1. Use a plastic flat bladed trim tool in order to release the lamp assembly from the rear compartment trim. 2. Disconnect the electrical connection.



Cargo Center Courtesy Lamp Bulb Replacement (Sportwagon)

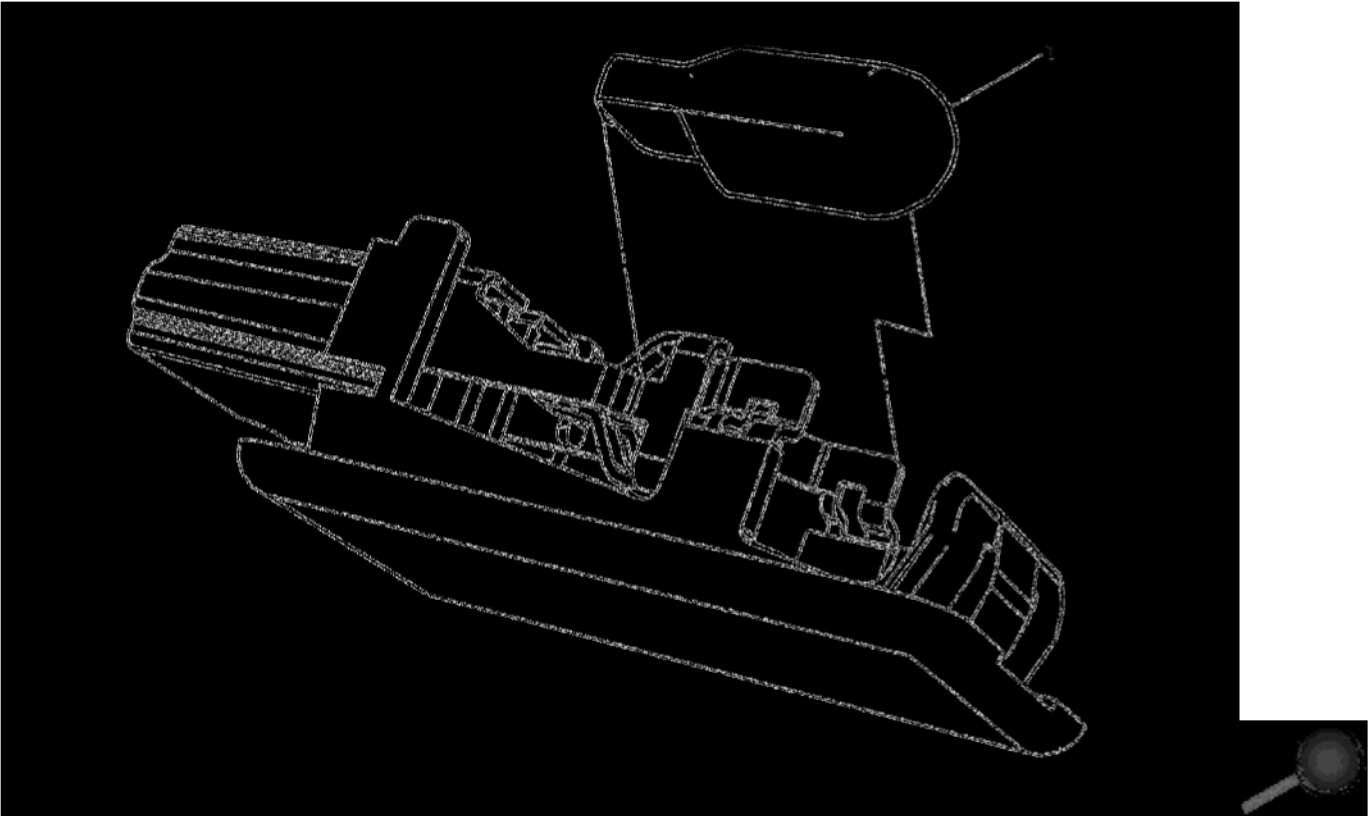


Cargo Center Courtesy Lamp Bulb Replacement

Callout	Component Name
Preliminary Procedure Remove the cargo center courtesy lamp. Refer to Cargo Center Courtesy Lamp Replacement .	
1	Cargo Center Courtesy Lamp Bulb Procedure

Gently bend back the contact lever that secures the bulb to remove.

Cargo Center Courtesy Lamp Bulb Replacement (Ute)

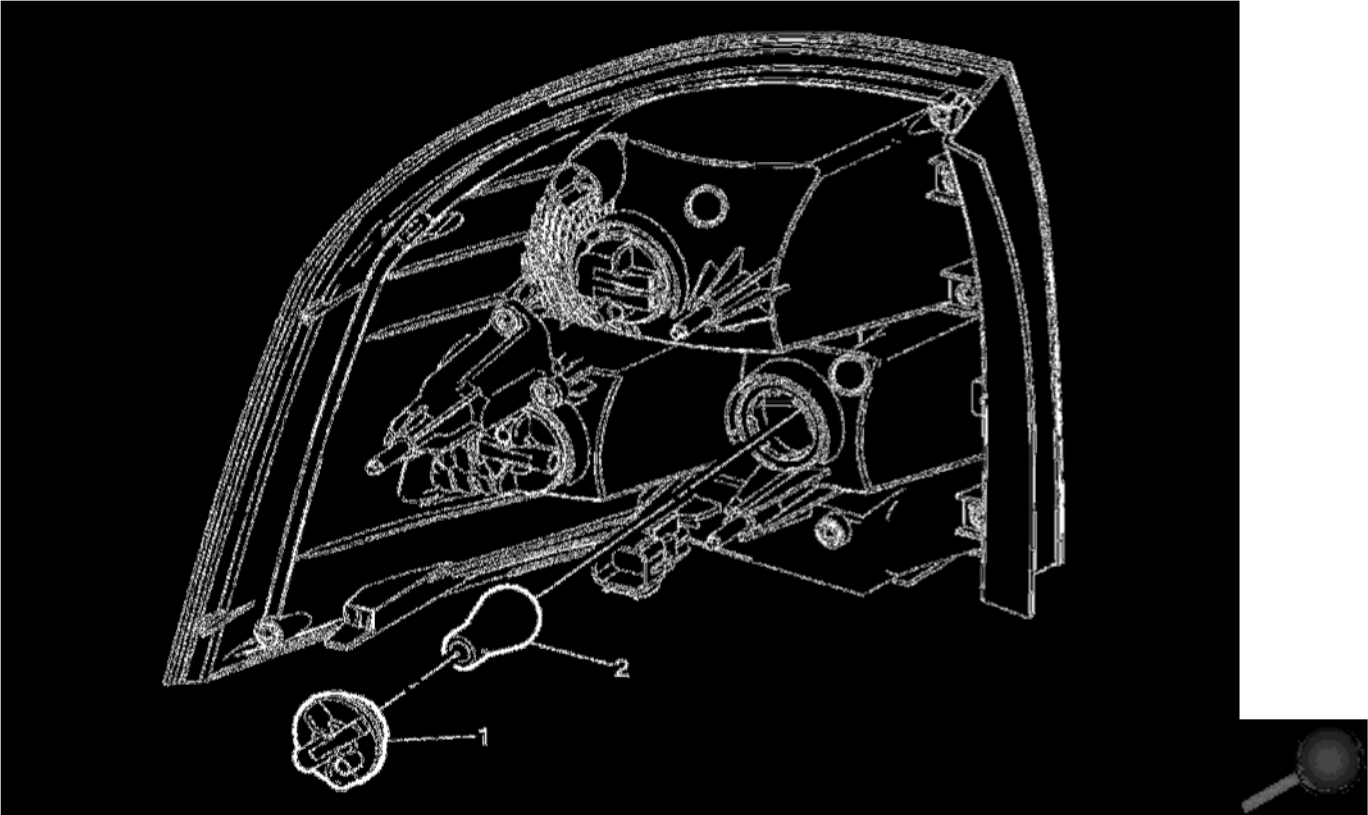


Cargo Center Courtesy Lamp Bulb Replacement

Callout	Component Name
Preliminary Procedure Remove the cargo center courtesy lamp. Refer to Cargo Center Courtesy Lamp Replacement .	
1	Cargo Center Courtesy Lamp Bulb Procedure

Gently bend back the contact lever that secures the bulb to remove.

Backup Lamp Bulb Replacement (Ute)

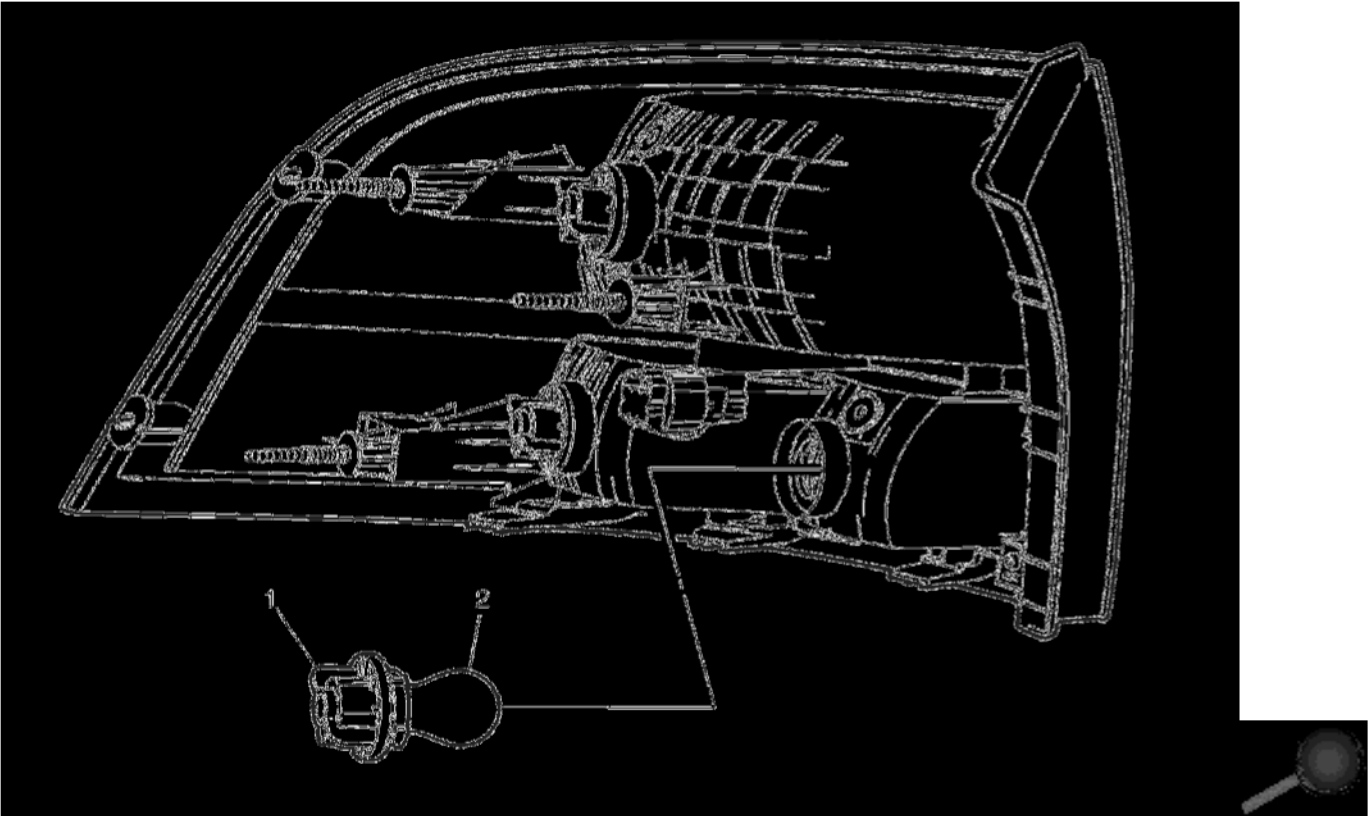


Backup Lamp Bulb Replacement

Callout	Component Name
Preliminary Procedure Remove the tail lamp. Refer to Tail Lamp Replacement .	
1	Backup Lamp Bulb Socket Procedure

	Rotate clockwise and pull from the tail lamp.
2	Backup Lamp Bulb Procedure Pull the backup lamp bulb straight out from the backup lamp bulb socket.

Backup Lamp Bulb Replacement (Sportwagon)

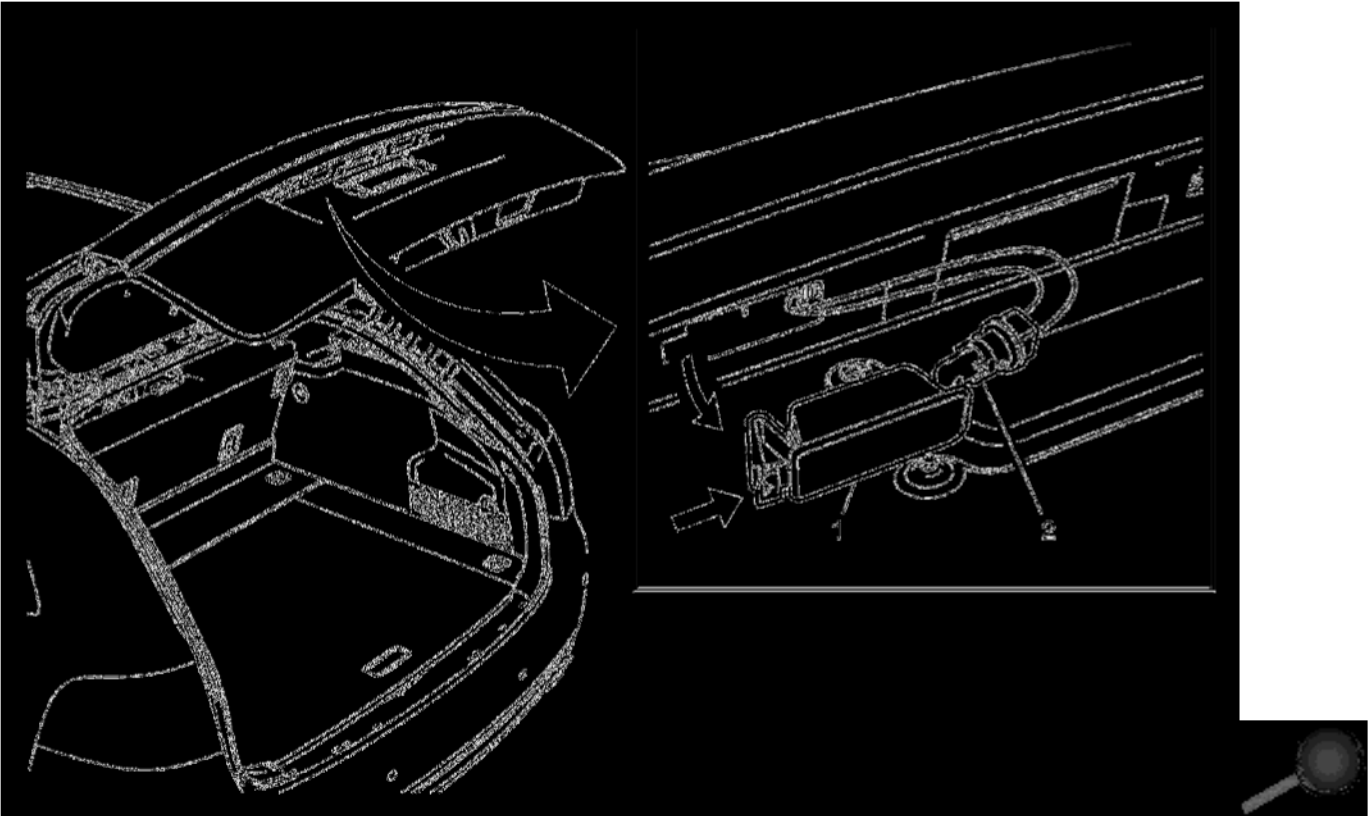


Backup Lamp Bulb Replacement

Callout	Component Name
Preliminary Procedure Remove the tail lamp. Refer to Tail Lamp Replacement . © 2014 General Motors. All rights reserved.	
1	Backup Lamp Bulb Socket Procedure

	Rotate counterclockwise and pull from the tail lamp.
2	Backup Lamp Bulb Procedure Pull the backup lamp bulb straight out from the backup lamp bulb socket.

Rear License Plate Lamp Replacement (Sportwagon)

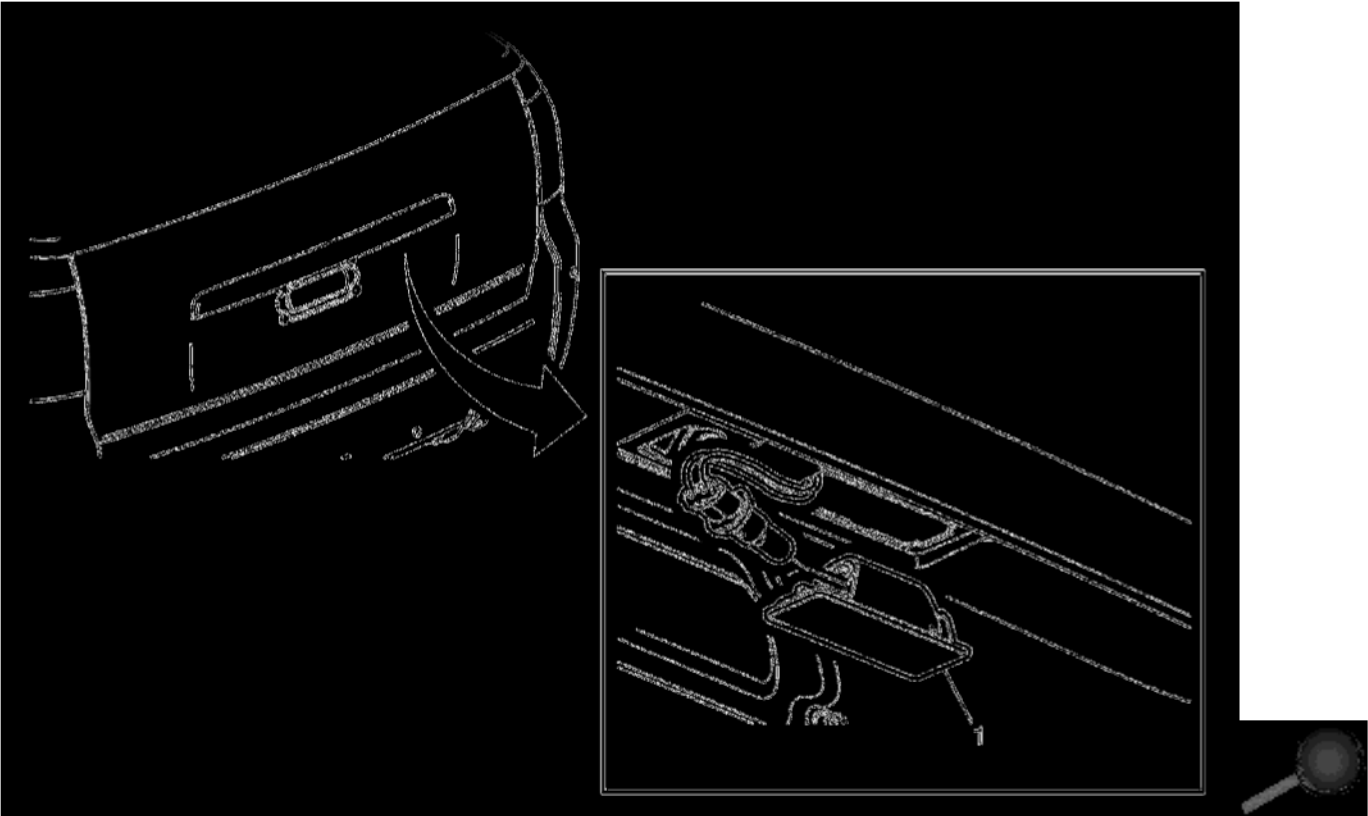


Rear License Plate Lamp Replacement

Callout	Component Name
1	Rear License Plate Lamp Procedure © 2014 General Motors. All rights reserved. 1. Use a flat bladed tool to compress the retainer on the drivers side end of the rear license plate lamp and release from the liftgate.

2. Turn rear license plate lamp bulb socket counterclockwise and pull from the rear license plate lamp.

Rear License Plate Lamp Replacement (Ute)

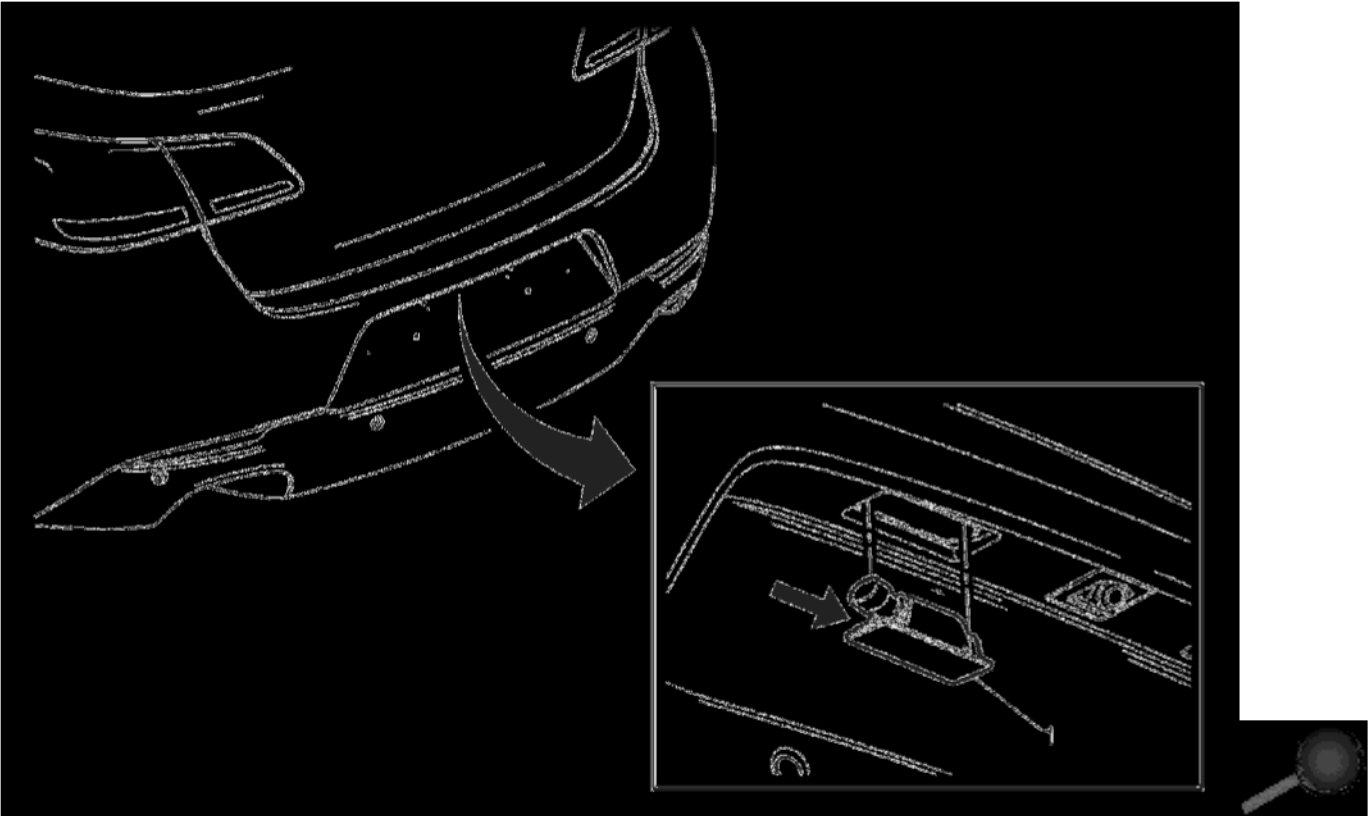


Rear License Plate Lamp Replacement

Callout	Component Name
1	Rear License Plate Lamp Procedure © 2014 General Motors. All rights reserved. 1. Use a suitable plastic flat bladed tool on the drivers side end of the rear license plate lamp and apply pressure towards the passenger side and pull down from the endgate applique.

2. Turn the rear license plate lamp bulb socket counterclockwise and pull from the rear license plate lamp.

Rear License Plate Lamp Replacement (Short Wheelbase)

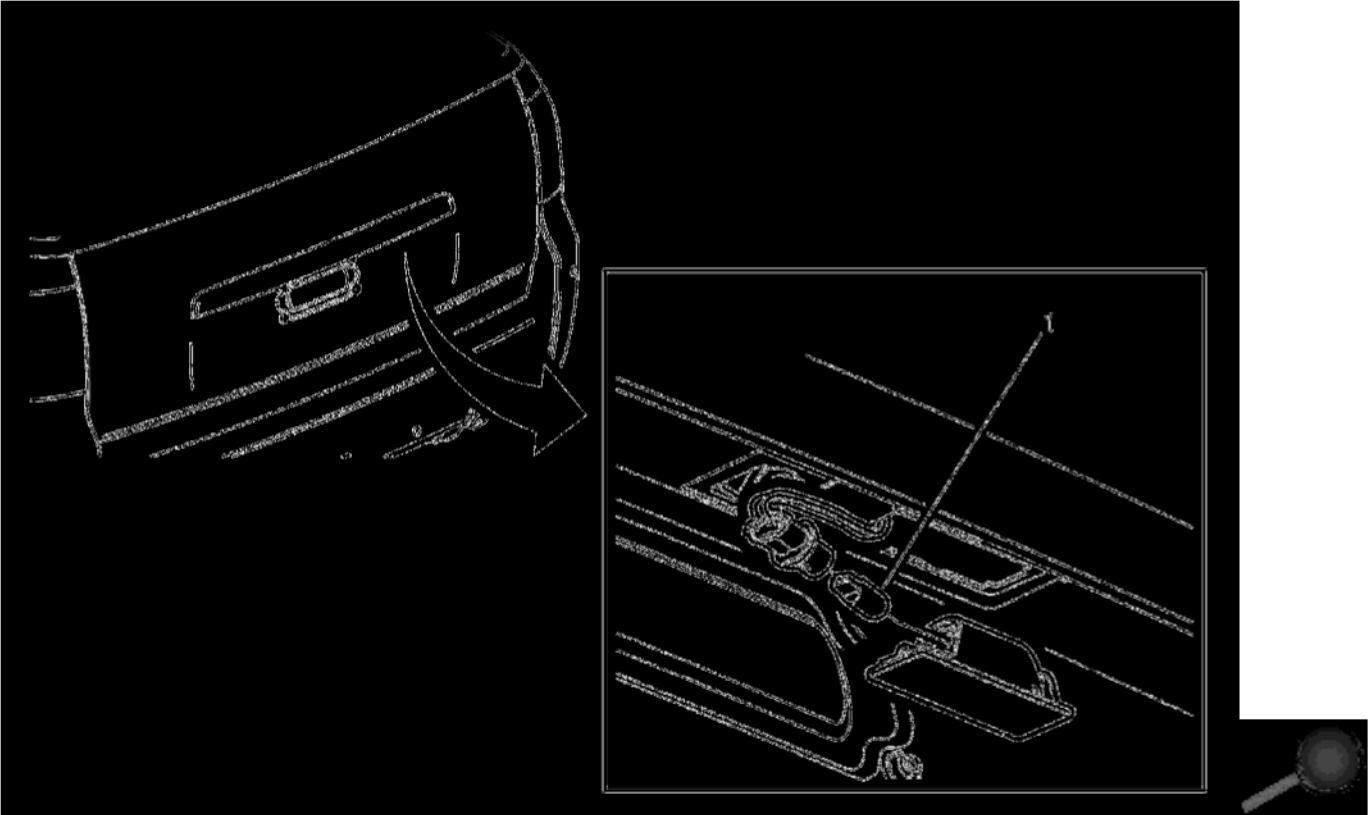


Rear License Plate Lamp Replacement

Callout	Component Name
1	Rear License Plate Lamp Procedure © 2014 General Motors. All rights reserved. 1. Use a suitable plastic flat bladed tool on the drivers side end of the rear license plate lamp and apply pressure towards the passenger side and pull down from the endgate applique.

2. Turn the rear license plate lamp bulb socket counterclockwise and pull from the rear license plate lamp.

Rear License Plate Lamp Bulb Replacement (Ute)



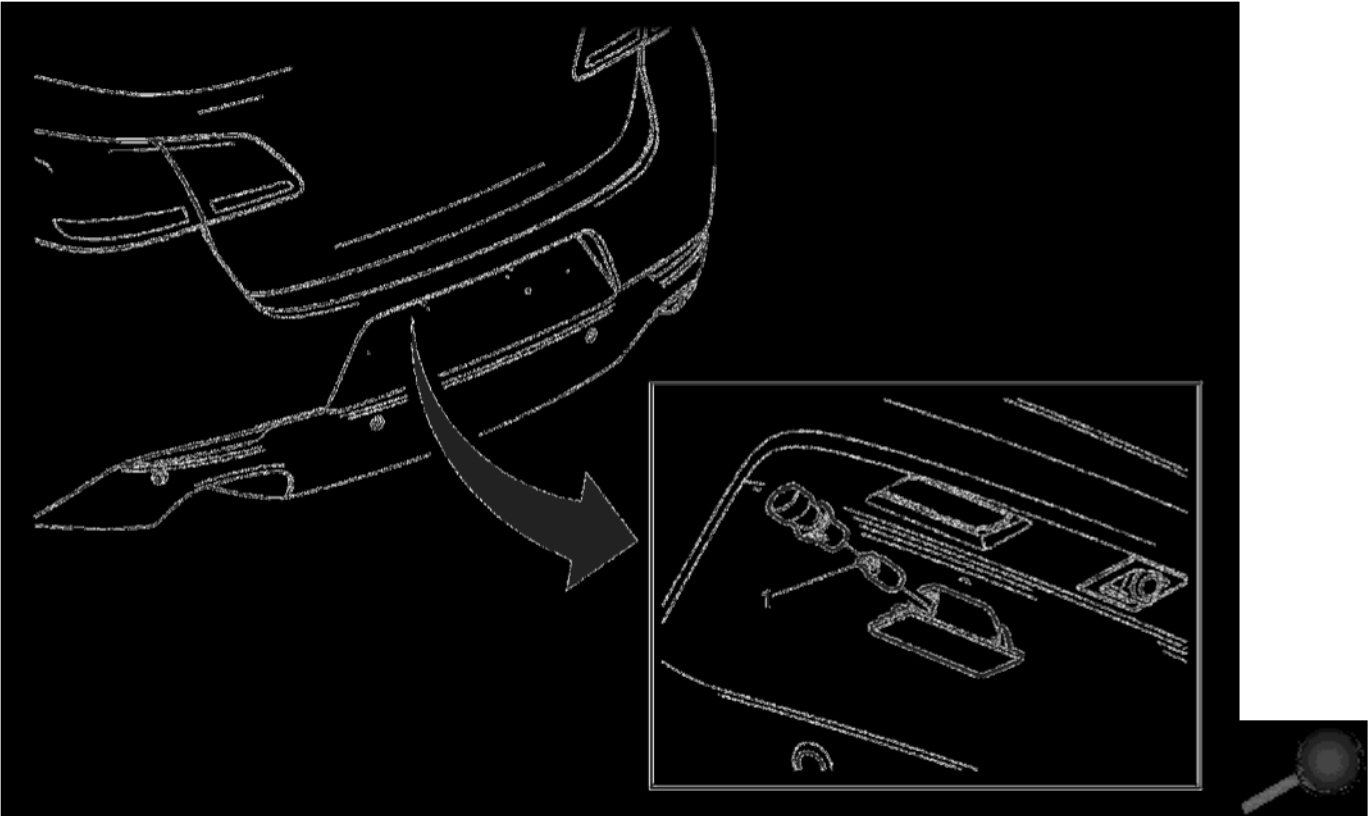
Rear License Plate Lamp Bulb Replacement

Callout	Component Name
Preliminary Procedure Remove the rear license plate lamp. Refer to Rear License Plate Lamp Replacement .	
	Rear License Plate Lamp Bulb Procedure

1

1. Rotate the rear license plate bulb socket counterclockwise and pull from the rear license plate lamp.
2. Pull the rear license plate lamp bulb straight out from the rear license plate lamp bulb socket.

Rear License Plate Lamp Bulb Replacement (Short Wheelbase)



Rear License Plate Lamp Bulb Replacement

Callout	Component Name
Preliminary Procedure Remove the rear license plate lamp. Refer to Rear License Plate Lamp Replacement .	
	Rear License Plate Lamp Bulb Procedure

1

1. Rotate the rear license plate bulb socket counterclockwise and pull from the rear license plate lamp.
2. Pull the rear license plate lamp bulb straight out from the rear license plate lamp bulb socket.

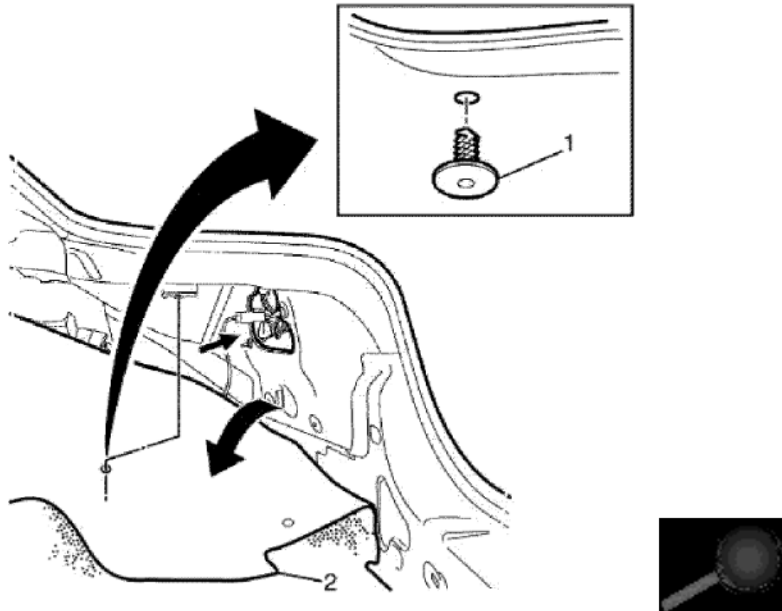
Tail Lamp Replacement (Long Wheelbase)

Removal Procedure

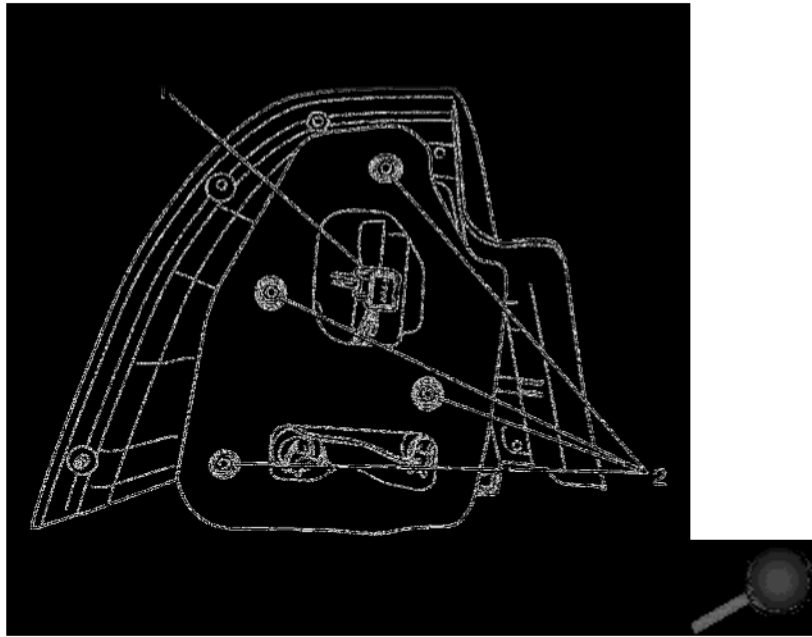
1. Open the rear compartment lid.

Warning: Refer to [Battery Disconnect Warning](#).

2. Disconnect the battery negative cable. Refer to [Battery Negative Cable Disconnection and Connection](#).
3. Remove the rear compartment floor panel carpet. Refer to [Rear Compartment Floor Panel Carpet Replacement](#).

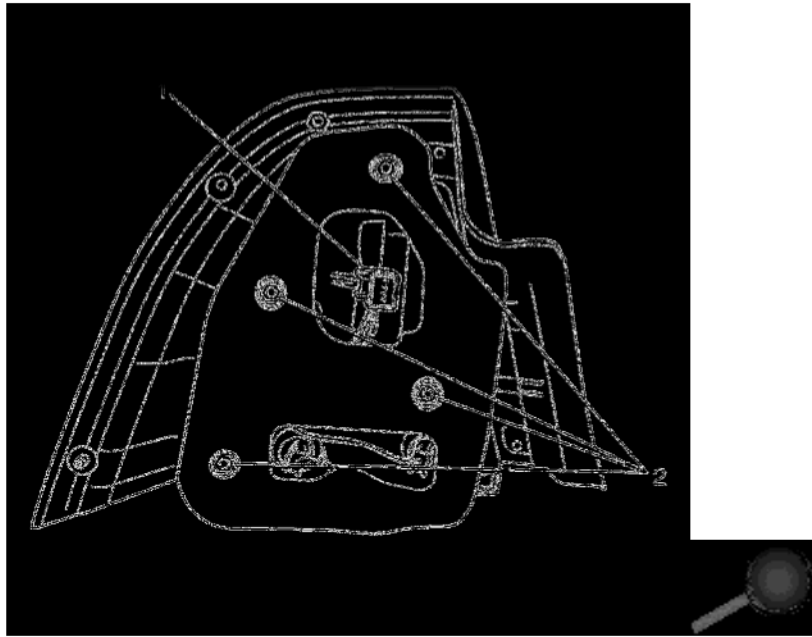


4. Remove the rear compartment side trim panel to body retaining scrivet (1).
5. Detach and move the rear compartment side trim panel (2) away from the body side panel.



6. Remove the tail lamp to body retaining nuts (2).
7. Disconnect the tail lamp electrical harness connector (1).
8. Remove the tail lamp from the vehicle.

[Installation Procedure](#)



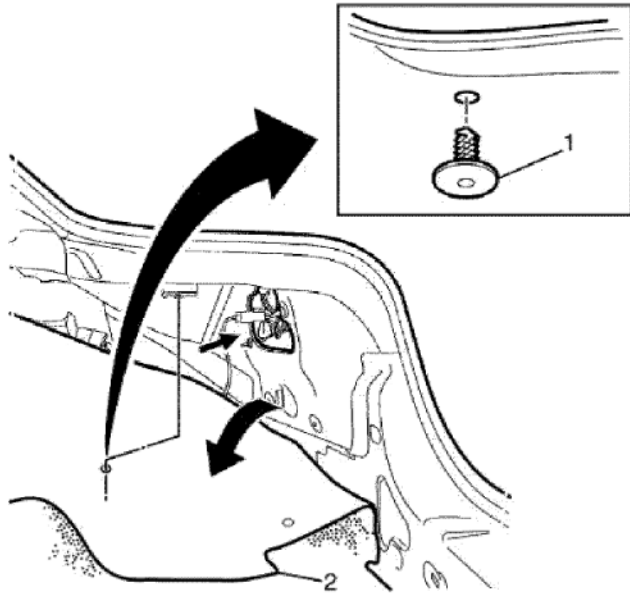
Note: To prevent water and dust entry into the vehicle make sure the tail lamp and vehicle body mating surfaces are cleaned of any contaminants.

1. Install the new tail lamp to the vehicle.

Caution: Refer to [Fastener Caution](#).

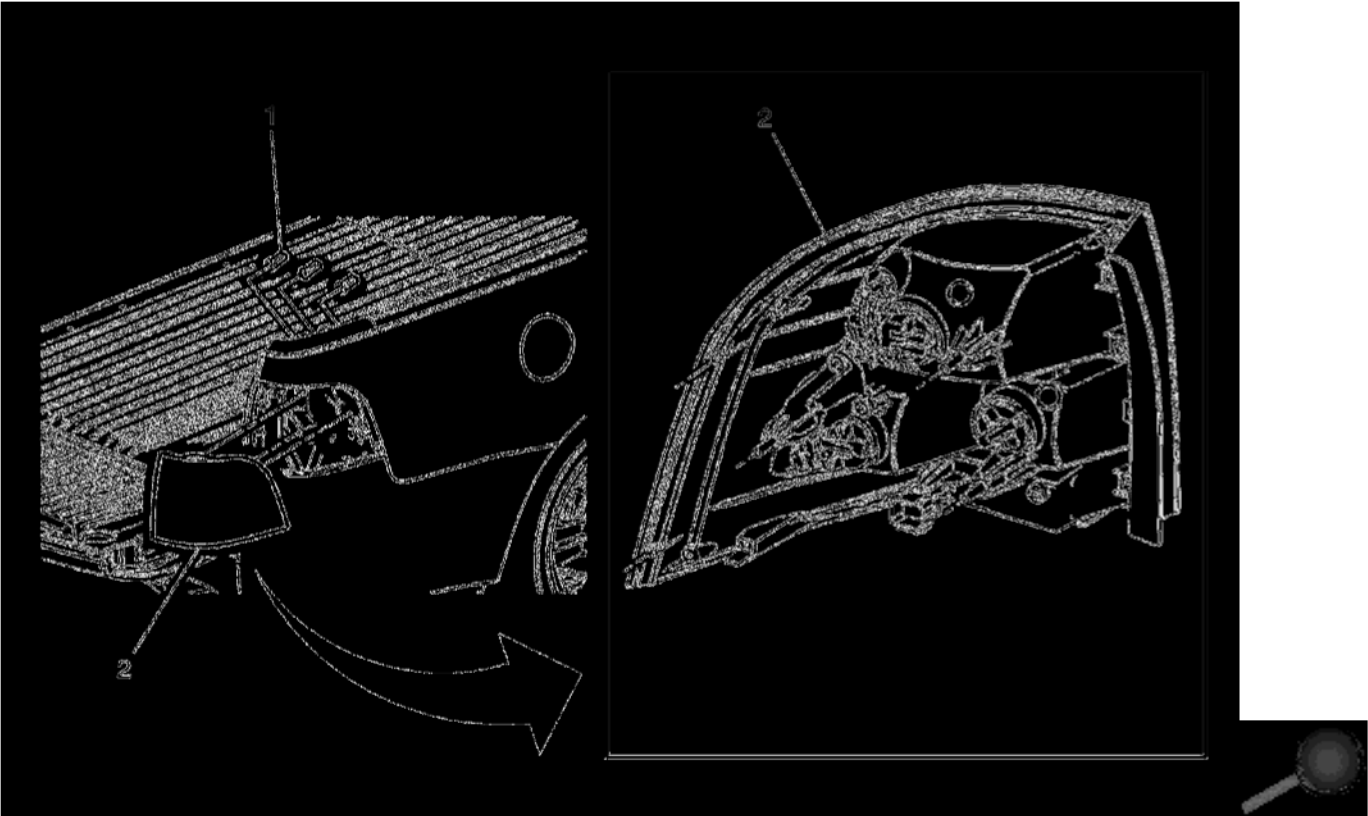
2. Install the tail lamp to body retaining nuts (2) and tighten to **3 N·m (27 lb in)**.

3. Connect the tail lamp electrical harness connector (1).



4. Move the rear compartment side trim panel (2) to its original position on the body side panel.
5. Install the rear compartment side trim panel to body retaining scrivet (1).
6. Install the rear compartment floor panel carpet. Refer to [Rear Compartment Floor Panel Carpet Replacement](#).
7. Connect the battery negative cable. Refer to [Battery Negative Cable Disconnection and Connection](#).
8. Close the rear compartment lid.
9. Check the operation of all the tail lamp functions.

Tail Lamp Replacement (Ute)

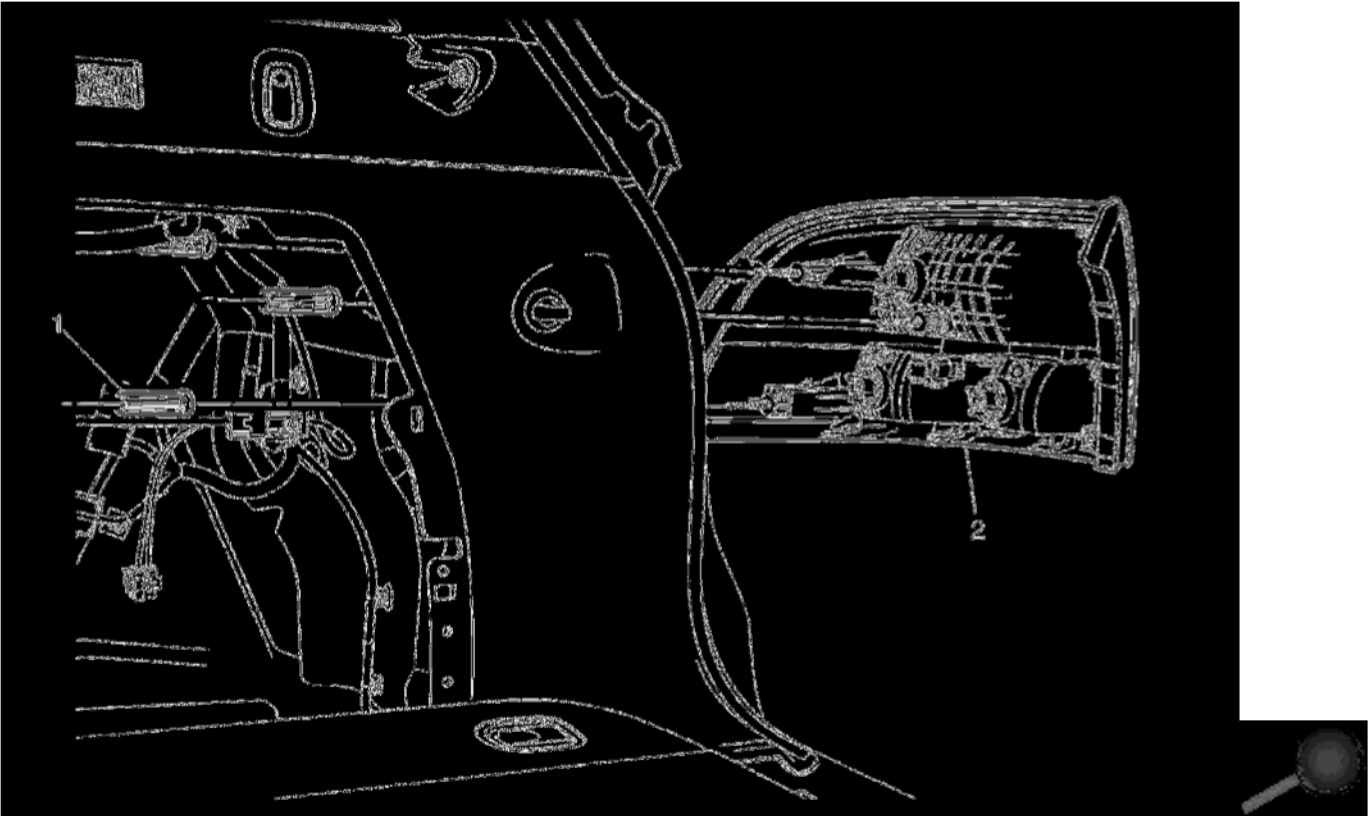


Tail Lamp Replacement

Callout	Component Name
Preliminary Procedure Remove tail lamp access hole cover.	
1	Tail Lamp Nut (Qty: 3) Caution: Refer to Fastener Caution .

2	Tail Lamp Procedure 1. Pull the tail lamp from the body side outer frame. 2. Disconnect the electrical connector.
---	--

Tail Lamp Replacement (Sportwagon, Right Side)



Tail Lamp Replacement

Callout	Component Name
Preliminary Procedure Remove rear compartment side trim panel access hole cover. Refer to Rear Compartment Side Trim Panel Access Hole Cover Replacement .	
1	Tail Lamp Nut (Qty: 3)

Caution: Refer to [Fastener Caution](#).

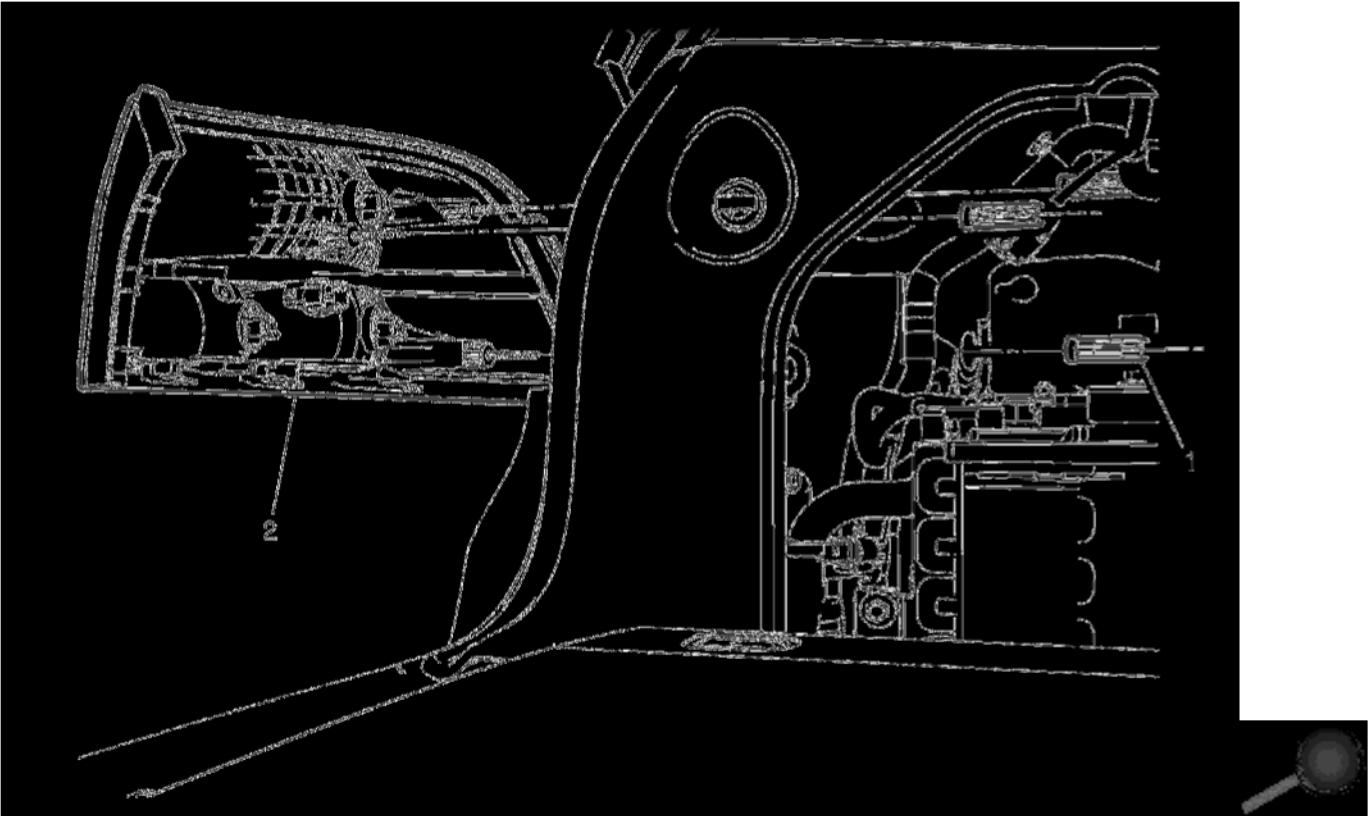
2

Tail Lamp

Procedure

1. Pull the tail lamp straight out from the body side outer frame.
2. Disconnect the electrical connector.

Tail Lamp Replacement (Sportwagon, Left Side)

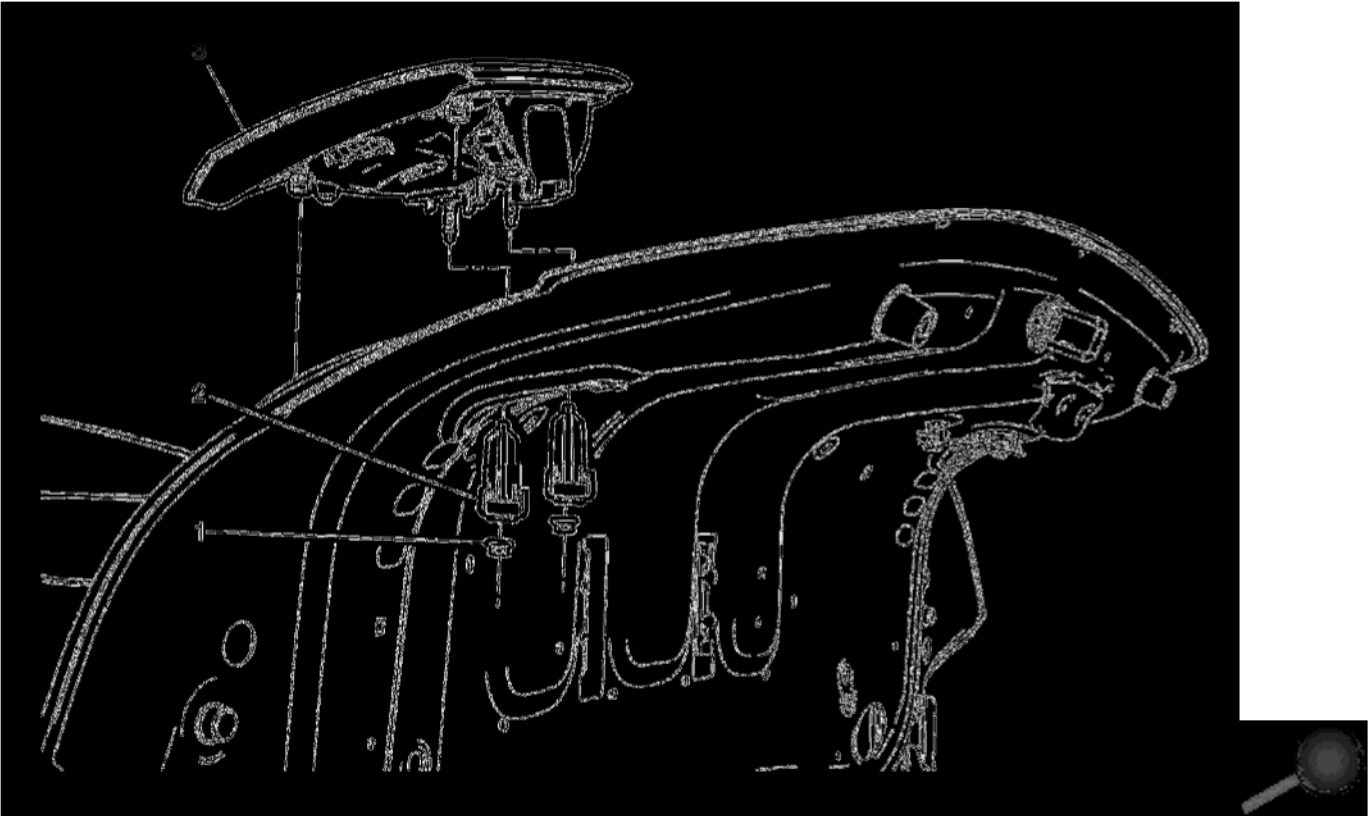


Tail Lamp Replacement

Callout	Component Name
Preliminary Procedure Remove the quarter inner trim finish panel opening cover. Refer to Quarter Inner Trim Finish Panel Opening Cover Replacement .	
1	Tail Lamp Nut (Qty: 3) Caution: Refer to Fastener Caution .

2	Tail Lamp Procedure 1. Pull the tail lamp straight out from the body side outer frame. 2. Disconnect the electrical connector.
---	---

Tail Lamp Replacement (Short Wheelbase, Rear Compartment Lid)

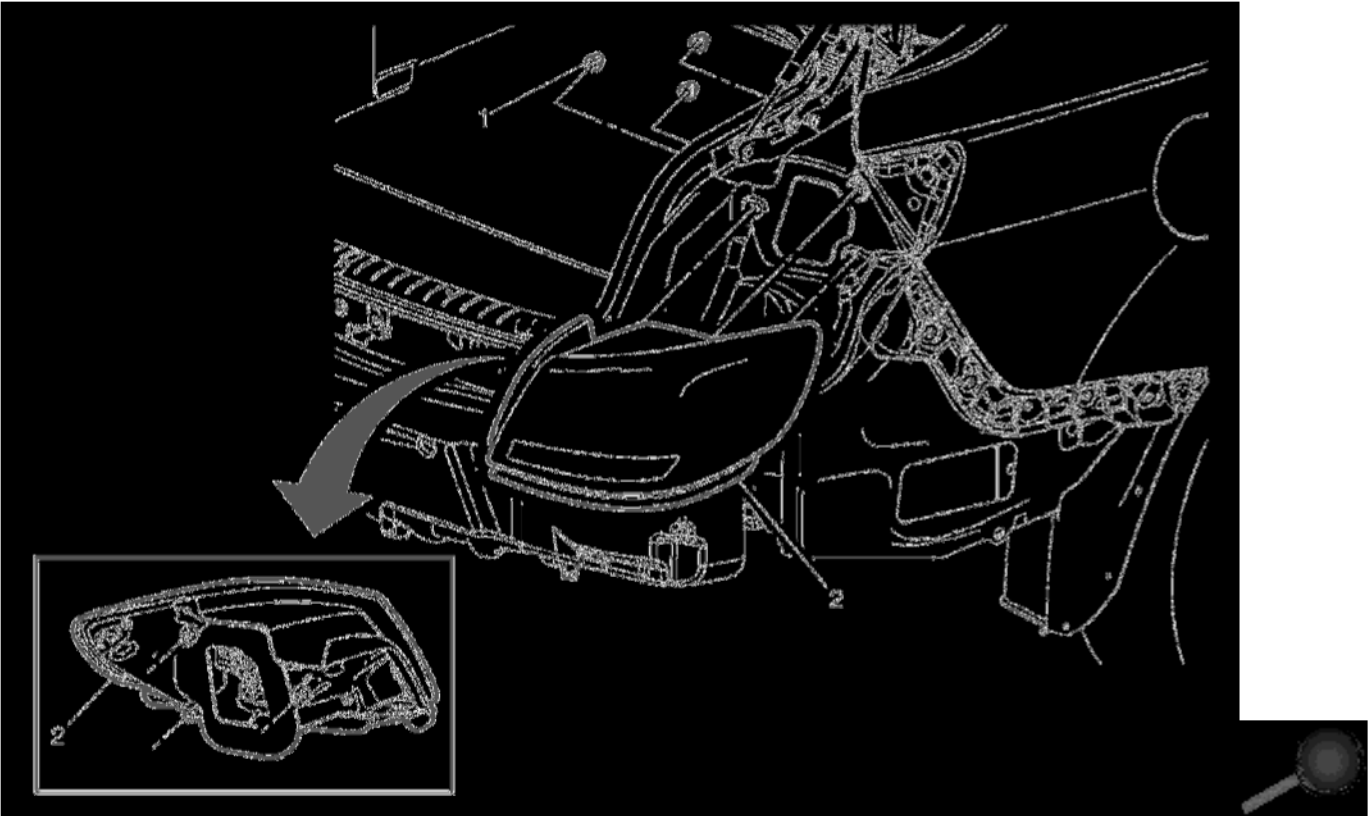


Tail Lamp Replacement

Callout	Component Name
Preliminary Procedure Remove the rear compartment lid carpet. Refer to Rear Compartment Lid Carpet Replacement . © 2014 General Motors. All rights reserved.	
1	Tail Lamp Nut (Qty: 2) Caution: Refer to Fastener Caution .

2	Tail Lamp Mounting Bracket (Qty: 2)
3	Tail Lamp-Rear Compartment Lid Procedure 1. Disconnect the electrical connector. 2. Pull up and out to release tail lamp retaining tabs and remove from rear compartment lid.

Tail Lamp Replacement (Short Wheelbase, Body Side)



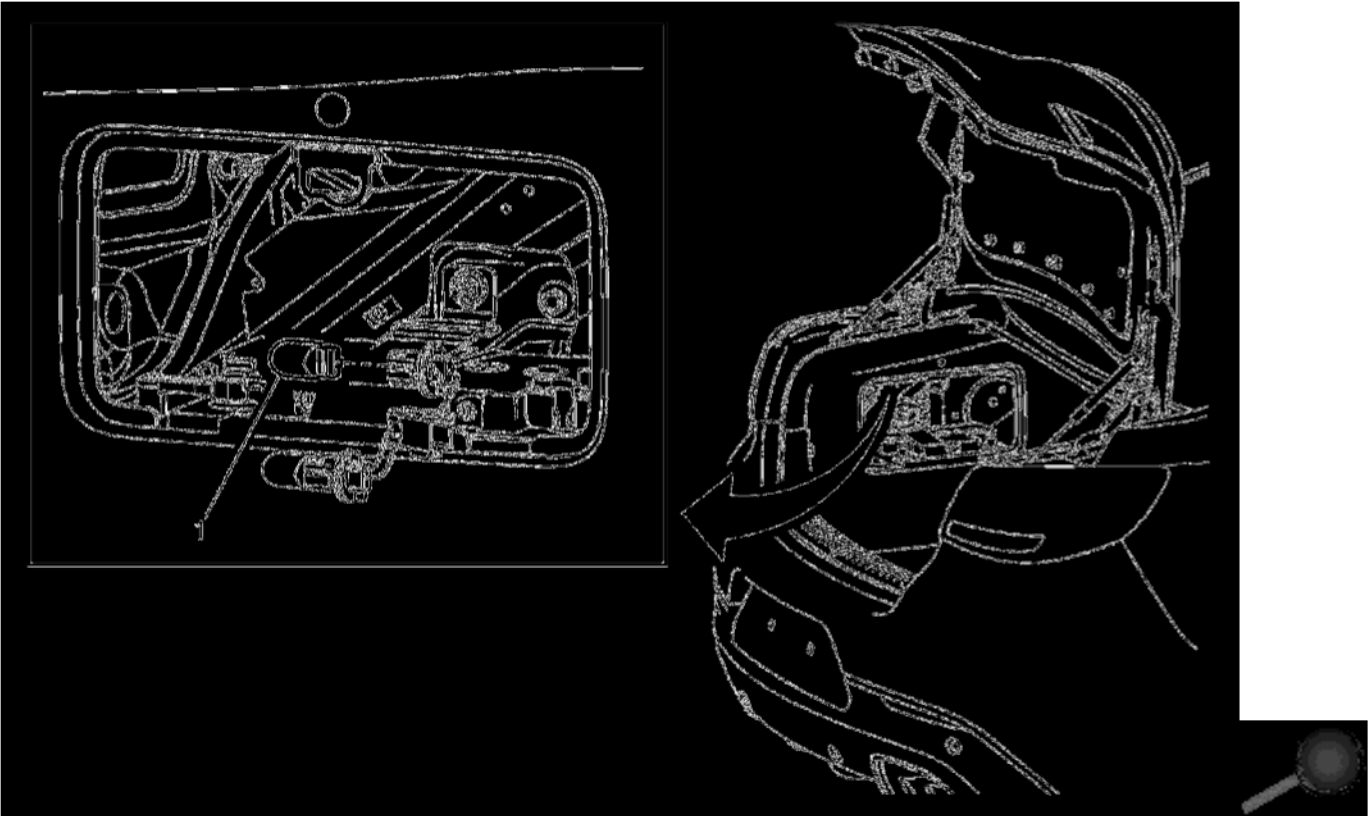
Tail Lamp Replacement

Callout	Component Name
Preliminary Procedure	
1. Remove the rear compartment side trim panel. Refer to Rear Compartment Side Trim Panel Replacement .	
2. Remove the rear bumper fascia. Refer to Rear Bumper Fascia Replacement .	

1	Tail Lamp Nut (Qty: 3) Caution: Refer to Fastener Caution .
2	Tail Lamp Procedure 1. Disconnect the electrical connector. 2. Pull the tail lamp from the body side outer frame.

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Tail Lamp Bulb Replacement (Short Wheelbase, Body Side, Left Side)

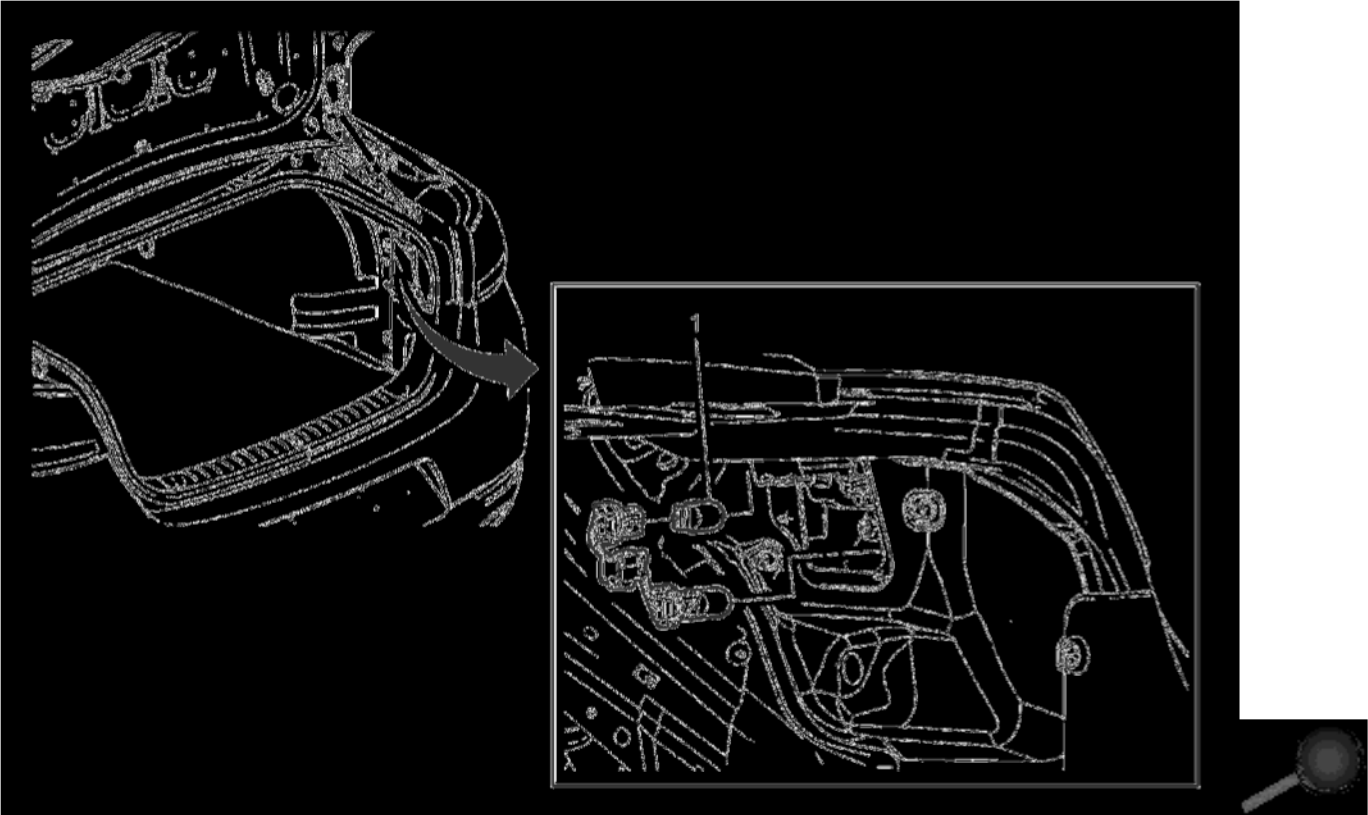


Tail Lamp Bulb Replacement

Callout	Component Name
Preliminary Procedure Remove the rear lamp wiring harness. Refer to Rear Lamp Wiring Harness Replacement . © 2014 General Motors. All rights reserved.	
1	Tail Lamp Bulb Procedure

Pull the tail lamp bulb straight out from the rear lamp wiring harness.

Tail Lamp Bulb Replacement (Short Wheelbase, Body Side, Right Side)

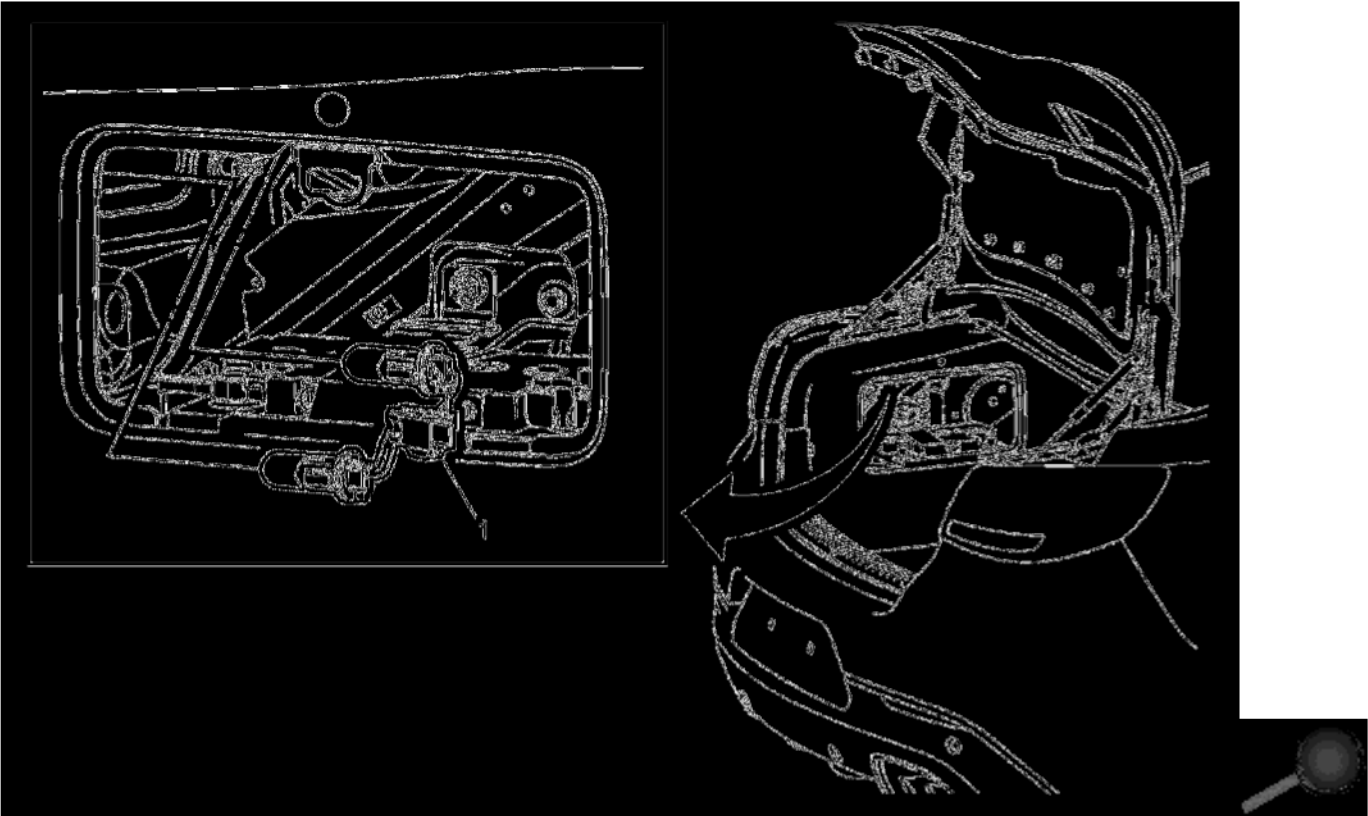


Tail Lamp Bulb Replacement

Callout	Component Name
Preliminary Procedure Remove the rear lamp wiring harness. Refer to Rear Lamp Wiring Harness Replacement .	
1	Tail Lamp Bulb Procedure

Pull the tail lamp bulb straight out from the rear lamp wiring harness.

Rear Lamp Wiring Harness Replacement (Short Wheelbase, Body Side, Left Side)



Rear Lamp Wiring Harness Replacement

Callout	Component Name
Preliminary Procedure Remove the rear compartment side trim panel access hole cover. Refer to Rear Compartment Side Trim Panel Access Hole Cover Replacement .	
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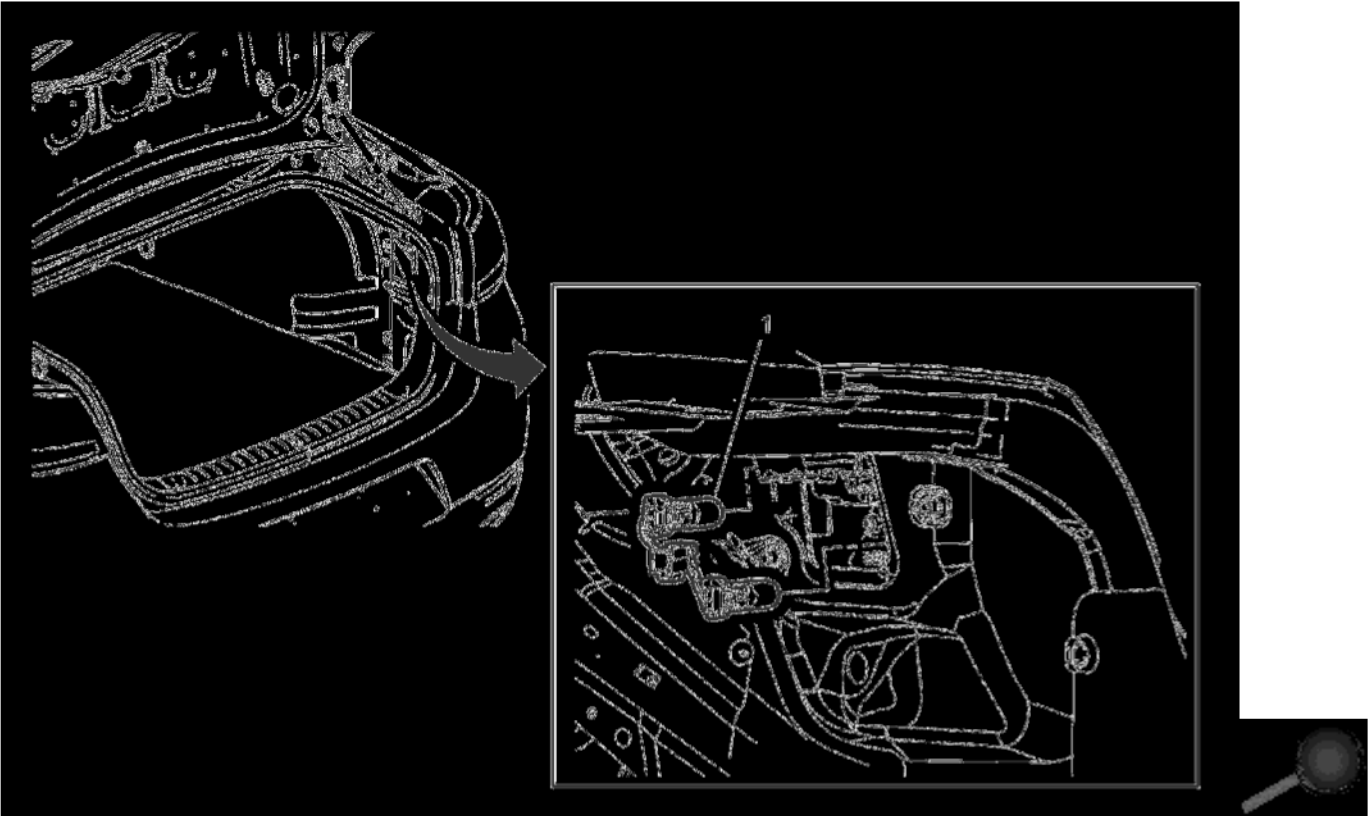
1

Rear Lamp Wiring Harness

Procedure

Rotate counterclockwise and pull the rear lamp wiring harness from the tail lamp.

Rear Lamp Wiring Harness Replacement (Short Wheelbase, Body Side, Right Side)



Rear Lamp Wiring Harness Replacement

Callout	Component Name
Preliminary Procedure Remove the rear compartment side trim panel. Refer to Rear Compartment Side Trim Panel Replacement .	
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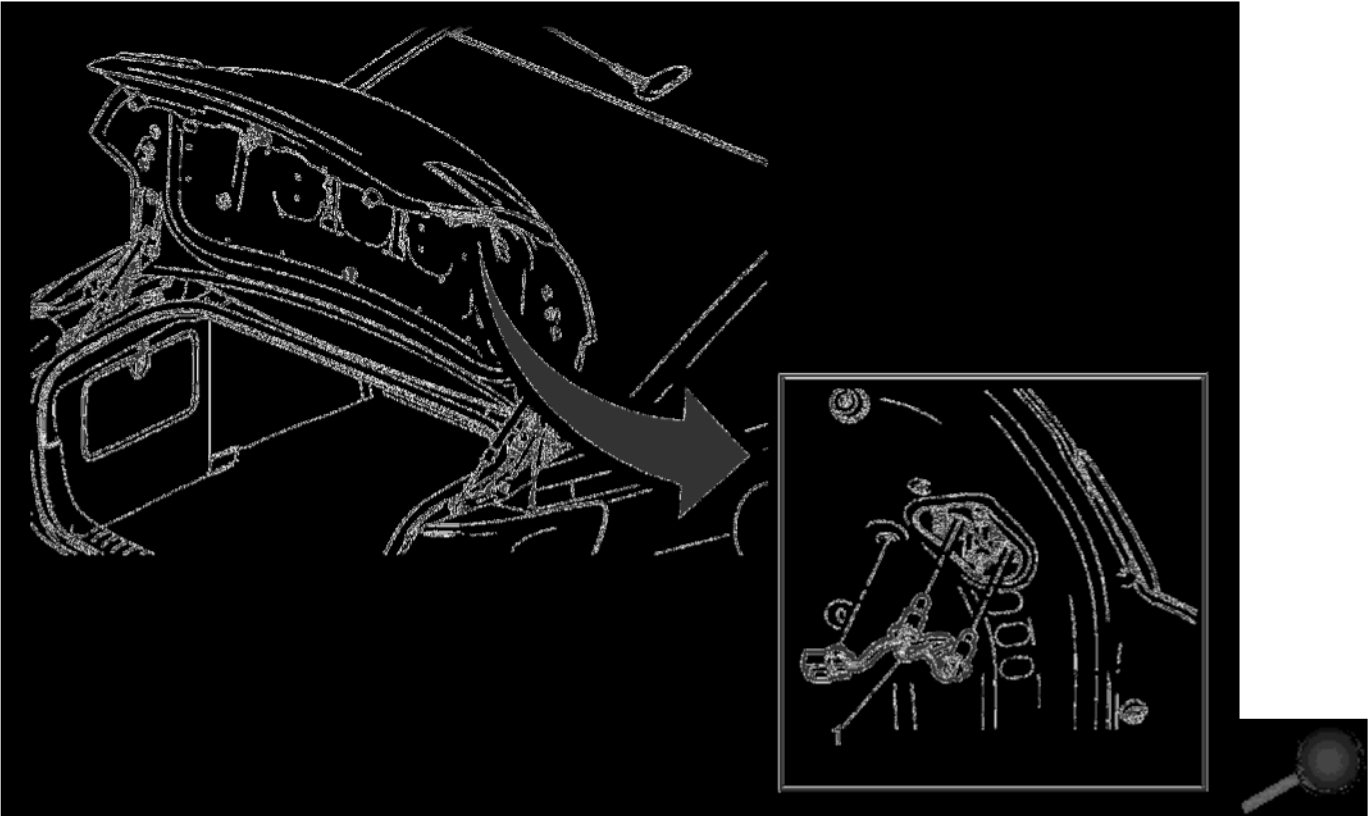
1

Rear Lamp Wiring Harness

Procedure

Rotate counterclockwise and pull the rear lamp wiring harness from the tail lamp.

Rear Lamp Wiring Harness Replacement (Short Wheelbase Sedan, Rear Compartment Lid)



Rear Lamp Wiring Harness Replacement

Callout	Component Name
Preliminary Procedure Remove the rear compartment lid carpet. Refer to Rear Compartment Lid Carpet Replacement .	
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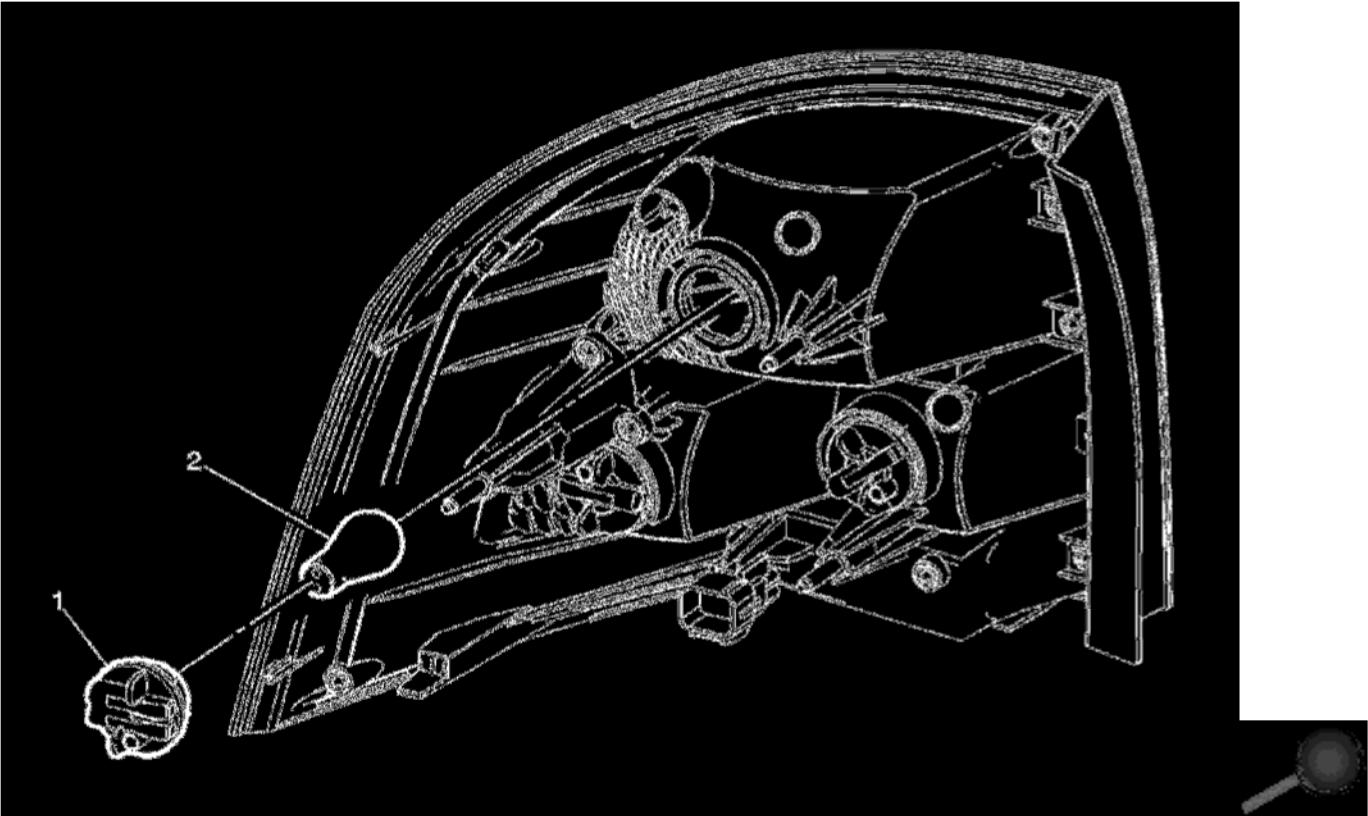
1

Rear Lamp Wiring Harness

Procedure

1. Rotate counterclockwise and pull the rear lamp wiring harness bulb sockets from the tail lamp.
2. With a trim type release tool release the retainer and pull the harness from the tail lamp.

Stop and Tail Lamp Bulb Replacement (Ute)

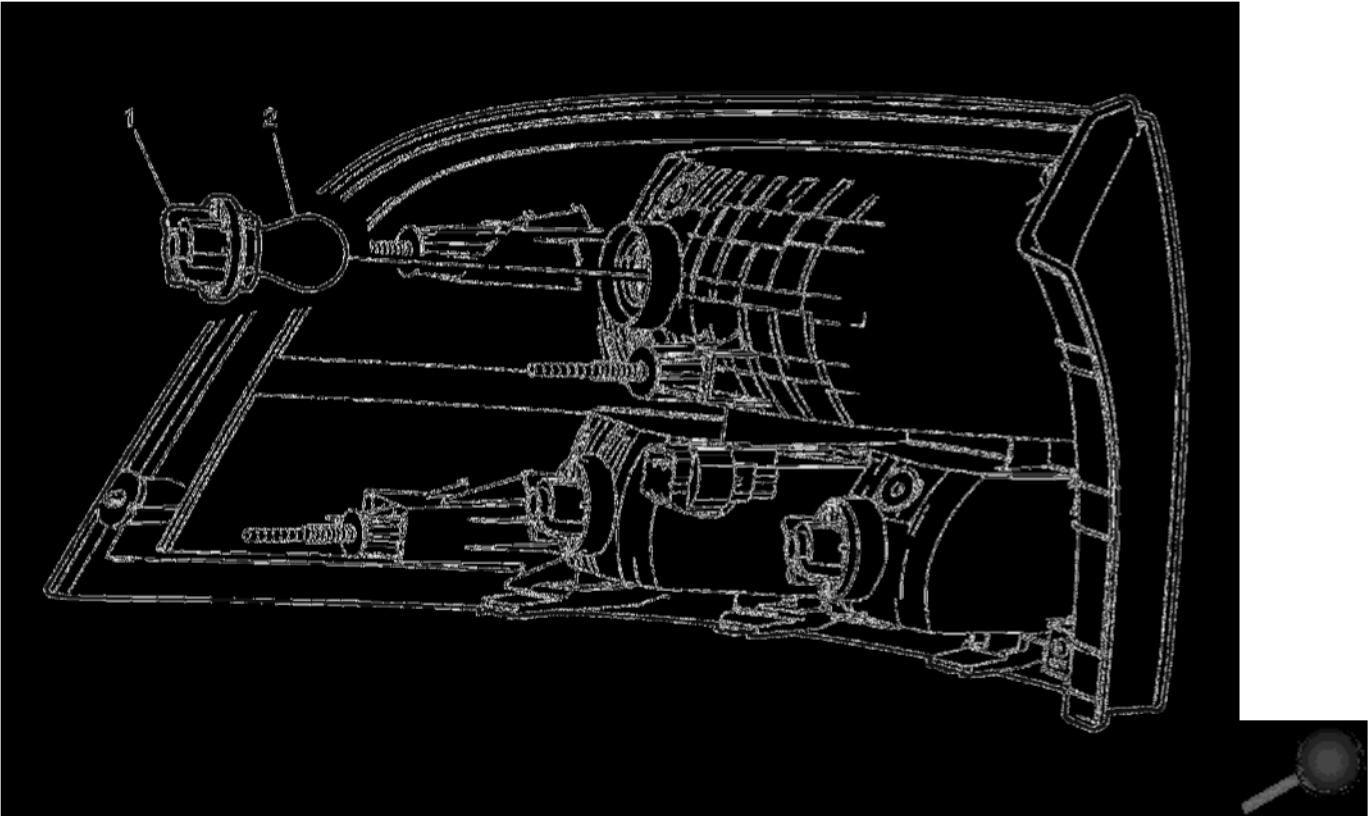


Stop and Tail Lamp Bulb Replacement

Callout	Component Name
Preliminary Procedure Remove the tail lamp. Refer to Tail Lamp Replacement .	
1	Stop and Tail Lamp Bulb Socket Procedure

	Rotate clockwise and pull from the tail lamp.
2	Stop and Tail Lamp Bulb Procedure Pull stop and tail lamp bulb straight out from stop and tail lamp bulb socket.

Stop and Tail Lamp Bulb Replacement (Sportwagon)

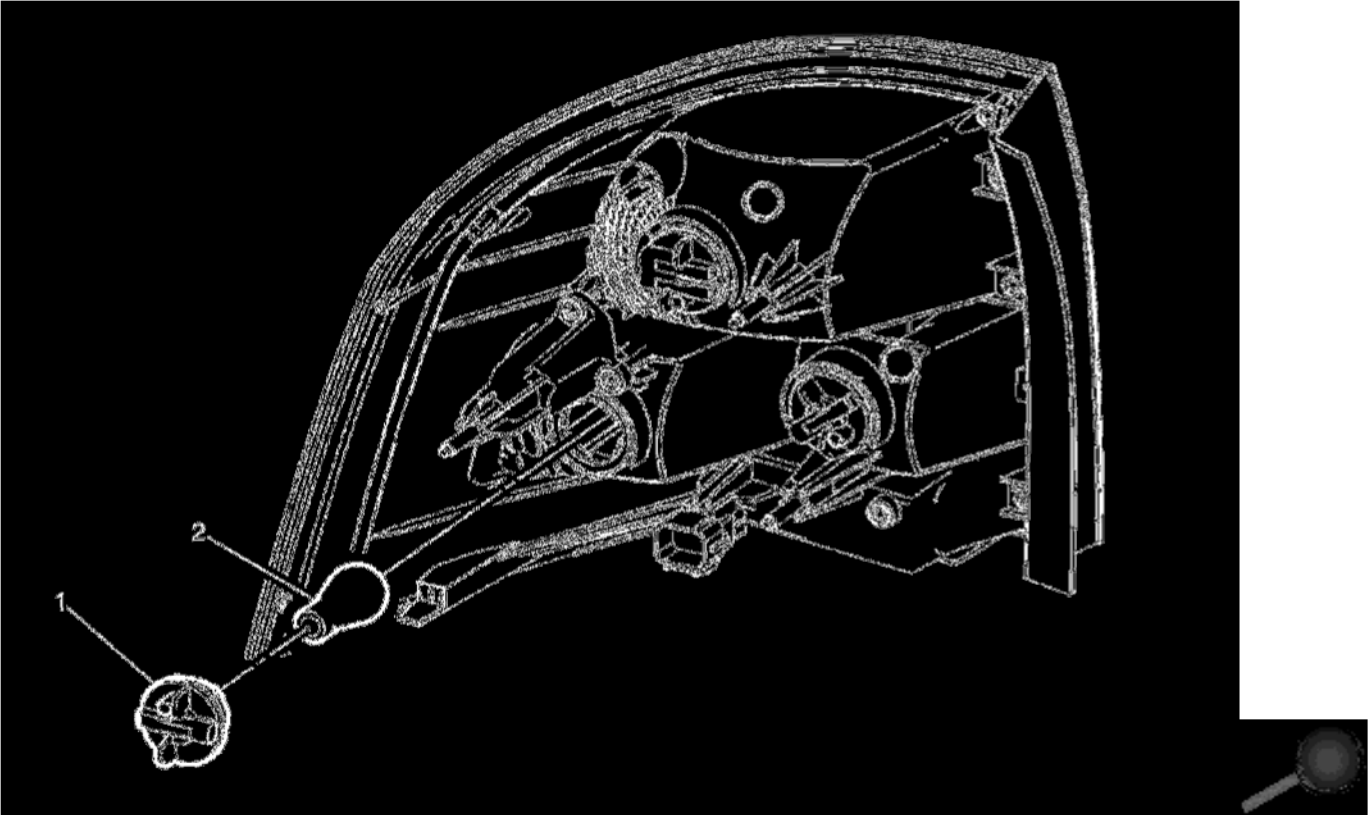


Stop and Tail Lamp Bulb Replacement

Callout	Component Name
Preliminary Procedure Remove the tail lamp. Refer to Tail Lamp Replacement . © 2014 General Motors. All rights reserved.	
1	Stop and Tail Lamp Bulb Socket Procedure

	Rotate counterclockwise and pull from the tail lamp.
2	Stop and Tail Lamp Bulb Procedure Pull stop and tail lamp bulb straight out from stop and tail lamp bulb socket.

Rear Turn Signal Lamp Bulb Replacement (Ute)

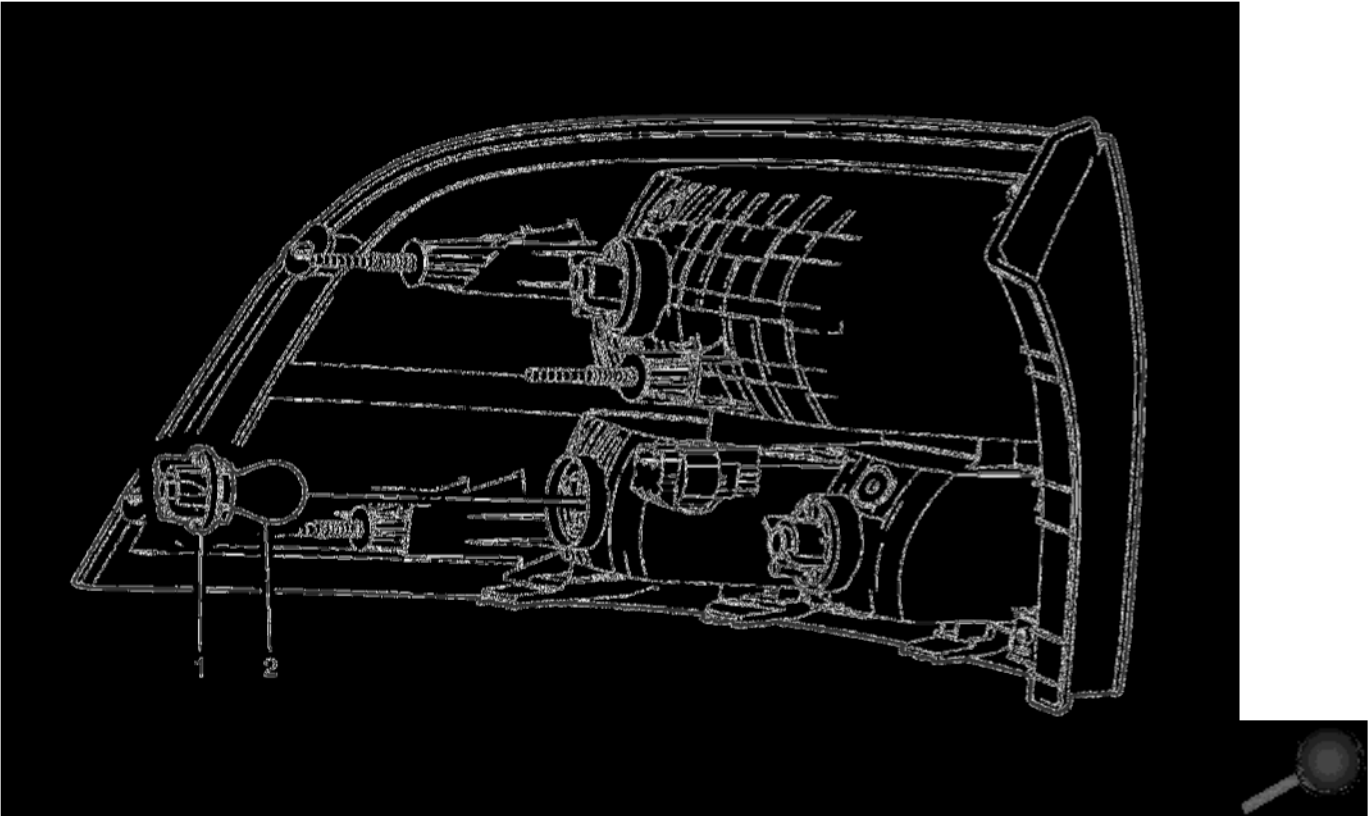


Rear Turn Signal Lamp Bulb Replacement

Callout	Component Name
Preliminary Procedure Remove the tail lamp. Refer to Tail Lamp Replacement .	
1	Rear Turn Signal Bulb Socket Procedure

	Rotate clockwise and pull from the tail lamp.
2	Rear Turn Signal Bulb Procedure Pull rear turn signal bulb straight out from rear turn signal bulb socket.

Rear Turn Signal Lamp Bulb Replacement (Sportwagon)

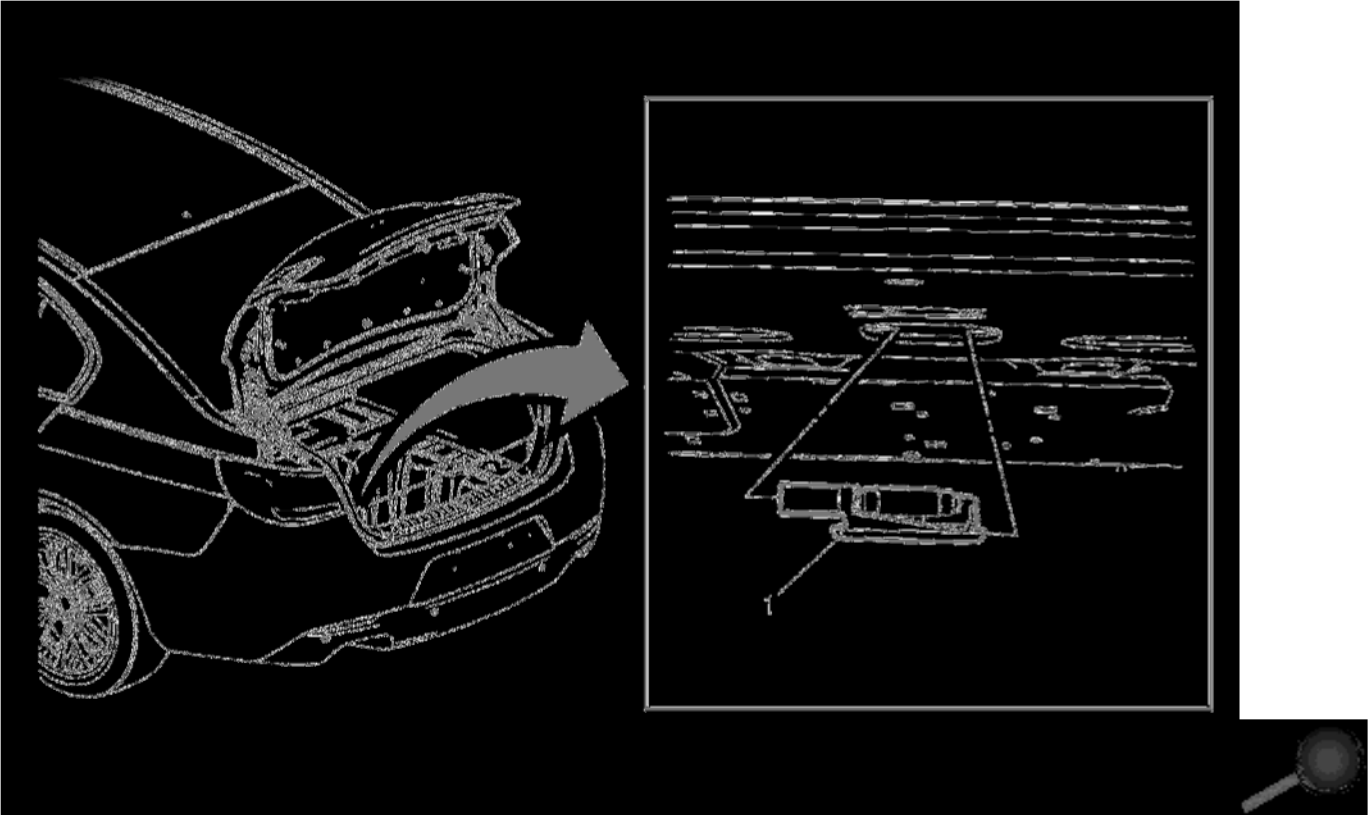


Rear Turn Signal Lamp Bulb Replacement

Callout	Component Name
Preliminary Procedure Remove the tail lamp. Refer to Tail Lamp Replacement .	
1	Rear Turn Signal Bulb Socket Procedure

	Rotate counterclockwise and pull from the tail lamp.
2	Rear Turn Signal Bulb Procedure Pull rear turn signal bulb straight out from rear turn signal bulb socket.

Rear Compartment Courtesy Lamp Replacement (Sedan)



Rear Compartment Courtesy Lamp Replacement

Callout	Component Name
1	Rear Compartment Courtesy Lamp Procedure © 2014 General Motors. All rights reserved. 1. Use a plastic flat bladed trim tool in order to release the lamp assembly from the rear compartment. 2. Disconnect the electrical connection.



Fastener Tightening Specifications

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Headlamp Leveling Front Suspension Height Sensor	9 N•m	80 lb in
Headlamp Leveling Rear Suspension Height Sensor	7 N•m	62 lb in

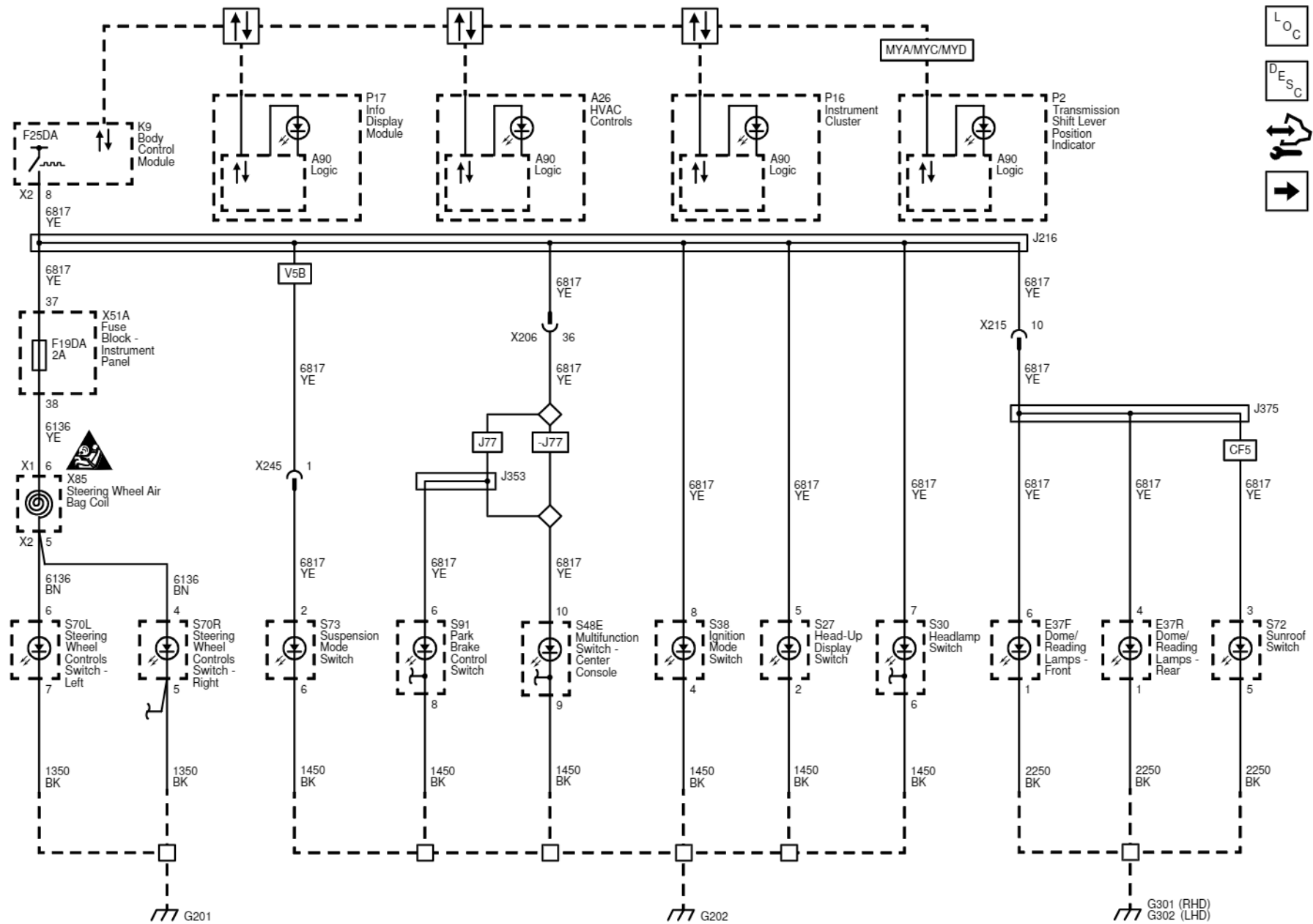
[2014 Holden VF Sedan](#) | [VF/WN - Sedan, Ute, Sportwagon, Caprice, Lumina, HSV Service Manual 5617662](#) | [Body Systems](#) |
[Lighting](#) | [Schematic and Routing Diagrams](#) | **Document ID: 3292414**

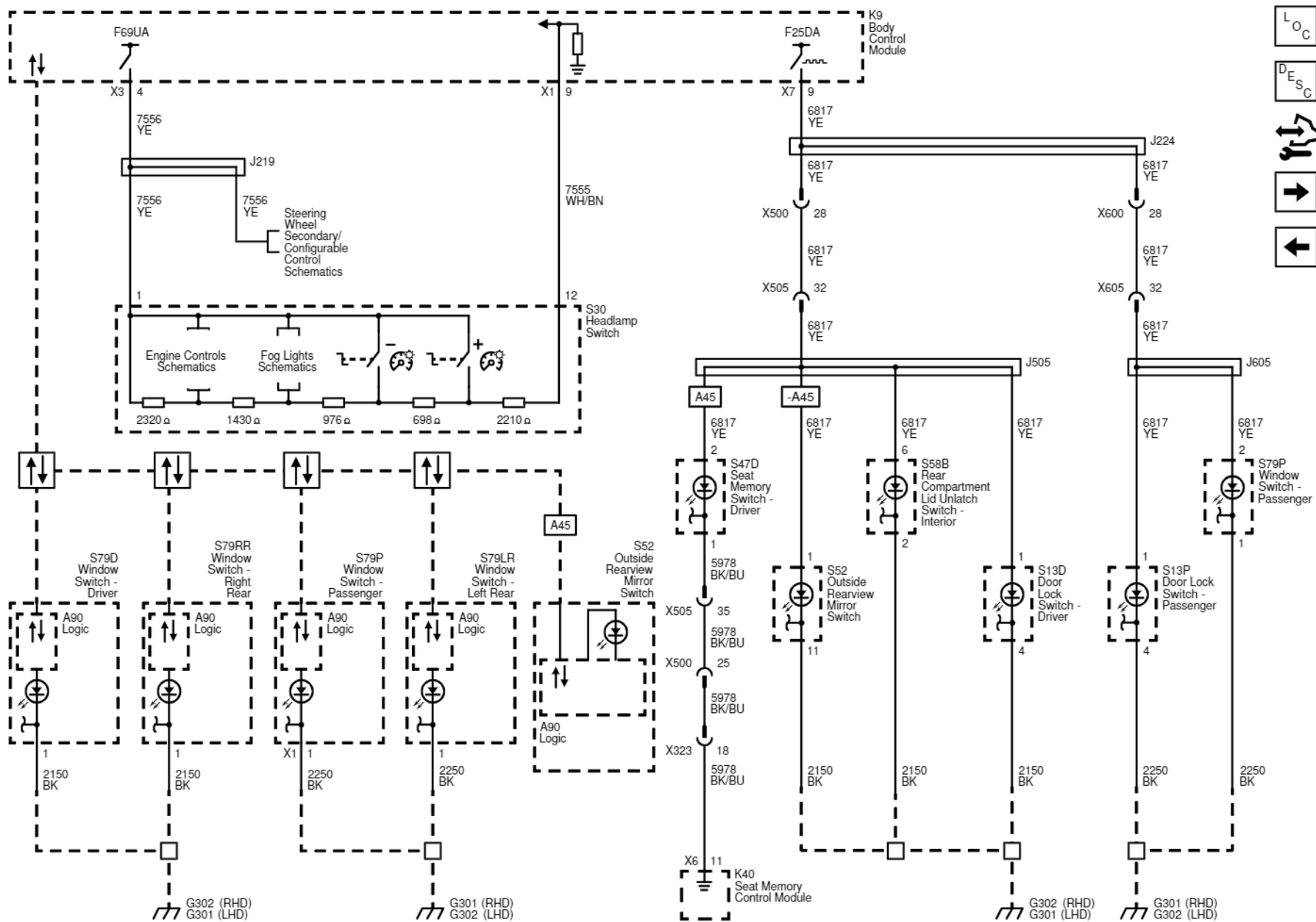
Interior Lights Dimming Schematics

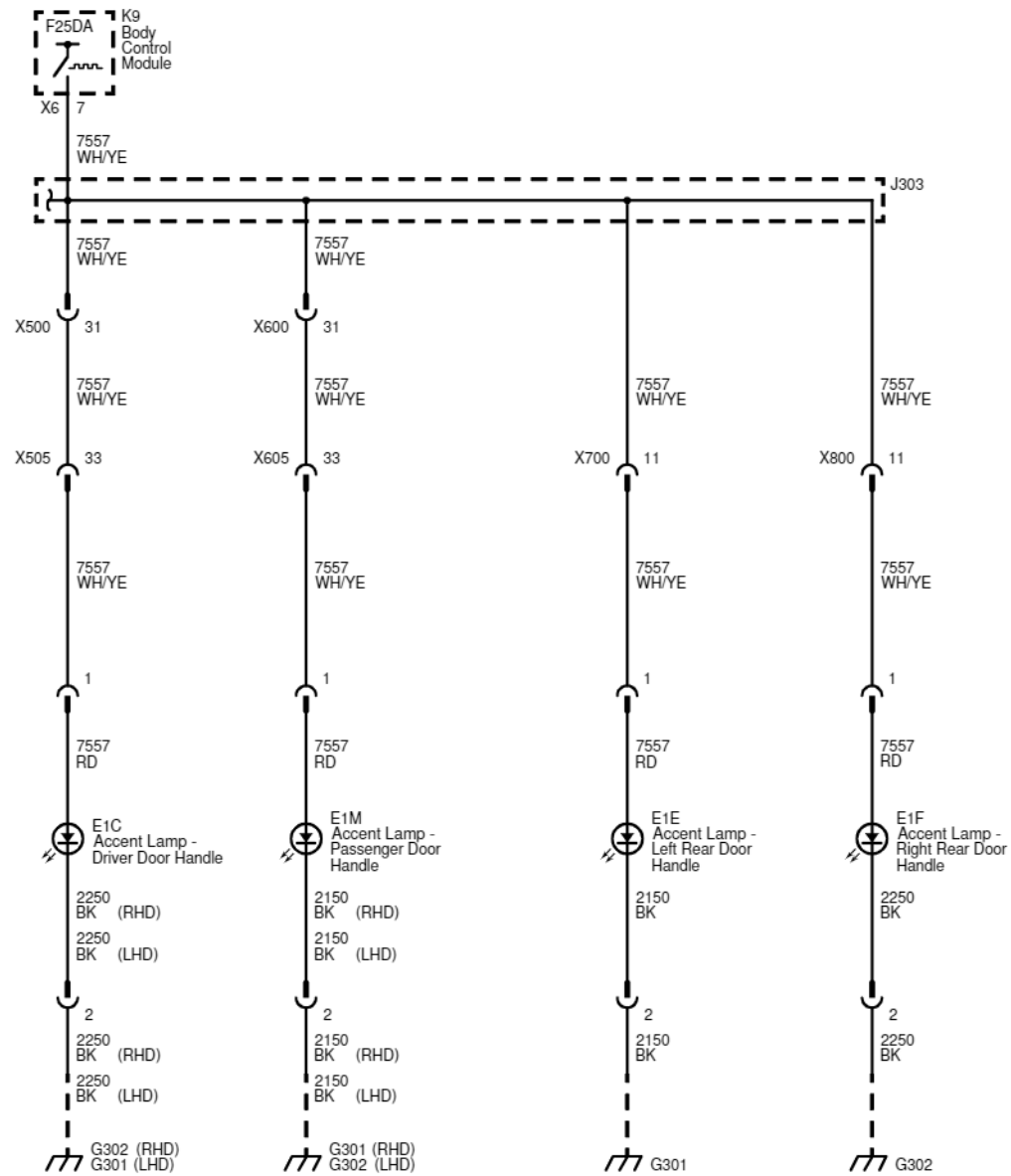
Figure 1: [Instrument Panel and Overhead Lamps](#)

Figure 2: [Dimming Controls and Non-Accent Lamps](#)

Figure 3: [Accent Lamps](#)







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