

2018 TRANSMISSION

Automatic Transmission - 6T40 (MNH MNK) Or 6T45 (MHG) - Repair Instructions - On Vehicle

REPAIR INSTRUCTIONS - ON VEHICLE

TRANSMISSION ADAPTIVE VALUES LEARN

Diagnostic Instructions

- Perform the Diagnostic System Check prior to using this diagnostic procedure: [Diagnostic System Check - Vehicle](#)
- Review the description of Strategy Based Diagnosis: [Strategy Based Diagnosis](#)

Description

The learn procedure performs a series of individual clutch applications which allows the control module K71 to learn initial clutch apply pressures. The control module uses the learn values for clutch control and timing of shifts.

When to Perform the Procedure

NOTE: Failure to perform this procedure may result in poor system performance, DTCs being set, or customer dissatisfaction.

This procedure is required when the following component has been repaired, replaced, removed, or serviced:

- Q8 Control Solenoid Valve Assembly
- T12 Automatic Transmission Assembly
- Any condition/repair related to the following: Shift Quality
- Calibration Update or Software Update
- Torque Converter

Conditions for Running the Procedure

- {Generation 2} Transmission Fluid Temperature = 64 to 76Â°C (147 to 169Â°F)
- {Generation 3} Transmission Fluid Temperature = 86 to 106Â°C (187 to 223Â°F)

Reference Information

Scan Tool Reference

[Control Module References](#)

With Scan Tool - Generation 2

WARNING: Refer to [Parking Brake and Drive Wheels Warning](#) .

WARNING: When performing a brake torque procedure, the vehicle must be parked outdoors away from any buildings, people, or other vehicles. Failure to follow these precautions may result in severe vehicle damage, and/or serious bodily injury.

1. Perform the following steps:
 1. Vehicle - Outside
 2. Set the parking brake.

3. Block the drive wheels.
2. Engine - Idling - At normal operating temperature.
3. Transmission Range - P

NOTE: Allow the component to cool if warmer than 76 °C (169 °F).

4. Verify the scan tool parameter: Transmission Fluid Temperature = Warmer than 64 °C (147 °F)
 - **If 64 °C (147 °F) or colder**
 1. Brake Pedal - Applied & Hold
 2. Transmission Range - D
 3. Engine Speed - 1.2k to 1.5k RPM - For 5 s
 4. Engine - Idling - For 10 s
 5. Transmission Range - P
 6. Repeat step 4
 - **Go to next step: If warmer than 64 °C (147 °F)**
5. Transmission Range - N - Wait 10 s before proceeding to the next step.
6. Select: Module Diagnostics
7. Select: Transmission Control Module
8. Select: Configuration/Reset Functions
9. Select: Transmission Adaptive Values Learn
10. Follow the instructions on the scan tool.

Verify the scan tool procedure was successful.

- **If the procedure was not successful**

Refer to: Step 1

- **Go to next step: If the procedure was successful**

11. All OK.

With Scan Tool - Generation 3

WARNING: Refer to [Parking Brake and Drive Wheels Warning](#) .

WARNING: When performing a brake torque procedure, the vehicle must be parked outdoors away from any buildings, people, or other vehicles. Failure to follow these precautions may result in severe vehicle damage, and/or serious bodily injury.

1. Perform the following steps:
 1. Vehicle - Outside
 2. Set the parking brake.
 3. Block the drive wheels.
2. Engine - Idling - At normal operating temperature.
3. Transmission Range - P

NOTE: Allow the component to cool if warmer than 106 °C (223 °F).

4. Verify the scan tool parameter: Transmission Fluid Temperature = Warmer than 86 °C (187 °F)
 - **If 86 °C (187 °F) or colder**
 1. Brake Pedal - Applied & Hold
 2. Transmission Range - D
 3. Engine Speed - 1.2k to 1.5 RPM - For 5 s

4. Engine - Idling - For 10 s

5. Transmission Range - P

6. Repeat step 4

• **Go to next step: If warmer than 86 °C (187°F)**

5. Transmission Range - N - Wait 10 s before proceeding to the next step.

6. Select: Module Diagnostics

7. Select: Transmission Control Module

8. Select: Configuration/Reset Functions

9. Select: Transmission Adaptive Values Learn

10. Follow the instructions on the scan tool.

Verify the scan tool procedure was successful.

• **If the procedure was not successful**

Refer to: Step 1

• **Go to next step: If the procedure was successful**

11. All OK.

Repair Instructions

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

CONNECTOR RECONNECTION - AUTOMATIC TRANSMISSION

Special Tools

EL-35616 Terminal Test Probe Kit

For equivalent regional tools, refer to [Special Tools](#).

When the condition is not currently present, but is indicated in DTC history, the cause may be intermittent. An intermittent may also be the cause when there is a customer complaint, but the symptom cannot be duplicated. Refer to the Symptom Table of the system that is suspect of causing the condition before trying to locate an intermittent condition.

Most intermittent conditions are caused by faulty electrical connections or wiring. Inspect for the following items:

- Loose, corroded, or painted terminal stud/fastener
- Wiring broken inside the insulation
- Poor connection between the male and female terminal at a connector
- A terminal not seated all the way into the connector body
- Poor terminal to wire connection - Some conditions which fall under this description are poor crimps, poor solder joints, crimping over the wire insulation rather than the wire itself, and corrosion in the wire to terminal contact area, etc.
- Pierced or damaged insulation can allow moisture to enter the wiring causing corrosion. The conductor can corrode inside the insulation, with little visible evidence. Look for swollen and stiff sections of wire in the suspect circuits.
- Wiring which has been pinched, cut, or its insulation rubbed through may cause an intermittent open or short as the bare area touches other wiring or parts of the vehicle.
- Wiring that comes in contact with hot or exhaust components
- Refer to [Inducing Intermittent Fault Conditions](#) in order to duplicate the conditions required, in order to verify the customer concern.
- Refer to [Testing for Electrical Intermittents](#) for test procedures to detect intermittent open, high resistance, short to ground, and short to voltage conditions.

- Refer to [Scan Tool Snapshot Procedure](#) for advanced intermittent diagnosis and Vehicle Data Recorder operation.

Testing for Terminal Fretting

Some intermittent conditions can be caused by wire terminal fretting corrosion. Fretting corrosion is a build-up of insulating, oxidized wear debris that can form when there is a small motion between electrical contacts. The oxidized wear debris can pile up enough at the electrical contact spots that the electrical resistance across the connection increases. Movement between the contacting surfaces as small as 10 to 100 microns can cause fretting. To put this in perspective, a sheet of paper is about 100 microns thick, so fretting motion is small and hard to see. Vibration and thermal expansion/contraction are the main sources that create fretting motion. Since vehicles vibrate and can experience large temperature swings, they are a good source for fretting motion. Tin, copper, nickel, and iron surfaces are all susceptible to fretting corrosion. Fretting corrosion can be difficult to see but it looks like small, dark smudges on the terminals contact surface.

To correct a fretting condition disconnect the suspect connector and add dielectric grease / lubricant (Nyogel 760G or equivalent, meeting GM specification 9986087) to both sides of the connector terminals. Then reconnect the connector and wipe away any excess lubricant. This will correct the additional terminal contact resistance due to the terminal fretting corrosion.

Testing for Proper Terminal Contact

It is important to test terminal contact at the component and any inline connectors before replacing a suspect component. Mating terminals must be inspected to ensure good terminal contact. A poor connection between the male and female terminal at a connector may be the result of contamination or deformation.

Contamination may be caused by the connector halves being improperly connected. A missing or damaged connector seal, damage to the connector itself, or exposing the terminals to moisture and dirt can also cause contamination. Contamination, usually in the underhood or underbody connectors, leads to terminal corrosion, causing an open circuit or intermittently open circuit.

Deformation is caused by probing the mating side of a connector terminal without the proper adapter. Always use the **EL-35616** kit when probing connectors. Other causes of terminal deformation are improperly joining the connector halves, or repeatedly separating and joining the connector halves. Deformation, usually to the female terminal contact tang, can result in poor terminal contact causing an open or intermittently open circuit.

Testing for Proper Terminal Contact in Bussed Electrical Centers

It is very important to use the correct test adapter when testing for proper terminal contact of fuses and relays in a bussed electrical center. Use the **EL-35616** kit to test for proper terminal contact. Failure to use the **EL-35616** kit can result in improper diagnosis of the bussed electrical center.

Follow the procedure below in order to test terminal contact:

1. Separate the connector halves.
2. Visually inspect the connector halves for contamination. Contamination may result in a white or green build-up within the connector body or between terminals. This causes high terminal resistance, intermittent contact, or an open circuit. An underhood or underbody connector that shows signs of contamination should be replaced in its entirety: terminals, seals, and connector body.
3. Using an equivalent male terminal/terminated lead, verify that the retention force is significantly different between a known good terminal and the suspect terminal. Replace the female terminal in question.

Flat Wire Connectors

There are no serviceable parts for flat wire connectors on the harness side or the component side.

Follow the procedure below in order to test terminal contact:

1. Remove the component in question.
2. Visually inspect each side of the connector for signs of contamination. Avoid touching either side of the connector as oil from your skin may be a source of contamination as well.
3. Visually inspect the terminal bearing surfaces of the flat wire circuits for splits, cracks, or other imperfections that could cause poor terminal contact. Visually inspect the component side connector to ensure that all of the terminals are uniform and free of damage or deformation.
4. Insert the appropriate adapter into the flat wire harness connector in order to test the circuit in question.

Control Module/Component Voltage and Grounds

Poor voltage or ground connections can cause widely varying symptoms.

- Test all control module voltage supply circuits. Many vehicles have multiple circuits supplying voltage to a control module. Other components in the system may have separate voltage supply circuits that may also need to be tested. Inspect connections at the module/component connectors, fuses, and any intermediate connections between the voltage source and the module/component. A test lamp or a DMM may indicate that voltage is present, but neither tests the ability of the circuit to carry sufficient current. Operate the component to test the ability of the circuit to carry sufficient current. Refer to [Circuit Testing](#), and Power Distribution Wiring Schematics.
- Test all control module ground and system ground circuits. The control module may have multiple ground circuits. Other components in the system may have separate grounds that may also need to be tested. Inspect grounds for clean and tight connections at the grounding point (screw or stud). Inspect the connections at the component and in splice packs, where applicable. Operate the component to test the ability of the circuit to carry sufficient current. Refer to [Circuit Testing](#), and Ground Distribution Wiring Schematics.

Temperature Sensitivity

- An intermittent condition may occur when a component/connection reaches normal operating temperature. The condition may occur only when the component/connection is cold, or only when the component/connection is hot.
- Freeze Frame, Failure Records, Snapshot, or Vehicle Data Recorder data may help with this type of intermittent condition, where applicable.
- If the intermittent is related to heat, review the data for a relationship with the following:
 - High ambient temperatures
 - Underhood/engine generated heat
 - Circuit generated heat due to a poor connection, or high electrical load
 - Higher than normal load conditions, towing, etc.
- If the intermittent is related to cold, review the data for the following:
 - Low ambient temperatures - In extremely low temperatures, ice may form in a connection or component. Inspect for water intrusion.
 - The condition only occurs on a cold start.
 - The condition goes away when the vehicle warms up.
- Information from the customer may help to determine if the trouble follows a pattern that is temperature related.
- If temperature is suspected of causing an intermittent fault condition, attempt to duplicate the condition. Refer to [Inducing Intermittent Fault Conditions](#) in order to duplicate the conditions required.

Electromagnetic Interference and Electrical Noise

Some electrical components/circuits are sensitive to electromagnetic interference or other types of electrical noise. Inspect for the following conditions:

- A mis-routed harness that is too close to high voltage/high current devices such as secondary ignition components, motors, generator etc. - These components may induce electrical noise on a circuit that could interfere with normal circuit operation.

- Electrical system interference caused by a malfunctioning relay, or a control module driven solenoid or switch - These conditions can cause a sharp electrical surge. Normally, the condition will occur when the malfunctioning component is operating.
- Installation of non-factory or aftermarket add on accessories such as lights, 2-way radios, amplifiers, electric motors, remote starters, alarm systems, cell phones, etc. - These accessories may create interference in other circuits while operating and the interference would disappear when the accessory is not operating. Refer to [Checking Aftermarket Accessories](#) .
- Test for an open diode across the A/C compressor clutch and for other open diodes. Some relays may contain a clamping diode.
- The generator may be allowing AC noise into the electrical system.

Incorrect Control Module

- There are only a few situations where reprogramming a control module is appropriate:
 - A new service control module is installed.
 - A control module from another vehicle is installed.
 - Revised software/calibration files have been released for this vehicle.

NOTE: **DO NOT re-program the control module with the SAME software/calibration files that are already present in the control module. This is not an effective repair for any type of concern.**

- Verify that the control module contains the correct software/calibration. If incorrect programming is found, reprogram the control module with the most current software/calibration. Refer to [Control Module References](#) for replacement, setup, and programming.

MANUAL SHIFT DETENT LEVER WITH SHAFT POSITION SWITCH ASSEMBLY REPLACEMENT

Special Tools

DT-41229 Manual Shaft Pin Installer

For equivalent regional tools, refer to [Special Tools](#) .

Removal Procedure

1. Remove the automatic transmission range selector lever. [Automatic Transmission Range Selector Lever Replacement](#).
2. Remove the control valve body. [Control Valve Body Replacement](#).

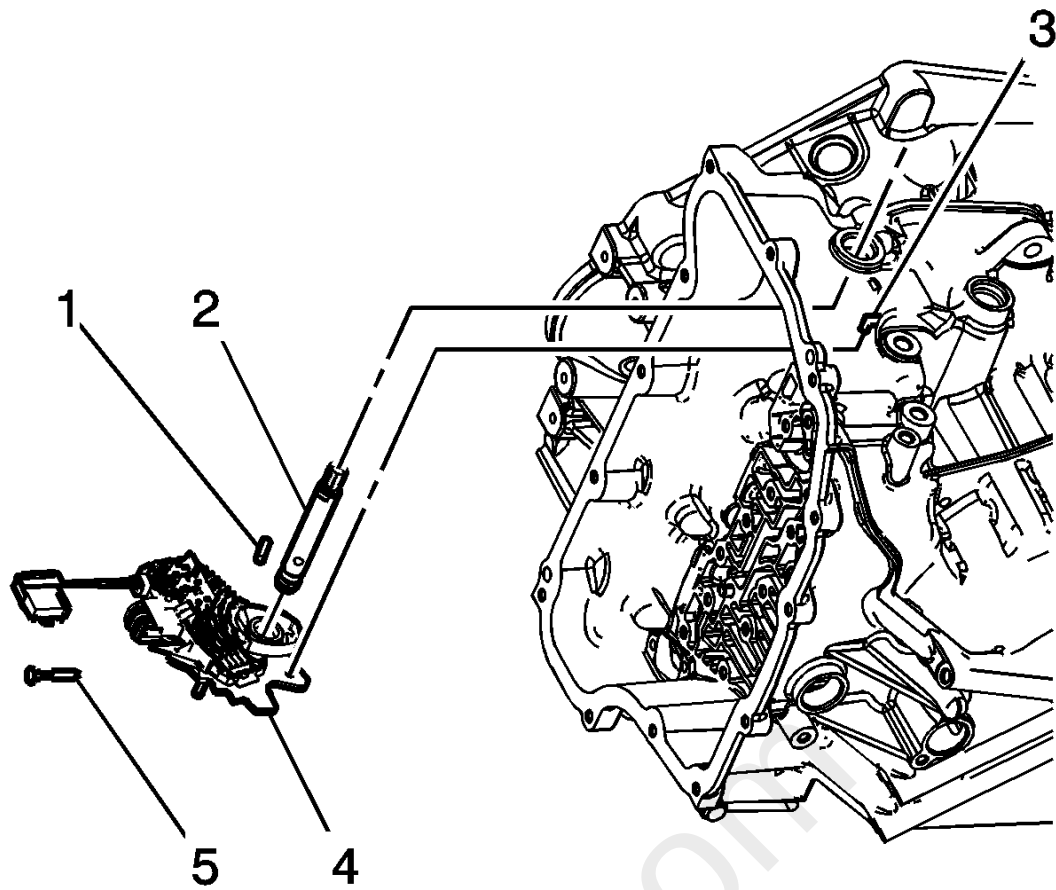


Fig. 1: View Of Manual Shift Detent Lever & Shaft Position Switch Assembly.
Courtesy of GENERAL MOTORS COMPANY

3. Remove the manual shaft detent lever hub pin (1) using a pry bar and pliers.
4. Remove and DISCARD the manual shift shaft pin (5).
5. Remove the manual shaft (2).

NOTE: Disconnect the actuator rod (3) from the detent lever assembly. Do not remove the actuator rod from the transmission case.

6. Remove the manual shaft detent (with shift position switch) lever assembly (4).

Installation Procedure

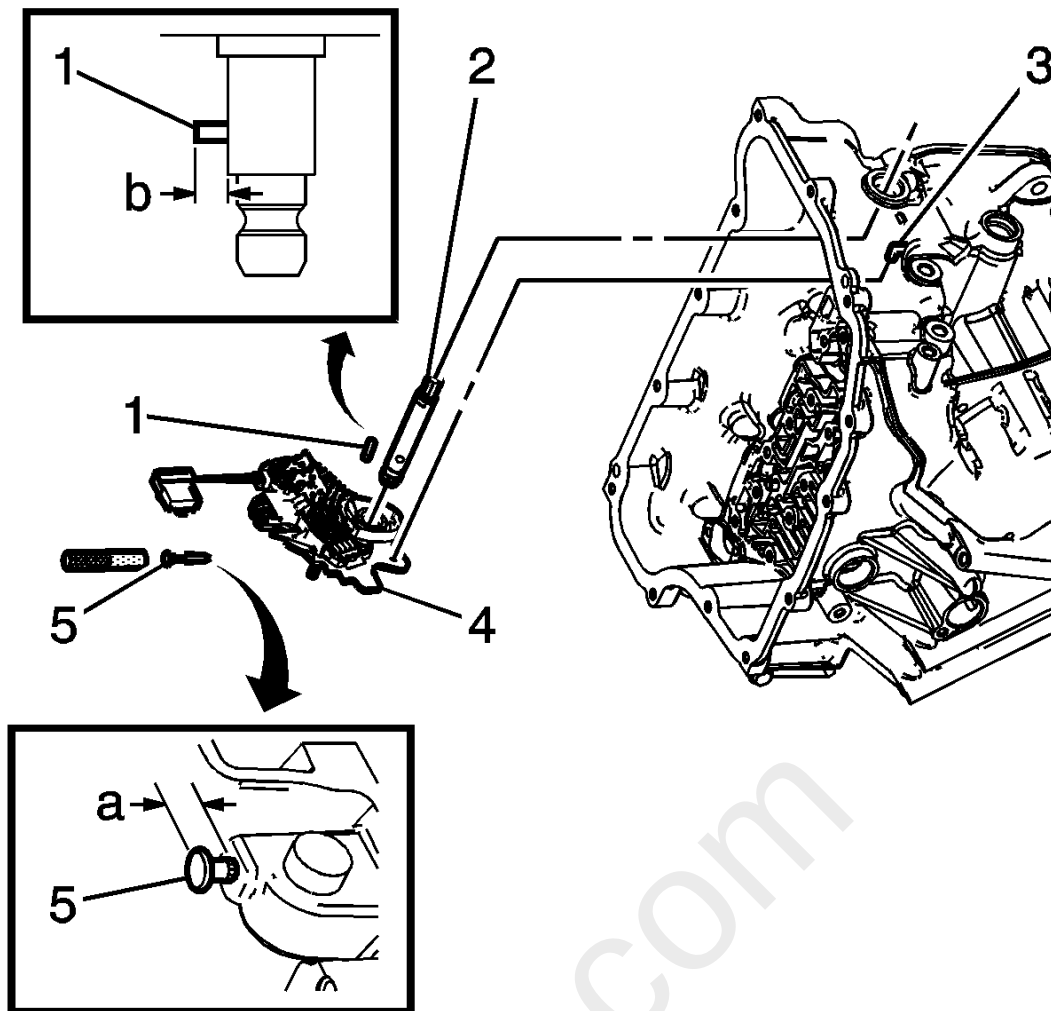


Fig. 2: Identifying Manual Shaft Detent (W/Shift Position Switch) Lever Assembly.
Courtesy of GENERAL MOTORS COMPANY

NOTE: Connect the actuator rod (3) to the detent lever assembly.

1. Install the manual shaft detent (with shift position switch) lever assembly (4).
2. Install the manual shaft (2).
3. Install the manual shaft detent lever hub pin (1).

Specification

Install the manual shaft detent lever hub pin to height of 7.9 mm (0.38 in) (b).

CAUTION: Use J 41229 to install the manual shaft pin at the correct height in order to properly secure the manual shaft. If you install the pin too deep, the case bore may crack.

4. Install the NEW manual shift shaft pin (5) using DT-41229 pin installer. Use a NEW pin to ensure proper engagement with the case.

Specification

Inspect pin installed height is within 7.2 - 8.2 mm (0.28 - 0.32 in) (a).

5. Install the control valve body. [Control Valve Body Replacement](#).
6. Install the automatic transmission range selector lever. [Automatic Transmission Range Selector Lever Replacement](#).
7. Perform the transmission adaptive values learn procedure. [Transmission Adaptive Values Learn](#).

Removal Procedure

1. Set the parking brake.
2. Shift the transmission control into Reverse position.

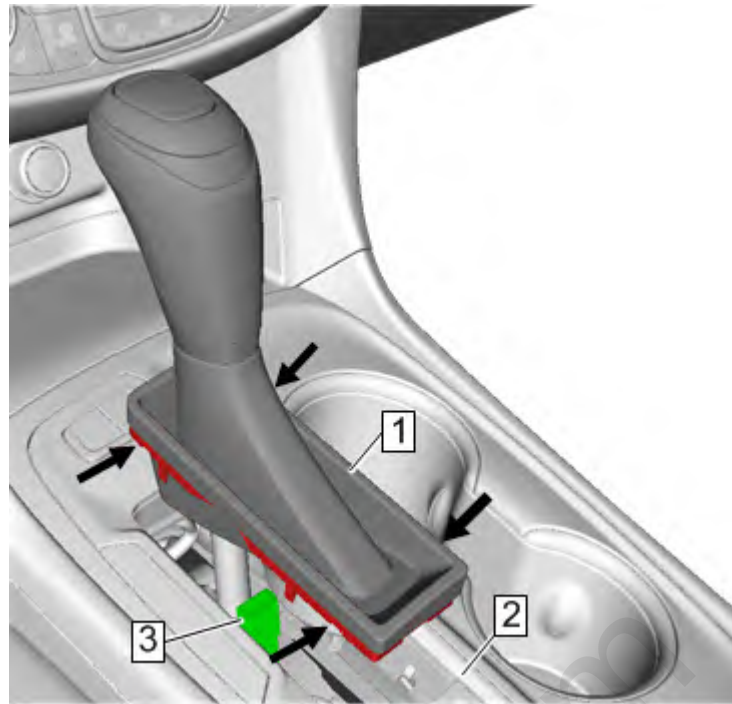


Fig. 3: Transmission Control Lever Boot, Lever Boot Bezel And Electrical Connector
Courtesy of GENERAL MOTORS COMPANY

NOTE: The transmission control lever boot snaps to the lever boot bezel in four locations (arrows): two on the passenger side, one on the driver side, and one on the front side.

3. Unclip the transmission control lever boot (1) from the lever boot bezel (2), using a flat bladed tool.
4. Pull the lever boot up to gain access to the electrical connector (3).

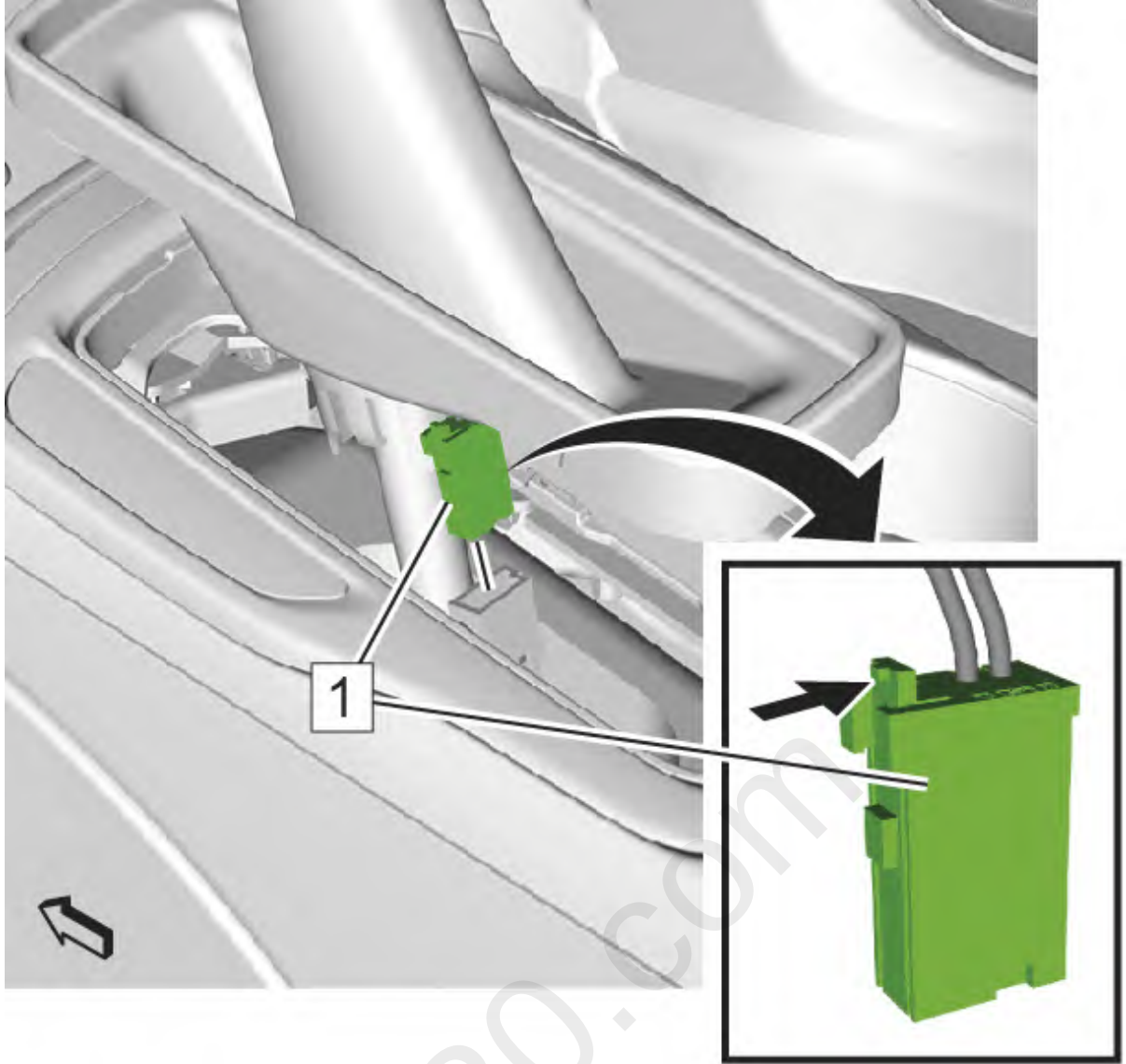


Fig. 4: Electrical Connector

Courtesy of GENERAL MOTORS COMPANY

5. Disconnect Electrical Connector (1)

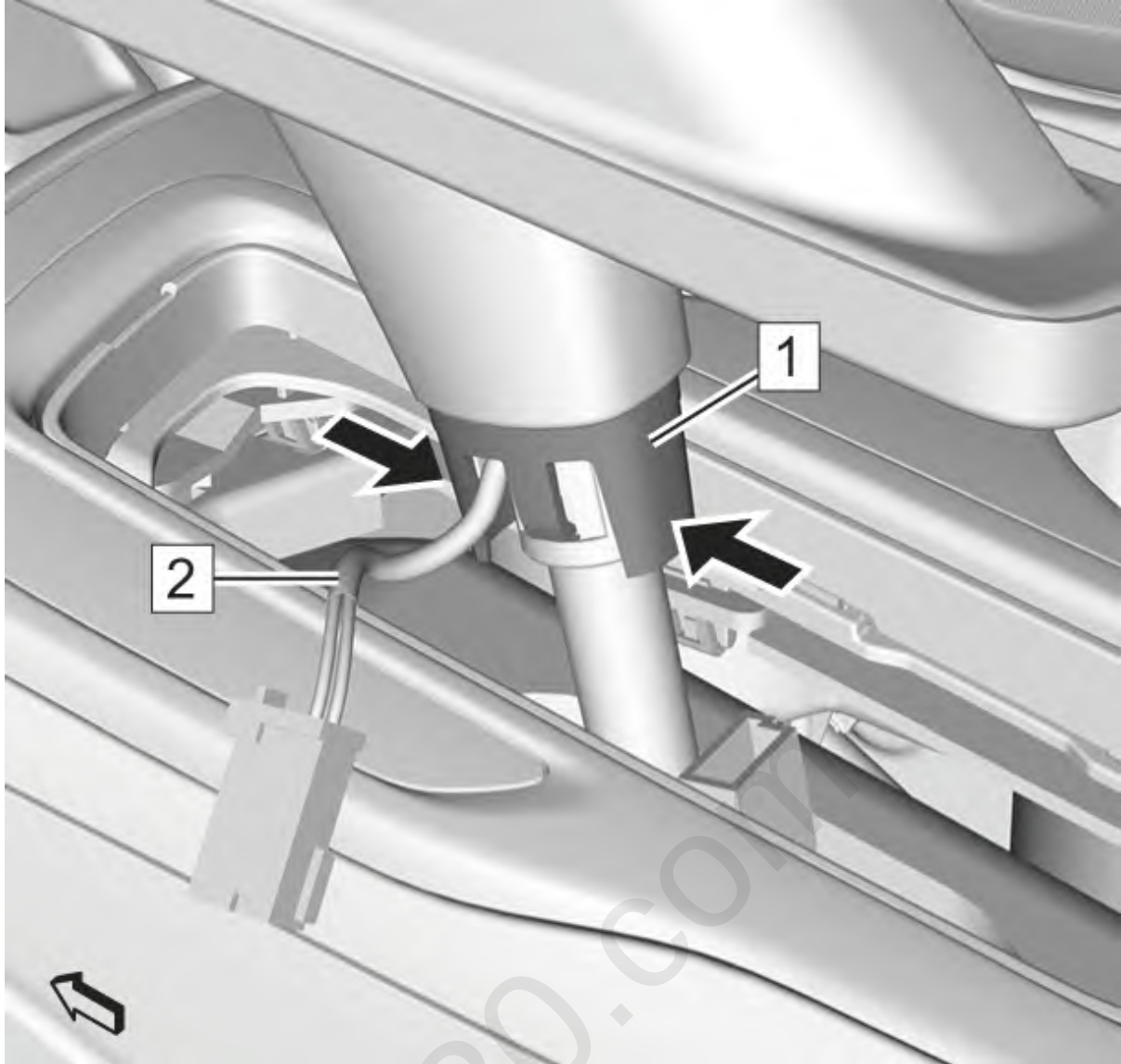


Fig. 5: Upper Boot Ring And Guide Harness

Courtesy of GENERAL MOTORS COMPANY

6. Detach the transmission control lever boot from the transmission control lever knob.
 1. Pull the transmission control lever boot over the transmission control lever knob to gain access to the upper boot ring (1).
 2. Press the upper boot ring (arrows) to disengage the snaps.
 3. Push the upper boot ring along with the lever boot down.
 4. Guide the wiring harness (2) upwards out of the upper boot ring.

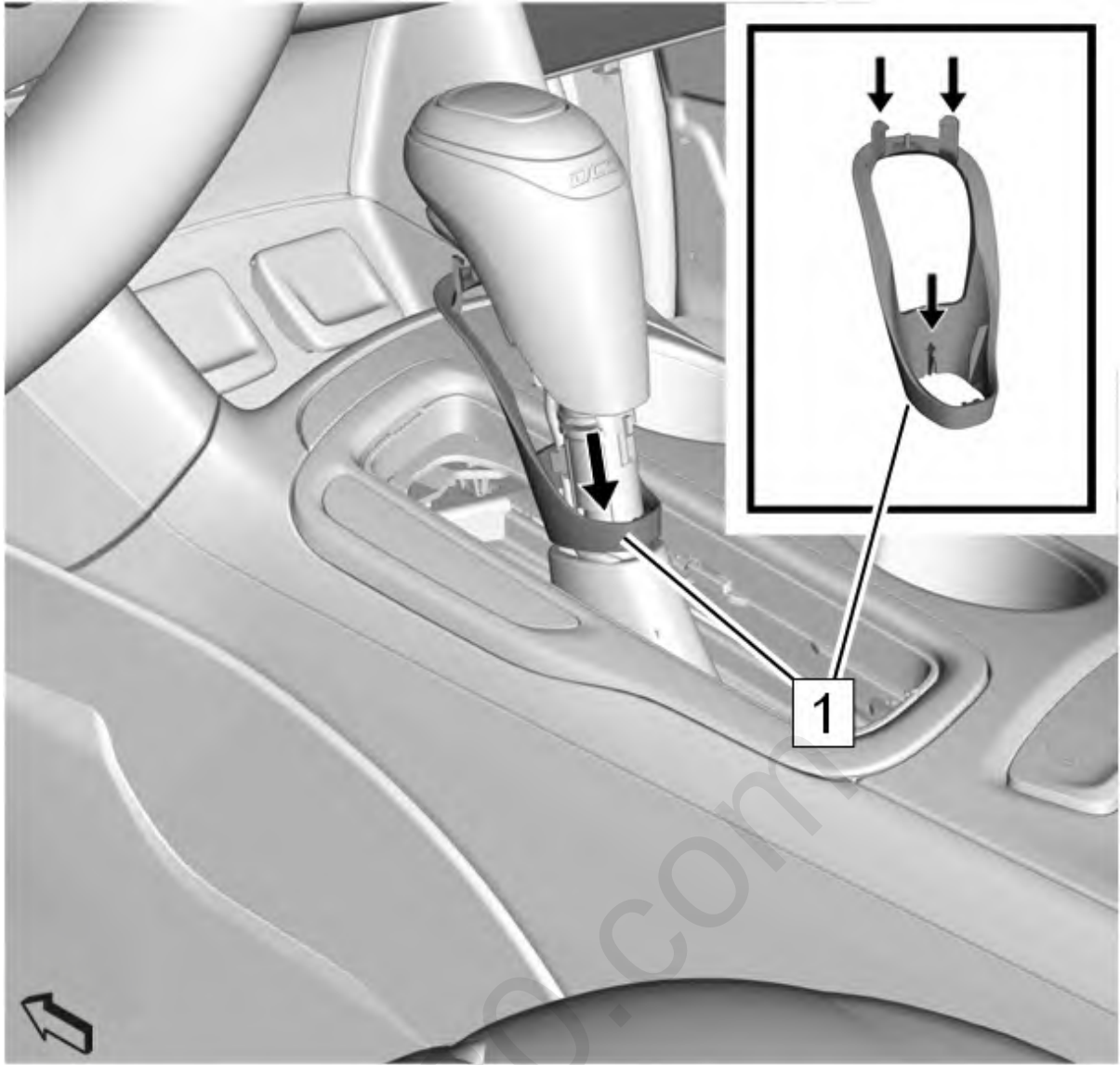


Fig. 6: Transmission Control Lever Knob Extension

Courtesy of GENERAL MOTORS COMPANY

NOTE: Press the button while sliding the lever knob extension downwards.

7. Detach the transmission control lever knob extension (1) from the lever knob with a flat bladed tool, then slide the lever knob extension downwards.

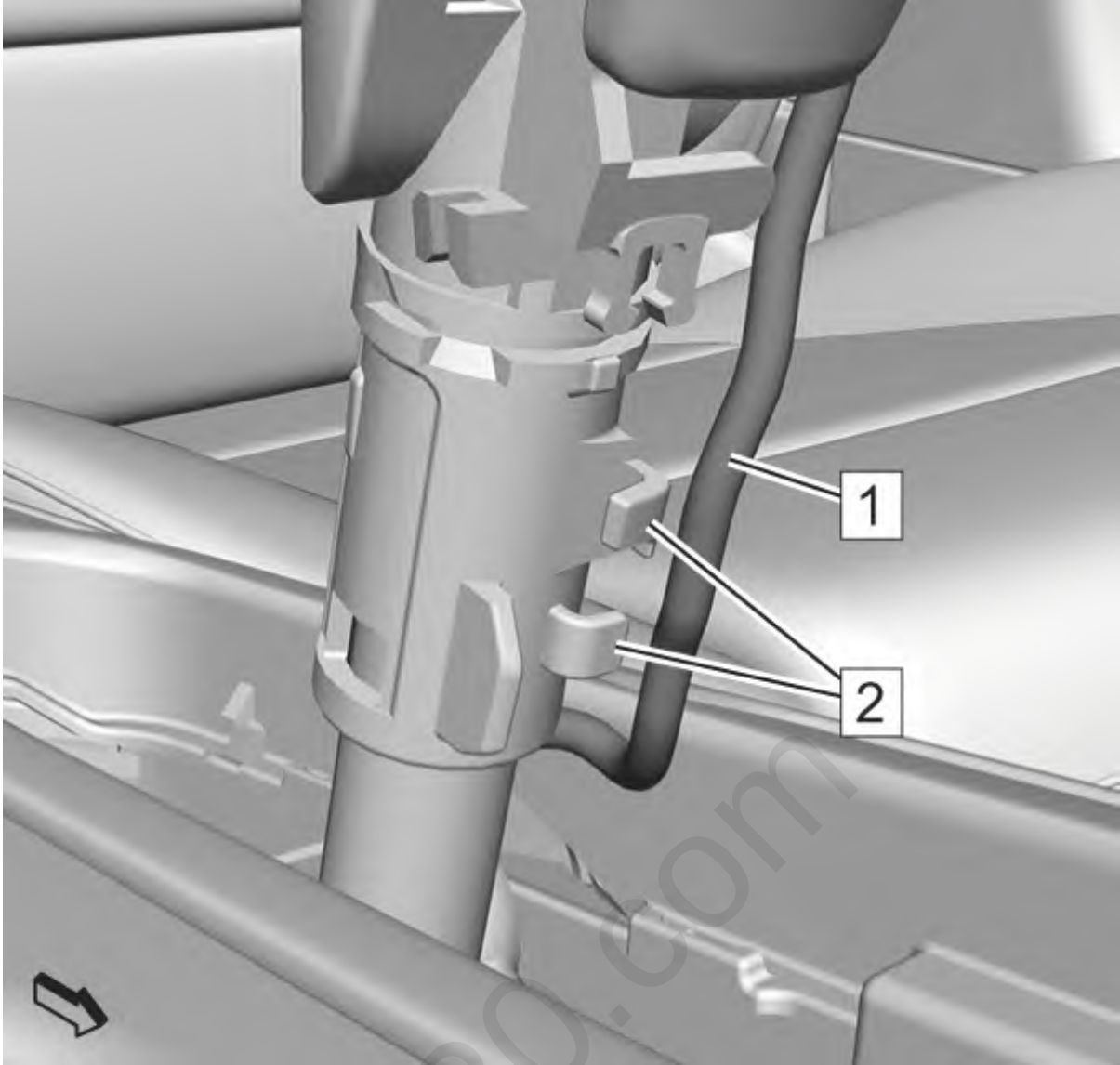


Fig.7: Wiring Harness And Holders

Courtesy of GENERAL MOTORS COMPANY

NOTE: The graphic is shown without the transmission control lever knob extension for clarity.

8. Position aside Wiring Harness (1)

1. Detach the wiring harness from the 2 holders (2).
2. Guide the wiring harness upwards out the bottom hole of the transmission control lever knob extension.

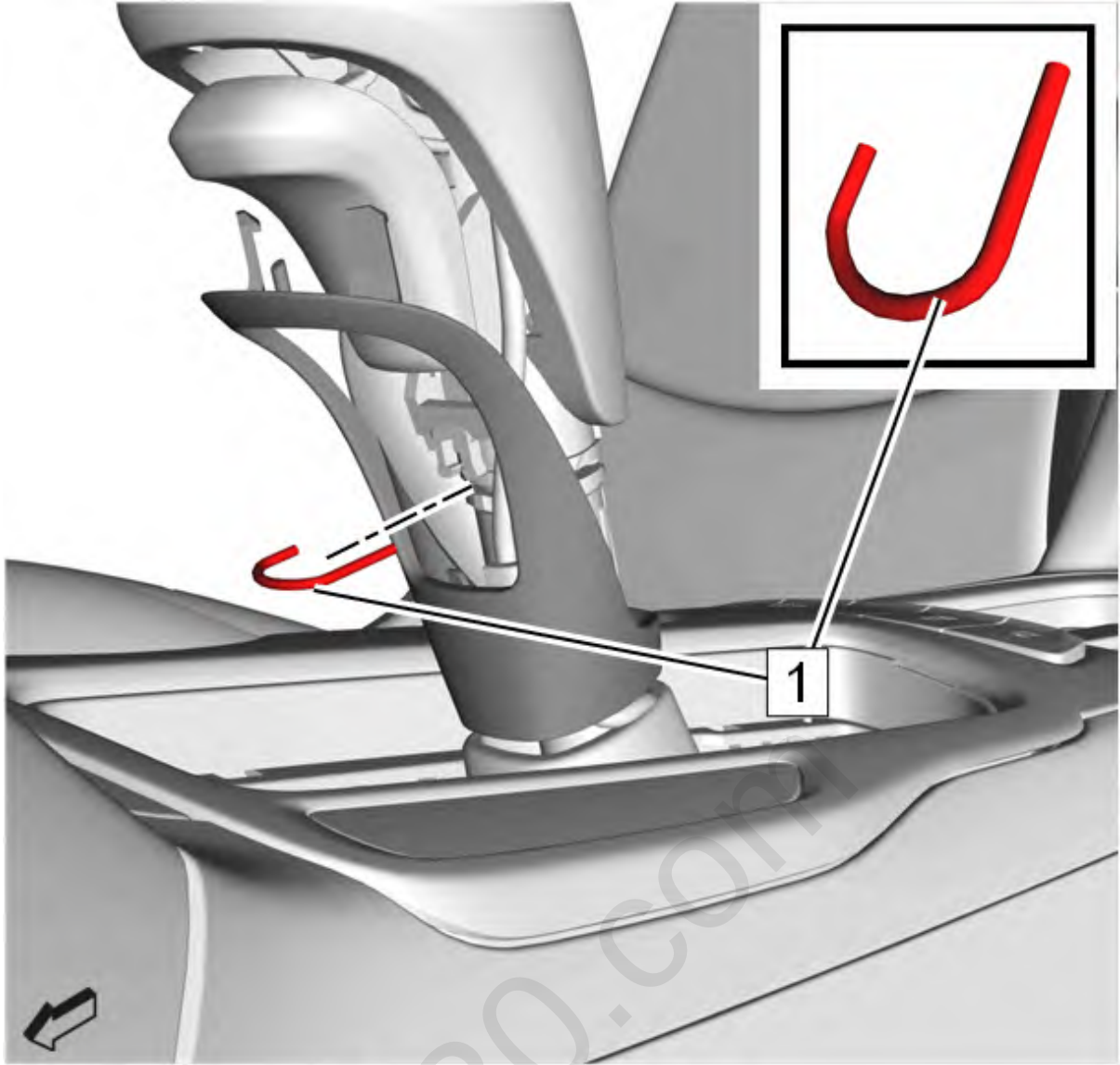


Fig. 8: Transmission Control Lever Knob Retainer
Courtesy of GENERAL MOTORS COMPANY

9. Remove the transmission control lever knob retainer (1).

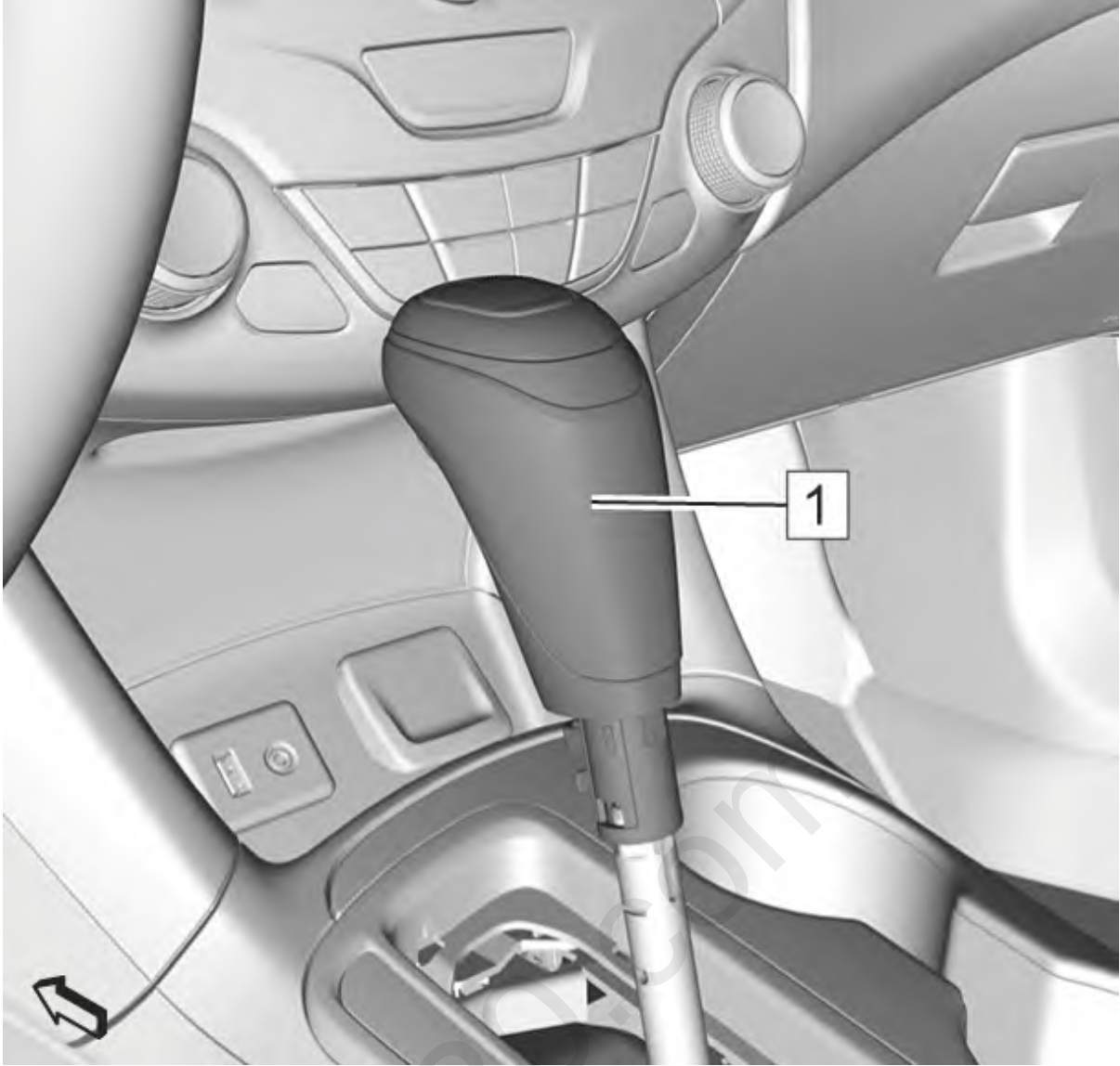


Fig. 9: Transmission Control Lever Knob

Courtesy of GENERAL MOTORS COMPANY

NOTE: This is a press fit and will require some force to pull the transmission control lever knob off. Before applying an upward force, ensure the wiring harness is free.

10. Remove Transmission Control Lever Knob (1) @Transmission Control Lever

Installation Procedure

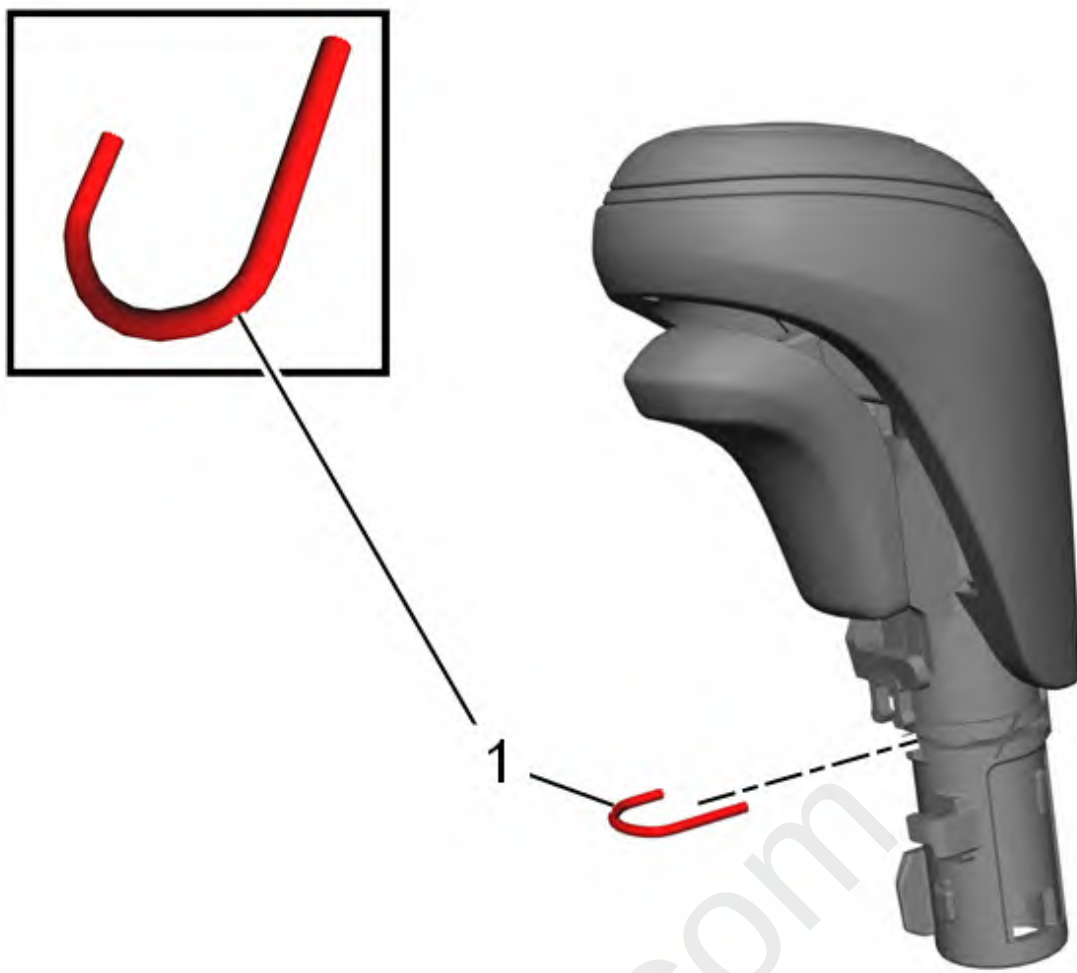


Fig. 10: Transmission Control Lever Knob Retainer
Courtesy of GENERAL MOTORS COMPANY

1. Install the transmission control lever knob retainer (1).

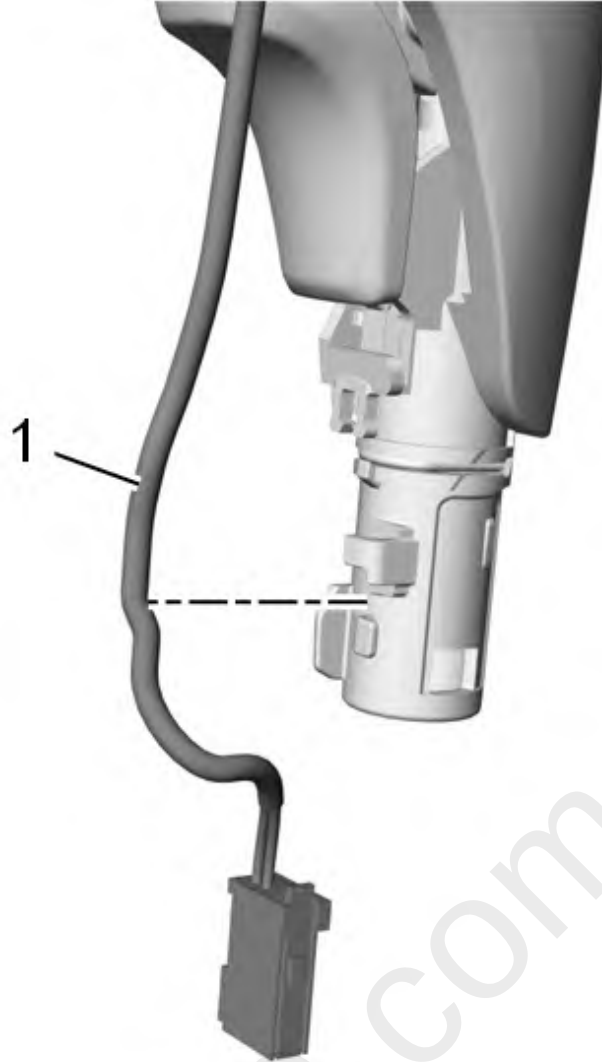


Fig. 11: Wiring Harness

Courtesy of GENERAL MOTORS COMPANY

2. Reposition Wiring Harness (1)

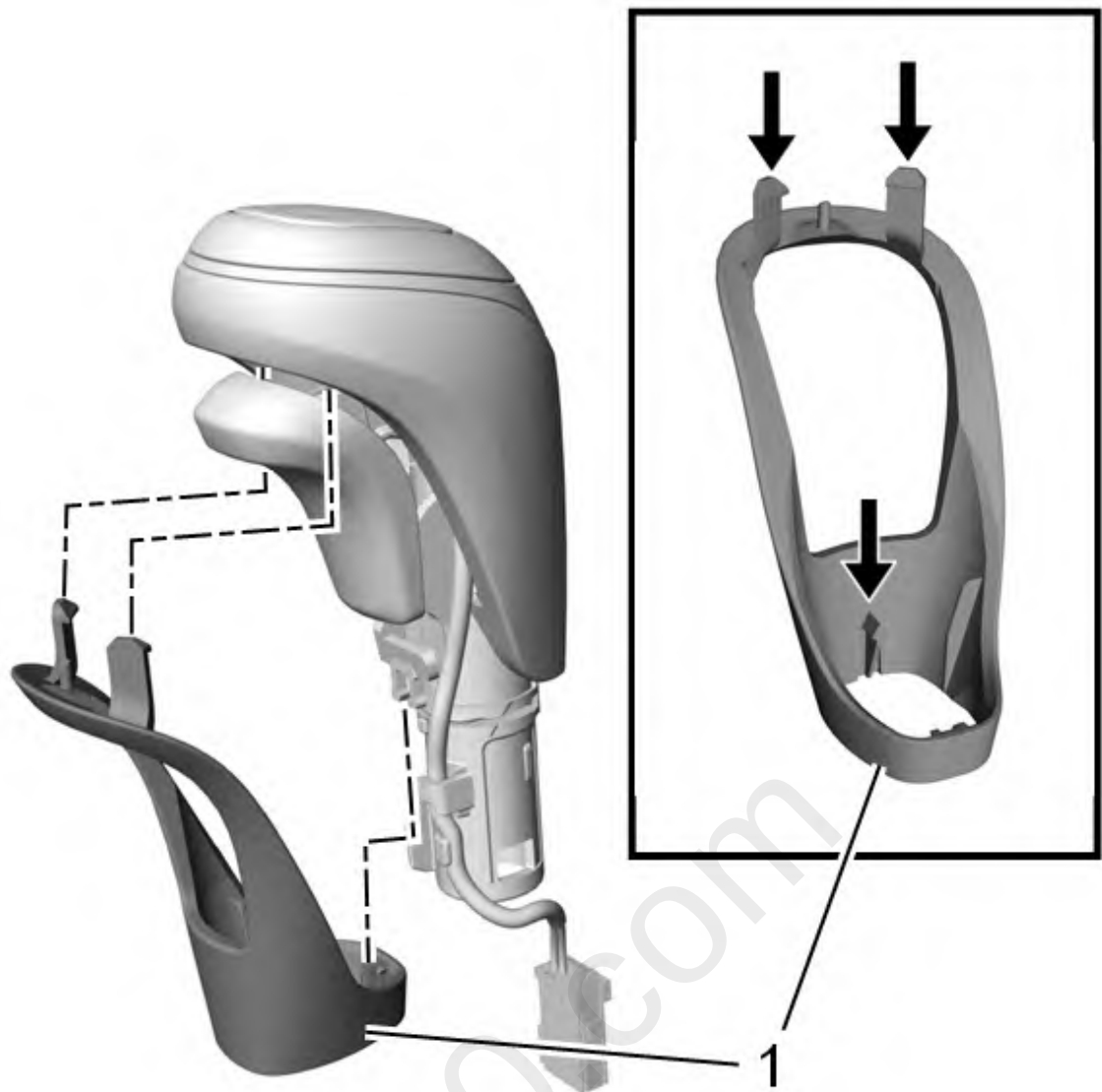


Fig. 12: Transmission Control Lever Knob Retainer
Courtesy of GENERAL MOTORS COMPANY

3. Guide the wiring harness through the transmission control lever knob retainer (1).
4. Attach the transmission control lever knob extension (1) to the lever knob.

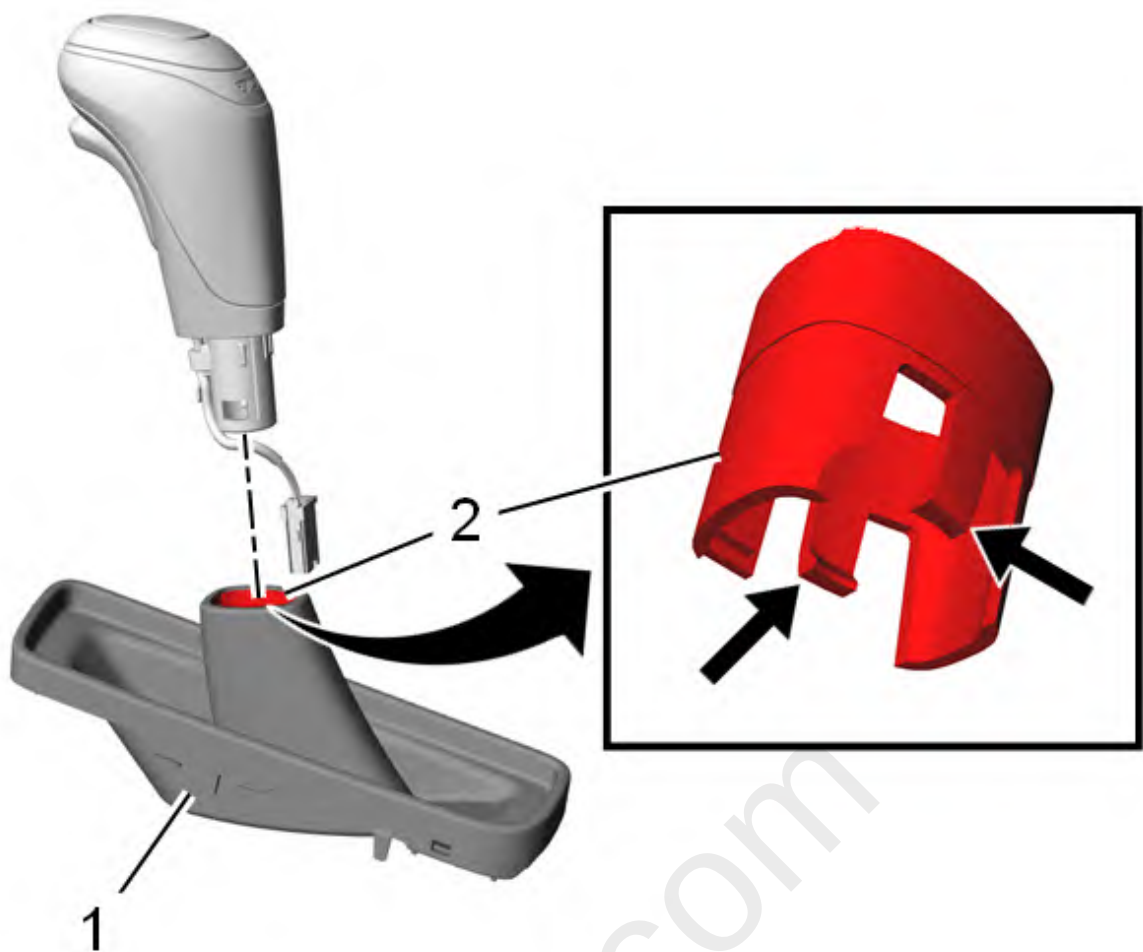
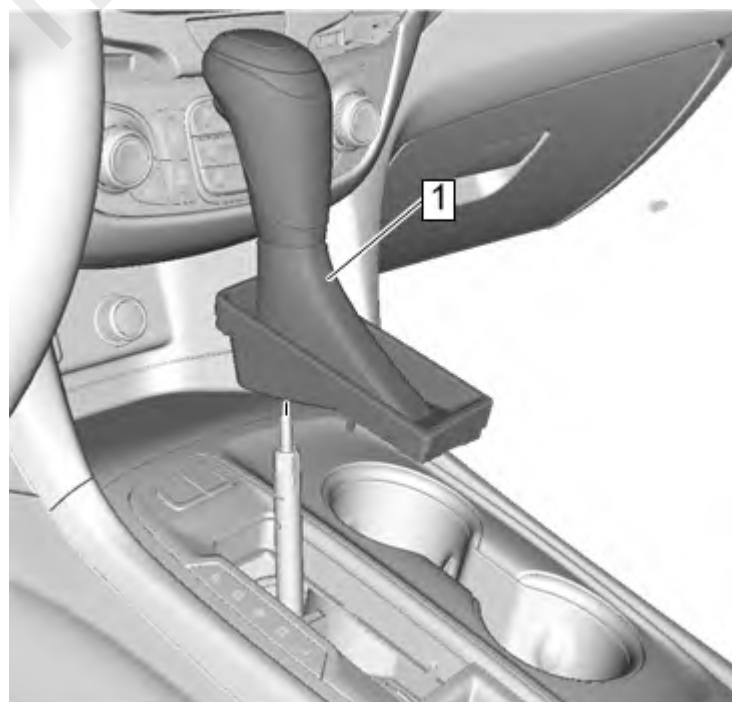


Fig. 13: Transmission Control Lever Boot
Courtesy of GENERAL MOTORS COMPANY

5. Attach the transmission control lever boot (1) to the transmission control lever knob.
 1. Guide the wiring harness through the transmission control lever boot (1).
 2. Clip the upper boot ring (2) into the bottom of the transmission control lever knob.



NOTE: When installing the transmission control lever knob, a defined snap noise should be audible and a snap effect should be felt. After installation, check the retention of the transmission control lever knob by pulling it upwards with two hands and significant force in an attempt to remove it.

6. Install Transmission Control Lever Knob (1) @Transmission Control Lever
7. Shift the transmission control lever into "P" position

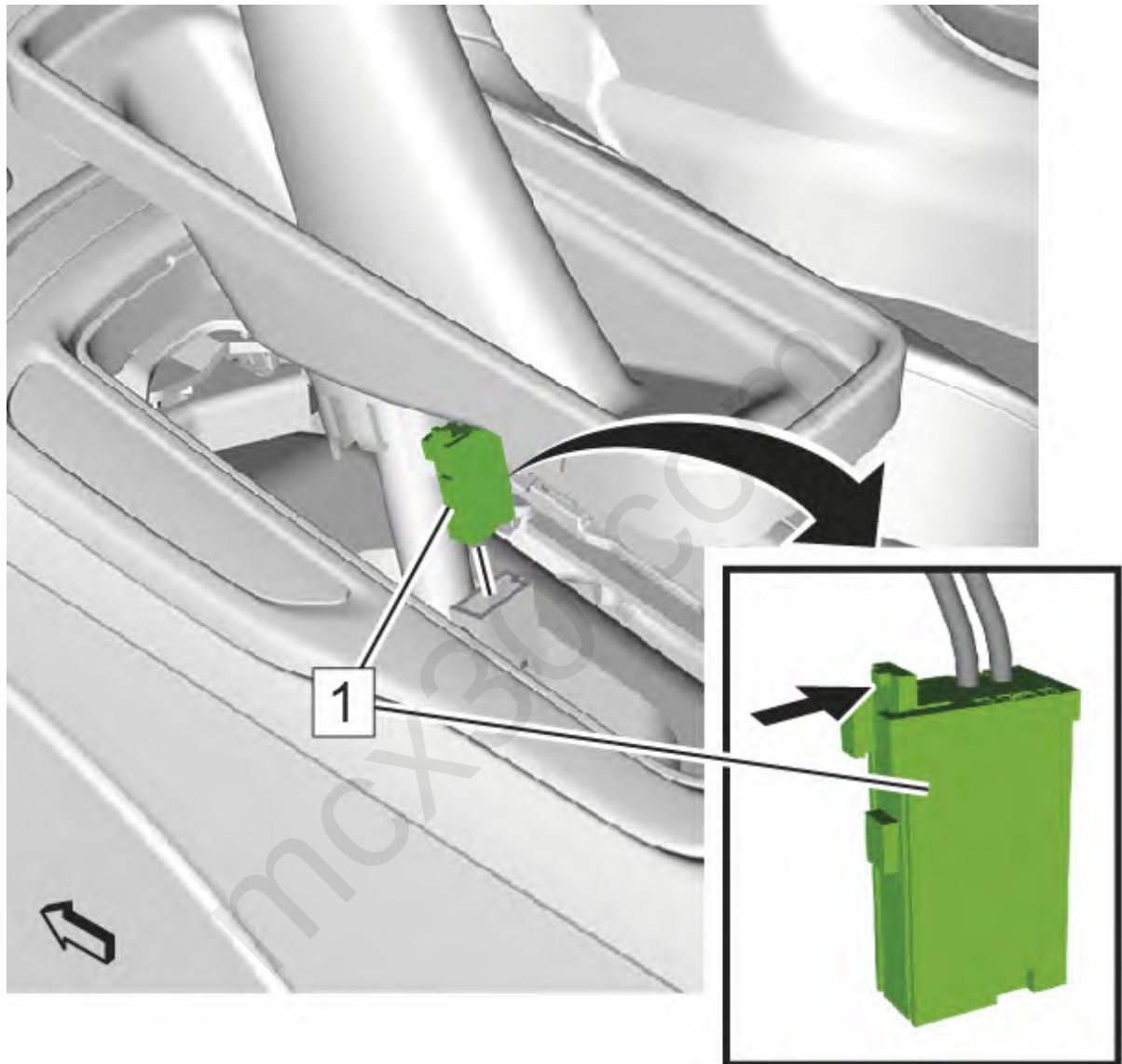


Fig. 15: Electrical Connector
Courtesy of GENERAL MOTORS COMPANY

8. Connect Electrical Connector (1)

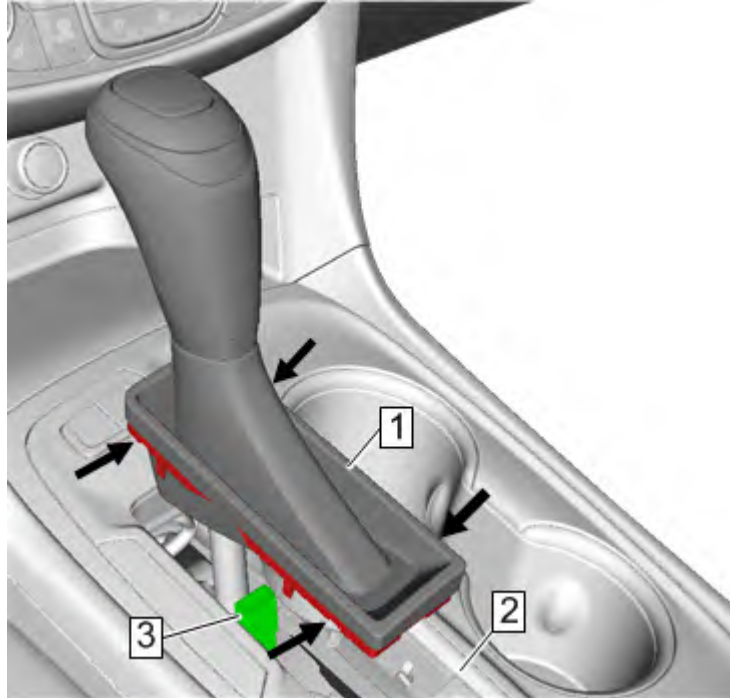


Fig. 16: Transmission Control Lever Boot, Lever Boot Bezel And Electrical Connector
Courtesy of GENERAL MOTORS COMPANY

NOTE: The transmission control lever boot snaps to the lever boot bezel in four locations (arrows): two on the passenger side, one on the driver side, and one on the front side. Before pushing the transmission control lever boot into the lever boot bezel, ensure proper alignment along the edges to avoid visible gaps.

9. Clip the transmission control lever boot (1) into the lever boot bezel (2).
10. Release the parking brake.

ELECTRONIC TRANSMISSION SHIFT CONTROL PUSHBUTTON REPLACEMENT

Removal Procedure

1. Remove the front floor console transmission shift opening bezel. [Front Floor Console Transmission Shift Opening Bezel Replacement \(Terrain\)](#)

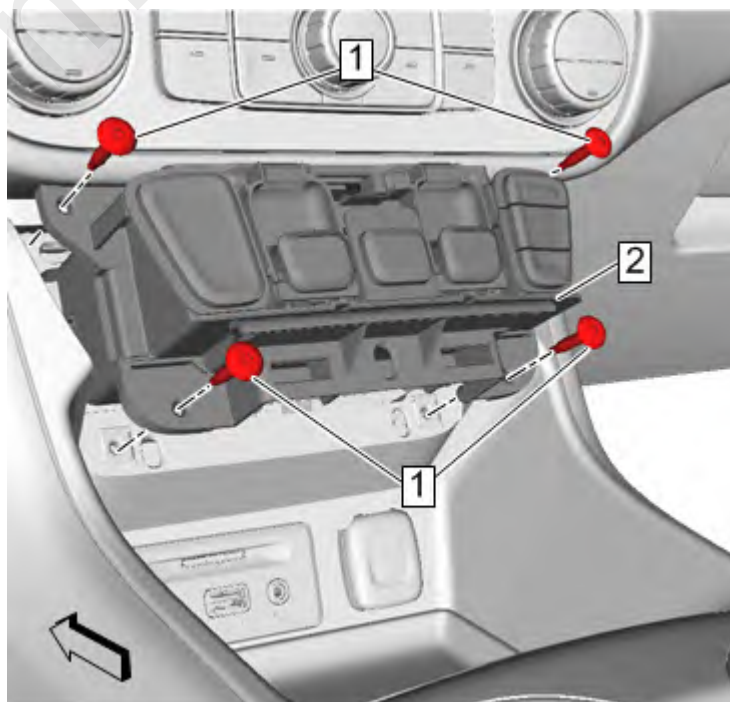


Fig. 17: Electronic Transmission Shift Control Pushbutton
Courtesy of GENERAL MOTORS COMPANY

2. Remove the screws (1)
3. Remove the electronic transmission shift control pushbutton assembly (2)
4. Disconnect the electrical connector.

Installation Procedure

1. Connect the electrical connector.

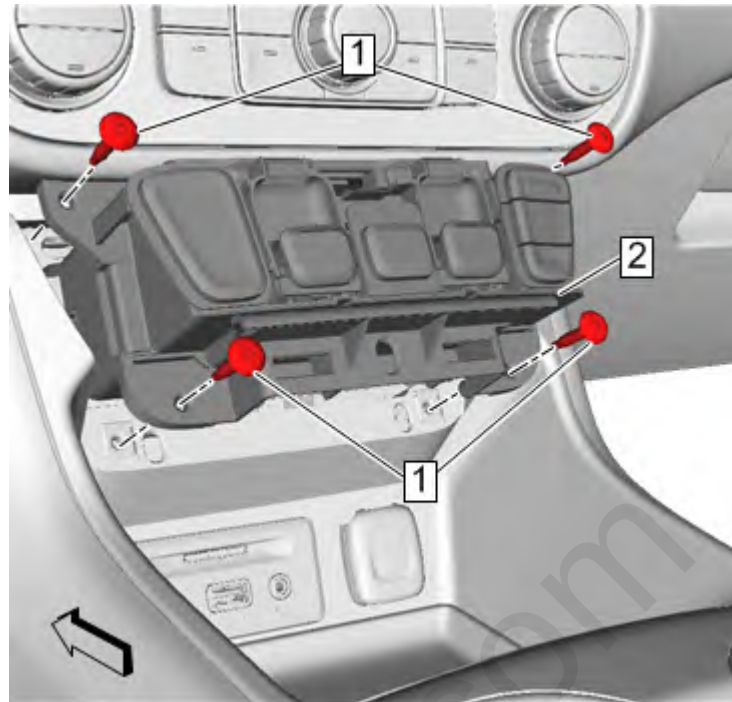


Fig. 18: Electronic Transmission Shift Control Pushbutton

Courtesy of GENERAL MOTORS COMPANY

2. Install the electronic transmission shift control pushbutton assembly (2)

CAUTION: Refer to Fastener Caution .

3. Install the screws.
4. Install the front floor console transmission shift opening bezel. Front Floor Console Transmission Shift Opening Bezel Replacement (Terrain)

AUTOMATIC TRANSMISSION CONTROL INDICATOR REPLACEMENT

Removal Procedure

1. Remove the front floor console trim plate. Front Floor Console Trim Plate Replacement (Equinox), Front Floor Console Trim Plate Replacement (Terrain)

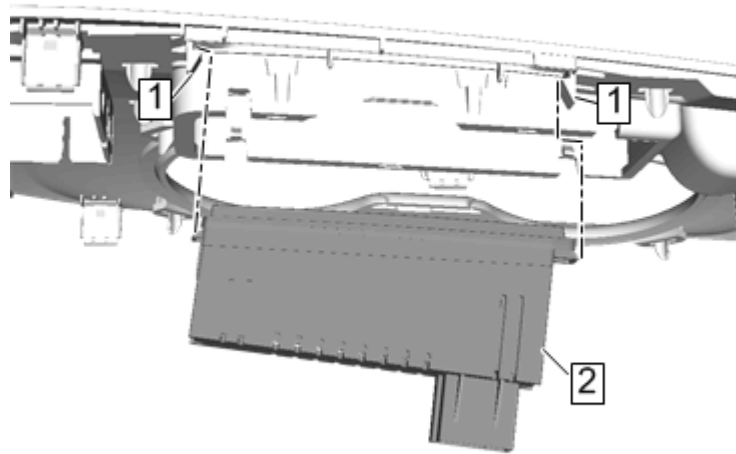


Fig. 19: Automatic Transmission Control Indicator Assembly And Retaining Tabs
 Courtesy of GENERAL MOTORS COMPANY

2. Using a soft bladed trim tool, release the retaining tabs (1), then remove the automatic transmission control indicator assembly (2) from the front floor console trim plate.

Installation Procedure

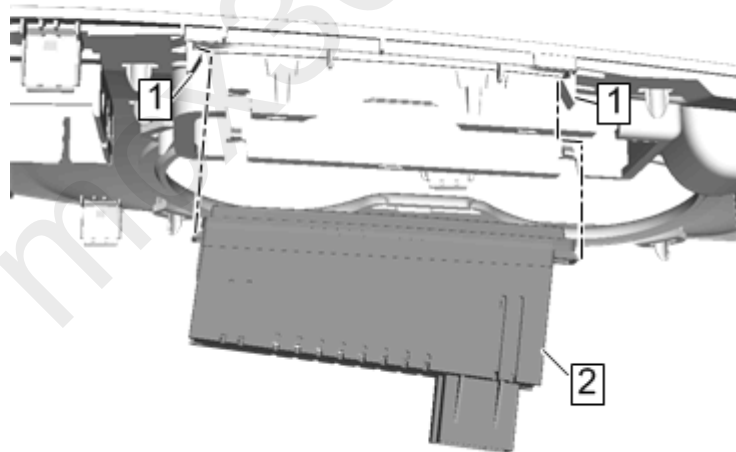


Fig. 20: Automatic Transmission Control Indicator Assembly And Retaining Tabs
 Courtesy of GENERAL MOTORS COMPANY

1. Install the automatic transmission control indicator assembly (2) to the front floor console trim plate.
2. Install the front floor console trim plate. [Front Floor Console Trim Plate Replacement \(Equinox\)](#), [Front Floor Console Trim Plate Replacement \(Terrain\)](#)

TRANSMISSION CONTROL REPLACEMENT

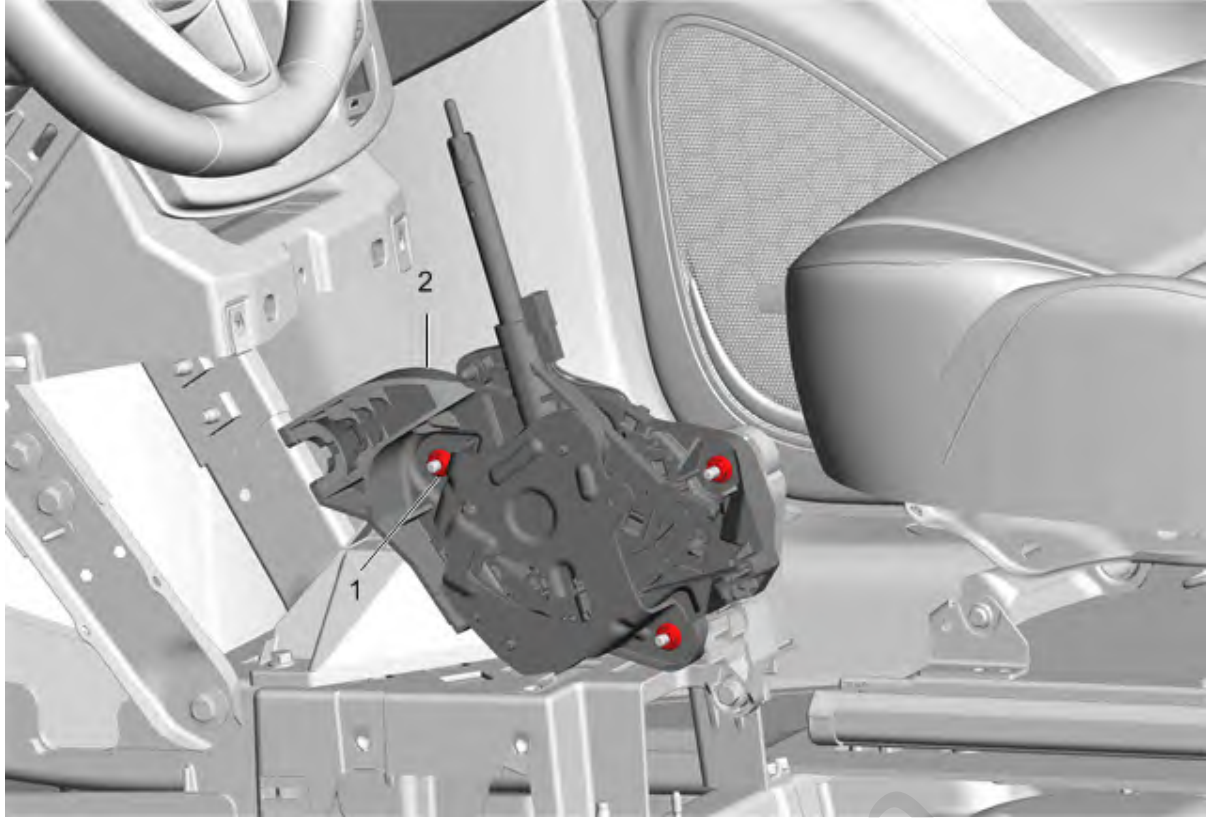


Fig. 21: Transmission Control

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures 1. Remove the front floor console. Front Floor Lower Console Replacement (Equinox) 2. Disconnect the shift control cable from the transmission control. Range Selector Lever Cable Replacement 3. Disconnect the electrical connector.	
1	Transmission Control Fastener (Qty: 3) CAUTION: Refer to Fastener Caution . Tighten 9 N.m (80 lb in)
2	Transmission Control

TRANSMISSION CONTROL BRACKET REPLACEMENT

Removal Procedure

1. Remove Transmission control [Transmission Control Replacement](#)

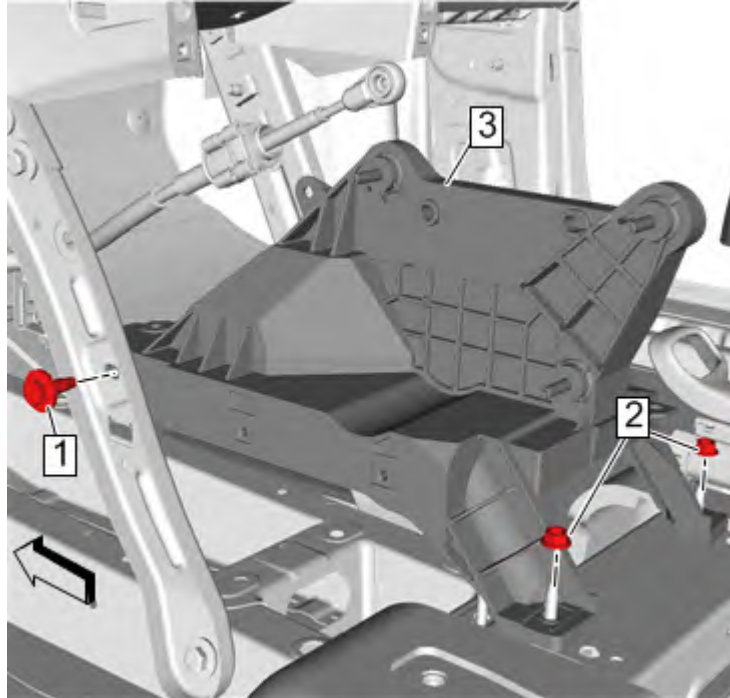


Fig. 22: Left I/P Center Support Bracket Bolt, Automatic Transmission Control Bracket And Nuts

Courtesy of GENERAL MOTORS COMPANY

2. Remove the left instrument panel center support bracket bolt (1).
3. Remove the automatic transmission control bracket nuts (2) from the automatic transmission control bracket (3).

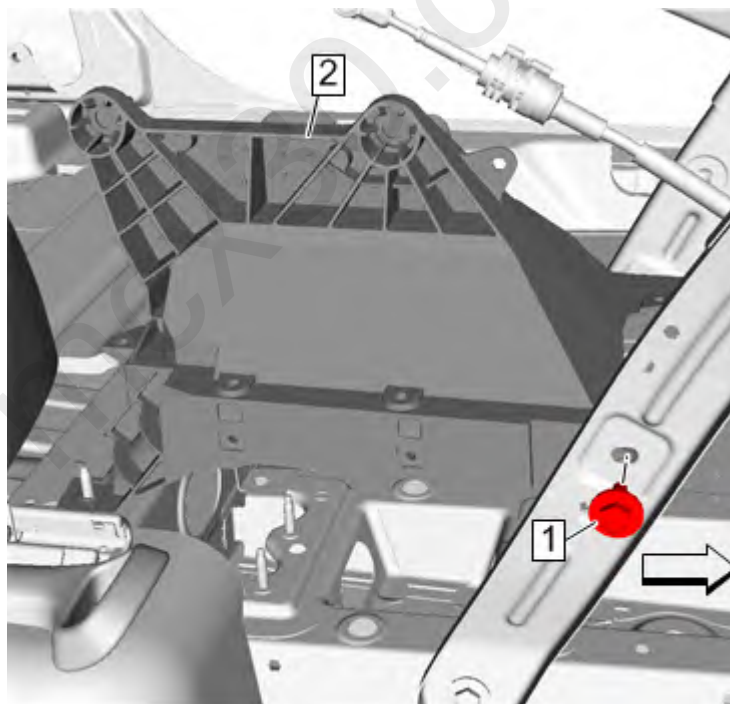


Fig. 23: Right I/P Center Support Bracket Bolt And Automatic Transmission Control Bracket

Courtesy of GENERAL MOTORS COMPANY

4. Remove the right instrument panel center support bracket bolt (1).
5. Remove the automatic transmission control bracket (2).

Installation Procedure

1. Position the transmission control bracket in the vehicle.

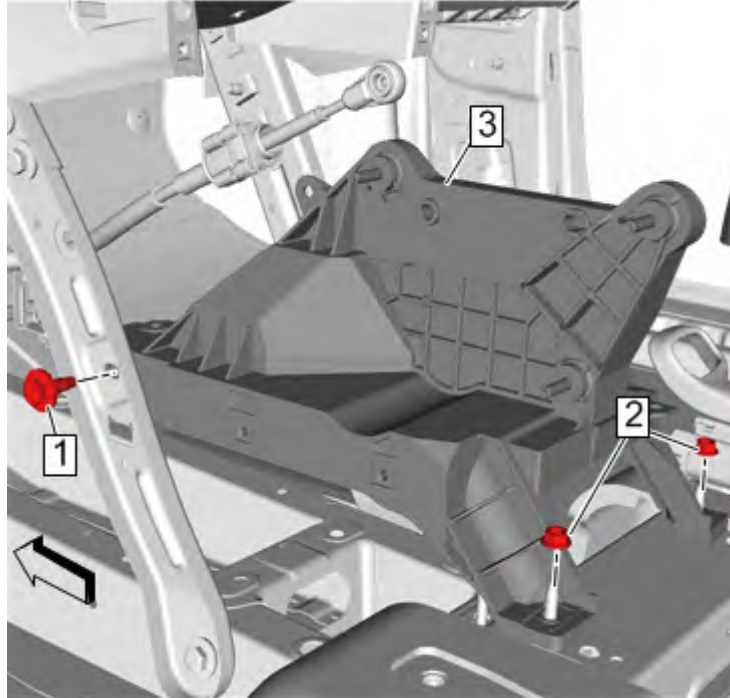


Fig. 24: Left I/P Center Support Bracket Bolt, Automatic Transmission Control Bracket And Nuts

Courtesy of GENERAL MOTORS COMPANY

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

2. Install the automatic transmission control nuts (2) to the automatic transmission control bracket (3) and tighten to 9 N.m (80 lb in).
3. Install the left instrument panel center support bracket bolt (1) and tighten to 22 N.m (16 lb ft).

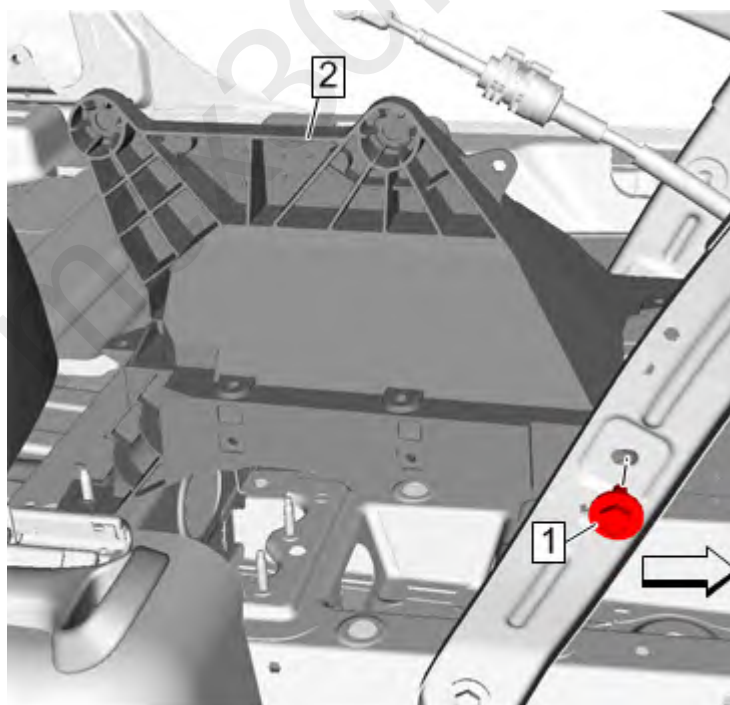


Fig. 25: Right I/P Center Support Bracket Bolt And Automatic Transmission Control Bracket

Courtesy of GENERAL MOTORS COMPANY

4. Install the right instrument panel center support bracket bolt (1) and tighten to 22 N.m (16 lb ft).
5. Install Transmission control - [Transmission Control Replacement](#)

AUTOMATIC TRANSMISSION RANGE SELECTOR LEVER REPLACEMENT

Removal Procedure

1. Set the park brake and chock the wheels.
2. Remove the battery tray. Refer to [Battery Tray Replacement](#).

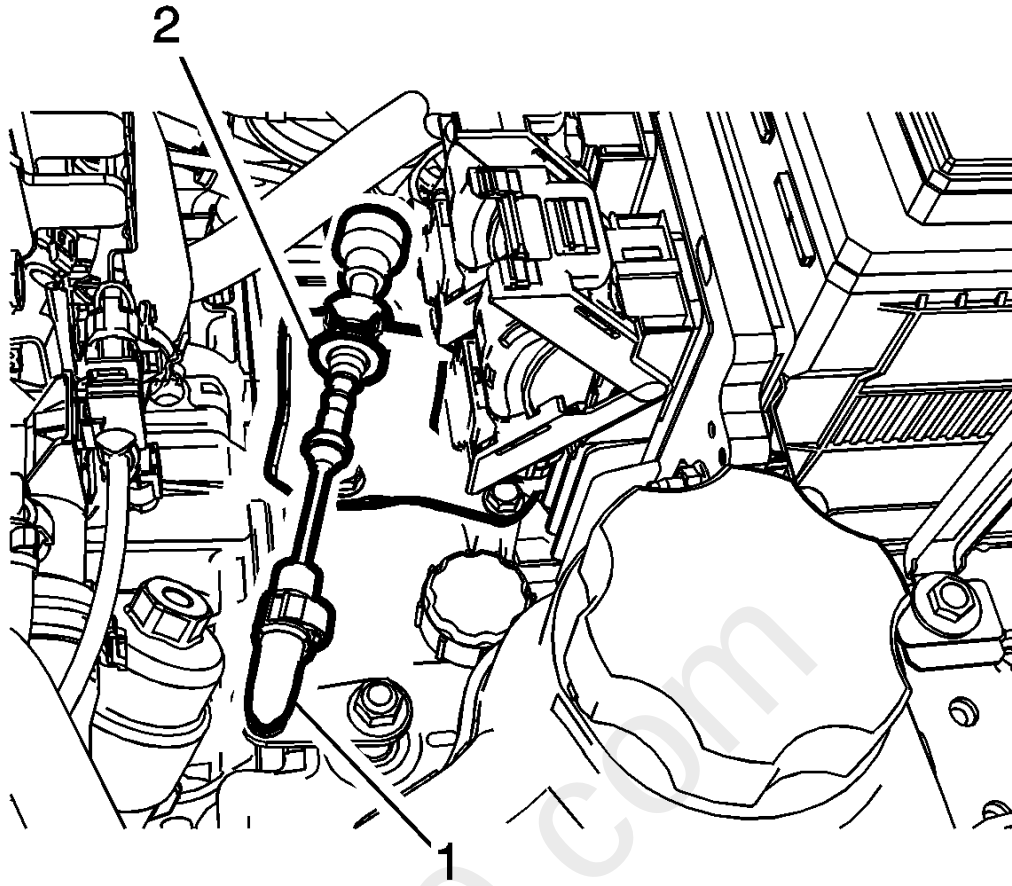


Fig. 26: Automatic Transmission Range Selector Lever Cable Terminal & Shift Lever Pin
Courtesy of GENERAL MOTORS COMPANY

3. Disconnect the transmission range selector lever cable terminal (1) from the transmission manual shift lever pin.
4. Press the locking tabs inward in order to release the transmission range selector lever cable (2) from the cable bracket.

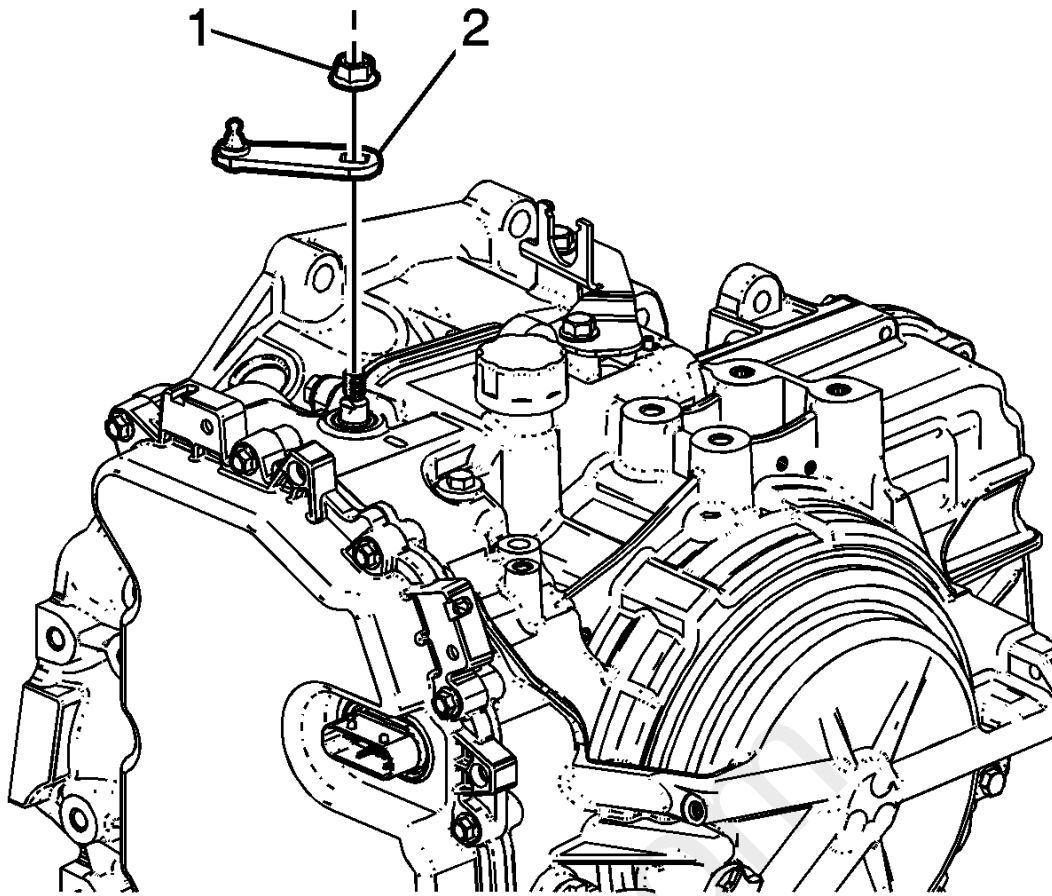


Fig. 27: View Of Transmission Range Selector Lever

Courtesy of GENERAL MOTORS COMPANY

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.

5. Remove the transmission range selector lever nut (1).
6. Remove the transmission range selector lever (2).

Installation Procedure

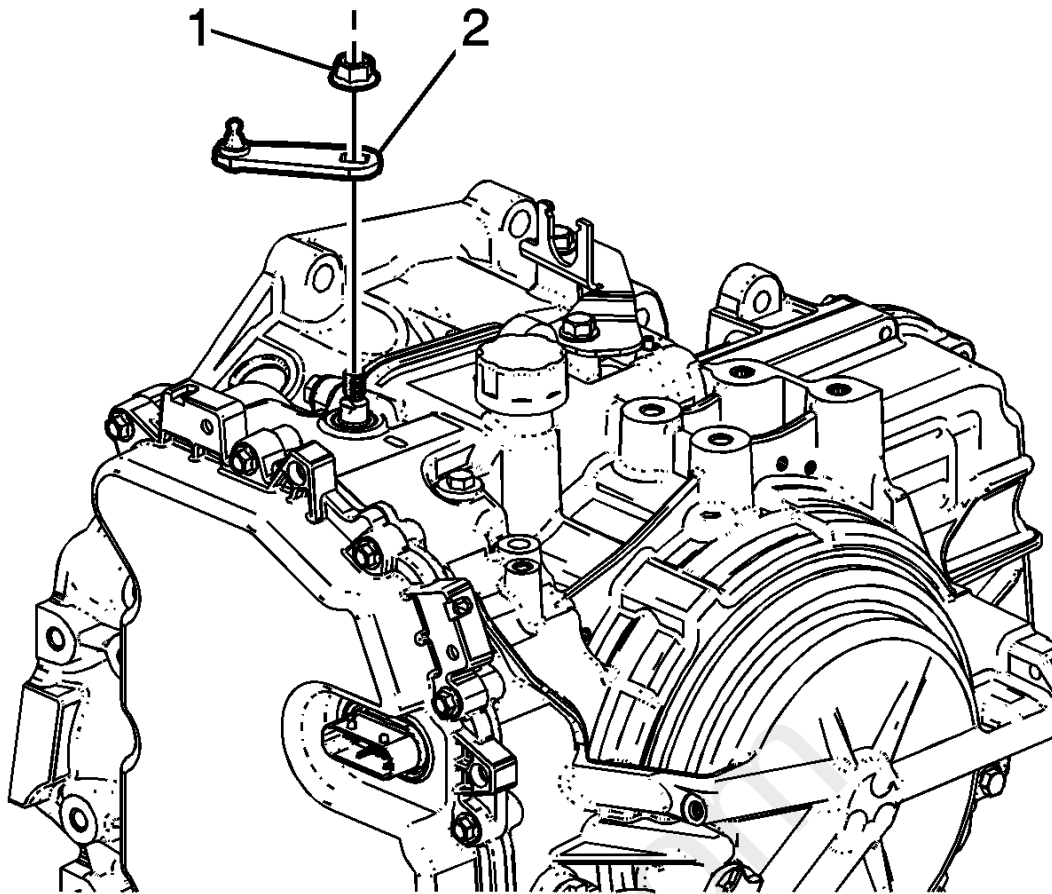


Fig. 28: View Of Transmission Range Selector Lever

Courtesy of GENERAL MOTORS COMPANY

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.

1. Install the transmission range selector lever (2).

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

2. Install the transmission range selector lever nut (1) and tighten to 30 N.m (22 lb ft).

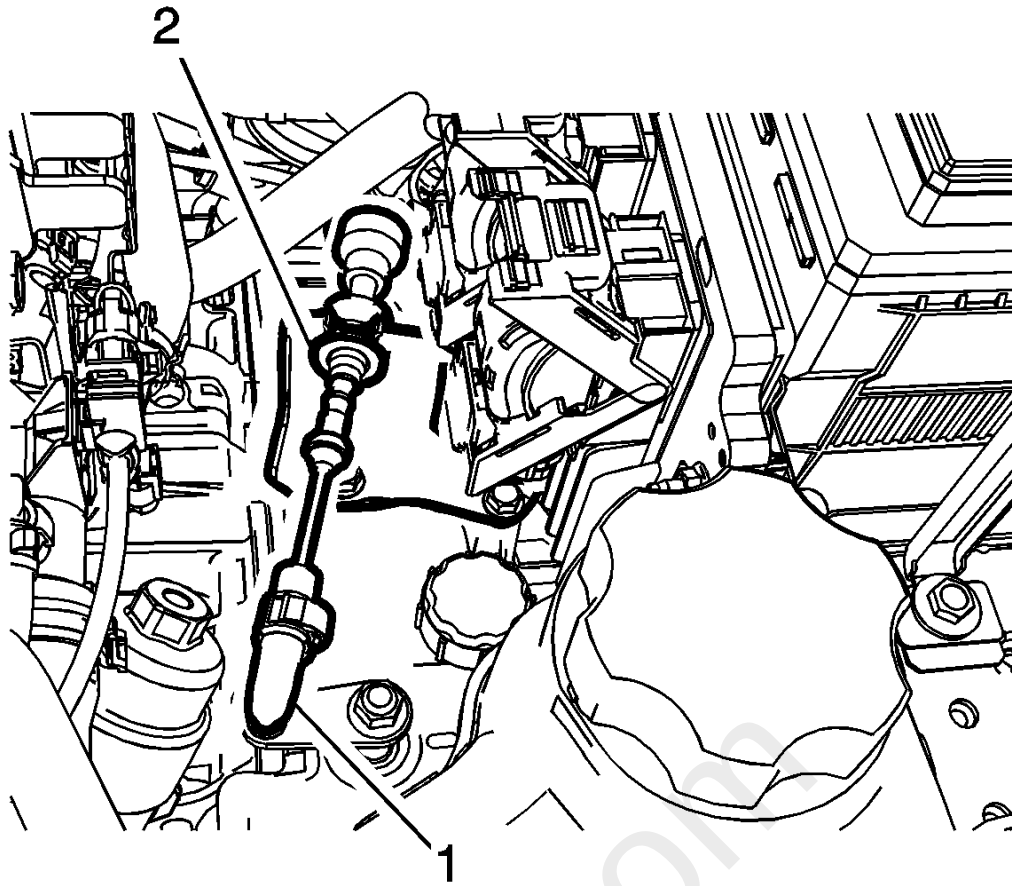


Fig. 29: Automatic Transmission Range Selector Lever Cable Terminal & Shift Lever Pin
Courtesy of GENERAL MOTORS COMPANY

3. Install the transmission range selector lever cable (2) to the cable bracket.

WARNING: After installing the transmission range selector shift cable, pull up and push down on ALL connections to verify that the connections are fully seated and properly engaged. Failure to perform this task can result in the vehicle not being able to shift into PARK causing potential vehicle damage and bodily injury.

4. Connect the transmission range selector lever cable terminal (1) to the transmission manual shift lever pin.
5. Check the range selector cable adjustment. Refer to [Range Selector Lever Cable Adjustment](#).
6. Install the battery tray. Refer to [Battery Tray Replacement](#).

RANGE SELECTOR LEVER LINK REPLACEMENT



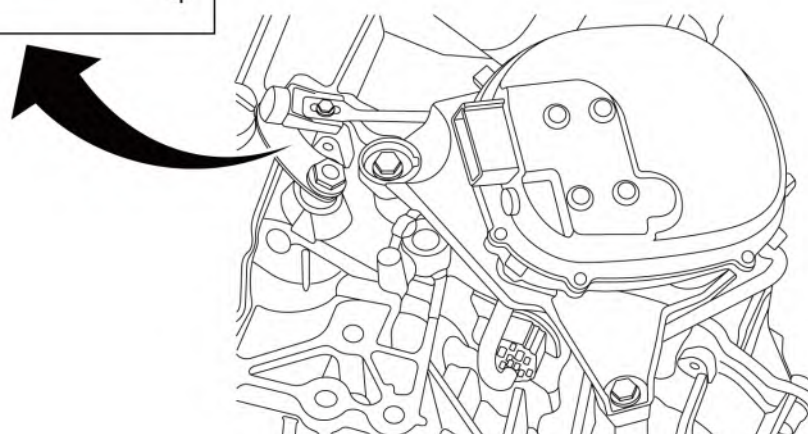
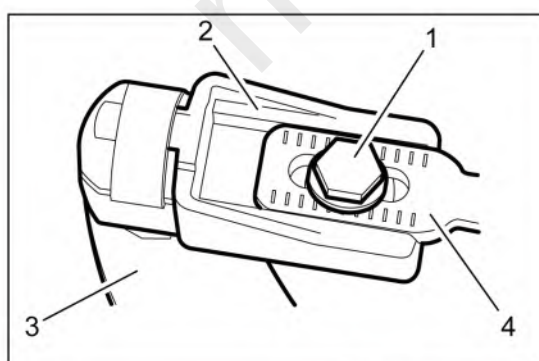
Fig. 30: Range Selector Lever Link

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure <u>Range Selector Actuator Replacement</u>	
1	Range Selector Lever Link Procedure Adjust the automatic transmission range selector lever link. <u>Range Selector Lever Link Adjustment</u>

RANGE SELECTOR LEVER LINK ADJUSTMENT

1. Remove the engine control module bracket. **Engine Control Module Bracket Replacement**



2. Loosen the adjuster bolt (1).
3. Remove the linkage end fitting (2) from the transmission lever ball stud (3).
4. Ensure the linkage end fitting (2) can freely slide on rod (4).
5. Reinstall the end fitting (2) over the transmission lever ball stud (3).

CAUTION: Fastener Caution

6. Tighten the adjuster bolt (1) to 4.7 N.m (42 lb in).
7. Install the engine control module bracket. Engine Control Module Bracket Replacement
8. Perform the transmission range control module range motor position learn procedure, Transmission Range Control Module Range Motor Position Learn (with MHG).
9. Perform Transmission Adaptive Values Learn. Transmission Adaptive Values Learn

RANGE SELECTOR ACTUATOR REPLACEMENT

Removal Procedure

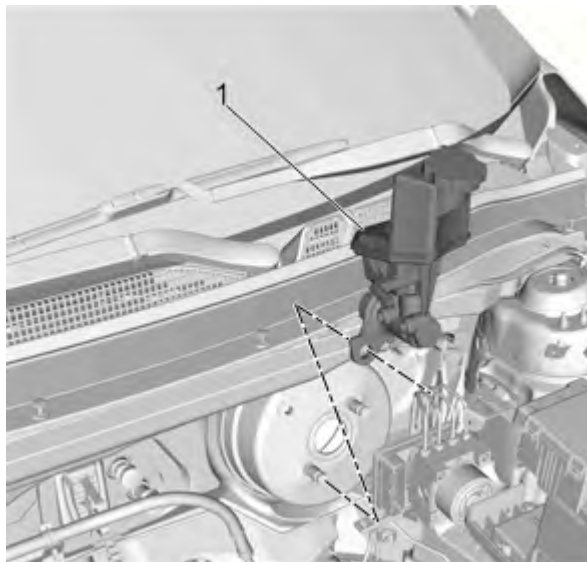
1. Set the parking brake and chock the wheels.

NOTE: If re-installing the original automatic transmission range selector actuator hardware module back into the vehicle, the Backup Park Lock Actuator must be activated prior to removal.

NOTE: If the automatic transmission range selector actuator hardware module is being replaced due to a malfunction, the original module does not need to be activated prior to removal.

NOTE: Perform this procedure before disconnecting the battery and removal of the actuator.

2. Perform the Backup Park Lock Actuator Disarming procedure. Backup Park Lock Actuator Disarming (with MHG)
3. Remove the charge air cooler outlet air tube. Charge Air Cooler Outlet Air Tube Replacement
4. Remove the primary brake pressure modulator valve pipe. Brake Pressure Modulator Valve Pipe Replacement (Primary). Brake Pressure Modulator Valve Pipe Replacement (Secondary).
5. Remove the secondary brake pressure modulator valve pipe. Brake Pressure Modulator Valve Pipe Replacement (Primary). Brake Pressure Modulator Valve Pipe Replacement (Secondary).



6. Remove the brake master cylinder (1). **Brake Master Cylinder Replacement**

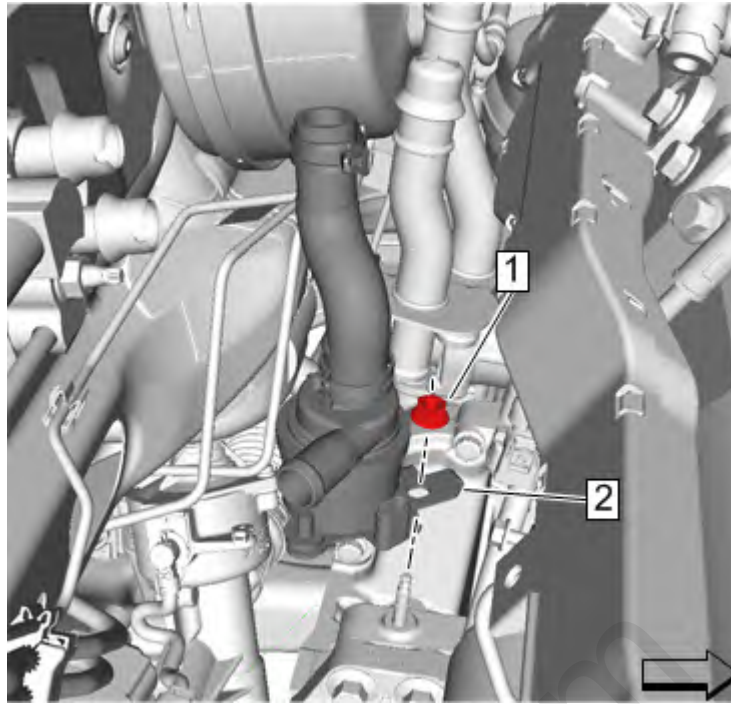


Fig. 33: Auxiliary Water Pump Bracket Nut And Auxiliary Water Pump
Courtesy of GENERAL MOTORS COMPANY

7. Remove the heater inlet and outlet pipe bracket nut (1).
8. Reposition the radiator surge tank out of the way. **Radiator Surge Tank Replacement (LYX without KL9)**, **Radiator Surge Tank Replacement (LTG LYX with KL9)**, **Radiator Surge Tank Replacement (LH7 FWD)**, **Radiator Surge Tank Replacement (LH7 AWD)**.
9. Disconnect the three starter cable retainers from the range selector actuator.
10. Disconnect the electrical connector.
11. Disconnect the range selector actuator lever link.

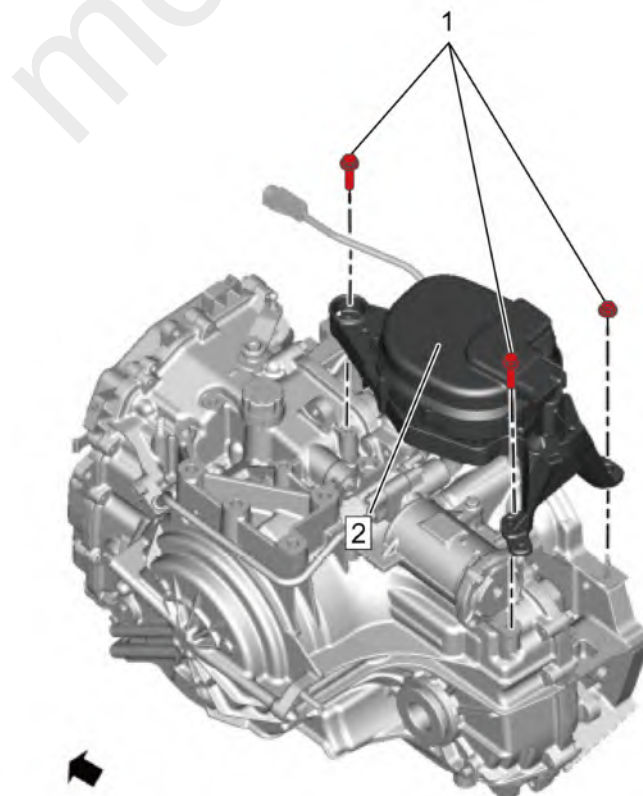


Fig. 34: Range Selector Actuator
Courtesy of GENERAL MOTORS COMPANY

12. Remove the three range selector actuator retaining fasteners (1).
13. Remove the range selector actuator (2).
14. Transfer components as necessary.

Installation Procedure

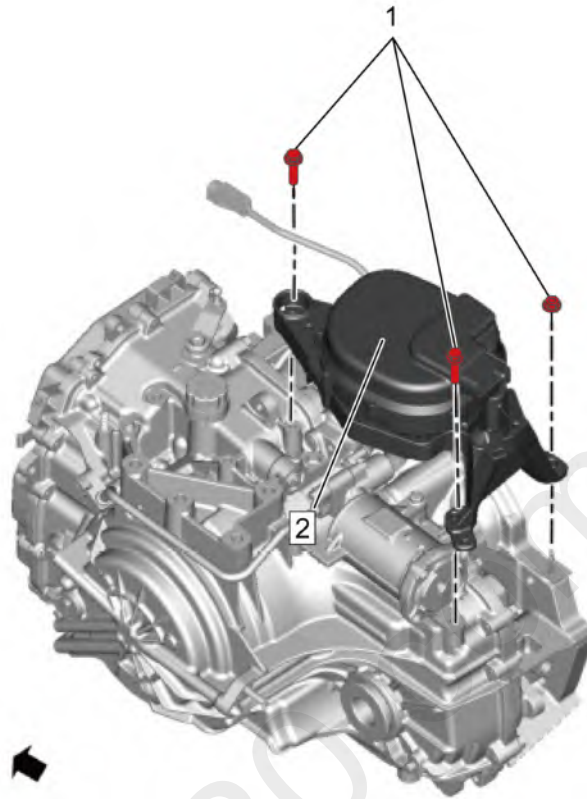


Fig. 35: Range Selector Actuator
Courtesy of GENERAL MOTORS COMPANY

1. Position the range selector actuator (2) to the transmission.

CAUTION: Fastener Caution

2. Install the three range selector actuator retaining fasteners (1) and tighten to 22 N.m (16 lb ft).
3. Connect the range selector actuator lever link.
4. Connect the electrical connector.
5. Connect the three starter cable retainers to the range selector actuator.
6. Reposition the radiator surge tank to the vehicle. Radiator Surge Tank Replacement (LYX without KL9), Radiator Surge Tank Replacement (LTG LYX with KL9), Radiator Surge Tank Replacement (LH7 FWD), Radiator Surge Tank Replacement (LH7 AWD).

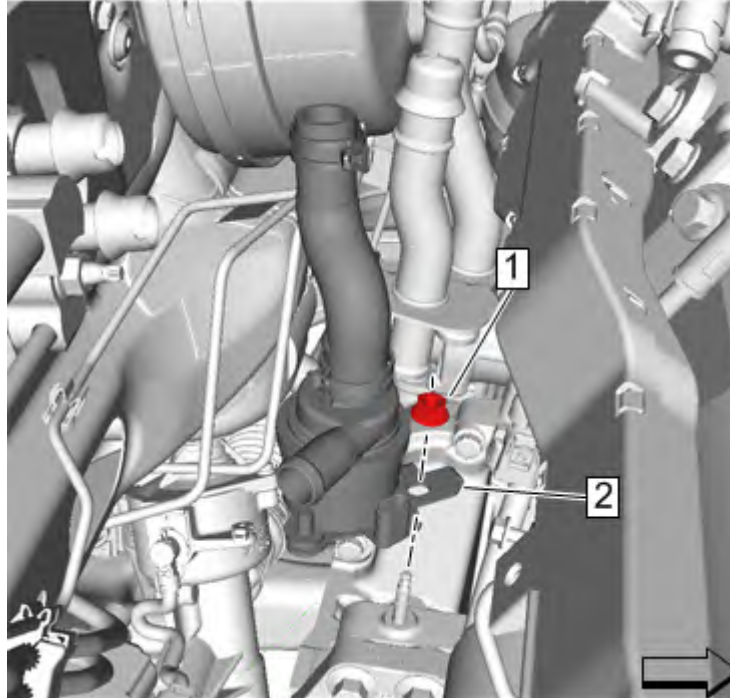


Fig. 36: Auxiliary Water Pump Bracket Nut And Auxiliary Water Pump
Courtesy of GENERAL MOTORS COMPANY

7. Install the heater inlet and outlet pipe bracket nut and tighten to 22 N.m (16 lb ft).

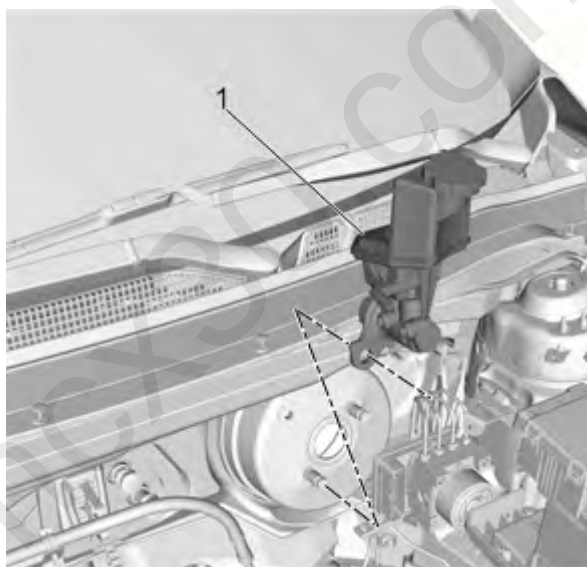


Fig. 37: Brake Master Cylinder Assembly
Courtesy of GENERAL MOTORS COMPANY

8. Install the brake master cylinder (1). [Brake Master Cylinder Replacement](#)
9. Install the primary brake pressure modulator valve pipe. [Brake Pressure Modulator Valve Pipe Replacement \(Primary\)](#). [Brake Pressure Modulator Valve Pipe Replacement \(Secondary\)](#).
10. Install the secondary brake pressure modulator valve pipe. [Brake Pressure Modulator Valve Pipe Replacement \(Primary\)](#). [Brake Pressure Modulator Valve Pipe Replacement \(Secondary\)](#).
11. Adjust the range selector lever link. [Range Selector Lever Link Adjustment](#)
12. Install the charge air cooler outlet air tube. [Charge Air Cooler Outlet Air Tube Replacement](#)
13. After installation is complete, perform the transmission adaptive values learn procedure. [Transmission Adaptive Values Learn](#)

RANGE SELECTOR LEVER CABLE REPLACEMENT

Removal Procedure

1. Set the park brake and chock the wheels.

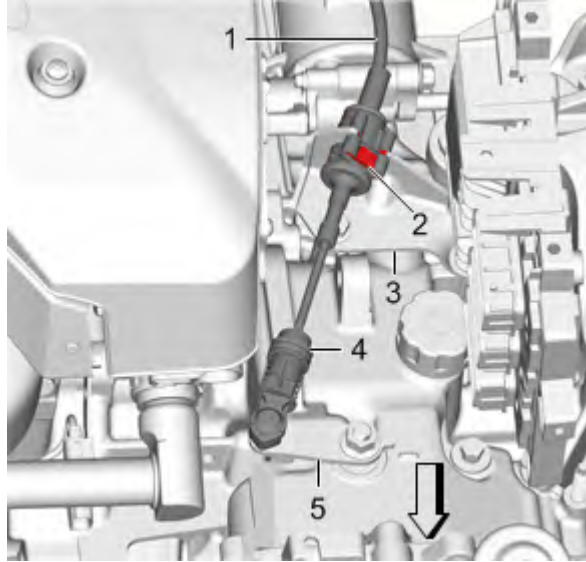


Fig. 38: Transmission Range Selector Lever Cable Components

Courtesy of GENERAL MOTORS COMPANY

2. Disconnect the range selector lever cable terminal (4) from the transmission manual shift lever (5).
3. Push the locking tab (2) forward in order to release the range selector lever cable (1) from the cable bracket (3).
4. Remove the range selector lever cable from the transmission.
5. Remove the front floor lower console. **Front Floor Lower Console Replacement (Equinox)**

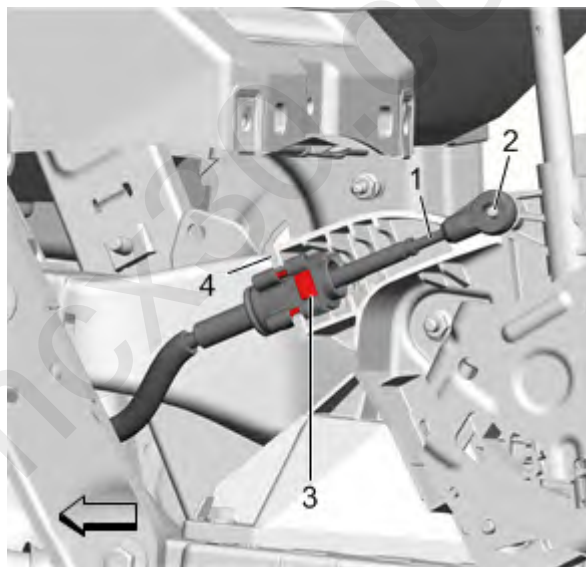


Fig. 39: Range Selector Lever Cable Components

Courtesy of GENERAL MOTORS COMPANY

6. Disconnect the range selector lever cable terminal (1) from the transmission control shift lever pin (2).
7. Push the locking tab (3) rearward in order to release the range selector lever cable (1) from the transmission control assembly (4).
8. Reposition the front left carpet to access the shift cable grommet, if necessary.

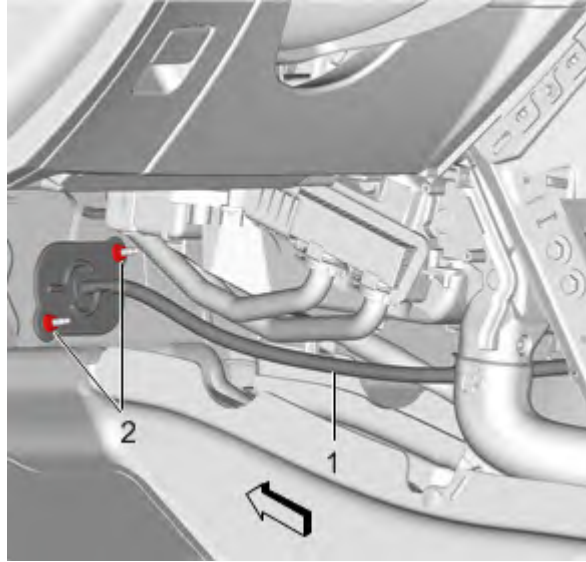


Fig. 40: Range Selector Lever Cable Grommet Fasteners
Courtesy of GENERAL MOTORS COMPANY

9. Remove the range selector lever cable grommet fasteners (2).
10. Remove the range selector lever cable (1) from the vehicle.

Installation Procedure

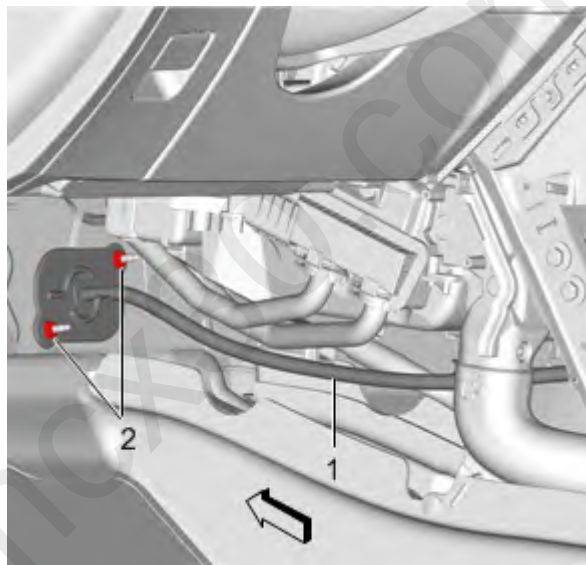


Fig. 41: Range Selector Lever Cable Grommet Fasteners
Courtesy of GENERAL MOTORS COMPANY

1. Install the range selector lever cable (1) through the cowl panel.

CAUTION: Refer to Fastener Caution .

2. Install the range selector lever cable grommet fasteners (2) and tighten to 6 N.m (53 lb in).

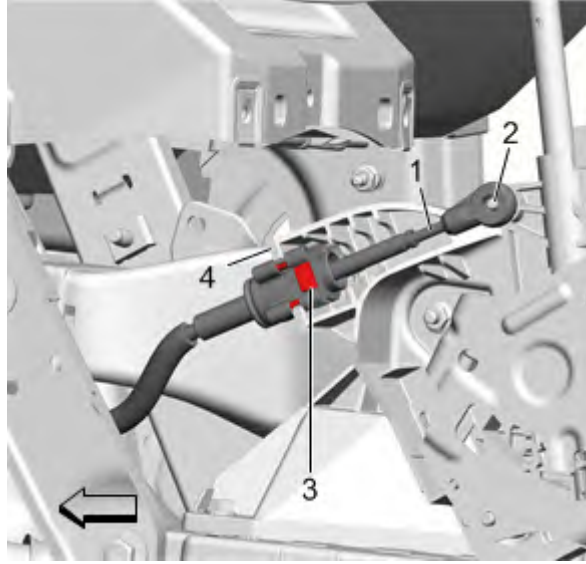


Fig. 42: Range Selector Lever Cable Components
Courtesy of GENERAL MOTORS COMPANY

3. Install the cable (1) to transmission control assembly (4).
4. Push the locking tab (3) forward in order to lock the range selector lever cable (1) to the transmission control assembly (4).

WARNING: After installing the transmission range selector shift cable, pull up and push down on ALL connections to verify that the connections are fully seated and properly engaged. Failure to perform this task can result in the vehicle not being able to shift into PARK causing potential vehicle damage and bodily injury.

5. Connect the transmission range selector lever cable terminal to the transmission control shift lever pin (2).
6. Install the front floor lower console. [Front Floor Lower Console Replacement \(Equinox\)](#)
7. Position the front left carpet, if necessary.

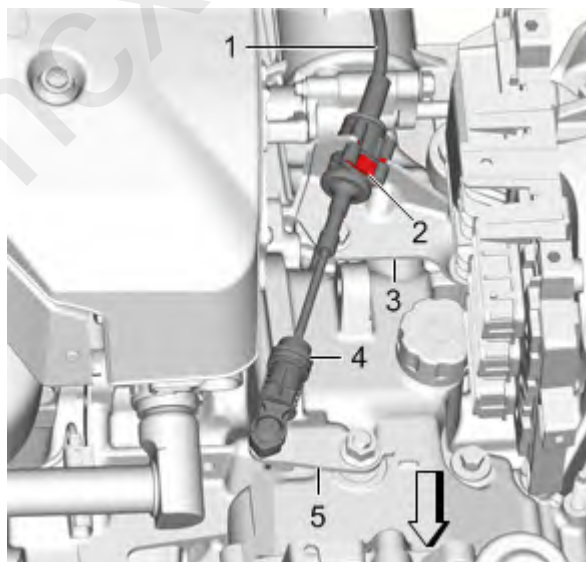


Fig. 43: Transmission Range Selector Lever Cable Components
Courtesy of GENERAL MOTORS COMPANY

8. Install the transmission range selector lever cable (1) to the cable bracket (3).
9. Connect the transmission range selector lever cable terminal (4) to the transmission manual shift lever (5).
10. Push the locking tab (2) rearward in order to lock the range selector lever cable (1) to the range selector lever cable bracket (3).
11. Adjust the range selector lever cable. [Range Selector Lever Cable Adjustment](#)

RANGE SELECTOR LEVER CABLE ADJUSTMENT

1. Remove the engine control module bracket. [Engine Control Module Bracket Replacement](#)

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.

2. Set the park brake and chock the wheels.
3. Verify the transmission range select lever is in the park position.
4. Verify the transmission manual shift lever is in the park position.

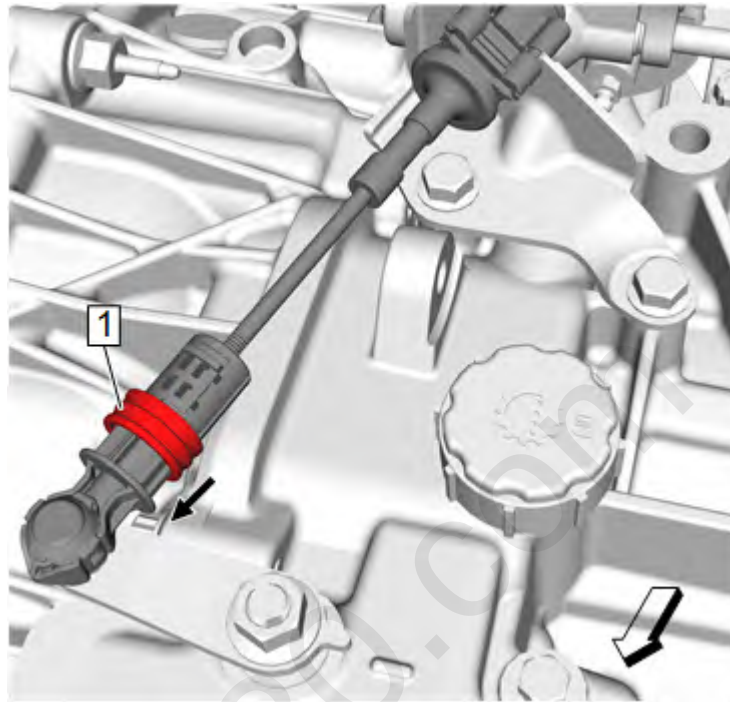


Fig. 44: Retaining Collar

Courtesy of GENERAL MOTORS COMPANY

5. Pull the retaining collar (1) forward.

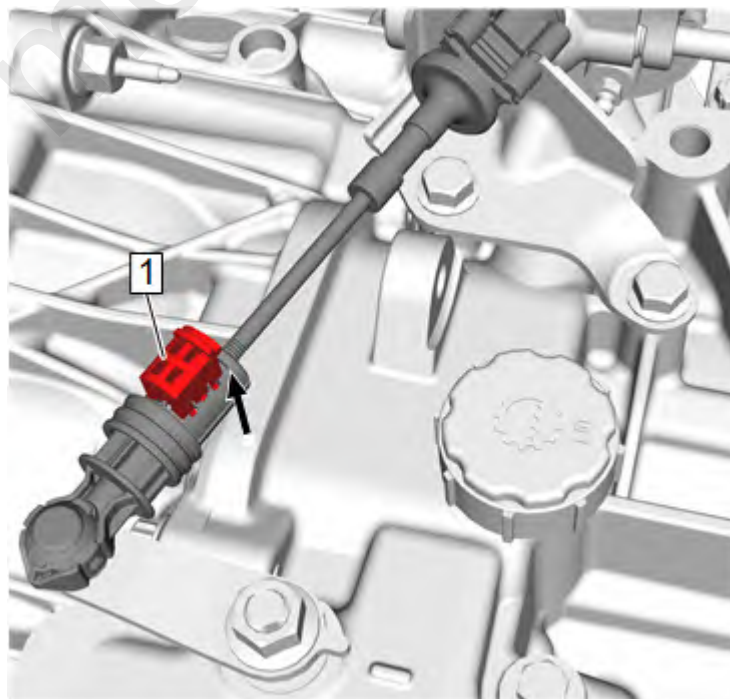


Fig. 45: Release Range Select Cable Adjusting Retainer By Pushing It Upward

Courtesy of GENERAL MOTORS COMPANY

6. Release the range select cable adjusting retainer by pushing it upward (1).

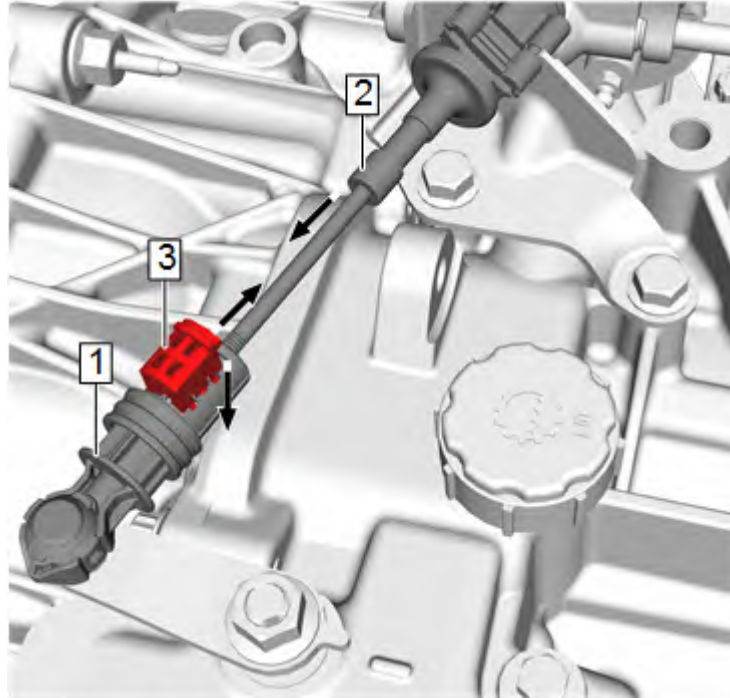


Fig. 46: Adjuster Retainer

Courtesy of GENERAL MOTORS COMPANY

7. Slide the two halves (1, 2) of the range select cable together until all free play is removed.
8. Depress the adjuster retainer (3) locking the adjuster retainer completely.

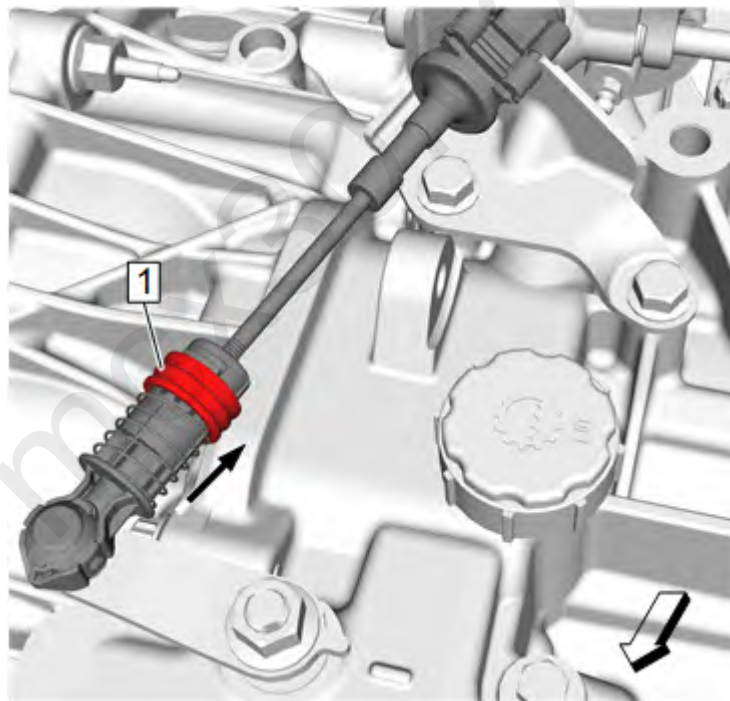


Fig. 47: Retaining Collar

Courtesy of GENERAL MOTORS COMPANY

9. Release the retaining collar (1).

WARNING: After installing the transmission range selector shift cable, pull up and push down on ALL connections to verify that the connections are fully seated and properly engaged. Failure to perform this task can result in the vehicle not being able to shift into PARK causing potential vehicle damage and bodily injury.

10. Pull both halves of the range select cable in opposite directions to verify the cable adjuster is secured.
11. Check the transmission range select lever in all gear selections for proper operation.
12. Install the engine control module bracket. [Engine Control Module Bracket Replacement](#)

RANGE SELECTOR LEVER CABLE BRACKET REPLACEMENT

Removal Procedure

1. Set the park brake and chock the wheels.
2. Disconnect the range selector lever cable from the range selector lever cable bracket. [Range Selector Lever Cable Replacement](#)

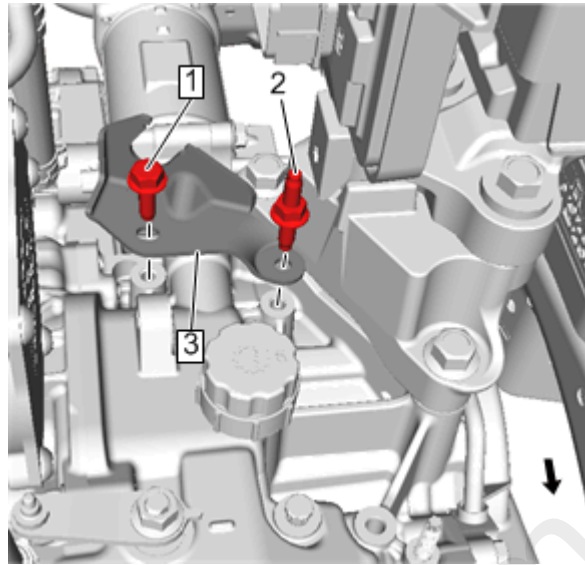


Fig. 48: Transmission Range Selector Cable Bracket, Bolt And Stud
Courtesy of GENERAL MOTORS COMPANY

3. Remove the transmission range selector cable bracket bolt (1).
4. Remove the transmission range selector cable bracket stud (2).
5. Remove the transmission range selector cable bracket (3).

Installation Procedure

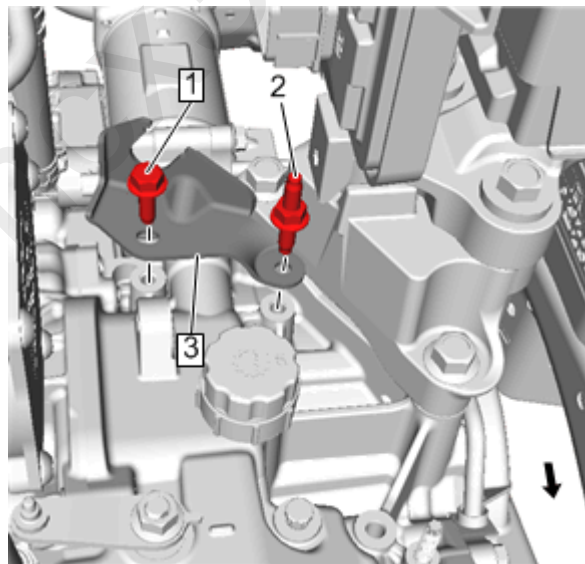


Fig. 49: Transmission Range Selector Cable Bracket, Bolt And Stud
Courtesy of GENERAL MOTORS COMPANY

1. Install the transmission range selector cable bracket (3).

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

2. Install the transmission range selector lever cable bracket stud (2) and tighten to 22 N.m (16 lb ft).
3. Install the transmission range selector lever cable bracket bolt (1) and tighten to 22 N.m (16 lb ft).
4. Connect the range selector lever cable to the range selector lever cable bracket. [Range Selector Lever Cable Replacement](#)

5. Check the range selector cable adjustment. [Range Selector Lever Cable Adjustment](#)

RANGE SELECTOR LEVER CABLE LEVER REPLACEMENT

Removal Procedure

1. Set the park brake and chock the wheels.
2. Remove the battery tray. Refer to [Battery Tray Replacement](#).

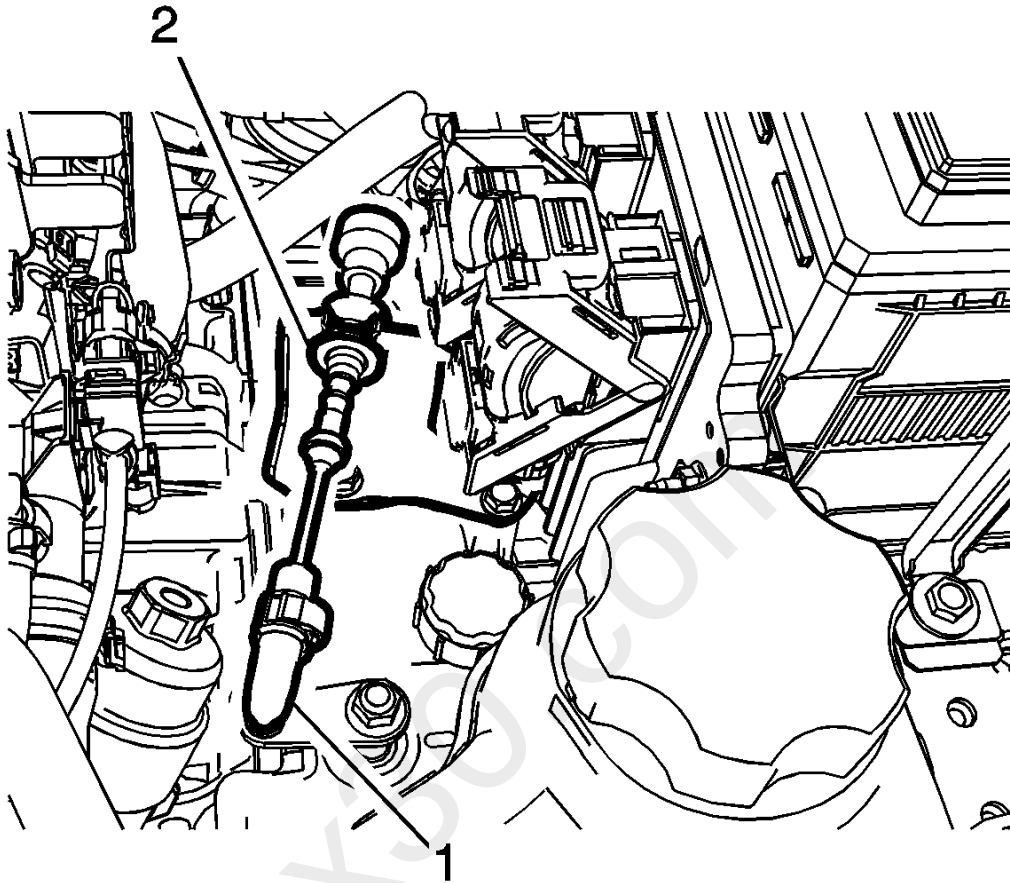


Fig. 50: Automatic Transmission Range Selector Lever Cable Terminal & Shift Lever Pin
Courtesy of GENERAL MOTORS COMPANY

3. Disconnect the transmission range selector lever cable terminal (1) from the transmission manual shift lever pin.
4. Press the locking tabs inward in order to release the transmission range selector lever cable (2) from the cable bracket.

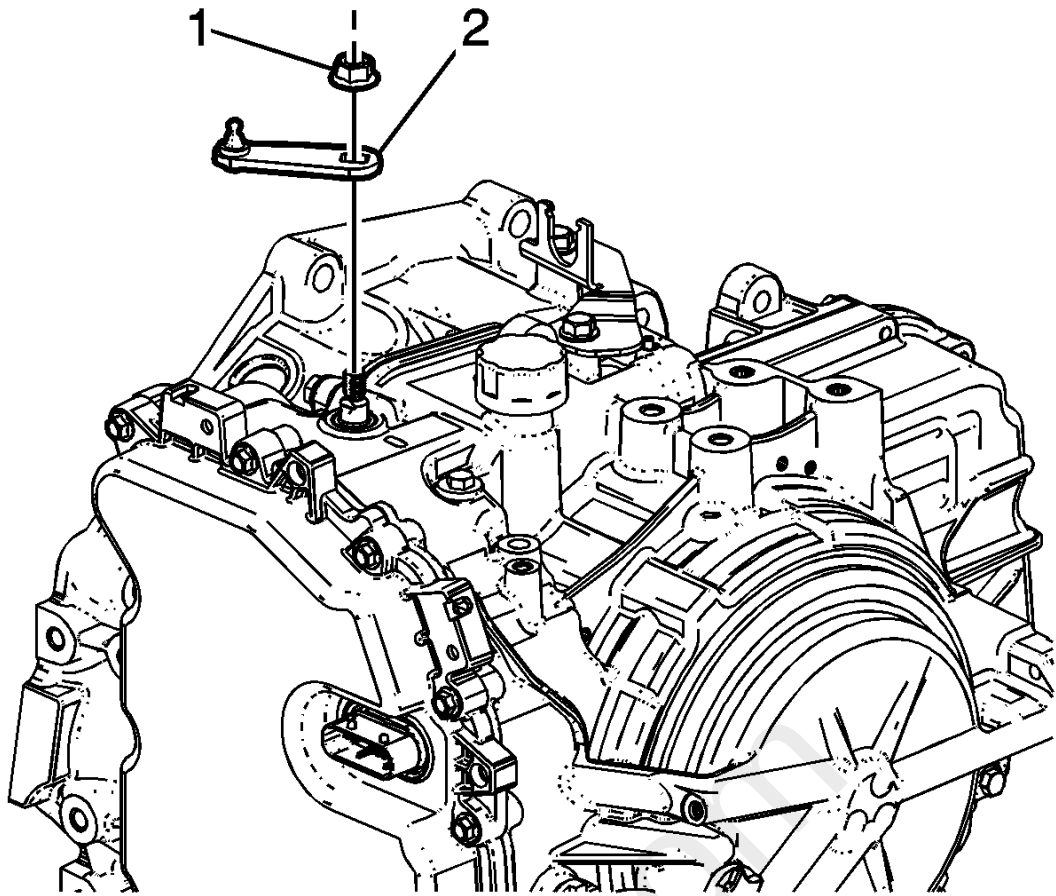


Fig. 51: View Of Transmission Range Selector Lever

Courtesy of GENERAL MOTORS COMPANY

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.

5. Remove the transmission range selector lever nut (1).
6. Remove the transmission range selector lever (2).

Installation Procedure

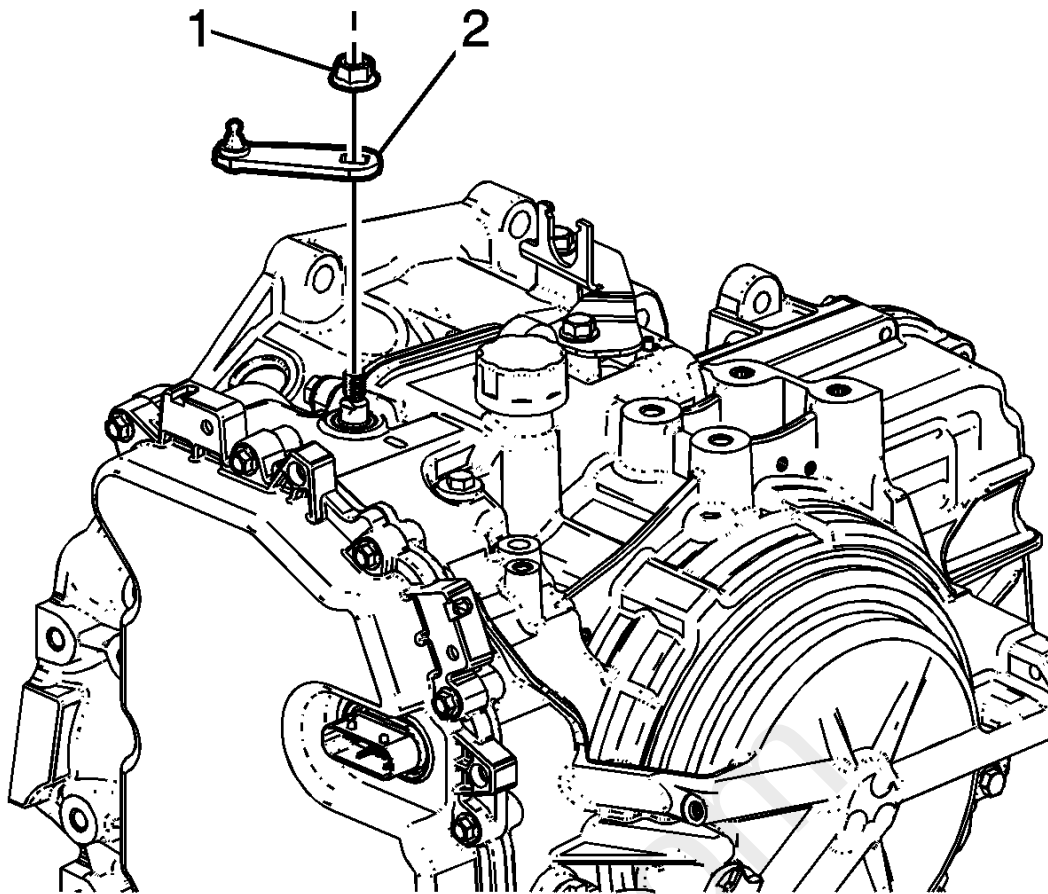


Fig. 52: View Of Transmission Range Selector Lever

Courtesy of GENERAL MOTORS COMPANY

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.

1. Install the transmission range selector lever (2).

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

2. Install the transmission range selector lever nut (1) and tighten to 30 N.m (22 lb ft).

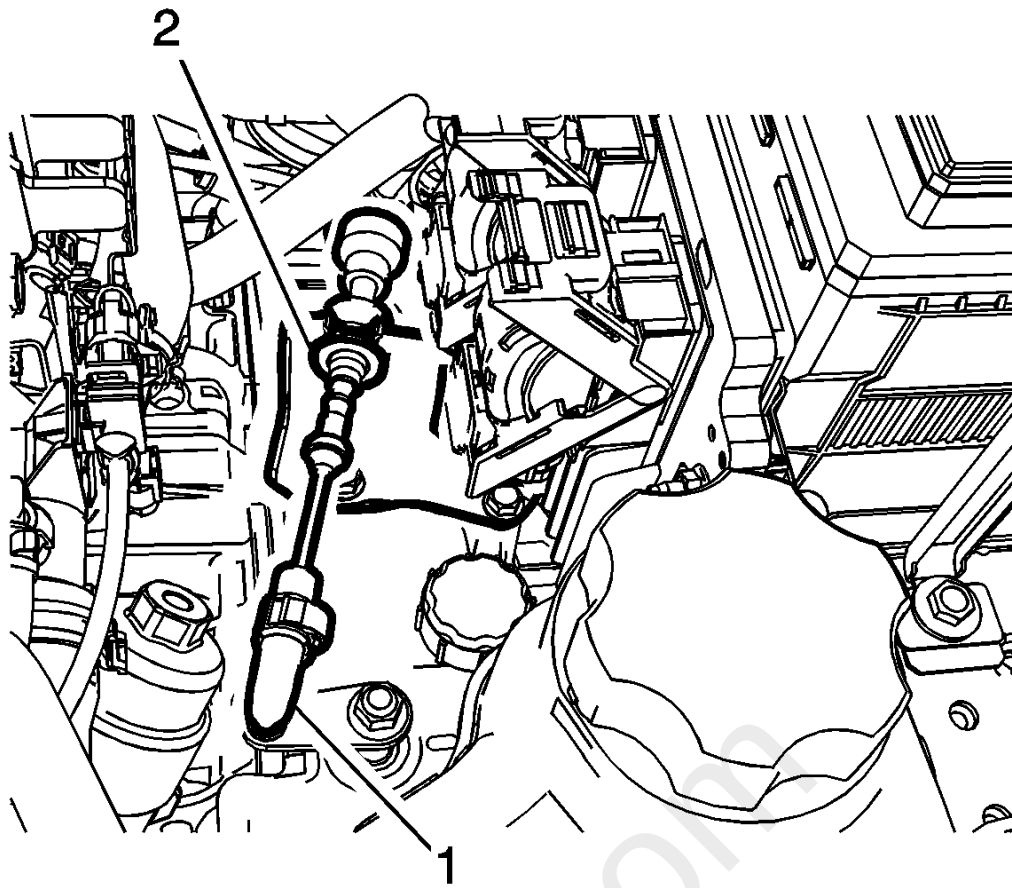


Fig. 53: Automatic Transmission Range Selector Lever Cable Terminal & Shift Lever Pin
Courtesy of GENERAL MOTORS COMPANY

3. Install the transmission range selector lever cable (2) to the cable bracket.

WARNING: After installing the transmission range selector shift cable, pull up and push down on ALL connections to verify that the connections are fully seated and properly engaged. Failure to perform this task can result in the vehicle not being able to shift into PARK causing potential vehicle damage and bodily injury.

4. Connect the transmission range selector lever cable terminal (1) to the transmission manual shift lever pin.
5. Check the range selector cable adjustment. Refer to [Range Selector Lever Cable Adjustment](#).
6. Install the battery tray. Refer to [Battery Tray Replacement](#).

TRANSMISSION FLUID DRAIN AND FILL

Removal Procedure

1. Raise and support the vehicle. [Lifting and Jacking the Vehicle](#)

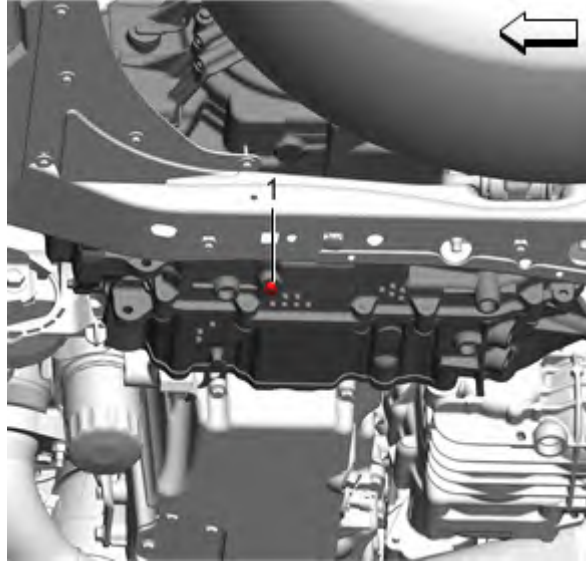


Fig. 54: Transmission Fluid Drain Plug

Courtesy of GENERAL MOTORS COMPANY

2. Remove the fluid drain plug (1).
3. Drain transmission fluid into a suitable container.

CAUTION: Refer to Component Fastener Tightening Caution .

4. Install the fluid drain plug (1) and tighten to 12 N.m (106 lb in).

Installation Procedure

1. Lower the vehicle.

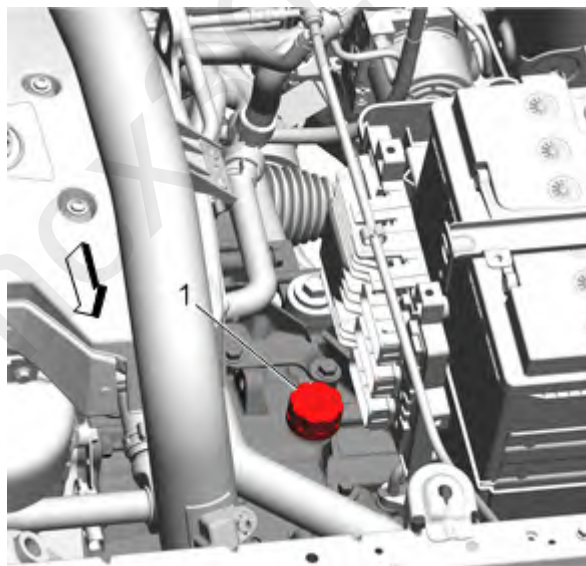


Fig. 55: Transmission Fluid Fill Cap

Courtesy of GENERAL MOTORS COMPANY

2. Remove the fluid fill cap (1).
3. Fill the transmission to the proper level with the correct fluid. Adhesives, Fluids, Lubricants, and Sealers , Approximate Fluid Capacities , and Transmission Fluid Level and Condition Check .
4. Install the fluid fill cap (1).

AUXILIARY FLUID ACCUMULATOR REPLACEMENT (EQUINOX)

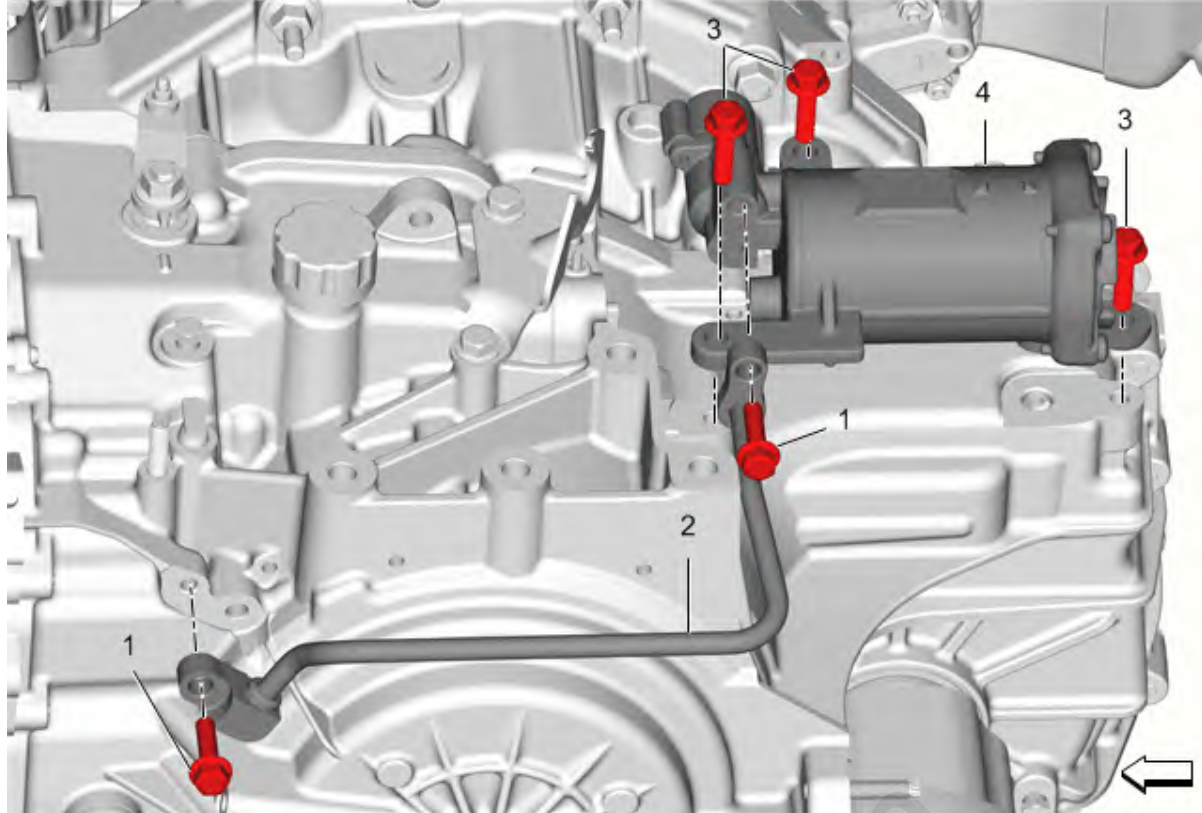


Fig. 56: Auxiliary Fluid Accumulator
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
WARNING: The automatic transmission fluid accumulator may be pressurized greater than 120 psi (827 kpa) and fluid may be hot. When servicing accumulator, key must be OFF for a minimum of 10 minutes. Do not open bleeder screw until instructed to do so or personal injury may result.	
Preliminary Procedures 1. Disconnect Battery Tray Replacement 2. Range Selector Lever Cable Replacement	
1	A/Trans Auxiliary Fluid Accumulator Pipe Bolt [2x] CAUTION: Refer to Fastener Caution . Tighten 22 N.m (16 lb ft)
2	A/Trans Auxiliary Fluid Accumulator Pipe
3	A/Trans Auxiliary Fluid Accumulator Bolt [3x] Tighten 22 N.m (16 lb ft)
4	A/Trans Auxiliary Fluid Accumulator Assembly Procedures 1. Disconnect/connect the electrical connector. 2. Replace seals as necessary. 3. Check the transmission fluid level. Transmission Fluid Level and Condition Check

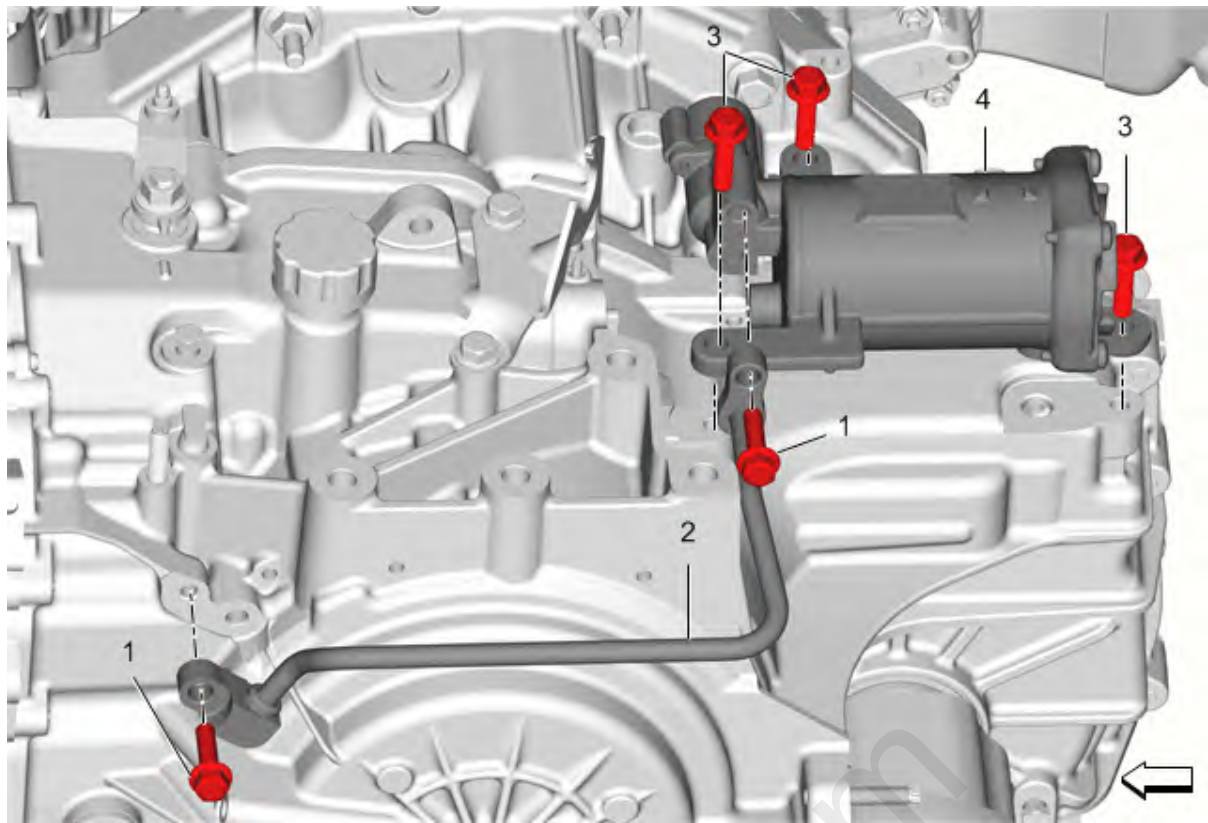


Fig. 57: Auxiliary Fluid Accumulator
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
WARNING: The automatic transmission fluid accumulator may be pressurized greater than 120 psi (827 kpa) and fluid may be hot. When servicing accumulator, key must be OFF for a minimum of 10 minutes. Do not open bleeder screw until instructed to do so or personal injury may result.	
Preliminary Procedures Battery Tray Replacement Range Selector Actuator Replacement	
1	Auxiliary Fluid Accumulator Pipe Bolt [2x] CAUTION: Refer to Fastener Caution . Tighten 22 N.m (16 lb ft)
2	Auxiliary Fluid Accumulator Pipe
3	Auxiliary Fluid Accumulator Bolt [3x] Tighten 22 N.m (16 lb ft)

Callout	Component Name
4	Auxiliary Fluid Accumulator Assembly Procedures 1. Disconnect/connect the electrical connector. 2. Replace seals as necessary. 3. Check the transmission fluid level. Transmission Fluid Level and Condition Check

TRANSMISSION FLUID ACCUMULATOR PIPE REPLACEMENT

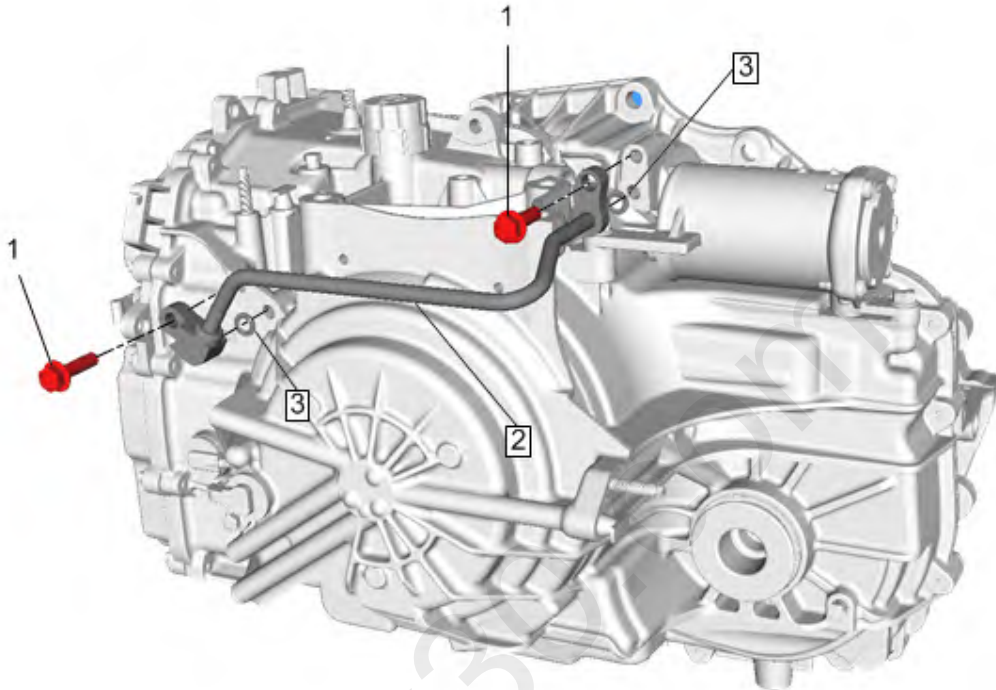


Fig. 58: Transmission Fluid Accumulator Pipe
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures 1. Remove the battery tray. Battery Tray Replacement . 2. Remove the left front wheelhouse liner. Front Wheelhouse Liner Replacement - Left Side (Equinox), Front Wheelhouse Liner Replacement - Left Side (Terrain)	

Callout	Component Name
1	A/Trans Auxiliary Fluid Accumulator Bolts (Qty: 2) CAUTION: Refer to Fastener Caution . Procedure 1. Fasten pipe to auxiliary accumulator and tighten bolt just enough to hold in place. 2. Align pipe to case and tighten bolt just enough to hold in place. 3. Check the transmission fluid level. Transmission Fluid Level and Condition Check Tighten 22 N.m (16 lb ft)
2	A/Trans Fluid Accumulator Pipe
3	A/Trans Fluid Accumulator Pipe Seals (Qty: 2) NOTE: Install NEW seals.

AUTOMATIC TRANSMISSION FLUID PRESSURE TEST HOLE PLUG REPLACEMENT

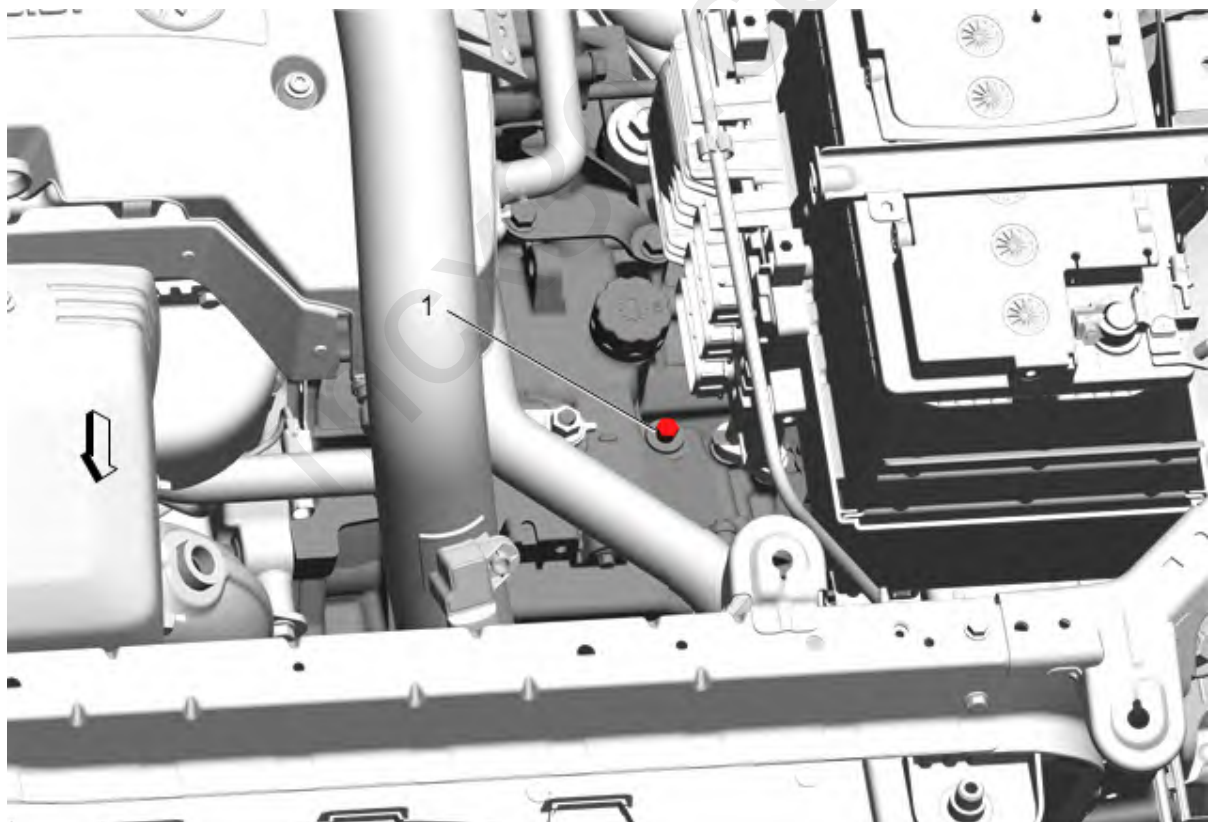


Fig. 59: Automatic Transmission Fluid Pressure Test Hole Plug
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Reposition the engine control module without disconnecting the electrical connectors. Engine Control Module Replacement	

Callout	Component Name
1	Fluid Pressure Test Plug CAUTION: Refer to Component Fastener Tightening Caution . Tighten 12 N.m (106 lb in)

FRONT WHEEL DRIVE SHAFT SEAL REPLACEMENT - LEFT SIDE

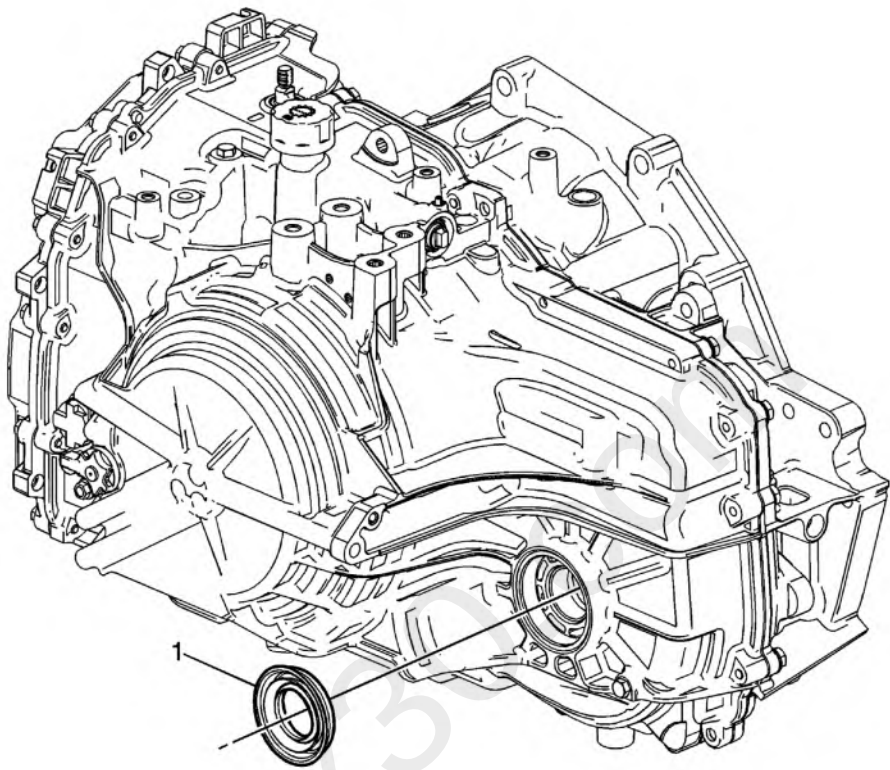


Fig. 60: Identifying Left Front Wheel Drive Shaft Seal
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Front Wheel Drive Half Shaft Replacement - Left Side	
1	Left Front Wheel Drive Shaft Oil Seal Procedure - For seal removal use GE-6125-1B slide hammer with DT-23129 universal seal remover. - For seal installation use GE-8092 driver handle with DT-47790 seal installer. Special Tools DT-23129 Universal Seal Remover DT-47790 Seal Installer GE-6125 - 1B Slide Hammer GE-8092 Driver Handle For equivalent regional tools, refer to Special Tools .

FRONT WHEEL DRIVE SHAFT SEAL REPLACEMENT - RIGHT SIDE

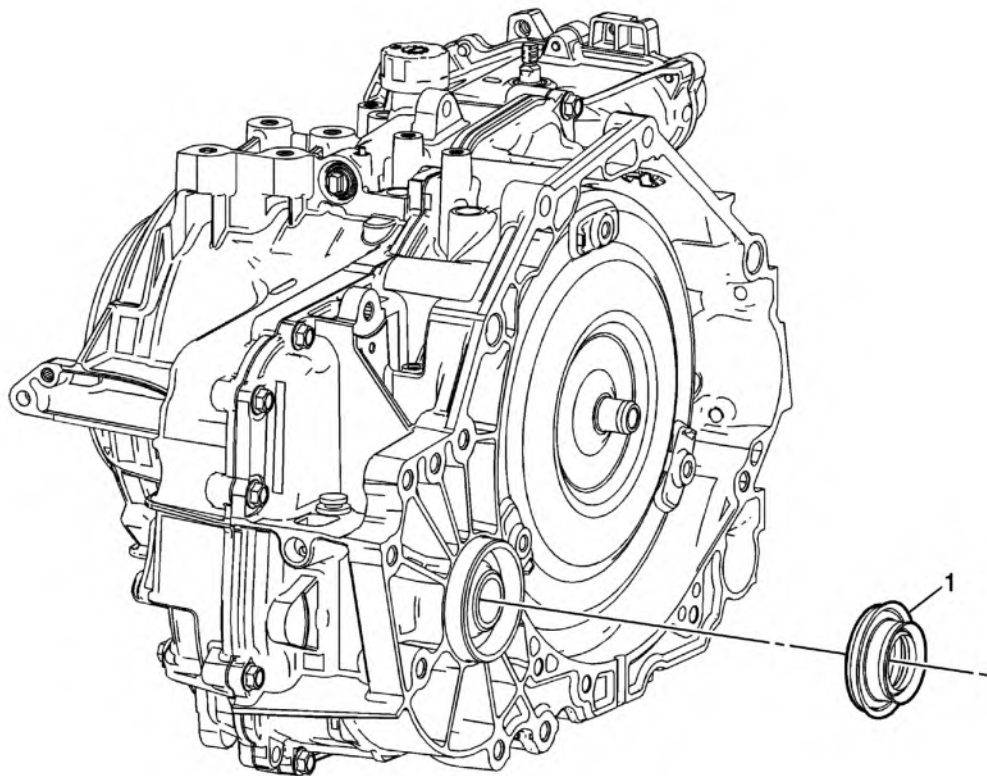


Fig. 61: Identifying Right Front Wheel Drive Shaft Seal

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure <u>Front Wheel Drive Half Shaft Replacement - Right Side (AWD)</u> , <u>Front Wheel Drive Half Shaft Replacement - Right Side (M3U, MHG, MNH, MNK with FWD)</u> , <u>Front Wheel Drive Half Shaft Replacement - Right Side (M3D, M3H with FWD)</u>	
1	Right Front Wheel Drive Shaft Oil Seal Procedure 1. For seal removal use GE-6125-1B slide hammer with DT-23129 universal seal remover. 2. For seal installation use GE-8092 driver handle with DT-47790 seal installer. Special Tools • DT-23129 Universal Seal Remover • DT-47790 Seal Installer • GE-6125-1B Slide Hammer • GE-8092 Driver Handle For equivalent regional tools, <u>Special Tools</u> .

MANUAL SHIFT SHAFT AND SEAL REPLACEMENT

Special Tools

- **DT-45201** Cooler Line Seal Remover
- **DT-49101** Seal Installer

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

Removal Procedure

1. Remove the battery tray. Refer to **Battery Tray Replacement** .

2. Remove the manual shaft and position switch assembly. Refer to [Manual Shift Detent Lever with Shaft Position Switch Assembly Replacement](#).

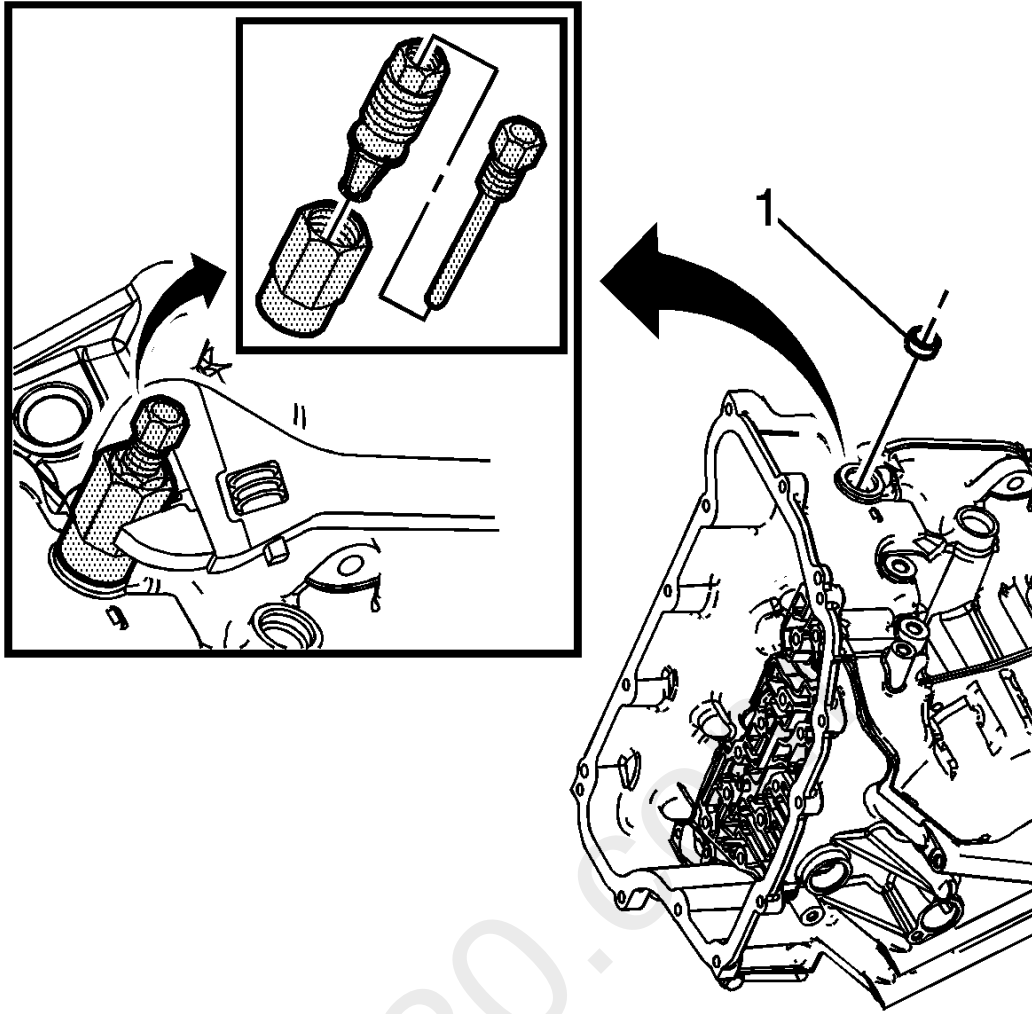


Fig. 62: Cooler Line Seal Remover

Courtesy of GENERAL MOTORS COMPANY

3. Remove the manual shaft seal (1) using **DT-45201** remover.

Installation Procedure

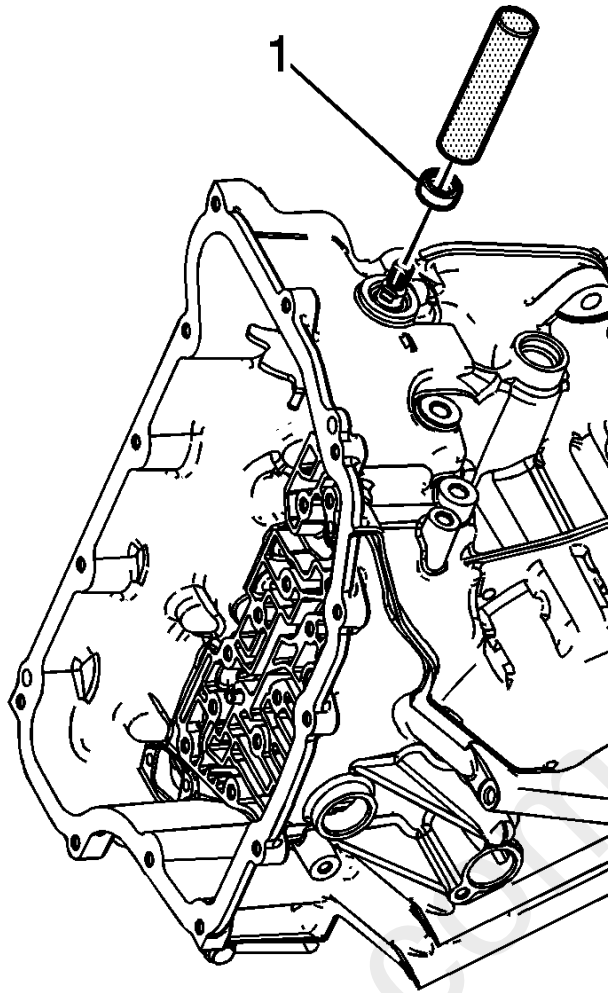


Fig. 63: Manual Shaft Seal Installation Tool

Courtesy of GENERAL MOTORS COMPANY

1. Install the manual shaft seal (1) using **DT-49101** seal installer.
2. Install the manual shaft and position switch assembly. Refer to [Manual Shift Detent Lever with Shaft Position Switch Assembly Replacement](#).
3. Install the battery tray. Refer to [Battery Tray Replacement](#).

CONTROL SOLENOID VALVE AND TRANSMISSION CONTROL MODULE ASSEMBLY REPLACEMENT

Removal Procedure

1. Remove the transmission control valve body cover. [Control Valve Body Cover Replacement](#)

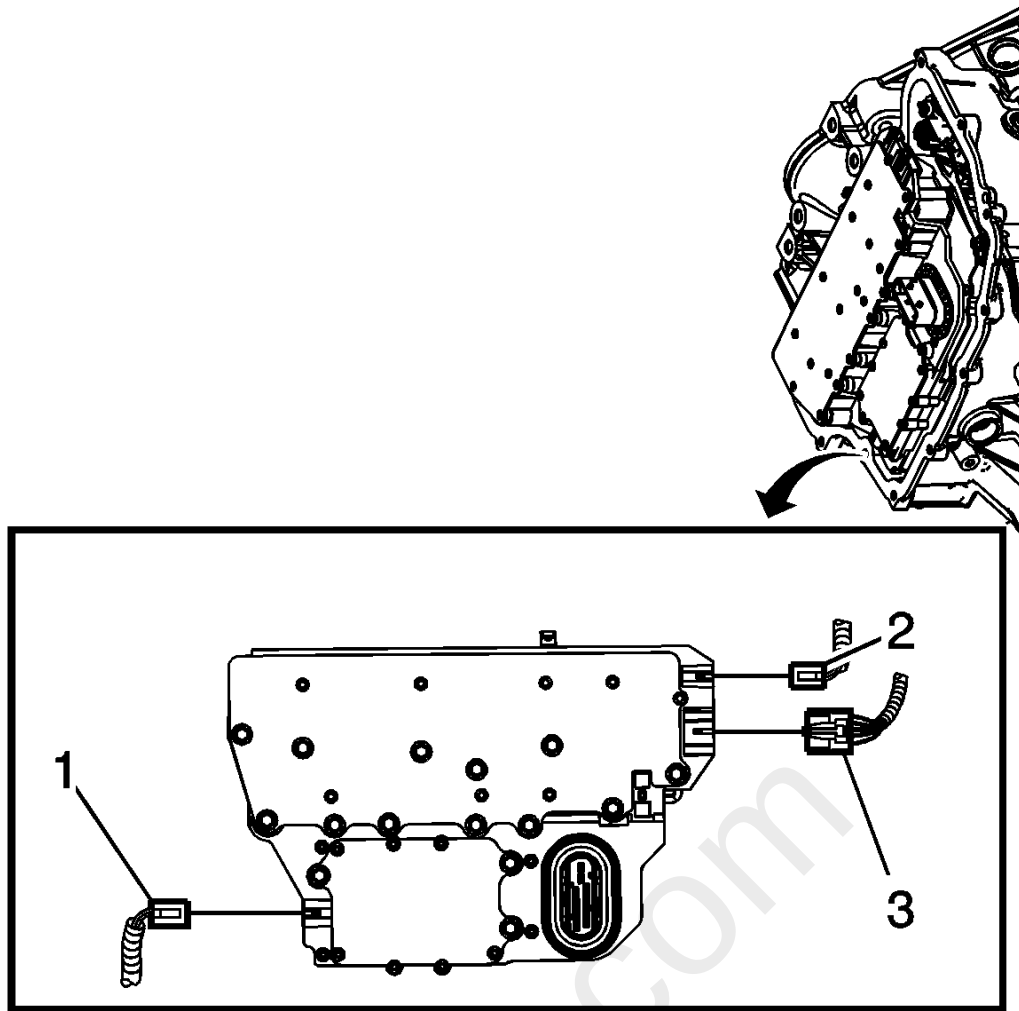


Fig. 64: Identifying Speed Sensor & Shift Position Switch Electrical Connectors
Courtesy of GENERAL MOTORS COMPANY

2. Disconnect the output speed sensor electrical connector (2).
3. Disconnect the shift position switch electrical connector (3).
4. Disconnect the input speed sensor electrical connector (1).

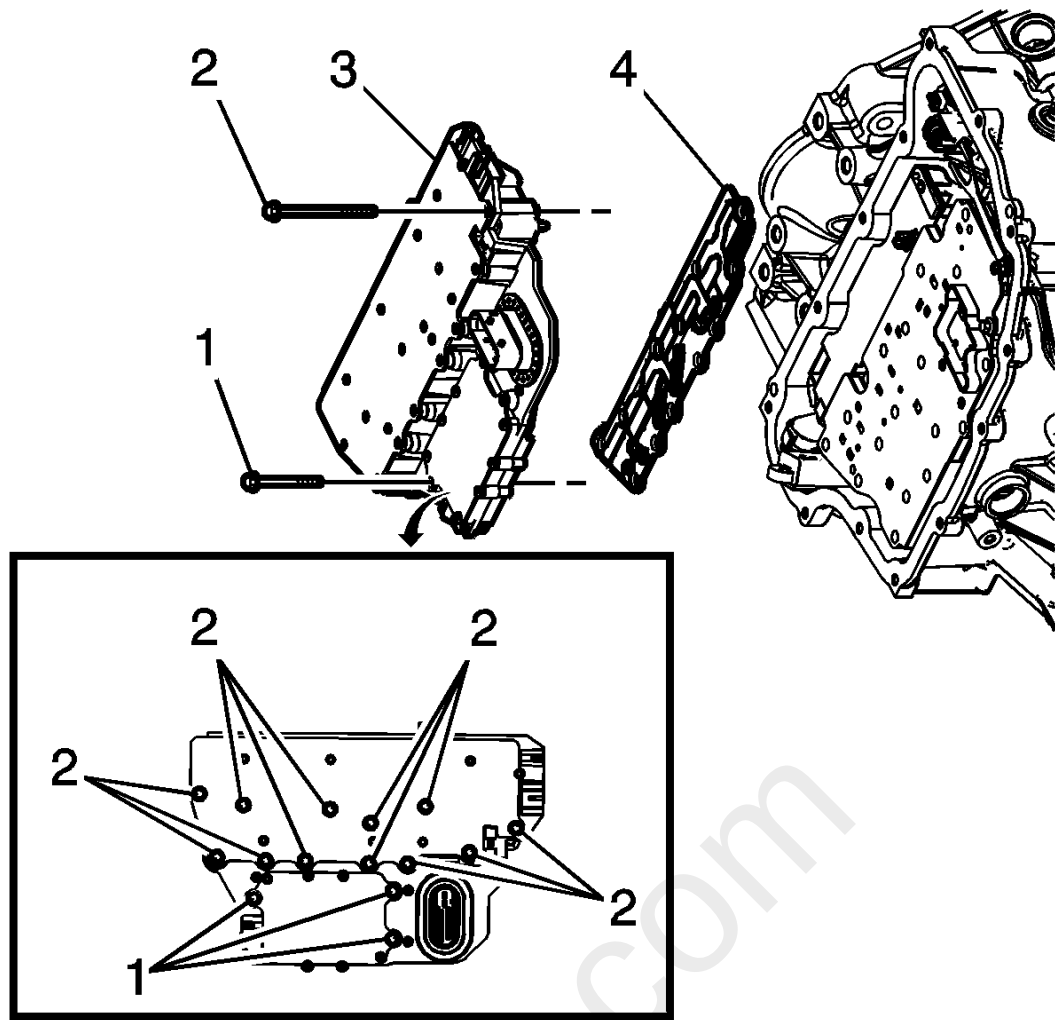


Fig. 65: Locating Control Valve Body & Bolts
 Courtesy of GENERAL MOTORS COMPANY

5. Remove the 3 control solenoid valve assembly bolts (1) M5 x 40.5.
6. Remove the 12 control solenoid valve assembly bolts (2) M6 x 97.
7. Remove the control solenoid valve assembly with transmission control module (3).

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.

8. Remove the control solenoid valve assembly filter plate (4). DISCARD the filter plate. It is not reusable.
9. Inspect the pressure switch seals for damage or contamination. Replace the control solenoid valve assembly as necessary.
10. Inspect the channel plate bolt pass through holes for damage or brinelling. Any damage could cause leaking. Replace as necessary.

Installation Procedure

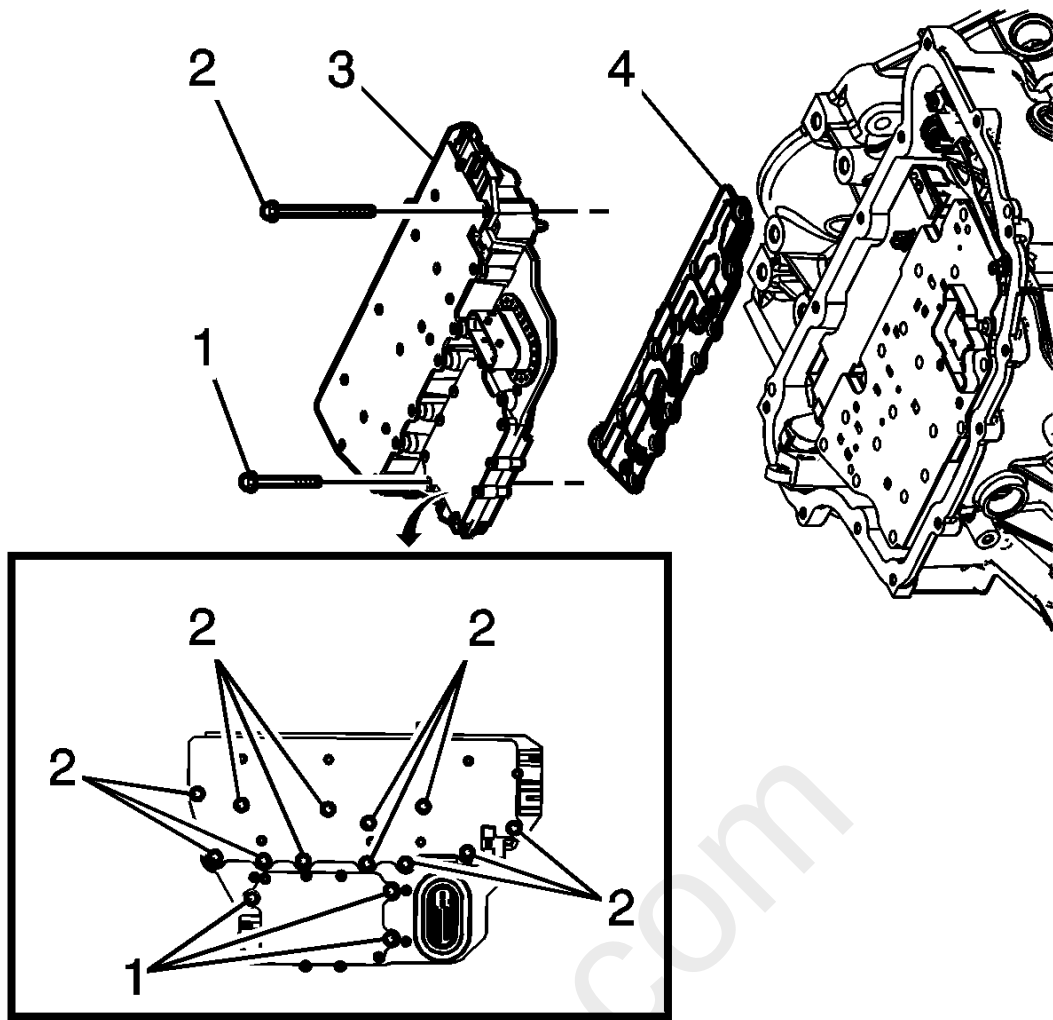


Fig. 66: Locating Control Valve Body & Bolts
 Courtesy of GENERAL MOTORS COMPANY

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.

1. Install a NEW control solenoid valve assembly filter plate (4) to prevent fluid leaks past the fluid seals.
2. Install the control solenoid valve assembly with transmission control module (3).
3. Hand start the control valve body bolts (1, 2).

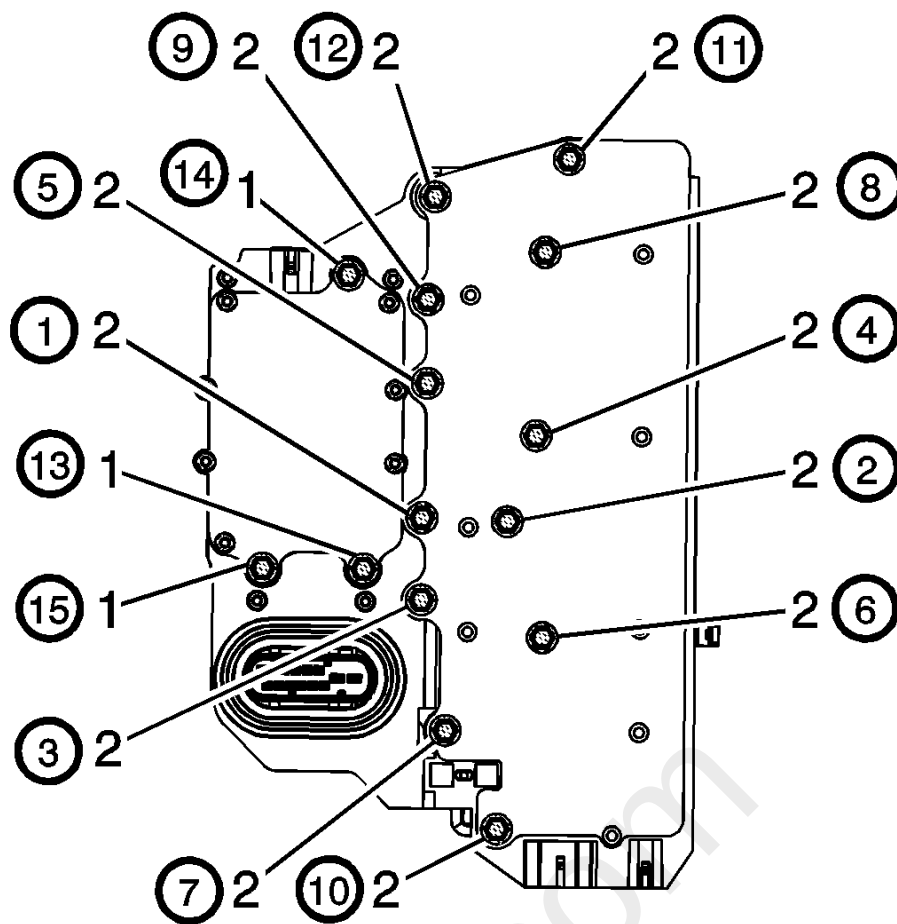


Fig. 67: Identifying Control Valve Body Bolt Tightening Sequence

Courtesy of GENERAL MOTORS COMPANY

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

4. Secure the 12 control solenoid valve assembly bolts (2) M6 x 97 and tighten in sequence to 10 N.m (89 lb in).
5. Secure the 3 control valve body bolts (1) M5 x 40.5 and tighten in sequence to 7 N.m (62 lb in).

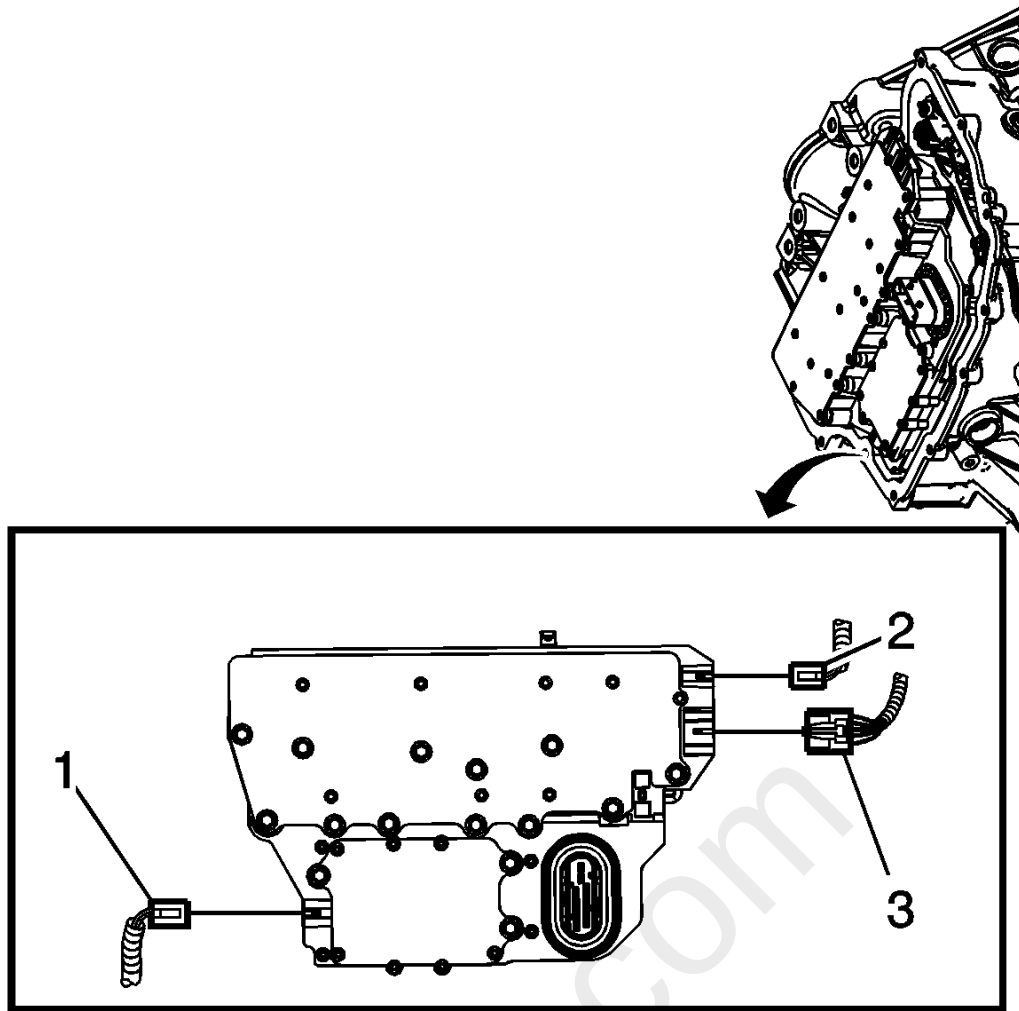


Fig. 68: Identifying Speed Sensor & Shift Position Switch Electrical Connectors
Courtesy of GENERAL MOTORS COMPANY

6. Connect the input speed sensor electrical connector (1).
7. Connect the output speed sensor electrical connector (2).
8. Connect the shift position switch electrical connector (3).
9. Install the transmission control valve body cover. [Control Valve Body Cover Replacement](#)
10. After repairs, refer to [Control Module References](#) for programming and set up procedures.
11. Perform the transmission adaptive values learn. [Transmission Adaptive Values Learn](#)

CONTROL VALVE BODY COVER REPLACEMENT

Removal Procedure

1. Disconnect the battery negative cable. [Battery Negative Cable Disconnection and Connection \(KL9\)](#)
2. Remove the charge air cooler outlet air tube. [Charge Air Cooler Outlet Air Tube Replacement](#)
3. Drain the transmission fluid. [Transmission Fluid Drain and Fill](#)

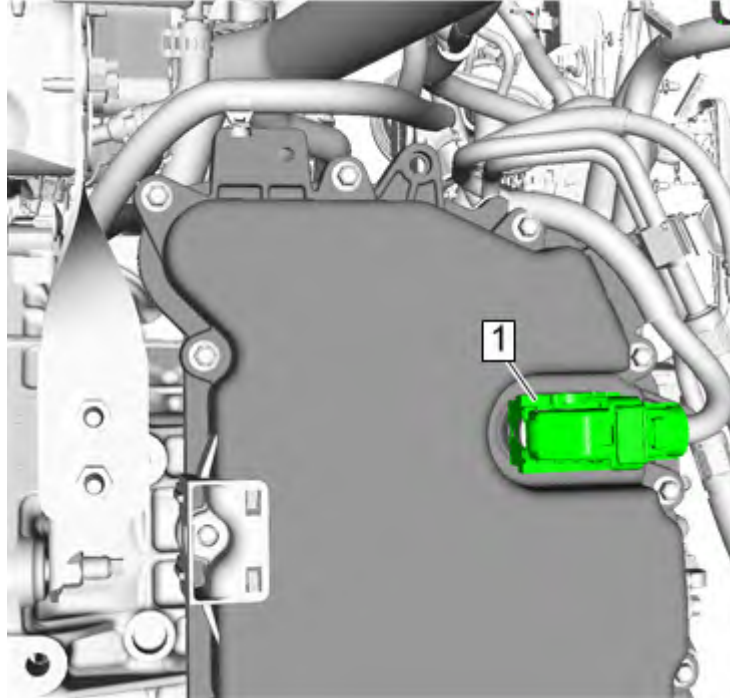


Fig. 69: Control Valve Body Transmission Control Module Electrical Connector
 Courtesy of GENERAL MOTORS COMPANY

4. Disconnect the control valve body transmission control module electrical connector (1), then unclip the wiring harness from the cover.
5. Remove the body ground cable and wiring harness assembly mounting bolt at front of transmission and position ground cable and harness out of the way.

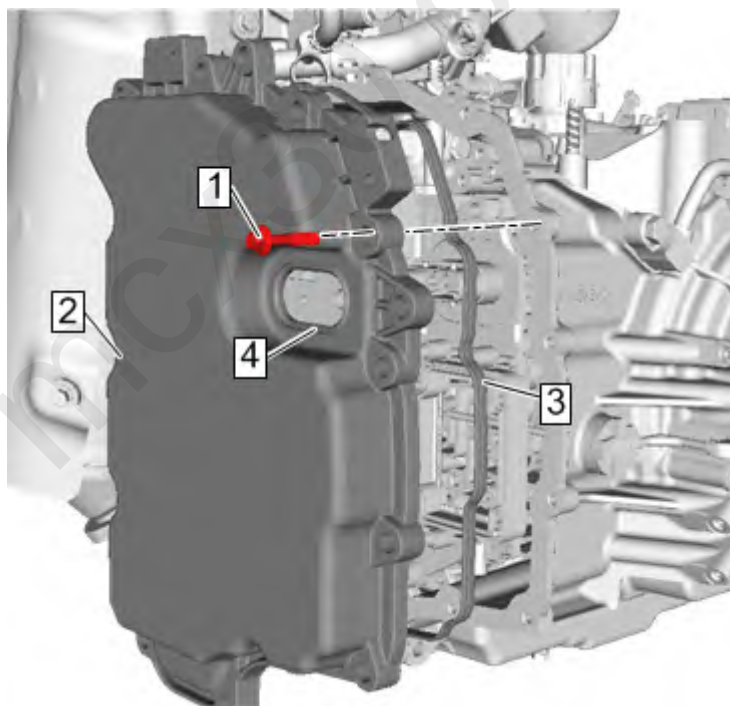


Fig. 70: Control Valve Body Cover Bolts, Cover And Gasket
 Courtesy of GENERAL MOTORS COMPANY

6. Remove the thirteen control valve body cover bolts (1).
7. Remove the control valve body cover (2).
8. Remove the control valve body cover gasket (3).

CAUTION: Support the control solenoid valve assembly around the connector when removing the seal. Excessive pulling force can damage the internal electrical connections.

9. Remove the control valve body cover wiring connector hole seal (4).

10. Remove all traces of the old gasket material. Clean the transmission case and control valve body cover gasket surfaces.

Installation Procedure

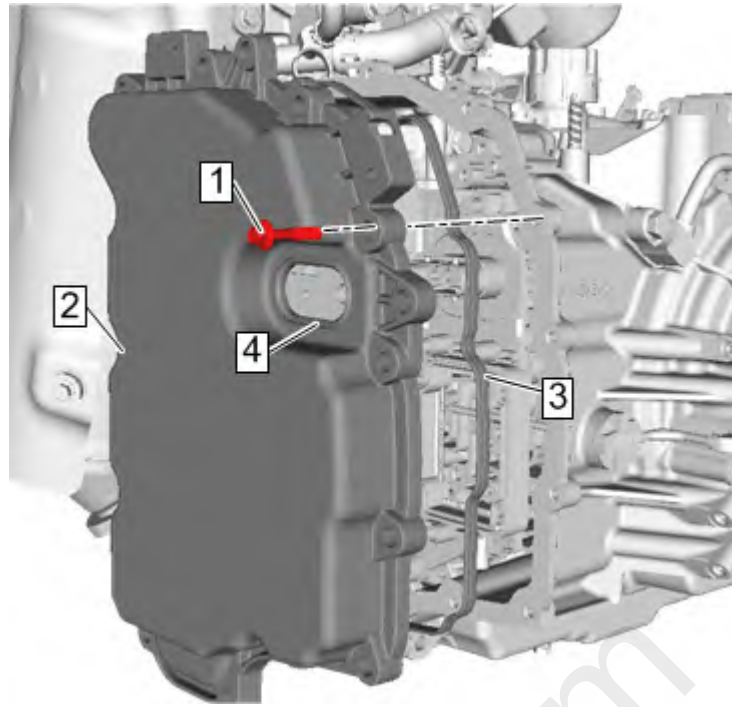


Fig. 71: Control Valve Body Cover Bolts, Cover And Gasket
Courtesy of GENERAL MOTORS COMPANY

1. Install the control valve body cover wiring connector hole seal (4).
2. Install the control valve body cover gasket (3) to the control valve body cover.
3. Install the control valve body cover (2).
4. Hand start the control valve body cover bolts (1).

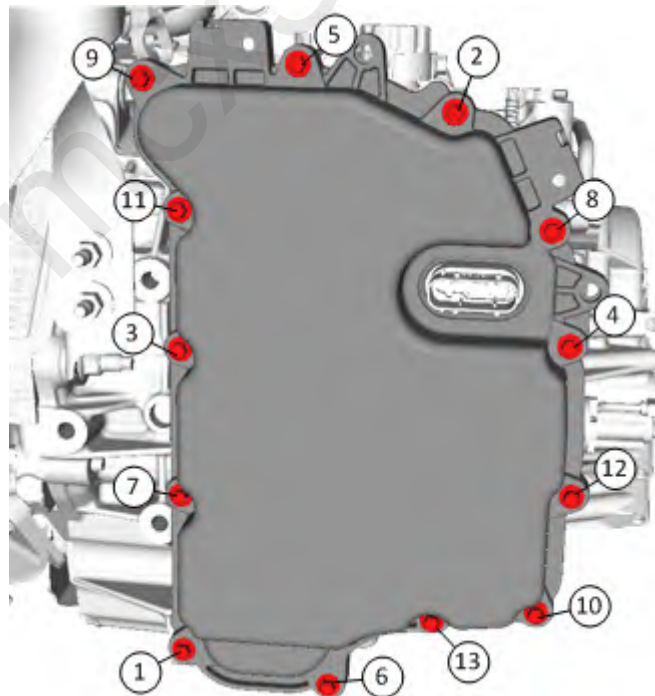


Fig. 72: Control Valve Body Cover Bolts With Tightening Sequence
Courtesy of GENERAL MOTORS COMPANY

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

NOTE: Install all control valve body cover bolts and studs by hand then torque all bolts and studs in sequence.

5. Install the control valve body cover bolts. Tighten the bolts in sequence to 12 N.m (106 lb in).

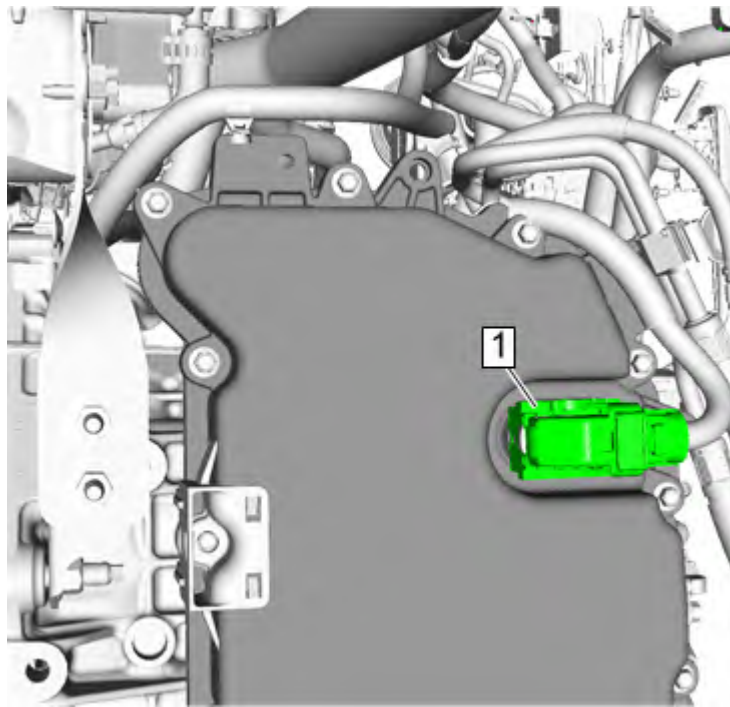
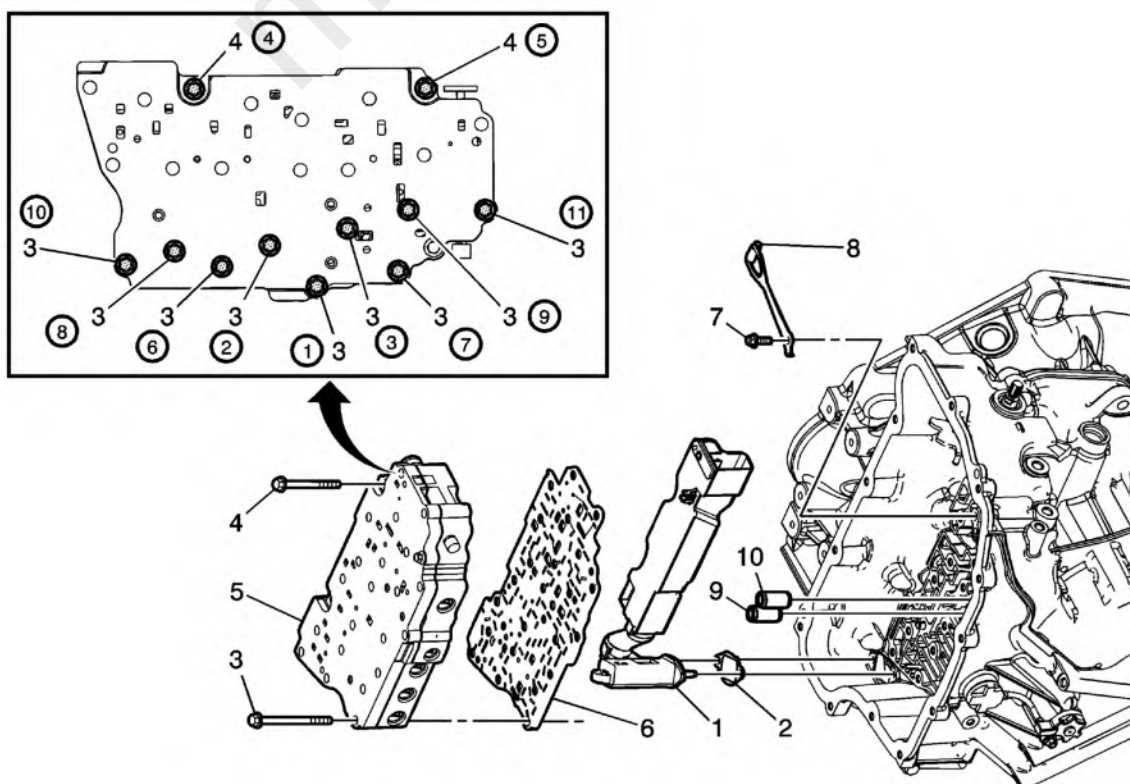


Fig. 73: Control Valve Body Transmission Control Module Electrical Connector
Courtesy of GENERAL MOTORS COMPANY

6. Connect the control valve body transmission control module electrical connector (1), then clip the wiring harness to the cover.
7. Install the body ground cable and wiring harness assembly to the front of transmission.
8. Fill the transmission with correct fluid.
9. Check transmission fluid level. [Transmission Fluid Level and Condition Check](#)
10. Connect the battery negative cable. [Battery Negative Cable Disconnection and Connection \(KL9\)](#)
11. Install the charge air cooler outlet air tube. [Charge Air Cooler Outlet Air Tube Replacement](#)
12. Check for leaks.

CONTROL VALVE BODY REPLACEMENT



Callout	Component Name
Preliminary Procedure Remove the control solenoid valve and transmission control module assembly. Refer to Control Solenoid Valve and Transmission Control Module Assembly Replacement .	
1	Fluid Level Control Valve
2	Fluid Level Control Valve Gasket
3	Control Valve Body Bolt M6 x 60 (Qty: 9) CAUTION: Refer to Fastener Caution . NOTE: Tighten in specified sequence. Tighten 11 N.m (97 lb in)
4	Control Valve Body Bolt M6 x 53 (Qty: 2) NOTE: Tighten in specified sequence. Tighten 11 N.m (97 lb in)
5	Control Valve Body Assembly
6	Control Valve Body Spacer Plate Assembly
7	Manual Shaft Detent Spring Bolt M6 x 16 NOTE: Tighten in specified sequence. Tighten 12 N.m (106 lb in)
8	Manual Shaft Detent Lever Spring Assembly
9	1-2-3-4 Clutch Fluid Passage Seal NOTE: Discard the seal. It is not reusable.
10	Low/Reverse Clutch Fluid Passage Seal NOTE: Discard the seal. It is not reusable.

TORQUE CONVERTER FLUID SEAL REPLACEMENT

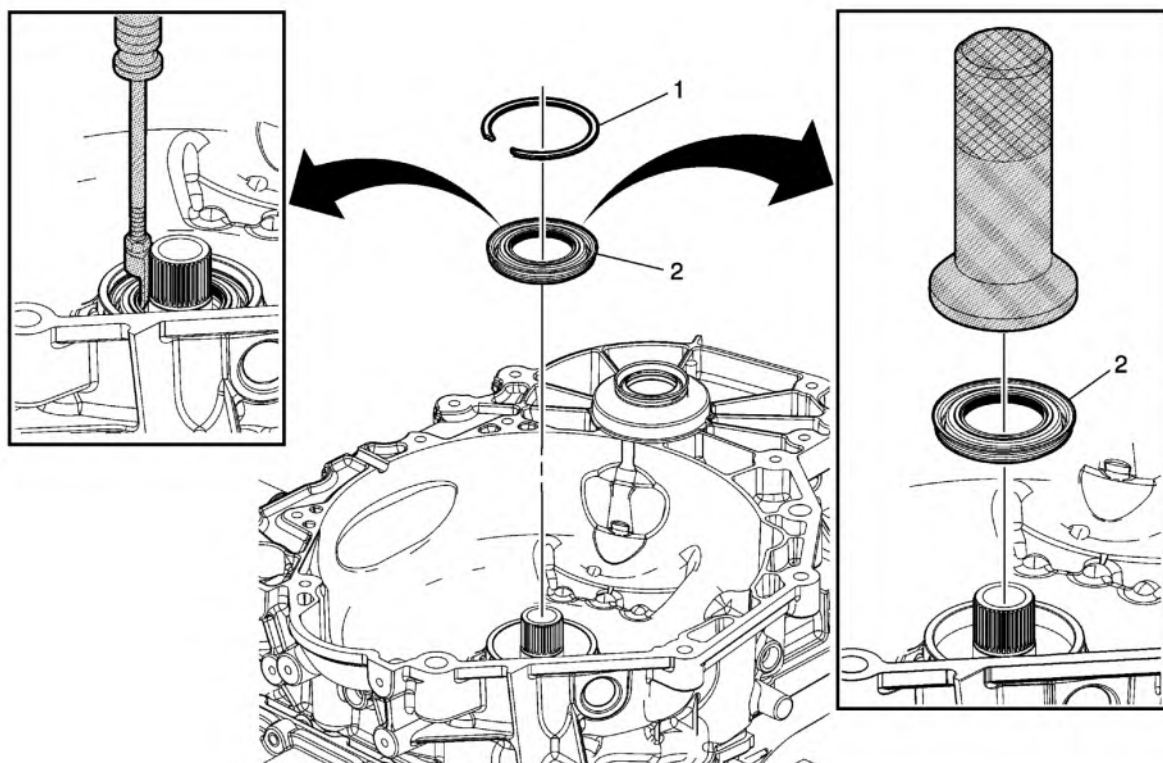


Fig. 75: Torque Converter Fluid Seal
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Torque Converter Replacement	
1	Torque Converter Fluid Seal Retainer
2	Torque Converter Fluid Seal NOTE: For Gen 2 transmissions use DT-47791-B Seal Installer. For Gen 3 transmissions use J-29162 Seal Installer. Special Tools • DT-47791-B Seal Installer • DT-6125-B Slide Hammer • EN-23129 Universal Seal Remover • J-29162 Seal Installer For equivalent regional tools, refer to Special Tools .

OUTPUT SPEED SENSOR REPLACEMENT

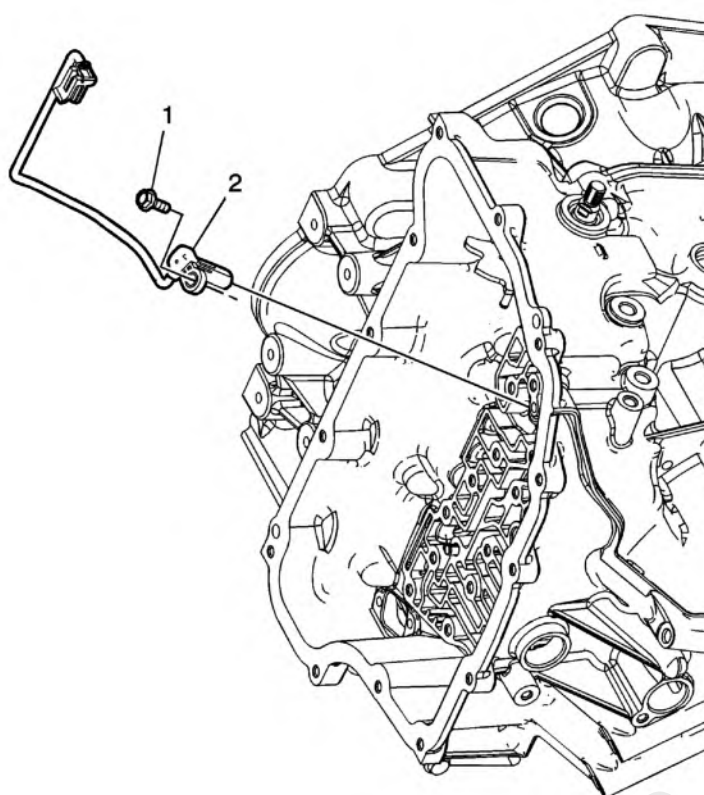


Fig. 76: Identifying Output Speed Sensor
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures 1. Remove the control solenoid valve and transmission control module assembly. Refer to Control Solenoid Valve and Transmission Control Module Assembly Replacement. 2. Perform the service fast learn adapt procedure.	
1	Output Speed Sensor Bolt M6 x 18 CAUTION: Refer to Fastener Caution . Tighten 9 N.m (80 lb in)
2	Output Speed Sensor

INPUT SPEED SENSOR REPLACEMENT

Removal Procedure

1. Remove the control solenoid valve and transmission control module assembly. Refer to [Control Solenoid Valve and Transmission Control Module Assembly Replacement](#).

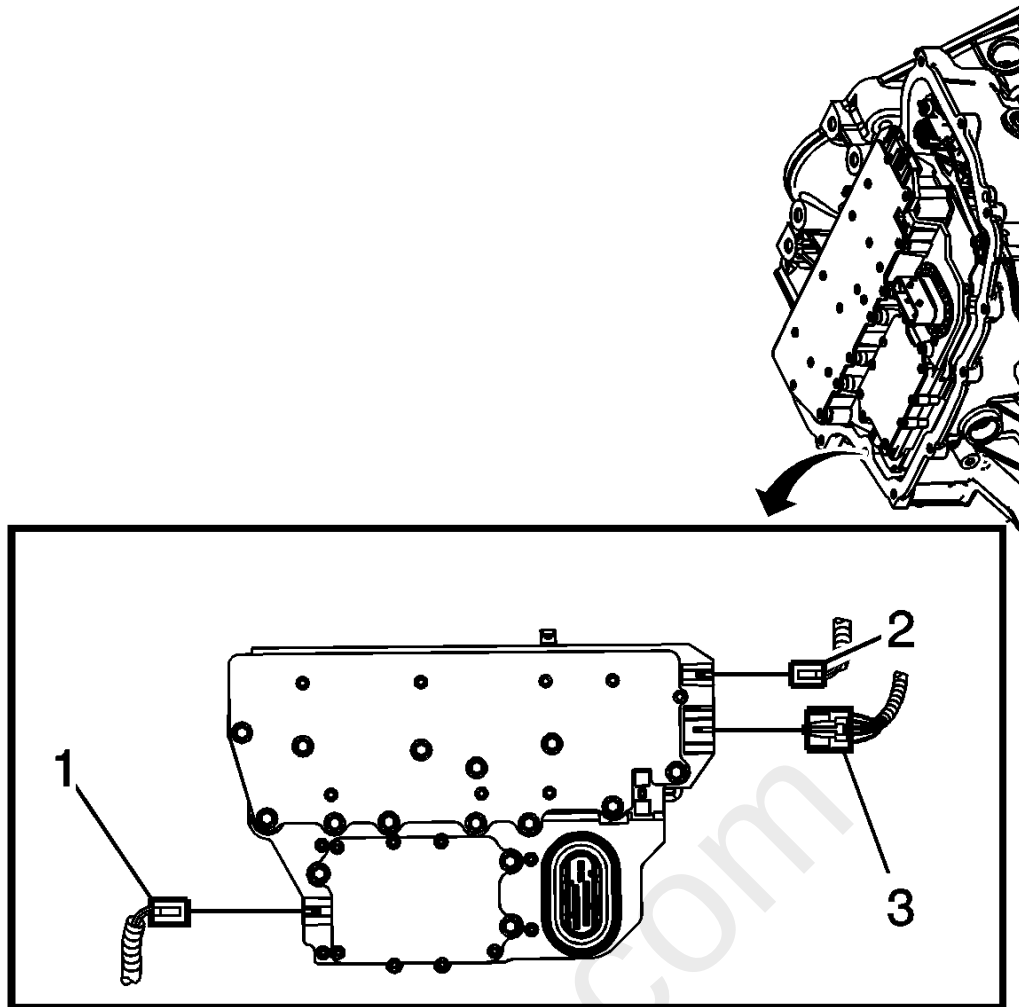


Fig. 77: Identifying Speed Sensor & Shift Position Switch Electrical Connectors
Courtesy of GENERAL MOTORS COMPANY

2. Disconnect the input speed sensor electrical connector (1).

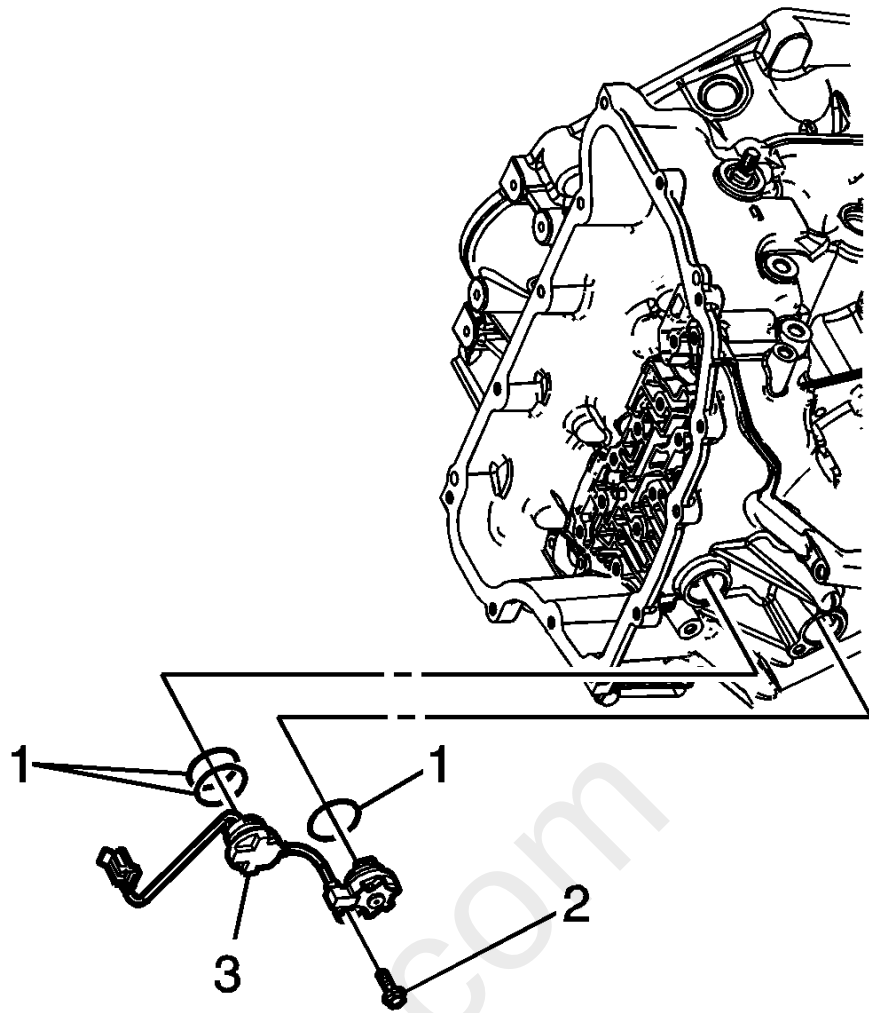


Fig. 78: Identifying Input Speed Sensor Mounting Bolt
Courtesy of GENERAL MOTORS COMPANY

3. Remove the input speed sensor bolt (2) M6 x 23.
4. Remove the input speed sensor (3).
5. Remove the 3 input speed sensor seals (1).

Installation Procedure

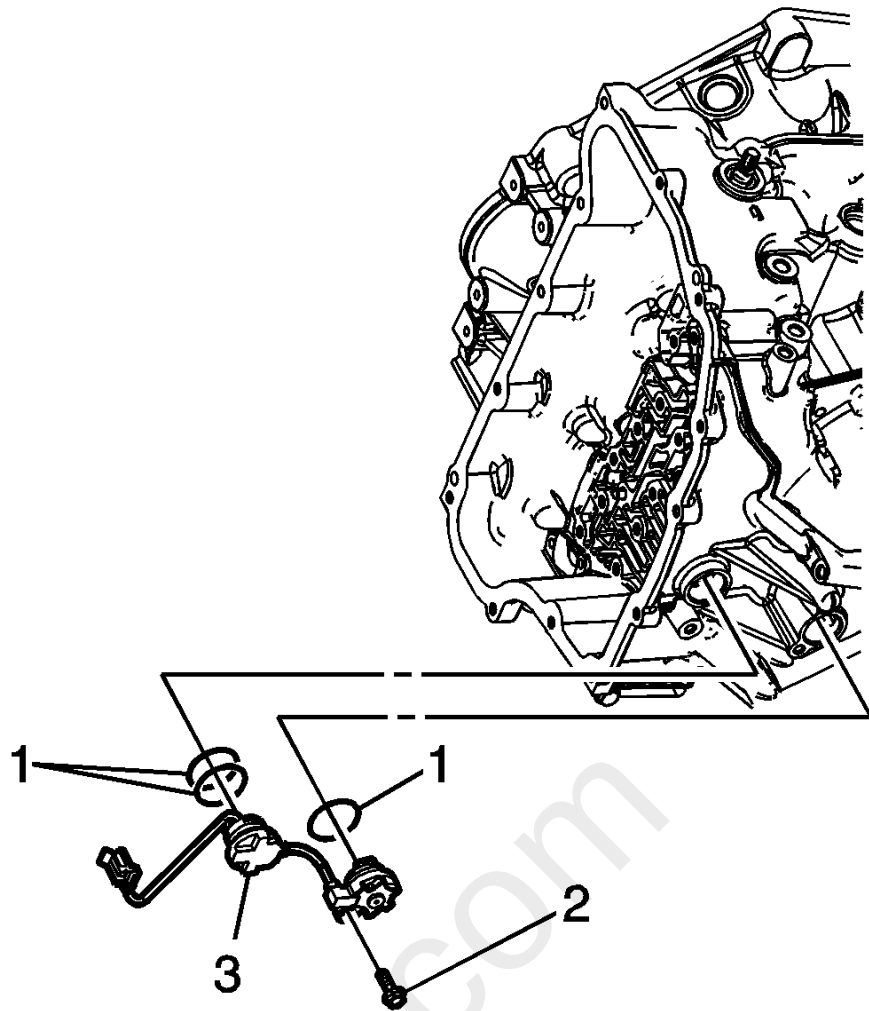


Fig. 79: Identifying Input Speed Sensor Mounting Bolt
Courtesy of GENERAL MOTORS COMPANY

1. Install the 3 input speed sensor seals (1).
2. Install the input speed sensor (3).

CAUTION: Refer to **Fastener Caution** .

3. Install the input speed sensor bolt (2) M6 x 23 and tighten to 9 N.m (80 lb in).

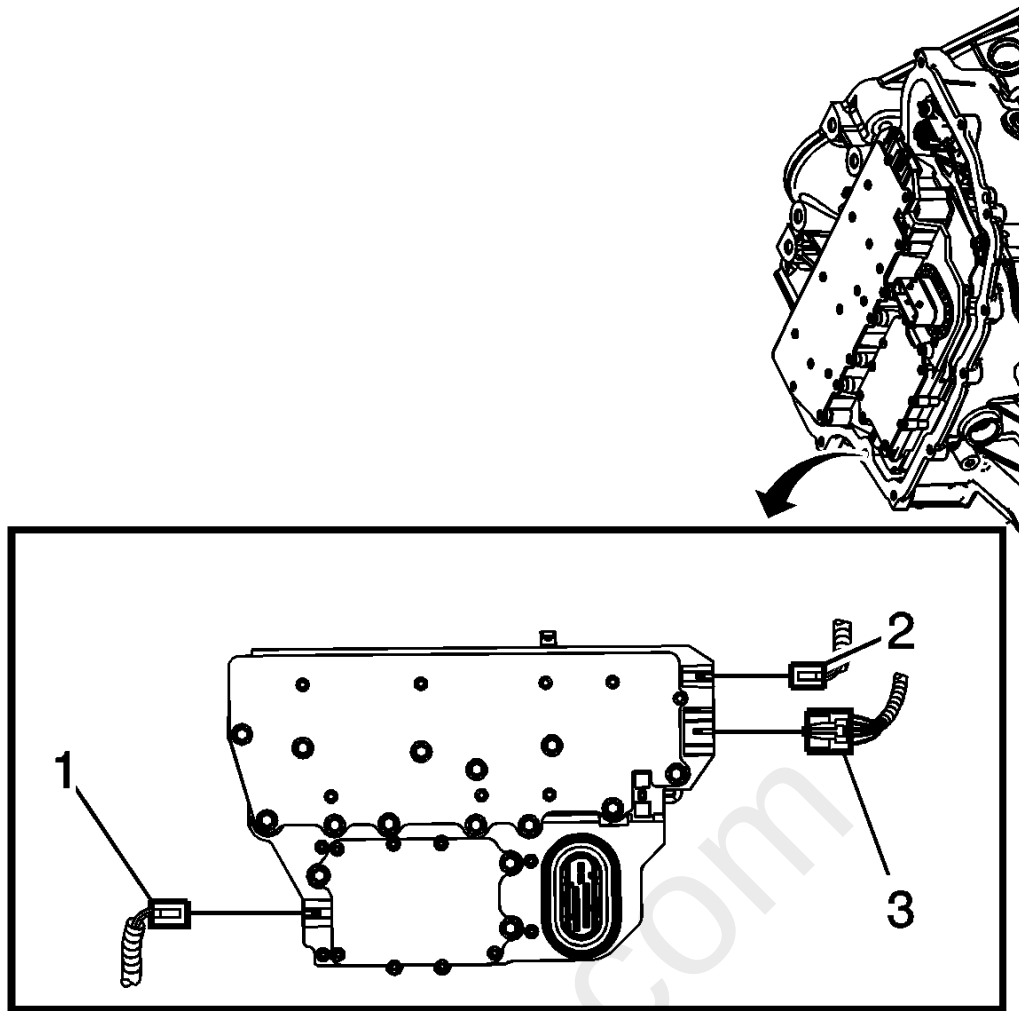


Fig. 80: Identifying Speed Sensor & Shift Position Switch Electrical Connectors
Courtesy of GENERAL MOTORS COMPANY

4. Connect the input speed sensor electrical connector (1).
5. Install the control solenoid valve and transmission control module assembly. Refer to [Control Solenoid Valve and Transmission Control Module Assembly Replacement](#).
6. Perform the service fast learn adapt procedure.

TRANSMISSION MOUNT BRACKET REPLACEMENT - LEFT SIDE

Removal Procedure

1. Remove the left transmission mount. [Transmission Mount Replacement - Left Side](#)

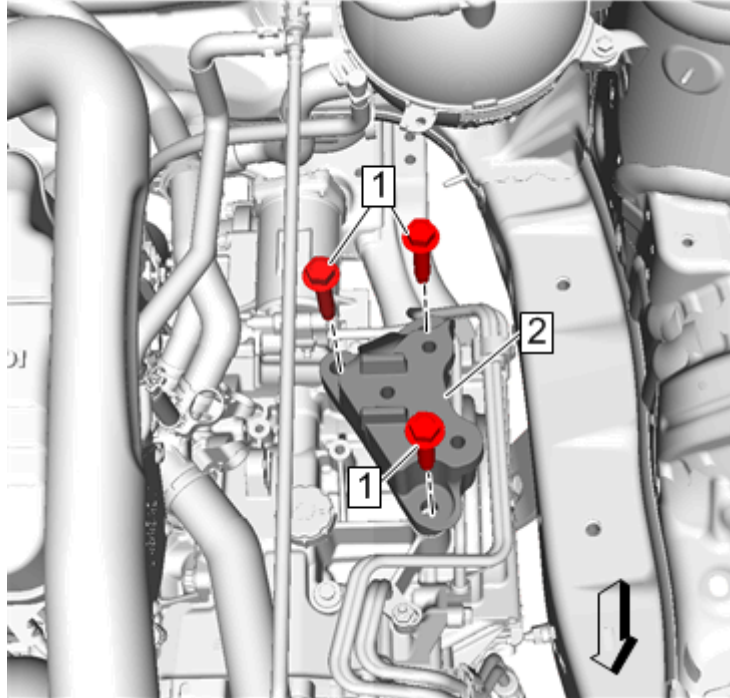


Fig. 81: Left Transmission Mount Bracket And Transmission Bolts
Courtesy of GENERAL MOTORS COMPANY

2. Remove and DISCARD the left transmission mount bracket to transmission bolts (1).
3. Remove the left transmission mount bracket (2) from the transmission.

Installation Procedure



Fig. 82: Left Transmission Mount Bracket And Transmission Bolts
Courtesy of GENERAL MOTORS COMPANY

1. Install the left transmission mount bracket (2) to the transmission.

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

2. Install the NEW left transmission mount bracket to transmission bolts (1) and tighten to 100 N.m (74 lb ft) plus 60-75 degrees.
3. Install the left transmission mount. [Transmission Mount Replacement - Left Side](#)

TRANSMISSION MOUNT REPLACEMENT - LEFT SIDE

Special Tools

Equivalent regional tools: [Special Tools](#)

Removal Procedure

1. Remove the battery tray. [Battery Tray Replacement](#)
2. Support the transmission using a suitable jack.



Fig. 83: Left Transmission Mount And Bolts
Courtesy of GENERAL MOTORS COMPANY

3. Remove and DISCARD the left transmission mount to transmission bolts (1, 2, 3).
4. Remove the left transmission mount to body bolts (5).
5. Remove the transmission mount (4) from the vehicle.

Installation Procedure



Fig. 84: Left Transmission Mount And Bolts
Courtesy of GENERAL MOTORS COMPANY

1. Install the left transmission mount (4) to the vehicle.

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

2. Install the transmission mount to body bolts (5) and tighten to 100 N.m (74 lb ft).

CAUTION: Refer to [Torque-to-Yield Fastener Warning](#) .

3. Install the NEW left transmission mount to transmission bolt (1) and initially tighten to 35 N.m (26 lb ft).
4. Install the NEW left transmission mount to transmission bolt (2) and initially tighten to 35 N.m (26 lb ft).
5. Install the NEW left transmission mount to transmission bolt (3) and initially tighten to 35 N.m (26 lb ft).
6. Tighten left transmission mount to transmission bolts (1-3) to 100 N.m (74 lb ft) plus 60 - 75 degrees, using the **EN-45059** meter.
7. Remove the transmission jack.
8. Install the battery tray. [Battery Tray Replacement](#) .

TRANSMISSION MOUNT STRUT REPLACEMENT (ALL WHEEL DRIVE)

Removal Procedure

1. Raise and support the vehicle. [Lifting and Jacking the Vehicle](#)
2. Prior to removing the transmission rear strut, mark the transmission rear strut fasteners to transmission rear strut to sub frame interfaces using spray paint or a marker for correct positioning during installation.
3. Remove the two piece propeller shaft. [Two-Piece Propeller Shaft Replacement](#)
4. Using a suitable jack stand, support the rear of the powertrain.

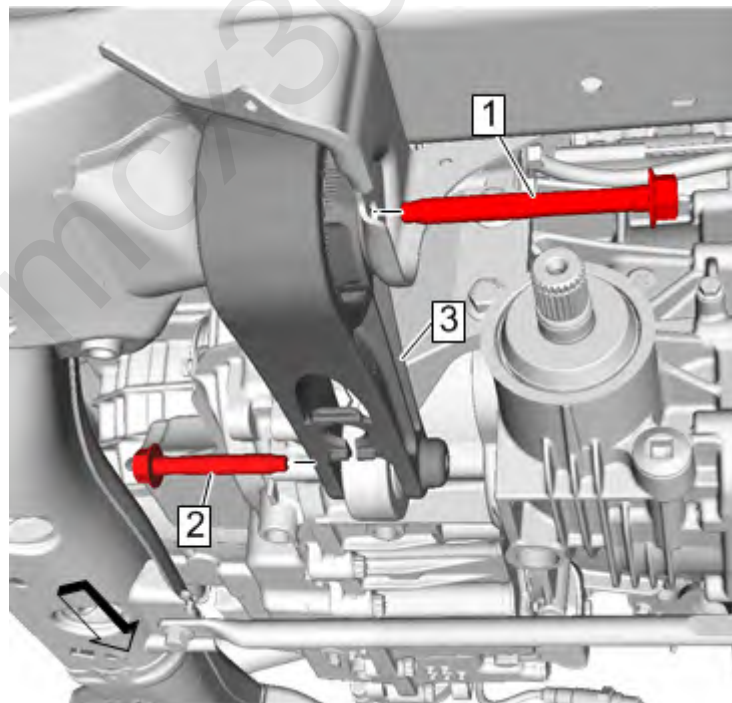


Fig. 85: Transmission Mount Strut Bolt

Courtesy of GENERAL MOTORS COMPANY

5. Remove and DISCARD the transmission rear strut through bolt (2).
6. Remove and DISCARD the transmission rear strut to drivetrain and front suspension cradle bolt (1).
7. Remove the transmission rear strut (3).

Installation Procedure

1. Using the outline made by the spray paint or marker, position the transmission rear strut to the drivetrain and front suspension cradle.

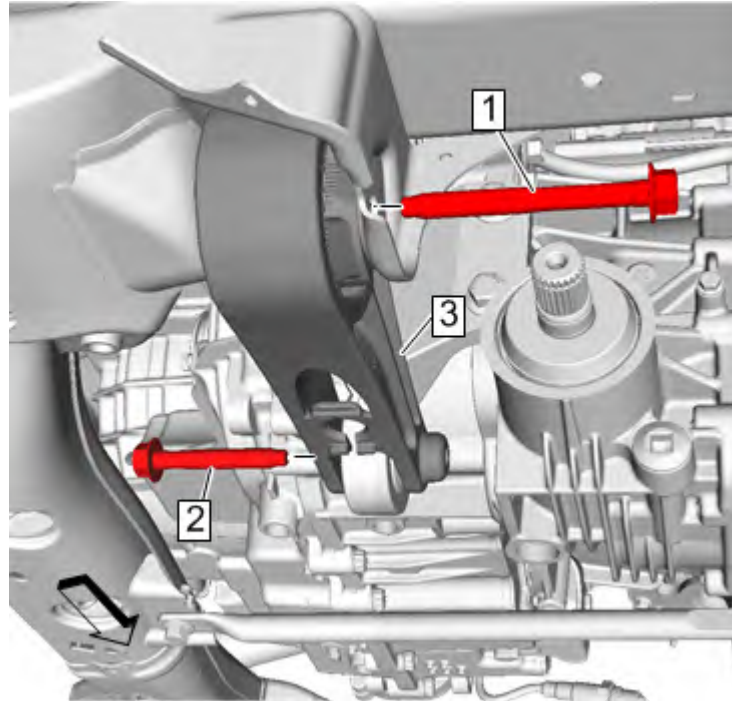


Fig. 86: Transmission Mount Strut Bolt
Courtesy of GENERAL MOTORS COMPANY

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

2. Install the NEW transmission rear strut bolt (2) and tighten the bolt to 80 N.m (59 lb ft) plus 45 to 60 degrees.
3. Install the NEW transmission rear strut to bracket through bolt (1) and tighten to 100 N.m (74 lb ft) plus 120 to 135 degrees.
4. Install the two piece propeller shaft. [Two-Piece Propeller Shaft Replacement](#)
5. Remove the jack stand.
6. Lower the vehicle. [Lifting and Jacking the Vehicle](#)

TRANSMISSION MOUNT STRUT REPLACEMENT (FRONT WHEEL DRIVE)

Removal Procedure

1. Remove the transmission mount strut bracket. [Transmission Mount Strut Bracket Replacement \(All Wheel Drive\)](#)[Transmission Mount Strut Bracket Replacement \(Front Wheel Drive\)](#).
2. Prior to removing the transmission strut, mark the transmission strut fasteners to transmission strut to sub frame interfaces using spray paint or a marker for correct positioning during installation.
3. Using a suitable jack stand, support the rear of the powertrain.

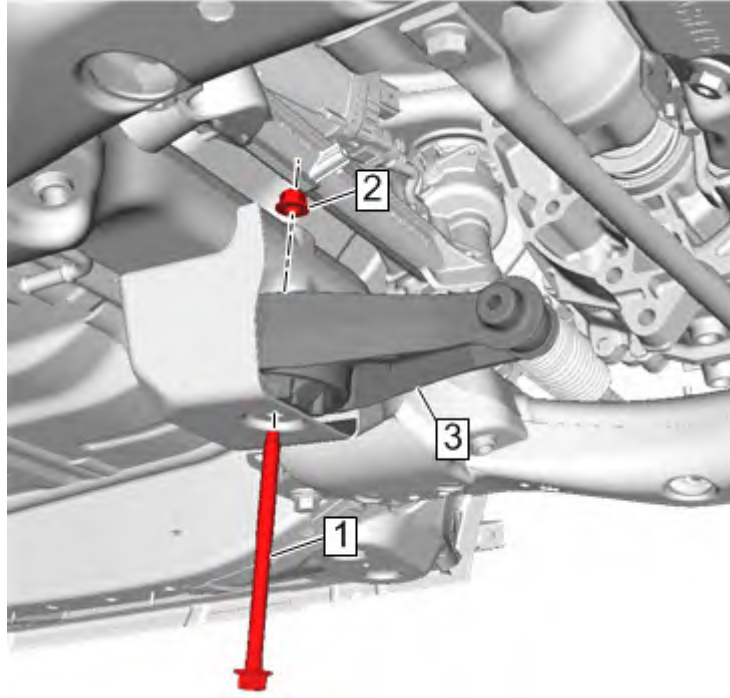


Fig. 87: Strut Through Bolt Retaining Nut And Transmission Strut Through Bolt
 Courtesy of GENERAL MOTORS COMPANY

4. Remove the strut through bolt retaining nut (2).
5. Remove and DISCARD the transmission strut through bolt (1).
6. Remove the transmission strut (3).

Installation Procedure

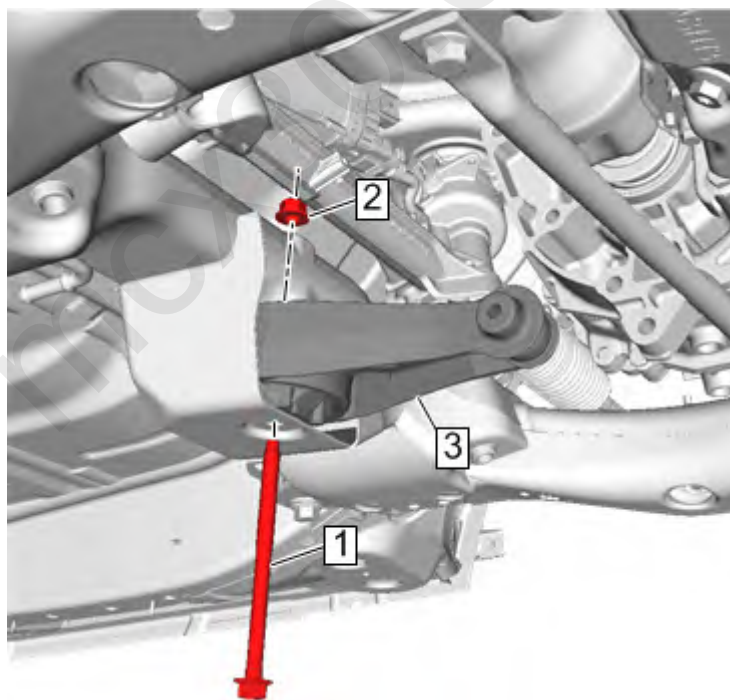


Fig. 88: Strut Through Bolt Retaining Nut And Transmission Strut Through Bolt
 Courtesy of GENERAL MOTORS COMPANY

1. Using the outline made by the spray paint or marker, position the transmission strut (3) to the drivetrain and front suspension cradle.

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

2. Install the NEW transmission strut to bracket through bolt (1) and nut (2) then tighten to 100 N.m (74 lb ft) plus 120 to 135 degrees.
3. Perform the Powertrain Mount Balancing - Lower procedure. Refer to the appropriate engine section.

4. Remove the jack stand.

5. Install the transmission mount strut bracket. [Transmission Mount Strut Bracket Replacement \(All Wheel Drive\)](#)[Transmission Mount Strut Bracket Replacement \(Front Wheel Drive\)](#).

TRANSMISSION MOUNT STRUT BRACKET REPLACEMENT (ALL WHEEL DRIVE)

Removal Procedure

1. Remove the transmission mount strut. [Transmission Mount Strut Replacement \(All Wheel Drive\)](#).

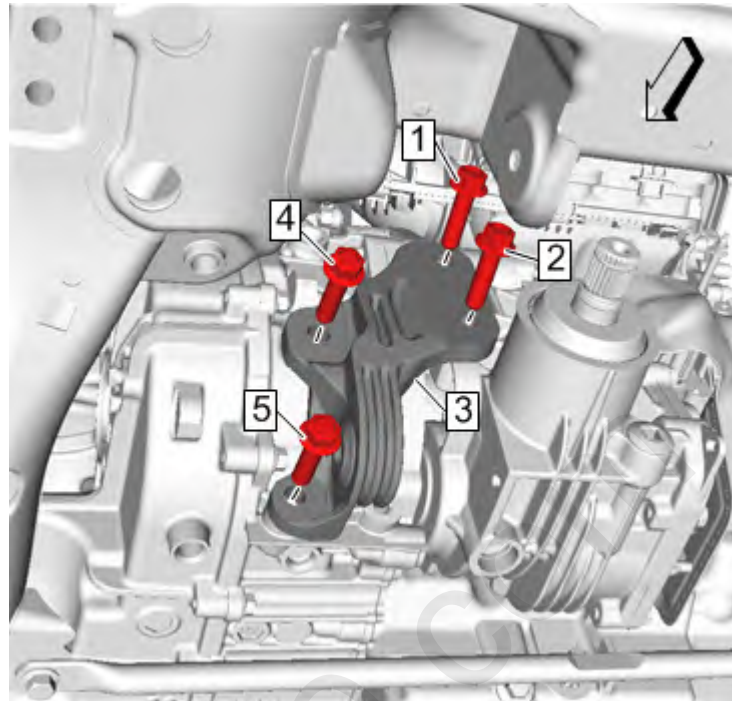


Fig. 89: Transmission Rear Mount Strut Bracket And Bolts
Courtesy of GENERAL MOTORS COMPANY

2. Remove the transmission rear mount strut bracket to power transfer unit bolts (1, 2).
3. Remove the transmission rear mount strut bracket to transmission bolts (4, 5).
4. Remove the transmission rear mount strut bracket (3) from the transmission.

Installation Procedure

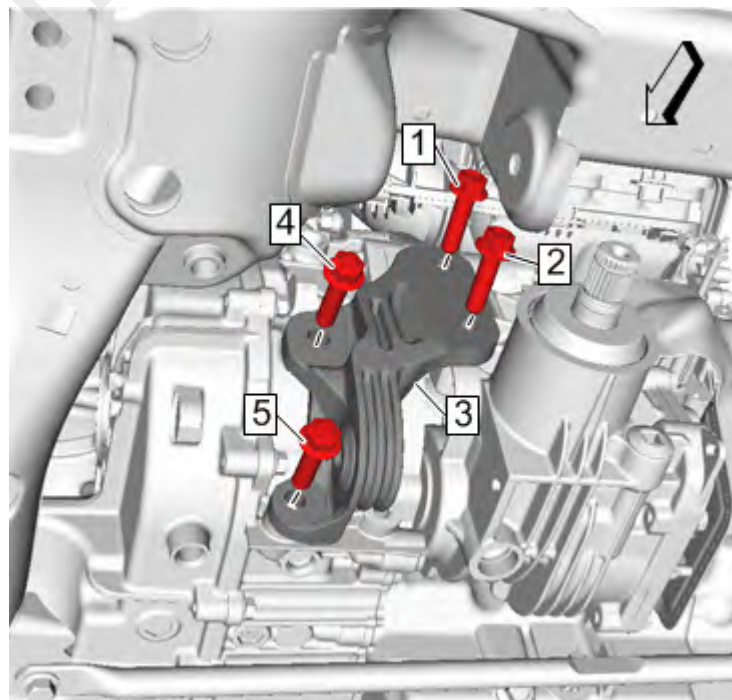


Fig. 90: Transmission Rear Mount Strut Bracket And Bolts
Courtesy of GENERAL MOTORS COMPANY

1. Position the transmission rear mount strut bracket (3) to the transmission.

CAUTION: Refer to Fastener Caution .

2. Install the two transmission rear mount strut bracket to power transfer unit bolts (1, 2) first and tighten to 100 N.m (74 lb ft) plus 60 - 75 degrees.
3. Install the two transmission rear mount strut bracket to transmission bolts (4, 5) and tighten to 100 N.m (74 lb ft) plus 60 - 75 degrees.
4. Install the transmission mount strut. Transmission Mount Strut Replacement (All Wheel Drive).

TRANSMISSION MOUNT STRUT BRACKET REPLACEMENT (FRONT WHEEL DRIVE)

Removal Procedure

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

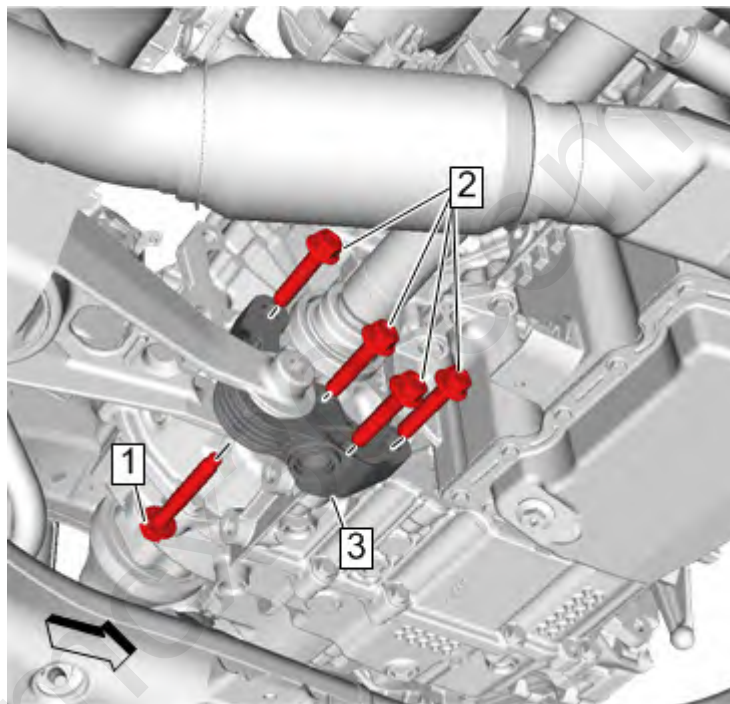


Fig. 91: Transmission Mount Strut Bracket And Bolts
Courtesy of GENERAL MOTORS COMPANY

2. Remove the transmission mount strut bracket to transmission mount strut bolt (1).
3. Remove and DISCARD the transmission mount strut bracket bolt (2).
4. Remove the transmission mount strut bracket (3) from the transmission.

Installation Procedure

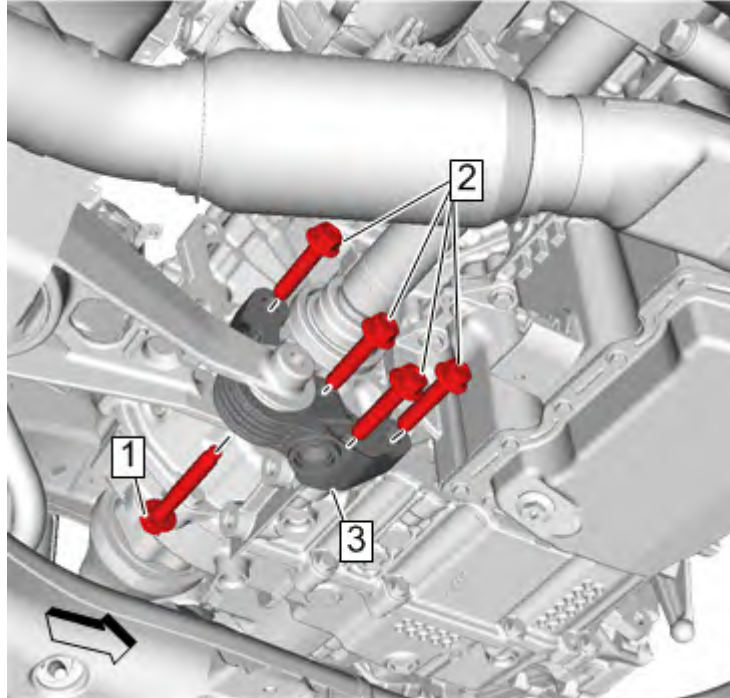


Fig. 92: Transmission Mount Strut Bracket And Bolts

Courtesy of GENERAL MOTORS COMPANY

1. Position the transmission mount strut bracket (3) to the transmission.

CAUTION: Refer to Torque-to-Yield Fastener Caution .

2. Install the four NEW transmission mount strut bracket to transmission bolts (2) and tighten to 100 N.m (74 lb ft) plus 60 to 75 degrees.
3. Install the transmission mount strut bracket to transmission mount strut bolt (1) and tighten to 80 N.m (59 lb ft) plus 45 to 60 degrees.
4. Lower the vehicle. Lifting and Jacking the Vehicle

TORQUE CONVERTER REPLACEMENT

Special Tools

DT-21366 Converter Holding Strap

DT-46409 Torque Converter Lifting Handles

For equivalent regional tools, refer to Special Tools .

Removal Procedure

1. Remove the transmission. Transmission Replacement (Front Wheel Drive except Diesel Engine)/Transmission Replacement (Front Wheel Drive with Diesel Engine).
2. Position the transmission assembly so the torque converter is facing up.

WARNING: The torque converter must be held to the torque converter housing by a retaining device such as shipping brackets. Without the retaining device, the torque converter may slide forward, disengaging the oil pump, or may fall completely out of the transmission causing personal injury and/or property damage.

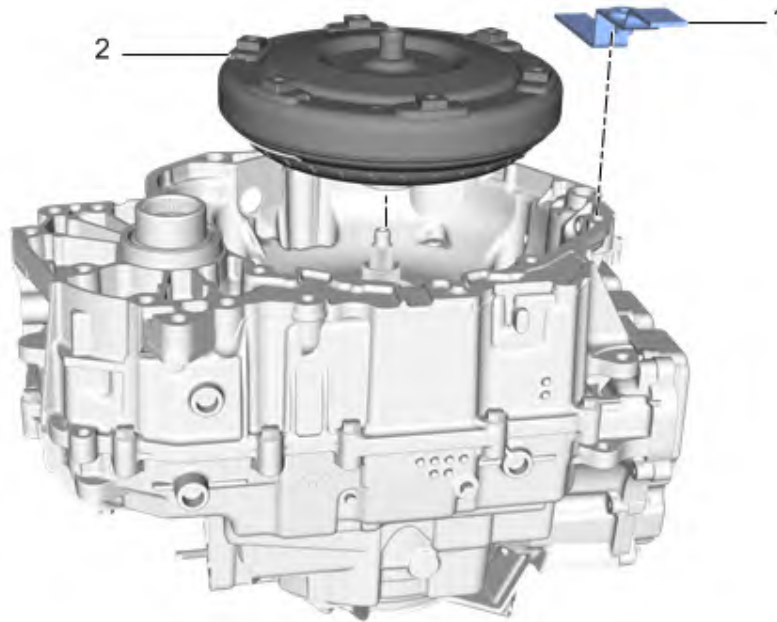


Fig. 93: Identifying Torque Converter Assembly.

Courtesy of GENERAL MOTORS COMPANY

3. Remove the converter holding strap (1).

CAUTION: Only install the lift assist handles until it stops. Do not tighten. Over tightening the lift assist handles can cause damage to the torque converter.

CAUTION: Lower the torque converter straight down. Failure to lower the torque converter straight down could damage the torque converter clutch lip seal inside the torque converter clutch assembly.

CAUTION: Failure to raise the torque dampener assembly straight up could damage the torque dampener clutch lip seal inside the torque dampener clutch assembly.

4. Remove the torque converter assembly (2) from the transmission.

Installation Procedure

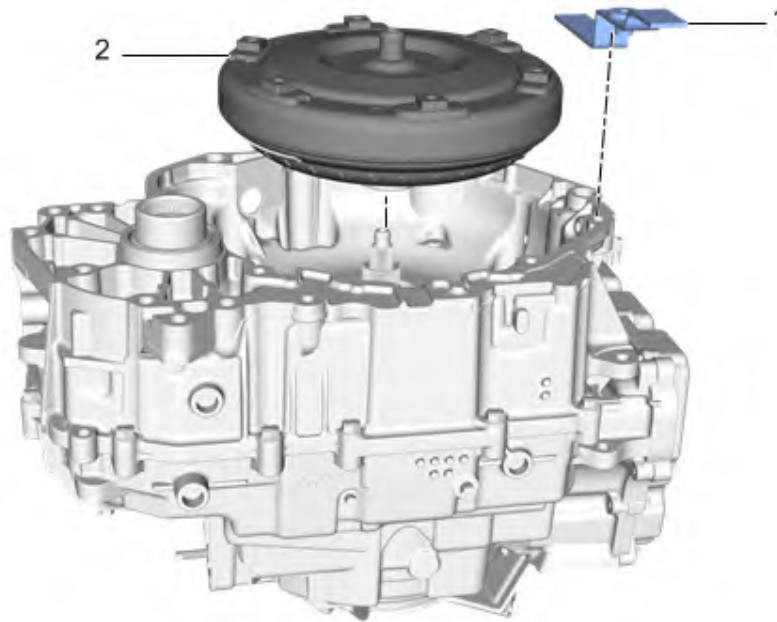


Fig. 94: Identifying Torque Converter Assembly.
 Courtesy of GENERAL MOTORS COMPANY

1. Install the torque converter assembly (2) to the transmission.
2. Install the converter holding strap (1).
3. Install the transmission. [Transmission Replacement \(Front Wheel Drive except Diesel Engine\)](#)[Transmission Replacement \(Front Wheel Drive with Diesel Engine\)](#)
4. Perform the transmission adaptive values learn procedure. [Transmission Adaptive Values Learn](#)

TRANSMISSION REPLACEMENT (FRONT WHEEL DRIVE EXCEPT DIESEL ENGINE)

Removal Procedure

1. Remove the battery tray. [Battery Tray Replacement](#)
2. Remove the transmission range select lever cable from the transmission, then position out of the way.
3. Drain the transmission fluid, if necessary. [Transmission Fluid Drain and Fill](#)

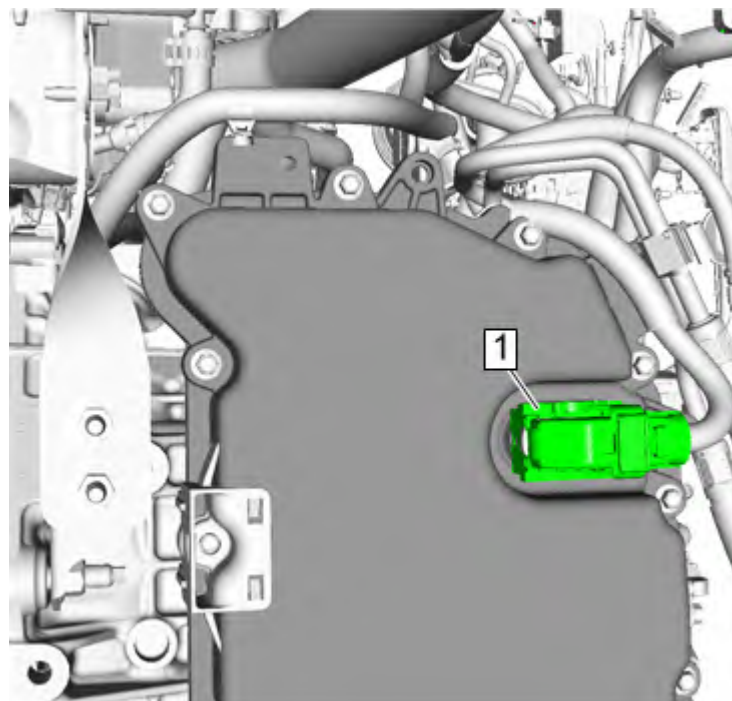


Fig. 95: Control Valve Body Transmission Control Module Electrical Connector
Courtesy of GENERAL MOTORS COMPANY

4. Disconnect the control valve body transmission control module (TCM) electrical connector (1) then unclip the connector from the transmission.

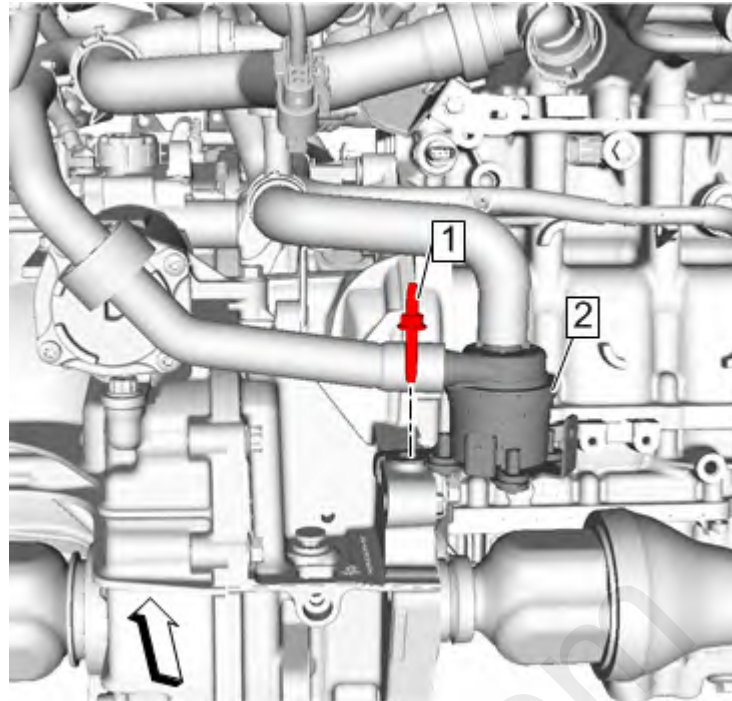


Fig. 96: Water Pump Fastener And Water Pump
Courtesy of GENERAL MOTORS COMPANY

5. Remove the water pump fastener (1), then position the water pump (2) out of the way.
6. Remove the transmission fluid cooler inlet and outlet hoses from the transmission, then position the hoses out of the way. **Transmission Fluid Cooler Inlet and Outlet Pipe Replacement (MNH, MHG)** **Transmission Fluid Cooler Inlet and Outlet Pipe Replacement (M3D, M3H, M3U)**.
7. Plug and/or cap the hose and transmission to prevent contamination.

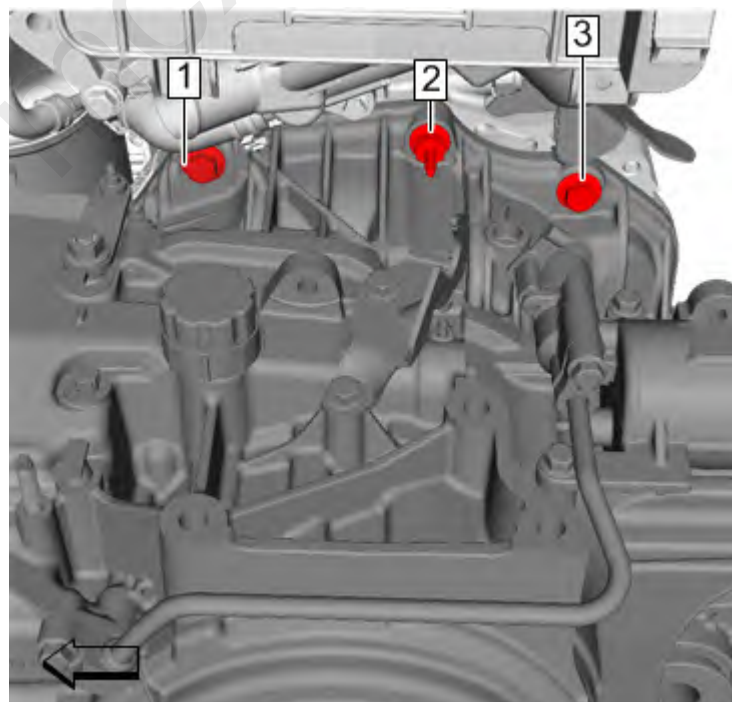


Fig. 97: Upper Transmission To Engine Bolts
Courtesy of GENERAL MOTORS COMPANY

8. Remove the upper transmission to engine bolts (1, 2, 3).

9. Remove the drivetrain and front suspension cradle. [Drivetrain and Front Suspension Cradle Replacement \(Front Wheel Drive\)](#), [Drivetrain and Front Suspension Cradle Replacement \(All Wheel Drive\)](#)
10. Remove the warm up three-way catalytic converter from the engine. [Warm Up Three-Way Catalytic Converter Replacement \(LYX\)](#), [Warm Up Three-Way Catalytic Converter Replacement \(LTG\)](#)
11. Disconnect the wheel drive shafts from the transmission. [Front Wheel Drive Half Shaft Replacement - Left Side](#), and [Front Wheel Drive Half Shaft Replacement - Right Side \(AWD\)](#), [Front Wheel Drive Half Shaft Replacement - Right Side \(M3U, MHG, MNH, MNK with FWD\)](#), [Front Wheel Drive Half Shaft Replacement - Right Side \(M3D, M3H with FWD\)](#)
12. Remove the transmission mount strut from the transmission. [Transmission Mount Strut Replacement \(Front Wheel Drive\)](#)
13. Remove the starter. [Starter Replacement \(LYX - Front Wheel Drive\)](#), [Starter Replacement \(LTG - Front Wheel Drive\)](#), [Starter Replacement \(LH7 - Front Wheel Drive\)](#)
14. Mark the relationship of the flywheel to the torque converter for reassembly.

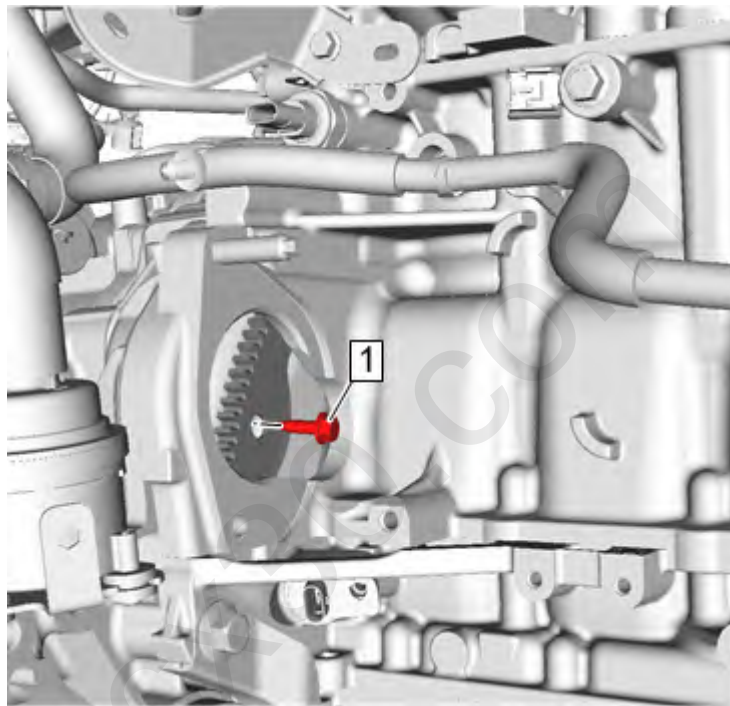


Fig. 98: Torque Converter To Flywheel Bolts
Courtesy of GENERAL MOTORS COMPANY

15. Remove the torque converter to flywheel bolts (1).
16. Lower the vehicle.
17. Remove the three left transmission mount bolts from the transmission. [Transmission Mount Replacement - Left Side](#)
18. Lower the transmission side with the support fixture to allow clearance for removal.
19. Unclip the engine wiring harness from the transmission.
20. Raise the vehicle.
21. Use a transmission jack in order to support the transmission.

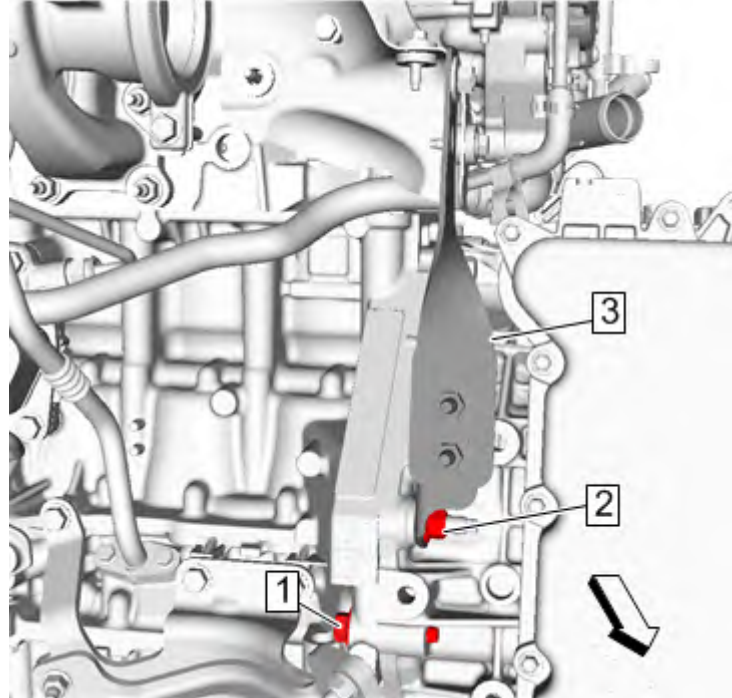


Fig. 99: Catalytic Converter Bracket Assembly.
Courtesy of GENERAL MOTORS COMPANY

22. Remove the front transmission fasteners (1, 2).
23. Remove the catalytic converter bracket assembly (3).

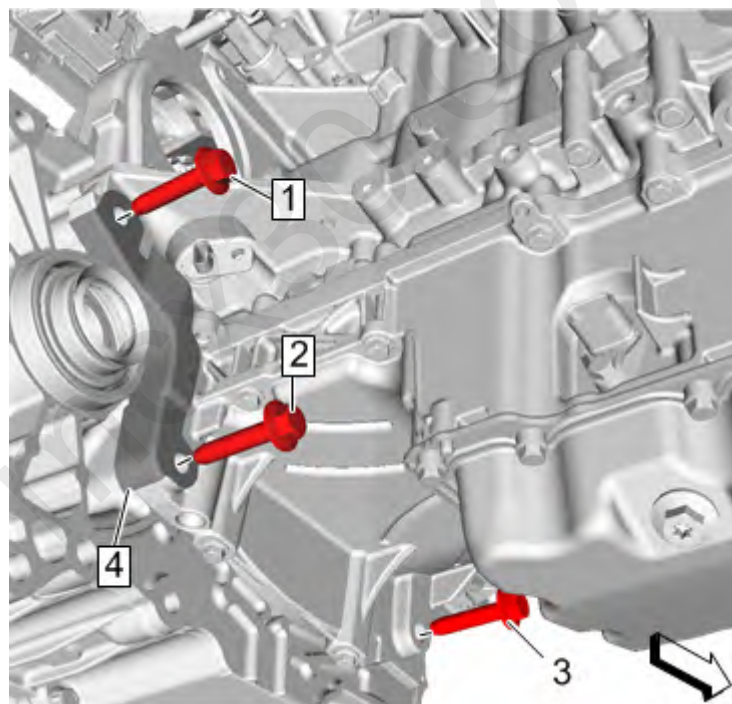


Fig. 100: Lower Transmission Fasteners And Torque Converter Cover
Courtesy of GENERAL MOTORS COMPANY

24. Remove the lower transmission fasteners (1, 2, 3).
25. Remove the torque converter cover (4).

NOTE: Ensure the torque converter remains securely in place on the transmission input shaft while separating and removing the transmission.

26. Separate the transmission from the engine.
27. Lower the transmission with the transmission jack far enough to remove the transmission.
28. Flush and flow test the transmission oil cooler and lines. [Transmission Fluid Cooler Flow Test and Flushing](#)

1. Raise the transmission with the transmission jack and position the transmission to the engine.

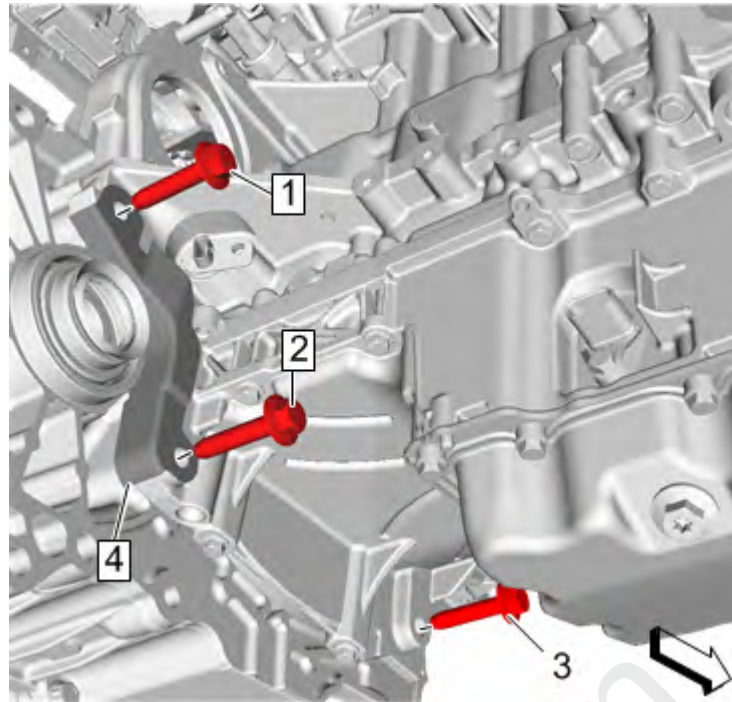


Fig. 101: Lower Transmission Fasteners And Torque Converter Cover
Courtesy of GENERAL MOTORS COMPANY

2. Install the torque converter cover (4).

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

3. Install the transmission bolts (1, 2, 3) and tighten to 58 N.m (43 lb ft).

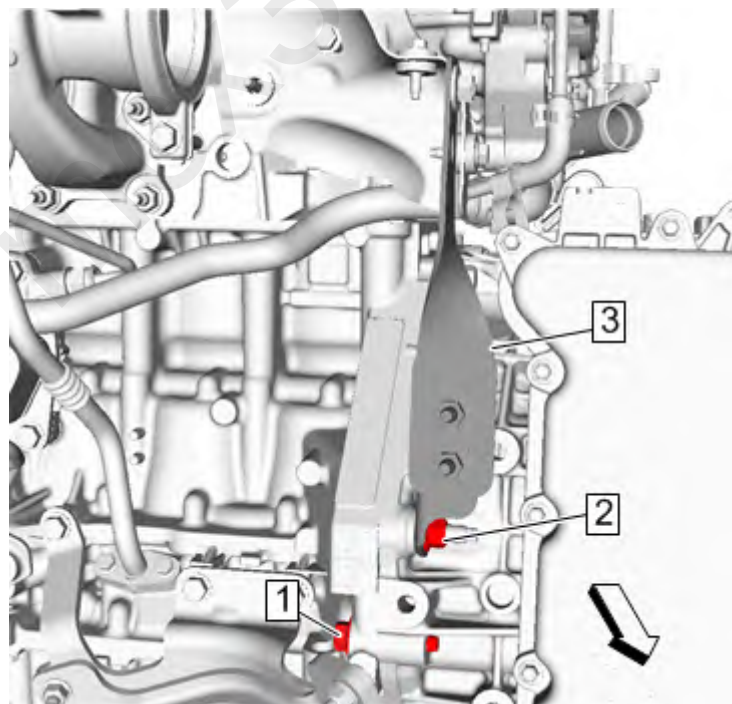


Fig. 102: Catalytic Converter Bracket Assembly
Courtesy of GENERAL MOTORS COMPANY

4. Install the catalytic converter bracket assembly (3).
5. Install the front transmission bolt and nut (1, 2) and tighten to 58 N.m (43 lb ft).
6. Install the warm up three-way catalytic converter to the engine. [Warm Up Three-Way Catalytic Converter Replacement \(LYX\)](#).
7. Remove the transmission jack.

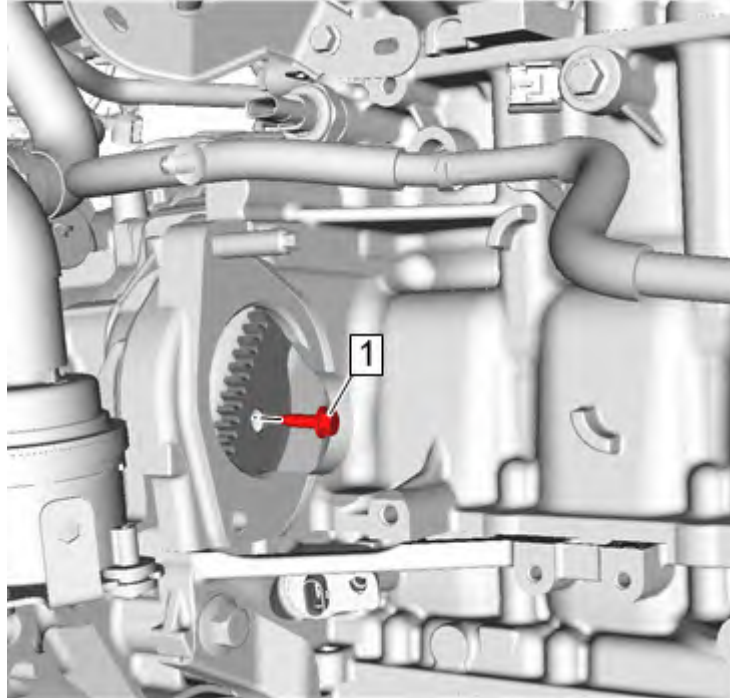


Fig. 103: Torque Converter To Flywheel Bolts
 Courtesy of GENERAL MOTORS COMPANY

NOTE: If reusing the torque converter bolts, clean the threads and apply threadlocker to the threads prior to installation. Refer to [Adhesives, Fluids, Lubricants, and Sealers](#) for the recommended threadlock material.

8. Install the torque converter to flywheel bolts (1) and tighten to 60 N.m (44 lb ft).
9. Install the starter. [Starter Replacement \(LYX - Front Wheel Drive\)](#), [Starter Replacement \(LH7 - Front Wheel Drive\)](#).
10. Install the transmission mount strut to the transmission. [Transmission Mount Strut Replacement \(Front Wheel Drive\)](#).
11. Install the left transmission mount to the transmission. [Transmission Mount Replacement - Left Side](#).
12. Install the wheel drive shafts to the transmission. [Front Wheel Drive Half Shaft Replacement - Left Side](#) , and [Front Wheel Drive Half Shaft Replacement - Right Side \(AWD\)](#), [Front Wheel Drive Half Shaft Replacement - Right Side \(M3U, MHG, MNH, MNK with FWD\)](#).
13. Install the drivetrain and front suspension cradle. [Drivetrain and Front Suspension Cradle Replacement \(Front Wheel Drive\)](#).

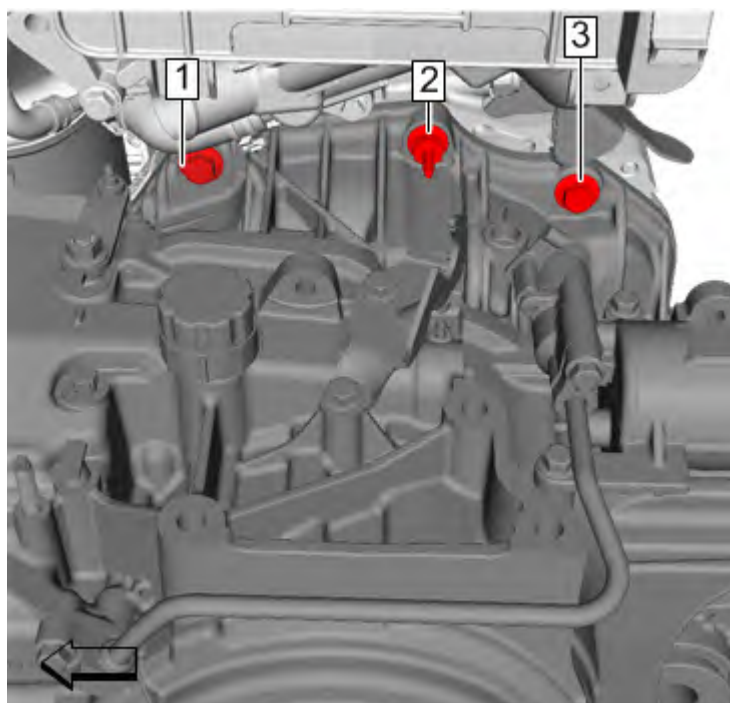


Fig. 104: Upper Transmission To Engine Bolts
Courtesy of GENERAL MOTORS COMPANY

14. Install the upper transmission to engine bolt (1, 2, 3) and tighten to 58 N.m (43 lb ft).
15. Remove the engine support fixture.

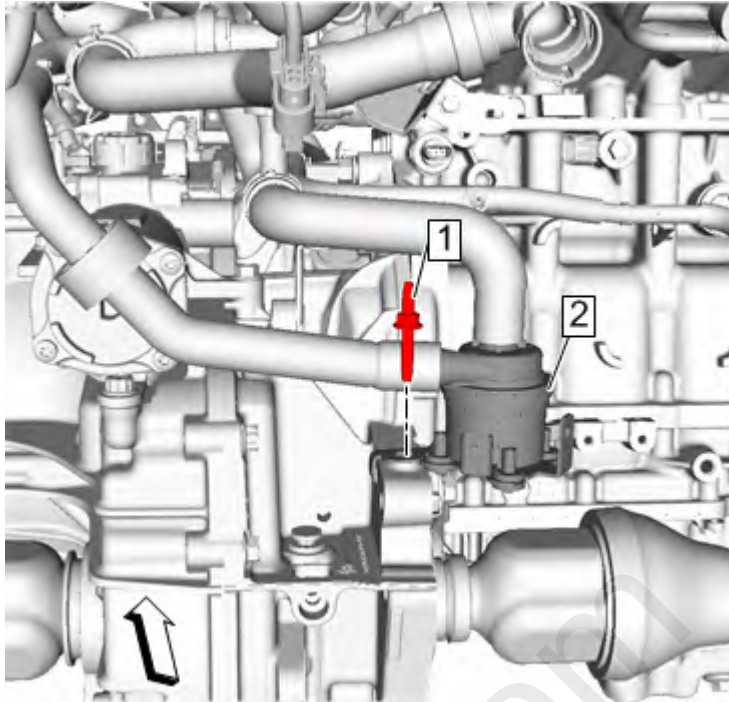


Fig. 105: Water Pump Fastener And Water Pump
Courtesy of GENERAL MOTORS COMPANY

16. Position the water pump (2), then install the water pump fastener (1) and tighten to 9 N.m (80 lb in).
17. Install the transmission fluid cooler inlet and outlet hoses to the transmission. [Transmission Fluid Cooler Inlet and Outlet Pipe Replacement \(MNH, MHG\)](#)

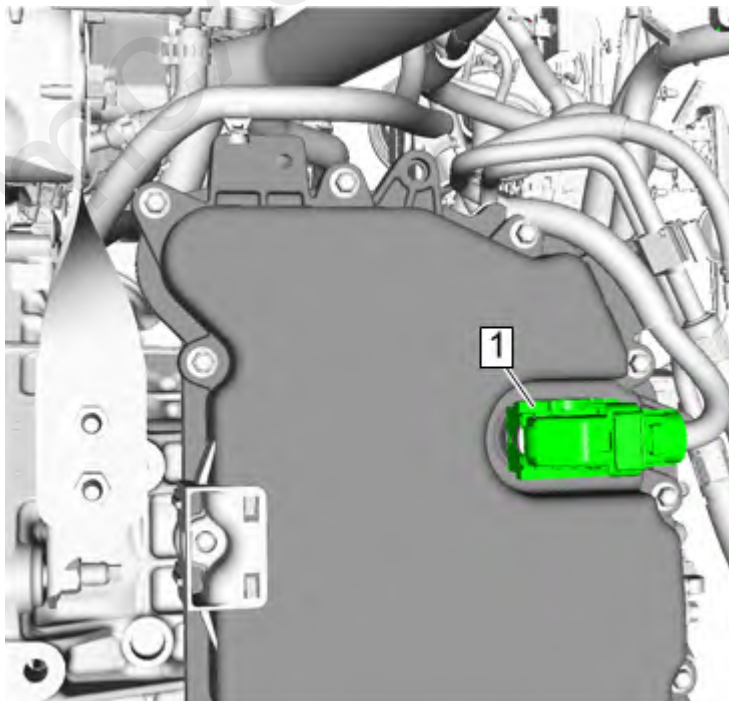


Fig. 106: Control Valve Body Transmission Control Module Electrical Connector
Courtesy of GENERAL MOTORS COMPANY

18. Connect the control valve body TCM electrical connector (1).
19. Install the transmission range select lever cable and bracket on the transmission.
20. Install the battery tray. [Battery Tray Replacement](#)

21. Adjust the automatic transmission range selector lever cable. [Range Selector Lever Cable Adjustment](#)
22. Fill the transmission with fluid. [Transmission Fluid Drain and Fill](#)
23. If a NEW TCM has been installed into the vehicle, the NEW module needs to be reprogrammed. [Service Programming System \(SPS\)](#)

NOTE: The Transmission Adaptive Values Learn 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

24. Perform the Transmission Adaptive Values Learn procedure. [Transmission Adaptive Values Learn](#)
25. Road test the vehicle.

TRANSMISSION REPLACEMENT (ALL WHEEL DRIVE EXCEPT DIESEL ENGINE)

Removal Procedure

1. Remove the battery tray. [Battery Tray Replacement](#)
2. Remove the transmission range select lever cable from the transmission, then position out of the way.
3. Drain the transmission fluid, if necessary. [Transmission Fluid Drain and Fill](#)

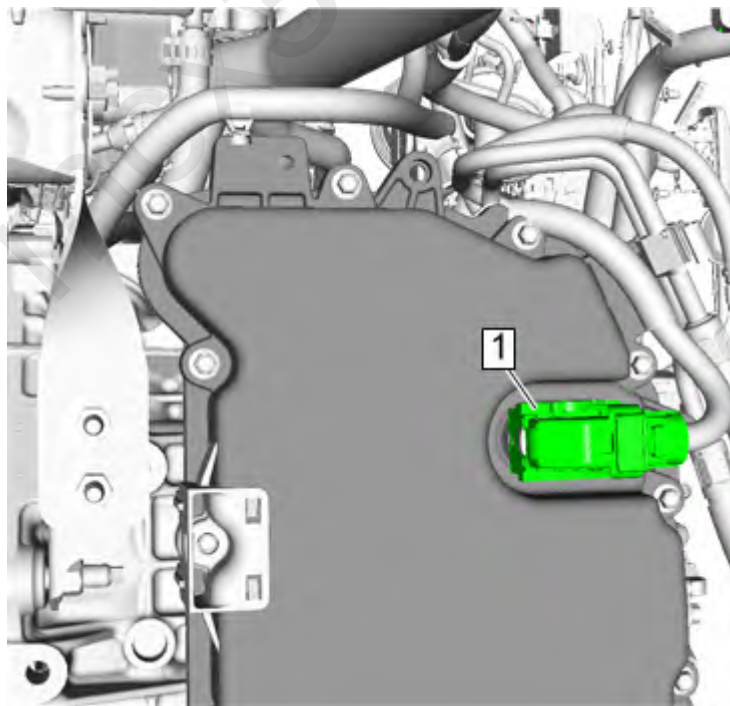


Fig. 107: Control Valve Body Transmission Control Module Electrical Connector
Courtesy of GENERAL MOTORS COMPANY

4. Disconnect the control valve body transmission control module (TCM) electrical connector (1) then unclip the connector from the transmission.

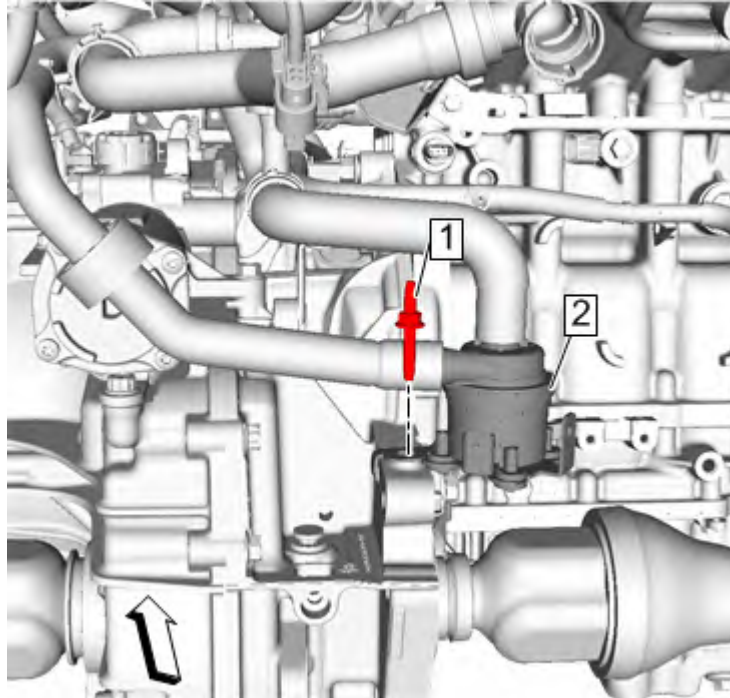


Fig. 108: Water Pump Fastener And Water Pump
 Courtesy of GENERAL MOTORS COMPANY

5. Remove the water pump fastener (1), then position the water pump (2) out of the way.
6. Remove the transmission fluid cooler inlet and outlet hoses from the transmission, then position the hoses out of the way. [Transmission Fluid Cooler Inlet and Outlet Pipe Replacement \(MNH, MHG\)](#)
7. Plug and/or cap the hose and transmission to prevent contamination.

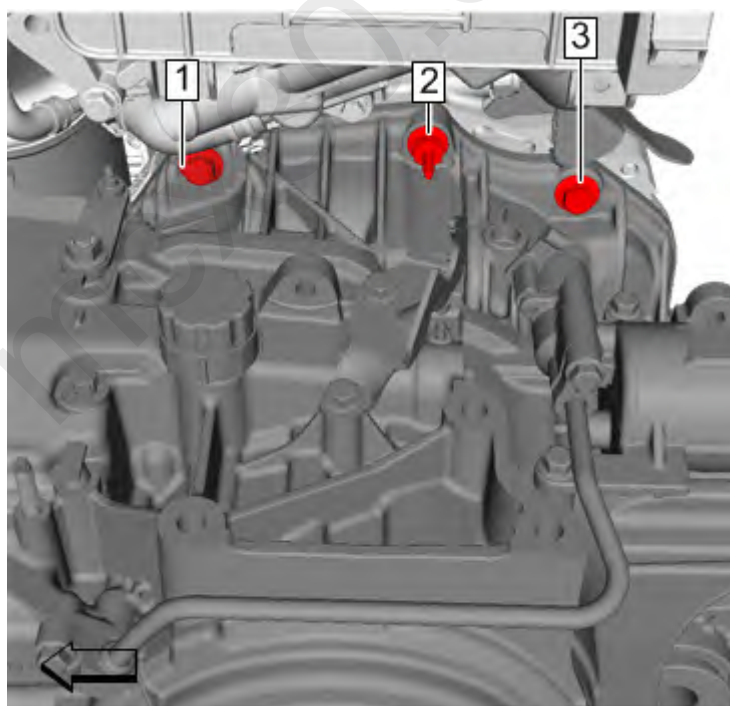


Fig. 109: Upper Transmission To Engine Bolts
 Courtesy of GENERAL MOTORS COMPANY

8. Remove the upper transmission to engine bolts (1, 2, 3).
9. Remove the drivetrain and front suspension cradle. [Drivetrain and Front Suspension Cradle Replacement \(All Wheel Drive\)](#)
10. Remove the warm up three-way catalytic converter from the engine. [Warm Up Three-Way Catalytic Converter Replacement \(LYX\)](#) [Warm Up Three-Way Catalytic Converter Replacement \(LTG\)](#)
11. Disconnect the wheel drive shafts from the transmission. [Front Wheel Drive Half Shaft Replacement - Left Side](#)

12. Remove the power transfer unit case. [Power Transfer Unit Case Replacement \(MNH Transmission with LYX Engine\)](#) [Power Transfer Unit Case Replacement \(M3D Transmission with LTG Engine\)](#) [Power Transfer Unit Case Replacement \(MHG Transmission with LH7 Engine\)](#).
13. Remove the transmission mount strut from the transmission. [Transmission Mount Strut Replacement \(All Wheel Drive\)](#).
14. Remove the starter. [Starter Replacement \(LYX - All Wheel Drive\)](#) [Starter Replacement \(LTG - All Wheel Drive\)](#) [Starter Replacement \(LH7 - All Wheel Drive\)](#).
15. Mark the relationship of the flywheel to the torque converter for reassembly.

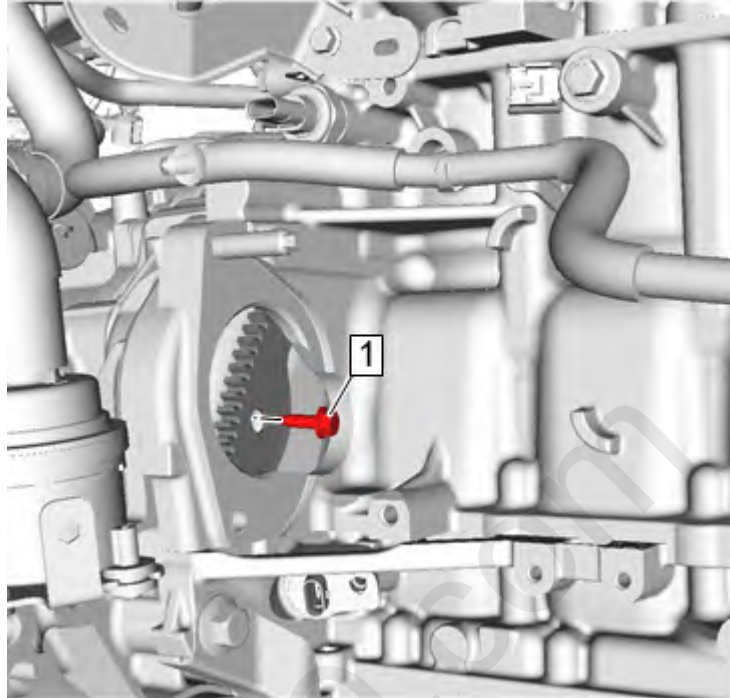


Fig. 110: Torque Converter To Flywheel Bolts
Courtesy of GENERAL MOTORS COMPANY

16. Remove the torque converter to flywheel bolts (1).
17. Lower the vehicle.
18. Remove the three left transmission mount bolts from the transmission. [Transmission Mount Replacement - Left Side](#)
19. Lower the transmission side with the support fixture to allow clearance for removal.
20. Unclip the engine wiring harness from the transmission.
21. Raise the vehicle.
22. Use a transmission jack in order to support the transmission.

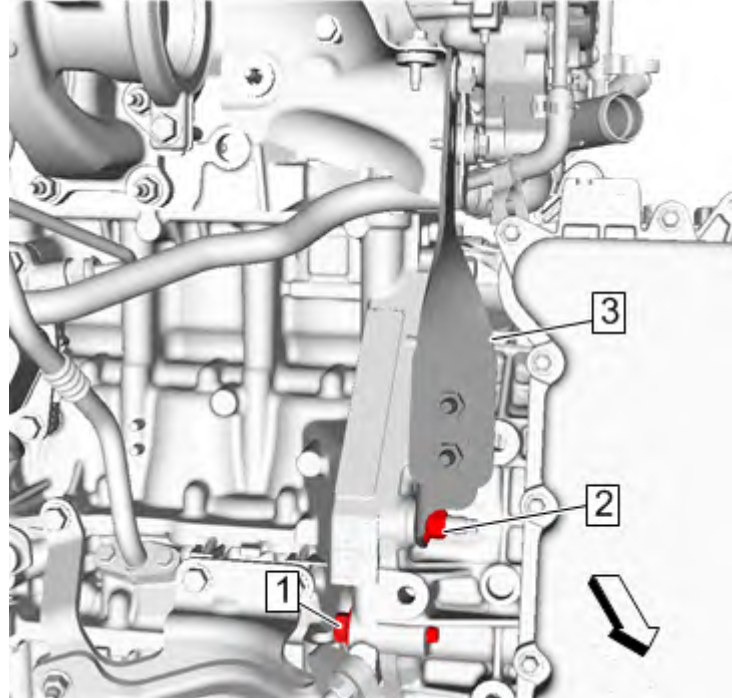


Fig. 111: Catalytic Converter Bracket Assembly.
Courtesy of GENERAL MOTORS COMPANY

23. Remove the front transmission fasteners (1, 2).
24. Remove the catalytic converter bracket assembly (3).

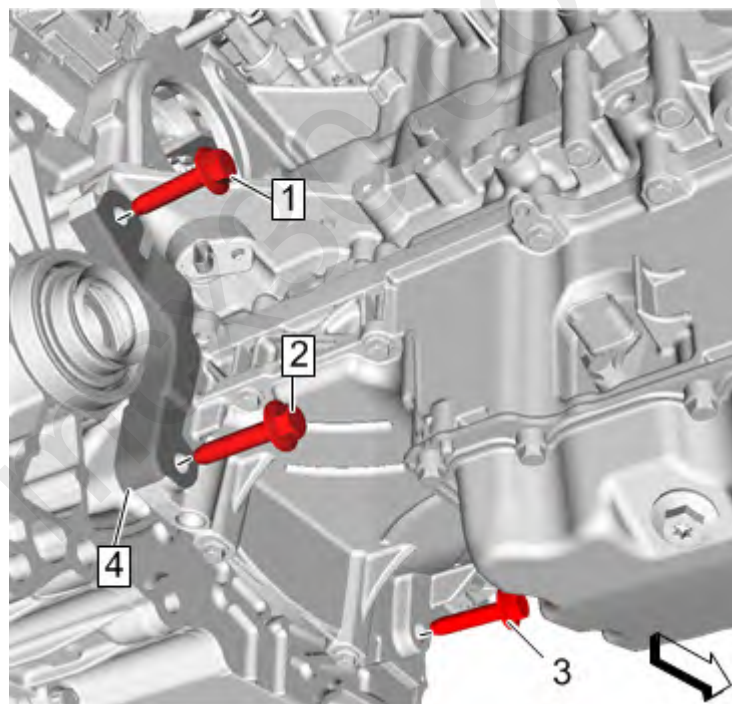


Fig. 112: Lower Transmission Fasteners And Torque Converter Cover
Courtesy of GENERAL MOTORS COMPANY

25. Remove the lower transmission fasteners (1, 2, 3).
26. Remove the torque converter cover (4).

NOTE: Ensure the torque converter remains securely in place on the transmission input shaft while separating and removing the transmission.

27. Separate the transmission from the engine.
28. Lower the transmission with the transmission jack far enough to remove the transmission.
29. Flush and flow test the transmission oil cooler and lines. [Transmission Fluid Cooler Flow Test and Flushing](#)

1. Raise the transmission with the transmission jack and position the transmission to the engine.

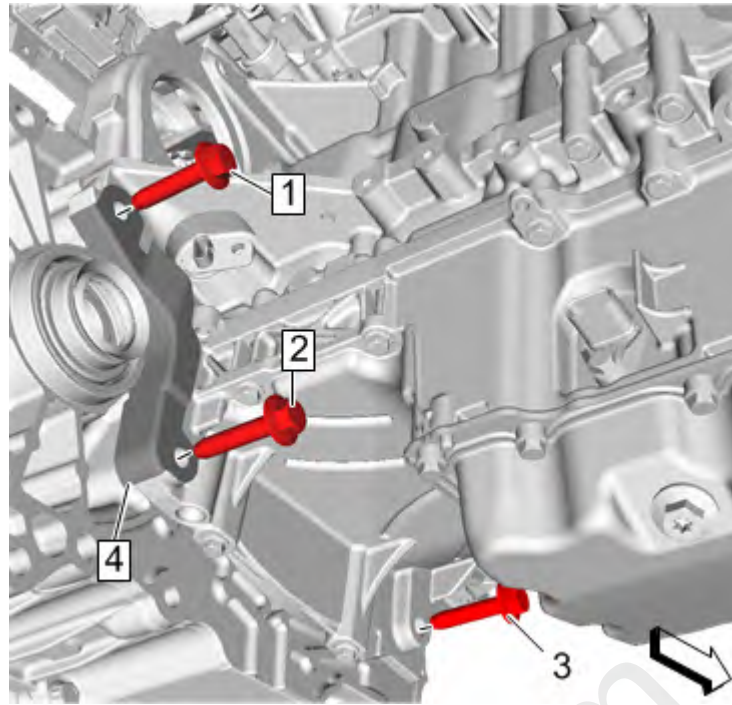


Fig. 113: Lower Transmission Fasteners And Torque Converter Cover
Courtesy of GENERAL MOTORS COMPANY

2. Install the torque converter cover (4).

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

3. Install the transmission bolts (1, 2, 3) and tighten to 58 N.m (43 lb ft).

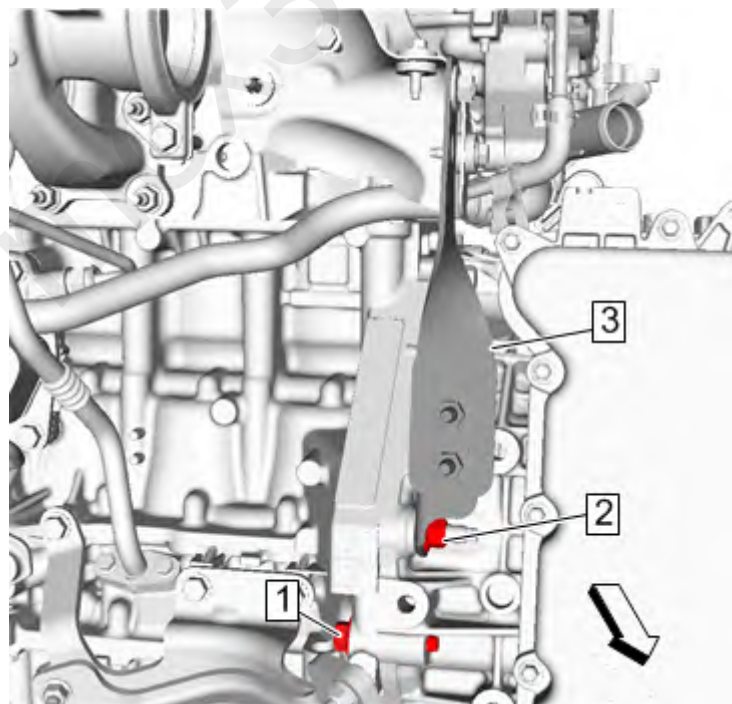


Fig. 114: Catalytic Converter Bracket Assembly
Courtesy of GENERAL MOTORS COMPANY

4. Install the catalytic converter bracket assembly (3).
5. Install the front transmission bolt and nut (1, 2) and tighten to 58 N.m (43 lb ft).
6. Install the warm up three-way catalytic converter to the engine. [Warm Up Three-Way Catalytic Converter Replacement \(LYX\)](#) [Warm Up Three-Way Catalytic Converter Replacement \(LTG\)](#)

7. Remove the transmission jack.

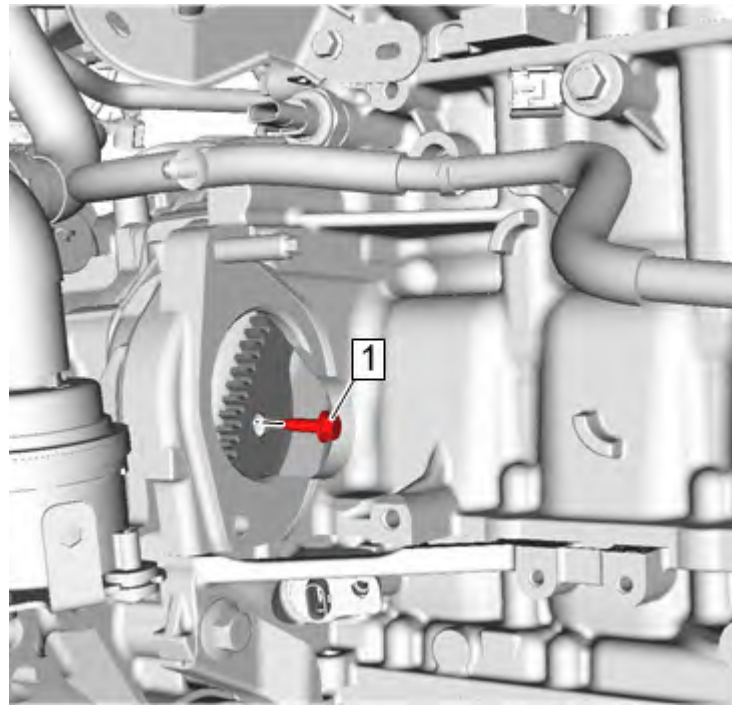


Fig. 115: Torque Converter To Flywheel Bolts
Courtesy of GENERAL MOTORS COMPANY

NOTE: If reusing the torque converter bolts, clean the threads and apply threadlocker to the threads prior to installation. Refer to [Adhesives, Fluids, Lubricants, and Sealers](#) for the recommended threadlock material.

8. Install the torque converter to flywheel bolts (1) and tighten to 60 N.m (44 lb ft).
9. Install the starter. [Starter Replacement \(LYX - All Wheel Drive\)](#) [Starter Replacement \(LTG - All Wheel Drive\)](#) [Starter Replacement \(LH7 - All Wheel Drive\)](#)
10. Install the transmission mount strut to the transmission. [Transmission Mount Strut Replacement \(All Wheel Drive\)](#)
11. Install the left transmission mount to the transmission. [Transmission Mount Replacement - Left Side](#)
12. Install the wheel drive shafts to the transmission. [Front Wheel Drive Half Shaft Replacement - Left Side](#)
13. Install the drivetrain and front suspension cradle. [Drivetrain and Front Suspension Cradle Replacement \(All Wheel Drive\)](#)
14. Install the power transfer unit case. [Power Transfer Unit Case Replacement \(MNH Transmission with LYX Engine\)](#) [Power Transfer Unit Case Replacement \(MHG Transmission with LH7 Engine\)](#)

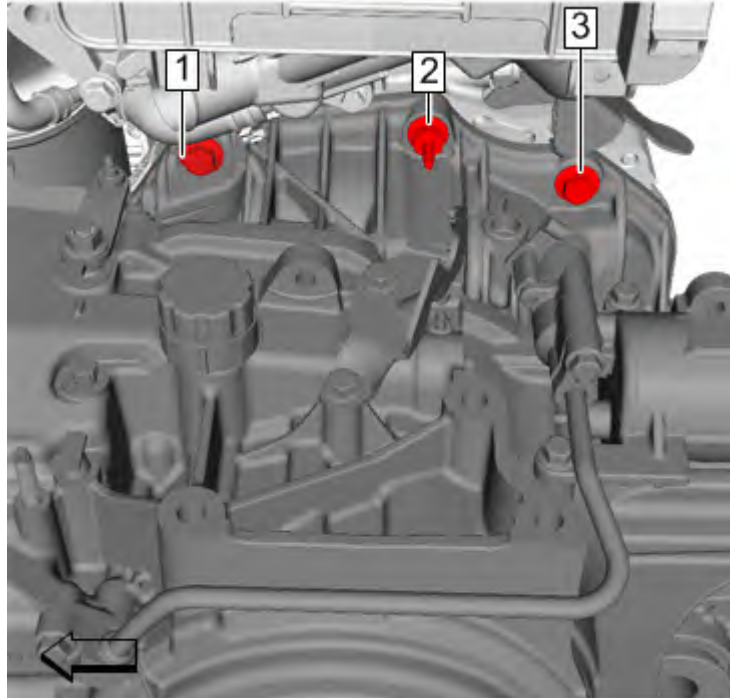


Fig. 116: Upper Transmission To Engine Bolts
Courtesy of GENERAL MOTORS COMPANY

15. Install the upper transmission to engine bolt (1, 2, 3) and tighten to 58 N.m (43 lb ft).
16. Remove the engine support fixture.

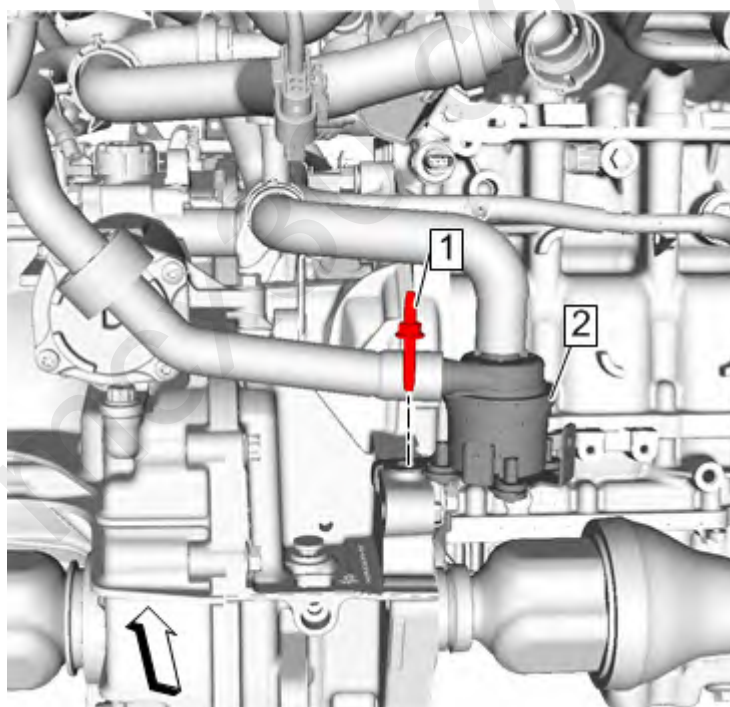


Fig. 117: Water Pump Fastener And Water Pump
Courtesy of GENERAL MOTORS COMPANY

17. Position the water pump (2), the install the water pump fastener (1) and tighten to 9 N.m (80 lb in).
18. Install the transmission fluid cooler inlet and outlet hoses to the transmission. [Transmission Fluid Cooler Inlet and Outlet Pipe Replacement \(MNH, MHG\)](#)

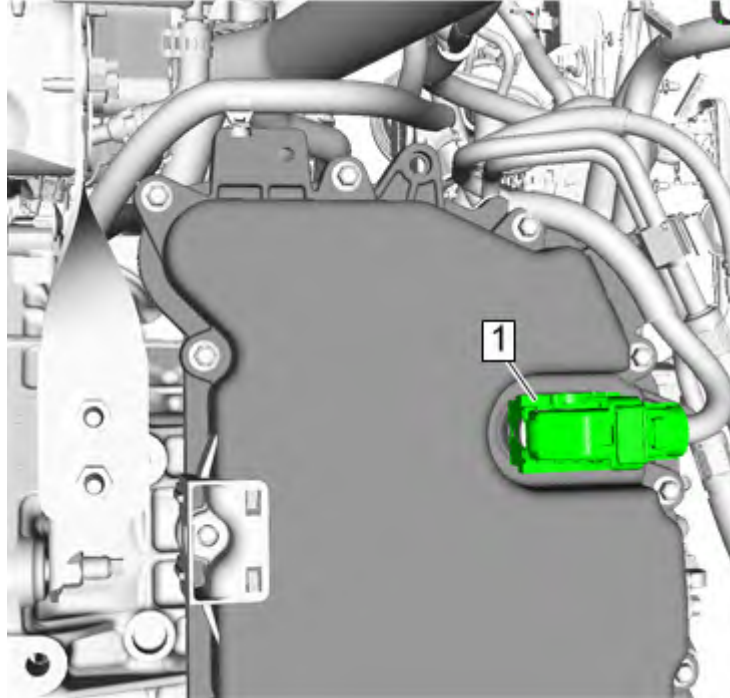


Fig. 118: Control Valve Body Transmission Control Module Electrical Connector
Courtesy of GENERAL MOTORS COMPANY

19. Connect the control valve body TCM electrical connector (1).
20. Install the transmission range select lever cable and bracket on the transmission.
21. Install the battery tray. [Battery Tray Replacement](#)
22. Adjust the automatic transmission range selector lever cable. [Range Selector Lever Cable Adjustment](#)
23. Fill the transmission with fluid. [Transmission Fluid Drain and Fill](#)
24. If a NEW TCM has been installed into the vehicle, the NEW module needs to be reprogrammed. [Service Programming System \(SPS\)](#)

NOTE:

The Transmission Adaptive Values Learn 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

25. Perform the Transmission Adaptive Values Learn procedure. [Transmission Adaptive Values Learn](#)
26. Road test the vehicle.

TRANSMISSION REPLACEMENT (ALL WHEEL DRIVE WITH DIESEL ENGINE, EQUINOX)

Removal Procedure

1. Remove the battery tray. [Battery Tray Replacement](#)
2. Remove the transmission range select lever cable from the transmission, then position out of the way.
3. Drain the transmission fluid, if necessary. [Transmission Fluid Drain and Fill](#)

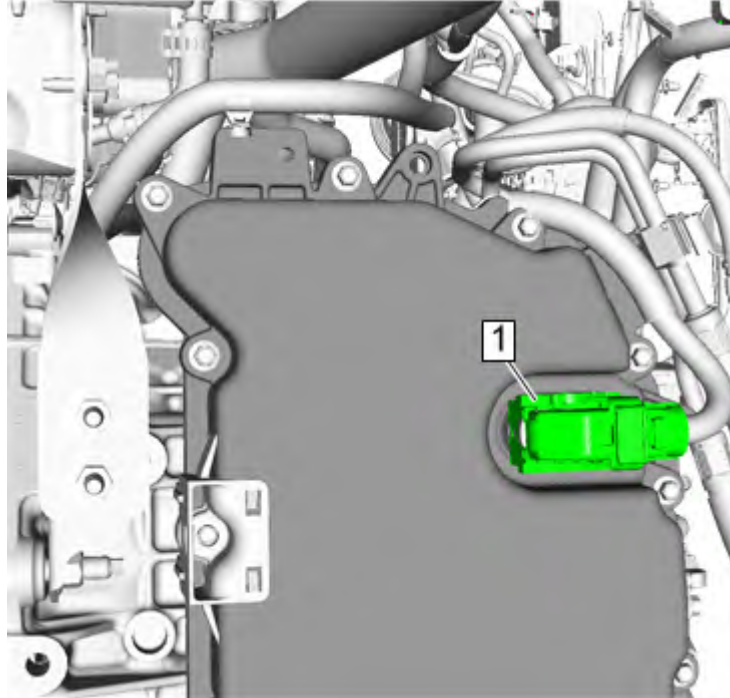


Fig. 119: Control Valve Body Transmission Control Module Electrical Connector
 Courtesy of GENERAL MOTORS COMPANY

4. Disconnect the control valve body transmission control module (TCM) electrical connector (1) then unclip the connector from the transmission.

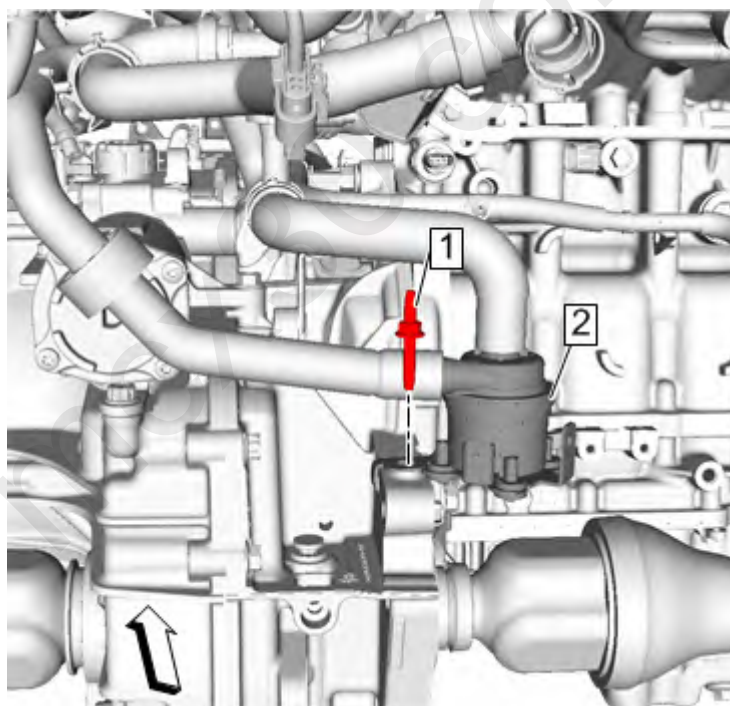


Fig. 120: Water Pump Fastener And Water Pump
 Courtesy of GENERAL MOTORS COMPANY

5. Remove the water pump fastener (1), then position the water pump (2) out of the way.
6. Remove the transmission fluid cooler inlet and outlet hoses from the transmission, then position the hoses out of the way. **Transmission Fluid Cooler Inlet and Outlet Pipe Replacement (MNH, MHG)**
7. Plug and/or cap the hose and transmission to prevent contamination.

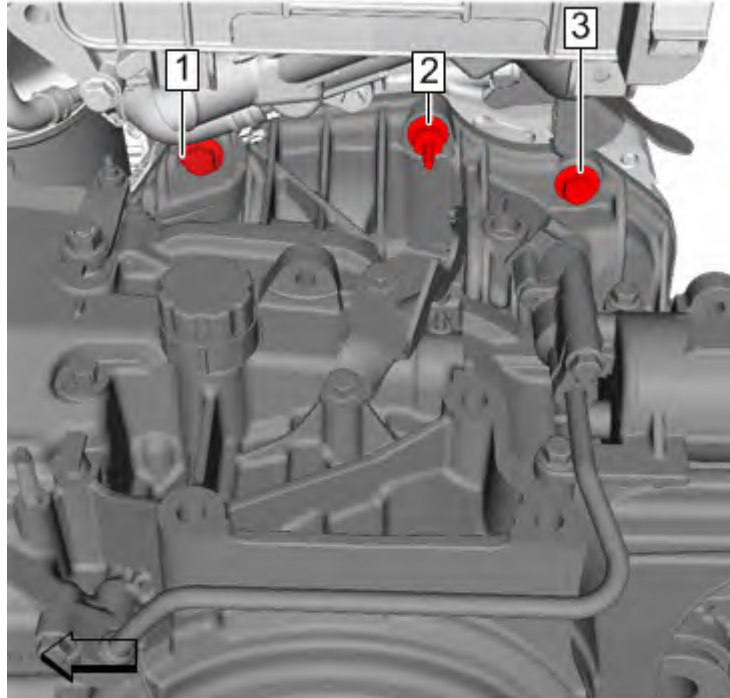


Fig. 121: Upper Transmission To Engine Bolts
Courtesy of GENERAL MOTORS COMPANY

8. Remove the upper transmission to engine bolts (1, 2, 3).
9. Remove the drivetrain and front suspension cradle. [Drivetrain and Front Suspension Cradle Replacement \(All Wheel Drive\)](#)
10. Remove the warm up three-way catalytic converter from the engine. [Warm Up Three-Way Catalytic Converter Replacement \(LYX\)](#) [Warm Up Three-Way Catalytic Converter Replacement \(LTG\)](#)
11. Disconnect the wheel drive shafts from the transmission. [Front Wheel Drive Half Shaft Replacement - Left Side](#)
12. Remove the power transfer unit case. [Power Transfer Unit Case Replacement \(MNH Transmission with LYX Engine\)](#) [Power Transfer Unit Case Replacement \(MHG Transmission with LH7 Engine\)](#)
13. Remove the transmission mount strut from the transmission. [Transmission Mount Strut Replacement \(All Wheel Drive\)](#)
14. Remove the starter. [Starter Replacement \(LYX - All Wheel Drive\)](#) [Starter Replacement \(LTG - All Wheel Drive\)](#) [Starter Replacement \(LH7 - All Wheel Drive\)](#)
15. Mark the relationship of the flywheel to the torque converter for reassembly.

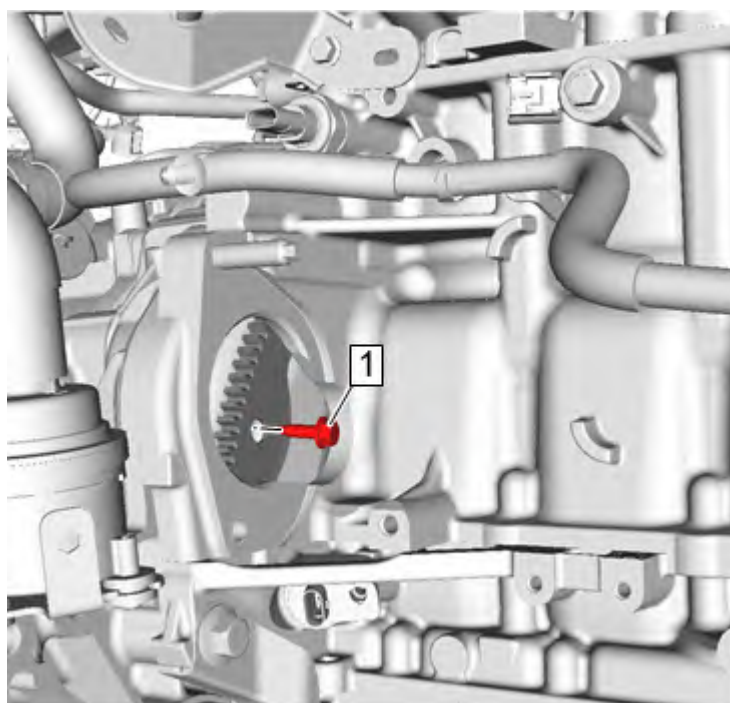


Fig. 122: Torque Converter To Flywheel Bolts
Courtesy of GENERAL MOTORS COMPANY

16. Remove the torque converter to flywheel bolts (1).
17. Lower the vehicle.
18. Remove the three left transmission mount bolts from the transmission. **Transmission Mount Replacement - Left Side**
19. Lower the transmission side with the support fixture to allow clearance for removal.
20. Unclip the engine wiring harness from the transmission.
21. Raise the vehicle.
22. Use a transmission jack in order to support the transmission.

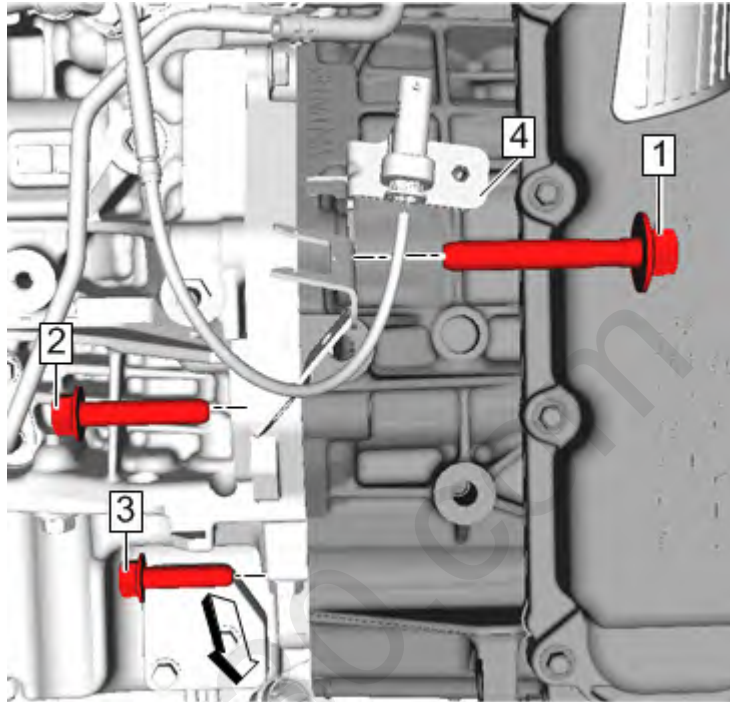


Fig. 123: Front Transmission Fasteners
Courtesy of GENERAL MOTORS COMPANY

23. Remove the front transmission fasteners (1, 2, 3).

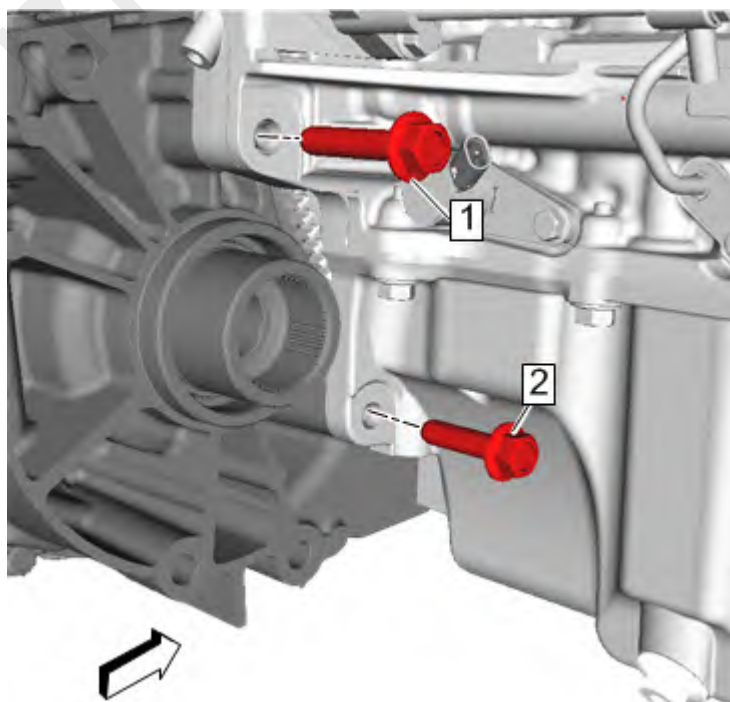


Fig. 124: Rear Transmission Fasteners
Courtesy of GENERAL MOTORS COMPANY

24. Remove the rear transmission fasteners (1, 2).

NOTE: Ensure the torque converter remains securely in place on the transmission input shaft while separating and removing the transmission.

25. Separate the transmission from the engine.

26. Lower the transmission with the transmission jack far enough to remove the transmission.

27. Flush and flow test the transmission oil cooler and lines. [Transmission Fluid Cooler Flow Test and Flushing](#)

Installation Procedure

1. Raise the transmission with the transmission jack and position the transmission to the engine.

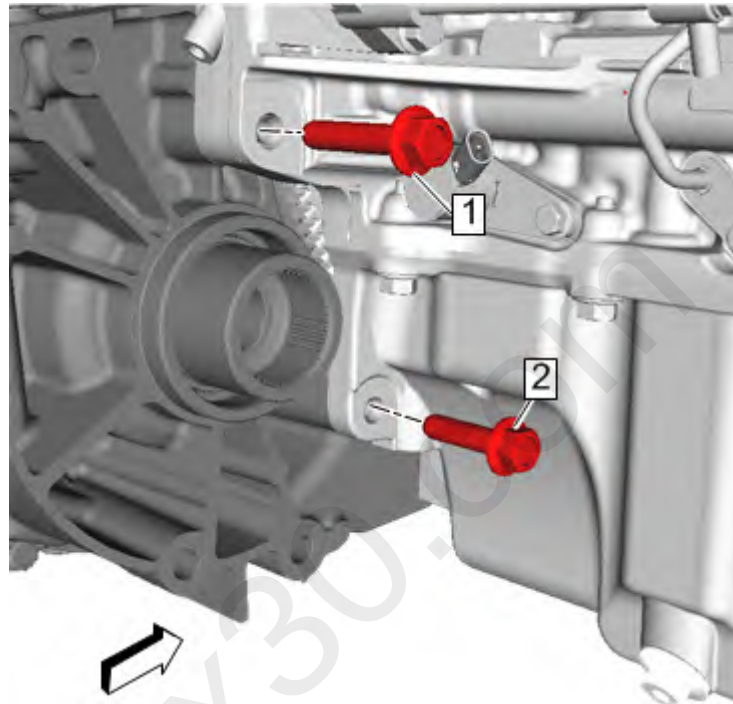
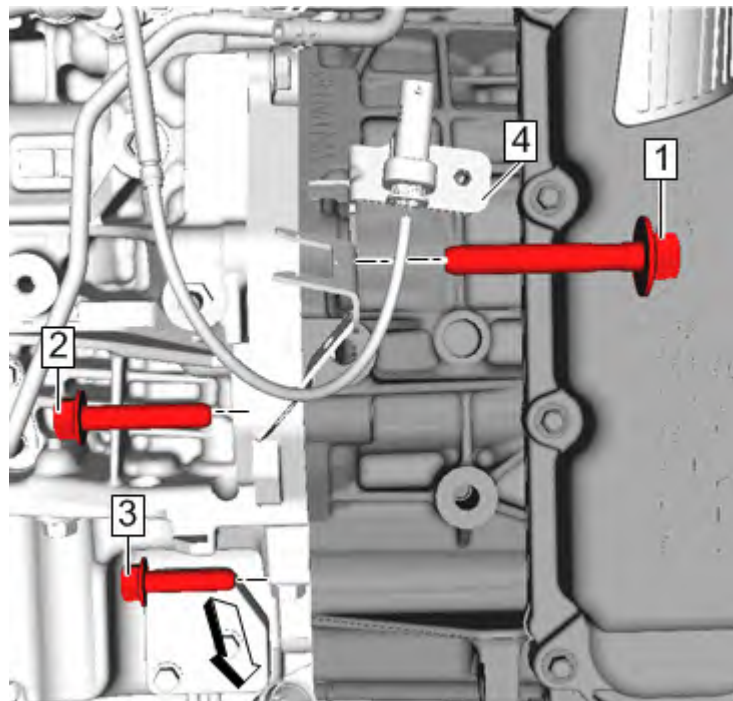


Fig. 125: Rear Transmission Fasteners

Courtesy of GENERAL MOTORS COMPANY

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

2. Install the rear transmission bolts (1, 2) and tighten to 58 N.m (43 lb ft).



- 3.
4. Install the front transmission bolts (1, 2) and tighten to 58 N.m (43 lb ft).
5. Install the warm up three-way catalytic converter to the engine. [Warm Up Three-Way Catalytic Converter Replacement \(LYX\)](#) [Warm Up Three-Way Catalytic Converter Replacement \(LTG\)](#)
6. Remove the transmission jack.

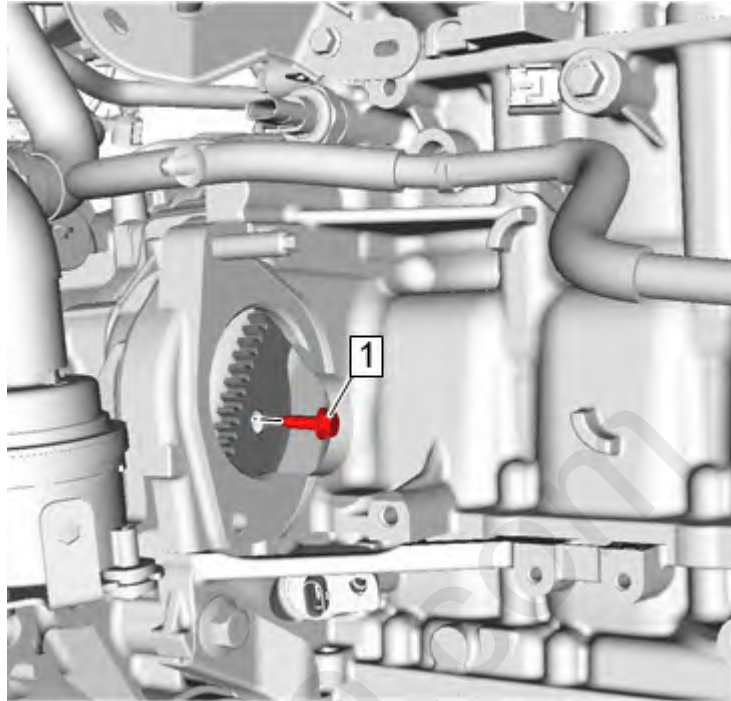


Fig. 127: Torque Converter To Flywheel Bolts
Courtesy of GENERAL MOTORS COMPANY

NOTE: If reusing the torque converter bolts, clean the threads and apply threadlocker to the threads prior to installation. Refer to [Adhesives, Fluids, Lubricants, and Sealers](#) for the recommended threadlock material.

7. Install the torque converter to flywheel bolts (1) and tighten to 60 N.m (44 lb ft).
8. Install the starter. [Starter Replacement \(LYX - All Wheel Drive\)](#) [Starter Replacement \(LTG - All Wheel Drive\)](#) [Starter Replacement \(LH7 - All Wheel Drive\)](#)
9. Install the transmission mount strut to the transmission. [Transmission Mount Strut Replacement \(All Wheel Drive\)](#)
10. Install the left transmission mount to the transmission. [Transmission Mount Replacement - Left Side](#)
11. Install the wheel drive shafts to the transmission. [Front Wheel Drive Half Shaft Replacement - Left Side](#)
12. Install the drivetrain and front suspension cradle. [Drivetrain and Front Suspension Cradle Replacement \(All Wheel Drive\)](#)
13. Install the power transfer unit case. [Power Transfer Unit Case Replacement \(MNH Transmission with LYX Engine\)](#) [Power Transfer Unit Case Replacement \(MHG Transmission with LH7 Engine\)](#)

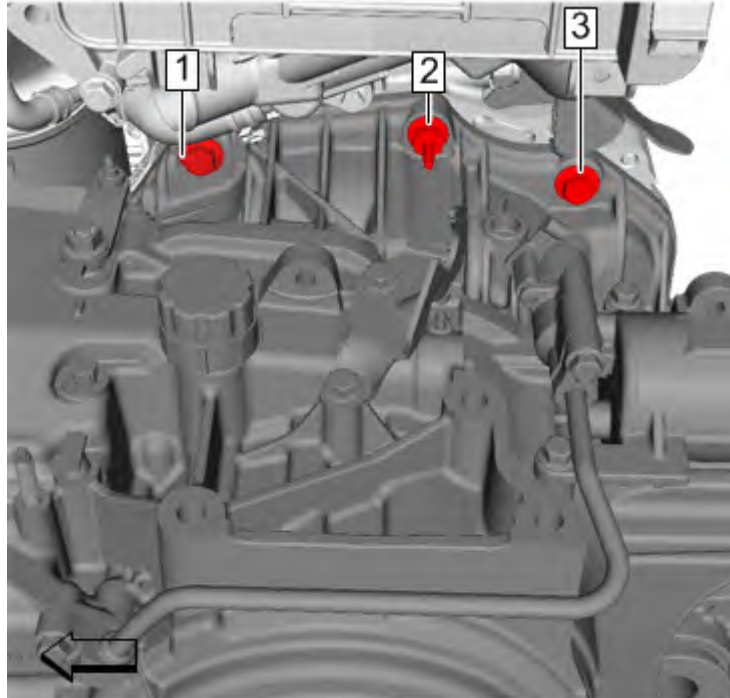


Fig. 128: Upper Transmission To Engine Bolts
 Courtesy of GENERAL MOTORS COMPANY

14. Install the upper transmission to engine bolt (1, 2, 3) and tighten to 58 N.m (43 lb ft).

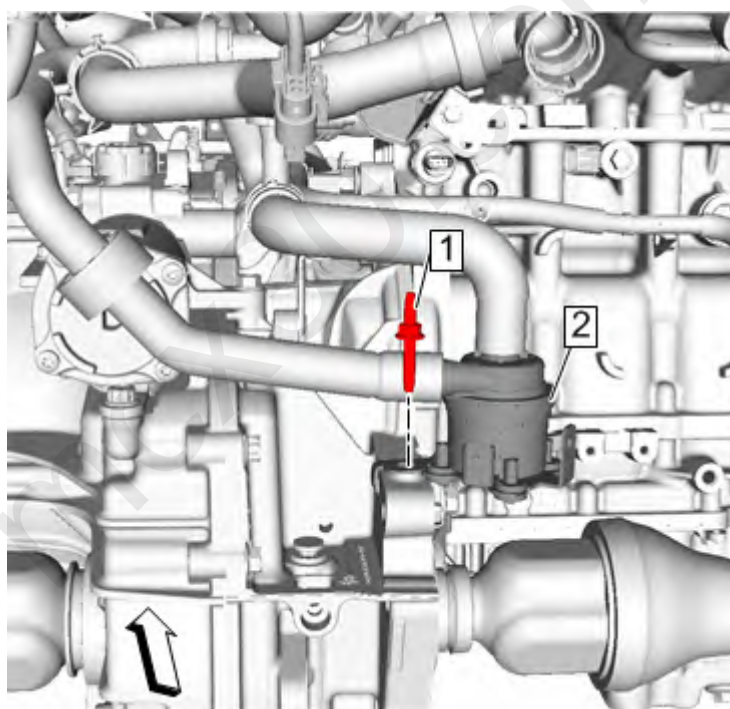


Fig. 129: Water Pump Fastener And Water Pump
 Courtesy of GENERAL MOTORS COMPANY

15. Position the water pump (2), then install the water pump fastener (1) and tighten to 9 N.m (80 lb in).
16. Install the transmission fluid cooler inlet and outlet hoses to the transmission. [Transmission Fluid Cooler Inlet and Outlet Pipe Replacement \(MNH, MHG\)](#)

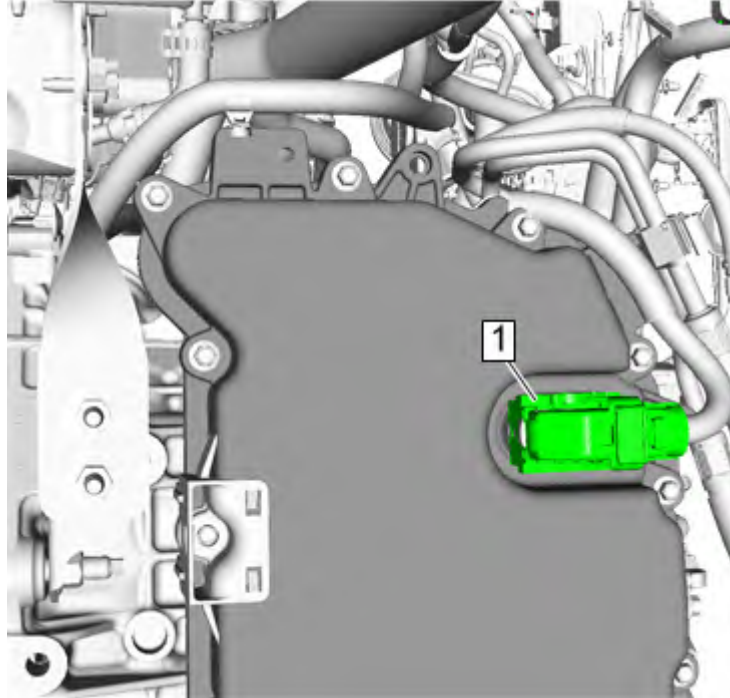


Fig. 130: Control Valve Body Transmission Control Module Electrical Connector
Courtesy of GENERAL MOTORS COMPANY

17. Connect the control valve body TCM electrical connector (1).
18. Install the transmission range select lever cable and bracket on the transmission.
19. Install the battery tray. [Battery Tray Replacement](#)
20. Adjust the automatic transmission range selector lever cable. [Range Selector Lever Cable Adjustment](#)
21. Fill the transmission with fluid. [Transmission Fluid Drain and Fill](#)
22. If a NEW TCM has been installed into the vehicle, the NEW module needs to be reprogrammed. [Service Programming System \(SPS\)](#)

NOTE:

The Transmission Adaptive Values Learn 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

23. Perform the Transmission Adaptive Values Learn procedure. [Transmission Adaptive Values Learn](#)
24. Road test the vehicle.

TRANSMISSION REPLACEMENT (FRONT WHEEL DRIVE WITH DIESEL ENGINE)

Removal Procedure

1. Remove the battery tray. [Battery Tray Replacement](#)
2. Remove the transmission range select lever cable from the transmission, then position out of the way.
3. Drain the transmission fluid, if necessary. [Transmission Fluid Drain and Fill](#)

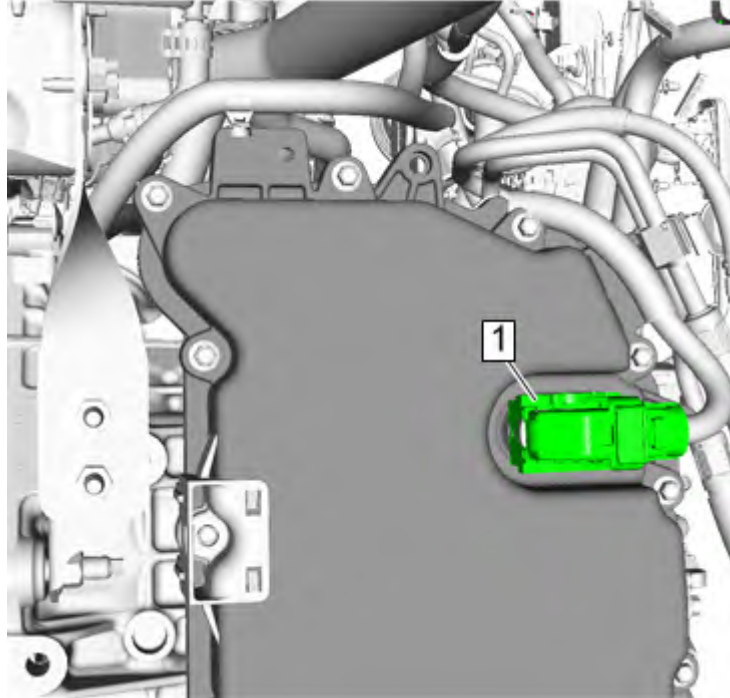


Fig. 131: Control Valve Body Transmission Control Module Electrical Connector
 Courtesy of GENERAL MOTORS COMPANY

4. Disconnect the control valve body transmission control module (TCM) electrical connector (1) then unclip the connector from the transmission.

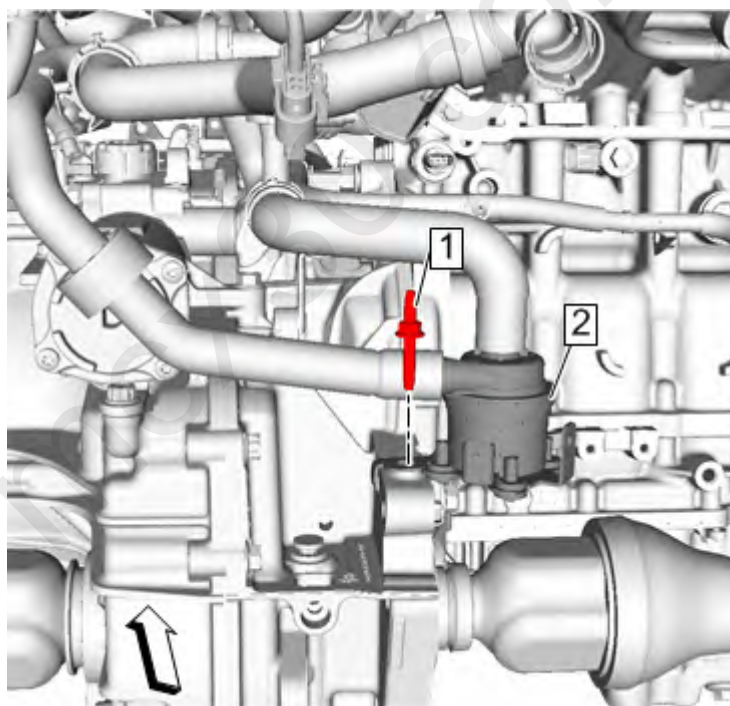


Fig. 132: Water Pump Fastener And Water Pump
 Courtesy of GENERAL MOTORS COMPANY

5. Remove the water pump fastener (1), then position the water pump (2) out of the way.
6. Remove the transmission fluid cooler inlet and outlet hoses from the transmission, then position the hoses out of the way. **Transmission Fluid Cooler Inlet and Outlet Pipe Replacement (MNH, MHG)**
7. Plug and/or cap the hose and transmission to prevent contamination.

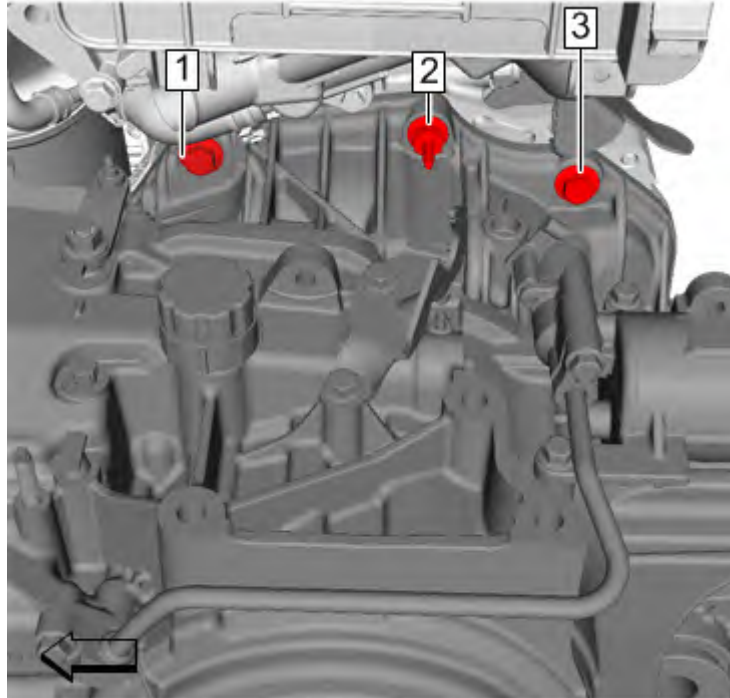


Fig. 133: Upper Transmission To Engine Bolts
Courtesy of GENERAL MOTORS COMPANY

8. Remove the upper transmission to engine bolts (1, 2, 3).
9. Remove the drivetrain and front suspension cradle. [Drivetrain and Front Suspension Cradle Replacement \(All Wheel Drive\)](#)
10. Remove the warm up three-way catalytic converter from the engine. [Warm Up Three-Way Catalytic Converter Replacement \(LYX\)](#) [Warm Up Three-Way Catalytic Converter Replacement \(LTG\)](#)
11. Disconnect the left wheel drive shaft from the transmission. [Front Wheel Drive Half Shaft Replacement - Left Side](#)
12. Disconnect the right wheel drive shaft from the transmission. [Front Wheel Drive Half Shaft Replacement - Right Side \(AWD\)](#) [Front Wheel Drive Half Shaft Replacement - Right Side \(M3U, MHG, MNH, MNK with FWD\)](#) [Front Wheel Drive Half Shaft Replacement - Right Side \(M3D, M3H with FWD\)](#)
13. Remove the starter. [Starter Replacement \(LYX - All Wheel Drive\)](#) [Starter Replacement \(LTG - All Wheel Drive\)](#) [Starter Replacement \(LH7 - All Wheel Drive\)](#)
14. Mark the relationship of the flywheel to the torque converter for reassembly.

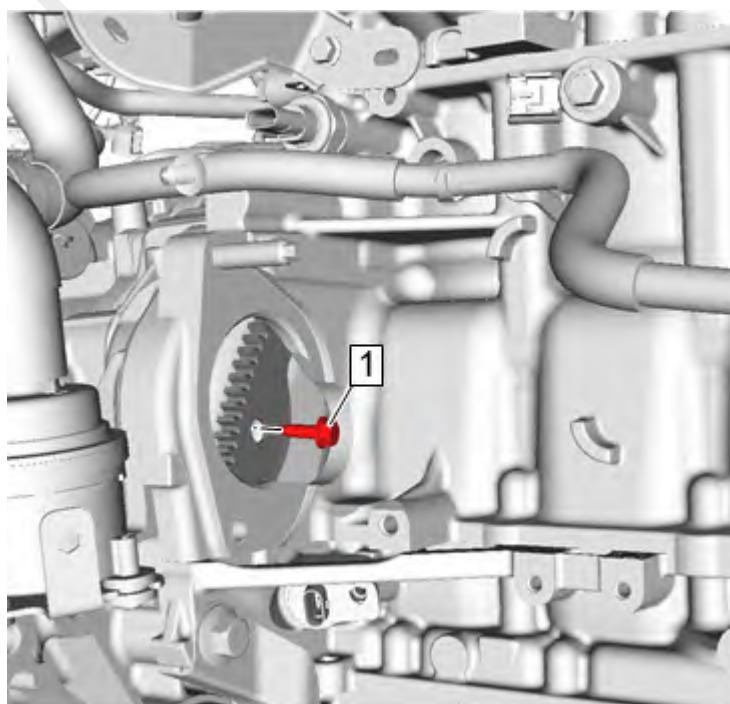


Fig. 134: Torque Converter To Flywheel Bolts
Courtesy of GENERAL MOTORS COMPANY

15. Remove the torque converter to flywheel bolts (1).
16. Lower the vehicle.
17. Remove the three left transmission mount bolts from the transmission. **Transmission Mount Replacement - Left Side**
18. Lower the transmission side with the support fixture to allow clearance for removal.
19. Unclip the engine wiring harness from the transmission.
20. Raise the vehicle.
21. Use a transmission jack in order to support the transmission.

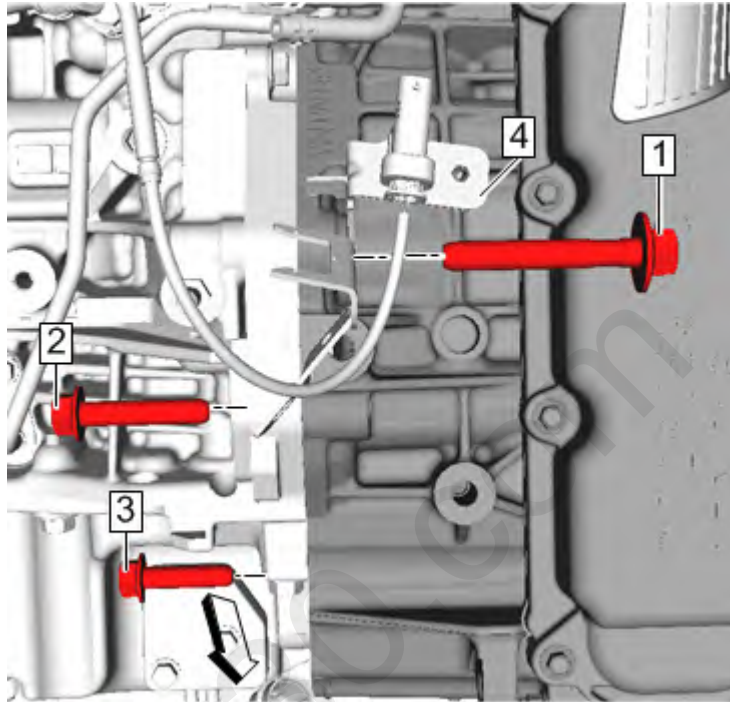


Fig. 135: Front Transmission Fasteners
Courtesy of GENERAL MOTORS COMPANY

22. Remove the front transmission fasteners (1, 2, 3).

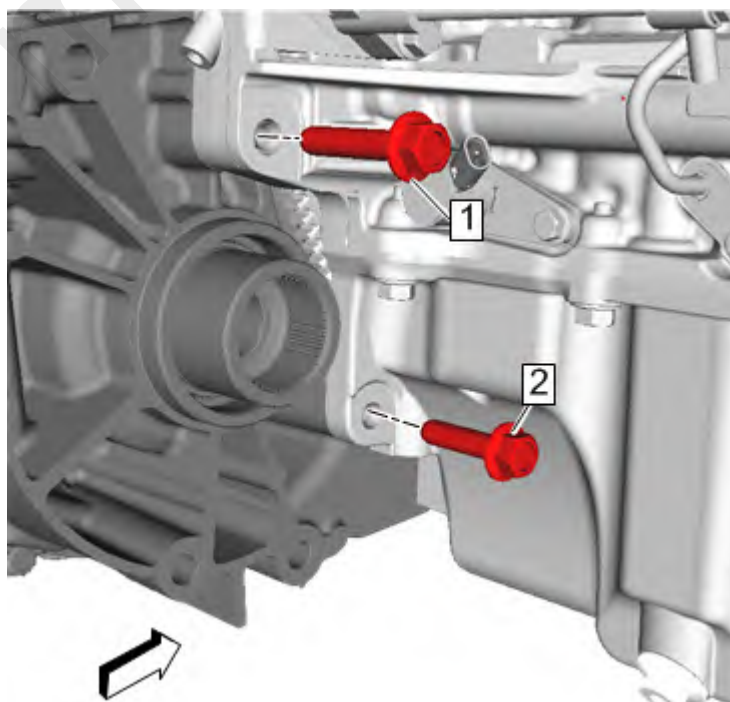


Fig. 136: Rear Transmission Fasteners
Courtesy of GENERAL MOTORS COMPANY

23. Remove the rear transmission fasteners (1, 2).
24. Remove the torque converter cover (4).

NOTE: Ensure the torque converter remains securely in place on the transmission input shaft while separating and removing the transmission.

25. Separate the transmission from the engine.
26. Lower the transmission with the transmission jack far enough to remove the transmission.
27. Flush and flow test the transmission oil cooler and lines. [Transmission Fluid Cooler Flow Test and Flushing](#)

Installation Procedure

1. Raise the transmission with the transmission jack and position the transmission to the engine.

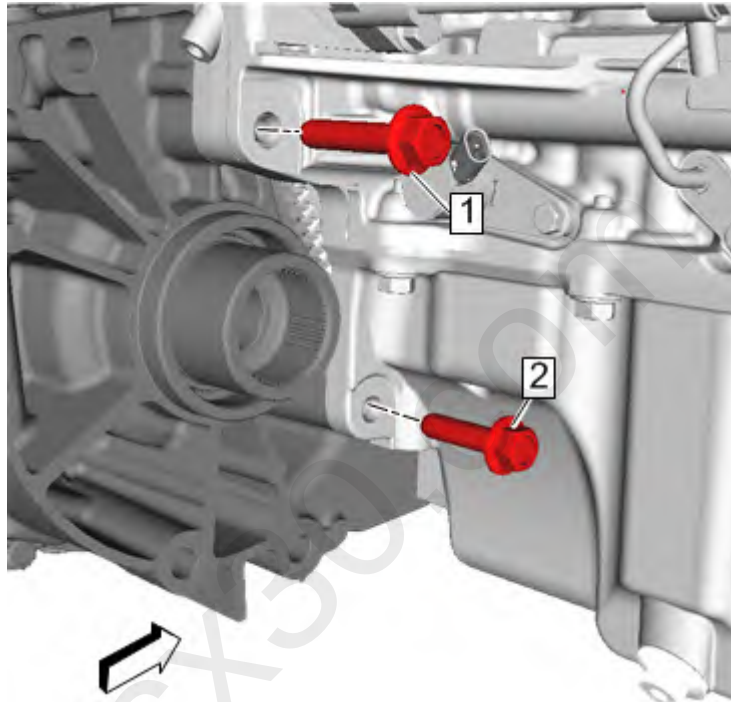


Fig. 137: Rear Transmission Fasteners
Courtesy of GENERAL MOTORS COMPANY

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

2. Install the rear transmission bolts (1, 2) and tighten to 58 N.m (43 lb ft).

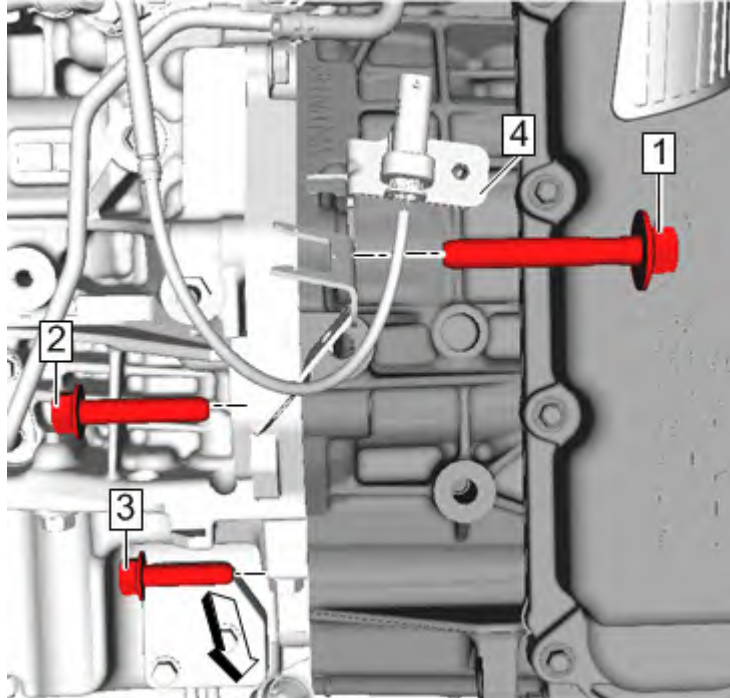


Fig. 138: Front Transmission Fasteners

Courtesy of GENERAL MOTORS COMPANY

- 3.
4. Install the front transmission bolts (1, 2, 3) and tighten to 58 N.m (43 lb ft).
5. Install the warm up three-way catalytic converter to the engine. [Warm Up Three-Way Catalytic Converter Replacement \(LYX\)](#), [Warm Up Three-Way Catalytic Converter Replacement \(LTG\)](#)
6. Remove the transmission jack.

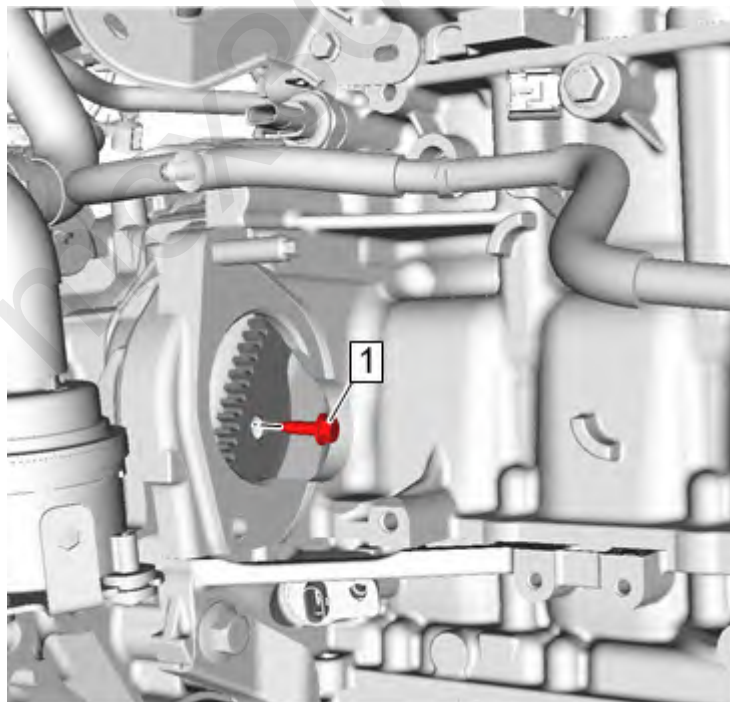


Fig. 139: Torque Converter To Flywheel Bolts

Courtesy of GENERAL MOTORS COMPANY

NOTE: If reusing the torque converter bolts, clean the threads and apply threadlocker to the threads prior to installation. Refer to [Adhesives, Fluids, Lubricants, and Sealers](#) for the recommended threadlock material.

7. Install the torque converter to flywheel bolts (1) and tighten to 60 N.m (44 lb ft).

8. Install the starter. [Starter Replacement \(LYX - All Wheel Drive\)](#) [Starter Replacement \(LTG - All Wheel Drive\)](#) [Starter Replacement \(LH7 - All Wheel Drive\)](#)
9. Install the left transmission mount to the transmission. [Transmission Mount Replacement - Left Side](#)
10. Install the wheel drive shaft to the transmission. [Front Wheel Drive Half Shaft Replacement - Left Side](#)
11. Connect the right wheel drive shaft to the transmission. [Front Wheel Drive Half Shaft Replacement - Right Side \(AWD\)](#) [Front Wheel Drive Half Shaft Replacement - Right Side \(M3U, MHG, MNH, MNK with FWD\)](#)
12. Install the drivetrain and front suspension cradle. [Drivetrain and Front Suspension Cradle Replacement \(All Wheel Drive\)](#)

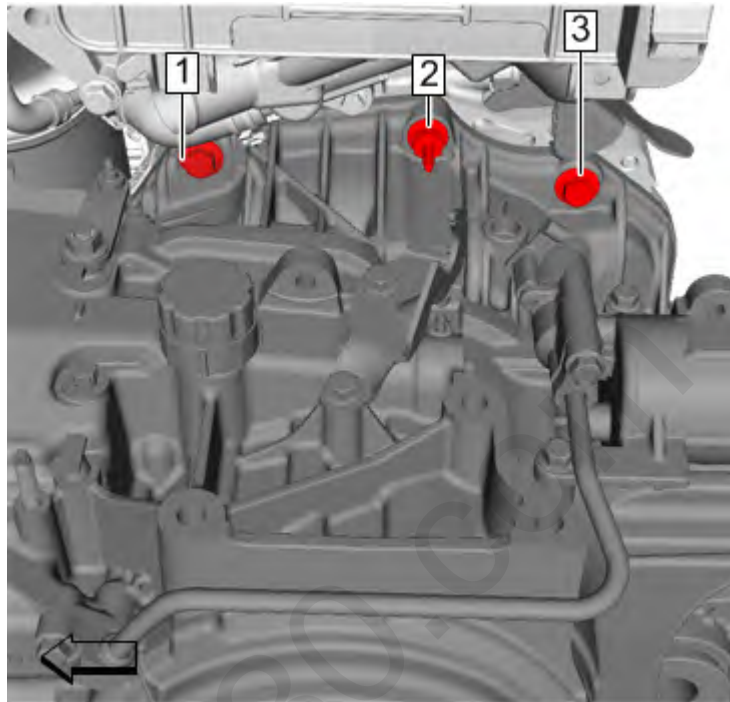


Fig. 140: Upper Transmission To Engine Bolts
Courtesy of GENERAL MOTORS COMPANY

13. Install the upper transmission to engine bolt (1, 2, 3) and tighten to 58 N.m (43 lb ft).

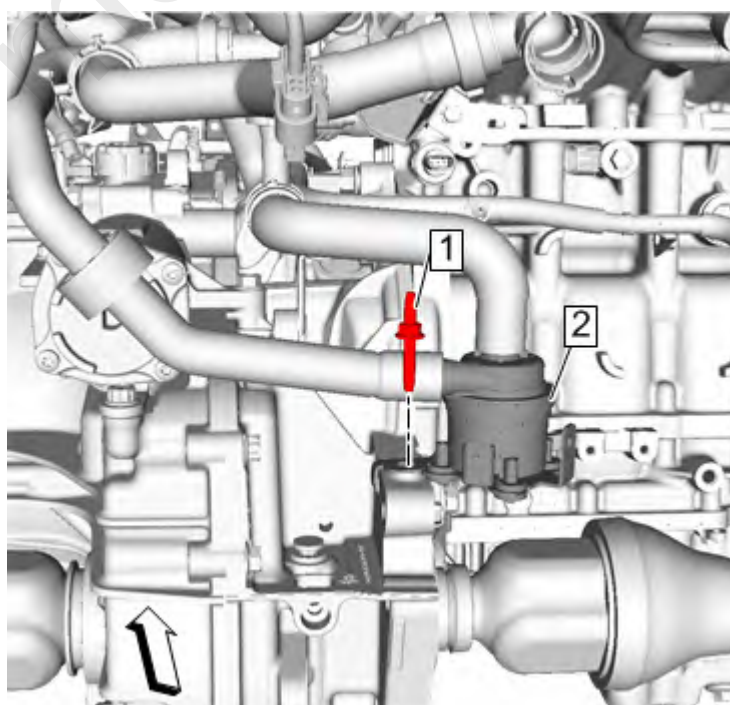


Fig. 141: Water Pump Fastener And Water Pump
Courtesy of GENERAL MOTORS COMPANY

14. Position the water pump (2), the install the water pump fastener (1) and tighten to 9 N.m (80 lb in).
15. Install the transmission fluid cooler inlet and outlet hoses to the transmission. [Transmission Fluid Cooler Inlet and Outlet Pipe Replacement \(MNH, MHG\)](#).

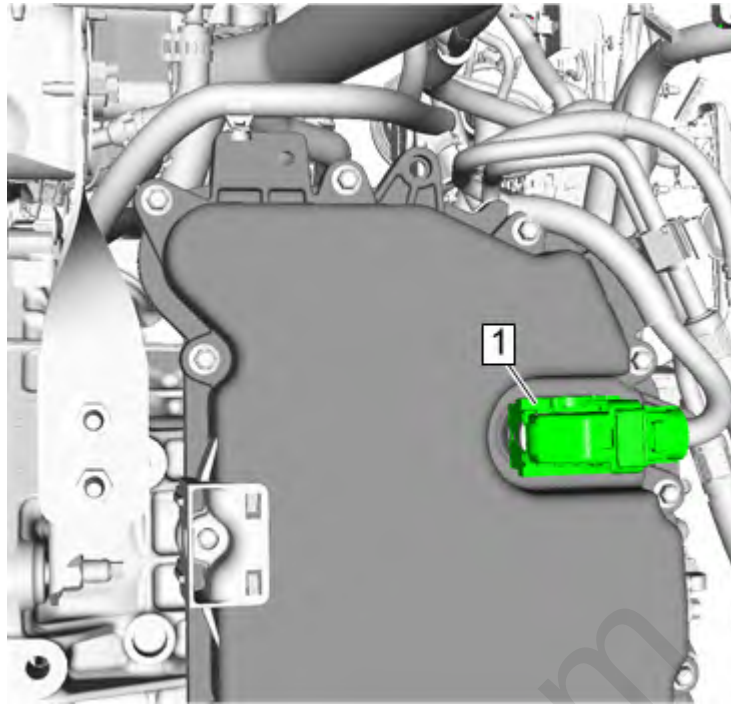


Fig. 142: Control Valve Body Transmission Control Module Electrical Connector
Courtesy of GENERAL MOTORS COMPANY

16. Connect the control valve body TCM electrical connector (1).
17. Install the transmission range select lever cable and bracket on the transmission.
18. Install the battery tray. [Battery Tray Replacement](#)
19. Adjust the automatic transmission range selector lever cable. [Range Selector Lever Cable Adjustment](#)
20. Fill the transmission with fluid. [Transmission Fluid Drain and Fill](#)
21. If a NEW TCM has been installed into the vehicle, the NEW module needs to be reprogrammed. [Service Programming System \(SPS\)](#).

NOTE: The Transmission Adaptive Values Learn 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

22. Perform the Transmission Adaptive Values Learn procedure. [Transmission Adaptive Values Learn](#)
23. Road test the vehicle.

TRANSMISSION REPLACEMENT (ALL WHEEL DRIVE WITH DIESEL ENGINE, TERRAIN)

Removal Procedure

1. Remove the battery tray. [Battery Tray Replacement](#)

2. Remove the range selector actuator from the transmission. [Range Selector Actuator Replacement](#)
3. Drain the transmission fluid, if necessary. [Transmission Fluid Drain and Fill](#)

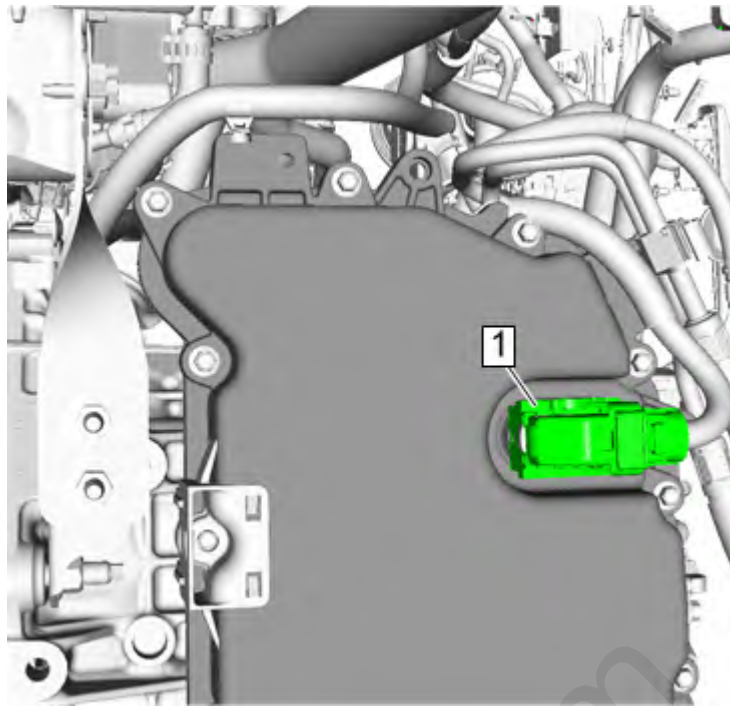


Fig. 143: Control Valve Body Transmission Control Module Electrical Connector
Courtesy of GENERAL MOTORS COMPANY

4. Disconnect the control valve body transmission control module (TCM) electrical connector (1) then unclip the connector from the transmission.

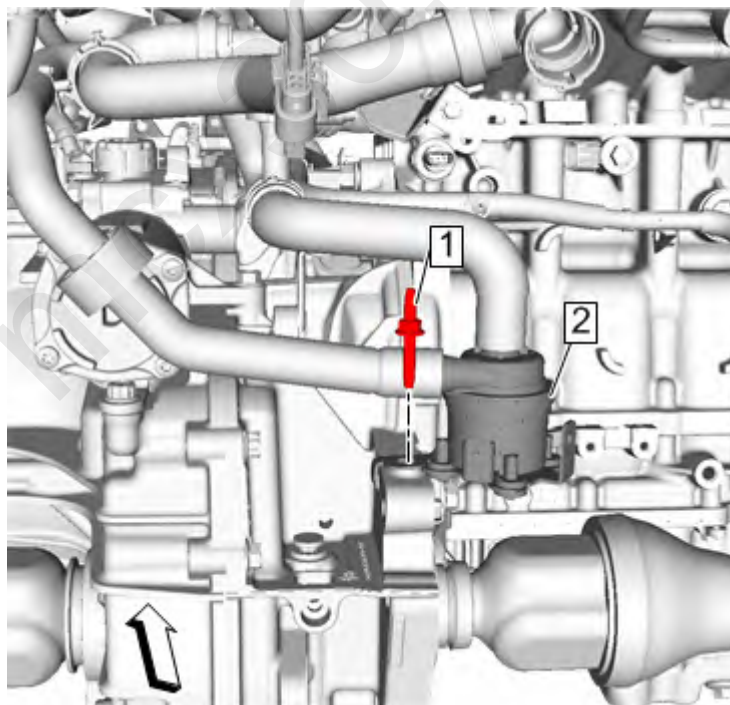


Fig. 144: Water Pump Fastener And Water Pump
Courtesy of GENERAL MOTORS COMPANY

5. Remove the water pump fastener (1), then position the water pump (2) out of the way.
6. Remove the transmission fluid cooler inlet and outlet hoses from the transmission, then position the hoses out of the way. [Transmission Fluid Cooler Inlet and Outlet Pipe Replacement \(MNH, MHG\)](#)
7. Plug and/or cap the hose and transmission to prevent contamination.

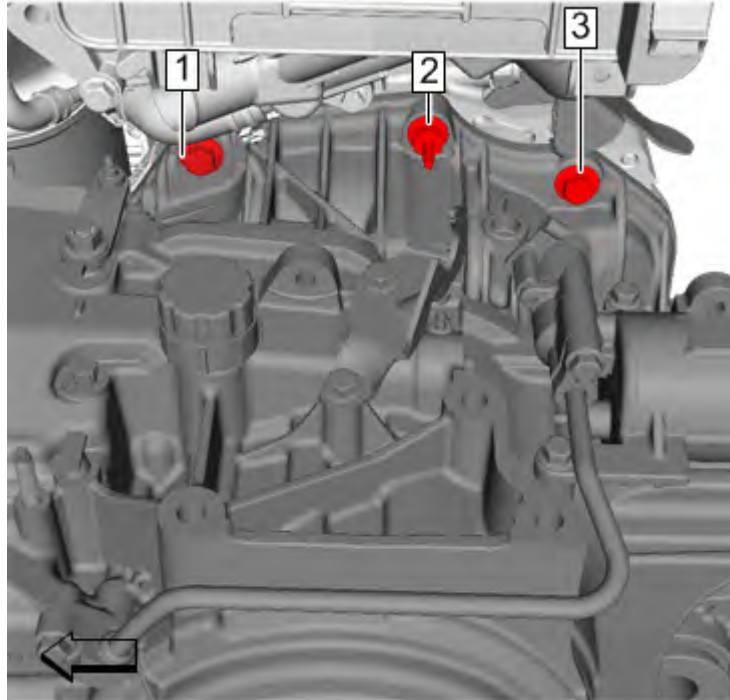


Fig. 145: Upper Transmission To Engine Bolts
Courtesy of GENERAL MOTORS COMPANY

8. Remove the upper transmission to engine bolts (1, 2, 3).
9. Remove the drivetrain and front suspension cradle. [Drivetrain and Front Suspension Cradle Replacement \(All Wheel Drive\)](#)
10. Remove the warm up three-way catalytic converter from the engine. [Warm Up Three-Way Catalytic Converter Replacement \(LYX\)](#) [Warm Up Three-Way Catalytic Converter Replacement \(LTG\)](#)
11. Disconnect the wheel drive shafts from the transmission. [Front Wheel Drive Half Shaft Replacement - Left Side](#)
12. Remove the power transfer unit case. [Power Transfer Unit Case Replacement \(MNH Transmission with LYX Engine\)](#) [Power Transfer Unit Case Replacement \(MHG Transmission with LH7 Engine\)](#)
13. Remove the transmission mount strut from the transmission. [Transmission Mount Strut Replacement \(All Wheel Drive\)](#)
14. Remove the starter. [Starter Replacement \(LYX - All Wheel Drive\)](#) [Starter Replacement \(LTG - All Wheel Drive\)](#) [Starter Replacement \(LH7 - All Wheel Drive\)](#)
15. Mark the relationship of the flywheel to the torque converter for reassembly.

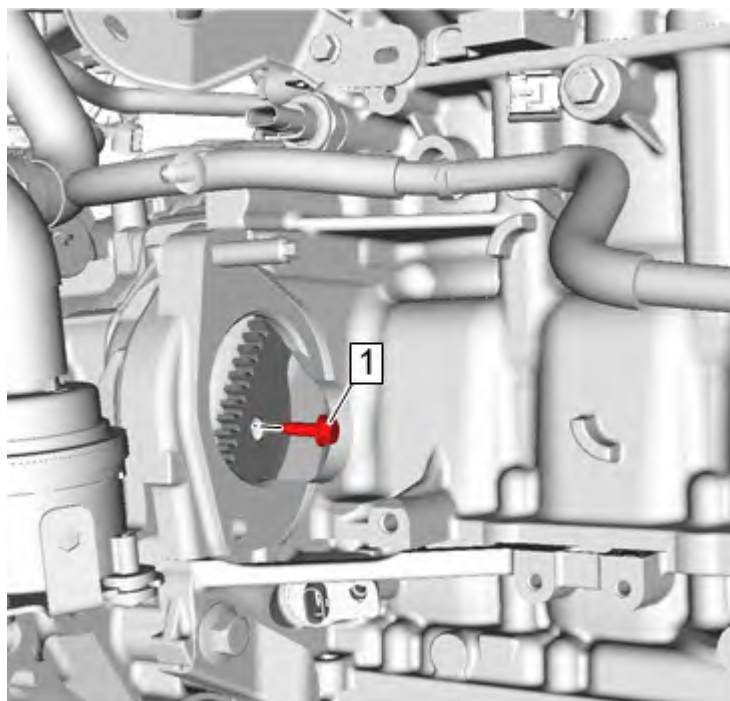


Fig. 146: Torque Converter To Flywheel Bolts
Courtesy of GENERAL MOTORS COMPANY

16. Remove the torque converter to flywheel bolts (1).
17. Lower the vehicle.
18. Remove the three left transmission mount bolts from the transmission. **Transmission Mount Replacement - Left Side**
19. Lower the transmission side with the support fixture to allow clearance for removal.
20. Unclip the engine wiring harness from the transmission.
21. Raise the vehicle.
22. Use a transmission jack in order to support the transmission.

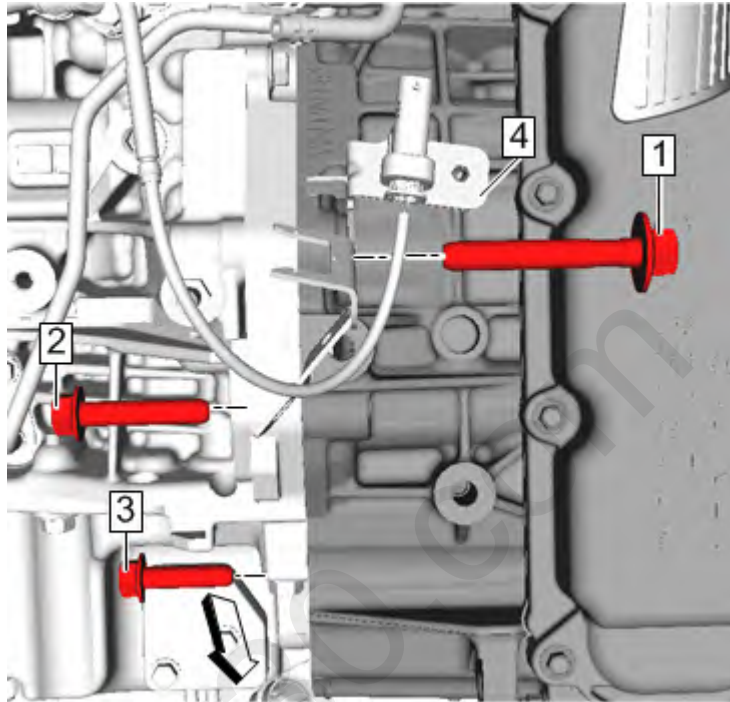


Fig. 147: Front Transmission Fasteners
Courtesy of GENERAL MOTORS COMPANY

23. Remove the front transmission fasteners (1, 2, 3).

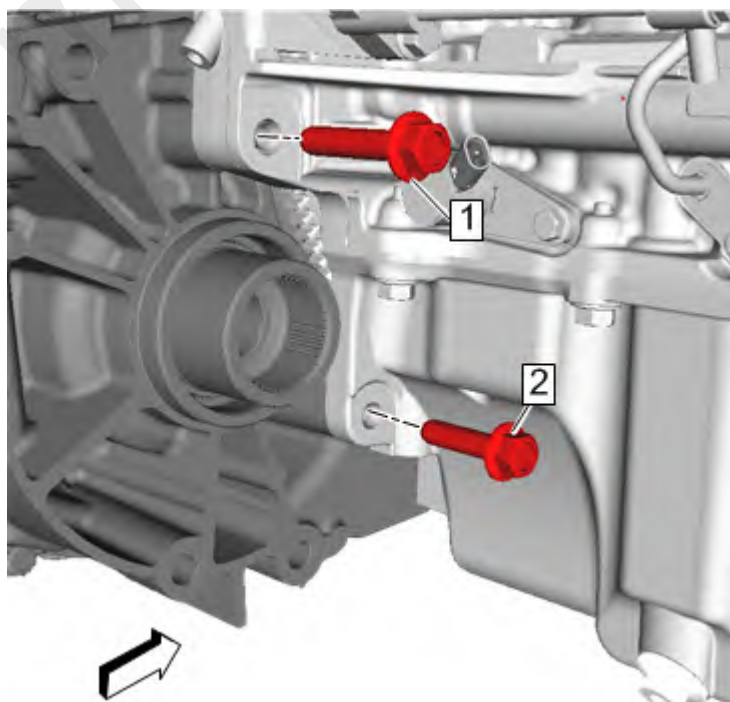


Fig. 148: Rear Transmission Fasteners
Courtesy of GENERAL MOTORS COMPANY

24. Remove the rear transmission fasteners (1, 2).

NOTE: Ensure the torque converter remains securely in place on the transmission input shaft while separating and removing the transmission.

25. Separate the transmission from the engine.

26. Lower the transmission with the transmission jack far enough to remove the transmission.

27. Transfer components as necessary.

28. Flush and flow test the transmission oil cooler and lines. [Transmission Fluid Cooler Flow Test and Flushing](#)

Installation Procedure

1. Raise the transmission with the transmission jack and position the transmission to the engine.

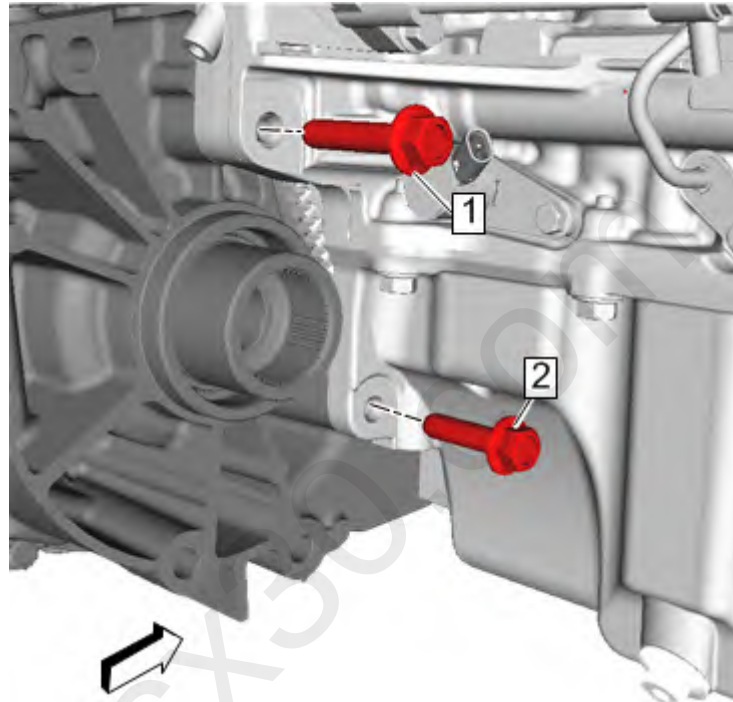


Fig. 149: Rear Transmission Fasteners
Courtesy of GENERAL MOTORS COMPANY

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

2. Install the rear transmission bolts (1, 2) and tighten to 58 N.m (43 lb ft).

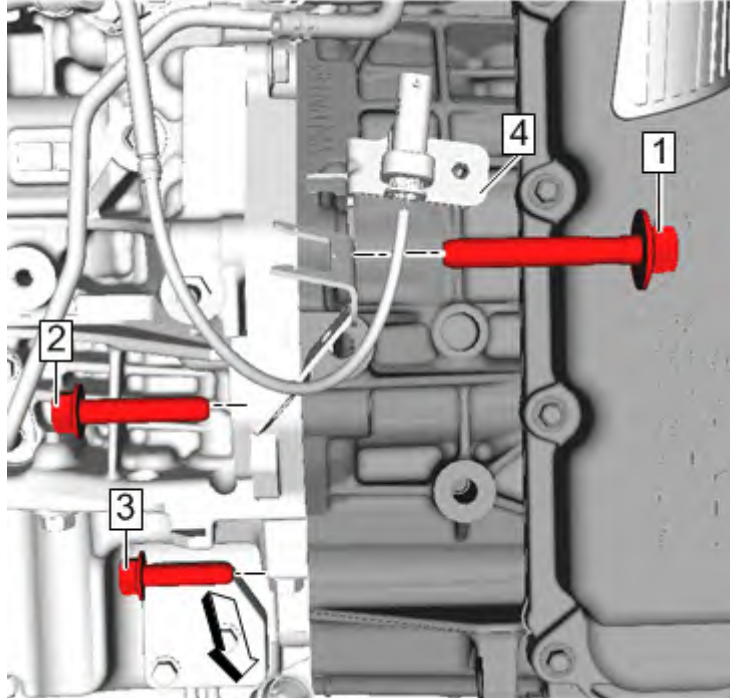


Fig. 150: Front Transmission Fasteners

Courtesy of GENERAL MOTORS COMPANY

- 3.
4. Install the front transmission bolts (1, 2) and tighten to 58 N.m (43 lb ft).
5. Install the warm up three-way catalytic converter to the engine. [Warm Up Three-Way Catalytic Converter Replacement \(LYX\)](#), [Warm Up Three-Way Catalytic Converter Replacement \(LTG\)](#)
6. Remove the transmission jack.

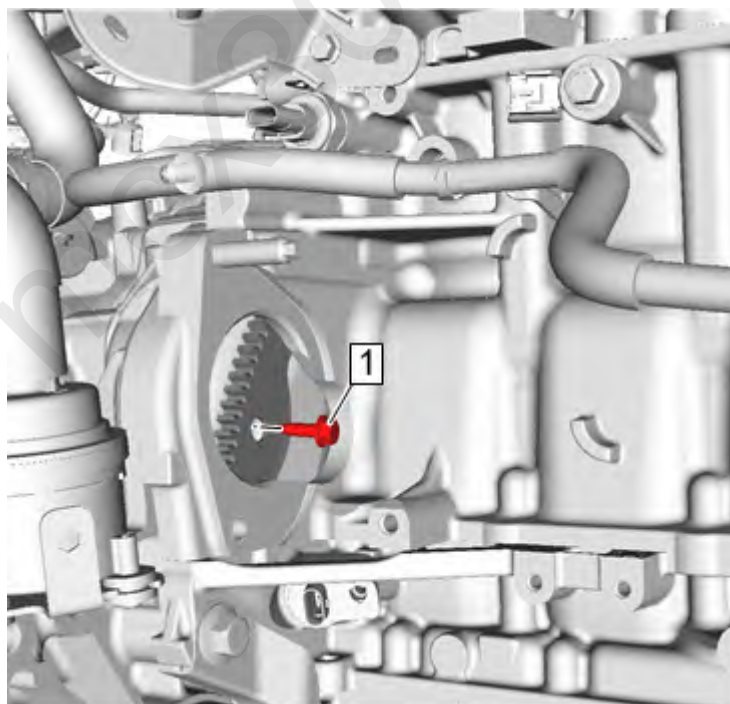


Fig. 151: Torque Converter To Flywheel Bolts

Courtesy of GENERAL MOTORS COMPANY

NOTE: If reusing the torque converter bolts, clean the threads and apply threadlocker to the threads prior to installation. Refer to [Adhesives, Fluids, Lubricants, and Sealers](#) for the recommended threadlock material.

7. Install the torque converter to flywheel bolts (1) and tighten to 60 N.m (44 lb ft).

8. Install the starter. [Starter Replacement \(LYX - All Wheel Drive\)](#), [Starter Replacement \(LTG - All Wheel Drive\)](#), [Starter Replacement \(LH7 - All Wheel Drive\)](#)
9. Install the transmission mount strut to the transmission. [Transmission Mount Strut Replacement \(All Wheel Drive\)](#)
10. Install the left transmission mount to the transmission. [Transmission Mount Replacement - Left Side](#)
11. Install the wheel drive shafts to the transmission. [Front Wheel Drive Half Shaft Replacement - Left Side](#)
12. Install the drivetrain and front suspension cradle. [Drivetrain and Front Suspension Cradle Replacement \(Front Wheel Drive\)](#), [Drivetrain and Front Suspension Cradle Replacement \(All Wheel Drive\)](#)
13. Install the power transfer unit case. [Power Transfer Unit Case Replacement \(MNH Transmission with LYX Engine\)](#), [Power Transfer Unit Case Replacement \(MHG Transmission with LH7 Engine\)](#)

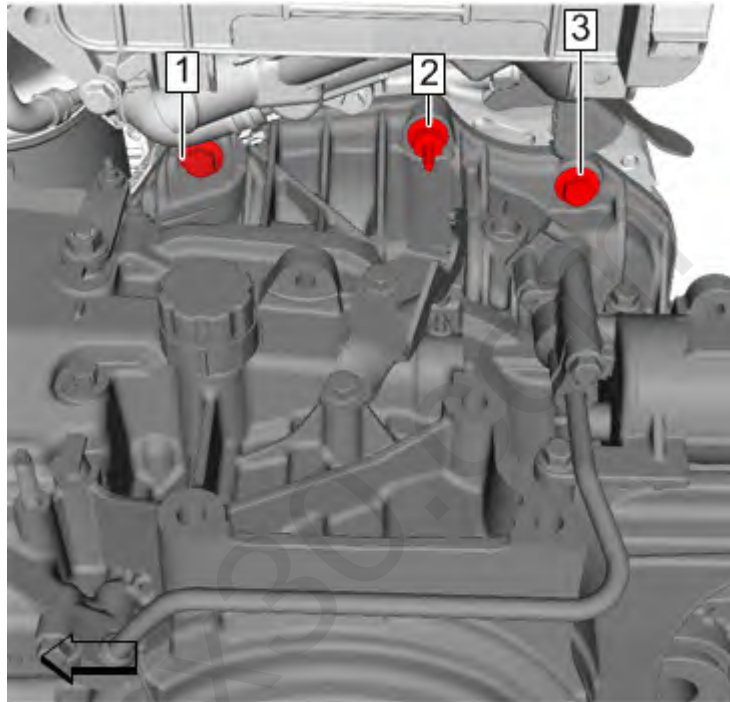
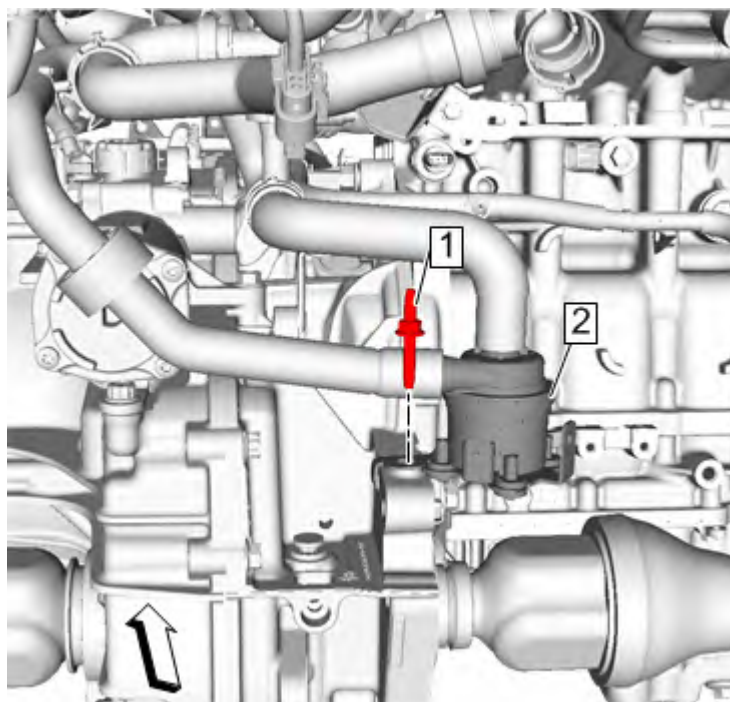


Fig. 152: Upper Transmission To Engine Bolts
Courtesy of GENERAL MOTORS COMPANY

14. Install the upper transmission to engine bolt (1, 2, 3) and tighten to 58 N.m (43 lb ft).



15. Position the water pump (2), then install the water pump fastener (1) and tighten to 9 N.m (80 lb in).
16. Install the transmission fluid cooler inlet and outlet hoses to the transmission. [Transmission Fluid Cooler Inlet and Outlet Pipe Replacement \(MNH, MHG\)](#)

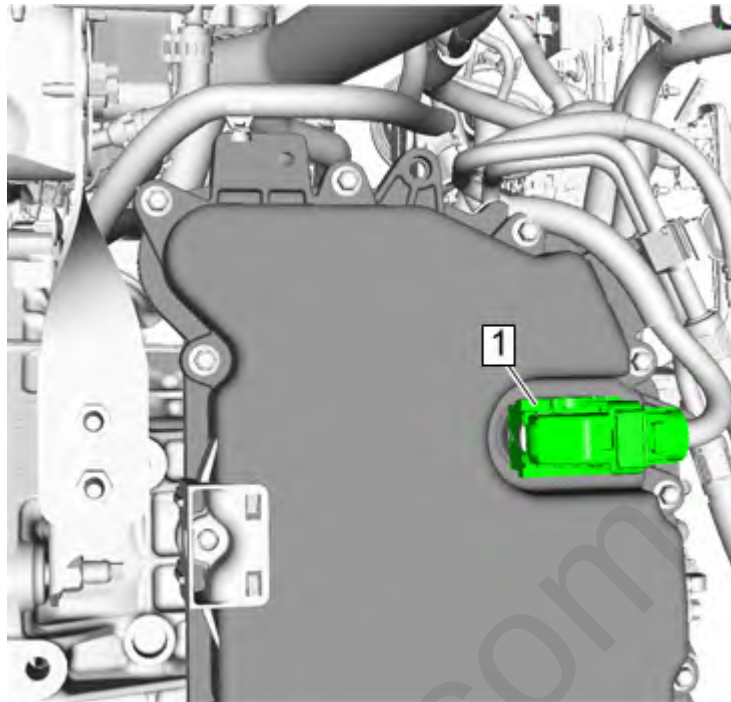


Fig. 154: Control Valve Body Transmission Control Module Electrical Connector
Courtesy of GENERAL MOTORS COMPANY

17. Connect the control valve body TCM electrical connector (1).
18. Install the range selector actuator to the transmission. [Range Selector Actuator Replacement](#)
19. Install the battery tray. [Battery Tray Replacement](#)
20. Fill the transmission with fluid. [Transmission Fluid Drain and Fill](#)
21. If a NEW TCM has been installed into the vehicle, the NEW module needs to be reprogrammed. [Service Programming System \(SPS\)](#)

NOTE: The Transmission Adaptive Values Learn 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

22. Perform the Transmission Adaptive Values Learn procedure. [Transmission Adaptive Values Learn](#)
 23. Road test the vehicle.
-

