

2017 ACCESSORIES AND EQUIPMENT

Lighting - Description and Operation - Bolt EV

DESCRIPTION AND OPERATION

EXTERIOR LIGHTING SYSTEMS DESCRIPTION AND OPERATION

Exterior Lamps

The exterior lighting system consist of the following lamps if equipped:

- Automatic high beam assist
- Backup lamps
- Daytime running lamps
- Rear fog lamps
- Hazard warning lamps
- Headlamps
- Manual headlamp leveling
- Park, tail, license, and side marker lamps
- Stop lamps
- Turn signal lamps

Low Beam Headlamps

The headlamps may be turned ON in 3 different ways:

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

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 responds by applying ground to the low beam relay control circuit which energizes the low beam relay. With the low beam relay energized, the switch contacts close allowing battery voltage to flow through the left and right low beam fuses to the low beam control circuits and onto the left and right low beam headlamps.

When the BCM commands the low beam headlamps ON, the operator will notice the interior backlighting for the instrument cluster and the various other switches dim to the level of brightness

selected by the instrument panel dimmer switch.

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

Automatic High Beam Assist

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

Automatic High Beam Assist System Activation

- Vehicle ON
- Turn signal/multifunction switch placed in the AUTO position
- Turn signal/multifunction switch high beam dimmer switch must be in the neutral position
- Press the Auto High Beam ON/OFF switch located on the turn signal/multifunction switch
- Outside lighting conditions must be dark
- Vehicle speed greater than 25 MPH (40 km/h)

Automatic High Beam Assist System Operation

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

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

NOTE: **Automatic high beam assist may not operate properly if any of the following conditions exist:**

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

Automatic High Beam Assist System Deactivation

- Manually operating the turn signal/multifunction switch high beam dimmer switch from neutral to high beam position
- Press the Auto High Beam ON/OFF switch located on the turn signal/multifunction switch

Automatic High Beam Assist System Indicator

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

Manual Headlamp Leveling

Each headlamp assembly contains a headlamp leveling actuator that is controlled by the headlamp leveling switch. The headlamp leveling switch is supplied with ignition voltage and contains a resistor ladder with 4 positions for adjusting the headlamps up or down. When the headlamp leveling switch is activated to the desired position, voltage from the B+ ignition circuit is pulled down through the resistor ladder and the voltage is applied to the left and right headlamp leveling actuators via the headlamp leveling control module. The headlamp leveling actuators are supplied with B+ and ground. When the headlamp leveling switch is activated, the left and right headlamp leveling actuators respond by moving the headlamps to the desired position.

Daytime Running Lamps

The daytime running lamps will illuminate continuously when the following conditions are met:

- The vehicle mode switch 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 (T83) or rain sensor module (CE1) is used to monitor outside lighting conditions. The BCM monitors the ambient light sensor or rain sensor module via serial data to determine if outside lighting conditions are correct for either daytime running lights or automatic lamp control when the headlamp switch is in the AUTO position. In daylight conditions the BCM will command the designated daytime running lights ON. During low light conditions the BCM will command the low beam headlamps ON. Any function or condition that turns on the headlamps will cancel daytime running lights operation.

Rear Fog Lamps

When the rear fog lamp switch is placed in the ON position, battery voltage is applied from the BCM to the rear fog lamps. Ground for the rear fog lamps is applied at all times.

The BCM will send a message via GMLAN serial data to the instrument panel cluster to enable the rear fog lamp indicator.

Flash to Pass

When the low beam headlamps are on and the turn signal/multi-function switch is momentarily placed in the flash to pass position, ground is applied to the turn signal/multi-function switch. The turn signal/multifunction switch applies ground to the BCM through the flash to pass switch signal circuit. The BCM then applies ground to the high beam relay control circuit. This energizes the high beam relay, closing the switch side contacts of the high beam relay, applying battery voltage to the left and right high beam fuses. Battery voltage is applied from the high beam fuses through the high beam voltage supply circuit to the high beam headlamp assemblies. This causes the high beam headlamps to illuminate at full brightness momentarily or until the flash to pass switch is released.

Hazard Lamps

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

The instrument panel dimmer switch controls the brightness of the interior backlighting components. When the instrument panel dimmer switch is placed in a desired brightness position, the body control

module (BCM) receives a signal from the instrument panel dimmer switch and responds by applying a pulse width modulated (PWM) voltage to the hazard switch light emitting diode (LED) backlighting control circuit illuminating the LED to the desired level of brightness.

Park, Tail, License, and Side Marker Lamps

The park lamps, tail lamps, license plate lamps, and side marker lamps are turned ON when the headlamp switch is placed in the PARK LIGHT or LOW BEAM position or anytime the headlights are requested. When the BCM receives a request from the headlamp switch to turn ON the park lamps the BCM will apply battery voltage to the left and right park lamp, side marker lamp, and license plate lamp control circuits illuminating the left and right park lamps, side marker lamps, and license plate lamps.

When the trailer lighting control module receives a request from the headlamp switch to turn ON the park lamps the trailer lighting control module will apply battery voltage to the left and right tail/stop lamp control circuits illuminating the left and right tail/stop lamps.

Stop Lamps

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

When the brakes have been applied the trailer lighting control module will apply battery voltage to the left and right tail/stop lamp and auxiliary tail/stop lamp control circuits. The left and right tail/stop lamps will illuminate when the liftgate is in the CLOSED position and the left and right auxiliary tail/stop lamps will illuminate when the liftgate is in the OPEN position.

Regen on Demand allows increased deceleration by pressing and holding the steering wheel paddle. It works in D (Drive) and L (Low). The accelerator pedal can be used to manage deceleration while using Regen on Demand. Cruise control will turn off and the brake lamps may come on when this feature is activated.

Turn Signal Lamps

Ground is applied at all times to the turn signal/multi-function switch. The turn signal lamps may only be activated with the vehicle ON/OFF switch in the Service Mode or ON position. When the turn signal/multi-function switch is placed in either the TURN RIGHT or TURN LEFT position, ground is applied to the BCM through either the right turn or left turn signal switch signal circuit. The BCM then applies a pulsating voltage to the front and rear turn signal lamps through their respective voltage supply circuits. When a turn signal request is received by the BCM, a serial data message is sent to the instrument cluster requesting the respective turn signal indicator be pulsed ON and OFF.

Backup Lamps

With the vehicle 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 vehicle must be ON for the backup lamps to operate.

Battery Run Down Protection/Inadvertent Power

To provide battery run down protection, the exterior lamps will be deactivated automatically under certain conditions. The BCM monitors the state of the headlamp switch. If the park or headlamp switch is ON when the vehicle mode switch is placed in either the CRANK or RUN position and then placed in the OFF position, the BCM initiates a 10 min timer. At the end of the 10 min, the BCM will turn off the control power output to the park lamp controls as well as the headlamp relay coils, deactivating the exterior lamps. This feature will be cancelled if any power mode other than OFF becomes active. The BCM will disable battery run down protection if any of the following conditions exist. The park or headlamp switch is placed in the ON to OFF position, and back to the ON position during battery run

down protection. The BCM determined that the park or headlamp switch was not active when the vehicle mode switch was turned OFF.

INTERIOR LIGHTING SYSTEMS DESCRIPTION AND OPERATION

Interior Lamps

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

- Dome lamps
- Courtesy lamps
- Reading lamps
- Rear compartment courtesy lamp

Dome Lamps

The dome lamp switch contains 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 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 s 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 min with the ignition switch in the OFF position, the BCM will deactivate the dome lamp control circuit to prevent total battery discharge. The dome lamps will turn OFF using the theater dimming feature when controlled by the BCM.

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 min has passed since any switch activation has been detected by the BCM.

Rear Compartment Courtesy Lamp

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

Courtesy/Illuminated Entry Lamps

The following lamps may be manually turned ON by placing the interior lamp switch in the ON position, or by opening a door while the switch is in the AUTOMATIC LIGHT position.

- The dome lamp
- The liftgate lamps
- Courtesy lamps

The courtesy lamp supply voltage circuit of the body control module (BCM) supplies battery positive voltage to the dome lamp, the liftgate lamps and courtesy lamps. When any door is opened, the door jamb switch contacts close providing a door open input to the BCM. The BCM then provides a B+ to the interior lamps with the switch in the AUTO position. The interior lamps receive a ground when the switch is in the ON position.

NOTE:

If the liftgate is opened after all the modules go to sleep, the dome light will not come on. The liftgate ajar switch input to the BCM will not wake up the BCM once it has gone to sleep, so the dome light will not come on. Once the BCM gets an input to wake it up, from remote keyless entry or a door handle, the dome light will turn on when the liftgate is opened.

If the driver inadvertently leaves any interior lamp ON, the BCM will turn it OFF after a 20 min time-out.

The courtesy lamps will turn OFF immediately if the vehicle ON/OFF switch is turned to the ON position or approximately 20 s after all doors are closed.

Keyless Entry Interior Illumination

When the BCM receives a door unlock command from the remote keyless entry transmitter, the BCM will flash the park lamps several times, illuminate the courtesy and park lamps, and illuminate the low beam headlamps at low intensity. The lamps will remain on until the vehicle ON/OFF switch is turned from the OFF position, a keyless entry transmitter door lock command is received, or after an approximate 20 s delay.

Interior Lamps Dimming

The second group includes lamps which may dim. This group may use a combination of vacuum fluorescent illumination, LEDs and incandescent lamps.

- Accent lamp - left instrument panel
- Accent lamp - right instrument panel
- Headlamp switch
- Multifunction switch 1 - instrument panel
- Multifunction switch 2 - instrument panel
- Door lock switch - driver
- Door lock switch - passenger
- The instrument panel cluster
- Park brake control switch
- Seat heating switch - left rear
- Seat heating switch - right rear
- Power window switches
- Various switches

When the vehicle ON/OFF switch is turned to the ON position, the vacuum fluorescent display, radio, turns ON at maximum brightness. When the park lamps are ON, all incandescent back lighting turn ON at the dimming level indicated by the instrument panel dimmer switch. At the same time all fluorescent display displays dim to match the indicated dimming level. When the headlamp switch is placed in the PARK position, the park lamp supply voltage circuit provides an input to the BCM. The BCM then supplies voltage to the instrument panel dimmer switch through the dimming control circuit. The setting of the instrument panel dimmer switch determines the amount of voltage that the instrument panel dimmer switch supplies to the BCM through the instrument panel dimming lamps low reference circuit. The BCM then sends a PWM voltage to all the interior lamps. All the fluorescent display and incandescent back lighting lamps are provided a specific voltage and are then grounded. When the headlight switch is turned to the park lamp or headlamp position, all incandescent back lighting turn ON at the dimming level indicated by the instrument panel dimmer switch. When the instrument panel dimmer switch is moved from MIN to MAX, all fluorescent display displays, as well as all incandescent back lighting respond from minimum intensity to maximum brightness in response to the instrument panel dimmer switch.

Inadvertent Power

The BCM used in this vehicle controls the lighting system through circuits that enable the interior lamps. The BCM opens these enabling circuits shortly after the vehicle ON/OFF switch is turned OFF with no lamp switch activity. If the vehicle ON/OFF switch is turned to any position other than OFF, or if a lamp switch is activated during this period, the timer will reset itself.

2017 ACCESSORIES & EQUIPMENT

Lighting - Diagnostic Information and Procedures - Bolt EV

DIAGNOSTIC INFORMATION AND PROCEDURES

DTC B1395: CONTROL MODULE VOLTAGE REFERENCE OUTPUT CIRCUIT LOW/HIGH VOLTAGE

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptors

DTC B1395 03

Control Module Voltage Reference Output Circuit Low Voltage

DTC B1395 07

Control Module Voltage Reference Output Circuit High Voltage

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Headlamp Switch B+	B1395 03, B3600 03	B3600 03	B1395 07, B3600 07	-
Headlamp Switch Signal	B1395 03, B3600 03	B3600 03	B1395 07, B3600 07	-
Headlamp 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 B+, low reference, and signal circuits to the instrument panel dimmer switch. When the instrument panel dimmer switch is placed in the desired position, the dimmed voltage setting is applied from the instrument panel dimmer switch through the instrument panel dimmer switch signal circuit to the BCM. The BCM interprets the signal and applies a pulse width modulated (PWM) voltage through the LED dimming control circuits illuminating the interior backlighting to the requested level of brightness.

Conditions for Running the DTC

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

Conditions for Setting the DTC

DTC B1395 03

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

- The BCM detects a short to ground 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

All interior backlighting defaults to 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 vehicle ON/OFF switch cycles have occurred.

Reference Information

Schematic Reference

Interior Lights Dimming Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Interior Lighting Systems Description and Operation

Electrical Information Reference

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

Scan Tool Reference

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

Circuit/System Testing

1. Vehicle OFF and all vehicle systems OFF, disconnect the harness connector at the S30 Headlamp Switch, vehicle in Service Mode.
2. Test for B+ between the B+ circuit terminal 12 and ground.
 - **If less than B+**
 1. Vehicle OFF, disconnect the X1 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 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. cardiagn.com
 - **If less than B+**

1. Vehicle OFF, disconnect the X1 harness connector at the K9 Body Control Module, vehicle in Service Mode.
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 B+**
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. Vehicle 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. Vehicle OFF, disconnect the X2 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 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.

- Refer to [Headlamp Switch Replacement](#)
- Refer to [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.
- Refer to [Diagnostic Procedure Instructions](#) to provide 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

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Courtesy Lamps Control - Terminal 2 X7	B1480 02	1	1	-
Dome/Reading Lamps - Overhead Console Ground	-	1, 2	-	-
Dome/Reading Lamps - Rear Ground	-	1, 2	-	-
1. Courtesy Lamps Malfunction 2. Dome Lamps Malfunction				

Circuit/System Description

The body control module (BCM) supplies battery voltage to the front and rear reading lamps via the courtesy lamp control circuit. The front and rear reading lamps are controlled by individual switches that are activated by the operator when additional cabin lighting is required. In the event that any of these courtesy lamps were to remain illuminated for more than 10 min with the vehicle ON/OFF switch in the OFF position and no doors opened, the BCM will deactivate the courtesy lamp control circuit to prevent total battery discharge.

Conditions for Running the DTC

Battery voltage must be between 9 - 16 V.

Conditions for Setting the DTC

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

Actions Taken When the DTC Sets

The BCM will disable the circuit and the front and rear reading lamps 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 vehicle ON/OFF switch cycles have occurred.

Diagnostic Aids

The Inadvertent Load scan tool command operates when the front and rear dome lamp switches are in the ON position.

Reference Information

Schematic Reference

Interior Lights Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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

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

[Circuit/System Testing](#)

1. Vehicle OFF, exterior lamps OFF, disconnect the harness connectors at the components listed below.
 - E37D Dome/Reading Lamps - Overhead Console
 - E37R Dome/Reading Lamps - Rear
2. Connect a test lamp between the appropriate control circuit terminal listed below and ground, vehicle in Service Mode.
 - E37D Dome/Reading Lamps - Overhead Console terminal 2
 - E37R Dome/Reading Lamps - Rear terminal 1
3. Verify the test lamp turns ON and OFF when commanding the Inadvertent Load ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Vehicle 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. Vehicle OFF, disconnect the X7 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 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.

- Refer to [Roof Console Replacement](#)
- Refer to [Center Courtesy Lamp Replacement](#)
- Refer to [Rear Seat Position Center Courtesy Lamp Bulb Replacement](#)
- Refer to [Control Module References](#) for BCM replacement, programming, and setup

DTC B2540: REAR FOG LAMPS CONTROL CIRCUIT

[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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

[DTC Descriptors](#)

DTC B2540 02

Rear Fog Lamps Control Circuit Short to Ground

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DTC B2540 04

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Rear Fog Lamp Control	B2540 02	B2540 04	1	-
Rear Fog Lamp Ground	-	1	-	-
1. Rear Fog Lamp Malfunction				

Circuit/System Description

The rear fog lamp switch signal circuit is grounded momentarily by pressing the rear fog lamp switch. The body control module (BCM) responds to the rear fog lamp request by applying voltage to the rear fog lamp control circuit which illuminates the rear fog lamp.

Conditions for Running the DTC

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

Conditions for Setting the DTC**DTC B2540 02**

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

DTC B2540 04

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

Actions Taken When the DTC Sets

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

Conditions for Clearing the DTC

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

Reference Information

Schematic Reference

Fog Lights Schematics

Connector End View Reference

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

Scan Tool Reference

Circuit/System Testing

1. Vehicle OFF, exterior lamps OFF, disconnect the X410 harness connector at the E5EA Tail Lamp - Auxiliary Left.
2. Test for less than 5 Ω between the ground circuit terminal 6 and ground.
 - **If 5 Ω or greater**
 1. Vehicle 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 4 and ground, vehicle in Service Mode.
4. Verify the test lamp turns ON and OFF when commanding the Rear Fog Lamp(s) Relay ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Vehicle 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. Vehicle OFF, disconnect the X5 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 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 E29R Fog Lamp - Rear.

Repair Instructions

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

- Refer to [Stop and Turn Signal Lamp Bulb Replacement \(Europe, Korea with Rear Fog\) Stop and Turn Signal Lamp Bulb Replacement \(Europe, Korea, North America with Back-up Bulb\)](#)
- Refer to [Control Module References](#) for BCM replacement, programming, and setup

DTC B2545: BACKUP LAMPS CIRCUIT

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptors

DTC B2545 01

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
Backup Lamp Control	B2545 02	1	1	-
Backup Lamp Ground	-	1	-	-
1. Backup Lamps Malfunction				

Circuit/System Description

With the vehicle 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 lamp control circuit illuminating the backup lamp. Once the driver moves the gear selector out of the reverse position, a message is sent by the TCM via serial data requesting the BCM to remove battery voltage from the backup lamp control circuit. The vehicle must be ON for the backup lamps to operate.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- Vehicle ON.
- Transmission placed in REVERSE gear.

Conditions for Setting the DTC

DTC B2545 01 and B2545 04

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

DTC B2545 02

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

Actions Taken When the DTC Sets

The backup lamp 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 vehicle ON/OFF switch cycles have occurred.

Reference Information

Schematic Reference

Exterior Lights 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

1. Vehicle OFF, exterior lamps OFF, disconnect the harness connector at the E5 Backup Lamp, vehicle in Service Mode.
2. Test for less than 5 Ω between the ground circuit at the socket terminal and ground.
 - **If 5 Ω or greater**
 1. Vehicle 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 and ground, vehicle in Service Mode.
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. Vehicle 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. Vehicle OFF, disconnect the X7 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 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.

- Refer to [Stop and Turn Signal Lamp Bulb Replacement \(Europe, Korea with Rear Fog\) Stop and Turn Signal Lamp Bulb Replacement \(Europe, Korea, North America with Back-up Bulb\)](#)
- Refer to [Control Module References](#) for BCM replacement, programming, and setup

DTC B2570: TRUNK LAMP CONTROL 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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptor

DTC B2570 02

Trunk Lamp Control Circuit Short to Ground

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Rear Compartment Courtesy Lamp Control	B2570 02	1	1	-
Rear Compartment Courtesy Lamp Ground	-	1	-	-
1. Rear Compartment Lamp Malfunction				

Circuit/System Description

The body control module (BCM) applies battery voltage to the rear compartment courtesy lamp through the rear compartment courtesy lamp control circuit. When the BCM receives a rear liftgate open input from the rear compartment lid latch, the BCM applies battery voltage to the rear compartment courtesy lamp control circuit illuminating the rear compartment courtesy lamp. In the event that the rear compartment courtesy lamp were to remain illuminated for more than 10 min with the vehicle ON/OFF switch in the OFF position, the BCM will deactivate the rear compartment courtesy lamp control circuit to prevent total battery discharge.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- Liftgate OPEN.

Conditions for Setting the DTC

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

Actions Taken When the DTC Sets

The rear compartment courtesy lamp is inoperative.

Conditions for Clearing the DTC

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

Reference Information

Schematic Reference

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 Testing](#)

1. Vehicle OFF, exterior lamps OFF, disconnect the harness connector at the E8S Rear Compartment Courtesy Lamp. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 5 Ω between the ground circuit terminal 2 and ground.
 - **If 5 Ω or greater**
 1. Vehicle 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 1 and ground, vehicle in Service Mode.
4. Verify the test lamp turns ON and OFF when commanding the Cargo Lamp ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Vehicle 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. Vehicle OFF, disconnect the X7 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
5. Test or replace the E8S Rear Compartment Courtesy Lamp.

[Repair Instructions](#)

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

- Refer to [Cargo Center Courtesy Lamp Bulb Replacement](#)
- Refer to [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.

- Refer to [Diagnostic Procedure Instructions](#) to provide 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	-	-
1. Headlamps Malfunction 2. Park, License, and/or Tail Lamps Malfunction				

Circuit/System Description

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

Conditions for Running the DTC

Battery voltage must be between 9-16 V.

Conditions for Setting the DTC

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

Actions Taken When the DTC Sets

- When DTC B257A 00 is present on the headlamp switch headlamps OFF signal circuit, the low beam and high beam headlamps are inoperative.
- When DTC B257A 00 is present on the headlamp switch headlamps ON signal circuit, the low beam headlamps are always ON in the PARK position and the park lamps are always ON in all positions.
- When DTC B257A 00 is present on the headlamp switch park lamps ON signal circuit, the high beam and low beam headlamps are inoperative in the PARK and HEAD positions.

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 vehicle ON/OFF switch cycles have occurred.

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Reference Information

- [Headlights/Daytime Running Lights \(DRL\) Schematics](#)
- [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. Vehicle OFF, all doors closed, all accessories OFF, disconnect the harness connector at the S30 Headlamp Switch. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 5 Ω between the ground circuit terminal 8 and ground.
 - **If 5 Ω or greater**
 1. Vehicle 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. Vehicle in Service Mode.
4. Verify the scan tool Automatic Headlamps Disable Switch parameter is Inactive.
 - **If not Inactive**
 1. Vehicle 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 the ground circuit terminal 8.
6. Verify the scan tool Automatic Headlamps Disable Switch parameter is Active.
 - **If not Active**
 1. Vehicle OFF, disconnect the X1 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 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. Vehicle 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 the ground circuit terminal 8.

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

- **If not Active**

1. Vehicle OFF, disconnect the X1 harness connector at the K9 Body Control Module, vehicle in Service Mode.
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. Vehicle 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 the ground circuit terminal 8.

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

- **If not Active**

1. Vehicle OFF, disconnect the X1 harness connector at the K9 Body Control Module, vehicle in Service Mode.
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.

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

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide 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	1	1	B2580 01	-
High Beam Headlamp - Left Control	1	1	1	-
High Beam Headlamp - Right Control	1	1	1	-
Headlamp - Left Ground	-	1	-	-
Headlamp - Right Ground	-	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 left and right high beam fuses to the high beam control circuits and on to the left and right high beam solenoid actuators within the headlamp assemblies. Once the high beam solenoid actuators are active, the solenoid shutters open in each headlamp assembly exposing the remaining portion of the headlamp that was covered by the shutters illuminating the high beams at full intensity.

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 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

- For an open/high resistance fault, the high beam headlamps and flash to pass function are inoperative. The high beam indicator on the instrument cluster operates normally.
- For a short to ground fault, the high beam headlamps and high beam indicator on the instrument cluster are always ON with the headlamp switch in the AUTO or HEAD positions.
- For a short to voltage fault, the high beam headlamps and flash to pass function 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 vehicle ON/OFF switch 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

Circuit/System Testing

1. Vehicle OFF, disconnect the X5 harness connector at the K9 Body Control Module, vehicle in Service Mode.
2. Test for B+ between the control circuit terminal 18 and ground.
 - **If less than B+**
 1. Vehicle 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 B+**
3. Vehicle OFF, connect a 3 A fused jumper between the control circuit terminal 18 and ground, vehicle in Service Mode, low beams ON.
4. Verify the high beam headlamps illuminate.

- **If the high beam headlamps do not illuminate**

1. Vehicle OFF, disconnect the X2 harness connector at the X50A Fuse Block - Underhood, vehicle in Service Mode.
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. Replace the K9 Body Control Module.

Repair Instructions

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

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

DTC B2585 OR B3867: LEFT/RIGHT PARK LAMPS CONTROL CIRCUIT

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptors

DTC B2585 01

Left Park Lamps Control Circuit Short to Battery

DTC B2585 02

Left Park Lamps Control Circuit Short to Ground

DTC B2585 04

Left Park Lamps Control Circuit Open

DTC B3867 01

Right Park Lamp Control Circuit Short to Battery

DTC B3867 02

Right Park Lamp Control Circuit Short to Ground

DTC B3867 04

Right Park Lamp Control Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Park Lamps Control - Left	B2585 02	1	1	-
Park Lamps Control - Right	B3867 02	1	1	-
Park Lamp Ground - Left Front	-	1	-	-
Park Lamp Ground - Right Front	-	1	-	-

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Side Marker Lamp Ground - Left Front	-	1	-	-
Side Marker Lamp Ground - Right Front	-	1	-	-
Side Marker Lamp Ground - Left Rear	-	1	-	-
Side Marker Lamp Ground - Right Rear	-	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 lamps ON signal circuit to the body control module (BCM). The BCM responds by applying voltage to the park lamps control circuit illuminating the park and side marker 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 front park lamp control circuit.

DTC B3867 02

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

Actions Taken When the DTC Sets

DTC B2585 02

The left front park lamp and left front and rear side marker lamps are inoperative.

DTC B3867 02

The right front park lamp and right front and rear side marker 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 vehicle ON/OFF switch cycles have occurred.

Reference Information

Schematic Reference

Exterior Lights Schematics

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- [Wiring Repairs](#)

Scan Tool Reference

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

Circuit/System Testing

DTC B2585

1. Vehicle OFF, exterior lamps OFF, disconnect the harness connector at the appropriate park lamp listed below.
 - E13LA Headlamp Assembly - Left
 - E2LR Side Marker Lamp - Left Rear
2. Test for less than 10 Ω between the appropriate ground circuit terminal listed below and ground.
 - E13LA Headlamp Assembly - Left terminal 8
 - E2LR Side Marker Lamp - Left Rear terminal 2
 - **If 10 Ω or greater**
 1. Vehicle 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, vehicle in Service Mode.
 - E13LA Headlamp Assembly - Left terminal 4
 - E13LA Headlamp Assembly - Left terminal 7 (-TR6)
 - E2LR Side Marker Lamp - Left Rear terminal 1
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. Vehicle 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. Vehicle OFF, disconnect the X4 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
5. Test or replace the appropriate left park lamp.

DTC B3867

1. Vehicle OFF, exterior lamps OFF, disconnect the harness connector at the appropriate park lamp listed below.
 - E13RA Headlamp Assembly - Right
 - E2RR Side Marker Lamp - Right Rear
2. Test for less than 10 Ω between the appropriate ground circuit terminal listed below and ground.
 - E13RA Headlamp Assembly - Right terminal 8
 - E2RR Side Marker Lamp - Right Rear terminal 2
 - **If 10 Ω or greater**
 1. Vehicle 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, vehicle in Service Mode.
 - E13RA Headlamp Assembly - Right terminal 4
 - E13RA Headlamp Assembly - Right terminal 7 (-TR6)
 - E2RR Side Marker Lamp - Right Rear terminal 1
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. Vehicle 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. Vehicle OFF, disconnect the X4 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
5. Test or replace the appropriate right park lamp.

Repair Instructions

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

- Refer to [Headlamp Replacement](#)
- Refer to [Rear Side Marker Lamp Replacement](#)
- Refer to [Control Module References](#) for BCM replacement, programming, and setup

DTC B258A: LOW BEAM CONTROL CIRCUIT

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptors

DTC B258A 01

Low Beam Control Circuit Short to Battery

DTC B258A 02

Low Beam Control Circuit Short to Ground

DTC B258A 04

Low Beam Control Circuit Open

Diagnostic Fault Information

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

Circuit/System Description

The headlamp low beam relay is supplied with battery voltage at all times. When the headlamp switch is in the ON position ground is applied to the body control module (BCM) through the low beam signal circuit. The BCM responds to the low beam request by applying ground to the low beam relay control circuit which energizes the headlamp low beam relay. With the low beam relay energized, the switch contacts close allowing battery voltage to flow through the low beam fuses to the low beam headlamps 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 B2580 01

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

DTC B2580 02

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

DTC B2580 04

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

Actions Taken When the DTC Sets

- The left and right low beam headlamps 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

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. Vehicle OFF, remove the KR49 Headlamp Low Beam Relay.
2. Connect a test lamp between the control circuit terminal 86 and B+, vehicle in Service Mode.
3. Verify the test lamp turns ON and OFF when commanding the Low Beam Lamps ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Vehicle OFF, disconnect the X5 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
 3. Vehicle 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. Vehicle OFF, disconnect the X5 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit terminal and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
4. Test or replace the KR49 Headlamp Low Beam Relay.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.

- Refer to Relay Replacement (Attached to Wire Harness) Relay Replacement (Within an Electrical Center)

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

DTC B2600 OR B2605: LEFT/RIGHT DAYTIME RUNNING LAMPS CONTROL 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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptors

DTC B2600 02

Left Daytime Running Lamps Control Circuit Short to Ground

DTC B2605 02

Right Daytime Running Lamps Control Circuit Short to Ground

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Daytime Running Lamp Control - Left	B2600 02	1	1	-
Daytime Running Lamp Control - Right	B2605 02	1	1	-
Headlamp Assembly Ground - Left	-	1	-	-
Headlamp Assembly Ground - Right	-	1	-	-
1. Daytime Running Lamps Malfunction				

Circuit/System Description

The ambient light/sunload sensor is used to monitor outside lighting conditions. The ambient light/sunload sensor provides a serial data message to the body control module (BCM) based on outside lighting conditions to determine if outside lighting conditions are correct for either daytime running lamps or automatic lamp control when the headlamp switch is in the AUTO position. In daylight conditions the BCM will command the designated daytime running lamps ON. During low light conditions the BCM will command the low beam headlamps ON. Any function or condition that turns on the headlamps will cancel daytime running lamps operation.

Conditions for Running the DTC

Battery voltage must be between 9-16 V.

Conditions for Setting the DTC

DTC B2600 02

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

DTC B2605 02

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

Actions Taken When the DTC Sets

DTC B2600 02

The left daytime running lamp is inoperative.

DTC B2605 02

The right daytime running lamp is inoperative.

Conditions for Clearing the DTC

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

Diagnostic Aids

The daytime running lamps will only operate in daylight conditions with the vehicle ON and in any transmission gear except PARK.

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

Circuit/System Testing

1. Vehicle OFF, exterior lamps OFF, disconnect the appropriate harness connector listed below.
 - X110 - left daytime running lamp
 - X120 - right daytime running lamp
2. Test for less than 10 Ω between the appropriate ground circuit terminal listed below and ground.
 - Terminal 5 (-TR6)
 - Terminal 7 (TR6)
 - **If 10 Ω or greater**
 1. Vehicle 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 3 and ground, vehicle in Service Mode.
4. Verify the test lamp turns ON and OFF when commanding the appropriate Dedicated Daytime Running Lamp ON and OFF with a scan tool.

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

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

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

5. Test or replace the appropriate E13 Headlamp Assembly.

Repair Instructions

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

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

DTC B2610: PASSENGER COMPARTMENT DIMMING 1 CIRCUIT

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptors

DTC B2610 01

Passenger Compartment Dimming 1 Circuit Short to Battery

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	1	1	-
LED Backlight Dimming Control Terminal 9 X7	B2610 02	1	1	-
Door Lock Switch - Driver Ground	-	1	-	-
Door Lock Switch - Passenger Ground	-	1	-	-

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Headlamp Switch Ground	-	1	-	-
Multifunction Switch 1 - Instrument Panel Ground	-	1	-	-
Multifunction Switch 2 - Instrument Panel Ground	-	1	-	-
Park Brake Control Switch Ground	-	1	-	-
Seat Heating Switch - Left Rear Ground	-	1	-	-
Seat Heating Switch - Right Rear Ground	-	1	-	-
Steering Wheel Controls Switch - Radio Presets Ground	-	1	-	-
1. Interior Backlighting Malfunction				

Circuit/System Description

The headlamp switch is used to increase and decrease the brightness of the interior backlighting components. The headlamp 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 B+, low reference, and signal circuits to the headlamp switch. When the headlamp switch is placed in the desired position, the dimmed voltage setting is applied from the headlamp switch through the headlamp switch signal circuit to the BCM. The BCM interprets the signal and applies a pulse width modulated (PWM) voltage through the LED dimming control circuits illuminating the interior backlighting to the requested level of brightness.

Conditions for Running the DTC

- Battery voltage must be between 9 - 16 V.

Conditions for Setting the DTC

DTC B2610 01

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

DTC B2610 02

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

DTC B2610 04

The BCM detects an open/high resistance in the LED backlight dimming control circuit terminal 8 X2 or the LED backlight dimming control circuit terminal 9 X7.

Actions Taken When the DTC Sets

The BCM will disable the LED backlight dimming control circuits.

Conditions for Clearing the DTC

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

Reference Information

Schematic Reference

Connector End View Reference

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- [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. Vehicle OFF, all doors closed, all accessories OFF, 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 5 Ω between the appropriate ground circuit terminal and ground.
 - **If 5 Ω or greater**
 1. Vehicle 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 and ground, vehicle in Service Mode.
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. Vehicle OFF, disconnect the appropriate harness connector listed below at the K9 Body Control Module.
 - X2 terminal 8
 - X7 terminal 9
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K9 Body Control Module.

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

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

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

5. Test or replace the component with inoperative backlighting.

Repair Instructions

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

- Refer to [Parking Brake Actuator Switch Replacement](#)
- Refer to [Headlamp Switch Replacement](#)
- Refer to [Door Lock Switch Replacement](#)
- Refer to [Rear Seat Heater Switch Replacement](#)
- Refer to [Radio Control Switch Replacement - Steering Wheel \(Left Side Lower\)](#) [Radio Control Switch Replacement - Steering Wheel \(Left Side Rear\)](#) [Radio Control Switch Replacement - Steering Wheel \(Right Side Front\)](#) [Radio Control Switch Replacement - Steering Wheel \(Right Side Rear\)](#)
- Refer to [Hazard Warning Switch Replacement](#)
- Refer to [Control Module References](#) for BCM replacement, programming, and setup

DTC B2615: PASSENGER COMPARTMENT DIMMING 2 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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptor

DTC B2615 02

Passenger Compartment Dimming 2 Circuit Short to Ground

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
F8DA (BCM 2) Fuse B+	B2615 02	B2615 02	-	-
Dome Lamps Control - Terminal 1 X7	B2615 02	1	1	-
Dome/Reading Lamps - Overhead Console Ground	-	1	-	-
Dome/Reading Lamps - Rear Ground	-	1	-	-
1. Dome Lamps 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 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 s 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 min with the vehicle ON/OFF switch in the OFF position and no doors opened, the BCM will deactivate the dome lamps control circuit to prevent total battery discharge.

Conditions for Running the DTC

Battery voltage must be between 9 - 16 V.

Conditions for Setting the DTC

- The BCM detects a short to ground or an open/high resistance in the F8DA (BCM 2) fuse B+ circuit.
- The BCM detects a short to ground in the dome lamps control circuit.

Actions Taken When the DTC Sets

The front and middle dome 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 vehicle ON/OFF switch cycles have occurred.

Reference Information

Schematic Reference

- [Interior Lights Schematics](#)
- [Body Control System 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. Vehicle OFF, disconnect the X1 harness connector at the K9 Body Control Module, vehicle in Service Mode.
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. 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. 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. Vehicle OFF, connect the X1 harness connector at the K9 Body Control Module.
- 4. Vehicle OFF, scan tool disconnected, all doors closed, all accessories OFF, disconnect the harness connector at the inoperative E37 Dome/Reading Lamp. 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 terminals listed below and ground.
 - E37D Dome/Reading Lamps - Overhead Console terminal 4
 - E37R Dome/Reading Lamps - Rear terminal 3
 - **If 5 Ω or greater**
 1. Vehicle OFF.
 2. Test for less than 2 Ω in the ground circuits 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 terminals listed below and ground, vehicle in Service Mode.
 - E37D Dome/Reading Lamps - Overhead Console terminal 3
 - E37R Dome/Reading Lamps - Rear terminal 4
- 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. Vehicle 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. Vehicle OFF, disconnect the X7 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 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 inoperative E37 Dome/Reading Lamp.

Repair Instructions

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

- Refer to [Roof Console Replacement](#)
- Refer to [Center Courtesy Lamp Replacement](#)
- Refer to [Rear Seat Position Center Courtesy Lamp Bulb Replacement](#)
- Refer to [Control Module References](#) for BCM replacement, programming, and setup

DTC B2625: DISPLAY DIMMING PULSE WIDTH MODULATION OUTPUT 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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptor

DTC B2625 02

Display Dimming Pulse Width Modulation Output Circuit Short to Ground

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Switch Indicator LED Backlight Control Terminal 5 X1	B2625 02	1	1	-
Lane Departure Warning Switch Control	1	1	1	-
Parking Assist Control Switch Control	1	1	1	-
Seat Heating Switch - Left Rear Control	1	1	1	-
Seat Heating Switch - Right Rear Control	1	1	1	-
1. Interior Backlighting Malfunction				

Circuit/System Description

The body control module (BCM) applies battery voltage to the amber switch indicators through the amber LED indicator control circuit. When the appropriate switch has been activated, the BCM applies a pulse width modulated voltage through the amber LED indicator control circuit illuminating the rear seat heating switches, park assist control switch, and lane departure warning switch amber LEDs.

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 switch indicator LED backlight dimming control circuit terminal 5 X1.

Actions Taken When the DTC Sets

The switch indicator LED backlight dimming control circuit terminal 5 X1 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 vehicle ON/OFF switch cycles have occurred.

Reference Information

Schematic Reference

cardiagn.com

[Interior Lights Dimming Schematics](#)

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- [Wiring Repairs](#)

Scan Tool Reference

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

Circuit/System Testing

1. Vehicle OFF, disconnect the harness connectors at the components listed below.

- S32LR Seat Heating Switch - Left Rear
- S32RR Seat Heating Switch - Right Rear
- S48D Multifunction Switch 2 - Instrument Panel

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

2. Vehicle in Service Mode, verify a test lamp illuminates between each control circuit terminal 6 and ground.

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

1. Vehicle 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**

3. Verify a test lamp does not illuminate at FULL intensity between each control circuit terminal 6 and ground.

- **If the test lamp illuminates at FULL intensity**

1. Vehicle OFF, disconnect the X1 harness connector at the K9 Body Control Module, vehicle in Service Mode.

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**

4. Test or replace the component with the inoperative switch indicator.

Repair Instructions

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

- Refer to [Rear Seat Heater Switch Replacement](#)

- Refer to [Instrument Panel Center Accessory Function Switch Replacement](#)
- Refer to [Control Module References](#) for BCM replacement, programming, and setup

DTC B3588: REAR 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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptor

DTC B3588 00

Rear Fog Lamp Switch Circuit Malfunction

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Rear Fog Lamp Switch Signal	B3588 00	1	1	-
Rear Fog Lamp Control	B2540 02	B2540 04	1	-
Rear Fog Lamp Ground	-	1	-	-
Headlamp Switch Ground	-	1	-	-
1. Rear Fog Lamp Malfunction				

Circuit/System Description

The rear fog lamp switch signal circuit is grounded momentarily by pressing the rear fog lamp switch. The body control module (BCM) responds to the rear fog lamp request by applying voltage to the rear fog lamp control circuit which illuminates the rear fog lamp.

Conditions for Running the DTC

Battery voltage must be between 9-16 V.

Conditions for Setting the DTC

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

Actions Taken When the DTC Sets

The rear fog lamp indicator on the instrument cluster is 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 vehicle ON/OFF switch cycles have occurred.

Reference Information

Schematic Reference

Fog Lights Schematics

Connector End View Reference

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Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Vehicle OFF, scan tool disconnected, all doors closed, all accessories OFF, disconnect the harness connector at the S30 Headlamp Switch. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 15 Ω between the ground circuit terminal 8 and ground.
 - **If 15 Ω or greater**
 1. Vehicle 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. Vehicle in Service Mode.
4. Verify the scan tool Rear Fog Lamp Switch parameter is Inactive.
 - **If not Inactive**
 1. Vehicle OFF, disconnect the X1 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit terminal 6 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 6 and ground.
6. Verify the scan tool Rear Fog Lamp Switch parameter is Active.
 - **If not Active**
 1. Vehicle OFF, disconnect the X1 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 2. Test for less than 1 V between the signal circuit terminal 6 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.

Repair Instructions

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

- Refer to [Headlamp Switch Replacement](#)
- Refer to [Control Module References](#) for BCM replacement, programming, and setup cardiagn.com

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide 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	-
Multifunction Switch 1 - Instrument Panel 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 hazard warning switch input is Active for longer than 60 s.

Actions Taken When the DTC Sets

The hazard lamps are inoperative.

Conditions for Clearing the DTC

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

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. Vehicle OFF, scan tool disconnected, all doors closed, all accessories OFF, disconnect the harness connector at the S48C Multifunction Switch 1 - Instrument Panel. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10 Ω between the ground circuit terminal 10 and ground.
 - **If 10 Ω or greater**
 1. Vehicle 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. Vehicle in Service Mode.
4. Verify the scan tool Hazard Lamps Switch parameter is Inactive.
 - **If not Inactive**
 1. Vehicle OFF, disconnect the X2 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 Hazard Lamps Switch parameter is Active.
 - **If not Active**
 1. Vehicle OFF, disconnect the X2 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 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. Test or replace the S48C Multifunction Switch 1 - Instrument Panel.

Repair Instructions

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

- Refer to [Hazard Warning Switch Replacement](#)
- Refer to [Control Module References](#) for BCM replacement, programming, and setup

DTC B3600: PASSENGER COMPARTMENT DIMMING REQUEST SIGNAL CIRCUIT LOW/HIGH VOLTAGE

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptors

DTC B3600 03

Passenger Compartment Dimming Request Signal Circuit Low Voltage

DTC B3600 07

Passenger Compartment Dimming Request Signal Circuit High Voltage

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Headlamp Switch B+	B1395 03, B3600 03	B3600 03	B1395 07, B3600 07	-
Headlamp Switch Signal	B1395 03, B3600 03	B3600 03	B1395 07, B3600 07	-
Headlamp 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 B+, low reference, and signal circuits to the instrument panel dimmer switch. When the instrument panel dimmer switch is placed in the desired position, the dimmed voltage setting is applied from the instrument panel dimmer switch through the instrument panel dimmer switch signal circuit to the BCM. The BCM interprets the signal and applies a pulse width modulated (PWM) voltage through the LED dimming control circuits illuminating the interior backlighting to the requested level of brightness.

Conditions for Running the DTC

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

Conditions for Setting the DTC

DTC B3600 03

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

DTC B3600 07

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

Actions Taken When the DTC Sets

All interior backlighting defaults to 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 vehicle ON/OFF switch cycles have occurred.

Reference Information

Schematic Reference

Interior Lights Dimming Schematics

Connector End View Reference

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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. Vehicle OFF and all vehicle systems OFF, disconnect the harness connector at the S30 Headlamp Switch, vehicle in Service Mode.
2. Test for B+ between the B+ circuit terminal 12 and ground.
 - **If less than B+**
 1. Vehicle OFF, disconnect the X1 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 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. Vehicle OFF, disconnect the X1 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 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 B+**
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. Vehicle 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. Vehicle OFF, disconnect the X2 harness connector at the K9 Body Control Module, vehicle in Service Mode.
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.

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

DTC B3650: HIGH BEAM REQUEST SIGNAL CIRCUIT PERFORMANCE - SIGNAL INVALID

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide 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
Turn Signal/Multifunction Switch High Beam Signal	B3650 08	1	1	-
Turn Signal/Multifunction Switch Ground	-	1	-	-
1. Headlamps Malfunction				

Circuit/System Description

For headlamp operation, the body control module (BCM) monitors three signal circuits from the turn signal/multifunction switch. When the turn signal/multifunction switch is in the AUTO position, the three signal circuits are open and the BCM relies on the ambient light sensor input to turn the headlamps and daytime running lamps (DRLs) ON and OFF. When the turn signal/multifunction switch is placed in the OFF position, the turn signal/multifunction switch headlamps OFF signal circuit is grounded,

indicating to the BCM that the exterior lamps should be turned OFF. With the turn signal/multifunction switch in the PARK LAMPS position, the turn signal/multifunction switch park lamps ON signal circuit is grounded, indicating that the park lamps have been requested. When the turn signal/multifunction switch is in the HEADLAMP position, both the turn signal/multifunction switch park lamps ON signal circuit and the turn signal/multifunction switch headlamps ON signal circuit are grounded. The BCM responds by commanding the park lamps and headlamps ON.

Conditions for Running the DTC

Battery voltage must be between 9-16 V.

Conditions for Setting the DTC

The BCM detects 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 vehicle ON/OFF switch cycles have occurred.

Reference Information

Schematic Reference

Exterior Lights Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Vehicle OFF, scan tool disconnected, all doors closed, all accessories OFF, disconnect the harness connector at the S78 Turn Signal/Multifunction Switch. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10 Ω between the ground circuit terminal 3 and ground.
 - **If 10 Ω or greater**
 1. Vehicle 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. Vehicle in Service Mode.
4. Verify the scan tool High Beam Select Switch parameter is Inactive.
 - **If not Inactive**
 1. Vehicle 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**
5. Install a 3 A fused jumper wire between the signal circuit terminal 7 and the ground circuit terminal 3.
6. Verify the scan tool High Beam Select Switch parameter is Active.
 - **If not Active**
 1. Vehicle OFF, disconnect the X3 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 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**
7. Test or replace the S78 Turn Signal/Multifunction Switch.

Repair Instructions

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

- Refer to [Turn Signal Switch Replacement](#)
- Refer to [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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptor

DTC B3806 00

High Beam and Headlamp Flash Select Circuit Malfunction

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Turn Signal/Multifunction Switch Flash To Pass Signal	B3806 00	1	1	-
Turn Signal/Multifunction Switch Ground	-	1	-	-
1. Headlamps Malfunction				

Circuit/System Description

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

Conditions for Running the DTC

Battery voltage must be between 9-16 V.

Conditions for Setting the DTC

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

Actions Taken When the DTC Sets

The high beam lamps and the high beam indicator on the instrument panel cluster are always ON with the headlamp switch in the HEAD 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 vehicle ON/OFF switch cycles have occurred.

Reference Information

Schematic Reference

Exterior Lights Schematics

Connector End View Reference

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Description and Operation

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Electrical Information Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Vehicle OFF, scan tool disconnected, all doors closed, all accessories OFF, disconnect the harness connector at the S78 Turn Signal/Multifunction Switch. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10 Ω between the ground circuit terminal 3 and ground.
 - **If 10 Ω or greater**
 1. Vehicle 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. Vehicle in Service Mode.
 4. Verify the scan tool Headlamps Flash Switch parameter is Inactive.
 - **If not Inactive**
 1. Vehicle OFF, disconnect the X3 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit terminal 6 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 6 and the ground circuit terminal 3.
 6. Verify the scan tool Headlamps Flash Switch parameter is Active.
 - **If not Active**
 1. Vehicle OFF, disconnect the X3 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 2. Test for less than 1 V between the signal circuit terminal 6 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.

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

DTC B3881 OR B3882: LEFT/RIGHT TAIL LAMP CIRCUIT (MBM)

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptors

DTC B3881 02

Left Tail Lamp Circuit Short to Ground

DTC B3881 04

Left Tail Lamp Circuit Open

DTC B3882 02

Right Tail Lamp Circuit Short to Ground

DTC B3882 04

Right Tail Lamp Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Left Tail Lamp Control	B3881 02	B3881 04	-	-
Right Tail Lamp Control	B3882 02	B3882 04	-	-
Left Tail/Stop Lamp Ground	-	1	-	-
Right Tail/Stop Lamp Ground	-	1	-	-
1. Park, License, and/or Tail Lamps Malfunction				

Circuit/System Description

When the headlamp switch is placed in either the park or low beam position, ground is applied from the park lamp signal circuit to the body control module (BCM). The BCM sends this message to the trailer lighting control module. The trailer lighting control module responds by applying battery voltage to the left and right tail lamp control circuits, illuminating the left and right tail lamps.

Conditions for Running the DTC

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

Conditions for Setting the DTC

DTC B3881 02

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

DTC B3881 04

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

DTC B3882 02

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

DTC B3882 04

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

Actions Taken When the DTC Sets

The appropriate tail lamp is inoperative.

Conditions for Clearing the DTC

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

Reference Information

Schematic Reference

Exterior Lights Schematics

Connector End View Reference

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- [Wiring Repairs](#)

Scan Tool Reference

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

Circuit/System Testing

DTC B3881

1. Vehicle OFF, exterior lamps OFF, disconnect the X910 harness connector at the E42L Tail Lamp Assembly - Left.
2. Test for less than 10 Ω between the ground circuit terminal 4 and ground.
 - **If 10 Ω or greater**
 1. Vehicle 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 1 and ground, vehicle in Service Mode.
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. Vehicle OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K68 Trailer Lighting Control Module.
 - **If the test lamp is always ON**
 1. Vehicle OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module, vehicle in Service Mode.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K68 Trailer Lighting Control Module.
 - **If the test lamp turns ON and OFF**
5. Test or replace the E42L Tail Lamp Assembly - Left.

DTC B3882

1. Vehicle OFF, exterior lamps OFF, disconnect the X920 harness connector at the E42R Tail Lamp Assembly - Right.
2. Test for less than 10 Ω between the ground circuit terminal 4 and ground.
 - **If 10 Ω or greater**
 1. Vehicle 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 1 and ground, vehicle in Service Mode.
 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. Vehicle OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K68 Trailer Lighting Control Module.
 - **If the test lamp is always ON**
 1. Vehicle OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module, vehicle in Service Mode.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K68 Trailer Lighting Control Module.
 - **If the test lamp turns ON and OFF**
 5. Test or replace the E42R Tail Lamp Assembly - Right.

Repair Instructions

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

- Refer to [Tail Lamp Control Module Replacement](#)
- Refer to [Rear Combination Lamp Replacement](#)
- Refer to [Control Module References](#) for trailer lighting control module replacement, programming, and setup

DTC B3881 OR B3882: LEFT/RIGHT TAIL LAMP CIRCUIT (MAH/MBC/MAW/MCX)

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptors

DTC B3881 02

Left Tail Lamp Circuit Short to Ground

DTC B3881 04

Left Tail Lamp Circuit Open

DTC B3882 02

Right Tail Lamp Circuit Short to Ground

DTC B3882 04

Right Tail Lamp Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Left Tail Lamp Control	B3881 02	B3881 04	-	-
Right Tail Lamp Control	B3882 02	B3882 04	-	-
Left Tail/Stop Lamp Ground	-	1	-	-
Right Tail/Stop Lamp Ground	-	1	-	-
1. Park, License, and/or Tail Lamps Malfunction				

Circuit/System Description

When the headlamp switch is placed in either the park or low beam position, ground is applied from the park lamp signal circuit to the body control module (BCM). The BCM sends this message to the trailer interface control module. The trailer interface control module responds by applying battery voltage to the left and right tail lamp control circuits, illuminating the left and right tail lamps.

Conditions for Running the DTC

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

Conditions for Setting the DTC

DTC B3881 02

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

DTC B3881 04

The trailer interface control module detects an open in the left tail lamp control circuit.

DTC B3882 02

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

DTC B3882 04

The trailer interface control module detects an open in the right tail lamp control circuit.

Actions Taken When the DTC Sets

The appropriate tail lamp is inoperative.

Conditions for Clearing the DTC

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

Reference Information

Schematic Reference

Exterior Lights Schematics

Connector End View Reference

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- [Wiring Repairs](#)

Scan Tool Reference

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

Circuit/System Testing

DTC B3881

1. Vehicle OFF, exterior lamps OFF, disconnect the X910 harness connector at the E42L Tail Lamp Assembly - Left.
2. Test for less than 10 Ω between the ground circuit terminal 4 and ground.
 - **If 10 Ω or greater**
 1. Vehicle 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 1 and ground, vehicle in Service Mode.
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. Vehicle OFF, disconnect the X1 harness connector at the K101 Trailer Interface 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 K101 Trailer Interface Control Module.
 - **If the test lamp is always ON**
 1. Vehicle OFF, disconnect the X1 harness connector at the K101 Trailer Interface Control Module, vehicle in Service Mode.
 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 K101 Trailer Interface Control Module.
 - **If the test lamp turns ON and OFF**
5. Test or replace the E42L Tail Lamp Assembly - Left.

DTC B3882

1. Vehicle OFF, exterior lamps OFF, disconnect the X920 harness connector at the E42R Tail Lamp Assembly - Right.
2. Test for less than 10 Ω between the ground circuit terminal 4 and ground.
 - **If 10 Ω or greater**
 1. Vehicle 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 1 and ground, vehicle in Service Mode.
 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. Vehicle OFF, disconnect the X1 harness connector at the K101 Trailer Interface 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 K101 Trailer Interface Control Module.
 - **If the test lamp is always ON**
 1. Vehicle OFF, disconnect the X1 harness connector at the K101 Trailer Interface Control Module, vehicle in Service Mode.
 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 K101 Trailer Interface Control Module.
 - **If the test lamp turns ON and OFF**
 5. Test or replace the E42R Tail Lamp Assembly - Right.

Repair Instructions

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

- Refer to [Tail Lamp Control Module Replacement](#)
- Refer to [Rear Combination Lamp Replacement](#)
- Refer to [Control Module References](#) for trailer interface control module replacement, programming, and setup

DTC B3883: LICENSE PLATE LAMP CIRCUIT

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide 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
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Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
License Plate Lamp Control	B3883 02	B3883 01, B3883 04	B3883 01	-
License Plate Lamp - Right Ground	-	1	-	-
License Plate Lamp - Left Ground	-	1	-	-
1. Park, License, and/or Tail Lamps Malfunction				

Circuit/System Description

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

Conditions for Running the DTC

DTC B3883 01

Turn signal/multifunction switch in OFF position.

DTC B3883 02 and B3883 04

Turn signal/multifunction switch in AUTO, PARK or ON positions.

Conditions for Setting the DTC

DTC B3883 01

The BCM detects a short to voltage in the license plate lamp control circuit.

DTC B3883 02

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

DTC B3883 04

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

Actions Taken When the DTC Sets

DTC B3883 01

License plate lamps always ON.

DTC B3883 02 and B3883 04

License plate 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 vehicle ON/OFF switch cycles have occurred.

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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. Vehicle OFF, exterior lamps OFF, remove both E7 License Plate Lamp bulbs.
2. Test for less than 5 Ω between each ground circuit terminal 2 and ground.
 - **If 5 Ω or greater**
 1. Vehicle 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 1 and ground, vehicle in Service Mode.
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. Vehicle 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. Vehicle OFF, disconnect the X4 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 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. Vehicle OFF.
6. Connect a test lamp between the E7R License Plate Lamp - Right control circuit terminal 1 and ground, vehicle in Service Mode.
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. Vehicle 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 bulb.

Repair Instructions

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

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

DTC B3884: CENTER HIGH MOUNTED STOP LAMP CIRCUIT

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptors

DTC B3884 01

Center High Mounted Stop Lamp Circuit Short to Battery

DTC B3884 02

Center High Mounted Stop Lamp Circuit Short to Ground

DTC B3884 04

Center High Mounted Stop Lamp Circuit Open

Diagnostic Fault Information

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

Circuit/System Description

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

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 center high mounted stop lamp control circuit.

DTC B3884 02

The BCM detects a short to ground in the center high mounted stop lamp control circuit.

DTC B3884 04

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

Actions Taken When the DTC Sets

DTC B3884 01

Center high mounted stop lamp always ON.

DTC B3884 02 and B3884 04

Center high mounted stop lamp 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 vehicle ON/OFF switch cycles have occurred.

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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. Vehicle OFF, exterior lamps OFF, disconnect the harness connector at the E6 Center High Mounted Stop Lamp.
2. Test for less than 5 Ω between the ground circuit terminal 2 and ground.
 - **If 5 Ω or greater**
 1. Vehicle 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 1 and ground, vehicle in Service Mode.
 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. Vehicle 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. Vehicle OFF, disconnect the X4 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
 5. Test or replace the E6 Center High Mounted Stop Lamp.

Repair Instructions

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

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

DTC B388B OR B388C: AUXILIARY LEFT/RIGHT TAIL AND STOP LAMP CIRCUIT (MBM)

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptors

DTC B388B 02

Auxiliary Left Tail and Stop Lamp Circuit Short to Ground

DTC B388B 04

Auxiliary Left Tail and Stop Lamp Circuit Open

DTC B388C 02

Auxiliary Right Tail and Stop Lamp Circuit Short to Ground

DTC B388C 04

Auxiliary Right Tail and Stop Lamp Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Auxiliary Left Tail/Stop Lamp Control	B388B 02	B388B 04	-	-
Auxiliary Right Tail/Stop Lamp Control	B388C 02	B388C 04	-	-
Auxiliary Left Tail/Stop Lamp Ground	-	1	-	-
Auxiliary Right Tail/Stop Lamp Ground	-	1	-	-
1. Stop Lamps Malfunction				

Circuit/System Description

The brake pedal position sensor provides an analog voltage signal to the BCM. The BCM sends this message to the trailer lighting control module. The trailer lighting control module responds by applying battery voltage to the left and right stop lamp control circuits, illuminating the left and right stop lamps. When the liftgate is in the CLOSED position, the trailer lighting control module will illuminate the left and right stop lamps. When the liftgate is in the OPEN position, the trailer lighting control module will illuminate the left and right auxiliary stop lamps.

Conditions for Running the DTC

- Battery voltage must be between 9 - 16 V.
- Brake pedal applied.
- Liftgate OPEN.

Conditions for Setting the DTC

DTC B388B 02

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

DTC B388B 04

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

DTC B388C 02

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

DTC B388C 04

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

Actions Taken When the DTC Sets

The appropriate auxiliary tail/stop lamp is inoperative.

Conditions for Clearing the DTC

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

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- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

DTC B388B

1. Vehicle OFF, exterior lamps OFF, disconnect the X410 harness connector at the E51L Tail Lamp Assembly - Auxiliary Left.
2. Test for less than 10 Ω between the ground circuit terminal 5 and ground.
 - **If 10 Ω or greater**
 1. Vehicle 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, vehicle in Service Mode.
4. Verify the test lamp turns ON and OFF while pressing and releasing the brake pedal, liftgate OPEN.
 - **If the test lamp is always OFF**
 1. Vehicle OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K68 Trailer Lighting Control Module.
 - **If the test lamp is always ON**
 1. Vehicle OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module, vehicle in Service Mode.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K68 Trailer Lighting Control Module.
 - **If the test lamp turns ON and OFF**
5. Test or replace the E5LC Tail/Stop Lamp - Auxiliary Left.

DTC B388C

1. Vehicle OFF, exterior lamps OFF, disconnect the X420 harness connector at the E51R Tail Lamp Assembly - Auxiliary Right.

2. Test for less than 10 Ω between the ground circuit terminal 5 and ground.

- **If 10 Ω or greater**

1. Vehicle 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, vehicle in Service Mode.

4. Verify the test lamp turns ON and OFF while pressing and releasing the brake pedal, liftgate OPEN.

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

1. Vehicle OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module.

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

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

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

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K68 Trailer Lighting Control Module.

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

1. Vehicle OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module, vehicle in Service Mode.

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

- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, replace the K68 Trailer Lighting Control Module.

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

5. Test or replace the E5RC Tail/Stop Lamp - Auxiliary Right.

Repair Instructions

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

- Refer to [Tail Lamp Control Module Replacement](#)
- Refer to [Stop and Turn Signal Lamp Bulb Replacement \(Europe, Korea with Rear Fog\) Stop and Turn Signal Lamp Bulb Replacement \(Europe, Korea, North America with Back-up Bulb\)](#)
- Refer to [Control Module References](#) for trailer lighting control module replacement, programming, and setup

DTC B388B OR B388C: AUXILIARY LEFT/RIGHT TAIL AND STOP LAMP CIRCUIT (MAH/MBC/MAW/MCX)

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptors

DTC B388B 02

Auxiliary Left Tail and Stop Lamp Circuit Short to Ground

DTC B388B 04

DTC B388C 02

Auxiliary Right Tail and Stop Lamp Circuit Short to Ground

DTC B388C 04

Auxiliary Right Tail and Stop Lamp Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Auxiliary Left Tail/Stop Lamp Control	B388B 02	B388B 04	-	-
Auxiliary Right Tail/Stop Lamp Control	B388C 02	B388C 04	-	-
Auxiliary Left Tail/Stop Lamp Ground	-	1	-	-
Auxiliary Right Tail/Stop Lamp Ground	-	1	-	-
1. Stop Lamps Malfunction				

Circuit/System Description

The brake pedal position sensor provides an analog voltage signal to the BCM. The BCM sends this message to the trailer interface control module. The trailer interface control module responds by applying battery voltage to the left and right stop lamp control circuits, illuminating the left and right stop lamps. When the liftgate is in the CLOSED position, the trailer interface control module will illuminate the left and right stop lamps. When the liftgate is in the OPEN position, the trailer interface control module will illuminate the left and right auxiliary stop lamps.

Conditions for Running the DTC

- Battery voltage must be between 9 - 16 V.
- Brake pedal applied.
- Liftgate OPEN.

Conditions for Setting the DTC**DTC B388B 02**

The trailer interface control module detects a short to ground in the left auxiliary tail/stop lamp control circuit.

DTC B388B 04

The trailer interface control module detects an open in the left auxiliary tail/stop lamp control circuit.

DTC B388C 02

The trailer interface control module detects a short to ground in the right auxiliary tail/stop lamp control circuit.

DTC B388C 04

The trailer interface control module detects an open in the right auxiliary tail/stop lamp control circuit.

Actions Taken When the DTC Sets

The appropriate auxiliary tail/stop lamp is inoperative.

Conditions for Clearing the DTC

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

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- [Wiring Repairs](#)

Scan Tool Reference

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

Circuit/System Testing

DTC B388B

1. Vehicle OFF, exterior lamps OFF, disconnect the X410 harness connector at the E51L Tail Lamp Assembly - Auxiliary Left.
2. Test for less than 10 Ω between the ground circuit terminal 5 and ground.
 - **If 10 Ω or greater**
 1. Vehicle 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, vehicle in Service Mode.
4. Verify the test lamp turns ON and OFF while pressing and releasing the brake pedal, liftgate OPEN.
 - **If the test lamp is always OFF**
 1. Vehicle OFF, disconnect the X1 harness connector at the K101 Trailer Interface 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 K101 Trailer Interface Control Module.
 - **If the test lamp is always ON**

1. Vehicle OFF, disconnect the X1 harness connector at the K101 Trailer Interface Control Module, vehicle in Service Mode.
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 K101 Trailer Interface Control Module.
- **If the test lamp turns ON and OFF**
5. Test or replace the E5LC Tail/Stop Lamp - Auxiliary Left.

DTC B388C

1. Vehicle OFF, exterior lamps OFF, disconnect the X420 harness connector at the E51R Tail Lamp Assembly - Auxiliary Right.
2. Test for less than 10 Ω between the ground circuit terminal 5 and ground.
 - **If 10 Ω or greater**
 1. Vehicle 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, vehicle in Service Mode.
4. Verify the test lamp turns ON and OFF while pressing and releasing the brake pedal, liftgate OPEN.
 - **If the test lamp is always OFF**
 1. Vehicle OFF, disconnect the X1 harness connector at the K101 Trailer Interface 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 K101 Trailer Interface Control Module.
 - **If the test lamp is always ON**
 1. Vehicle OFF, disconnect the X1 harness connector at the K101 Trailer Interface Control Module, vehicle in Service Mode.
 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 K101 Trailer Interface Control Module.
 - **If the test lamp turns ON and OFF**
5. Test or replace the E5RC Tail/Stop Lamp - Auxiliary Right.

Repair Instructions

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

- Refer to [Tail Lamp Control Module Replacement](#)
- Refer to [Stop and Turn Signal Lamp Bulb Replacement \(Europe, Korea with Rear Fog\) Stop and Turn Signal Lamp Bulb Replacement \(Europe, Korea, North America with Back-up Bulb\)](#)
- Refer to [Control Module References](#) for trailer interface control module replacement, programming, and setup

DTC B3890 OR B3891: TRAILER BACKUP/FOG LAMPS CIRCUIT SHORT TO GROUND (MBM)

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptors

DTC B3890 02

Trailer Backup Lamps Circuit Short to Ground

DTC B3891 02

Trailer Fog Lamps Circuit Short to Ground

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Left Stop Lamp Control	B3890 02	B3890 04	1	-
Right Stop Lamp Control	B3891 02	B3891 04	1	-
Tail Lamp Assembly - Left Ground	-	1	-	-
Tail Lamp Assembly - Right Ground	-	1	-	-
1. Stop Lamps Malfunction				

Circuit/System Description

The brake pedal position sensor provides an analog voltage signal to the BCM. The BCM sends this message to the trailer lighting control module. The trailer lighting control module responds by applying battery voltage to the left and right stop lamp control circuits, illuminating the left and right stop lamps. When the liftgate is in the CLOSED position, the trailer lighting control module will illuminate the left and right stop lamps. When the liftgate is in the OPEN position, the trailer lighting control module will illuminate the left and right auxiliary stop lamps.

Conditions for Running the DTC

- Battery voltage must be between 9 - 16 V.
- Brake pedal applied.
- Liftgate CLOSED.

Conditions for Setting the DTC

DTC B3890 02

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

DTC B3890 04

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

DTC B3891 02

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

DTC B3891 04

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

Actions Taken When the DTC Sets

The appropriate tail/stop lamp is inoperative.

Conditions for Clearing the DTC

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

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- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

DTC B3890

1. Vehicle OFF, exterior lamps OFF, disconnect the X910 harness connector at the E42L Tail Lamp Assembly - Left.
2. Test for less than 10 Ω between the ground circuit terminal 4 and ground.
 - **If 10 Ω or greater**
 1. Vehicle 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 3 and ground, vehicle in Service Mode.
4. Verify the test lamp turns ON and OFF while pressing and releasing the brake pedal, liftgate CLOSED.
 - **If the test lamp is always OFF**
 1. Vehicle OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K68 Trailer Lighting Control Module.
 - **If the test lamp is always ON**

1. Vehicle OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module, vehicle in Service Mode.
2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K68 Trailer Lighting Control Module.
- **If the test lamp turns ON and OFF**
5. Test or replace the E42L Tail Lamp Assembly - Left.

DTC B3891

1. Vehicle OFF, exterior lamps OFF, disconnect the X920 harness connector at the E42R Tail Lamp Assembly - Right.
2. Test for less than 10 Ω between the ground circuit terminal 4 and ground.
 - **If 10 Ω or greater**
 1. Vehicle 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 3 and ground, vehicle in Service Mode.
4. Verify the test lamp turns ON and OFF while pressing and releasing the brake pedal, liftgate CLOSED.
 - **If the test lamp is always OFF**
 1. Vehicle OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K68 Trailer Lighting Control Module.
 - **If the test lamp is always ON**
 1. Vehicle OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module, vehicle in Service Mode.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K68 Trailer Lighting Control Module.
 - **If the test lamp turns ON and OFF**
5. Test or replace the E42R Tail Lamp Assembly - Right.

Repair Instructions

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

- Refer to [Tail Lamp Control Module Replacement](#)
- Refer to [Rear Combination Lamp Replacement](#)
- Refer to [Control Module References](#) for trailer lighting control module replacement, programming, and setup

DTC B3890 OR B3891: TRAILER BACKUP/FOG LAMPS CIRCUIT SHORT TO GROUND (MAH/MBC/MAW/MCX)

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptors

DTC B3890 02

Trailer Backup Lamps Circuit Short to Ground

DTC B3891 02

Trailer Fog Lamps Circuit Short to Ground

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Left Stop Lamp Control	B3890 02	B3890 04	1	-
Right Stop Lamp Control	B3891 02	B3891 04	1	-
Tail Lamp Assembly - Left Ground	-	1	-	-
Tail Lamp Assembly - Right Ground	-	1	-	-
1. Stop Lamps Malfunction				

Circuit/System Description

The brake pedal position sensor provides an analog voltage signal to the BCM. The BCM sends this message to the trailer interface control module. The trailer interface control module responds by applying battery voltage to the left and right stop lamp control circuits, illuminating the left and right stop lamps. When the liftgate is in the CLOSED position, the trailer interface control module will illuminate the left and right stop lamps. When the liftgate is in the OPEN position, the trailer interface control module will illuminate the left and right auxiliary stop lamps.

Conditions for Running the DTC

- Battery voltage must be between 9 - 16 V.
- Brake pedal applied.
- Liftgate CLOSED.

Conditions for Setting the DTC

DTC B3890 02

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

DTC B3890 04

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

DTC B3891 02

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

DTC B3891 04

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

Actions Taken When the DTC Sets

The appropriate tail/stop lamp is inoperative.

Conditions for Clearing the DTC

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

Reference Information

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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 B3890

1. Vehicle OFF, exterior lamps OFF, disconnect the X910 harness connector at the E42L Tail Lamp Assembly - Left.
2. Test for less than 10 Ω between the ground circuit terminal 4 and ground.
 - **If 10 Ω or greater**
 1. Vehicle 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 3 and ground, vehicle in Service Mode.
4. Verify the test lamp turns ON and OFF while pressing and releasing the brake pedal, liftgate CLOSED.
 - **If the test lamp is always OFF**
 1. Vehicle OFF, disconnect the X1 harness connector at the K101 Trailer Interface 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 K101 Trailer Interface Control Module.
 - **If the test lamp is always ON**

1. Vehicle OFF, disconnect the X1 harness connector at the K101 Trailer Interface Control Module, vehicle in Service Mode.
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 K101 Trailer Interface Control Module.
- **If the test lamp turns ON and OFF**
5. Test or replace the E42L Tail Lamp Assembly - Left.

DTC B3891

1. Vehicle OFF, exterior lamps OFF, disconnect the X920 harness connector at the E42R Tail Lamp Assembly - Right.
2. Test for less than 10 Ω between the ground circuit terminal 4 and ground.
 - **If 10 Ω or greater**
 1. Vehicle 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 3 and ground, vehicle in Service Mode.
4. Verify the test lamp turns ON and OFF while pressing and releasing the brake pedal, liftgate CLOSED.
 - **If the test lamp is always OFF**
 1. Vehicle OFF, disconnect the X1 harness connector at the K101 Trailer Interface 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 K101 Trailer Interface Control Module.
 - **If the test lamp is always ON**
 1. Vehicle OFF, disconnect the X1 harness connector at the K101 Trailer Interface Control Module, vehicle in Service Mode.
 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 K101 Trailer Interface Control Module.
 - **If the test lamp turns ON and OFF**
5. Test or replace the E42R Tail Lamp Assembly - Right.

Repair Instructions

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

- Refer to [Tail Lamp Control Module Replacement](#)
- Refer to [Rear Combination Lamp Replacement](#)
- Refer to [Control Module References](#) for trailer interface control module replacement, programming, and setup

DTC B3948 OR B3949: LEFT/RIGHT FRONT TURN SIGNAL CIRCUIT

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide 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
F7DA (BCM 3) Fuse B+	B3949 01, B3949 04	B3949 01, B3949 04	-	-
F43DA (BCM 7) Fuse B+	B3948 01, B3948 04, B3951 01, B3951 04	B3948 01, B3948 04, B3951 01, B3951 04	-	-
Turn Signal Control - Left Front	B3948 01, B3948 02	B3948 01, B3948 04	B3948 01	-
Turn Signal Control - Right Front	B3949 01, B3949 02	B3949 01, B3949 04	B3949 01	-
Outside Rearview Mirror - Driver Ground	-	1	-	-
Outside Rearview Mirror - Passenger Ground	-	1	-	-
Turn Signal Lamp - Left Front Ground	-	1	-	-
Turn Signal Lamp - Right Front 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 vehicle ON/OFF switch in the SERVICE MODE or ON positions. When the turn signal/multifunction switch is placed in either the turn right or turn left position, ground is applied to the body control module (BCM) through either the right turn or left turn signal switch signal circuit. The BCM responds to the turn signal switch input by applying a pulsating voltage to the front and rear turn signal lamps through their respective control circuits. When a turn signal request is received by the

BCM, a serial data message is sent to the instrument panel requesting the respective turn signal indicator be pulsed ON and OFF.

Conditions for Running the DTC

Battery voltage must be between 9-16 V.

Conditions for Setting the DTC

DTC B3948 01

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

DTC B3948 01 and B3948 04

- The BCM detects a short to ground or an open/high resistance in the F43DA (BCM 7) fuse B+ circuit.
- The BCM detects an open/high resistance in the left front turn signal control circuit.

DTC B3948 02

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

DTC B3949 01

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

DTC B3949 01 and B3949 04

- The BCM detects a short to ground or an open/high resistance in the F7DA (BCM 3) fuse B+ circuit.
- The BCM detects an open/high resistance in the right front turn signal control circuit.

DTC B3949 02

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

Actions Taken When the DTC Sets

DTC B3948

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

DTC B3949

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

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 vehicle ON/OFF switch cycles have occurred.

Reference Information

Schematic Reference

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

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- [Wiring Repairs](#)

Scan Tool Reference

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

Circuit/System Testing

DTC B3948

1. Vehicle OFF, disconnect the X5 harness connector at the K9 Body Control Module, vehicle in Service Mode.
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. Vehicle OFF.
 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. Vehicle OFF.
 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. Vehicle OFF, connect the X5 harness connector at the K9 Body Control Module.
4. Exterior lamps OFF, disconnect the harness connector at the appropriate left front turn signal listed below.
 - E4LF Turn Signal Lamp - Left Front
 - A9A Outside Rearview Mirror - Driver
5. Test for less than 10 Ω between the appropriate ground circuit terminal listed below and ground.
 - E4LF Turn Signal Lamp - Left Front terminal 2
 - A9A Outside Rearview Mirror - Driver terminal 5
 - **If 10 Ω or greater**
 1. Vehicle 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 appropriate control circuit terminal listed below and ground, vehicle in Service Mode.
 - E4LF Turn Signal Lamp - Left Front terminal 1

- A9A Outside Rearview Mirror - Driver terminal 6

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

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

8. Test or replace the appropriate left front turn signal lamp.

DTC B3949

1. Vehicle OFF, disconnect the X1 harness connector at the K9 Body Control Module, vehicle in Service Mode.

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. Vehicle OFF.
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. Vehicle OFF.
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. Vehicle OFF, connect the X1 harness connector at the K9 Body Control Module.

4. Exterior lamps OFF, disconnect the harness connector at the appropriate right front turn signal listed below.

- E4RF Turn Signal Lamp - Right Front
- A9B Outside Rearview Mirror - Passenger

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

- E4RF Turn Signal Lamp - Right Front terminal 2
- A9B Outside Rearview Mirror - Passenger terminal 5

- **If 10 Ω or greater**

1. Vehicle 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 appropriate control circuit terminal listed below and ground, vehicle in Service Mode.
 - E4RF Turn Signal Lamp - Right Front terminal 1
 - A9B Outside Rearview Mirror - Passenger terminal 6
7. 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. Vehicle 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. Vehicle OFF, disconnect the X4 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 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 E4RF Turn Signal Lamp - Right Front.

Repair Instructions

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

- Refer to [Front Turn Signal Lamp Bulb Replacement](#)
- Refer to [Outside Rearview Mirror Turn Signal Lamp Replacement](#)
- Refer to [Control Module References](#) for BCM replacement, programming and setup

DTC B3950 OR B3951: LEFT/RIGHT REAR TURN SIGNAL CIRCUIT

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide 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

DTC B3951 04

Right Rear Turn Signal Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
F6DA (BCM 4) Fuse B+	B3950 01, B3950 04	B3950 01, B3950 04	-	-
F43DA (BCM 7) Fuse B+	B3948 01, B3948 04, B3951 01, B3951 04	B3948 01, B3948 04, B3951 01, B3951 04	-	-
Turn Signal - Left Rear Control	B3950 01, B3950 02	B3950 01, B3950 04	B3950 01	-
Turn Signal - Right Rear Control	B3951 01, B3951 02	B3951 01, B3951 04	B3951 01	-
Turn Signal Lamp - Left Rear Ground	-	1	-	-
Turn Signal Lamp - Right Rear 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 vehicle ON/OFF switch in the SERVICE MODE or ON positions. When the turn signal/multifunction switch is placed in either the turn right or turn left position, ground is applied to the body control module (BCM) through either the right turn or left turn signal switch signal circuit. The BCM responds to the turn signal switch input by applying a pulsating voltage to the front and rear turn signal lamps through their respective control circuits. When a turn signal request is received by the BCM, a serial data message is sent to the instrument panel requesting the respective turn signal indicator be pulsed ON and OFF.

Conditions for Running the DTC

Battery voltage must be between 9-16 V.

Conditions for Setting the DTC**DTC B3950 01**

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

DTC B3950 01 and B3950 04

- The BCM detects a short to ground or an open/high resistance in the F6DA (BCM 4) fuse B+ circuit.
- The BCM detects an open/high resistance in the left rear turn signal control circuit.

DTC B3950 02

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

DTC B3951 01

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

DTC B3951 01 and B3951 04

- The BCM detects a short to ground or an open/high resistance in the F43DA (BCM 7) fuse B+ circuit.
- The BCM detects an open/high resistance in the right rear turn signal control circuit.

DTC B3951 02

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

Actions Taken When the DTC Sets

DTC B3950

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

DTC B3951

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

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 vehicle ON/OFF switch 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

DTC B3950

1. Vehicle OFF, disconnect the X1 harness connector at the K9 Body Control Module, vehicle in Service Mode.
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. Vehicle OFF.
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. Vehicle OFF.
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. Vehicle OFF, connect the X1 harness connector at the K9 Body Control Module.
4. Vehicle OFF, exterior lamps OFF, disconnect the harness connector at the E4LR Turn Signal Lamp - Left Rear.
5. Test for less than 10 Ω between the ground circuit at the socket terminal and ground.
 - **If 10 Ω or greater**
 - 1. Vehicle 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 at the socket terminal and ground, vehicle in Service Mode.
7. Verify the test lamp turns ON and OFF when commanding the Left Rear Turn Signal Lamp ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 - 1. Vehicle 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. Vehicle OFF, disconnect the X5 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 - 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 E4LR Turn Signal Lamp - Left Rear.

DTC B3951

1. Vehicle OFF, disconnect the X5 harness connector at the K9 Body Control Module, vehicle in Service Mode.
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. Vehicle OFF.
 - 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. Vehicle OFF.

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. Vehicle OFF, connect the X5 harness connector at the K9 Body Control Module.

4. Vehicle OFF, exterior lamps OFF, disconnect the harness connector at the E4RR Turn Signal Lamp - Right Rear.

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

- **If 10 Ω or greater**

1. Vehicle 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 at the socket terminal and ground, vehicle in Service Mode.

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

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

1. Vehicle 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. Vehicle OFF, disconnect the X4 harness connector at the K9 Body Control Module, vehicle in Service Mode.

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 E4RR Turn Signal Lamp - Right Rear.

Repair Instructions

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

- Refer to [Stop and Turn Signal Lamp Bulb Replacement \(Europe, Korea with Rear Fog\) Stop and Turn Signal Lamp Bulb Replacement \(Europe, Korea, North America with Back-up Bulb\)](#)
- Refer to [Rear Fascia Lower Signal Lamp Replacement](#)
- Refer to [Control Module References](#) for BCM replacement, programming and setup

DTC C0277 OR C0890: BRAKE PEDAL POSITION SENSOR CIRCUIT/CONTROL MODULE VOLTAGE REFERENCE OUTPUT 3 CIRCUIT

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptors

DTC C0277 06

Brake Pedal Position Sensor Circuit Low Voltage/Open

DTC C0277 07

Brake Pedal Position Sensor Circuit High Voltage

DTC C0277 09

Brake Pedal Position Sensor Circuit Too Fast Transitions

DTC C0277 4B

Brake Pedal Position Sensor Circuit Calibration Not Learned

DTC C0890 03

Control Module Voltage Reference Output 3 Circuit Low Voltage

DTC C0890 07

Control Module Voltage Reference Output 3 Circuit High Voltage

Diagnostic Fault Information

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

Circuit/System Description

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

Conditions for Running the DTC

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

Conditions for Setting the DTC

DTC C0277 06

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

DTC C0277 07

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

DTC C0277 09

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

DTC C0277 4B

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

DTC C0890 03

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

DTC C0890 07

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

Actions Taken When the DTC Sets

DTC C0277 06 or C0890 03

- The vehicle will not start with a short to ground or an open/high resistance on the BPPS 5 V reference circuit or the BPPS signal circuit.

DTC C0277 07 or C0890 07

The vehicle will not start with a short to voltage on the BPPS 5 V reference circuit or the BPPS signal circuit.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- For DTC C0277 4B a successful brake pedal position sensor calibration has been performed.
- A history DTC will clear once 50 consecutive malfunction-free vehicle ON/OFF switch cycles have occurred.
- A DTC will not clear the current status until the next ignition cycle.

Reference Information

Schematic Reference

Exterior Lights Schematics

Connector End View Reference

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- [Connector Repairs](#)
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- [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. Vehicle OFF, disconnect the harness connector at the B22 Brake Pedal Position Sensor, vehicle in Service Mode.
2. Test for B+ between the low reference circuit terminal 2 and B+.
 - **If less than B+**
 1. Vehicle 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 B+**
3. Test for 4.8 - 5.2 V between the 5 V reference circuit terminal 1 and ground.
 - **If less than 4.8 V**
 1. Vehicle 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. Vehicle OFF, disconnect the X2 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 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**
4. Verify the scan tool Brake Pedal Applied parameter is Inactive.
 - **If not Inactive**
 1. Vehicle OFF, disconnect the X2 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 2. Test for less than 1 V between the signal circuit terminal 3 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **If Inactive**
5. Install a 3 A fused jumper wire between the 5-volt reference circuit terminal 1 and the signal circuit terminal 3.
6. Verify the scan tool Brake Pedal Applied parameter is Active.
 - **If not Active**
 1. Vehicle 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**
7. 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. Vehicle in Service Mode.
 2. Perform the BPP sensor recalibration 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 B22 Brake Pedal Position Sensor.
 - If the DTC does not reset
 4. All OK.
 - **If DTC C0277 4B is not set**
2. All OK.

DTC C0277 09

1. Verify DTC C0277 09 is not set.
 - **If DTC C0277 09 is set**
 1. Replace the B22 Brake Pedal Position Sensor.
 2. Perform the BPP sensor recalibration 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.

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

DTC C0297: BRAKE APPLIED OUTPUT 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.
- Refer to [**Diagnostic Procedure Instructions**](#) to provide an overview of each diagnostic category.

DTC Descriptor

DTC C0297 02

Brake Applied Output Circuit Short to Ground

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Brake Applied Signal	C0297 02	1	1	-
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 control circuit.

Conditions for Running the DTC

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

Conditions for Setting the DTC

The BCM detects a short to ground or an open/high resistance on 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 vehicle ON/OFF switch cycles have occurred.

Diagnostic Aids

Verify that the brake pedal position sensor is properly calibrated.

Reference Information

Schematic Reference

Cruise Control 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 Testing

1. Vehicle OFF, disconnect the X1 harness connector at the K20 Engine Control Module.
2. Connect a test lamp between the signal circuit terminal 20 and ground, ignition ON.
3. Verify the test lamp turns ON and OFF while pressing and releasing the brake pedal.
 - **If the test lamp is always OFF**
 1. Vehicle OFF, disconnect the X5 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 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. Vehicle OFF, disconnect the X5 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 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.

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

SYMPTOMS - LIGHTING

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

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

Visual/Physical Inspection

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

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](#)
- [Courtesy Lamps Malfunction](#)
- [Daytime Running Lamps Malfunction](#)
- [Dome Lamps Malfunction](#)
- [Rear Fog Lamps Malfunction](#)
- [Hazard Lamps Malfunction](#)
- [Headlamps Malfunction](#)
- [Headlamp Leveling Malfunction](#)
- [Interior Backlighting Malfunction](#)
- [Park, License, and/or Tail Lamps Malfunction \(MBM\)](#)[Park, License, and/or Tail Lamps Malfunction \(MAH/MBC/MAW/MCX\)](#)
- [Rear Compartment Lamp Malfunction](#)
- [Stop Lamps Malfunction \(MBM\)](#)[Stop Lamps Malfunction \(MAH/MBC/MAW/MCX\)](#)
- [Turn Signal Lamps and/or Indicators Malfunction](#)

BACKUP LAMPS MALFUNCTION

Diagnostic Instructions

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

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
F17DA (BCM 6) Fuse B+	1	1	-	-
Backup Lamp Control	B2545 02	1	1	-
Backup Lamp Ground	-	1	-	-
1. Backup Lamps Malfunction				

Circuit/System Description

With the vehicle 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 lamp control circuit illuminating the backup lamp. Once the driver moves the gear selector out of the reverse position, a message is sent by the TCM via serial data requesting the BCM to remove battery voltage from the backup lamp control circuit. The vehicle must be ON for the backup lamps to operate.

Reference Information

Schematic Reference

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

Connector End View Reference

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. Vehicle OFF, disconnect the X5 harness connector at the K9 Body Control Module, vehicle in Service Mode.
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. Vehicle OFF.
 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. Vehicle OFF.
 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. Vehicle OFF, connect the X5 harness connector at the K9 Body Control Module.
4. Vehicle OFF, exterior lamps OFF, disconnect the harness connector at the E5 Backup Lamp.
5. Test for less than 5 Ω between the ground circuit at the socket terminal and ground.
 - **If 5 Ω or greater**
 1. Vehicle 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 at the socket terminal and ground, vehicle in Service Mode.
7. Verify the test lamp turns ON and OFF when commanding the Backup Lamps ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Vehicle 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. Vehicle OFF, disconnect the X7 harness connector at the K9 Body Control Module, vehicle in Service Mode.
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 E5 Backup Lamp.

Repair Instructions

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

- Refer to [Stop and Turn Signal Lamp Bulb Replacement \(Europe, Korea with Rear Fog\) Stop and Turn Signal Lamp Bulb Replacement \(Europe, Korea, North America with Back-up Bulb\)](#)
- Refer to [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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
F17DA (BCM 6) Fuse B+	1	1	-	-
Courtesy Lamps Control - Terminal 2 X7	B1480 02	1	1	-
Dome/Reading Lamps - Overhead Console Ground	-	1	-	-
Dome/Reading Lamps - Rear Ground	-	1	-	-
1. Courtesy Lamps Malfunction				

Circuit/System Description

The body control module (BCM) supplies battery voltage to the front and rear reading lamps via the courtesy lamp control circuit. The front and rear reading lamps are controlled by individual switches that are activated by the operator when additional cabin lighting is required. In the event that any of these courtesy lamps were to remain illuminated for more than 10 min with the vehicle ON/OFF switch in the OFF position and no doors opened, the BCM will deactivate the courtesy lamp control circuit to prevent total battery discharge.

Diagnostic Aids

The Inadvertent Load scan tool command operates when the front and rear dome lamp switches are in the ON position.

Reference Information

Schematic Reference

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

Connector End View Reference

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. Vehicle OFF, disconnect the X5 harness connector at the K9 Body Control Module, vehicle in Service Mode.
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. 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. 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. Vehicle OFF, connect the X5 harness connector at the K9 Body Control Module.
4. Vehicle OFF, scan tool disconnected, all doors closed, all accessories OFF, disconnect the harness connectors at the inoperative component listed below. It may take up to 2 min for all vehicle systems to power down.
 - E37D Dome/Reading Lamps - Overhead Console
 - E37R Dome/Reading Lamps - Rear
5. Test for less than 10 Ω between the appropriate ground circuit terminal listed below and ground.
 - E37D Dome/Reading Lamps - Overhead Console terminal 4
 - E37R Dome/Reading Lamps - Rear terminal 3
 - **If 10 Ω or greater**
 1. Vehicle 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 appropriate control circuit terminal listed below and ground, vehicle in Service Mode.
 - E37D Dome/Reading Lamps - Overhead Console terminal 2
 - E37R Dome/Reading Lamps - Rear terminal 1
7. 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. Vehicle 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. Vehicle OFF, disconnect the X7 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
- **If the test lamp turns ON and OFF**
8. Test or replace the appropriate courtesy lamp.

Repair Instructions

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

- Refer to [Roof Console Replacement](#)
- Refer to [Center Courtesy Lamp Replacement](#)
- Refer to [Rear Seat Position Center Courtesy Lamp Bulb Replacement](#)
- Refer to [Control Module References](#) for BCM replacement, programming, and setup

DAYTIME RUNNING LAMPS MALFUNCTION

Diagnostic Instructions

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

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Daytime Running Lamp Control - Left	B2600 02	1	1	-
Daytime Running Lamp Control - Right	B2605 02	1	1	-
Headlamp Assembly Ground - Left	-	1	-	-
Headlamp Assembly Ground - Right	-	1	-	-
1. Daytime Running Lamps Malfunction				

Circuit/System Description

The ambient light/sunload sensor is used to monitor outside lighting conditions. The ambient light/sunload sensor provides a serial data message to the body control module (BCM) based on outside lighting conditions to determine if outside lighting conditions are correct for either daytime running lamps or automatic lamp control when the headlamp switch is in the AUTO position. In daylight conditions the BCM will command the designated daytime running lamps ON. During low light conditions the BCM will command the low beam headlamps ON. Any function or condition that turns on the headlamps will cancel daytime running lamps operation.

Diagnostic Aids

The daytime running lamps will only operate in daylight conditions with the vehicle ON and in any transmission gear except PARK.

Reference Information

Schematic Reference

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

Connector End View Reference

[COMPONENT CONNECTOR END VIEWS - INDEX](#)

Description and Operation

[Exterior Lights Schematics](#)

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

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

Refer to Daytime Running Lamp Malfunction.
 - **If the right daytime running lamp turns ON and OFF**
4. Refer to [DTC U1340-U135F](#).

Circuit/System Testing

Daytime Running Lamp Malfunction

1. Vehicle OFF, exterior lamps OFF, disconnect the appropriate harness connector listed below.
 - X110 - left daytime running lamp
 - X120 - right daytime running lamp
2. Test for less than 10 Ω between the appropriate ground circuit terminal listed below and ground.
 - Terminal 5 (-TR6)
 - Terminal 7 (TR6)
 - **If 10 Ω or greater**
1. Vehicle 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 3 and ground, vehicle in Service Mode.
4. Verify the test lamp turns ON and OFF when commanding the appropriate Dedicated Daytime Running Lamp ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Vehicle 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. Vehicle OFF, disconnect the X4 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
5. Test or replace the appropriate E13 Headlamp Assembly.

Repair Instructions

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

- Refer to [Headlamp Replacement](#)
- Refer to [Control Module References](#) for BCM 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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Dome Lamps Control - Terminal 1 X7	B2615 02	1	1	-
Dome Lamp Switch Cancel Signal	2	2	2	-
Dome Lamp Switch ON Signal	2	2	2	-
Dome/Reading Lamps Ground - Overhead Console	-	1, 2	-	-
Dome/Reading Lamps Ground - Rear	-	1	-	-
1. Dome Lamps Malfunction 2. Dome Lamp Switch Malfunction				

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 s 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 min with the vehicle ON/OFF switch in the OFF position and no doors opened, the BCM will deactivate the dome lamps control circuit to prevent total battery discharge.

Reference Information

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. Vehicle in Service Mode.
2. Verify the scan tool Door Ajar Sw. parameter changes between Active and Inactive while opening and closing each vehicle door.
 - **If the parameter does not change**
Refer to **Door Ajar Indicator Malfunction**.
 - **If the parameter changes**
3. Verify the scan tool Interior/Courtesy Lighting Master Switch parameter changes between Door, On, and Cancel while placing the dome lamp switch in the Door, On, and Cancel positions.
 - **If the parameter does not change**
Refer to Dome Lamp Switch Malfunction.
 - **If the parameter changes**
4. Verify the dome lamps turn ON and OFF while commanding the Courtesy Lamps ON and OFF with a scan tool.
 - **If the dome lamps do not turn ON and OFF**
Refer to Dome Lamp Malfunction.
 - **If the dome lamps turn ON and OFF**

Circuit/System Testing

Dome Lamp Switch Malfunction

1. Vehicle OFF, scan tool disconnected, all doors closed, all accessories OFF, disconnect the harness connector at the E37D Dome/Reading Lamps - Overhead Console. 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 4 and ground.
 - **If 5 Ω or greater**
 1. Vehicle 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. Vehicle in Service Mode.
4. Verify the scan tool Interior/Courtesy Lighting Master Switch parameter is Door.
 - **If Cancel**
 1. Vehicle OFF, disconnect the X7 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit terminal 6 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. Vehicle 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 6 and the ground circuit terminal 4.
6. Verify the scan tool Interior/Courtesy Lighting Master Switch parameter is Cancel.
 - **If not Cancel**
 1. Vehicle OFF, disconnect the X7 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 2. Test for less than 1 V between the signal circuit terminal 6 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
 3. Test for less than 2 Ω in the signal circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K9 Body Control Module.
 - **If Cancel**
7. Install a 3 A fused jumper wire between the signal circuit terminal 5 and the ground circuit terminal 4.
8. Verify the scan tool Interior/Courtesy Lighting Master Switch parameter is On.
 - **If not On**
 1. Vehicle OFF, disconnect the X7 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 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 E37D Dome/Reading Lamps - Overhead Console.

Dome Lamps Malfunction

1. Vehicle OFF, scan tool disconnected, all doors closed, all accessories OFF, disconnect the harness connector at the inoperative component listed below. It may take up to 2 min for all vehicle systems to power down.
 - E37D Dome/Reading Lamps - Overhead Console
 - E37R Dome/Reading Lamps - Rear
2. Test for less than 10 Ω between the appropriate ground circuit terminal listed below and ground.
 - E37D Dome/Reading Lamps - Overhead Console terminal 4
 - E37R Dome/Reading Lamps - Rear terminal 3
 - **If 10 Ω or greater**
 1. Vehicle OFF.
 2. Test for less than 2 Ω in the ground circuits 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, vehicle in Service Mode.
 - E37D Dome/Reading Lamps - Overhead Console terminal 3
 - E37R Dome/Reading Lamps - Rear terminal 4
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. Vehicle 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. Vehicle OFF, disconnect the X7 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
5. Test or replace the inoperative E37 Dome/Reading Lamp.

Repair Instructions

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

- Refer to [Roof Console Replacement](#)
- Refer to [Center Courtesy Lamp Replacement](#)
- Refer to [Rear Seat Position Center Courtesy Lamp Bulb Replacement](#)

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

REAR FOG LAMPS MALFUNCTION

Diagnostic Instructions

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

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Rear Fog Lamp Switch Signal	B3588 00	2	2	-
Rear Fog Lamps Control	B2540 02	B2540 04	1	-
Rear Fog Lamp Ground	-	1	-	-
Headlamp Switch Ground	-	2	-	-
1. Rear Fog Lamp Malfunction 2. Rear Fog Lamp Switch Malfunction				

Circuit/System Description

The rear fog lamp switch signal circuit is grounded momentarily by pressing the rear fog lamp switch. The body control module (BCM) responds to the rear fog lamp request by applying voltage to the rear fog lamp control circuit which illuminates the rear fog lamp.

Reference Information

Schematic Reference

Fog Lights Schematics

Connector End View Reference

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Electrical Information Reference

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

Scan Tool Reference

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

Circuit/System Verification

1. Vehicle in Service Mode, headlamps ON.
2. Verify the scan tool Rear Fog Lamps Switch parameter changes between Active and Inactive while commanding the rear fog lamp ON and OFF with the rear fog lamp switch.
 - **If the parameter does not change**

Refer to Rear Fog Lamp Switch Malfunction.

- **If the parameter changes**

3. Verify the rear fog lamp turns ON and OFF when commanding the Rear Fog Lamp(s) Relay ON and OFF with a scan tool.

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

Refer to Rear Fog Lamp Malfunction.

- **If the rear fog lamp turns ON and OFF**

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

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

Refer to Rear Fog Lamp Indicator Malfunction.

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

5. All OK.

Circuit/System Testing

Rear Fog Lamp Switch Malfunction

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

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

- **If 15 Ω or greater**

1. Vehicle 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. Vehicle in Service Mode.

4. Verify the scan tool Rear Fog Lamp Switch parameter is Inactive.

- **If not Inactive**

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

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

6. Verify the scan tool Rear Fog Lamp Switch parameter is Active.

- **If not Active**

1. Vehicle OFF, disconnect the X1 harness connector at the K9 Body Control Module, vehicle in Service Mode.

2. Test for less than 1 V between the signal circuit terminal 6 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.

Rear Fog Lamp Malfunction

1. Vehicle OFF, exterior lamps OFF, disconnect the X410 harness connector at the E5EA Tail Lamp - Auxiliary Left.
2. Test for less than 5 Ω between the ground circuit terminal 6 and ground.
 - **If 5 Ω or greater**
 1. Vehicle 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 4 and ground, vehicle in Service Mode.
4. Verify the test lamp turns ON and OFF when commanding the Rear Fog Lamp(s) Relay ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Vehicle 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. Vehicle OFF, disconnect the X5 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 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 E5EA Tail Lamp - Auxiliary Left.

Rear Fog Lamp Indicator Malfunction

1. Vehicle in Service Mode.
2. Verify the rear fog lamp indicator turns ON and OFF when commanding the Instrument Cluster All Indicators Test ON and OFF with a scan tool.
 - **If the rear fog lamp indicator is always OFF or remains ON**

Replace the P16 Instrument Cluster.
 - **If the rear fog lamp indicator turns ON and OFF**
3. Replace the K9 Body Control Module.

Repair Instructions

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

- Refer to [Headlamp Switch Replacement](#)
- Refer to [Stop and Turn Signal Lamp Bulb Replacement \(Europe, Korea with Rear Fog\) Stop and Turn Signal Lamp Bulb Replacement \(Europe, Korea, North America with Back-up Bulb\)](#)
- Refer to [Control Module References](#) for BCM and 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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
F9DA (BCM 1) Fuse B+	B1325 03, U156D 00	B1325 03, U156D 00	-	-
Hazard Warning Switch Signal	B3596 00	1	1	-
Hazard Warning Switch LED Backlighting Control	2	2	2	-
Multifunction Switch 1 - Instrument Panel Ground	-	1	-	-
1. Hazard Lamps Malfunction 2. Hazard Warning Switch Backlighting Malfunction				

Circuit/System Description

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

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](#)

Scan Tool Reference

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

Circuit/System Verification

1. Vehicle in Service Mode.
2. Verify the scan tool Hazard Lamps Switch parameter changes between Active and Inactive while commanding the hazard lamps ON and OFF with the hazard warning switch.
 - **If the parameter does not change**

Refer to Hazard Warning Switch Malfunction.

- **If the parameter changes**

3. Verify all left and right turn signal lamps turn ON and OFF while commanding the hazard lamps ON and OFF with the hazard warning switch.

- **If all turn signal lamps do not turn ON and OFF**

Refer to [Turn Signal Lamps and/or Indicators Malfunction](#)

- **If all turn signal lamps turn ON and OFF**

4. Verify the hazard lamps switch backlighting turns ON and OFF while commanding the hazard lamps ON and OFF with the hazard warning switch.

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

Refer to Hazard Warning Switch Backlighting Malfunction.

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

5. All OK.

Circuit/System Testing

Hazard Warning Switch Malfunction

1. Vehicle OFF, scan tool disconnected, all doors closed, all accessories OFF, disconnect the harness connector at the S48C Multifunction Switch 1 - Instrument Panel. It may take up to 2 min for all vehicle systems to power down.

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

- **If 10 Ω or greater**

1. Vehicle 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. Vehicle in Service Mode.

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

- **If not Inactive**

1. Vehicle OFF, disconnect the X2 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 the ground terminal 10.

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

- **If not Active**

1. Vehicle OFF, disconnect the X2 harness connector at the K9 Body Control Module, vehicle in Service Mode.

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. Test or replace the S48C Multifunction Switch 1 - Instrument Panel.

Hazard Warning Switch Backlighting Malfunction

1. Vehicle OFF, disconnect the X2 harness connector at the K9 Body Control Module, vehicle in Service Mode.
2. Verify a test lamp illuminates between the B+ circuit terminal 1 and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. 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. 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. Vehicle OFF, connect the X2 harness connector at the K9 Body Control Module.
4. Vehicle OFF, scan tool disconnected, all doors closed, all accessories OFF, disconnect the harness connector at the S48C Multifunction Switch 1 - Instrument Panel. It may take up to 2 min for all vehicle systems to power down.
5. Test for less than 10 Ω between the ground circuit terminal 10 and ground.
 - **If 10 Ω or greater**
 1. Vehicle 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. Vehicle in Service Mode, test for B+ between the control circuit terminal 4 and ground.
 - **If less than B+**
 1. Vehicle 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 B+**
7. Verify a test lamp does not illuminate between control circuit terminal 4 and ground.
 - **If the test lamp illuminates**
 1. Vehicle OFF, disconnect the X1 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 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**
8. Test or replace the S48C Multifunction Switch 1 - Instrument Panel.

Repair Instructions

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

- Refer to [Hazard Warning Switch Replacement](#)
- Refer to [Control Module References](#) for BCM replacement, programming, and setup

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Headlamp High Beam Relay Control	2	2	B2580 01	-
Headlamp Low Beam Relay Control	B258A 02	B258A 04	B258A 01	-
High Beam Headlamp Control - Left	2	2	2	-
High Beam Headlamp Control - Right	2	2	2	-
Low Beam Headlamp Control - Left	1	1	1	-
Low Beam Headlamp Control - Right	1	1	1	-
Headlamp Switch Headlamps OFF Signal	B257A 00	4	4	-
Headlamp Switch Headlamps ON Signal	B257A 00	4	4	-
Turn Signal/Multifunction Switch Flash To Pass Signal	B3806 00	3	3	-
Turn Signal/Multifunction Switch High Beam Signal	B3650 08	3	3	-
Turn Signal/Multifunction Switch Auto High Beam Select Signal (TQ5)	5	5	5	-
Headlamp Assembly Ground - Left	-	1, 2	-	-
Headlamp Assembly Ground - Right	-	1, 2	-	-
Headlamp Switch Ground	-	4	-	-
Turn Signal/Multifunction Switch Ground	-	3	-	-
1. Headlamps Malfunction - Low Beam 2. Headlamps Malfunction - High Beam 3. Turn Signal/Multifunction Switch Malfunction 4. Headlamp Switch Malfunction 5. Automatic High Beam Select Switch Malfunction				

Circuit/System Description

For headlamp operation, the body control module (BCM) monitors 3 signal circuits from the headlamp switch. When the headlamp switch is in the AUTO position, the 3 signal circuits are open and the BCM relies on the ambient light sensor input to turn the headlamps and daytime running lamps (DRLs) ON and OFF. When the headlamp switch is placed in the OFF position, the headlamp switch headlamps OFF signal circuit is grounded, indicating to the BCM that the exterior lamps should be turned OFF. With the headlamp switch in the PARK LAMPS position, the headlamp switch park lamps ON signal circuit is grounded, indicating that the park lamps have been requested. When the headlamp switch is in the HEADLAMP position, both the headlamp switch park lamps ON signal circuit and the headlamp switch headlamps ON signal circuit are grounded. The BCM responds by commanding the park lamps and headlamps ON.

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

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.

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

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 Verification

1. Vehicle in Service Mode.
2. Verify the scan tool Headlamps On Switch parameter changes between Active and Inactive while commanding the headlamps ON and OFF with the turn signal/multifunction switch.
 - **If the parameter does not change**

Refer to Headlamp Switch Malfunction.

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- **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 headlamp 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 low beam headlamps turn ON and OFF when commanding the Low Beam Lamps ON and OFF with a scan tool.

- **If the low beam headlamps do not turn ON and OFF**

Refer to Headlamps Malfunction - Low Beam.

- **If the low beam headlamps turn ON and OFF**

7. Low beam headlamps ON, 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**

8. 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**

9. (TQ5 only) Verify the scan tool Auto High Beam Select Switch parameter changes between Active and Inactive while commanding the auto high beams ON and OFF with the turn signal/multifunction switch.

- **If the parameter does not change**

Refer to Automatic High Beam Select Switch Malfunction.

- **If the parameter changes**

10. All OK.

Circuit/System Testing

Headlamp Switch Malfunction

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

2. Test for less than 10 Ω between the ground circuit terminal 8 and ground.

- **If 10 Ω or greater**

1. Vehicle 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. Vehicle in Service Mode.

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

- **If not Inactive**

1. Vehicle 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. Vehicle OFF, disconnect the X1 harness connector at the K9 Body Control Module, vehicle in Service Mode.
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 Headlamps On Switch parameter is Inactive.

- **If not Inactive**

1. Vehicle 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**

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

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

- **If not Active**

1. Vehicle OFF, disconnect the X1 harness connector at the K9 Body Control Module, vehicle in Service Mode.
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**

10. Test or replace the S30 Headlamp Switch.

1. Vehicle OFF, scan tool disconnected, all doors closed, all accessories OFF, disconnect the harness connector at the S78 Turn Signal/Multifunction Switch. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10 Ω between the ground circuit terminal 3 and ground.
 - **If 10 Ω or greater**
 1. Vehicle 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. Vehicle in Service Mode.
4. Verify the scan tool High Beam Select Switch parameter is Inactive.
 - **If not Inactive**
 1. Vehicle 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**
5. Install a 3 A fused jumper wire between the signal circuit terminal 7 and ground.
6. Verify the scan tool High Beam Select Switch parameter is Active.
 - **If not Active**
 1. Vehicle OFF, disconnect the X3 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 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**
7. Verify the scan tool Headlamps Flash Switch parameter is Inactive.
 - **If not Inactive**
 1. Vehicle OFF, disconnect the X3 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit terminal 6 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 6 and ground.
9. Verify the scan tool Headlamps Flash Switch parameter is Active.
 - **If not Active**
 1. Vehicle OFF, disconnect the X3 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 2. Test for less than 1 V between the signal circuit terminal 6 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.

Automatic High Beam Select Switch Malfunction

1. Vehicle OFF, scan tool disconnected, all doors closed, all accessories OFF, disconnect the harness connector at the S78 Turn Signal/Multifunction Switch. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10 Ω between the ground circuit terminal 3 and ground.
 - **If 10 Ω or greater**
 1. Vehicle 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. Vehicle in Service Mode.
4. Verify the scan tool Auto High Beam Select Switch parameter is Inactive.
 - **If not Inactive**
 1. Vehicle OFF, disconnect the X2 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 Auto High Beam Select Switch parameter is Active.
 - **If not Active**
 1. Vehicle OFF, disconnect the X2 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 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**
7. Test or replace the S78 Turn Signal/Multifunction Switch.

Headlamps Malfunction - Low Beam

1. Vehicle OFF, disconnect the KR49 Headlamp Low Beam Relay, vehicle in Service Mode.
2. Verify a test lamp illuminates between the B+ circuit terminal 30 and ground.
 - **If the test lamp does not illuminate**

Replace the X50A Fuse Block - Underhood.
 - **If the test lamp illuminates**
3. Verify a test lamp illuminates between the B+ circuit terminal 85 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 86 and B+, ignition ON.
5. Verify the test lamp turns ON and OFF when commanding the Low Beam Lamps ON and OFF with a scan tool.

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

1. Vehicle OFF, disconnect the X5 harness connector at the K9 Body Control Module, vehicle in Service Mode.
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
3. Vehicle 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. Vehicle OFF, disconnect the X5 harness connector at the K9 Body Control Module.
2. Test for infinite resistance between the control circuit terminal 13 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. Vehicle OFF, exterior lamps OFF, connect the KR49 Headlamp Low Beam Relay.
7. Disconnect the appropriate E4 Headlamp - Low Beam.
8. Test for less than 10 Ω between the ground circuit at the socket terminal and ground.

- **If 10 Ω or greater**

1. Vehicle 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**

9. Connect a test lamp between the control circuit at the socket terminal and ground, vehicle in Service Mode.
10. Verify the test lamp turns ON and OFF when commanding the Low Beam Lamps ON and OFF with a scan tool.

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

1. Vehicle 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. Vehicle 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**

11. Test or replace the E4 Headlamp - Low Beam.

Headlamps Malfunction - High Beam

1. Vehicle OFF, disconnect the X5 harness connector at the K9 Body Control Module, vehicle in Service Mode.
2. Test for B+ between the control circuit terminal 18 and ground.

- **If less than B+**

1. Vehicle 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 B+**

3. Vehicle OFF, connect a 3 A fused jumper between the control circuit terminal 18 and ground.
4. Remove the left high beam fuse at the X50A Fuse Block - Underhood, vehicle in Service Mode.
5. Verify a test lamp illuminates between the left high beam fuse B+ switch control terminal and ground.

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

1. Vehicle OFF, disconnect the X2 harness connector at the X50A Fuse Block - Underhood, vehicle in Service Mode.
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. Vehicle OFF, connect the X5 harness connector at the K9 Body Control Module.
7. Install the left high beam fuse at the X50A Fuse Block - Underhood.
8. Vehicle OFF, exterior lamps OFF, disconnect the appropriate harness connector listed below.
 - X110 - left high beam headlamp
 - X120 - right high beam headlamp
9. Test for less than 10 Ω between the appropriate ground circuit terminal listed below and ground.
 - Terminal 6 (-TR6)
 - Terminal 8 (TR6)

- **If 10 Ω or greater**

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

- **If less than 10 Ω**

10. Connect a test lamp between the control circuit terminal 2 and ground, vehicle in Service Mode.
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. Vehicle 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 X50A Fuse Block - Underhood.

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

1. Vehicle OFF, disconnect the X1 harness connector at the X50A Fuse Block - Underhood, vehicle in Service Mode.
2. Test for less than 1 V between the control circuit terminal and ground.

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

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

12. Test or replace the E13 Headlamp Assembly.

High Beam Indicator Malfunction

1. Vehicle in Service Mode.
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.

- Refer to [Headlamp Replacement](#)
- Refer to [Headlamp Switch Replacement](#)
- Refer to [Turn Signal Switch Replacement](#)
- Refer to [Relay Replacement \(Attached to Wire Harness\)](#) [Relay Replacement \(Within an Electrical Center\)](#)
- Refer to [Battery Distribution Fuse Block Replacement](#)
- Refer to [Control Module References](#) for BCM and Instrument Cluster replacement, programming, and setup

HEADLAMP LEVELING MALFUNCTION

Diagnostic Instructions

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

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Headlamp Leveling Actuator - Left B+	1	1	-	-
Headlamp Leveling Actuator - Right B+	1	1	-	-
Headlamp Leveling Switch B+	1	1	-	-
Headlamp Leveling Control	1	1	1	-
Headlamp Leveling Actuator - Left Ground	-	1	-	-
Headlamp Leveling Actuator - Right Ground	-	1	-	-
Driver Information Center Switch Ground	-	1	-	-
1. Headlamp Leveling Malfunction				

Each headlamp assembly contains a headlamp leveling actuator that is controlled by the headlamp leveling switch. The headlamp leveling switch is supplied with ignition voltage and ground and contains a resistor ladder with 4 positions for adjusting the headlamps up or down. When the headlamp leveling switch is activated to the desired position, voltage from the B+ ignition circuit is pulled down through the resistor ladder and the voltage is applied to the left and right headlamp leveling actuators via the headlamp leveling control circuits. The headlamp leveling actuators are supplied with B+ and ground. When the headlamp leveling switch is activated, the left and right headlamp leveling actuators respond by moving the headlamps to the desired position.

Diagnostic Aids

For testing purposes, the vehicle battery must be fully charged.

Reference Information

Schematic Reference

Headlights/Daytime Running Lights (DRL) Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Vehicle OFF, exterior lamps OFF, disconnect the appropriate harness connector listed below. It may take up to 2 min for all vehicle systems to power down.
 - X110 - left headlamp
 - X120 - right headlamp
2. Test for less than 10 Ω between the ground circuit terminal 10 and ground.
 - **If 10 Ω or greater**
 1. Vehicle 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. Vehicle in Service Mode.
4. Verify a test lamp illuminates between the ignition circuit terminal 5 and ground.
 - **If the test lamp does not illuminate**
 1. Vehicle OFF, disconnect the X1 harness connector at the X50A Fuse Block - Underhood.
 2. Test for infinite resistance between the ignition 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 , refer to **Power Mode Mismatch**.
- **If the test lamp illuminates**
5. Vehicle OFF, disconnect the harness connector at the S30 Headlamp Switch. It may take up to 2 min for all vehicle systems to power down.
6. Test for less than 10 Ω between the ground circuit terminal 8 and ground.
 - **If 10 Ω or greater**
 1. Vehicle 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**
7. Vehicle in Service Mode.
8. Verify a test lamp illuminates between the B+ circuit terminal 4 and ground.
 - **If the test lamp does not illuminate**
 1. Vehicle OFF, disconnect the X3 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
 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**
9. Vehicle OFF, connect the harness connector at the S30 Headlamp Switch.
10. Vehicle in Service Mode, exterior lights OFF.
11. Test the voltage between the control circuit terminal 11 and ground for each headlamp leveling switch position listed below.
 - Headlamp leveling switch position 0 - 10 V - 11 V
 - Headlamp leveling switch position 1 - 8.5 V - 9.9 V
 - Headlamp leveling switch position 2 - 8 V - 9 V
 - Headlamp leveling switch position 3 - 6 V - 7 V
 - **If less than the specified voltage range for each headlamp leveling switch position**
 1. Vehicle OFF, disconnect the harness connector at the S30 Headlamp Switch.
 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 S30 Headlamp Switch.
 - **If greater than the specified voltage range for each headlamp leveling switch position**
 1. Vehicle OFF, disconnect the harness connector at the S30 Headlamp Switch, vehicle in Service Mode.
 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 S30 Headlamp Switch.
 - **If within the specified voltage range for each headlamp leveling switch position**
12. Test or replace the appropriate E13 Headlamp Assembly.

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

- Refer to [Headlamp Replacement](#)
- Refer to [Headlamp Switch Replacement](#)

INTERIOR BACKLIGHTING MALFUNCTION

Diagnostic Instructions

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

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
F17DA (BCM 6) Fuse B+	3	3	-	-
Headlamp Switch B+	B1395 03, B3600 03	B3600 03	1	-
Headlamp Switch Signal	B1395 03, B3600 03	B3600 03	1	-
LED Backlight Dimming Control Terminal 8 X2	B2610 02	2	2	-
LED Backlight Dimming Control Terminal 9 X7	B2610 02	2	2	-
Switch Indicator Amber LED Backlight Dimming Control Terminal 5 X1	B2625 02	3	3	-
Headlamp Switch Low Reference	1	1	1	-
Door Lock Switch - Driver Ground	-	2	-	-
Door Lock Switch - Passenger Ground	-	2	-	-
Headlamp Switch Ground	-	2	-	-
Multifunction Switch 1 - Instrument Panel Ground	-	2	-	-
Multifunction Switch 2 - Instrument Panel Ground	-	2	-	-
Park Brake Control Switch Ground	-	2	-	-
Seat Heating Switch - Left Rear Ground	-	2	-	-
Seat Heating Switch - Right Rear Ground	-	2	-	-
Steering Wheel Controls Switch - Radio Presets Ground	-	2	-	-
1. Dimmer Switch Malfunction 2. Interior Backlighting Malfunction 3. Switch Indicator Amber LED Backlighting Malfunction				

Circuit/System Description

The headlamp switch is used to increase and decrease the brightness of the interior backlighting components. The headlamp 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 B+, low reference, and signal, circuits to the headlamp switch. When the headlamp switch is placed in the desired position, the dimmed voltage setting is applied from the

headlamp switch through the headlamp switch signal circuit to the BCM. The BCM interprets the signal and applies a pulse width modulated (PWM) voltage through the LED dimming control circuits illuminating the interior backlighting to the requested level of brightness.

Reference Information

Schematic Reference

- [Interior Lights Dimming 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 Verification

1. Vehicle in Service Mode, park lamps 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 backlighting components turn ON and OFF while commanding the LED Backlight Dimming ON and OFF with a scan tool.
 - **If the backlighting components do not turn ON and OFF**

Refer to Interior Backlighting Malfunction.
 - **If the backlighting components turn ON and OFF**
4. Vehicle ON, verify the switch indicator amber LED's for the components listed below illuminate when the appropriate switch is commanded ON and OFF.
 - S32LR Seat Heating Switch - Left Rear
 - S32RR Seat Heating Switch - Right Rear
 - S48D Multifunction Switch 2 - Instrument Panel Park Assist Switch
 - S48D Multifunction Switch 2 - Instrument Panel Lane Departure Warning Switch
 - **If the switch indicator amber LED's do not illuminate**

Refer to Switch Indicator Amber LED Backlighting Malfunction.
 - **If the switch indicator amber LED's illuminate**
5. All OK.

Dimmer Switch Malfunction

1. Vehicle OFF and all vehicle systems OFF, disconnect the harness connector at the S30 Headlamp Switch, vehicle in Service Mode.
2. Test for B+ between the B+ circuit terminal 12 and ground.
 - **If less than B+**
 1. Vehicle OFF, disconnect the X1 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 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. Vehicle OFF, disconnect the X1 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 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 B+**
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. Vehicle 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. Vehicle OFF, disconnect the X2 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 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.

Interior Backlighting Malfunction

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. Vehicle OFF, all doors closed, all accessories OFF, 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. Vehicle 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, vehicle in Service Mode.
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. Vehicle OFF, disconnect the appropriate harness connector listed below at the K9 Body Control Module.
 - X2 terminal 8
 - X7 terminal 9
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K9 Body Control Module.
 - **If the test lamp is always ON**
 1. Vehicle OFF, disconnect the appropriate harness connector listed below at the K9 Body Control Module, vehicle in Service Mode
 - X2 terminal 8
 - X7 terminal 9
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
5. Test or replace the component with inoperative backlighting.

Switch Indicator Amber LED Backlighting Malfunction

1. Vehicle OFF, disconnect the X5 harness connector at the K9 Body Control Module, vehicle in Service Mode.
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. 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. 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. Vehicle OFF, connect the X5 harness connector at the K9 Body Control Module.

4. Vehicle OFF, disconnect the harness connectors at the components listed below.

- S32LR Seat Heating Switch - Left Rear
- S32RR Seat Heating Switch - Right Rear
- S48D Multifunction Switch 2 - Instrument Panel

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.

5. Vehicle in Service Mode, verify a test lamp illuminates between each control circuit terminal 6 and ground.

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

1. Vehicle 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**

6. Verify a test lamp does not illuminate at FULL intensity between each control circuit terminal 6 and ground.

- **If the test lamp illuminates at FULL intensity**

1. Vehicle OFF, disconnect the X1 harness connector at the K9 Body Control Module, vehicle in Service Mode.

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 component with the inoperative switch indicator.

Repair Instructions

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

- Refer to [Parking Brake Actuator Switch Replacement](#)
- Refer to [Headlamp Switch Replacement](#)
- Refer to [Door Lock Switch Replacement](#)
- Refer to [Rear Seat Heater Switch Replacement](#)
- Refer to [Radio Control Switch Replacement - Steering Wheel \(Left Side Lower\)](#) [Radio Control Switch Replacement - Steering Wheel \(Left Side Rear\)](#) [Radio Control Switch Replacement - Steering Wheel \(Right Side Front\)](#) [Radio Control Switch Replacement - Steering Wheel \(Right Side Rear\)](#)
- Refer to [Hazard Warning Switch Replacement](#)
- Refer to [Instrument Panel Center Accessory Function Switch Replacement](#)
- Refer to [Control Module References](#) for BCM replacement, programming and setup

PARK, LICENSE, AND/OR TAIL LAMPS MALFUNCTION (MBM)

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
F6DA (BCM 4) Fuse B+	B3950 01, B3950 04	B3950 01, B3950 04	-	-
F7DA (BCM 3) Fuse B+	B3949 01, B3949 04	B3949 01, B3949 04	-	-
F9DA (BCM 1) Fuse B+	B1325 03, U156D 00	B1325 03, U156D 00	-	-
Headlamp Switch Park Lamps ON Signal	2	B257A 00	2	-
Left Tail Lamp Control	B3881 02	B3881 04	4	-
Right Tail Lamp Control	B3882 02	B3882 04	4	-
License Plate Lamp Control	B3883 02	3	3	-
Park Lamps Control - Left	B2585 02	1	1	-
Park Lamps Control - Right	B3867 02	1	1	-
Headlamp Switch Ground	-	2	-	-
Left Tail Lamp Ground	-	4	-	-
Right Tail Lamp Ground	-	4	-	-
License Plate Lamp Ground - Left	-	3	-	-
License Plate Lamp Ground - Right	-	3	-	-
Park Lamp Ground - Left Front	-	1	-	-
Park Lamp Ground - Right Front	-	1	-	-
Side Marker Lamp Ground - Left Front	-	1	-	-
Side Marker Lamp Ground - Right Front	-	1	-	-
Side Marker Lamp Ground - Left Rear	-	1	-	-
Side Marker Lamp Ground - Right Rear	-	1	-	-
1. Park, License, and/or Tail Lamps Malfunction 2. Park Lamp Switch Malfunction 3. License Plate Lamps Malfunction 4. Tail Lamps Malfunction				

Circuit/System Description

The park lamps, tail lamps, license plate lamps, and side marker lamps are turned ON when the headlamp switch is placed in the PARK LIGHT or LOW BEAM position or anytime the headlights are requested. When the BCM receives a request from the headlamp switch to turn ON the park lamps the BCM will apply battery voltage to the left and right park lamp, side marker lamp, and license plate lamp control circuits illuminating the left and right park lamps, side marker lamps, and license plate lamps.

When the trailer lighting control module receives a request from the headlamp switch to turn ON the park lamps the trailer lighting control module will apply battery voltage to the left and right tail/stop

lamp and auxiliary tail/stop lamp control circuits illuminating the left and right tail/stop lamps and auxiliary tail/stop lamps.

Reference Information

Schematic Reference

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

Connector End View Reference

[COMPONENT CONNECTOR END VIEWS - INDEX](#)

Description and Operation

[Exterior Lighting Systems Description and Operation](#)

Electrical Information Reference

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

Scan Tool Reference

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

Circuit/System Verification

1. Vehicle in Service Mode.
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 Park Lamp Switch Malfunction.
 - **If the parameter changes**
3. Verify the left front park lamp and left front and rear side marker 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 lamp and right front and rear side marker 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 tail/stop lamp on the vehicle turns ON and OFF when commanding the Left Rear Stop/Park Lamp ON and OFF with a scan tool.
 - **If the left tail/stop lamp does not turn ON and OFF**

Refer to Tail Lamps Malfunction.
 - **If the left tail/stop lamp turns ON and OFF**

6. Verify the right tail/stop lamp on the vehicle turns ON and OFF when commanding the Right Rear Stop/Park Lamp ON and OFF with a scan tool.

- **If the right tail/stop lamp does not turn ON and OFF**

Refer to Tail Lamps Malfunction.

- **If the right tail/stop lamp turns 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

Park Lamp Switch Malfunction

1. Vehicle OFF, all doors closed, all accessories OFF, disconnect the harness connector at the S30 Headlamp Switch. It may take up to 2 min for all vehicle systems to power down.

2. Test for less than 10 Ω between the ground circuit terminal 8 and ground.

- **If 10 Ω or greater**

1. Vehicle 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. Vehicle in Service Mode.

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

- **If not Inactive**

1. Vehicle 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 the ground circuit terminal 8.

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

- **If not Active**

1. Vehicle OFF, disconnect the X1 harness connector at the K9 Body Control Module, vehicle in Service Mode.

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. Vehicle OFF, disconnect the X1 harness connector at the K9 Body Control Module, vehicle in Service Mode.
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. Vehicle OFF.
 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. Vehicle OFF.
 2. Test for infinite resistance between the B+ circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If the test lamp illuminates**
3. Verify a test lamp illuminates between the B+ circuit terminal 3 and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. Vehicle OFF.
 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. Vehicle OFF.
 2. Test for infinite resistance between the B+ circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If the test lamp illuminates**
4. Vehicle OFF, connect the X1 harness connector at the K9 Body Control Module.
5. Vehicle OFF, disconnect the X2 harness connector at the K9 Body Control Module, vehicle in Service Mode.
6. Verify a test lamp illuminates between the B+ circuit terminal 3 and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. 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. Test for infinite resistance between the B+ circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module
 - **If the test lamp illuminates**
7. Vehicle OFF, connect the X2 harness connector at the K9 Body Control Module.
8. Vehicle OFF, exterior lamps OFF, disconnect the harness connector at the inoperative park lamp.
9. Test for less than 10 Ω between the appropriate ground circuit terminal listed below and ground.
 - E4LA Headlamp Assembly - Left terminal 8
 - E4RA Headlamp Assembly - Right terminal 8
 - E2LR Side Marker Lamp - Left Rear terminal 2
 - E2RR Side Marker Lamp - Right Rear terminal 2
 - **If 10 Ω or greater**
 1. Vehicle OFF.
 2. Test for less than 2 Ω in the ground circuit end to end.

- If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , repair the open/high resistance in the ground connection.
 - **If less than 10 Ω**
10. Connect a test lamp between the appropriate control circuit terminal listed below and ground, vehicle in Service Mode.
 - E4LA Headlamp Assembly - Left terminal 4
 - E4RA Headlamp Assembly - Right terminal 4
 - E4LA Headlamp Assembly - Left terminal 7 (-TR6)
 - E4RA Headlamp Assembly - Right terminal 7 (-TR6)
 - E2LR Side Marker Lamp - Left Rear terminal 1
 - E2RR Side Marker Lamp - Right Rear terminal 1
 11. Verify the test lamp turns ON and OFF when commanding the appropriate Park Lamps ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Vehicle 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. Vehicle OFF, disconnect the X4 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 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 park lamp.

Tail Lamps Malfunction

1. Vehicle OFF, exterior lamps OFF, disconnect the appropriate harness connector listed below at the appropriate E42 Tail Lamp Assembly.
 - X910 - left tail lamp assembly
 - X920 - right tail lamp assembly
2. Test for less than 10 Ω between the ground circuit terminal 4 and ground.
 - **If 10 Ω or greater**
 1. Vehicle 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 1 and ground, vehicle in Service Mode.
4. Verify the test lamp turns ON and OFF when commanding the appropriate Rear Stop/Park Lamp ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Vehicle OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.

- If infinite resistance
3. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K68 Trailer Lighting Control Module.
 - **If the test lamp is always ON**
 1. Vehicle OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module, vehicle in Service Mode.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K68 Trailer Lighting Control Module.
 - **If the test lamp turns ON and OFF**
5. Test or replace the appropriate E42 Tail Lamp Assembly.

License Plate Lamps Malfunction

1. Vehicle OFF, disconnect the X2 harness connector at the K9 Body Control Module, vehicle in Service Mode.
2. Verify a test lamp illuminates between the B+ circuit terminal 1 and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. Vehicle OFF.
 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. Vehicle OFF.
 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. Vehicle OFF, connect the X2 harness connector at the K9 Body Control Module.
4. Vehicle OFF, exterior lamps OFF, remove both E7 License Plate Lamp bulbs.
5. Test for less than 10 Ω between each ground circuit terminal 2 and ground.
 - **If 10 Ω or greater**
 1. Vehicle 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 E7L License Plate Lamp - Left control circuit terminal 1 and ground, vehicle in Service Mode.
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. Vehicle 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. Vehicle OFF, disconnect the X4 harness connector at the K9 Body Control Module, vehicle in Service Mode.
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. Connect a test lamp between the E7R License Plate Lamp - Right control circuit terminal 1 and ground, vehicle in Service Mode.
9. 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. Vehicle 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 turns ON and OFF**

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

Repair Instructions

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

- Refer to [Headlamp Replacement](#)
- Refer to [Rear License Plate Lamp Bulb Replacement](#)
- Refer to [Rear Side Marker Lamp Replacement](#)
- Refer to [Headlamp Switch Replacement](#)
- Refer to [Tail Lamp Control Module Replacement](#)
- Refer to [Rear Combination Lamp Replacement](#)
- Refer to [Control Module References](#) for BCM and trailer lighting control module replacement, programming, and setup

PARK, LICENSE, AND/OR TAIL LAMPS MALFUNCTION (MAH/MBC/MAW/MCX)

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
F6DA (BCM 4) Fuse B+	B3950 01, B3950 04	B3950 01, B3950 04	-	-
F7DA (BCM 3) Fuse B+	B3949 01, B3949 04	B3949 01, B3949 04	-	-
F9DA (BCM 1) Fuse B+	B1325 03, U156D 00	B1325 03, U156D 00	-	-
Headlamp Switch Park Lamps ON Signal	2	B257A 00	2	-

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Left Tail Lamp Control	B3881 02	B3881 04	4	-
Right Tail Lamp Control	B3882 02	B3882 04	4	-
License Plate Lamp Control	B3883 02	3	3	-
Park Lamps Control - Left	B2585 02	1	1	-
Park Lamps Control - Right	B3867 02	1	1	-
Headlamp Switch Ground	-	2	-	-
Left Tail Lamp Ground	-	4	-	-
Right Tail Lamp Ground	-	4	-	-
License Plate Lamp Ground - Left	-	3	-	-
License Plate Lamp Ground - Right	-	3	-	-
Park Lamp Ground - Left Front	-	1	-	-
Park Lamp Ground - Right Front	-	1	-	-
Side Marker Lamp Ground - Left Front	-	1	-	-
Side Marker Lamp Ground - Right Front	-	1	-	-
Side Marker Lamp Ground - Left Rear	-	1	-	-
Side Marker Lamp Ground - Right Rear	-	1	-	-
1. Park, License, and/or Tail Lamps Malfunction 2. Park Lamp Switch Malfunction 3. License Plate Lamps Malfunction 4. Tail Lamps Malfunction				

Circuit/System Description

The park lamps, tail lamps, license plate lamps, and side marker lamps are turned ON when the headlamp switch is placed in the PARK LIGHT or LOW BEAM position or anytime the headlights are requested. When the BCM receives a request from the headlamp switch to turn ON the park lamps the BCM will apply battery voltage to the left and right park lamp, side marker lamp, and license plate lamp control circuits illuminating the left and right park lamps, side marker lamps, and license plate lamps.

When the trailer interface control module receives a request from the headlamp switch to turn ON the park lamps the trailer interface control module will apply battery voltage to the left and right tail/stop lamp and auxiliary tail/stop lamp control circuits illuminating the left and right tail/stop lamps and auxiliary tail/stop lamps.

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

cardiagn.com

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. Vehicle in Service Mode.
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 Park Lamp Switch Malfunction.
 - **If the parameter changes**
3. Verify the left front park lamp and left front and rear side marker 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 lamp and right front and rear side marker 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 tail/stop lamp on the vehicle turns ON and OFF when commanding the Left Rear Stop/Park Lamp ON and OFF with a scan tool.
 - **If the left tail/stop lamp does not turn ON and OFF**
Refer to Tail Lamps Malfunction.
 - **If the left tail/stop lamp turns ON and OFF**
6. Verify the right tail/stop lamp on the vehicle turns ON and OFF when commanding the Right Rear Stop/Park Lamp ON and OFF with a scan tool.
 - **If the right tail/stop lamp does not turn ON and OFF**
Refer to Tail Lamps Malfunction.
 - **If the right tail/stop lamp turns 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

Park Lamp Switch Malfunction

1. Vehicle OFF, all doors closed, all accessories OFF, disconnect the harness connector at the S30 Headlamp Switch. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10 Ω between the ground circuit terminal 8 and ground.
 - **If 10 Ω or greater**
 1. Vehicle 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. Vehicle in Service Mode.
4. Verify the scan tool Park Lamps Switch parameter is Inactive.
 - **If not Inactive**
 1. Vehicle 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 the ground circuit terminal 8.
6. Verify the scan tool Park Lamps Switch parameter is Active.
 - **If not Active**
 1. Vehicle OFF, disconnect the X1 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 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. Vehicle OFF, disconnect the X1 harness connector at the K9 Body Control Module, vehicle in Service Mode.
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. Vehicle OFF.
 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. Vehicle OFF.
 2. Test for infinite resistance between the B+ circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If the test lamp illuminates**
3. Verify a test lamp illuminates between the B+ circuit terminal 3 and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**

1. Vehicle OFF.
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. Vehicle OFF.
2. Test for infinite resistance between the B+ circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
- **If the test lamp illuminates**
4. Vehicle OFF, connect the X1 harness connector at the K9 Body Control Module.
5. Vehicle OFF, disconnect the X2 harness connector at the K9 Body Control Module, vehicle in Service Mode.
6. Verify a test lamp illuminates between the B+ circuit terminal 3 and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 - 1. 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. Test for infinite resistance between the B+ circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module
 - **If the test lamp illuminates**
7. Vehicle OFF, connect the X2 harness connector at the K9 Body Control Module.
8. Vehicle OFF, exterior lamps OFF, disconnect the harness connector at the inoperative park lamp.
9. Test for less than 10 Ω between the appropriate ground circuit terminal listed below and ground.
 - E4LA Headlamp Assembly - Left terminal 8
 - E4RA Headlamp Assembly - Right terminal 8
 - E2LR Side Marker Lamp - Left Rear terminal 2
 - E2RR Side Marker Lamp - Right Rear terminal 2
- **If 10 Ω or greater**
1. Vehicle OFF.
2. Test for less than 2 Ω in the ground circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , repair the open/high resistance in the ground connection.
- **If less than 10 Ω**
10. Connect a test lamp between the appropriate control circuit terminal listed below and ground, vehicle in Service Mode.
 - E4LA Headlamp Assembly - Left terminal 4
 - E4RA Headlamp Assembly - Right terminal 4
 - E4LA Headlamp Assembly - Left terminal 7 (-TR6)
 - E4RA Headlamp Assembly - Right terminal 7 (-TR6)
 - E2LR Side Marker Lamp - Left Rear terminal 1
 - E2RR Side Marker Lamp - Right Rear terminal 1
11. Verify the test lamp turns ON and OFF when commanding the appropriate Park Lamps ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 - 1. Vehicle 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. Vehicle OFF, disconnect the X4 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 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 park lamp.

Tail Lamps Malfunction

1. Vehicle OFF, exterior lamps OFF, disconnect the appropriate harness connector listed below at the appropriate E42 Tail Lamp Assembly.
 - X910 - left tail lamp assembly
 - X920 - right tail lamp assembly
2. Test for less than 10 Ω between the ground circuit terminal 4 and ground.
 - **If 10 Ω or greater**
 1. Vehicle 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 1 and ground, vehicle in Service Mode.
4. Verify the test lamp turns ON and OFF when commanding the appropriate Rear Stop/Park Lamp ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Vehicle OFF, disconnect the X1 harness connector at the K101 Trailer Interface 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 K101 Trailer Interface Control Module.
 - **If the test lamp is always ON**
 1. Vehicle OFF, disconnect the X1 harness connector at the K101 Trailer Interface Control Module, vehicle in Service Mode.
 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 K101 Trailer Interface Control Module.
 - **If the test lamp turns ON and OFF**
5. Test or replace the appropriate E42 Tail Lamp Assembly.

License Plate Lamps Malfunction

1. Vehicle OFF, disconnect the X2 harness connector at the K9 Body Control Module, vehicle in Service Mode.

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

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

1. Vehicle OFF.

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. Vehicle OFF.

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. Vehicle OFF, connect the X2 harness connector at the K9 Body Control Module.

4. Vehicle OFF, exterior lamps OFF, remove both E7 License Plate Lamp bulbs.

5. Test for less than 10 Ω between each ground circuit terminal 2 and ground.

- **If 10 Ω or greater**

1. Vehicle 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 E7L License Plate Lamp - Left control circuit terminal 1 and ground, vehicle in Service Mode.

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. Vehicle 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. Vehicle OFF, disconnect the X4 harness connector at the K9 Body Control Module, vehicle in Service Mode.

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. Connect a test lamp between the E7R License Plate Lamp - Right control circuit terminal 1 and ground, vehicle in Service Mode.

9. 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. Vehicle 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 turns ON and OFF**

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

Repair Instructions

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

- Refer to [Headlamp Replacement](#)
- Refer to [Rear License Plate Lamp Bulb Replacement](#)
- Refer to [Rear Side Marker Lamp Replacement](#)
- Refer to [Headlamp Switch Replacement](#)
- Refer to [Tail Lamp Control Module Replacement](#)
- Refer to [Rear Combination Lamp Replacement](#)
- Refer to [Control Module References](#) for BCM and trailer interface control module replacement, programming, and setup

REAR COMPARTMENT LAMP MALFUNCTION

Diagnostic Instructions

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

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
F43DA (BCM 7) Fuse B+	B3948 01, B3948 04, B3951 01, B3951 04	B3948 01, B3948 04, B3951 01, B3951 04	-	-
Rear Compartment Courtesy Lamp Control	B2570 02	1	1	-
Rear Compartment Courtesy Lamp Ground	-	1	-	-
1. Rear Compartment Lamp Malfunction				

Circuit/System Description

The body control module (BCM) applies battery voltage to the cargo lamp through the cargo lamp control circuit. When the BCM receives a rear liftgate open input from the rear compartment lid latch, the BCM applies battery voltage to the cargo lamp control circuit illuminating the cargo lamp. In the event that the cargo lamp were to remain illuminated for more than 10 min with the vehicle ON/OFF switch in the OFF position, the BCM will deactivate the cargo 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](#)

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. Vehicle OFF, disconnect the X5 harness connector at the K9 Body Control Module, vehicle in Service Mode.
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. 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. 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. Vehicle OFF, connect the X5 harness connector at the K9 Body Control Module.
4. Vehicle OFF, exterior lamps OFF, disconnect the harness connector at the E8S Rear Compartment Courtesy Lamp. It may take up to 2 min for all vehicle systems to power down.
5. Test for less than 5 Ω between the ground circuit terminal 2 and ground.
 - **If 5 Ω or greater**
 1. Vehicle 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, vehicle in Service Mode.
7. Verify the test lamp turns ON and OFF when commanding the Cargo Lamp ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Vehicle 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. Vehicle OFF, disconnect the X7 harness connector at the K9 Body Control Module, vehicle in Service Mode.

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 E8S Rear Compartment Courtesy Lamp.

Repair Instructions

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

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

STOP LAMPS MALFUNCTION (MBM)

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
F9DA (BCM 1) Fuse B+	1	1	-	-
Brake Pedal Position Sensor 5 V Reference	C0277 06, C0890 03, U0422 71	C0277 06, U0422 71	C0890 07, U0422 71	-
Brake Pedal Position Sensor Signal	C0277 06, U0422 71	C0277 06, U0422 71	C0277 07, C0890 07, U0422 71	C0277 09
Auxiliary Left Tail/Stop Lamp Control	B388B 02	B388B 04	3	-
Auxiliary Right Tail/Stop Lamp Control	B388C 02	B388C 04	3	-
Center High Mounted Stop Lamp Control	B3884 02	1	1	-
Left Stop Lamp Control	B3890 02	B3890 04	4	-
Right Stop Lamp Control	B3891 02	B3891 04	4	-
Brake Pedal Position Sensor Low Reference	-	C0277 07, U0422 71	2	-
Auxiliary Left Tail/Stop Lamp Ground	-	3	-	-
Auxiliary Right Tail/Stop Lamp Ground	-	3	-	-
Center High Mounted Stop Lamp Ground	-	1	-	-
Tail Lamp Assembly - Left Ground	-	4	-	-
Tail Lamp Assembly - Right Ground	-	4	-	-
1. Center High Mounted Stop Lamp Malfunction 2. Brake Pedal Position Sensor Malfunction 3. Auxiliary Stop Lamps Malfunction 4. Stop Lamps Malfunction				

Circuit/System Description

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

For stop lamp operation, the trailer lighting control module receives an input from the center high mount stop lamp control circuit. When the brakes are applied on the vehicle, the trailer lighting control module receives the brake applied input from the center high mount stop lamp control circuit. The trailer lighting control module responds by applying voltage to the trailer stop lamp control circuit illuminating the trailer stop lamps. The trailer lighting control module also receives a serial data message from the BCM indicating that the vehicle brakes have been applied. When the liftgate is in the OPEN position, the trailer lighting control module will illuminate the left and right auxiliary stop lamps. When the liftgate is in the CLOSED position, the trailer lighting control module will illuminate the left and right stop lamps.

Reference Information

Schematic Reference

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

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

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

Scan Tool Reference

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

Circuit/System Verification

1. Vehicle in Service Mode.
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 center high mounted stop lamp turns ON and OFF when commanding the Center Stop Lamp ON and OFF with a scan tool.
 - **If the center high mounted stop does not turn ON and OFF**

Refer to Center High Mount Stop Lamp Malfunction.
 - **If the center high mounted stop turns ON and OFF**
4. Verify the left and right tail/stop lamps turn ON and OFF while pressing and releasing the brake pedal, liftgate CLOSED.

- **If the left and right tail/stop lamps do not turn ON and OFF**

Refer to Stop Lamps Malfunction.

- **If the left and right tail/stop lamps turn ON and OFF**

5. Verify the left and right auxiliary tail/stop lamps turn ON and OFF while pressing and releasing the brake pedal, liftgate OPEN.

- **If the left and right auxiliary tail/stop lamps do not turn ON and OFF**

Refer to Auxiliary Stop Lamps Malfunction.

- **If the left and right auxiliary tail/stop lamps turn ON and OFF**

6. All OK.

Circuit/System Testing

Brake Pedal Position Sensor Malfunction

1. Vehicle OFF, disconnect the harness connector at the B22 Brake Pedal Position Sensor, vehicle in Service Mode.
2. Test for less than 1 V between the low reference circuit terminal 2 and ground.
 - **If 1 V or greater**
 1. Vehicle OFF, disconnect the X1 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 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.

Center High Mount Stop Lamp Malfunction

1. Vehicle OFF, disconnect the X2 harness connector at the K9 Body Control Module, vehicle in Service Mode.
2. Verify a test lamp illuminates between the B+ circuit terminal 1 and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. 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. 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. Vehicle OFF, connect the X2 harness connector at the K9 Body Control Module.
4. Vehicle OFF, exterior lamps OFF, disconnect the harness connector at the E6 Center High Mounted Stop Lamp.
5. Test for less than 10 Ω between the ground circuit terminal 2 and ground.
 - **If 10 Ω or greater**
 1. Vehicle 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 appropriate control circuit terminal listed below and ground, vehicle in Service Mode.

- E6 Center High Mounted Stop Lamp terminal 1
- K68 Trailer Lighting Control Module terminal 14 X1

7. 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. Vehicle 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. Vehicle OFF, disconnect the X4 harness connector at the K9 Body Control Module, vehicle in Service Mode.

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 E6 Center High Mounted Stop Lamp.

Auxiliary Stop Lamps Malfunction

1. Vehicle OFF, exterior lamps OFF, disconnect the appropriate harness connector listed below at the appropriate E51 Tail Lamp Assembly - Auxiliary.

- X410 - left auxiliary tail lamp assembly
- X420 - right auxiliary tail lamp assembly

2. Test for less than 10 Ω between the ground circuit terminal 5 and ground.

- **If 10 Ω or greater**

1. Vehicle 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, vehicle in Service Mode.

4. Verify the test lamp turns ON and OFF while pressing and releasing the brake pedal, liftgate OPEN.

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

1. Vehicle OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module.

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

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

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

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K68 Trailer Lighting Control Module.

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

1. Vehicle OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module, vehicle in Service Mode.

2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K68 Trailer Lighting Control Module.

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

5. Test or replace the appropriate E5 Tail/Stop Lamp - Auxiliary.

Stop Lamps Malfunction

1. Vehicle OFF, exterior lamps OFF, disconnect the appropriate harness connector listed below at the appropriate E42 Tail Lamp Assembly.
 - X910 - left tail lamp assembly
 - X920 - right tail lamp assembly
2. Test for less than 10 Ω between the ground circuit terminal 4 and ground.
 - **If 10 Ω or greater**
 1. Vehicle 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 3 and ground, vehicle in Service Mode.
4. Verify the test lamp turns ON and OFF while pressing and releasing the brake pedal, liftgate CLOSED.
 - **If the test lamp is always OFF**
 1. Vehicle OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K68 Trailer Lighting Control Module.
 - **If the test lamp is always ON**
 1. Vehicle OFF, disconnect the X1 harness connector at the K68 Trailer Lighting Control Module, vehicle in Service Mode.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K68 Trailer Lighting Control Module.
 - **If the test lamp turns ON and OFF**
5. Test or replace the appropriate E42 Tail Lamp Assembly.

Repair Instructions

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

- Refer to [High Mount Stop Lamp Replacement](#)
- Refer to [Brake Pedal Position Sensor Replacement](#)
- Refer to [Brake Pedal Position Sensor Calibration](#)
- Refer to [Tail Lamp Control Module Replacement](#)
- Refer to [Stop and Turn Signal Lamp Bulb Replacement \(Europe, Korea with Rear Fog\) Stop and Turn Signal Lamp Bulb Replacement \(Europe, Korea, North America with Back-up Bulb\)](#)
- Refer to [Rear Combination Lamp Replacement](#)

- Refer to [Control Module References](#) for BCM and trailer lighting control module replacement, programming, and setup

STOP LAMPS MALFUNCTION (MAH/MBC/MAW/MCX)

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
F9DA (BCM 1) Fuse B+	1	1	-	-
Brake Pedal Position Sensor 5 V Reference	C0277 06, C0890 03, U0422 71	C0277 06, U0422 71	C0890 07, U0422 71	-
Brake Pedal Position Sensor Signal	C0277 06, U0422 71	C0277 06, U0422 71	C0277 07, C0890 07, U0422 71	C0277 09
Auxiliary Left Tail/Stop Lamp Control	B388B 02	B388B 04	3	-
Auxiliary Right Tail/Stop Lamp Control	B388C 02	B388C 04	3	-
Center High Mounted Stop Lamp Control	B3884 02	1	1	-
Left Stop Lamp Control	B3890 02	B3890 04	4	-
Right Stop Lamp Control	B3891 02	B3891 04	4	-
Brake Pedal Position Sensor Low Reference	-	C0277 07, U0422 71	2	-
Auxiliary Left Tail/Stop Lamp Ground	-	3	-	-
Auxiliary Right Tail/Stop Lamp Ground	-	3	-	-
Center High Mounted Stop Lamp Ground	-	1	-	-
Tail Lamp Assembly - Left Ground	-	4	-	-
Tail Lamp Assembly - Right Ground	-	4	-	-
1. Center High Mounted Stop Lamp Malfunction 2. Brake Pedal Position Sensor Malfunction 3. Auxiliary Stop Lamps Malfunction 4. Stop Lamps Malfunction				

Circuit/System Description

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

For stop lamp operation, the trailer interface control module receives an input from the center high mount stop lamp control circuit. When the brakes are applied on the vehicle, the trailer interface control module receives the brake applied input from the center high mount stop lamp control circuit. The trailer interface control module responds by applying voltage to the trailer stop lamp control circuit

illuminating the trailer stop lamps. The trailer interface control module also receives a serial data message from the BCM indicating that the vehicle brakes have been applied. When the liftgate is in the OPEN position, the trailer interface control module will illuminate the left and right auxiliary stop lamps. When the liftgate is in the CLOSED position, the trailer interface control module will illuminate the left and right stop lamps.

Reference Information

Schematic Reference

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

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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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. Vehicle in Service Mode.
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 center high mounted stop lamp turns ON and OFF when commanding the Center Stop Lamp ON and OFF with a scan tool.
 - **If the center high mounted stop does not turn ON and OFF**
Refer to Center High Mount Stop Lamp Malfunction.
 - **If the center high mounted stop turns ON and OFF**
4. Verify the left and right tail/stop lamps turn ON and OFF while pressing and releasing the brake pedal, liftgate CLOSED.
 - **If the left and right tail/stop lamps do not turn ON and OFF**
Refer to Stop Lamps Malfunction.
 - **If the left and right tail/stop lamps turn ON and OFF**
5. Verify the left and right auxiliary tail/stop lamps turn ON and OFF while pressing and releasing the brake pedal, liftgate OPEN.
 - **If the left and right auxiliary tail/stop lamps do not turn ON and OFF**
Refer to Auxiliary Stop Lamps Malfunction.

- If the left and right auxiliary tail/stop lamps turn ON and OFF

6. All OK.

Circuit/System Testing

Brake Pedal Position Sensor Malfunction

1. Vehicle OFF, disconnect the harness connector at the B22 Brake Pedal Position Sensor, vehicle in Service Mode.
2. Test for less than 1 V between the low reference circuit terminal 2 and ground.
 - **If 1 V or greater**
 1. Vehicle OFF, disconnect the X1 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 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.

Center High Mount Stop Lamp Malfunction

1. Vehicle OFF, disconnect the X2 harness connector at the K9 Body Control Module, vehicle in Service Mode.
2. Verify a test lamp illuminates between the B+ circuit terminal 1 and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. 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. 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. Vehicle OFF, connect the X2 harness connector at the K9 Body Control Module.
4. Vehicle OFF, exterior lamps OFF, disconnect the harness connector at the E6 Center High Mounted Stop Lamp.
5. Test for less than 10 Ω between the ground circuit terminal 2 and ground.
 - **If 10 Ω or greater**
 1. Vehicle 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 appropriate control circuit terminal listed below and ground, vehicle in Service Mode.
 - E6 Center High Mounted Stop Lamp terminal 1
 - K101 Trailer Interface Control Module terminal 14 X1
7. 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. Vehicle 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. Vehicle OFF, disconnect the X4 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 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 E6 Center High Mounted Stop Lamp.

Auxiliary Stop Lamps Malfunction

1. Vehicle OFF, exterior lamps OFF, disconnect the appropriate harness connector listed below at the appropriate E51 Tail Lamp Assembly - Auxiliary.
 - X410 - left auxiliary tail lamp assembly
 - X420 - right auxiliary tail lamp assembly
2. Test for less than 10 Ω between the ground circuit terminal 5 and ground.
 - **If 10 Ω or greater**
 1. Vehicle 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, vehicle in Service Mode.
4. Verify the test lamp turns ON and OFF while pressing and releasing the brake pedal, liftgate OPEN.
 - **If the test lamp is always OFF**
 1. Vehicle OFF, disconnect the X1 harness connector at the K101 Trailer Interface 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 K101 Trailer Interface Control Module.
 - **If the test lamp is always ON**
 1. Vehicle OFF, disconnect the X1 harness connector at the K101 Trailer Interface Control Module, vehicle in Service Mode.
 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 K101 Trailer Interface Control Module.
 - **If the test lamp turns ON and OFF**
5. Test or replace the appropriate E5 Tail/Stop Lamp - Auxiliary.

Stop Lamps Malfunction

1. Vehicle OFF, exterior lamps OFF, disconnect the appropriate harness connector listed below at the appropriate E42 Tail Lamp Assembly.
 - X910 - left tail lamp assembly

- X920 - right tail lamp assembly
2. Test for less than 10 Ω between the ground circuit terminal 4 and ground.
 - **If 10 Ω or greater**
 1. Vehicle 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 3 and ground, vehicle in Service Mode.
 4. Verify the test lamp turns ON and OFF while pressing and releasing the brake pedal, liftgate CLOSED.
 - **If the test lamp is always OFF**
 1. Vehicle OFF, disconnect the X1 harness connector at the K101 Trailer Interface 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 K101 Trailer Interface Control Module.
 - **If the test lamp is always ON**
 1. Vehicle OFF, disconnect the X1 harness connector at the K101 Trailer Interface Control Module, vehicle in Service Mode.
 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 K101 Trailer Interface Control Module.
 - **If the test lamp turns ON and OFF**
 5. Test or replace the appropriate E42 Tail Lamp Assembly.

Repair Instructions

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

- Refer to [High Mount Stop Lamp Replacement](#)
- Refer to [Brake Pedal Position Sensor Replacement](#)
- Refer to [Brake Pedal Position Sensor Calibration](#)
- Refer to [Tail Lamp Control Module Replacement](#)
- Refer to [Stop and Turn Signal Lamp Bulb Replacement \(Europe, Korea with Rear Fog\) Stop and Turn Signal Lamp Bulb Replacement \(Europe, Korea, North America with Back-up Bulb\)](#)
- Refer to [Rear Combination Lamp Replacement](#)
- Refer to [Control Module References](#) for BCM and trailer interface control module 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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Turn Signal Switch Signal - Left	2	2	2	-
Turn Signal Switch Signal - Right	2	2	2	-
Turn Signal Control - Left Front	B3948 01, B3948 02	B3948 01, B3948 04	B3948 01	-
Turn Signal Control - Right Front	B3949 01, B3949 02	B3949 01, B3949 04	B3949 01	-
Turn Signal Control - Left Rear	B3950 01, B3950 02	B3950 01, B3950 04	B3950 01	-
Turn Signal Control - Right Rear	B3951 01, B3951 02	B3951 01, B3951 04	B3951 01	-
Outside Rearview Mirror Ground - Driver	-	1	-	-
Outside Rearview Mirror Ground - Passenger	-	1	-	-
Turn Signal Lamp Ground - Left Front	-	1	-	-
Turn Signal Lamp Ground - Right Front	-	1	-	-
Turn Signal Lamp Ground - Left Rear	-	1	-	-
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 vehicle mode switch in the SERVICE MODE or ON 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

The tail lamp outage detection circuits are low current B+ circuits that will not illuminate a test lamp.

Reference Information

Schematic Reference

Exterior Lights Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- [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. Vehicle in Service Mode.
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 lamp and turn signal repeater lamp 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 lamp does not turn ON and OFF**
Refer to Turn Signal Lamps Malfunction.
 - **If the left front turn signal lamp turns ON and OFF**
4. Verify the right front turn signal lamp and turn signal repeater lamp 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 lamp does not turn ON and OFF**
Refer to Turn Signal Lamps Malfunction.
 - **If the right front turn signal lamp turns ON and OFF**
5. Verify the left rear turn signal lamp turns ON and OFF while commanding the Left Rear Turn Signal Lamp ON and OFF with a scan tool.
 - **If the left rear turn signal lamp does not turn ON and OFF**
Refer to Turn Signal Lamps Malfunction.
 - **If the left rear turn signal lamp turns ON and OFF**
6. Verify the right rear turn signal lamp turns ON and OFF while commanding the Right Rear Turn Signal Lamp ON and OFF with a scan tool.
 - **If the right rear turn signal lamp does not turn ON and OFF**
Refer to Turn Signal Lamps Malfunction.
 - **If the right rear turn signal lamp turns ON and OFF**
7. Verify the left and right turn signal indicators turn ON and OFF while commanding the Instrument Cluster Gauge Sweep Test ON and OFF with a scan tool.
 - **If the left or right turn signal indicators do not turn ON and OFF**
Refer to Turn Signal Indicators Malfunction.
 - **If the left and right turn signal indicators turn ON and OFF**
8. All OK.

Circuit/System Testing

Turn Signal/Multifunction Switch Malfunction

1. Vehicle OFF, scan tool disconnected, all doors closed, all accessories OFF, disconnect the harness connector at the S78 Turn Signal/Multifunction Switch. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10 Ω between the ground circuit terminal 3 and ground.
 - **If 10 Ω or greater**
 1. Vehicle 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. Vehicle in Service Mode.
4. Verify the scan tool Left Turn Signal Switch parameter is Inactive.
 - **If not Inactive**
 1. Vehicle 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 the ground circuit terminal 3.
6. Verify the scan tool Left Turn Signal Switch parameter is Active.
 - **If not Active**
 1. Vehicle OFF, disconnect the X3 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 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. Vehicle 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**
8. Install a 3 A fused jumper wire between the signal circuit terminal 2 and the ground circuit terminal 3.
9. Verify the scan tool Right Turn Signal Switch parameter is Active.
 - **If not Active**
 1. Vehicle OFF, disconnect the X3 harness connector at the K9 Body Control Module, vehicle in Service Mode.
 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**

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

Turn Signal Lamps Malfunction

- Vehicle OFF, exterior lamps OFF, disconnect the harness connector at the appropriate turn signal lamp.
- Test for less than 10 Ω between the appropriate ground circuit terminal listed below and ground.
 - E4LF Turn Signal Lamp - Left Front terminal 2
 - E4RF Turn Signal Lamp - Right Front terminal 2
 - A9A Outside Rearview Mirror - Driver terminal 5
 - A9B Outside Rearview Mirror - Passenger terminal 5
 - E4LR Turn Signal Lamp - Left Rear socket terminal
 - E4RR Turn Signal Lamp - Right Rear socket terminal
 - **If 10 Ω or greater**
 - Vehicle OFF.
 - 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**
- Connect a test lamp between the appropriate control circuit terminal listed below and ground, vehicle in Service Mode.
 - E4LF Turn Signal Lamp - Left Front terminal 1
 - E4RF Turn Signal Lamp - Right Front terminal 1
 - A9A Outside Rearview Mirror - Driver terminal 6
 - A9B Outside Rearview Mirror - Passenger terminal 6
 - E4LR Turn Signal Lamp - Left Rear socket terminal
 - E4RR Turn Signal Lamp - Right Rear socket terminal
- 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**
 - Vehicle OFF, disconnect the appropriate harness connector listed below at the K9 Body Control Module.
 - X5 left turn signals
 - X4 right turn signals
 - 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
 - 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**
 - Vehicle OFF, disconnect the appropriate harness connector listed below at the K9 Body Control Module, vehicle in Service Mode.
 - X5 left turn signals
 - X4 right turn signals
 - 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**
- Test or replace the appropriate turn signal lamp.

Turn Signal Indicators Malfunction

1. Vehicle in Service Mode.
2. Verify the left and right turn signal indicators turn ON and OFF while commanding the Instrument Cluster Gauge Sweep 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.

- Refer to [Front Turn Signal Lamp Bulb Replacement](#)
 - Refer to [Outside Rearview Mirror Turn Signal Lamp Replacement](#)
 - Refer to [Rear Fascia Lower Signal Lamp Replacement](#)
 - Refer to [Stop and Turn Signal Lamp Bulb Replacement \(Europe, Korea with Rear Fog\) Stop and Turn Signal Lamp Bulb Replacement \(Europe, Korea, North America with Back-up Bulb\)](#)
 - Refer to [Turn Signal Switch Replacement](#)
 - Refer to [Control Module References](#) for BCM or Instrument Cluster replacement, programming and setup
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2017 ACCESSORIES AND EQUIPMENT
Lighting - Repair Instructions - Bolt EV

REPAIR INSTRUCTIONS

TURN SIGNAL SWITCH REPLACEMENT

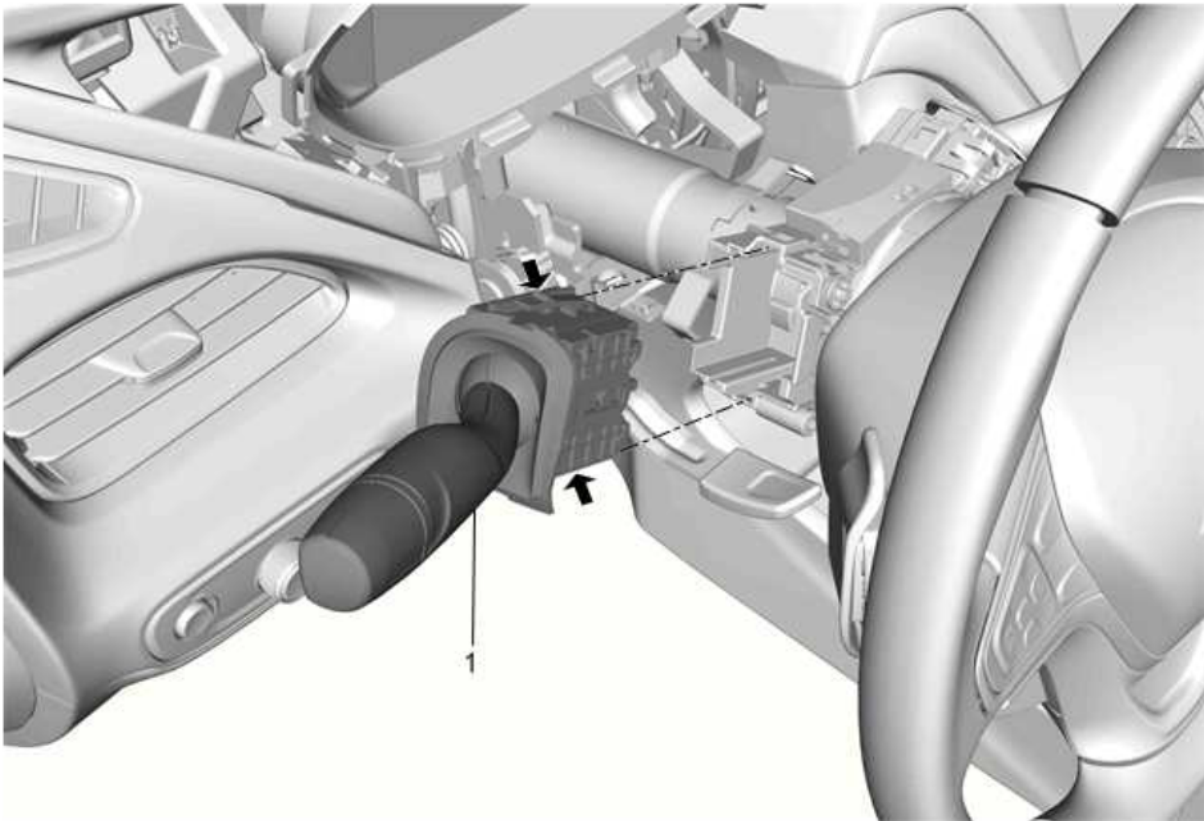


Fig. 1: Turn Signal Switch
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure <u>Steering Column Lower Trim Cover Replacement</u>	
1	Turn Signal Switch Procedure 1. Release the retaining tabs and remove the turn signal switch from the switch bracket. 2. Disconnect the electrical connector.

BRAKE PEDAL POSITION SENSOR CALIBRATION

Calibration Criteria

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

Brake pedal position sensor calibration must be performed after the brake pedal position sensor, body control module (BCM), engine control module (ECM), or hybrid powertrain control module have been

serviced. The calibration procedure will set the brake pedal position sensor home value. This value is used by the BCM and ECM/HPCM to determine the action of the driver applying the brake system and to provide this information to the vehicle subsystems via serial data.

Calibration Procedure

- 1. Apply the parking brake.
- 2. Vehicle in Service Mode, 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.

BRAKE PEDAL POSITION SENSOR REPLACEMENT

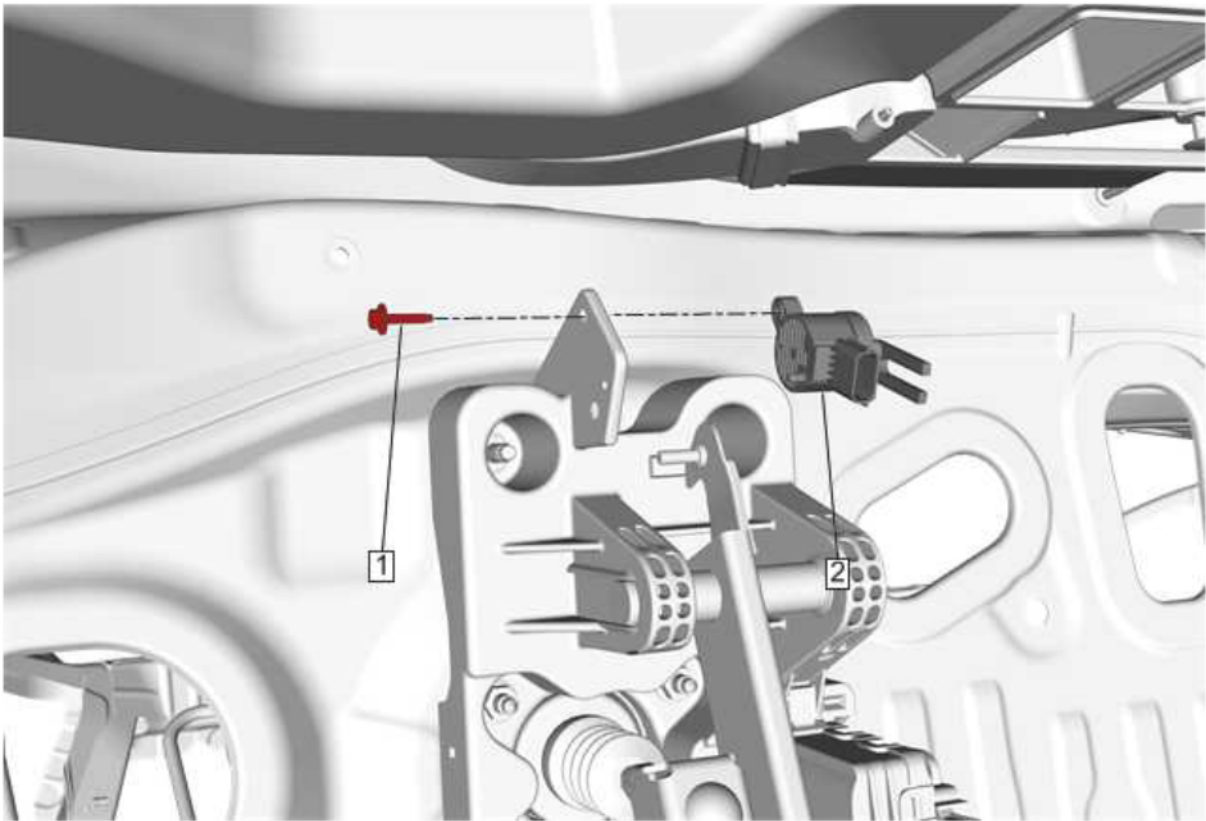


Fig. 2: Brake Pedal Position Sensor
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure <u>Steering Column Replacement</u>	
1	Brake Pedal Position Sensor Bolt CAUTION: Refer to <u>Fastener Caution</u> . Tighten 2.5 N.m (22 lb in)

Callout	Component Name
3	Brake Pedal Position Sensor Procedure 1. Disconnect the electrical connector. 2. Calibrate the brake pedal position sensor. Brake Pedal Position Sensor Calibration

HEADLAMP SWITCH REPLACEMENT



Fig. 3: Headlamp Switch
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Instrument Panel Trim Pad Replacement - Left Side	
1	Headlamp Switch Procedure Release the tabs and remove the switch.

HAZARD WARNING SWITCH REPLACEMENT

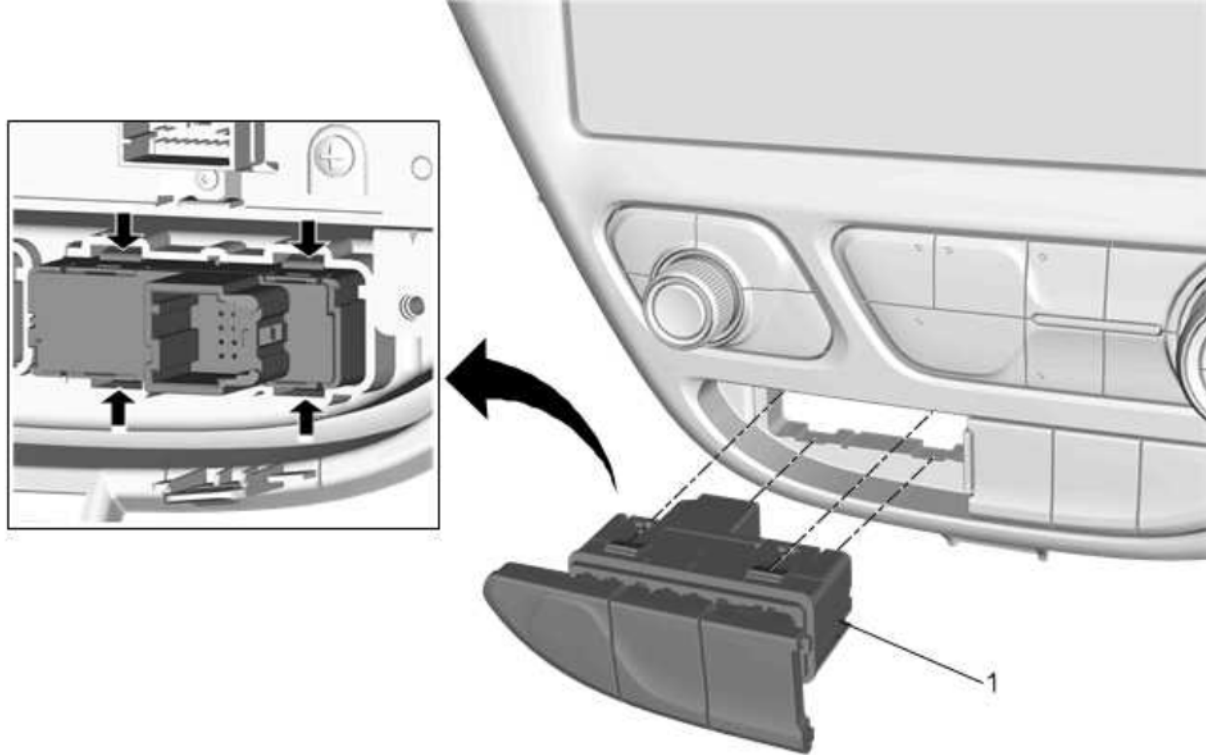


Fig. 4: Hazard Warning Switch

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure	
<u>Instrument Panel Trim Plate Replacement</u>	
1	Hazard Warning Switch Procedure Release the tabs and remove the switch.

CENTER COURTESY LAMP REPLACEMENT

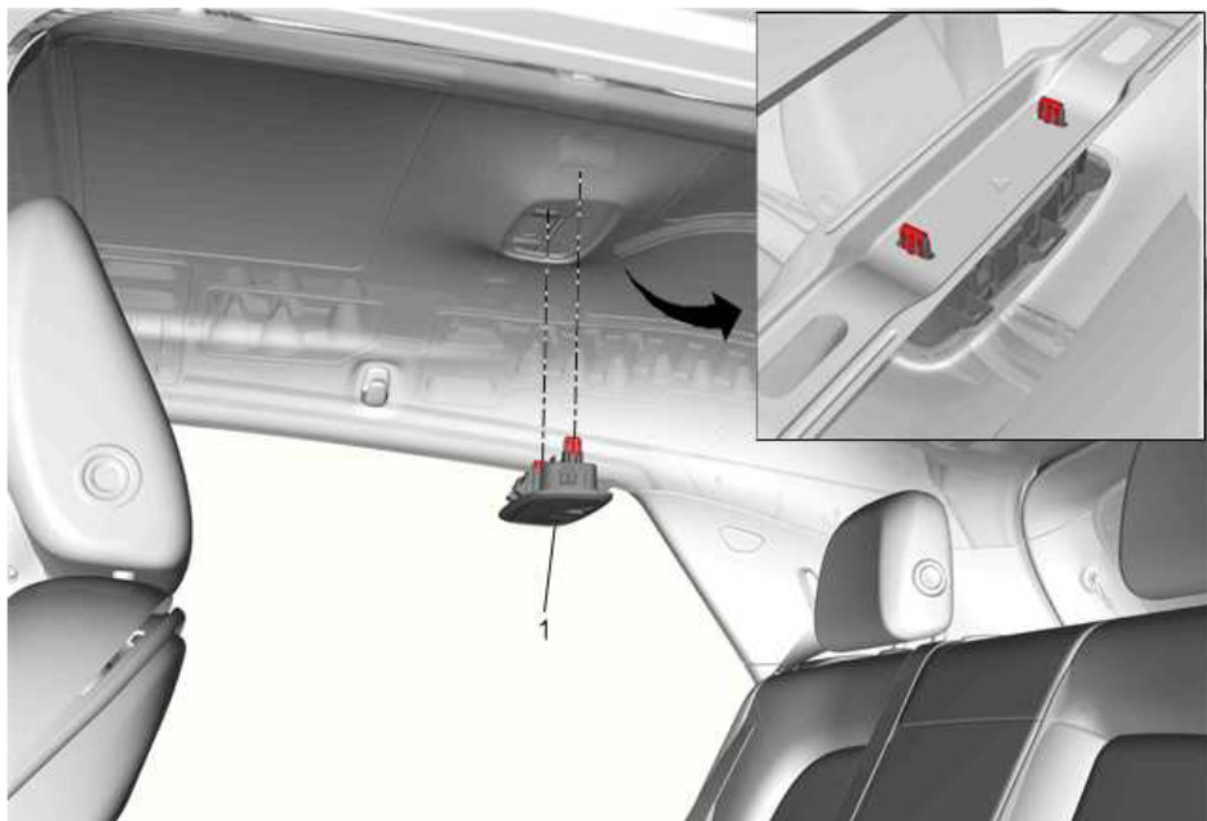


Fig. 5: Center Courtesy Lamp

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Center Courtesy Lamp Procedure 1. Use a flat bladed plastic trim tool. 2. Release enough of the courtesy lamp wiring harness from headliner to allow slack for installation. 3. Wrap the exposed harness with foam tape to preventing rattling. 4. Disconnect the electrical connector.

REAR SEAT POSITION CENTER COURTESY LAMP BULB REPLACEMENT

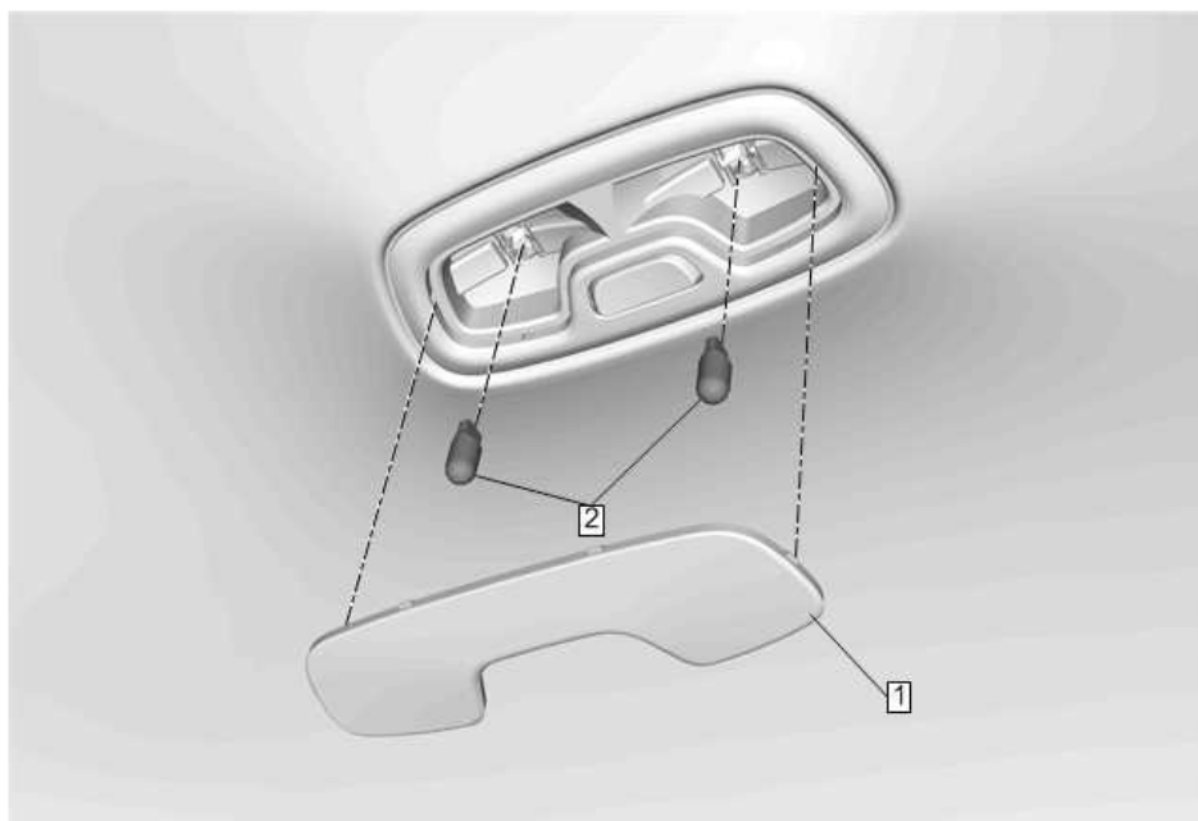


Fig. 6: Rear Seat Position Center Courtesy Lamp Bulb
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Center Courtesy Lamp Lens Procedure 1. Use a flat bladed plastic trim tool. 2. Release the plastic retaining tabs.
2	Rear Seat Position Center Courtesy Lamp Bulb

OUTSIDE REARVIEW MIRROR TURN SIGNAL LAMP REPLACEMENT

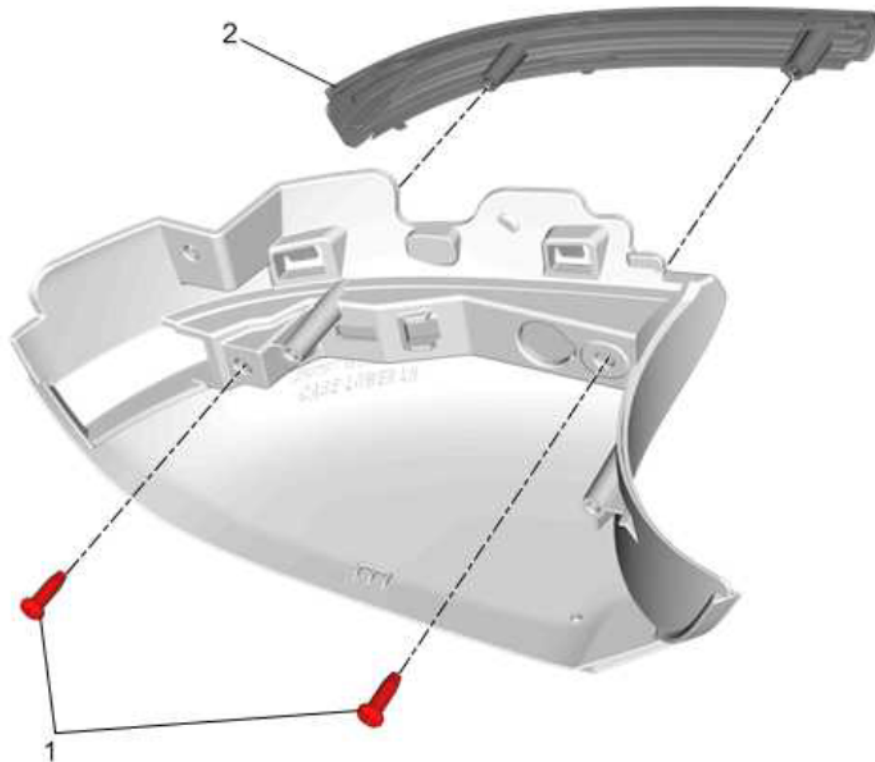


Fig. 7: Outside Rearview Mirror Turn Signal Lamp
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure <u>Outside Rearview Mirror Housing Lower Cover Replacement</u>	
1	Outside Rearview Mirror Turn Signal Lamp Screw CAUTION: <u>Fastener Caution</u> Tighten 0.8 N.m (7 lb in)
2	Outside Rearview Mirror Turn Signal Lamp

HEADLAMP REPLACEMENT

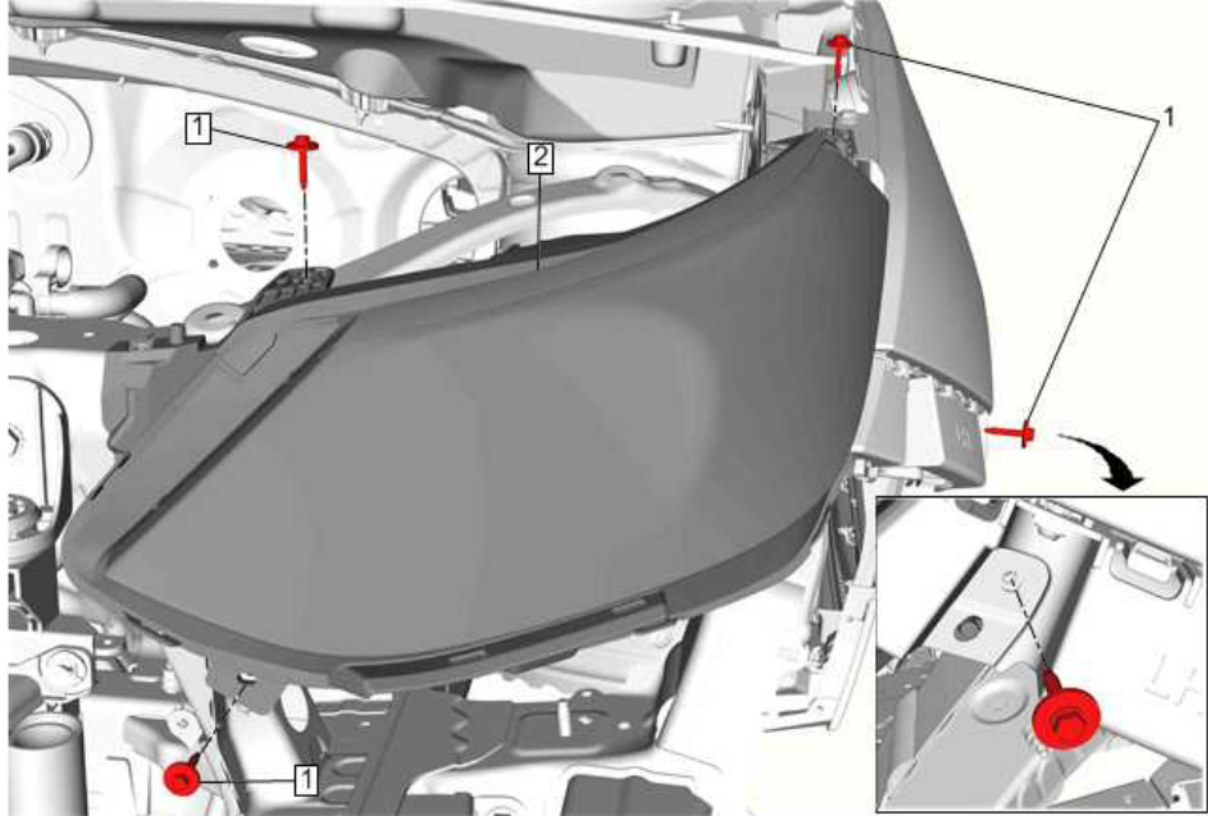


Fig. 8: Headlamp

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures Front Bumper Fascia Replacement (North America) Front Bumper Fascia Replacement (Europe, Korea) - Front Fender Upper Rear Molding Bolt - Remove - Front Fender Upper Rear Molding Replacement	
1	Headlamp Bolt CAUTION: Refer to Fastener Caution . Tighten 2.5 N.m (22 lb in)
2	Headlamp Procedure - Remove the fastener shared by the front fender upper rear molding. - Disconnect the electrical connector. - Perform the headlamp aiming procedure. Headlamp Aiming (Europe, Korea)Headlamp Aiming (North America)

HEADLAMP BALLAST REPLACEMENT

Removal Procedure

WARNING: The high intensity discharge system produces high voltage and current. In order to reduce the risk of severe shocks and burns, the battery negative cable must be disconnected any time service work is being performed on or around the high intensity discharge system.

WARNING: The high intensity discharge system produces high voltage and current. To reduce the risk of severe shocks and burns:

- Never open the high intensity discharge system ballast or the arc tube assembly starter.
- Never probe between the high intensity discharge system ballast output connector and the arc tube assembly.

1. Remove the headlamp. [Headlamp Replacement](#)

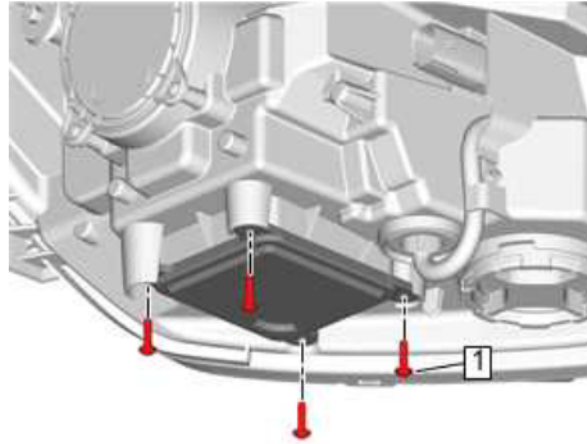


Fig. 9: Headlamp Ballast Fasteners

Courtesy of GENERAL MOTORS COMPANY

2. Remove the headlamp ballast fasteners (1).

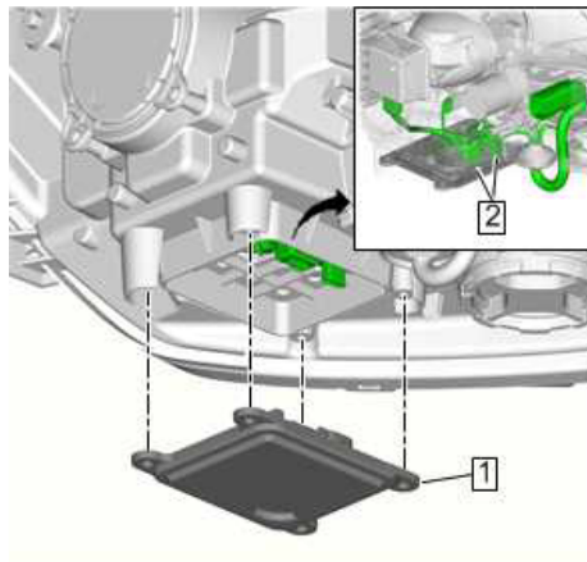


Fig. 10: Headlamp Ballast

Courtesy of GENERAL MOTORS COMPANY

3. Remove the headlamp ballast (1).
4. Disconnect the electrical connectors (2).

Installation Procedure

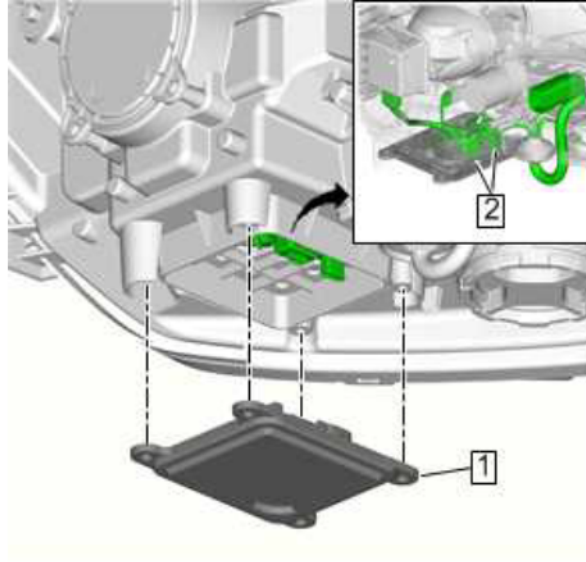


Fig. 11: Headlamp Ballast

Courtesy of GENERAL MOTORS COMPANY

1. Connect the electrical connectors (2).
2. Install the headlamp ballast (1).

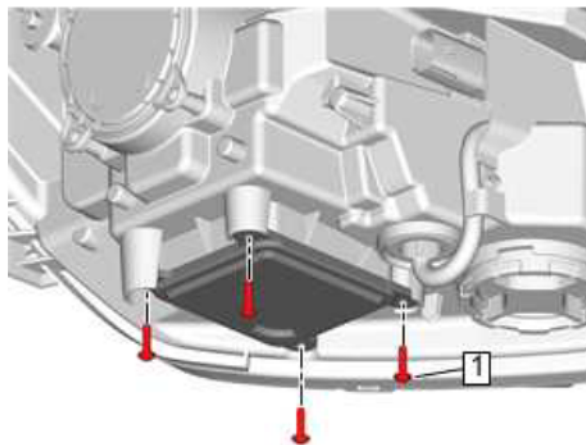


Fig. 12: Headlamp Ballast Fasteners

Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to **Fastener Caution** .

3. Install the headlamp ballast fasteners (1) and tighten to 2.5 N.m (22 lb in).
4. Install the headlamp. **Headlamp Replacement**

HEADLAMP BULB REPLACEMENT

Removal Procedure

WARNING: The high intensity discharge system produces high voltage and current. In order to reduce the risk of severe shocks and burns, the battery negative cable must be disconnected any time service work is being performed on or around the high intensity discharge system.

WARNING: The high intensity discharge system produces high voltage and current. To reduce the risk of severe shocks and burns:

- Never open the high intensity discharge system ballast or the arc tube assembly starter.

- Never probe between the high intensity discharge system ballast output connector and the arc tube assembly.

1. Remove the headlamp. [Headlamp Replacement](#)

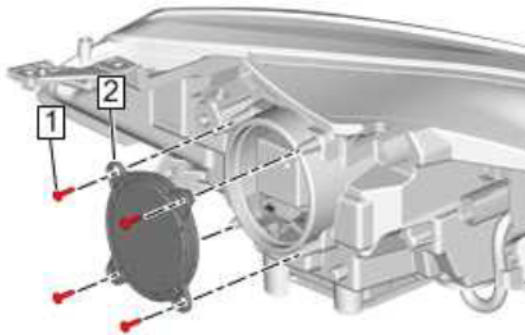


Fig. 13: Headlamp Bulb Access Cover Fasteners

Courtesy of GENERAL MOTORS COMPANY

2. Remove the headlamp bulb access cover fasteners (1).
3. Remove the headlamp bulb access cover (2).

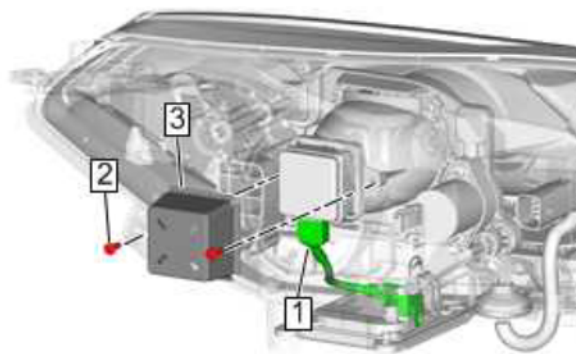


Fig. 14: Headlamp Bulb Retaining Cover Fasteners

Courtesy of GENERAL MOTORS COMPANY

4. Disconnect the electrical connector (1).
5. Remove the headlamp bulb retaining cover fasteners (2).
6. Remove the headlamp bulb retaining cover (3).

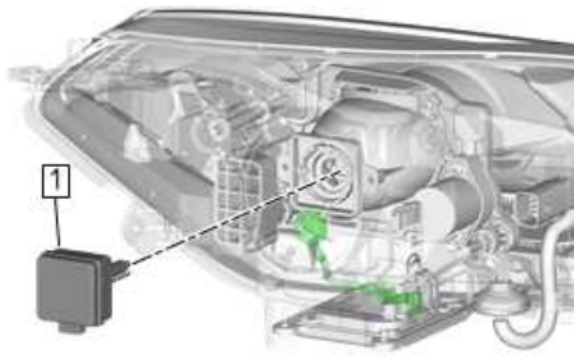


Fig. 15: Headlamp Bulb

Courtesy of GENERAL MOTORS COMPANY

7. Remove the headlamp bulb (1).

Installation Procedure

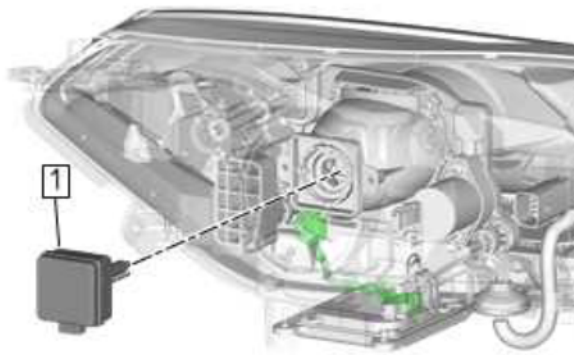


Fig. 16: Headlamp Bulb

Courtesy of GENERAL MOTORS COMPANY

NOTE: The outer ring of the assembly contains alignment keys to ensure the correct orientation.

1. Install the headlamp bulb (1).

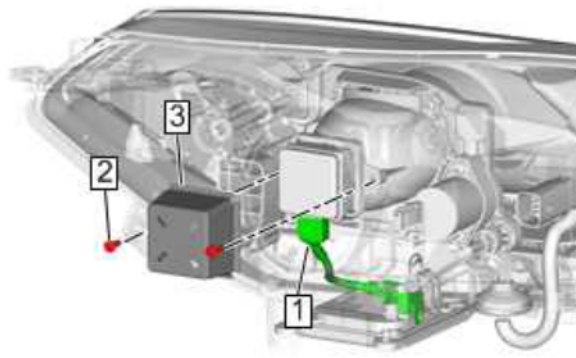


Fig. 17: Headlamp Bulb Retaining Cover Fasteners
 Courtesy of GENERAL MOTORS COMPANY

2. Install the headlamp bulb retaining cover (3).

CAUTION: Refer to [Fastener Caution](#) .

3. Install the headlamp bulb retaining cover fasteners (2) and tighten to 2.5 N.m (22 lb in).
4. Connect the electrical connector (1).

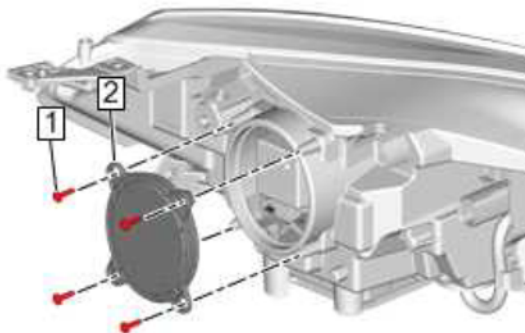


Fig. 18: Headlamp Bulb Access Cover Fasteners
 Courtesy of GENERAL MOTORS COMPANY

5. Install the headlamp bulb access cover (2).
6. Install the headlamp bulb access cover fasteners (1) and tighten to 2.5 N.m (22 lb in).
7. Install the headlamp. [Headlamp Replacement](#)

HEADLAMP AIMING (EUROPE, KOREA)

General

Directive 76/756 EEC and ECE-Regulation 48 cover checking and aiming of headlamps on vehicle. Correct aiming of headlamps of vehicles should enable optimal road illumination by the low beam-, with minimal glare to oncoming traffic. For this purpose the inclination of the light beam in relation to the road surface and the angle of the beam to the vertical longitudinal plane running through the vehicle centre must comply with the requirements laid down in the ECE regulation and EEC directive.

Glaring of the low beam is considered eliminated if the intensity of the illumination at a distance of 25 m (82 ft) from each individual headlamp on the plane perpendicular to the road and at the height of the

headlamp as well as above, is not greater than 1 lux. This requirement is generally satisfied if the headlamp aiming is carried out according to these aiming guidelines.

For the nondazzling high beam (Intelilux) special attention must be turned to the correct lateral alignment of the headlamps (low beam).

If a non-railed adjustment device will be used, the lateral orientation of the adjustment device has to be checked separately in front of each single headlamp.

The measurement of adjustment for the basic headlamp aiming is displayed in % on the headlamp housing.

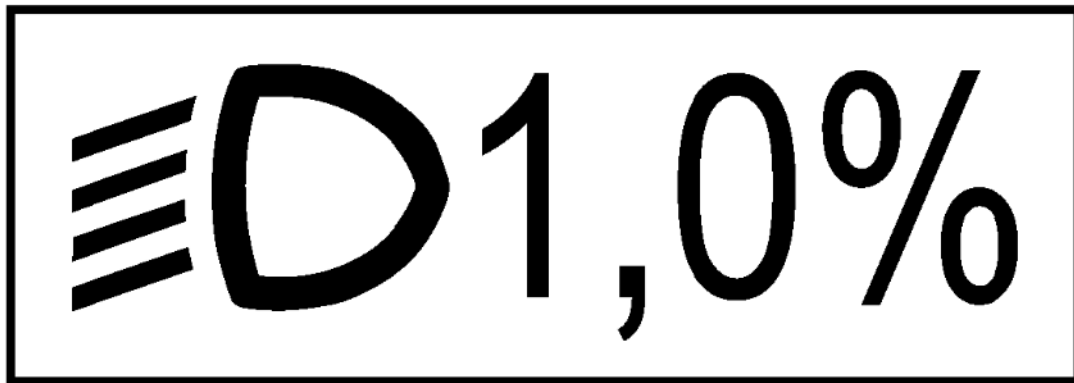


Fig. 19: Headlamp Aiming

Courtesy of GENERAL MOTORS COMPANY

Example: Label for a headlamp inclination of 1.0% for the low beam on the headlamp.

Reference 1.0 percent corresponds to the adjustment dimension of the headlamp with reference to the inclination of the light beam. The inclination at a distance of 10 m (33 ft) from vehicle headlamp is therefore 10 cm (4 in). The inclination of the low beam headlamp is indicated by its light/dark boundary (cut-off line).

Depending on the specific inner design of the headlamps, the movement of the lightbeam on the measurement screen is not exactly vertical or horizontal during the aiming on the aiming screws. This is caused by the technical solution of the suspension of the reflectors in the headlamp housing. After aiming of one axis the aiming of the other axis should be rechecked. For instance the vertical aiming could be changed a bit after the aiming of the horizontal axis. Therefore the vertical axis must be checked and if necessary aimed again after the aiming of the horizontal axis.

If a headlamp shows a significant deviation from the correct aiming for both horizontal and vertical direction the aiming operation must be performed step by step for the two directions. This means that in such a case the aiming of horizontal and vertical direction must be done alternately in small steps. Not more than one turn of an aiming screw shall be performed at once. After one turn change to the other aiming screw. Repeat this procedure until the headlamp is correctly aimed.

Headlamp Beam Setter / Inspection Station

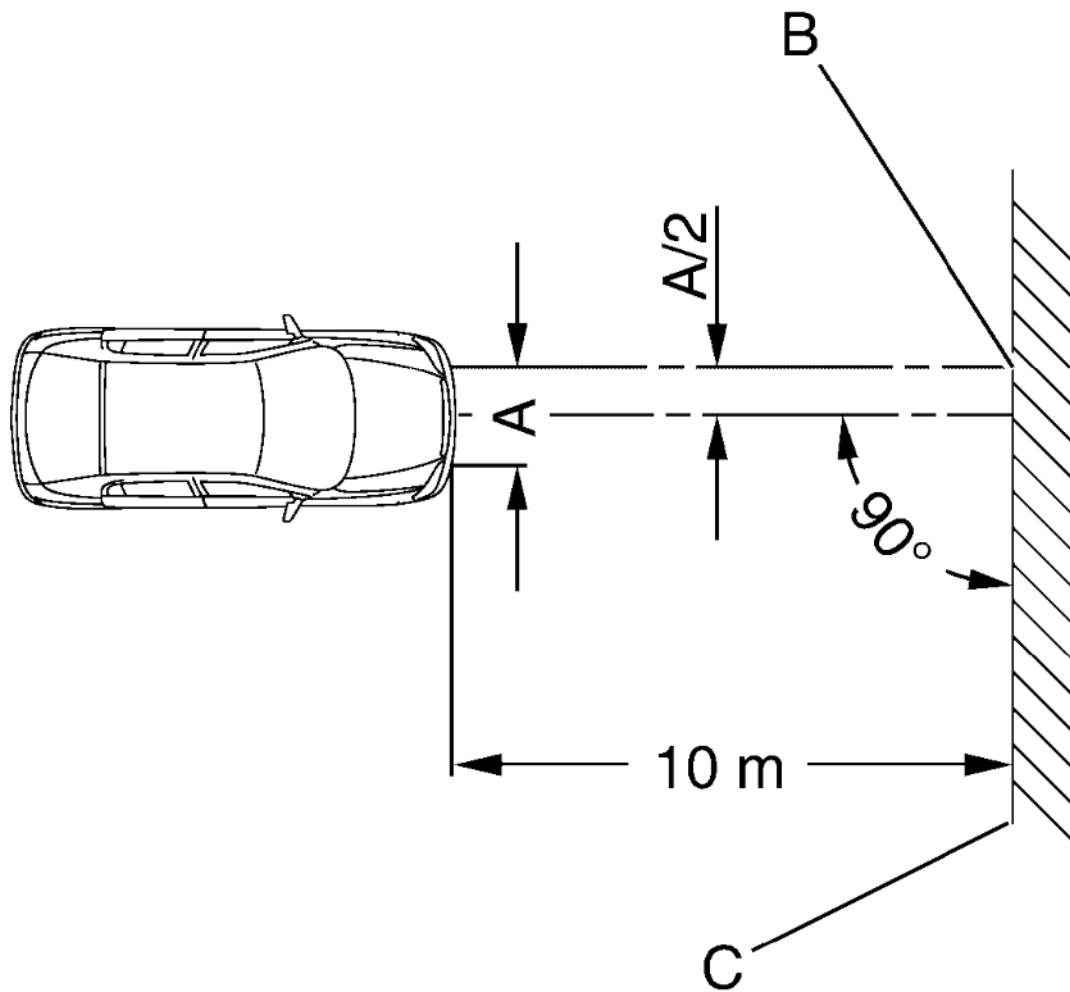


Fig. 20: Aiming Guideline

Courtesy of GENERAL MOTORS COMPANY

Abbreviations used:

A = Horizontal distance between headlamp centres

B = Central marking

C = Test surface

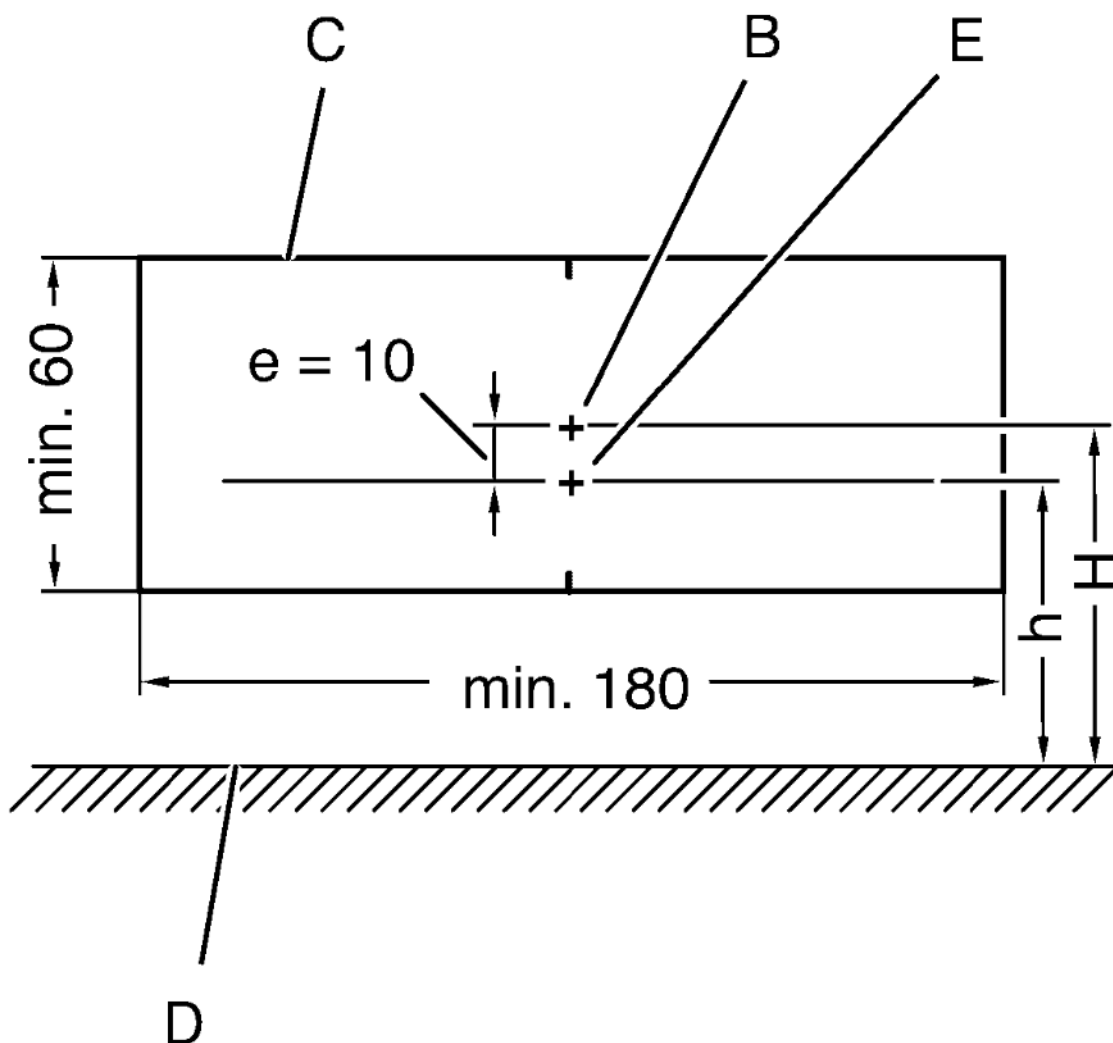


Fig. 21: Aiming Guideline

Courtesy of GENERAL MOTORS COMPANY

C = Test surface

D = Road surface

E = Break point (kink of cut-off line)

e = Aiming dimension in cm, $e = H - h$ (aiming dimension, low beam headlamps usually at 1.0 percent, $e = 10$ cm (4 in), front fog lamps 2.0 percent, $e = 20$ cm (8 in), high beam headlamps (if separately amiable) at 0 percent, $e = 0$ cm (0 in).

H = Height of centre of headlamp over road surface

h = Height of light/dark boundary line (cut-off line) of low beam above road surface

The headlamp aiming is performed according to the specifications, as shown in the illustrations, using an adjuster. When using a headlamp adjuster, set up the height and position of the adjuster according to the instructions in the operation manual. Ensure that the vehicle tire surface that is in contact with the road and the surface for setting up the adjuster are at the same level and parallel with each another.

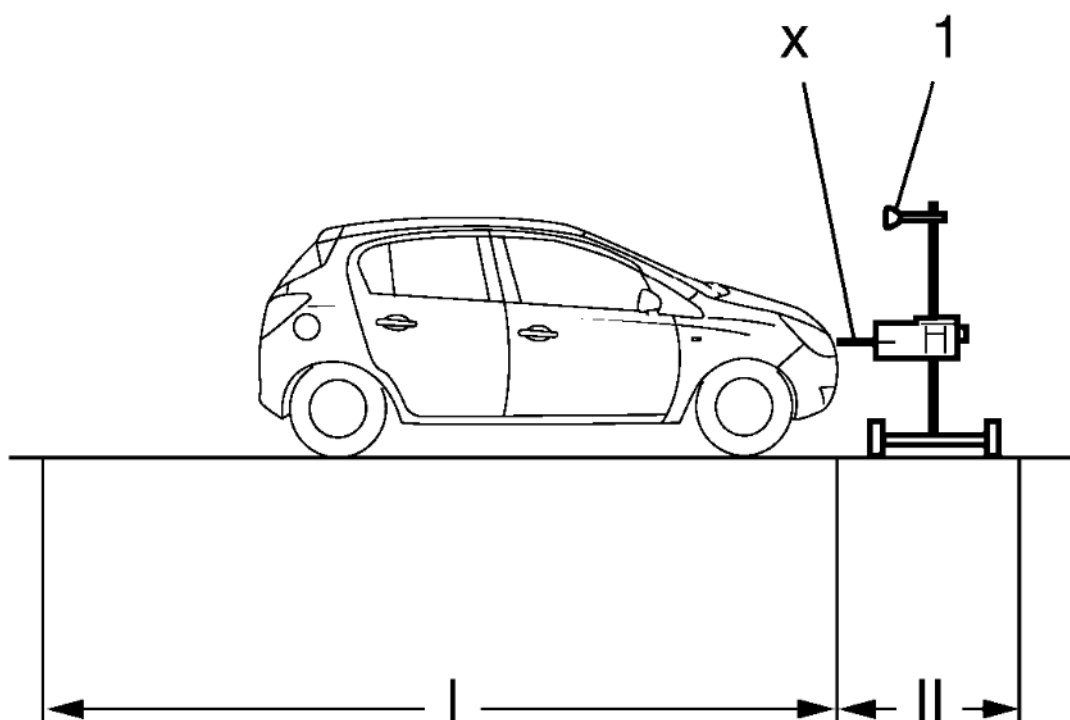


Fig. 22: Marking Of Control Mirror

Courtesy of GENERAL MOTORS COMPANY

X = Center of adjuster lens (see arrow mark on adjuster housing) must be aligned on the same level as the low beam headlamp and must be parallel to the ground.

1 = Use marking of the control mirror (1) to align the adjuster system in the correct angle to the vehicle, based on the information shown in the owner operating instructions.

The distance between the adjuster lens and the headlamp must be max. 0, 9 meters (refer to operation instructions of the adjuster system)

The surface on which the measuring instrument (adjuster system) and the vehicle stand must be flat. See follow table.

I difference utility space from vehicle	
longitudinal direction	lateral direction
$\hat{A} \pm 3 \text{ mm} / \text{m}$	$\hat{A} \pm 0 \text{ mm} / 1 \text{ m}$
$\hat{A} \pm 5 \text{ mm} / 2 \text{ m}$	$\hat{A} \pm 0 \text{ mm} / 2 \text{ m}$
$\hat{A} \pm 7 \text{ mm} / 3 \text{ m}$	$\hat{A} \pm 0 \text{ mm} / 3 \text{ m}$
$\hat{A} \pm 9 \text{ mm} / 4 \text{ m}$	$\hat{A} \pm 0 \text{ mm} / 4 \text{ m}$
$\hat{A} \pm 10 \text{ mm} / 6 \text{ m}$	$\hat{A} \pm 0 \text{ mm} / 6 \text{ m}$
$\hat{A} \pm 11 \text{ mm} / 8 \text{ m}$	$\hat{A} \pm 0 \text{ mm} / 8 \text{ m}$

II difference utility space from vehicle	
longitudinal direction	lateral direction
$\hat{A} \pm 1 \text{ mm} / 1 \text{ m}$	$\hat{A} \pm 1 \text{ mm} / 1 \text{ m}$

Vehicle tires must have specified air pressure. Blackened bulbs must be replaced before adjusting.

The adjustment is performed at vehicle curb weight plus one person or 75 kg (165 lb) on the driver's seat. (Curb weight = weight of vehicle ready for use with 90% filled fuel tank plus the weight of all equipment carried during use, e.g. spare wheel, tools, jack, first aid kit, emergency warning triangle, etc.).

Light Pattern / Scheme of Headlamps

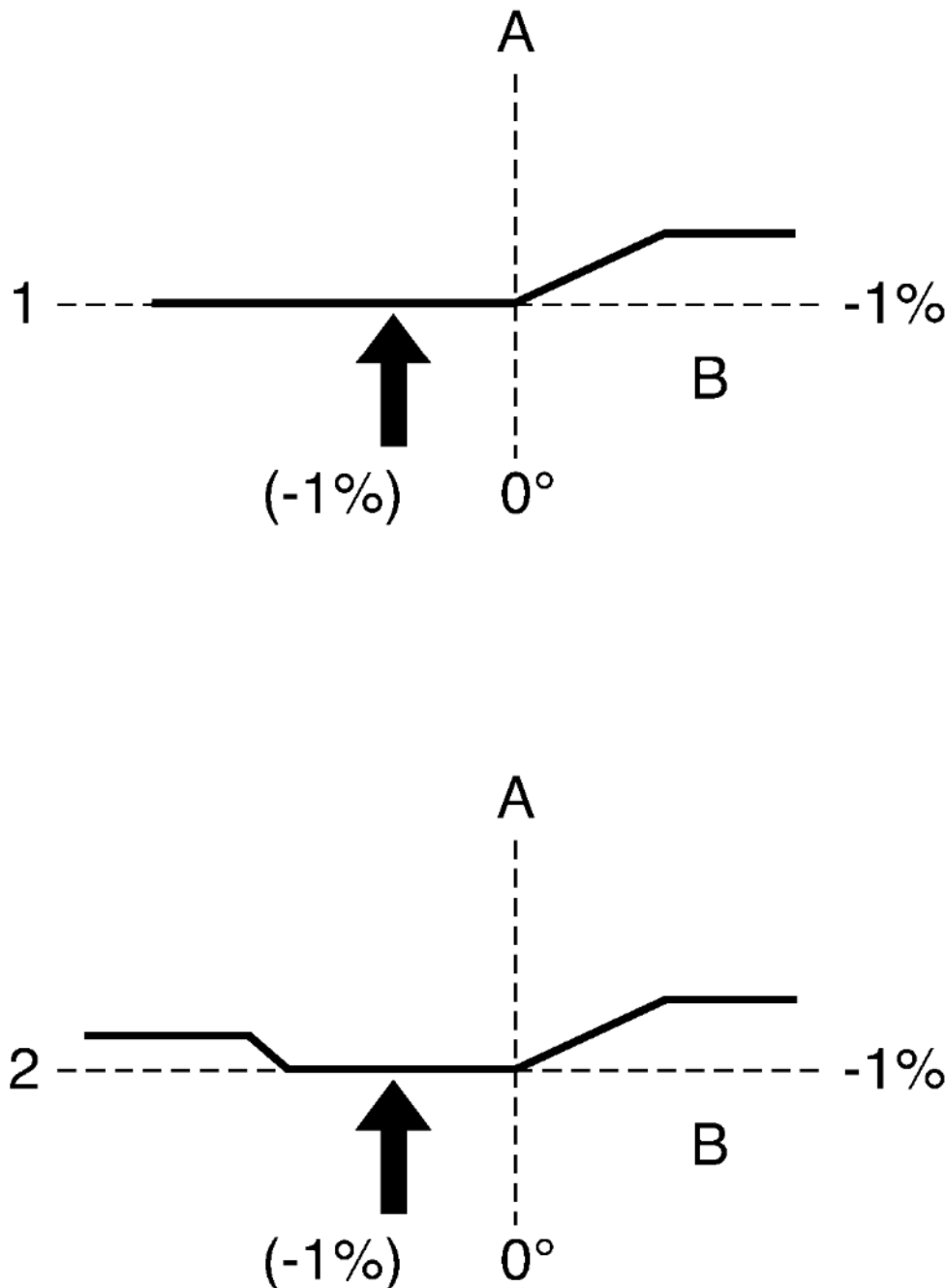


Fig. 23: Light Pattern / Scheme of Headlamp
Courtesy of GENERAL MOTORS COMPANY

A = Kink of cut-off line for the left/right setting

B = Horizontal area of the cut-off line for up/down setting

1 and 2 = Depending on the headlamp setup the outer sections will be straight or increasing.



Fig. 24: Headlamp Switch

Courtesy of GENERAL MOTORS COMPANY

The headlamp switch must be turned on manual low beam if equipped, the manual headlamp range adjustment has to be in the zero position.

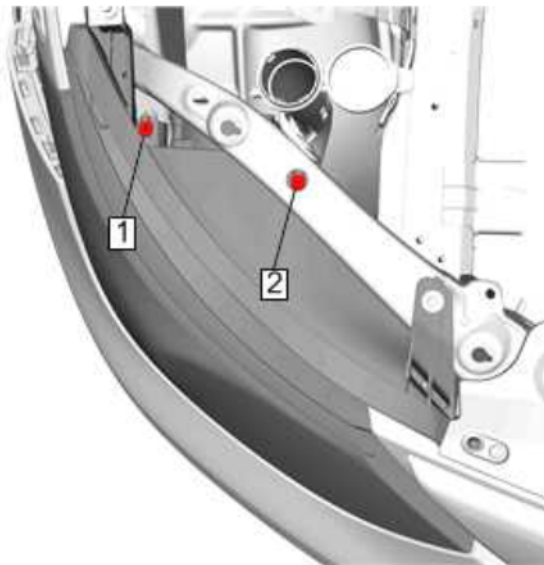


Fig. 25: Headlamp Screw

Courtesy of GENERAL MOTORS COMPANY

Halogen Headlamp

- (1) Aiming screw for vertical adjustment
- (2) Aiming screw for horizontal adjustment

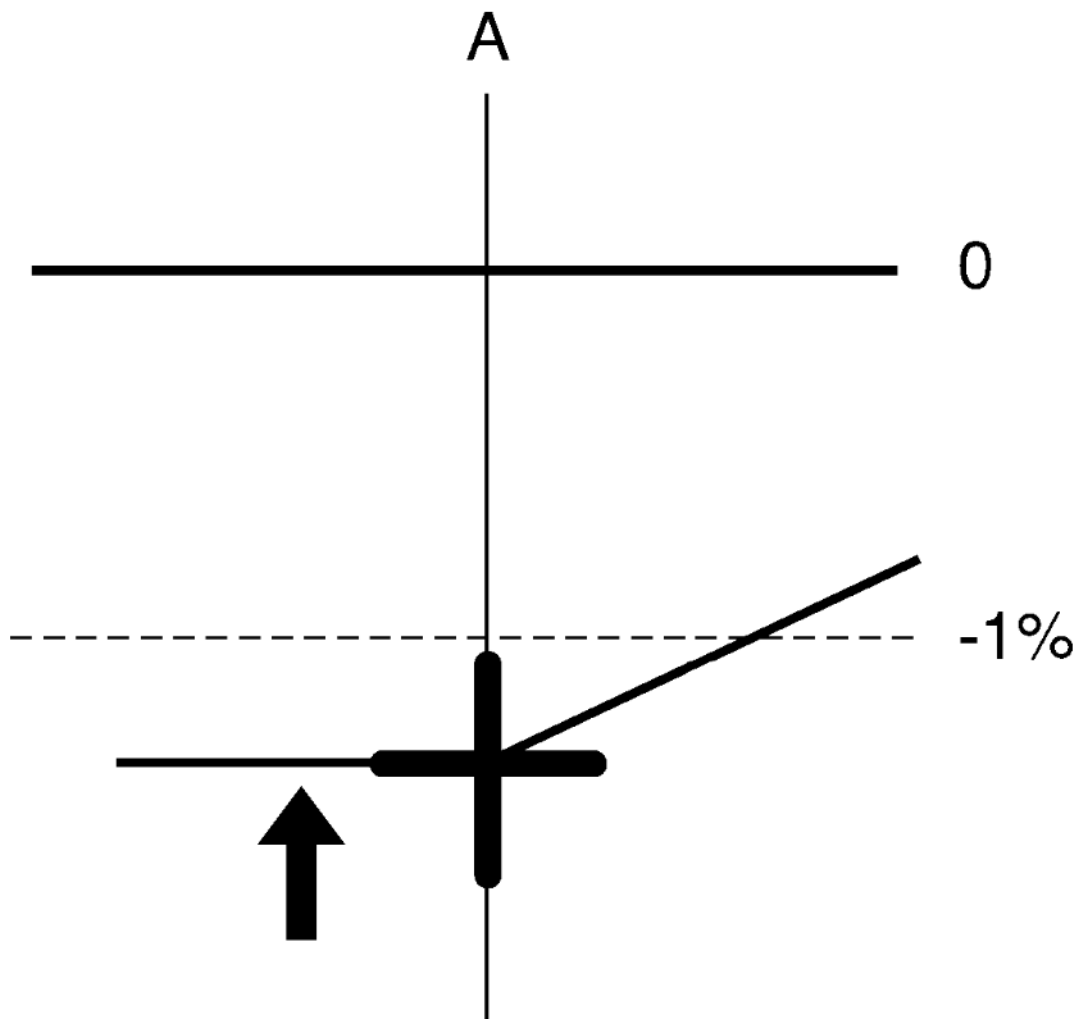


Fig. 26: Headlamp Adjustment Grid

Courtesy of GENERAL MOTORS COMPANY

NOTE: Guide and adjust the headlamps always from below to the horizontal area of the separation line

For the vertical adjustment (adjustment of the height), the separation line has to be on the left side of the adjustment cross parallel to the horizontal adjustment line (1).

NOTE: At first perform the vertical (1) and then the lateral adjustment. Check the vertical adjustment again after the lateral adjustment.

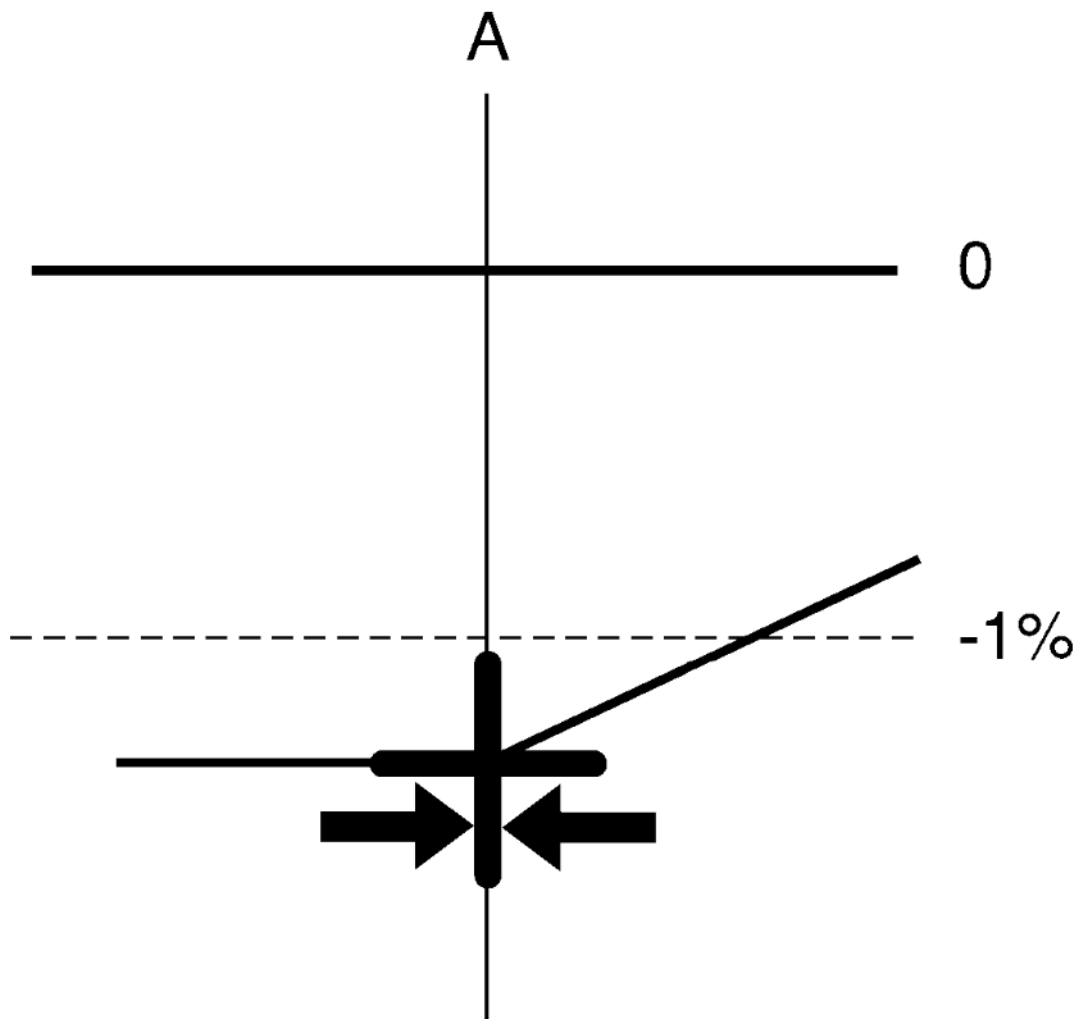


Fig. 27: Vertical Separation Line

Courtesy of GENERAL MOTORS COMPANY

To assure the correct lateral adjustment the horizontal increase (inflection point) must lay on the vertical separation line A (0 degree).

NOTE: This description is valid for right hand traffic. For left hand traffic the light pattern of left and right side is mirrored.

HEADLAMP AIMING (NORTH AMERICA)

Visual Aiming Preparation Procedure

NOTE: Some state and local laws specify requirements for headlamp aim. Comply with all of these laws when performing any headlamp aiming operations.

Headlamp aim should be checked:

- When a new headlamp capsule is installed.
- If service or repairs to the front end area have, or may have, disturbed the headlamps or their mounting.

The aiming screen should meet the following criteria:

- The area will consist of a level surface large enough to allow for a vehicle and an additional 7.62 m (25 ft) measured from face of lamps to the front of the aiming screen.
- The screen will be 1.52 m (5 ft) high x 3.66 m (12 ft) wide with a matte white surface well shaded from extraneous light, and properly adjusted to the floor on which the vehicle stands. Provisions

should be made to align the aiming screen parallel with the vehicle.

- The screen shall be provided with a fixed vertical centerline, two laterally adjustable vertical tapes, and one vertically adjustable horizontal tape.
- If a regular commercial aiming screen is not available, the screen may consist of a vertical wall having a clear uninterrupted area approximately 1.83 m (6 ft) high and 3.66 m (12 ft) wide. The surface should be finished with a washable non-gloss white paint.

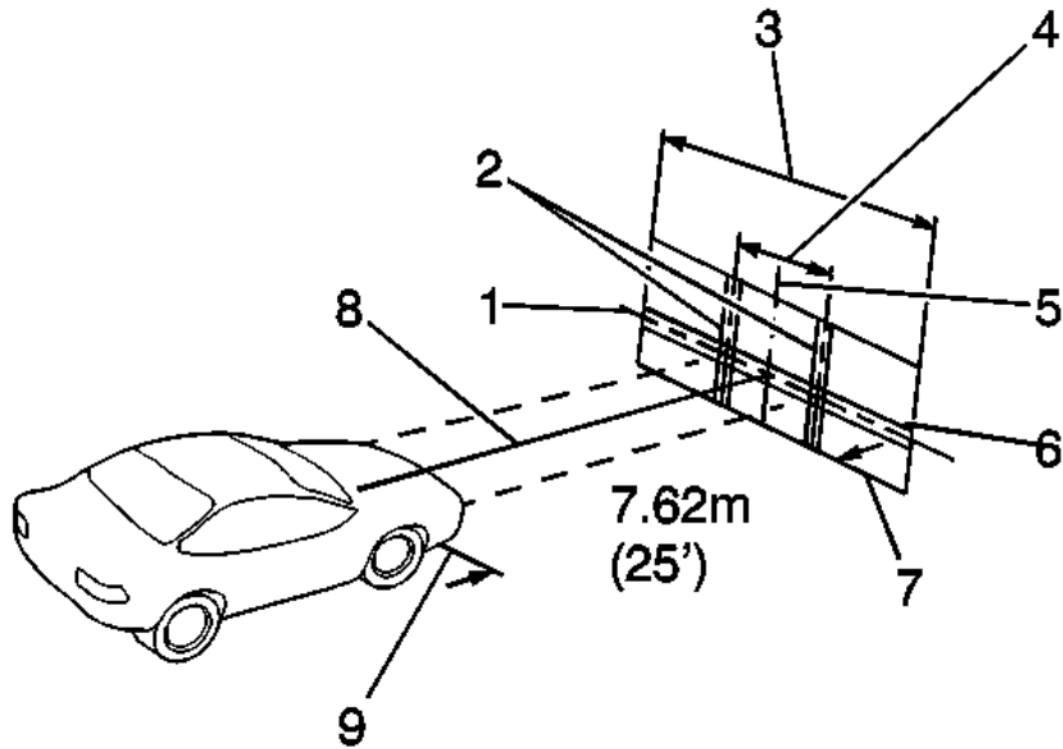


Fig. 28: Headlamp Aiming/Adjustment Procedure

Courtesy of GENERAL MOTORS COMPANY

- After the aiming screen has been set up in a permanent location, paint a reference line on the floor directly under the lens of the lamps to indicate the proper location of the headlamps when they are being aimed:
 - Distance between headlamps (1)
 - Center line of screen (2)
 - Adjustable vertical pointer (3)
 - Adjustable horizontal tape (4)
 - Diagram of light screen (5)
 - Vertical center line ahead of right headlamp pointer position (6)
 - 7.62 m (25 ft) (7)
 - Car axis (8)
 - Adjustable vertical pointer
 - Horizontal center line of lamps
 - Vertical center line ahead of left headlamp

Prior to aiming the headlamps, the following steps must be taken:

1. Remove any snow, ice or mud from the vehicle.
2. Stop all other work on the vehicle.
3. If any service has been performed on the vehicle, make sure that all of the components are back in their original place.
4. The vehicle must be on a level surface.

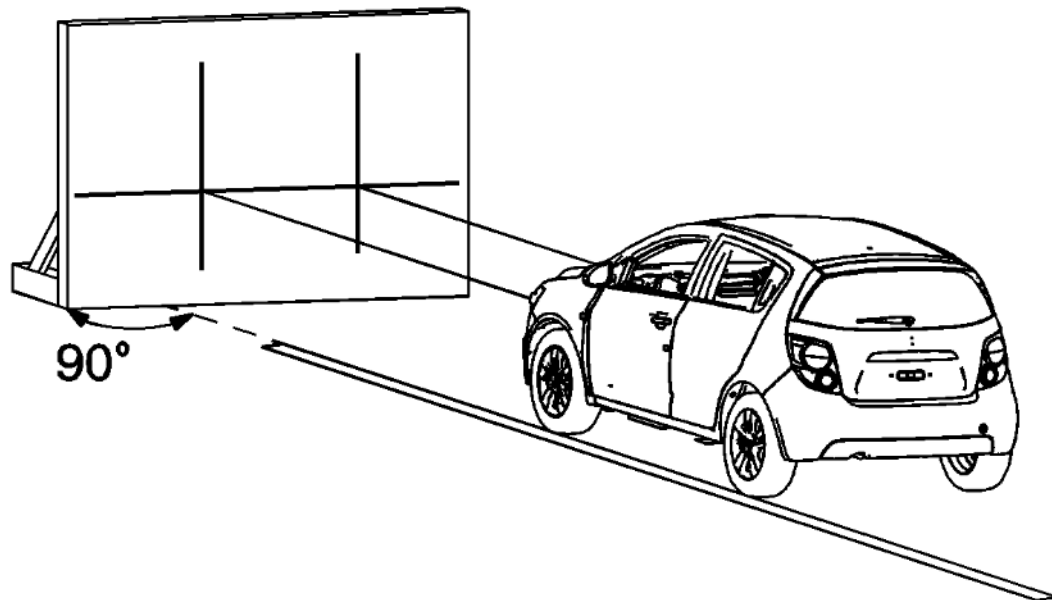


Fig. 29: Headlamp Aiming

Courtesy of GENERAL MOTORS COMPANY

5. The vehicle left tires must be aligned with the reference line extending from the screen with the headlamps aligned with the reference line.
6. Do not load any cargo in the vehicle.
7. The vehicle must contain approximately 75 kg (165 lb) on the driver seat.
8. Inflate the tires to the proper pressure.
9. Simulate the vehicle loads if the intended use of the vehicle is for hauling heavy loads or towing a trailer.
10. Rock the vehicle in order to stabilize the suspension.
11. Turn on the headlamps to low beam and observe the left and the top edges of the high intensity zone on the screen. The edges of the high intensity zone should fall within the specifications.

Headlamp Aiming Procedure

1. Open the hood.

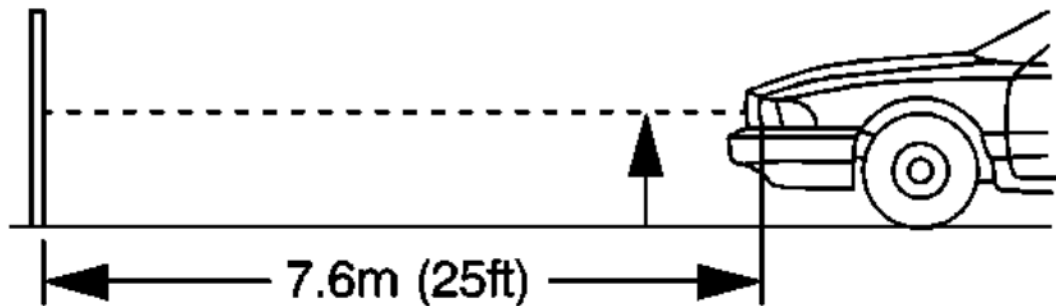


Fig. 30: Measuring Distance Between Headlamps Face & Aiming Screen
Courtesy of GENERAL MOTORS COMPANY

2. Measure from the floor to the center of the headlamp bulb. Some headlamps have an aim dot marked on the headlamp lens.
3. At the screen, measure from the floor and place the horizontal tape at the measured distance.
4. Measure from the reference line on the floor to the left headlamp bulb centerline.
5. At the screen, measure from the reference line and place the vertical tape at the measured distance.
6. Measure from the reference line on the floor to the right headlamp bulb centerline.
7. At the screen, measure from the reference line and place the vertical tape at the measured distance.

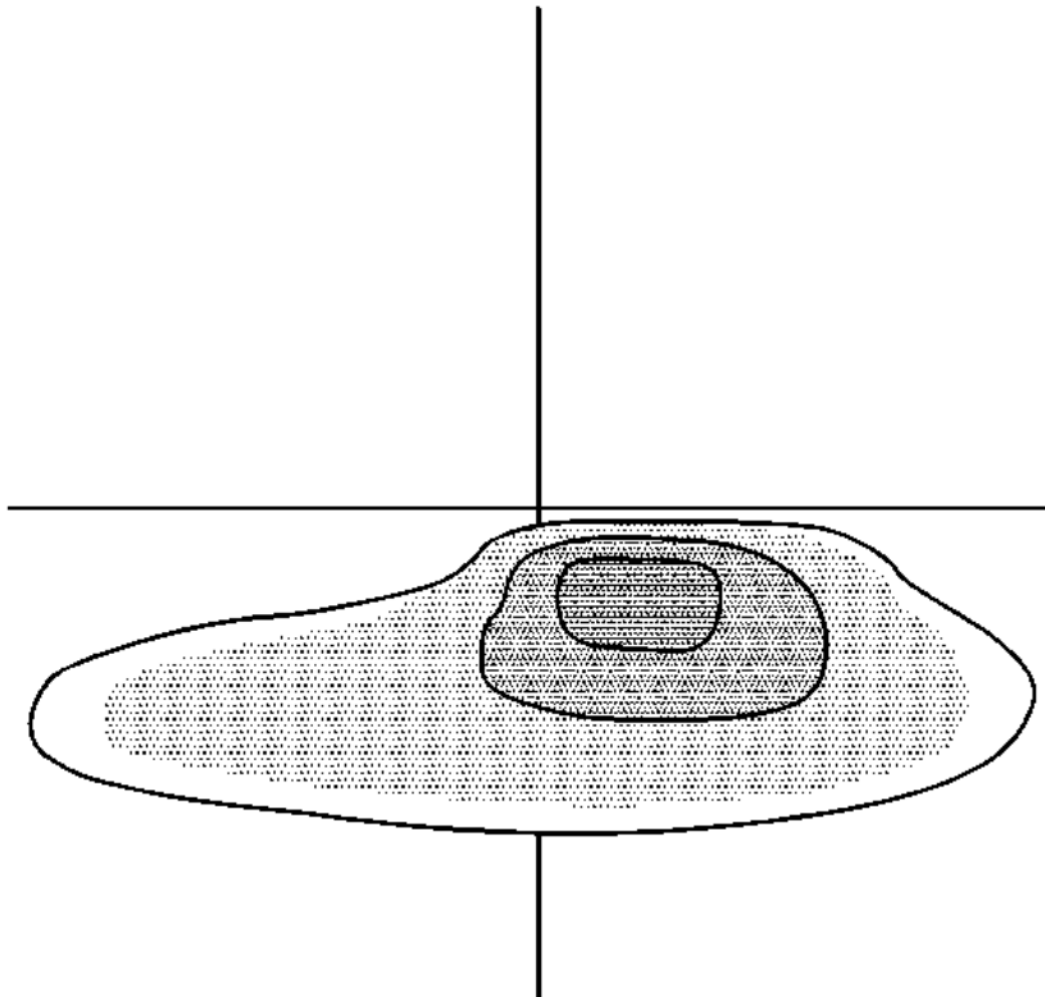


Fig. 31: Right Side Low Beam Proper Screen Positioning
Courtesy of GENERAL MOTORS COMPANY

NOTE: DO NOT cover the headlamp. This may cause excessive heat build up.

8. Turn ON the low beam headlamps. Block the light from projecting onto the screen from the passenger side headlamp.

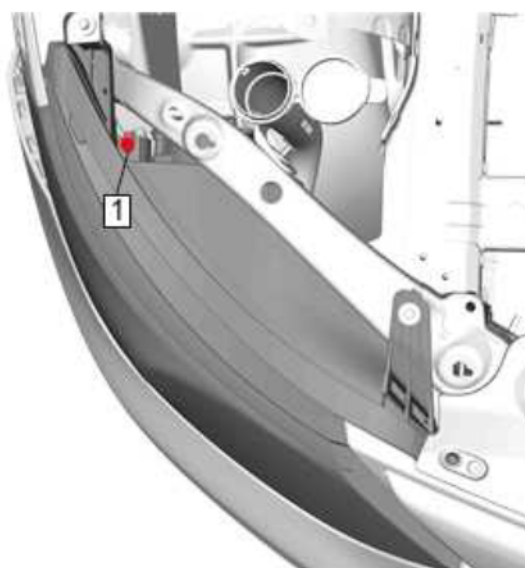


Fig. 32: Vertical Aim Screw
Courtesy of GENERAL MOTORS COMPANY

9. Adjust the vertical aim screw (1) of the headlamps to the specifications required by the state and the local authorities, or as shown in step number 8.
10. Repeat the aiming procedure for the passenger side headlamp while blocking the light from projecting onto the screen from the driver side headlamp.
11. Turn the headlamps OFF.
12. Close the hood.

FRONT TURN SIGNAL LAMP REPLACEMENT

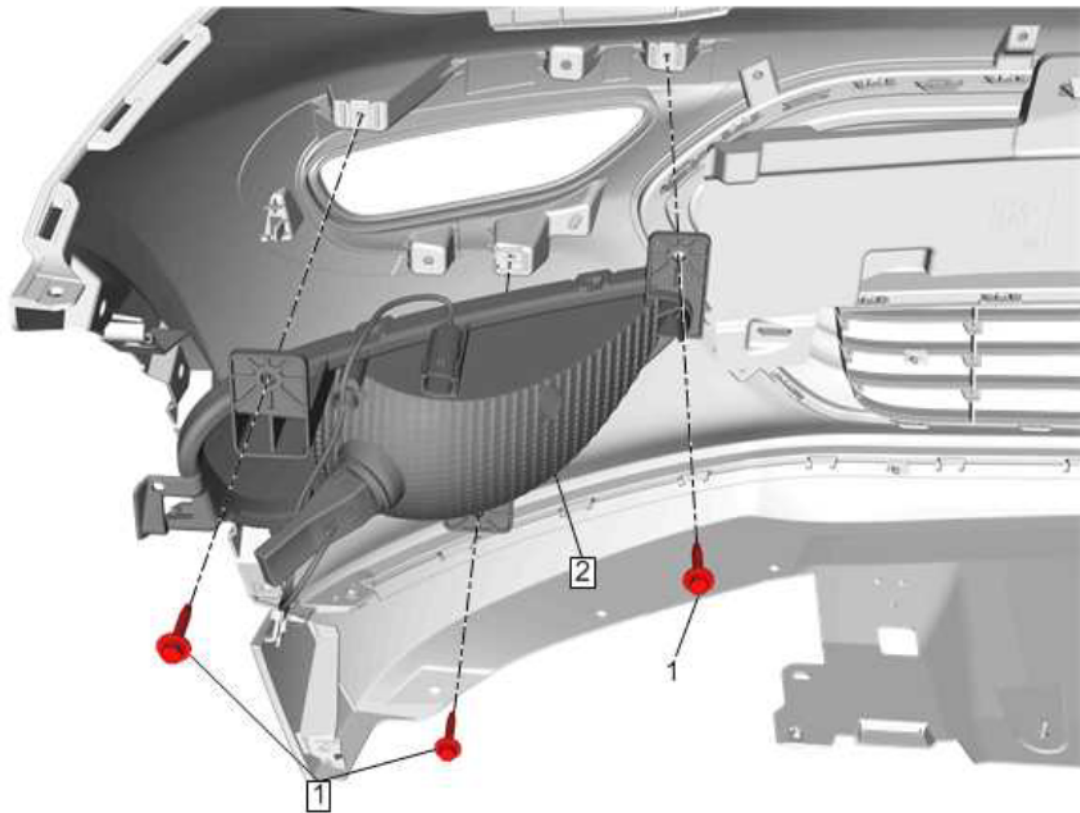


Fig. 33: Front Turn Signal Lamp

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure <u>Front Bumper Fascia Replacement (North America)</u> <u>Front Bumper Fascia Replacement (Europe, Korea)</u>	
1	Front Turn Signal Lamp Bolt CAUTION: <u>Fastener Caution</u> Tighten 2.5 N.m (22 lb in)
2	Front Turn Signal Lamp Procedure Disconnect the electrical connector.

REAR SIDE MARKER LAMP REPLACEMENT

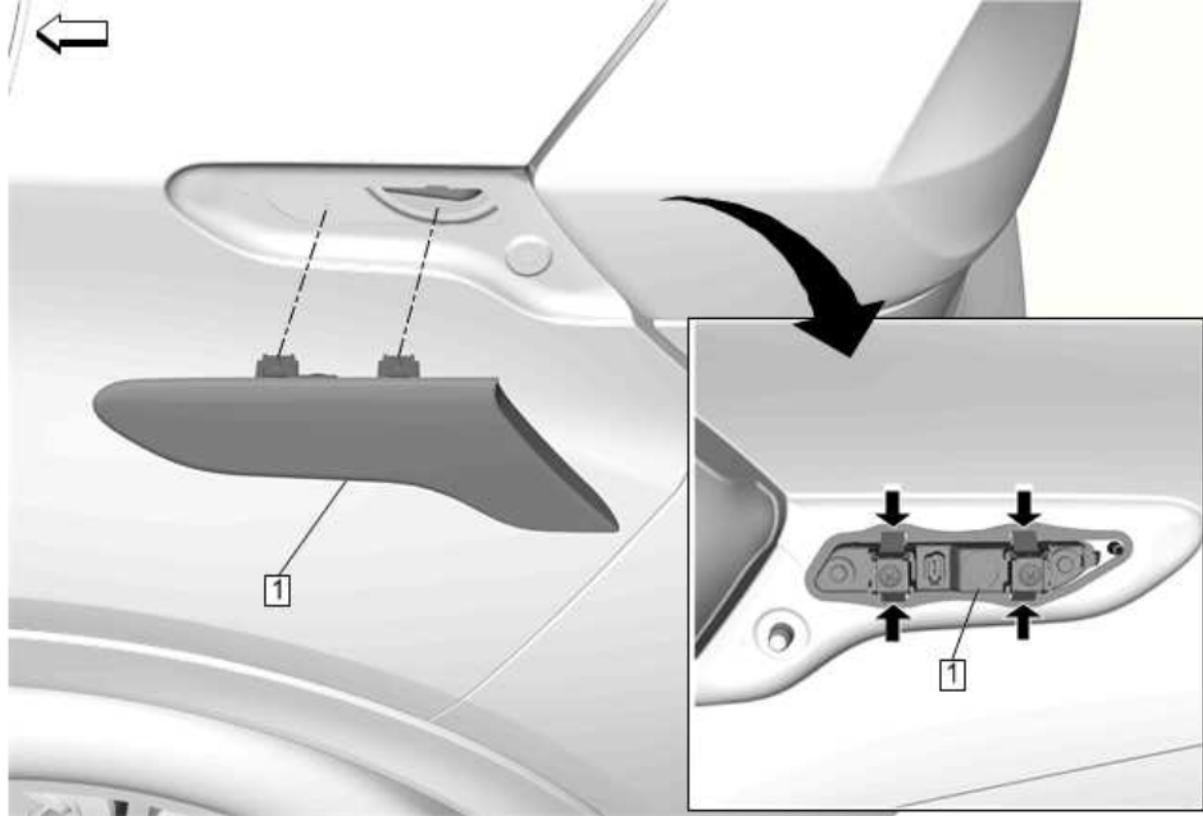


Fig. 34: Rear Side Marker Lamp

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	CAUTION: To avoid paint damage, protect the area surrounding the part which you are removing or installing. CAUTION: Be very careful and gentle when using the plastic trim tool to remove the rear side marker lamp. The rear side marker lamp is very brittle and will be damaged if one is not careful with the plastic trim tool. If the rear side marker lamp is damaged it must be replaced. Rear Side Marker LampProcedure Using a plastic trim tool, remove the side marker lamp from the body.

FRONT TURN SIGNAL LAMP BULB REPLACEMENT

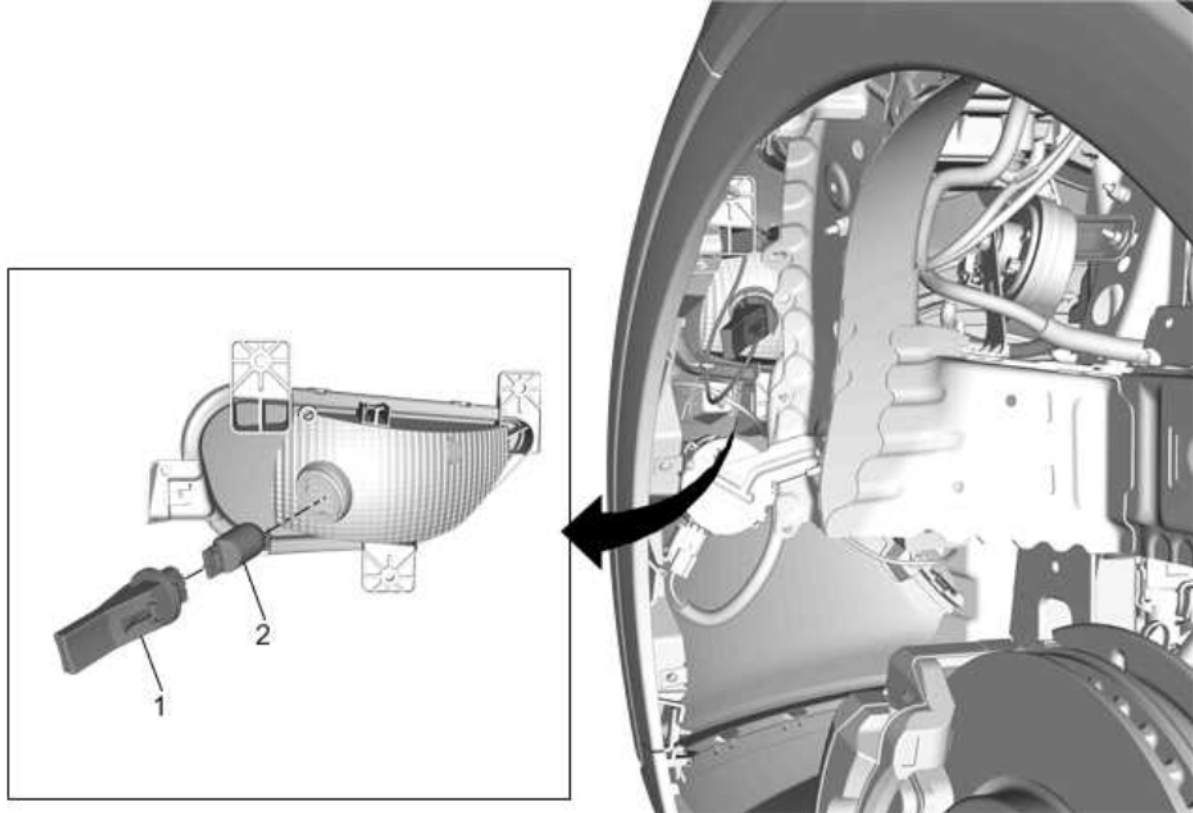


Fig. 35: Front Turn Signal Lamp Bulb
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
WARNING: Halogen Bulb Warning	
Preliminary Procedure Front Wheelhouse Liner Replacement	
1	Front Turn Signal Lamp Bulb Socket Procedure Rotate the bulb socket counterclockwise to remove it from the lamp housing.
2	Front Turn Signal Lamp Bulb Procedure Pull the bulb straight from the lamp socket.

HIGH MOUNT STOP LAMP REPLACEMENT

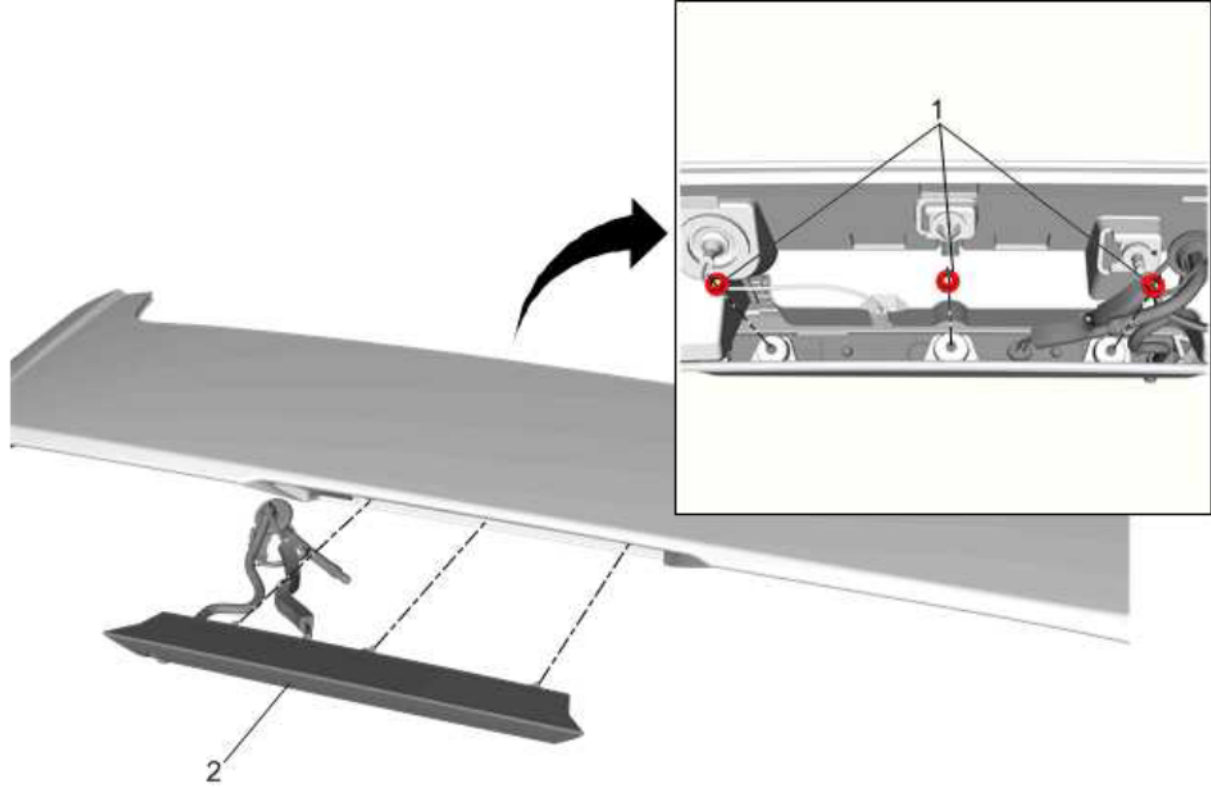


Fig. 36: High Mount Stop Lamp

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure <u>Rear End Spoiler Replacement</u>	
1	High Mount Stop Lamp Nut CAUTION: <u>Fastener Caution</u> Tighten 6 N.m (53 lb in)
2	High Mount Stop Lamp Procedure Disconnect the washer hose from rear washer nozzle. Route the hose and harness through the spoiler.

CARGO CENTER COURTESY LAMP REPLACEMENT

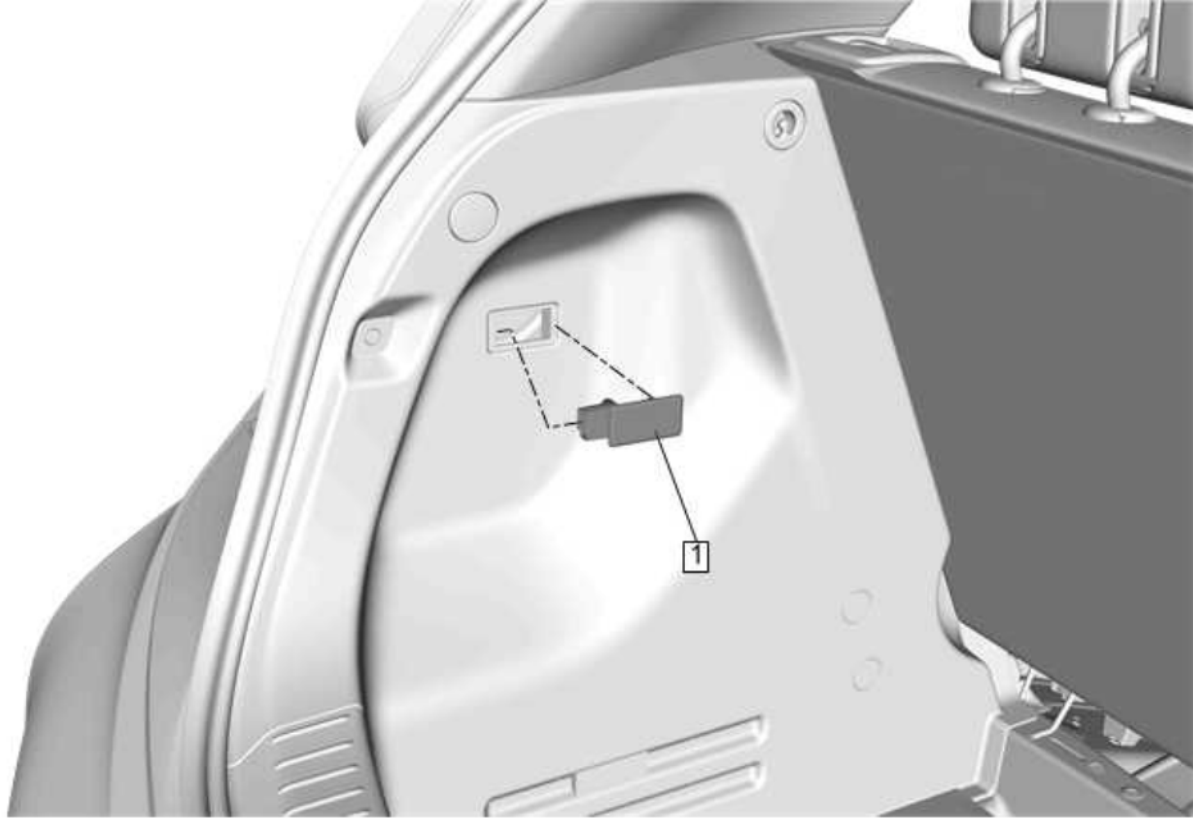


Fig. 37: Cargo Center Courtesy Lamp
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Cargo Center Courtesy Lamp Procedure 1. Use a plastic flat bladed trim tool in order to release the lamp assembly. 2. Disconnect the electrical connector.

CARGO CENTER COURTESY LAMP BULB REPLACEMENT

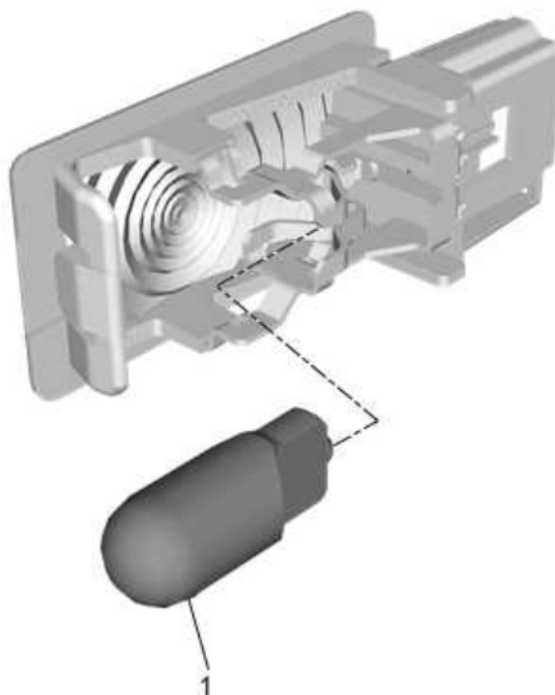


Fig. 38: Cargo Center Courtesy Lamp Bulb
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure <u>Cargo Center Courtesy Lamp Replacement</u>	
1	Cargo Center Courtesy Lamp Bulb

REAR LICENSE PLATE LAMP REPLACEMENT

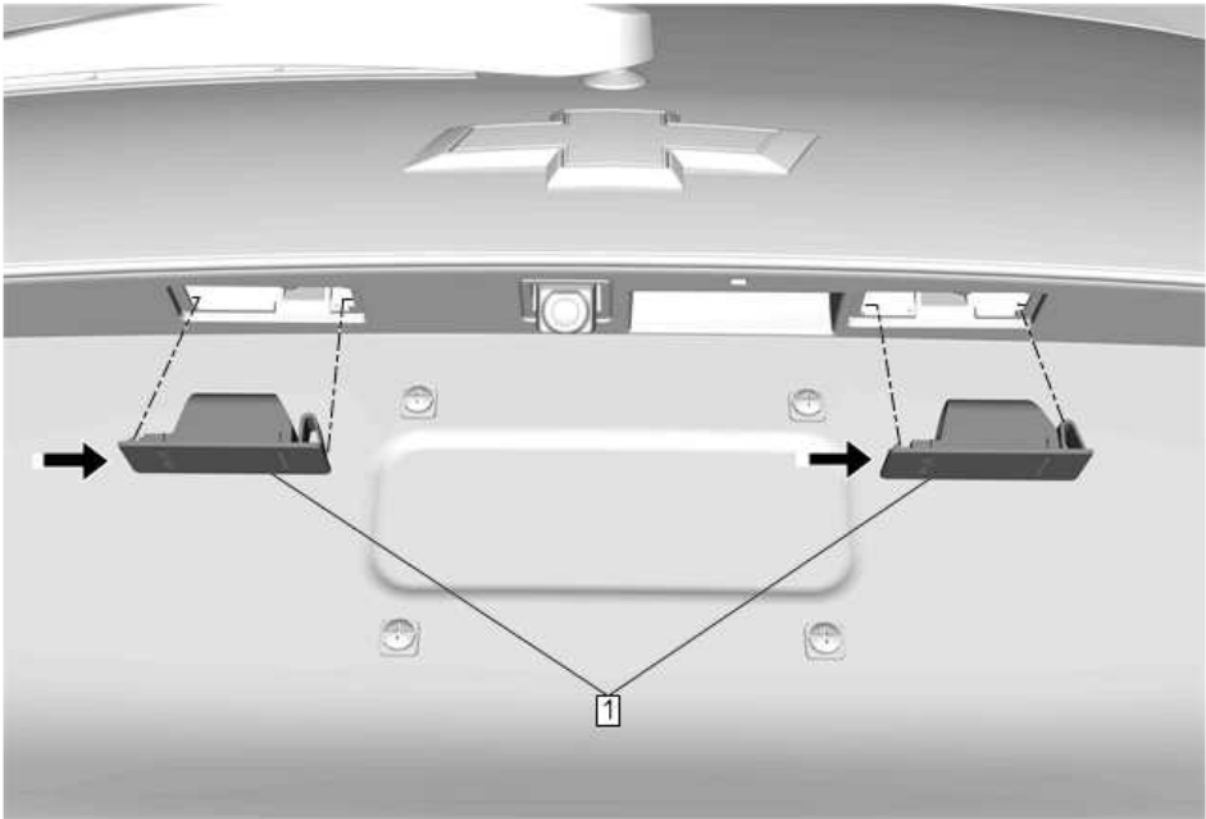


Fig. 39: Rear License Plate Lamp
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Rear License Plate Lamp
	Procedure 1. Using a plastic trim tool, from the left side, gently pry the lamp to the right, then downward to release and remove. 2. Remove the sockets from the lamps by twisting counterclockwise.

REAR LICENSE PLATE LAMP BULB REPLACEMENT

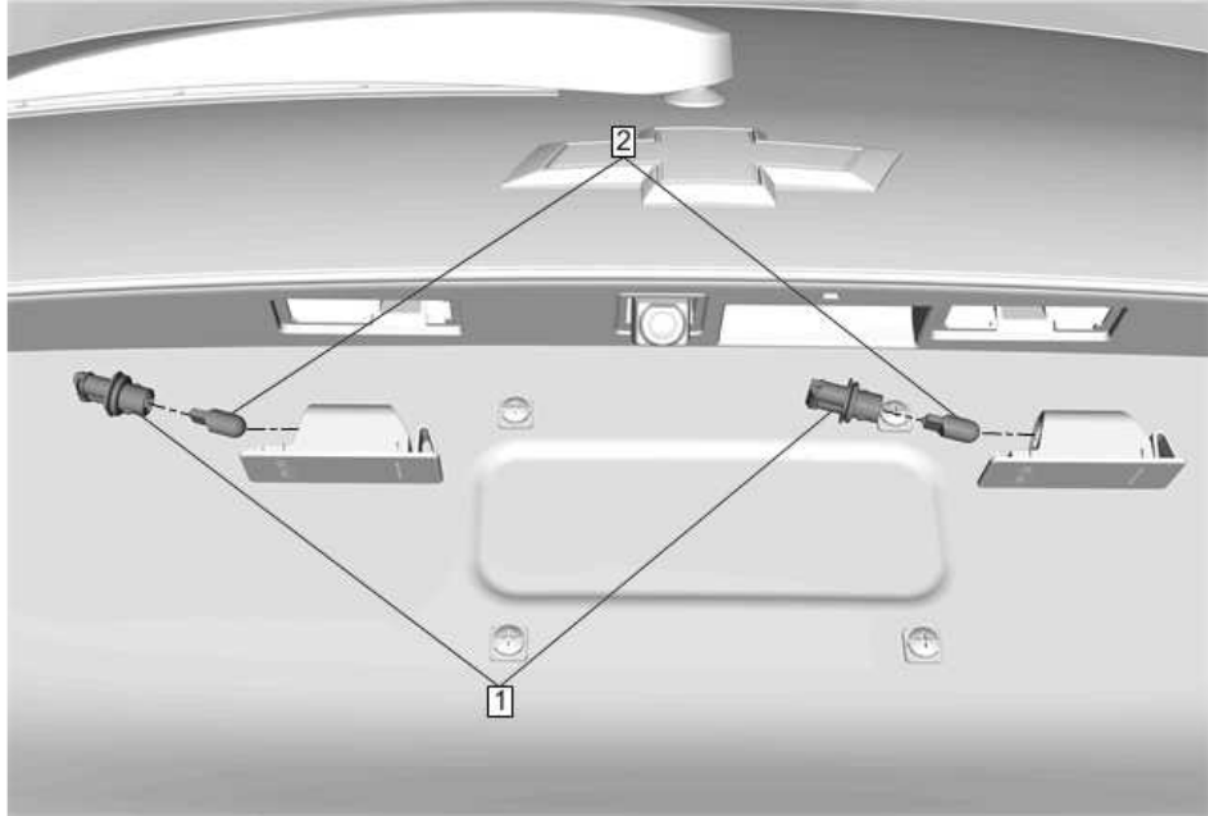


Fig. 40: Rear License Plate Lamp Bulb
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure	
<u>Rear License Plate Lamp Replacement</u>	
1	License Plate Lamp Socket Procedure Rotate the bulb socket counterclockwise to remove it from the lamp housing.
2	Rear License Plate Lamp Bulb Procedure Pull the bulb straight from the lamp socket.

REAR LICENSE PLATE LAMP WIRING HARNESS REPLACEMENT

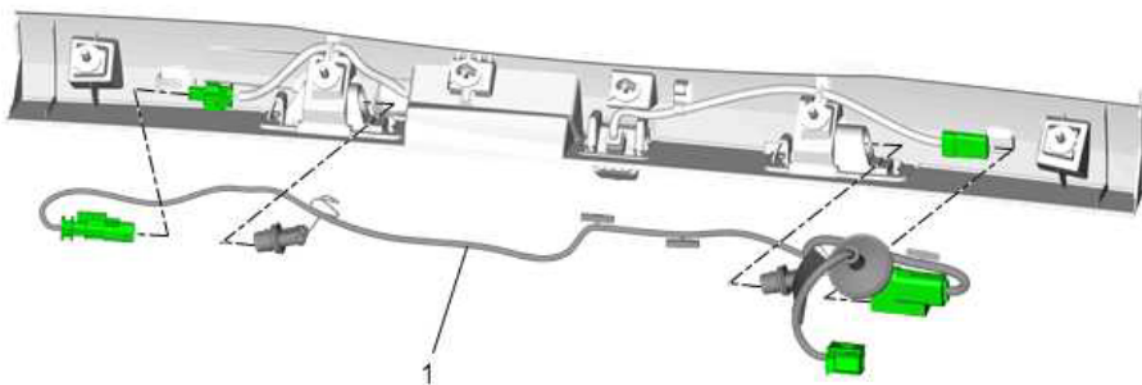


Fig. 41: Rear License Plate Lamp Wiring Harness
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure <u>Rear Closure Center Applique Replacement</u>	
1	Rear License Plate Lamp Wiring Harness Procedure 1. Disconnect the electrical connector. 2. Transfer components as necessary.

REAR COMBINATION LAMP REPLACEMENT

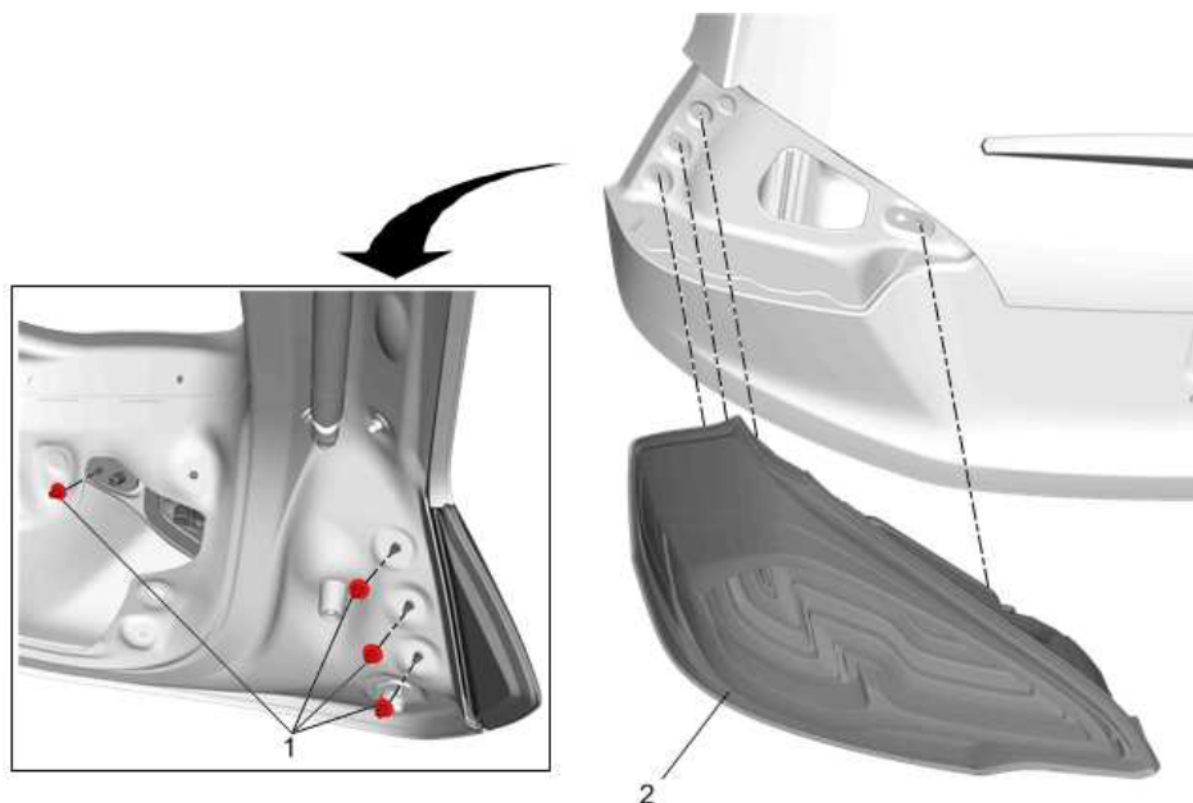


Fig. 42: Rear Combination Lamp
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure <u>Liftgate Lower Trim Finish Panel Replacement</u>	
1	Rear Combination Lamp Nut CAUTION: Refer to <u>Fastener Caution</u> . Procedure Remove the lamp stud cover / cap Tighten 4.7 N.m (42 lb in)

Callout	Component Name
2	Rear Combination Lamp Procedure 1. Disconnect the electrical connector. 2. Release the integral retainers by pulling the lamp outward.

STOP AND TURN SIGNAL LAMP BULB REPLACEMENT (EUROPE, KOREA WITH REAR FOG)

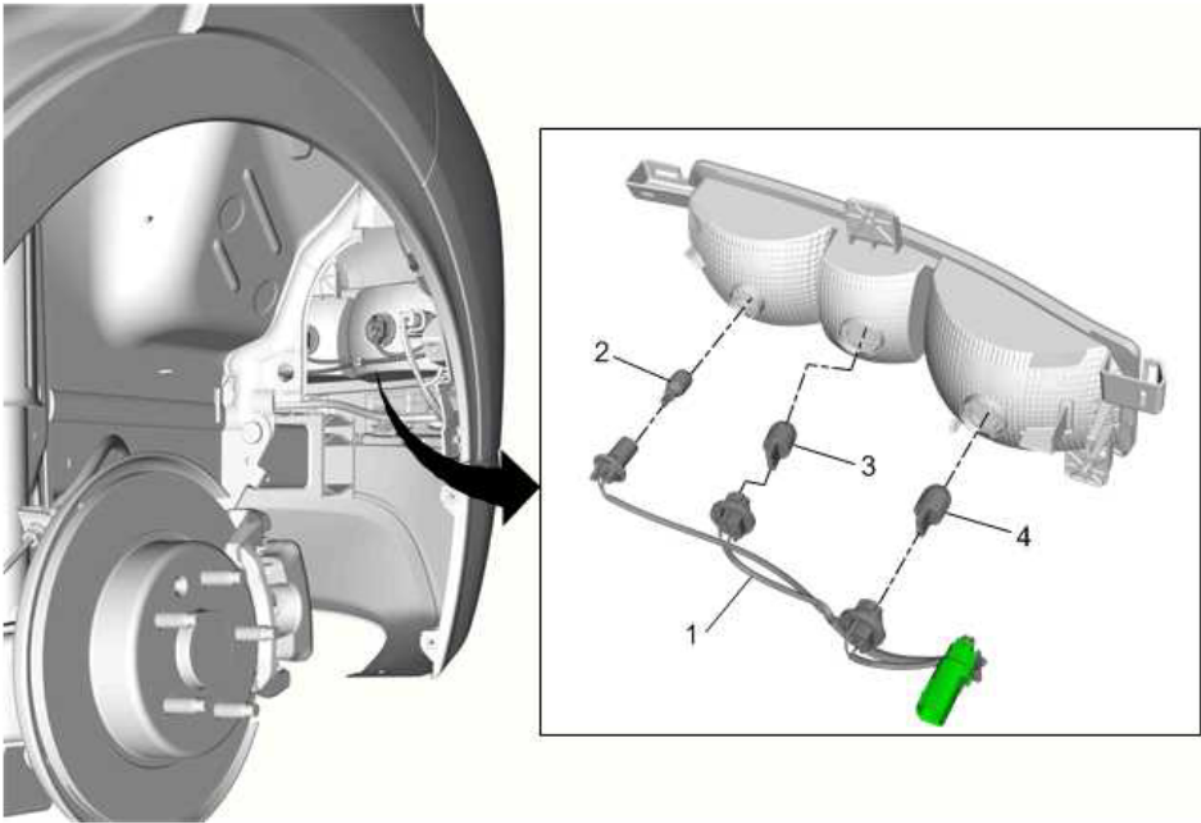


Fig. 43: Stop and Turn Signal Lamp Bulb (Europe, Korea with Rear Fog)
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
WARNING: Halogen Bulb Warning	
Preliminary Procedure Raise and support the vehicle. Lifting and Jacking the Vehicle	
1	Stop and Turn Signal Lamp Bulb Socket Procedure Rotate the bulb socket counterclockwise to remove it from the lamp housing.
2	Rear Fog Bulb Procedure Pull the bulb straight from the lamp socket.
3	Turn Signal Bulb Procedure Pull the bulb straight from the lamp socket.
4	Tail and Stop Bulb Procedure 1. Pull the bulb straight from the lamp socket. 2. Lower the vehicle. Lifting and Jacking the Vehicle

STOP AND TURN SIGNAL LAMP BULB REPLACEMENT (EUROPE, KOREA, NORTH AMERICA WITH BACK-UP BULB)

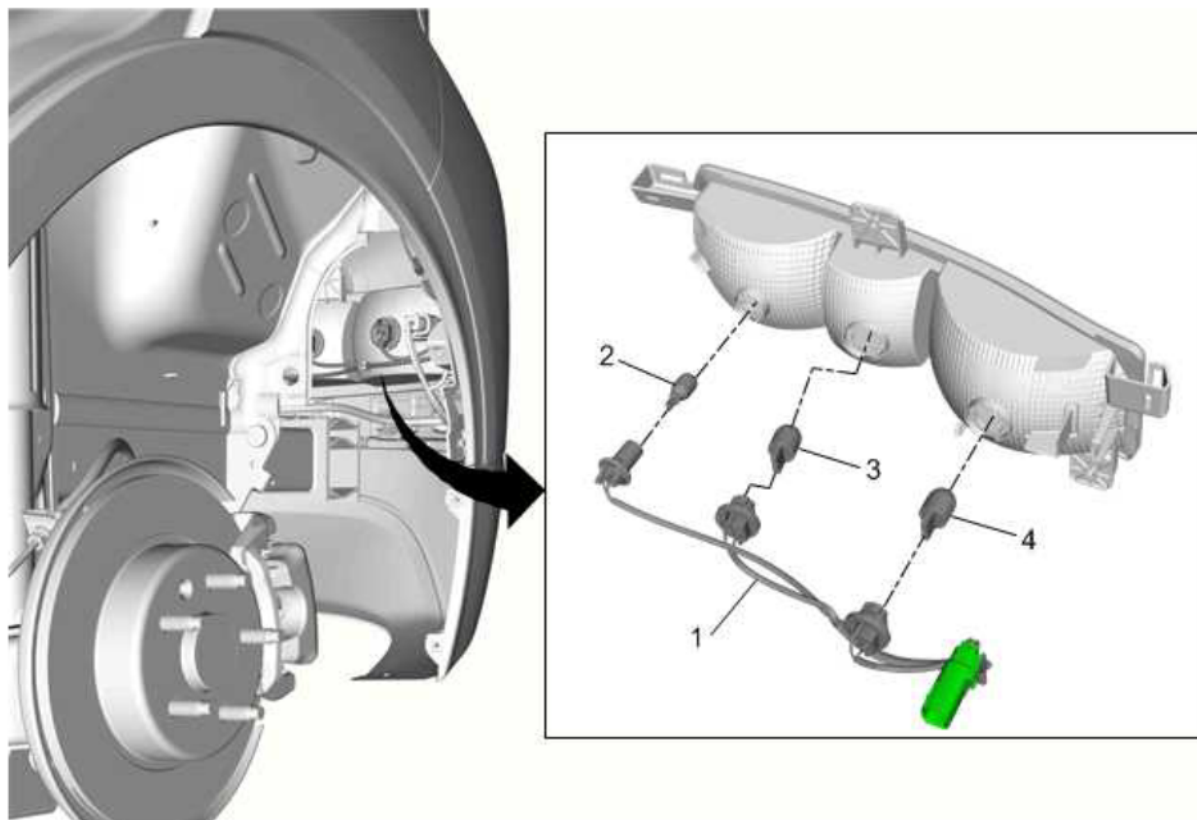


Fig. 44: Stop and Turn Signal Lamp Bulb (Europe, Korea, North America with Back-up Bulb)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
WARNING: Halogen Bulb Warning	
Preliminary Procedure Raise and support the vehicle. Lifting and Jacking the Vehicle	
1	Stop and Turn Signal Lamp Bulb Socket Procedure Rotate the bulb socket counterclockwise to remove it from the lamp housing.
2	Back Up Bulb Procedure Pull the bulb straight from the lamp socket.
3	Turn Signal Bulb Procedure Pull the bulb straight from the lamp socket.
4	Tail and Stop Bulb Procedure 1. Pull the bulb straight from the lamp socket. 2. Lower the vehicle. Lifting and Jacking the Vehicle

REAR FASCIA LOWER SIGNAL LAMP REPLACEMENT

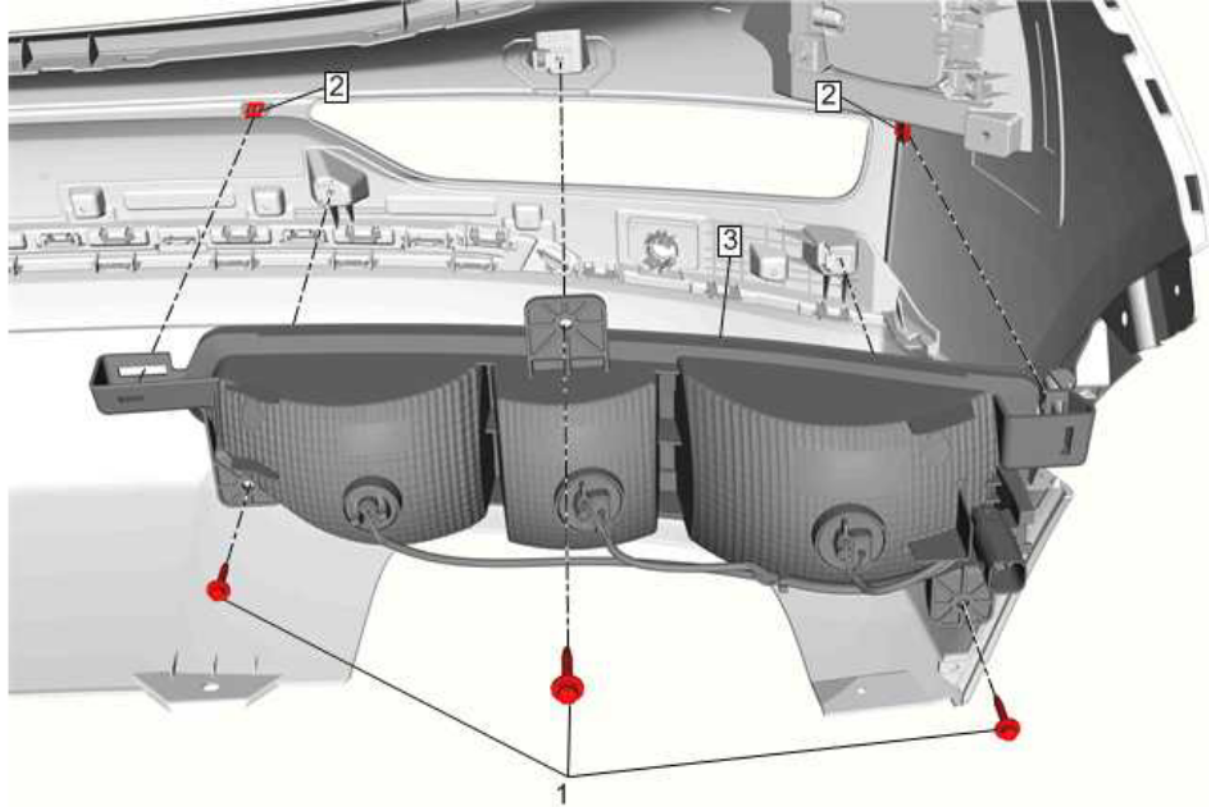


Fig. 45: Rear Fascia Lower Signal Lamp
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Rear Bumper Fascia Replacement	
1	Rear Fascia Lower Signal Lamp Bolt CAUTION: Refer to Fastener Caution . Tighten 2.5 N.m (22 lb in)
2	Rear Fascia Lower Signal Lamp Clip
3	Rear Fascia Lower Signal Lamp Procedure 1. Disconnect the electrical connector. 2. Transfer components as necessary.

TAIL LAMP CONTROL MODULE REPLACEMENT

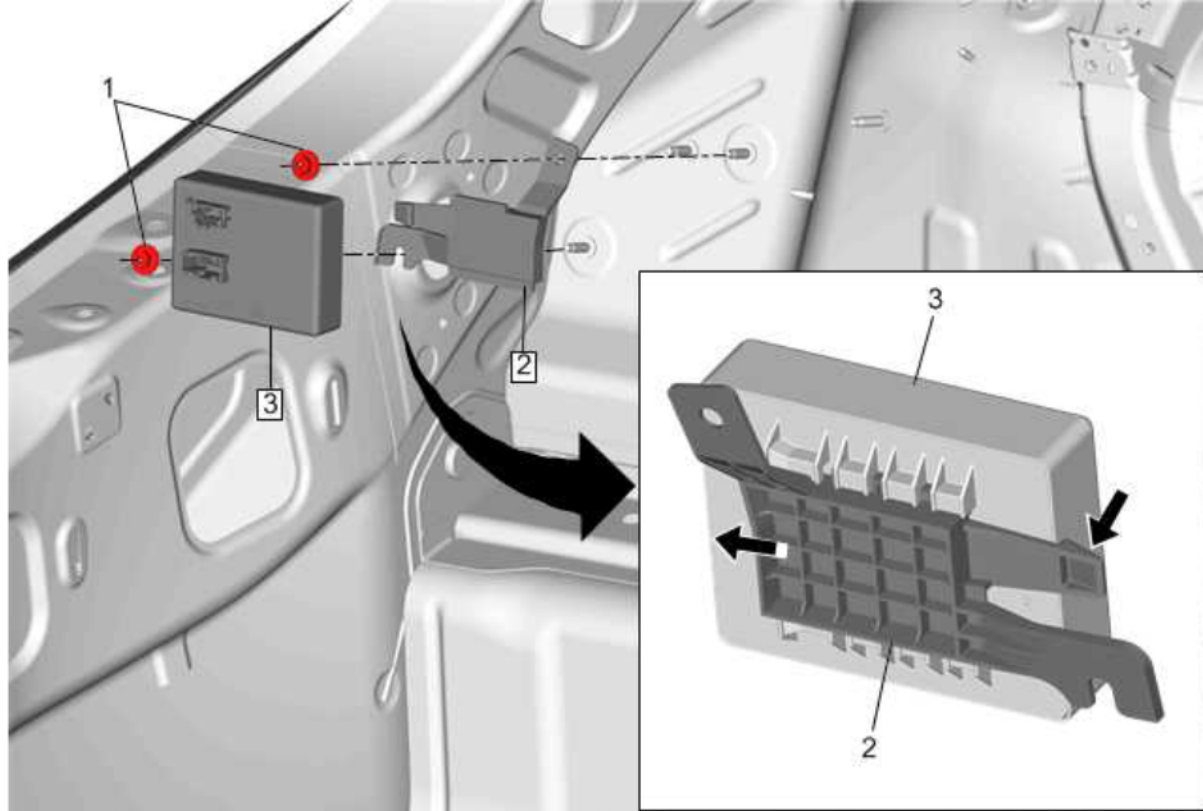


Fig. 46: Tail Lamp Control Module

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures Quarter Lower Rear Trim Panel-Left Side - Remove - Quarter Lower Rear Trim Panel Replacement	
1	Tail Lamp Control Module Nut CAUTION: Fastener Caution Tighten 8 N.m (71 lb in)
2	Tail Lamp Control Module Bracket Procedure Slide the module bracket and remove it from the module.
3	Tail Lamp Control Module Procedure 1. Disconnect the electrical connector. 2. Perform the necessary programming and setup procedure: Control Module References

2017 ACCESSORIES AND EQUIPMENT

Lighting - Schematic Wiring Diagrams - Bolt EV

SCHEMATIC WIRING DIAGRAMS

HEADLIGHTS/DAYTIME RUNNING LIGHTS (DRL) WIRING SCHEMATICS

Controls and Indicators

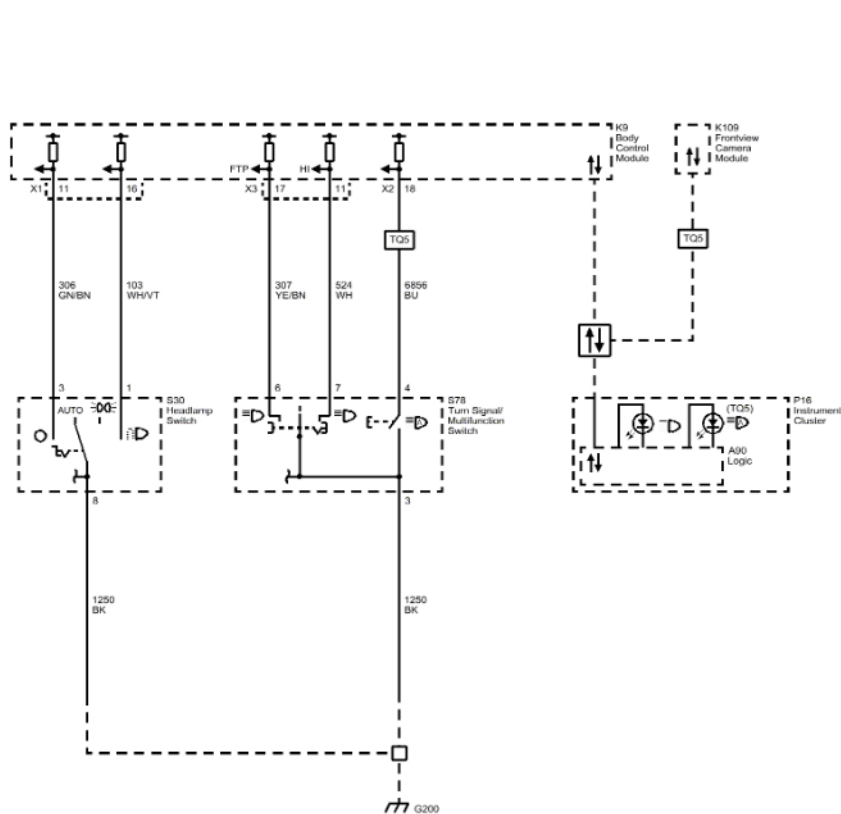


Fig. 1: Controls and Indicators

Courtesy of GENERAL MOTORS COMPANY

Headlamps and Daytime Running Lamps

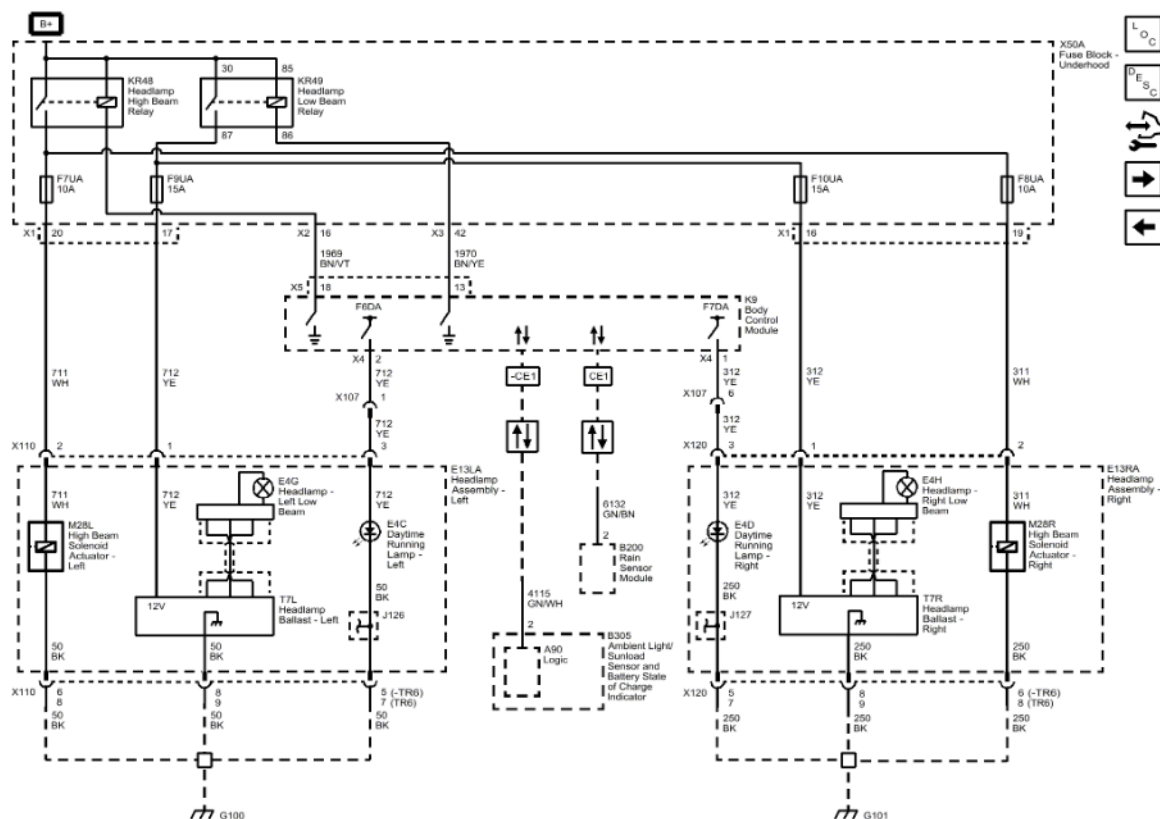


Fig. 2: Headlamps and Daytime Running Lamps
Courtesy of GENERAL MOTORS COMPANY

Manual Headlamp Leveling (TR6)

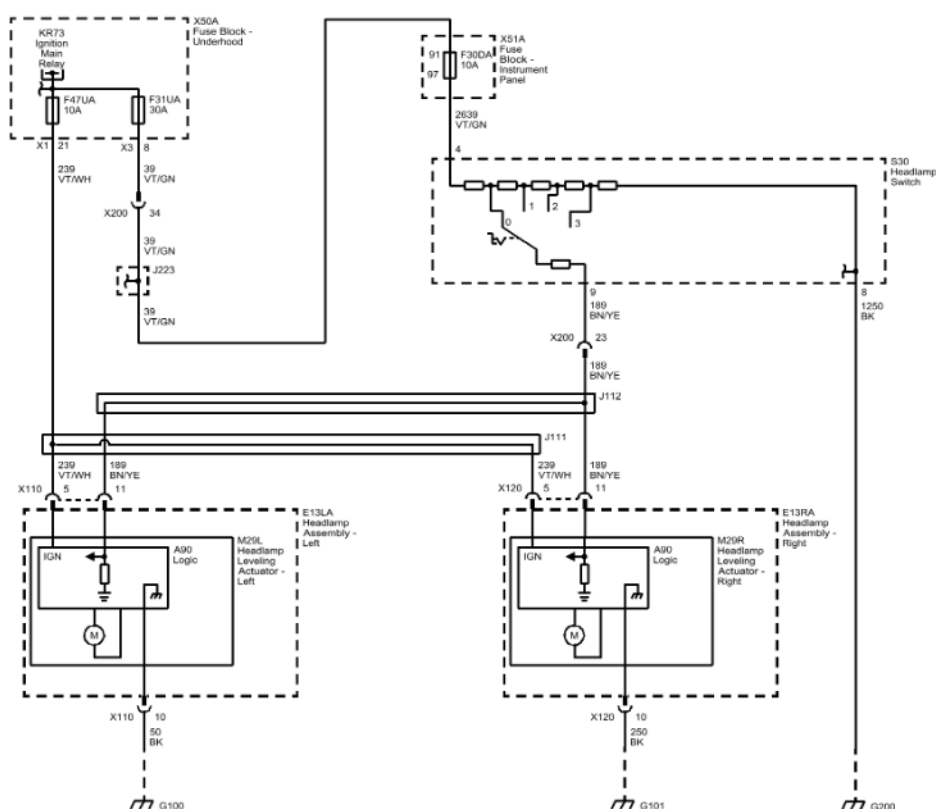


Fig. 3: Manual Headlamp Leveling (TR6)
Courtesy of GENERAL MOTORS COMPANY

FOG LIGHTS WIRING SCHEMATICS

Rear Fog Light (VD1)

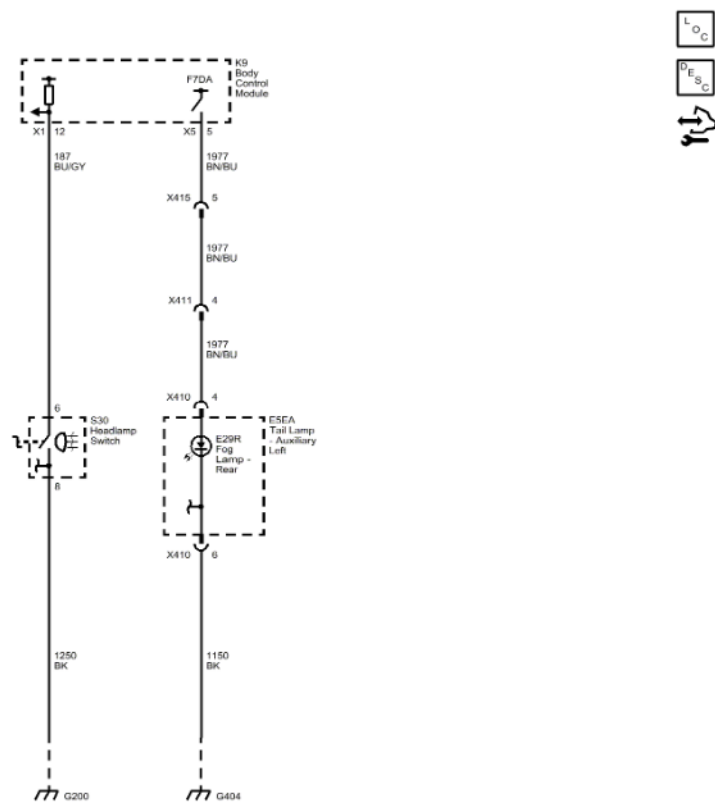


Fig. 4: Rear Fog Light (VD1)

Courtesy of GENERAL MOTORS COMPANY

EXTERIOR LIGHTS WIRING SCHEMATICS

Controls and Indicators

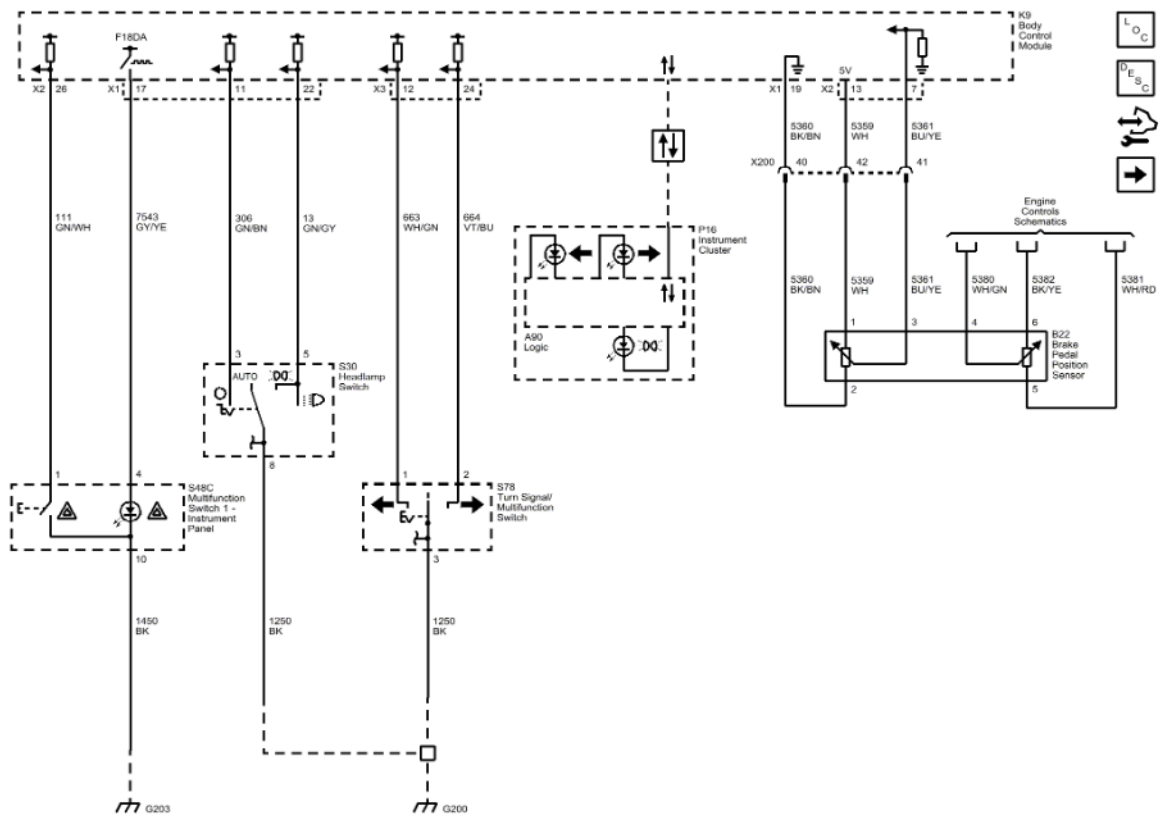


Fig. 5: Controls and Indicators

Courtesy of GENERAL MOTORS COMPANY

Park/Position Lamps

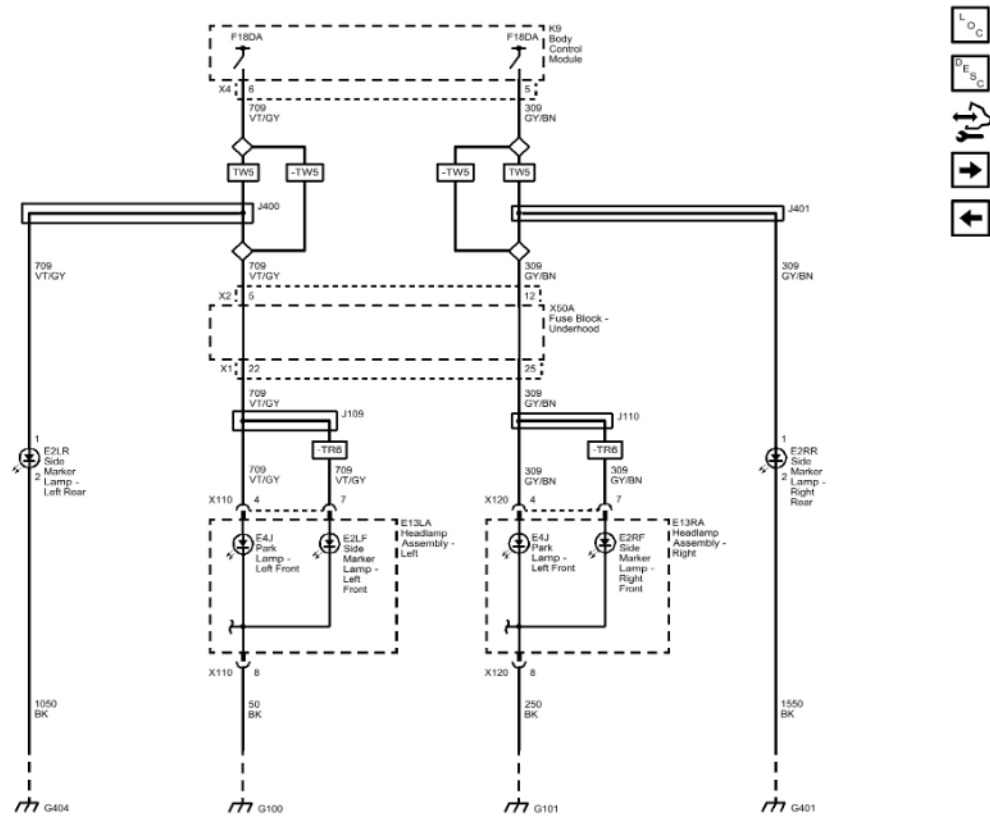


Fig. 6: Park/Position Lamps
Courtesy of GENERAL MOTORS COMPANY

Front Turn Signal and Repeater Lamps

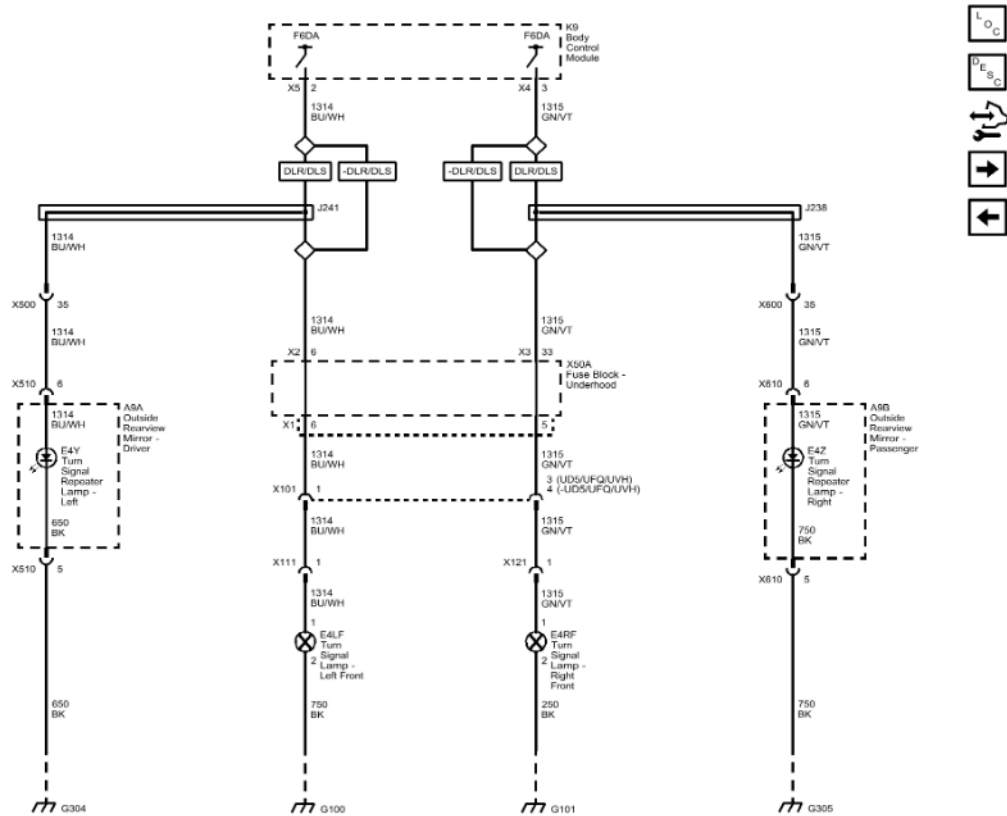


Fig. 7: Front Turn Signal and Repeater Lamps
Courtesy of GENERAL MOTORS COMPANY

Tail, Stop, and Rear Turn Signal Lamps (MBM)

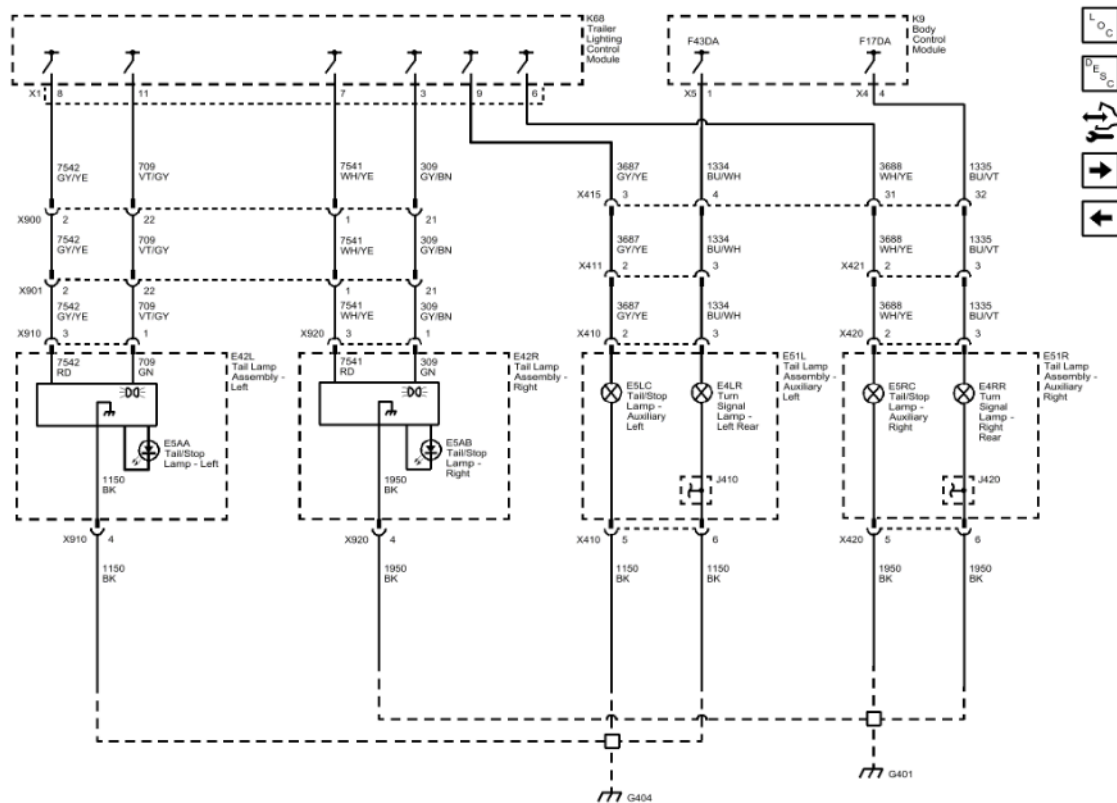


Fig. 8: Tail, Stop, and Rear Turn Signal Lamps (MBM)
Courtesy of GENERAL MOTORS COMPANY

Tail, Stop, and Rear Turn Signal Lamps (MAH/MBC/MAW/MCX)

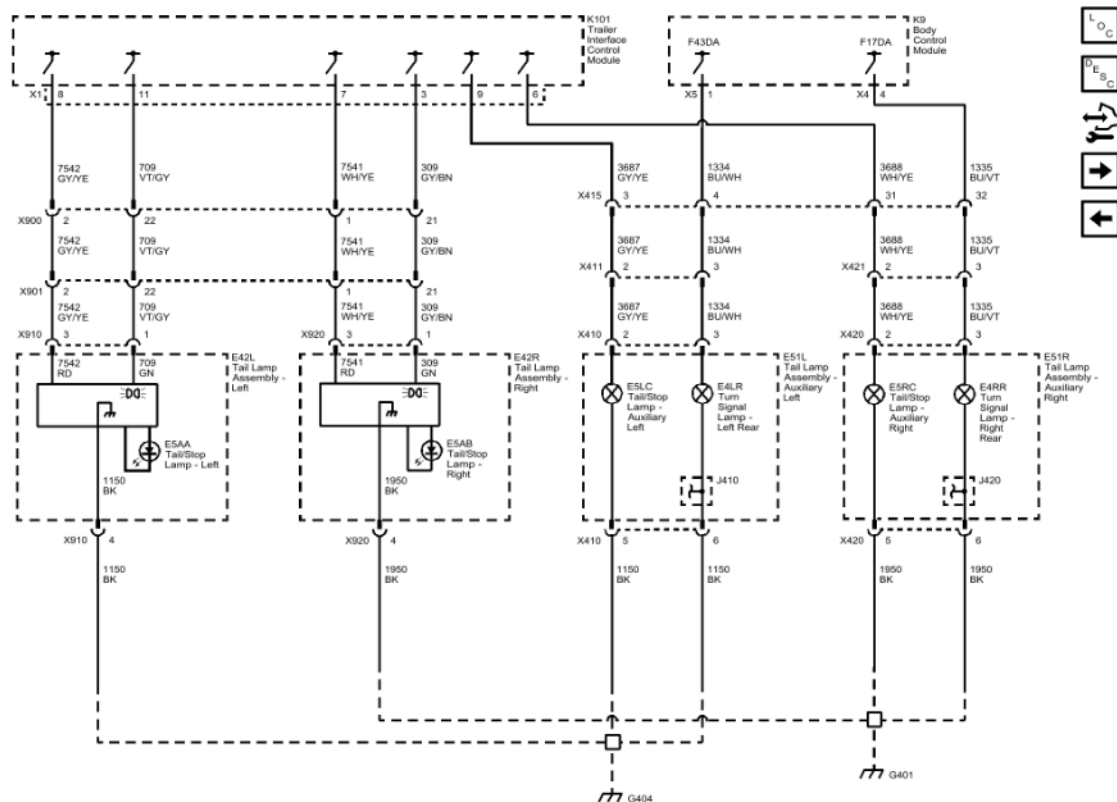


Fig. 9: Tail, Stop, and Rear Turn Signal Lamps (MAH/MBC/MAW/MCX)
Courtesy of GENERAL MOTORS COMPANY

Backup, Center Stop, and License Lamps (MBM)

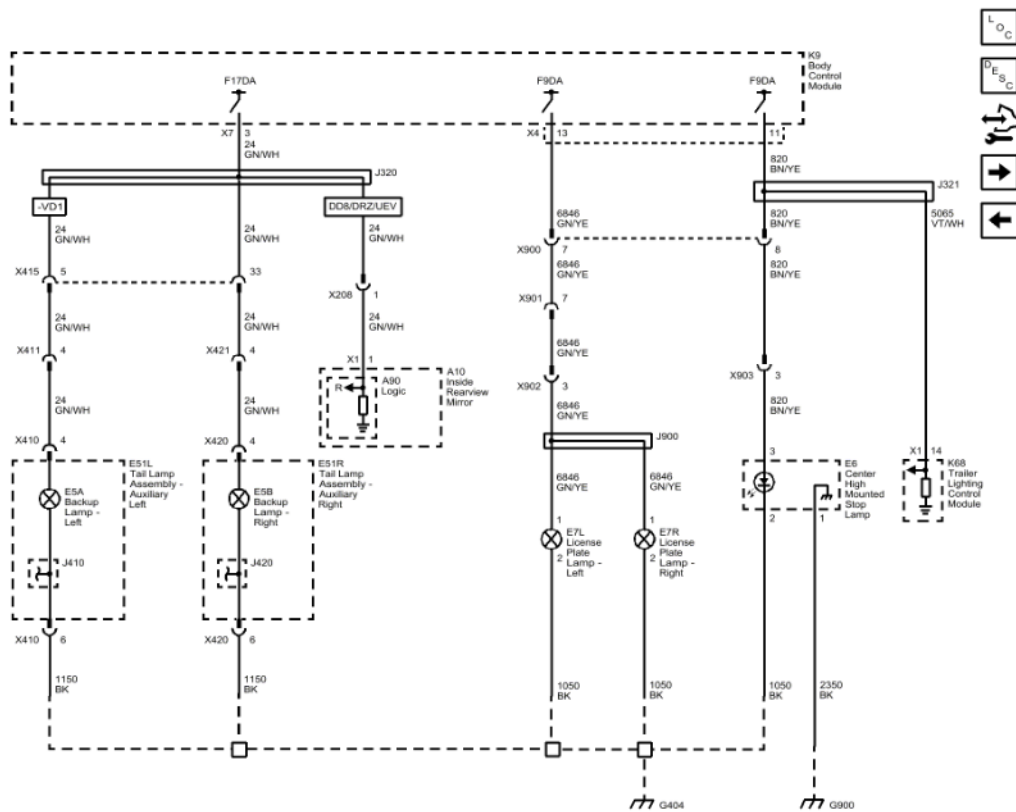


Fig. 10: Backup, Center Stop, and License Lamps (MBM)
 Courtesy of GENERAL MOTORS COMPANY

Backup, Center Stop, and License Lamps (MAH/MBC/MAW/MCX)

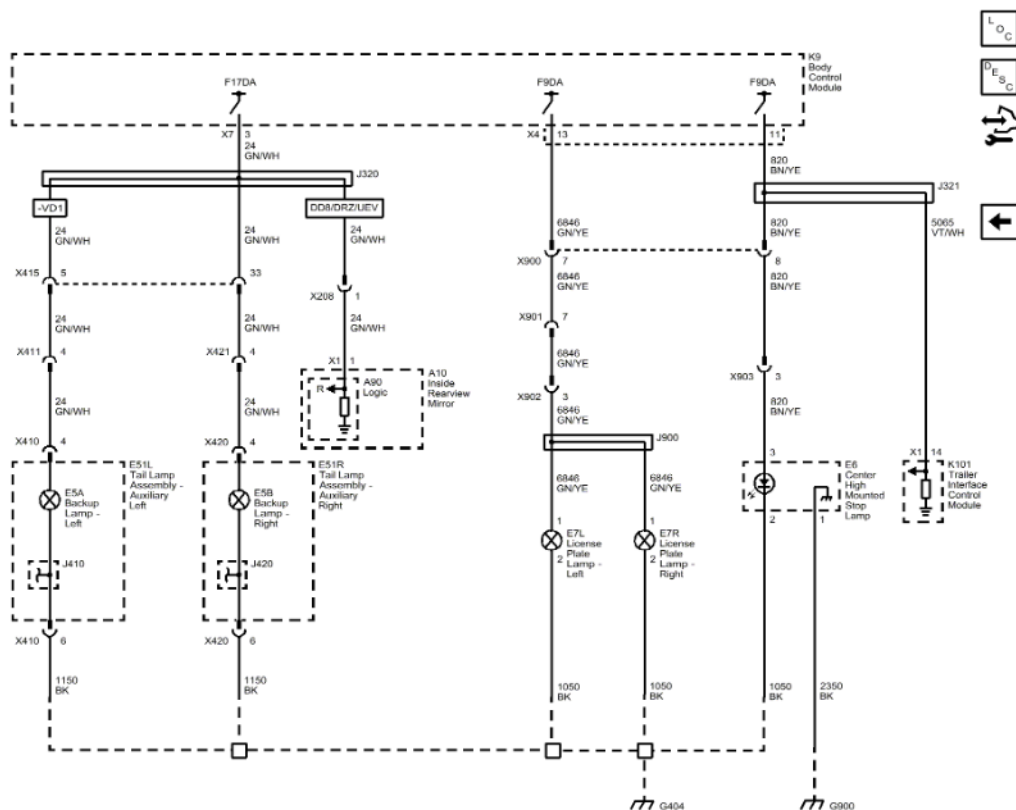


Fig. 11: Backup, Center Stop, and License Lamps (MAH/MBC/MAW/MCX)
 Courtesy of GENERAL MOTORS COMPANY

INTERIOR LIGHTS WIRING SCHEMATICS

Controls

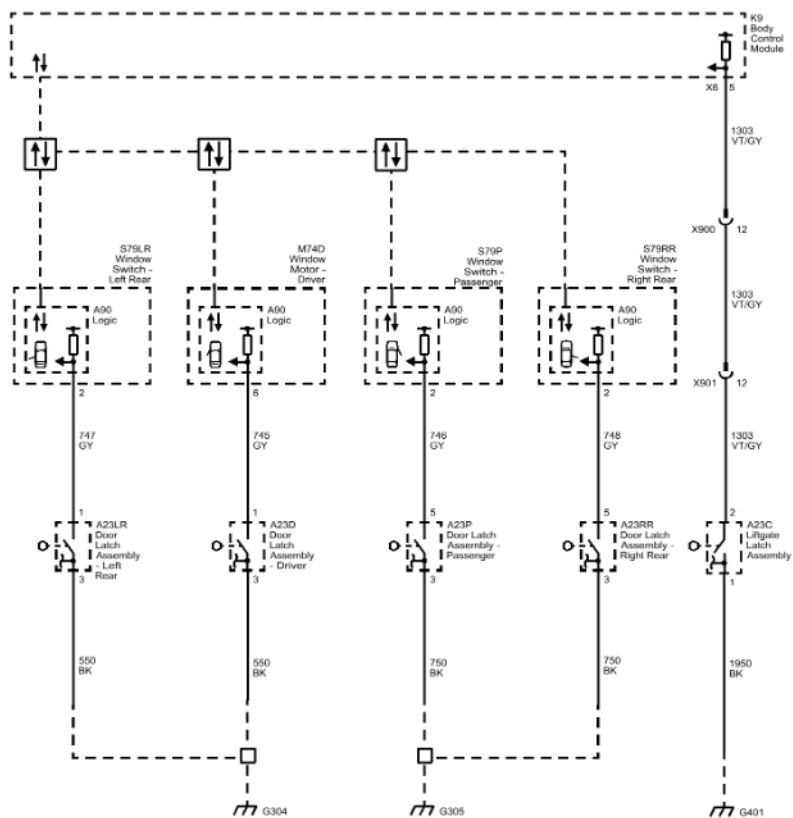


Fig. 12: Controls

Courtesy of GENERAL MOTORS COMPANY

Dome and Courtesy Lamps

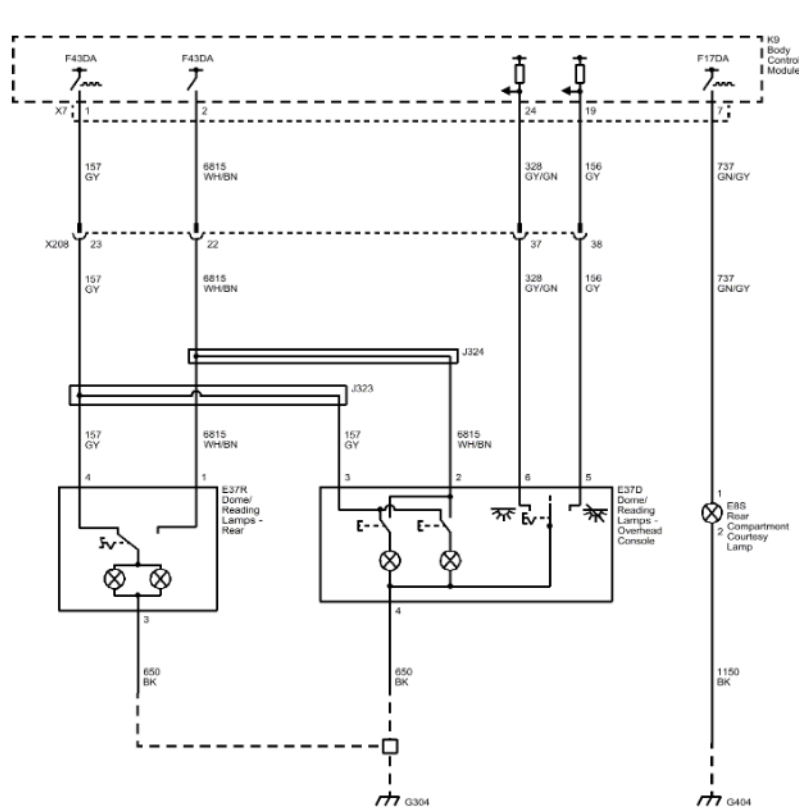


Fig. 13: Dome and Courtesy Lamps

Courtesy of GENERAL MOTORS COMPANY

Accent Lamp - Instrument Panel (C9J)

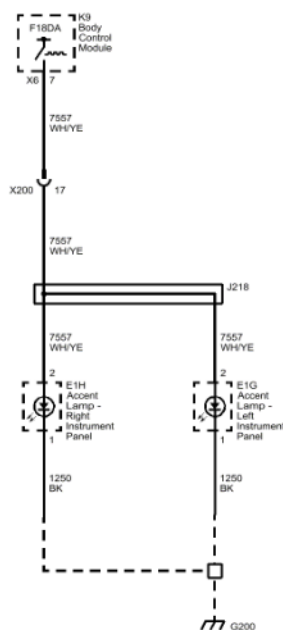
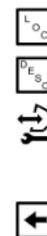


Fig. 14: Accent Lamp - Instrument Panel (C9J)
Courtesy of GENERAL MOTORS COMPANY

INTERIOR LIGHTS DIMMING WIRING SCHEMATICS

Controls and Instrument Panel Lamps

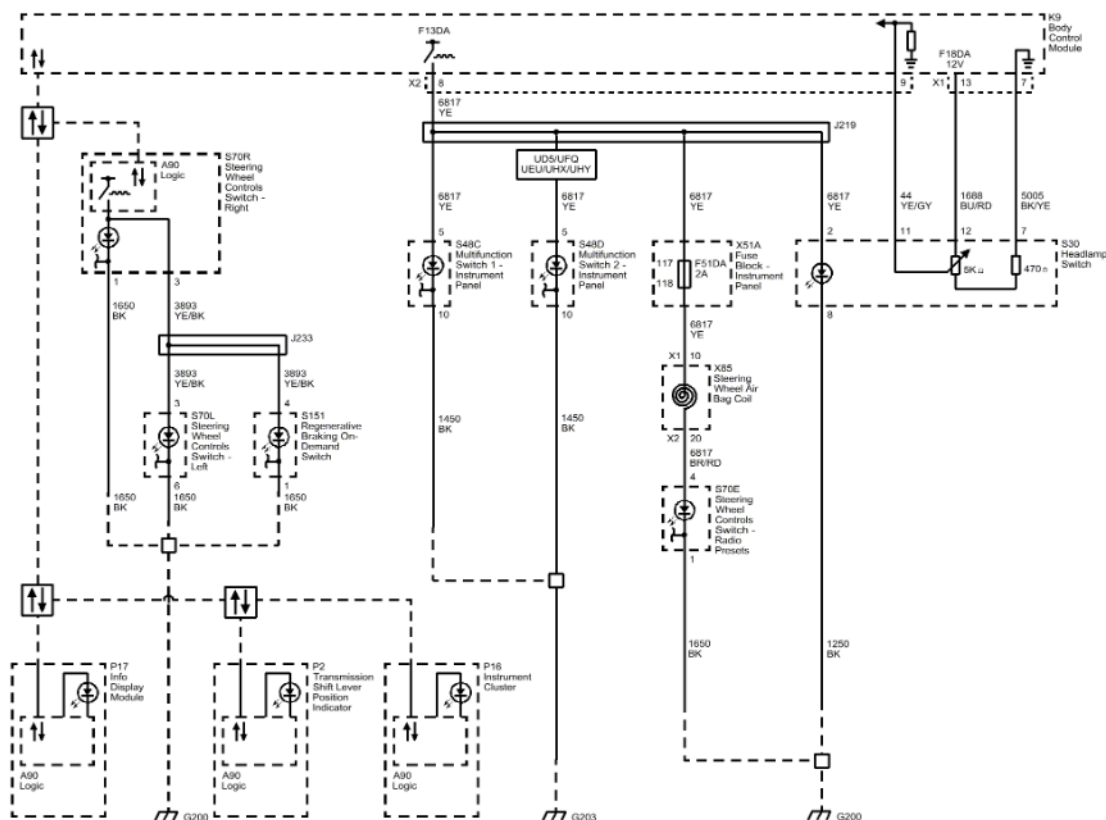


Fig. 15: Controls and Instrument Panel Lamps
Courtesy of GENERAL MOTORS COMPANY

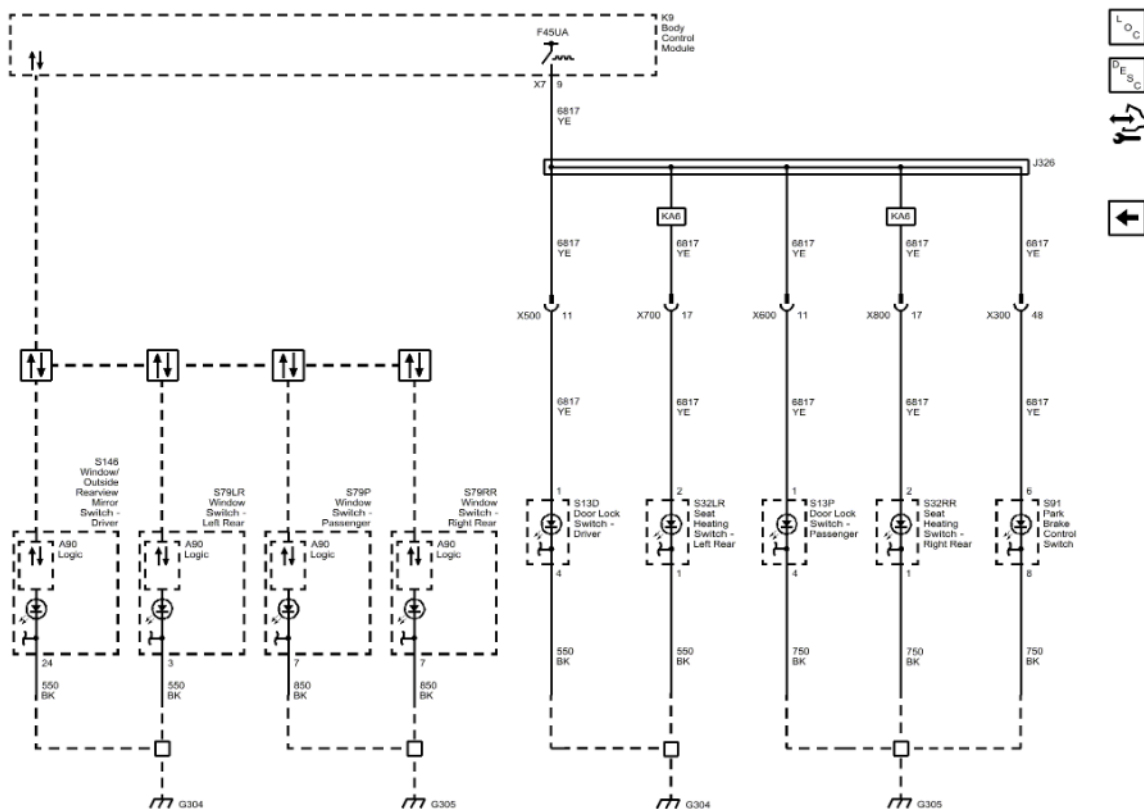


Fig. 16: Doors, Seats and Center Console
Courtesy of GENERAL MOTORS COMPANY

Indicator Lamps

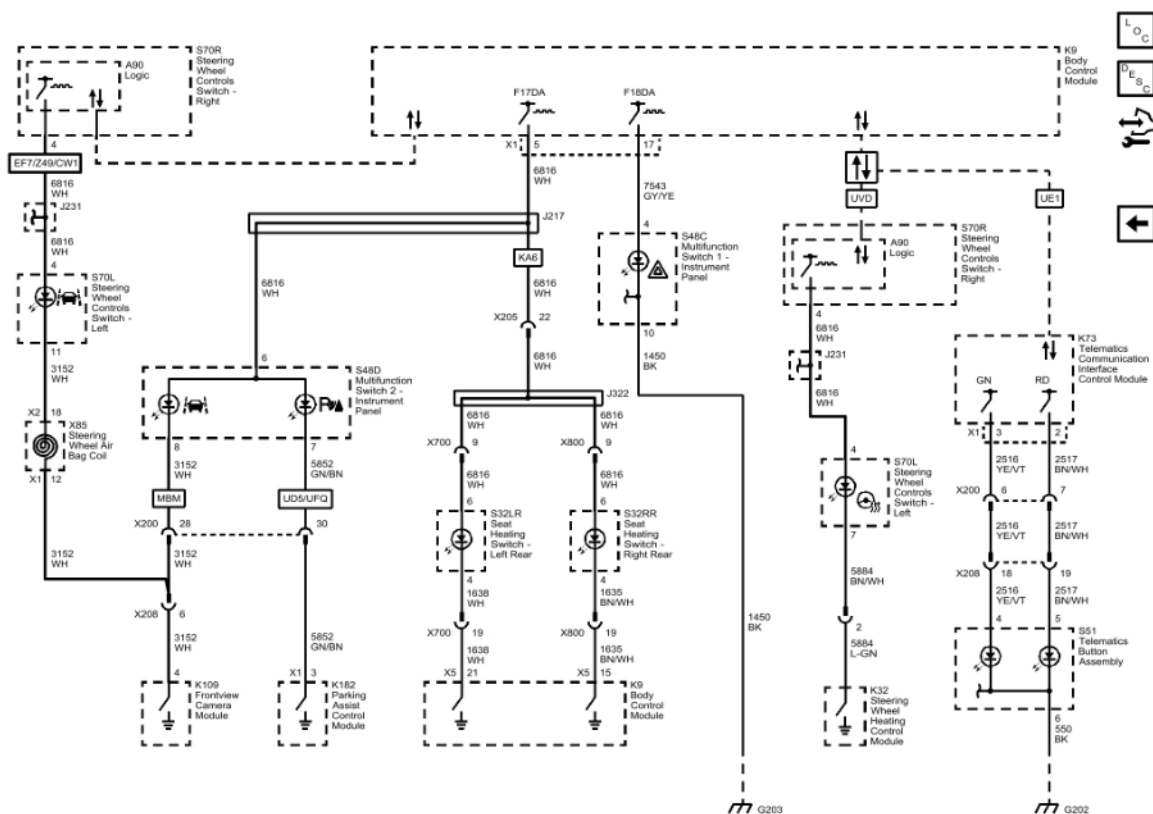


Fig. 17: Indicator Lamps
Courtesy of GENERAL MOTORS COMPANY

2017 ACCESSORIES AND EQUIPMENT**Lighting - Specifications - Fastener Specifications - Bolt EV****SPECIFICATIONS****FASTENER SPECIFICATIONS****Reusable Threaded Fastener Tightening Specifications**

Application	Specification
	Metric (English)
NOTE: <i>All fasteners listed in this table can be reused after removal.</i>	
Brake Pedal Position Sensor Bolt	2.5 N.m (22 lb in)
Front Turn Signal Lamp Bolt	2.5 N.m (22 lb in)
Headlamp Ballast Fastener	2.5 N.m (22 lb in)
Headlamp Bolt	2.5 N.m (22 lb in)
Headlamp Bulb Access Cover Fastener	2.5 N.m (22 lb in)
Headlamp Bulb Retaining Cover Fastener	2.5 N.m (22 lb in)
High Mount Stop Lamp Nut	6 N.m (53 lb in)
Outside Rearview Mirror Turn Signal Lamp Screw	0.8 N.m (7 lb in)
Rear Combination Lamp Nut	4.7 N.m (42 lb in)
Rear Fascia Lower Signal Lamp Bolt	2.5 N.m (22 lb in)
Tail Lamp Control Module Nut	8 N.m (71 lb in)