

ACCESSORIES & EQUIPMENT

Lighting - Canyon, Colorado

SPECIFICATIONS

FASTENER SPECIFICATIONS

Application	Specification	
	Metric	English
Headlamp Bolts	4 N.m	35 lb in
High Mount Stop Lamp Screws	2.5 N.m	22 lb in
Rear Body Structure Stop Lamp Screws	2.5 N.m	22 lb in

SCHEMATIC WIRING DIAGRAMS

HEADLIGHTS/DAYTIME RUNNING LIGHTS (DRL) WIRING SCHEMATICS

Controls

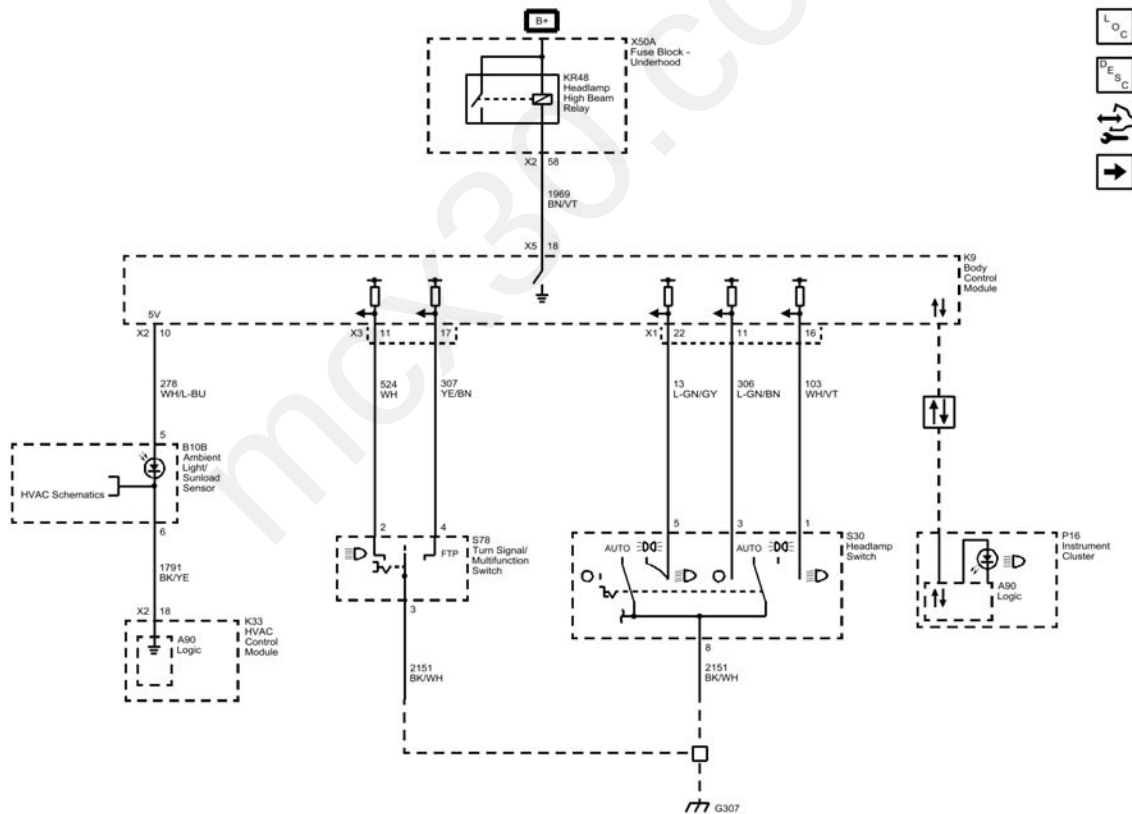


Fig. 1: Controls

Courtesy of GENERAL MOTORS COMPANY

Headlamps

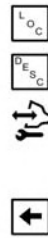
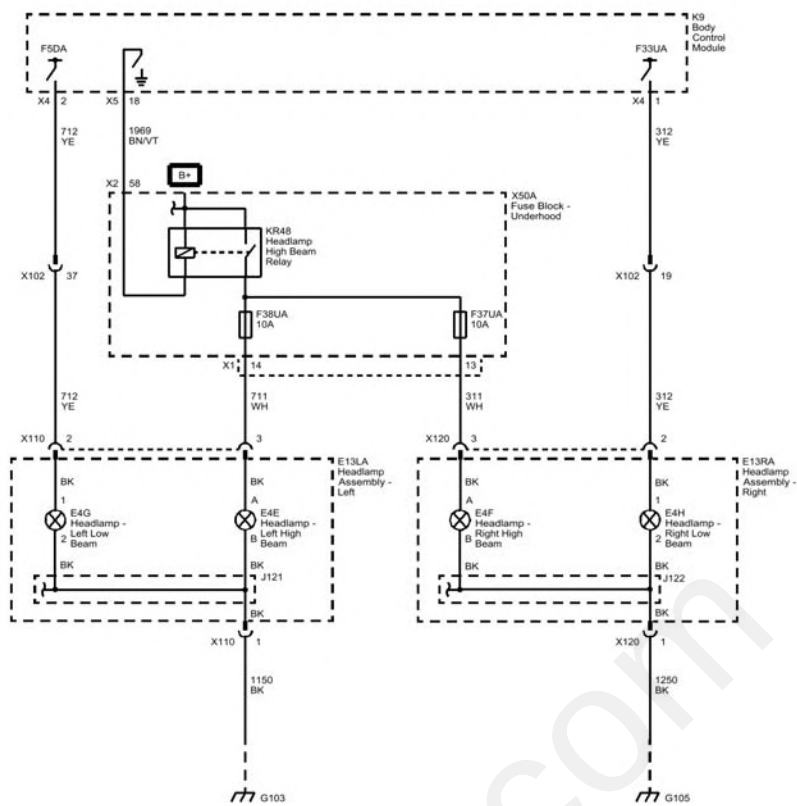


Fig. 2: Headlamps

Courtesy of GENERAL MOTORS COMPANY

FOG LIGHTS WIRING SCHEMATICS

Fog Lamps (T3U)

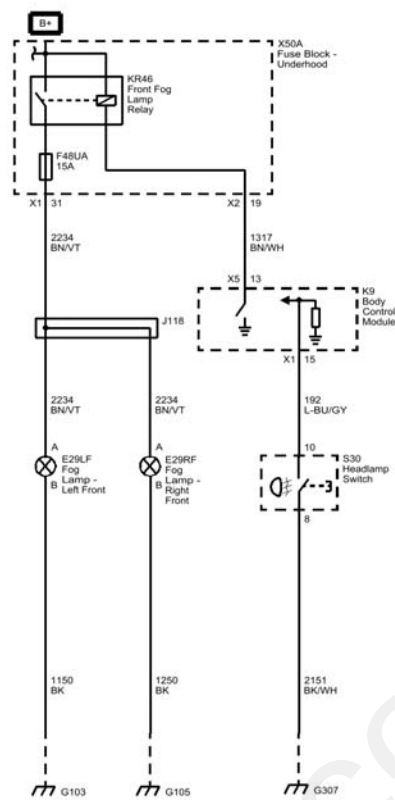


Fig. 3: Fog Lamps (T3U)

Courtesy of GENERAL MOTORS COMPANY

EXTERIOR LIGHTS WIRING SCHEMATICS

Controls and Indicators

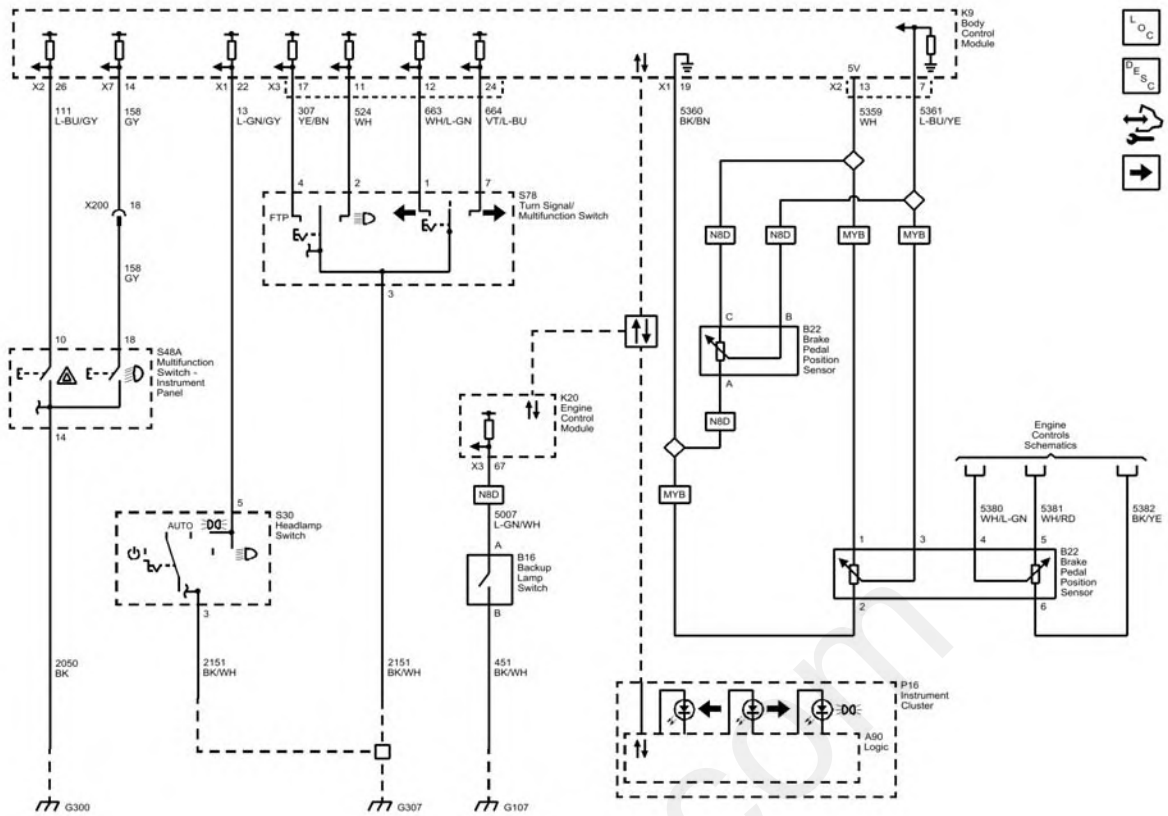


Fig. 4: Controls and Indicators

Courtesy of GENERAL MOTORS COMPANY

Park, Side Marker and Front Turn Lamps

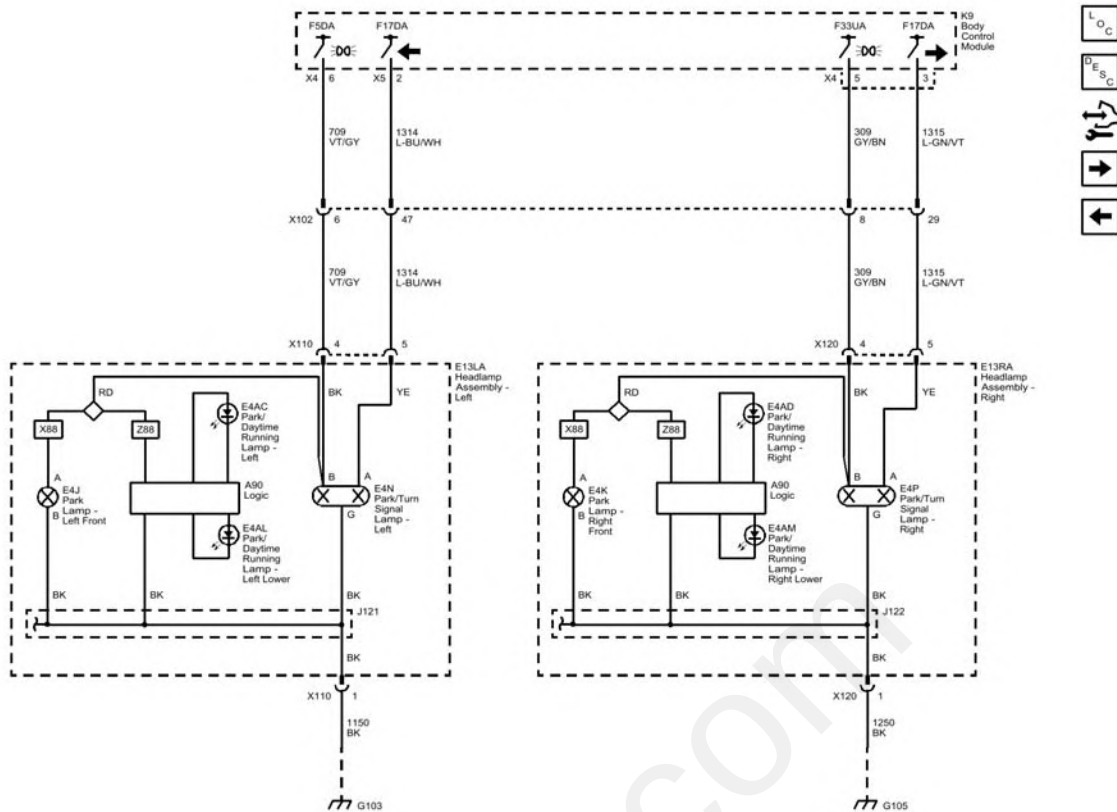


Fig. 5: Park, Side Marker and Front Turn Lamps
Courtesy of GENERAL MOTORS COMPANY

Tail Lamps

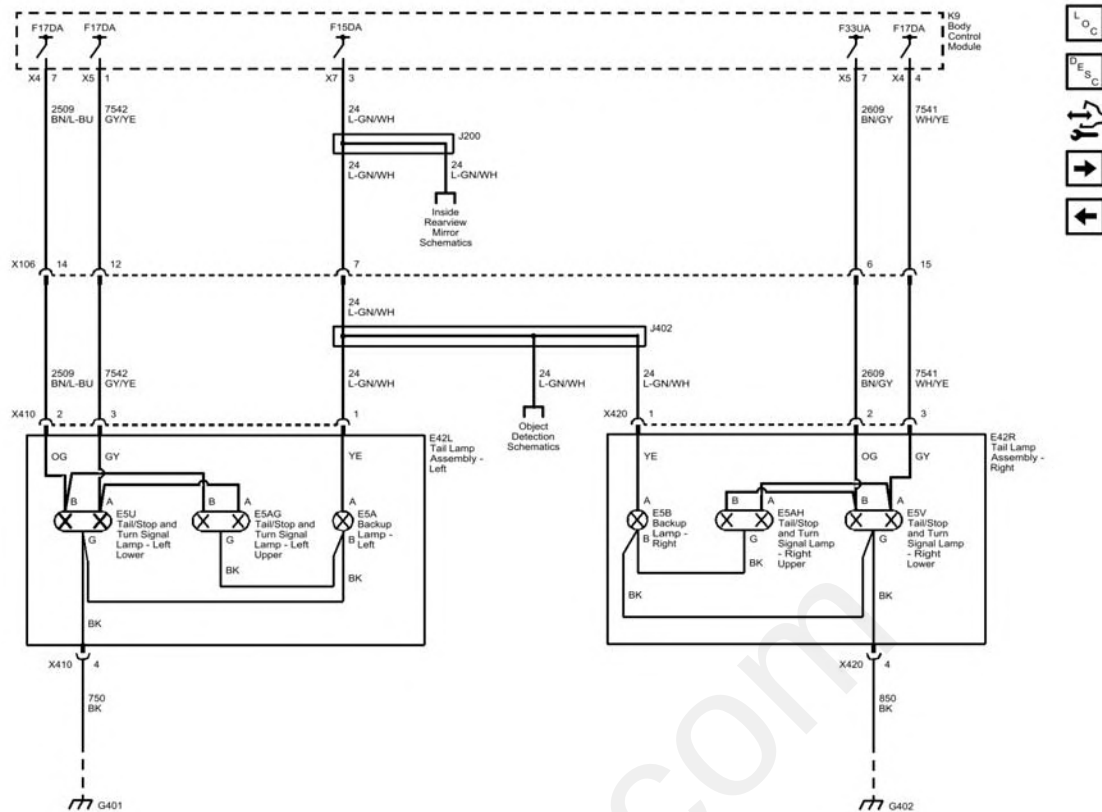


Fig. 6: Tail Lamps

Courtesy of GENERAL MOTORS COMPANY

CHMSL, Cargo, License Plate Lamps and Accessory Bed Lighting (S0Y)

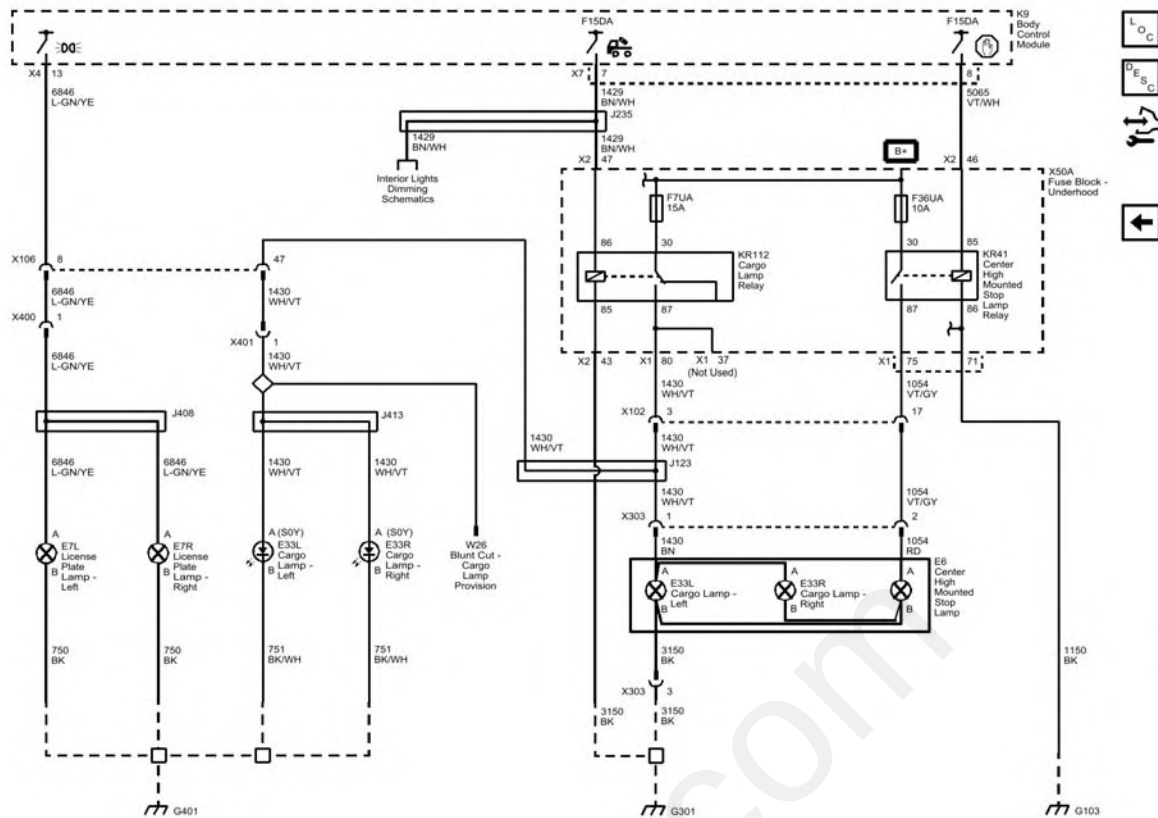


Fig. 7: CHMSL, Cargo, License Plate Lamps and Accessory Bed Lighting (S0Y)

Courtesy of GENERAL MOTORS COMPANY

INTERIOR LIGHTS WIRING SCHEMATICS

Dome Lamps (Except C74)

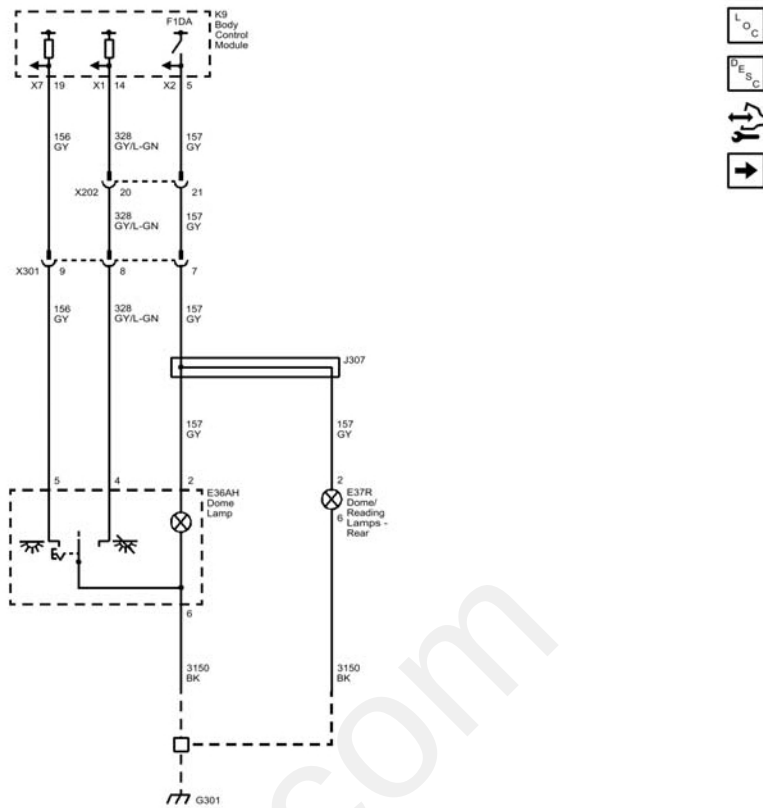


Fig. 8: Dome Lamps (Except C74)

Courtesy of GENERAL MOTORS COMPANY

Dome/Reading, and Sunshades Lamps (C74/TR0/D6I)

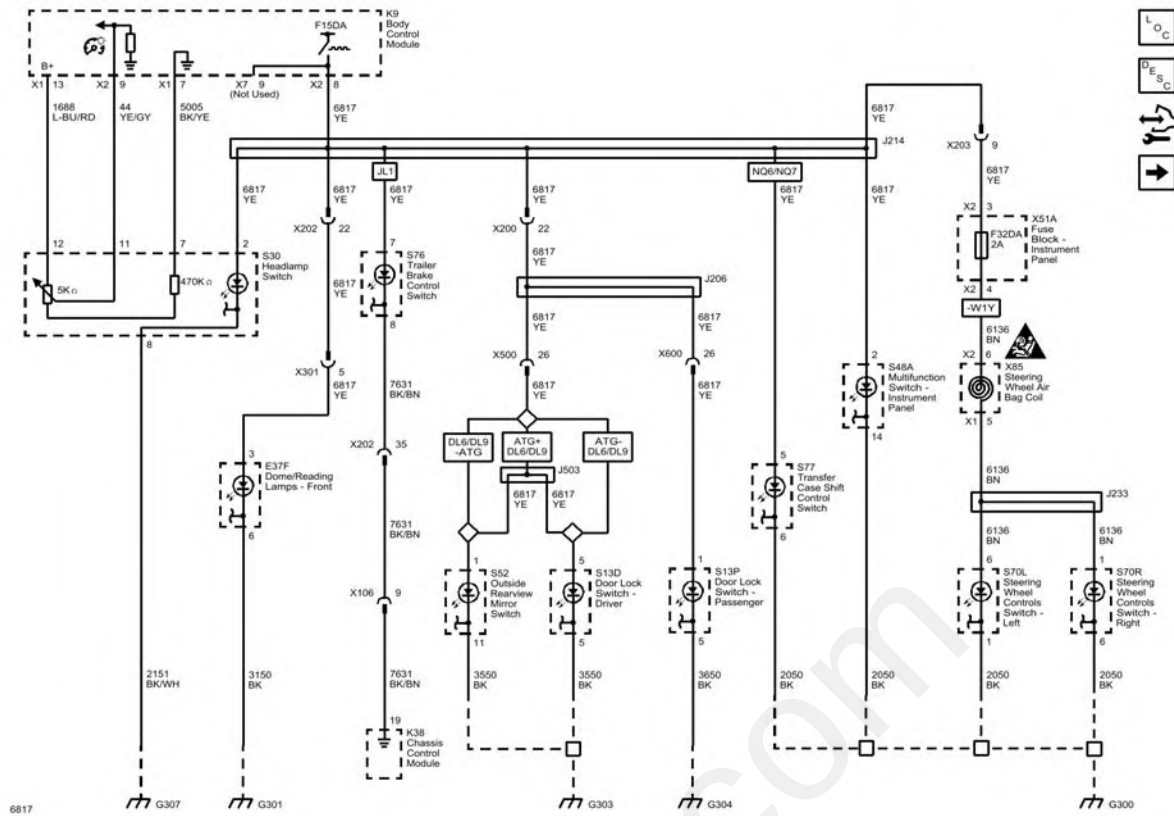


Fig. 10: Dimming Control (1 of 3)

Courtesy of GENERAL MOTORS COMPANY

Dimming Control (2 of 3)

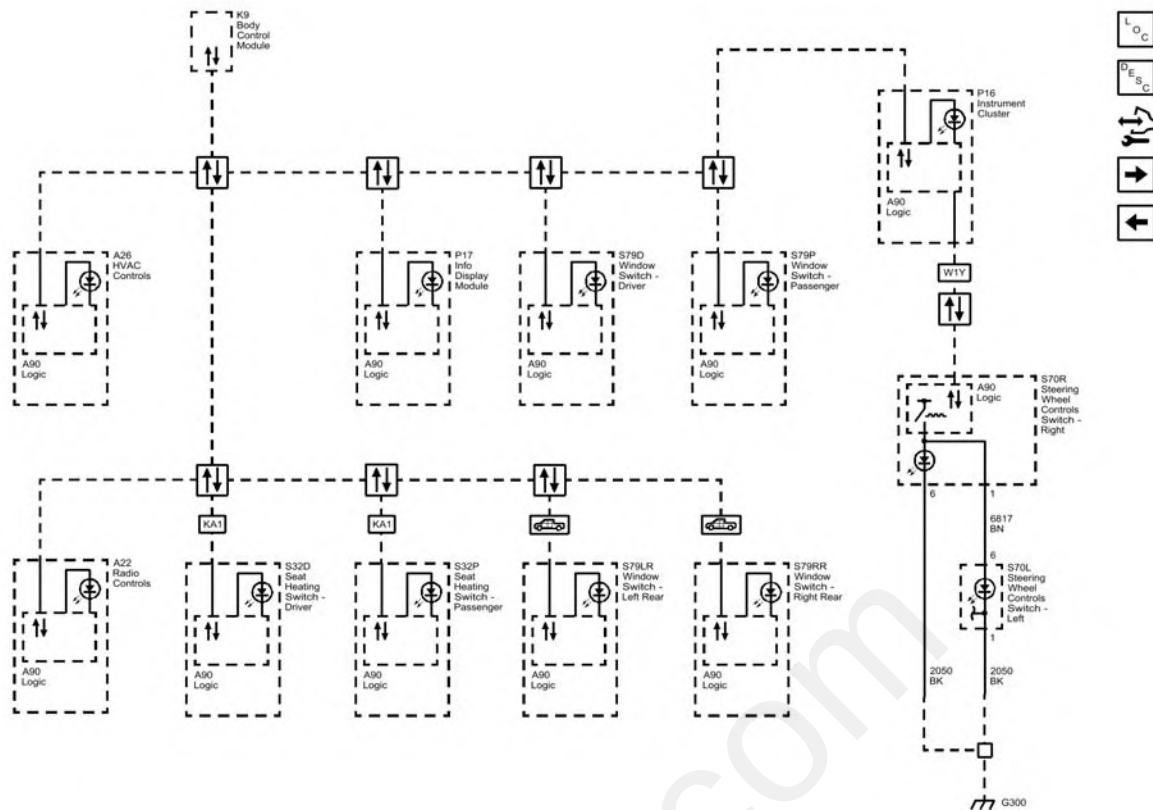


Fig. 11: Dimming Control (2 of 3)

Courtesy of GENERAL MOTORS COMPANY

Dimming Control (3 of 3)

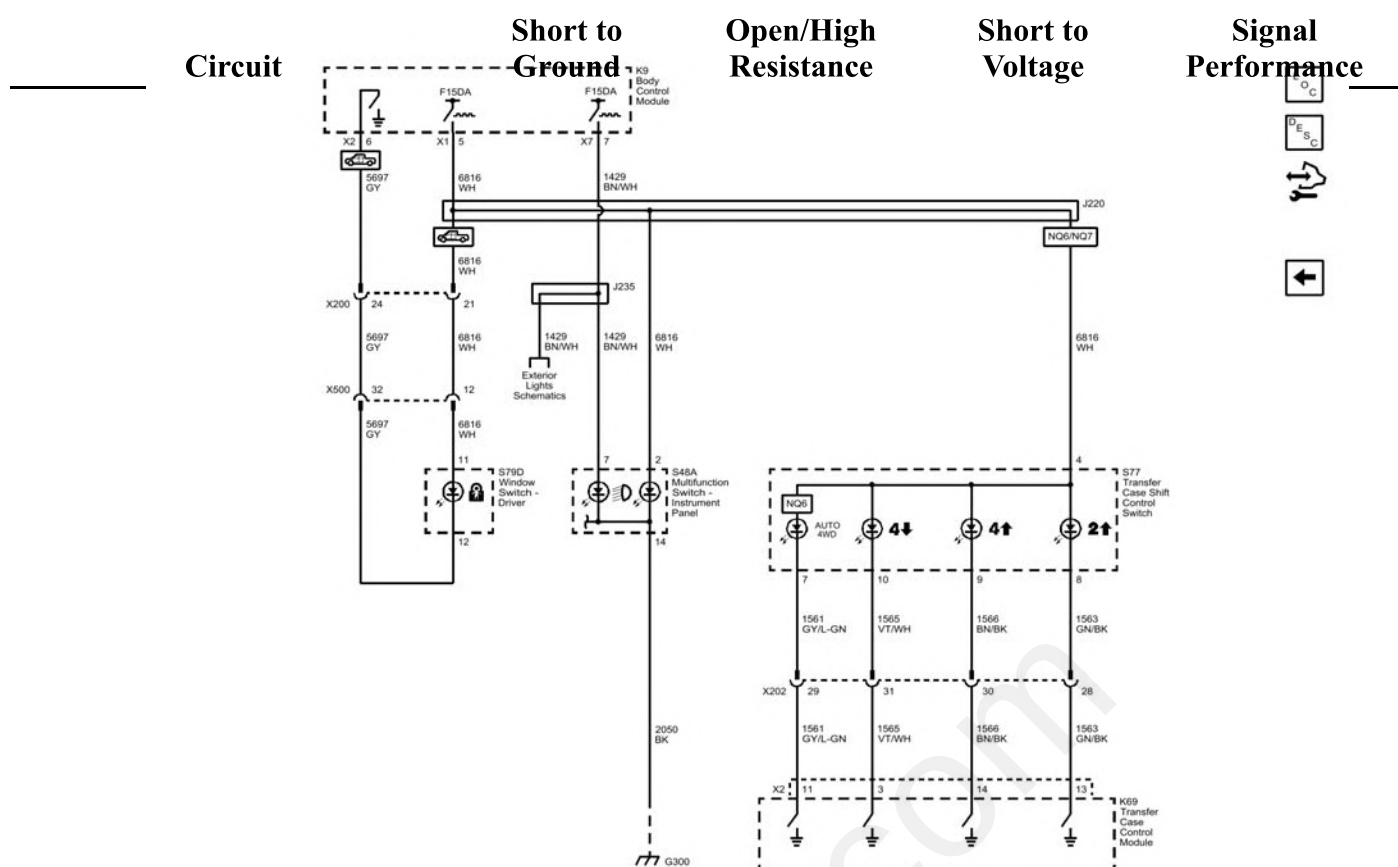


Fig. 12: Dimming Control (3 of 3)

Courtesy of GENERAL MOTORS COMPANY

DIAGNOSTIC INFORMATION AND PROCEDURES

DTC B1395: CONTROL MODULE VOLTAGE REFERENCE OUTPUT 1

Diagnostic Instructions

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

DTC Descriptors

DTC B1395 03

Control Module Voltage Reference Output 1 Circuit Low Voltage

DTC B1395 07

Control Module Voltage Reference Output 1 Circuit High Voltage

Diagnostic Fault Information

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

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

Circuit/System Description

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

Conditions for Running the DTC

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

Conditions for Setting the DTC

DTC B1395 03

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

DTC B1395 07

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

Actions Taken When the DTC Sets

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

Conditions for Clearing the DTC

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

Reference Information

Schematic Reference

s Dimming Schematics

Connector End View Reference

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Interior Lighting Systems Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

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

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
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- If infinite resistance, replace the K9 Body Control Module.

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

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

- **If less than B+**

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

2. Test for less than 1 V between the signal circuit terminal 11 and ground.

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

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

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K9 Body Control Module.

- **If B+**

6. Test or replace the S30 Headlamp Switch.

Repair Instructions

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

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

DTC B1480: BATTERY RUNDOWN PROTECTION CIRCUIT SHORT TO GROUND

Diagnostic Instructions

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

DTC Descriptor

DTC B1480 02

Battery Rundown Protection Circuit Short to Ground

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
F5DA (BCM 2) Fuse B+	B127B 2B	B127B 2B	-	-
Courtesy Lamps Control - Terminal 2 X7	B1480 02	1	1	-
Dome/Reading Lamps - Front Ground	-	1	-	-
Dome/Reading Lamps - Rear Ground	-	1	-	-
Sunshade Mirror Lamp - Left Ground	-	1	-	-

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Sunshade Mirror Lamp - Right Ground	-	1	-	-
1. Courtesy Lamps Malfunction				

Circuit/System Description

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

Conditions for Running the DTC

Battery voltage must be between 9-16 V.

Conditions for Setting the DTC

The BCM detects a short to ground in the courtesy lamps control circuit terminal 2 X7.

Actions Taken When the DTC Sets

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

Conditions for Clearing the DTC

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

Reference Information

Schematic Reference

Interior Lights Schematics

Connector End View Reference

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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

[le References](#) for scan tool information

Circuit/System Testing

1. Ignition OFF, exterior lamps OFF, disconnect the harness connectors at the components listed below.
 - A3L Sunshade - Left (with D61)
 - A3R Sunshade - Right (with D61)
 - E37F Dome/Reading Lamps - Front
 - E37R Dome/Reading Lamps - Rear (with TRO)
2. Connect a test lamp between the appropriate control circuit terminal listed below and ground, ignition ON.
 - A3L Sunshade - Left terminal A (with D61)
 - A3R Sunshade - Right terminal A (with D61)
 - E37F Dome/Reading Lamps - Front terminal 1
 - E37R Dome/Reading Lamps - Rear terminal 1 (with TRO)
3. Verify the test lamp turns ON and OFF when commanding the Inadvertent Load ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K9 Body Control Module.
 - **If the test lamp is always ON**
 1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
4. Test or replace the appropriate courtesy lamp.

Repair Instructions

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

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

DTC B2530: FRONT FOG LAMPS

Diagnostic Instructions

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

^s Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
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DTC B2530 01

Front Fog Lamps Control Circuit Short to Battery

DTC B2530 02

Front Fog Lamps Control Circuit Short to Ground

DTC B2530 04

Front Fog Lamps Control Circuit Open

Diagnostic Fault Information

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

Circuit/System Description

The front fog lamp relay is supplied with battery voltage at all times. The front fog lamp switch signal circuit is grounded momentarily by pressing the front fog lamp switch. The body control module (BCM) energizes the front fog lamp relay by applying ground to the front fog lamp relay control circuit. When the front fog lamp relay is energized, the relay switch contacts close and battery voltage is applied through the F48UA fog lamp fuse to the front fog lamp control circuit which illuminates the front fog lamps.

Conditions for Running the DTC

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

Conditions for Setting the DTC

DTC B2530 01

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

DTC B2530 02

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

DTC B2530 04

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

Actions Taken When the DTC Sets

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

Conditions for Clearing the DTC

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

Reference Information

Schematic Reference

Fog Lights Schematics

Connector End View Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.
2. Verify a test lamp illuminates between the control circuit terminal 13 and ground.
 - **If the test lamp does not illuminate**
 1. Ignition OFF, disconnect the X2 harness connector at the X50A Fuse Block - Underhood.
 2. Test for infinite resistance between the control circuit terminal and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the X50A Fuse Block - Underhood.
 - **If the test lamp illuminates**
3. Ignition OFF, connect a 3 A fused jumper between the control circuit terminal 13 and ground.
4. Remove the F48UA fog lamp fuse at the X50A Fuse Block - Underhood, ignition ON.
5. Verify a test lamp illuminates between the F48UA fog lamp fuse B+ switch control terminal and ground.
 - **If the test lamp does not illuminate**
 1. Ignition OFF, disconnect the X2 harness connector at the X50A Fuse Block - Underhood, ignition ON.

st for less than 1 V between the control circuit terminal 1B and ground.
Circuit V or greater, repair the short to voltage on the circuit. **Short to Ground** **Open/High Resistance** **Short to Voltage**

Signal Performance

- If less than 1 V, replace the X50A Fuse Block - Underhood.

- **If the test lamp illuminates**

6. Test or replace the K9 Body Control Module.

Repair Instructions

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

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

DTC B2545: BACKUP LAMPS

Diagnostic Instructions

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

DTC Descriptors

DTC B2545 01

Backup Lamps Circuit Short to Battery

DTC B2545 02

Backup Lamps Circuit Short to Ground

DTC B2545 04

Backup Lamps Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
F5DA (BCM 2) Fuse B+	B127B 2B	B127B 2B	-	-
Backup Lamp Switch Signal (Manual Transmission)	1	1	1	-
Backup Lamps Control	B127B 2B, B2545 02	B127B 2B, B2545 04	B2545 01	-
Backup Lamp Switch Ground (Manual Transmission)	-	1	-	-
Backup Lamp Ground - Left	-	1	-	-
Backup Lamp Ground - Right	-	1	-	-
1. Backup Lamps Malfunction				

Circuit/System Description

Automatic Transmission

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

Manual Transmission

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

Conditions for Running the DTC

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

Conditions for Setting the DTC

DTC B2545 01

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

DTC B2545 02

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

DTC B2545 04

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

Actions Taken When the DTC Sets

The backup lamps will not operate.

Conditions for Clearing the DTC

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

Reference Information

Schematic Reference

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

Connector End View Reference

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Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, all doors closed, all accessories off, open and close drivers door, disconnect the harness connector at the appropriate E5 Backup Lamp bulb. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 5 Ω between the ground circuit at the socket terminal B and ground.
 - **If 5 Ω or greater**
 1. Ignition OFF.
 2. Test for less than 2 Ω in the ground circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , repair the open/high resistance in the ground connection.
 - **If less than 5 Ω**
3. Connect a test lamp between the control circuit at the socket terminal A and ground, ignition ON.
4. Verify the test lamp turns ON and OFF when commanding the Backup Lamps ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K9 Body Control Module.
 - **If the test lamp is always ON**
 1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
5. Test or replace the E5 Backup Lamp.

Repair Instructions

agnostic Repair Verification after completing the repair.

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
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- [Fuse Block Replacement](#)
- [Backup Bulb Replacement](#)
- [Control Module References](#) for BCM replacement, programming, and setup

DTC B2560: CARGO LAMPS CONTROL

Diagnostic Instructions

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

DTC Descriptors

DTC B2560 01

Cargo Lamps Control Circuit Short to Battery

DTC B2560 02

Cargo Lamps Control Circuit Short to Ground

DTC B2560 04

Cargo Lamps Control Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
F25DA (BCM 7) Fuse B+	1	1	-	-
Cargo Lamps Relay Control	B2560 02	B2560 04	B2560 01	-
Cargo Lamps Control	1	1	1	-
Cargo Lamps Switch Signal	1	1	1	-
Cargo Lamps Ground	1	1	1	-
Cargo Lamps Relay Ground	-	1	-	-
Cargo Lamps Switch Ground	-	1	-	-
1. Cargo Lamps Malfunction				

Circuit/System Description

The cargo lamp relay is supplied with battery voltage at all times. The cargo lamp switch signal circuit is grounded momentarily by pressing the cargo lamp switch. The body control module (BCM) energizes the cargo lamp relay by applying ground to the cargo lamp relay control circuit. When the cargo lamp relay is energized, the relay switch contacts close and battery voltage is applied through the F7UA fuse to the cargo lamp control circuit which illuminates the cargo lamps.

Conditions for Running the DTC

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

Setting the DTC

DTC B2560 01

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

DTC B2560 02

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

DTC B2560 04

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

Actions Taken When the DTC Sets

The cargo lamps are inoperative.

Conditions for Clearing the DTC

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

Reference Information

Schematic Reference

- [Exterior Lights Schematics](#)
- [Interior Lights Schematics](#)

Connector End View Reference

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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, all doors closed, open and close drivers door, disconnect the KR112 Cargo Lamp Relay. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 5 Ω between the ground circuit terminal 85 and ground.
 - **If 5 Ω or greater**

Ignition OFF.	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
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2. Test Circuit

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

• If less than 5 Ω

3. Connect a test lamp between the control circuit terminal 86 and ground, ignition ON.

4. Verify the test lamp turns ON and OFF when commanding the Pickup Bed Cargo Lamp ON and OFF with a scan tool.

• If the test lamp is always OFF

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

2. Test for infinite resistance between the control circuit terminal and ground.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance

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

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K9 Body Control Module.

• If the test lamp is always ON

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

2. Test for less than 1 V between the control circuit terminal and ground.

- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, replace the K9 Body Control Module.

• If the test lamp turns ON and OFF

5. Test or replace the KR112 Cargo Lamp Relay.

Repair Instructions

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

- [Relay Replacement \(Attached to Wire Harness\)](#) [Relay Replacement \(Within an Electrical Center\)](#)
- [Control Module References](#) for BCM replacement, programming, and setup

DTC B256B: CARGO LAMPS SWITCH CIRCUIT 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.

DTC Descriptor

DTC B256B 00

Cargo Lamps Switch Circuit Malfunction

Diagnostic Fault Information

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

Circuit/System Description

The cargo lamp relay is supplied with battery voltage at all times. The cargo lamp switch signal circuit is grounded momentarily by pressing the cargo lamp switch. The body control module (BCM) energizes the cargo lamp relay by applying ground to the cargo lamp relay control circuit. When the cargo lamp relay is energized, the relay switch contacts close and battery voltage is applied through the F7UA fuse to the cargo lamp control circuit which illuminates the cargo lamps.

Conditions for Running the DTC

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

Conditions for Setting the DTC

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

Actions Taken When the DTC Sets

The cargo lamps are inoperative.

Conditions for Clearing the DTC

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

Reference Information

Schematic Reference

- [Exterior Lights Schematics](#)
- [Interior Lights Schematics](#)

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- [Circuit Testing](#)

or Repairs

- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, open and close drivers door, disconnect the X1 harness connector at the S48A Multifunction Switch - Instrument Panel. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 15 Ω between the ground circuit terminal 14 and ground.
 - **If 15 Ω or greater**
 1. Ignition OFF.
 2. Test for less than 2 Ω in the ground circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , repair the open/high resistance in the ground connection.
 - **If less than 15 Ω**
3. Ignition ON.
4. Verify the scan tool Pickup Bed Cargo Lamp Command parameter is 0 %.
 - **If not 0 %**
 1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit terminal 18 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If 0 %**
5. Install a 3 A fused jumper wire between the signal circuit terminal 18 and ground.
6. Verify the scan tool Pickup Bed Cargo Lamp Command parameter is 100 %.
 - **If not 100 %**
 1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the signal circuit terminal 18 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
 3. Test for less than 2 Ω in the signal circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K9 Body Control Module.
 - **If 100 %**
7. Test or replace the S48A Multifunction Switch - Instrument Panel.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.

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

DTC B2575 OR B2699: HEADLAMP CONTROL Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
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Diagnostic Instructions

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

DTC Descriptors

DTC B2575 01

Headlamps Control Circuit Short to Battery

DTC B2575 02

Headlamps Control Circuit Short to Ground

DTC B2575 04

Headlamps Control Circuit Open

DTC B2699 01

Right Headlamp Control Circuit Short to Battery

DTC B2699 02

Right Headlamp Control Circuit Short to Ground

DTC B2699 04

Right Headlamp Control Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
F17DA (BCM 4) Fuse B+	B2575 01, B2575 04	B2575 01, B2575 04	-	-
F33UA (BCM 3) Fuse B+	B2699 01, B2699 04	B2699 01, B2699 04	-	-
Low Beam Headlamp - Left Control	B2575 02	B2575 01, B2575 04	B2575 01, B2575 04	-
Low Beam Headlamp - Right Control	B2699 02	B2699 01, B2699 04	B2699 01, B2699 04	-
Headlamp Assembly - Left Ground	-	1	-	-
Headlamp Assembly - Right Ground	-	1	-	-
1. Headlamps Malfunction				

Circuit/System Description

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

Conditions for Running the DTC

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

Conditions for Setting the DTC

DTC B2575 01 and B2575 04

- The BCM detects a short to voltage or an open/high resistance in the left low beam headlamp control circuit.
- The BCM detects a short to ground or an open/high resistance in the F17DA (BCM 4) fuse B+ circuit.

DTC B2575 02

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

DTC B2699 01 and B2699 04

- The BCM detects a short to voltage or an open/high resistance in the right low beam headlamp control circuit.
- The BCM detects a short to ground or an open/high resistance in the F33UA (BCM 3) fuse B+ circuit.

DTC B2699 02

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

Actions Taken When the DTC Sets

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

Conditions for Clearing the DTC

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

Reference Information

Schematic Reference

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

Connector End View Reference

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[Exterior Lighting Systems Description and Operation](#)

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

Scan Tool Reference

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

Circuit/System Testing

DTC B2575

1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.
2. Verify a test lamp illuminates between the B+ circuit terminal 2 and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF, disconnect the X2 harness connector at the X51A Fuse Block - Instrument Panel.
 2. Test for less than 2 Ω in the B+ circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , verify the fuse is not open and there is voltage at the fuse.
 - **If the test lamp does not illuminate and the circuit fuse is open**
 1. Ignition OFF, disconnect the X2 harness connector at the X51A Fuse Block - Instrument Panel.
 2. Test for infinite resistance between the B+ circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If the test lamp illuminates**
3. Ignition OFF, connect the X1 harness connector at the K9 Body Control Module.
4. Ignition OFF, exterior lamps OFF, disconnect the harness connector at the E4G Headlamp - Left Low Beam.
It may take up to 2 min for all vehicle systems to power down.
5. Test for less than 5 Ω between the ground circuit terminal 2 and ground.
 - **If 5 Ω or greater**
 1. Ignition OFF.
 2. Test for less than 2 Ω in the ground circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , repair the open/high resistance in the ground connection.
 - **If less than 5 Ω**
6. Connect a test lamp between the control circuit terminal 1 and ground, ignition ON.
7. Verify the test lamp turns ON and OFF when commanding the Left Low Beam/Daytime Running Lamp ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance

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

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K9 Body Control Module.

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

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

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

8. Test or replace the E4G Headlamp - Left Low Beam.

DTC B2699

1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.
2. Verify a test lamp illuminates between the B+ circuit terminal 3 and ground.

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

1. Ignition OFF, disconnect the X2 harness connector at the X50A Fuse Block - Underhood.
2. Test for less than 2 Ω in the B+ circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , verify the fuse is not open and there is voltage at the fuse.

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

1. Ignition OFF, disconnect the X2 harness connector at the X50A Fuse Block - Underhood.
2. Test for infinite resistance between the B+ circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.

- **If the test lamp illuminates**

3. Ignition OFF, connect the X1 harness connector at the K9 Body Control Module.
4. Ignition OFF, exterior lamps OFF, disconnect the harness connector at the E4H Headlamp - Right Low Beam. It may take up to 2 min for all vehicle systems to power down.
5. Test for less than 5 Ω between the ground circuit terminal 2 and ground.
 - **If 5 Ω or greater**
 1. Ignition OFF.
 2. Test for less than 2 Ω in the ground circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , repair the open/high resistance in the ground connection.

- **If less than 5 Ω**

6. Connect a test lamp between the control circuit terminal 1 and ground, ignition ON.
7. Verify the test lamp turns ON and OFF when commanding the Right Low Beam/Daytime Running Lamp ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
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- If less than 2 Ω , replace the K9 Body Control Module.

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

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

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

8. Test or replace the E4H Headlamp - Right Low Beam.

Repair Instructions

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

- [Headlamp Bulb Replacement - Left Side \(Chevrolet High Beam\)](#)[Headlamp Bulb Replacement - Left Side \(Chevrolet Low Beam\)](#)[Headlamp Bulb Replacement - Left Side \(GMC High Beam\)](#)[Headlamp Bulb Replacement - Left Side \(GMC Low Beam\)](#)
- [Headlamp Bulb Replacement - Right Side \(Chevrolet High Beam\)](#)[Headlamp Bulb Replacement - Right Side \(Chevrolet Low Beam\)](#)[Headlamp Bulb Replacement - Right Side \(GMC High Beam\)](#)[Headlamp Bulb Replacement - Right Side \(GMC Low Beam\)](#)
- [Control Module References](#) for BCM replacement, programming, and setup

DTC B257A: HEADLAMP SWITCH INPUT SIGNALS CORRELATION 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.

DTC Descriptor

DTC B257A 00

Headlamp Switch Input Signals Correlation Malfunction

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Headlamp Switch Park Lamps ON Signal	2	B257A 00	2	-
Headlamp Switch Headlamps OFF Signal	B257A 00	1	1	-
Headlamp Switch Headlamps ON Signal	B257A 00	1	1	-
Headlamp Switch Ground	-	1, 2	-	-
1. Headlamps Malfunction 2. Park, License, and/or Tail Lamps Malfunction				

Description

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

Conditions for Running the DTC

Battery voltage must be between 9-16 V.

Conditions for Setting the DTC

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

Actions Taken When the DTC Sets

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

Conditions for Clearing the DTC

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

Reference Information

Schematic Reference

Headlights/Daytime Running Lights (DRL) Schematics

Connector End View Reference

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Exterior Lighting Systems Description and Operation

Electrical Information Reference

- Circuit Testing

or Repairs

- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

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

Inactive

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

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

- **If not Active**

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

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

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

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

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K9 Body Control Module.

- **If Active**

10. Verify the scan tool Headlamps On Switch parameter is Inactive.

- **If not Inactive**

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

2. Test for infinite resistance between the signal circuit terminal 1 and ground.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance, replace the K9 Body Control Module.

- **If Inactive**

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

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

- **If not Active**

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

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

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

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

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K9 Body Control Module.

- **If Active**

13. Test or replace the S30 Headlamp Switch.

Repair Instructions

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

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

DTC B257B: LIGHTING CONTROL SWITCH SIGNAL

Diagnostic Instructions

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

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
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Lighting Control Switch Signal Low Voltage

DTC B257B 07

Lighting Control Switch Signal High Voltage

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Instrument Panel Dimmer Switch B+ Reference	B257B 03	B257B 03	1	-
Instrument Panel Dimmer Switch Signal	B257B 03	B257B 03	B257B 07	-
Instrument Panel Dimmer Switch Low Reference	1	1	1	-
1. Interior Backlighting Malfunction				

Circuit/System Description

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

Conditions for Running the DTC

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

Conditions for Setting the DTC

DTC B257B 03

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

DTC B257B 07

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

Actions Taken When the DTC Sets

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

Clearing the DTC

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

Reference Information

Schematic Reference

Interior Lights Dimming Schematics

Connector End View Reference

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

the test lamp does not illuminate	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
4. Test for Circuit between the B+ circuit terminal 12 and the signal circuit terminal 11.				

- **If less than B+**

1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.
2. Test for less than 1 V between the signal circuit terminal 11 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
3. Test for less than 2 Ω in the signal circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K9 Body Control Module.

- **If B+**

5. Test or replace the S30 Headlamp Switch.

Repair Instructions

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

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

DTC B2580: HEADLAMP HIGH BEAM CONTROL

Diagnostic Instructions

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

DTC Descriptors

DTC B2580 01

Headlamp High Beam Control Circuit Short to Battery

DTC B2580 02

Headlamp High Beam Control Circuit Short to Ground

DTC B2580 04

Headlamp High Beam Control Circuit Open

Diagnostic Fault Information

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

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
High Beam Headlamp Control - Right	1	1	1	-
Headlamp Ground - Left	-	1	-	-
Headlamp Ground - Right	-	1	-	-
1. Headlamps Malfunction				

Circuit/System Description

The high beam and flash to pass functions are contained within the turn signal/multifunction switch. The BCM provides the turn signal/multifunction switch with two signal circuits, the high beam signal circuit and the flash to pass signal circuit. When the low beam headlamps are ON and the turn signal/multifunction switch is placed in the high beam position, ground is applied to the BCM through the high beam signal circuit. The BCM responds to the high beam request by applying ground to the high beam relay control circuit which energizes the high beam relay. With the high beam relay energized, the switch contacts close allowing battery voltage to flow through the high beam fuse to the high beam control circuits illuminating the high beam headlamps.

Conditions for Running the DTC

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

Conditions for Setting the DTC

DTC B2580 01

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

DTC B2580 02 and DTC B2580 04

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

Actions Taken When the DTC Sets

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

Conditions for Clearing the DTC

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

Reference Information

Schematic Reference

Headlights/Daytime Running Lights (DRL) Schematics

Connector End View Reference

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- [Wiring Repairs](#)

Scan Tool Reference

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

Circuit/System Testing

1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.
2. Verify a test lamp illuminates between the control circuit terminal 18 and ground.
 - **If the test lamp does not illuminate**
 1. Ignition OFF, disconnect the X2 harness connector at the X50A Fuse Block - Underhood.
 2. Test for infinite resistance between the control circuit terminal and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the X50A Fuse Block - Underhood.
 - **If the test lamp illuminates**
3. Ignition OFF, connect a 3 A fused jumper between the control circuit terminal 18 and ground.
4. Verify the high beam headlamps illuminate.
 - **If the high beam headlamps do not illuminate**
 1. Ignition OFF, disconnect the X2 harness connector at the X50A Fuse Block - Underhood, ignition ON.
 2. Test for less than 1 V between the control circuit terminal 18 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the X50A Fuse Block - Underhood.
 - **If the high beam headlamps illuminate**
5. Test or replace the K9 Body Control Module.

Repair Instructions

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

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

DTC B2585 OR B3867: PARK LAMPS CONTROL

Diagnostic Instructions

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

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
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Left Park Lamps Control Circuit Short to Ground

DTC B3867 02

Right Park Lamps Control Circuit Short to Ground

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Park Lamps Control - Left Front Terminal 6 X4	B2585 02	1	1	-
Park Lamps Control - Right Front Terminal 5 X4	B3867 02	1	1	-
Park Lamp Ground - Left Front	-	1	-	-
Park Lamp Ground - Right Front	-	1	-	-
1. Park, License, and/or Tail Lamps Malfunction				

Circuit/System Description

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

Conditions for Running the DTC

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

Conditions for Setting the DTC

DTC B2585 02

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

DTC B3867 02

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

Actions Taken When the DTC Sets

DTC B2585 02

The left park lamps are always OFF.

DTC B3867 02

The right park lamps are always OFF.

Conditions for Clearing the DTC

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

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

Reference Information

Schematic Reference

Exterior Lights Schematics

Connector End View Reference

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Exterior Lighting Systems 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

Circuit/System Testing

DTC B2585

1. Ignition OFF, exterior lamps OFF, all doors closed, open and close drivers door, disconnect the harness connector at the appropriate left front park lamp.
2. Test for less than 5 Ω between the appropriate ground circuit terminal listed below and ground.
 - E4J Park Lamp - Left Front terminal B (with X88)
 - E4N Park/Turn Signal Lamp - Left terminal G
 - E13LA Headlamp Assembly - Left terminal 1 (with Z88)
 - **If 5 Ω or greater**
 1. Ignition OFF.
 2. Test for less than 2 Ω in the ground circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , repair the open/high resistance in the ground connection.
 - **If less than 5 Ω**
3. Connect a test lamp between the appropriate control circuit terminal listed below and ground, ignition ON.
 - E4J Park Lamp - Left Front terminal A (with X88)
 - E4N Park/Turn Signal Lamp - Left terminal B
4. Verify the test lamp turns ON and OFF when commanding the Left Park Lamps ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.

st for infinite resistance between the control circuit and ground.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance

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

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K9 Body Control Module.

• **If the test lamp is always ON**

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

2. Test for less than 1 V between the control circuit terminal and ground.

- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, replace the K9 Body Control Module.

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

5. Test or replace the left park lamp.

DTC B3867

1. Ignition OFF, exterior lamps OFF, all doors closed, open and close drivers door, disconnect the harness connector at the appropriate right front park lamp.

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

- E4K Park Lamp - Right Front terminal B (with X88)
- E4P Park/Turn Signal Lamp - Right terminal G
- E13RA Headlamp Assembly - Right terminal 1 (with Z88)

• **If 5 Ω or greater**

1. Ignition OFF.

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

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

• **If less than 5 Ω**

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

- E4K Park Lamp - Right Front terminal A (with X88)
- E4P Park/Turn Signal Lamp - Right terminal B

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

• **If the test lamp is always OFF**

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

2. Test for infinite resistance between the control circuit and ground.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance

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

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K9 Body Control Module.

• **If the test lamp is always ON**

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

2. Test for less than 1 V between the control circuit terminal and ground.

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
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- If the test lamp turns ON and OFF

5. Test or replace the right park lamp.

Repair Instructions

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

- [Front Side Marker Lamp Bulb Replacement](#)
- [Front Turn Signal Lamp Bulb Replacement \(Chevrolet - Left Side\)](#)[Front Turn Signal Lamp Bulb Replacement \(GMC - Left Side\)](#)[Front Turn Signal Lamp Bulb Replacement \(Chevrolet - Right Side\)](#)[Front Turn Signal Lamp Bulb Replacement \(GMC - Right Side\)](#)
- [Control Module References](#) for BCM replacement, programming, and setup

DTC B2610: PASSENGER COMPARTMENT DIMMING 1

Diagnostic Instructions

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

DTC Descriptors

DTC B2610 02

Passenger Compartment Dimming 1 Circuit Short to Ground

DTC B2610 04

Passenger Compartment Dimming 1 Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
LED Backlight Dimming Control Terminal 8 X2	B2610 02	B2610 04	B2610 04	-
Dome/Reading Lamps - Front Ground	-	1	-	-
Door Lock Switch - Driver Ground	-	1	-	-
Door Lock Switch - Passenger Ground	-	1	-	-
Headlamp Switch Ground	-	1	-	-
Multifunction Switch - Instrument Panel Ground	-	1	-	-
Outside Rearview Mirror Switch Ground	-	1	-	-
Passenger Air Bag Disable Indicator Ground	-	1	-	-

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

Circuit/System Description

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

Conditions for Running the DTC

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

Conditions for Setting the DTC

DTC B2610 02

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

DTC B2610 04

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

Actions Taken When the DTC Sets

The BCM will disable the LED backlight dimming control circuits.

Conditions for Clearing the DTC

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

Reference Information

Schematic Reference

Interior Lights Dimming Schematics

Connector End View Reference

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Interior Lighting Systems Description and Operation

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

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

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

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, open and close drivers door, disconnect the harness connector at the component with inoperative backlighting. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10 Ω between the appropriate ground circuit terminal and ground.
 - **If 10 Ω or greater**
 1. Ignition OFF.
 2. Test for less than 2 Ω in the ground circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , repair the open/high resistance in the ground connection.
 - **If less than 10 Ω**
3. Connect a test lamp between the appropriate control circuit terminal and ground, ignition ON.
4. Verify the test lamp turns ON and OFF when commanding the LED Backlight Dimming ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K9 Body Control Module.

the test lamp is always ON	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
1. Ignition OFF, disconnect the X2 harness connector from the K9 Body Control Module, Ignition ON				
2. Test for less than 1 V between the control circuit terminal and ground.				
• If 1 V or greater, repair the short to voltage on the circuit.				
• If less than 1 V, replace the K9 Body Control Module.				
• If the test lamp turns ON and OFF				
5. Test or replace the component with inoperative backlighting.				

Repair Instructions

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

- [Headlamp Switch Replacement](#)
- [Instrument Panel Airbag Arming Status Display Replacement](#)
- [Door Lock Switch Replacement - Driver Side](#)
- [Door Lock Switch Replacement - Passenger Front](#)
- [Front Side Door Window Control Switch Replacement \(Crew Cab\)](#) [Front Side Door Window Control Switch Replacement \(Extended Cab\)](#)
- [Center Reading and Courtesy Lamp Replacement](#)
- [Control Module References](#) for BCM replacement, programming, and setup

DTC B2615: PASSENGER COMPARTMENT DIMMING 2

Diagnostic Instructions

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

DTC Descriptors

DTC B2615 02

Passenger Compartment Dimming 2 Circuit Short to Ground

DTC B2615 04

Passenger Compartment Dimming 2 Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
F15DA (BCM 6) Fuse B+	B270A 01, B2615 02	B270A 01, B2615 02	-	-
Dome Lamps Control - Terminal 5 X2	B2615 02	B2615 04	1	-
Dome/Reading Lamps - Front Ground	-	1	-	-
Dome/Reading Lamps - Rear Ground	-	1	-	-

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

Circuit/System Description

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

Conditions for Running the DTC

Battery voltage must be between 9-16 V.

Conditions for Setting the DTC

DTC B2615 02

- The BCM detects a short to ground in the dome lamps control circuit terminal 5 X2.
- The BCM detects a short to ground or an open/high resistance in the F15DA (BCM 6) fuse B+ circuit.

DTC B2615 04

The BCM detects an open/high resistance in the dome lamps control circuit terminal 5 X2.

Actions Taken When the DTC Sets

The BCM will disable the dome lamps control circuit.

Conditions for Clearing the DTC

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

Reference Information

Schematic Reference

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

Connector End View Reference

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or Repairs

- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.
2. Verify a test lamp illuminates between the B+ circuit terminal 4 and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF, disconnect the X1 harness connector at the X51A Fuse Block - Instrument Panel.
 2. Test for less than 2 Ω in the B+ circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , verify the fuse is not open and there is voltage at the fuse.
 - **If the test lamp does not illuminate and the circuit fuse is open**
 1. Ignition OFF, disconnect the X1 harness connector at the X51A Fuse Block - Instrument Panel.
 2. Test for infinite resistance between the B+ circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If the test lamp illuminates**
3. Ignition OFF, connect the X1 harness connector at the K9 Body Control Module.
4. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, open and close drivers door, disconnect the harness connectors at the components listed below. It may take up to 2 min for all vehicle systems to power down.
 - E37F Dome/Reading Lamps - Front
 - E37R Dome/Reading Lamps - Rear
5. Test for less than 10 Ω between the ground circuit terminal 6 and ground.
 - **If 10 Ω or greater**
 1. Ignition OFF.
 2. Test for less than 2 Ω in the ground circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , repair the open/high resistance in the ground connection.
 - **If less than 10 Ω**
6. Connect a test lamp between the control circuit terminal 2 and ground, ignition ON.
7. Verify the test lamp turns ON and OFF when commanding the Courtesy Lamps ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 Ω in the control circuit end to end.

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
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- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K9 Body Control Module.

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

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

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

8. Test or replace the E37 Dome/Reading Lamp.

Repair Instructions

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

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

DTC B2625: DISPLAY DIMMING PULSE WIDTH MODULATION OUTPUT

Diagnostic Instructions

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

DTC Descriptors

DTC B2625 01

Display Dimming Pulse Width Modulation Output Circuit Short to Battery

DTC B2625 02

Display Dimming Pulse Width Modulation Output Circuit Short to Ground

DTC B2625 04

Display Dimming Pulse Width Modulation Output Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Switch Indicator LED Backlight Dimming Control Terminal 5 X1	B2625 02	B2625 04	B2625 01	-
Lane Departure Switch Amber Indicator Control	B0987 06	B0987 06	1	-
Child Lockout Amber Indicator Control	2	2	2	-
1. Lane Departure Warning System Malfunction 2. Power Door Child Lock Malfunction				

Description

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

Conditions for Running the DTC

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

Conditions for Setting the DTC

DTC B2625 01

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

DTC B2625 02

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

DTC B2625 04

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

Actions Taken When the DTC Sets

The LED backlight dimming control circuit driver is shut down.

Conditions for Clearing the DTC

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

Reference Information

Schematic Reference

- [Interior Lights Dimming Schematics](#)
- [Door Lock/Indicator Schematics](#)
- [Object Detection Schematics](#)

Connector End View Reference

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[Interior Lighting Systems 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

Circuit/System Testing

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

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

1. Ignition OFF, disconnect the harness connectors at the components listed below.
 - S48A Multifunction Switch - Instrument Panel
 - S77 Transfer Case Shift Control Switch
 - S79D Window Switch - Driver
2. Ignition ON, place the dimmer switch in the HIGH position for high backlighting intensity.

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

3. Verify a test lamp illuminates between each control circuit terminal listed below and ground.
 - S48A Multifunction Switch - Instrument Panel terminal 2
 - S77 Transfer Case Shift Control Switch terminal 4
 - S79D Window Switch - Driver terminal 11
 - **If the test lamp does not illuminate**
 1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K9 Body Control Module.
 - **If the test lamp illuminates**
4. Place the dimmer switch in the LOW position for low backlighting intensity.
5. Verify a test lamp does not illuminate at FULL intensity between each control circuit terminal listed below and ground.
 - S48A Multifunction Switch - Instrument Panel terminal 2
 - S77 Transfer Case Shift Control Switch terminal 4
 - S79D Window Switch - Driver terminal 11

the test lamp illuminates at full intensity	Open/High Resistance	Short to Voltage	Signal Performance
1. Ignition OFF, disconnect the harness connector at the K9 Body Control Module, Ignition ON			
2. Test for less than 1 V between the control circuit terminal and ground.			
- If 1 V or greater, repair the short to voltage on the circuit. - If less than 1 V, replace the K9 Body Control Module.			
If the test lamp does not illuminate at full intensity			
6. Test or replace the inoperative component.			

Repair Instructions

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

- [Vehicle Stability Control System Switch Replacement](#)
- [Front Side Door Window Control Switch Replacement \(Crew Cab\) Front Side Door Window Control Switch Replacement \(Extended Cab\)](#)
- [Transfer Case Selector Switch Replacement](#)
- [Transfer Case Selector Switch Replacement](#)
- [Control Module References](#) for BCM replacement, programming, and setup

DTC B2645: AMBIENT LIGHT SENSOR

Diagnostic Instructions

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

DTC Descriptors

DTC B2645 03

Ambient Light Sensor Circuit Low Voltage

DTC B2645 07

Ambient Light Sensor Circuit High Voltage

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Ambient Light Sensor Signal	B2645 03	B2645 07	B2645 07	-
Ambient Light Sensor Low Reference	1	B2645 07, B0163 05, B0183 05	1	-
1. Daytime Running Lamps Malfunction				

Circuit/System Description

The ambient light sensor is used to monitor outside lighting conditions. The ambient light sensor provides a voltage signal that will vary between 0.2 and 4.9 V depending on outside lighting conditions. The body control module (BCM) provides a 5 V reference signal to the ambient light sensor and the HVAC control module provides a low reference ground. The BCM monitors the ambient light sensor signal circuit to determine if outside lighting

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

Conditions for Running the DTC

Battery voltage must be between 9-16 V.

Conditions for Setting the DTC

DTC B2645 03

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

DTC B2645 07

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

Actions Taken When the DTC Sets

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

Conditions for Clearing the DTC

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

Reference Information

Schematic Reference

Headlights/Daytime Running Lights (DRL) Schematics

Connector End View Reference

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

Scan Tool Reference

Control Module References for scan tool information

Testing

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, open and close drivers door, disconnect the harness connector at the B10B Ambient Light/Sunload Sensor. It may take up to 10 min for all vehicle systems to power down.
2. Test for less than 15 Ω between the low reference circuit terminal 6 and ground.
 - **If 15 Ω or greater**
 1. Ignition OFF, disconnect the X2 harness connector at the K33 HVAC Control Module.
 2. Test for less than 2 Ω in the low reference circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K33 HVAC Control Module.
 - **If less than 15 Ω**
3. Ignition ON.
4. Verify the scan tool Ambient Light Sensor parameter is greater than 4.65 V.
 - **If 4.65 V or less**
 1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit terminal 5 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If greater than 4.65 V**
5. Install a 3 A fused jumper wire between the signal circuit terminal 5 and the low reference circuit terminal 6.
6. Verify the scan tool Ambient Light Sensor parameter is less than 0.196 V.
 - **If 0.196 V or greater**
 1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the signal circuit terminal 5 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
 3. Test for less than 2 Ω in the signal circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K9 Body Control Module.
 - **If less than 0.196 V**
7. Test or replace the B10B Ambient Light/Sunload Sensor.

Repair Instructions

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

- [Sun Load Temperature and Headlamp Automatic Control Ambient Light Sensor Replacement](#)
- [Control Module References](#) for BCM or HVAC Control Module replacement, programming, and setup

DTC B2740: FRONT FOG LAMP SWITCH CIRCUIT 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	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
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DTC B2740 00

Front Fog Lamp Switch Circuit Malfunction

Diagnostic Fault Information

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

Circuit/System Description

The front fog lamp relay is supplied with battery voltage at all times. The front fog lamp switch signal circuit is grounded momentarily by pressing the front fog lamp switch. The body control module (BCM) energizes the front fog lamp relay by applying ground to the front fog lamp relay control circuit. When the front fog lamp relay is energized, the relay switch contacts close and battery voltage is applied through the F48UA fog lamp fuse to the front fog lamp control circuit which illuminates the front fog lamps. With the front fog lamp switch activated the BCM sends a message via serial data to the instrument cluster requesting the instrument cluster to illuminate the front fog indicator.

Conditions for Running the DTC

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

Conditions for Setting the DTC

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

Actions Taken When the DTC Sets

The front fog lamps are inoperative.

Conditions for Clearing the DTC

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

Reference Information

Schematic Reference

Fog Lights Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Exterior Lighting Systems Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

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

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
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Perform the [Diagnostic Repair Verification](#) after completing the repair.

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

DTC B3596: HAZARD LAMPS REQUEST CIRCUIT 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.

DTC Descriptor

DTC B3596 00

Hazard Lamps Request Circuit Malfunction

Diagnostic Fault Information

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

Circuit/System Description

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

Conditions for Running the DTC

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

Conditions for Setting the DTC

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

Actions Taken When the DTC Sets

The hazard lamps are inoperative.

Conditions for Clearing the DTC

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

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

Reference Information

Schematic Reference

Exterior Lights Schematics

Connector End View Reference

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- Wiring Repairs

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, open and close drivers door, disconnect the X1 harness connector at the S48A Multifunction Switch - Instrument Panel. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 5 Ω between the ground circuit terminal 14 and ground.
 - **If 5 Ω or greater**
 1. Ignition OFF.
 2. Test for less than 2 Ω in the ground circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , repair the open/high resistance in the ground connection.
 - **If less than 5 Ω**
3. Ignition ON.
4. Verify the scan tool Hazard Lamps Switch parameter is Inactive.
 - **If not Inactive**
 1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit terminal 11 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If Inactive**
5. Install a 3 A fused jumper wire between the signal circuit terminal 11 and ground.
6. Verify the scan tool Hazard Lamps Switch parameter is Active.
 - **If not Active**

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
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2. Test for less than 1 V between the signal circuit terminal 11 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
3. Test for less than 2 Ω in the signal circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K9 Body Control Module.
- **If Active**
7. Test or replace the S48A Multifunction Switch - Instrument Panel.

Repair Instructions

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

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

DTC B3650: HIGH BEAM REQUEST SIGNAL CIRCUIT PERFORMANCE

Diagnostic Instructions

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

DTC Descriptor

DTC B3650 08

High Beam Request Signal Circuit Performance - Signal Invalid

Diagnostic Fault Information

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

Description

When the low beam headlamps are on and the turn signal/multifunction switch is placed in the high beam position, ground is applied to the body control module (BCM) through the high beam signal circuit. The BCM responds to the high beam request by applying ground to the high beam relay control circuit which energizes the high beam relay. With the high beam relay energized, the switch contacts close allowing battery voltage to flow through the high beam fuses to the high beam control circuits illuminating the high beam headlamps.

Conditions for Running the DTC

Battery voltage must be between 9-16 V.

Conditions for Setting the DTC

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

Actions Taken When the DTC Sets

The high beam headlamps will not operate.

Conditions for Clearing the DTC

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

Reference Information

Schematic Reference

Headlights/Daytime Running Lights (DRL) Schematics

Connector End View Reference

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Exterior Lighting Systems Description and Operation

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, open and close drivers door, disconnect the harness connector at the S78 Turn Signal/Multifunction Switch. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 5 Ω between the ground circuit terminal 3 and ground.

5 Ω or greater

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

Repair Instructions

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

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

DTC B3806: HIGH BEAM AND HEADLAMP FLASH SELECT CIRCUIT 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.

DTC Descriptor

DTC B3806 00

High Beam and Headlamp Flash Select Circuit Malfunction

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

Circuit/System Description

When the turn signal/multifunction switch is momentarily placed in the flash to pass position, ground is applied to the body control module (BCM) through the flash to pass signal circuit. The BCM responds to the flash to pass request by applying ground to the high beam relay control circuit which energizes the high beam relay. With the high beam relay energized, the switch contacts close allowing battery voltage to flow through the high beam fuses to the high beam control circuits illuminating the high beam headlamps. The high beam headlamps will only illuminate for as long as the flash to pass switch is activated.

Conditions for Running the DTC

Battery voltage must be between 9-16 V.

Conditions for Setting the DTC

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

Actions Taken When the DTC Sets

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

Conditions for Clearing the DTC

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

Reference Information

Schematic Reference

Headlights/Daytime Running Lights (DRL) Schematics

Connector End View Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

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

Active Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
7. Test or replace the S78 Turn Signal Multifunction Switch.				

Repair Instructions

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

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

DTC B3881 OR B3882: TAIL LAMP

Diagnostic Instructions

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

DTC Descriptors

DTC B3881 02

Tail Lamp Circuit Short to Ground

DTC B3882 02

Right Tail Lamp Circuit Short to Ground

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Tail Lamp Control - Left Terminal 7 X4	B3881 02	1	1	-
Tail Lamp Control - Right Terminal 7 X5	B3882 02	1	1	-
Tail Lamp Assembly Ground - Left	-	1	-	-
Tail Lamp Assembly Ground - Right	-	1	-	-
1. Park, License, an/or Tail Lamps Malfunction				

Circuit/System Description

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

Conditions for Running the DTC

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

Conditions for Setting the DTC

DTC B3881 02

cts a short to ground in the left tail lamp control circuit terminal 7 X4.

DTC B3882 02

The BCM detects a short to ground in the right tail lamp control circuit terminal 7 X5.

Actions Taken When the DTC Sets

The appropriate tail lamps will not operate.

Conditions for Clearing the DTC

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

Diagnostic Aids

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

Reference Information

Schematic Reference

Exterior Lights Schematics

Connector End View Reference

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- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

DTC B3881

1. Ignition OFF, exterior lamps OFF, all doors closed, open and close drivers door, remove the appropriate E5 Tail/Stop and Turn Signal Lamp - Left bulb. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 5 Ω between the ground circuit at the socket terminal G and ground.
 - **If 5 Ω or greater**
 1. Ignition OFF.
 2. Test for less than 2 Ω in the ground circuit end to end.

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

- **If less than 5 Ω**

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

4. Verify the test lamp turns ON and OFF when commanding the Left Rear Stop/Park Lamp ON and OFF with a scan tool.

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

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

2. Test for infinite resistance between the control circuit and ground.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance

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

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K9 Body Control Module.

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

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

2. Test for less than 1 V between the control circuit terminal and ground.

- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, replace the K9 Body Control Module.

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

5. Test or replace the E5 Tail/Stop and Turn Signal Lamp - Left.

DTC B3882

1. Ignition OFF, exterior lamps OFF, all doors closed, open and close drivers door, remove the appropriate E5 Tail/Stop and Turn Signal Lamp - Right bulb. It may take up to 2 min for all vehicle systems to power down.

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

- **If 5 Ω or greater**

1. Ignition OFF.

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

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

- **If less than 5 Ω**

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

4. Verify the test lamp turns ON and OFF when commanding the Right Rear Stop/Park Lamp ON and OFF with a scan tool.

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

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

2. Test for infinite resistance between the control circuit and ground.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance

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

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K9 Body Control Module.

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
1. If the test lamp is always ON, disconnect the wiring harness connector from the K9 Body Control Module, and turn the ignition OFF.				
2. Test for less than 1 V between the control circuit terminal and ground.				
• If 1 V or greater, repair the short to voltage on the circuit.				
• If less than 1 V, replace the K9 Body Control Module.				
• If the test lamp turns ON and OFF				
5. Test or replace the E5 Tail/Stop and Turn Signal Lamp - Right.				

Repair Instructions

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

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

DTC B3883: LICENSE PLATE LAMP

Diagnostic Instructions

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

DTC Descriptors

DTC B3883 01

License Plate Lamp Circuit Short to Battery

DTC B3883 02

License Plate Lamp Circuit Short to Ground

DTC B3883 04

License Plate Lamp Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
F1DA (BCM 1) Fuse B+	B0790 06, B0987 06, B1011 00, B1517 07, U152D 00	B0790 06, B0987 06, B1011 00, B1517 07, U152D 00	-	-
License Plate Lamps Control	B3883 02	B3883 01, B3883 04	B3883 01, B3883 04	-
License Plate Lamp Ground - Right	-	1	-	-
License Plate Lamp Ground - Left	-	1	-	-

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

Circuit/System Description

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

Conditions for Running the DTC

Battery voltage must be between 9-16 V.

DTC B3883 01

Headlamp switch in OFF position.

DTC B3883 02 or B3883 04

Headlamp switch in AUTO, PARK or ON positions.

Conditions for Setting the DTC

DTC B3883 01 and DTC B3883 04

- The BCM detects a short to voltage or an open/high resistance in the license lamps control circuit.
- The BCM detects an open/high resistance in the license lamps ground circuit.

DTC B3883 02

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

Actions Taken When the DTC Sets

DTC B3883 01

License lamps always ON.

DTC B3883 02 or B3883 04

License lamps inoperative.

Conditions for Clearing the DTC

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

Diagnostic Aids

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

Reference Information

Schematic Reference

Lights Schematics

- Body Control System Schematics

Connector End View Reference

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Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, all doors closed, open and close drivers door, remove both E7 License Plate Lamp bulbs. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 5 Ω between each ground circuit terminal B and ground.
 - **If 5 Ω or greater**
 1. Ignition OFF.
 2. Test for less than 2 Ω in the ground circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , repair the open/high resistance in the ground connection.
 - **If less than 5 Ω**
3. Connect a test lamp between the E7L License Plate Lamp - Left control circuit terminal A and ground, ignition ON.
4. Verify the test lamp turns ON and OFF when commanding the License Plate Lamps ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K9 Body Control Module.
 - **If the test lamp is always ON**
 1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the control circuit terminal and ground.

- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, replace the K9 Body Control Module.

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
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5. Ignition OFF.

6. Connect a test lamp between the E7R License Plate Lamp - Right control circuit terminal A and ground, ignition ON.

7. Verify the test lamp turns ON and OFF when commanding the License Plate Lamps ON and OFF with a scan tool.

• **If the test lamp is always OFF**

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

2. Test for infinite resistance between the control circuit and ground.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance

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

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

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

8. Test or replace the appropriate E7 License Plate Lamp bulb.

Repair Instructions

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

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

DTC B3884: CENTER HIGH MOUNTED BRAKE LAMP

Diagnostic Instructions

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

DTC Descriptors

DTC B3884 01

Center High Mounted Brake Lamp Circuit Short to Battery

DTC B3884 02

Center High Mounted Brake Lamp Circuit Short to Ground

DTC B3884 04

Center High Mounted Brake Lamp Circuit Open

Diagnostic Fault Information

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

Circuit/System Description

The brake pedal position sensor is used to sense the action of the driver application of the brake pedal. The brake pedal position sensor provides an analog voltage signal that will increase as the brake pedal is applied. The body control module (BCM) provides a low reference signal and a 5 V reference voltage to the brake pedal position sensor. When the variable signal reaches a voltage threshold indicating the brakes have been applied, the BCM energizes the center high mounted stop lamp relay by applying voltage to the center high mounted stop lamp relay control circuit. When the center high mounted stop lamp relay is energized, the relay switch contacts close and battery voltage is applied through the F36UA fuse to the center high mounted stop lamp control circuit which illuminates the center high mounted stop lamp.

Conditions for Running the DTC

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

Conditions for Setting the DTC

DTC B3884 01

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

DTC B3884 02

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

DTC B3884 04

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

Actions Taken When the DTC Sets

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

Conditions for Clearing the DTC

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

Reference Information

Schematic Reference

ts Schematics

Connector End View Reference

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- 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, all doors closed, open and close drivers door, disconnect the KR41 Center High Mounted Stop Lamp Relay. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 5 Ω between the ground circuit terminal 86 and ground.
 - **If 5 Ω or greater**
 1. Ignition OFF.
 2. Test for less than 2 Ω in the ground circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , repair the open/high resistance in the ground connection.
 - **If less than 5 Ω**
3. Connect a test lamp between the control circuit terminal 85 and ground, ignition ON.
4. Verify the test lamp turns ON and OFF when commanding the Center Stop Lamp ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit terminal and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K9 Body Control Module.
 - **If the test lamp is always ON**
 1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.

the test lamp turns ON and OFF to	Open/High	Short to	Signal
Circuit	Resistance	Voltage	Performance
5. Test or replace the KR41 Center High Mounted Stop Lamp Relay.			

Repair Instructions

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

- [Relay Replacement \(Attached to Wire Harness\)](#) [Relay Replacement \(Within an Electrical Center\)](#)
- [Control Module References](#) for BCM replacement, programming, and setup

DTC B3948 OR B3949: FRONT TURN SIGNAL

Diagnostic Instructions

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

DTC Descriptors

DTC B3948 01

Left Front Turn Signal Circuit Short to Battery

DTC B3948 02

Left Front Turn Signal Circuit Short to Ground

DTC B3948 04

Left Front Turn Signal Circuit Open

DTC B3949 01

Right Front Turn Signal Circuit Short to Battery

DTC B3949 02

Right Front Turn Signal Circuit Short to Ground

DTC B3949 04

Right Front Turn Signal Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
F25DA (BCM 7) Fuse B+	1	1	-	-
Turn Signal Switch Signal - Left	1	1	1	-
Turn Signal Switch Signal - Right	1	1	1	-
Turn Signal Control - Left Front	B3948 02	B3948 04	B3948 01	-
Stop/Turn Signal Lamp Control - Left	B3950 02, B3950 04	B3950 04	B3950 01	-

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Turn Signal Control - Right Front	B3949 02	B3949 04	B3949 01	-
Stop/Turn Signal Lamp Control - Right	B3951 02, B3951 04	B3951 04	B3951 01	-
Turn Signal Lamp Ground - Left Front	-	1	-	-
Turn Signal Lamp Ground - Right Front	-	1	-	-
Stop/Turn Signal Lamp Ground - Left Rear	-	1	-	-
Stop/Turn Signal Lamp Ground - Right Rear	-	1	-	-
Turn Signal/Multifunction Switch Ground	-	1	-	-
1. Turn Signal Lamps and/or Indicators Malfunction				

Circuit/System Description

Ground is applied at all times to the turn signal/multifunction switch. The turn signal lamps may only be activated with the ignition switch in the ON or START positions. When the turn signal/multifunction switch is placed in either the TURN RIGHT or TURN LEFT position, ground is applied to the body control module (BCM) through either the right turn or left turn signal switch signal circuit. The BCM responds to the turn signal switch input by applying a pulsating voltage to the front and rear turn signal lamps through their respective control circuits. When a turn signal request is received by the BCM, a serial data message is sent to the instrument cluster requesting the respective turn signal indicator be pulsed ON and OFF.

Conditions for Running the DTC

Battery voltage must be between 9-16 V.

Conditions for Setting the DTC

DTC B3948 01 and B3948 04

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

DTC B3948 02

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

DTC B3949 01 and B3949 04

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

DTC B3949 02

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

Actions Taken When the DTC Sets

DTC B3948

front turn signal is inoperative.

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

DTC B3949

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

Conditions for Clearing the DTC

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

Diagnostic Aids

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

Reference Information

Schematic Reference

Exterior Lights Schematics

Connector End View Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

DTC B3948

1. Ignition OFF, exterior lamps OFF, remove the bulb at the E4N Park/Turn Signal Lamp - Left. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 5 Ω between the ground circuit at the socket terminal G and ground.
 - **If 5 Ω or greater**

ition OFF.

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

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

• **If less than 5 Ω**

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

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

• **If the test lamp is always OFF**

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

2. Test for infinite resistance between the control circuit and ground.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance

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

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K9 Body Control Module.

• **If the test lamp is always ON**

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

2. Test for less than 1 V between the control circuit terminal and ground.

- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, replace the K9 Body Control Module.

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

5. Test or replace the E4N Park/Turn Signal Lamp - Left.

DTC B3949

1. Ignition OFF, exterior lamps OFF, remove the bulb at the E4P Park/Turn Signal Lamp - Right. It may take up to 2 min for all vehicle systems to power down.

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

• **If 5 Ω or greater**

1. Ignition OFF.

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

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

• **If less than 5 Ω**

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

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

• **If the test lamp is always OFF**

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

2. Test for infinite resistance between the control circuit and ground.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance

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

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K9 Body Control Module.
- **If the test lamp is always ON**
 1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
- **If the test lamp turns ON and OFF**
 5. Test or replace the E4P Park/Turn Signal Lamp - Right.

Repair Instructions

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

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

DTC B3950 OR B3951: LEFT/RIGHT REAR TURN SIGNAL

Diagnostic Instructions

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

DTC Descriptors

DTC B3950 01

Left Rear Turn Signal Circuit Short to Battery

DTC B3950 02

Left Rear Turn Signal Circuit Short to Ground

DTC B3950 04

Left Rear Turn Signal Circuit Open

DTC B3951 01

Right Rear Turn Signal Circuit Short to Battery

DTC B3951 02

Right Rear Turn Signal Circuit Short to Ground

DTC B3951 04

Right Rear Turn Signal Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
F25DA (BCM 7) Fuse B+	1	1	-	-
Turn Signal Switch Signal - Left	1	1	1	-
Turn Signal Switch Signal - Right	1	1	1	-
Turn Signal Control - Left Front	B3948 02	B3948 04	B3948 01	-
Stop/Turn Signal Lamp Control - Left	B3950 02, B3950 04	B3950 04	B3950 01	-
Turn Signal Control - Right Front	B3949 02	B3949 04	B3949 01	-
Stop/Turn Signal Lamp Control - Right	B3951 02, B3951 04	B3951 04	B3951 01	-
Turn Signal Lamp Ground - Left Front	-	1	-	-
Turn Signal Lamp Ground - Right Front	-	1	-	-
Stop/Turn Signal Lamp Ground - Left Rear	-	1	-	-
Stop/Turn Signal Lamp Ground - Right Rear	-	1	-	-
Turn Signal/Multifunction Switch Ground	-	1	-	-
1. Turn Signal Lamps and/or Indicators Malfunction				

Circuit/System Description

Ground is applied at all times to the turn signal/multifunction switch. The turn signal lamps may only be activated with the ignition switch in the ON or START positions. When the turn signal/multifunction switch is placed in either the TURN RIGHT or TURN LEFT position, ground is applied to the body control module (BCM) through either the right turn or left turn signal switch signal circuit. The BCM responds to the turn signal switch input by applying a pulsating voltage to the front and rear turn signal lamps through their respective control circuits. When a turn signal request is received by the BCM, a serial data message is sent to the instrument cluster requesting the respective turn signal indicator be pulsed ON and OFF.

Conditions for Running the DTC

Battery voltage must be between 9-16 V.

Conditions for Setting the DTC

DTC B3950 01

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

DTC B3950 02 and B3950 04

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

DTC B3951 01

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

DTC B3951 02 and B3951 04

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

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

Actions Taken When the DTC Sets

DTC B3950

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

DTC B3951

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

Conditions for Clearing the DTC

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

Diagnostic Aids

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

Reference Information

Schematic Reference

Exterior Lights Schematics

Connector End View Reference

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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, exterior lamps OFF, all doors closed, open and close drivers door, remove the appropriate tail/stop and turn signal lamp bulb listed below. It may take up to 2 min for all vehicle systems to power down.
 - E5U Tail/Stop and Turn Signal Lamp - Left Lower
 - E5AG Tail/Stop and Turn Signal Lamp - Left Upper
2. Test for less than 5 Ω between the ground circuit at the socket terminal G and ground.
 - **If 5 Ω or greater**
 1. Ignition OFF.
 2. Test for less than 2 Ω in the ground circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , repair the open/high resistance in the ground connection.
 - **If less than 5 Ω**
3. Connect a test lamp between the control circuit at the socket terminal A and ground, ignition ON.
4. Verify the test lamp turns ON and OFF when commanding the Left Rear Turn Signal/Stop Lamp ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K9 Body Control Module.
 - **If the test lamp is always ON**
 1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
5. Replace the E5 Tail/Stop and Turn Signal Lamp - Left.

DTC B3951

1. Ignition OFF, exterior lamps OFF, all doors closed, open and close drivers door, remove the appropriate tail/stop and turn signal lamp bulb listed below. It may take up to 2 min for all vehicle systems to power down.
 - E5V Tail/Stop and Turn Signal Lamp - Right Lower
 - E5AH Tail/Stop and Turn Signal Lamp - Right Upper
2. Test for less than 5 Ω between the ground circuit at the socket terminal G and ground.
 - **If 5 Ω or greater**
 1. Ignition OFF.
 2. Test for less than 2 Ω in the ground circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.

• If less than 2 Ω , repair the open/high resistance in the ground connection.	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
• If less than 5 Ω				

3. Connect a test lamp between the control circuit at the socket terminal A and ground, ignition ON.
4. Verify the test lamp turns ON and OFF when commanding the Right Rear Turn Signal/Stop Lamp ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K9 Body Control Module.
 - **If the test lamp is always ON**
 1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
5. Replace the E5 Tail/Stop and Turn Signal Lamp - Right.

Repair Instructions

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

- [Stop and Tail Lamp Bulb Replacement](#)
- [Rear Body Structure Stop Lamp Replacement \(Chevrolet\)](#)[Rear Body Structure Stop Lamp Replacement \(GMC\)](#)
- [Control Module References](#) for BCM replacement, programming, and setup

DTC C0010: REVERSE GEAR SIGNAL CIRCUIT NOT PLAUSIBLE

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 C0010 5A

Reverse Gear Signal Circuit Not Plausible

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Backup Lamp Switch Signal	1	1	1	C0010 5A

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

Circuit/System Description

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

Conditions for Running the DTC

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

Conditions for Setting the DTC

The ECM detects a stuck backup lamp switch.

Conditions for Clearing the DTC

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

Reference Information

Schematic Reference

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

Connector End View Reference

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- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, exterior lamps OFF, all doors closed, disconnect the harness connector at the B16 Backup Lamp Switch. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 5 Ω between the ground circuit terminal B and ground.
 - **If 5 Ω or greater**
 1. Ignition OFF.
 2. Test for less than 2 Ω in the ground circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , repair the open/high resistance in the ground connection.
 - **If less than 5 Ω**
3. Ignition ON.
4. Verify the scan tool Reverse Position Switch parameter is Off.
 - **If not Off**
 1. Ignition OFF, disconnect the X3 harness connector at the K20 Engine Control Module.
 2. Test for infinite resistance between the signal circuit terminal A and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K20 Engine Control Module.
 - **If Off**
5. Install a 3 A fused jumper wire between the signal circuit terminal A and ground.
6. Verify the scan tool Reverse Position Switch parameter is On.
 - **If not On**
 1. Ignition OFF, disconnect the X3 harness connector at the K20 Engine Control Module, ignition ON.
 2. Test for less than 1 V between the signal circuit terminal A and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
 3. Test for less than 2 Ω in the signal circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K20 Engine Control Module.
 - **If On**
7. Test or replace the B16 Backup Lamp Switch.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.

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

DTC C0277 OR C0890: BRAKE PEDAL POSITION SENSOR /CONTROL MODULE VOLTAGE

Diagnostic Instructions

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

Strategy Based Diagnosis	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
• Diagnostic Procedure Instructions	Provides an overview of each diagnostic approach.			

DTC Descriptors

DTC C0277 06

Brake Pedal Position Sensor Circuit Low Voltage/Open

DTC C0277 07

Brake Pedal Position Sensor Circuit High Voltage

DTC C0277 09

Brake Pedal Position Sensor Circuit Too Fast Transitions

DTC C0277 12

Brake Pedal Position Sensor Circuit Below Minimum Threshold

DTC C0277 4B

Brake Pedal Position Sensor Circuit Calibration Not Learned

DTC C0890 03

Control Module Voltage Reference Output 3 Circuit Low Voltage

DTC C0890 07

Control Module Voltage Reference Output 3 Circuit High Voltage

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Brake Pedal Position Sensor 5 V Reference	B1011 00, C0277 06, C0890 03, U0422 71	B1011 00, C0277 06, U0422 71	B1011 00, C0277 07, C0890 07, U0422 71	C0277 09, C0277 12
Brake Pedal Position Sensor Signal	B1011 00, C0277 06, U0422 71	B1011 00, C0277 06, U0422 71	B1011 00, C0277 07, C0890 07, U0422 71	C0277 09, C0277 12
Brake Pedal Position Sensor Low Reference	-	B1011 00, C0277 07, U0422 71	1	-
1. Stop Lamps Malfunction				

Circuit/System Description

The brake pedal position sensor is used to sense the action of the driver application of the brake pedal. The brake pedal position sensor provides an analog voltage signal that will increase as the brake pedal is applied. The body control module (BCM) provides a low reference signal and a 5 V reference voltage to the brake pedal position sensor. When the variable signal reaches a voltage threshold indicating the brakes have been applied, the BCM will

oltage to the left and right stop lamp control circuits as well as the center high mounted stop lamp relay control circuit illuminating the left and right stop lamps and the center high mounted stop lamp.

Conditions for Running the DTC

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

Conditions for Setting the DTC

DTC C0277 06

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

DTC C0277 07

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

DTC C0277 09

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

DTC C0277 4B

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

DTC C0890 03

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

DTC C0890 07

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

Actions Taken When the DTC Sets

- The Traction Control Malfunction indicator is commanded ON.
- For DTC C0277 4B, the stop lamps may not activate at the expected brake pedal positions.

Conditions for Clearing the DTC

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

Schematic Reference

Exterior Lights Schematics

Connector End View Reference

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Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

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

1. Ignition OFF, disconnect the harness connector at the B22 Brake Pedal Position Sensor, ignition ON.
2. Verify a test lamp illuminates between the appropriate low reference circuit terminal listed below and B+.
 - Terminal 2 - with MYB
 - Terminal A - without MYB
 - **If the test lamp does not illuminate**
 1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.
 2. Test for less than 2 Ω in the low reference circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K9 Body Control Module.
 - **If the test lamp illuminates**
3. Ignition ON.
4. Test for 4.8-5.2 V between the appropriate 5 V reference circuit terminal listed below and ground.
 - Terminal 1 - with MYB
 - Terminal C - without MYB
 - **If less than 4.8 V**
 1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the 5 V reference circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 Ω in the 5 V reference circuit end to end.

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K9 Body Control Module.
- **If greater than 5.2 V**
 1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the 5 V reference circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
- **If between 4.8-5.2 V**
- 5. Test for less than 1 V between the appropriate signal circuit terminal listed below and ground.
 - Terminal 3 - with MYB
 - Terminal B - without MYB
- **If 1 V or greater**
 1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the signal circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
- **If less than 1 V**

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

6. Install a 3 A fused jumper wire between the appropriate 5 V reference circuit terminal and signal circuit terminal listed below.
 - 5 V reference terminal 1 and signal terminal 3 - with MYB
 - 5 V reference terminal C and signal terminal B - without MYB
7. Verify the scan tool Brake Pedal Applied parameter is Active for 2 s before defaulting to Inactive.
 - **If not Active**
 1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 Ω in the signal circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K9 Body Control Module.
 - **If Active**
8. Test or replace the B22 Brake Pedal Position Sensor.

DTC C0277 4B

1. Verify DTC C0277 4B is not set.
 - **If DTC C0277 4B is set**
 1. Ignition ON
 2. Perform the brake pedal position sensor learn procedure for the K9 Body Control Module. Refer to [Brake Pedal Position Sensor Calibration](#).

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

- If the DTC does not reset

4. All OK.

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

2. All OK.

DTC C0277 09

1. Verify DTC C0277 09 is not set.

- **If DTC C0277 09 is set**

1. Replace the B22 Brake Pedal Position Sensor.

2. Perform the brake pedal position sensor learn procedure for the K9 Body Control Module. Refer to [Brake Pedal Position Sensor Calibration](#).

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

- If the DTC resets, replace the K9 Body Control Module.
- If the DTC does not reset

4. All OK.

- **If DTC C0277 09 is not set**

2. All OK.

Repair Instructions

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

- [Brake Pedal Position Sensor Calibration](#)
- [Brake Pedal Position Sensor Replacement](#)
- [Control Module References](#) for BCM replacement, programming, and setup

DTC C0297: BRAKE APPLIED OUTPUT

Diagnostic Instructions

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

DTC Descriptors

DTC C0297 01

Brake Applied Output Circuit Short to Battery

DTC C0297 02

Brake Applied Output Circuit Short to Ground

Diagnostic Fault Information

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

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Brake Applied Signal	C0297 02	1	C0297 01	-
1. Cruise Control Malfunction				

Circuit/System Description

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

Conditions for Running the DTC

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

Conditions for Setting the DTC

DTC C0297 01

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

DTC C0297 02

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

Actions Taken When the DTC Sets

The cruise control system is disabled.

Conditions for Clearing the DTC

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

Diagnostic Aids

Verify that the brake pedal position sensor is properly calibrated.

Reference Information

Schematic Reference

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

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

Scan Tool Reference

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

Circuit/System Testing

1. Ignition OFF, disconnect the X1 harness connector at the K20 Engine Control Module.
2. Connect a test lamp between the appropriate signal circuit terminal listed below and ground, ignition ON.
 - Terminal 50 - with LCV
 - Terminal 57 - with LFX
3. Verify the test lamp turns ON and OFF while pressing and releasing the brake pedal.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 Ω in the signal circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K9 Body Control Module.
 - **If the test lamp is always ON**
 1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the signal circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
4. Replace the K20 Engine Control Module.

Repair Instructions

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

- [Brake Pedal Position Sensor Calibration](#)
- [Control Module References](#) for BCM or ECM replacement, programming, and setup

SYMPTOMS - LIGHTING

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

- Perform the [Diagnostic System Check - Vehicle](#) before using a symptom table in order to verify that all of the following conditions are true:
 - There are no DTCs set.

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
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- Review the system description and operation in order to familiarize yourself with the system functions. Refer to the following:

- [Exterior Lighting Systems Description and Operation](#)
- [Interior Lighting Systems Description and Operation](#)

Visual/Physical Inspection

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

Intermittent

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

Symptom List

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

- [Backup Lamps Malfunction \(Automatic Transmission\)](#)[Backup Lamps Malfunction \(Manual Transmission\)](#)
- [Cargo Lamps Malfunction](#)
- [Courtesy Lamps Malfunction](#)
- [Daytime Running Lamps Malfunction](#)
- [Dome Lamps Malfunction](#)
- [Front Fog Lamps Malfunction](#)
- [Hazard Lamps Malfunction](#)
- [Headlamps Malfunction](#)
- [Interior Backlighting Malfunction](#)
- [Park, License, and/or Tail Lamps Malfunction](#)
- [Stop Lamps Malfunction](#)
- [Trailer Lamps Malfunction](#)
- [Turn Signal Lamps and/or Indicators Malfunction](#)

BACKUP LAMPS MALFUNCTION (AUTOMATIC TRANSMISSION)

Diagnostic Instructions

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

Diagnostic Fault Information

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

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
F5DA (BCM 2) Fuse B+	B127B 2B	B127B 2B	-	-
Backup Lamps Control	B127B 2B, B2545 02	B127B 2B, B2545 04	B2545 01	-
Backup Lamp - Left Ground	-	1	-	-
Backup Lamp - Right Ground	-	1	-	-
1. Backup Lamps Malfunction				

Circuit/System Description

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

Diagnostic Aids

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

Reference Information

Schematic Reference

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

Connector End View Reference

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- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

Scan Tool Reference

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

Circuit/System Testing

1. Ignition OFF, all doors closed, all accessories off, open and close drivers door, disconnect the harness connector at the appropriate E5 Backup Lamp bulb. It may take up to 2 min for all vehicle systems to power down.

less than 5 Ω between the ground circuit of the socket terminal B and ground.

• **If 2 Ω or greater**

**Short to
Ground**

**Open/High
Resistance**

**Short to
Voltage**

**Signal
Performance**

1. Ignition OFF.
2. Test for less than 2 Ω in the ground circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , repair the open/high resistance in the ground connection.
- **If less than 5 Ω**
3. Connect a test lamp between the control circuit at the socket terminal A and ground, ignition ON.
4. Verify the test lamp turns ON and OFF when commanding the Backup Lamps ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K9 Body Control Module.
 - **If the test lamp is always ON**
 1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
5. Test or replace the E5 Backup Lamp.

Repair Instructions

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

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

BACKUP LAMPS MALFUNCTION (MANUAL TRANSMISSION)

Diagnostic Instructions

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

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
F5DA (BCM 2) Fuse B+	B127B 2B	B127B 2B	-	-
Backup Lamp Switch Signal	1	1	1	-

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

Circuit/System Description

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

Reference Information

Schematic Reference

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

Connector End View Reference

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Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

Scan Tool Reference

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

Circuit/System Verification

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

Refer to Backup Lamp Switch Malfunction.

the parameter changes

3. Verify the backup lamps turn ON and OFF when commanding the Backup Lamps ON and OFF with a scan tool.

- **If the backup lamps do not turn ON and OFF**

Refer to Backup Lamps Malfunction.

- **If the backup lamps turn ON and OFF**

4. All OK.

Circuit/System Testing

Backup Lamp Switch Malfunction

1. Ignition OFF, exterior lamps OFF, all doors closed, disconnect the harness connector at the B16 Backup Lamp Switch. It may take up to 2 min for all vehicle systems to power down.

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

- **If 10 Ω or greater**

1. Ignition OFF.

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

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

- **If less than 10 Ω**

3. Ignition ON.

4. Verify the scan tool Reverse Position Switch parameter is Off.

- **If not Off**

1. Ignition OFF, disconnect the X3 harness connector at the K20 Engine Control Module.

2. Test for infinite resistance between the signal circuit terminal A and ground.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance, replace the K20 Engine Control Module.

- **If Off**

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

6. Verify the scan tool Reverse Position Switch parameter is On.

- **If not On**

1. Ignition OFF, disconnect the X3 harness connector at the K20 Engine Control Module, ignition ON.

2. Test for less than 1 V between the signal circuit terminal A and ground.

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

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

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K20 Engine Control Module.

- **If On**

7. Test or replace the B16 Backup Lamp Switch.

Backup Lamps Malfunction

OFF, all doors closed, all accessories off, open and close drivers door, disconnect the harness connector at the appropriate E5 Backup Lamp bulb. It may take up to 2 min for all vehicle systems to power down.

	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
2. Test for less than 5 Ω between the ground circuit at the socket terminal B and ground				

• If 5 Ω or greater

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

• If less than 5 Ω

3. Connect a test lamp between the control circuit at the socket terminal A and ground, ignition ON.
4. Verify the test lamp turns ON and OFF when commanding the Backup Lamps ON and OFF with a scan tool.

• If the test lamp is always OFF

1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module.
2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
3. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K9 Body Control Module.

• If the test lamp is always ON

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

• If the test lamp turns ON and OFF

5. Test or replace the E5 Backup Lamp.

Repair Instructions

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

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

CARGO LAMPS MALFUNCTION

Diagnostic Instructions

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

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
F25DA (BCM 7) Fuse B+	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Cargo Lamps Relay Control	B2560 02	B2560 04	B2560 01	-
Cargo Lamps Control	1	1	1	-
Cargo Lamps Switch Signal	1	1	1	-
Cargo Lamps Ground	1	1	1	-
Cargo Lamps Relay Ground	-	1	-	-
Cargo Lamps Switch Ground	-	1	-	-
1. Cargo Lamps Malfunction				

Circuit/System Description

The cargo lamp relay is supplied with battery voltage at all times. The cargo lamp switch signal circuit is grounded momentarily by pressing the cargo lamp switch. The body control module (BCM) energizes the cargo lamp relay by applying ground to the cargo lamp relay control circuit. When the cargo lamp relay is energized, the relay switch contacts close and battery voltage is applied through the F7UA fuse to the cargo lamp control circuit which illuminates the cargo lamps.

Diagnostic Aids

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

Reference Information

Schematic Reference

- [Exterior Lights Schematics](#)
- [Interior Lights Schematics](#)

Connector End View Reference

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- [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.

the scan tool Pickup Bed Cargo Lamp Command parameter changes between 0 % and 100 % while commanding the cargo lamps ON and OFF with the cargo lamp switch.

- **If the parameter does not change between 0 % and 100 %**

Refer to Cargo Lamp Switch Malfunction.

- **If the parameter changes between 0 % and 100 %**

3. Verify the cargo lamps turn ON and OFF when commanding the Pickup Bed Cargo Lamp ON and OFF with a scan tool.

- **If the cargo lamps do not turn ON and OFF**

Refer to Cargo Lamps Malfunction.

- **If the cargo lamps turn ON and OFF**

4. All OK.

Circuit/System Testing

Cargo Lamp Switch Malfunction

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, open and close drivers door, disconnect the harness connector at the S48A Multifunction Switch - Instrument Panel. It may take up to 2 min for all vehicle systems to power down.

2. Test for less than 5 Ω between the ground circuit terminal 14 and ground.

- **If 5 Ω or greater**

1. Ignition OFF.

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

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

- **If less than 5 Ω**

3. Ignition ON.

4. Verify the scan tool Pickup Bed Cargo Lamp Command parameter is 0 %.

- **If not 0 %**

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

2. Test for infinite resistance between the signal circuit terminal 18 and ground.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance, replace the K9 Body Control Module.

- **If 0 %**

5. Install a 3 A fused jumper wire between the signal circuit terminal 18 and ground.

6. Verify the scan tool Pickup Bed Cargo Lamp Command parameter is 100 %.

- **If not 100 %**

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

2. Test for less than 1 V between the signal circuit terminal 18 and ground.

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

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

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

- If less than 2 Ω , replace the K9 Body Control Module.
- **If 100 %**

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

Cargo Lamps Malfunction

1. Ignition OFF, all doors closed, open and close drivers door, disconnect the KR112 Cargo Lamp Relay. It may take up to 2 min for all vehicle systems to power down.

2. Test for less than 5 Ω between the ground circuit terminal 85 and ground.

- **If 5 Ω or greater**

1. Ignition OFF.

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

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

- **If less than 5 Ω**

3. Ignition ON.

4. Verify a test lamp illuminates between the B+ circuit terminal 30 and ground.

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

Replace the X50A Fuse Block - Underhood.

- **If the test lamp illuminates**

5. Ignition OFF, connect a test lamp between the control circuit terminal 86 and ground, ignition ON.

6. Verify the test lamp turns ON and OFF when commanding the Pickup Bed Cargo Lamp ON and OFF with a scan tool.

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

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

2. Test for infinite resistance between the control circuit terminal and ground.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance

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

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K9 Body Control Module.

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

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

2. Test for less than 1 V between the control circuit terminal and ground.

- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, replace the K9 Body Control Module.

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

7. Ignition OFF, connect the KR112 Cargo Lamp Relay.

8. Ignition OFF, all doors closed, open and close drivers door, remove the appropriate E33 Cargo Lamp bulb. It may take up to 2 min for all vehicle systems to power down.

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

- **If 5 Ω or greater**

1. Ignition OFF.

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
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- If less than 2 Ω , repair the open/high resistance in the ground connection.

- **If less than 5 Ω**

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

11. Verify the test lamp turns ON and OFF when commanding the Pickup Bed Cargo Lamp ON and OFF with a scan tool.

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

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

2. Test for infinite resistance between the control circuit and ground.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance

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

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the KR112 Cargo Lamp Relay.

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

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

2. Test for less than 1 V between the control circuit terminal and ground.

- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, replace the KR112 Cargo Lamp Relay.

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

12. Test or replace the E33 Cargo Lamp.

Repair Instructions

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

- [High Mount Stop Lamp Bulb Replacement \(Cargo\)](#)[High Mount Stop Lamp Bulb Replacement \(Stop\)](#)
- [Fuse Block Replacement](#)
- [Vehicle Stability Control System Switch Replacement](#)
- [Control Module References](#) for BCM replacement, programming, and setup

COURTESY LAMPS MALFUNCTION

Diagnostic Instructions

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

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
F5DA (BCM 2) Fuse B+	B127B 2B	B127B 2B	-	-
Courtesy Lamps Control - Terminal 2 X7	B1480 02	1	1	-

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Dome/Reading Lamps - Front Ground	-	1	-	-
Dome/Reading Lamps - Rear Ground	-	1	-	-
Sunshade Mirror Lamp - Left Ground	-	1	-	-
Sunshade Mirror Lamp - Right Ground	-	1	-	-
1. Courtesy Lamps Malfunction				

Circuit/System Description

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

Reference Information

Schematic Reference

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

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Interior Lighting Systems Description and Operation

Electrical Information Reference

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, open and close drivers door, disconnect the harness connector at the inoperative courtesy lamp. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10 Ω between the appropriate ground circuit terminal listed below and ground.

• A3L Sunshade - Left - terminal B (with D61)

- A3R Sunshade - Right - terminal B (with D61)
- E37F Dome/Reading Lamps - Front terminal 6
- E37R Dome/Reading Lamps - Rear terminal 6 (with TRO)
- **If 10 Ω or greater**

1. Ignition OFF.

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

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

• **If less than 10 Ω**

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

- A3L Sunshade - Left - terminal A (with D61)
- A3R Sunshade - Right - terminal A (with D61)
- E37F Dome/Reading Lamps - Front terminal 1
- E37R Dome/Reading Lamps - Rear terminal 1 (with TRO)

4. Verify the test lamp turns ON and OFF when commanding the Inadvertent Load ON and OFF with a scan tool.

• **If the test lamp is always OFF**

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

2. Test for infinite resistance between the control circuit and ground.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance

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

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K9 Body Control Module.

• **If the test lamp is always ON**

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

2. Test for less than 1 V between the control circuit terminal and ground.

- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, replace the K9 Body Control Module.

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

5. Test or replace the courtesy lamp.

Repair Instructions

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

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

DAYTIME RUNNING LAMPS MALFUNCTION

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.

Strategy Based Diagnosis	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Diagnostic Procedure Instructions				

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Ambient Light Sensor Signal	B2645 03	B2645 07	B2645 07	-
Low Beam Headlamp Control - Left	B2575 02	B2575 04	B2575 01	-
Low Beam Headlamp Control - Right	B2699 02	B2699 04	B2699 01	-
Ambient Light Sensor Low Reference	2	B2645 07, B0163 05, B0183 05	2	-
Headlamp Assembly Ground - Left	-	1	-	-
Headlamp Assembly Ground - Right	-	1	-	-
1. Headlamps Malfunction 2. Daytime Running Lamps Malfunction				

Circuit/System Description

The ambient light sensor is used to monitor outside lighting conditions. The ambient light sensor provides a voltage signal that will vary between 0.2 and 4.9 V depending on outside lighting conditions. The body control module (BCM) provides a 5 V reference signal to the ambient light sensor and the HVAC control module provides a low reference ground. The BCM monitors the ambient light sensor signal circuit to determine if outside lighting conditions are correct for either daytime running lamps or automatic lamp control when the headlamp switch is in the AUTO position. In daylight conditions the BCM will command the daytime running lamps ON. During low light conditions the BCM will command the low beam headlamps ON. Any function or condition that turns on the headlamps will cancel daytime running lamps operation.

Reference Information

Schematic Reference

Headlights/Daytime Running Lights (DRL) Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify the low beam headlamps turn ON & OFF when commanding the Low Beam Headlamps ON and OFF with a scan tool.
 - **If the low beam headlamps do not turn ON and OFF**
Refer to Headlamps Malfunction.
 - **If the low beam headlamps turn ON and OFF**
3. Ignition ON, park brake released.
4. Verify the scan tool BCM Park Brake Status parameter displays Released.
 - **If the park brake status parameter does not display Released**
Refer to Brake Warning Indicator Malfunction.
 - **If the parameter displays Released**
5. Refer to Circuit/System Testing.

Circuit/System Testing

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, open and close drivers door, disconnect the harness connector at the B10B Ambient Light/Sunload Sensor. It may take up to 10 min for all vehicle systems to power down.
2. Test for less than 15 Ω between the low reference circuit terminal 6 and ground.
 - **If 15 Ω or greater**
 1. Ignition OFF, disconnect the X2 harness connector at the K33 HVAC Control Module.
 2. Test for less than 2 Ω in the low reference circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K33 HVAC Control Module.
 - **If less than 15 Ω**
3. Ignition ON.
4. Verify the scan tool Ambient Light Sensor parameter is greater than 4.65 V.
 - **If 4.65 V or less**
 1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit terminal 5 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If greater than 4.65 V**
5. Install a 3 A fused jumper wire between the signal circuit terminal 5 and the low reference circuit terminal 6.
6. Verify the scan tool Ambient Light Sensor parameter is less than 0.196 V.
 - **If 0.196 V or greater**
 1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the signal circuit terminal 5 and ground.

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
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- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V

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

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K9 Body Control Module.

- **If less than 0.196 V**

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

Repair Instructions

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

- [Headlamp Automatic Control Ambient Light Sensor Replacement](#)
- [Control Module References](#) for BCM or HVAC Control Module replacement, programming, and setup

DOME LAMPS MALFUNCTION

Diagnostic Instructions

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

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
F15DA (BCM 6) Fuse B+	B270A 01, B2615 02	B270A 01, B2615 02	-	-
Dome Lamps Control - Terminal 5 X2	B2615 02	B2615 04	1	-
Dome Lamps Switch Cancel Signal	2	2	2	-
Dome Lamps Switch On Signal	2	2	2	-
Dome/Reading Lamps - Front Ground	-	1	-	-
Dome/Reading Lamps - Rear Ground	-	1	-	-
1. Dome Lamps Malfunction 2. Dome Lamp Switch Malfunction				

Circuit/System Description

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

Schematic Reference

Interior Lights Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Interior Lighting Systems Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify both sunshade lamps and ALL reading lamps operate ON/OFF when activated.
 - **If both sunshade lamps and ALL reading lamps do not activate**
Refer to Courtesy Lamps Malfunction.
 - **If both sunshade lamps and ALL reading lamps activate**
3. Verify the scan tool Door Ajar Switch parameter changes between Active and Inactive while opening and closing each vehicle door.
 - **If the parameter does not change**
Refer to Door Ajar Indicator Malfunction (Extended Cab) Door Ajar Indicator Malfunction (Crew Cab).
 - **If the parameter changes**
4. Verify the scan tool Interior/Courtesy Lighting Master Switch parameter changes between Door, On, and Cancel while placing the dome lamp switch in the Door, On, and Cancel positions.
 - **If the parameter does not change**
Refer to Dome Lamp Switch Malfunction.
 - **If the parameter changes**
5. Verify the dome lamps turn ON and OFF while commanding the Courtesy Lamps ON and OFF with a scan tool.
 - **If the dome lamps do not turn ON and OFF**

refer to Dome Lamps Malfunction.

- **If the dome lamps turn ON and OFF**

6. All OK.

Circuit/System Testing

Dome Lamp Switch Malfunction

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, open and close drivers door, disconnect the harness connector at the appropriate component listed below. It may take up to 2 min for all vehicle systems to power down.
 - E36AH Dome/Reading Lamp (without C74)
 - E37F Dome/Reading Lamps - Front (with C74/TR0)
2. Test for less than 10 Ω between the ground circuit terminal 6 and ground.
 - **If 10 Ω or greater**
 1. Ignition OFF.
 2. Test for less than 2 Ω in the ground circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , repair the open/high resistance in the ground connection.
 - **If less than 10 Ω**
3. Ignition ON.
4. Verify the scan tool Interior/Courtesy Lighting Master Switch parameter is Door.
 - **If Cancel**
 1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit terminal 4 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If On**
 1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit terminal 5 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If Door**
5. Install a 3 A fused jumper wire between the signal circuit terminal 4 and ground.
6. Verify the scan tool Interior/Courtesy Lighting Master Switch parameter is Cancel.
 - **If not Cancel**
 1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the signal circuit terminal 4 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
 3. Test for less than 2 Ω in the signal circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K9 Body Control Module.
 - **If Cancel**

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

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

- **If not On**

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

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

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

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

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K9 Body Control Module.

- **If On**

9. Test or replace the Dome/Reading Lamps - Front.

Dome Lamps Malfunction

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

- E36AH Dome/Reading Lamp (without C74)
- E37F Dome/Reading Lamps - Front (with C74/TR0)
- E37R Dome/Reading Lamps - Rear (with C74/TR0)

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

- **If 10 Ω or greater**

1. Ignition OFF.

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

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

- **If less than 10 Ω**

3. Connect a test lamp between the control circuit terminal 2 and ground, ignition ON.

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

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

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

2. Test for infinite resistance between the control circuit and ground.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance

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

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K9 Body Control Module.

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

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

2. Test for less than 1 V between the control circuit terminal and ground.

- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, replace the K9 Body Control Module.

the test lamp turns ON and OFF 5. Test or Repair the dome/reading lamp. Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
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Repair Instructions

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

- [Center Courtesy Lamp Replacement](#)
- [Center Reading and Courtesy Lamp Replacement](#)
- [Rear Seat Position Center Courtesy Lamp Replacement \(Extended Cab\)](#)
- [Control Module References](#) for BCM replacement, programming, and setup

FRONT FOG LAMPS MALFUNCTION

Diagnostic Instructions

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

Diagnostic Fault Information

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

Circuit/System Description

The front fog lamp relay is supplied with battery voltage at all times. The front fog lamp switch signal circuit is grounded momentarily by pressing the front fog lamp switch. The body control module (BCM) energizes the front fog lamp relay by applying ground to the front fog lamp relay control circuit. When the front fog lamp relay is energized, the relay switch contacts close and battery voltage is applied through the F48UA fog lamp fuse to the front fog lamp control circuit which illuminates the front fog lamps. With the front fog lamp switch activated the BCM sends a message via serial data to the instrument cluster requesting the instrument cluster to illuminate the front fog indicator.

Reference Information

Schematic Reference

Fog Lights Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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, park lamps ON.
2. Verify the scan tool Front Fog Lamps Switch parameter changes between Active and Inactive while commanding the front fog lamps ON and OFF with the front fog lamp switch.
 - **If the parameter does not change**
Refer to Front Fog Lamp Switch Malfunction.
 - **If the parameter changes**
3. Verify the front fog lamps turn ON and OFF when commanding the Front Fog Lamps ON and OFF with a scan tool.
 - **If the front fog lamps do not turn ON and OFF**
Refer to Front Fog Lamps Malfunction.
 - **If the front fog lamps turn ON and OFF**
4. Verify the front fog lamp indicator on the instrument cluster turns ON and OFF while commanding the front fog lamps ON and OFF with the front fog lamp switch.
 - **If the front fog lamp indicator does not turn ON and OFF**
Refer to Front Fog Lamp Indicator Malfunction.
 - **If the front fog lamp indicator turns ON and OFF**
5. All OK.

Circuit/System Testing

Front Fog Lamp Switch Malfunction

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, open and close drivers door, disconnect the harness connector at the S30 Headlamp Switch. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 5 Ω between the ground circuit terminal 8 and ground.
 - **If 5 Ω or greater**
 1. Ignition OFF.
 2. Test for less than 2 Ω in the ground circuit end to end.

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

- **If less than 5 Ω**

3. Ignition ON.

4. Verify the scan tool Front Fog Lamps Switch parameter is Inactive.

- **If not Inactive**

1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.
2. Test for infinite resistance between the signal circuit terminal 10 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.

- **If Inactive**

5. Install a 3 A fused jumper wire between the signal circuit terminal 10 and ground.

6. Verify the scan tool Front Fog Lamps Switch parameter is Active.

- **If not Active**

1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.
2. Test for less than 1 V between the signal circuit terminal 10 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
3. Test for less than 2 Ω in the signal circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K9 Body Control Module.

- **If Active**

7. Test or replace the S30 Headlamp Switch.

Front Fog Lamps Malfunction

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

2. Verify a test lamp illuminates between the control circuit terminal 13 and ground.

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

1. Ignition OFF, disconnect the X2 harness connector at the X50A Fuse Block - Underhood.
2. Test for infinite resistance between the control circuit terminal and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
3. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the X50A Fuse Block - Underhood.

- **If the test lamp illuminates**

3. Ignition OFF, remove the F48UA fog lamp fuse at the X50A Fuse Block - Underhood.

4. Connect a 3 A fused jumper between the control circuit terminal 13 and ground, ignition ON.

5. Verify a test lamp illuminates between the F48UA fog lamp fuse B+ switch control terminal and ground.

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

1. Ignition OFF, disconnect the X2 harness connector at the X50A Fuse Block - Underhood, ignition ON.
2. Test for less than 1 V between the control circuit terminal 13 and ground.

- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, replace the X50A Fuse Block - Underhood.

- **If the test lamp illuminates**

6. Ignition OFF, connect the X5 harness connector at the K9 Body Control Module.
7. Install the F48UA fog lamp fuse at the X50A Fuse Block - Underhood.
8. Ignition OFF, exterior lamps OFF, disconnect the harness connector at the appropriate E29 Fog Lamp. It may take up to 2 min for all vehicle systems to power down.
9. Test for less than 5 Ω between the ground circuit terminal B and ground.

- **If 5 Ω or greater**

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

- **If less than 5 Ω**

10. Connect a test lamp between the control circuit terminal A and ground, ignition ON.
11. Verify the test lamp turns ON and OFF when commanding the Front Fog Lamps ON and OFF with a scan tool.

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

1. Ignition OFF, disconnect the X1 harness connector at the X50A Fuse Block - Underhood.
2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
3. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K9 Body Control Module.

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

1. Ignition OFF, disconnect the X1 harness connector at the X50A Fuse Block - Underhood, ignition ON.
2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.

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

12. Test or replace the appropriate E29 Fog Lamp.

Front Fog Lamp Indicator Malfunction

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

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

Replace the P16 Instrument Cluster.

- **If the front fog lamp indicator turns ON and OFF**

3. Replace the K9 Body Control Module.

agnostic Repair Verification after completing the repair.

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
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- [Headlamp Switch Replacement](#)
- [Front Fog Lamp Replacement](#)
- [Front Fog Lamp Bulb Replacement](#)
- [Fuse Block Replacement](#)
- [Control Module References](#) for BCM or Instrument Cluster replacement, programming, and setup

HAZARD LAMPS MALFUNCTION

Diagnostic Instructions

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

Diagnostic Fault Information

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

Circuit/System Description

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

Reference Information

Schematic Reference

[Exterior Lights Schematics](#)

Connector End View Reference

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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](#)

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify the scan tool Hazard Lamps Switch parameter changes between Active and Inactive while commanding the hazard lamps ON and OFF with the hazard warning switch.
 - **If the parameter does not change**
Refer to Circuit/System Testing.
 - **If the parameter changes**
3. Verify all left and right turn signal lamps turn ON and OFF while commanding the hazard lamps ON and OFF with the hazard warning switch.
 - **If all turn signal lamps do not turn ON and OFF**
Refer to Turn Signal Lamps and/or Indicators Malfunction
 - **If all turn signal lamps turn ON and OFF**
4. All OK.

Circuit/System Testing

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, open and close drivers door, disconnect the harness connector at the S48A Multifunction Switch - Instrument Panel. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 5 Ω between the ground circuit terminal 14 and ground.
 - **If 5 Ω or greater**
 1. Ignition OFF.
 2. Test for less than 2 Ω in the ground circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , repair the open/high resistance in the ground connection.
 - **If less than 5 Ω**
3. Ignition ON.
4. Verify the scan tool Hazard Lamps Switch parameter is Inactive.
 - **If not Inactive**
 1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit terminal 11 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If Inactive**
5. Install a 3 A fused jumper wire between the signal circuit terminal 11 and ground.
6. Verify the scan tool Hazard Lamps Switch parameter is Active.
 - **If not Active**
 1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the signal circuit terminal 11 and ground.

- If 1 V or greater, repair the short to voltage in the circuit.
- If less than 1 V, repair the short to ground.
- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K9 Body Control Module.

- **If Active**

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

Repair Instructions

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

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

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
F17DA (BCM 4) Fuse B+	B2575 01, B2575 04	B2575 01, B2575 04	-	-
F33UA (BCM 3) Fuse B+	B2699 01, B2699 04	B2699 01, B2699 04	-	-
Headlamp High Beam Relay Control	B2580 02, B2580 04	B2580 02, B2580 04	B2580 01	-
Low Beam Headlamp Control - Left	B2575 02	B2575 01, B2575 04	B2575 01, B2575 04	-
Low Beam Headlamp Control - Right	B2699 02	B2699 01, B2699 04	B2699 01, B2699 04	-
High Beam Headlamp Control - Left	2	2	2	-
High Beam Headlamp Control - Right	2	2	2	-
Headlamp Switch Park Lamps ON Signal	3	B257A 00	3	-
Headlamp Switch Headlamps OFF Signal	B257A 00	3	3	-
Headlamp Switch Headlamps ON Signal	B257A 00	3	3	-
Turn Signal/Multifunction Switch Flash To Pass Signal	B3806 00	4	4	-
Turn Signal/Multifunction Switch High Beam Signal	B3650 08	4	4	-
Headlamp Assembly Ground - Left	-	1	-	-

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Headlamp Assembly Ground - Right	-	1	-	-
Headlamp Switch Ground	-	3	-	-
Turn Signal/Multifunction Switch Ground	-	4	-	-
1. Headlamps Malfunction - Low Beam 2. Headlamps Malfunction - High Beam 3. Headlamp Switch Malfunction 4. Turn Signal/Multifunction Switch Malfunction				

Circuit/System Description

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

The high beam and flash to pass functions are contained within the turn signal/multifunction switch. The BCM provides the turn signal/multifunction switch with two signal circuits, the high beam signal circuit and the flash to pass signal circuit. When the low beam headlamps are ON and the turn signal/multifunction switch is placed in the high beam position, ground is applied to the BCM through the high beam signal circuit. The BCM responds to the high beam request by applying ground to the high beam relay control circuit which energizes the high beam relay. With the high beam relay energized, the switch contacts close allowing battery voltage to flow through the left and right high beam fuses to the high beam control circuits illuminating the high beam headlamps.

When the turn signal/multifunction switch is momentarily placed in the flash to pass position, ground is applied to the BCM through the flash to pass signal circuit. The BCM responds by applying ground to the high beam relay control circuit which energizes the high beam relay illuminating the high beams for a brief moment or until the flash to pass switch is released.

Diagnostic Aids

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

Reference Information

Schematic Reference

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

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Exterior Lighting Systems Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify the scan tool Headlamps On Switch parameter changes between Active and Inactive while commanding the headlamps ON and OFF with the headlamp switch.
 - **If the parameter does not change**
Refer to Headlamp Switch Malfunction.
 - **If the parameter changes**
3. Verify the scan tool Automatic Headlamps Disable Switch parameter changes between Active and Inactive while commanding the automatic lamp control ON and OFF with the headlamp switch.
 - **If the parameter does not change**
Refer to Headlamp Switch Malfunction.
 - **If the parameter changes**
4. Verify the scan tool Headlamps Flash Switch parameter changes between Active and Inactive while commanding the flash to pass ON and OFF with the turn signal/multifunction switch.
 - **If the parameter does not change**
Refer to Turn Signal/Multifunction Switch Malfunction.
 - **If the parameter changes**
5. Verify the scan tool High Beam Select Switch parameter changes between Active and Inactive while commanding the high beams ON and OFF with the turn signal/multifunction switch.
 - **If the parameter does not change**
Refer to Turn Signal/Multifunction Switch Malfunction.
 - **If the parameter changes**
6. Verify the left low beam headlamp turns ON and OFF when commanding the Left Low Beam/Daytime Running Lamp ON and OFF with a scan tool.
 - **If the left low beam headlamp does not turn ON and OFF**
Refer to Headlamps Malfunction - Low Beam.

the left low beam headlamp turns ON and OFF

7. Verify the right low beam headlamp turns ON and OFF when commanding the Right Low Beam/Daytime Running Lamp ON and OFF with a scan tool.

- **If the right low beam headlamp does not turn ON and OFF**

Refer to Headlamps Malfunction - Low Beam.

- **If the right low beam headlamp turns ON and OFF**

8. Verify the high beams turn ON and OFF when commanding the High Beams ON and OFF with a scan tool.

- **If the high beams do not turn ON and OFF**

Refer to Headlamps Malfunction - High Beam.

- **If the high beams turn ON and OFF**

9. Verify the high beam indicator on the instrument cluster turns ON and OFF while commanding the All Indicators Test ON and OFF with a scan tool.

- **If the high beam indicator does not turn ON and OFF**

Refer to High Beam Indicator Malfunction.

- **If the high beam indicator turns ON and OFF**

10. All OK.

Circuit/System Testing

Headlamp Switch Malfunction

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, open and close drivers door, disconnect the harness connector at the S30 Headlamp Switch. It may take up to 2 min for all vehicle systems to power down.

2. Test for less than 5 Ω between the ground circuit terminal 8 and ground.

- **If 5 Ω or greater**

1. Ignition OFF.

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

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

- **If less than 5 Ω**

3. Ignition ON.

4. Verify the scan tool Automatic Headlamps Disable Switch parameter is Inactive.

- **If not Inactive**

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

2. Test for infinite resistance between the signal circuit terminal 3 and ground.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance, replace the K9 Body Control Module.

- **If Inactive**

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

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

- **If not Active**

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

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

- **If Active**

13. Test or replace the S30 Headlamp Switch.

Turn Signal/Multifunction Switch Malfunction

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

not Active

1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module, ignition ON.
2. Test for less than 1 V between the signal circuit terminal 4 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
3. Test for less than 2 Ω in the signal circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K9 Body Control Module.

- **If Active**

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

Headlamps Malfunction - Low Beam

1. Ignition OFF, exterior lamps OFF, remove the appropriate E4 Headlamp - Low Beam bulb. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 5 Ω between the ground circuit at the socket terminal 2 and ground.
 - **If 5 Ω or greater**
 1. Ignition OFF.
 2. Test for less than 2 Ω in the ground circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , repair the open/high resistance in the ground connection.
 - **If less than 5 Ω**
3. Connect a test lamp between the control circuit at the socket terminal 1 and ground, ignition ON.
4. Verify the test lamp turns ON and OFF when commanding the appropriate Low Beam/Daytime Running Lamp ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K9 Body Control Module.
 - **If the test lamp is always ON**
 1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
5. Test or replace the E4 Headlamp - Low Beam.

Headlamps Malfunction - High Beam

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

the test lamp does not illuminate

1. Ignition OFF, disconnect the X2 harness connector at the X50A Fuse Block - Underhood.
2. Test for infinite resistance between the control circuit terminal and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
3. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the X50A Fuse Block - Underhood.

• If the test lamp illuminates

3. Ignition OFF, connect a 3 A fused jumper between the control circuit terminal 18 and ground.
4. Remove the left high beam fuse (F38UA) at the X50A Fuse Block - Underhood, ignition ON.
5. Verify a test lamp illuminates between the left high beam fuse (F38UA) B+ switch control terminal and ground.

• If the test lamp does not illuminate

1. Ignition OFF, disconnect the X2 harness connector at the X50A Fuse Block - Underhood, ignition ON.
2. Test for less than 1 V between the control circuit terminal 18 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the X50A Fuse Block - Underhood.

• If the test lamp illuminates

6. Ignition OFF, connect the X5 harness connector at the K9 Body Control Module.
7. Install the left high beam fuse (F38UA) at the X50A Fuse Block - Underhood.
8. Ignition OFF, exterior lamps OFF, remove the appropriate E4 Headlamp - High Beam bulb. It may take up to 2 min for all vehicle systems to power down.
9. Test for less than 5 Ω between the ground circuit at the socket terminal B and ground.

• If 5 Ω or greater

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

• If less than 5 Ω

10. Connect a test lamp between the control circuit at the socket terminal A and ground, ignition ON.
11. Verify the test lamp turns ON and OFF when commanding the High Beams ON and OFF with a scan tool.

• If the test lamp is always OFF

1. Ignition OFF, disconnect the X1 harness connector at the X50A Fuse Block - Underhood.
2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
3. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K9 Body Control Module.

• If the test lamp is always ON

1. Ignition OFF, disconnect the X1 harness connector at the X50A Fuse Block - Underhood, ignition ON.
2. Test for less than 1 V between the control circuit terminal and ground.

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
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- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, replace the K9 Body Control Module.

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

12. Test or replace the E4 Headlamp - High Beam.

High Beam Indicator Malfunction

1. Ignition ON.
2. Verify the high beam indicator turns ON and OFF when commanding the Instrument Cluster All Indicators Test ON and OFF with a scan tool.

- **If the high beam indicator is always OFF or remains ON**

Replace the P16 Instrument Cluster.

- **If the high beam indicator turns ON and OFF**

3. Replace the K9 Body Control Module.

Repair Instructions

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

- [Headlamp Switch Replacement](#)
- [Turn Signal Switch Replacement](#)
- [Headlamp Bulb Replacement - Left Side \(Chevrolet High Beam\)Headlamp Bulb Replacement - Left Side \(Chevrolet Low Beam\)Headlamp Bulb Replacement - Left Side \(GMC High Beam\)Headlamp Bulb Replacement - Left Side \(GMC Low Beam\)](#)
- [Headlamp Bulb Replacement - Right Side \(Chevrolet High Beam\)Headlamp Bulb Replacement - Right Side \(Chevrolet Low Beam\)Headlamp Bulb Replacement - Right Side \(GMC High Beam\)Headlamp Bulb Replacement - Right Side \(GMC Low Beam\)](#)
- [Fuse Block Replacement](#)
- [Control Module References](#) for BCM or Instrument Cluster replacement, programming, and setup

INTERIOR BACKLIGHTING MALFUNCTION

Diagnostic Instructions

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

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
F5DA (BCM 2) Fuse B+	B127B 2B	B127B 2B	-	-
F28DA (IP/IGN/SDM IGN) Fuse B+	4	4	-	-
Instrument Panel Dimmer Switch B+ Reference	B257B 03	B257B 03	1	-
Instrument Panel Dimmer Switch Signal	B257B 03	B257B 03	B257B 07	-

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
LED Backlight Dimming Control Terminal 8 X2	B2610 02	B2610 04	B2610 04	-
Switch Indicator LED Backlight Dimming Control Terminal 5 X1	B2625 02	B2625 04	B2625 01	-
Instrument Panel Dimmer Switch Low Reference	1	1	1	-
Dome/Reading Lamps - Front Ground	-	2	-	-
Door Lock Switch - Driver Ground	-	2	-	-
Door Lock Switch - Passenger Ground	-	2	-	-
Headlamp Switch Ground	-	2	-	-
Multifunction Switch - Instrument Panel Ground	-	3	-	-
Outside Rearview Mirror Switch Ground	-	2	-	-
Passenger Air Bag Disable Indicator Ground	-	4	-	-
Steering Wheel Controls Switch - Right Ground	-	2	-	-
Steering Wheel Controls Switch - Left Ground	-	2	-	-
Transfer Case Shift Control Switch Ground	-	2	-	-
1. Dimmer Switch Malfunction 2. Interior Backlighting Malfunction 3. Switch Indicator LED Backlighting Malfunction 4. Passenger Air Bag Disable Indicator Backlighting Malfunction				

Circuit/System Description

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

Reference Information

Schematic Reference

- [Interior Lights Dimming Schematics](#)
- [Object Detection Schematics](#)
- [SIR Schematics](#)

Connector End View Reference

T CONNECTOR END VIEWS - INDEX

Description and Operation

Interior Lighting Systems Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify the scan tool LED Backlight Dimming Command parameter changes between a high percentage to a low percentage while operating the dimmer switch from high to low.
 - **If the parameter does not change**
Refer to Dimmer Switch Malfunction.
 - **If the parameter changes**
3. Verify the switch indicator amber LED's for the components listed below turn ON and OFF while turning both switches ON and OFF.
 - S48A Multifunction Switch - Instrument Panel (lane departure switch)
 - S77 Transfer Case Shift Control Switch
 - S79D Window Switch - Driver (child safety lock switch)
 - **If the switch indicator amber LED's do not turn ON and OFF**
Refer to Switch Indicator LED Backlighting Malfunction.
 - **If the switch indicator amber LED's turn ON and OFF**
4. Verify all backlighting components turn ON and OFF while commanding the LED Backlight Dimming ON and OFF with a scan tool.
 - **If all backlighting components do not turn ON and OFF**
Refer to Interior Backlighting Malfunction.
 - **If all backlighting components turn ON and OFF**
5. Verify the phrase PASSENGER AIR BAG is illuminated on the Passenger Air Bag Disable Indicator.
 - **If the phrase PASSENGER AIR BAG is not illuminated**
Refer to Passenger Air Bag Disable Indicator Backlighting Malfunction.
 - **If the phrase PASSENGER AIR BAG is illuminated**
6. All OK.

Dimmer Switch Malfunction

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

ighting Malfunction

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

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

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, open and close drivers door, disconnect the harness connector at the component with inoperative backlighting. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10 Ω between the appropriate ground circuit terminal and ground.
 - **If 10 Ω or greater**
 1. Ignition OFF.
 2. Test for less than 2 Ω in the ground circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , repair the open/high resistance in the ground connection.
 - **If less than 10 Ω**
3. Connect a test lamp between the appropriate control circuit terminal and ground, ignition ON.
4. Verify the test lamp turns ON and OFF when commanding the LED Backlight Dimming ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K9 Body Control Module.
 - **If the test lamp is always ON**
 1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
5. Test or replace the component with inoperative backlighting.

Switch Indicator LED Backlighting Malfunction

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

- Backlighting components the vehicle is equipped with

- **Each component's control and ground circuit terminals**
- **Component locations on the backlighting control circuit**

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

- S48A Multifunction Switch - Instrument Panel
- S77 Transfer Case Shift Control Switch
- S79D Window Switch - Driver

2. Test for less than 10 Ω between the ground circuit terminal 14 at the S48A Multifunction Switch - Instrument Panel and ground.

- **If 10 Ω or greater**

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

- **If less than 10 Ω**

3. Ignition ON, place the dimmer switch in the HIGH position for high backlighting intensity.

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

4. Verify a test lamp illuminates between each control circuit terminal listed below and ground.

- S48A Multifunction Switch - Instrument Panel terminal 2
- S77 Transfer Case Shift Control Switch terminal 4
- S79D Window Switch - Driver terminal 11
- **If the test lamp does not illuminate**
 1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K9 Body Control Module.
- **If the test lamp illuminates**

5. Place the dimmer switch in the LOW position for low backlighting intensity.

6. Verify a test lamp does not illuminate at FULL intensity between each control circuit terminal listed below and ground.

- S48A Multifunction Switch - Instrument Panel terminal 2
- S77 Transfer Case Shift Control Switch terminal 4
- S79D Window Switch - Driver terminal 11
- **If the test lamp illuminates at full intensity**
 1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the control circuit terminal and ground.

- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, replace the K9 Body Control Module.

- **If the test lamp does not illuminate at full intensity**

7. Test or replace the inoperative component.

Passenger Air Bag Disable Indicator Backlighting Malfunction

1. Ignition OFF, all doors closed, all accessories OFF, open and close drivers door, disconnect the harness connector at the P14 Passenger Air Bag Disable Indicator. It may take up to 2 min for all vehicle systems to power down.

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

- **If 10 Ω or greater**

1. Ignition OFF.

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

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

- **If less than 10 Ω**

3. Connect a test lamp between the control circuit terminal 4 and ground.

4. Verify the test lamp turns ON and OFF while turning the ignition switch ON and OFF.

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

1. Ignition OFF, disconnect the X3 harness connector at the X51A Fuse Block - Instrument Panel.

2. Test for infinite resistance between the control circuit and ground.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance

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

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the X51A Fuse Block - Instrument Panel.

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

1. Ignition OFF, disconnect the X3 harness connector at the X51A Fuse Block - Instrument Panel, ignition ON.

2. Test for less than 1 V between the control circuit terminal and ground.

- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, replace the X51A Fuse Block - Instrument Panel.

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

5. Test or replace the P14 Passenger Air Bag Disable Indicator.

Repair Instructions

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

- **Headlamp Switch Replacement**
- **Instrument Panel Airbag Arming Status Display Replacement**
- **Door Lock Switch Replacement - Driver Side**
- **Door Lock Switch Replacement - Passenger Front**
- **Vehicle Stability Control System Switch Replacement**

de Door Window Control Switch Replacement (Extended Cab)	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
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- [Center Courtesy Lamp Replacement](#)
- [Transfer Case Selector Switch Replacement](#)
- [Transfer Case Selector Switch Replacement](#)
- [Control Module References](#) for BCM replacement, programming, and setup

PARK, LICENSE, AND/OR TAIL LAMPS MALFUNCTION

Diagnostic Instructions

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

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Headlamp Switch Park Lamps ON Signal	2	B257A 00	2	-
License Plate Lamp Control	B3883 02	B3883 01, B3883 04	B3883 01, B3883 04	-
Park Lamps Control - Left Front Terminal 6 X4	B2585 02	1	1	-
Park Lamps Control - Right Front Terminal 5 X4	B3867 02	1	1	-
Tail Lamp Control - Left Terminal 7 X4	B3881 02	1	1	-
Tail Lamp Control - Right Terminal 7 X5	B3882 02	1	1	-
License Plate Lamp Ground - Left	-	1	-	-
License Plate Lamp Ground - Right	-	1	-	-
Park Lamp Ground - Left Front	-	1	-	-
Park Lamp Ground - Right Front	-	1	-	-
Tail Lamp Assembly Ground - Left	-	1	-	-
Tail Lamp Assembly Ground - Right	-	1	-	-
Headlamp Switch Ground	-	2	-	-
1. Park, License, and/or Tail Lamps Malfunction 2. Headlamp Switch Malfunction				

Circuit/System Description

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

Diagnostic Aids

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

Schematic Reference

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

Connector End View Reference

[COMPONENT CONNECTOR END VIEWS - INDEX](#)

Description and Operation

[Exterior Lighting Systems Description and Operation](#)

Electrical Information Reference

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

Scan Tool Reference

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

[Circuit/System Verification](#)

1. Ignition ON.
2. Verify the scan tool Park Lamp Switch parameter changes between Active and Inactive while commanding the park lamps ON and OFF with the headlamp switch.
 - **If the parameter does not change**

Refer to Headlamp Switch Malfunction.
 - **If the parameter changes**
3. Verify the left front park lamps turn ON and OFF when commanding the Left Park Lamps ON and OFF with a scan tool.
 - **If the left front park lamps do not turn ON and OFF**

Refer to Park Lamps Malfunction.
 - **If the left front park lamps turn ON and OFF**
4. Verify the right front park lamps turn ON and OFF when commanding the Right Park Lamps ON and OFF with a scan tool.
 - **If the right front park lamps do not turn ON and OFF**

Refer to Park Lamps Malfunction.
 - **If the right front park lamps turn ON and OFF**
5. Verify the left rear park lamps turn ON and OFF when commanding the Left Rear Stop/Park Lamp ON and OFF with a scan tool.
 - **If the left rear park lamps do not turn ON and OFF**

Refer to Park Lamps Malfunction.

- **If the left rear park lamps turn ON and OFF**

6. Verify the right rear park lamps turn ON and OFF when commanding the Right Rear Stop/Park Lamp ON and OFF with a scan tool.

- **If the right rear park lamps do not turn ON and OFF**

Refer to Park Lamps Malfunction.

- **If the right rear park lamps turn ON and OFF**

7. Verify the license plate lamps turn ON and OFF when commanding the License Plate Lamps ON and OFF with a scan tool.

- **If the license plate lamps do not turn ON and OFF**

Refer to License Plate Lamps Malfunction.

- **If the license plate lamps turn ON and OFF**

8. All OK.

Circuit/System Testing

Headlamp Switch Malfunction

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, open and close drivers door, disconnect the harness connector at the S30 Headlamp Switch. It may take up to 2 min for all vehicle systems to power down.

2. Test for less than 5 Ω between the ground circuit terminal 8 and ground.

- **If 5 Ω or greater**

1. Ignition OFF.

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

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

- **If less than 5 Ω**

3. Ignition ON.

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

- **If not Inactive**

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

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

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance, replace the K9 Body Control Module.

- **If Inactive**

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

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

- **If not Active**

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

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

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

- If less than 1 V
3. Test for less than 2 Ω in the signal circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K9 Body Control Module.

- **If Active**

7. Test or replace the S30 Headlamp Switch.

Park Lamps Malfunction

1. Ignition OFF, exterior lamps OFF, all doors closed, open and close drivers door, disconnect the appropriate park lamp listed below. It may take up to 2 min for all vehicle systems to power down.

- E4J Park Lamp - Left Front (with X88)
- E4N Park/Turn Signal Lamp - Left
- E13LA Headlamp Assembly - Left (with Z88)
- E4K Park Lamp - Right Front (with X88)
- E4P Park/Turn Signal Lamp - Right
- E13RA Headlamp Assembly - Right (with Z88)
- E5AG Tail/Stop and Turn Signal Lamp - Left Upper
- E5U Tail/Stop and Turn Signal Lamp - Left Lower
- E5AH Tail/Stop and Turn Signal Lamp - Right Upper
- E5V Tail/Stop and Turn Signal Lamp - Right Lower

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

- E4J Park Lamp - Left Front terminal B (with X88)
- E4N Park/Turn Signal Lamp - Left terminal G
- E13LA Headlamp Assembly - Left terminal 1 (with Z88)
- E4K Park Lamp - Right Front terminal B (with X88)
- E4P Park/Turn Signal Lamp - Right terminal G
- E13RA Headlamp Assembly - Right terminal 1 (with Z88)
- E5AG Tail/Stop and Turn Signal Lamp - Left Upper terminal G
- E5U Tail/Stop and Turn Signal Lamp - Left Lower terminal G
- E5AH Tail/Stop and Turn Signal Lamp - Right Upper terminal G
- E5V Tail/Stop and Turn Signal Lamp - Right Lower terminal G

- **If 5 Ω or greater**

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

- **If less than 5 Ω**

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

- E4J Park Lamp - Left Front terminal A (with X88)
- E4N Park/Turn Signal Lamp - Left terminal B
- E13LA Headlamp Assembly - Left terminal 4 (with Z88)
- E4K Park Lamp - Right Front terminal A (with X88)
- E4P Park/Turn Signal Lamp - Right terminal B

3RA Headlamp Assembly - Right terminal 4 (with Z88)

- E5AG Tail/Stop and Turn Signal Lamp - Left Upper terminal B
- E5U Tail/Stop and Turn Signal Lamp - Left Lower terminal B
- E5AH Tail/Stop and Turn Signal Lamp - Right Upper terminal B
- E5V Tail/Stop and Turn Signal Lamp - Right Lower terminal B

4. Verify the test lamp turns ON and OFF when commanding the appropriate Park Lamp parameter listed below ON and OFF with a scan tool.

- Left Park Lamps - (left front park lamps)
- Right Park Lamps - (right front park lamps)
- Left Rear Stop/Park Lamp - (left rear park lamps)
- Right Rear Stop/Park Lamp - (right rear park lamps)

• **If the test lamp is always OFF**

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

- X4 - all except right rear tail lamp
- X5 - right rear tail lamp

2. Test for infinite resistance between the control circuit and ground.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance

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

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K9 Body Control Module.

• **If the test lamp is always ON**

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

- X4 - all except right rear tail lamp
- X5 - right rear tail lamp

2. Test for less than 1 V between the control circuit terminal and ground.

- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, replace the K9 Body Control Module.

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

5. Test or replace the park lamp.

License Plate Lamps Malfunction

1. Ignition OFF, exterior lamps OFF, all doors closed, open and close drivers door, remove both E7 License Plate Lamp bulbs. It may take up to 2 min for all vehicle systems to power down.

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

• **If 5 Ω or greater**

1. Ignition OFF.

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

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

• **If less than 5 Ω**

a test lamp between the E7L License Plate Lamp - Left control circuit terminal A and ground, ignition ON.

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

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

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

2. Test for infinite resistance between the control circuit and ground.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance

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

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K9 Body Control Module.

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

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

2. Test for less than 1 V between the control circuit terminal and ground.

- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, replace the K9 Body Control Module.

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

5. Ignition OFF.

6. Connect a test lamp between the E7R License Plate Lamp - Right control circuit terminal A and ground, ignition ON.

7. Verify the test lamp turns ON and OFF when commanding the License Plate Lamps ON and OFF with a scan tool.

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

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

2. Test for infinite resistance between the control circuit and ground.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance

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

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

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

8. Test or replace the E7 License Plate Lamp.

Repair Instructions

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

- [Headlamp Switch Replacement](#)
- [Rear License Plate Lamp Bulb Replacement](#)
- [Front Side Marker Lamp Bulb Replacement](#)
- [Stop and Tail Lamp Bulb Replacement](#)
- [Control Module References](#) for BCM replacement, programming, and setup

STOP LAMPS MALFUNCTION

Diagnostic Instructions

the **Diagnostic System Check - Vehicle Open/High** prior to using this diagnostic procedure.

- Review **Circuit 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
F25DA (BCM 7) Fuse B+	1	1	-	-
Brake Pedal Position Sensor 5 V Reference	B1011 00, C0277 06, C0890 03, U0422 71	B1011 00, C0277 06, U0422 71	B1011 00, C0277 07, C0890 07, U0422 71	-
Brake Pedal Position Sensor Signal	B1011 00, C0277 06, U0422 71	B1011 00, C0277 06, U0422 71	B1011 00, C0277 07, C0890 07, U0422 71	C0277 09, C0277 12
Center High Mounted Stop Lamp Relay Control	B3884 02	B3884 04	B3884 01	-
Center High Mounted Stop Lamp Control	2	2	2	-
Stop/Turn Signal Lamp Control - Left	B3950 02, B3950 04	B3950 04	B3950 01	-
Stop/Turn Signal Control - Right	B3951 02, B3951 04	B3951 04	B3951 01	-
Brake Pedal Position Sensor Low Reference	-	B1011 00, C0277 07, U0422 71,	1	-
Center High Mounted Stop Lamp Ground	-	2	-	-
Stop Lamp Relay Ground	-	2	-	-
Stop and Turn Signal Lamp Ground - Left	-	1	-	-
Stop and Turn Signal Lamp Ground - Right	-	1	-	-
1. Stop Lamps Malfunction 2. Center High Mounted Stop Lamp Malfunction				

Circuit/System Description

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

Diagnostic Aids

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

Reference Information

erence

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

Connector End View Reference

[COMPONENT CONNECTOR END VIEWS - INDEX](#)

Description and Operation

[Exterior Lighting Systems Description and Operation](#)

Electrical Information Reference

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

Scan Tool Reference

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

[Circuit/System Verification](#)

1. Ignition ON.
2. Verify the scan tool Brake Pedal Applied parameter changes between Active and Inactive while pressing and releasing the brake pedal.
 - **If the parameter does not change**
Refer to Brake Pedal Position Sensor Malfunction.
 - **If the parameter changes**
3. Verify the left brake lamp turns ON and OFF when commanding the Left Rear Turn Signal/Stop Lamp ON and OFF with a scan tool.
 - **If the left brake lamp does not turn ON and OFF**
Refer to Stop Lamps Malfunction.
 - **If the left brake lamp turns ON and OFF**
4. Verify the right brake lamp turns ON and OFF when commanding the Right Rear Turn Signal/Stop Lamp ON and OFF with a scan tool.
 - **If the right brake lamp does not turn ON and OFF**
Refer to Stop Lamps Malfunction.
 - **If the right brake lamp turns ON and OFF**
5. Verify the center high mounted stop lamp turns ON and OFF when commanding the Center Stop Lamp ON and OFF with a scan tool.
 - **If the center high mounted stop does not turn ON and OFF**
Refer to Center High Mount Stop Lamp Malfunction.

the center high mounted stop turns ON and OFF

6. All OK.

Circuit/System Testing

Brake Pedal Position Sensor Malfunction

1. Ignition OFF, disconnect the harness connector at the B22 Brake Pedal Position Sensor, ignition ON.
2. Test for less than 1 V between the appropriate low reference circuit terminal listed below and ground.
 - Terminal 2 - with MYB
 - Terminal A - without MYB
 - **If 1 V or greater**
 1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the low reference circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **If less than 1 V**
3. Test or replace the B22 Brake Pedal Position Sensor.

Stop Lamps Malfunction

1. Ignition OFF, exterior lamps OFF, all doors closed, open and close drivers door, remove the appropriate tail/stop and turn signal lamp bulb listed below. It may take up to 2 min for all vehicle systems to power down.
 - E5U Tail/Stop and Turn Signal Lamp - Left Lower
 - E5AG Tail/Stop and Turn Signal Lamp - Left Upper
 - E5V Tail/Stop and Turn Signal Lamp - Right Lower
 - E5AH Tail/Stop and Turn Signal Lamp - Right Upper
2. Test for less than 5 Ω between the ground circuit at the socket terminal G and ground.
 - **If 5 Ω or greater**
 1. Ignition OFF.
 2. Test for less than 2 Ω in the ground circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , repair the open/high resistance in the ground connection.
 - **If less than 5 Ω**
3. Connect a test lamp between the control circuit at the socket terminal A and ground, ignition ON.
4. Verify the test lamp turns ON and OFF when commanding the appropriate Rear Turn Signal/Stop Lamp ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the appropriate harness connector listed below at the K9 Body Control Module.
 - X5 left stop lamp
 - X4 right stop lamp
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance

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

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K9 Body Control Module.

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

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

- X5 left stop lamp
- X4 right stop lamp

2. Test for less than 1 V between the control circuit terminal and ground.

- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, replace the K9 Body Control Module.

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

5. Test or replace the E5 Tail/Stop and Turn Signal Lamp.

Center High Mount Stop Lamp Malfunction

1. Ignition OFF, all doors closed, open and close drivers door, disconnect the KR41 Center High Mounted Stop Lamp Relay. It may take up to 2 min for all vehicle systems to power down.

2. Test for less than 5 Ω between the ground circuit terminal 86 and ground.

- **If 5 Ω or greater**

1. Ignition OFF.

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

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

- **If less than 5 Ω**

3. Ignition ON.

4. Verify a test lamp illuminates between the B+ circuit terminal 30 and ground.

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

Replace the X50A Fuse Block - Underhood.

- **If the test lamp illuminates**

5. Ignition OFF, connect a test lamp between the control circuit terminal 85 and ground, ignition ON.

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

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

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

2. Test for infinite resistance between the control circuit terminal 85 and ground.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance

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

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K9 Body Control Module.

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

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

st for less than 1 V between the control circuit terminal 85 and ground.

- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, replace the K9 Body Control Module.

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

7. Ignition OFF, connect the KR41 Center High Mounted Stop Lamp Relay.

8. Ignition OFF, all doors closed, open and close drivers door, remove the E6 Center High Mounted Stop Lamp bulb. It may take up to 2 min for all vehicle systems to power down.

9. Test for less than 5 Ω between the ground circuit at the socket terminal B and ground.

- **If 5 Ω or greater**

1. Ignition OFF.

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

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

- **If less than 5 Ω**

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

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

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

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

2. Test for infinite resistance between the control circuit and ground.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance

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

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the KR41 Center High Mounted Stop Lamp Relay.

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

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

2. Test for less than 1 V between the control circuit terminal and ground.

- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, replace the KR41 Center High Mounted Stop Lamp Relay.

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

12. Test or replace the E6 Center High Mounted Stop Lamp.

Repair Instructions

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

- [High Mount Stop Lamp Bulb Replacement \(Cargo\)](#)[High Mount Stop Lamp Bulb Replacement \(Stop\)](#)
- [Brake Pedal Position Sensor Replacement](#)
- [Brake Pedal Position Sensor Calibration](#)
- [Fuse Block Replacement](#)
- [Stop and Tail Lamp Bulb Replacement](#)
- [Rear Body Structure Stop Lamp Replacement \(Chevrolet\)](#)[Rear Body Structure Stop Lamp Replacement \(GMC\)](#)
- [Control Module References](#) for BCM replacement, programming, and setup

MPS MALFUNCTION Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
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Diagnostic Instructions

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

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Trailer Stop/Turn Signal Lamp Relay Control - Left	1	1	1	-
Trailer Stop/Turn Signal Lamp Relay Control - Right	1	1	1	-
Trailer Backup Lamps Relay Control	1	1	1	-
Trailer Park Lamps Relay Control	1	1	1	-
Trailer Backup Lamps Control	1	1	1	-
Trailer Park Lamps Control	1	1	1	-
Trailer Stop/Turn Signal Lamp Control - Left	1	1	1	-
Trailer Stop/Turn Signal Lamp Control - Right	1	1	1	-
Trailer Connector Ground	-	1	-	-
1. Trailer Lamps Malfunction				

Circuit/System Description

Backup Lamps

For backup lamp operation, the trailer backup lamps relay is supplied with battery voltage at all times. With the engine running and the transmission in the reverse position, the transmission control module (TCM) sends a serial data message to the body control module (BCM). The message indicates that the gear selector is in the reverse position. The BCM responds to the backup lamp request by energizing the trailer backup lamps relay by applying battery voltage to the trailer backup lamps relay control circuit. When the trailer backup lamps relay is energized, the relay switch contacts close and battery voltage is applied through the backup lamp fuse to the trailer backup lamps control circuit which illuminates the trailer backup lamps. Once the driver moves the gear selector out of the reverse position, a message is sent by the TCM via serial data requesting the BCM to remove battery voltage from the trailer backup lamps relay control circuit.

Park Lamps

For trailer park lamp operation, the trailer park lamps relay is supplied with battery voltage at all times. When the headlamp switch is placed in the HEAD or PARK position, ground is applied to the park lamp switch ON signal circuit to the body control module (BCM). The BCM responds to the park lamp request by energizing the trailer park lamps relay by applying ground to the trailer park lamps relay control circuit. When the trailer park lamps relay is energized, the relay switch contacts close and battery voltage is applied through the trailer parks lamp fuse to the trailer park lamp control circuit which illuminates the trailer park lamps.

Stop Lamps

lamp operation, the left and right trailer stop/turn signal lamp relay's are supplied with battery voltage at all times. The brake pedal position sensor is used to sense the action of the driver application of the brake pedal. The brake pedal position sensor provides an analog voltage signal that will increase as the brake pedal is applied. The body control module (BCM) provides a low reference signal and a 5 V reference voltage to the brake pedal position sensor. When the variable signal reaches a voltage threshold indicating the brakes have been applied, the BCM energizes the left and right trailer stop/turn signal lamp relay's by applying ground to the left and right trailer stop/turn signal lamp relay control circuits. With the left and right trailer stop/turn signal lamp relay's energized, the relay switch contacts close and battery voltage is applied through the left and right trailer stop/turn signal fuse's to the trailer stop lamp control circuits which illuminates the trailer stop lamps.

Turn Signal Lamps

For trailer turn signal lamp operation, the left and right trailer stop/turn signal lamp relay's are supplied with battery voltage at all times. Ground is applied at all times to the turn signal/multifunction switch. The turn signal lamps may only be activated with the ignition switch in the ON or START positions. When the turn signal/multifunction switch is placed in either the TURN RIGHT or TURN LEFT position, ground is applied to the body control module (BCM) through either the right turn or left turn signal switch signal circuit. The BCM responds to the turn signal switch input by applying a pulsating ground to the left and right trailer stop/turn signal lamp relay control circuits energizing the relay's in an ON and OFF cycle. With the left and right trailer stop/turn signal lamp relay's energized, the relay switch contacts cycle ON and OFF applying battery voltage through the left and right trailer stop/turn signal fuse's to the trailer turn signal lamp control circuits which illuminates the trailer turn signal lamps in an ON and OFF cycle.

Diagnostic Aids

For testing purposes, the vehicle must be diagnosed with the trailer/trailer lighting connector disconnected.

Reference Information

Schematic Reference

- [Exterior Lights Schematics](#)
- [Body Control System Schematics](#)
- [Trailer Connector/Provision Schematics](#)

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

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

ON.

2. Verify the vehicles park lamps turn ON and OFF when commanding the Park Lamps ON and OFF with a scan tool.

- **If the vehicles park lamps do not turn ON and OFF**

Refer to [Park, License, and/or Tail Lamps Malfunction.](#)

- **If the vehicles park lamps turn ON and OFF**

3. Verify the vehicles backup lamps turn ON and OFF when commanding the Backup Lamps ON and OFF with a scan tool.

- **If the vehicles backup lamps do not turn ON and OFF**

Refer to [Backup Lamps Malfunction \(Automatic Transmission\)Backup Lamps Malfunction \(Manual Transmission\).](#)

- **If the vehicles backup lamps turn ON and OFF**

4. Verify the vehicles left brake lamp turns ON and OFF when commanding the Left Brake Lamp ON and OFF with a scan tool.

- **If the vehicles left brake lamp does not turn ON and OFF**

Refer to [Stop Lamps Malfunction.](#)

- **If the vehicles left brake lamp turns ON and OFF**

5. Verify the vehicles right brake lamp turns ON and OFF when commanding the Right Brake Lamp ON and OFF with a scan tool.

- **If the vehicles right brake lamp does not turn ON and OFF**

Refer to [Stop Lamps Malfunction.](#)

- **If the vehicles right brake lamp turns ON and OFF**

6. Verify the vehicles left and right turn signal lamps turn ON and OFF when commanding the left and right turn signal lamps ON and OFF with the turn signal/multifunction switch.

- **If the vehicles left or right turn signal lamps do not turn ON and OFF**

Refer to [Turn Signal Lamps and/or Indicators Malfunction.](#)

- **If the vehicles left and right turn signal lamps turn ON and OFF**

7. Refer to Circuit/System Testing.

Circuit/System Testing

Trailer Backup Lamps Malfunction

1. Ignition OFF, exterior lamps OFF.

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

- X88 Trailer Connector terminal B - with Z82
- W24 Blunt Cut - Trailer Provision circuit 22 BK - without Z82
- **If 10 Ω or greater**

1. Ignition OFF.

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

- If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , repair the open/high resistance in the ground connection.
 - **If less than 10 Ω**
3. Disconnect the X1 harness connector at the X50A Fuse Block - Underhood.
 4. Test for less than 10 Ω between the ground circuit terminal 71 and ground.
 - **If 10 Ω or greater**
 1. Ignition OFF.
 2. Test for less than 2 Ω in the ground circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , repair the open/high resistance in the ground connection.
 - **If less than 10 Ω**
 5. Connect the X1 harness connector at the X50A Fuse Block - Underhood.
 6. Disconnect the X2 harness connector at the X50A Fuse Block - Underhood, ignition ON.
 7. Verify a test lamp does not illuminate between the control circuit terminal 52 and ground.
 - **If the test lamp illuminates**
 1. Ignition ON.
 2. Test for less than 1 V between the control circuit terminal 52 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the trailer connector.
 - **If the test lamp does not illuminate**
 8. Ignition OFF, connect a 3 A fused jumper between the control circuit terminal 52 and B+, ignition ON.
 9. Verify a test lamp illuminates between the appropriate control circuit terminal listed below and ground.
 - X88 Trailer Connector terminal A - with Z82
 - W24 Blunt Cut - Trailer Provision circuit 1624 GY - without Z82
 - **If the test lamp does not illuminate**
 1. Ignition OFF, remove the 3 A fused jumper wire.
 2. Test for infinite resistance between the control circuit terminal 52 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the trailer connector.
 - **If the test lamp illuminates**
 10. Ignition OFF, connect the X2 harness connector at the X50A Fuse Block - Underhood.
 11. Disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.
 12. Verify a test lamp illuminates between the control circuit terminal 26 and B+.
 - **If the test lamp does not illuminate**
 1. Ignition OFF, disconnect the X2 harness connector at the X50A Fuse Block - Underhood, ignition ON.
 2. Test for less than 1 V between the control circuit terminal 26 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
 3. Test for less than 2 Ω in the control circuit end to end.

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the X50A Fuse Block - Underhood.

- **If the test lamp illuminates**

13. Ignition OFF, connect a 3 A fused jumper between the control circuit terminal 26 and B+, ignition ON.

14. Verify a test lamp illuminates between the appropriate control circuit terminal listed below and ground.

- X88 Trailer Connector terminal A - with Z82
- W24 Blunt Cut - Trailer Provision circuit 1624 GY - without Z82

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

1. Ignition OFF, disconnect the X2 harness connector at the X50A Fuse Block - Underhood.
2. Test for infinite resistance between the control circuit terminal 26 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the X50A Fuse Block - Underhood.

- **If the test lamp illuminates**

15. Test or replace the K9 Body Control Module.

Trailer Park Lamps Malfunction

1. Ignition OFF, disconnect the KR125 Trailer Park Lamps Relay, ignition ON

2. Verify a test lamp illuminates between the B+ circuit terminal 86 and ground.

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

Replace the X50A Fuse Block - Underhood.

- **If the test lamp illuminates**

3. Verify a test lamp illuminates between the B+ circuit terminal 30 and ground.

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

Replace the X50A Fuse Block - Underhood.

- **If the test lamp illuminates**

4. Connect a test lamp between the control circuit terminal 85 and B+, ignition ON.

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

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

1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.
2. Test for less than 1 V between the control circuit terminal 85 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V

3. Ignition OFF.

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

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K9 Body Control Module.

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

1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module.
2. Test for infinite resistance between the control circuit terminal 85 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.

- If infinite resistance, replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
6. Ignition OFF, exterior lamps OFF, connect the KR125 Trailer Park Lamps Relay.
 7. Test for less than 10 Ω between the appropriate ground circuit terminal listed below and ground.
 - X88 Trailer Connector terminal B - with Z82
 - W24 Blunt Cut - Trailer Provision circuit 22 BK - without Z82
 - **If 10 Ω or greater**
 1. Ignition OFF.
 2. Test for less than 2 Ω in the ground circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , repair the open/high resistance in the ground connection.
 - **If less than 10 Ω**
 8. Connect a test lamp between the appropriate control circuit terminal listed below and ground, ignition ON.
 - X88 Trailer Connector terminal F - with Z82
 - W24 Blunt Cut - Trailer Provision 2109 BN - without Z82
 9. Verify the test lamp turns ON and OFF when commanding the Park Lamps ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X1 harness connector at the X50A Fuse Block - Underhood.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the KR125 Trailer Park Lamps Relay.
 - **If the test lamp is always ON**
 1. Ignition OFF, disconnect the X1 harness connector at the X50A Fuse Block - Underhood, ignition ON.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the KR125 Trailer Park Lamps Relay.
 - **If the test lamp turns ON and OFF**
 10. Test or replace trailer connector.

Trailer Stop/Turn Signal Lamps Malfunction

1. Ignition OFF, exterior lamps OFF.
2. Test for less than 10 Ω between the appropriate ground circuit terminal listed below and ground.
 - X88 Trailer Connector terminal B - with Z82
 - W24 Blunt Cut - Trailer Provision circuit 22 BK - without Z82
 - **If 10 Ω or greater**
 1. Ignition OFF.
 2. Test for less than 2 Ω in the ground circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , repair the open/high resistance in the ground connection.

less than 10 Ω

3. Disconnect the X2 harness connector at the X50A Fuse Block - Underhood, ignition ON.
4. Verify a test lamp does not illuminate between the appropriate control circuit terminal listed below and ground.
 - Terminal 51 - left stop/turn signal
 - Terminal 30 - right stop/turn signal
 - **If the test lamp illuminates**
 1. Ignition ON.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the trailer connector.
 - **If the test lamp does not illuminate**
5. Ignition OFF, connect a 3 A fused jumper between the appropriate control circuit terminal listed below and B+, ignition ON.
 - Terminal 51 - left stop/turn signal
 - Terminal 30 - right stop/turn signal
6. Verify a test lamp illuminates between the appropriate control circuit terminal listed below and ground.
 - X88 terminal G - left stop/turn signal - with Z82
 - X88 terminal D - right stop/turn signal - with Z82
 - W24 Blunt Cut - Trailer Provision circuit 1618 N.mE - left stop/turn signal - without Z82
 - W24 Blunt Cut - Trailer Provision circuit 1619 L-GN - right stop/turn signal - without Z82
 - **If the test lamp does not illuminate**
 1. Ignition OFF, remove the 3 A fused jumper wire.
 2. Test for infinite resistance between the control circuit terminal and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the trailer connector.
 - **If the test lamp illuminates**
7. Ignition OFF, connect the X2 harness connector at the X50A Fuse Block - Underhood.
8. Disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.
9. Verify a test lamp illuminates between the appropriate control circuit terminal listed below and ground.
 - Terminal 8 - left stop/turn signal
 - Terminal 17 - right stop/turn signal
 - **If the test lamp does not illuminate**
 1. Ignition OFF, disconnect the X2 harness connector at the X50A Fuse Block - Underhood
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the X50A Fuse Block - Underhood.

	the test lamp illuminates	Short to	Open/High	Short to	Signal
Circuit	Ground	Resistance	Voltage	Performance	

10. Connect a fused jumper between the appropriate control circuit terminal listed below and ground, ignition ON.

- Terminal 8 - left stop/turn signal
- Terminal 17 - right stop/turn signal

11. Verify a test lamp illuminates between the appropriate control circuit terminal listed below and ground.

- X88 terminal G - left stop/turn signal - with Z82
- X88 terminal D - right stop/turn signal - with Z82
- W24 Blunt Cut - Trailer Provision circuit 1618 N.mE - left stop/turn signal - without Z82
- W24 Blunt Cut - Trailer Provision circuit 1619 L-GN - right stop/turn signal - without Z82
- **If the test lamp does not illuminate**

1. Ignition OFF, disconnect the X2 harness connector at the X50A Fuse Block - Underhood, ignition ON.
2. Test for less than 1 V between the appropriate control circuit terminal listed below and ground.
 - Terminal 8 - left stop/turn signal
 - Terminal 17 - right stop/turn signal
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the X50A Fuse Block - Underhood.

- **If the test lamp illuminates**

12. Test or replace the K9 Body Control Module.

Repair Instructions

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

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

TURN SIGNAL LAMPS AND/OR INDICATORS MALFUNCTION

Diagnostic Instructions

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

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
F25DA (BCM 7) Fuse B+	1	1	-	-
Turn Signal Switch Signal - Left	2	2	2	-
Turn Signal Switch Signal - Right	2	2	2	-
Turn Signal Control - Left Front	B3948 02	B3948 04	B3948 01	-
Stop/Turn Signal Lamp Control - Left	B3950 02, B3950 04	B3950 04	B3950 01	-
Turn Signal Control - Right Front	B3949 02	B3949 04	B3949 01	-

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Stop/Turn Signal Lamp Control - Right	B3951 02, B3951 04	B3951 04	B3951 01	-
Turn Signal Lamp Ground - Left Front	-	1	-	-
Turn Signal Lamp Ground - Right Front	-	1	-	-
Stop/Turn Signal Lamp Ground - Left Rear	-	1	-	-
Stop/Turn Signal Lamp Ground - Right Rear	-	1	-	-
Turn Signal/Multifunction Switch Ground	-	2	-	-
1. Turn Signal Lamps and/or Indicators Malfunction 2. Turn Signal/Multifunction Switch Malfunction				

Circuit/System Description

Ground is applied at all times to the turn signal/multifunction switch. The turn signal lamps may only be activated with the ignition switch in the ON or START positions. When the turn signal/multifunction switch is placed in either the TURN RIGHT or TURN LEFT position, ground is applied to the body control module (BCM) through either the right turn or left turn signal switch signal circuit. The BCM responds to the turn signal switch input by applying a pulsating voltage to the front and rear turn signal lamps through their respective control circuits. When a turn signal request is received by the BCM, a serial data message is sent to the instrument cluster requesting the respective turn signal indicator be pulsed ON and OFF.

Diagnostic Aids

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

Reference Information

Schematic Reference

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

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify the scan tool Right Turn Signal Switch and Left Turn Signal Switch parameters change between Active and Inactive while cycling the turn signal switch between the right and left positions.
 - **If the parameters do not change**
Refer to Turn Signal/Multifunction Switch Malfunction.
 - **If the parameters change**
3. Verify the left front turn signal lamps turn ON and OFF while commanding the Left Front Turn Signal Lamp ON and OFF with a scan tool.
 - **If the left front turn signal lamps do not turn ON and OFF**
Refer to Turn Signal Lamps Malfunction.
 - **If the left front turn signal lamps turn ON and OFF**
4. Verify the right front turn signal lamps turn ON and OFF while commanding the Right Front Turn Signal Lamp ON and OFF with a scan tool.
 - **If the right front turn signal lamps do not turn ON and OFF**
Refer to Turn Signal Lamps Malfunction.
 - **If the right front turn signal lamps turn ON and OFF**
5. Verify the left rear turn signal lamp turns ON and OFF while commanding the Left Rear Turn Signal/Stop Lamp ON and OFF with a scan tool.
 - **If the left rear turn signal lamp does not turn ON and OFF**
Refer to Turn Signal Lamps Malfunction.
 - **If the left rear turn signal lamp turns ON and OFF**
6. Verify the right rear turn signal lamp turns ON and OFF while commanding the Right Rear Turn Signal/Stop Lamp ON and OFF with a scan tool.
 - **If the right rear turn signal lamp does not turn ON and OFF**
Refer to Turn Signal Lamps Malfunction.
 - **If the right rear turn signal lamp turns ON and OFF**
7. Verify the left and right turn signal indicators turn ON and OFF while commanding the All Indicators Test ON and OFF with a scan tool.
 - **If the left or right turn signal indicators do not turn ON and OFF**
Refer to Turn Signal Indicators Malfunction.
 - **If the left and right turn signal indicators turn ON and OFF**
8. All OK.

Circuit/System Testing

Multifunction Switch Malfunction

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, open and close drivers door, disconnect the harness connector at the S78 Turn Signal/Multifunction Switch. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 5 Ω between the ground circuit terminal 3 and ground.
 - **If 5 Ω or greater**
 1. Ignition OFF.
 2. Test for less than 2 Ω in the ground circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , repair the open/high resistance in the ground connection.
 - **If less than 5 Ω**
3. Ignition ON.
4. Verify the scan tool Left Turn Signal Switch parameter is Inactive.
 - **If not Inactive**
 1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit terminal 1 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If Inactive**
5. Install a 3 A fused jumper wire between the signal circuit terminal 1 and ground.
6. Verify the scan tool Left Turn Signal Switch parameter is Active.
 - **If not Active**
 1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the signal circuit terminal 1 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
 3. Test for less than 2 Ω in the signal circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K9 Body Control Module.
 - **If Active**
7. Verify the scan tool Right Turn Signal Switch parameter is Inactive.
 - **If not Inactive**
 1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit terminal 7 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If Inactive**
8. Install a 3 A fused jumper wire between the signal circuit terminal 7 and ground.
9. Verify the scan tool Right Turn Signal Switch parameter is Active.
 - **If not Active**
 1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the signal circuit terminal 7 and ground.

- If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
3. Test for less than 2 Ω in the signal circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K9 Body Control Module.

- **If Active**

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

Turn Signal Lamps Malfunction

1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.
2. Verify a test lamp illuminates between the B+ circuit terminal 3 and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF, disconnect the X1 harness connector at the X51A Fuse Block - Instrument Panel.
 2. Test for less than 2 Ω in the B+ circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , verify the fuse is not open and there is voltage at the fuse.
 - **If the test lamp does not illuminate and the circuit fuse is open**
 1. Ignition OFF, disconnect the X1 harness connector at the X51A Fuse Block - Instrument Panel.
 2. Test for infinite resistance between the B+ circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If the test lamp illuminates**
3. Ignition OFF, connect the X5 harness connector at the K9 Body Control Module.
4. Ignition OFF, exterior lamps OFF, all doors closed, open and close drivers door, remove the appropriate turn signal lamp bulb listed below. It may take up to 2 min for all vehicle systems to power down.
 - E4N Park/Turn Signal Lamp - Left
 - E4P Park/Turn Signal Lamp - Right
 - E5AG Tail/Stop and Turn Signal Lamp - Left Upper
 - E5U Tail/Stop and Turn Signal Lamp - Left Lower
 - E5AH Tail/Stop and Turn Signal Lamp - Right Upper
 - E5V Tail/Stop and Turn Signal Lamp - Right Lower
5. Test for less than 5 Ω between the ground circuit at the socket terminal G and ground.
 - **If 5 Ω or greater**
 1. Ignition OFF.
 2. Test for less than 2 Ω in the ground circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , repair the open/high resistance in the ground connection.
 - **If less than 5 Ω**
6. Connect a test lamp between the appropriate control circuit at the socket terminal A and ground, ignition ON.
7. Verify the test lamp turns ON and OFF when commanding the appropriate Turn Signal Lamp ON and OFF with a scan tool.
 - **If the test lamp is always OFF**

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

- X5 left turn signals
- X4 right turn signals

2. Test for infinite resistance between the control circuit and ground.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance

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

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K9 Body Control Module.

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

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

- X5 left turn signals
- X4 right turn signals

2. Test for less than 1 V between the control circuit terminal and ground.

- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, replace the K9 Body Control Module.

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

8. Test or replace the turn signal lamp.

Turn Signal Indicators Malfunction

1. Ignition ON.

2. Verify the left and right turn signal indicators turn ON and OFF while commanding the All Indicators Test ON and OFF with a scan tool.

- **If the left or right turn signal indicators are always OFF or remain ON**

Replace the P16 Instrument Cluster.

- **If the left and right turn signal indicators turn ON and OFF**

3. Replace the K9 Body Control Module.

Repair Instructions

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

- [Turn Signal Switch Replacement](#)
- [Front Turn Signal Lamp Bulb Replacement \(Chevrolet - Left Side\)](#)[Front Turn Signal Lamp Bulb Replacement \(GMC - Left Side\)](#)[Front Turn Signal Lamp Bulb Replacement \(Chevrolet - Right Side\)](#)[Front Turn Signal Lamp Bulb Replacement \(GMC - Right Side\)](#)
- [Fuse Block Replacement](#)
- [Stop and Tail Lamp Bulb Replacement](#)
- [Rear Body Structure Stop Lamp Replacement \(Chevrolet\)](#)[Rear Body Structure Stop Lamp Replacement \(GMC\)](#)
- [Control Module References](#) for BCM or Instrument Cluster replacement, programming, and setup

REPAIR INSTRUCTIONS

Special Tools	REPAIR - LIGHTING Crimp Tool Nest Color		Wire Gauge mm ² / (AWG)
	Splice Sleeve Color	3 Crimp Nests	4 Crimp Nests

- **EL-38125-10** Splice Sleeve Crimping Tool (non GMNA)
- **J-38125-5A** Ultra Torch Special Tool
- **J-38125-8** Splice Sleeve Crimping Tool (GMNA)

For equivalent regional tools, refer to [Special Tools](#).

WARNING: In order to reduce the risk of personal injury, loss of high voltage isolation to ground and higher system impedance, do not attempt to repair any HV wiring, connector, or terminal that is damaged. High voltage coaxial type cables are not repairable. Never attempt to repair a coaxial type cable. The entire cable/harness or component must be replaced. In order to maintain system integrity and personal safety, never attempt to repair any high voltage wiring, cables, or terminals. Performing this procedure on high voltage circuits may result in serious injury or death.

NOTE: If the wiring harness internal to the transmission is damaged, the wiring harness must be replaced. The use of splice sleeves in an attempt to repair the internal transmission wires, connectors, or terminals could result in performance issues.

NOTE: Do not splice wires in Door Harness Grommets.

NOTE: The DuraSeal splice sleeves have the following 2 critical features:

- A special heat shrink sleeve environmentally seals the splice. The heat shrink sleeve contains a sealing adhesive inside.
- A cross hatched (knurled) core crimp provides the necessary low resistance contact integrity for these sensitive, low energy circuits.

Use only DuraSeal splice sleeves to form a one-to-one splice on all types of insulation except high voltage and specialty cables. Use DuraSeal splice sleeves where there are special requirements such as moisture sealing. Follow the instructions below in order to splice copper wire using DuraSeal splice sleeves.

Splice Sleeve Selection

Splice Sleeve Color	Crimp Tool Nest Color		Wire Gauge mm ² / (AWG)
	3 Crimp Nests	4 Crimp Nests	
Salmon (Yellow-Pink) 19300089	Red (1) or Red/Green (1)	Red (2)	0.22-0.8/(18-26)
Blue 19168447	Blue (2)	Blue (3)	1.0-2.0/(14-16)
Yellow 19168448	Yellow (3)	Yellow (4)	3.0-5.0/(10-12)

NOTE: You must perform the following procedures in the listed order. Repeat the procedure if any wire strands are damaged. You must obtain a clean strip with all of the wire strands intact.

1. Open the harness by removing any tape:

Use a sewing seam ripper, available from sewing supply stores, in order to cut open the harness in order to avoid wire insulation damage.

- Use the DuraSeal splice sleeves on all types of insulation except Tefzel and coaxial.
- Do not use the crimp and DuraSeal splice sleeve to form a splice with more than 2 wires coming together.

2. Cut as little wire off the harness as possible. You may need the extra length of wire in order to change the location of a splice.

Adjust splice locations so that each splice is at least 40 mm (1.5 in) away from the other splices, harness branches, or connectors.

3. Strip the insulation:

- When adding a length of wire to the existing harness, use the same size wire as the original wire.
- Perform one of the following items in order to find the correct wire size:
 - Find the wire on the schematic and convert to regional wiring gauge size.
 - If you are unsure of the wire size, begin with the largest opening in the wire stripper and work down until achieving a clean strip of the insulation.
- Strip approximately 5.0 mm (0.20 in) of insulation from each wire to be spliced.
- Do not nick or cut any of the strands. Inspect the stripped wire for nicks or cut strands.
- If the wire is damaged, repeat this procedure after removing the damaged section.

4. For high temperature wiring, slide a section of high temperature SCT1 shrink tubing down the length of wire to be spliced. Ensure that the shrink tubing will not interfere with the splice procedure.

5. Select the proper DuraSeal splice sleeve according to the wire size. Refer to the above table at the beginning of the repair procedure for the color coding of the DuraSeal splice sleeves and the crimp tool nests.

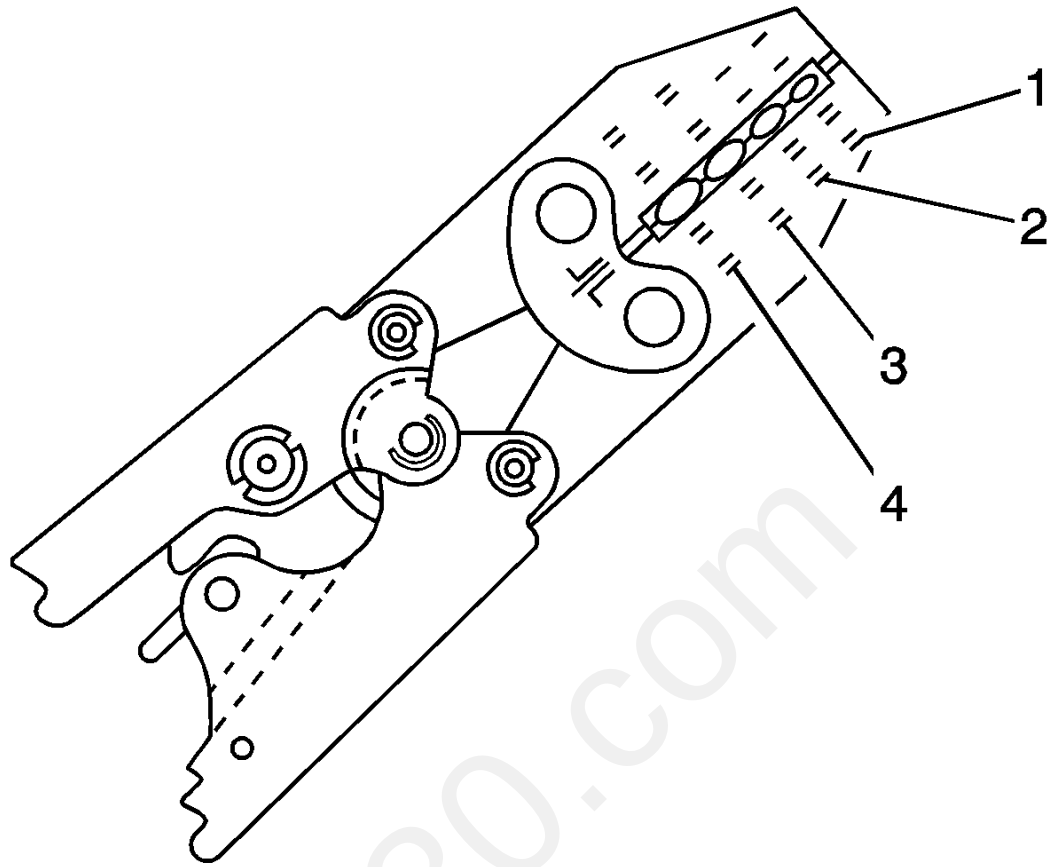


Fig. 13: Crimping Tool

Courtesy of GENERAL MOTORS COMPANY

6. The **EL-38125-10** splice sleeve crimping tool has four crimp nests. The largest crimp nest (4) is used for crimping 10 and 12 gauge wires. The second largest crimp nest (3) is used for crimping 14 and 16 gauge wires. The third largest crimp nest (2) is used for crimping 18 and 20 gauge wires. The smallest crimp nest (1) is used for crimping 22 to 26 gauge wires. The crimp nests are referenced in the table (farther above) under the crimp tool nest color.

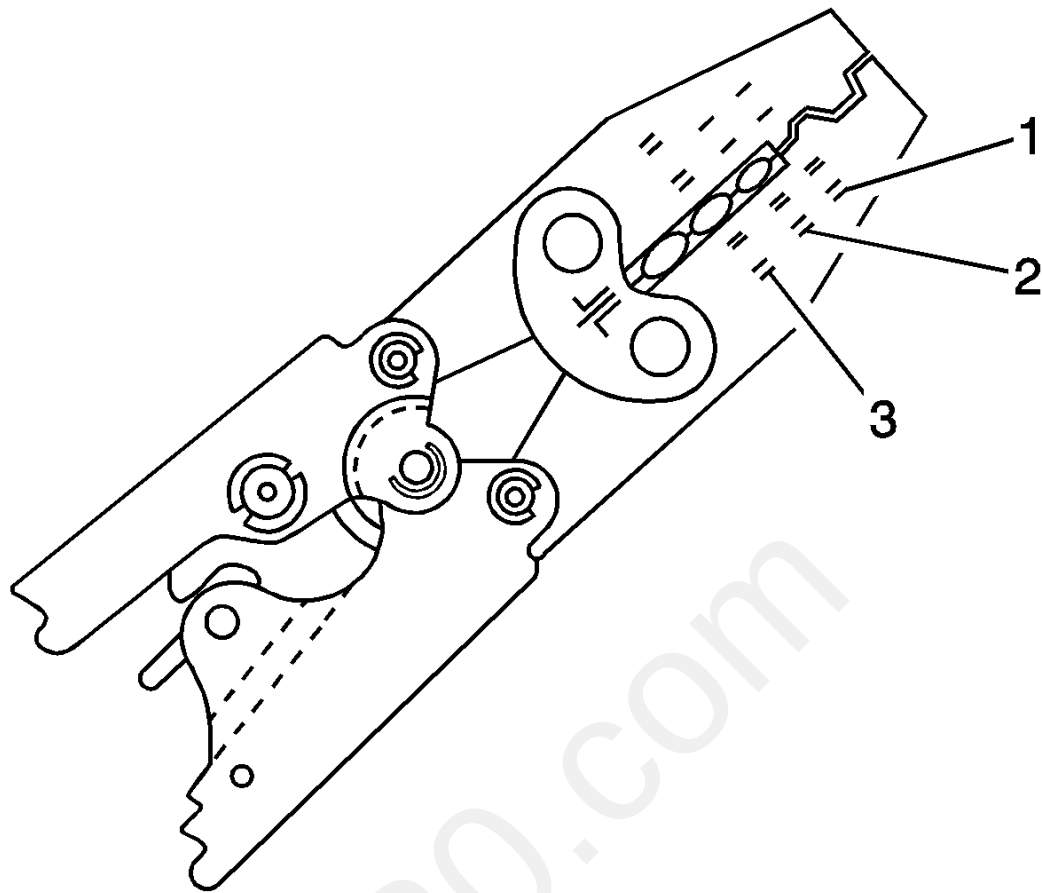


Fig. 14: Identifying Splice Crimp Tool Nests Terminal Identification
 Courtesy of GENERAL MOTORS COMPANY

7. The **J-38125-8** splice sleeve crimping tool has three crimp nests. The largest crimp nest (3) is used for crimping 10 and 12 gauge wires. The second largest crimp nest (2) is used for crimping 14 and 16 gauge wires. The smallest crimp nest (1) is used for crimping 18 to 20 gauge wires. The crimp nests are referenced in the table (farther above) under the crimp tool nest color.
8. Use the splice sleeve crimp tool in order to position the DuraSeal splice sleeve in the proper color nest of the splice sleeve crimp tool. For the four crimp nest tool, use the three largest crimp nests to crimp the splice sleeves. For the three crimp nest tool, use all three crimp nests to crimp the splice sleeves. Use the four and three crimp tool diagrams (above) and the table (farther above) to match the splice sleeve with the correct crimp nest. The crimp tool diagram callout numbers match the numbers in the table (under crimp tool nest color).

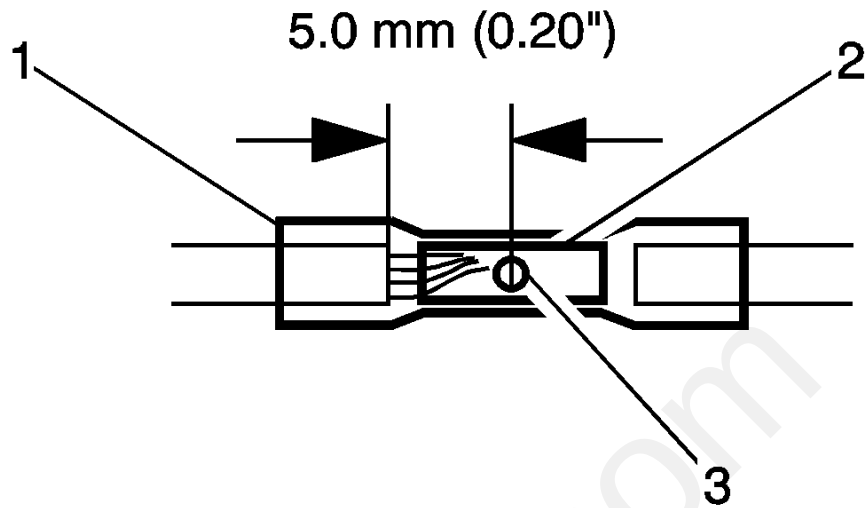


Fig. 15: Identifying Duraseal Splice Sleeve

Courtesy of GENERAL MOTORS COMPANY

9. Place the DuraSeal splice sleeve in the nest. Ensure that the crimp falls midway between the end of the barrel and the stop. The sleeve has a stop (3) in the middle of the barrel (2) in order to prevent the wire (1) from going further. Close the hand crimper handles slightly in order to firmly hold the DuraSeal splice sleeve in the proper nest.



Fig. 16: Crimped Duraseal Splice Sleeve

Courtesy of GENERAL MOTORS COMPANY

10. Insert the wire into the splice sleeve barrel until the wire hits the barrel stop. Refer to **Folded-Over Wire Repair** for splicing wires of 0.35 mm or less (22, 24, 26 gauge sizes) and for splicing wires of different gauges.
11. Tightly close the handles of the crimp tool until the crimper handles open when released.

The crimper handles will not open until you apply the proper amount of pressure to the DuraSeal splice sleeve. Repeat steps 4 and 6 for the opposite end of the splice.



Fig. 17: Crimped Duraseal Splice Sleeve

Courtesy of GENERAL MOTORS COMPANY

12. Using the heat torch, apply heat to the crimped area of the barrel.
13. Start in the middle and gradually move the heat barrel to the open ends of the tubing:
 - The tubing will shrink completely as the heat is moved along the insulation.
 - A small amount of sealant will come out of the end of the tubing when sufficient shrinkage is achieved.

Weatherpack™ Wiring Repair

NOTE: Some replacement pigtail connectors may be delivered without the terminated leads installed into the connector. For Weatherpack™ connectors, all terminated leads included in the package should to be installed into the connector. If the connector end view shows that a terminal is not occupied, the extra terminated lead(s) need to be installed and the end(s) sealed using a DuraSeal splice sleeve and taped back into the harness.

2. Push the wire into the splice sleeve barrel until the wire hits the barrel stop. Refer to [Folded-Over Wire Repair](#) for splicing wires of 0.35 mm or less (22, 24, 26 gauge sizes) and for splicing wires of different gauges.

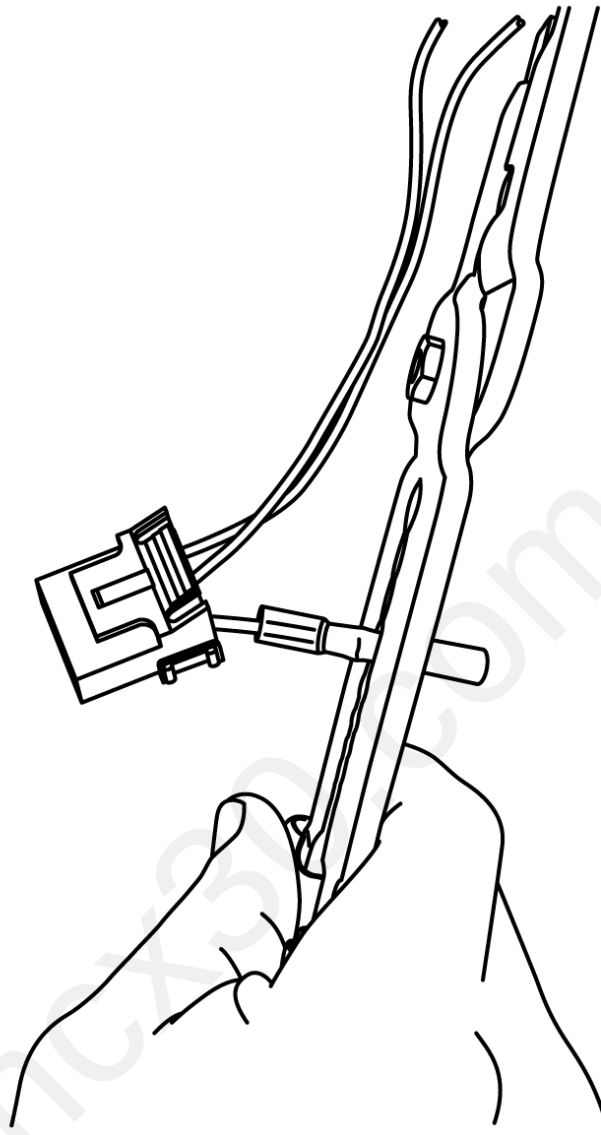


Fig. 18: Tightly Close Handles Of Crimp Tool
Courtesy of GENERAL MOTORS COMPANY

2. Tightly close the handles of the crimp tool until the crimper handles open when released.

The crimper handles will not open until you apply the proper amount of pressure to the DuraSeal splice sleeve. Holding the DuraSEAL with one hand gently tug on the wire to ensure it is crimped in the DuraSeal.

3. Using the heat torch, apply heat to the crimped area of the barrel.

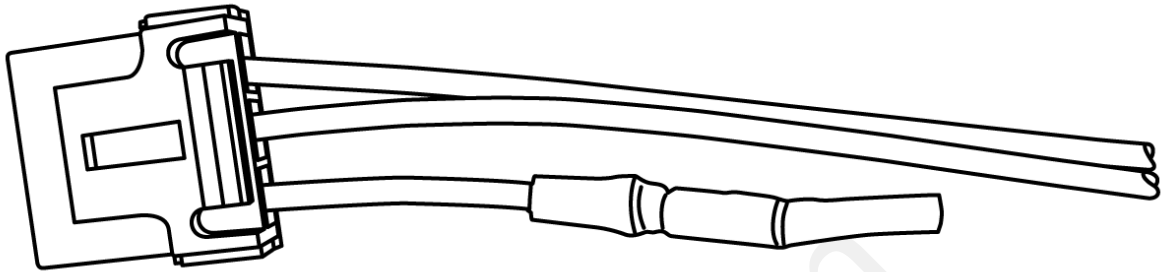


Fig. 19: Applying Heat To Crimped Area Of Barrel
Courtesy of GENERAL MOTORS COMPANY

4. Start in the middle and gradually move the heat barrel to the open ends of the tubing:
 - The tubing will shrink completely as the heat is moved along the insulation.
 - A small amount of sealant will come out of the end of the tubing when sufficient shrinkage is achieved.

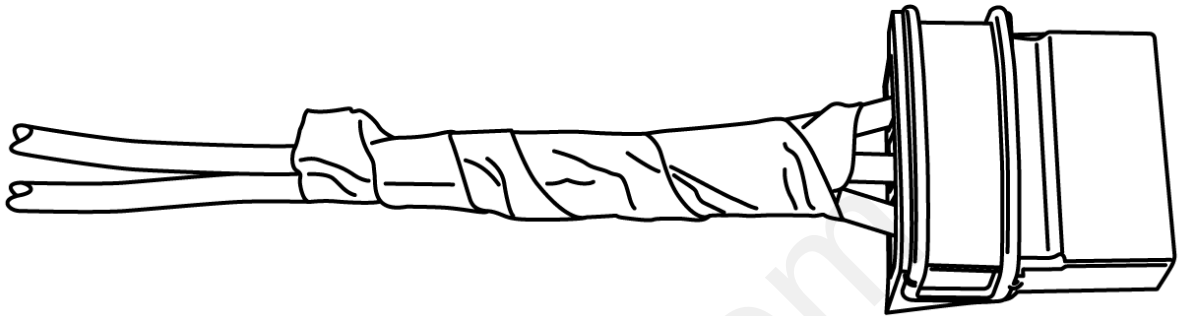


Fig. 20: Taping Extra Terminated Leads Back Into Harness
Courtesy of GENERAL MOTORS COMPANY

5. Tape the extra terminated lead(s) back into the harness.

High Temperature Wiring Repairs

Use the following procedures to perform high temperature wiring repairs:

1. Center the high temperature SCT1 shrink tube over the DuraSeal splice sleeve.
2. Using the heat torch, apply heat to the high temperature heat shrink tubing.
3. Gradually move the heat from the center to the open end of the tubing:
 - The tubing will shrink completely as the heat is moved along the insulation.
 - A small amount of sealant will come out of the end of the tubing when sufficient shrinkage is achieved.
4. Replace any reflective tape and clips that may have been removed during the repair.

CONNECTOR RECONNECTION - LIGHTING

Special Tools

For equivalent regional tools, refer to [Special Tools](#).

When the condition is not currently present, but is indicated in DTC history, the cause may be intermittent. An intermittent may also be the cause when there is a customer complaint, but the symptom cannot be duplicated. Refer to the Symptom Table of the system that is suspect of causing the condition before trying to locate an intermittent condition.

Most intermittent conditions are caused by faulty electrical connections or wiring. Inspect for the following items:

- Wiring broken inside the insulation
- Poor connection between the male and female terminal at a connector
- Poor terminal to wire connection - Some conditions which fall under this description are poor crimps, poor solder joints, crimping over the wire insulation rather than the wire itself, and corrosion in the wire to terminal contact area, etc.
- Pierced or damaged insulation can allow moisture to enter the wiring causing corrosion. The conductor can corrode inside the insulation, with little visible evidence. Look for swollen and stiff sections of wire in the suspect circuits.
- Wiring which has been pinched, cut, or its insulation rubbed through may cause an intermittent open or short as the bare area touches other wiring or parts of the vehicle.
- Wiring that comes in contact with hot or exhaust components
- Refer to [Inducing Intermittent Fault Conditions](#) in order to duplicate the conditions required, in order to verify the customer concern.
- Refer to [Testing for Electrical Intermittents](#) for test procedures to detect intermittent open, high resistance, short to ground, and short to voltage conditions.
- Refer to [Scan Tool Snapshot Procedure](#) for advanced intermittent diagnosis and Vehicle Data Recorder operation.

Testing for Terminal Fretting

Some intermittent conditions can be caused by wire terminal fretting corrosion. Fretting corrosion is a build-up of insulating, oxidized wear debris that can form when there is a small motion between electrical contacts. The oxidized wear debris can pile up enough at the electrical contact spots that the electrical resistance across the connection increases. Movement between the contacting surfaces as small as 10 to 100 microns can cause fretting. To put this in perspective, a sheet of paper is about 100 microns thick, so fretting motion is small and hard to see. Vibration and thermal expansion/contraction are the main sources that create fretting motion. Since vehicles vibrate and can experience large temperature swings, they are a good source for fretting motion. Tin, copper, nickel, and iron surfaces are all susceptible to fretting corrosion. Fretting corrosion can be difficult to see but it looks like small, dark smudges on the terminals contact surface.

To correct a fretting condition disconnect the suspect connector and add dielectric grease / lubricant (Nyogel 760G or equivalent, meeting GM specification 9986087) to both sides of the connector terminals. Then reconnect the connector and wipe away any excess lubricant. This will correct the additional terminal contact resistance due to the terminal fretting corrosion.

Testing for Proper Terminal Contact

It is important to test terminal contact at the component and any inline connectors before replacing a suspect component. Mating terminals must be inspected to ensure good terminal contact. A poor connection between the male and female terminal at a connector may be the result of contamination or deformation.

may be caused by the connector halves being improperly connected. A missing or damaged connector seal, damage to the connector itself, or exposing the terminals to moisture and dirt can also cause contamination. Contamination, usually in the underhood or underbody connectors, leads to terminal corrosion, causing an open circuit or intermittently open circuit.

Deformation is caused by probing the mating side of a connector terminal without the proper adapter. Always use the **EL-35616** kit when probing connectors. Other causes of terminal deformation are improperly joining the connector halves, or repeatedly separating and joining the connector halves. Deformation, usually to the female terminal contact tang, can result in poor terminal contact causing an open or intermittently open circuit.

Testing for Proper Terminal Contact in Bussed Electrical Centers

It is very important to use the correct test adapter when testing for proper terminal contact of fuses and relays in a bussed electrical center. Use the **EL-35616** kit to test for proper terminal contact. Failure to use the **EL-35616** kit can result in improper diagnosis of the bussed electrical center.

Follow the procedure below in order to test terminal contact:

1. Separate the connector halves.
2. Visually inspect the connector halves for contamination. Contamination may result in a white or green build-up within the connector body or between terminals. This causes high terminal resistance, intermittent contact, or an open circuit. An underhood or underbody connector that shows signs of contamination should be replaced in its entirety: terminals, seals, and connector body.
3. Using an equivalent male terminal/terminated lead, verify that the retention force is significantly different between a known good terminal and the suspect terminal. Replace the female terminal in question.

Flat Wire Connectors

There are no serviceable parts for flat wire connectors on the harness side or the component side.

Follow the procedure below in order to test terminal contact:

1. Remove the component in question.
2. Visually inspect each side of the connector for signs of contamination. Avoid touching either side of the connector as oil from your skin may be a source of contamination as well.
3. Visually inspect the terminal bearing surfaces of the flat wire circuits for splits, cracks, or other imperfections that could cause poor terminal contact. Visually inspect the component side connector to ensure that all of the terminals are uniform and free of damage or deformation.
4. Insert the appropriate adapter into the flat wire harness connector in order to test the circuit in question.

Control Module/Component Voltage and Grounds

Poor voltage or ground connections can cause widely varying symptoms.

- Test all control module voltage supply circuits. Many vehicles have multiple circuits supplying voltage to a control module. Other components in the system may have separate voltage supply circuits that may also need to be tested. Inspect connections at the module/component connectors, fuses, and any intermediate connections between the voltage source and the module/component. A test lamp or a DMM may indicate that voltage is present, but neither tests the ability of the circuit to carry sufficient current. Operate the component to test the ability of the circuit to carry sufficient current. Refer to [Circuit Testing](#) , and [Power Distribution Schematics](#) .
- Test all control module ground and system ground circuits. The control module may have multiple ground circuits. Other components in the system may have separate grounds that may also need to be tested. Inspect grounds for clean and tight connections at the grounding point. Inspect the connections at the component and

packs, where applicable. Operate the component to test the ability of the circuit to carry sufficient current. Refer to [Circuit Testing](#) , and [Ground Distribution Schematics](#) .

Temperature Sensitivity

- An intermittent condition may occur when a component/connection reaches normal operating temperature. The condition may occur only when the component/connection is cold, or only when the component/connection is hot.
- Freeze Frame, Failure Records, Snapshot, or Vehicle Data Recorder data may help with this type of intermittent condition, where applicable.
- If the intermittent is related to heat, review the data for a relationship with the following:
 - High ambient temperatures
 - Underhood/engine generated heat
 - Circuit generated heat due to a poor connection, or high electrical load
 - Higher than normal load conditions, towing, etc.
- If the intermittent is related to cold, review the data for the following:
 - Low ambient temperatures - In extremely low temperatures, ice may form in a connection or component. Inspect for water intrusion.
 - The condition only occurs on a cold start.
 - The condition goes away when the vehicle warms up.
- Information from the customer may help to determine if the trouble follows a pattern that is temperature related.
- If temperature is suspected of causing an intermittent fault condition, attempt to duplicate the condition. Refer to [Inducing Intermittent Fault Conditions](#) in order to duplicate the conditions required.

Electromagnetic Interference and Electrical Noise

Some electrical components/circuits are sensitive to electromagnetic interference or other types of electrical noise. Inspect for the following conditions:

- A mis-routed harness that is too close to high voltage/high current devices such as secondary ignition components, motors, generator etc. - These components may induce electrical noise on a circuit that could interfere with normal circuit operation.
- Electrical system interference caused by a malfunctioning relay, or a control module driven solenoid or switch - These conditions can cause a sharp electrical surge. Normally, the condition will occur when the malfunctioning component is operating.
- Installation of non-factory or aftermarket add on accessories such as lights, 2-way radios, amplifiers, electric motors, remote starters, alarm systems, cell phones, etc. - These accessories may create interference in other circuits while operating and the interference would disappear when the accessory is not operating. Refer to [Checking Aftermarket Accessories](#) .
- Test for an open diode across the A/C compressor clutch and for other open diodes. Some relays may contain a clamping diode.
- The generator may be allowing AC noise into the electrical system.

Incorrect Control Module

- There are only a few situations where reprogramming a control module is appropriate:
 - A new service control module is installed.
 - A control module from another vehicle is installed.
 - Revised software/calibration files have been released for this vehicle.

DO NOT re-program the control module with the SAME software/calibration files that are already present in the control module. This is not an effective repair for any type of concern.

- Verify that the control module contains the correct software/calibration. If incorrect programming is found, reprogram the control module with the most current software/calibration. Refer to [Control Module References](#) for replacement, setup, and programming.

BRAKE PEDAL POSITION SENSOR CALIBRATION

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

Calibration Criteria

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

Brake pedal position sensor calibration must be performed after the brake pedal position sensor, body control module (BCM), engine control module (ECM), or hybrid powertrain control module have been serviced. The calibration procedure will set the brake pedal position sensor home value. This value is used by the BCM and ECM/HPCM to determine the action of the driver applying the brake system and to provide this information to the vehicle subsystems via serial data.

Calibration Procedure

1. Apply the parking brake.
2. Ignition ON, engine OFF, place the transmission in the PARK position for automatic transmission or NEUTRAL position for manual transmission.
3. Install a scan tool.
4. Clear all DTCs before proceeding.
5. Navigate to the Configuration/Reset Functions menu of the BCM.
6. Select the Brake Pedal Position Sensor Learn procedure and follow the directions displayed on the screen.
7. Navigate to the Configuration/Reset Functions menu of the ECM/HPCM.
8. Select the Learn Functions menu.
9. Select the Brake Pedal Position Sensor Learn procedure and follow the directions displayed on the screen.

BRAKE PEDAL POSITION SENSOR REPLACEMENT

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

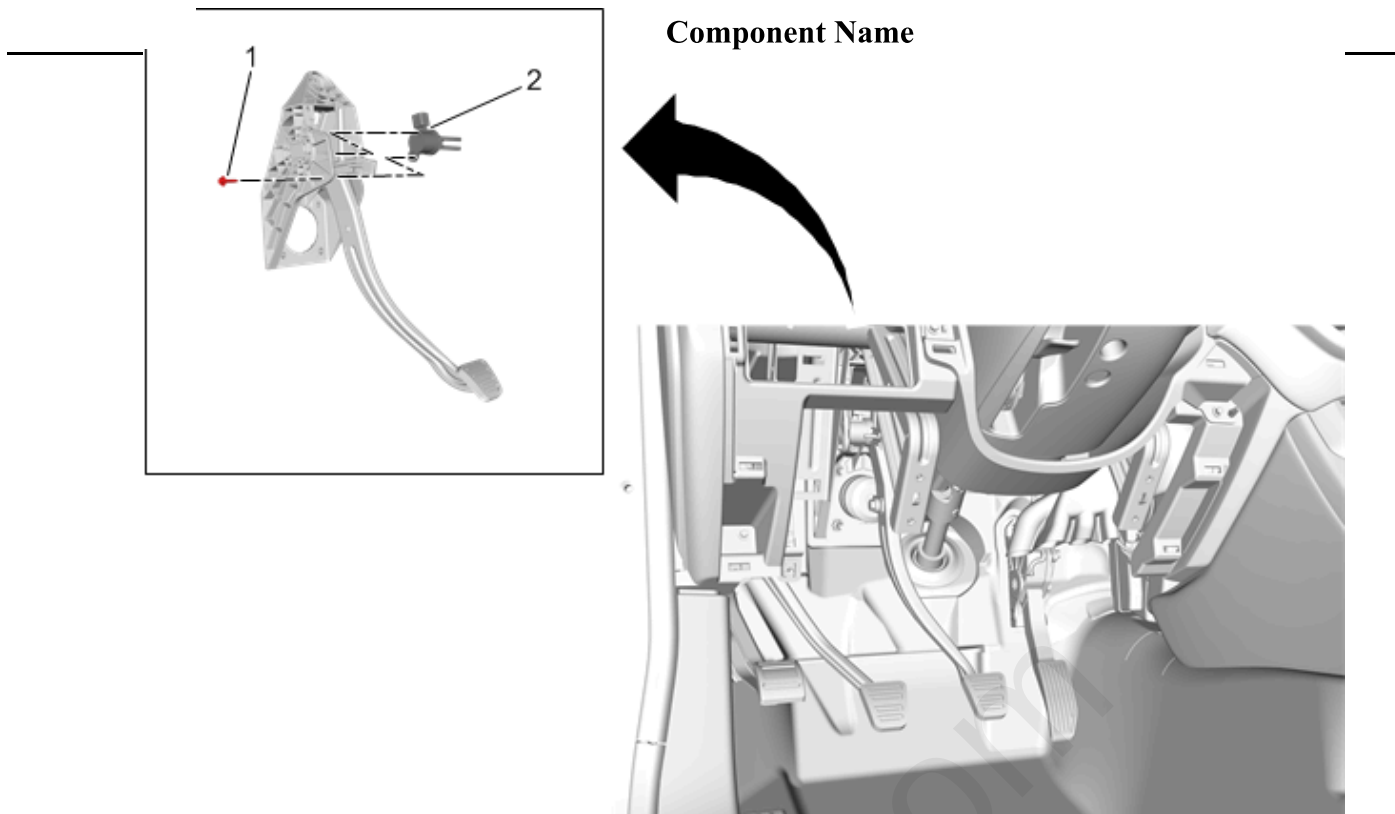


Fig. 21: Brake Pedal Position Sensor
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures Remove the instrument panel knee bolster outer deflector. Refer to Instrument Panel Knee Bolster Deflector Replacement .	
1	Brake Pedal Position Sensor Bolt CAUTION: Refer to Fastener Caution . Tighten 3 N.m (27 lb in)
2	Brake Pedal Position Sensor Procedure 1. Disconnect the electrical connector. 2. After the installation is complete, calibrate the brake pedal position sensor. Refer to Brake Pedal Position Sensor Calibration.

HEADLAMP SWITCH REPLACEMENT

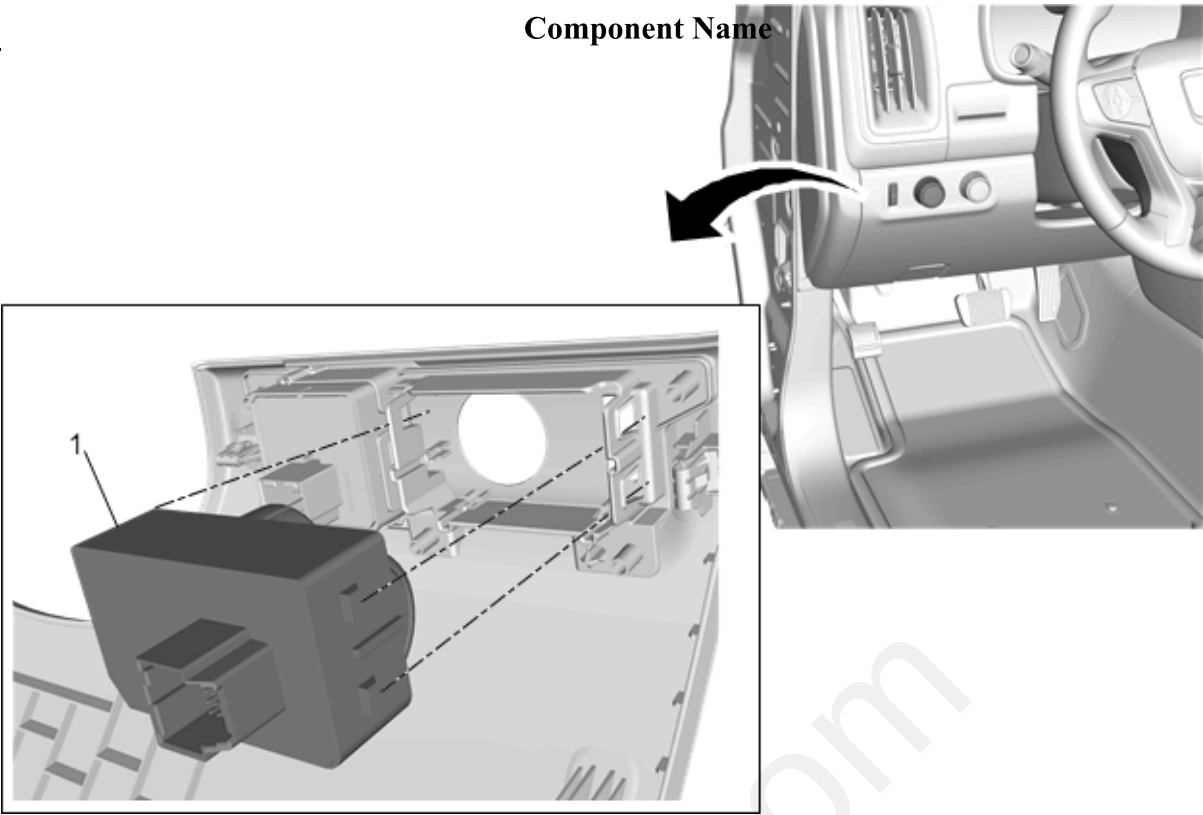


Fig. 22: Headlamp Switch
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove instrument panel knee bolster. Refer to Instrument Panel Knee Bolster Replacement .	
1	Headlamp Switch Procedure Using the appropriate tool gently depress tabs to remove the switch assembly from the bezel.

HEADLAMP AUTOMATIC CONTROL AMBIENT LIGHT SENSOR REPLACEMENT

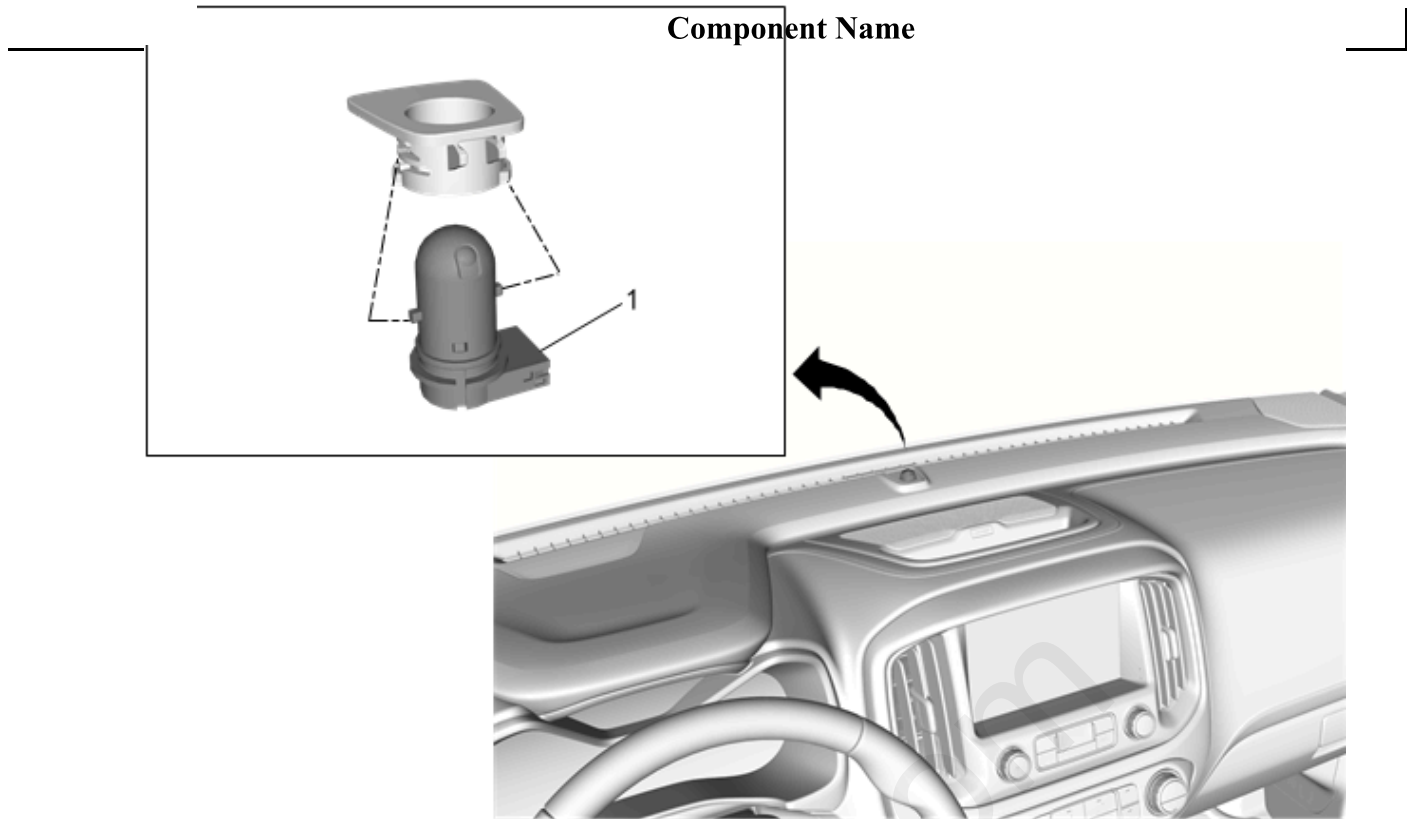


Fig. 23: Headlamp Automatic Control Ambient Light Sensor
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the daytime running lamp ambient light bezel. Refer to Daytime Running Lamp Ambient Light Bezel Replacement .	
1	Headlamp Automatic Control Ambient Light Sensor Procedure - Carefully separate the bezel from the sensor by lining up the tabs to release. - Disconnect the electrical connector.

READING LAMP BULB REPLACEMENT

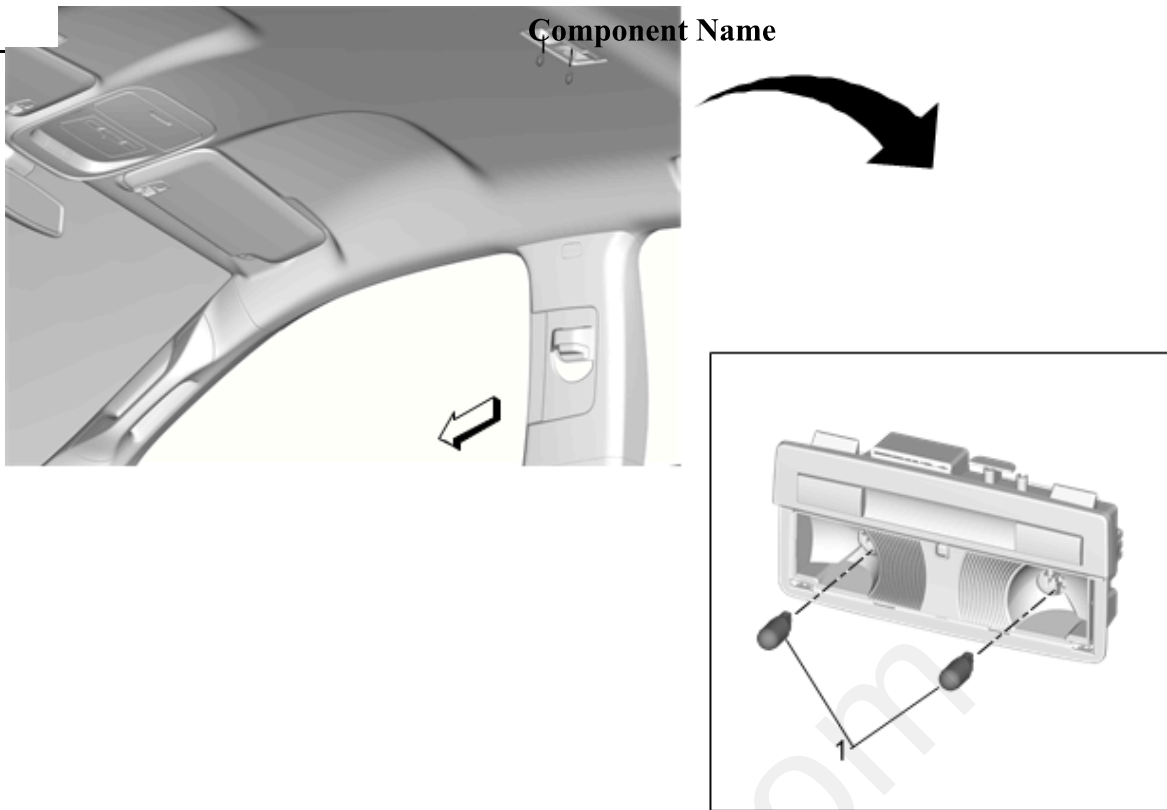


Fig. 24: Reading Lamp Bulb

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the center reading and courtesy lamp lens. Refer to Center Reading and Courtesy Lamp Lens Replacement (Front) Center Reading and Courtesy Lamp Lens Replacement (Rear) Center Reading and Courtesy Lamp Lens Replacement (Extended Cab) .	
1	Reading Lamp Bulb (Qty: 2) Procedure Pull bulb straight out from element socket.

CENTER COURTESY LAMP REPLACEMENT

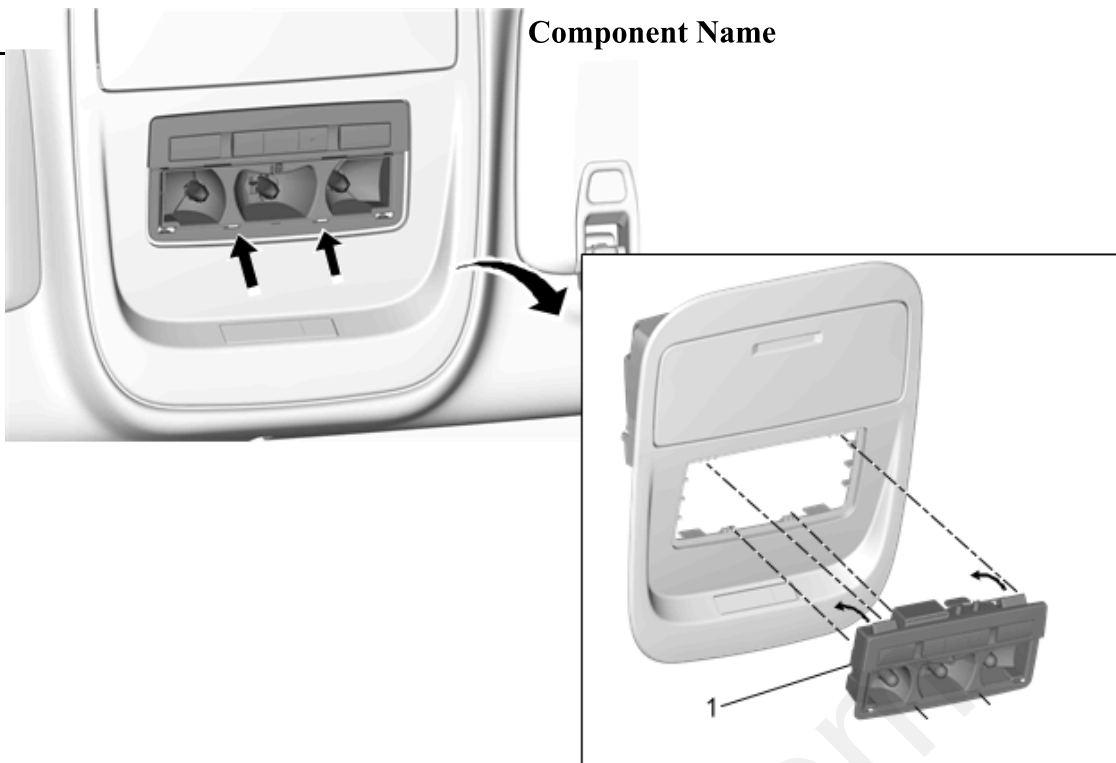


Fig. 25: Center Courtesy Lamp

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the center reading and courtesy lamp lens. Refer to Center Reading and Courtesy Lamp Lens Replacement (Front) Center Reading and Courtesy Lamp Lens Replacement (Rear) Center Reading and Courtesy Lamp Lens Replacement (Extended Cab) .	
1	Center Courtesy Lamp Procedures 1. Remove the reflector from the lamp assembly in order to access the lamp retainers. 2. Using a suitable flat bladed tool, release the metal retaining clips through the two access holes and pull downward to release the retainer clips securing the assembly to the roof console. 3. Disconnect the electrical connections.

CENTER READING AND COURTESY LAMP REPLACEMENT

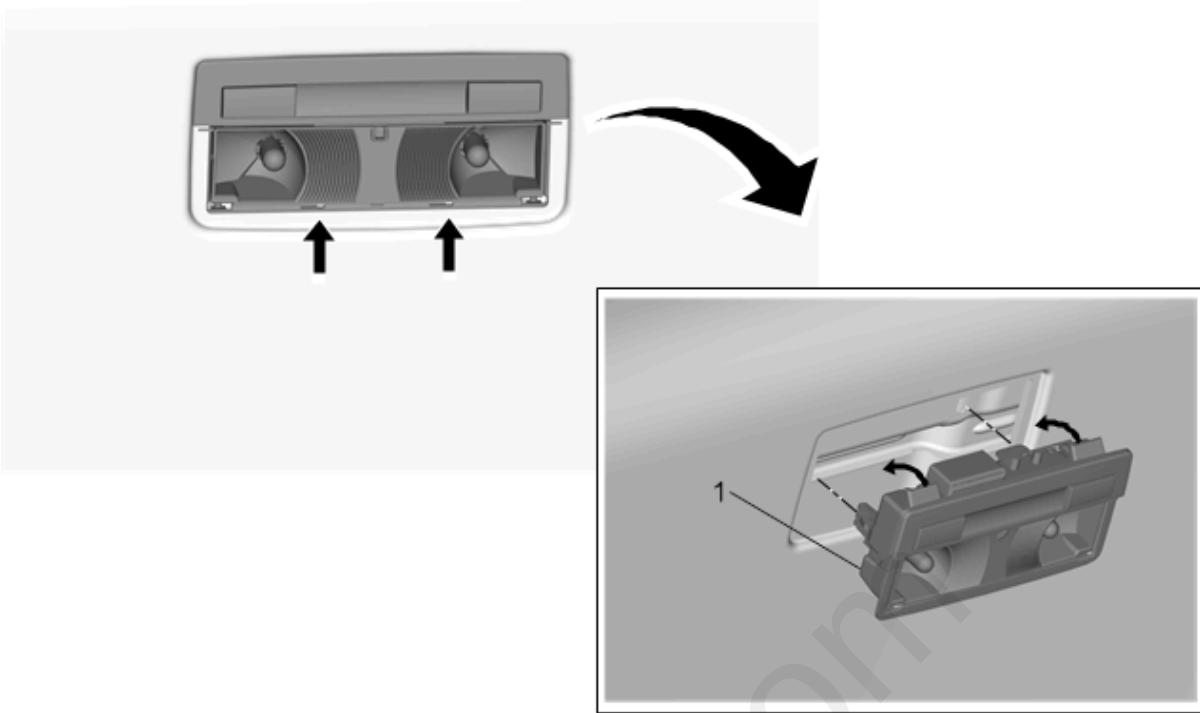
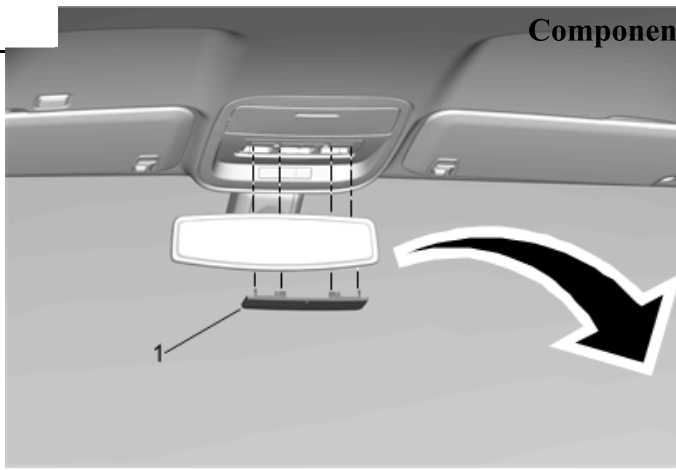


Fig. 26: Center Reading and Courtesy Lamp
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the center reading and courtesy lamp lens. Refer to Center Reading and Courtesy Lamp Lens Replacement (Front) Center Reading and Courtesy Lamp Lens Replacement (Rear) Center Reading and Courtesy Lamp Lens Replacement (Extended Cab) .	
1	Center Reading and Courtesy Lamp Procedures 1. Remove the reflector from the lamp assembly in order to access the lamp retainers. 2. Using a suitable flat bladed tool, release the metal retaining clips through the two access holes and pull downward to release the retainer clips securing the assembly to the roof trim. 3. Disconnect the electrical connections.

CENTER READING AND COURTESY LAMP LENS REPLACEMENT (FRONT)



Component Name

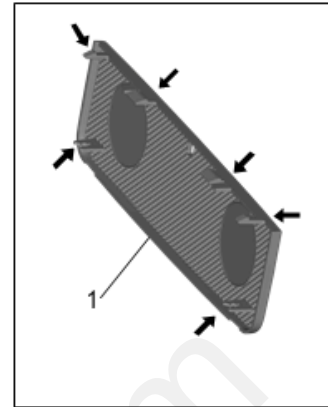
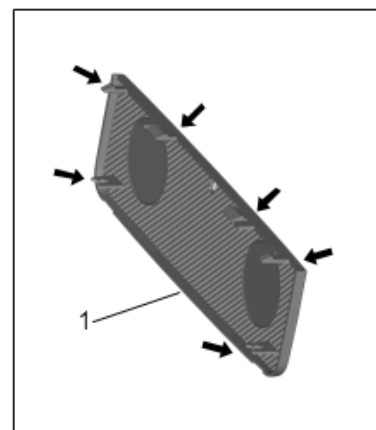
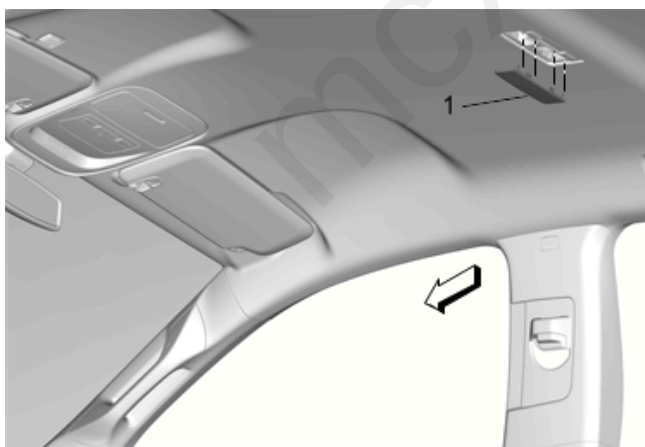


Fig. 27: Center Reading and Courtesy Lamp Lens (Front)

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Center Reading and Courtesy Lamp Lens Procedure Carefully use the appropriate tool to release the retainers securing the lens to the center courtesy lamp assembly.

CENTER READING AND COURTESY LAMP LENS REPLACEMENT (REAR)



Callout	Component Name
1	Center Reading and Courtesy Lamp Lens Procedure Carefully use the appropriate tool to release the retainers securing the lens to the center reading and courtesy lamp assembly.

CENTER READING AND COURTESY LAMP LENS REPLACEMENT (EXTENDED CAB)

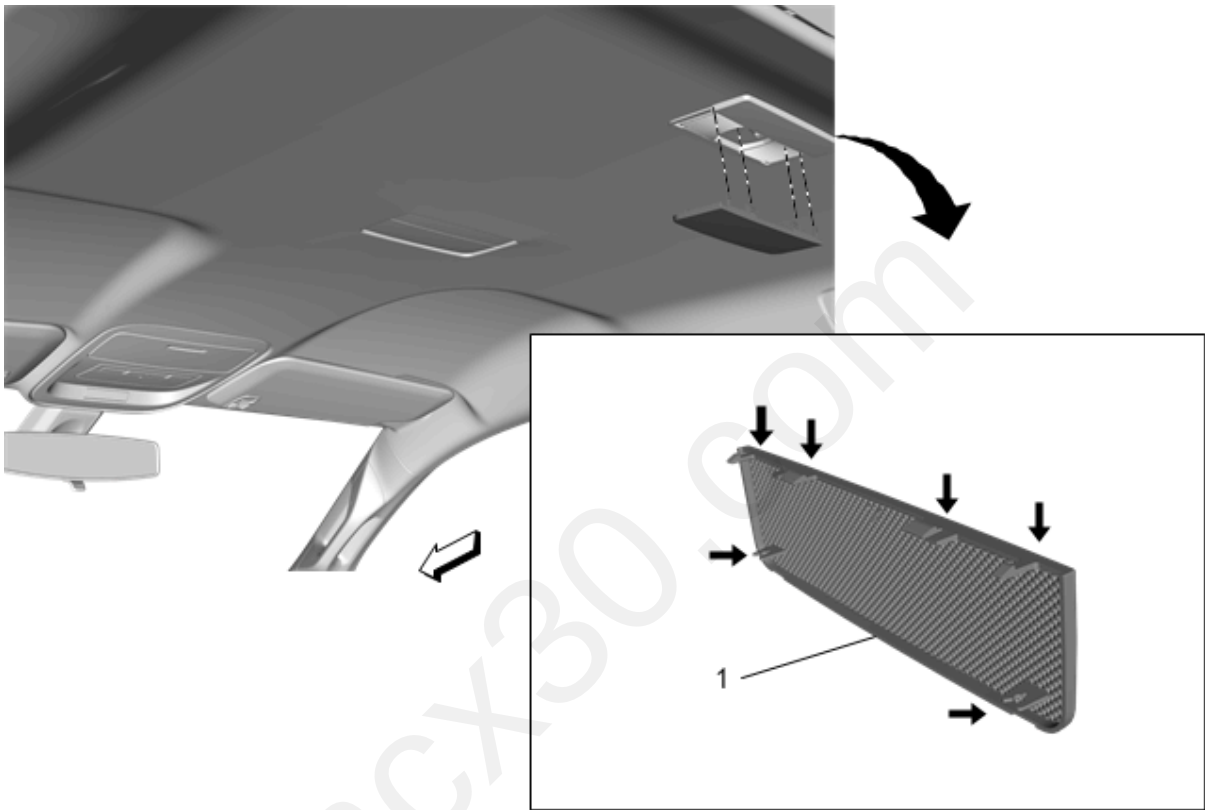


Fig. 29: Center Reading and Courtesy Lamp Lens (Extended Cab)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Center Reading and Courtesy Lamp Lens Procedure Carefully use the appropriate tool to release the retainers securing the lens to the lamp assembly.

REAR SEAT POSITION CENTER COURTESY LAMP REPLACEMENT (EXTENDED CAB)

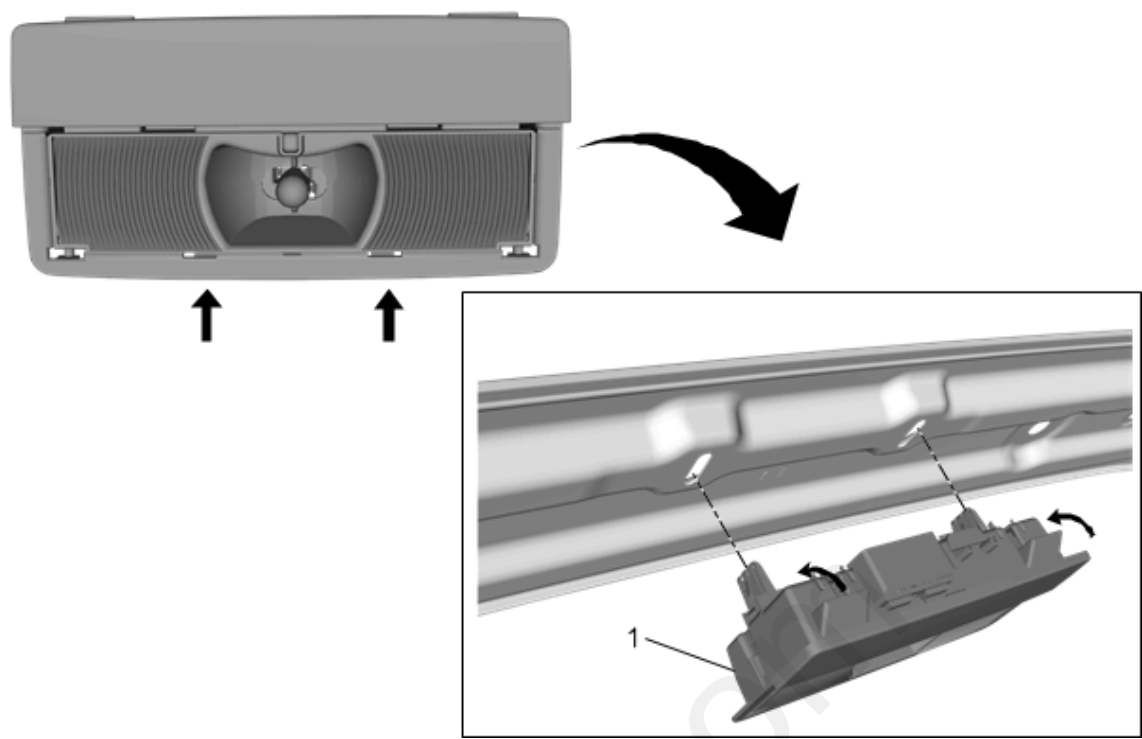


Fig. 30: Rear Seat Position Center Courtesy Lamp (Extended Cab)

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the center reading and courtesy lamp lens. Refer to Center Reading and Courtesy Lamp Lens Replacement (Extended Cab) .	
1	Rear Seat Position Center Courtesy Lamp Procedures 1. Using a suitable flat bladed tool, release the metal retaining clips through the two access holes and pull downward to release the retainer clips securing the assembly to the roof trim. 2. Disconnect the electrical connections.

REAR SEAT POSITION CENTER COURTESY LAMP BULB REPLACEMENT (EXTENDED CAB)

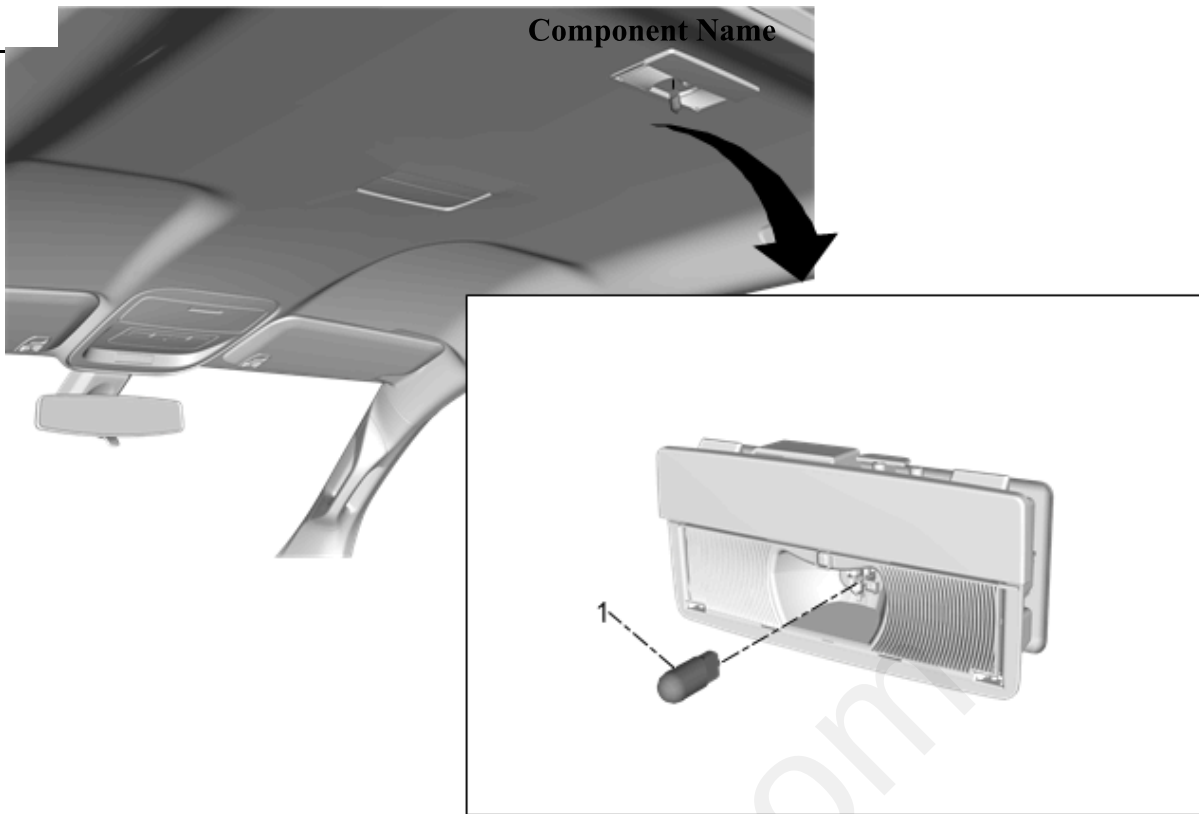


Fig. 31: Rear Seat Position Center Courtesy Lamp Bulb
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the center reading and courtesy lamp lens. Refer to Center Reading and Courtesy Lamp Lens Replacement (Front) Center Reading and Courtesy Lamp Lens Replacement (Rear) Center Reading and Courtesy Lamp Lens Replacement (Extended Cab) .	
1	Rear Seat Position Center Courtesy Lamp Bulb Procedure Pull bulb straight out from element socket.

SUNSHADE ILLUMINATED MIRROR LAMP BULB REPLACEMENT

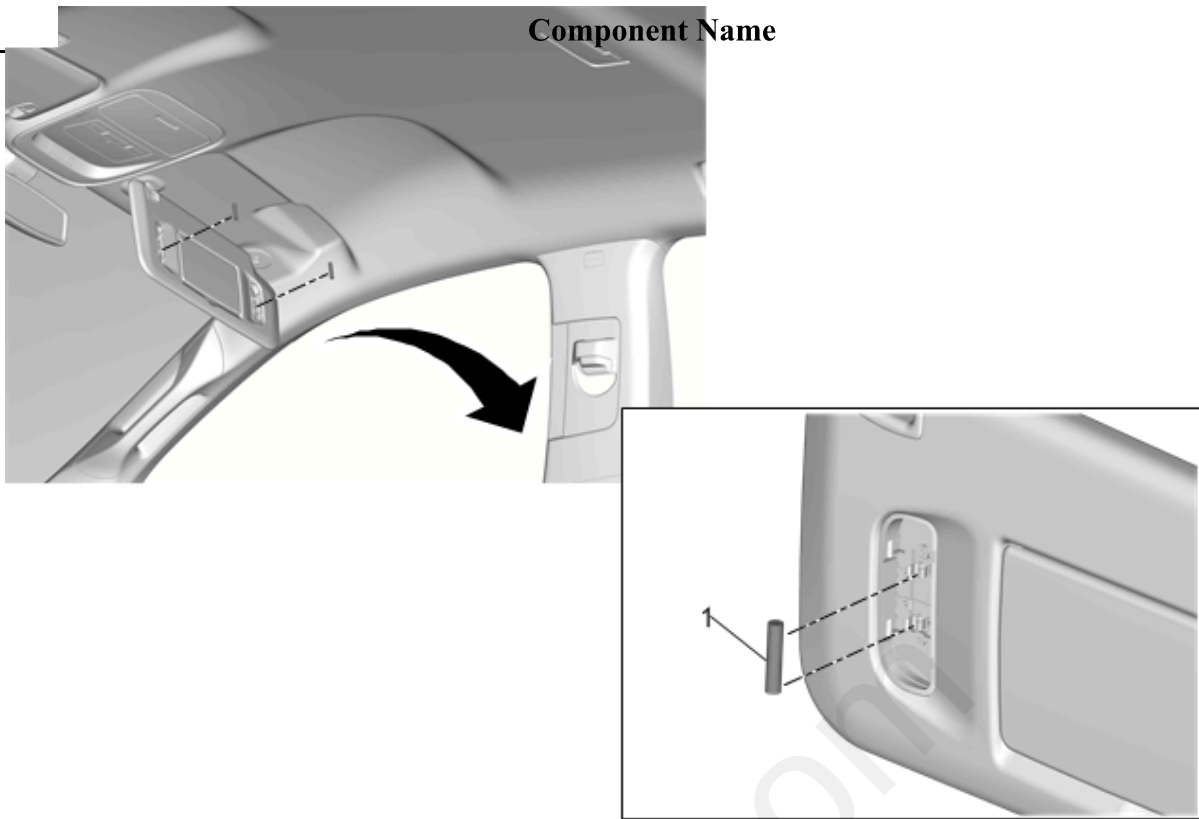


Fig. 32: Sunshade Illuminated Mirror Lamp Bulb
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the sunshade illuminated mirror lamp lens. Refer to Sunshade Illuminated Mirror Lamp Lens Replacement .	
1	Sunshade Illuminated Mirror Lamp Bulb Procedure Gently bend back the contact lever that secures the bulb to remove.

SUNSHADE ILLUMINATED MIRROR LAMP LENS REPLACEMENT

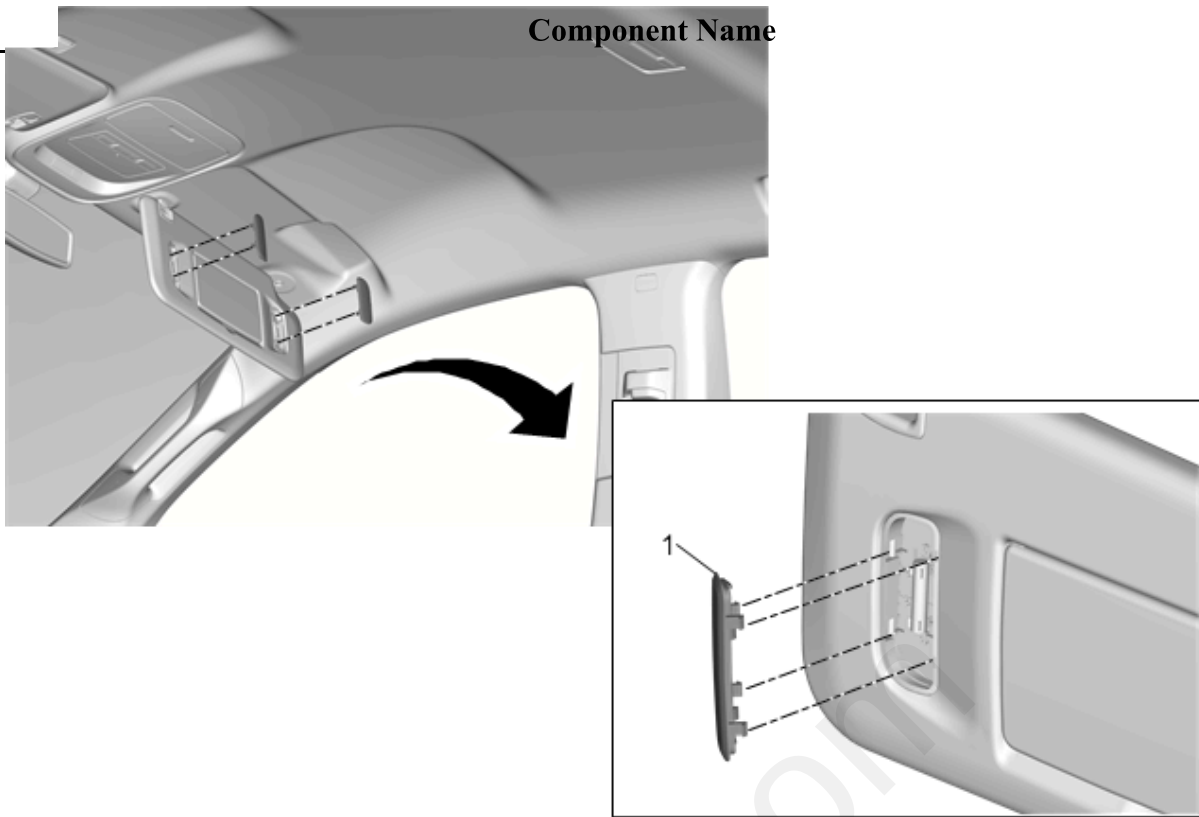


Fig. 33: Sunshade Illuminated Mirror Lamp Lens
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Sunshade Illuminated Mirror Lamp Lens Procedure Using the appropriate tool, gently depress the tabs on the lens to remove.

DOMELAMP BULB REPLACEMENT

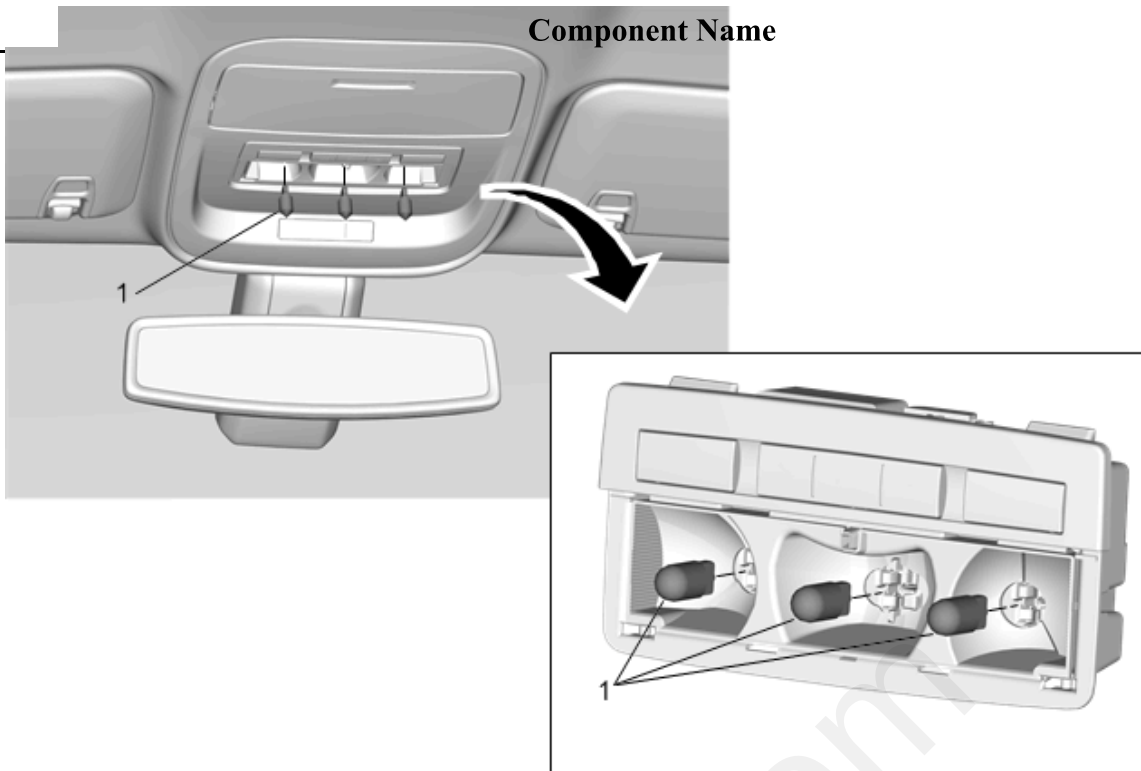


Fig. 34: Dome Lamp Bulb

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the center reading and courtesy lamp lens. Refer to Center Reading and Courtesy Lamp Lens Replacement (Front) Center Reading and Courtesy Lamp Lens Replacement (Rear) Center Reading and Courtesy Lamp Lens Replacement (Extended Cab) .	
1	Dome Lamp Bulb (Qty: 3) Procedure Pull bulb straight out from element socket.

HEADLAMP REPLACEMENT (CHEVROLET - LEFT SIDE)

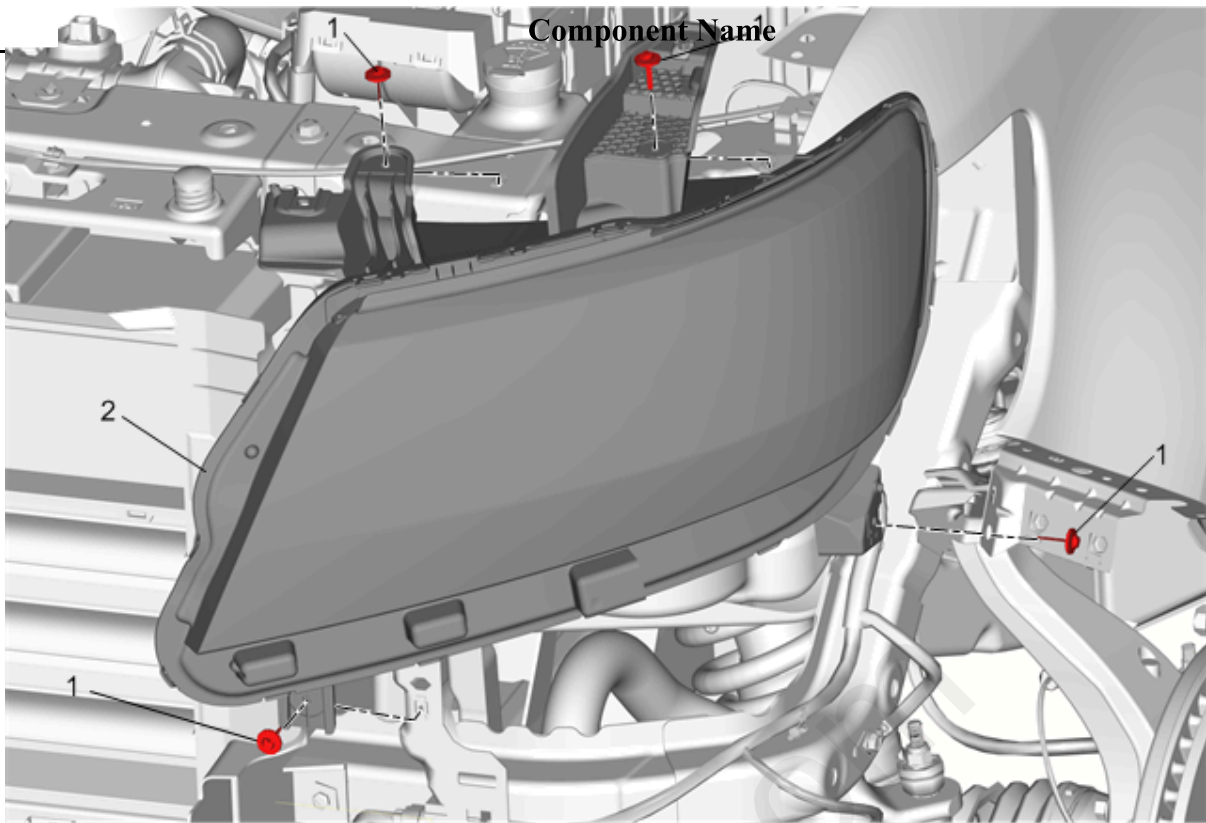


Fig. 35: Headlamp (Chevrolet - Left Side)
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the front grille. Refer to Front Grille Replacement (Colorado) .	
1	Headlamp Screw (Qty: 4) CAUTION: Refer to Fastener Caution . Tighten 4 N.m (35 lb in)
2	Headlamp Assembly Procedure 1. Disconnect the electrical connector and remove the headlamp. 2. Aim the headlamp after replacement. Refer to Headlamp Aiming.

HEADLAMP REPLACEMENT (GMC - LEFT SIDE)

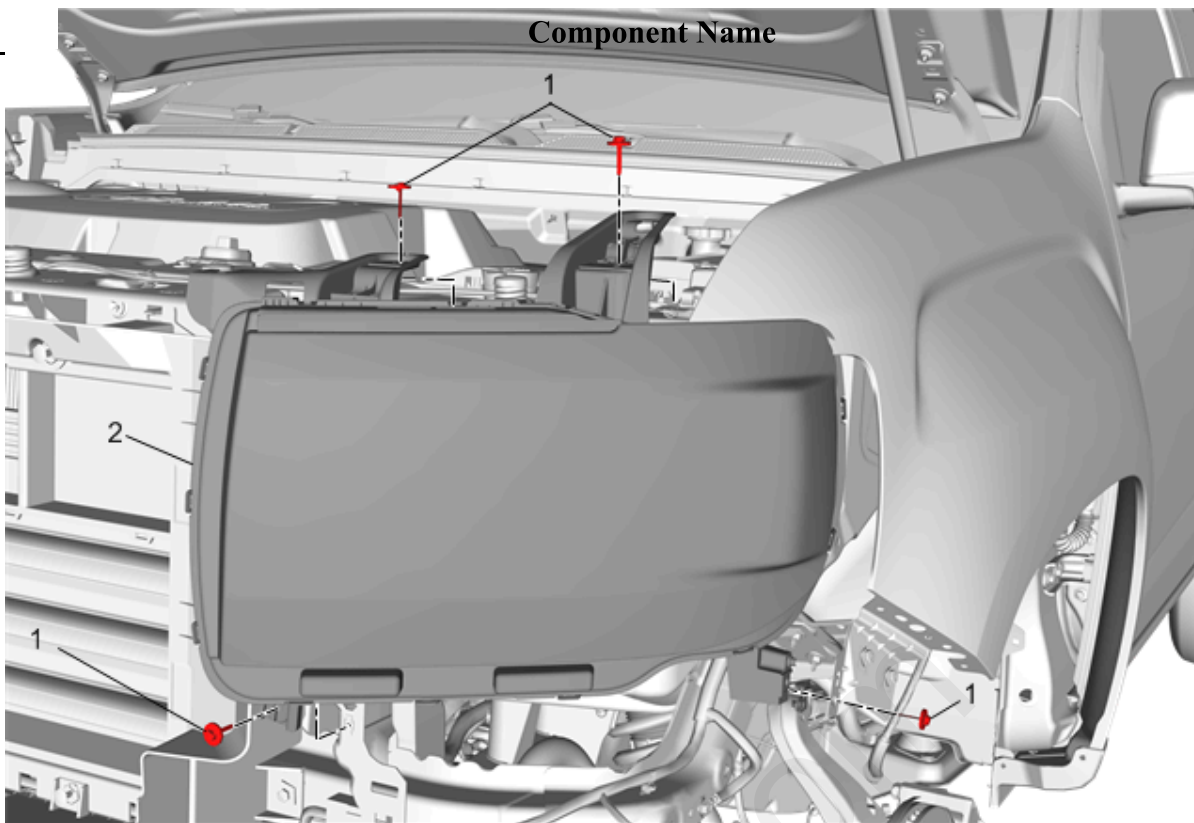


Fig. 36: Headlamp (GMC - Left Side)
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the front grille. Refer to Front Grille Replacement (Canyon) .	
1	Headlamp Screw (Qty: 4) CAUTION: Refer to Fastener Caution . Tighten 4 N.m (35 lb in)
2	Headlamp Assembly Procedure 1. Disconnect the electrical connector and remove the headlamp. 2. Aim the headlamp after replacement. Refer to Headlamp Aiming.

HEADLAMP REPLACEMENT (CHEVROLET - RIGHT SIDE)

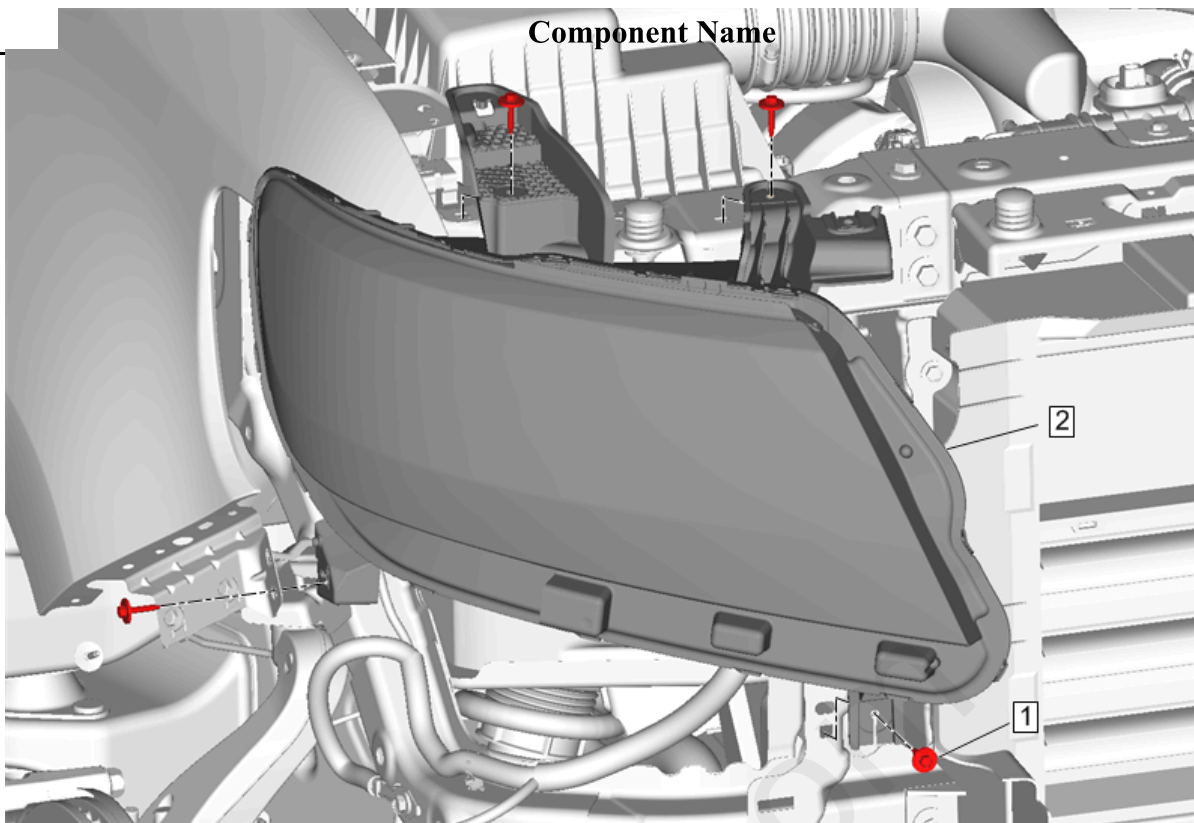


Fig. 37: Headlamp (Chevrolet - Right Side)
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures Front Grille Replacement (Colorado) Intake Air Baffle Replacement , (LCV) or Intake Air Baffle Replacement (LFX)	
1	Headlamp Screw (Qty: 2) CAUTION: Refer to Fastener Caution . Tighten 4 N.m (35 lb in)
2	Headlamp Procedure - Disconnect the electrical connector. Headlamp Aiming

HEADLAMP REPLACEMENT (GMC - RIGHT SIDE)

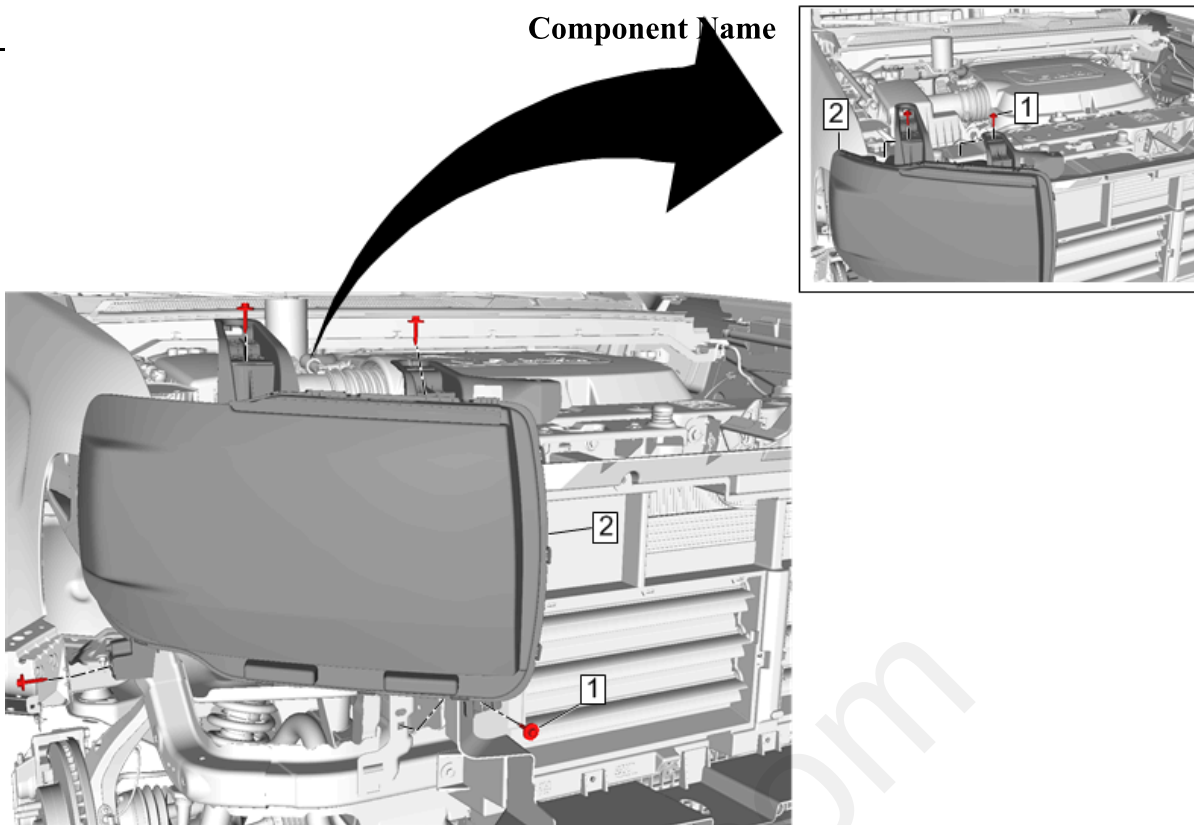


Fig. 38: Headlamp (GMC - Right Side)
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures Front Grille Replacement (Canyon) Intake Air Baffle Replacement , (LCV) or Intake Air Baffle Replacement (LFX)	
1	Headlamp Screw (Qty: 2) CAUTION: Refer to Fastener Caution . Tighten 4 N.m (35 lb in)
2	Headlamp Procedure - Disconnect the electrical connector. Headlamp Aiming

HEADLAMP BULB REPLACEMENT - LEFT SIDE (CHEVROLET HIGH BEAM)

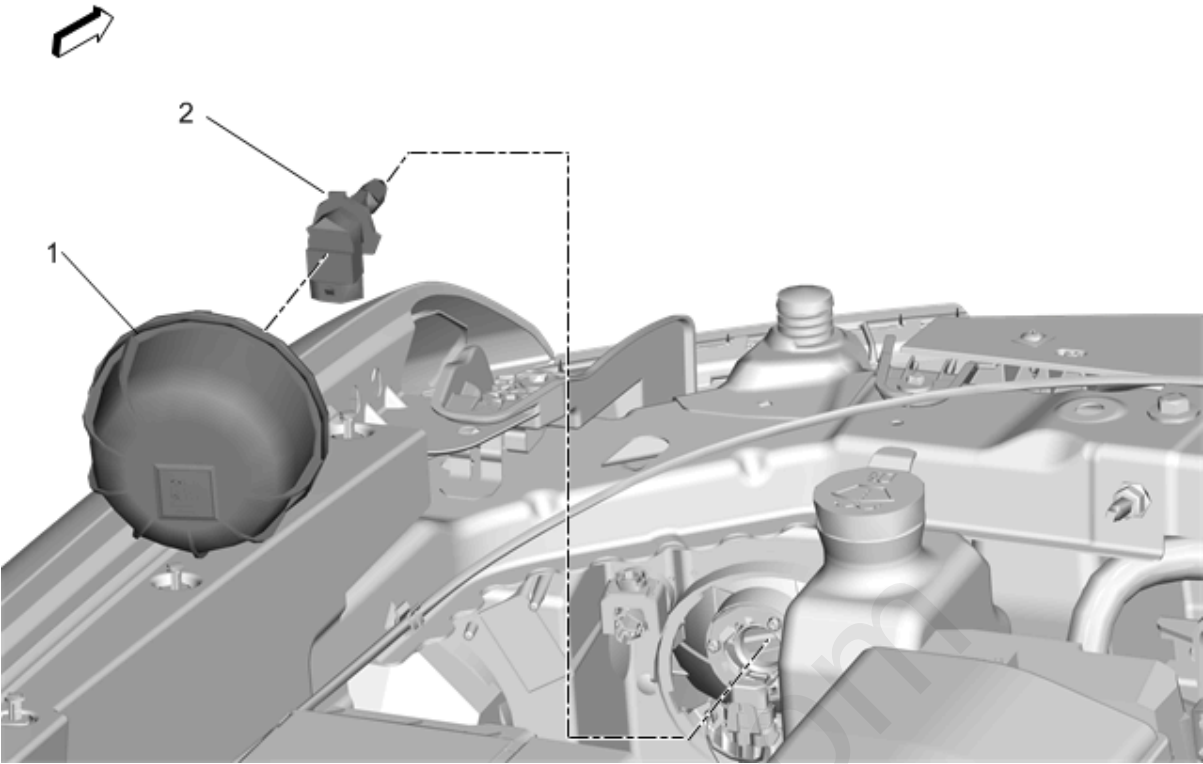


Fig. 39: Headlamp Bulb - Left Side (Chevrolet High Beam)

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Open the hood.	
1	Headlamp Bulb Access Cover Procedure Rotate the headlamp bulb access cover counterclockwise and pull from the headlamp.
2	Headlamp Bulb WARNING: Refer to Halogen Bulb Warning . Procedure 1. Disconnect the electrical connector. 2. Rotate the headlamp bulb counterclockwise and pull from the headlamp.

HEADLAMP BULB REPLACEMENT - LEFT SIDE (CHEVROLET LOW BEAM)

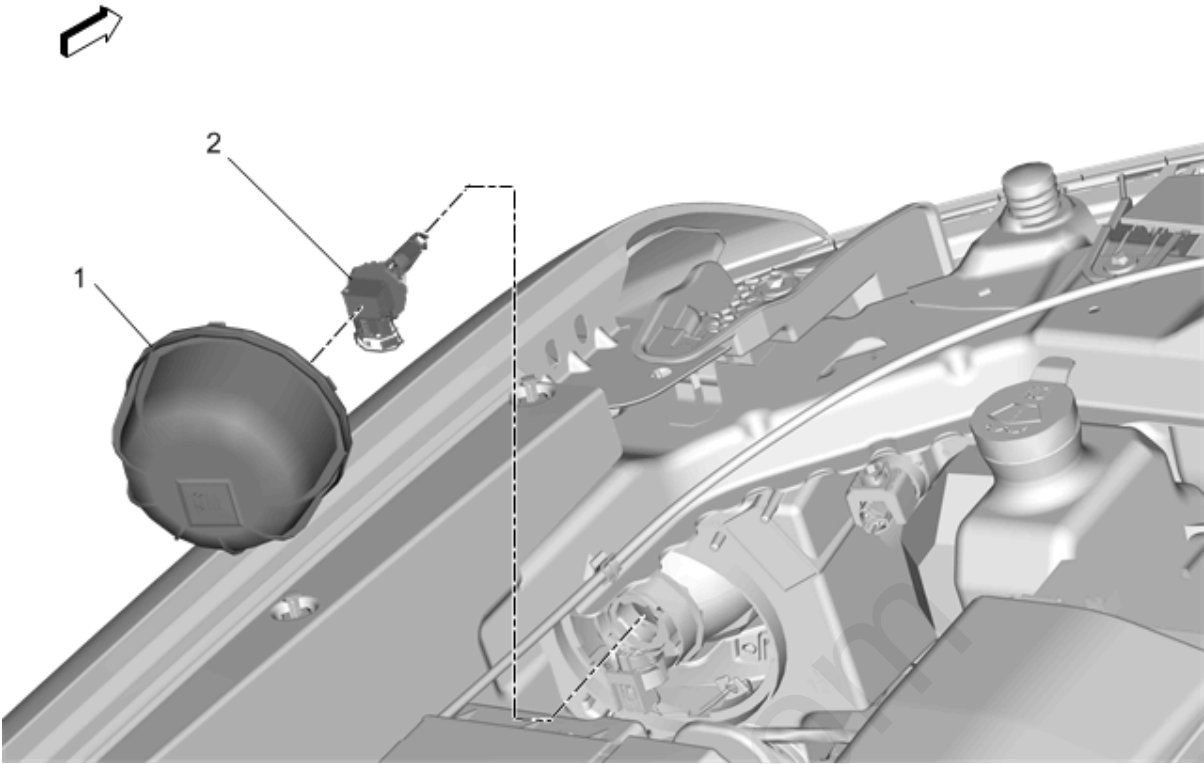


Fig. 40: Headlamp Bulb - Left Side (Chevrolet Low Beam)

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Open the hood.	
1	Headlamp Bulb Access Cover Procedure Rotate the headlamp bulb access cover counterclockwise and pull from the headlamp.
2	Headlamp Bulb WARNING: Refer to Halogen Bulb Warning . Procedure 1. Disconnect the electrical connector. 2. Rotate the headlamp bulb counterclockwise and pull from the headlamp.

HEADLAMP BULB REPLACEMENT - LEFT SIDE (GMC HIGH BEAM)

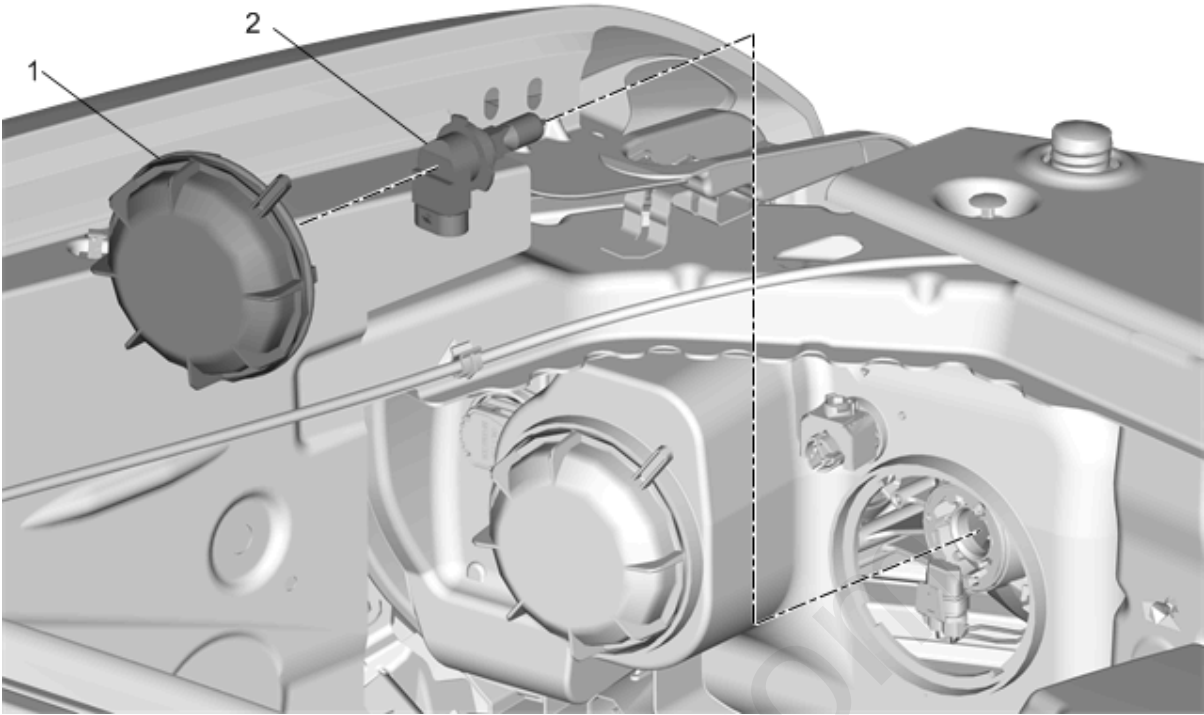


Fig. 41: Headlamp Bulb - Left Side (GMC High Beam)

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Open the hood.	
1	Headlamp Bulb Access Cover Procedure Rotate the headlamp bulb access cover counterclockwise and pull from the headlamp.
2	Headlamp Bulb WARNING: Refer to Halogen Bulb Warning . Procedure 1. Disconnect the electrical connector. 2. Rotate the headlamp bulb counterclockwise and pull from the headlamp.

HEADLAMP BULB REPLACEMENT - LEFT SIDE (GMC LOW BEAM)

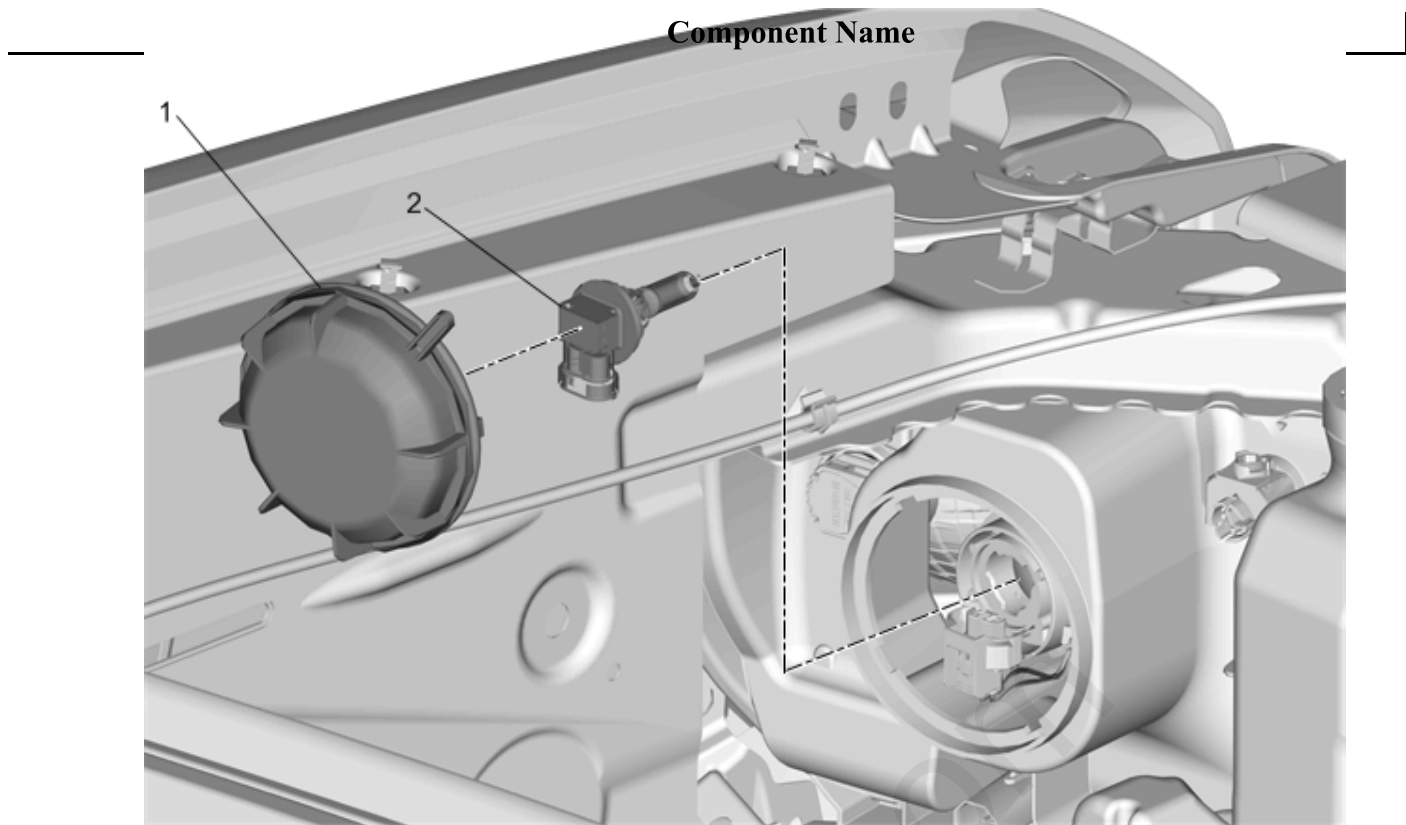


Fig. 42: Headlamp Bulb - Left Side (GMC Low Beam)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Open the hood.	
1	Headlamp Bulb Access Cover Procedure Rotate the headlamp bulb access cover counterclockwise and pull from the headlamp.
2	Headlamp Bulb WARNING: Refer to Halogen Bulb Warning . Procedure 1. Disconnect the electrical connector. 2. Rotate the headlamp bulb counterclockwise and pull from the headlamp.

HEADLAMP BULB REPLACEMENT - RIGHT SIDE (CHEVROLET HIGH BEAM)

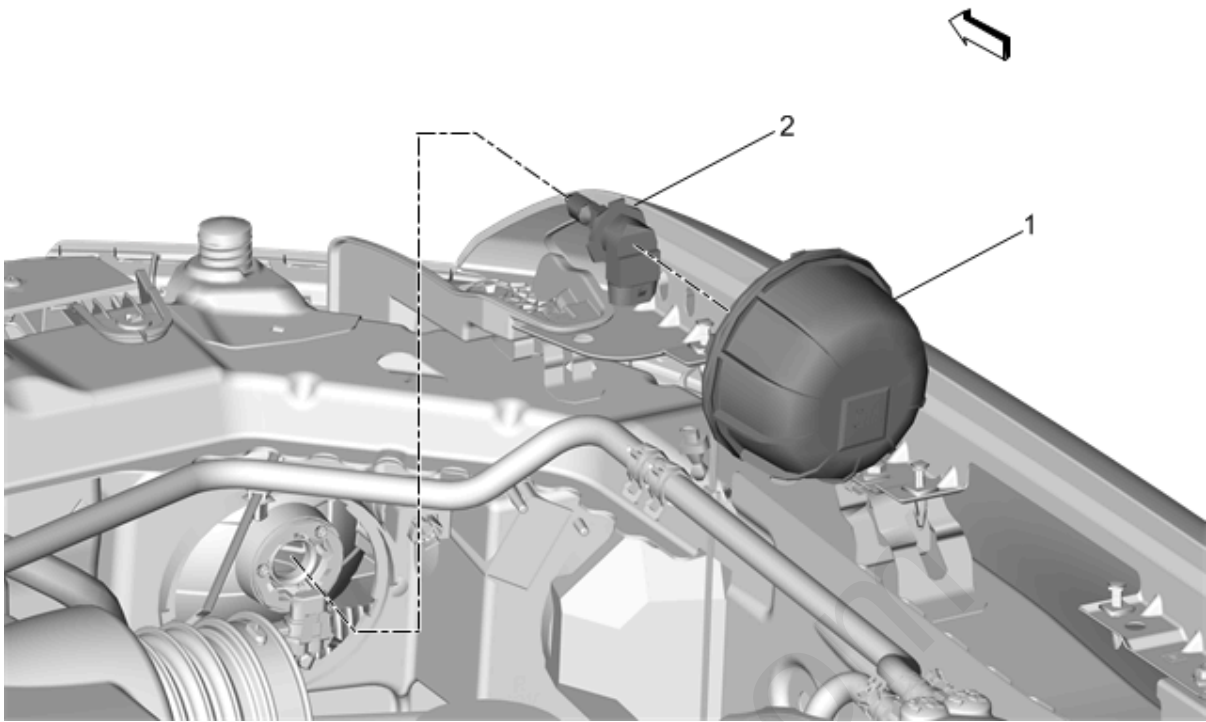


Fig. 43: Headlamp Bulb - Right Side (Chevrolet High Beam)

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the intake air splash shield. Refer to Intake Air Splash Shield Replacement , (LCV) or Intake Air Splash Shield Replacement (LFX).	
1	Headlamp Bulb Access Cover Procedure Rotate the headlamp bulb access cover counterclockwise and pull from the headlamp.
2	Headlamp Bulb WARNING: Refer to Halogen Bulb Warning . Procedure 1. Disconnect the electrical connector. 2. Rotate the headlamp bulb counterclockwise and pull from the headlamp.

HEADLAMP BULB REPLACEMENT - RIGHT SIDE (CHEVROLET LOW BEAM)

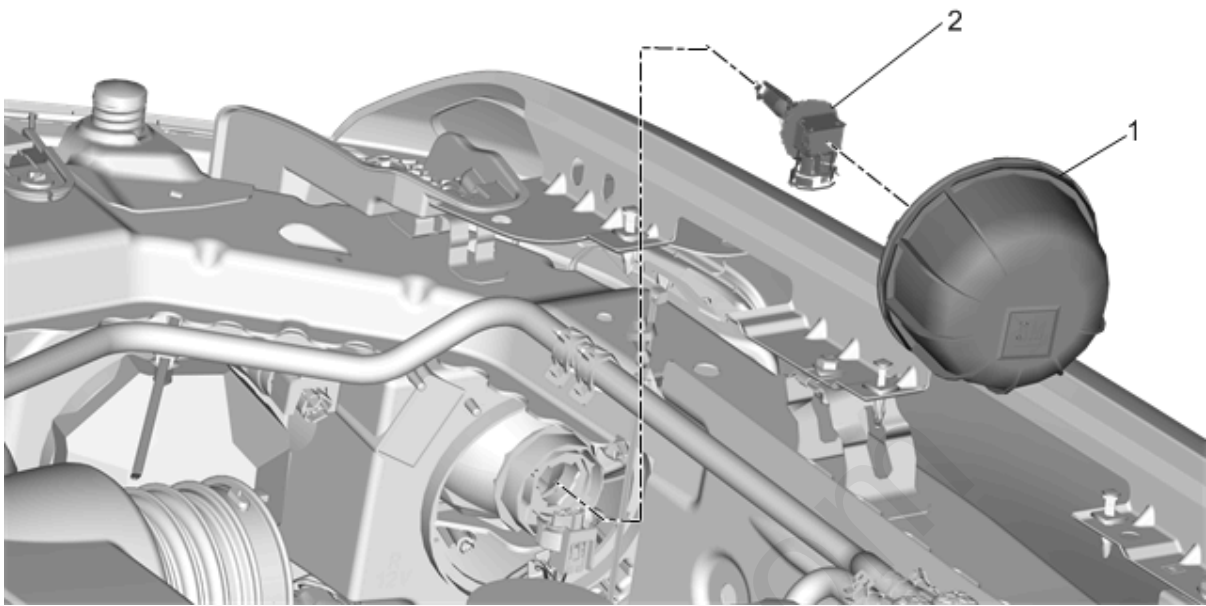


Fig. 44: Headlamp Bulb - Right Side (Chevrolet Low Beam)

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure 1. Remove the air cleaner assembly. Refer to Air Cleaner Assembly Replacement , (LCV) or Air Cleaner Assembly Replacement (LFX). 2. Remove the intake air splash shield. Refer to Intake Air Splash Shield Replacement , (LCV) or Intake Air Splash Shield Replacement (LFX).	
1	Headlamp Bulb Access Cover Procedure Rotate the headlamp bulb access cover counterclockwise and pull from the headlamp.
2	Headlamp Bulb WARNING: Refer to Halogen Bulb Warning . Procedure 1. Disconnect the electrical connector. 2. Rotate the headlamp bulb counterclockwise and pull from the headlamp.

HEADLAMP BULB REPLACEMENT - RIGHT SIDE (GMC HIGH BEAM)

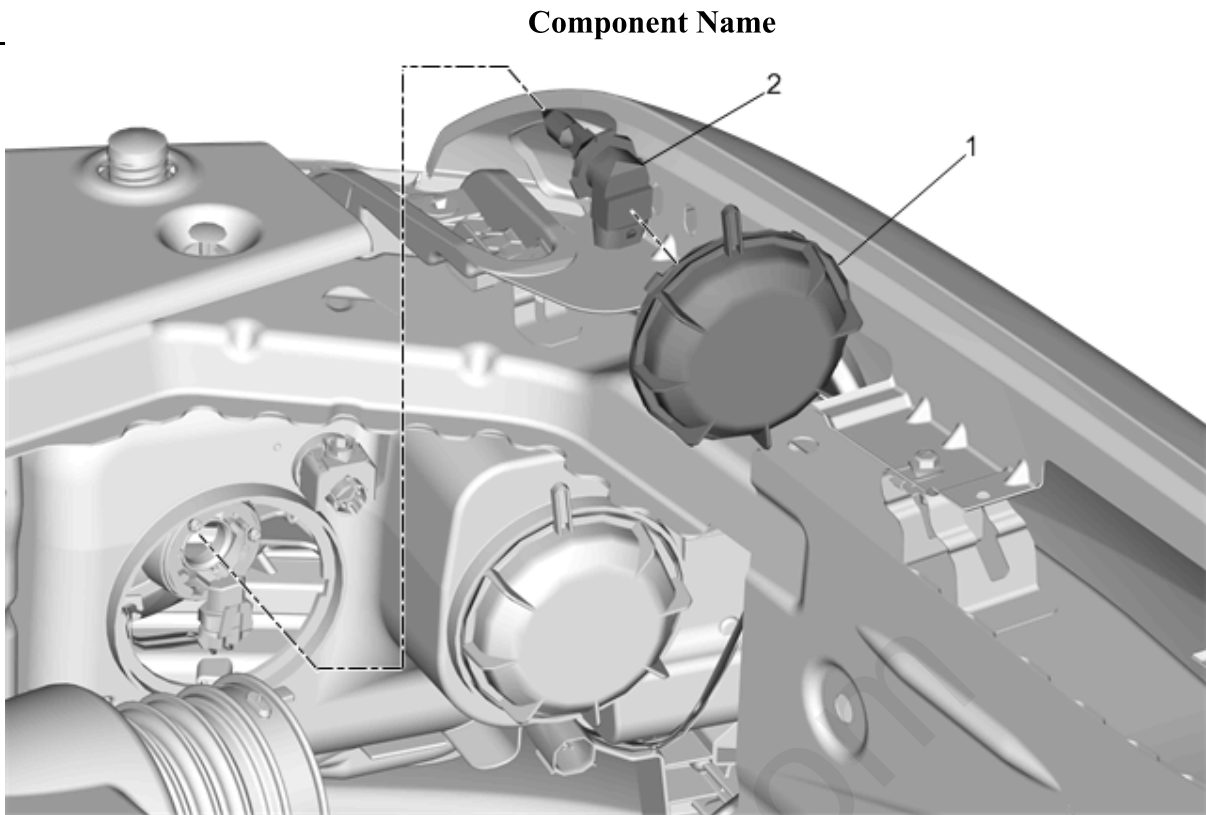


Fig. 45: Headlamp Bulb - Right Side (GMC High Beam)

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the intake air splash shield. Refer to Intake Air Splash Shield Replacement , (LCV) or Intake Air Splash Shield Replacement (LFX).	
1	Headlamp Bulb Access Cover Procedure Rotate the headlamp bulb access cover counterclockwise and pull from the headlamp.
2	Headlamp Bulb WARNING: Refer to Halogen Bulb Warning . Procedure 1. Disconnect the electrical connector. 2. Rotate the headlamp bulb counterclockwise and pull from the headlamp.

HEADLAMP BULB REPLACEMENT - RIGHT SIDE (GMC LOW BEAM)

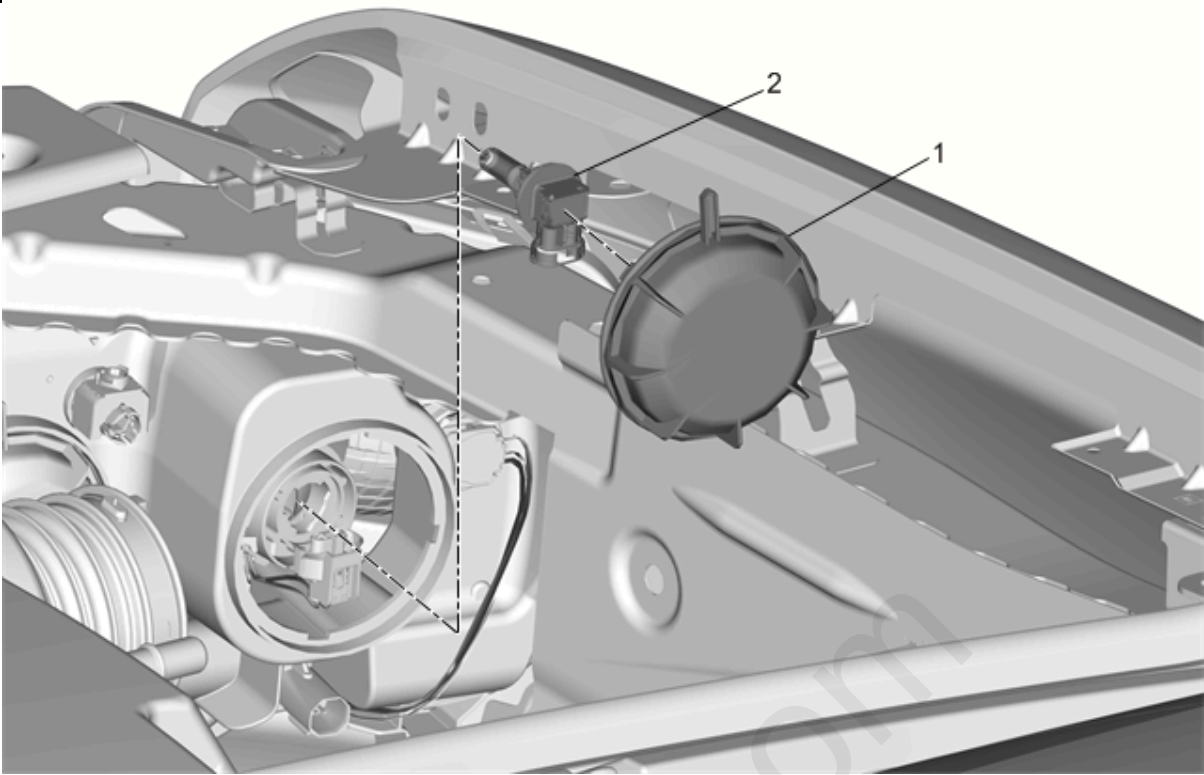


Fig. 46: Headlamp Bulb - Right Side (GMC Low Beam)

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the intake air splash shield. Refer to Intake Air Splash Shield Replacement , (LCV) or Intake Air Splash Shield Replacement (LFX).	
1	Headlamp Bulb Access Cover Procedure Rotate the headlamp bulb access cover counterclockwise and pull from the headlamp.
2	Headlamp Bulb WARNING: Refer to Halogen Bulb Warning . Procedure 1. Disconnect the electrical connector. 2. Rotate the headlamp bulb counterclockwise and pull from the headlamp.

HEADLAMP AIMING

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

Screen Method for Headlamp Aiming (Visual Aim)

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

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

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

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

Headlamp Aiming Procedure

1. Align the left tires of the vehicle with the reference line extending from the screen with the headlamps aligned with the reference line.
2. Remove any snow, ice or mud from the vehicle.
3. The vehicle should be fully assembled and all other work stopped while the headlamp aiming is being done.
4. The vehicle should contain cargo or be loaded to represent normal vehicle use.
5. Tires should be properly inflated.
6. Rock the vehicle to stabilize the suspension.
7. Measure from the floor to the center of the lamp bulb on the vehicle. Some lamps have an aim dot marked on the lens.
8. At the screen, measure from the floor and place the horizontal tape at the measured distance.

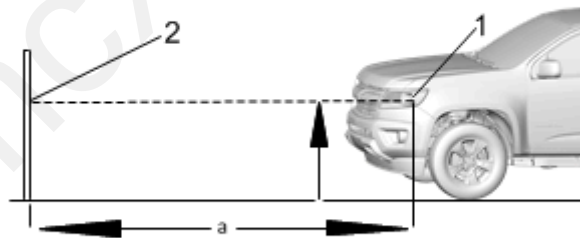


Fig. 47: Measure From Reference Line On Floor To Left Headlamp Bulb Centerline
Courtesy of GENERAL MOTORS COMPANY

9. Measure from the reference line on the floor to the left headlamp bulb centerline (1).
10. At the screen, measure from the reference line and place the vertical tape at the measured distance (2).
11. Measure from the reference line on the floor to the left headlamp bulb centerline.
12. At the screen, measure from the reference line and place the vertical tape at the measured distance.
13. Turn the headlamps ON.
14. Block the light from projecting onto the screen from the passenger side headlamp. This will allow the cutoff in the beam pattern from the drivers side to be more pronounced for easier aim verification.

WARNING: DO NOT cover the headlamp, this may cause excessive heat build up.

15. On this vehicle you will be verifying the aim of the vertical cutoff on the right side of the lamp vertical bulb centerline as it is projected onto the aim board.
16. If the location of the cutoff projected onto the board differs from figure 4 then an adjustment to the beam pattern location is necessary.

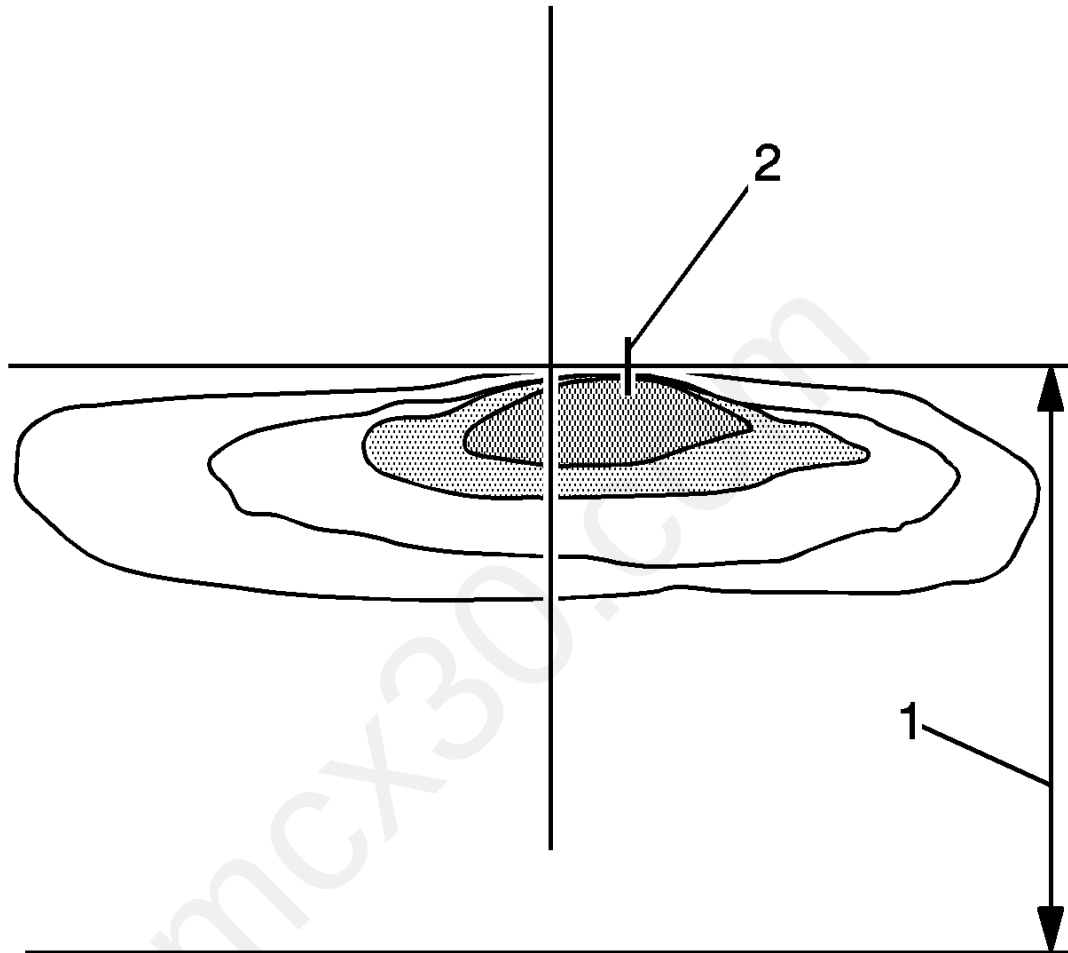


Fig. 48: Measuring Horizontal & vertical Axis
Courtesy of GENERAL MOTORS COMPANY

17. Adjust the vertical headlamp adjustment screw until the Right Gradient Line (Cutoff Line) is set at the Horizontal Axis within ± 2.0 inches (2) measured at 7.62 m (25 ft).
18. Verify proper aim location.
19. Repeat the aiming procedure for the passengers side headlamp while blocking the light from projecting onto the screen from the drivers side headlamp.

FRONT FOG LAMP REPLACEMENT

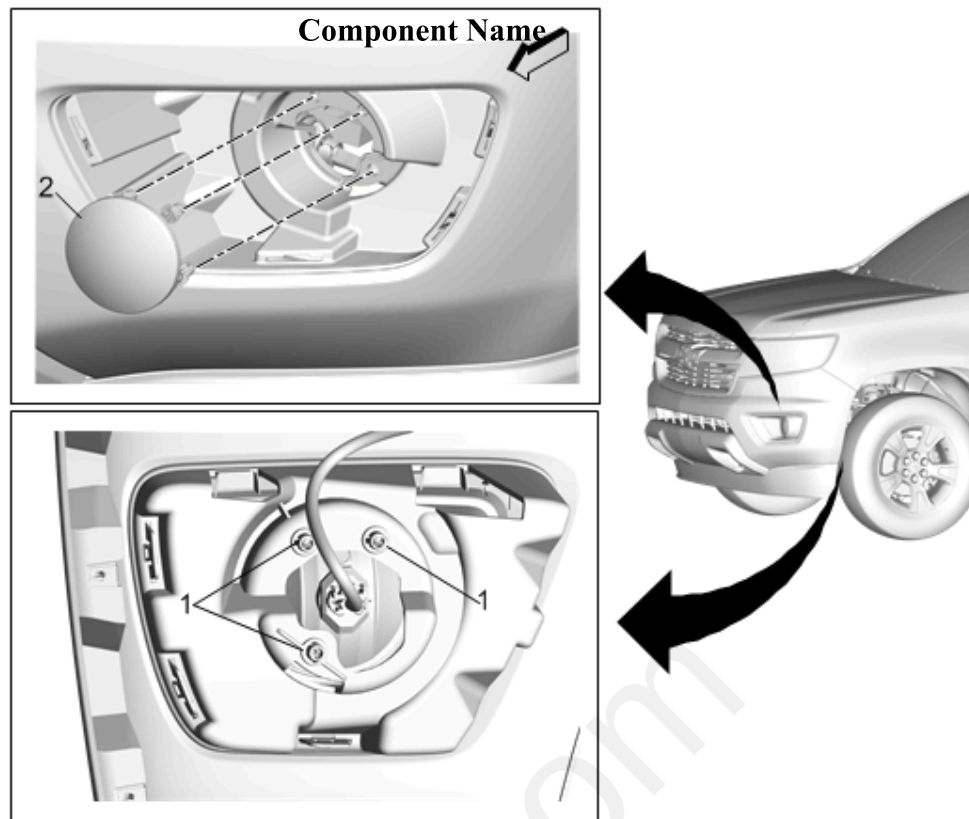


Fig. 49: Front Fog Lamp

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure 1. Remove the front fog lamp bezel on the side the front fog lamp will be serviced. Refer to Front Fog Lamp Bezel Replacement. 2. Remove the front wheelhouse liner on the side the front fog lamp bulb will be serviced. Refer to Front Wheelhouse Liner Replacement.	
1	Front Fog Lamp Retainer (Qty: 3) Procedure Release the 3 locking tab retainers from the rear side of the fascia, access to these locking tabs is available through the wheelhouse opening.
2	Front Fog Lamp Procedure 1. Pull the front fog lamp straight out from the front fog lamp housing. 2. Aim the front fog lamp after replacement. Refer to Fog Lamp Aiming.

FRONT FOG LAMP BULB REPLACEMENT

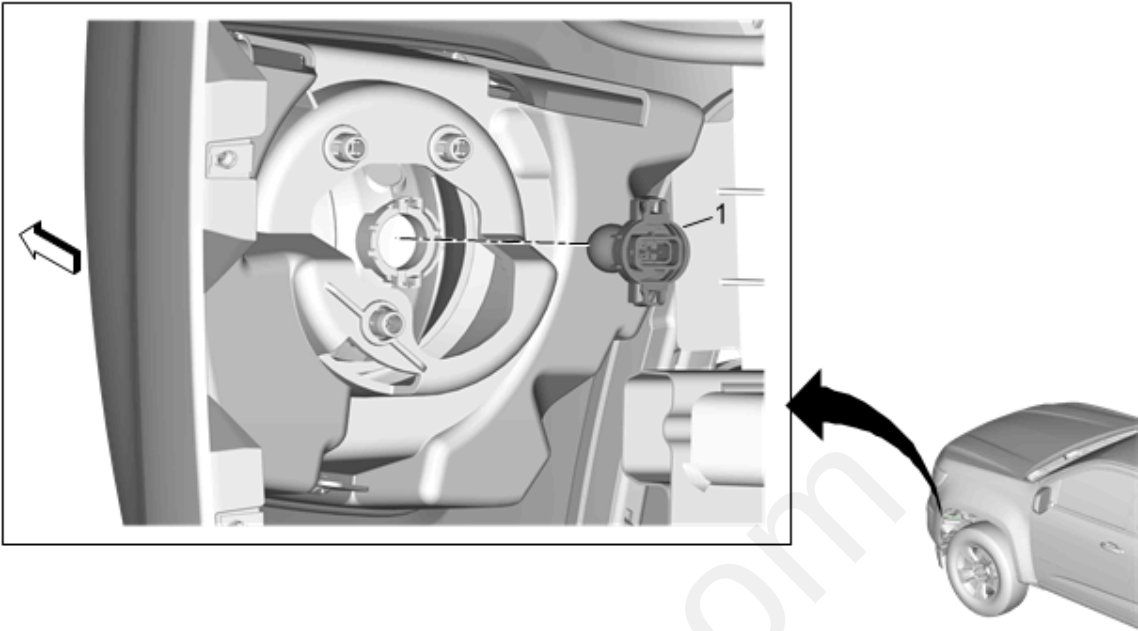


Fig. 50: Front Fog Lamp Bulb
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the front wheelhouse liner on the side the front fog lamp bulb will be serviced. Refer to Front Wheelhouse Liner Replacement .	
1	Front Fog Lamp Bulb Procedure 1. Disconnect the electrical connector. 2. Release the 2 locking tabs and pull the front fog lamp bulb straight from the front fog lamp.

FRONT FOG LAMP OPENING COVER REPLACEMENT (CHEVROLET)

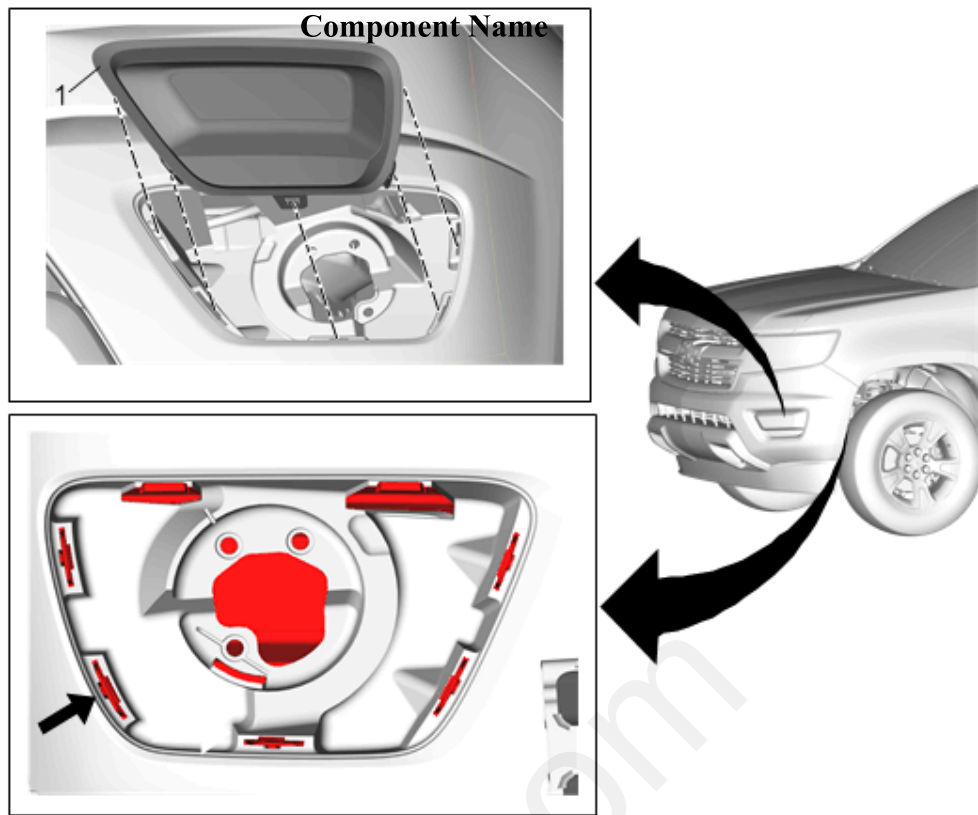


Fig. 51: Front Fog Lamp Opening Cover (Chevrolet)

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the front wheelhouse liner on the side the front fog lamp opening cover will be serviced. Refer to Front Wheelhouse Liner Replacement .	
1	Front Fog Lamp Opening Cover Procedure Release all tabs holding the fog lamp opening cover to the fascia from the rear side of the fascia, access to these tabs is available through the wheelhouse opening.

FRONT FOG LAMP OPENING COVER REPLACEMENT (GMC)

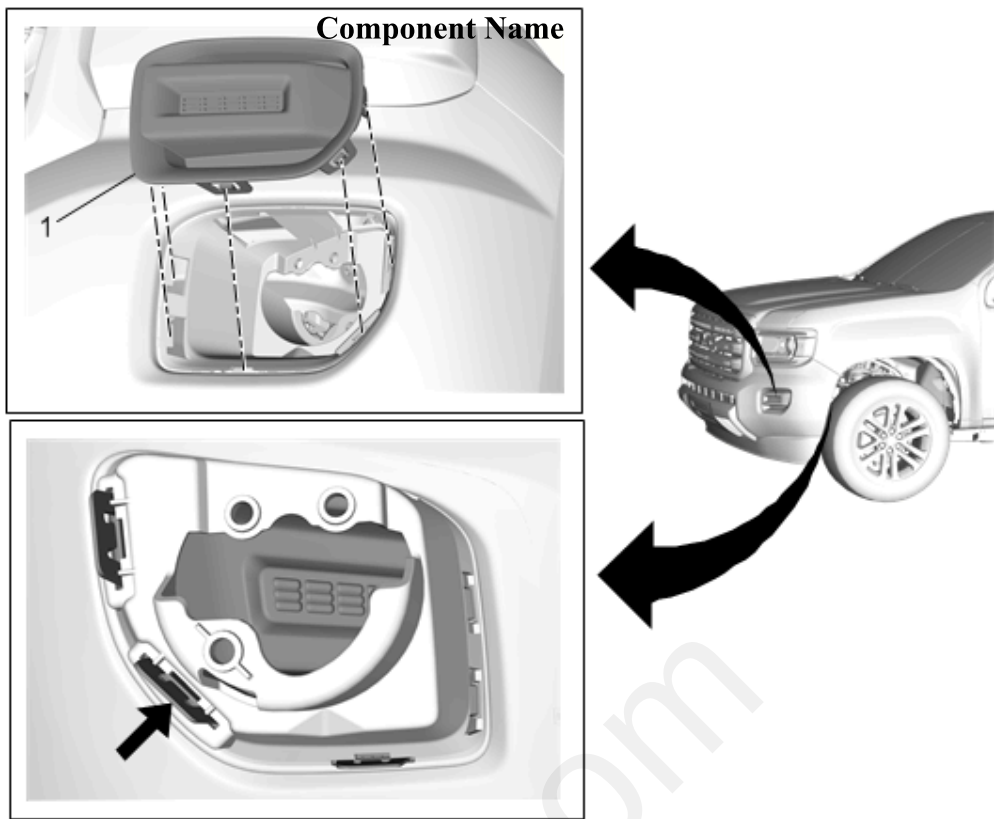


Fig. 52: Front Fog Lamp Opening Cover (GMC)

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the front wheelhouse liner on the side the front fog lamp opening cover will be serviced. Refer to Front Wheelhouse Liner Replacement .	
1	Front Fog Lamp Opening Cover Procedure Release all tabs holding the front fog lamp opening cover to the fascia from the rear side of the fascia, access to these tabs is available through the wheelhouse opening.

FOG LAMP AIMING

Preparation Procedure

NOTE: Horizontal aim is not adjustable on this vehicle. Vertical aim is done by an adjusting allen head screw located through the front wheelhouse liner. Prior to aiming the fog lamps, perform the following steps

1. Completely assemble all of the components on the vehicle.
2. Place the vehicle on a level surface.
3. Stop all unnecessary operations or work that could affect the ride height of the vehicle.
4. Close the doors and verify that the luggage compartment is empty.
5. Stabilize the suspension by rocking the vehicle sideways.
6. Ensure that the fuel level is full.
7. Ensure that the tires are inflated to the proper pressure.
8. Ensure that the driver or a similar weight, approximately 75 kg (165 lb), is in the vehicle driver seat.

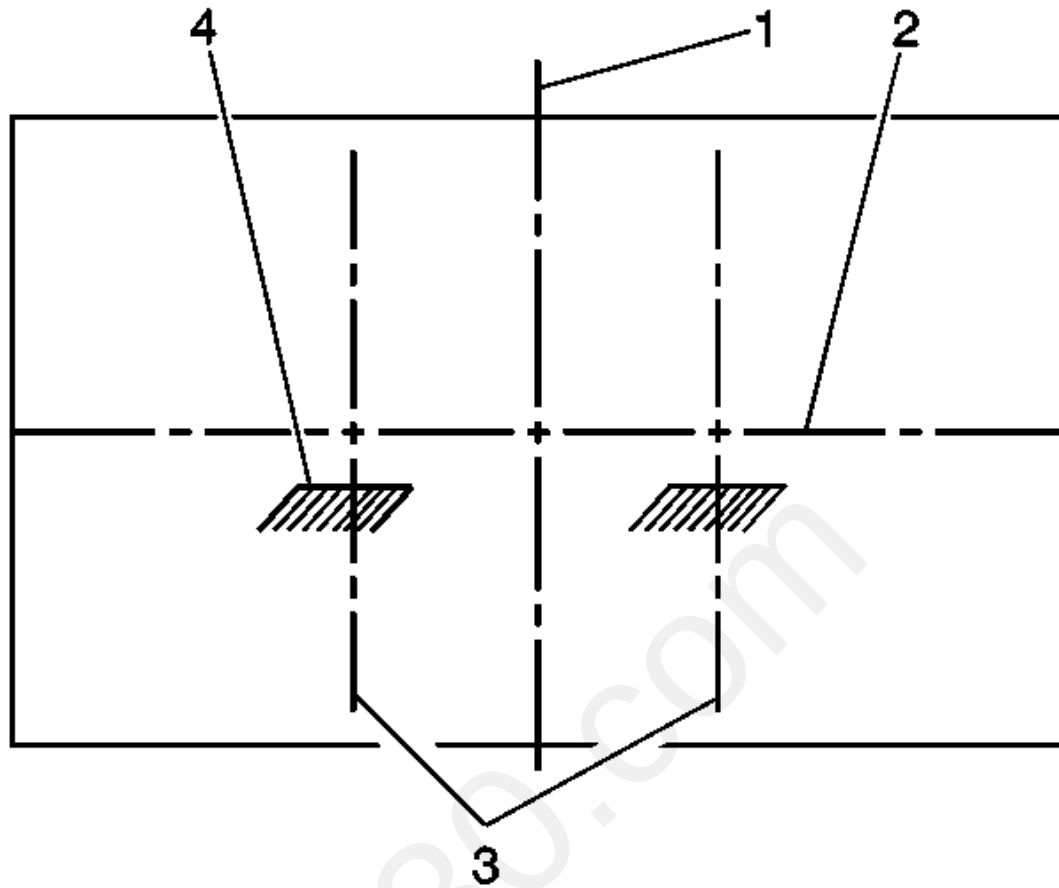


Fig. 53: Locating Alignment Points On Target Screen
Courtesy of GENERAL MOTORS COMPANY

1. Park the vehicle 7.6 m (25 ft) away from the target screen.
2. Measure from the center of the fog lamp to the ground line. Using this measurement, mark the horizontal centerline (2) of the fog lamp on the target screen directly in front of the vehicle
3. Turn ON the fog lamps. The top of the fog lamp beam image (4) on the target screen should be 114 mm (4 in) below the center of the fog lamp lens height.

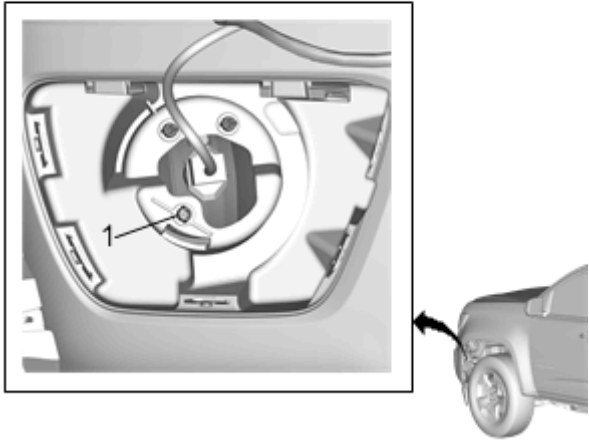


Fig. 54: Front Fog Lamp

Courtesy of GENERAL MOTORS COMPANY

- 4. Adjust the fog lamp as required using the front fog lamp (1) adjusting screw at the rear lower portion of the projector lens. Pull back the front wheelhouse liner to access the adjusting screw.
- 5. Turn OFF the fog lamps.

FRONT SIDE MARKER LAMP BULB REPLACEMENT

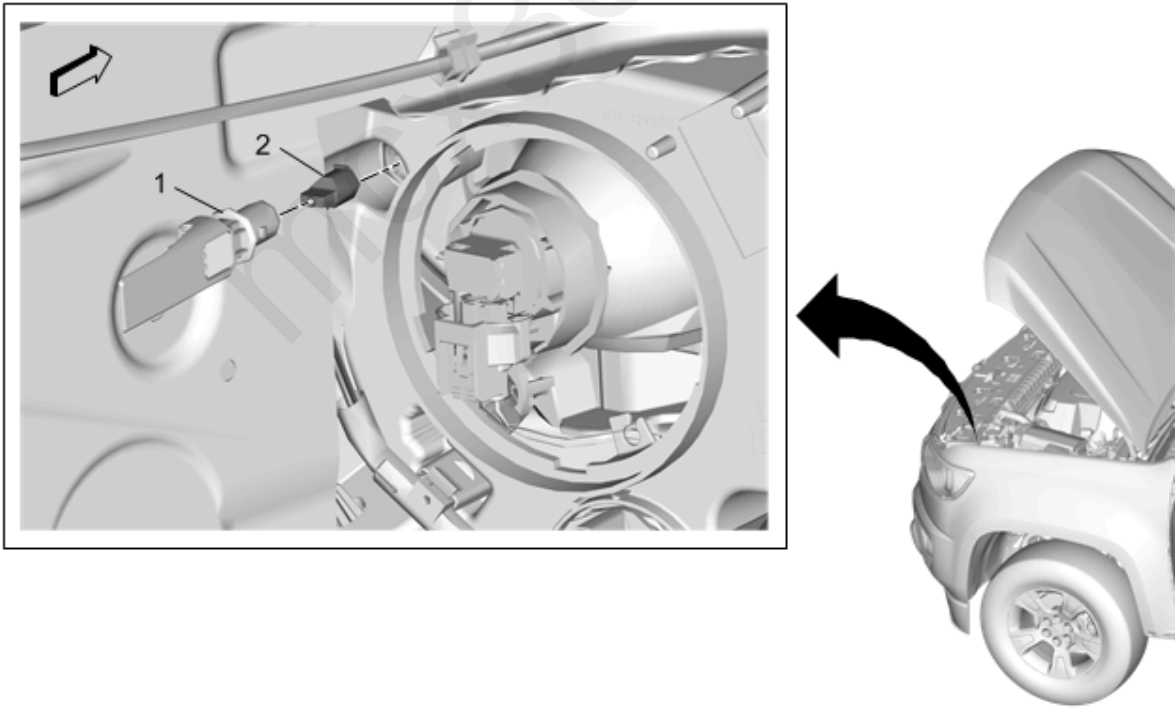


Fig. 55: Front Side Marker Lamp Bulb

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name

Component Name	
Preliminary Procedure Remove the headlamp on the side the front side marker lamp bulb will be serviced. Refer to Headlamp Replacement (Chevrolet - Left Side) Headlamp Replacement (GMC - Left Side) Headlamp Replacement (Chevrolet - Right Side) Headlamp Replacement (GMC - Right Side) .	
1	Front Side Marker Lamp Bulb Connector Procedure Pull the front side marker lamp bulb connector straight out from the headlamp housing.
2	Front Side Marker Bulb Procedure Pull the front side marker lamp bulb from the front side marker lamp bulb socket.

FRONT TURN SIGNAL LAMP BULB REPLACEMENT (CHEVROLET - LEFT SIDE)

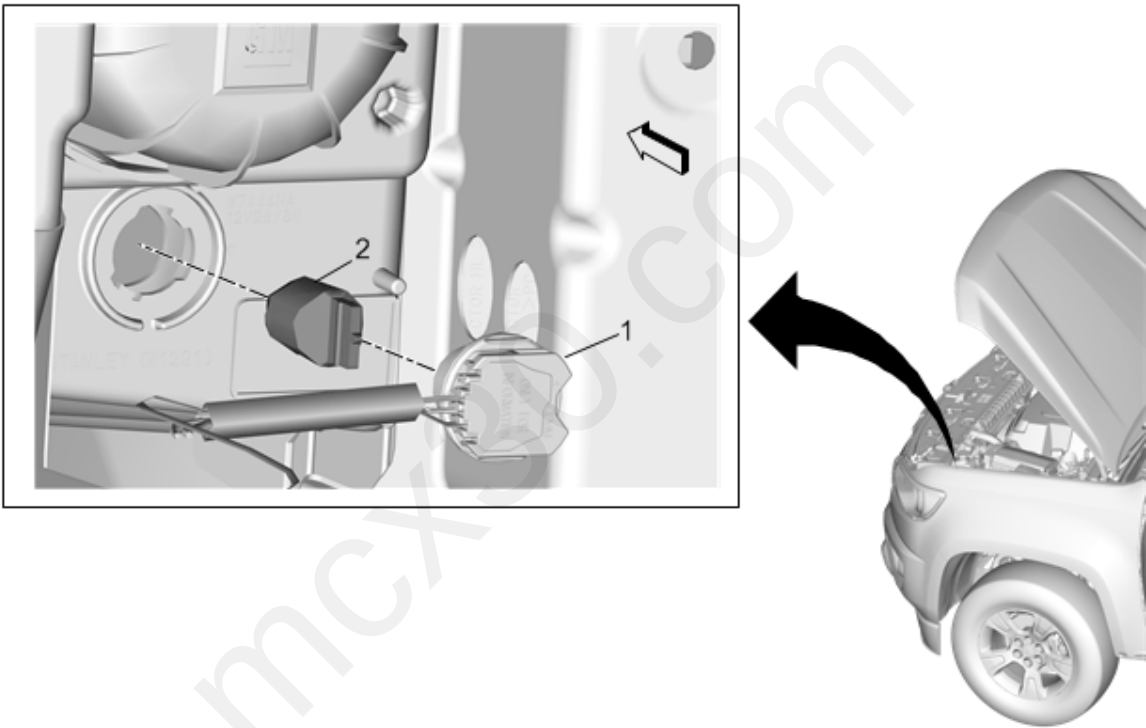


Fig. 56: Front Turn Signal Lamp Bulb (Chevrolet - Left Side)

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the low beam headlamp bulb access cover. Refer to Headlamp Bulb Replacement - Left Side (Chevrolet Low Beam) .	
1	Front Turn Signal Lamp Bulb Socket Procedure Rotate the bulb socket a quarter turn counterclockwise and remove from the headlamp housing.
2	Front Turn Signal Lamp Bulb Procedure Pull the turn signal lamp bulb from the front turn signal lamp bulb socket.

FRONT TURN SIGNAL LAMP BULB REPLACEMENT (GMC - LEFT SIDE)

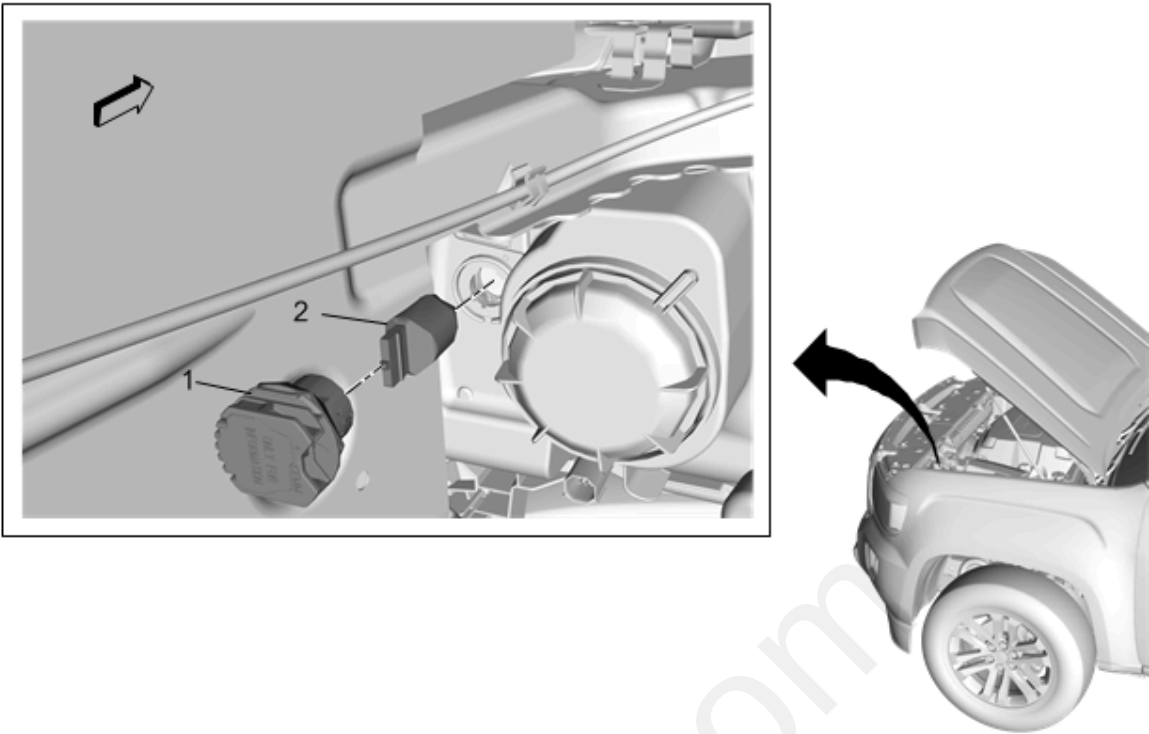


Fig. 57: Front Turn Signal Lamp Bulb (GMC - Left Side)

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Front Turn Signal Lamp Bulb Socket Procedure Rotate the bulb socket a quarter turn counterclockwise and remove from the headlamp housing.
2	Front Turn Signal Lamp Bulb Procedure Pull the front turn signal lamp bulb from the front turn signal lamp bulb socket.

FRONT TURN SIGNAL LAMP BULB REPLACEMENT (CHEVROLET - RIGHT SIDE)

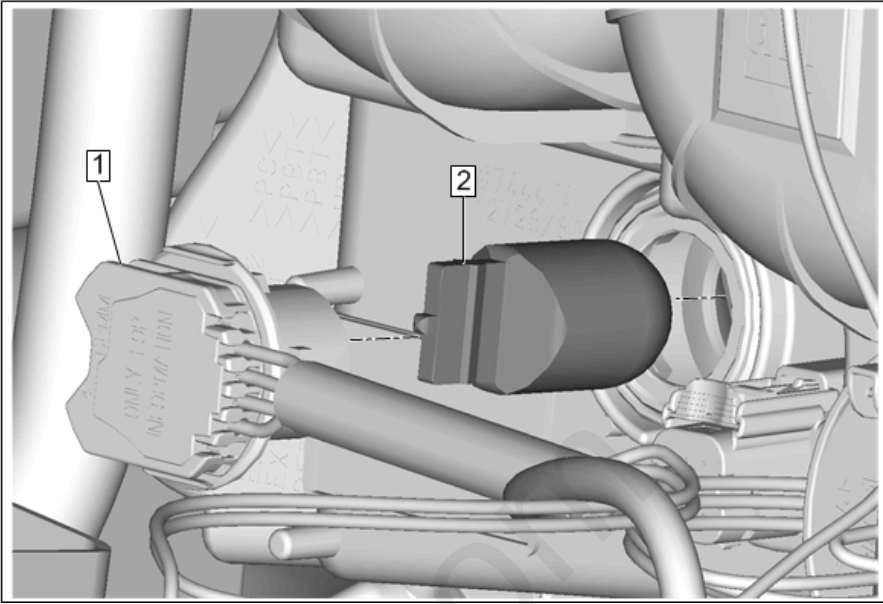
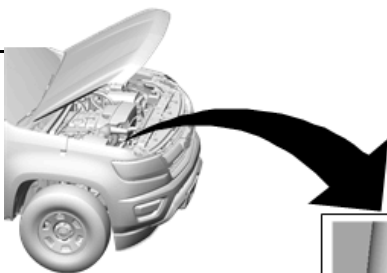


Fig. 58: Front Turn Signal Lamp Bulb (Chevrolet - Right Side)

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the intake air splash shield. Refer to Intake Air Splash Shield Replacement , (LCV) or Intake Air Splash Shield Replacement (LFX).	
1	Front Turn Signal Lamp Bulb Socket Procedure Rotate the bulb socket a quarter turn counterclockwise and remove from the headlamp housing.
2	Front Turn Signal Lamp Bulb Procedure Pull the turn signal lamp bulb from the front turn signal lamp bulb socket.

FRONT TURN SIGNAL LAMP BULB REPLACEMENT (GMC - RIGHT SIDE)

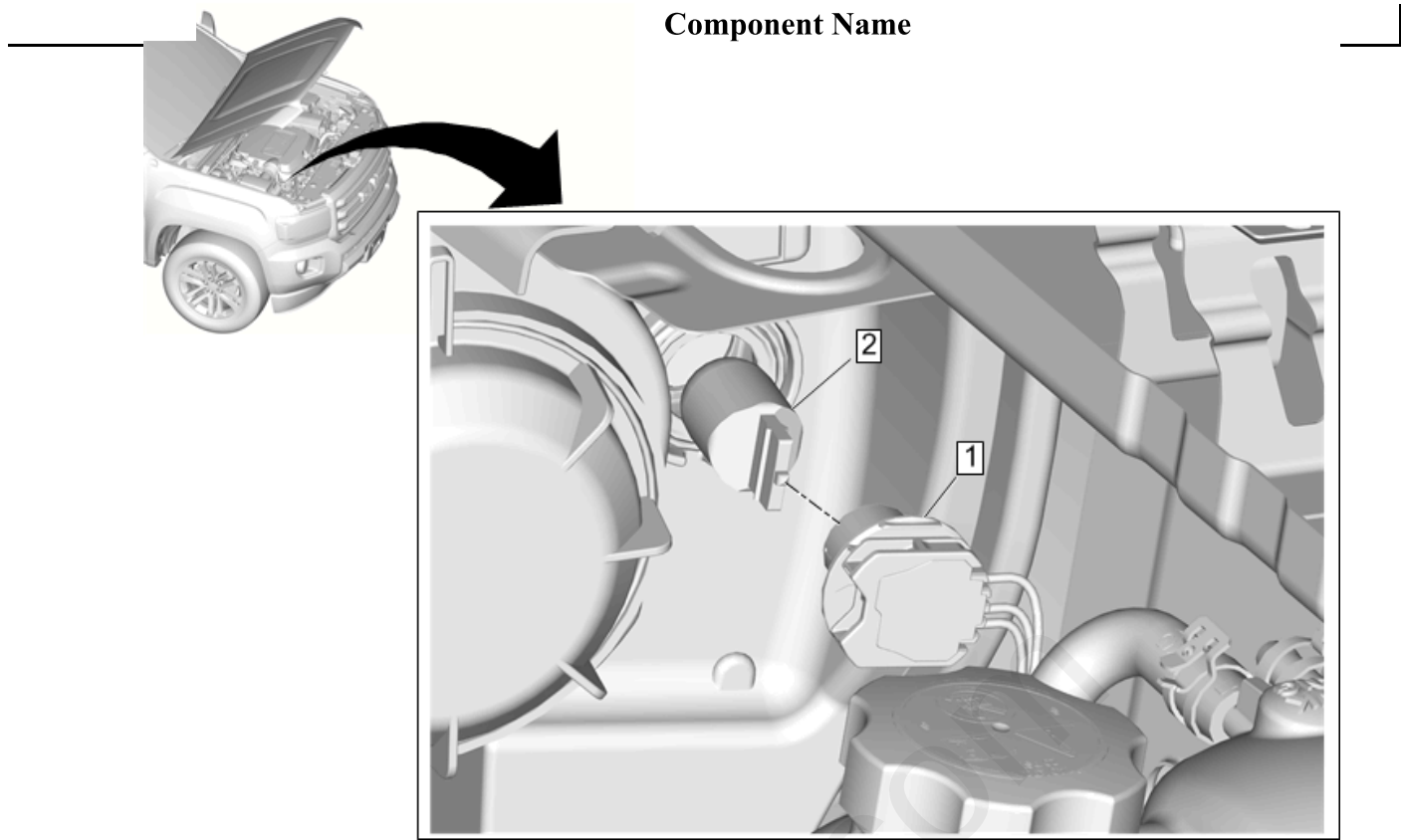


Fig. 59: Front Turn Signal Lamp Bulb (GMC - Right Side)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the intake air splash shield. Refer to Intake Air Splash Shield Replacement , (LCV) or Intake Air Splash Shield Replacement (LFX).	
1	Front Turn Signal Lamp Bulb Socket Procedure Rotate the bulb socket a quarter turn counterclockwise and remove from the headlamp housing.
2	Front Turn Signal Lamp Bulb Procedure Pull the turn signal lamp bulb from the front turn signal lamp bulb socket.

HIGH MOUNT STOP LAMP REPLACEMENT

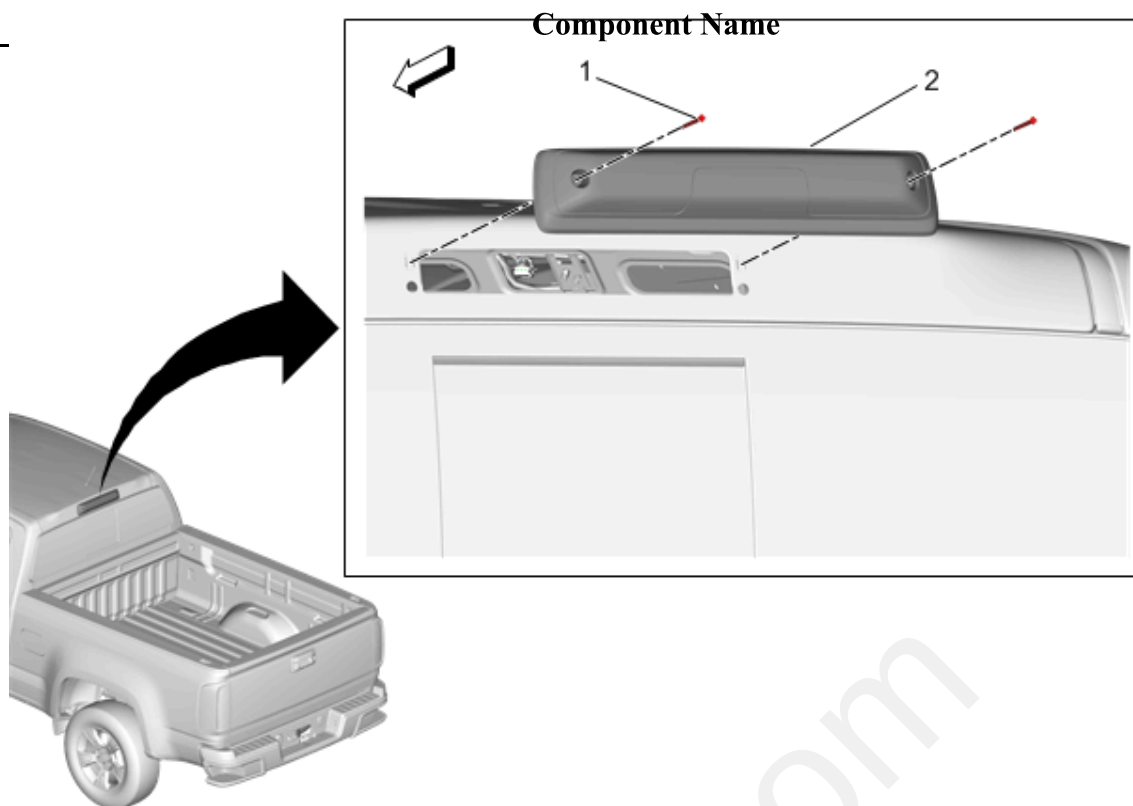


Fig. 60: High Mount Stop Lamp

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	High Mount Stop Lamp Screw (Qty: 2) CAUTION: Refer to Fastener Caution . Tighten 2.5 N.m (22 lb in)
2	High Mount Stop Lamp Procedure Pull high mount stop lamp from vehicle and disconnect the electrical connector.

HIGH MOUNT STOP LAMP BULB REPLACEMENT (CARGO)

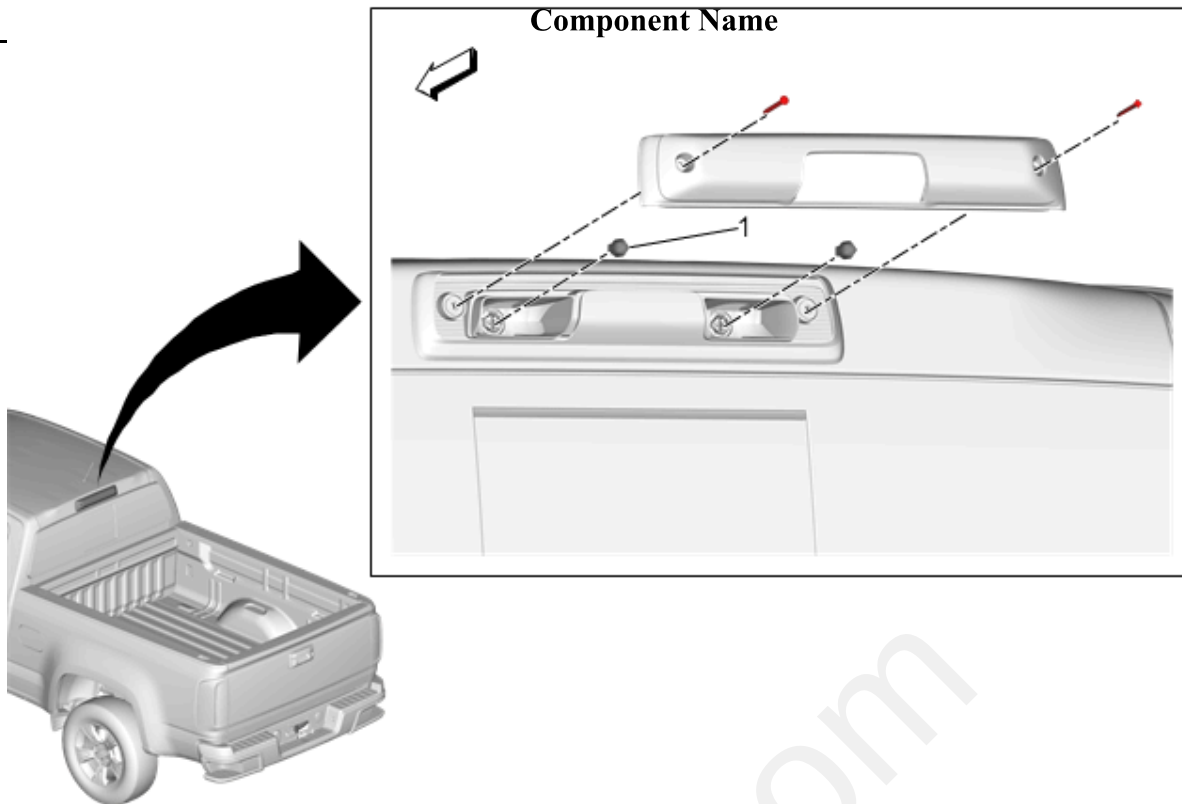


Fig. 61: High Mount Stop Lamp Bulb (Cargo)
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the high mount stop lamp. Refer to High Mount Stop Lamp Replacement .	
1	High Mount Stop Lamp Bulb (Cargo) Procedure Remove the high mount stop lamp bulb from the high mount stop lamp housing.

HIGH MOUNT STOP LAMP BULB REPLACEMENT (STOP)

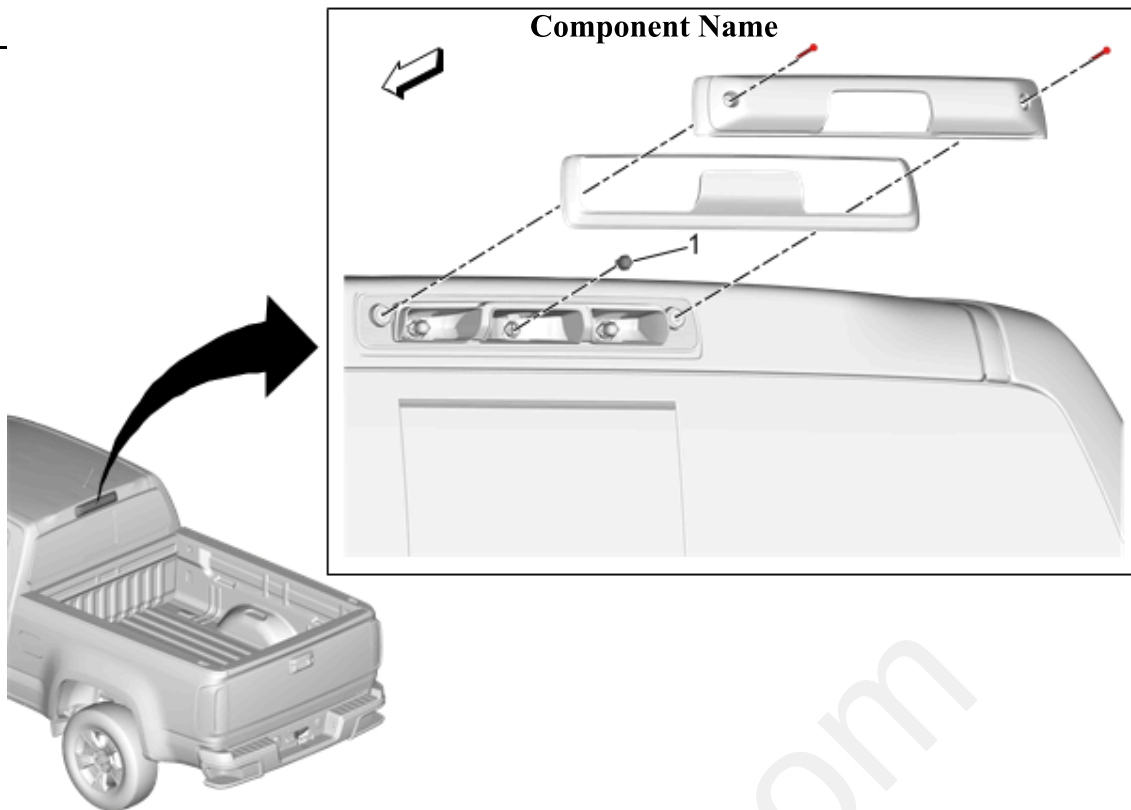


Fig. 62: High Mount Stop Lamp Bulb (Stop)
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the high mount stop lamp. Refer to High Mount Stop Lamp Replacement .	
1	High Mount Stop Lamp Bulb (Stop) Procedure Remove the high mount stop lamp bulb from high mount stop lamp housing.

REAR BODY STRUCTURE STOP LAMP REPLACEMENT (CHEVROLET)

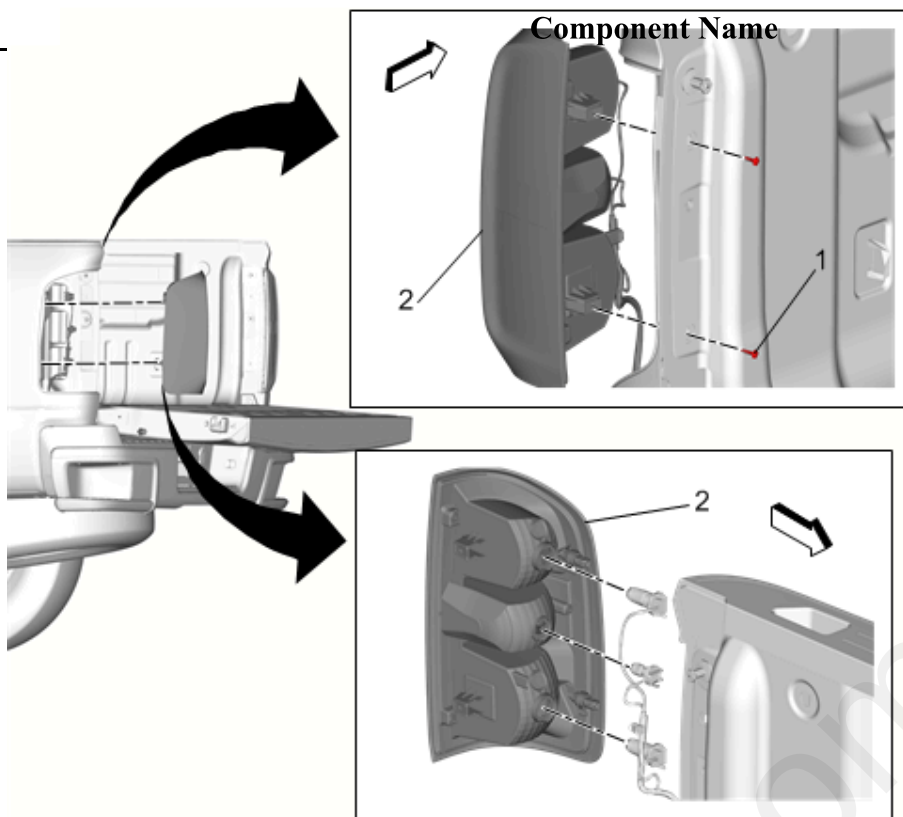


Fig. 63: Rear Body Structure Stop Lamp (Chevrolet)

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Lower the pickup box endgate.	
1	Rear Body Structure Stop Lamp Screw (Qty: 2) CAUTION: Refer to Fastener Caution . Tighten 2.5 N.m (22 lb in)
2	Rear Body Structure Stop Lamp Procedure 1. Carefully pull the rear body structure stop lamp straight outward from the panel to release the two outer retainers. 2. Disconnect the bulb sockets from the rear body structure stop lamp housing. 3. Compress the spring clip and remove the rear lamp monitor light conductor harness from the rear body structure stop lamp.

REAR BODY STRUCTURE STOP LAMP REPLACEMENT (GMC)

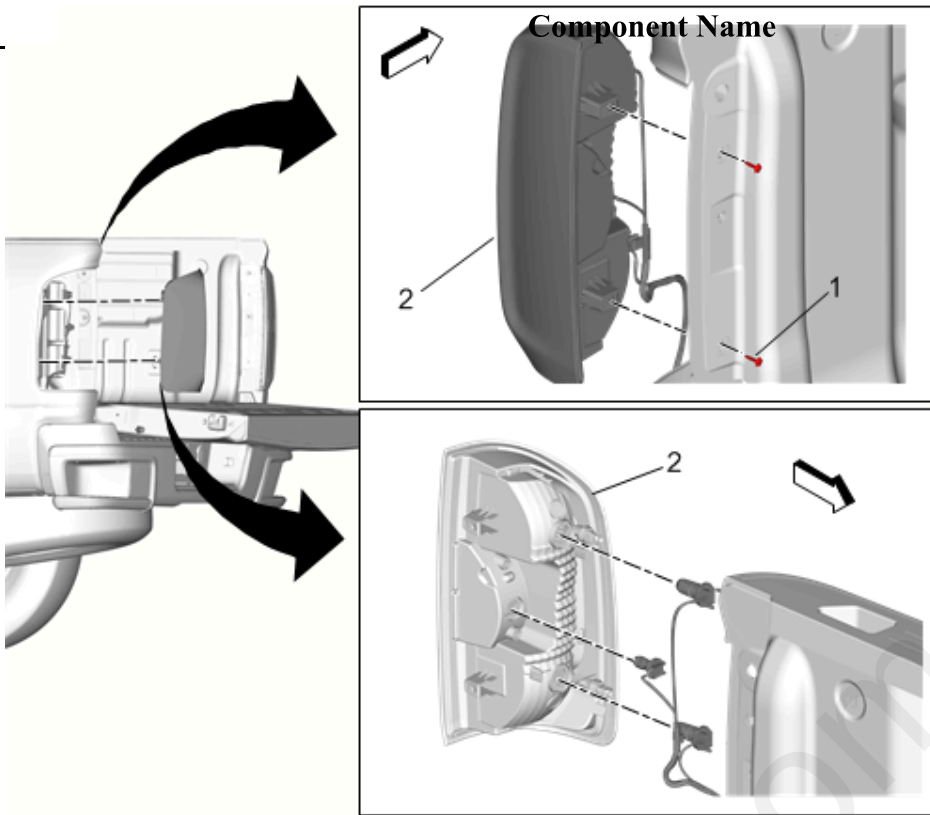


Fig. 64: Rear Body Structure Stop Lamp (GMC)

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Lower the pickup box endgate.	
1	Rear Body Structure Stop Lamp Screw (Qty: 2) CAUTION: Refer to Fastener Caution . Tighten 2.5 N.m (22 lb in)
2	Rear Body Structure Stop Lamp Procedure 1. Carefully pull the rear body structure stop lamp straight outward from the panel to release the two outer retainers. 2. Disconnect the bulb sockets from the rear body structure stop lamp housing. 3. Compress the spring clip and remove the rear lamp monitor light conductor harness from the rear body structure stop lamp.

BACKUP BULB REPLACEMENT



Fig. 65: Backup Bulb

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the rear body structure stop lamp. Refer to Rear Body Structure Stop Lamp Replacement (Chevrolet) Rear Body Structure Stop Lamp Replacement (GMC) .	
1	Backup Bulb Procedure Pull the backup bulb straight out from the rear lamp monitor light conductor harness.

REAR LICENSE PLATE LAMP REPLACEMENT

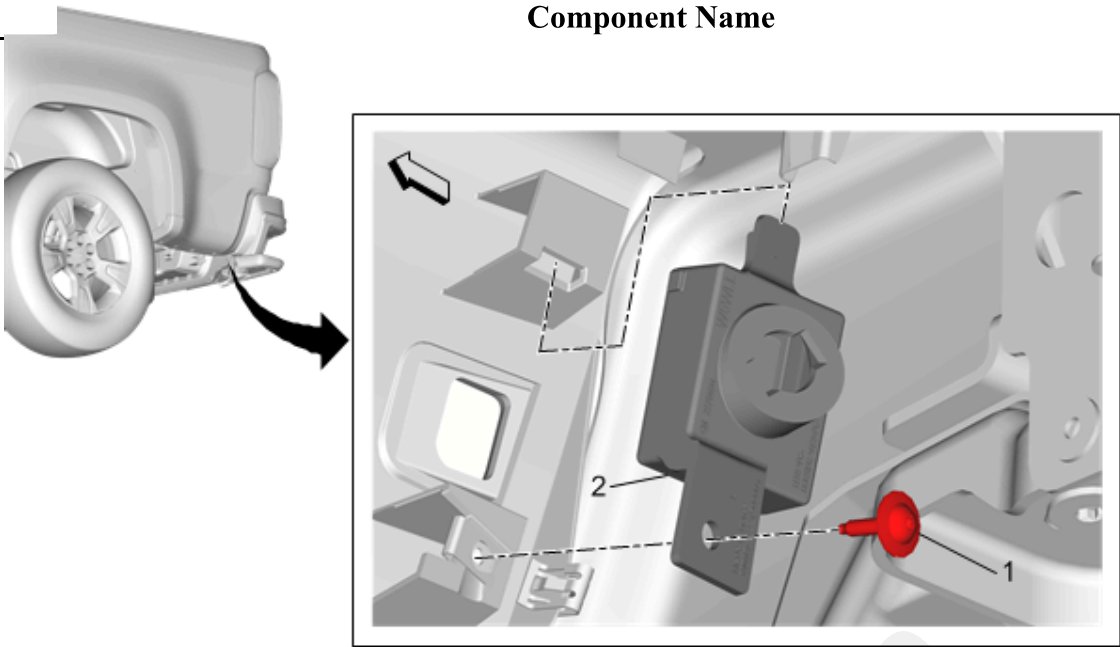


Fig. 66: Rear License Plate Lamp
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Rear License Plate Lamp Screw CAUTION: Refer to Fastener Caution .
2	Rear License Plate Lamp Procedure 1. Disconnect the electrical connector. 2. Depress the locking tab on the rear license plate lamp and pull from the rear bumper impact bar. 3. Transfer parts as necessary.

REAR LICENSE PLATE LAMP BULB REPLACEMENT

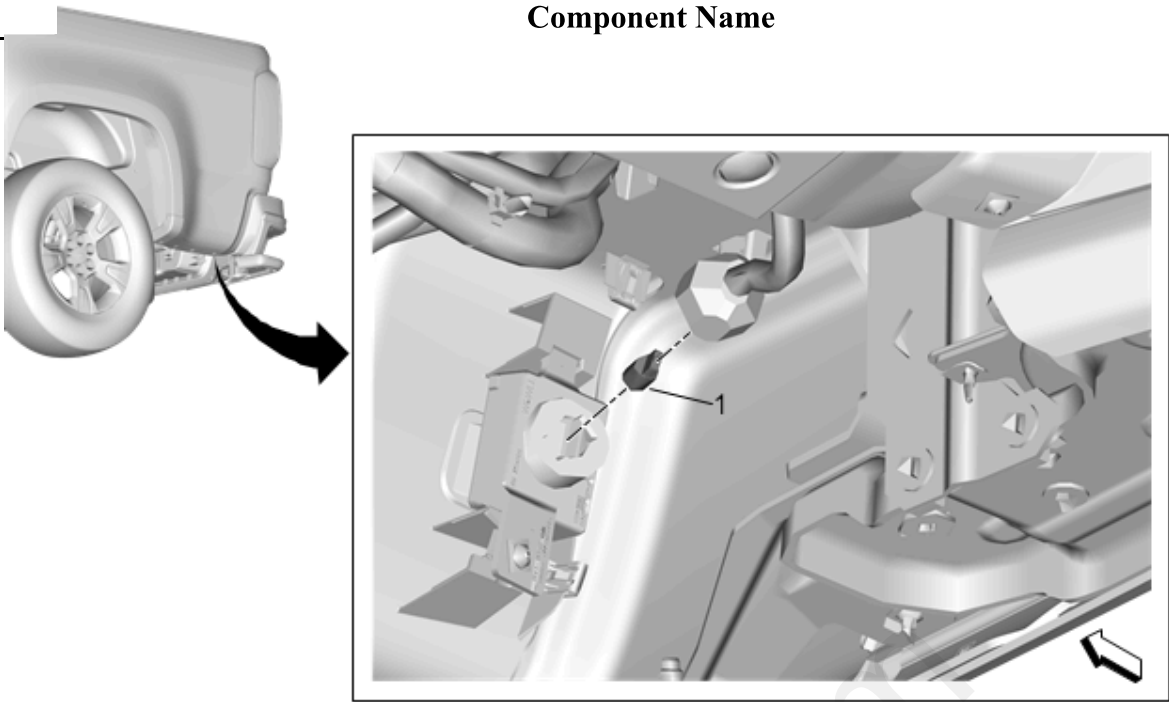


Fig. 67: Rear License Plate Lamp Bulb
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Rear License Plate Lamp Bulb Procedure 1. Rotate counterclockwise and pull the socket from the rear license plate lamp. 2. Pull the rear license plate lamp bulb straight out of the socket.

REAR LICENSE PLATE LAMP WIRING HARNESS REPLACEMENT



Component Name

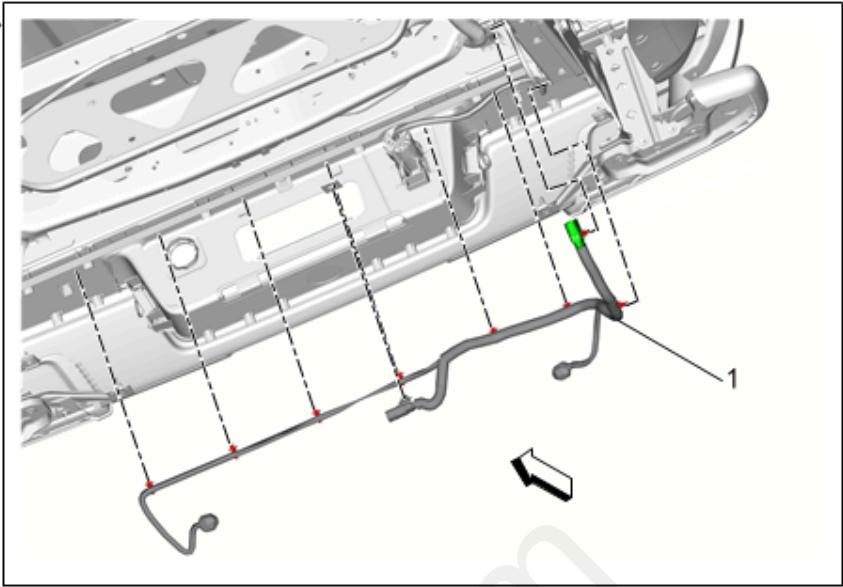


Fig. 68: Rear License Plate Lamp Wiring Harness
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Rear License Plate Lamp Wiring Harness Procedure 1. Disconnect the electrical harness from the body harness. 2. Disconnect the nine electrical harness retainers. 3. Replace the license plate bulbs if needed.

REAR LAMP MONITOR LIGHT CONDUCTOR HARNESS REPLACEMENT

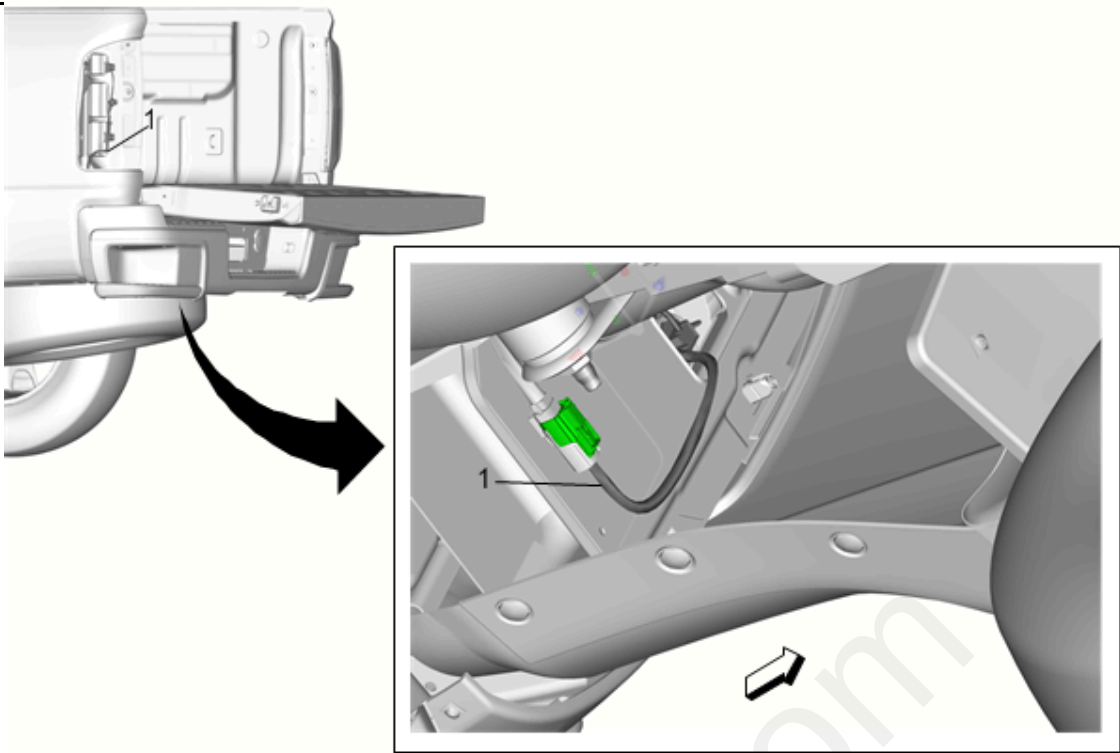


Fig. 69: Rear Lamp Monitor Light Conductor Harness

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the rear body structure stop lamp. Refer to Rear Body Structure Stop Lamp Replacement (Chevrolet) Rear Body Structure Stop Lamp Replacement (GMC) .	
1	Rear Lamp Wiring Harness Procedure 1. Disconnect the electrical connector. 2. Remove thr rear lamp monitor light conductor harness from the fender opening.

STOP AND TAIL LAMP BULB REPLACEMENT

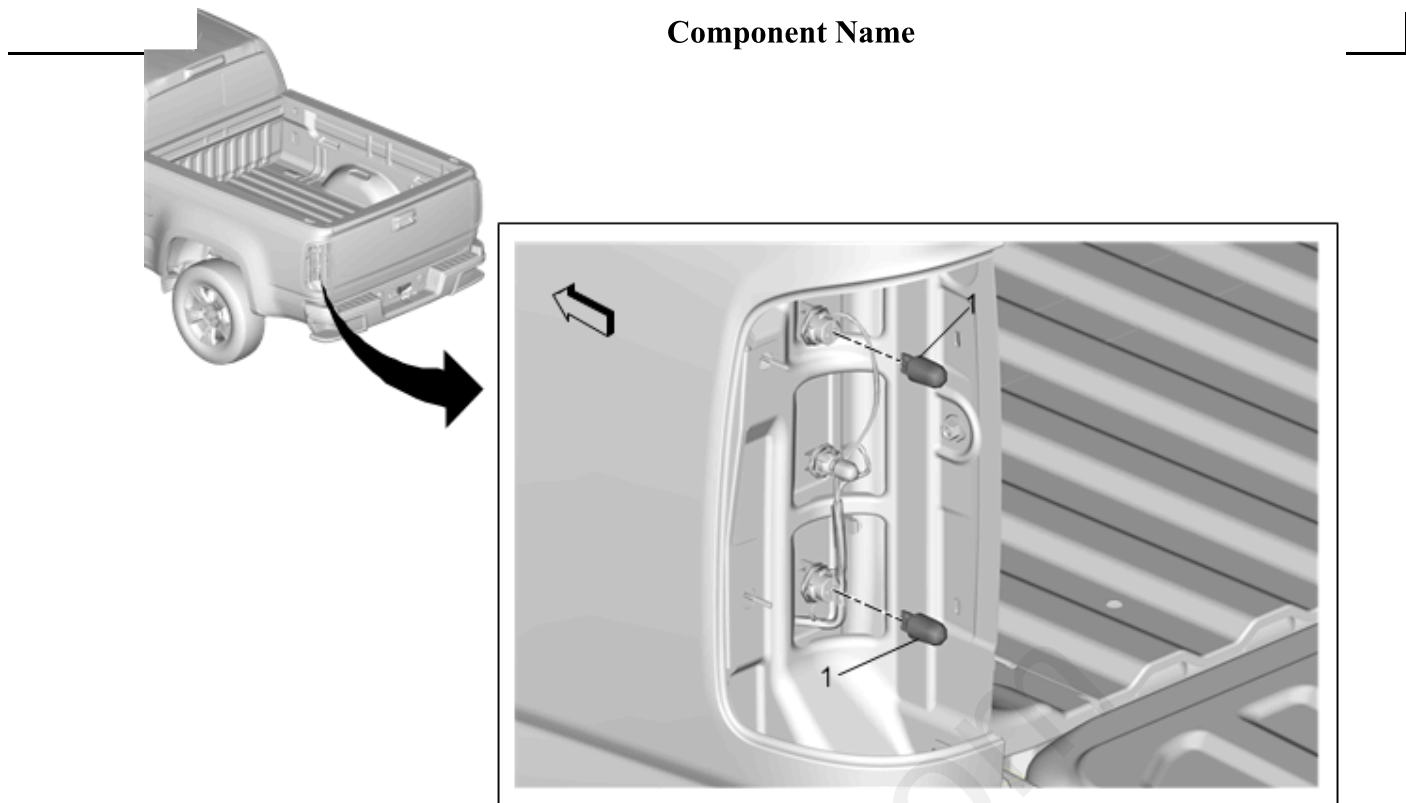


Fig. 70: Stop and Tail Lamp Bulb
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the rear body structure stop lamp. Refer to Rear Body Structure Stop Lamp Replacement (Chevrolet)Rear Body Structure Stop Lamp Replacement (GMC) .	
1	Stop and Tail Lamp Bulb Procedure Pull the stop and tail lamp bulb straight out from the rear lamp monitor light conductor harness.

DESCRIPTION AND OPERATION

EXTERIOR LIGHTING SYSTEMS DESCRIPTION AND OPERATION

The exterior lighting system consist of the following lamps:

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

Low Beam Headlamps

may be turned ON in 3 different ways:

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

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

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

When the BCM commands the low beam headlamps ON, the vehicle operator will notice the interior backlighting for the instrument cluster and the various switches with backlighting control will dim to the level of brightness selected by the instrument panel dimmer switch.

The body control module (BCM) monitors three signal circuits from the headlamp switch. When the headlamp switch is in the AUTO position, all three signal circuits are open. When placed in the AUTO position, the BCM monitors inputs from the ambient light sensor to determine if headlamps are required or if daytime running lamps will be activated based on outside lighting conditions. When the headlamp switch is placed in the OFF position, the headlamp switch headlamps OFF signal circuit is grounded, indicating to the BCM that the exterior lamps should be turned OFF. With the headlamp switch in the PARK position, the headlamp switch park lamps ON signal circuit is grounded, indicating that the park lamps have been requested. When the headlamp switch is placed in the HEADLAMP position, both the headlamp switch park lamps ON signal circuit and the headlamp switch headlamps ON signal circuit are grounded. The BCM responds to the inputs by illuminating the park lamps and headlamps. When the low beam headlamps are requested, the BCM applies B+ to both low beam headlamp control circuits illuminating the low beam headlamps.

High Beam Headlamps

When the low beam headlamps are ON and the turn signal/multifunction switch is placed in the high beam position, ground is applied to the BCM through the high beam signal circuit. The BCM responds to the high beam request by applying ground to the high beam relay control circuit which energizes the high beam relay. With the high beam relay energized, the switch contacts close allowing battery voltage to flow through the left and right high beam fuses to the high beam control circuits illuminating the left and right high beam headlamps.

Daytime Running Lamps

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

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

The ambient light sensor is used to monitor outside lighting conditions. The ambient light sensor provides a voltage signal that will vary between 0.2 and 4.9 volts depending on outside lighting conditions. The body control module (BCM) provides a 5 V reference signal to the ambient light sensor and the HVAC control module provides a low reference ground. The BCM monitors the ambient light sensor signal circuit to determine if outside lighting conditions are correct for either daytime running lights or automatic lamp control when the headlamp switch is in the AUTO position. In daylight conditions the BCM will command the low beam headlamps ON. Any function or condition that turns on the headlamps will cancel daytime running lamps operation.

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

Backup Lamps

Automatic Transmission

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

Manual Transmission

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

Front Fog Lamps

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

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

Hazard Lamps

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

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

Park, Tail, and License Lamps

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

Stop Lamps

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

Turn Signal Lamps

Ground is applied at all times to the turn signal/multifunction switch. The turn signal lamps may only be activated with the ignition switch in the ON or START positions. When the turn signal/multifunction switch is placed in either the TURN RIGHT or TURN LEFT position, ground is applied to the body control module (BCM) through either the right turn or left turn signal switch signal circuit. The BCM responds to the turn signal switch input by applying a pulsating voltage to the front and rear turn signal lamps through their respective control circuits. When a turn signal request is received by the BCM, a serial data message is sent to the instrument cluster requesting the respective turn signal indicator be pulsed ON and OFF.

Trailer Lighting

Backup Lamps

For backup lamp operation, the trailer backup lamps relay is supplied with battery voltage at all times. With the engine running and the transmission in the reverse position, the transmission control module (TCM) sends a serial data message to the body control module (BCM). The message indicates that the gear selector is in the reverse position. The BCM responds to the backup lamp request by energizing the trailer backup lamps relay by applying battery voltage to the trailer backup lamps relay control circuit. When the trailer backup lamps relay is energized, the relay switch contacts close and battery voltage is applied through the backup lamp fuse to the trailer backup lamps control circuit which illuminates the trailer backup lamps. Once the driver moves the gear selector out of the reverse position, a message is sent by the TCM via serial data requesting the BCM to remove battery voltage from the trailer backup lamps relay control circuit.

Park Lamps

For trailer park lamp operation, the trailer park lamps relay is supplied with battery voltage at all times. When the headlamp switch is placed in the HEAD or PARK position, ground is applied to the park lamp switch ON signal circuit to the body control module (BCM). The BCM responds to the park lamp request by energizing the trailer park lamps relay by applying ground to the trailer park lamps relay control circuit. When the trailer park lamps relay is energized, the relay switch contacts close and battery voltage is applied through the trailer park lamp fuse to the trailer park lamp control circuit which illuminates the trailer park lamps.

Stop Lamps

lamp operation, the left and right trailer stop/turn signal lamp relay's are supplied with battery voltage at all times. The brake pedal position sensor is used to sense the action of the driver application of the brake pedal. The brake pedal position sensor provides an analog voltage signal that will increase as the brake pedal is applied. The body control module (BCM) provides a low reference signal and a 5 V reference voltage to the brake pedal position sensor. When the variable signal reaches a voltage threshold indicating the brakes have been applied, the BCM energizes the left and right trailer stop/turn signal lamp relay's by applying ground to the left and right trailer stop/turn signal lamp relay control circuits. With the left and right trailer stop/turn signal lamp relay's energized, the relay switch contacts close and battery voltage is applied through the left and right trailer stop/turn signal fuse's to the trailer stop lamp control circuits which illuminates the trailer stop lamps.

Turn Signal Lamps

For trailer turn signal lamp operation, the left and right trailer stop/turn signal lamp relay's are supplied with battery voltage at all times. Ground is applied at all times to the turn signal/multifunction switch. The turn signal lamps may only be activated with the ignition switch in the ON or START positions. When the turn signal/multifunction switch is placed in either the TURN RIGHT or TURN LEFT position, ground is applied to the body control module (BCM) through either the right turn or left turn signal switch signal circuit. The BCM responds to the turn signal switch input by applying a pulsating ground to the left and right trailer stop/turn signal lamp relay control circuits energizing the relay's in an ON and OFF cycle. With the left and right trailer stop/turn signal lamp relay's energized, the relay switch contacts cycle ON and OFF applying battery voltage through the left and right trailer stop/turn signal fuse's to the trailer turn signal lamp control circuits which illuminates the trailer turn signal lamps in an ON and OFF cycle.

Battery Run Down Protection/Inadvertent Power

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

INTERIOR LIGHTING SYSTEMS DESCRIPTION AND OPERATION

Interior Lamps

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

- Dome lamps
- Reading lamps
- Sunshade mirror lamps

Dome Lamps

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

and no doors opened, the BCM will deactivate the dome lamps control circuit to prevent total battery discharge. The dome lamps will turn OFF using the theater dimming feature when controlled by the BCM.

Reading Lamps

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

Sunshade Mirror Lamps

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

Keyless Entry Interior Illumination

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

Interior Lamps Dimming

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

- Dome/reading lamps - front
- Dome/reading lamps - rear
- Door lock switch - driver
- Door lock switch - passenger
- Hazard switch
- Headlamp switch
- HVAC control head assembly
- Multifunction switch - instrument panel
- Outside rearview mirror switch
- Radio
- Steering wheel control switch - left
- Steering wheel control switch - right
- Sun roof switch
- Sun roof tilt switch
- Window switch - passenger

With the headlamp switch in the PARK or HEAD position, the park lamp switch signal circuit provides an input to the body control module (BCM). The BCM responds by applying voltage to the park lamps as well as the backlight dimming control circuits illuminating all components with interior backlighting. All interior backlighting

: dimming level indicated by the instrument panel dimmer switch. The instrument panel dimmer switch is a momentary type switch and utilizes a resistor ladder to increase and decrease the brightness of the interior backlighting components. The instrument panel dimmer switch provides a voltage signal to the BCM that will increase as the brightness of the lights are increased and decrease as the brightness of the lights are decreased. The BCM provides a low reference signal and a B+ circuit to the switch. When the instrument panel dimmer switch is held in the desired position, the dimmed voltage setting is applied from the instrument panel dimmer switch through the instrument panel dimmer switch signal circuit to the BCM. The BCM interprets the signal and applies a pulse width modulated (PWM) voltage through the backlighting control circuits illuminating the interior backlighting to the requested level of brightness.

The backlighting for the HVAC controls, instrument cluster, and radio controls are controlled by the BCM via serial data. When the instrument panel dimmer switch is operated to the desired backlighting setting, the BCM sends a serial data message to the HVAC control module, radio, and instrument cluster requesting the backlighting be adjusted to the desired level.

Battery Rundown Protection/Inadvertent Power

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