the applicable SAE standards when servicing vehicles equipped with R-1234yf refrigerant systems. Reference SAE J639, SAE J2845, SAE J2842, SAE J2843 & SAE J2851. Failure to follow these precautions may cause personal injury and/or damage to the vehicle or its components.

INTRODUCTION > RELIEVING FUEL PRESSURE WARNING

WARNING:

Remove the fuel tank cap and relieve the fuel system pressure before servicing the fuel system in order to reduce the risk of personal injury. After you relieve the fuel system pressure, a small amount of fuel may be released when servicing the fuel lines, the fuel injection pump, or the connections. In order to reduce the risk of personal injury, cover the fuel system components with a shop towel before disconnection. This will catch any fuel that may leak out. Place the towel in an approved container when the disconnection is complete.

INTRODUCTION > ROAD TEST WARNING

WARNING:

Road test a vehicle under safe conditions and while obeying all traffic laws. Do not attempt any maneuvers that could jeopardize vehicle control. Failure to adhere to these precautions could lead to serious personal injury and vehicle damage.

INTRODUCTION > SAFETY GLASSES AND COMPRESSED AIR WARNING

WARNING:

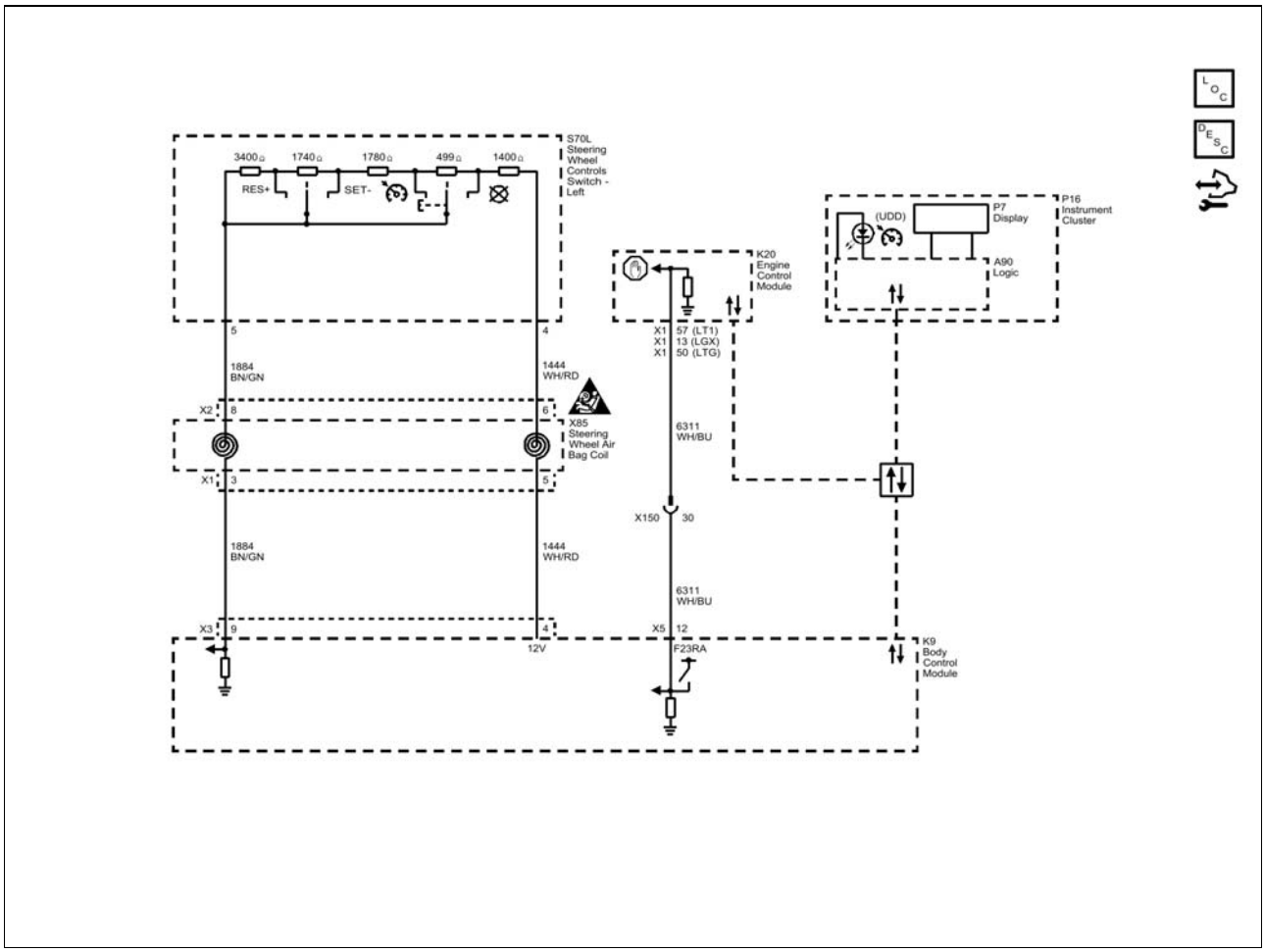
Wear safety glasses when using compressed air in order to prevent eye injury.

INTRODUCTION > SAFETY GLASSES WARNING

Service Manual: CRUISE CONTROL SYSTEM

SCHEMATIC WIRING DIAGRAMS > CRUISE CONTROL WIRING SCHEMATICS > CRUISE CONTROL

Fig 1: Cruise Control



Courtesy of GENERAL MOTORS COMPANY

DIAGNOSTIC INFORMATION AND PROCEDURES > DTC P0572 OR P0573: BRAKE SWITCH CIRCUIT 1 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.
- Diagnostic Procedure Instructions provides an overview of each diagnostic category.

DIAGNOSTIC INFORMATION AND PROCEDURES > DTC P0572 OR P0573: BRAKE SWITCH CIRCUIT 1 VOLTAGE > DTC DESCRIPTORS

that connects to the right sensor. The scan tool is able to individually communicate with each sensor.

Outside Rearview Mirrors

The outside rearview mirrors contain an icon that is backlit with high intensity, amber-colored LED's located on the mirror surface. The display brightness adapts to day/night conditions. The side blind zone alert indicator icon in the left or right outside rearview mirror is illuminated if the left or right side object sensor module detects a vehicle in the side blind zone to inform the driver that there is a vehicle driving in the blind spot zone.

DESCRIPTION AND OPERATION > OBJECT DETECTION DESCRIPTION AND OPERATION (WITH SIDE BLIND ZONE ALERT, UDQ, N AMERICA) > SIDE BLIND ZONE ALERT OPERATION

When the vehicle is started, both outside mirror displays will briefly come on to indicate that the system is operating. The system is designed to detect objects of interest as small as a 125cc motorcycle with rider. The detection zone starts at the outside rearview mirror and extends out to 3.5 m (11 ft) at the back corner of the vehicle and 3 m (10 ft) behind the vehicle at a height of 0.5 m (1.5 ft) to 2.0 m (6 ft) above the ground. The system may light up an indicator due to guardrails, signs, trees, shrubs, and other non-moving objects. This is normal system operation; the vehicle does not need service.

When the system detects a vehicle in the side blind zone while driving forward, independent if passing a vehicle or being passed, an amber warning symbol will light up in the appropriate outside mirror. This indicates that it may be unsafe to change lanes. If the driver then activates the turn signal, the amber warning symbol starts flashing as an extra warning not to change lanes.

Foul weather may affect the operation of the side blind zone system. Occasional missed alerts can occur under normal circumstances and will increase in wet conditions. The number of missed alerts will increase with increased rainfall or road spray. Heavy rainfall, as well as mud, dirt, snow, ice, or slush build-up on the rear fascia, can completely disable the system.

If the vehicle is towing a trailer or has an object such as a bicycle rack attached to the rear of the vehicle, the side blind zone system may not function properly and the indicators may illuminate intermittently or remain illuminated all the time.

DESCRIPTION AND OPERATION > OBJECT DETECTION DESCRIPTION AND OPERATION (WITH SIDE BLIND ZONE ALERT, UDQ, N AMERICA) > SIDE BLIND ZONE ALERT DRIVER INFORMATION CENTER MESSAGES

SIDE BLIND ZONE ALERT OFF

This message indicates that the system has been disabled through the driver information center. Refer to the vehicle owners manual for instructions on how to set personalization options on the driver information center.

SERVICE SIDE DETECTION SYSTEM

This message indicates that the system requires service. When the message is displayed, the indicators will remain illuminated at all times, notifying the driver that the side blind zone system should not be relied upon when changing lanes. Since the sensors are also used for rear cross traffic alert, this

Refer to Circuit/System Testing - Driver Window Switch Malfunction.

1. **If the driver window does not express UP or express DOWN**

   Normalize the driver window motor, refer to Window Motor Programming - Express Function .

1. **If after normalization, the driver window does not express UP or express DOWN**

   Refer to Circuit/System Testing - Driver Window Switch Malfunction.

1. **If the driver window moves UP, express UP, DOWN and express DOWN as commanded**

4. Verify the scan tool parameters listed below change when pressing and pulling the switches for the passenger window on the driver window master control;
   1. Front Passenger Main Control Down Switch - Inactive and Active
   2. Front Passenger Main Control Express Switch - Inactive and Active
   3. Front Passenger Main Control Up Switch - Inactive and Active

   1. **If the parameters do not change**

      Refer to Circuit/System Testing - Driver Window Switch Malfunction.

   1. **If the parameters changes**

5. Verify the passenger window moves while commanding the Passenger Window Motor Up and Down with a scan tool.

   1. **If the passenger window does not move UP and DOWN as commanded**

      Refer to Circuit/System Testing - Driver/Passenger Window Motor Malfunction.

   1. **If the passenger window moves UP and DOWN as commanded**

6. Verify the passenger window moves while commanding the window UP, express UP, DOWN and express DOWN with the S79P Window Switch-Passenger.

   1. **If the passenger window does not move UP or DOWN as commanded**

      Refer to Circuit/System Testing - Passenger Window Switch Malfunction.

   1. **If the passenger window does not express UP or express DOWN**

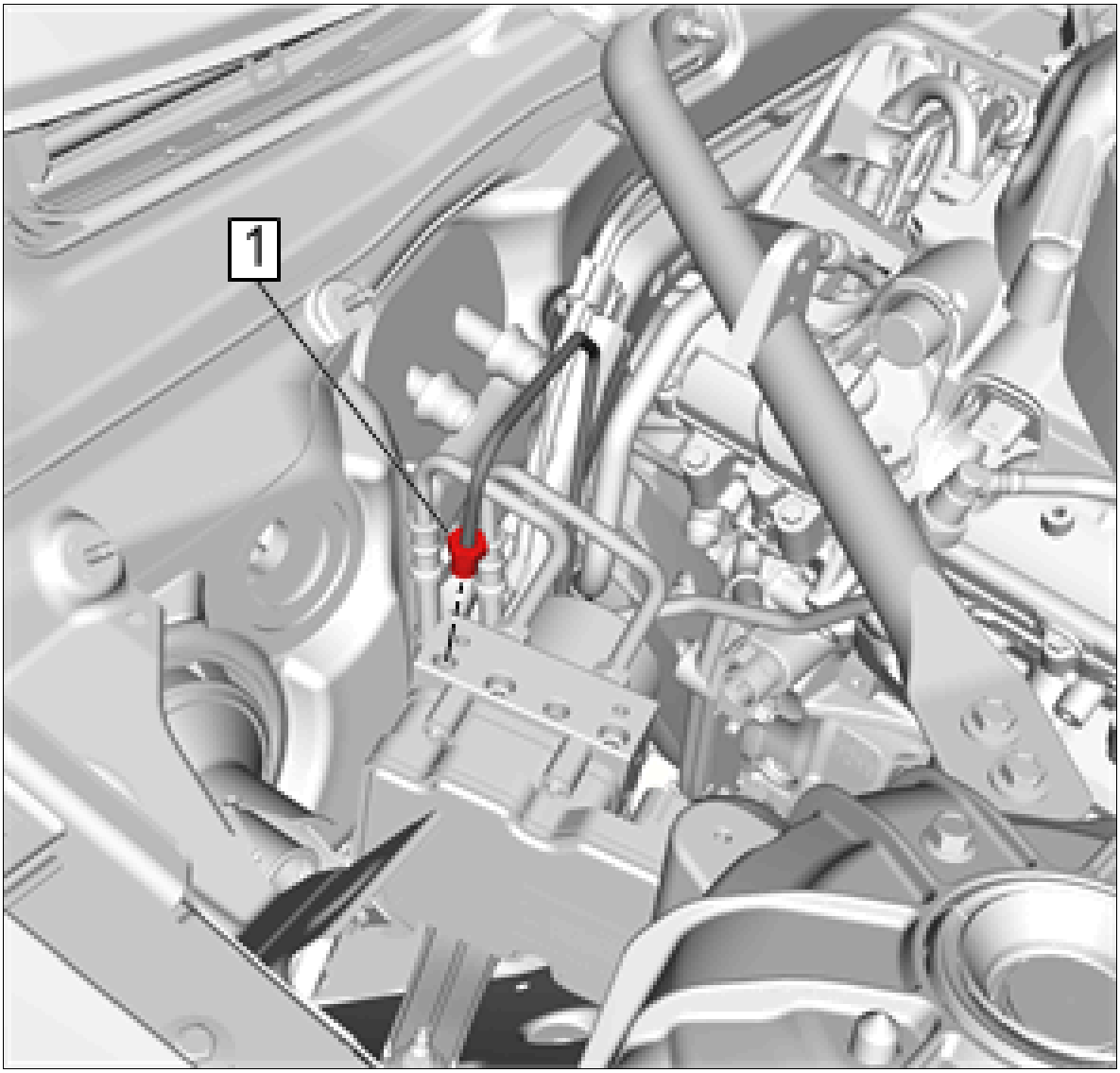
      Normalize the passenger window motor, refer to Window Motor Programming - Express Function .

   1. **If after normalization, the passenger window does not express UP or express DOWN**

      Refer to Circuit/System Testing - Passenger Window Switch Malfunction.

   1. **If the passenger window moves UP, express UP, DOWN and express DOWN as commanded**

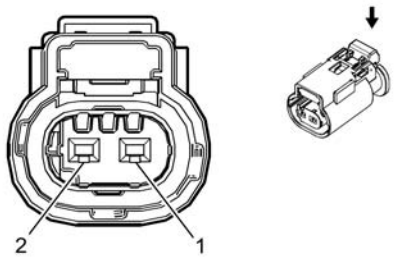
Fig 4: Left Rear Brake Pipe Fitting



Courtesy of GENERAL MOTORS COMPANY

11. Disconnect Left Rear Brake Pipe Fitting (1)
12. Cap the brake pipe fitting and plug the BPMV outlet port to prevent brake fluid loss and contamination.

	actuators require replacement?		
9	1. Replace park brake hardware components as necessary. Parking Brake Shoe Replacement 2. Replace the park brake actuators as necessary. Rear Parking Brake Actuator Lever Replacement Did you complete the replacement?	Go to **Step 17**	-
10	With the aid of an assistant, apply and release the parking brake while observing the cables for free movement. Do the park brake cables move freely?	Go to **Step 11**	Go to **Step 13**
11	Check the adjustment of the park brake and adjust as necessary. Parking Brake Adjustment Did you find and correct the condition?	Go to **Step 17**	Go to **Step 12**
12	1. With the transmission still in NEUTRAL, apply the park brake. 2. Attempt to rotate the rear wheels to check the rear brakes for a significant amount of drag. 3. Release the park brake. 4. Rotate the rear wheels to check the rear brakes for a significant reduction of drag. Did the park brake apply and release properly?	Go to **Step 17**	Go to Symptoms - Park Brake
13	Disconnect the park brake cable connections that are accessible on the UNDERSIDE of the vehicle one at a time and check each cable for free movement. Do any of the park brake cables accessible on the underside of the vehicle require replacement?	Go to **Step 14**	Go to **Step 15**
14	Replace any of the park brake cables that do not have free movement (not releasing properly). Refer to the following procedures as necessary: • Parking Brake Intermediate Cable Replacement • Parking Brake Rear Cable Replacement Did you complete the replacement?	Go to **Step 17**	-
15	Inspect the electronic parking brake control module for proper operation and replace as necessary.	Go to **Step 17**	Go to **Step 16**



Connector Part Information

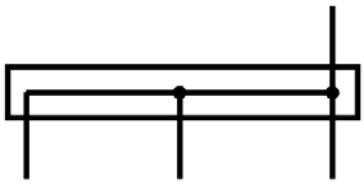
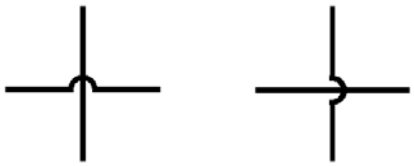
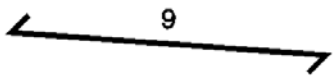
- Harness Type: Front Fascia
- OEM Connector: 9405623
- Service Connector: Service by Harness - See Part Catalog
- Description: 2-Way F 1.2 MLK Series, Sealed (BK)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-16 (LT GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

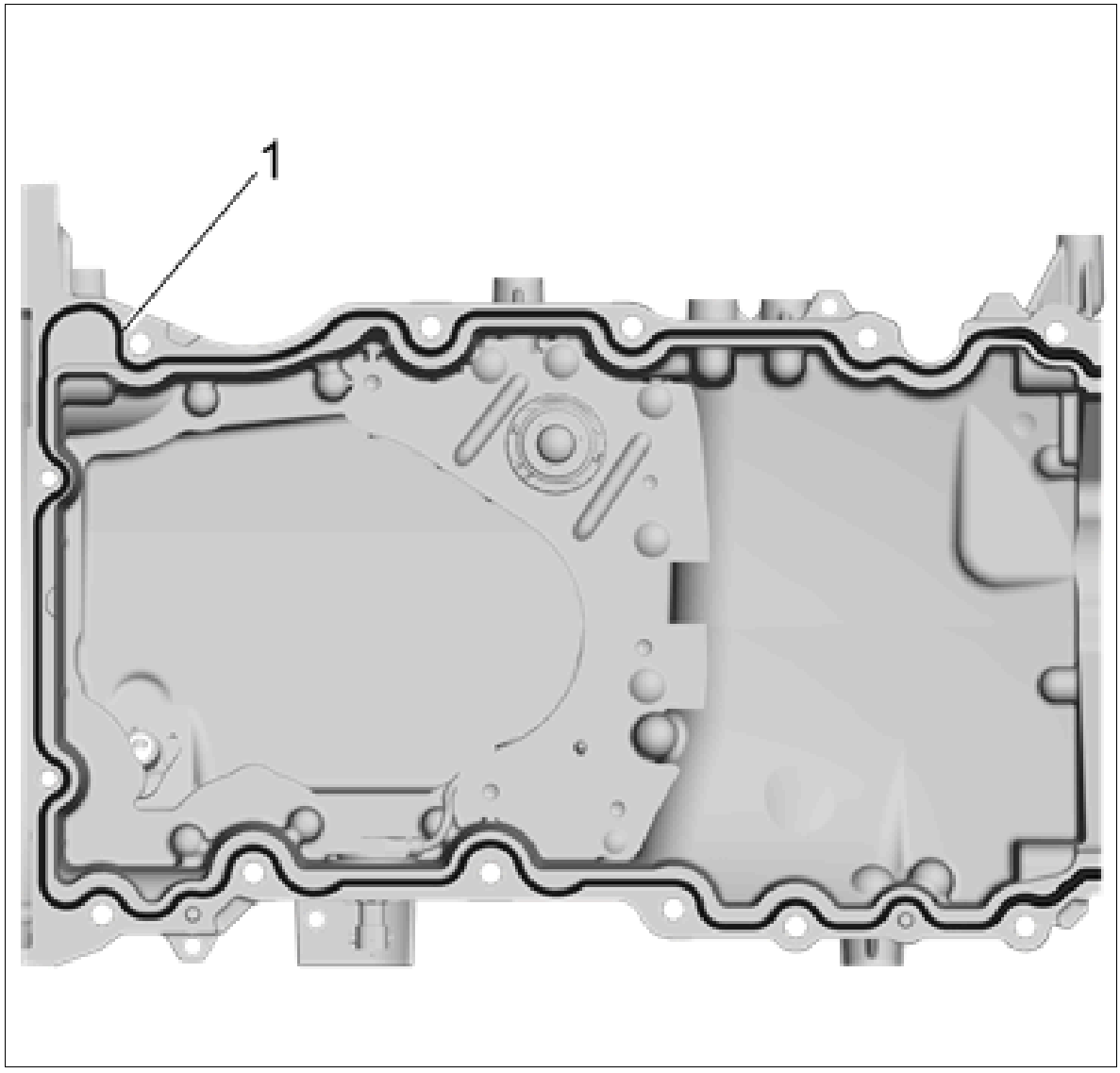
Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.35	BN/YE	4038	Pedestrian Protection Safing Sensor Module Signal	I	B3T
2	0.35	BK/VT	4045	Pedestrian Protection Safing Sensor Module Low Reference	I	B3T

COMPONENT CONNECTOR END VIEWS > B82F PEDESTRIAN IMPACT DETECTION SENSOR-UPPER BEAM FRONT X2

	Complete Physical Splice- 3 or more wires
	Wire Crosses
	Twisted Wires

PROCEDURE

Fig 1: Short Lower Oil Pan Bolts



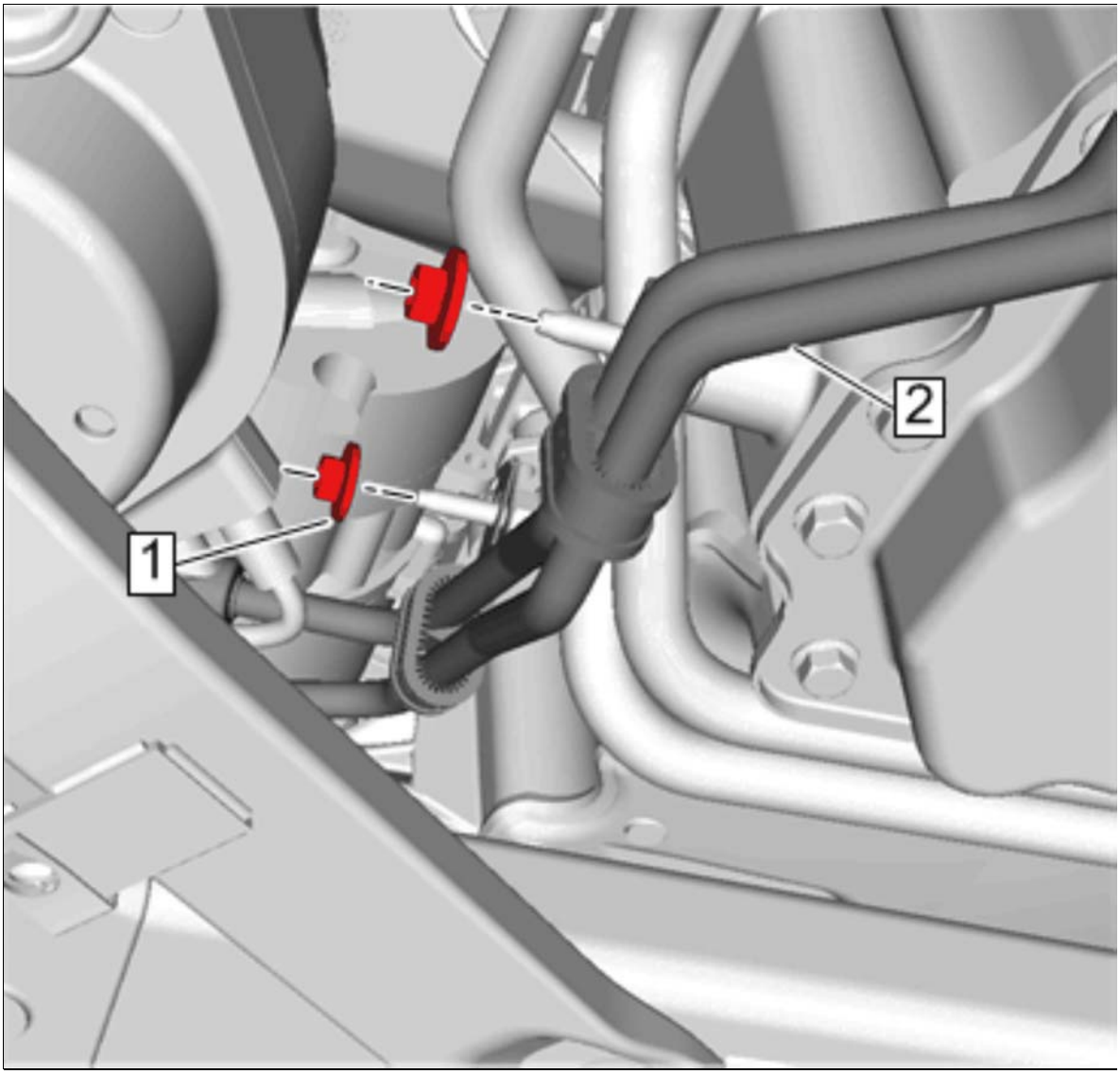
Courtesy of GENERAL MOTORS COMPANY

NOTE:

1. *The lower crankcase surface must be free of contamination prior to applying the sealer.*
2. *Install and align the oil pan to block within 20 minutes of applying the sealer.*
3. *The oil pan must be fastened to final torque specification within 60 minutes of applying the sealer.*

1. Apply a 4.25 mm bead of sealer (1) on the level part of the flange around the perimeter of the oil pan. Adhesives, Fluids, Lubricants, and Sealers

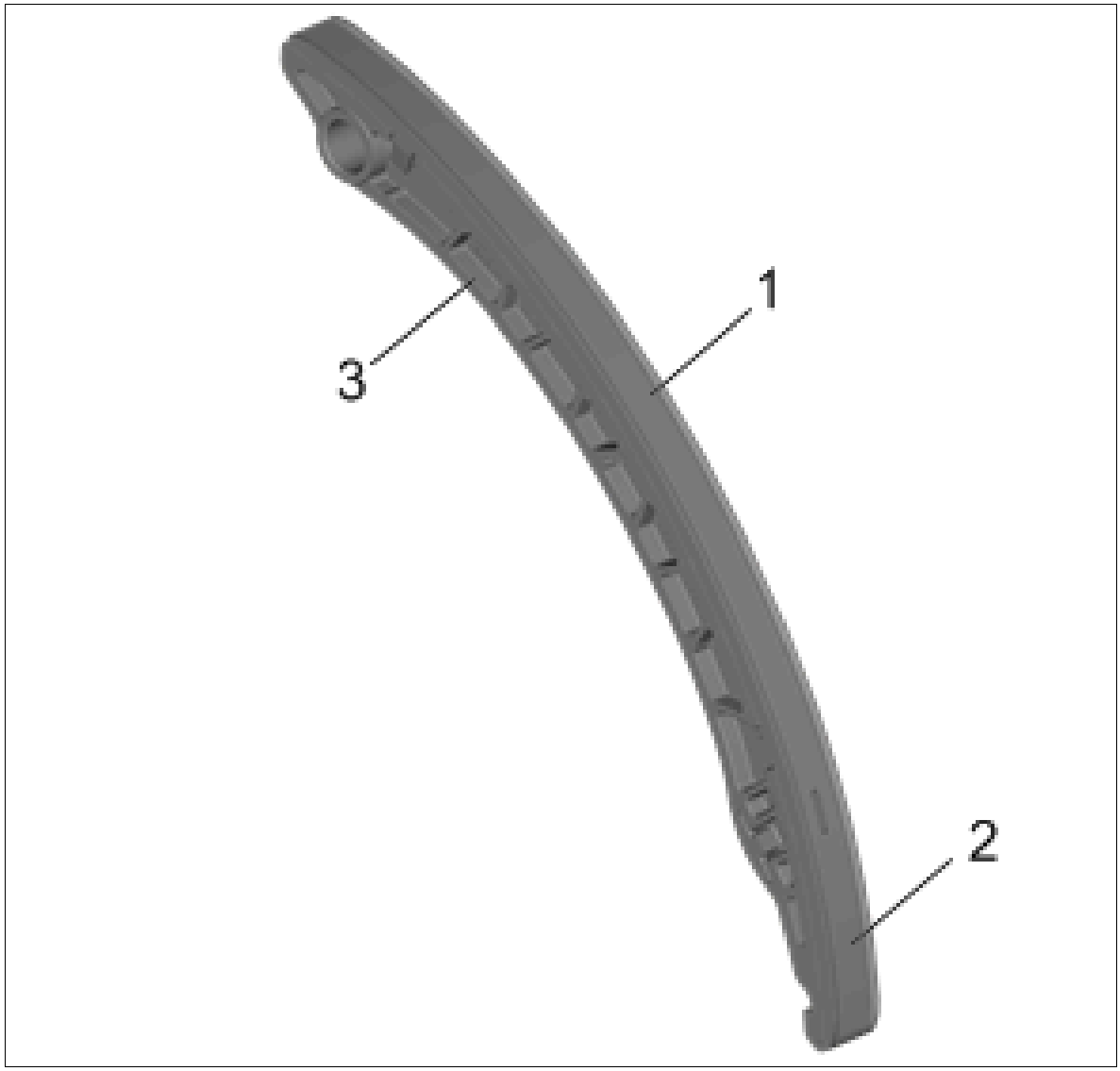
Fig 6: Transmission Fluid Cooler Pipe Nut



Courtesy of GENERAL MOTORS COMPANY

7. Move Transmission Fluid Cooler Pipe (2) into position
8. Install Transmission Fluid Cooler Pipe Nut (1) (Qty: 2) and tighten - Transmission Fluid Cooler Inlet and Outlet Pipe Replacement (LTG With M5T, Without V03)Transmission Fluid Cooler Inlet and Outlet Pipe Replacement (LTG With M5T, With V03)

Fig 16: Timing Chain Guide Inspection Points

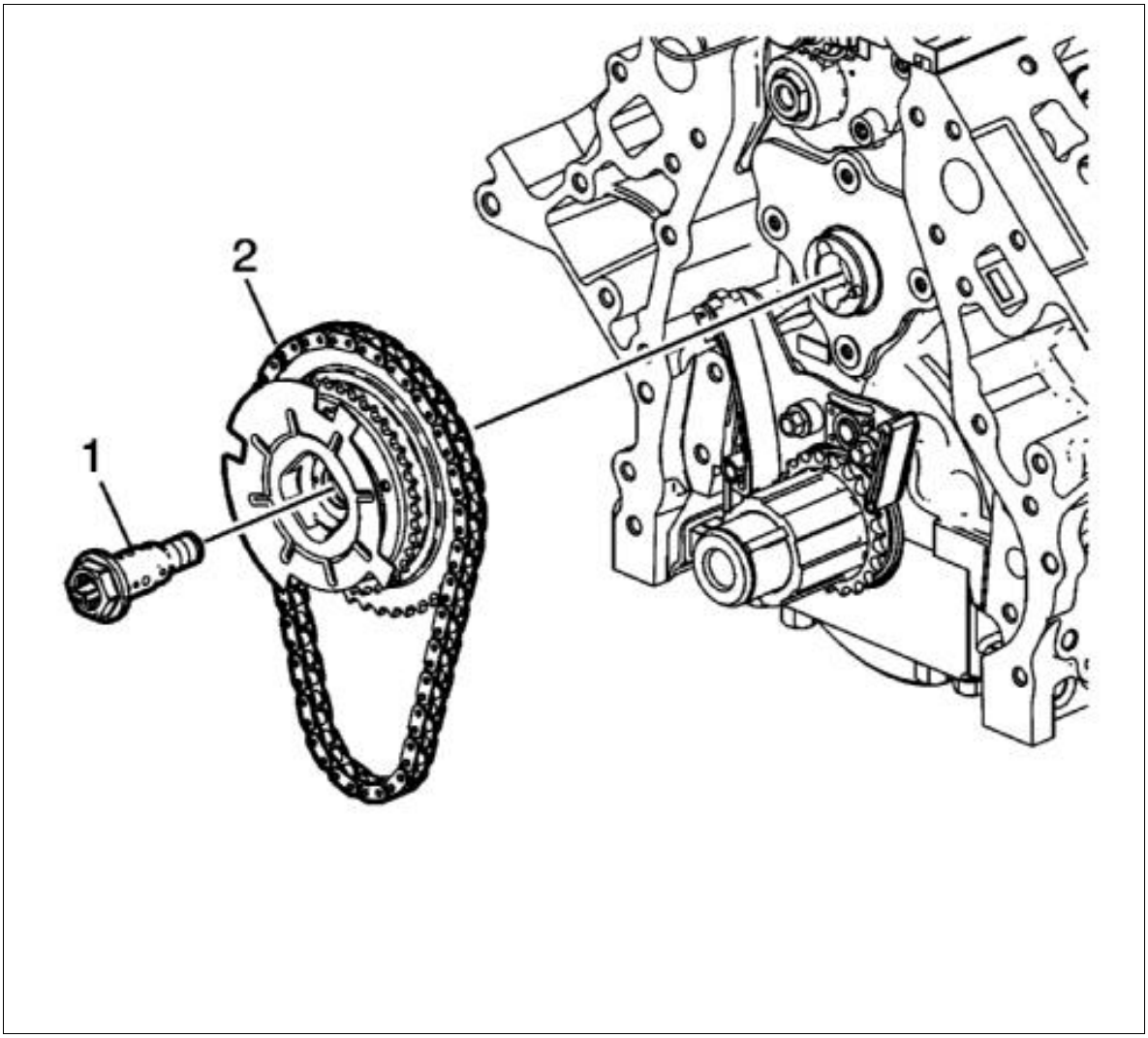


Courtesy of GENERAL MOTORS COMPANY

1. Inspect the timing chain guide for the following:
    1. Worn guide surface (1)
    2. Cracked or broken guide surface (2)
    3. Cracked or damaged guide base (3)
2. Replace a damaged primary timing chain upper guide.

Timing Chain Guide

Fig 2: Actuator And Timing Chain



Courtesy of GENERAL MOTORS COMPANY

3. Install the NEW CMP actuator (1) and timing chain (2). Refer to Timing Chain, Crankshaft Sprocket, Camshaft Position Actuator, and Solenoid Valve Replacement .
4. Install the valve lifter follower guide. Refer to Valve Lifter Follower Guide Replacement .
5. Install the valve lifters. Refer to Valve Lifter Replacement .
6. Install the engine. Refer to Engine Replacement (Automatic Transmission) .

REPAIR INSTRUCTIONS - ON VEHICLE > ENGINE FLYWHEEL REPLACEMENT

Special Tools

- **J-42386-A** Flywheel Holding Tool

For equivalent regional tools, refer to Special Tools .

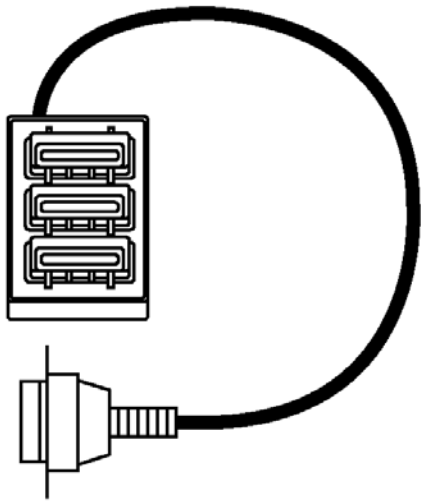
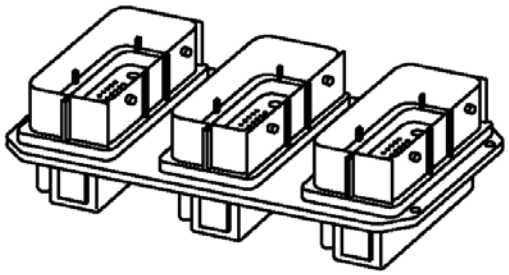
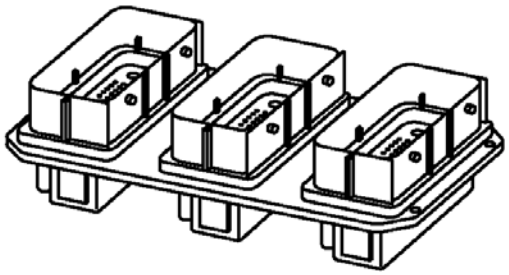
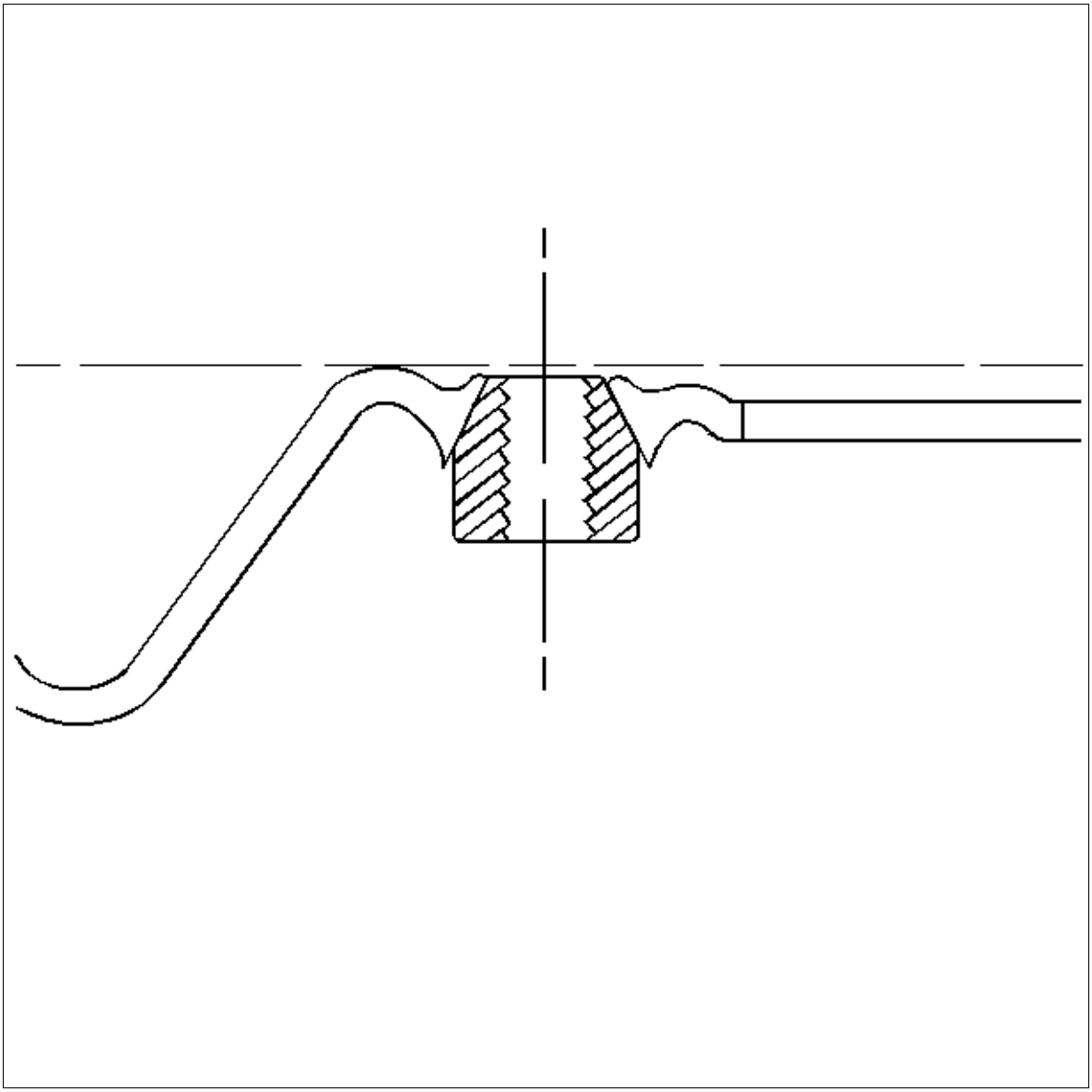
	CH-47976-511 AFIT SIDI E82 G5 Adapter Cable
	CH-47976-512 E80 G3B Stop/Start Adapter
	CH-47976-513 E92 G2C Stop/Start and SENT Adapter

Fig 3: Mounting Wheel/Nut Holes For Damage Caused From Over-Torquing The Wheel/Nuts

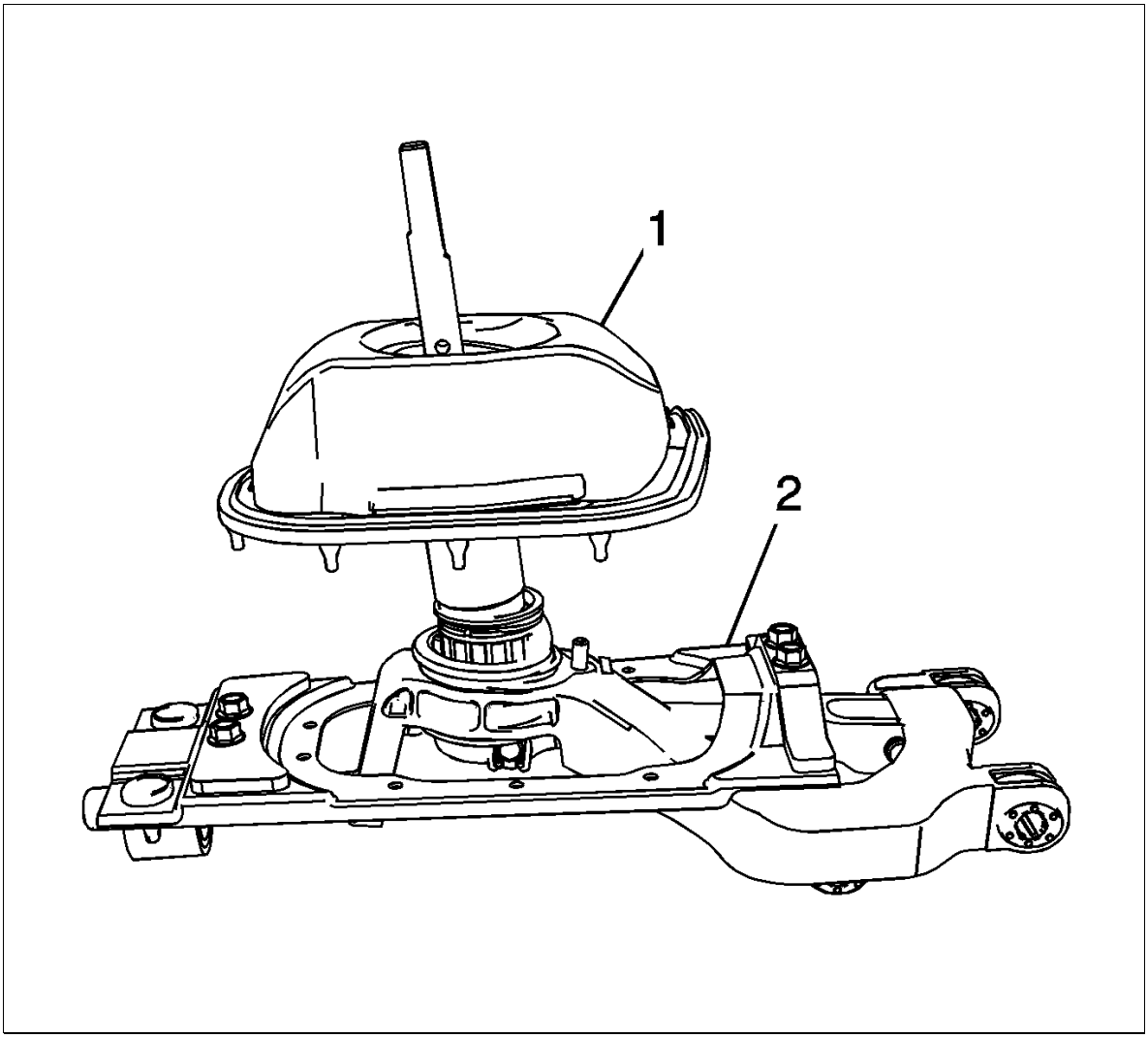


Courtesy of GENERAL MOTORS COMPANY

6. Inspect the mounting wheel/nut holes for damage caused from over-torquing the wheel/nuts. Inspect for collapsed wheel/nut bosses. Inspect for cracked wheel bosses.

> ⚠ *CAUTION:*
>
> *The use of non-GM original equipment wheels may cause:*
>
> 1. *Damage to the wheel bearing, the wheel fasteners and the wheel*
> 2. *Tire damage caused by the modified clearance to the adjacent vehicle components*
> 3. *Adverse vehicle steering stability caused by the modified scrub radius*
> 4. *Damage to the vehicle caused by the modified ground clearance*

Fig 1: Shift Control Assembly & Closeout Boot



Courtesy of GENERAL MOTORS COMPANY

1. Install the shift control lever lower boot (1) to the shift control assembly (2).
2. Install the shift front floor console trim plate to the vehicle. Front Floor Console Trim Plate Replacement (Automatic)Front Floor Console Trim Plate Replacement (Manual)

REPAIR INSTRUCTIONS - ON VEHICLE > TRANSMISSION CONTROL LEVER BOOT REPLACEMENT > REMOVAL PROCEDURE

NOTE:

The shift boot is shown semi-transparent for fastener location.

NOTE: