

## 2008 Isuzu Ascender LS

2008 Accessories & Equipment Lighting - Ascender, Envoy & Trailblazer

### 2008 Accessories & Equipment

#### Lighting - Ascender, Envoy & Trailblazer

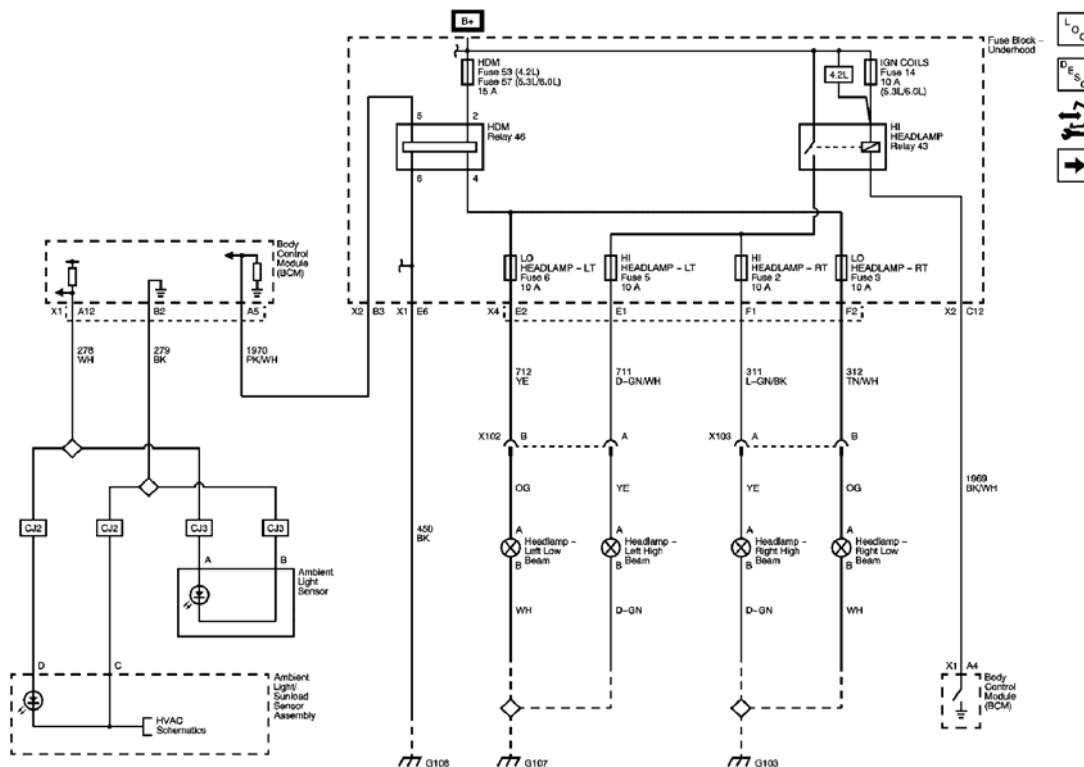
## SPECIFICATIONS

### FASTENER TIGHTENING SPECIFICATIONS

Application	Specification	
	Metric	English
Backup Lamp to Fascia Nuts	10 N.m	88 lb in
Front Fog Lamp Bolts	10 N.m	88 lb in
High Mount Stop Lamp Lens Screws	2.5 N.m	22 lb in
Instrument Panel Compartment Lamp Screws	1.9 N.m	17 lb in
License Plate Lamp Lens to Liftgate Screws	1.4 N.m	12 lb in
Tail Lamp Assembly to Vehicle Screws	1.9 N.m	17 lb in

## SCHEMATIC & ROUTING DIAGRAMS

### HEADLIGHTS/DAYTIME RUNNING LIGHTS (DRL) SCHEMATICS

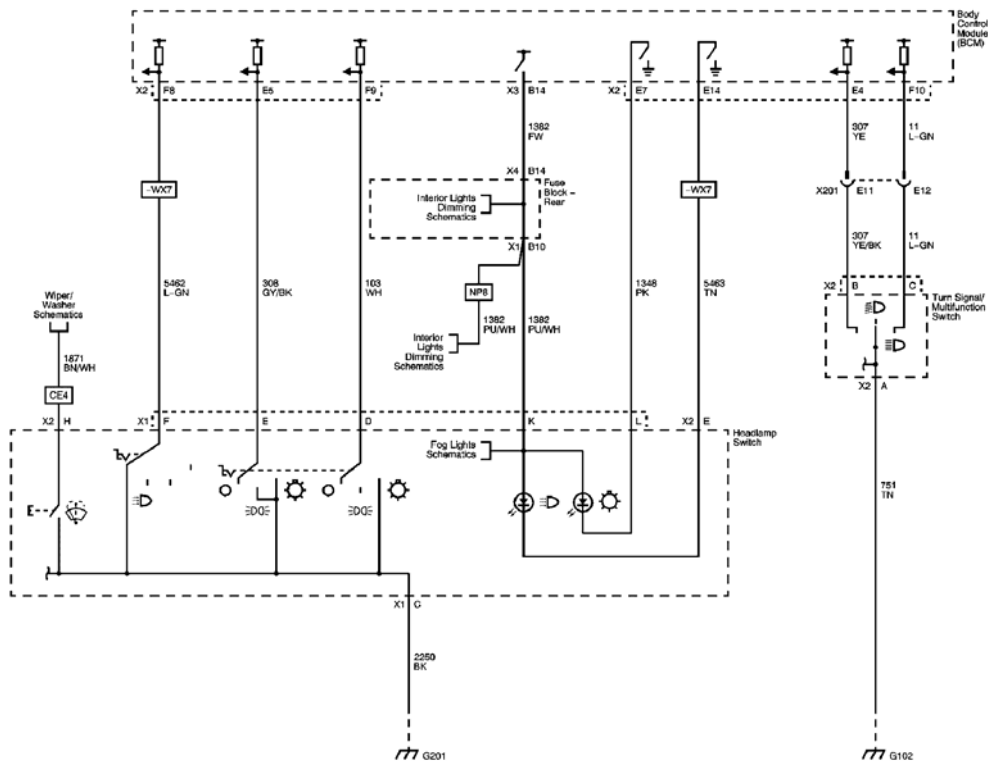


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**Fig. 1: Headlamps Schematic**

Courtesy of GENERAL MOTORS CORP.



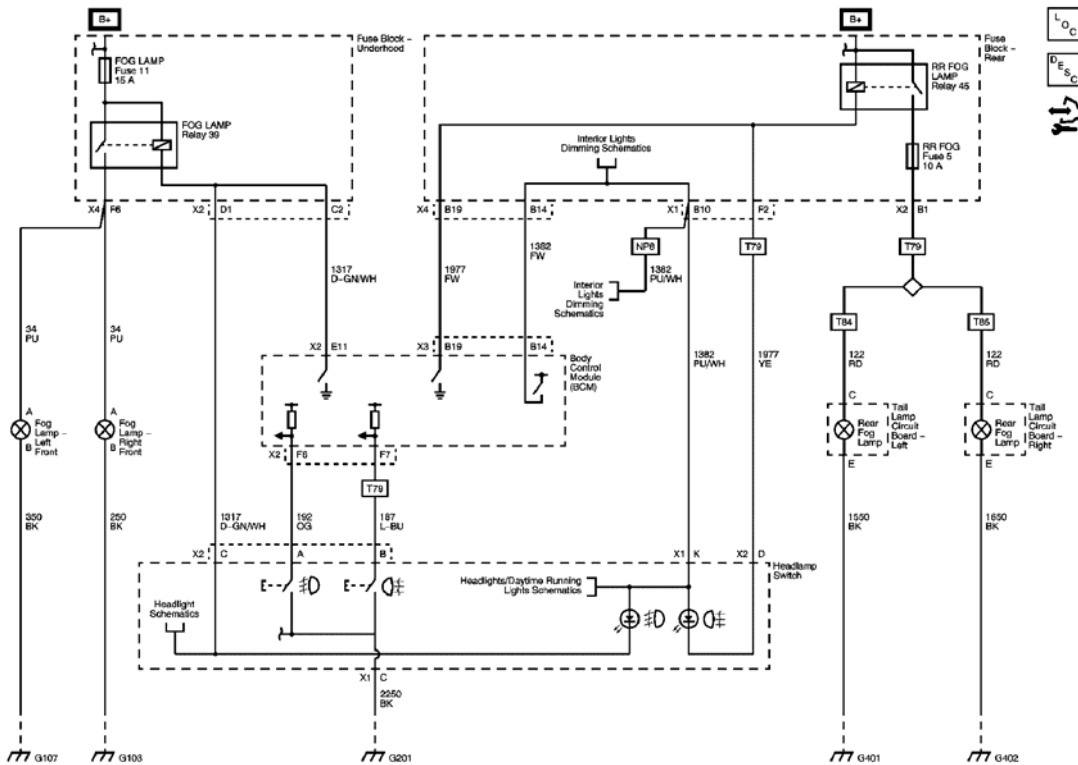
**Fig. 2: Headlamp Switch Schematic**

Courtesy of GENERAL MOTORS CORP.

## FOG LIGHTS SCHEMATICS

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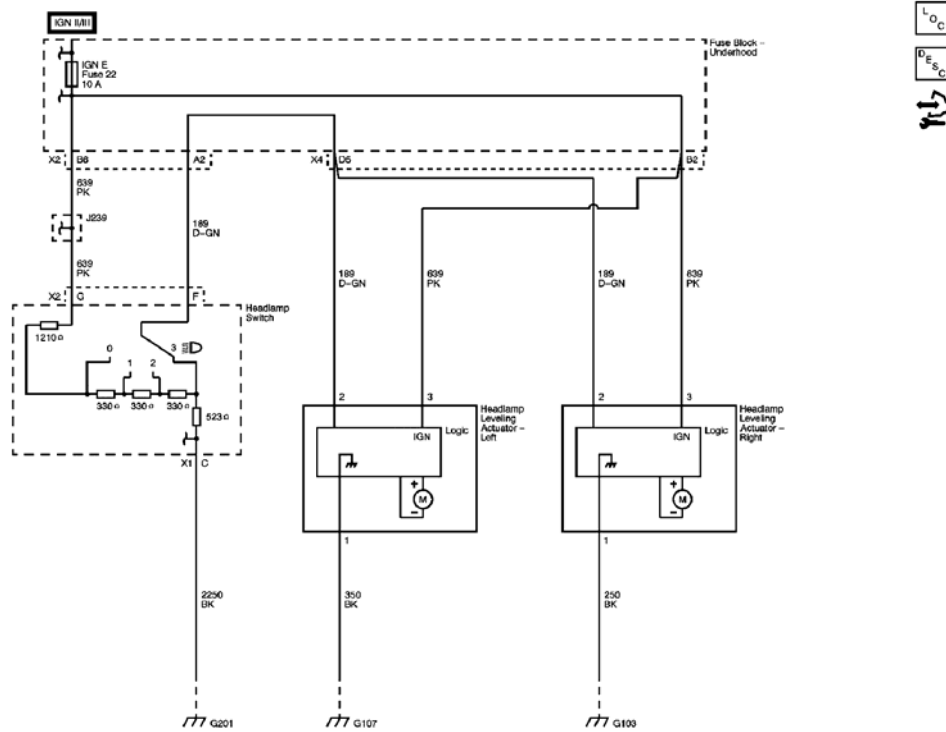


**Fig. 3: Fog Lights Schematic**  
Courtesy of GENERAL MOTORS CORP.

### HEADLIGHT LEVELING SCHEMATICS

## 2008 Isuzu Ascender LS

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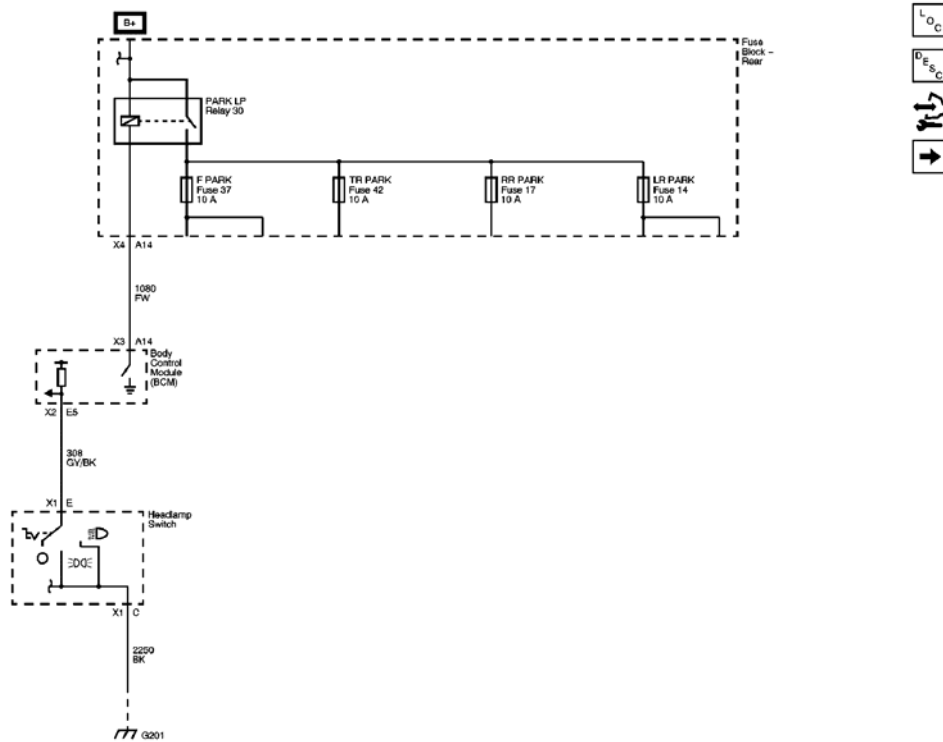


**Fig. 4: Headlight Leveling Schematic**  
Courtesy of GENERAL MOTORS CORP.

### EXTERIOR LIGHTS SCHEMATICS

## 2008 Isuzu Ascender LS

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**Fig. 5: Park Lamp Relay Schematic**  
Courtesy of GENERAL MOTORS CORP.

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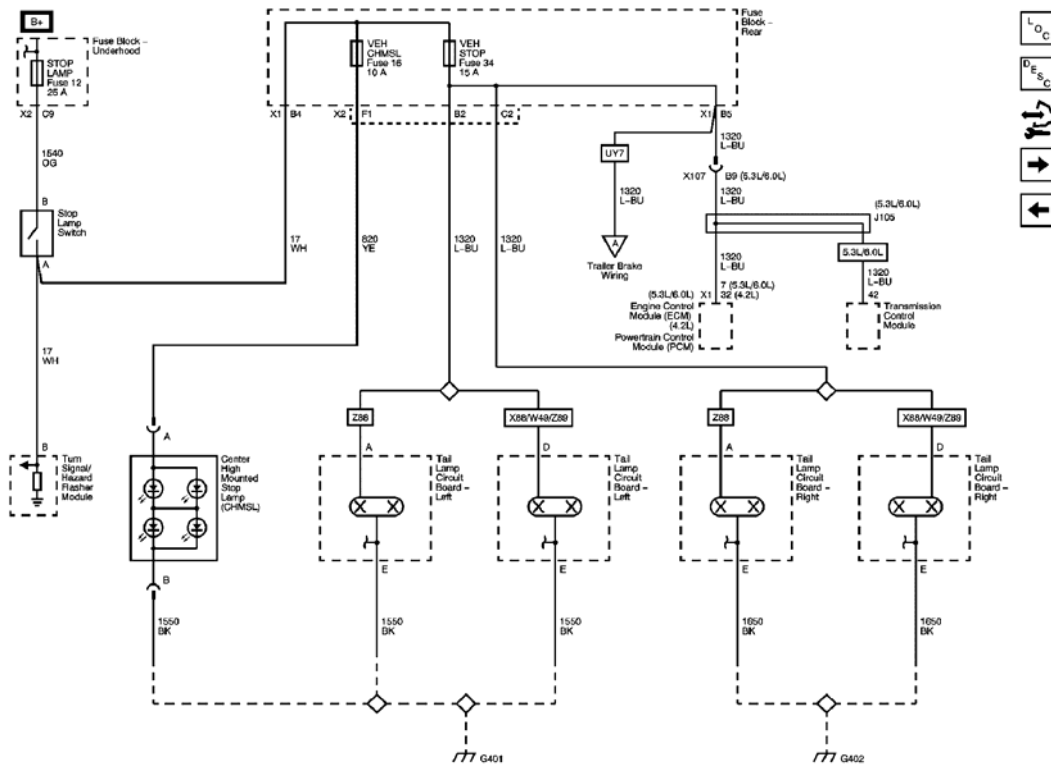
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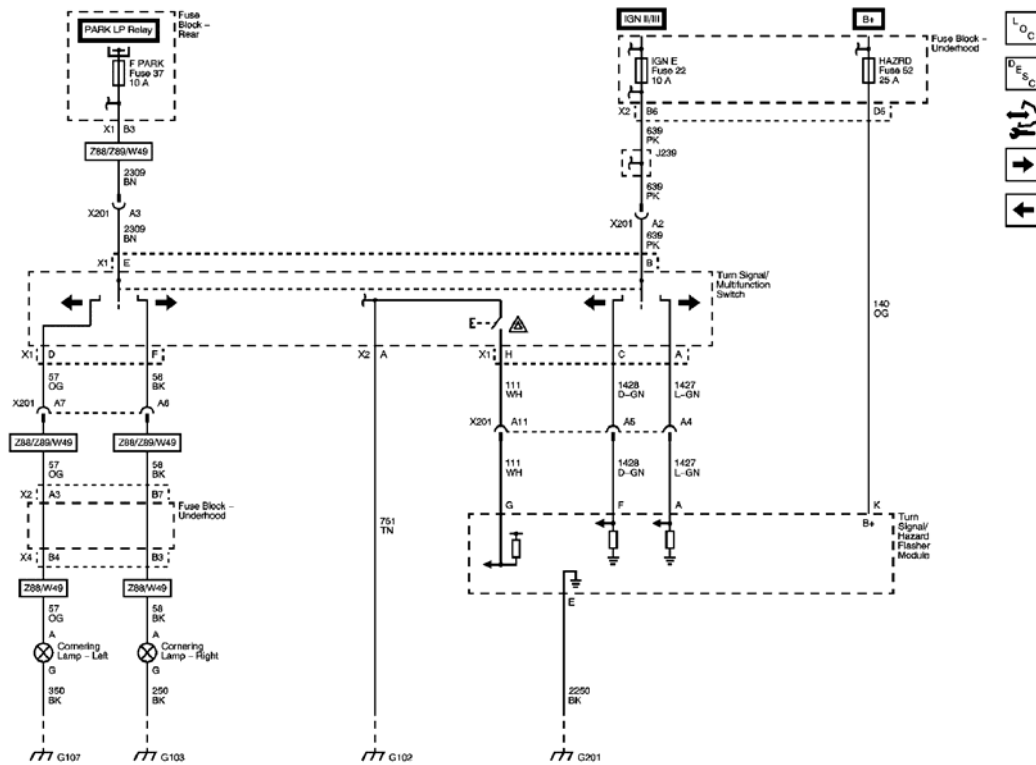


**Fig. 8: Stop Lamps Schematic**  
**Courtesy of GENERAL MOTORS CORP.**



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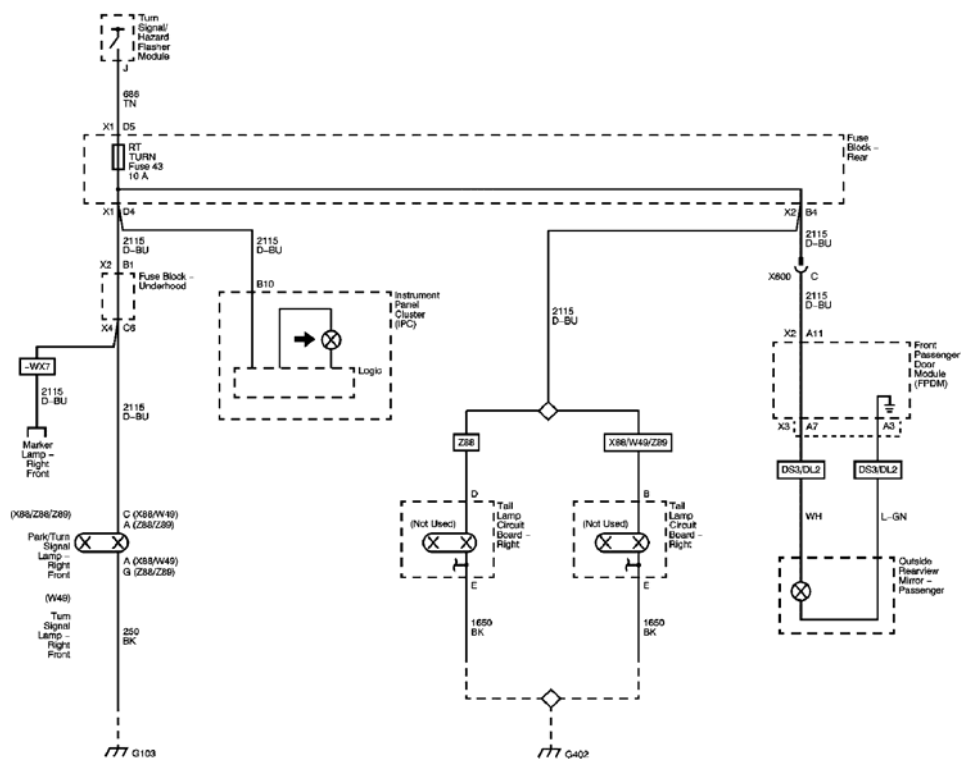
**Fig. 9: Turn Signal/Multifunction Switch and Cornering Lamps Schematic**  
**Courtesy of GENERAL MOTORS CORP.**

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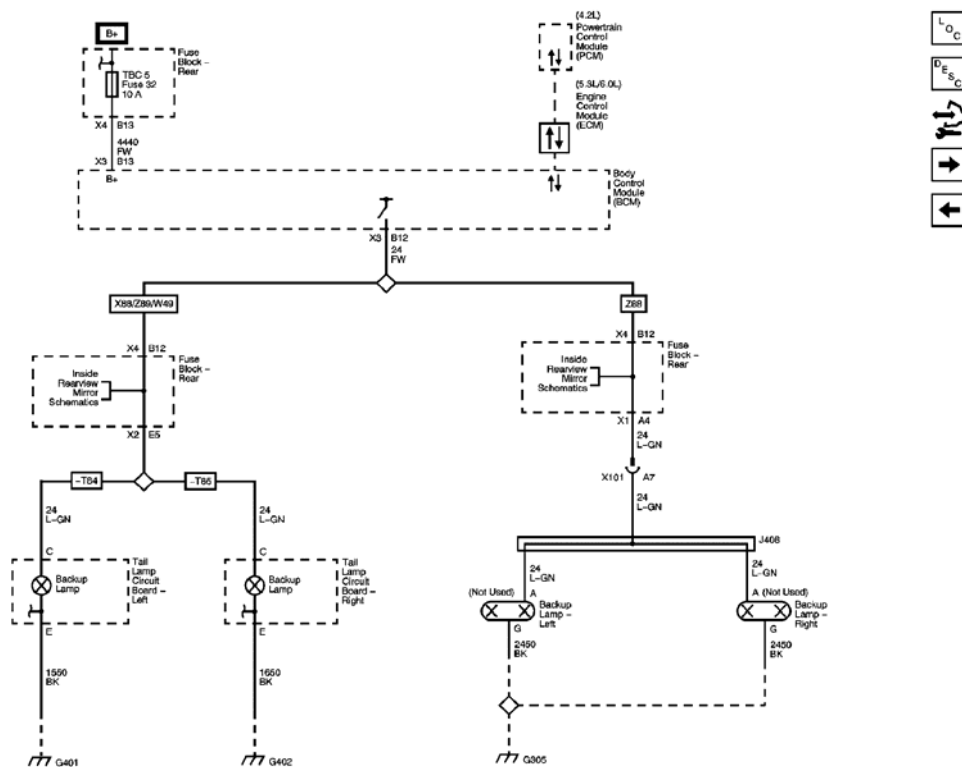
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**Fig. 11: Right Turn Signals Schematic**  
**Courtesy of GENERAL MOTORS CORP.**

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**Fig. 12: Backup Lamps Schematic**  
**Courtesy of GENERAL MOTORS CORP.**

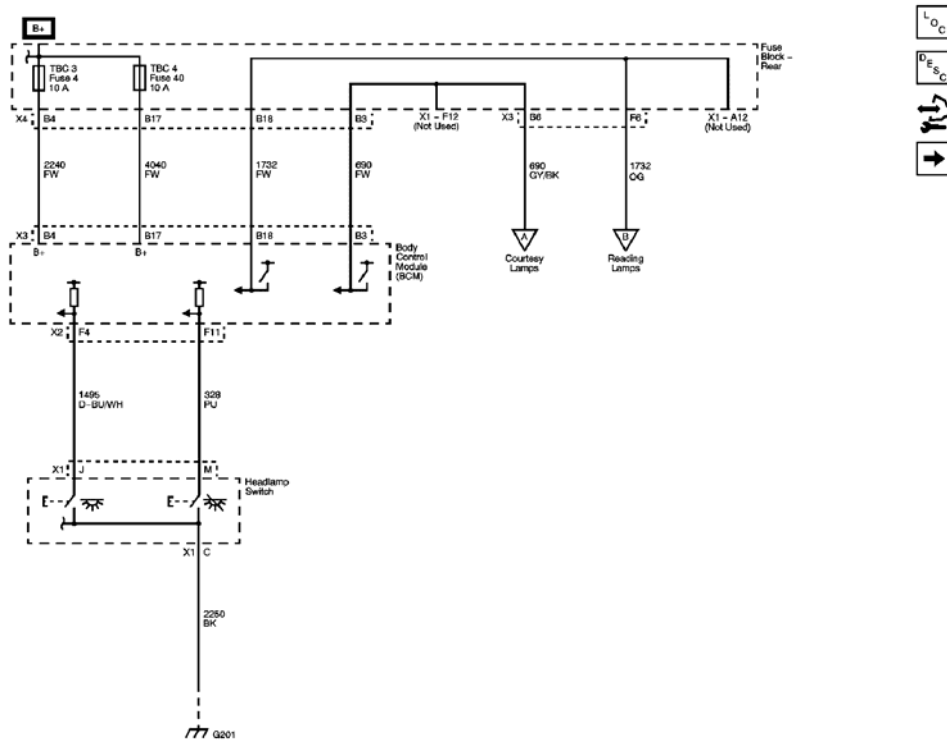
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## INTERIOR LIGHTS SCHEMATICS

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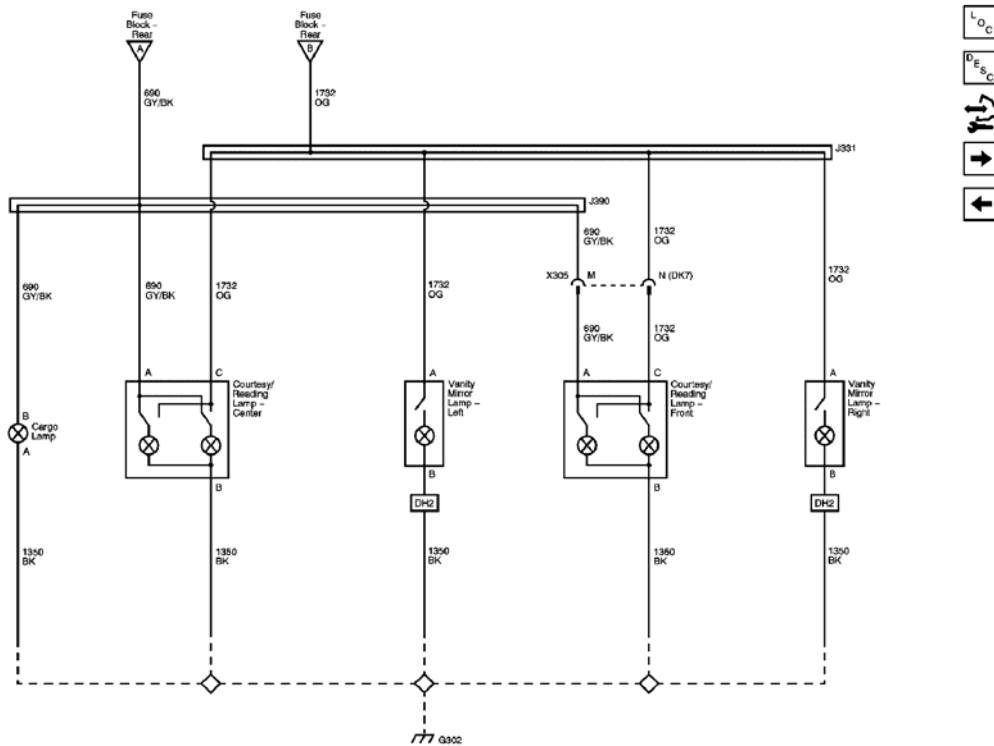
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**Fig. 14: Interior Lamp Controls Schematic**  
**Courtesy of GENERAL MOTORS CORP.**

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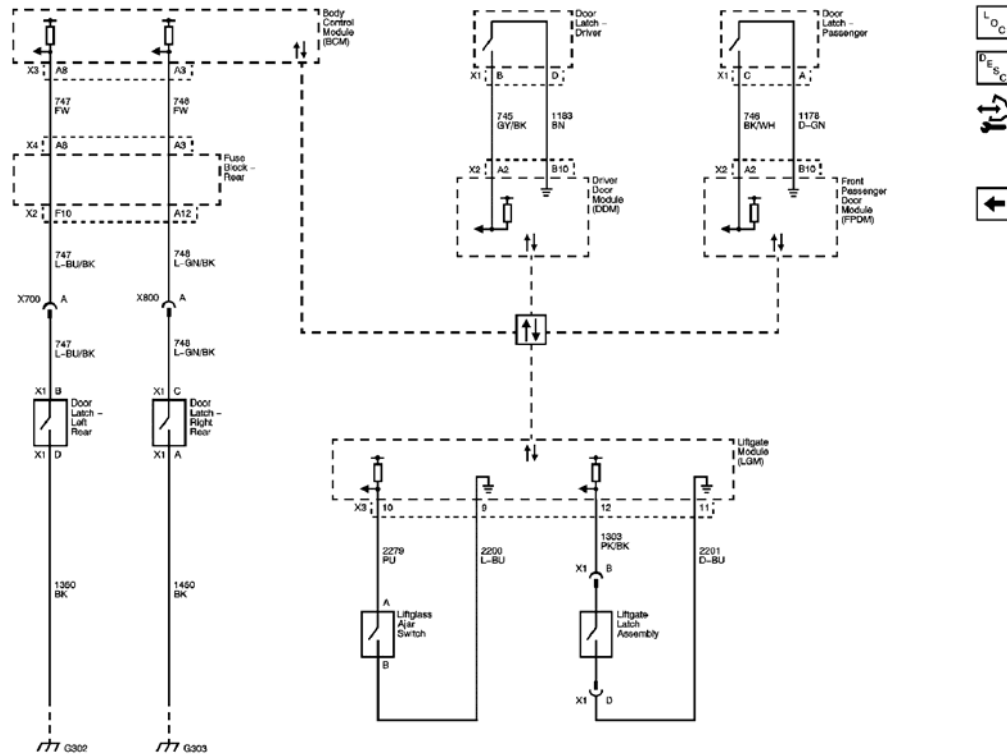
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**Fig. 15: Interior Lamps Schematic**  
Courtesy of GENERAL MOTORS CORP.

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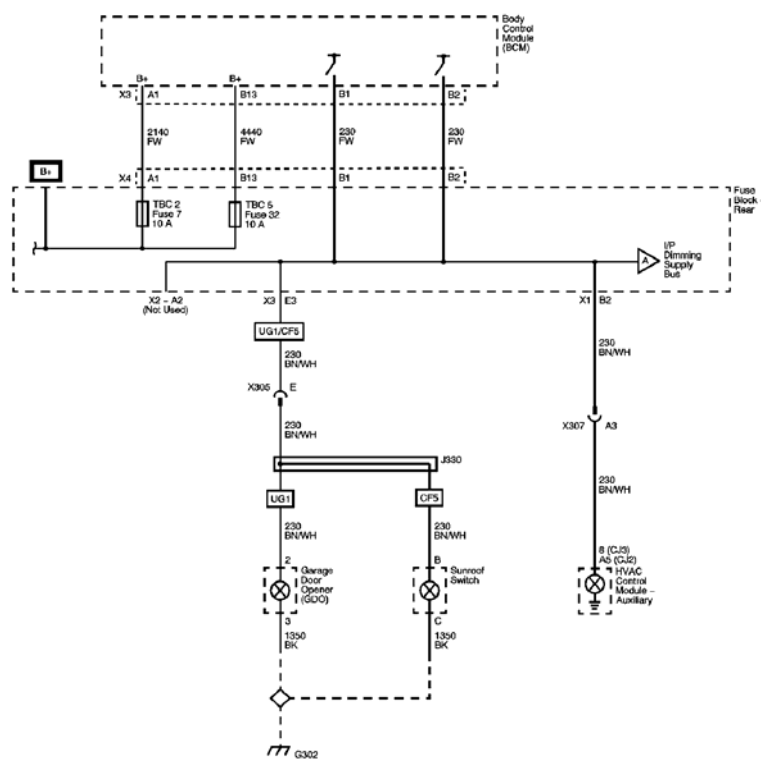
**Fig. 16: Door Switch Inputs and Liftgate Switch Inputs Schematic**  
Courtesy of GENERAL MOTORS CORP.

### INTERIOR LIGHTS DIMMING SCHEMATICS



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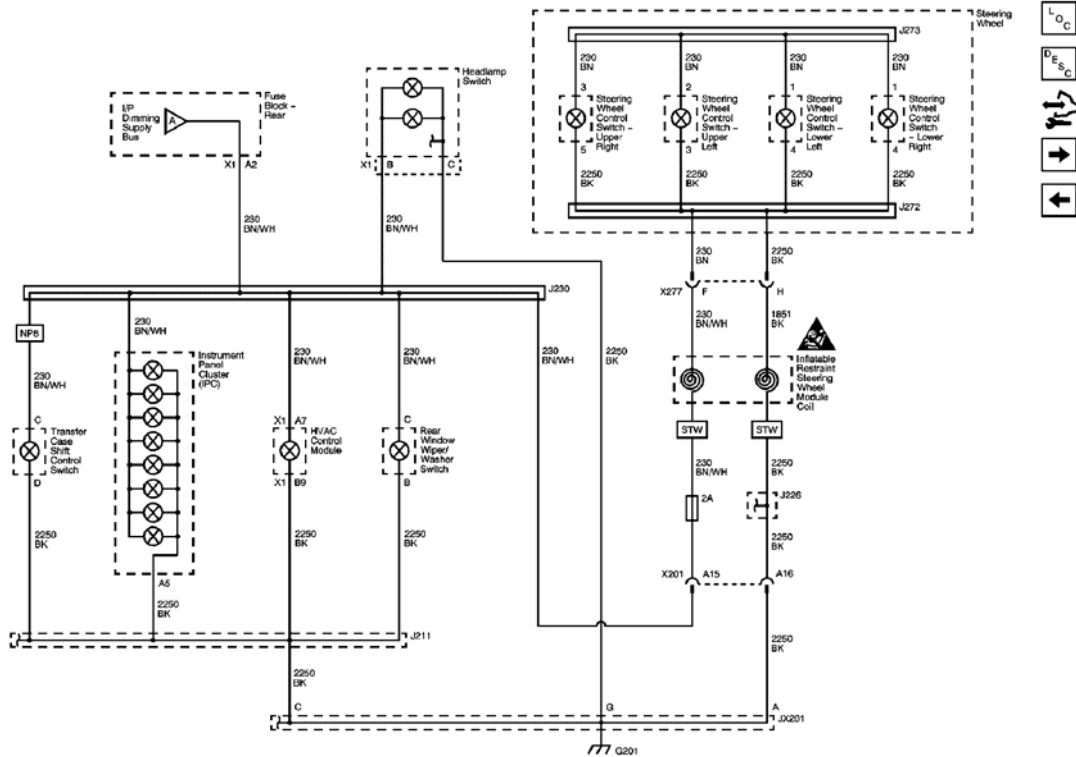
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**Fig. 17: I/P Dimming Supply Schematic - 1 of 2**  
**Courtesy of GENERAL MOTORS CORP.**

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**Fig. 18: I/P Dimming Supply Schematic - 2 of 2**  
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**Fig. 19: Courtesy Lamp Supply Schematic**  
**Courtesy of GENERAL MOTORS CORP.**

## DIAGNOSTIC INFORMATION & PROCEDURES

## DIAGNOSTIC CODE INDEX

## DIAGNOSTIC CODE INDEX

DTC	Description
<b><u>DTC B0951</u></b>	B0951: Headlamps On Indicator Circuit
<b><u>DTC B1480</u></b>	B1480: Battery Rundown Protection Circuit
<b><u>DTC B2527</u></b>	B2527: Front Fog Lamps Circuit Low
<b><u>DTC B2530</u></b>	B2530: Front Fog Lamps Control Circuit
<b><u>DTC B2540</u></b>	B2540: Rear Fog Lamps Control Circuit
<b><u>DTC B2550</u></b>	B2550: Backup Lamps Control Circuit
<b><u>DTC B2575</u></b>	B2575: Headlamp Control Circuit
<b><u>DTC B2580</u></b>	B2580: Headlamp High Beam Control Circuit
<b><u>DTC B2585</u></b>	B2585: Park Lamp Control Circuit
<b><u>DTC B2610</u></b>	B2610: Passenger Compartment Dimming 1 Circuit
<b><u>DTC B2615</u></b>	B2615: Passenger Compartment Dimming 2 Circuit
<b><u>DTC B2620</u></b>	B2620: Display Dimming Pulse Width Modulation (PWM) Input Circuit

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<b><u>DTC B2625</u></b>	B2625: Display Dimming Pulse Width Modulation (PWM) Output Circuit
<b><u>DTC B2645</u></b>	B2645: Ambient Light Sensor Circuit
<b><u>DTC B3801</u></b>	B3801: Passenger Compartment Lamp Request Circuit
<b><u>DTC B3802</u></b>	B3802: Park Lamps Request Circuit

### DIAGNOSTIC STARTING POINT - LIGHTING SYSTEMS

Begin the system diagnosis with the **Diagnostic System Check - Vehicle** . The Diagnostic System Check will provide the following information:

- The identification of the control module(s) which command the system.
- The ability of the control module(s) to communicate through the serial data circuit.
- The identification of any stored diagnostic trouble codes (DTCs) and their status.

The use of the Diagnostic System Check will identify the correct procedure for diagnosing the system and where the procedure is located.

### DTC B0951

#### 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 B0951

Headlamps On Indicator Circuit

#### Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
LED Dimming Control	B0591, B2625	B0591	-	-
Headlamp On Indicator Control	-	1	1	-
1. Headlamp on indicator inoperative				

#### Circuit/System Description

The body control module (BCM) controls the illumination dimming of all of the control switch indicators. The BCM will set the control switch indicator illumination level according to the instrument panel (I/P) dimmer switch signal received when the component is activated and the indicator is ON.

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### Conditions for Running the DTC

The battery voltage must be between 9-16 volts.

### Conditions for Setting the DTC

The LED dimming control circuit is open or shorted to ground.

### Action Taken When the DTC Sets

The control switch indicators will not operate or will not dim.

### Conditions for Clearing the DTC

- This DTC will clear on current status after the condition for setting the fault is corrected.
- A history DTC will clear after 100 consecutive ignition cycles without a fault present.

### 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, operate the headlamp switch on and off. The headlamp on indicator should turn on and off.
2. Headlamps ON, operate the interior dimming switch between bright and dim. The headlamp on indicator

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should change from bright to dim.

### Circuit/System Testing

1. Ignition OFF, disconnect the headlamp switch connector X1.
2. Connect a test lamp between the LED dimming control circuit terminal K and ground.
3. Park lamps ON, operate the IP dimmer switch between bright and dim. The test lamp should illuminate bright to dim.
  - If the test lamp does not illuminate, test the control circuit for an open/high resistance or short to ground.
  - If the test lamp remains illuminated bright, test the control circuit for a short to voltage.
4. If all circuits test normal replace the BCM.

### Repair Procedures

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

**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

Battery Rundown Protection Circuit

#### Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
TBC 4 Battery Supply	B1480	B1480	-	-
Inadvertent Power Supply	B1480	1	-	-
1. Reading and vanity mirror lamps inoperative				

#### Circuit/System Description

The body control module (BCM) supplies battery positive voltage to the reading lamps and both visor vanity mirror lamps. In the event that any of these lamps were to remain illuminated for more than 20 minutes with the

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ignition switch in the OFF position, the BCM will deactivate the inadvertent power courtesy lamps supply voltage circuit to prevent a total battery discharge condition

#### **Conditions for Running the DTC**

The battery voltage must be between 9-16 volts.

#### **Conditions for Setting the DTC**

- The TBC 4 fuse battery supply circuit to the BCM is open or shorted to ground.
- The inadvertent power supply voltage circuit to the reading and vanity mirror lamps is shorted to ground.

#### **Action Taken When the DTC Sets**

The reading and vanity mirror lamps will be inoperative.

#### **Conditions for Clearing the DTC**

- This DTC will clear on current status after the condition for setting the fault is corrected.
- A history DTC will clear after 100 consecutive ignition cycles without a fault present.

#### **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**

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### Circuit/System Verification

Cycle the ignition ON and OFF and verify operation of the reading and vanity mirror lamps.

### Circuit/System Testing

1. Ignition OFF, disconnect the BCM connector X3.
2. Verify that a test lamp illuminates between the B+ circuit terminal B17 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 and the B+ circuit fuse is open, test the inadvertent power supply circuit terminal B18 for a short to ground.
3. If the circuits test normal replace the BCM.

### Repair Procedures

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

**Control Module References** for BCM replacement, programming, and setup

### DTC B2527

#### 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 B2527

Front Fog Lamps Circuit Low

#### Circuit/System Description

The body control module (BCM) monitors the front fog lamp switch signal circuit in order to determine when the fog lamp relay is to be energized. When the BCM senses that the front fog lamp switch signal circuit is grounded momentarily by pressing the fog lamp switch, the BCM energizes the fog lamp relay by grounding the fog lamp relay control circuit.

#### Conditions for Running the DTC

The battery voltage must be between 9-16 volts.

#### Conditions for Setting the DTC



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The front fog lamp switch signal circuit is shorted to ground for 15 minutes.

### Action Taken When the DTC Sets

The front fog lamps will be inoperative.

### Conditions for Clearing the DTC

- This DTC will clear on current status after the condition for setting the fault is corrected.
- A history DTC will clear after 100 consecutive ignition cycles without a fault 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
- Wiring Repairs

### Scan Tool Reference

### Control Module References for Scan Tool Information

### Circuit/System Verification

Ignition ON, observe the scan tool front fog lamp switch parameter while pressing and releasing the front fog lamp switch. The reading should change between on and off.

### Circuit/System Testing

1. Ignition OFF, disconnect the harness connector X2 at the headlamp switch.
2. Ignition ON, verify the scan tool front fog lamp switch parameter is off.
  - If not the specified value test the front fog lamp switch signal circuit for a short to ground. If the

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circuit tests normal replace the BCM.

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

### Component Testing

1. Ignition OFF, disconnect the harness connectors at the headlamp switch.
2. Test for infinite resistance between the front fog lamp switch signal terminal A X2 and the low reference terminal C X1 with the switch in the open position.
  - If not the specified value, replace the headlamp switch.
3. Test for less than 1 ohm of resistance between the front fog lamp switch signal terminal A X2 and the low reference terminal C X1 while pressing the front fog lamp switch.
  - If greater than the specified range, replace the 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 B2530

#### Diagnostic Instructions

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

#### DTC Descriptor

### DTC B2530

Front Fog Lamps Control Circuit

#### Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Front Fog Lamp Relay Control	B2530	B2530	B2530	-

#### Circuit/System Description

When the body control module (BCM) senses that the front fog lamp switch signal circuit is grounded momentarily by pressing the front fog lamp switch, the BCM energizes the front fog lamp relay by grounding the front fog lamp relay control circuit. The front fog lamp indicator is also illuminated utilizing the same fog

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lamp relay control circuit.

### Conditions for Running the DTC

The battery voltage must be between 9-16 volts.

### Conditions for Setting the DTC

- When the BCM receives a front fog lamp switch OFF command and the front fog lamp relay control circuit is shorted to ground.
- When the BCM receives a front fog lamp switch ON command and the front fog lamp relay control circuit is shorted to voltage or open.

### Action Taken When the DTC Sets

The front fog lamps will be inoperative or always on.

### Conditions for Clearing the DTC

- This DTC will clear on current status after the condition for setting the fault is corrected.
- A history DTC will clear after 100 consecutive ignition cycles without a fault present.

### Reference Information

#### Schematic Reference

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#### Connector End View Reference

#### Component Connector End Views

#### Description and Operation

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- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

#### Scan Tool Reference

#### Control Module References for Scan Tool Information

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### Circuit/System Testing

1. Ignition OFF, disconnect the front fog lamp relay.
2. Connect a test lamp between the relay control circuit terminal 86 and B+.
3. Operate the front fog lamps on and off. 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 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 BCM.
4. Verify that a test lamp illuminates between the B+ circuit terminal 85 and ground.
  - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance.
5. If all circuits test normal, test or replace the front fog lamp relay.

### Component Testing

#### Relay Test

1. Ignition OFF, disconnect the front fog lamp relay.
2. Test for 70-100 ohms of resistance between terminals 85 and 86.
  - If the resistance is not within the specified range, replace the relay.
3. Test for infinite resistance between the following terminals:
  - 30 and 85
  - 30 and 86
  - 30 and 87
  - 85 and 87
  - If not the specified value, replace the relay.
4. Install a 10A fused jumper wire between relay terminal 85 and B+. Install a jumper wire between relay terminal 86 and ground. Test for less than 2 ohms of resistance between terminals 30 and 87.
  - If greater than the specified range, replace the relay.

### Repair Procedures

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

**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.

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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 B2540

Rear Fog Lamps Control Circuit

### Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Rear Fog Lamp Relay Control	B2540	B2540	B2540	-

### Circuit/System Description

When the body control module (BCM) senses that the rear fog lamp switch signal circuit is grounded momentarily by pressing the rear fog lamp switch, the BCM energizes the rear fog lamp relay by grounding the rear fog lamp relay control circuit. The rear fog lamp indicator is also illuminated utilizing the same fog lamp relay control circuit.

### Conditions for Running the DTC

The battery voltage must be between 9-16 volts.

### Conditions for Setting the DTC

- When the BCM receives a rear fog lamp switch OFF command and the rear fog lamp relay control circuit is shorted to ground.
- When the BCM receives a rear fog lamp switch ON command and the rear fog lamp relay control circuit is shorted to voltage or open.

### Action Taken When the DTC Sets

The rear fog lamps will be inoperative or always on.

### Conditions for Clearing the DTC

- This DTC will clear on current status after the condition for setting the fault is corrected.
- A history DTC will clear after 100 consecutive ignition cycles without a fault 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**
- **Wiring Repairs**

**Scan Tool Reference****Control Module References** for Scan Tool Information**Circuit/System Testing**

1. Ignition OFF, disconnect the rear fog lamp relay.
2. Connect a test lamp between the relay control circuit terminal 86 and B+.
3. Operate the rear fog lamps on and off. 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 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 BCM.
4. Verify that a test lamp illuminates between the B+ circuit terminal 85 and ground.
  - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance.
5. If all circuits test normal, test or replace the rear fog lamp relay.

**Component Testing****Relay Test**

1. Ignition OFF, disconnect the rear fog lamp relay.
2. Test for 70-100 ohms of resistance between terminals 85 and 86.
  - If the resistance is not within the specified range, replace the relay.
3. Test for infinite resistance between the following terminals:

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- 30 and 85
  - 30 and 86
  - 30 and 87
  - 85 and 87
  - If not the specified value, replace the relay.
4. Install a 10A fused jumper wire between relay terminal 85 and B+. Install a jumper wire between relay terminal 86 and ground. Test for less than 2 ohms of resistance between terminals 30 and 87.
- If greater than the specified range, replace the relay.

### Repair Procedures

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

**Control Module References** for BCM replacement, programming, and setup.

### DTC B2550

#### 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 B2550

Backup Lamps Control Circuit

#### Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Backup Lamp Control	B2550	B2550	B2550	-

#### Circuit/System Description

When the Body Control Module (BCM) receives a class 2 message from the Powertrain Control Module (PCM) requesting to illuminate the backup lamps, battery voltage is sent directly from the BCM through the backup lamp supply voltage circuit to the backup lamps.

#### Conditions for Running the DTC

The battery voltage must be between 9-16 volts.

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### Conditions for Setting the DTC

- When the BCM receives a backup lamp request signal and the backup lamp supply voltage circuit is shorted to ground.
- When the BCM is not receiving a backup lamp request signal and the backup lamp supply voltage circuit is open or shorted to voltage.

### Action Taken When the DTC Sets

The backup lamps will be inoperative or always on.

### Conditions for Clearing the DTC

- This DTC will clear on current status after the condition for setting the fault is corrected.
- A history DTC will clear after 100 consecutive ignition cycles without a fault present.

### 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

Ignition ON, shift the vehicle in and out of reverse. The backup lamps should turn on and off.

#### Circuit/System Testing



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1. Ignition OFF, disconnect the harness connector at an affected backup lamp.
2. Test for less than 1 ohm of resistance between the listed ground circuit terminal and ground.
  - Chevy, Isuzu terminal E
  - GMC terminal G
  - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Connect a test lamp between the listed control circuit terminal and ground circuit terminal.
  - Chevy, Isuzu terminal C
  - GMC terminal A
4. Command the backup 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 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 BCM.
5. If all circuits test normal, test or replace the affected backup lamps.

#### Repair Procedures

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

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

#### DTC B2575

##### 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 B2575

Headlamp Control Circuit

##### Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Headlamp Low Beam Relay Control	B2575	B2575	B2575	-

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### Circuit/System Description

When the body control module (BCM) senses a request for headlamp or daytime running lamp (DRL) illumination, the BCM sends a pulse width modulated (PWM) ground signal to the low beam headlamp driver module through the low beam headlamp driver module control circuit. The low beam headlamp driver module will illuminate the headlamps, adjusting the intensity based on the PWM signal received.

### Conditions for Running the DTC

The battery voltage must be between 9-16 volts.

### Conditions for Setting the DTC

- When the BCM receives a low beam headlamp request the low beam headlamp relay control circuit is open or shorted to voltage.
- When the BCM is not receiving a low beam headlamp request the low beam headlamp relay control circuit is shorted to ground.

### Action Taken When the DTC Sets

The low beam headlamps will be inoperative or always on.

### Conditions for Clearing the DTC

- This DTC will clear on current status after the condition for setting the fault is corrected.
- A history DTC will clear after 100 consecutive ignition cycles without a fault present.

### 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

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- **Wiring Repairs**

### Scan Tool Reference

**Control Module References** for Scan Tool Information

### Circuit/System Testing

1. Ignition OFF, disconnect the low beam headlamp relay.
2. Test for less than 1 ohm of resistance between the ground circuit terminal 6 and ground.
  - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Connect a test lamp between the relay control circuit terminal 5 and B+.
4. Command the daytime running lights ON and OFF with a scan tool. The test lamp should illuminate at low intensity and go out 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 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 BCM.
5. If all circuits test normal replace the low beam headlamp relay.

### Repair Procedures

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

**Control Module References** for BCM replacement, programming, and setup.

### DTC B2580

#### Diagnostic Instructions

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

#### DTC Descriptor

### DTC B2580

Headlamp High Beam Control Circuit

#### Diagnostic Fault Information

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

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High Beam Relay Control	B2580	B2580	B2580	-
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### Circuit/System Description

When the body control module (BCM) receives a ground signal from the multifunction high beam or flash to pass (FTP) switch commanding to illuminate the high beam headlamps, the BCM will energize the high beam relay by grounding the high beam relay control circuit.

### Conditions for Running the DTC

The battery voltage must be between 9-16 volts.

### Conditions for Setting the DTC

- When the BCM receives a high beam headlamp request the high beam headlamp relay control circuit is shorted to voltage.
- When the BCM is not receiving a high beam headlamp request the high beam headlamp relay control circuit is open or shorted to ground.

### Action Taken When the DTC Sets

The high beam headlamps are inoperative or always on.

### Conditions for Clearing the DTC

- This DTC will clear on current status after the condition for setting the fault is corrected.
- A history DTC will clear after 100 consecutive ignition cycles without a fault present.

### 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

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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

1. Ignition OFF, disconnect the high beam headlamp relay.
2. Ignition ON, verify that a test lamp illuminates between the B+ circuit terminal 85 and ground.
  - If the test lamp does not illuminate and the fuse is not open, replace the underhood fuse block.
3. Connect a test lamp between the relay control circuit terminal 86 and B+.
4. Operate the high beam headlamps ON and OFF. 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 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 BCM.
5. If all circuits test normal replace the high beam headlamp relay.

### Repair Procedures

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

**Control Module References** for BCM replacement, programming, and setup.

### DTC B2585

#### 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 B2585

Park Lamp Control Circuit

#### Diagnostic Fault Information

	Short to	Open/High	Short to	Signal
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Circuit	Ground	Resistance	Voltage	Performance
Park Lamp Relay Control	B2585	B2585	B2585	-

### Circuit/System Description

When the body control module (BCM) receives a ground signal from the headlamp switch commanding to illuminate the park lamps, the BCM will energize the park lamp relay by grounding the park lamp relay control circuit.

### Conditions for Running the DTC

The battery voltage must be between 9-16 volts.

### Conditions for Setting the DTC

- When the BCM receives a park lamp request the park lamp relay control circuit is shorted to voltage.
- When the BCM is not receiving a park lamp request the park lamp relay control circuit is open or shorted to ground.

### Action Taken When the DTC Sets

The park lamps will be inoperative or always on.

### Conditions for Clearing the DTC

- This DTC will clear on current status after the condition for setting the fault is corrected.
- A history DTC will clear after 100 consecutive ignition cycles without a fault present.

### 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

1. Ignition OFF, disconnect the park lamp relay.
2. Ignition ON, verify that a test lamp illuminates between the B+ circuit terminal 85 and ground.
  - If the test lamp does not illuminate, replace the underhood fuse block.
3. Connect a test lamp between the relay control circuit terminal 86 and B+.
4. Command the 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 ground. If the circuit tests normal, replace the 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 BCM.
5. If all circuits test normal replace the park lamp relay.

### Repair Procedures

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

**Control Module References** for BCM replacement, programming, and setup.

### DTC B2610

#### Diagnostic Instructions

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

### DTC Descriptor

### DTC B2610

Passenger Compartment Dimming 1 Circuit

### Circuit/System Description

The body control module (BCM) receives a variable voltage signal from the instrument panel (I/P) dimmer

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switch requesting to illuminate the instrument panel controls illumination lamps to a desired intensity. When this occurs, the BCM directly sends a variable voltage based on the I/P dimmer switch position through the instrument panel lamps dimming control circuit to the instrument panel controls illumination lamps

#### Conditions for Running the DTC

The battery voltage must be between 9-16 volts.

#### Conditions for Setting the DTC

The instrument panel lamps dimming control circuit is shorted to voltage.

#### Action Taken When the DTC Sets

The instrument panel controls illumination lamps will be always on.

#### Conditions for Clearing the DTC

- This DTC will clear on current status after the condition for setting the fault is corrected.
- A history DTC will clear after 100 consecutive ignition cycles without a fault present.

#### 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**

Park lamps ON, operate the interior dimmer switch from bright to dim. The IP switch backlighting should illuminate from bright to dim.

**Circuit/System Testing**

1. Ignition OFF, disconnect the harness connector at an affected component.
2. Test for less than 1 ohm of resistance between the affected component ground circuit terminal listed below and ground.
  - Transfer case shift control switch terminal D
  - IPC terminal A5
  - HVAC control module terminal B9 X1
  - Rear window wiper/washer switch terminal B
  - Headlamp switch terminal C X1
  - Upper right steering wheel switch terminal 5
  - Upper left steering wheel switch terminal 3
  - Lower left steering wheel switch terminal 4
  - Lower right steering wheel switch terminal 4
  - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Connect a test lamp between the listed control circuit terminal and ground circuit terminal.
  - Transfer case shift control switch terminal C to terminal D
  - IPC terminal A7 to terminal A5
  - HVAC control module terminal A7 X1 to terminal B9 X1
  - Rear window wiper/washer switch terminal C to terminal B
  - Headlamp switch terminal B X1 to terminal C X1
  - Upper right steering wheel switch terminal 3 to terminal 5
  - Upper left steering wheel switch terminal 2 to terminal 3
  - Lower left steering wheel switch terminal 1 to terminal 4
  - Lower right steering wheel switch terminal 1 to terminal 4
4. Command the lamp dimming test 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 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 BCM.
5. If all circuits test normal, test or replace the affected component.

**Repair Procedures**

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

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- **Transfer Case Shift Control Switch Replacement (GMC, Buick)**
- **Rear Window Wiper and Washer Switch Replacement**
- **Headlamp Switch Replacement**
- **Control Module References** for BCM, HVAC control module, or IPC replacement, programming, and setup.

### DTC B2615

#### Diagnostic Instructions

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

#### DTC Descriptor

### DTC B2615

Passenger Compartment Dimming 2 Circuit

#### Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
TBC 3 Battery Supply	B2615	B2615	-	-
Courtesy Lamp Supply	B2615	B2615	B2615	-
Courtesy Lamp Ground	-	B2615	-	-

#### Circuit/System Description

The body control module (BCM) receives a ground signal from the door jamb, liftglass/liftgate, or courtesy lamp switches requesting courtesy/dome lamp illumination. When this occurs, the BCM directly sends a voltage through the courtesy lamp supply voltage circuit illuminating the courtesy/dome lamps.

#### Conditions for Running the DTC

The battery voltage must be between 9-16 volts.

#### Conditions for Setting the DTC

- The TBC 3 fuse battery supply circuit to the BCM is open or shorted to ground.
- The courtesy lamp supply voltage circuit is shorted to ground, shorted to voltage, or open.

#### Action Taken When the DTC Sets

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The courtesy/dome lamps will be inoperative or always on.

### Conditions for Clearing the DTC

- This DTC will clear on current status after the condition for setting the fault is corrected.
- A history DTC will clear after 100 consecutive ignition cycles without a fault present.

### Reference Information

### Schematic Reference

### Interior Lights Schematics

### Connector End View Reference

### Component Connector End Views

### Description and Operation

### Interior Lighting Systems Description and Operation

### Electrical Information Reference

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

### Scan Tool Reference

### Control Module References for Scan Tool Information

### Circuit/System Testing

1. Ignition OFF, disconnect the BCM connector X3.
2. Verify that a test lamp illuminates between the B+ circuit terminal B4 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 and the B+ circuit fuse is open, test the courtesy lamp supply circuit terminal B3 for a short to ground.
3. Disconnect an affected courtesy lamp connector.
4. Test for less than 1 ohm of resistance between the ground circuit terminal B and ground.
  - 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 A and the ground circuit terminal B.
6. Doors closed, turn the courtesy lamp switch ON and OFF. The test lamp should turn ON and OFF when

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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 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 BCM.

7. If the circuits test normal replace the courtesy lamps.

### Repair Procedures

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

**Control Module References** for BCM replacement, programming, and setup.

### DTC B2620

#### 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 B2620

Display Dimming Pulse Width Modulation (PWM) Input Circuit

#### Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
5-volt Reference	B2620	2	B2620	-
IP Dimmer Switch Signal	2	1	1	-
Low Reference	-	2	-	-
1. Interior backlighting inoperative 2. Interior backlighting does not dim				

#### Circuit/System Description

The body control module (BCM) directly sends a 5-volt reference voltage to the instrument panel (I/P) dimmer switch which is then adjusted based on the I/P dimmer switch position and returned as a low reference and a signal to the BCM. The BCM uses this signal to directly control the desired level of instrument panel illumination lamp intensity.

#### Conditions for Running the DTC

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The battery voltage must be between 9-16 volts.

#### **Conditions for Setting the DTC**

- The dimmer switch 5-volt reference is greater than 6.15 volts.
- The dimmer switch 5-volt reference is less than 3.85 volts.
- The dimmer switch signal circuit is greater than 4.83 volts.

#### **Action Taken When the DTC Sets**

The interior dimming backlights and indicators are inoperative or at full intensity whenever on.

#### **Conditions for Clearing the DTC**

- This DTC will clear on current status after the condition for setting the fault is corrected.
- A history DTC will clear after 100 consecutive ignition cycles without a fault present.

#### **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, observe the scan tool dimming input parameter. The reading should change between high and low while rotating the IP dimmer switch.

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### Circuit/System Testing

1. Ignition OFF, disconnect the harness connector X1 at the headlamp switch.
2. Ignition ON, test for 4.8-5.2 volts between the 5-volt reference circuit terminal A and ground.
  - If less than the specified range, test the 5-volt reference circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the BCM.
  - If greater than the specified range, test the 5-volt reference circuit for a short to voltage. If the circuit tests normal, replace the BCM.
3. Verify the scan tool dimming input parameter is less than 1.0 volt.
  - If greater than the specified range, test the signal circuit terminal G for a short to voltage. If the circuit tests normal, replace the BCM.
4. Install a 3A fused jumper wire between the signal circuit terminal G and the 5-volt reference circuit terminal A. Verify the scan tool dimming input parameter is greater than 4.5 volts.
  - 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 BCM.
5. If all circuits test normal, test or replace the 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 B2625

#### Diagnostic Instructions

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

#### DTC Descriptor

### DTC B2625

Display Dimming Pulse Width Modulation (PWM) Output Circuit

#### Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
TBC Supply Voltage	B2625	B2625	-	-
LED Dimming Control	B0951, B2625	B0951	1	-

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### 1. LED indicators always on

#### Circuit/System Description

The body control module (BCM) receives a variable voltage signal from the instrument panel (I/P) dimmer switch requesting to illuminate the instrument panel illumination lamps to a desired intensity. When this occurs, the BCM directly sends a pulse width modulated (PWM) voltage based on the I/P dimmer switch position through the instrument panel lamps dimming control circuit to the instrument panel illumination lamps.

#### Conditions for Running the DTC

The battery voltage must be between 9-16 volts.

#### Conditions for Setting the DTC

- The TBC 4 fuse battery supply circuit to the BCM is open or shorted to ground.
- The LED dimming supply voltage circuit is shorted to ground.

#### Action Taken When the DTC Sets

The switch LED indicators will be inoperative.

#### Conditions for Clearing the DTC

- This DTC will clear on current status after the condition for setting the fault is corrected.
- A history DTC will clear after 100 consecutive ignition cycles without a fault present.

#### 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

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- **Wiring Repairs**

### Scan Tool Reference

**Control Module References** for Scan Tool Information

### Circuit/System Testing

1. Ignition OFF, disconnect the BCM connector X3.
2. Verify that a test lamp illuminates between the B+ circuit terminal B4 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 and the B+ circuit fuse is open, test the courtesy lamp supply circuit terminal B3 for a short to ground.
3. If the circuits test normal replace the BCM.

### Repair Procedures

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

**Control Module References** for BCM replacement, programming, and setup

### DTC B2645

#### Diagnostic Instructions

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

#### DTC Descriptor

### DTC B2645

Ambient Light Sensor Circuit

#### Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Ambient Light Sensor Signal	B2645	B2645	B2645	-
Low Reference	B2645	B2645	B2645	-

#### Circuit/System Description

The body control module (BCM) monitors the ambient light sensor signal circuit in order to determine if the



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daytime running lights (DRL) or the auto headlights (ALC) should be turned ON in the AUTO mode. When the BCM senses the ambient light sensor signal voltage is between 1.75-4.9 volts, either the DRL will be commanded ON or the ALC will be commanded ON depending upon the amount of light received by the sensor.

#### **Conditions for Running the DTC**

The battery voltage must be between 9-16 volts.

#### **Conditions for Setting the DTC**

- The ambient light sensor signal voltage is less than 1.75 volts.
- The ambient light sensor signal voltage is greater than 4.9 volts.

#### **Action Taken When the DTC Sets**

ALC will remain ON in any ambient light state.

#### **Conditions for Clearing the DTC**

- This DTC will clear on current status after the condition for setting the fault is corrected.
- A history DTC will clear after 100 consecutive ignition cycles without a fault present.

#### **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 light sensor parameter. The reading should be between 1.79 and 4.9 volts.

**Circuit/System Testing**

1. Ignition OFF, disconnect the harness connector at the ambient light sensor.
2. Ignition OFF, test for less than 1 ohm of resistance between the listed low reference circuit terminal and ground.
  - Ambient light sensor terminal B
  - Ambient light/sunload sensor terminal C
  - If greater than the specified range, test the low reference circuit for an open/high resistance. If the circuit tests normal, replace the BCM.
3. Ignition ON, verify the scan tool light sensor parameter is greater than 4.9 volts.
  - If less than the specified range, test the listed signal circuit terminal for a short to ground. If the circuit tests normal, replace the BCM.
    - Ambient light sensor terminal A
    - Ambient light/sunload sensor terminal D
4. Install a 3A fused jumper wire between the listed signal circuit terminal and the low reference circuit terminal. Verify the scan tool light sensor parameter is less than 1.0 volt.
  - Ambient light sensor terminal A to B
  - Ambient light/sunload sensor terminal D to C
  - 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 BCM.
5. If all circuits test normal, test or replace the ambient light sensor.

**Repair Procedures**

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

- **Ambient Light Sensor Replacement**
- **Control Module References** for BCM replacement, programming, and setup.

**DTC B3801****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 B3801

Passenger Compartment Lamp Request Circuit

### Circuit/System Description

The body control module (BCM) monitors the courtesy lamp switch signal circuit in order to determine when the courtesy/dome lamps should be illuminated. When the BCM senses that the courtesy lamp switch signal circuit is grounded when the switch is activated, the BCM will directly illuminate the courtesy/dome lamps.

### Conditions for Running the DTC

The battery voltage must be between 9-16 volts.

### Conditions for Setting the DTC

The BCM detects the courtesy lamp switch is active while the IP lamp dimmer switch at the dim position.

### Action Taken When the DTC Sets

The courtesy/dome lamps will be inoperative.

### Conditions for Clearing the DTC

- This DTC will clear on current status after the condition for setting the fault is corrected.
- A history DTC will clear after 100 consecutive ignition cycles without a fault present.

### 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

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

### Scan Tool Reference

**Control Module References** for Scan Tool Information

### Circuit/System Verification

1. Ignition ON, observe the scan tool dimming input parameter. The reading should be between 0.0 and 4.86 volts and change from low to high while the dimmer switch is rotated from bright to dim.
  - If the parameter is always high, refer to the **Dimmer Switch Circuit Test**.
2. Observe the scan tool courtesy lamp switch parameter. The reading should change between active and inactive when turning the switch on and off.
  - If the parameter is always active, refer to the **Courtesy Lamp Switch Circuit Test**.

### Circuit/System Testing

#### Dimmer Switch Circuit Test

1. Ignition OFF, disconnect the harness connector X1 at the headlamp switch.
2. Ignition OFF, test for less than 1 ohm of resistance between the low reference circuit terminal H 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 BCM.
3. Verify the scan tool dimming input parameter is less than 1.0 volt.
  - If greater than the specified range, test the signal circuit terminal G for a short to voltage. If the circuit tests normal, replace the BCM.
4. If all circuits test normal replace the headlamp switch.

#### Courtesy Lamp Switch Circuit Test

1. Ignition OFF, disconnect the harness connector X1 at the headlamp switch.
2. Ignition ON, verify the scan tool courtesy lamp switch parameter is inactive.
  - If not the specified value, test the signal circuit terminal J for a short to ground. If the circuit tests normal, replace the BCM.
3. If all circuits test normal replace the 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

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### DTC B3802

#### 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 B3802

Park Lamps Request Circuit

#### Circuit/System Description

The body control module (BCM) monitors the park lamp switch signal circuit and the headlamp switch headlamps on signal circuit in order to determine when the park lamps and headlamps should be illuminated. When the headlamp switch is turned to PARK, the BCM senses that the park lamp switch signal circuit is grounded and the headlamps switch headlamps on signal circuit is open. The BCM will then energize the park lamp relay illuminating the park lamps. When the headlamp switch is turned to HEAD, the BCM senses that the park lamp switch signal circuit and the headlamp switch headlamps on signal circuit are grounded. The BCM will then energize the park lamp relay and headlamp driver module (HDM) illuminating the park lamps and headlamps.

#### Conditions for Running the DTC

The battery voltage must be between 9-16 volts.

#### Conditions for Setting the DTC

The BCM detects the headlamp on switch signal is active while the park lamp switch signal is inactive.

#### Action Taken When the DTC Sets

The park lamps will inoperative or the headlamps will illuminate without the park lamps.

#### Conditions for Clearing the DTC

- This DTC will clear on current status after the condition for setting the fault is corrected.
- A history DTC will clear after 100 consecutive ignition cycles without a fault present.

#### 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 park lamp switch parameter. The reading should be between active and inactive while turning the park lamp switch on and off.
2. Observe the scan tool headlamp switch parameter. The reading should be between active and inactive while turning the headlamp switch on and off.

## **Circuit/System Testing**

1. Ignition OFF, disconnect the harness connector X1 at the headlamp switch.
2. Ignition ON, verify the scan tool headlamp switch parameter is inactive.
  - If not the specified value, test the signal circuit terminal D for a short to ground. If the circuit tests normal, replace the BCM.
3. Install a 3A fused jumper wire between the signal circuit terminal E and the low reference circuit terminal C. Verify the scan tool park lamp switch parameter is active.
  - If not the specified value, test the signal circuit for an open/high resistance. If the circuit tests normal, replace the BCM.
4. If all circuits test normal, test or replace the 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.

**SYMPTOMS - LIGHTING SYSTEMS**

**IMPORTANT:** The following steps must be completed before using the symptom tables.

1. Perform the **Diagnostic System Check - Vehicle** before using the Symptom Tables in order to verify that all of the following are true:
  - There are no DTCs set.
  - The control modules can communicate via the serial data link.
2. Review the system operation and circuit descriptions that apply to the customer complaint in order to familiarize yourself with the system functions. Refer to the following list:
  - **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**

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to **Testing for Intermittent Conditions and Poor Connections** .

**Symptom List**

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

- **Backup Lamps Malfunction**
- **Cornering Lamps Malfunction**
- **Courtesy Lamps Malfunction**
- **Daytime Running Lamps Malfunction**
- **Front Fog Lamps Malfunction**
- **Rear Fog Lamps Malfunction**
- **Hazard Lamps Malfunction**
- **Headlamp Switch On Indicator Inoperative**
- **Headlamps Malfunction**
- **Headlamps Flash to Pass Inoperative**
- **Headlamp Leveling Malfunction**
- **Interior Backlighting Malfunction**
- **Park, License, and/or Tail Lamps Malfunction**

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- **Reading Lamp Inoperative**
- **Stop Lamps Malfunction**
- **Turn Signal Lamps and/or Indicators Malfunction**
- **Vanity Mirror Lamp Malfunction**

### BACKUP LAMPS MALFUNCTION

#### Diagnostic Instructions

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

#### Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Backup Lamp Control	B2550	B2550	B2550	-

#### Circuit/System Description

When the Body Control Module (BCM) receives a class 2 message from the Powertrain Control Module (PCM) requesting to illuminate the backup lamps, battery voltage is sent directly from the BCM through the backup lamp supply voltage circuit to the backup lamps.

#### 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**



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- **Wiring Repairs**

### Scan Tool Reference

**Control Module References** for Scan Tool Information

### Circuit/System Verification

Ignition ON, shift the vehicle in and out of reverse. The backup lamps should turn on and off.

### Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at an affected backup lamp.
2. Test for less than 1 ohm of resistance between the listed ground circuit terminal and ground.
  - Chevy, Isuzu terminal E
  - GMC terminal G
    - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Connect a test lamp between the listed control circuit terminal and ground circuit terminal.
  - Chevy, Isuzu terminal C
  - GMC terminal A
4. Command the backup 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 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 BCM.
5. If all circuits test normal, test or replace the affected backup lamps.

### Repair Procedures

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

- **Backup Lamp Replacement (GMC)**
- **Control Module References** for BCM replacement, programming, and setup.

## CORNERING 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.

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### Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Park Lamp Control	1	1	-	-
Left Cornering Lamp Control	1	2	3	-
Right Cornering Lamp Control	1	4	5	-
Left Cornering Lamp Ground	-	2	-	-
Right Cornering Lamp Ground	-	4	-	-
1. Front park lamps and cornering lamps inoperative 2. Left cornering lamp inoperative 3. Left cornering lamp always on 4. Right cornering lamp inoperative 5. Right cornering lamp always on				

### Circuit/System Description

The turn signal switch sends battery positive voltage to the cornering lamps which will constantly remain illuminated until turn signal operation is cancelled. The cornering lamps are grounded at G103 and G107.

### Diagnostic Aids

Verify normal operation of the park lamps.

### 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

Ignition ON, park lamps ON, operate the left and right turn signals and verify operation of the left and right cornering lamps.

## Circuit/System Testing

1. Ignition OFF, disconnect the harness connector X1 at the turn signal/multifunction switch.
2. Ignition ON, and park lamp switch ON, verify that a test lamp illuminates between the park lamp control circuit terminal E and ground.
  - If the test lamp does not illuminate, test the park lamp control circuit for a short to ground or an open/high resistance.
3. Disconnect the harness connector at the affected cornering lamp bulb.
4. Test for less than 1 ohm between the ground circuit terminal G and ground.
  - If greater than the specified range, test the ground circuit for an open/high resistance.
5. Connect the harness connector cornering lamp bulb.
6. Park lamps ON, connect a 10A fused jumper wire between the park lamp control circuit terminal E and the cornering lamp control circuit terminals D and F. Verify the cornering lamps illuminate.
7. If either cornering lamp does not illuminate, test the affected control circuit for an open/high resistance. If the circuit tests normal replace the cornering lamp bulb.
8. If all circuits test, normal replace the turn signal/multifunction switch.

## Repair Procedures

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

- **Cornering Lamp Bulb Replacement (Envoy)**
- **Turn Signal Multifunction Switch Replacement**

## 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.

### Circuit/System Description

The courtesy lamps include the reading lamps, cargo lamp, and dome lamps. The cargo lamp and dome lamps

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may be manually turned ON or OFF by placing the interior lamp switch in the ON or OFF position. When the driver places the dome lamp defeat switch in the OFF position, these courtesy lamps will be disabled. If a door is opened, the courtesy lamps illuminate. After all the doors have been closed, the courtesy lamps will remain illuminated approximately 15 seconds after the last door closes. The courtesy lamps will also turn ON prior to any door being opened and will remain illuminated approximately 40 seconds when the driver removes the ignition key. The body control module (BCM) will immediately turn OFF the courtesy lamps if a door lock command is received with all of the doors closed, or if the ignition switch is turned to either the ON or RUN position.

### 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. Verify that the courtesy lamp switch parameter displays active and inactive while operating the courtesy lamp switch on and off.
  - If the scan tool parameter does not display the correct state in relation to the actual switch position, refer to the Courtesy Lamp Switch Circuit Test.
2. Verify that the interior lamp defeat switch parameter displays on and off while operating the interior lamp defeat switch on and off.
  - If the scan tool parameter does not display the correct state in relation to the actual switch position, refer to the Courtesy Lamp Switch Circuit Test.
3. Verify that the door ajar switch parameters display the correct state while opening and closing the driver

and passenger doors.

- If any of the scan tool parameters do not display the correct state in relation to the actual switch position, refer to the **Door Jamb Switch Circuit Test**.

4. If the switch circuits test normal refer to the **Courtesy Lamp Control Circuit Test**.

### **Circuit/System Testing**

#### **Courtesy Lamp Switch Circuit Test**

1. Ignition OFF, disconnect the harness connector X1 at the headlamp switch.
2. Test for less than 1 ohm of resistance 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 ON, verify the scan tool courtesy lamp switch parameter is inactive.
  - If not the specified value, test the signal circuit terminal J for a short to ground. If the circuit tests normal, replace the BCM.
4. Install a 3A fused jumper wire between the signal circuit terminal J and the ground circuit terminal C. Verify the scan tool courtesy lamp 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 BCM.
5. Ignition ON, verify the scan tool interior lamp defeat switch parameter is inactive.
  - If not the specified value, test the signal circuit terminal M for a short to ground. If the circuit tests normal, replace the BCM.
6. Install a 3A fused jumper wire between the signal circuit terminal M and the ground circuit terminal C. Verify the scan tool interior lamp defeat 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 BCM.
7. If all circuits test normal, test or replace the headlamp switch.

#### **Door Jamb Switch Circuit Test**

1. Ignition OFF, disconnect the harness connector X1 at the affected door latch.
2. Test for less than 1 ohm of resistance between the listed ground circuit terminal and ground.
  - Driver and LR passenger terminal D.
  - Front passenger and RR passenger terminal A.
  - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Ignition ON, verify the scan tool affected door jamb switch parameter is off.
  - If not the specified value, test the listed signal circuit terminal for a short to ground. If the circuit tests normal, replace the affected control module.
    - Driver and LR passenger terminal B.
    - Front passenger and RR passenger terminal C.
4. Install a 3A fused jumper wire between the listed signal circuit and ground circuit terminals. Verify the

scan tool affected door jamb switch parameter is on.

- Driver and LR passenger terminal B to terminal D.
- Front passenger and RR passenger terminal C to terminal A.
  - If not the specified value, test the listed signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the affected control module.
    - Driver and LR passenger terminal B.
    - Front passenger and RR passenger terminal C.

5. If all circuits test normal, test or replace the affected door latch.

### Courtesy Lamp Control Circuit Test

1. Ignition OFF, disconnect the harness connector at the affected courtesy lamp.
2. Test for less than 1 ohm of resistance between the ground circuit terminal B 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 the ground circuit terminal B.
4. Turn the courtesy lamp switch on and off. 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 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 BCM.
5. If all circuits test normal, test or replace the affected courtesy lamp.

### Repair Procedures

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

- **Dome and Reading Lamp Bulb Replacement**
- **Front Side Door Latch Replacement**
- **Rear Side Door Latch Replacement**
- **Control Module References** for BCM or Door Module replacement, programming, and setup.

### DAYTIME RUNNING LAMPS MALFUNCTION

#### Diagnostic Instructions

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

#### Diagnostic Fault Information

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Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
HDM Relay Battery Supply	1	1	-	-
Low Beam Headlamp Control	1	1	2	-
HDM Relay Control	B2575	B2575	B2575	-
Ambient Light Sensor Signal	B2645	B2645	B2645	-
Ambient Light Sensor Low Reference	-	B2645	-	-
HDM Relay Ground	-	1	-	-
Headlamp Ground	-	3	-	-
1. Low beam headlamps inoperative 2. Low beam headlamps always on 3. One headlamp inoperative				

### Circuit/System Description

The ambient light sensor is a light sensitive transistor that varies its voltage signal to the body control module (BCM) in response to changes to the outside (ambient) light level. When the BCM receives this signal it will either turn on the daytime running lamps (DRL) through the HDM using the reduced output or the headlamps at full intensity for auto headlamp operation. Any function or condition that turns on the headlights will cancel the daytime running lamps operation. The daytime running lamps (DRL) are the low beam headlights at a reduced intensity. With the headlight switch in the OFF position, the headlights will either be turned ON or OFF, after an approximate 8 second delay depending on whether daylight or low light conditions are sensed. When the BCM signals the HDM for DRL operation in daylight conditions, the HDM illuminates the low beam headlights at a reduced intensity. The DRL will operate when the ignition switch is in the RUN position, the gear selector is not in the PARK position and the parking brake is released. When these conditions have been met and the ambient light sensor indicates daytime conditions, the DRL will illuminate.

### 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

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

### Scan Tool Reference

**Control Module References** for Scan Tool Information

### Circuit/System Verification

1. Ignition ON, observe the scan tool Ambient Light Sensor parameter voltage while carefully supplying sufficient light to simulate daylight conditions to the ambient light sensor, then covering to simulate darkness. The voltage reading should change from approximately 1.75-4.9 volts.
  - If the reading does not change between light and dark, refer to the **Ambient Light Sensor Circuit Test**.
2. Ignition ON, command the daytime running lamps ON and OFF with a scan tool. The daytime running lamps should turn on and off.
  - If the daytime running lamps do not turn on and off, refer to the **Daytime Running Lamps Circuit Test**.

### Circuit/System Testing

#### Ambient Light Sensor Circuit Test

1. Ignition OFF, disconnect the harness connector at the ambient light sensor.
2. Ignition OFF, test for less than 1 ohm between the listed low reference circuit terminal and ground.
  - Ambient light sensor terminal B
  - Ambient light/sunload sensor terminal C
  - If greater than the specified range, test the low reference circuit for an open/high resistance. If the circuit tests normal, replace the BCM.
3. Ignition ON, verify the scan tool light sensor parameter is greater than 4.5 volts.
  - If less than the specified range, test the signal circuit for a short to ground. If the circuit tests normal, replace the BCM.
4. Install a 3A fused jumper wire between the listed signal circuit terminal and the low reference circuit terminal. Verify the scan tool light sensor parameter is less than 1.0 volt.
  - Ambient light sensor terminal A to B
  - Ambient light/sunload sensor terminal D to C
  - 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 BCM.
5. If all circuits test normal, test or replace the ambient light sensor.

#### Daytime Running Lamps Circuit Test

1. Ignition OFF, disconnect the HDM relay.



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2. Test for less than 1 ohm 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 does not illuminate between the control circuit terminal 5 and ground.
  - If the test lamp illuminates, test the control circuit for a short to voltage.
4. Verify that a test lamp illuminates between the B+ circuit terminal 2 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 and the B+ circuit fuse is open, test the control circuit terminal 4 for a short to ground. If the circuit tests normal, test or replace the HDM relay.
5. Disconnect the harness connector at the affected headlamp.
6. Test for less than 1 ohm between the low beam headlamp ground circuit terminal D and ground.
  - If greater than the specified range, test the ground circuit for an open/high resistance.
7. Connect the harness connector at the headlamp.
8. Connect a 15A fused jumper wire between the B+ circuit terminal 2 and the low beam headlamp control circuit terminal 4. Verify the low beam headlamps are illuminated at full intensity.
  - If the low beam headlamps do not illuminate at full intensity, test the control circuit for an open/high resistance. If the circuit tests normal, test or replace the affected headlamp.
9. Connect a test lamp between the B+ circuit terminal 2 and the relay control circuit terminal 5.
10. Command the daytime running lamps ON and OFF with a scan tool. The test lamp should illuminate at low intensity and go out 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 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 BCM.
11. If all circuits test normal, test or replace the HDM relay.

### Repair Procedures

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

- **Ambient Light Sensor Replacement**
- **Headlamp Bulb Replacement (Envoy, Ascender)** or **Headlamp Bulb Replacement (TrailBlazer)**
- **Control Module References** for BCM replacement, programming, and setup

## FRONT FOG LAMPS MALFUNCTION

### Diagnostic Instructions

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

### Diagnostic Fault Information

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Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Front Fog Lamp Relay Supply	B2530	B2530	-	-
Front Fog Lamp Control	1	1	3	-
Front Fog Lamp Switch Signal	B2527	2	-	-
Front Fog Lamp Relay Control	B2530	B2530	B2530	-
Front Fog Lamp Ground	-	1	-	-
Headlamp Switch Ground	-	4	-	-
1. One fog lamp inoperative. 2. Both fog lamps inoperative. 3. Fog lamps always on. 4. All headlamp switch functions inoperative.				

### Circuit/System Description

With both the ignition switch in the RUN position and the park lamps or low beam head lamps on, the fog lights will illuminate when the driver presses the fog lamp switch. The FOG LAMP fuse in the engine wiring harness junction block supplies battery positive voltage to the fog lamp relay. With the headlamp switch in either the park or headlamp position and the fog lamp switch is pressed, the body control module (BCM) will energize the fog lamp relay control circuit. The current flow is from the fog lamp relay to both front fog lamps and to ground G107 and G103. The state of the fog lamps either ON or OFF will remain the same until the fog lamp switch is pressed again, or the ignition switch is cycled OFF and ON. Fog lamp operation will be cancelled whenever the park lamps are turned OFF or the high beam headlights have been 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

Ignition ON, headlamps ON, verify the scan tool front fog lamp switch parameter changes between on and off when turning the front fog lamp switch on and off.

- If the scan tool parameter does not change between on and off, refer to the **Fog Lamp Switch Circuit Test**.
- If the switch operates normal but the front fog lamps do not turn on and off, refer to the **Fog Lamp Control Circuit Test**.

### Circuit/System Testing

#### Fog Lamp Switch Circuit Test

1. Ignition OFF, disconnect the harness connectors at the headlamp switch.
2. Test for less than 1 ohm between the ground circuit terminal X1 C and ground.
  - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Ignition ON, verify the scan tool front fog lamp switch parameter is off.
  - If not the specified value, test the signal circuit terminal X2 A for a short to ground. If the circuit tests normal, replace the BCM.
4. Install a 3A fused jumper wire between the signal circuit terminal X2 A and the ground circuit terminal X1 C. Verify the scan tool front fog lamp switch parameter is on.
  - 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 BCM.
5. If all circuits test normal, test or replace the headlamp switch.

#### Fog Lamp Control Circuit Test

1. Ignition OFF, disconnect the fog lamp relay.
2. Ignition ON, verify that a test lamp does not illuminate between the fog lamp control circuit terminal 87 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 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 and the B+ circuit fuse is open, test the control circuit terminal 87 for a short to ground. If the circuit tests normal, test or replace the FOG LAMP relay.
4. Verify that a test lamp illuminates between the B+ circuit terminal 85 and ground.
  - If the test lamp does not illuminate, test the B+ circuit for an open/high resistance.

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5. Disconnect the harness connector at the affected fog lamp.
6. Test for less than 1 ohm between the fog lamp ground circuit terminal B and ground.
  - If greater than the specified range, test the ground circuit for an open/high resistance.
7. Connect the harness connector at the fog lamp.
8. Connect a 15A fused jumper wire between the B+ circuit terminal 30 and the control circuit terminal 87. Verify the fog lamps are on.
  - If the fog lamps are not on, test the control circuit for an open/high resistance. If the circuit tests normal, test or replace the affected fog lamp.
9. Connect a test lamp between the B+ circuit terminal 85 and the control circuit terminal 86.
10. Headlamps on turn the front fog lamps on and off. 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 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 BCM.
11. If all circuits test normal, test or replace the FOG LAMP relay.

### Repair Procedures

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

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

### REAR FOG LAMPS MALFUNCTION

#### Diagnostic Instructions

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

#### Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Rear Fog Lamp Relay Supply	B2540	B2540	-	-
Rear Fog Lamp Control	1	1	3	-
Rear Fog Lamp Switch Signal	3	2	-	-
Rear Fog Lamp Relay Control	B2540	B2540	B2540	-
Rear Fog Lamp Ground	-	1	-	-

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Headlamp Switch Ground	-	4	-	-
<ol style="list-style-type: none"><li>1. One fog lamp inoperative.</li><li>2. Both fog lamps inoperative.</li><li>3. Fog lamps always on.</li><li>4. All headlamp switch functions inoperative.</li></ol>				

### Circuit/System Description

The rear fog lamp (Export) is located in the left tail lamp assembly. The rear fog lamp has a dedicated relay and both the relay control and current flow operate the same as the front fog lamps. The RR FOG fuse supplies voltage to the lamp and G 401 supplies ground.

### 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, headlamps ON, verify the scan tool rear fog lamp switch parameter changes between on and off when turning the rear fog lamp switch on and off.

- If the scan tool parameter does not change between on and off, refer to the **fog lamp switch circuit test**.
- If the switch operates normal but the rear fog lamps do not turn on and off, refer to the **Fog Lamp Control Circuit Test**.

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

1. Ignition OFF, disconnect the harness connectors at the headlamp switch.
2. Test for less than 1 ohm between the ground circuit terminal X1 C and ground.
  - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Ignition ON, verify the scan tool rear fog lamp switch parameter is off.
  - If not the specified value, test the signal circuit terminal X2 B for a short to ground. If the circuit tests normal, replace the BCM.
4. Install a 3A fused jumper wire between the signal circuit terminal X2 B and the ground circuit terminal X1 C. Verify the scan tool rear fog lamp switch parameter is on.
  - 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 BCM.
5. If all circuits test normal, test or replace the headlamp switch.

**Fog Lamp Control Circuit Test**

1. Ignition OFF, disconnect the rear fog lamp relay.
2. Ignition ON, verify that a test lamp does not illuminate between the rear fog lamp control circuit terminal 87 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 30 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 85 and ground.
  - If the test lamp does not illuminate, test the B+ circuit for an open/high resistance.
5. Disconnect the harness connector at the affected fog lamp.
6. Test for less than 1 ohm between the fog lamp ground circuit terminal E and ground.
  - If greater than the specified range, test the ground circuit for an open/high resistance.
7. Connect the harness connector at the fog lamp.
8. Connect a 15A fused jumper wire between the B+ circuit terminal 30 and the control circuit terminal 87. Verify the fog lamps are on.
  - If the fog lamps are not on, test the control circuit for an open/high resistance. If the circuit tests normal, test or replace the affected fog lamp.
9. Connect a test lamp between the B+ circuit terminal 85 and the control circuit terminal 86.
10. Headlamps on turn the rear fog lamps on and off. 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 BCM.
  - If the test lamp is always OFF, test the control circuit for a short to voltage or an open/high

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resistance. If the circuit tests normal, replace the BCM.

11. If all circuits test normal, test or replace the RR FOG LP relay.

### Repair Procedures

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

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

### HAZARD LAMPS MALFUNCTION

#### Diagnostic Instructions

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

#### Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Turn Signal/Hazard Flasher Module Supply	1	1	-	-
Hazard Switch Signal	3	2	-	-
Hazard Switch Ground	-	2	-	-
Turn Signal/Hazard Flasher Module Ground	-	1	-	-
1. Hazard flashers and turn signals inoperative 2. Hazard flashers inoperative 3. Hazard flashers always on				

#### Circuit/System Description

The hazard switch is an input to the turn signal/hazard flasher module, and when the switch is pressed the signal circuit is grounded. When the hazard switch is pressed, all turn signal lamps will flash including both IPC turn indicators. The front turn signals are grounded at G103 and G107. The rear turn signals are grounded at G401 and G402.

#### 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 left and right, front and rear turn signal lamps while the hazard switch is on.

- If one or more of the lamps flash normally, refer to **Turn Signal Lamps and/or Indicators Malfunction**.

## **Circuit/System Testing**

1. Ignition OFF, disconnect the harness connector at the turn signal/hazard flasher module.
2. Test for less than 1 ohm between the ground circuit terminal E and ground.
  - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Verify that a test lamp illuminates between the B+ circuit terminal K and ground.
  - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance.
4. Connect the harness connector at the turn signal/hazard flasher module.
5. Disconnect the harness connectors at the turn signal/multifunction switch.
6. Verify the hazard flashers are not on.
  - If the hazard flashers are on, test the hazard switch signal circuit terminal X1 H for a short to ground. If the circuit tests normal replace the turn signal/hazard flasher module.
7. Test for less than 1 ohm between the ground circuit terminal X2 A and ground.
  - If greater than the specified range, test the ground circuit for an open/high resistance.
8. Install a 3A fused jumper wire between the hazard switch signal circuit terminal X1 H and the ground circuit terminal X2 A. Verify the hazard flashers operate normal.
  - If the hazard flashers do not operate, test hazard switch signal circuit for an open/high resistance. If



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the circuit tests normal replace the turn signal/hazard flasher module.

9. If all circuits test normal replace the turn signal/multifunction switch.

### Repair Procedures

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

- **Hazard and Turn Signal Flasher Replacement**
- **Turn Signal Multifunction Switch Replacement**

### HEADLAMP SWITCH ON INDICATOR INOPERATIVE

#### 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
LED Dimming Control	B0951	B0951	1	-
Headlamp On Indicator Control	2	3	-	-
1. LED switch indicators will not dim 2. Headlamp on indicator will be illuminated with headlamps off 3. Headlamp on indicator will not illuminate				

#### Circuit/System Description

The headlamp switch indicators are supplied by the LED dimming control circuit from the BCM. The indicators are controlled on and off by the BCM through low side drive control circuits. When a headlamp switch function is activated that requires an indicator to be illuminated, the BCM will ground the control circuit and the indicator will be illuminated at the level of brightness determined by the LED dimming control.

#### 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, with the IP dimmer switch at the full bright position, operate the headlamp switch to the headlamps on position, and back to the automatic headlamps off position. The headlamp switch indicators should turn on and off when changing between the commanded states.

### **Circuit/System Testing**

1. Ignition OFF, disconnect the harness connectors at the headlamp switch.
2. Ignition ON, Verify that a test lamp illuminates between the LED dimming control circuit terminal X1 K and ground.
3. Connect a test lamp between the LED dimming control circuit terminal X1 K and the headlamp on indicator control circuit terminal X1 L.
  - If the test lamp does not illuminate, test the LED dimming control circuit for a short to ground or an open/high resistance. If the circuit tests normal replace the BCM.
4. Install and remove a 3A fused jumper wire between headlamp on switch signal circuit terminal X1 D and the low reference circuit terminal X1 C. The test lamp should turn on and off when changing between the commanded states.
  - If the test lamp is always ON, test the headlamp on indicator control circuit for a short to ground. If the circuit tests normal, replace the BCM.
  - If the test lamp is always OFF, test the headlamp on indicator control circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the BCM.
5. If all circuits test normal, test or replace the 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

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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
Headlamp On Switch Signal	B3802	1	-	-
Headlamp High Beam Switch Signal	2	3	-	-
Low Beam Headlamp Relay Control	B2575	B2575	B2575	-
High Beam Headlamp Relay Control	B2580	B2580	B2580	-
Low Beam Headlamp Control	4	4	5	-
High Beam Headlamp Control	3	3	6	-
Headlamp High Beam Switch Ground	-	3	-	-
Left Headlamp Ground	-	7	-	-
Right Headlamp Ground	-	8	-	-
1. Headlamps inoperative from switch 2. High beams always on with low beams on 3. High beam headlamps inoperative 4. Low beam headlamps inoperative 5. Low beam headlamps always on 6. High beam headlamps always on 7. Left side headlamps inoperative 8. Right side headlamps inoperative				

#### Circuit/System Description

The HDM and high beam relay receive battery positive voltage directly from the battery. The BCM supplies a 100% duty cycle PWM ground signal to the HDM for automatic headlight control and normal headlight operation. The BCM also supplies ground to the high beam relay coil for high beam headlight operation. When the driver places the headlamp switch in the HEADLAMP position and the dimmer switch is in the low beam position, the HDM switches to full output sending current flow through the left and right low beam headlamp fuses to both low beam headlamps. The dimmer switch sends a ground signal to the BCM in the high beam position and a momentary ground signal in the flash-to-Pass (FTP) position from G102 to deactivate the low beam headlights and activate the high beam headlights. With the headlights in the low beam position, the high beams may be momentarily turned on or flashed by activating the FTP portion of the switch.

#### 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 headlamp switch parameter while cycling the headlamp switch between the auto and headlamp position. The parameter should cycle between active and inactive.
  - If the parameter does not cycle between the specified values, refer to the **Headlamp Switch Circuit Test**.
2. Observe the headlamps while cycling the headlamp switch between the auto and headlamp position. The low beam headlamps should turn on and off.
  - If 1 or both of the low beam headlamps do not turn on and off, refer to the **Low Beam Headlamp Circuit Test**.
3. With the headlamps ON, observe the scan tool high beam switch parameter while switching the headlamp dimmer switch between the low and high beam positions. The parameter should cycle between on and off.
  - If the parameter does not cycle between the specified values, refer to the **Turn Signal/Multifunction Switch Circuit Test**.
4. With the headlamps ON, observe the headlamps while switching the headlamp dimmer switch between the low and high beam positions. The high beam headlamps should turn on and off.
  - If 1 or both of the high beam headlamps do not turn on and off, refer to the **High Beam Headlamp Circuit Test**.

**Circuit/System Testing****Headlamp Switch Circuit Test**

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1. Ignition OFF, disconnect the harness connector X1 at the headlamp switch.
2. Test for less than 1 ohm between the ground circuit terminal X1 C and ground.
  - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Ignition ON, verify the scan tool headlamp switch parameter is inactive.
  - If not the specified value, test the headlamp on switch signal circuit terminal X1 D for a short to ground. If the circuit tests normal, replace the BCM.
4. Install a 3A fused jumper wire between the headlamp on switch signal circuit terminal X1 D and the ground circuit terminal X1 C. Verify the scan tool headlamp switch parameter is active.
  - If not the specified value, test the headlamp on switch signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the BCM.
5. If all circuits test normal, test or replace the headlamp switch.

#### Turn Signal/Multifunction Switch Circuit Test

1. Ignition OFF, disconnect the harness connector X2 at the turn signal/multifunction switch.
2. Test for less than 1 ohm between the ground circuit terminal X2 A and ground.
  - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Ignition ON, verify the scan tool high beam switch parameter is off.
  - If not the specified value, test the high beam switch signal circuit terminal X2 C for a short to ground. If the circuit tests normal, replace the BCM.
4. Install a 3A fused jumper wire between the high beam switch signal circuit terminal X2 C and the ground circuit terminal X2 A. Verify the scan tool high beam switch parameter is on.
  - If not the specified value, test the high beam switch signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the BCM.
5. If all circuits test normal, test or replace the turn signal/multifunction switch.

#### Low Beam Headlamp Circuit Test

1. Ignition OFF, disconnect the harness connector at the affected headlamp bulb.
2. Test for less than 1 ohm between the ground circuit terminal B 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 the ground circuit terminal B.
4. Turn the low beam headlamps on and off. 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 low beam headlamp relay.
  - 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 low beam headlamp relay.
5. If all circuits test normal, test or replace the affected headlamp bulb.

#### High Beam Headlamp Circuit Test

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1. Ignition OFF, disconnect the harness connector at the affected headlamp bulb.
2. Test for less than 1 ohm between the ground circuit terminal B 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 the ground circuit terminal B.
4. Turn the high beam headlamps on and off. 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 high beam headlamp relay.
  - 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 high beam headlamp relay.
5. If all circuits test normal, test or replace the affected headlamp bulb.

### Repair Procedures

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

- **Headlamp Bulb Replacement (Envoy, Ascender)** or **Headlamp Bulb Replacement (TrailBlazer)**
- **Headlamp Switch Replacement**
- **Turn Signal Multifunction Switch Replacement**
- **Control Module References** for BCM replacement, programming, and setup

### HEADLAMPS FLASH TO PASS INOPERATIVE

#### 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
Flash to Pass Switch Signal	1	2	-	-
Turn Signal/Multifunction Switch Ground	-	2	-	-
1. High beam headlamps always on with low beams 2. Flash to pass inoperative				

#### Circuit/System Description

The flash to pass switch signal is referenced from battery voltage by the BCM. When the flash to pass switch is activated, the switch signal circuit is closed to ground and the signal circuit voltage goes low, indicating to the

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BCM the switch is active.

### 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, pull and release the flash to pass switch. The high beam headlamps should flash on and off.

### Circuit/System Testing

1. Ignition OFF, disconnect the harness connector X2 at the turn signal/multifunction switch.
2. Test for less than 1 ohm between the ground circuit terminal X2 A and ground.
  - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Ignition ON, verify the scan tool flash to pass switch parameter is off.
  - If not the specified value, test the signal circuit terminal X2 B for a short to ground. If the circuit tests normal, replace the BCM.
4. Install a 3A fused jumper wire between the signal circuit terminal X2 B and the ground circuit terminal X2 A. Verify the scan tool flash to pass switch parameter is on.
  - 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 BCM.
5. If all circuits test normal, test or replace the 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

### HEADLAMP LEVELING MALFUNCTION

#### Diagnostic Instructions

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

#### Circuit/System Description

The IGN E fuse in the I/P fuse block supplies battery positive voltage to the headlamp leveling switch. When the driver places the headlamp leveling switch in any position, a signal is sent to the headlamp leveling actuators to adjust the headlight aiming to the desired position. The underhood fuse block supplies battery positive voltage and G107 and G103 supplies ground to the headlamp leveling actuators.

#### 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



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### Circuit/System Verification

Ignition ON, adjust the headlamp leveling switch from the highest to lowest setting and verify that both headlamp leveling actuators operate.

- If one leveling actuator is inoperative, refer to the **Headlamp Leveling Actuator Circuit Test**.
- If both leveling actuators are inoperative, refer to the **Headlamp Leveling Switch Circuit Test**.

### Circuit/System Testing

#### Headlamp Leveling Actuator Circuit Test

1. Ignition OFF, disconnect the harness connector at the affected actuator.
2. Verify that a test lamp illuminates between the ground circuit terminal 1 and ground.
  - If the test lamp does not illuminate, test the ground circuit for an open/high resistance.
3. Ignition ON, verify that a test lamp illuminates between the supply circuit terminal 3 and ground.
  - If the test lamp does not illuminate, test the supply circuit for a short to ground or an open/high resistance.
4. Ignition ON, test for 2.0 - 8.0 volts between the switch signal circuit terminal 2 and ground while operating the leveling switch from the lowest to highest setting.
  - If less than the specified range, test the signal circuit for a short to ground or an open/high resistance.
  - If greater than the specified range, test the signal circuit for a short to voltage.
5. If all circuits test normal, test or replace the affected actuator.

#### Headlamp Leveling Switch Circuit Test

1. Ignition OFF, disconnect the harness connectors at the headlamp switch.
2. Test for less than 1 ohm of resistance between the low reference circuit terminal X1 C and ground.
  - If greater than the specified range, test the low reference circuit for an open/high resistance.
3. Ignition ON, verify that a test lamp illuminates between the supply circuit terminal X2 G and ground.
  - If the test lamp does not illuminate, test the supply circuit for a short to ground or an open/high resistance.
4. Test the switch signal circuit for an open/high resistance, short to ground, or short to voltage.
5. If all circuits test normal, test or replace the headlamp switch.

### Repair Procedures

Perform the after completing the diagnostic procedure.

- **Headlamp Replacement (Envoy)** or **Headlamp Replacement (TrailBlazer)**
- **Headlamp Switch Replacement**

## **INTERIOR BACKLIGHTING MALFUNCTION**

### **Diagnostic Instructions**

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

### **Circuit/System Description**

When the ignition switch is turned to the RUN position, the radio's VF displays turn 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 (I/P) dimmer switch. At the same time all VF displays dim to match the indicated dimming level. The panel dimmer switch potentiometer is an input to the body control module (BCM). When the driver selects a dimming setting by moving the I/P dimming switch potentiometer, all incandescent back lighting lamps are provided with a specific voltage. The incandescent back lighting lamps are then grounded at G201, G302, and G303. When the I/P dimmer switch is moved from MIN to MAX, all vacuum fluorescent (VF) displays, as well as all incandescent back lighting respond from minimum intensity to maximum brightness in response to the I/P dimmer switch.

### **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**

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Ignition ON, observe the scan tool Dimming Input parameter while operating the dimmer switch from high to low. The voltage reading should change from high to low as the switch is rotated.

- If the reading does not change, refer to **Dimmer Switch Circuit Test**.
- If the scan tool dimmer control operates normal, refer to **Interior Backlighting Circuit Test**.

#### Circuit/System Testing

##### Dimmer Switch Circuit Test

1. Ignition OFF, disconnect the headlamp switch connector X1.
2. Test for less than 1 ohm of resistance between the low reference circuit terminal X1 H and ground.
  - If greater than the specified range, test the low reference circuit for an open/high resistance.
3. Ignition ON, verify that the scan tool dimming input parameter displays less than 1.0 volt.
  - If the parameter displays greater than the specified value, test the switch signal circuit terminal X1 G for a short to voltage. If the circuit tests normal replace the BCM.
4. Install a 3A fused jumper wire between the signal circuit terminal X1 G and the 5.0 volt reference circuit terminal X1 A. Verify the scan tool dimming input parameter displays greater than 4.0 volts.
  - If the parameter displays less than the specified value, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the BCM.
5. If the circuits test normal test or replace the headlamp switch.

##### Interior Backlighting Circuit Test

1. Ignition OFF, disconnect the harness connector at the affected component.
2. Ignition OFF, verify that a test lamp illuminates between the listed ground circuit terminal and battery voltage.
  - Garage door opener terminal 3
  - Sunroof switch terminal C
  - Auxiliary HVAC control module (CJ3) terminal 7
  - Auxiliary HVAC control module (CJ2) terminal A4
  - Transfer case shift control switch terminal D
  - IPC terminal A5
  - HVAC control module terminal X1 B9
  - Rear window wiper/washer switch terminal B
  - Headlamp switch terminal X1 C
  - Upper right SWC switch terminal 5
  - Upper left SWC switch terminal 3
  - Lower left SWC switch terminal 4
  - Lower right SWC switch terminal 4

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- If the test lamp does not illuminate, test the ground circuit for an open/high resistance.
- 3. Connect a test lamp between the listed backlighting control circuit terminal and ground.
  - Garage door opener terminal 2
  - Sunroof switch terminal B
  - Auxiliary HVAC control module (CJ3) terminal 8
  - Auxiliary HVAC control module (CJ2) terminal A5
  - Transfer case shift control switch terminal C
  - IPC terminal A7
  - HVAC control module terminal X1 A7
  - Rear window wiper/washer switch terminal C
  - Headlamp switch terminal X1 CB
  - Upper right SWC switch terminal 3
  - Upper left SWC switch terminal 2
  - Lower left SWC switch terminal 1
  - Lower right SWC switch terminal 1
- 4. Command the dimming test high to low with a scan tool. The test lamp should turn from bright to dim when changing between the commanded states.
  - If the test lamp is always off, test the control circuit for an open/high resistance or short to ground. If the circuit tests normal, replace the BCM.
  - If the test lamp is always bright, test the control circuit for a short to voltage. If the circuit tests normal, replace the BCM.
- 5. If all circuits test normal, test or replace the affected component.

### Repair Procedures

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

- **Steering Wheel Control Switch Assembly Replacement**
- **Rear Window Wiper and Washer Switch Replacement**
- **Transfer Case Shift Control Switch Replacement (GMC, Buick)**
- **Headlamp Switch Replacement**
- **Control Module References** for BCM, IPC, or HVAC control module replacement, programming, and setup.

### PARK, LICENSE & 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.

## 2008 Isuzu Ascender LS

2008 Accessories & Equipment Lighting - Ascender, Envoy & Trailblazer

### Circuit/System Description

The park, tail, marker, license, and clearance (Y92 only) lamps are turned on when the headlamp switch is placed in the PARK or ON position or anytime the headlights are requested. The I/P BATT fuse in the engine wiring harness junction block supplies battery positive voltage to both the park lamp relay switch contacts and the park lamp coil circuit. The body control module (BCM) provides a ground or control circuit to the park lamp relay coil circuit. When the park lamps are turned on, the BCM energizes the park lamp relay. Current flow is from the park lamp relay to the individual park lamp circuit fuses and to their respective park, tail, marker, and license lamps. The front park and marker lamps are grounded at G107 and G103. The tail lamps are grounded at G401 and G402. The license lamps are grounded at G401. When equipped with the Y92 roof rack option, the clearance lamps are grounded at G302. If the driver places the headlight switch in the ON position after the ignition switch has been turned OFF, the park, tail, marker, license, and clearance lamps will remain on until turned off or the battery runs dead.

### 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 parklamp switch parameter while cycling the headlamp switch between the park and off positions. The parameter should cycle between active and inactive.
  - If the parameter does not cycle between the specified values, refer to Headlamp Switch Circuit Test.
2. Command the parking lamps on and off with a scan tool. Verify the park, license, and tail lamps turn on

and off.

- If any of the lamps do not cycle between the commanded states, refer to **Exterior Lamps Circuit Test**.

### **Circuit/System Testing**

#### **Headlamp Switch Circuit Test**

1. Ignition OFF, disconnect the harness connector X1 at the headlamp switch.
2. Ignition OFF, test for less than 1.0 ohm of resistance 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 ON, verify the scan tool BCM parklamp switch parameter is inactive.
  - If not the specified value, test the signal circuit terminal E for a short to ground. If the circuit tests normal, replace the BCM.
4. Install a 3A fused jumper wire between the signal circuit terminal E and ground. Verify the scan tool BCM parklamp switch parameter is active.
  - If not the specified value, test the signal circuit for a short to voltage or open/high resistance. If the circuit tests normal, replace the BCM.
5. If all circuits test normal, test or replace the headlamp switch.

#### **Exterior Lamps Circuit Test**

1. Ignition OFF, disconnect an affected park, marker, or license lamp bulb.
2. Verify that a test lamp illuminates when connected between battery voltage and the listed ground circuit terminal.
  - Front park lamp terminal A
  - Rear park lamp terminal E
  - Marker or license lamp terminal B
  - If the test lamp does not illuminate, test the ground circuit for an open/high resistance.
3. Ignition ON, connect a test lamp between the listed control circuit terminal and ground.
  - Front park lamp terminal B
  - Rear park lamp Chevy or Isuzu terminal A
  - Rear park lamp GMC terminal C
  - Marker or license lamp terminal A
4. Turn the park lamp switch on and off and verify that the test lamp turns on and off.
  - If the test lamp does not illuminate test the control circuit for an open/high resistance.
  - If the test lamp remains illuminated test the control circuit for a short to voltage.
5. If all circuits test normal replace the affected bulb.

### **Repair Procedures**

## 2008 Isuzu Ascender LS

2008 Accessories & Equipment Lighting - Ascender, Envoy & Trailblazer

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

- **Park/Turn Signal/Side Marker Lamp Bulb Replacement (Envoy) or Park/Turn Signal/Side Marker Lamp Bulb Replacement (TrailBlazer)**
- **Tail Lamp Bulb Replacement**
- **Rear License Lamp Replacement**
- **Control Module References** for BCM replacement, programming, and setup.

### READING LAMP INOPERATIVE

#### 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.

#### Circuit/System Description

The reading lamps are supplied voltage through the inadvertent power supply circuit from the BCM.

#### 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

## 2008 Isuzu Ascender LS

2008 Accessories & Equipment Lighting - Ascender, Envoy & Trailblazer

### Circuit/System Verification

Ignition ON, turn the reading lamps on and off. The reading lamps should turn on and off.

### Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at an affected courtesy/reading lamp center.
2. Test for less than 1 ohm of resistance between the ground circuit terminal B 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 inadvertent power supply circuit terminal C and ground.
  - If the test lamp does not illuminate, test the inadvertent power supply circuit for a short to ground or an open/high resistance. If the circuit tests normal replace the BCM.
4. Connect the harness connector at the courtesy/reading lamp center, and remove the reading lamp bulb.
5. Connect a test lamp across the bulb terminals.
6. Ignition ON, turn the reading lamp switch on and off. The test lamp should turn on and off when changing between the commanded states.
  - If the test lamp is always on, replace the affected courtesy/reading lamp center.
  - If the test lamp is always off, replace the affected courtesy/reading lamp center.
7. If all circuits test normal, test or replace the affected reading lamp bulb.

### Repair Procedures

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

**Control Module References** for BCM replacement, programming, and setup.

## STOP LAMPS MALFUNCTION

### Diagnostic Instructions

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

### Circuit/System Description

The STOP fuse in the engine wiring harness junction block supplies battery positive voltage to the normally open stop lamp switch. When the driver presses the brake pedal, the switch contacts close and battery positive voltage is supplied to both the VEHICLE STOP fuse and the VEHICLE CHMSL fuse. The current flow is now to the stop lamps which are grounded at G401 and G402. The center high mounted stop lamp (CHMSL) is grounded at G401.

### 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**

Press and release the brake pedal while observing brake lamp operation.

- If all of the brake lamps are always on or inoperative, refer to the **Stop Lamp Switch Circuit Test**.
- If 1 or 2 of the brake lamps function normally, refer to the **Stop Lamp Circuit Test**.

## **Circuit/System Testing**

### **Stop Lamp Switch Circuit Test**

1. Ignition OFF, disconnect the harness connector at the stop lamp switch.
2. Verify that a test lamp illuminates between the battery supply circuit terminal B and ground.
  - If the test lamp does not illuminate, test the battery supply circuit for a short to ground or an open/high resistance. If the circuit tests normal and the battery supply circuit fuse is open, test the stop lamp control circuit terminal A for a short to ground.
3. Verify that the stop lamps are not illuminated.
  - If any of the stop lamps are illuminated, test the stop lamp control circuit for a short to voltage.
4. Install a 25A fused jumper wire between the stop lamp control circuit terminal A and the battery supply circuit terminal B. Verify the stop lamps are illuminated.
  - If the stop lamps are not illuminated test the stop lamp control circuit for an open/high resistance.

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5. If all circuits test normal replace the stop lamp switch.

### Stop Lamp Circuit Test

1. Ignition OFF, disconnect the harness connector at the affected stop lamp.
2. Test for less than 1 ohm of resistance between the listed ground circuit terminal and ground.
  - Center high mounted stop lamp terminal B
  - Tail lamp terminal E
    - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Connect a test lamp between the listed stop lamp control circuit terminal and ground circuit terminal.
  - Center high mounted stop lamp terminal A to B
  - Tail lamp Chevy, Isuzu terminal D to E
  - Tail lamp GMC terminal A to E
4. Press and release the brake pedal. 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 test lamp is always OFF, test the control circuit for a short to ground or an open/high resistance.
5. If all circuits test normal, test or replace the affected stop lamp.

### Repair Procedures

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

- **Tail Lamp Bulb Replacement**
- **High Mount Stop Lamp Replacement (Envoy, TrailBlazer, Ascender)**
- **Stop Lamp Switch Replacement**

### TURN SIGNAL LAMPS & 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
Turn Signal/Hazard Flasher Module Supply	1	1	-	-

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Turn Signal/Multifunction Switch Supply	2	2	-	-
Left or Right Turn Signal Control	1 or 3	3 or 5	4	-
Left or Right Turn Signal Switch Signal	2	3	4	-
Turn Signal Lamp Ground	-	5	-	-
Turn Signal/Hazard Flasher Module Ground	-	1	-	-
1. Turn signals and hazard flashers inoperative 2. Turn signals inoperative 3. Left or right turn signal inoperative 4. Left or right turn signal always on 5. One turn signal lamp inoperative				

### Circuit/System Description

The IGN E fuse in the engine wiring harness junction block supplies Ignition positive voltage to the turn signal switch assembly. With the ignition switch in the RUN or START position, ignition positive voltage is connected through the turn signal and hazard switch assembly to the turn signal/hazard flasher module which is powered by the FLASHER fuse also in the engine wiring harness junction block and is grounded at G201. When the turn signal switch is placed in either the left or right position, the circuit is complete from the turn signal/hazard flasher module to the turn signal lamps and to ground. The turn signal/hazard flasher module then sends an on-off voltage signal to either the left or right turn signals and their instrument panel cluster (IPC) indicator. When the hazard switch is pressed, all turn signal lamps will flash including both IPC turn indicators. The front turn signals are grounded at G103 and G107. The rear turn signals are grounded at G401 and G402.

### 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. Observe the left and right, front and rear turn signal lamps while the hazard switch is on.
  - If none of the lamps flash normally, refer to **Hazard Lamps Malfunction**.
2. Connect a test lamp between the input side LT TURN fuse and ground.
3. Ignition ON, operate the left turn switch on and off. The test lamp should change from flashing and off when changing between the commanded states.
  - If the test lamp is always on or flashing, refer to the **turn signal switch circuit test**.
  - If the test lamp is always off, refer to the **Turn Signal Switch Circuit Test**.
4. Connect a test lamp between the input side RT TURN fuse and ground.
5. Operate the right turn switch on and off. The test lamp should change from flashing and off when changing between the commanded states.
  - If the test lamp is always on or flashing, refer to the **turn signal switch circuit test**.
  - If the test lamp is always off, refer to the **turn signal switch circuit test**.
6. If the flasher output circuits test normal, refer to **Turn Signal Lamps Circuit Test**.

**Circuit/System Testing****Turn Signal Switch Circuit Test**

1. Ignition OFF, Disconnect the turn signal/multifunction switch connector X1.
2. Ignition ON, verify that a test lamp illuminates between the ignition circuit terminal B and ground.
  - If the test lamp does not illuminate, test the ignition circuit for a short to ground or an open/high resistance.
3. Connect the turn signal/multifunction switch connector.
4. Disconnect the turn signal/hazard flasher module connector.
5. Connect a test lamp between the left turn switch signal circuit terminal F and ground.
6. Ignition ON, operate the left turn switch on and off. The test lamp should turn ON and OFF when changing between the commanded states.
  - If the test lamp is always ON, test the left turn switch signal circuit for a short to voltage. If the circuit tests normal, replace the turn signal/multifunction switch.
  - If the test lamp is always OFF, test the left turn switch signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the turn signal/multifunction switch.
7. Connect a test lamp between the right turn switch signal circuit terminal A and ground.
8. Ignition ON, operate the right turn switch on and off. 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 right turn switch signal circuit for a short to voltage. If the circuit tests normal, replace the turn signal/multifunction switch.
  - If the test lamp is always OFF, test the right turn switch signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the turn signal/multifunction switch.
9. Connect the turn signal/hazard flasher module connector.
  10. Connect a test lamp between the input side LT TURN fuse and ground.
  11. Ignition ON, operate the left turn switch on and off. The test lamp should change from flashing and off when changing between the commanded states.
    - If the test lamp is always on or flashing, test the left turn lamp control circuit for a short to voltage. If the circuit tests normal replace the turn signal/hazard flasher module.
    - If the test lamp is always off, test the left turn lamp control circuit for an open/high resistance or short to ground. If the circuit tests normal replace the turn signal/hazard flasher module.
  12. Connect a test lamp between the input side RT TURN fuse and ground.
  13. Operate the right turn switch on and off. The test lamp should change from flashing and off when changing between the commanded states.
    - If the test lamp is always on or flashing, test the right turn lamp control circuit for a short to voltage. If the circuit tests normal replace the turn signal/hazard flasher module.
    - If the test lamp is always off, test the right turn lamp control circuit for an open/high resistance or short to ground. If the circuit tests normal replace the turn signal/hazard flasher module.

### Turn Signal Lamps Circuit Test

1. Ignition OFF, disconnect the harness connector at the affected turn signal lamp.
2. Test for less than 1 ohm between the listed ground circuit terminal and ground.
  - Front Chevy terminal A
  - Front GMC, Isuzu terminal G
  - Rear terminal E
  - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Connect a test lamp between the listed control circuit terminal and ground circuit terminal.
  - Front Chevy terminal C to terminal A
  - Front GMC, Isuzu terminal A to terminal G
  - Rear Chevy, Isuzu terminal B to terminal E
  - Rear GMC terminal D to terminal E
4. Ignition ON, operate the affected turn signal ON and OFF. The test lamp should flash and turn 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 turn signal/hazard flasher module.
  - 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 turn signal/hazard flasher module.
5. If all circuits test normal, test or replace the affected turn signal lamp.

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### Repair Procedures

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

- **Hazard and Turn Signal Flasher Replacement**
- **Park/Turn Signal/Side Marker Lamp Bulb Replacement (Envoy) or Park/Turn Signal/Side Marker Lamp Bulb Replacement (TrailBlazer)**
- **Tail Lamp Bulb Replacement**

### VANITY MIRROR 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.

#### Circuit/System Description

The inadvertent power courtesy lamps supply voltage circuit of the body control module (BCM) provides battery positive voltage to each vanity mirror lamp. When the vanity mirror cover on the sunshade is opened, a switch closes to provide a ground circuit and the vanity lamp illuminates.

#### 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**

Ignition On, fold down the sun visors and verify the vanity lamps illuminate.

**Circuit/System Testing**

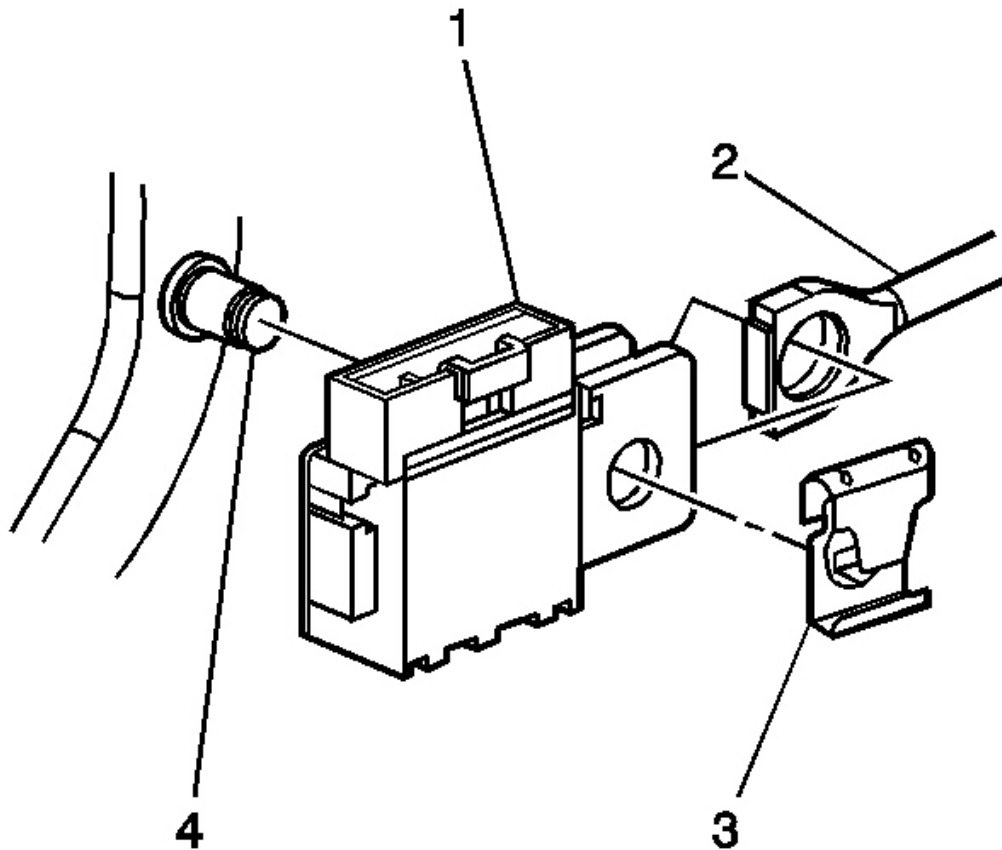
1. Ignition OFF, disconnect the harness connector at an affected vanity mirror lamp.
2. Test for less than 1 ohm of resistance between the ground circuit terminal B and ground.
  - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Ignition ON, verify that a test lamp illuminates between the inadvertent power supply circuit terminal A and ground.
  - If the test lamp does not illuminate, test the inadvertent power supply circuit for a short to ground or an open/high resistance. If the circuit tests normal replace the BCM.
4. Connect the harness connector at the vanity mirror lamp, and remove the vanity lamp bulb.
5. Connect a test lamp across the bulb terminals.
6. Ignition ON, open and close the vanity mirror. The test lamp should turn on and off when changing between the commanded states.
  - If the test lamp is always on, replace the affected vanity mirror lamp.
  - If the test lamp is always off, replace the affected vanity mirror lamp.
7. If all circuits test normal, test or replace the affected vanity lamp bulb.

**Repair Procedures**

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

**Control Module References** for BCM replacement, programming, and setup.

**REPAIR INSTRUCTIONS****STOP LAMP SWITCH REPLACEMENT****Removal Procedure**

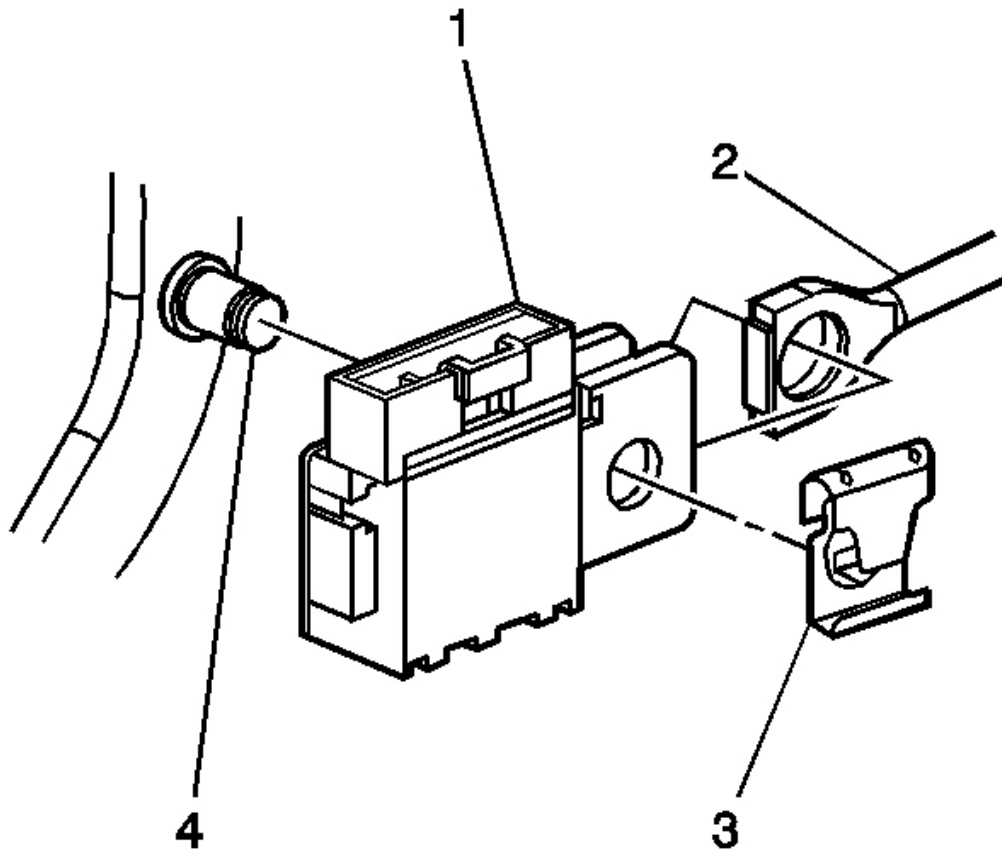


**Fig. 20: Identifying Brake Light Switch Components**  
Courtesy of GENERAL MOTORS CORP.

1. Remove the left sound insulator. Refer to **Instrument Panel Insulator Panel Replacement - Left Side** .
2. Remove the pushrod retainer (3) from the brake pedal pin (4).
3. Remove the stop lamp switch (1) and the pushrod (2) from the brake pedal pin (4).
4. Disconnect the stop lamp switch (1) electrical connector.
5. Remove the stop lamp switch from the vehicle.

#### **Installation Procedure**





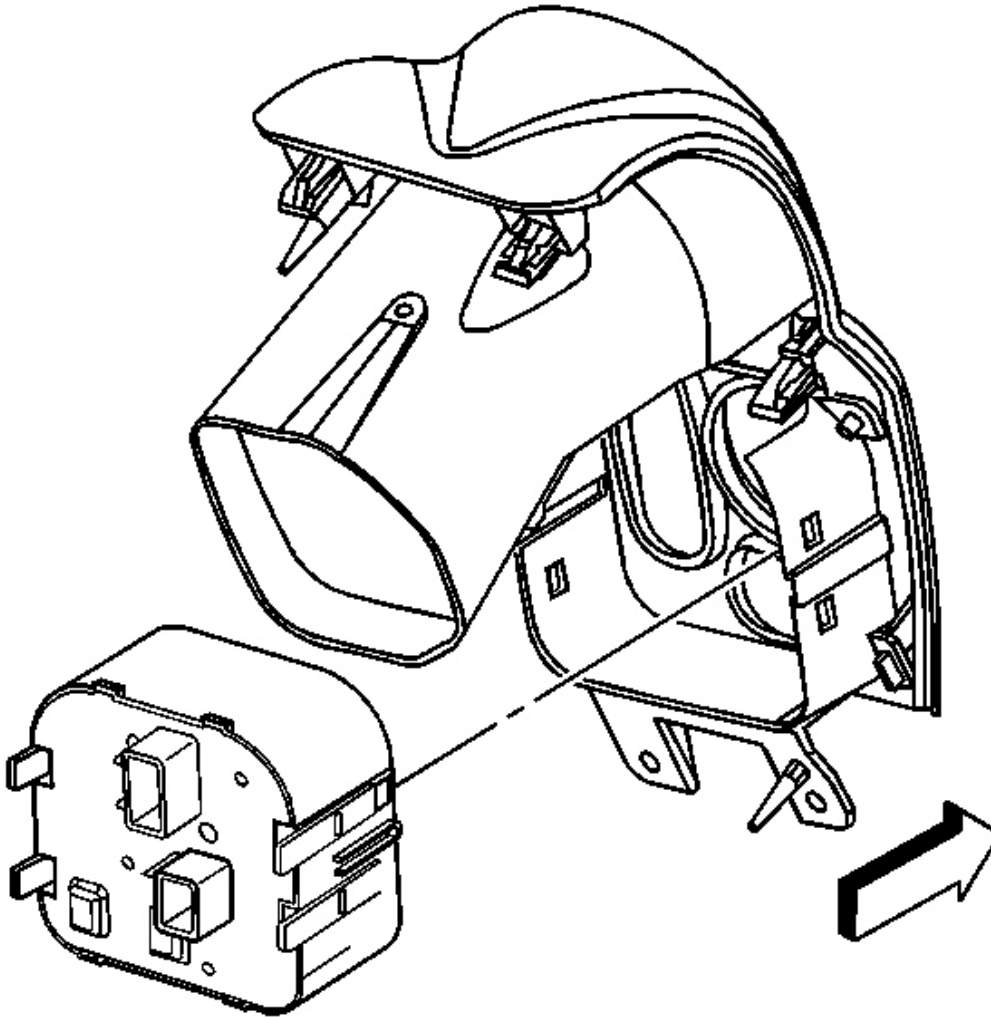
**Fig. 21: Identifying Brake Light Switch Components**  
Courtesy of GENERAL MOTORS CORP.

1. Install the electrical connector to the stop lamp switch (1).
2. Position the stop lamp switch (1) on the pushrod (2) and install the assembly on the brake pedal pin.
3. Install the pushrod retainer (3) to the brake pedal pin (4). The retainer will snap into place.
4. Install the left sound insulator. Refer to **Instrument Panel Insulator Panel Replacement - Left Side**.

## HEADLAMP SWITCH REPLACEMENT

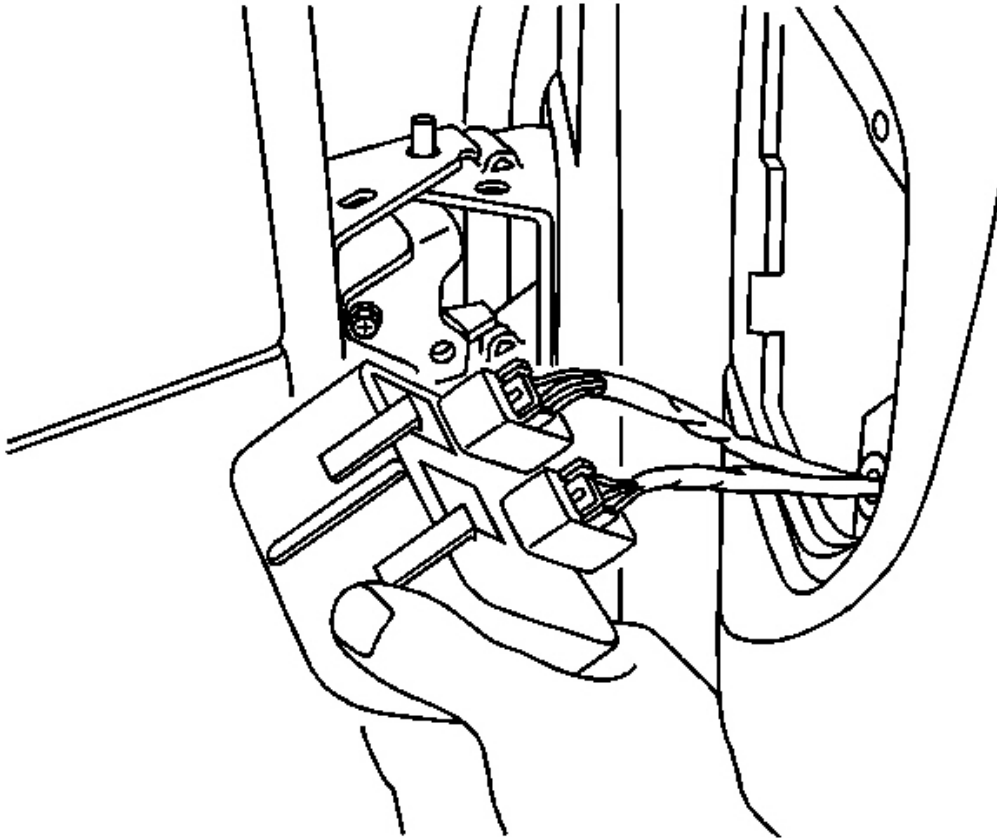
### Removal Procedure

1. Open the left instrument panel (IP) access cover.



**Fig. 22: Headlamp Switch & Retaining Tabs**  
Courtesy of GENERAL MOTORS CORP.

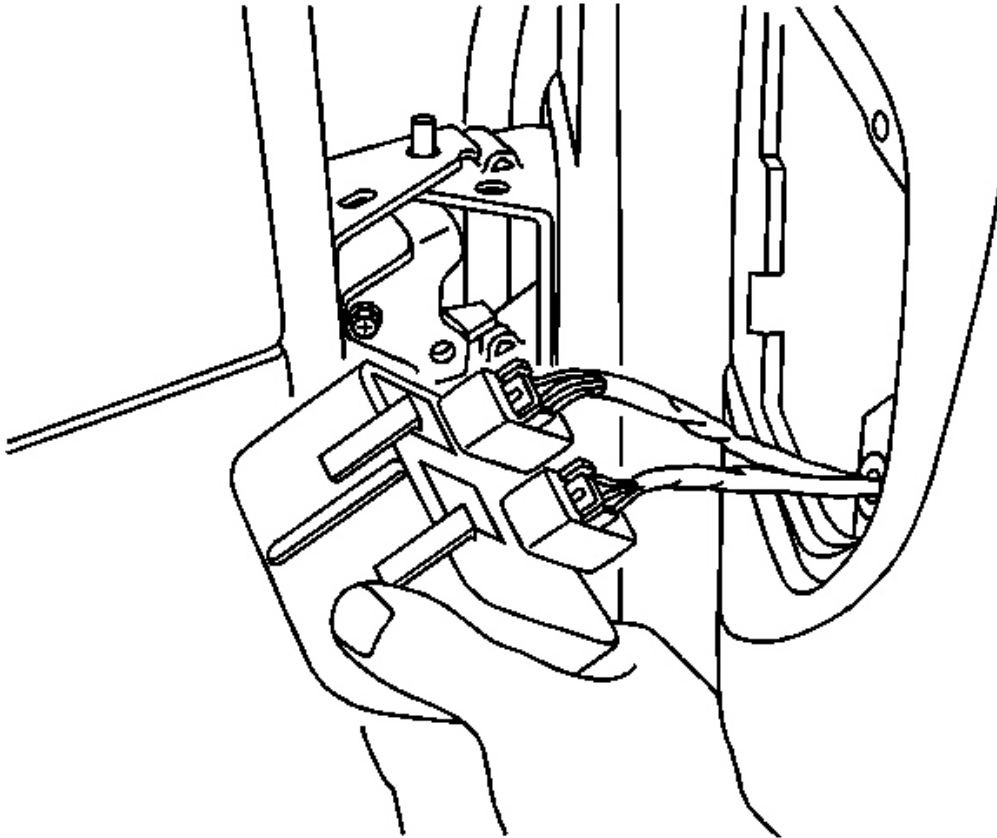
2. Reach into the access hole and release the 4 retaining tabs located on the headlamp switch behind the IP.



**Fig. 23: Identifying Headlamp Switch Electrical Connectors**  
Courtesy of GENERAL MOTORS CORP.

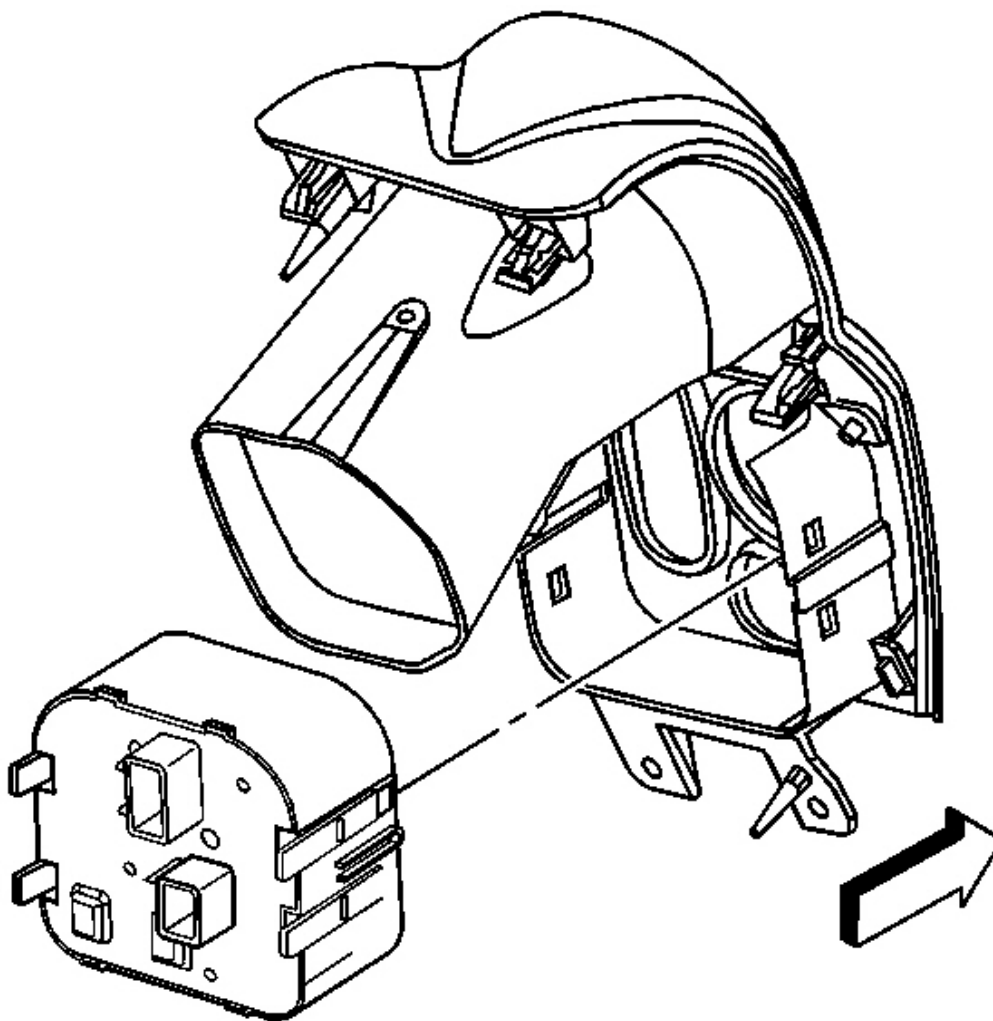
3. Remove the headlamp switch from the IP, through the IP access hole.
4. Disconnect the electrical connectors from the headlamp switch.
5. Remove the headlamp from the IP.

#### **Installation Procedure**



**Fig. 24: Identifying Headlamp Switch Electrical Connectors**  
Courtesy of GENERAL MOTORS CORP.

1. Position the headlamp switch near the access hole.
2. Connect the electrical connectors to the headlamp switch.



**Fig. 25: Headlamp Switch & Retaining Tabs**  
Courtesy of GENERAL MOTORS CORP.

3. Install the headlamp switch to the IP. Ensure that the retaining tabs are fully seated.
4. Install the left IP access cover.

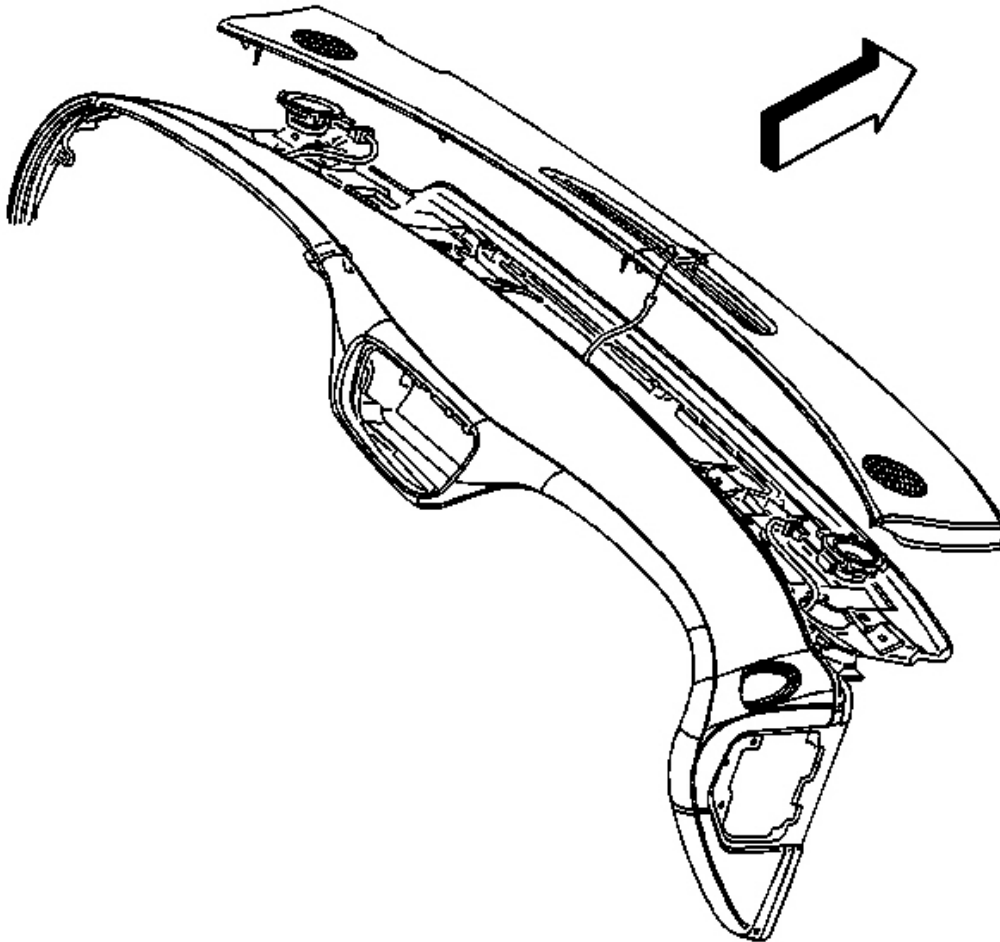
## **AMBIENT LIGHT SENSOR REPLACEMENT**

### **Removal Procedure**

1. Remove the windshield garnish moldings. Refer to **Windshield Pillar Garnish Molding Replacement** .

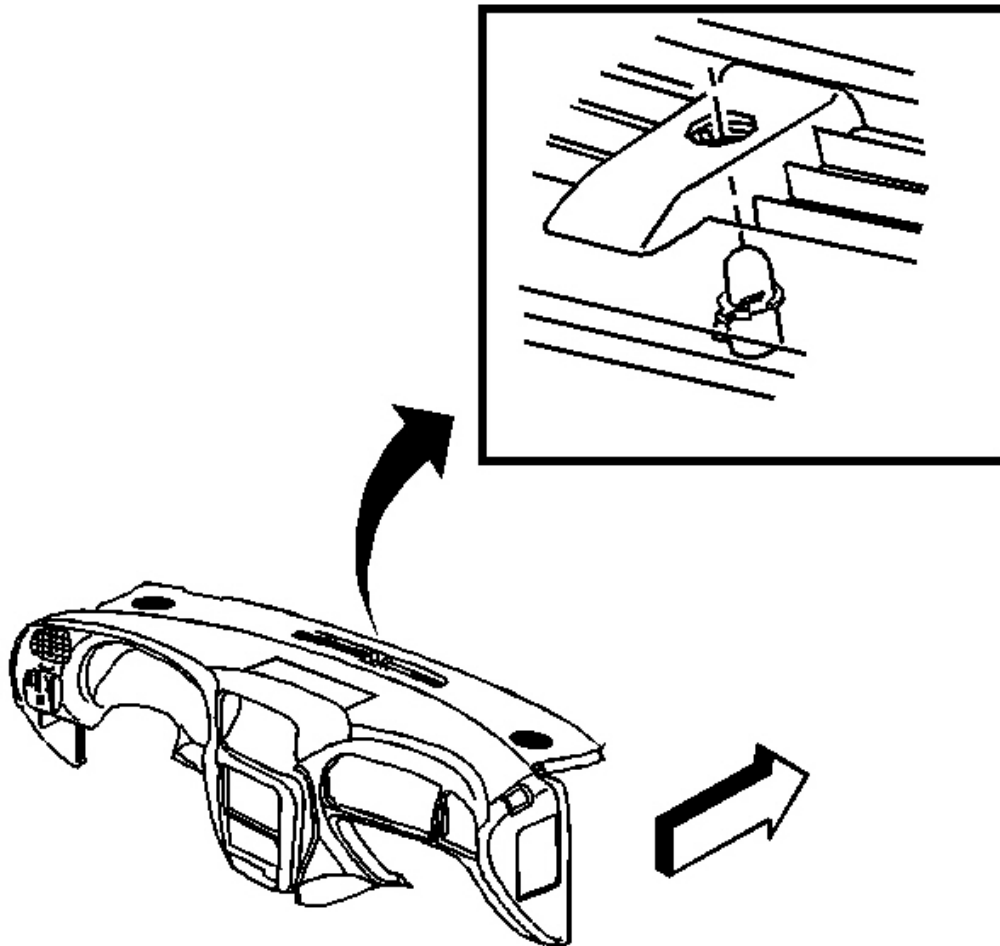
2. Remove the trim pad. Refer to **Instrument Panel Upper Trim Pad Replacement** .

**IMPORTANT:** Cover the windshield defrost vents with clean shop rags.



**Fig. 26: View Of Instrument Panel (I/P) Upper Trim Pad**  
Courtesy of GENERAL MOTORS CORP.

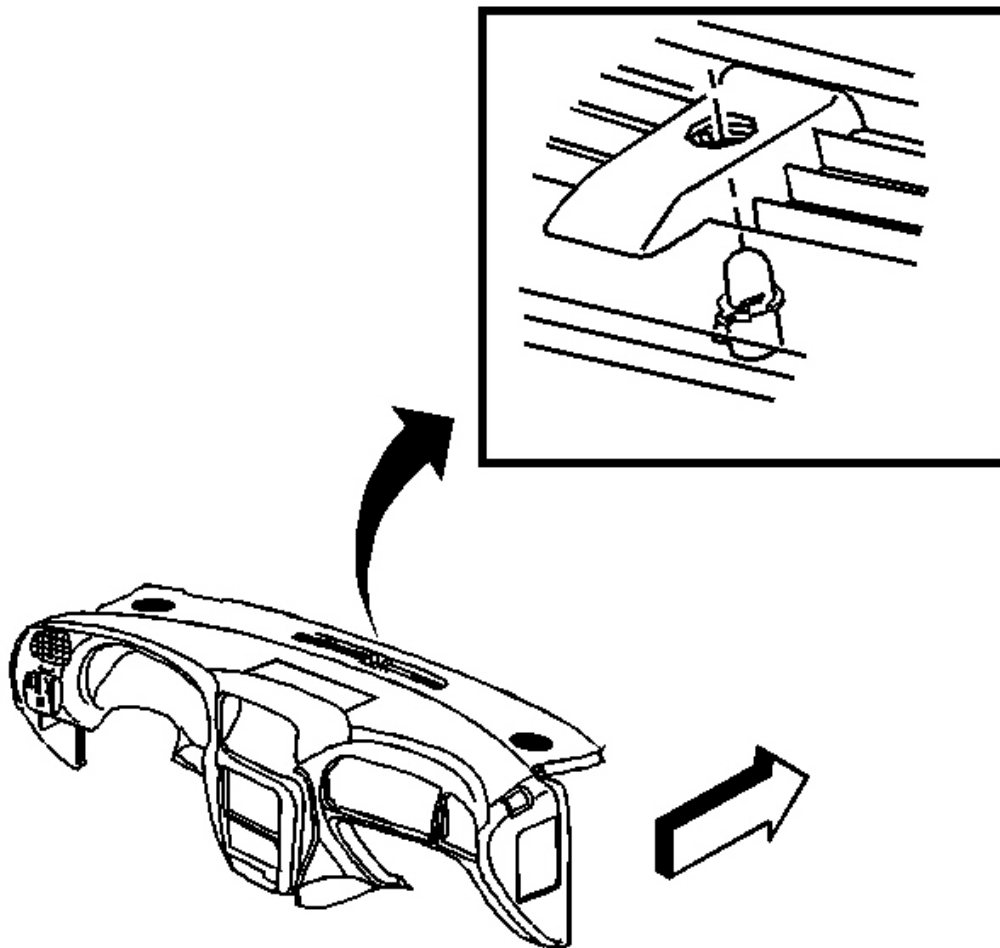
3. Disconnect the electrical connector from the sensor.



**Fig. 27: Locating Ambient Light Sensor**  
**Courtesy of GENERAL MOTORS CORP.**

4. In order to remove the sensor from the trim pad, rotate the sensor counterclockwise 1/4 turn.
5. Remove the sensor from the trim pad.

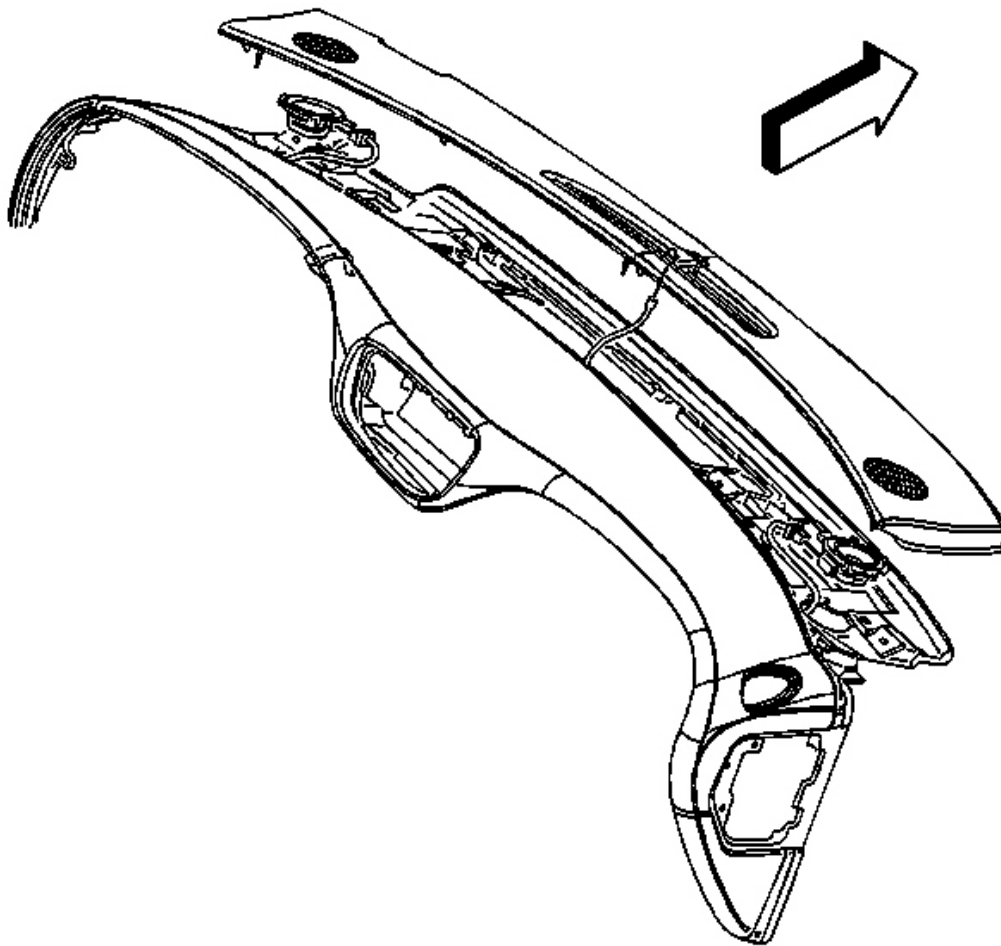
**Installation Procedure**



**Fig. 28: Locating Ambient Light Sensor**  
**Courtesy of GENERAL MOTORS CORP.**

1. Position the sensor to the trim pad.
2. In order to install the sensor to the trim pad, rotate the sensor clockwise 1/4 turn.





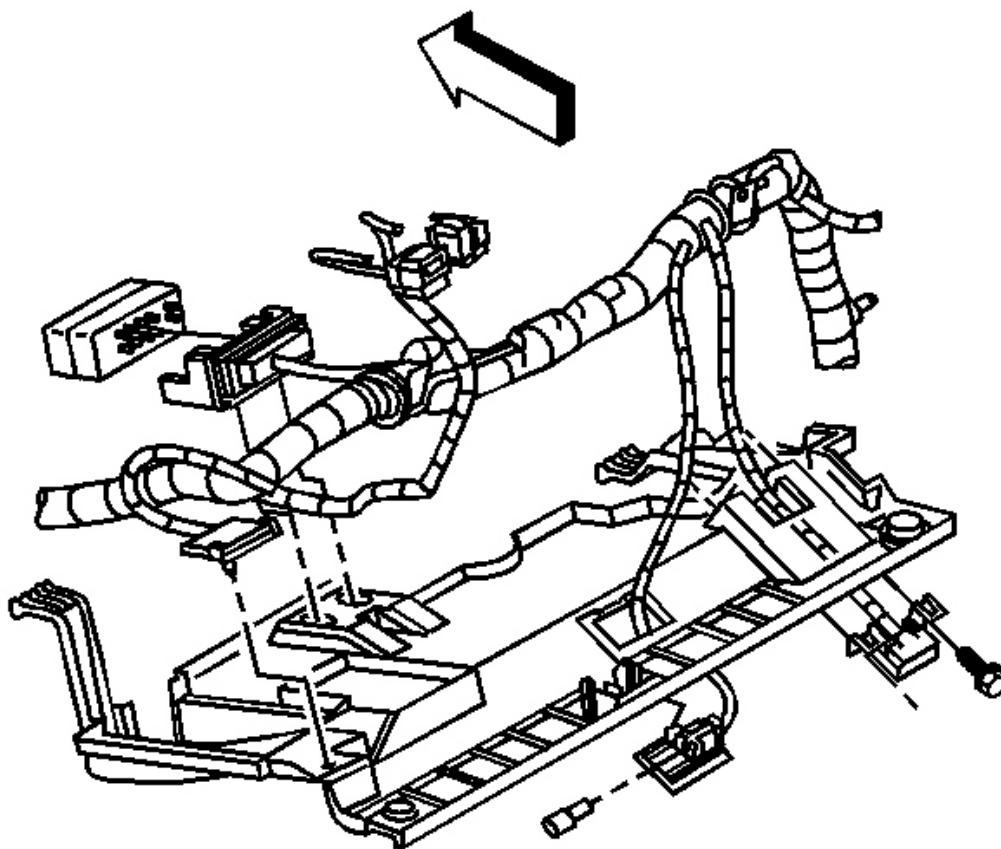
**Fig. 29: View Of Instrument Panel (I/P) Upper Trim Pad**  
Courtesy of GENERAL MOTORS CORP.

3. Position the trim pad to the upper portion of the instrument panel (I/P).
4. Connect the electrical connector to the sensor.
5. Remove the shop rags from the windshield defrost vents.
6. Install the trim pad to the I/P. Refer to **Instrument Panel Upper Trim Pad Replacement** .
7. Install the windshield garnish moldings. Refer to **Windshield Pillar Garnish Molding Replacement** .

## **HAZARD & TURN SIGNAL FLASHER REPLACEMENT**

### **Removal Procedure**

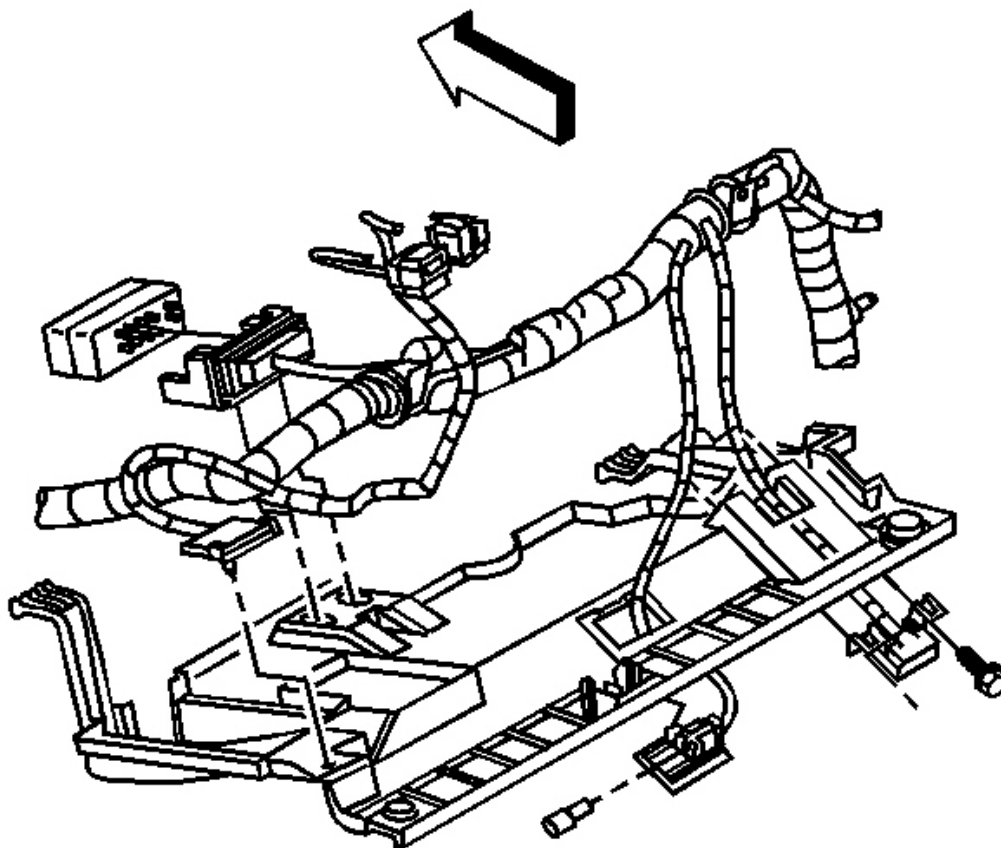
1. Remove the left closeout/insulator panel. Refer to **Instrument Panel Insulator Panel Replacement - Left Side**.



**Fig. 30: View Of Flasher Retaining Bracket & Electrical Connector**  
Courtesy of GENERAL MOTORS CORP.

2. Remove the flasher retaining bracket from the insulator panel.
3. Disconnect the flasher from the electrical connector.
4. Remove the flasher from the vehicle.

#### **Installation Procedure**

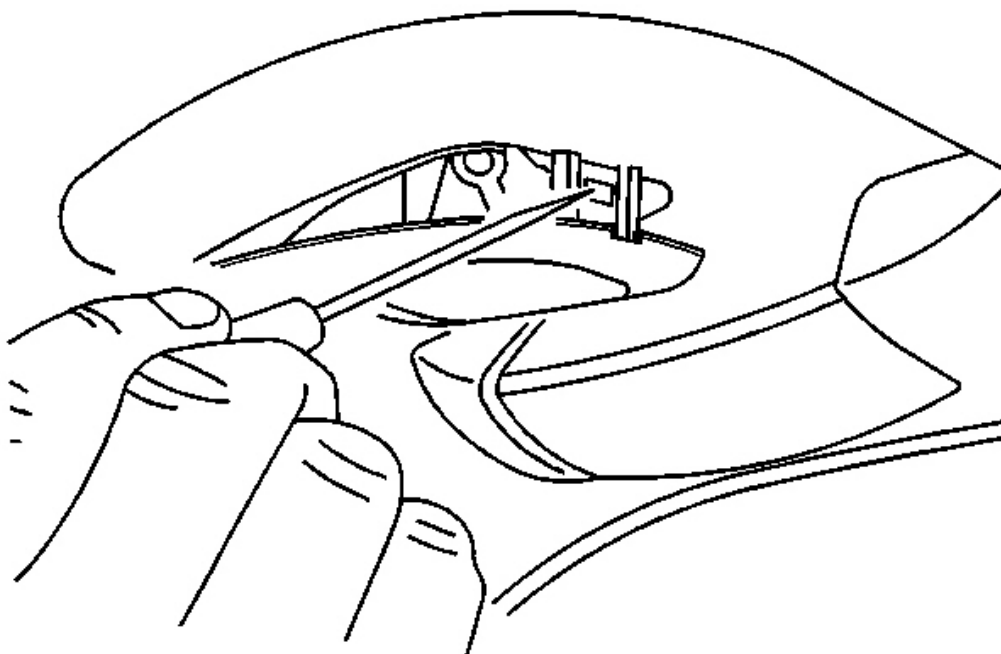


**Fig. 31: View Of Flasher Retaining Bracket & Electrical Connector**  
Courtesy of GENERAL MOTORS CORP.

1. Position the flasher to the insulator panel.
2. Connect the electrical connector to the flasher.
3. Install the flasher retaining bracket to the insulator panel.
4. Install the left closeout/insulator panel. Refer to **Instrument Panel Insulator Panel Replacement - Left Side** .

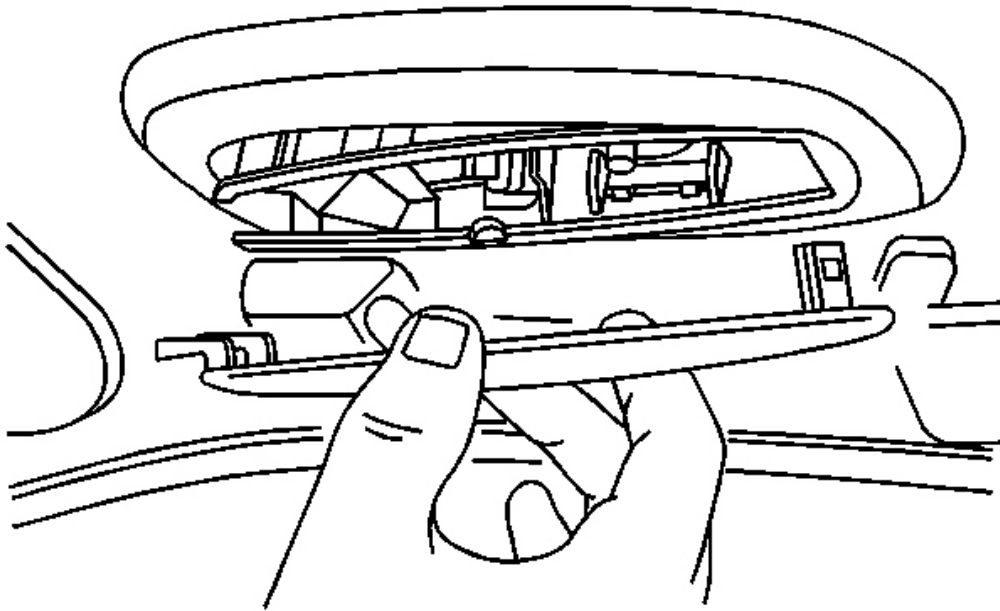
## **DOME & READING LAMP BULB REPLACEMENT**

### **Removal Procedure**



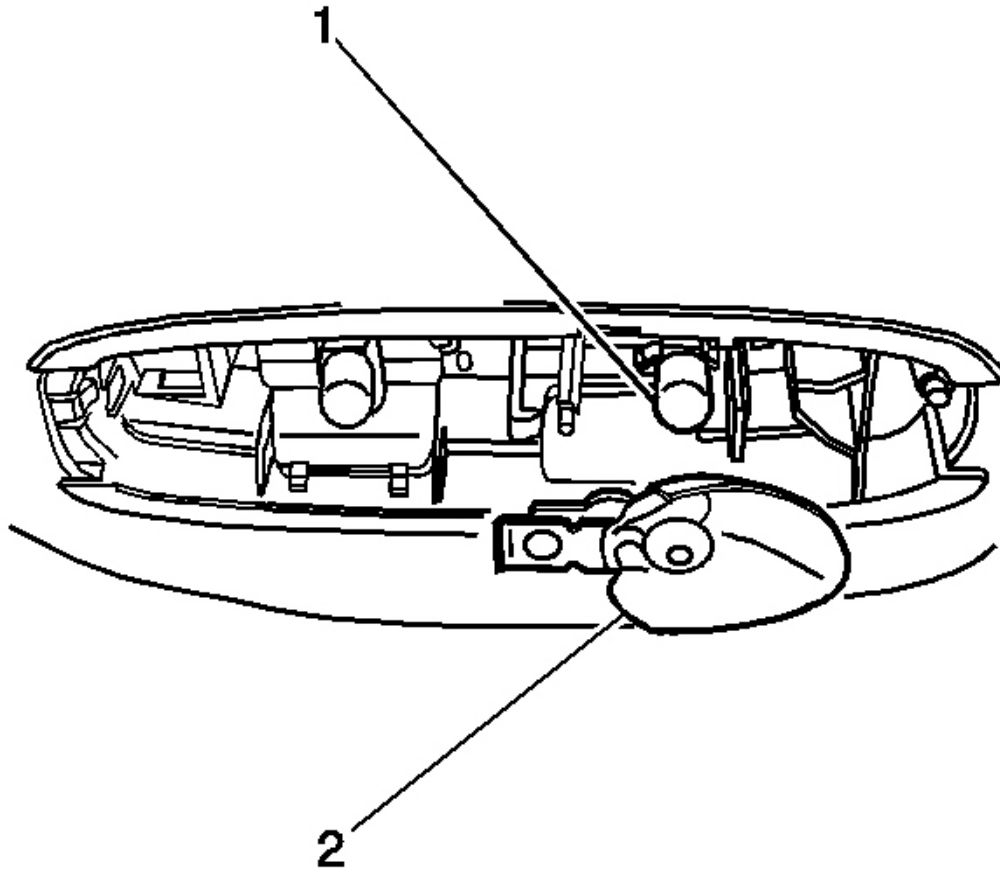
**Fig. 32: Exposing Rear Retaining Tab**  
Courtesy of GENERAL MOTORS CORP.

1. Carefully grasp the sides of the lens to partially expose the rear retaining tab.
2. Use a flat bladed tool in order to release the rear lens retaining tab.
3. Lower the rear edge of the lens away from the headliner.
4. Move the lens rearward in order to release the front horizontal retaining tab.



**Fig. 33: View Of Headliner Lens**  
**Courtesy of GENERAL MOTORS CORP.**

5. Remove the lens from the headliner.

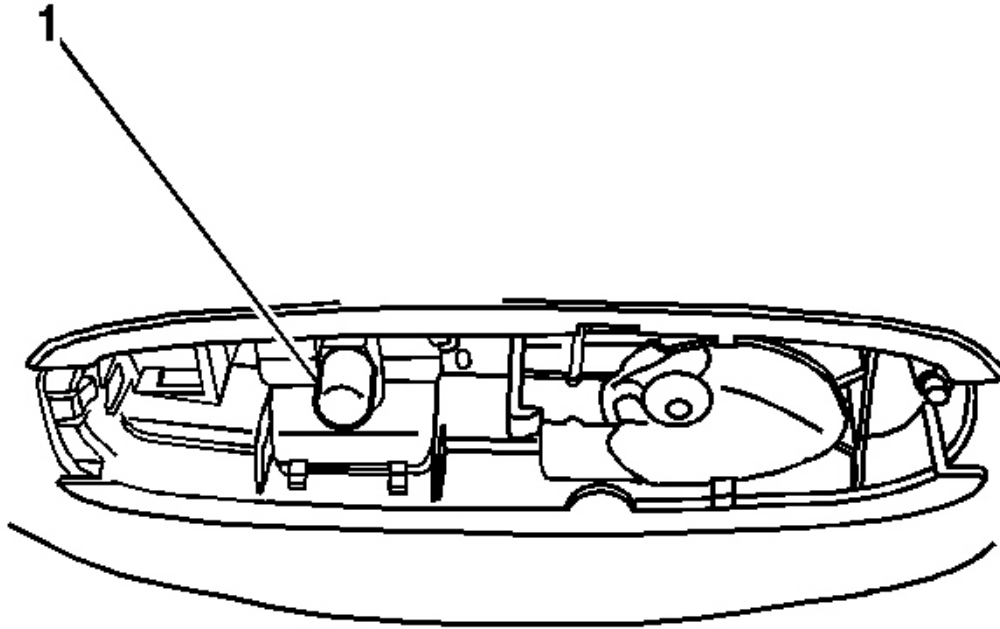


**Fig. 34: Identifying Reading Lamp Bulb & Reflector**  
Courtesy of GENERAL MOTORS CORP.

6. If replacing the reading lamp bulb (1), remove the reflector (2) from the dome lamp.
7. Remove the reading lamp bulb from the socket.

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**Fig. 35: Dome Lamp Bulb**

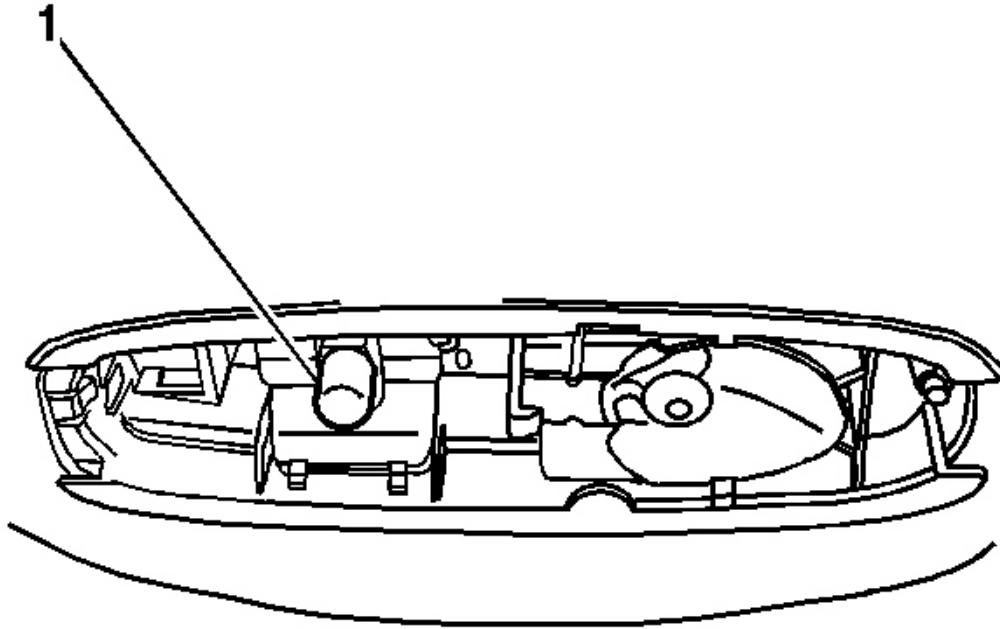
Courtesy of GENERAL MOTORS CORP.

8. If replacing the dome lamp bulb (1), remove the dome lamp bulb from the socket.

### Installation Procedure

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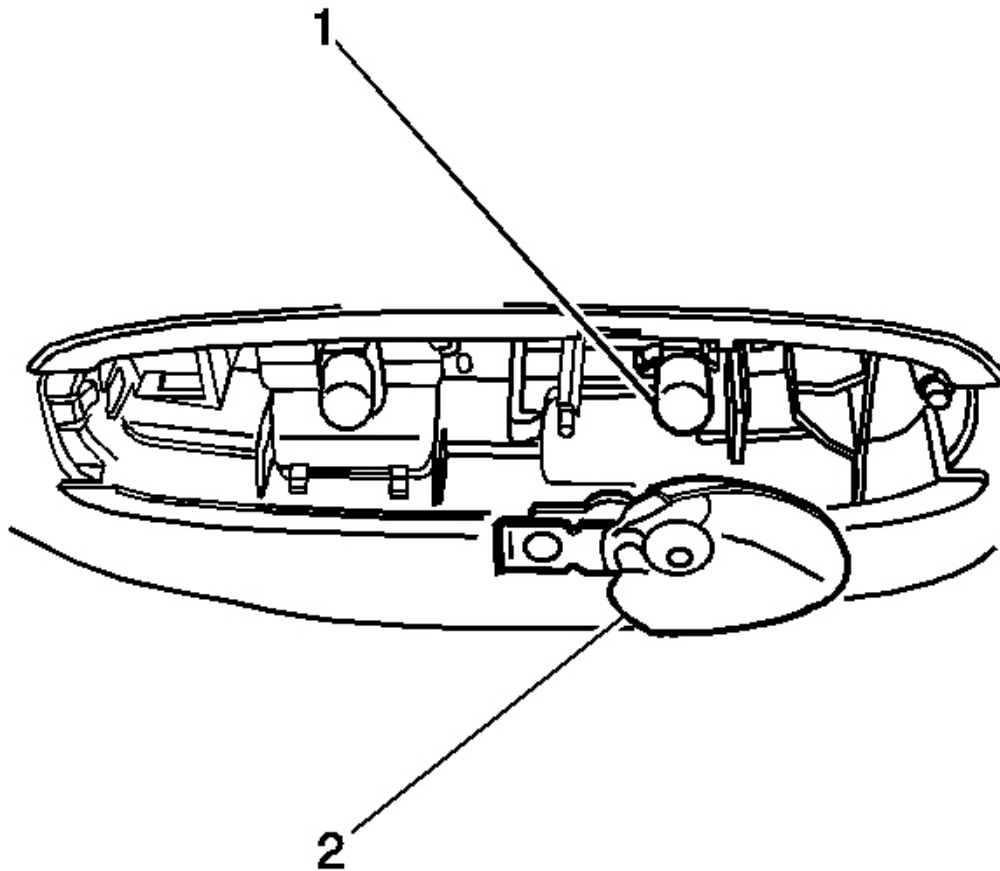


**Fig. 36: Dome Lamp Bulb**

Courtesy of GENERAL MOTORS CORP.

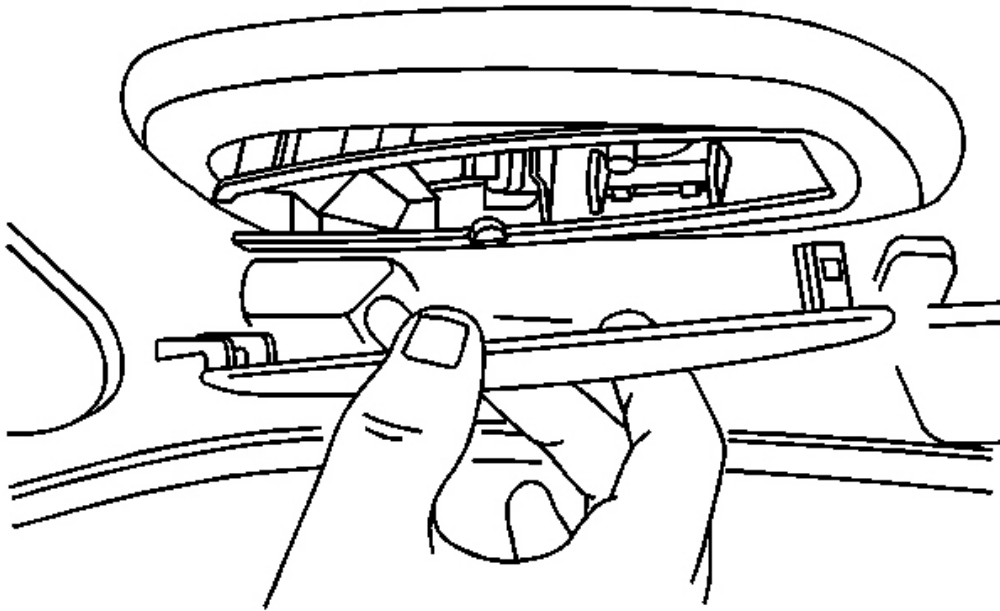
1. If replacing the dome lamp bulb (1), install the dome lamp bulb to the socket.





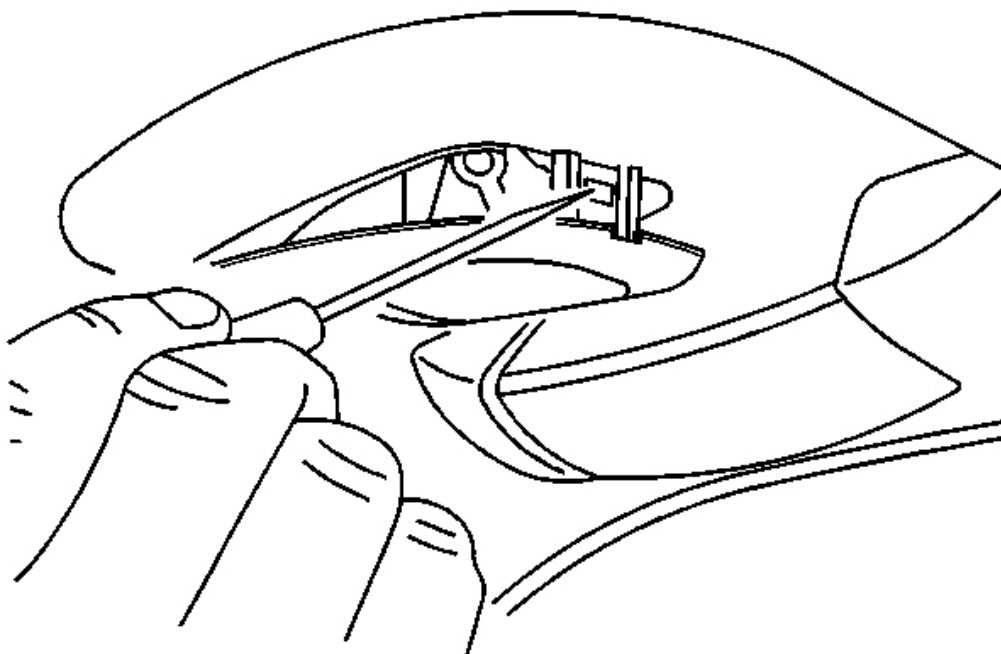
**Fig. 37: Identifying Reading Lamp Bulb & Reflector**  
Courtesy of GENERAL MOTORS CORP.

2. If replacing the reading lamp bulb (1), install the reading lamp bulb to the socket.
3. Install the reflector (2) to the dome lamp, ensuring the retaining tabs are fully seated.



**Fig. 38: View Of Headliner Lens**  
**Courtesy of GENERAL MOTORS CORP.**

4. Position the lens to the headliner with the horizontal tab facing forward.

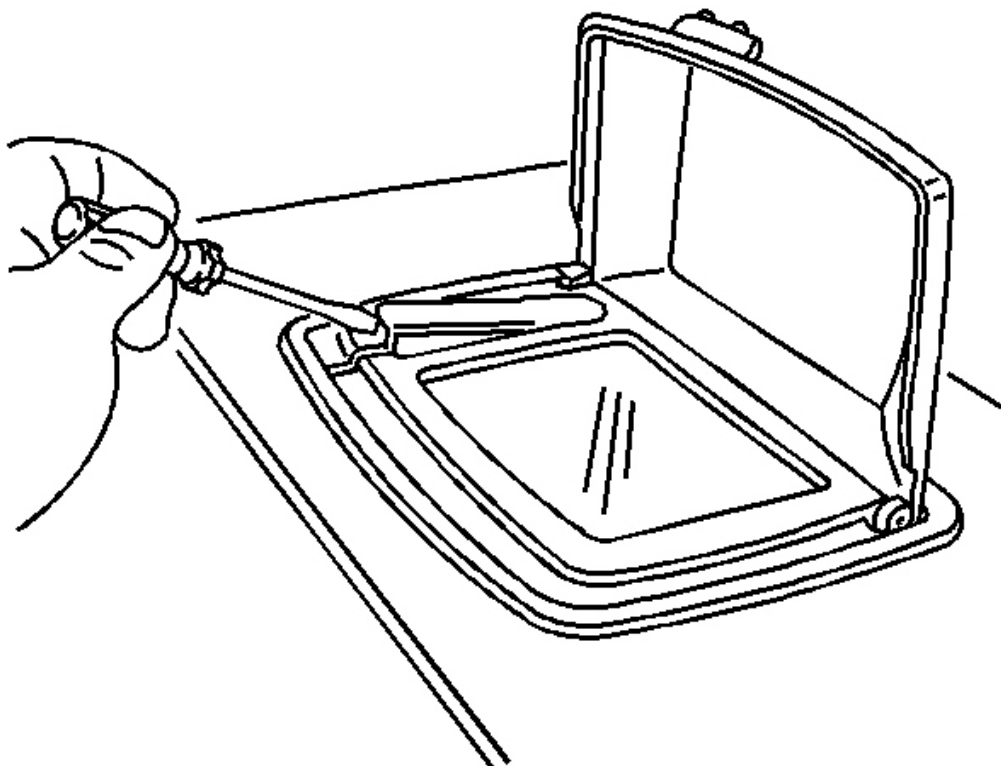


**Fig. 39: Exposing Rear Retaining Tab**  
Courtesy of GENERAL MOTORS CORP.

5. Position the horizontal tab above the headliner and push the lens forward to seat the tab.
6. Push upward on the rear portion of the lens, in order to seat the rear lens retaining tab.
7. Pull down on the lens to ensure that the lens is secured to the headliner.

## **SUNSHADE ILLUMINATED MIRROR LAMP BULB REPLACEMENT**

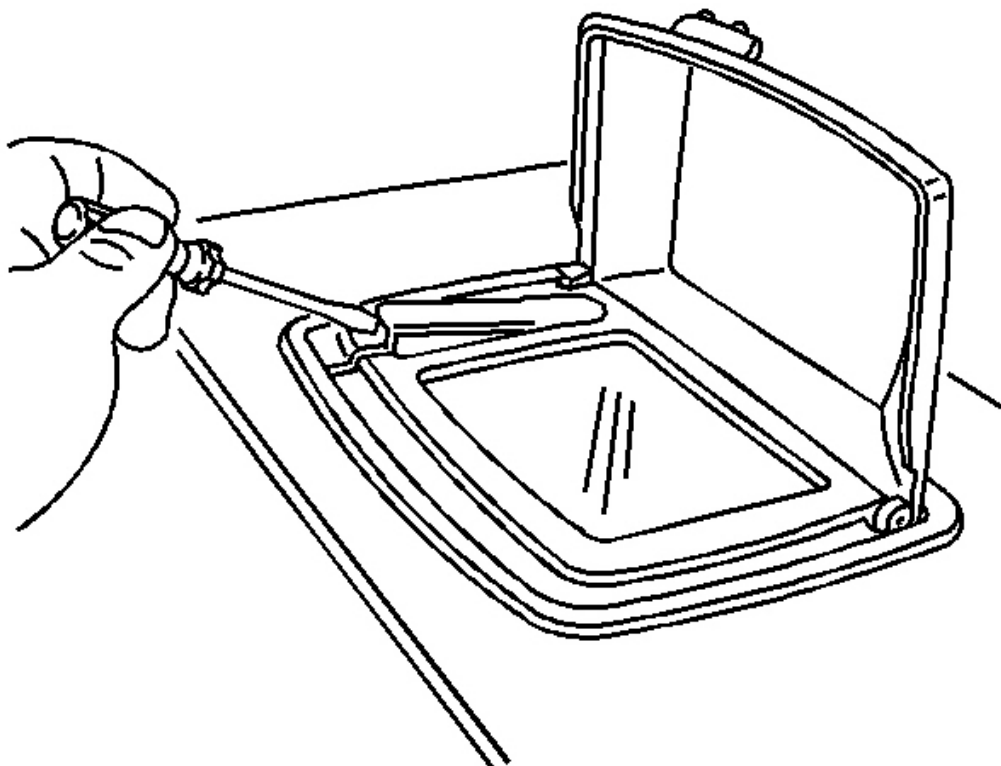
### **Removal Procedure**



**Fig. 40: Releasing Vanity Light Lens Retaining Tab**  
**Courtesy of GENERAL MOTORS CORP.**

1. Fold down the sunshade.
2. Open the cover to the vanity mirror in order to reveal the vanity light.
3. Use a flat bladed tool in order to release the retaining tab on the vanity light lens.
4. Remove the vanity light lens from the vanity mirror.
5. Remove the bulb from the socket.

#### **Installation Procedure**



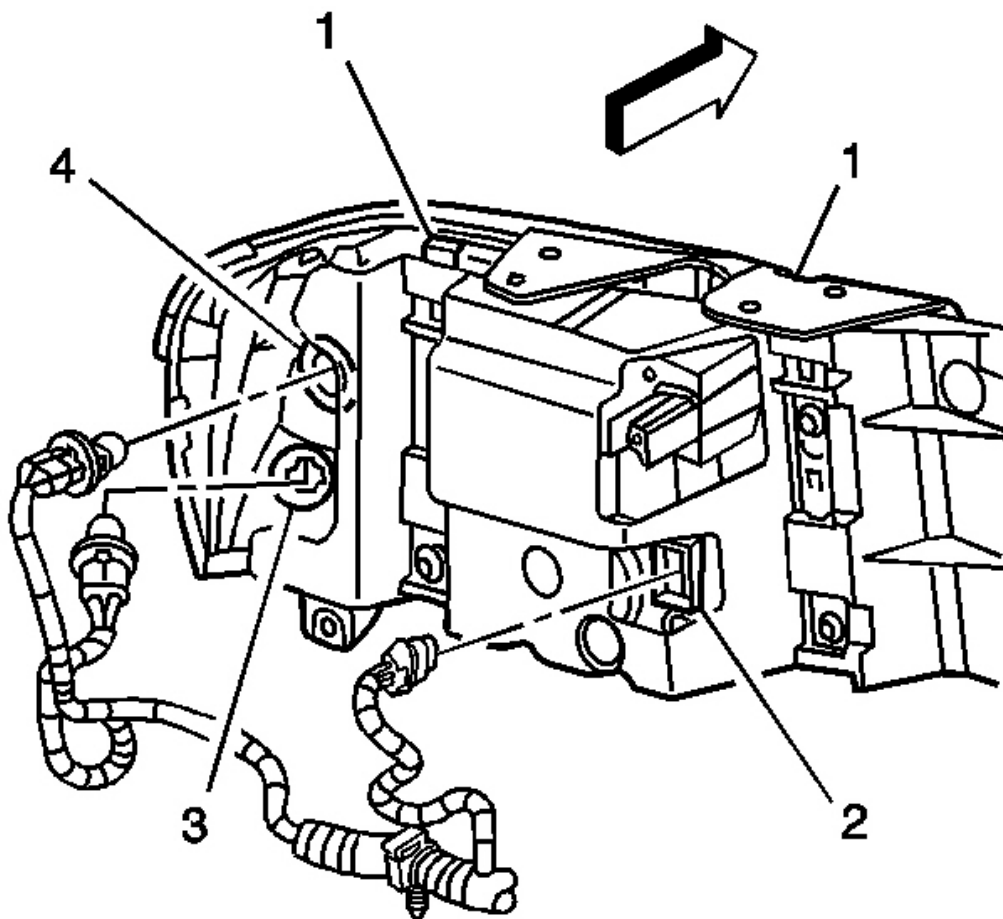
**Fig. 41: Releasing Vanity Light Lens Retaining Tab**  
Courtesy of GENERAL MOTORS CORP.

1. Install the bulb to the socket.
2. Install the vanity light lens to the vanity mirror ensuring the retaining tab is fully seated.
3. Close the cover to the vanity mirror.
4. Return the sunshade to the folded up position.

## **HEADLAMP REPLACEMENT (ENVOY)**

### **Removal Procedure**

1. Open and support the hood.

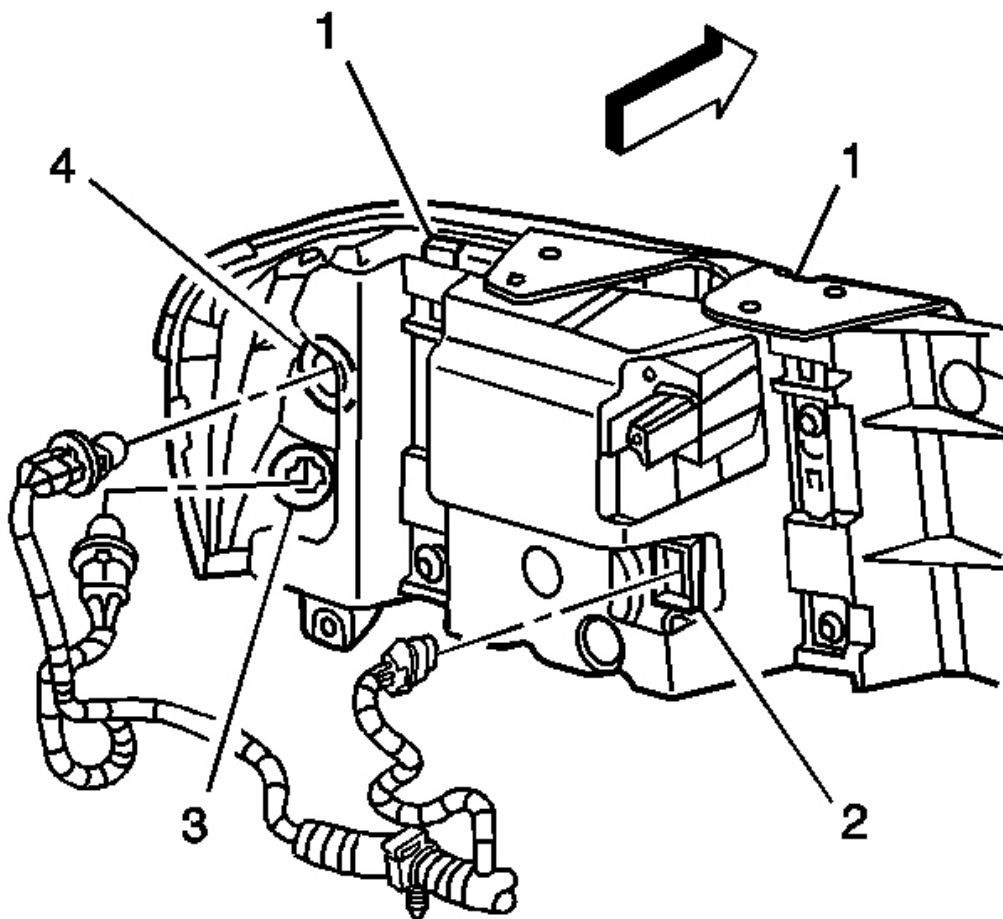


**Fig. 42: Identifying Retaining Tabs, Headlamp Electrical Connector, Side Marker Socket & Park/Turn Socket**

Courtesy of GENERAL MOTORS CORP.

2. Pull up on the retaining tabs (1) in order to remove the headlamp assembly from the headlamp panel.
3. Disconnect the headlamp electrical connector (2) from the headlamp assembly.
4. Remove the side marker socket (3) from the headlamp assembly.
5. Remove the park/turn socket (4) from the headlamp assembly.
6. Remove the headlamp assembly from the headlamp panel.

#### Installation Procedure



**Fig. 43: Identifying Retaining Tabs, Headlamp Electrical Connector, Side Marker Socket & Park/Turn Socket**

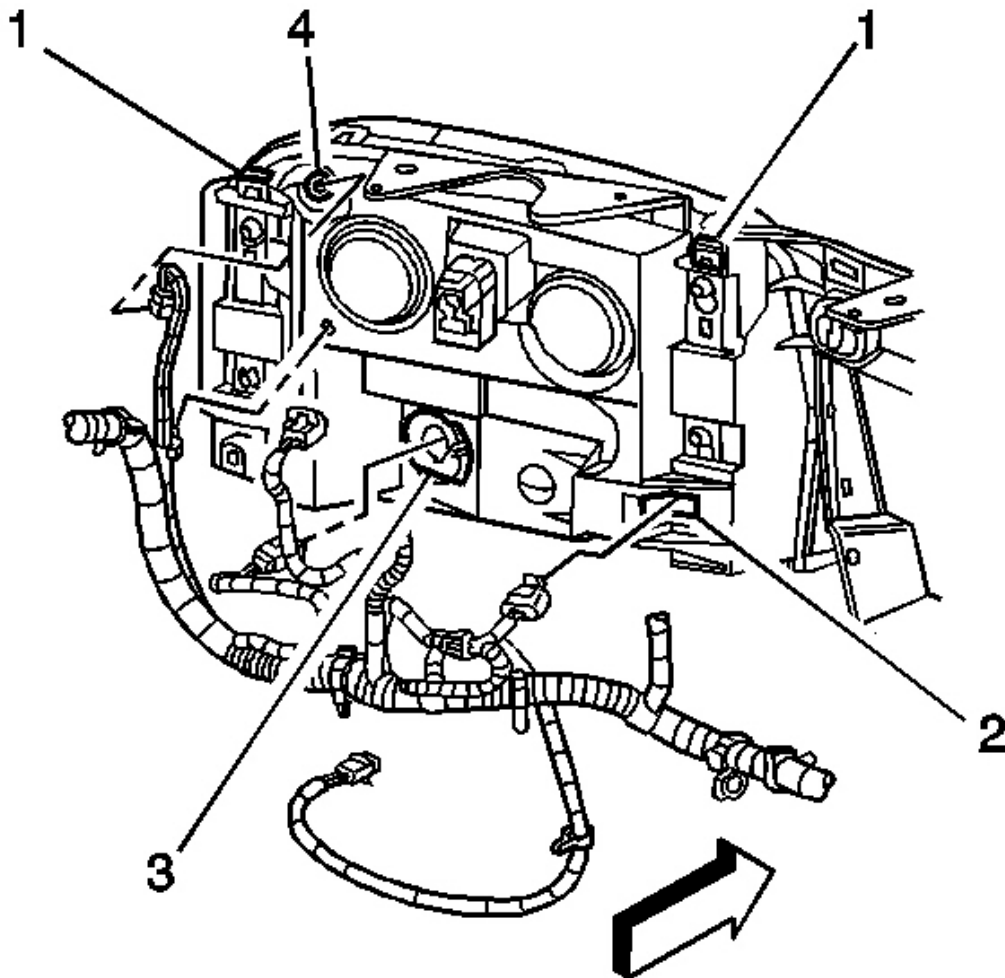
**Courtesy of GENERAL MOTORS CORP.**

1. Position the headlamp assembly to the headlamp panel.
2. Index and seat the tabs on the park/turn socket (4) to the headlamp assembly.
3. Index and seat the tabs on the side marker socket (3) to the headlamp assembly.
4. Connect the headlamp electrical connector (2).
5. Align and install the 4 locator pins on the back of the headlamp assembly into the retaining tab holes.
6. Push down on the retaining tabs (1) in order to lock the headlamp assembly into the headlamp panel.
7. Close the hood.

## **HEADLAMP REPLACEMENT (TRAILBLAZER)**

### Removal Procedure

1. Open and support the hood.
2. Remove the grille. Refer to [Grille Replacement \(Envoy\)](#) or [Grille Replacement \(TrailBlazer\)](#) .



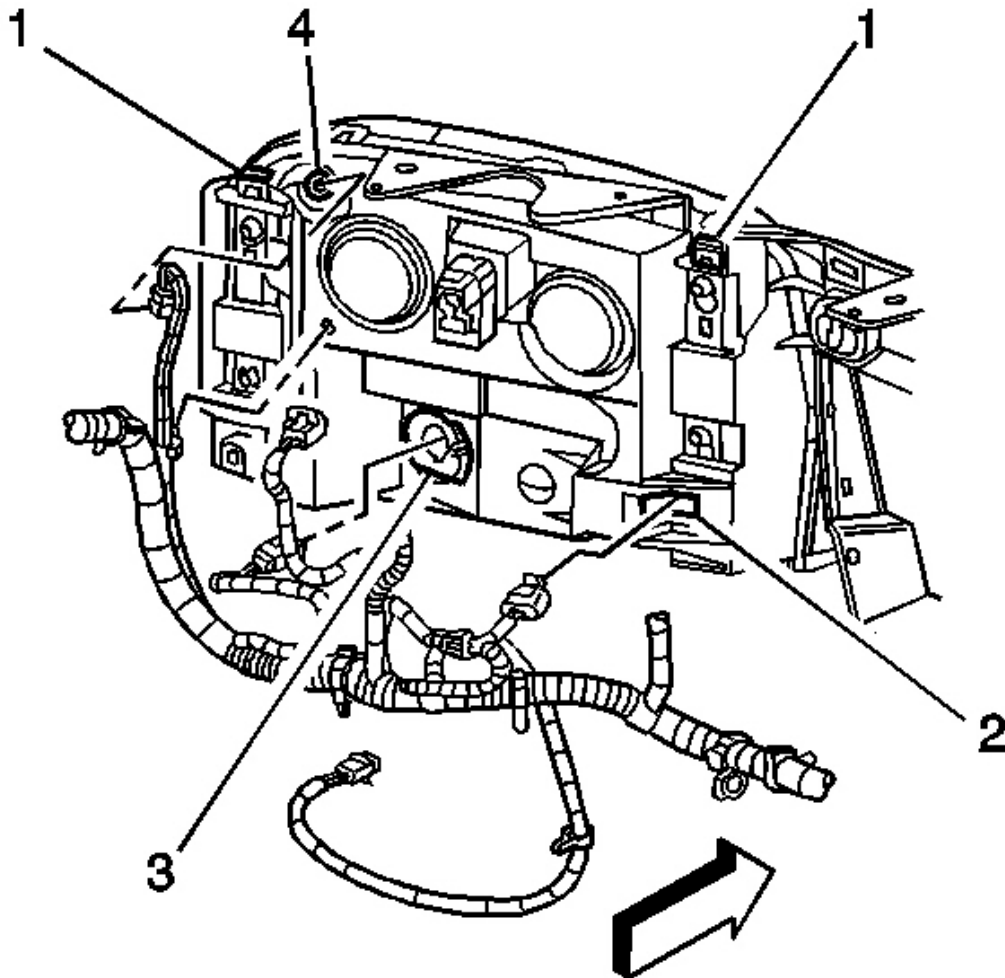
**Fig. 44: Locating Headlamp Components (TrailBlazer)**  
Courtesy of GENERAL MOTORS CORP.

3. Pull up on the retaining tabs (1) in order to remove the headlamp assembly from the headlamp panel.
4. Disconnect the headlamp leveling electrical connector from the motor/actuator if equipped.
5. Disconnect the headlamp electrical connector (2) from the headlamp assembly.



6. Remove the side marker socket (4) from the headlamp assembly.
7. Remove the park/turn socket (3) from the headlamp assembly.
8. Remove the headlamp assembly from the headlamp panel.

**Installation Procedure**



**Fig. 45: Locating Headlamp Components (TrailBlazer)**  
Courtesy of GENERAL MOTORS CORP.

1. Position the headlamp assembly to the headlamp panel.
2. Index and seat the tabs on the park/turn socket (3) to the headlamp assembly.

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3. Index and seat the tabs on the side marker socket (4) to the headlamp assembly.
4. Connect the headlamp electrical connector (2).
5. Connect the headlamp leveling electrical connector to the motor/actuator if equipped.
6. Align and install the 4 locator pins on the back of the headlamp assembly into the retaining tab holes.
7. Push down on the retaining tabs (1) in order to lock the headlamp assembly into the headlamp panel.
8. Install the grille. Refer to **Grille Replacement (Envoy)** or **Grille Replacement (TrailBlazer)** .
9. Close the hood.

### HEADLAMP BULB REPLACEMENT (ENVOY, ASCENDER)

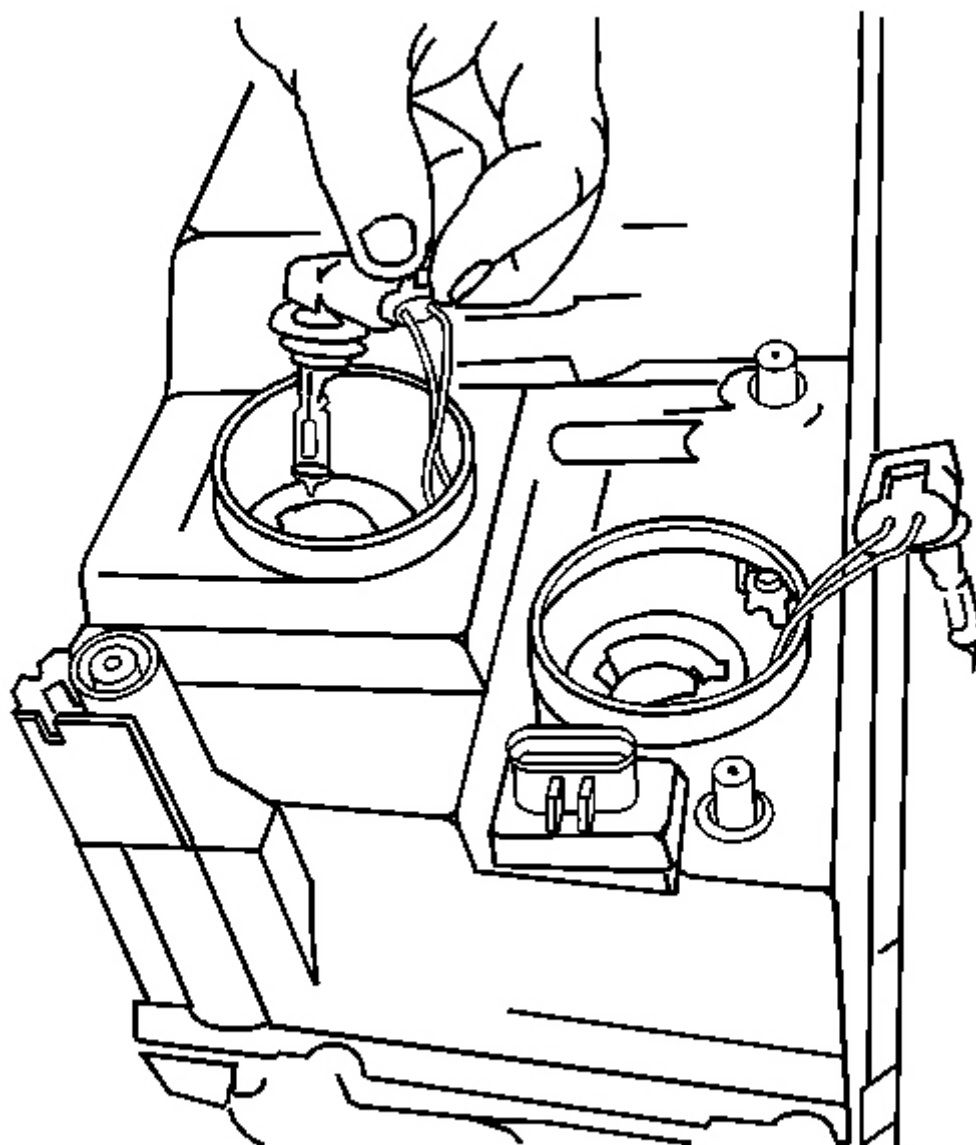
#### Removal Procedure

**CAUTION:** Halogen bulbs contain gas under pressure. Handling a bulb improperly could cause it to shatter into flying glass fragments. To help avoid personal injury:

- Turn off the lamp switch and allow the bulb to cool before changing the bulb.
- Leave the lamp switch OFF until the bulb change is complete.
- Always wear eye protection when changing a halogen bulb.
- Handle the bulb only by its base. Avoid touching the glass.
- Keep dirt and moisture off the bulb.
- Properly dispose of the used bulb.
- Keep halogen bulbs out of the reach of children.

**NOTE:** Avoid touching the bulb or letting the bulb come in contact with anything damp. Oil from your skin or moisture on the bulb can cause the bulb to explode when the bulb is turned on. If either comes in contact with the bulb, clean the bulb with alcohol or a suitable degreaser and wipe the bulb dry.

1. Open the hood.
2. Remove the headlamp. Refer to **Headlamp Replacement (Envoy)** or **Headlamp Replacement (TrailBlazer)**.



**Fig. 46: View Of Headlamp Socket & Bulb**  
**Courtesy of GENERAL MOTORS CORP.**

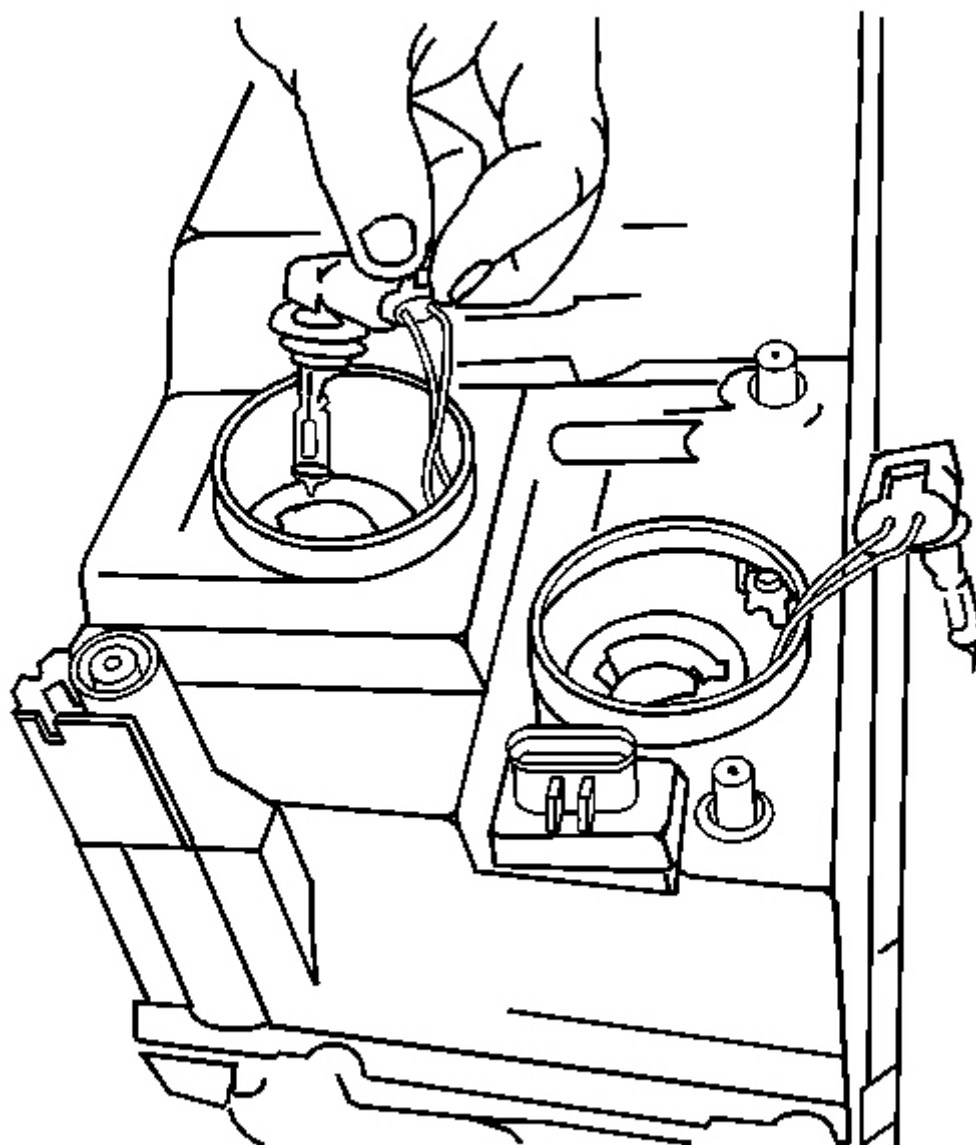
3. Remove the access cover from the rear of the headlamp.
4. Disconnect the electrical connector from the socket.
5. Rotate the bulb and socket counterclockwise in order to remove the bulb and socket from the housing.

<b>2008 Isuzu Ascender LS</b>
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### **Installation Procedure**

#### **IMPORTANT:**

- **Replace a high beam bulb with another high beam bulb. The high beam bulb has a black socket.**
- **Replace a low beam bulb with another low beam bulb. The low beam bulb has a gray tip and a grey socket.**



**Fig. 47: View Of Headlamp Socket & Bulb**  
**Courtesy of GENERAL MOTORS CORP.**

1. Connect the electrical connector to the socket.
2. Install the bulb and socket to the housing by rotating the bulb and socket clockwise, locking the retaining tabs to the housing.

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3. Install the access cover to the rear of the headlamp assembly
4. Install the headlamp. Refer to **Headlamp Replacement (Envoy)** or **Headlamp Replacement (TrailBlazer)**.

### HEADLAMP BULB REPLACEMENT (TRAILBLAZER)

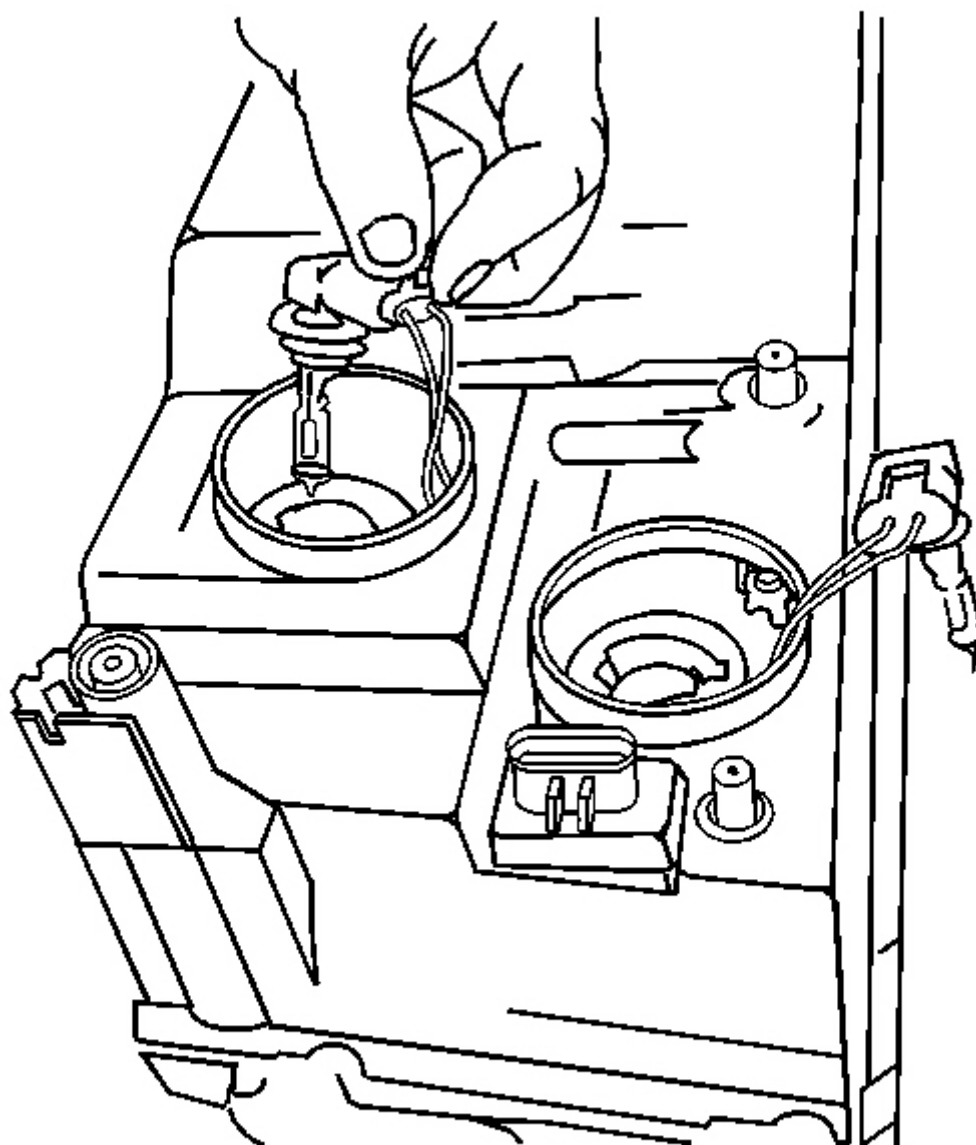
#### Removal Procedure

**CAUTION:** Halogen bulbs contain gas under pressure. Handling a bulb improperly could cause it to shatter into flying glass fragments. To help avoid personal injury:

- Turn off the lamp switch and allow the bulb to cool before changing the bulb.
- Leave the lamp switch OFF until the bulb change is complete.
- Always wear eye protection when changing a halogen bulb.
- Handle the bulb only by its base. Avoid touching the glass.
- Keep dirt and moisture off the bulb.
- Properly dispose of the used bulb.
- Keep halogen bulbs out of the reach of children.

**NOTE:** Avoid touching the bulb or letting the bulb come in contact with anything damp. Oil from your skin or moisture on the bulb can cause the bulb to explode when the bulb is turned on. If either comes in contact with the bulb, clean the bulb with alcohol or a suitable degreaser and wipe the bulb dry.

1. Open the hood.



**Fig. 48: View Of Headlamp Socket & Bulb**  
**Courtesy of GENERAL MOTORS CORP.**

2. Remove the access cover from the rear of the headlamp.
3. Rotate the bulb and socket counterclockwise in order to remove the bulb and socket from the housing.
4. Disconnect the electrical connector from the socket.

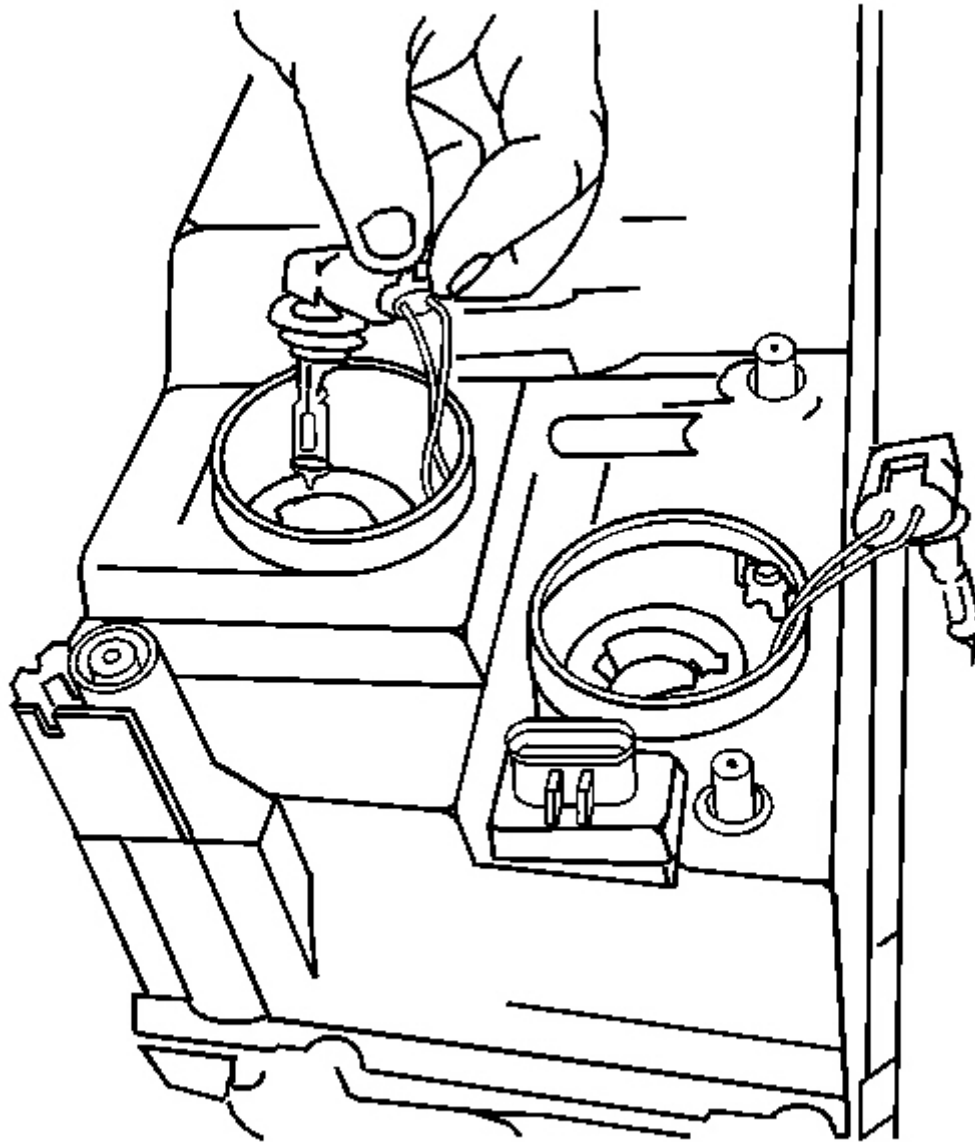
<b>2008 Isuzu Ascender LS</b>
2008 Accessories & Equipment Lighting - Ascender, Envoy & Trailblazer

### **Installation Procedure**

#### **IMPORTANT:**

- **Replace a high beam bulb with another high beam bulb. The high beam bulb has a black socket.**
- **Replace a low beam bulb with another low beam bulb. The low beam bulb has a gray tip and a grey socket.**





**Fig. 49: View Of Headlamp Socket & Bulb**  
**Courtesy of GENERAL MOTORS CORP.**

1. Connect the electrical connector to the socket.
2. Position the bulb and socket to the headlamp.
3. Install the bulb and socket to the housing by rotating the bulb and socket clockwise, locking the retaining

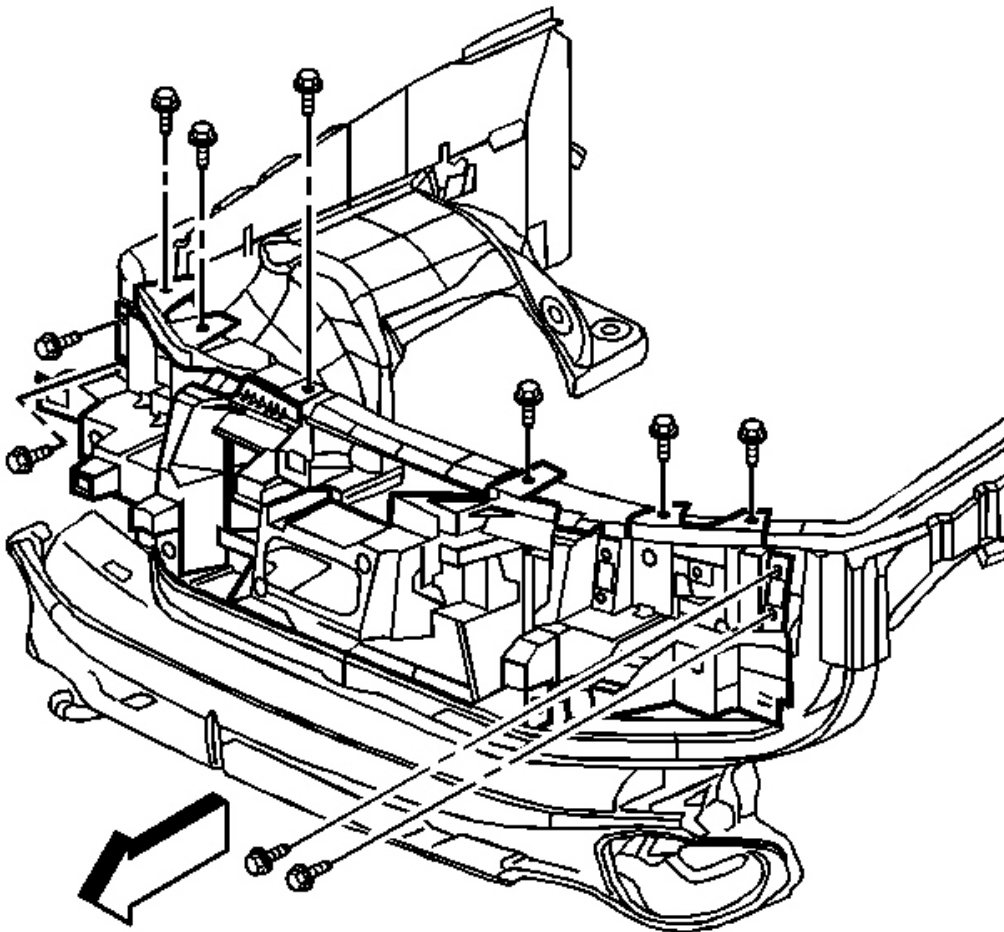
tabs to the housing.

4. Install the access cover to the rear of the headlamp assembly

## **HEADLAMP HOUSING PANEL REPLACEMENT (ENVOY, ASCENDER)**

### **Removal Procedure**

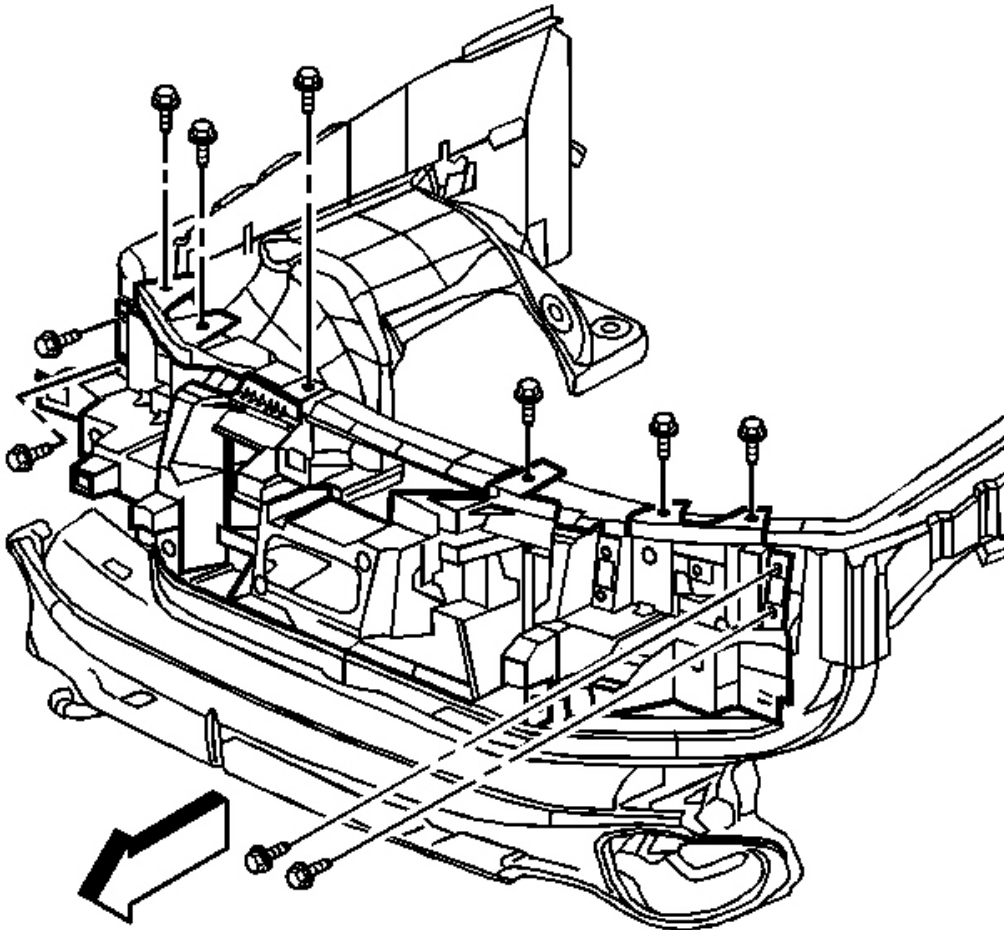
1. Remove the headlamp assemblies. Refer to **Headlamp Replacement (Envoy)** or **Headlamp Replacement (TrailBlazer)**.
2. Remove the grille. Refer to **Grille Replacement (Envoy)** or **Grille Replacement (TrailBlazer)** .
3. Release the tabs that retain the ambient temperature sensor to the headlamp housing panel.
4. Note the wiring harness routing for installation.



**Fig. 50: Identifying Headlamp Housing Panel-To-Core Support Bolts**  
Courtesy of GENERAL MOTORS CORP.

5. Remove the bolts that retain the headlamp housing panel to the core support.
6. Remove the headlamp housing panel from the vehicle.

**Installation Procedure**



**Fig. 51: Identifying Headlamp Housing Panel-To-Core Support Bolts**  
Courtesy of GENERAL MOTORS CORP.

1. Position the headlamp housing panel to the vehicle.
2. Route the wiring harness through the headlamp housing panel as noted during removal.

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**NOTE:** Refer to **Fastener Notice** .

3. Install the bolts that retain the headlamp housing panel to the core support.

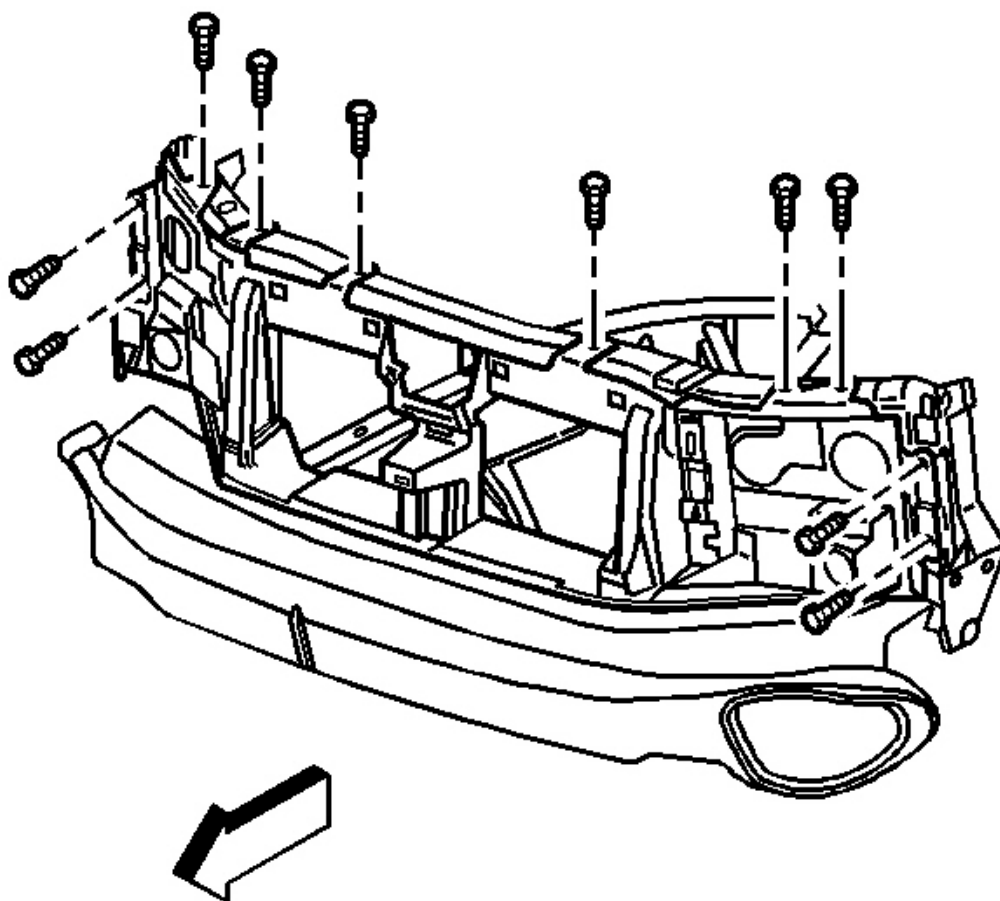
**Tighten:** Tighten the bolts to 8 N.m (71 lb in).

4. Install the ambient temperature sensor to the headlamp housing panel, ensure the retaining tabs are fully seated.
5. Install the grille. Refer to **Grille Replacement (Envoy)** or **Grille Replacement (TrailBlazer)** .
6. Install the headlamp assemblies. Refer to **Headlamp Replacement (Envoy)** or **Headlamp Replacement (TrailBlazer)**.

### HEADLAMP HOUSING PANEL REPLACEMENT (TRAILBLAZER)

#### Removal Procedure

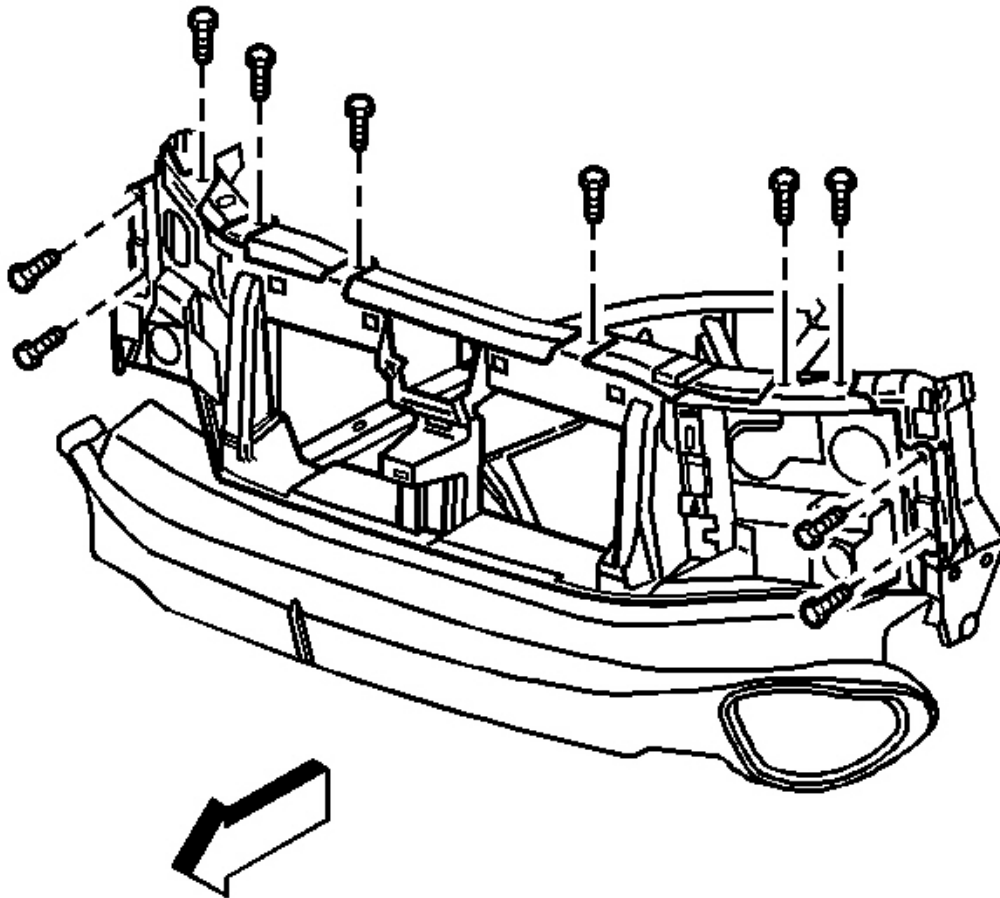
1. Remove the grille. Refer to **Grille Replacement (Envoy)** or **Grille Replacement (TrailBlazer)** .
2. Remove the headlamp assemblies. Refer to **Headlamp Replacement (Envoy)** or **Headlamp Replacement (TrailBlazer)**.
3. Release the tabs that retain the ambient temperature sensor to the headlamp housing panel.
4. Note the wiring harness routing for installation.



**Fig. 52: Identifying Headlamp Panel Assembly Retaining Bolts**  
Courtesy of GENERAL MOTORS CORP.

5. Remove the bolts that retain the headlamp housing panel to the core support.
6. Remove the headlamp housing panel from the vehicle.

#### Installation Procedure



**Fig. 53: Identifying Headlamp Panel Assembly Retaining Bolts**  
Courtesy of GENERAL MOTORS CORP.

1. Position the headlamp housing panel to the vehicle.
2. Route the wiring harness through the headlamp housing panel as noted during removal.

**NOTE:** Refer to Fastener Notice .

3. Install the bolts that retain the headlamp housing panel to the core support.

**Tighten:** Tighten the bolts to 8 N.m (71 lb in).

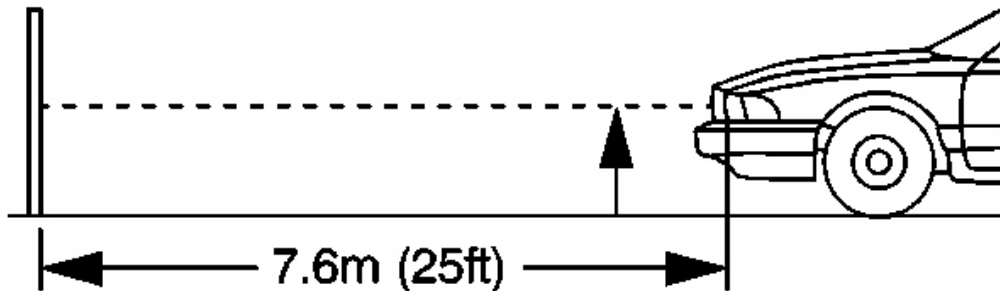
4. Install the ambient temperature sensor to the headlamp housing panel, ensure the retaining tabs are fully seated.

5. Install the headlamp assemblies. Refer to **Headlamp Replacement (Envoy)** or **Headlamp Replacement (TrailBlazer)**.
6. Install the grille. Refer to **Grille Replacement (Envoy)** or **Grille Replacement (TrailBlazer)**.

## HEADLAMP AIMING

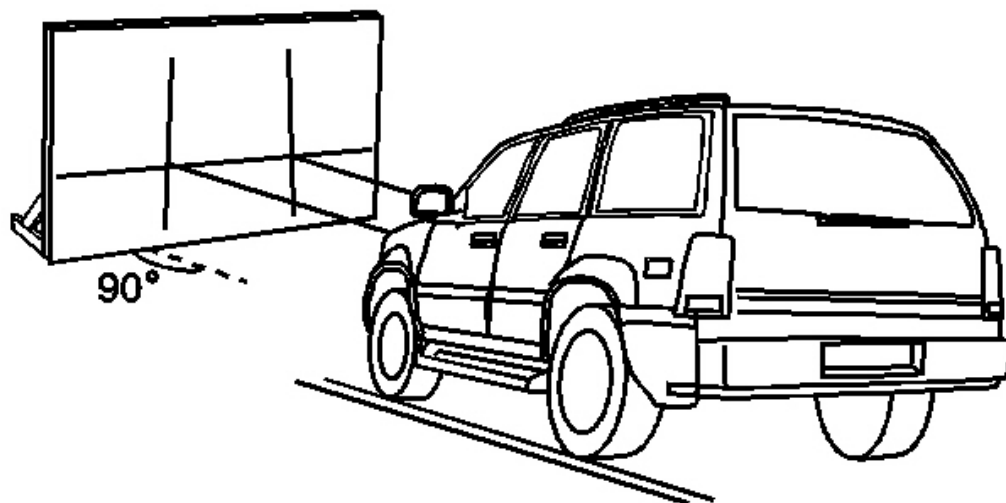
### Screen Method for Headlamp Aiming

The screen method requires an area set up specifically for headlamp aiming.



**Fig. 54: Measuring Distance Between Headlamps Face & Aiming Screen**  
Courtesy of GENERAL MOTORS CORP.

The area should consist of a level surface large enough to allow for a vehicle and an additional 7.62 m (25 ft) as measured from the face of the headlamps to the aiming screen.



**Fig. 55: Screen Method For Headlamp Aiming**  
**Courtesy of GENERAL MOTORS CORP.**

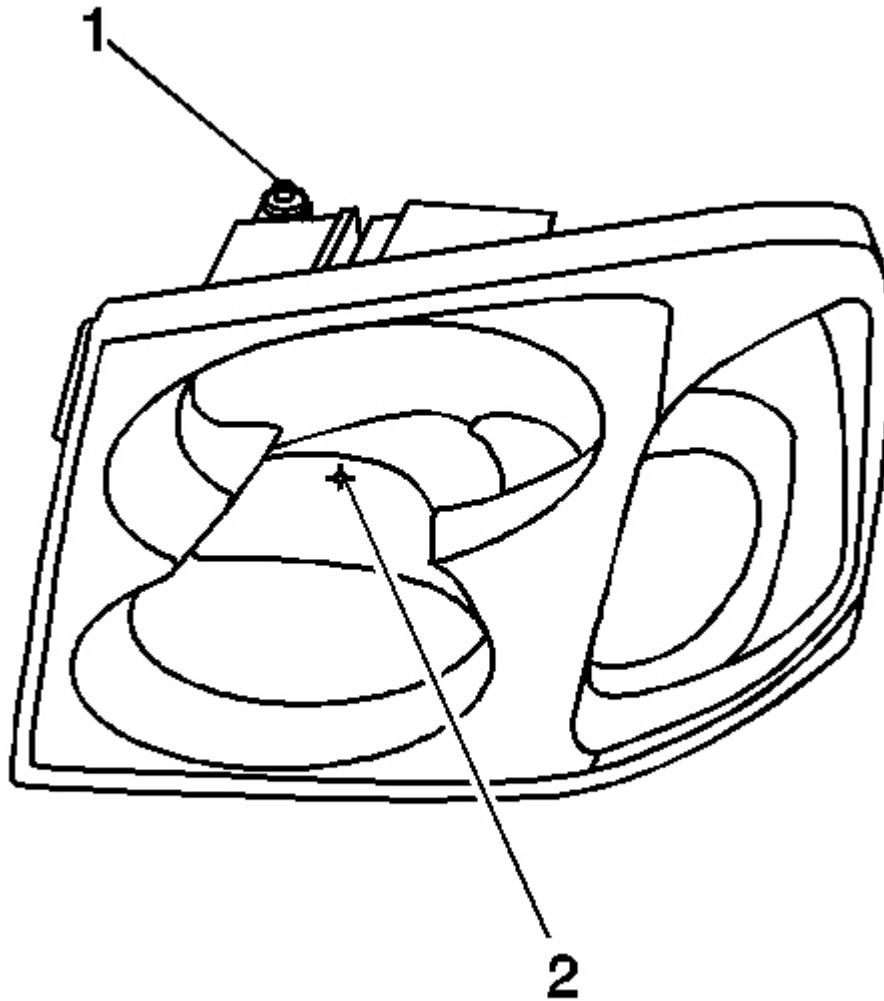
The screen should be a wall or other flat surface at least 1.52 m (5 ft) high by 3.66 m (12 ft) wide with a matte white surface well shaded from extraneous light, and 90 degrees to the floor. The screen should be provided with a permanent vertical reference line 0.61 m (2 ft) from the left edge of the screen, 2 laterally adjustable vertical tapes, and one vertically adjustable horizontal tape.

After the aiming screen has been set up and located, paint or tape a reference line on the floor 15.24 m (50 ft) from the vertical reference line on the screen. This line should be perpendicular to the aiming screen and a mark placed at 7.62 m (25 ft) from the screen.

#### **Headlamp Aiming Procedure**

1. Align the left tires of the vehicle with the reference line extending from the screen with the headlamps aligned with the reference line.
2. Remove any snow, ice or mud from the vehicle.
3. The vehicle must be fully assembled and all other work stopped while the headlamp aiming is being done.
4. The vehicle must contain one person or approximately 160 lb (73 kg).
5. Tires should be properly inflated.
6. Rock the vehicle to stabilize the suspension.





**Fig. 56: Identifying Vertical Adjustment & Headlamp Lens**  
Courtesy of GENERAL MOTORS CORP.

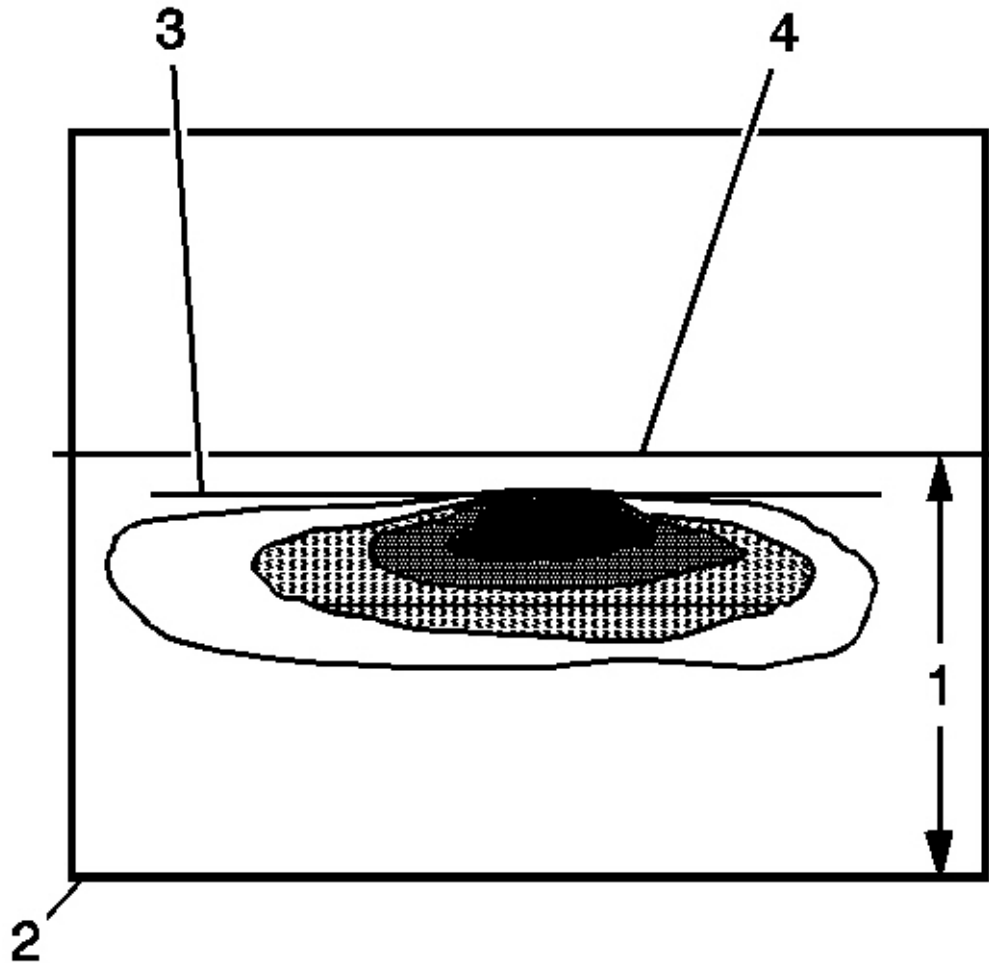
7. Measure from the floor to the reference mark on the headlamp lens (2).

The graphic shows a GMC headlamp. Chevrolet and Oldsmobile are similar.

8. At the screen, measure from the floor and place the horizontal tape at the above measured distance.
9. Turn the low beam headlamps ON.
10. The graphic shows the vertical (1) adjustment, no horizontal adjustments are required.

The graphic shows a GMC headlamp. Chevrolet and Oldsmobile are similar.

Adjust the headlamps to the specifications required by state and local authorities.



**Fig. 57: Identifying Centerline Reference Marks, Headlamp Pattern & Ground Line**  
Courtesy of GENERAL MOTORS CORP.

**IMPORTANT:** Do not place a cover directly on the headlamp assembly while the headlamp is ON.

11. The beam pattern must be positioned as shown in the graphic.
12. Adjust one headlamp at a time while blocking the light from the other. The cover must be away from the

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headlamp.

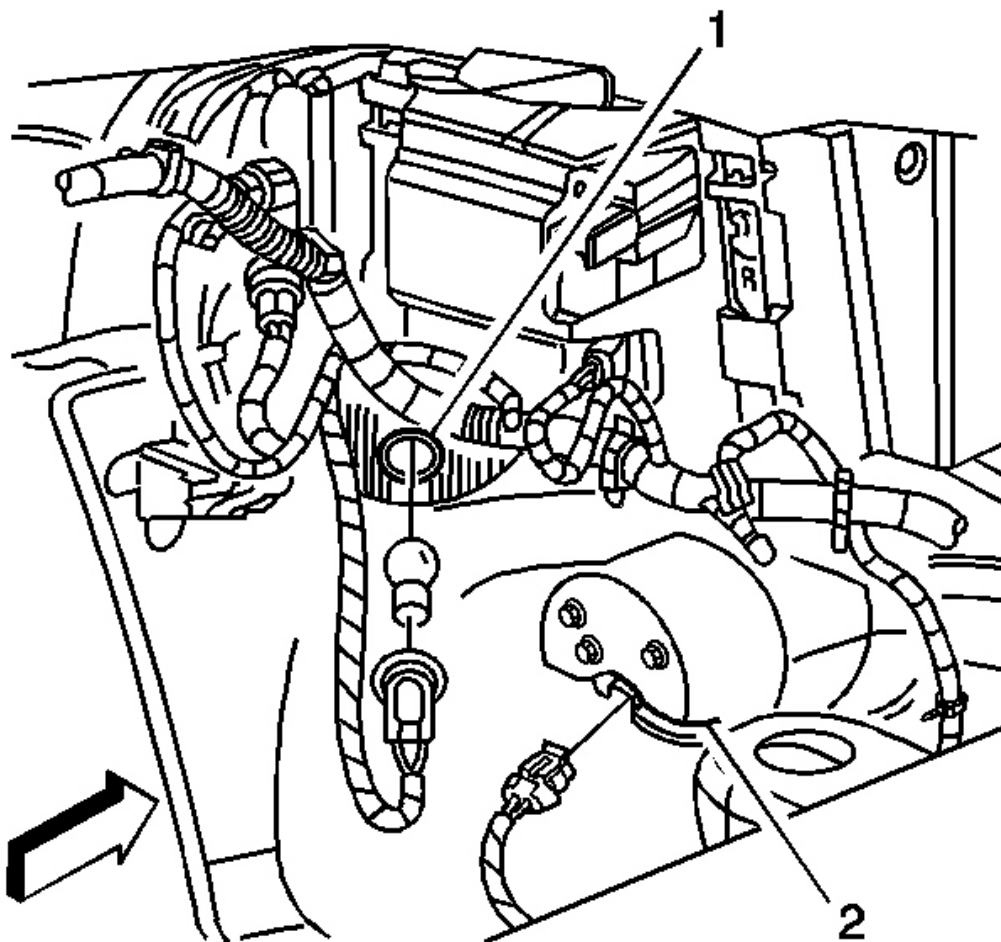
The following list refers to the callouts in the graphic:

- The low beam centerline reference mark (4).
- Distance from ground to the low beam bulb centerline reference mark (1).
- The ground line (2).
- Horizontal edge of the low beam headlamp pattern (3).
- The edge of the headlamp pattern (3), must be 5 cm (2 in) below the reference mark (4), with the vehicle 7.62 m (25 ft) away.

### FRONT FOG LAMP REPLACEMENT (ENVOY, TRAILBLAZER)

#### Removal Procedure

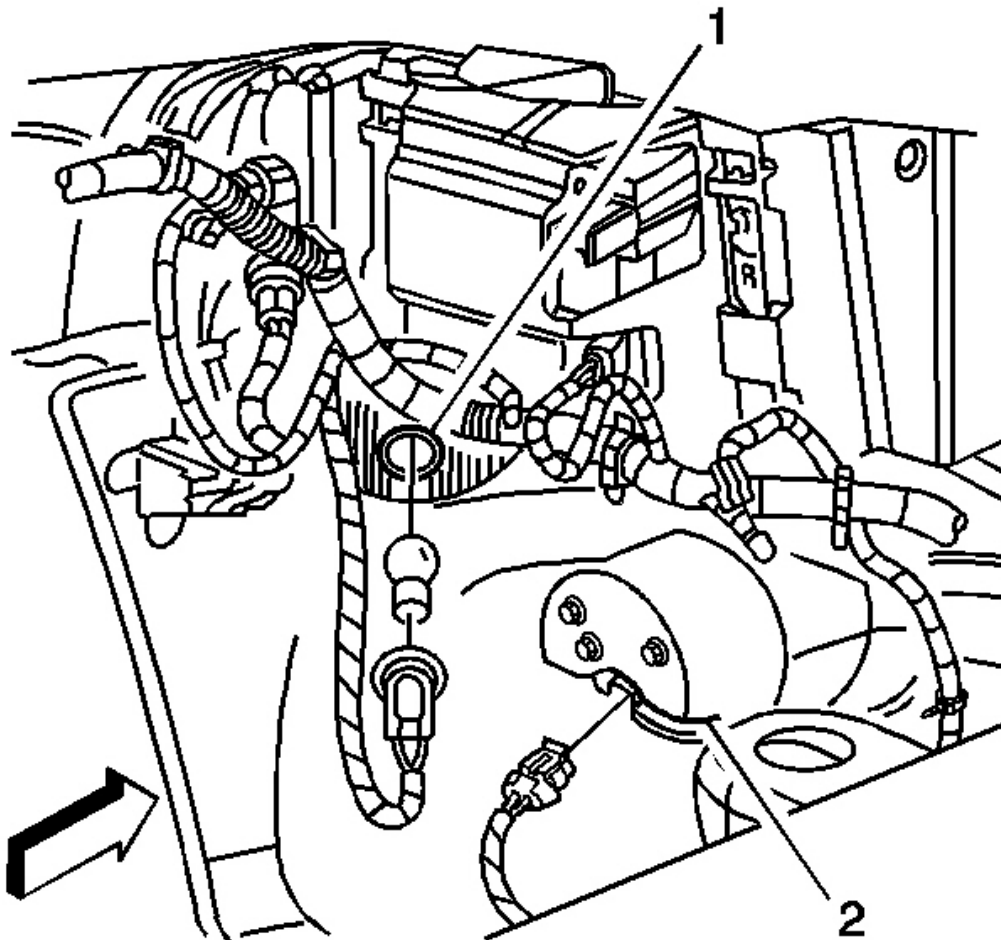
1. Remove the fog lamp bulb and socket. Refer to **Front Fog Lamp Bulb Replacement**.



**Fig. 58: View Of Fog Lamp Housing & Socket**  
Courtesy of GENERAL MOTORS CORP.

2. Remove the 3 nuts that retain the fog lamp to the fascia (2).
3. Remove the fog lamp from the fascia.

#### Installation Procedure



**Fig. 59: View Of Fog Lamp Housing & Socket**  
Courtesy of GENERAL MOTORS CORP.

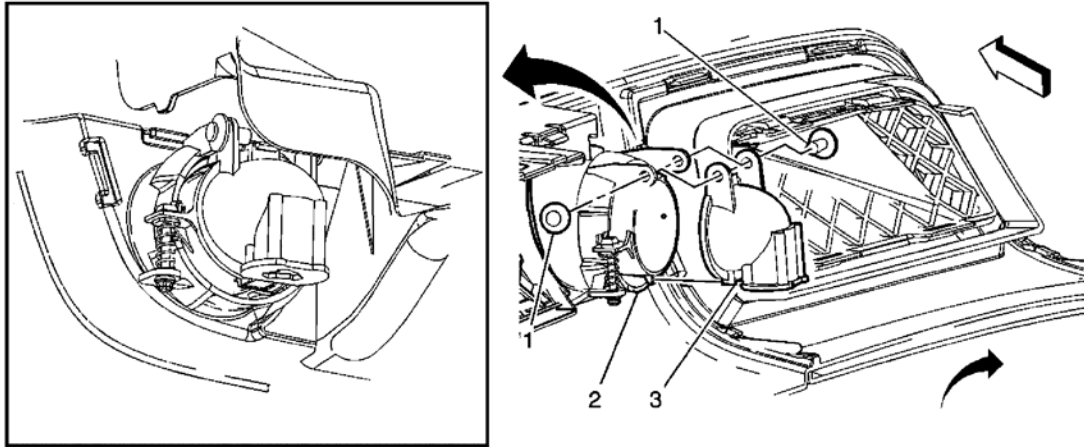
1. Install the fog lamp to the fascia (2).

**NOTE:** Refer to Fastener Notice .

2. Install the 3 fog lamp retaining nuts.

**Tighten:** Tighten the nuts to 10.0 N.m (88 lb in).

3. Install the fog lamp bulb and socket. Refer to Front Fog Lamp Bulb Replacement.
4. Aim the fog lamp(s). Refer to Fog Lamp Aiming.

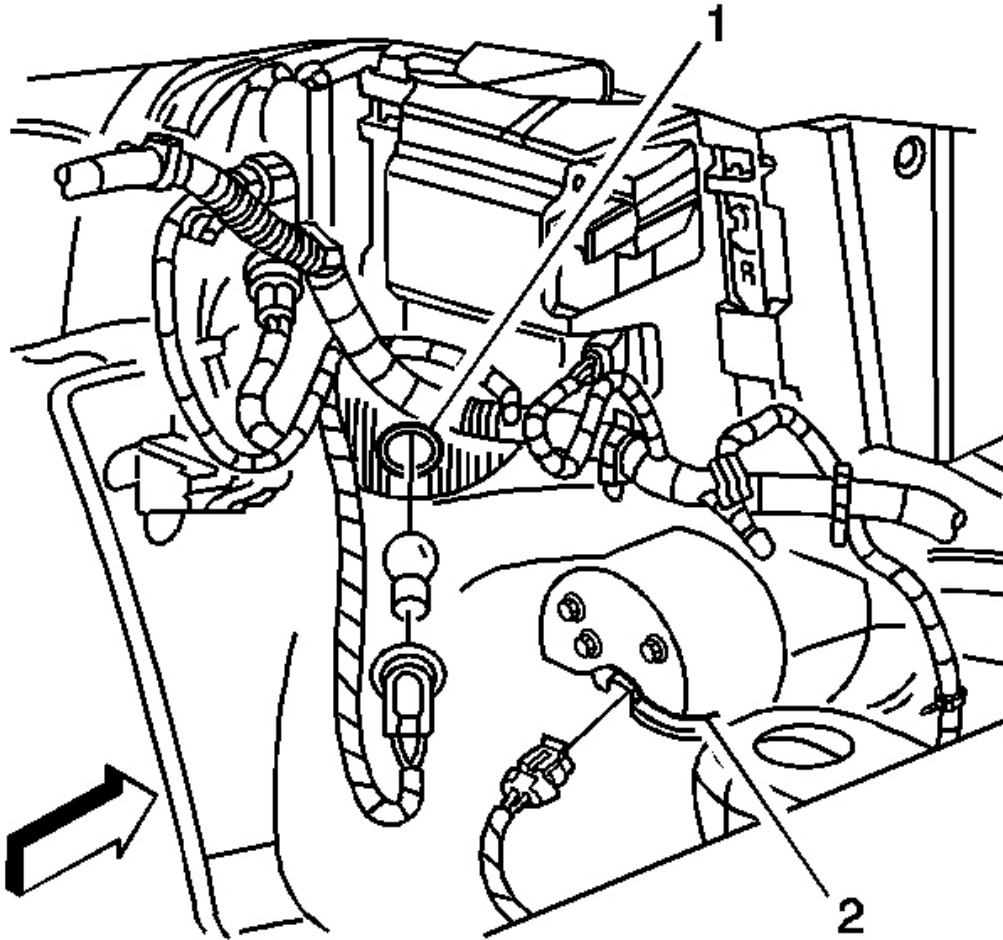
**FRONT FOG LAMP REPLACEMENT (TRAILBLAZER SS)**

**Fig. 60: Identifying Fog Lamp Components - Front (TrailBlazer SS)**  
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
<b>NOTE:</b> Refer to <u>Fastener Notice</u> .	
<b>Fastener Tightening Specifications:</b> Refer to <u>Fastener Tightening Specifications</u> .	
<b>Preliminary Procedures</b>	
1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> . 2. Reposition the lower radiator air baffle in order to access the fog lamp adjuster bolts. 3. Disconnect the electrical connector from the fog lamp bulb socket.	
1	Front Fog Lamp Adjuster Bolts <b>Tip:</b> Remove the 2 horizontal adjusting bolts from the fog lamp bracket assembly.  <b>Tighten:</b> 10 N.m (89 lb in)
2	Front Fog Lamp Bracket Retention Clips <b>Tip:</b> Release the clips in order to remove the housing from the bracket.
3	Fog Lamp Housing <b>Tip:</b> <ul style="list-style-type: none"> <li>Upon reassembly, ensure the housing is secure to the retention clips on the fog lamp bracket.</li> <li>Aim the fog lamps after replacement. Refer to <u>Fog Lamp Aiming</u>.</li> </ul>

**FRONT FOG LAMP BULB REPLACEMENT**

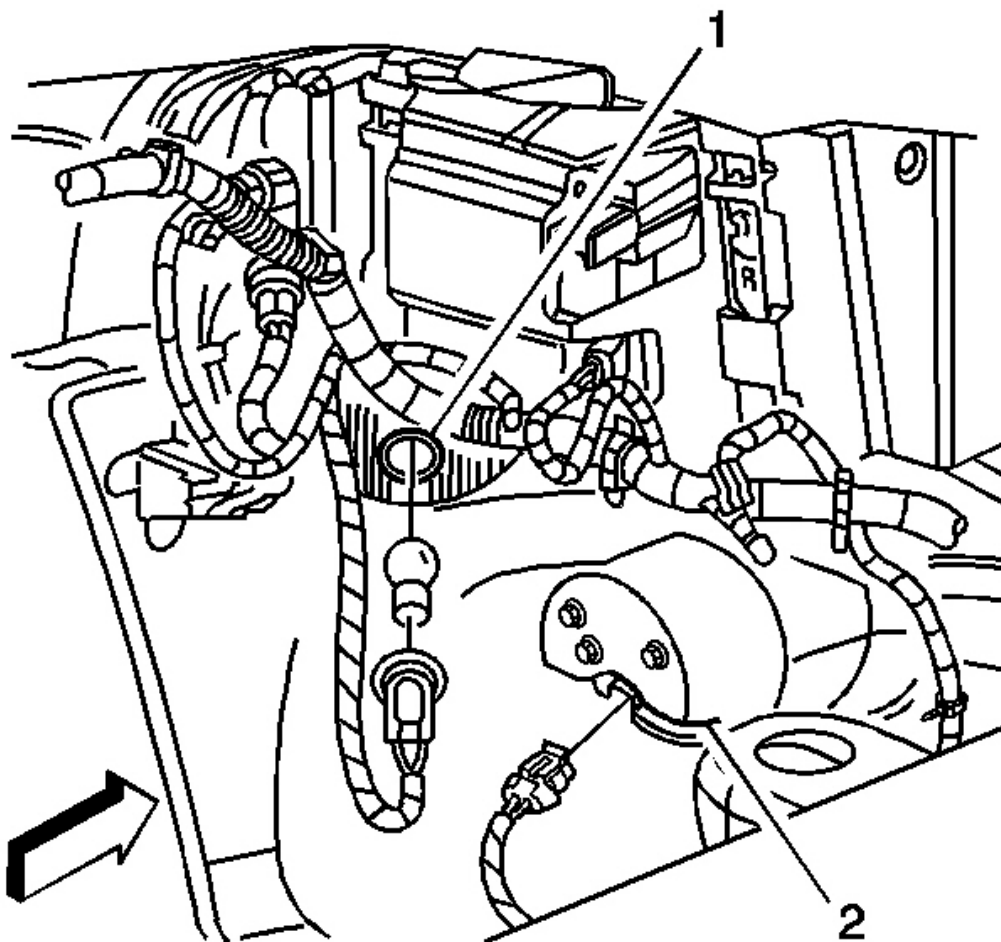
## Removal Procedure



**Fig. 61: View Of Fog Lamp Housing & Socket**  
Courtesy of GENERAL MOTORS CORP.

1. Turn the fog lamp switch to the OFF position.
2. Rotate the bulb socket counter clockwise in order to release the socket from the fog lamp housing.
3. Remove the socket from the fog lamp housing (2).
4. Remove the bulb from the socket.

## Installation Procedure



**Fig. 62: View Of Fog Lamp Housing & Socket**  
Courtesy of GENERAL MOTORS CORP.

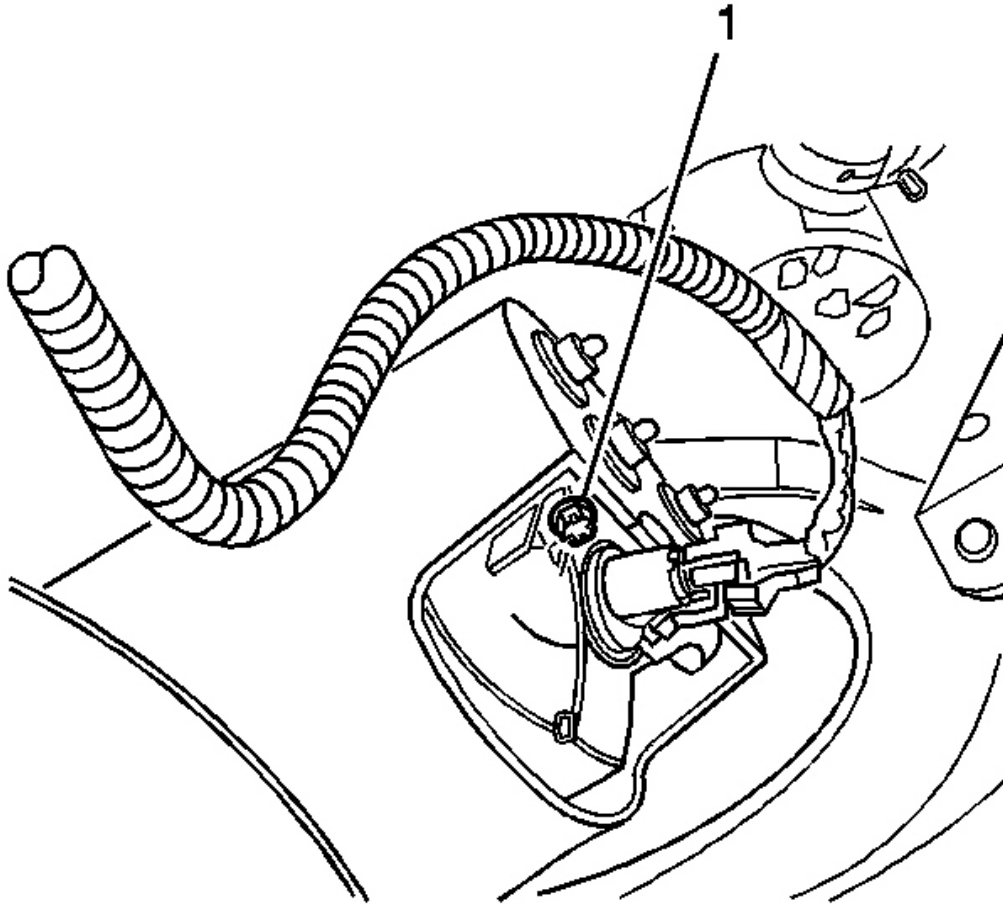
1. Install the bulb to the socket.
2. Index the tabs on the bulb socket to the slots in the fog lamp housing.
3. Install the socket to the fog lamp housing (2).
4. Rotate the socket clockwise until fully seated.

## FOG LAMP AIMING

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.

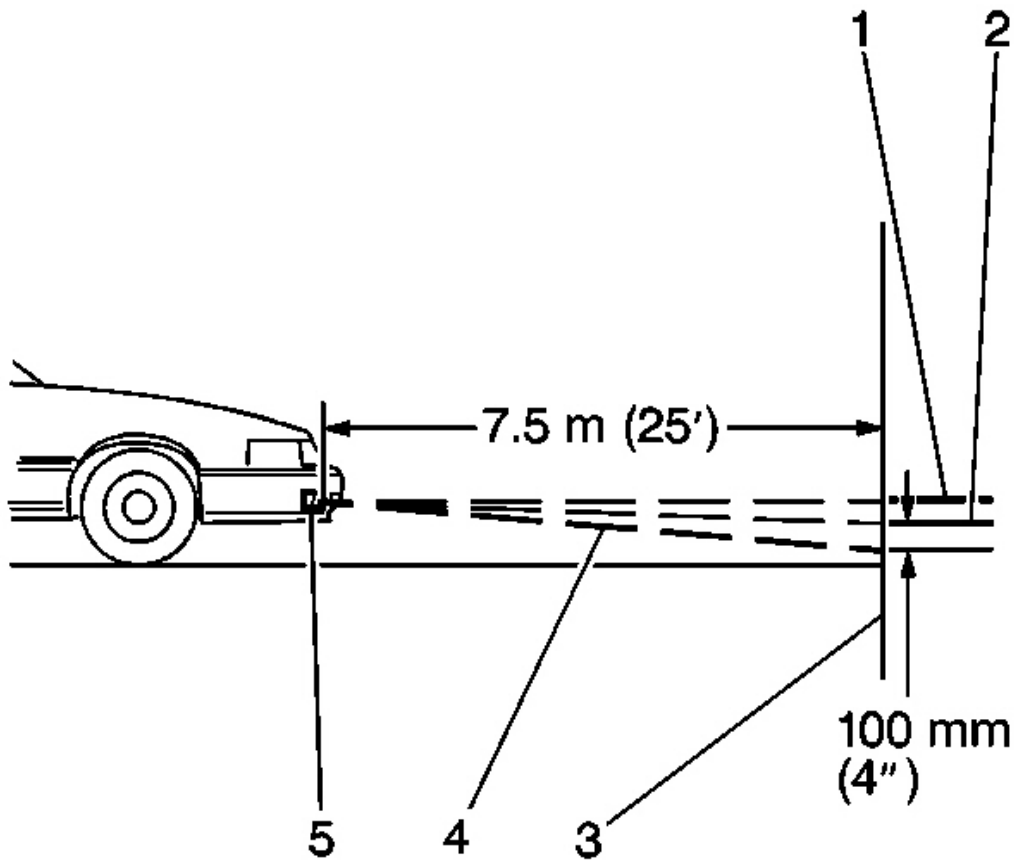


**Fig. 63: Front Foglamp Adjustment Screw**  
Courtesy of GENERAL MOTORS CORP.

The front foglamps can be adjusted by turning the adjustment screw (1) located below the backside of the lamp, next to the electrical connector.

Use the following guidelines in order to adjust the aim:

- Turn the TORX® adjustment screw clockwise in order to raise the aim.
- Turn the TORX® adjustment screw counter-clockwise in order to lower the aim.



**Fig. 64: 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.

## 2008 Isuzu Ascender LS

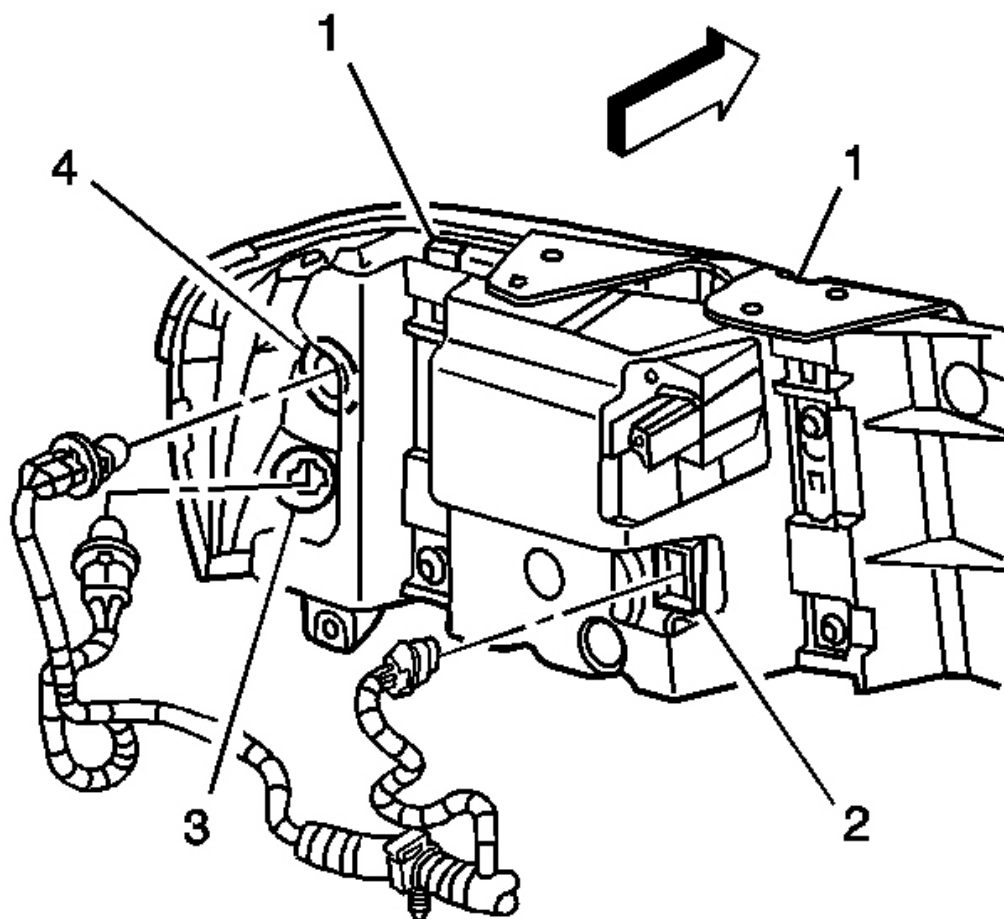
2008 Accessories & Equipment Lighting - Ascender, Envoy & Trailblazer

2. Turn the front fog lamps ON.
3. Access the fog lamp vertical adjuster.
4. Adjust the fog lamp up or down until the top edge of the high intensity zone on the screen is 102 mm (4 in) below (2) the horizontal centerline (1).
5. Turn OFF the front fog lamps.

### **PARK/TURN SIGNAL/SIDE MARKER LAMP BULB REPLACEMENT (ENVOY)**

#### **Removal Procedure**

1. Open the hood.
2. Remove the headlamp. Refer to **Headlamp Bulb Replacement (Envoy, Ascender)** or **Headlamp Bulb Replacement (TrailBlazer)**.

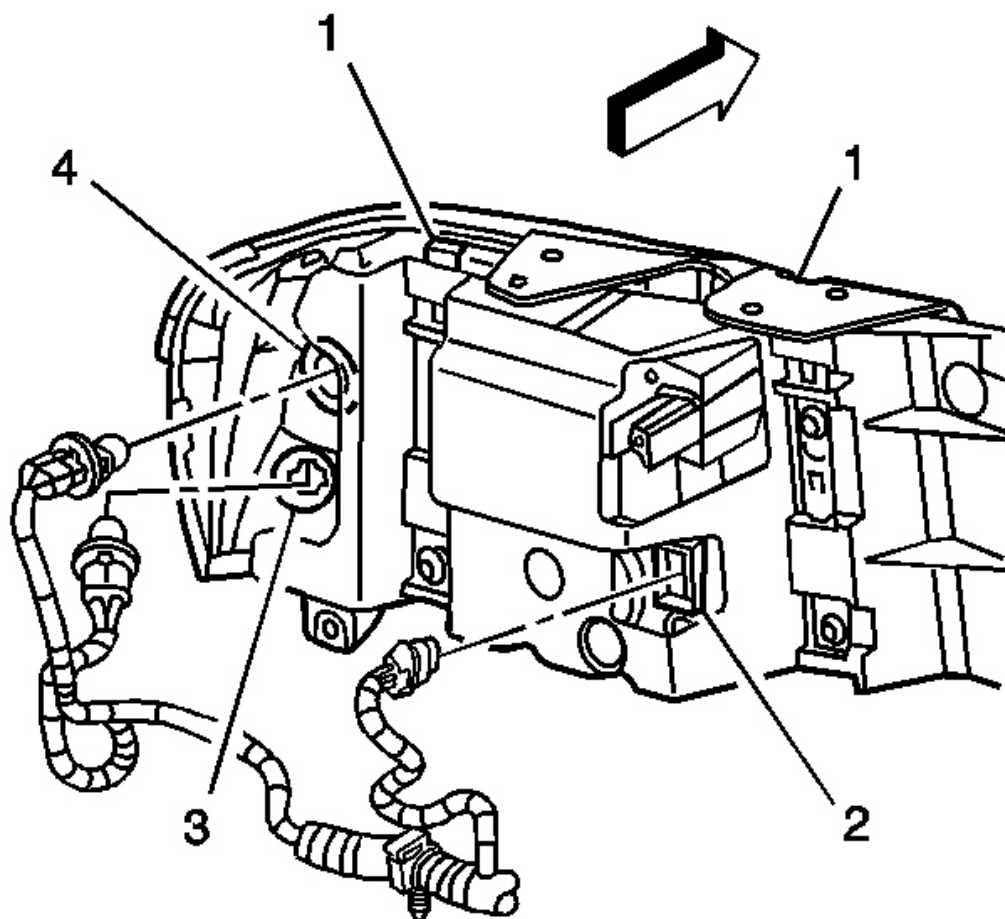


**Fig. 65: Identifying Retaining Tabs, Headlamp Electrical Connector, Side Marker Socket & Park/Turn Socket**

**Courtesy of GENERAL MOTORS CORP.**

3. Rotate the bulb and socket counterclockwise in order to remove the bulb and socket from the housing.
4. Remove the side marker bulb (3) or turn signal/park bulb (4) from the socket.

#### **Installation Procedure**



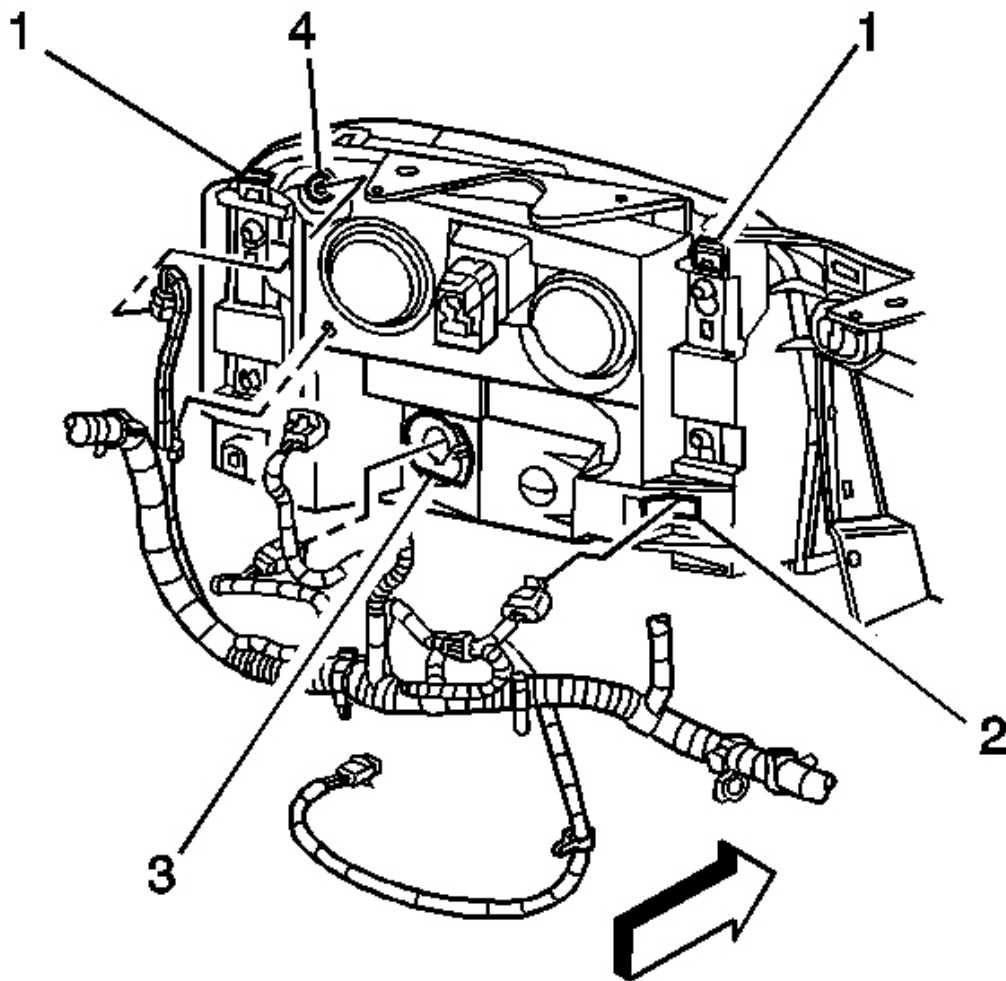
**Fig. 66: Identifying Retaining Tabs, Headlamp Electrical Connector, Side Marker Socket & Park/Turn Socket**

Courtesy of GENERAL MOTORS CORP.

1. Install the side marker bulb (3) or turn signal/park bulb (4) to the socket.
2. Wipe the bulb with a clean cloth to ensure the bulb is free of any dirt or oil.
3. Install the bulb and socket to the headlamp by rotating the bulb and socket clockwise, locking the retaining tabs to the headlamp.
4. Install the headlamp. Refer to **Headlamp Bulb Replacement (Envoy, Ascender)** or **Headlamp Bulb Replacement (TrailBlazer)**.
5. Close the hood.

### Removal Procedure

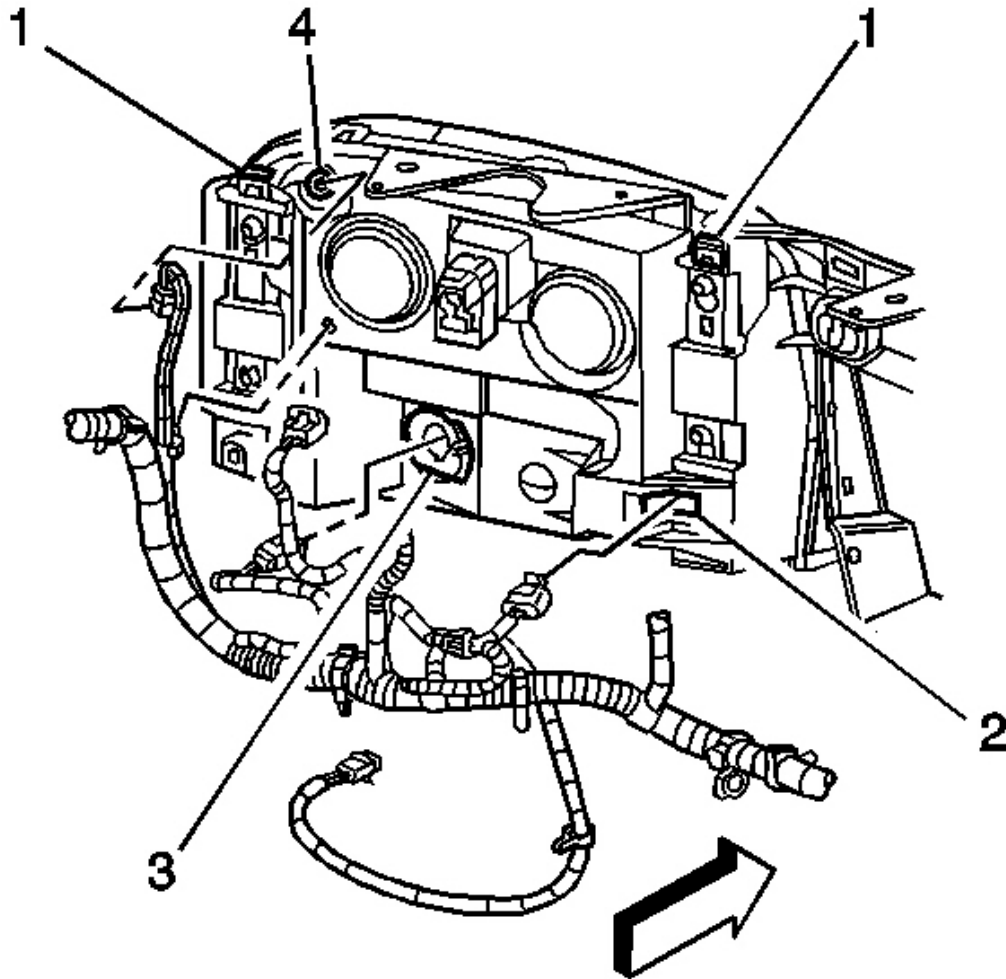
1. Open the hood.



**Fig. 67: Locating Headlamp Components (TrailBlazer)**  
Courtesy of GENERAL MOTORS CORP.

2. Rotate the bulb and socket counterclockwise in order to remove the bulb and socket from the housing.
3. Remove the side marker bulb (4) or turn signal/park bulb (3) from the socket.

### Installation Procedure



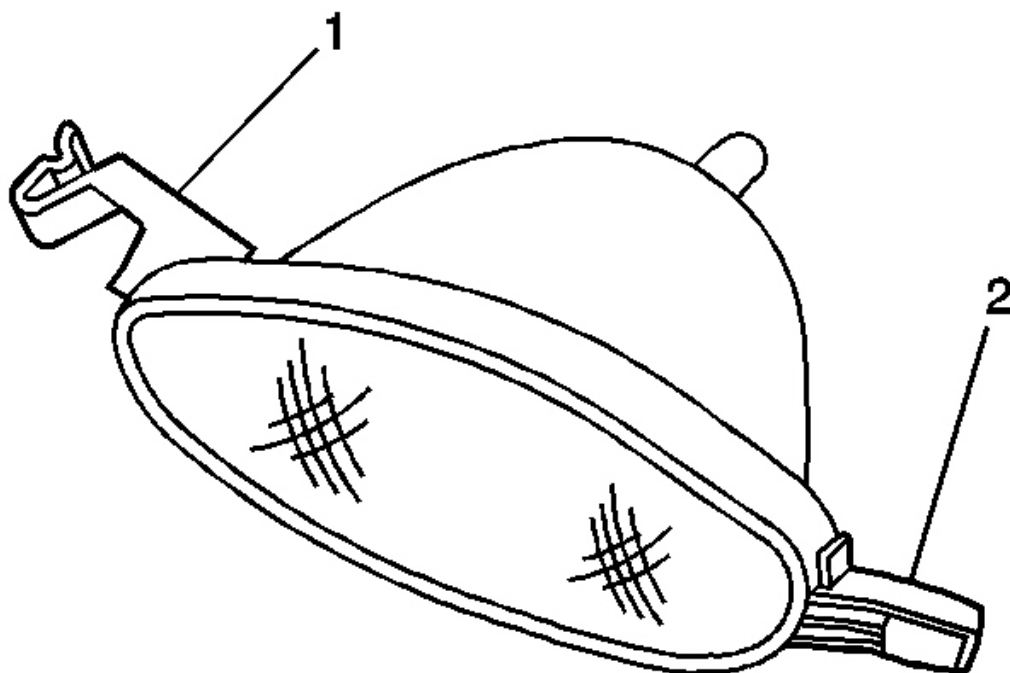
**Fig. 68: Locating Headlamp Components (TrailBlazer)**  
Courtesy of GENERAL MOTORS CORP.

1. Install the side marker bulb (4) or turn signal/park bulb (3) to the socket.
2. Wipe the bulb with a clean cloth to ensure the bulb is free of any dirt or oil.
3. Install the bulb and socket to the headlamp by rotating the bulb and socket clockwise, locking the retaining tabs to the headlamp.
4. Close the hood.

## CORNERING LAMP REPLACEMENT

### Removal Procedure

1. Remove the bulb socket from the cornering lamp.

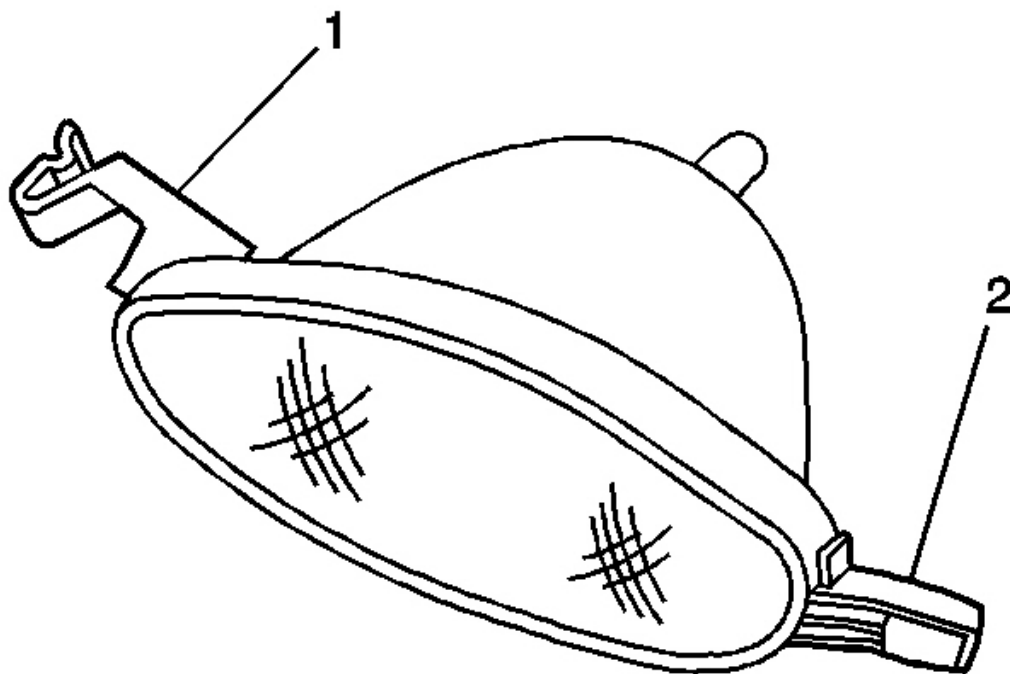


**Fig. 69: View Of Side Marker Retaining Ear & Stem**  
Courtesy of GENERAL MOTORS CORP.

2. Release the forward retaining tab (1) from the fascia.
3. Remove the rearward retaining tab (2) from the fascia.
4. Remove the cornering lamp from the vehicle.

#### **Installation Procedure**



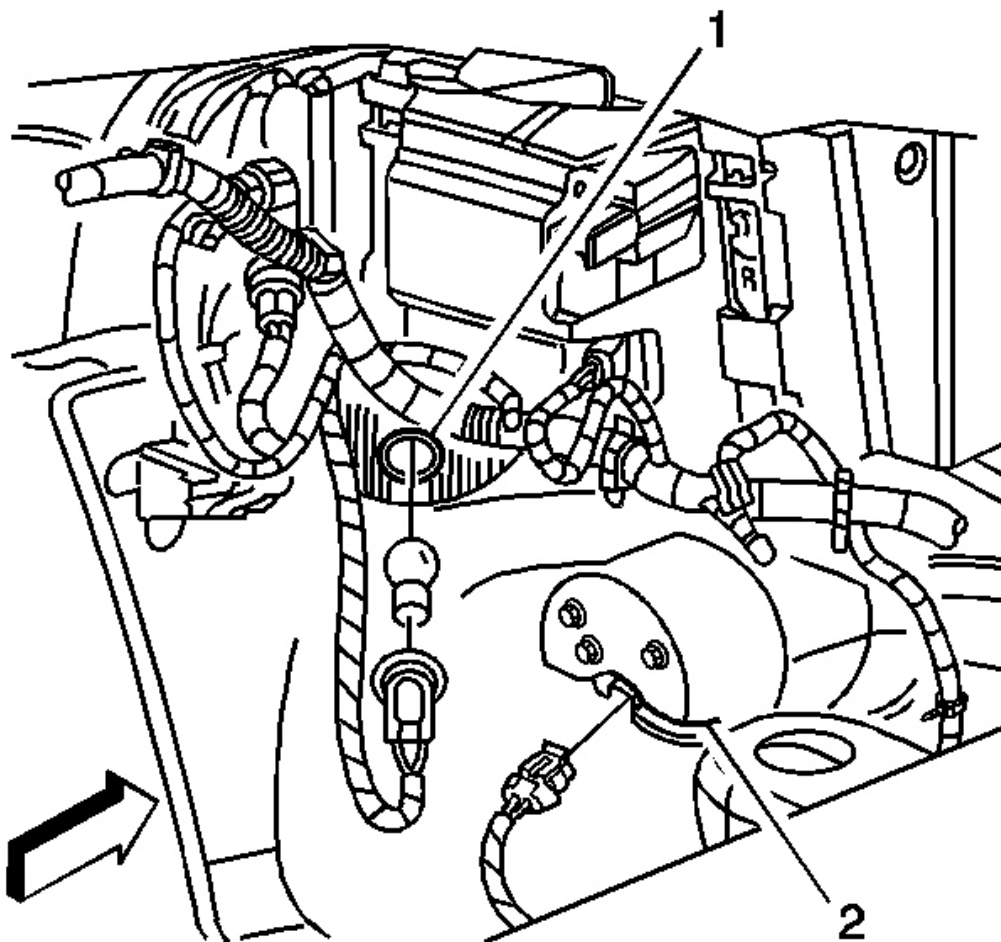


**Fig. 70: View Of Side Marker Retaining Ear & Stem**  
Courtesy of GENERAL MOTORS CORP.

1. Position the cornering lamp to the fascia.
2. Install the rearward retaining tab (2) to the fascia.
3. Secure the forward retaining tab (1) to the fascia.
4. Install the bulb socket to the cornering lamp.

## **CORNERING LAMP BULB REPLACEMENT (ENVOY)**

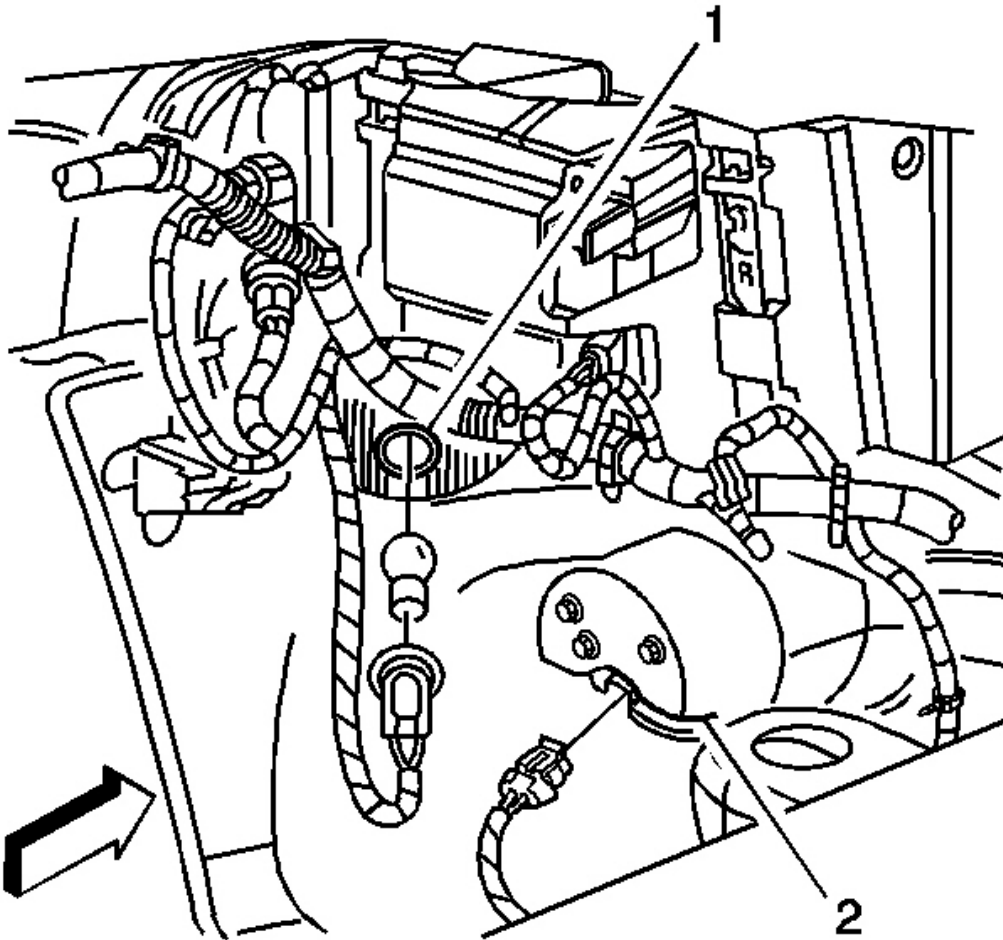
### **Removal Procedure**



**Fig. 71: View Of Fog Lamp Housing & Socket**  
Courtesy of GENERAL MOTORS CORP.

1. Push the retaining tab inward and rotate the socket counterclockwise.
2. Remove the socket from the cornering lamp housing (1).
3. Remove the bulb from the socket.

#### **Installation Procedure**

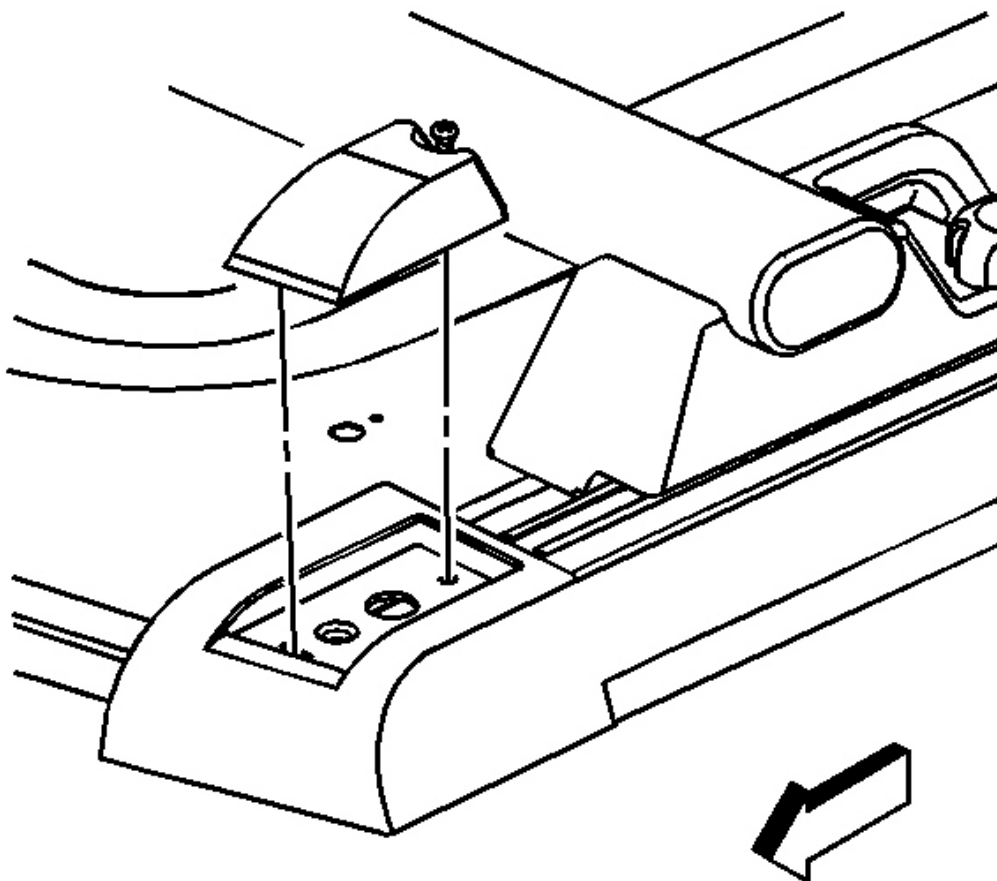


**Fig. 72: View Of Fog Lamp Housing & Socket**  
**Courtesy of GENERAL MOTORS CORP.**

1. Install the bulb into the socket.
2. Index the socket tabs to the cornering lamp housing slots.
3. Position the socket into the cornering lamp housing (1).
4. Rotate the socket clockwise until the locking tab is fully seated.

## **CLEARANCE LAMP REPLACEMENT**

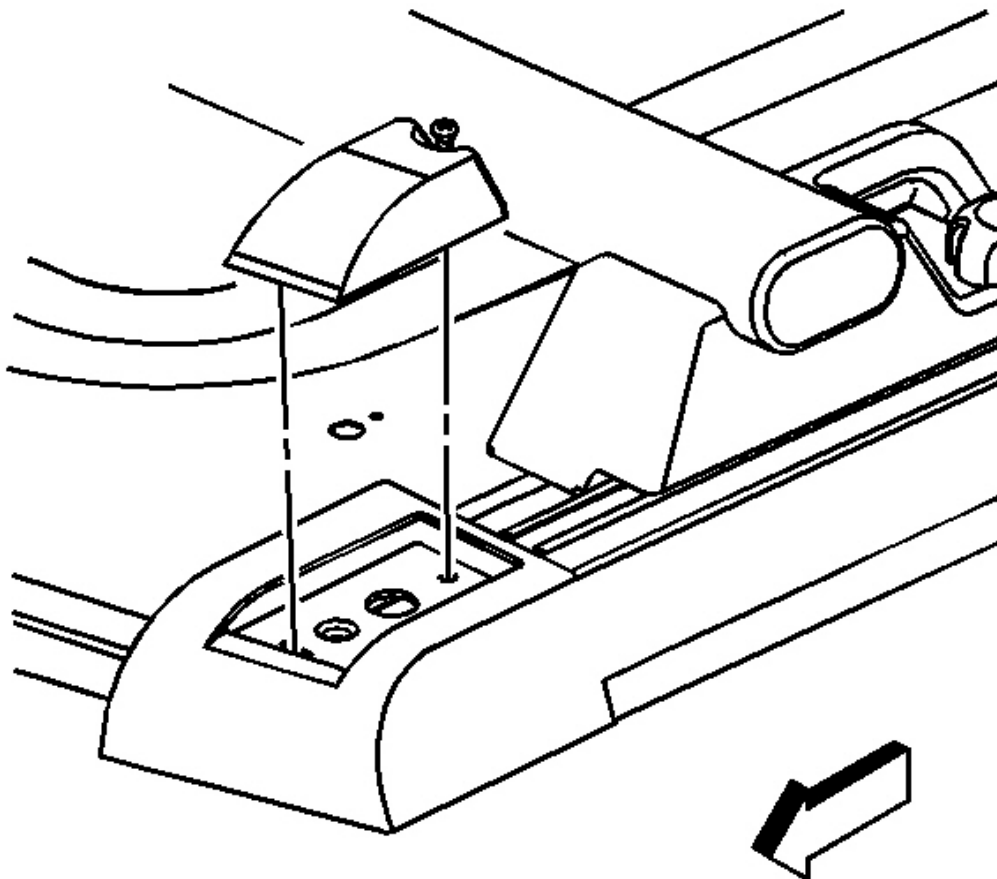
### **Removal Procedure**



**Fig. 73: Clearance Lamp Screw (SUV)**  
**Courtesy of GENERAL MOTORS CORP.**

1. Turn OFF the headlamp switch.
2. Remove the push-pin.
3. Insert a small flat bladed tool under the rear edge of the lens and pry upward.
4. Remove the lens by pulling rearward.
5. Twist the bulb counterclockwise to remove.

**Installation Procedure**

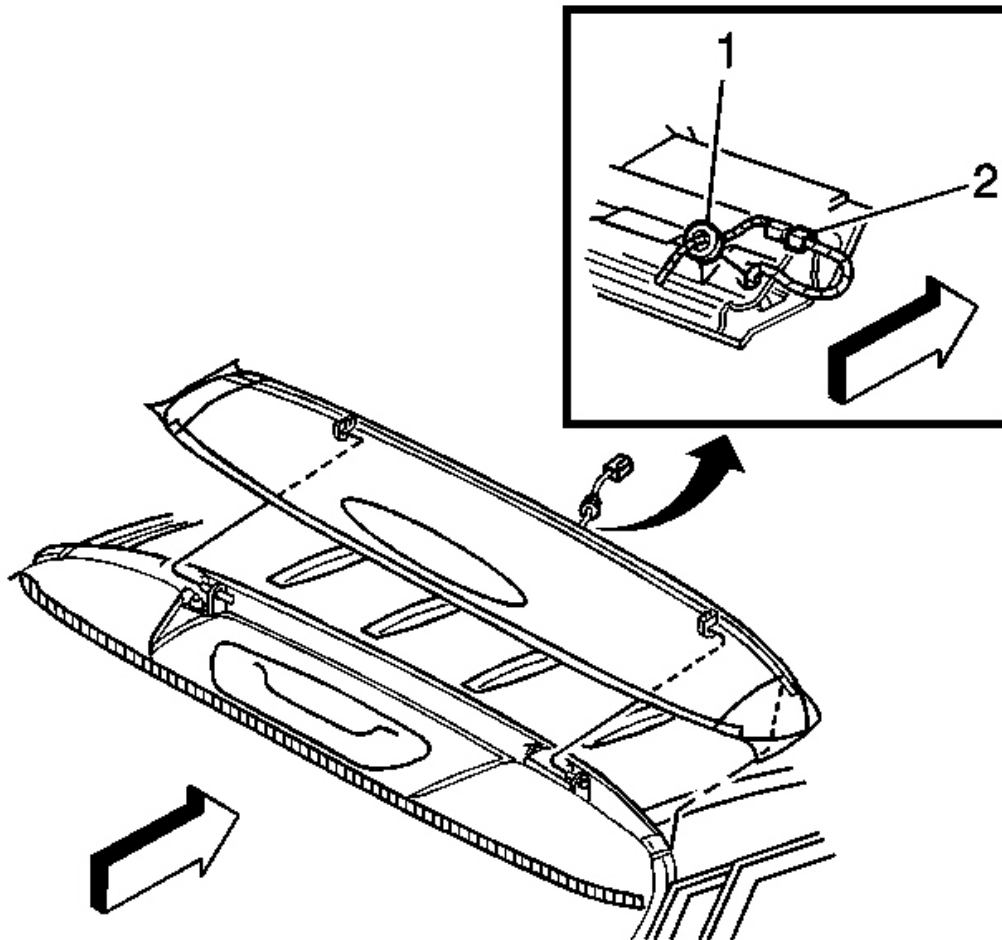


**Fig. 74: Clearance Lamp Screw (SUV)**  
Courtesy of GENERAL MOTORS CORP.

1. Insert the bulb into the bulb socket and twist clockwise to install.
2. Insert the forward edge of the lens into the opening and press the rear edge downward to install.
3. Install the push-pin.

## **HIGH MOUNT STOP LAMP REPLACEMENT**

### **Removal Procedure**



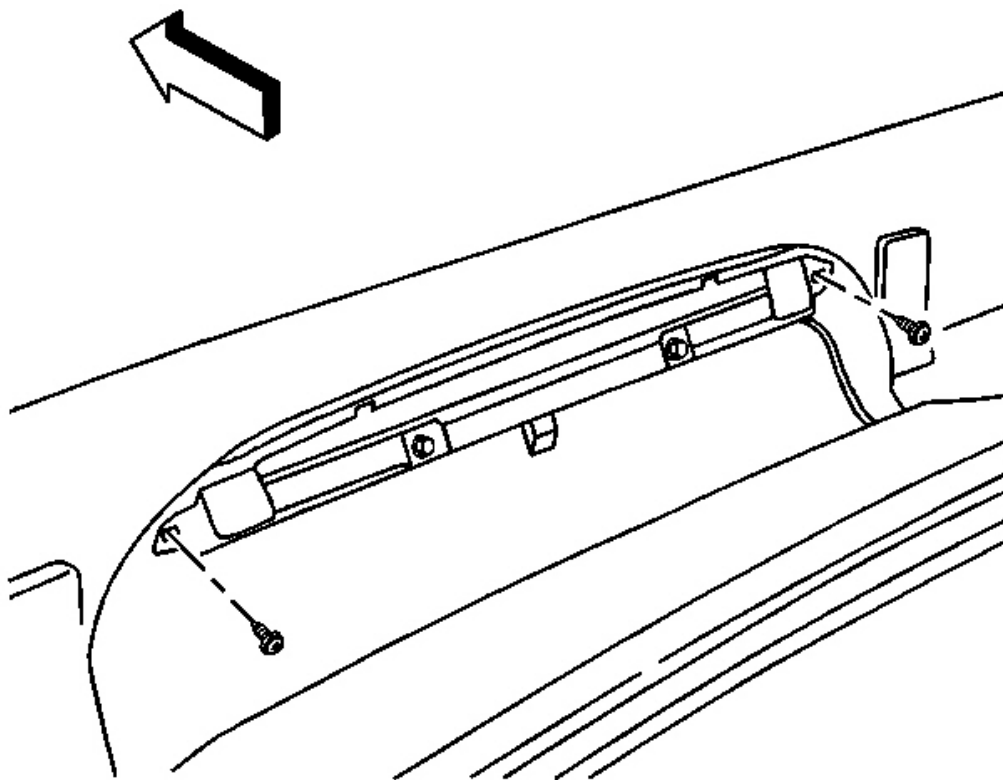
**Fig. 75: Accessing High Mount Stop Lamp Electrical Connector**  
Courtesy of GENERAL MOTORS CORP.

1. Open the liftgate.
2. Lower the rear portion of the headliner by releasing the 2 headliner retaining pins.
3. Disconnect the high mount stop lamp electrical connector (2).
4. Remove the grommet (1) from the body.

**NOTE:** Do NOT raise the liftgate while the liftgate glass is open. This can result in damage to the high-mounted stoplamp, the liftgate hinges, or the liftgate glass.

5. Close the liftgate.

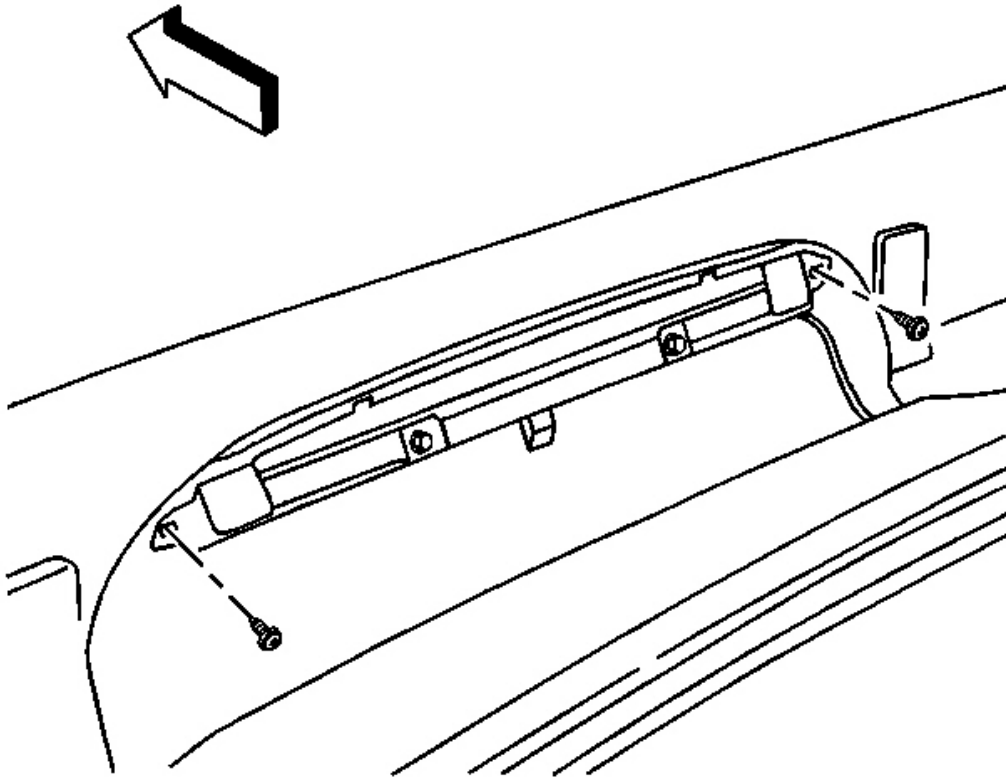
6. Open the liftgate window.



**Fig. 76: Identifying High Mount Stoplamp Retaining Screws**  
Courtesy of GENERAL MOTORS CORP.

7. Remove the 2 screws that retain the high mount stoplamp to the lift gate window reveal molding.
8. Remove the high mount stop lamp from the vehicle.

#### **Installation Procedure**



**Fig. 77: Identifying High Mount Stoplamp Retaining Screws**  
Courtesy of GENERAL MOTORS CORP.

1. Install the high mount stop lamp to the lift gate window reveal molding, ensuring the center retaining tab is fully seated.

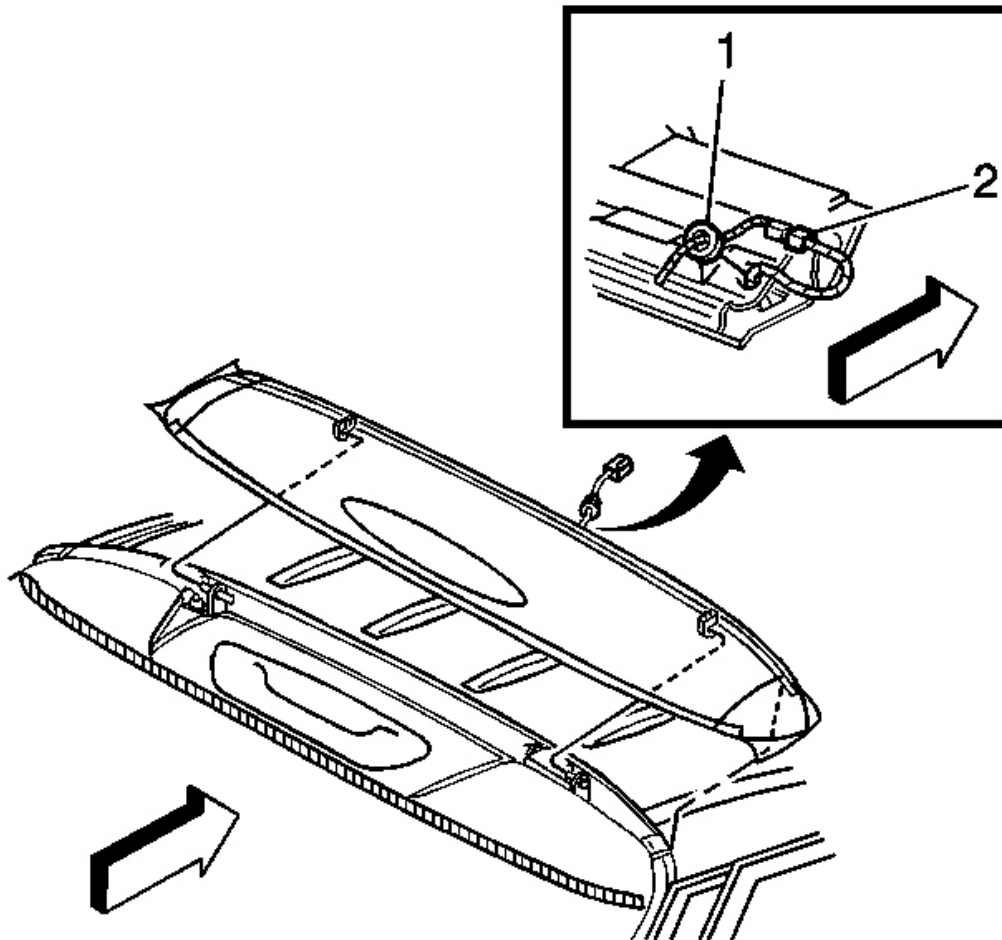
**NOTE:** Refer to Fastener Notice .

2. Install the 2 screws that retain the high mount stop lamp to the lift gate window reveal molding.

**Tighten:** Tighten the 2 retaining screws to 2.5 N.m (22 lb in).

3. Close the liftgate window.
4. Open the liftgate.





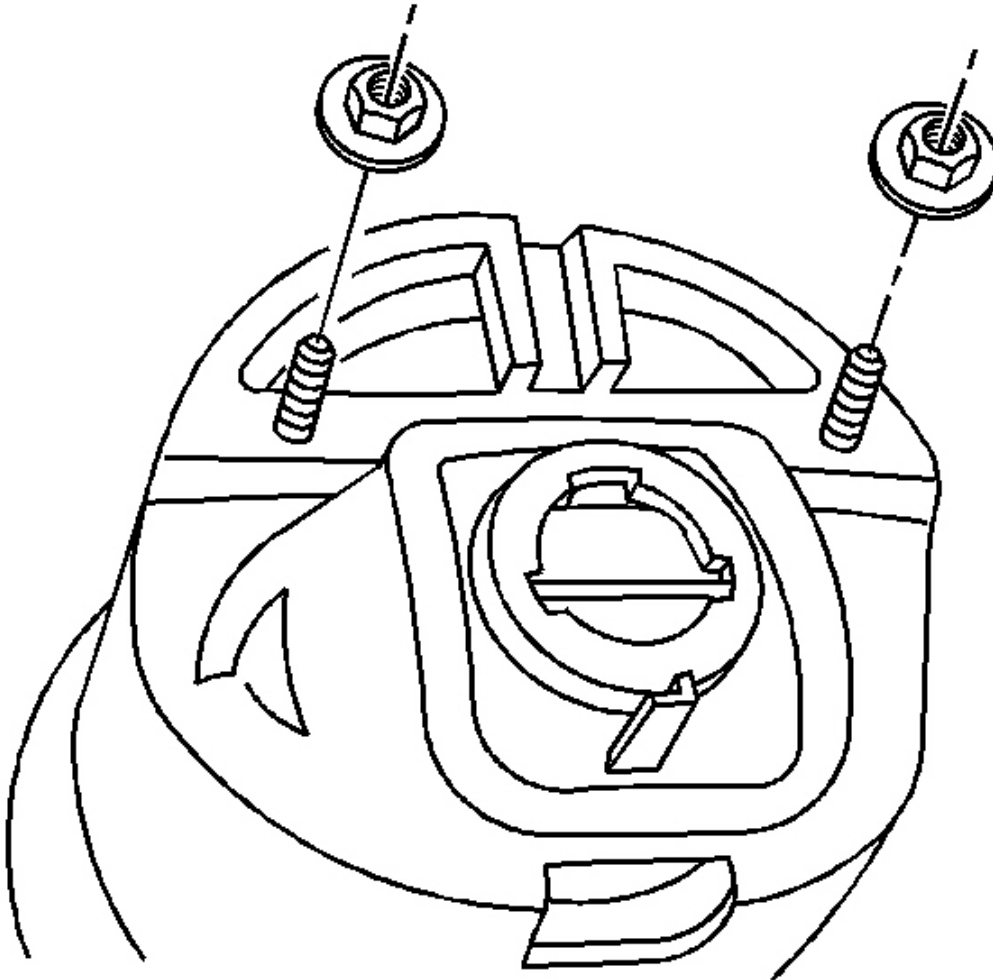
**Fig. 78: Accessing High Mount Stop Lamp Electrical Connector (Envoy, TrailBlazer, Ascender)**  
Courtesy of GENERAL MOTORS CORP.

5. Install the grommet (1) to the body.
6. Connect the high mount stoplamp electrical connector (2).
7. Attach the rear portion of the headliner to the roof panel, by seating the 2 headliner retaining pins.
8. Position the lift gate opening weatherstrip over the headliner.

## **BACKUP LAMP REPLACEMENT (GMC)**

### **Removal Procedure**

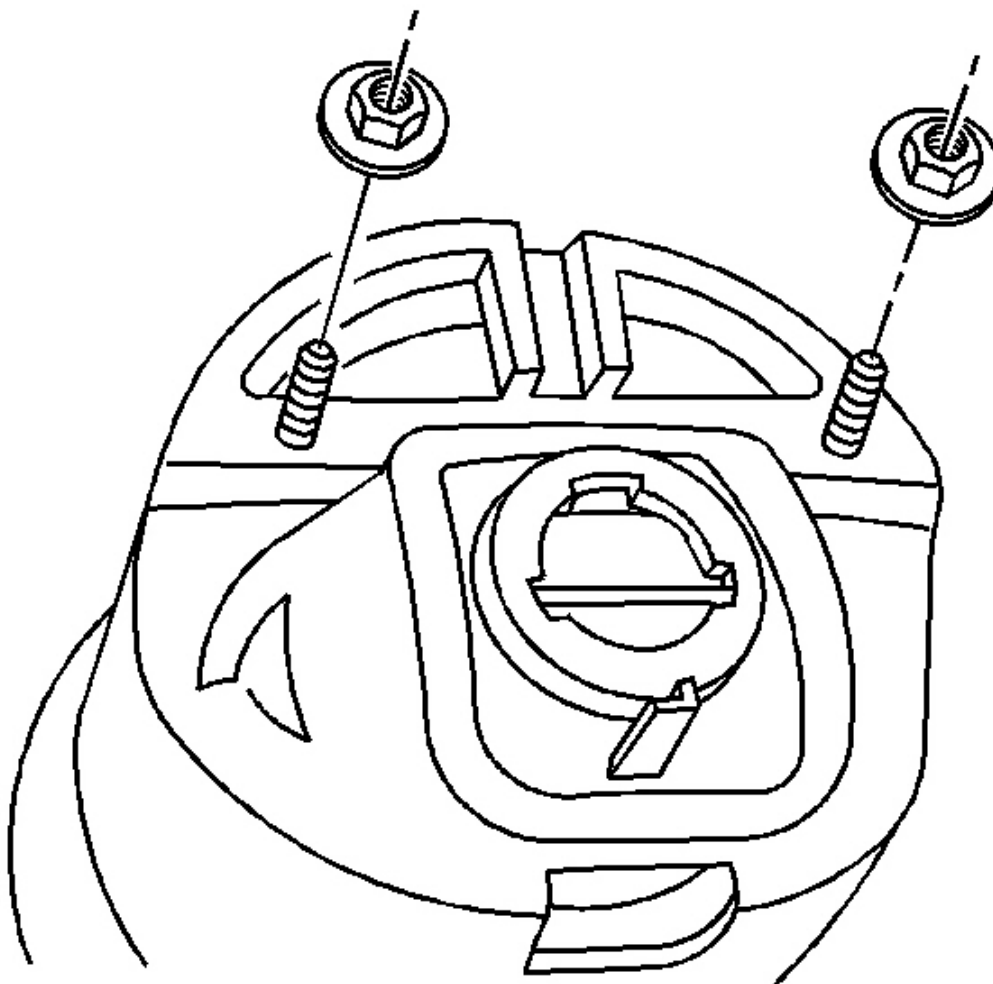
1. Remove the backup lamp socket.



**Fig. 79: Backup Lamp Retaining Nuts**  
Courtesy of GENERAL MOTORS CORP.

2. Remove the 2 nuts that retain the backup lamp to the fascia.
3. Remove the back up lamp from the fascia.

**Installation Procedure**



**Fig. 80: Backup Lamp Retaining Nuts**  
Courtesy of GENERAL MOTORS CORP.

1. Install the back up lamp to the fascia.

**NOTE:** Refer to Fastener Notice .

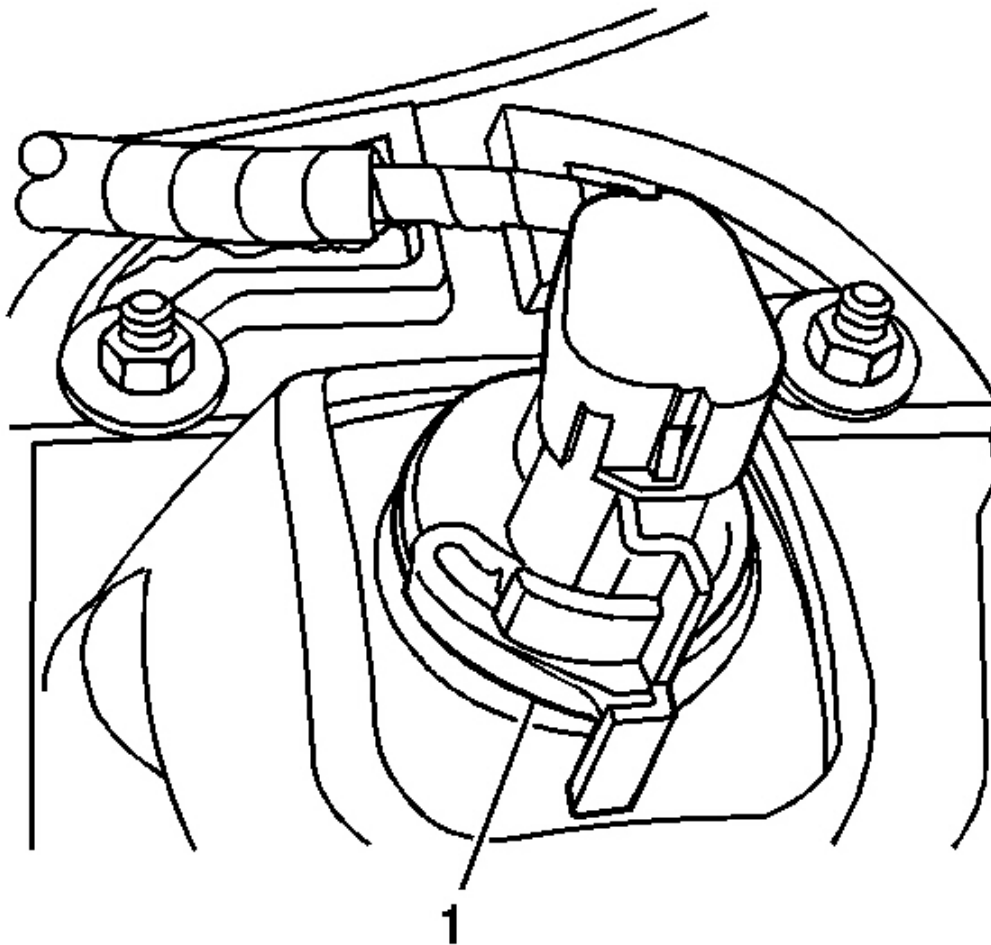
2. Install the 2 backup lamp retaining nuts.

**Tighten:** Tighten the nuts to 10 N.m (88 lb in).

3. Install the backup lamp socket.

## BACKUP LAMP BULB REPLACEMENT (GMC)

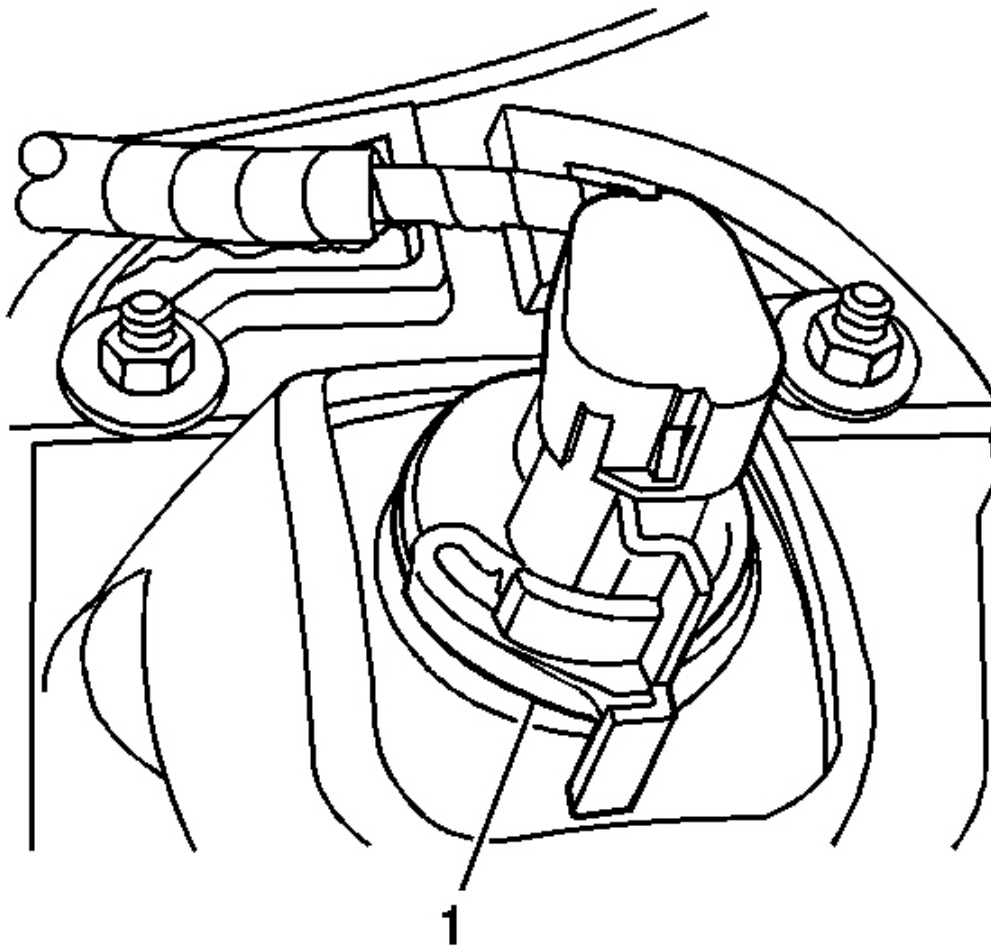
### Removal Procedure



**Fig. 81: Locating Backup Lamp Socket Retaining Tab (GMC)**  
Courtesy of GENERAL MOTORS CORP.

1. Push the retaining tab (1) inward and rotate the socket counterclockwise.
2. Remove the socket from the backup lamp housing.
3. Remove the bulb from the socket.

### Installation Procedure



**Fig. 82: Locating Backup Lamp Socket Retaining Tab (GMC)**  
Courtesy of GENERAL MOTORS CORP.

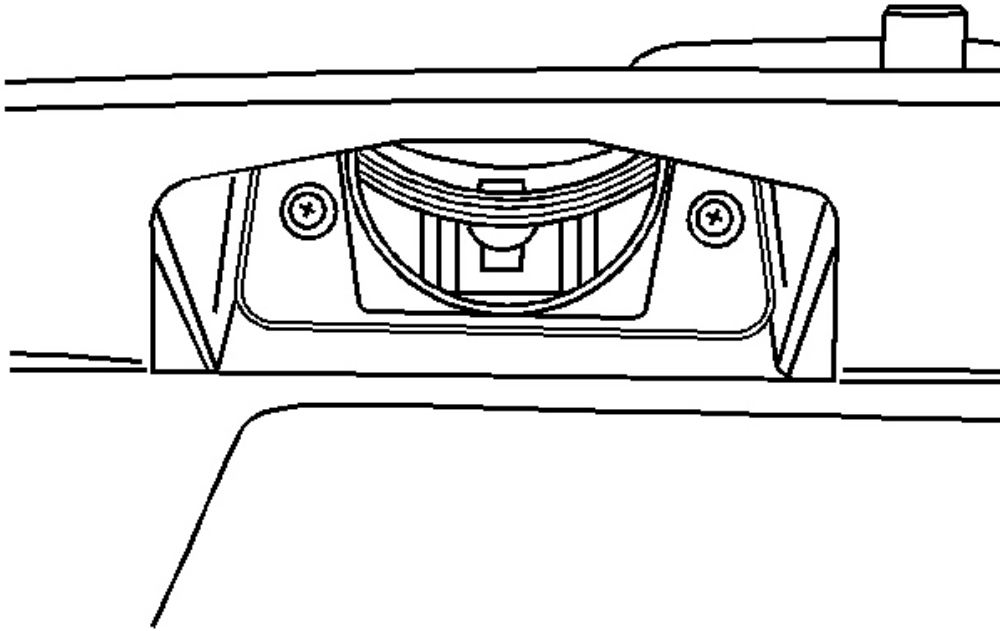
1. Install the bulb into the socket.
2. Index the socket tabs to the backup lamp housing slots.
3. Position the socket to the backup lamp housing.
4. Rotate the socket clockwise until the retaining tab (1) is fully seated.

## **REAR LICENSE LAMP REPLACEMENT**

### **Removal Procedure**

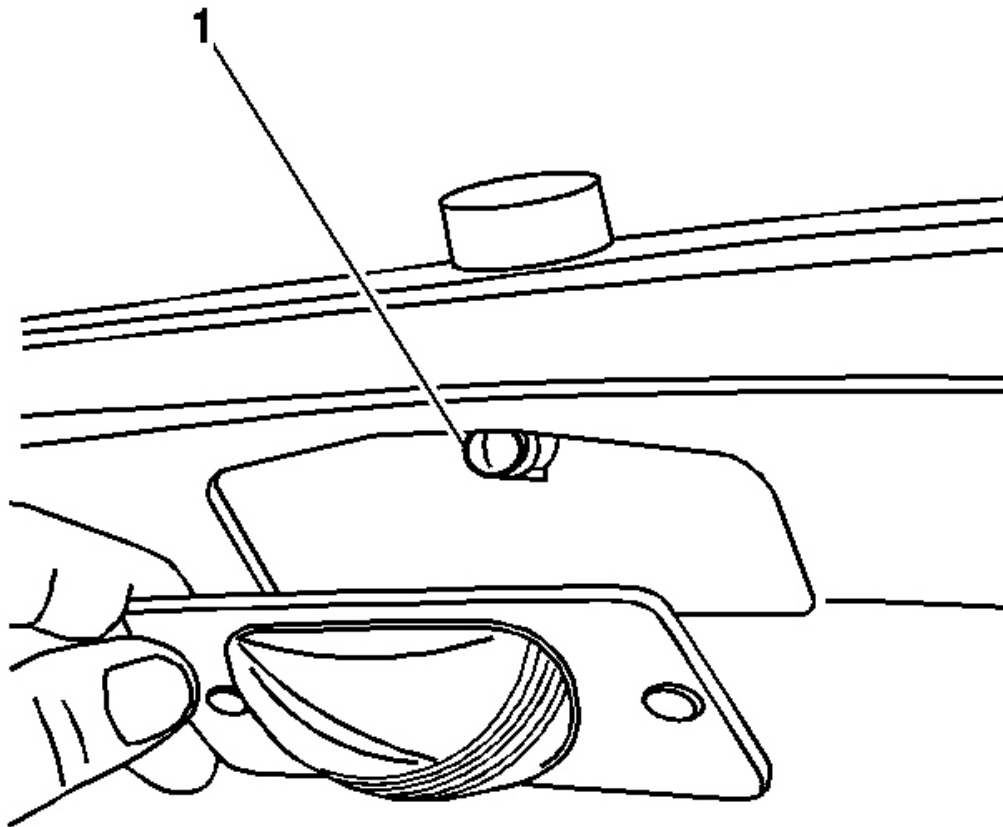
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**Fig. 83: License Lamp Lens Screws**  
Courtesy of GENERAL MOTORS CORP.

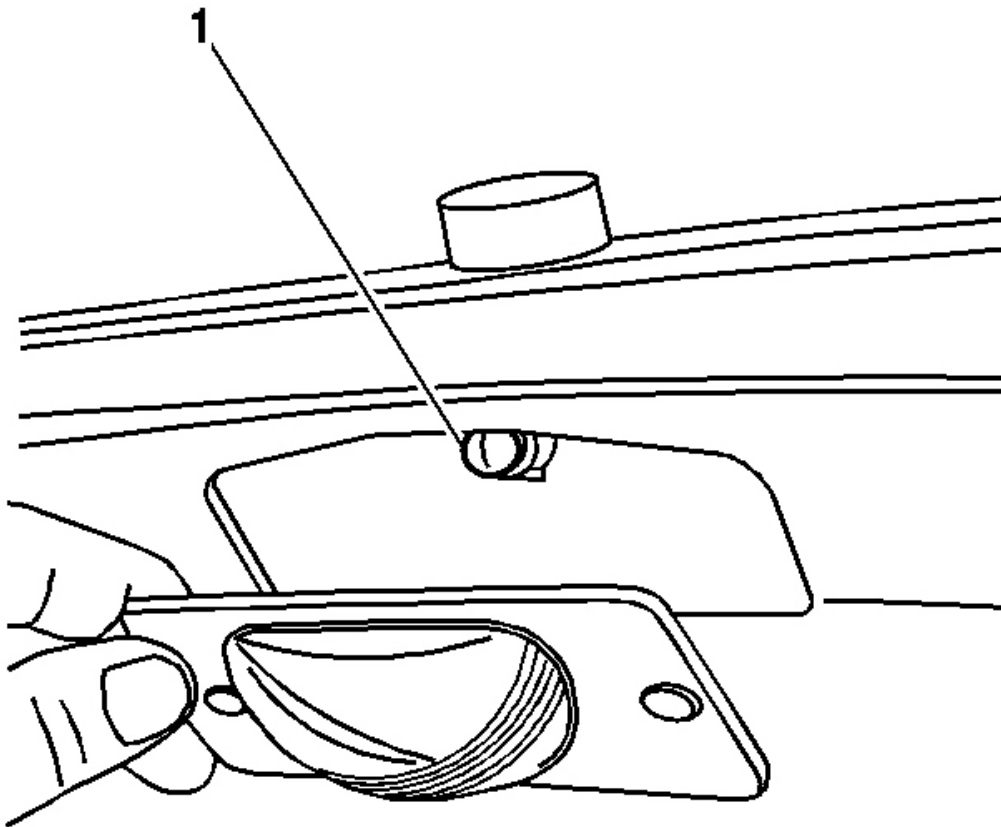
1. Remove the 2 screws that retain the license lamp lens to the liftgate.



**Fig. 84: Locating License Lamp Bulb**  
**Courtesy of GENERAL MOTORS CORP.**

2. Remove the license lamp lens from the liftgate.
3. Remove the bulb (1) from the socket.

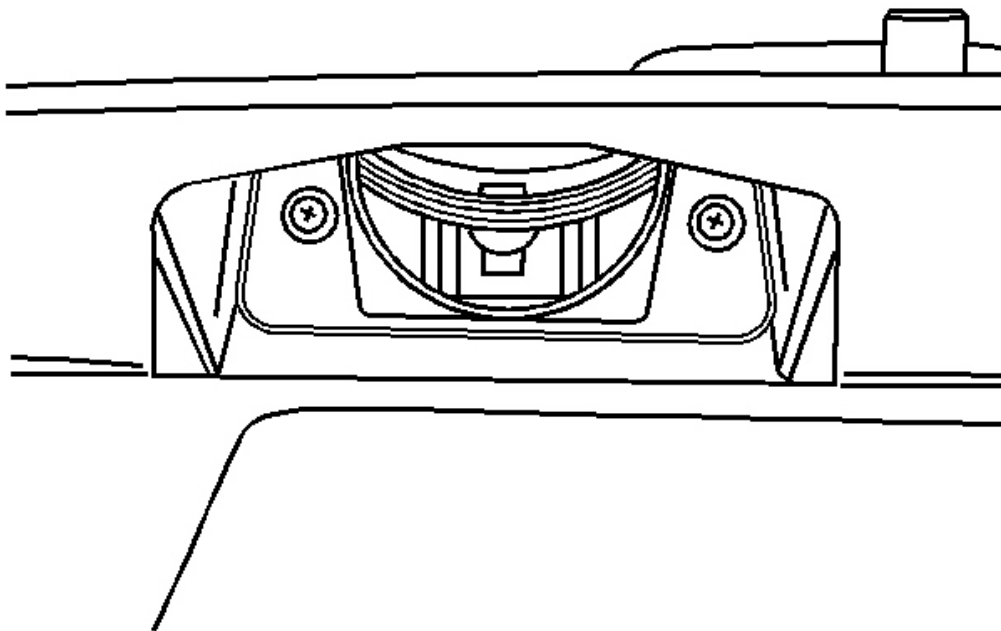
**Installation Procedure**



**Fig. 85: Locating License Lamp Bulb**  
**Courtesy of GENERAL MOTORS CORP.**

1. Install the bulb (1) to the socket.
2. Wipe the bulb to ensure the bulb is free of dirt or oil.





**Fig. 86: License Lamp Lens Screws**  
Courtesy of GENERAL MOTORS CORP.

3. Position the license lamp lens to the liftgate.
4. Verify that the license lamp lens gasket is fully seated to the liftgate.

**NOTE:** Refer to Fastener Notice .

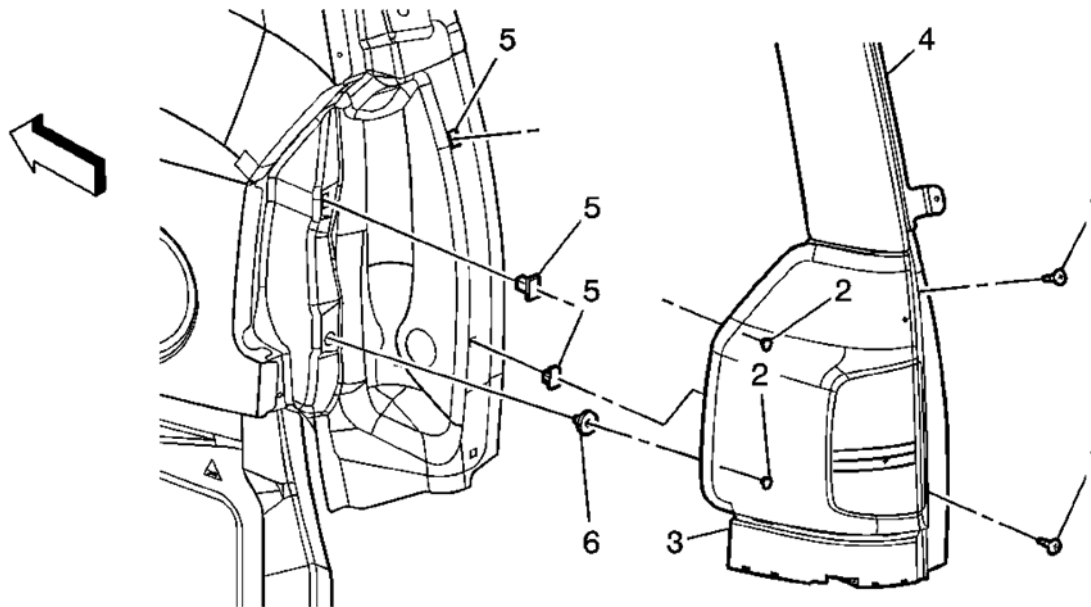
5. Install the 2 license lamp lens retaining screws.

**Tighten:** Tighten the screws to 1.4 N.m (12 lb in).

## TAIL LAMP REPLACEMENT (ISUZU)

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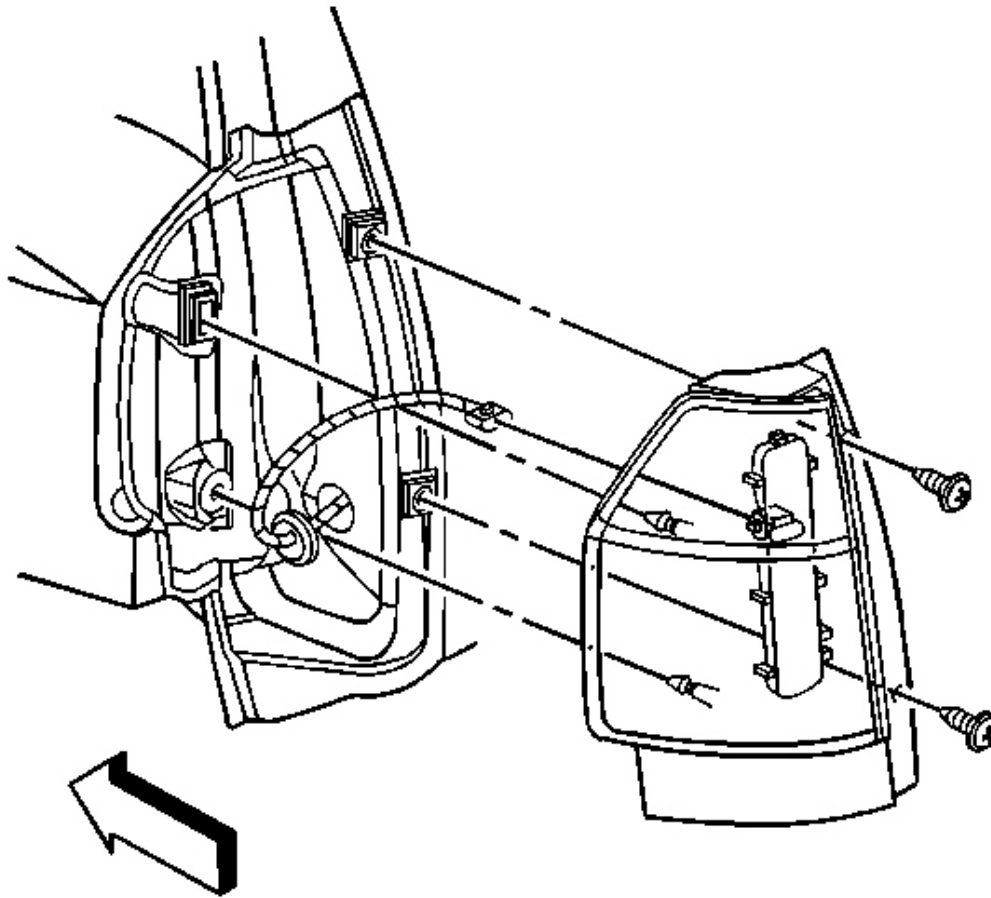


**Fig. 87: View Of Tail Lamp Components (Isuzu)**  
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
<b>NOTE:</b> Refer to <u>Fastener Notice</u> .	
<b>Fastener Tightening Specifications:</b> Refer to <u>Fastener Tightening Specifications</u> . <b>Preliminary Procedure:</b> Open the liftgate in order to access the rear tail lamp screws.	
1	Tail Lamp Assembly Screws (Qty: 2) <b>Tip:</b> Disconnect the electrical connector.  <b>Tighten:</b> 1.9 N.m (17 lb in)
2	Locating Pins (Qty: 2)
3	Tail Lamp Lower Cover
4	Liftgate Upper Reveal Molding <b>Tip:</b> Ensure the tail lamp upper edge is located under the liftgate reveal molding.
5	Filler Nuts (Qty: 2) <b>Tip:</b> Inspect the filler nuts prior to installing the tail lamp screws.
6	Filler Retainers (Qty: 2) <b>Tip:</b> <ul style="list-style-type: none"> <li>Ensure the retainers are secure to the body panel prior to installation of the new tail light.</li> <li>Transfer the circuit board to the new tail lamp. Refer to <u>Tail Lamp Circuit Board Replacement</u>.</li> </ul>

## **TAIL LAMP REPLACEMENT (TRAILBLAZER)**

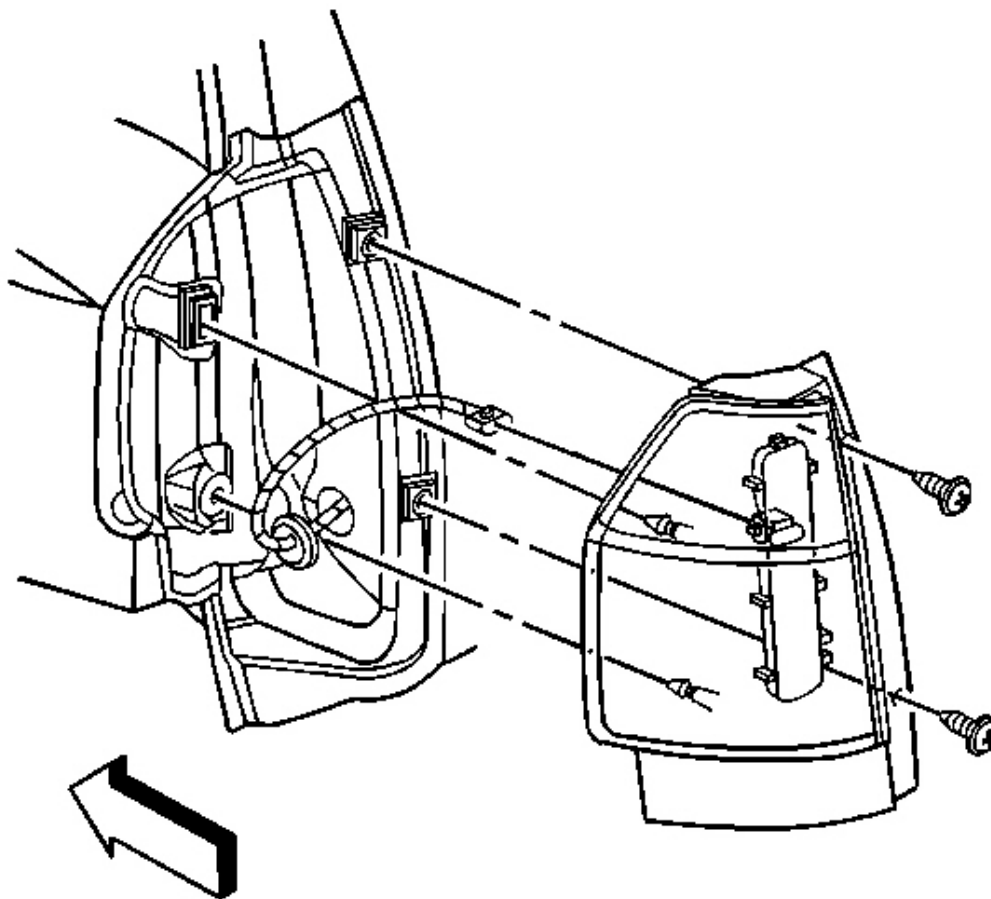
### **Removal Procedure**



**Fig. 88: View Of Tail Lamp Components**  
**Courtesy of GENERAL MOTORS CORP.**

1. Remove the 2 screws that retain the tail lamp assembly to the body.
2. Pull the assembly directly rearward in order to release the 2 locking pins.
3. Disconnect the tail lamp electrical connector.
4. Remove the lamp assembly from the vehicle.
5. Remove the tail lamp circuit board. Refer to **Tail Lamp Circuit Board Replacement**.

## Installation Procedure



**Fig. 89: View Of Tail Lamp Components**  
Courtesy of GENERAL MOTORS CORP.

1. Install the tail lamp circuit board. Refer to **Tail Lamp Circuit Board Replacement**.
2. Connect the tail lamp electrical connector.
3. Push the tail lamp assembly directly forward in order to seat the 2 locking pins.

**NOTE:** Refer to **Fastener Notice** .

4. Install the 2 tail lamp assembly retaining screws.

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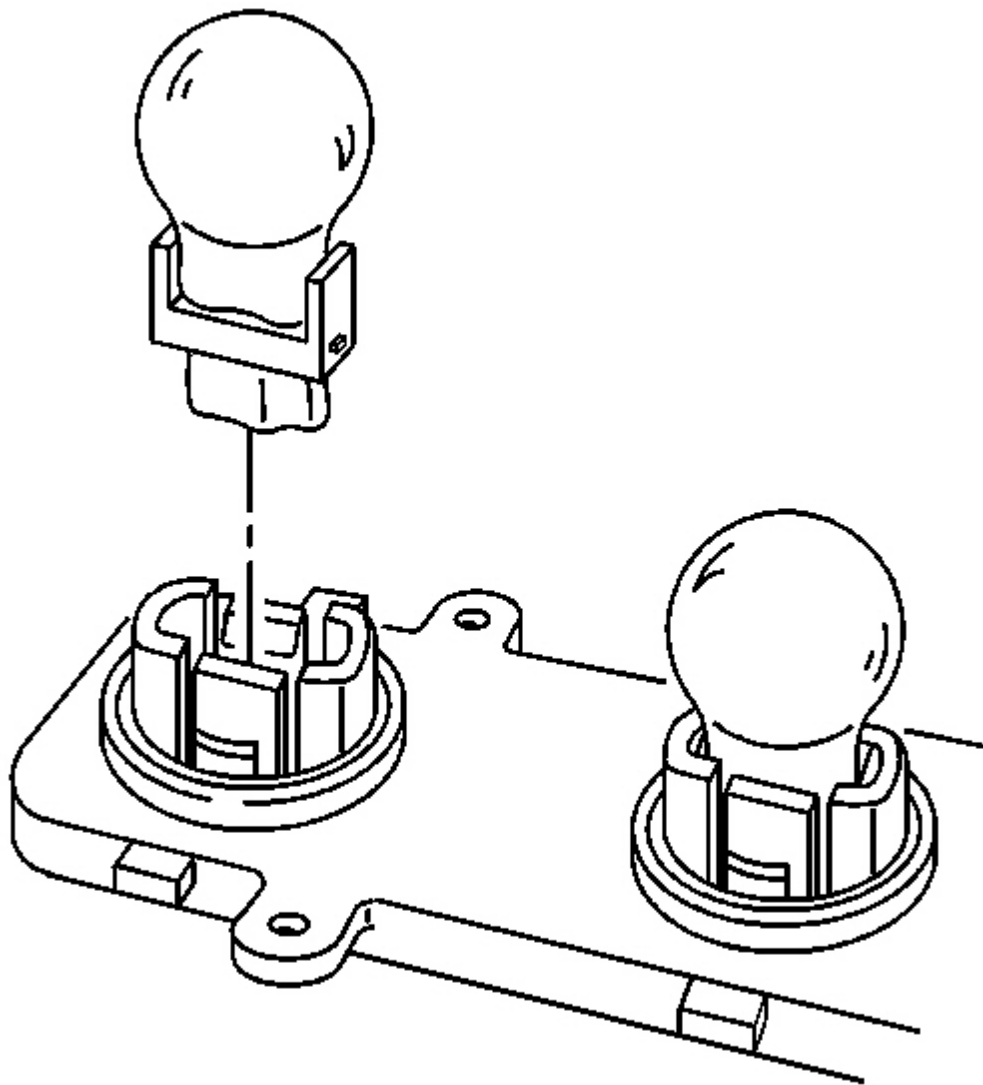
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**Tighten:** Tighten the screws to 1.9 N.m (17 lb in).

### TAIL LAMP BULB REPLACEMENT

#### Removal Procedure

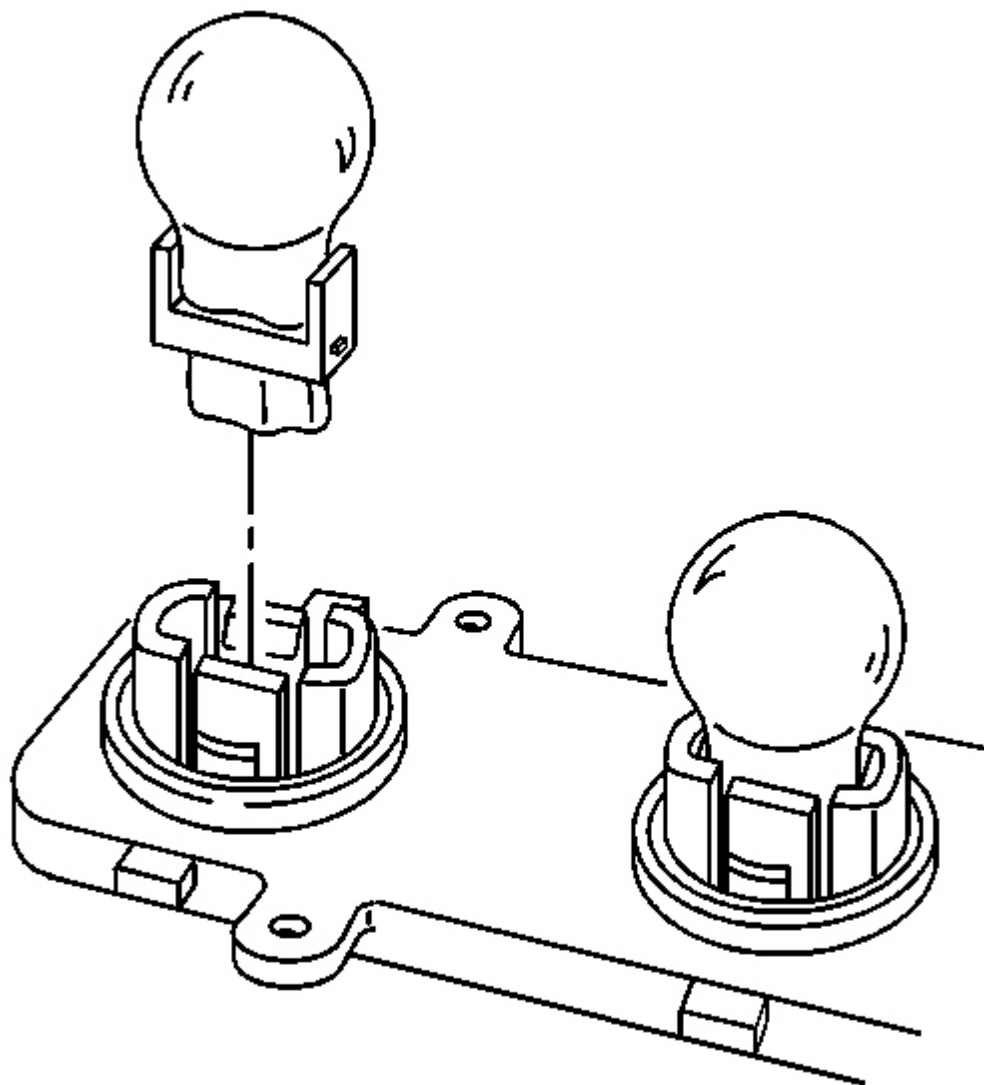
1. Remove the tail lamp assembly. Refer to **Tail Lamp Replacement (Isuzu)** or **Tail Lamp Replacement (TrailBlazer)**.
2. Remove the tail lamp circuit board. Refer to **Tail Lamp Circuit Board Replacement**.
3. Place the tail lamp assembly onto a clean prepared surface.



**Fig. 90: View Of Tail Lamp Bulb**  
**Courtesy of GENERAL MOTORS CORP.**

4. Pull the bulb straight out in order to remove the tail lamp bulb from the socket assembly.

#### **Installation Procedure**



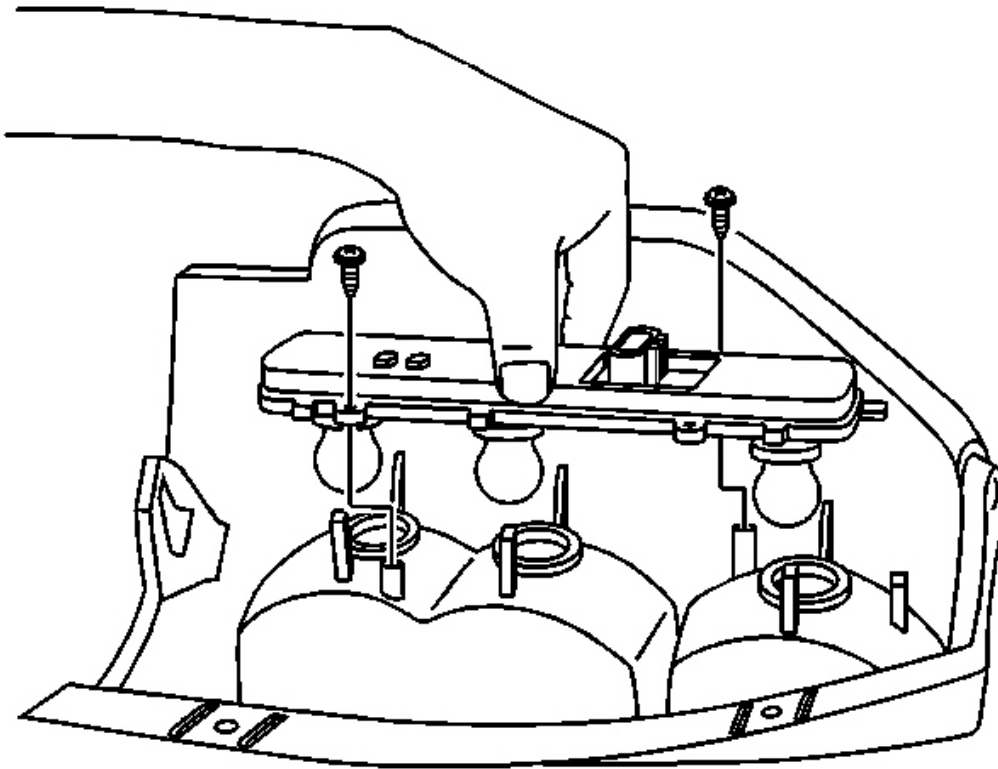
**Fig. 91: View Of Tail Lamp Bulb**  
Courtesy of GENERAL MOTORS CORP.

1. Install the tail lamp bulb to the tail lamp circuit board.
2. Ensure the bulbs are wiped clean and free of any oil or dirt.
3. Install the tail lamp to the vehicle. Refer to **Tail Lamp Replacement (Isuzu)** or **Tail Lamp Replacement (TrailBlazer)**.
4. Check the bulbs for proper operation.

## **TAIL LAMP CIRCUIT BOARD REPLACEMENT**

### **Removal Procedure**

1. Remove the tail lamp. Refer to **Tail Lamp Replacement (Isuzu)** or **Tail Lamp Replacement (TrailBlazer)**.

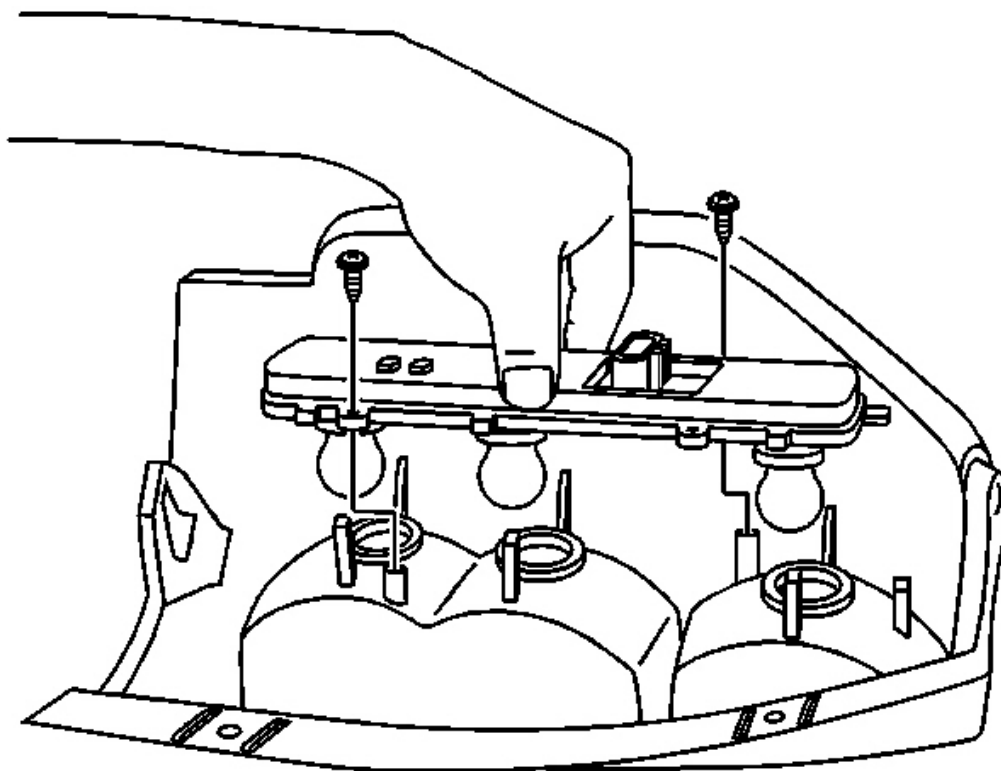


**Fig. 92: View Of Tail Lamp Circuit Board**  
Courtesy of GENERAL MOTORS CORP.

2. Remove the 2 tail lamp circuit board retaining screws.
3. Simultaneously release the bottom 4 locking tabs and partially remove the tail lamp circuit board.
4. Release the top 2 locking tabs and remove the tail lamp circuit board from the tail lamp assembly.
5. Remove the bulbs from the tail lamp circuit board.

### **Installation Procedure**





**Fig. 93: View Of Tail Lamp Circuit Board**  
Courtesy of GENERAL MOTORS CORP.

1. Install the bulbs to the tail lamp circuit board.
2. Position the tail lamp circuit board to the tail lamp.
3. Hold the top 2 locking tabs apart while pushing the tail lamp circuit board into place.
4. Hold the bottom 4 locking tabs apart while pushing the tail lamp circuit board into place.
5. Verify that the circuit board is fully seated with the locking tabs fully seated.

**NOTE:** Refer to Fastener Notice .

6. Install the 2 tail lamp circuit board retaining screws.

**Tighten:** Tighten the screws to 1.9 N.m (17 lb in).

7. Install the tail lamp. Refer to Tail Lamp Replacement (Isuzu) or Tail Lamp Replacement (TrailBlazer).

## **DESCRIPTION & OPERATION**

### **EXTERIOR LIGHTING SYSTEMS DESCRIPTION & OPERATION**

#### **Exterior Lamps**

The exterior lighting system consist of the following lamps:

- The Headlamps
- The Daytime Running Lamps (DRL)
- The Clearance Lamps (Y92 roof rack only)
- The Cornering Lamps
- The Front Fog Lamps
- The Rear Fog Lamps (Export)
- The Park, Tail and Marker Lamps
- The Turn Signal Lamps
- The Stop Lamps
- The Backup Lamps

#### **Headlamps**

The headlamp driver module (HDM) is an electronic module that provides electrical power to the vehicle low beam headlamps. The HDM is controlled by a pulse width modulated (PWM) ground signal from the body control module (BCM). The BCM determines the desired lamp intensity using the ambient light sensor, multifunction switch and the park brake switch as inputs. In general, the HDM will operate in 1 of 3 modes:

- **Reduced Intensity Mode:** This mode is used by features that do not require or allow maximum low beam headlamp intensity such as daytime running lights (DRL) (nominal: 85% duty cycle).
- **Full Intensity Mode:** This mode is used by features that require full low beam headlamp intensity such as low beam headlamp operation in manual or auto modes (nominal: 100% duty cycle).
- **Off Mode:** This is the default mode of the system that will occur when none of the features described above are active. The BCM will deactivate its PWM output (0% duty cycle) during this mode.

The normal battery voltage input to the HDM must be between 6 and 16 volts DC to operate. Any deviation to these values could cause improper operation.

Major components of this system are the BCM, HDM, ambient light sensor, multifunction switch, park brake switch and low beam headlamps.

The headlamps may be turned on in 2 different ways. First, when the driver places the headlamp switch in the HEADLAMP position, normal operation occurs. Second, with the headlamp switch is placed in the AUTO position, automatic lamp control (ALC) occurs. During ALC control, the headlamps will be in daytime running lamp (DRL) operation in daylight conditions, or low beam operation in low light conditions.

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The HDM and high beam relay receive battery positive voltage directly from the battery. The BCM supplies a 100% duty cycle PWM ground signal to the HDM for automatic headlight control and normal headlight operation. The BCM also supplies ground to the high beam relay coil for high beam headlight operation. When the driver places the headlamp switch in the HEADLAMP position and the dimmer switch is in the low beam position, the HDM switches to full output sending current flow through the left and right low beam headlamp fuses to both low beam headlamps. The dimmer switch sends a ground signal to the BCM in the high beam position and a momentary ground signal in the flash-to-Pass (FTP) position from G102 to deactivate the low beam headlights and activate the high beam headlights. With the headlights in the low beam position, the high beams may be momentarily turned on or flashed by activating the FTP portion of the switch.

The instrument panel cluster (IPC) illuminates the high beam indicator when the body control module (BCM) detects that the high beams are requested. The IPC receives a class 2 message from the BCM requesting illumination.

The Headlamps On at Exit and Perimeter Lighting modes can be adjusted using the steering wheel controls to select the desired function as displayed in the driver information center. The Headlamps On at Exit selection will allow the driver to customize the period of time that the headlamps remain illuminated upon exiting the vehicle. This period can be adjusted from 0 seconds to 180 seconds. The Perimeter Lighting feature allows the driver to select if they desire the headlamps and backup lamps to illuminate when the door UNLOCK button on the key fob is activated. This feature can be turned ON or OFF by using the driver information center steering wheel control buttons.

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

The ambient light sensor is a light sensitive transistor that varies its voltage signal to the body control module (BCM) in response to changes to the outside (ambient) light level. When the BCM receives this signal it will either turn on the daytime running lamps (DRL) through the HDM using the reduced output or the headlamps at full intensity for auto headlamp operation. Any function or condition that turns on the headlights will cancel the daytime running lamps operation. The daytime running lamps (DRL) are the low beam headlights at a reduced intensity. With the headlight switch in the OFF position, the headlights will either be turned ON or OFF, after an approximate 8 second delay depending on whether daylight or low light conditions are sensed. When the BCM signals the HDM for DRL operation in daylight conditions, the HDM illuminates the low beam headlights at a reduced intensity. The DRL will operate when the ignition switch is in the RUN position, the gear selector is not in the PARK position and the parking brake is released. When these conditions have been met and the ambient light sensor indicates daytime conditions, the DRL will illuminate.

On vehicles equipped with the 4-position headlamp switch, DRL and headlamp operation can be temporarily disabled by momentarily placing the headlamp switch in the DRL defeat position. This will signal the BCM to disable the headlamps until the headlamp switch is momentarily placed in the DRL defeat position again or until the next ignition key cycle.

DRL operation in Manual Transmission equipped vehicles will occur when the ignition switch is in the RUN position, and the parking brake is released.

#### **Headlamp Leveling (Export)**

The IGN E fuse in the I/P fuse block supplies battery positive voltage to the headlamp leveling switch. When the driver places the headlamp leveling switch in any position, a signal is sent to the headlamp leveling

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actuators to adjust the headlight aiming to the desired position. The underhood fuse block supplies battery positive voltage and G107 and G103 supplies ground to the headlamp leveling actuators.

#### **Fog Lamps**

With both the ignition switch in the RUN position and the park lamps or low beam head lamps on, the fog lights will illuminate when the driver presses the fog lamp switch. The FOG LAMP fuse in the engine wiring harness junction block supplies battery positive voltage to the fog lamp relay. With the headlamp switch in either the park or headlamp position and the fog lamp switch is pressed, the body control module (BCM) will energize the fog lamp relay control circuit. The current flow is from the fog lamp relay to both front fog lamps and to ground G107 and G103. The state of the fog lamps either ON or OFF will remain the same until the fog lamp switch is pressed again, or the ignition switch is cycled OFF and ON. Fog lamp operation will be cancelled whenever the park lamps are turned OFF or the high beam headlights have been selected.

The rear fog lamp (Export) is located in the left tail lamp assembly. The rear fog lamp has a dedicated relay and both the relay control and current flow operate the same as the front fog lamps. The RR FOG fuse supplies voltage to the lamp and G 401 supplies ground.

#### **Park, Tail, Marker, License & Clearance Lamps**

The park, tail, marker, license, and clearance (Y92 only) lamps are turned on when the headlamp switch is placed in the PARK or ON position or anytime the headlights are requested. The I/P BATT fuse in the engine wiring harness junction block supplies battery positive voltage to both the park lamp relay switch contacts and the park lamp coil circuit. The body control module (BCM) provides a ground or control circuit to the park lamp relay coil circuit. When the park lamps are turned on, the BCM energizes the park lamp relay. Current flow is from the park lamp relay to the individual park lamp circuit fuses and to their respective park, tail, marker, and license lamps. The front park and marker lamps are grounded at G107 and G103. The tail lamps are grounded at G401 and G402. The license lamps are grounded at G401. When equipped with the Y92 roof rack option, the clearance lamps are grounded at G302. If the driver places the headlight switch in the ON position after the ignition switch has been turned OFF, the park, tail, marker, license, and clearance lamps will remain on until turned off or the battery runs dead.

The T PARK fuse in the rear fuse-relay block supplies battery positive voltage to a separate park lamp circuit connected to the trailer wiring harness.

#### **Turn Signal Lamps**

The smart flasher (GMSF) is an automotive flasher designed to accept turn, hazard, and brake inputs. The GMSF will provide corresponding outputs to the exterior lamps and instrument panel turn signal indicator lamps. This lighting system has dedicated lamps for the turn/hazard functions and dedicated lamps for the brake function. The system incorporates the use of flash rates for diagnostics. The flash rate is a calculation of the number of flashes that occur within a 60 second period. This system uses a percentage of on-time to off-time called duty cycle. For the bulb outage condition, the indicator of the vehicle side on which the outage occurs shall assume bulb outage flash rate mode. The opposite side indicator will assume the normal flash rate mode for an input from the non bulb outage side of the vehicle. Hazard warning lamp outage will maintain a normal flash rate as long as 2 or more exterior signaling lamps are functional. During all modes of operation, the IPC will receive the same flash rates and duty cycles that the exterior lamps receive. The IPC will then control the indicators in the cluster. The vehicle operator will be provided with an audible and visual indication of the

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flasher operation. Below is a table with flash rates and duty cycles:

Operating Condition	Flash Rate	Duty Cycle
Normal	75 to 105 flashes per minute	45% to 55%
Turn Signal Lamp Outage	2 or 3 times faster than normal flash rate	35% to 55%

The IGN E fuse in the engine wiring harness junction block supplies Ignition positive voltage to the turn signal switch assembly. With the ignition switch in the RUN or START position, ignition positive voltage is connected through the turn signal and hazard switch assembly to the GMSF which is powered by the FLASHER fuse also in the engine wiring harness junction block and is grounded at G201. When the turn signal switch is placed in either the left or right position, the circuit is complete from the GMSF to the turn signal lamps and to ground. The GMSF then sends an on-off voltage signal to either the left or right turn signals and their instrument panel cluster (IPC) indicator. When the hazard switch is pressed, all turn signal lamps will flash including both IPC turn indicators. The front turn signals are grounded at G103 and G107. The rear turn signals are grounded at G401 and G402.

The IPC illuminates the TURN SIGNAL ON indicator in the driver information center when the IPC determines that the turn signal is active for more than 1.2 km (0.75 mile). The IPC also sends a class 2 message to the radio in order to activate the audible warning.

On vehicles equipped with the outside rear view mirror turn signal lamps, the turn signal voltage is also sent to the respective front door module. The door modules then distribute power and ground to the activated lamp.

For trailer wiring, separate turn signal circuits are connected through the GMSF to the trailer wiring harness.

### Cornering Lamps

The turn signal switch sends battery positive voltage to the cornering lamps which will constantly remain illuminated until turn signal operation is cancelled. The cornering lamps are grounded at G103 and G107.

### Stop Lamps

The STOP fuse in the engine wiring harness junction block supplies battery positive voltage to the normally open stop lamp switch. When the driver presses the brake pedal, the switch contacts close and battery positive voltage is supplied to both the VEHICLE STOP fuse and the VEHICLE CHMSL fuse. The current flow is now to the stop lamps which are grounded at G401 and G402. The center high mounted stop lamp (CHMSL) is grounded at G401.

For trailer wiring, a separate stop lamp circuit is connected through the GMSF to the trailer wiring harness.

### Backup Lamps

On a vehicle equipped with an automatic transmission, the backup lamps request signal is sent from the powertrain control module (PCM) to the body control module (BCM) via class 2. This signal is based on the state of the park neutral position (PNP) switch. On a manual transmission equipped vehicle, the B/U fuse in the engine wiring harness junction block supplies battery positive voltage to the normally open backup lamp switch.

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When the driver places the gear selector lever in the REVERSE position, the backup lamp switch closes and the current flow is from the backup lamp switch to the BCM signaling for backup lamp illumination.

The BCM directly supplies voltage for backup lamp operation on both automatic and manual transmission vehicles. The backup lamps are grounded at G401 and G402 (G305 on vehicles that have the backup lamps located in the lower bumper fascia).

For trailer wiring, a separate backup lamp circuit is connected through the TRLR B/U fuse to the trailer wiring harness.

## INTERIOR LIGHTING SYSTEMS DESCRIPTION & OPERATION

### Interior Lamps

The interior lighting consist of the following 2 groups. This first group includes lamps that may not be dimmed.

- The cargo lamp
- The dome lamps
- The reading lamps
- The vanity mirror lamps

### Courtesy Lamps

The courtesy lamps include the reading lamps, cargo lamp, and dome lamps. The cargo lamp and dome lamps may be manually turned ON or OFF by placing the interior lamp switch in the ON or OFF position. When the driver places the dome lamp defeat switch in the OFF position, these courtesy lamps will be disabled. If a door is opened, the courtesy lamps illuminate. After all the doors have been closed, the courtesy lamps will remain illuminated approximately 15 seconds after the last door closes. The courtesy lamps will also turn ON prior to any door being opened and will remain illuminated approximately 40 seconds when the driver removes the ignition key. The body control module (BCM) will immediately turn OFF the courtesy lamps if a door lock command is received with all of the doors closed, or if the ignition switch is turned to either the ON or RUN position.

### Keyless Entry Interior Illumination

When the driver uses the door key in order to unlock the doors, the body control module (BCM) receives a door unlock signal. The BCM must have inputs that indicate that the ignition switch is OFF, the courtesy lamp switch is OFF, and all the doors are closed. The BCM will then illuminate the interior lamps. The courtesy lamps will remain illuminated for approximately 15 seconds after the door is closed. If the door locks are activated to the LOCK position, or if the ignition switch is turned to either the RUN or CRANK position, the courtesy lamps will turn OFF immediately.

When the driver uses the remote function actuator transmitter to unlock the doors or presses the panic button, the BCM will keep the courtesy lamps ON for approximately 15 seconds. If the door locks are activated to the UNLOCK or LOCK position or if the ignition switch is turned to either the RUN or CRANK position, the courtesy lamps will turn OFF immediately. The BCM will also keep the courtesy lamps ON for approximately 40 seconds after an alarm event is completed.

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### Vanity Mirror Lamps

The inadvertent power courtesy lamps supply voltage circuit of the body control module (BCM) provides battery positive voltage to each vanity mirror lamp. When the vanity mirror cover on the sunshade is opened, a switch closes to provide a ground circuit and the vanity lamp illuminates.

### Battery Rundown Protection/Inadvertent Power

The body control module (BCM) inadvertent power courtesy lamps supply voltage circuit provides battery positive voltage to all of the interior reading lamps and both visor vanity mirror lamps. In the event that any of these lamps were to remain illuminated for a period of more than 20 minutes with the ignition switch in the OFF position, the BCM will deactivate the inadvertent power courtesy lamps supply voltage circuit to prevent a total battery discharge condition. Only when the ignition switch is cycled back to the RUN position will the BCM reset the internal timer and reactivate the inadvertent power courtesy lamps supply voltage circuit.

The BCM also utilizes the inadvertent power courtesy lamps supply voltage circuit as a courtesy lamp request signal circuit when none of the lamps in the circuit are illuminated. When a lamp switch is activated, the BCM receives the request for lamp illumination and switches to supplying voltage to the inadvertent power courtesy lamps supply voltage circuit.

### Interior Lamps Dimming

The second group includes lamps which may be dimmed. This group may use a combination of vacuum fluorescent (VF) illumination and of incandescent lamps.

- Door switches and window switches
- HVAC control head assembly
- Radio and steering wheel controls
- The rear HVAC/radio controls
- The instrument panel cluster (IPC)

When the ignition switch is turned to the RUN position, the radio's VF displays turn 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 (I/P) dimmer switch. At the same time all VF displays dim to match the indicated dimming level. The panel dimmer switch potentiometer is an input to the body control module (BCM). When the driver selects a dimming setting by moving the I/P dimming switch potentiometer, all incandescent back lighting lamps are provided with a specific voltage. The incandescent back lighting lamps are then grounded at G201, G302, and G303. When the I/P dimmer switch is moved from MIN to MAX, all vacuum fluorescent (VF) displays, as well as all incandescent back lighting respond from minimum intensity to maximum brightness in response to the I/P dimmer switch.