

Transmission

Transmission Cooling - CTS Sedan

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Oil Cooler Fitting To Radiator	20 N.m	15 lb ft
Transmission Fluid Cooler Inlet and Outlet Pipe Bolt	22 N.m	16 lb ft
Transmission Fluid Cooler Inlet and Outlet Pipe Clip Bolt	9 N.m	80 lb in
Transmission Fluid Cooler Inlet and Outlet Pipe Stud	22 N.m	16 lb ft
Transmission Fluid Cooler Pipe Bolt	22 N.m	16 lb ft

DIAGNOSTIC INFORMATION AND PROCEDURES

TRANSMISSION FLUID COOLER FLUSHING AND FLOW TEST (6L45)

GM studies indicate that plugged or restricted transmission oil coolers and pipes cause insufficient transmission lubrication and elevated operating temperatures which can lead to premature transmission failure. Many repeat repair cases could have been prevented by following published procedures for transmission oil cooler flushing and flow checking. This procedure includes flow checking and flushing the auxiliary transmission oil cooler, if equipped.

NOTE: Use the J 45096 flush and flow test tool or equivalent to flush and flow test the transmission oil cooler and the oil cooler pipes after the transaxle is removed for repairs.

Only GM Goodwrench DEXRON®VI automatic transmission fluid should be used when doing a repair on a GM transmission.

Time allowance for performing the cooler flow checking and flushing procedure has been included in the appropriate labor time guide operations since the 1987 model year. The service procedure steps for oil cooler flushing and flow testing are as follows:

Cooler Flow Check and Flushing Steps

1. Machine Set-up
2. Determine Minimum Flow Rate
3. Back Flush
4. Forward Flush

5. Flow Test
6. Code Recording Procedure
7. Clean-up

Special Tools

- **DT 45096** Transmission Oil Cooling System Flush and Flow Test Tool
- **DT 45096-30** Transmission Cooler Flush Adapter
- Shop air supply with water/oil filters, regulator and pressure gauge - minimum 90 psi
- Eye protection
- Rubber gloves

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

Machine Set-up

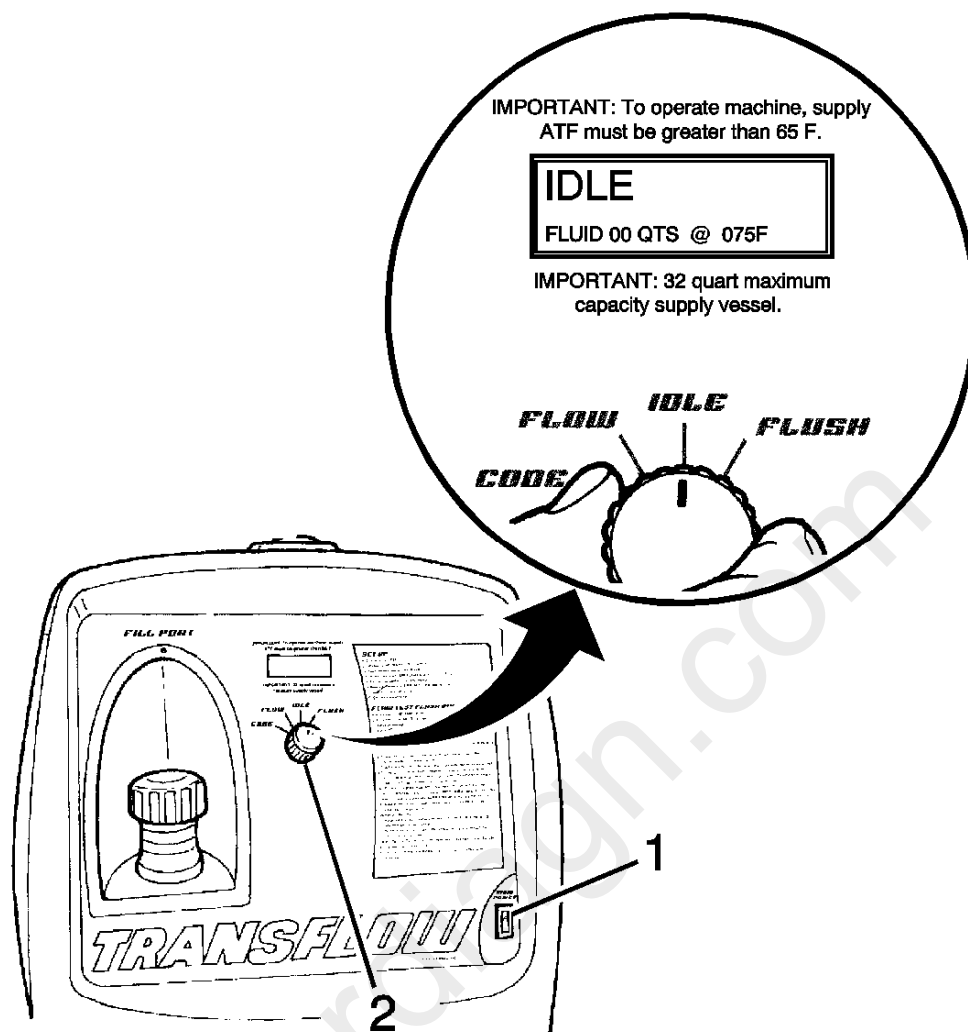


Fig. 1: View Of Main Power Switch & Main Function Switch
Courtesy of GENERAL MOTORS COMPANY

1. Verify that the main power switch (1) is in the OFF position.
2. Place the main function switch (2) in the IDLE position.

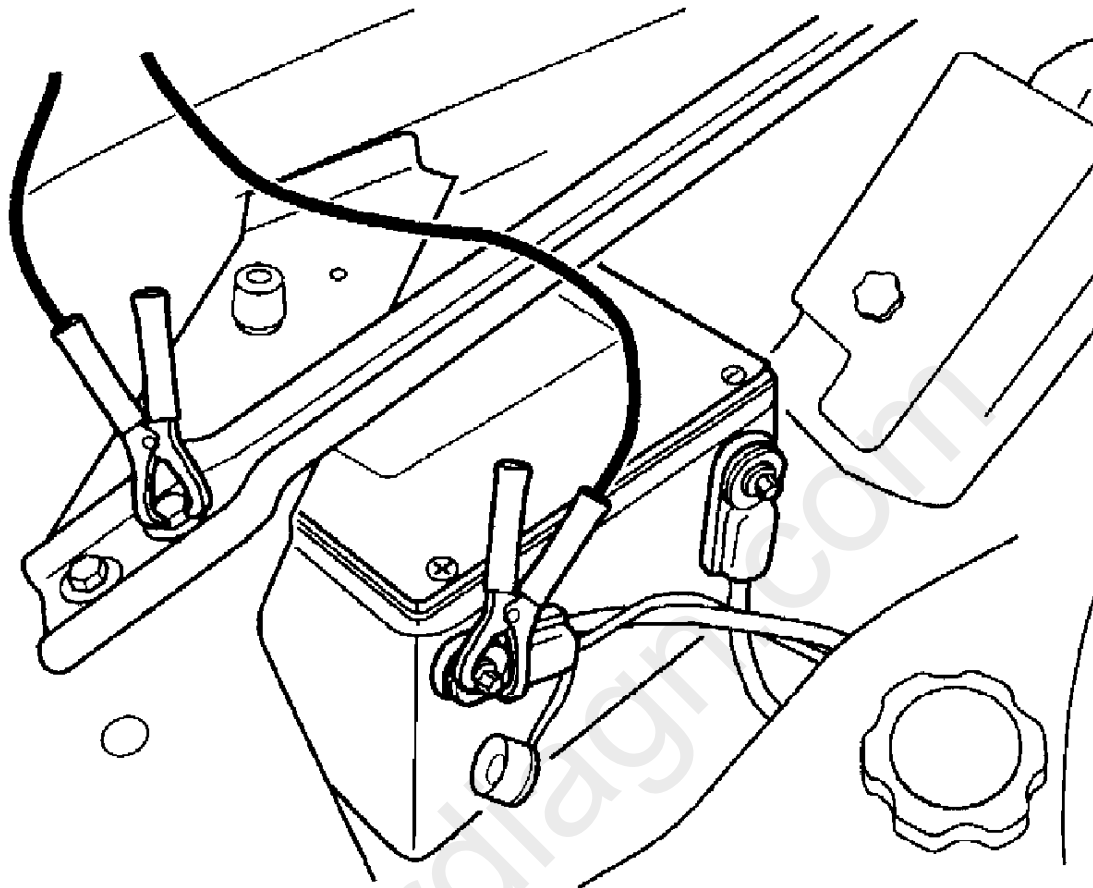


Fig. 2: Connecting To 12V DC Power Source
Courtesy of GENERAL MOTORS COMPANY

3. Connect **DT 45096** flush and flow test tool to the vehicle 12V DC power source by connecting the red battery clip to the positive, +, battery post on the vehicle and connect the negative lead to a known good chassis ground.
4. Turn the main power switch to the ON position.

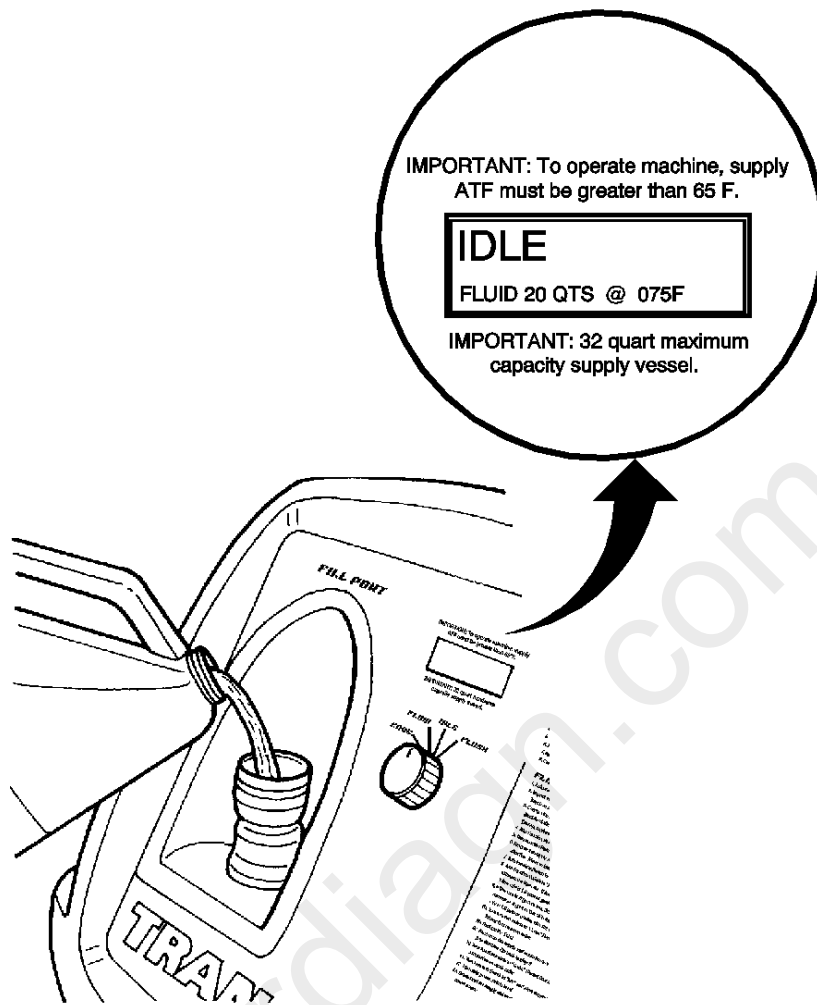


Fig. 3: Filling Supply Tank With Transmission Fluid
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Do not overfill the supply vessel. Damage to the unit may result. To verify the fluid level, view the LCD screen display while filling the unit, to ensure the fluid level does not exceed 30 L (32 qt).

5. Fill the supply tank with Dexron®VI through the fill port.
6. Reinstall and tighten the fill cap.

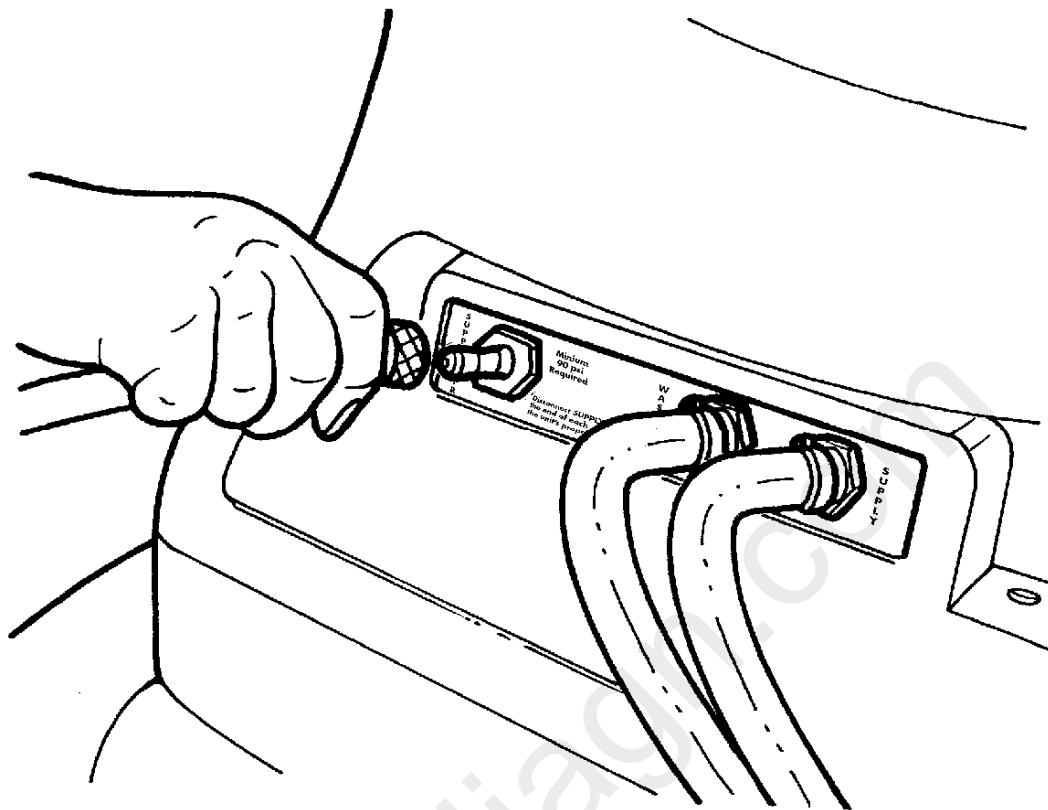


Fig. 4: Applying Shop Air Supply Hose To Quick-Disconnect
Courtesy of GENERAL MOTORS COMPANY

7. Connect a shop air supply hose to the quick-disconnect on the rear panel marked SUPPLY AIR.

Determine Minimum Flow Rate

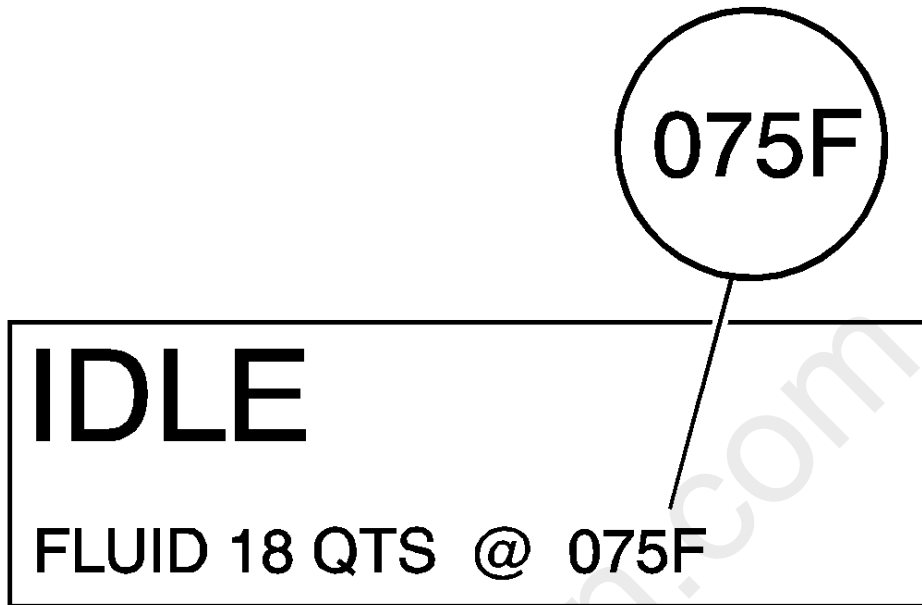


Fig. 5: Identifying Machine Display Of Automatic Transmission Fluid Temperature
Courtesy of GENERAL MOTORS COMPANY

1. From the machine display, identify the temperature of the automatic transmission fluid that is stored in the supply vessel of **DT 45096** flush and flow test tool.

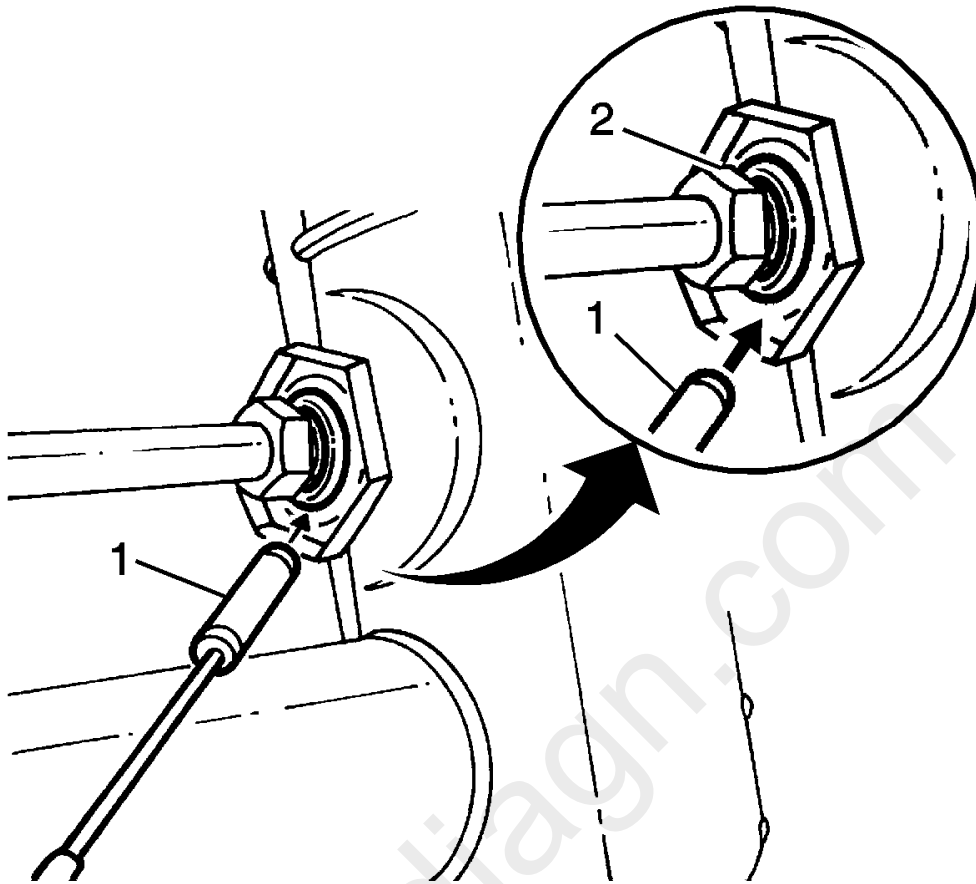


Fig. 6: Identifying Transmission Oil Cooler Metal Composition
Courtesy of GENERAL MOTORS COMPANY

2. Determine whether the transmission oil cooler is steel or aluminum by using a magnet (1) at the cooler flange (2) at the radiator.
3. Refer to the table below. Using the temperature from step 1, locate on either the Steel MINIMUM Flow Rate table or the Aluminum MINIMUM Flow Rate table the minimum flow rate in gallons per minutes (GPM). Record the minimum flow rate in GPMs and the supply fluid temperature for further reference.

Example

- Fluid temperature: 75°F
- Cooler type: Steel

The MINIMUM flow rate for this example would be 0.8 GPM.

4. Inspect transmission oil cooler lines for damage or kinks that could cause restricted oil flow. Repair as needed and refer to the appropriate GM service manual procedures.

Minimum Flow Rate in Gallons Per Minute (gpm)

Temperature Range	Steel	Aluminum
65 - 66°F	0.6 gpm	0.5 gpm
67 - 70°F	0.7 gpm	0.6 gpm
71 - 75°F	0.8 gpm	0.7 gpm
76 - 80°F	0.9 gpm	0.8 gpm
81 - 84°F	1.0 gpm	0.9 gpm
85 - 89°F	1.1 gpm	1.0 gpm
90 - 94°F	1.2 gpm	1.1 gpm
95 - 98°F	1.3 gpm	1.2 gpm
99 - 103°F	1.4 gpm	1.3 gpm
104 - 108°F	1.5 gpm	1.4 gpm
109 - 112°F	1.6 gpm	1.5 gpm
113 - 117°F	1.7 gpm	1.6 gpm
118 - 120°F	1.8 gpm	1.7 gpm

Back Flush Procedure

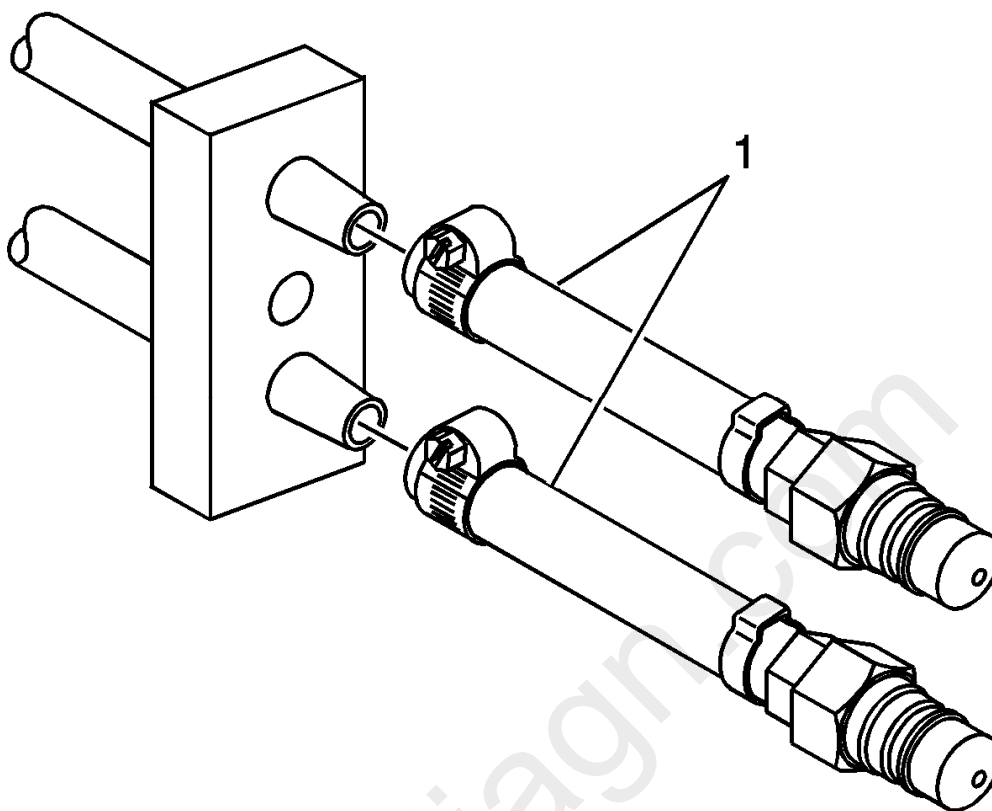


Fig. 7: Identifying Cooler Flush Adapter
Courtesy of GENERAL MOTORS COMPANY

1. Connect the **DT 45096-30** cooler flush adapter (1) to the vehicle transmission oil cooler supply and return lines at the transmission.

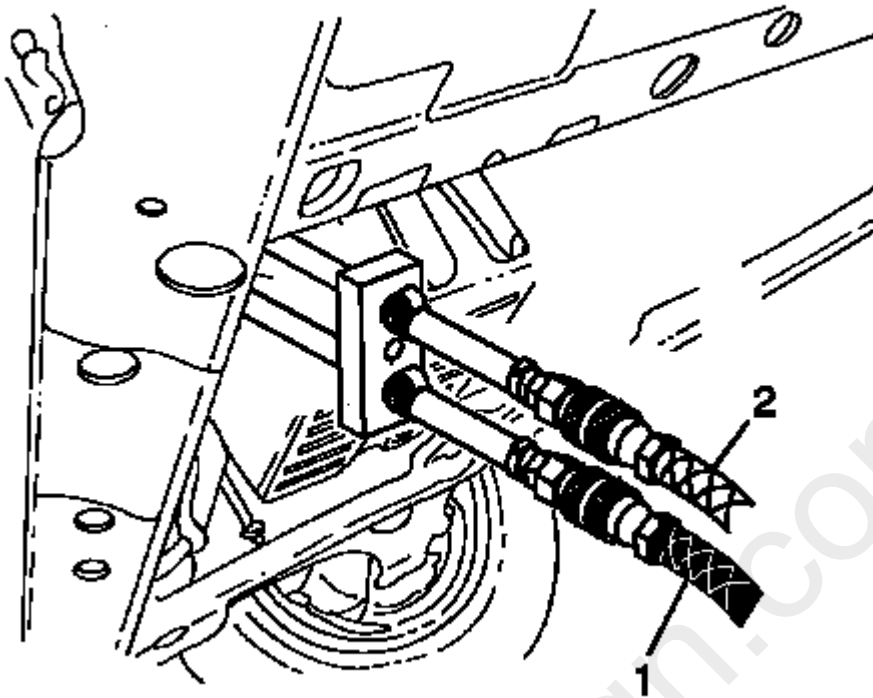


Fig. 8: Identifying Black Supply Hose & Clear Waste Hose
Courtesy of GENERAL MOTORS COMPANY

2. Connect the black supply hose (1) to the return line, bottom connector of the transmission, and the clear waste hose (2) to the feed line, top connector of the transmission, to the vehicle cooler lines. This is the reverse flow - backflush direction.

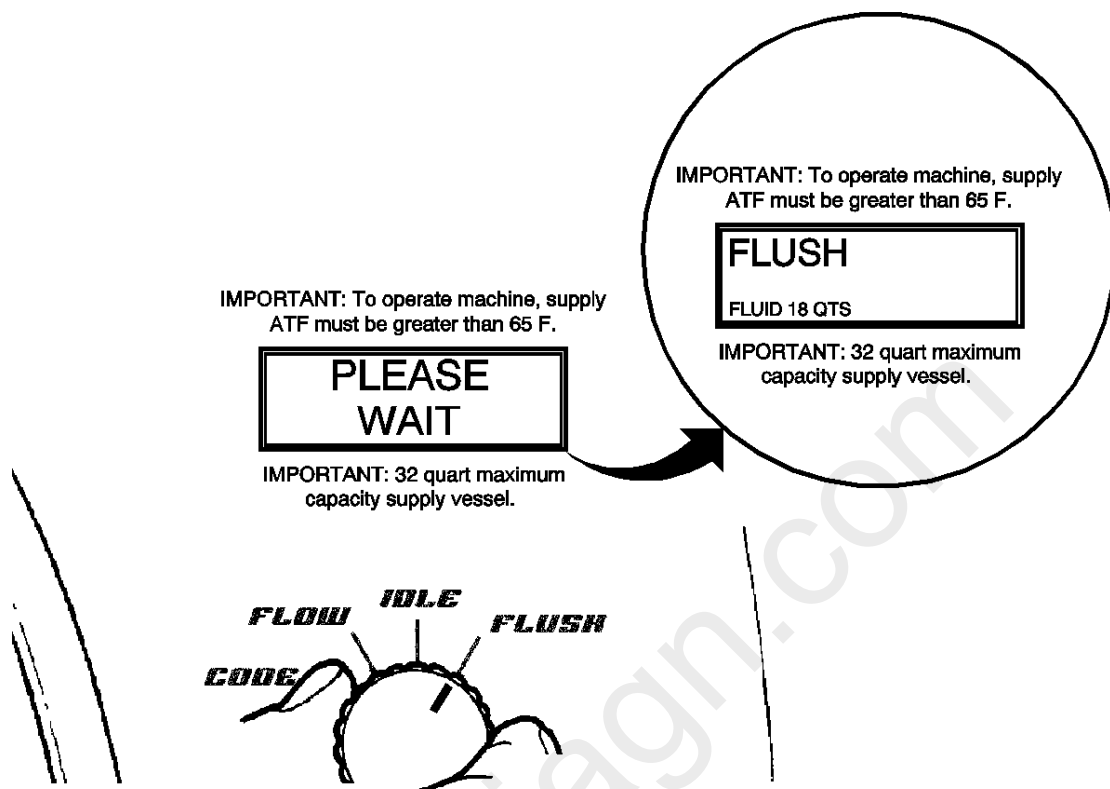


Fig. 9: View Of Main Function Switch FLUSH Position
Courtesy of GENERAL MOTORS COMPANY

3. Turn the main function switch to the FLUSH position. Allow the machine to operate for 30 seconds.

IMPORTANT: To operate machine, supply
ATF must be greater than 65 F.

IDLE

FLUID 16 QTS @ 075F

IMPORTANT: 32 quart maximum
capacity supply vessel.

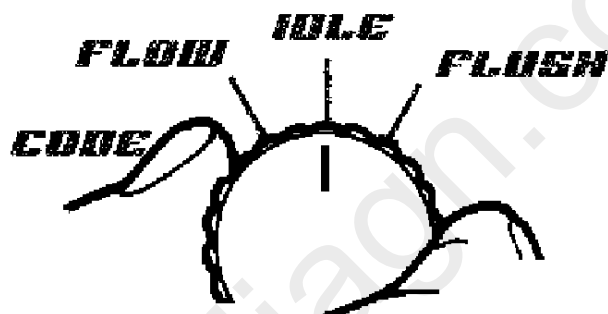


Fig. 10: View Of Main Function Switch IDLE Position
Courtesy of GENERAL MOTORS COMPANY

4. Turn the main function switch to the IDLE position and allow the supply vessel pressure to dissipate.

Forward Flush

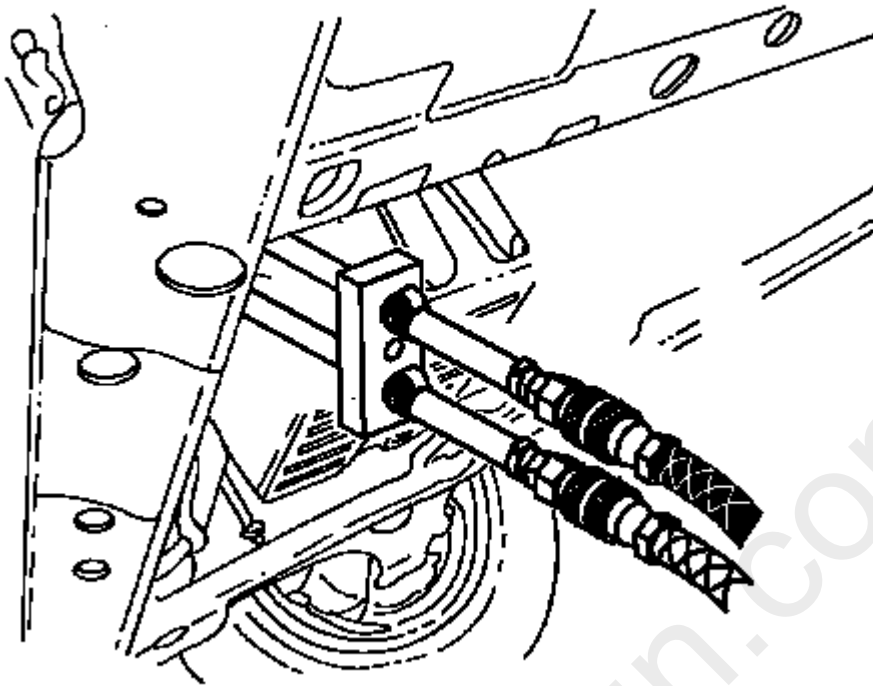


Fig. 11: Identifying Black Supply Hose & Clear Waste Hose
Courtesy of GENERAL MOTORS COMPANY

1. Disconnect the supply and waste hoses from the vehicle cooler lines. Reverse the supply and waste hoses to provide a normal flow direction.

IMPORTANT: To operate machine, supply
ATF must be greater than 65 F.

FLUSH

FLUID 18 QTS

IMPORTANT: 32 quart maximum
capacity supply vessel.

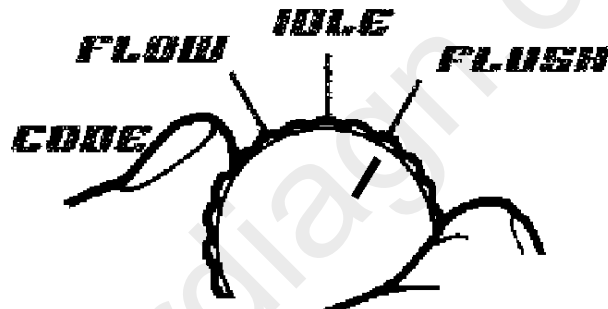


Fig. 12: View Of Main Function Switch FLUSH Position
Courtesy of GENERAL MOTORS COMPANY

2. Turn the main function switch to the FLUSH position and allow machine to operate for 30 seconds.

Flow Test

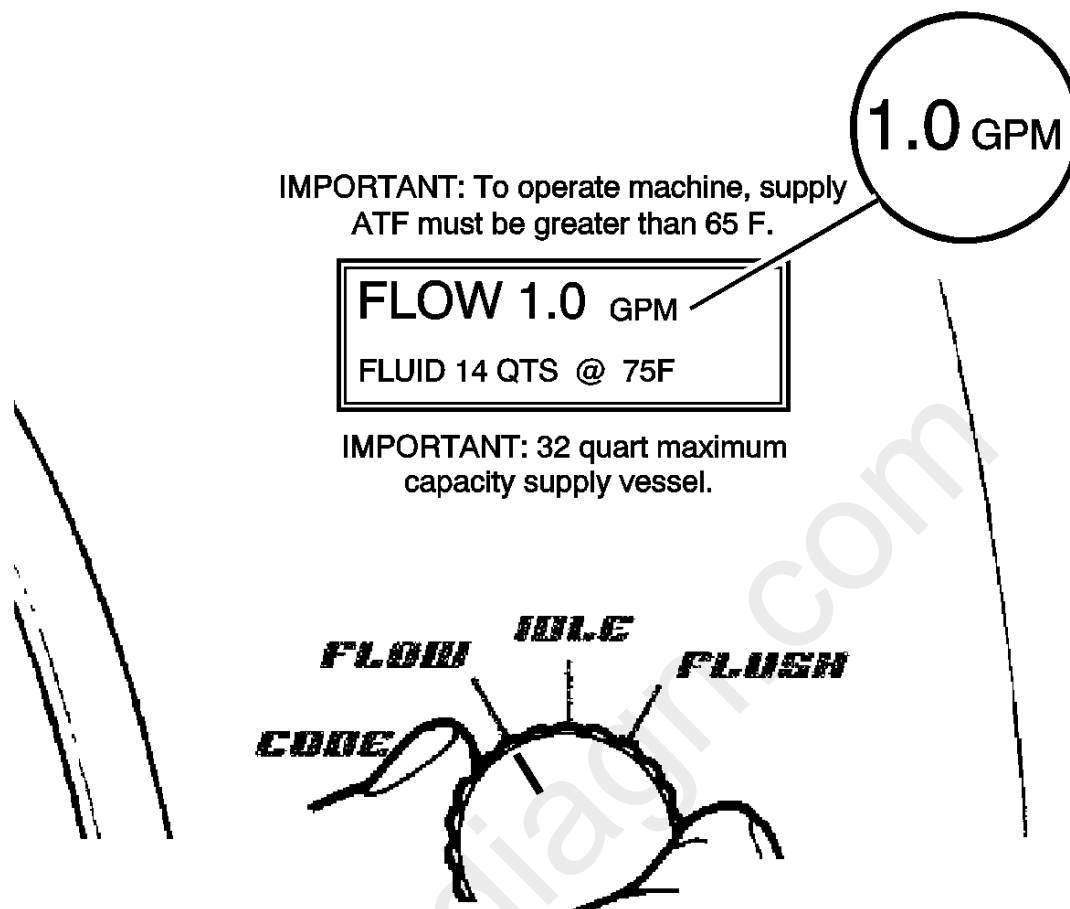


Fig. 13: View Of Main Function Switch FLOW Position
Courtesy of GENERAL MOTORS COMPANY

NOTE: If the flow rate is less than 0.5 gpm, the LCD displays an error message. Refer to the Troubleshooting section of the operation manual.

1. Turn the main function switch to the FLOW position and allow the oil to flow for 15 seconds. Observe and note the flow rate; this is the TESTED flow rate.
2. Compare the TESTED flow rate to the MINIMUM flow rate information previously recorded.
 - If the TESTED flow rate is equal to or greater than the MINIMUM flow rate recorded, the oil cooling system is functioning properly. Perform Code Recording Procedure.
 - If the TESTED flow rate is less than the MINIMUM flow rate previously recorded, repeat the back flush and forward flush procedures.
3. If the TESTED flow rate is less than the MINIMUM flow rate after the second test, perform Code Recording Procedure.

1. Replace the transmission oil cooler.
2. Reconnect supply and waste hoses to the cooler lines in the normal flow direction. Perform Flow Test.
3. Perform Code Recording Procedure.

Code Recording Procedure

IMPORTANT: To operate machine, supply ATF must be greater than 65 F.

FLOW 1.0 @ 75F CYCLE 6
A10DFB2

IMPORTANT: 32 quart maximum capacity supply vessel.



Fig. 14: View Of Main Function Switch CODE Position
Courtesy of GENERAL MOTORS COMPANY

1. Turn the main function switch to the CODE position.

NOTE:

- If power is interrupted prior to the recording of the seven-character code, the code will be lost and the flow rate test will need to be repeated.

- The flow test must run for a minimum of 8-10 seconds and be above 0.5 GPM for a code to be generated.

2. Record TESTED flow rate, temperature, cycle and seven-character flow code information on repair order.

Clean-up

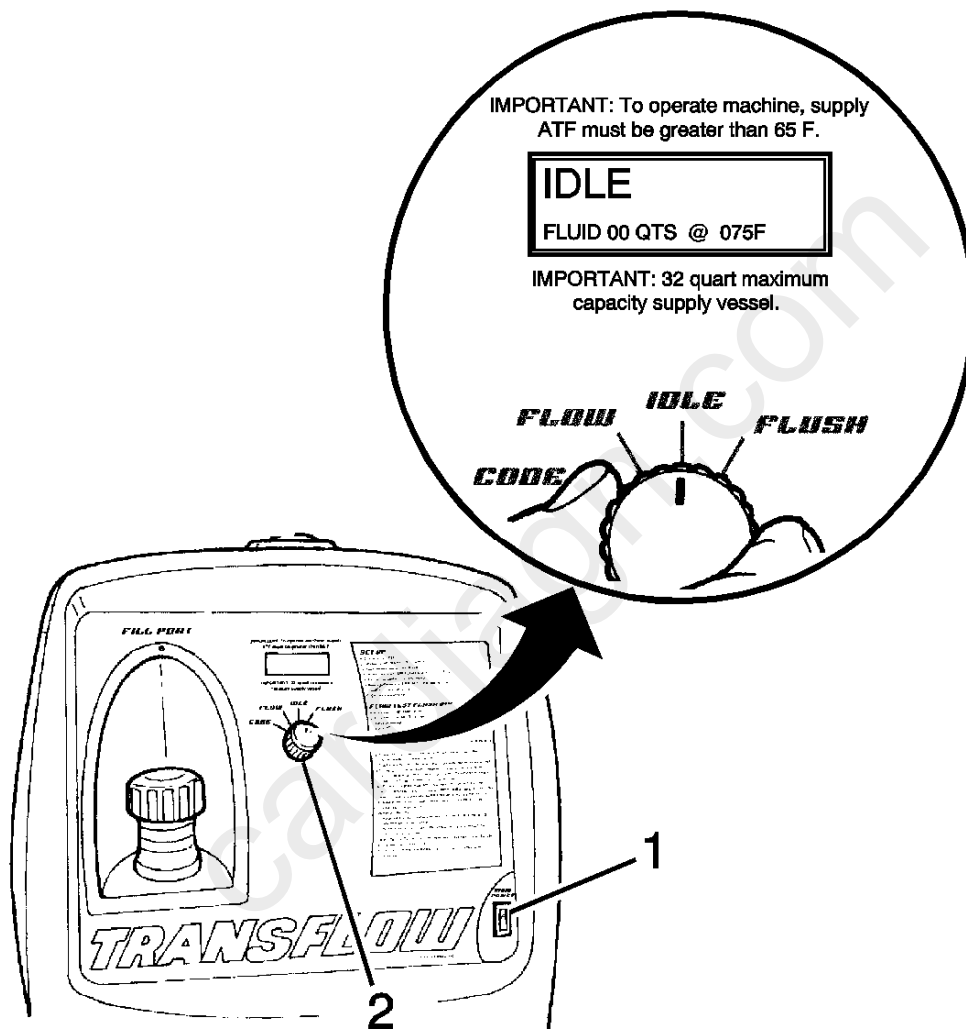


Fig. 15: View Of Main Power Switch & Main Function Switch
 Courtesy of GENERAL MOTORS COMPANY

1. Turn the main function switch (2) to the IDLE position and allow the supply vessel pressure to dissipate.
2. Turn the main power switch (1) to the OFF position.

NOTE: A small amount of water may drain from the bottom of the unit when the air supply is disconnected. This is a normal operation of the built-in water

separator.

3. Disconnect the supply and waste hoses and the 12-volt power source from the vehicle.

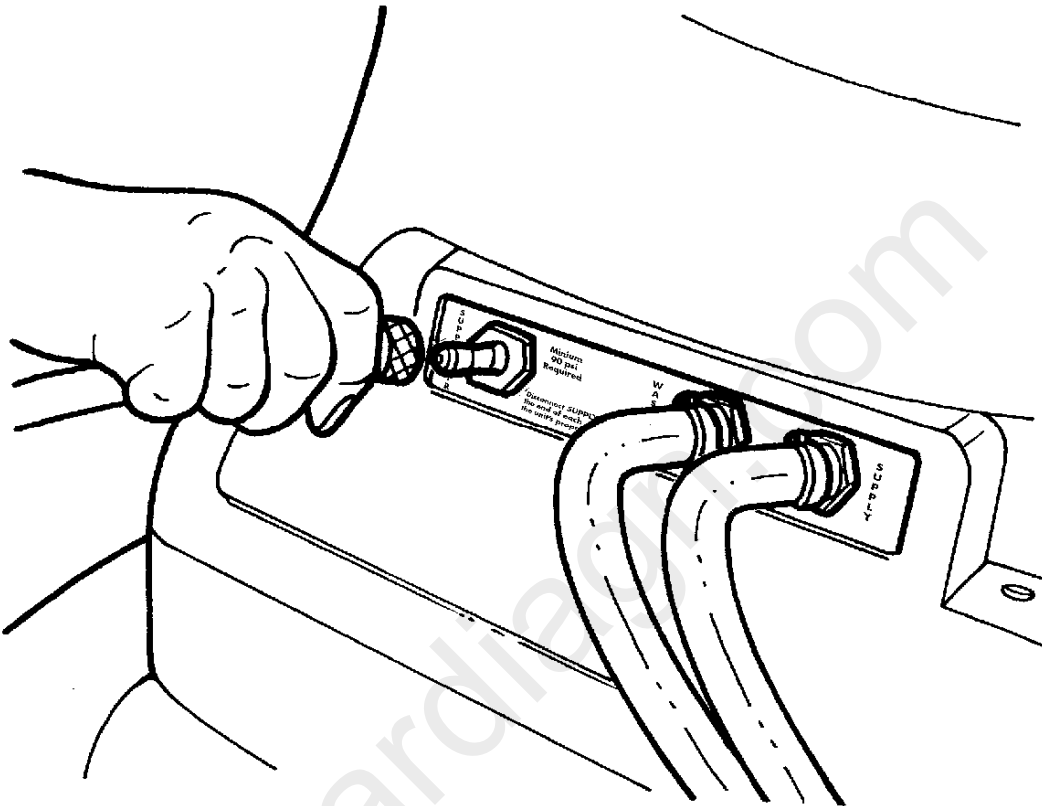


Fig. 16: Applying Shop Air Supply Hose To Quick-Disconnect
Courtesy of GENERAL MOTORS COMPANY

4. Disconnect the air supply hose from J 45096 flush and flow test tool.
5. Dispose of the waste ATF in accordance with all applicable federal, state, and local requirements.

TRANSMISSION FLUID COOLER FLUSHING AND FLOW TEST (TL-80SN)

GM studies indicate that plugged or restricted transmission oil coolers and pipes cause insufficient transmission lubrication and elevated operating temperatures which can lead to premature transmission failure. Many repeat repair cases could have been prevented by following published procedures for transmission oil cooler flushing and flow checking. This procedure includes flow checking and flushing the auxiliary transmission oil cooler, if

equipped.

NOTE: Use the J-45096 flush and flow test tool or equivalent to flush and flow test the transmission oil cooler and the oil cooler pipes after the transaxle is removed for repairs.

Only GM Goodwrench DEXRON®VI automatic transmission fluid should be used when doing a repair on a GM transmission.

Time allowance for performing the cooler flow checking and flushing procedure has been included in the appropriate labor time guide operations since the 1987 model year. The service procedure steps for oil cooler flushing and flow testing are as follows:

Cooler Flow Check and Flushing Steps

1. Machine Set-up
2. Determine Minimum Flow Rate
3. Back Flush
4. Forward Flush
5. Flow Test
6. Code Recording Procedure
7. Clean-up

Special Tools

- **DT-45096** Transmission Oil Cooling System Flush and Flow Test Tool
- **DT-45096-30** Transmission Cooler Flush Adapter
- Shop air supply with water/oil filters, regulator and pressure gauge - minimum 90 psi
- Eye protection
- Rubber gloves

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

Machine Set-up

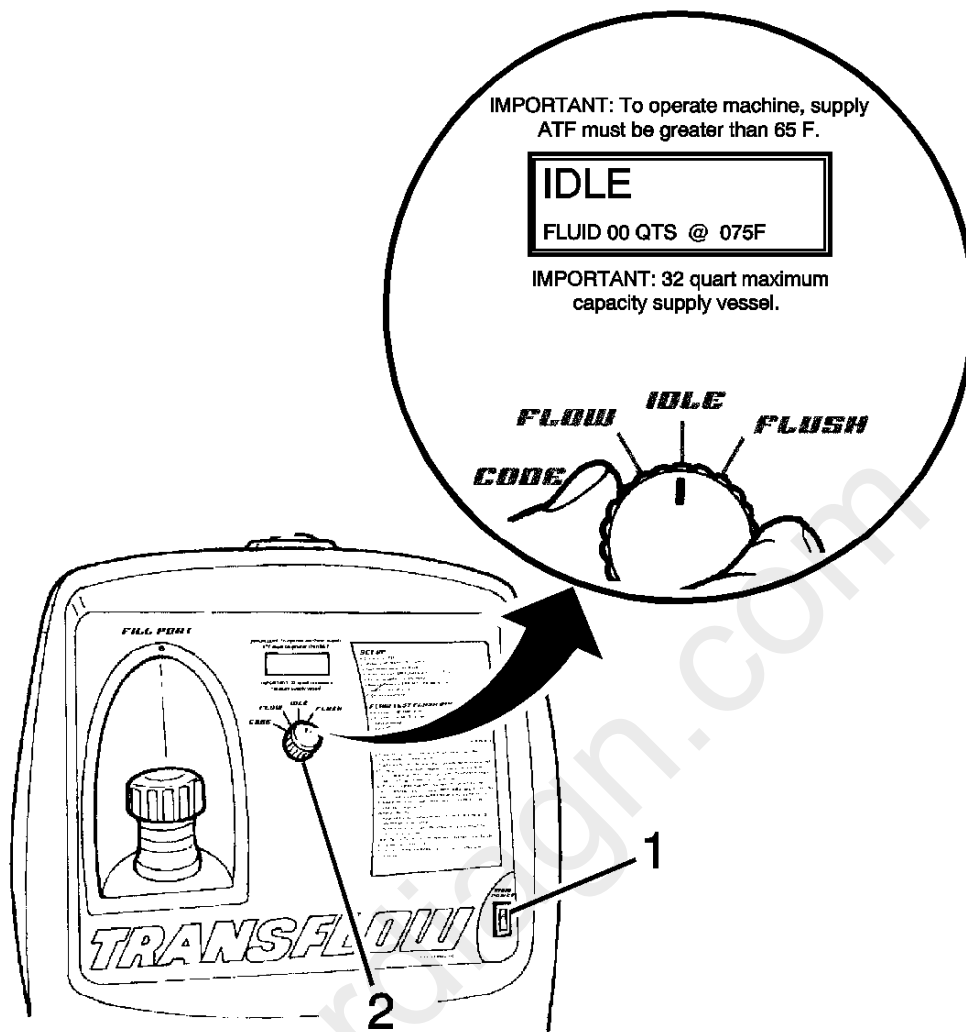


Fig. 17: View Of Main Power Switch & Main Function Switch
Courtesy of GENERAL MOTORS COMPANY

1. Verify that the main power switch (1) is in the OFF position.
2. Place the main function switch (2) in the IDLE position.

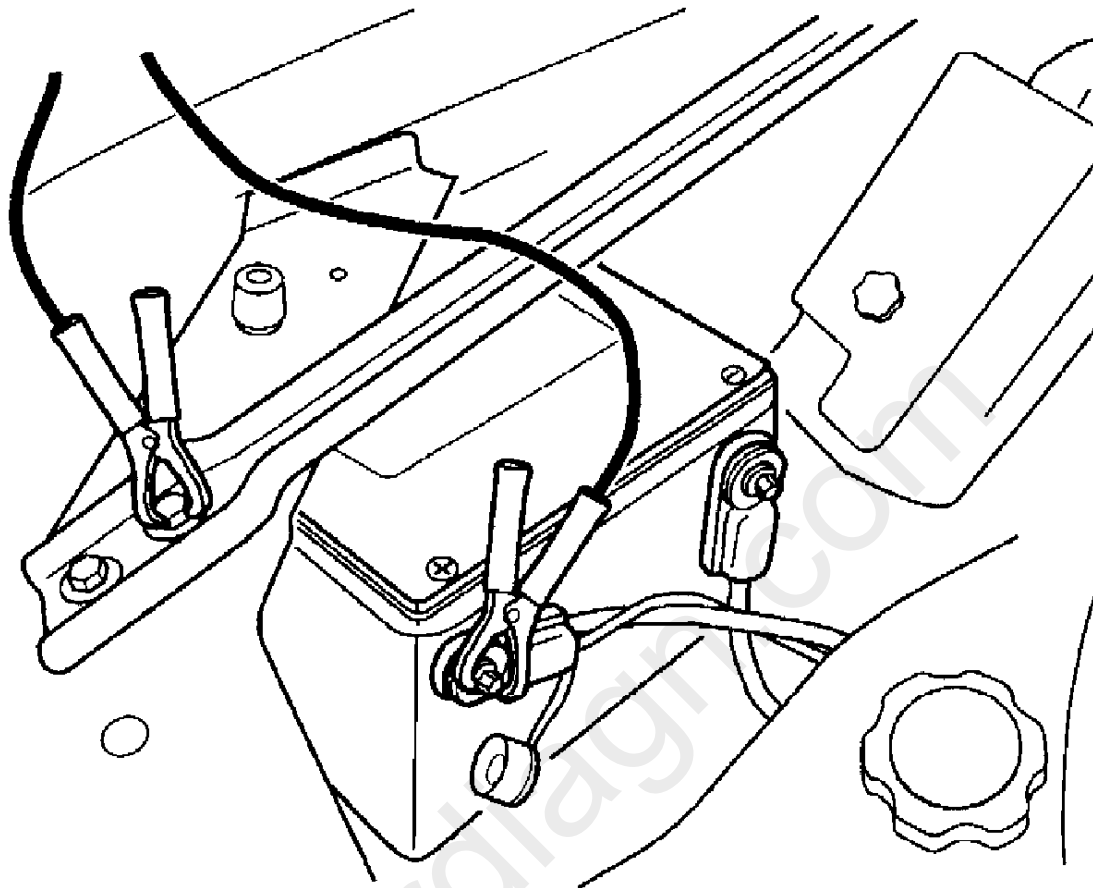


Fig. 18: Connecting To 12V DC Power Source
Courtesy of GENERAL MOTORS COMPANY

3. Connect **DT-45096** flush and flow test tool to the vehicle 12V DC power source by connecting the red battery clip to the positive, +, battery post on the vehicle and connect the negative lead to a known good chassis ground.
4. Turn the main power switch to the ON position.

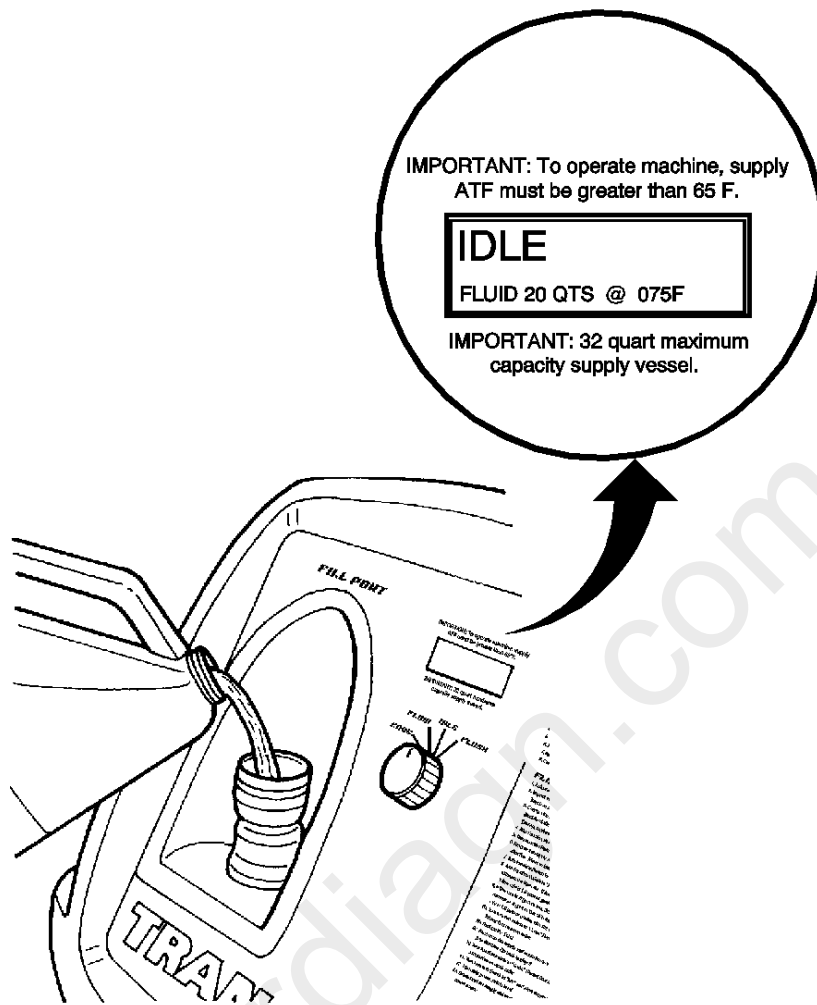


Fig. 19: Filling Supply Tank With Transmission Fluid
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Do not overfill the supply vessel. Damage to the unit may result. To verify the fluid level, view the LCD screen display while filling the unit, to ensure the fluid level does not exceed 30 L (32 qt).

5. Fill the supply tank with Dexron®VI through the fill port.
6. Reinstall and tighten the fill cap.

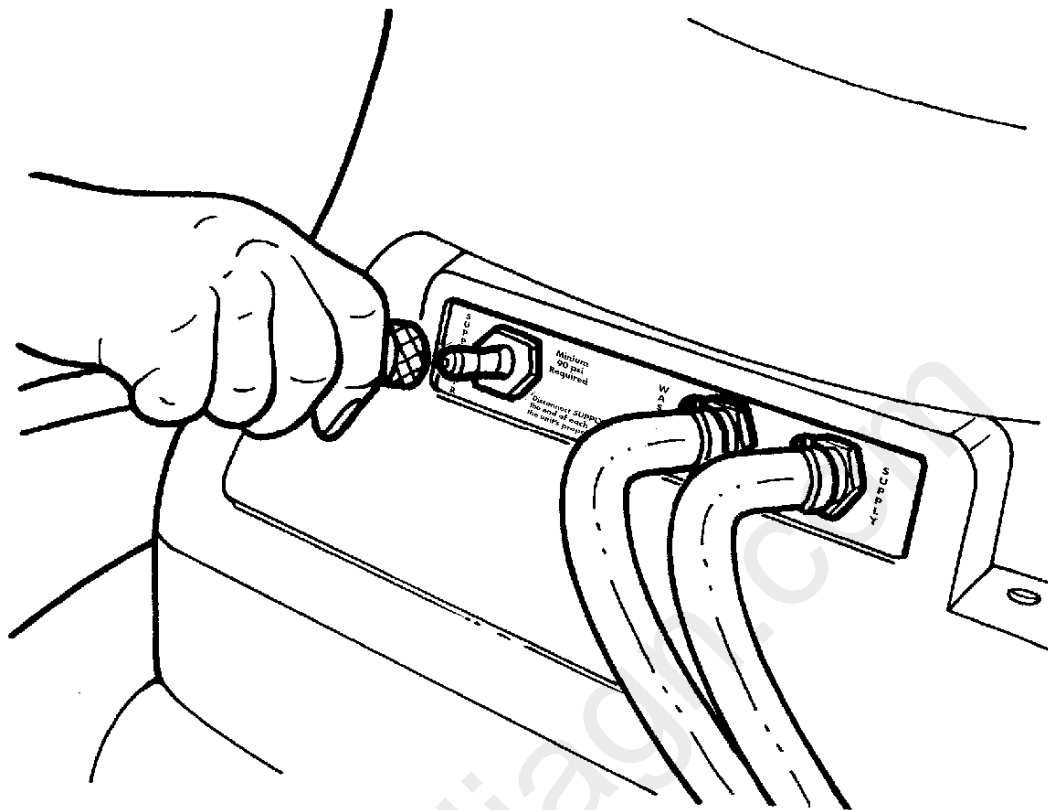


Fig. 20: Applying Shop Air Supply Hose To Quick-Disconnect
Courtesy of GENERAL MOTORS COMPANY

7. Connect a shop air supply hose to the quick-disconnect on the rear panel marked SUPPLY AIR.

Determine Minimum Flow Rate

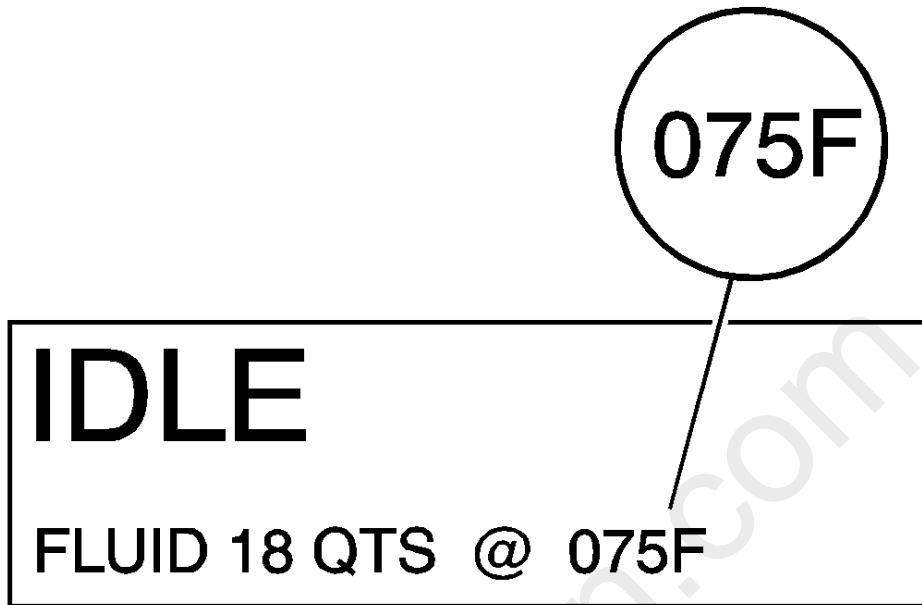


Fig. 21: Identifying Machine Display Of Automatic Transmission Fluid Temperature
Courtesy of GENERAL MOTORS COMPANY

1. From the machine display, identify the temperature of the automatic transmission fluid that is stored in the supply vessel of **DT-45096** flush and flow test tool.

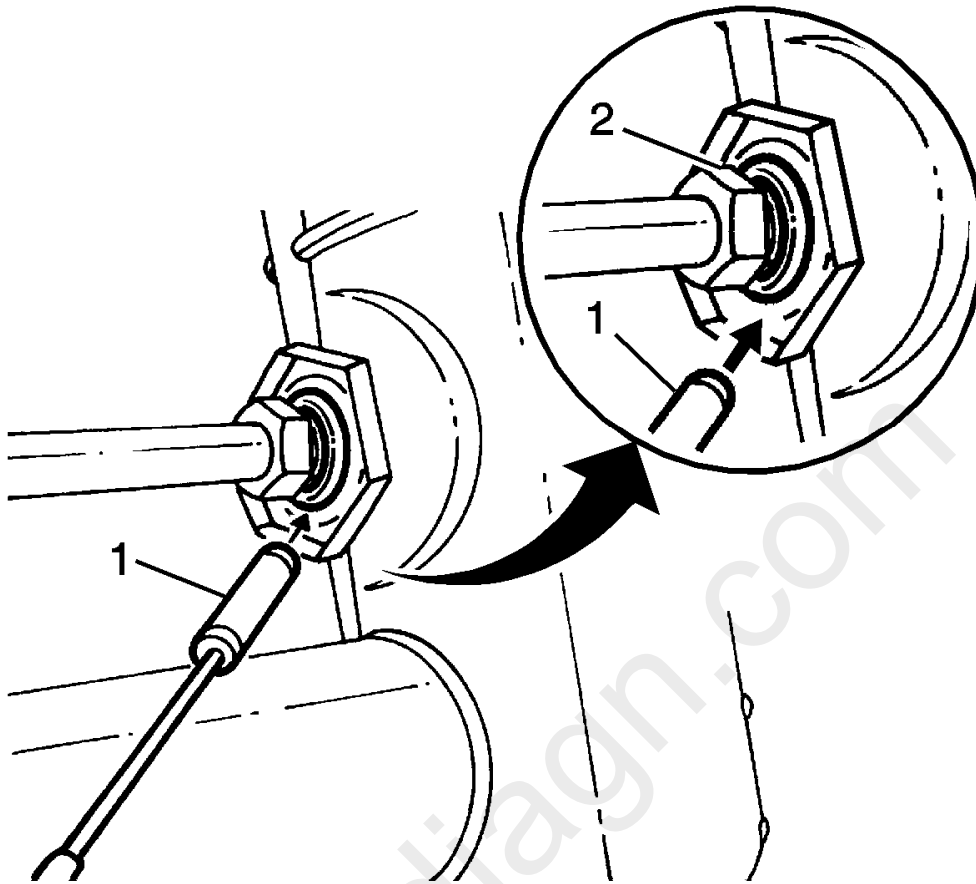


Fig. 22: Identifying Transmission Oil Cooler Metal Composition
Courtesy of GENERAL MOTORS COMPANY

2. Determine whether the transmission oil cooler is steel or aluminum by using a magnet (1) at the cooler flange (2) at the radiator.
3. Refer to the table below. Using the temperature from step 1, locate on either the Steel MINIMUM Flow Rate table or the Aluminum MINIMUM Flow Rate table the minimum flow rate in gallons per minutes (GPM). Record the minimum flow rate in GPMs and the supply fluid temperature for further reference.

Example

- Fluid temperature: 75°F
- Cooler type: Steel

The MINIMUM flow rate for this example would be 0.8 GPM.

4. Inspect transmission oil cooler lines for damage or kinks that could cause restricted oil flow. Repair as needed and refer to the appropriate GM service manual procedures.

Minimum Flow Rate in Gallons Per Minute (gpm)

Temperature Range	Steel	Aluminum
65 - 66°F	0.6 gpm	0.5 gpm
67 - 70°F	0.7 gpm	0.6 gpm
71 - 75°F	0.8 gpm	0.7 gpm
76 - 80°F	0.9 gpm	0.8 gpm
81 - 84°F	1.0 gpm	0.9 gpm
85 - 89°F	1.1 gpm	1.0 gpm
90 - 94°F	1.2 gpm	1.1 gpm
95 - 98°F	1.3 gpm	1.2 gpm
99 - 103°F	1.4 gpm	1.3 gpm
104 - 108°F	1.5 gpm	1.4 gpm
109 - 112°F	1.6 gpm	1.5 gpm
113 - 117°F	1.7 gpm	1.6 gpm
118 - 120°F	1.8 gpm	1.7 gpm

Back Flush Procedure

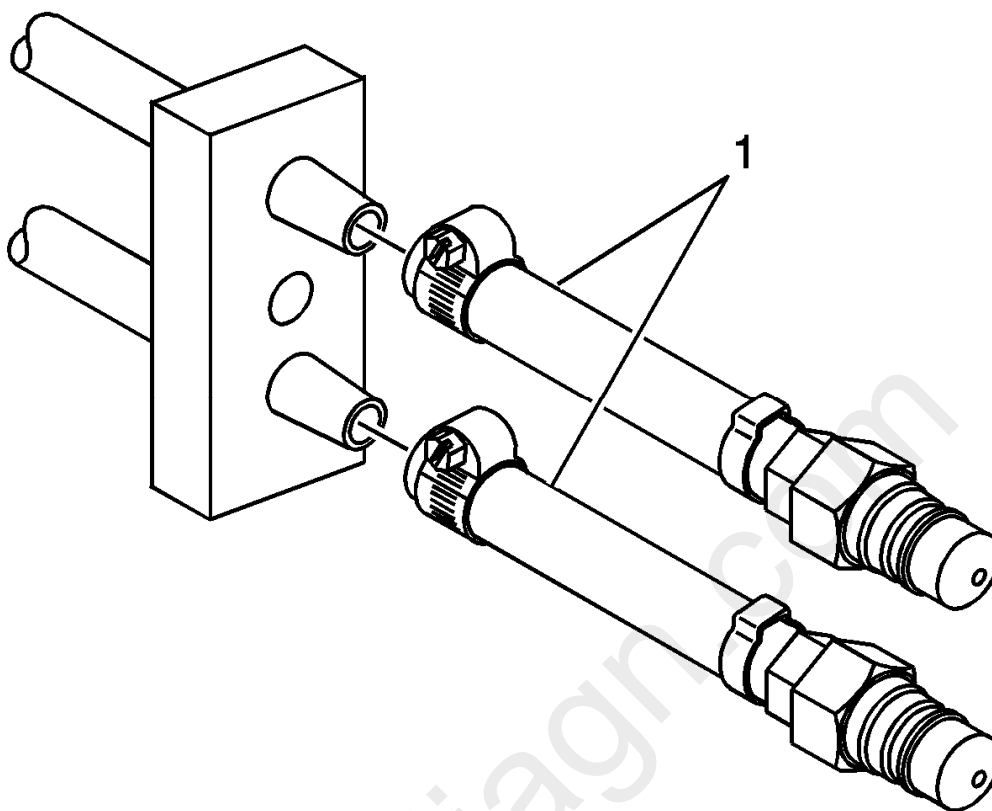


Fig. 23: Identifying Cooler Flush Adapter
Courtesy of GENERAL MOTORS COMPANY

1. Connect the **DT-45096-30** cooler flush adapter (1) to the vehicle transmission oil cooler supply and return lines at the transmission.

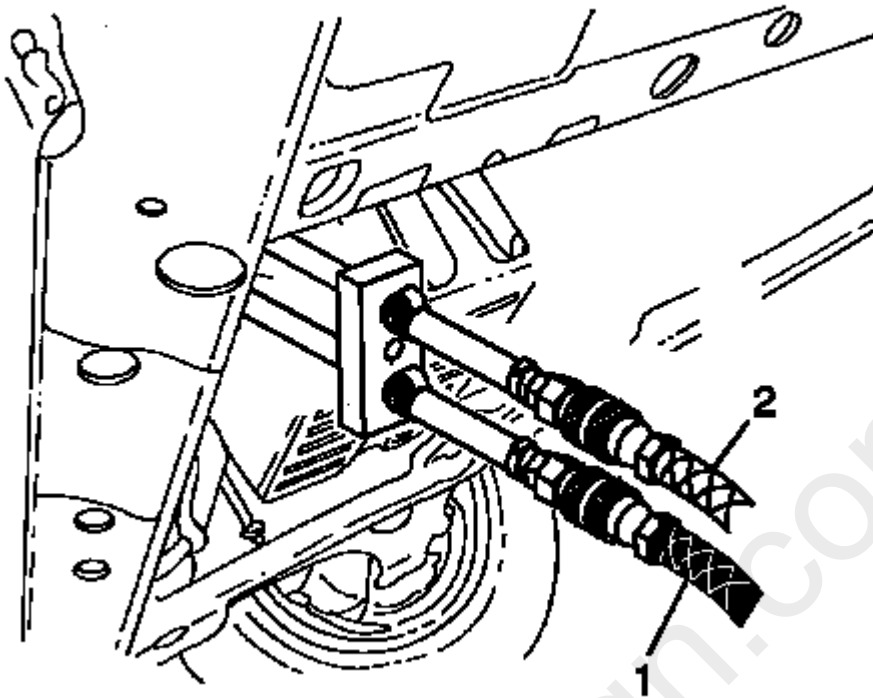


Fig. 24: Identifying Black Supply Hose & Clear Waste Hose
Courtesy of GENERAL MOTORS COMPANY

2. Connect the black supply hose (1) to the return line, bottom connector of the transmission, and the clear waste hose (2) to the feed line, top connector of the transmission, to the vehicle cooler lines. This is the reverse flow - backflush direction.

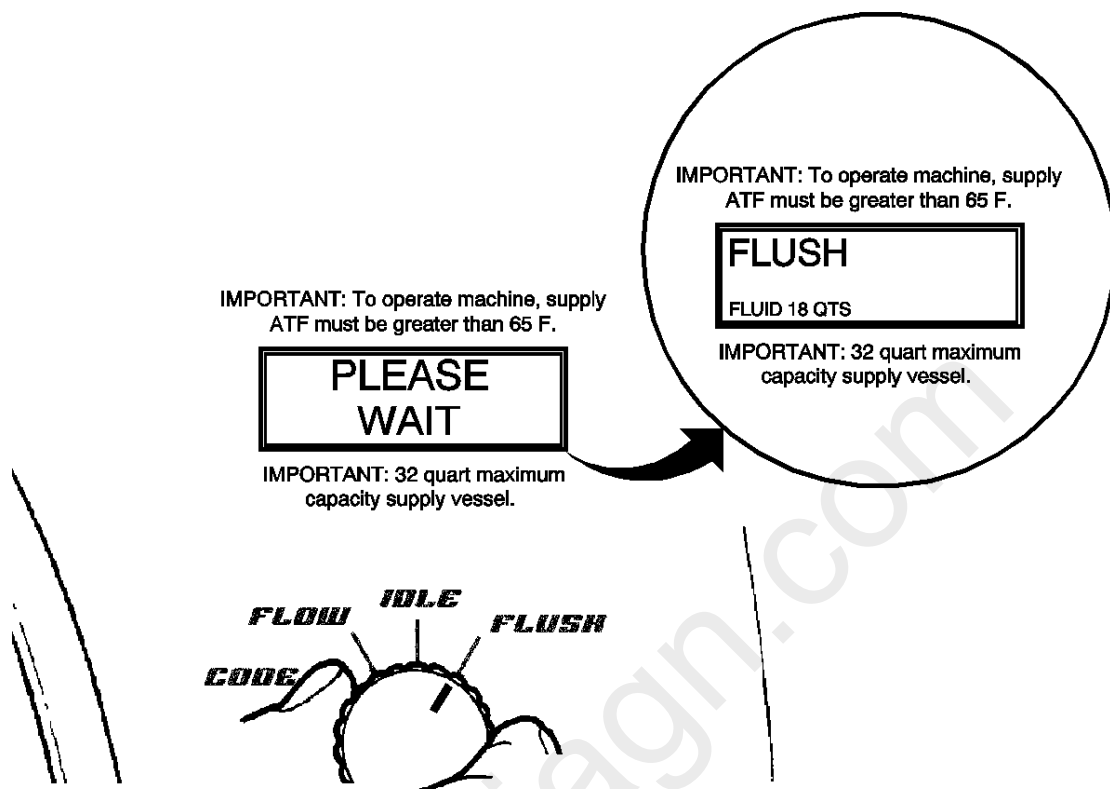


Fig. 25: View Of Main Function Switch FLUSH Position
Courtesy of GENERAL MOTORS COMPANY

3. Turn the main function switch to the FLUSH position. Allow the machine to operate for 30 seconds.

IMPORTANT: To operate machine, supply
ATF must be greater than 65 F.

IDLE

FLUID 16 QTS @ 075F

IMPORTANT: 32 quart maximum
capacity supply vessel.

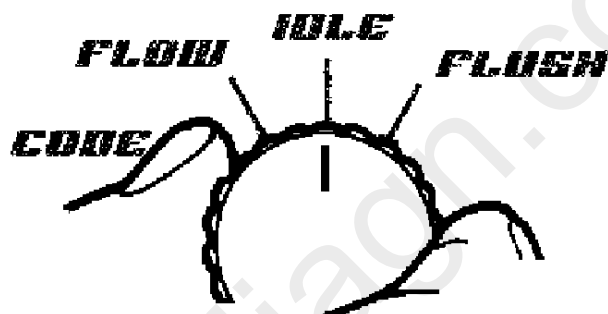


Fig. 26: View Of Main Function Switch IDLE Position
Courtesy of GENERAL MOTORS COMPANY

4. Turn the main function switch to the IDLE position and allow the supply vessel pressure to dissipate.

Forward Flush

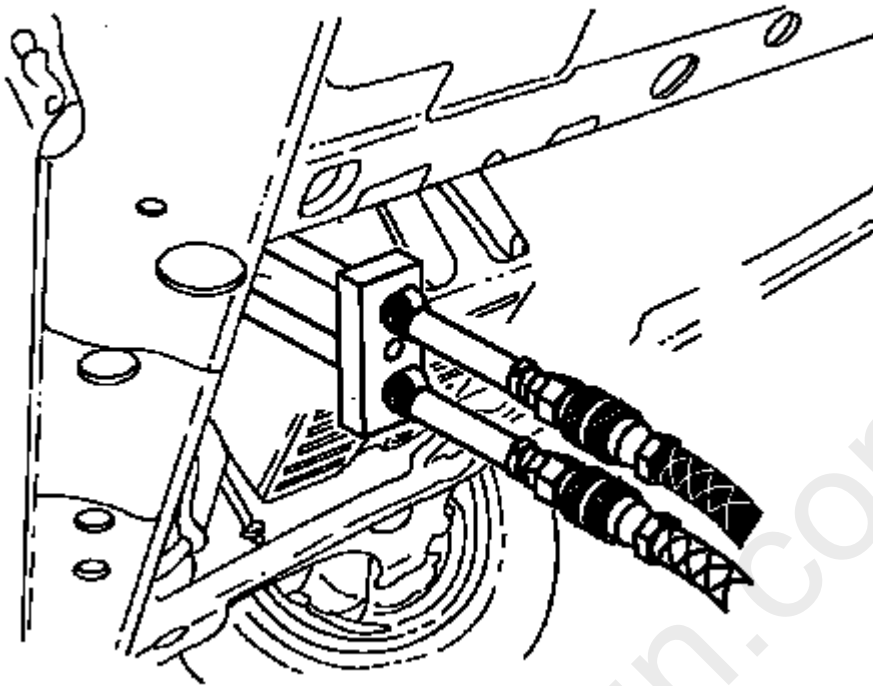


Fig. 27: Identifying Black Supply Hose & Clear Waste Hose
Courtesy of GENERAL MOTORS COMPANY

1. Disconnect the supply and waste hoses from the vehicle cooler lines. Reverse the supply and waste hoses to provide a normal flow direction.

IMPORTANT: To operate machine, supply
ATF must be greater than 65 F.

FLUSH

FLUID 18 QTS

IMPORTANT: 32 quart maximum
capacity supply vessel.

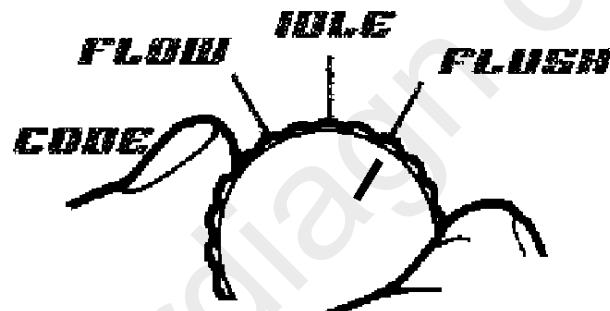


Fig. 28: View Of Main Function Switch FLUSH Position
Courtesy of GENERAL MOTORS COMPANY

2. Turn the main function switch to the FLUSH position and allow machine to operate for 30 seconds.

Flow Test

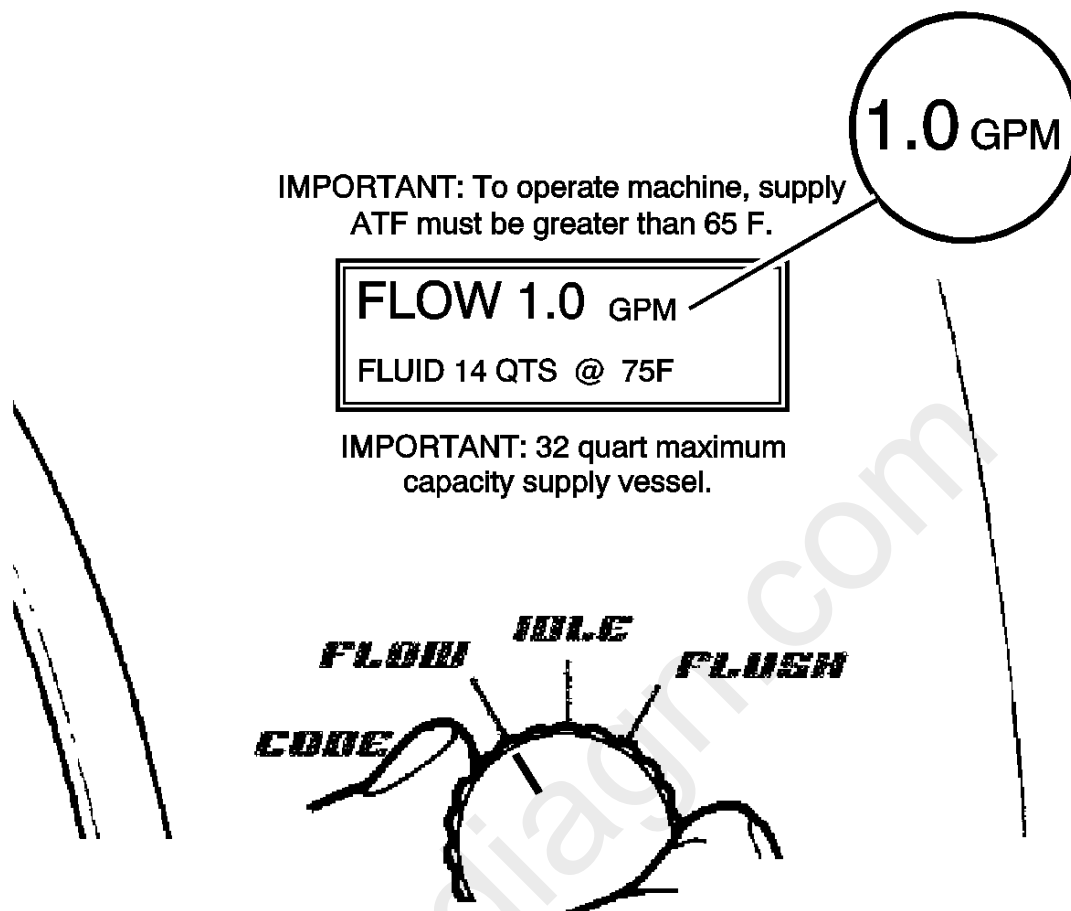


Fig. 29: View Of Main Function Switch FLOW Position
Courtesy of GENERAL MOTORS COMPANY

NOTE: If the flow rate is less than 0.5 gpm, the LCD displays an error message. Refer to the Troubleshooting section of the operation manual.

1. Turn the main function switch to the FLOW position and allow the oil to flow for 15 seconds. Observe and note the flow rate; this is the TESTED flow rate.
2. Compare the TESTED flow rate to the MINIMUM flow rate information previously recorded.
 - If the TESTED flow rate is equal to or greater than the MINIMUM flow rate recorded, the oil cooling system is functioning properly. Perform Code Recording Procedure.
 - If the TESTED flow rate is less than the MINIMUM flow rate previously recorded, repeat the back flush and forward flush procedures.
3. If the TESTED flow rate is less than the MINIMUM flow rate after the second test, perform Code Recording Procedure.

1. Replace the transmission oil cooler.
2. Reconnect supply and waste hoses to the cooler lines in the normal flow direction. Perform Flow Test.
3. Perform Code Recording Procedure.
4. Use compressed air to blow the residual transmission fluid out of the oil cooler and lines if the fluid in the **DT-45096** flush and flow test tool is different than what is used in the transmission.

Code Recording Procedure

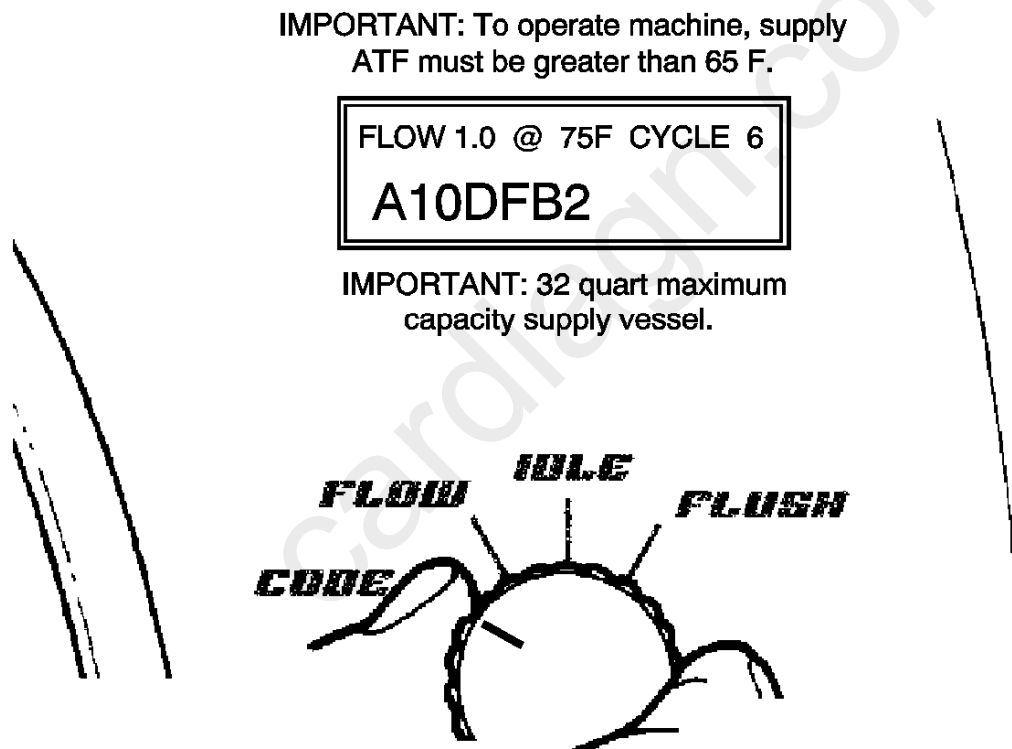


Fig. 30: View Of Main Function Switch CODE Position
Courtesy of GENERAL MOTORS COMPANY

1. Turn the main function switch to the CODE position.

NOTE:

- If power is interrupted prior to the recording of the seven-character

code, the code will be lost and the flow rate test will need to be repeated.

- The flow test must run for a minimum of 8-10 seconds and be above 0.5 GPM for a code to be generated.

2. Record TESTED flow rate, temperature, cycle and seven-character flow code information on repair order.

Clean-up

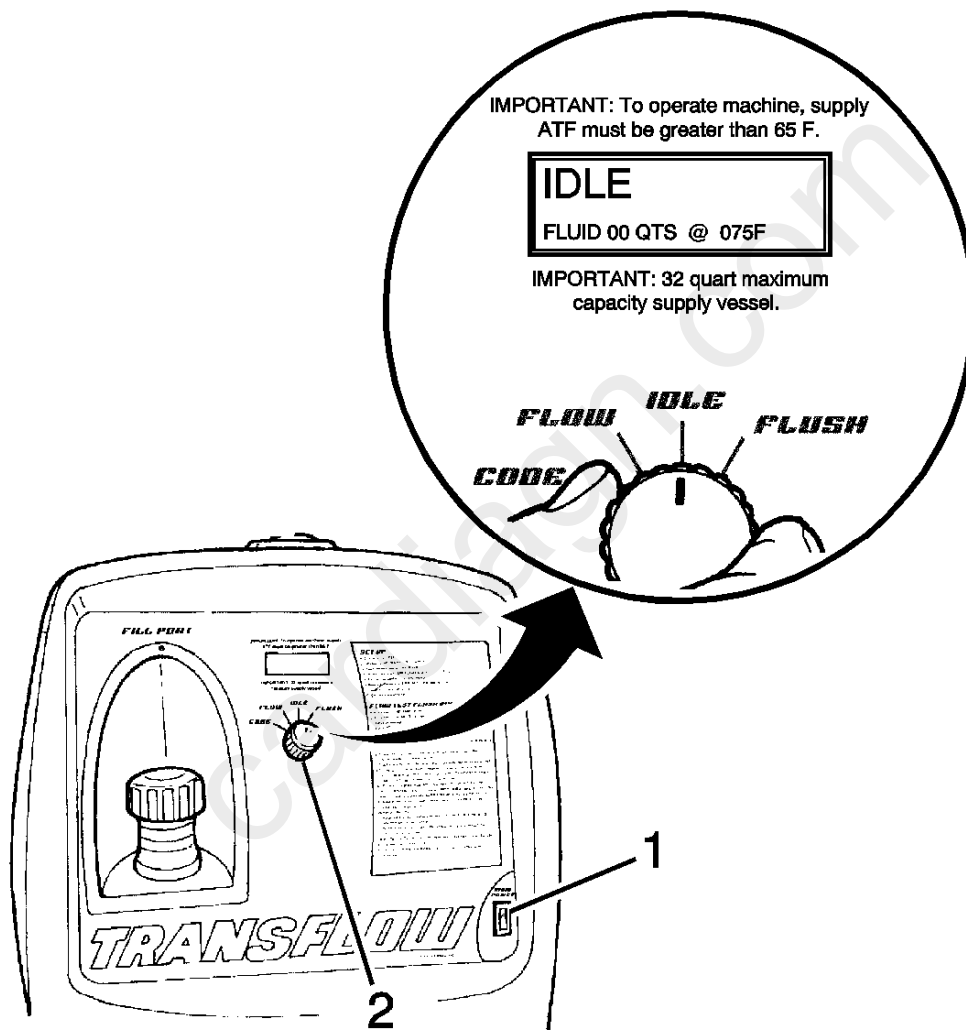


Fig. 31: View Of Main Power Switch & Main Function Switch
Courtesy of GENERAL MOTORS COMPANY

1. Turn the main function switch (2) to the IDLE position and allow the supply vessel pressure to dissipate.
2. Turn the main power switch (1) to the OFF position.

NOTE: A small amount of water may drain from the bottom of the unit when the air supply is disconnected. This is a normal operation of the built-in water separator.

3. Disconnect the supply and waste hoses and the 12-volt power source from the vehicle.

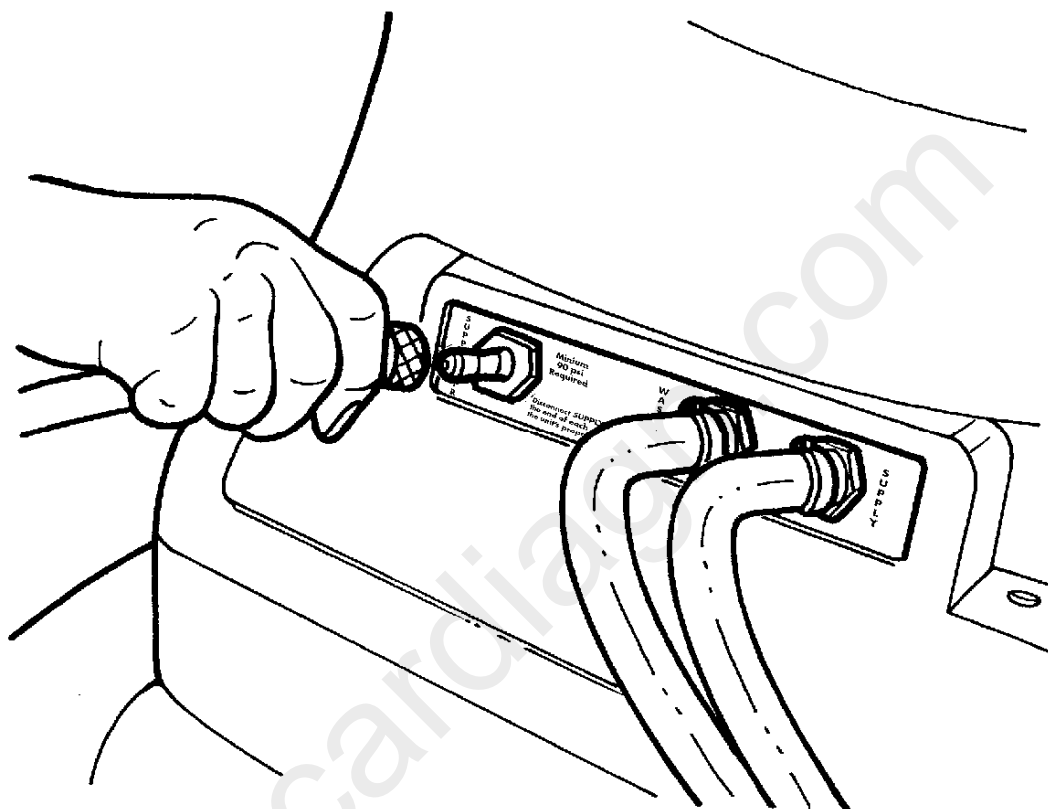


Fig. 32: Applying Shop Air Supply Hose To Quick-Disconnect
Courtesy of GENERAL MOTORS COMPANY

4. Disconnect the air supply hose from J-45096 flush and flow test tool.
5. Dispose of the waste ATF in accordance with all applicable federal, state, and local requirements.

REPAIR INSTRUCTIONS

TRANSMISSION FLUID COOLER PIPE SEAL REPLACEMENT (WITH V03)

Special Tools

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

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

Removal Procedure

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

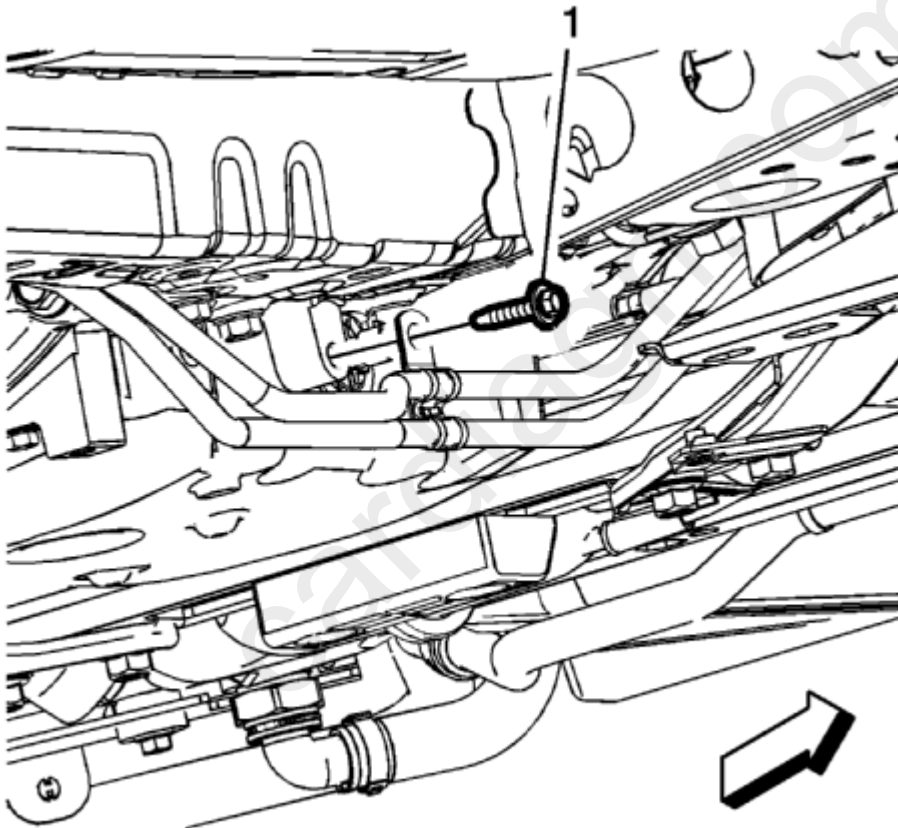


Fig. 33: Transmission Fluid Cooler Inlet And Outlet Pipe Bolt
Courtesy of GENERAL MOTORS COMPANY

3. Remove the transmission fluid cooler inlet and outlet pipe bolt (1).

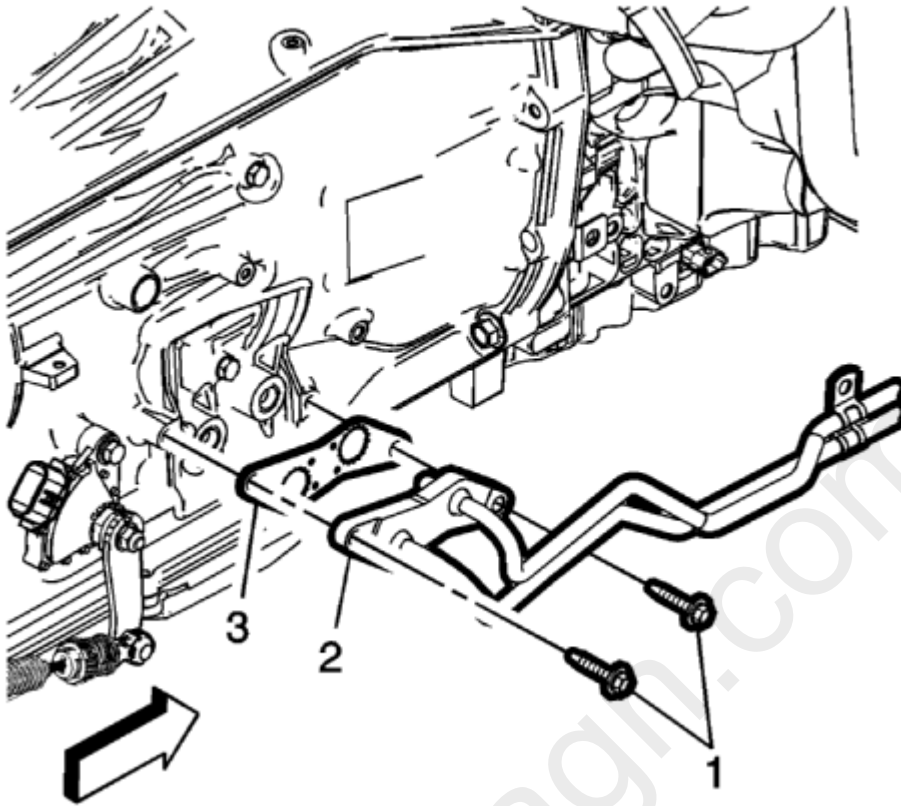


Fig. 34: Transmission Fluid Cooler Inlet And Outlet Pipes
Courtesy of GENERAL MOTORS COMPANY

4. Remove the transmission fluid cooler inlet and outlet pipe bolts (1) from the transmission.
5. Remove the transmission fluid cooler inlet and outlet pipe (2) from the transmission.
6. Remove and discard the transmission fluid cooler inlet and outlet pipe fitting seal (3).
7. Remove the transmission support and lower the transmission to provide tool access. Refer to **Transmission Support Replacement (RWD)** , **Transmission Support Replacement (AWD)** .

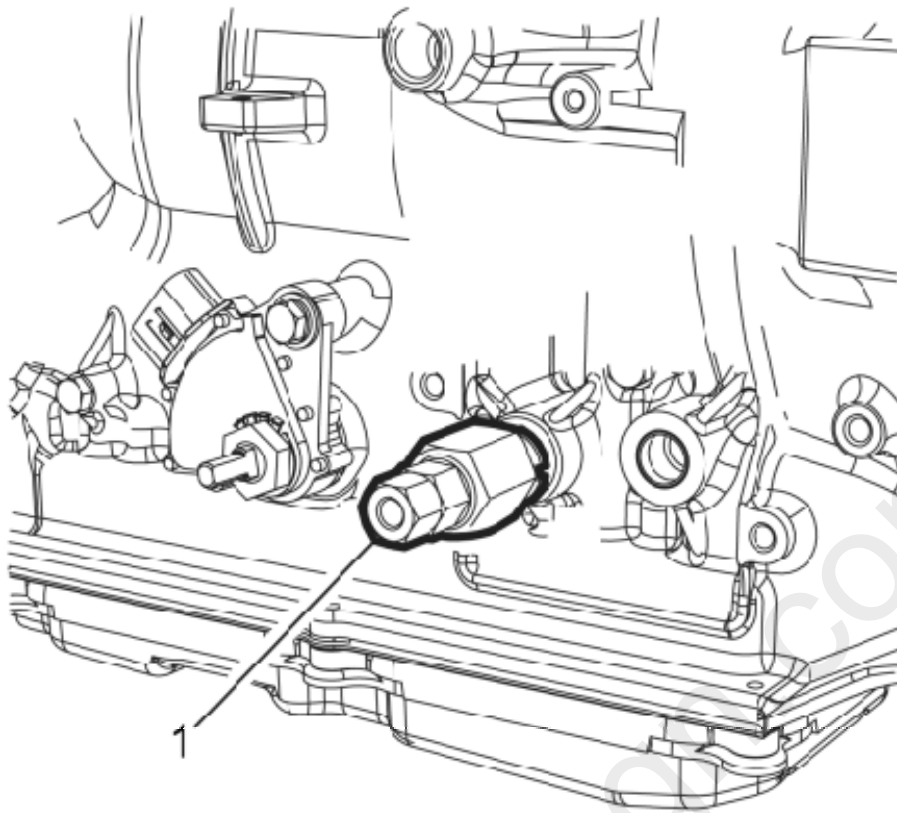


Fig. 35: Transmission Oil Cooler Line Seal Remover
Courtesy of GENERAL MOTORS COMPANY

8. Use **DT-45201** remover (1) to remove the transmission oil cooler line seals from the transmission.

Installation Procedure

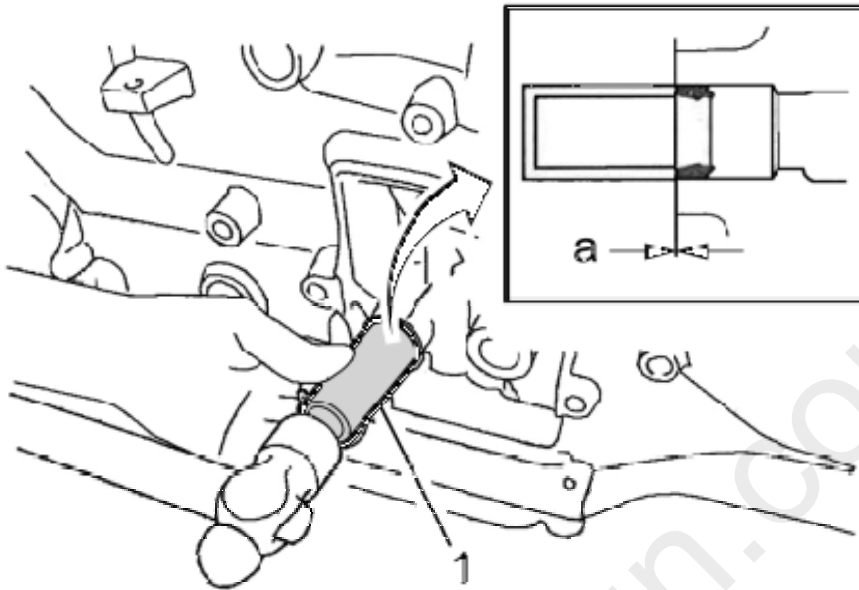


Fig. 36: Installing Transmission Oil Cooler Line Seal
Courtesy of GENERAL MOTORS COMPANY

NOTE: Dimension a is 0-0.3 mm (0-0.0118 in) to the surface of the transmission case.

1. Use **DT-47770** installer (1) to install the cooler plug seal.
2. Install the transmission support and lower the transmission. Refer to **Transmission Support Replacement (RWD)** , **Transmission Support Replacement (AWD)** .

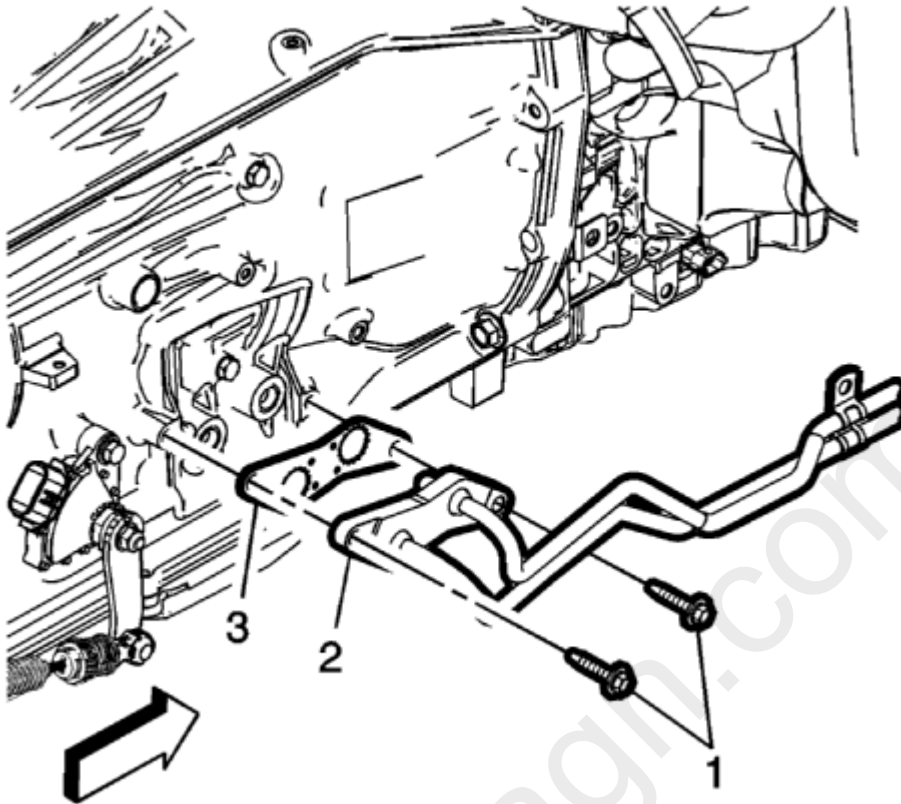


Fig. 37: Transmission Fluid Cooler Inlet And Outlet Pipes
Courtesy of GENERAL MOTORS COMPANY

3. Install a NEW transmission fluid cooler inlet and outlet pipe fitting seal (3).

CAUTION: Refer to Fastener Caution .

4. Install the transmission fluid cooler inlet and outlet pipe bolts (1) and tighten to 22 (16 lb ft).

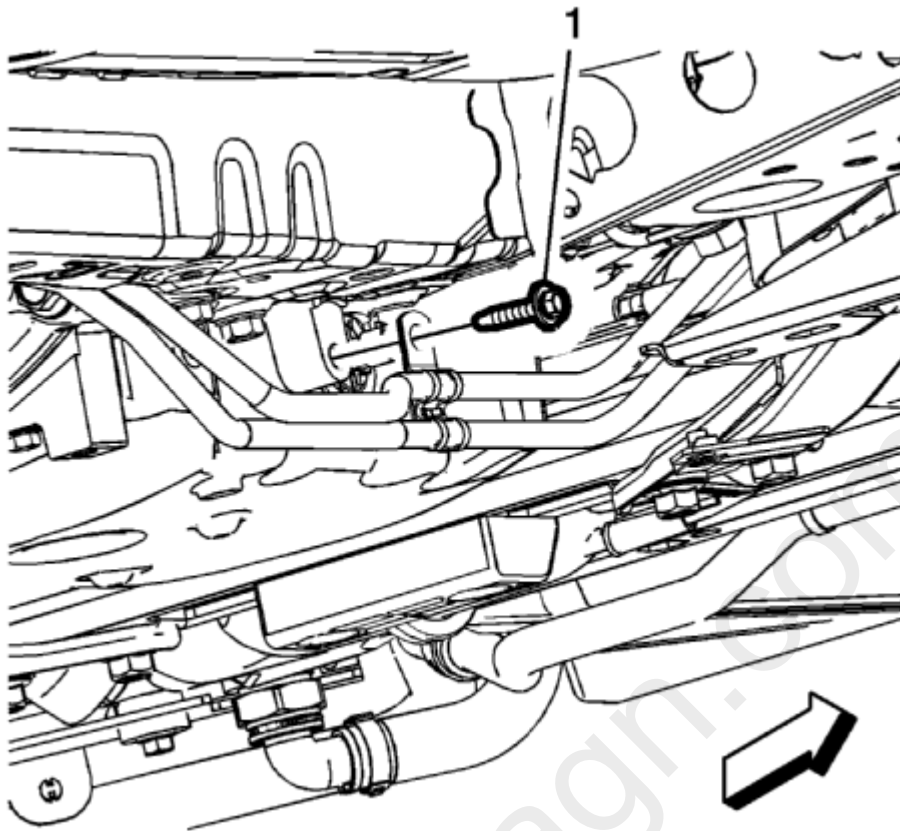


Fig. 38: Transmission Fluid Cooler Inlet And Outlet Pipe Bolt
Courtesy of GENERAL MOTORS COMPANY

5. Install the transmission fluid cooler inlet and outlet pipe bolt (1) to the oil pan and tighten to 22 (16 lb ft).
6. Remove the drain pan.
7. Fill the transmission to the proper level with transmission fluid. Refer to **Transmission Fluid Level and Condition Check** .

TRANSMISSION FLUID COOLER PIPE SEAL REPLACEMENT (WITHOUT V03)

Special Tools

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

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

Removal Procedure

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

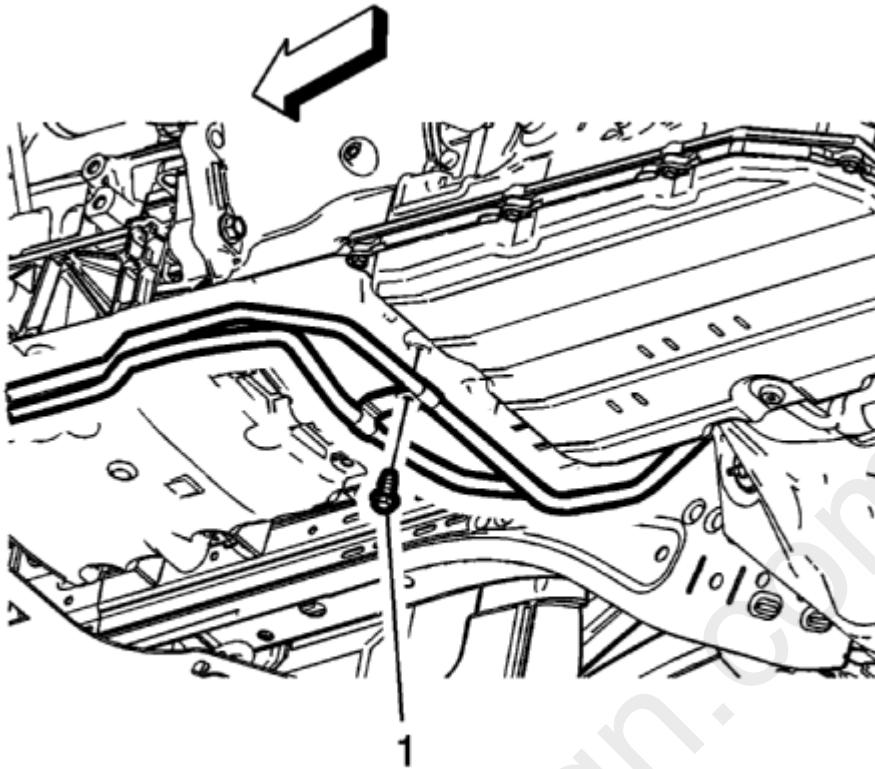


Fig. 39: Transmission Fluid Cooler Inlet And Outlet Pipe Clip Bolt
Courtesy of GENERAL MOTORS COMPANY

3. Remove the transmission fluid cooler inlet and outlet pipe bolt (1).

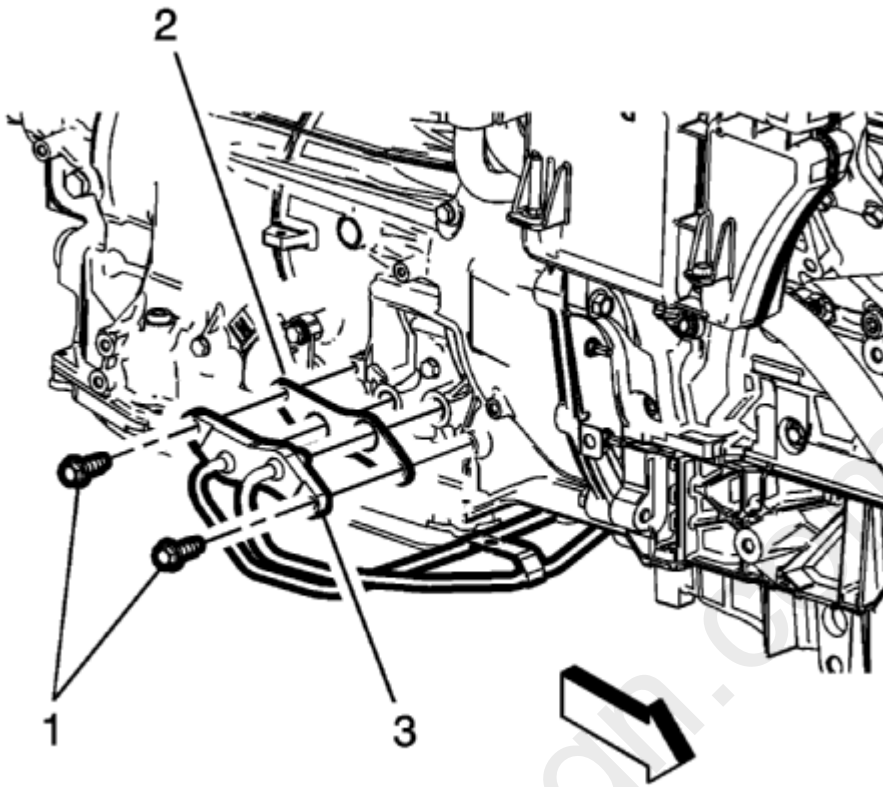


Fig. 40: Transmission Fluid Cooler Inlet And Outlet Pipes
Courtesy of GENERAL MOTORS COMPANY

4. Remove the transmission fluid cooler inlet and outlet pipe bolts (1) from the transmission.
5. Remove the transmission fluid cooler inlet and outlet pipe (2) from the transmission.
6. Remove and discard the transmission fluid cooler inlet and outlet pipe fitting seal (3).
7. Remove the transmission support and lower the transmission to provide tool access. Refer to **Transmission Support Replacement (RWD)** , **Transmission Support Replacement (AWD)** .

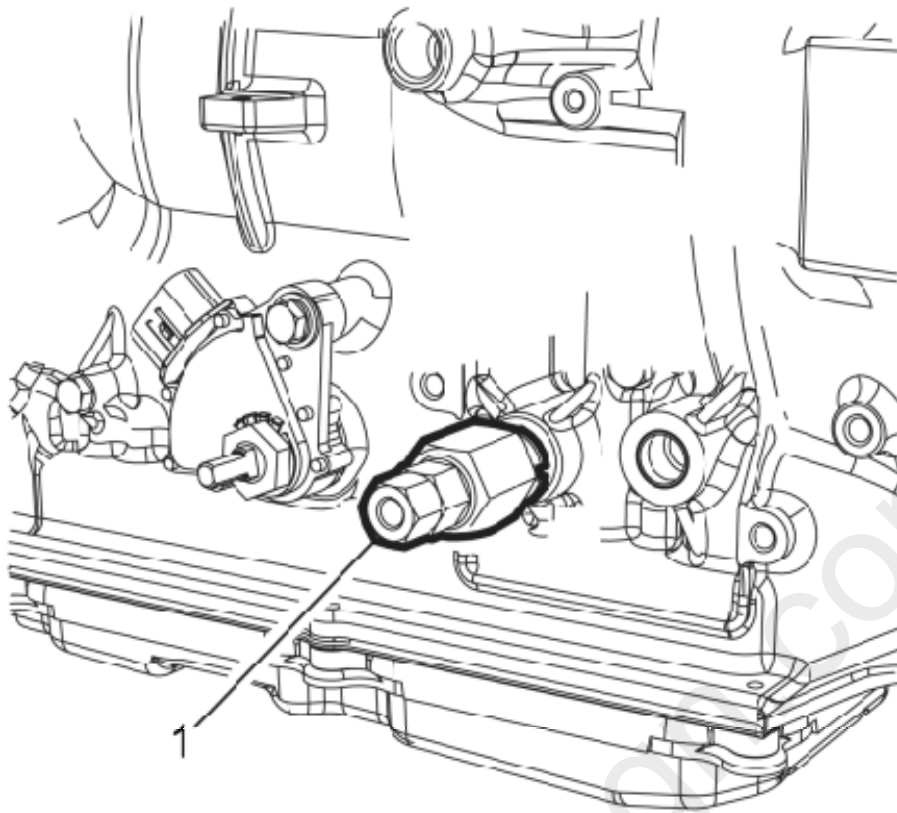


Fig. 41: Transmission Oil Cooler Line Seal Remover
Courtesy of GENERAL MOTORS COMPANY

8. Use **DT-45201** remover (1) to remove the transmission oil cooler line seals from the transmission.

Installation Procedure

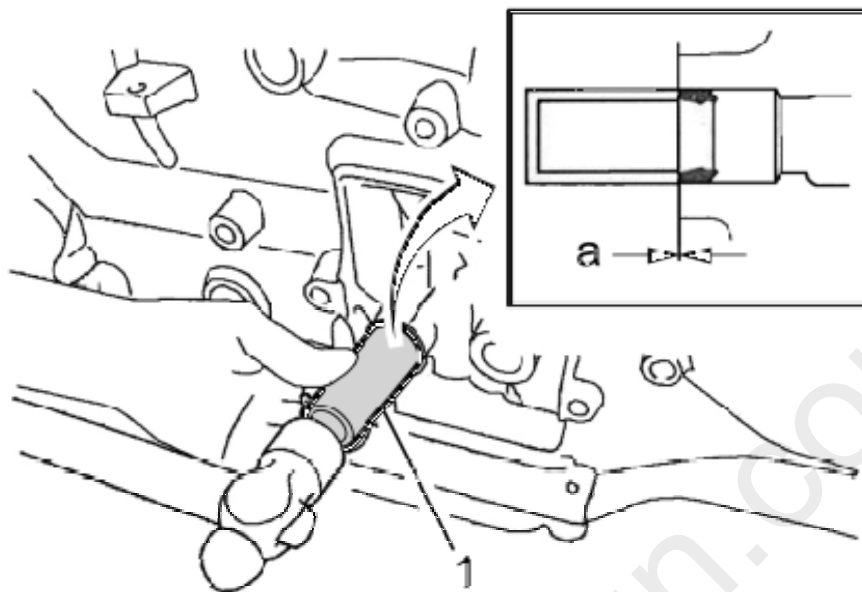


Fig. 42: Installing Transmission Fluid Cooler Inlet And Outlet Pipe Fitting Seal
Courtesy of GENERAL MOTORS COMPANY

NOTE: Dimension a is 0-0.3 mm (0-0.0118 in) to the surface of the transmission case.

1. Use **DT-47770** installer (1) to install the cooler plug seal.
2. Install the transmission support and lower the transmission. Refer to **Transmission Support Replacement (RWD)** , **Transmission Support Replacement (AWD)** .

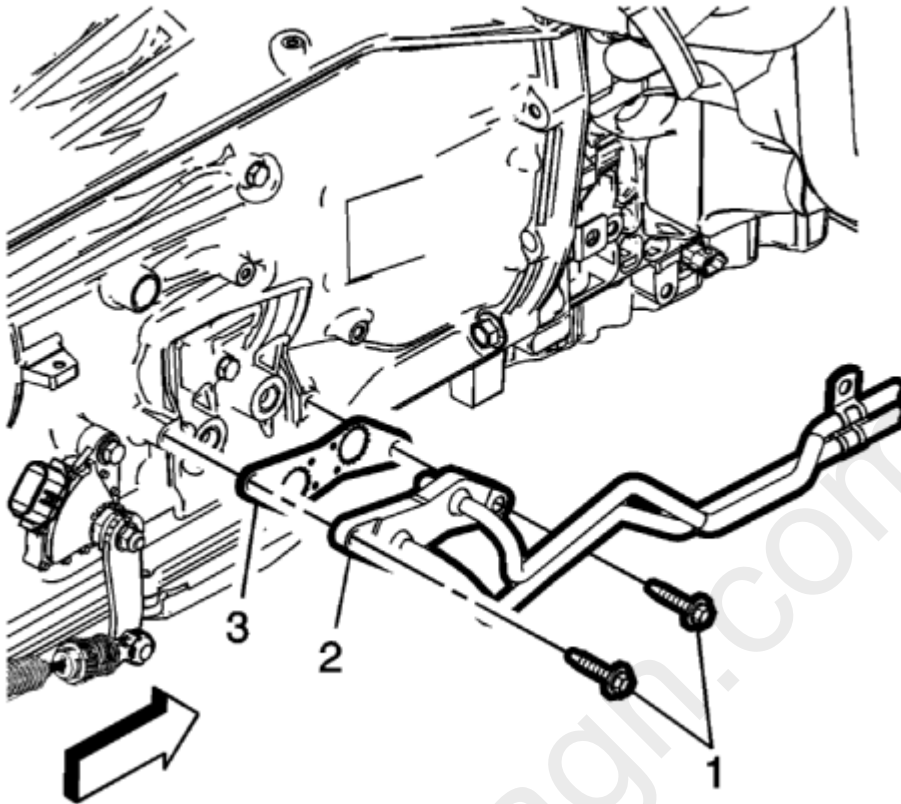


Fig. 43: Transmission Fluid Cooler Inlet And Outlet Pipes
Courtesy of GENERAL MOTORS COMPANY

3. Install a NEW transmission fluid cooler inlet and outlet pipe fitting seal (3).

CAUTION: Refer to Fastener Caution .

4. Install the transmission fluid cooler inlet and outlet pipe bolts (1) and tighten to 22 (16 lb ft).

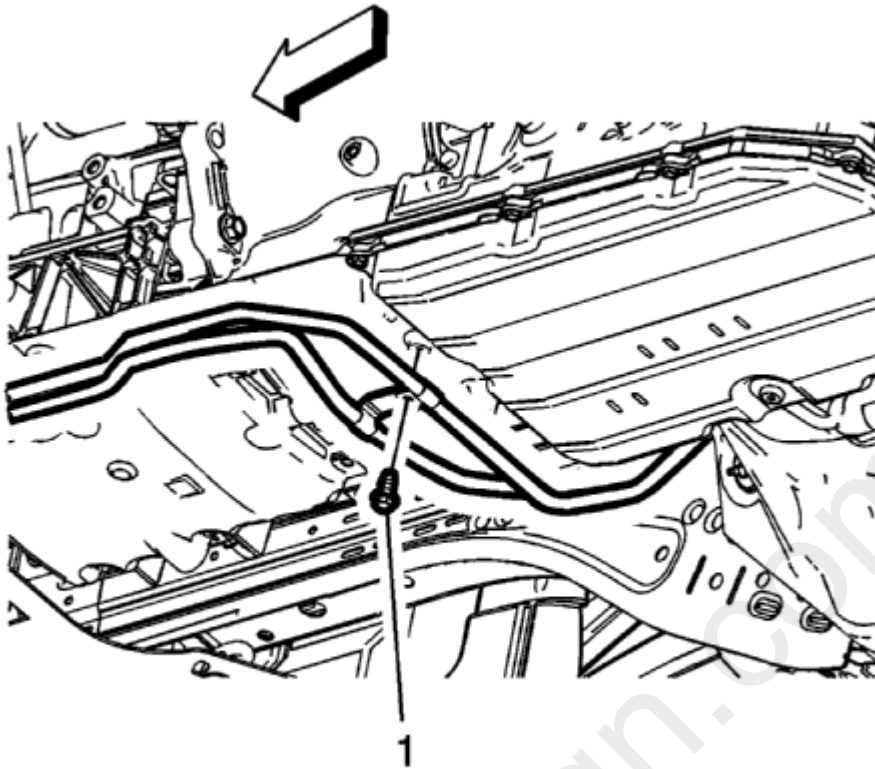


Fig. 44: Transmission Fluid Cooler Inlet And Outlet Pipe Clip Bolt
Courtesy of GENERAL MOTORS COMPANY

5. Install the transmission fluid cooler inlet and outlet pipe clip bolt (1) to the transmission and tighten to 9 (80 lb in).
6. Remove the drain pan.
7. Fill the transmission to the proper level with transmission fluid. Refer to **Transmission Fluid Level and Condition Check** .

TRANSMISSION FLUID COOLER HOSE/PIPE QUICK-CONNECT FITTING DISCONNECTION AND CONNECTION

Special Tools

- **DT-28585** Universal Snap Ring Remover for the 5/8 inch Line
- **DT-41623-B** 3/8 inch Line Quick Release Tool

Removal Procedure

1. Remove the plastic cap from the quick connect fitting by pulling the cap back along the pipe.

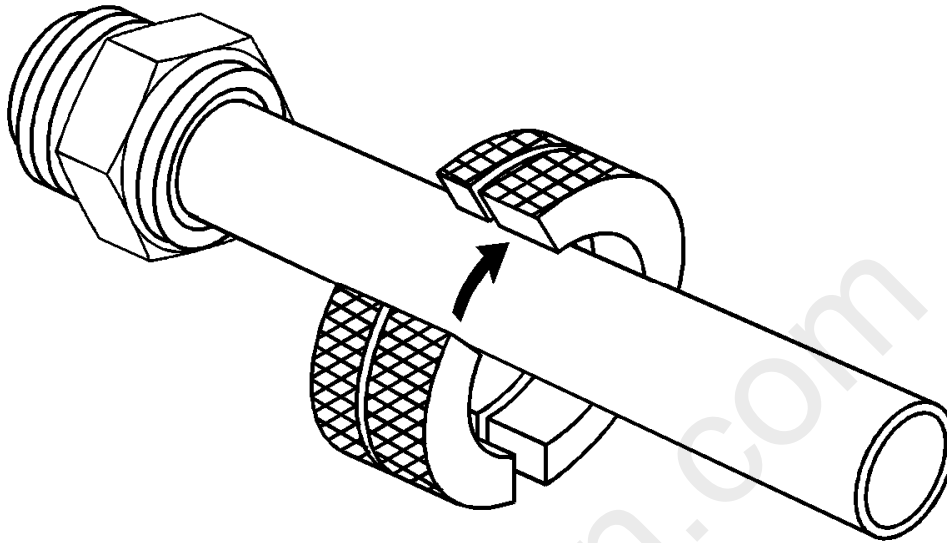


Fig. 45: View Line Quick Release Tool & Generator Cooling Inlet Pipe
Courtesy of GENERAL MOTORS COMPANY

2. Install the **DT-41623-B** 3/8 inch line quick release tool onto the transmission oil cooler (TOC) pipe, or use the **DT-28585** universal snap ring remover for the 5/8 inch line.

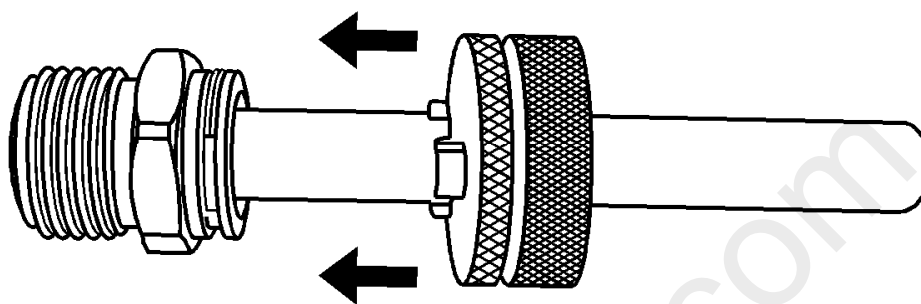


Fig. 46: Sliding Line Quick Release Tool Toward Generator Cooling Inlet Pipe Fitting
Courtesy of GENERAL MOTORS COMPANY

3. Slide the **DT-41623-B** 3/8 inch line quick release tool toward the TOC pipe fitting, or use the **DT-28585** universal snap ring remover for the 5/8 inch line.

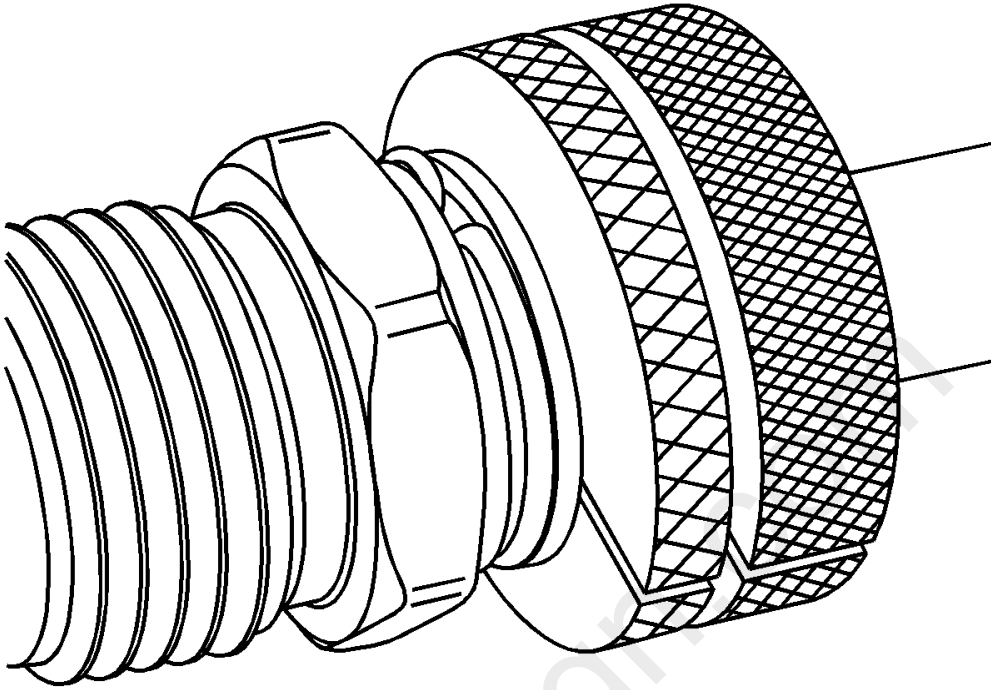


Fig. 47: Rotating Quick-Connect On Coolant Pipe
Courtesy of GENERAL MOTORS COMPANY

NOTE: Rotate the DT-41623-B 3/8 inch line quick release tool to engage the TOC pipe fitting's retainer slots.

The DT-41623-B 3/8 inch line quick release tool should be nearly flush with the fitting.

4. Connect the **DT-41623-B** 3/8 inch line quick release tool onto the TOC pipe fitting.

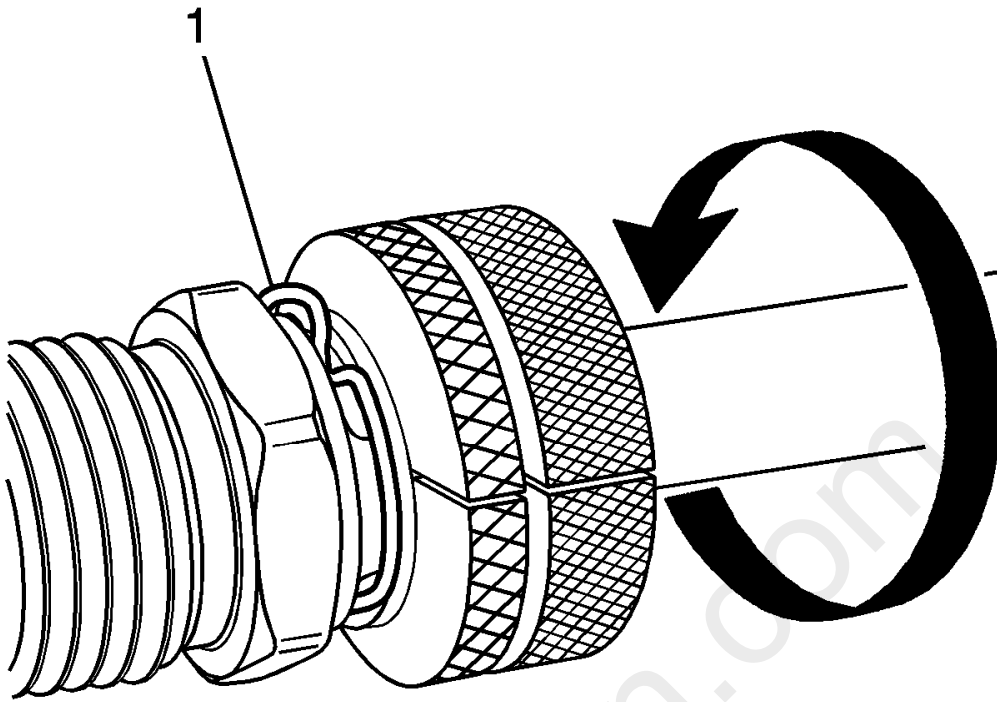


Fig. 48: Rotating Quick-Connect Until Retainer Clip Rises Above Fitting Retainer Seat
Courtesy of GENERAL MOTORS COMPANY

5. Rotate the **DT-41623-B** 3/8 inch line quick release tool or use the **DT-28585** universal snap ring remover for the 5/8 inch line until the retainer clip (1) rises above the fitting retainer seat.

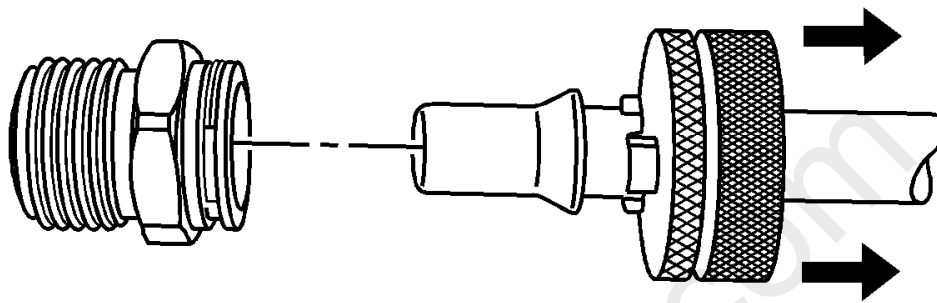


Fig. 49: View Of Line Quick Release Tool & Generator Cooling Inlet Pipe
Courtesy of GENERAL MOTORS COMPANY

6. Pull back on the TOC pipe to disengage the pipe from the TOC pipe fitting.
7. Remove the **DT-41623-B** 3/8 inch line quick release tool or the **DT-28585** universal snap ring remover for the 5/8 inch line from the TOC pipe.

Installation Procedure

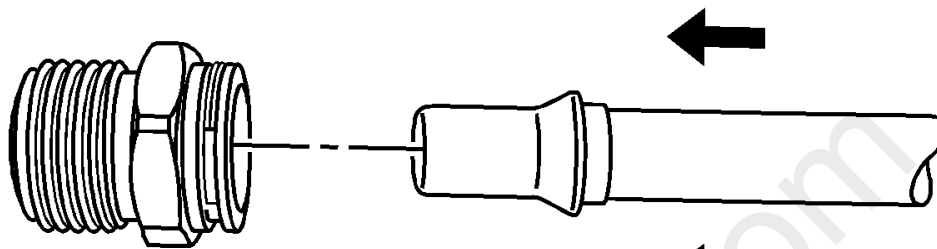


Fig. 50: View Of Generator Cooling Inlet Pipe & Generator Cooling Inlet Pipe Fitting
Courtesy of GENERAL MOTORS COMPANY

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. Install the plastic cap onto the quick connect fitting. The plastic cap should snap onto fitting and spin freely by hand.
3. To ensure the cooler line is properly installed, give the cooler pipe a gentle pull.

TRANSMISSION FLUID COOLER INLET AND OUTLET PIPE REPLACEMENT (LFX, LTG MYA WITH V03)

Removal Procedure

1. Remove the front compartment front sight shield. Refer to **Front Compartment Front Sight Shield Replacement** .
2. Remove the air cleaner outlet duct. Refer to **Air Cleaner Outlet Duct Replacement** .
3. Remove the air cleaner assembly. Refer to **Air Cleaner Assembly Replacement** .
4. Cap the fittings and plug the holes when removing the transmission fluid cooler inlet and outlet pipe.
5. Place a drain pan under the transmission fluid cooler inlet and outlet pipe.

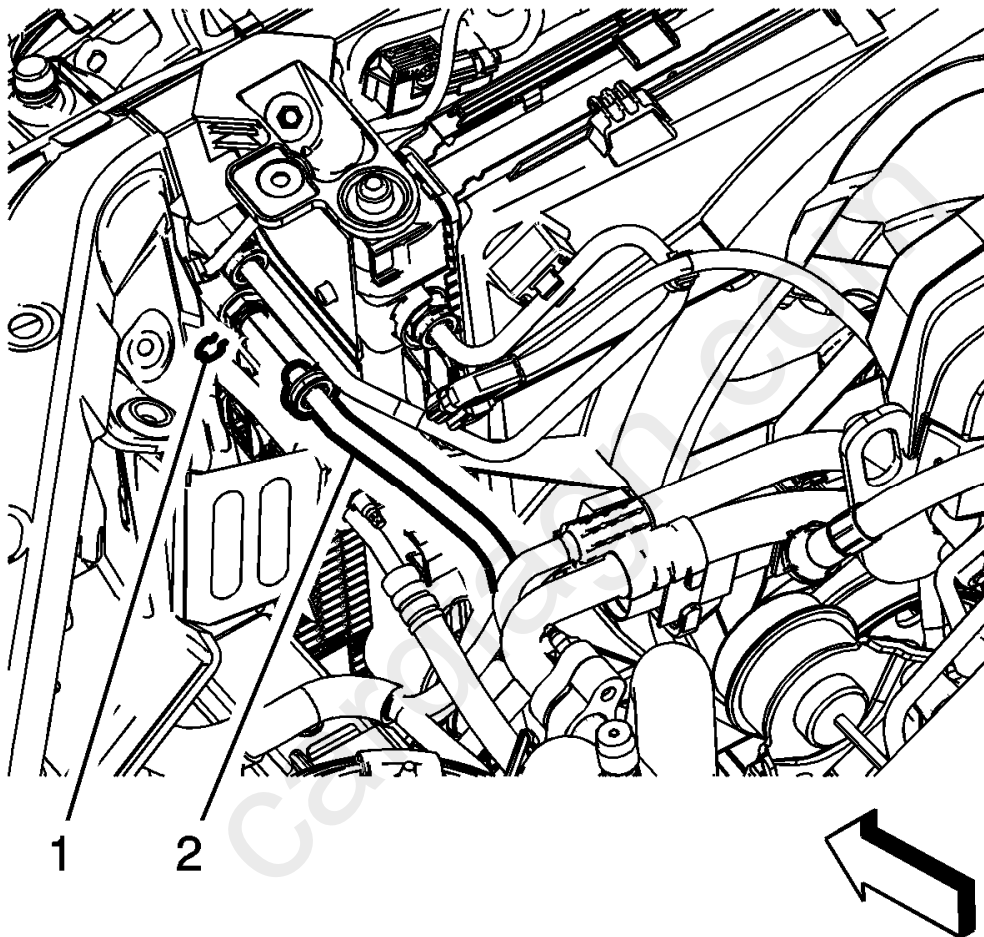


Fig. 51: Transmission Fluid Cooler Inlet & Outlet Pipe With Retaining Ring
Courtesy of GENERAL MOTORS COMPANY

6. Disconnect the transmission fluid cooler inlet and outlet pipe retaining ring (1) from the air conditioning condenser. Refer to **Transmission Fluid Cooler Hose/Pipe Quick-Connect Fitting Disconnection and Connection** .
7. Disconnect the transmission fluid cooler inlet and outlet pipe (2) from the air conditioning condenser.
8. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
9. Remove the left wheelhouse liner. Refer to **Front Wheelhouse Liner Replacement** .
10. Remove the front bumper fascia air deflector. Refer to **Front Bumper Fascia Air Deflector**

Replacement - Center .

11. Remove the front compartment lower noise shield. Refer to **Front Compartment Lower Noise Shield Replacement (AWD)** , **Front Compartment Lower Noise Shield Replacement (RWD)** .

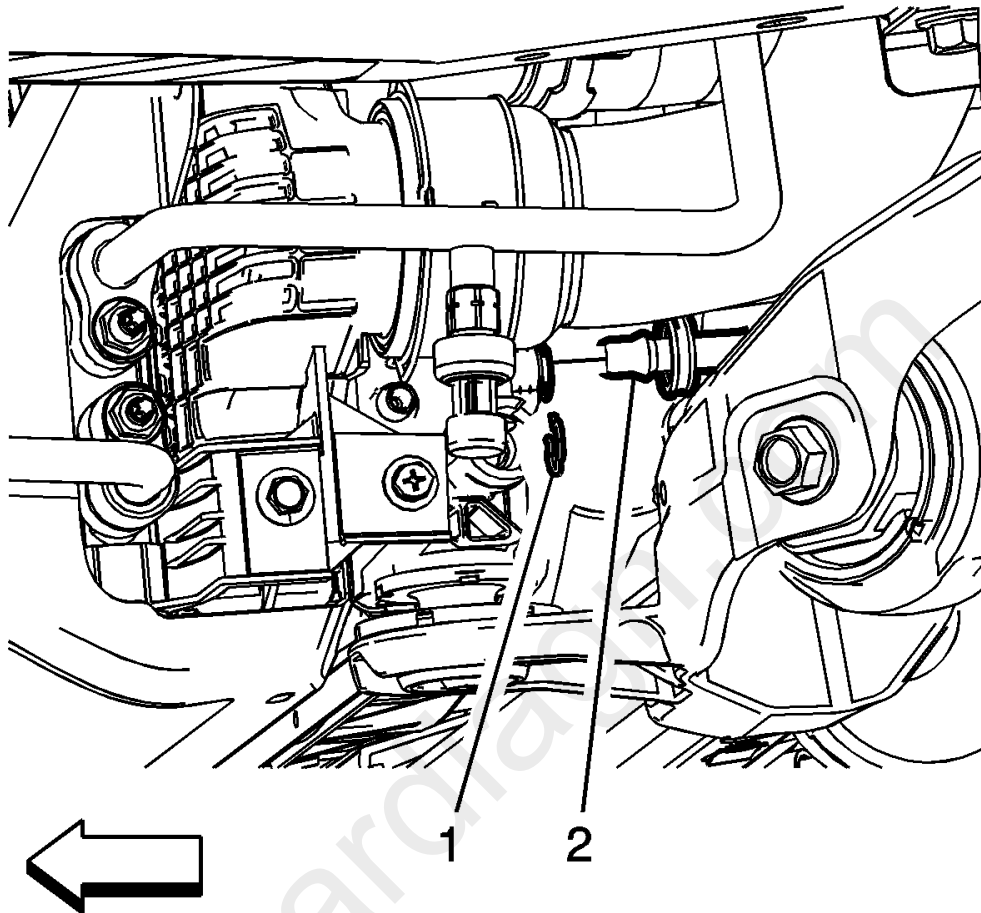


Fig. 52: Transmission Fluid Cooler Inlet And Outlet Pipe
Courtesy of GENERAL MOTORS COMPANY

12. Disconnect the transmission fluid cooler inlet and outlet pipe retaining ring (1) from the radiator assembly. Refer to **Transmission Fluid Cooler Hose/Pipe Quick-Connect Fitting Disconnection and Connection.**
13. Disconnect the transmission fluid cooler inlet and outlet pipe (2) from the radiator assembly.

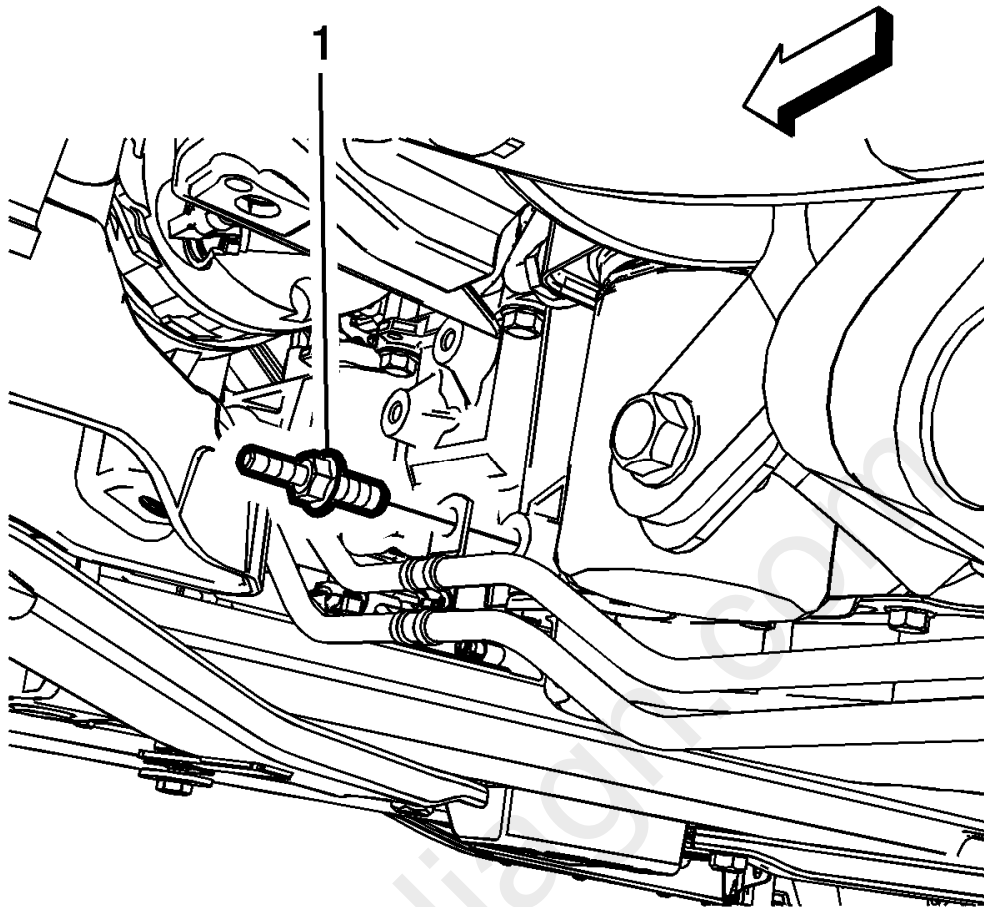


Fig. 53: Transmission Fluid Cooler Inlet & Outlet Pipe Stud
Courtesy of GENERAL MOTORS COMPANY

14. Remove the transmission fluid cooler inlet and outlet pipe stud (1) from the engine oil pan.

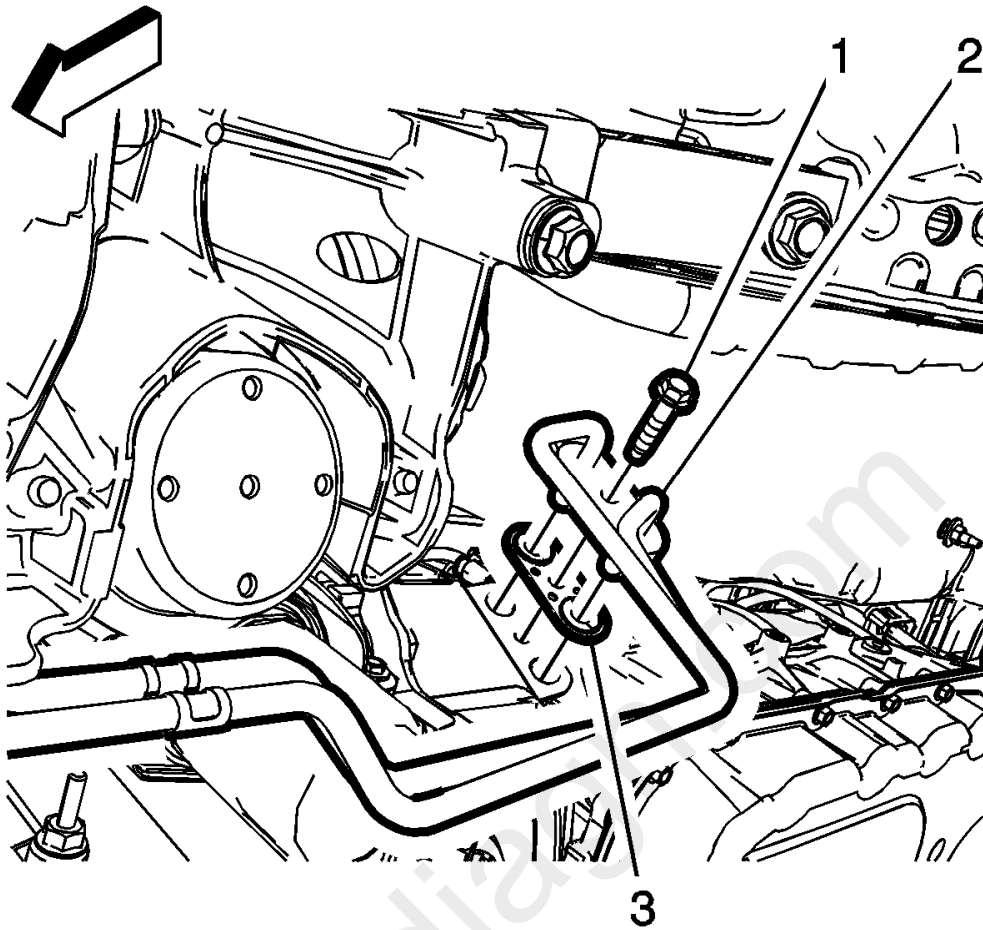


Fig. 54: Transmission Fluid Cooler Inlet & Outlet Pipe, Bolt & Fitting Seal
Courtesy of GENERAL MOTORS COMPANY

15. Remove the transmission fluid cooler inlet and outlet pipe bolt (1) from the transmission.
16. Remove and discard the old transmission fluid cooler inlet and outlet pipe fitting seal (3).

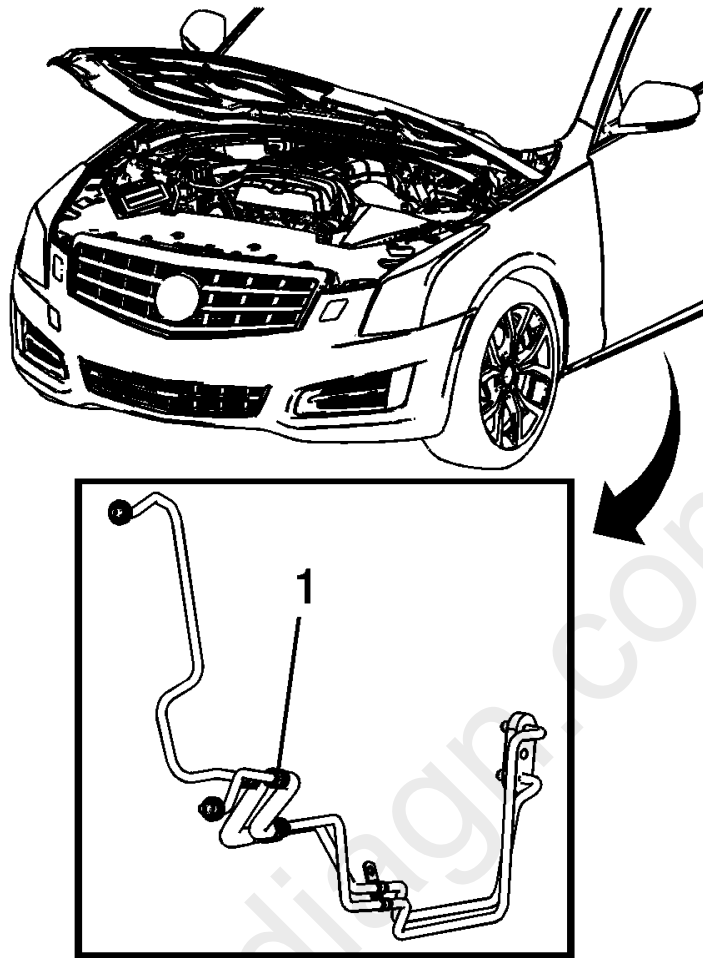


Fig. 55: Transmission Fluid Cooler Inlet & Outlet Pipe
Courtesy of GENERAL MOTORS COMPANY

17. Remove the transmission fluid cooler inlet and outlet pipe (1) from the vehicle.
18. Transfer all necessary parts.

Installation Procedure

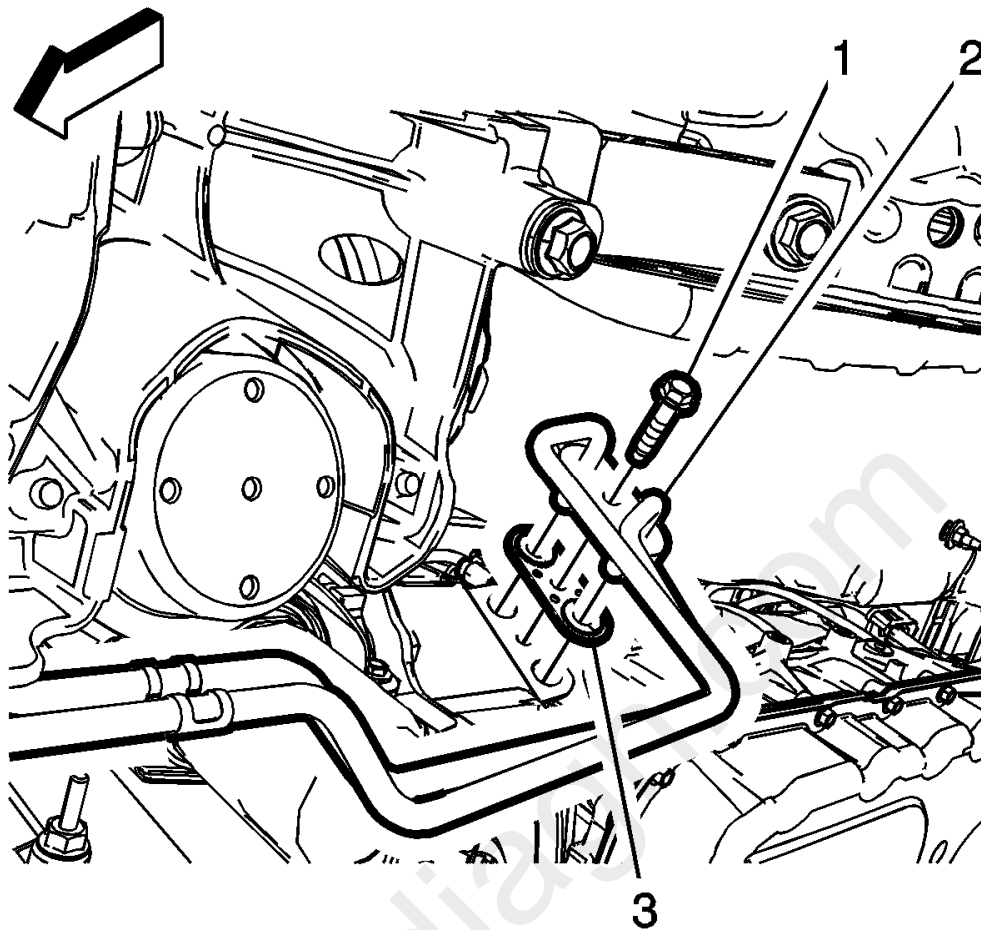


Fig. 56: Transmission Fluid Cooler Inlet & Outlet Pipe, Bolt & Fitting Seal
Courtesy of GENERAL MOTORS COMPANY

1. Install a NEW transmission fluid cooler inlet and outlet pipe fitting seal (3) to the transmission fluid cooler inlet and outlet pipe (2).
2. Install the transmission fluid cooler inlet and outlet pipe (2) to the vehicle.

CAUTION: Refer to Fastener Caution .

3. Install the transmission fluid cooler inlet and outlet pipe bolt (1) to the transmission and tighten to 22 N.m (16 lb ft).

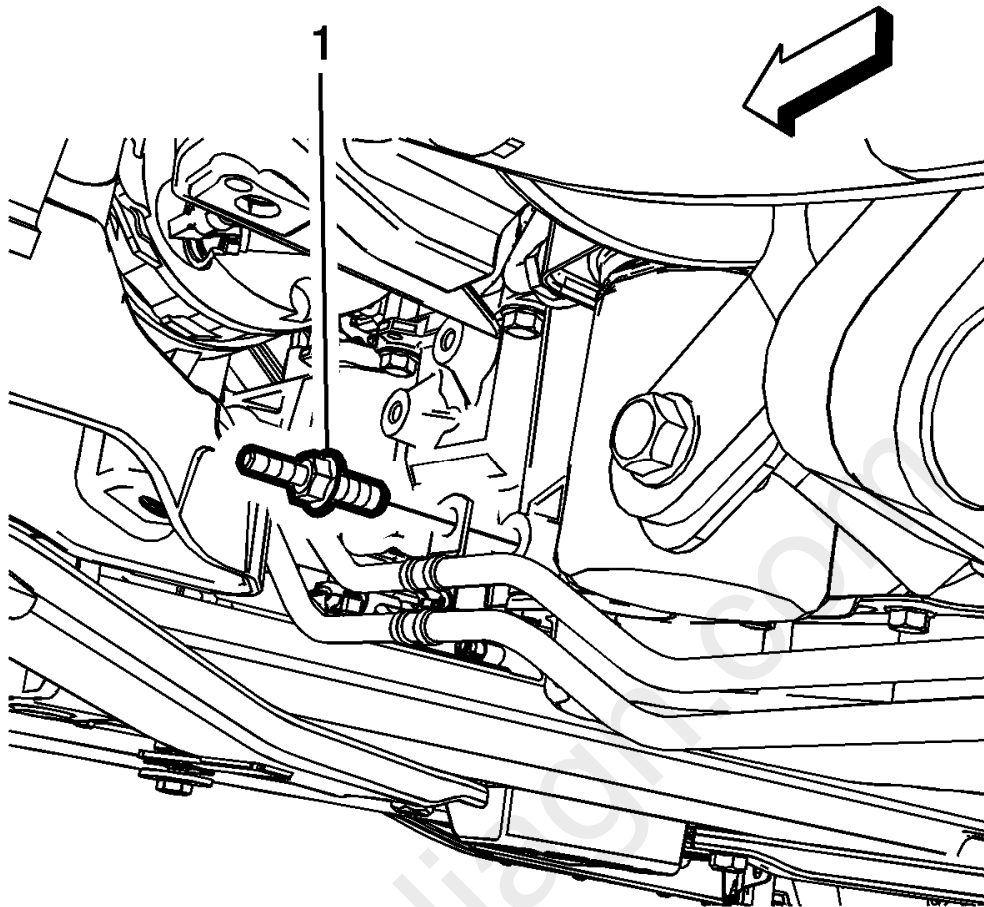


Fig. 57: Transmission Fluid Cooler Inlet & Outlet Pipe Stud
Courtesy of GENERAL MOTORS COMPANY

4. Install the transmission fluid cooler inlet and outlet pipe stud (1) to the engine oil pan and tighten to 22 N.m (16 lb ft).

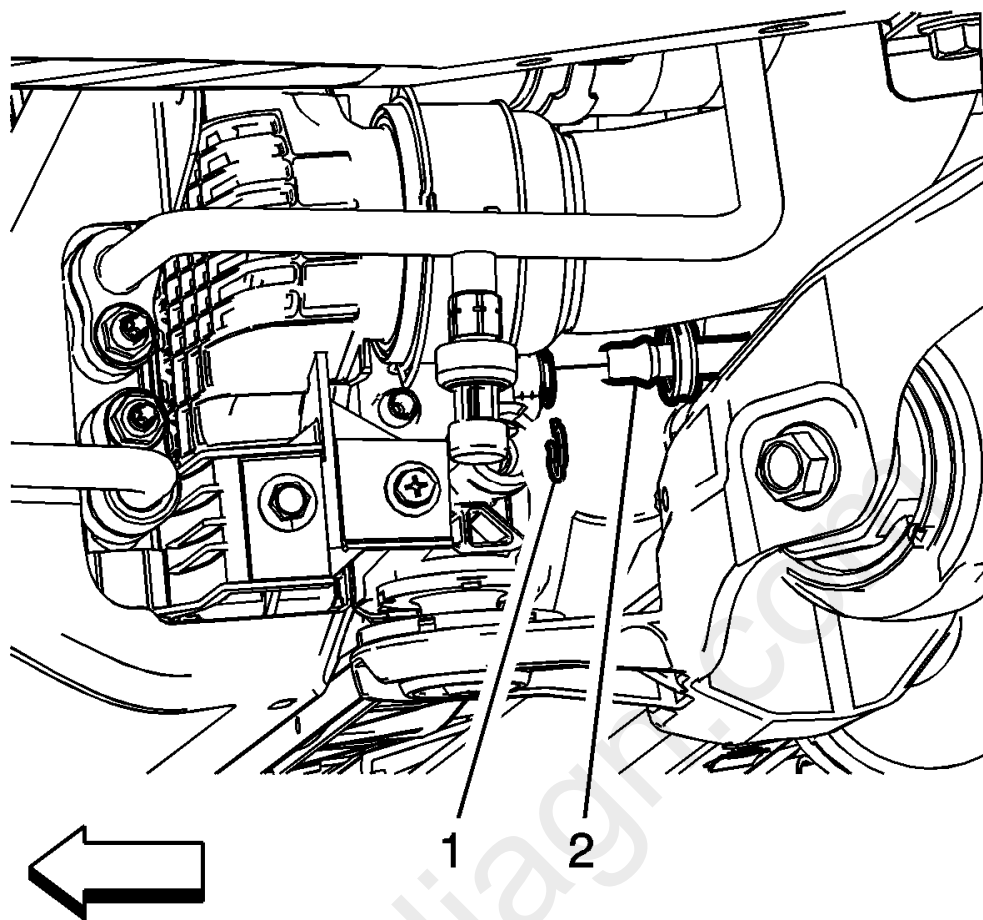


Fig. 58: Transmission Fluid Cooler Inlet And Outlet Pipe
Courtesy of GENERAL MOTORS COMPANY

5. Connect the transmission fluid cooler inlet and outlet pipe (2) to the radiator assembly. Refer to **Transmission Fluid Cooler Hose/Pipe Quick-Connect Fitting Disconnection and Connection.**
6. Install the front compartment lower noise shield. Refer to **Front Compartment Lower Noise Shield Replacement (AWD)** , **Front Compartment Lower Noise Shield Replacement (RWD)** .
7. Install the front bumper fascia air deflector. Refer to **Front Bumper Fascia Air Deflector Replacement - Center** .
8. Install the left wheelhouse liner. Refer to **Front Wheelhouse Liner Replacement** .
9. Lower the vehicle.

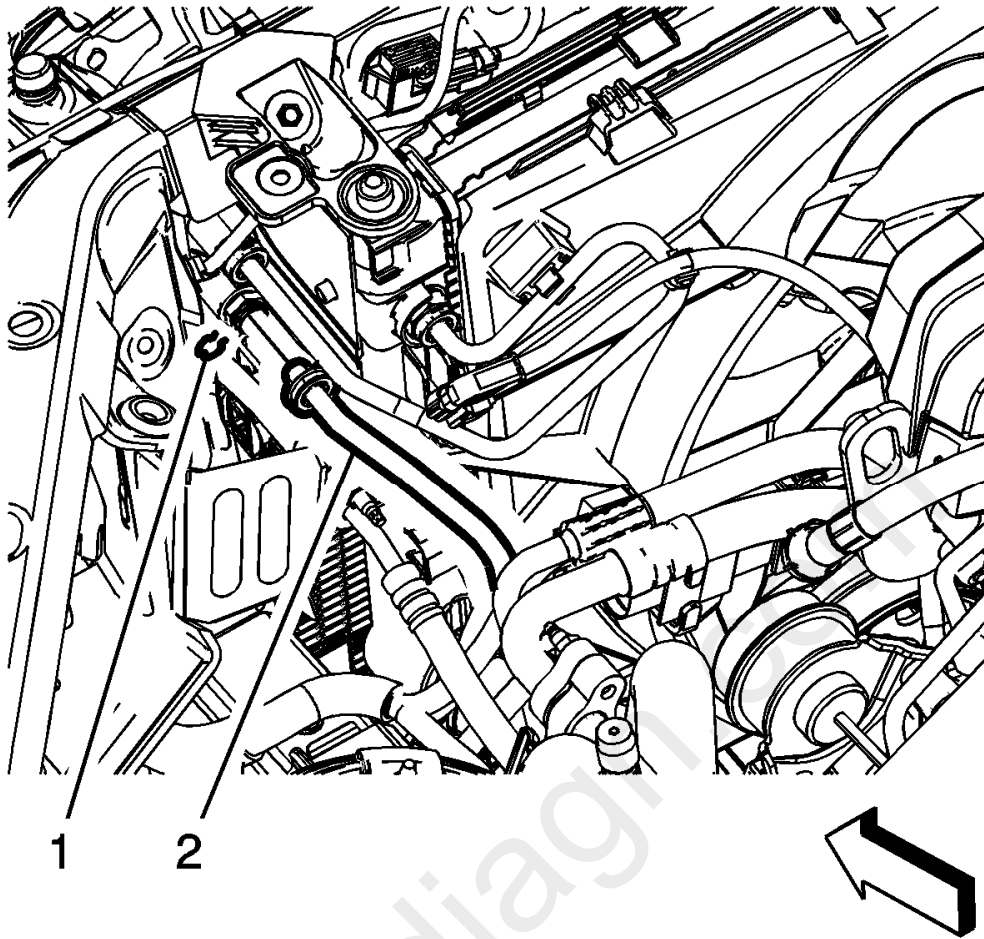


Fig. 59: Transmission Fluid Cooler Inlet & Outlet Pipe With Retaining Ring
Courtesy of GENERAL MOTORS COMPANY

10. Connect the transmission fluid cooler inlet and outlet pipe (2) to the air conditioning condenser. Refer to **Transmission Fluid Cooler Hose/Pipe Quick-Connect Fitting Disconnection and Connection**.
11. Install the air cleaner assembly. Refer to **Air Cleaner Assembly Replacement**.
12. Install the air cleaner outlet duct. Refer to **Air Cleaner Outlet Duct Replacement**.
13. Install the front compartment front sight shield. Refer to **Front Compartment Front Sight Shield Replacement**.
14. Fill the transmission to the proper fluid level. Refer to **Transmission Fluid Fill Procedure**.
15. Inspect for fluid leaks.

TRANSMISSION FLUID COOLER INLET AND OUTLET PIPE REPLACEMENT (LFX, LTG MYA WITHOUT V03)

Removal Procedure

1. Remove the front compartment front sight shield. Refer to **Front Compartment Front Sight Shield**

Replacement .

2. Remove the air cleaner outlet duct. Refer to **Air Cleaner Outlet Duct Replacement .**
3. Disconnect the electrical connector from the fan control module and reposition the harness out of the way. Refer to **Fan Control Module Replacement (LFX, LTG without V03) .**
4. Cap the fittings and plug the holes when removing the transmission fluid cooler inlet and outlet pipe.
5. Place a drain pan under the transmission fluid cooler inlet and outlet pipe.

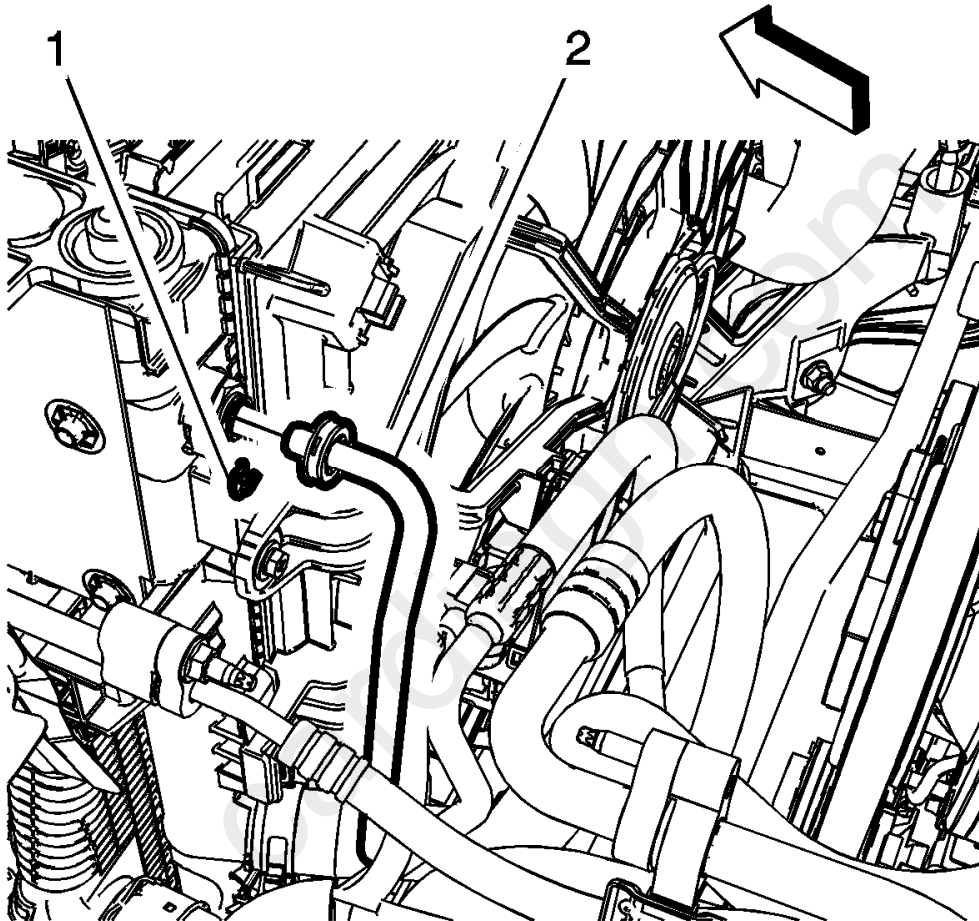


Fig. 60: Transmission Fluid Cooler Inlet & Outlet Pipe With Retaining Clip
Courtesy of GENERAL MOTORS COMPANY

6. Disconnect the transmission fluid cooler inlet and outlet pipe retaining clip (1) from the radiator assembly. Refer to **Transmission Fluid Cooler Hose/Pipe Quick-Connect Fitting Disconnection and Connection.**
7. Disconnect the transmission fluid cooler inlet and outlet pipe (2) from the radiator assembly.
8. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle .**
9. Remove the left wheelhouse liner. Refer to **Front Wheelhouse Liner Replacement .**
10. Remove the front bumper fascia air deflector. Refer to **Front Bumper Fascia Air Deflector**

Replacement - Center .

11. Remove the front compartment lower noise shield. Refer to **Front Compartment Lower Noise Shield Replacement (AWD)** , **Front Compartment Lower Noise Shield Replacement (RWD)** .

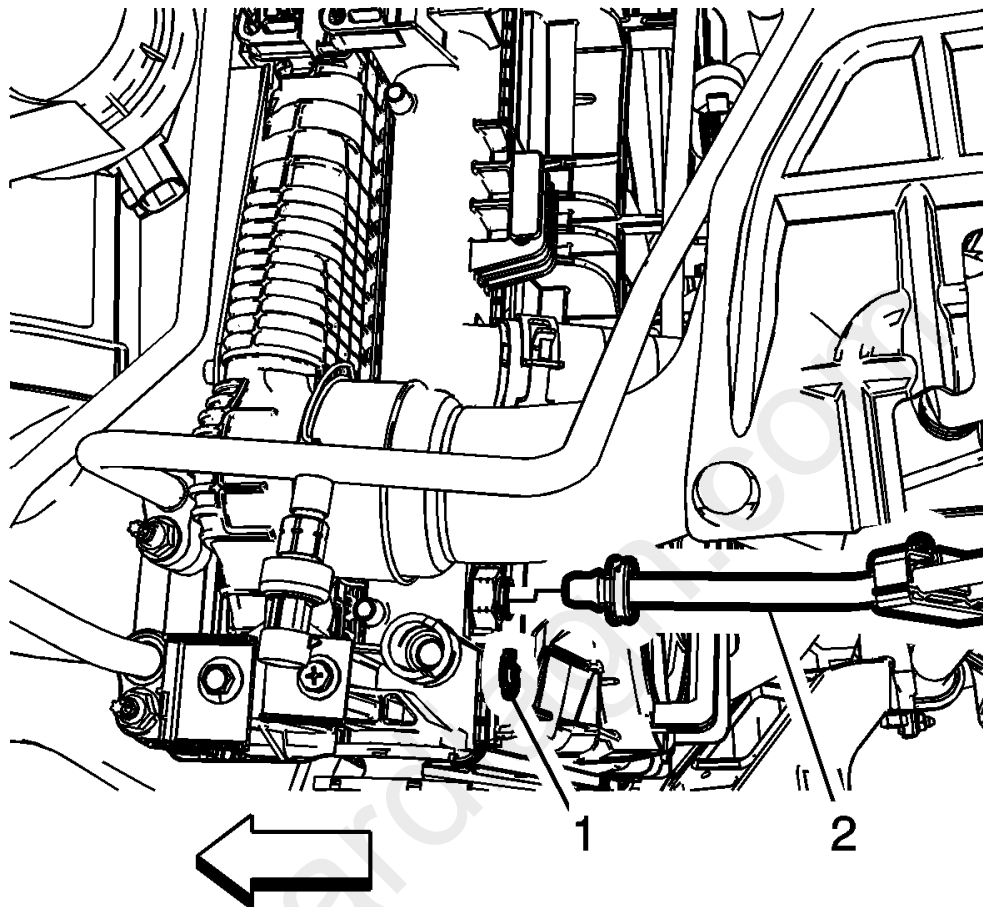


Fig. 61: Transmission Fluid Cooler Inlet & Outlet Pipe With Retaining Clip
Courtesy of GENERAL MOTORS COMPANY

12. Disconnect the transmission fluid cooler inlet and outlet pipe retaining clip (1) from the radiator assembly. Refer to **Transmission Fluid Cooler Hose/Pipe Quick-Connect Fitting Disconnection and Connection**.
13. Disconnect the transmission fluid cooler inlet and outlet pipe (2) from the radiator assembly.

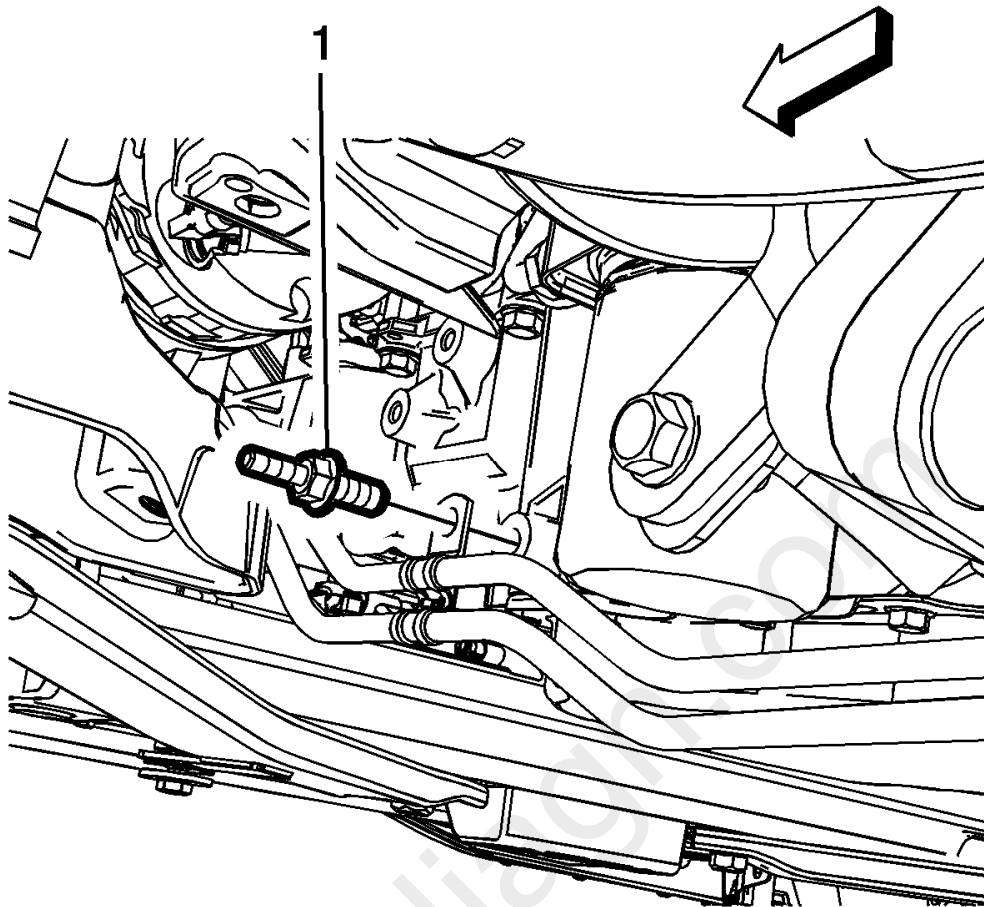


Fig. 62: Transmission Fluid Cooler Inlet & Outlet Pipe Stud
Courtesy of GENERAL MOTORS COMPANY

14. Remove the transmission fluid cooler inlet and outlet pipe stud (1) from the engine oil pan.

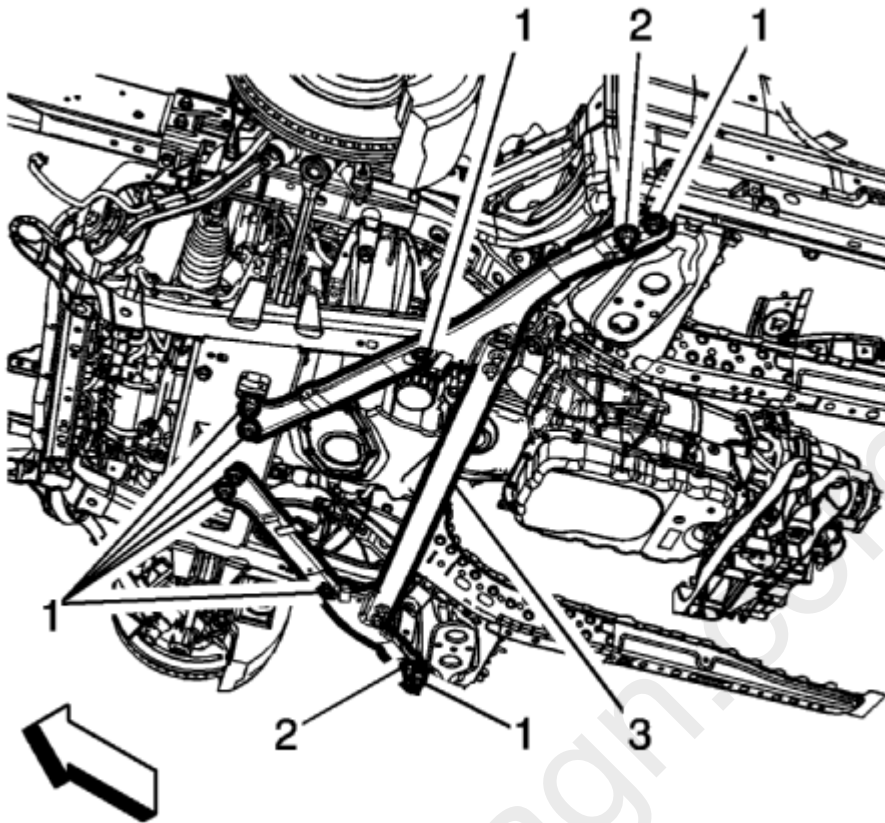


Fig. 63: Frame Brace

Courtesy of GENERAL MOTORS COMPANY

15. Remove the front crossmember brace fasteners (1).
16. Remove the front crossmember brace nuts (2).
17. Remove the front crossmember brace (3).

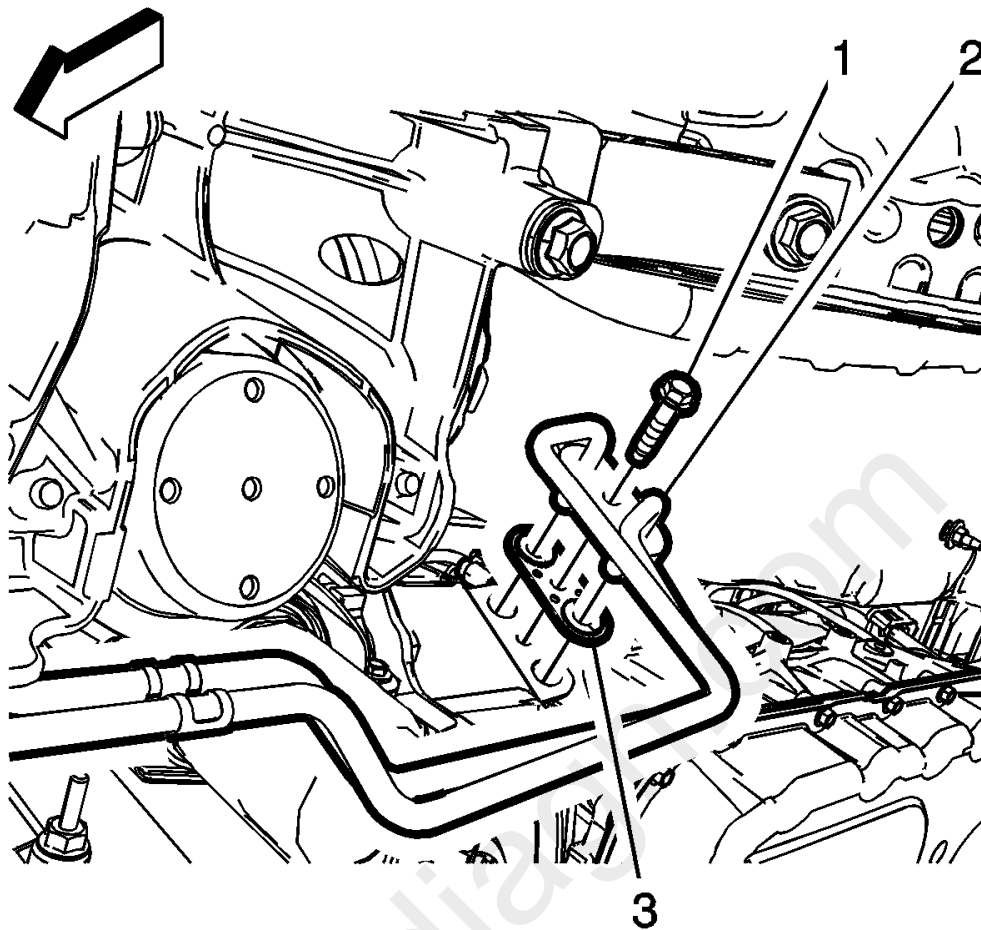


Fig. 64: Transmission Fluid Cooler Inlet & Outlet Pipe, Bolt & Fitting Seal
Courtesy of GENERAL MOTORS COMPANY

18. Remove the transmission fluid cooler inlet and outlet pipe bolt (1) from the transmission.
19. Remove and discard the old transmission fluid cooler inlet and outlet pipe fitting seal (3).

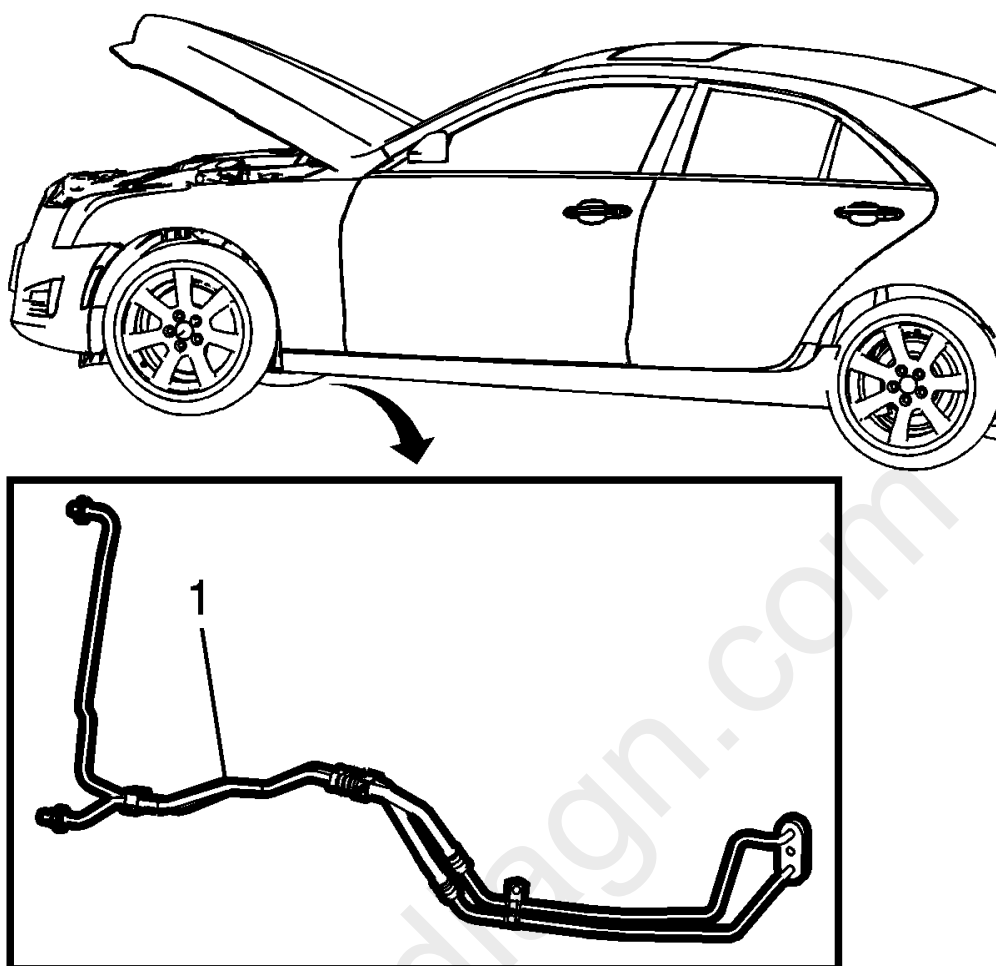


Fig. 65: Transmission Fluid Cooler Inlet And Outlet Pipe
Courtesy of GENERAL MOTORS COMPANY

20. Remove the transmission fluid cooler inlet and outlet pipe (1) from the vehicle.
21. Transfer all necessary parts.

Installation Procedure

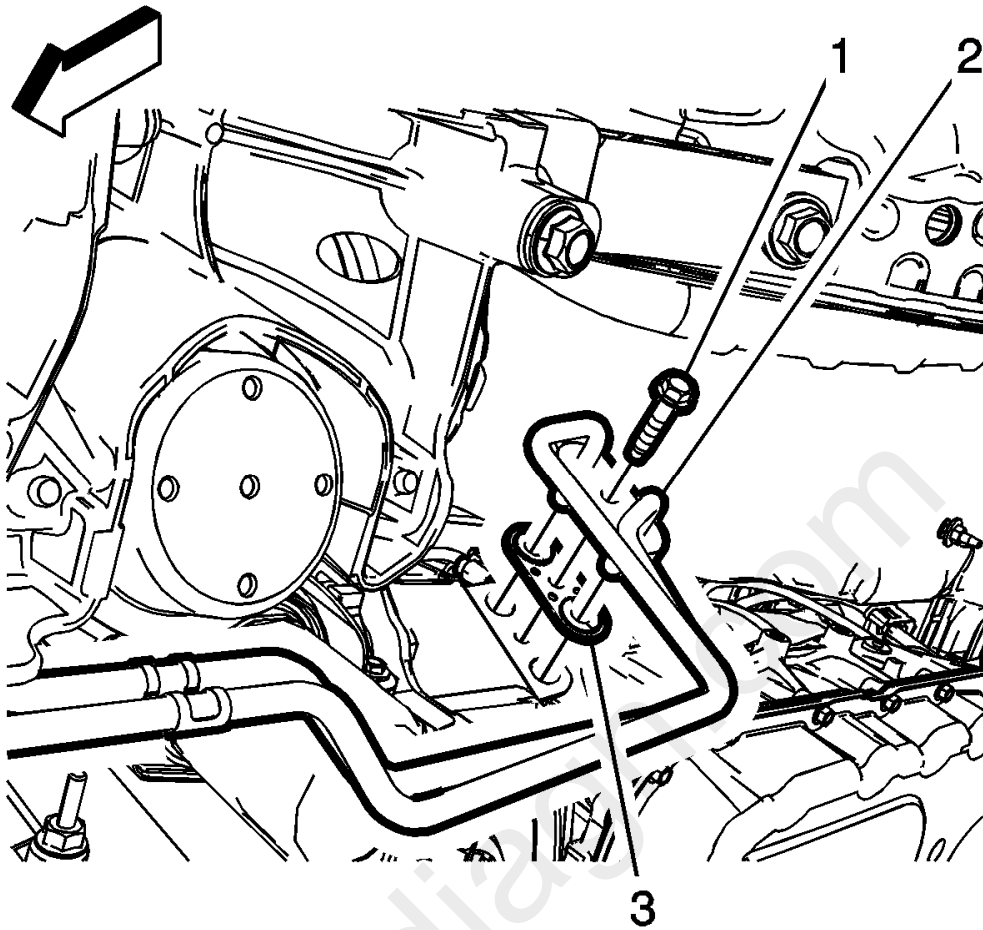


Fig. 66: Transmission Fluid Cooler Inlet & Outlet Pipe, Bolt & Fitting Seal
Courtesy of GENERAL MOTORS COMPANY

1. Install a NEW transmission fluid cooler inlet and outlet pipe fitting seal (3).
2. Install the transmission fluid cooler inlet and outlet pipe (2) to the vehicle.

CAUTION: Refer to Fastener Caution .

3. Install the transmission fluid cooler inlet and outlet pipe bolt (1) and tighten to 22 N.m (16 lb ft).

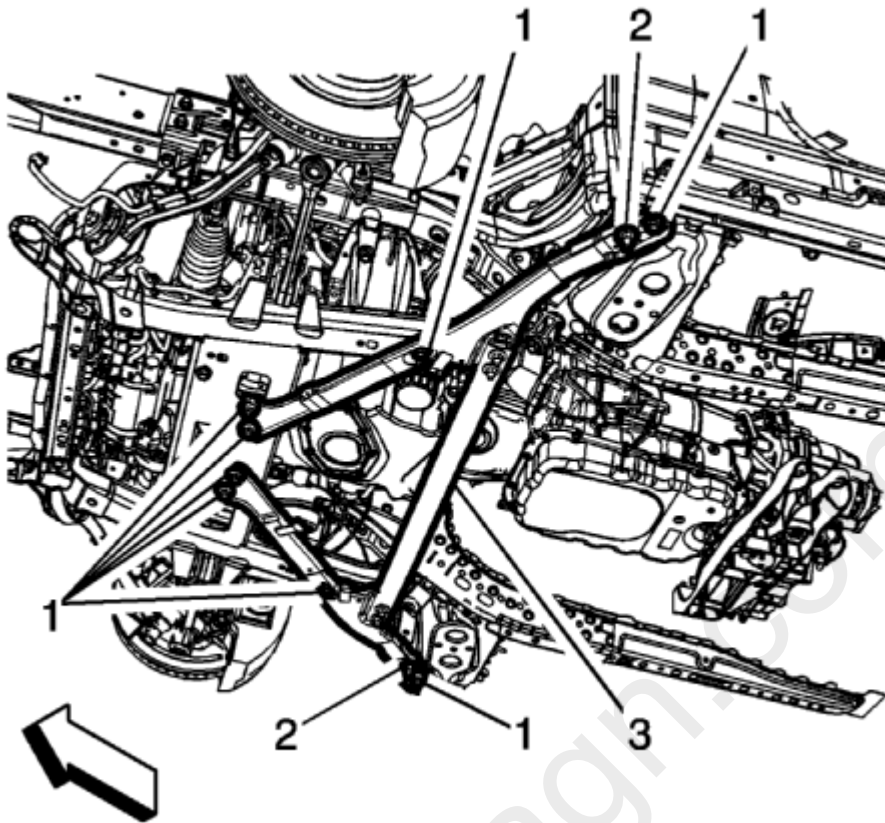


Fig. 67: Frame Brace

Courtesy of GENERAL MOTORS COMPANY

4. Apply red loctite® 743 or equivalent to the fasteners (1).
5. Install the frame brace (3) and fasteners to the vehicle and tighten the fasteners to 50 (37 lb ft).
6. Install the nuts (2) and tighten to 50 (37 lb ft)

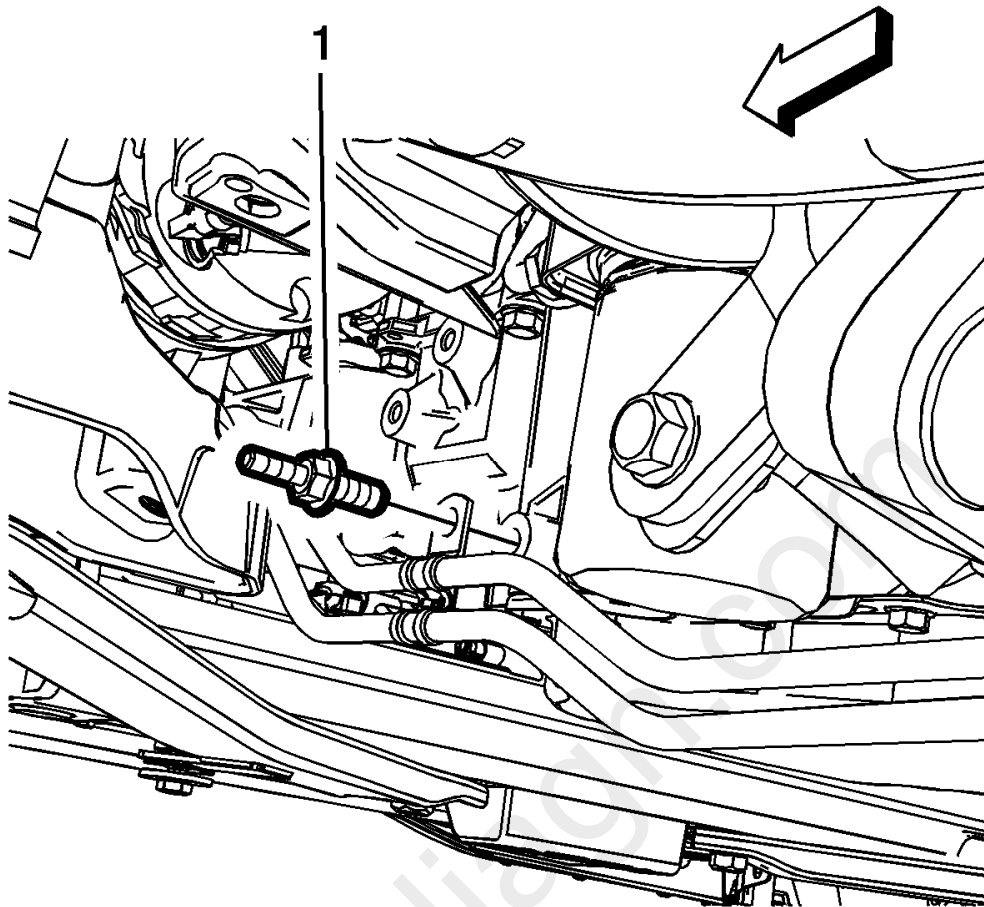


Fig. 68: Transmission Fluid Cooler Inlet & Outlet Pipe Stud
Courtesy of GENERAL MOTORS COMPANY

7. Install the transmission fluid cooler inlet and outlet pipe stud (1) to the oil pan and tighten to 22 N.m (16 lb ft).

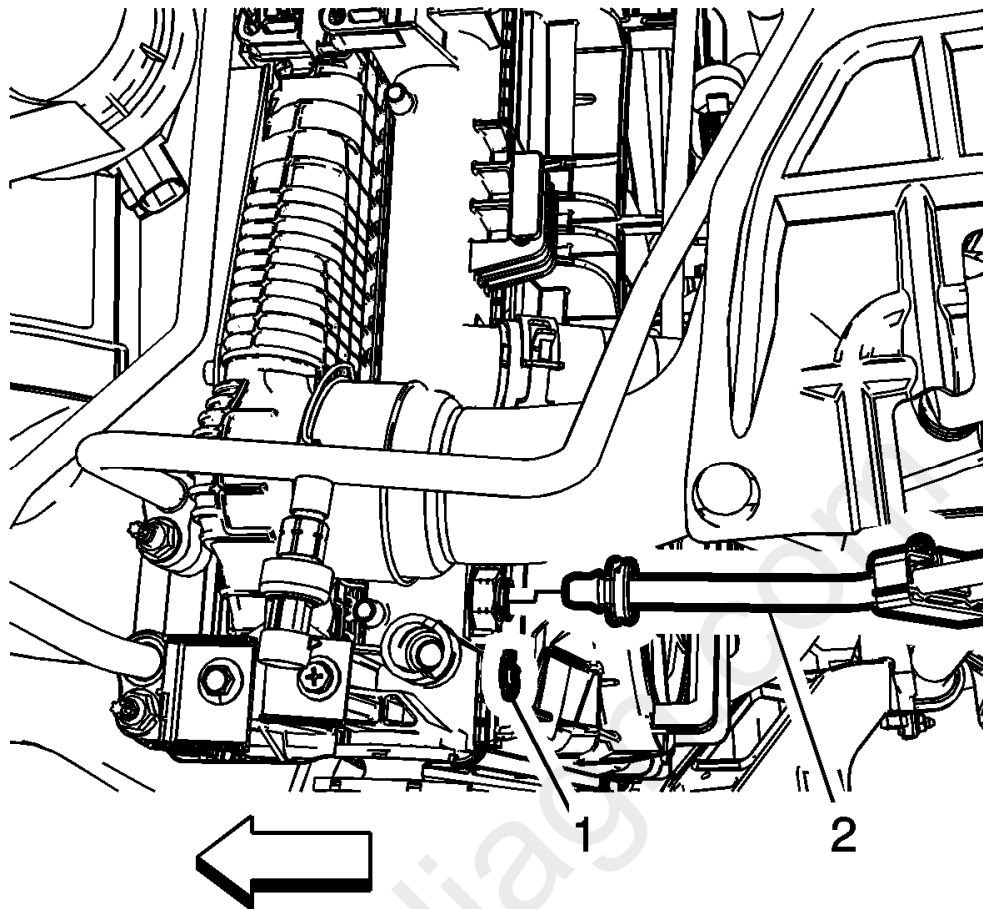


Fig. 69: Transmission Fluid Cooler Inlet & Outlet Pipe With Retaining Clip
Courtesy of GENERAL MOTORS COMPANY

8. Connect the transmission fluid cooler inlet and outlet pipe (2) to the radiator assembly. Refer to **Transmission Fluid Cooler Hose/Pipe Quick-Connect Fitting Disconnection and Connection.**
9. Install the front compartment lower noise shield. Refer to **Front Compartment Lower Noise Shield Replacement (AWD)** , **Front Compartment Lower Noise Shield Replacement (RWD)** .
10. Install the front bumper fascia air deflector. Refer to **Front Bumper Fascia Air Deflector Replacement - Center** .
11. Install the left wheelhouse liner. Refer to **Front Wheelhouse Liner Replacement** .
12. Lower the vehicle. Refer to **Lifting and Jacking the Vehicle** .

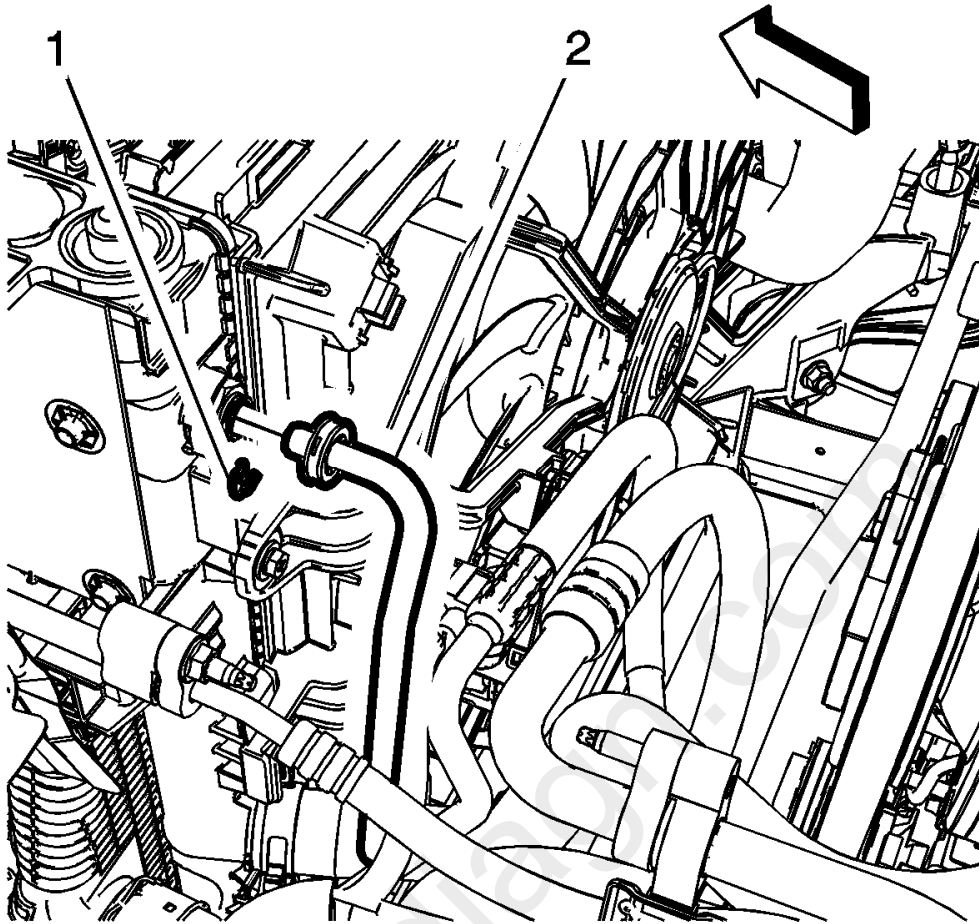


Fig. 70: Transmission Fluid Cooler Inlet & Outlet Pipe With Retaining Clip
Courtesy of GENERAL MOTORS COMPANY

13. Connect the transmission fluid cooler inlet and outlet pipe (2) to the radiator. Refer to **Transmission Fluid Cooler Hose/Pipe Quick-Connect Fitting Disconnection and Connection**.
14. Connect the electrical connector to the fan control module and reposition the harness. Refer to **Fan Control Module Replacement (LFX, LTG without V03)**.
15. Install the air cleaner outlet duct. Refer to **Air Cleaner Outlet Duct Replacement**.
16. Install the front compartment front sight shield. Refer to **Front Compartment Front Sight Shield Replacement**.
17. Fill the transmission to the proper fluid level. Refer to **Transmission Fluid Fill Procedure**.
18. Inspect for fluid leaks.

TRANSMISSION FLUID COOLER INLET AND OUTLET PIPE REPLACEMENT (LFX MGG)

Removal Procedure

1. Remove the front compartment front sight shield. Refer to **Front Compartment Front Sight Shield**

Replacement .

2. Remove the air cleaner outlet duct. Refer to **Air Cleaner Outlet Duct Replacement .**
3. Cap the fittings and plug the holes when removing the transmission fluid cooler inlet and outlet pipe.
4. Place a drain pan under the transmission fluid cooler inlet and outlet pipe.

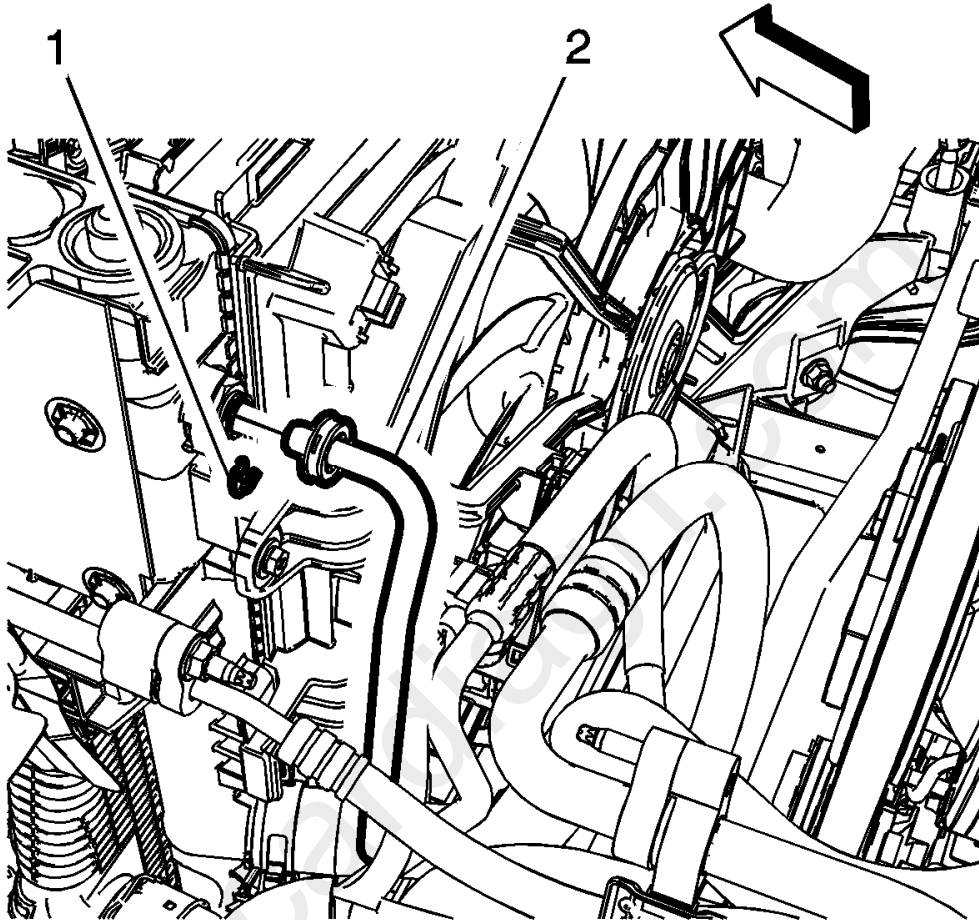


Fig. 71: Transmission Fluid Cooler Inlet & Outlet Pipe With Retaining Clip
Courtesy of GENERAL MOTORS COMPANY

5. Disconnect the transmission fluid cooler inlet and outlet pipe retaining clip (1) from the radiator assembly. Refer to **Transmission Fluid Cooler Hose/Pipe Quick-Connect Fitting Disconnection and Connection.**
6. Disconnect the transmission fluid cooler inlet and outlet pipe (2) from the radiator assembly.
7. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle .**
8. Remove the left wheelhouse liner. Refer to **Front Wheelhouse Liner Replacement .**
9. Remove the front bumper fascia air deflector. Refer to **Front Bumper Fascia Air Deflector Replacement - Center .**
10. Remove the front compartment lower noise shield. Refer to **Front Compartment Lower Noise Shield**

Replacement (AWD) , Front Compartment Lower Noise Shield Replacement (RWD) .

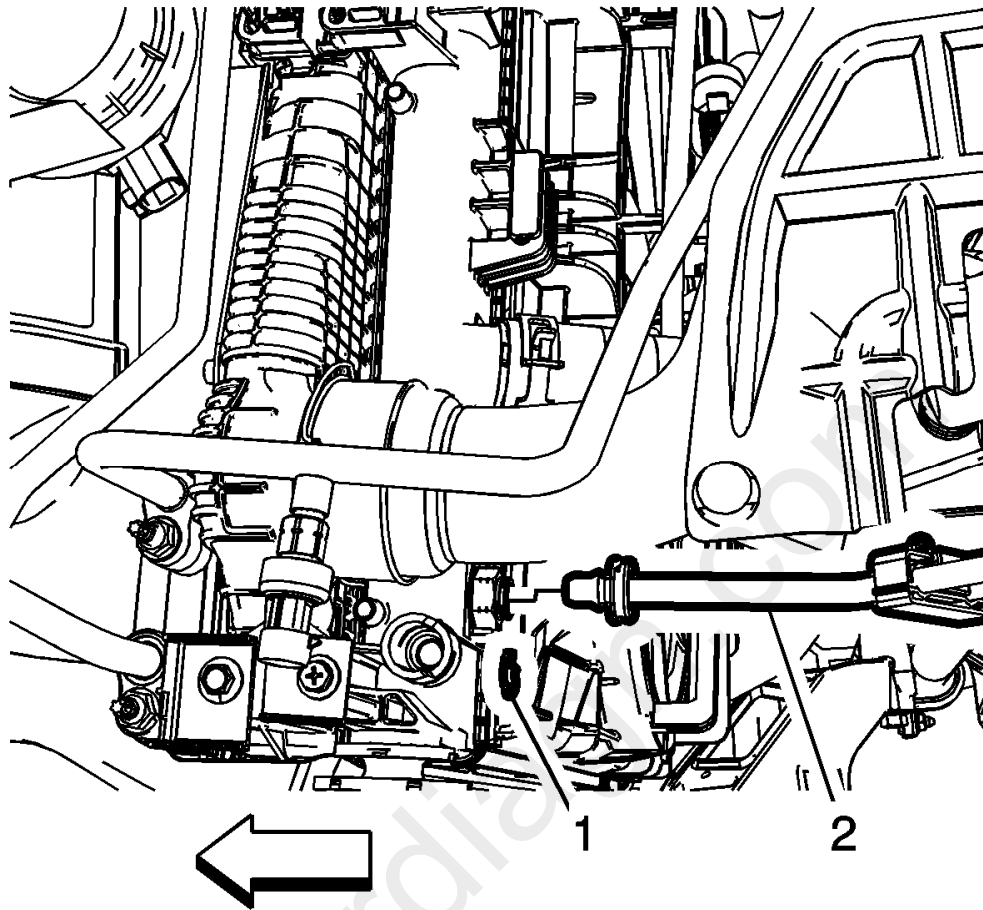


Fig. 72: Transmission Fluid Cooler Inlet & Outlet Pipe With Retaining Clip
Courtesy of GENERAL MOTORS COMPANY

11. Disconnect the transmission fluid cooler inlet and outlet pipe retaining clip (1) from the radiator assembly. Refer to **Transmission Fluid Cooler Hose/Pipe Quick-Connect Fitting Disconnection and Connection**.
12. Disconnect the transmission fluid cooler inlet and outlet pipe (2) from the radiator assembly.

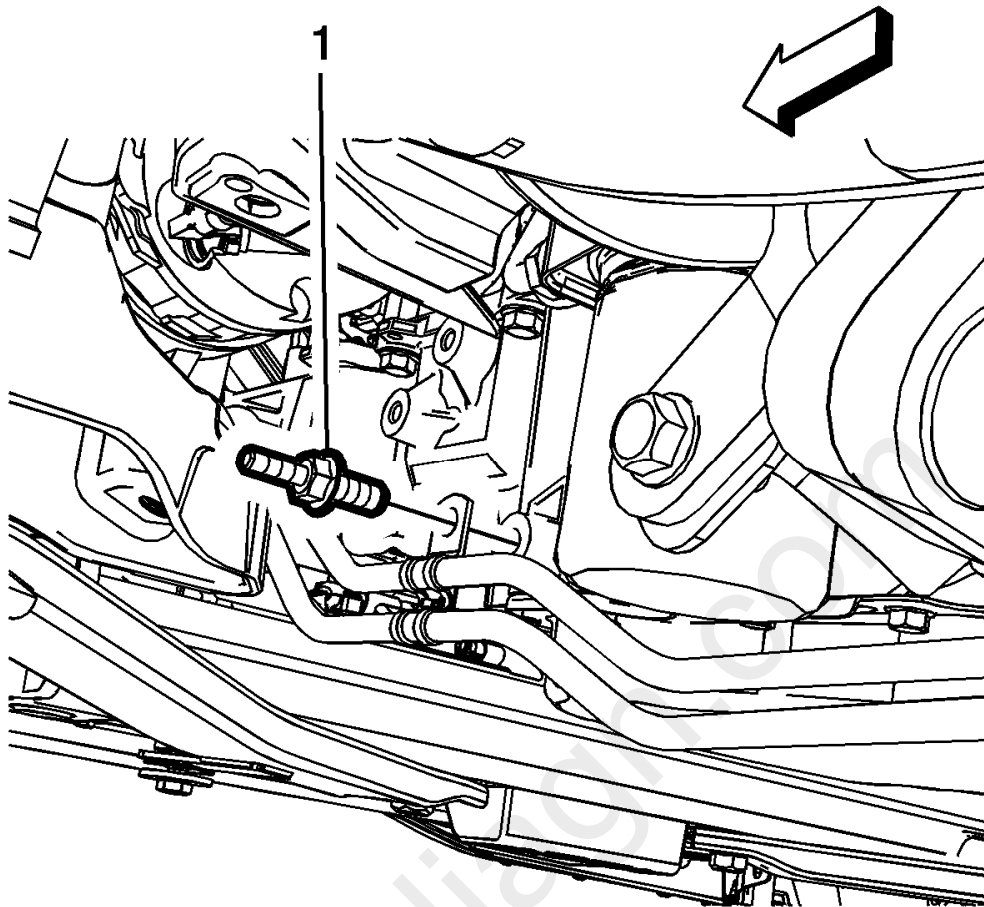


Fig. 73: Transmission Fluid Cooler Inlet & Outlet Pipe Stud
Courtesy of GENERAL MOTORS COMPANY

13. Remove the transmission fluid cooler inlet and outlet pipe stud (1) from the engine oil pan.

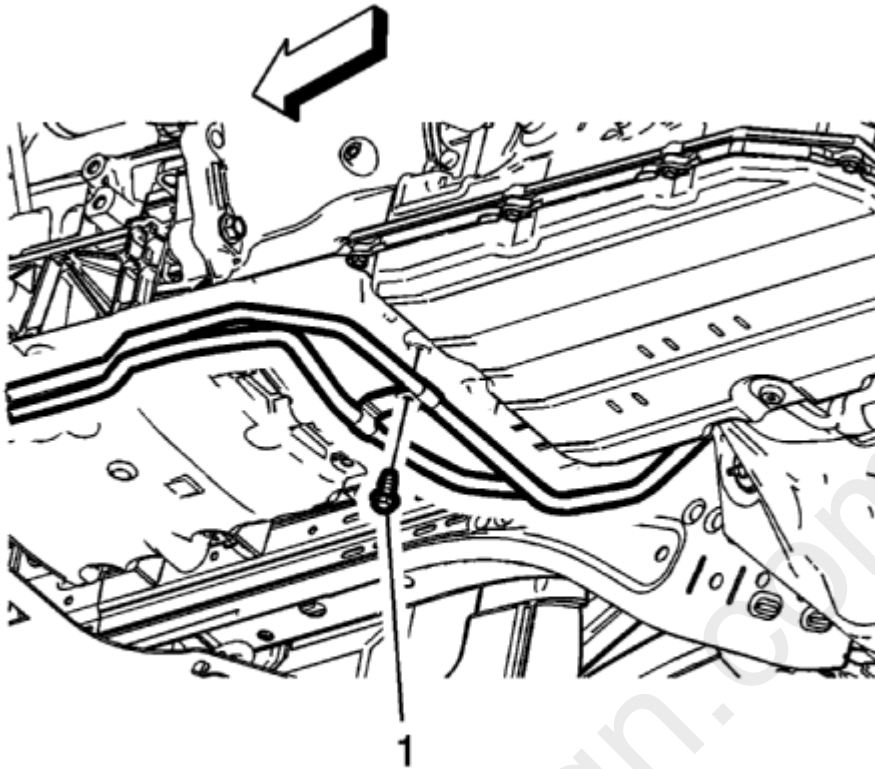


Fig. 74: Transmission Fluid Cooler Inlet And Outlet Pipe Clip Bolt
Courtesy of GENERAL MOTORS COMPANY

14. Remove the transmission fluid cooler inlet and outlet pipe clip bolt (1) from the transmission.

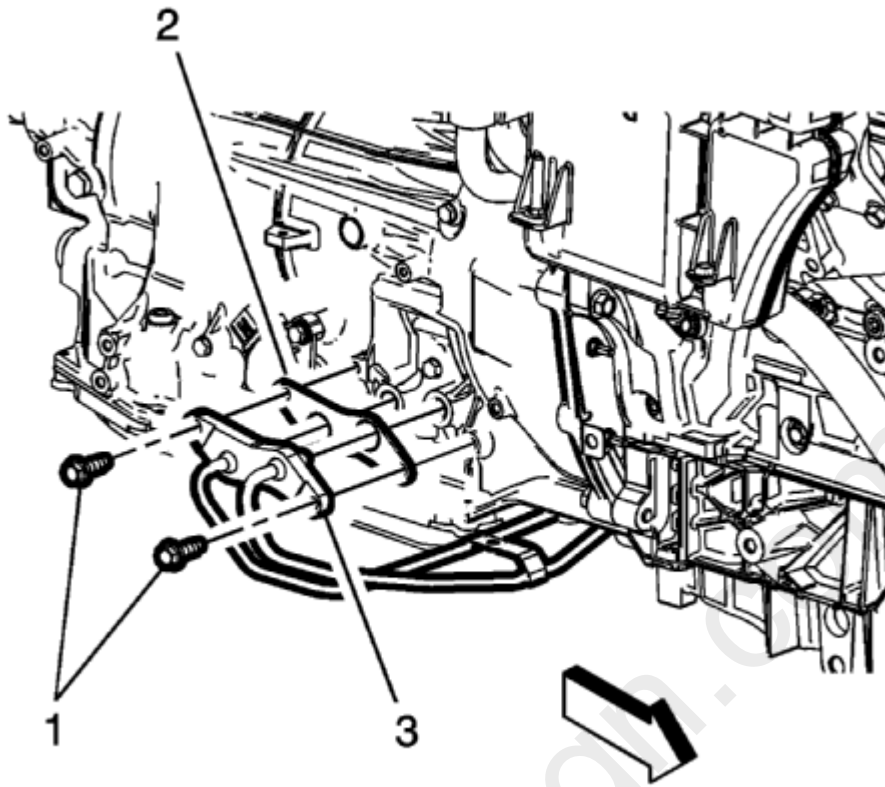


Fig. 75: Transmission Fluid Cooler Inlet And Outlet Pipes
Courtesy of GENERAL MOTORS COMPANY

15. Remove the transmission fluid cooler inlet and outlet pipe bolts (1) from the transmission.
16. Remove and discard the old transmission fluid cooler inlet and outlet pipe fitting seal (2).

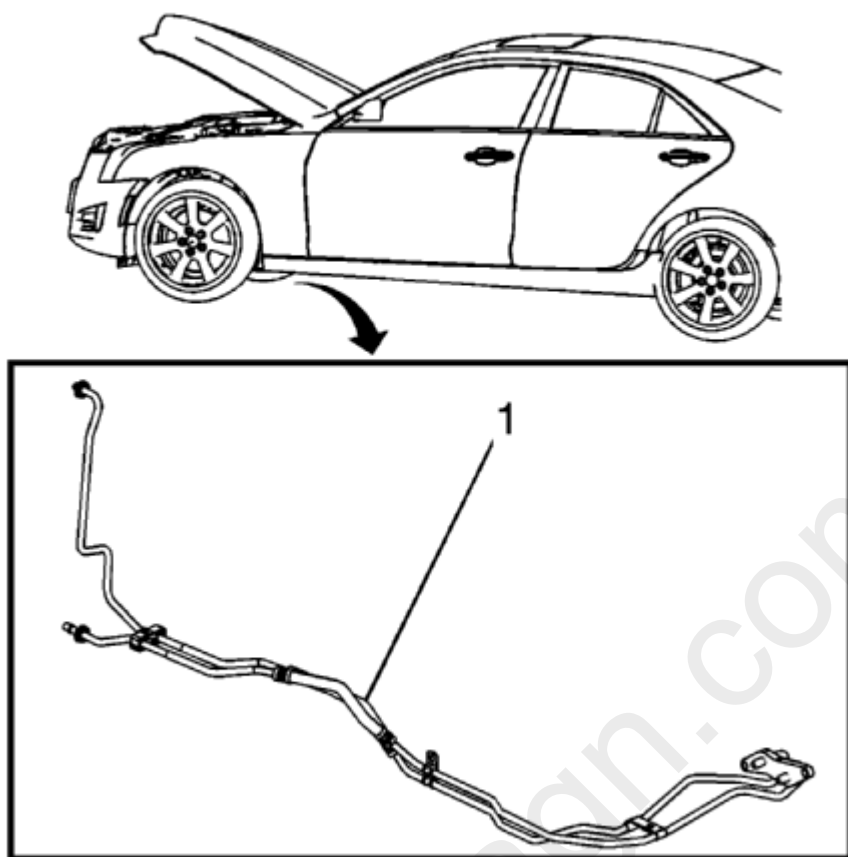


Fig. 76: Transmission Fluid Cooler Inlet And Outlet Pipe
Courtesy of GENERAL MOTORS COMPANY

17. Remove the transmission fluid cooler inlet and outlet pipe (1) from the vehicle.
18. Transfer all necessary parts.

Installation Procedure

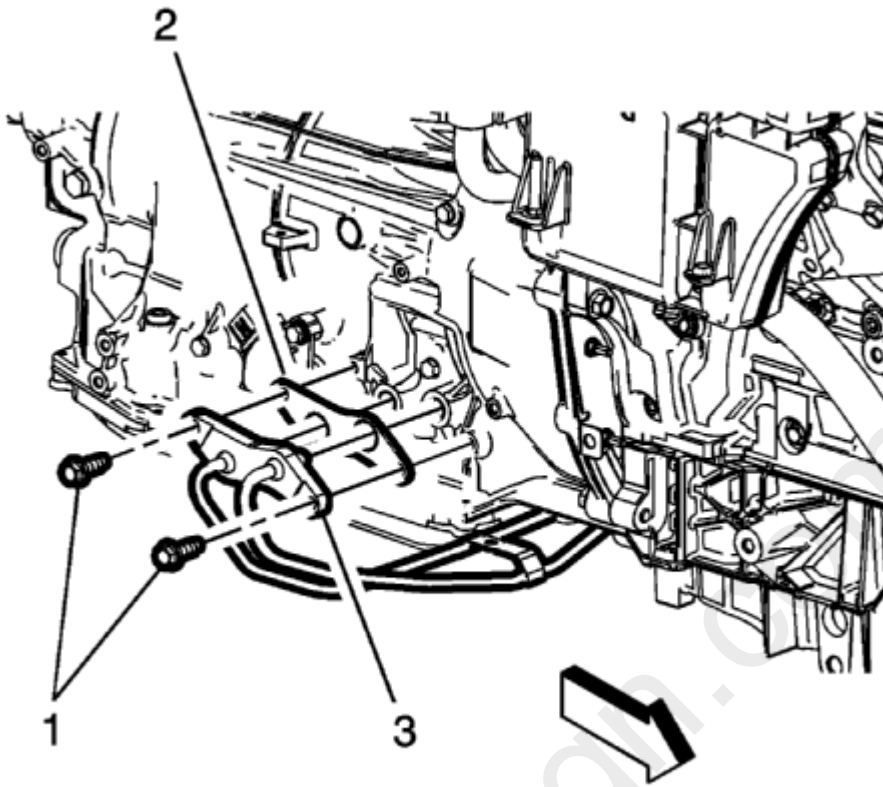


Fig. 77: Transmission Fluid Cooler Inlet And Outlet Pipes
Courtesy of GENERAL MOTORS COMPANY

1. Install a NEW transmission fluid cooler inlet and outlet pipe fitting seal (2).
2. Install the transmission fluid cooler inlet and outlet pipe (3) to the vehicle.

CAUTION: Refer to Fastener Caution .

3. Install the transmission fluid cooler inlet and outlet pipe bolts (1) and tighten to 22 N.m (16 lb ft).

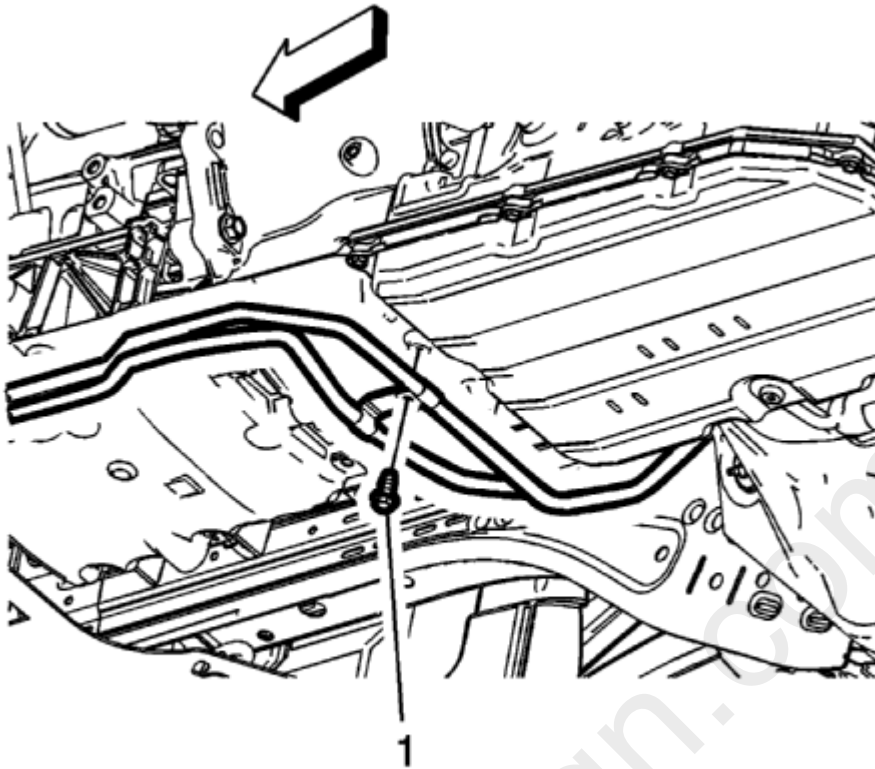


Fig. 78: Transmission Fluid Cooler Inlet And Outlet Pipe Clip Bolt
Courtesy of GENERAL MOTORS COMPANY

4. Install the transmission fluid cooler inlet and outlet pipe clip bolt (1) to the transmission and tighten to 9 (80 lb in).

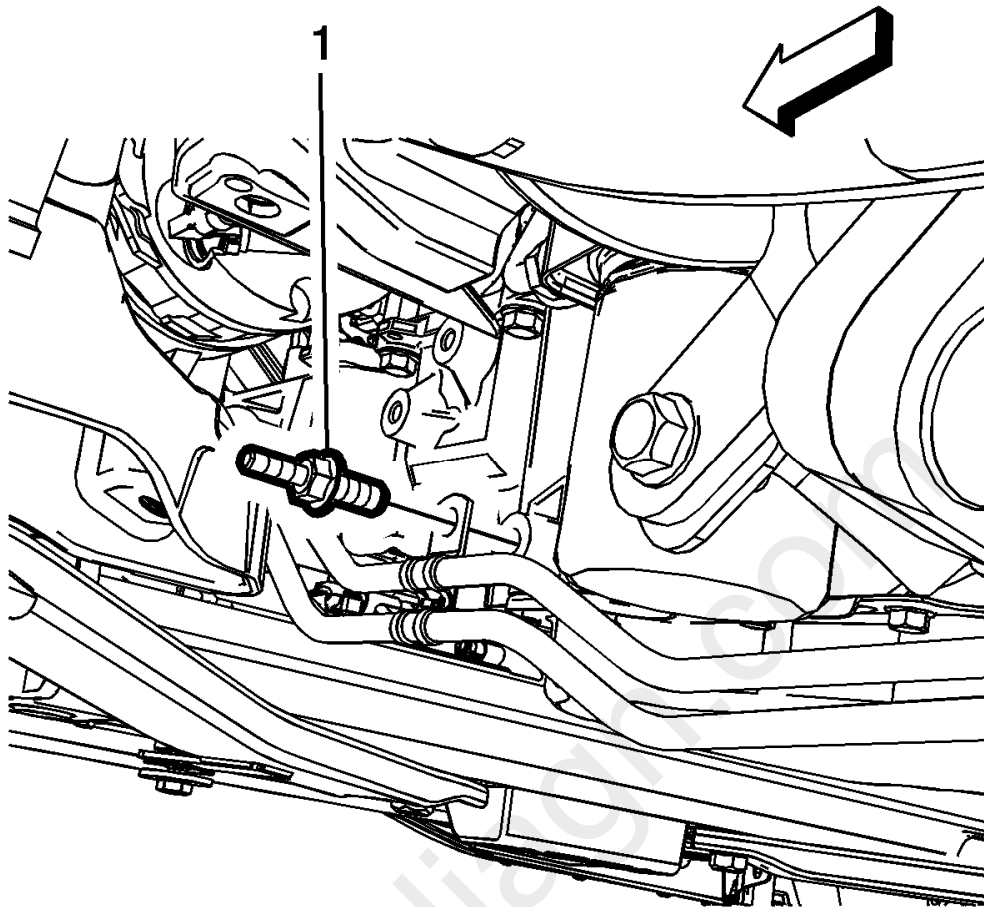


Fig. 79: Transmission Fluid Cooler Inlet & Outlet Pipe Stud
Courtesy of GENERAL MOTORS COMPANY

5. Install the transmission fluid cooler inlet and outlet pipe stud (1) to the oil pan and tighten to 22 N.m (16 lb ft).

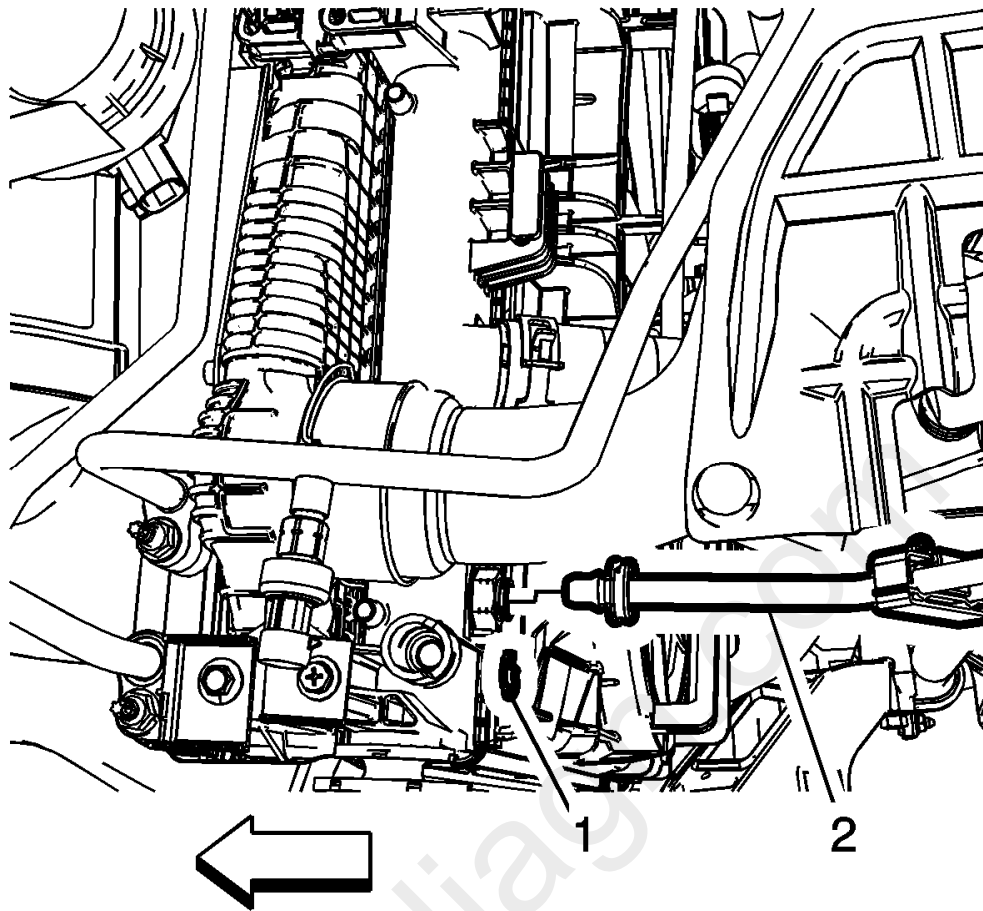


Fig. 80: Transmission Fluid Cooler Inlet & Outlet Pipe With Retaining Clip
Courtesy of GENERAL MOTORS COMPANY

6. Connect the transmission fluid cooler inlet and outlet pipe (2) to the radiator assembly. Refer to **Transmission Fluid Cooler Hose/Pipe Quick-Connect Fitting Disconnection and Connection**.
7. Install the front compartment lower noise shield. Refer to **Front Compartment Lower Noise Shield Replacement (AWD)** , **Front Compartment Lower Noise Shield Replacement (RWD)** .
8. Install the front bumper fascia air deflector. Refer to **Front Bumper Fascia Air Deflector Replacement - Center** .
9. Install the left wheelhouse liner. Refer to **Front Wheelhouse Liner Replacement** .
10. Lower the vehicle. Refer to **Lifting and Jacking the Vehicle** .

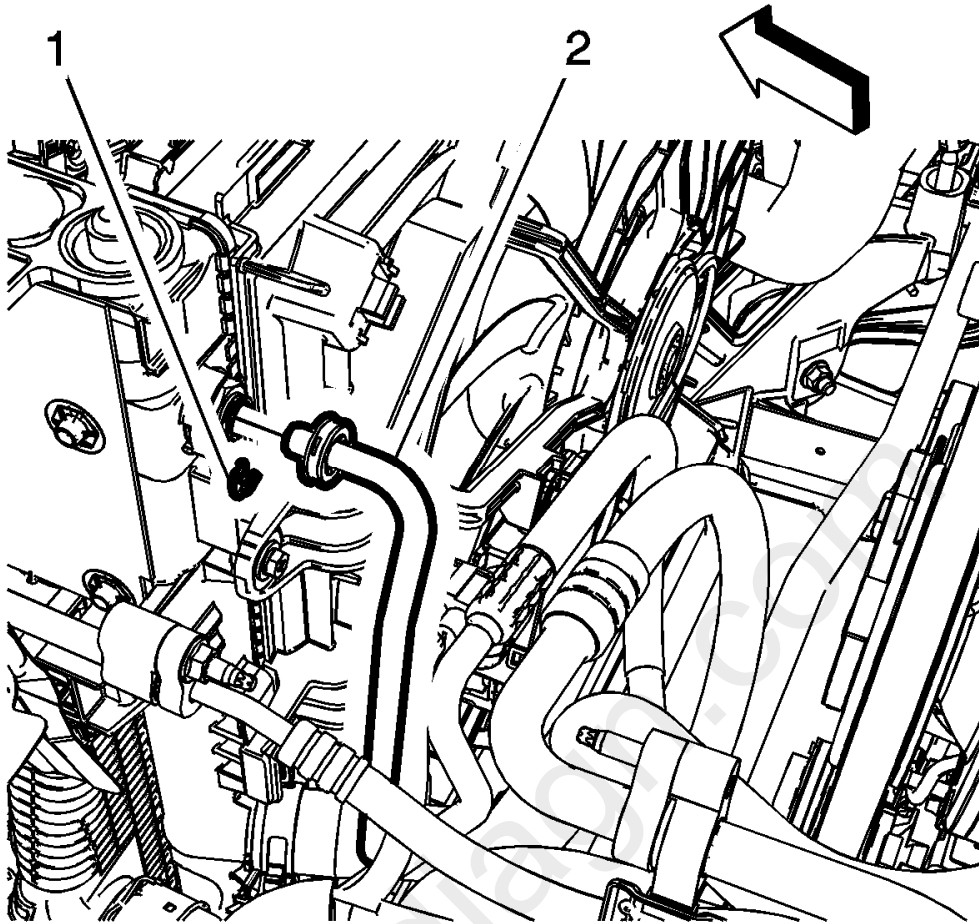


Fig. 81: Transmission Fluid Cooler Inlet & Outlet Pipe With Retaining Clip
Courtesy of GENERAL MOTORS COMPANY

11. Connect the transmission fluid cooler inlet and outlet pipe (2) to the radiator. Refer to **Transmission Fluid Cooler Hose/Pipe Quick-Connect Fitting Disconnection and Connection**.
12. Install the air cleaner outlet duct. Refer to **Air Cleaner Outlet Duct Replacement** .
13. Install the front compartment front sight shield. Refer to **Front Compartment Front Sight Shield Replacement** .
14. Fill the transmission to the proper fluid level. Refer to **Transmission Fluid Fill Procedure** .
15. Inspect for fluid leaks.

TRANSMISSION FLUID COOLER INLET AND OUTLET PIPE REPLACEMENT (LF3 WITH MGG AND V03)

Removal Procedure

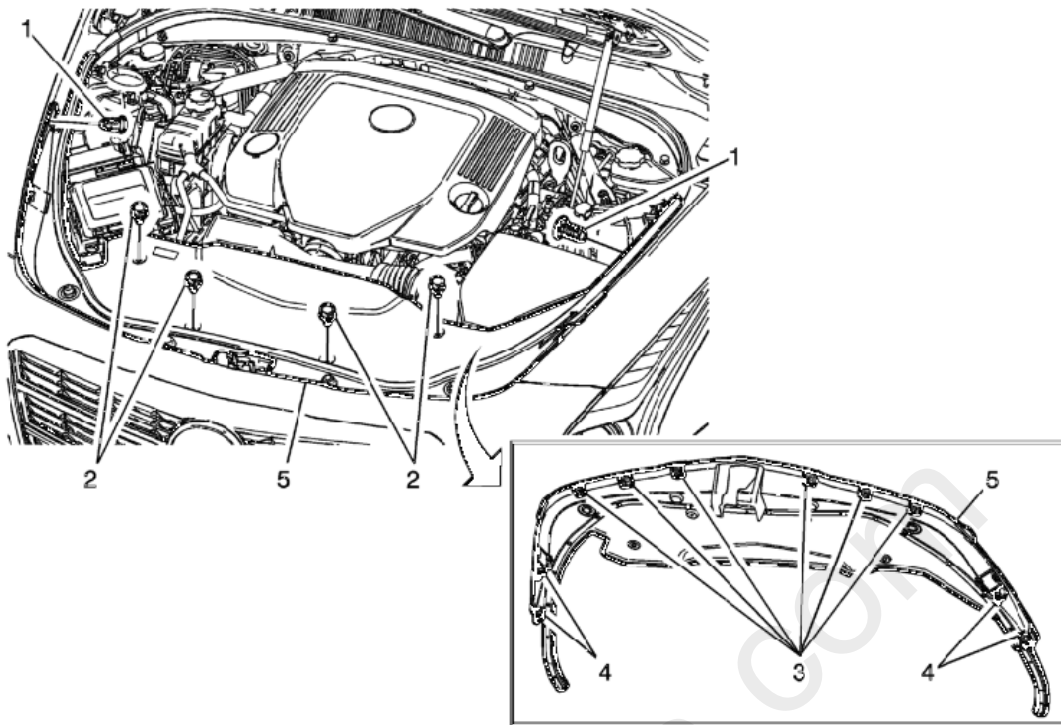


Fig. 82: Front Compartment Front Sight Shield
Courtesy of GENERAL MOTORS COMPANY

1. Remove the front compartment front sight shield (5). Refer to **Front Compartment Front Sight Shield Replacement** .
2. Remove the air cleaner assembly. Refer to **Air Cleaner Assembly Replacement (LF3)** .
3. Cap the fittings and plug the holes when removing the transmission fluid cooler inlet and outlet pipe.
4. Place a drain pan under the transmission fluid cooler inlet and outlet pipe.
5. Remove the charge air bypass valve tube from the charge air bypass valve and reposition out of the way. Refer to **Charge Air Bypass Valve Vacuum Tank Tube Replacement (Left Side Wastegate to Vacuum Tube LF3)** , **Charge Air Bypass Valve Vacuum Tank Tube Replacement (Right Side Wastegate to Vacuum Tube LF3)** , **Charge Air Bypass Valve Vacuum Tank Tube Replacement (Bundle Right Section LF3)** , **Charge Air Bypass Valve Vacuum Tank Tube Replacement (Bundle Left Section LF3)** .

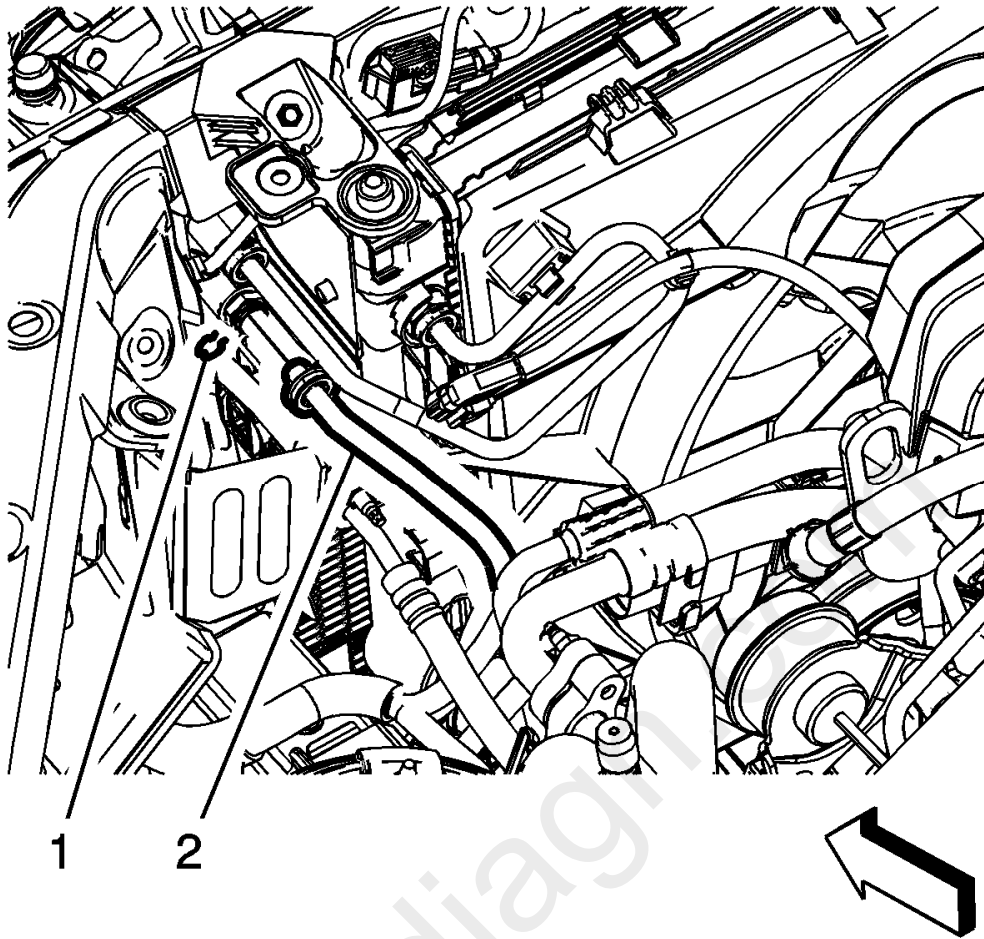


Fig. 83: Transmission Fluid Cooler Inlet & Outlet Pipe With Retaining Ring
Courtesy of GENERAL MOTORS COMPANY

6. Disconnect the transmission fluid cooler inlet and outlet pipe retaining clip (1) from the radiator assembly. Refer to **Transmission Fluid Cooler Hose/Pipe Quick-Connect Fitting Disconnection and Connection.**
7. Disconnect the transmission fluid cooler inlet and outlet pipe (2) from the radiator assembly.
8. Unclip the transmission fluid cooler inlet and outlet pipe (2) from the engine coolant fan shroud.
9. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .

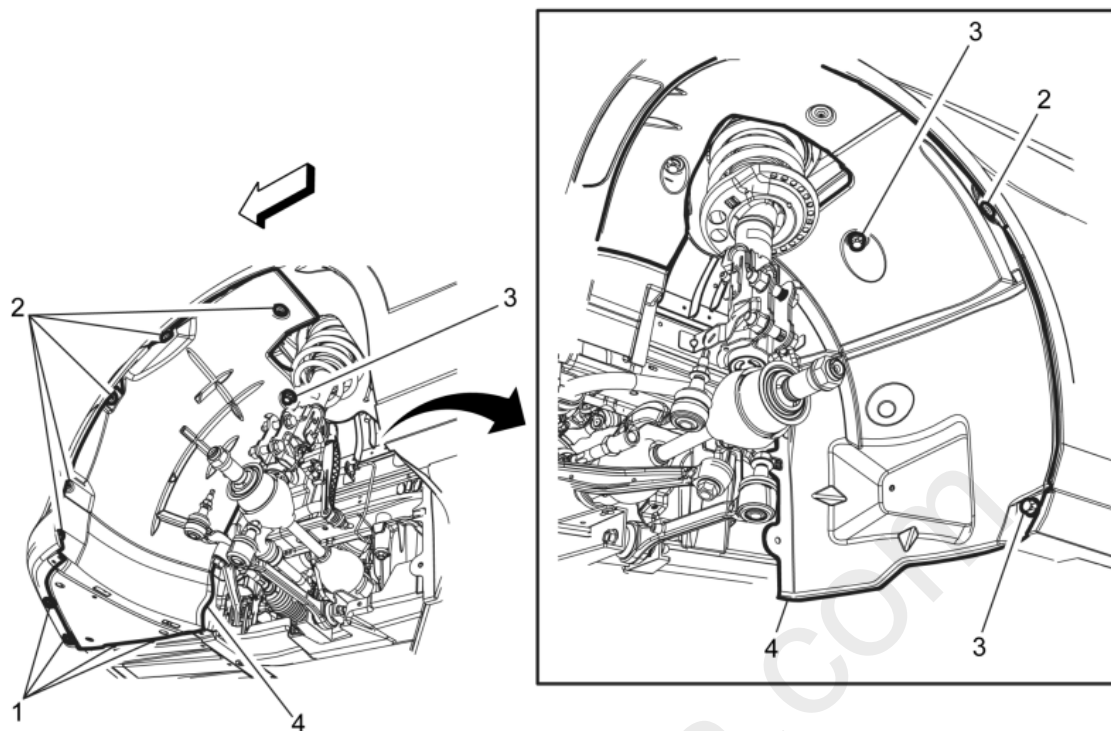


Fig. 84: Front Wheelhouse Liners
 Courtesy of GENERAL MOTORS COMPANY

10. Remove the left wheelhouse liner (4). Refer to **Front Wheelhouse Liner Replacement** .

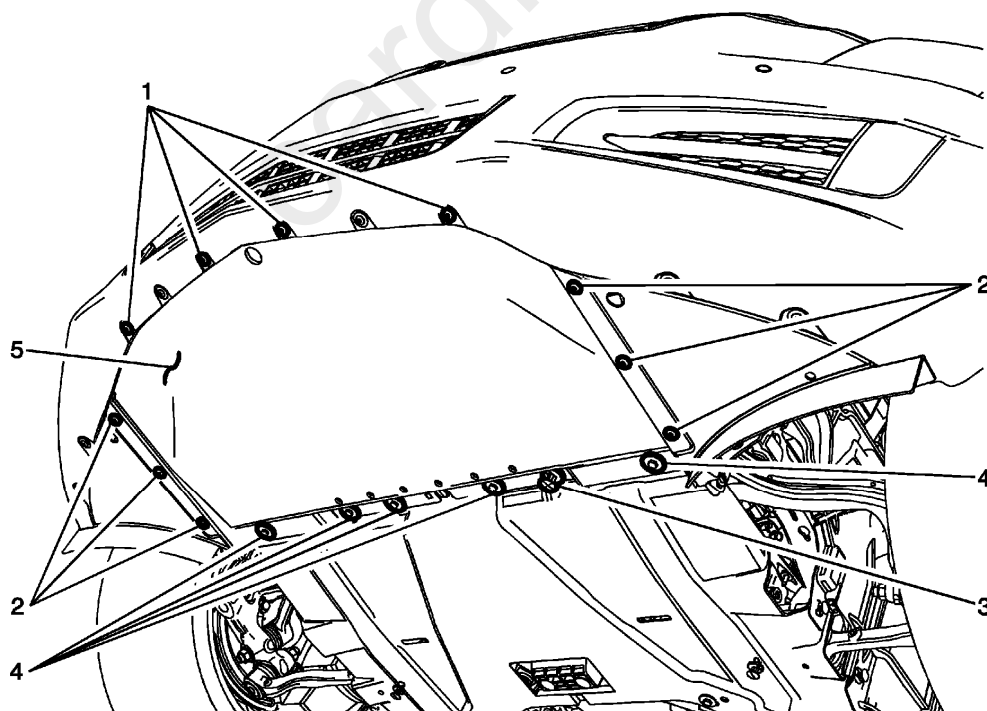


Fig. 85: Front Bumper Fascia Air Deflector - Center
Courtesy of GENERAL MOTORS COMPANY

11. Remove the front bumper fascia air deflector (5). Refer to **Front Bumper Fascia Air Deflector Replacement - Center** .

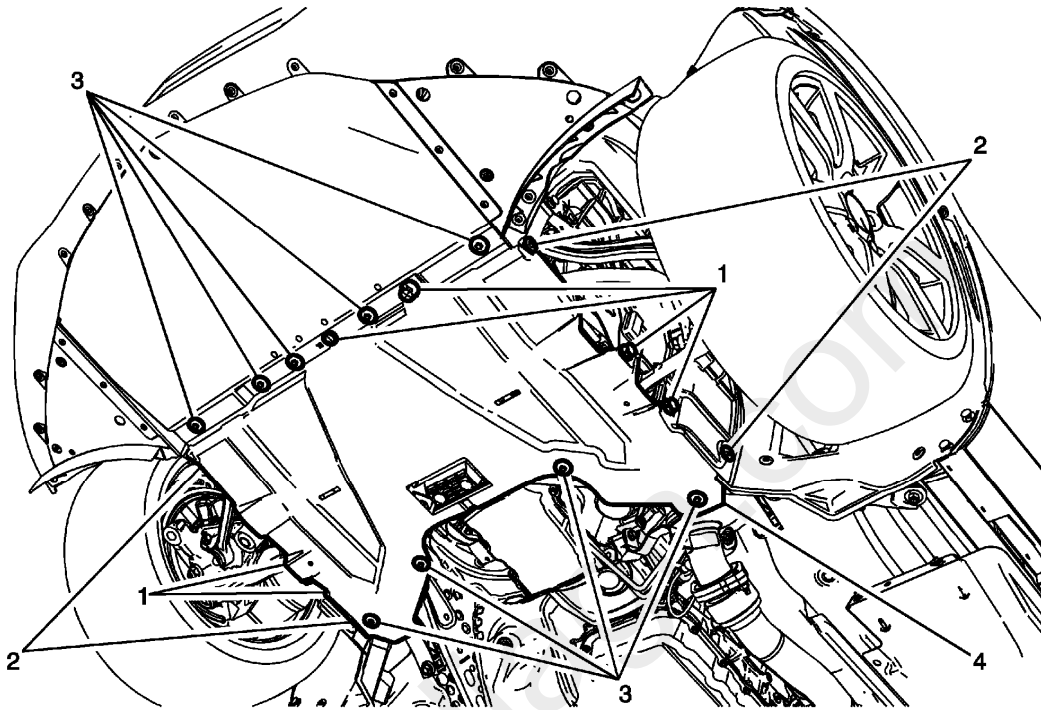


Fig. 86: Front Compartment Lower Noise Shield (RWD)
Courtesy of GENERAL MOTORS COMPANY

12. Remove the front compartment lower noise shield (4). Refer to **Front Compartment Lower Noise Shield Replacement (AWD)** , **Front Compartment Lower Noise Shield Replacement (RWD)** .

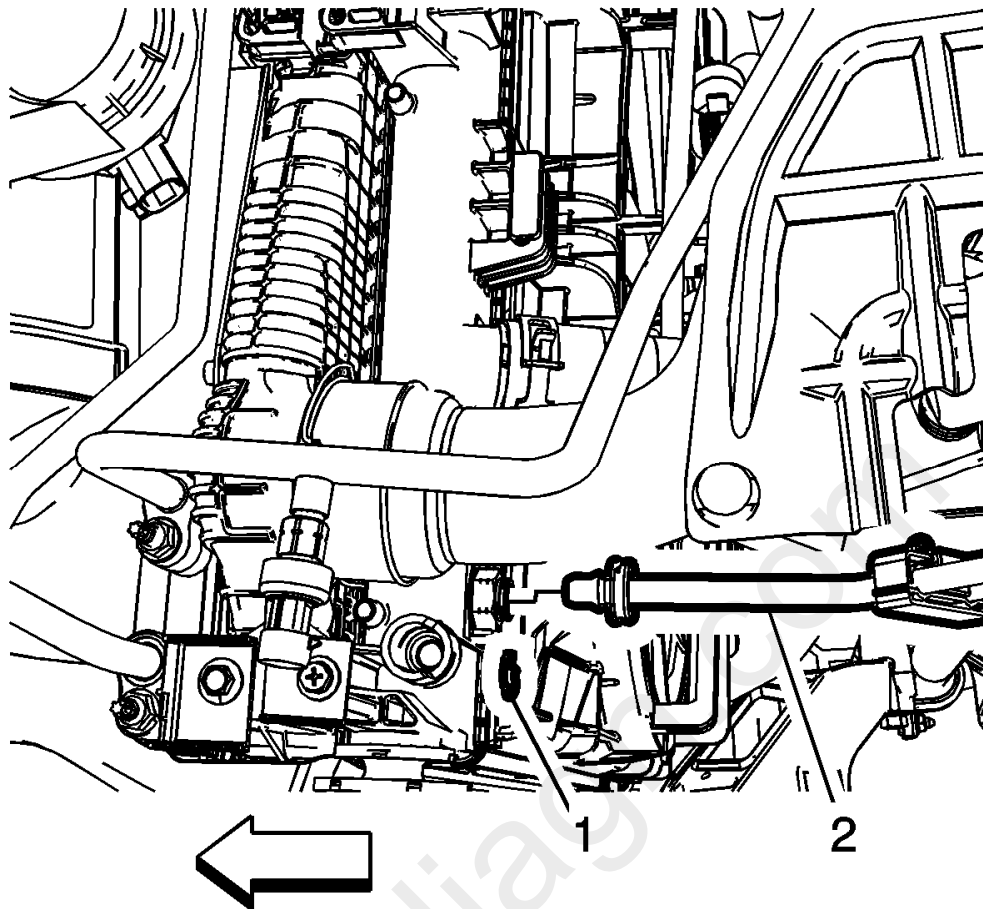


Fig. 87: Transmission Fluid Cooler Inlet & Outlet Pipe With Retaining Clip
Courtesy of GENERAL MOTORS COMPANY

13. Disconnect the transmission fluid cooler inlet and outlet pipe retaining clip (1) from the radiator assembly. Refer to **Transmission Fluid Cooler Hose/Pipe Quick-Connect Fitting Disconnection and Connection.**
14. Disconnect the transmission fluid cooler inlet and outlet pipe (2) from the radiator assembly.

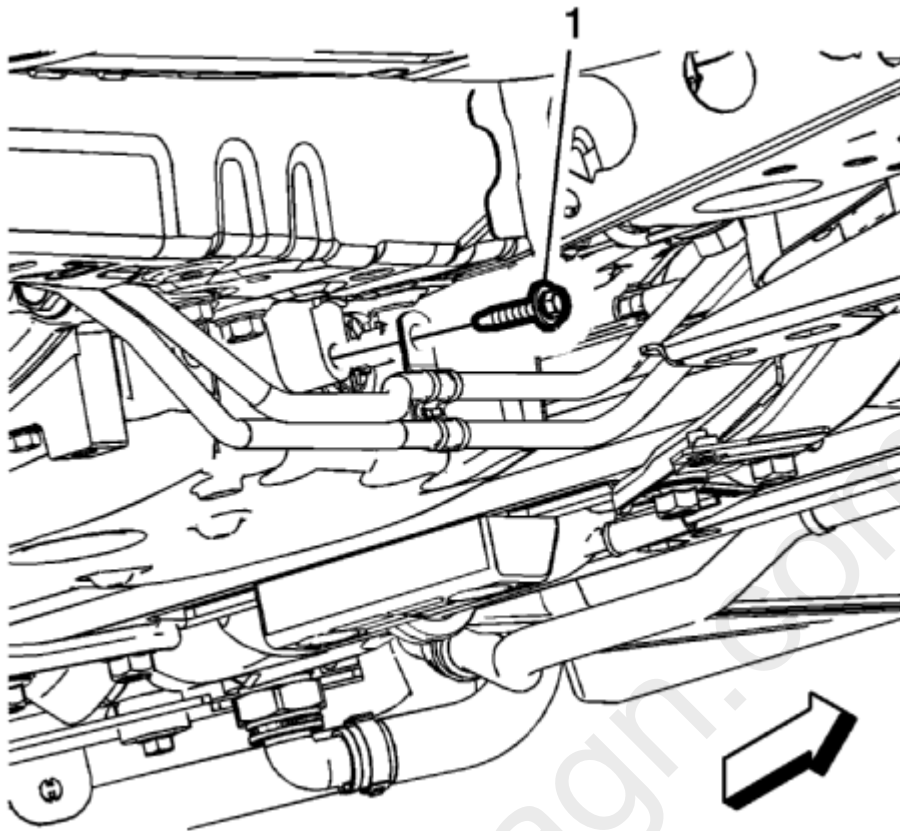


Fig. 88: Transmission Fluid Cooler Inlet And Outlet Pipe Bolt
Courtesy of GENERAL MOTORS COMPANY

15. Remove the transmission fluid cooler inlet and outlet pipe bolt (1) from the engine oil pan.

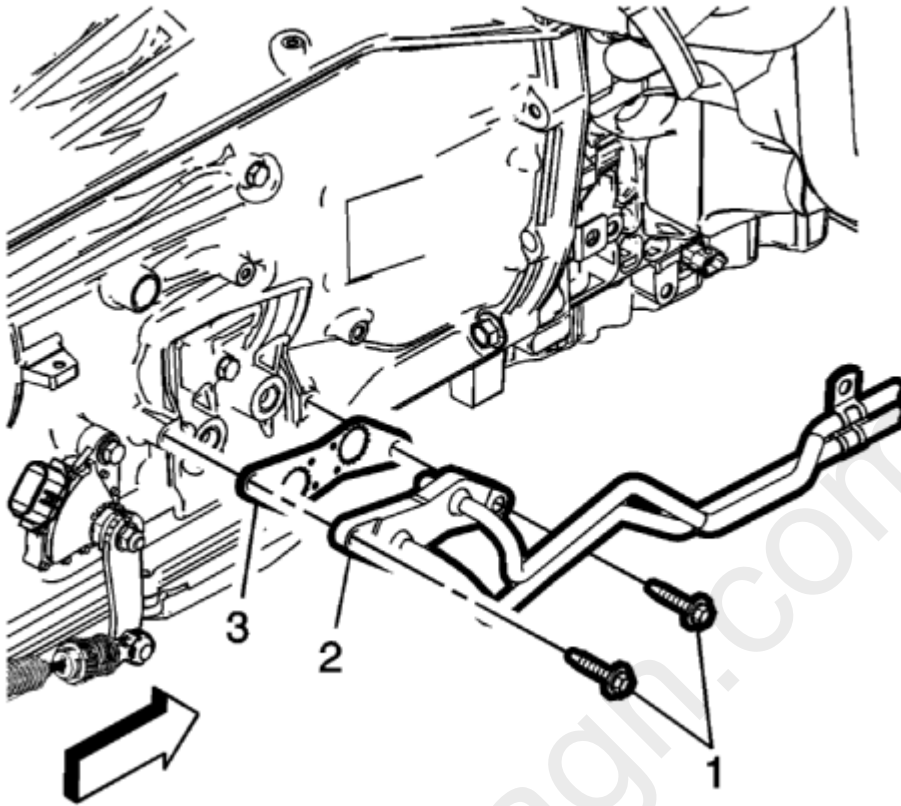


Fig. 89: Transmission Fluid Cooler Inlet And Outlet Pipes
Courtesy of GENERAL MOTORS COMPANY

16. Remove the transmission fluid cooler inlet and outlet pipe bolts (1) from the transmission.
17. Remove the transmission fluid cooler inlet and outlet pipe (2) from the transmission.
18. Remove and discard the old transmission fluid cooler inlet and outlet pipe fitting seal (3).

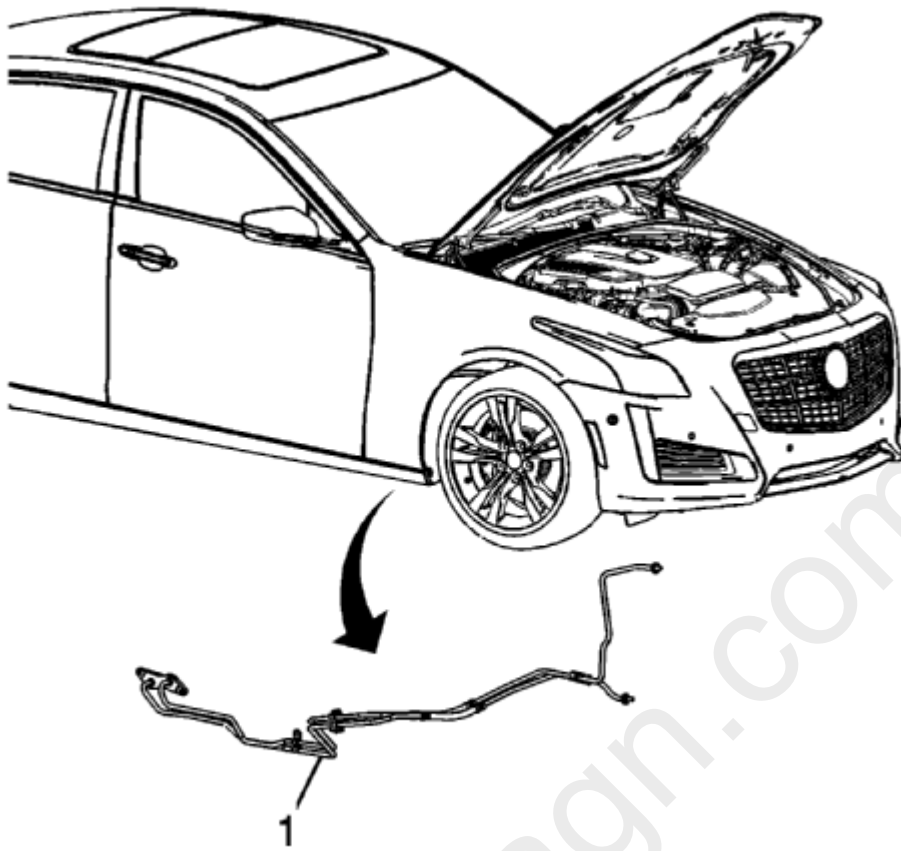


Fig. 90: Transmission Fluid Cooler Inlet And Outlet Pipe
Courtesy of GENERAL MOTORS COMPANY

19. Remove the transmission fluid cooler inlet and outlet pipe (1) from the vehicle.
20. Transfer all necessary parts.

Installation Procedure

1. Remove the cap the fittings and plugs from the transmission fluid cooler inlet and outlet pipe.

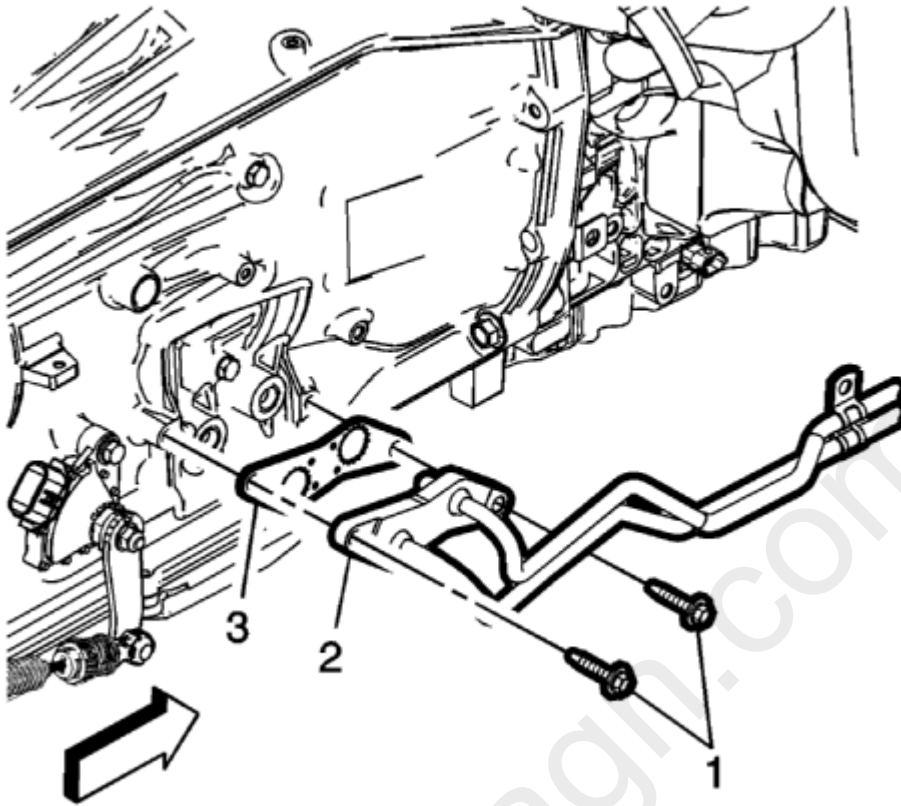


Fig. 91: Transmission Fluid Cooler Inlet And Outlet Pipes
Courtesy of GENERAL MOTORS COMPANY

2. Install a NEW transmission fluid cooler inlet and outlet pipe fitting seal (3).
3. Install the transmission fluid cooler inlet and outlet pipe (2) to the vehicle.

CAUTION: Refer to Fastener Caution .

4. Install the transmission fluid cooler inlet and outlet pipe bolts (1) and tighten to 22 (16 lb ft).

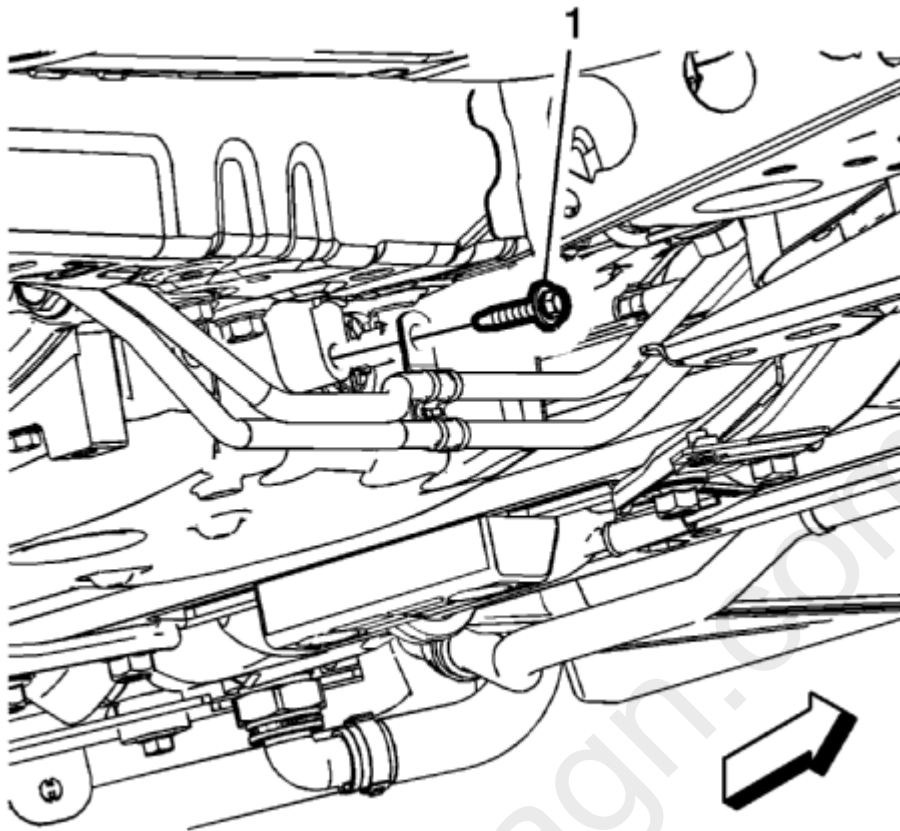


Fig. 92: Transmission Fluid Cooler Inlet And Outlet Pipe Bolt
Courtesy of GENERAL MOTORS COMPANY

5. Install the transmission fluid cooler inlet and outlet pipe bolt (1) to the oil pan and tighten to 22 (16 lb ft).

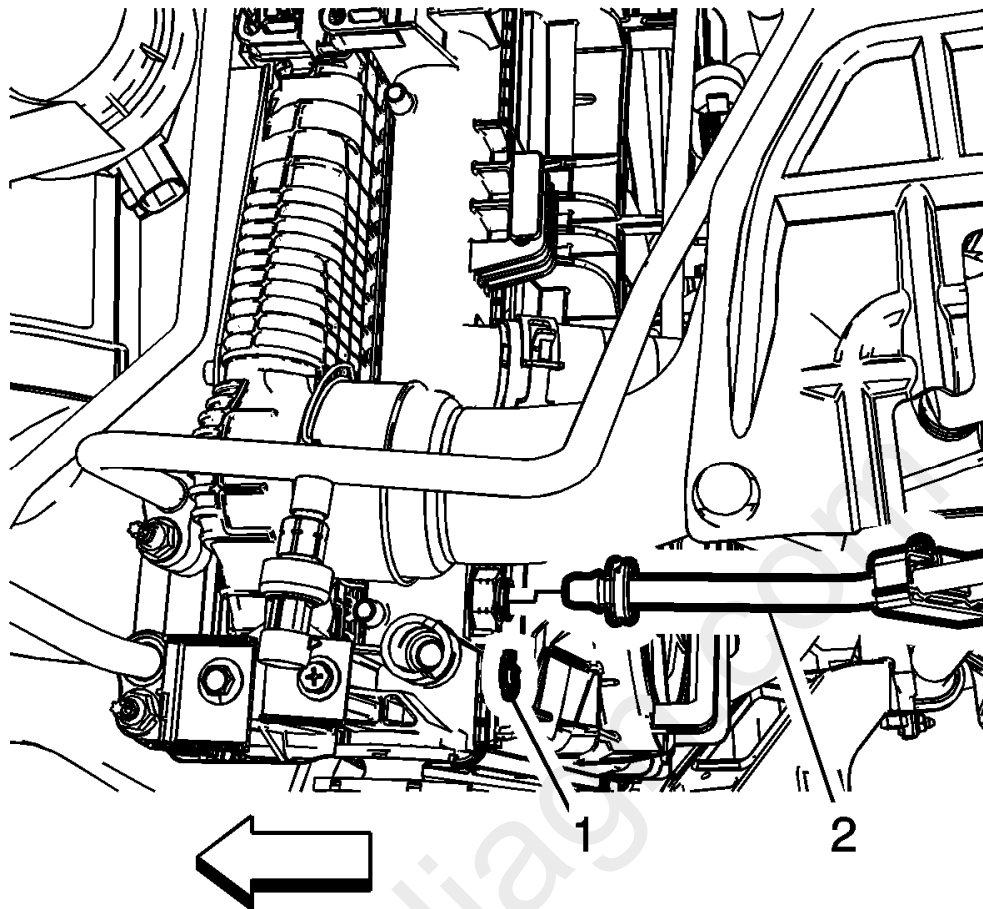


Fig. 93: Transmission Fluid Cooler Inlet & Outlet Pipe With Retaining Clip
Courtesy of GENERAL MOTORS COMPANY

6. Connect the transmission fluid cooler inlet and outlet pipe (2) to the radiator assembly. Refer to .
7. Connect the transmission fluid cooler inlet and outlet pipe retaining clip (1) to the radiator assembly. Refer to **Transmission Fluid Cooler Hose/Pipe Quick-Connect Fitting Disconnection and Connection.**

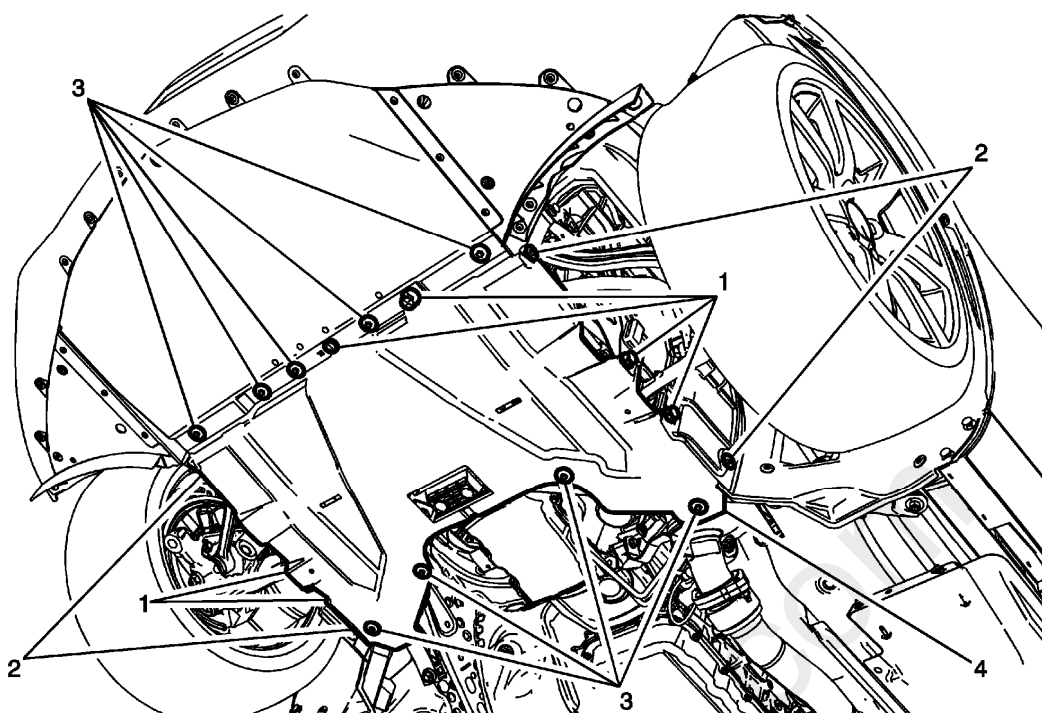


Fig. 94: Front Compartment Lower Noise Shield (RWD)
Courtesy of GENERAL MOTORS COMPANY

8. Install the front compartment lower noise shield (4). Refer to **Front Compartment Lower Noise Shield Replacement (AWD)** , **Front Compartment Lower Noise Shield Replacement (RWD)** .

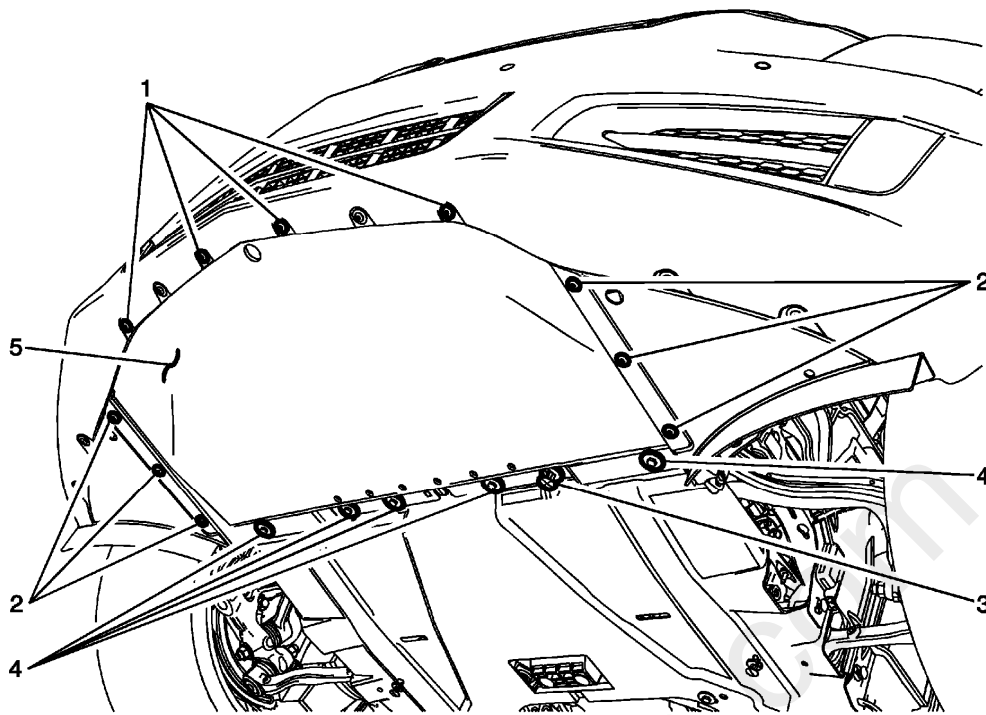


Fig. 95: Front Bumper Fascia Air Deflector - Center
Courtesy of GENERAL MOTORS COMPANY

9. Install the front bumper fascia air deflector (5). Refer to **Front Bumper Fascia Air Deflector Replacement - Center** .

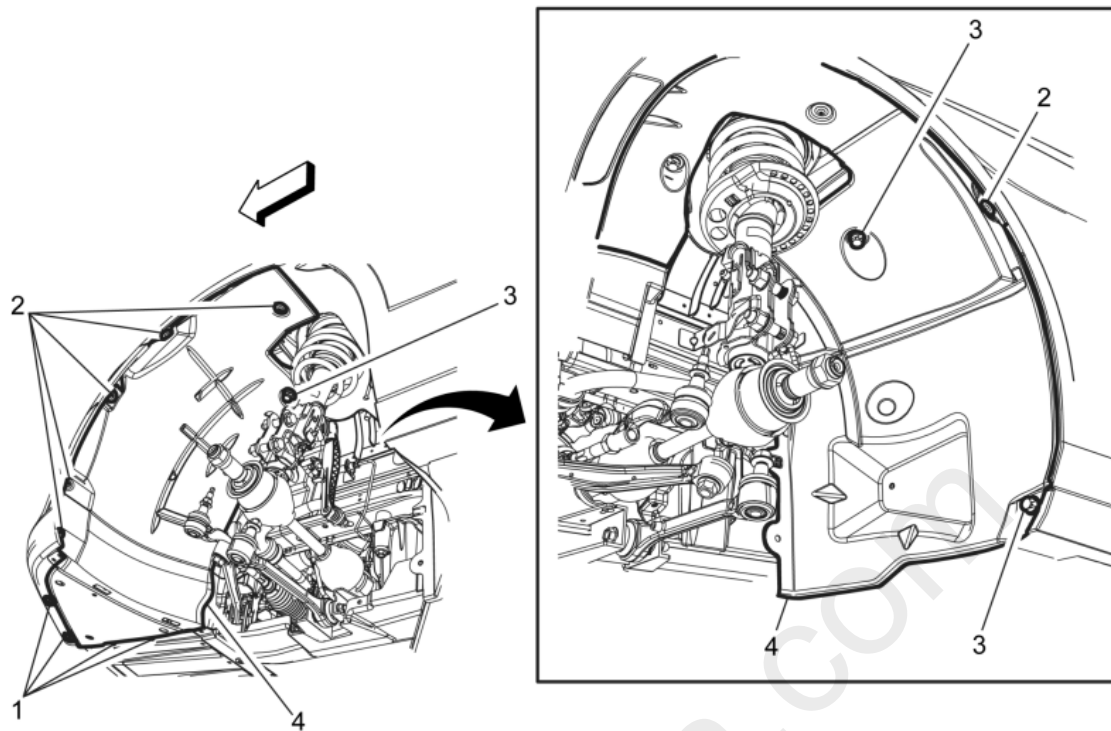


Fig. 96: Front Wheelhouse Liners
Courtesy of GENERAL MOTORS COMPANY

10. Install the left wheelhouse liner (4). Refer to **Front Wheelhouse Liner Replacement** .
11. Remove the drain pan from under the transmission fluid cooler inlet and outlet pipe.
12. Lower the vehicle. Refer to **Lifting and Jacking the Vehicle** .

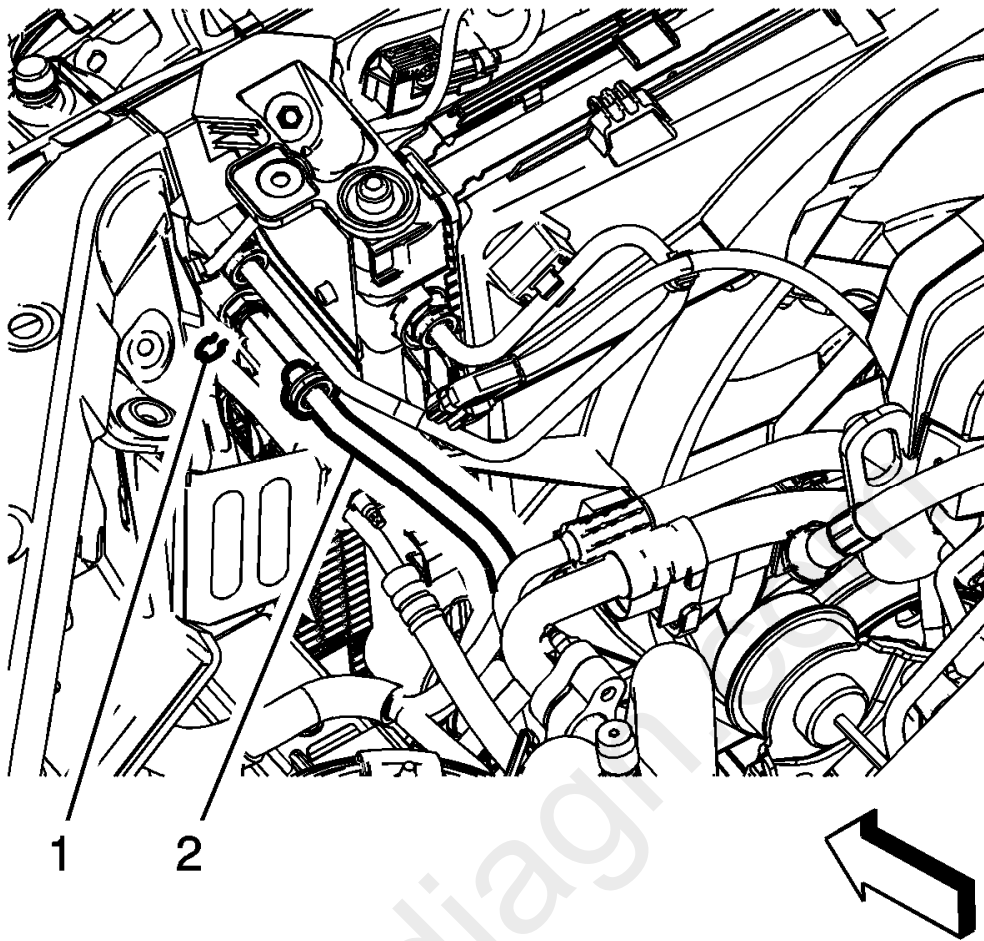


Fig. 97: Transmission Fluid Cooler Inlet & Outlet Pipe With Retaining Ring
Courtesy of GENERAL MOTORS COMPANY

13. Connect the transmission fluid cooler inlet and outlet pipe (2) to the radiator. Refer to **Transmission Fluid Cooler Hose/Pipe Quick-Connect Fitting Disconnection and Connection.**
14. Clip the transmission fluid cooler inlet and outlet pipe (2) to the engine coolant fan shroud.
15. Install the charge air bypass valve tube to the charge air bypass valve. Refer to **Charge Air Bypass Valve Vacuum Tank Tube Replacement (Left Side Wastegate to Vacuum Tube LF3)** , **Charge Air Bypass Valve Vacuum Tank Tube Replacement (Right Side Wastegate to Vacuum Tube LF3)** , **Charge Air Bypass Valve Vacuum Tank Tube Replacement (Bundle Right Section LF3)** , **Charge Air Bypass Valve Vacuum Tank Tube Replacement (Bundle Left Section LF3)** .
16. Install the air cleaner assembly. Refer to **Air Cleaner Assembly Replacement (LF3)** .

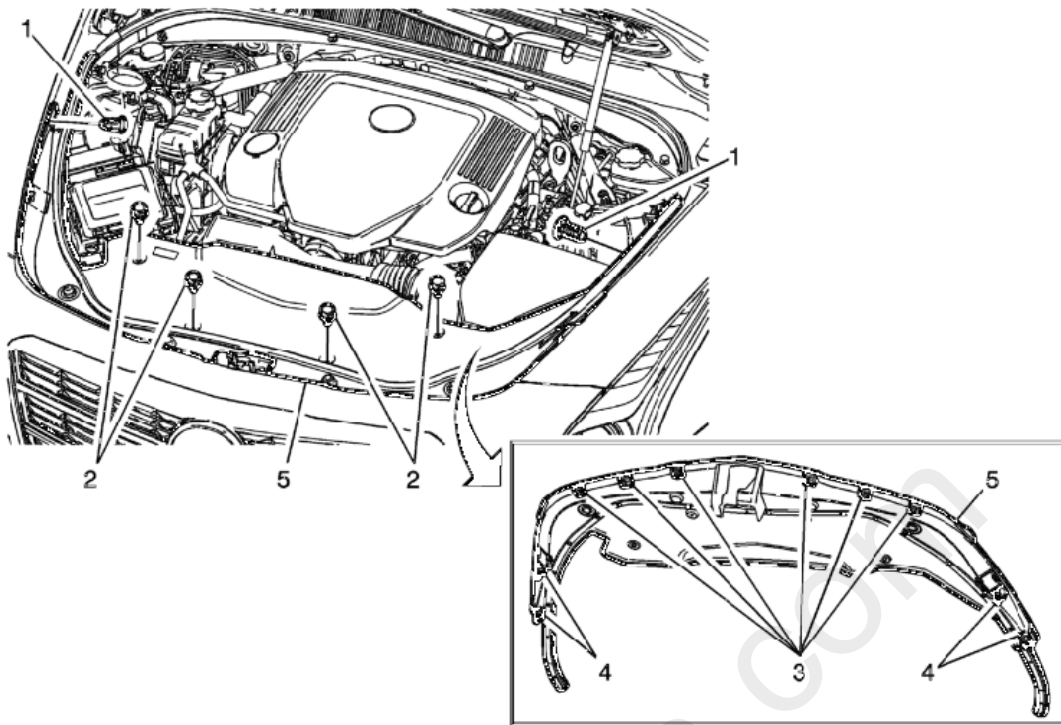


Fig. 98: Front Compartment Front Sight Shield
Courtesy of GENERAL MOTORS COMPANY

17. Install the front compartment front sight shield (5). Refer to **Front Compartment Front Sight Shield Replacement** .
18. Fill the transmission to the proper fluid level. Refer to **Transmission Fluid Fill Procedure** .
19. Inspect for fluid leaks.

TRANSMISSION FLUID COOLER PIPE REPLACEMENT (LF3, LFX WITH V03)

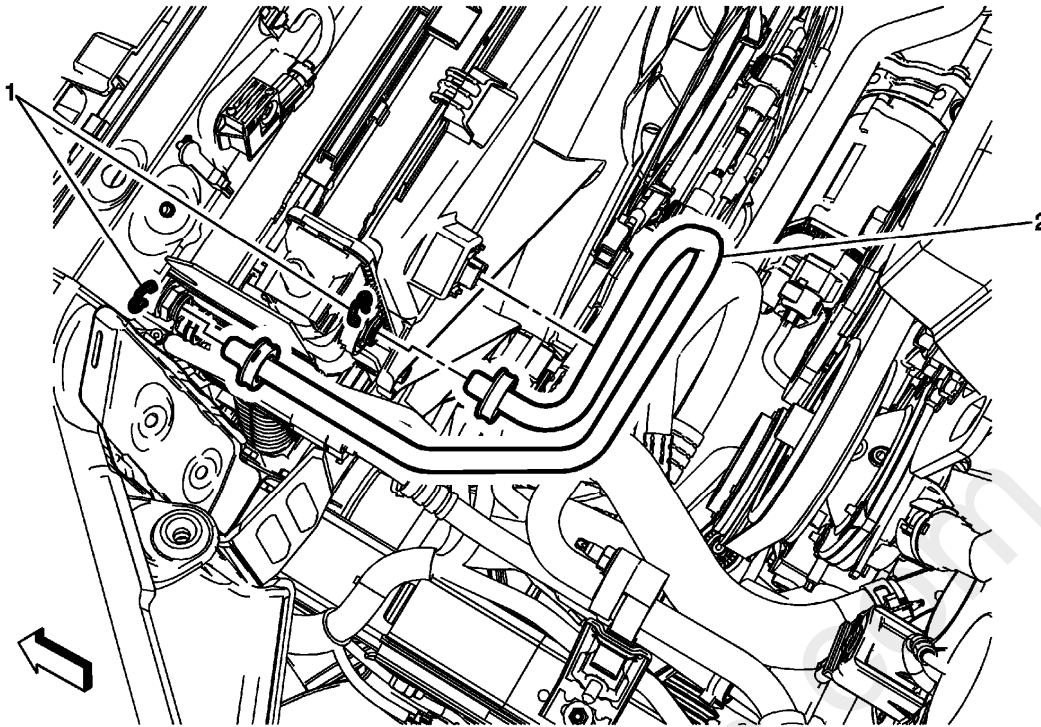


Fig. 99: Transmission Fluid Cooler Pipe
 Courtesy of GENERAL MOTORS COMPANY

Transmission Fluid Cooler Pipe Replacement (LF3, LFX with V03)

Callout	Component Name
Preliminary Procedures	
1. Remove the front compartment front sight shield. Refer to <u>Front Compartment Front Sight Shield Replacement</u> . 2. Remove the air cleaner outlet duct. Refer to <u>Air Cleaner Outlet Duct Replacement</u> . 3. Remove the air cleaner assembly. Refer to <u>Air Cleaner Assembly Replacement</u> . 4. Remove the left radiator upper bracket. refer to <u>Radiator Upper Bracket Replacement (LFX, LTG)</u> . 5. Reposition the electrical harness out of the way. 6. Cap the fittings and plug the holes when removing the transmission fluid cooler pipe. 7. Place a drain pan under the transmission fluid cooler outlet pipes.	
1	Transmission Fluid Cooler Pipe Retaining Ring (Qty: 2) Procedure Disconnect the quick connect fittings from the transmission fluid cooler pipe. Refer to <u>Transmission Fluid Cooler Hose/Pipe Quick-Connect Fitting Disconnection and Connection</u> .
	Transmission Fluid Cooler Pipe Procedure

- Inspect the transmission fluid level. Refer to **Transmission Fluid Fill Procedure** .
- Inspect for transmission fluid leaks. Refer to **Automatic Transmission Fluid Leaks** .

TRANSMISSION FLUID COOLER PIPE REPLACEMENT (LTG MYA WITH V03)

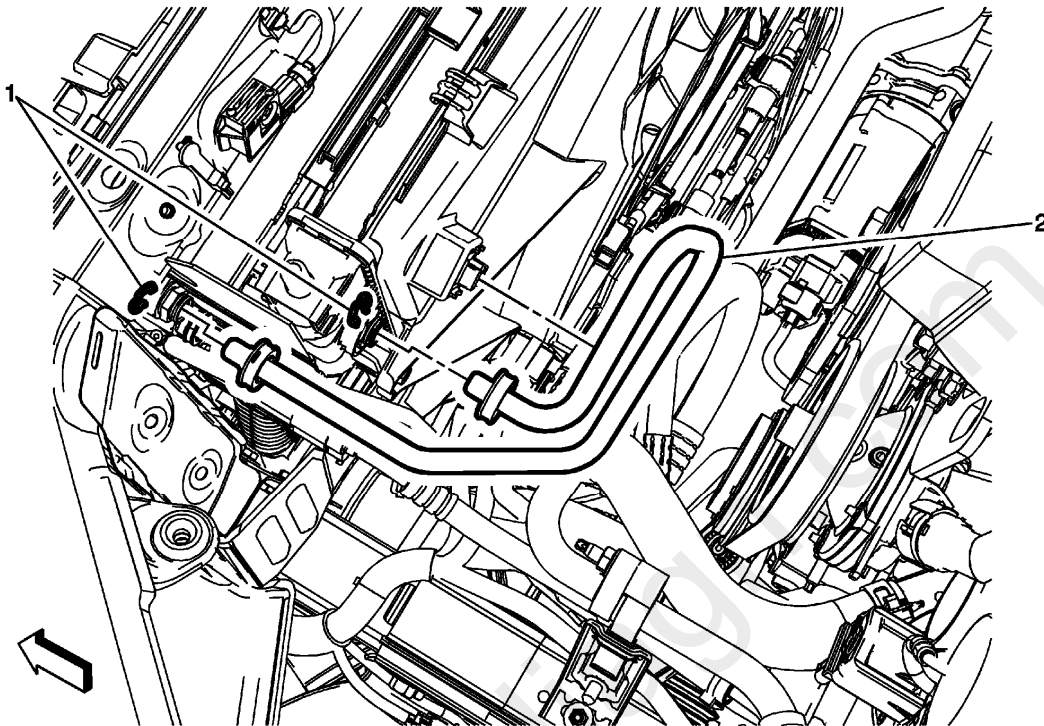


Fig. 100: Transmission Fluid Cooler Pipe
Courtesy of GENERAL MOTORS COMPANY

Transmission Fluid Cooler Pipe Replacement (LTG MYA with V03)

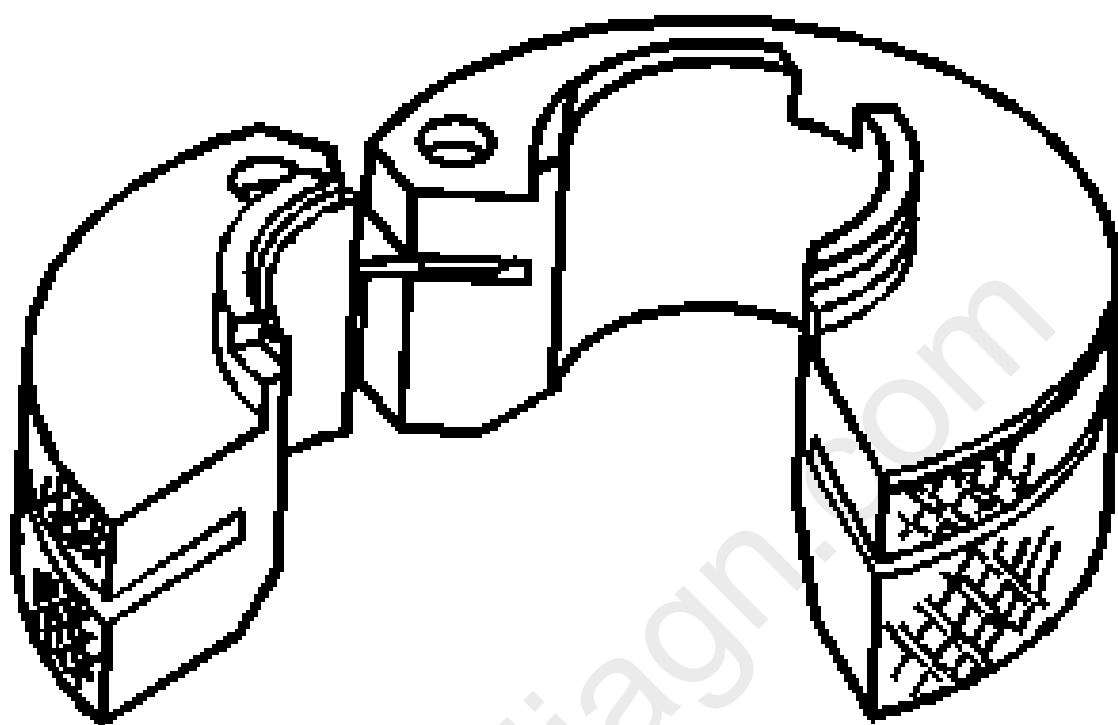
Callout	Component Name
Preliminary Procedures	
1. Remove the front compartment front sight shield. Refer to <u>Front Compartment Front Sight Shield Replacement</u> . 2. Remove the air cleaner outlet duct. Refer to <u>Air Cleaner Outlet Duct Replacement (LF3)</u> . 3. Remove the air cleaner assembly. 4. Remove the left radiator upper bracket. refer to <u>Radiator Upper Bracket Replacement (LFX, LTG)</u> . 5. Reposition the electrical harness out of the way. 6. Cap the fittings and plug the holes when removing the transmission fluid cooler pipe. 7. Place a drain pan under the transmission fluid cooler outlet pipes.	
	Transmission Fluid Cooler Pipe Retaining Ring (Qty: 2)
Procedure	

1	Disconnect the quick connect fittings from the transmission fluid cooler pipe. Refer to <u>Transmission Fluid Cooler Hose/Pipe Quick-Connect Fitting Disconnection and Connection.</u>
2	Transmission Fluid Cooler Pipe Procedure - Inspect the transmission fluid level. Refer to <u>Transmission Fluid Fill Procedure</u> . - Inspect for transmission fluid leaks. Refer to <u>Automatic Transmission Fluid Leaks</u> .

SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

Illustration	Tool Number/ Description
	DT 28585 J 28585 Snap Ring Remover



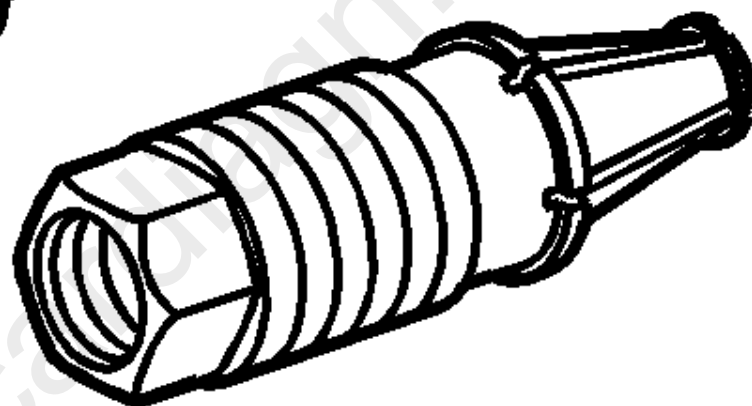
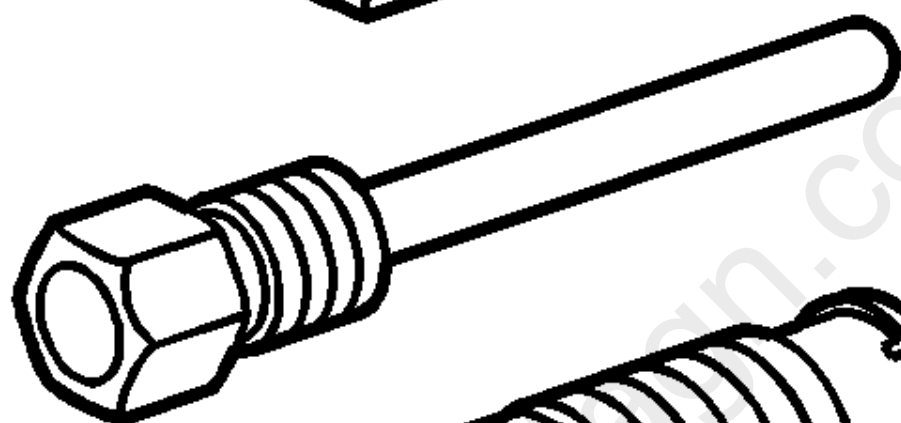
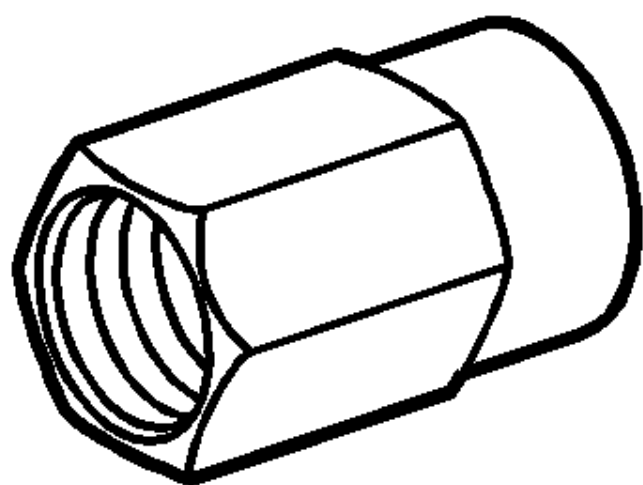
DT 41623-B
J 41623-B
Cooler
Quick
Connect
Tool

DT 45096
J 45096
Transmission
Oil Cooling
System
Flush and
Flow Test
Tool



DT 45096-
30
J 45096-30
Transmission
Cooler Flush
Adapter

DT 45201
J 45201
Cooler Line
Seal
Remover



	DT 47770 J 47770 Seal Installer
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