

2014 TRANSMISSION**Transmission Cooling - Acadia, Enclave And Traverse****DIAGNOSTIC INFORMATION AND PROCEDURES****TRANSMISSION FLUID COOLER FLUSHING AND FLOW TEST**

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 DT 45096 transmission oil cooling system 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 45096-50** 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

1. Verify that the main power switch (1) is in the OFF position.

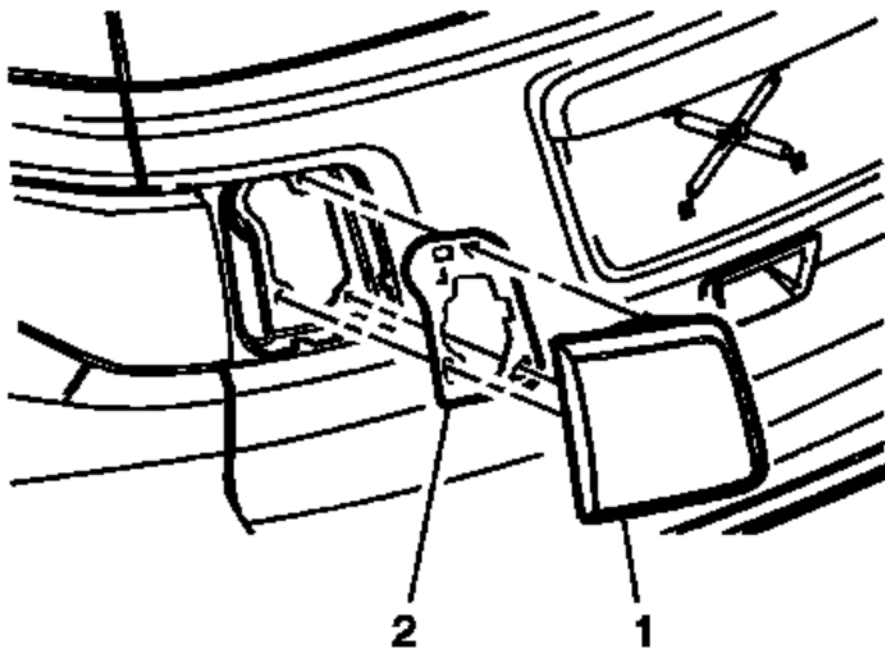


Fig. 1: View Of Main Power Switch & Main Function Switch
Courtesy of GENERAL MOTORS COMPANY

2. Place the main function switch (2) in the IDLE position.
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.

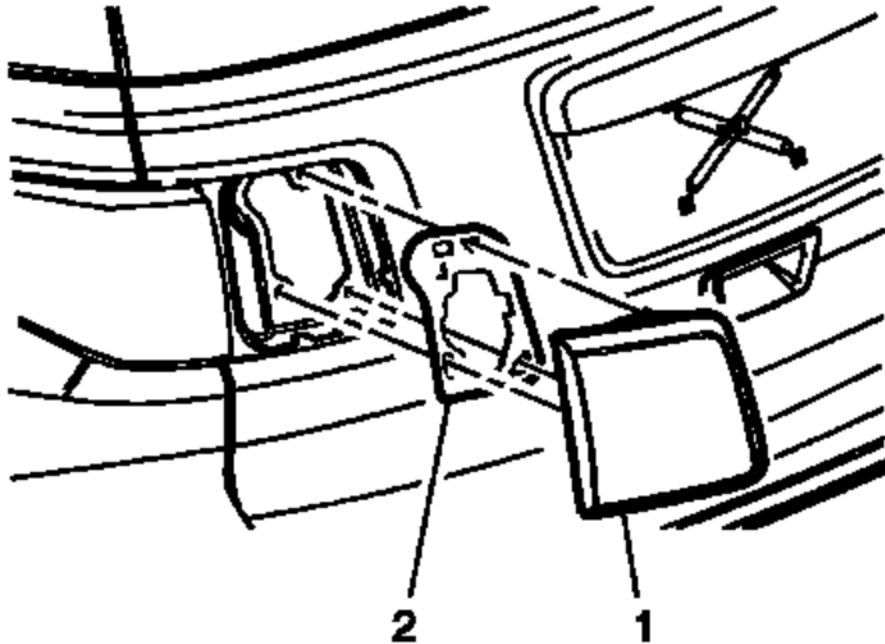


Fig. 2: Connecting To 12V DC Power Source
Courtesy of GENERAL MOTORS COMPANY

4. Turn the main power switch to the ON position.
5. Fill the supply tank with Dexron®VI through the fill port.

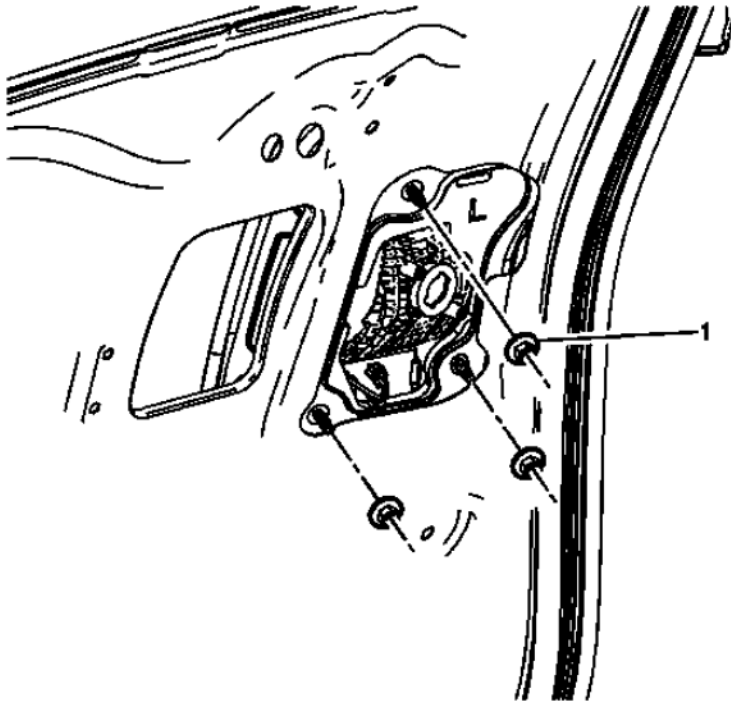


Fig. 3: Filling Supply Tank With Transmission Fluid
Courtesy of GENERAL MOTORS COMPANY

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).

6. Reinstall and tighten the fill cap.
7. Connect a shop air supply hose to the quick-disconnect on the rear panel marked SUPPLY AIR.

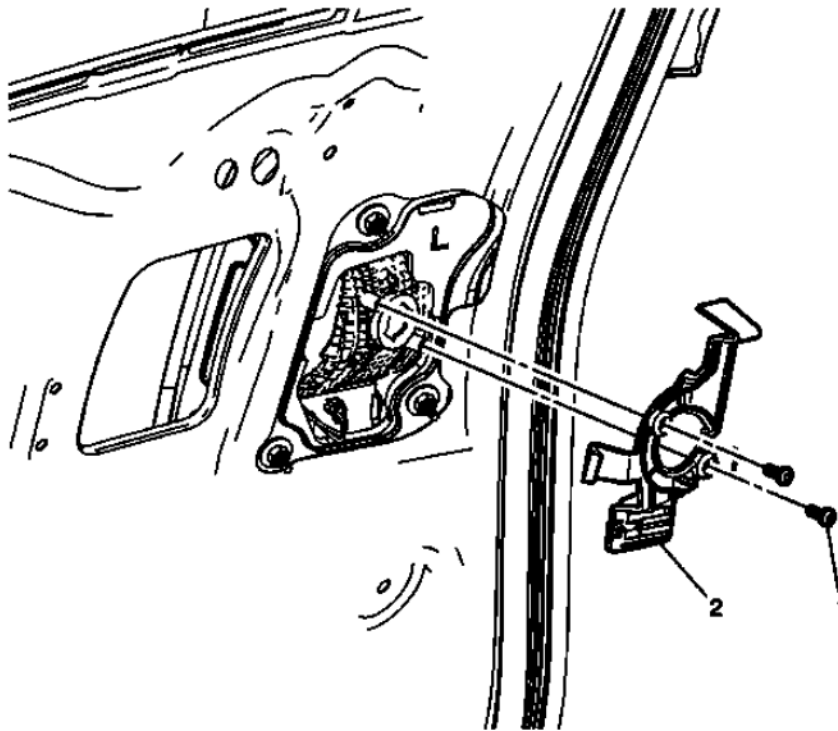


Fig. 4: Applying Shop Air Supply Hose To Quick-Disconnect
Courtesy of GENERAL MOTORS COMPANY

Determine Minimum Flow Rate

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.

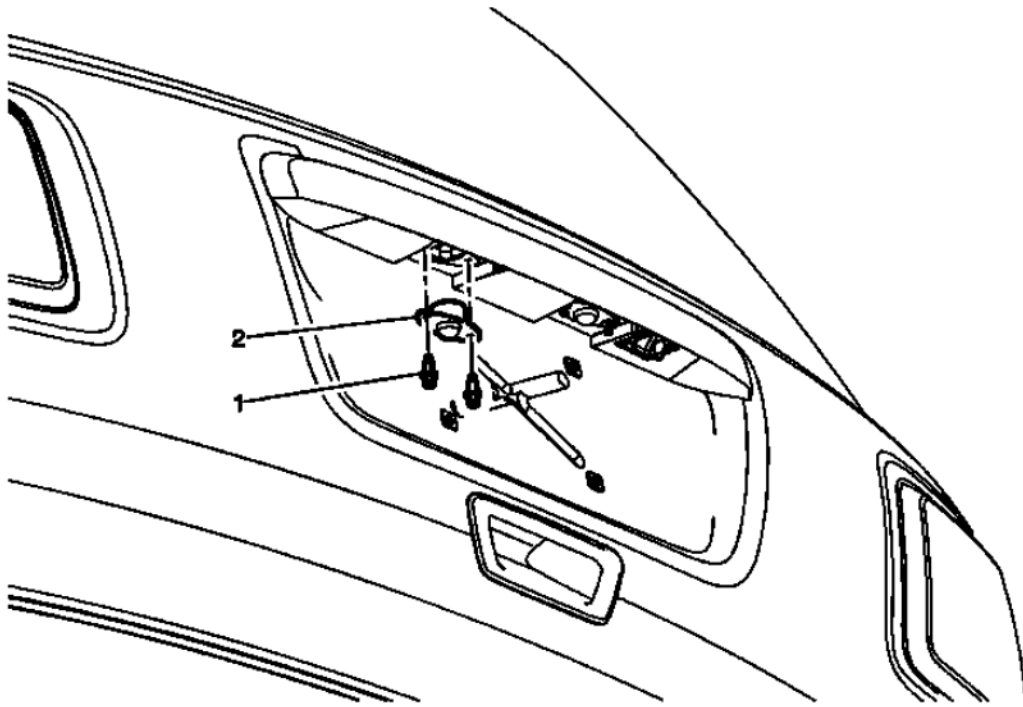


Fig. 5: Identifying Machine Display Of Automatic Transmission Fluid Temperature
Courtesy of GENERAL MOTORS COMPANY

2. Determine whether the transmission oil cooler is steel or aluminum by using a magnet (1) at the cooler flange (2) at the radiator.

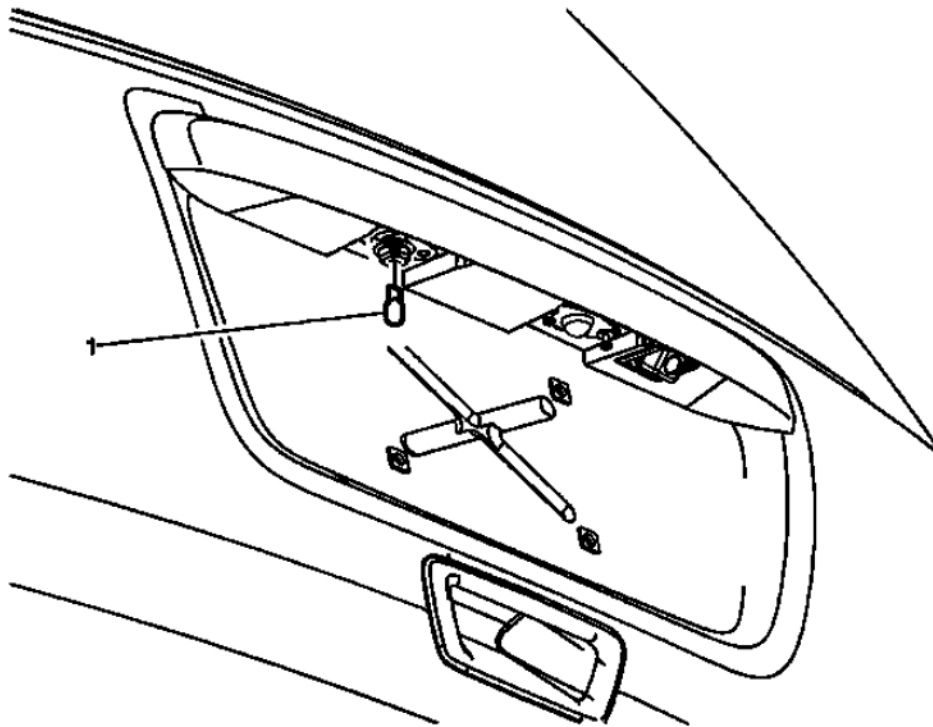


Fig. 6: Identifying Transmission Oil Cooler Metal Composition
 Courtesy of GENERAL MOTORS COMPANY

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

1. Connect the **DT 45096-50** cooler flush adapter (1) to the vehicle transmission oil cooler supply and return lines at the transmission.

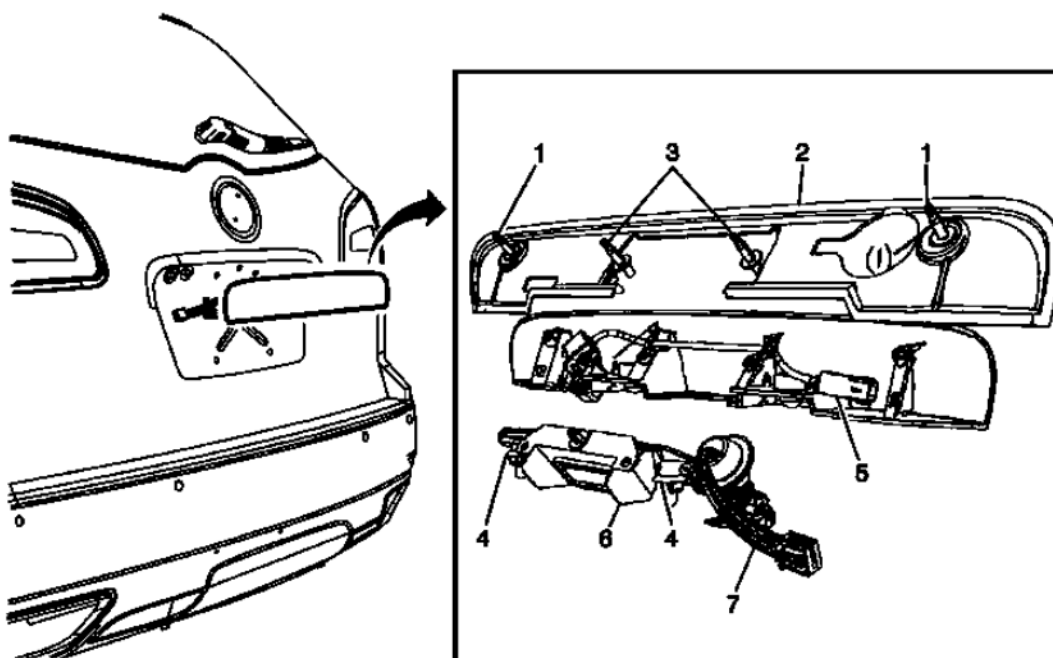


Fig. 7: Identifying Special Tool - J 45096-50
Courtesy of GENERAL MOTORS COMPANY

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

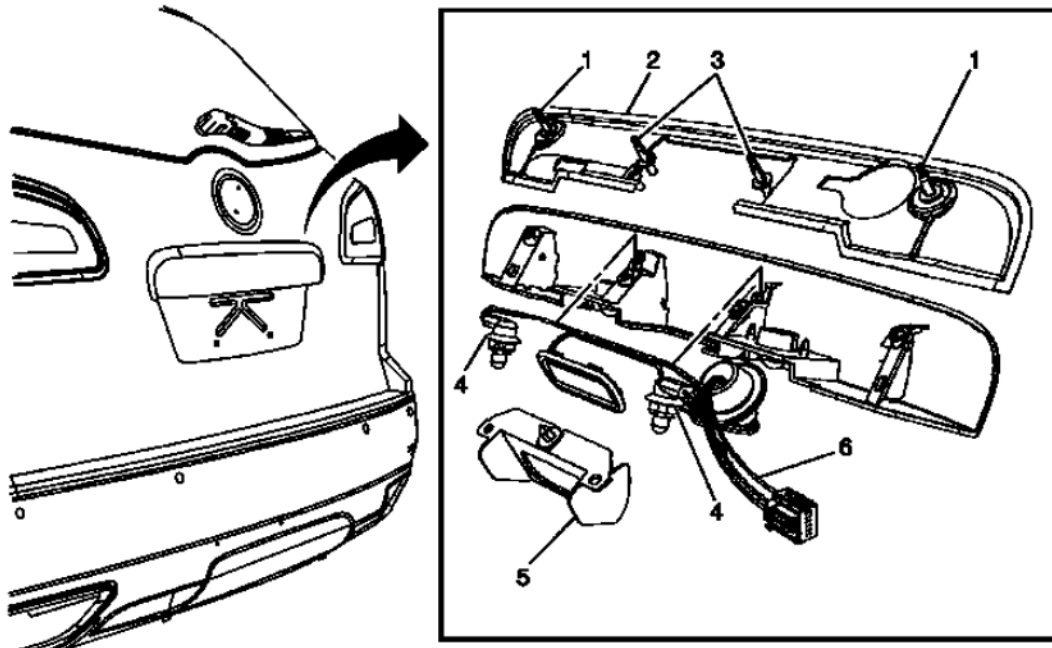


Fig. 8: View Of Black Supply Hose And Clear Waste Hose
Courtesy of GENERAL MOTORS COMPANY

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

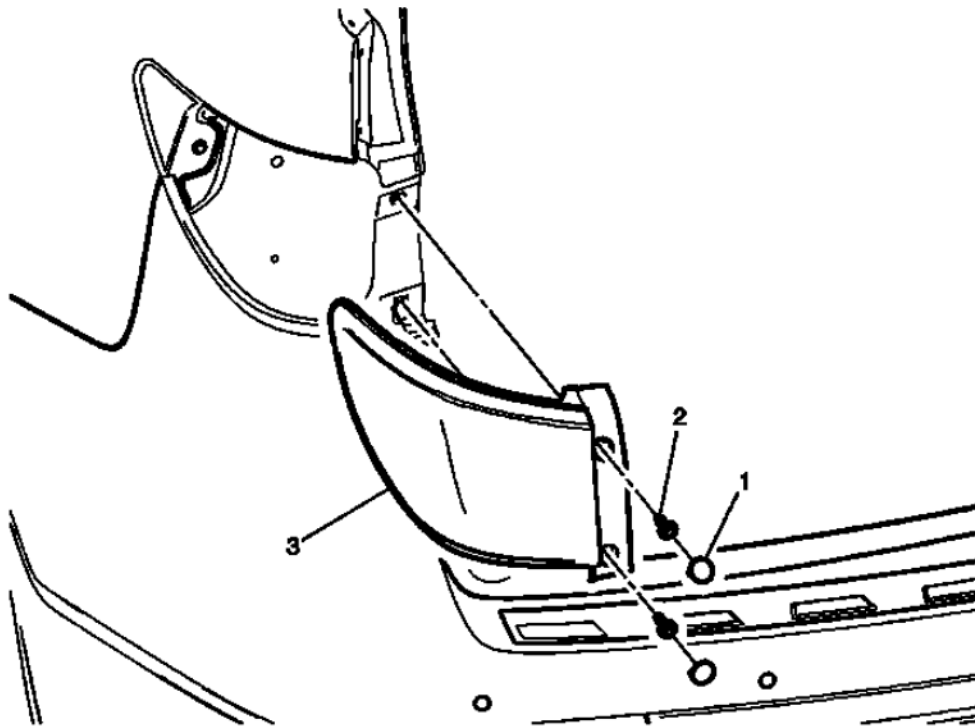


Fig. 9: View Of Main Function Switch FLUSH Position
Courtesy of GENERAL MOTORS COMPANY

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

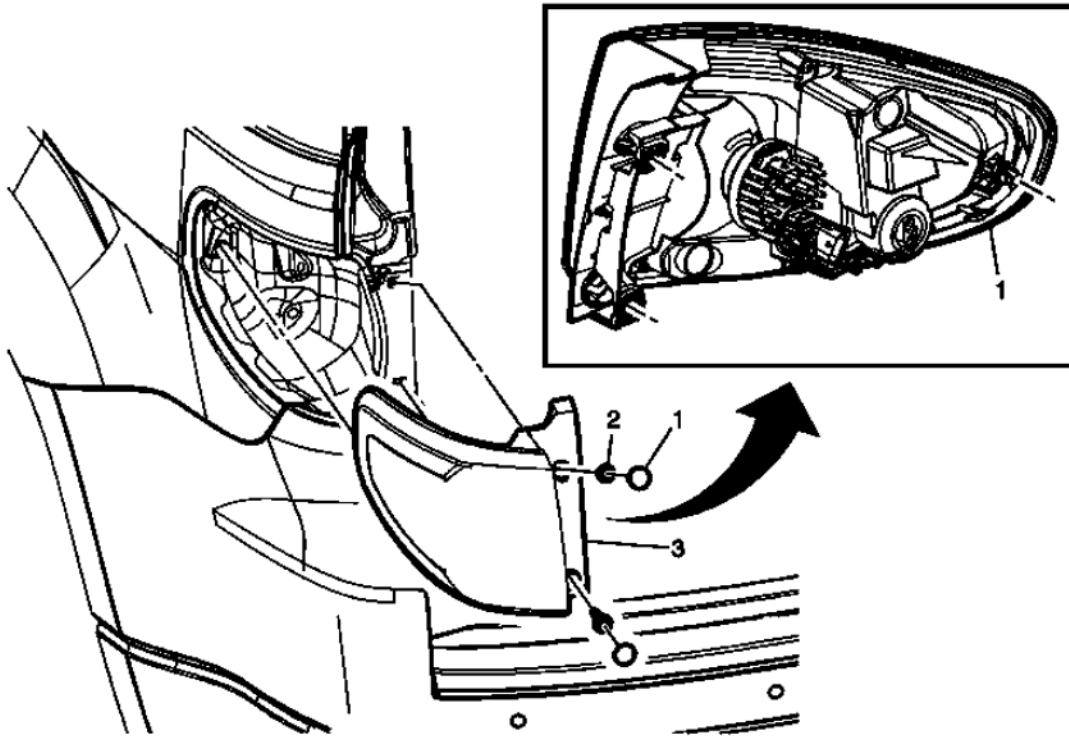


Fig. 10: View Of Main Function Switch IDLE Position
Courtesy of GENERAL MOTORS COMPANY

Forward Flush

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

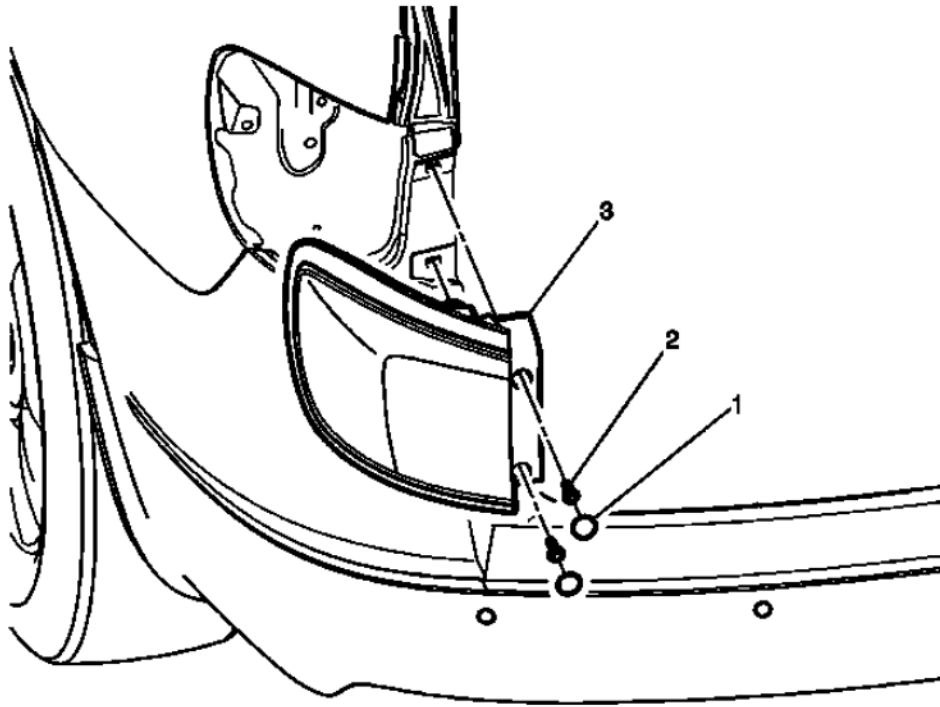


Fig. 11: Identifying Supply And Waste Hoses
Courtesy of GENERAL MOTORS COMPANY

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

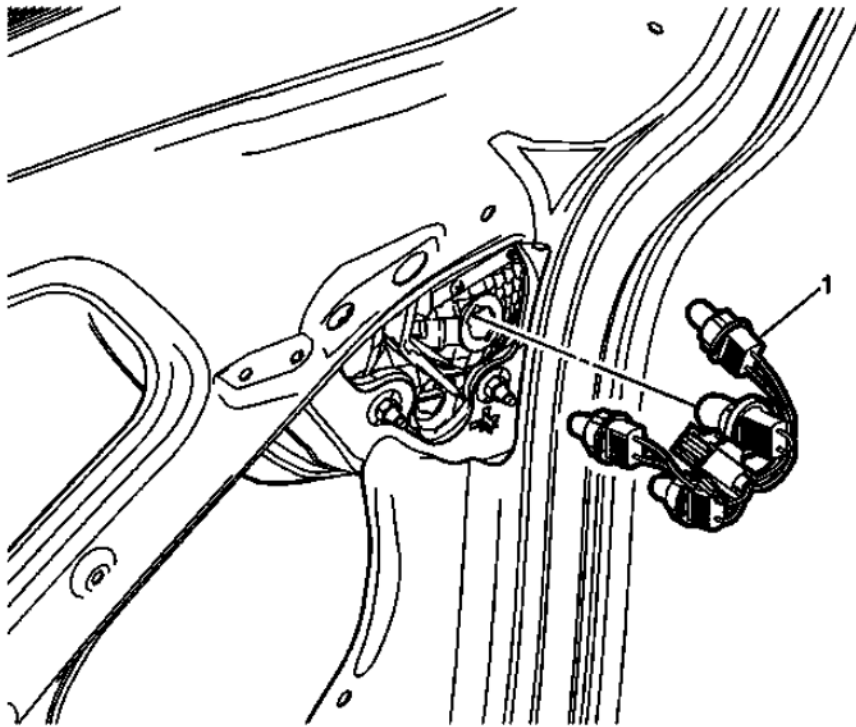


Fig. 12: View Of Main Function Switch FLUSH Position
Courtesy of GENERAL MOTORS COMPANY

Flow Test

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.

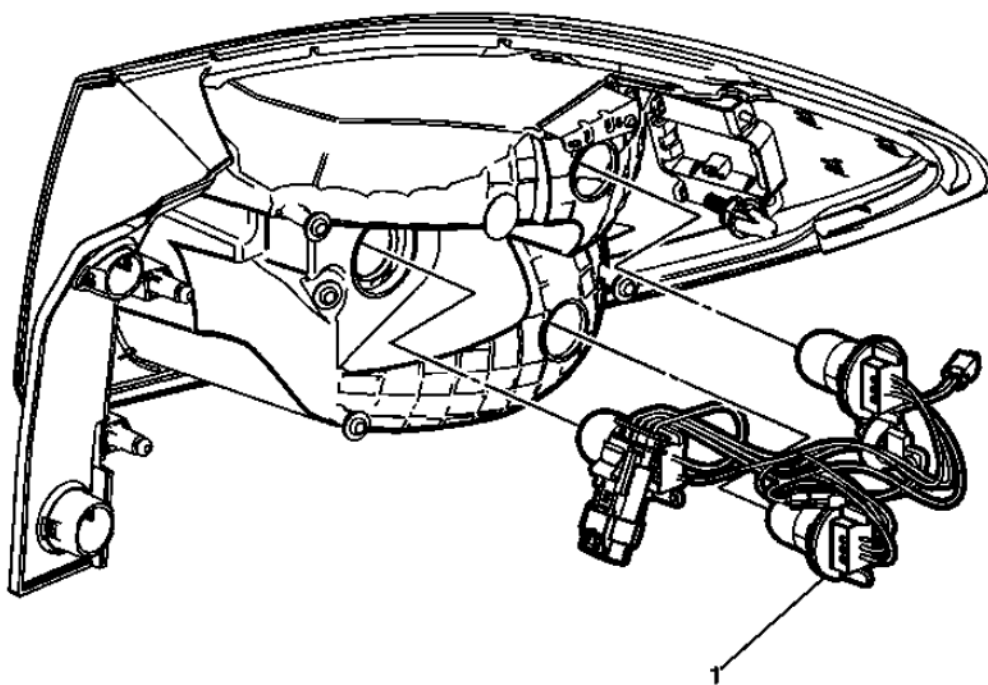


Fig. 13: View Of Main Function Switch FLOW Position
Courtesy of GENERAL MOTORS COMPANY

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.

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

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

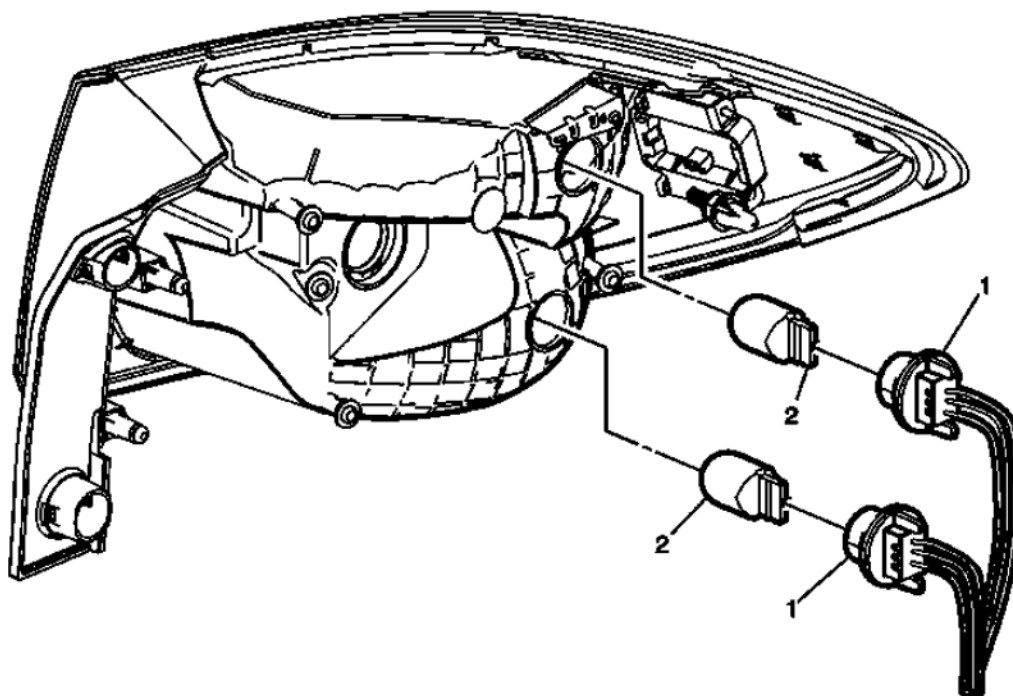


Fig. 14: View Of Main Function Switch CODE Position
Courtesy of GENERAL MOTORS COMPANY

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

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.

Clean-up

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

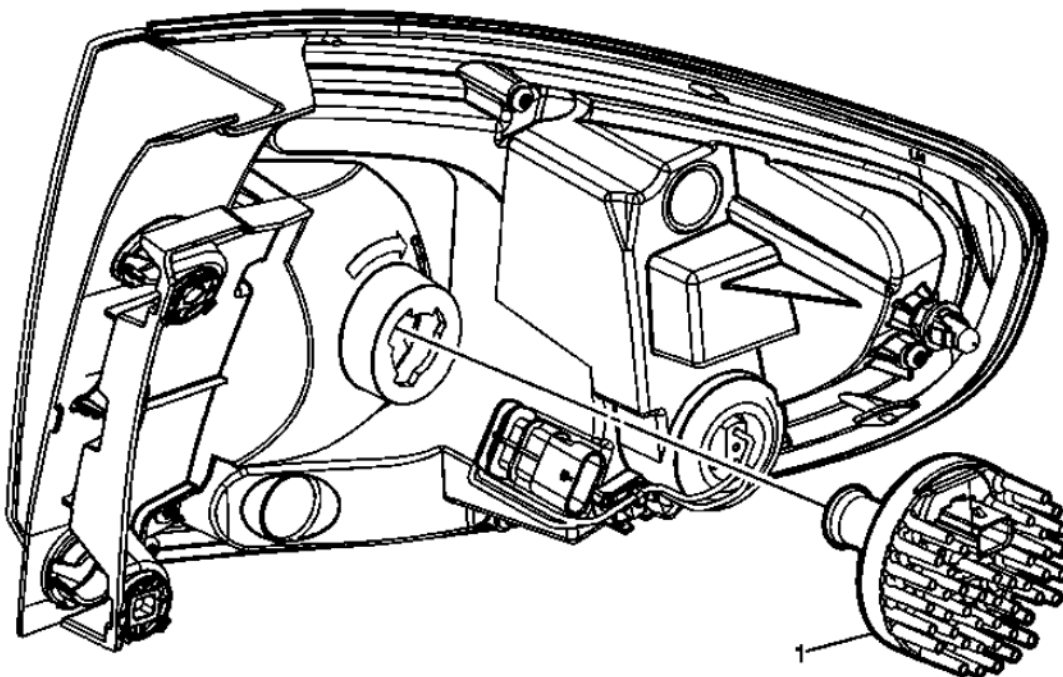


Fig. 15: View Of Main Power Switch & Main Function Switch
Courtesy of GENERAL MOTORS COMPANY

2. Turn the main power switch (1) to the OFF position.
3. Disconnect the supply and waste hoses and the 12-volt power source from the vehicle.

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.

4. Disconnect the air supply hose from **DT 45096** flush and flow test tool.

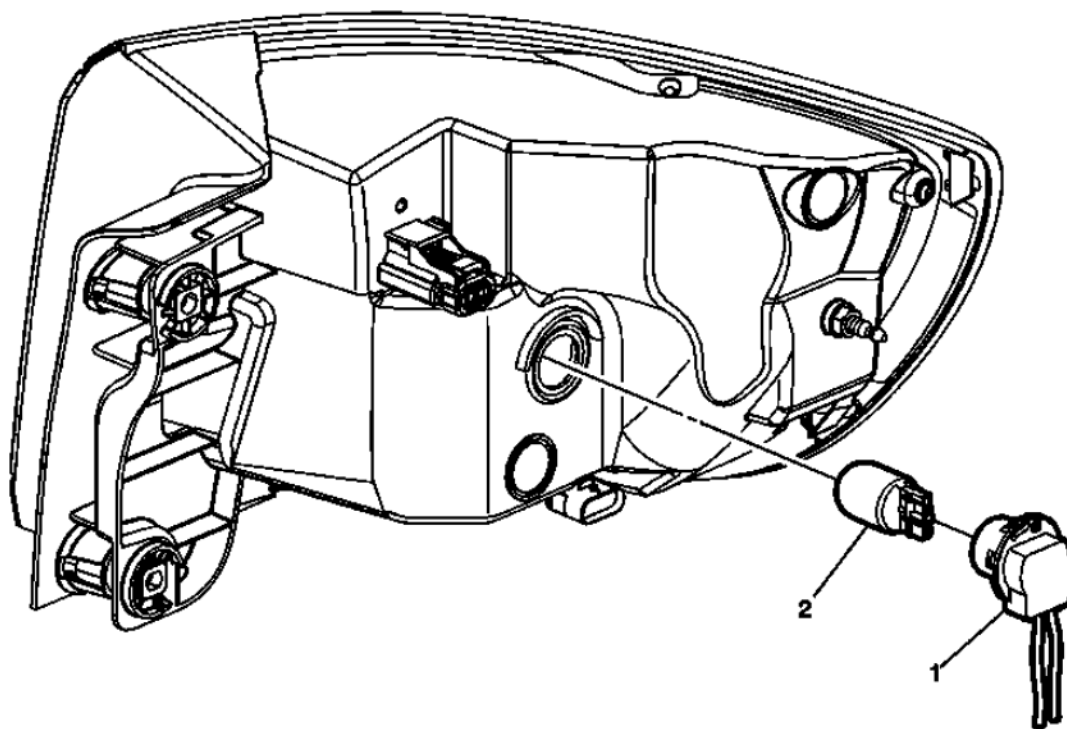


Fig. 16: Applying Shop Air Supply Hose To Quick-Disconnect
Courtesy of GENERAL MOTORS COMPANY

5. Dispose of the waste ATF in accordance with all applicable federal, state and local requirements.

REPAIR INSTRUCTIONS

TRANSMISSION FLUID COOLER PIPE CONNECTOR REPLACEMENT - RADIATOR

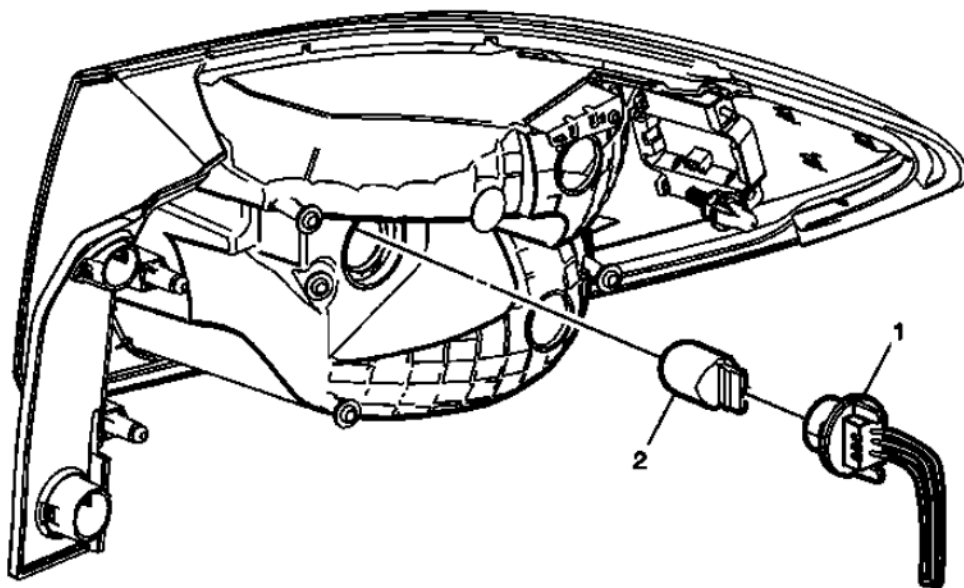


Fig. 17: View Of Transmission Fluid Cooler Hose/Pipe Connector
 Courtesy of GENERAL MOTORS COMPANY

Transmission Fluid Cooler Pipe Connector Replacement - Radiator

Callout	Component Name
Preliminary Procedures 1. Drain the cooling system. Refer to <u>Cooling System Draining and Filling (Static Fill)</u> and/or <u>Cooling System Draining and Filling (Vac N Fill)</u> . 2. Remove the transaxle oil cooler pipe from the oil cooler fittings on the radiator. Refer to <u>Transmission Fluid Cooler Hose/Pipe Quick-Connect Fitting Disconnection and Connection</u>.	
NOTE: 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 CAUTION: Refer to <u>Fastener Caution</u> . Procedure Remove the plastic caps from the quick connect fittings by pulling the caps back along the pipe before installation.

NOTE:

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

Tighten

24 N.m (18 lb ft)

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.
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.

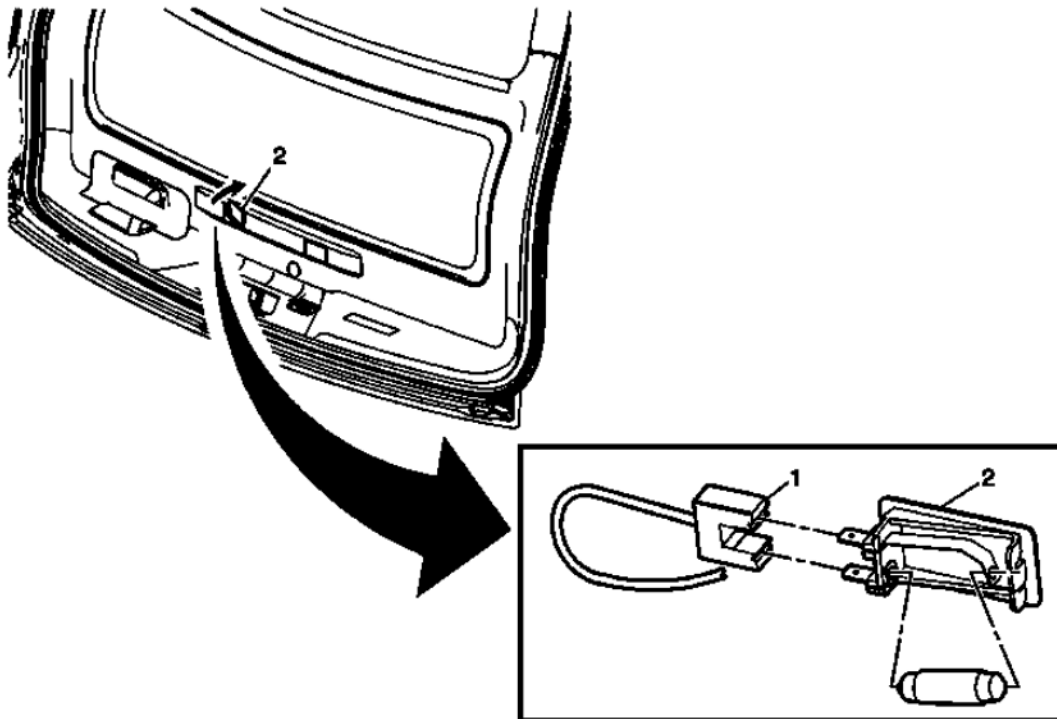


Fig. 18: View Of J 41623-B & Generator Cooling Inlet Pipe
Courtesy of GENERAL MOTORS COMPANY

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.

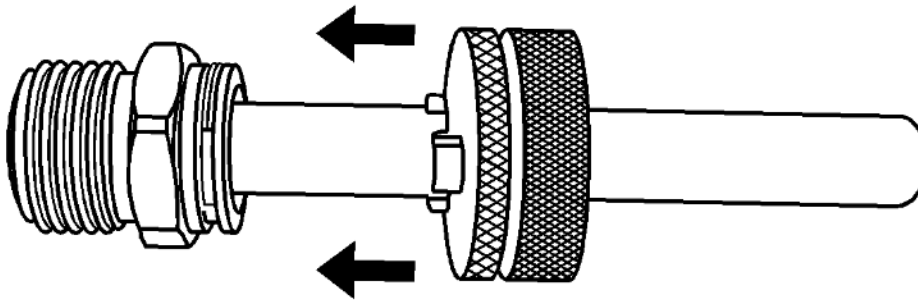


Fig. 19: Sliding J 41623-B Toward Generator Cooling Inlet Pipe Fitting
Courtesy of GENERAL MOTORS COMPANY

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

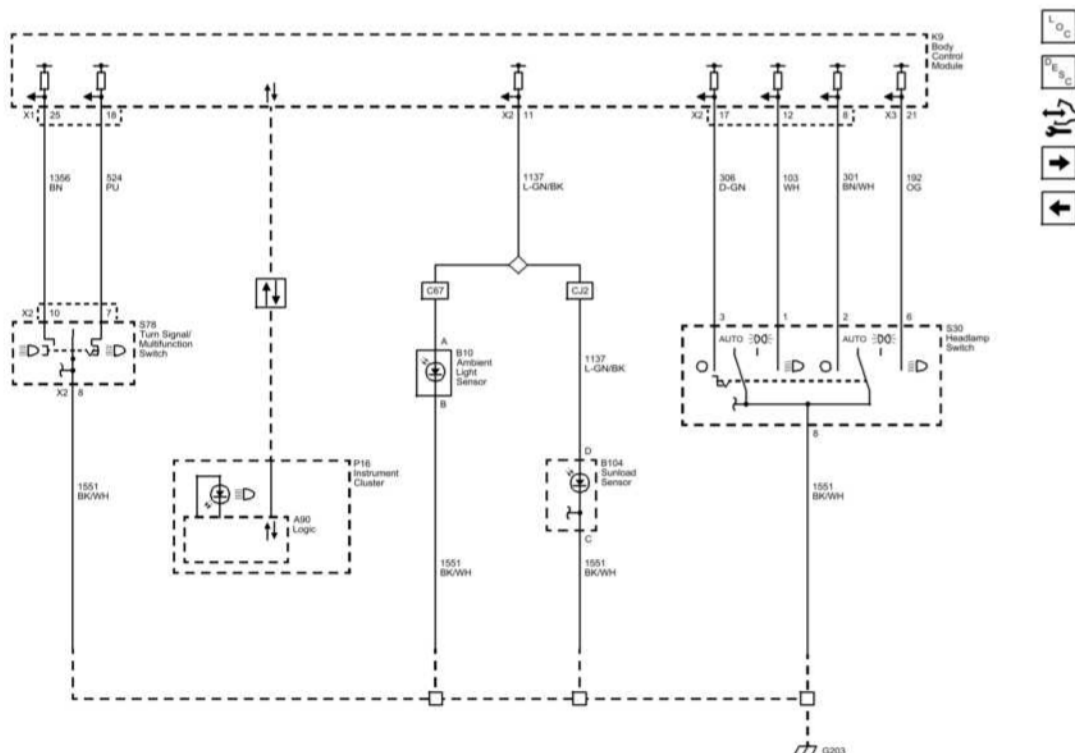


Fig. 20: Rotating Quick-Connect On Coolant Pipe
Courtesy of GENERAL MOTORS COMPANY

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.

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.

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

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.

FLUID COOLER INLET HOSE REPLACEMENT

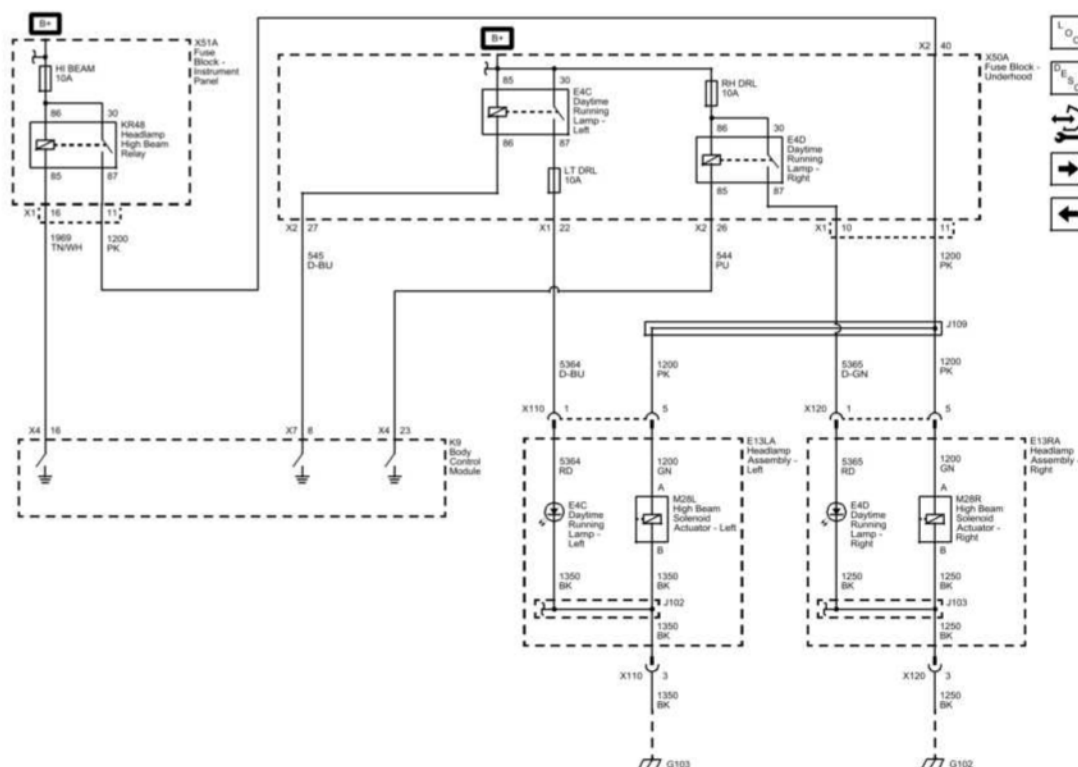


Fig. 24: Fluid Cooler Inlet Hose
 Courtesy of GENERAL MOTORS COMPANY

Fluid Cooler Inlet Hose Replacement

Callout	Component Name
Preliminary Procedure	
1. Remove the front compartment front sight shield. Refer to Front Compartment Front Sight Shield Replacement (Enclave) , Front Compartment Front Sight Shield Replacement (Traverse) and/or Front Compartment Front Sight Shield Replacement (Acadia) . 2. Remove the air cleaner outlet duct. Refer to Air Cleaner Outlet Duct Replacement .	
1	Transmission Fluid Cooler Inlet Hose Nut CAUTION: Refer to <u>Fastener Caution</u> . Tighten 22 (16 lb ft)
2	Transmission Fluid Cooler Inlet Hose Sealing Washer Procedure Remove and discard the sealing washers and replace with a NEW sealing washer.

3	Transmission Fluid Cooler Inlet Hose Retaining Clip Procedure Disconnect the quick connect fittings from the transmission fluid cooler inlet hose. Refer to <u>Transmission Fluid Cooler Hose/Pipe Quick-Connect Fitting Disconnection and Connection</u>.
4	Transmission Fluid Cooler Inlet Hose Procedure 1. Remove the transmission fluid cooler inlet hose from the retaining clips securing the line to the transmission and fan shroud. 2. Fill the transmission to the proper fluid level. Refer to <u>Transmission Fluid Drain and Fill</u>. 3. Inspect for fluid leaks. Refer to <u>Transmission Fluid Level and Condition Check</u>.

FLUID COOLER OUTLET HOSE REPLACEMENT

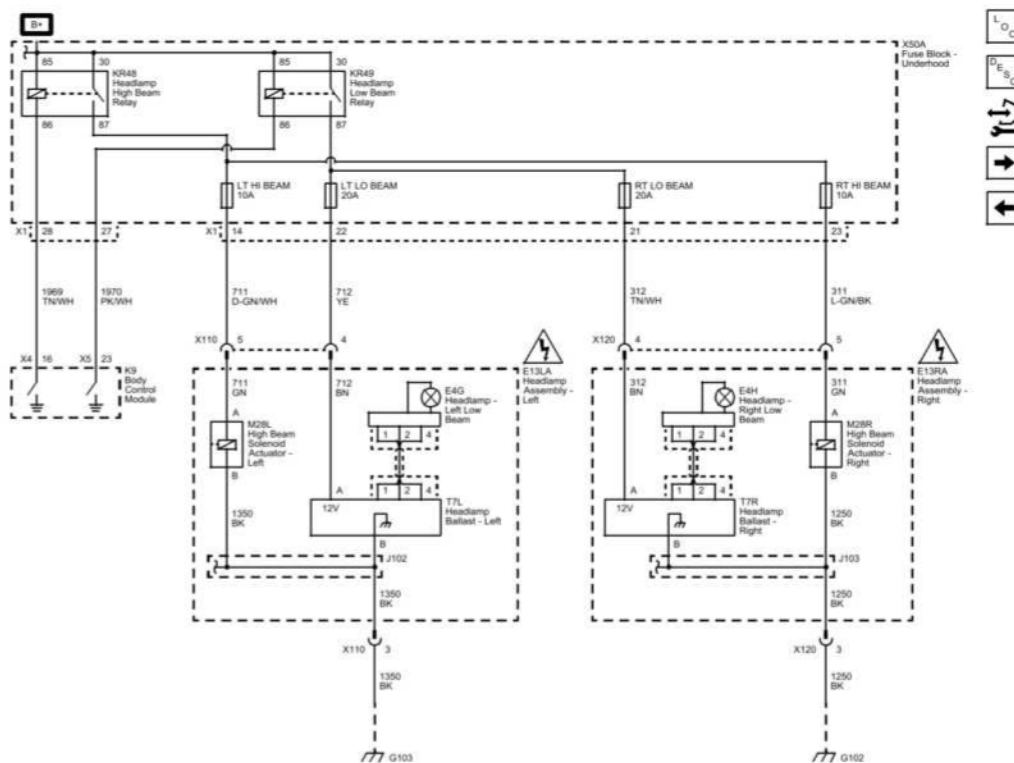


Fig. 25: Fluid Cooler Outlet Hose
 Courtesy of GENERAL MOTORS COMPANY

Fluid Cooler Outlet Hose Replacement

Callout	Component Name
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Preliminary Procedure

1. Remove the front compartment front sight shield. Refer to **Front Compartment Front Sight Shield Replacement (Enclave)** , **Front Compartment Front Sight Shield Replacement (Traverse)** and/or **Front Compartment Front Sight Shield Replacement (Acadia)** .
2. Remove the air cleaner outlet duct. Refer to **Air Cleaner Outlet Duct Replacement** .

1	Transmission Fluid Cooler Outlet Hose Nut CAUTION: Refer to <u>Fastener Caution</u> . Tighten 22 (16 lb ft)
2	Transmission Fluid Cooler Outlet Hose Sealing Washer Procedure Remove and discard the sealing washers and replace with a NEW sealing washer.
3	Transmission Fluid Cooler Outlet Hose Clip Nut Tighten 9 (80 lb in)
4	Transmission Fluid Cooler Outlet Hose Retaining Clip Procedure Disconnect the quick connect fittings from the transmission fluid cooler outlet hose. Refer to <u>Transmission Fluid Cooler Hose/Pipe Quick-Connect Fitting Disconnection and Connection</u> .
5	Transmission Fluid Cooler Outlet Hose Procedure 1. Remove the transmission fluid cooler outlet hose from the retaining clips securing the line to the transmission and fan shroud. 2. Fill the transmission to the proper fluid level. Refer to <u>Transmission Fluid Drain and Fill</u> . 3. Inspect for fluid leaks. Refer to <u>Transmission Fluid Level and Condition Check</u> .