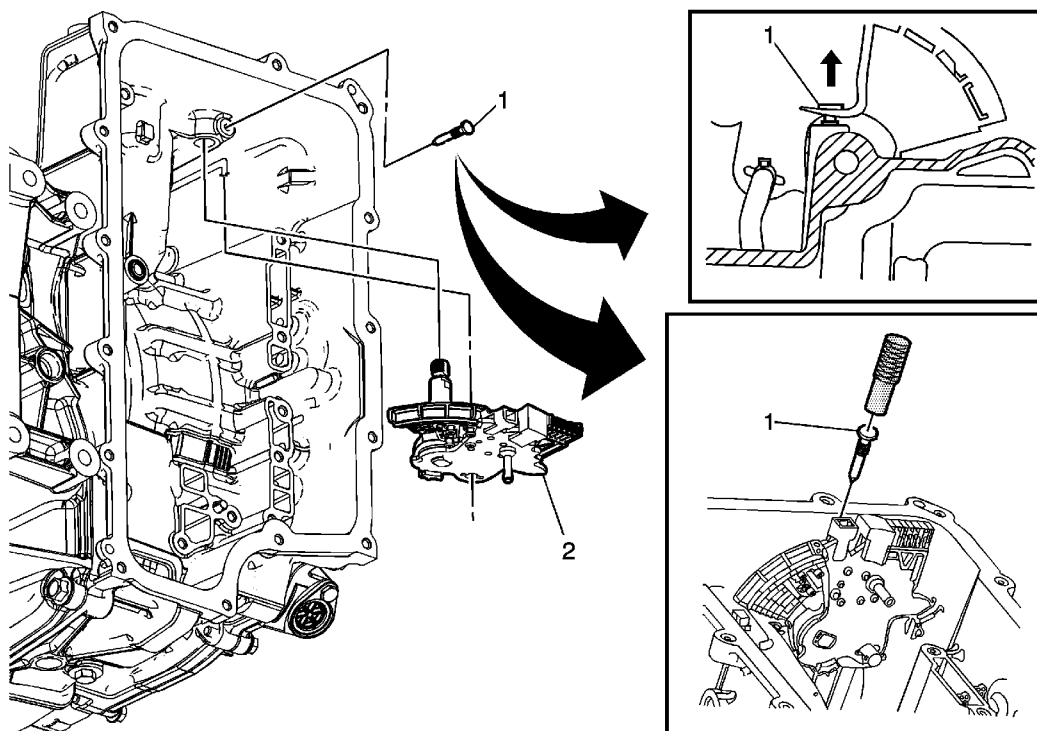


Manual Shift Detent Lever with Shaft Position Switch Assembly Replacement



Callout	Component Name
Preliminary Procedures	
1. Remove the transmission range selector lever. Refer to Automatic Transmission Range Selector Lever Replacement. 2. Remove the lower control valve body. Refer to Control Valve Lower Body and Upper Body Replacement.	
1	Manual Shaft Detent Lever Pin 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. Tip • Use a small nail puller to remove the pin. Discard the pin. It is not reusable. • Use J 41229 Manual Shaft Pin Installer to install the pin. Inspect that the pin installed height is within 6.5 mm-7.5 mm (0.25 in-0.30 in).

Manual Shaft Detent Lever Assembly (w/Shift Position Switch)

Tip

Do not pull the park actuator rod end out beyond the machined oil passage surface in the case. A no park condition will exist if the park pawl actuator assembly is pulled out of the transmission too far and the actuator rod disengages from the park pawl. The transmission assembly will require disassembly to re-install the actuator rod over the park pawl.

Procedure

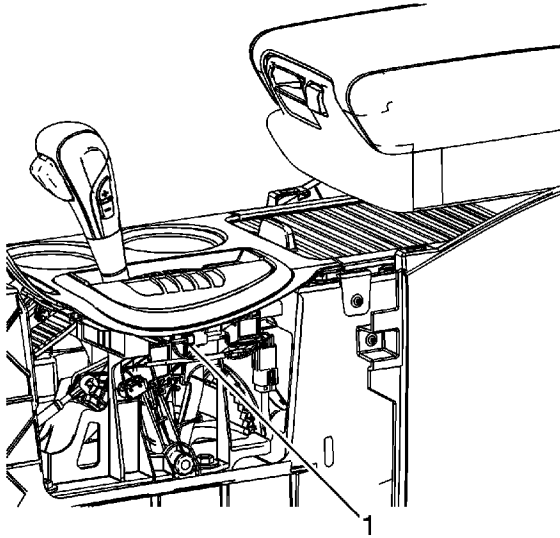
2

- Removal: partly lower the manual shaft detent lever assembly (w/shift position switch) in order to rotate the detent lever and disconnect the park actuator rod. Then fully remove the manual shaft detent lever assembly from the transmission case.
- Installation: partly install the manual shaft detent lever assembly (w/shift position switch). Rotate the detent lever and connect the park actuator rod. Then fully install the manual shaft detent lever assembly in the transmission case.
- Lubricate the manual shaft with automatic transmission fluid (ATF) to prevent damage to the manual shift shaft seal.

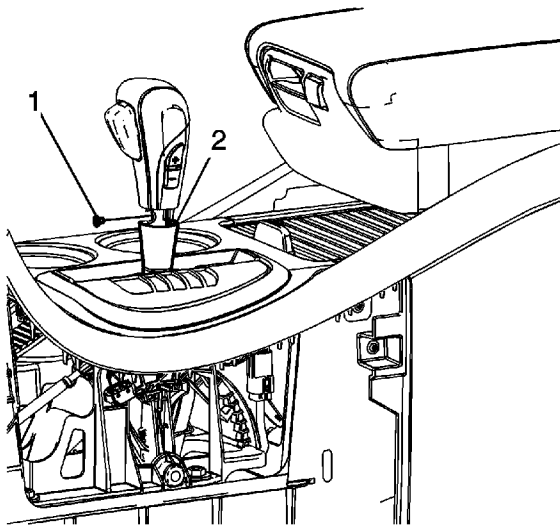
Transmission Control Lever Knob Replacement (Enclave)

Removal Procedure

1. Apply the parking brake.
2. Remove the floor console left extension panel. Refer to [Front Floor Console Extension Panel Replacement - Left Side](#).

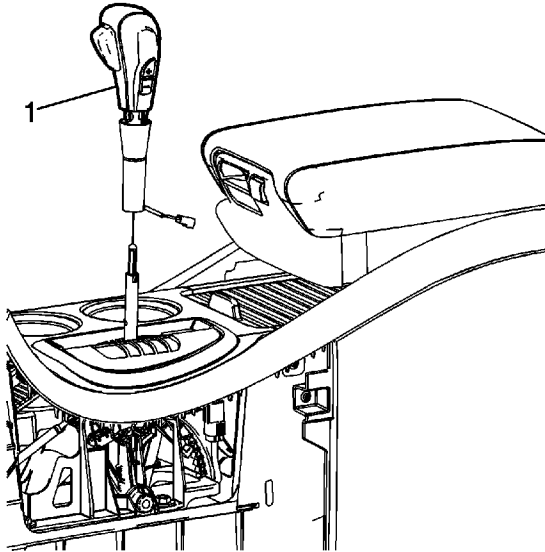


3. Disconnect the transmission tap up/tap down switch electrical connector (1).
4. Rotate the key to the RUN position, however do NOT start the vehicle.
5. Move the transmission shift control lever rearward.





6. Carefully insert a small flat-bladed tool between the trim ring (2) and the shift knob. Apply careful downward pressure to the shift knob trim ring to separate the trim ring from the shift knob. The trim ring will drop down approximately 13.0 mm (0.5 in) exposing the shift knob retaining screw.
7. Remove the shift control knob screw (1) from the shift control knob.

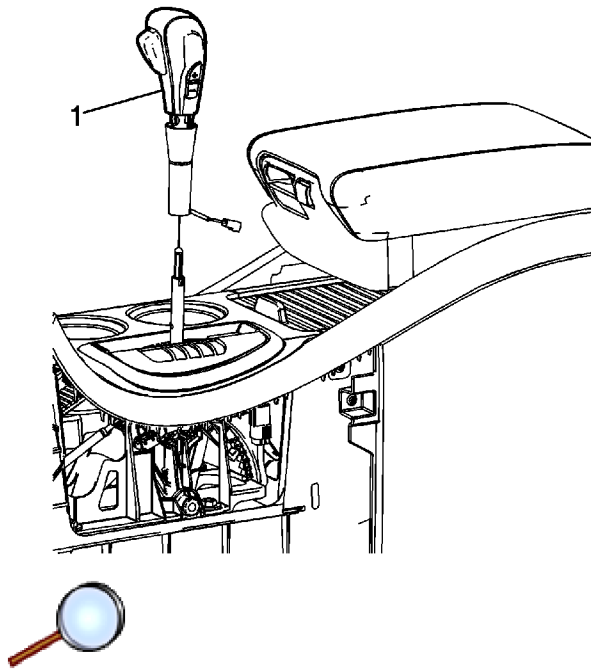


Note: Carefully guide the transmission tap up/tap down switch electrical harness and connector past the shift control indicator while removing the shift control knob.

8. Remove the shift control knob (1) from the shift control lever.

Installation Procedure

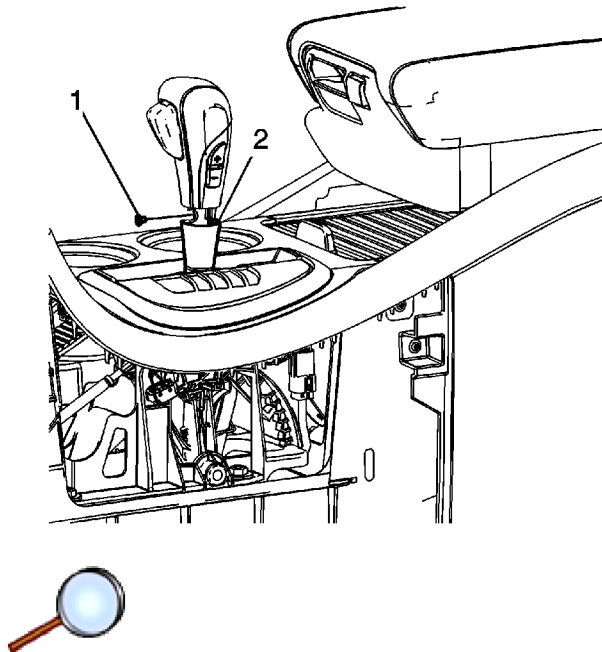
1. Apply lubricant GM P/N 88861426 (Canadian P/N 88861442) to the tip of the shift control lever.



Note: Carefully guide the transmission tap up/tap down switch electrical harness and connector past the shift control indicator while installing the shift control knob.

2. Install the shift control knob (1) to the shift control lever.

Caution: Refer to [Fastener Caution](#) in the Preface section.

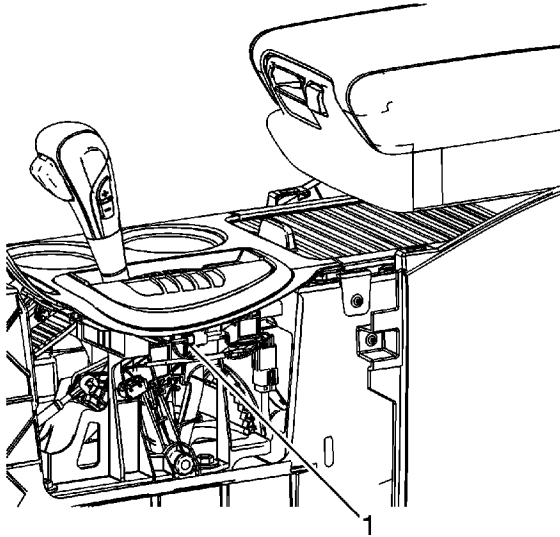


3. Install the control knob screw (1).

Tighten

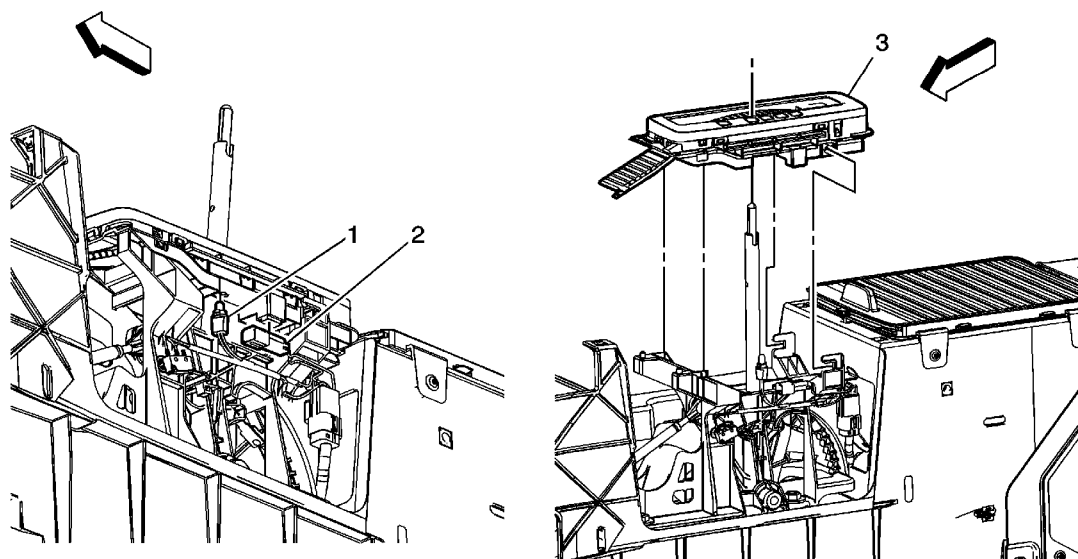
Tighten the screw to 4 N·m (35 lb in).

4. Lift the shift control knob trim ring (2) up to the shift control knob until a click sound is heard indicating the trim ring is secured to the shift knob.
5. Place the shift control lever in the PARK position.
6. Rotate the key to the off position.



7. Connect the transmission tap up/tap down switch electrical connector (1).
8. Check for proper operation of the shift control through all gear ranges.
9. Install the floor console left extension panel. Refer to [Front Floor Console Extension Panel Replacement - Left Side](#).
10. Release the parking brake.

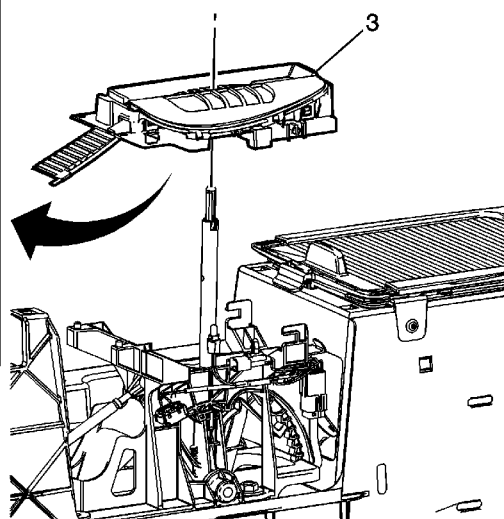
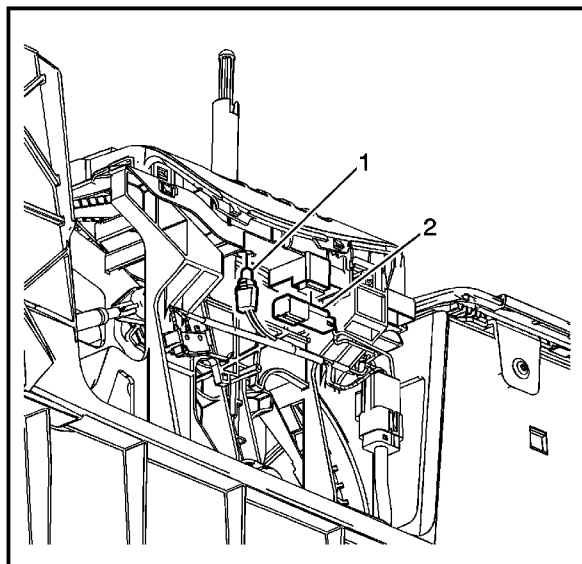
Automatic Transmission Control Indicator Replacement (OUTLOOK)



Callout	Component Name
Preliminary Procedures	
1. Remove the console trim plate. Refer to Front Floor Console Cover Replacement . 2. Remove the shift knob. Refer to Transmission Control Lever Knob Replacement .	
1	Automatic Transmission Shift Control Indicator Lamp Tip Rotate the lamp socket one eighth turn counterclockwise to remove or clockwise to install.
2	Automatic Transmission Tap Up/Tap Down Switch Electrical Harness Connector Tip Slide the harness connector forward off of the retainer.
3	Automatic Transmission Shift Control Indicator Tip Release the front two shift indicator retaining tabs then lift and remove the indicator from the rear two retaining tabs.

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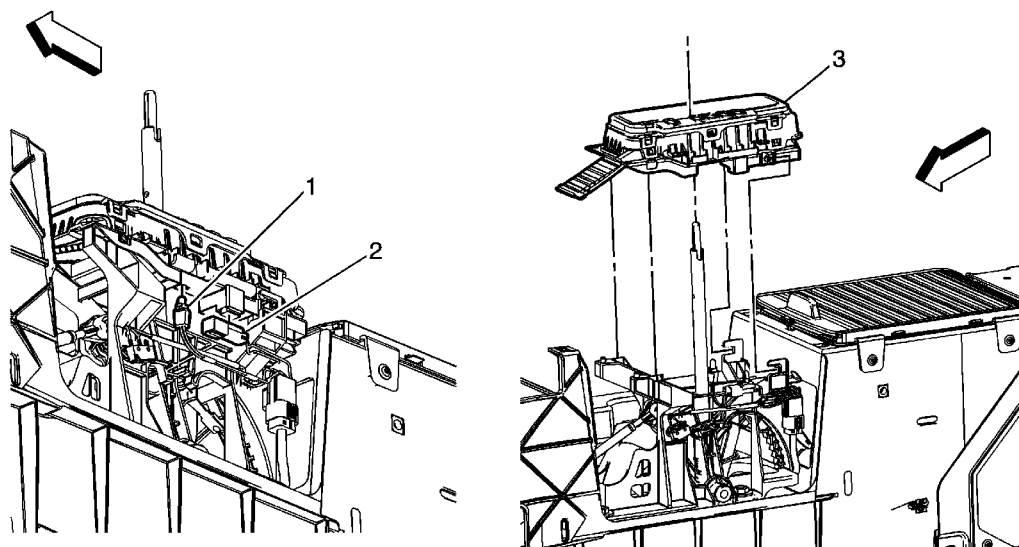
Automatic Transmission Control Indicator Replacement (Enclave)



Callout	Component Name
Preliminary Procedures	
1. Remove the console trim plate. Refer to Front Floor Console Cover Replacement . 2. Remove the shift knob. Refer to Transmission Control Lever Knob Replacement .	
1	Automatic Transmission Shift Control Indicator Lamp Tip Rotate the lamp socket one eighth turn counterclockwise to remove or clockwise to install.
2	Automatic Transmission Tap Up/Tap Down Switch Electrical Harness Connector. Tip Slide the harness connector forward off of the retainer.
3	Automatic Transmission Shift Control Indicator Tip Release the front two shift indicator retaining tabs then lift and remove the indicator from the rear two retaining tabs.

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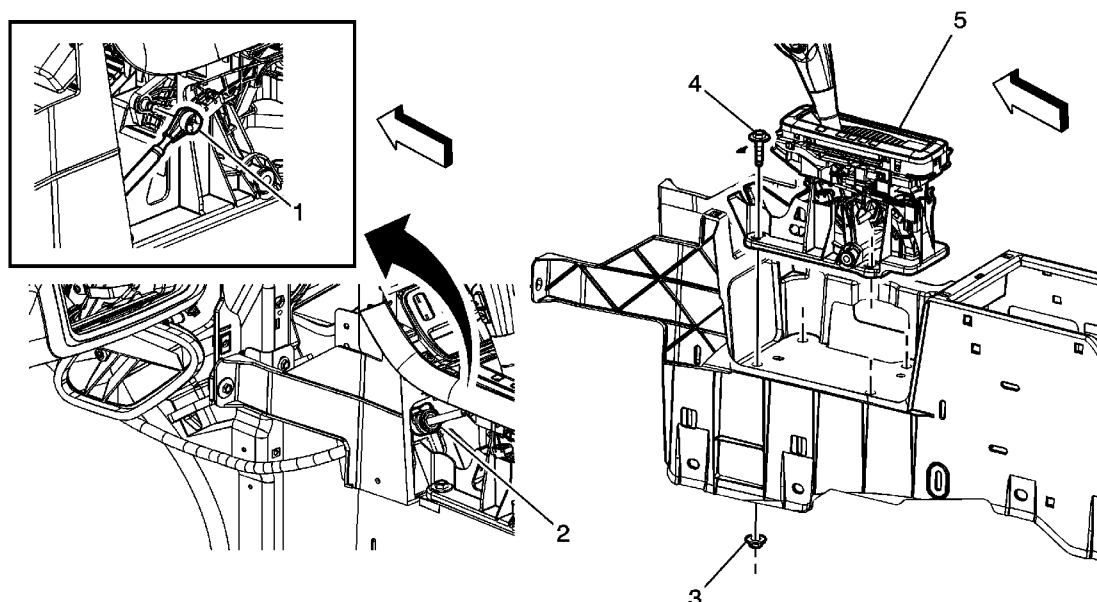
Automatic Transmission Control Indicator Replacement (Acadia)



Callout	Component Name
Preliminary Procedures 1. Remove the console trim plate. Refer to Front Floor Console Cover Replacement. 2. Remove the shift knob. Refer to Transmission Control Lever Knob Replacement.	
1	Automatic Transmission Shift Control Indicator Lamp Tip Rotate the lamp socket one eighth turn counterclockwise to remove or clockwise to install.
2	Automatic Transmission Tap Up/Tap Down Switch Electrical Harness Connector. Tip Slide the harness connector forward off of the retainer.
3	Automatic Transmission Shift Control Indicator Tip Release the front two shift indicator retaining tabs then lift and remove the indicator from the rear two retaining tabs.

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Transmission Control Replacement (OUTLOOK)

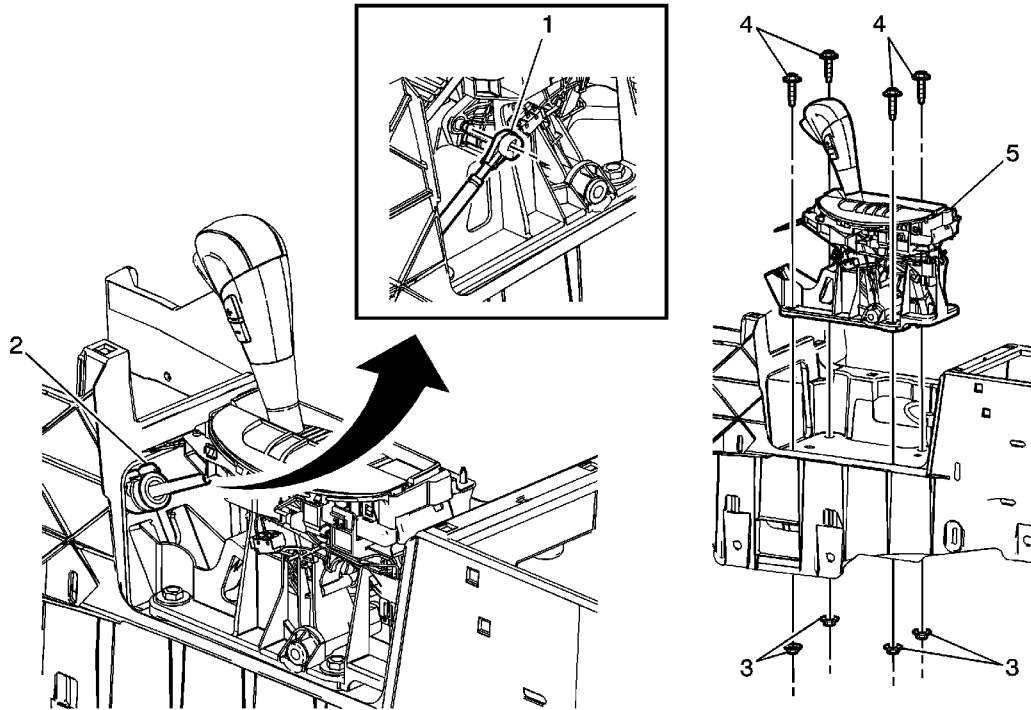


Callout	Component Name
Preliminary Procedures	
Remove the console trim plate. Refer to Front Floor Console Cover Replacement .	
1	Automatic Transmission Range Select Lever Cable
2	Automatic Transmission Range Select Lever Cable Retainer
3	Automatic Transmission Control Nut (Qty: 4) Caution: Refer to Fastener Caution in the Preface section. Tighten 25 N·m (18 lb ft)
4	Automatic Transmission Control Bolt (Qty: 4)
5	Automatic Transmission Control Procedure 1. Disconnect the transmission control electrical connector. 2. Apply lubricant GM P/N 88861426 (Canadian P/N 88861442) to the tip of the

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	shift control lever.
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Transmission Control Replacement (Enclave)

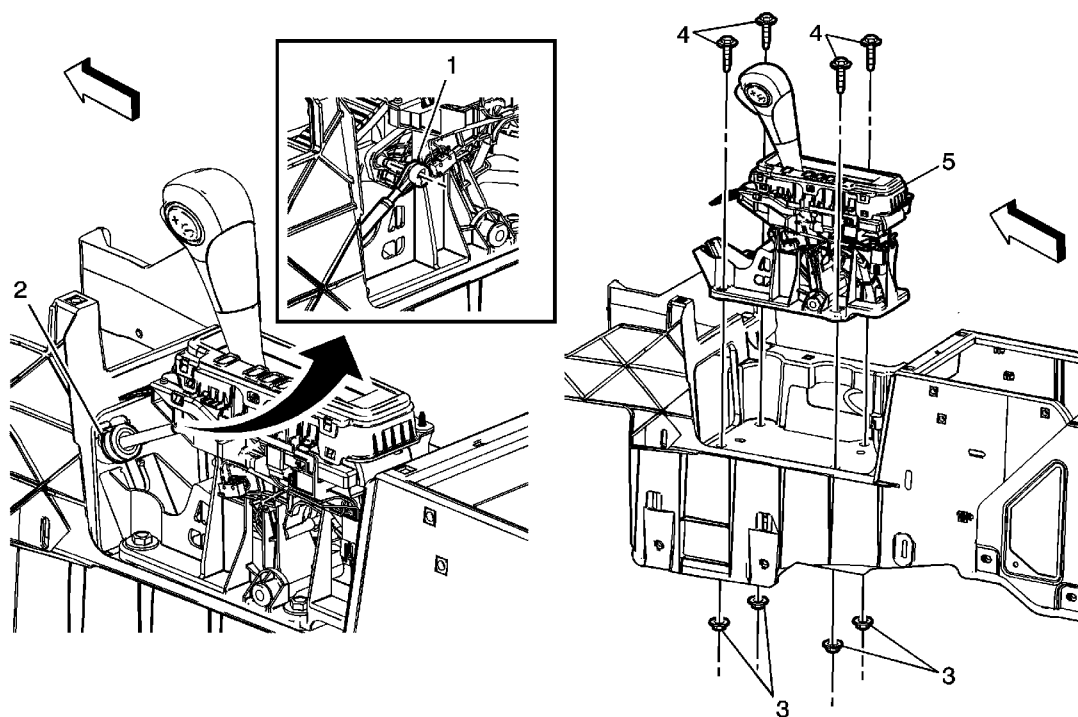


Callout	Component Name
Preliminary Procedure	
Remove the console trim plate. Refer to Front Floor Console Cover Replacement .	
1	Automatic Transmission Range Select Lever Cable
2	Automatic Transmission Range Select Lever Cable Retainer
3	Automatic Transmission Control Nut (Qty: 4) Caution: Refer to Fastener Caution in the Preface section. Tighten 25 N·m (18 lb ft)
4	Automatic Transmission Control Bolt (Qty: 4)
5	Automatic Transmission Control Procedure 1. Disconnect the transmission control electrical connector. 2. Apply lubricant GM P/N 88861426 (Canadian P/N 88861442) to the tip of the

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	shift control lever.
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Transmission Control Replacement (Acadia)

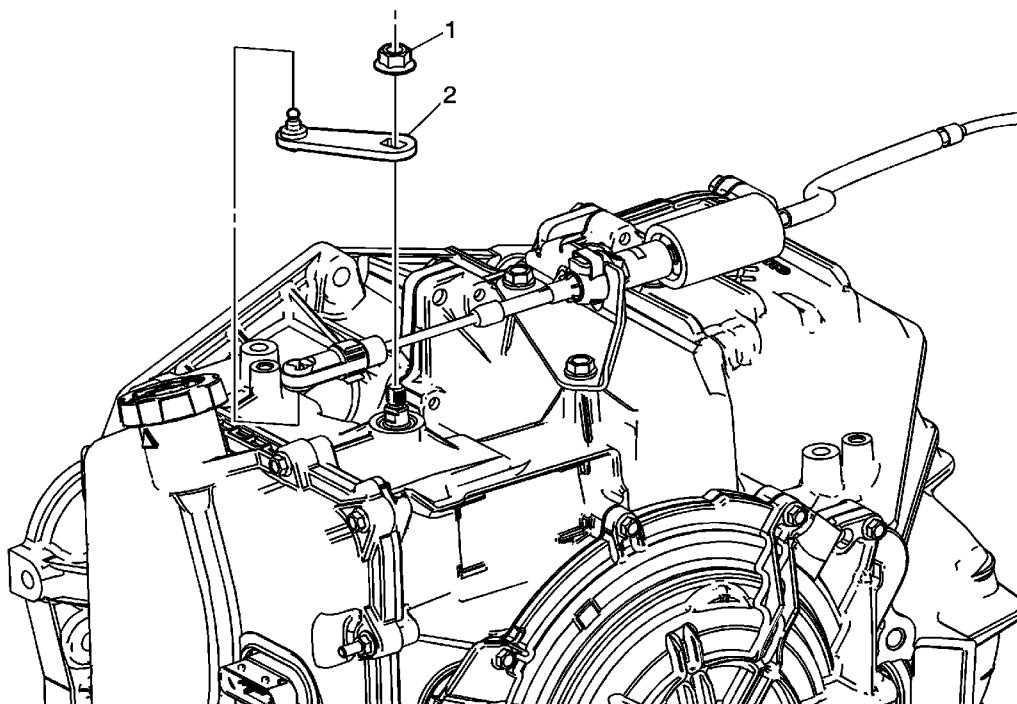


Callout	Component Name
Preliminary Procedure	
Remove the console trim plate. Refer to Front Floor Console Cover Replacement .	
1	Automatic Transmission Range Select Lever Cable
2	Automatic Transmission Range Select Lever Cable Retainer
3	Automatic Transmission Control Nut (Qty: 4) Caution: Refer to Fastener Caution in the Preface section. Tighten 25 N·m (18 lb ft)
4	Automatic Transmission Control Bolt (Qty: 4)
5	Automatic Transmission Control Procedure 1. Disconnect the transmission control electrical connector. 2. Apply lubricant GM P/N 88861426 (Canadian P/N 88861442) to the tip of the

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	shift control lever.
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Automatic Transmission Range Selector Lever Replacement

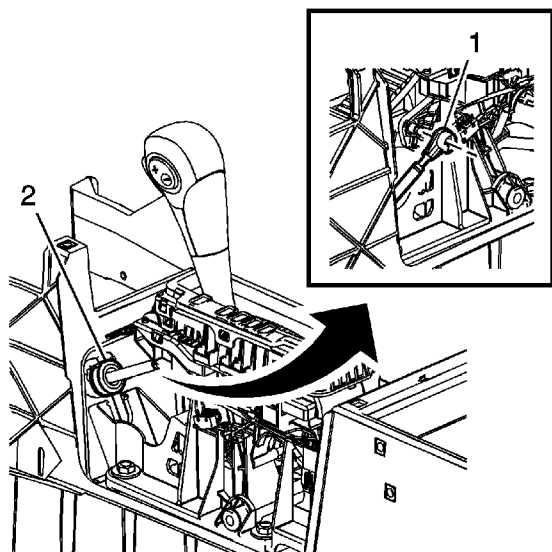


Callout	Component Name
Preliminary Procedures	
1. Set the park brake and chock the wheels. 2. Disconnect the range selector cable from the range selector lever.	
1	Transmission Range Selector Lever Nut Caution: Refer to Fastener Caution in the Preface section. Tighten 20 N·m (15 lb ft)
2	Transmission Range Selector Lever

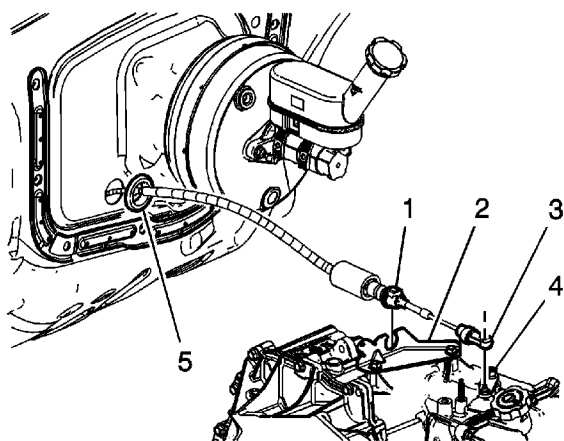
Range Selector Lever Cable Replacement

Removal Procedure

1. Apply the parking brake and chock the wheels.
2. Remove the floor console left extension panel. Refer to [Front Floor Console Extension Panel Replacement - Left Side](#).



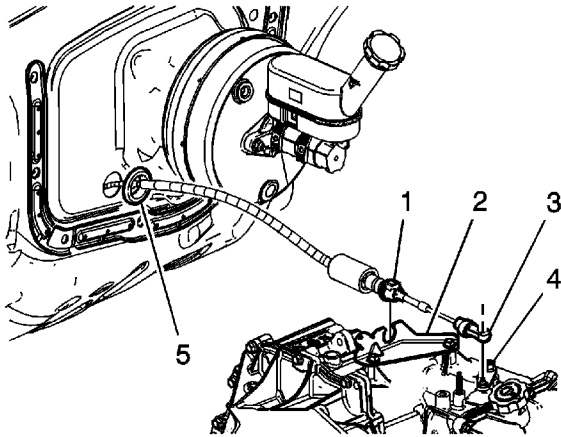
3. Disconnect the transmission range selector lever cable terminal (1) from the shift lever pin.
4. Release the transmission range selector lever cable retainer (2) and remove the transmission range selector cable from the transmission control lever base.



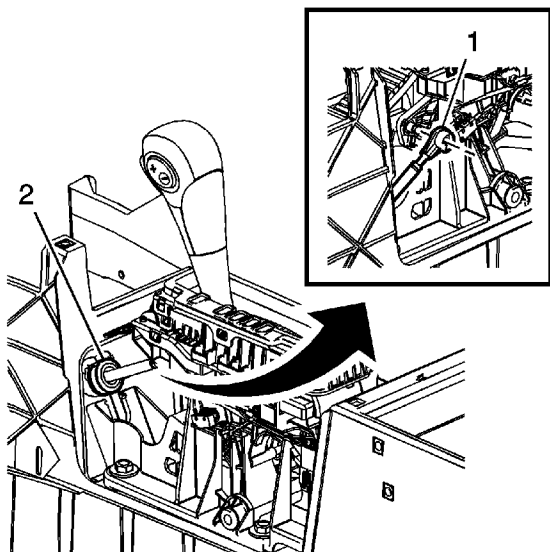
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5. Disconnect the transmission range selector lever cable terminal (3) from the transmission manual shift lever (4).
6. Press the locking tabs inward in order to release the transmission range selector lever cable (1) from the cable bracket (2).
7. Remove the transmission range selector lever cable grommet (5) from the cowl panel.
8. Remove the transmission range selector lever cable from the vehicle.

Installation Procedure



1. Install the transmission range selector lever cable to the vehicle.
2. Install the transmission range selector lever cable grommet (5) to the cowl panel.
3. Install the transmission range selector lever cable (1) to the cable bracket (2).
4. Connect the transmission range selector lever cable terminal (3) to the transmission manual shift lever (4).





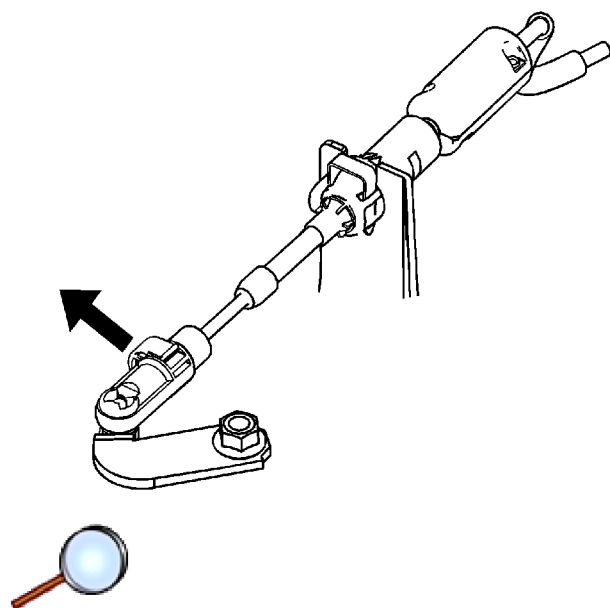
5. Install the transmission range selector lever cable to the transmission control lever base. Insure the cable retainer (2) is fully secured to the transmission control lever base.
6. Connect the transmission range selector lever cable terminal (1) to the shift lever pin.
7. Install the floor console left extension panel. Refer to [Front Floor Console Extension Panel Replacement - Left Side](#) .
8. Adjust the automatic transmission range selector lever cable. Refer to [Range Selector Lever Cable Adjustment](#) .
9. Release the parking brake.

Range Selector Lever Cable Adjustment

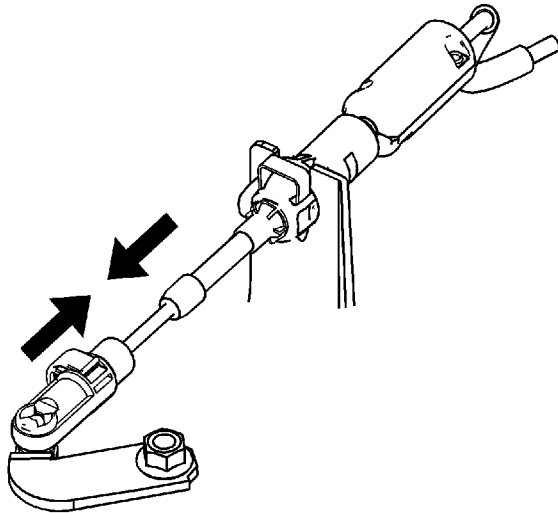
Warning: The automatic transaxle range selector cable is made out of two cable sections. After initial connection never separate the two metal couplings from one another. Integrity of the connection of the two metal couplings will be lost if separation of the two metal couplings occurs. When servicing the transaxle remove the cable at the automatic transaxle range selector lever and at the automatic transaxle range selector cable bracket. If either section of the cable needs to be replaced, replace both of the cable sections. Loss of connection integrity of the two metal couplings can cause loss of transaxle shift control which could result in personal injury.

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

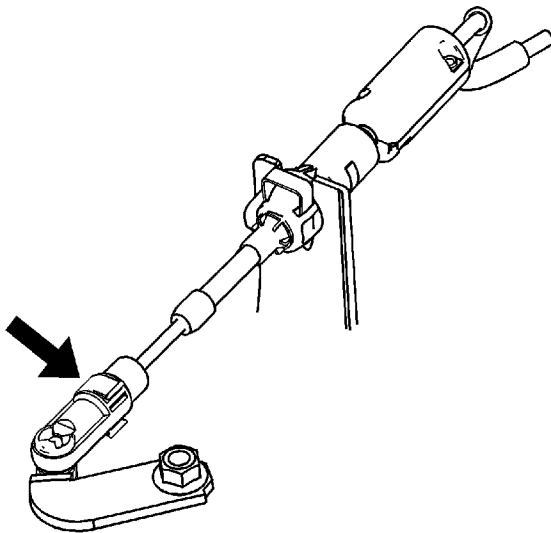
1. Set the park brake and chock the wheels.
2. Verify the transmission range select lever is in the park position.
3. Verify the transmission manual shift lever is in the park position.



4. Release the range select cable adjuster clip.

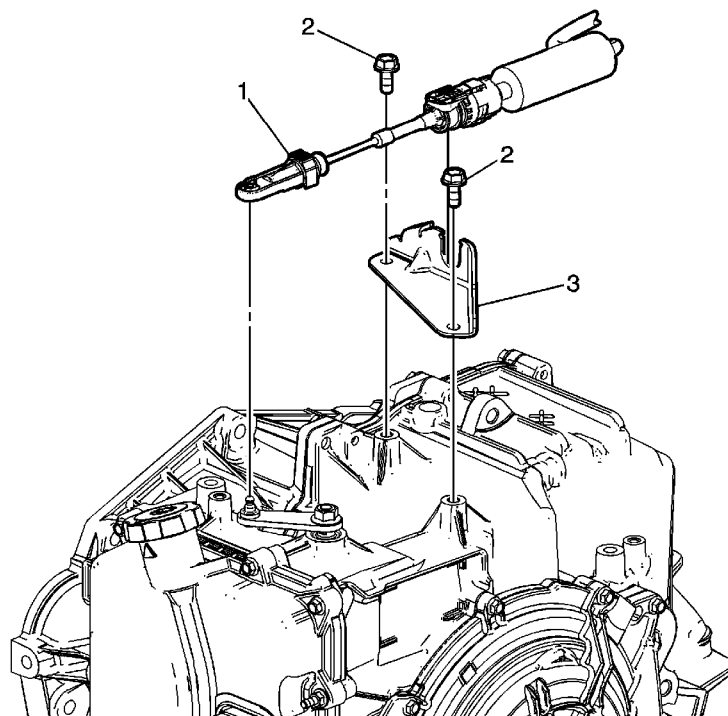


5. Slide the two halves of the range select cable together until all free play is removed.



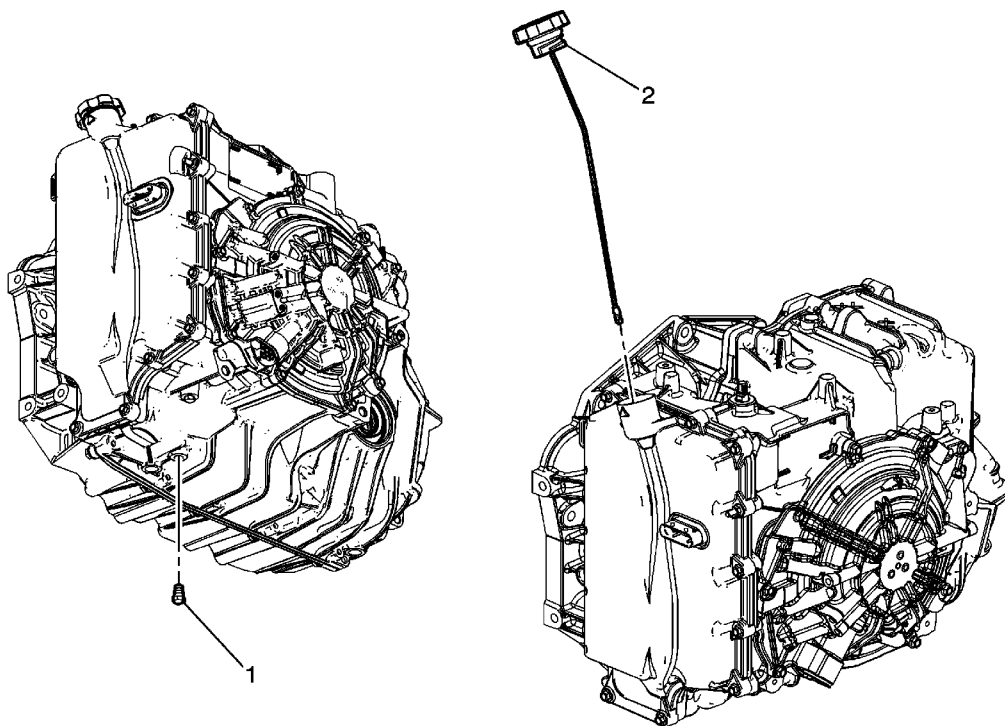
6. Depress the adjuster clip locking the adjuster clip completely.
7. Pull both halves of the range select cable in opposite directions to verify the cable adjuster is secured.
8. Check the transmission range select lever in all gear selections for proper operation.

Range Selector Lever Cable Bracket Replacement



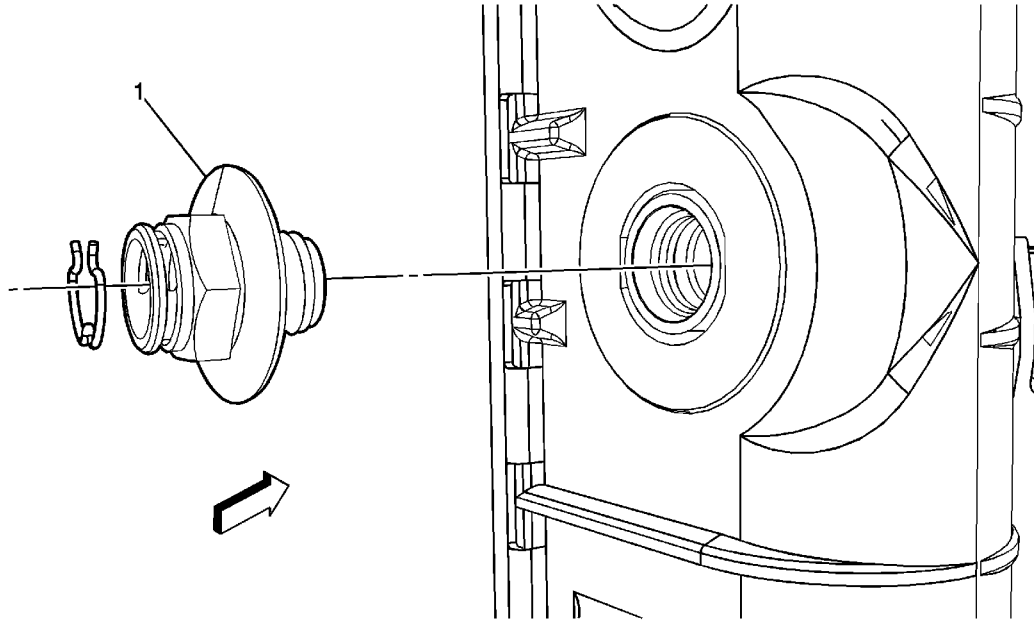
Callout	Component Name
Preliminary Procedures	
1. Set the park brake and chock the wheels. 2. Remove the air cleaner assembly. Refer to Air Cleaner Assembly Replacement.	
1	Transmission Range Selector Lever Cable
2	Transmission Range Selector Lever Cable Bracket Bolt Caution: Refer to Fastener Caution in the Preface section. Tighten 25 N·m (18 lb ft)
3	Transmission Range Selector Lever Cable Bracket

Transmission Fluid Replacement



Callout	Component Name
Preliminary Procedure	
Raise the vehicle. Refer to Lifting and Jacking the Vehicle .	
1	Fluid Drain Plug Caution: Refer to Fastener Caution in the Preface section. Tip Place a drain pan capable of containing more than 5 quarts of fluid under the transmission before removing the plug to drain the fluid. Tighten 12 N·m (106 lb in)
2	Fluid Level Indicator Tip • Transmission will require approximately 5 quarts of fluid. • Fill the transmission with fluid. Refer to Transmission Fluid Check.

Transmission Fluid Cooler Pipe Connector Replacement - Radiator



Callout	Component Name
Preliminary Procedures	
1. Drain the cooling system. Refer to Cooling System Draining and Filling. 2. Remove the transaxle oil cooler pipe from the oil cooler fittings on the radiator. Refer to Transmission Fluid Cooler Hose/Pipe Quick-Connect Fitting Disconnection and Connection.	
Tip Do not remove the upper and lower transaxle oil cooler fittings from the radiator at the same time other wise the transaxle oil cooler may fall inside the radiator end tank.	
1	Transmission Oil Cooler Fitting Procedure Remove the plastic caps from the quick connect fittings by pulling the caps back along the pipe before installation. Tip

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The correct thread engagement is critical. Cross-threaded fittings can achieve proper tightness and still leak.

Caution: Refer to [Fastener Caution](#) in the Preface section.

Tighten

24 N·m (18 lb ft)

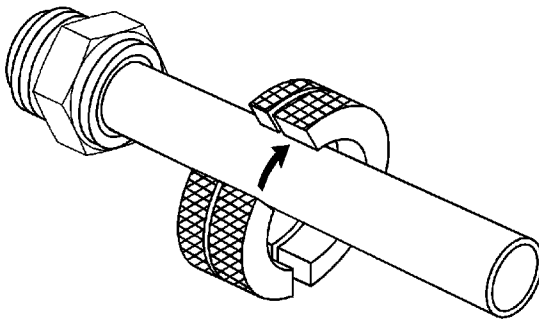
Transmission Fluid Cooler Hose / Pipe Quick-Connect Fitting Disconnection and Connection

Special Tools

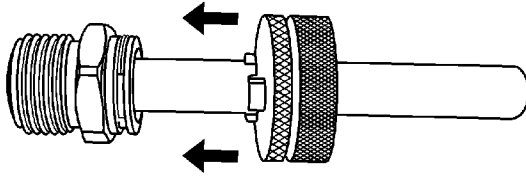
- [J 28585](#) Universal Snap Ring Remover for the 5/8 inch Line
- [J 41623-B](#) 3/8 inch Line Quick Release Tool

Removal Procedure

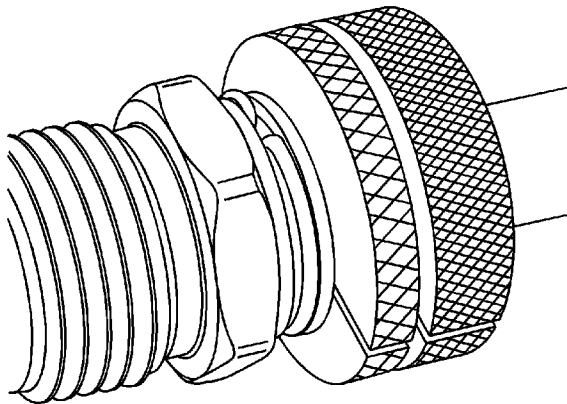
1. Remove the plastic caps from the quick connect fittings by pulling the caps back along the pipe before installation.



2. Install the [J 41623-B](#) onto the transmission oil cooler (TOC) pipe, or use the [J 28585](#)



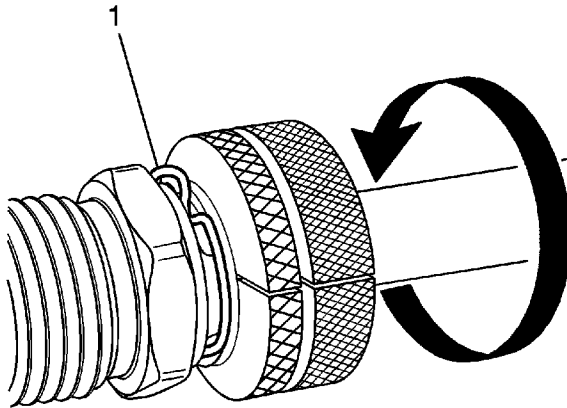
3. Slide the [J 41623-B](#) toward the TOC pipe fitting, or use the [J 28585](#)



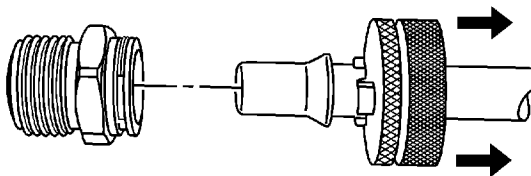
Note: Rotate the [J 41623-B](#) to engage the TOC pipe fitting's retainer slots.

The [J 41623-B](#) should be nearly flush with the fitting.

4. Connect the [J 41623-B](#) onto the TOC pipe fitting.

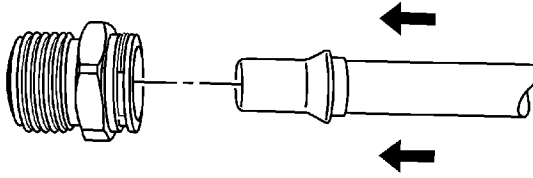


5. Rotate the [J 41623-B](#) or use the [J 28585](#) until the retainer clip (1) rises above the fitting retainer seat.



6. Pull back on the TOC pipe to disengage the pipe from the TOC pipe fitting.
7. Remove the [J 41623-B](#) or the [J 28585](#) from the TOC pipe.

Installation Procedure



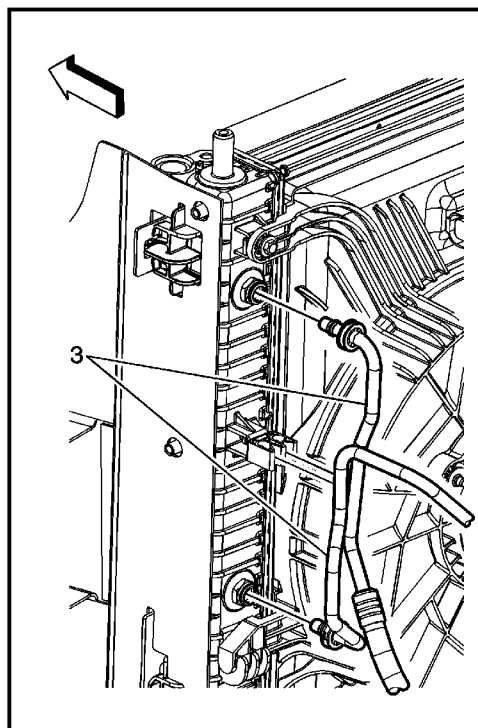
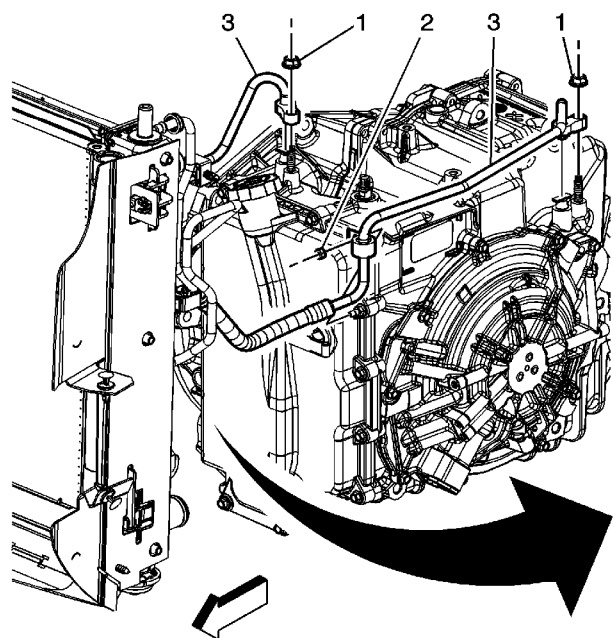
Note: Discard the TOC retaining clip and install a new retaining clip.

1. Install the TOC pipe into the TOC pipe fitting.

A distinct snap should be heard or felt when assembling the TOC pipe to the fitting.

2. To ensure the cooler line is properly installed, give the cooler pipe a gentle pull.

Fluid Cooler Inlet Hose Replacement

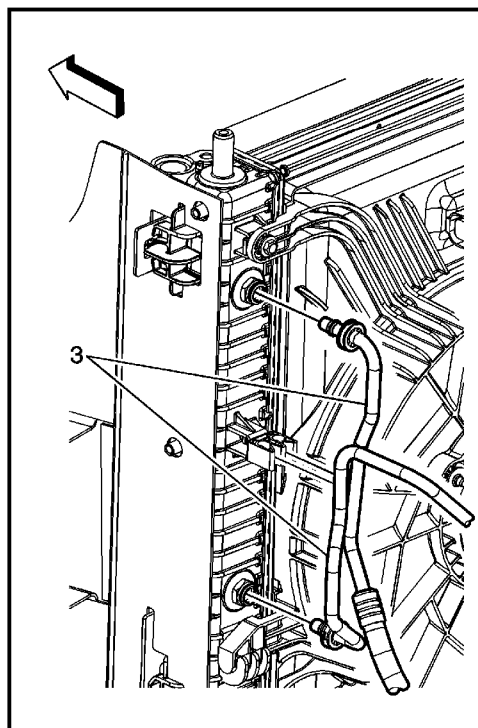
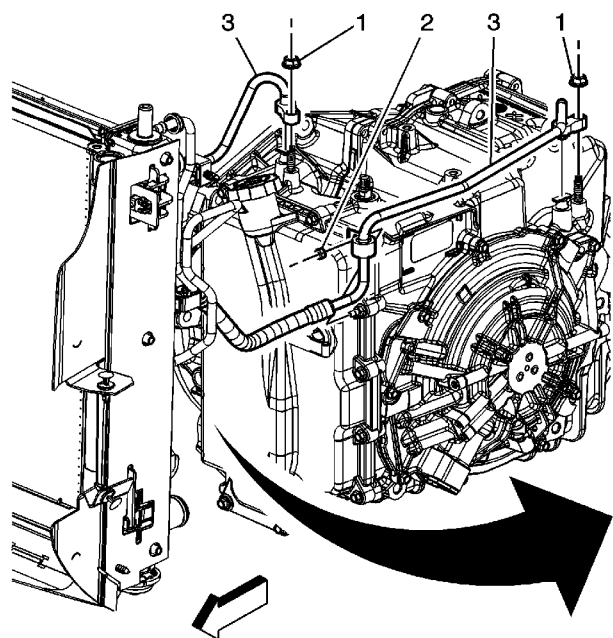


Callout	Component Name
Preliminary Procedure	
Remove the Air Cleaner Inlet Duct. Refer to Air Cleaner Outlet Duct Replacement .	
1	Transmission Fluid Cooler Inlet Hose/Pipe Nut Caution: Refer to Fastener Caution in the Preface section. Tighten 22 N·m (16 lb ft)
2	Transmission Fluid Cooler Inlet Hose/Pipe Clamp Nut Tighten 22 N·m (16 lb ft)
3	Transmission Fluid Cooler Inlet Hose/Pipe Procedure 1. Remove the transmission line from the clips securing the line to the transmission and fan shroud.

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	2. Inspect the transmission fluid level. Refer to Transmission Fluid Check .
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Fluid Cooler Outlet Hose Replacement

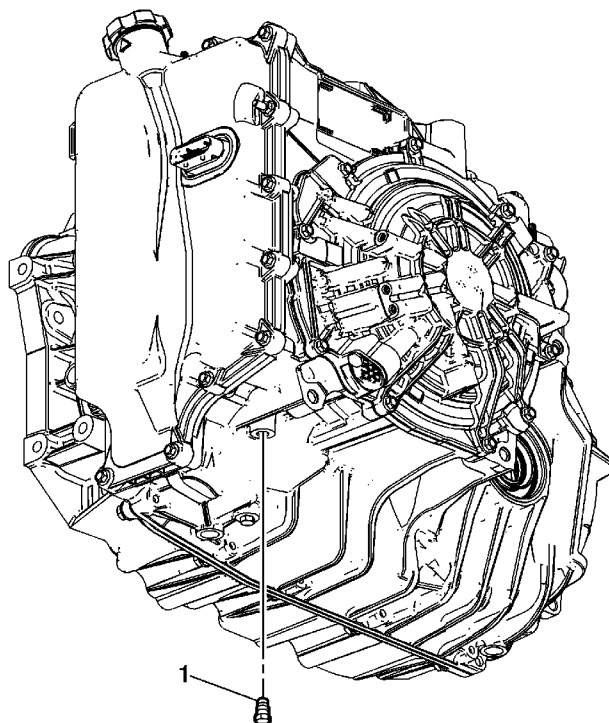


Callout	Component Name
Preliminary Procedure	
Remove the Air Cleaner Outlet Duct. Refer to Air Cleaner Outlet Duct Replacement .	
1	Transmission Fluid Cooler Outlet Hose/Pipe Nut Caution: Refer to Fastener Caution in the Preface section. Tighten 22 N·m (16 lb ft)
2	Transmission Fluid Cooler Outlet Hose/Pipe Clamp Nut Tighten 22 N·m (16 lb ft)
3	Transmission Fluid Cooler Outlet Hose/Pipe Procedure 1. Remove the transmission line from the clips securing the line to the transmission and fan shroud.

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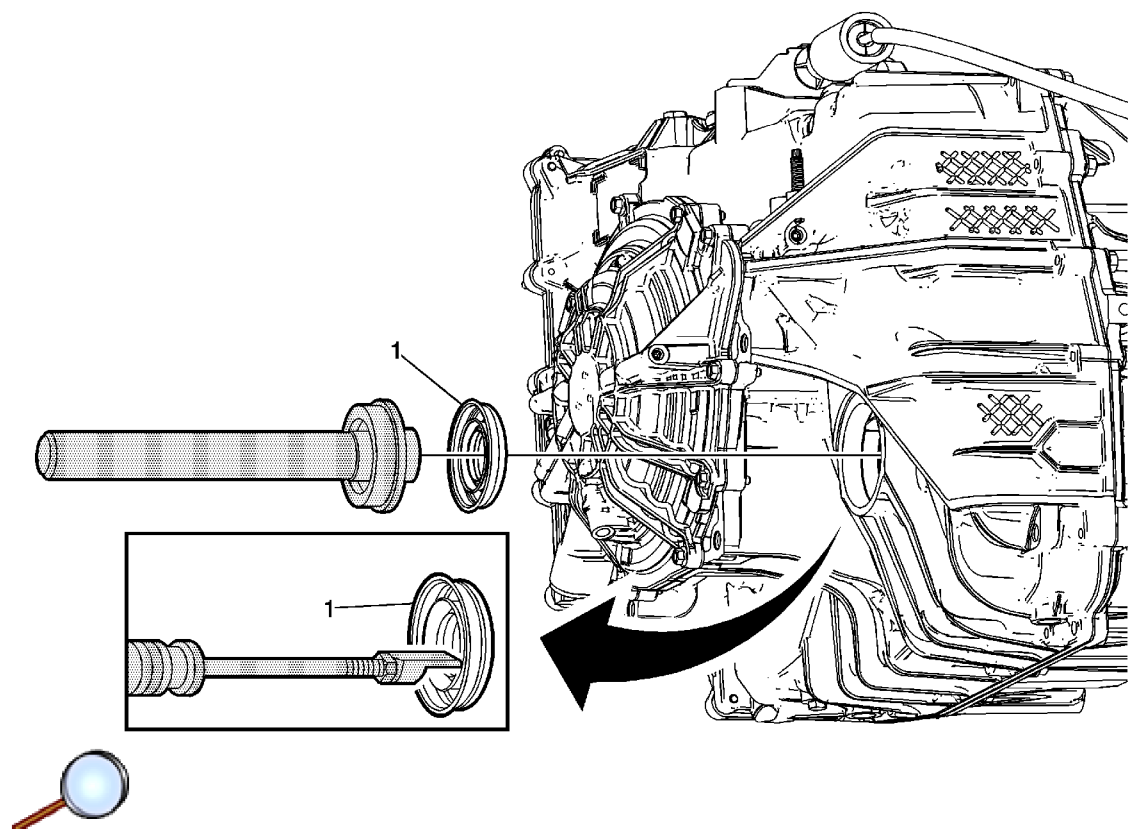
	2. Inspect the transmission fluid level. Refer to Transmission Fluid Check .
--	--

Automatic Transmission Fluid Pressure Test Hole Plug Replacement



Callout	Component Name
Preliminary Procedure	
Raise the vehicle. Refer to Lifting and Jacking the Vehicle .	
1	Fluid Pressure Test Plug Caution: Refer to Fastener Caution in the Preface section. Tighten 12 N·m (106 lb in)

Front Wheel Drive Shaft Seal Replacement - Left Side

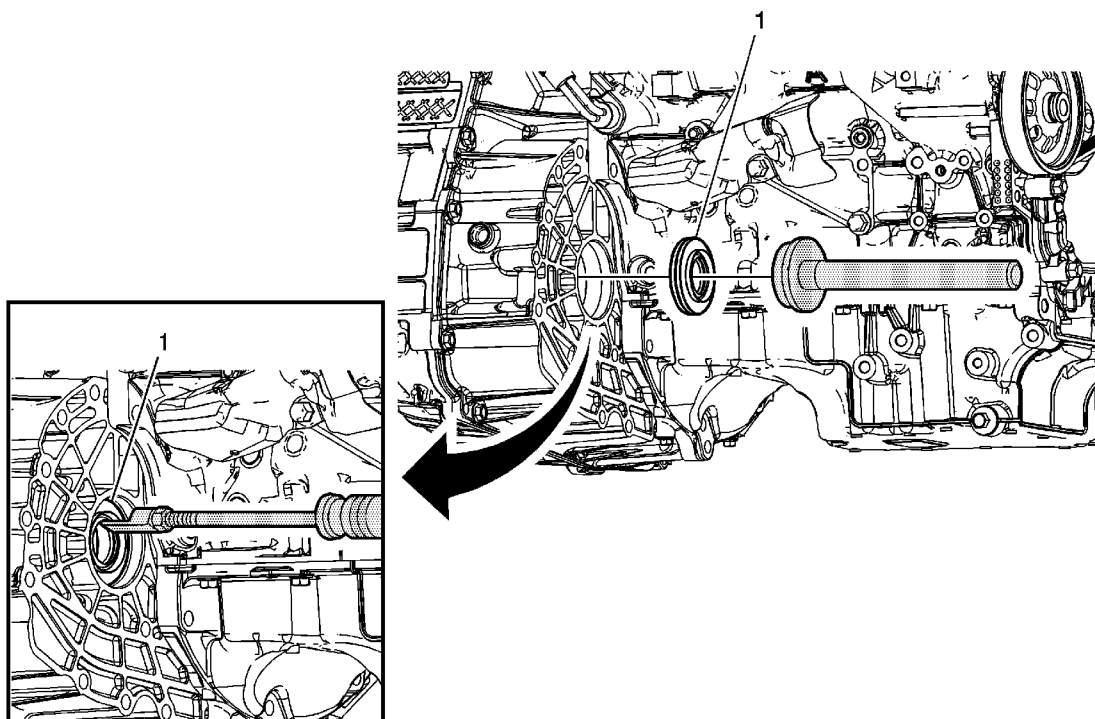


Callout	Component Name
Preliminary Procedures	
1. Raise the vehicle. Refer to Lifting and Jacking the Vehicle . 2. Remove the left wheel drive shaft. Refer to Front Wheel Drive Shaft Replacement .	
1	Left Front Wheel Drive Shaft Oil Seal
	Procedure
	• For seal removal use J 6125-1B Slide Hammer with J 23129 Universal Seal Remover. • For seal installation use J 8092 Driver Handle with J-46629-A Axle Seal Installer. The axle seal installer has no depth stop, be careful to NOT install the seal too deep, ensure the seal is installed flush and level with the transmission case surface for proper sealing.
	Special Tools
	• J 8092 Driver Handle

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- [J-46629-A](#) Axle Seal Installer

Front Wheel Drive Shaft Seal Replacement - Right Side (Front Wheel Drive)

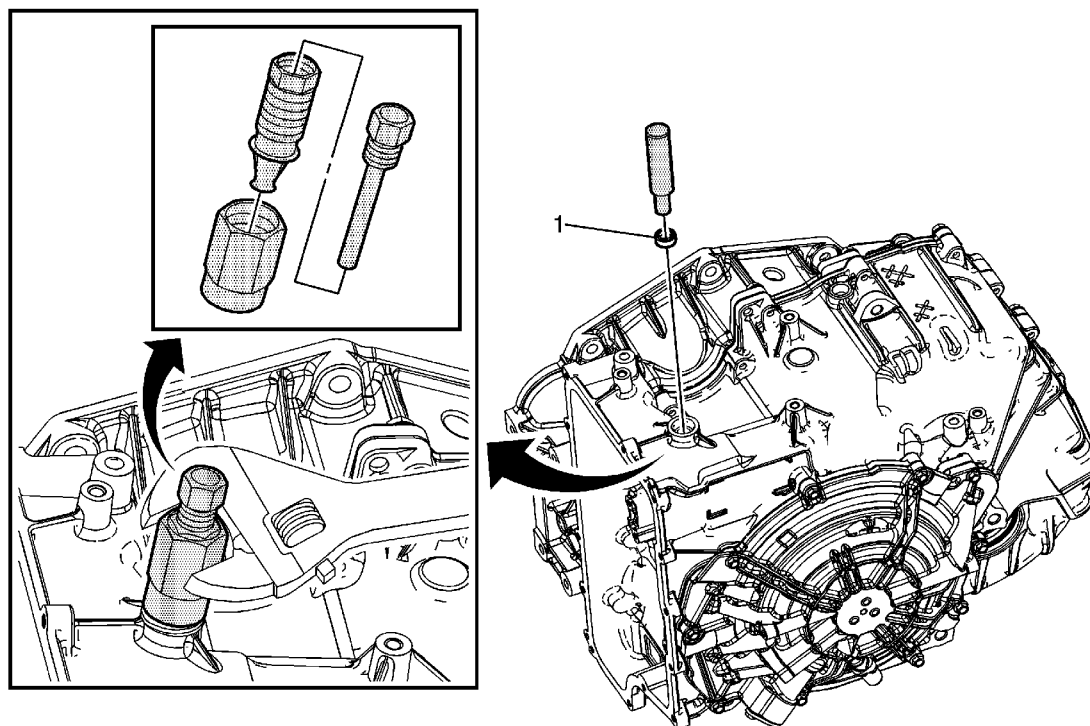


Callout	Component Name
Preliminary Procedures 1. Raise the vehicle. Refer to Lifting and Jacking the Vehicle. 2. Remove the intermediate drive shaft. Refer to Intermediate Drive Shaft Replacement.	
1	Right Front Wheel Drive Shaft Oil Seal Tip • For seal removal use J 6125-1B Slide Hammer with J 23129 Universal Seal Remover. • For seal installation use J 8092 Driver Handle with J-46629-A Axle Seal Installer. The axle seal installer has no depth stop, be careful to NOT install the seal too deep, ensure the seal is installed flush and level with the transmission case surface for proper sealing. Special Tools • J 8092 Driver Handle

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- [J-46629-A](#) Axle Seal Installer

Manual Shift Shaft and Seal Replacement



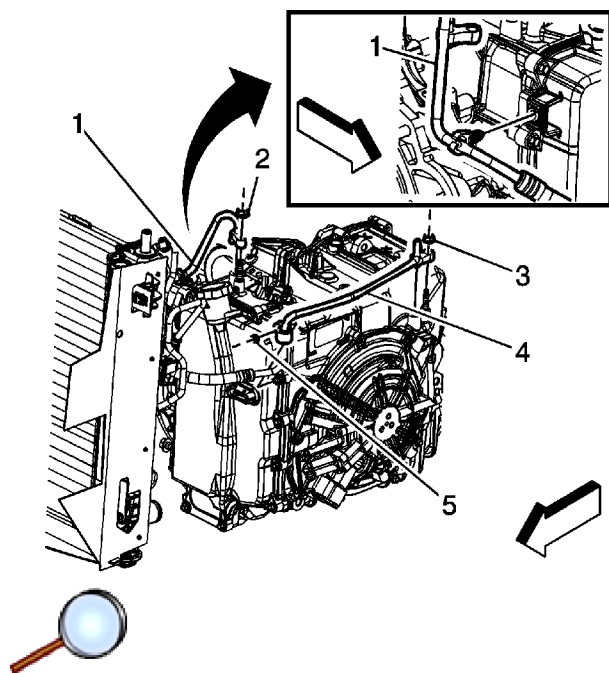
Callout	Component Name
Preliminary Procedures 1. Remove the air cleaner assembly. Refer to Air Cleaner Assembly Replacement . 2. Remove the manual shift and position switch assembly. Refer to Manual Shift Detent Lever with Shaft Position Switch Assembly Replacement .	
1	Manual Shift Shaft Seal Procedure • For seal removal use J 45201 Cooler Line Seal Remover. • For seal installation use J-46626 Seal Installer. • Lubricate the manual shaft with ATF to prevent damage to the manual shift shaft seal. Special Tools • J 45201 Cooler Line Seal Remover • J-46626 Seal Installer

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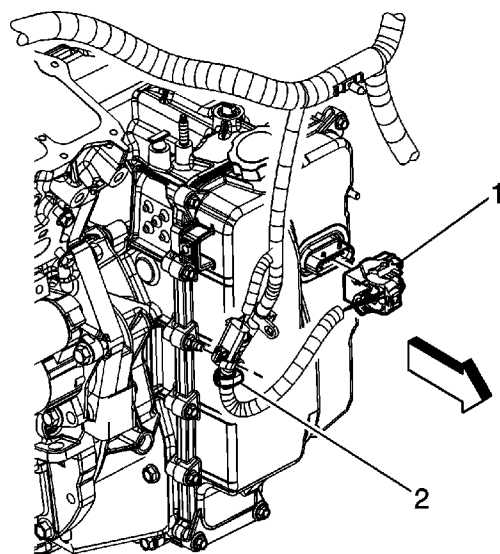
Control Valve Body Cover Replacement

Removal Procedure

1. Disconnect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#).
2. Remove the air cleaner assembly. Refer to [Air Cleaner Assembly Replacement](#).



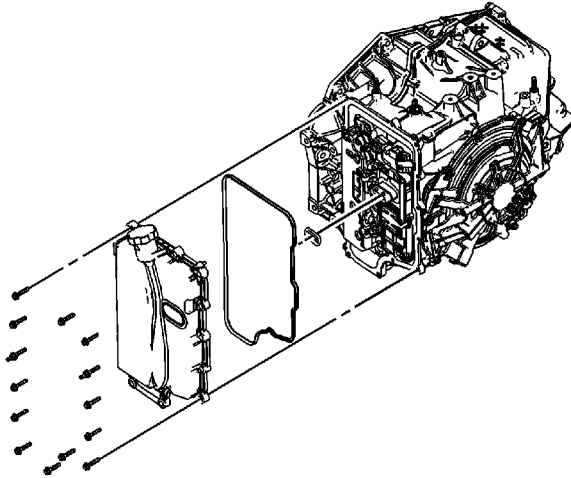
3. Remove the oil cooler inlet hose (1) from the retainer on the control valve body cover.
4. Remove the oil cooler outlet hose retainer nut (5) from the control valve body cover.
5. Remove the oil cooler outlet hose (4) from the retainer on the control valve body cover.
6. Raise and support the vehicle. Refer to [Lifting and Jacking the Vehicle](#).
7. Remove the left engine splash shield. Refer to [Engine Splash Shield Replacement](#).
8. Drain the transmission. Refer to [Transmission Fluid Replacement](#).



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9. Remove the wire harness retainer (2) from the control valve body cover stud.
10. Disconnect the control valve body transmission control module (TCM) electrical connector (1).

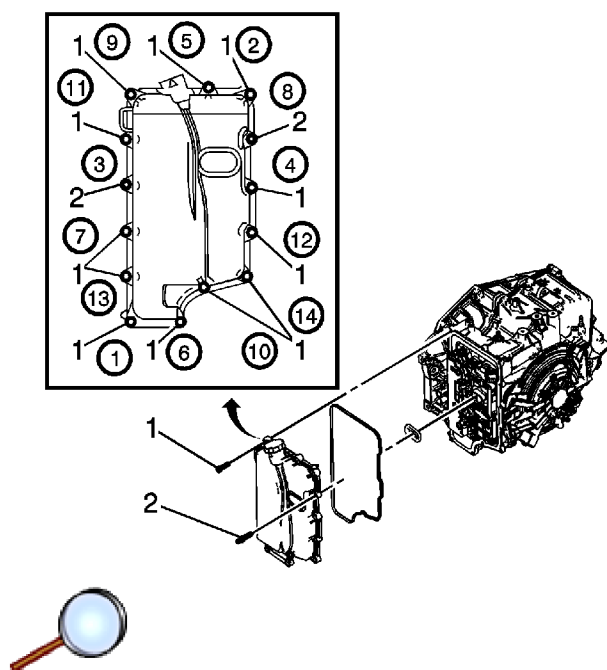


11. Remove the 2 control valve body cover studs M6 x 30.
12. Remove the 12 control valve body cover bolts M6 x 30.
13. Support the transmission with a transmission jack.
14. Using the transmission jack raise the transmission to gain clearance for removal of the control valve body cover.
15. Remove the control valve body cover.
16. Remove the control valve body cover gasket.

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

17. Remove all traces of the old gasket material. Clean the transmission case and control valve body cover gasket surfaces.
18. Remove the control valve body cover wiring connector hole seal from the TCM.

Installation Procedure



Note: The holes in the control valve body cover wiring connector hole seal must face toward the control solenoid valve assembly. If the holes face toward the valve body cover, there is a potential for a leak around the seal.

1. Install the control valve body cover wiring connector hole seal.
2. Install the control valve body cover gasket to the control valve body cover.
3. Install the control valve body cover.
4. Lower the transmission and remove the transmission jack.

Caution: Refer to [Fastener Caution](#) in the Preface section.

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

5. Install the 12 control valve body cover bolts (1) M6 x 30.

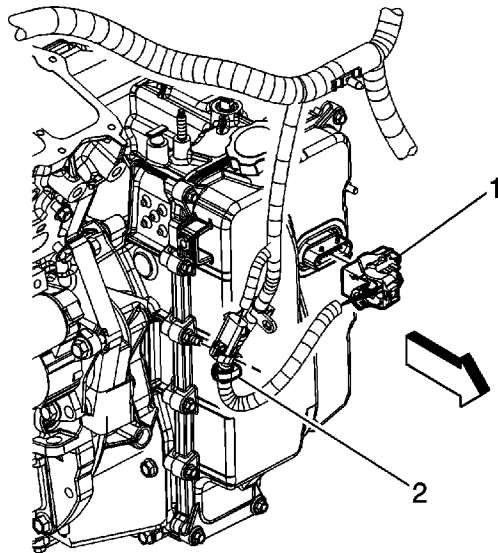
Tighten

Tighten the bolts in sequence to 12 N·m (106 lb in).

6. Install the 2 control valve body cover studs (2) M6 x 30.

Tighten

Tighten the studs in sequence to 12 N·m (106 lb in).

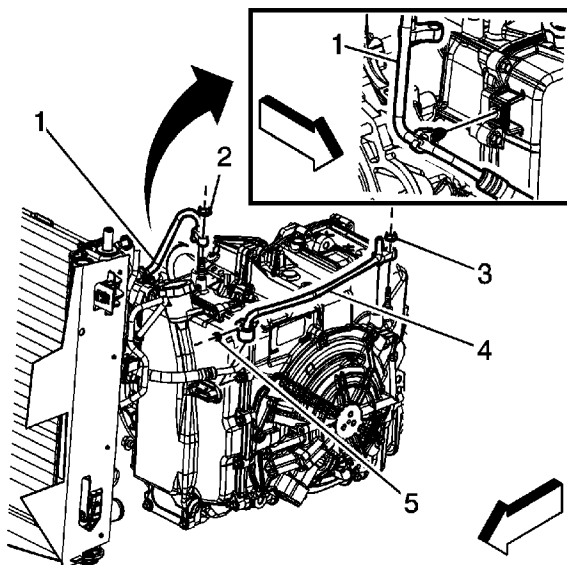


7. Connect the control valve body TCM electrical connector (1).
8. Install the wire harness retainer (2) to the control valve body cover stud.

Tighten

Tighten the nut to 12 N·m (106 lb in).

9. Install the left engine splash shield. Refer to [Engine Splash Shield Replacement](#).
10. Lower the vehicle.



11. Install the oil cooler outlet hose (4) to the retainer on the control valve body cover.
12. Install the oil cooler outlet hose retainer nut (5) to the control valve body cover.

Tighten

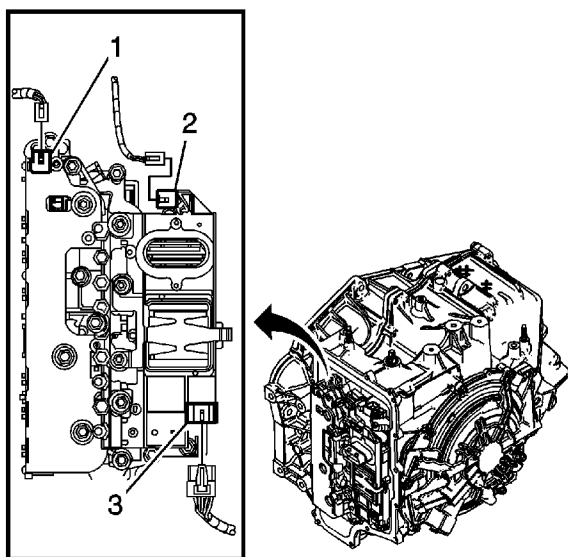
Tighten the nut to 12 N·m (106 lb in).

13. Install the oil cooler inlet hose (1) to the retainer on the control valve body cover.
14. Connect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#).
15. Fill the transmission. Refer to [Transmission Fluid Replacement](#).
16. Check for leaks.

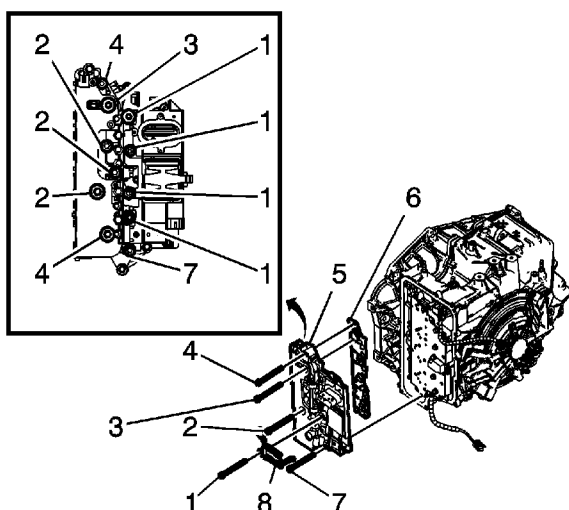
Control Solenoid Valve and Transmission Control Module Assembly Replacement

Removal Procedure

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



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





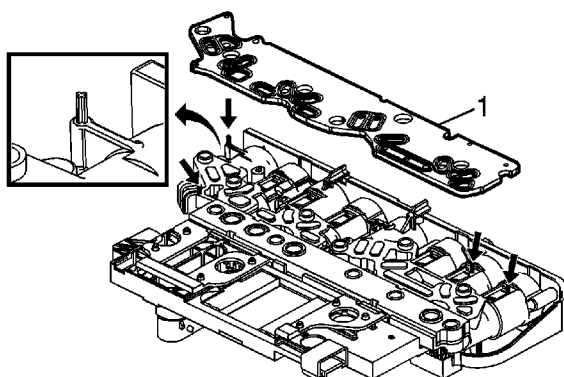
5. Remove the 4 control valve body bolts (1) M6 x 80.
6. Position the control solenoid valve spring (8) to the side. Spring will be released with the removal of the control valve body assembly.
7. Remove the 2 control valve body bolts (4) M6 x 65.
8. Remove the control valve body bolt (3) M6 x 42.
9. Remove the 3 control valve body bolts (2) M6 x 95.
10. Remove the control valve body bolt (7) M6 x 55.
11. Remove the control solenoid valve body and transmission control module (TCM) assembly (5).

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

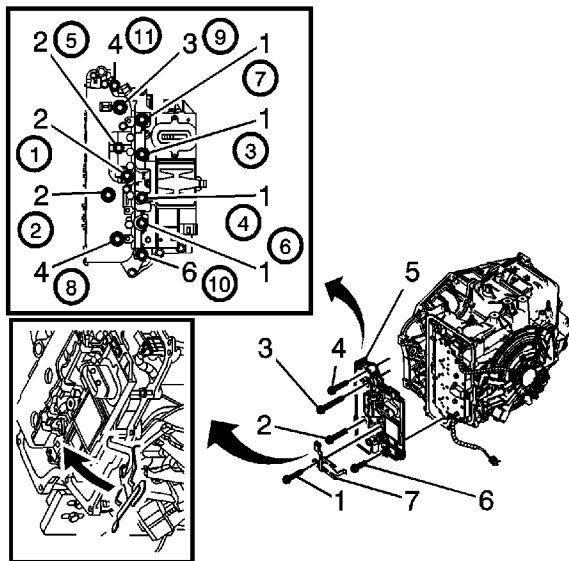
12. Remove the control solenoid valve assembly filter plate (6).
 - Discard the filler plate. It is not reusable.
 - Inspect the pressure switch manifold seals for damage or contamination. Replace the control solenoid valve assembly as necessary.
 - Inspect the upper channel plate bolt holes for damage, peening or burnelling. Any damage around the bolt holes near the pressure control switch (PCS) feed holes could cause leakage around the PCS seals. Replace the upper channel plate as necessary.

Installation Procedure

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 (1).

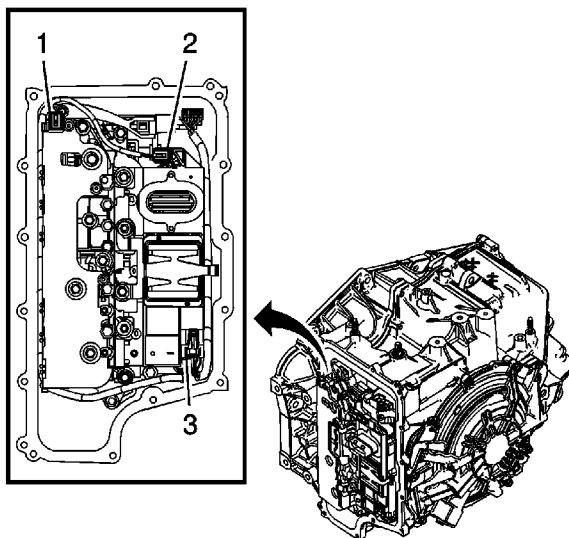


2. Install the control solenoid valve body and TCM assembly (5).
3. Rotate the control solenoid valve spring (7) into position.

Caution: Refer to [Fastener Caution](#) in the Preface section.

Note: Install all bolts before tightening, then tighten in specified sequence.

4. Install the 4 control valve body bolts (1) M6 x 80.
5. Install the control valve body bolt (6) M6 x 55.
6. Install the 3 control valve body bolts (2) M6 x 95.
7. Install the control valve body bolt (3) M6 x 42.
8. Install the 2 control valve body bolts (4) M6 x 65 and tighten to **12 N·m (106 lb in)**.



9. Connect the input speed sensor electrical connector (1).

10. Connect the output speed sensor electrical connector (2).
11. Connect the shift position switch electrical connector (3).
12. Install the control valve body cover. Refer to [Control Valve Body Cover Replacement](#).
13. For transmission control module programming and setup. Refer to [Control Module References](#).

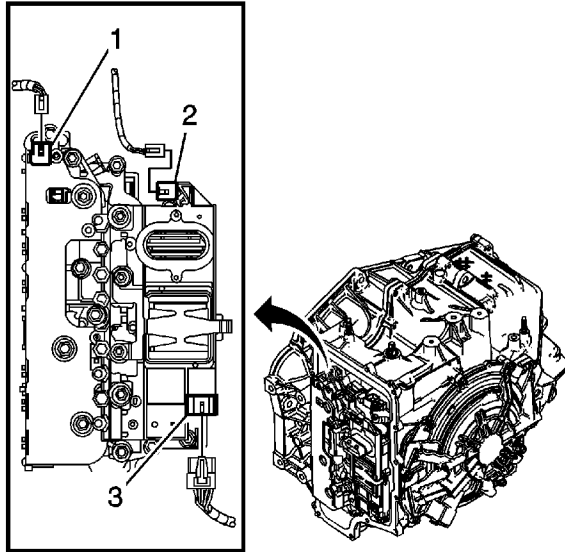
Note: After an internal transmission repair or internal part replacement the service fast learn adapt procedure should be performed.

14. Perform the service fast learn adapt procedure. Refer to [Service Fast Learn Adapts](#).

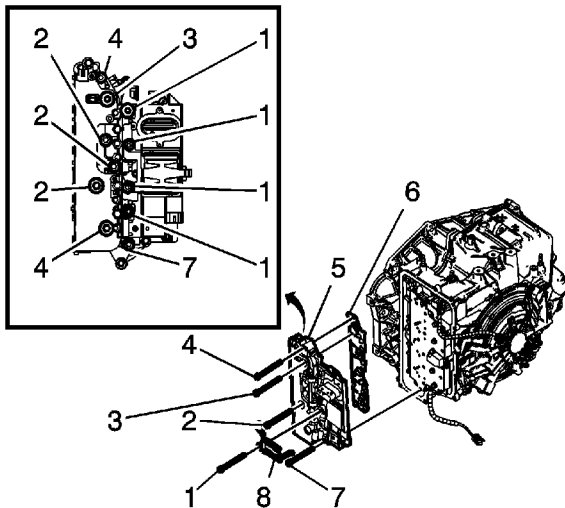
Control Valve Lower Body and Upper Body Replacement

Removal Procedure

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



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



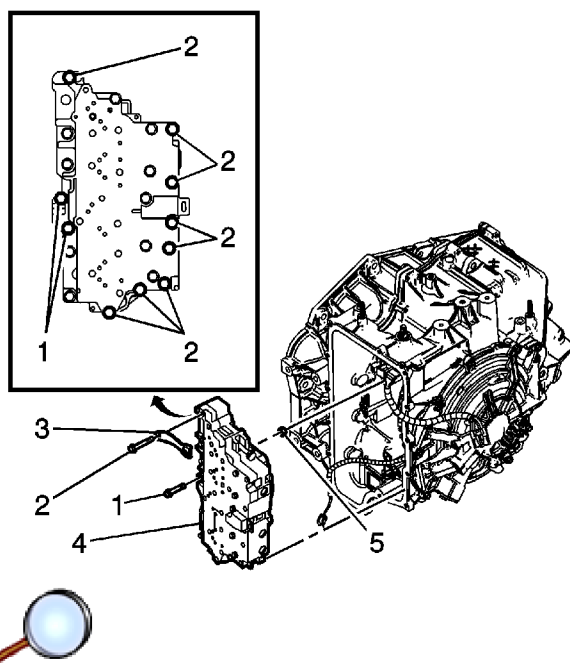
5. Remove the 4 control valve body bolts (1) M6 x 80.

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6. Position the control solenoid valve spring (8) to the side. Spring will be released with removal of lower control valve body.
7. Remove the 2 control valve body bolts (4) M6 x 65.
8. Remove the control valve body bolt (3) M6 x 42.
9. Remove the 3 control valve body bolts (2) M6 x 95.
10. Remove the control valve body bolt (7) M6 x 55.
11. Remove the control solenoid valve body and transmission control module (TCM) assembly (5).

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

12. Remove the control solenoid valve body assembly filter plate (6).
 - Discard the filler plate. It is not reusable.
 - Inspect the pressure switch manifold seals for damage or contamination. Replace the control solenoid valve assembly as necessary.
 - Inspect the upper channel plate bolt holes for damage, peening or burnelling. Any damage around the bolt holes near the PCS switch feed holes could cause leakage around the PCS switch seals. Replace the upper channel plate as necessary.

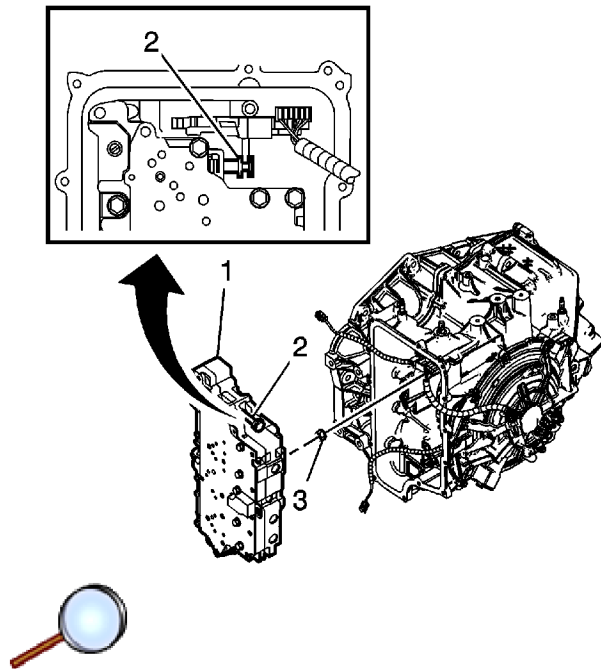


13. Remove the 8 control valve body bolts (2) M6 x 65.
14. Remove the 2 control valve body bolts (1) M6 x 55.
15. Remove the manual shaft detent assembly (3).
16. Remove the control valve body assembly (4).
17. The control solenoid valve spring can now be fully removed from the lower control valve body assembly.

Note: The clutch fluid passage seal is not reusable.

18. Remove the 1-2-3-4 clutch fluid passage seal (5).

Installation Procedure



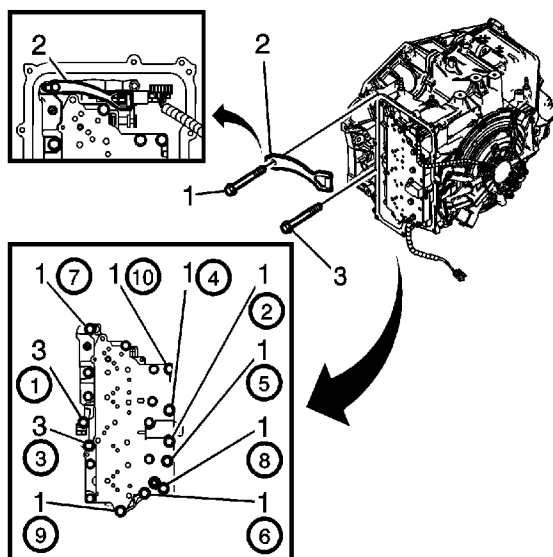
Note: The clutch fluid passage seal is not reusable.

1. Install a NEW 1-2-3-4 clutch fluid passage seal (3).

Note: Ensure the control solenoid valve spring is attached to the lower control valve body assembly.

Note: Align the manual valve (2) to the detent lever assembly while installing the lower control valve body assembly.

2. Install the control valve body assembly (1).





Note: Ensure proper alignment of the detent assembly to the detent lever assembly with position switch while tightening the bolt. The detent assembly can move and hit the valve body assembly that could cause improper engagement with the detent lever assembly.

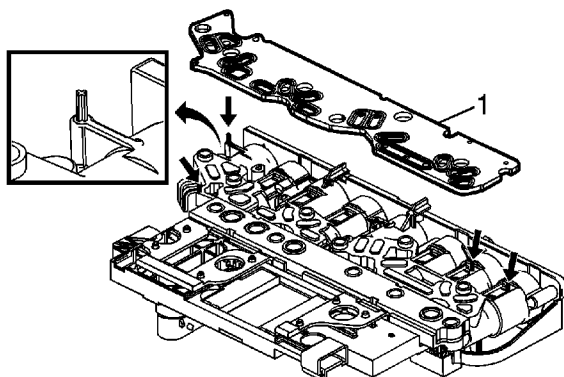
3. Install the manual shaft detent assembly (2).

Caution: Refer to [Fastener Caution](#) in the Preface section.

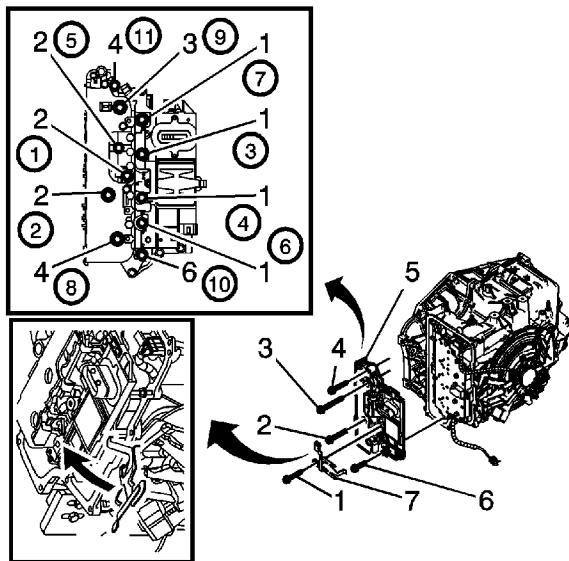
Note: Install all bolts before tightening, then tighten in specified sequence.

4. Install the 8 control valve body bolts (1) M6 x 65 and tighten to **12 N·m (106 lb in)**.
5. Install the 2 control valve body bolts (3) M6 x 55 and tighten to **12 N·m (106 lb in)**.

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.



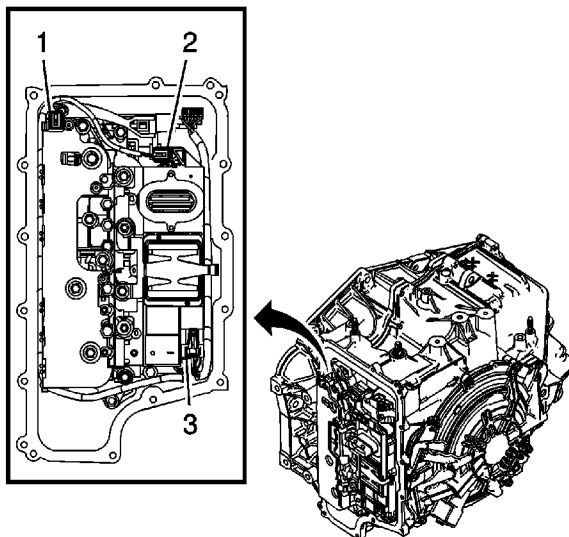
6. Install a NEW control solenoid valve assembly filter plate (1).



7. Install the control solenoid valve body and TCM assembly (5).
8. Rotate the control solenoid valve spring (7) into position.

Note: Install all bolts before tightening, then tighten in specified sequence.

9. Install the 4 control valve body bolts (1) M6 x 80.
10. Install the control valve body bolt (6) M6 x 55.
11. Install the 3 control valve body bolts (2) M6 x 95.
12. Install the control valve body bolt (3) M6 x 42.
13. Install the 2 control valve body bolts (4) M6 x 65.



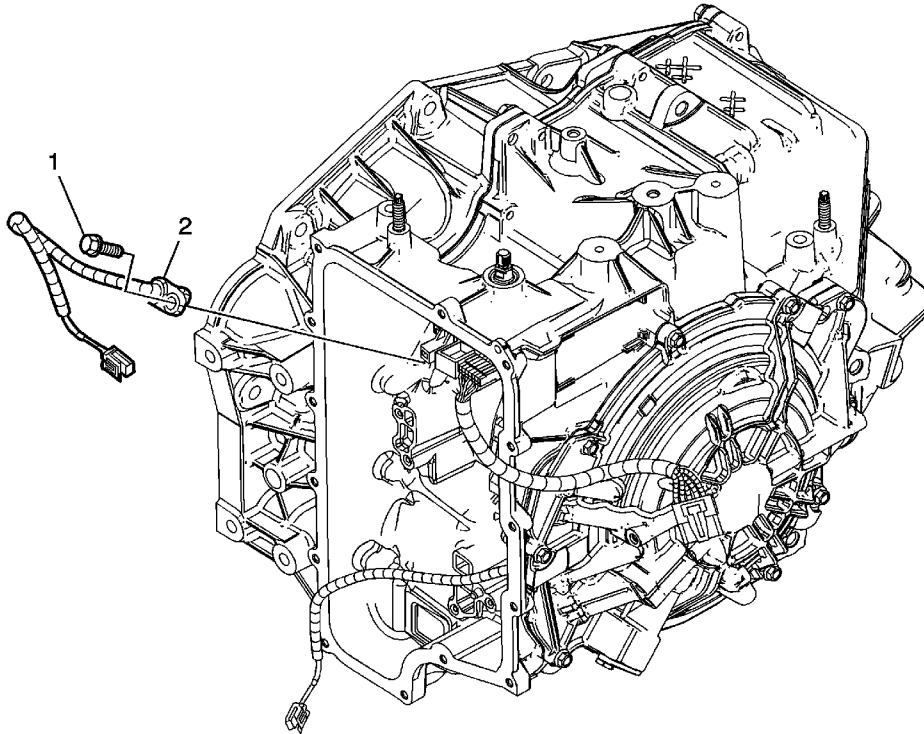
14. Connect the input speed sensor electrical connector (1).
15. Connect the output speed sensor electrical connector (2).
16. Connect the shift position switch electrical connector (3).

17. Install the control valve body cover. Refer to [Control Valve Body Cover Replacement](#).
18. For transmission control module programming and setup. Refer to [Control Module References](#).

Note: After an internal transmission repair or internal part replacement the service fast learn adapt procedure should be performed.

19. Perform the service fast learn adapt procedure. Refer to [Service Fast Learn Adapts](#).

Output Speed Sensor Replacement

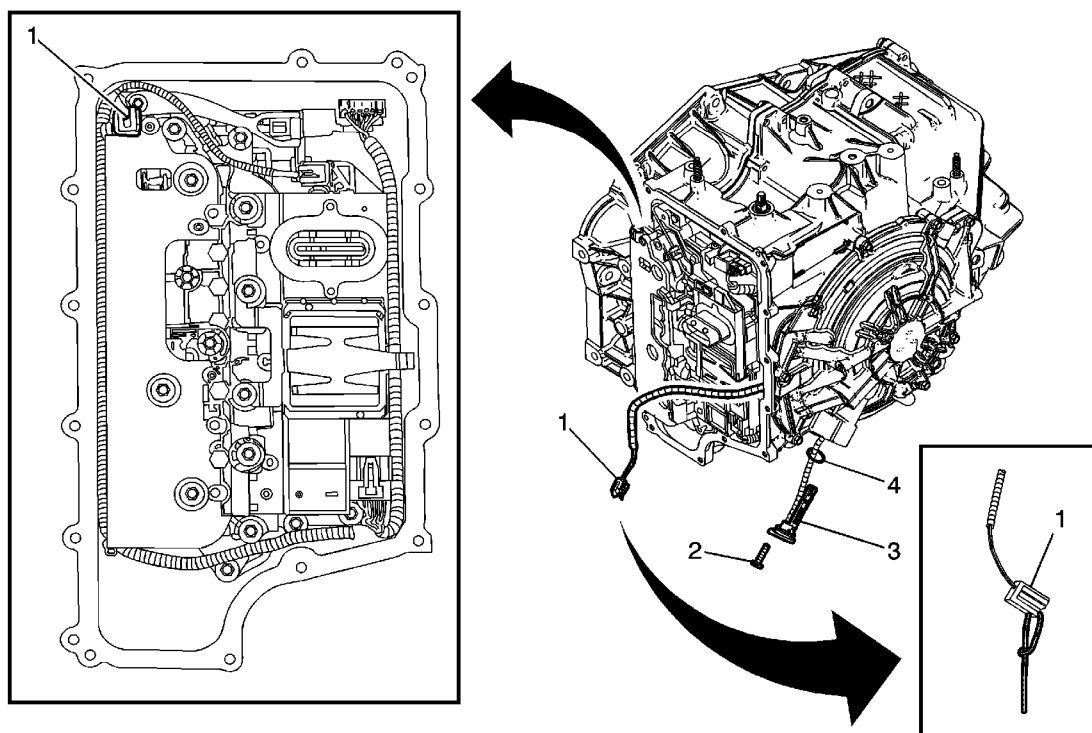


Callout	Component Name
Preliminary Procedures 1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle. 2. Remove the control valve lower body and upper body. Refer to Control Valve Lower Body and Upper Body Replacement.	
1	Output Speed Sensor Bolt M6 x 25 Caution: Refer to Fastener Caution in the Preface section. Tighten 12 N·m (106 lb in)
2	Output Speed Sensor Procedure Perform the service fast learn adapt procedure. Refer to Service Fast Learn Adapts. Tip After an internal transmission repair or internal part replacement the service fast

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learn adapt procedure should be performed.

Input Speed Sensor Replacement

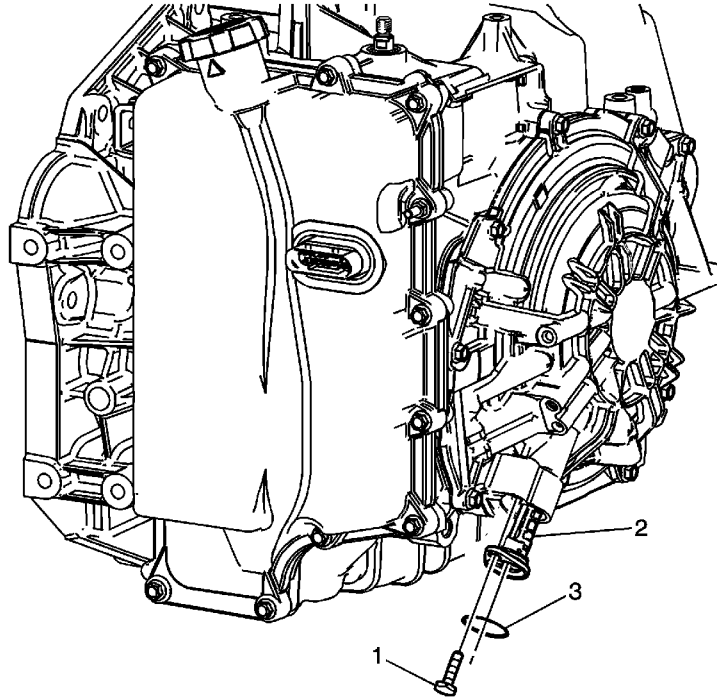


Callout	Component Name
Preliminary Procedures 1. Remove the control valve body cover. Refer to Control Valve Body Cover Replacement. 2. Remove the left transmission mount bracket. Refer to Transmission Mount Bracket Replacement - Left Side.	
1	Input Speed Sensor (ISS) Wire Harness Procedure Attach DT-47734 speed sensor harness tether to the ISS electrical connector locking tab before removal of old ISS to assist in installation of the new ISS. Special Tools DT-47734 Speed Sensor Harness Tether
	Input Speed Sensor Bolt M6 x 25 Caution: Refer to Fastener Caution in the Preface section.

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2	Procedure Apply threadlocker GM P/N 12345382 (Canadian P/N 10953489) or equivalent to the input speed sensor bolt. Tighten 9 N·m (7 lb in)
3	Input Speed Sensor Procedure Perform the service fast learn adapt procedure. Refer to Service Fast Learn Adapts. Tip After an internal transmission repair or internal part replacement the service fast learn adapt procedure should be performed.
4	Input Speed Sensor Seal

Input Speed Sensor Seal Replacement



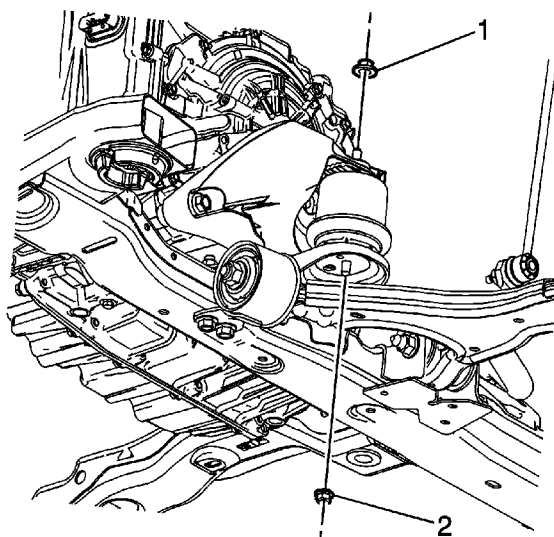
Callout	Component Name
Preliminary Procedures 1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle. 2. Drain the transmission, refill when repair is completed. Refer to Transmission Fluid Replacement. 3. Remove the left transmission mount bracket. Refer to Transmission Mount Bracket Replacement - Left Side.	
1	Input Speed Sensor Bolt M6 x 25 Caution: Refer to Fastener Caution in the Preface section. Procedure Apply threadlocker GM P/N 12345382 (Canadian P/N 10953489) or equivalent to the input speed sensor bolt. Tighten 9 N·m (80 lb in)
	Input Speed Sensor (ISS)

2	Procedure Pull the ISS out of the case cover just far enough to gain access to the ISS seal.
3	Input Speed Sensor Seal Procedure • Remove the ISS seal by pulling it over the end of the ISS base. • Install the new ISS Seal by gently stretching it over the ISS base. Overstretching the seal will cause it to not seal properly. The seal is coated with a dry lubricant. If the coating is missing, lubricate the seal with automatic transmission fluid prior to installation.

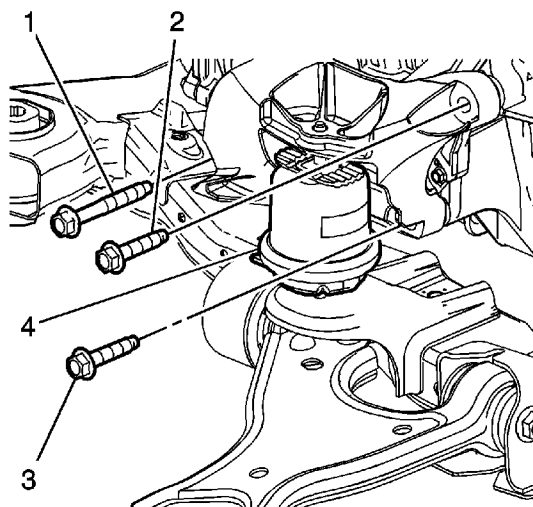
Transmission Mount Bracket Replacement - Left Side

Removal Procedure

1. Raise and support the vehicle. Refer to [Lifting and Jacking the Vehicle](#).
2. Remove the left engine splash shield. Refer to [Engine Splash Shield Replacement](#).
3. Support the transmission with a transmission jack.



4. Remove the transmission mount nuts (1, 2).

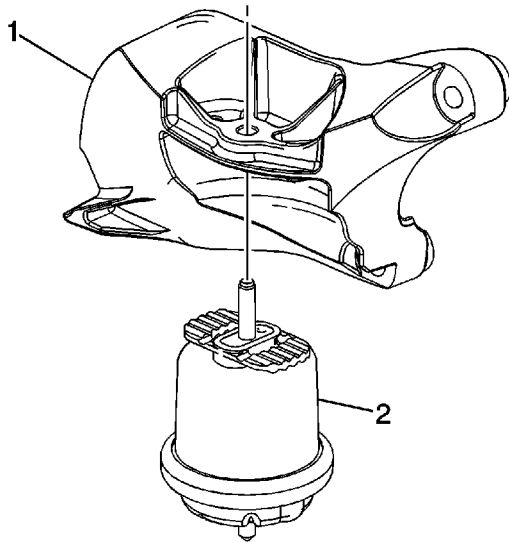


5. Remove the transmission mount bracket bolts (1, 2).
6. Using the transmission jack, lift the transmission just enough to gain clearance for tilting the

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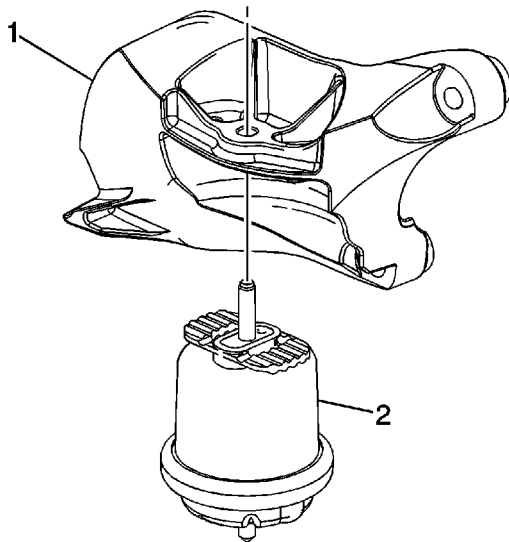
transmission mount.

7. Remove the transmission mount bracket bolt (3).



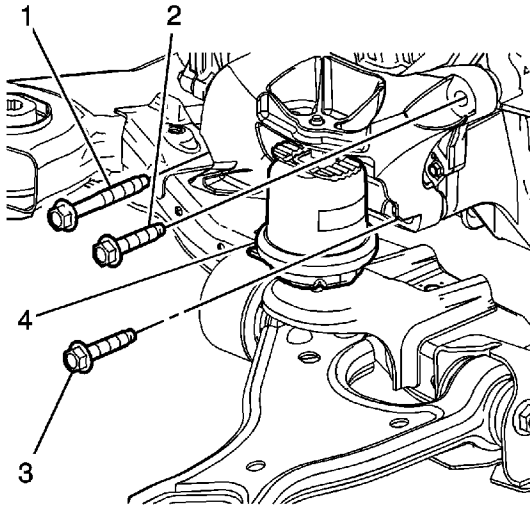
8. Remove the transmission mount (2) and bracket (1) from the vehicle.

Installation Procedure

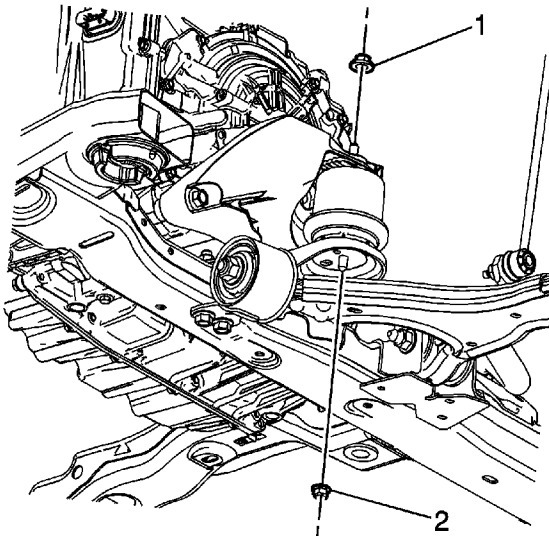


1. Install the transmission mount (2) and bracket (1) to the vehicle.

Caution: Refer to [Fastener Caution](#) in the Preface section.

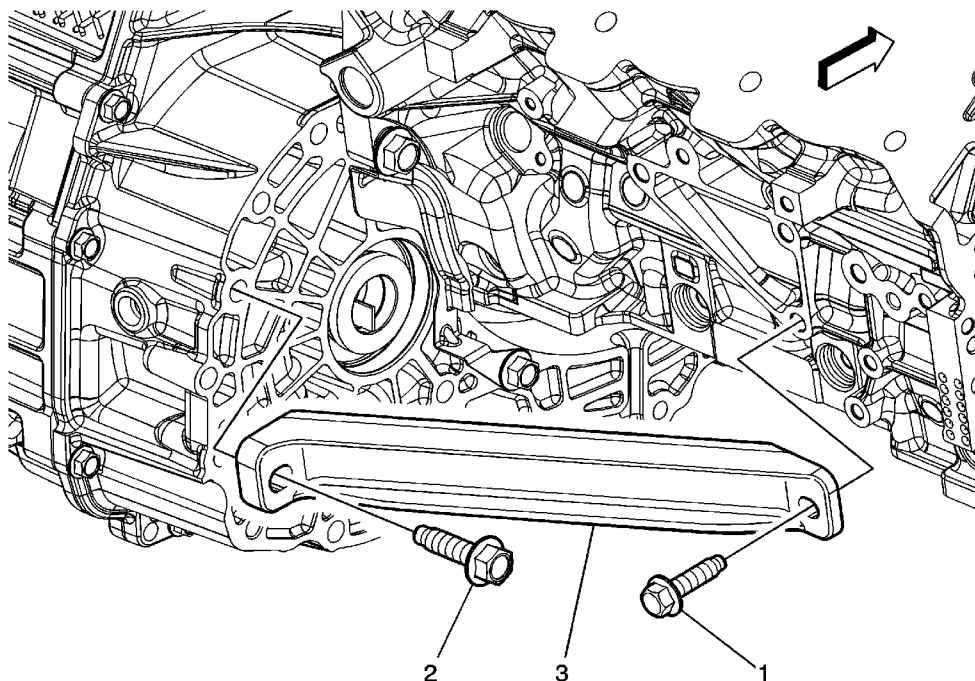


2. Install the transmission mount bracket bolt (3) and tighten to **90 N·m (66 lb ft)**.
3. Install the transmission mount bracket bolt (1) and tighten to **90 N·m (66 lb ft)**.
4. Using the transmission jack, lower the transmission until the transmission mount bracket rests on the transmission mount.
5. Install the transmission mount bracket bolt (2) and tighten to **90 N·m (66 lb ft)**.
6. Remove the transmission jack.



7. Install the transmission mount nut (2) and tighten to **75 N·m (55 lb ft)**.
8. Install the transmission mount nut (1) and tighten to **90 N·m (66 lb ft)**.
9. Install the left engine splash shield. Refer to [Engine Splash Shield Replacement](#).
10. Lower the vehicle

Transmission Brace Replacement

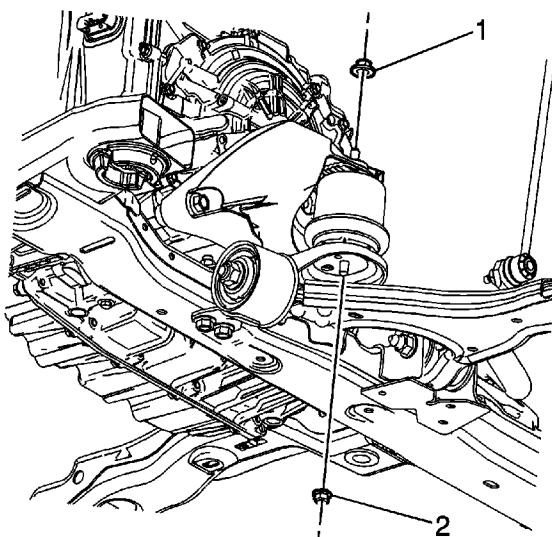


Callout	Component Name
Preliminary Procedures 1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle . 2. Remove the right and left catalytic converters. Refer to Catalytic Converter Replacement - Left Side and Catalytic Converter Replacement - Right Side . 3. Support the transaxle with a transaxle jack.	
1	Rear Transaxle Brace Bolt Caution: Refer to Fastener Caution in the Preface section. Tighten 50 N·m (37 lb ft)
2	Rear Transaxle Brace Bolt Tighten 50 N·m (37 lb ft)
3	Rear Transaxle Brace

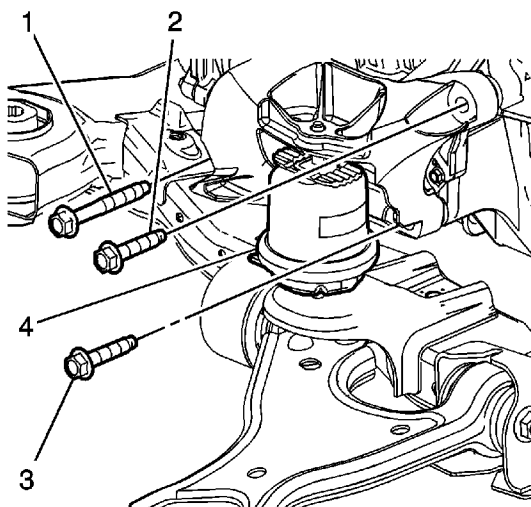
Transmission Mount Replacement - Left Side

Removal Procedure

1. Raise and support the vehicle. Refer to [Lifting and Jacking the Vehicle](#).
2. Remove the left engine splash shield. Refer to [Engine Splash Shield Replacement](#).
3. Support the transmission with a transmission jack.



4. Remove the transmission mount nuts (1, 2).

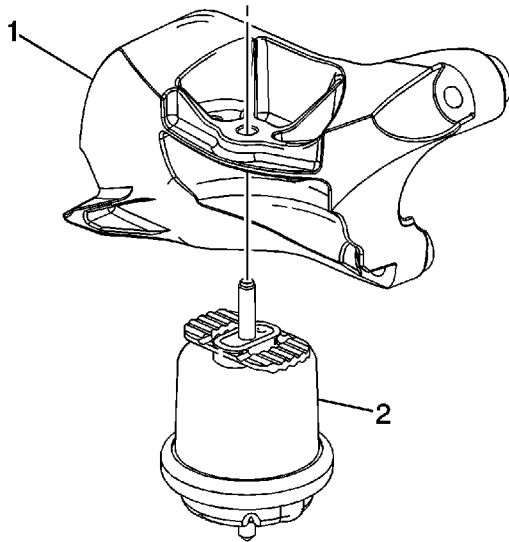


5. Remove the transmission mount bracket bolts (1, 2).
6. Using the transmission jack, lift the transmission just enough to gain clearance for tilting the

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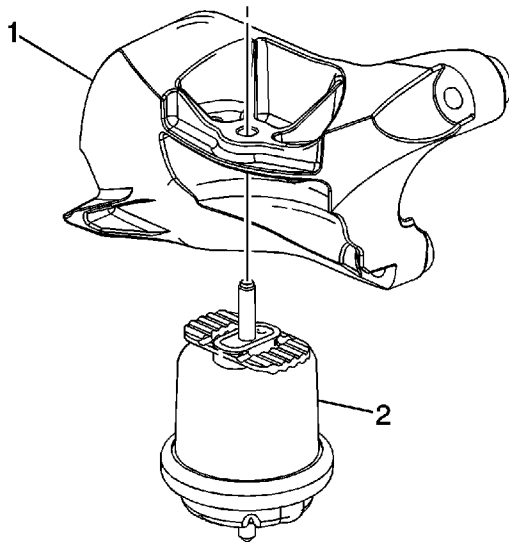
transmission mount.

7. Remove the transmission mount bracket bolt (3).



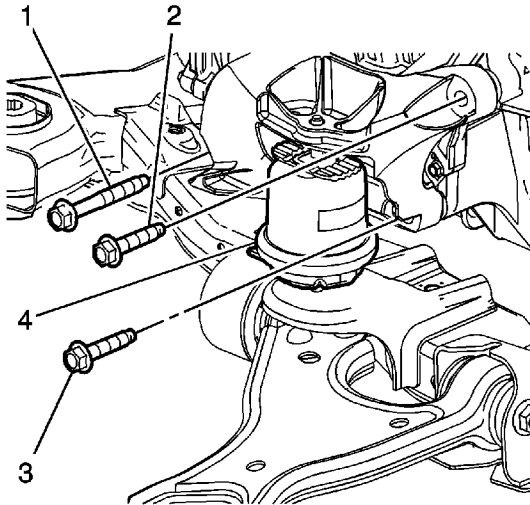
8. Remove the transmission mount (2) and bracket (1) from the vehicle.

Installation Procedure

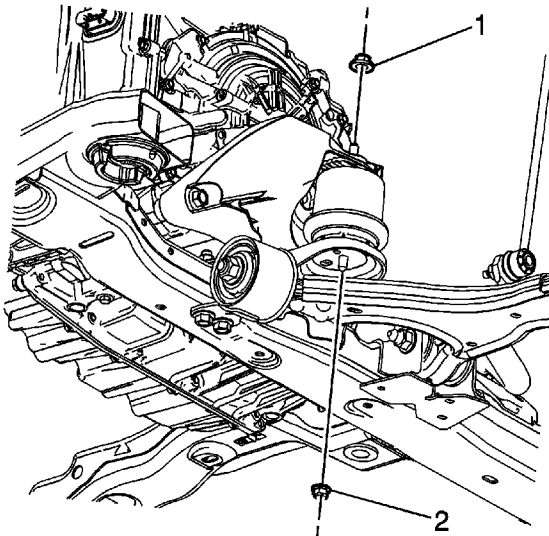


1. Install the transmission mount (2) and bracket (1) to the vehicle.

Caution: Refer to Fastener Caution in the Preface section.



2. Install the transmission mount bracket bolt (3) and tighten to **90 N·m (66 lb ft)**.
3. Install the transmission mount bracket bolt (1) and tighten to **90 N·m (66 lb ft)**.
4. Using the transmission jack, lower the transmission until the transmission mount bracket rests on the transmission mount.
5. Install the transmission mount bracket bolt (2) and tighten to **90 N·m (66 lb ft)**.
6. Remove the transmission jack.

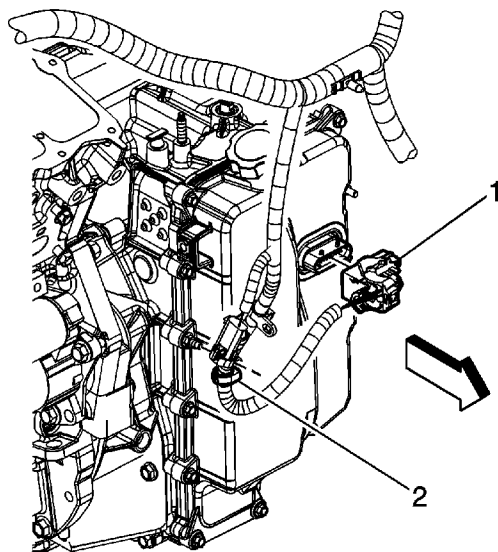


7. Install the transmission mount nut (2) and tighten to **75 N·m (55 lb ft)**.
8. Install the transmission mount nut (1) and tighten to **90 N·m (66 lb ft)**.
9. Install the left engine splash shield. Refer to [Engine Splash Shield Replacement](#).
10. Lower the vehicle

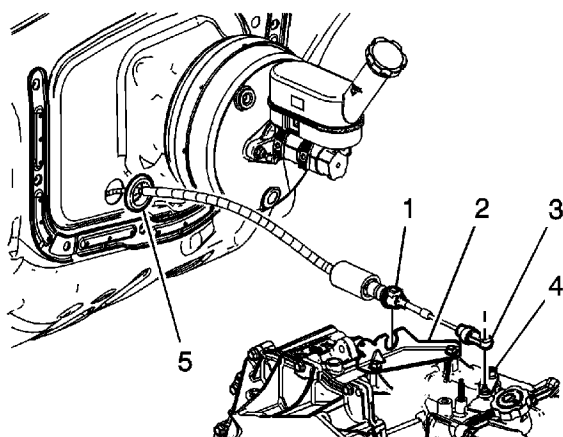
Transmission Replacement (Front Wheel Drive)

Removal Procedure

1. Remove the air cleaner assembly. Refer to [Air Cleaner Assembly Replacement](#).



2. Remove the wire harness retainer (2) from the control valve body cover stud.
3. Disconnect the control valve body transmission control module (TCM) electrical connector (1).

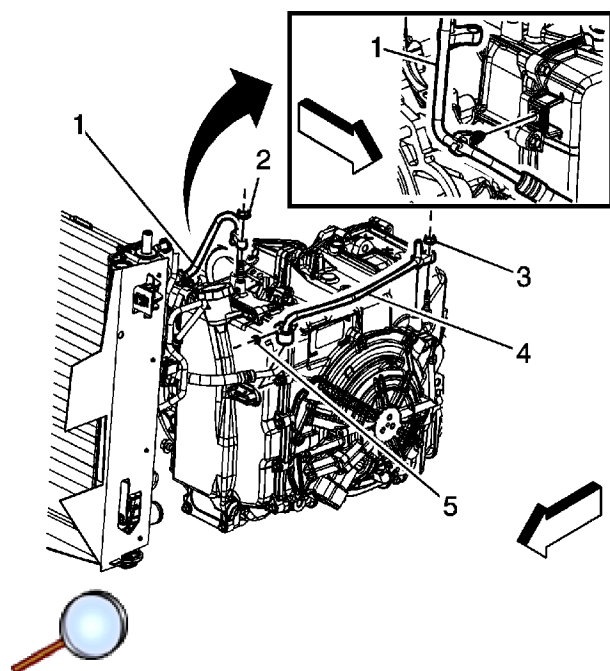


4. Disconnect the transmission range selector lever cable terminal (3) from the transmission

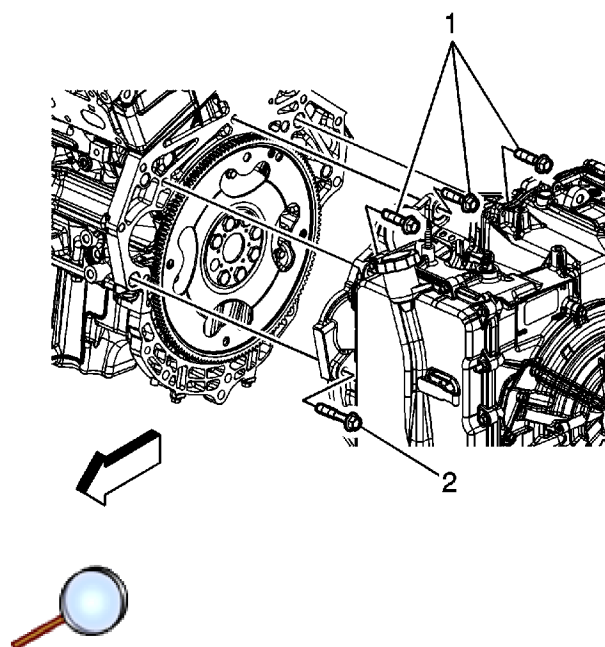
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manual shift lever (4).

5. Press the locking tabs inward in order to release the transmission range selector lever cable (1) from the cable bracket (2).

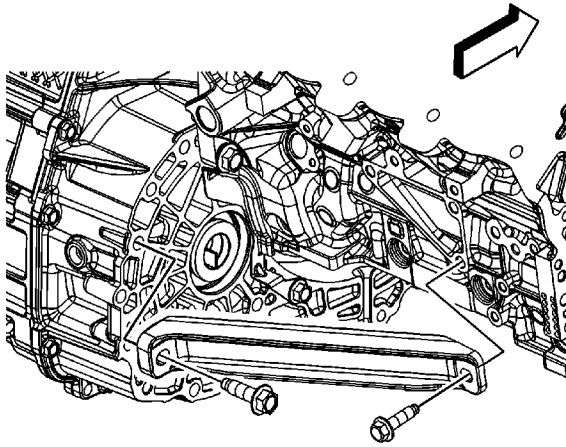


6. Release the transmission fluid cooler inlet pipe retainer from the transmission control valve body cover.
7. Remove the transmission fluid cooler inlet pipe nut (2).
8. Remove the transmission fluid cooler inlet pipe (1) and seal from the transmission.
9. Remove the oil cooler outlet pipe retainer nut (5) and retainer from the transmission control valve body cover.
10. Remove the transmission fluid cooler outlet pipe nut (3).
11. Remove the transmission fluid cooler outlet pipe (4) and seal from the transmission.
12. Plug and/or cap both fluid cooler pipes and transmission to prevent contamination.

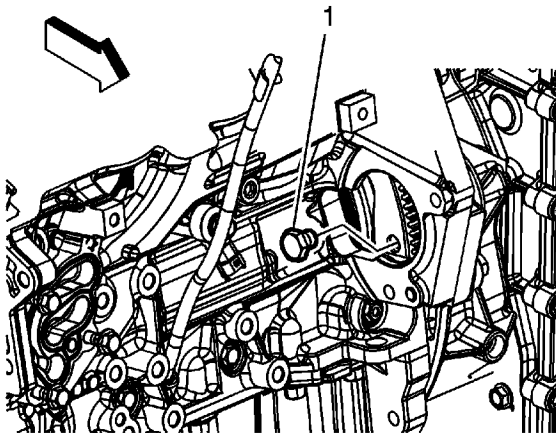


13. Remove the upper transmission to engine bolts (1, 2).
14. Install the engine support fixture. Refer to [Engine Support Fixture](#).

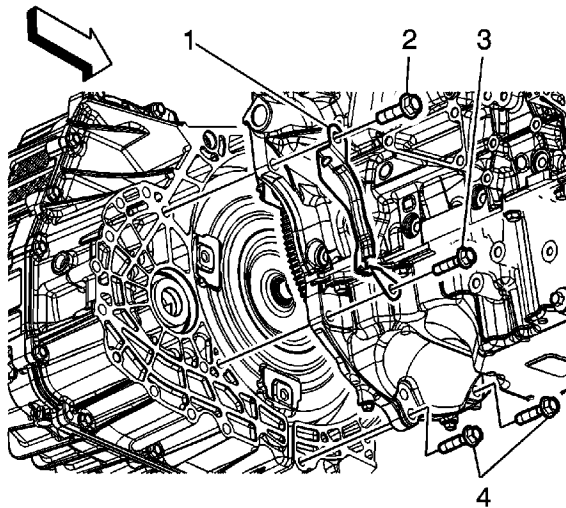
15. Raise and support the vehicle. Refer to [Lifting and Jacking the Vehicle](#).
16. Remove the frame. Refer to [Front Frame Replacement](#).
17. Disconnect the left wheel drive shaft from the transmission. Refer to [Front Wheel Drive Shaft Replacement](#).
18. Remove the intermediate drive shaft. Refer to [Intermediate Drive Shaft Replacement](#).



19. Remove the transmission brace bolts.
20. Remove the transmission brace.
21. Remove the left transmission mount bracket from the transmission. Refer to [Transmission Mount Bracket Replacement - Left Side](#).



22. Remove the starter. Refer to [Starter Motor Replacement](#).
23. Mark the relationship of the flywheel to the torque converter for reassembly.
24. Remove the 4 torque converter to flywheel bolts (1).
25. Use a transmission jack in order to support the transmission.

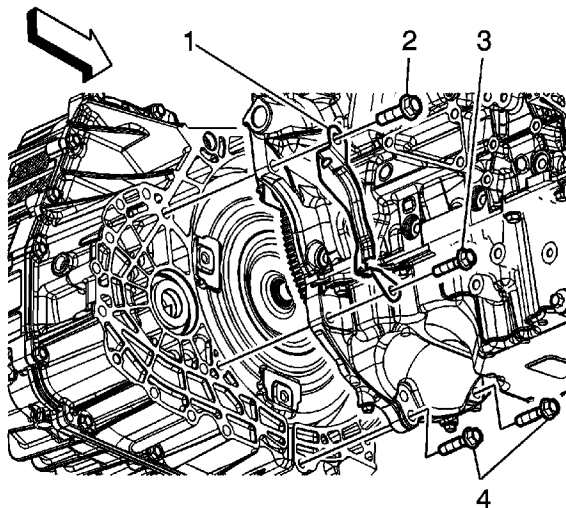


26. Remove the flywheel inspection cover bolts (2, 3).
27. Remove the flywheel inspection cover (1).
28. Remove the remaining transmission bolts (4).
29. Separate the transmission from the engine.
30. Lower the transmission with the transmission jack far enough to remove the transmission.

Installation Procedure

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

Caution: Refer to [Fastener Caution](#) in the Preface section.





2. Install the transmission bolts (4).

Tighten

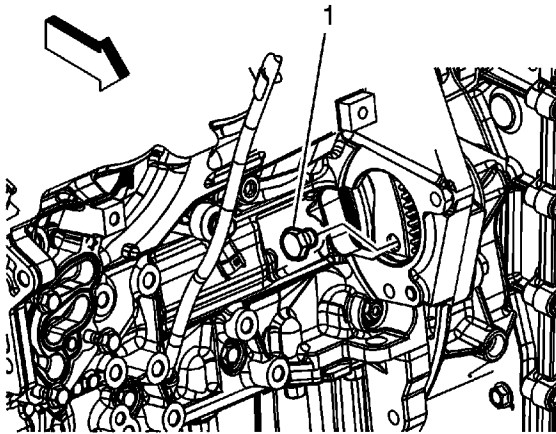
Tighten the bolt to 75 N·m (55 lb ft).

3. Install the flywheel inspection cover (1).
4. Install the flywheel inspection cover bolts (2, 3).

Tighten

Tighten the bolt to 75 N·m (55 lb ft).

5. Remove the transmission jack.

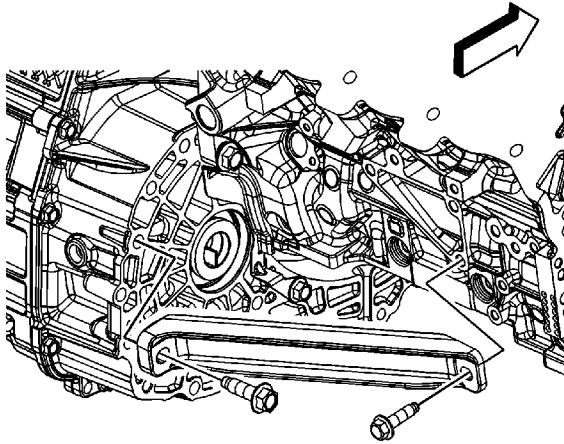


6. Install the 4 torque converter to flywheel bolts (1).

Tighten

Tighten the bolts to 62 N·m (46 lb ft).

7. Install the starter. Refer to [Starter Motor Replacement](#).
8. Install the left transmission mount bracket to the transmission. Refer to [Transmission Mount Bracket Replacement - Left Side](#).

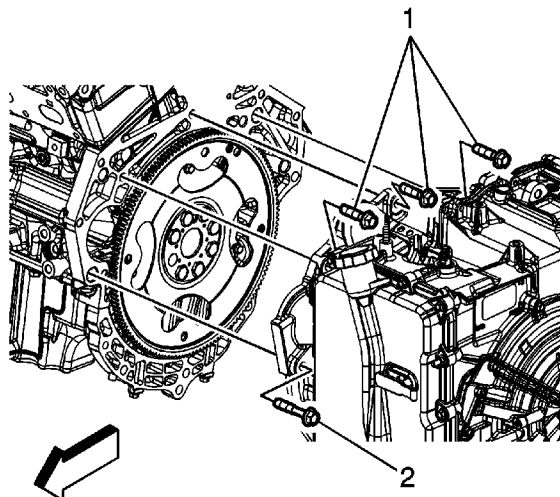


9. Install the transmission brace.
10. Install the transmission brace bolts.

Tighten

Tighten the bolt/stud to 50 N·m (37 lb ft).

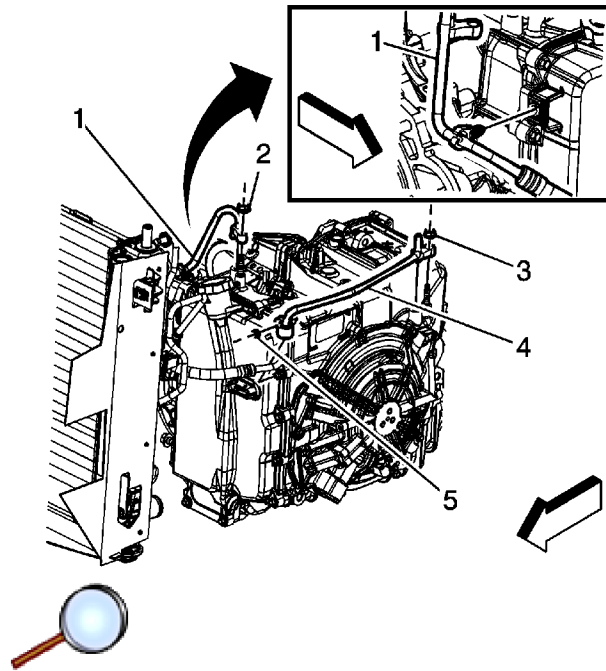
11. Install the intermediate drive shaft. Refer to [Intermediate Drive Shaft Replacement](#).
12. Install the left wheel drive shaft to the transmission. Refer to [Front Wheel Drive Shaft Replacement](#).
13. Install the frame. Refer to [Front Frame Replacement](#).
14. Lower the vehicle.
15. Remove the engine support fixture.



16. Install the upper transmission to engine bolt (1, 2).

Tighten

Tighten the bolt to 75 N·m (55 lb ft).



17. Install the transmission fluid cooler outlet pipe (4) and seal to the transmission.
18. Install the transmission fluid cooler outlet pipe nut (3).

Tighten

Tighten the nut to 22 N·m (16 lb ft).

19. Install the oil cooler outlet pipe retainer and nut (5) to the transmission control valve body cover.

Tighten

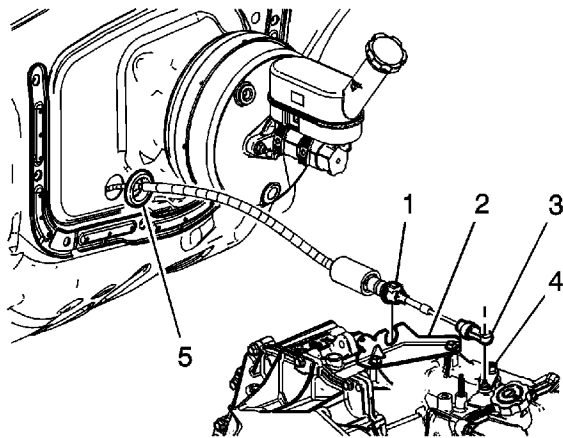
Tighten the nut to 12 N·m (106 lb in).

20. Install the transmission fluid cooler inlet pipe (1) and seal to the transmission.
21. Install the transmission fluid cooler inlet pipe nut (2).

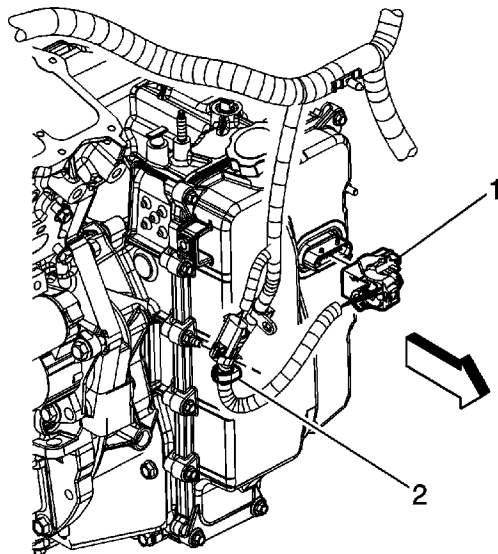
Tighten

Tighten the nut to 22 N·m (16 lb ft).

22. Install the transmission fluid cooler inlet pipe retainer to the transmission control valve body cover.



23. Install the transmission range selector lever cable (1) to the cable bracket (2).
24. Connect the transmission range selector lever cable terminal (3) to the transmission manual shift lever (4).



25. Connect the control valve body TCM electrical connector (1).
26. Install the wire harness retainer (2) to the control valve body cover stud.

Tighten

Tighten the nut to 12 N·m (106 lb in).

27. Adjust the automatic transmission range selector lever cable. Refer to [Range Selector Lever Cable Adjustment](#).
28. Verify the proper fluid level of the transmission. Refer to [Transmission Fluid Check](#).
29. Install the air cleaner assembly. Refer to [Air Cleaner Assembly Replacement](#).

30. For transmission control module programming and setup, refer to [Control Module References](#).

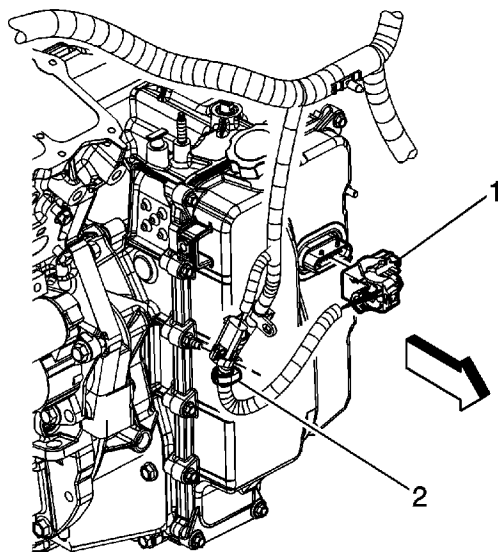
Note: After an internal transmission repair or internal part replacement the service fast learn adapt procedure should be performed.

31. Perform the service fast learn adapt procedure. Refer to [Service Fast Learn Adapts](#).
32. Road test the vehicle.

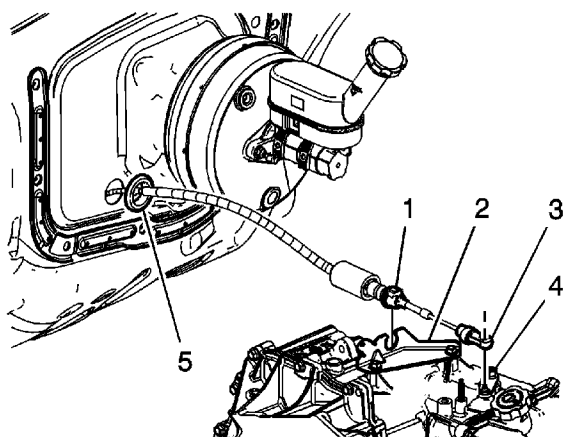
Transmission Replacement (All Wheel Drive)

Removal Procedure

1. Remove the air cleaner assembly. Refer to [Air Cleaner Assembly Replacement](#).



2. Remove the wire harness retainer (2) from the control valve body cover stud.
3. Disconnect the control valve body transmission control module (TCM) electrical connector (1).

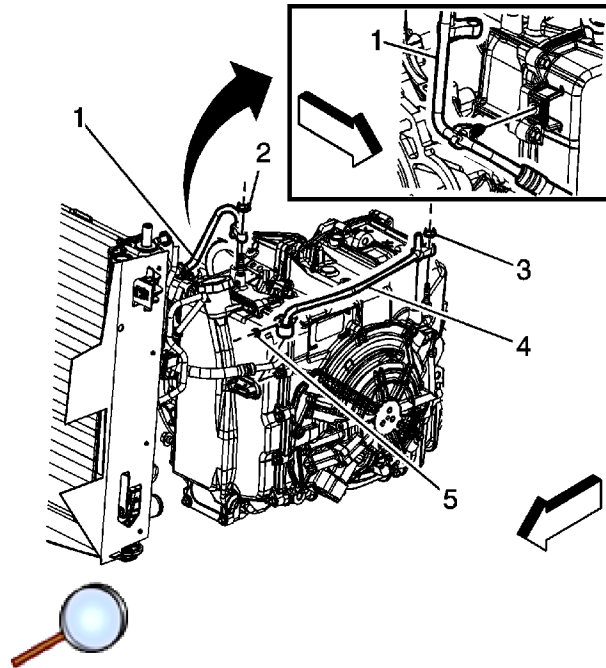


4. Disconnect the transmission range selector lever cable terminal (3) from the transmission

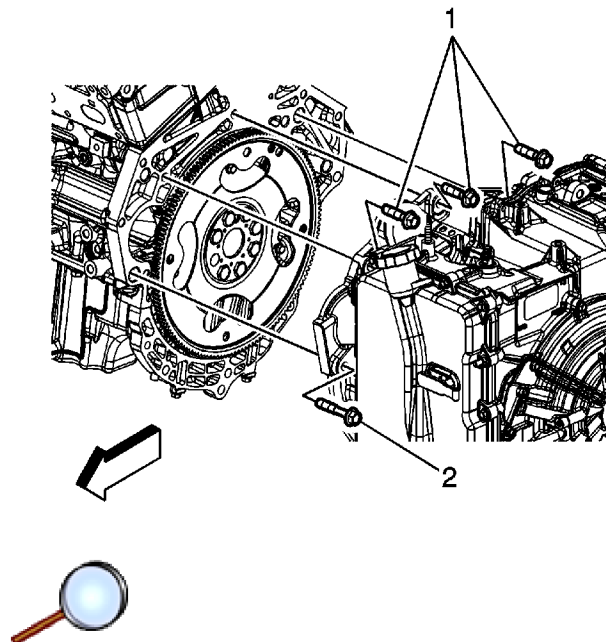
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manual shift lever (4).

5. Press the locking tabs inward in order to release the transmission range selector lever cable (1) from the cable bracket (2).

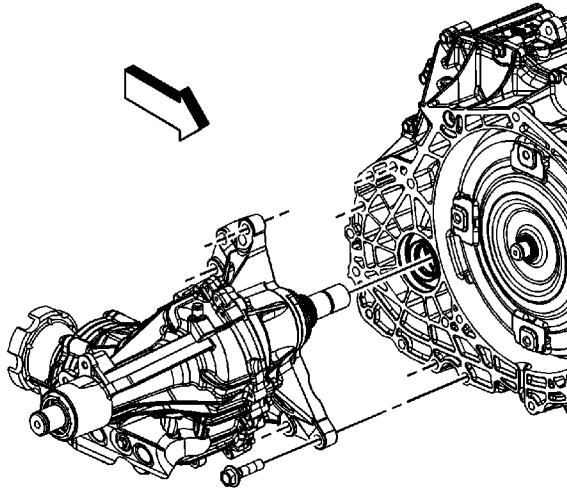


6. Release the transmission fluid cooler inlet pipe retainer from the transmission control valve body cover.
7. Remove the transmission fluid cooler inlet pipe nut (2).
8. Remove the transmission fluid cooler inlet pipe (1) and seal from the transmission.
9. Remove the oil cooler outlet pipe retainer nut (5) and retainer from the transmission control valve body cover.
10. Remove the transmission fluid cooler outlet pipe nut (3).
11. Remove the transmission fluid cooler outlet pipe (4) and seal from the transmission.
12. Plug and/or cap both fluid cooler pipes and transmission to prevent contamination.

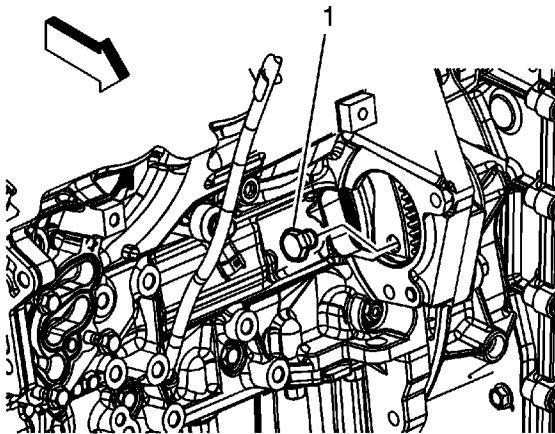


13. Remove the upper transmission to engine bolts (1, 2).
14. Install the engine support fixture. Refer to [Engine Support Fixture](#).

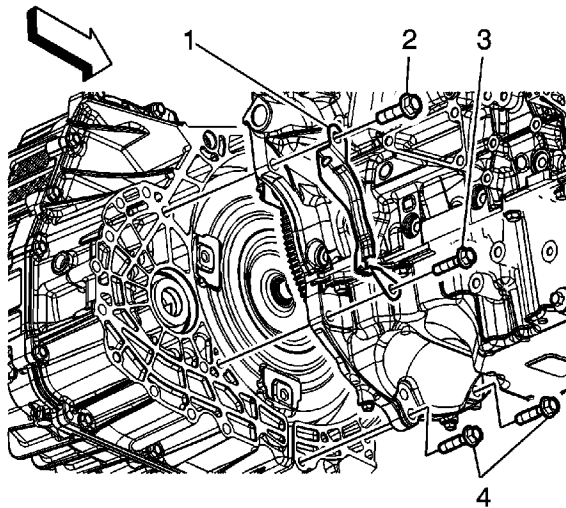
15. Raise and support the vehicle. Refer to [Lifting and Jacking the Vehicle](#).
16. Remove the frame. Refer to [Front Frame Replacement](#).
17. Disconnect the left wheel drive shaft from the transmission. Refer to [Front Wheel Drive Shaft Replacement](#).



18. Remove the transfer case. Refer to [Transfer Case Assembly Replacement](#).
19. Remove the left transmission mount bracket from the transmission. Refer to [Transmission Mount Bracket Replacement - Left Side](#).



20. Remove the starter. Refer to [Starter Motor Replacement](#).
21. Mark the relationship of the flywheel to the torque converter for reassembly.
22. Remove the 4 torque converter to flywheel bolts (1).
23. Use a transmission jack in order to support the transmission.

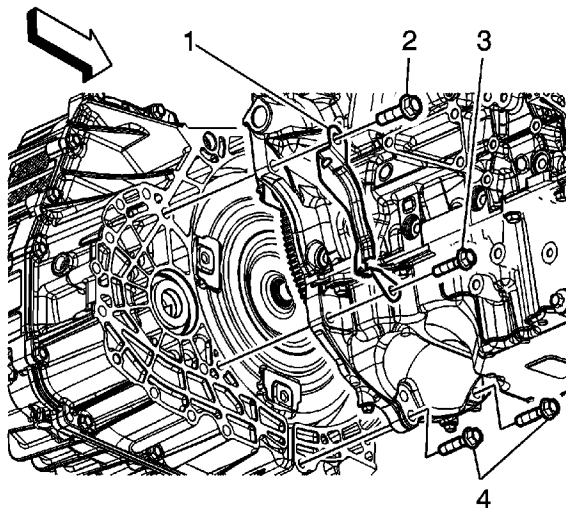


24. Remove the remaining transmission bolts (2-4).
25. Separate the transmission from the engine.
26. Lower the transmission with the transmission jack far enough to remove the transmission.

Installation Procedure

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

Caution: Refer to [Fastener Caution](#) in the Preface section.

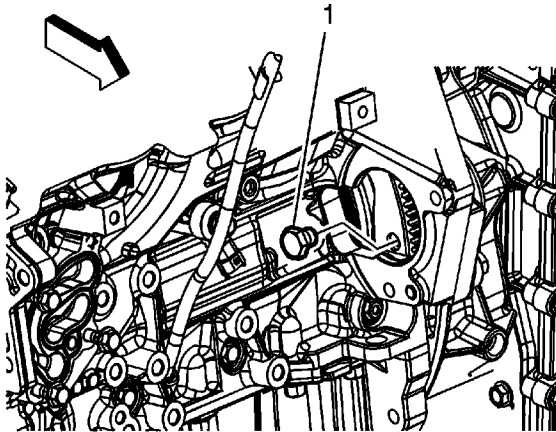


2. Install the transmission bolts (2-4).

Tighten

Tighten the bolt to 75 N·m (55 lb ft).

3. Remove the transmission jack.

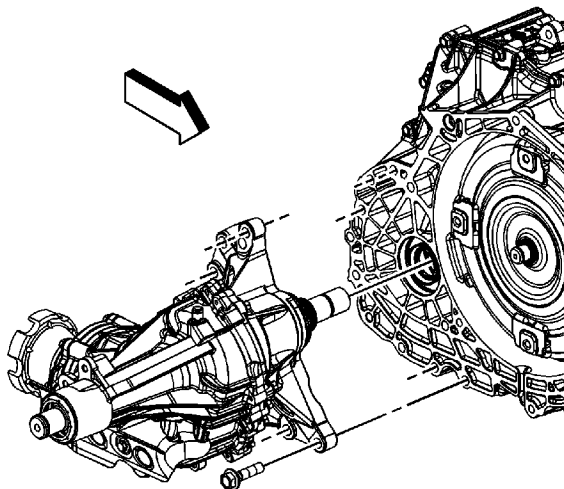


4. Install the 4 torque converter to flywheel bolts (1).

Tighten

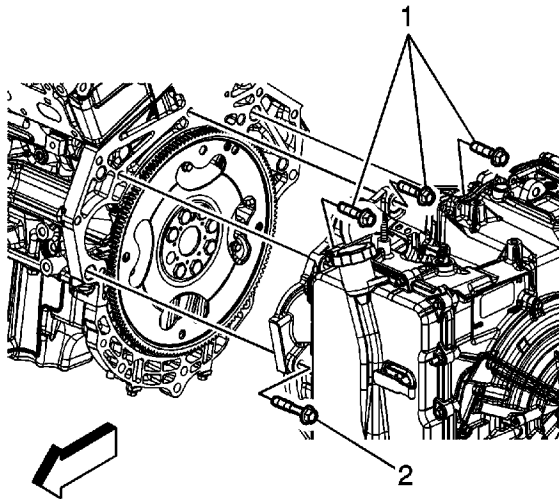
Tighten the bolts to 62 N·m (46 lb ft).

5. Install the starter. Refer to [Starter Motor Replacement](#).
6. Install the left transmission mount bracket to the transmission. Refer to [Transmission Mount Bracket Replacement - Left Side](#).



7. Install the transfer case. Refer to [Transfer Case Assembly Replacement](#).

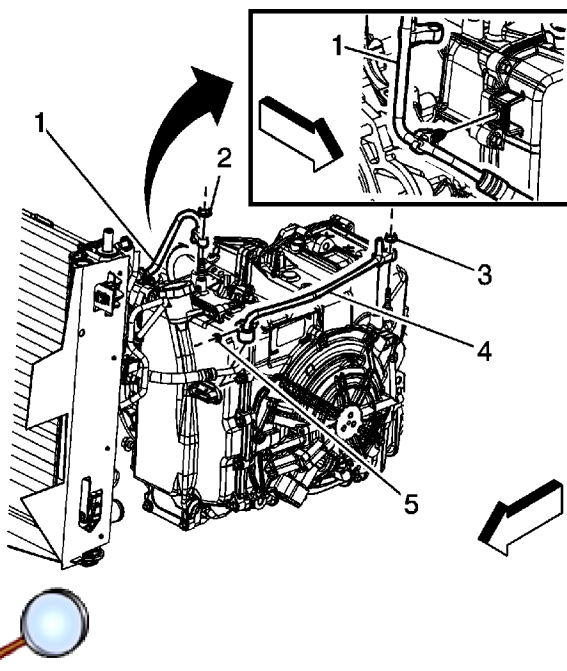
8. Install the left wheel drive shaft to the transmission. Refer to [Front Wheel Drive Shaft Replacement](#).
9. Install the frame. Refer to [Front Frame Replacement](#).
10. Lower the vehicle.
11. Remove the engine support fixture.



- 
12. Install the upper transmission to engine bolt (1, 2).

Tighten

Tighten the bolt to 75 N·m (55 lb ft).



13. Install the transmission fluid cooler outlet pipe (4) and seal to the transmission.
14. Install the transmission fluid cooler outlet pipe nut (3).

Tighten

Tighten the nut to 22 N·m (16 lb ft).

15. Install the oil cooler outlet pipe retainer and nut (5) to the transmission control valve body cover.

Tighten

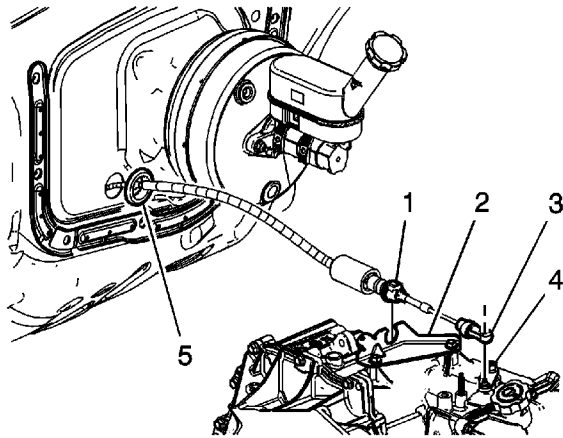
Tighten the nut to 12 N·m (106 lb in).

16. Install the transmission fluid cooler inlet pipe (1) and seal to the transmission.
17. Install the transmission fluid cooler inlet pipe nut (2).

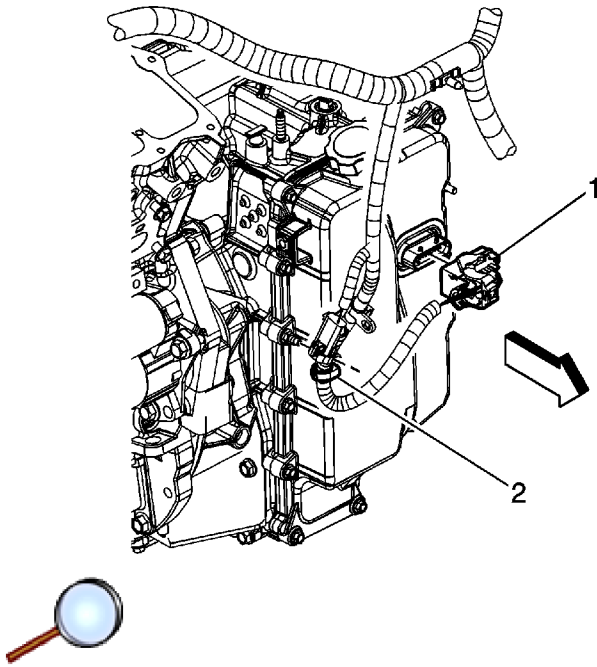
Tighten

Tighten the nut to 22 N·m (16 lb ft).

18. Install the transmission fluid cooler inlet pipe retainer to the transmission control valve body cover.



19. Install the transmission range selector lever cable (1) to the cable bracket (2).
20. Connect the transmission range selector lever cable terminal (3) to the transmission manual shift lever (4).



21. Connect the control valve body TCM electrical connector (1).
22. Install the wire harness retainer (2) to the control valve body cover stud.

Tighten

Tighten the nut to 12 N·m (106 lb in).

23. Adjust the automatic transmission range selector lever cable. Refer to [Range Selector Lever Cable Adjustment](#).
24. Verify the proper fluid level of the transmission. Refer to [Transmission Fluid Check](#).
25. Install the air cleaner assembly. Refer to [Air Cleaner Assembly Replacement](#).
26. For transmission control module programming and setup, refer to [Control Module References](#).

Note: After an internal transmission repair or internal part replacement the service fast learn adapt procedure should be performed.

27. Perform the service fast learn adapt procedure. Refer to [Service Fast Learn Adapts](#).
28. Road test the vehicle.