

# Acronyms and Units

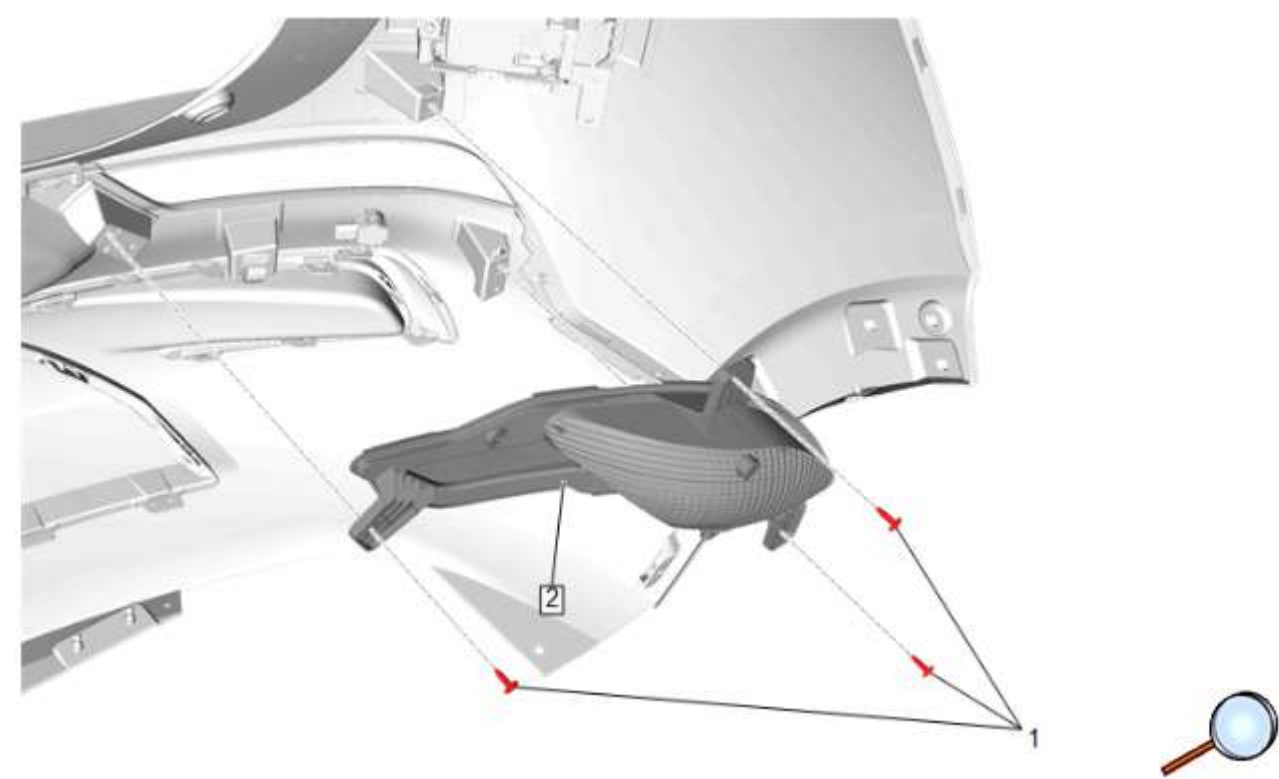
**Table 1:** [Acronyms](#)

**Table 2:** [Units](#)

## Acronyms

| Acronym | Meaning                    | Definition                                                                                                                                                                                                                                                                                                                                                 |
|---------|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2WD     | Two-Wheel Drive            | Indicates that a vehicle has 2 driven wheels OR that a 4WD vehicle uses only 2 wheels for propulsion. So it can be the description of a vehicle configuration OR the operational mode of the drivetrain.                                                                                                                                                   |
| 4WD     | Four-Wheel Drive           | Four-wheeled vehicle with a drivetrain that allows all four wheels to receive power from the engine simultaneously which provides better control on various surfaces. Can be used to describe the configuration of the vehicle OR as the operational mode of the drivetrain. 4WD vehicles usually can turn 2 wheels off to be in a 2WD mode. See also AWD. |
| A/C     | Air Conditioning           | The cooling and dehumidification of indoor air for thermal comfort.                                                                                                                                                                                                                                                                                        |
| A/D     | Analog to Digital          | Used in context of converting electrical analog signals to digital signals.                                                                                                                                                                                                                                                                                |
| ABS     | Antilock Braking System    | System on motor vehicles which prevents the wheels from locking while braking which helps the driver maintain control in heavy braking conditions.                                                                                                                                                                                                         |
| AC      | Alternating Current        | An electrical current whose magnitude and direction vary cyclically.                                                                                                                                                                                                                                                                                       |
| AGM     | Absorbent Glass Mat        | the AGM battery uses a very absorbent micro fiberglass material to trap the gas generated during discharge and recharge.                                                                                                                                                                                                                                   |
| AM      | Amplitude Modulation       | Method of impressing data onto an alternating-current (AC) carrier waveform.                                                                                                                                                                                                                                                                               |
| APP     | Accelerator Pedal Position | A pedal that controls the throttle valve.                                                                                                                                                                                                                                                                                                                  |
| AWD     | All-Wheel Drive            | All-wheel-drive systems are designed to function on all types of surfaces, both on- and off-road, and most of them cannot be switched off. This can also be called full-time four wheel drive. See also 4WD.                                                                                                                                               |
| AWG     | American Wire Gauge        | American wire gauge is a standardized wire gauge system used since 1857 predominantly in the United States for the diameters of round, solid, nonferrous, electrically conducting wire.<br>E.g. a wire of AWG10 has a diameter of 2.588mm, AWG20 corresponds to a diameter of 0.812mm.                                                                     |
| B+      | Battery Positive Voltage   | The electrical potential on the positive terminal of the battery.                                                                                                                                                                                                                                                                                          |
| BARO    | Barometric Pressure        | Atmospheric pressure as measured by a barometer.                                                                                                                                                                                                                                                                                                           |

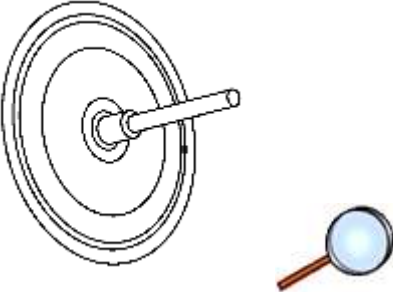
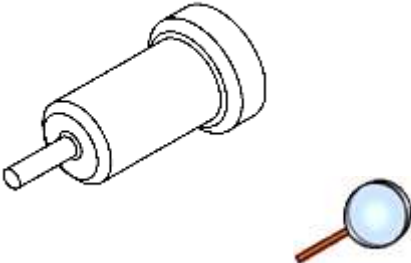
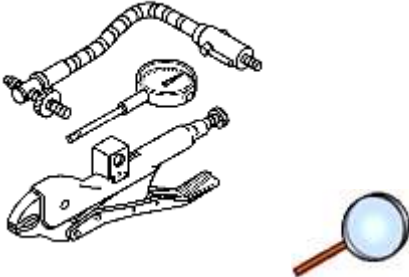
# Rear Fascia Lower Signal Lamp Replacement



Rear Fascia Lower Signal Lamp Replacement

| Callout                                                                        | Component Name                                                                                                                      |
|--------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| <b>Preliminary Procedure</b><br><a href="#">Rear Bumper Fascia Replacement</a> |                                                                                                                                     |
| 1                                                                              | Rear Fascia Lower Signal Lamp Bolt [3x]<br><b>Caution:</b> <a href="#">Fastener Caution</a><br><b>Tighten</b><br>2.5 N•m (22 lb in) |
| 2                                                                              | Rear Fascia Lower Signal Lamp<br><b>Procedure</b><br>Disconnect the electrical connector.                                           |

Special Tools

| Illustration                                                                        | Tool Number/Description                     |
|-------------------------------------------------------------------------------------|---------------------------------------------|
|    | CH-41013<br>Rotor Resurfacing Kit           |
|    | CH-42450-A<br>Wheel Hub Resurfacing Kit     |
|  | CH-45101<br>Hub and Wheel Runout Gauge      |
|  | CH-45101-100<br>Conical Brake Rotor Washers |

The customer's device may not be compatible or is defective.

## **Reference Information**

### **Schematic Reference**

[Image Display Camera Schematics](#)

### **Connector End View Reference**

[Master Electrical Component List](#)

### **Electrical Information Reference**

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

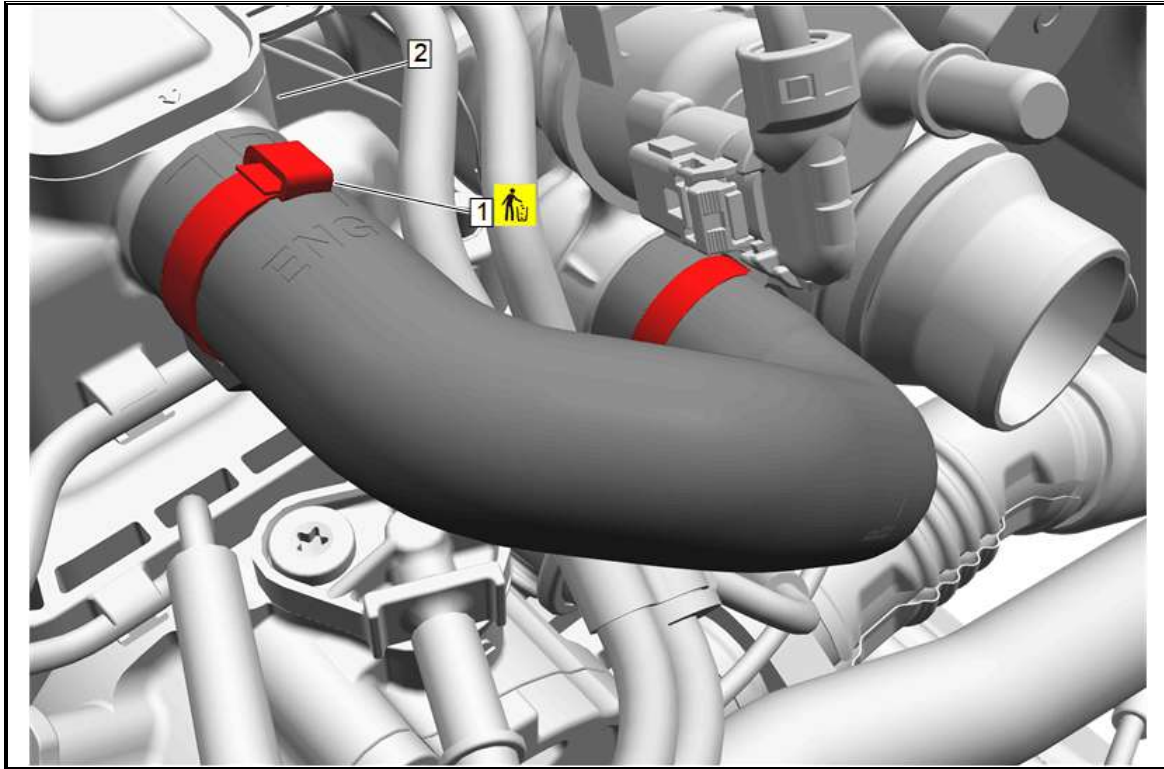
### **Scan Tool Reference**

[Control Module References](#)

## **Circuit/System Testing**

1. Ignition/Vehicle & All vehicle systems » Off
2. Disconnect the electrical connector: X1 @ X20 Memory Card Receptacle
3. Test for less than 10  $\Omega$  between the test points: Ground circuit terminal 4 & Ground  
⇒ **If 10  $\Omega$  or greater**
  - 3.1. Test for less than 2  $\Omega$  between the test points: Ground circuit terminal 4 @ Component harness & The other end of the circuit  
⇒ If 2  $\Omega$  or greater » Repair the open/high resistance in the circuit.  
⇒ If less than 2  $\Omega$  » Repair the open/high resistance in the ground connection.
- ⇓ **If less than 10  $\Omega$**
4. Verify a test lamp turns On between the test points: B+ circuit terminal 6 & Ground  
⇒ **If the test lamp does not turn On**
  - 4.1. Ignition/Vehicle » Off & Remove » Test lamp
  - 4.2. Test for less than 2  $\Omega$  between the test points: B+ circuit terminal 6 & The other end of the circuit  
⇒ If 2  $\Omega$  or greater » Repair the open/high resistance in the circuit.
- ⇓ **If the test lamp turns On**
5. Poor connections or damaged USB cables can cause intermittent or no operation of USB devices. Inspect connectors, terminals, and cables for damage and replace components as necessary. Ensure all USB inline connections and connections at components are fully seated and connector position retainers/locks are secure.
6. Connect the special tool: EL-50334-50
7. Connect the tool between the test points: X2 @ X20 Memory Card Receptacle & X3 @ K157 Video Processing Control Module
8. Ignition On
9. Verify the component activation: X20 Memory Card Receptacle

1. Warm Up Three-Way Catalytic Converter » Remove — [Warm Up Three-Way Catalytic Converter Replacement](#)
2. Catalytic Converter Gasket (1) » Remove and DISCARD [2x]
3. Exhaust Pipe Clamp (2) » Remove and DISCARD
4. Charge Air Cooler Inlet Air Hose » Remove — [Charge Air Cooler Inlet Air Hose Replacement](#)
5. Air Cleaner Outlet Rear Duct » Remove — [Air Cleaner Outlet Rear Duct Replacement](#)



**Note:** DO NOT remove the positive crankcase ventilation vacuum hose unless replacement of either the vacuum hose or turbocharger is necessary.

- The positive crankcase ventilation vacuum hose clamps are tamper-proof connections.
- The turbocharger can be removed and set aside so long as the vacuum hose connection remains intact and undamaged.

6. Positive Crankcase Ventilation Vacuum Hose Clamp @ Camshaft Cover » Remove and DISCARD — [Positive Crankcase Ventilation Vacuum Hose Replacement](#)

## DTC P100C or P100D

### [Diagnostic Instructions](#)

- Perform the Diagnostic System Check prior to using this diagnostic procedure: [Diagnostic System Check - Vehicle](#)
- Review the description of Strategy Based Diagnosis: [Strategy Based Diagnosis](#)
- An overview of each diagnostic category can be found here: [Diagnostic Procedure Instructions](#)

### [DTC Descriptor](#)

**DTC P100C** Battery Sensor Module Temperature Erratic

**DTC P100D** Battery Sensor Module Internal Temperature Circuit Erratic

**Symptom Byte Information:** [Symptom Byte List](#)

### [Circuit/System Description](#)

| Component                  | Description                                                                                                                                                                       |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| B110 Battery Sensor Module | The battery sensor module contains a hall effect current sensor and additional electronics that processes the signal. It monitors the current through the negative battery cable. |

### [Conditions for Running the DTC](#)

- System Voltage = Greater than 11 V
- Engine Running

### [Conditions for Setting the DTC](#)

DTC P100C or DTC P100D

- B110 Battery Sensor Module = Internal — Fault

### [Actions Taken When the DTC Sets](#)

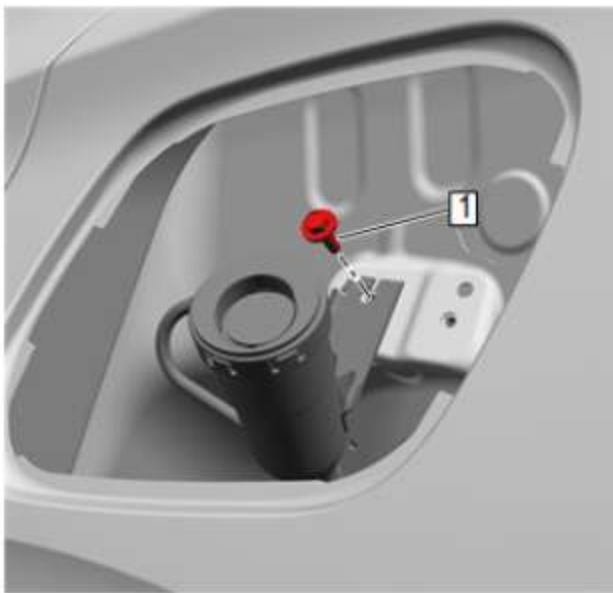
- DTC P100C = Type B DTC
- DTC P100D = Type B DTC

### [Conditions for Clearing the DTC](#)

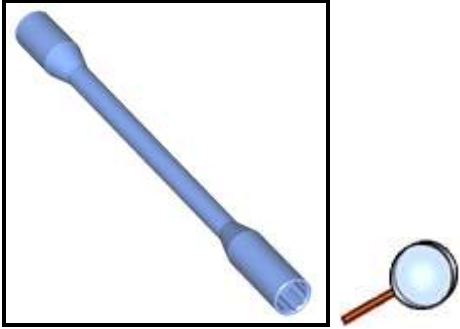
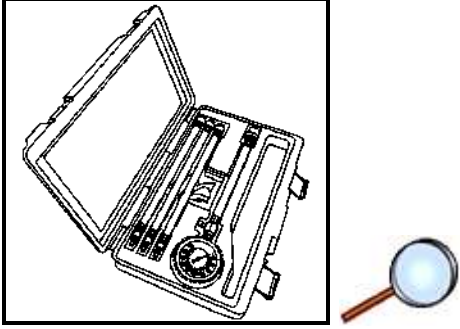
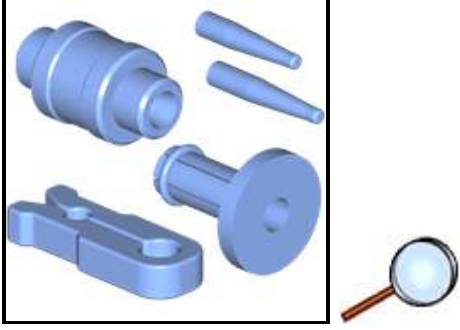
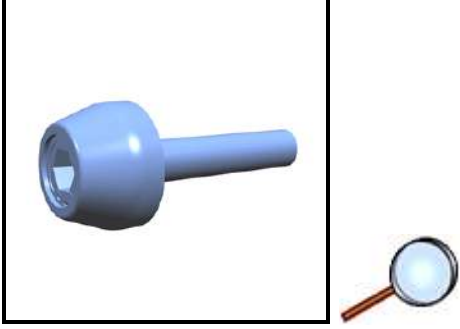
- DTC P100C = Type B DTC
- DTC P100D = Type B DTC

### [Reference Information](#)

**Schematic Reference**



6. Fuel Tank Filler Pipe Ground Bolt (1) » Install and tighten **9 N•m (80 lb in)**
7. Rear Wheelhouse Liner - Left Side » Install — [Rear Wheelhouse Liner Replacement](#)
8. Install the left rear tire and wheel assembly. [Tire and Wheel Removal and Installation](#)
9. Lower the vehicle.
10. Fuel Tank Filler Door Latch Housing » Install — [Fuel Tank Filler Door Latch Housing Replacement](#)
11. Refill the fuel tank.

| Illustration                                                                        | Tool Number/ Description                               |
|-------------------------------------------------------------------------------------|--------------------------------------------------------|
|    | <p>EN-51149<br/>Spark Plug Wrench</p>                  |
|    | <p>EN-51749<br/>Compression Gauge Tester Kit</p>       |
|   | <p>EN-51955<br/>Fuel Injector Seal Installer/Sizer</p> |
|  | <p>EN-52432<br/>Front Cover Seal Installer</p>         |

## DTC B0193

### Diagnostic Instructions

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

### DTC Descriptors

**DTC B0193 01** Front Blower Motor Speed Circuit Short to Battery

**DTC B0193 06** Front Blower Motor Speed Circuit Low Voltage/Open

### Diagnostic Fault Information

| Circuit                                                  | Short to Ground | Open/High Resistance | Short to Voltage | Signal Performance |
|----------------------------------------------------------|-----------------|----------------------|------------------|--------------------|
| Blower Motor Control Module B+                           | B0193 06        | B0193 06             | —                | —                  |
| Blower Motor B+                                          | B0193 06        | 1                    | —                | —                  |
| Blower Motor Control Module Control                      | B0193 06        | B0193 06             | B0193 01         | —                  |
| Blower Motor Control                                     | 2               | 1                    | 1                | —                  |
| Blower Motor Control Module Ground                       | —               | 1                    | —                | —                  |
| 1. Blower Motor Inoperative<br>2. Blower Motor Always ON |                 |                      |                  |                    |

### Circuit/System Description

The blower motor control module is an interface between the HVAC control module and the blower motor. The blower motor control module has 5 circuits: a B+ input, ground, a control circuit from the HVAC control module, a B+ output to the blower motor, and a low side pulse width modulation (PWM) output. The HVAC control module provides a low side (PWM) signal to the blower motor control module in order to request the blower motor speed. The blower motor control module grounds the blower motor using a low side PWM signal in order to vary the blower motor speed.

### Conditions for Running the DTC

- Ignition ON.
- The HVAC control module is ON.

### Conditions for Setting the DTC

**B0193 01**

| DTC   | DTC Descriptor                                                                     |
|-------|------------------------------------------------------------------------------------|
| U0617 | Lost Communication With Engine Coolant Bypass Valve "C"                            |
| U0618 | Lost Communication with Block Coolant Valve Actuator                               |
| U0623 | Lost Communication with Auxiliary Coolant Pump                                     |
| U0625 | Lost Communication With Fuel Rail Pressure Sensor Bank 1                           |
| U062F | Loss Communication with Low Temperature Loop Coolant Pump                          |
| U0632 | Lost Communication with Engine Cooling Fan                                         |
| U063E | Lost Communication with Exhaust Heat Exchanger Exhaust Bypass Valve                |
| U063F | Lost Communication With Engine Coolant Flow Control Valve Position Sensor          |
| U0643 | Lost Communication With Turbocharger Wastegate Actuator Temperature Sensor Bank 1  |
| U0644 | Lost Communication With Turbocharger Wastegate Position Sensor                     |
| U0646 | Lost Communication with Motor Electronics Coolant Pump "A"                         |
| U064F | Lost Communication With Intake Manifold Runner Control Valve Position Sensor       |
| U0650 | Lost Communication With Exhaust Pressure Control Valve "A" Sensor/Switch           |
| U0653 | Lost Communication with Exhaust Gas Recirculation 2 Position Sensor                |
| U0656 | Lost Communication with Turbocharger Boost Control Position Sensor                 |
| U0657 | Lost Communication with Turbocharger/Supercharger Bypass Valve "A" Position Sensor |
| U0672 | Lost Communication with Engine Coolant Pump                                        |
| U0674 | Lost Communication With Turbocharger Wastegate Position Sensor Bank 2              |
| U0680 | Lost Communication With Barometric Pressure Sensor Bank 2 Sensor 1                 |
| U0688 | Lost Communication With Throttle Position Sensor Bank 2 Sensor 2                   |
| U0689 | Lost Communication With Turbocharger Wastegate Actuator Temperature Sensor Bank 2  |
| U068A | Lost Communication With Barometric Pressure Sensor 2                               |
| U101B | Lost Communication With Fuel Rail Pressure Sensor Bank 1 Sensor 2                  |
| U1032 | Lost Communication with Vehicle Dynamic Sensor 1                                   |
| U1033 | Lost Communication with Vehicle Dynamic Sensor 2                                   |

|       |                                                   |
|-------|---------------------------------------------------|
| U1067 | Lost Communication With Dynamic Pressure Sensor 1 |
|-------|---------------------------------------------------|

| Code | Name                             | Option | Location                                                                                                                 | Locator View                                                | Connector End View                                                                                                            |
|------|----------------------------------|--------|--------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| S2   | Transmission Manual Shift Switch | —      | In the passenger compartment, at the front of the center console. inside Transmission Shift Lever.                       | —                                                           | —                                                                                                                             |
| S3   | Transmission Shift Lever         | —      | In the passenger compartment, at the front of the center console                                                         | <a href="#">Left Front Passenger Compartment Components</a> | <a href="#">S3 Transmission Shift Lever</a>                                                                                   |
| S13D | Door Lock Switch - Driver        | —      | In the driver door trim panel, forward of the door handle.                                                               | —                                                           | <a href="#">S13D Door Lock Switch - Driver</a>                                                                                |
| S13P | Door Lock Switch - Passenger     | —      | In the passenger door trim panel, forward of the door handle.                                                            | —                                                           | <a href="#">S13P Door Lock Switch - Passenger</a>                                                                             |
| S25  | Garage Door Opener               | UG1    | In the passenger compartment, in the overhead console.                                                                   | —                                                           | <a href="#">S25 Garage Door Opener</a>                                                                                        |
| S26  | Hazard Warning Switch            | —      | In the passenger compartment, In center of Dash.                                                                         | <a href="#">Front of the Instrument Panel Components</a>    | <a href="#">S26 Hazard Warning Switch</a>                                                                                     |
| S27  | Head-Up Display Switch           | UV7    | In the passenger compartment, on the instrument panel, to the left of the steering column.                               | —                                                           | <a href="#">S27 Head-Up Display Switch</a>                                                                                    |
| S30  | Headlamp Switch                  | —      | In the passenger compartment, on the left side of the instrument panel, between the steering column, and the driver door | <a href="#">Front of the Instrument Panel Components</a>    | <a href="#">S30 Headlamp Switch</a>                                                                                           |
| S33  | Horn Switch                      | —      | In the driver side of the passenger compartment, in the center of the steering wheel, behind the steering                | —                                                           | <ul style="list-style-type: none"> <li><a href="#">S33 Horn Switch X1</a></li> <li><a href="#">S33 Horn Switch</a></li> </ul> |

⇒ If infinite resistance, replace the K36 Inflatable Restraint Sensing and Diagnostic Module.

↓ **If greater than 25  $\Omega$**

5. Ignition ON/Vehicle in Service Mode.

6. Test for less than 11 V between the control circuit terminals listed below and ground:

- Control circuit terminal 1
- Control circuit terminal 2

⇒ **If 11 V or greater**

6.1. Ignition OFF/Vehicle OFF.

6.2. Verify the SIR system is disabled.

6.3. Disconnect the X2 harness connector at the K36 Inflatable Restraint Sensing and Diagnostic Module.

6.4. Ignition ON/Vehicle in Service Mode

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

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

⇒ If less than 1 V, replace the K36 Inflatable Restraint Sensing and Diagnostic Module.

↓ **If less than 11 V**

7. Ignition OFF/Vehicle OFF.

8. Test for greater than 25  $\Omega$  between the control circuit terminals listed below and ground:

- Control circuit terminal 1
- Control circuit terminal 2

⇒ **If 25  $\Omega$  or less**

8.1. Verify the SIR system is disabled.

8.2. Disconnect the X2 harness connector at the K36 Inflatable Restraint Sensing and Diagnostic Module.

8.3. 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, replace the K36 Inflatable Restraint Sensing and Diagnostic Module.

↓ **If greater than 25  $\Omega$**

9. Ignition OFF/Vehicle OFF.

10. Verify the SIR system is disabled.

11. Install a 3 A fused jumper wire between the control circuit terminals 1 and 2. Ignition ON/Vehicle in Service Mode.

12. Verify the scan tool Deployment Loop Resistance parameter is less than 2  $\Omega$ .

⇒ **If 2  $\Omega$  or greater**

12.1. Ignition OFF/Vehicle OFF.

12.2. Verify the SIR system is disabled.

12.3. Disconnect the X2 harness connector at the K36 Inflatable Restraint Sensing and Diagnostic Module.

12.4. Test for less than 2  $\Omega$  in each control circuit end to end.

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

⇒ If less than 2  $\Omega$ , replace the K36 Inflatable Restraint Sensing and Diagnostic Module.

↓ **If less than 2  $\Omega$**

13. Ignition OFF/Vehicle OFF.

# Key with Integrated Transmitter Programming

Keys can be programming in various ways using the procedures outlined below. Using the Replacing Keys procedure will first erase all the known keys from the vehicle. Any existing keys and any new keys will then be programmed. This procedure should be used any time a key is required to be unlearned or erased from a vehicle. If a new key is being learned to a vehicle to replace a damaged, inoperative, missing, or stolen key, the Replacing Keys procedure must be used. This ensures that the old key cannot be used to access or start the vehicle after programming.

The Adding Keys procedure does not erase any keys prior to programming. The procedure will simply program the key into the next available slot. The Adding Keys procedure should only be used when adding an additional keys to the vehicle. The Adding Keys procedure should never be used to program a key to a vehicle that is having a key replaced, regardless of the cause for the replacement.

## Replacing Keys (Without SPS)

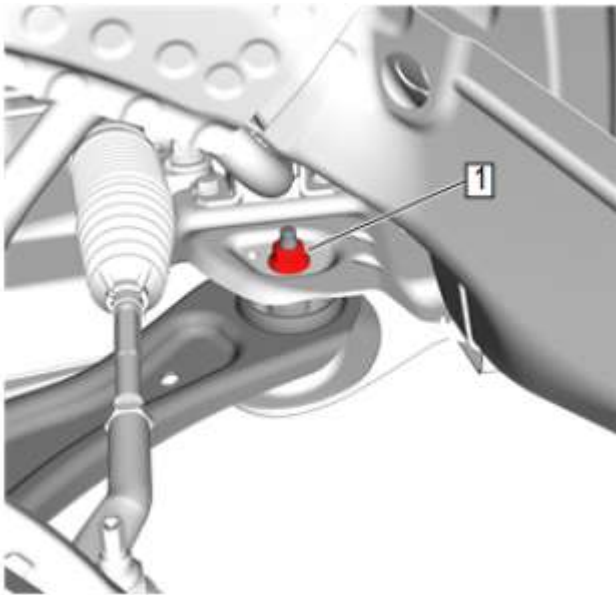
### **Note:**

- This procedure will unlearn all previously learned keys. All keys that are to be programmed must be with the vehicle.
  - A minimum of two transmitters must be learned during this procedure. The vehicle will not exit the learn mode until at least a second transmitter is learned.
  - A total of eight keys maybe be learned to a single vehicle.
  - This procedure will only learn the vehicle key information. This procedure will not learn any immobilizer information between the body control module (BCM) and engine control module (ECM).
  - This procedure may be used with or without existing learned keys being present. If existing keys are present, keep the keys away from the vicinity of the vehicle. Failure to keep learned keys away from the vehicle will result in the learn changing to the Adding Keys procedure.
  - The keys to be learned must duplicate the mechanical cut of the current key.
1. Insert the mechanical key of the new key into the key lock cylinder located on the outside of the driver door and turn the key to the unlock position five times within ten seconds. The Driver Information Center (DIC) will display Remote Learn Pending, Please Wait.
  2. After ten minutes, the DIC will display Press Engine Start Button To Learn. Press the ignition mode switch. The DIC will again display Remote Learn Pending, Please Wait.
  3. Repeat Step 2 two additional times, for a total of thirty minutes. All previously known keys have now been unlearned. Remaining keys can be learned during the next steps. The DIC display will now display Ready For Remote # 1.
- Note:** Refer to [Keyless Entry Transmitter Pocket Location](#) for transmitter pocket location.
4. Place the new key into the key pocket.
- Note:** If the programming does not complete or hangs during the programming operation, refer to [Unable to Complete Programming](#) below.
5. Press the ignition mode switch. When the key is learned the DIC will indicate that it is ready to program the next key.
  6. Remove the key from the key pocket and press the unlock button. To program additional keys, repeat Steps 4 through 6.
  7. When all additional keys are programmed, press and hold the ignition mode switch for 5 seconds to exit programming mode.

## Replacing Keys (With SPS)

### **Note:**

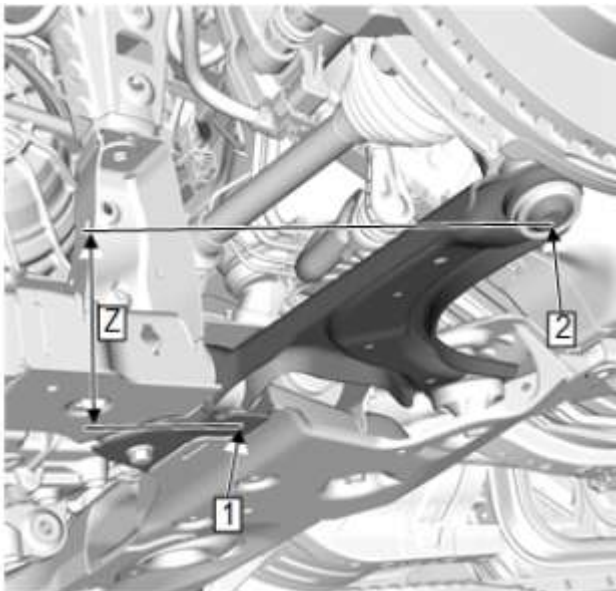
- This procedure will unlearn all previously learned keys. All keys that are to be programmed must be with the vehicle.
- A minimum of two transmitters must be learned during this procedure. The vehicle will not exit the learn mode until at least a second transmitter is learned.



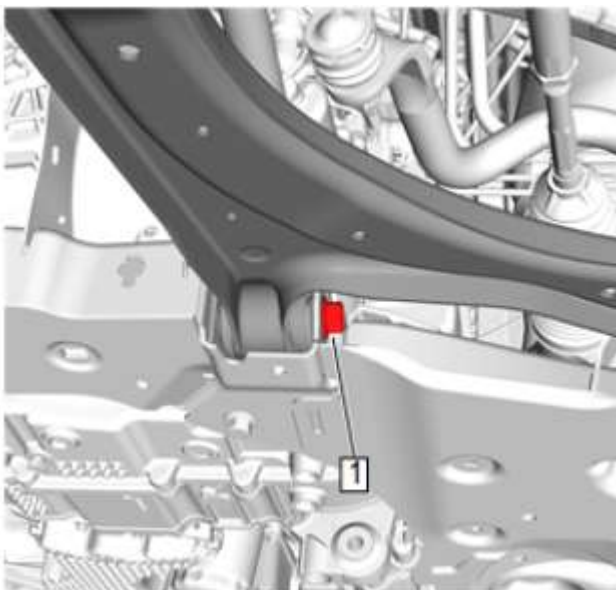
6. Front Lower Control Arm Rear Nut (1) » Tighten

6.1. First Pass: **80 N•m (59 lb ft)**

6.2. Final Pass: **45 – 60 degrees**

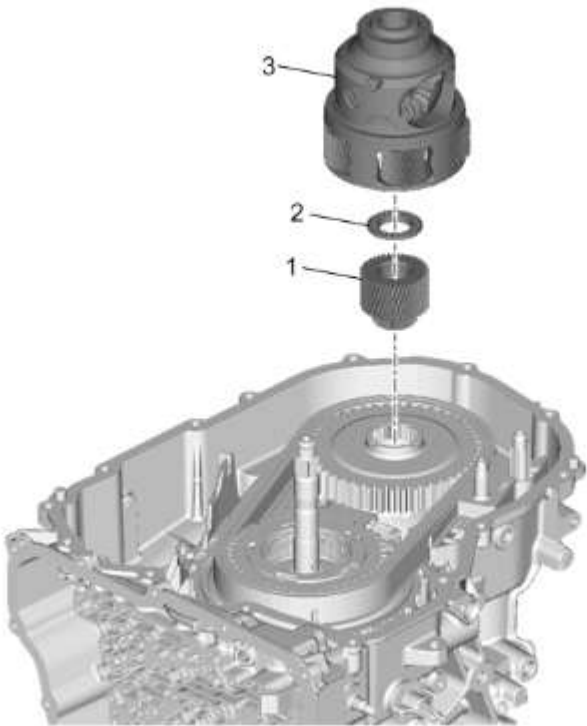


7. Set the front suspension height (Z) to the specification using a hydraulic jack. [Trim Height Specifications](#)



8. Front Lower Control Arm Front Bolt (1) » Tighten

# Front Differential Carrier Installation



Front Differential Carrier Installation

| Callout | Component Name                               |
|---------|----------------------------------------------|
| 1       | Front Differential Carrier Sun Gear          |
| 2       | Differential Carrier Sun Gear Thrust Bearing |
| 3       | Front Differential Carrier                   |