

2010 Cadillac SRX**2010 ACCESSORIES & EQUIPMENT Lighting - SRX****2010 ACCESSORIES & EQUIPMENT****Lighting SRX****SECTIONS****FASTENER TIGHTENING SPECIFICATIONS**

Application	Specification	
	Metric	English
Brake Pedal Position Sensor Bolt	9 N.m	80 lb in
Fog Lamp Assembly Screws	2.5 N.m	22 lb in
Headlamp Control Module Nuts	6 N.m	53 lb in
Headlamp Leveling Front Suspension Height Sensor Fastener	8 N.m	71 lb in
Headlamp Leveling Rear Suspension Height Sensor Fastener	8 N.m	71 lb in
Headlamp Screws	6 N.m	53 lb in
High Mounted Stop Lamp to the Rear End Spoiler Screws	2 N.m	18 lb in
Light Plate Blocker Bolts	2.5 N.m	22 lb in
Rear Bracket Compartment Frame Bolts	9 N.m	80 lb in
Rear Bracket Compartment Frame Nuts	9 N.m	80 lb in
Tail Lamp to the Body Panel Screws	2.5 N.m	22 lb in
Trailer Lamp Control Module Bolt	9 N.m	80 lb in

SCHEMATIC ROUTING ARRAYS**HEADLIGHTS/ AIR TIGHTENING LIGHTS (RL) SCHEMATICS**

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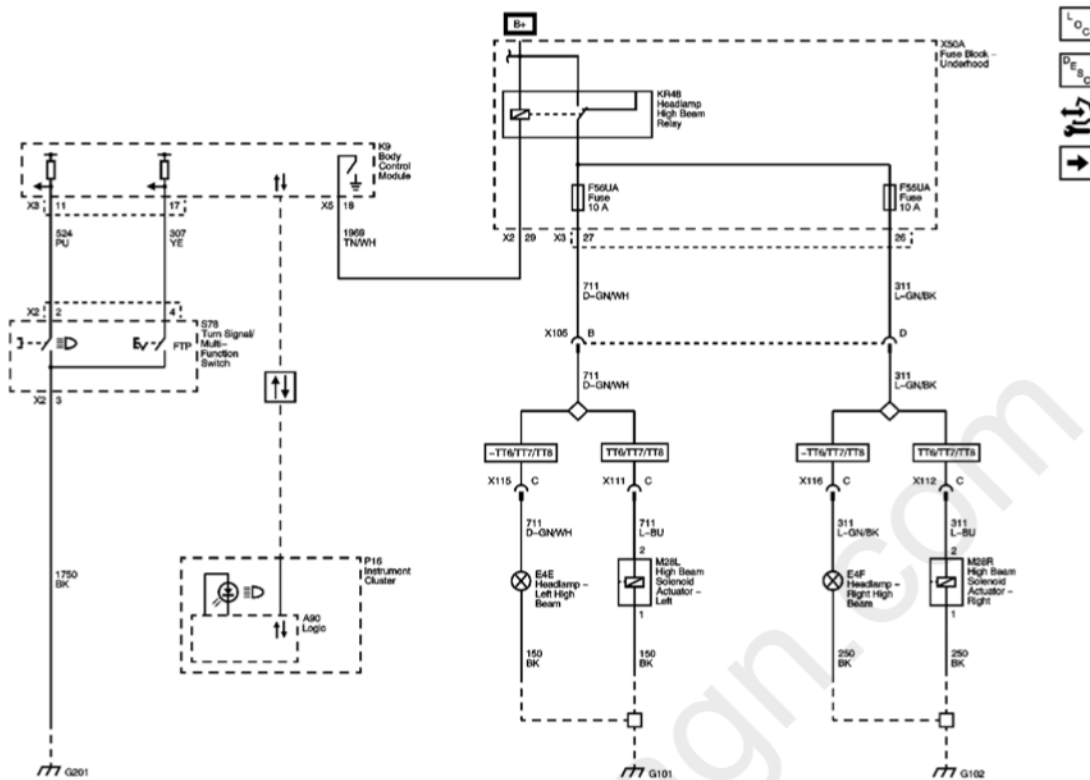


Fig. : Headlamps Circuit Schematic - High beam
 Courtesy of GENERAL MOTORS CORP.

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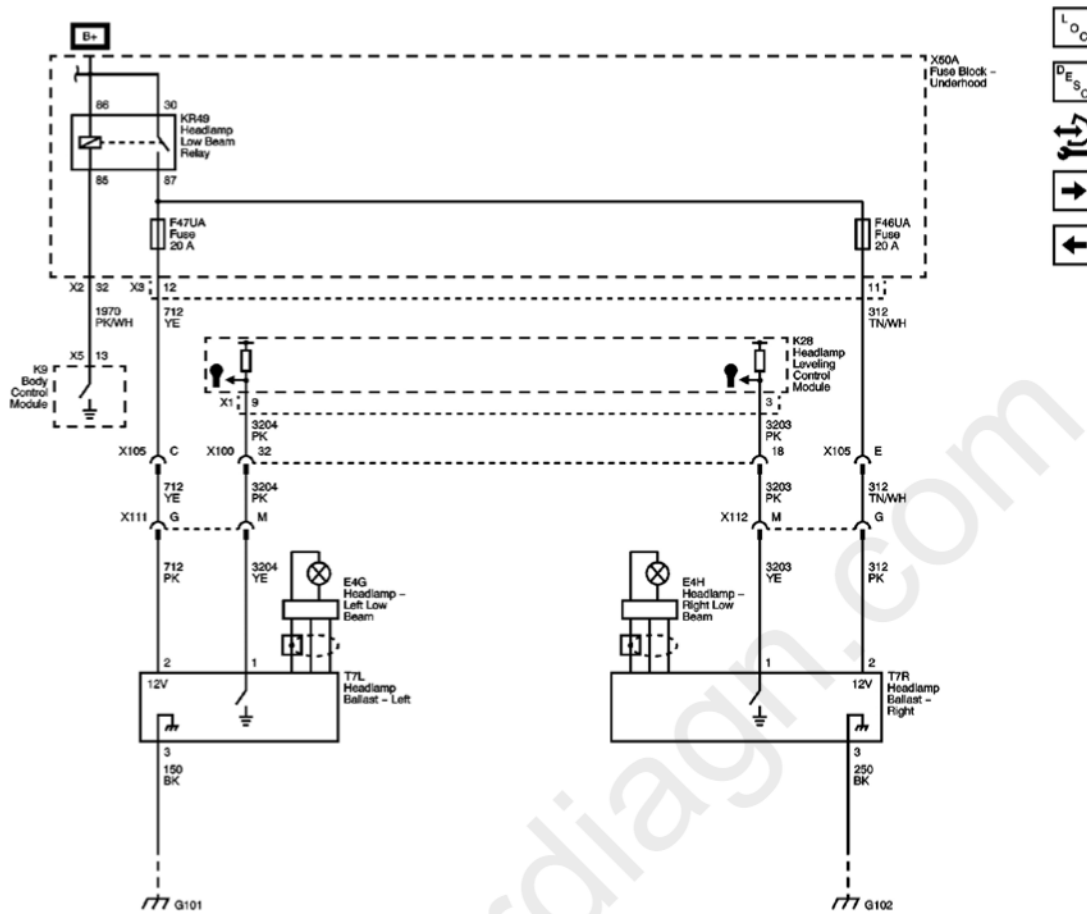


Fig. : Headlamps Circuit Schematic - Low beam with TT6, TT7, or TT8
Courtesy of GENERAL MOTORS CORP.

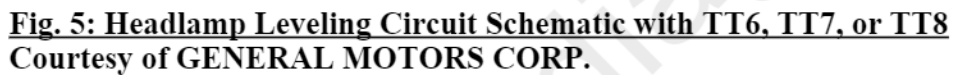
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Courtesy of GENERAL MOTORS CORP.

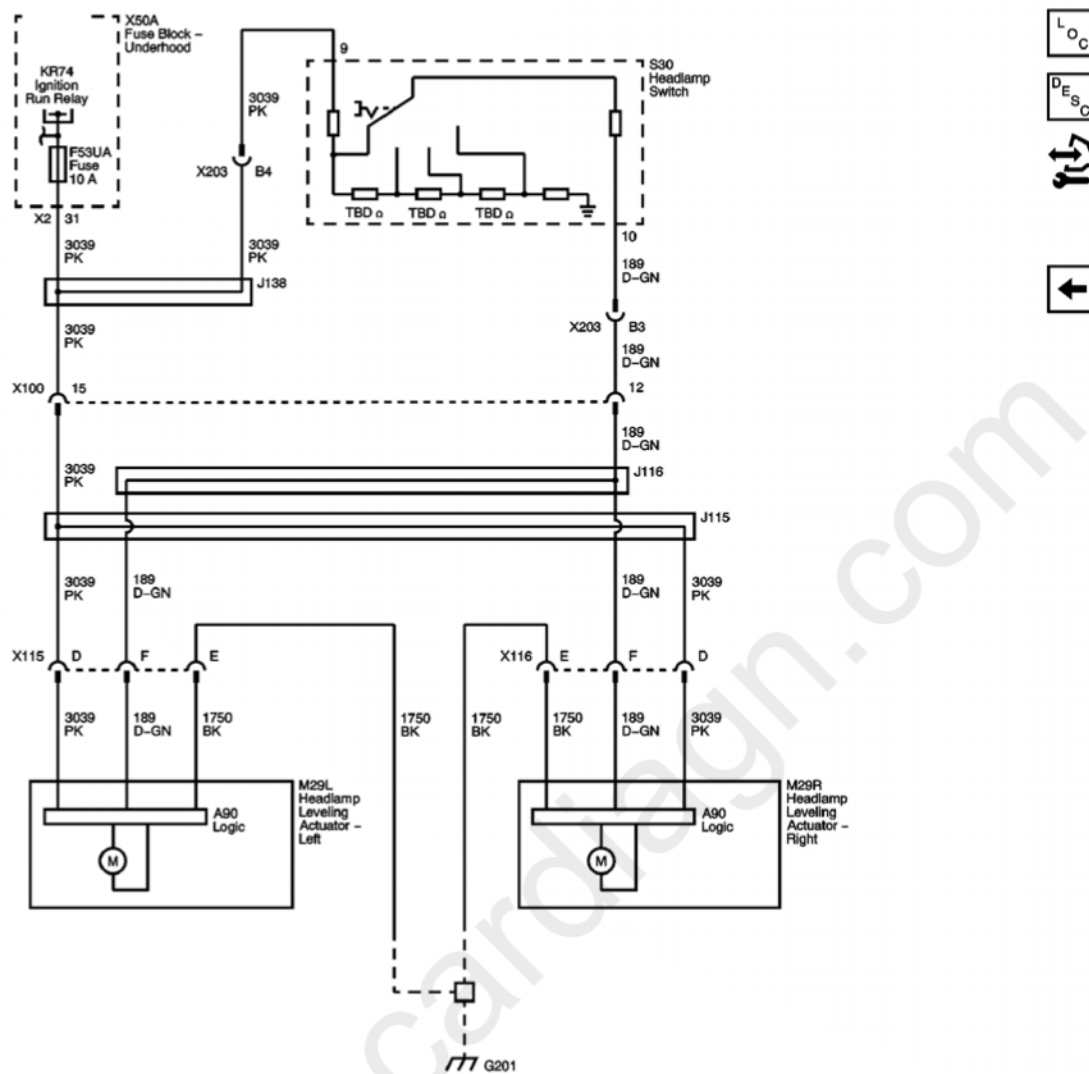


Fig. 6: Automatic Headlamp Leveling Circuit Schematic with T84 or T85
Courtesy of GENERAL MOTORS CORP.

FOG LIGHTS SCHEMATICS

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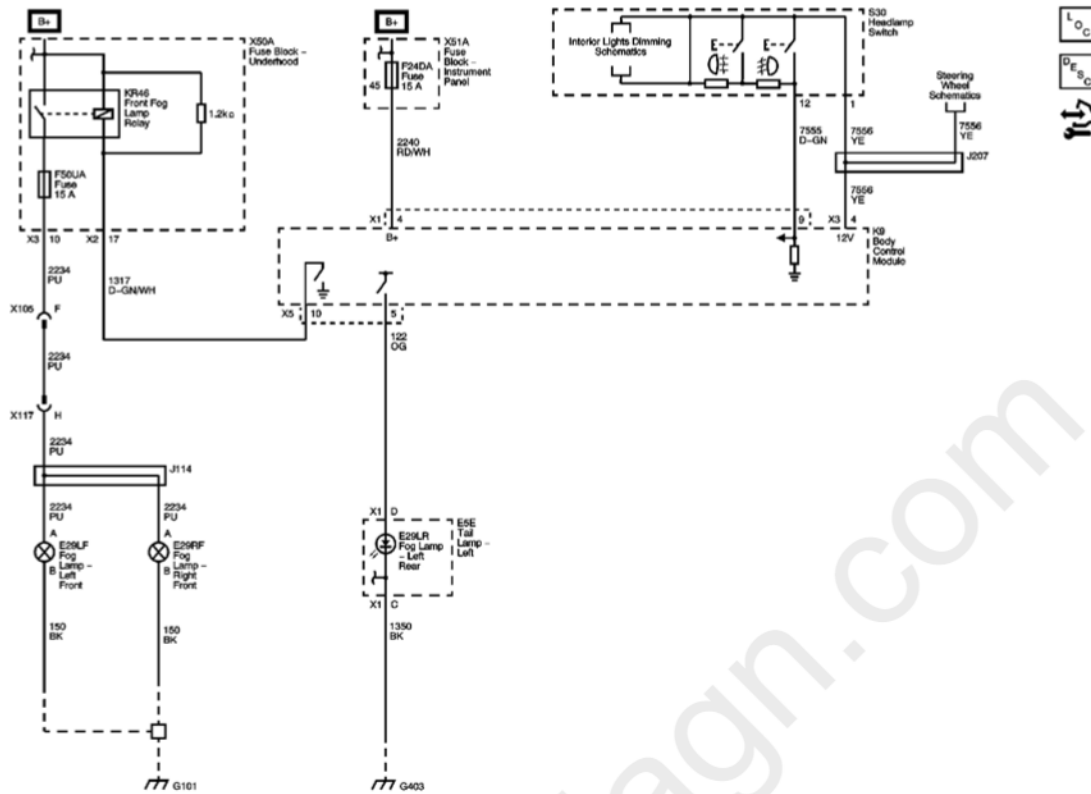


Fig. 7: Fog Lamps Circuit Schematic - Front (T96) and Rear (T79)
Courtesy of GENERAL MOTORS CORP.

EXTERIOR LIGHTS SCHEMATICS

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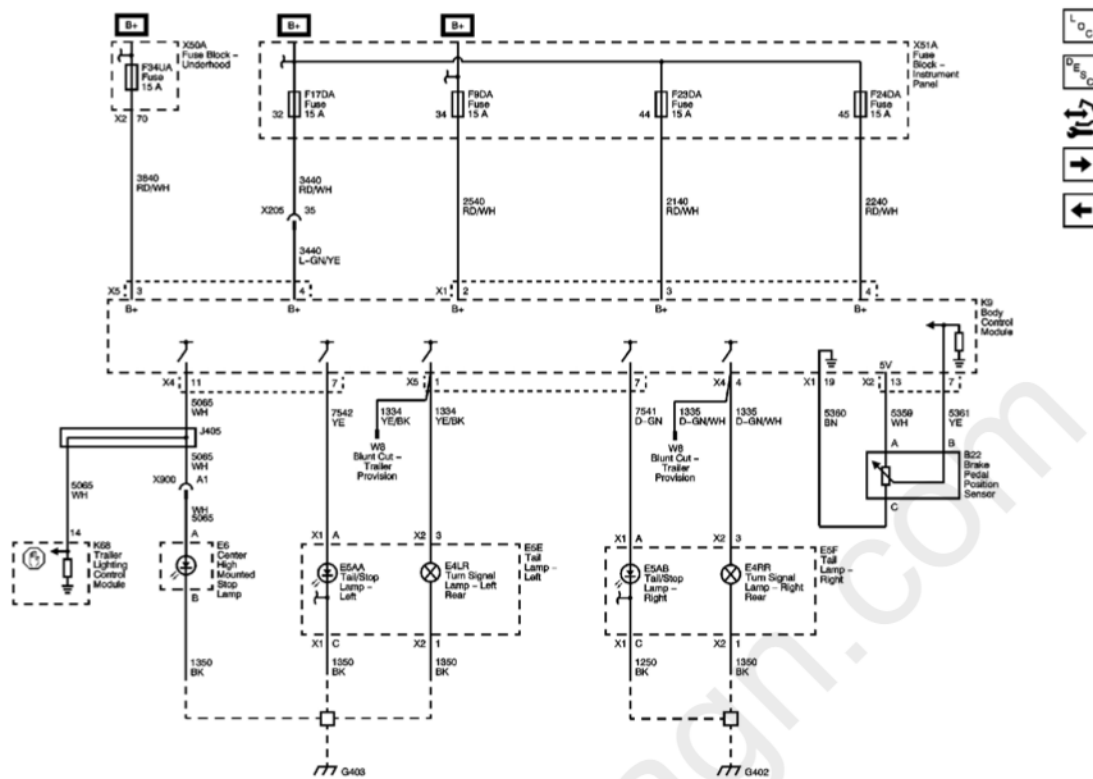


Fig. 9: Turn Signal Lamps Rear & Stop Lamps Circuit Schematic
 Courtesy of GENERAL MOTORS CORP.

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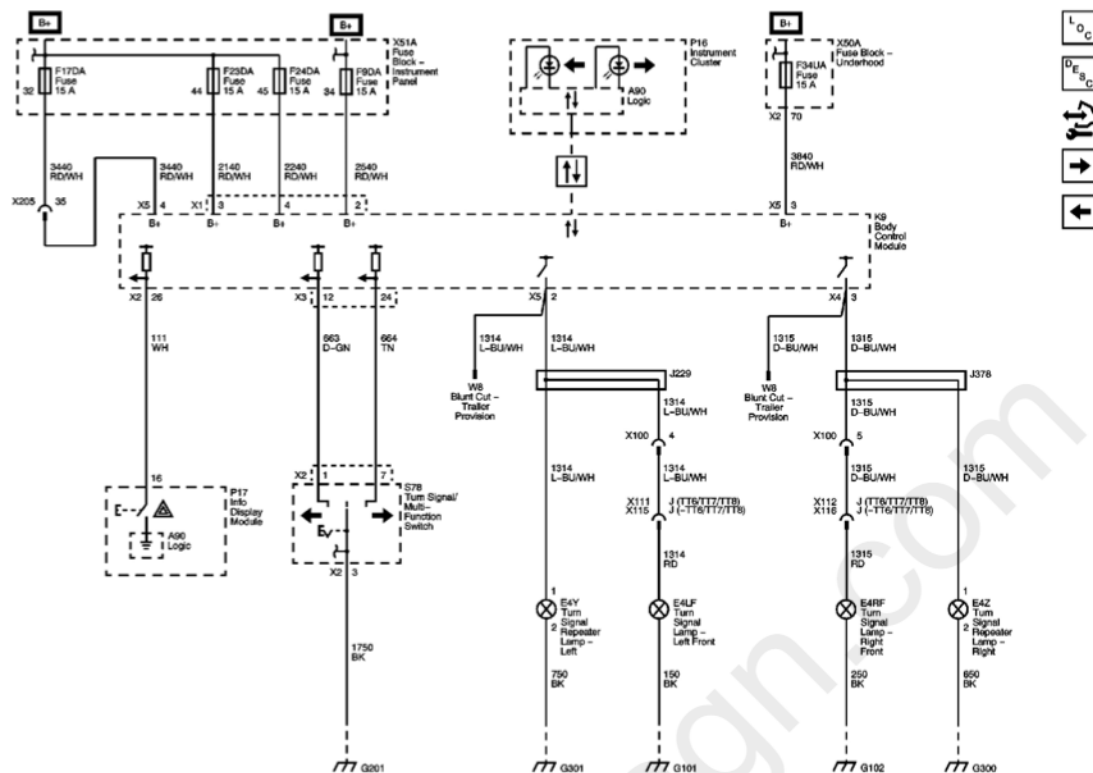


Fig. 10: Turn Signal Lamps Controls & Indicators Circuit Schematic
 Courtesy of GENERAL MOTORS CORP.

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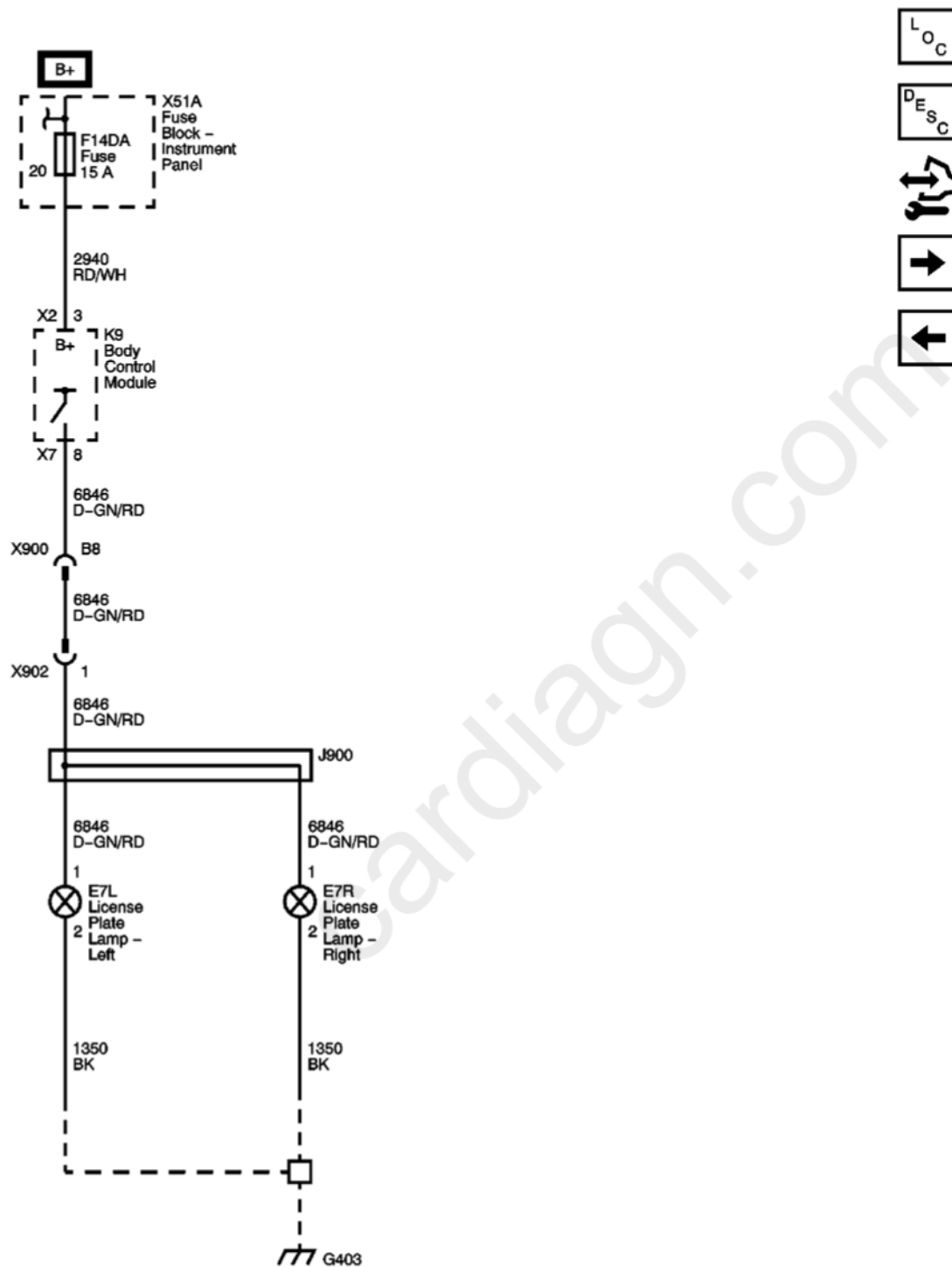
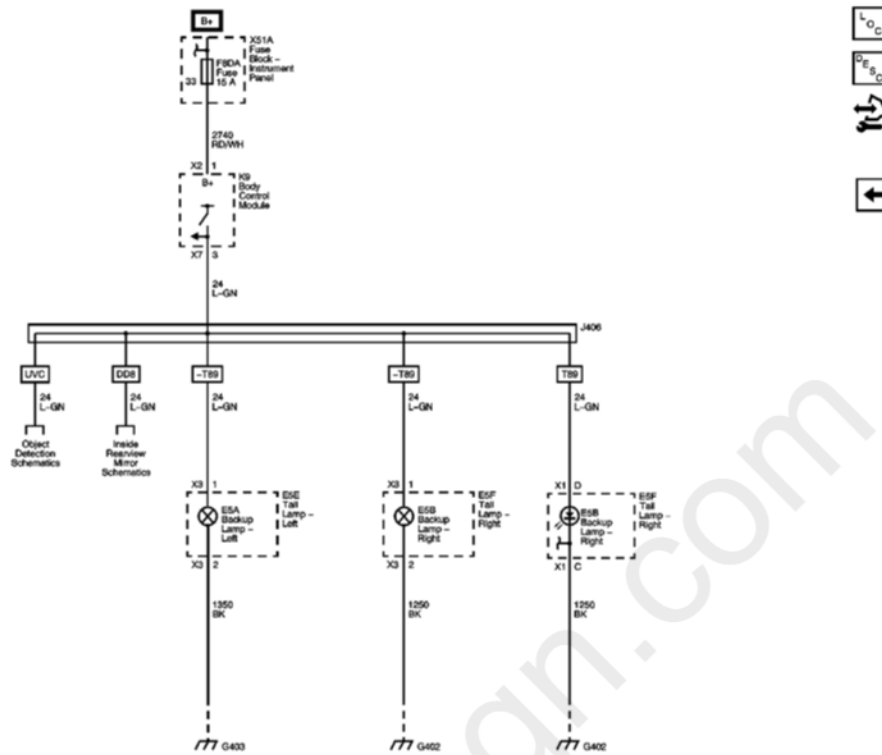


Fig. 11: License Lamps Circuit Schematic
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Fig. 12: Backup Lamps Circuit Schematic
Courtesy of GENERAL MOTORS CORP.

INTERIOR LIGHTS SCHEMATICS

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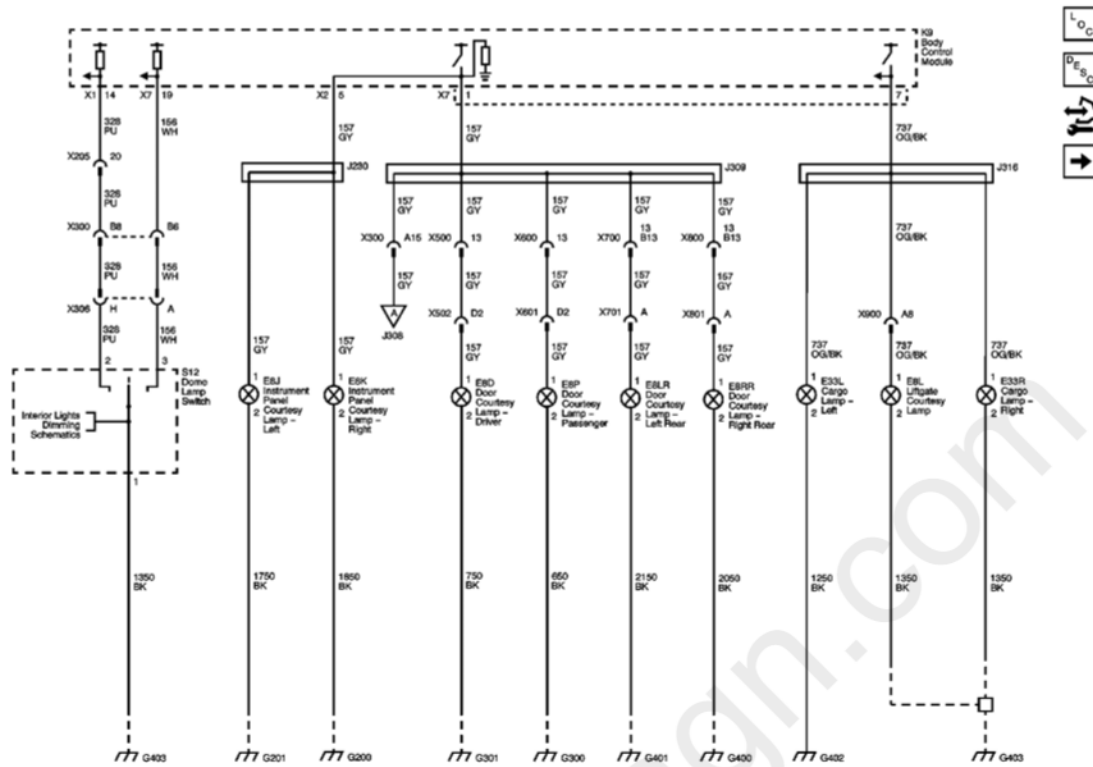


Fig. 13: Courtesy Lamps Circuit Schematic
Courtesy of GENERAL MOTORS CORP.

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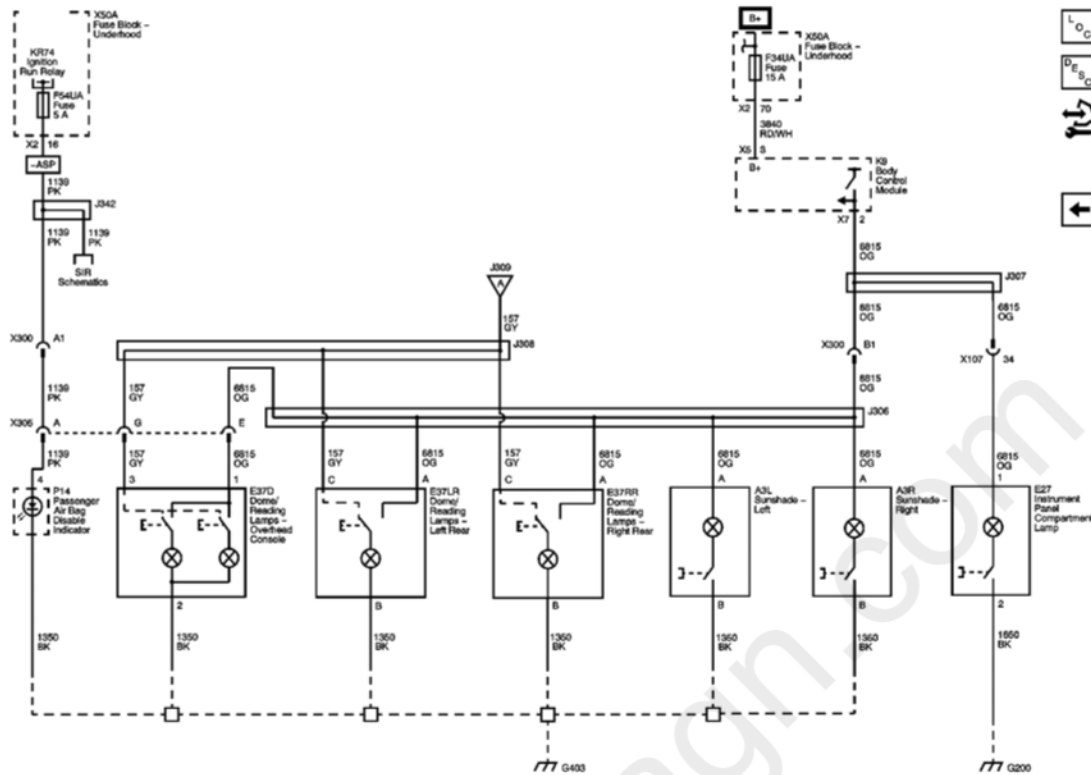


Fig. 14: Courtesy/Reading & Sunshade Lamps Circuit Schematic
Courtesy of GENERAL MOTORS CORP.

INTERIOR LIGHTS DIMMING SCHEMATICS

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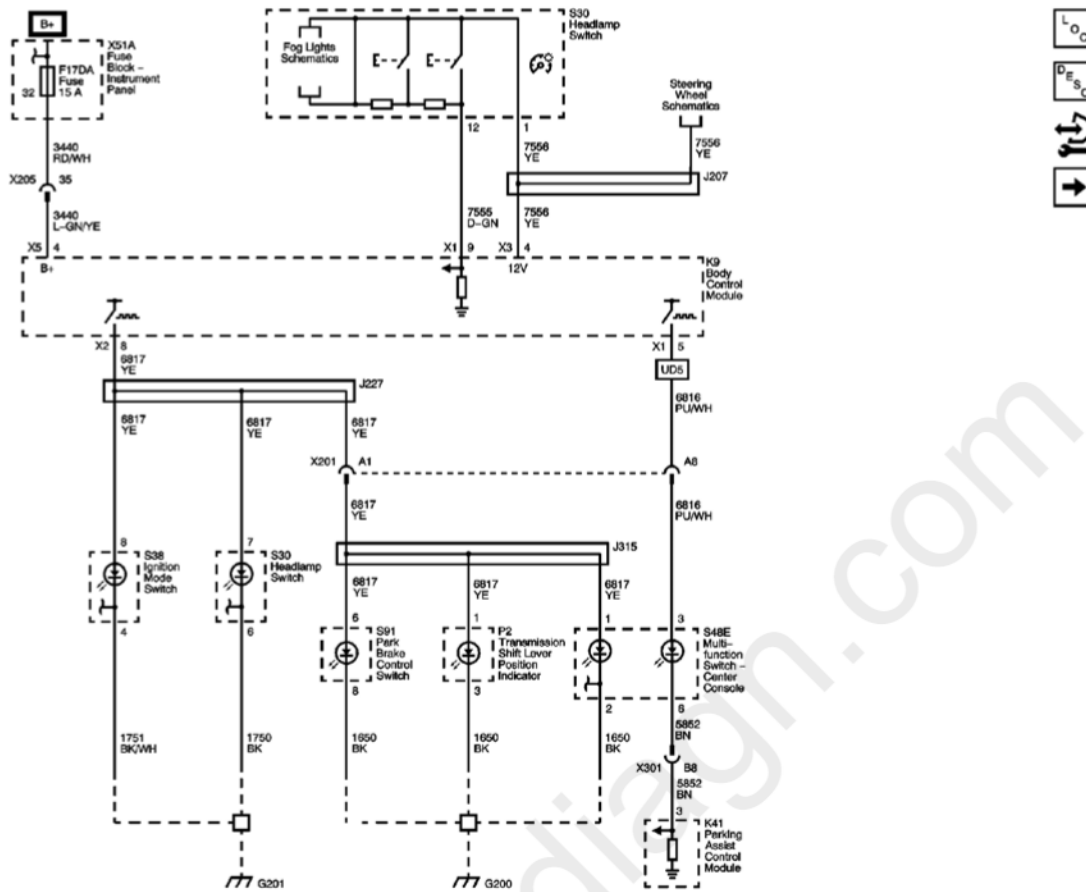


Fig. 15: I/P & Center Console Circuit Schematic
 Courtesy of GENERAL MOTORS CORP.

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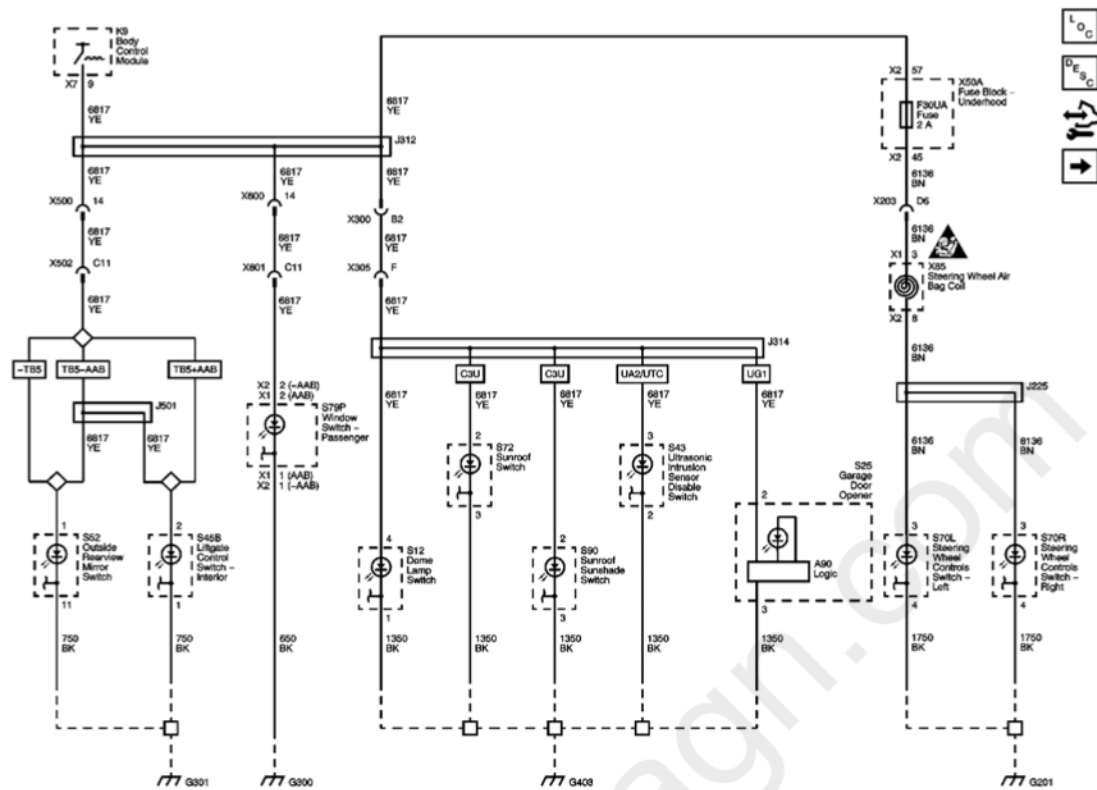
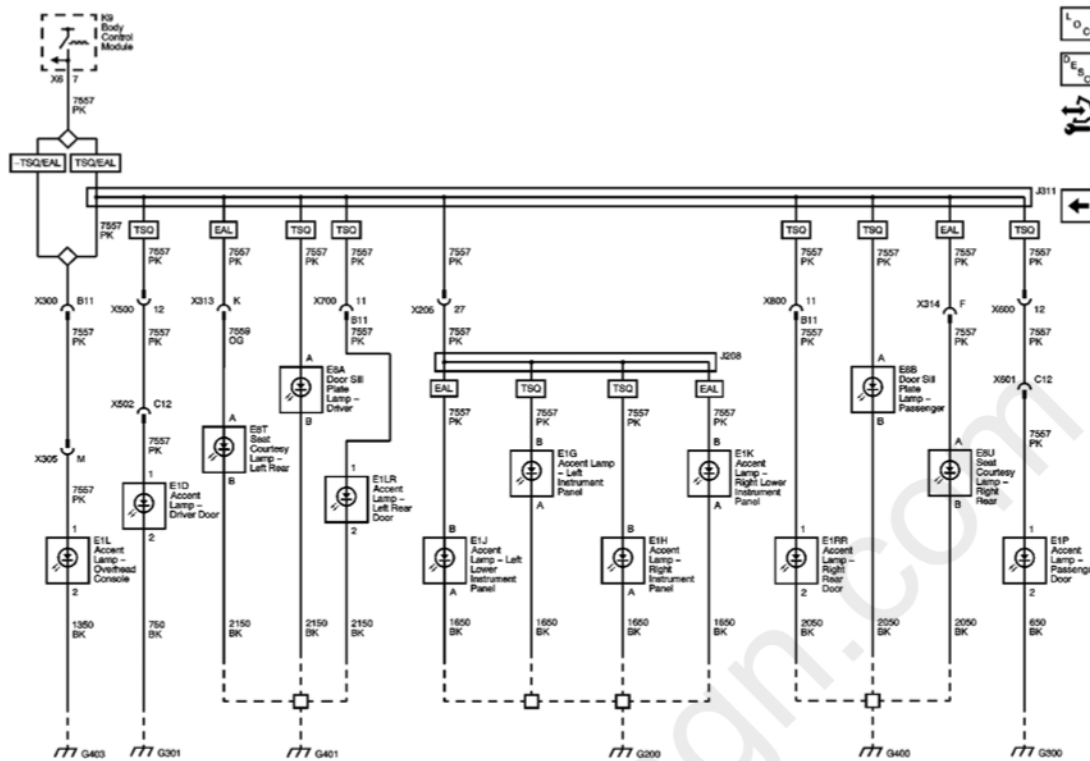


Fig. 16: Overhead Console, Steering Wheel & Outside Rearview Mirror Circuit Schematic
 Courtesy of GENERAL MOTORS CORP.

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DIAGNOSTIC CODE INDEX

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DTC	Description
<u>DTC B0655</u>	B0655 5A: Brake Lamp Switch Circuit Not Plausible
<u>DTC B096A</u>	B096A 02: Hazard Lamps Switch Backlight Circuit Short to Ground
<u>DTC B1405, B1529, or B257B</u>	B1405 02: Control Module Voltage Reference Output 2 Circuit Short to Ground B1405 03: Control Module Voltage Reference Output 2 Circuit Low Voltage B1405 07: Control Module Voltage Reference Output 2 Circuit High Voltage B1529 03: Control Module Voltage Reference Output 5 Circuit Low Voltage B1529 07: Control Module Voltage Reference Output 5 Circuit High Voltage B257B 03: Lighting Control Switch Signal Low Voltage B257B 07: Lighting Control Switch Signal High Voltage

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<u>DTC B1480</u>	B1480 02: Battery Rundown Protection Circuit Short to Ground
<u>DTC B2530</u>	B2530 02: Front Fog Lamps Control Circuit Short to Ground
<u>DTC B2540</u>	B2540 02: Rear Fog Lamps Control Circuit Short to Ground
<u>DTC B2545</u>	B2545 01: Backup Lamps Circuit Short to Battery B2545 02: Backup Lamps Circuit Short to Ground B2545 04: Backup Lamps Circuit Open
<u>DTC B256A</u>	B256A 02: Liftgate Lamp Control Circuit Short to Ground
<u>DTC B2575 or B2699</u>	B2575 01: Left Headlamp Control Circuit Short to Battery B2575 02: Left Headlamp Control Circuit Short to Ground B2575 04: Left Headlamp Control Circuit Open B2699 01: Right Headlamp Control Circuit Short to Battery B2699 02: Right Headlamp Control Circuit Short to Ground B2699 04: Right Headlamp Control Circuit Open
<u>DTC B257A</u>	B257A 00: Headlamp Switch Input Signals Correlation Malfunction
<u>DTC B257B</u>	B257B 03: Lighting Control Switch Signal Low Voltage B257B 07: Lighting Control Switch Signal High Voltage
<u>DTC B257C or B257D</u>	B257C 00: Left Headlamp Assembly Malfunction B257D 00: Right Headlamp Assembly Malfunction
<u>DTC B2580</u>	B2580 02: High Beam Control Circuit Short to Ground
<u>DTC B2585 or B3867</u>	B2585 02: Park Lamps Control Circuit Short to Ground B3867 02: Right Park Lamp Control Circuit Short to Ground
<u>DTC B258A</u>	B258A 01: Low Beam Control Circuit Short to Battery B258A 02: Low Beam Control Circuit Short to Ground B258A 04: Low Beam Control Circuit Open
<u>DTC B2600 or B2605</u>	B2600 01: Left Daytime Running Lamps Control Circuit Short to Battery B2600 02: Left Daytime Running Lamps Control Circuit Short to Ground B2600 04: Left Daytime Running Lamps Control Circuit Open B2605 01: Right Daytime Running Lamps Control Circuit Short to Battery B2605 02: Right Daytime Running Lamps Control Circuit Short to Ground B2605 04: Right Daytime Running Lamps Control Circuit Open
<u>DTC B260A</u>	B260A 00: Backlight and Display Dimming Request Circuit Malfunction
<u>DTC B260B or B260C</u>	B260B 01: Left Daytime Running Lamp Relay Control Circuit Short to Battery B260B 02: Left Daytime Running Lamp Relay Control Circuit Short to Ground B260B 04: Left Daytime Running Lamp Relay Control Circuit Open B260C 01: Right Daytime Running Lamp Relay Control Circuit Short to Battery B260C 02: Right Daytime Running Lamp Relay Control Circuit Short to Ground B260C 04: Right Daytime Running Lamp Relay Control Circuit Open
<u>DTC B260D or B260E</u>	B260D 01: Left Daytime Running Lamp and Front Park Lamp Control

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	Circuit Short to Battery B260D 02: Left Daytime Running Lamp and Front Park Lamp Control Circuit Short to Ground B260D 04: Left Daytime Running Lamp and Front Park Lamp Control Circuit Open B260E 01: Right Daytime Running Lamp and Front Park Lamp Control Circuit Short to Battery B260E 02: Right Daytime Running Lamp and Front Park Lamp Control Circuit Short to Ground B260E 04: Right Daytime Running Lamp and Front Park Lamp Control Circuit Open
<u>DTC B2615</u>	B2615 02: Passenger Compartment Dimming 2 Circuit Short to Ground
<u>DTC B2625</u>	B2625 02: Display Dimming Pulse Width Modulation Output Circuit Short to Ground
<u>DTC B2645</u>	B2645 03: Ambient Light Sensor Circuit Low Voltage B2645 07: Ambient Light Sensor Circuit High Voltage
<u>DTC B2652</u>	B2652 02: Passenger Compartment Dimming 3 Circuit Short to Ground
<u>DTC B2657</u>	B2657 02: Ignition Switch Halo Lamp Circuit Short to Ground
<u>DTC B2740</u>	B2740 00: Front Fog Lamp Switch Circuit Malfunction
<u>DTC B3410 or B3420</u>	B3410 01: Automatic Headlamp Leveling Control Module Front Axle Sensor Signal Circuit Short to Battery B3410 06: Automatic Headlamp Leveling Control Module Front Axle Sensor Signal Circuit Low Voltage/Open B3420 01: Automatic Headlamp Leveling Control Module Rear Axle Sensor Signal Circuit Short to Battery B3420 06: Automatic Headlamp Leveling Control Module Rear Axle Sensor Signal Circuit Low Voltage/Open
<u>DTC B3415</u>	B3415 01: Automatic Headlamp Leveling Control Module Axle Sensor Supply Circuit Short to Battery B3415 02: Automatic Headlamp Leveling Control Module Axle Sensor Supply Circuit Short to Ground
<u>DTC B3588</u>	B3588 00: Rear Fog Lamp Switch Circuit Malfunction
<u>DTC B3596</u>	B3596 00: Hazard Lamps Request Circuit
<u>DTC B364A</u>	B364A 00: Surveillance Mode Switch Circuit Malfunction
<u>DTC B3650</u>	B3650 08: High Beam Request Signal Circuit Performance - Signal Invalid
<u>DTC B3806</u>	B3806 00: High Beam and Headlamp Flash Select Circuit Malfunction
<u>DTC B3881 or B3882</u>	B3881 02: Tail Lamp Circuit Short to Ground B3881 04: Tail Lamp Circuit Open B3882 02: Right Tail Lamp Circuit Short to Ground B3882 04: Right Tail Lamp Circuit Open
<u>DTC B3883</u>	B3883 02: License Plate Lamp Circuit Short to Ground B3883 04: License Plate Lamp Circuit Open
<u>DTC B3884</u>	B3884 02: Center High Mounted Brake Lamp Circuit Short to Ground B3884 04: Center High Mounted Brake Lamp Circuit Open

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<u>DTC B 5 or B 6</u>	B3885 02: Trailer Left Tail Lamp Circuit Short to Ground B3885 04: Trailer Left Tail Lamp Circuit Open B3886 02: Trailer Right Tail Lamp Circuit Short to Ground B3886 04: Trailer Right Tail Lamp Circuit Open
<u>DTC B 7 or B With U4G</u>	B3887 02: Trailer Left Turn Signal Circuit Short to Ground B3887 04: Trailer Left Turn Signal Circuit Open B3888 02: Trailer Right Turn Signal Circuit Short to Ground B3888 04: Trailer Right Turn Signal Circuit Open
<u>DTC B 7 or B Without U4G</u>	B3887 02: Trailer Left Turn Signal Circuit Short to Ground B3887 04: Trailer Left Turn Signal Circuit Open B3888 02: Trailer Right Turn Signal Circuit Short to Ground B3888 04: Trailer Right Turn Signal Circuit Open
<u>DTC B 9</u>	B3889 02: Trailer Brake Lamps Circuit Short to Ground B3889 04: Trailer Brake Lamps Circuit Open
<u>DTC B A</u>	B388A 01: Trailer Park Lamps Circuit Short to Battery B388A 02: Trailer Park Lamps Circuit Short to Ground B388A 04: Trailer Park Lamps Circuit Open
<u>DTC B 90</u>	B3890 02: Trailer Backup Lamps Circuit Short to Ground B3890 04: Trailer Backup Lamps Circuit Open
<u>DTC B 91</u>	B3891 02: Trailer Fog Lamps Circuit Short to Ground B3891 04: Trailer Fog Lamps Circuit Open
<u>DTC B 94 or B 949</u>	B3948 02: Left Front Turn Signal Circuit Short to Ground B3949 02: Right Front Turn Signal Circuit Short to Ground
<u>DTC B 950 or B 951</u>	B3950 02: Left Rear Turn Signal Circuit Short to Ground B3951 02: Right Rear Turn Signal Circuit Short to Ground
<u>DTC C0277 or C0 90</u>	C0277 06: Brake Pedal Position Sensor Circuit Short to Ground or Open C0277 07: Brake Pedal Position Sensor Circuit High Voltage C0277 09: Brake Pedal Position Sensor Circuit Too Fast Transitions C0277 4B: Brake Pedal Position Sensor Circuit Calibration Not Learned C0890 03: Control Module Voltage Reference Output 3 Circuit Low Voltage C0890 07: Control Module Voltage Reference Output 3 Circuit High Voltage
<u>DTC C0297</u>	C0297 02: Brake Applied Output Circuit Short to Ground

DTC B0655**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 B0655 5A**

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Brake Lamp Switch Circuit Not Plausible

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Center High Mounted Brake Lamp Control	B3884 02	B3884 04	1	B0655 5A
1. Center High Mounted Brake Lamp Always ON				

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 to the body control module (BCM). The BCM will apply battery voltage to the right, left and center stop lamp control circuits and to the trailer brake control module if equipped.

Conditions for Running the DTC

When the brake pedal is applied.

Conditions for Setting the DTC

The trailer brake control module receives a serial data message from the BCM that the brakes have been applied, but the trailer brake control module does not detect a signal voltage on the center high mounted stop lamp control circuit.

Action Taken When the DTC Sets

The brake lights on the trailer will be inoperative

Conditions for Clearing the DTC

- The DTC will be current for as long as the fault is present.
- When the fault is no longer present, the DTC will be a history DTC.
- A history DTC will clear after 50 ignition cycles.

Reference Information

Schematic Reference

Trailer Connector/Pro vision 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

Observe the function of the E6 center high mounted stop lamp while pressing and releasing the brake pedal. The E6 center high mounted stop lamp should turn ON when the pedal is pressed and OFF when the pedal is released.

- If the E6 center high mounted stop lamp is always ON or always OFF, refer to **Stop Lamps Malfunction**
- If the E6 center high mounted stop lamp turns ON and OFF as commanded, perform the Circuit/System Testing.

Circuit/System Testing

1. Ignition OFF, disconnect the X1 harness connector at the K67 trailer brake control module.
2. Connect a test lamp between the signal circuit terminal 14 and ground.
3. Ignition ON, command the Center Brake Lamp ON and OFF with a scan tool. The test lamp should turn ON and OFF while changing between the commanded states.
 - If the test lamp is always ON, test the signal circuit for a short to voltage.
 - If the test lamp is always OFF, test the signal circuit for a short to ground or an open/high resistance.
4. If all circuits test normal, replace the K67 trailer brake control module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

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

DTC B096A

Diagnostic Instructions

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- 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 B096A 02

Hazard Lamps Switch Backlight Circuit Short to Ground

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Interior Backlighting Control	B096A 02	2	1	-
1. Hazard Backlighting at Full Intensity and Cannot be Dimmed				
2. Hazard Backlighting do Not Illuminate				

Circuit/System Description

The body control module (BCM) supplies a voltage reference through the instrument panel cluster dimming voltage reference circuit to the instrument panel cluster lamps dimmer switch, which is part of the headlamp switch. When the dimmer switch is placed in a desired brightness position, reference voltage is applied through the dimmer switch rheostat and the cluster lamps dimmer switch signal circuit to the BCM. The BCM interprets this voltage signal, then applies a pulse width modulated (PWM) voltage to the LED dimming supply circuit to all related interior lamps, illuminating them to the desired level of brightness.

Conditions for Running the DTC

The ignition is ON.

Conditions for Setting the DTC

B096A 02

The BCM detects a short to ground on the LED backlight lamp control circuit.

Action Taken When the DTC Sets

The BCM will not dim or illuminate any LED backlighting supplied by the backlight lamp 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 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 Verification**

Ignition ON, vary the interior backlighting from dim to full bright by using the dimmer switch. The interior backlighting should dim and then become full bright.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the S26 Hazard Lamps Switch.
2. Test for less than 5 ohms between the ground circuit terminal 1 and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Connect a test lamp between the backlight control circuit of the S26 Hazard Lamps Switch terminal 5 and ground.
4. Ignition ON, vary the interior lamp dimming switch from dim to full bright. The test lamp should dim and then become full bright.
 - If the test lamp cannot be dimmed, test the control circuit for a short to voltage. If the circuit tests normal, replace the K9 Body Control Module.
 - If the test lamp is always OFF, test the control circuit for open/high resistance or short to ground. If the circuit tests normal, replace the K9 Body Control Module.
5. If all circuits test normal, replace the S26 Hazard Lamps Switch.

Repair Procedures

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Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Radio Control Assembly Replacement**
- **Control Module References** for BCM replacement, setup, and programming

DTC B1405, B1529, OR 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 B1405 02

Control Module Voltage Reference Output 2 Circuit Short to Ground

DTC B1405 03

Control Module Voltage Reference Output 2 Circuit Low Voltage

DTC B1405 07

Control Module Voltage Reference Output 2 Circuit High Voltage

DTC B1529 03

Control Module Voltage Reference Output 5 Circuit Low Voltage

DTC B1529 07

Control Module Voltage Reference Output 5 Circuit High Voltage

DTC B257B 03

Lighting Control Switch Signal Low Voltage

DTC B257B 07

Lighting Control Switch Signal High Voltage

Diagnostic Fault Information

	Short to	Open/High	Short to	Signal
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Circuit	Ground	Resistance	Voltage	Performance
Headlamp Switch B+	B1405 03, B1529 03, B257B 03, 1	B257B 03, 1	-	-
Instrument Panel Lamps Dimmer Switch Signal	B257B 03, 1	B257B 03, 1	B257B 07	-
Interior Backlighting Control BCM Terminal 9 X7	B2625 02	2	1	-
Interior Backlighting Control BCM Terminal 8 X2	B2625 02, 2	2	1	-
Interior Backlighting Control BCM Terminal 5 X1 (with UD5)	B2625 02	2	1	-
Headlamp Switch Ground	-	B257B 03	-	-
1. Interior backlighting at full intensity and cannot be dimmed 2. Interior backlighting component does not illuminate				

Circuit/System Description

The body control module (BCM) supplies battery positive voltage to the backlight dimmer switch, which is part of the headlamp switch. When the backlight dimmer switch is placed in a desired brightness position, reference voltage is applied to the BCM. The BCM interprets this voltage signal, then applies a pulse width modulated (PWM) voltage to the LED dimming supply circuit to all related interior lamps, illuminating them to the desired level of brightness.

Conditions for Running the DTC

The ignition is ON.

Conditions for Setting the DTC

B1405 03, B1529 03, or B257B 03

The BCM detects less than 0.3 V on the dimmer switch signal circuit.

B1405 07, B1529 07, or B257B 07

The BCM detects a voltage greater than 12.2 V on dimmer switch signal circuit.

Action Taken When the DTC Sets

The BCM will not dim or illuminate any LED backlighting supplied by the backlight lamp 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 fault free ignition cycles have occurred.

Reference Information**Schematic Reference**

- **Interior Lights Dimming Schematics**
- **Steering Wheel Secondary/Configurable Control 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**

Ignition ON, headlamps ON, vary the interior backlight dimming from low to full bright by using the dimmer switch. The interior backlighting should start dim and then become full bright.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the S30 headlamp switch.
2. Test for less than 10 ohms between the ground circuit terminal 6 and ground.
 - If greater than the specified range, test the ground circuit for an open high/resistance.
3. Ignition ON, verify that a test lamp illuminates between the B+ circuit terminal 1 and ground.
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
4. Ignition ON, test for less than 0.3 V between signal circuit terminal 12 and ground.
 - If greater than the specified range, test the signal circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
5. Install a 3 A fused jumper wire between the signal circuit terminal 12 and the B+ circuit terminal 1. The interior backlighting should be dimmed.
 - If the interior backlighting is not dimmed, test the signal circuit for a short to ground or an

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open/high resistance. If the circuit tests normal, replace the K9 BCM.

6. If all circuits test normal, test or replace the S30 headlamp switch.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Headlamp Switch Replacement**
- **Control Module References** for BCM 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
Battery Saver Relay - Control Circuit	B1480 02	-	-	-

Circuit/System Description

The battery saver mode reduces the parasitic load of some modules during overseas shipment or during vehicle storage conditions. This improves the drain time on the battery of up to 70 days without the battery going dead. When the vehicle is in transport/storage, some features may have reduce functionality as a result being in the battery saver mode, such as disabling the Remote Function Actuator or content theft features.

The battery saver mode incorporates a latching relay that when enabled disconnects some modules from their ignition off power or memory power sources. Battery saver mode is initiated by starting the vehicle and then turning the ignition key into the crank position for greater than 15 seconds. The mode is disengaged by repeating the previous process causing the relay to latch in the other direction. This feature can be used as many times as necessary if the vehicle is to be stored for an extended period of time.

Conditions for Running the DTC

- The system voltage is between 9-16 V.

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- The DTC can only run when the output is activated.

Conditions for Setting the DTC

The BCM detects a short to ground in the battery saver relay set circuit.

Action Taken When the DTC Sets

The module output driver will be shut down and not supply voltage to the battery saver relay set circuit.

Conditions for Clearing the DTC

- The current DTC will clear when the module request for the output is removed or the malfunction is no longer present.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold of 50, without a repeat of the malfunction.

Reference Information

Schematic Reference

- Body Control System Schematics
- Power Distribution Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Power Mode 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 KR104A battery saver relay.

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2. Connect a test lamp between the relay control circuit and ground.
3. Enable and disable the batter saver mode. The test lamp should turn ON and OFF when changing the relay latch positions.
 - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
 - If the test lamp is always OFF, test the control circuit for a short to ground or open/high resistance. If the circuit tests normal, replace the K9 BCM.
4. If all circuits test normal, test or replace the KR104A battery saver relay.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Relay Replacement Attached to Wire Harness** or **Relay Replacement Within an Electrical Center**
- **Control Module References** for BCM replacement, programming and setup

DTC B25 0

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 B25 0 02

Front Fog Lamps Control Circuit Short to Ground

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Front Fog Lamps Control	B2530 02	2	1	-
1. Front Fog Lamps Always ON 2. Front Fog Lamps Inoperative				

Circuit/System Description

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

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to the front fog lamp supply voltage circuit which illuminates the front fog lamps.

Conditions for Running the DTC

Front fog lamps activated

Conditions for Setting the DTC

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

Action Taken When the DTC Sets

The front fog lamps will always be illuminated.

Conditions for Clearing the DTC

- The DTC will be current for as long as the fault is present.
- When the fault is no longer present, the DTC will be a history DTC.
- A history DTC will clear after 50 ignition cycles.

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

Circuit/System Verification

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Ignition ON, command the Fog Lamps ON and OFF with a scan tool. The front fog lamps should turn ON and OFF when changing between the commanded states.

Circuit/System Testing

1. Ignition OFF, disconnect the X5 harness connector at the K9 BCM.
2. Ignition ON, test for greater than 10V between the control circuit terminal 10 and ground.
 - If less than the specified range, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the X50A underhood fuse block.
3. If all circuits test normal, replace the K9 BCM.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **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 Lamps Control	B2540 02	2	1	-
Tail Lamp Ground	-	2	-	-
1. Rear fog lamp always ON 2. Rear fog lamp always OFF				

Circuit/System Description

The body control module (BCM) energizes the rear fog lamp by applying voltage to the rear fog lamp control circuit. When the rear fog lamp control circuit is energized the rear fog lamp is illuminated.

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Conditions for Running the DTC

Rear fog lamp activated

Conditions for Setting the DTC

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

Action Taken When the DTC Sets

The rear fog lamp will be inoperative.

Conditions for Clearing the DTC

- The DTC will be current for as long as the fault is present.
- When the fault is no longer present, the DTC will be a history DTC.
- A history DTC will clear after 50 ignition cycles.

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

Ignition ON, command the Rear Fog Lamp(s) Relay ON and OFF with a scan tool. The rear fog lamp should turn ON and OFF when changing between the commanded states.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the E5 fog lamp-rear.
2. Test for less than 30 ohms between the ground circuit terminal C and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Connect a test lamp between the control circuit terminal A and ground.
4. Ignition ON, command the Rear Fog Lamp(s) Relay ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the commanded states.
 - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
 - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
5. If all circuits test normal, replace the E5 fog lamp-rear.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Tail Lamp Replacement**
- **Control Module References** for BCM replacement, setup and programming

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

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Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
BCM B+	1, 2	1, 2	-	-
Backup Lamp Supply Voltage	B2545 02	B2545 04	B2545 01	-
Left Backup Lamp Ground	-	1	-	-
Right Backup Lamp Ground	-	2	-	-
1. Left Backup Lamp Inoperative 2. Right Backup Lamp Inoperative				

Circuit/System Description

When the engine is running and the transmission is placed in reverse gear, the transmission control module 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. Once the driver moves the gear selector out of the reverse position, a message is sent by the transmission control module via serial data requesting the BCM to remove battery voltage from the backup lamp signal circuit. The BCM will not apply battery voltage to the backup lamps if the engine is not running.

Conditions for Running the DTC

Reverse Gear engaged.

Conditions for Setting the DTC**B2545 01**

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

B2545 02

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

B2545 04

The BCM detects an open/high resistance both backup lamps control circuits.

Action Taken When the DTC Sets

For B2545 01, both backup lamps will be continuously illuminated.

For B2545 02 and B2545 04, both backup lamps will be inoperative.

Conditions for Clearing the DTC

- The DTC will be current for as long as the fault is present.
- When the fault is no longer present, the DTC will be a history DTC.
- A history DTC will clear after 50 ignition cycles.

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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 Verification

Engine running, command the Backup Lamps ON and OFF with a scan tool. The E5A backup lamp-left and the E5B backup lamp-right should turn ON and OFF when changing between the commanded states.

- If the E5A backup lamp-left or the E5B backup lamp-right is always OFF, inspect for a burned out bulb or corrosion of the bulb sockets.
- If the E5A backup lamp-left and the E5B backup lamp-right are always OFF or always ON, perform the Circuit/System Testing.

Circuit/System Testing

1. Ignition OFF, disconnect the X2 harness connector K9 BCM.
2. Ignition ON, verify that a test lamp illuminates between the B+ circuit terminal 1 and ground.
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance.
3. Ignition OFF, connect the X2 harness connector K9 BCM
4. Disconnect the harness connector at the E5A backup lamp listed below:
 - X3 harness connector E5E tail lamp-left (Without T79)

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- X1 harness connector E5E tail lamp-left (With T79)
 - X3 harness connector E5F tail lamp-right (Without T79)
 - X1 harness connector E5F tail lamp-right (With T79)
5. Test for less than 30 ohms between the ground circuit terminal listed below and ground.
 - E5E tail lamp-left (Without T79) ground terminal 2
 - E5E tail lamp-left (With T79) ground terminal C
 - E5F tail lamp-right (Without T79) ground terminal 2
 - E5F tail lamp-right (With T79) ground terminal C
 - If greater than the specified range, test the ground circuit for an open/high resistance.
 6. Connect a test lamp between the control circuit terminal listed below and ground:
 - E5E tail lamp-left (Without T79) control terminal 1
 - E5E tail lamp-left (With T79) control terminal D
 - E5F tail lamp-right (Without T79) control terminal 1
 - E5F tail lamp-right (With T79) control terminal D
 7. Engine running, command the Backup Lamps ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the selected states.
 - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
 - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
 8. If all circuits test normal, test or replace the E5A backup lamp-left and the E5B backup lamp-right.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Backup Lamp Bulb Replacement**
- **Control Module References** for BCM replacement, setup and programming

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 Descriptor

DTC B256A 02

Liftgate Lamp Control Circuit Short to Ground

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Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Cargo Lamp Control	B256A 02	2	1	-
Cargo Lamp Ground	-	2	-	-
1. Cargo Lamp Always ON 2. Cargo Lamp Always OFF				

Circuit/System Description

When the body control module (BCM) receives a liftgate open signal, the BCM supplies B+ to the cargo lamp control circuit. This will illuminate the cargo lamp.

Conditions for Running the DTC

- Ignition ON.
- The system voltage is between 9-16 V.

Conditions for Setting the DTC

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

Action Taken When the DTC Sets

The cargo lamps are inoperative.

Conditions for Clearing the DTC

A current DTC clears when the diagnostic runs and passes.

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

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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 Verification

Command the Cargo Lamp ON and OFF with a scan tool. The cargo lamps should turn ON and OFF when changing between the commanded states.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the appropriate cargo lamp.
2. Test for less than 5 ohms between the ground circuit terminal 2 and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Connect a test lamp between the control circuit terminal 1 and ground.
4. Command the Cargo Lamp ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the commanded states.
 - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
 - If the test lamp is always OFF, test the control circuit for a short to round or open/high resistance. If the circuit tests normal, replace the K9 BCM.
5. If all circuits test normal, replace the cargo lamp.

Repair Procedures

Perform the Diagnostic Repair Verification after completing the diagnostic procedure.

- Rear Compartment Courtesy Lamp Replacement - Liftgate
- Rear Compartment Courtesy Lamp Replacement - Quarter Upper Trim
- 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.

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DTC Descriptor

DTC B2575 01

Left Headlamp Control Circuit Short to Battery

DTC B2575 02

Left Headlamp Control Circuit Short to Ground

DTC B2575 04

Left Headlamp Control Circuit Open

DTC B2699 01

Right Headlamp Control Circuit Short to Battery

DTC B2699 02

Right Headlamp Control Circuit Short to Ground

DTC B2699 04

Right Headlamp Control Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
BCM B+	B2575 04	B2575 04	-	-
BCM B+	B2699 02	B2699 02	-	-
Left Headlamp Control	B2575 02	B2575 04	B2575 01	-
Right Headlamp Control	B2699 02	B2699 04	B2699 01	-

Circuit/System Description

When the headlight switch is placed in low beam position, the body control module (BCM) applies a voltage to the low beam headlamps through their respective voltage supply circuits.

Conditions for Running the DTC

The headlamps are turned ON.

Conditions for Setting the DTC

B2575 01

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The BCM detects a short to voltage on the left headlamp low beam control circuit.

B2575 02

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

B2575 04

The BCM detects an open on the left headlamp low beam control circuit or an open/high resistance on the left headlamp low beam ground circuit.

B2699 01

The BCM detects a short to voltage on the right headlamp low beam control circuit.

B2699 02

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

B2699 04

The BCM detects an open on the right headlamp low beam control circuit or an open/high resistance on the right headlamp low beam ground circuit.

Action Taken When the DTC Sets

For B2575 02, B2575 04, B2699 02 or B2699 04, the appropriate headlamp low beam will be inoperative.

For B2575 01 or B2699 01, the appropriate headlamp low beam will be continuously illuminated.

Conditions for Clearing the DTC

- The DTC will be current for as long as the fault is present.
- When the fault is no longer present, the DTC will be a history DTC.
- A history DTC will clear after 50 ignition cycles.

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

Ignition ON, observe the function of the E4G headlamp-left low beam and the E4F headlamp-right low beam while commanding the low beam lamps ON and OFF with a scan tool. The E4G headlamp-left low beam and the E4F headlamp-right low beam should turn ON and OFF while changing between the commanded states.

Circuit/System Testing

1. Ignition OFF, disconnect the harness X1 harness connector at the K9 BCM.
2. Ignition ON, verify that a test lamp illuminates between the B+ circuit terminal listed below and ground:
 - B+ circuit terminal 3
 - B+ circuit terminal 4
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance.
3. Ignition OFF, connect the harness X1 harness connector at the K9 BCM.
4. Disconnect the inline harness connector at the appropriate E4 headlamp-low beam listed below:
 - E4G headlamp-left low beam X115 inline harness connector
 - E4F headlamp-right low beam X116 inline harness connector
5. Connect a test lamp between the control circuit terminal G and ground.
6. Ignition ON, command the low beam lamps ON and OFF with a scan tool. The test lamp should turn ON and OFF while changing between the commanded states.
 - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
 - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM
7. If all circuits test normal, replace the headlamp bulb or the headlamp.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

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

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 Lamp Signal	2	B257A 00	2	-
Headlamp Switch On Signal	B257A 00	1	1	-
Headlamp Switch Headlamps Off Signal	B257A 00	1	1	-
Headlamp Switch Ground	-	1	-	-
1. Headlight Auto Function Only 2. Headlight Auto Function Disabled				

Circuit/System Description

The body control module (BCM) monitors the 12 V signal circuits for the headlamps off signal, headlamps on signal and the park lamp on signal circuits. When the headlight control switch is selected to the desired headlamp function, the signal circuit is pulled to ground and the BCM will detect the voltage drop in that signal circuit and will command the appropriate lights to turn on or turn off.

Conditions for Running the DTC

The ignition is in the ON, ACCESSORY or RUN position.

Conditions for Setting the DTC

The BCM receives an unexpected signal along either the headlamp switch OFF circuit or the headlamp ON circuit.

Action Taken When the DTC Sets

The automatic headlamps will malfunction.

Conditions for Clearing the DTC

- The DTC will be current for as long as the fault is present.
- When the fault is no longer present, the DTC will be a history DTC.
- A history DTC will clear after 50 ignition cycles.

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**

Ignition ON, observe the scan tool Headlamps On Switch, Park Lamps Switch and Automatic Headlamps Disable Switch parameters while selecting the headlamp control switch between the Off, park lamps and headlamps settings. Each parameter should be Inactive and change to Active as each setting is selected.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the S30 headlamp switch.
2. Ignition OFF, test for less than 30 ohms between the ground circuit terminal 6 and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Ignition ON, verify the scan tool Park Lamps Switch parameter is Inactive.

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- If not the specified value, test the signal circuit terminal 3 for a short to ground. If the circuit tests normal, replace the K9 BCM.
- 4. Install a 3 A fused jumper wire between the signal circuit terminal 3 and the ground circuit terminal 6. Verify the scan tool Park Lamps Switch parameter is Active.
 - If not the specified value, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
- 5. Verify the scan tool Headlamps On Switch parameter is Inactive.
 - If not the specified value, test the signal circuit terminal 4 for a short to ground. If the circuit tests normal, replace the K9 BCM.
- 6. Install a 3 A fused jumper wire between the signal circuit terminal 4 and the ground circuit terminal 6. Verify the scan tool Headlamps On Switch parameter is Active.
 - If not the specified value, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
- 7. Verify the scan tool Automatic Headlamps Disable Switch parameter is Inactive.
 - If not the specified value, test the signal circuit terminal 5 for a short to ground. If the circuit tests normal, replace the K9 BCM.
- 8. Install a 3 A fused jumper wire between the signal circuit terminal 5 and the ground circuit terminal 6. Verify the scan tool Automatic Headlamps Disable Switch parameter is Active.
 - If not the specified value, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
- 9. If all circuits test normal, test or replace the S30 headlamp switch.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **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 0

Lighting Control Switch Signal Low Voltage

DTC B257B 07

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Lighting Control Switch Signal High Voltage

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Headlamp Switch B+ Reference	B257B 03	B257B 03	-	-
Instrument Panel Lamps Dimmer Switch Signal	B257B 03	B257B 03	B257B 07	-
Interior backlighting at full intensity and cannot be dimmed				

Circuit/System Description

The body control module (BCM) supplies a reference voltage to the backlight dimmer switch, which is part of the headlamp switch. When the backlight dimmer switch is placed in a desired brightness position, reference voltage is applied to the BCM. The BCM interprets this voltage signal, then applies a pulse width modulated (PWM) voltage to the LED dimming supply circuit to all related interior lamps, illuminating them to the desired level of brightness.

Conditions for Running the DTC

The ignition is ON.

Conditions for Setting the DTC

B257B 0

The BCM detects a voltage that is lower than 0.3 V on the dimming voltage circuit.

B257B 07

The BCM detects a voltage that is greater than 12.2 V on dimming voltage circuit.

Action Taken When the DTC Sets

The BCM will not dim or illuminate any LED backlighting supplied by the backlight lamp 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 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 Verification**

Ignition ON, headlamps ON, vary the interior backlight dimming from low to full bright by using the dimmer switch. The interior backlighting should start dim and then become full bright.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the S30 Headlamp Switch.
2. Ignition ON, test for B+ between the B+ reference circuit terminal 1 and ground.
 - If less than the specified range, test the B+ reference circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
3. Ignition ON, test for less than 0.3 V between signal circuit terminal 12 and ground.
 - If greater than the specified range, test the signal circuit terminal 12 for a short to voltage. If the circuit tests normal, replace the K9 BCM.
4. Reconnect the harness connector at the S30 Headlamp Switch.
5. Dim the interior backlighting with the S30 Headlamp Switch.
6. Disconnect the harness connector at the S30 Headlamp Switch.
7. Install a 3 A fused jumper wire between the signal circuit terminal 12 and the B+ reference circuit terminal 1. The interior backlighting should now be dimmed.
 - If the interior backlighting is not dimmed, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
8. If all circuits test normal, replace the S30 Headlamp Switch.

Repair Procedures

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Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

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

DTC B257C OR B257D

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 B257C 00

Left Headlamp Assembly Malfunction

DTC B257D 00

Right Headlamp Assembly Malfunction

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Left Headlamp Low Beam Supply Voltage	B257C 00	B257C 00	B257C 00	-
Right Headlamp Low Beam Supply Voltage	B257D 00	B257D 00	B257D 00	-

Circuit/System Description

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

The headlamps are turned ON.

Conditions for Setting the DTC

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B257C 00

The headlamp control module detects a fault in the left low beam control circuit or an open/high resistance is the left low beam ground circuit.

B257D 00

The headlamp control module detects a fault in the right low beam control circuit or an open/high resistance is the right low beam ground circuit.

Action Taken When the DTC Sets

The appropriate headlamp is inoperative.

Conditions for Clearing the DTC

- The DTC will be current for as long as the fault is present.
- When the fault is no longer present, the DTC will be a history DTC.
- A history DTC will clear after 50 ignition cycles.

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

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Ignition ON, observe the function of the low beam headlamps while commanding the Low Beam Lamps ON and OFF with a scan tool. The E4G headlamp-left low beam and the E4H headlamp-right low beam should turn ON and OFF while changing between the commanded states.

- If the E4G headlamp-left low beam is always OFF, refer to **Left Low Beam Inoperative**.
- If the E4H headlamp-right low beam is always OFF, refer to **Right Low Beam Inoperative**.
- If both low beam headlamps are always ON or always OFF, refer to Headlamps Malfunction below.

Circuit/System Testing

Left Low Beam Inoperative

1. Ignition OFF, disconnect the X118 inline harness connector at the E4G headlamp-left low beam.
2. Connect a test lamp between the control circuit terminal G and ground.
3. Ignition ON, command the Low Beam Lamps ON with a scan tool, the test should illuminate while commanding the headlamp ON.
 - If the test lamp does not illuminate and the circuit fuse is good, test the control circuit for an open/high resistance.
 - If the test lamp does not illuminate and the circuit fuse is open, test the control circuit for a short to ground.
4. If all circuits test normal, replace the E4G headlamp-left low beam.

Right Low Beam Inoperative

1. Ignition OFF, disconnect the X120 inline harness connector at the E4H headlamp-right low beam.
2. Connect a test lamp between the control circuit terminal G and ground.
3. Ignition ON, command the Low Beam Lamps ON with a scan tool, the test should illuminate while commanding the headlamp ON.
 - If the test lamp does not illuminate and the circuit fuse is good, test the control circuit for an open/high resistance.
 - If the test lamp does not illuminate and the circuit fuse is open, test the control circuit for a short to ground.
4. If all circuits test normal, replace the E4H headlamp-right low beam.

Headlamps Malfunction

1. Ignition OFF, disconnect the KR49 headlamp low beam relay.
2. Ignition ON, verify that a test lamp does not illuminate between the control circuit terminal 30 and ground.
 - If the test lamp illuminates, test the control circuit for a short to voltage
3. Verify that a test lamp illuminates between the B+ circuit terminal 87 and ground.
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high

resistance

4. Verify that a test lamp illuminates between the B+ circuit terminal 86 and ground.
 - If the test lamp does not illuminate, test the B+ circuit for an open/high resistance.
5. Connect a 15A fused jumper wire between the B+ circuit terminal 87 and the control circuit terminal 30. Verify the E4G headlamp-left low beam and the E4H headlamp-right low beam are activated.
 - If the E4G headlamp-left low beam and the E4H headlamp-right low beam do not activate, test the control circuit for a short to ground or an open/high resistance.
6. Connect a test lamp between the B+ circuit terminal 86 and the control circuit terminal 85.
7. Ignition ON, command the Low Beam Lamps ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the commanded states.
 - If the test lamp is always ON, test the control circuit for a short to ground. If the circuit tests normal, replace the K9 BCM.
 - If the test lamp is always OFF, test the control circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
8. If all circuits test normal, test or replace the KR49 headlamp low beam relay.

Component Testing

Relay Test

1. Ignition OFF, disconnect the KR49 headlamp low beam relay.
2. Test for 60-180 ohms between terminals 85 and 86.
 - If not within the specified range, replace the KR49 headlamp low beam relay.
3. Test for infinite resistance between the following terminals:
 - 30 and 86
 - 30 and 87
 - 30 and 85
 - 85 and 87
 - If not the specified value, replace the KR49 headlamp low beam relay.
4. Install a 15A fused jumper wire between relay terminal 85 and 12 V. Install a jumper wire between relay terminal 86 and ground. Test for less than 2 ohms between terminals 30 and 87.
 - If greater than the specified range, replace the KR49 headlamp low beam relay.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Headlamp Replacement**
- **Relay Replacement Attached to Wire Harness** or **Relay Replacement Within an Electrical Center**
- **Control Module References** for headlamp control module replacement, setup and programming

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DTC B25 0

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 B25 0 02

High Beam Control Circuit Short to Ground

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Headlamp High Beam Relay Control	B2580 02	2	1	-
1. High Beam Lamps Always ON 2. High Beam Lamps Inoperative				

Circuit/System Description

The headlamp high beam relay is supplied with battery voltage at all times. The turn signal/multifunction switch signal circuit is grounded by pressing the turn signal/multifunction switch. The body control module (BCM) energizes the headlamp high beam relay by applying ground to the headlamp high beam relay control circuit. When the headlamp high beam relay is energized, the relay switch contacts close and battery voltage is applied through the high beam lamp fuses to the high beam lamp supply voltage circuit which illuminates the high beam lamps.

Conditions for Running the DTC

High beam lamps ON.

Conditions for Setting the DTC

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

Action Taken When the DTC Sets

The high beam headlamps will always be illuminated.

Conditions for Clearing the DTC

- The DTC will be current for as long as the fault is present.
- When the fault is no longer present, the DTC will be a history DTC.

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- A history DTC will clear after 50 ignition cycles.

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

Ignition ON, command the High Beams ON and OFF with a scan tool. The high beam headlamps should turn ON and OFF when changing between the commanded states.

Circuit/System Testing

1. Ignition OFF, disconnect the X5 harness connector at the K9 BCM.
2. Ignition ON, test for greater than 10V between the control circuit terminal 18 and ground.
 - If less than the specified range, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the X50A underhood fuse block.
3. If all circuits test normal, replace the K9 BCM.

Repair Procedures

Perform the Diagnostic Repair Verification after completing the diagnostic procedure.

- Fuse Block Replacement
- Control Module References for BCM, replacement, programming and setup

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DTC B25 5 OR B 67

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 B25 5 02

Park Lamps Control Circuit Short to Ground

DTC B 67 02

Right Park Lamp Control Circuit Short to Ground

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Park Lamps Control	B2585 02	2	1	-
Right Park Lamps Control	B3867 02	2	1	-
1. Park Lamps Always ON 2. Park Lamps Always OFF				

Circuit/System Description

The body control module (BCM) energizes the park lamps by applying voltage to the park lamp control circuit. When the park lamp control circuit is energized, the park lamps are illuminated.

Conditions for Running the DTC

Headlamp switch in park or low beam position.

Conditions for Setting the DTC

B25 5 02

The BCM detects a short to ground on the left side park lamp control circuit.

B 67 02

The BCM detects a short to ground on the right side park lamp control circuit.

Action Taken When the DTC Sets

The appropriate park lamps will be inoperative

Conditions for Clearing the DTC

- The DTC will be current for as long as the fault is present.
- When the fault is no longer present, the DTC will be a history DTC.
- A history DTC will clear after 50 ignition cycles.

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, observe the function of the E2LF side marker lamp-left front, E5E tail lamp-left rear and the E4J park lamp-left front while commanding the Left Park Lamps ON and OFF with a scan tool. The E2LF side marker lamp-left front, E5E tail lamp-left rear and the E4J park lamp-left front should turn ON and OFF while changing between the commanded states
 - If the E2LF side marker lamp-left front, E5E tail lamp-left rear and the E4J park lamp-left front are always ON or always OFF, refer to Left Side Marker/Tail Lamps Malfunction below.
2. Ignition ON, observe the function of the E2RF side marker lamp-right front, E5F tail lamp-right rear and the E4K park lamp-right front while commanding the Right Park Lamps ON and OFF with a scan tool. The E2RF side marker lamp-right front, E5F tail lamp-right rear and the E4K park lamp-right front should turn ON and OFF while changing between the commanded states.
 - If the E2RF side marker lamp-right front, E5F tail lamp-right rear and the E4K park lamp-right

front are always ON or always OFF, refer to Right Side Marker/Tail Lamps Malfunction below.

Circuit/System Testing

Left Side Marker/Tail Lamps Malfunction

1. Disconnect the X1 harness connector at the E5E tail lamp-left.
2. Test for less than 30 ohms between the ground circuit terminal C and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Disconnect the appropriate inline harness connector listed below:
 - X111 inline harness connector (With TT6/TT7/TT8)
 - X115 inline harness connector (Without TT6/TT7/TT8)
4. Test for less than 30 ohms between the ground circuit terminal listed below and ground:
 - Ground circuit terminal A
 - Ground circuit terminal E
 - If greater than the specified range, test the ground circuit for an open/high resistance.
5. Connect a test lamp between the control circuit terminal listed below and ground.
 - E2LF side marker lamp-left front control circuit terminal K
 - E4J park lamp-left front control circuit terminal B
 - E5E tail lamp-left control circuit terminal B
6. Ignition ON, command the Left Park Lamps ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the commanded states.
 - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
 - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuits test normal, replace the K9 BCM.
7. If all the circuits test normal, replace the appropriate left marker lamp.

Right Side Marker/Tail Lamps Malfunction

1. Disconnect the X1 harness connector at the E5F tail lamp-right.
2. Test for less than 30 ohms between the ground circuit terminal C and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Ignition OFF, disconnect the appropriate inline harness connector listed below:
 - X112 inline harness connector (With TT6/TT7/TT8)
 - X116 inline harness connector (Without TT6/TT7/TT8)
4. Test for less than 30 ohms between the ground circuit terminal listed below and ground:
 - Ground circuit terminal A
 - Ground circuit terminal E
 - If greater than the specified range, test the ground circuit for an open/high resistance.
5. Connect a test lamp between the control circuit terminal listed below and ground.

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- E2RF side marker lamp-right front control circuit terminal K
 - E4K park lamp-right front control circuit terminal B
 - E5F tail lamp-right control circuit terminal A
6. Ignition ON, command the Right Park Lamps ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the commanded states.
- If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
 - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuits test normal, replace the K9 BCM.
7. If all the circuits test normal, replace the appropriate right marker lamp

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

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

DTC B25 A

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 B25 A 01

Low Beam Control Circuit Short to Battery

DTC B25 A 02

Low Beam Control Circuit Short to Ground

DTC B25 A 04

Low Beam Control Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
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Headlamp Low Beam Relay Control	B258A 02	B258A 04	B258A 01	-
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Circuit/System Description

When the headlight switch is placed in low beam position, the body control module (BCM) energizes the low beam headlamp relay which supplies battery voltage to the respective headlamp control circuits.

Conditions for Running the DTC

The headlamp switch is in the low beam position.

Conditions for Setting the DTC

B25 A 01

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

B25 A 02

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

B25 A 04

The BCM detects an open/high resistance in the headlamp low beam relay control circuit.

Action Taken When the DTC Sets

B25 A 01 or B25 A 04

The low beam headlamps will be inoperative.

B25 A 02

The low beam headlamps will be continuously illuminated.

Conditions for Clearing the DTC

- The DTC will be current for as long as the fault is present.
- When the fault is no longer present, the DTC will be a history DTC.
- A history DTC will clear after 50 ignition cycles.

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**

Ignition ON, command the Headlamp Low Beam ON and OFF with a scan tool. The low beam lamp should turn ON and OFF when changing between the commanded states.

Circuit/System Testing

1. Ignition OFF, disconnect the KR49 headlamp low beam relay.
2. Ignition ON, verify that a test lamp does not illuminate between the control circuit terminal 30 and ground.
 - If the test lamp illuminates, test the control circuit for a short to voltage
3. Verify that a test lamp illuminates between the B+ circuit terminal 87 and ground.
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance.
4. Verify that a test lamp illuminates between the B+ circuit terminal 86 and ground.
 - If the test lamp does not illuminate, test the B+ circuit for an open/high resistance.
5. Connect a 15A fused jumper wire between the B+ circuit terminal 87 and the control circuit terminal 30. Verify the E4G headlamp-left low beam and the E4H headlamp-right low beam are activated.
 - If the E4G headlamp-left low beam and the E4H headlamp-right low beam do not activate, test the control circuit for a short to ground or an open/high resistance.
6. Connect a test lamp between the B+ circuit terminal 86 and the control circuit terminal 85.
7. Ignition ON, command the Low Beam Lamps ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the commanded states.
 - If the test lamp is always ON, test the control circuit for a short to ground. If the circuit tests normal, replace the K9 BCM.
 - If the test lamp is always OFF, test the control circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K9 BCM.

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8. If all circuits test normal, test or replace the KR49 headlamp low beam relay.

Component Testing

Relay Test

1. Ignition OFF, disconnect the KR49 headlamp low beam relay.
2. Test for 60-180 ohms between terminals 85 and 86.
 - If not within the specified range, replace the KR49 headlamp low beam relay.
3. Test for infinite resistance between the following terminals:
 - 30 and 86
 - 30 and 87
 - 30 and 85
 - 85 and 87
 - If not the specified value, replace the KR49 headlamp low beam relay.
4. Install a 15A fused jumper wire between relay terminal 85 and 12 V. Install a jumper wire between relay terminal 86 and ground. Test for less than 2 ohms between terminals 30 and 87.
 - If greater than the specified range, replace the KR49 headlamp low beam relay.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Relay Replacement (Attached to Wire Harness)** or **Relay Replacement (Within an Electrical Center)**
- **Control Module References** for BCM replacement, setup and programming

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 Descriptor

DTC B2600 01

Left Daytime Running Lamps Control Circuit Short to Battery

DTC B2600 02

Left Daytime Running Lamps Control Circuit Short to Ground

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DTC B2600 04

Left Daytime Running Lamps Control Circuit Open

DTC B2605 01

Right Daytime Running Lamps Control Circuit Short to Battery

DTC B2605 02

Right Daytime Running Lamps Control Circuit Short to Ground

DTC B2605 04

Right Daytime Running Lamps Control Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Left Daytime Running Lamps Control	B2600 02	B2600 04	B2600 01	-
Right Daytime Running Lamps Control	B2605 02	B2605 04	B2605 01	-

Circuit/System Description

When the headlight switch is in the Auto position and the ambient light sensor detects sunlight, the body control module (BCM) will command the daytime running lamps to illuminate by providing 12 volts to the daytime running lamp control circuit.

Conditions for Running the DTC

- The engine is running.
- Headlamp switch in AUTO position.
- The ambient light is day.

Conditions for Setting the DTC

B2600 01 or B2605 01

The BCM detects a short to voltage on the daytime running lamp control circuit

B2600 02 or B2605 04

The BCM detects a short to ground on the daytime running lamp control circuit

B2600 04 or B2605 04

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The BCM detects an open/high resistance on the daytime running lamp control circuit

Action Taken When the DTC Sets

B2600 01 or B2605 01

The daytime running lamp will be continuously illuminated.

B2600 02, B2600 04, B2605 02 or B2605 04

The daytime running lamp will be inoperative

Conditions for Clearing the DTC

- The DTC will be current for as long as the fault is present.
- When the fault is no longer present, the DTC will be a history DTC.
- A history DTC will clear after 50 ignition cycles.

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

Ignition ON, command the Left Dedicated Daytime Running Lamp and the Right Dedicated Daytime Running Lamp ON and OFF with a scan tool. The E4C daytime running lamp - left and the E4D daytime running lamp -

right should turn ON and OFF while changing between the commanded states.

Circuit/System Testing

1. Ignition OFF, disconnect the X1 harness connector K9 BCM.
2. Ignition ON, verify that a test lamp illuminates between the B+ circuit terminal 3 and ground.
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance.
3. Ignition OFF, connect the X1 harness connector K9 BCM
4. Ignition OFF, disconnect the inline harness connector listed below:
 - E4C daytime running lamp - left X111 inline harness connector
 - E4D daytime running lamp - right X116 inline harness connector
5. Connect a test lamp between the control circuit terminal G and ground.
6. Command the appropriate Dedicated Daytime Running Lamp ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the commanded states.
 - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
 - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuits test normal, replace the K9 BCM.
7. If all circuits test normal, replace the daytime running lamp bulb.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Daytime Running Lamp Bulb Replacement (TT6,TT7,TT8 Passenger Side Headlamp)** or **Daytime Running Lamp Bulb Replacement (T84, T85 Passenger Side Headlamp)** or **Daytime Running Lamp Bulb Replacement (T84, T85 Driver Side Headlamp)** or **Daytime Running Lamp Bulb Replacement (TT6,TT7,TT8 Driver Side Headlamp)**
- **Control Module References** for BCM replacement, setup, and programming

DTC B260A

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 B260A 00

Backlight and Display Dimming Request Circuit Malfunction

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Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Backlight and Display Dimming Request Signal	-	-	-	B260A

Circuit/System Description

The body control module (BCM) supplies a reference voltage to the backlight dimmer switch, which is part of the headlamp switch. When the backlight dimmer switch is placed in a desired brightness position, reference voltage is applied through the backlight dimmer switch rheostat to the BCM. The BCM interprets this voltage signal, then applies a pulse width modulated (PWM) voltage to the LED dimming supply circuit to all related interior lamps, illuminating them to the desired level of brightness.

Conditions for Running the DTC

The ignition is ON. Parklamps are illuminated.

Conditions for Setting the DTC

The BCM detects the instrument panel dimmer switch is ON for greater than 60 seconds.

Action Taken When the DTC Sets

The BCM will not dim or illuminate any LED backlighting supplied by the backlight lamp 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 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

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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 Verification

Ignition ON, switch ON exterior lighting, vary the interior backlight from dim to full bright by using the dimmer switch. The interior backlighting should dim and then become full bright.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the S30 Headlamp Switch.
2. Ignition OFF, test for less than 5 ohms between the low reference circuit terminal 6 and ground.
 - If greater than the specified range, test the low reference circuit for an open/high resistance. If the circuit tests normal, replace the K9 Body Control Module.
3. Ignition ON, test for 4.8-5.2 V between the 5 V reference circuit terminal 1 and ground.
 - If less than the specified range, test the 5 V reference circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 Body Control Module.
 - If greater than the specified range, test the 5 V reference circuit for a short to voltage. If the circuit tests normal, replace the K9 Body Control Module.
4. Verify the scan tool LED Backlight Dimming Command is less than 5 percent.
 - If greater than the specified range, test the signal circuit terminal 12 for a short to voltage. If the circuit tests normal, replace the K9 Body Control Module.
5. Install a 3 A fused jumper wire between the signal circuit terminal 12 and the 5 V reference circuit terminal 5. Verify the scan tool LED Backlight Dimming Command is greater than 95 percent.
 - If less than the specified range, test the signal circuit for short to ground or an open/high resistance. If the circuit tests normal, replace the K9 Body Control Module.
6. If all circuits test normal, test or replace the S30 Headlamp Switch.

Repair Procedures

Perform the Diagnostic Repair Verification after completing the diagnostic procedure.

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

DTC B260B OR B260C

Diagnostic Instructions

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- 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 B260B 01

Left Daytime Running Lamp Relay Control Circuit Short to Battery

DTC B260B 02

Left Daytime Running Lamp Relay Control Circuit Short to Ground

DTC B260B 04

Left Daytime Running Lamp Relay Control Circuit Open

DTC B260C 01

Right Daytime Running Lamp Relay Control Circuit Short to Battery

DTC B260C 02

Right Daytime Running Lamp Relay Control Circuit Short to Ground

DTC B260C 04

Right Daytime Running Lamp Relay Control Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Left Daytime Running Lamp Relay B+	B260B 04	B260B 04	-	-
Right Daytime Running Lamp Relay B+	B260C 04	B260C 04	-	-
Left Daytime Running Lamp Relay Control	B260B 02	B260B 04	B260B 01	-
Right Daytime Running Lamp Relay Control	B260C 02	B260C 04	B260C 01	-
Daytime Running Lamp Relay Control	2	2	1	-
1. The appropriate Park Lamp/Side Marker Lamp is Always ON				
2. The appropriate Park Lamp/Side Marker Lamp is Always OFF				

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Circuit/System Description

The headlamp switch is supplied with ground at all times. When the headlamp switch is placed in either the park or low beam position, ground is applied to the tail lamp signal circuit to the body control module (BCM). The BCM responds by applying battery voltage to the left/right park lamps, left/right side marker lamps and left/right tail lamps. This energizes the appropriate lamp.

Conditions for Running the DTC

- The engine is running.
- Headlamp switch in AUTO position.
- The ambient light is day.

Conditions for Setting the DTC

B260B 01 or B260C 01

The BCM detects a short to voltage on the daytime running lamp relay control circuit.

B260B 02 or B260C 02

The BCM detects a short to ground on the daytime running lamp relay control circuit.

B260B 04 or B260C 04

The BCM detects an open/high resistance on the daytime running lamp relay control circuit.

Action Taken When the DTC Sets

B260B 01 or B260C 01

The appropriate daytime running lamp will be continuously illuminated.

B260B 02, B260C 04, B260B 02 or B260C 04

The appropriate daytime running lamp will be inoperative.

Conditions for Clearing the DTC

- The DTC will be current for as long as the fault is present.
- When the fault is no longer present, the DTC will be a history DTC.
- A history DTC will clear after 50 ignition cycles.

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****Circuit/System Verification**

Ignition ON, command the Left Dedicated Daytime Running Lamp and the Right Dedicated Daytime Running Lamp ON and OFF with a scan tool. The E4C daytime running lamp - left and the E4D daytime running lamp - right should turn ON and OFF while changing between the commanded states.

Circuit/System Testing

1. Ignition OFF, disconnect the appropriate KR42 daytime running lamp relay.
2. Ignition ON, verify that a test lamp illuminates between the B+ circuit terminal 86 and ground.
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance.
3. Connect a test lamp between the B+ circuit terminal 86 and the control circuit terminal 85.
4. Command the appropriate Front Park Lamp test with a scan tool. The test lamp should turn ON and OFF when changing between the commanded states.
 - If the test lamp is always ON, test the control circuit for a short to ground. If the circuit tests normal, replace the K9 BCM.
 - If the test lamp is always OFF, test the control circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
5. If all circuits test normal, test or replace the KR42 daytime running lamp relay.

Component Testing**Relay Test**

1. Ignition OFF, disconnect the appropriate KR42 daytime running lamp relay.

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2. Test for 60-180 ohms between terminals 85 and 86.
 - If not within the specified range, replace the KR42 daytime running lamp relay.
3. Test for infinite resistance between the following terminals:
 - 30 and 86
 - 30 and 87
 - 30 and 85
 - 85 and 87
 - If not the specified value, replace the KR42 daytime running lamp relay.
4. Install a 15A fused jumper wire between relay terminal 85 and 12 V. Install a jumper wire between relay terminal 86 and ground. Test for less than 2 ohms between terminals 30 and 87.
 - If greater than the specified range, replace the KR42 daytime running lamp relay.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Headlamp Replacement**
- **Relay Replacement (Attached to Wire Harness)** or **Relay Replacement (Within an Electrical Center)**
- **Control Module References** for BCM replacement, setup and programming

DTC B260D OR B260E

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 B260D 01

Left Daytime Running Lamp and Front Park Lamp Control Circuit Short to Battery

DTC B260D 02

Left Daytime Running Lamp and Front Park Lamp Control Circuit Short to Ground

DTC B260D 04

Left Daytime Running Lamp and Front Park Lamp Control Circuit Open

DTC B260E 01

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Right Daytime Running Lamp and Front Park Lamp Control Circuit Short to Battery

DTC B260E 02

Right Daytime Running Lamp and Front Park Lamp Control Circuit Short to Ground

DTC B260E 04

Right Daytime Running Lamp and Front Park Lamp Control Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Left Daytime Running Lamps Control	B260D 02	B260D 04	B260D 01	-
Right Daytime Running Lamps Control	B260E 02	B260E 04	B260E 01	-

Circuit/System Description

When the headlight switch is in the Auto position and the ambient light sensor detects sunlight, the body control module (BCM) will command the daytime running lamps to illuminate by providing 12 volts to the daytime running lamp control circuit.

Conditions for Running the DTC

- The engine is running.
- Headlamp switch in AUTO position.
- The ambient light is day.

Conditions for Setting the DTC

B260D 01 or B260E 01

The BCM detects a short to voltage on the daytime running lamp control circuit

B260D 02 or B260E 02

The BCM detects a short to ground on the daytime running lamp control circuit

B260D 04 or B260E 04

The BCM detects an open/high resistance on the daytime running lamp control circuit

Action Taken When the DTC Sets

B260D 01 or B260E 01

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The daytime running lamp will be continuously illuminated.

B260D 02, B260D 04, B260E 02 or B260E 04

The daytime running lamp will be inoperative

Conditions for Clearing the DTC

- The DTC will be current for as long as the fault is present.
- When the fault is no longer present, the DTC will be a history DTC.
- A history DTC will clear after 50 ignition cycles.

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

Circuit/System Verification

Ignition ON, command the Left Dedicated Daytime Running Lamp and the Right Dedicated Daytime Running Lamp ON and OFF with a scan tool. The E4C daytime running lamp - left and the E4D daytime running lamp - right should turn ON and OFF while changing between the commanded states.

Circuit/System Testing

1. Ignition OFF, disconnect the X1 harness connector K9 BCM.

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2. Ignition ON, verify that a test lamp illuminates between the B+ circuit terminal 3 and ground.
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance.
3. Ignition OFF, connect the X1 harness connector K9 BCM
4. Ignition OFF, disconnect the inline harness connector listed below:
 - E4C daytime running lamp - left X111 inline harness connector
 - E4D daytime running lamp - right X116 inline harness connector
5. Connect a test lamp between the control circuit terminal G and ground.
6. Command the appropriate Dedicated Daytime Running Lamp ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the commanded states.
 - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
 - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuits test normal, replace the K9 BCM.
7. If all circuits test normal, replace the daytime running lamp bulb.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Daytime Running Lamp Bulb Replacement (TT6,TT7,TT8 Passenger Side Headlamp)** or **Daytime Running Lamp Bulb Replacement (T84, T85 Passenger Side Headlamp)** or **Daytime Running Lamp Bulb Replacement (T84, T85 Driver Side Headlamp)** or **Daytime Running Lamp Bulb Replacement (TT6,TT7,TT8 Driver Side Headlamp)**
- **Control Module References** for BCM replacement, setup, and programming

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

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Courtesy Lamps Control	B2615 02	2	1	-
1. Courtesy Lamps Always Illuminated 2. Courtesy Lamps do Not Illuminate				

Circuit/System Description

Battery voltage for the courtesy lamps is supplied at all times to the body control module (BCM). When the BCM receives a signal to command the courtesy lamps ON, it then applies voltage through the courtesy lamps control circuits to the courtesy lamps.

Conditions for Running the DTC

The BCM attempts to illuminate the courtesy lamps.

Conditions for Setting the DTC

The BCM detects a short to ground on the courtesy lamp control circuit.

Action Taken When the DTC Sets

The BCM will not attempt to activate courtesy lamps.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction 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****Circuit/System Verification**

Command the Courtesy Lamps ON and OFF with a scan tool. The courtesy lamps should turn ON and OFF when changing between commanded states.

Circuit/System Testing

1. Disconnect the harness connector at the appropriate courtesy lamp.
2. Ignition OFF, scan tool OFF, doors CLOSED, interior lamps OFF, test for less than 5.0 ohms between the ground circuit terminal listed below and ground:
 - Instrument Panel Courtesy Lamp - terminal 2
 - Door Courtesy Lamp - terminal 2
 - Overhead Console Courtesy/Reading Lamp - terminal 2
 - Rear Courtesy/Reading Lamp - terminal B
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Connect a test lamp between the control circuit terminal listed below and ground:
 - Instrument Panel Courtesy Lamp - terminal 1
 - Door Courtesy Lamp - terminal 1
 - Overhead Console Courtesy/Reading Lamp - terminal 3
 - Rear Courtesy/Reading Lamp - terminal C
4. Command the Courtesy Lamps ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the commanded states.
 - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
 - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
5. If all circuits test normal, replace the courtesy lamp.

Repair Procedures

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

- Refer to the appropriate replacement procedure for the lighting component that requires replacement.
- **Control Module References** for BCM replacement, programming and setup

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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 B2625 02

Display Dimming Pulse Width Modulation Output Circuit Short to Ground

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Headlamp Switch B+	B1405 03, B1529 03, B257B 03, 1	B257B 03, 1	-	-
Instrument Panel Lamps Dimmer Switch Signal	B257B 03, 1	B257B 03, 1	B257B 07	-
Interior Backlighting Control BCM Terminal 9 X7	B2625 02	2	1	-
Interior Backlighting Control BCM Terminal 8 X2	B2625 02, 2	2	1	-
Interior Backlighting Control BCM Terminal 5 X1 (with UD5)	B2625 02	2	1	-
Headlamp Switch Ground	-	B257B 03	-	-
1. Interior backlighting at full intensity and cannot be dimmed 2. Interior backlighting component does not illuminate				

Circuit/System Description

The dimmer switch is used to increase and decrease the brightness of the interior backlighting components. The body control module (BCM) supplies a reference voltage to the backlight dimmer switch, which is part of the headlamp switch. When the dimmer switch is placed in a desired brightness position, the dimmed voltage setting is applied through the dimmer switch and the dimmer switch signal circuit to the BCM. The BCM interprets this voltage signal, then applies a pulse width modulated (PWM) voltage through the backlight lamp control circuit and the LED dimming control circuit illuminating the components to the requested level.

Conditions for Running the DTC

The ignition is ON.

Conditions for Setting the DTC

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The BCM detects a short to ground in the LED dimming control circuit.

Actions Taken When the DTC Sets

The BCM will not attempt to illuminate the LED indicator lamps when a short circuit to ground is detected.

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 Verification

Ignition ON, park lamps ON, vary the interior backlight dimming from low to full bright by using the dimmer switch. The LED on all components should dim and then become full bright.

Circuit/System Testing

NOTE: Each component on backlighting control circuit may need to be disconnected to isolate a short to voltage or short to ground. Use the schematic to identify the following:

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

1. Ignition OFF, disconnect the harness connector at any component on the interior backlighting control circuit.
2. Scan tool disconnected, interior lamps OFF, doors CLOSED, test for less than 10 ohms between the ground circuit terminal and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Connect a test lamp between the control circuit terminal and ground.
4. Ignition ON, command the LED Backlight Dimming ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the commanded states.
 - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
 - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
5. If all circuits test normal, test or replace the appropriate component.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- Refer to the appropriate replacement procedure for the component causing the condition.
- **Control Module References** for BCM replacement, setup and programming

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

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Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Ambient Light Sensor Signal	B2645 03	B2645 03	B2645 07	-
Low Reference	-	B0163 05, B0183 05, B1405 05, B2645 07	-	-

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 1.4-4.5 V depending on outside lighting conditions. The body control module (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 daytime running lights ON. During low light conditions the BCM will command the low beam headlamps ON.

Conditions for Running the DTC

Ignition ON

Conditions for Setting the DTC

B2645 03

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

B2645 07

The BCM detects greater than 5 volts on the ambient light sensor signal circuit.

Action Taken When the DTC Sets

The automatic headlamps will malfunction.

Conditions for Clearing the DTC

- The DTC will be current for as long as the fault is present.
- When the fault is no longer present, the DTC will be a history DTC.
- A history DTC will clear after 50 ignition cycles.

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****Circuit/System Verification**

Ignition ON, observe the scan tool Ambient Light Sensor parameter. The reading should be between 1.4-4.5 V and change with ambient light changes.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the B10B ambient light/sunload sensor.
2. Test for less than 30 ohms between the low reference circuit terminal 6 and ground.
 - If greater than the specified range, test the low reference circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K33 HVAC control module.
3. Ignition ON, test for 4.8-5.2 V between the signal circuit terminal 5 and ground.
 - If greater than the specified range, test the signal circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
 - If less than the specified range, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
4. If all circuits test normal, replace the B10B ambient light/sunload sensor.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Sun Load Temperature and Daytime Running Lamp Ambient Light Sensor Replacement**
- **Control Module References** for BCM or HVAC control module replacement, setup and programming

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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
Interior Accent Light Control	B2652 02	2	1	-
1. Interior Accent Light at Full Intensity and Does Not Dim 2. Interior Accent Light do Not Illuminate				

Circuit/System Description

The body control module (BCM) uses the ambient light sensor to determine which brightness of the accent lighting is needed. The BCM applies a pulse width modulated (PWM) voltage through the accent light LED control circuit. Depending on the specified lighting requirements, the BCM has three different accent lighting settings:

- Daylight conditions (70 %)
- Night conditions (40 %)
- Welcome light (100 %)

Conditions for Running the DTC

- The ignition is ON.
- The headlamps or park lamps ON.

Conditions for Setting the DTC

The BCM detects a short to ground on the accent lighting control circuit.

Action Taken When the DTC Sets

The BCM does not attempt to illuminate the accent lighting.

Conditions for Clearing the DTC

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- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction 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 Verification

Ignition ON, command the Accent Lighting ON and OFF with a scan tool. The accent lighting should turn ON and OFF when changing between the commanded states.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connectors at the appropriate E1 accent light.
2. Test for less than 5 ohms between the ground circuit terminal and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Ignition OFF, doors closed, wait 20 seconds before testing for less than 0.3 V between the control circuit terminal and ground.
 - If greater than the specified value, test the circuit for a short to voltage. If the circuits test normal replace the K9 BCM.
4. Ignition ON, doors open, test for greater than 11 V between the control circuit terminal and ground.
 - If less than the specified value, test the circuit for a short to ground or an open/high resistance. If the circuits test normal replace the K9 BCM.

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5. If all circuits test normal, test or replace the E1 accent light.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- Refer to the appropriate replacement procedure for the lighting component that requires replacement.
- **Control Module References** for BCM replacement, programming and setup

DTC B2657

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 B2657 02

Ignition Switch Halo Lamp Circuit Short to Ground

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Ignition Switch Halo Lamp Control	B2657 02	2	1	-
Ignition Switch Halo Lamp Ground	-	2	-	-
1. Ignition Switch Halo Lamp Always ON 2. Ignition Switch Halo Lamp Always OFF				

Circuit/System Description

The body control module (BCM) supplies a voltage reference through the backlight dimmer switch, which is part of the headlamp switch. When the dimmer switch is placed in a desired brightness position, reference voltage is applied through the backlight dimmer switch to the BCM. The BCM interprets this voltage signal, then applies a pulse width modulated (PWM) voltage through the backlight lamp control circuit. This will illuminate the ignition mode switch halo lamp.

Conditions for Running the DTC

- The ignition is ON.
- The headlamps or park lamps are ON.

Conditions for Setting the DTC

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The BCM detects a short to ground on the ignition switch halo lamp control circuit.

Action Taken When the DTC Sets

The BCM will not illuminate the ignition switch halo lamp.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction 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 Verification

Ignition ON, command the LED Backlighting ON and OFF with a scan tool. The ignition switch halo lamp should turn ON and OFF when changing between the commanded states.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the S38 ignition mode switch.
2. Ignition OFF and all vehicle systems OFF. It may take up to 2 minutes for all vehicle systems to power down. Test for less than 10 ohms between the ground circuit terminal 4 and ground.

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- If greater than the specified range, test the ground circuit for an open/high resistance.
- 3. Connect a test lamp between the control circuit terminal 8 and the ground circuit terminal 4.
- 4. Command the LED Backlighting ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the commanded states.
 - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
 - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
- 5. If all circuits test normal, test or replace the S38 ignition mode switch.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

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

DTC B2740

Diagnostic Instructions

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

DTC Descriptor

DTC B2740 00

Front Fog Lamp Switch Circuit Malfunction

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Lighting Control Switch Reference	B1405 03, B1529 03, B2740 00	B257B 03	1	-
Lighting Control Switch Signal	B257B 03	B257B 03	1	-
1. Front Fog Switch Malfunction				

Circuit/System Description

The front fog lamp relay is supplied with battery voltage at all times. The front fog lamp switch signal circuit is grounded momentarily by pressing the front fog lamp switch. The body control module (BCM) energizes the

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front fog lamp relay by applying ground to the front fog lamp relay control circuit. When the front fog lamp relay is energized, the relay switch contacts close and battery voltage is applied through the front fog lamp fuse to the front fog lamp supply voltage circuit which illuminates the front fog lamps.

Conditions for Running the DTC

- The ignition is turned ON.
- Front fog lamp switch activated.

Conditions for Setting the DTC

The BCM detects the fog lamp switch is continuously active.

Action Taken When the DTC Sets

Front fog lamps will be continuously illuminated.

Conditions for Clearing the DTC

- The DTC will be current for as long as the fault is present.
- When the fault is no longer present, the DTC will be a history DTC.
- A history DTC will clear after 50 ignition cycles.

Conditions for Clearing the DTC

The condition for setting the DTC is not longer present.

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

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- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

Ignition ON, observe the scan tool Front Fog Lamps Switch parameter while turning the front fog lamps switch ON and OFF. The parameter should change between Active and Inactive.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the S30 headlamp switch.
2. Ignition ON, test for greater than 10V between the 12 V reference circuit terminal 1 and ground.
 - If less than the specified range, test the 12 V reference circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
3. Test for 0.4K ohms to 1K ohms between the signal circuit terminal 12 and ground.
 - If greater than the specified range, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
 - If less than the specified range, test the signal circuit for a short to ground. If the circuit tests normal, replace the K9 BCM.
4. If all circuits test normal, test or replace the S30 headlamp switch.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

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

DTC B 410 OR B 420

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 B 410 01

Automatic Headlamp Leveling Control Module Front Axle Sensor Signal Circuit Short to Battery

2010 Cadillac SRX**2010 ACCESSORIES & EQUIPMENT Lighting - SRX****DTC B 410 06**

Automatic Headlamp Leveling Control Module Front Axle Sensor Signal Circuit Low Voltage/Open

DTC B 420 01

Automatic Headlamp Leveling Control Module Rear Axle Sensor Signal Circuit Short to Battery

DTC B 420 06

Automatic Headlamp Leveling Control Module Rear Axle Sensor Signal Circuit Low Voltage/Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Headlamp Leveling Sensor 5V Reference - Front	B3415 02	1	B3415 01	-
Headlamp Leveling Sensor 5V Reference - Rear	B3415 02	1	B3415 01	-
Headlamp Leveling Sensor Signal - Front	B3410 06	B3410 06	B3410 01	-
Headlamp Leveling Sensor Signal - Rear	B3420 06	B3420 06	B3420 01	-
Headlamp Leveling Sensor Low Reference - Front	-	B3410 06	-	-
Headlamp Leveling Sensor Low Reference - Rear	-	1	-	-
1. Headlamp Leveling Malfunction				

Circuit/System Description

The front and rear suspension position sensors provide the headlamp control module with front and rear suspension position information. Each sensor receives a 5V reference, signal, and low reference circuits from the headlamp control module. The sensors are connected to the control arms at 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 sensors to change. The headlamp control module compares the information from the front and rear suspension position sensors and adjusts the headlamp leveling as needed.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- The ignition is in the ON or RUN position.
- The headlamps are ON.

Conditions for Setting the DTC

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B 410 01 or B 420 01

The headlamp leveling control module detects a short to battery on the sensor signal line.

B 410 06 or B 420 06

The headlamp leveling control module detects a short to ground or an open/high resistance on the sensor signal line.

Action Taken When the DTC Sets

- The headlamp control module disables the headlamp leveling system.
- The driver information center will display Service AFL Lamp message.

Conditions for Clearing the DTC

- The DTC will be current for as long as the fault is present.
- When the fault is no longer present, the DTC will be a history DTC.
- A history DTC will clear after 50 ignition cycles.

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

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1. Ignition OFF, disconnect the harness connector at the appropriate B51 headlamp leveling sensor.
2. Test for less than 5 ohms between the low reference circuit terminal 3 and ground.
 - If greater than the specified range, test the low reference circuit for an open/high resistance. If the circuit tests normal, replace the K28 headlamp leveling control module.
3. Ignition ON, test for 4.8-5.2 V between the 5V reference circuit terminal 1 and ground.
 - If less than the specified range, test the 5V reference circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K28 headlamp leveling control module.
 - If greater than the specified range, test the 5V reference circuit for a short to voltage. If the circuit tests normal, replace the K28 headlamp leveling control module.
4. Verify the appropriate scan tool Leveling Position Sensor parameter is 0 V.
 - If greater than the specified range, test the signal circuit terminal 2 for a short to voltage. If the circuit tests normal, replace the K28 headlamp leveling control module.
5. Install a 3 A fused jumper wire between the signal circuit terminal 2 and the 5V reference circuit terminal 1. Verify the appropriate scan tool Leveling Position Sensor parameter is greater than 5 V.
 - If less than the specified range, test the signal circuit for short to ground or an open/high resistance. If the circuit tests normal, replace the K28 headlamp leveling control module.
6. If all circuits test normal, replace the B51 headlamp leveling sensor.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Headlamp Leveling Front Suspension Height Sensor Replacement**
- **Headlamp Leveling Rear Suspension Height Sensor Replacement**
- **Control Module References** for headlamp leveling control module replacement, setup, and programming

DTC B 415

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 B 415 01

Automatic Headlamp Leveling Control Module Axle Sensor Supply Circuit Short to Battery

DTC B 415 02

Automatic Headlamp Leveling Control Module Axle Sensor Supply Circuit Short to Ground

2010 Cadillac SRX**2010 ACCESSORIES & EQUIPMENT Lighting - SRX****Diagnostic Fault Information**

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Headlamp Leveling Sensor 5V Reference - Front	B3415 02	1	B3415 01	-
Headlamp Leveling Sensor 5V Reference - Rear	B3415 02	1	B3415 01	-
Headlamp Leveling Sensor Signal - Front	B3410 06	B3410 06	B3410 01	-
Headlamp Leveling Sensor Signal - Rear	B3420 06	B3420 06	B3420 01	-
Headlamp Leveling Sensor Low Reference - Front	-	1	-	-
Headlamp Leveling Sensor Low Reference - Rear	-	1	-	-
1. Headlamp Leveling Malfunction				

Circuit/System Description

The front and rear suspension position sensors provide the headlamp control module with front and rear suspension position information. Each sensor receives a 5V reference, signal, and low reference circuits from the headlamp control module. The sensors are connected to the control arms at 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 sensors to change. The headlamp control module compares the information from the front and rear suspension position sensors and adjusts the headlamp leveling as needed.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- The ignition is in the ON or RUN position.
- The headlamps are ON.

Conditions for Setting the DTC**B 415 01**

The headlamp leveling control module detects a short to voltage on the sensor signal line.

B 415 02

The headlamp leveling control module detects a short to ground or an open/high resistance on the sensor signal line.

Action Taken When the DTC Sets

- The headlamp control module disables the headlamp leveling system.

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- The driver information center will display Service AFL Lamp message.

Conditions for Clearing the DTC

- The DTC will be current for as long as the fault is present.
- When the fault is no longer present, the DTC will be a history DTC.
- A history DTC will clear after 50 ignition cycles.

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 harness connector at the appropriate B51 headlamp leveling sensor.
2. Test for less than 5 ohms between the low reference circuit terminal 3 and ground.
 - If greater than the specified range, test the low reference circuit for an open/high resistance. If the circuit tests normal, replace the K28 headlamp leveling control module.
3. Ignition ON, test for 4.8-5.2 V between the 5V reference circuit terminal 1 and ground.
 - If less than the specified range, test the 5V reference circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K28 headlamp leveling control module.
 - If greater than the specified range, test the 5V reference circuit for a short to voltage. If the circuit tests normal, replace the K28 headlamp leveling control module.

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4. Verify the appropriate scan tool Leveling Position Sensor parameter is 0 V.
 - If greater than the specified range, test the signal circuit terminal 2 for a short to voltage. If the circuit tests normal, replace the K28 headlamp leveling control module.
5. Install a 3 A fused jumper wire between the signal circuit terminal 2 and the 5V reference circuit terminal 1. Verify the appropriate scan tool Leveling Position Sensor parameter is greater than 5 V.
 - If less than the specified range, test the signal circuit for short to ground or an open/high resistance. If the circuit tests normal, replace the K28 headlamp leveling control module.
6. If all circuits test normal, replace the B51 headlamp leveling sensor.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Headlamp Leveling Front Suspension Height Sensor Replacement**
- **Headlamp Leveling Rear Suspension Height Sensor Replacement**
- **Control Module References** for headlamp leveling control module replacement, setup, and programming

DTC B 5

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 B 5 00

Rear Fog Lamp Switch Circuit Malfunction

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Headlamp Switch Reference Voltage	B257B 03	B257B 03	-	B3588 00
Headlamp Switch Signal	B257B 03	B257B 03	B257B 07	-

Circuit/System Description

The body control module (BCM) supplies a reference voltage to the backlight dimmer switch, which is part of the headlamp switch. When the backlight dimmer switch is placed in a desired brightness position, reference voltage is applied through the backlight dimmer switch resistor ladder to the BCM. The BCM interprets this voltage signal and will command the interior lights to the desired brightness, command the front fog lamps or

the rear fog lamps depending upon the switch setting selected.

Conditions for Running the DTC

- The ignition is turned ON.
- Low beam or front fog lamps illuminated.
- Rear fog lamp switch activated.

Conditions for Setting the DTC

Rear fog lamp switch stuck.

Action Taken When the DTC Sets

- All cluster/backlighting defaults full bright
- Steering wheel cluster/backlighting dimming controls inoperative
- Front fog lamps are inoperative
- Rear fog lamps are inoperative

Conditions for Clearing the DTC

- The DTC will be current for as long as the fault is present.
- When the fault is no longer present, the DTC will be a history DTC.
- A history DTC will clear after 40 ignition cycles.

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

Ignition ON, observe the scan tool Rear Fog Lamps Switch parameter. The parameter should change between Active and Inactive each time the rear fog lamp switch is pressed.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the S30 headlamp switch.
2. Ignition OFF, test for 0.4k ohms to 1 ohms between the signal circuit terminal 12 and ground.
 - o If greater than the specified value, test the low reference circuit for an short to voltage or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
 - o If less than the specified range, test the signal circuit for a short to ground. If the circuit tests normal, replace the K9 BCM.
3. Test for greater than 10 V between the 12 V reference circuit terminal 1 and ground.
 - o If less than the specified range, test the 12 V reference circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
4. If all circuits test normal, replace the K9 BCM.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

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

DTC B 596

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 B 596 00

Hazard Lamps Request Circuit

Diagnostic Fault Information

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Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Hazard Lamps Request Signal	B3596 00	1	1	-
1. Hazard Function Inoperative				

Circuit/System Description

When the hazard switch is placed in the ON position, ground is momentarily applied through the hazard switch signal circuit to the body control module (BCM). The BCM will detect this voltage drop and will supply battery voltage to all four turn signal lamps in an ON and OFF duty cycle. When the hazard switch is activated, the BCM sends a serial data message to the instrument panel cluster (IPC) requesting both turn signal indicators to be cycled ON and OFF.

Conditions for Running the DTC

Ignition is ON

Conditions for Setting the DTC

The BCM detects a short to ground on the hazard switch signal circuit for greater than 1 min

Action Taken When the DTC Sets

The hazard lamps will continuously function.

Conditions for Clearing the DTC

- The DTC will be current for as long as the fault is present.
- When the fault is no longer present, the DTC will be a history DTC.
- A history DTC will clear after 50 ignition cycles.

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

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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 Verification

Observe the function of the right and left turn signal lamps while turning the hazard lamp switch ON and OFF. The right and left turn signal lamps should cycle ON and OFF while the hazard lamp switch is ON and remain OFF when the hazard lamp switch is OFF.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the P17 info display module.
2. Ignition ON, test for greater than 10V between the signal circuit terminal 16 and ground.
 - If less than the specified range, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
3. If all circuits test normal, replace the P17 info display module.

Repair Procedures

Perform the Diagnostic Repair Verification after completing the diagnostic procedure.

- Radio Control Assembly Replacement
- Control Module References for BCM replacement, setup and programming

DTC B364A

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 B364A 00

Surveillance Mode Switch Circuit Malfunction

Diagnostic Fault Information

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Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Front Fog Lamps Switch Signal	-	-	-	B2740 00

Circuit/System Description

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

Conditions for Running the DTC

- The ignition is turned ON.
- Front fog lamp switch activated.

Action Taken When the DTC Sets

Front fog lamps malfunction

Conditions for Setting the DTC

Front fog lamp switch stuck

Conditions for Clearing the DTC

The condition for setting the DTC is not longer present.

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

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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

Ignition ON, observe the scan tool Front Fog Lamps Switch parameter. The reading should change between Active/Inactive when changing between pressed and released front fog lamp switch button.

Circuit/System Testing

1. Ignition OFF, disconnect the X1 and X3 harness connector at the K9 Body Control Module.
2. Ignition ON, test for less than 0.3 V at the K9 Body Control Module signal circuit harness terminal 9 X1 and ground.
 - If greater than the specified value, test the signal circuit for an short to voltage.
3. Test for less than 0.3 V at the K9 Body Control Module 12 V reference circuit harness terminal 4 X3 and ground.
 - If greater than the specified value, test the 12 V reference circuit for a short to voltage.
4. Ignition OFF, test for infinite resistance between the K9 Body Control Module signal circuit harness terminal 9 X1 and ground.
 - If lower than the specified value, test the signal circuit for a short to ground.
5. Test for infinite resistance between the K9 Body Control Module 12 V reference circuit harness terminal 4 X3 and ground.
 - If lower than the specified value, test the 12 V reference circuit for a short to ground.
6. Press and hold the front fog lamp switch button.
7. Test for 2.6-3.2 kohms between the K9 Body Control Module 12 V reference circuit harness connector X3 terminal 4 and the K9 Body Control Module signal circuit harness terminal 9 X1.
 - If not within the specified range, test the 12 V reference circuit and the signal circuit for an open/high resistance. If the circuits test normal, replace the S30 Headlamp Switch.
8. If all circuits test normal, replace the K9 Body Control Module.

Component Testing

Static Test

Ignition OFF, disconnect the harness connector at the S30 Headlamp Switch. Press and hold the front fog lamp switch button, test for 2.6-3.2 kohms at the S30 Headlamp Switch terminal 1 and terminal 12.

- If not within the specified range replace the S30 Headlamp Switch.

Repair Procedures

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Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

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

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 High Beam Signal	B3650 08	1	1	-
Headlamp Flash To Pass Signal	B3806 00	2	2	-
Turn Signal/Multifunction Switch Ground	-	1, 2	-	-
1. Headlamp Dimmer Switch Malfunction 2. Headlamp Flash To Pass Switch Malfunction				

Circuit/System Description

The BCM monitors the voltage level within the high beam signal circuit and the flash to pass signal circuit. When the turn signal/multifunction switch is moved to the high beam position or to the flash to pass position, the voltage within the appropriate signal circuit drops to less than 1 V. The BCM will detect the voltage drop and will command the headlamp high beams to turn ON or OFF.

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 headlamp high beam signal circuit.

Action Taken When the DTC Sets

The high beam headlamps will malfunction.

Conditions for Clearing the DTC

- The DTC will be current for as long as the fault is present.
- When the fault is no longer present, the DTC will be a history DTC.
- A history DTC will clear after 50 ignition cycles.

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**

Ignition ON, observe the scan tool High Beam Select Switch parameter while pulling and releasing the turn signal/multi-function switch. The value should change between Inactive and Active when changing between the selected states.

Circuit/System Testing

1. Ignition OFF, disconnect at the S78 turn signal/multifunction switch.
2. Ignition ON, verify that the scan tool High Beam Select Switch parameter is Inactive.
 - If not the specified value, test the signal circuit terminal 2 for a short to ground. If the circuit tests normal, replace the K9 BCM.
3. Connect a 3 A fused jumper wire between the signal circuit terminal 2 and ground, verify that the scan

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tool High Beam Select Switch parameter is Active.

- If not the specified value, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K9 BCM.

4. If all circuits test normal, test or replace the S78 turn signal/multifunction switch.

Component Testing

Turn Signal/Multifunction Switch Test

1. Ignition OFF, disconnect the harness connector at the S78 turn signal/multifunction switch.
2. Test for Infinite resistance between the terminals listed below with the switch in the open position.
 - Signal terminal 2 and ground terminal 3
 - Signal terminal 4 and ground terminal 3
 - If not the specified value, replace the S78 turn signal/multifunction switch.
3. Test for less than 2 ohms between the signal terminal 2 and the ground terminal 3 with the switch in the high beam position.
 - If greater than the specified value, replace the S78 turn signal/multifunction switch.
4. Test for less than 2 ohms between the signal terminal 4 and the ground terminal 3 while holding the switch in the flash to pass position.
 - If greater than the specified value, replace the S78 turn signal/multifunction switch.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

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

DTC B 06

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 B 06 00

High Beam and Headlamp Flash Select Circuit Malfunction

Diagnostic Fault Information

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Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Headlamp High Beam Signal	B3650 08	1	1	-
Headlamp Flash To Pass Signal	B3806 00	2	2	-
Turn Signal/Multifunction Switch Ground	-	1, 2	-	-
1. Headlamp Dimmer Switch Malfunction 2. Headlamp Flash To Pass Switch Malfunction				

Circuit/System Description

The BCM monitors the voltage level within the high beam signal circuit and the flash to pass signal circuit. When the turn signal/multifunction switch is moved to the high beam position or to the flash to pass position, the voltage within the appropriate signal circuit drops to less than 1 V. The BCM will detect the voltage drop and will command the headlamp high beams to turn ON or OFF.

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 headlamp flash to pass signal circuit for greater than 15 seconds.

Action Taken When the DTC Sets

The high beam headlamps will malfunction.

Conditions for Clearing the DTC

- The DTC will be current for as long as the fault is present.
- When the fault is no longer present, the DTC will be a history DTC.
- A history DTC will clear after 50 ignition cycles.

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

Ignition ON, observe the scan tool Headlamps Flash Switch parameter while pulling and releasing the turn signal/multifunction switch. The value should change between Inactive and Active when changing between the selected states.

Circuit/System Testing

1. Ignition OFF, disconnect at the S78 turn signal/multifunction switch.
2. Ignition ON, verify that the scan tool Headlamps Flash Switch parameter is Inactive.
 - If not the specified value, test the signal circuit terminal 4 for a short to ground. If the circuit tests normal, replace the K9 BCM.
3. Connect a 3 A fused jumper wire between the signal circuit terminal 4 and ground, verify that the scan tool Headlamps Flash Switch parameter is Active.
 - If not the specified value, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
4. If all circuits test normal, test or replace the S78 turn signal/multifunction switch.

Component Testing**Turn Signal/Multifunction Switch Test**

1. Ignition OFF, disconnect the harness connector at the S78 turn signal/multifunction switch.
2. Test for Infinite resistance between the terminals listed below with the switch in the open position.
 - Signal terminal 2 and ground terminal 3
 - Signal terminal 4 and ground terminal 3
 - If not the specified value, replace the S78 turn signal/multifunction switch.
3. Test for less than 2 ohms between the signal terminal 2 and the ground terminal 3 with the switch in the high beam position.
 - If greater than the specified value, replace the S78 turn signal/multifunction switch.
4. Test for less than 2 ohms between the signal terminal 4 and the ground terminal 3 while holding the switch in the flash to pass position.
 - If greater than the specified value, replace the S78 turn signal/multifunction switch.

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Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

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

DTC B 1 OR B 2

Diagnostic Instructions

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

DTC Descriptors

DTC B 1 02

Tail Lamp Circuit Short to Ground

DTC B 1 04

Tail Lamp Circuit Open

DTC B 2 02

Right Tail Lamp Circuit Short to Ground

DTC B 2 04

Right Tail Lamp Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Left Stop Lamp Control	B3881 02	B3881 04	1	-
Right top Lamp Control	B3882 02	B3882 04	1	-
1. Stop Lamps Always ON				

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 to the body control module (BCM). The BCM will apply battery voltage to the right, left and center stop lamp control circuits.

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Conditions for Running the DTC

Brake pedal is applied.

Conditions for Setting the DTC

B3881 01

The BCM detects a short to voltage on the left rear brake lamp control circuit.

B3881 02

The BCM detects a short to ground on the left rear brake lamp control circuit.

B3882 01

The BCM detects a short to voltage on the right rear brake lamp control circuit.

B3882 02

The BCM detects a short to ground on the right rear brake lamp control circuit.

Action Taken When the DTC Sets

The appropriate brake lamp will be inoperative.

Conditions for Clearing the DTC

- The DTC will be current for as long as the fault is present.
- When the fault is no longer present, the DTC will be a history DTC.
- A history DTC will clear after 50 ignition cycles.

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

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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 Verification

1. Ignition ON, observe the function of the E5L stop lamp-left while commanding the Left Brake Lamp ON and OFF with a scan tool. The E5L stop lamp-left should turn ON and OFF while changing between the commanded states
2. Observe the function of the E5R stop lamp-right while commanding the Right Brake Lamp ON and OFF with a scan tool. The E5R stop lamp-right should turn ON and OFF while changing between the commanded states.

Circuit/System Testing

1. Ignition OFF, disconnect the X1 harness connector at the appropriate E5 tail lamp.
2. Test for less than 30 ohms between the ground circuit terminal C and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance
3. Connect a test lamp between the control circuit terminal A and ground
4. Ignition ON, command the Brake Lamp ON and OFF with a scan tool, the test lamp should turn ON and OFF when changing between the commanded states.
 - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
 - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
5. If all circuits test normal, test or replace the E5 tail lamp.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Tail Lamp Replacement**
- **Control Module References** for BCM replacement, setup and programming

DTC B3883

Diagnostic Instructions

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

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- 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 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
License Plate Lamp Control	B3883 02	B3883 04	1	-
1. License Plate Lamps Always ON				

Circuit/System Description

The headlamp switch is supplied with ground at all times. When the headlamp switch is placed in either the park or low beam position, the BCM responds by applying battery voltage to the license plate lamp control circuit. This energizes the left and right license lamp.

Conditions for Running the DTC

Headlamp switch in park or low beam position.

Conditions for Setting the DTC

B3883 02

The BCM detects a short to ground on the license plate lamp control circuit.

B3883 04

The BCM detects an open/high resistance on the license plate lamp control circuit.

Action Taken When the DTC Sets

The license plate lamps will be inoperative.

Conditions for Clearing the DTC

- The DTC will be current for as long as the fault is present.

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- When the fault is no longer present, the DTC will be a history DTC.
- A history DTC will clear after 50 ignition cycles.

Reference Information

Schematic Reference

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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

Ignition ON, command the License Plate Lamps ON and OFF with a scan tool. The license plate lamps should turn ON and OFF when changing between the commanded states.

Circuit/System Testing

1. Ignition OFF, disconnect the X902 inline harness connector.
2. Test for less than 10 ohms between the ground circuit terminal 15 and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Connect a test lamp between the control circuit terminal 1 and ground.
4. Ignition ON, command the license plate lamps ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the selected states.
 - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
 - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.

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5. If all circuits test normal, test or replace the E7L license plate lamp-left or E7R license plate lamp-right.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Liftgate Center Appli ue Replacement**
- **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 Descriptors

DTC B3884 02

Center High Mounted Brake Lamp Circuit Short to Ground

DTC B3884 04

Center High Mounted Brake Lamp Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Center High Mounted Brake Lamp Control	B3884 02	B3884 04	1	B0655 5A
Center High Mounted Brake Lamp Ground	-	B3884 04	-	-
1. Center High Mounted Brake Lamp Always ON				

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 to the body control module (BCM). The BCM will apply battery voltage to the right, left and center stop lamp control circuits.

Conditions for Running the DTC

The brakes are applied.

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Conditions for Setting the DTC

B 4 02

The BCM detects a short to ground on the center high mounted brake lamp control circuit

B 4 04

The BCM detects an open/high resistance on the center high mounted brake lamp control circuit

Action Taken When the DTC Sets

The center high mounted brake lamp will not illuminate.

Conditions for Clearing the DTC

- The DTC will be current for as long as the fault is present.
- When the fault is no longer present, the DTC will be a history DTC.
- A history DTC will clear after 50 ignition cycles.

Reference Information

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Description and Operation

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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

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Ignition ON, command the E6 center high mounted stop lamp ON and OFF by applying and releasing the brake pedal. The E6 center high mounted stop lamp should turn ON and OFF each time the brake pedal is applied and released.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the E6 center high mounted stop lamp.
2. Test for less than 30 ohms between the ground circuit terminal B and ground.
 - o If greater than the specified value, test the ground circuit for an open/high resistance.
3. Connect a test lamp between the control circuit terminal A and ground.
4. Ignition ON, command the center high mounted stop lamp ON and OFF by applying and releasing the brake pedal. The test lamp should turn ON and OFF when changing between the selected states.
 - o If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
 - o If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
5. If all circuits test normal, replace the E6 center high mounted stop lamp.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **High Mount Stop Lamp Replacement**
- **Control Module References** for BCM replacement, setup and programming

DTC B 5 OR B 6

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 B 5 02

Trailer Left Tail Lamp Circuit Short to Ground

DTC B 5 04

Trailer Left Tail Lamp Circuit Open

DTC B 6 02

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Trailer Right Tail Lamp Circuit Short to Ground

DTC B 6 04

Trailer Right Tail Lamp Circuit Open

Diagnostic Fault Information

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

Circuit/System Description

The trailer brake control module will receive a serial data message from the body control module (BCM) indicating that the vehicle park lamps have been activated. The trailer brake control module will then apply system voltage to the trailer tail lamps through their respective voltage supply circuits.

Conditions for Running the DTC

When the parking lamps are turned on.

Conditions for Setting the DTC

B 5 02 or B 6 02

The trailer brake control module detects a short to ground on the appropriate tail lamp control circuit.

B 5 04 or B 6 04

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

Action Taken When the DTC Sets

The appropriate trailer tail lamp will be inoperative.

Conditions for Clearing the DTC

- The DTC will be current for as long as the fault is present.
- When the fault is no longer present, the DTC will be a history DTC.
- A history DTC will clear after 40 ignition cycles.

Reference Information

Schematic Reference

Trailer Connector/Provision 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**

Ignition ON, observe the function of the left trailer tail lamp and the right trailer tail lamp while commanding the Left Trailer Tail Lamp and the Right Trailer Tail Lamp ON and OFF with a scan tool. The left trailer tail lamp and the right trailer tail lamp should turn ON and OFF while changing between the commanded states.

Circuit/System Testing

1. Ignition OFF, disconnect the X1 harness connector at the K68 trailer lighting control module.
2. Test for infinite resistance between the control circuit terminal listed below and ground:
 - Right trailer park lamp control terminal 16
 - Left trailer park lamp control terminal 4
 - If less than the specified value, test the control circuit for a short to ground. If the circuit tests normal, replace the X88 trailer connector.
3. Test for less than 1 ohms between the control circuit terminals listed below:
 - Control terminal 16 at the K68 trailer lighting control module and control terminal 5 at the X88 trailer connector.
 - Control terminal 4 at the K68 trailer lighting control module and control terminal 7 at the X88 trailer connector.
 - If greater than the specified range, test the control circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the X88 trailer connector.
4. If all the circuits test normal, replace the K68 trailer lighting control module.

Repair Procedures

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Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

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

DTC B 7 OR B WITH U4G

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 B 7 02

Trailer Left Turn Signal Circuit Short to Ground

DTC B 7 04

Trailer Left Turn Signal Circuit Open

DTC B 02

Trailer Right Turn Signal Circuit Short to Ground

DTC B 04

Trailer Right Turn Signal Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Trailer Left Turn Signal	B3887 02	B3887 04	1	-
Trailer Right Turn Signal	B3888 02	B3888 04	2	-
1. Left Trailer Turn Signal Lamp Always On				
2. Right Trailer Turn Signal Lamp Always On				

Circuit/System Description

The trailer brake control module will receive a serial data message from the BCM indicating that the vehicle left turn signal lamp or the right turn signal lamp has been activated. The trailer brake control module will then apply a pulsating voltage to the appropriate trailer turn signal lamps through their respective voltage supply circuits.

Conditions for Running the DTC

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When the trailer left turn lamp or right turn lamp is being actively commanded by the trailer brake control module.

Conditions for Setting the DTC

B 7 02 or B 02

The trailer brake control module detects a short to ground on the appropriate turn signal control circuit.

B 7 04 or B 04

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

Action Taken When the DTC Sets

The appropriate trailer turn signal lamp will be inoperative.

Conditions for Clearing the DTC

- The DTC will be current for as long as the fault is present.
- When the fault is no longer present, the DTC will be a history DTC.
- A history DTC will clear after 40 ignition cycles.

Reference Information

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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 Verification

Ignition ON, observe the function of the left trailer turn signal lamp and the right trailer turn signal lamp while commanding the Left Trailer Turn Signal Lamp and the Right Trailer Turn Signal Lamp ON and OFF with a scan tool. The left trailer turn signal lamp and the right trailer turn signal lamp should turn ON and OFF while changing between the commanded states.

Circuit/System Testing

1. Ignition OFF, disconnect the X1 harness connector at the K68 trailer lighting control module.
2. Test for infinite resistance between the control circuit terminal listed below and ground:
 - Right trailer turn signal lamp control terminal 2
 - Left trailer turn signal lamp control terminal 17
 - If less than the specified value, test the control circuit for a short to ground. If the circuit tests normal, replace the X88 trailer connector.
3. Test for less than 1 ohms between the control circuit terminals listed below:
 - Control terminal 2 at the K68 trailer lighting control module and control terminal 4 at the X88 trailer connector.
 - Control terminal 17 at the K68 trailer lighting control module and control terminal 1 at the X88 trailer connector.
 - If greater than the specified range, test the control circuit for a short to voltage or an open/high resistance.
4. If all the circuits test normal, replace the K68 trailer lighting control module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

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

DTC B 7 OR B WITHOUT U4G

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 B 7 02

Trailer Left Turn Signal Circuit Short to Ground

DTC B 7 04

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Trailer Left Turn Signal Circuit Open

DTC B 02

Trailer Right Turn Signal Circuit Short to Ground

DTC B 04

Trailer Right Turn Signal Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Left Trailer Turn Signal Lamp Control	B3887 02	B3887 04	1	-
Right Trailer Turn Signal Lamp Control	B3888 02	B3888 04	2	-
1. Left Trailer Turn Signal Lamp Inoperative 2. Right Trailer Turn Signal Lamp Inoperative				

Circuit/System Description

When the appropriate turn signals are activated, the BCM will apply a pulsating ground to the appropriate trailer stop/turn signal lamp relay.

Conditions for Running the DTC

The system voltage is 9-16 V.

Conditions for Setting the DTC

B 7 02 or B 02

The BCM detects a short to ground on the appropriate trailer turn signal control circuit.

B 7 04 or B 04

The BCM detects an open/high resistance on the appropriate trailer turn signal control circuit

Action Taken When the DTC Sets

The appropriate trailer turn signal lamp will be inoperative.

Conditions for Clearing the DTC

- The DTC will be current for as long as the fault is present.

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- When the fault is no longer present, the DTC will be a history DTC.
- A history DTC will clear after 40 ignition cycles.

Reference Information

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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

Ignition ON, observe the function of the left trailer turn signal lamp and the right trailer turn signal lamp while commanding the Left Trailer Turn Signal Lamp and the Right Trailer Turn Signal Lamp ON and OFF with a scan tool. The left trailer turn signal lamp and the right trailer turn signal lamp should turn ON and OFF while changing between the commanded states.

Circuit/System Testing

1. Ignition OFF, disconnect the X5 harness connector at the K9 BCM.
2. Ignition ON, test for greater than 10 V between the control circuit terminal listed below and ground:
 - Right trailer turn signal lamp control terminal 17
 - Left trailer turn signal lamp control terminal 8
 - If less than the specified value, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the X50 A fuse block-underhood.
3. If all the circuits test normal, replace the K9 BCM.

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Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Fuse Block Replacement**
- **Control Module References** for BCM replacement, programming and setup

DTC B 9

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 B 9 02

Trailer Brake Lamps Circuit Short to Ground

DTC B 9 04

Trailer Brake Lamps Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Trailer Stop Lamps Control	B3889 02	B3889 04	1	-
1. Trailer Stop Lamps Always ON				

Circuit/System Description

The trailer brake control module will receive a serial data message from the BCM indicating that the vehicle brake lamps have been activated. The trailer brake control module will then apply system voltage to the trailer stop lamps through their respective voltage supply circuits.

Conditions for Running the DTC

When the brake pedal is pressed.

Conditions for Setting the DTC

B 9 02

The trailer brake control module detects a short to ground on the trailer stop lamp control circuit.

B 9 04

The trailer brake control module detects an open/high resistance on the trailer stop lamp control circuit.

Action Taken When the DTC Sets

The trailer brake lamps will be inoperative.

Conditions for Clearing the DTC

- The DTC will be current for as long as the fault is present.
- When the fault is no longer present, the DTC will be a history DTC.
- A history DTC will clear after 40 ignition cycles.

Reference Information**Schematic Reference****Trailer Connector/Pro vision 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**

Ignition ON, observe the function of the trailer stop lamps while commanding the Trailer Stop Lamp ON and OFF with a scan tool. The trailer stop lamps should turn ON and OFF while changing between the commanded states.

Circuit/System Testing

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1. Ignition OFF, disconnect the X1 harness connector at the K68 trailer lighting control module.
2. Test for infinite resistance between the control circuit terminal 10 and ground.
 - If less than the specified value, test the control circuit for a short to ground. If the circuit tests normal, replace the X88 trailer connector.
3. Test for less than 1 ohms between the control circuit terminal 10 at the K68 trailer lighting control module and control circuit terminal 6 at the X88 trailer connector.
 - If greater than the specified range, test the control circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the X88 trailer connector.
4. If all the circuits test normal, replace the K68 trailer lighting control module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

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

DTC B A

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 B A 01

Trailer Park Lamps Circuit Short to Battery

DTC B A 02

Trailer Park Lamps Circuit Short to Ground

DTC B A 04

Trailer Park Lamps Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Trailer Park Lamp Relay B+	B388A 04	B388A 04	-	-
Park Lamp Supply Voltage/Marker Lamp Supply Voltage	B388A 02	B388A 04	B388A 01	-

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Circuit/System Description

The trailer park lamp relay is supplied with battery voltage at all times. The trailer park lamp signal circuit is grounded by turning the headlamp switch. The body control module (BCM) energizes the trailer park lamp relay by applying ground to the trailer park lamp relay control circuit. When the trailer park lamp relay is energized, the relay switch contacts close and battery voltage is applied through the trailer park lamp relay fuse to the trailer park lamp supply voltage circuit which illuminates the trailer park lamps if a trailer is connected.

Conditions for Running the DTC

When the trailer park lamp relay is actively being requested by the BCM.

Conditions for Setting the DTC

B A 01

The BCM detects a short to voltage on the park lamp supply voltage/marker lamp supply voltage circuit.

B A 02

The BCM detects a short to ground on the park lamp supply voltage/marker lamp supply voltage circuit

B A 04

The BCM detects an open/high resistance on the park lamp supply voltage/marker lamp supply voltage circuit

Action Taken When the DTC Sets

B A 01 or B A 04

The trailer park lamps are inoperative

B A 02

The trailer park lamps are always ON

Conditions for Clearing the DTC

- The DTC will be current for as long as the fault is present.
- When the fault is no longer present, the DTC will be a history DTC.
- A history DTC will clear after 40 ignition cycles.

Reference Information

Schematic Reference

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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 Verification**

Ignition ON, observe the function of the trailer tail lamps while commanding the Trailer Park Lamps ON and OFF with a scan tool. The trailer tail lamps should turn ON and OFF while changing between the commanded states.

Circuit/System Testing

1. Ignition OFF, disconnect the trailer park lamp relay.
2. Ignition ON, verify a test lamp illuminates between the B+ circuit terminal 86 and ground.
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance.
3. Connect a test lamp between the control circuit terminal 85 and the B+ circuit terminal 86.
4. Command the Trailer Park Lamps ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the commanded states.
 - If the test lamp is always OFF, test the control circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
 - If the test lamp is always ON, test the control circuit for a short to ground. If the circuit tests normal, replace the K9 BCM
5. If all circuits test normal, test or replace the trailer park lamp relay.

Component Testing**Relay Test**

1. Ignition OFF, disconnect the trailer park lamp relay.

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2. Test for 60-180 ohms between terminals 85 and 86.
 - If not within the specified range, replace the trailer park lamp relay.
3. Test for infinite resistance between the following terminals:
 - 30 and 86
 - 30 and 87
 - 30 and 85
 - 85 and 87
 - If not the specified value, replace the trailer park lamp relay.
4. Install a 5 A fused jumper wire between relay terminal 85 and 12 V. Install a jumper wire between relay terminal 86 and ground. Test for less than 2 ohms between terminals 30 and 87.
 - If greater than the specified range, replace the trailer park lamp relay.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Relay Replacement Attached to Wire Harness** or **Relay Replacement Within an Electrical Center**
- **Control Module References** for BCM replacement, programming and setup

DTC B 90

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 B 90 02

Trailer Backup Lamps Circuit Short to Ground

DTC B 90 04

Trailer Backup Lamps Circuit Open

Diagnostic Fault Information

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

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Circuit/System Description

The trailer brake control module will receive a serial data message from the BCM indicating that the vehicle backup lamps have been activated. The trailer brake control module will then apply system voltage to the trailer backup lamps through their respective voltage supply circuits.

Conditions for Running the DTC

When the trailer backup lamps are turned on.

Conditions for Setting the DTC

B 90 02

The trailer brake control module detects a short to ground on the trailer backup lamp control circuit.

B 90 04

The trailer brake control module detects an open/high resistance on the trailer backup lamp control circuit.

Action Taken When the DTC Sets

The trailer backup lamps will be inoperative.

Conditions for Clearing the DTC

- The DTC will be current for as long as the fault is present.
- When the fault is no longer present, the DTC will be a history DTC.
- A history DTC will clear after 40 ignition cycles.

Reference Information

Schematic Reference

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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 Verification

Ignition ON, observe the function of the trailer backup lamps while commanding the Trailer Backup Lamp ON and OFF with a scan tool. The trailer backup lamps should turn ON and OFF while changing between the commanded states.

Circuit/System Testing

1. Ignition OFF, disconnect the X1 harness connector at the K68 trailer lighting control module.
2. Test for infinite resistance between the control circuit terminal 7 and ground.
 - If less than the specified value, test the control circuit for a short to ground. If the circuit tests normal, replace the X88 trailer connector.
3. Test for less than 1 ohms between the control circuit terminal 7 at the K68 trailer lighting control module and control circuit terminal 8 at the X88 trailer connector.
 - If greater than the specified range, test the control circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the X88 trailer connector.
4. If all the circuits test normal, replace the K68 trailer lighting control module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

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

DTC B 91**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 B 91 02**

Trailer Fog Lamps Circuit Short to Ground

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DTC B 91 04

Trailer Fog Lamps Circuit Open

Diagnostic Fault Information

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

Circuit/System Description

The trailer brake control module will receive a serial data message from the BCM indicating that the vehicle rear fog lamps have been activated. The trailer brake control module will then apply system voltage to the trailer fog lamps through their respective voltage supply circuits.

Conditions for Running the DTC

When the trailer fog lamps are turned on.

Conditions for Setting the DTC

B 91 02

The trailer brake control module detects a short to ground on the trailer fog lamp control circuit.

B 91 04

The trailer brake control module detects an open/high resistance on the trailer fog lamp control circuit.

Action Taken When the DTC Sets

The trailer fog lamps will be inoperative.

Conditions for Clearing the DTC

- The DTC will be current for as long as the fault is present.
- When the fault is no longer present, the DTC will be a history DTC.
- A history DTC will clear after 40 ignition cycles.

Reference Information

Schematic Reference

Trailer Connector/Pro vision 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**

Ignition ON, observe the function of the trailer fog lamps while commanding the Trailer Fog Lamp ON and OFF with a scan tool. The trailer fog lamps should turn ON and OFF while changing between the commanded states.

Circuit/System Testing

1. Ignition OFF, disconnect the X1 harness connector at the K68 trailer lighting control module.
2. Test for infinite resistance between the control circuit terminal 8 and ground.
 - If less than the specified value, test the control circuit for a short to ground. If the circuit tests normal, replace the X88 trailer connector.
3. Test for less than 1 ohms between the control circuit terminal 8 at the K68 trailer lighting control module and control circuit terminal 2 at the X88 trailer connector.
 - If greater than the specified range, test the control circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the X88 trailer connector.
4. If all the circuits test normal, replace the K68 trailer lighting control module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

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

DTC B 94 OR B 949**Diagnostic Instructions**

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- 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 B 94 02

Left Front Turn Signal Circuit Short to Ground

DTC B 949 02

Right Front Turn Signal Circuit Short to Ground

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Left Front Turn Signal Lamp Control	B3948 02	1	2	-
Right Front Turn Signal Lamp Control	B3949 02	1	2	-
Left Repeater Lamp Control	B3948 02	1	2	-
Right Repeater Lamp Control	B3949 02	1	2	-
Left Tail Lamp Ground	-	1	-	-
Right Tail Lamp Ground	-	1	-	-
1. Turn Signal Lamps Inoperative 2. Turn Signal Lamps Always ON				

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 position. 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 through either the right turn or left turn signal switch signal circuit. The BCM then applies a pulsating voltage to the front and rear turn signal lamps through there respective voltage supply circuits. When a turn signal request is received by the BCM, a serial data message is sent to the instrument cluster requesting the respective turn signal indicator be pulsed ON and OFF.

Conditions for Running the DTC

When the appropriate turn signal is commanded

Conditions for Setting the DTC

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

B3949 02

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

Action Taken When the DTC Sets

The appropriate turn signal lamp is inoperative.

Conditions for Clearing the DTC

- The DTC will be current for as long as the fault is present.
- When the fault is no longer present, the DTC will be a history DTC.
- A history DTC will clear after 50 ignition cycles.

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, with the turn signal switch in the left position, observe the function of the E4LF turn signal lamp-left front and the E4Y turn signal repeater lamp-left. Each lamp should flash ON and OFF.
2. With the turn signal switch in the right position, observe the function of the E4RF turn signal lamp-right

front and the E4Z turn signal repeater lamp-right. Each lamp should flash ON and OFF.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the appropriate turn signal lamp.
2. Test for less than 30 ohms between the ground circuit terminal listed below and ground.
 - E4Y turn signal repeater lamp-left terminal 2
 - E4Z turn signal repeater lamp-right terminal 2
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Disconnect the inline harness connector at the appropriate E4LF turn signal lamp-front listed below:
 - E4LF turn signal lamp-left front X115 (Without TT6/TT7/TT8)
 - E4LF turn signal lamp-left front X111 (With TT6/TT7/TT8)
 - E4RF turn signal lamp-right front X116 (Without TT6/TT7/TT8)
 - E4RF turn signal lamp-right front X112 (With TT6/TT7/TT8)
4. Connect a test lamp between the control circuit terminal listed below and ground.
 - E4LF turn signal lamp-left front terminal J
 - E4RF turn signal lamp-right front terminal J
 - E4Y turn signal repeater lamp-left terminal 1
 - E4Z turn signal repeater lamp-right terminal 1
5. Command the appropriate Turn Signal Lamp ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the commanded states.
 - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
 - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
6. If all circuits test normal, replace the turn signal lamp.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Front Side Turn Signal Lamp Bulb Replacement**
- **Front Turn Signal Lamp Bulb Replacement (T84, T85 Driver Side Headlamp)** or **Front Turn Signal Lamp Bulb Replacement (T84, T85 Passenger Side Headlamp)** or **Front Turn Signal Lamp Bulb Replacement (TT6,TT7,TT8 Passenger Side Headlamp)** or **Front Turn Signal Lamp Bulb Replacement (TT6,TT7,TT8 Driver Side Headlamp)**
- **Control Module References** for BCM replacement, setup and programming

DTC B3950 OR B3951

Diagnostic Instructions

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

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

DTC Descriptor

DTC B3950 02

Left Rear Turn Signal Circuit Short to Ground

DTC B3951 02

Right Rear Turn Signal Circuit Short to Ground

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
BCM B+	B2545 01, B2545 04, B3950 01, B3950 04	B2545 01, B2545 04, B3950 01, B3950 04	-	-
Left Rear Turn Signal Lamp Supply Voltage	B3950 02	2	1	-
Right Rear Turn Signal Lamp Supply Voltage	B3951 02	2	1	-
1. Rear Turn Signal Lamp Always ON 2. Rear Turn Signal Lamp Always OFF				

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 position. 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 through either the right turn or left turn signal switch signal circuit. The BCM then applies a pulsating voltage to the front and rear turn signal lamps through their respective voltage supply circuits. When a turn signal request is received by the BCM, a serial data message is sent to the instrument cluster requesting the respective turn signal indicator be pulsed ON and OFF.

Conditions for Running the DTC

The appropriate turn signal is active

Conditions for Setting the DTC

The BCM detects a short to ground on the rear turn signal control circuit

Action Taken When the DTC Sets

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The appropriate rear turn signal will be inoperative.

Conditions for Clearing the DTC

- The DTC will be current for as long as the fault is present.
- When the fault is no longer present, the DTC will be a history DTC.
- A history DTC will clear after 50 ignition cycles.

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

Circuit/System Verification

1. Ignition ON, command the Left Rear Turn Signal Lamp ON and OFF with a scan tool. The left rear turn signal lamp should turn ON and OFF when changing between the commanded states.
2. Command the Right Rear Turn Signal Lamp ON and OFF with a scan tool. The right rear turn signal lamp should turn ON and OFF when changing between the commanded states.

Circuit/System Testing

1. Ignition OFF, disconnect the X2 harness connector K9 BCM.
2. Ignition ON, verify that a test lamp illuminates between the B+ circuit terminal 1 and ground.
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance

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3. Ignition OFF, connect the X2 harness connector K9 BCM.
4. Ignition OFF, disconnect the X2 harness connector at the appropriate E4 turn signal lamp-rear.
5. Test for less than 30 ohms between the ground circuit terminal 1 and ground.
 - o If greater than the specified value, test the ground circuit for an open/high resistance.
6. Connect a test lamp between the control circuit terminal 3 and ground.
7. Command the appropriate Rear Turn Signal Lamp ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the commanded states.
 - o If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
 - o If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
8. If all the circuits test normal, replace the bulb or E4 turn signal lamp-rear.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **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 Short to Ground or 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

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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

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
5 V Reference	C0277 06, C0890 03	C0277 06	C0277 07, C0890 07	-
Signal	C0277 06, C0890 03	C0277 06	C0277 07, C0890 07	C0277 09
Low Reference	-	C0277 07	-	-

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 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 stop lamp control circuit and center high mounted stop lamp control circuit. When the control circuit is energized the stop lamps are illuminated.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V
- Brakes applied

Conditions for Setting the DTC

C0277 06 or C0890 03

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

C0277 07 or C0890 07

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

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C0277 09

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

C0277 4B

The brake pedal position sensor home position is not learned.

Action Taken When the DTC Sets

Brake lights will malfunction, the shift lock is inoperative, the service park brake system lamp illuminated in IPC, park brake will set but not disengage

Conditions for Clearing the DTC

- The DTC will be current for as long as the fault is present.
- When the fault is no longer present, the DTC will be a history DTC.
- A history DTC will clear after 50 ignition cycles.

Diagnostic Aids

C0277 4B

If the DTC is set, recalibrate the brake pedal position sensor.

C0277 09

If the DTC is set, replace the brake pedal position sensor. If the DTC resets, replace the BCM.

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

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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

C0277 06, C0277 07, C0890 03, C0890 07

1. Ignition OFF, disconnect the harness connector at the B22 brake pedal position sensor.
2. Ignition OFF, test for less than 60 ohms between the low reference circuit terminal C and ground.
 - If greater than the specified range, test the low reference circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
3. Ignition ON, test for 4.8-5.2 V between the 5 V reference circuit terminal A and ground.
 - If less than the specified range, test the 5 V reference circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
 - If greater than the specified range, test the 5 V reference circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
4. Verify that the scan tool Brake Pedal Position Sensor parameter is less than 0.3 V.
 - If greater than the specified range, test the signal circuit terminal B for a short to voltage. If the circuit tests normal, replace the K9 BCM.
5. Connect a 3 A fused jumper wire between the 5 V reference circuit terminal A and the signal circuit terminal B. Verify that the scan tool Brake Pedal Position Sensor parameter is 4.8-5.2 V.
 - If less than the specified range, test the signal circuit for short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
6. If all circuits test normal, test or replace the B22 brake pedal position sensor.

C0277 09

1. Replace the B22 BPP sensor.
2. Perform the BPP sensor recalibration procedure. Refer to Brake Pedal Position Sensor Calibration.
3. Operate the vehicle within the Conditions for Running and Setting the DTC and verify the DTC does not reset.
 - If the DTC resets, replace the K9 BCM.

C0277 4B

1. Verify that the DTC sets under the Conditions for Running and Setting.
2. Perform the BPP sensor recalibration procedure. Refer to Brake Pedal Position Sensor Calibration.
3. Operate the vehicle within the conditions that the customer experienced and verify the DTC does not reset.

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- If the DTC resets, replace the B22 BPP sensor.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **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 Descriptor

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
Cruise/ETC/TCC Brake Signal	C0297 02, P0572	P0572	P0573	-

Circuit/System Description

The stop lamp switch signal circuit is a B+ input from the body control module (BCM) to the engine control module (ECM). The ECM monitors the stop lamp switch circuit to detect when the brake pedal has been applied. The BCM monitors the brake pedal position sensor to determine when the brake pedal is applied. When the brake pedal is applied, the BCM supplies 12V on the stop lamp switch signal circuit and also sends a serial data message to the ECM indicating that the brake pedal has been applied.

Conditions for Setting the DTC

The BCM detects a short to ground on the cruise/ETC/TCC brake signal circuit.

Action Taken When the DTC Sets

The cruise control system is disabled

Conditions for Clearing the DTC

- The DTC will be current for as long as the fault is present.
- When the fault is no longer present, the DTC will be a history DTC.
- A history DTC will clear after 50 ignition cycles.

Reference Information**Schematic Reference****Cruise Control 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 (LF1) or X2 (LAU) harness connector at the K20 ECM.
2. Connect a test lamp between the signal circuit terminal listed below and ground:
 - Terminal 57 (LF1)
 - Terminal 52 (LAU)
3. Ignition ON, observe the function of the test lamp while pressing and releasing the brake pedal. The test lamp should turn ON when the brake pedal is pressed and turn OFF when the brake pedal is released.
 - If the test lamp is always ON, test the signal circuit for a short to voltage.
 - If the test lamp is always OFF, test the signal circuit for a short to ground or an open/high resistance.
4. If all circuits test normal, replace the K9 BCM.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for BCM replacement, setup and programming

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**
- **Front Fog Lamps Malfunction**
- **Hazard Lamps Malfunction**
- **Headlamps Malfunction**
- **Headlamp Leveling Malfunction (RPO T or T) or Headlamp Leveling Malfunction (RPO TT TT or TT)**
- **High Intensity Discharge Lamp Malfunction**

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- Interior Accent Lighting Malfunction
- Interior Backlighting Malfunction
- Park License and/or Tail Lamps Malfunction
- Rear Fog Lamps 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
Headlight Leveling Control Module B+	1	1	-	-
Headlamp Leveling Sensor 5V Reference - Front	B3415 02	1	B3415 01	-
Headlamp Leveling Sensor 5V Reference - Rear	B3415 02	1	B3415 01	-
Headlamp Leveling Sensor Signal - Front	B3410 06	B3410 06	B3410 01	-
Headlamp Leveling Sensor Signal - Rear	B3420 06	B3420 06	B3420 01	-
Headlamp Leveling Sensor Low Reference - Front	-	B3410 06	-	-
Headlamp Leveling Sensor Low Reference - Rear	-	B3415 02	-	-
Left Headlamp Ground	-	U1511 00, U1521 00	-	-
Right Headlamp Ground	-	U1512 00, U1522 00	-	-
1. All Headlamp Leveling Actuators 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, transmission control module, electronic brake control module, 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, disconnect the inline harness connector listed below:
 - M29L headlamp leveling actuator-left inline harness connector X111
 - M29R headlamp leveling actuator-right inline harness connector X112
2. Test for less than 30 ohms between the ground circuit terminal A and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Engine running, test for less than 30 ohms between the ground circuit terminal E and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance. If the circuit tests normal, replace the K28 headlamp leveling control module.

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4. Verify that a test lamp illuminates between the control circuit terminal D and ground.
 - If the test lamp does not illuminate, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K28 headlamp leveling control module.
5. Test for 4.25 V-5.25 V between the signal circuit terminal M and ground.
 - If less than the specified range, test the signal circuit for short to ground or an open/high resistance. If the circuit tests normal, replace the K28 headlamp leveling control module.
 - If greater than the specified range, test the signal circuit for a short to voltage. If the circuit tests normal, replace the K28 headlamp leveling control module.
6. If all circuits test normal, test or replace the M29 headlamp leveling actuator

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Headlamp Replacement**
- **Control Module References** for headlamp leveling control module replacement, setup, and programming

BAC UP 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 B+	1, 2	1, 2	-	-
Backup Lamp Supply Voltage	B2545 02	B2545 04	B2545 01	-
Left Backup Lamp Ground	-	1	-	-
Right Backup Lamp Ground	-	2	-	-
1. Left Backup Lamp Inoperative 2. Right Backup Lamp Inoperative				

Circuit/System Description

When the engine is running and the transmission is placed in reverse gear, the transmission control module 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. Once the driver moves the gear selector out of the reverse position, a message is sent by the transmission control module via serial data requesting the BCM to remove battery voltage from the backup lamp signal circuit. The BCM will not apply battery voltage to the backup lamps if the engine is not running.

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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 Verification

Engine running, command the Backup Lamps ON and OFF with a scan tool. The E5A backup lamp-left and the E5B backup lamp-right should turn ON and OFF when changing between the commanded states.

- If the E5A backup lamp-left or the E5B backup lamp-right is always OFF, inspect for a burned out bulb or corrosion of the bulb sockets.
- If the E5A backup lamp-left and the E5B backup lamp-right are always OFF or always ON, perform the Circuit/System Testing.

Circuit/System Testing

1. Ignition OFF, disconnect the X2 harness connector K9 BCM.
2. Ignition ON, verify that a test lamp illuminates between the B+ circuit terminal 1 and ground.
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance.
3. Ignition OFF, connect the X2 harness connector K9 BCM
4. Disconnect the harness connector at the E5A backup lamp listed below:
 - X3 harness connector E5E tail lamp-left (Without T79)

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- X1 harness connector E5E tail lamp-left (With T79)
 - X3 harness connector E5F tail lamp-right (Without T79)
 - X1 harness connector E5F tail lamp-right (With T79)
5. Test for less than 30 ohms between the ground circuit terminal listed below and ground.
 - E5E tail lamp-left (Without T79) ground terminal 2
 - E5E tail lamp-left (With T79) ground terminal C
 - E5F tail lamp-right (Without T79) ground terminal 2
 - E5F tail lamp-right (With T79) ground terminal C
 - If greater than the specified range, test the ground circuit for an open/high resistance.
 6. Connect a test lamp between the control circuit terminal listed below and ground:
 - E5E tail lamp-left (Without T79) control terminal 1
 - E5E tail lamp-left (With T79) control terminal D
 - E5F tail lamp-right (Without T79) control terminal 1
 - E5F tail lamp-right (With T79) control terminal D
 7. Engine running, command the Backup Lamps ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the selected states.
 - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
 - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
 8. If all circuits test normal, test or replace the E5A backup lamp-left and the E5B backup lamp-right.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Backup Lamp Bulb Replacement**
- **Control Module References** for BCM replacement, setup and programming

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
Dome/Courtesy Lamp Control	B2615 02	2	1	-

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Courtesy Lamp Control	-	2	-	-
1. Dome/Courtesy Lamps Always Illuminated 2. Dome/Courtesy Lamps do Not Illuminate				

Circuit/System Description

Battery voltage for the courtesy lamps is supplied at all times to the body control module (BCM). When the BCM receives a signal to command the courtesy lamps ON, it then applies voltage through the dome/courtesy lamps control circuit to the courtesy lamps.

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, observe the scan tool Door Ajar Switch parameter while opening and closing each vehicle door. The parameter should change between Inactive and Active.
 - If the parameter does not change between the selected states, refer to **Door Ajar Indicator Malfunction** .
2. Observe the scan tool Rear Closure Ajar Switch parameter while opening and closing the rear liftgate. The parameter should change between Active and Inactive.
 - If the parameter does not change between the selected states, refer to **Liftgate Ajar Indicator Malfunction (Manual Liftgate)** or **Liftgate Ajar Indicator Malfunction (Power Liftgate)** .

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3. Cycle the dome lamp switch while observing the scan tool Interior/Courtesy Lighting Master Switch parameter. The parameter should change between Cancel, ON and Door.
 - If the parameter does not change, refer to Dome Lamp Switch Malfunction below.
4. Command the Courtesy Lamps ON and OFF with a scan tool. The courtesy lamps should turn ON and OFF when changing between the commanded states.
 - If the courtesy lamps do not turn ON and OFF when changing between the commanded states, refer to Courtesy Lamp Malfunction below.
5. Command the Courtesy Lamps ON and OFF with a scan tool. The reading lamps should turn ON and OFF while changing between the commanded states.
 - If the reading lamps do not turn ON and OFF when changing between the commanded states, refer to Reading Lamp Malfunction below.
6. Command the Cargo Lamp ON and OFF with a scan tool. The cargo lamps should turn ON and OFF while changing between the commanded states.
 - If the cargo lamps do not turn ON and OFF when changing between the commanded states, refer to Cargo Lamp Malfunction below.
7. Turn the sunshade lamp ON and OFF by using the sunshade lamp switch. The sunshade lamp should turn ON and OFF while changing between the selected states.
 - If the sunshade lamp does not turn ON and OFF when changing between the selected states, refer to Sunshade Illumination Malfunction below.
8. Turn the instrument panel compartment lamp ON and OFF by using the instrument panel compartment lamp switch. The instrument panel compartment lamp should turn ON and OFF while changing between the selected states.
 - If the instrument panel compartment lamp does not turn ON and OFF when changing between the selected states, refer to Instrument Panel Compartment Lamp Malfunction below.

Circuit/System Testing

Dome Lamp Switch Malfunction

1. Ignition OFF, disconnect the harness connector at the S12 dome lamp switch.
2. Scan tool disconnected, doors CLOSED, interior lamps OFF, test for less than 30 ohms between the ground circuit terminal 1 and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Ignition ON, verify the scan tool Interior/Courtesy Lighting Master Switch parameter is Door.
 - If not the specified value, test the signal circuit terminal 2 for a short to ground. If the circuit tests normal, replace the K9 BCM.
4. Verify the scan tool Interior/Courtesy Lighting Master Switch parameter is Door.
 - If not the specified value, test the signal circuit terminal 3 for a short to ground. If the circuit tests normal, replace the K9 BCM.
5. Connect a 3 A fused jumper wire between the signal circuit terminal 2 and ground. Verify the scan tool Interior/Courtesy Lighting Master Switch parameter is Cancel.
 - If not the specified value, test the signal circuit for a short to B+ or an open/high resistance. If the circuit tests normal, replace the K9 BCM.

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6. Connect a 3 A fused jumper wire between the signal circuit terminal 3 and ground. Verify the scan tool Interior/Courtesy Lighting Master Switch parameter is On.
 - If not the specified value, test the signal circuit for a short to B+ or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
7. If all circuits test normal, replace the S12 dome lamp switch.

Courtesy Lamp Malfunction

1. Disconnect the harness connector at the appropriate courtesy lamp.
2. Ignition OFF, scan tool OFF, doors CLOSED, interior lamps OFF, test for less than 5.0 ohms between the ground circuit terminal listed below and ground:
 - Instrument Panel Courtesy Lamp - terminal 2
 - Door Courtesy Lamp - terminal 2
 - Overhead Console Courtesy/Reading Lamp - terminal 2
 - Rear Courtesy/Reading Lamp - terminal B
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Connect a test lamp between the control circuit terminal listed below and ground:
 - Instrument Panel Courtesy Lamp - terminal 1
 - Door Courtesy Lamp - terminal 1
 - Overhead Console Courtesy/Reading Lamp - terminal 3
 - Rear Courtesy/Reading Lamp - terminal C
4. Command the Courtesy Lamps ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the commanded states.
 - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
 - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
5. If all circuits test normal, replace the courtesy lamp.

Reading Lamp Malfunction

1. Ignition OFF, disconnect the harness connector at the appropriate reading lamp.
2. Test for less than 5 ohms between the ground circuit terminal listed below and ground.
 - Overhead Console Courtesy/Reading Lamps - terminal 2
 - Rear Courtesy/Reading Lamps - terminal B
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Verify a test lamp illuminates between the control circuit terminal listed below and ground:
 - Overhead Console Courtesy/Reading Lamps - terminal 1
 - Rear Courtesy/Reading Lamps - terminal A
 - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.

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4. If all circuits test normal, test or replace the reading lamp.

Cargo Lamp Malfunction

1. Ignition OFF, disconnect the harness connector at the appropriate cargo lamp.
2. Ignition OFF, scan tool OFF, doors CLOSED, interior lamps OFF, test for less than 5.0 ohms between the ground circuit terminal listed below and ground:
 - Cargo Lamp - terminal 2
 - Liftgate Courtesy Lamp - terminal 2
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Connect a test lamp between the control circuit terminal listed below and ground. The test lamp should turn ON when connected.
 - Cargo Lamp - terminal 1
 - Liftgate Courtesy Lamp - terminal 1
4. Command the Cargo Lamp ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the commanded states.
 - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
 - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
5. If all circuits test normal, replace the cargo lamp.

Sunshade Illumination Malfunction

1. Ignition OFF, disconnect the harness connector at the A3 sunshade.
2. Test for less than 5 ohms between the ground circuit terminal B and ground.
 - If greater than the specified value, test the ground circuit for an open/high resistance.
3. Verify a test lamp illuminates between the control circuit terminal A and ground.
 - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
4. If all circuits test normal, test or replace the A3 sunshade.

Instrument Panel Compartment Lamp Malfunction

1. Ignition OFF, disconnect the harness connector at the E27 instrument panel compartment lamp.
2. Open the instrument panel compartment.
3. Verify that a test lamp illuminates between B+ and the ground circuit terminal 2.
 - If the test lamp does not illuminate, test the ground circuit for an open/high resistance.
4. Verify a test lamp illuminates between the control circuit terminal 1 and ground.
 - If the test lamp does not illuminate, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
5. If all circuits test normal, replace the E27 instrument panel compartment lamp.

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Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- Refer to the appropriate replacement procedure for the lighting component that requires replacement.
- **Dome and Reading Lamp Switch Replacement**
- **Control Module References** for BCM replacement, setup, and programming

DA TIME 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 03	B2645 07	-
Headlamp Switch Park Lamp Signal	2	B257A 00	2	-
Headlamp Switch On Signal	B257A 00	1	1	-
Headlamp Switch Headlamps Off Signal	B257A 00	1	1	-
Left Daytime Running Lamps Control	B2600 02	B2600 04	B2600 01	-
Right Daytime Running Lamps Control	B2605 02	B2605 04	B2605 01	-
Inside Air Temperature Sensor Low Reference	-	B0163 05, B0183 05, B1405 05, B2645 07	-	-
Headlamp Switch Ground	-	1	-	-
1. Headlight Auto Function Only 2. Headlight Auto Function Disabled				

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 1.4-4.5 V depending on outside lighting conditions. The body control module (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 daytime running lights ON. During low light conditions the BCM will command the low beam headlamps ON.

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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

Circuit/System Verification

1. Ignition ON, observe the scan tool Ambient Light Sensor parameter. The reading should be between 1.4-4.5 V and change with ambient light changes.
 - If greater or less than the specified range, refer to Ambient Light Sensor Malfunction below.
2. Observe the scan tool Automatic Headlamp Disable Switch parameter while cycling the headlamp switch between the AUTOMATIC LIGHT and OFF positions. The parameter should cycle between Active and Inactive.
 - If the value does not change, refer to Headlamp Switch Malfunction below.
3. Observe the scan tool Headlamp ON Switch parameter while cycling the headlamp switch between the AUTOMATIC LIGHT and LOW BEAM ON position. The parameter should cycle between Active and Inactive.
 - If the value does not change, refer to Headlamp Switch Malfunction below.
4. Command the Left Dedicated Daytime Running Lamp and the Right Dedicated Daytime Running Lamp ON and OFF with a scan tool. The E4C daytime running lamp - left and the E4D daytime running lamp - right should turn ON and OFF while changing between the commanded states
 - If the E4C daytime running lamp - left and the E4D daytime running lamp - right are always ON or always OFF, refer to Daytime Running Lamp Malfunction below.

Circuit/System Testing

Ambient Light Sensor Malfunction

1. Ignition OFF, disconnect the harness connector at the B10B ambient light/sunload sensor.
2. Test for less than 30 ohms between the low reference circuit terminal 6 and ground.
 - If greater than the specified range, test the low reference circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K33 HVAC control module.
3. Ignition ON, test for 4.8-5.2 V between the signal circuit terminal 5 and ground.
 - If greater than the specified range, test the signal circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
 - If less than the specified range, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
4. If all circuits test normal, replace the B10B ambient light/sunload sensor.

Headlamp Switch Malfunction

1. Ignition OFF, disconnect the harness connector at the S30 headlamp switch.
2. Ignition OFF, test for less than 30 ohms between the ground circuit terminal 6 and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Ignition ON, verify the scan tool Park Lamps Switch parameter is Inactive.
 - If not the specified value, test the signal circuit terminal 3 for a short to ground. If the circuit tests normal, replace the K9 BCM.
4. Install a 3 A fused jumper wire between the signal circuit terminal 3 and the ground circuit terminal 6. Verify the scan tool Park Lamps Switch is Active.
 - If not the specified value, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
5. Verify the scan tool Headlamps On Switch parameter is Inactive.
 - If not the specified value, test the signal circuit terminal 4 for a short to ground. If the circuit tests normal, replace the K9 BCM.
6. Install a 3 A fused jumper wire between the signal circuit terminal 4 and the ground circuit terminal 6. Verify the scan tool Headlamps On Switch is Active.
 - If not the specified value, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
7. Verify the scan tool Automatic Headlamps Disable Switch parameter is Inactive.
 - If not the specified value, test the signal circuit terminal 5 for a short to ground. If the circuit tests normal, replace the K9 BCM.
8. Install a 3 A fused jumper wire between the signal circuit terminal 5 and the ground circuit terminal 6. Verify the scan tool Automatic Headlamps Disable Switch is Active.
 - If not the specified value, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
9. If all circuits test normal, test or replace the S30 headlamp switch.

Daytime Running Lamp Malfunction

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1. Ignition OFF, disconnect the X1 harness connector at the K9 BCM.
2. Ignition ON, verify that a test lamp illuminates between the B+ circuit terminal 3 and ground.
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance.
3. Ignition OFF, connect the X1 harness connector at the K9 BCM
4. Ignition OFF, disconnect the appropriate inline harness connector listed below:
 - E4C daytime running lamp - left X111 inline harness connector
 - E4D daytime running lamp - right X116 inline harness connector
5. Test for less than 30 ohms between the ground circuit terminal listed below and ground:
 - Ground circuit terminal A
 - Ground circuit terminal E
 - If greater than the specified range, test the ground circuit for an open/high resistance.
6. Connect a test lamp between the control circuit terminal G and ground.
7. Command the appropriate Dedicated Daytime Running Lamp ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the commanded states.
 - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
 - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuits test normal, replace the K9 BCM.
8. If all circuits test normal, replace the daytime running lamp bulb.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Daytime Running Lamp Bulb Replacement TT TT TT Passenger Side Headlamp or Daytime Running Lamp Bulb Replacement T T Passenger Side Headlamp or Daytime Running Lamp Bulb Replacement T T Driver Side Headlamp or Daytime Running Lamp Bulb Replacement TT TT TT Driver Side Headlamp**
- **Headlamp Switch Replacement**
- **Sun Load Temperature and Daytime Running Lamp Ambient Light Sensor Replacement**
- **Control Module References**

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

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Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Headlamp Switch Reference Voltage	B257B 03	B257B 03	-	-
Headlight Switch Signal	B257B 03	B257B 03	B257B 07	-
Fog Lamp Relay Control	B2530 02	1	2	-
Front Fog Lamp Control	1	1	2	-
Right Front Fog Lamp Ground	-	3	-	-
Left Front Fog Lamp Ground	-	4	-	-
1. Front fog lamps inoperative 2. Front fog lamps always ON 3. Right front fog lamp inoperative 4. Left front fog lamp inoperative				

Circuit/System Description

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

Reference Information

Schematic Reference

Fog Lights Schematics

Connector End View Reference

Component Connector End Views

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, observe the scan tool Front Fog Lamps Switch parameter. The parameter should change between Active and Inactive each time the front fog lamp switch is pressed.
 - If the value does not change, refer to Fog Lamp Switch Malfunction below.
2. Command the Fog Lamps ON and OFF with a scan tool. The front fog lamps should turn ON and OFF when changing between the commanded states.
 - If the front fog lamps are always ON or always OFF, refer to Front Fog Lamp Malfunction below.

Circuit/System Testing**Fog Lamp Switch Malfunction**

1. Ignition OFF, disconnect the harness connector at the S30 headlamp switch.
2. Ignition ON, test for greater than 10V between the 12V reference circuit terminal 1 and ground.
 - If less than the specified range, test the 12V reference circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
3. Connect a 3A fused jumper wire between the 12V reference circuit terminal 1 and the signal circuit terminal 12, verify that the scan tool Front Fog Lamps Switch parameter is Active.
 - If not the specified value, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM
4. If all circuits test normal, test or replace the S30 headlamp switch.

Front Fog Lamp Malfunction

1. Ignition OFF, disconnect the X2 harness connector at the X50A underhood fuse block.
2. Connect a test lamp between the control circuit terminal 17 and B+.
3. Command the Fog Lamps ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the commanded states.
 - If the test lamp is always ON, test the control circuit for a short to ground. If the circuit tests normal, replace the K9 BCM.
 - If the test lamp is always OFF, test the control circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
4. Ignition OFF, connect the X2 harness connector at the X50A underhood fuse block. Disconnect the harness connector at the E29 fog lamp-front.
5. Test for less than 30 ohms between the ground circuit terminal B and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
6. Connect a test lamp between the control circuit terminal A and ground.
7. Ignition ON, command the Fog Lamps ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the commanded states.
 - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests

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normal, replace the X50A underhood fuse block.

- If the test lamp is always OFF and the circuit fuse is good, test the control circuit for an open/high resistance. If the circuit tests normal, replace the X50A underhood fuse block.
- If the test lamp is always OFF and the circuit fuse is open, test the control circuit for a short to ground. If the circuit tests normal, test or replace the E29 fog lamp-front

8. If all circuits test normal, replace the E29 fog lamp-front.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Front Fog Lamp Replacement**
- **Fuse Block Replacement**
- **Headlamp Switch Replacement**
- **Control Module References** for BCM replacement, setup and programming.

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
Headlamp Switch Reference Voltage	B257B 03	B257B 03	-	B3588 00
Headlight Switch Signal	B257B 03	B257B 03	B257B 07	-
Rear Fog Lamps Control	B2540 02	2	1	-
Tail Lamp Ground	-	2	-	-
1. Rear fog lamp always ON 2. Rear fog lamp always OFF				

Circuit/System Description

The body control module (BCM) supplies a reference voltage to the backlight dimmer switch, which is part of the headlamp switch. When the backlight dimmer switch is placed in a desired brightness position, reference voltage is applied through the backlight dimmer switch resistor ladder to the BCM. The BCM interprets this voltage signal and will command the interior lights to the desired brightness, command the front fog lamps or the rear fog lamps depending upon the switch setting selected.

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, observe the scan tool Rear Fog Lamps Switch parameter. The parameter should change between Active and Inactive each time the rear fog lamp switch is pressed.
 - If the value does not change, refer to Rear Fog Lamp Switch Malfunction below.
2. Command the Rear Fog Lamp(s) Relay ON and OFF with a scan tool. The rear fog lamp should turn ON and OFF when changing between the commanded states
 - If the rear fog lamps are always ON or always OFF, refer to Rear Fog Lamp Malfunction below.

Circuit/System Testing**Rear Fog Lamp Switch Malfunction**

1. Ignition OFF, disconnect the harness connector at the S30 headlamp switch.
2. Ignition OFF, test for 0.4K ohms to 1 ohms between the signal circuit terminal 12 and ground.
 - If greater than the specified value, test the low reference circuit for an short to voltage or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
 - If less than the specified range, test the signal circuit for a short to ground. If the circuit tests normal, replace the K9 BCM.
3. Test for greater than 10V between the 12V reference circuit terminal 1 and ground.
 - If less than the specified range, test the 12V reference circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.

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4. If all circuits test normal, replace the K9 BCM.

Rear Fog Lamp Malfunction

1. Ignition OFF, disconnect the harness connector at the E5 fog lamp-rear.
2. Test for less than 30 ohms between the ground circuit terminal C and ground.
 - o If greater than the specified range, test the ground circuit for an open/high resistance.
3. Connect a test lamp between the control circuit terminal A and ground.
4. Ignition ON, command the Rear Fog Lamp(s) Relay ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the commanded states.
 - o If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
 - o If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
5. If all circuits test normal, replace the E5 fog lamp-rear.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

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

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 Switch Signal	B3596 00	1	1	-
1. Hazard Function Inoperative				

Circuit/System Description

When the hazard switch is placed in the ON position, ground is momentarily applied through the hazard switch signal circuit to the body control module (BCM). The BCM will detect this voltage drop and will supply battery voltage to all four turn signal lamps in an ON and OFF duty cycle. When the hazard switch is activated, the

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BCM sends a serial data message to the instrument panel cluster (IPC) requesting both turn signal indicators to be cycled ON and OFF.

Reference Information

Schematic Reference

Exterior Lights Schematics

Connector End View Reference

Component Connector End Views

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

Observe the function of the right and left turn signal lamps while turning the hazard lamp switch ON and OFF. The right and left turn signal lamps should cycle ON and OFF while the hazard lamp switch is ON and remain OFF when the hazard lamp switch is OFF.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the P17 info display module.
2. Ignition ON, test for greater than 10V between the signal circuit terminal 16 and ground.
 - If less than the specified range, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
3. If all circuits test normal, replace the P17 info display module.

Repair Procedures

Perform the Diagnostic Repair Verification after completing the diagnostic procedure.

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- **Radio Control Assembly Replacement**
- **Control Module References** for BCM replacement, setup and programming

HIGH INTENSITY DISCHARGE 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
Headlamp Low Beam Relay B+	B258A 04	B258A 04	-	-
Headlamp Low Beam Relay Control	B258A 02	B258A 04	B258A 01	-
Left Low Beam Headlamp Control	2	2	1	-
Right Low Beam Headlamp Control	2	2	1	-
1. Headlamps Always ON 2. Headlamps Always OFF				

Circuit/System Description

When the headlight switch is placed in low beam position, the body control module (BCM) energizes the low beam headlamp relay which supplies battery voltage to the respective headlamp control circuits.

Diagnostic Aids

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.
- Refer to **Exterior Lighting Systems Description and Operation** for more information on when to change the HID bulb.

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**

Ignition ON, command the Headlamp Low Beam ON and OFF with a scan tool. The E4G headlamp-left low beam and the E4H headlamp-right low beam should turn ON and OFF when changing between the commanded states.

Circuit/System Testing

ARNIN : 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.**

1. Ignition OFF, disconnect the KR49 headlamp low beam relay.
2. Ignition ON, verify that a test lamp does not illuminate between the control circuit terminal 30 and ground.
 - If the test lamp illuminates, test the control circuit for a short to voltage.
3. Verify that a test lamp illuminates between the B+ circuit terminal 87 and ground.
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance
4. Verify that a test lamp illuminates between the B+ circuit terminal 86 and ground.

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- If the test lamp does not illuminate, test the B+ circuit for an open/high resistance.
- 5. Connect a 20 A fused jumper wire between the B+ circuit terminal 87 and the control circuit terminal 30. Verify the E4G headlamp-left low beam and the E4H headlamp-right low beam are activated.
 - If the E4G headlamp-left low beam or the E4H headlamp-right low beam do not activate, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the appropriate E4 headlamp-low beam
- 6. Connect a test lamp between the B+ circuit terminal 86 and the control circuit terminal 85.
- 7. Ignition ON, command the Low Beam Lamps ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the commanded states.
 - If the test lamp is always ON, test the control circuit for a short to ground. If the circuit tests normal, replace the K9 BCM.
 - If the test lamp is always OFF, test the control circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
- 8. If all circuits test normal, test or replace the KR49 headlamp low beam relay.

Component Testing

Relay Test

- 1. Ignition OFF, disconnect the KR49 headlamp low beam relay.
- 2. Test for 60-180 ohms between terminals 85 and 86.
 - If not within the specified range, replace the KR49 headlamp low beam relay.
- 3. Test for infinite resistance between the following terminals:
 - 30 and 86
 - 30 and 87
 - 30 and 85
 - 85 and 87
 - If not the specified value, replace the KR49 headlamp low beam relay.
- 4. Install a 15A fused jumper wire between relay terminal 85 and 12 V. Install a jumper wire between relay terminal 86 and ground. Test for less than 2 ohms between terminals 30 and 87.
 - If greater than the specified range, replace the KR49 headlamp low beam relay.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Headlamp Replacement**
- **Headlamp Ballast Replacement TT TT TT**
- **Headlamp Capsule Replacement TT TT TT**
- **Relay Replacement Attached to Wire Harness** or **Relay Replacement Within an Electrical Center**
- **Control Module References** for BCM replacement, programming and setup

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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
Ambient Light Sensor Signal	B2645 03	B2645 03	B2645 07	-
Headlamp Switch Park Lamp Signal	2	B257A 00	2	-
Headlamp Switch On Signal	B257A 00	1	1	-
Headlamp Switch Headlamps Off Signal	B257A 00	1	1	-
Left Headlamp Control	B2575 02	B2575 04	B2575 01	-
Right Headlamp Control	B2699 02	B2699 04	B2699 01	-
Inside Air Temperature Sensor Low Reference	-	B0163 05, B0183 05, B1405 05, B2645 07	-	-
Headlamp Switch Ground	-	1	-	-
1. Headlight Auto Function Only 2. Headlight Auto Function Disabled				

Circuit/System Description

The vehicle headlamps are controlled by the body control module (BCM) based on inputs from the headlamp switch and the turn signal/multifunction switch. The headlamp switch has four positions: OFF, AUTOMATIC LIGHT, PARKING LIGHT, and LOW BEAM. The default headlamp switch position is AUTOMATIC LIGHT, in which the BCM uses the ambient light sensor to determine when headlamps are needed. The OFF portion of the headlamp switch is a momentary switch which overrides the automatic headlamp and will turn OFF the vehicle headlamps. When in the OFF position, the headlamp switch grounds the headlamp switch headlamps OFF signal circuit, prompting the BCM to turn OFF the headlamps. The Park position of the headlamp switch will only illuminate the vehicle parking lamps. The LOW BEAM position of the headlamp switch will illuminate both the parking lamps, as well as the headlamps. With the headlamp switch in the LOW BEAM position, the headlamp switch headlamps on signal circuit is grounded, prompting the BCM to turn on the headlamps, regardless of other factors such as ambient light.

The headlamp high beams are controlled through the flash to pass switch and the headlamp dimmer switch, both located in the turn signal/multifunction switch. The flash to pass switch is a momentary type switch, designed to illuminate the high beams as long as the switch is held. With the switch closed, the flash to pass switch signal circuit is grounded, prompting the BCM to turn on the high beam lamps. The headlamp dimmer switch allows the operator to select between full time high or low beam operation. Unlike the flash to pass switch, it is not a

momentary switch. When the headlamp dimmer switch is in the high beam position, the headlamp dimmer switch high beam signal circuit is grounded. This prompts the BCM to turn on the high beam lamps.

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, observe the scan tool Ambient Light Sensor parameter. The reading should be between 1.4-4.5 V and change with ambient light changes.
 - If greater or less than the specified range, refer to Ambient Light Sensor Malfunction below.
2. Observe the scan tool Automatic Headlamp Disable Switch parameter while cycling the headlamp switch between the AUTOMATIC LIGHT and OFF positions. The parameter should cycle between Active and Inactive.
 - If the value does not change, refer to Headlamp Switch Malfunction below.
3. Observe the scan tool Headlamp ON Switch parameter while cycling the headlamp switch between the AUTOMATIC LIGHT and LOW BEAM ON position. The parameter should cycle between Active and Inactive.
 - If the value does not change, refer to Headlamp Switch Malfunction below.
4. Observe the function of the E4G headlamp-left low beam and the E4F headlamp-right low beam while commanding the low beam lamps ON and OFF with a scan tool. The E4G headlamp-left low beam and the E4F headlamp-right low beam should turn ON and OFF while changing between the commanded states

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- If the E4G headlamp-left low beam and the E4F headlamp-right low beam are always ON or always OFF, refer to Low Beam Headlamp Malfunction below.
- 5. Observe the scan tool High Beam Select Switch parameter while selecting the S78 turn signal/multifunction switch between the high beam position and the low beam position. The value should change between Inactive and Active while selecting between the two positions.
 - If a value does not change between the commanded states, refer to Turn Signal/Multifunction Switch Malfunction below.
- 6. Observe the scan tool Headlamps Flash Switch parameter while pulling and releasing the S78 turn signal/multifunction switch. The value should be Inactive and change to Active as the switch is pulled and released
 - If a value does not change between the commanded states, refer to Turn Signal/Multifunction Switch Malfunction below.
- 7. Command the High Beams ON and OFF with a scan tool. The E4E headlamp-left high beam and the E4F right high beam should turn ON and OFF when changing between the selected states.
 - If the E4E headlamp-left high beam or the E4F right high beam low beam is always OFF, refer to High Beam Headlamps Inoperative below.
 - If both high beam headlamps are always ON or always OFF, refer to High Beam Command Malfunction below.

Circuit/System Testing

Ambient Light Sensor Malfunction

1. Ignition OFF, disconnect the harness connector at the B10B ambient light/sunload sensor.
2. Ignition ON, test for 4.8-5.2 V between the signal circuit terminal 5 and ground.
 - If greater than the specified range, test the signal circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
 - If less than the specified range, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
3. If all circuits test normal, replace the B10B ambient light/sunload sensor.

Headlamp Switch Malfunction

1. Ignition OFF, disconnect the harness connector at the S30 headlamp switch.
2. Ignition OFF, test for less than 30 ohms between the ground circuit terminal 6 and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Ignition ON, verify the scan tool Park Lamps Switch parameter is Inactive.
 - If not the specified value, test the signal circuit terminal 3 for a short to ground. If the circuit tests normal, replace the K9 BCM.
4. Install a 3 A fused jumper wire between the signal circuit terminal 3 and the ground circuit terminal 6. Verify the scan tool Park Lamps Switch is Active.
 - If not the specified value, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K9 BCM.

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5. Verify the scan tool Headlamps On Switch parameter is Inactive.
 - If not the specified value, test the signal circuit terminal 4 for a short to ground. If the circuit tests normal, replace the K9 BCM.
6. Install a 3 A fused jumper wire between the signal circuit terminal 4 and the ground circuit terminal 6. Verify the scan tool Headlamps On Switch is Active.
 - If not the specified value, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
7. Verify the scan tool Automatic Headlamps Disable Switch parameter is Inactive.
 - If not the specified value, test the signal circuit terminal 5 for a short to ground. If the circuit tests normal, replace the K9 BCM.
8. Install a 3 A fused jumper wire between the signal circuit terminal 5 and the ground circuit terminal 6. Verify the scan tool Automatic Headlamps Disable Switch is Active.
 - If not the specified value, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
9. If all circuits test normal, test or replace the S30 headlamp switch.

Low Beam Headlamp Malfunction

1. Ignition OFF, disconnect the harness X1 harness connector at the K9 BCM.
2. Ignition ON, verify that a test lamp illuminates between the B+ circuit terminal listed below and ground:
 - B+ circuit terminal 3
 - B+ circuit terminal 4
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance.
3. Ignition OFF, connect the harness X1 harness connector at the K9 BCM.
4. Disconnect the inline harness connector at the appropriate E4 headlamp-low beam listed below:
 - E4G headlamp-left low beam X115 inline harness connector
 - E4F headlamp-right low beam X116 inline harness connector
5. Connect a test lamp between the control circuit terminal G and ground.
6. Ignition ON, command the low beam lamps ON and OFF with a scan tool. The test lamp should turn ON and OFF while changing between the commanded states.
 - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
 - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
7. If all circuits test normal, replace the headlamp bulb or the headlamp.

Turn Signal/Multifunction Switch Malfunction

1. Ignition OFF, disconnect the harness connector at the S78 turn signal/multifunction switch.
2. Ignition OFF, test for less than 30 ohms between the ground circuit terminal 3 and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.

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3. Ignition ON, verify the scan tool Headlamps Flash Switch parameter is Inactive.
 - If not the specified value, test the signal circuit terminal 4 for a short to ground. If the circuit tests normal, replace the K9 BCM.
4. Install a 3 A fused jumper wire between the signal circuit terminal 4 and ground. Verify the scan tool Headlamps Flash Switch parameter is Active.
 - If not the specified value, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
5. Verify the scan tool High Beam Select Switch parameter is Inactive.
 - If not the specified value, test the signal circuit terminal 2 for a short to ground. If the circuit tests normal, replace the K9 BCM.
6. Install a 3 A fused jumper wire between the signal circuit terminal 2 and ground. Verify the scan tool High Beam Select Switch parameter is Active.
 - If not the specified value, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
7. If all circuits test normal, test or replace the S78 turn signal/multifunction switch.

High Beam Headlamps Inoperative

1. Connect a 10A fused jumper wire between the HI BEAM-LT fuse test point and B+. Verify that the E4E headlamp-left high beam is illuminated.
 - If the E4E headlamp-left high beam does not illuminate, test the control circuit terminal 27 X3 at the X50A fuse block-underhood for a short to ground or an open/high resistance. If the circuit tests normal, replace the E4E headlamp-left high beam.
2. Connect a 10A fused jumper wire between the HI BEAM-RT fuse test point and B+. Verify that the E4F headlamp-right high beam is illuminated.
 - If the E4F headlamp-right high beam does not illuminate, test the control circuit terminal 26 X3 at the X50A fuse block-underhood for a short to ground or an open/high resistance. If the circuit tests normal, replace the E4F headlamp-right high beam.

High Beam Command Malfunction

1. Ignition OFF, disconnect the X5 harness connector at the K9 BCM.
2. Ignition ON, test for greater than 10V between the control circuit terminal 18 and ground.
 - If less than the specified range, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the X50A fuse block-underhood.
3. Connect a 5A fused jumper wire between the control circuit terminal 18 and ground. Verify that the E4E headlamp-left high beam and the E4F right high beam is illuminated.
 - If the E4E headlamp-left high beam and the E4F right high beam is not illuminated, test the control circuit for a short to voltage. If the circuit tests normal, replace the X50A fuse block-underhood.
4. If all circuits test normal, replace the K9 BCM.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

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- Headlamp Replacement
- Headlamp Switch Replacement
- Sun Load Temperature and Daytime Running Lamp Ambient Light Sensor Replacement
- Control Module References

HEADLAMP LEVELING MALFUNCTION RPO T OR T

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 Leveling Switch Ignition	1	1	-	-
Left Headlamp Leveling Ignition	2	2	-	-
Right Headlamp Leveling Ignition	3	3	-	-
Left Headlamp Leveling Control	2	2	2	-
Right Headlamp Leveling Control	3	3	3	-
Left Headlamp Ground	-	2	-	-
Right Headlamp Ground	-	3	-	-
1. All Headlamp Leveling Actuator Malfunction 2. Left Headlamp Leveling Actuator Malfunction 3. Right Headlamp Leveling Actuator Malfunction				

Circuit/System Description

Each headlamp assembly contains a headlamp leveling motor that is controlled by the headlight switch. The headlight switch is a resistance ladder switch and wired to the headlamp leveling motors. With the ignition in ON position the headlight switch ON, the headlamp leveling motors are supplied with a specific voltage depending upon the position of the headlamp leveling switch. With the switch in the 0 position, no voltage is supplied to the headlamp leveling motors and the headlamp aiming will be at the factory specifications. Each switch selection will provide the headlamp leveling motors with incrementally increased voltage levels changing the headlamp aiming.

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**

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

Circuit/System Verification

Ignition ON, headlamps ON, observe the function of the left and right headlamps while selecting each level position on the headlamp level switch. The left and right headlamps should move as each position is selected.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the S30 headlamp switch.
2. Ignition ON, verify that a test lamp illuminates between the ignition circuit terminal 9 and ground.
 - If the test lamp does not illuminate, test the ignition circuit for a short to ground or an open/high resistance.
3. Ignition OFF, connect the harness connector at the S30 headlamp switch and disconnect the inline harness connector listed below:
 - M29L headlamp leveling actuator-left inline harness connector X115
 - M29R headlamp leveling actuator-right inline harness connector X116
4. Test for less than 30 ohms between the ground circuit terminal E and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
5. Ignition ON, verify that a test lamp illuminates between the ignition circuit terminal D and ground.
 - If the test lamp does not illuminate, test the ignition circuit for a short to ground or an open/high resistance.
6. Connect a test lamp between the control circuit terminal F and ground.
7. Ignition ON, headlamps ON, command each headlamp level function by using the headlamp leveling switch. The test lamp should illuminate and change intensity while changing between the commanded states.
 - If the test lamp is always OFF, test the control circuit for a short to ground or an open. If the circuit tests normal, test or replace the S30 headlamp switch.
 - If the test lamp is always ON or does not change intensity, test the control circuit for a short to voltage or for high resistance. If the circuit tests normal, test or replace the S30 headlamp switch.
8. If all circuits test normal, replace the M29 headlamp leveling actuator.

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Component Testing

1. Ignition OFF, disconnect the harness connector at the S30 headlamp switch.
2. With the headlamp leveling switch in position 0, test for 2.2-2.4 k ohms between the ignition terminal 9 and control terminal 10.
 - If not within the specified range, replace the S30 headlamp switch.
3. With the headlamp leveling switch in position 1, test for 1.9-2.1 k ohms between the ignition terminal 9 and control terminal 10.
 - If not within the specified range, replace the S30 headlamp switch.
4. With the headlamp leveling switch in position 2, test for 1.7-1.9 k ohms between the ignition terminal 9 and control terminal 10.
 - If not within the specified range, replace the S30 headlamp switch.
5. With the headlamp leveling switch in position 3, test for 1.4-1.6 kohms between the ignition terminal 9 and control terminal 10..
 - If not within the specified range, replace the S30 headlamp switch.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Headlamp Replacement**
- **Headlamp Switch Replacement**

HEADLAMP LEVELING MALFUNCTION (RPO TT TT OR TT)

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
Ignition Left Headlamp	2	2	-	B1461 00
Ignition Right Headlamp	3	3	-	B1462 00
Headlamp Leveling Sensor 5V Reference - Front	B3415 02	1	B3415 01	-
Headlamp Leveling Sensor 5V Reference - Rear	B3415 02	1	B3415 01	-
Headlamp Leveling Sensor Signal - Front	B3410 06	B3410 06	B3410 01	-
Headlamp Leveling Sensor Signal -				

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Rear	B3420 06	B3420 06	B3420 01	-
Headlamp Leveling Sensor Low Reference - Front	-	1	-	-
Headlamp Leveling Sensor Low Reference - Rear	-	1	-	-
Left Headlamp Ground	-	2	-	B1461 00
Right Headlamp Ground	-	3	-	B1462 00
1. All Headlamp Leveling Actuator Malfunction 2. Left Headlamp Leveling Actuator Malfunction 3. Right Headlamp Leveling Actuator 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 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.

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**Headlamp Leveling Sensor Malfunction**

1. Ignition OFF, disconnect the harness connector at the appropriate B51 headlamp leveling sensor.
2. Test for less than 5 ohms between the low reference circuit terminal 3 and ground.
 - If greater than the specified range, test the low reference circuit for an open/high resistance. If the circuit tests normal, replace the K28 headlamp leveling control module.
3. Ignition ON, test for 4.8-5.2 V between the 5V reference circuit terminal 1 and ground.
 - If less than the specified range, test the 5V reference circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K28 headlamp leveling control module.
 - If greater than the specified range, test the 5V reference circuit for a short to voltage. If the circuit tests normal, replace the K28 headlamp leveling control module.
4. Verify the appropriate scan tool Leveling Position Sensor parameter is 0 V.
 - If greater than the specified range, test the signal circuit terminal 2 for a short to voltage. If the circuit tests normal, replace the K28 headlamp leveling control module.
5. Install a 3 A fused jumper wire between the signal circuit terminal 2 and the 5V reference circuit terminal 1. Verify the appropriate scan tool Leveling Position Sensor parameter is greater than 5 V.
 - If less than the specified range, test the signal circuit for short to ground or an open/high resistance. If the circuit tests normal, replace the K28 headlamp leveling control module.
6. If all circuits test normal, replace the B51 headlamp leveling sensor.

Headlamp Leveling Actuator Malfunction

1. Ignition OFF, disconnect the inline harness connector listed below:
 - M29L headlamp leveling actuator-left inline harness connector X111
 - M29R headlamp leveling actuator-right inline harness connector X112
2. Test for less than 30 ohms between the ground circuit terminal A and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Engine running, test for less than 30 ohms between the ground circuit terminal E and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance. If the circuit tests normal, replace the K28 headlamp leveling control module.
4. Verify that a test lamp illuminates between the control circuit terminal D and ground.
 - If the test lamp does not illuminate, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K28 headlamp leveling control module.
5. Test for 4.25 V-5.25 V between the signal circuit terminal M and ground.

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- If less than the specified range, test the signal circuit for short to ground or an open/high resistance. If the circuit tests normal, replace the K28 headlamp leveling control module.
 - If greater than the specified range, test the signal circuit for a short to voltage. If the circuit tests normal, replace the K28 headlamp leveling control module.
6. If all circuits test normal, test or replace the M29 headlamp leveling actuator.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Headlamp Replacement**
- **Headlamp Leveling Front Suspension Height Sensor Replacement**
- **Headlamp Leveling Rear Suspension Height Sensor Replacement**
- **Control Module References** for module replacement, setup, and programming

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	1	1	2	-
Accent Lamp Ground	-	1	-	-
1. Interior Accent Lighting Inoperative 2. Interior Accent Lighting Always ON				

Circuit/System Description

The body control module (BCM) uses the ambient light sensor to determine which brightness of the accent lamps is needed. The BCM provides B+ voltage to the individual accent lamps via the accent lamps control circuit.

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**

Ignition ON, command the Accent Lighting ON and OFF with a scan tool. The accent lighting should turn ON and OFF when changing between the commanded states.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the appropriate E1 accent lamp.
2. Test for less than 5.0 ohms between the ground circuit terminal and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Connect a test lamp between the control circuit terminal and ground.
4. Ignition ON, command the Accent Lighting ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the commanded states.
 - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
 - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
5. If all circuits test normal, replace the E1 accent lamp.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- Refer to the appropriate replacement procedure for the lighting component that requires replacement.
- **Control Module References** for BCM replacement, programming and setup

INTERIOR BAC LIGHTING MALFUNCTION

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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 Switch B	B1405 03, B1529 03, B257B 03, 1	B257B 03, 1	-	-
Instrument Panel Lamps Dimmer Switch Signal	B257B 03, 1	B257B 03, 1	B257B 07	-
Interior Backlighting Control BCM Terminal 9 X7	B2625 02	2	1	-
Interior Backlighting Control BCM Terminal 8 X2	B2625 02, 2	2	1	-
Interior Backlighting Control BCM Terminal 5 X1 (with UD5)	B2625 02	2	1	-
Headlamp Switch Ground	-	B257B 03	-	-
1. Interior backlighting at full intensity and cannot be dimmed 2. Interior backlighting component does not illuminate				

Circuit/System Description

The dimmer switch is used to increase and decrease the brightness of the interior backlighting components. The body control module (BCM) supplies a reference voltage to the backlight dimmer switch, which is part of the headlamp switch. When the dimmer switch is placed in a desired brightness position, the dimmed voltage setting is applied through the dimmer switch and the dimmer switch signal circuit to the BCM. The BCM interprets this voltage signal, then applies a pulse width modulated (PWM) voltage through the backlight lamp control circuit and the LED dimming control circuit illuminating the components to the requested level.

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, observe the scan tool Indicator Dimming Duty cycle Command parameter while operating the dimmer switch from high to low. The parameter should change between 5-50 when the backlight switch is moved up and down.
 - If the reading does not change, refer to the Dimmer Switch Circuit Test below.
2. Observe the interior backlighting components while commanding the LED Backlight Dimming ON and OFF with the scan tool. The backlighting should turn ON and OFF when changing between the commanded states.
 - If the backlighting does not change between the commanded states, refer to the Interior Backlighting Circuit Test below.

Circuit/System Testing**Dimmer Switch Circuit Test**

1. Ignition OFF, disconnect the harness connector at the S30 headlamp switch.
2. Test for less than 10 ohms between the ground circuit terminal 6 and ground.
 - If greater than the specified range, test the ground circuit for an open high/resistance.
3. Ignition ON, verify that a test lamp illuminates between the B circuit terminal 1 and ground.
 - If the test lamp does not illuminate, test the B circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
4. Ignition ON, test for less than 0.3 V between signal circuit terminal 12 and ground.
 - If greater than the specified range, test the signal circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
5. Install a 3 A fused jumper wire between the signal circuit terminal 12 and the B circuit terminal 1. The interior backlighting should be dimmed.
 - If the interior backlighting is not dimmed, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
6. If all circuits test normal, test or replace the S30 headlamp switch.

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Interior Backlighting Circuit Test

1. Ignition OFF, disconnect the harness connector at the appropriate backlighting component.
2. Test for less than 5.0 ohms between the ground circuit terminal and ground.
 - o If greater than the specified range, test the ground circuit for an open/high resistance.
3. Connect a test lamp between the control circuit terminal and ground.
4. Ignition ON, command the LED Backlight Dimming ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the commanded states.
 - o If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
 - o If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
5. If all circuits test normal, test or replace the component with the inoperative backlighting.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Headlamp Switch Replacement**
- Refer to the appropriate replacement procedure for the lighting component that requires replacement.
- **Control Module References** for BCM replacement, setup and programming

PAR 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
Left Park Lamp Supply Voltage	B2585 02	B2585 04	B2585 01	-
Right Park Lamp Supply Voltage	B3867 02	B3867 01, B3867 04	B3867 01	-
License Plate Lamp Control	B3883 02	B3883 04	B3883 01	-
Left Headlamp Lamp Ground	-	1	-	-
Left Tail Lamp Ground	-	2	-	-
Left License Plate Lamp Ground	-	3	-	-
Right Headlamp Lamp Ground	-	4	-	-
Right Tail Lamp Ground	-	5	-	-

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Right License Plate Lamp Ground	-	6	-	-
1. Left Front Side Marker Lamp Inoperative 2. Left Rear Side Marker Lamp Inoperative 3. Left License Plate Lamp Inoperative 4. Right Front Side Marker Lamp Inoperative 5. Right Rear Side Marker Lamp Inoperative 6. Right License Plate Lamp Inoperative				

Circuit/System Description

The park lamps, tail lamps and license plate lights are turned ON when the headlamp switch is placed in the PARK or LOW BEAM position or anytime the headlights are requested. When the body control module (BCM) receives a request from the headlamp switch to turn ON the park lamps the BCM sends out a voltage on the control circuit, which illuminates the park lamps, tail lamps and license plate lights.

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, observe the function of the E2LF side marker lamp-left front, E5E tail lamp-left rear and the E4J park lamp-left front while commanding the Left Park Lamps ON and OFF with a scan tool. The E2LF side marker lamp-left front, E5E tail lamp-left rear and the E4J park lamp-left front should turn ON and OFF while changing between the commanded states

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- If the E2LF side marker lamp-left front, E5E tail lamp-left rear and the E4J park lamp-left front are always ON or always OFF, refer to Left Side Marker/Tail Lamps Malfunction below.
- 2. Ignition ON, observe the function of the E2RF side marker lamp-right front, E5F tail lamp-right rear and the E4K park lamp-right front while commanding the Right Park Lamps ON and OFF with a scan tool. The E2RF side marker lamp-right front, E5F tail lamp-right rear and the E4K park lamp-right front should turn ON and OFF while changing between the commanded states.
 - If the E2RF side marker lamp-right front, E5F tail lamp-right rear and the E4K park lamp-right front are always ON or always OFF, refer to Right Side Marker/Tail Lamps Malfunction below.
- 3. Observe the function of the E7L license plate lamp-left and E7R license plate lamp-right while commanding the license plate lamps ON and OFF with a scan tool. The E7L license plate lamp-left and E7R license plate lamp-right should turn ON and OFF when changing between the commanded states
 - If the E7L license plate lamp-left or E7R license plate lamp-right is always OFF, inspect for a burned out bulb or corrosion of the bulb sockets.
 - If the E7L license plate lamp-left and E7R license plate lamp-right are always OFF or always ON, refer to License Plate Lamp Malfunction below.

Circuit/System Testing

Left Side Marker/Tail Lamps Malfunction

1. Disconnect the X1 harness connector at the E5E tail lamp-left.
2. Test for less than 30 ohms between the ground circuit terminal C and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Disconnect the appropriate inline harness connector listed below:
 - X111 inline harness connector (With TT6/TT7/TT8)
 - X115 inline harness connector (Without TT6/TT7/TT8)
4. Test for less than 30 ohms between the ground circuit terminal listed below and ground:
 - Ground circuit terminal A
 - Ground circuit terminal E
 - If greater than the specified range, test the ground circuit for an open/high resistance.
5. Connect a test lamp between the control circuit terminal listed below and ground.
 - E2LF side marker lamp-left front control circuit terminal K
 - E4J park lamp-left front control circuit terminal B
 - E5E tail lamp-left control circuit terminal B
6. Ignition ON, command the Left Park Lamps ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the commanded states.
 - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
 - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuits test normal, replace the K9 BCM.
7. If all the circuits test normal, replace the appropriate left marker lamp.

Right Side Marker Tail Lamps Malfunction

1. Disconnect the X1 harness connector at the E5F tail lamp-right.
2. Test for less than 30 ohms between the ground circuit terminal C and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Ignition OFF, disconnect the appropriate inline harness connector listed below:
 - X112 inline harness connector (With TT6/TT7/TT8)
 - X116 inline harness connector (Without TT6/TT7/TT8)
4. Test for less than 30 ohms between the ground circuit terminal listed below and ground:
 - Ground circuit terminal A
 - Ground circuit terminal E
 - If greater than the specified range, test the ground circuit for an open/high resistance.
5. Connect a test lamp between the control circuit terminal listed below and ground.
 - E2RF side marker lamp-right front control circuit terminal K
 - E4K park lamp-right front control circuit terminal B
 - E5F tail lamp-right control circuit terminal A
6. Ignition ON, command the Right Park Lamps ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the commanded states.
 - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
 - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuits test normal, replace the K9 BCM.
7. If all the circuits test normal, replace the appropriate right marker lamp

License Plate Lamp Malfunction

1. Ignition OFF, disconnect the X902 inline harness connector.
2. Test for less than 30 ohms between the ground circuit terminal 15 and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Connect a test lamp between the control circuit terminal 1 and ground.
4. Ignition ON, command the license plate lamps ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the selected states.
 - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
 - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
5. If all circuits test normal, test or replace the E7L license plate lamp-left or E7R license plate lamp-right.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

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- **Tail Lamp Replacement**
- **Front Turn Signal Lamp Bulb Replacement (T84, T85 Driver Side Headlamp)** or **Front Turn Signal Lamp Bulb Replacement (T84, T85 Passenger Side Headlamp)** or **Front Turn Signal Lamp Bulb Replacement (TT6,TT7,TT8 Passenger Side Headlamp)** or **Front Turn Signal Lamp Bulb Replacement (TT6,TT7,TT8 Driver Side Headlamp)**
- **Liftgate Center Appli ue Replacement**
- **Control Module References** for BCM replacement, programming and setup

STOP LAMPS MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - ehicle** 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 oltage	Signal Performance
Brake Apply Sensor 5 V Reference	C0890 03, C0277 06	C0277 06	C0277 07	-
Brake Apply Sensor Signal	C0277 06	C0277 06	C0277 07	-
Center High Mounted Stop Lamp Control	B3884 02	1	2	-
Left Brake Lamps Control	B3881 02	1	2	-
Right Brake Lamp Control	B3882 02	1	2	-
Brake Apply Sensor Low Reference	-	C0277 07	-	-
Center High Mounted Stop Lamp Ground	-	1	-	-
Left Tail Lamp Ground	-	1	-	-
Right Tail Lamp Ground	-	1	-	-
1. Stop Lamps Inoperative 2. Stop Lamps Always ON				

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 stop lamp control circuit and center high mounted stop lamp control circuit. When the control circuit is energized the stop lamps are illuminated.

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, observe the scan tool Brake Pedal Position Sensor parameter while applying and releasing the brake pedal. The value should be 0.2 V with the pedal pressed and 0 V with the pedal released.
 - If the value does not change, refer to the Brake Pedal Position Sensor Malfunction below.
2. Observe function of the E5L stop lamp- left while commanding the Left Brake Lamp ON and OFF with a scan tool. The E5L stop lamp- left should turn ON and OFF when changing between the selected states.
 - If the E5L stop lamp- left is always ON or always OFF, refer to Left Brake Lamp Malfunction below.
3. Observe function of the E5R stop lamp- right while commanding the Right Brake Lamp ON and OFF with a scan tool. The E5R stop lamp- right should turn ON and OFF when changing between the selected states.
 - If the E5R stop lamp- right is always ON or always OFF, refer to Right Brake Lamp Malfunction below.
4. Observe function of the E6 center high mounted stop lamp while commanding the Center Brake Lamp ON and OFF with a scan tool. The E6 center high mounted stop lamp should turn ON and OFF when changing between the selected states.
 - If the E6 center high mounted stop lamp is always ON or always OFF, refer to Center High Mount Stop Lamp Malfunction below.

Circuit System Testing

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Brake Pedal Position Sensor Malfunction

1. Ignition OFF, disconnect the harness connector at the B22 brake pedal position sensor.
2. Ignition OFF, test for less than 30 ohms between the low reference circuit terminal C and ground.
 - If greater than the specified range, test the low reference circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
3. Ignition ON, test for 4.8-5.2 V between the 5 V reference circuit terminal A and ground.
 - If less than the specified range, test the 5 V reference circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
 - If greater than the specified range, test the 5 V reference circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
4. Verify that the scan tool Brake Pedal Position Sensor parameter is less than 0.3 V.
 - If greater than the specified range, test the signal circuit terminal B for a short to voltage. If the circuit tests normal, replace the K9 BCM.
5. Connect a 3 A fused jumper wire between the 5 V reference circuit terminal A and the signal circuit terminal B. Verify that the scan tool Brake Pedal Position Sensor parameter is 4.8-5.2 V.
 - If less than the specified range, test the signal circuit for short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
6. If all circuits test normal, test or replace the B22 brake pedal position sensor.

Left Brake Lamp Malfunction

1. Ignition OFF, disconnect the X1 harness connector at the E5E tail lamp-left.
2. Test for less than 30 ohms between the ground circuit terminal C and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Connect a test lamp between the control circuit terminal A and ground.
4. Ignition ON, command the Left Brake Lamp ON and OFF with a scan tool, the test lamp should turn ON and OFF when changing between the commanded states.
 - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
 - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
5. If all circuits test normal, test or replace the E5E tail lamp-left.

Right Brake Lamp Malfunction

1. Ignition OFF, disconnect the X1 harness connector at the E5F tail lamp-right.
2. Test for less than 30 ohms between the ground circuit terminal C and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Connect a test lamp between the control circuit terminal A and ground.
4. Ignition ON, command the Right Brake Lamp ON and OFF with a scan tool, the test lamp should turn ON and OFF when changing between the commanded states.

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- If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
 - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
5. If all circuits test normal, test or replace the E5F tail lamp-right.

Center High Mount Stop Lamp Malfunction

1. Ignition OFF, disconnect the harness connector at the E6 center high mounted stop lamp.
2. Test for less than 30 ohms between the ground circuit terminal B and ground.
 - If greater than the specified value, test the ground circuit for an open/high resistance.
3. Connect a test lamp between the control circuit terminal A and ground.
4. Ignition ON, command the Center Brake Lamp ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the commanded states.
 - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
 - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
5. If all circuits test normal, replace the E6 center high mounted stop lamp.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Brake Pedal Position Sensor Replacement**
- **Brake Pedal Position Sensor Calibration**
- **Tail Lamp Replacement**
- **High Mount Stop Lamp Replacement**
- **Control Module References** for BCM replacement, programming and setup

TRAILER LAMPS MALFUNCTION (WITHOUT U4G)

Diagnostic Instructions

- Perform the **Diagnostic System Check - ehicle** 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 oltage	Signal Performance
Trailer Park Lamp Relay B+	B388A 04	B388A 04	-	-

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Left Trailer Turn Signal Lamp Control	B3887 02	B3887 04	1	-
Right Trailer Turn Signal Lamp Control	B3888 02	B3888 04	2	-
Park Lamp Supply Voltage/Marker Lamp Supply Voltage	B388A 02	B388A 04	B388A 01	-
1. Left Trailer Turn Signal Lamp Inoperative 2. Right Trailer Turn Signal Lamp Inoperative				

Circuit/System Description

The trailer park lamp relay is supplied with battery voltage at all times. The trailer park lamp signal circuit is grounded by turning the headlamp switch. The body control module (BCM) energizes the trailer park lamp relay by applying ground to the trailer park lamp relay control circuit. When the trailer park lamp relay is energized, the relay switch contacts close and battery voltage is applied through the trailer park lamp relay fuse to the trailer park lamp supply voltage circuit which illuminates the trailer park lamps if a trailer is connected.

Reference Information

Schematic Reference

Trailer Connector/Pro vision 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, observe the function of the left trailer turn signal lamp and the right trailer turn signal lamp while commanding the Left Trailer Turn Signal Lamp and the Right Trailer Turn Signal Lamp ON and OFF with a scan tool. The left trailer turn signal lamp and the right trailer turn signal lamp should turn

ON and OFF while changing between the commanded states.

- If the left or right trailer turn signal lamp is always ON or always OFF, refer to Trailer Turn Signal Lamps Malfunction below.
- 2. Observe the function of the trailer tail lamps while commanding the Trailer Park Lamps ON and OFF with a scan tool. The trailer tail lamps should turn ON and OFF while changing between the commanded states.
 - If the trailer parks lamps are always ON or always OFF, refer to Trailer Park Lamps Malfunction below.

Circuit/System Testing

Trailer Turn Signal Lamps Malfunction

1. Ignition OFF, disconnect the X5 harness connector at the K9 BCM.
2. Ignition ON, test for greater than 10 V between the control circuit terminal listed below and ground:
 - Right trailer turn signal lamp control terminal 17
 - Left trailer turn signal lamp control terminal 8
 - If less than the specified value, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the X50A fuse block-underhood.
3. Connect a 10 A fused jumper wire between the trailer turn signal lamp fused test point and B+. Verify that the appropriate trailer turn signal lamp is illuminated.
 - If the trailer turn signal lamp is not illuminated, test the control circuit listed below for a short to ground or an open/high resistance. If the circuit tests normal, replace the X50A fuse block-underhood.
 - Control terminal 43 X2 at the X50A fuse block-underhood.
 - Control terminal 67 X2 at the X50A fuse block-underhood.
4. If all the circuits test normal, replace the K9 BCM.

Trailer Park Lamps Malfunction

1. Ignition OFF, disconnect the trailer park lamp relay.
2. Ignition ON, verify that a test lamp does not illuminate between the control circuit terminal 87 and ground.
 - If the test lamp illuminates, test the control circuit for a short to voltage
3. Ignition ON, verify a test lamp illuminates between the B+ circuit terminal 86 and ground.
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance.
4. Verify a test lamp illuminates between the B+ circuit terminal 30 and ground.
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance. If the circuit tests normal, test or replace the trailer park lamp relay.
5. Connect a 15 A fused jumper wire between the B+ circuit terminal 30 and the control circuit terminal 87. Verify the trailer park lamps are activated.
 - If the trailer park lamps do not activate, test the control circuit for an open/high resistance. If the

circuit tests normal, replace the trailer park lamps.

6. Connect a test lamp between the control circuit terminal 85 and the B+ circuit terminal 86.
7. Command the Trailer Park Lamps ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the commanded states.
 - If the test lamp is always OFF, test the control circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
 - If the test lamp is always ON, test the control circuit for a short to ground. If the circuit tests normal, replace the K9 BCM.
8. If all circuits test normal, test or replace the trailer park lamp relay.

Component Testing

Relay Test

1. Ignition OFF, disconnect the trailer park lamp relay.
2. Test for 60-180 ohms between terminals 85 and 86.
 - If not within the specified range, replace the trailer park lamp relay.
3. Test for infinite resistance between the following terminals:
 - 30 and 86
 - 30 and 87
 - 30 and 85
 - 85 and 87
 - If not the specified value, replace the trailer park lamp relay.
4. Install a 5 A fused jumper wire between relay terminal 85 and 12 V. Install a jumper wire between relay terminal 86 and ground. Test for less than 2 ohms between terminals 30 and 87.
 - If greater than the specified range, replace the trailer park lamp relay.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Relay Replacement (Attached to Wire Harness)** or **Relay Replacement (Within an Electrical Center)**
- **Fuse Block Replacement**
- **Control Module References** for BCM replacement, programming and setup

TRAILER LAMPS MALFUNCTION (WITH U G)

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.

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Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Trailer Brake Control Module B+	B1325 03	B1325 03	-	-
Center High Mounted Stop Lamp Signal	5	5	5	B0655 5A
Backup Lamps Control	B3890 02	B3890 04	2	-
Stop Lamps Control	B3889 02	B3889 04	5	-
Left Turn Signal Lamps Control	B3887 02	B3887 04	6	-
Right Turn Signal Lamps Control	B3888 02	B3888 04	7	-
Trailer Fog Lamp Control	B3891 02	B3891 04	3	-
Trailer Left Park Lamp Control	B3885 02	B3885 04	4	-
Trailer Right Park Lamp Control	B3886 02	B3886 04	4	-
Trailer Brake Control Module Ground	-	1	-	-
Trailer Connector Ground	-	1	-	-
1. All Trailer Lamps Inoperative 2. Trailer Backup Lamps Malfunction 3. Trailer Fog Lamps Malfunction 4. Trailer Park/Tail Lamps Malfunction 5. Trailer Brake Lamps Malfunction 6. Trailer Left Turn Signal Lamp Malfunction 7. Trailer Right Turn Signal Lamp Malfunction				

Circuit/System Description

The trailer brake control module will receive a serial data message from the BCM indicating when each of the vehicle exterior lights have been activated. The trailer brake control module will then apply voltage to the appropriate trailer lamps through their respective voltage supply circuits.

Reference Information**Schematic Reference****Trailer Connector/Pro vision 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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- 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, observe the function of the left trailer tail lamp and the right trailer tail lamp while commanding the Left Trailer Tail Lamp and the Right Trailer Tail Lamp ON and OFF with a scan tool. The left trailer tail lamp and the right trailer tail lamp should turn ON and OFF while changing between the commanded states.
 - If the left trailer tail lamp or the right trailer tail lamp is always ON or always OFF, refer to Trailer Lamps Malfunction below.
2. Observe the function of the left trailer turn signal lamp and the right trailer turn signal lamp while commanding the Left Trailer Turn Signal Lamp and the Right Trailer Turn Signal Lamp ON and OFF with a scan tool. The left trailer turn signal lamp and the right trailer turn signal lamp should turn ON and OFF while changing between the commanded states.
 - If the left trailer turn signal lamp or the right trailer turn signal lamp is always ON or always OFF, refer to Trailer Lamps Malfunction below.
3. Observe the function of the trailer fog lamps while commanding the Trailer Fog Lamps ON and OFF with a scan tool. The trailer fog lamps should turn ON and OFF while changing between the commanded states.
 - If the trailer fog lamps are always ON or always OFF, refer to Trailer Lamps Malfunction below.
4. Observe the function of the trailer backup lamps while commanding the Trailer Backup Lamps ON and OFF with a scan tool. The trailer backup lamps should turn ON and OFF while changing between the commanded states.
 - If the trailer backup lamps are always ON or always OFF, refer to Trailer Lamps Malfunction below.
5. Observe the function of the trailer brake lamps while commanding the Trailer Brake Lamps ON and OFF with a scan tool. The trailer brake lamps should turn ON and OFF while changing between the commanded states.
 - If the trailer brake lamps are always ON or always OFF, refer to Trailer Brake Lamps Malfunction below.
6. If all trailer lamps are inoperative, refer to All Trailer Lamps Inoperative below.

Circuit/System Testing

Trailer Lamps Malfunction

NOTE: **erify that the trailer has been disconnected from the X trailer**

connector.

1. Ignition OFF, disconnect the X1 harness connector at the K67 trailer brake control module.
2. Test for infinite resistance between the control circuit terminal listed below and ground:
 - Right trailer turn signal lamp control terminal 2
 - Left trailer park lamp control terminal 4
 - Trailer backup lamp control terminal 7
 - Trailer fog lamp control terminal 8
 - Right trailer park lamp control terminal 16
 - Left trailer turn signal lamp control terminal 17
 - If not the specified value, test the control circuit for a short to ground. If the circuit tests normal, replace the X88 trailer connector.
3. Ignition ON, verify that a test lamp does not illuminate between the control circuit terminal listed below and ground:
 - Right trailer turn signal lamp control terminal 2
 - Left trailer park lamp control terminal 4
 - Trailer backup lamp control terminal 7
 - Trailer fog lamp control terminal 8
 - Right trailer park lamp control terminal 16
 - Left trailer turn signal lamp control terminal 17
 - If the test lamp illuminates, test the control circuit for a short to voltage. If the circuit tests normal, replace the X88 trailer connector.
4. Test for less than 1 ohms between the control circuit terminals listed below:
 - Right trailer turn signal lamp control terminal 2 at the K67 trailer brake control module and control terminal 4 at the X88 trailer connector.
 - Left trailer park lamp control terminal 4 at the K67 trailer brake control module and control terminal 7 at the X88 trailer connector.
 - Trailer backup lamp control terminal 7 at the K67 trailer brake control module and control terminal 8 at the X88 trailer connector.
 - Trailer fog lamp control terminal 8 at the K67 trailer brake control module and control terminal 2 at the X88 trailer connector.
 - Right trailer park lamp control terminal 16 at the K67 trailer brake control module and control terminal 5 at the X88 trailer connector.
 - Left trailer turn signal lamp control terminal 17 at the K67 trailer brake control module and control terminal 1 at the X88 trailer connector.
 - If greater than the specified range, test the control circuit for an open/high resistance. If the circuit tests normal, replace the X88 trailer connector.
5. If all circuits test normal, replace the K67 trailer brake control module.

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1. Ignition OFF, disconnect the X1 harness connector at the K67 trailer brake control module.
2. Connect a test lamp between the signal circuit terminal 14 and ground.
3. Ignition ON, command the Center Brake Lamp ON and OFF with a scan tool. The test lamp should turn ON and OFF while changing between the commanded states.
 - If the test lamp is always ON, test the signal circuit for a short to voltage. If the circuit tests normal, refer to **Stop Lamps Malfunction**.
 - If the test lamp is always OFF, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, refer to **Stop Lamps Malfunction**.
4. Verify that a test lamp does not illuminate between the control circuit terminal 10 and ground.
 - If the test lamp illuminates, test the control circuit for a short to voltage. If the circuit tests normal, replace the X88 trailer connector.
5. Test for infinite resistance between the control circuit terminal 10 and ground.
 - If not the specified value, test the control circuit for a short to ground. If the circuit tests normal, replace the X88 trailer connector.
6. Test for less than 1 ohms between the control circuit 10 at the K67 trailer brake control module and the control circuit terminal 6 at the X88 trailer connector.
 - If greater than the specified range, test the control circuit for an open/high resistance. If the circuit tests normal, replace the X88 trailer connector.
7. If all circuits test normal, replace the K67 trailer brake control module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for trailer brake control module replacement, programming 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
Left Turn Signal Switch Signal	2	2	2	-
Right Turn Signal Switch Signal	3	3	3	-
Left Front Turn Signal Lamp Control	B3948 02	4	4	-
Right Front Turn Signal Lamp Control	B3949 02	5	5	-
Left Rear Turn Signal Lamp Control	B3950 02	6	6	-

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Right Rear Turn Signal Lamp Control	B3951 02	7	7	-
Left Repeater Lamp Control	B3948 02	8	8	-
Right Repeater Lamp Control	B3949 02	9	9	-
Turn Signal/Multifunction Switch Ground	-	1	-	-
Left Tail Lamp Ground	-	6	-	-
Left Repeater Lamp Ground	-	8	-	-
Right Repeater Lamp Ground	-	9	-	-
Right Tail Lamp Ground	-	7	-	-
1. All Turn Signals Lamps and/or Indicators Inoperative 2. Left Turn Signals Malfunction 3. Right Turn Signals Malfunction 4. Left Front Turn Signal Malfunction 5. Right Front Turn Signal Malfunction 6. Left Rear Turn Signal Malfunction 7. Right Rear Turn Signal Malfunction 8. Left Repeater Lamp Malfunction 9. Right Repeater Lamp 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 position. 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 through either the right turn or left turn signal switch signal circuit. The BCM then applies a pulsating voltage to the front and rear turn signal lamps through their respective voltage supply circuits. When a turn signal request is received by the BCM, a serial data message is sent to the instrument cluster requesting the respective turn signal indicator be pulsed ON and OFF.

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, observe the scan tool Left Turn Signal Switch parameter while moving the turn signal switch from the center position to the left position. The value should be Inactive and change to Active.
 - If the value does not change, refer to Turn Signal Switch Malfunction below.
2. Ignition ON, observe the scan tool Right Turn Signal Switch parameter while moving the turn signal switch from the center position to the right position. The value should be Inactive and change to Active.
 - If the value does not change, refer to Turn Signal Switch Malfunction below.
3. Ignition ON, with the turn signal switch in the left position, observe the function of the E4LF turn signal lamp-left front, the E4Y turn signal repeater lamp-left and the E4LR turn signal lamp-left rear. Each lamp should flash ON and OFF.
 - If a lamp is always On or always OFF, refer to Turn Signal Lamps Malfunction below.
4. Ignition ON, with the turn signal switch in the right position, observe the function of the E4RF turn signal lamp-right front, the E4Z turn signal repeater lamp-right and the E4RR turn signal lamp-right rear. Each lamp should flash ON and OFF.
 - If a lamp is always ON or always OFF, refer to Turn Signal Lamps Malfunction below.
5. Command the All Indicators Test ON and OFF with a scan tool. The left and right turn signal indicators should turn ON and OFF when changing between the commanded states.
 - If the left and right turn signal indicators are always ON or always OFF, replace the P16 instrument cluster.

Circuit/System Testing

Turn Signal Switch Malfunction

1. Ignition OFF, disconnect the X2 harness connector at the S78 turn signal/multi-function switch.
2. Test for less than 30 ohms between the ground circuit terminal 3 and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Ignition ON, verify the scan tool Left Turn Signal Switch parameter is Inactive.
 - If not the specified value, test the signal circuit terminal 1 for a short to ground. If the circuit tests normal, replace the K9 BCM.
4. Install a 3 A fused jumper wire between the signal circuit terminal 1 and ground. Verify the scan tool Left Turn Signal Switch parameter is Active.
 - If not the specified value, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K9 BCM.

5. Verify the scan tool Right Turn Signal Switch parameter is Inactive.
 - If not the specified value, test the signal circuit terminal 7 for a short to ground. If the circuit tests normal, replace the K9 BCM.
6. Install a 3 A fused jumper wire between the signal circuit terminal 7 and ground. Verify the scan tool Right Turn Signal Switch parameter is Active.
 - If not the specified value, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
7. If all circuits test normal, test or replace the S78 turn signal/multi-function switch.

Turn Signal Lamps Malfunction

1. Ignition OFF, disconnect the harness connector at the appropriate turn signal lamp.
2. Test for less than 30 ohms between the ground circuit terminal listed below and ground.
 - E4Y turn signal repeater lamp-left terminal 2
 - E4Z turn signal repeater lamp-right terminal 2
 - E4LR turn signal lamp-left rear terminal 1
 - E4RR turn signal lamp-right rear terminal 1
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Disconnect the inline harness connector at the appropriate E4LF turn signal lamp-front listed below:
 - E4LF turn signal lamp-left front X115 (Without TT6/TT7/TT8)
 - E4LF turn signal lamp-left front X111 (With TT6/TT7/TT8)
 - E4RF turn signal lamp-right front X116 (Without TT6/TT7/TT8)
 - E4RF turn signal lamp-right front X112 (With TT6/TT7/TT8)
4. Connect a test lamp between the control circuit terminal listed below and ground.
 - E4LF turn signal lamp-left front terminal J
 - E4RF turn signal lamp-right front terminal J
 - E4Y turn signal repeater lamp-left terminal 1
 - E4LR turn signal lamp-left rear terminal 3
 - E4Z turn signal repeater lamp-right terminal 1
 - E4RR turn signal lamp-right rear terminal 3
5. Command the appropriate Turn Signal Lamp ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the commanded states.
 - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the K9 BCM.
 - If the test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K9 BCM.
6. If all circuits test normal, replace the turn signal lamp.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- Turn Signal Multifunction Switch Replacement
- Front Turn Signal Lamp Bulb Replacement (T84, T85 Driver Side Headlamp) or Front Turn Signal Lamp Bulb Replacement (T84, T85 Passenger Side Headlamp) or Front Turn Signal Lamp Bulb Replacement (TT6,TT7,TT8 Passenger Side Headlamp) or Front Turn Signal Lamp Bulb Replacement (TT6,TT7,TT8 Driver Side Headlamp)
- Tail Lamp Replacement
- Control Module References for BC or instrument cluster replacement, setup and programming

REPAIR INSTRUCTIONS

BRAKE PEDAL POSITION SENSOR CALIBRATION

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

Calibration Criteria

NOTE: Do not apply the brake pedal during the brake pedal position sensor calibration procedure. Any movement of the brake pedal during this procedure will cause the calibration procedure to fail. If this occurs, the brake pedal position sensor calibration must be repeated.

Brake pedal position sensor calibration must be performed after the brake pedal position sensor or body control module (BCM) have been serviced. The calibration procedure will set the brake pedal position sensor home value. This value is used by the BCM 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. Place the transmission in the PARK position.
3. Install a scan tool.
4. Clear all BCM DTCs before proceeding.
5. Navigate to the Module Diagnosis menu.
6. Select BCM menu item.
 - Select Configuration Reset functions menu item.
 - Select the Brake Pedal Position Sensor Learn procedure and follow the directions displayed on the screen.

BRAKE PEDAL POSITION SENSOR REPLACEMENT

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

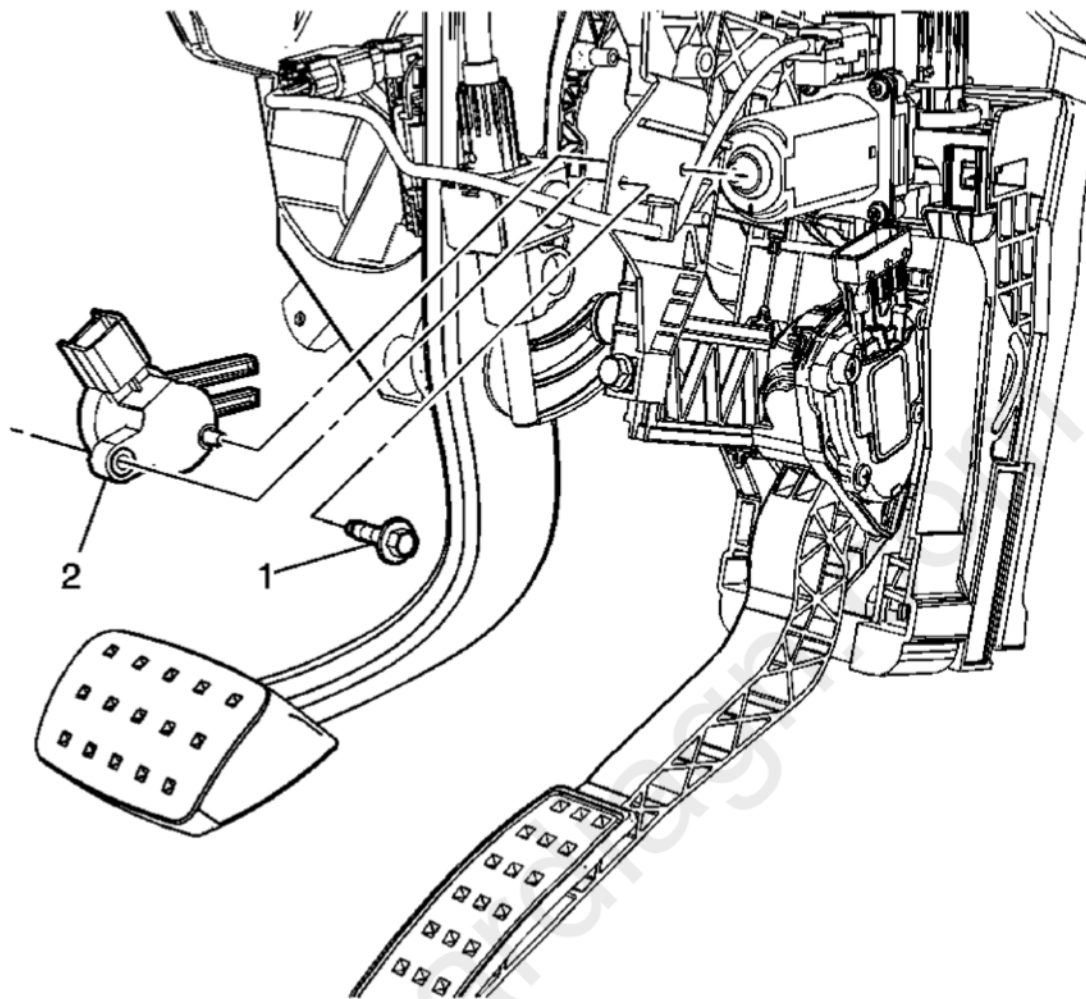


Fig. 18: Identifying Brake Pedal Position Sensor
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the instrument panel insulator panel. Refer to <u>Instrument Panel Insulator Panel Replacement - Left Side</u> .	
1	Brake Pedal Position Sensor Bolt CAUTION: Refer to <u>Fastener Caution</u> . Procedure: Remove the sensor bolt. Tighten: N.m (lb in)

Brake pedal position Sensor

Procedure

2

1. Disconnect the electrical connector.
2. Pull the sensor away from the bracket.
3. Recalibrate the brake pedal position sensor. Refer to **Brake Pedal Position Sensor Calibration**.

SUN LOAD TEMPERATURE AND DAYTIME RUNNING LAMP AMBIENT LIGHT SENSOR REPLACEMENT

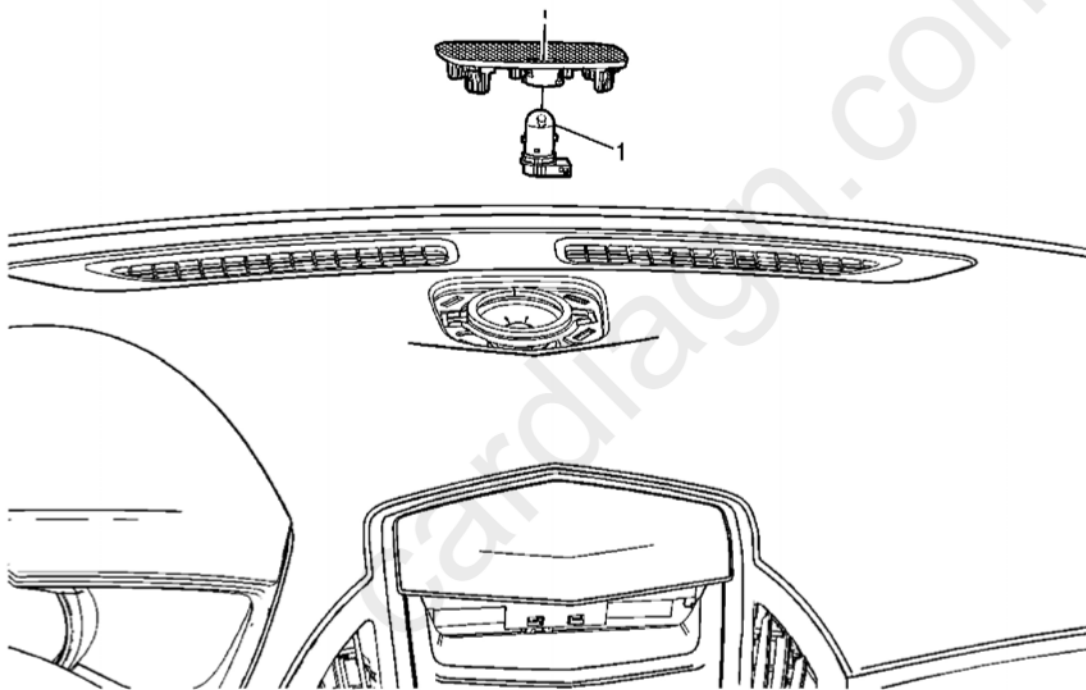


Fig. 19: Identifying Sun Load Temperature & Daytime Running Lamp Ambient Light Sensor
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the radio front speaker grille. Refer to <u>Radio Front Speaker Grille Replacement</u> .	
1	Sunload temperature and Daytime Running Lamp and Ambient Light Sensor Procedure 1. Twist and pull up to remove. 2. Disconnect electrical connector.

HEADLAMP SWITCH REPLACEMENT

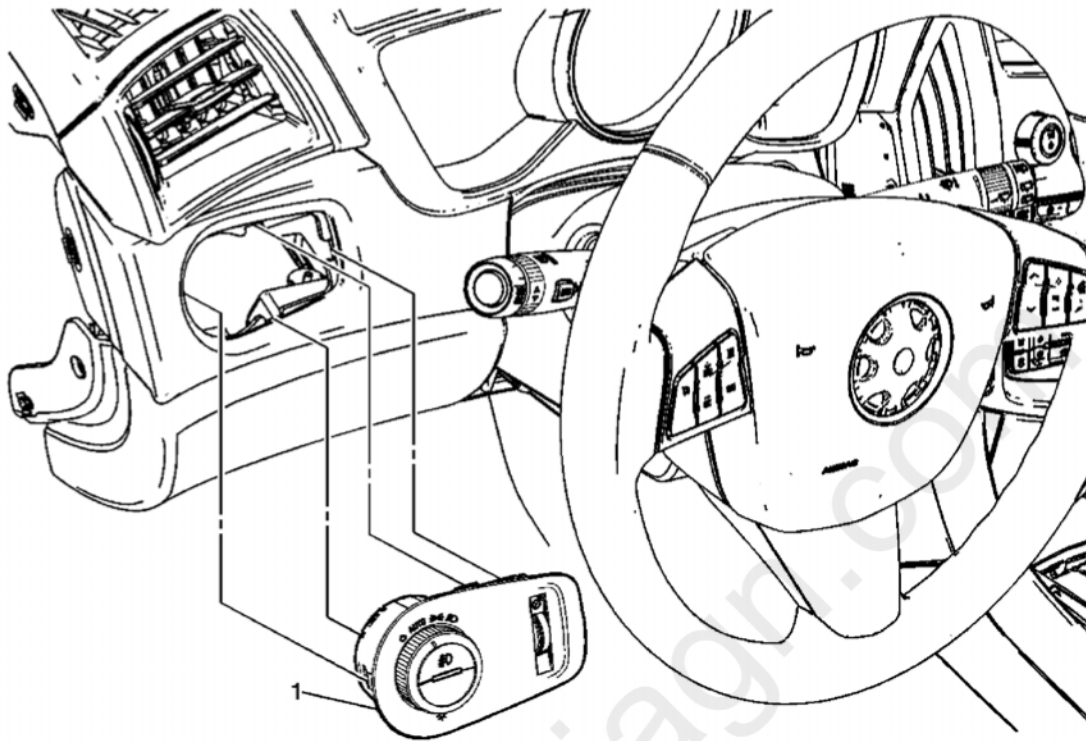


Fig. 20: Locating Headlamp Switch
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove instrument panel side trim panel. Refer to <u>Instrument Panel Side Trim Panel Replacement</u> .	
1	Headlamp Switch Procedure 1. Depress tabs to remove the switch assembly from the instrument panel. 2. Disconnect the electrical connector.

TRAILER LAMP CONTROL MODULE REPLACEMENT

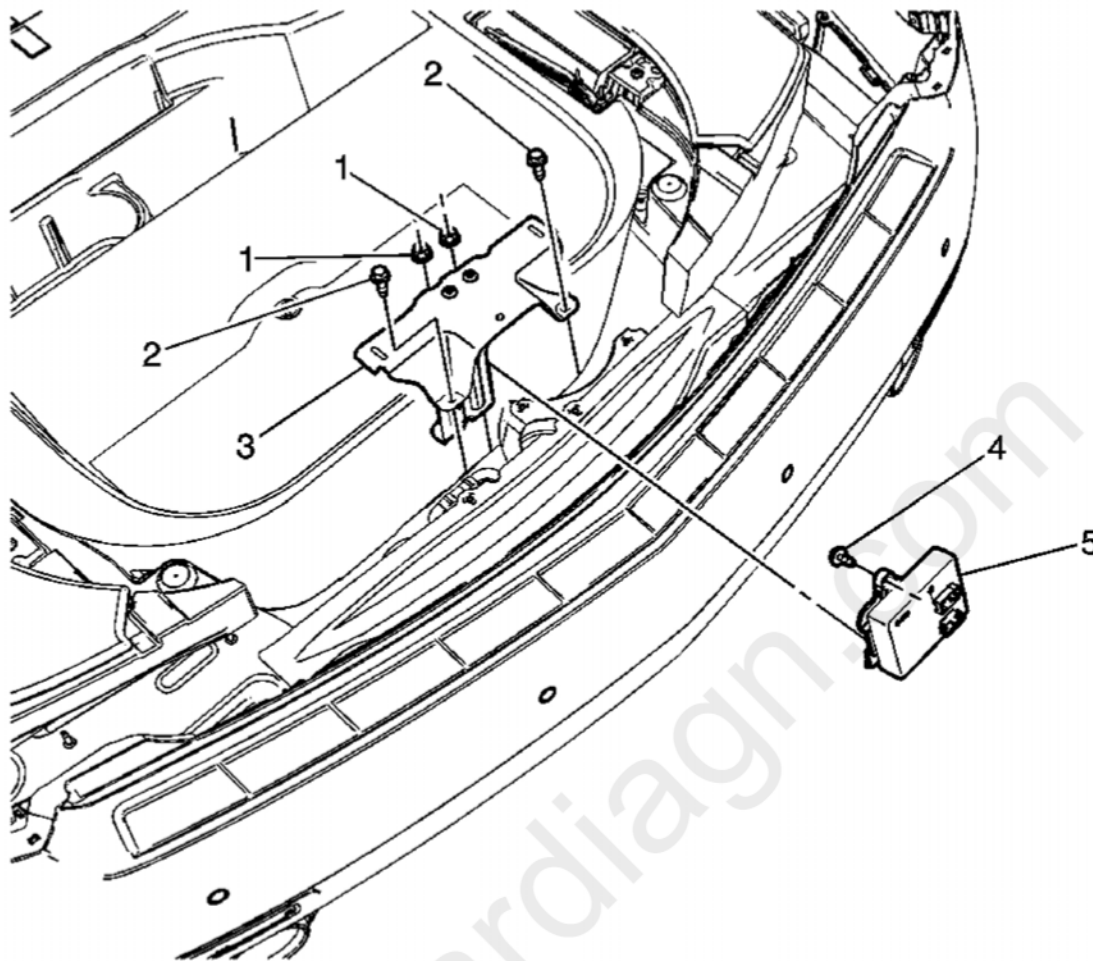


Fig. 21: Identifying Trailer Lamp Control Module
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the rear compartment floor stowage compartment tray. Refer to Rear Compartment Floor Stowage Compartment Tray Replacement	
1	Rear Bracket Compartment Nuts (Qty: 2) CAUTION: Refer to Fastener Caution . Tighten: N.m (lb in)
2	Rear Bracket Compartment Bolts (Qty: 2) Tighten: N.m (lb in)
3	Rear Bracket Compartment

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4	Trailer Lamp Control Module Bolt Tighten: 9 N.m (80 lb in)
5	Trailer Lamp Control Module Procedure 1. Disconnect the electrical connector. 2. Slide the module upward to remove. 3. If installing a new trailer lamp control module, program the module. Refer to <u>Control Module References</u> .

READING LAMP SWITCH PUSH-BUTTON REPLACEMENT

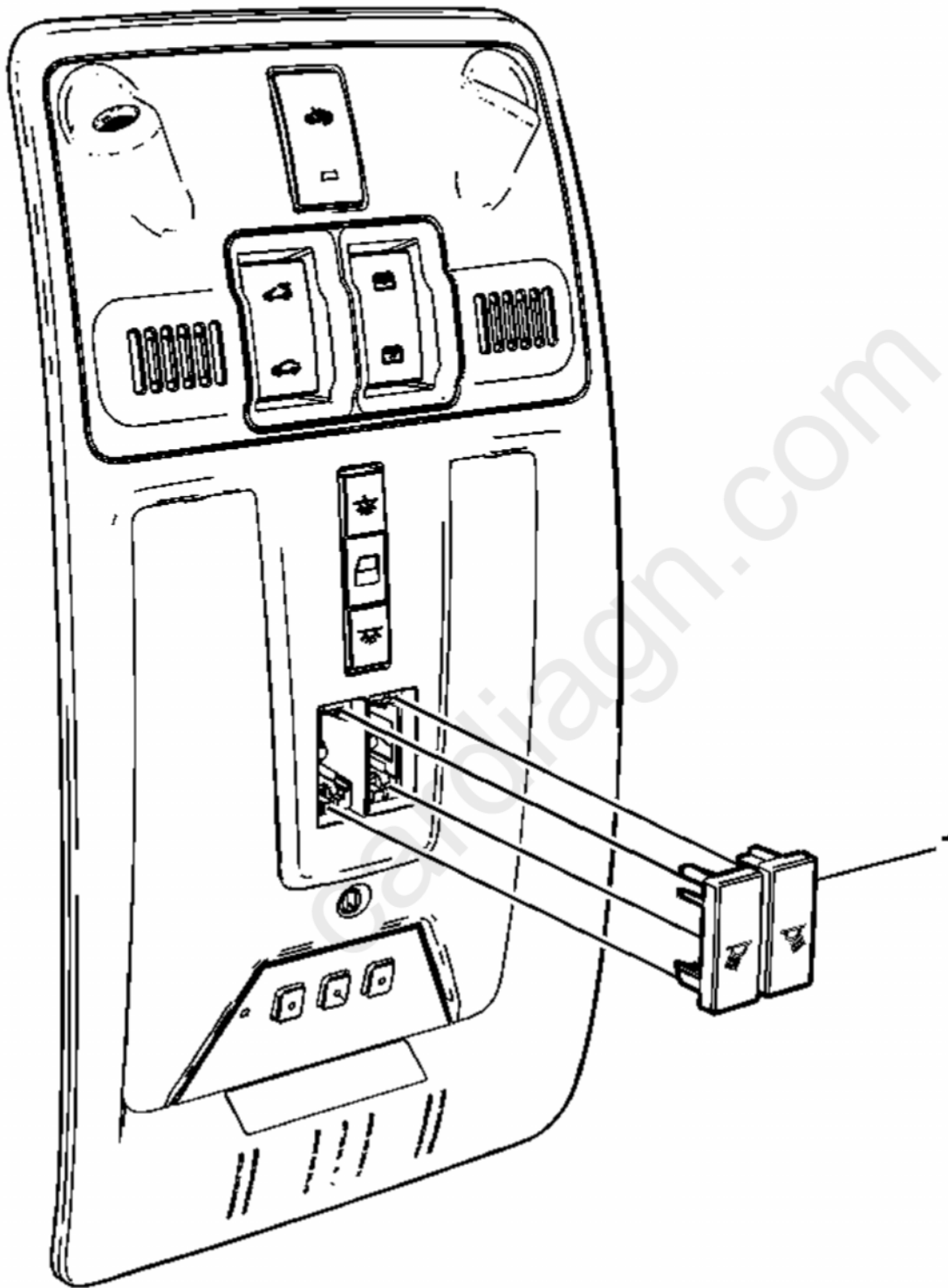


Fig. 22: Identifying Reading Lamp Switch Push- utton
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
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Preliminary Procedure: Remove the roof console. Refer to <u>Roof Console Replacement</u> .	
1	Reading Lamp Switch Push-button Procedure: Press tabs together and remove switch.

DOMES AND READING LAMP SWITCH REPLACEMENT

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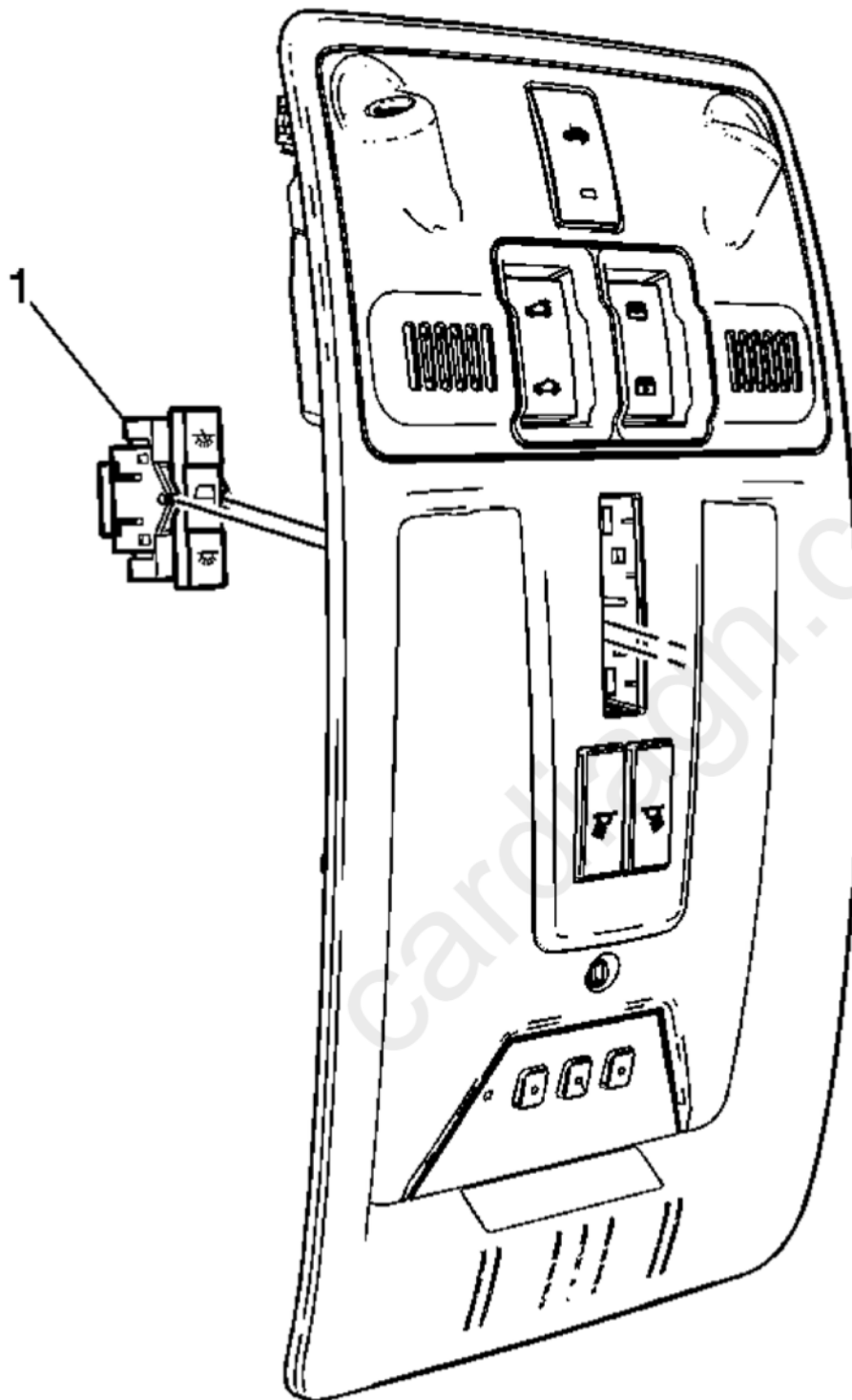


Fig. 23: Identifying Dome and Reading Lamp Switch
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name

Preliminary Procedure:

Remove the roof console. Refer to **Roof Console Replacement** .

1	Dome and Reading Lamp Switch
	1. Disconnect the electrical connector.
	2. Release the tabs and remove the switch.

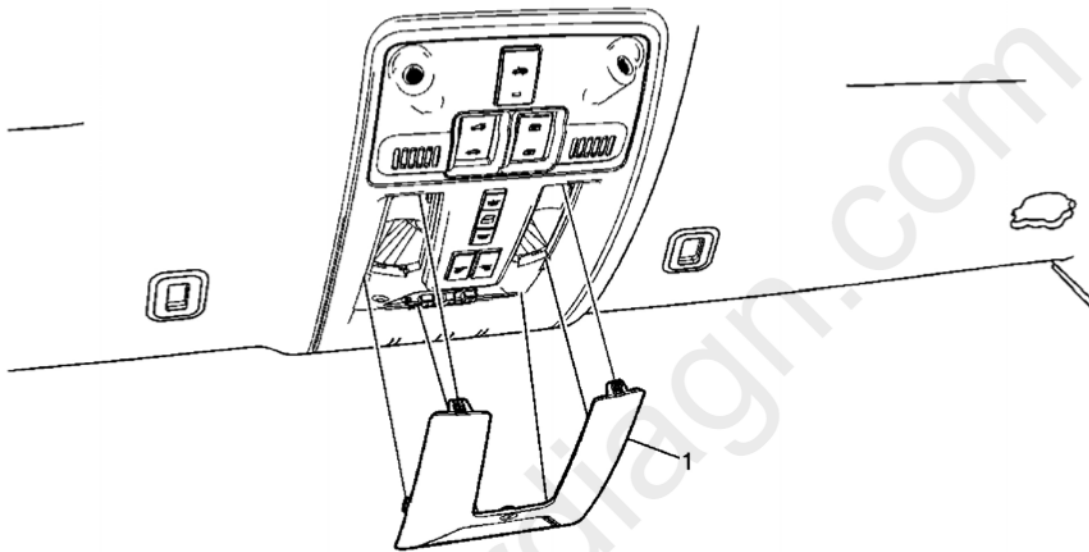
DOME LAMP LENS REPLACEMENT

Fig. 24: Identifying Dome Lamp Lens

Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Dome Lamp Lens Procedure: Using nylon flat bladed tool release the four integral tabs on the lens from the roof console.

INSTRUMENT PANEL COURTESY LAMP REPLACEMENT - LEFT SIDE

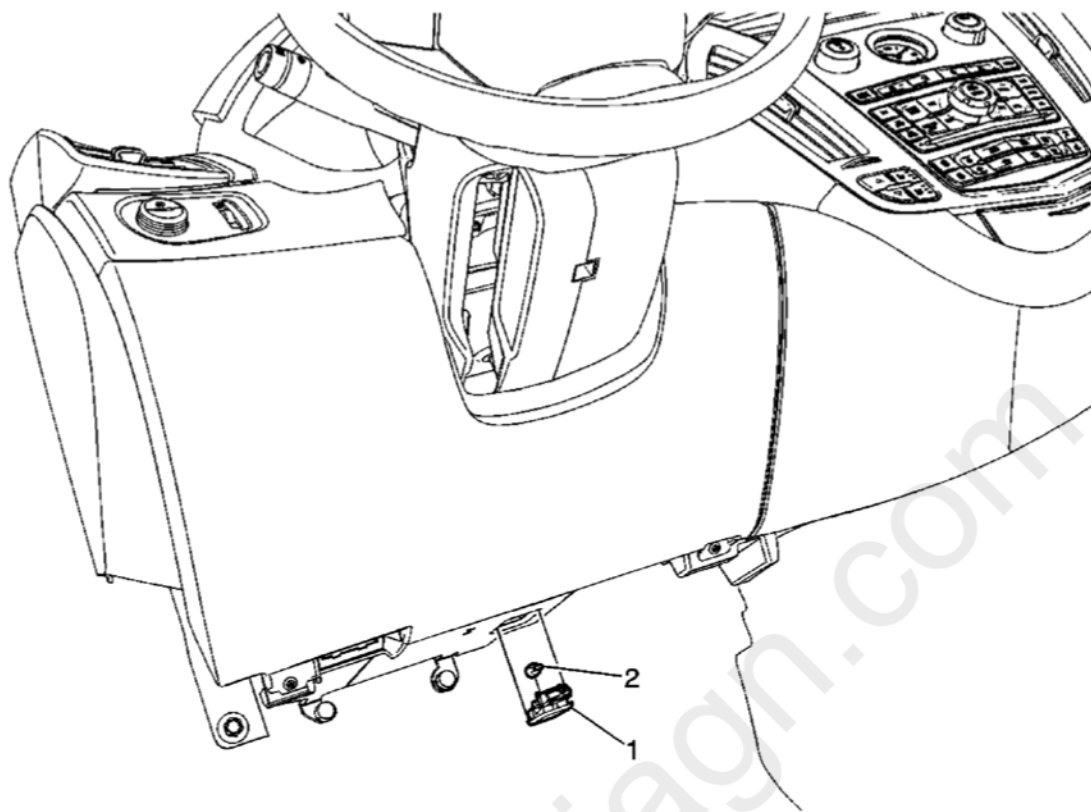


Fig. 25: Identifying Instrument Panel Courtesy Lamp - Left Side
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Instrument Panel Courtesy Lamp Procedure 1. Use a plastic flat-bladed trim tool in order to release the lamp assembly from the drivers side insulator panel. 2. Disconnect the electrical connection.
2	Instrument Panel Courtesy Lamp Bulb

INSTRUMENT PANEL COURTESY LAMP REPLACEMENT - RIGHT SIDE

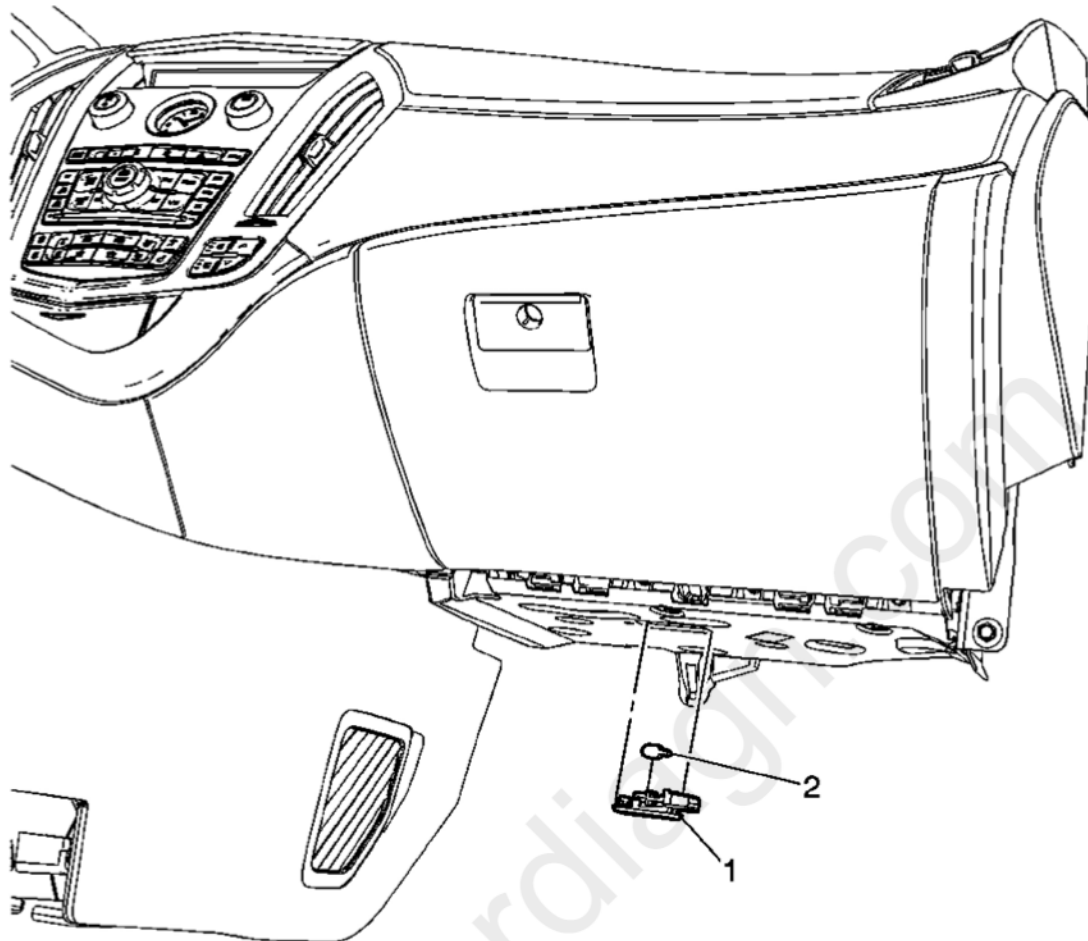


Fig. 26: Identifying Instrument Panel Courtesy Lamp - Right Side
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Instrument Panel Courtesy Lamp Procedure 1. Use a plastic flat-bladed trim tool in order to release the lamp assembly from the instrument panel insulator panel. 2. Disconnect the electrical connection.
2	Instrument Panel Courtesy Lamp Bulb

FRONT FLOOR CONSOLE FLOOD LAMP REPLACEMENT

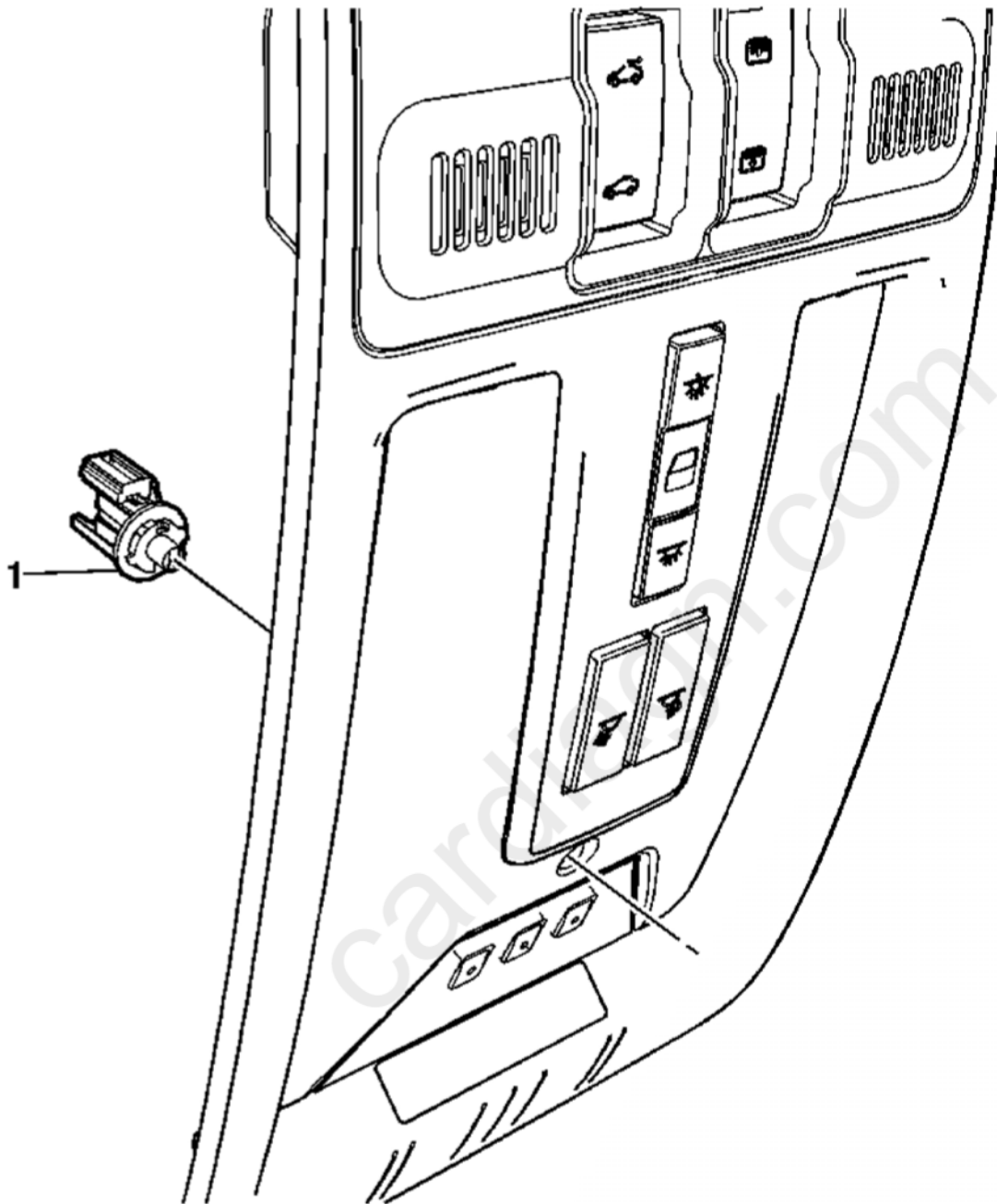


Fig. 27: Identifying Front Floor Console Flood Lamp
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the roof console. Refer to Roof Console Replacement .	
1	Front Floor Console Flood Lamp Procedure:

Disconnect electrical connector.

REAR SIDE DOOR COURTESY LAMP REPLACEMENT

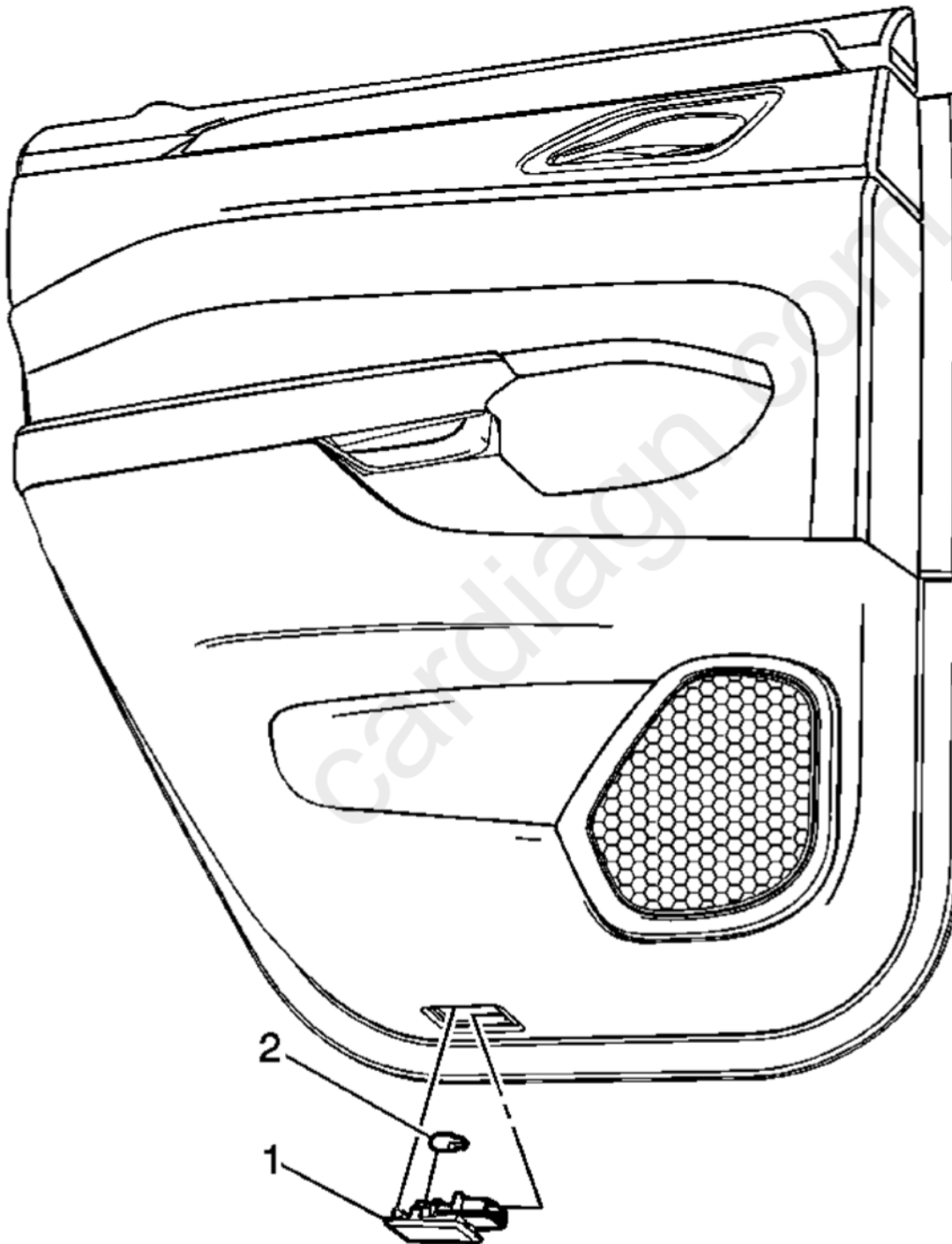


Fig. 28: Identifying Rear Side Door Courtesy Lamp
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Rear Side Door Courtesy Lamp Procedure 1. Depress the clips and use a flat-bladed tool to remove the door courtesy lamp from the door trim panel. 2. Disconnect the electrical connectors.
2	Rear Side Door Courtesy Lamp Bulb

FRONT SIDE DOOR COURTESY LAMP REPLACEMENT

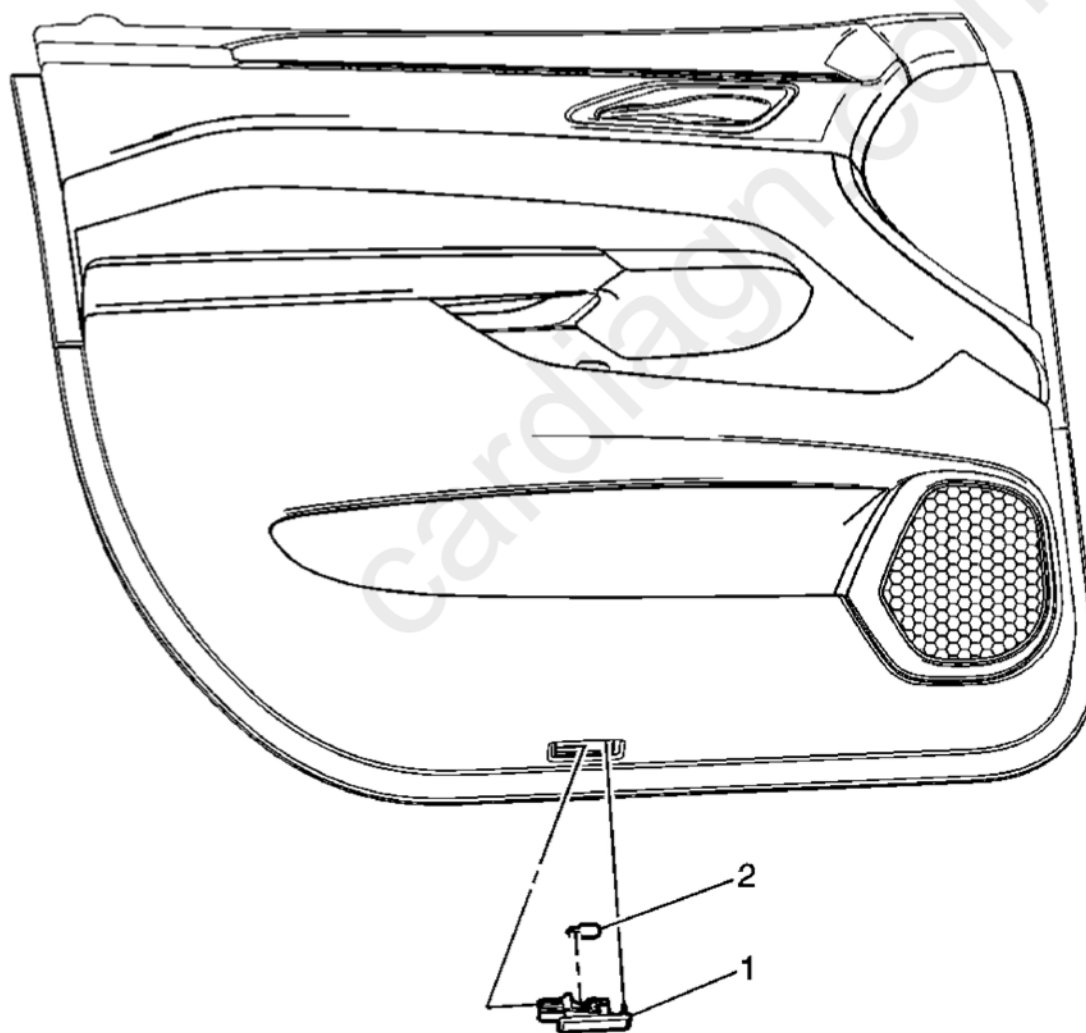


Fig. 29: Identifying Front Side Door Courtesy Lamp
Courtesy of GENERAL MOTORS CORP.

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Callout	Component Name
1	Front Side Door Courtesy Lamp
	Procedure 1. Depress the clips and use a flat-bladed tool to remove the door courtesy lamp from the door trim panel. 2. Disconnect the electrical connectors.
2	Front Side Door Courtesy Lamp Bulb

FRONT SIDE DOOR WARNING LAMP REPLACEMENT

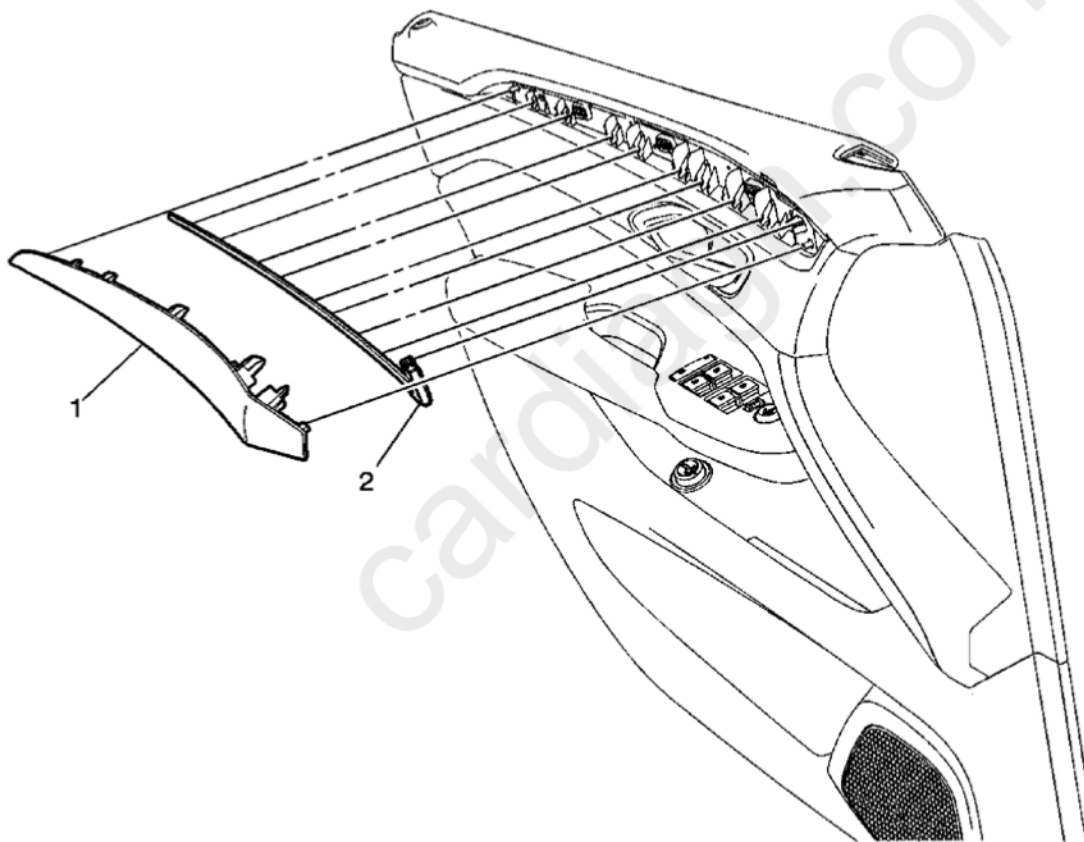


Fig. 30: View Of Front Side Door Warning Lamp
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the front side door trim panel. Refer to <u>Front Side Door Trim Replacement</u>	
1	Front Side Door Applique Refer to <u>Front Side Door Trim Panel Finish Panel Applique Replacement</u> .

2

Front Side Door Warning Lamp

Procedure:

Disconnect the electrical connector.

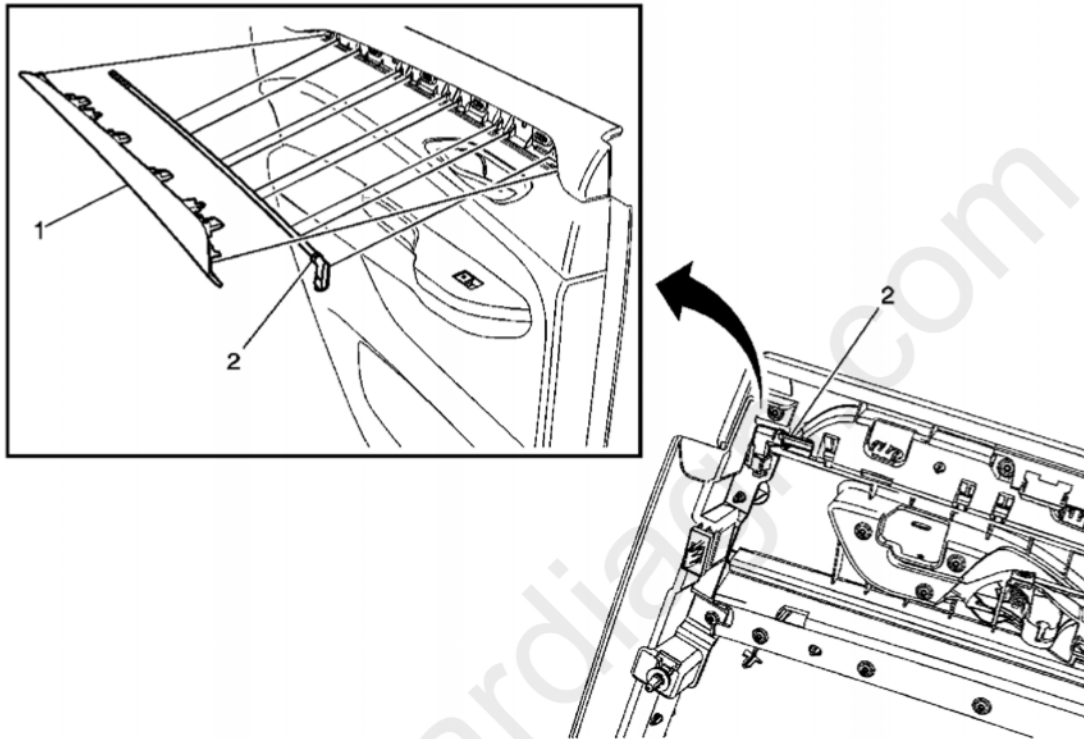
REAR SIDE DOOR WARNING LAMP REPLACEMENT

Fig. 31: View Of Rear Side Door Warning Lamp
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure	
1. Remove the rear side door trim panel. Refer to <u>Rear Side Door Trim Replacement</u>	
2. Disconnect the warning lamp connector.	
1	Rear Side Door Applique Refer to <u>Rear Side Door Trim Panel Applique Replacement</u> .
2	Rear Side Door Warning Lamp Procedure: After the lamp has been disconnected, gently pull connector through opening and remove lamp from integral clips.

INSTRUMENT PANEL FLOOD LAMP REPLACEMENT - LEFT SIDE

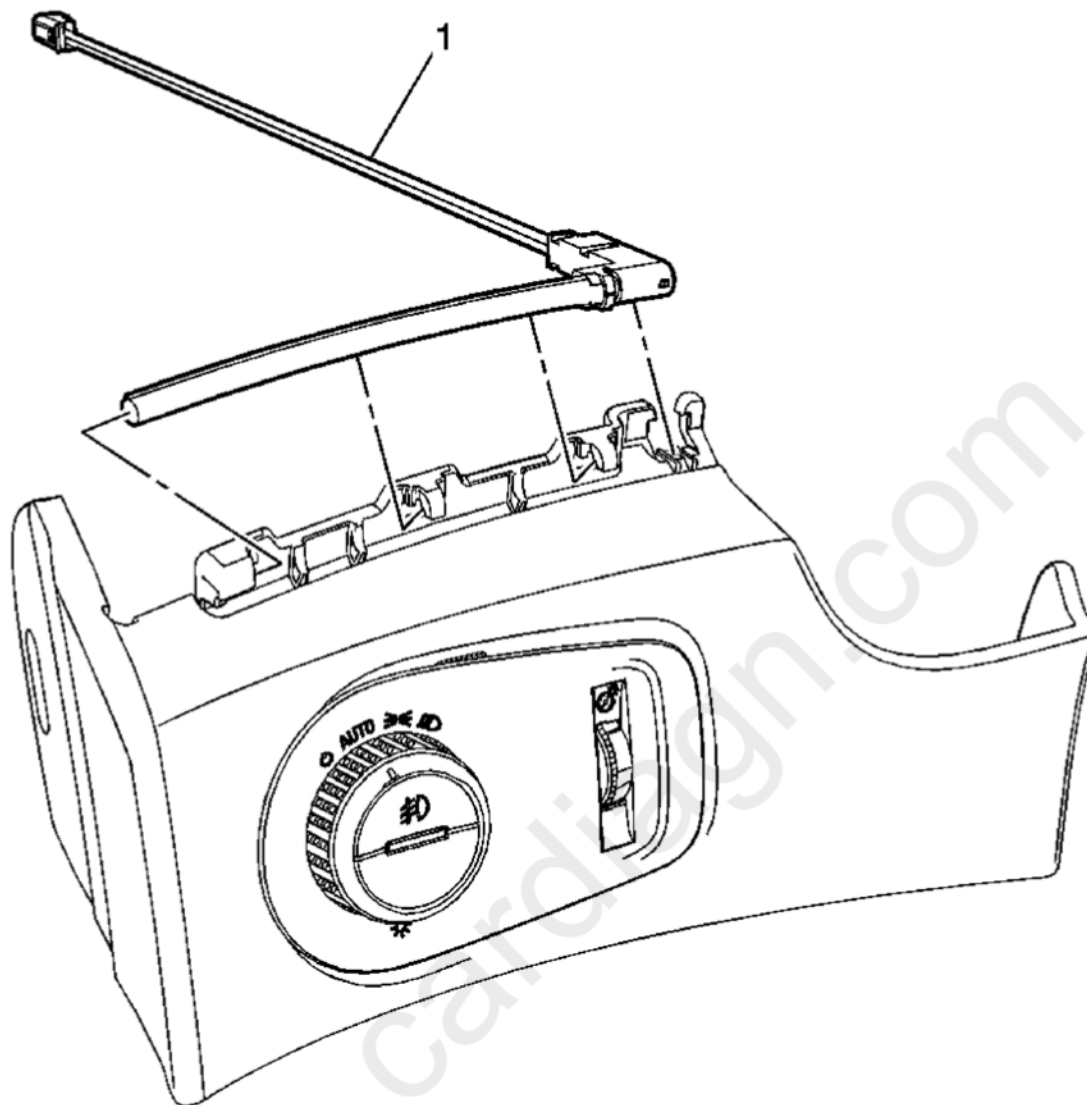


Fig. 32: Identifying Instrument Panel Flood Lamp - Left Side
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the instrument panel accessory switch trim panel - left side. Refer to <u>Instrument Panel Accessory Switch Trim Panel Replacement - Left Side</u>	
1	Instrument Panel Flood Lamp Procedure: Unsnap the flood lamp assembly from instrument panel accessory switch trim panel.

INSTRUMENT PANEL FLOOD LAMP REPLACEMENT - RIGHT SIDE

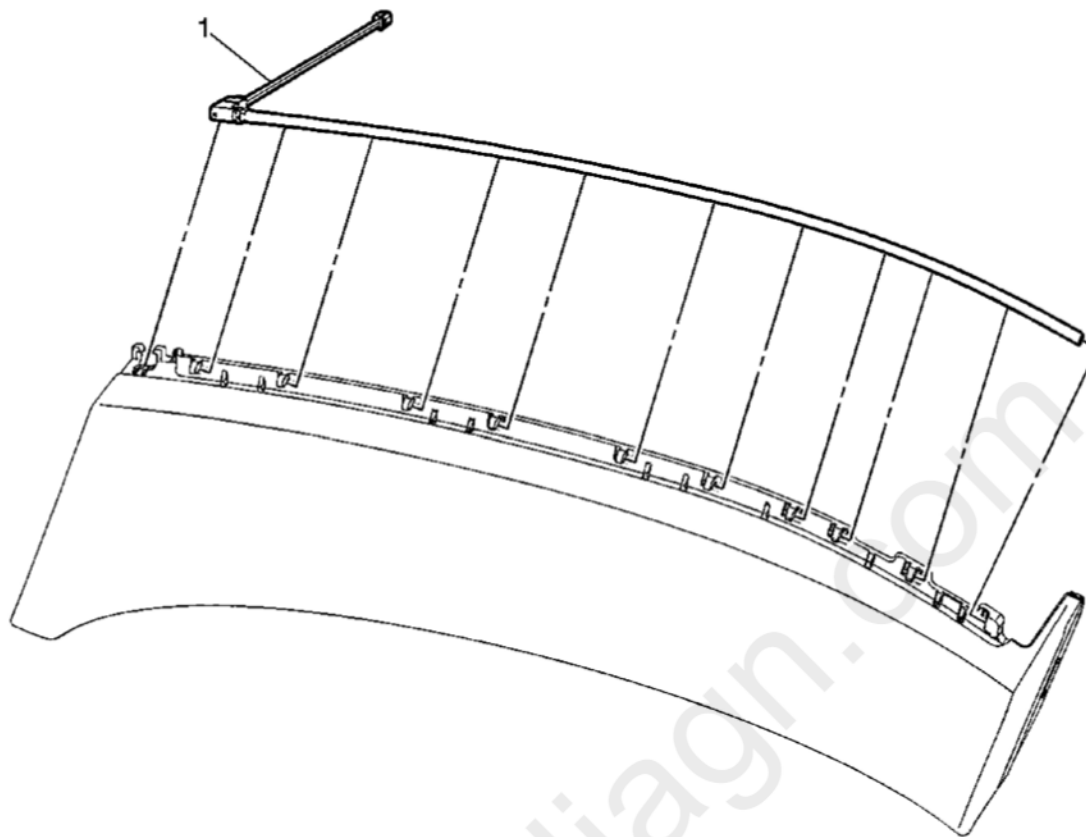


Fig. 33: View Of Instrument Panel Flood Lamp - Right Side
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the instrument panel trim panel. Refer to <u>Instrument Panel Trim Panel Replacement</u>	
1	Instrument Panel Flood Lamp
	Procedure 1. Note the routing of the wiring through the instrument panel assembly to ensure proper reinstallation. 2. Disconnect the electrical connector. 3. Unsnap the flood lamp assembly from the instrument panel trim.

FRONT SEAT BACK COURTESY LAMP REPLACEMENT

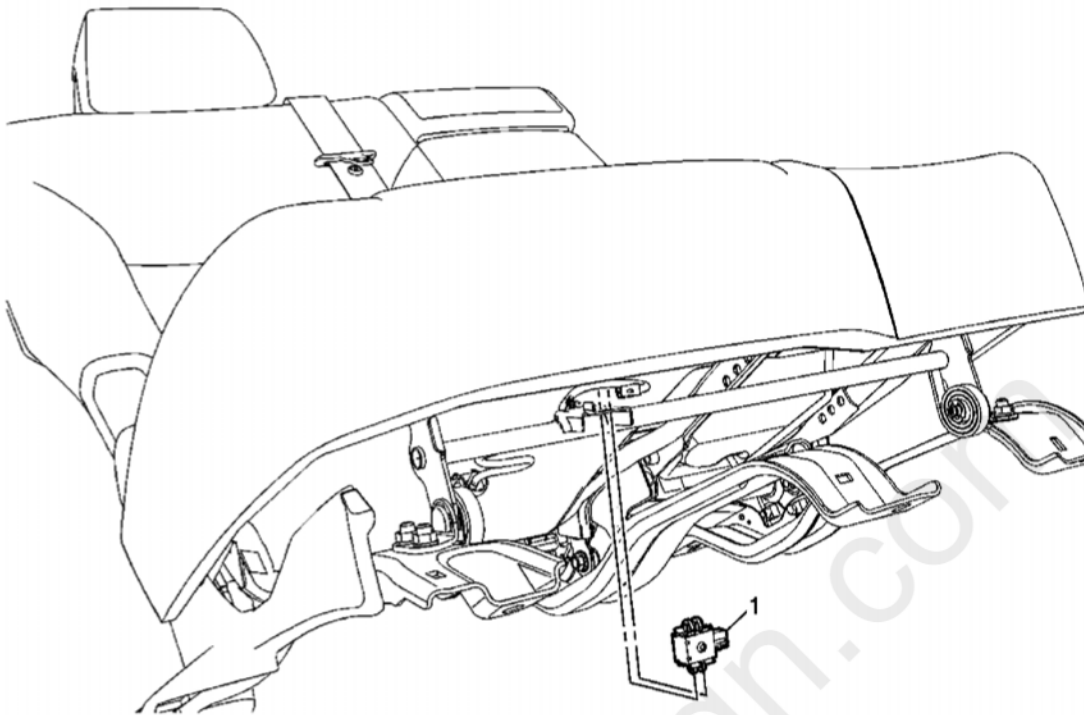


Fig. 34: Identifying Front Seat Back Courtesy Lamp
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Front Seat Back Courtesy Lamp Procedure 1. Disconnect the electrical connector. 2. Squeeze the bottom tabs together and push up to remove.

INSTRUMENT PANEL COMPARTMENT LAMP REPLACEMENT

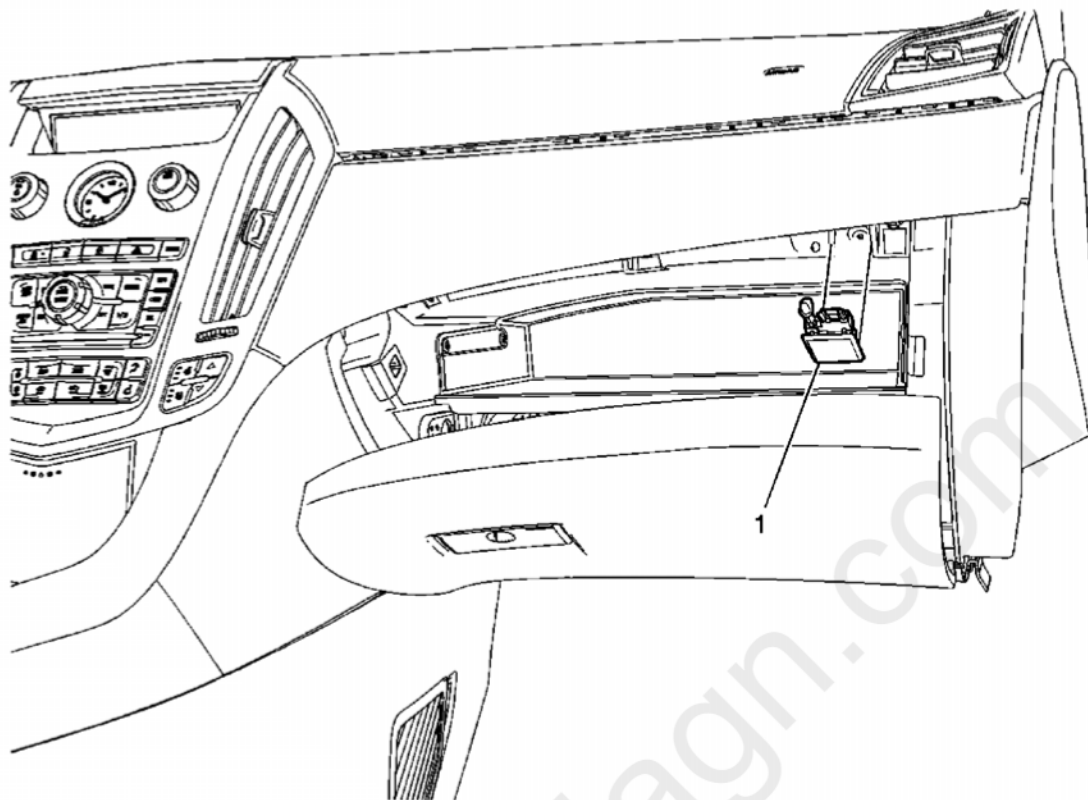


Fig. 35: Identifying Instrument Panel Compartment Lamp
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Instrument Panel Compartment Lamp Procedure 1. Use a plastic flat bladed trim tool in order to release the lamp assembly from the instrument panel compartment housing. 2. Disconnect the electrical connection.

INSTRUMENT PANEL COMPARTMENT LAMP BULB REPLACEMENT

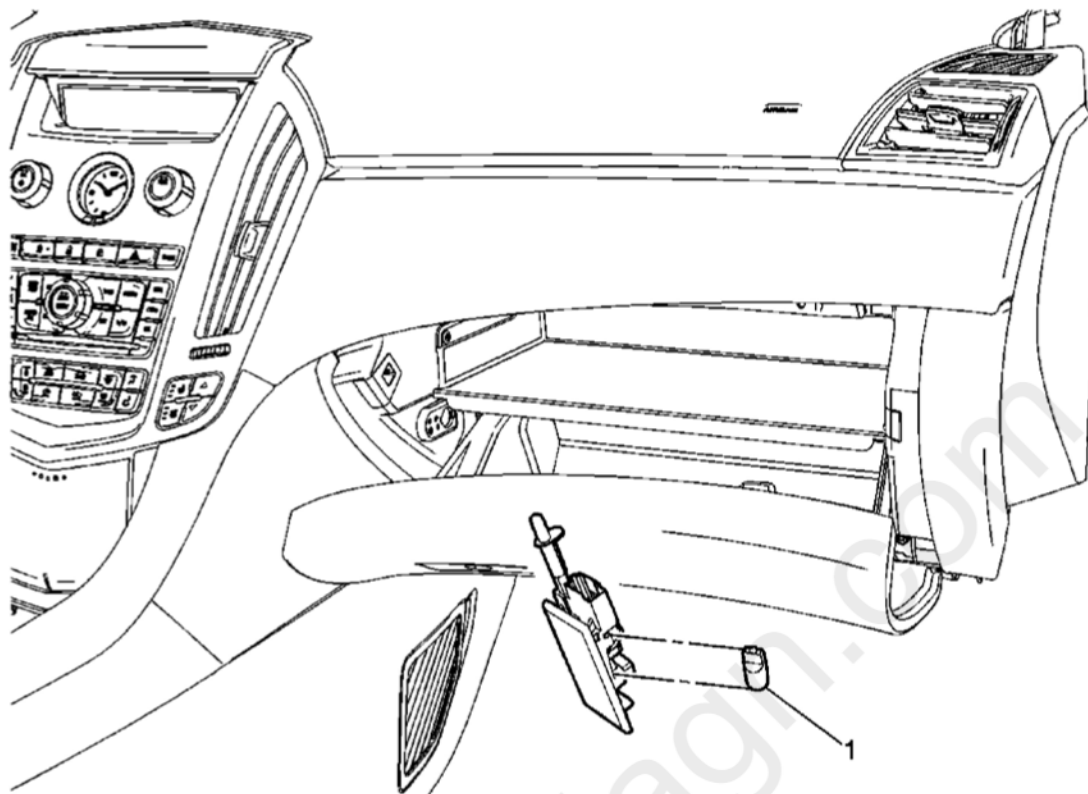


Fig. 36: Identifying Instrument Panel Compartment Lamp Bulb
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the instrument panel compartment lamp. Refer to <u>Instrument Panel Compartment Lamp Replacement</u> .	
1	Instrument Panel Compartment Lamp Bulb

ROOF RAIL COURTESY AND READING LAMP REPLACEMENT

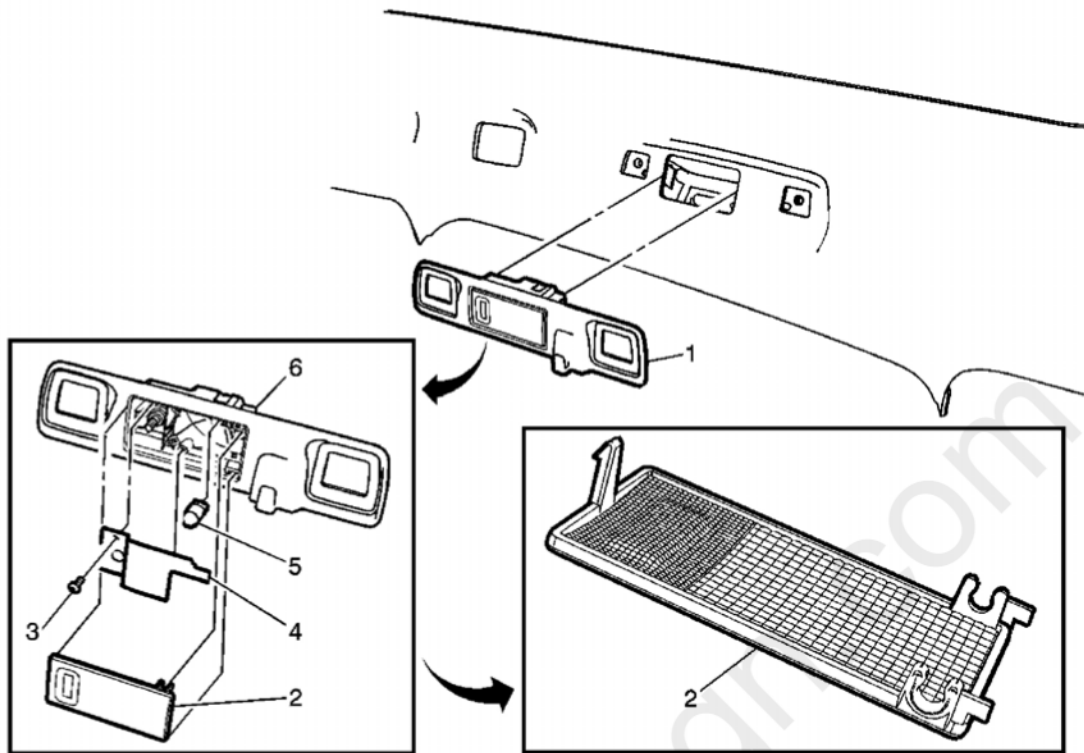


Fig. 37: Locating Roof Rail Courtesy and Reading Lamp
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the roof rail rear assist handle. Refer to Roof Rail Rear Assist Handle Replacement .	
1	Roof Rail Courtesy and Reading Lamp Assembly
2	Roof Rail Courtesy and Reading Lamp Lens Procedure: From the backside of the lamp assembly, using the appropriate tool, depress tab on indented side and then disengage the opposite side of the lens.
3	Light Plate Blocker Bolt CAUTION: Refer to Fastener Caution . Tighten: 2.5 N.m (22 lb in)
4	Light Plate Blocker Tip: Remove blocker, if equipped.
5	Roof Rail Courtesy and Reading Lamp Bulb
6	Roof Rail Courtesy and Reading Lamp Bezel Tip: Remove any protective films from service part.

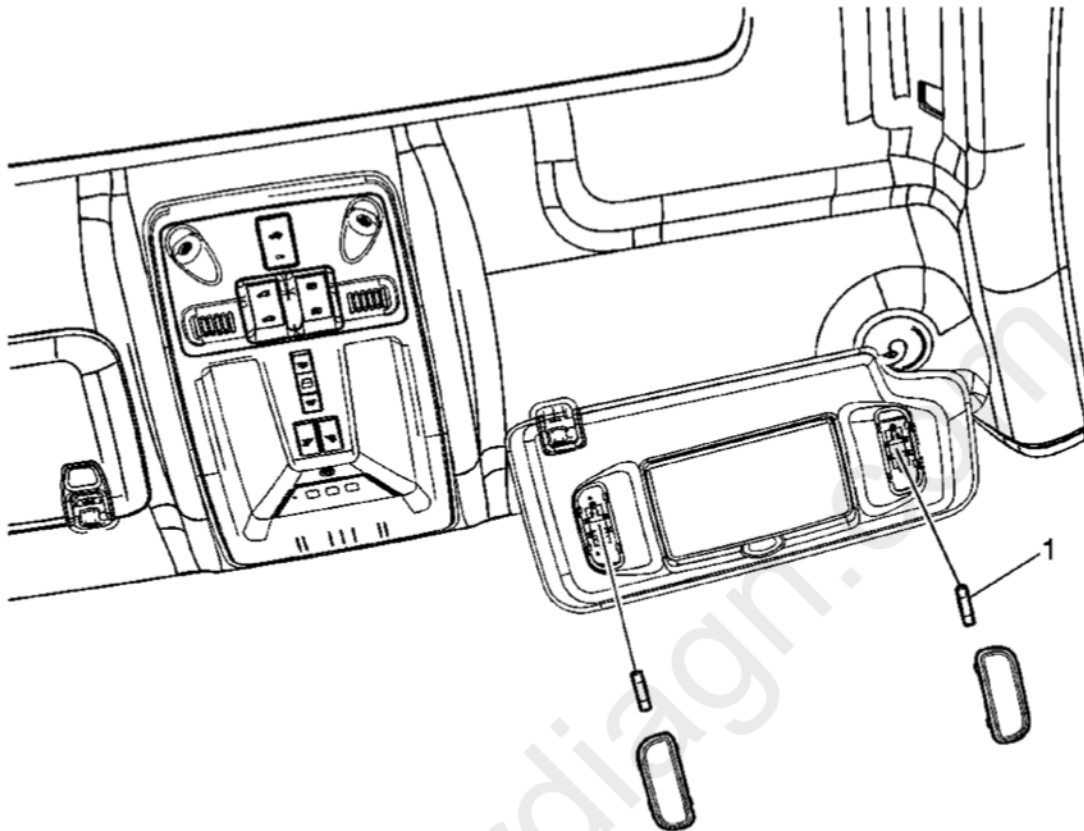
SUNSHADE ILLUMINATED MIRROR LAMP BULB REPLACEMENT

Fig. 38: ie Of Sunshade Illuminated Mirror Lamp Bulb
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the sunshade illuminated mirror lamp lens. Refer to Sunshade Illuminated Mirror Lamp Lens Replacement	
1	Sunshade Illuminated Mirror Lamp Bulb

SUNSHADE ILLUMINATED MIRROR LAMP LENS REPLACEMENT

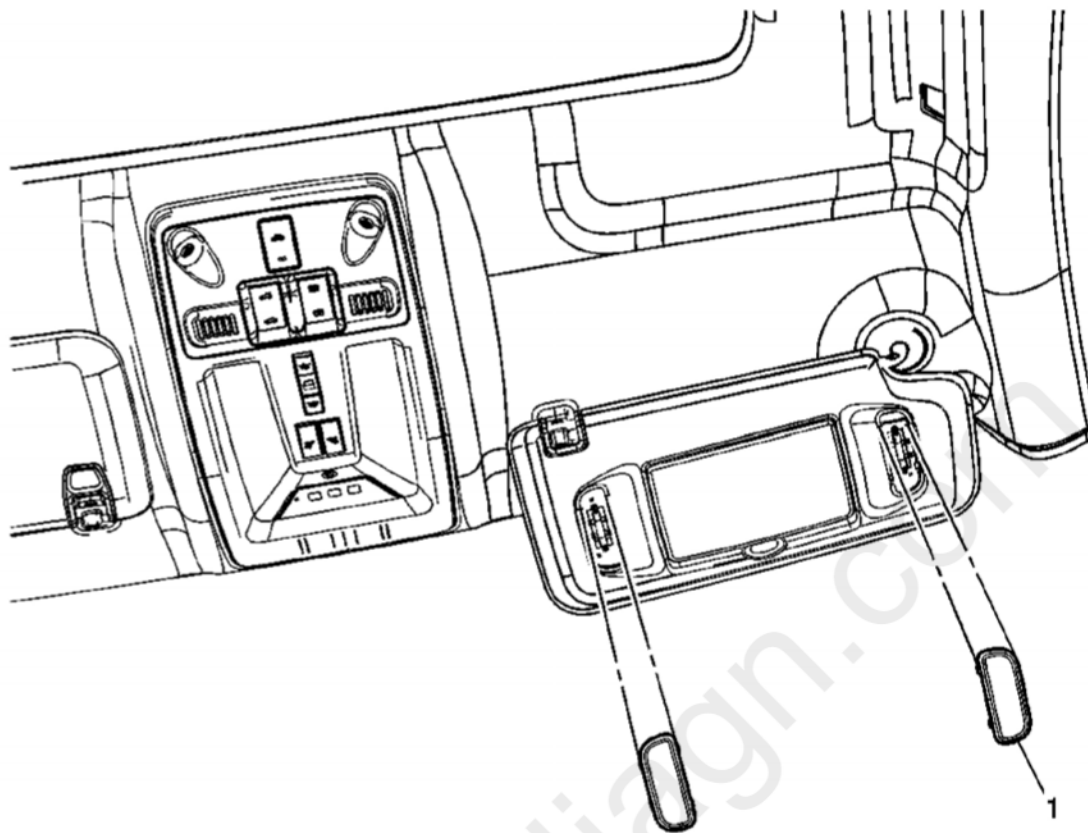


Fig. 3 : Identifying Sunshade Illuminated Mirror Lamp Lens
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Sunshade Illuminated Mirror Lamp Lens Procedure: Carefully use a flat bladed tool, and release the tabs retaining the lamp lens to the sunshade assembly.

DOME LAMP BULB REPLACEMENT

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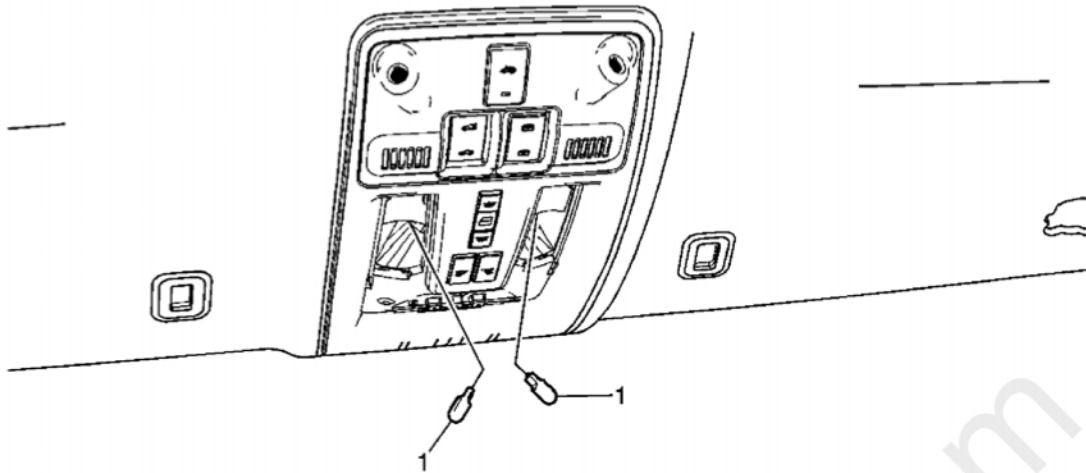
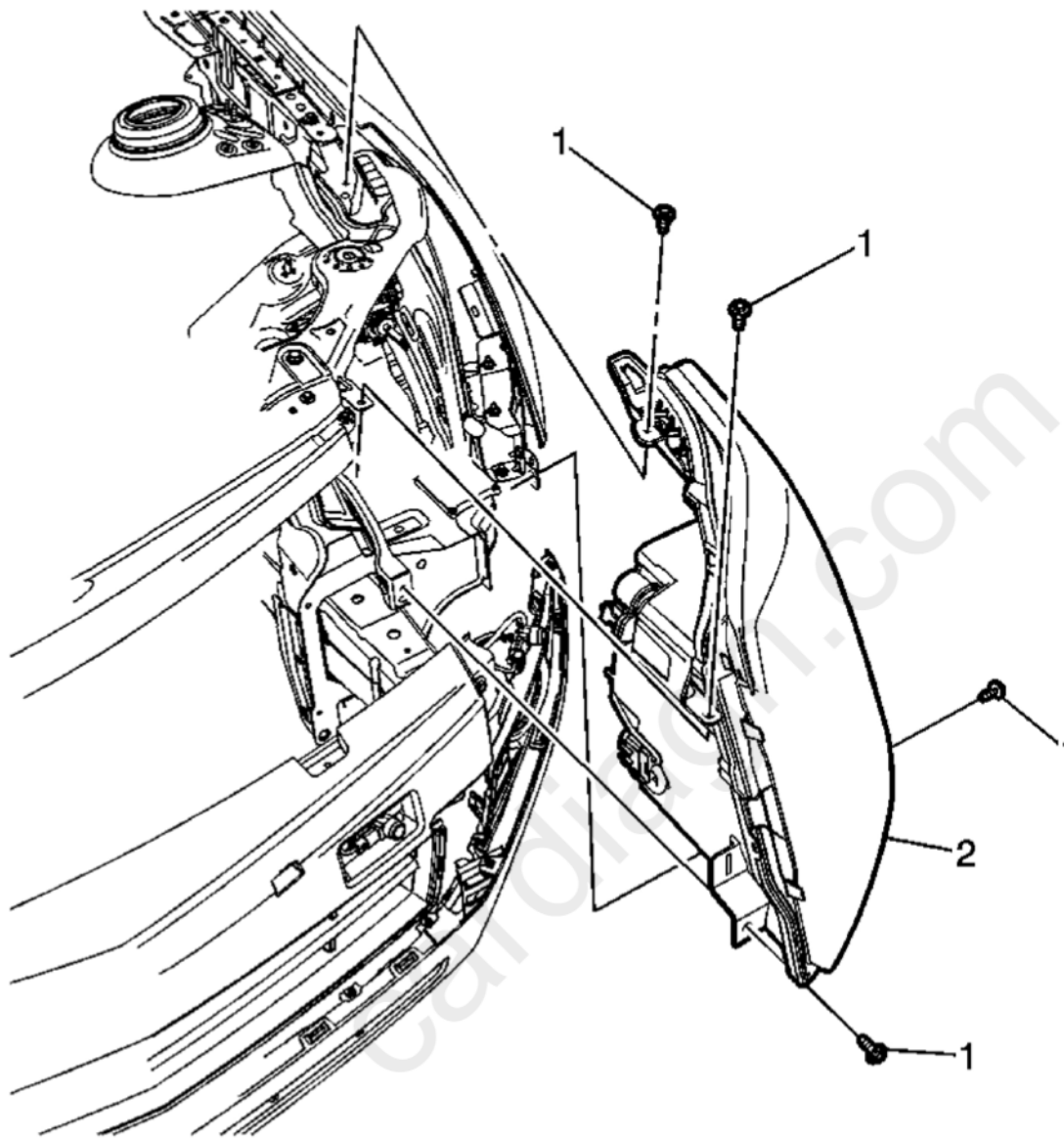


Fig. 40: Identifying Dome Lamp Bulb
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the dome lamp lens. Refer to <u>Dome Lamp Lens Replacement</u> .	
1	Dome Lamp Bulb

HEADLAMP REPLACEMENT

**Fig. 41: Identifying Headlamp**

Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure	
1.	Open and support the hood.
2.	Remove the front bumper fascia. Refer to Front Bumper Fascia Replacement .
3.	Remove the front compartment side sight shields. Refer to Front Compartment Side Sight Shield Replacement .
4.	Disconnect the headlamp electrical connector at the base of the headlamp assembly.
	Headlamp Assembly Screw (Qty: 4)

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1	CAUTION: Refer to <u>Fastener Caution</u> . Tighten: 6 N.m (53 lb in)
2	Headlamp Assembly ARNIN : Refer to <u>alogen ulb arning</u> . Procedure 1. Remove both accessory bulb covers and transfer. 2. Disconnect the electrical connectors from the headlamp bulbs. 3. Remove the low beam bulb and transfer. 4. Remove the high beam bulb and transfer. 5. Disengage the park turn signal bulb socket and transfer the bulb.

HEADLAMP BULB REPLACEMENT - LEFT SIDE (T84, T85)

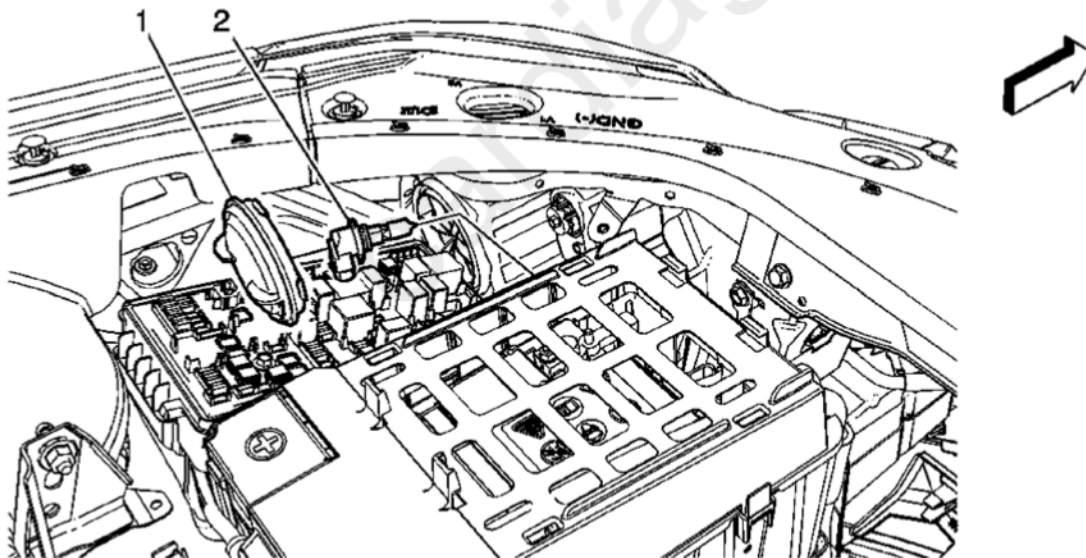


Fig. 42: Identifying Headlamp Bulb - Left Side (T84, T85)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure	
1.	Remove the under electrical center (UEC) cover.

2. Disengage the three locking tabs from the cover and remove.	
1	Headlamp Bulb Accessory Cover Procedure: Rotate the cover counter-clockwise and remove. Tip: Notice the direction of the arrow on the cover, ensure the arrow points downward upon re-installing the cover.
2	Headlamp Bulb (High Beam) ARNIN : Refer to <u>alogen ulb arning</u> . Procedure 1. Disconnect the electrical connector prior to removing the headlamp bulb from the headlamp assembly. 2. Rotate the bulb socket counter-clockwise and remove.

HEADLAMP BULB REPLACEMENT - RIGHT SIDE (T84, T85)

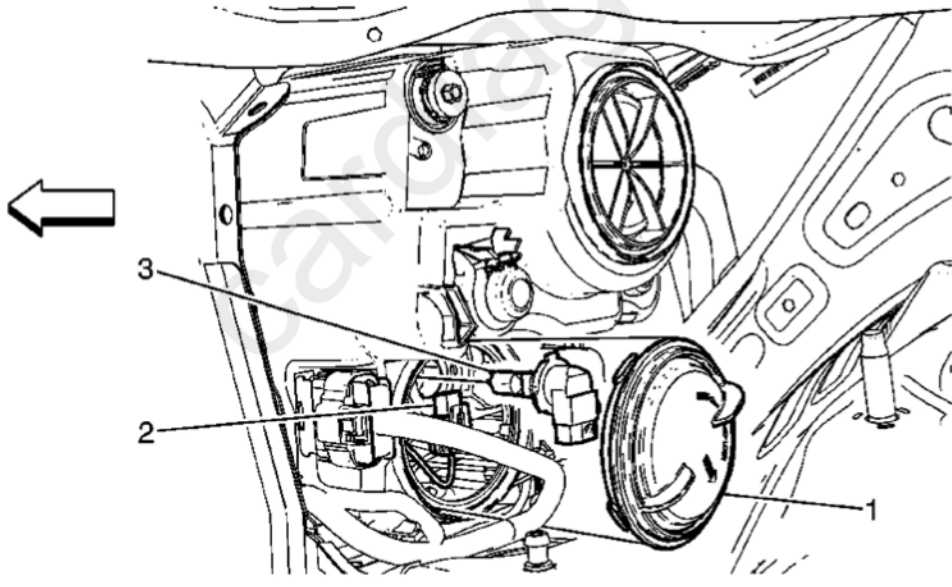


Fig. 43: Identifying Headlamp Bulb - Right Side (T84, T85)
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the air cleaner assembly. Refer to <u>Air Cleaner Assembly Replacement (LF1)</u> or <u>Air Cleaner Assembly Replacement (LAU)</u> .	
	Headlamp Bulb Accessory Cover

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1	Procedure: Rotate the cover counter-clockwise and remove. Tip: Note the direction of the arrow on the cover, ensure the arrow points downward upon re-installing the cover to the headlamp.
2	Headlamp Bulb Electrical Connector Tip: Disconnect prior to removing the headlamp bulb from the headlamp housing.
3	Headlamp Bulb (High Beam) ARNIN : Refer to <u>halogen bulb arning</u> . Procedure: Rotate the bulb socket counter-clockwise and remove.

HEADLAMP BALLAST REPLACEMENT (TT6, TT7, TT8)

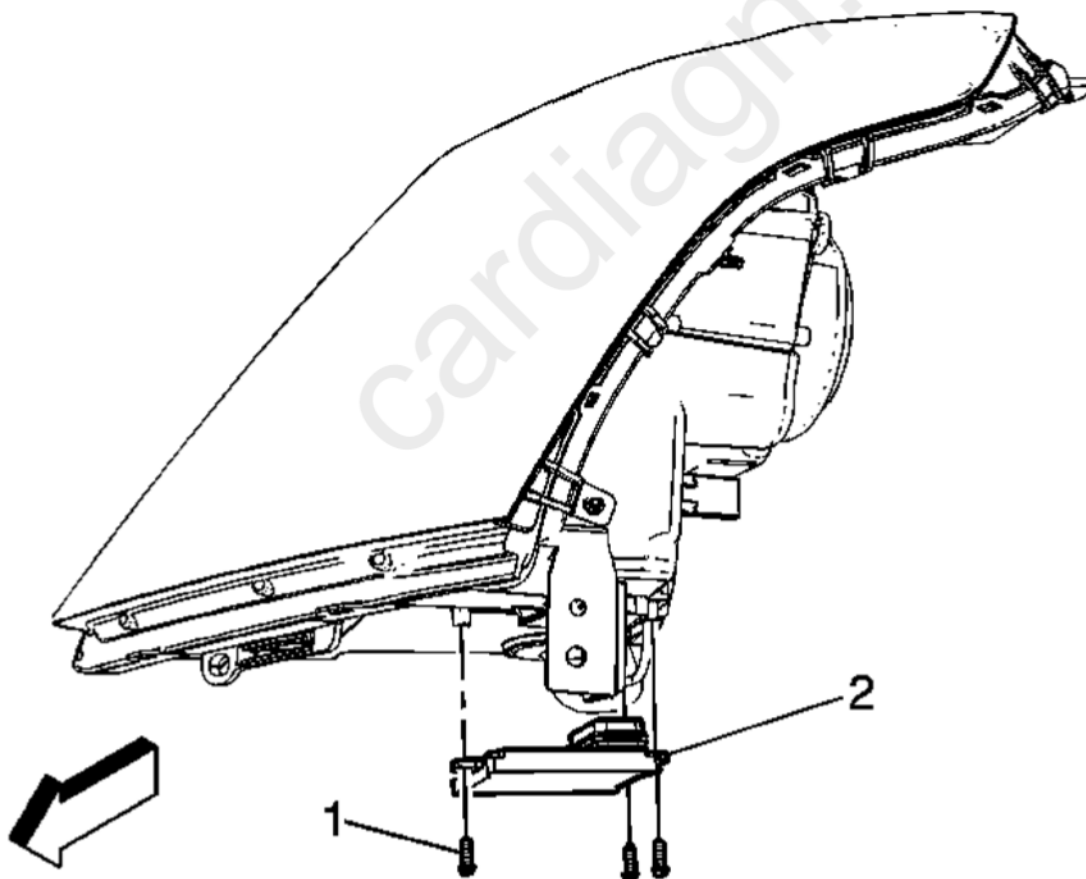


Fig. 44: Identifying Headlamp Ballast (TT6, TT7, TT8)
Courtesy of GENERAL MOTORS CORP.

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Callout	Component Name
ARNIN :	
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.	
ARNIN :	
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.	
Preliminary Procedure: Remove the headlamp capsule. Refer to <u>Headlamp Capsule Replacement (TT6, TT7, TT8)</u> .	
1	Headlamp Ballast Screw (Qty: 3) Tip: Hand tighten the ballast screws.
2	Headlamp Ballast Tip: Ensure the ballast seal is properly seated onto the ballast prior to installing the ballast to the headlamp capsule.

HEADLAMP IGNITOR REPLACEMENT (TT6, TT7, TT8 PASSENGER SIDE)

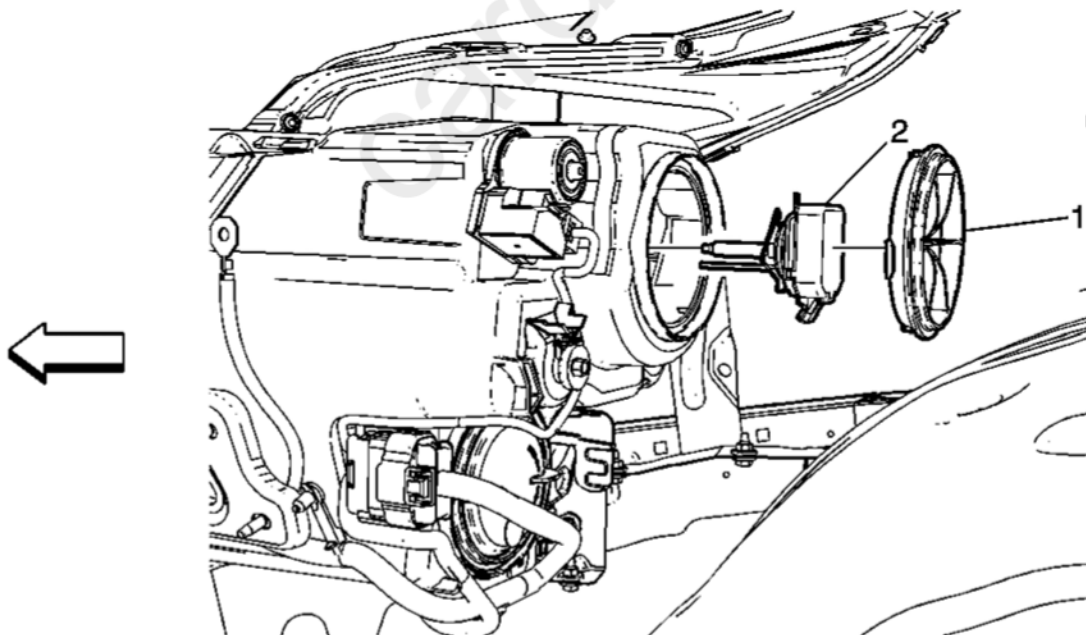


Fig. 45: Identifying Headlamp Ignitor (TT6, TT7, TT8 Passenger Side)
Courtesy of GENERAL MOTORS CORP.

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Callout	Component Name
ARNIN :	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. ARNIN : 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 ballast. Refer to <u>Headlamp Ballast Replacement (TT6, TT7, TT8)</u>.
1	Headlamp Bulb Accessory Cover Procedure: Rotate the cover counter clockwise a quarter turn and remove from the headlamp capsule.
2	Headlamp Ignitor Assembly ARNIN : Refer to <u>Halogen Bulb Warning</u>. Procedure 1. Release the retention spring in order to remove the high intensity discharge (HID) ignitor bulb. 2. Disconnect the electrical connector. 3. Rotate the ignitor bulb and remove.

HEADLAMP IGNITOR REPLACEMENT (TT6, TT7, TT8 DRIVER SIDE)

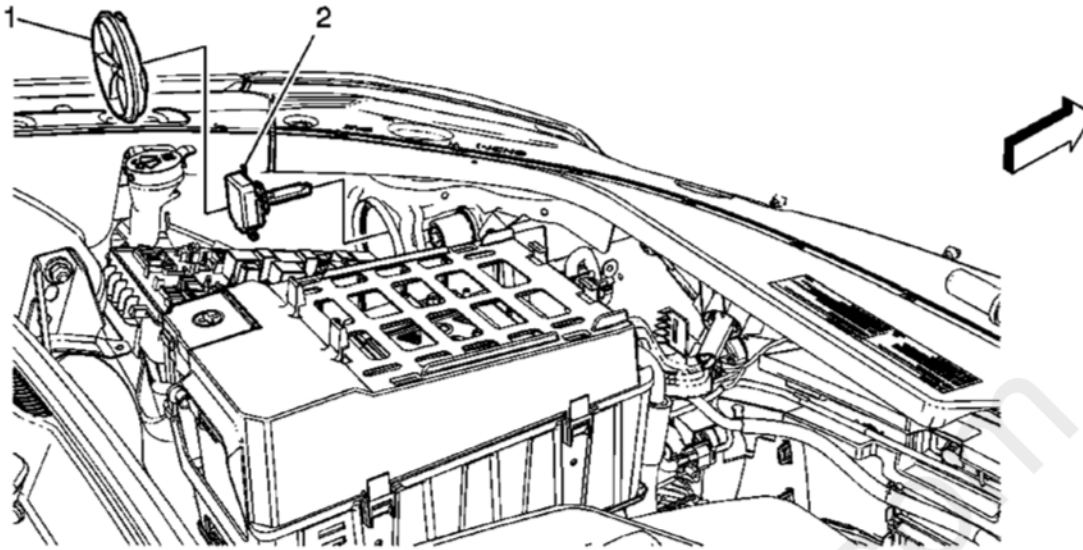


Fig. 46: Identifying Headlamp Ignitor (TT6, TT7, TT8 Driver Side)
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
ARNIN : 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. ARNIN : 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 ballast. Refer to <u>Headlamp Ballast Replacement (TT6, TT7, TT8).</u>	
1	Headlamp Bulb Accessory Cover Procedure: Rotate the cover counter clockwise a quarter turn and remove from the headlamp capsule.
2	Headlamp Ignitor Assembly ARNIN : Refer to <u>halogen bulb wiring</u> . Procedure

1. Release the retention spring in order to remove the high intensity discharge (H D) ignitor bulb.
2. Disconnect the electrical connector.
3. Rotate the ignitor bulb and remove.

HEADLAMP CAPSULE REPLACEMENT (TT6, TT7, TT8)

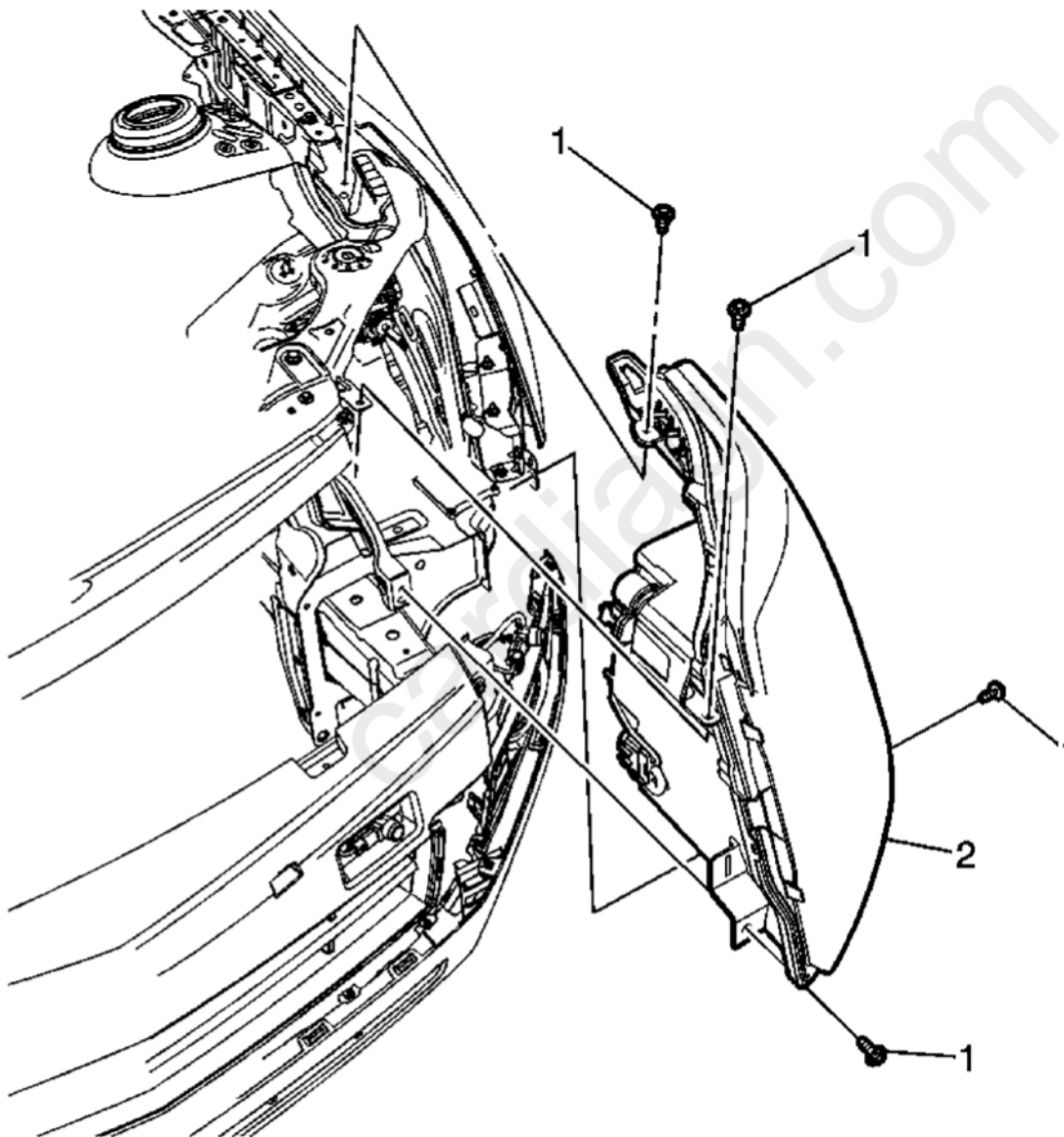


Fig. 47: Identifying Headlamp Capsule (TT6, TT7, TT8)

Courtesy of GENERAL MOTORS CORP.

Callout	Component Name

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ARNIN :

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.

ARNIN :

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. Open and support the hood.
2. Remove the front bumper fascia. Refer to **Front Bumper Fascia Replacement**.
3. Remove the front compartment side sight shields. Refer to **Front Compartment Side Sight Shield Replacement**.
4. Disconnect the headlamp electrical connector at the base of the headlamp assembly.

1

Headlamp Assembly Screw (Qty: 4)

CAUTION:

Refer to **Fastener Caution**.

Tighten: 6 N.m (53 lb in)

2

Headlamp Capsule Assembly

ARNIN :

Refer to **Halogen Bulb Warning**.

Procedure

1. Carefully move the headlamp capsule assembly upward and outward in order to remove.
2. Remove and transfer both headlamp bulb accessory covers and gaskets.
3. Disconnect the electrical connectors.
4. Remove and transfer the headlamp ignitor bulb.
5. Remove and transfer the daytime running lamp (DRL) bulb.
6. Disengage the park turn signal lamp socket.
7. Remove and transfer the park turn signal lamp bulb.

HEADLAMP AIMING

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The vehicle has a visual optical headlamp aiming system. The headlamp aiming system has been preset at the factory.

However, If the vehicle is damaged in an accident, the aim of the headlamps can be affected and adjustment could be necessary.

The vehicle should be properly prepared as follows:

- The vehicle should be placed so the headlamps are 25 ft (7.6 m) from a light colored wall or other flat surface.
- The vehicle must have all four tires on a perfectly level surface which is level all the way to the wall or other flat surface.
- The vehicle should be placed so it is perpendicular to the wall or other flat surface.
- The vehicle should not have any snow, ice or mud on it.
- The vehicle should be fully assembled and all other work stopped while headlamp aiming is being done.
- The vehicle should be normally loaded with a full tank of fuel and one person or 160 lbs (75 kg) on the driver seat.
- Tires should be properly inflated.

Headlamp aiming is done with the vehicle low-beam headlamps. The high-beam headlamps will be correctly aimed if the low-beam headlamps are aimed properly.

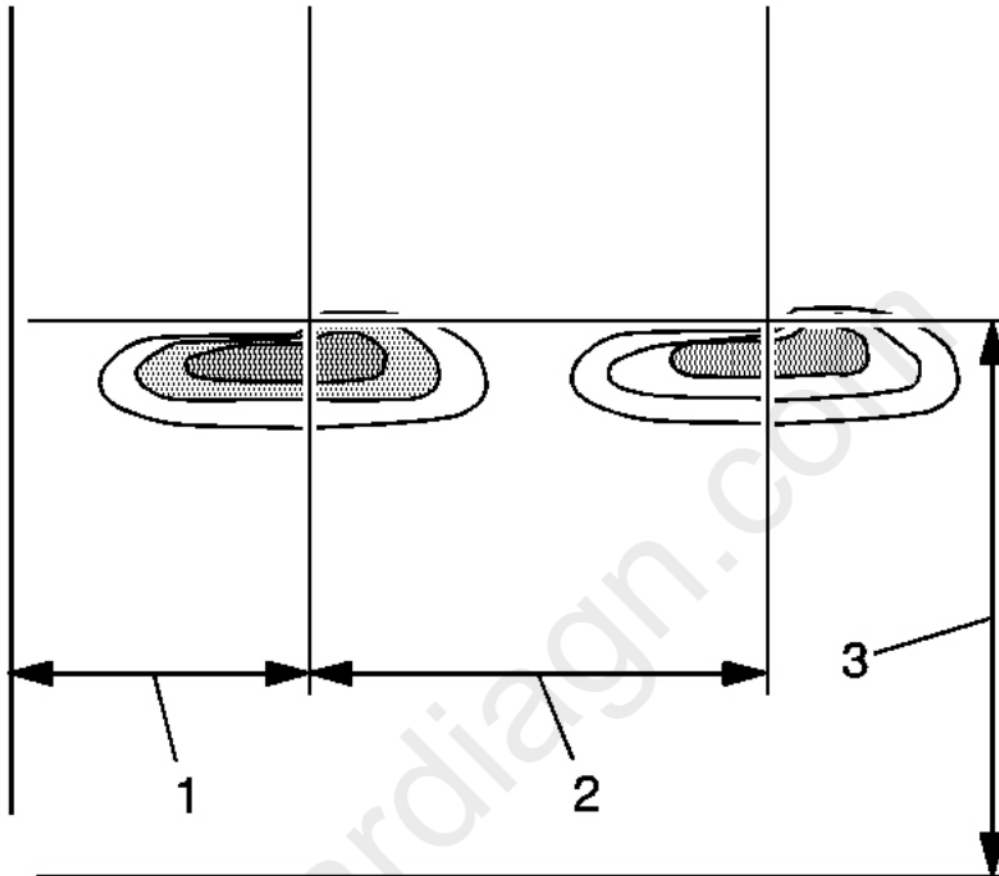


Fig. 48: View Of Headlamp Bulb Centerline
Courtesy of GENERAL MOTORS CORP.

1. To adjust the vertical aim:
2. Locate the aim point at the center inner projector condensing lens of the low beam headlamp (not the outer lens).
3. Measure the distance from the ground to the aim dot on the low beam headlamp.
4. Record the distance.
5. At the wall, measure from the ground upward to the recorded distance from step 3, and draw or tape a horizontal line (3) the width of the vehicle.

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.

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6. Turn on the low-beam headlamps and place a piece of cardboard or equivalent in front of the headlamp not being adjusted. This only allows the beam of light from the headlamp being adjusted to be seen on the flat surface.
7. Locate the vertical aiming screws, which are under the hood near each headlamp assembly.
8. For the vehicle that is equipped with a Base headlamp (halogen bulb), there will be one vertical headlamp aiming screw (V1).
9. The aiming screw (V1) is adjusted from the engine compartment side of the beauty cover.
10. For the vehicle that is equipped with an Up-level headlamp (HID), there will be two vertical headlamp aiming screws (V1 and V2).
11. The aiming screw (V1) is adjusted from the engine compartment side of the beauty cover and the aiming screw (V2) is adjusted through the access hole in the beauty cover.
12. For the Base vehicle, turn the vertical aiming screw (V1) until the headlamp beam is aimed to the horizontal tape line. Turn it clockwise or counter-clockwise to raise or lower the angle of the beam.
13. For the Up-level vehicle, turn the vertical aiming screws (V1 and V2) simultaneously until the headlamp beam is aimed to the horizontal tape line. Turn them clockwise or counter-clockwise to raise or lower the angle of the beam.
14. Make sure that the light from the headlamp is positioned at the bottom edge (1,2) of the horizontal tape line (3).
15. Repeat steps 7 through 14 for the opposite headlamp.

HEADLAMP LEVELING FRONT SUSPENSION HEIGHT SENSOR REPLACEMENT

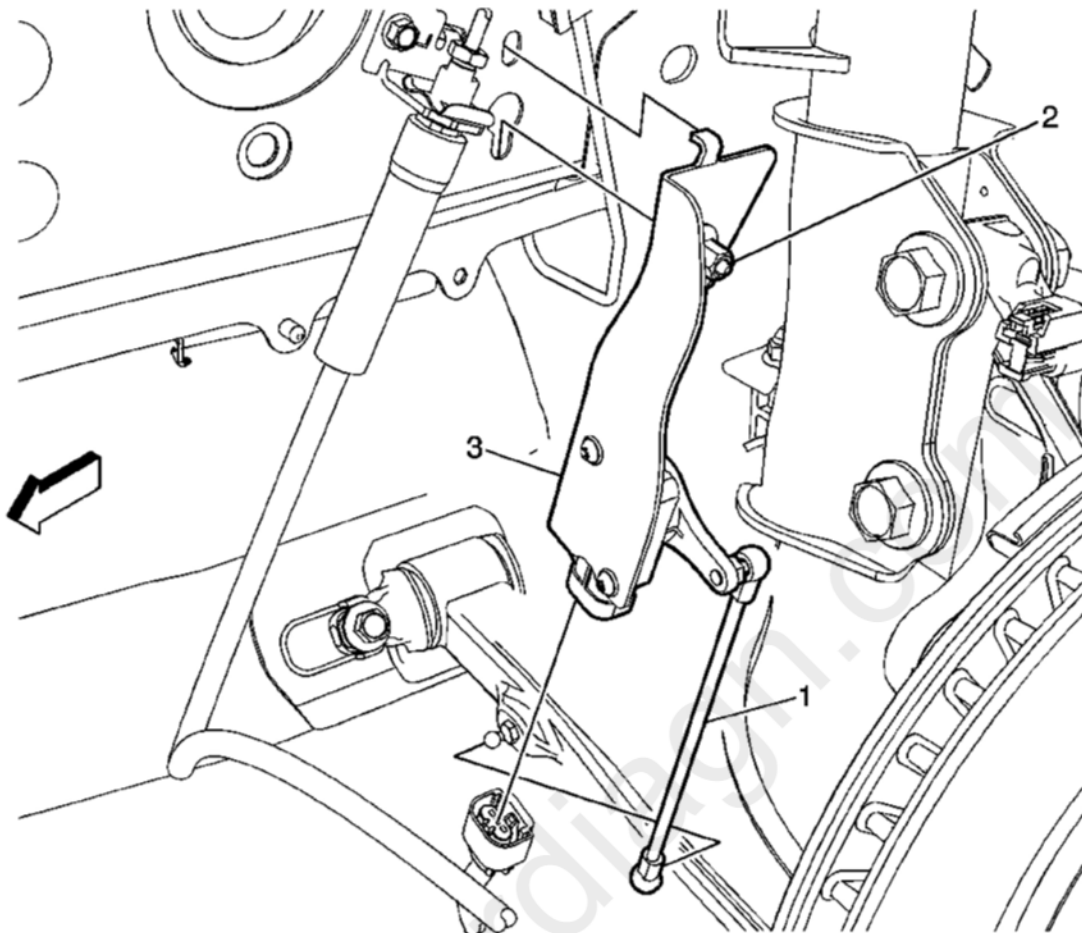


Fig. 4 : View Of Headlamp Leveling Front Suspension Height Sensor
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures	
1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> . 2. Remove the left front wheel and tire assembly. Refer to <u>Tire and Wheel Removal and Installation</u> . 3. Disconnect the headlamp leveling front suspension height sensor electrical connector.	
1	Headlamp Leveling Front Suspension Height Sensor Socket Procedure: Disconnect the headlamp leveling front suspension height sensor socket from the ball stud.
2	Headlamp Leveling Front Suspension Height Sensor Fastener CAUTION: Refer to <u>Fastener Caution</u> .

Tighten: 8 N.m (71 lb in)

3 Headlamp Leveling Front Suspension Height Sensor

HEADLAMP LEVELING REAR SUSPENSION HEIGHT SENSOR REPLACEMENT

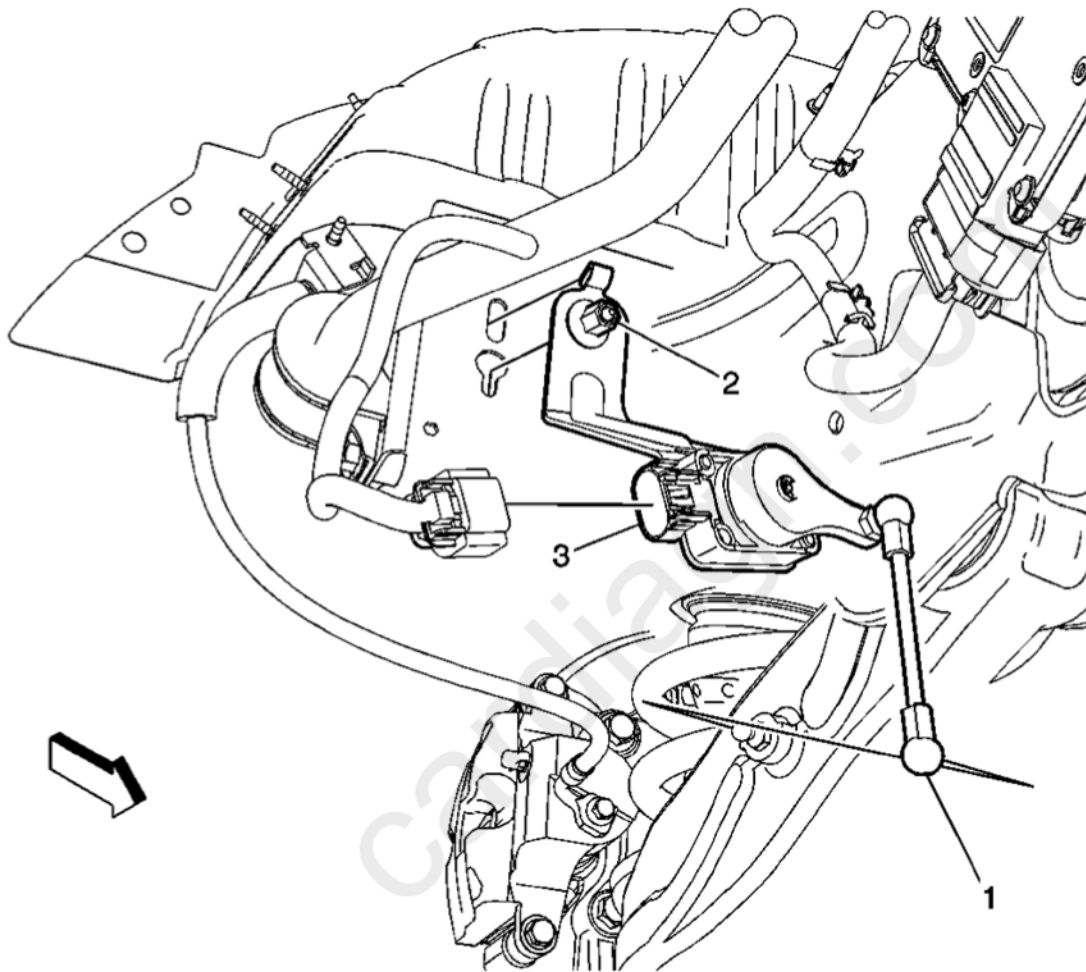


Fig. 5 : Identifying Headlamp Leveling Rear Suspension Height Sensor
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure	
1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> .	
2. Disconnect the headlamp leveling suspension height sensor electrical connector.	
1	Headlamp Leveling Rear Suspension Height Sensor Socket Procedure: Disconnect the headlamp leveling rear suspension height sensor socket from the ball stud.
	Headlamp Leveling Rear Suspension Height Sensor Fastener

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2	CAUTION: Refer to Fastener Caution . Tighten: 8 N.m (71 lb in)
3	Headlamp Leveling Rear Suspension Height Sensor

HEADLAMP CONTROL MODULE REPLACEMENT

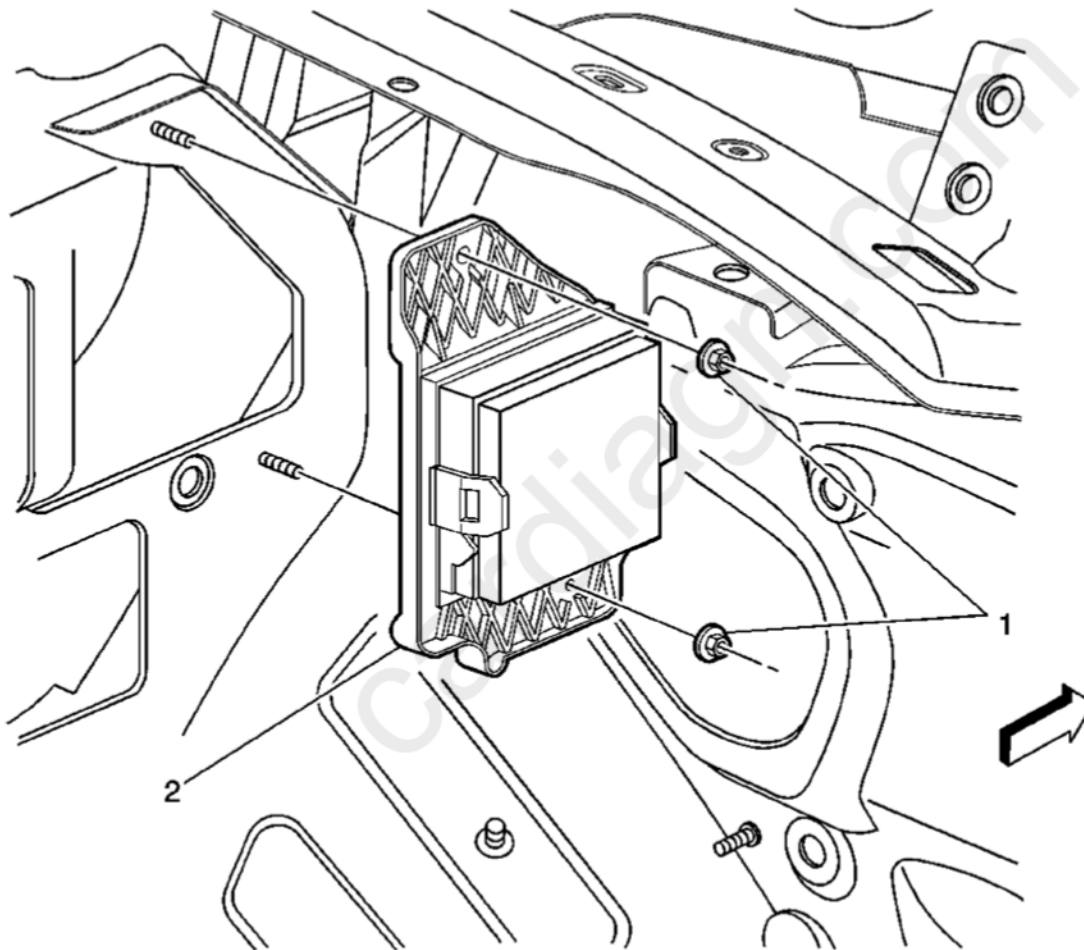


Fig. 51: Identifying Headlamp Control Module
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the body control module. Refer to Body Control Module Replacement and mounting bracket.	
	Headlamp Control Module Nuts (Qty: 2)

1	CAUTION: Refer to Fastener Caution . Tighten: 6 N.m (53 lb in) Headlamp Control Module
2	Procedure 1. Disconnect the electrical connectors. 2. Refer to Control Module References for programming and set up procedures.

FRONT FOG LAMP REPLACEMENT

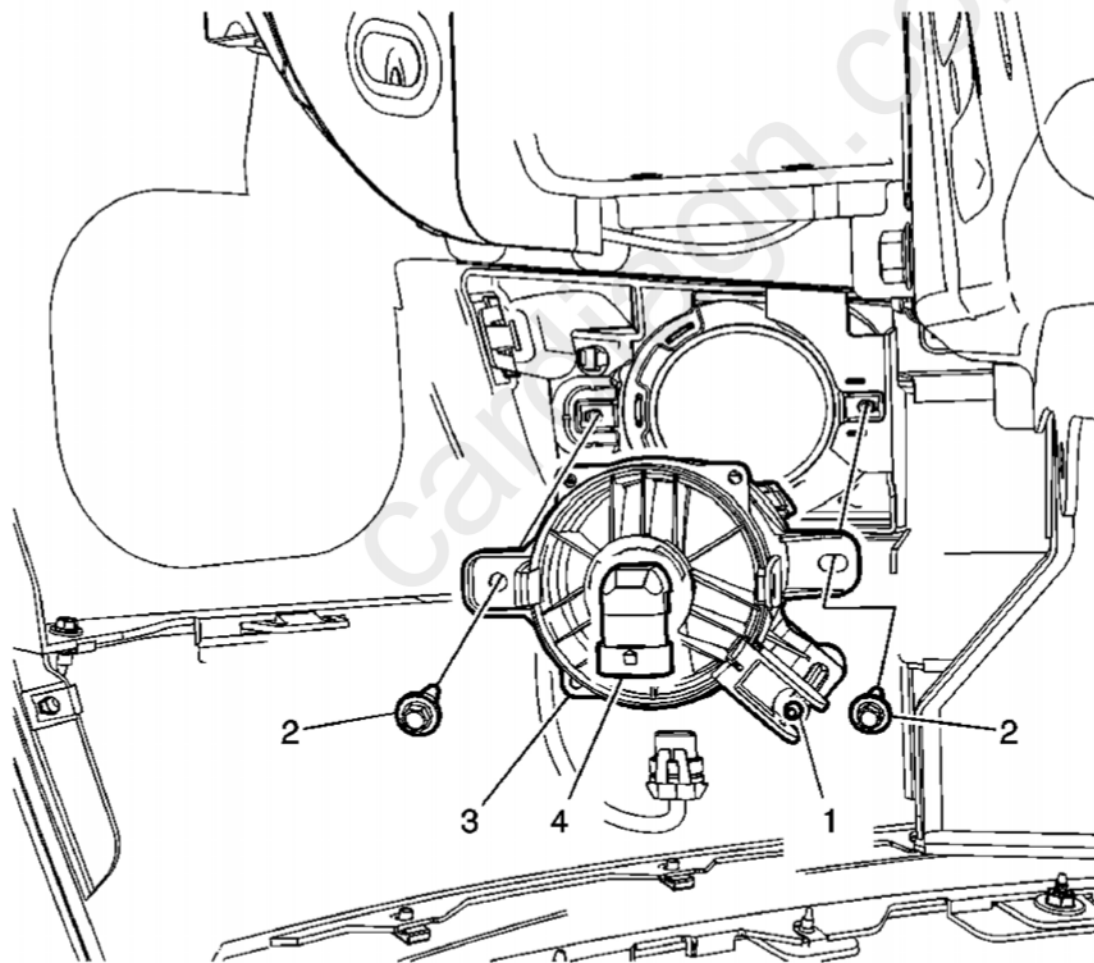


Fig. 52: View Of Front Fog Lamp
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
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Preliminary Procedures

1. Remove either the LF or RF wheelhouse liner. Refer to **Front Wheelhouse Liner Replacement** .
2. Disconnect the fog lamp bulb socket electrical connector.

1	Front Fog Lamp Adjuster Screw
2	Front Fog Lamp Screw (Qty: 2) CAUTION: Refer to <u>Fastener Caution</u> . Tighten: 2.5 N.m (22 lb in)
3	Front Fog Lamp Assembly Procedure: Aim the fog lamps after installation. Refer to <u>Fog Lamp Aiming</u> .
4	Front Fog Lamp Bulb Socket ARNIN : Refer to <u>alogen ulb arning</u> . Tip: Turn the bulb socket counterclockwise and remove from the lamp assembly.

FOG LAMP AIMING

Adjustment Procedure

Proper road illumination and safety require the fog lamps to be aimed. The front fog lamp aim should be checked when a new front fog lamp assembly is installed, or if any service repairs have been performed to the vehicle which disturb the front fog lamp mounting or the vehicle ride height.

There are no horizontal adjustments for aiming the front fog lamp assemblies on this vehicle.

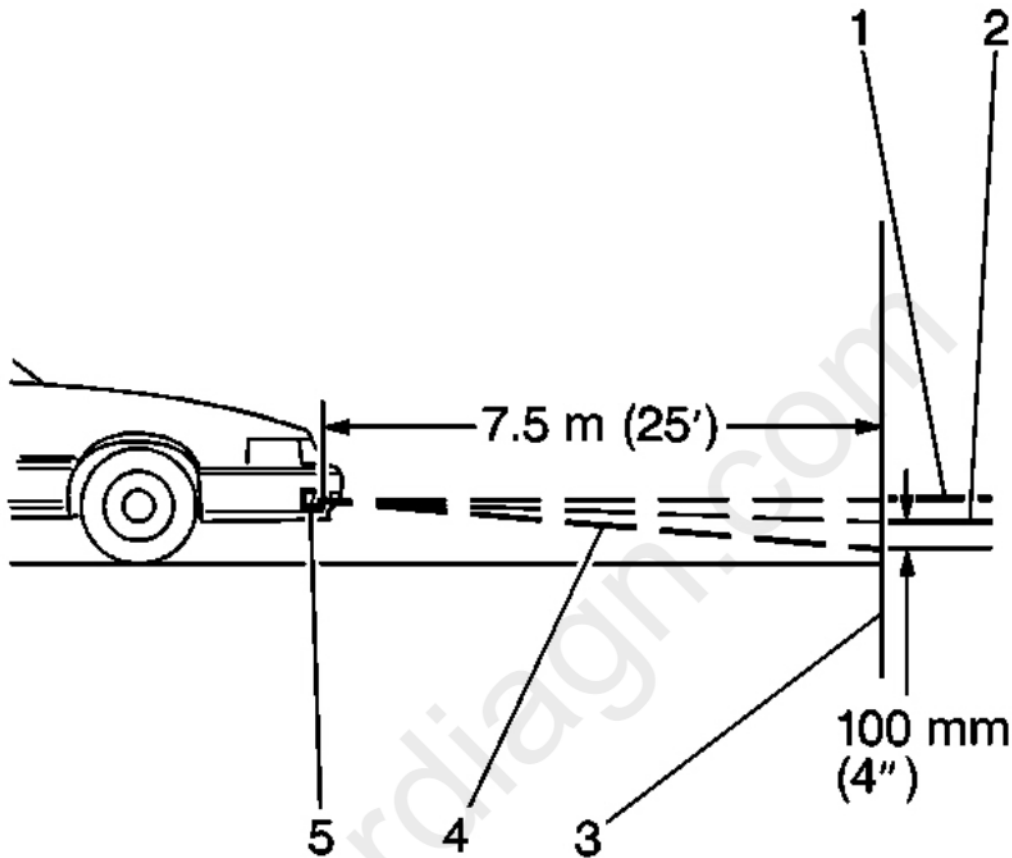


Fig. 53: Fog Lamp Aiming Procedure Distances
Courtesy of GENERAL MOTORS CORP.

1. To ensure accurate vertical front fog lamp aiming, first perform the following steps to prepare the vehicle.
 - Make sure that all the components are in place on the vehicle, the tires are properly inflated, and there is not any mud or snow clinging to the vehicle.
 - Stop all other operations of work on the vehicle.
 - Make sure the fuel level is 1/2 full or more.
 - Jounce the vehicle to settle the suspension.
 - Place the vehicle on a level surface 7.6 m (25 ft) from the target screen.
 - Measure the distance from the floor to the center of the fog lamp (5).
 - Using this measurement, mark the horizontal centerline of the fog lamp (1) on the target screen directly in front of the vehicle.
 - Start the vehicle in order to level the suspension.

2. Turn the front fog lamps ON.

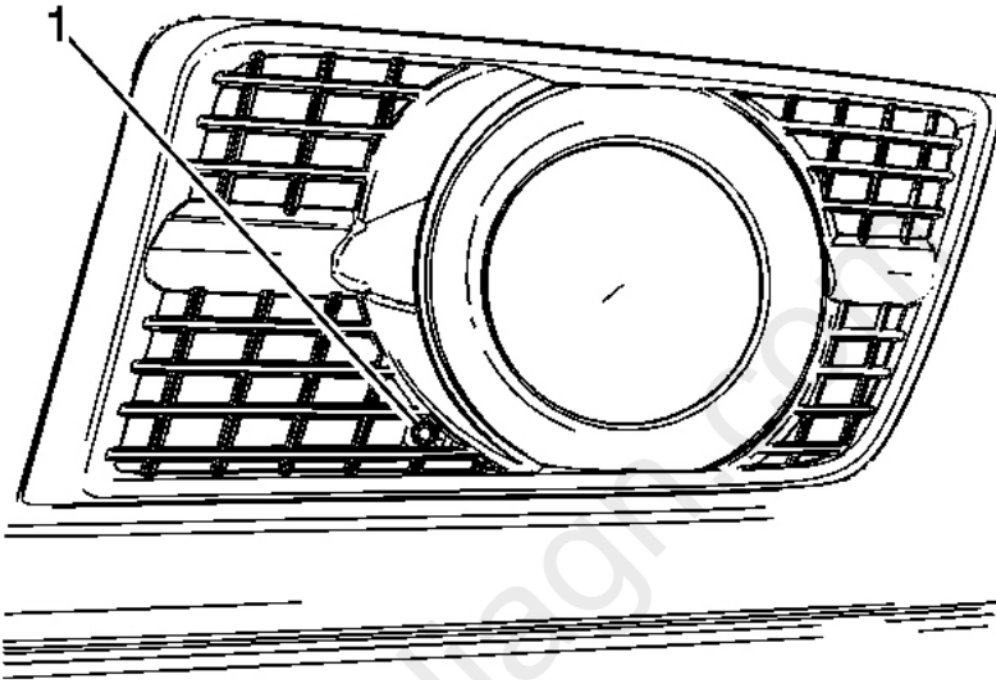


Fig. 54: Fog Lamp Aiming Screws
Courtesy of GENERAL MOTORS CORP.

3. Adjust (1) the fog lamp up or down until the top edge of the high intensity zone on the screen is 102 mm (4 in) below the horizontal centerline (1).
4. Turn OFF the front fog lamps.

DAYTIME RUNNING LAMP BULB REPLACEMENT (TT6,TT7,TT8 PASSENGER SIDE HEADLAMP)

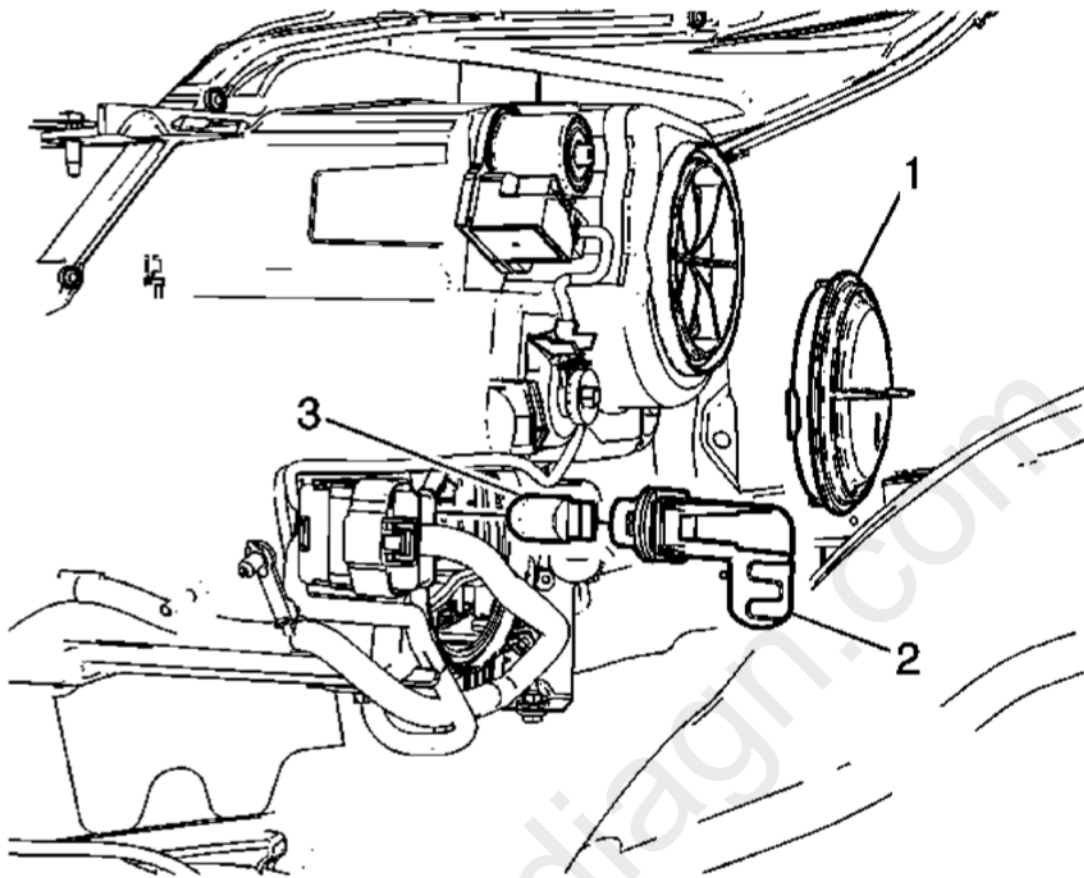


Fig. 55: Identifying Daytime Running Lamp Bulb (TT6, TT7, TT8 Passenger Side Headlamp)
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
ARNIN : 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. ARNIN : 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. Preliminary Procedure: Remove the air cleaner assembly. Refer to <u>Air Cleaner Assembly Replacement (LF1)</u> or <u>Air Cleaner Assembly Replacement (LAU)</u>.	
1	Headlamp Bulb Accessory Cover

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	Tip: Rotate the cover counter-clockwise and remove.
2	Daytime Running Lamp Bulb Socket ARNIN : Refer to <u>alogen ulb arning</u> . Procedure: Rotate the bulb socket counter-clockwise and remove.
3	Daytime Running Lamp Bulb Tip: Pull the bulb from the socket and replace.

DA TIME RUNNING LAMP BULB REPLACEMENT (T84, T85 PASSENGER SIDE HEADLAMP)

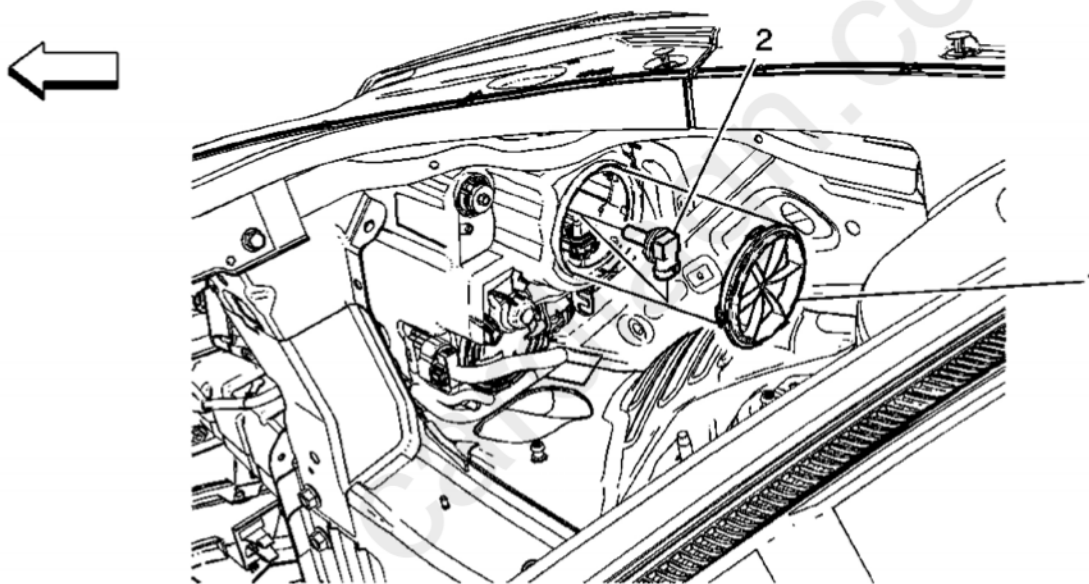


Fig. 56: Identifying Daytime Running Lamp Bulb (T84, T85 Passenger Side Headlamp)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the air cleaner assembly. Refer to <u>Air Cleaner Assembly Replacement (LF1)</u> or <u>Air Cleaner Assembly Replacement (LAU)</u> .	
1	Headlamp Bulb Accessory Cover Tip: Rotate the cover counter-clockwise and remove.
	Daytime Running Lam/Low Beam Headlamp Bulb ARNIN : Refer to <u>alogen ulb arning</u> .

2

Tip: Disconnect prior to removing the headlamp bulb from the headlamp housing.

Procedure:

Rotate the bulb socket counter-clockwise and remove.

DA TIME RUNNING LAMP BULB REPLACEMENT (T84, T85 DRIVER SIDE HEADLAMP)

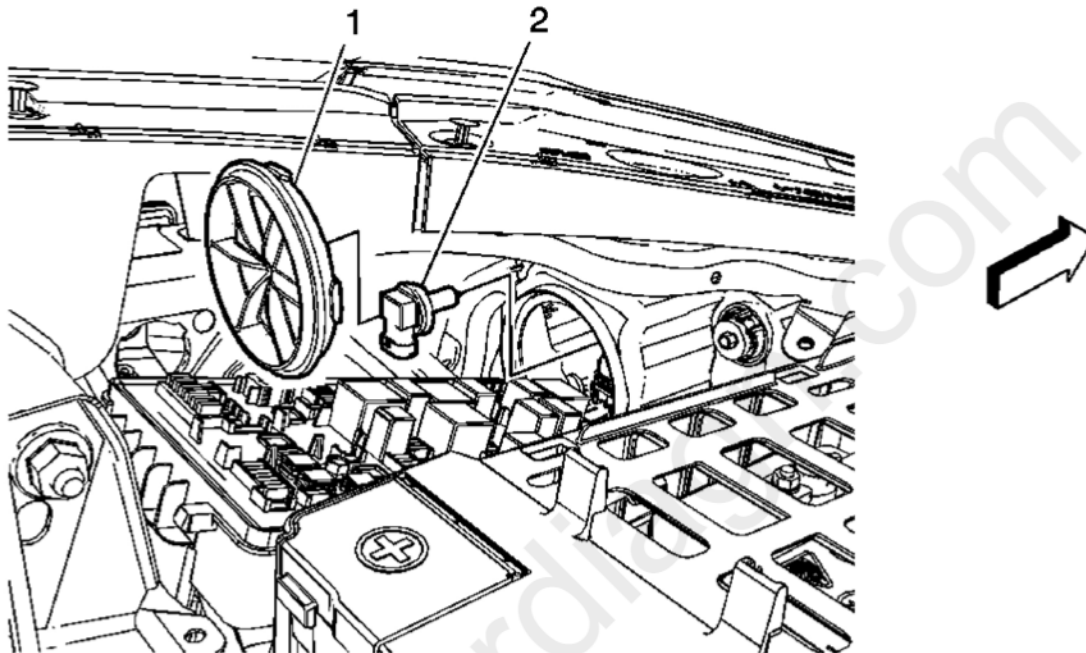


Fig. 57: Identifying Daytime Running Lamp Bulb (T84, T85 Driver Side Headlamp)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure	
1. Remove the under electrical center (UEC) cover. 2. Disengage the three locking tabs from the cover and remove.	
1	Headlamp Bulb Accessory Cover Tip: Rotate the cover counter-clockwise and remove.
2	Daytime Running Lamp/Low Beam Headlamp Bulb ARNIN : Refer to <u>alogen ulb arning</u> . Tip: Disconnect the electrical connector prior to removing the headlamp bulb from the headlamp housing.

Procedure:

Rotate the bulb socket counter-clockwise and remove.

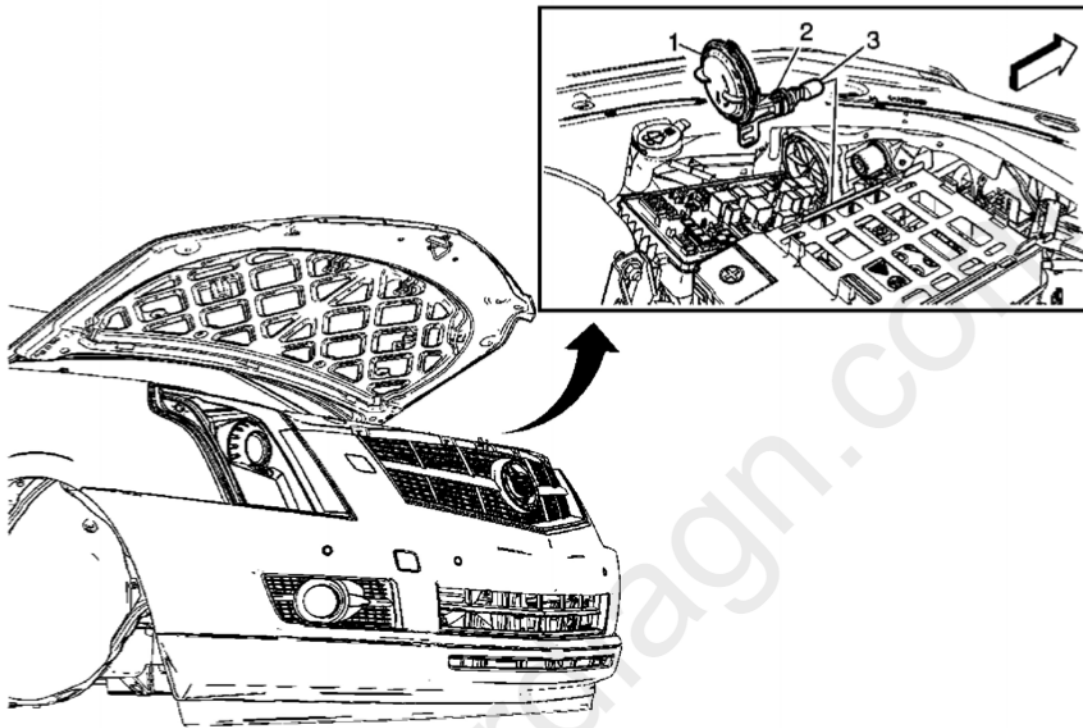
DA TIME RUNNING LAMP BULB REPLACEMENT (TT6,TT7,TT8 DRIVER SIDE HEADLAMP)

Fig. 58: Identifying Daytime Running Lamp Bulb (TT6,TT7,TT8 Driver Side Headlamp)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure	
ARNIN : 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.	
ARNIN : 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.	

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1. Remove the underhood electrical center (UEC) cover.
2. Disengage the three locking tabs and remove the cover.

1	Headlamp Bulb Accessory Cover Procedure: Rotate the cover counter-clockwise and remove. Tip: Ensure the arrow on the cover is pointing downward upon re-installation of the cover to the headlamp capsule.
2	Daytime Running Lamp (DRL) Bulb Socket ARNIN : Refer to <u>halogen bulb wiring</u> . Procedure: Rotate the bulb socket counter-clockwise and remove.
3	Daytime Running Lamp (DRL) Bulb Tip: Pull the bulb from the socket and replace.

FRONT SIDE TURN SIGNAL LAMP REPLACEMENT

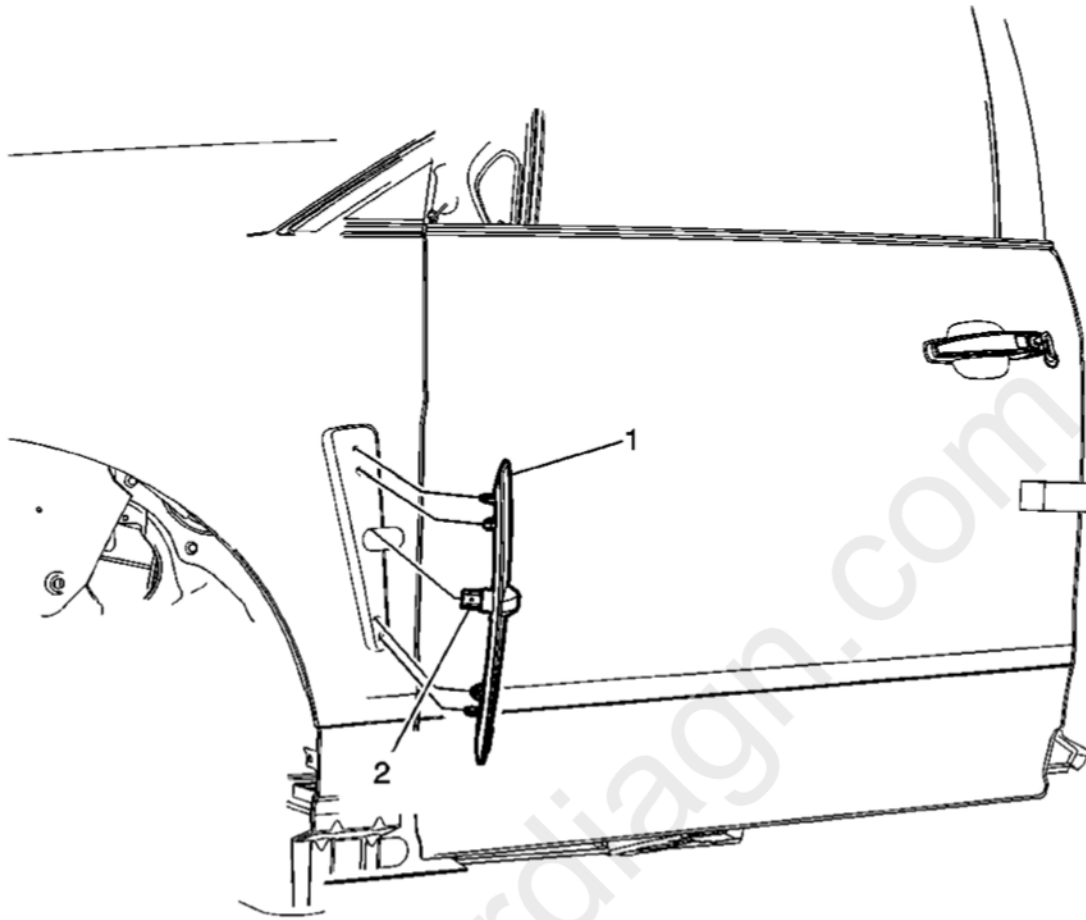


Fig. 59: Identifying Front Side Turn Signal Lamp
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Side Turn Signal Lamp Assembly Procedure 1. Remove the front wheelhouse liner in order to access the fasteners for the front turn signal lamp. Refer to Front Wheelhouse Liner Replacement. 2. Begin releasing the retainers at the bottom of the side turn signal lamp and work towards the top. 3. When the first lower retainer clip is released, insert a small plastic flat-bladed tool between the exterior body panel and the side turn signal assembly to prevent the retainer from re-engaging back into the fender panel hole. 4. Disconnect the electrical harness connector from the side turn signal lamp housing. 5. Connect the electrical harness lamp socket to the side turn signal lamp housing. 6. Position the side turn signal lamp retainers to the fender holes.

	7. Using the palm portion of the hand, secure the retainers to the fender holes.
	8. An light audible click will be heard when each retainer is secure to the fender panel.
2	Front Side Turn Signal Lamp Bulb Socket

FRONT SIDE TURN SIGNAL LAMP BULB REPLACEMENT

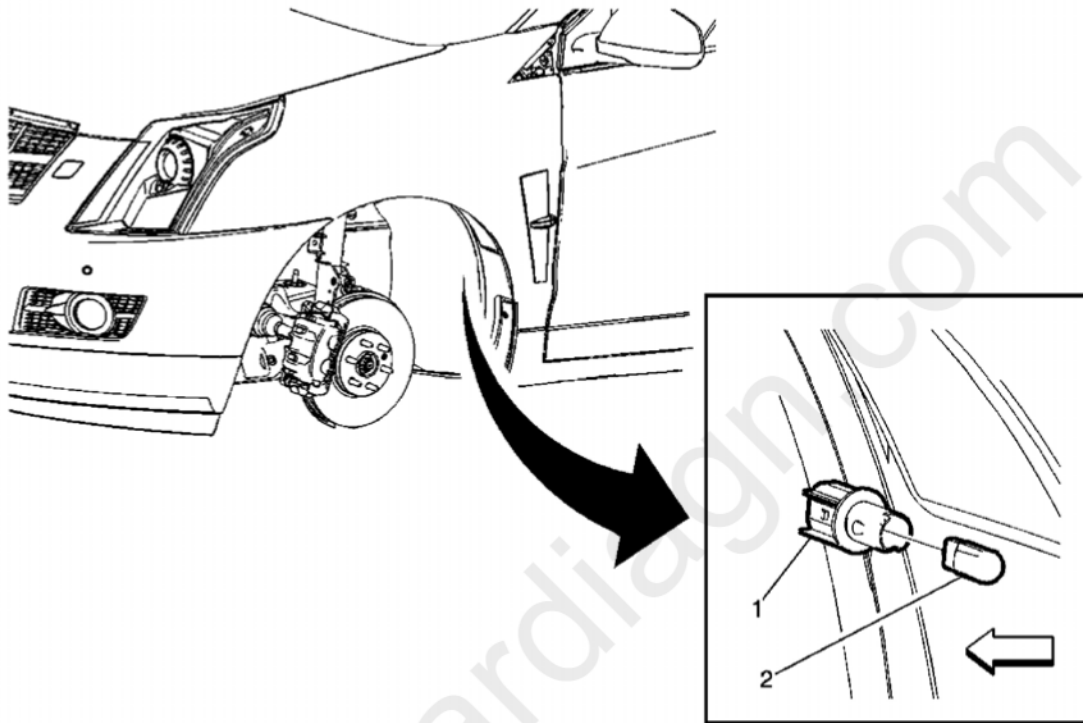


Fig. 60: Identifying Front Side Turn Signal Lamp Bulb
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures	
1. Remove the front wheelhouse liner. Refer to Front Wheelhouse Liner Replacement . 2. Reach inside the fender well and rotate the bulb socket a quarter turn and remove. 3. Pull the turn signal lamp bulb from the lamp socket.	
1	Front Side Turn Signal Lamp Socket Tip: Ensure the fingers on the turn signal lamp socket point forward upon installation. If the socket fingers point rearward, the bulb socket will not seal in the lamp housing.
2	Front Side Turn Signal Lamp Bulb

FRONT TURN SIGNAL LAMP BULB REPLACEMENT (T84, T85 DRIVER SIDE HEADLAMP)

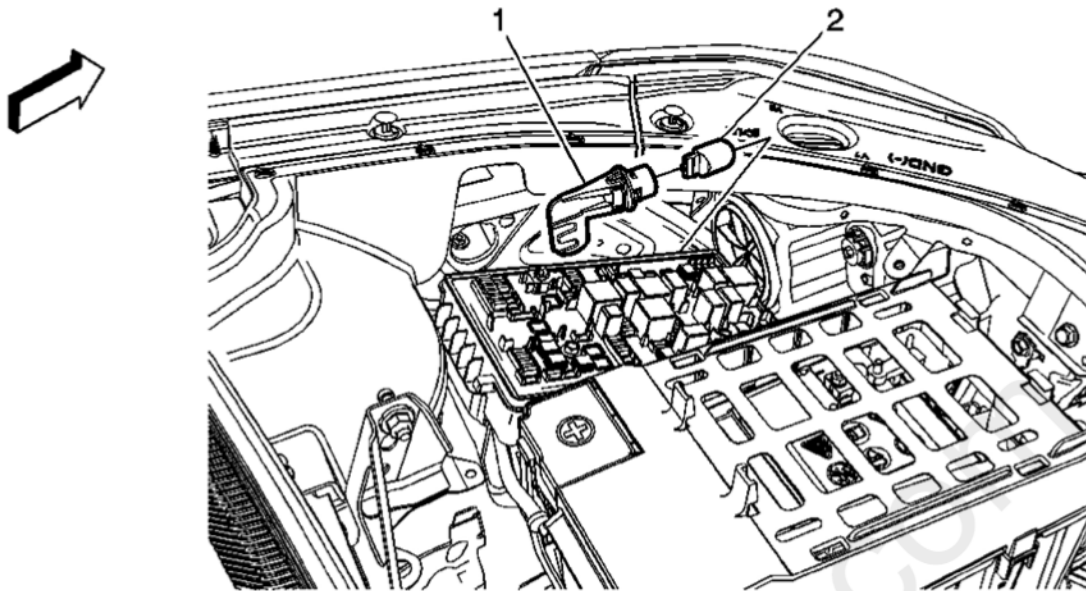


Fig. 61: Locating Front Turn Signal Lamp Bulb (T84, T85 Driver Side Headlamp)
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure	
1. Remove the under electrical center (UEC) cover. 2. Disengage the three locking tabs from the cover and remove.	
1	Park Turn Signal Bulb Socket Procedure: Rotate the park turn bulb socket counter-clockwise and remove.
2	Park Turn Signal Bulb ARNIN : Refer to <u>alogen ulb arning</u> . Procedure: Pull the bulb from the park turn signal bulb socket and replace.

FRONT TURN SIGNAL LAMP BULB REPLACEMENT (T84, T85 PASSENGER SIDE HEADLAMP)

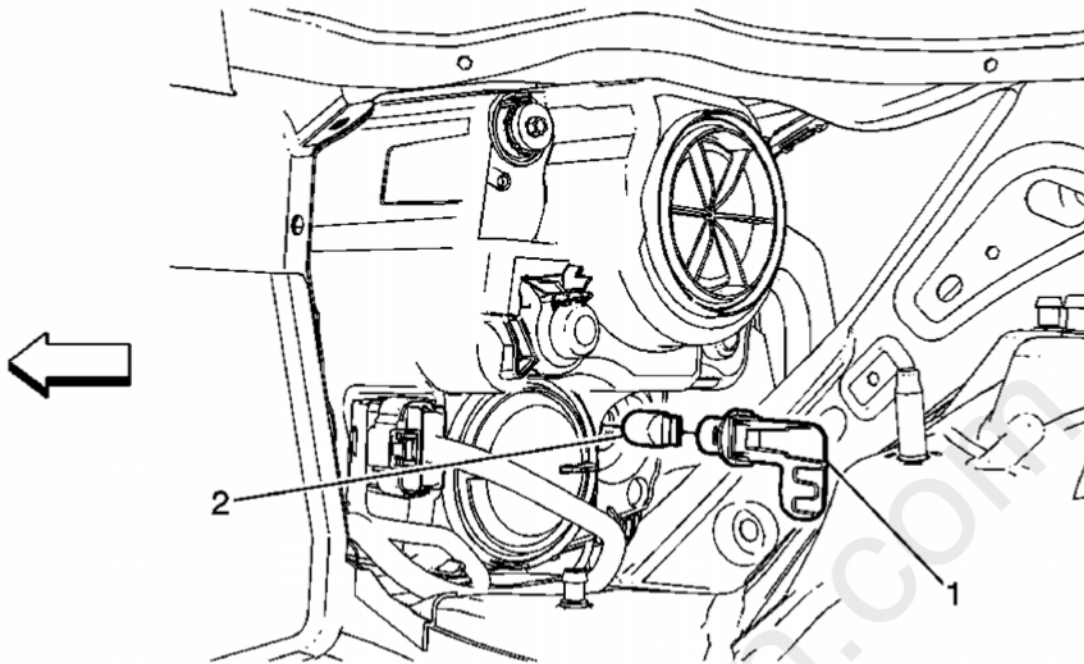


Fig. 62: Identifying Front Turn Signal Lamp Bulb (T84, T85 Passenger Side Headlamp)
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the air cleaner assembly. Refer to <u>Air Cleaner Assembly Replacement (LF1)</u> or <u>Air Cleaner Assembly Replacement (LAU)</u> .	
1	Park Turn Signal Bulb Socket Procedure: Rotate the park turn signal bulb socket counter-clockwise and remove.
2	Park Turn Signal Bulb ARNIN : Refer to <u>halogen bulb arning</u> . Procedure: Pull the park turn signal bulb from the socket and replace.

FRONT TURN SIGNAL LAMP BULB REPLACEMENT (TT6,TT7,TT8 PASSENGER SIDE HEADLAMP)

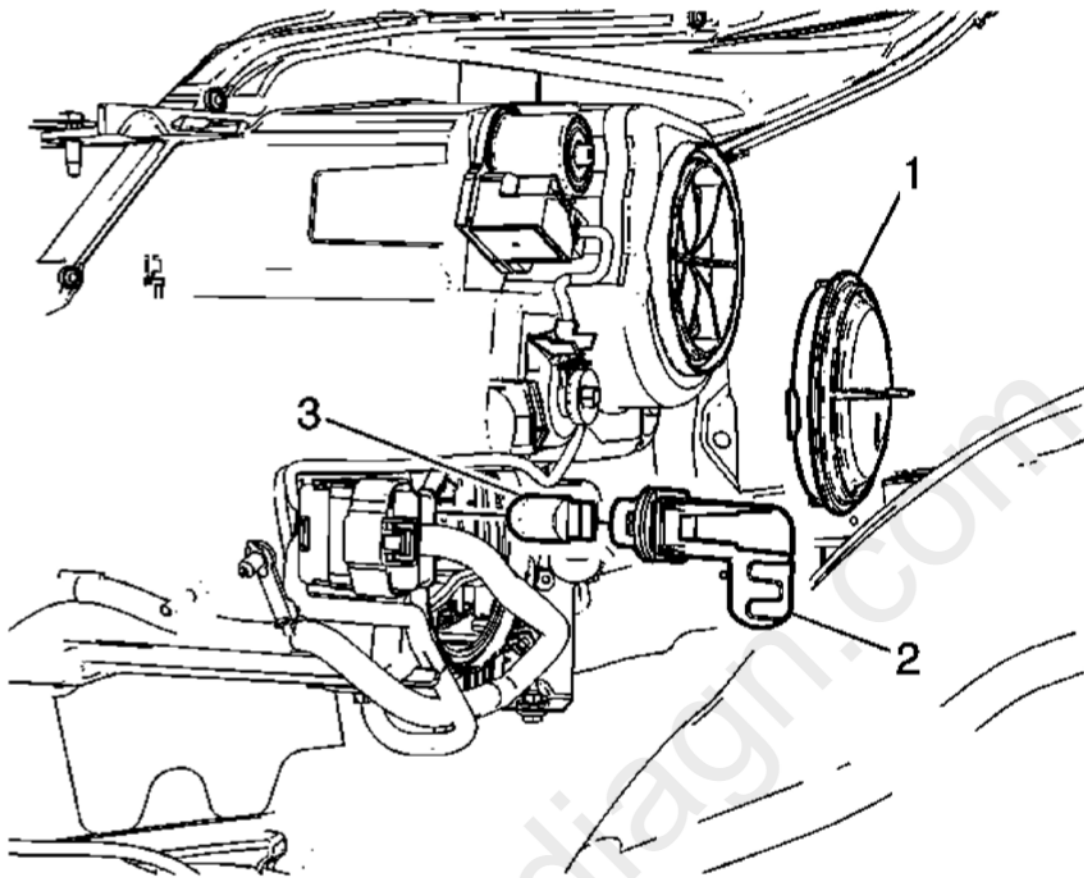


Fig. 63: Identifying Front Turn Signal Lamp Bulb (TT6,TT7,TT8 Passenger Side Headlamp)
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: ARNIN : 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. ARNIN : 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.	

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Remove the air cleaner assembly. Refer to [Air Cleaner Assembly Replacement \(LF \)](#) or [Air Cleaner Assembly Replacement \(LAU\) .](#)

1	Headlamp Bulb Access Cover
2	Park Turn Signal Bulb Socket Procedure: Rotate the park turn signal bulb socket counter-clockwise and remove.
3	Park Turn Signal Bulb ARNIN : Refer to <u>halogen bulb wiring .</u> Procedure: Pull the park turn signal bulb from the bulb socket and replace.

FRONT TURN SIGNAL LAMP BULB REPLACEMENT (TT6 TT7 TT8 DRIVER SIDE HEADLAMP)

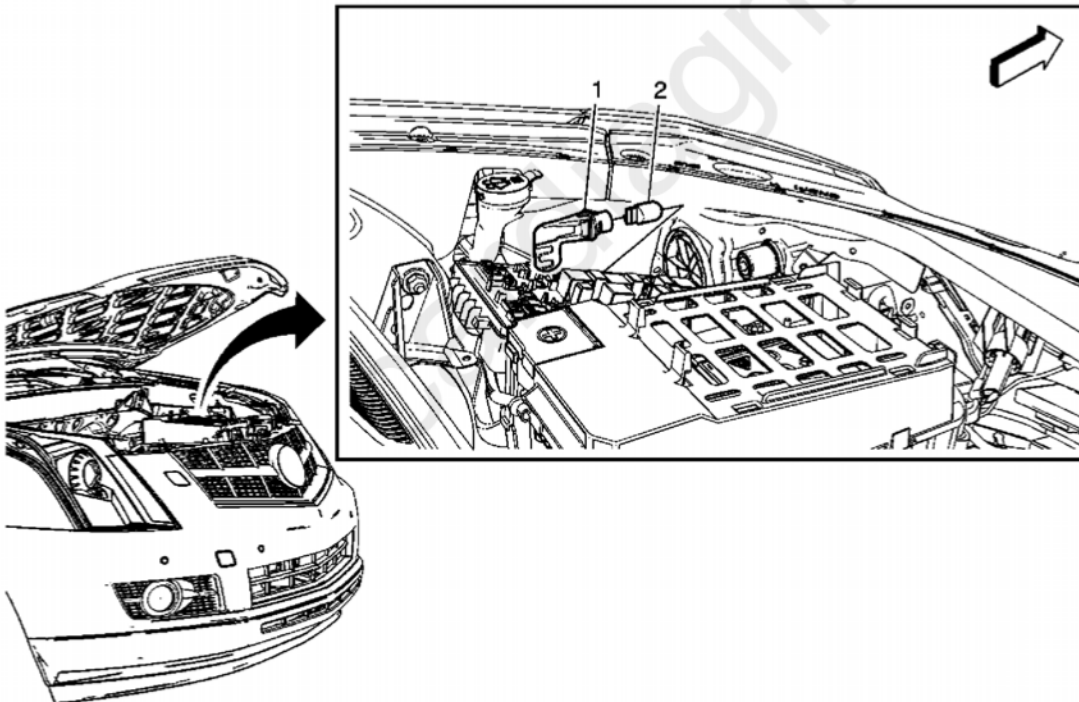


Fig. 64: Locating Front Turn Signal Lamp Bulb (TT6 TT7 TT8 Driver Side Headlamp)

Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure	
ARNIN :	

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.

ARNIN :

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.

1. Remove the underhood electrical center (UCC) cover.
2. Disengage the three locking tabs and remove the cover.

1	Park Turn Signal Bulb Socket ARNIN : Refer to <u>halogen bulb wiring</u>. Procedure: Rotate the bulb socket counter-clockwise and remove.
2	Park Turn Signal Bulb Tip: Pull the bulb from the socket and replace.

HIGH MOUNT STOP LAMP REPLACEMENT

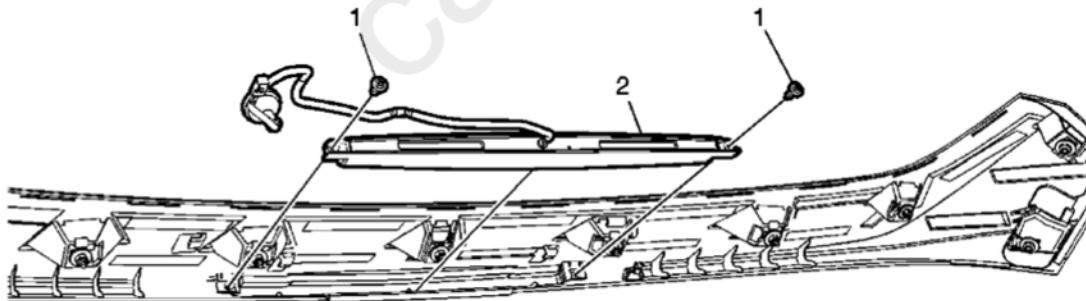


Fig. 6 : Identifying High Mount Stop Lamp
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Open the liftgate. 2. Remove the rear end spoiler. Refer to <u>Rear End Spoiler Replacement</u>.	

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3. Place the rear spoiler on a clean protected surface in order to remove the Light emitted Diode (LED) high mounted stop lamp.

1

High Mount Stop Lamp Screw (Qty: 2)

CAUTION:

Refer to Fastener Caution .

Tighten: 2 N.m (1 lb in)

2

High Mount Stop Lamp Assembly

Procedure:

Remove the high mount (LED) stop lamp from the back side of the rear spoiler.

BAC UP LAMP BULB REPLACEMENT

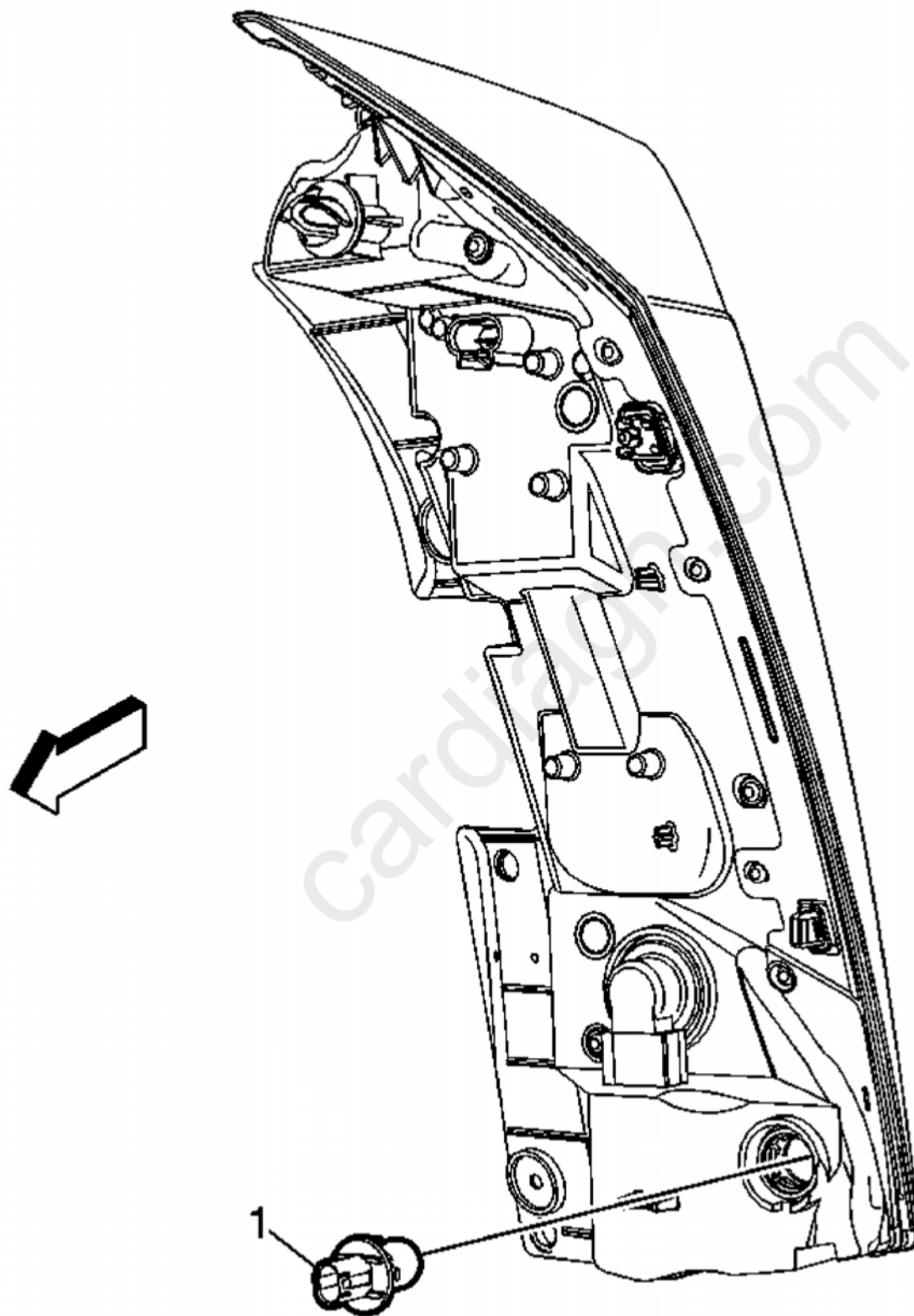


Fig. 66: Identifying Backup Lamp Bulb
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the rear tail lamp assembly. Refer to Tail Lamp Replacement .	
1	Back Up Lamp Bulb ARNIN : Refer to <u>alogen ulb arning</u> . Procedure: Rotate the back up lamp bulb socket counterclockwise from the tail lamp assembly.

TAIL LAMP REPLACEMENT

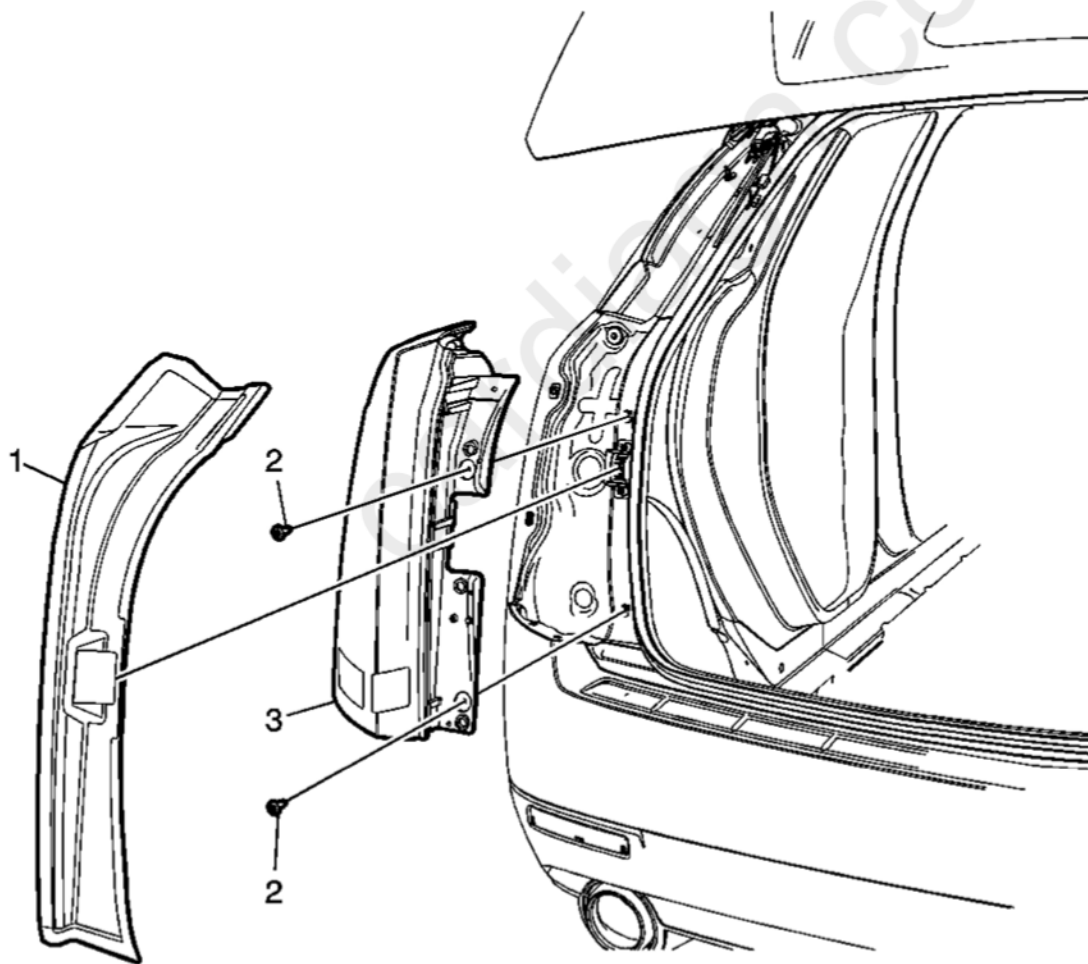


Fig. 67: Identifying Tail Lamp

Courtesy of GENERAL MOTORS CORP.

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Callout	Component Name
Preliminary Procedure: Open the rear liftgate in order to access and remove the tail lamp screws.	
1	Tail Lamp Filler Panel Procedure: Using a suitable flat bladed tool, remove the push-pin and tail lamp filler panel.
2	Tail Lamp Screw (Qty 2) CAUTION: Refer to <u>Fastener Caution</u> . Tighten: 2.5 N.m (22 lb in)
3	Tail Lamp Assembly Procedure 1. Pull on the outer edge of the tail lamp assembly in order to release the tail lamp locator pins from the rear bodyside panel. 2. Disconnect the electrical connectors.

REAR TURN SIGNAL LAMP BULB REPLACEMENT

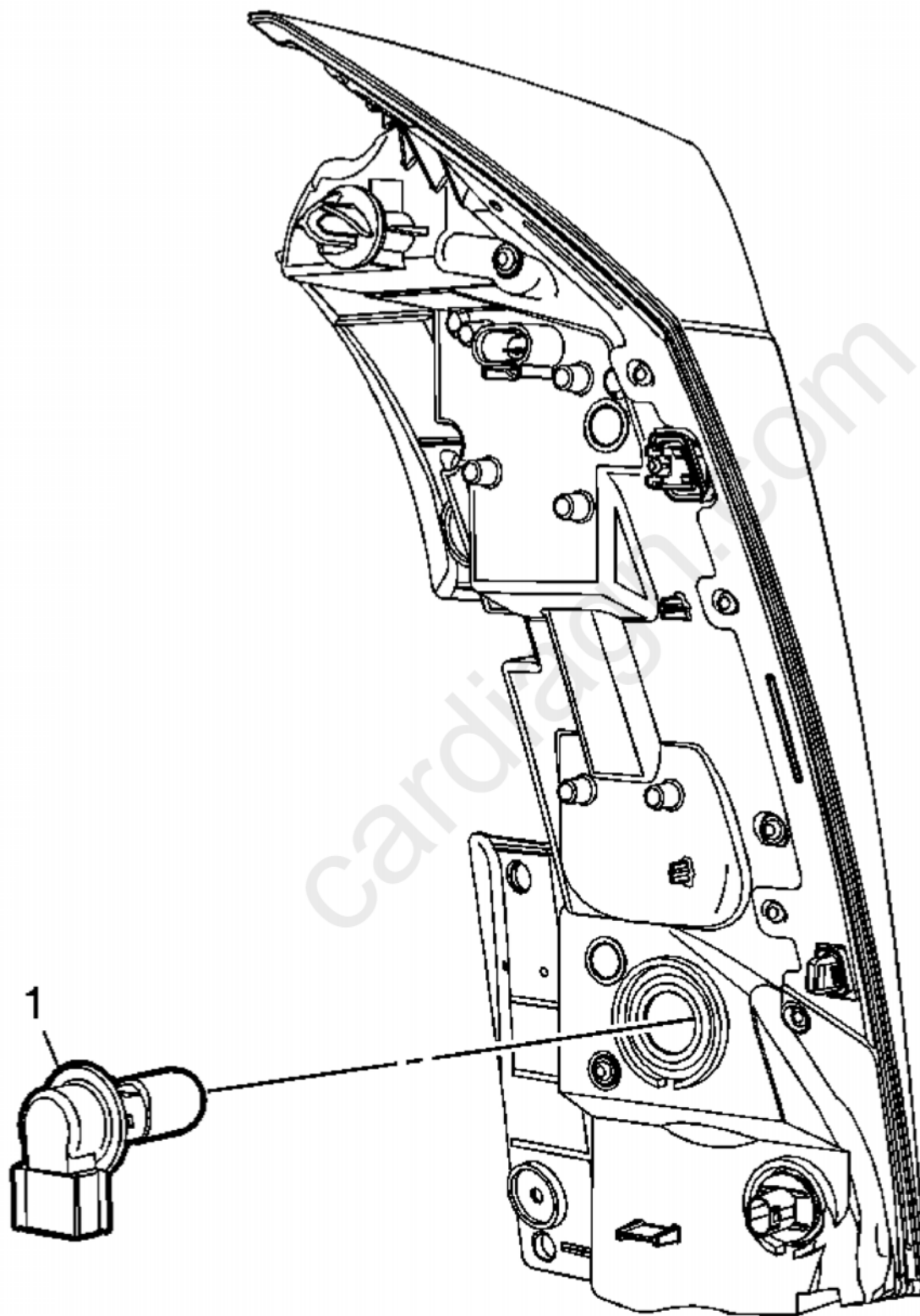


Fig. 68: Identifying Rear Turn Signal Lamp Bulb
Courtesy of GENERAL MOTORS CORP.

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Callout	Component Name
Preliminary Procedure: Remove the rear tail lamp assembly. Refer to <u>Tail Lamp Replacement</u> .	
1	Rear Turn Signal Bulb RNIN : Refer to <u>Halogen Bulb Warning</u> . Procedure: Rotate the rear turn signal lamp bulb socket counterclockwise from the tail lamp assembly.

REAR COMPARTMENT COURTESY LAMP REPLACEMENT - LIFTGATE

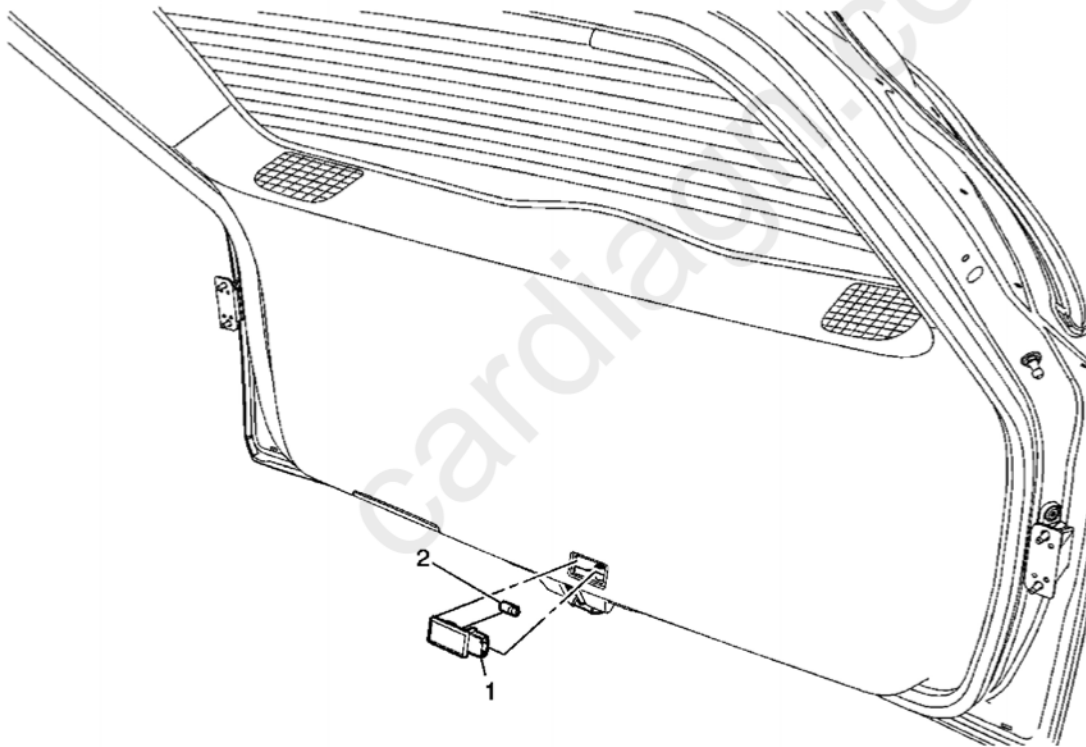


Fig. 69: Identifying Rear Compartment Courtesy Lamp - Liftgate
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Rear Compartment Courtesy Lamp - Liftgate Procedure 1. Use a plastic flat bladed trim tool in order to release the lamp assembly from the

	liftgate trim panel.
	2. Disconnect the electrical connection.
2	Rear Compartment Courtesy Lamp Bulb

REAR COMPARTMENT COURTESY LAMP REPLACEMENT - QUARTER UPPER TRIM

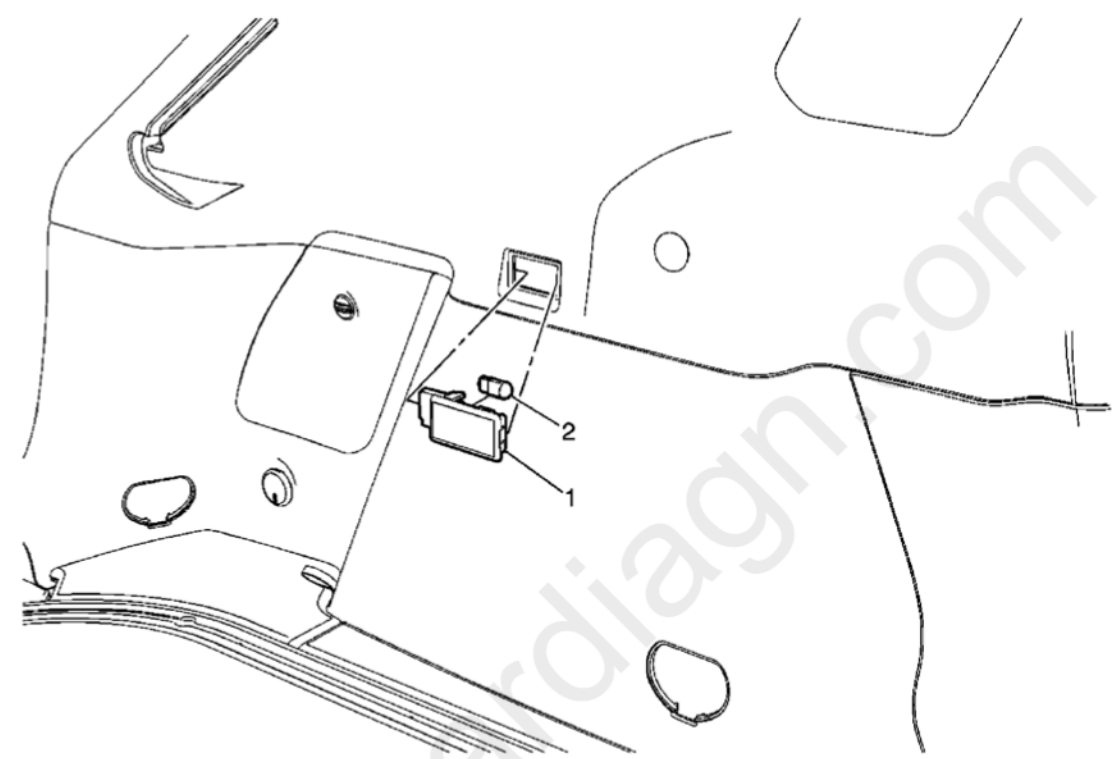


Fig. 70: View Of Rear Compartment Courtesy Lamp - Quarter Upper Trim
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Rear Compartment Courtesy Lamp - Quarter Upper Trim Procedure 1. Use a plastic flat bladed trim tool in order to release the lamp assembly from the rear quarter trim panel. 2. Disconnect the electrical connection.
2	Rear Compartment Courtesy Lamp Bulb

Exterior Lamps

The exterior lighting system consist of the following lamps:

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

Low Beam Headlamps (Standard) RPO TT4

The headlamps consist of 2 interchangeable single filament bulbs or 2 high intensity discharge (HID) arc tubes and ballast on each side of the vehicle which provide high and low beams. The lower bulb in the headlamp is the high beam and the upper bulb is the low beam.

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 AUTOMATIC LIGHT position, for automatic lamp control
- When the headlamp switch is placed in the AUTOMATIC LIGHT position, with the windshield wipers ON in daylight conditions, after a 6 s delay

The body control module (BCM) controls the headlamps based on the inputs explained above. When a low beam request is received, the BCM supplies B+ to both low beam headlamps, illuminating the low beam headlamps.

When a high beam request is received, the BCM grounds the headlamp high beam relay control circuit. This energizes the coil in the headlamp high beam relay, causing the relay switch to close. This then applies B+ to both high beam headlamps through the left high beam and right high beam fuses, illuminating the high beam headlamps.

High Intensity Discharge (HID) Low Beam Headlamps (up level) RPO TT6

The BCM controls the headlamps based on the inputs explained above. When a low beam request is received, the BCM grounds the headlamp low beam relay control circuit. This energizes the coil in the headlamp low

beam relay, causing the relay switch to close. This then applies B+ to both low beam HID headlamps through the left low beam and right low beam fuses, illuminating the low beam headlamps. When a high beam request is received, the BCM grounds the headlamp high beam relay control circuit. This energizes the coil in the high beam relay, causing the relay switch to close. This then applies B+ to both low beam HID headlamps through the left high beam and right high beam fuses which results in lifting the shutter of both headlamps. This causes the Xenon lamp to illuminate the headlamp at full brightness.

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

An inoperative bulb, 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 h period. When the bulb begins shutting itself off occasionally, the ballast will automatically turn the bulb back ON again within 0.5 s. The ballast will restrike 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 an extreme amount of repetitive current input. Repetitive and extreme amount restarts or restrikes, without time for the ballast to cool down, will permanently damage the ballast. As a safeguard, when repetitive restrikes are detected, the ballast will not attempt to restrike the lamp. The ballast then shuts down and the bulb goes out.

The following symptoms are noticeable signs of an inoperative bulb:

- Flickering light, caused in the early stages of an inoperative bulb
- Lights go out, caused when the ballast detects, repetitive bulb restrike
- 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 an extreme amount of repetitive bulb restrike. When an extreme amount of repetitive bulb restrikes 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.

Inoperative bulbs are often sporadic at first, and difficult to repeat. Inoperative bulbs can be identified by observing if the condition gets progressively worse over the next 100 h of operation.

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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 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 inoperative stage.

Adaptive Forward Lighting

The adaptive forward lighting consist of the following components:

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

Dynamic Curve Light

Bend lighting is a function depending on the following signal input values:

- Steering angle
- Vehicle speed
- Yaw Rate

The appropriate swivel angle is calculated based on vehicle speed and the steering angle value.

Town Light

Town Light is activated while the vehicle speed is below 55 km/h (34 MPH) as well as the light sensor detects street lights and the town road category is detected. The light distribution is reduced to an area near the car due to low speeds.

Motorway Light

If vehicle speed is above 100 km/h (62 MPH) for at least 20 s (or once above 126 km/h (78 MPH)) and the corresponding road category is identified, the headlamps will be switched to a motorway light distribution. During motorway light the light output of the HID bulb is increased to 38 W by electrical power management. This improves the visibility range at the far end of the road.

Country Light

Country light replaces the current low beam and will be controlled based on programmable vehicle thresholds as well as corresponding road detection. The vehicle speed has to be between 55 km/h (34 MPH) and 100 km/h (62 MPH). Country light is the default light distribution at 35 W. Light distribution is reduced on the left side to prevent oncoming traffic from being dazzled.

Tourist Mode with RPO TT and TT

The tourist mode functionality switches the adaptive forward lighting headlamps into a non dazzling mode, if the traffic regulation moves from left hand traffic to right hand traffic and vice versa. The functionality is switched on/off with the same stalk/switch combination. The "flash to pass" stalk needs to be activated while ignition is switched on (System Power Mode = RUN). The "flash to pass" stalk remains activated until the warning indicator within the instrument panel cluster starts flashing (4 s) and an acoustic indication is sent. The activation period takes about 3 s. An activation flag must be set within the adaptive forward lighting ECM and stored in non-volatile memory. Each time the ignition is switched on and the tourist mode is active, the warning indicator is flashing about 4 s. The tourist mode is deactivated with the same procedure described above. The function is switched OFF, if an acoustic signal is sent (Warning indicator remains inactive).

Adverse Weather Light

Adverse weather light will be switched on while the vehicle speed is below 100 km/h (62 MPH) and the windscreen wipers are activated. The HID bulbs will be powered with different values:

- left: 32 W
- right: 38 W

The main advantage is that reflections on the wet floor are reduced to a minimum. This is noticeable as well for oncoming traffic as for the driver. In front of the car a less illuminated area is realized.

Automatic Lamp Control

Automatic Light is switched ON as default. It can be switched OFF by turning the light switch to OFF position. It will be switched ON again by doing so again. Automatic Light is only available if a rain sensor or rain/light sensor module is installed in the car. The rain/light sensor module will send the actual ambient light state (day/night) to the BCM. If Automatic Light is enabled, BCM will react on the message received from the rain/light sensor module by switching ON/OFF low beams.

Flash to Pass Standard RPO TT

When the low beam headlamps are on and the turn signal/multifunction switch is momentarily placed in the flash to pass position, ground is applied to the turn signal/multifunction switch. The turn signal/multifunction switch applies ground to the BCM through the flash to pass switch signal circuit. The BCM then applies ground to the high beam relay control circuit. This energizes the high beam relay, closing the switch side contacts of the high beam relay, applying battery voltage to the left and right high beam fuses. Battery voltage is applied from the high beam fuses through the high beam voltage supply circuit to the high beam headlamp assemblies. This causes the high beam headlamps to illuminate at full brightness momentarily or until the flash to pass switch is released.

Flash to Pass upgrade RPO TT

When the low beam headlamps are ON and the turn signal/multifunction switch is momentarily placed in the flash to pass position, ground is applied to the turn signal/multifunction switch. The turn signal/multifunction switch applies ground to the BCM through the flash to pass switch signal circuit. The BCM sends a message to the headlamp control module to lift the shutter from the Xenon lamp. This causes the Xenon lamp to illuminate the headlamp at full brightness momentarily or until the flash to pass switch is released.

Automatic Headlamp Leveling

The Automatic Headlamp Leveling Systems consist of the following components:

- Ballast module - left
- Ballast module - right
- Headlamp leveling actuator - left
- Headlamp leveling actuator - right
- Headlamp control module
- Headlamp leveling sensor - front
- Headlamp leveling sensor - rear

The automatic headlamp leveling system automatically maintains the vertical alignment of the headlamps when the vehicle load and driving conditions change. The headlamp control module receives inputs from the front and rear headlamp leveling sensors to determine vehicle pitch. The headlamp leveling sensors send an output to the headlamp control module as the vehicle suspension compresses and rebounds. The headlamp control module calculates the difference in vehicle pitch and sends a command to the (HID) ballast. The ballast then drive the headlamp leveling actuators to the position commanded by the headlamp control module. The headlamp leveling system also monitors the performance of the HID bulb and ballast. When the headlamp switch is placed in the ON position the headlamps will go down, and then back up to the center position.

Daytime Running Lamps DRL without HID RPO TT

The DRL bulbs are combined with the park lamps. One filament is for the DRL and one for the park lamps. The DRL will operate when the following conditions are met:

- Engine is running.
- Headlamp switch in AUTOMATIC LIGHT position.
- The high and low beam headlamps are OFF.

By turning the headlamp switch in the OFF position the automatic light function and the DRL will be deactivated.

The ambient light sensor is used to monitor outside lighting conditions. The ambient light sensor provides a voltage signal that will vary between 0.2-4.9 V depending on outside lighting conditions. The HVAC control module provides a low reference ground and 5 V reference signals to the ambient light sensor. The BCM monitors the ambient light sensor signal circuit to determine if outside lighting conditions are correct for either DRL or low beam when the headlamp switch is in the AUTOMATIC LIGHT position. In daylight conditions, the BCM will command the DRL ON by applying ground to the left and right DRL relays via separate left and right DRL relay control circuits. When the BCM applies ground to the relay control circuits, the left and right DRL relay coils energize causing both relay switch contacts to close. With the left and right DRL relay switch contacts closed, battery voltage flows to the left and right DRL lamps. Any function or condition that turns on the headlamps will cancel DRL operation.

Daytime Running Lamps DRL with HID RPO TT

The DRL are LEDs which are continuously illuminated when:

- Ignition is switched ON.
- Engine is running.
- High and low beam headlamps are ON or OFF.
- Headlamp switch is in PARKING LIGHT, AUTOMATIC LIGHT or LOW BEAM position.

By turning the headlamp switch in the OFF position the automatic light function and the DRL will be deactivated.

The ambient light sensor is used to monitor outside lighting conditions. The ambient light sensor provides a voltage signal that will vary between 0.2-4.9 V depending on outside lighting conditions. The HVAC control module provides a low reference ground and 5 V reference to the ambient light sensor. The BCM monitors the ambient light sensor signal circuit to determine if outside lighting conditions are correct for only DRL or DRL and low beam when the headlamp switch is in the AUTOMATIC LIGHT position. In daylight conditions the BCM will command the DRL ON.

Front Fog Lamps

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

Rear Fog Lamps

When the rear fog lamp switch is placed in the ON position, battery voltage is applied from the BCM to the rear fog lamps. Ground for the rear fog lamps is applied at all times.

The BCM will send a message via GMLAN serial data to the instrument panel cluster to enable the rear fog lamp indicator.

Park Tail License and Marker Lamps

The park lamps, tail lamps/LEDs and number plate lights are turned ON when the headlamp switch is placed in the Parking lights or Low beam position or anytime the headlights are requested. When the BCM receives a request from the headlamp switch to turn ON the park lamps the BCM sends out a PWM signal, which illuminates the park lamps, tail lamps and number plate lights.

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 position. When the turn signal/multifunction switch is placed in either the TURN RIGHT or TURN LEFT position, ground is applied to the BCM through either the right turn or left turn signal switch signal circuit. The BCM then applies a pulsating voltage to the front and rear turn signal lamps through their respective voltage supply circuits. When a turn signal request is received by the

BCM, a serial data message is sent to the instrument cluster requesting the respective turn signal indicator be pulsed ON and OFF.

Repeater Lamps

The repeater lamps are located in the front fender. The repeater lamps are used as additional turn signal lamps, and operate as described in the Turn Signal/Hazard Flasher Lamps description.

Hazard Flasher Lamps

The hazard flashers may be activated in any power mode. The hazard switch is permanently grounded. When the hazard switch is placed in the ON position, ground is applied through the hazard switch signal circuit to the BCM. The BCM supplies battery voltage to all 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 cluster requesting both turn signal indicators to be cycled ON and OFF.

Stop Lamps

The brake pedal position (BPP) sensor is used to sense the action of the driver application of the brake pedal. The BPP sensor provides an analog voltage signal that will increase as the brake pedal is applied. The BCM provides a low reference signal and a 5 V 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 stop lamp control circuit and center high mounted stop lamp control circuit. When the control circuit is energized the stop lamps are illuminated.

Backup Lamps

When the transmission is placed in the reverse position, the engine control module (ECM) sends a serial data message to the BCM. The message indicates that the gear selector is in the reverse position. The BCM applies battery voltage to the backup lamps. The backup lamps are permanently grounded. Once the driver moves the gear selector out of the reverse position, a message is sent by the ECM via serial data requesting the BCM to remove battery voltage from the backup lamp control circuit.

Battery Run Down Protection/Intermittent 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 and 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 lamps consist of 2 groups, those which can dim from the instrument panel cluster lamps dimmer switch and those that can not dim.

Courtesy/Illuminated Entry Lamps

The following lamps may be manually turned ON by placing the interior lamp switch in the ON position, or by opening a door while the switch is in the AUTO position.

- The dome lamp
- The liftgate lamps
- Courtesy lamps

The courtesy lamp supply voltage circuit of the body control module (BCM) supplies battery positive voltage to the dome lamp, the liftgate lamps and courtesy lamps. When any door is opened, the door jamb switch contacts close providing a door open input to the BCM. The BCM then provides a B+ to the interior lamps with the switch in the AUTO position. The interior lamps receive a ground when the switch is in the ON position.

NOTE: If the liftgate is opened after all the modules go to sleep, the dome light will not come on. The liftgate ajar switch input to the BCM will not wake up the BCM once it has gone to sleep, so the dome light will not come on. Once the BCM gets an input to wake it up, from remote keyless entry or a door handle, the dome light will turn on when the liftgate is opened.

If the driver inadvertently leaves any interior lamp ON, the BCM will turn it OFF after a 20 minute time-out.

The courtesy lamps will turn OFF immediately if the ignition switch is turned to the ON position or approximately 20 seconds after all doors are closed.

Keyless Entry Interior Illumination

When the BCM receives a door unlock command from the remote keyless entry transmitter, the BCM will flash the park lamps several times, illuminate the courtesy and park lamps, and illuminate the low beam headlamps at low intensity. The lamps will remain on until the ignition key is turned from the OFF position, a keyless entry transmitter door lock command is received, or after an approximate 20 second delay.

Interior Lamps Dimming

This group includes lamps which may dim. This group may use a combination of vacuum fluorescent illumination, LEDs and incandescent lamps.

- HVAC control module, head assembly
- Rear HVAC control module, head assembly
- Radio
- Rear seat audio
- The instrument panel cluster
- The PRNDL lamp, with the exception of the current gear select position

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- Power window switches
- Various switches

When the ignition switch is turned to the ON position, the vacuum fluorescent display, radio, turns ON at maximum brightness. When the park lamps are ON, all incandescent back lighting turn ON at the dimming level indicated by the instrument panel cluster dimmer switch. At the same time all fluorescent display displays dim to match the indicated dimming level. When the headlamp switch is placed in the PARK position, the park lamp supply voltage circuit provides an input to the BCM. The BCM then supplies voltage to the instrument panel cluster dimmer switch through the dimming control circuit. The setting of the instrument panel cluster dimmer switch determines the amount of voltage that the instrument panel cluster dimmer switch supplies to the BCM. The BCM then sends a PWM voltage to all the interior lamps. All the fluorescent display and incandescent back lighting lamps are provided a specific voltage and are then grounded. When the headlight switch is turned to the park lamp or headlamp position, all incandescent back lighting turn ON at the dimming level indicated by the instrument panel cluster dimmer switch. When the instrument panel cluster dimmer switch is moved from minimum to maximum, all fluorescent display displays, as well as all incandescent back lighting respond from minimum intensity to maximum brightness in response to the instrument panel cluster dimmer switch.

Inadvertent Power

The BCM used in this vehicle controls the lighting system through circuits that enable the interior lamps. The BCM opens these enabling circuits shortly after the ignition switch is turned OFF with no lamp switch activity. If the ignition switch is turned to any position other than OFF, or if a lamp switch is activated during this period, the timer will reset itself.

