

TRANSMISSION

Automatic Transmission - 6L45 (MYA) - Repair Instructions - On Vehicle - CTS Sedan

REPAIR INSTRUCTIONS - ON VEHICLE

TRANSMISSION CONTROL LEVER KNOB REPLACEMENT

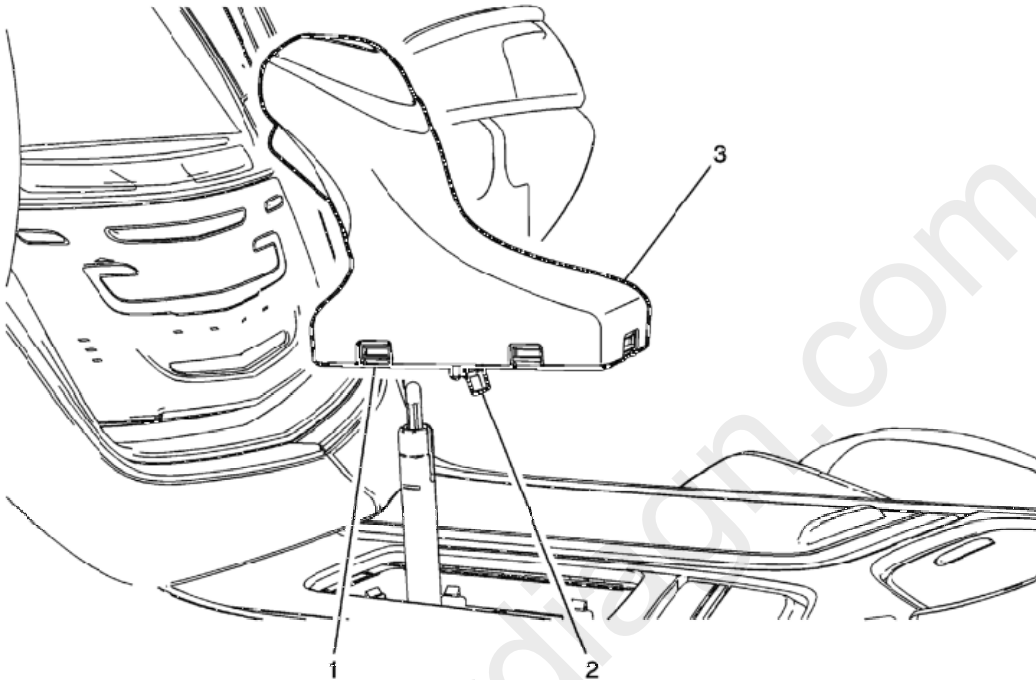


Fig. 1: Transmission Control Lever Knob
Courtesy of GENERAL MOTORS COMPANY

Transmission Control Lever Knob Replacement

Callout	Component Name
1	Transmission Control Lever Knob Retainer (Qty: 6) Procedure Use a flat-bladed plastic trim tool in order to release the retainer clips securing the control lever boot. NOTE: Place the transmission control in the Neutral position.
2	Electrical Connector
3	Transmission Control Lever Knob NOTE:

- The control lever boot and knob are replaced as an assembly.
- To remove the knob, pull upward and twist.

AUTOMATIC TRANSMISSION CONTROL INDICATOR REPLACEMENT

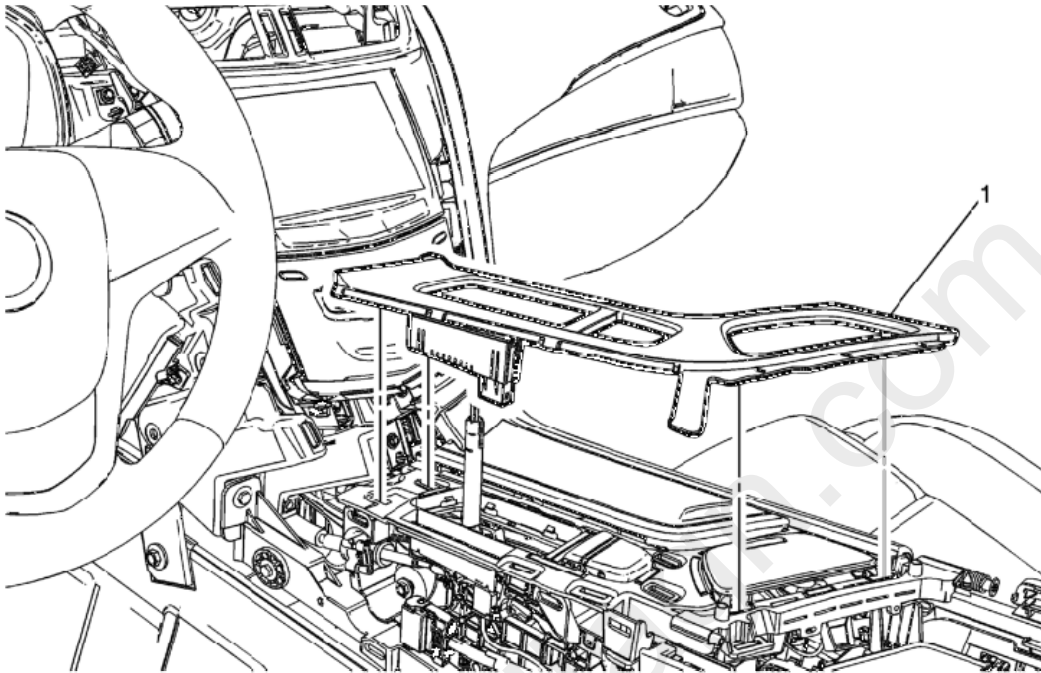


Fig. 2: Automatic Transmission Control Indicator
Courtesy of GENERAL MOTORS COMPANY

Automatic Transmission Control Indicator Replacement

Callout	Component Name
Preliminary Procedure	
1. Remove the left front floor console. Refer to <u>Front Floor Console Replacement</u> . 2. Remove the front floor console compartment. Refer to <u>Front Floor Console Compartment Replacement</u> . 3. Remove the front floor rear console side trim panel - left side. Refer to <u>Front Floor Rear Console Side Trim Panel Replacement - Left Side</u> .	
1	Automatic Transmission Control Indicator Assembly Procedure 1. Use a flat-bladed plastic trim tool in order to release the retainer clips securing the automatic transmission control indicator assembly. 2. Disconnect the electrical connector.

TRANSMISSION CONTROL REPLACEMENT

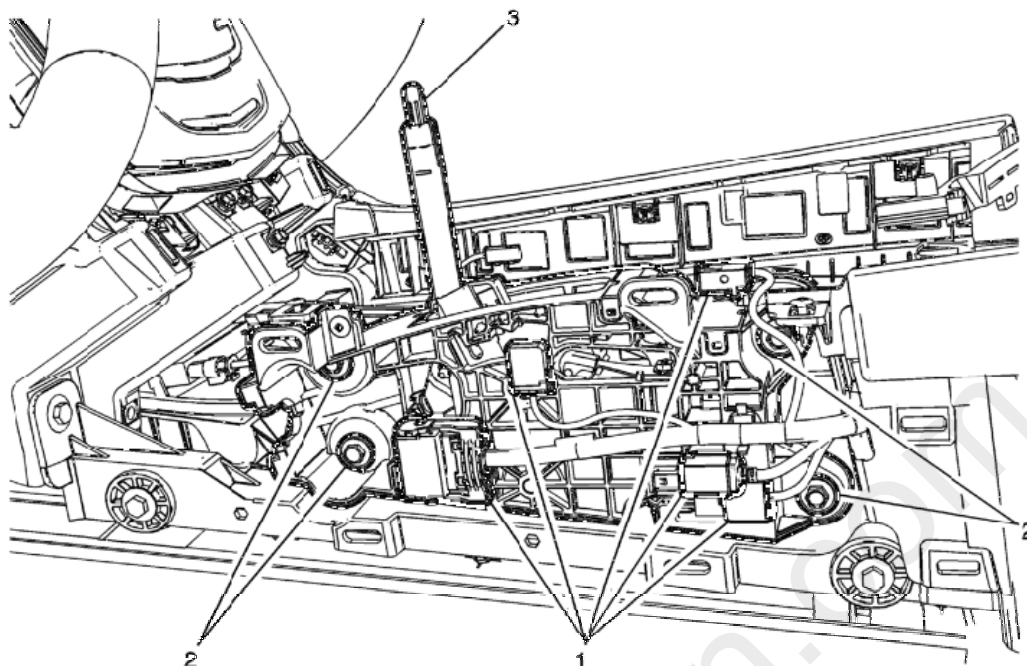


Fig. 3: Transmission Control
Courtesy of GENERAL MOTORS COMPANY

Transmission Control Replacement

Callout	Component Name
Preliminary Procedures	
1. Remove the front floor console cup holder plate assembly. Refer to <u>Front Floor Console Cup Holder Plate Replacement</u> .	
1	Electrical Connector (Qty: 4)
2	Transmission Control Fasteners (Qty: 4) CAUTION: Refer to <u>Fastener Caution</u> . Tighten 9 N.m (80 lb in)
3	Transmission Control

RANGE SELECTOR LEVER CABLE REPLACEMENT

Removal Procedure

1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .

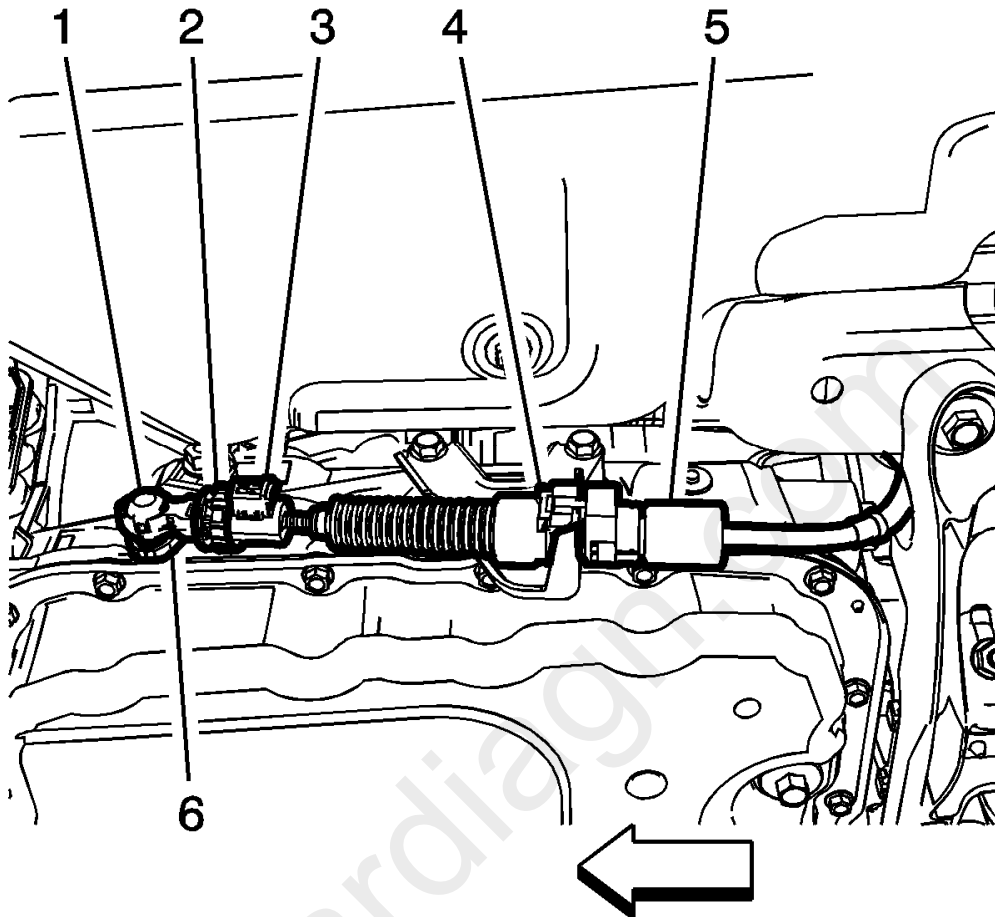


Fig. 4: Range Selector Lever Cable
Courtesy of GENERAL MOTORS COMPANY

2. Disconnect the transmission range selector lever cable terminal (1) from the transmission manual shift lever pin (6).
3. Slide the retainer (4) rearward to release the transmission range selector lever cable from the bracket.
4. Lower the vehicle.
5. Remove the front floor console rear air duct. Refer to Front Floor Console Rear Air Duct Replacement .

NOTE: Mark the orientation of the grommet to the floor panel for installation.

6. Remove the grommet and cable assembly from the floor panel.

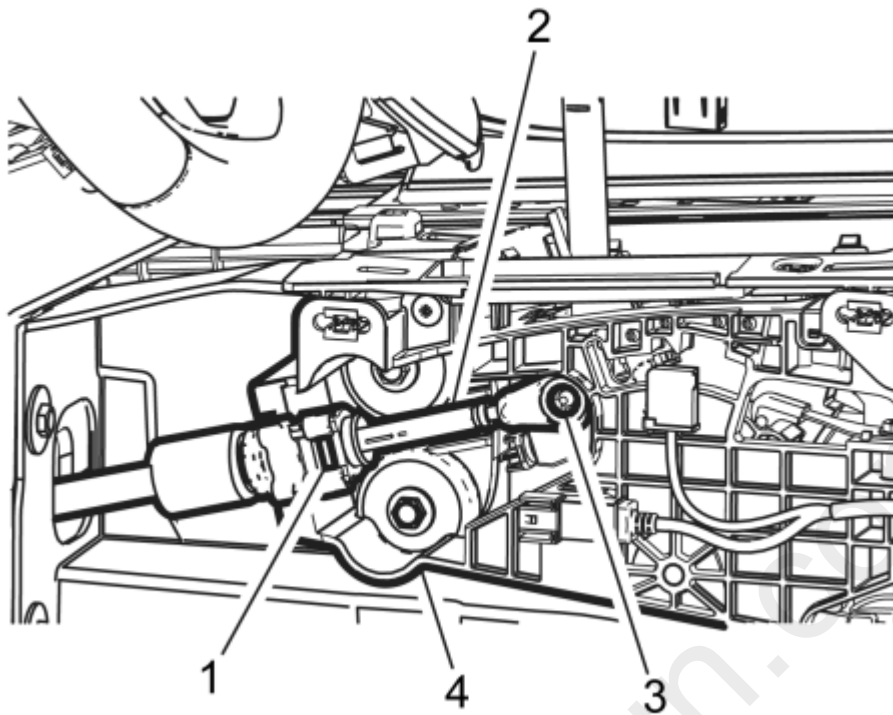


Fig. 5: Range Selector Lever Cable
Courtesy of GENERAL MOTORS COMPANY

7. Slide the transmission range selector lever cable retainer rearward (1) and remove the transmission range selector cable from the transmission control base (4).
8. Disconnect the transmission range selector lever cable terminal from the shift lever pin (3).
9. Remove the transmission range selector lever cable from the vehicle.

Installation Procedure

1. Install the transmission range selector lever cable in the vehicle.

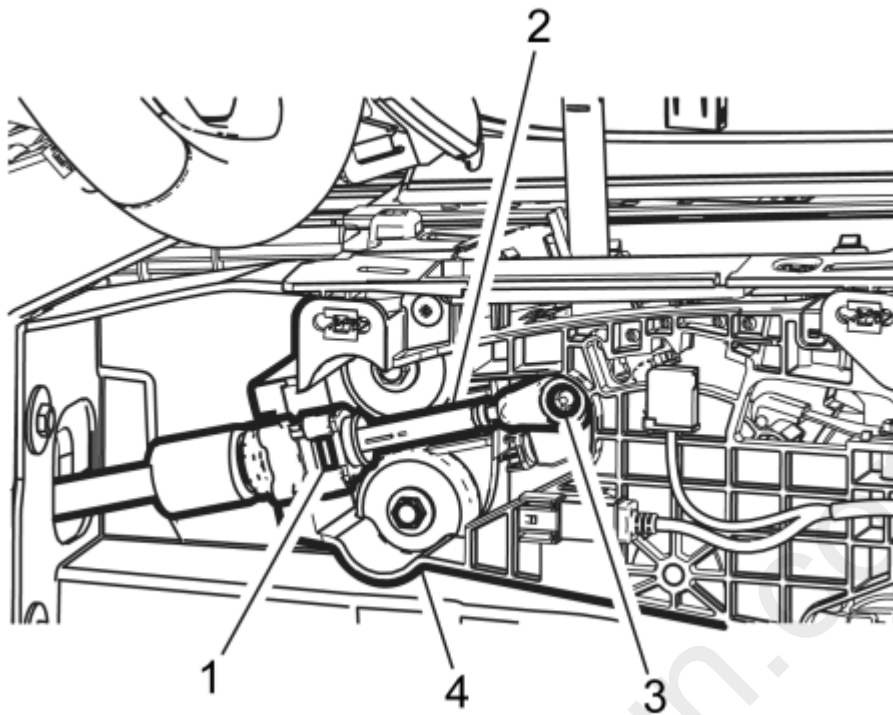


Fig. 6: Range Selector Lever Cable
Courtesy of GENERAL MOTORS COMPANY

2. Connect the transmission range selector lever cable terminal (2) to the shift lever pin.
3. Install the transmission range selector cable to the transmission control base (4), then lock the cable retainer (1) by pushing it forward until it seats into place.

NOTE: **Ensure the grommet is properly oriented.**

4. Install the grommet and cable assembly into the floor panel with alignment key opening.
5. Install the front floor console rear air duct. Refer to **Front Floor Console Rear Air Duct Replacement** .
6. Raise the vehicle.

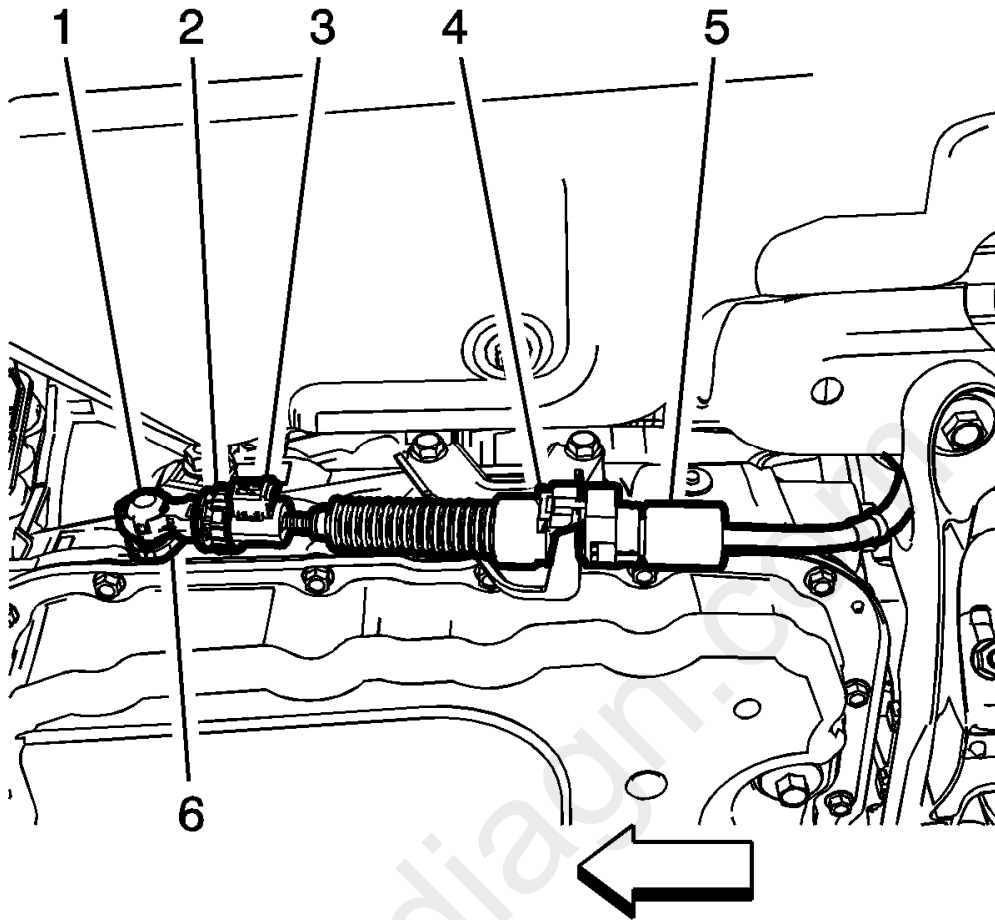


Fig. 7: Range Selector Lever Cable
Courtesy of GENERAL MOTORS COMPANY

7. Connect the transmission range selector lever cable terminal (1) to the transmission manual shift lever pin (6).
8. Install the cable into the bracket and ensure cable is fully seated.
9. Adjust the cable. Refer to **Range Selector Lever Cable Adjustment**.
10. Lower the vehicle.

RANGE SELECTOR LEVER CABLE ADJUSTMENT

NOTE: Adjust the automatic transmission range selector cable while the transmission and the gear selector are in the Park position only. Failure to do so may cause mis-adjustment.

1. Set the park brake and chock the wheels.
2. Verify the transmission range select lever is in the park position.

3. Verify the transmission manual shift lever is in the park position.

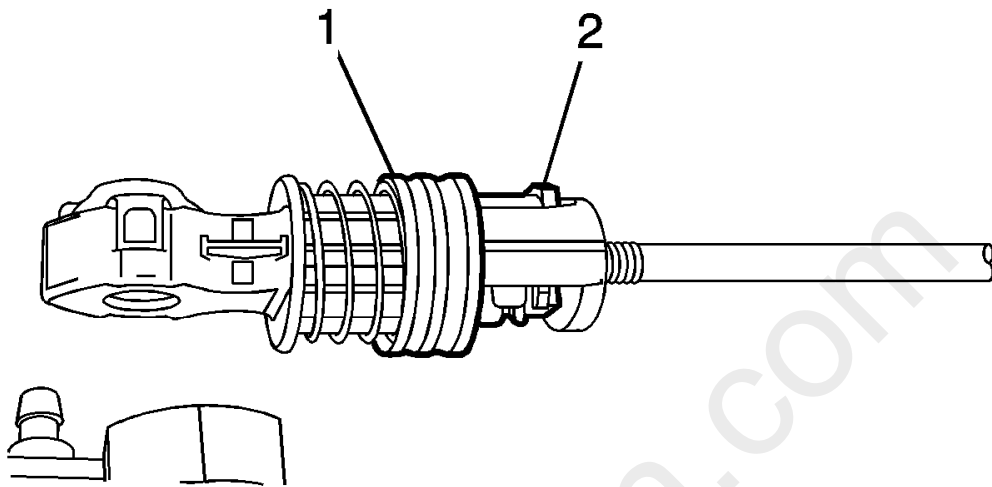


Fig. 8: Retaining Collar And Adjuster Clip
Courtesy of GENERAL MOTORS COMPANY

4. If installing a new cable, skip this step and go to the next step. Pull the retaining collar (1) forward, then release the range select cable adjuster clip (2) by pushing in on the adjuster clip from the backside.
5. Depress the adjuster clip (2) inboard, locking the adjuster clip completely.
6. Ensure that the cable adjuster clip (2) is secured with retaining collar covering the adjuster clip.
7. Check the transmission range select lever in all gear selections for proper operation.

AUTOMATIC TRANSMISSION RANGE SELECTOR LEVER REPLACEMENT

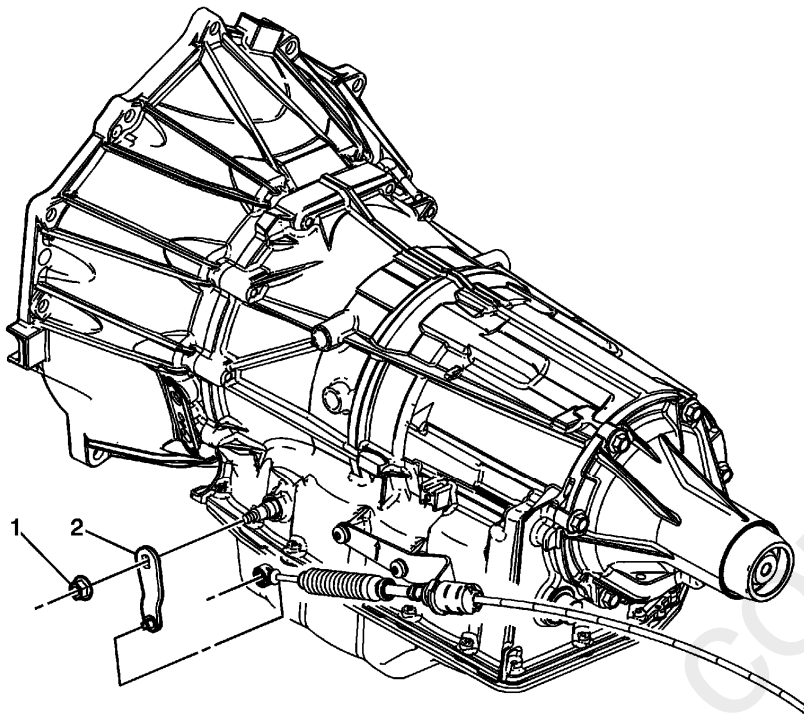


Fig. 9: View Of Transmission Range Selector Cable Lever & Nut
 Courtesy of GENERAL MOTORS COMPANY

Automatic Transmission Range Selector Lever Replacement

Callout	Component Name
Preliminary Procedures 1. Apply the park brake. 2. Shift the transmission into neutral. 3. Raise the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> . 4. Disconnect the transmission range selector cable from the range selector cable lever ball stud.	
1	Transmission Range Selector Cable Lever Nut WARNING: Hold the transmission range selector lever while removing or installing the lever retaining nut. Failure to hold the lever can cause damage to the transmission internal park system components which could allow the vehicle to roll when placed in the park position. CAUTION: Refer to <u>Fastener Caution</u> . Tighten 30 N.m (22 lb ft)

MANUAL SHIFT AUXILIARY POSITION SWITCH REPLACEMENT - STEERING WHEEL

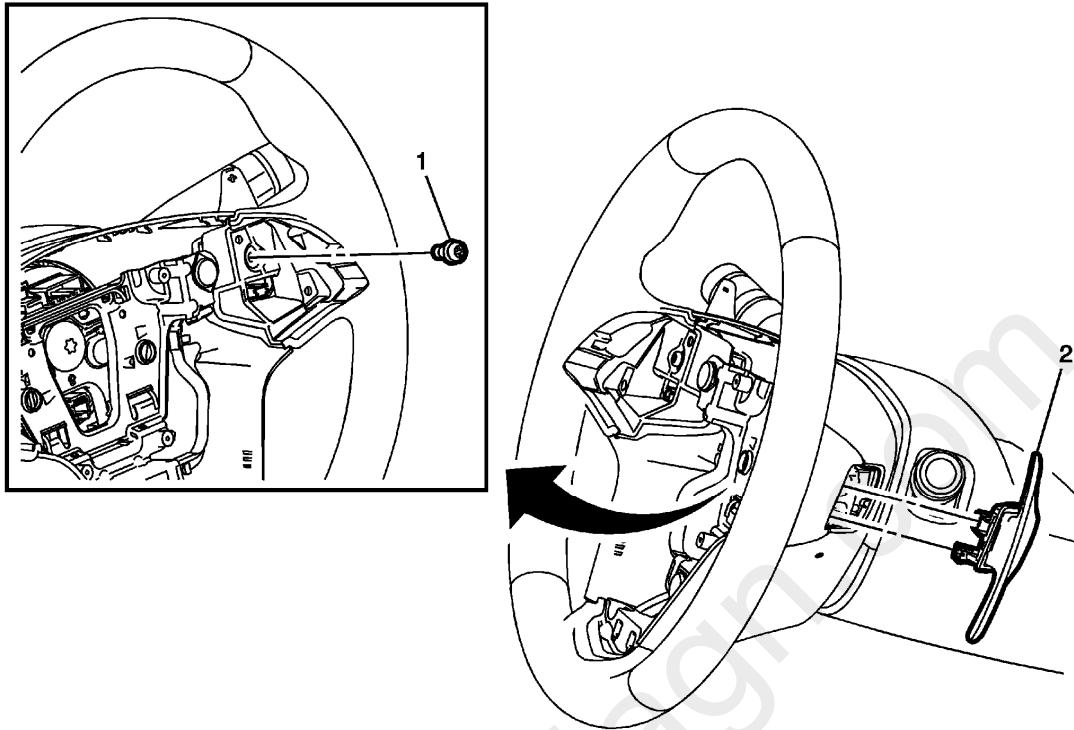


Fig. 10: Manual Shift Auxiliary Position Switch - Steering Wheel

Courtesy of GENERAL MOTORS COMPANY

Manual Shift Auxiliary Position Switch Replacement - Steering Wheel

Callout	Component Name
Preliminary Procedures	
1. Remove the steering wheel spoke cover. Refer to <u>Steering Wheel Spoke Cover Replacement</u> . 2. Disconnect the electrical connector.	
1	Steering Wheel Manual Shift Auxiliary Position Switch Fastener CAUTION: Refer to <u>Fastener Caution</u> . Tighten 2.5 N.m (22 lb in)
2	Steering Wheel Manual Shift Auxiliary Position Switch Procedure Ensure the steering wheel manual shift auxiliary position switch is properly seated on the

steering wheel during installation.

VENT HOSE REPLACEMENT (2.5L ENGINE)

Removal Procedure

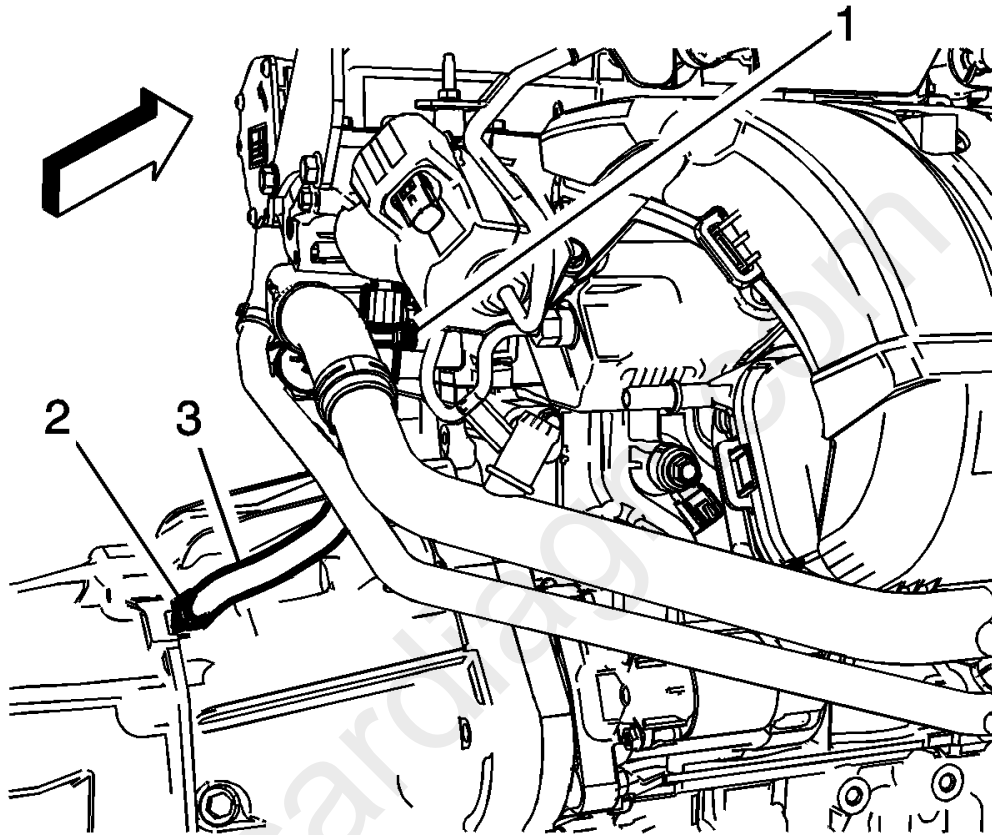


Fig. 11: Transmission Vent Hose
Courtesy of GENERAL MOTORS COMPANY

1. Remove the fuel pump cover to gain access to the vent hose upper retainer (1). Refer to **Fuel Pump Cover Replacement** .
2. Lower the powertrain enough to access the vent hose clamp and hose assembly. Refer to **Engine Replacement** .
3. Release the transmission vent hose clamp (2) and disconnect the vent hose from the transmission.
4. Remove the vent hose assembly (3) from the vehicle.

Installation Procedure

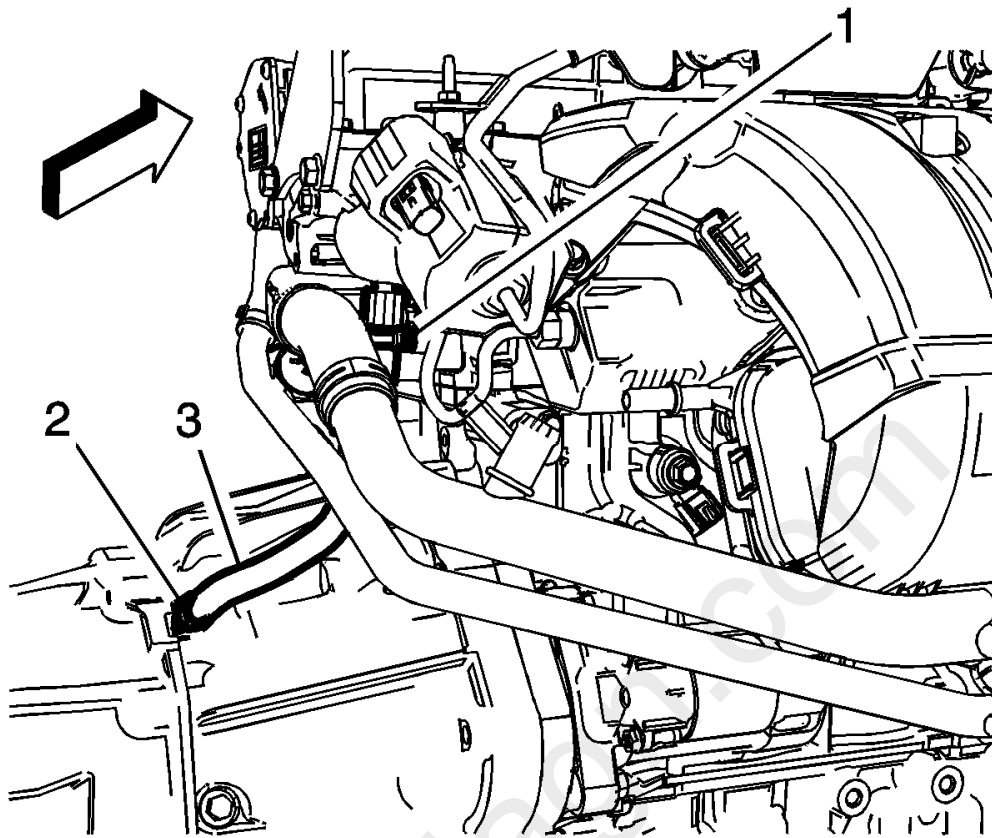


Fig. 12: Transmission Vent Hose
Courtesy of GENERAL MOTORS COMPANY

1. Install the vent hose assembly (3) to the vehicle.
2. Connect the vent hose and clamp (2) to the transmission.
3. Install the vent hose retainer (1) to the cylinder head.
4. Raise the powertrain. Refer to **Engine Replacement** .
5. Install the fuel pump cover. Refer to **Fuel Pump Cover Replacement** .

VENT HOSE REPLACEMENT (3.0L ENGINE)

Removal Procedure

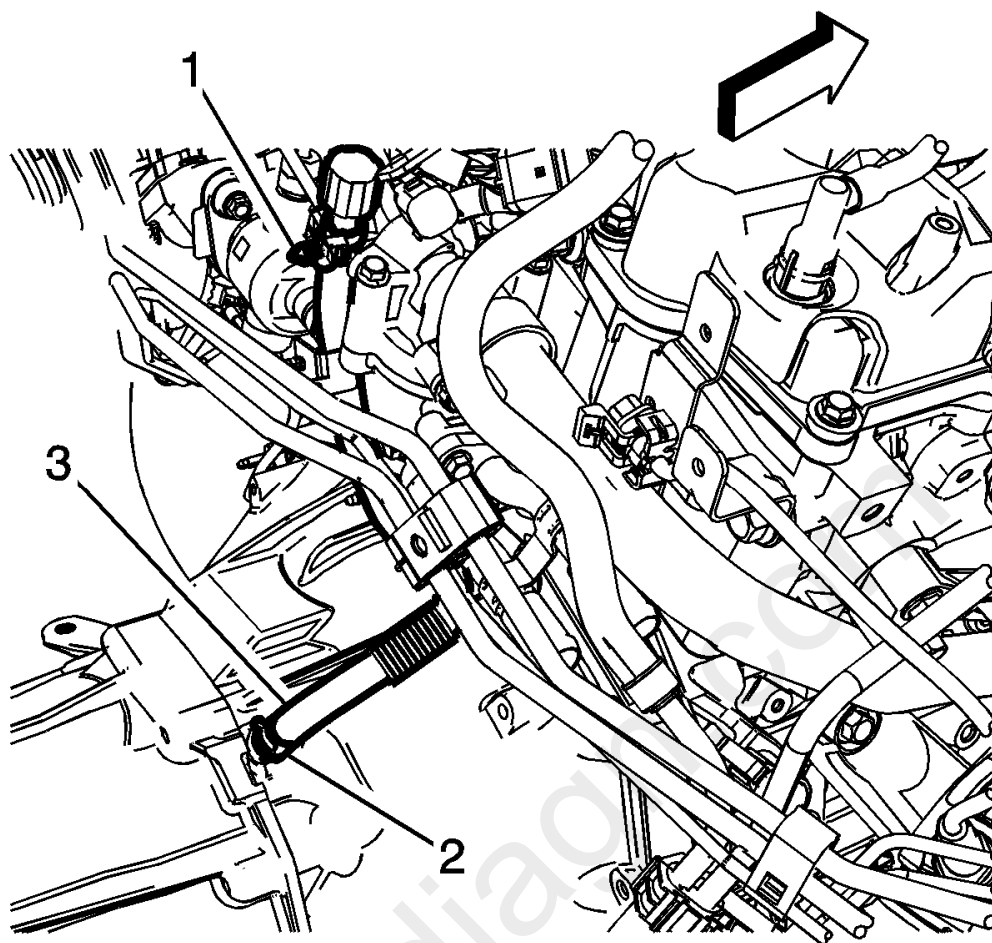


Fig. 13: Transmission Vent Hose
Courtesy of GENERAL MOTORS COMPANY

1. Remove the fuel pipe shield to gain access to the vent hose upper retainer (1). Refer to **Fuel Pipe Shield Replacement (LFX)** , **Fuel Pipe Shield Replacement (LF3)** .
2. Release the transmission vent hose clamp (2) and disconnect the vent hose from the transmission.
3. Remove the vent hose assembly (3) from the vehicle.

Installation Procedure

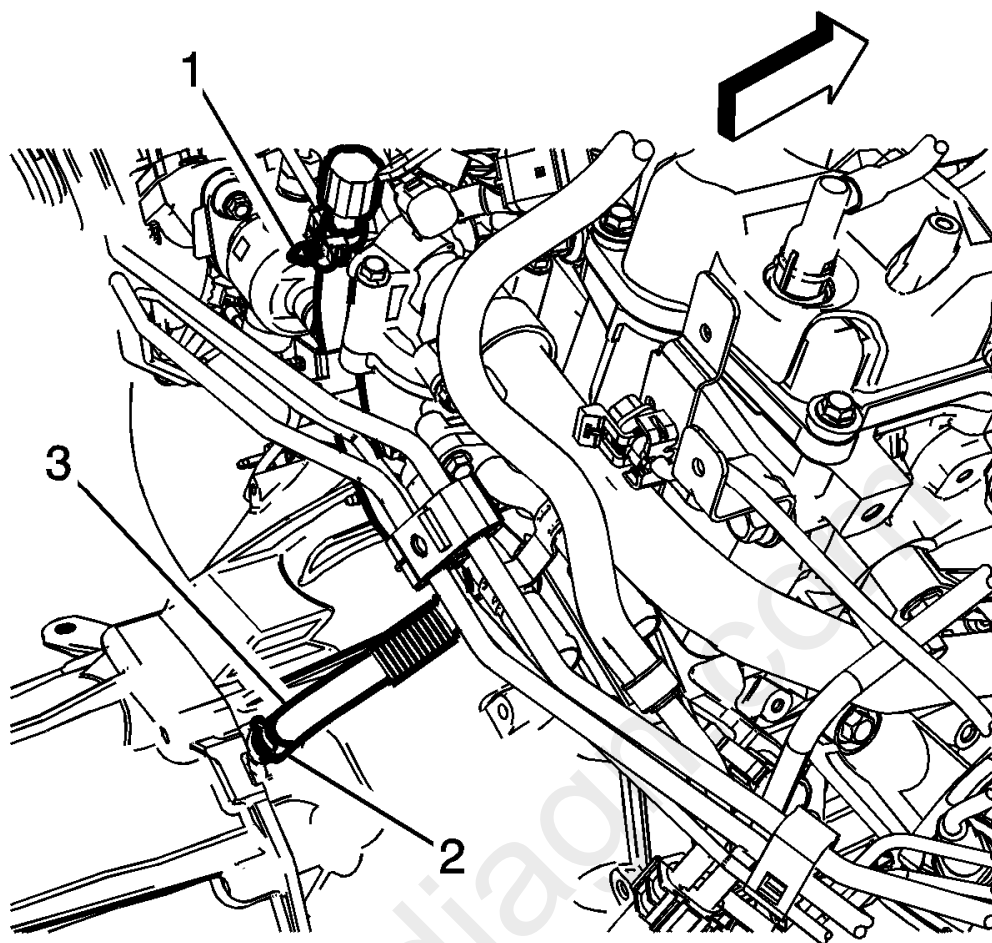


Fig. 14: Transmission Vent Hose
Courtesy of GENERAL MOTORS COMPANY

1. Install the vent hose assembly (3) to the vehicle.
2. Connect the vent hose and clamp (2) to the transmission.
3. Install the vent hose retainer (1) to the fuel pipe shield.
4. Install the fuel pipe shield. Refer to **Fuel Pipe Shield Replacement (LFX)** , **Fuel Pipe Shield Replacement (LF3)** .

AUTOMATIC TRANSMISSION FLUID PRESSURE TEST HOLE PLUG REPLACEMENT

Removal Procedure

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
2. If equipped with all-wheel drive, remove the front propeller shaft. Refer to **Front Axle Propeller Shaft Replacement** .

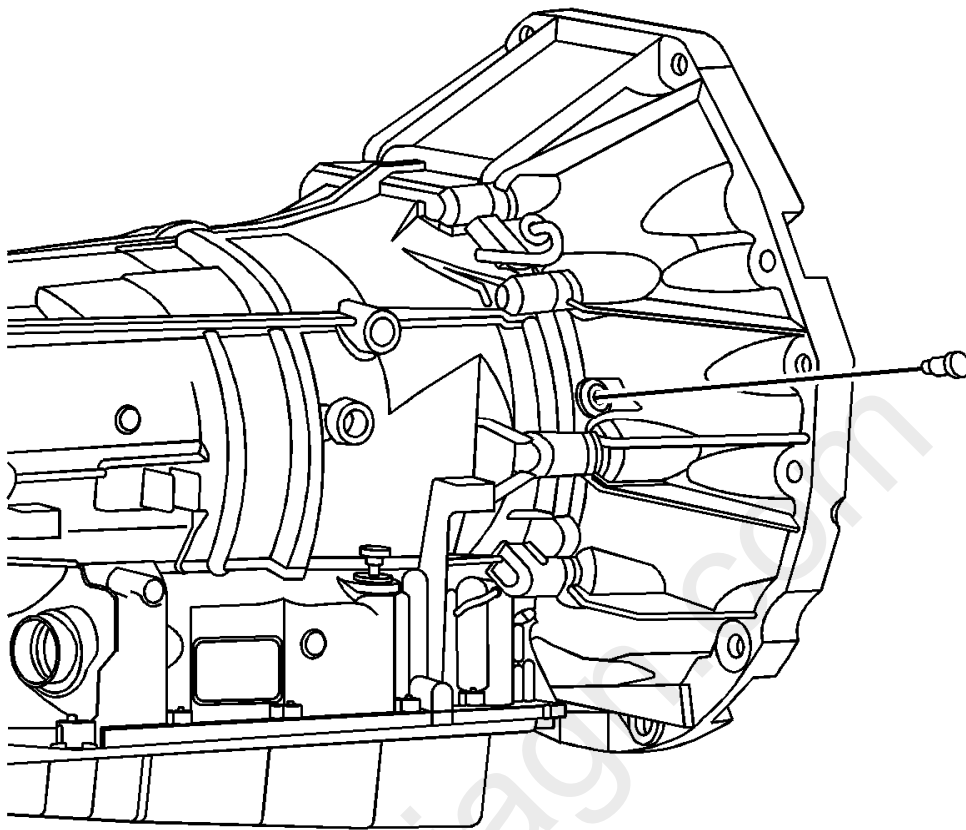


Fig. 15: View Of Oil Pressure Test Plug
Courtesy of GENERAL MOTORS COMPANY

3. Clean the surrounding area of the oil pressure test plug.
4. Remove the oil pressure test plug.

Installation Procedure

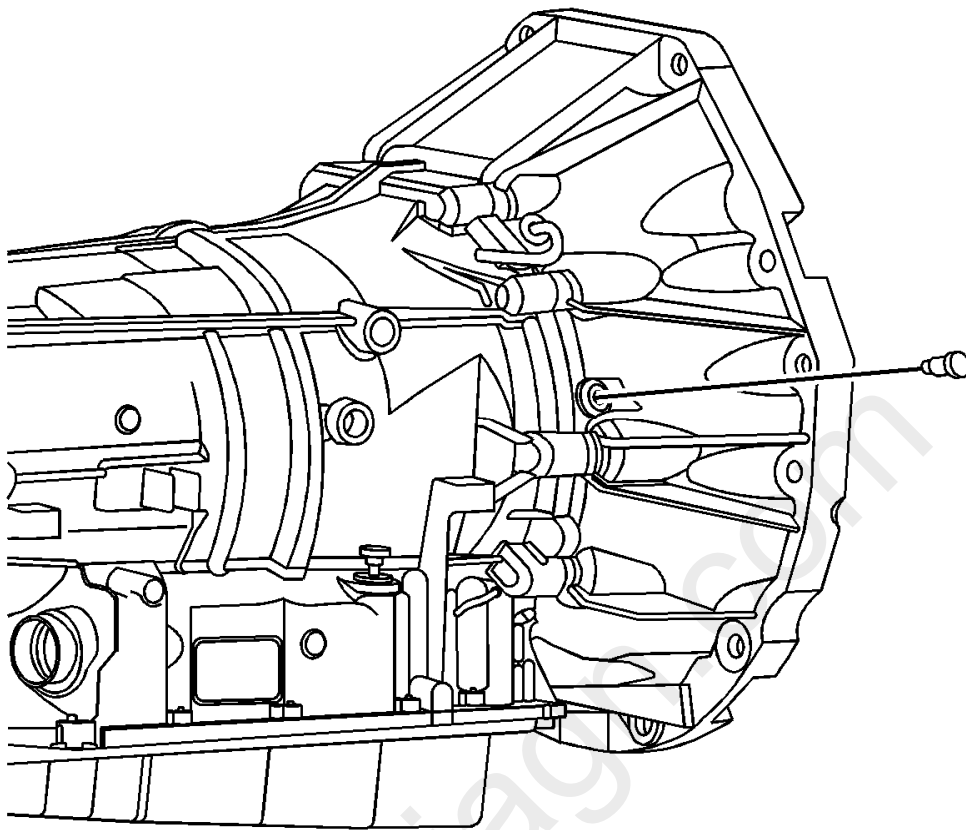


Fig. 16: View Of Oil Pressure Test Plug
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to Fastener Caution .

1. Install the oil pressure test plug and tighten to 11 (97 lb in).
2. If equipped with all-wheel drive, install the front propeller shaft. Refer to Front Axle Propeller Shaft Replacement .
3. Check the transmission fluid level (fill if necessary). Refer to Transmission Fluid Level and Condition Check , and Transmission Fluid Fill Procedure .
4. Lower the vehicle.

AUTOMATIC TRANSMISSION ELECTRICAL CONNECTOR PASSAGE SLEEVE REPLACEMENT

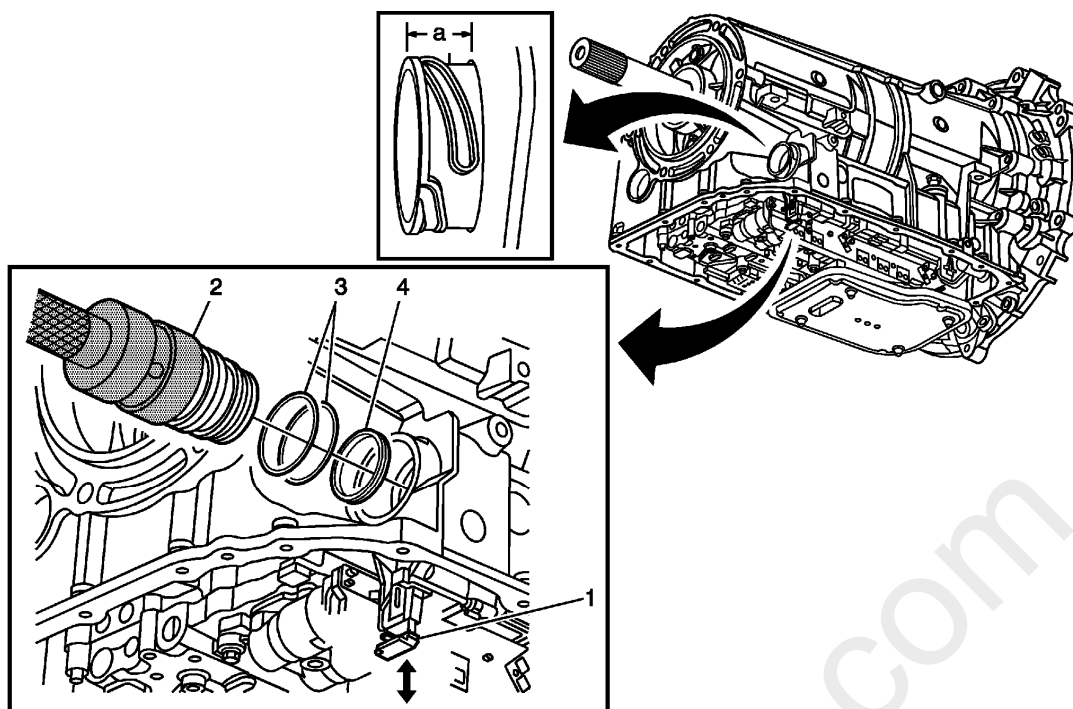


Fig. 17: Automatic Transmission Electrical Connector Passage Sleeve Component View
 Courtesy of GENERAL MOTORS COMPANY

Automatic Transmission Electrical Connector Passage Sleeve Replacement

Callout	Component Name
CAUTION: Orientate the alignment tab inside the passage sleeve with the slot in the electrical connector of the control solenoid valve assembly. Push the sleeve straight into the case bore and connector. Do NOT rotate the sleeve at any time. Ensure the sleeve is fully seated into the case. When the sleeve is properly installed, the distance from the case surface to the end of the sleeve should be 14-16 mm. Even though the correct electrical connections may still be maintained, failure to ensure proper installation of the sleeve may result in a fluid leak around the sleeve lip seal and into the sleeve cavity.	
Preliminary Procedures 1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> . 2. Remove the transmission oil pan. Refer to <u>Automatic Transmission Fluid, Fluid Pan and/or Filter Replacement</u>. 3. Disconnect the vehicle wire harness electrical connector from the transmission electrical connector passage sleeve.	
1	Electrical Connector Slide Lock Procedure Pull down on the slide lock to remove the sleeve. Push up on the slide lock after sleeve installation.
	Electrical Connector Passage Sleeve

	NOTE: • Use the DT-47715 electrical connector passage sleeve remover/installer and J-42183 driver handle to remove and install the electrical connector passage sleeve. • The distance (a) from the case surface to the end of the sleeve should be 14-16 mm.
2	Special Tools • DT-47715 Electrical Connector Passage Sleeve Remover/Installer • J-42183 Driver Handle For equivalent regional tools, refer to <u>Special Tools</u> .
3	O-Ring Seal (Qty: 2) NOTE: Use a NEW O-ring seal.
4	Lip Seal NOTE: Use a NEW lip seal.

TRANSMISSION FLUID FILLER TUBE PLUG REPLACEMENT

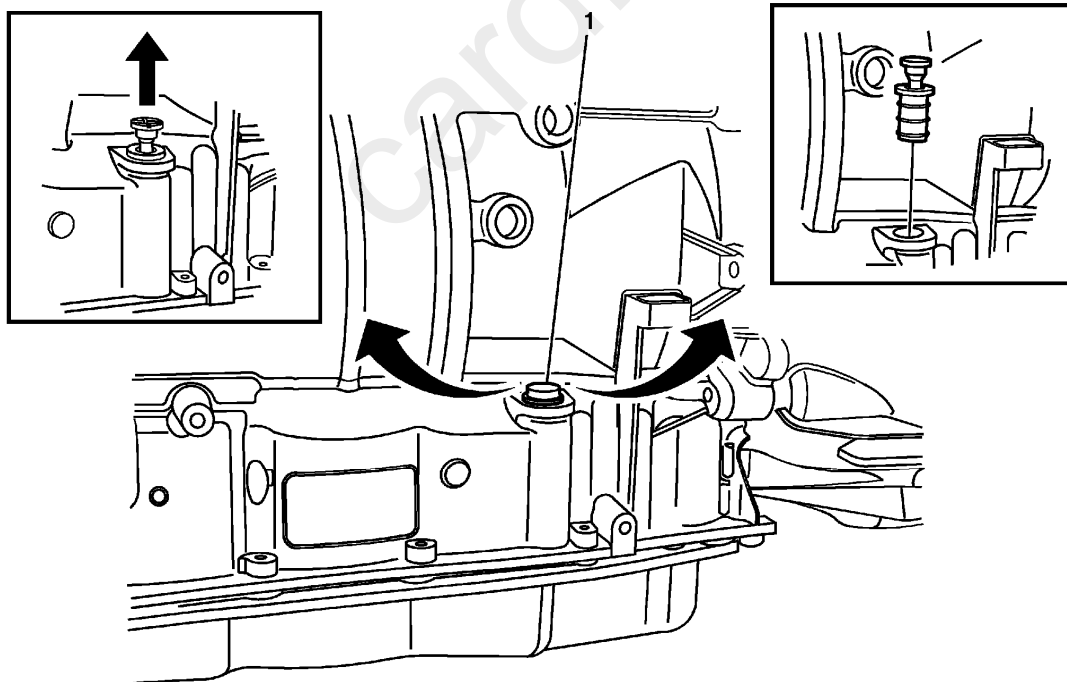


Fig. 18: Transmission Fluid Filler Tube Plug Component View
Courtesy of GENERAL MOTORS COMPANY

Transmission Fluid Filler Tube Plug Replacement

Callout	Component Name
Preliminary Procedures	
1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> . 2. If equipped with all-wheel drive, remove the front propeller shaft. Refer to <u>Front Axle Propeller Shaft Replacement</u> .	
1	Transmission Fluid Filler Tube Plug Procedure 1. Clean the area around the filler tube plug before removal. 2. Use a door trim tool to release the filler tube plug interlock.

AUTOMATIC TRANSMISSION FLUID, FLUID PAN AND/OR FILTER REPLACEMENT

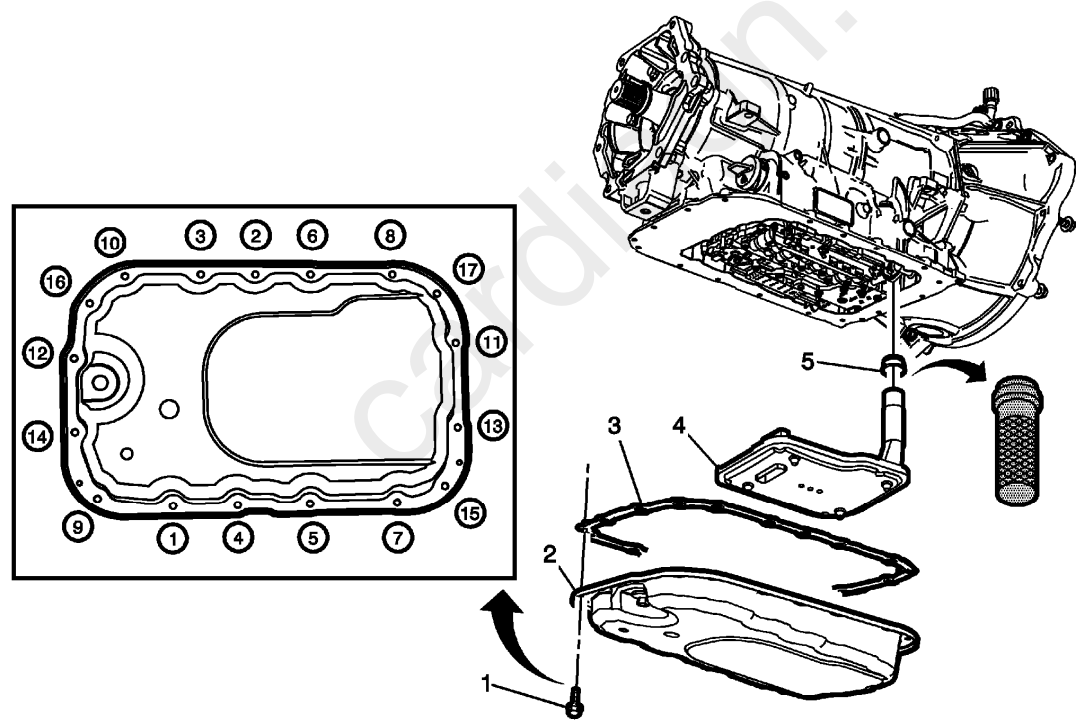


Fig. 19: Automatic Transmission Fluid, Fluid Pan and/or Filter
Courtesy of GENERAL MOTORS COMPANY

Automatic Transmission Fluid, Fluid Pan and/or Filter Replacement

Callout	Component Name

CAUTION:

Use Dexron® VI transmission fluid only. Failure to use the proper fluid may result in transmission internal damage.

Preliminary Procedures

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
2. Place a suitable drain pan under the transmission.

1	Transmission Fluid Pan Bolt (Qty: 17) CAUTION: Refer to <u>Fastener Caution</u> . NOTE: Tighten the bolts in the sequence shown. Tighten 9 (80 lb in)
2	Transmission Fluid Pan Assembly Procedure 1. Check the condition of the draining fluid. Refer to <u>Transmission Fluid Level and Condition Check</u> . 2. Fill the transmission with the proper fluid. Refer to <u>Transmission General Specifications</u> , and <u>Transmission Fluid Fill Procedure</u> . 3. Fill the transmission with the proper amount of transmission fluid. Refer to <u>Fluid Capacity Specifications</u> , and <u>Transmission Fluid Level and Condition Check</u> .
3	Transmission Fluid Pan Gasket NOTE: The fluid pan gasket is reusable. Inspect the gasket to determine if it may be reused.
4	Fluid Filter Assembly Procedure 1. Pull the fluid filter assembly straight out. Do not bend or twist the filter neck. 2. Use a new fluid filter assembly.
	Fluid Filter Seal Assembly CAUTION: Do not damage the case sealing surface when removing the filter seal assembly.

5

Procedure

1. Use a screwdriver or snap ring pliers to remove the filter seal.
2. Use the **DT-47848** seal installer and the **J-42183** driver handle to install the filter seal.
3. Use a new fluid filter seal assembly.
4. Lubricate the filter seal with transmission fluid before installing the filter.

Special Tools

- **DT-47848** Seal Installer
- **J-42183** Driver Handle

For equivalent regional tools, refer to **Special Tools** .

TRANSMISSION MOUNT INSPECTION

CAUTION: In order to avoid oil pan damage and possible engine failure, insert a block of wood that spans the width of the oil pan bottom between the oil pan and the jack support.

1. Raise the transmission/transaxle in order to remove the weight from the transmission/transaxle mount and create slight tension in the rubber.
2. Observe the transmission/transaxle mount while raising the transmission/transaxle. Replace the transmission/transaxle mount if the transmission/transaxle mount exhibits any of the following conditions:

NOTE: **Black paint on the rubber will crack with time, this does no constitute a failure.**

- The hard rubber surface is covered with heat check cracks.
 - The rubber is separated from the metal plate of the transmission/transaxle mount.
 - The rubber is split through the center of the transmission/transaxle mount.
3. If there is movement between the metal plate of the transmission/transaxle mount and its attaching points, lower the transmission/transaxle on the transmission/transaxle mount. Tighten the bolts or nuts attaching the transmission/transaxle mount to the frame or transmission/transaxle mount bracket.

TRANSMISSION MOUNT REPLACEMENT

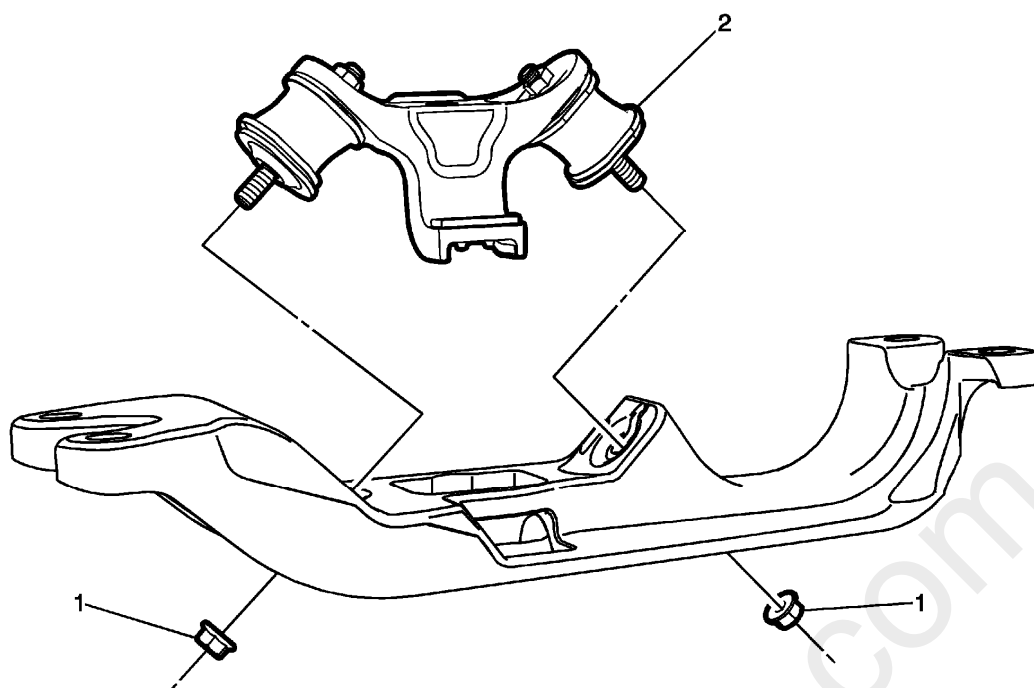


Fig. 20: Transmission Mount
 Courtesy of GENERAL MOTORS COMPANY

Transmission Mount Replacement

Callout	Component Name
Preliminary Procedures Remove the transmission support. Refer to <u>Transmission Support Replacement (RWD)</u> , <u>Transmission Support Replacement (AWD)</u> .	
1	Transmission Mount Nut (Qty: 2) CAUTION: Refer to <u>Fastener Caution</u> . Tighten 22 (16 lb ft)
2	Transmission Mount

CASE EXTENSION AND GASKET REPLACEMENT (2WD)

Special Tools

J-45012 Holding Fixture

For equivalent regional tools, refer to Special Tools .

Removal Procedure

1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .
2. If equipped with LFX, remove the exhaust system. Refer to Exhaust System Replacement (LF3) , Exhaust System Replacement (LFX) .
3. If equipped with LTG or LCV, remove the exhaust muffler. Refer to Exhaust Muffler Replacement (LTG) .
4. Remove the drive shaft. Refer to Two-Piece Propeller Shaft Replacement (LFX, LF3) , Two-Piece Propeller Shaft Replacement (LTG, LCV, LKW) .
5. Support the transmission with a suitable jack.
6. Remove the transmission support assembly. Refer to Transmission Support Replacement (RWD) .

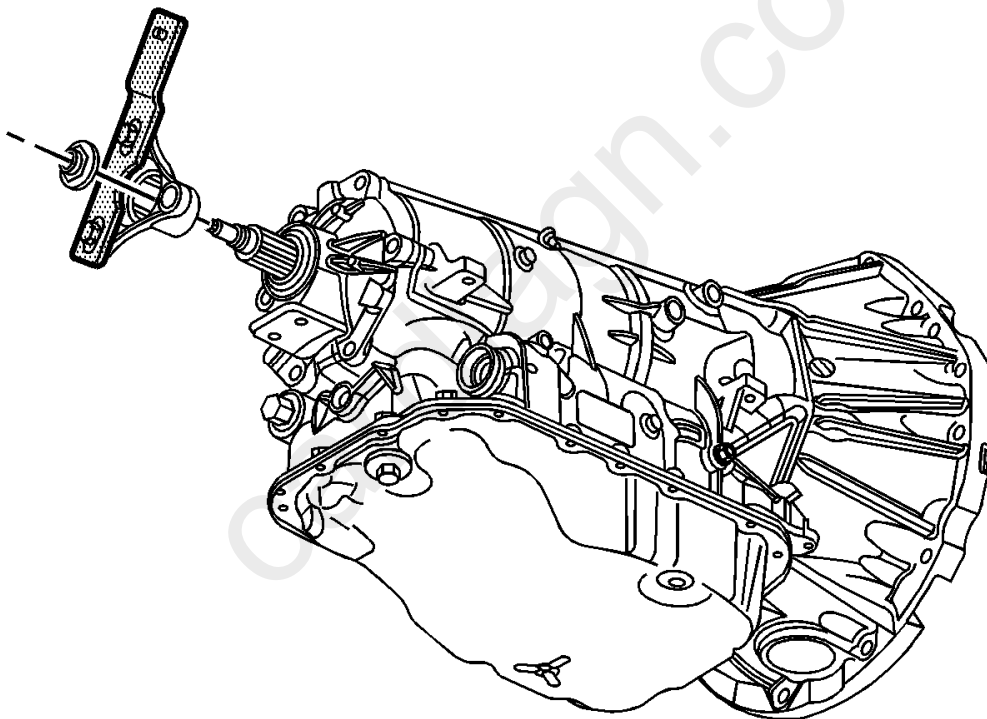


Fig. 21: View Of Holding Fixture

Courtesy of GENERAL MOTORS COMPANY

7. Install the J-45012 holding fixture.

CAUTION: Do not reuse the flange nut. Reusing the flange nut may cause

damage to the transmission.

8. Remove and discard the propeller shaft flange nut.
9. Remove the propeller shaft flange.

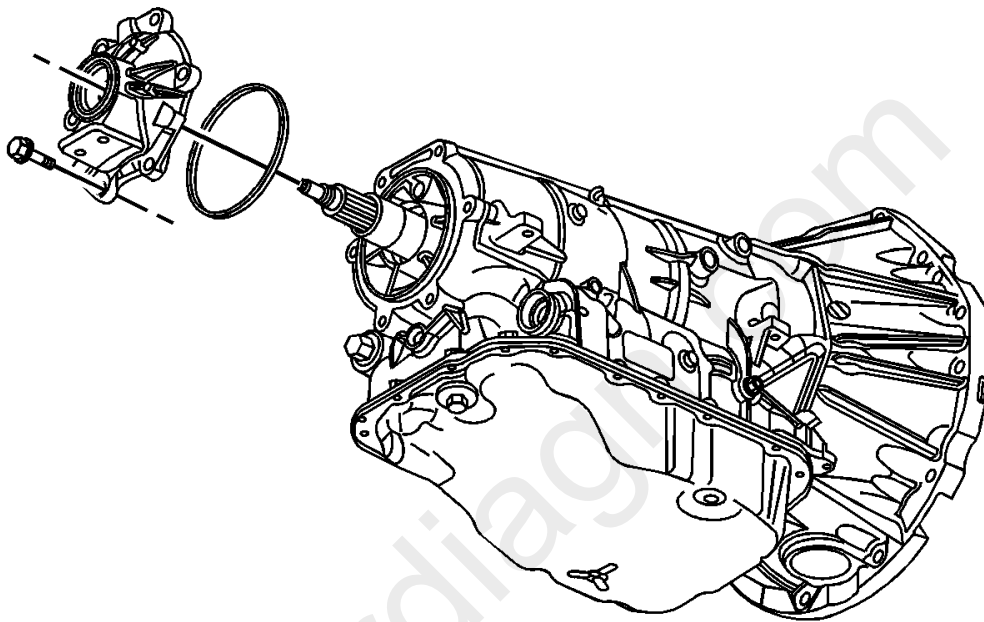


Fig. 22: View Of Case Extension Housing Seal
Courtesy of GENERAL MOTORS COMPANY

10. Remove the case extension housing bolts.
11. Remove the case extension housing.
12. Remove the case extension housing seal.

Installation Procedure

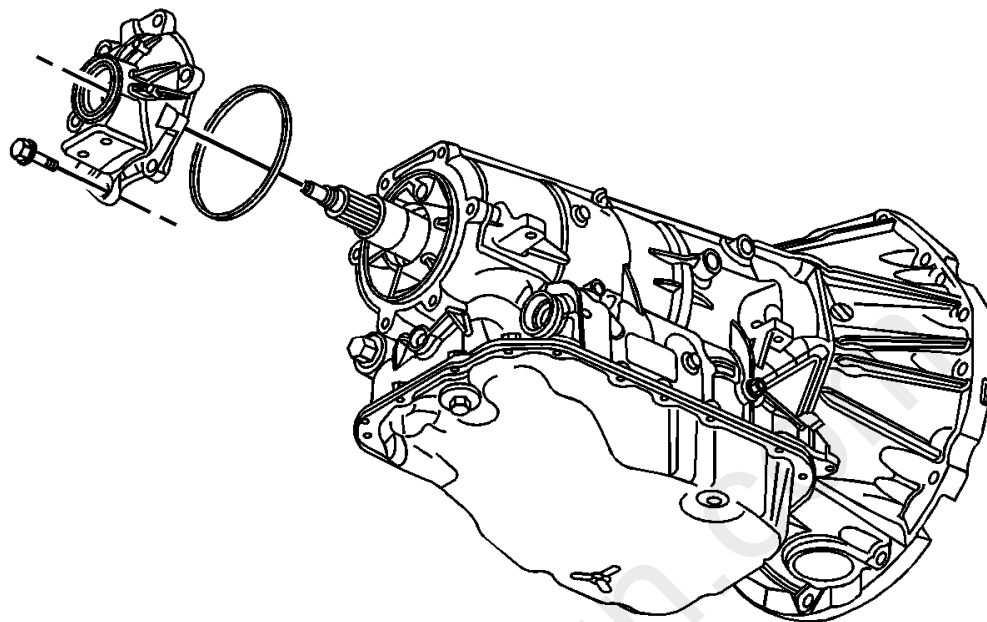


Fig. 23: View Of Case Extension Housing Seal
Courtesy of GENERAL MOTORS COMPANY

1. Install the case extension housing seal.
2. Install the case extension housing.
3. Install by hand the case extension housing bolts.

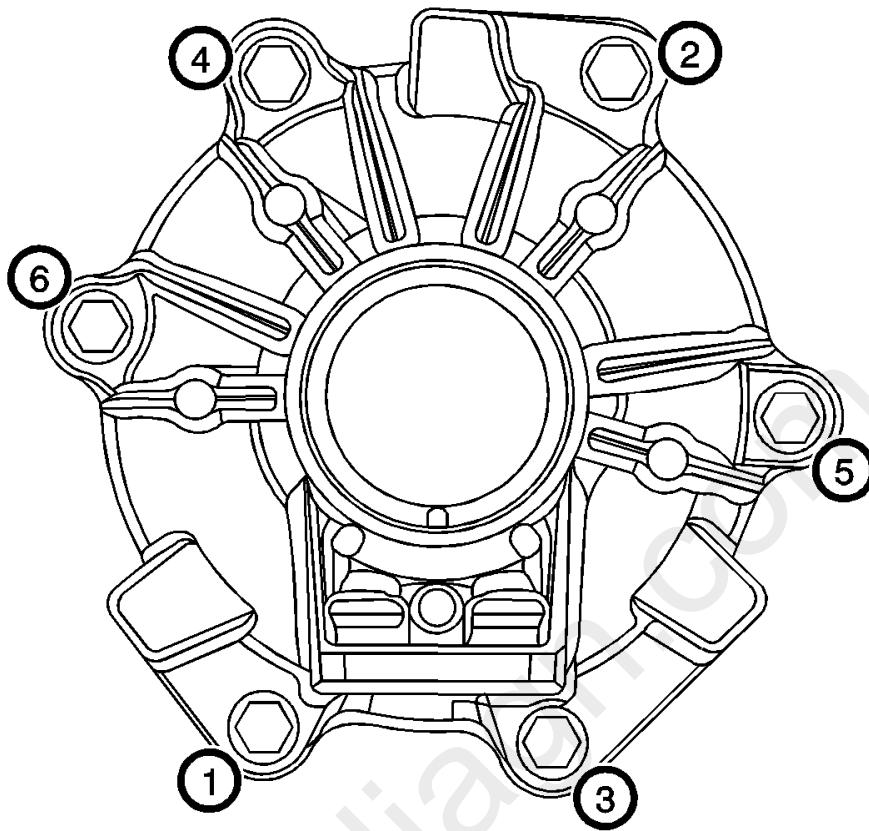


Fig. 24: Identifying Tightening Sequence
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to Fastener Caution .

4. Secure the case extension housing bolts in the specified sequence and tighten to 50 (37 lb ft).

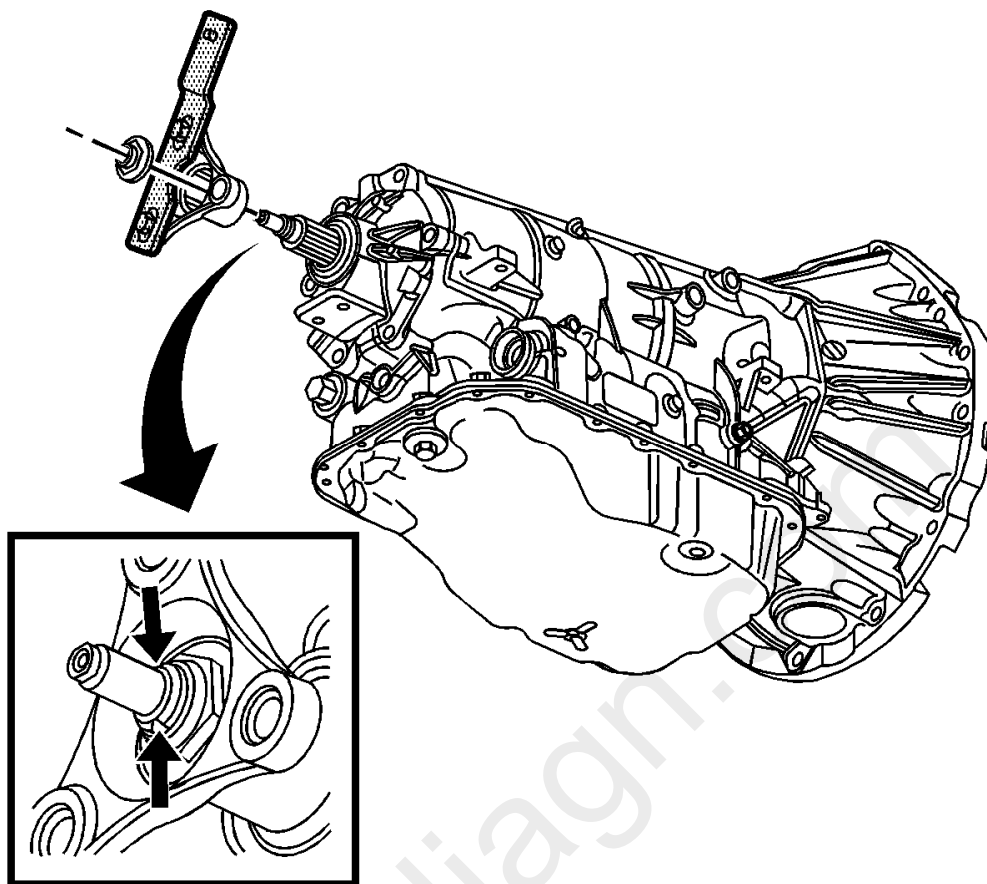


Fig. 25: View Of Holding Fixture
 Courtesy of GENERAL MOTORS COMPANY

5. Install the prop shaft flange.

CAUTION: Stake the flange nut onto the output shaft. Use the two staking grooves on the shaft to locate the staking points. Failure to stake the flange nut may result in damage to the transmission.

NOTE: Use a NEW propeller shaft flange nut.

6. Install the NEW propeller shaft flange nut and tighten to 105 (77 lb ft).
7. Remove the J-45012 holding fixture.
8. Install the transmission support assembly. Refer to **Transmission Support Replacement (RWD)** .
9. Remove the transmission jack.
10. Install the drive shaft. Refer to **Two-Piece Propeller Shaft Replacement (LFX, LF3)** , **Two-Piece Propeller Shaft Replacement (LTG, LCV, LKW)** .

11. If equipped with LTG or LCV, install the exhaust muffler. Refer to **Exhaust Muffler Replacement (LTG)** .
12. If equipped with LFX, install the exhaust system. Refer to **Exhaust System Replacement (LF3)** , **Exhaust System Replacement (LFX)** .
13. Lower the vehicle.

CASE EXTENSION AND GASKET REPLACEMENT (4WD)

Removal Procedure

1. Remove the transfer case from the vehicle. Refer to **Transfer Case Assembly Replacement** .

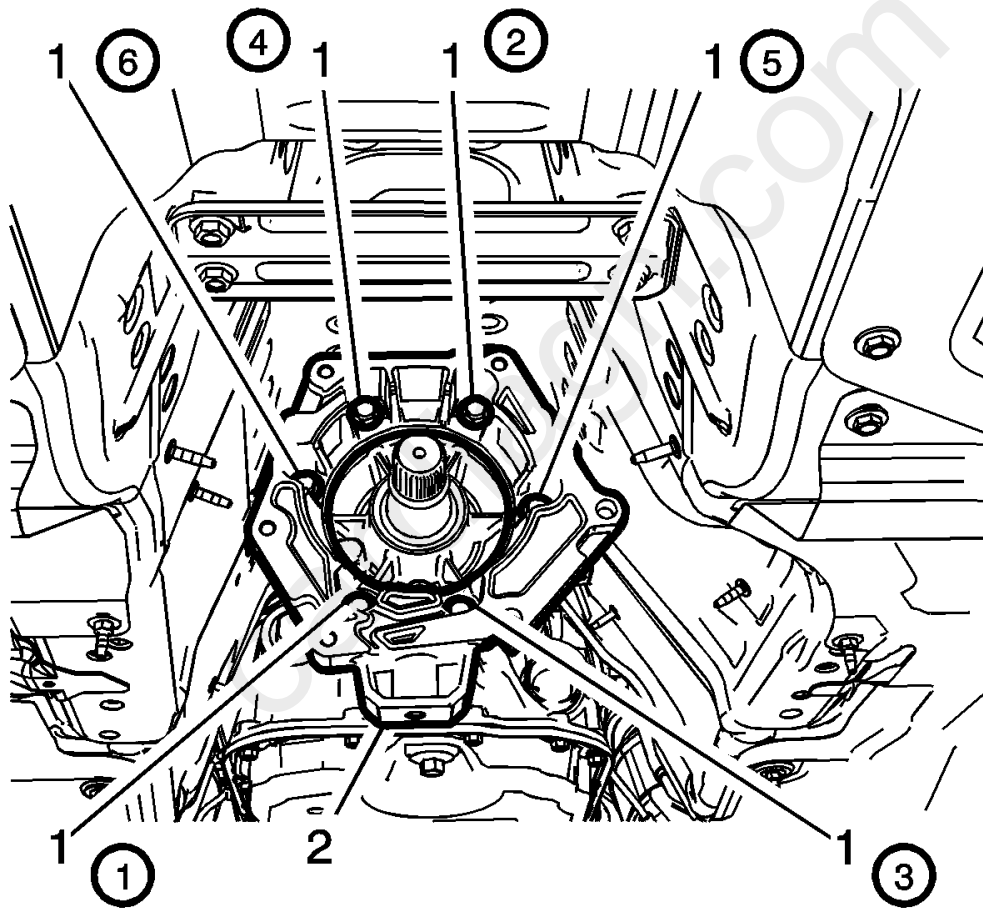


Fig. 26: Case Extension Housing
Courtesy of GENERAL MOTORS COMPANY

NOTE: There are no gaskets or seals for the case extension housing.

2. Remove the six case extension housing bolts (1).

3. Remove the case extension housing (2).

Installation Procedure

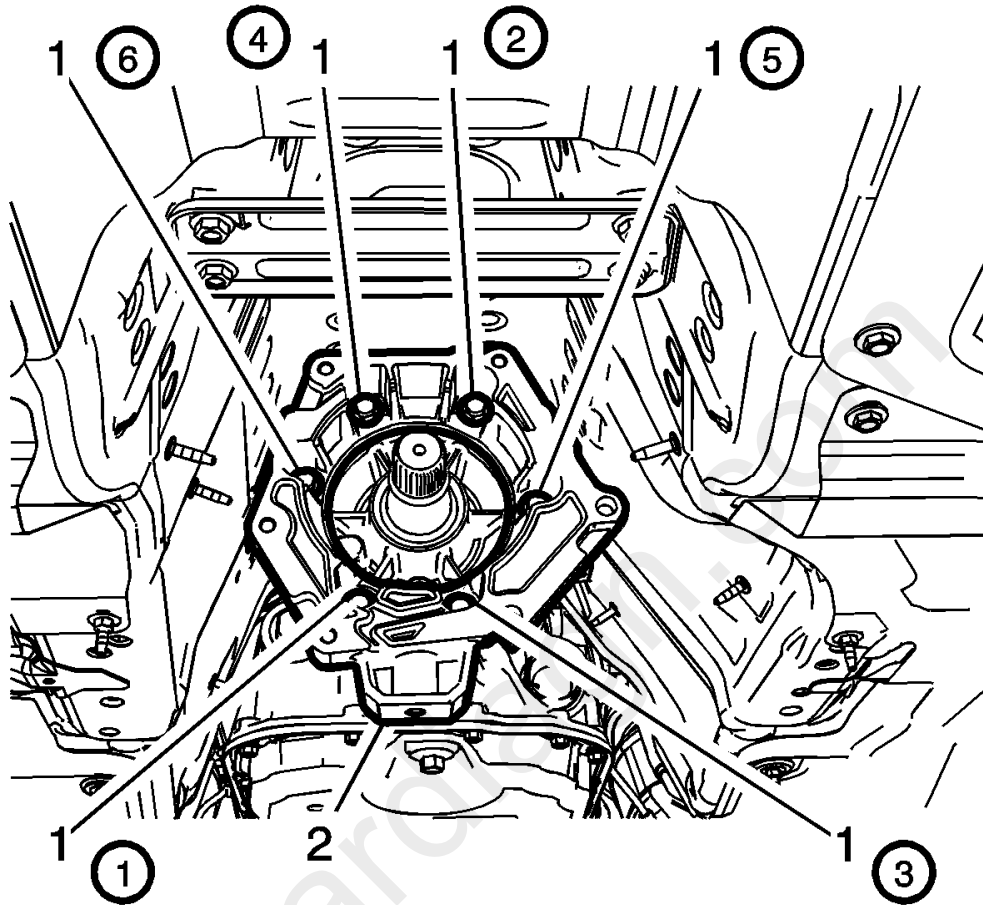


Fig. 27: Case Extension Housing
Courtesy of GENERAL MOTORS COMPANY

1. Install the case extension housing (2).
2. Install by hand the case extension housing bolts.

CAUTION: Refer to Fastener Caution .

3. Secure the case extension housing bolts in the specified sequence and tighten to 55 (41 lb ft).
4. Install the transfer case in the vehicle. Refer to Transfer Case Assembly Replacement .
5. Lower the vehicle.

PROPELLER SHAFT TRANSMISSION FLANGE REPLACEMENT

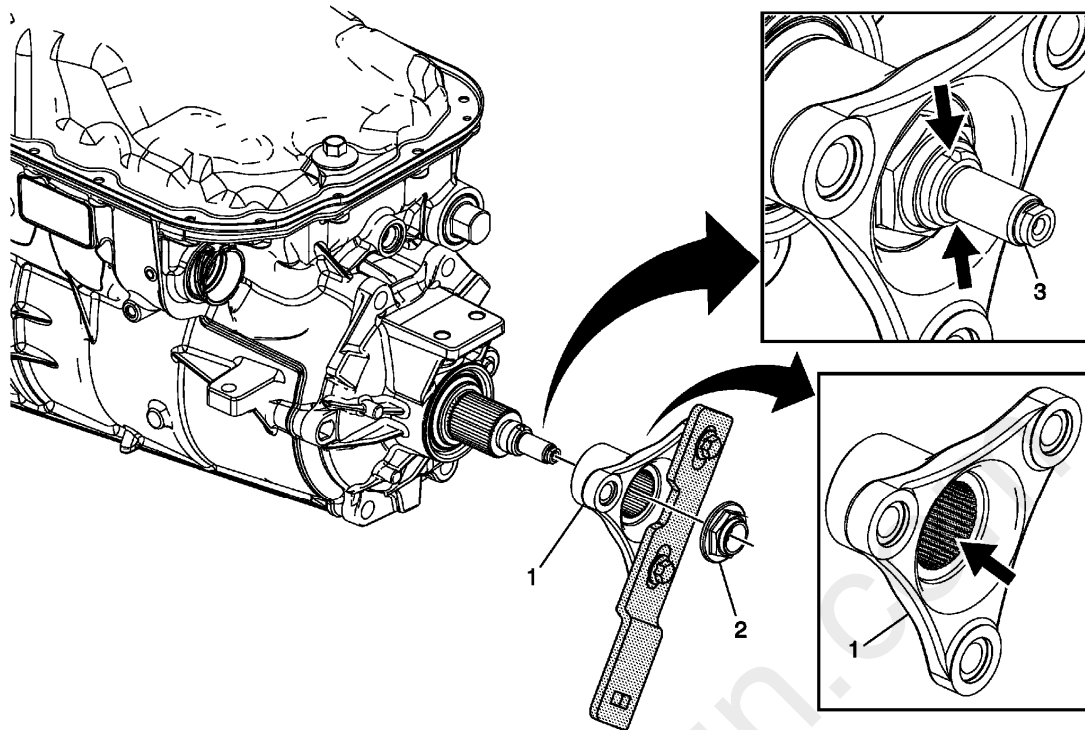


Fig. 28: Propeller Shaft Transmission Flange
Courtesy of GENERAL MOTORS COMPANY

Propeller Shaft Transmission Flange Replacement

Callout	Component Name
Preliminary Procedures	
1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> . 2. Remove the propeller shaft. Refer to <u>Two-Piece Propeller Shaft Replacement (LFX, LF3)</u> , <u>Two-Piece Propeller Shaft Replacement (LTG, LCV, LKW)</u> .	
1	Prop Shaft Trans Flange Procedure 1. The output shaft splines must be thoroughly clean and dry before installing the flange. 2. Apply GM P/N 89021297 (Canadian P/N 10953488) across the width of the flange splines, install. However, if the replacement flange contains a pre-applied adhesive patch, then liquid adhesive is not required and the 24 hour cure time is not necessary. 3. Sufficient application of adhesive to every tooth on the flange will leave excess adhesive on the output shaft after installation. If no excess is observed, reapply adhesive. NOTE:

	• When repairing low speed and garage shift clunk - except for moving the vehicle from the hoist, do not operate the vehicle above 5 mph at light throttle for 24 hours to allow the adhesive to cure. • If the replacement flange contains a pre-applied adhesive patch, then liquid adhesive is not required and the 24 hour cure time is not necessary.
2	Propeller Shaft Flange Nut CAUTION: Refer to <u>Fastener Caution</u> . CAUTION: Stake the flange nut onto the output shaft. Use the two staking grooves on the shaft to locate the staking points. Failure to stake the flange nut may result in damage to the transmission. Procedure 1. Discard the propeller shaft flange nut. 2. The output shaft nut threads must be thoroughly clean and dry before installing the nut. 3. Apply GM P/N 89021297 (Canadian P/N 10953488) across the width of the nut threads, prior to tightening and staking. However, if the replacement nut contains a pre-applied adhesive patch, then liquid adhesive is not required. 4. Install a NEW nut. Tighten 55 (41 lb ft) Special Tool J-45012 Holding Fixture For equivalent regional tools, refer to <u>Special Tools</u> .
3	Output Shaft

TRANSMISSION OUTPUT SHAFT SEAL REPLACEMENT (ALL WHEEL DRIVE)

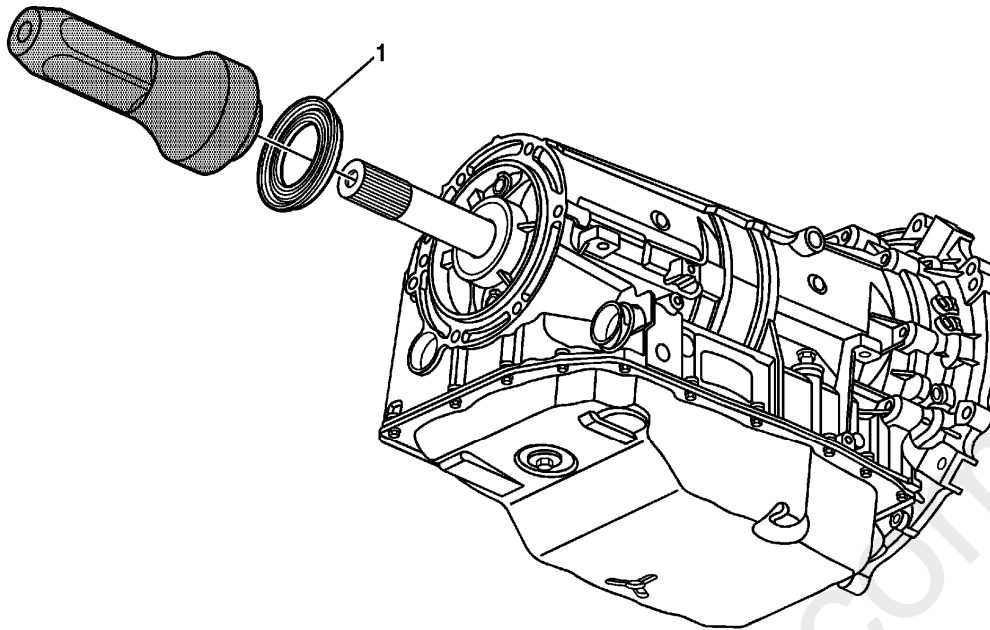


Fig. 29: Identifying Transmission Output Shaft Seal (All Wheel Drive)
 Courtesy of GENERAL MOTORS COMPANY

Transmission Output Shaft Seal Replacement (All Wheel Drive)

Callout	Component Name
Preliminary Procedure Remove the transfer case. Refer to <u>Transfer Case Assembly Replacement</u> .	
1	Output Shaft Seal Procedure 1. Use the J-6125-B hammer and J-36825-A remover to remove the seal. Use care in order to avoid scraping or gouging the output shaft bushing. 2. Lubricate the seal with clean transmission fluid. 3. Use the DT-50648 installer to install the seal. Special Tools • DT-50648 Case Seal Installer • J-6125-B Slide Hammer with Adaptor • J-36825-A Output Shaft Oil Seal Remover For equivalent regional tools, refer to <u>Special Tools</u> .

TRANSMISSION OUTPUT SHAFT SEAL REPLACEMENT (REAR WHEEL DRIVE)

Special Tools

- **J-36183** Seal Installer
- **J-45000** Seal Remover
- **J-45012** Holding Fixture

For equivalent regional tools, refer to **Special Tools** .

Removal Procedure

1. Remove the propeller shaft. Refer to **Two-Piece Propeller Shaft Replacement (LFX, LF3)** , **Two-Piece Propeller Shaft Replacement (LTG, LCV, LKW)** .
2. Support the transmission with a suitable jack.

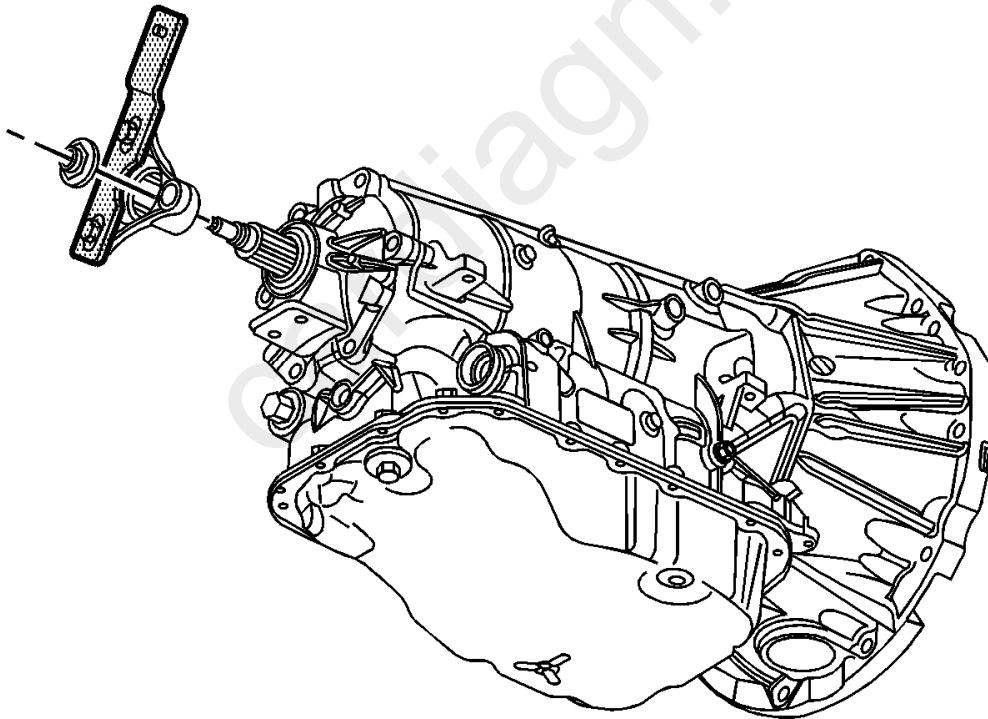


Fig. 30: View Of Holding Fixture
Courtesy of GENERAL MOTORS COMPANY

3. Install the **J-45012** holding fixture using the propeller shaft bolts.

CAUTION: Do not reuse the flange nut. Reusing the flange nut may cause damage to the transmission.

4. Remove and discard the propeller shaft flange nut.
5. Remove the propeller shaft flange.

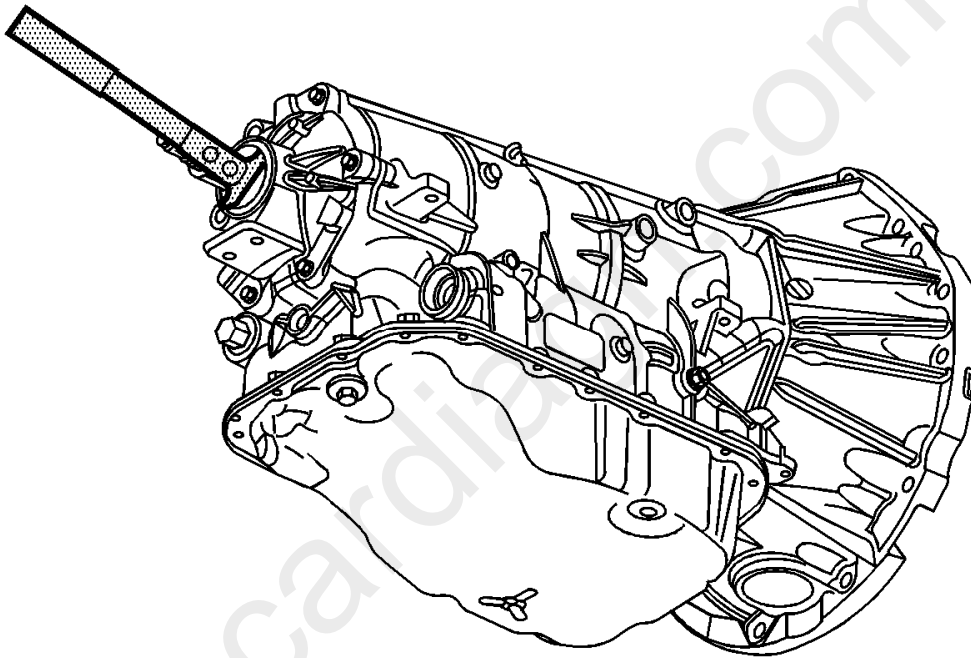


Fig. 31: View Of Seal Remover

Courtesy of GENERAL MOTORS COMPANY

NOTE: Be careful not to scrape or gouge the case extension housing while removing the output shaft seal.

6. Use the **J-45000** remover to remove the output shaft seal from the case extension housing.

Installation Procedure

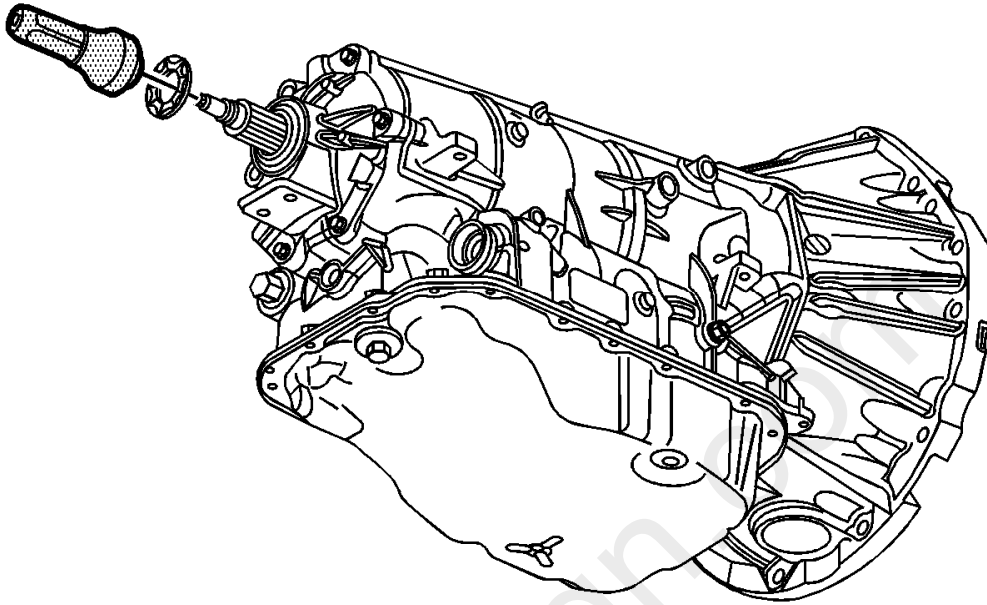


Fig. 32: View Of Seal Installer
Courtesy of GENERAL MOTORS COMPANY

1. Lubricate the new seal with clean transmission fluid.
2. Use the **J-36183** installer to install the output shaft seal to the case extension housing.

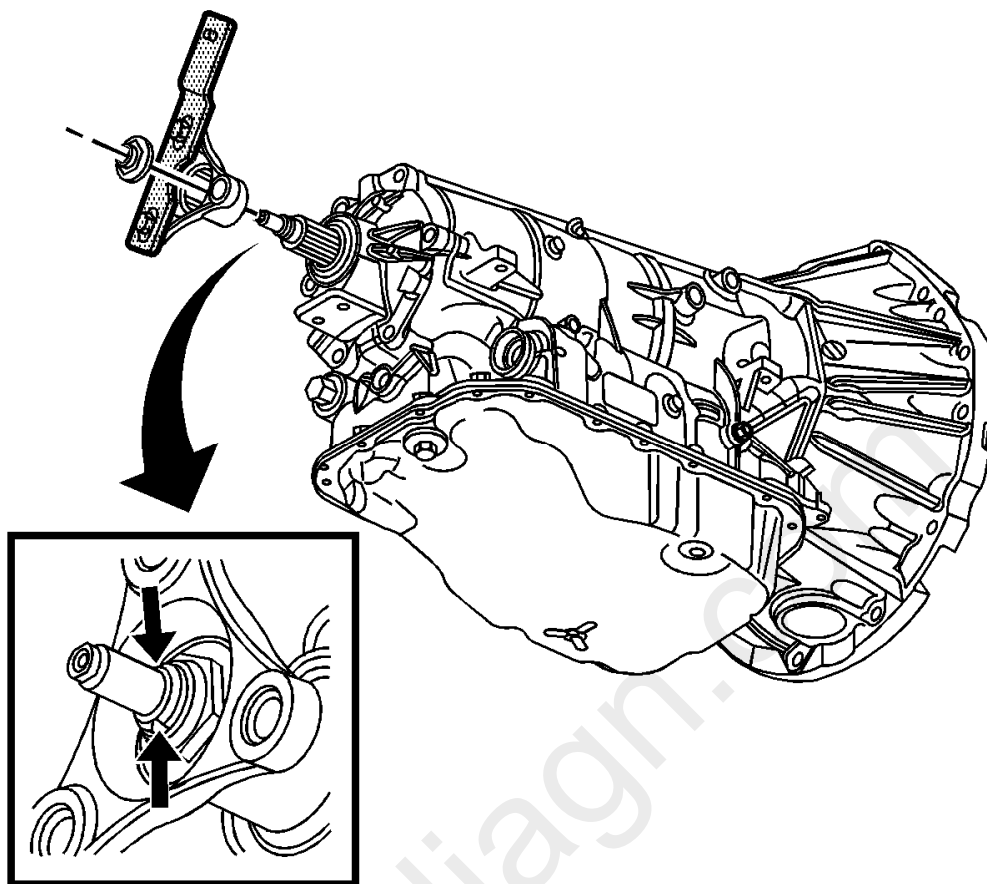


Fig. 33: View Of Holding Fixture
Courtesy of GENERAL MOTORS COMPANY

3. Install the prop shaft flange.

CAUTION: Stake the flange nut onto the output shaft. Use the two staking grooves on the shaft to locate the staking points. Failure to stake the flange nut may result in damage to the transmission.

CAUTION: Refer to Fastener Caution .

NOTE: Use a NEW propeller shaft flange nut.

4. Install the NEW propeller shaft flange nut and tighten to 105 (77 lb ft).
5. Remove the J-45012 holding fixture.
6. Remove the transmission jack.

7. Install the propeller shaft. Refer to **Two-Piece Propeller Shaft Replacement (LFX, LF3)** , **Two-Piece Propeller Shaft Replacement (LTG, LCV, LKW)** .

MANUAL SHIFT SHAFT AND SEAL REPLACEMENT

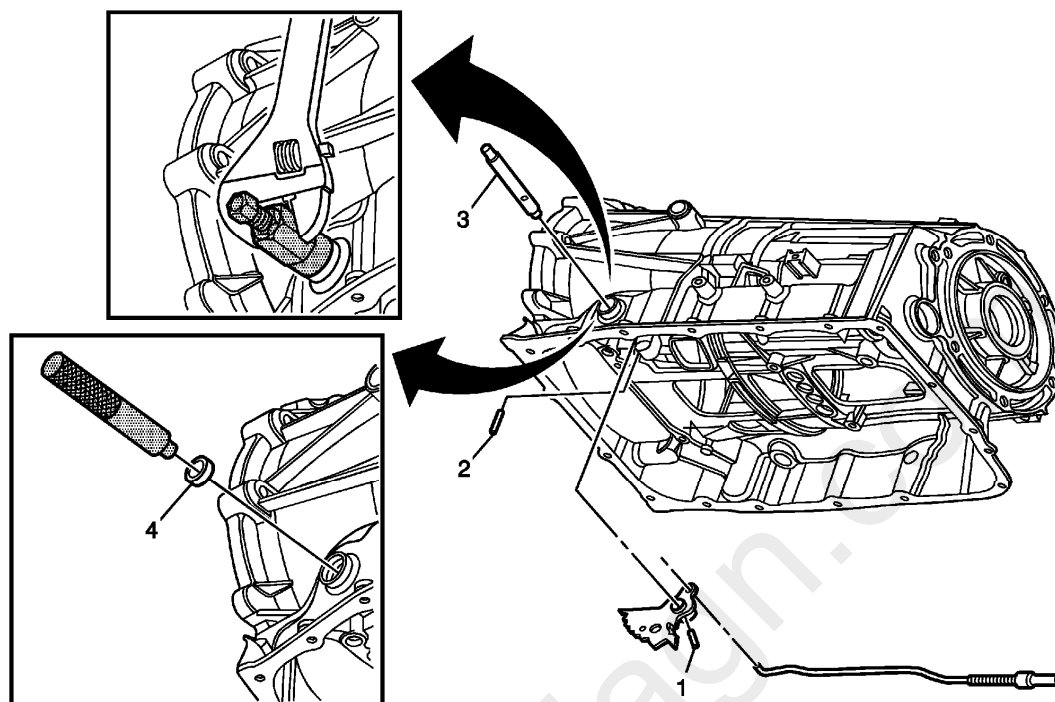


Fig. 34: Manual Shift Shaft and Seal Component View
Courtesy of GENERAL MOTORS COMPANY

Manual Shift Shaft and Seal Replacement

Callout	Component Name
Preliminary Procedures	
1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> . 2. Remove the transmission fluid pan. Refer to <u>Automatic Transmission Fluid, Fluid Pan and/or Filter Replacement</u>. 3. Remove the manual shaft detent assembly roller. Refer to <u>Control Valve Lower Body and Upper Body Replacement</u>.	
1	Manual Shaft Detent Lever Hub Pin Procedure 1. Discard the pin. Replace with a NEW pin. 2. "Walk" the pin out using side cutters.
	Manual Shift Shaft Pin

2	Procedure 1. Discard the pin. Replace with a NEW pin. 2. "Walk" the pin out using side cutters.
3	Manual Shift Shaft
4	Manual Shift Shaft Seal Procedure 1. The manual shaft must be removed to replace the manual shaft seal. 2. Use the J-45201 remover to remove the seal from the transmission case. 3. Use the DT-47770 installer to install the seal into the transmission case. Special Tools • DT-47770 Seal Installer • J-45201 Cooler Line Seal Remover For equivalent regional tools, refer to Special Tools .

MANUAL SHIFT SHAFT POSITION SWITCH REPLACEMENT

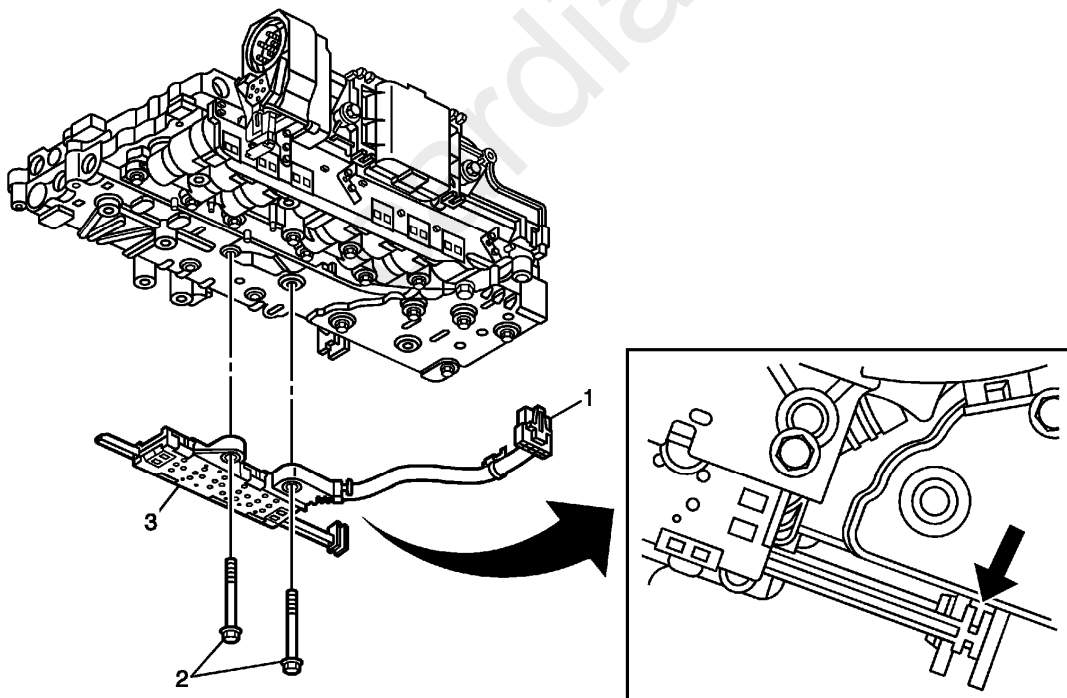


Fig. 35: Manual Shift Shaft Position Switch Component View
 Courtesy of GENERAL MOTORS COMPANY

Manual Shift Shaft Position Switch Replacement

Callout	Component Name
Preliminary Procedures 1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> . 2. Remove the transmission fluid pan and filter. Refer to <u>Automatic Transmission Fluid, Fluid Pan and/or Filter Replacement</u> .	
1	Manual Shift Shaft Position Switch Assembly Electrical Connector NOTE: • Release the connector lock before disconnecting. Engage the connector lock after connecting. • The wiring harness clip near the connector does not need to be replaced if broken or missing. The clip is used during manufacturing to keep the wire harness clear during an automated bolt installation process. If the clip is damaged, simply remove and discard.
2	Manual Shift Shaft Position Switch Assembly Bolts CAUTION: Refer to <u>Fastener Caution</u> . Tighten 12 (106 lb in)
3	Manual Shift Shaft Position Switch Assembly Procedure Align the switch activator slide with the manual valve link.

CONTROL SOLENOID VALVE AND TRANSMISSION CONTROL MODULE ASSEMBLY REPLACEMENT

Removal Procedure

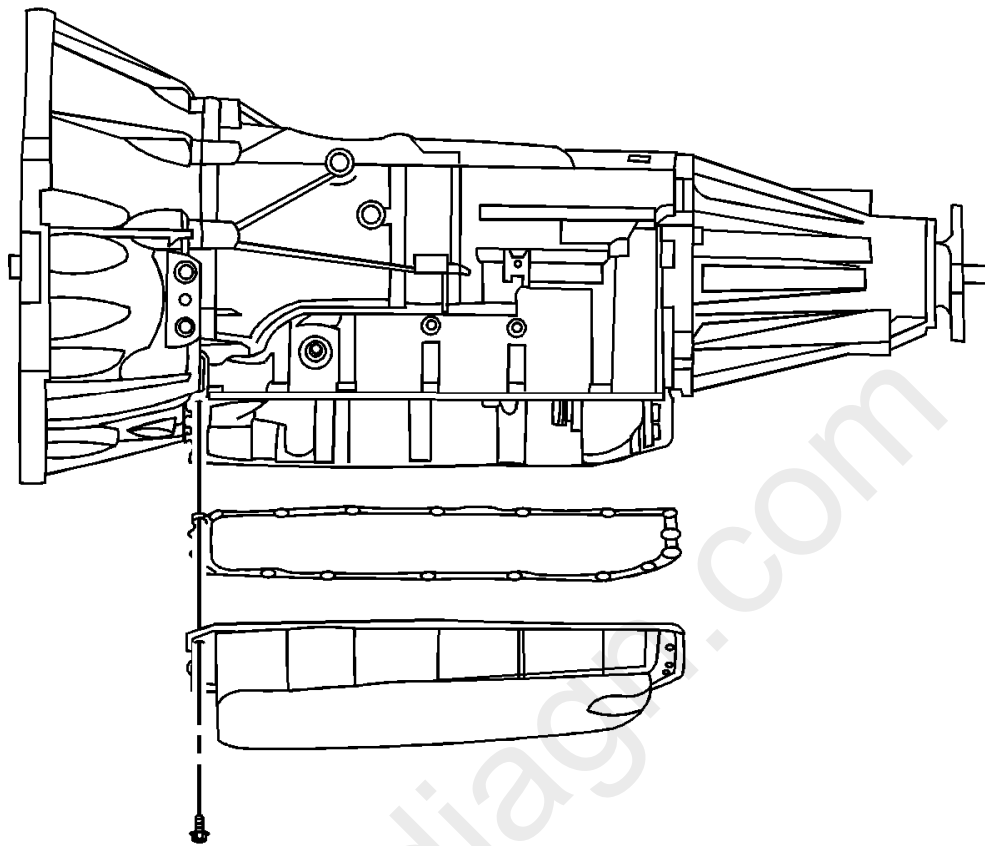


Fig. 36: View Of Transmission Oil Pan And Filter
Courtesy of GENERAL MOTORS COMPANY

NOTE: The valve body must be removed from the transmission to replace the control solenoid valve and transmission control module assembly.

1. Remove the transmission oil pan and filter. Refer to **Automatic Transmission Fluid, Fluid Pan and/or Filter Replacement**.
2. Remove the electrical connector passage sleeve. Refer to **Automatic Transmission Electrical Connector Passage Sleeve Replacement**.

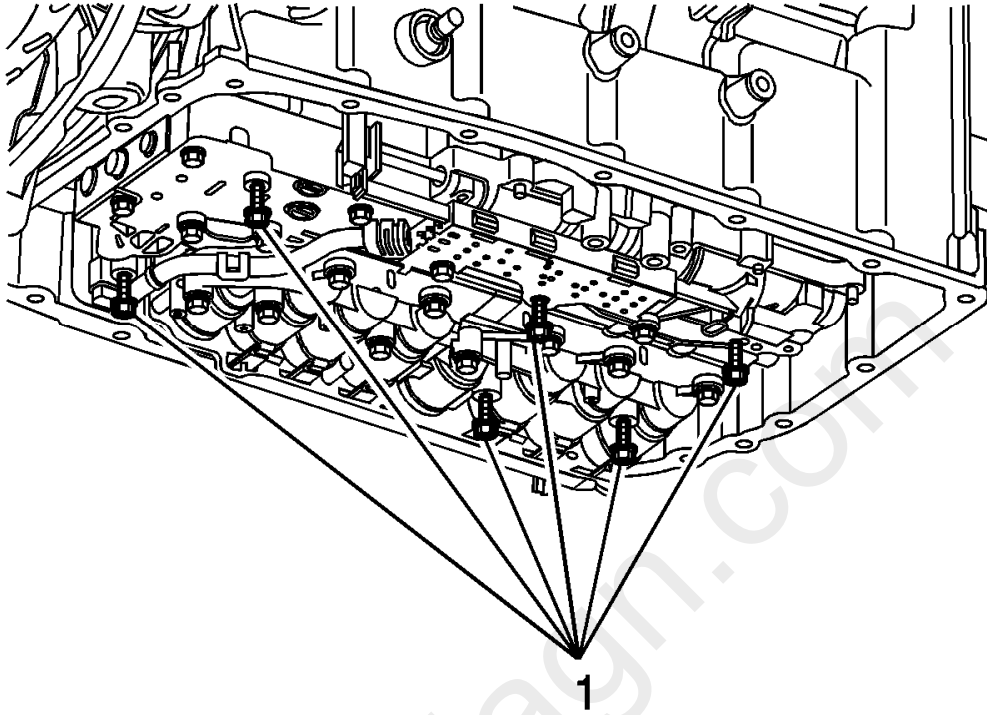


Fig. 37: View Of Valve Body Bolts
Courtesy of GENERAL MOTORS COMPANY

3. Remove the valve body bolts (1).

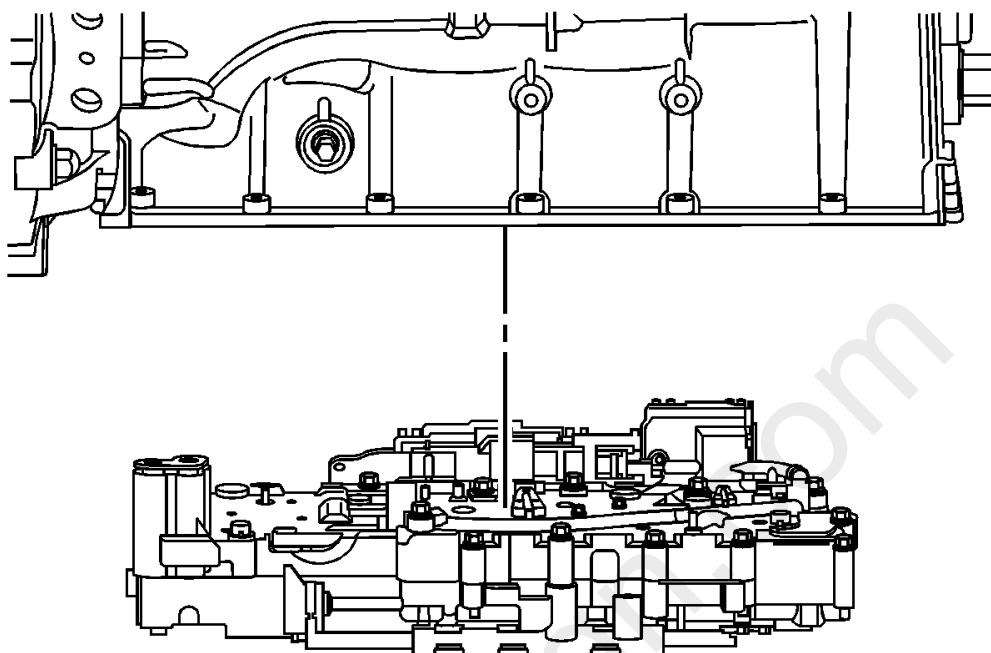


Fig. 38: Valve Body Assembly
Courtesy of GENERAL MOTORS COMPANY

4. Remove the upper and lower control valve body assembly.

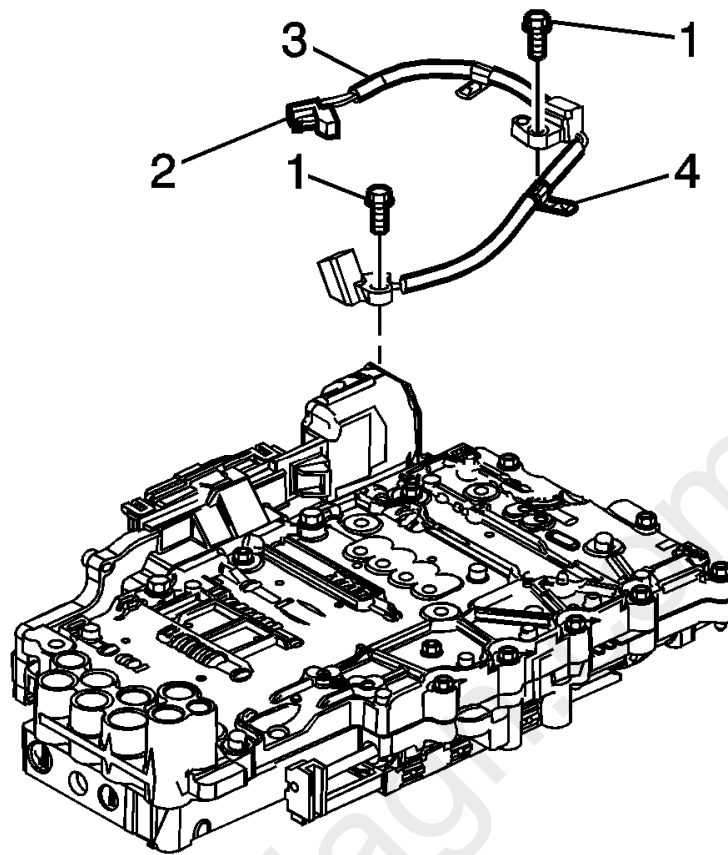


Fig. 39: View Of Speed Sensor Electrical Connector
Courtesy of GENERAL MOTORS COMPANY

5. Disconnect the speed sensor electrical connector (2) from the control solenoid valve assembly.
6. Turn the control valve body assembly over.

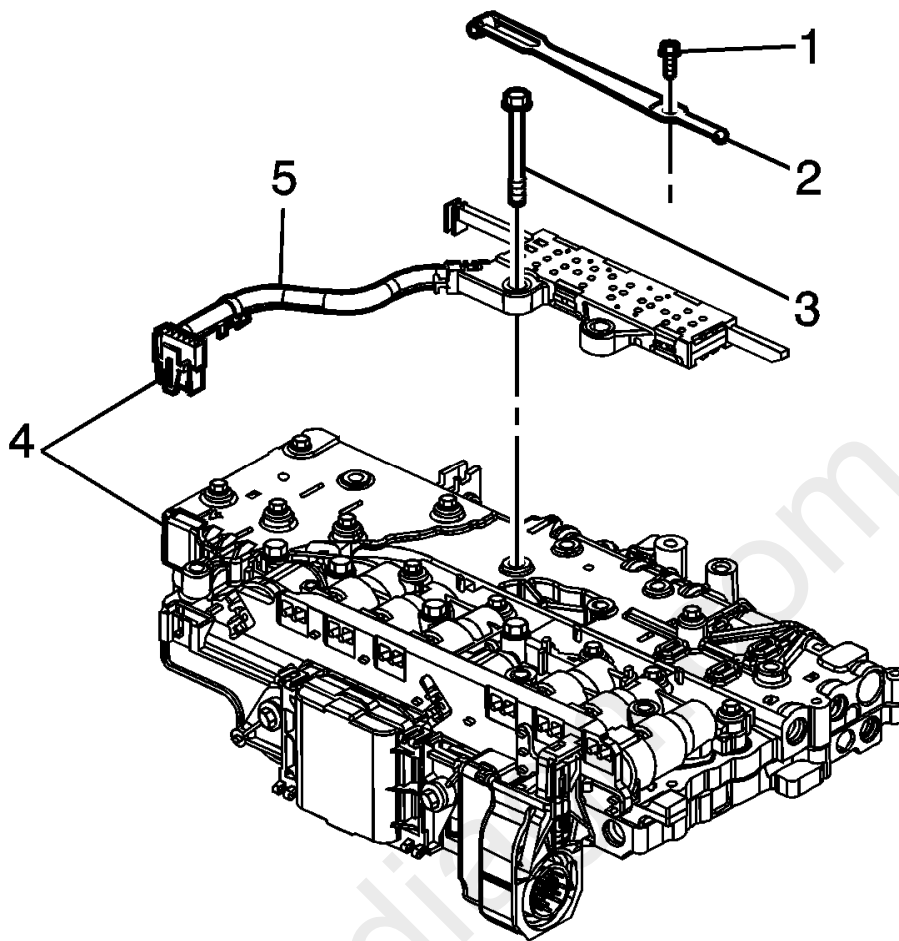


Fig. 40: Manual Shift Shaft Position Switch Connector
Courtesy of GENERAL MOTORS COMPANY

NOTE: Release the connector lock before disconnecting.

7. Disconnect the manual shift shaft position switch connector (4) from the control solenoid valve assembly.
8. Remove the bolt (3) and remove the manual shift shaft position switch assembly.

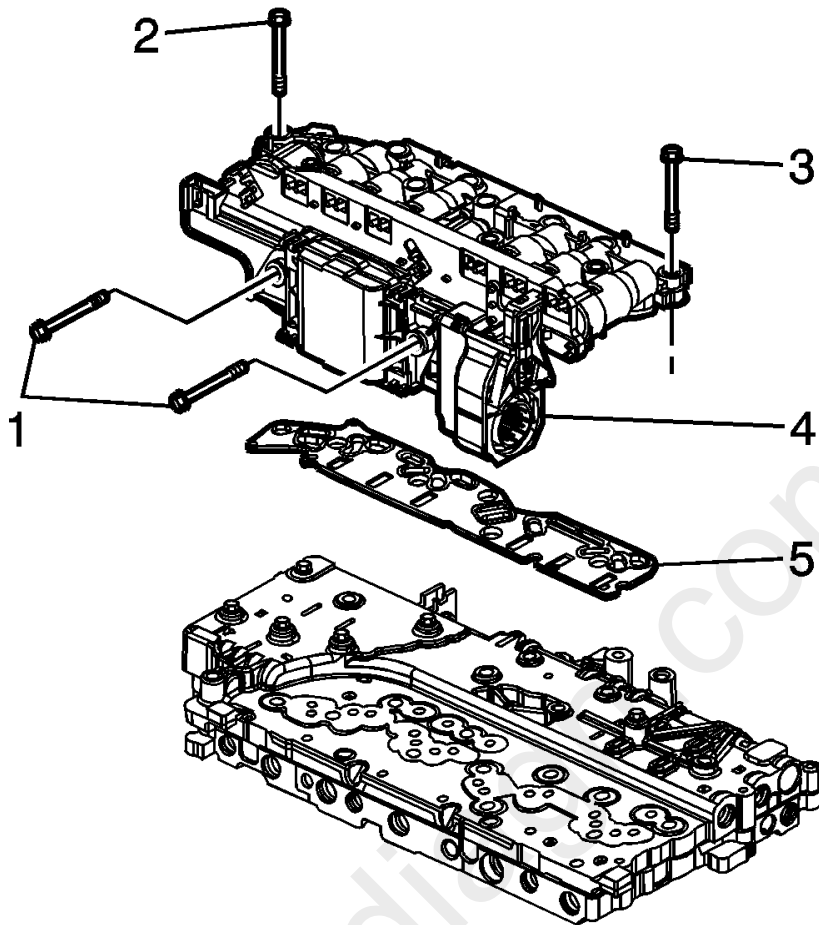


Fig. 41: View Of Control Valve Body Assembly
Courtesy of GENERAL MOTORS COMPANY

9. Remove the 2 bolts (1) from the "heat sink" side of the control solenoid valve assembly.

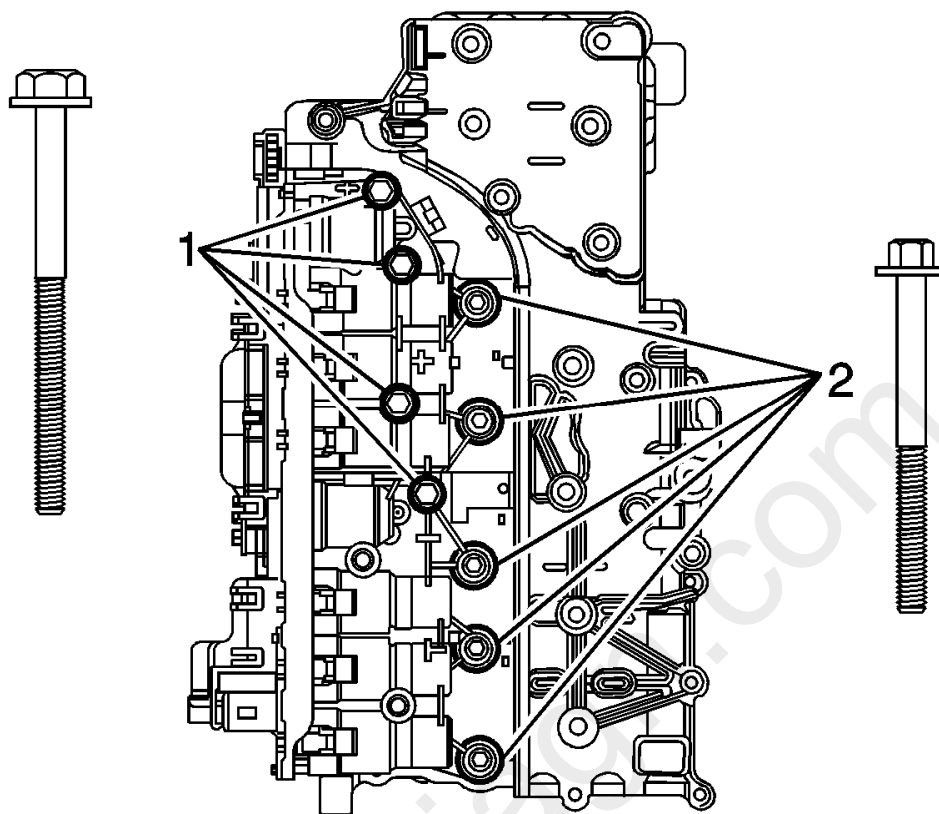


Fig. 42: View Of Bolts
Courtesy of GENERAL MOTORS COMPANY

10. Remove the 5 bolts (2) and the 4 bolts (1) securing the control solenoid valve assembly to the control valve body assembly.

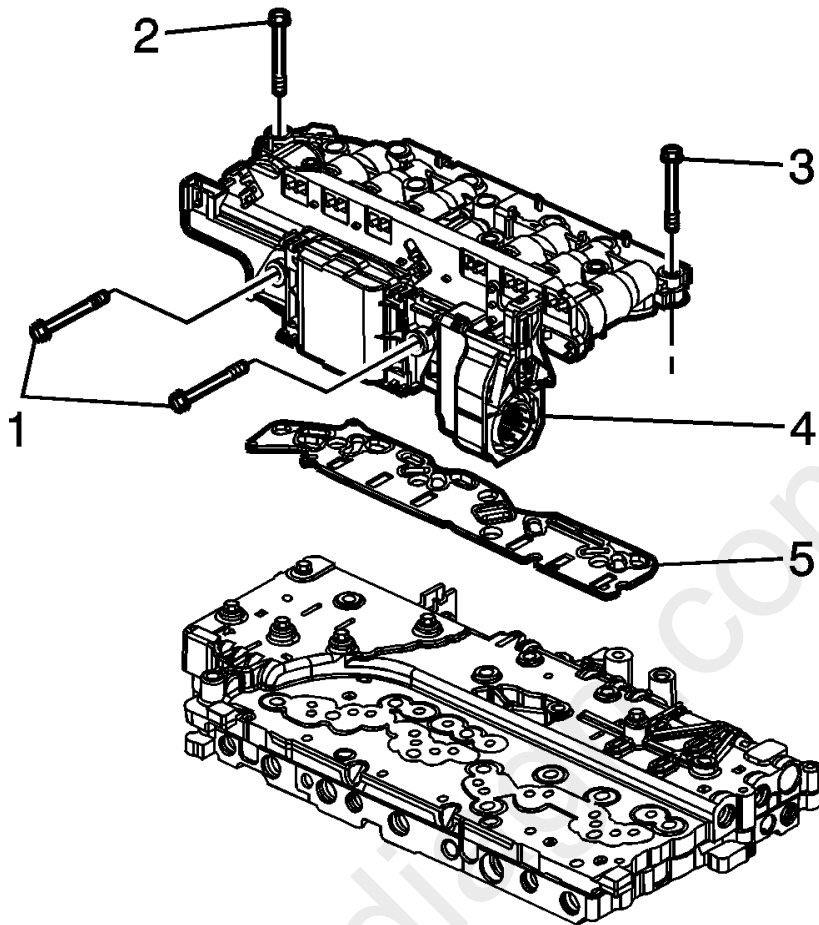


Fig. 43: View Of Control Valve Body Assembly
Courtesy of GENERAL MOTORS COMPANY

11. Remove the control valve body assembly.

CAUTION: Use care when removing or installing the filter plate assembly. A broken or missing retaining tab may not adequately secure the filter plate to the control solenoid valve assembly, resulting in possible damage or contamination.

12. Carefully remove and discard the filter plate assembly (5).

Installation Procedure

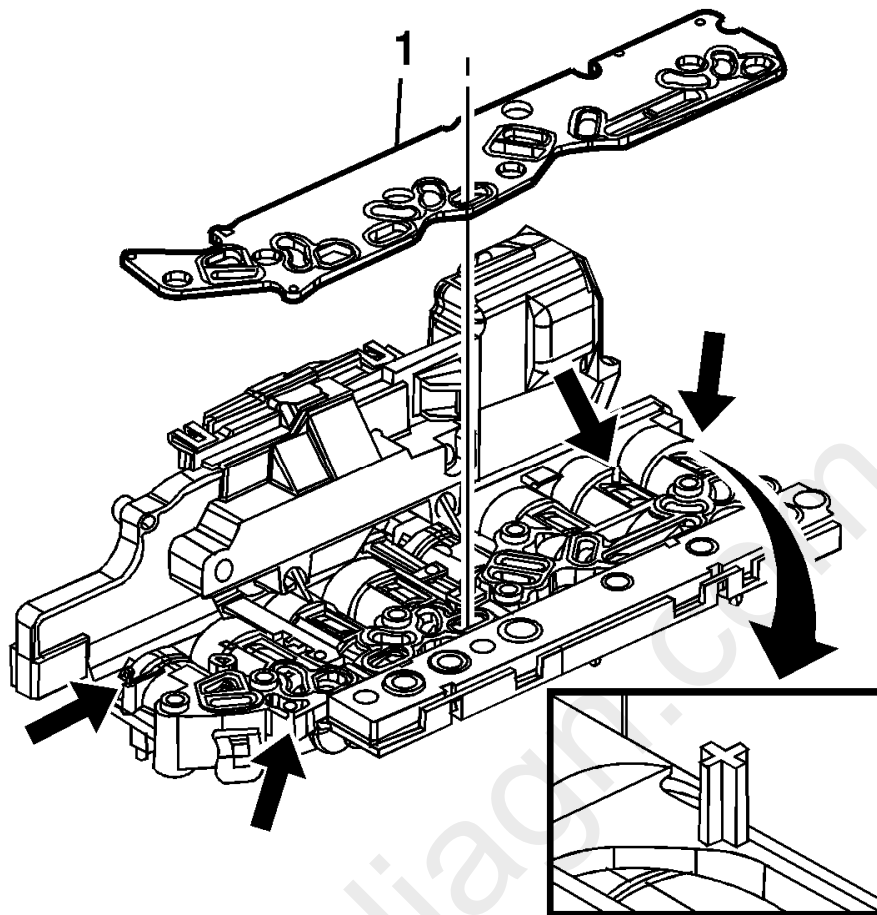


Fig. 44: View Of Filter Plate Assembly
Courtesy of GENERAL MOTORS COMPANY

NOTE: Inspect the 4 filter plate retaining tabs on the control solenoid valve assembly. A broken or missing tab may not adequately secure the filter plate to the control solenoid valve assembly.

1. Install a NEW filter plate assembly (1).

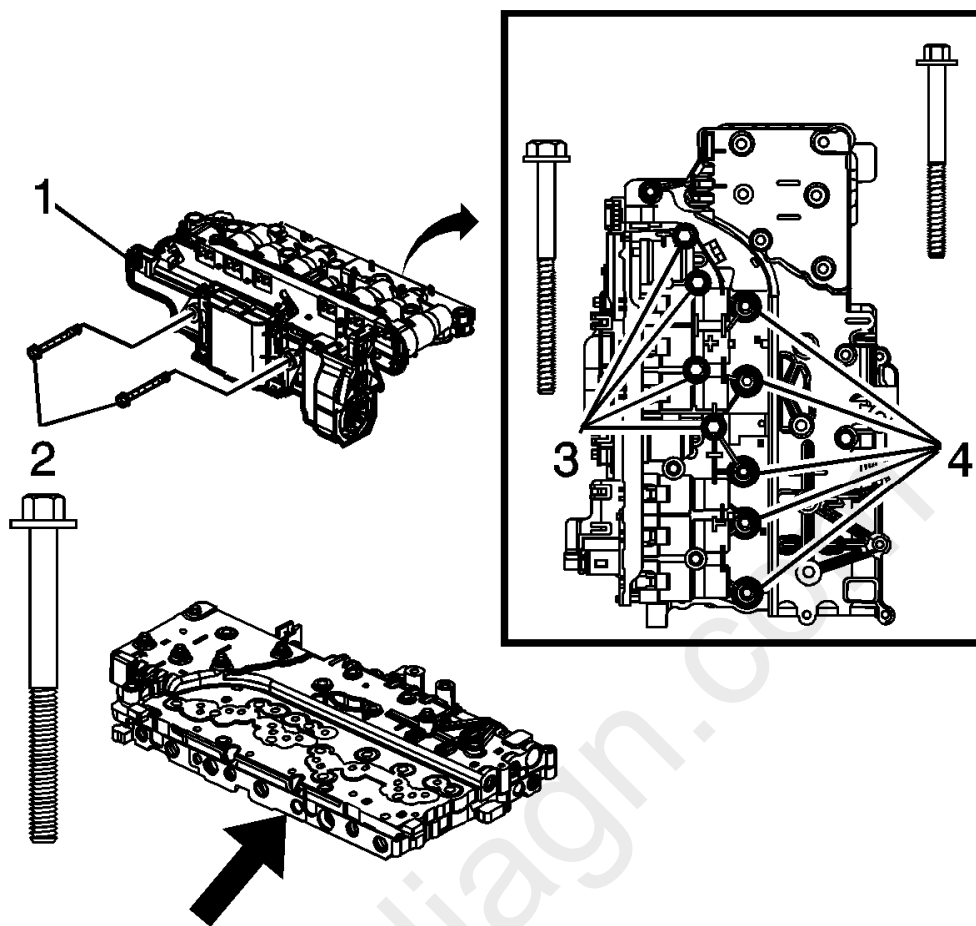


Fig. 45: View Of Control Solenoid Valve Assembly Bolts
Courtesy of GENERAL MOTORS COMPANY

NOTE: Note the locator pin on the control valve lower body assembly.

2. Align the control solenoid valve assembly (1) to the control valve lower body assembly.
3. Install the 2 bolts (2), through the "heat sink" side of the control solenoid valve assembly (1). Hand tighten only.

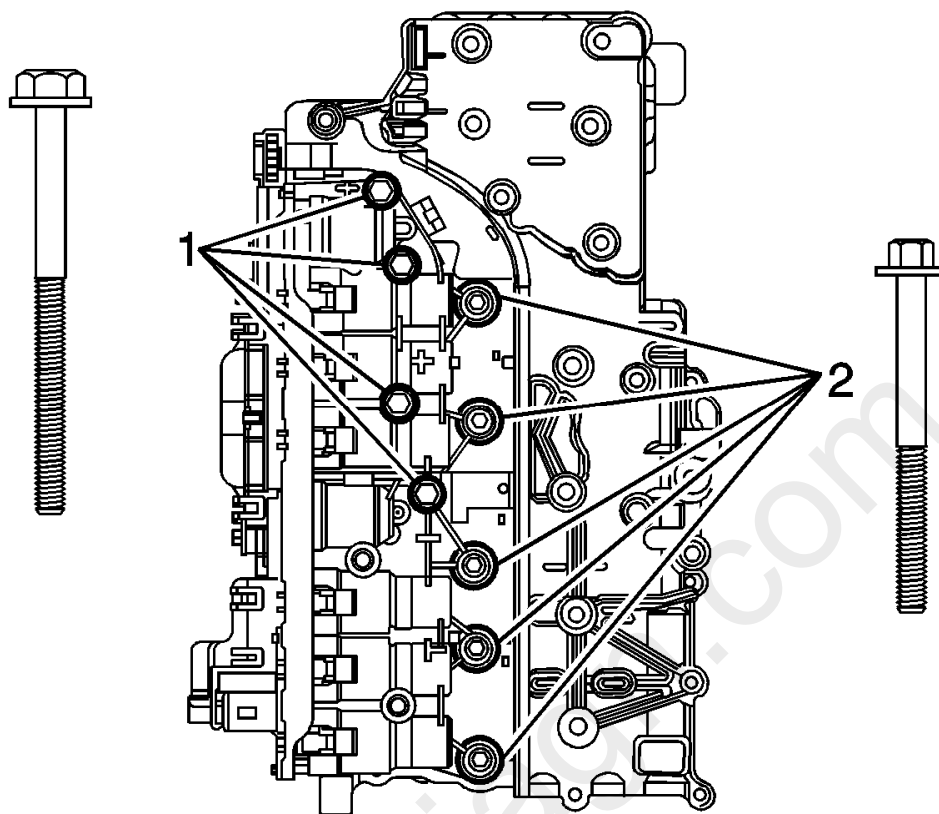


Fig. 46: View Of Bolts

Courtesy of GENERAL MOTORS COMPANY

4. Install the 4 bolts (1) and 5 bolts (2) securing the control solenoid valve assembly to the control valve lower body assembly. Hand tighten only.

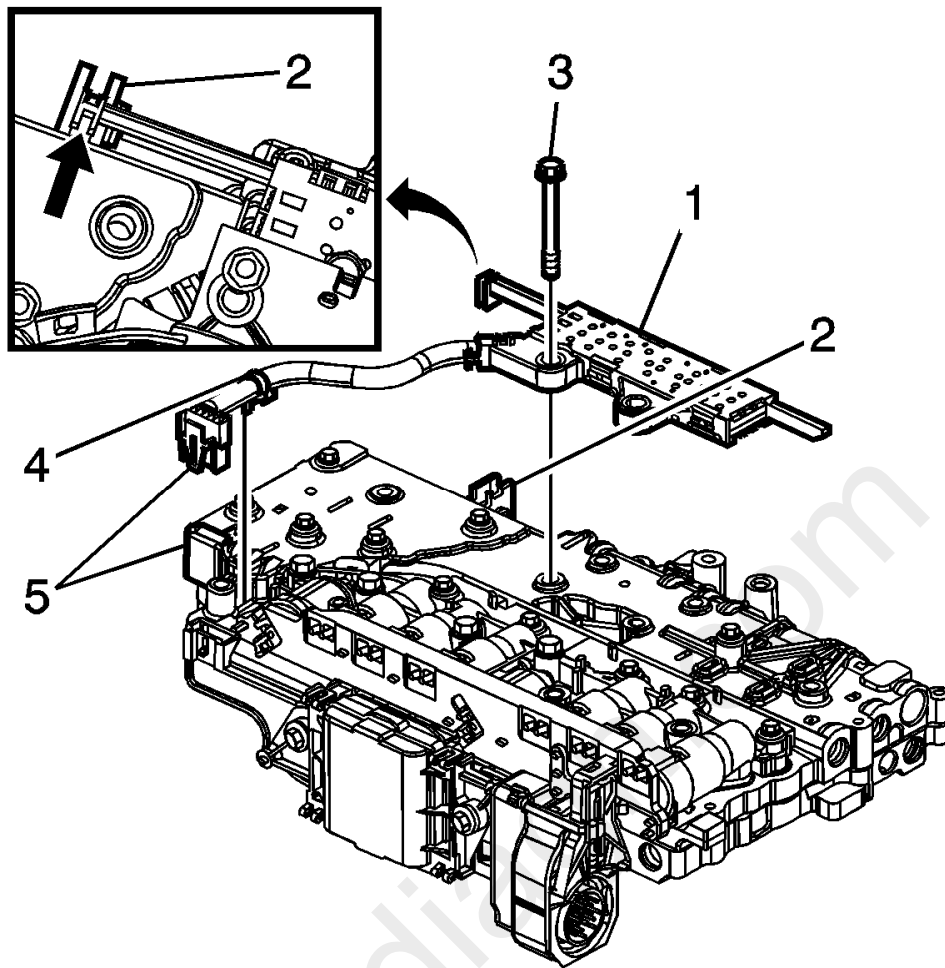


Fig. 47: View Of Manual Shift Shaft Position Switch Assembly
Courtesy of GENERAL MOTORS COMPANY

5. Install the manual shift shaft position switch assembly (1). Align the switch activator slide with the manual valve link. Secure with 1 bolt (3). Hand tighten only.

NOTE: The wiring harness clip (4) on the manual shift shaft position switch does not need to be replaced if damaged or missing. The clip functions only as a manufacturing assembly aid to keep the harness clear during an automated bolt installation process. If the clip is damaged, simply remove and discard.

6. Connect and lock the manual shift shaft position switch electrical connector (5) to the control solenoid valve assembly and attach the wiring harness clip (4).

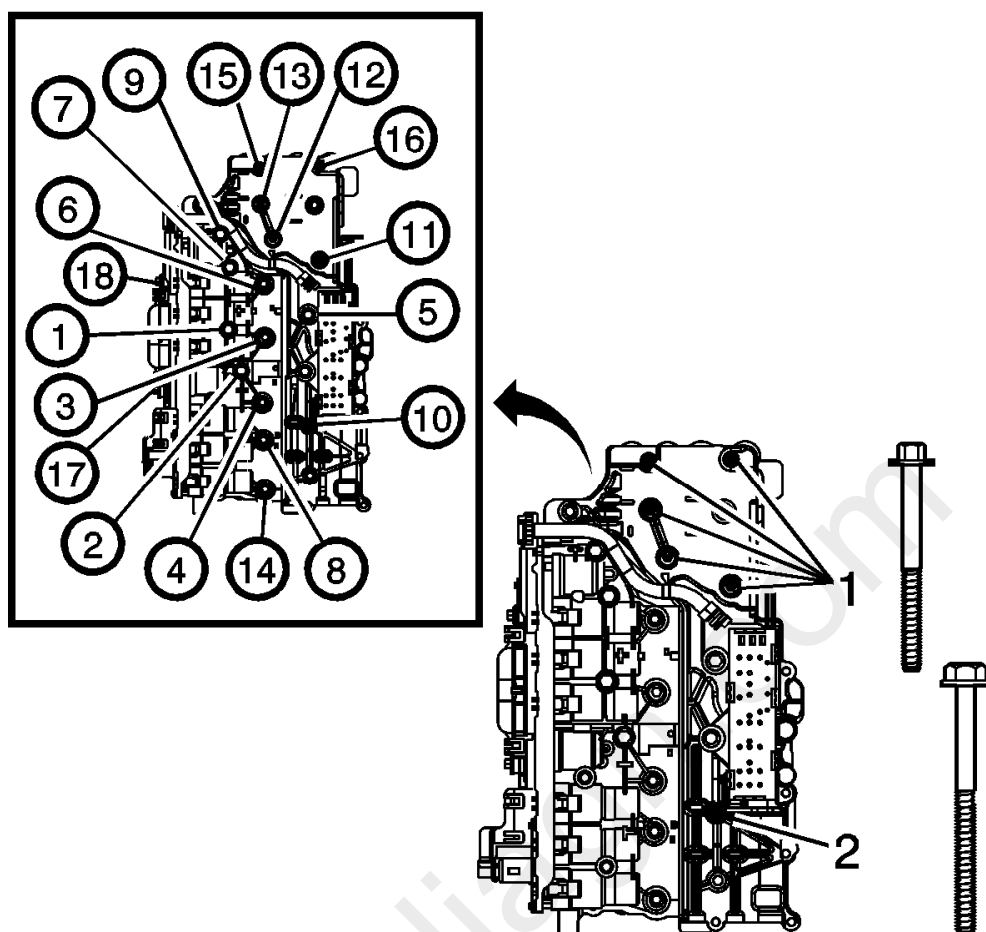


Fig. 48: Bolt Tightening Sequence
 Courtesy of GENERAL MOTORS COMPANY

7. Install the 5 remaining bolts (1) and 1 remaining bolt (2). Hand tighten only.

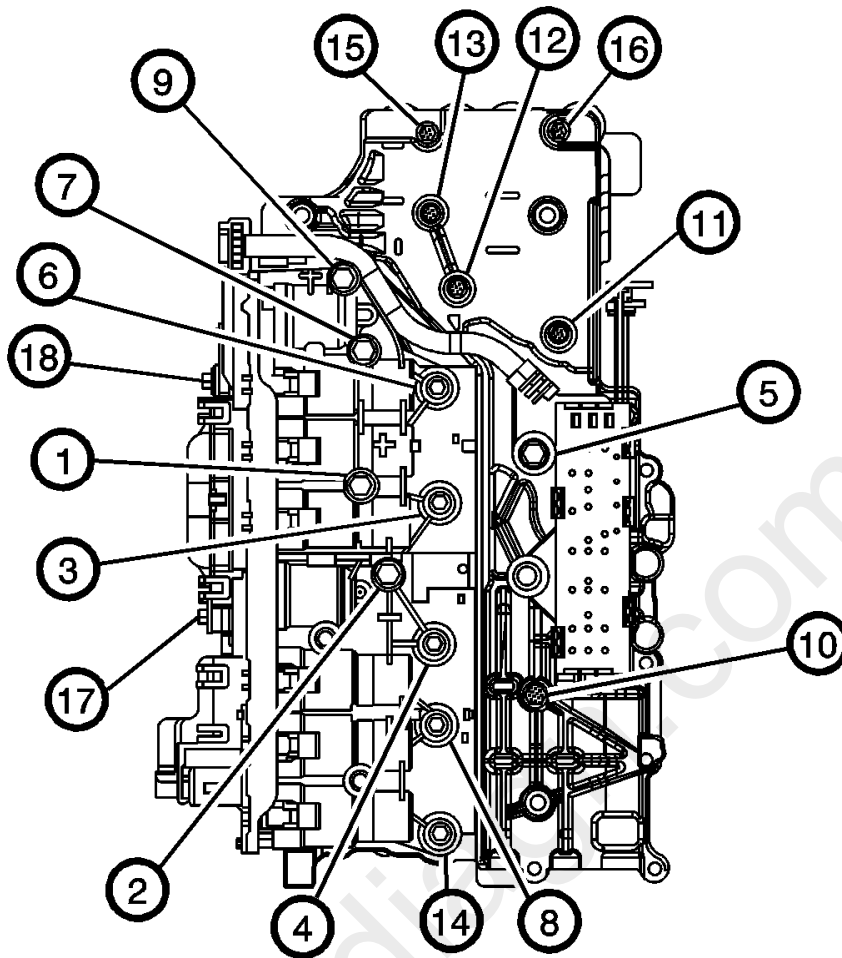


Fig. 49: Bolt Tightening Sequence
 Courtesy of GENERAL MOTORS COMPANY

CAUTION: Bolt torque sequencing is critical to the proper function of the control solenoid valve assembly. Failure to follow the required sequencing may result in transmission malfunction.

CAUTION: Refer to Fastener Caution .

8. Tighten all bolts in the sequence shown. The 2 "heat sink" bolts (17,18) must be tightened last.

Tighten bolts to 8 (71 lb in).

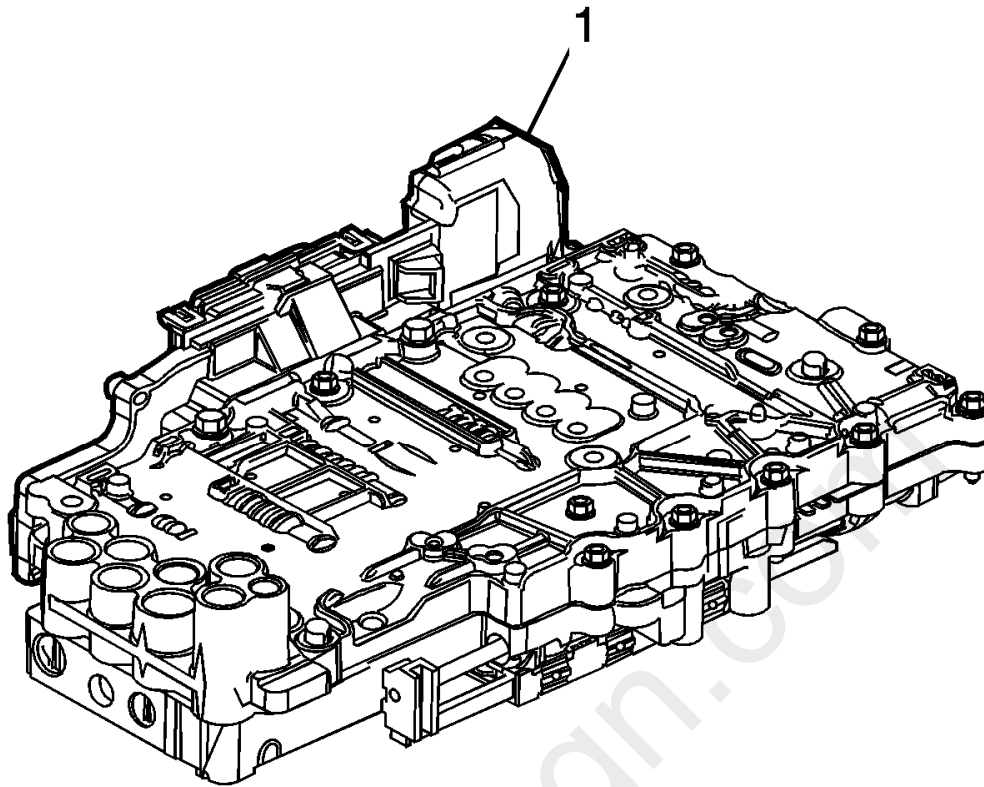


Fig. 50: View Of Control Solenoid Valve Assembly
Courtesy of GENERAL MOTORS COMPANY

9. Inspect the contact area between the "heat sink" area of the control solenoid valve assembly (1) and the valve body. There should be no visible gap. If a gap exists, loosen all 18 bolts and retighten in the sequence shown.

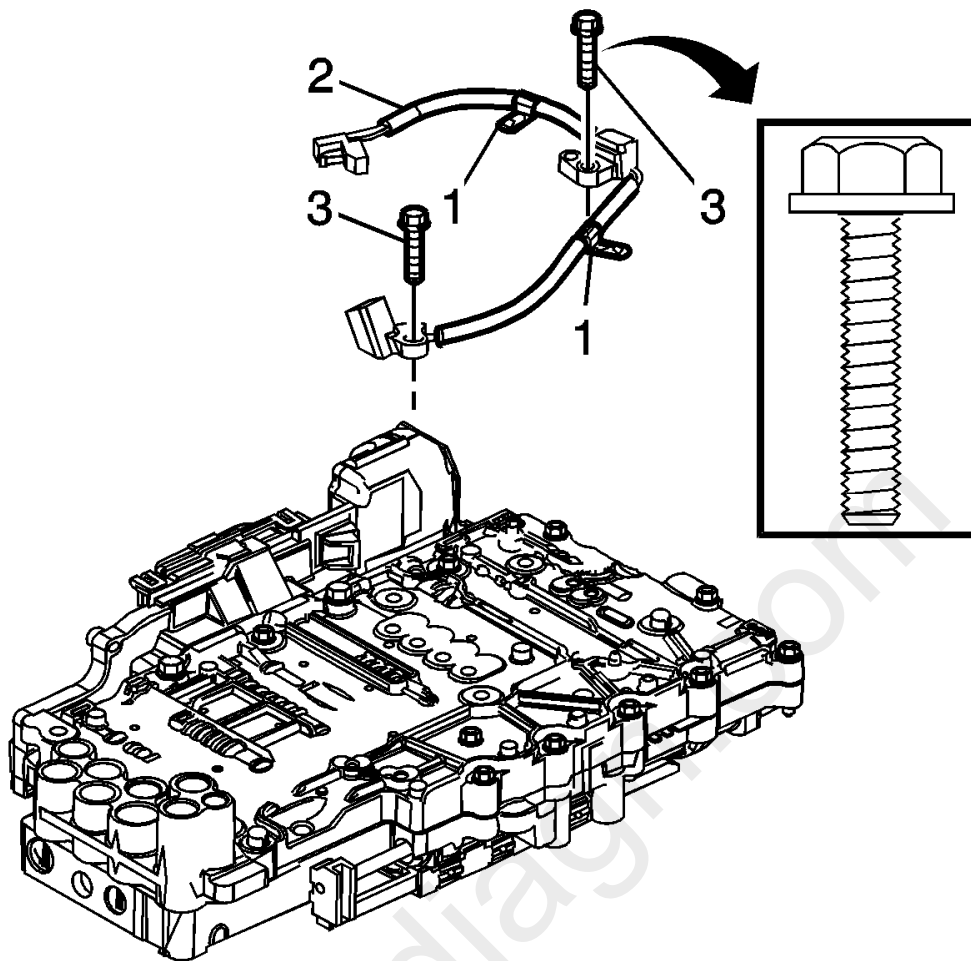


Fig. 51: View Of Output Speed Sensor Wiring Harness
Courtesy of GENERAL MOTORS COMPANY

10. Inspect the 2 input and output speed sensor wiring harness clips (1) for damage. Replace if damaged.

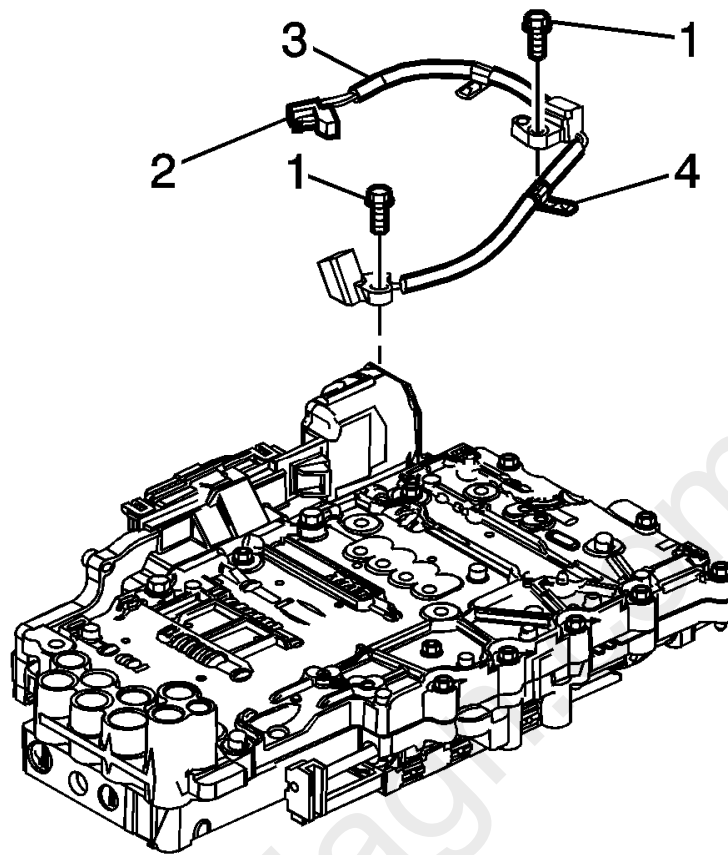


Fig. 52: View Of Speed Sensor Electrical Connector
Courtesy of GENERAL MOTORS COMPANY

11. Connect the speed sensor electrical connector (2) to the control solenoid valve assembly.

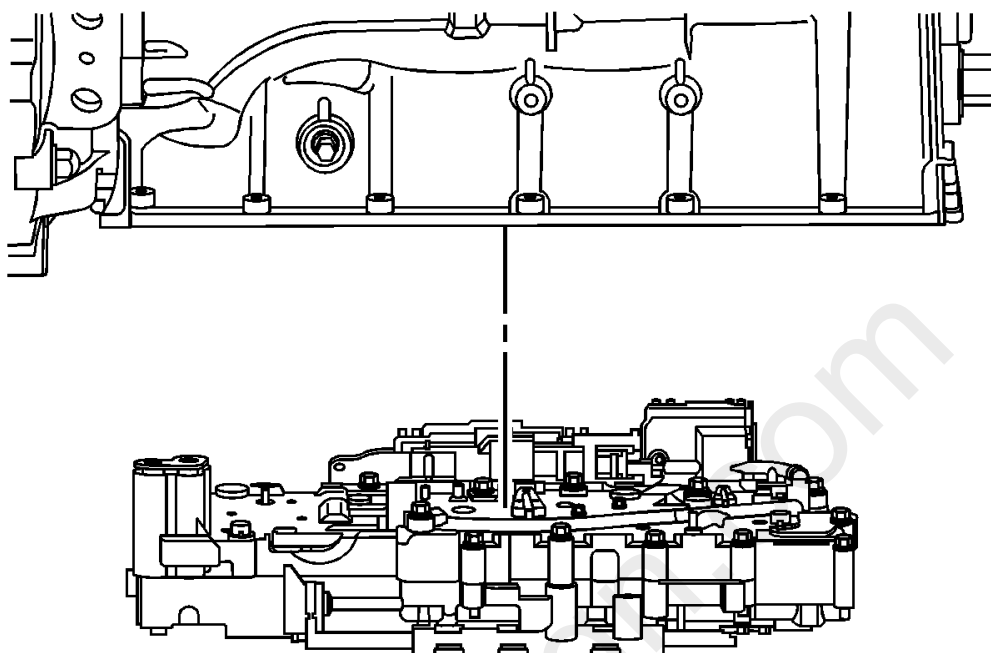


Fig. 53: Valve Body Assembly
Courtesy of GENERAL MOTORS COMPANY

12. Install the upper and lower control valve body assembly. Refer to **Control Valve Lower Body and Upper Body Replacement**.
13. Install the electrical connector passage sleeve. Refer to **Automatic Transmission Electrical Connector Passage Sleeve Replacement**.

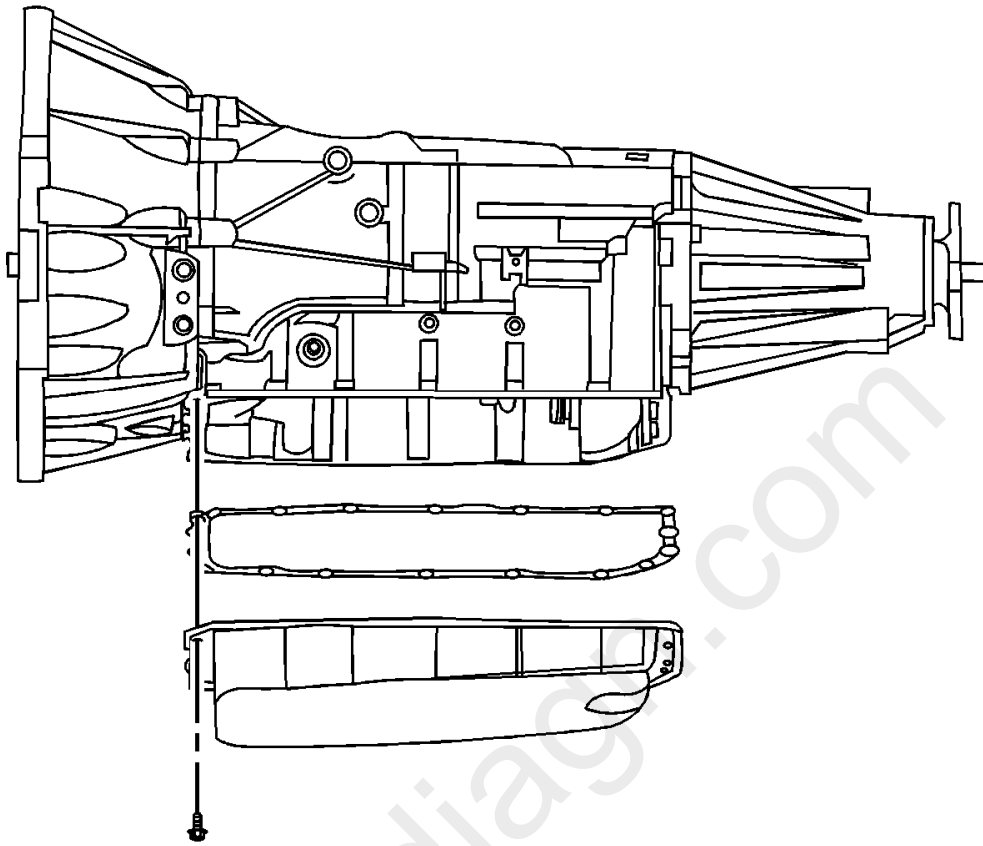


Fig. 54: View Of Transmission Oil Pan And Filter
Courtesy of GENERAL MOTORS COMPANY

14. Install the transmission oil pan and filter. Refer to **Automatic Transmission Fluid, Fluid Pan and/or Filter Replacement**.
15. If a NEW TCM has been installed into the vehicle, the NEW module needs to be reprogrammed. Refer to **Service Programming System (SPS)** .

NOTE: The Service Fast Learn Adapts procedure must be performed when one of the following repairs have been made to the vehicle. Failure to perform the procedure after one of the following repairs may result in poor transmission performance, as well as transmission DTCs being set:

- Transmission internal service/overhaul
- Valve body repair or replacement
- Control solenoid valve assembly replacement
- TCM software/calibration update

- Any service in response to a shift quality concern

16. Perform the Reset Transmission Adapts. Refer to Reset Transmission Adapts .

CONTROL VALVE LOWER BODY AND UPPER BODY REPLACEMENT

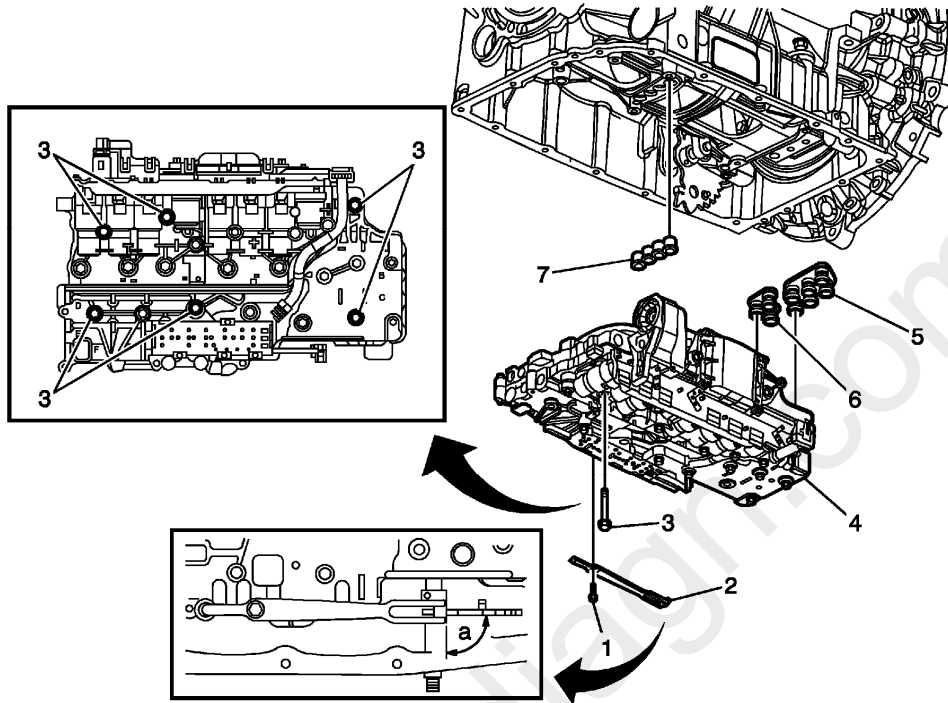


Fig. 55: Control Valve Lower Body and Upper Body Component View
Courtesy of GENERAL MOTORS COMPANY

Control Valve Lower Body and Upper Body Replacement

Callout	Component Name
Preliminary Procedures	
1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> . 2. Remove the transmission fluid pan, gasket and filter. Refer to <u>Automatic Transmission Fluid, Fluid Pan and/or Filter Replacement</u> . 3. Remove the electrical connector sleeve. Refer to <u>Automatic Transmission Electrical Connector Passage Sleeve Replacement</u> .	
1	Manual Shaft Detent Assembly Bolt CAUTION: Refer to <u>Fastener Caution</u> . Tighten

	12 (106 lb in)
2	Manual Shaft Detent Assembly NOTE: Ensure the manual shaft detent assembly roller is centered (a) over the manual shaft detent lever assembly. Failure to center the roller may cause hard or no shift lever operation.
3	Control Valve Assembly Bolt (Qty: 6) NOTE: - Do not remove all the bolts in the control valve body assembly. Remove only the bolts indicated. - Tighten the bolts in the proper order. Refer to <u>Control Valve Body Assembly Installation</u> . Tighten 8 (71 lb in)
4	Control Valve Assembly NOTE: - For control valve body disassembly, refer to <u>Control Valve Body Assembly Disassemble</u> . - For control valve body cleaning and inspection, refer to <u>Control Valve Lower Body Assembly Cleaning and Inspection</u> , and <u>Control Valve Upper Body Assembly Cleaning and Inspection</u> . - For ball check valve locations, refer to <u>Ball Check Valve Locations</u> . - For control valve body assembly, refer to <u>Control Valve Body Assembly Assemble</u> . - Align the manual shift shaft position switch activator slide with the detent lever guide pin during control valve body installation.
5	Fluid Pump Seal Assembly NOTE: Do not reuse the seal assembly.
6	Fluid Pump Seal Assembly NOTE: Do not reuse the seal assembly.
7	Center Support Fluid Passage Seal Assembly NOTE: - Do not reuse the seal assembly. - It is recommended that transmission adaptive pressure (TAP) information be

reset. Resetting the TAP values using a scan tool will erase all learned values in all cells. As a result, the engine control module (ECM), powertrain control module (PCM) or transmission control module (TCM) will need to relearn TAP values. Transmission performance may be affected as new TAP values are learned. Reset the TAP values. Refer to Transmission Adaptive Functions .

INPUT AND OUTPUT SPEED SENSOR REPLACEMENT

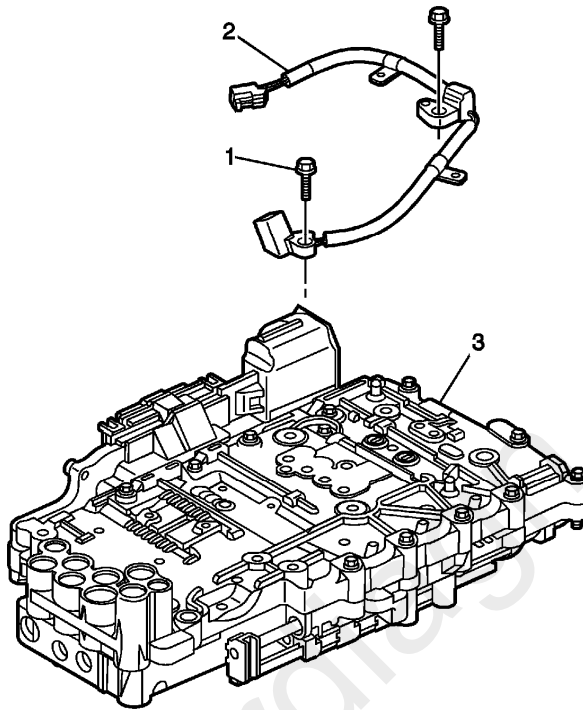


Fig. 56: Input and Output Speed Sensor Component View
Courtesy of GENERAL MOTORS COMPANY

Input and Output Speed Sensor Replacement

Callout	Component Name
Preliminary Procedures	
1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> . 2. Remove the transmission fluid pan and filter. Refer to <u>Automatic Transmission Fluid, Fluid Pan and/or Filter Replacement</u>. 3. Remove the upper and lower valve body assembly. Refer to <u>Control Valve Lower Body and Upper Body Replacement</u>. 4. Disconnect the speed sensor electrical connector from the control solenoid valve assembly.	
1	Input and Output Speed Sensor Assembly Bolt (Qty: 2) CAUTION: Refer to <u>Fastener Caution</u> .

	Tighten 12 (106 lb in)
2	Input and Output Speed Sensor Assembly Procedure Disconnect the speed sensor wiring harness clips. Inspect the clips for damage. Replace if damaged.
3	Control Valve Body Assembly

TRANSMISSION REPLACEMENT (LTG)

Special Tools

J-21366 Torque Converter Holding Strap

For equivalent regional tools, refer to **Special Tools** .

Removal Procedure

1. Remove the right hood strut. Refer to **Hood Strut Replacement** .
2. Remove the outer fuel pump insulator. Refer to **Fuel Pump Insulator Replacement (Inner)** , **Fuel Pump Insulator Replacement (Outer)** .
3. Raise and suitably support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
4. Remove the starter motor. Refer to **Starter Replacement (LTG)** .
5. Remove the rear propeller shaft. Refer to **Two-Piece Propeller Shaft Replacement (LTG, LCV, LKW)** .
6. If equipped with AWD, remove the front propeller shaft. Refer to **Front Axle Propeller Shaft Replacement** .
7. Remove the catalytic converter. Refer to **Catalytic Converter Replacement (LTG)** .
8. Disconnect the wiring harness and connectors from the transmission.
9. Disconnect the wiring harness and connectors from the transfer case, if equipped.

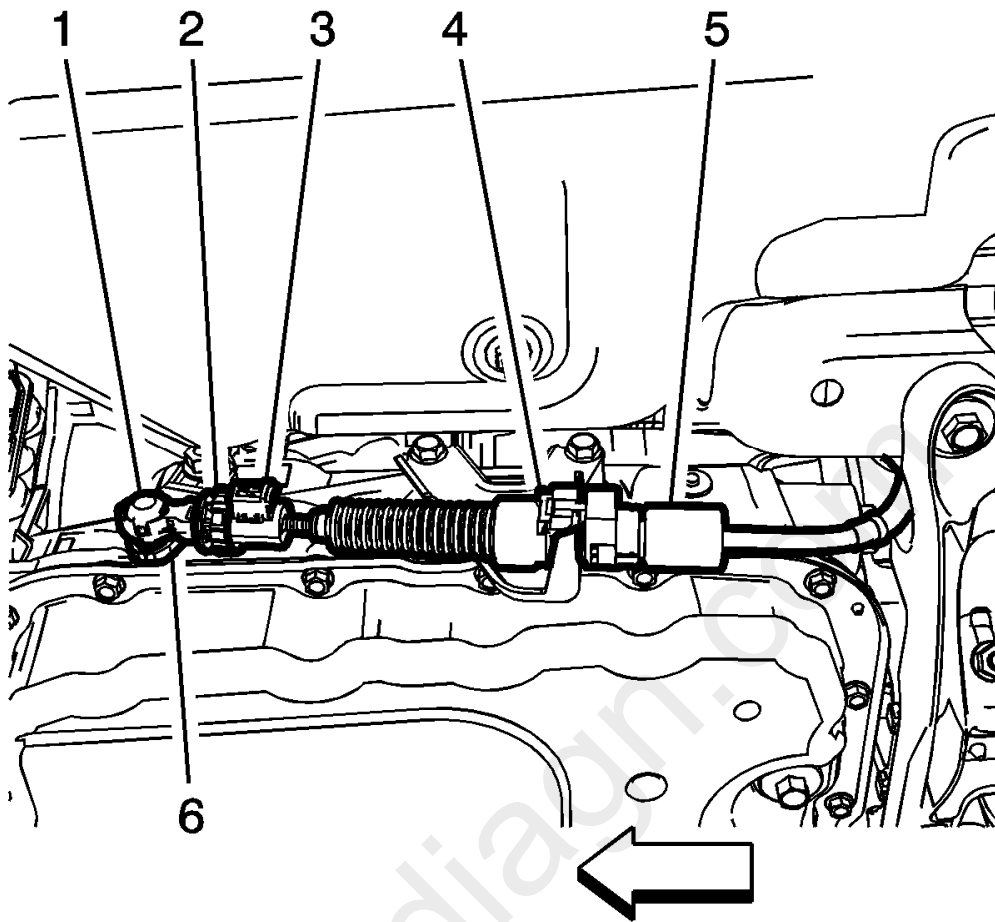


Fig. 57: Range Selector Lever Cable
Courtesy of GENERAL MOTORS COMPANY

10. Disconnect the transmission range selector lever cable terminal (1) from the transmission manual shift lever pin (6).
11. Slide the retainer (4) forward to release the transmission range selector lever cable from the bracket.
12. Remove the transmission range selector lever cable bracket, if necessary.

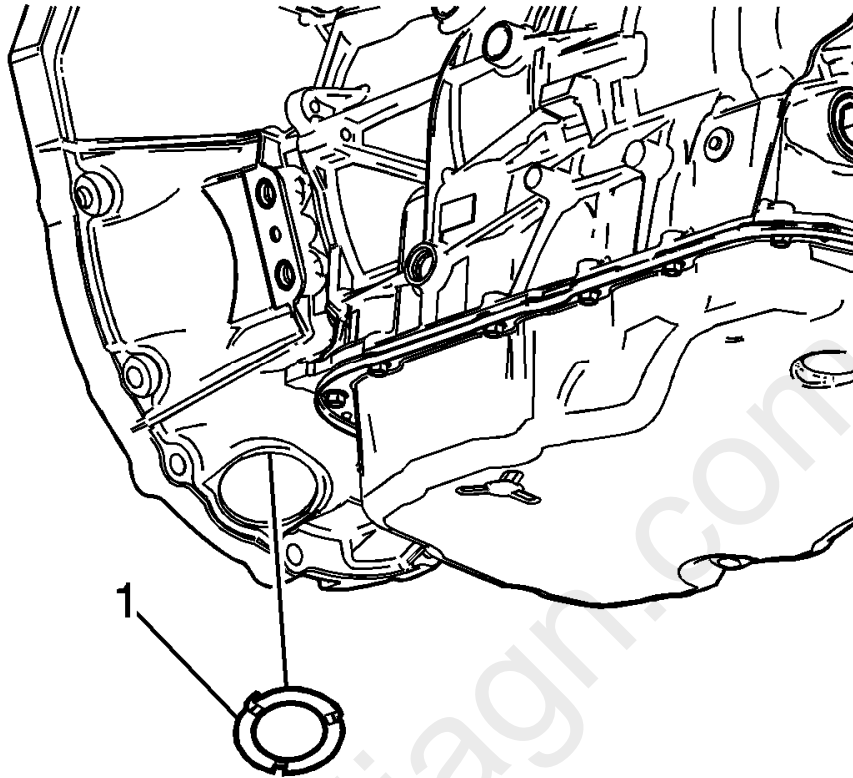


Fig. 58: Identifying Transmission Close Out Plug
Courtesy of GENERAL MOTORS COMPANY

13. Remove the transmission close out plug (1).
14. Mark the torque converter to flexplate/flywheel orientation to ensure proper realignment.

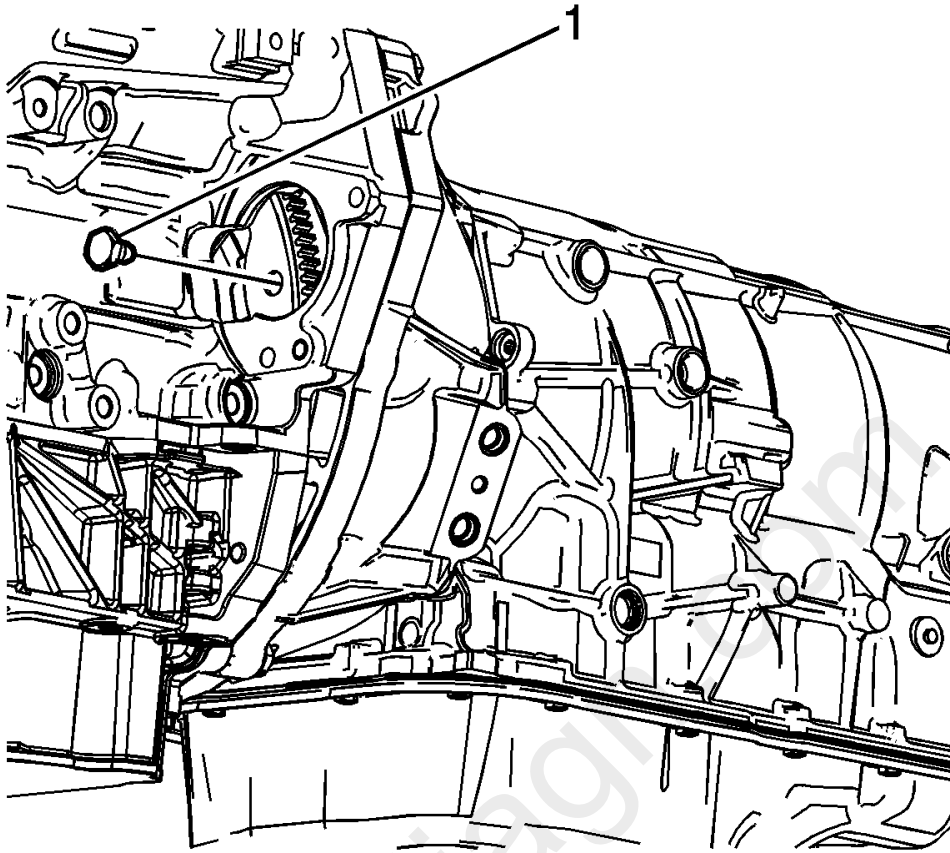


Fig. 59: Identifying Torque Converter Bolts
Courtesy of GENERAL MOTORS COMPANY

15. Repeat the following steps for all torque converter bolts (1):
 1. Rotate the harmonic balancer center bolt clockwise ONLY, in order to align the torque converter bolt with the starter opening.
 2. Remove and discard the torque converter bolt.
16. Place an oil drain pan under the transmission fluid cooler pipes.
17. Remove the transmission fluid cooler inlet and outlet pipe from the transmission, and position aside. Refer to **Transmission Fluid Cooler Inlet and Outlet Pipe Replacement (LFX, LTG MYA with V03)** , **Transmission Fluid Cooler Inlet and Outlet Pipe Replacement (LFX, LTG MYA without V03)** .
18. Plug the open outlet ports to prevent fluid loss and contamination.
19. Support the transmission with a transmission jack.
20. Remove the transmission support. Refer to **Transmission Support Replacement (RWD)** , **Transmission Support Replacement (AWD)** .
21. Lower the transmission jack enough to expose the upper transmission to engine bolts.

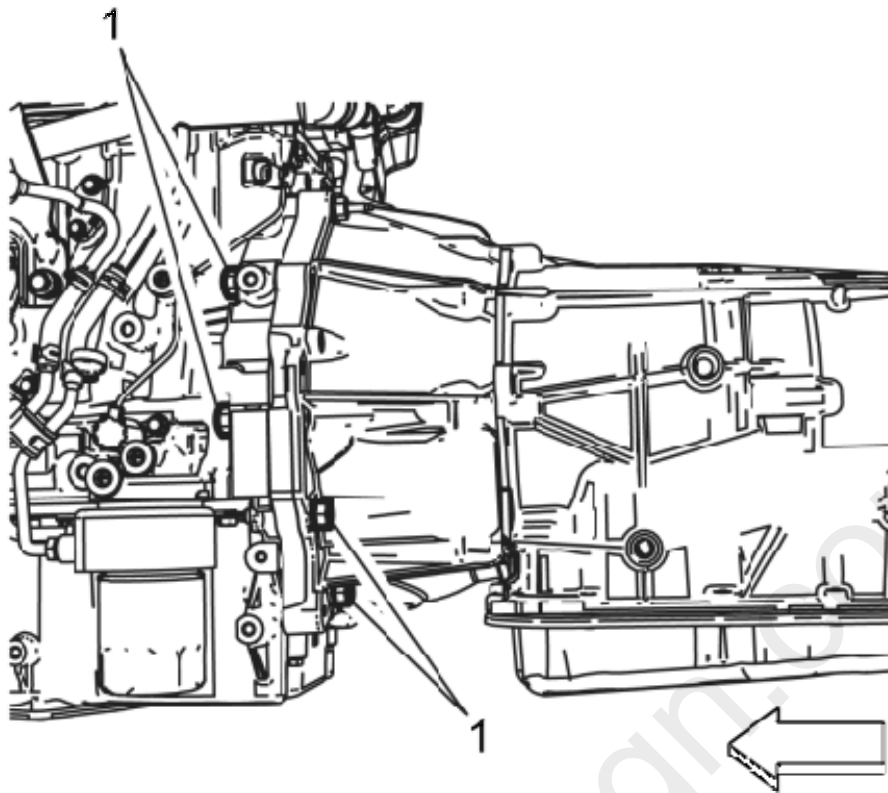


Fig. 60: Left Side Transmission Mounting Bolts
Courtesy of GENERAL MOTORS COMPANY

22. Remove the left side transmission to engine bolts (1).

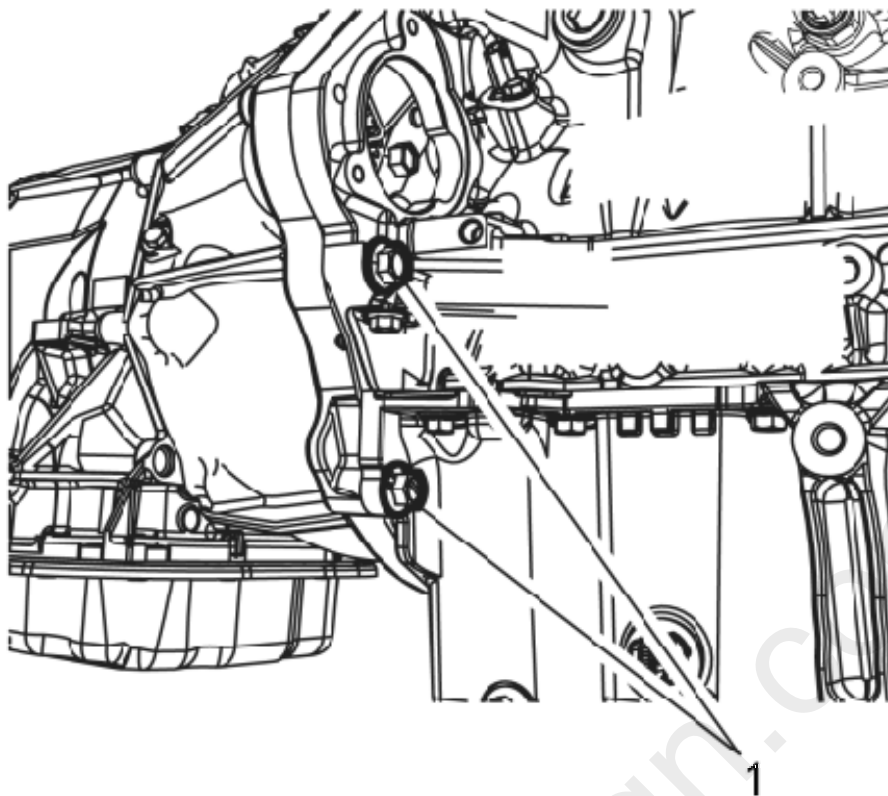


Fig. 61: Right Side Transmission Mounting Bolts
Courtesy of GENERAL MOTORS COMPANY

23. Remove the right side transmission to engine bolts (1).

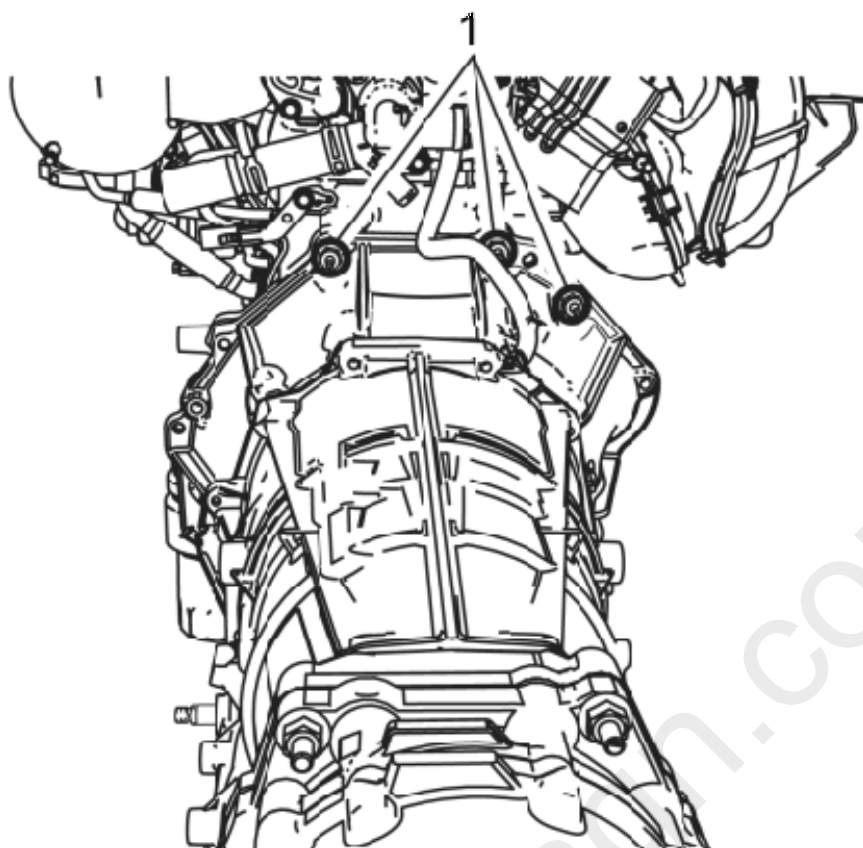


Fig. 62: Upper Transmission Mounting Bolts
Courtesy of GENERAL MOTORS COMPANY

24. Remove the upper transmission to engine bolts (1).
25. Remove the transmission from the vehicle.
26. Install J-21366 holding strap.

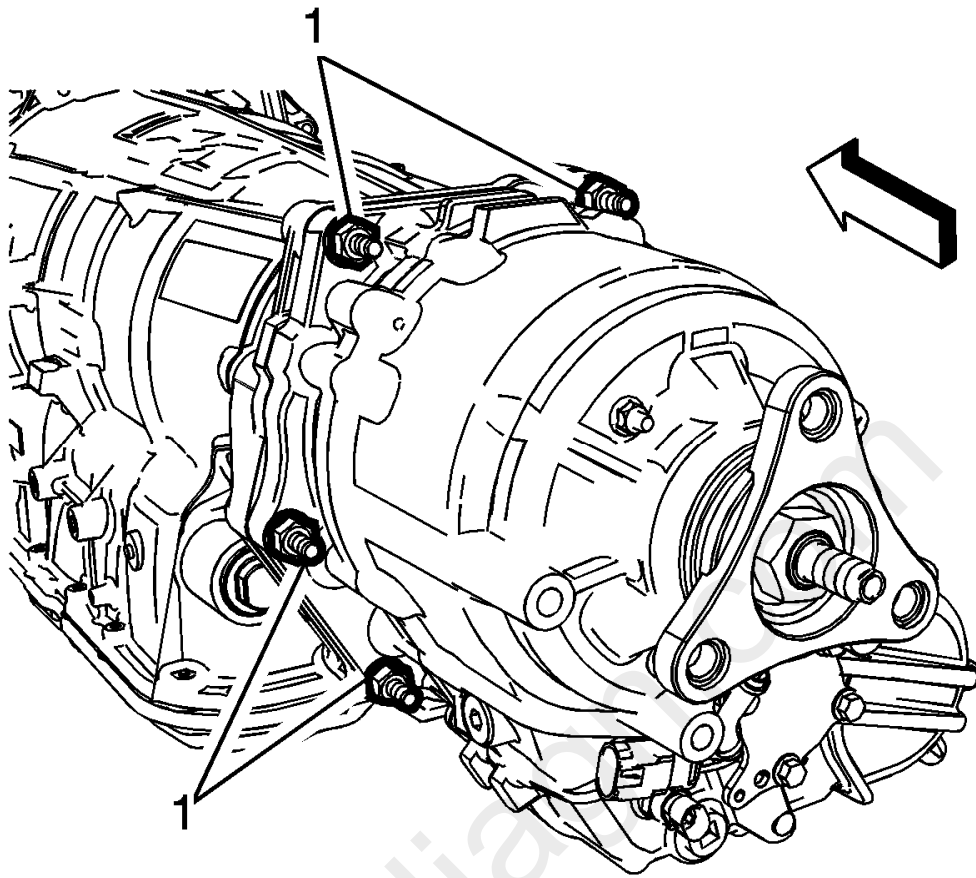


Fig. 63: Four Rear Transfer Case Mounting Fasteners
Courtesy of GENERAL MOTORS COMPANY

27. On AWD vehicles, remove the four rear transfer case mounting fasteners (1).

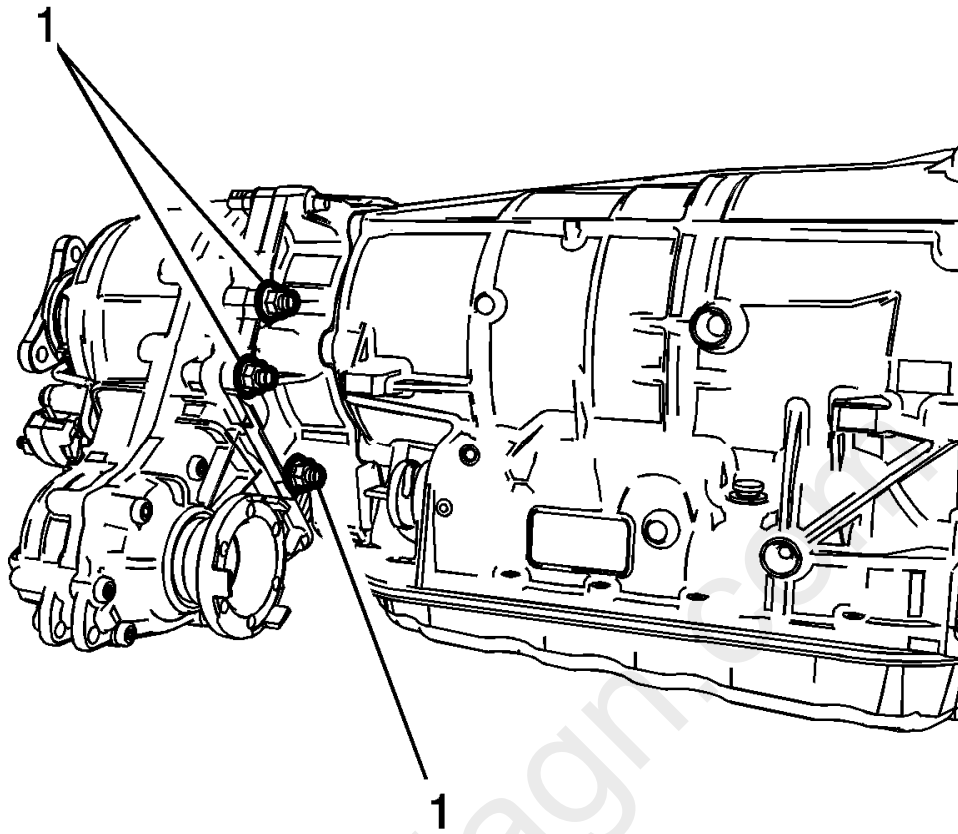


Fig. 64: Three Front Transfer Case Mounting Fasteners
Courtesy of GENERAL MOTORS COMPANY

28. On AWD vehicles, remove the three front transfer case mounting fasteners (1).
29. On AWD vehicles, remove the transfer case from the transmission.
30. Remove and DISCARD the vehicle wiring harness bracket located on the top of the transfer case assembly.
31. Flush and flow test the transmission oil cooler and lines. Refer to **Transmission Fluid Cooler Flushing and Flow Test (6L45)** , **Transmission Fluid Cooler Flushing and Flow Test (TL-80SN)** .

Installation Procedure

1. Install the NEW vehicle wiring harness bracket located on the top of the transfer case assembly.
2. On AWD vehicles, position the transfer case to the transmission.

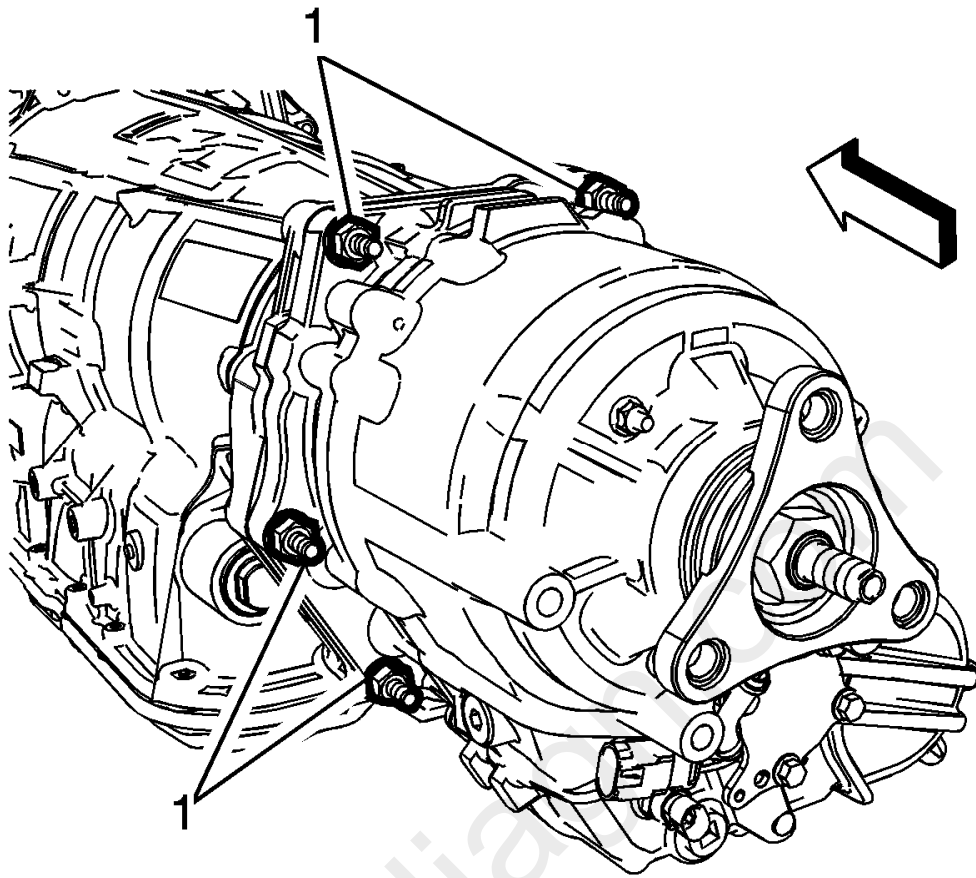


Fig. 65: Four Rear Transfer Case Mounting Fasteners
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to Fastener Caution .

3. On AWD vehicles, install the four rear transfer case mounting fasteners (1) and tighten to 50 (37 lb ft).

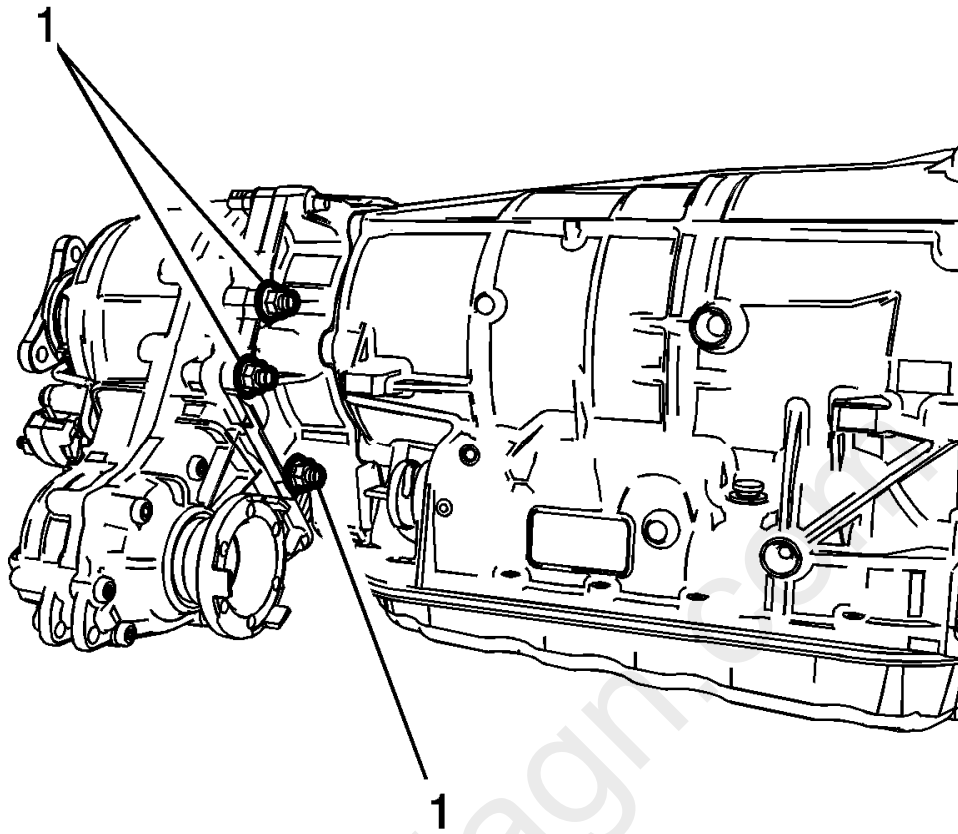


Fig. 66: Three Front Transfer Case Mounting Fasteners
Courtesy of GENERAL MOTORS COMPANY

4. On AWD vehicles, install the three front transfer case mounting fasteners (1) and tighten to 50 (37 lb ft).
5. Remove J-21366 holding strap.
6. Install the transmission to the vehicle.

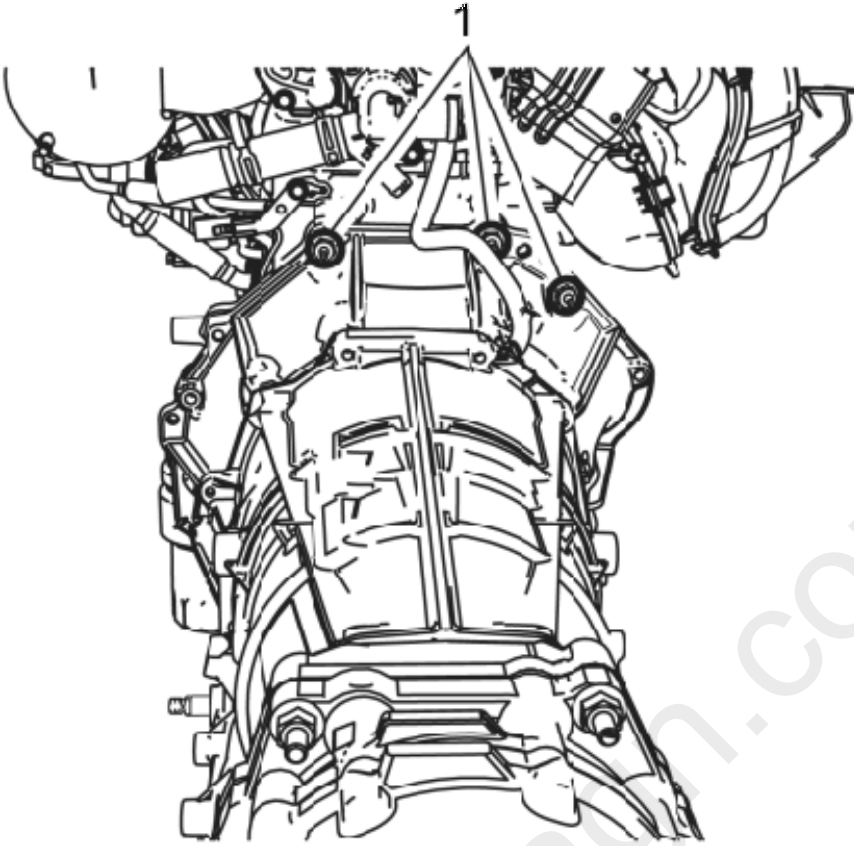


Fig. 67: Upper Transmission Mounting Bolts
Courtesy of GENERAL MOTORS COMPANY

7. Install the upper transmission to engine bolts (1) and tighten to 50 (37 lb ft).

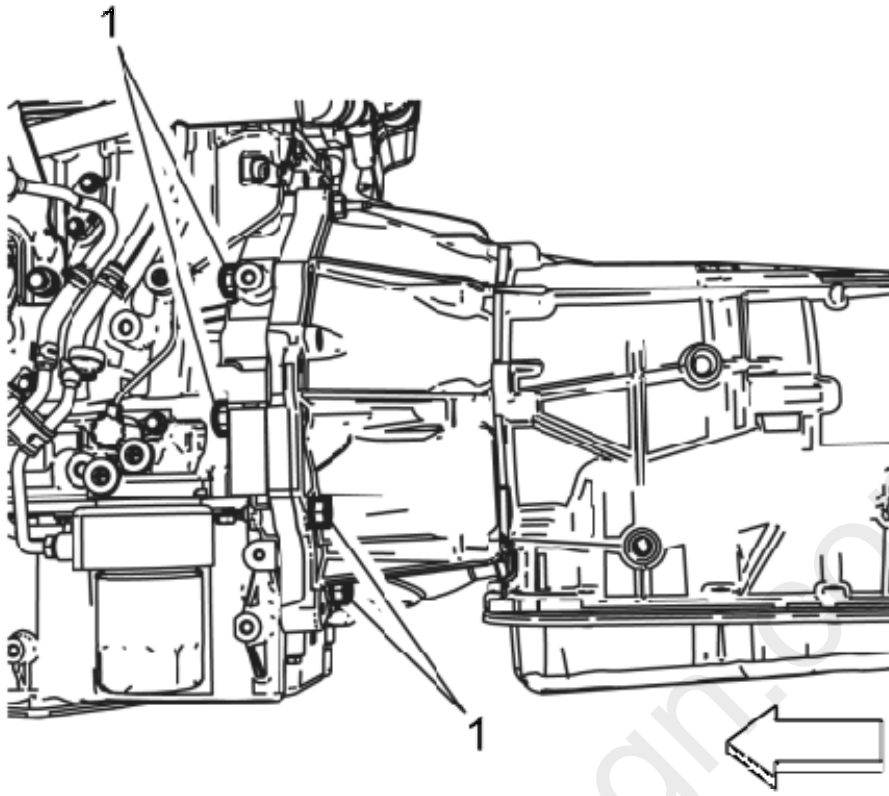


Fig. 68: Left Side Transmission Mounting Bolts
Courtesy of GENERAL MOTORS COMPANY

8. Install the left side transmission to engine bolts (1) and tighten to 50 (37 lb ft).

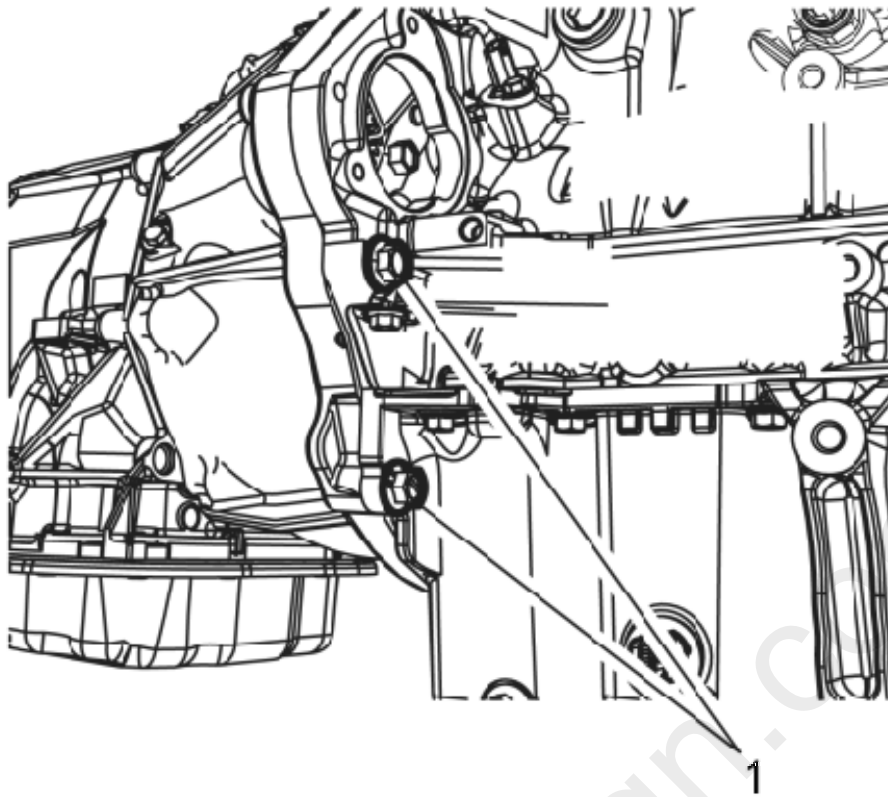


Fig. 69: Right Side Transmission Mounting Bolts
Courtesy of GENERAL MOTORS COMPANY

9. Remove the right side transmission to engine bolts (1) and tighten to 50 (37 lb ft).
10. Install the transmission support. Refer to **Transmission Support Replacement (RWD)** , **Transmission Support Replacement (AWD)** .
11. Using a small pry bar through the access hole in the case, move the torque converter toward the flexplate.

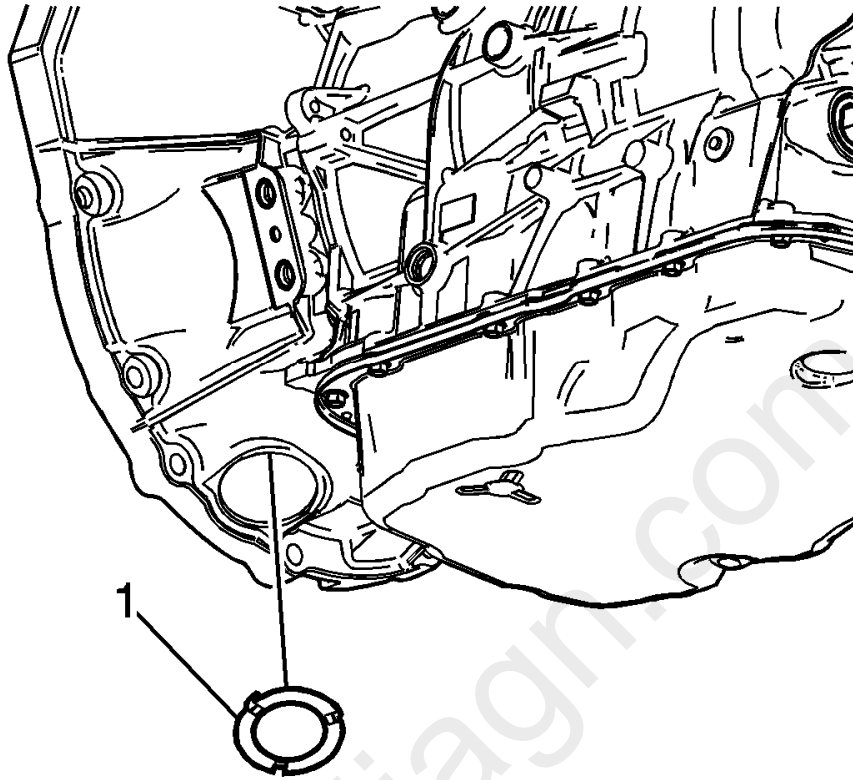


Fig. 70: Identifying Transmission Close Out Plug
Courtesy of GENERAL MOTORS COMPANY

12. Install the transmission close out plug (1).
13. Align the torque converter to flexplate orientation marks made during the removal procedure.

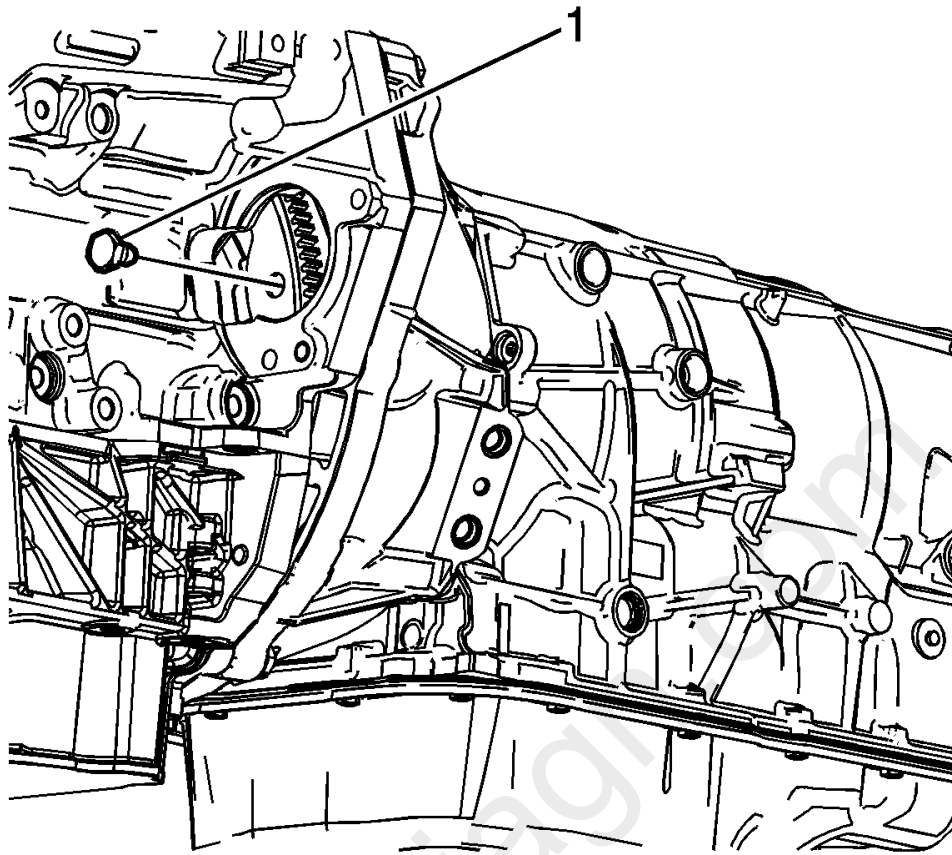


Fig. 71: Identifying Torque Converter Bolts
 Courtesy of GENERAL MOTORS COMPANY

NOTE: Torque converter bolts are self locking and must be replaced with NEW torque converter bolts every time the bolts are removed.

14. Complete the following steps for all torque converter bolts (1):
 1. Rotate the harmonic balancer center bolt clockwise ONLY, in order to align the torque converter bolt holes in the flexplate with the starter opening in the engine block.
 2. Install all NEW torque converter bolts (1) and tighten to 63 (46 lb ft).
15. Install the transmission fluid cooler inlet and outlet pipe to the transmission. Refer to **Transmission Fluid Cooler Inlet and Outlet Pipe Replacement (LFX, LTG MYA with V03)** , **Transmission Fluid Cooler Inlet and Outlet Pipe Replacement (LFX, LTG MYA without V03)** .
16. Install the catalytic converter. Refer to **Catalytic Converter Replacement (LTG)** .
17. If equipped with AWD, install the front propeller shaft. Refer to **Front Axle Propeller Shaft Replacement** .
18. Install the rear propeller shaft. Refer to **Two-Piece Propeller Shaft Replacement (LTG, LCV, LKW)** .

19. Connect the wiring harness and connectors to the transfer case, if equipped.
20. Connect the wiring harness and connectors to the transmission.
21. If removed, install the range selector cable lever and tighten the nut:
 - AWD: 20 (15 lb ft)
 - RWD: 15 (11 lb ft)
22. If removed, install the transmission range selector lever cable bracket and tighten to 22 (16 lb ft).

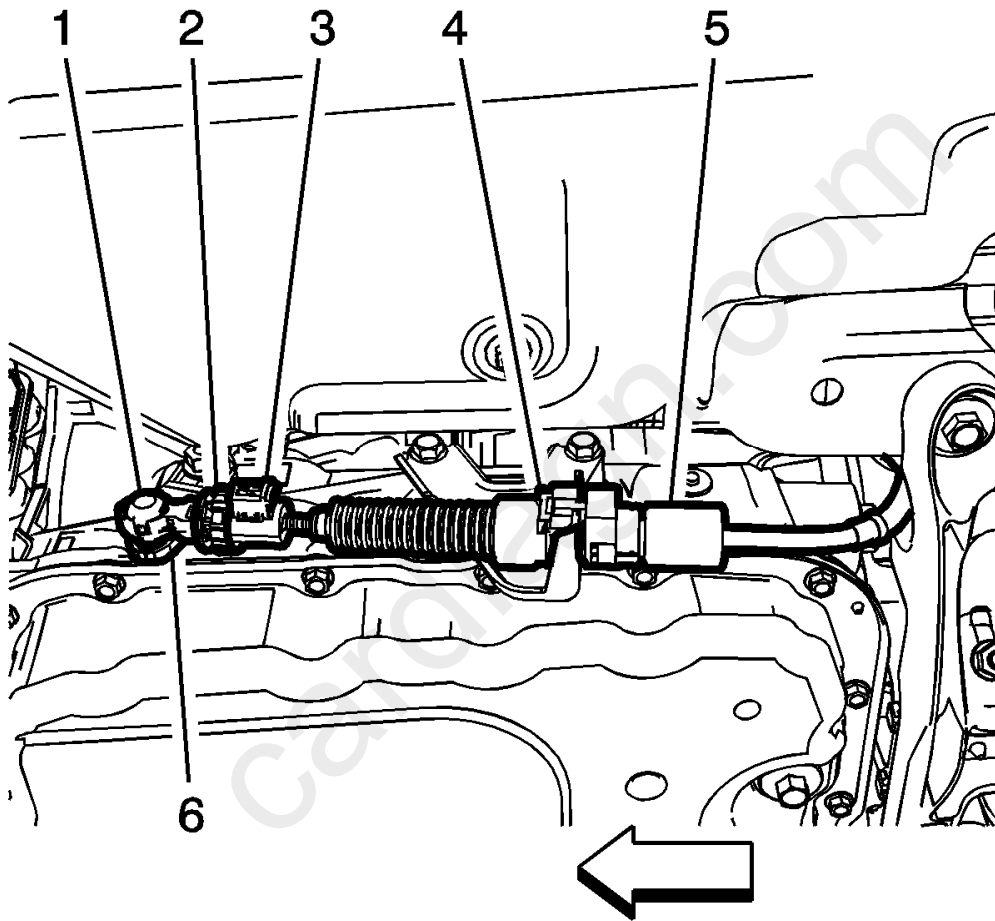


Fig. 72: Range Selector Lever Cable
Courtesy of GENERAL MOTORS COMPANY

23. Connect the transmission range selector lever cable terminal (1) to the transmission manual shift lever pin (6).
24. Install the cable in the bracket, then slide the retainer (4) forward to lock the transmission range selector lever cable in the bracket.
25. Adjust the cable. Refer to **Range Selector Lever Cable Adjustment**.
26. Install the starter motor. Refer to **Starter Replacement (LTG)**.

27. Lower the vehicle.
28. Install the fuel pump insulator. Refer to **Fuel Pump Insulator Replacement (Inner)** , **Fuel Pump Insulator Replacement (Outer)** .
29. Install the right hood strut. Refer to **Hood Strut Replacement** .
30. Check the transmission fluid level and fill if necessary. Refer to **Transmission Fluid Level and Condition Check** .
31. If a NEW TCM has been installed into the vehicle, the NEW module needs to be reprogrammed. Refer to **Service Programming System (SPS)** .

IMPORTANT: The Reset Transmission Adapts procedure must be performed when one of the following repairs have been made to the vehicle. Failure to perform the procedure after one of the following repairs may result in poor transmission performance, as well as transmission DTCs being set:

- Transmission internal service/overhaul
- Valve body repair or replacement
- Control solenoid valve assembly replacement
- TCM software/calibration update
- Any service in response to a shift quality concern

- 32.
33. Perform the Reset Transmission Adapts. Refer to **Reset Transmission Adapts** .
34. Road test the vehicle. Refer to **Road Test** .

TRANSMISSION REPLACEMENT (LFX)

Special Tools

J-21366 Torque Converter Holding Strap

For equivalent regional tools, refer to **Special Tools** .

Removal Procedure

1. Drain the cooling system. Refer to **Cooling System Draining and Filling (Static Fill)** , **Cooling System Draining and Filling (GE 47716)** .

NOTE: It is not necessary to remove the thermostat housing completely.

2. Remove the thermostat housing and reposition to gain access to the top transmission to engine fastener. Refer to **Engine Coolant Thermostat Housing Replacement (LFX, LF3)** .
3. Disconnect the engine wire harness retainers at the rear of the engine and reposition the harness to improve access.

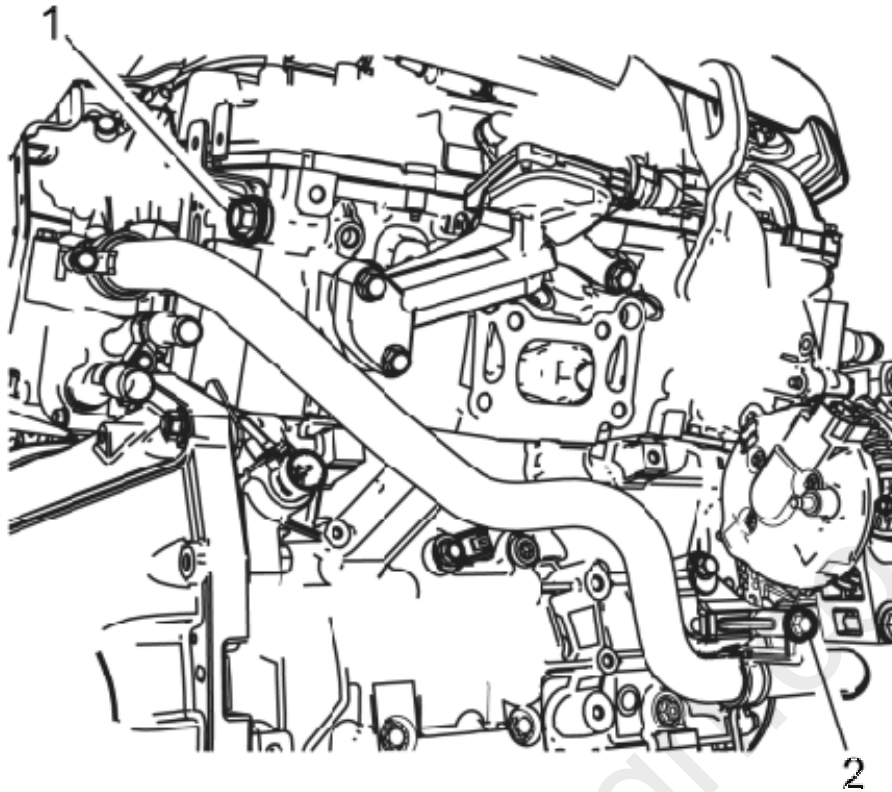


Fig. 73: Radiator Outlet Pipe Retaining Bracket Fastener
Courtesy of GENERAL MOTORS COMPANY

4. Remove the radiator outlet pipe retaining bracket fastener (1) on the rear of the cylinder head.
5. Raise and suitably support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
6. Remove the front compartment lower noise shield. Refer to **Front Compartment Lower Noise Shield Replacement (AWD)** , **Front Compartment Lower Noise Shield Replacement (RWD)** .
7. Remove the radiator outlet pipe clamp fastener on the generator bracket (2).
8. Remove the starter motor. Refer to **Starter Replacement (LFX)** .
9. Remove the rear propeller shaft. Refer to **Two-Piece Propeller Shaft Replacement (LFX, LF3)** .
10. If equipped with AWD, remove the front propeller shaft. Refer to **Front Axle Propeller Shaft Replacement** .
11. Disconnect the wiring harness and connectors from the transmission.
12. Disconnect the wiring harness and connectors from the transfer case, if equipped.

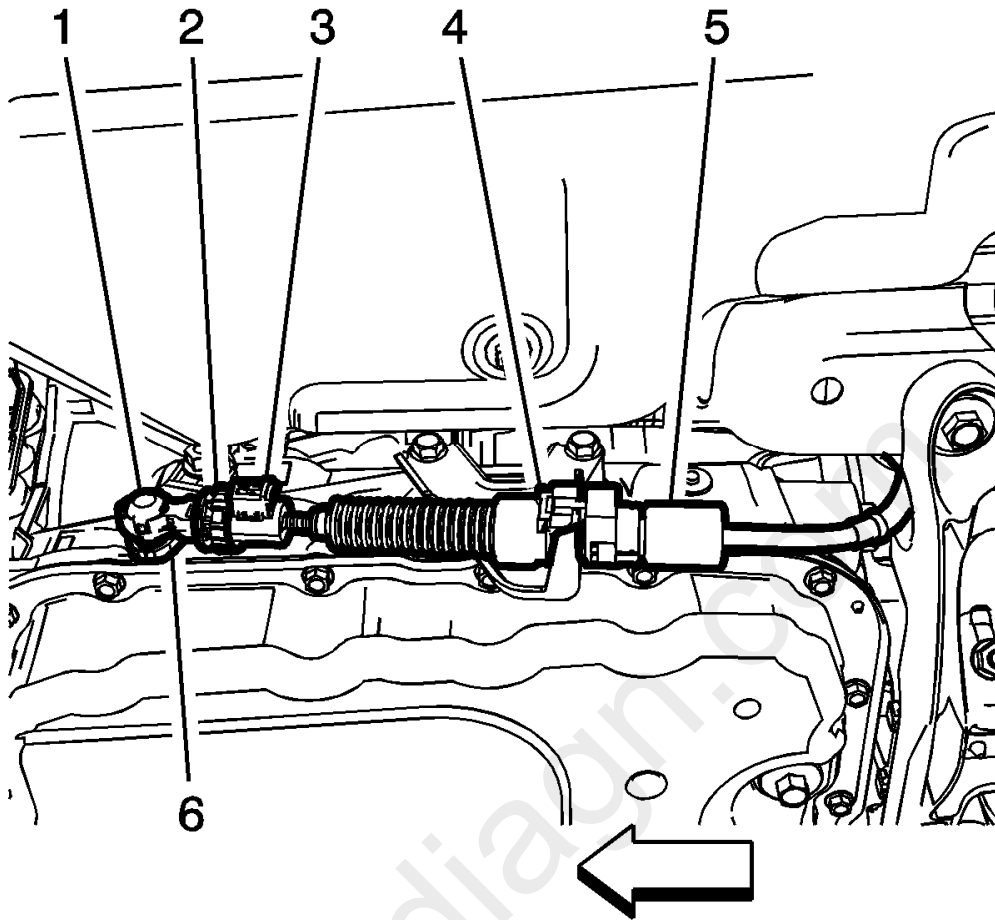


Fig. 74: Range Selector Lever Cable
Courtesy of GENERAL MOTORS COMPANY

13. Disconnect the transmission range selector lever cable terminal (1) from the transmission manual shift lever pin (6).
14. Slide the retainer (4) forward to release the transmission range selector lever cable from the bracket.
15. Remove the transmission range selector lever cable bracket, if necessary.
16. Remove the range selector cable lever, if necessary.

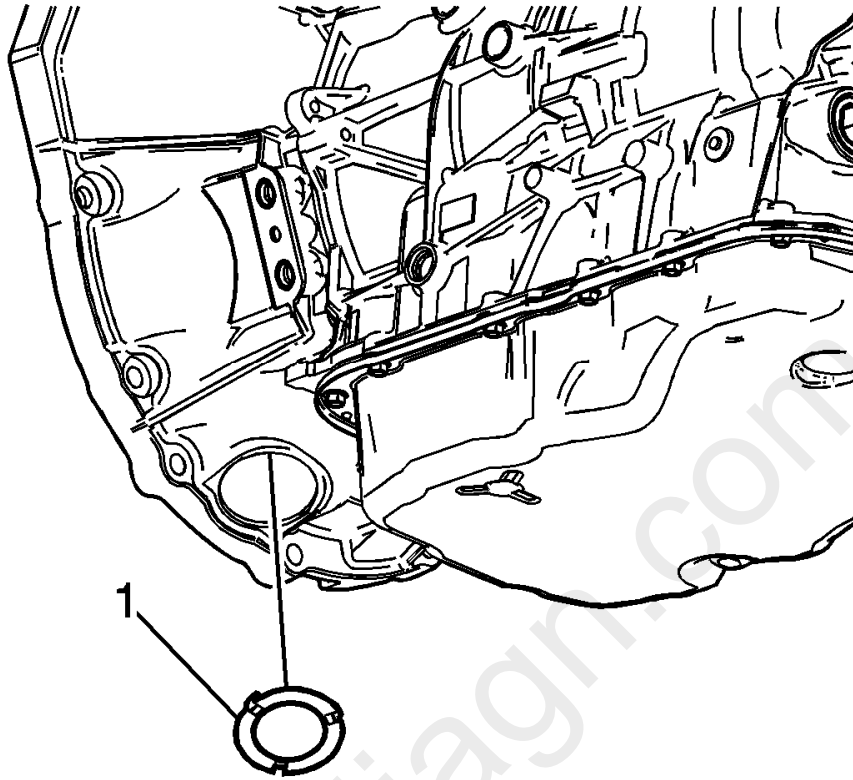


Fig. 75: Identifying Transmission Close Out Plug
Courtesy of GENERAL MOTORS COMPANY

17. Remove the transmission close out plug (1).
18. Mark the torque converter to flexplate/flywheel orientation to ensure proper realignment.

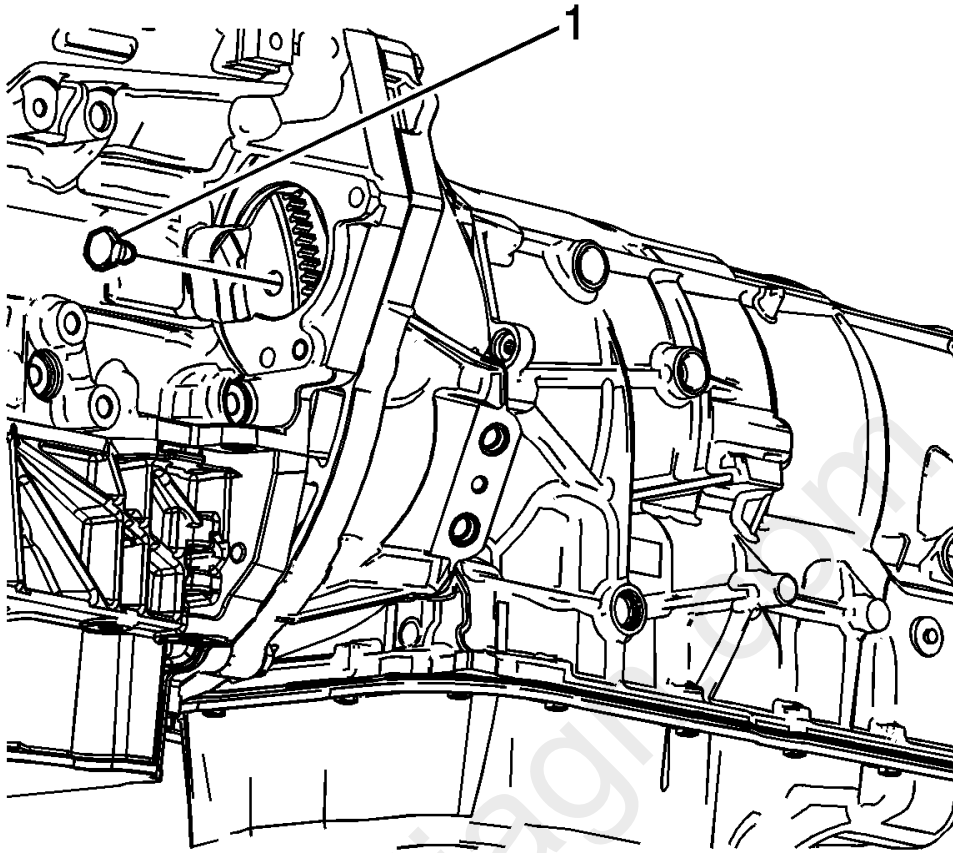


Fig. 76: Identifying Torque Converter Bolts
Courtesy of GENERAL MOTORS COMPANY

19. Repeat the following steps for all torque converter bolts (1):
 1. Rotate the harmonic balancer center bolt clockwise ONLY, in order to align the torque converter bolt with the starter opening.
 2. Remove and discard the torque converter bolt.
20. Place an oil drain pan under the transmission fluid cooler pipes.
21. Remove the transmission fluid cooler inlet and outlet pipe from the transmission, and position aside. Refer to **Transmission Fluid Cooler Inlet and Outlet Pipe Replacement (LFX, LTG MYA with V03)** , **Transmission Fluid Cooler Inlet and Outlet Pipe Replacement (LFX, LTG MYA without V03)** .
22. Plug the open outlet ports to prevent fluid loss and contamination.

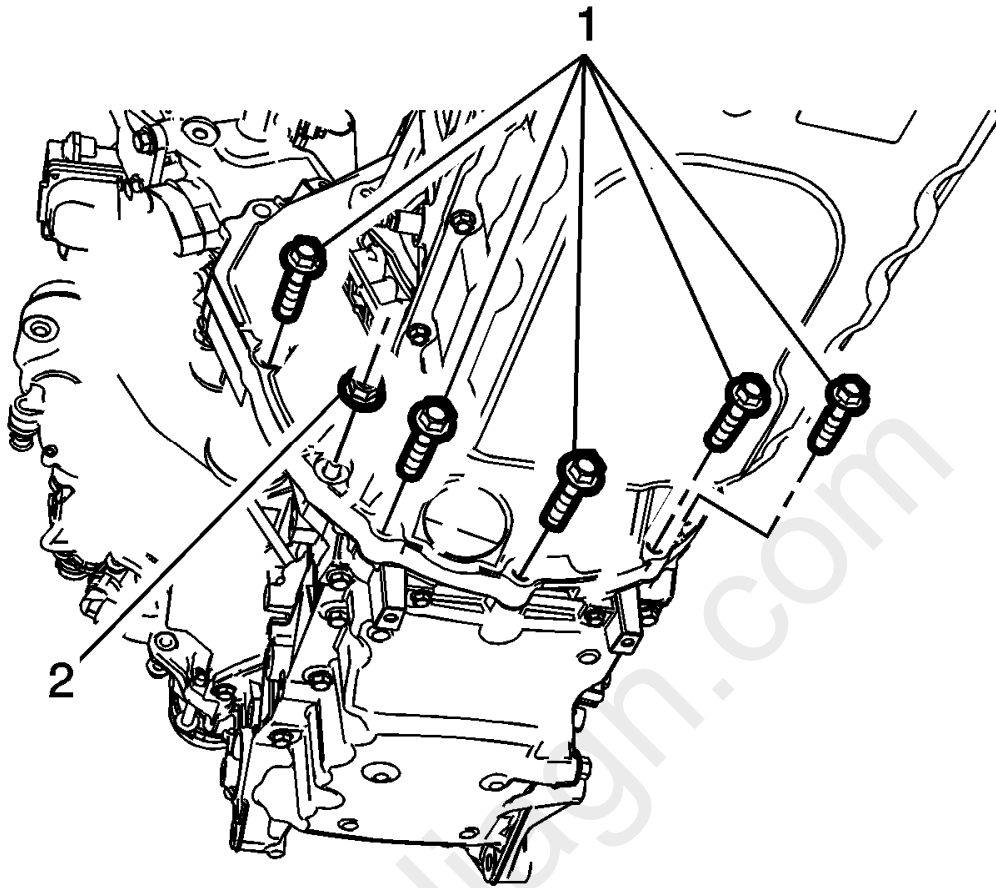


Fig. 77: Transmission Mounting Bolts
Courtesy of GENERAL MOTORS COMPANY

23. Support the transmission with a transmission jack.
24. Remove the transmission support. Refer to **Transmission Support Replacement (RWD)** , **Transmission Support Replacement (AWD)** .
25. Lower the transmission jack enough to expose the upper transmission to engine bolts.
26. Remove the transmission to engine bolts (1) and the nut (2).
27. Remove the transmission from the vehicle.
28. Install J-21366 holding strap.

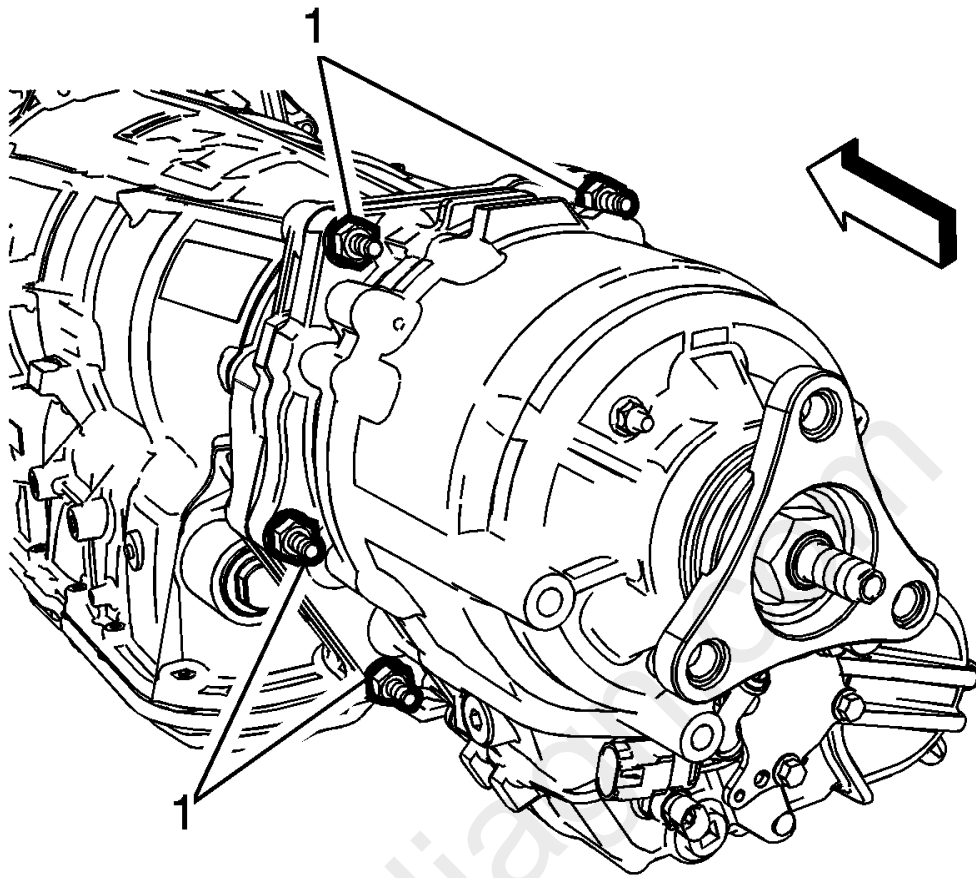


Fig. 78: Four Rear Transfer Case Mounting Fasteners
Courtesy of GENERAL MOTORS COMPANY

29. On AWD vehicles, remove the four rear transfer case mounting fasteners (1).

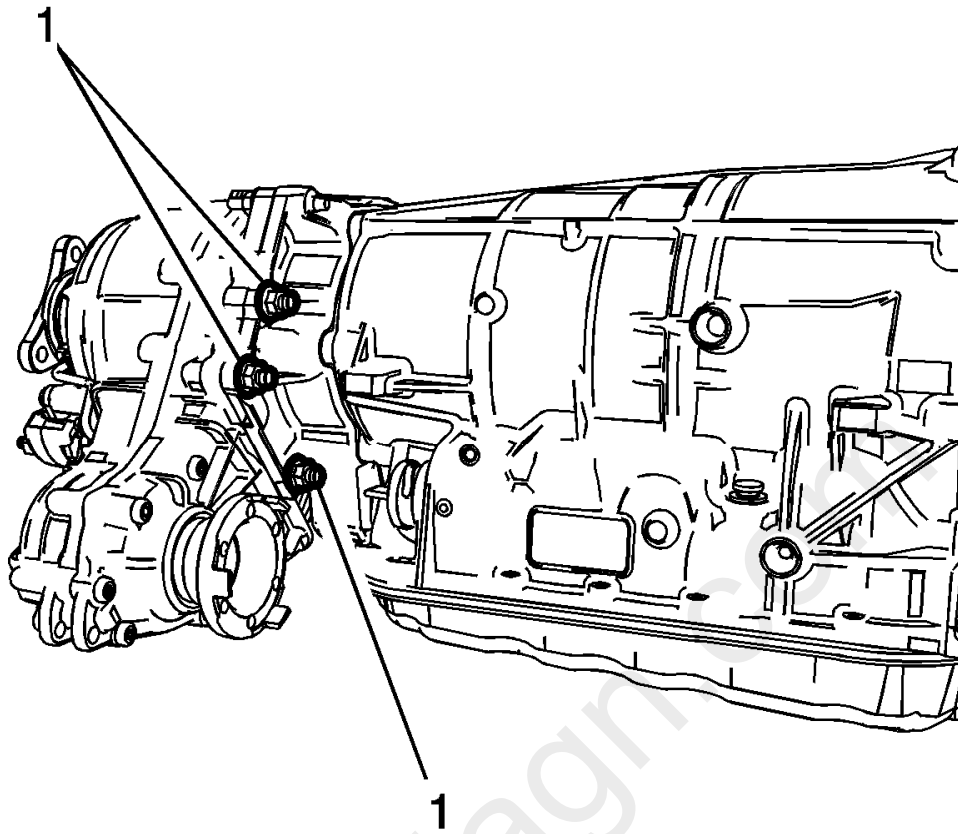


Fig. 79: Three Front Transfer Case Mounting Fasteners
Courtesy of GENERAL MOTORS COMPANY

30. On AWD vehicles, remove the three front transfer case mounting fasteners (1).
31. On AWD vehicles, remove the transfer case from the transmission.
32. Remove and DISCARD the vehicle wiring harness bracket located on the top of the transfer case assembly.
33. Flush and flow test the transmission oil cooler and lines. Refer to **Transmission Fluid Cooler Flushing and Flow Test (6L45)** .

Installation Procedure

1. Install the NEW vehicle wiring harness bracket located on the top of the transfer case assembly.
2. On AWD vehicles, position the transfer case to the transmission.

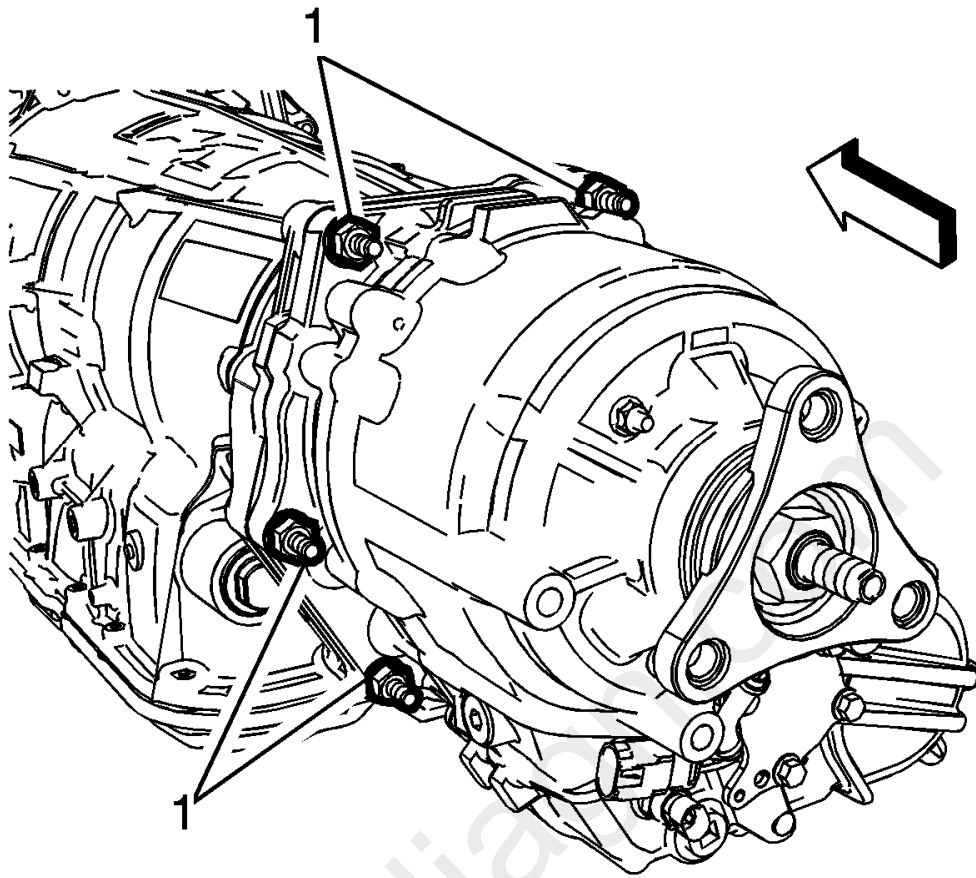


Fig. 80: Four Rear Transfer Case Mounting Fasteners
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to Fastener Caution .

3. On AWD vehicles, install the four rear transfer case mounting fasteners (1) and tighten to 50 (37 lb ft).

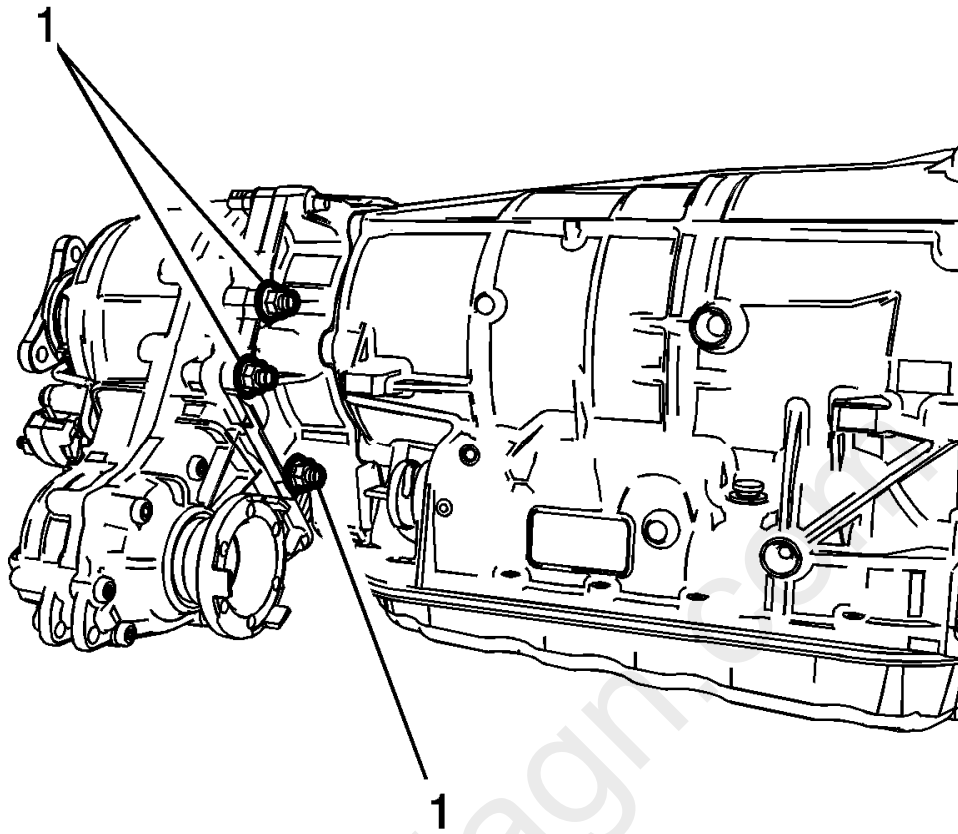


Fig. 81: Three Front Transfer Case Mounting Fasteners
Courtesy of GENERAL MOTORS COMPANY

4. On AWD vehicles, install the three front transfer case mounting fasteners (1) and tighten to 50 (37 lb ft).
5. Remove J-21366 holding strap.
6. Install the transmission to the vehicle.

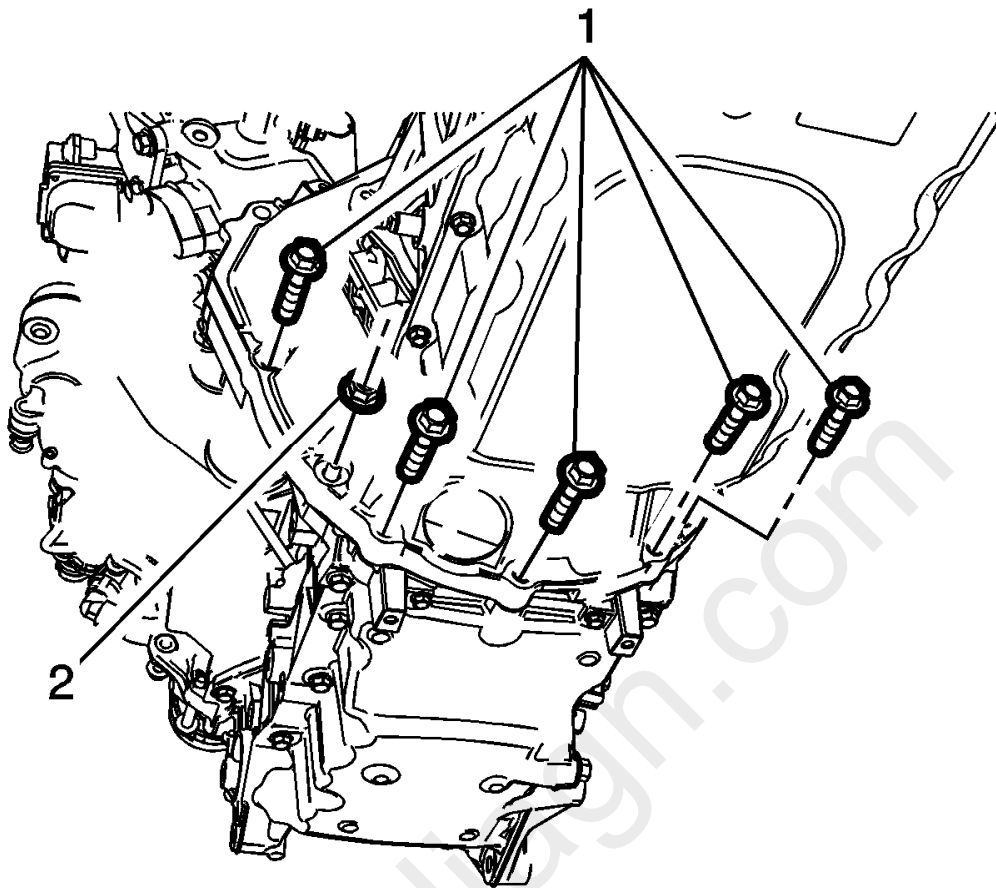


Fig. 82: Transmission Mounting Bolts
Courtesy of GENERAL MOTORS COMPANY

7. Install the transmission to engine bolts (1) and the nut (2) and tighten to 50 (37 lb ft).
8. Install the transmission support. Refer to **Transmission Support Replacement (RWD)** , **Transmission Support Replacement (AWD)** .
9. Using a small pry bar through the access hole in the case, move the torque converter toward the flexplate.

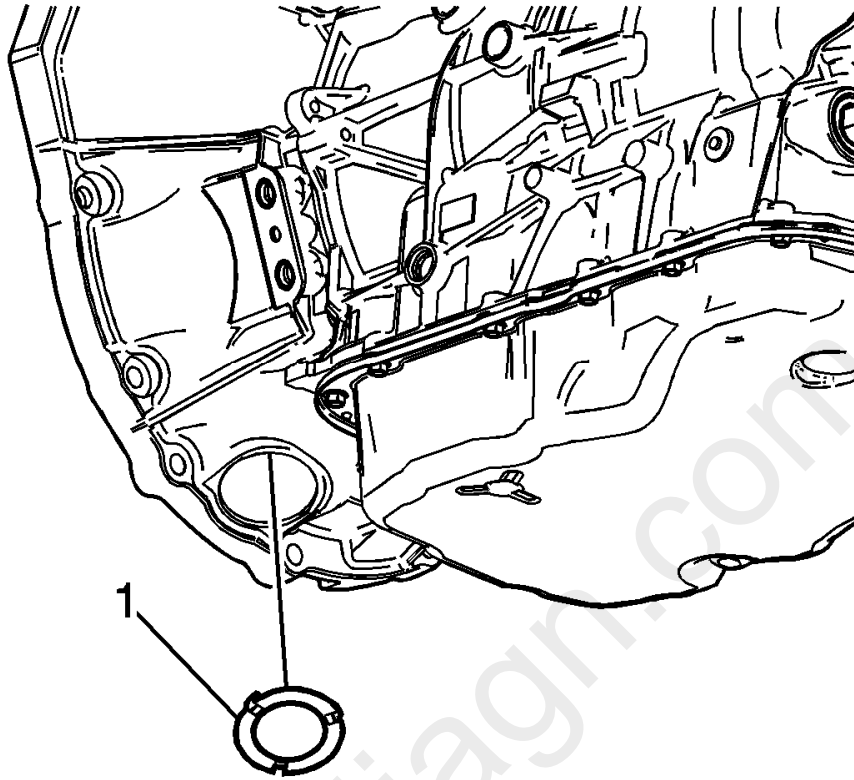


Fig. 83: Identifying Transmission Close Out Plug
Courtesy of GENERAL MOTORS COMPANY

10. Align the torque converter to flexplate orientation marks made during the removal procedure.
11. Install the transmission close out plug (1).

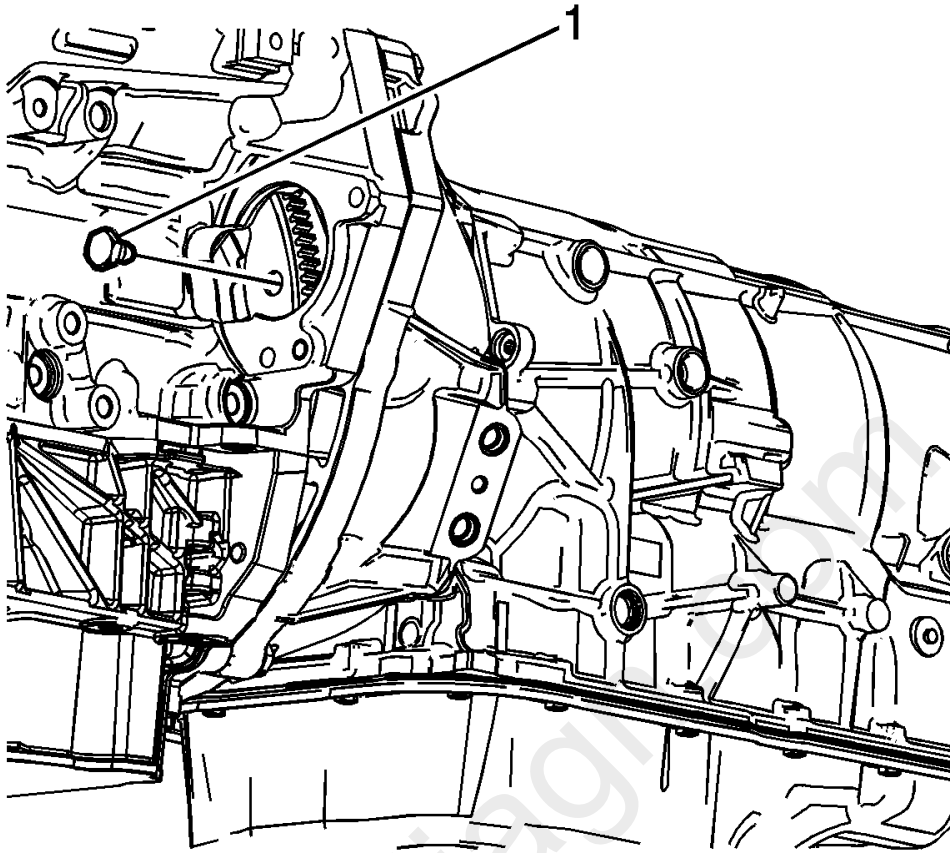


Fig. 84: Identifying Torque Converter Bolts
Courtesy of GENERAL MOTORS COMPANY

NOTE: Torque converter bolts are self locking and must be replaced with NEW torque converter bolts every time the bolts are removed.

12. Complete the following steps for all torque converter bolts (1):
 1. Rotate the harmonic balancer center bolt clockwise ONLY, in order to align the torque converter bolt holes in the flexplate with the starter opening in the engine block.
 2. Install all NEW torque converter bolts (1) and tighten to 63 (46 lb ft).
13. If equipped with AWD, install the front propeller shaft. Refer to **Front Axle Propeller Shaft Replacement** .
14. Install the rear propeller shaft. Refer to **Two-Piece Propeller Shaft Replacement (LFX, LF3)** .
15. Install the transmission fluid cooler inlet and outlet pipe to the transmission. Refer to **Transmission Fluid Cooler Inlet and Outlet Pipe Replacement (LFX, LTG MYA with V03)** , **Transmission Fluid Cooler Inlet and Outlet Pipe Replacement (LFX, LTG MYA without V03)** .
16. Connect the wiring harness and connectors to the transfer case, if equipped.

17. Connect the wiring harness and connectors to the transmission.
18. If removed, install the range selector cable lever and tighten the nut to 30 (22 lb ft).
19. If removed, install the transmission range selector lever cable bracket and tighten to 22 (16 lb ft).

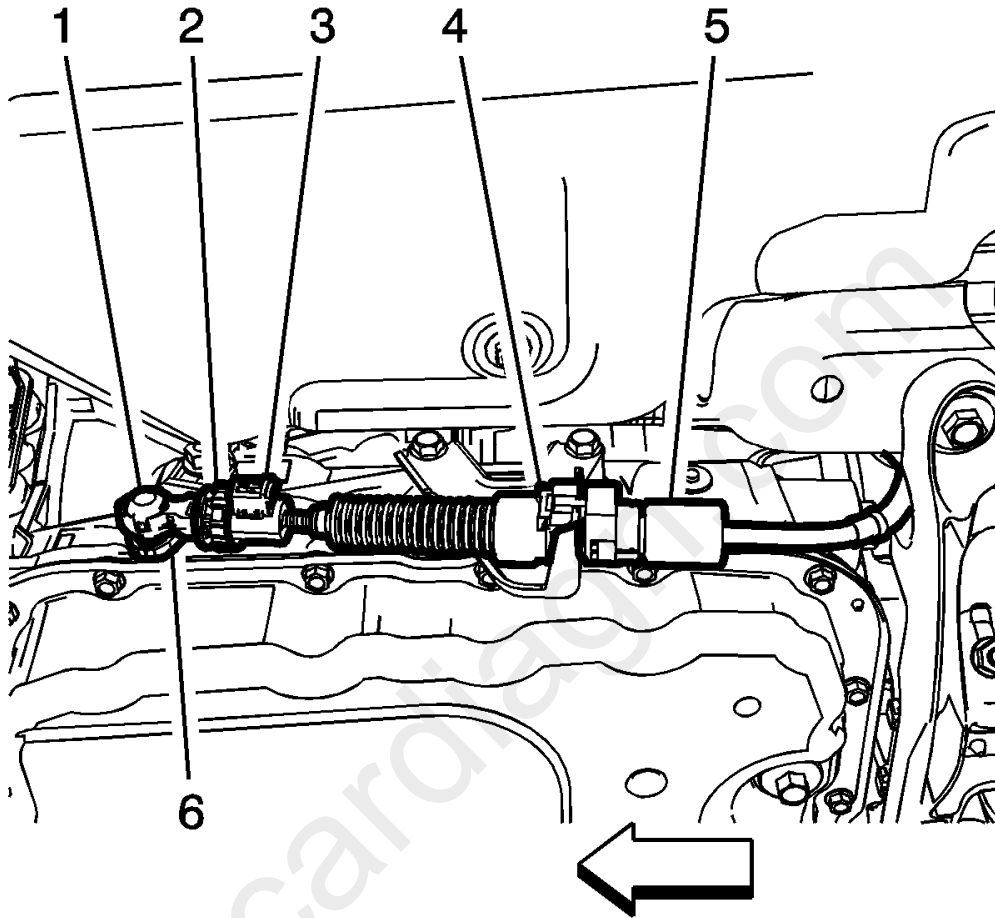


Fig. 85: Range Selector Lever Cable
Courtesy of GENERAL MOTORS COMPANY

20. Connect the transmission range selector lever cable terminal (1) to the transmission manual shift lever pin (6).
21. Install the cable in the bracket, then slide the retainer (4) forward to lock the transmission range selector lever cable in the bracket.
22. Adjust the cable. Refer to **Range Selector Lever Cable Adjustment**.
23. Install the starter motor. Refer to **Starter Replacement (LFX)**.

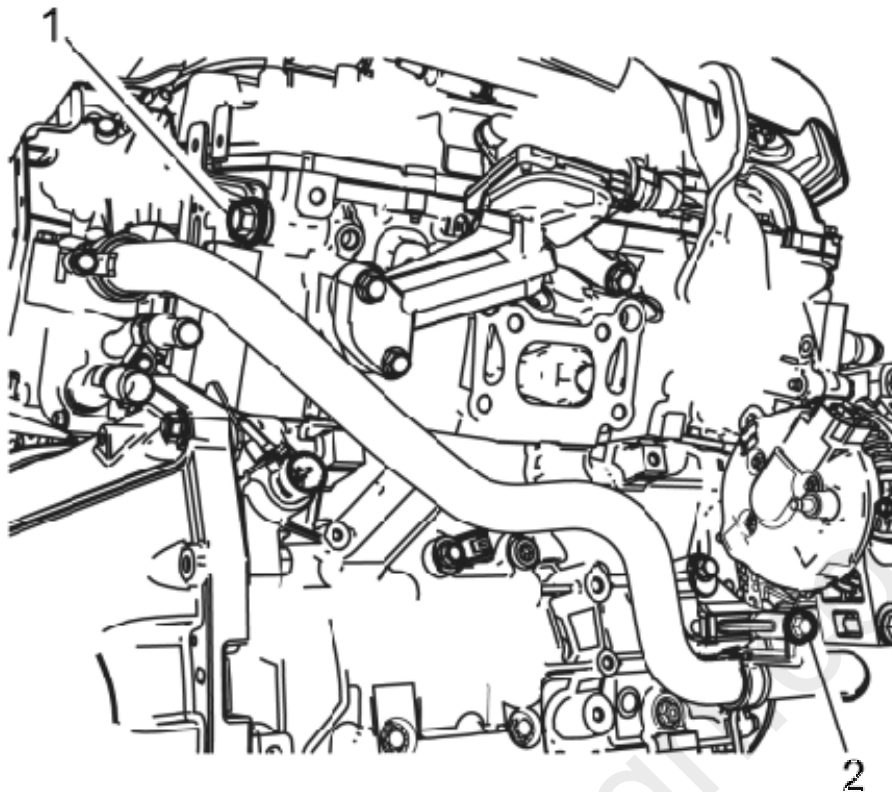


Fig. 86: Radiator Outlet Pipe Retaining Bracket Fastener
 Courtesy of GENERAL MOTORS COMPANY

24. Install and the radiator outlet pipe clamp fastener on the generator bracket (2). Tighten the heater outlet pipe bolt to 22 (16 lb ft).
25. Install the front compartment lower noise shield. Refer to **Front Compartment Lower Noise Shield Replacement (AWD)** , **Front Compartment Lower Noise Shield Replacement (RWD)** .
26. Install and the radiator outlet pipe retaining bracket fastener on the rear of the cylinder head (1). Tighten the heater outlet pipe bolt to 58 (43 lb ft).
27. Install the thermostat housing. Refer to **Engine Coolant Thermostat Housing Replacement (LFX, LF3)** .
28. Reconnect the engine wire harness retainers at the rear of the engine.
29. Fill the cooling system. Refer to **Cooling System Draining and Filling (Static Fill)** , **Cooling System Draining and Filling (GE 47716)** .
30. Check the transmission fluid level and fill if necessary. Refer to **Transmission Fluid Level and Condition Check** .
31. If a NEW TCM has been installed into the vehicle, the NEW module needs to be reprogrammed. Refer to **Service Programming System (SPS)** .

IMPORTANT: The Reset Transmission Adapts procedure must be performed when one of the following repairs have been made to the vehicle. Failure to perform

the procedure after one of the following repairs may result in poor transmission performance, as well as transmission DTCs being set:

- Transmission internal service/overhaul
- Valve body repair or replacement
- Control solenoid valve assembly replacement
- TCM software/calibration update
- Any service in response to a shift quality concern

32.

33. Perform the Reset Transmission Adapts. Refer to **Reset Transmission Adapts** .

34. Road test the vehicle. Refer to **Road Test** .

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