DIAGNOSTIC INFORMATION AND PROCEDURES

AIR/WIND NOISE

Air/Wind Noise-Diagnosis and Tests

Tools

- Stethoscope
- Duct tape, foam, etc.

WARNING: **Refer to Assistant Driving Warning .**

Overview

To analyze a reported wind noise condition, use the following outline:

- Speak with the customer to obtain as much information as possible.
- Perform a static evaluation of the vehicle to identify potential areas of concern.
- Test drive the vehicle to determine the source of the noise.
- Select the appropriate solution.
- After repair, re-evaluate the vehicle to confirm the customer's complaint is resolved.

When test driving the vehicle, choose a regular route with smooth and straight roads. The area should have little traffic and little noise in order to minimize interference with the test. Drive the vehicle at the speed in which the noise was noticed, or until the noise is heard. Maintain safe and legal speeds.

You can diagnose the following types of wind noise:

- Wind whistle/wind leaks
- Wind rush

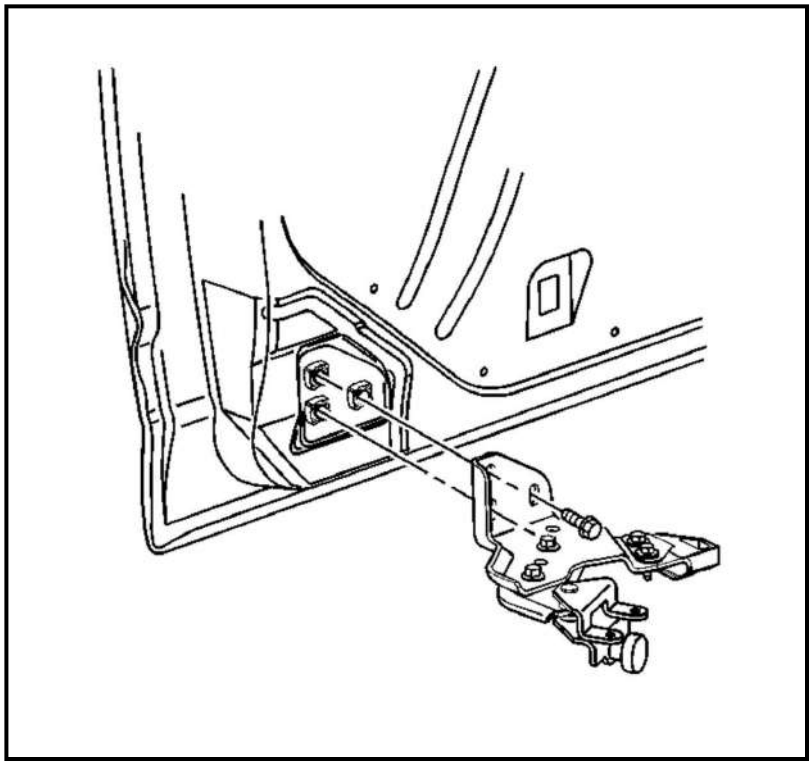
When moving at highway speeds, air pressure inside the vehicle becomes greater than the air pressure outside. When a leak occurs, the escaping air causes a hiss or a whistle. Wind whistle/wind leaks are repairable when properly root caused.

Wind rush occurs when air presses over the vehicle's body, and is related to the aerodynamics of the vehicle. Some wind rush is repairable as it relates to part fits and body panel fits. A thorough root cause analysis is required before concluding that the wind noise is not repairable.

Air/Wind Noise - Diagnostic Procedure

Use the following procedure in order to diagnose wind noise:

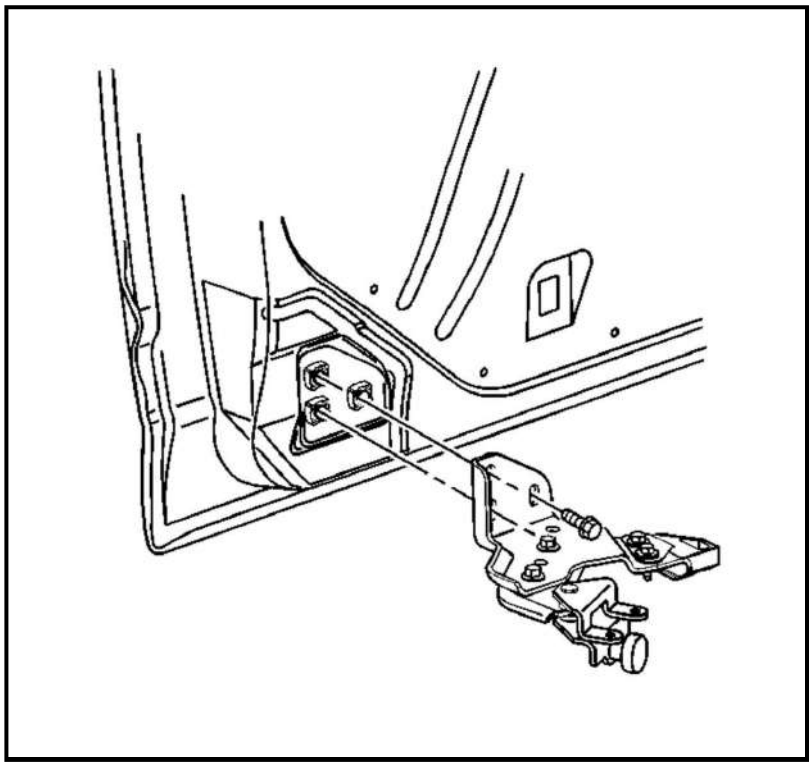
1. It is important to obtain as many details from the customer as possible in order to assure that you are addressing the issue that the customer hears. Note the following details:
    - The perceived location (B-pillar, mirror, roof, rear of vehicle, front of vehicle, high or low in vehicle)
    - The location where the noise is loudest (specific location along the door header, front edge of sunroof, etc.)
    - The volume of the noise (very loud, can only hear when radio is off and no ambient noises)
    - The ambient conditions (temperature, windy, direction of wind, quiet)
    - The road surface (rough, smooth, smooth concrete, ribbed concrete, asphalt)
    - The vehicle speed (city, highway, all speeds)
    - The interior fan speed (off, low, high, floor mode, defrost, etc.)

2. 

   Remove the bolts that retain the sliding side door lower roller bracket to the door.

3. Remove the sliding side door lower roller bracket from the track.
4. Remove the sliding side door lower roller bracket from the vehicle.

Installation Procedure

1. 

   Install the sliding door lower roller bracket to the vehicle.

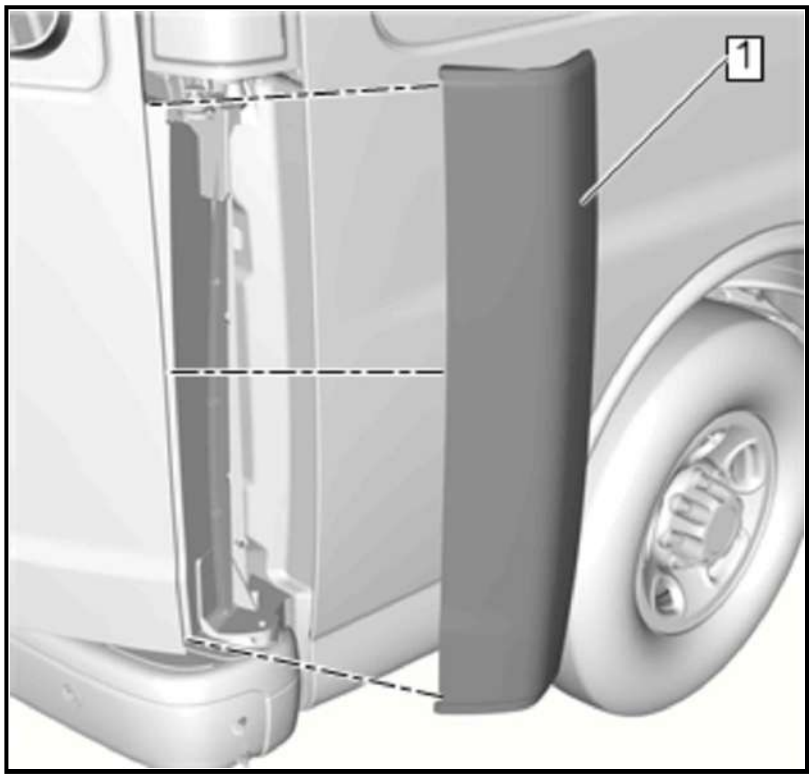
2. Install the sliding door lower roller bracket to the track.

CAUTION: **Refer to Fastener Caution .**

REAR DOOR OUTER EXTENSION PANEL REPLACEMENT

Removal Procedure

1. Open the rear door.
2. 

   Rear Door Outer Extension Panel Bolt (1) - Remove [3x]
3. 

   Partially close the rear door.
4. Grasp the rear door outer extension panel (1) and pull the extension from the rear door.

Installation Procedure

2. Test for infinite resistance between the signal terminal F and the ground terminal A with the switch in the center position.
    - **If less than infinite resistance**

      Replace the S13P Door Lock Switch-Passenger.

    - **Go to next step: If infinite resistance**
3. Test for infinite resistance between the signal terminal G and the ground terminal A with the switch in the center position.
    - **If less than infinite resistance**

      Replace the S13P Door Lock Switch-Passenger

    - **Go to next step: If infinite resistance**
4. Test for less than 2 Ω between the signal terminal G and the ground terminal A with the switch in the Lock position.
    - **If 2 Ω or greater**

      Replace the S13P Door Lock Switch-Passenger.

    - **Go to next step: If less than 2 Ω**
5. Test for less than 2 Ω between the signal terminal F and the ground terminal A with the switch in the Unlock position.
    - **If 2 Ω or greater**

      Replace the S13P Door Lock Switch-Passenger.

    - **Go to next step: If less than 2 Ω**
6. All OK

Cargo Door Lock Switch

1. Ignition OFF, disconnect the harness connector at the S13A Door Lock Switch-Rear Cargo.
2. Test for infinite resistance between the signal terminal A and the ground terminal E with the switch in the center position.
    - **If less than infinite resistance**

      Replace the S13A Door Lock Switch-Rear Cargo.

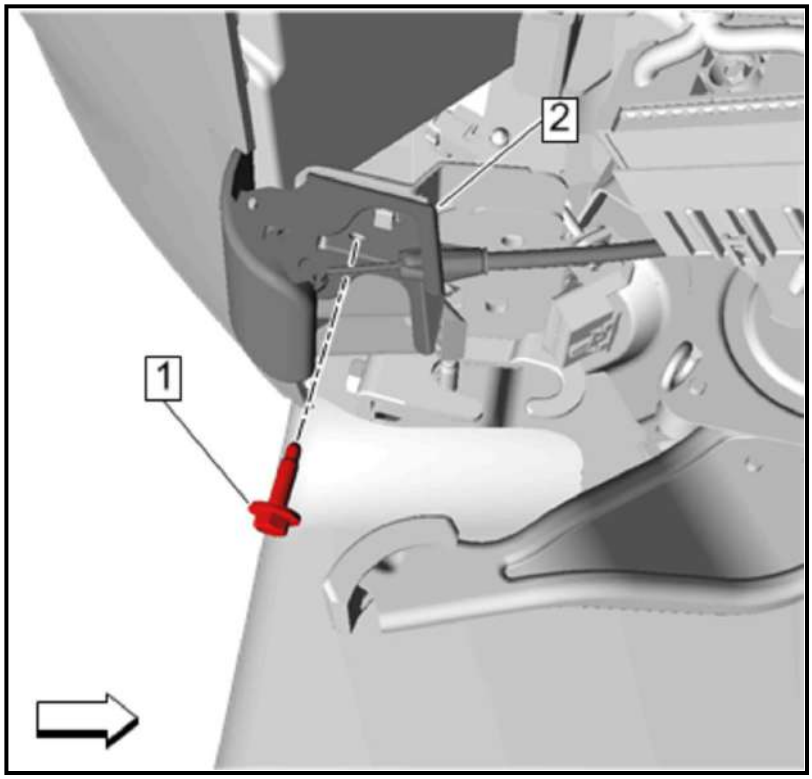
    - **Go to next step: If infinite resistance**
3. Test for infinite resistance between the signal terminal D and the ground terminal E with the switch in the center position.
    - **If less than infinite resistance**

      Replace the S13A Door Lock Switch-Rear Cargo

    - **Go to next step: If infinite resistance**
4. Test for less than 2 Ω between the signal terminal D and the ground terminal E with the switch in the Lock position.
    - **If 2 Ω or greater**

      Replace the S13A Door Lock Switch-Rear Cargo.

    - **Go to next step: If less than 2 Ω**

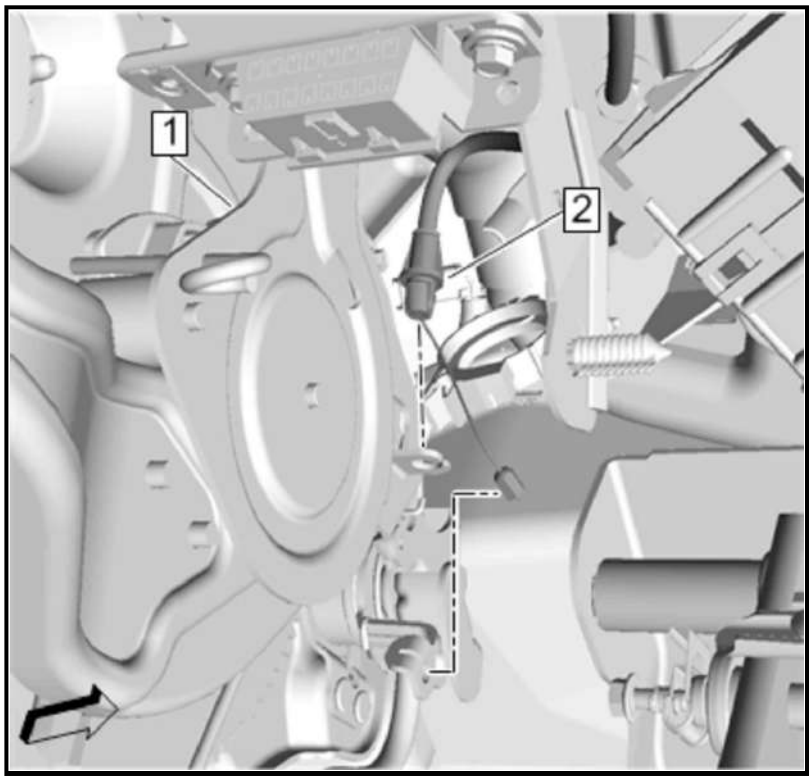
1. 

NOTE: **Ensure that the parking brake lever handle cable is routed the same as removed.**

Parking Brake Lever Handle (2) - Install

CAUTION: **Refer to Fastener Caution .**

2. Parking Brake Lever Handle Bolt (1) - Install and tighten 10 N.m (89 lb in)

3. 

Parking Brake Lever Handle Cable (2) @ Parking Brake Control Module (1) - Connect

4. Floor Front Air Outlet Center Duct Replacement - Left Side - Install - **Floor Front Air Outlet Center Duct Replacement - Left Side**

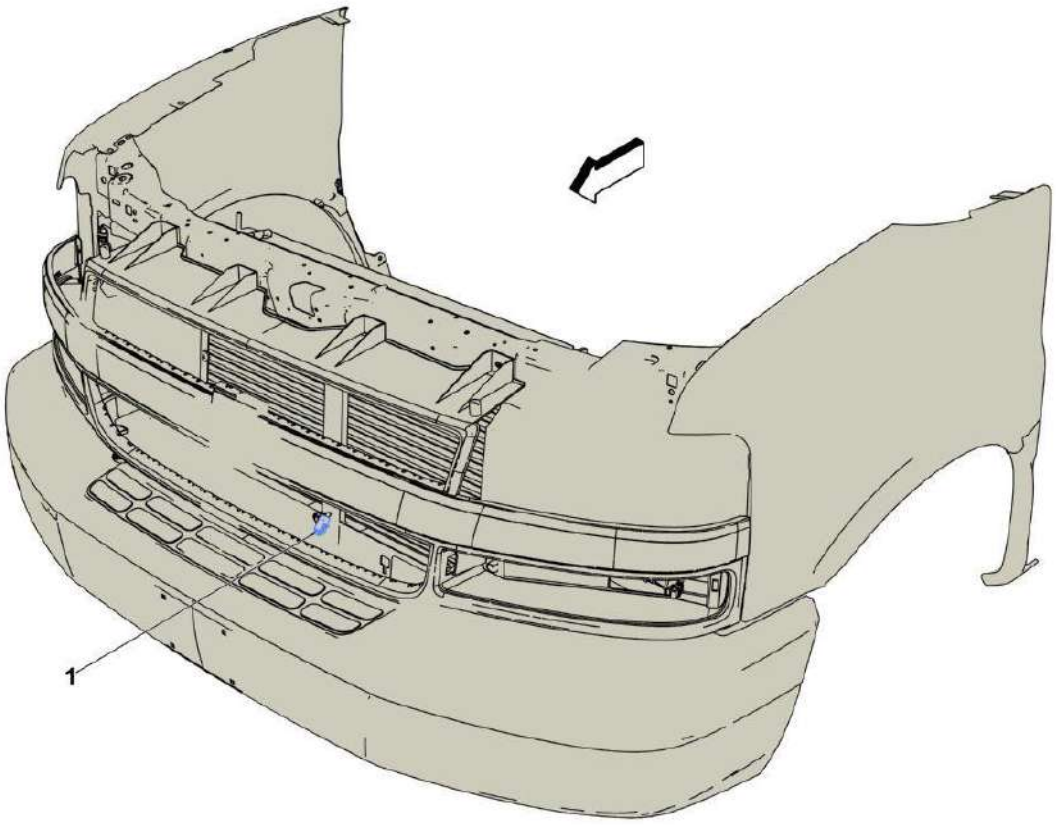


Fig. 25: Ambient Air Temperature Sensor (UFA)
Courtesy of GENERAL MOTORS COMPANY

Ambient Air Temperature Sensor (UFA)

Harness Name	Callout
B9 Ambient Air Temperature Sensor **B9 Ambient Air Temperature Sensor (UFA)**	1

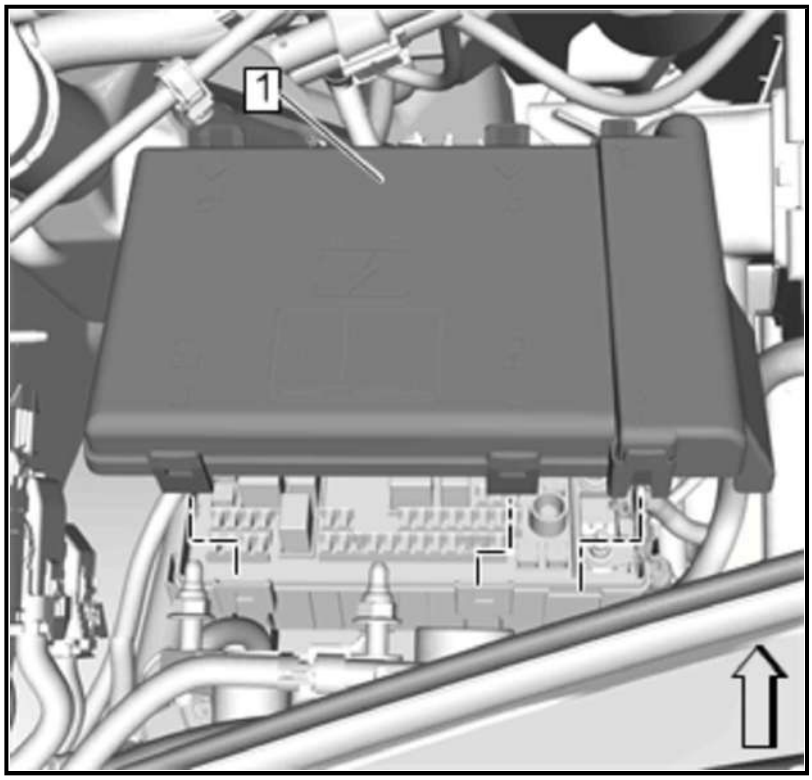
Brake Booster Fluid Alarm Switches (UJ1)

Battery Positive Cable (3) - Install [2x]

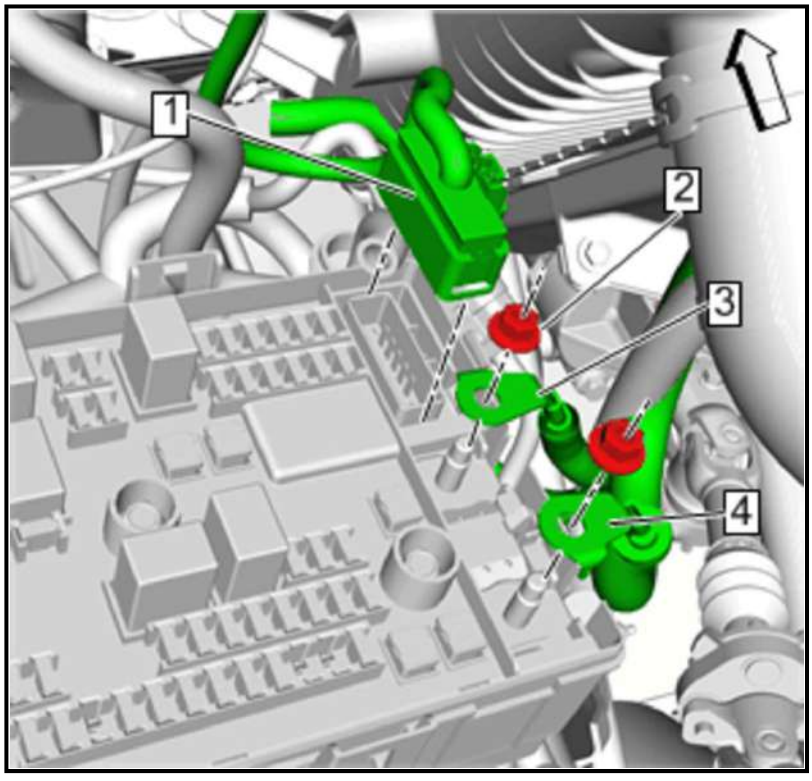
4. Front Compartment Fuse Block Cable Nut (2) - Install and tighten [2x] 20 N.m (15 lb ft)
5. Front Compartment Fuse Block Cover (1) - Install
6. Install the battery. (1) **Battery Replacement (L8T, L96, LC8, LV1)**

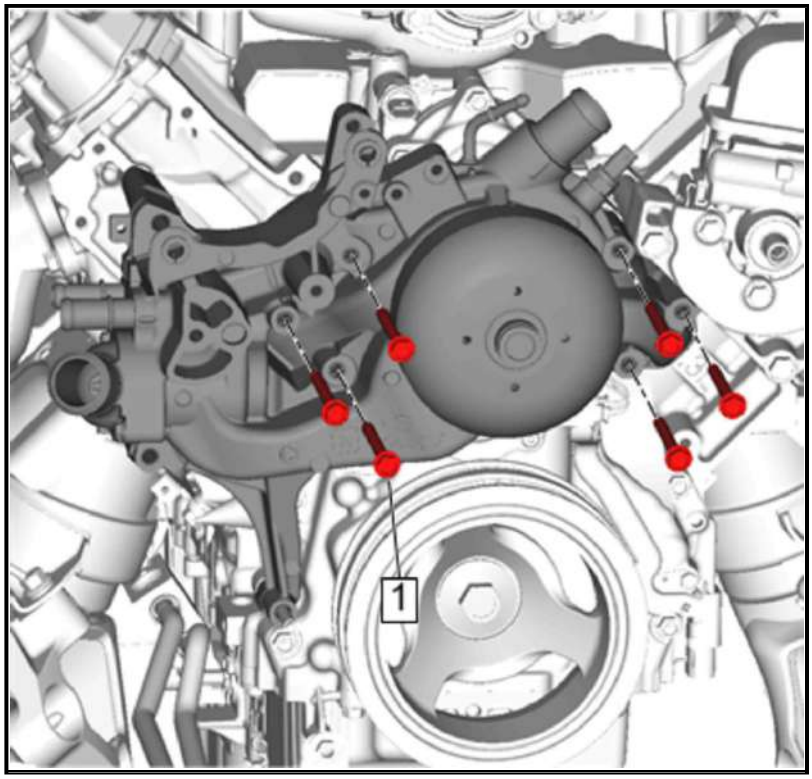
UNDERHOOD ELECTRICAL CENTER OR JUNCTION BLOCK REPLACEMENT

Removal Procedure

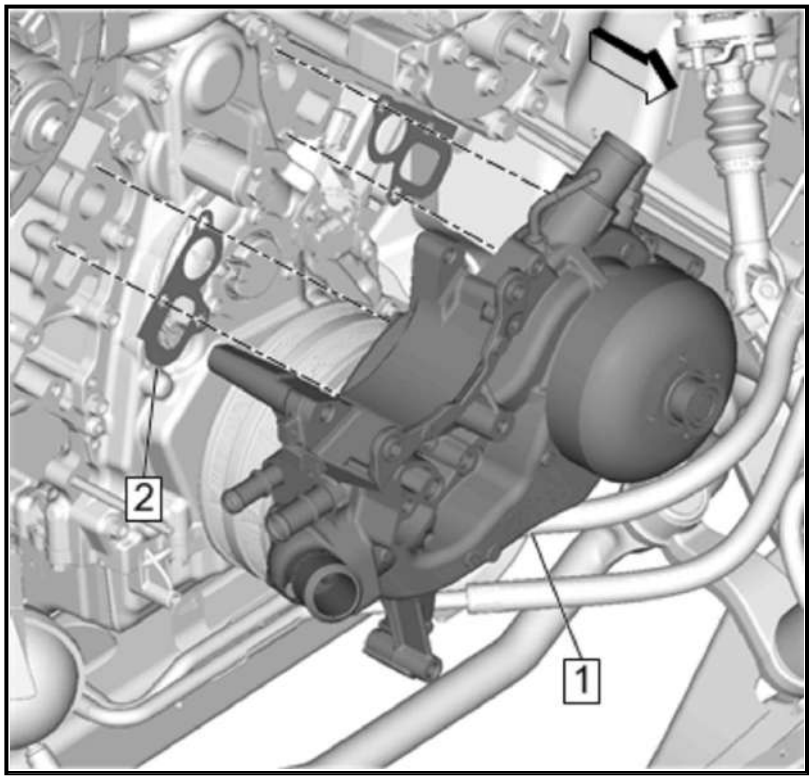
1. Disconnect the battery negative cable. **Battery Negative Cable Disconnection and Connection (Single Battery)** , or **Battery Negative Cable Disconnection and Connection (Dual Battery)** .
2. 

Fuse Block Cover (1) - Remove

3. 

22. 

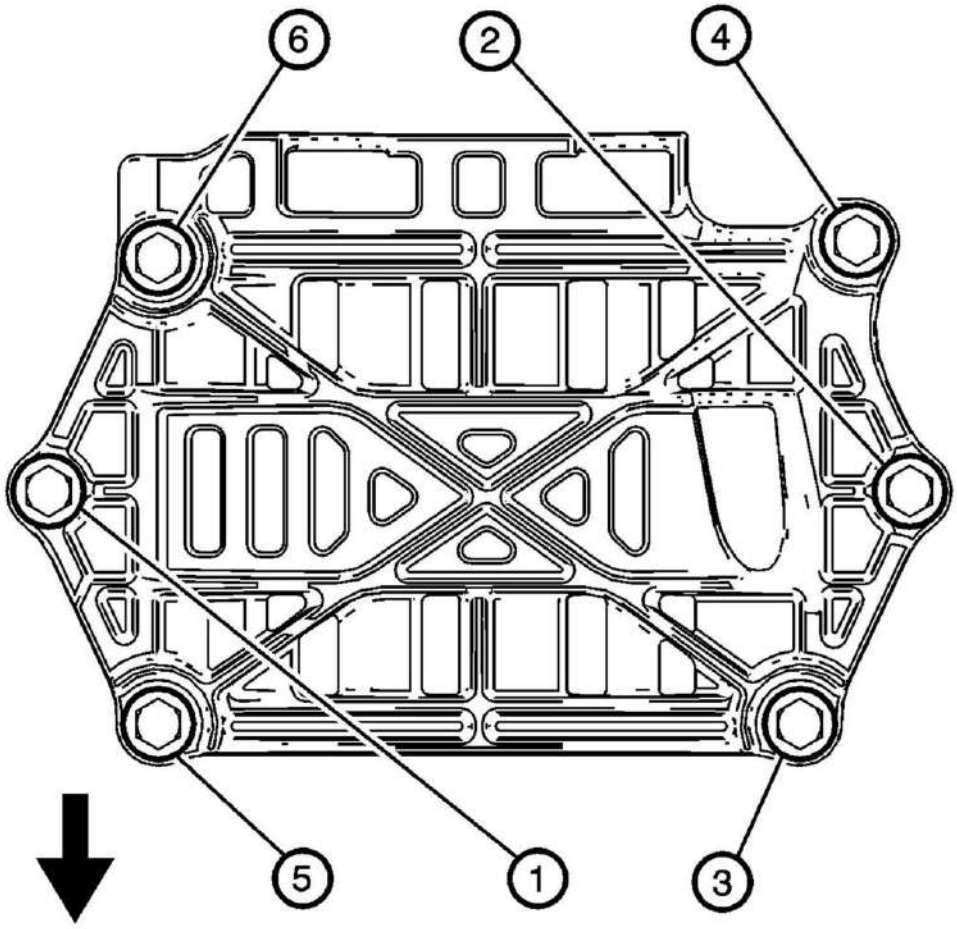
Water Pump Bolt (1) - Remove [6x]

23. 

Water Pump (1) - Remove

24. Water Pump Gasket (2) - Remove and DISCARD [2x]
25. Transfer components as necessary.

Installation Procedure



3.

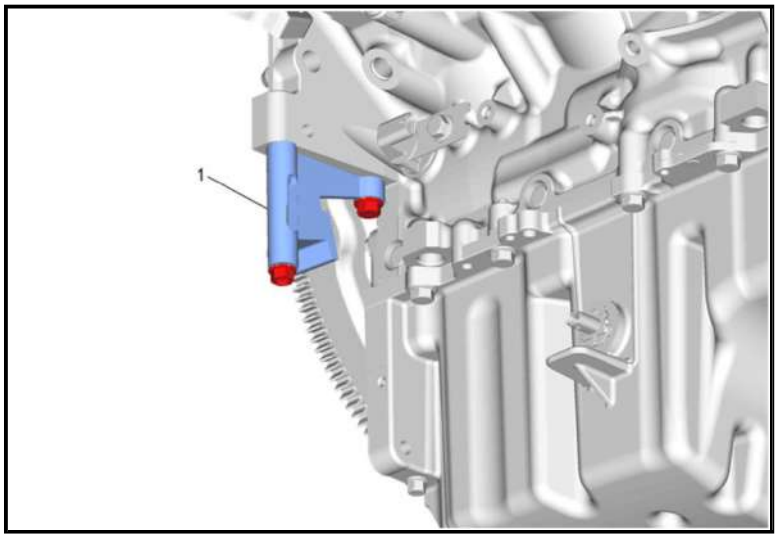
Fig. 49: Oil Pan Baffle Bolts Tightening Sequence
Courtesy of GENERAL MOTORS COMPANY

CAUTION: **Refer to Fastener Caution .**

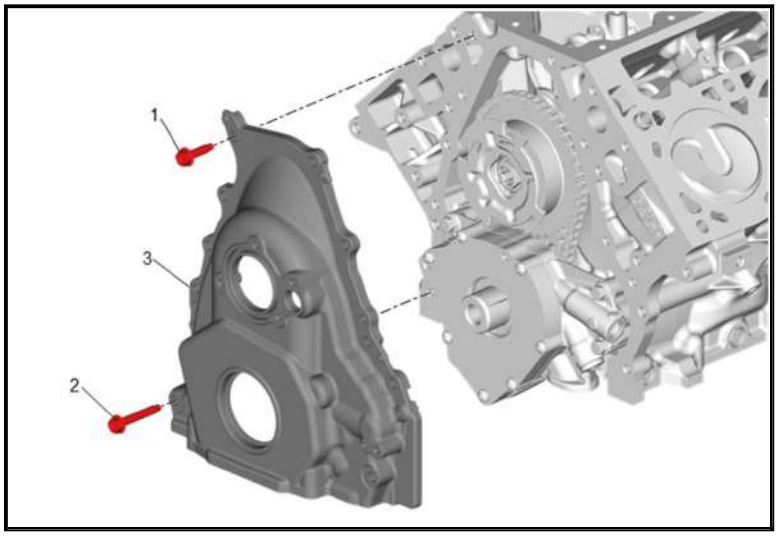
Tighten the bolts in sequence to 32 N.m (24 lb ft).

UPPER OIL PAN INSTALLATION

Upper Oil Pan Installation

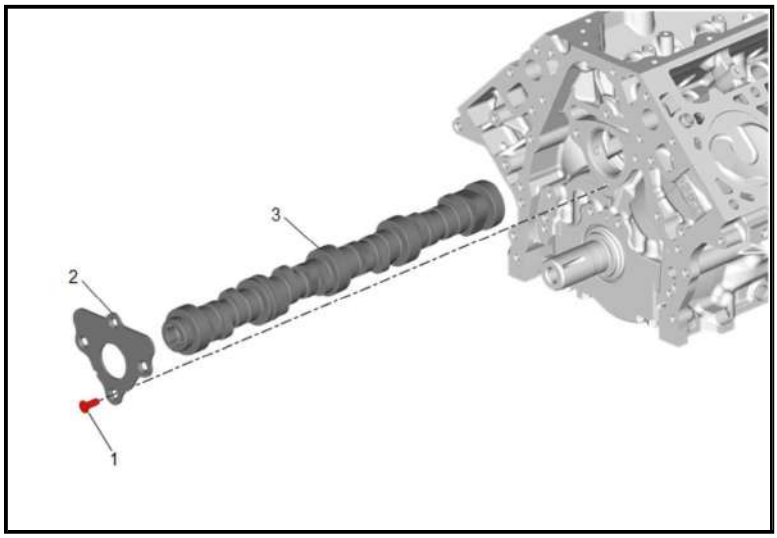
5. 

   Install the **EN-42386-A** Flywheel Holding Tool (1) and starter bolts (2).

6. 

   Engine Front Cover (3) - Remove - **Engine Front Cover Replacement**

7. Oil Pump Assembly - Remove - **Oil Pump Replacement**
8. Remove the timing chain, crankshaft sprocket, camshaft position actuator, and solenoid valve. **Timing Chain, Crankshaft Sprocket, Camshaft Position Actuator, and Solenoid Valve Replacement**

9. 

   Camshaft Retainer Bolt (1) - Remove [4x]

10. Camshaft Retainer (2) - Remove

Circuit/System Description

For an overview of the component/system, refer to **Exhaust Gas Recirculation (EGR) System Description**

Circuit	Description
Control - Terminal 1	The output circuit is switched from ground to 12 V to activate the component.
Control - Terminal 5	The output circuit is switched from ground to 12 V to activate the component.

Component	Description
Q14 Exhaust Gas Recirculation Valve	Redirecting the exhaust gas back into the intake system aids in reducing the amount of oxygen that enters the cylinders. This reduces the amount of nitrogen oxide (NOx) that is produced during combustion. The component is actuated by a bidirectional DC motor.
K20 Engine Control Module	The control module contains a microprocessor used to process input data to control outputs. The control module controls a series of actuators to ensure optimal engine performance. The control module does this by reading values from a variety of sensors, interprets the data and adjusts the engine actuators accordingly.

Conditions for Running the DTC

- DTC P0403, P0405, P0406, P0489, P0490, P049D, P1402, P1407, P140F, P1424 = Not set
- Engine = Running
- Ignition Voltage = Greater than 11 V

Frequency the DTC runs = Continuously - After the running conditions are met

Conditions for Setting the DTC

EGR Valve = Commanded state does not match the actual state - For greater than 2.5 s

Actions Taken When the DTC Sets

DTCs listed in the DTC Descriptor Category = Type A DTC

Conditions for Clearing the DTC

DTCs listed in the DTC Descriptor Category = Type A DTC

Reference Information

Schematic Reference

Engine Controls Wiring Schematics

Connector End View Reference

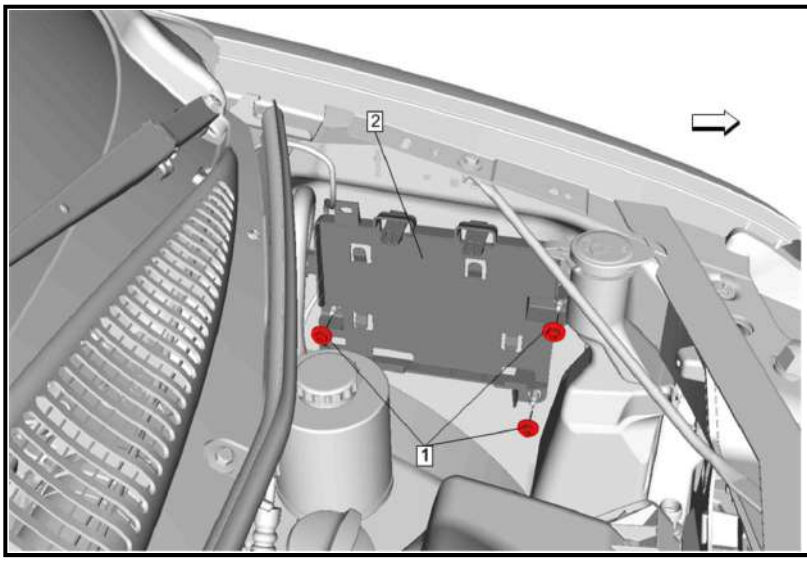
Master Electrical Component List , or **Component Connector End Views - Index**

Electrical Information Reference

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

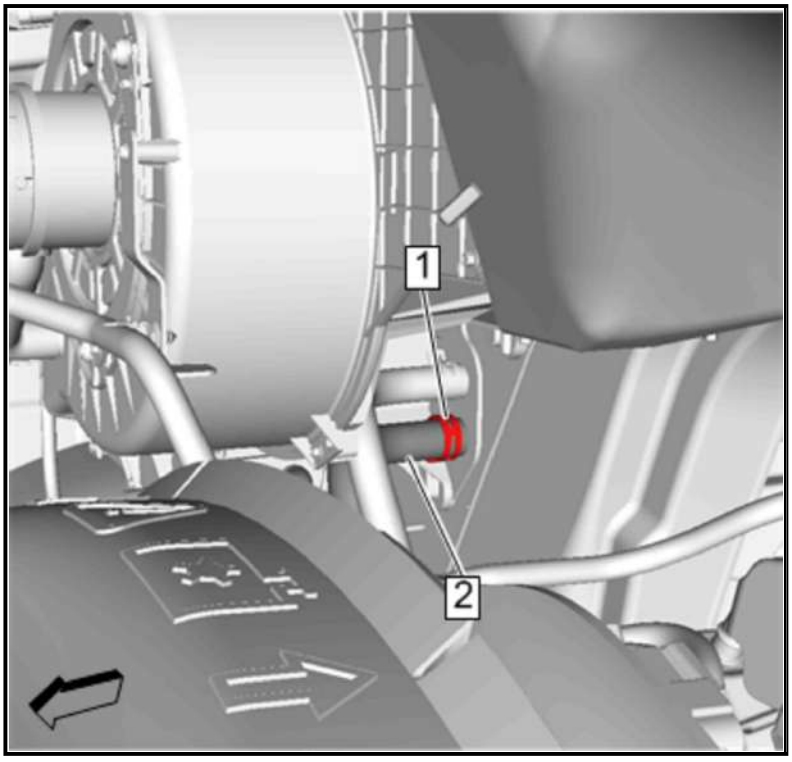
Callout	Component Name
	the Engine Oil Life remaining back to the original percentage recorded.

ENGINE CONTROL MODULE BRACKET REPLACEMENT



Callout	Component Name
Preliminary Procedure **Engine Control Module Replacement**	
1	Engine Control Module Bracket Nut [3x] **CAUTION:** **Refer to Fastener Caution .** **Tighten** 22 N.m (16 lb ft)
2	Engine Control Module Bracket

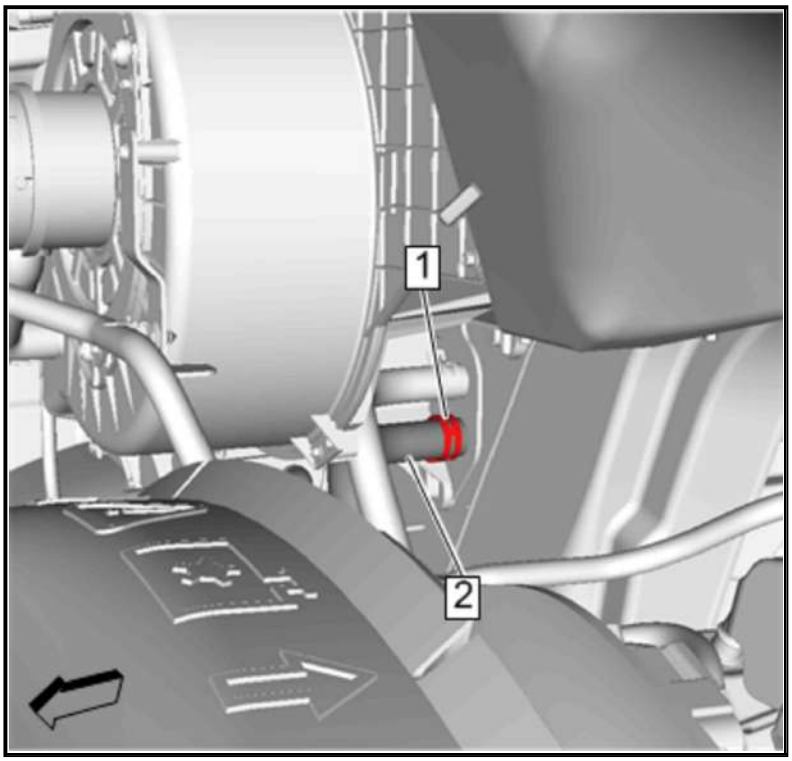
CHASSIS CONTROL MODULE REPLACEMENT (SHORT WHEEL BASE)

8. 

   Heater Inlet Hose Clamp (1) - Disengage - **Hose Clamp Replacement Guidelines - Spring Type**

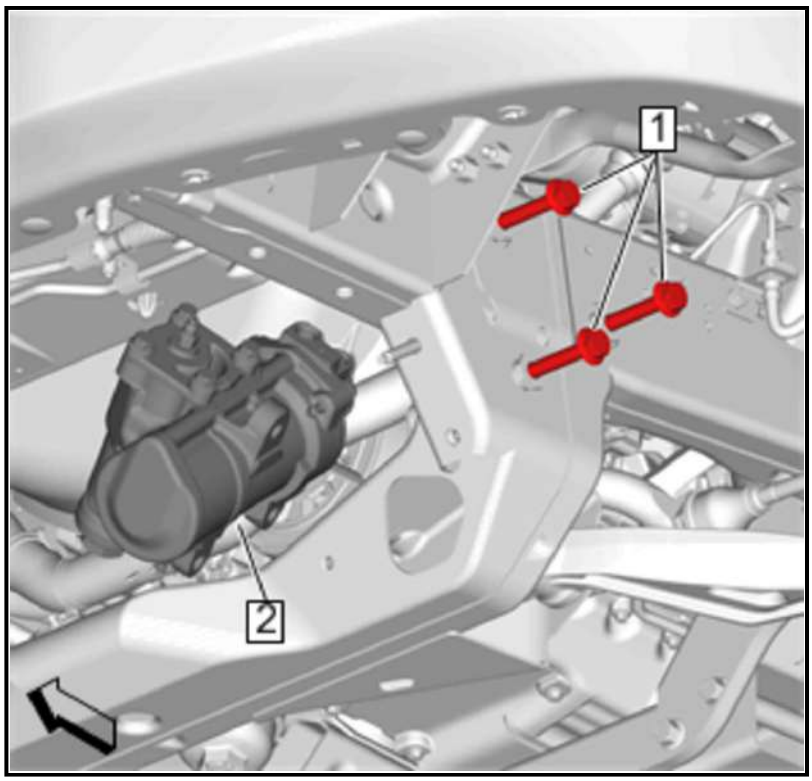
9. Heater Inlet Hose (2) @ Heater Core Inlet Tube - Remove
10. Heater Inlet Hose (2) - Remove

Installation Procedure

1. 

   Heater Inlet Hose (2) @ Heater Core Inlet Tube - Install

2. Heater Inlet Hose Clamp (1) - Engage - **Hose Clamp Replacement Guidelines - Spring Type**

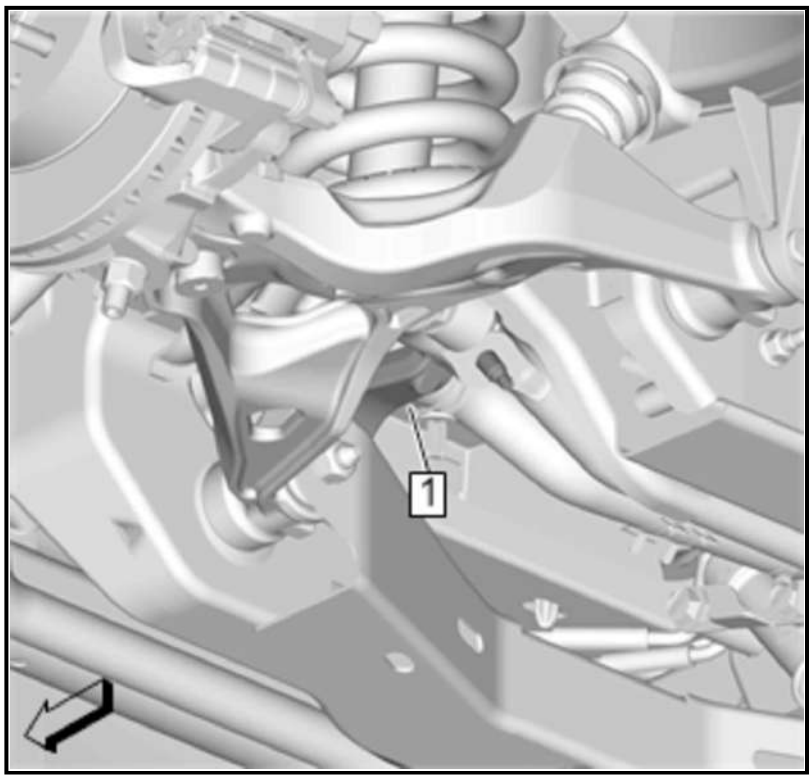
2. 

Position the steering gear (2) on the vehicle.

3. Support the steering gear prior to installing the steering gear bolts.

CAUTION: **Refer to Fastener Caution .**

4. Steering Gear Bolt (1) - Install and tighten [3x] 150 N.m (111 lb ft)

5. 

Pitman Arm (1) @ Steering Linkage Relay Rod - Install - **Steering Linkage Relay Rod Replacement**

3. Pressure Regulator Valve Train (2) - Clean and inspect
4. Pressure Relief Ball Valve Train (3) - Clean and inspect
5. Actuator Feed Limit Valve Train (4) - Clean and inspect
6. Default Override Valve Train (5) - Clean and inspect
7. Automatic Transmission Wiring Harness Bracket Bolt - Model Dependent (6) - Clean and inspect
8. Automatic Transmission Wiring Harness Bracket Bolt - Model Dependent (6) - Install and tighten M6 x 209 N.m (80 lb in)
9. Control Valve Plug - Model Dependent (7) - Clean and inspect
10. Control Valve Center Body Hole Plug (8) - Clean and inspect
11. Clutch Piston Exhaust Blow off Ball Valve Train (9) - Clean and inspect
12. Torque Converter Clutch Valve Train (10) - Clean and inspect
13. Lube Regulator Valve Train (11) - Clean and inspect
14. Torque Converter Clutch Control Valve Train (12) - Clean and inspect

CONTROL VALVE BODY ASSEMBLY ASSEMBLE

1.

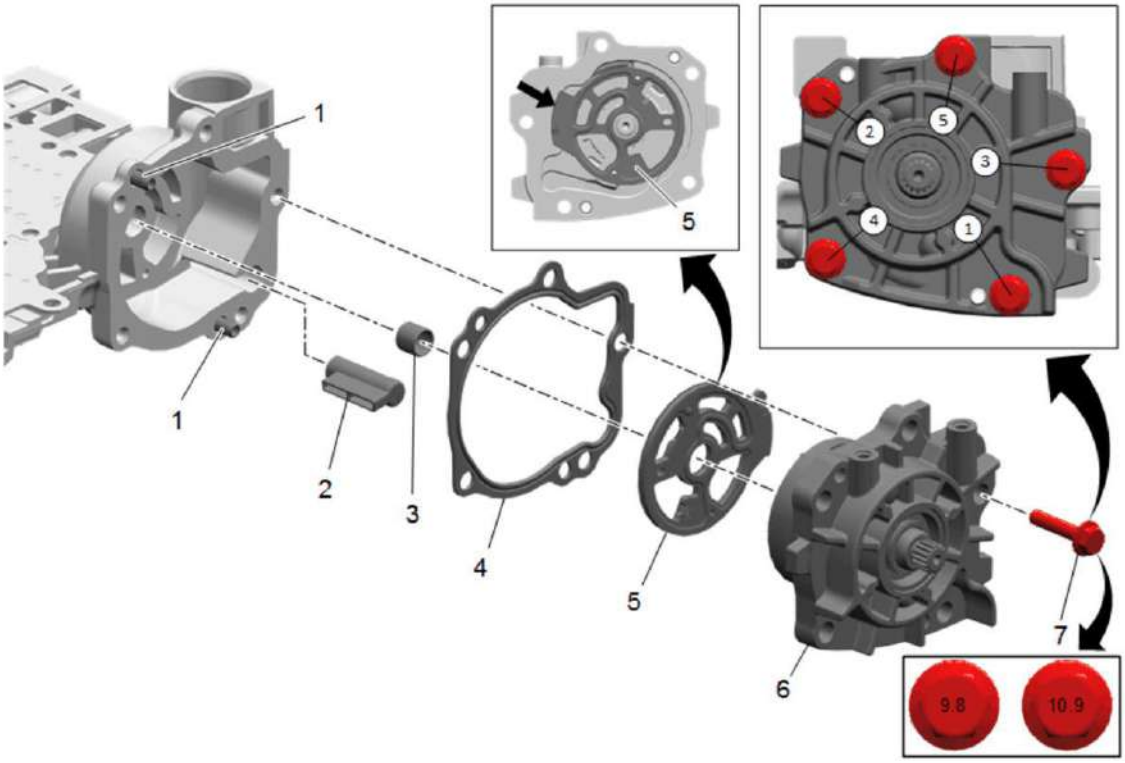


Fig. 4: Automatic Transmission Fluid Pump Bolts Tightening Sequence
Courtesy of GENERAL MOTORS COMPANY

Automatic Transmission Fluid Pump Locating Pin (1) - Install [2x]

2. Automatic Transmission Fluid Pump Passage Sleeve (2) - Install
3. Automatic Transmission Fluid Pump Drive Shaft Bushing (3) - Install
4. Automatic Transmission Fluid Pump Gasket (4) - Install NEW

NOTE: **Install the seal onto the pump as shown. "Side Up", indicated by the arrow, should face away from the pump assembly.**

5. Automatic Transmission Fluid Pump Seal (5) - Install NEW
6. Automatic Transmission Fluid Pump (6) - Install

CAUTION: **Refer to Fastener Caution .**