

2021 TRANSMISSION

Automatic Transmission - 8L45 (M5T) - Repair Instructions - on Vehicle - Canyon, Colorado

REPAIR INSTRUCTIONS - ON VEHICLE

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 12345579) 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](#) , or [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](#) , or [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.

TRANSMISSION SERVICE FAST LEARN PROCEDURE

The transmission service fast learn is a procedure that is performed after any 8L45/90 transmission repair. The service fast learn procedure performs a series of tests which allow the transmission control module (TCM) to learn individual clutch apply pressures. These learn pressure values are used by the TCM for clutch control and timing of shifts. The scan tool is used to perform the transmission service fast learn procedure.

The service fast learn procedure must be performed when any of the following repairs has been made to the transmission.

- Pressure regulating solenoid replacement
- Valve body repair or replacement
- Any service/repair in response to a shift quality concern
- Any internal transmission service, repair, overhaul, or replacement
- TCM replacement
- Transmission assembly replacement
- Reprogramming Transmission Control Module

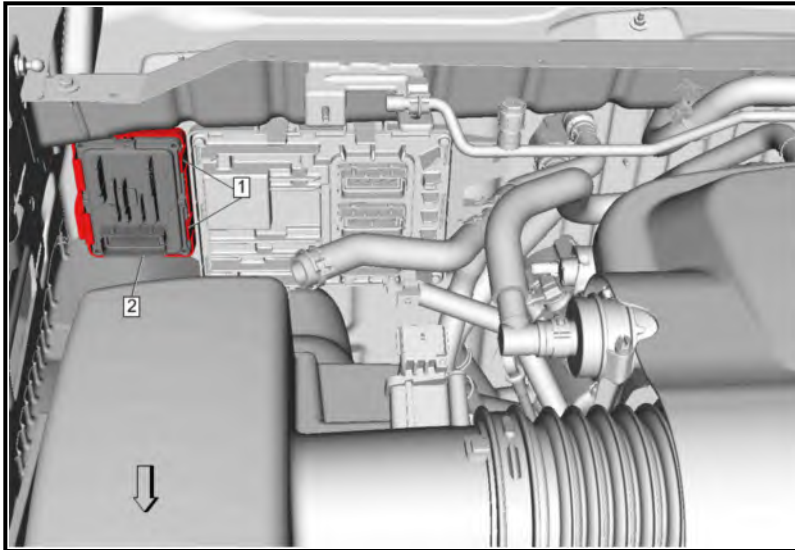
Failure to perform the procedure may result in poor transmission performance, DTCs being set, or customer dissatisfaction. Perform the service fast learn procedure in the exact sequence as listed below.

1. If a pressure regulating solenoid, TCM or transmission assembly was replaced, perform the [Q77 Transmission Control Solenoid Valve Characterization Programming](#).
2. Ignition ON, clear the DTCs with a scan tool.
3. Ignition OFF, and all vehicle systems OFF. It may take up to 2 minutes for all vehicle control modules to power down.

NOTE: **If the transmission fluid temperature is not between 75B°C (167B°F) and 85B°C (185B°F) the scan tool will not allow you to perform the service fast learn procedure.**

4. Engine running, transmission in drive position with brake applied. Perform the service fast learn procedure with a scan tool. Follow the instructions on the scan tool.
5. Ignition OFF for 2 minutes.

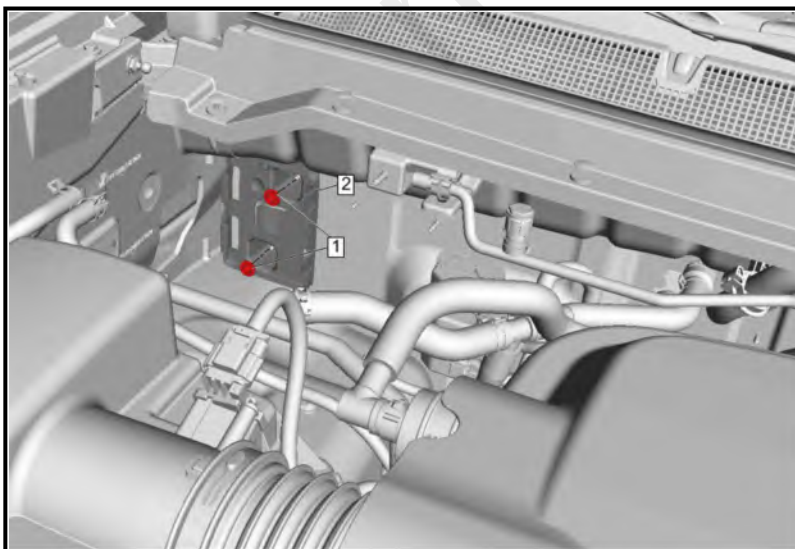
TRANSMISSION CONTROL MODULE REPLACEMENT



NOTE: Callouts in the following chart represent components shown in graphic above.

Callout	Component Name
Preliminary Procedure Position the radiator surge tank out of the way, do not remove from vehicle. Radiator Surge Tank Replacement (LCV, LGZ)	
1	Retaining Tabs Procedure Move to release position.
2	Transmission Control Module Procedure 1. Disconnect the electrical connector. 2. Remove the module from the module bracket. 3. Program the transmission control module, if replaced. Control Module References

TRANSMISSION CONTROL MODULE BRACKET REPLACEMENT



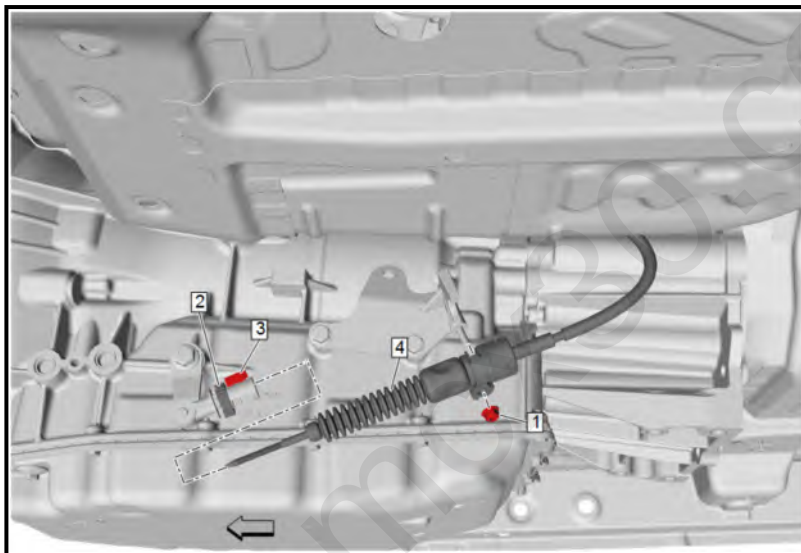
NOTE: Callouts in the following chart represent components shown in graphic above.

Callout	Component Name
Preliminary Procedure <u>Transmission Control Module Replacement</u>	
1	Transmission Control Module Bracket Fastener [2x] CAUTION: Refer to <u>Fastener</u> <u>Caution</u> . Tighten 9 N.m (80 lb in)
2	Transmission Control Module Bracket

RANGE SELECTOR LEVER CABLE REPLACEMENT

Removal Procedure

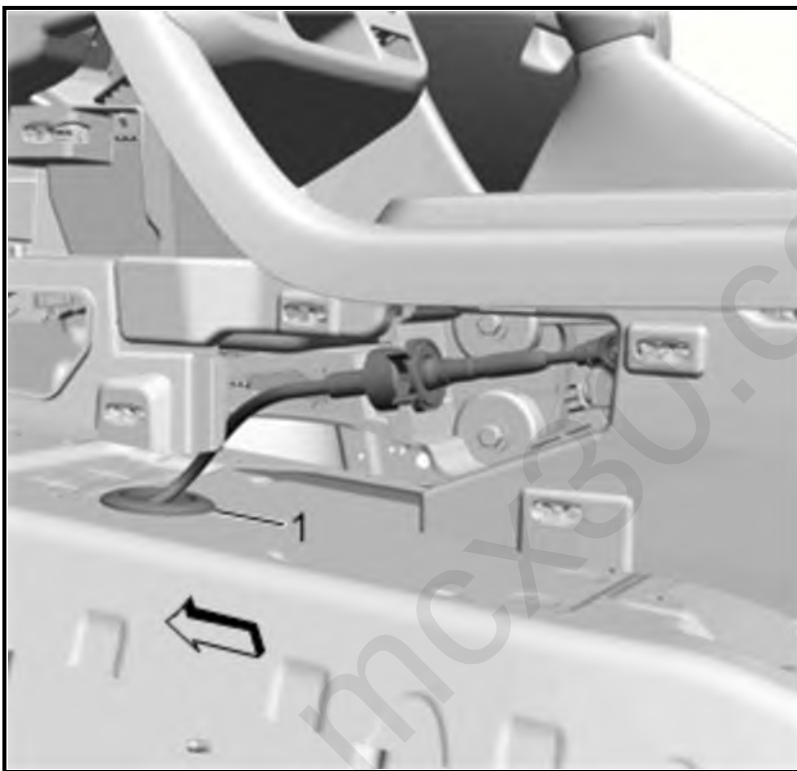
1. Raise and support the vehicle. **Lifting and Jacking the Vehicle**
2. Slide the locking ring (2) forward to access the cable retainer (3).



3. Using a flat bladed tool, raise the range selector lever cable retainer (3) on the automatic transmission range selector lever.
4. Remove the range selector lever cable bracket nut (1) from the range selector lever cable bracket.
5. Remove the range selector lever cable (4) from the range selector lever cable bracket.
6. Lower the vehicle.
7. Using wheel chocks, block the tires.
8. Front Floor Console Extension Panel-Left Side (1) - Remove - **Front Floor Console Extension Panel Replacement**

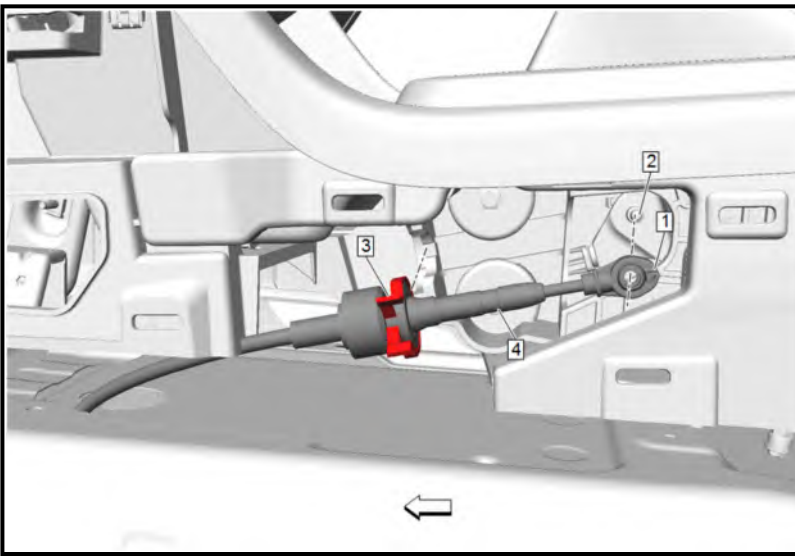


9. Using a flat bladed tool, release the range selector lever cable grommet (1) from the floor pan.



NOTE: Floor carpet not shown for clarity.

10. Disconnect the range selector lever cable end (1) from the transmission control pin (2).



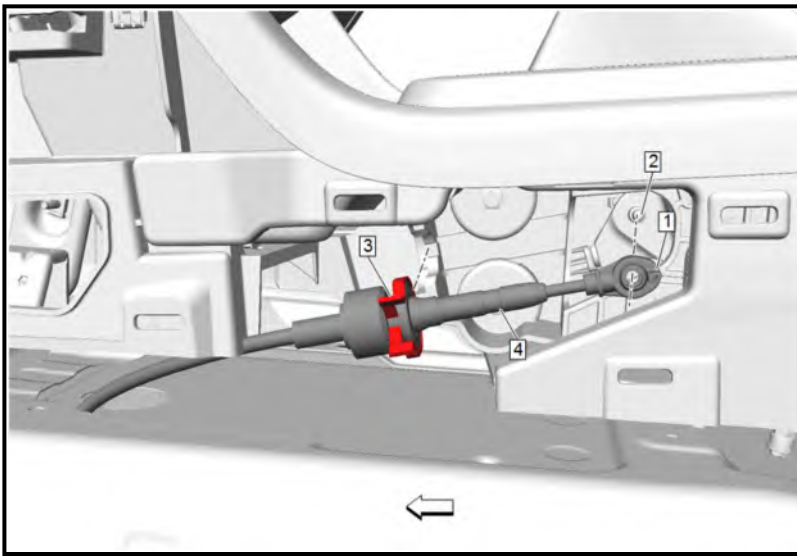
11. Squeeze the range selector lever cable retainer (3) and remove the range selector lever cable from the transmission control.
12. Remove the shift cable from the vehicle.

Installation Procedure

1. Position the shift cable through the floor pan.
2. Install the automatic transmission range selector cable grommet (1) to the floor pan.



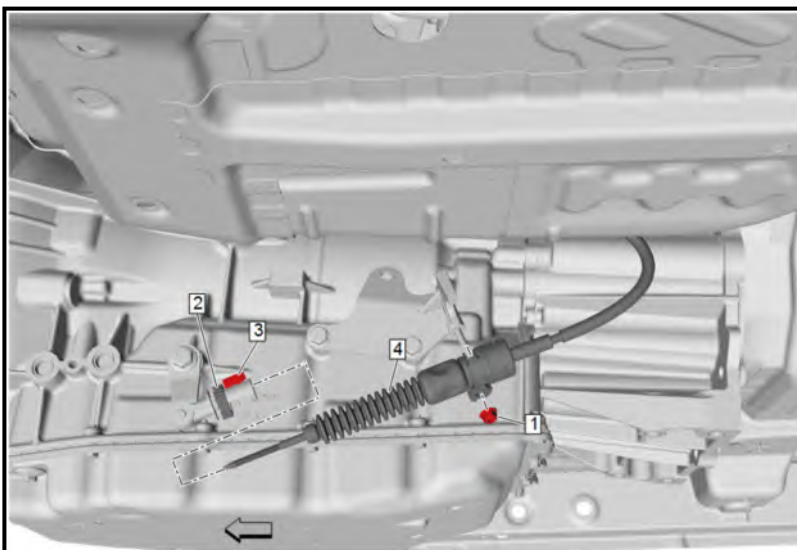
3. Connect the range selector lever cable end (1) to the transmission control pin (2).



4. Squeeze the range selector lever cable retainer (3) and install the range selector lever cable to the transmission control.
5. Front Floor Console Extension Panel-Left Side (1) - Install - [Front Floor Console Extension Panel Replacement](#)



6. Raise the vehicle.
7. Insert the range selector lever cable (4) into the automatic transmission range selector lever.



8. Install the range selector lever cable (4) to the range selector lever cable bracket.

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

9. Install the range selector lever cable bracket nut (1) and tighten to 9 N.m (80 lb in).

NOTE: Ensure the transmission control is in the Park position and the automatic transmission range selector lever is in the Park position.

10. Depress the range selector lever cable retainer (3) on the automatic transmission range selector lever.

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.

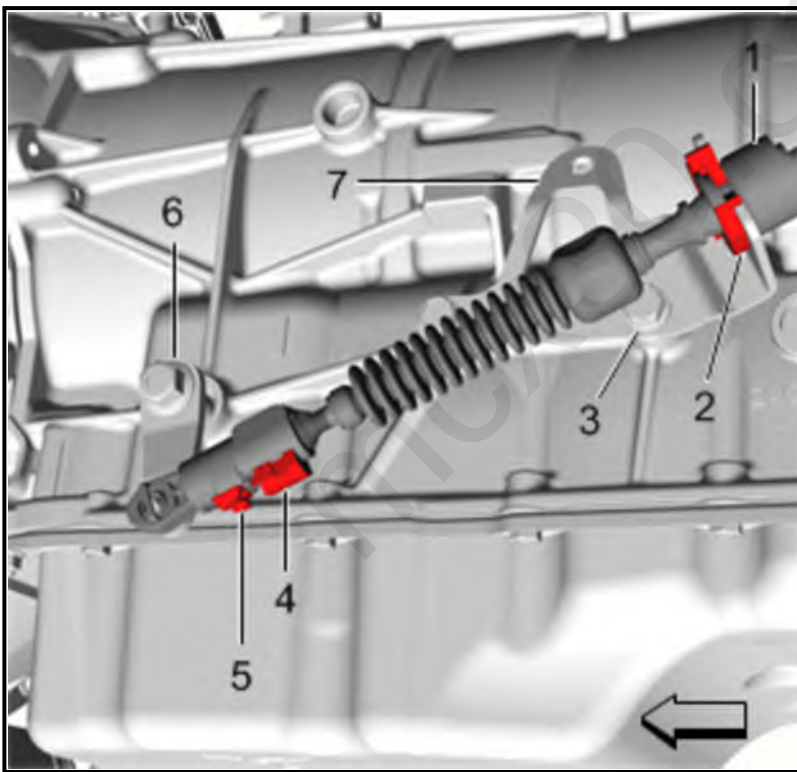
11. Slide the locking ring (2) rearward to ensure the cable retainer (3) is fully seated.

12. Adjust the automatic transmission range selector cable. [Range Selector Lever Cable Adjustment](#)

RANGE SELECTOR LEVER CABLE ADJUSTMENT

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

2. Unlock the range selector lever cable adjustment clip (5).



3. Unlock the range selector lever cable adjustment retainer (4).

4. Ensure that the transmission manual shaft lever (6) is in the park (P) position.

5. Lower the vehicle.

6. Ensure that the transmission control is in the park (P) position.

7. Raise the vehicle.

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

8. Hold the selector lever (6) on transmission to eliminate any play.

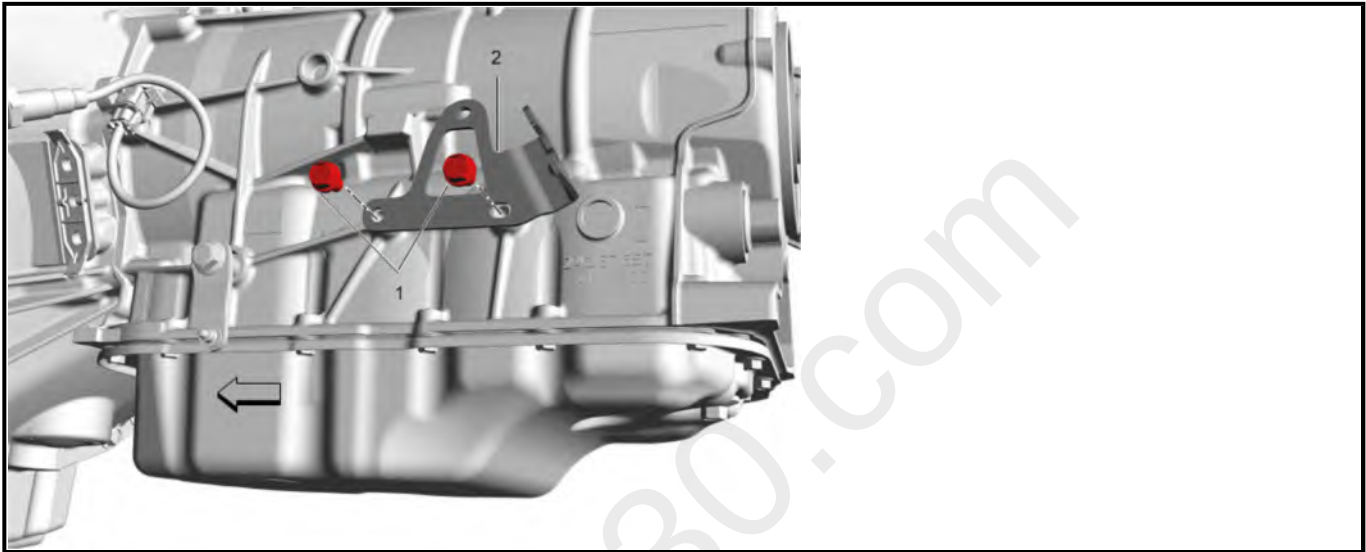
9. Lock the range selector lever cable adjustment retainer (4).

10. Lock the range selector lever cable adjustment clip (5).
11. Inspect the operation of the starting system with the shift lever in each position. The engine should only crank when the lever is in the PARK or NEUTRAL position.
12. Check to ensure that all available shift controls operate properly.

WARNING: After installing the transmission range selector shift cable, ensure the shifter cannot be shifted out of the Park position unless the brake is applied. Failure to perform this task can result in the shifter moving out of the Park position unintentionally, causing potential vehicle damage and bodily injury.

13. Ensure the shifter cannot be shifted out of the Park position unless the brake is applied.

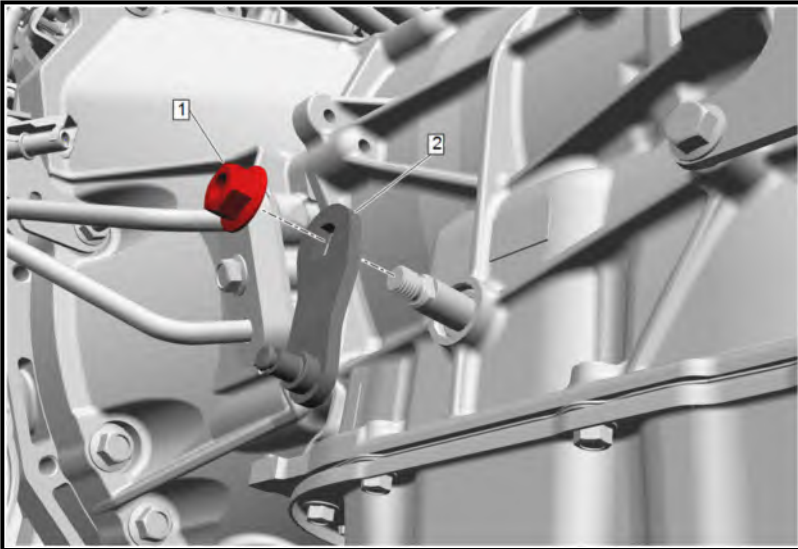
RANGE SELECTOR LEVER CABLE BRACKET REPLACEMENT



NOTE: Callouts in the following chart represent components shown in graphic above.

Callout	Component Name
Preliminary Procedures 1. Apply the park brake. 2. Shift the transmission into NEUTRAL. 3. <u>Lifting and Jacking the Vehicle</u> 4. Range Selector Lever Cable @ Transmission Range Selector Lever Cable Bracket - Disconnect - <u>Range Selector Lever Cable Replacement (First Design)</u> , or <u>Range Selector Lever Cable Replacement (Second Design)</u>.	
1	Transmission Range Selector Lever Cable Bracket Bolt [2x] CAUTION: Refer to <u>Fastener Caution</u> . Tighten 22 N.m (16 lb ft)
2	Transmission Range Selector Lever Cable Bracket

AUTOMATIC TRANSMISSION RANGE SELECTOR LEVER REPLACEMENT



NOTE: Callouts in the following chart represent components shown in graphic above.

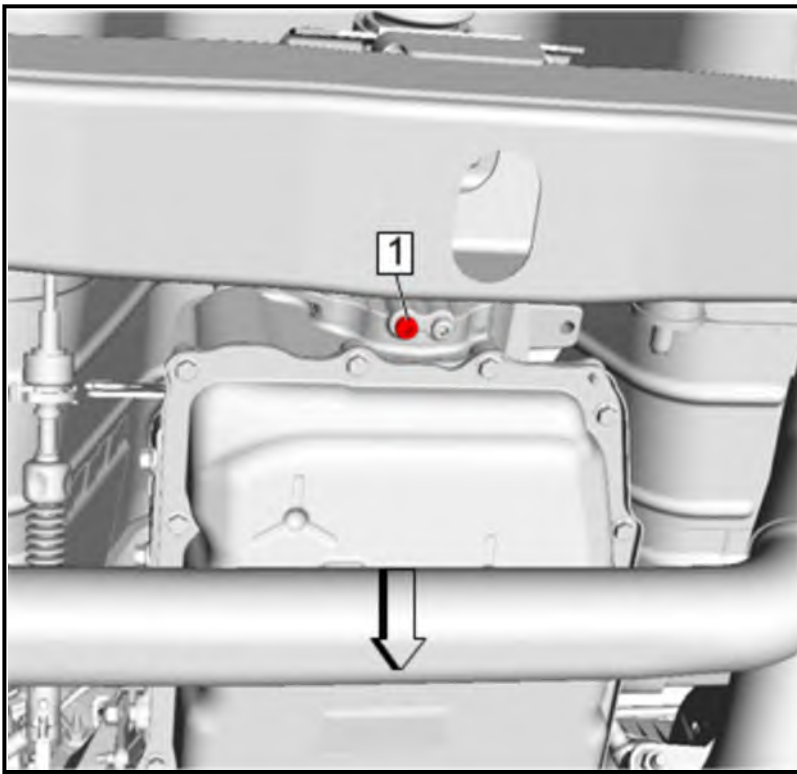
Callout	Component Name
Preliminary Procedures	
1. Apply the park brake. 2. Shift the transmission into neutral.	
WARNING: After installing the transmission range selector shift cable, pull up and push down on ALL connections to verify that the connections are fully seated and properly engaged. Failure to perform this task can result in the vehicle not being able to shift into PARK causing potential vehicle	

Callout	Component Name
	damage and bodily injury. 3. Range Selector Lever Cable @ Transmission - Disconnect - <u>Range Selector Lever Cable Replacement</u>
1	Transmission Range Selector Cable Lever Nut WARNING: Hold the transmission range selector lever while removing or installing the lever retaining nut. Failure to hold the lever can cause damage to the transmission internal park system components which could allow the vehicle to roll when placed in the park position. CAUTION: Refer to <u>Fastener Caution</u> . Tighten 25 N.m (18 lb ft)
2	Transmission Range Selector Cable Lever

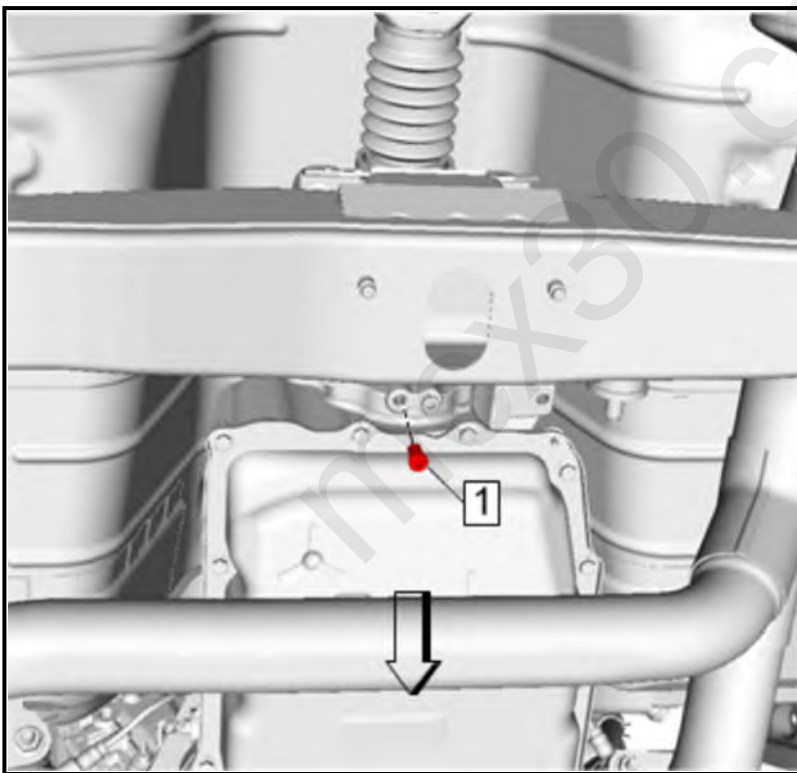
AUTOMATIC TRANSMISSION FLUID PRESSURE TEST HOLE PLUG REPLACEMENT

Removal Procedure

1. Raise and support the vehicle. Lifting and Jacking the Vehicle
2. Clean the surrounding area of the automatic transmission fluid pressure test hole plug (1).

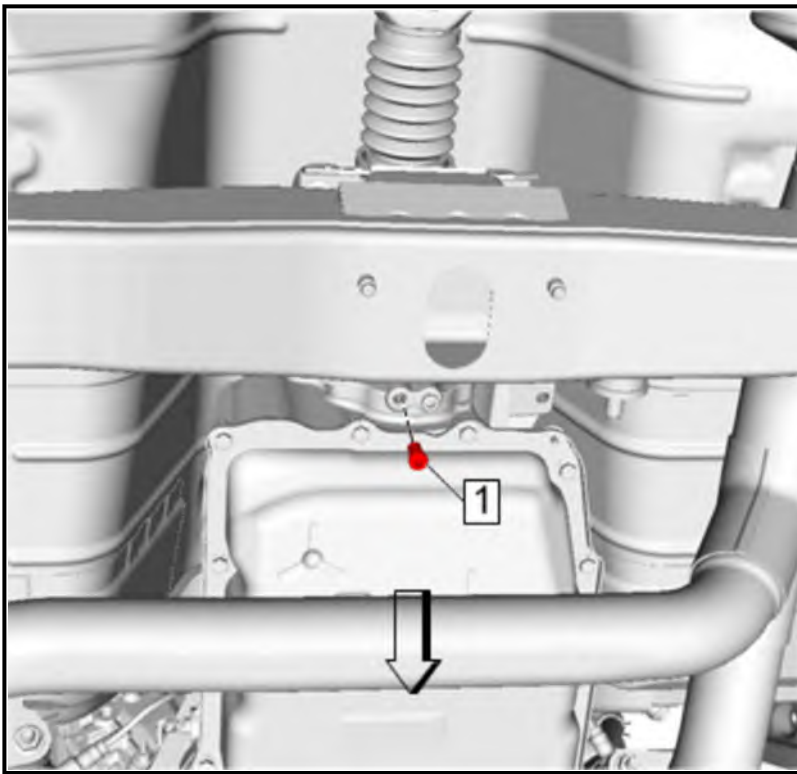


3. Remove the automatic transmission fluid pressure test hole plug (1).



Installation Procedure

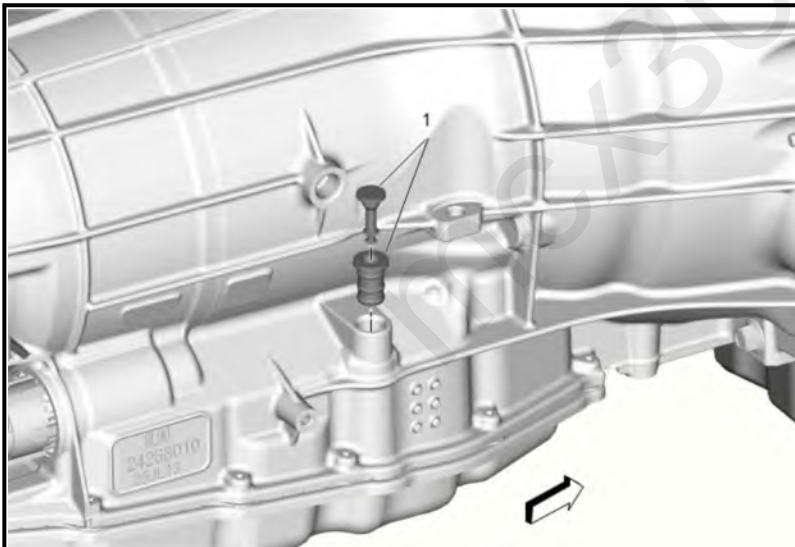
1. Install the automatic transmission fluid pressure test hole plug (1) and tighten to 11 N.m (97 lb in).



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

2. Check the transmission fluid level (fill if necessary). [Transmission Fluid Fill Procedure](#)
3. Lower the vehicle.

TRANSMISSION FLUID FILLER TUBE PLUG REPLACEMENT



NOTE: Callouts in the following chart represent components shown in graphic above.

Callout	Component Name
Preliminary Procedure Lifting and Jacking the Vehicle	
1	Transmission Fluid Level Tube Plug Assembly

TRANSMISSION MOUNT INSPECTION

CAUTION: To prevent transmission oil pan damage and possible transmission failure, insert a block of wood that completely covers the bottom of the transmission oil pan surface, between the transmission oil pan and the jack support. If the

inserted block of wood does not completely cover the bottom of the transmission oil pan, this may result in damage to the transmission oil pan and possible transmission failure.

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

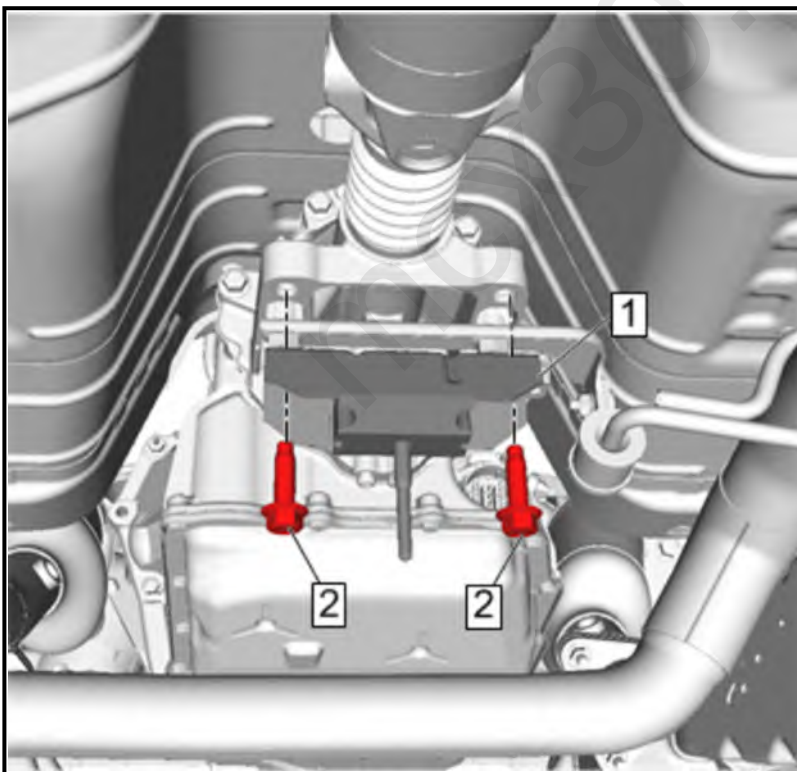
NOTE: **Black paint on the rubber will crack with time, this does not constitute a failure.**

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

TRANSMISSION MOUNT REPLACEMENT (TWO WHEEL DRIVE)

Removal Procedure

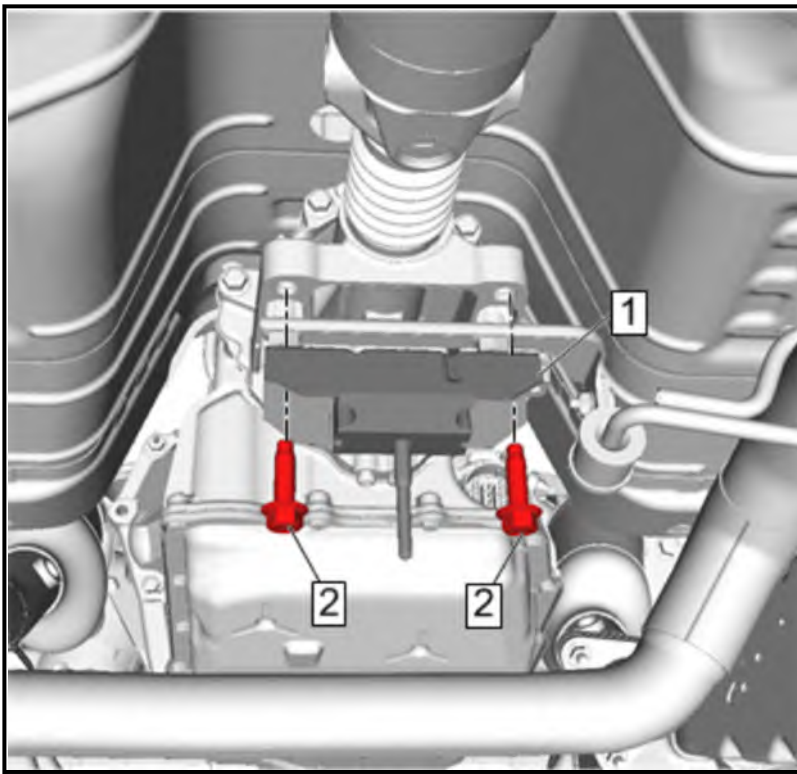
1. Remove the transmission support crossmember. [Transmission Support Crossmember Replacement \(2 Wheel Drive\)](#)
2. Remove the transmission mount bolts (2).



3. Remove the transmission mount (1) from the vehicle.

Installation Procedure

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



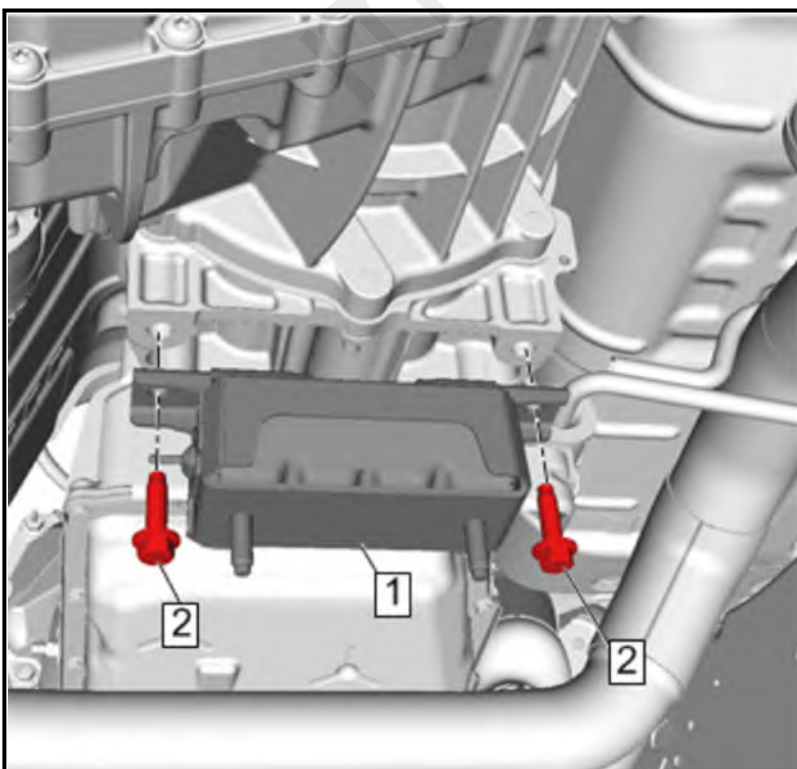
CAUTION: Refer to [Fastener Caution](#) .

2. Install the bolts (2) and tighten to 100 N.m (74 lb ft).
3. Install the transmission support crossmember. [Transmission Support Crossmember Replacement \(2 Wheel Drive\)](#)

TRANSMISSION MOUNT REPLACEMENT (FOUR WHEEL DRIVE)

Removal Procedure

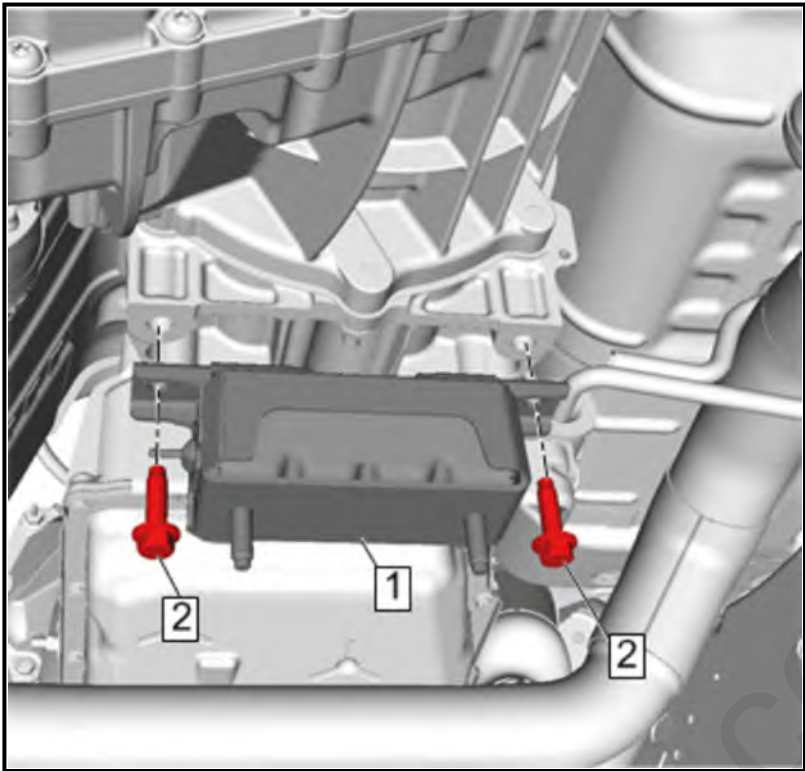
1. Remove the transmission support crossmember. [Transmission Support Crossmember Replacement \(4 Wheel Drive\)](#)
2. Remove the transmission mount bolts (2).



3. Remove the transmission mount (1) from the vehicle.

Installation Procedure

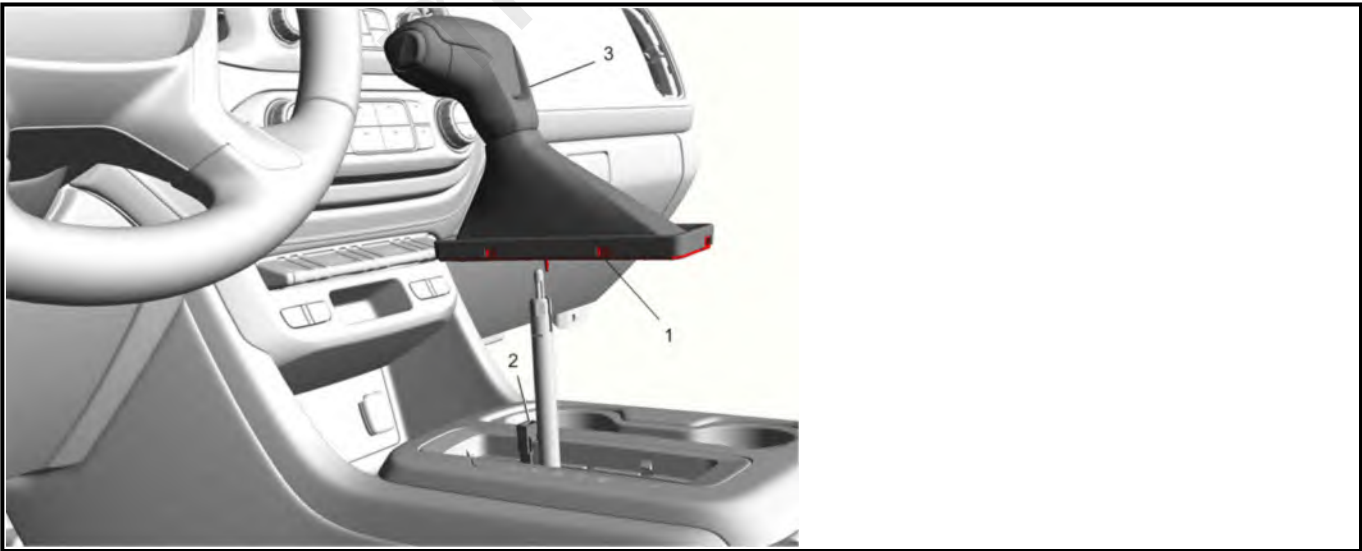
1. Install the transmission mount (1) to the vehicle.



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

2. Install the bolts (2) and tighten to 58 N.m (43 lb ft).
3. Install the transmission support crossmember. [Transmission Support Crossmember Replacement \(4 Wheel Drive\)](#)

TRANSMISSION CONTROL LEVER KNOB REPLACEMENT



NOTE: Callouts in the following chart represent components shown in graphic above.

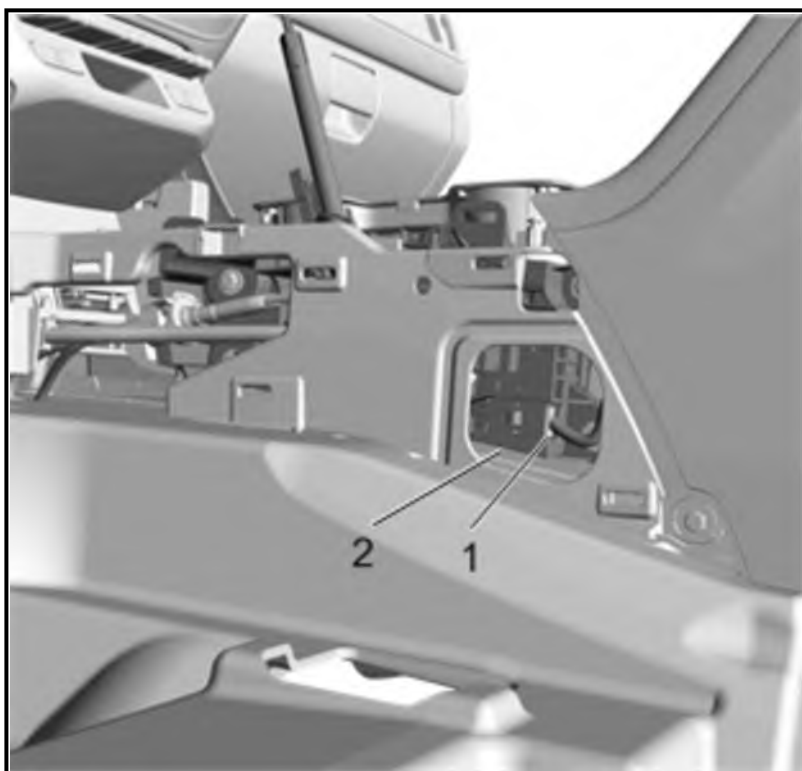
Callout	Component Name
1	Transmission Control Lever Knob Retainer (Qty: 6)
Procedure	

Callout	Component Name
	Using a flat-bladed plastic trim tool, release the retaining clips securing the control lever boot.
2	Electrical connector
3	Transmission Control Lever Knob NOTE: • The control lever boot and knob are replaced as an assembly. • To remove the knob and boot assembly, pull upward and twist clockwise and counter-clockwise to release it from the transmission control shaft.

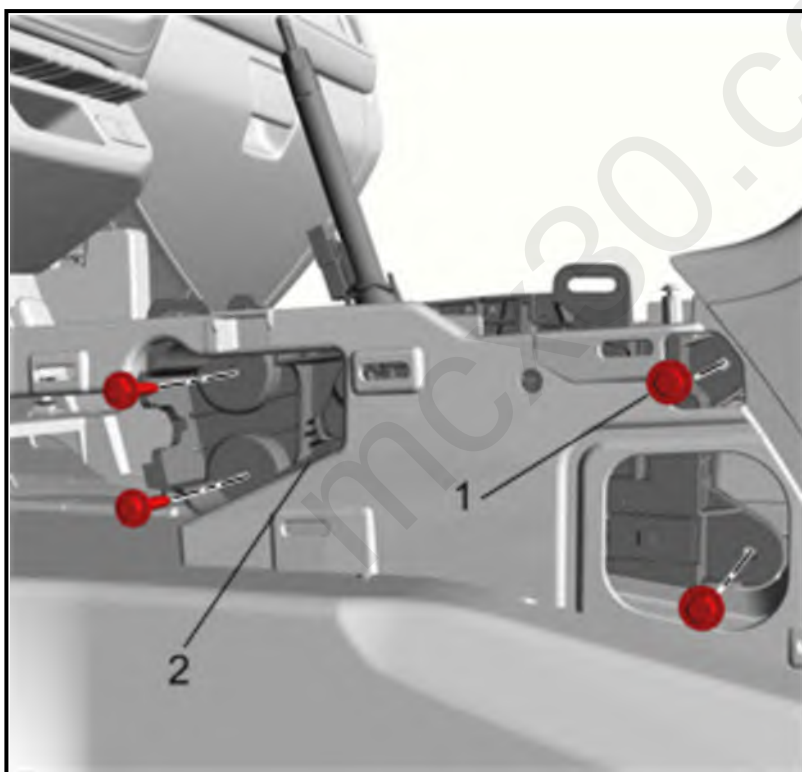
TRANSMISSION CONTROL REPLACEMENT

Removal Procedure

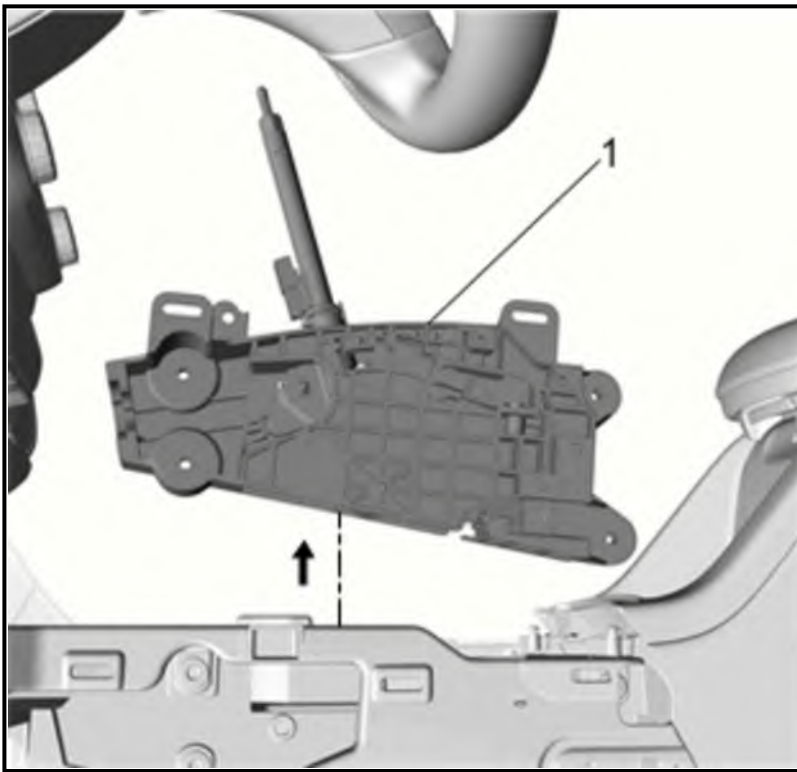
1. Set the park brake and chock the wheels.
2. Remove the front floor console cup holder opening trim plate (automatic transmission). [Front Floor Console Cup Holder Opening Trim Plate Replacement \(Manual Transmission\)](#) , or [Front Floor Console Cup Holder Opening Trim Plate Replacement \(Automatic Transmission\)](#).
3. Range Selector Lever Cable @ Automatic Transmission Control - Remove - [Range Selector Lever Cable Replacement](#)
4. Disconnect the electrical connector (1) from the rear of the transmission control (2).



5. Remove the four transmission shift control fasteners (1).

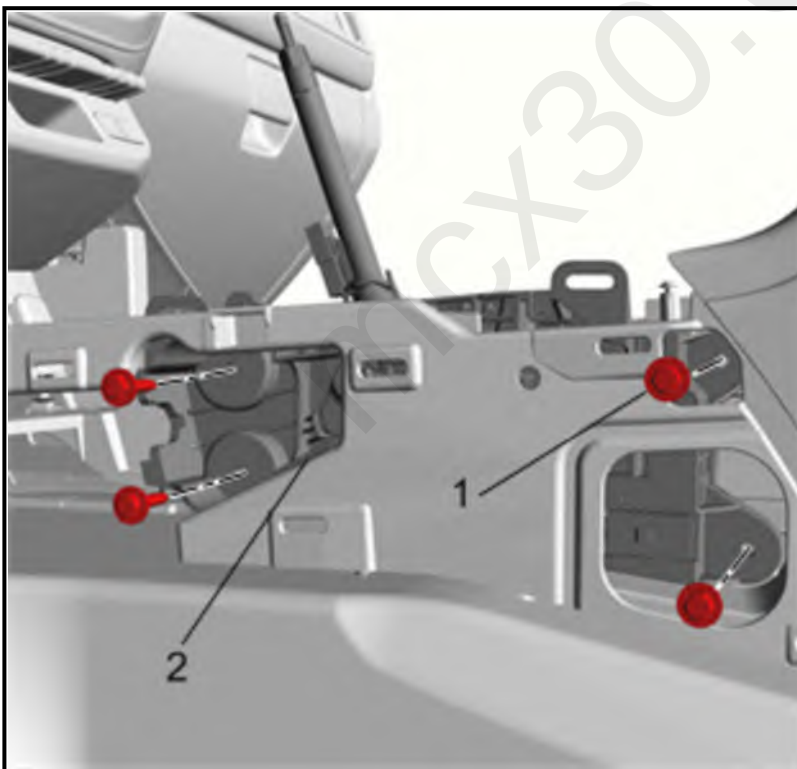


6. Remove the transmission shift control (1) from the console.



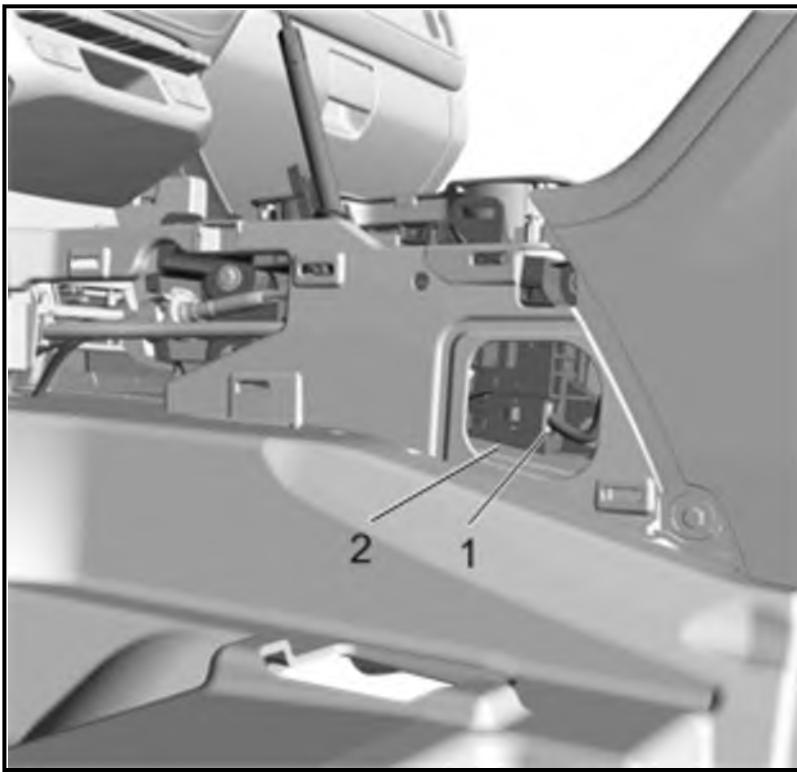
Installation Procedure

1. Position the transmission shift control into the floor console.
2. Install the transmission shift control fasteners (1) and tighten to 9 N.m (80 lb in)



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

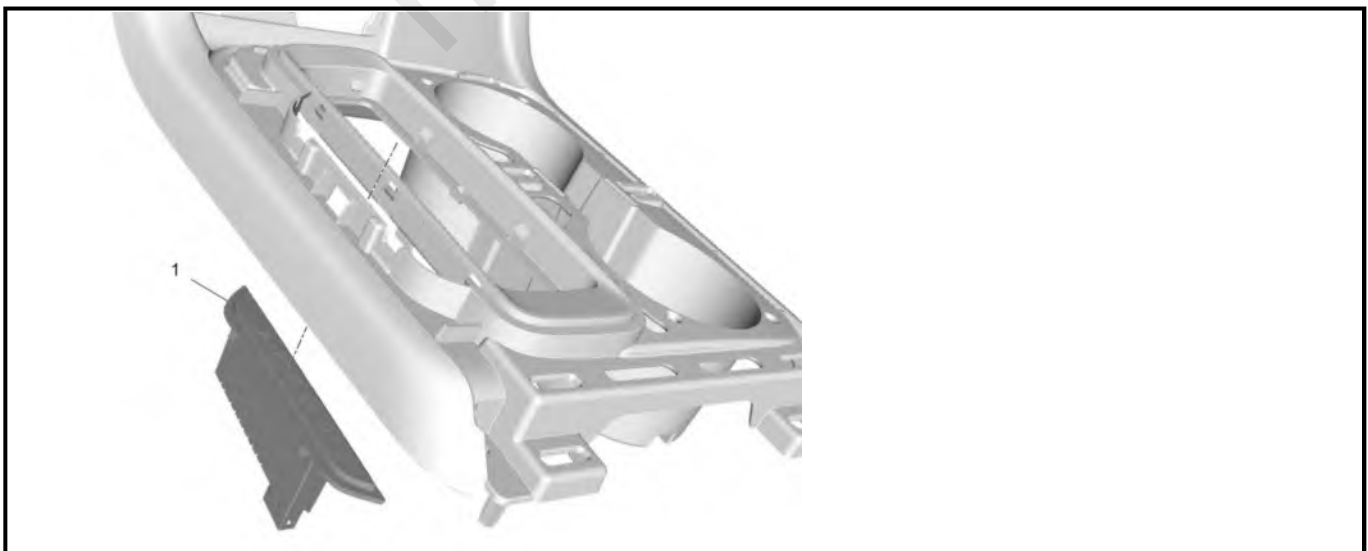
3. Connect the electrical connector (1) to the rear of the transmission control.



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. Range Selector Lever Cable @ Automatic Transmission Control - Install - [Range Selector Lever Cable Replacement](#)
5. Install the front floor console cup holder opening trim plate (automatic transmission). [Front Floor Console Cup Holder Opening Trim Plate Replacement \(Manual Transmission\)](#) , or [Front Floor Console Cup Holder Opening Trim Plate Replacement \(Automatic Transmission\)](#).
6. Adjust the automatic transmission range selector lever cable. [Range Selector Lever Cable Adjustment](#)

AUTOMATIC TRANSMISSION CONTROL INDICATOR REPLACEMENT



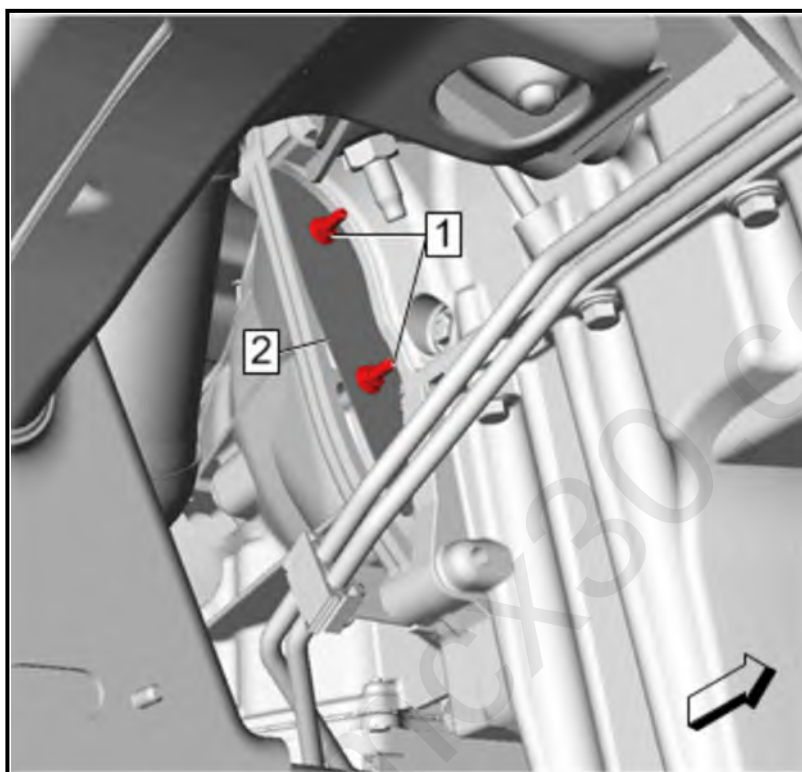
NOTE: Callouts in the following chart represent components shown in graphic above.

Callout	Component Name
Preliminary Procedure Remove the front floor console cup holder trim plate. Front Floor Console Cup Holder Opening Trim Plate Replacement (Manual Transmission) , or Front Floor Console Cup Holder Opening Trim Plate Replacement (Automatic Transmission) .	
1	Automatic Transmission Control Indicator Assembly Procedure Disconnect the electrical connector. Using a trim tool, release retaining tabs.

TRANSMISSION CONVERTER COVER REPLACEMENT

Removal Procedure

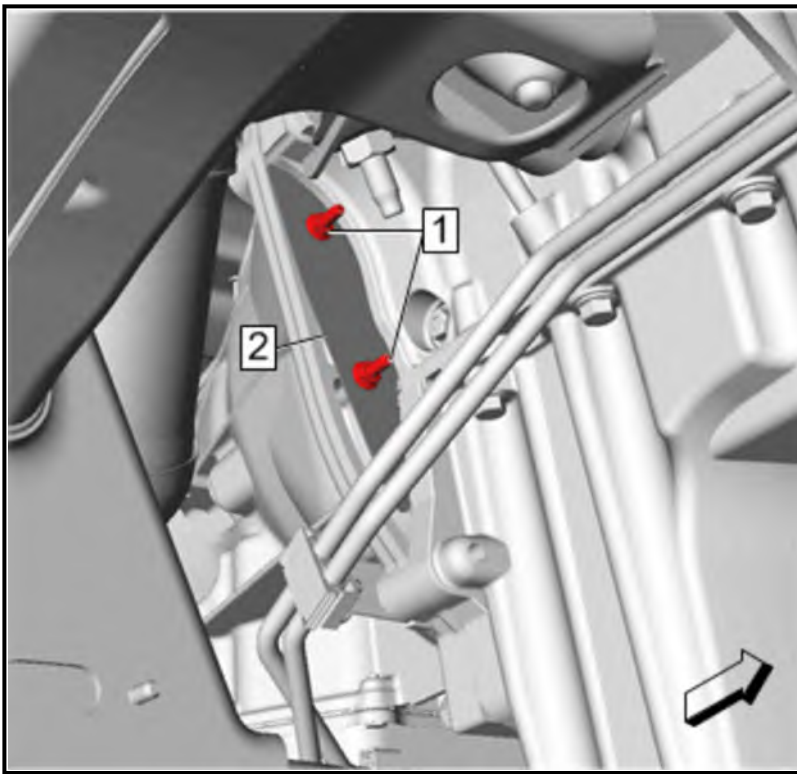
1. Remove the electrical wiring harness from the upper bolt (1).



2. Remove the right flywheel inspection cover bolt (1) and cover (2).

Installation Procedure

1. Install the right flywheel inspection cover (2) and bolt (1). Tighten the bolt to 10 N.m (89 lb in).



CAUTION: Refer to Fastener Caution .

2. Install the electrical wiring harness to the upper bolt (1).

AUTOMATIC TRANSMISSION FLUID, FLUID PAN AND/OR FILTER REPLACEMENT

Removal Procedure

NOTE: The three-way catalytic converter does not have to be fully removed.

1. Separate the three-way catalytic converter from the warm up three-way catalytic converters and lower out of the way. Three-Way Catalytic Converter Replacement (LGZ).
2. Place a suitable drain pan under the automatic transmission.
3. Clean the surrounding area of the automatic transmission fluid pan (2).

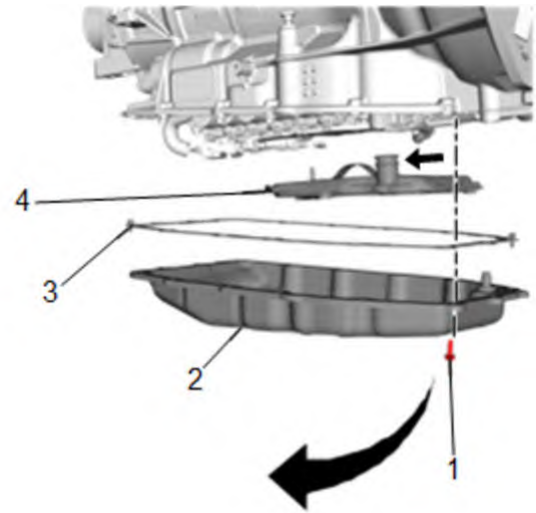
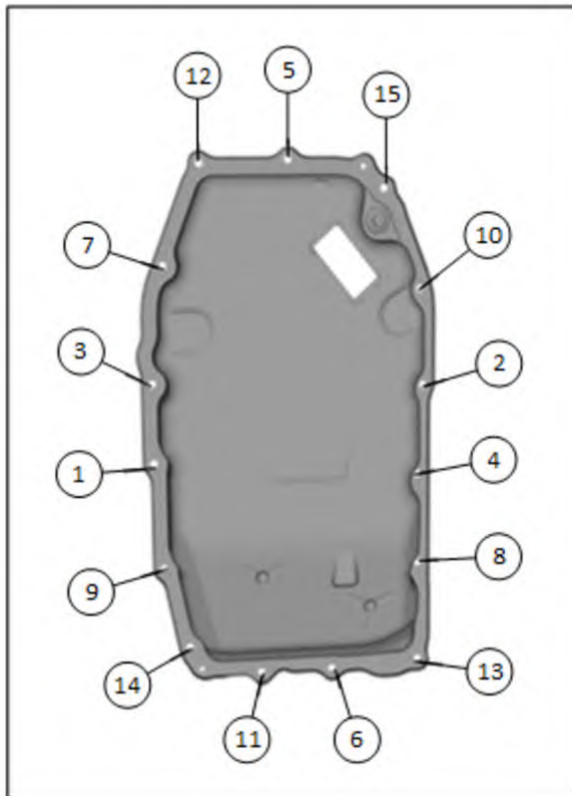


Fig. 1: Automatic Transmission Fluid Pan and/or Filter Replacement Components Bolts Tightening Sequence

Courtesy of GENERAL MOTORS COMPANY

4. Remove the 15 automatic transmission fluid pan bolts (1).
5. Remove the automatic transmission fluid pan (2).
6. Remove the automatic transmission fluid pan gasket (3).

NOTE: The seal is not serviced separately and comes with the NEW filter assembly.

7. Remove the automatic transmission fluid filter (4).

Installation Procedure

1. Install the automatic transmission fluid filter (4).

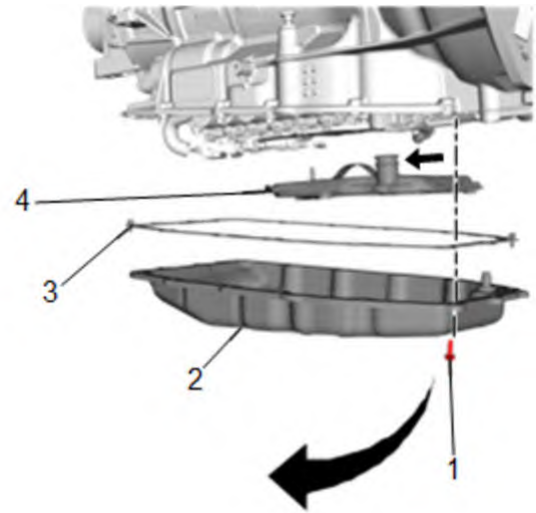
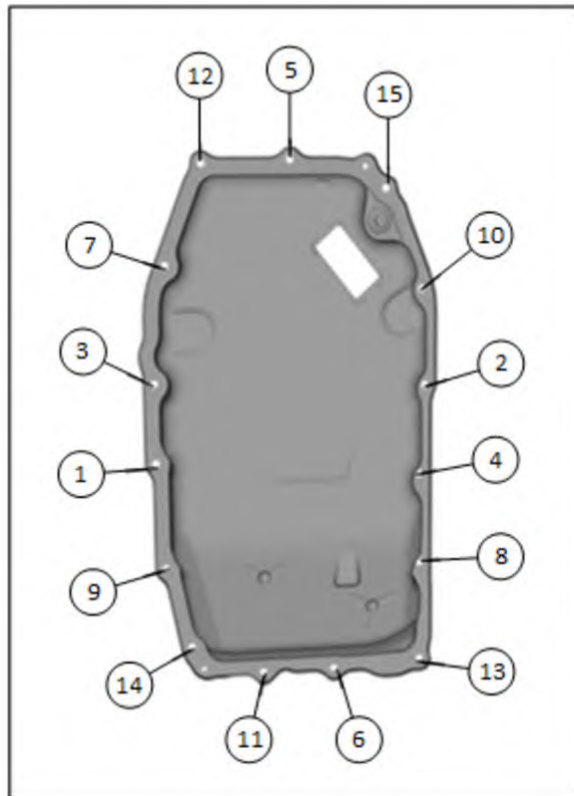


Fig. 2: Automatic Transmission Fluid Pan Bolts Tightening Sequence
Courtesy of GENERAL MOTORS COMPANY

NOTE:

- The seal is not serviced separately and comes with the NEW filter assembly.
- Lubricate the filter seal with transmission fluid before installing the filter.

NOTE:

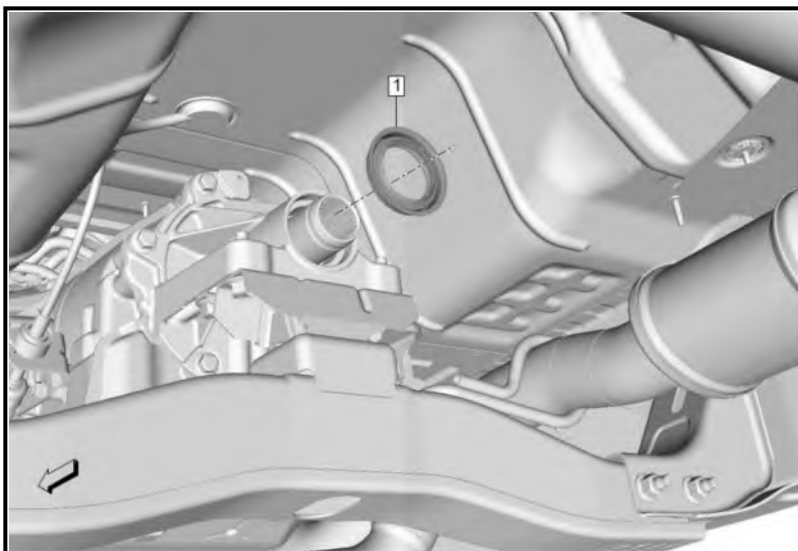
The fluid pan gasket is reusable. Inspect the gasket to determine if it may be reused. If the gasket is stuck to the case or pan, it should be replaced.

2. Install the automatic transmission fluid pan gasket (3) to the fluid pan.
3. Install the automatic transmission fluid pan (2) to the transmission.

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

4. Install the 15 automatic transmission fluid pan bolts (1) and tighten in the sequence shown to 10 N.m (89 lb in).
5. Fill the transmission. [Transmission Fluid Level and Condition Check](#)
6. Connect the three-way catalytic converter to the warm up three-way catalytic converters. [Three-Way Catalytic Converter Replacement \(LGZ\)](#).

PROPELLER SHAFT TRANSMISSION FLANGE FLUID SEAL REPLACEMENT



NOTE: Callouts in the following chart represent components shown in graphic above.

Callout	Component Name
Preliminary Procedure Propeller Shaft Replacement (M5T with 4WD)	
1	Propeller Shaft Transmission Flange Fluid Seal NOTE: Install a NEW seal, it is not reusable. Procedure 1. Using a suitable tool, remove the rear transmission housing oil seal (1) from the transmission housing. Use care in order to avoid damaging the output shaft. 2. Lubricate the seal with clean transmission fluid. 3. Use the DT-22828 Input and Countershaft Race Installer and DT-50896 Seal Installer to install the seal. Special Tools • DT-22828 Input and Countershaft Race Installer • DT-50896 Seal Installer For equivalent regional tools, refer to Special Tools .

MANUAL SHIFT SHAFT AND SEAL REPLACEMENT

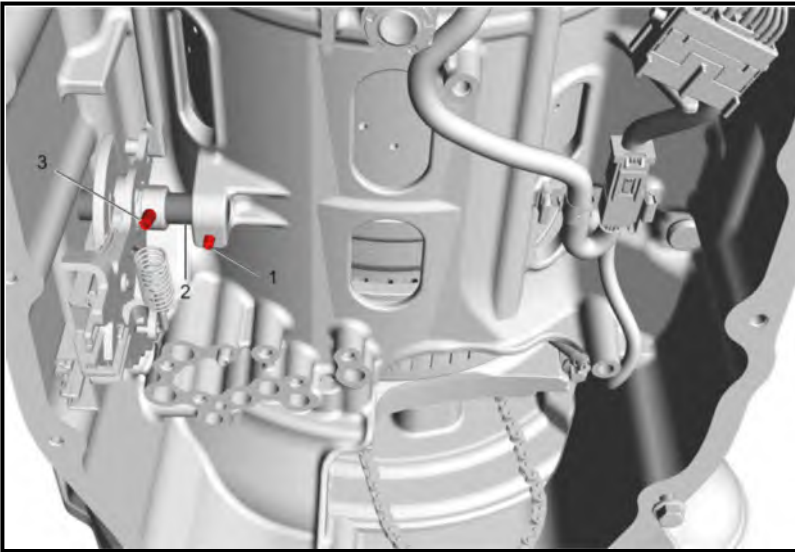
Special Tools

- **DT-45201** Cooler Line Seal Remover
- **DT-47770** Seal Installer

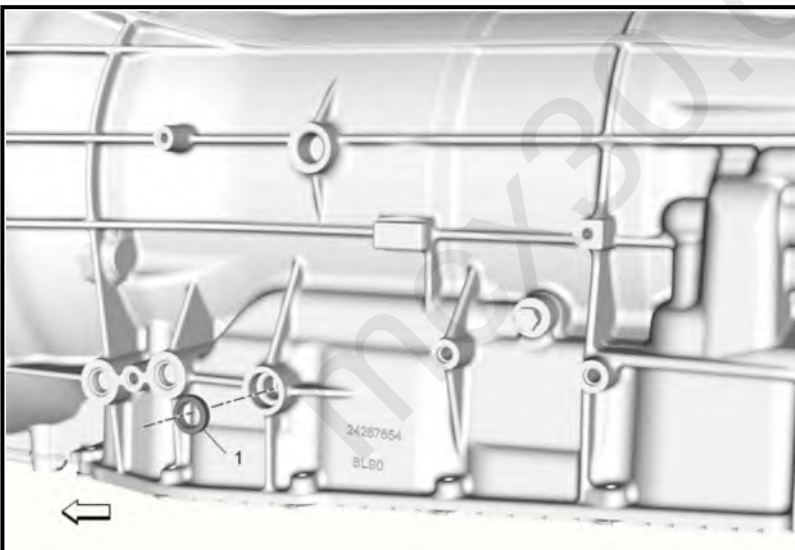
For equivalent tools, refer to [Special Tools](#) .

Removal Procedure

1. Remove the automatic transmission range selector lever. Refer to [Automatic Transmission Range Selector Lever Replacement](#).
2. Remove the control valve body. Refer to [Control Valve Body Replacement](#).
3. Remove and Discard the manual shift shaft detent lever hub pin (3).

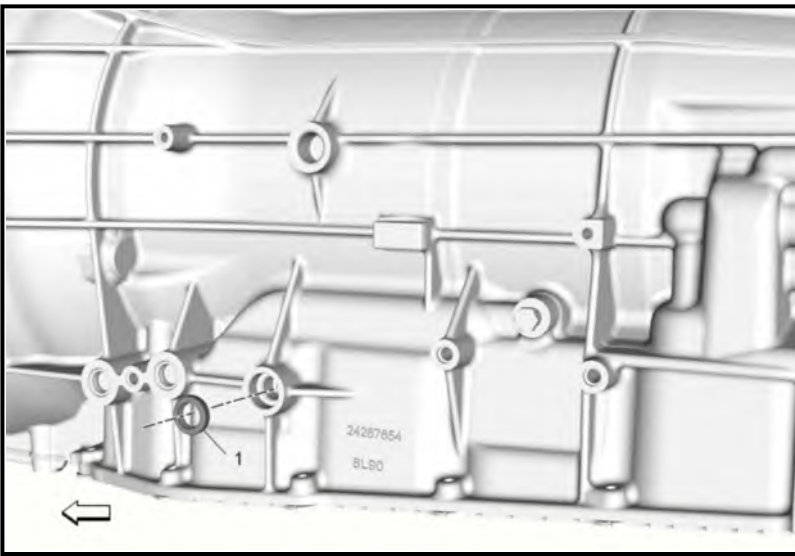


4. Remove and Discard the manual shift shaft pin (1).
5. Remove the manual shift shaft (2).
6. Remove and Discard the manual shift shaft seal (1) using **DT-45201** cooler line seal remover.

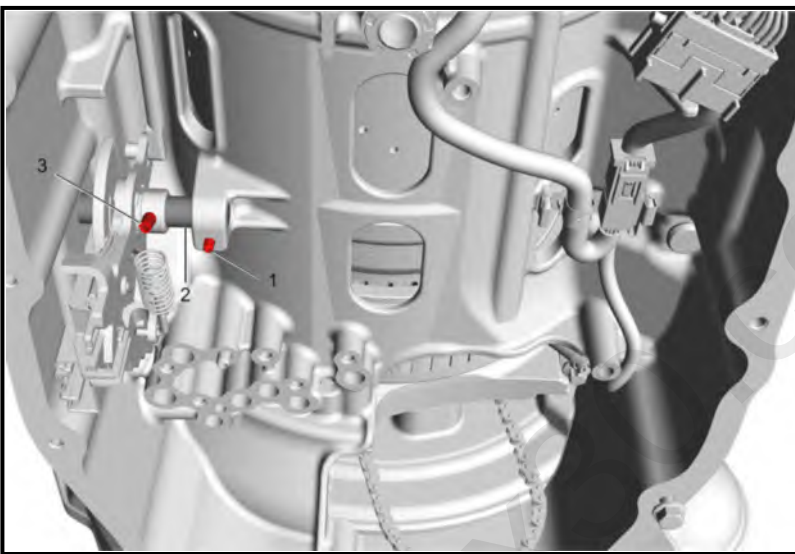


Installation Procedure

1. Install the NEW manual shift shaft seal (1) using **DT-47770** seal installer.



2. Install the manual shift shaft (2) aligning the position switch assembly onto the shaft.



3. Install the NEW manual shift shaft pin (1).

4. Install the NEW manual shift shaft detent lever hub pin (3).

5. Install the control valve body. Refer to [Control Valve Body Replacement](#).

6. Install the automatic transmission range selector lever. Refer to [Automatic Transmission Range Selector Lever Replacement](#).

7. Reprogram the transmission. [Solenoid Valve Characterization Reprogramming](#) Solenoid Valve Characterization Reprogramming

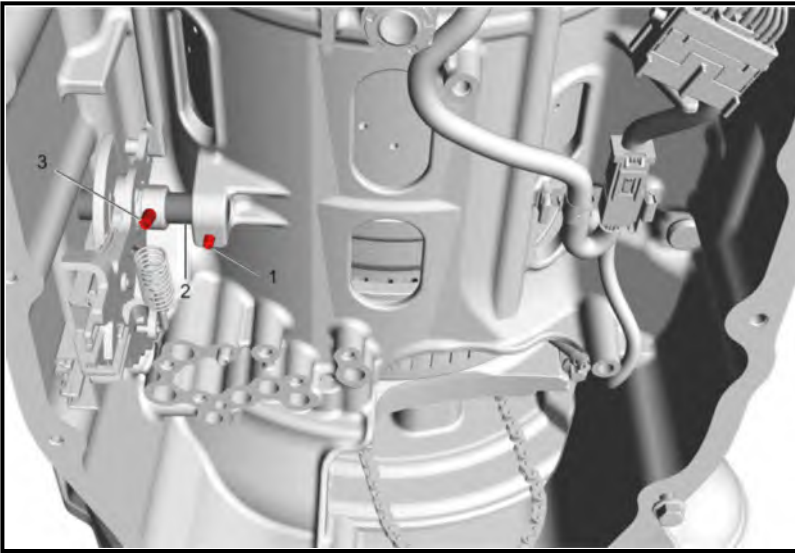
MANUAL SHIFT SHAFT POSITION SWITCH REPLACEMENT

Removal Procedure

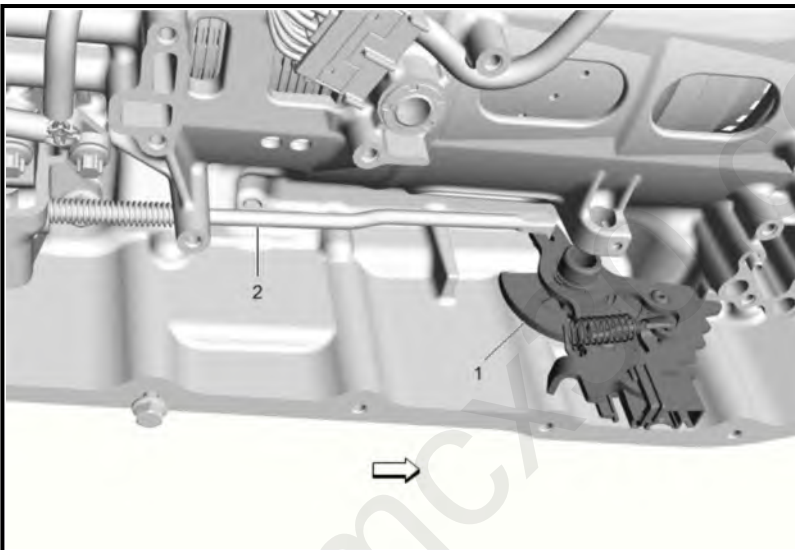
1. Remove the automatic transmission range selector lever. Refer to [Automatic Transmission Range Selector Lever Replacement](#).

2. Remove the control valve body. Refer to [Control Valve Body Replacement](#).

3. Remove and Discard the manual shift shaft detent lever hub pin (3).

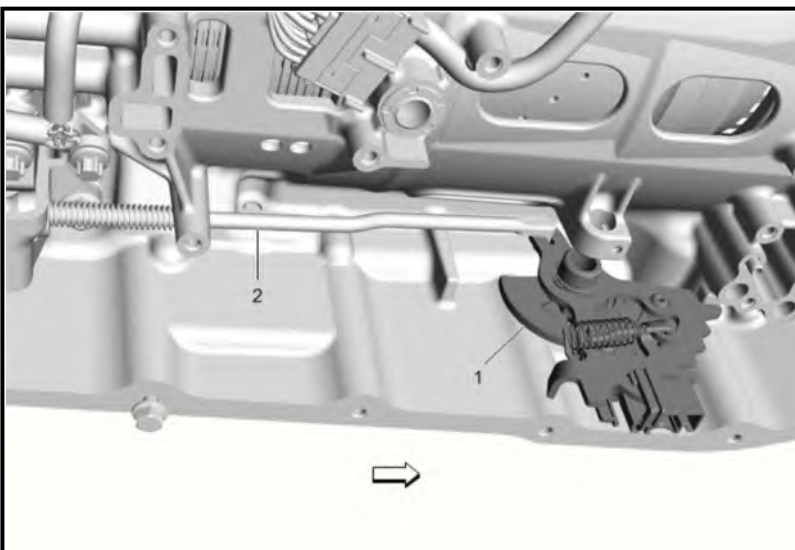


4. Remove and Discard the manual shift shaft pin (1).
5. Remove the manual shift shaft (2).
6. Remove or reposition the manual shift shaft position switch assembly as necessary.
7. Disconnect the park pawl actuator rod (2) from the manual shift shaft position switch (1).

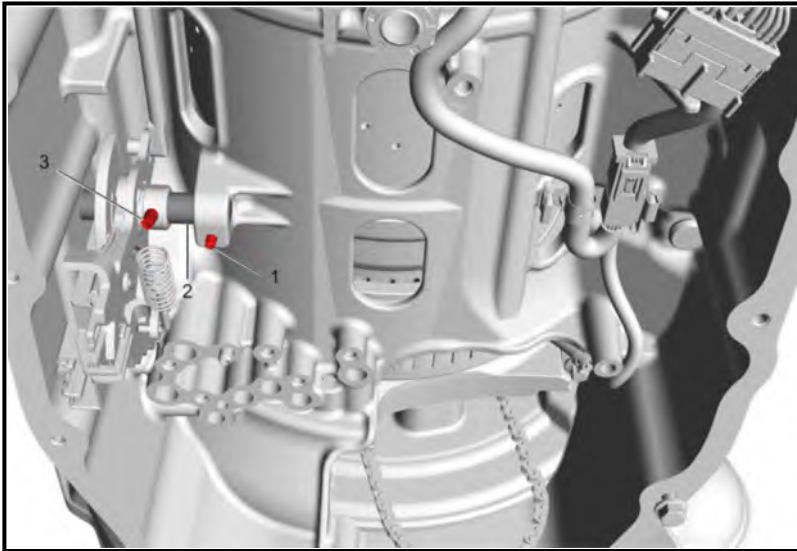


Installation Procedure

1. Connect the park pawl actuator rod (2) to the manual shift shaft position switch (1).



2. Install the manual shift shaft position switch assembly (1).
3. Install the manual shift shaft (2) aligning the position switch assembly onto the shaft.



4. Install the NEW manual shift shaft pin (1).
5. Install the NEW manual shift shaft detent lever hub pin (3).
6. Install the control valve body. Refer to [Control Valve Body Replacement](#).
7. Install the automatic transmission range selector lever. Refer to [Automatic Transmission Range Selector Lever Replacement](#).
8. Reprogram the transmission. [Solenoid Valve Characterization Reprogramming](#)

INPUT AND OUTPUT SPEED SENSOR REPLACEMENT

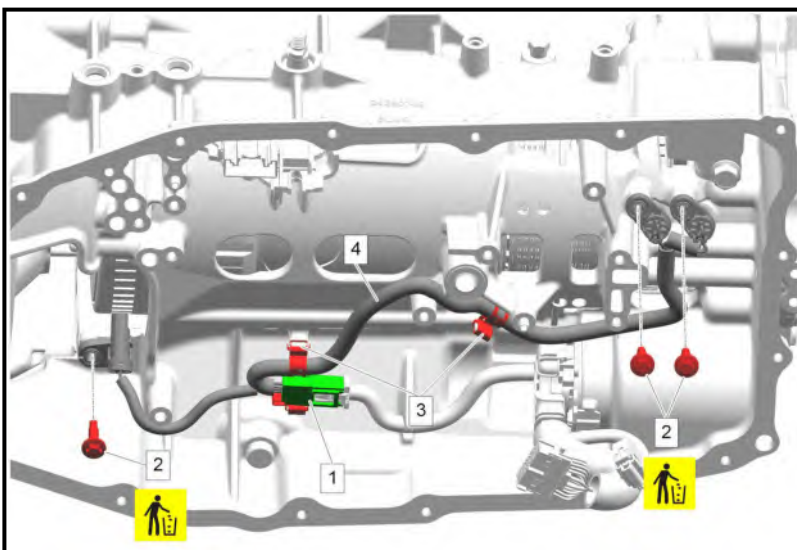
Special Tools

- DT-48285 Valve Body Torx Plus Socket

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

Removal Procedure

1. Remove the control valve body from the transmission. Refer to [Control Valve Body Replacement](#).
2. Disconnect the electrical connector (1).

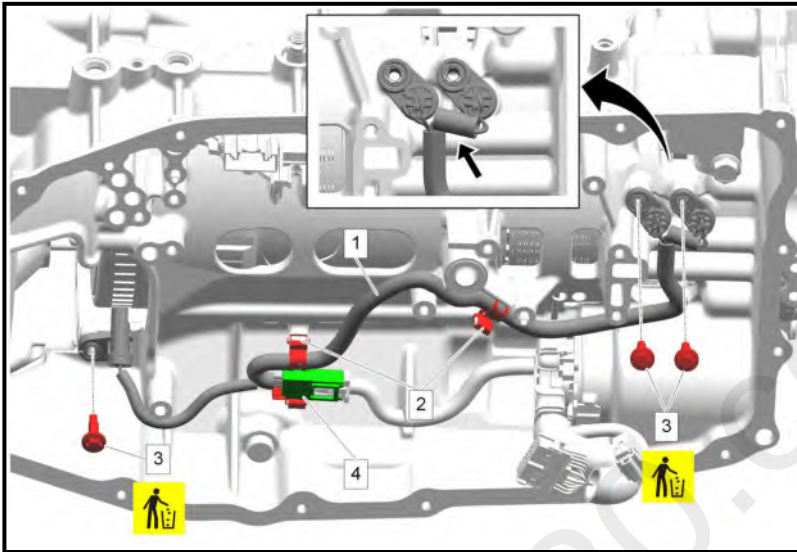


CAUTION: This vehicle is equipped with torque-to-yield or single use fasteners. Install a NEW torque-to-yield or single use fastener when installing this component. Failure to replace the torque-to-yield or single use fastener could cause damage to the vehicle or component.

3. Using the **DT-48285** Valve Body Torx Plus Socket, remove the three automatic transmission fluid baffle bolts and Discard (2).
4. Disconnect the two wiring harness retainers (3).
5. Remove the automatic transmission output speed sensor wiring harness (4).

Installation Procedure

1. Install the automatic transmission output speed sensor wiring harness (1).



CAUTION: The intermediate and output speed sensors must be installed in the correct location. Harsh shifting or transmission damage may occur if the speed sensors are not installed in the correct location.

NOTE: Ensure speed sensors are in the correct positions indicated by arrow.

2. Connect the two wiring harness retainers (2).

CAUTION: This vehicle is equipped with torque-to-yield or single use fasteners. Install a NEW torque-to-yield or single use fastener when installing this component. Failure to replace the torque-to-yield or single use fastener could cause damage to the vehicle or component.

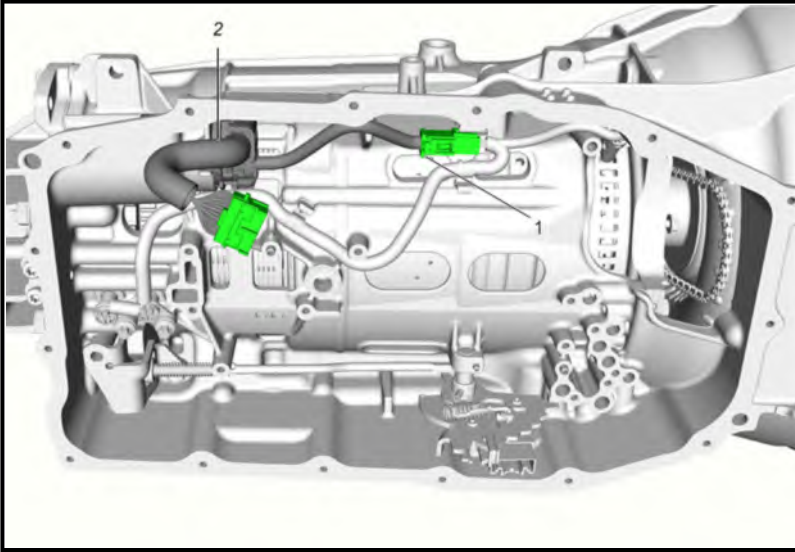
CAUTION: Refer to [Fastener Caution](#) .

3. Using the **DT-48285** Valve Body Torx Plus Socket, Install the three NEW automatic transmission fluid baffle bolts (3) and tighten the bolts to 4 N.m (35 lb in) plus 45 degrees.
4. Connect the electrical connector (4).
5. Install the control valve body to the transmission. Refer to [Control Valve Body Replacement](#)
6. Reprogram the transmission. [Q77 Transmission Control Solenoid Valve Characterization Programming](#)

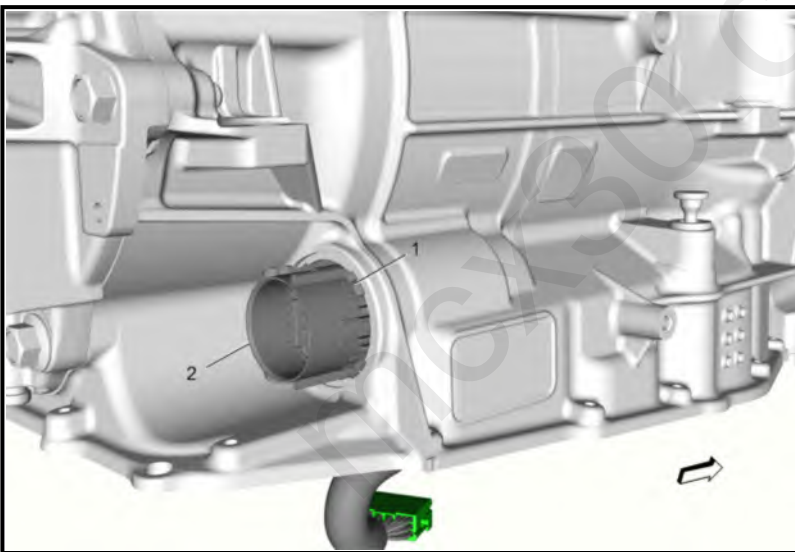
AUTOMATIC TRANSMISSION WIRING HARNESS REPLACEMENT (ELECTRICAL CONNECTOR PASSAGE SLEEVE)

Removal Procedure

1. Remove the control valve body. **Control Valve Body Replacement**.
2. Disconnect the chassis wiring harness from the transmission electrical connector.
3. Disconnect the electrical connector (1).



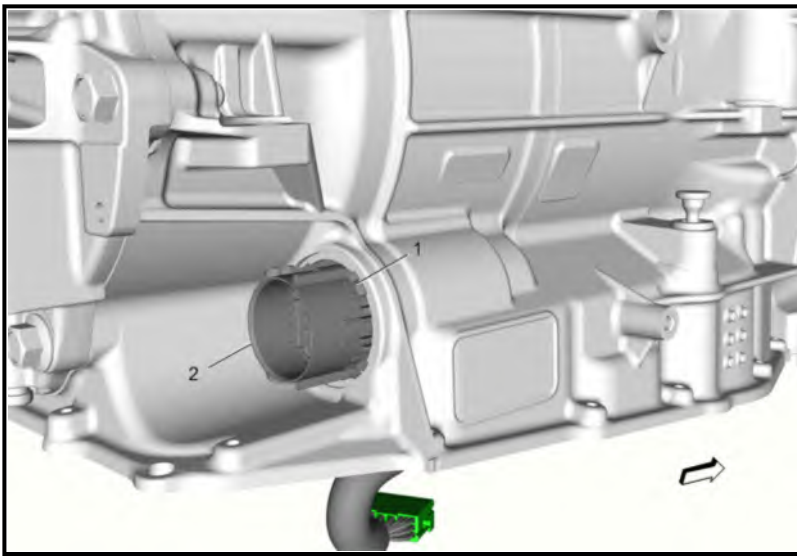
4. Using a flat-bladed tool, press inward the four retaining tabs (1) around the main connector, then slide the main connector (2) inward into the transmission case.



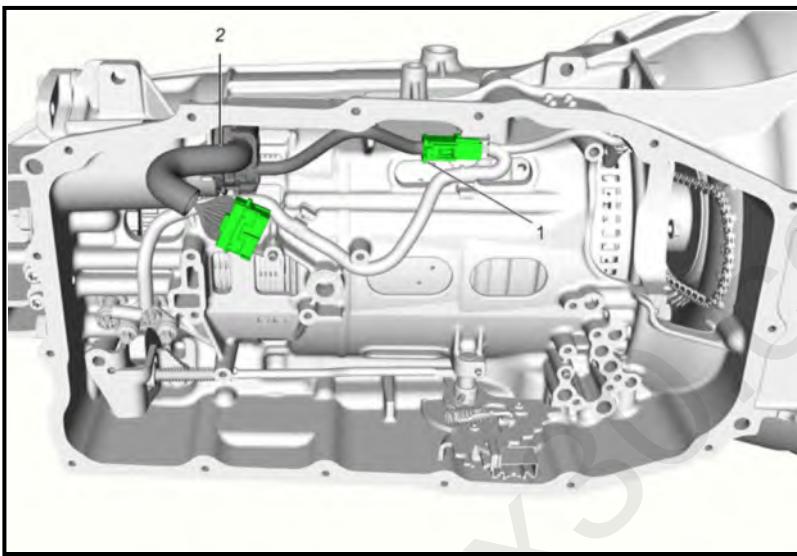
5. Remove the automatic transmission wiring harness from the transmission.

Installation Procedure

1. Position the automatic transmission wiring harness into the transmission.
2. Press the main connector into the transmission case until the four retaining tabs (1) around the main connector, lock into place.



3. Connect the electrical connector (1).



4. Install the control valve body. [Control Valve Body Replacement](#).

5. Connect the chassis wiring harness from the transmission electrical connector.

6. Reprogram the transmission. [Q77 Transmission Control Solenoid Valve Characterization Programming](#)

CONTROL VALVE BODY REPLACEMENT

Special Tools

- **DT-48285** Valve Body Torx Plus Socket

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

Removal Procedure

1. Remove the transmission fluid filter (4). [Automatic Transmission Fluid, Fluid Pan and/or Filter Replacement](#)

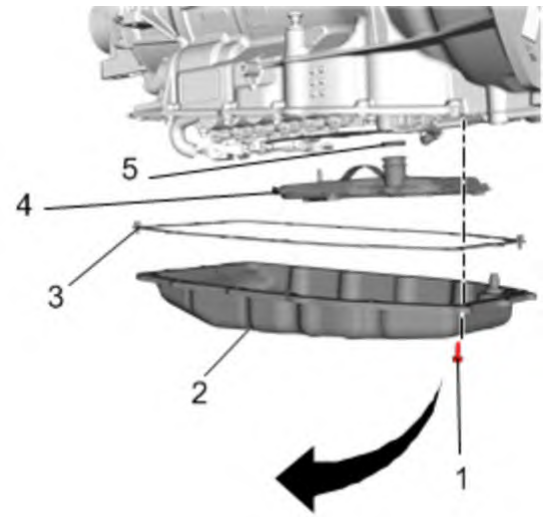
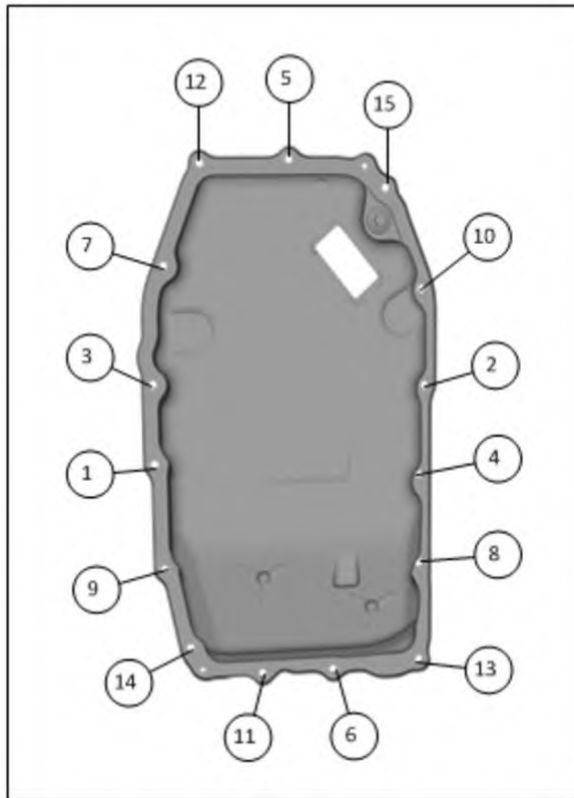
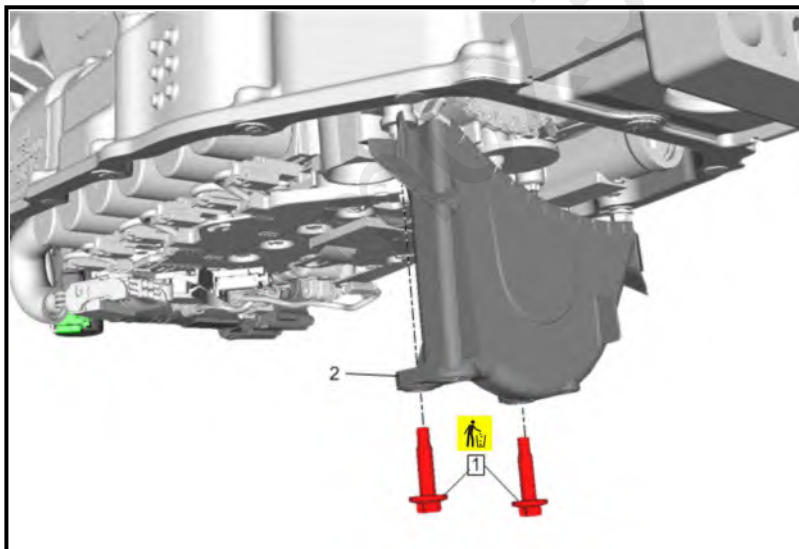


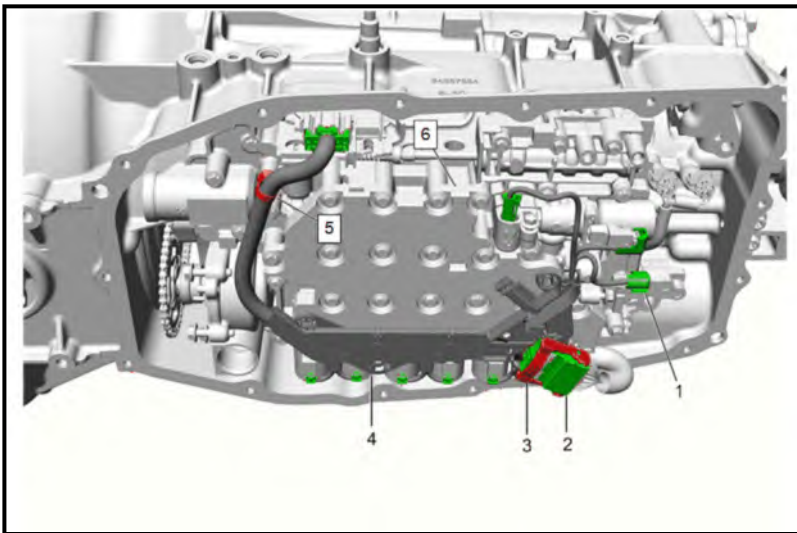
Fig. 3: Exploded View Of Transmission Fluid Pan, Filter, Filter Seal, Gasket And Bolts With Tightening Sequence

Courtesy of GENERAL MOTORS COMPANY

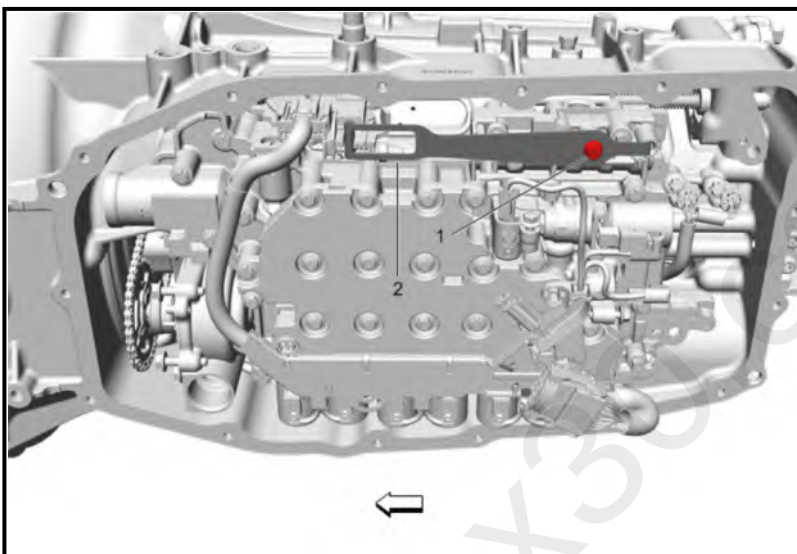
2. Remove and DISCARD the 2 transmission fluid baffle bolts, then remove the fluid baffle from the transmission. **Transmission Fluid Baffle Replacement**



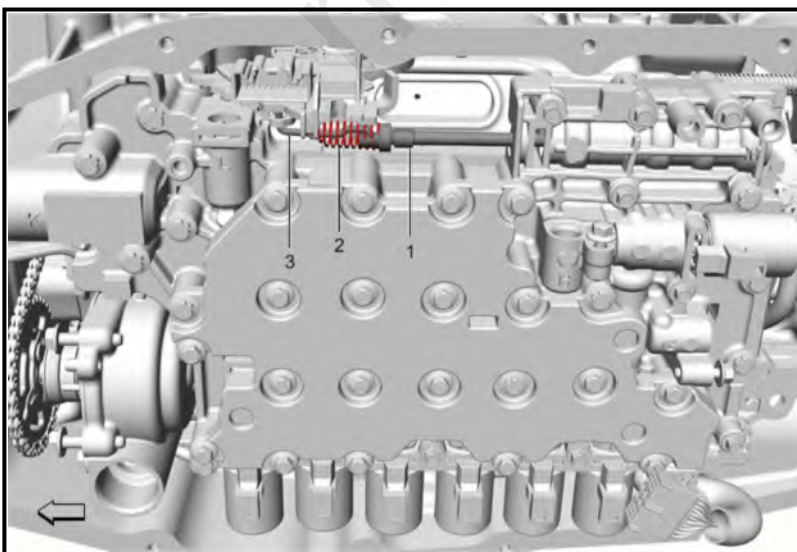
3. Remove the transmission control wiring harness (4). **Transmission Control Wiring Harness Replacement**



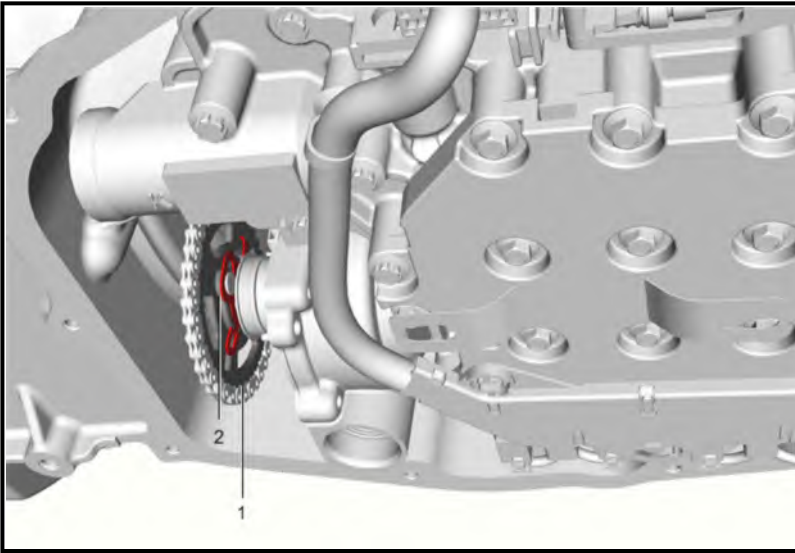
4. Remove the manual shaft detent lever spring retaining bolt (1) and the manual shaft detent lever spring (2).



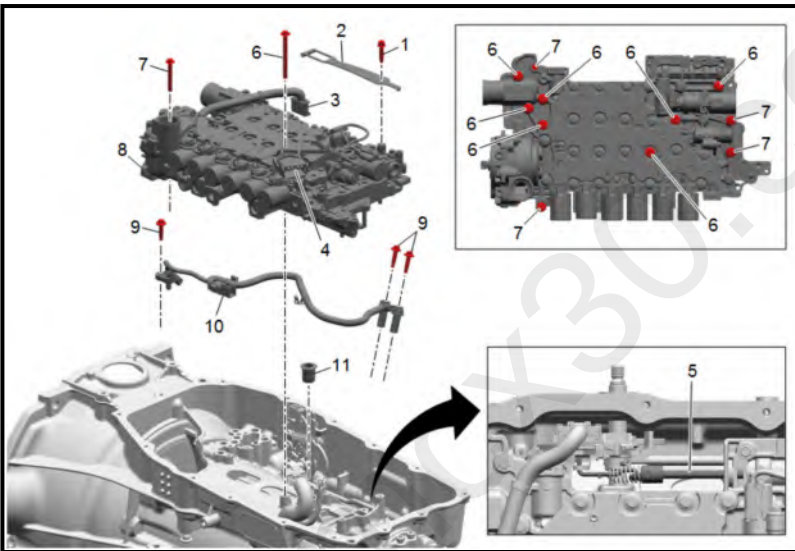
5. Pull back the spring (2), then disconnect the manual valve (1) from the manual shift shaft position switch assembly linkage (3).



6. Rotate the engine as necessary to obtain access to the retainer (2).

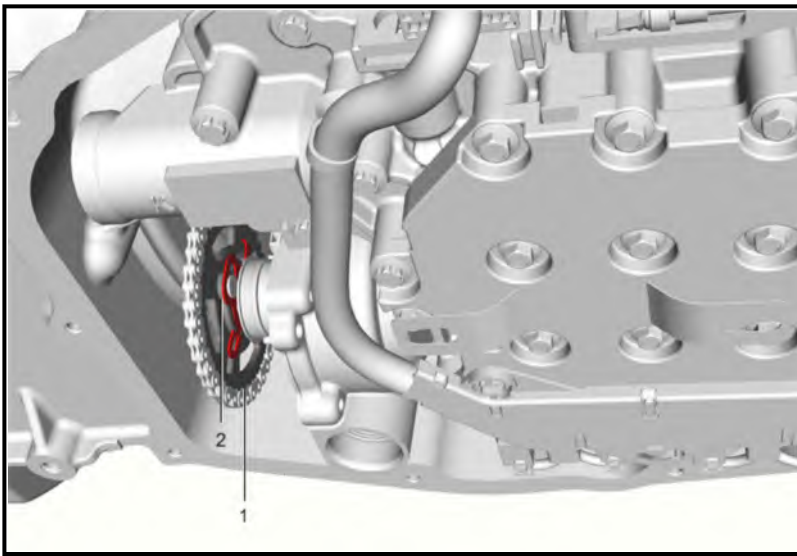


7. Using a suitable pry tool, unlock the retainer (2).
8. Remove the transmission fluid pump driven sprocket (1). Refer to transmission fluid baffle and driven sprocket in [Control Valve Assembly and Transmission Wiring Harness Removal](#) .
9. Remove the control valve body assembly (8). [Control Valve Assembly and Transmission Wiring Harness Removal](#)



Installation Procedure

1. Install the transmission fluid pump driven sprocket (1) onto the chain then position the sprocket and control valve body then loosely install the control valve assembly. [Control Valve Assembly and Transmission Wiring Harness Installation](#) .



NOTE: Due to transmission fluid pump chain tension, the control valve assembly and fluid pump sprocket must be installed simultaneously.

2. Using a suitable pry tool, lock the retainer (2).
3. Complete the installation of the control valve body assembly (4). [Control Valve Assembly and Transmission Wiring Harness Installation](#)

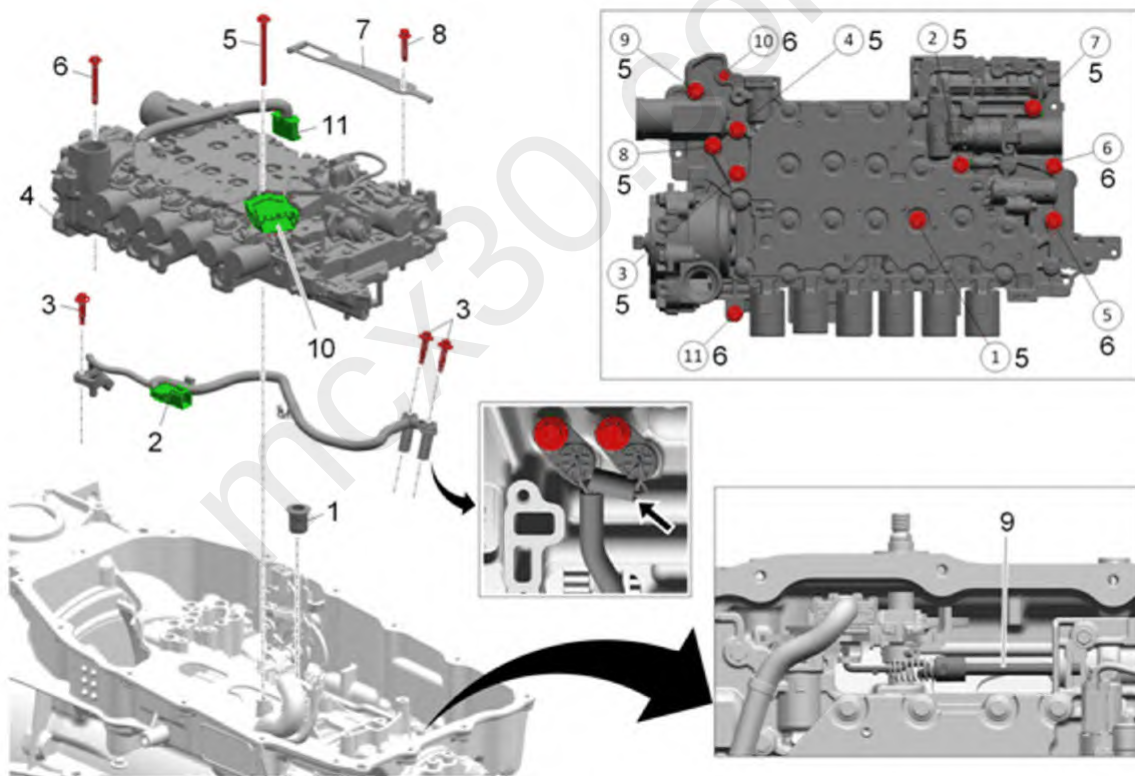
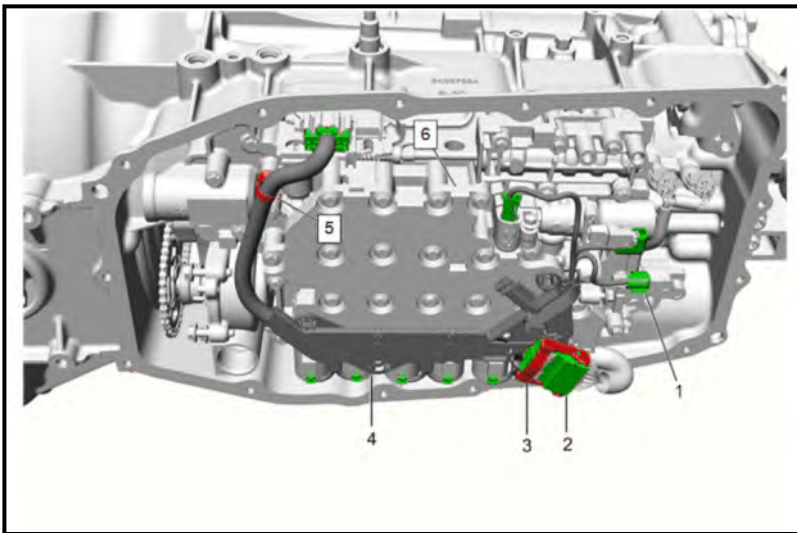


Fig. 4: Control Valve Solenoid Body Bolts Tightening Sequence

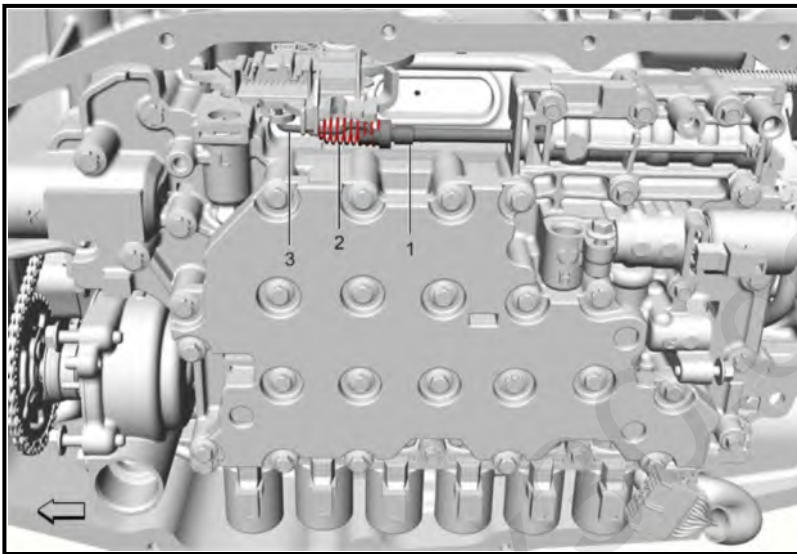
Courtesy of GENERAL MOTORS COMPANY

NOTE: Before installing the control valve solenoid body onto the transmission, document the 16-digit Part Unique Number (PUN). If the control valve solenoid body PUN has not been saved for reference, it may be necessary to disassemble the control valve solenoid body from the transmission to clearly read the control valve solenoid body PUN.

4. Install the transmission control wiring harness (4). [Transmission Control Wiring Harness Replacement](#)

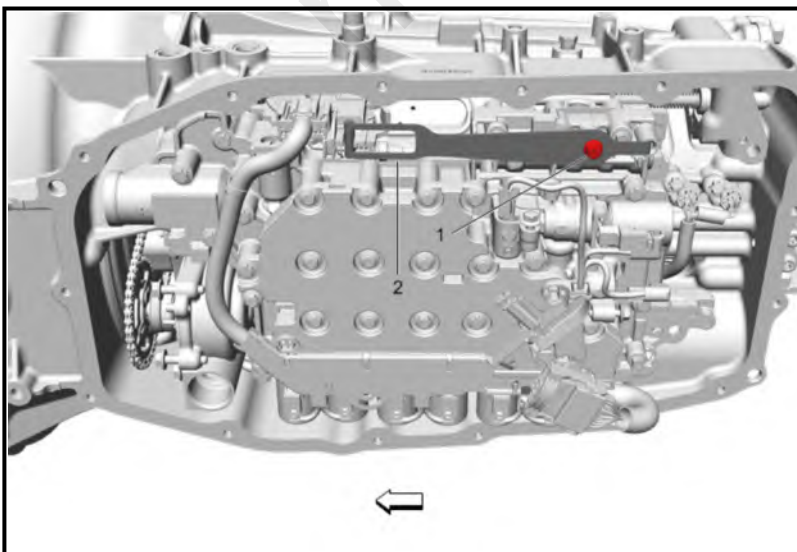


5. Connect the manual valve (1) to the manual shift shaft position switch assembly linkage (2).

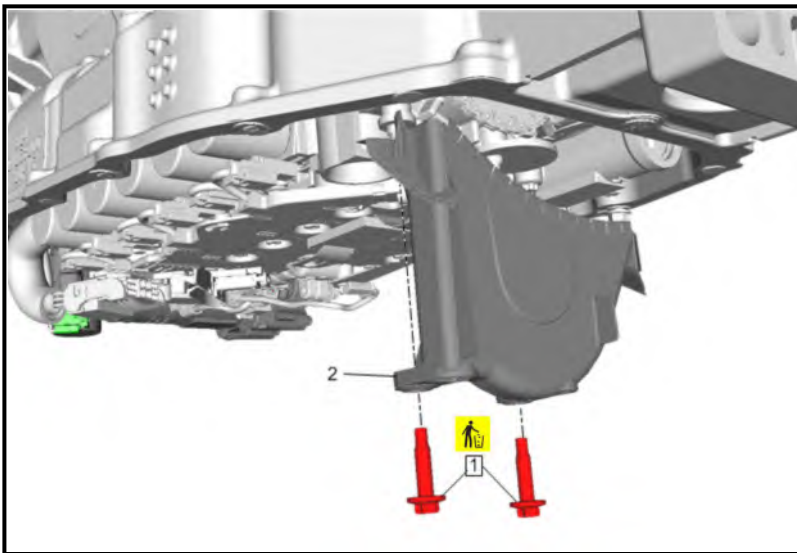


6. Return the spring (2) to it's correct position.

7. Install the manual shaft detent lever spring (2) and the manual shaft detent lever spring retaining bolt (1) then tighten to 12 N.m (106 lb in).



8. Install the transmission fluid baffle, then install the 2 NEW fluid baffle bolts. [Transmission Fluid Baffle Replacement](#)



9. Install the transmission fluid filter (4). [Automatic Transmission Fluid, Fluid Pan and/or Filter Replacement](#)

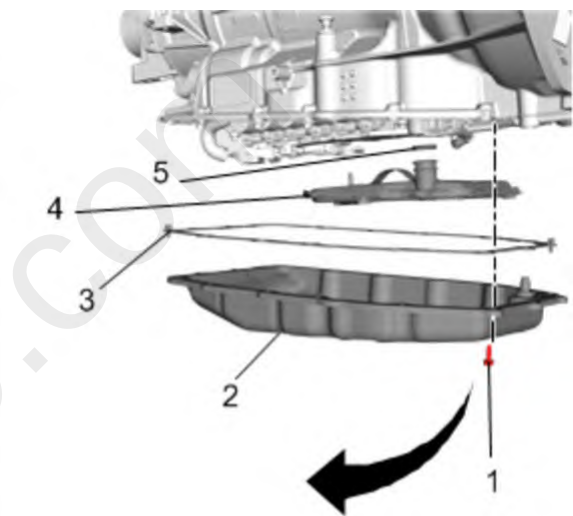
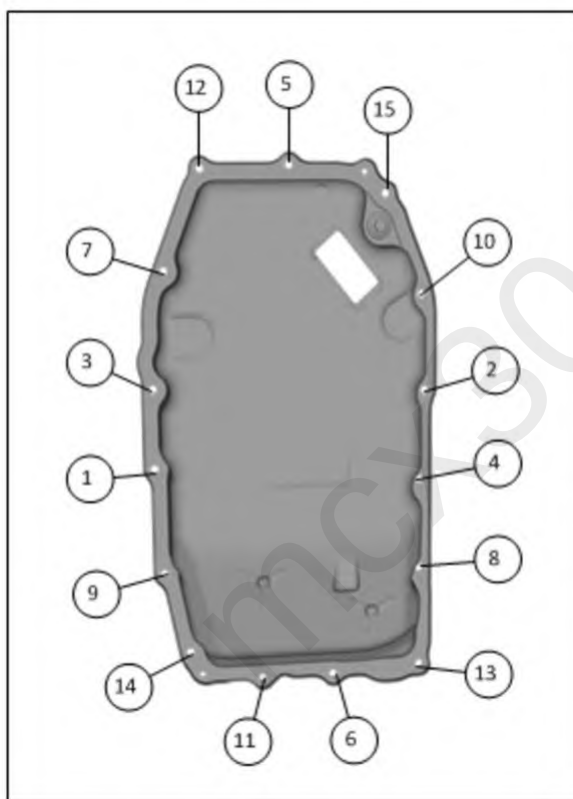


Fig. 5: Transmission Fluid Pump Baffle Bolts Tightening Sequence
Courtesy of GENERAL MOTORS COMPANY

10. Reprogram the transmission. [Q77 Transmission Control Solenoid Valve Characterization Programming](#)

NOTE:

The Service Fast 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:

The service fast learn procedure must be performed when any of the following repairs has been made to the transmission.

- Pressure regulating solenoid replacement

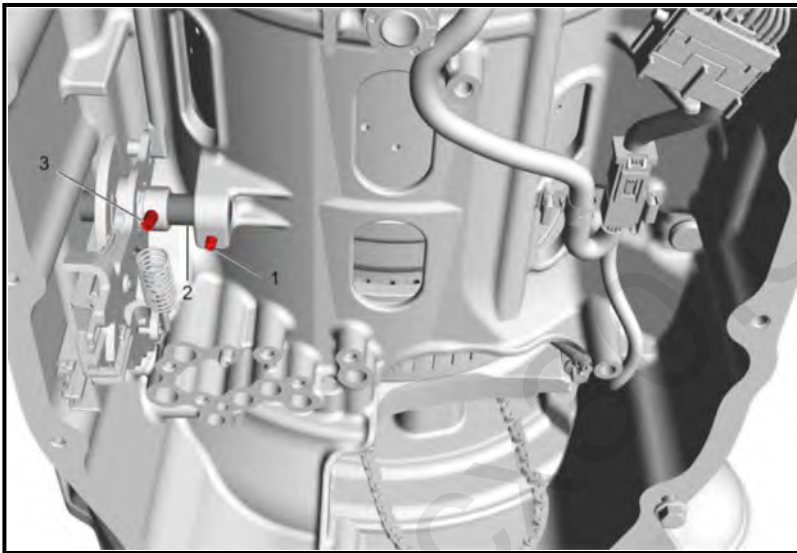
- Valve body repair or replacement
- Any service/repair in response to a shift quality concern
- Any internal transmission service, repair, overhaul, or replacement
- Torque converter replacement
- TCM replacement
- Transmission assembly replacement

11. Perform the service fast learn procedure. [Transmission Service Fast Learn Procedure](#)

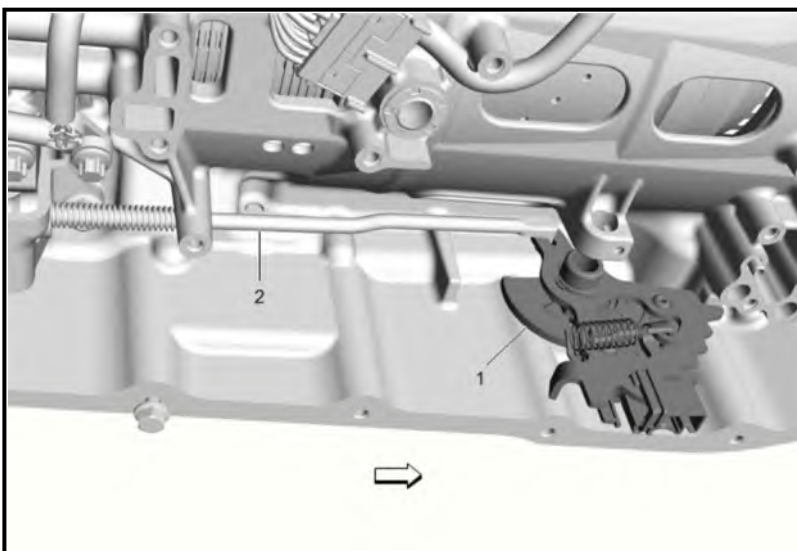
PARK PAWL ACTUATOR REPLACEMENT

Removal Procedure

1. Remove the automatic transmission range selector lever. Refer to [Automatic Transmission Range Selector Lever Replacement](#).
2. Remove the control valve body. Refer to [Control Valve Body Replacement](#).
3. Remove and Discard the manual shift shaft detent lever hub pin (3).



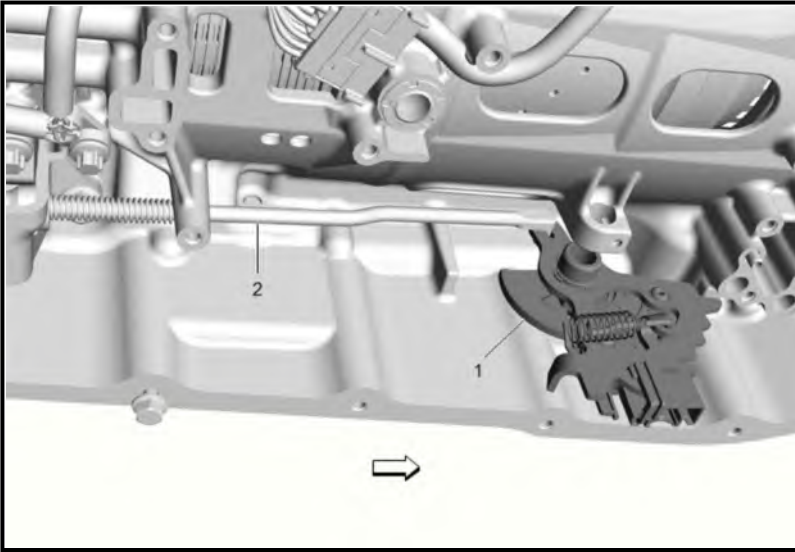
4. Remove and Discard the manual shift shaft pin (1).
5. Remove the manual shift shaft (2).
6. Remove or reposition the manual shift shaft position switch assembly as necessary.
7. Disconnect the park pawl actuator rod (2) from the manual shift shaft position switch (1).



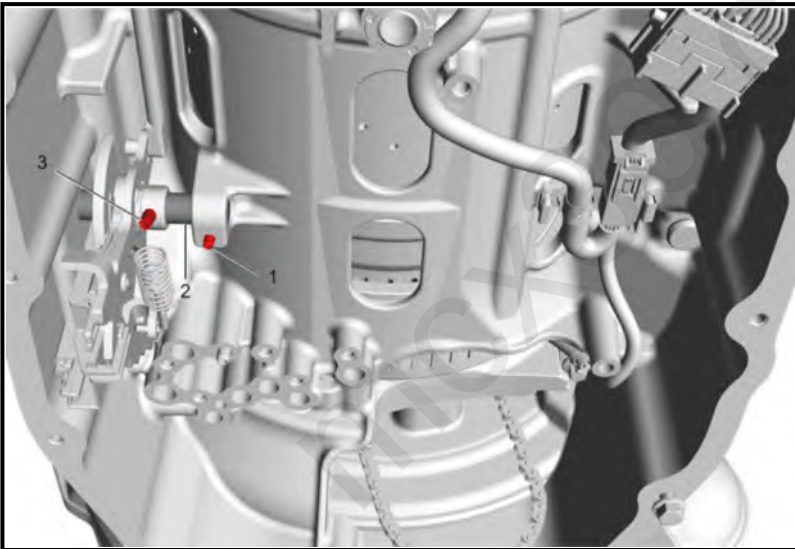
8. Remove the park pawl actuator rod.

Installation Procedure

1. Connect the park pawl actuator rod (2) to the manual shift shaft position switch (1).



2. Install the manual shift shaft position switch and park pawl assembly (1).
3. Install the manual shift shaft (2) aligning the position switch assembly onto the shaft.

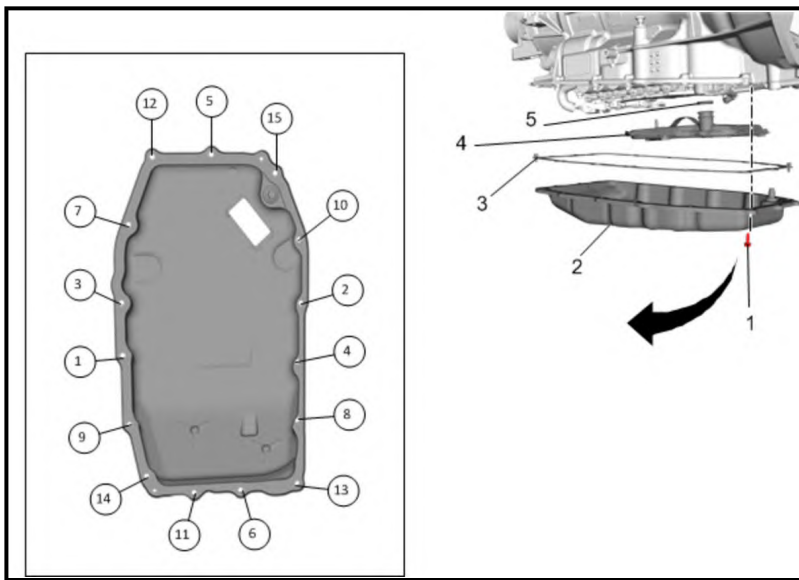


4. Install the NEW manual shift shaft pin (1).
5. Install the NEW manual shift shaft detent lever hub pin (3).
6. Install the control valve body. Refer to [Control Valve Body Replacement](#).
7. Reprogram the transmission. [Solenoid Valve Characterization Reprogramming](#)

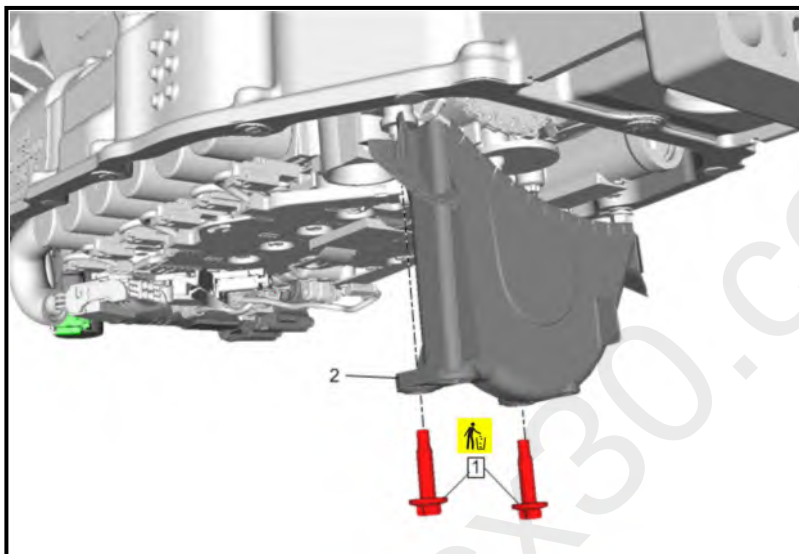
TRANSMISSION FLUID BAFFLE REPLACEMENT

Removal Procedure

1. Remove the transmission fluid filter (4). Refer to [Automatic Transmission Fluid, Fluid Pan and/or Filter Replacement](#).



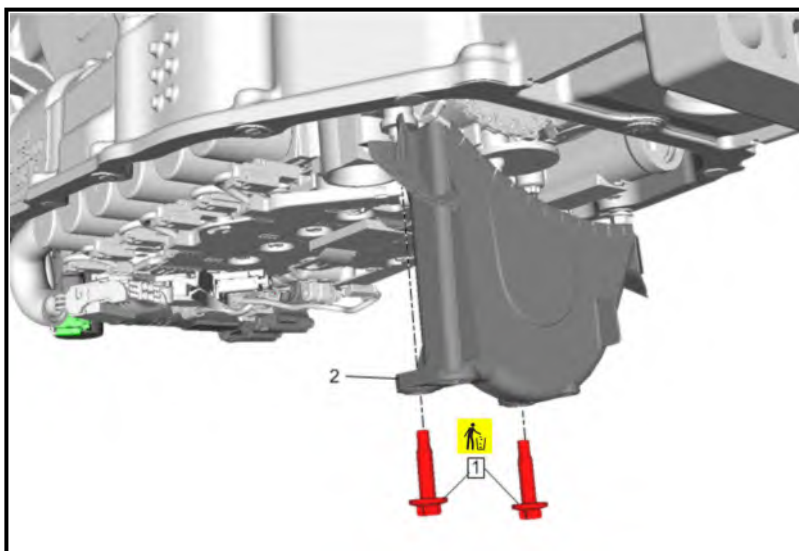
2. Remove the transmission fluid baffle bolts (1) and discard.



3. Remove the transmission fluid pump baffle (2).

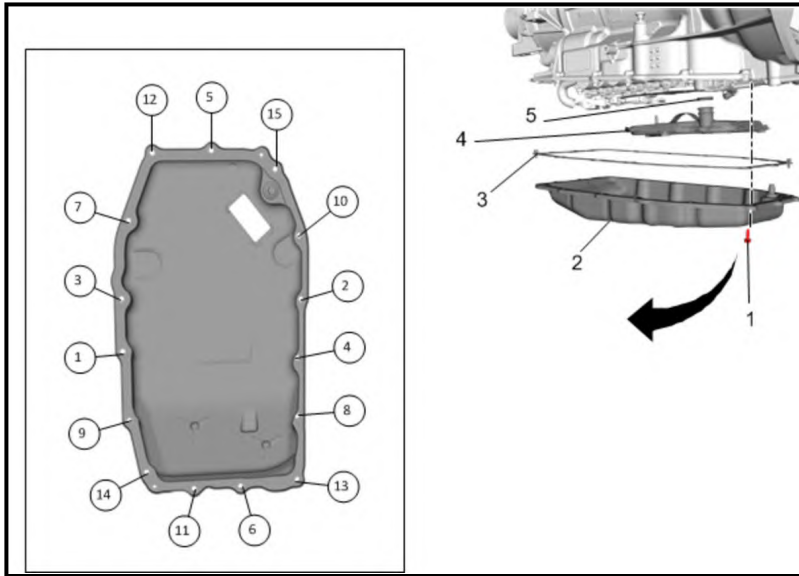
Installation Procedure

1. Install the transmission fluid pump baffle (2).



2. Install the NEW transmission fluid baffle bolts (1) and tighten to 4 N.m (35 lb in) plus 45 degrees.

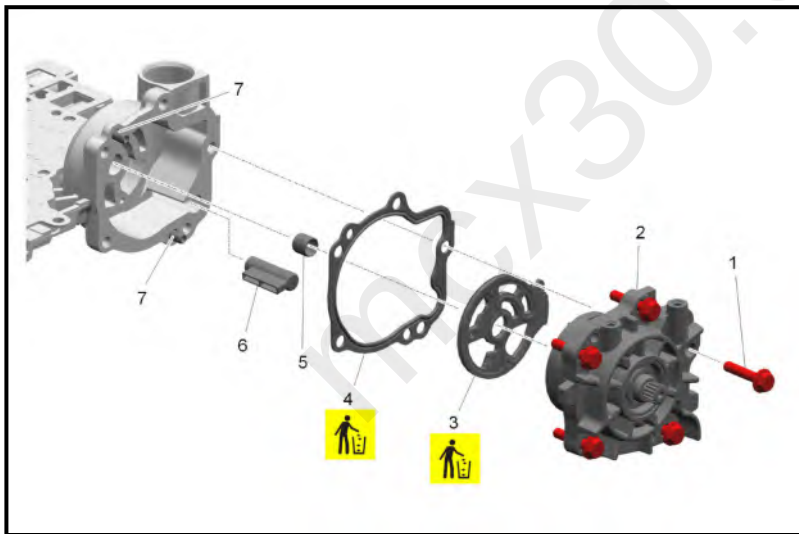
3. Install the transmission fluid filter (4). Refer to [Automatic Transmission Fluid, Fluid Pan and/or Filter Replacement](#).



TRANSMISSION FLUID PUMP REPLACEMENT

Removal Procedure

1. Remove the control valve body. Refer to [Control Valve Body Replacement](#).
2. Remove the automatic transmission fluid pump (2). Refer to automatic transmission fluid pump assembly removal in [Control Valve Body Assembly Disassemble](#).



Installation Procedure

1. Install the automatic transmission fluid pump (2). Refer to automatic transmission fluid pump assembly installation in [Control Valve Body Assembly Assemble](#).

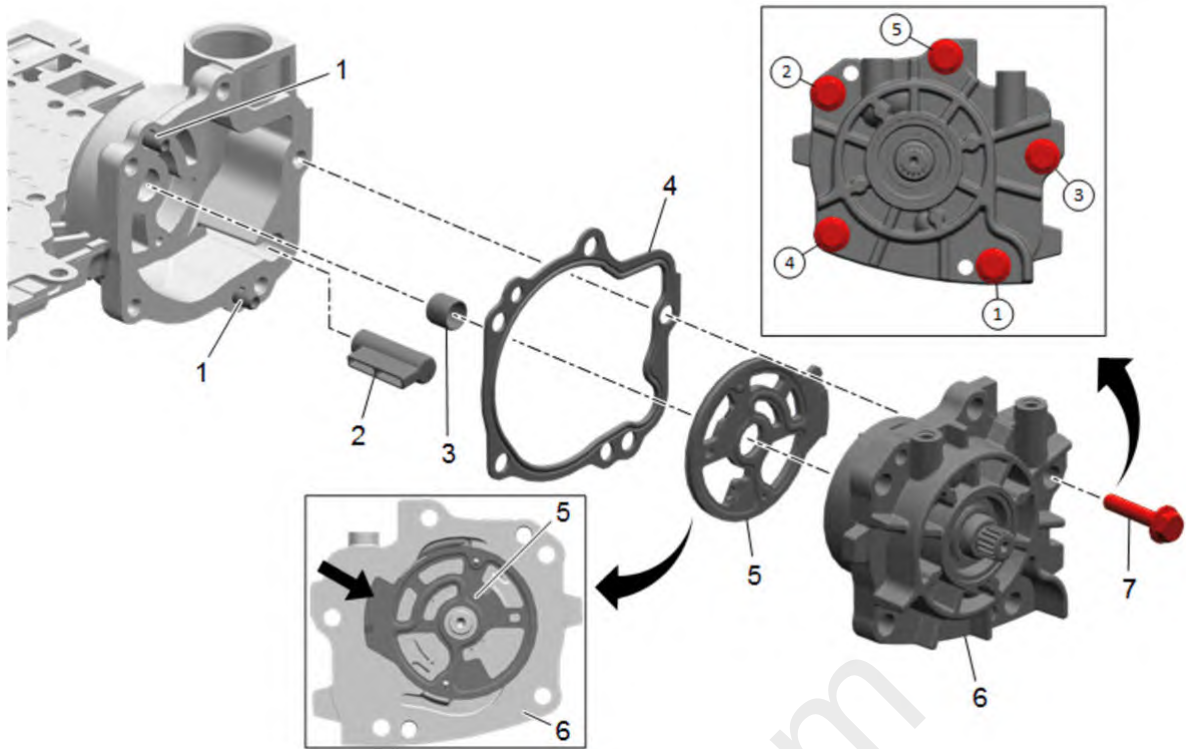


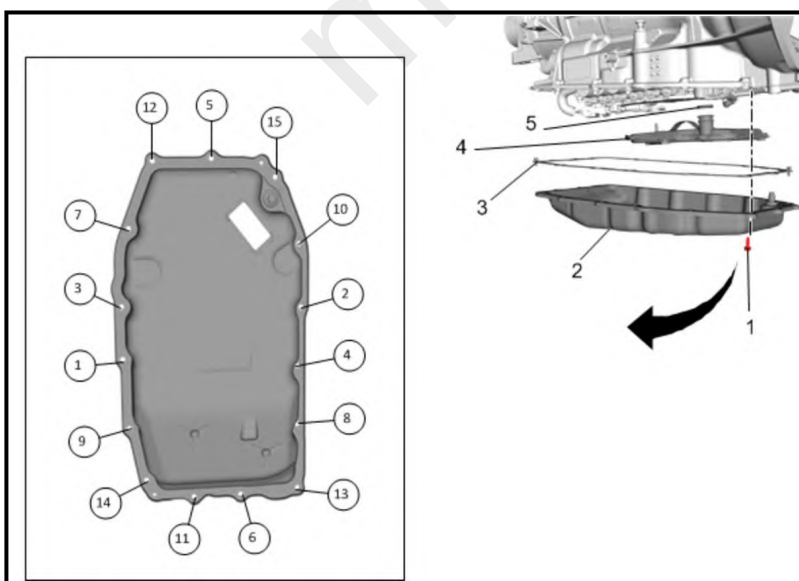
Fig. 6: Automatic Transmission Fluid Pump Assembly Bolts Tightening Sequence
 Courtesy of GENERAL MOTORS COMPANY

2. Install the control valve body. Refer to [Control Valve Body Replacement](#).
3. Reprogram the transmission. [Q77 Transmission Control Solenoid Valve Characterization Programming](#)

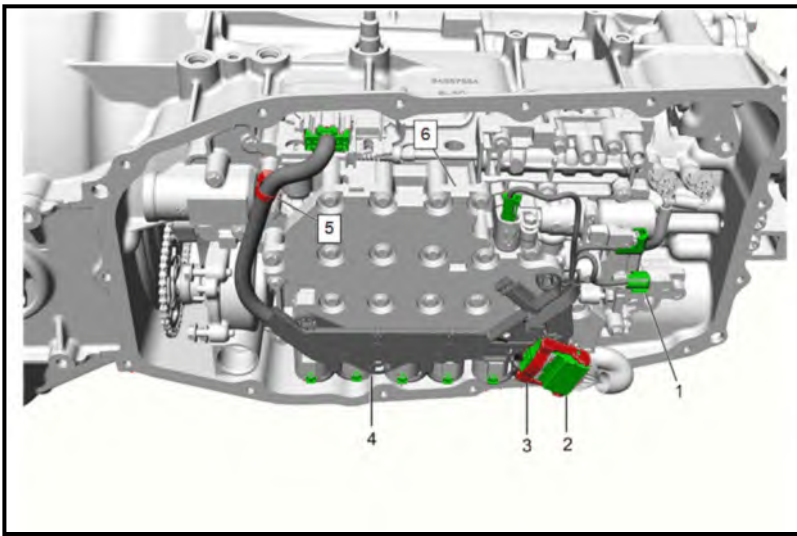
TRANSMISSION CONTROL WIRING HARNESS REPLACEMENT

Removal Procedure

1. Remove the transmission fluid filter (4). Refer to [Automatic Transmission Fluid, Fluid Pan and/or Filter Replacement](#).



2. Release the transmission control wiring harness connectors.



NOTE: Mark and identify electrical connectors before removal to ensure correct installation.

3. Carefully disconnect the wiring harness clips from the valve body and case.

NOTE: If replacing the wiring harness, the new wiring harness may not have electrical connector (2). If it does not have electrical connector (2), the control valve body will have to be removed.

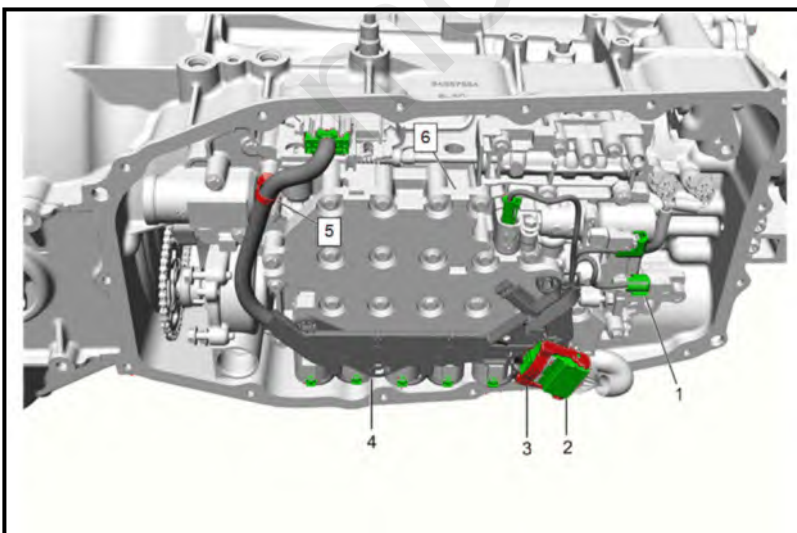
4. If necessary, remove the control valve body from the transmission. [Control Valve Body Replacement](#)

NOTE: The new replacement wiring harness may not have electrical connector (2). It will be a one piece harness.

5. Remove the transmission control wiring harness (4).

Installation Procedure

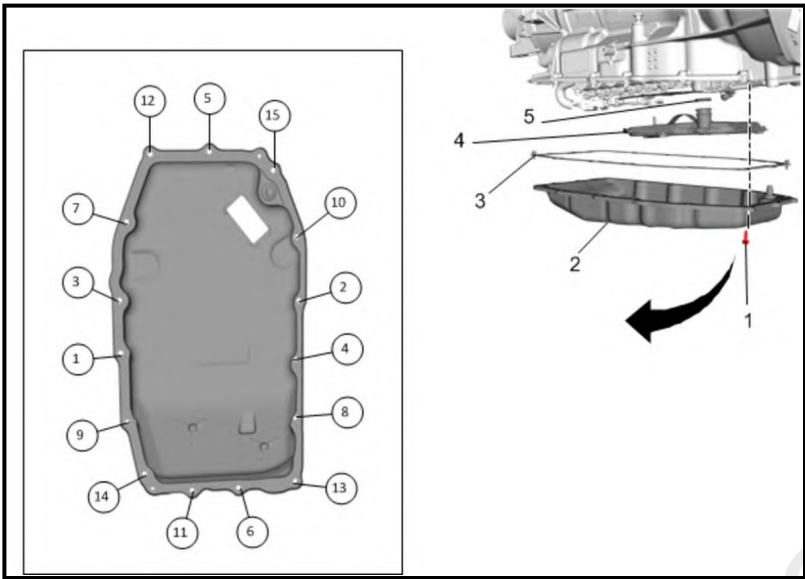
1. Install automatic transmission control wiring harness (4).



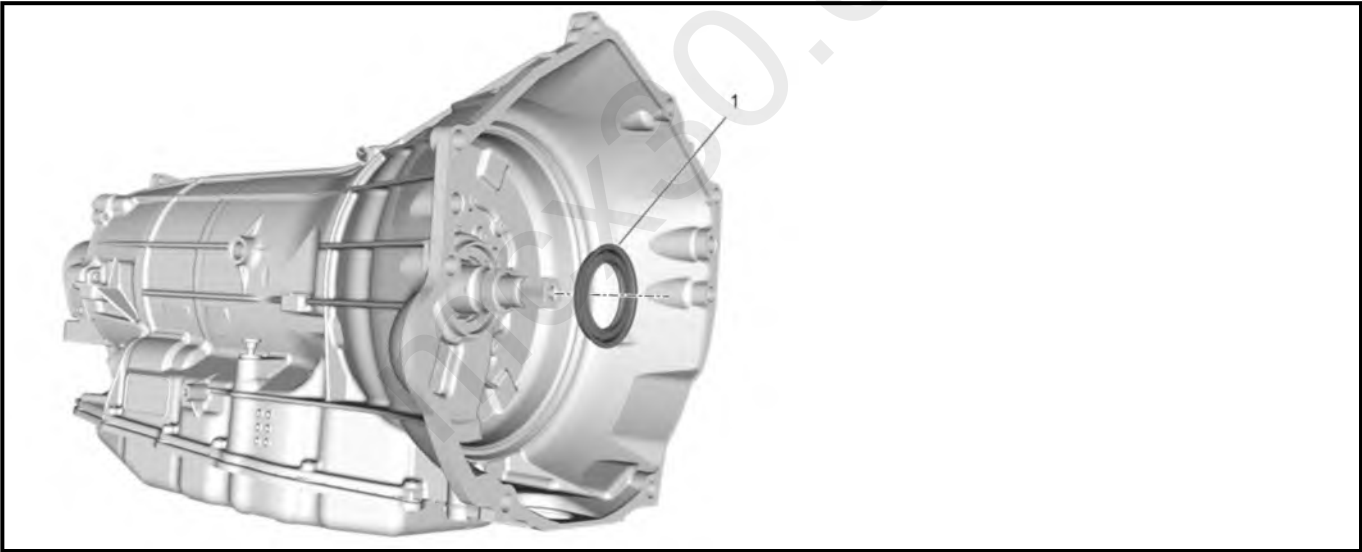
NOTE: The new replacement wiring harness may not have electrical connector (2). It will be a one piece harness.

NOTE: Be sure to remove any labels used to mark and identify the connectors during removal.

2. If necessary, install the control valve body to the transmission. [Control Valve Body Replacement](#)
3. Connect the wiring harness clips to the valve body and case.
4. Connect the transmission control wiring harness connectors.
5. If equipped, ensure the valve body connector retainer (3) is latched.
6. Install the transmission fluid filter (4). Refer to [Automatic Transmission Fluid, Fluid Pan and/or Filter Replacement](#).



TORQUE CONVERTER FLUID SEAL REPLACEMENT



NOTE: Callouts in the following chart represent components shown in graphic above.

Callout	Component Name
Preliminary Procedure	
Remove the torque converter. Refer to Torque Converter Replacement .	
1	Torque Converter Fluid Seal Assembly
	Special Tools • DT-45000 Seal Remover • DT-43772 Torque Converter Seal Installer
	For equivalent regional tools, refer to Special Tools .

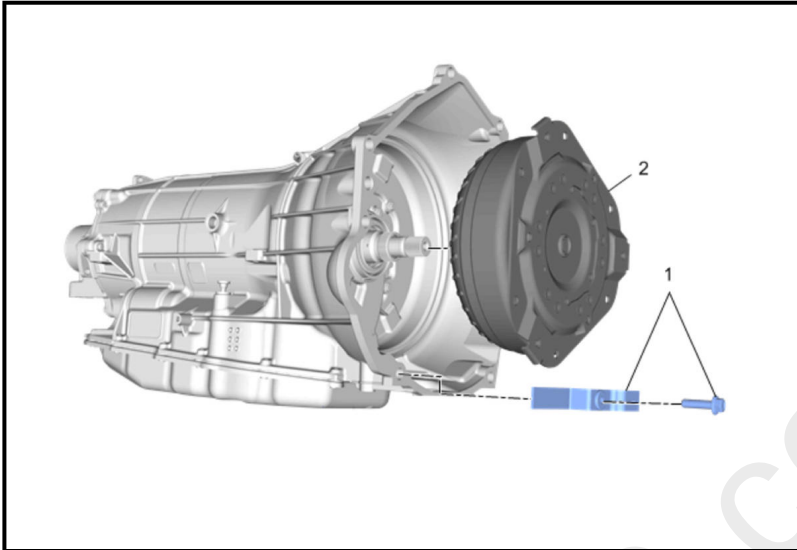
TORQUE CONVERTER REPLACEMENT

Special Tool

- **DT-21366** Converter Holding Strap
- For equivalent regional tools, refer to [Special Tools](#) .

Removal Procedure

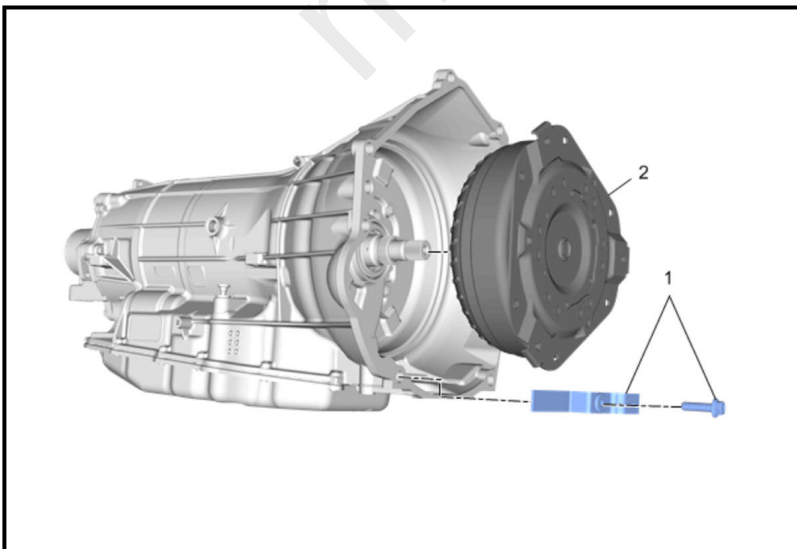
1. Remove the transmission. [Transmission Replacement \(2WD\)](#), or [Transmission Replacement \(4WD\)](#).
2. Remove the converter holding strap (1) **DT-21366** Converter Holding Strap from the transmission.



3. Place a drain pan under the front of the transmission.
4. Remove the torque converter (2) from the transmission.

Installation Procedure

1. To install the torque converter (2), spin the torque converter to engage the turbine shaft splines in the torque converter hub, the stator shaft splines in the stator race and to engage the drive flats on the converter pump hub with the oil pump drive gear.



NOTE: Lubricate the converter pump hub OD and the torque converter seal with clean transmission fluid.

NOTE: Use care not to damage the torque converter seal during the installation procedure.

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.

2. Install the converter holding strap (1) **D T-21366** Converter Holding Strap to the transmission.
3. Install the transmission. [Transmission Replacement \(2WD\)](#), or [Transmission Replacement \(4WD\)](#).

TRANSMISSION REPLACEMENT (2WD)

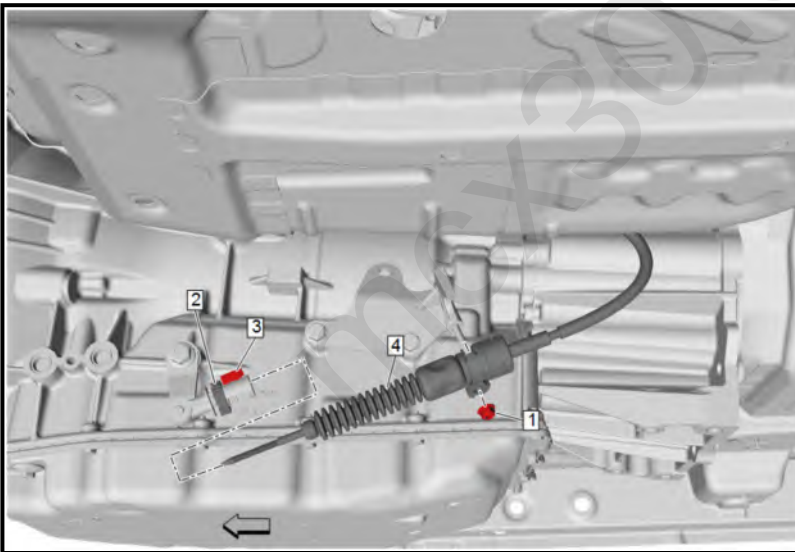
Special Tools

J-21366 Torque Converter Holding Strap

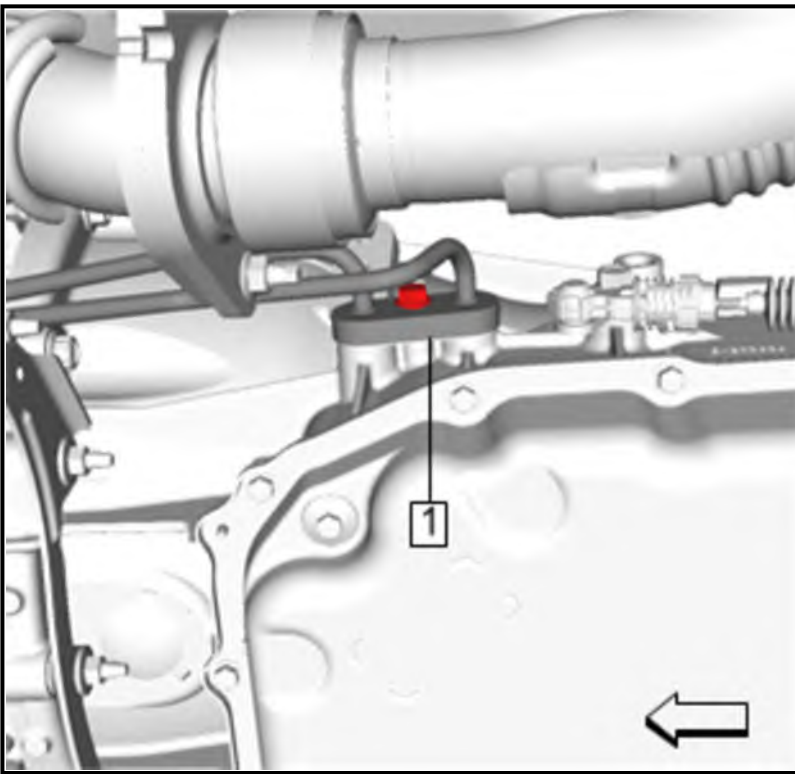
For equivalent regional tools, refer to [Special Tools](#) .

Removal Procedure

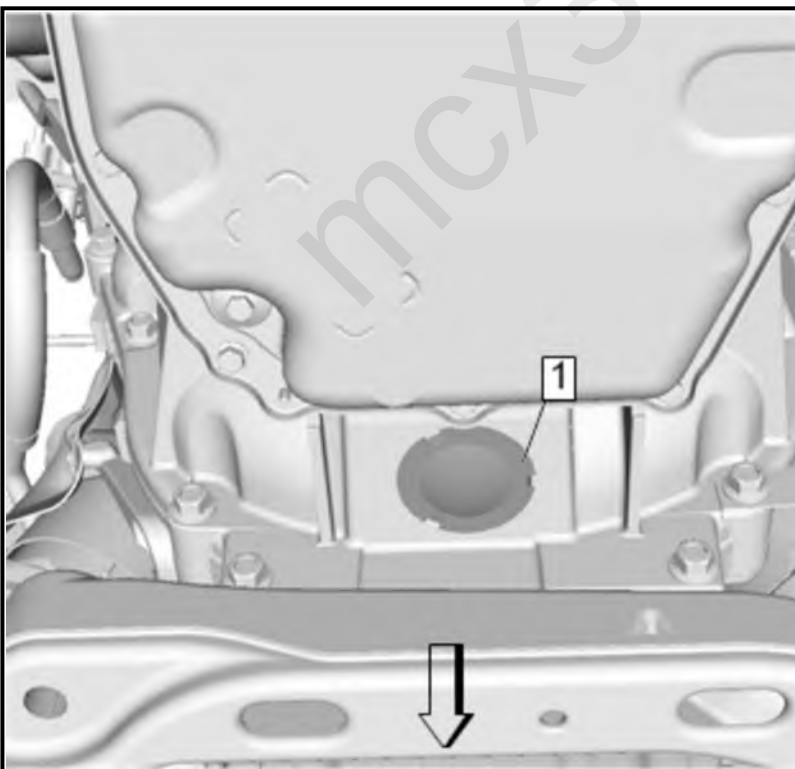
1. Three way catalytic converter - Remove - [Three-Way Catalytic Converter Replacement \(LGZ\)](#).
2. Propeller shaft - Remove - [Propeller Shaft Replacement \(M5T with 2WD\)](#).
3. Remove the range selector lever cable (4) from the transmission. [Range Selector Lever Cable Replacement](#)



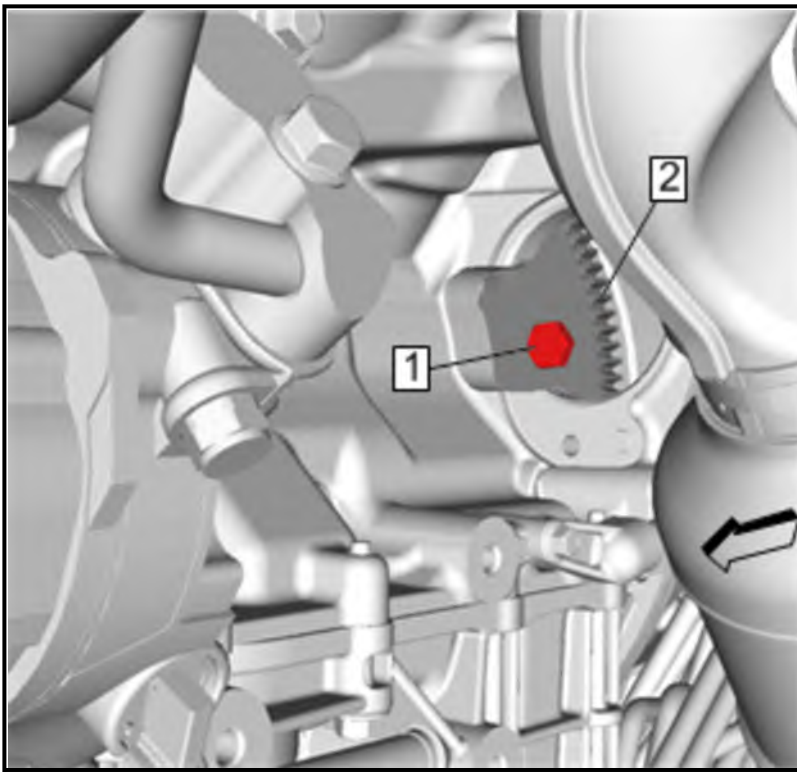
4. Place an oil drain pan under the transmission fluid cooler pipes (1).



5. Remove the transmission fluid cooler inlet and outlet pipes (1) from the transmission, and position aside, or remove from the vehicle as necessary. [Transmission Fluid Cooler Inlet and Outlet Pipe Replacement \(LGZ With M5T and 2WD\)](#)
6. Plug the open fluid ports to prevent fluid loss and contamination.
7. Starter - Remove - [Starter Replacement \(LGZ\)](#)
8. Transmission converter cover - Remove - [Transmission Converter Cover Replacement](#)
9. Remove the transmission close out plug (1).



10. Mark the torque converter to flexplate orientation to ensure proper realignment.
11. Repeat the following steps for all torque converter bolts (1):

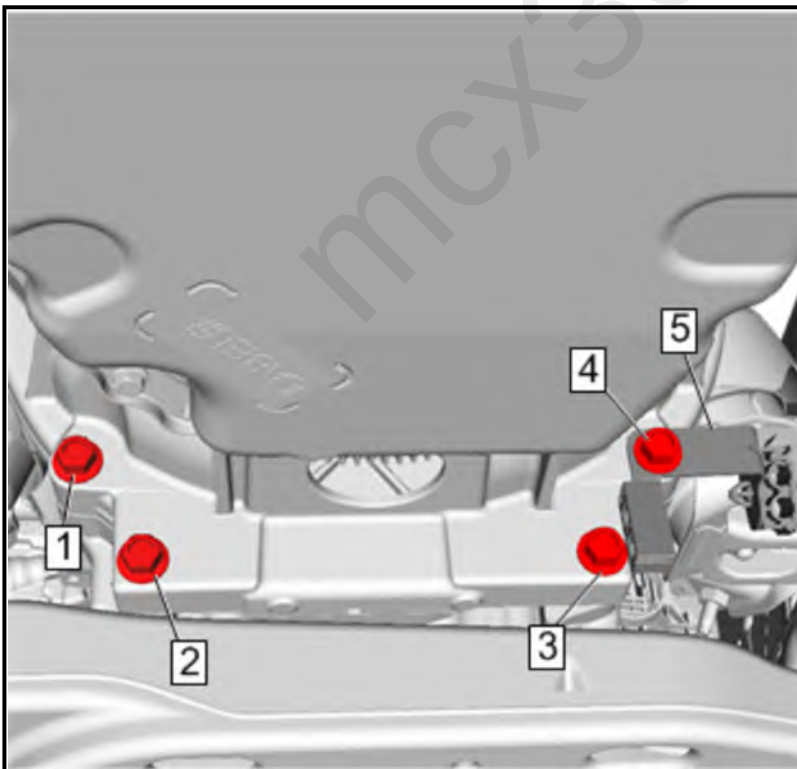


1. Rotate the harmonic balancer center bolt clockwise ONLY, in order to align the torque converter bolt with the starter opening.
2. Remove and DISCARD the torque converter bolt.

12. Reinstall the left engine mount and bracket.

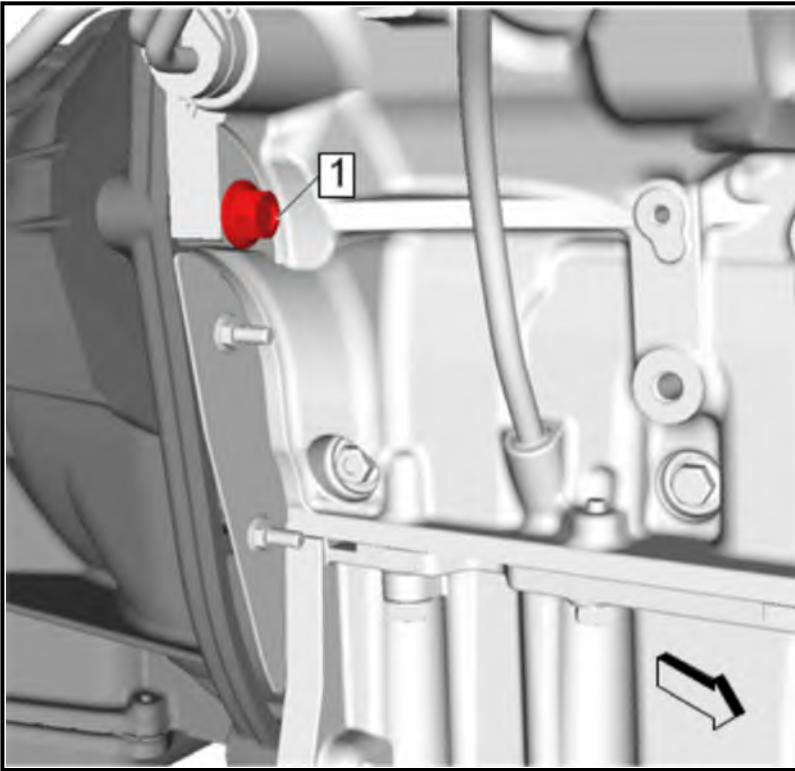
13. Lower the engine with the engine support fixture and install the left mount bolts to the frame.

14. Remove the lower transmission to engine bolts (1, 2, 3, 4).

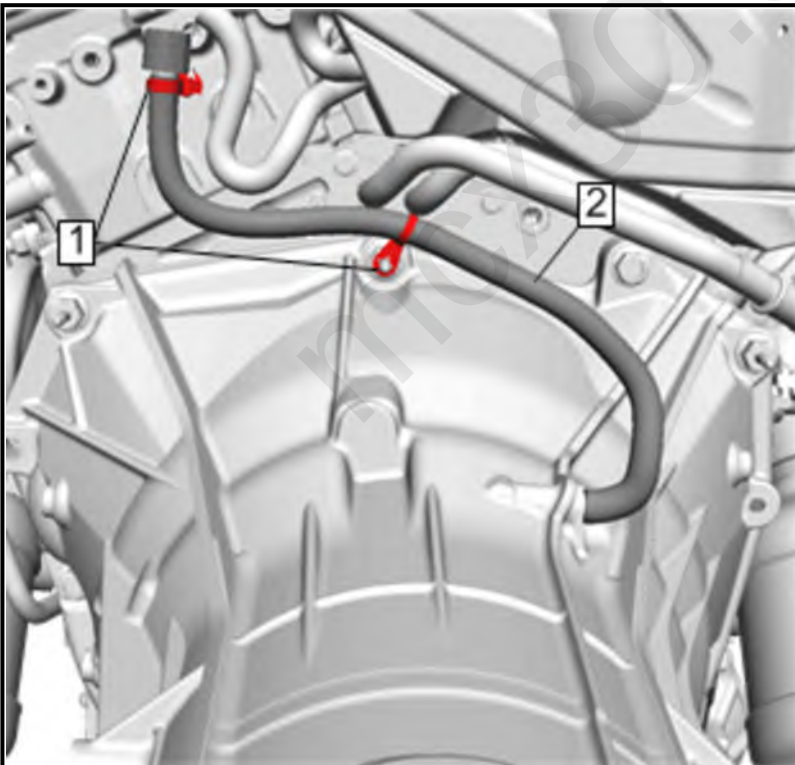


15. Remove the transmission fluid cooler inlet and outlet pipe retainer (5).

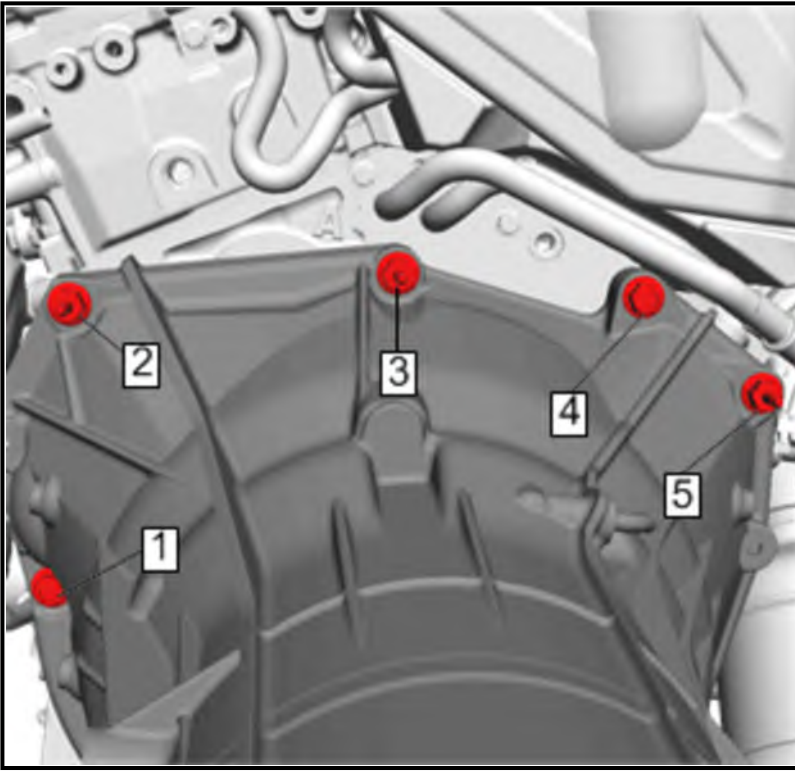
16. Remove the right side engine to transmission bolt.



17. Support the transmission with a suitable transmission jack.
18. Transmission mount - Remove - [Transmission Mount Replacement \(Two Wheel Drive\)](#)
19. Tilt the transmission downward just enough to gain access to the upper transmission fasteners.
20. Disconnect the transmission vent hose retainers (1).



21. Disconnect the electrical wiring harness retainers from the transmission to engine fasteners and from the transmission case.
22. Disconnect the main transmission electrical connector.
23. Position a suitable block of wood between the front of the engine and the frame.
24. Using a suitable strap, secure the transmission to the transmission jack.
25. Remove the transmission to engine bolts (1, 2, 3, 4, 5).



26. Pull the transmission straight back.
27. Install the **J-21366** strap onto the transmission bell housing to retain the torque converter.
28. Remove the transmission from the vehicle.
29. Transfer components as necessary.
30. Inspect the transmission fluid cooler, hoses, and pipes for leaks or damage. Replace as necessary.

Installation Procedure

1. Remove the **J-21366** strap from the transmission bell housing.
2. Install the transmission to the vehicle.
3. Install the six transmission to engine bolts (1, 2, 3, 4, 5) and tighten to 58 N.m (43 lb ft).

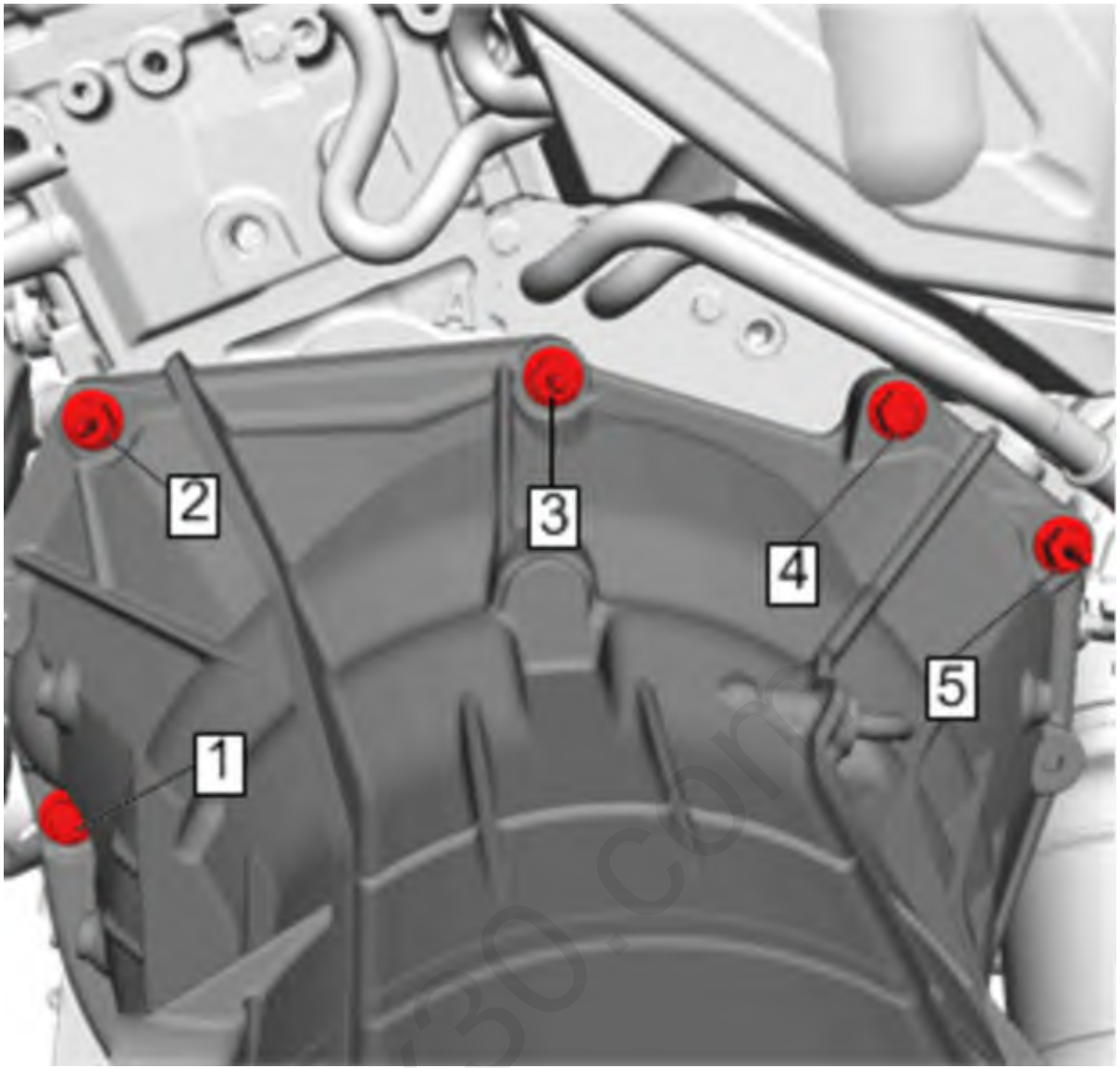
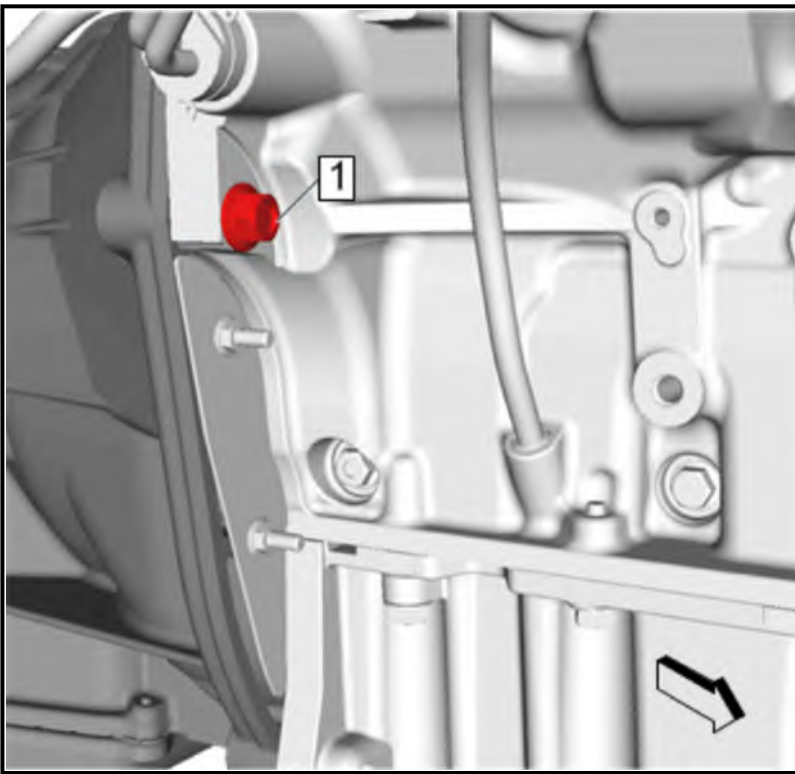


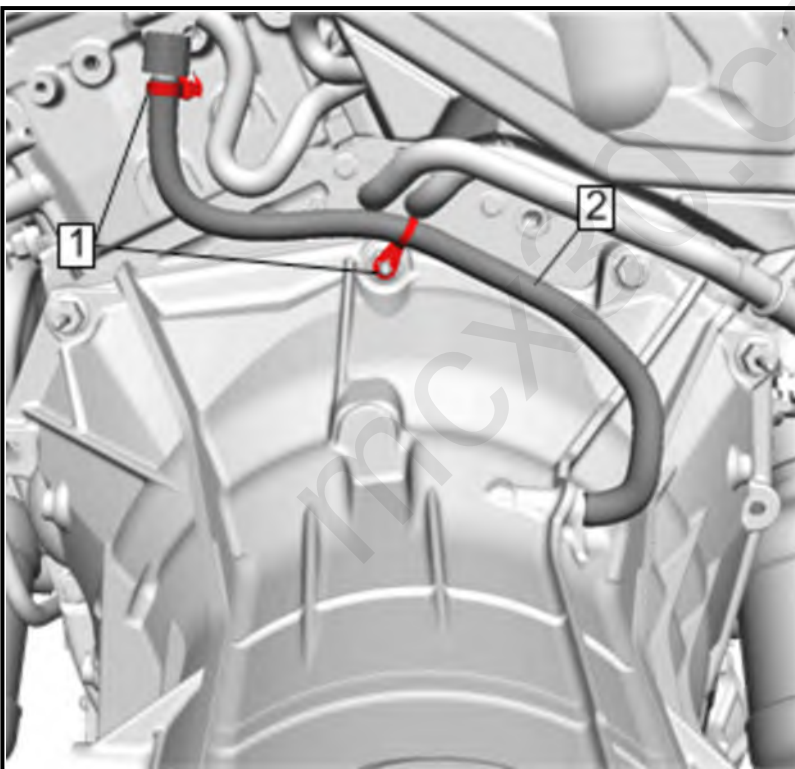
Fig. 7: Transmission To Engine Bolts Tightening Sequence
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to **Fastener Caution** .

4. Install the right side engine to transmission bolt and tighten to 58 N.m (43 lb ft).



5. Connect the transmission vent hose retainers (1).



6. Connect the electrical wiring harness retainers to the transmission to engine fasteners and to the transmission case.

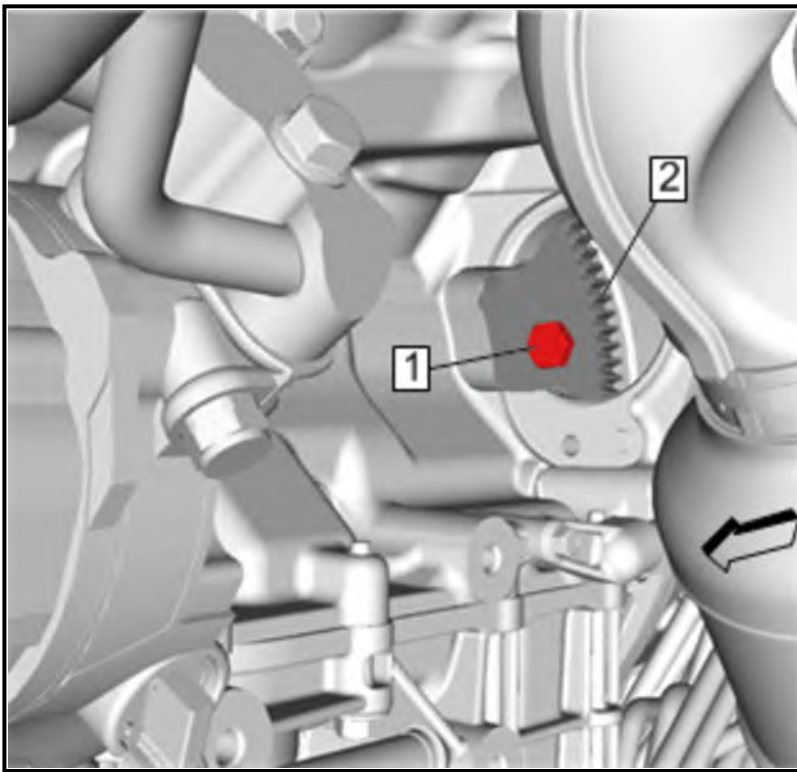
7. Transmission mount - Install - [Transmission Mount Replacement \(Two Wheel Drive\)](#)

8. Remove the transmission jack from under the vehicle.

9. Remove the block of wood.

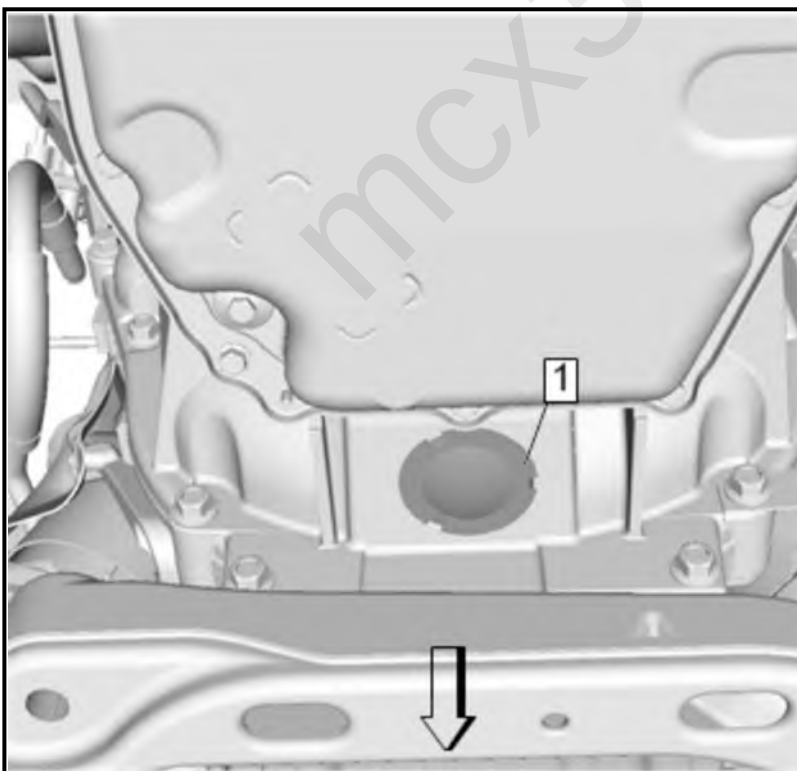
10. Align the torque converter to flexplate orientation marks made during the removal procedure.

11. Complete the following steps for all torque converter bolts (1):

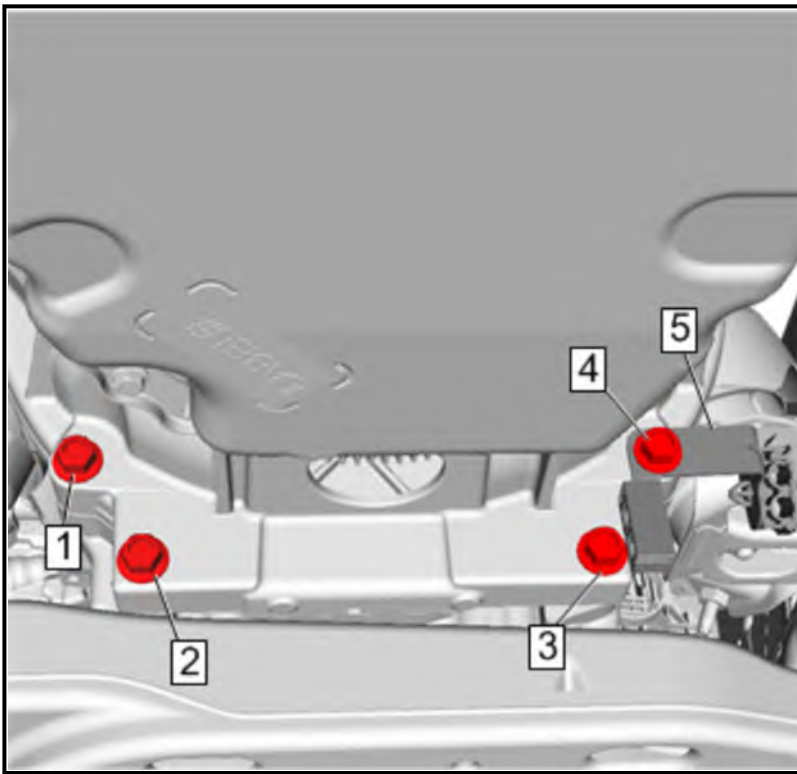


NOTE: Torque converter bolts are self-locking and must be replaced with NEW torque converter bolts every time the bolts are removed.

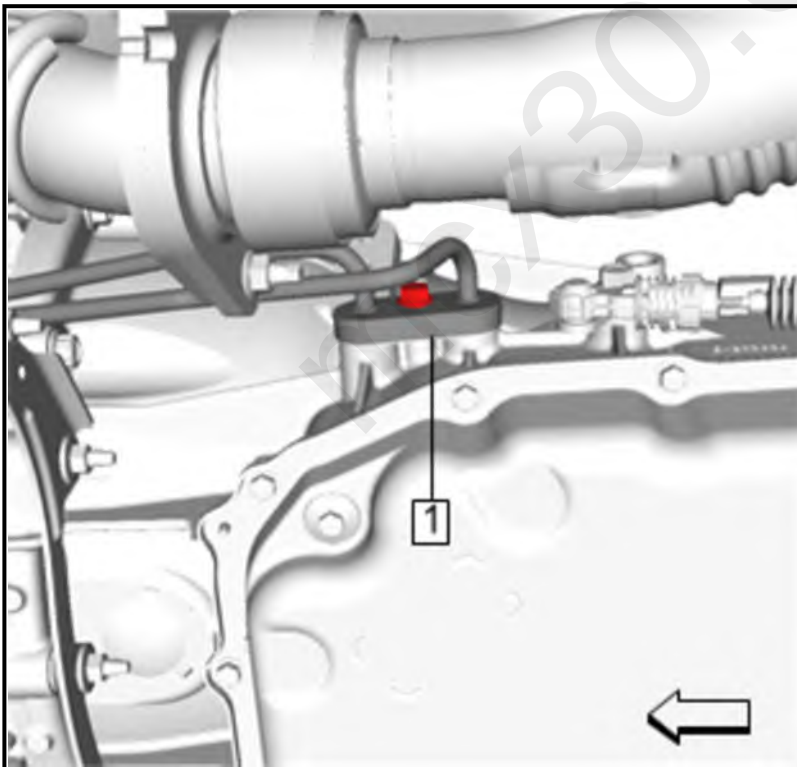
1. Rotate the harmonic balancer center bolt clockwise ONLY, in order to align the torque converter bolt holes in the flexplate with the starter opening in the engine block.
2. Install all NEW torque converter bolts (1) and tighten to 63 N.m (46 lb ft).
12. Install the transmission close out plug (1).



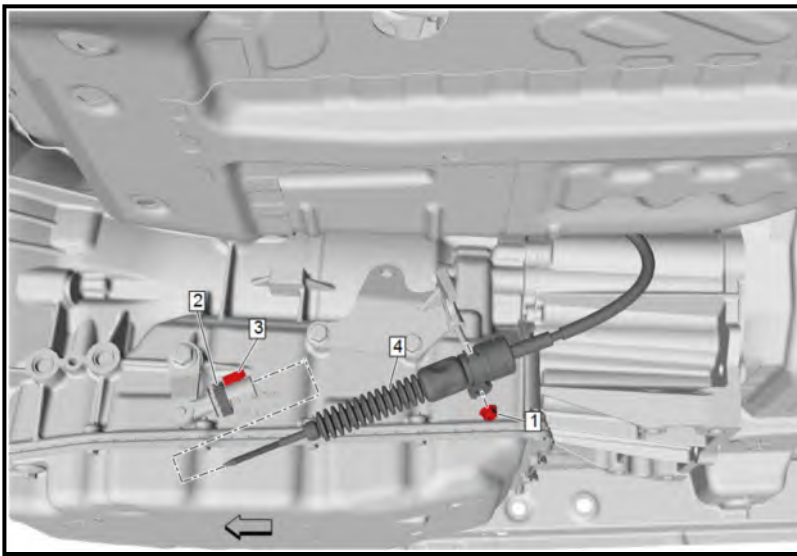
13. Transmission converter cover - Install - [Transmission Converter Cover Replacement](#)
14. Starter motor - Install - [Starter Replacement \(LGZ\)](#)
15. Position the transmission fluid cooler inlet and outlet pipe retainer (5) to the transmission.



16. Install the lower transmission to engine bolts (1, 2, 3, 4) and tighten to 58 N.m (43 lb ft).
17. Install the five retaining nuts (1) and tighten to 22 N.m (16 lb ft).
18. Install the transmission fluid cooler inlet and outlet pipe (1) to the transmission. [Transmission Fluid Cooler Inlet and Outlet Pipe Replacement \(LGZ With M5T and 2WD\)](#)



19. Connect the wiring harness retainers and connectors to the transmission.
20. Connect the main transmission electrical connector.
21. Install the range selector cable (4) to the transmission. [Range Selector Lever Cable Replacement](#)



22. Adjust the cable. [Range Selector Lever Cable Adjustment](#)
23. Propeller shaft - Install - [Propeller Shaft Replacement \(M5T with 2WD\)](#)
24. Three way catalytic converter - Install - [Three-Way Catalytic Converter Replacement \(LGZ\)](#) .
25. Check the transmission fluid level and fill if necessary. [Transmission Fluid Level and Condition Check](#)
26. Lower the vehicle.
27. Install the intake manifold. [Intake Manifold Replacement](#)
28. Perform the solenoid valve characterization. [Solenoid Valve Characterization Reprogramming](#)

NOTE:

The Service Fast 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:

The service fast learn procedure must be performed when any of the following repairs has been made to the transmission.

- Pressure regulating solenoid replacement
- Valve body repair or replacement
- Any service/repair in response to a shift quality concern
- Any internal transmission service, repair, overhaul, or replacement
- Torque converter replacement
- TCM replacement
- Transmission assembly replacement

29. Perform the service fast learn procedure. [Transmission Service Fast Learn Procedure](#)

TRANSMISSION REPLACEMENT (4WD)

Special Tools

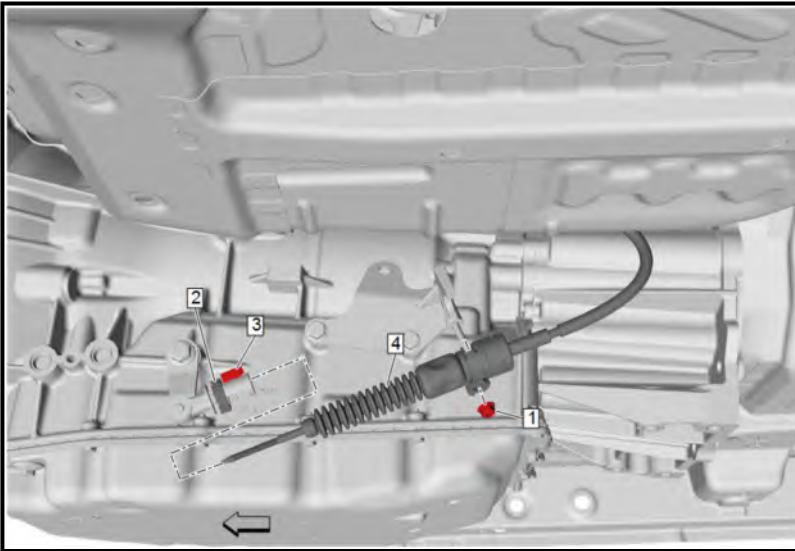
DT-21366 Torque Converter Holding Strap

Equivalent regional tools: [Special Tools](#)

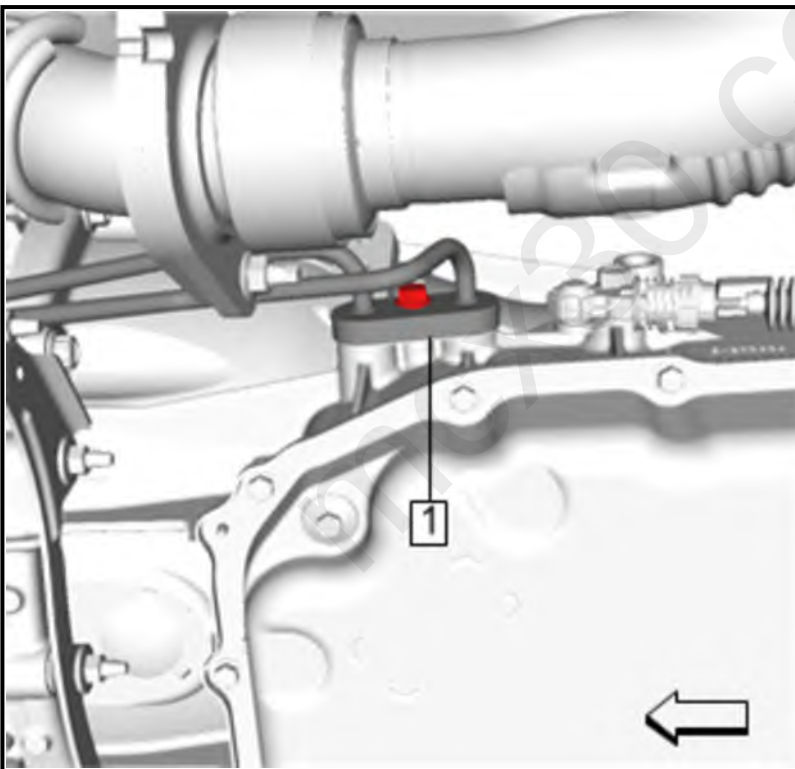
Removal Procedure

1. Three way catalytic converter - Remove - [Three-Way Catalytic Converter Replacement \(LGZ\)](#).

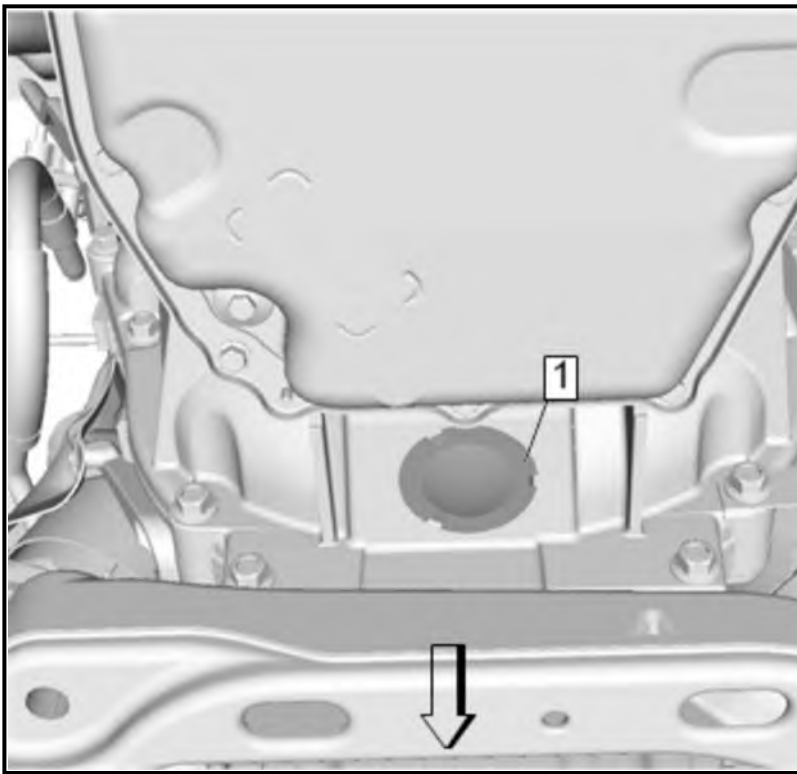
2. Transfer case - Remove - [Transfer Case Assembly Replacement \(NQ7\)](#) , or [Transfer Case Assembly Replacement \(NQ6\)](#)
3. Remove the range selector lever cable (4) from the transmission. [Range Selector Lever Cable Replacement](#)



4. Place an oil drain pan under the transmission fluid cooler pipes (1).



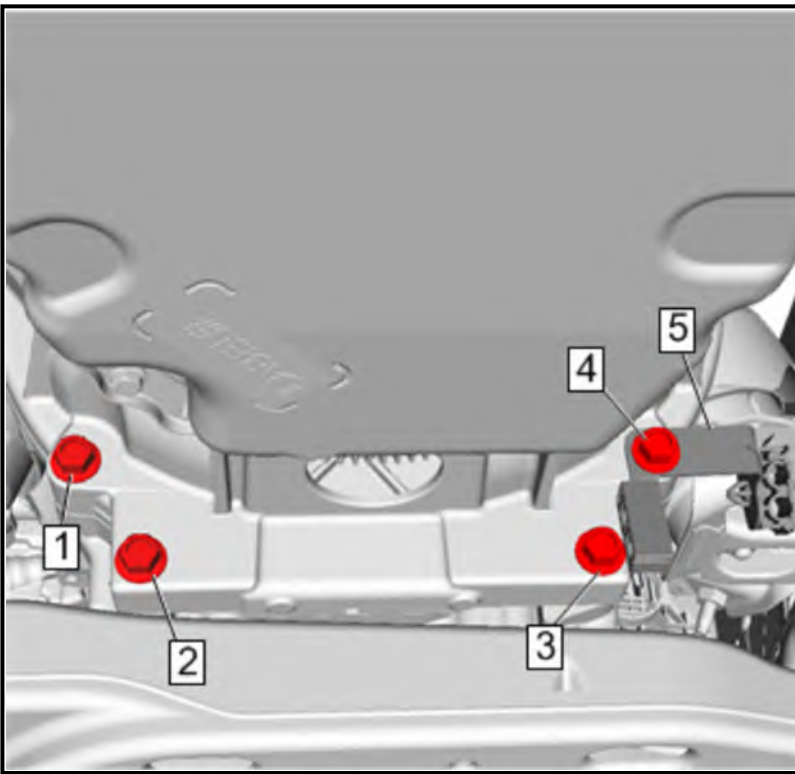
5. Remove the transmission fluid cooler inlet and outlet pipes (1) from the transmission, and position aside, or remove from the vehicle as necessary. [Transmission Fluid Cooler Inlet and Outlet Pipe Replacement \(LGZ With M5T and 4WD\)](#)
6. Plug the open fluid ports to prevent fluid loss and contamination.
7. Starter - Remove - [Starter Replacement \(LGZ\)](#)
8. Transmission converter cover - Remove - [Transmission Converter Cover Replacement](#)
9. Remove the transmission close out plug (1).



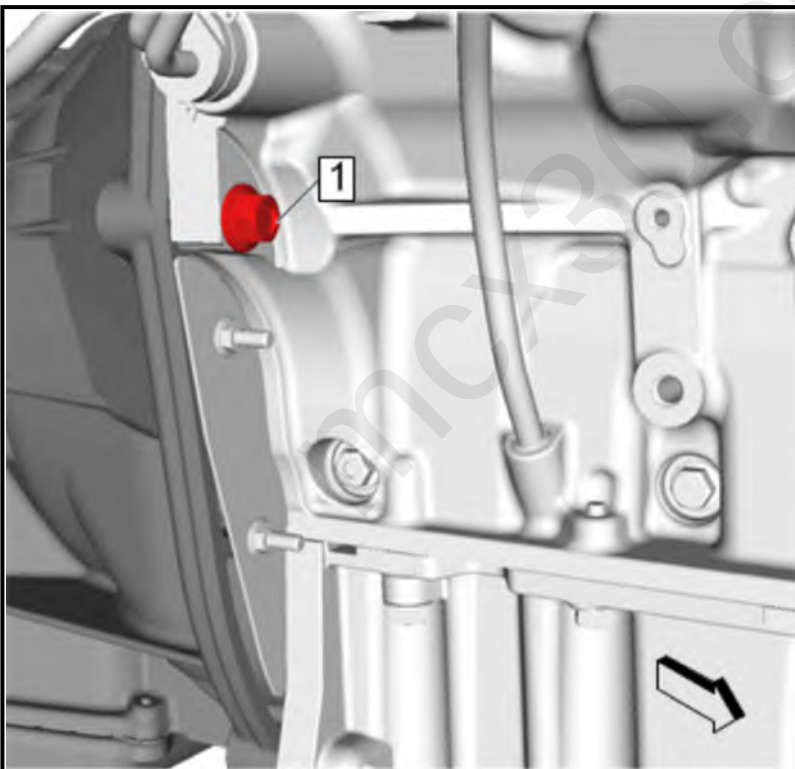
10. Mark the torque converter to flexplate orientation to ensure proper realignment.
11. Repeat the following steps for all torque converter bolts (1):



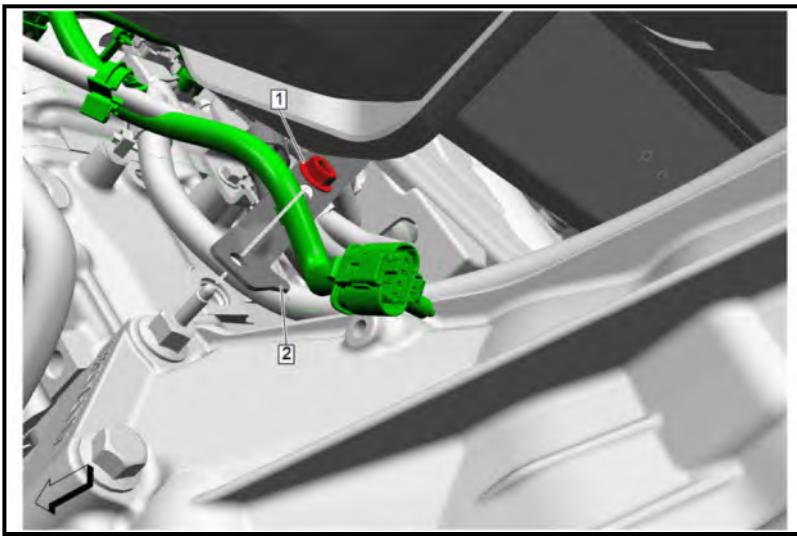
1. Rotate the harmonic balancer center bolt clockwise ONLY, in order to align the torque converter bolt with the starter opening.
 2. Remove and DISCARD the torque converter bolt.
12. Lower the engine with the engine support fixture.
 13. Remove the lower transmission to engine bolts (1, 2, 3, 4).



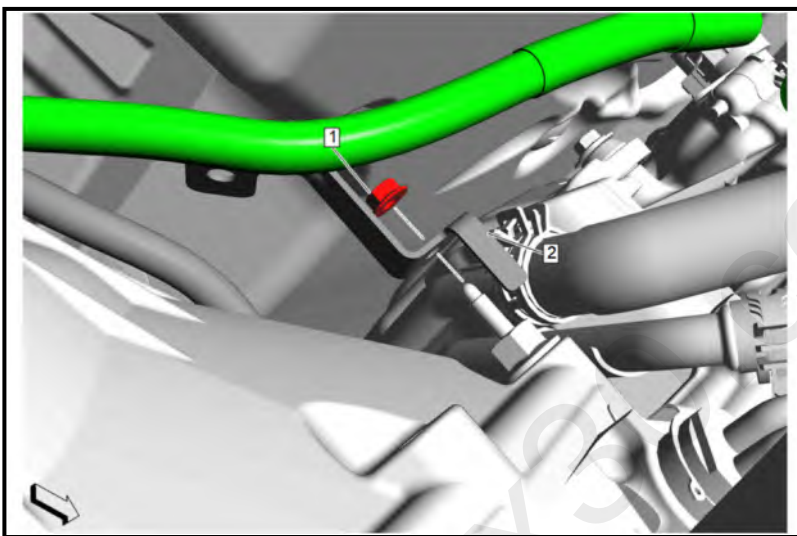
14. Remove the transmission fluid cooler inlet and outlet pipe retainer (5).
15. Remove the right side engine to transmission bolt (1).



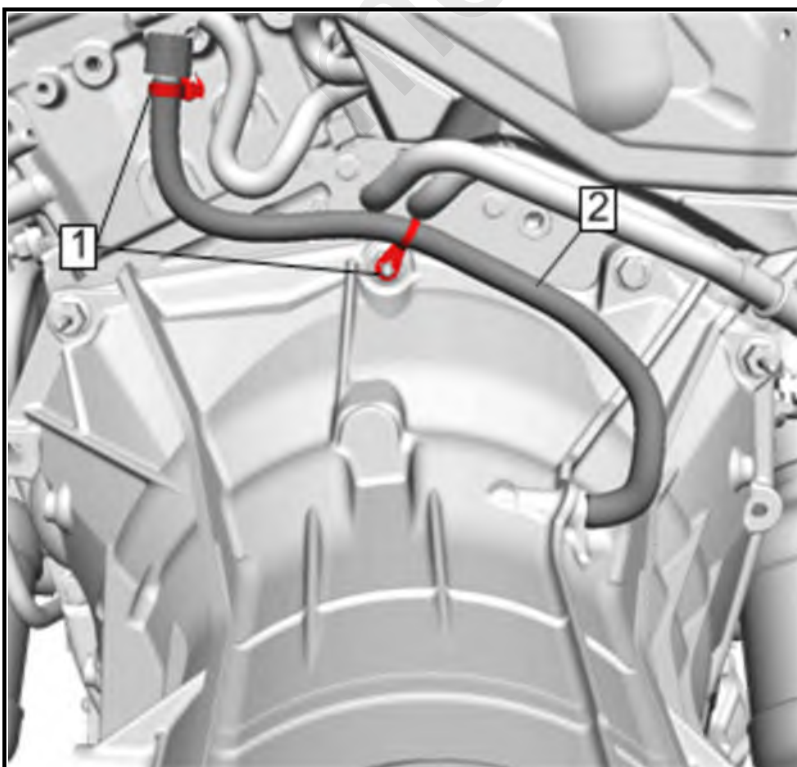
16. Support the transmission with a suitable transmission jack.
17. Transmission mount - Remove - [**Transmission Mount Replacement \(Four Wheel Drive\)**](#)
18. Tilt the transmission downward just enough to gain access to the upper transmission fasteners.
19. Remove the fuel feed and return pipe clip bracket nut (1) from the transmission to engine stud, and reposition the fuel feed and return pipe clip bracket (2).



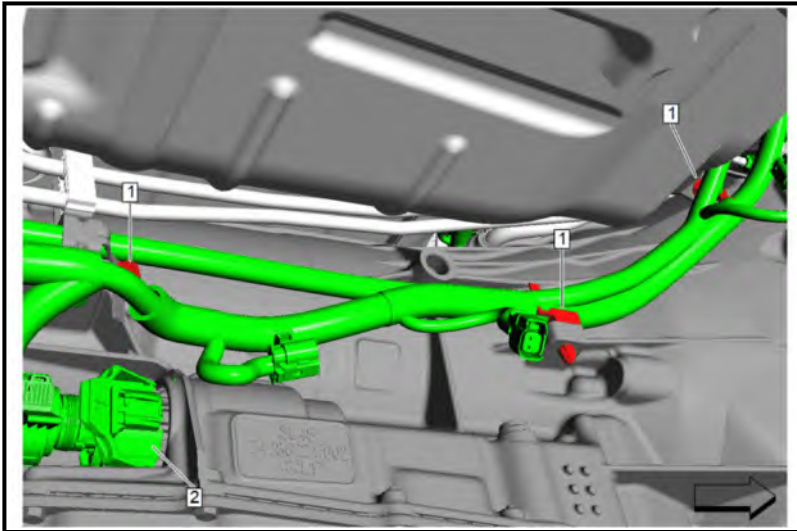
20. Remove the fuel feed and return pipe clip bracket nut (1) from the transmission to engine stud, and reposition the fuel feed and return pipe clip bracket (2).



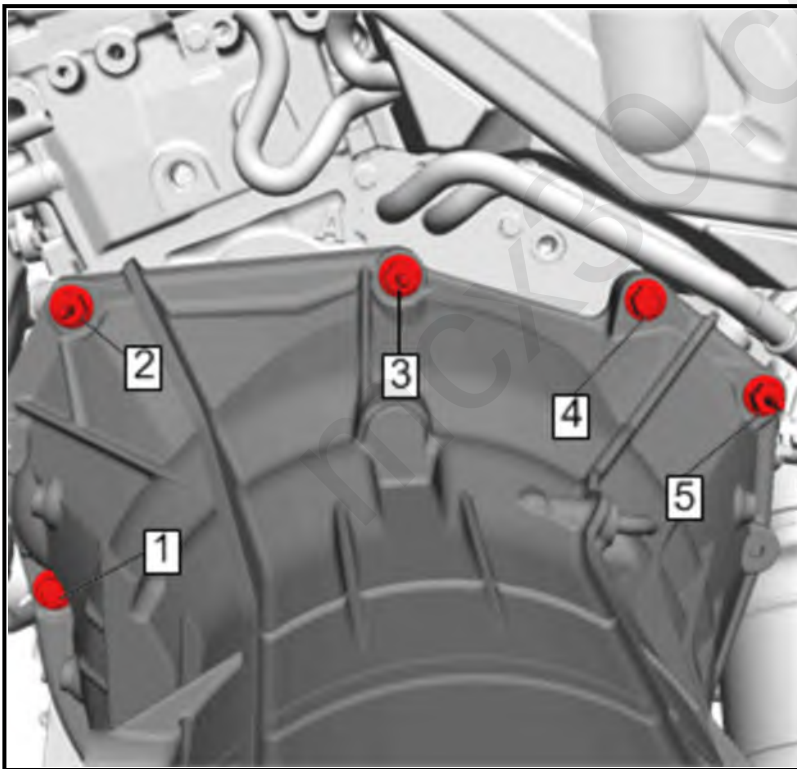
21. Disconnect the vent hose (2) from the transmission vent tube.



22. Disconnect the vent hose retainer (1) from the bell housing stud.
23. Disconnect the 3 electrical wiring harness retainers (1) from the transmission case.



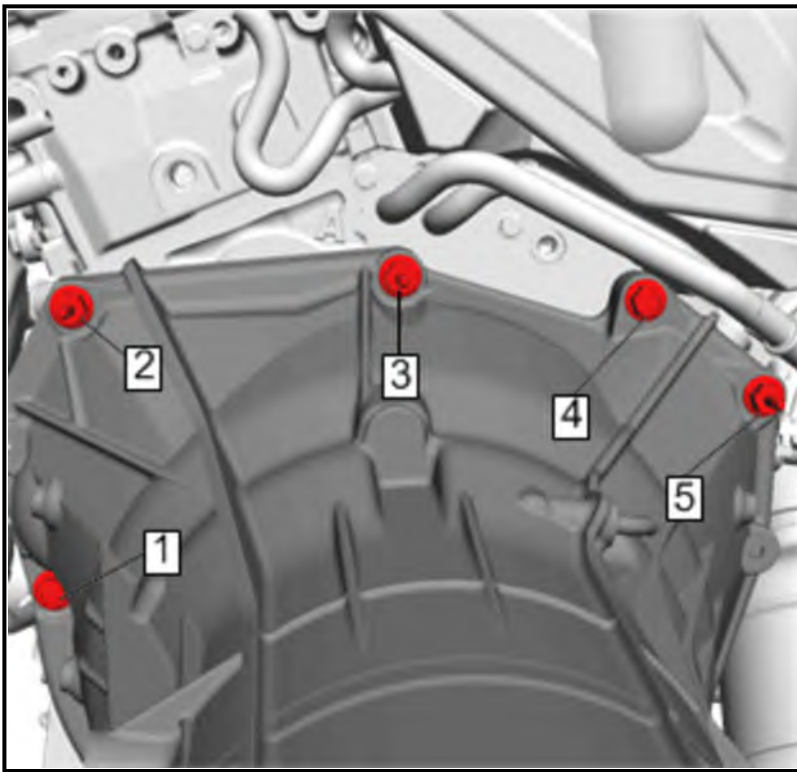
24. Disconnect the main transmission electrical connector (2).
25. Position a suitable block of wood between the front of the engine and the frame.
26. Using a suitable strap, secure the transmission to the transmission jack.
27. Remove the transmission to engine bolts (1, 2, 3, 4, 5).



28. Pull the transmission straight back.
29. Install the **DT-21366** strap onto the transmission bell housing to retain the torque converter.
30. Remove the transmission from the vehicle.
31. Transfer components as necessary.

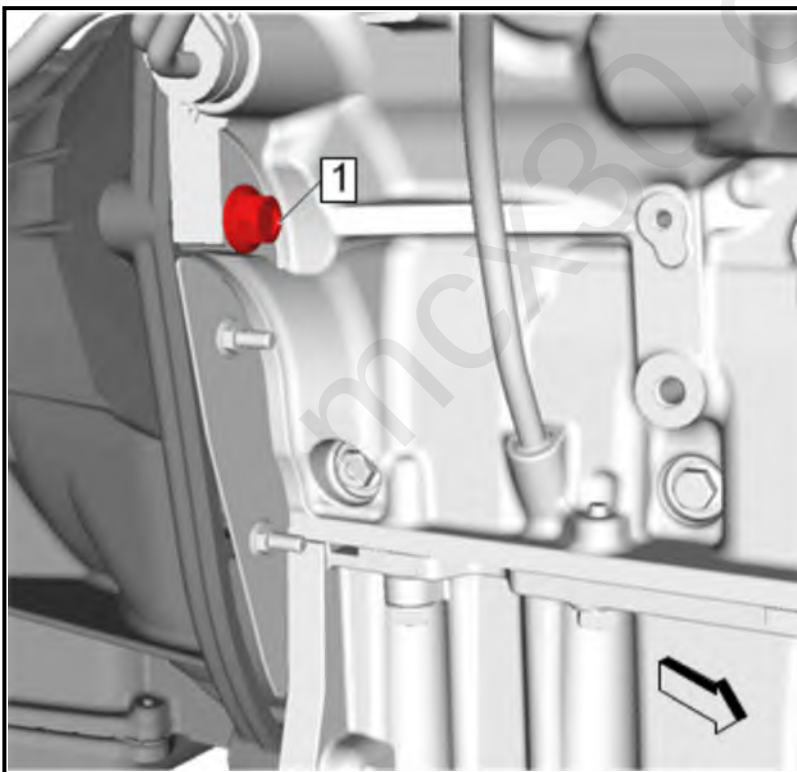
Installation Procedure

1. Remove the **DT-21366** strap from the transmission bell housing.
2. Install the transmission to the vehicle.
3. Install the transmission to engine bolts (1, 2, 3, 4, 5) and tighten to 58 N.m (43 lb ft).

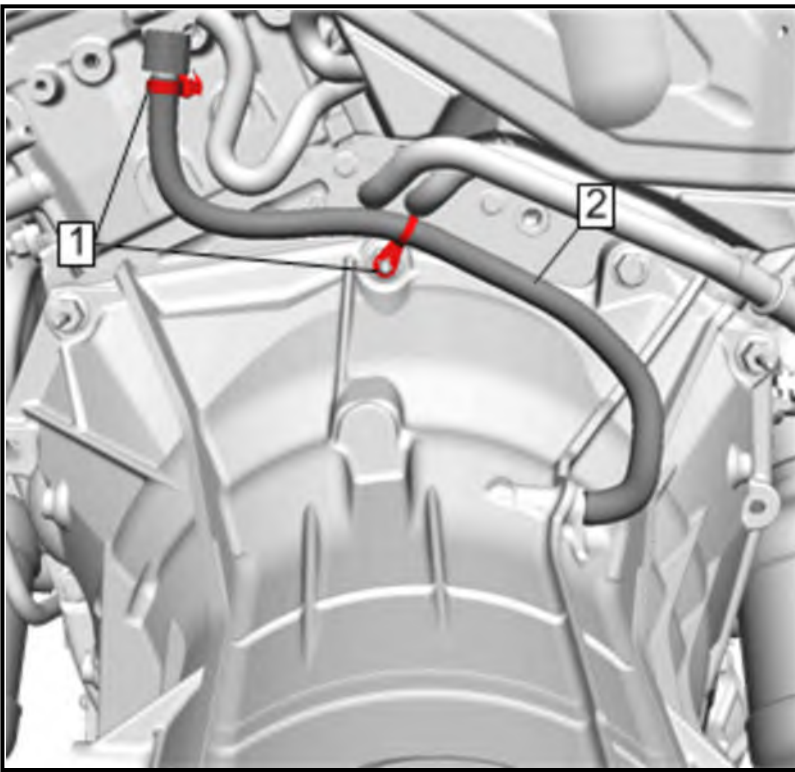


CAUTION: Refer to [Fastener Caution](#) .

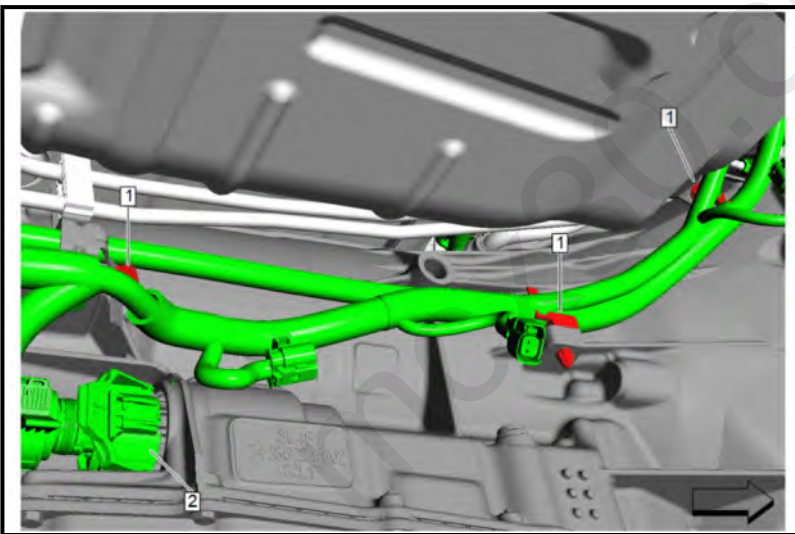
4. Install the right side engine to transmission bolt and tighten to 58 N.m (43 lb ft).



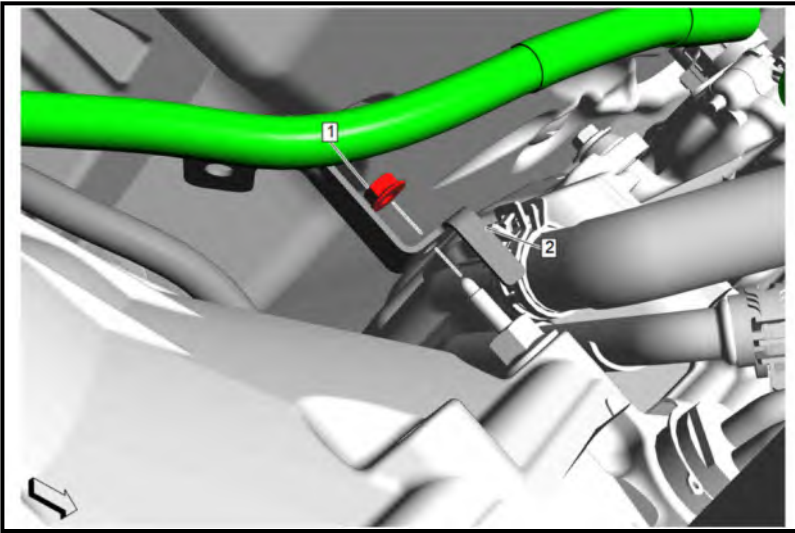
5. Connect the vent hose (2) to the transmission vent tube.



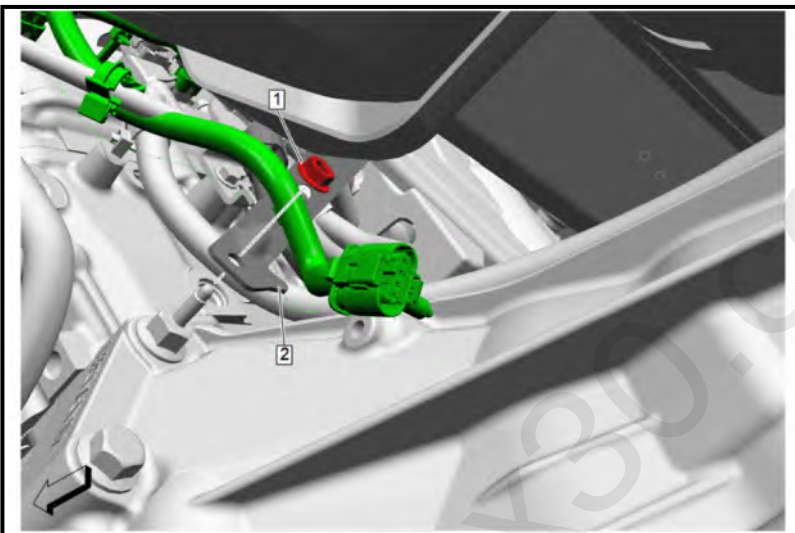
6. Connect the vent hose retainer (1) to the bell housing stud.
7. Connect the 3 electrical wiring harness retainers (1) to the transmission case.



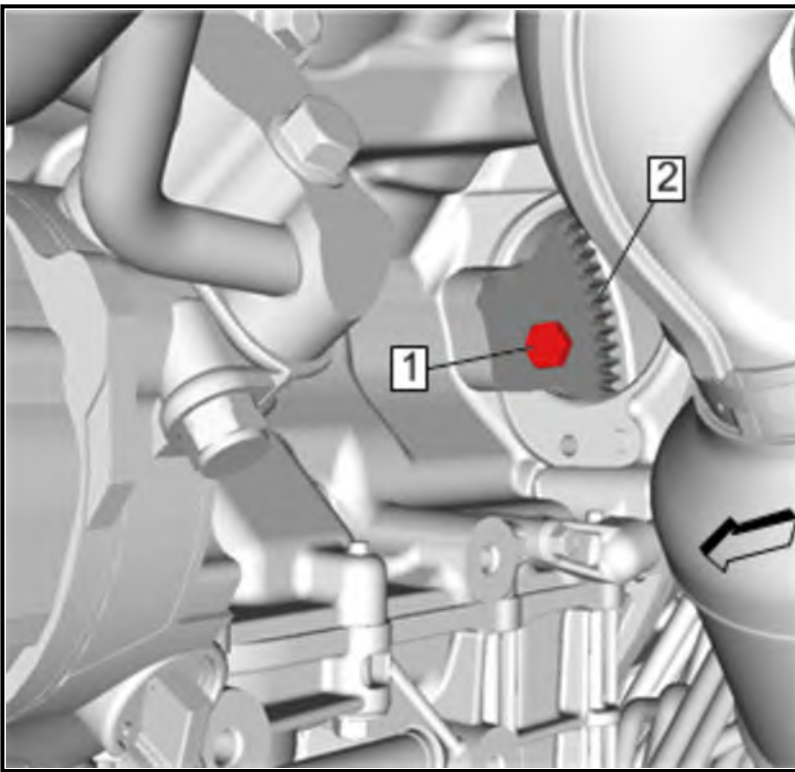
8. Connect the main transmission electrical connector (2).
9. Install the fuel feed and return pipe clip bracket (2) to the transmission to engine stud.



10. Install and tighten the fuel feed and return pipe clip bracket nut (1). 7 N.m (62 lb in)
11. Install the fuel feed and return pipe clip bracket (2) from the transmission to engine stud.

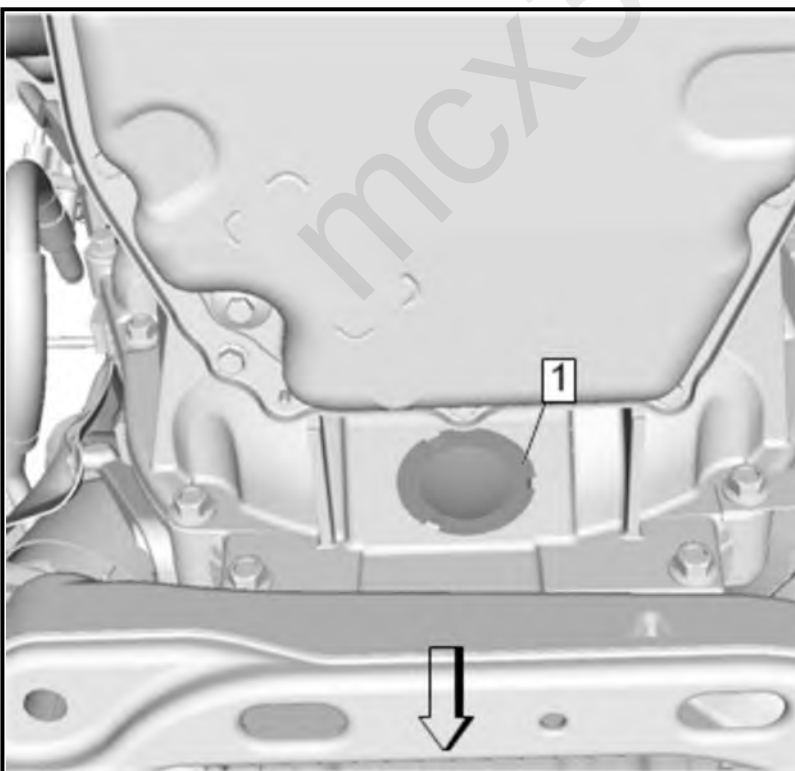


12. Install and tighten the fuel feed and return pipe clip bracket nut (1). 7 N.m (62 lb in)
13. Install the fuel feed and return pipe clip bracket bolt to the right side of the transmission and tighten to 22 N.m (16 lb ft).
14. Install the fuel feed return pipe bracket retaining nut and tighten to 50 N.m (37 lb ft).
15. Transfer case - Install - [Transfer Case Assembly Replacement \(NQ7\)](#) , or [Transfer Case Assembly Replacement \(NQ6\)](#)
16. Transmission mount - Install - [Transmission Mount Replacement \(Four Wheel Drive\)](#)
17. Remove the transmission jack from under the vehicle.
18. Remove the block of wood.
19. Align the torque converter to flexplate orientation marks made during the removal procedure.
20. Complete the following steps for all torque converter bolts (1):

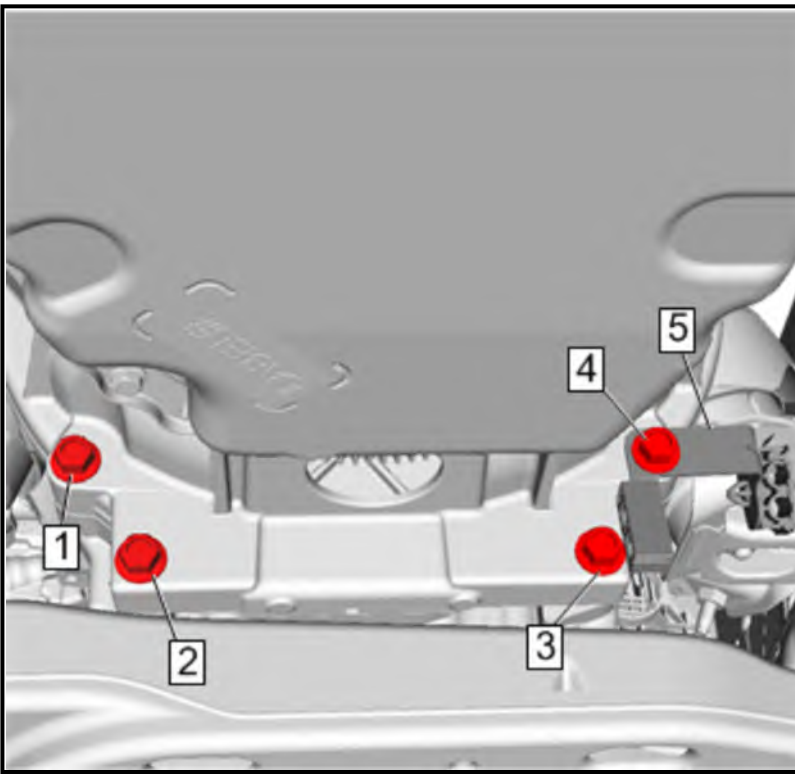


NOTE: Torque converter bolts are self-locking and must be replaced with NEW torque converter bolts every time the bolts are removed.

1. Rotate the harmonic balancer center bolt clockwise ONLY, in order to align the torque converter bolt holes in the flexplate with the starter opening in the engine block.
 2. Install all NEW torque converter bolts (1) and tighten to 63 N.m (46 lb ft).
21. Install the transmission close out plug (1).

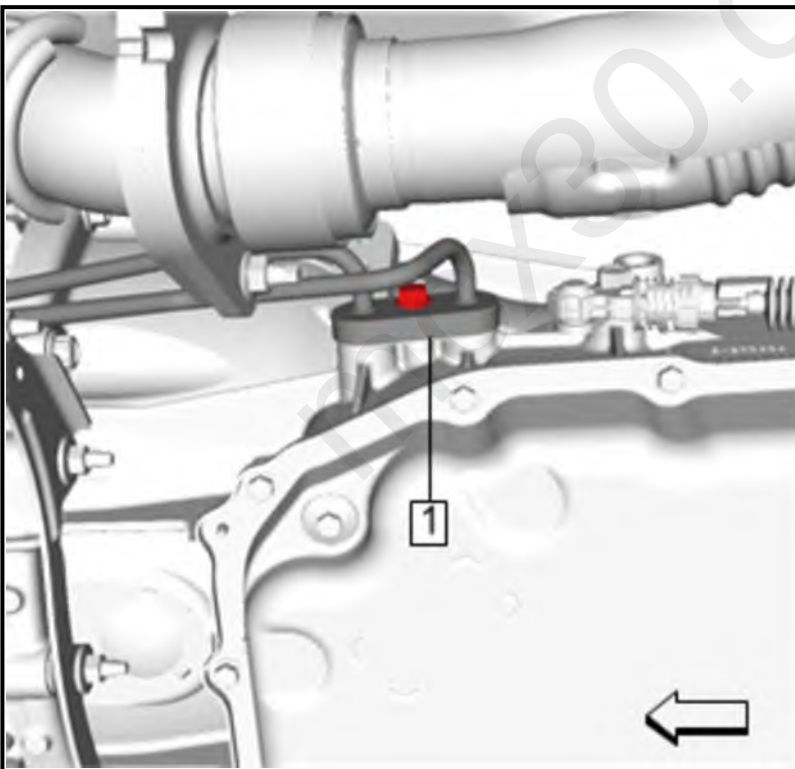


22. Transmission converter cover - Install - [Transmission Converter Cover Replacement](#)
23. Raise the engine with the engine support fixture.
24. Starter motor - Install - [Starter Replacement \(LGZ\)](#)
25. Position the transmission fluid cooler inlet and outlet pipe retainer (5) to the transmission.



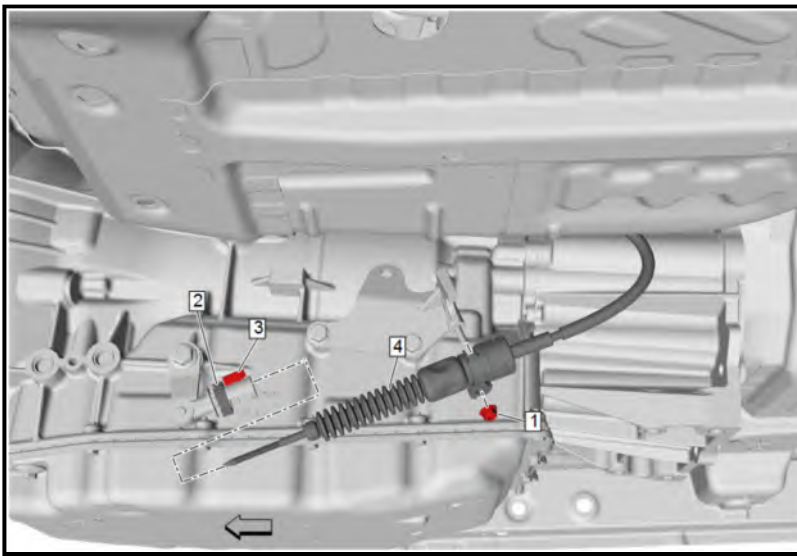
26. Install the lower transmission to engine bolts (1, 2, 3, 4) and tighten to 58 N.m (43 lb ft).

27. Install the transmission fluid cooler inlet and outlet pipe (1) to the transmission. [Transmission Fluid Cooler Inlet and Outlet Pipe Replacement \(LGZ With M5T and 4WD\)](#)



28. Connect the wiring harness retainers and connectors to the transmission.

29. Install the range selector lever cable (4) to the transmission. [Range Selector Lever Cable Replacement](#)



30. Adjust the cable. [Range Selector Lever Cable Adjustment](#)
31. Three way catalytic converter - Install - [Three-Way Catalytic Converter Replacement \(LGZ\)](#) .
32. Check the transmission fluid level and fill if necessary. [Transmission Fluid Level and Condition Check](#)
33. Lower the vehicle.
34. Perform the solenoid valve characterization. [Solenoid Valve Characterization Reprogramming](#)

NOTE:

The Service Fast 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:

The service fast learn procedure must be performed when any of the following repairs has been made to the transmission.

- Pressure regulating solenoid replacement
- Valve body repair or replacement
- Any service/repair in response to a shift quality concern
- Any internal transmission service, repair, overhaul, or replacement
- Torque converter replacement
- TCM replacement
- Transmission assembly replacement

35. Perform the service fast learn procedure. [Transmission Service Fast Learn Procedure](#)
-