

2013 HVAC

Heating, Ventilation, and Air Conditioning - Malibu

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Air Conditioning Compressor and Condenser Hose Bolt	20	15 lb ft
Air Conditioning Compressor and Condenser Hose Nut at Condenser	20	15 lb ft
Air Conditioning Compressor and Condenser Hose Nut at Evaporator Tube- Except LCV	20	15 lb ft
Air Conditioning Compressor Bolt	22	16 lb ft
Air Conditioning Compressor Heat Shield Bolt - LCV, LTG	7.5	66 lb in
Air Conditioning Compressor Hose Bolt - LCV, LTG	22	16 lb ft
Air Conditioning Compressor Hose Nut - LCV, LTG	22	16 lb ft
Air Conditioning Compressor Hose Retaining Fastener	9	80 lb in
Air Conditioning Compressor Nut	22	16 lb ft
Air Conditioning Compressor Stud	9	80 lb in
Air Conditioning Compressor Tube Assembly Nut	22	16 lb ft
Air Conditioning Evaporator Hose Fastener	20	15 lb ft
Air Conditioning Evaporator Hose Nut - LCV, LTG	22	16 lb ft
Air Conditioning Evaporator Hose Stud Bolt	15	11 lb ft
Air Conditioning Evaporator Thermal Expansion Valve Bolt	7	62 lb in
Air Conditioning Refrigerant Pressure Sensor	7.4	66 lb in
Air Conditioning Refrigerant Pressure Sensor - LCV	6	53 lb in
Bracket Heater Core Inlet Tube Bolt	2.5	23 lb in
Compressor Pressure Relief Valve	8	70 lb in
Receiver and Dehydrator Plug	12	9 lb ft

REFRIGERANT SYSTEM SPECIFICATIONS

Refrigerant System Specifications

Application	Specification	
	Metric	English
Abrupt Refrigerant Loss	60 ml ¹	2.0 oz ¹
PAG Oil GM P/N 12378526 for United States PAG Oil GM P/N 88900060 for Canada		
Compressor Replacement		
NOTE: Compressor failure can occur if the oil removed during refrigerant recovery is not replaced. The service compressor is shipped with 74 ml ² (2.5 oz ²) or 40 ml ² (1.4 oz ²) of PAG oil. Refer to the oil balance instructions for information regarding the specific service compressor oil charge.		
Condenser Replacement	30 ml ²	1.0 oz ²
Evaporator Replacement	90 ml ²	3.0 oz ²
Any Line Set (Hose/Tube or Tube Assembly) Replacement	30 ml ²	1.0 oz ²
• Total System PAG Oil Capacity	150.0 ml	5.1 oz
R-134a		
• Refrigerant Charge -LAF/LEA/LF1/LLT/LUK/LFX	0.68 kg	1.50 lb
• Refrigerant Charge - LHU	0.60 kg	1.30 lb
¹ Abrupt refrigerant loss due to large leak, hose rupture, collision, or pressure relief valve opening. Conditions that allow the refrigerant to seep or bleed off over time do not cause this oil loss. Upon replacement of a component that caused a large refrigerant loss, also add the required amount of oil for the particular component. ² If more than the specified amount of PAG oil was drained from a component, add the amount drained.		

DIAGNOSTIC INFORMATION AND PROCEDURES

LEAK TESTING

Special Tools

- **GE-39400-A** Halogen Leak Detector
- **GE-41447** R-134A A/C Tracer Dye-Box of 24
- **GE-42220** Universal 12V Leak Detection Lamp
- **GE-43872** Fluorescent Dye Cleaner
- **GE-46297** A/C Dye Injector Kit
- **GE-46297-12** Replacement Dye Cartridges

For equivalent regional tools. Refer to **Special Tools**.

Refrigerant Leak Testing

NOTE: General Motors vehicles are now manufactured with fluorescent dye installed directly into the air conditioning (A/C) system.

The fluorescent dye mixes and flows with the polyalkylene glycol (PAG) oil throughout the refrigerant system.

Verifying some passive leaks may require using the **GE-39400-A** Halogen Leak Detector, even though the A/C system contains fluorescent dye.

The only time that adding additional fluorescent dye is required is after flushing the A/C system.

Fluorescent Leak Detector

Fluorescent dye will assist in locating any leaks in the A/C system.

NOTE: PAG oil is water soluble.

- Condensation on the evaporator core or the refrigerant lines may wash the PAG oil and fluorescent dye away from the actual leak. Condensation may also carry dye through the HVAC module drain.
- Leaks in the A/C system will be indicated in a light green or yellow color when using the leak detection lamp.

Use the leak detection lamp in the following areas:

- All fittings or connections that use seal washers or O-rings
- All of the A/C components
- The A/C compressor shaft seal
- The A/C hoses and pressure switches
- The HVAC module drain tube, if the evaporator core is suspected of leaking
- The service port sealing caps

The sealing cap is the primary seal for the service ports.

- Follow the instructions supplied with the **GE-42220** Universal 12V Leak Detection Lamp.
- To prevent false diagnosis in the future, thoroughly clean the residual dye from any area where leaks were found. Use a rag and the approved **GE-43872** Fluorescent Dye Cleaner.

Fluorescent Dye Injection

NOTE: Use only fluorescent dye approved by General Motors.

- **GE-41447 R-134A A/C Tracer Dye-Box of 24** can be poured directly into a removed A/C component.
- **GE-46297-12 Replacement Dye Cartridges** is injected into the low side port using **GE-46297 A/C Dye Injector Kit**.

- Not all of the fluorescent dyes are compatible with PAG oil. Some types of dye decrease the oil viscosity or may chemically react with the oil.
- R-134A leak detection dye requires time to work. Depending upon the leak rate, a leak may not become visible for between 15 minutes and 7 days.

NOTE: Do NOT overcharge the A/C system with dye. Use only one 7.39 ml (0.25 oz) charge.

- To prevent false diagnosis, thoroughly clean any residual dye from the service port with a rag and the approved fluorescent dye cleaner **GE-43872** Fluorescent Dye Cleaner.

Halogen Leak Detector

WARNING: Do not operate the detector in a combustible atmosphere since its sensor operates at high temperatures or personal injury and/or damage to the equipment may result.

Ensure that the vehicle has at least 0.45 kg (1 lb) of refrigerant in the A/C refrigeration system in order to perform a leak test. Refer to **Refrigerant Recovery and Recharging** for recharging the A/C system.

NOTE: Halogen leak detectors are sensitive to the following items:

- Windshield washing solutions
- Many solvents and cleaners
- Some adhesives used in the vehicle

Clean and dry all surfaces in order to prevent a false warning. Liquids will damage the detector.

NOTE: Follow a continuous path in order to ensure that you will not miss any possible leaks. Test all areas of the system for leaks.

Follow the instructions supplied with the **GE-39400-A** Halogen Leak Detector.

AIR CONDITIONING (A/C) SYSTEM PERFORMANCE TEST

This test measures the operating efficiency of the A/C system under the following conditions:

- The current ambient air temperature
- The current relative humidity
- The high side pressure of the A/C system
- The low side pressure of the A/C system
- The temperature of the air being discharged into the passenger compartment

Test Description

The numbers below refer to the step numbers on the diagnostic table.

1

This step determines if the A/C system has at least the minimum refrigerant charge required to operate the system without damage.

2

This step measures the performance of the A/C system.

3

This step is to allow for vehicle variations as well as high ambient temperatures.

Air Conditioning (A/C) System Performance Test

Step	Action	Values	Yes	No
NOTE: • The ambient air temperature must be at least 16°C (60°F). • Do not induce additional air flow across the front of the vehicle during the test. • If you were sent here from a DTC diagnostic table, clear the DTC upon completion of this test.				
1	1. Park the vehicle inside or in the shade. 2. Open the windows in order to ventilate the interior of the vehicle. 3. If the A/C system was operating, allow the A/C system to equalize for about 2 minutes. 4. Turn OFF the ignition. 5. Install the J 43600 ACR 2000 Air Conditioning Service Center. 6. Record the ambient air temperature displayed on the J 43600 ACR 2000 Air Conditioning Service Center. 7. Record the low and high side STATIC pressure readings. Are both the low side and high side pressures within the specified value?	More than 16°C (60°F) - 345 kPa (50 psi) More than 24°C (75°F) - 483 kPa (70 psi) More than 33°C (90°F) - 690 kPa (100 psi)	Go to Step 2	Go to Leak Testing
	NOTE: Record the relative humidity and the ambient air temperature at the time of the test. 1. Close the vehicle doors and windows.			

2

2. Open the drivers door window 12.7-15.2 cm (5-6 in).
3. Select the following HVAC control settings:
 - The A/C is ON.
 - The coldest temperature setting
 - The maximum blower speed
 - Recirculation mode
 - The instrument panel (I/P) panel outlet mode
 - All I/P panel outlets are OPEN.
4. Install the temperature probes of the **J 43600 ACR 2000 Air Conditioning Service Center** in the left and right center panel air outlets.
5. Apply the parking brake.
6. Place the transaxle/transmission in one of the following positions:
 - PARK (Automatic)
 - NEUTRAL (Manual)
7. Start the engine and warm to operating temperature.
8. Operate the A/C system for 5 minutes.
9. Inspect A/C components for the following conditions:
 - Abnormal frost areas
 - Unusual noises
- NOTE:**
Press the RESET button, before using the print function of the J 43600 ACR 2000 Air Conditioning Service Center.
10. Print the following information:
 - The panel outlet air temperatures
 - The low-side pressure
 - The high-side pressure
11. Compare the low and high side pressures and the panel output temperatures to the A/C Performance Table below.

	Does all the data recorded fall within the specified ranges of the A/C Performance Table below?		Go to Step 5	Go to Step 3
3	If the pressures and temperatures recorded do not fall within the specified ranges: 1. Continue to operate the A/C system for an additional 5 minutes. 2. RESET the J 43600 ACR 2000 Air Conditioning Service Center and record the pressures and temperatures again. 3. Compare the low and high side pressures and the panel output temperature to the table below. Does all the data recorded fall within the specified ranges of the table below?	-	Go to Step 5	Go to Step 4
4	Perform the necessary repairs. Refer to <u>A/C Diagnostics Chart</u>. Is the action complete?	-	Go to Step 5	-
5	Operate the system in order to verify the test results. Did you find the same results?	-	System OK	Go to <u>Symptoms - HVAC Systems - Automatic</u>

A/C Performance Table

Ambient Temperature	Relative Humidity	Low Side Service Port Pressure	High Side Service Port Pressure	Maximum Left Center Discharge Air Temperature
13-18°C (55-65°F)	0-100%	151-220 kPa (22-32 psi)	950-1102 kPa (138-160 psi)	8°C (45°F)
19-24°C (66-75°F)	Below 40%	151-248 kPa (22-36 psi)	1178-1378 kPa (171-200 psi)	8°C (46°F)
	Above 40%	165-268 kPa (24-39 psi)	1109-1336 kPa (161-194 psi)	12°C (52°F)
25-29°C (76-85°F)	Below 35%	192-275 kPa (28-40 psi)	1329-1543 kPa (193-224 psi)	12°C (52°F)
	35-50%	199-289 kPa (29-42 psi)	13209-1543 kPa (190-224 psi)	13°C (54°F)
	Above 50%	213-310 kPa (31-45 psi)	1288-1543 kPa (187-224 psi)	14°C (57°F)
30-35°C (86-95°F)	Below 30%	227-316 kPa (33-46 psi)	1460-1722 kPa (212-250 psi)	14°C (57°F)
	30-50%	234-330 kPa (34-48 psi)	1460-1743 kPa (212-253 psi)	15°C (59°F)

	Above 50%	248-351 kPa (36-51 psi)	1460-1777 kPa (212-258 psi)	18°C (63°F)
36-41°C (96-105°F)	Below 20%	261-351 kPa (38-51 psi)	1619-1880 kPa (235-273 psi)	18°C (63°F)
	20-40%	268-365 kPa (39-53 psi)	1632-1922 kPa (237-279 psi)	18°C (64°F)
	Above 40%	282-378 kPa (41-55 psi)	1646-1970 kPa (239-286 psi)	19°C (66°F)
42-46°C (106-115°F)	Below 20%	303-378 kPa (44-55 psi)	1770-2011 kPa (257-292 psi)	20°C (68°F)
	Above 20%	310-399 kPa (45-58 psi)	1798-2080 kPa (261-302 psi)	22°C (70°F)
47-49°C (116-120°F)	Below 30%	344-427 kPa (50-62 psi)	1929-2197 kPa (280-319 psi)	24°C (75°F)

A/C DIAGNOSTICS CHART

A/C Diagnostics Chart

Low Side Gauge Reading	High Side Gauge Reading	Potential Causes
Low	Low	Low Refrigerant Charge
		Restriction between Compressor and High Side port
	Low/Normal	Evaporator Freezing
	High	Restriction between the Low Side and High Side ports or Restricted TXV/Orifice Tube
		Compressor Stuck at Maximum Displacement
High	Low	Compressor has Low Displacement or Internal Malfunction
	High	Malfunctioning Cooling Fans
		Refrigerant Overcharge
		Restriction between the Low Side Port and Compressor Inlet
		Restricted Condenser Air Flow
		Expansion Device Stuck Open
Normal/High	Normal/High	Air in A/C System
		Refrigerant Contamination
		PAG or POE Oil Overcharge

HEATING PERFORMANCE DIAGNOSTIC

Heating Performance Diagnostic

Step	Action	Yes	No
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1	Were you sent here from Symptoms or another diagnostic table?	Go to Step 2	Go to Symptoms - HVAC Systems - Automatic
2	1. Start the engine. 2. Allow the engine to idle. Does the engine reach a normal operating temperature?	Go to Step 3	Go to Step 9
3	WARNING: Refer to <u>Moving Parts and Hot Surfaces Warning</u> . 1. Allow the engine to idle. 2. Select the FLOOR mode. 3. Select the minimum blower speed. 4. Select the warmest temperature setting. 5. Feel the temperature of the inlet and outlet heater hoses at the heater core. Does the inlet heater hose feel warmer than the outlet heater hose?	Go to Step 7	Go to Step 4
4	1. Install a thermometer into the center I/P PANEL air outlet. 2. Secure a thermometer to the heater core outlet hose. 3. Select the PANEL mode. 4. Select the maximum blower speed. 5. Select the warmest temperature setting. 6. Record the temperature at the following locations: • The center I/P PANEL air outlet • The heater core outlet hose 7. Compare the recorded temperatures. Are the 2 temperature readings about equal?	Go to Step 5	Go to Step 6
5	1. Inspect and repair the following areas of the vehicle for cold air leaks: • The cowl • The recirculation door • The HVAC module case 2. Perform the necessary repairs.		-

	Are the repairs complete?	Go to Step 10	
6	1. Inspect the temperature door operation. Refer to <u>Diagnostic System Check - Vehicle</u> . 2. Perform any necessary repairs. Are the repairs complete?	Go to Step 10	-
7	1. Turn OFF the engine. 2. Backflush the heater core. 3. Start the engine. 4. Select the FLOOR mode. 5. Select the minimum blower speed. 6. Select the warmest temperature setting. 7. Feel the temperature of the inlet and outlet heater hoses at the heater core. Does the inlet heater hose feel warmer than the outlet heater hose?	Go to Step 8	Go to Step 10
8	Replace the heater core. Refer to <u>Heater Core Replacement</u> . Is the repair complete?	Go to Step 10	-
9	Repair the low engine temperature concern. Refer to <u>Engine Fails To Reach Normal Operating Temperature</u> . Is the repair complete?	Go to Step 10	-
10	Operate the system in order to verify the repair. Did you find and correct the condition?	System OK	Go to Step 2

DEFROSTING INSUFFICIENT

Defrosting Insufficient

Step	Action	Yes	No
DEFINITION: Time required to defrost the windshield is longer than normal.			
1	Were you sent here from Symptoms or another diagnostic table?	Go to Step 2	Go to <u>Symptoms - HVAC Systems - Automatic</u>
2	1. Start the engine. 2. Select the DEFROST mode. 3. Select the maximum blower speed. Does sufficient air flow from the defroster outlets?	Go to Step 3	Go to Step 10
3	Measure the engine operating temperature. Does engine reach a normal operating		

	temperature?	Go to Step 4	Go to Step 8
4	1. Select the minimum blower speed. 2. Select the maximum temperature setting. 3. Feel the temperature of the inlet and outlet hoses at the heater core. Does the inlet hose feel warmer than the outlet hose?	Go to Step 11	Go to Step 5
5	Test the operation of the A/C compressor clutch. Does the A/C compressor clutch engage?	Go to Step 7	Go to Step 6
6	Repair the A/C compressor clutch. Refer to <u>Air Conditioning Compressor Replacement (LUK)</u> , <u>Air Conditioning Compressor Replacement (LCV)</u> , <u>Air Conditioning Compressor Replacement (LTG)</u> . Is the repair complete?	Go to Step 14	-
7	Perform the A/C system performance test. Refer to <u>Air Conditioning (A/C) System Performance Test</u> . Is the A/C system operating within the specifications?	Go to Step 9	Go to Step 12
8	Repair the low engine temperature concern. Refer to <u>Engine Fails To Reach Normal Operating Temperature</u> . Is the repair complete?	Go to Step 14	-
9	Inspect for correct operation of the recirculation door. Is the recirculation door operating correctly?	Go to Step 14	Go to Step 13
10	Repair the air delivery concern. Is the repair complete?	Go to Step 14	-
11	Repair the heating concern. Refer to <u>Air Temperature Malfunction</u> . Is the repair complete?	Go to Step 14	-
12	Repair the A/C performance concern. Refer to <u>Air Conditioning (A/C) System Performance Test</u> . Is the repair complete?	Go to Step 14	-
13	Repair the recirculation door concern. Is the repair complete?	Go to Step 14	-
14	Operate the system in order to verify the repair. Did you find and correct the problem?	System OK	Go to Step 2

NOISE DIAGNOSIS - BLOWER MOTOR

Noise Diagnosis - Blower Motor

Step	Action	Yes	No
DEFINITION: Noise originating from the blower motor.			
1	Were you sent here from Symptoms or another diagnostic table?	Go to Step 2	Go to Symptoms - HVAC Systems - Automatic
2	Inspect the air inlet grille for debris. Is debris present?	Go to Step 8	Go to Step 3
3	1. Sit inside the vehicle. 2. Close the vehicle doors and windows. 3. Turn ON the ignition, with the engine OFF. 4. Cycle the blower motor through all of the speeds and modes in order to determine where and when the noise occurs. Is a noise evident during the blower operation?	Go to Step 4	Go to Step 11
4	Inspect for excessive vibration at each blower motor speed by feeling the blower case. Is excess vibration present?	Go to Step 6	Go to Step 5
5	Listen to the blower motor at each speed. Is the blower motor making a squeaking or chirping noise?	Go to Step 9	Go to Step 11
6	1. Remove the blower motor. Refer to Blower Motor Replacement. 2. Inspect the blower motor impeller for deposits of foreign material. 3. Inspect the blower motor for deposits of foreign material. Did you find any foreign material on the blower motor or blower motor impeller?	Go to Step 8	Go to Step 7
7	Inspect the blower motor for the following conditions: • Cracked blades • A loose impeller retainer • Improper impeller alignment Did you find any of these conditions?	Go to Step 9	Go to Step 10
	Remove the foreign material.		

8	Is the action complete?	Go to Step 10	-
9	Replace the blower motor. Refer to Blower Motor Replacement . Is the repair complete?	Go to Step 11	-
10	Install the blower motor. Refer to Blower Motor Replacement . Is the action complete?	Go to Step 11	-
11	Operate the system in order to verify the repair. Did you find and correct the condition?	System OK	Go to Step 2

AIR CONDITIONING COMPRESSOR OIL DIAGNOSIS

Air Conditioning Compressor Oil Diagnosis

Condition	Corrective Action
NOTE: To avoid repeat compressor failure, always inspect the condition of the refrigerant oil and take the appropriate corrective action before installing the replacement compressor.	
Clean Oil no debris present	No corrective action necessary.
Clean Oil with debris present	• Replace desiccant or component containing the desiccant. • Replace desiccant filter if applicable. • Remove and inspect high pressure side filter (if applicable). • Remove, inspect, clean, or replace orifice tube (if applicable). • If the system has a front orifice tube and is equipped with a filter in the rear auxiliary line, remove, inspect, clean, or replace the filter.
Dark brown/black and/or pungent/unusual odor with no debris present	• Replace desiccant or component containing the desiccant. • Replace desiccant filter if applicable. • Flush refrigerant system.
Dark brown/black and/or pungent/unusual odor with debris present	• Replace desiccant or component containing the desiccant. • Replace desiccant filter if applicable. • Flush refrigerant system. • Remove and inspect high pressure side filter (if applicable). • Remove, inspect, clean, or replace orifice tube (if applicable). • If the system has a front orifice tube and is equipped with a filter in the rear auxiliary line,

	remove, inspect, clean, or replace the filter.
Oil Overcharge	Flush refrigerant system.
Refrigerant Contamination	Flush refrigerant system.
Hybrid Polyolester Refrigerant Oil (POE) Contamination	• Flush refrigerant system. • Replace desiccant or component containing the desiccant. • Replace desiccant filter if applicable.

NOISE DIAGNOSIS - AIR CONDITIONING (A/C) SYSTEM

Noise Diagnosis - Air Conditioning (A/C) System

Step	Action	Yes	No
DEFINITION: Noise originating from the A/C compressor, drive belt, or the A/C lines.			
1	Were you sent here from Symptoms or another diagnostic table?	Go to Step 2	Go to Symptoms - HVAC Systems - Automatic
2	1. A/C system noises can be generally categorized into 3 areas: • Screeching, squealing, chirping noises • Moaning noises • Vibration/rattle noises 2. Start the engine. 3. Ensure that the A/C is ON. Is a screeching, squealing noise heard when the A/C is engaged?	Go to Step 3	Go to Step 9
3	With the engine OFF, inspect the drive belt for excessive wear. Refer to the appropriate procedure: • <u>Drive Belt Falls Off and Excessive Wear Diagnosis</u> for the 2.2L or 2.4L engine • <u>Drive Belt Falls Off and Excessive Wear Diagnosis</u> for the 2.0L or 2.5L engine Is the drive belt excessively worn?	Go to Step 18	Go to Step 4
4	Inspect the drive belt tension. Refer to the appropriate procedure: • <u>Drive Belt Tensioner Diagnosis</u> for the 2.2L or 2.4L engine • <u>Drive Belt Tensioner Diagnosis</u> for the 2.0L or 2.5L engine		

	Is the drive belt tension correct?	Go to Step 5	Go to Step 19
5	Inspect the drive belt for excessive oil coverage. Is the drive belt covered with oil?	Go to Step 17	Go to Step 6
6	1. Start the engine. 2. Ensure that the A/C is ON. 3. Inspect the compressor and the clutch.		
	Is the A/C compressor locked up?	Go to Step 24	Go to Step 7
7	Is the A/C compressor clutch slipping?	Go to Step 23	Go to Step 8
8	WARNING: Refer to <u>Moving Parts and Hot Surfaces Warning</u> . Using a stethoscope, listen to the A/C compressor for any abnormal noises. Is the compressor causing an abnormal noise?	Go to Step 15	Go to Step 10
9	Does a moaning noise exist when the A/C clutch is engaged?	Go to Step 10	Go to Step 12
10	Listen to the A/C compressor components and mounting for noise concerns using a stethoscope. Are any of these components loose, damaged, or excessively worn?	Go to Step 20	Go to Step 11
11	1. Idle the engine. 2. Engage the A/C compressor clutch. 3. Using a stethoscope, move around the entire refrigerant plumbing system. Listening for any abnormal noises caused by a component of the A/C system touching another component.		
	Are any of the A/C components grounding out and causing a vibration noise?	Go to Step 22	Go to Step 13
12	Does a vibration or rattle noise exist when the A/C clutch is engaged?	Go to Step 13	Go to Step 14
13	Does the noise stop when the A/C clutch is disengaged?	Go to Step 15	Go to Step 25
14	1. Idle the engine in PARK with the A/C compressor clutch engaged. 2. Using a stethoscope, move around the entire A/C system testing for any abnormal noises caused by a component.		
	Do any of the A/C components cause an abnormal noise?	Go to Step 21	Go to Step 25
	Verify that the A/C system is properly charged. Refer to		

15	<u>Refrigerant System Specifications.</u> Is the A/C system properly charged?	Go to Step 26	Go to Step 16
16	Recharge the A/C system to specification. Refer to <u>Refrigerant Recovery and Recharging.</u> Is the abnormal compressor noise still present?	Go to Step 24	Go to Step 26
17	Repair the oil leak. Refer to the appropriate procedure: • <u>Oil Leak Diagnosis</u> for the 2.2L or 2.4L engine • <u>Oil Leak Diagnosis</u> for the 2.0L or 2.5L engine Is the repair complete?	Go to Step 18	-
18	Replace the drive belt. Refer to the appropriate procedure: • <u>Drive Belt Replacement</u> for the 2.2L or 2.4L engine • <u>Drive Belt Replacement</u> for the 2.0L or 2.5L engine Is the replacement complete?	Go to Step 26	-
19	Replace the drive belt tensioner. Refer to the appropriate procedure: • <u>Drive Belt Tensioner Replacement</u> for the 2.2L or 2.4L engine • <u>Drive Belt Tensioner Replacement</u> for the 2.0L or 2.5L engine Is the replacement complete?	Go to Step 26	-
20	Repair or replace the A/C compressor mounting component. Is the repair complete?	Go to Step 26	-
21	Repair or replace the component which is causing the moaning concern as needed. Is the repair complete?	Go to Step 26	-
22	Correctly route or insulate the A/C component. Is the repair complete?	Go to Step 26	-
23	Replace the A/C compressor clutch. Refer to <u>Air Conditioning Compressor Replacement (LUK)</u> , <u>Air Conditioning Compressor Replacement (LCV)</u> , <u>Air Conditioning Compressor Replacement (LTG)</u> . Is the repair complete?	Go to Step 26	-

24	Replace the A/C compressor. Refer to <u>Air Conditioning Compressor Replacement (LUK)</u> , <u>Air Conditioning Compressor Replacement (LCV)</u> , <u>Air Conditioning Compressor Replacement (LTG)</u> . Is the repair complete?	Go to Step 26	-
25	The concern may be caused by an engine related component. Refer to <u>Vibration Analysis - Engine</u> . Did you find and correct the condition?	Go to Step 26	-
26	Operate the system in order to verify the repair. Did you find and correct the condition?	System OK	Go to Step 2

NOISE DIAGNOSIS - HVAC MODULE

Noise Diagnosis - HVAC Module

Step	Action	Yes	No
DEFINITION: Noise originating from the HVAC module.			
1	Were you sent here from Symptoms or another diagnostic table?	Go to Step 2	Go to <u>Symptoms - HVAC Systems - Automatic</u>
2	- Start the engine. - Cycle through all of the following: - Blower motor speeds - HVAC modes - Temperature control settings - Determine the type of noise: - Scrape, pop - Tick/click, chirp or groaning - Air rush/whistle Is a scrape or pop noise evident when selecting modes or temperature settings?	Go to Step 6	Go to Step 3
3	Is a tick/click, chirping, groaning or scraping noise present, but decreases as blower motor speed is decreased?	Go to Step 6	Go to Step 4
4	Is an air rush/whistle noise evident in all modes but not all temperature settings?	Go to Step 6	Go to Step 5
5	Is an air rush/whistle noise evident only in defrost or floor mode?	Go to Step 6	Go to Step 6
6	Remove the instrument panel (I/P) carrier. Refer to <u>Instrument Panel Tie Bar Replacement</u> . Is the action complete?	Go to Step 7	-
	- Inspect the air flow doors for proper operation. - Inspect the ducts for obstructions or foreign		

7	materials. Were any of these conditions found?	Go to Step 10	Go to Step 8
8	Inspect the mode and temperature doors and seals for warping or cracking. Are the doors in normal condition?	Go to Step 11	Go to Step 9
9	Replace the appropriate door and/or seals. Is the repair complete?	Go to Step 11	-
10	Remove any obstructions or foreign material found. Is the action complete?	Go to Step 11	-
11	Install the I/P carrier. Refer to <u>Instrument Panel Tie Bar Replacement</u> . Is the action complete?	Go to Step 12	-
12	Operate the system to verify the repair. Did you find and correct the condition?	System OK	Go to Step 2

REPAIR INSTRUCTIONS

ODOR CORRECTION

Eliminating Air Conditioning Odor

- Odors may be emitted from the air conditioning system primarily at start up in hot, humid climates. The following conditions may cause the odor:
 - Debris is present in the HVAC module assembly.
 - Microbial growth on the evaporator core.
- When the blower motor fan is turned on, the microbial growth may release an unpleasant musty odor into the passenger compartment. To remove odors of this type, the microbial growth must be addressed. Perform the following procedure:
 - Remove evaporator core. Refer to **Heater and Air Conditioning Evaporator and Blower Module Removal and Installation**.
 - Clean evaporator core with a solution of 40% vinegar and 60% water.
 - Refit evaporator core. Refer to **Heater and Air Conditioning Evaporator and Blower Module Removal and Installation**.

REFRIGERANT RECOVERY AND RECHARGING

WARNING: To prevent personal injury, avoid breathing A/C Refrigerant and lubricant vapor or mist. Work in a well ventilated area. To remove refrigerant from the A/C System, use service equipment designed for recovery that is certified to meet the requirements of the appropriate SAE Standards. If an accidental system discharge occurs, ventilate the work area before continuing service. Additional health and safety information may be obtained from the refrigerant, refrigerant recovery, and lubricant

manufacturers.

WARNING: For personal protection, goggles and lint-free gloves should be worn and a clean cloth wrapped around fittings, valves, and connections when doing work that includes opening the refrigerant system. If refrigerant comes in contact with any part of the body severe frostbite and personal injury can result. The exposed area should be flushed immediately with cold water and prompt medical help should be obtained.

CAUTION: You must replace the desiccant if the A/C refrigerant system has been open to atmosphere for more than four hours, or if the A/C refrigerant oil has been contaminated. Failure to replace the desiccant will result in damage to the A/C refrigerant system.

CAUTION: To avoid system damage use only R-134a dedicated tools when servicing the A/C system.

CAUTION: R-134a is the only approved refrigerant for use in this vehicle. The use of any other refrigerant may result in poor system performance or component failure.

CAUTION: Use only Polyalkylene Glycol Synthetic Refrigerant Oil (PAG) for internal circulation through the R-134a A/C system and only 525 viscosity mineral oil on fitting threads and O-rings. If lubricants other than those specified are used, compressor failure and/or fitting seizure may result.

CAUTION: R-12 refrigerant and R-134a refrigerant must never be mixed, even in the smallest of amounts, as they are incompatible with each other. If the refrigerants are mixed, compressor failure is likely to occur. Refer to the manufacturer instructions included with the service equipment before servicing.

The A/C service station is a complete air conditioning service center for refrigerant. The service station recovers, recycles, evacuates and recharges A/C refrigerant quickly, accurately and automatically. The unit has a display screen that contains the function controls and displays prompts that will lead the technician through the recover, recycle, evacuate and recharge operations. A/C refrigerant is recovered into and charged out of an internal storage vessel.

The A/C service station has a built in A/C refrigerant identifier that will test for contamination, prior to recovery and will notify the technician if there are foreign gases present in the A/C system. If foreign gases are present, the station will not recover the refrigerant from the A/C system.

For information on the actual equipment, please refer to the manual of the equipment in question.

Always recharge the A/C System with the proper amount of refrigerant. Refer to **Refrigerant System**

Specifications for the correct amount.

A/C Refrigerant System Oil Charge Replenishing

If oil was removed from the A/C system during the recovery process or due to component replacement, the oil must be replenished. Oil can be injected into a charged system. For the proper quantities of oil to add to the A/C refrigerant system, refer to **Refrigerant System Specifications**.

FLUSHING

NOTE: This procedure is not used in Europe.

Special Tools

- **GE-8800** ACR 2000 Air Conditioning Service Center
- **GE-41447** Leak Detection Dye
- **GE-42220** Universal 12V Leak Detection Lamp
- **GE-45268** Flush Adapter Kit

For equivalent regional tools. Refer to **Special Tools**.

NOTE: Flushing with the GE-8800 ACR 2000 Air Conditioning Service Center is not intended to remove metal from the A/C system.

Flushing is intended to remove the following:

- Contaminated polyalkylene glycol (PAG) oil
- Desiccant, following a desiccant bag failure
- Overcharge of PAG oil
- Refrigerant contamination

NOTE: Warmer engine or ambient temperature decreases the refrigerant recovery time during the A/C flush procedure.

1. Recover the refrigerant. Refer to **Refrigerant Recovery and Recharging**.
2. Remove the thermal expansion valve (TXV). Refer to **Air Conditioning Evaporator Thermal Expansion Valve Replacement**.
3. Install the stud for the **GE-45268** Flush Adapter Kit onto the J 45268-115.
4. Install the J 45268-115 in place of the TXV.

CAUTION: Refer to **Fastener Caution** .

5. Install the TXV mounting bolts.

Tighten

Tighten the bolts to 7 N.m (62 lb in).

6. Connect the evaporator line to the J 45268-115.
7. Install the TXV block fitting nut.

Tighten

Tighten the bolts to 17 N.m (12.5 lb ft).

8. Remove the A/C compressor. Refer to **Air Conditioning Compressor Replacement (LUK)**, **Air Conditioning Compressor Replacement (LCV)**, **Air Conditioning Compressor Replacement (LTG)**.
9. Install J 45268-10 to the A/C compressor hose assembly.
10. Install the nut and bolt from the **J 45268** Flush Adapter Kit to the J 45268-10 and compressor hose assembly.

Tighten

Tighten the bolts to 17 N.m (12.5 lb ft).

11. Forward flow refrigerant flushing is recommended for contaminated refrigerant or PAG oil.

Perform the following procedure:

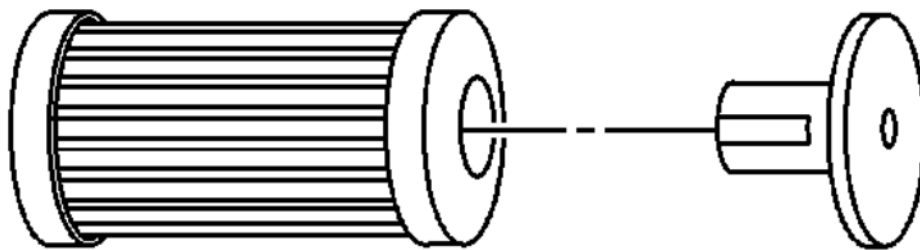


Fig. 1: View Of A/C Filter & Check Valve
Courtesy of GENERAL MOTORS COMPANY

NOTE: **The filter inside GE 45268-1 is serviceable. Remove and discard the check valve from the filter.**

1. Service the filter with ACDelco P/N GF 470, before each flush.
2. Install the port plugs GE 45268-9 onto the GE 45268-10.
3. Install the fitting GE 45268-7 onto the GE 45268-10.
4. Install the fitting GE 45268-8 onto the GE 45268-10.
5. Connect GE 45268-1 flush filter to the suction port of GE 45268-7 flush adapter.
6. Connect the blue hose from the **GE-8800** ACR 2000 Air Conditioning Service Center to the GE 45268-1 flush filter adapter.
7. Connect the red hose from the **GE-8800** ACR 2000 Air Conditioning Service Center to the GE 45268-8 flush adapter.
12. Reverse flow refrigerant flush is recommended for desiccant bag failure. Replace the A/C condenser when the A/C flush is complete and perform the following procedure:

NOTE: **The filter inside GE 45268-1 is serviceable. Remove and discard the check valve from the filter.**

1. Service the filter with ACDelco P/N GF 470, before each flush.
2. Install the port plugs GE 45268-9 onto the GE 45268-10.
3. Install the fitting GE 45268-7 onto the GE 45268-10.
4. Install the fitting GE 45268-8 onto the GE 45268-10.
5. Connect GE 45268-1 flush filter to the discharge port of GE 45268-7 flush adapter.
6. Connect the blue hose from **GE-8800** ACR 2000 Air Conditioning Service Center to the GE 45268-1 flush filter adapter.
7. Connect the red hose from **GE-8800** ACR 2000 Air Conditioning Service Center to the GE 45268-8 flush adapter.

NOTE: **Close the valve on the external refrigerant tank, before starting the flush process.**

13. Flush the A/C system. Follow the instructions supplied with the **GE-8800** ACR 2000 Air Conditioning Service Center.
14. Disconnect the red hose on the **GE-8800** ACR 2000 Air Conditioning Service Center from the GE 45268-10.
15. Disconnect the blue hose on the **GE-8800** ACR 2000 Air Conditioning Service Center from the GE 45268-1.
16. Remove GE 45268-1 from the GE 45268-10.
17. Remove the GE 45268-10 from the A/C compressor hose assembly.

NOTE: **The A/C system must be replenished with the correct amount of PAG oil.**

Flushing will remove all the PAG oil from the A/C system.

18. If you will reinstall the removed A/C compressor, perform the following procedure:
 1. Remove the A/C compressor drain plug.
 2. Drain the PAG oil from the A/C compressor. Rotate the compressor input shaft to assist in draining the PAG oil from the compressor.
 3. Install the A/C compressor drain plug.

Tighten

Tighten the drain plug to 16 N.m (12 lb ft).

4. Add the total system capacity of PAG oil to the A/C compressor. Refer to **Refrigerant System Specifications**.
19. If you will replace the A/C compressor after flushing the system, perform the following procedure:

1. Determine if the new service compressor is shipped with PAG oil. Refer to the **Refrigerant System Specifications**.
2. If the service compressor is shipped with PAG oil, DO NOT drain the new PAG oil from the compressor.
3. Deduct the amount of PAG oil shipped with the service compressor from the amount of PAG oil listed in the capacities table. Refer to **Refrigerant System Specifications**.
4. Add the calculated amount to the compressor, as needed.

NOTE: **Flushing will remove the fluorescent leak detection dye from the A/C system.**

20. Add one bottle of **GE-41447** Leak Detection Dye directly to the A/C Compressor.
21. Install the A/C compressor. Refer to **Air Conditioning Compressor Replacement (LUK)**, **Air Conditioning Compressor Replacement (LCV)**, **Air Conditioning Compressor Replacement (LTG)**.
22. Remove GE 45268-115.
23. Inspect the TXV for debris. Clean or replace as needed.
24. Install the TXV. Refer to **Air Conditioning Evaporator Thermal Expansion Valve Replacement**.
25. Evacuate and recharge the A/C system. Refer to **Refrigerant Recovery and Recharging**.
26. Leak test the fittings using **GE-42220** Universal 12V Leak Detection Lamp.

AIR CONDITIONING COMPRESSOR OIL BALANCING

Draining Procedure

NOTE: **Drain and measure as much of the refrigerant oil as possible from the rear head ports of the REMOVED compressor.**

1. Drain the refrigerant oil from the crankcase and rear head ports into a clean, graduated container.

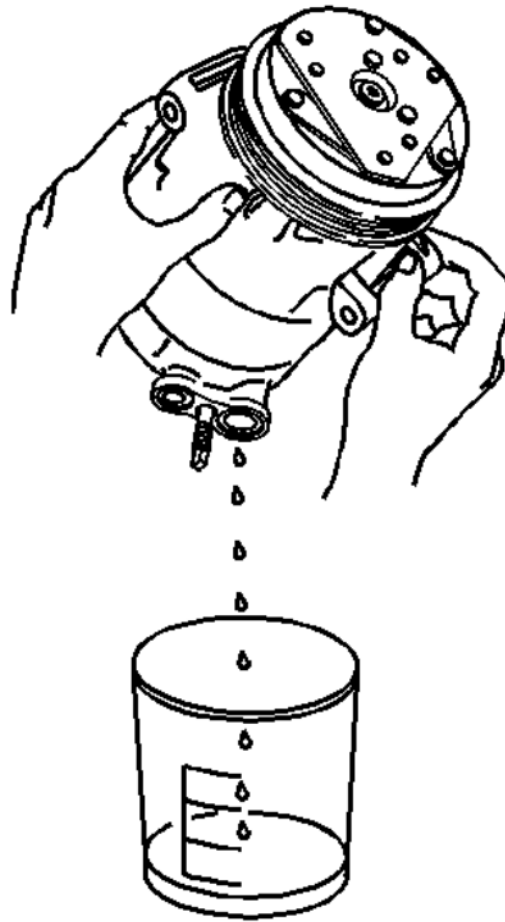


Fig. 2: Draining A/C Refrigerant Oil From Compressor
Courtesy of GENERAL MOTORS COMPANY

2. Rotate the compressor shaft to assist in draining the compressor.
3. Measure and record the amount of oil drained from the removed compressor.

This measurement will be used during installation of the replacement compressor.

4. Inspect oil drained from removed compressor. Refer to **Air Conditioning Compressor Oil Diagnosis**.
5. Properly discard the used refrigerant oil.
6. Clean the graduated cylinder.

NOTE: **Drain and measure as much of the refrigerant oil as possible from the rear head ports of the NEW compressor.**

7. Remove the drain bolt and drain the refrigerant oil from the crankcase and rear head ports into a clean, graduated container.
8. Rotate the compressor shaft to assist in draining the compressor.

Balancing Procedure

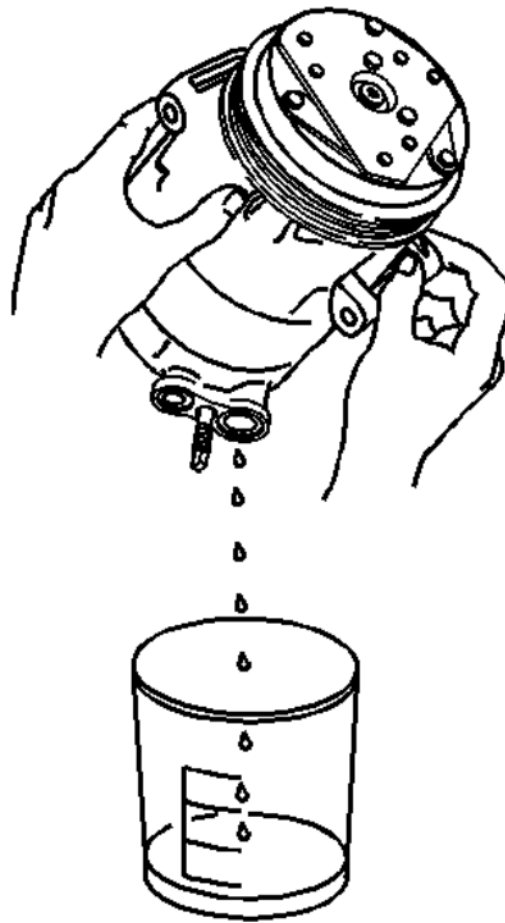


Fig. 3: Draining A/C Refrigerant Oil From Compressor
Courtesy of GENERAL MOTORS COMPANY

NOTE: The refrigerant oil in the A/C system must be balanced during compressor replacement.

The replacement compressor is shipped with a service charge of 74 ml (2.5 fl. oz) or 40 ml (1.4 fl. oz) of refrigerant oil.

1. Refer to the amount of refrigerant oil recorded during the compressor removal.
2. If the amount of oil recorded from the removed compressor is less than or equal to the service charge of oil in the new compressor, add back the full amount of the new PAG oil back into the new compressor through the compressor suction port.
3. If the amount of oil recorded from the removed compressor is greater than the service charge of oil in the new compressor, add back the full new PAG oil back into the new compressor and supplement with new PAG to the new compressor through the compressor suction port.

4. Rotate the clutch driver three times to lubricate the internal compressor components.

NOTE: If additional A/C components are replaced during compressor replacement, add the PAG oil directly to the A/C compressor to compensate the A/C system.

5. If necessary, refer to Refrigerant System Specifications.

AIR CONDITIONING COMPRESSOR REPLACEMENT (LUK)

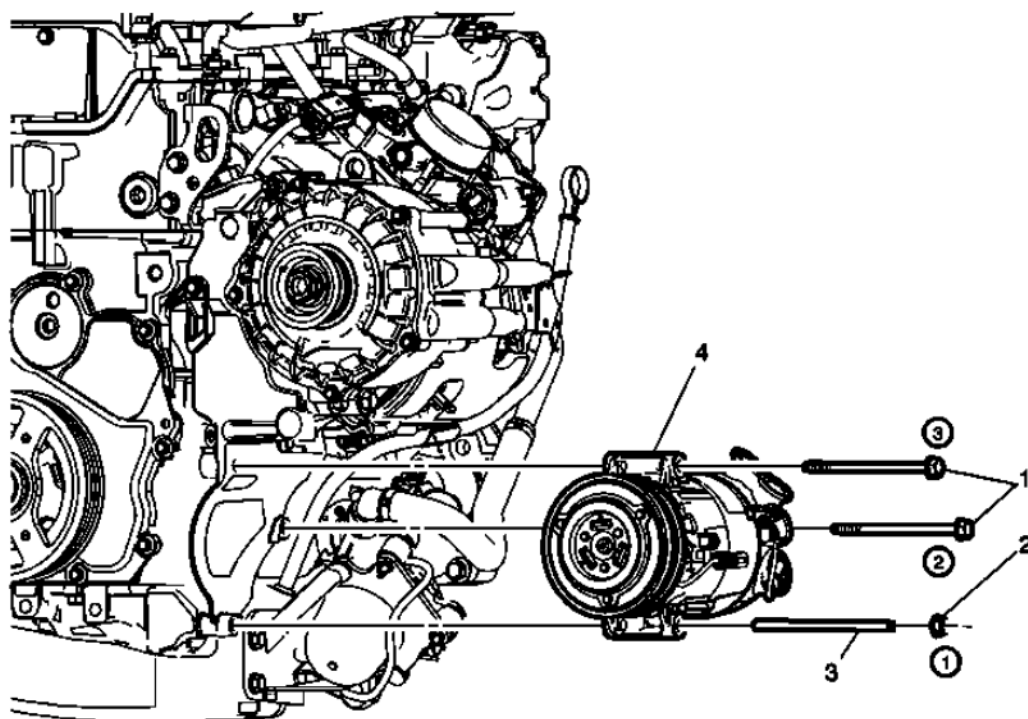


Fig. 4: Air Conditioning Compressor (LUK)
Courtesy of GENERAL MOTORS COMPANY

Air Conditioning Compressor Replacement (LUK)

Callout	Component Name
Preliminary Procedures	
1.	Recover the refrigerant. Refer to <u>Refrigerant Recovery and Recharging</u> .
2.	Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> .
3.	Remove the drive belt. Refer to <u>Drive Belt Replacement</u> .
4.	Disconnect the air conditioning (A/C) compressor electrical connector.
5.	Remove the air conditioning compressor and condenser hose from the compressor. Refer to <u>Air Conditioning Compressor and Condenser Hose Replacement</u> .
6.	Remove the lower drive belt tensioner bolt and loosen the upper bolt to pivot the belt tensioner out

of the way. Refer to **Drive Belt Tensioner Replacement** .

7. Remove the secondary air injection pump assembly, if equipped. Refer to **Secondary Air Injection Pump Replacement** .

1	A/C Compressor Bolt (Qty: 2) CAUTION: Refer to <u>Fastener Caution</u> . NOTE: Tighten the air conditioning compressor mounting fasteners in sequence. Tighten 22 (16 lb ft)
2	A/C Compressor Nut Tighten 22 (16 lb ft)
3	A/C Compressor Stud Tighten 9 (80 lb in)
4	A/C Compressor Procedure 1. Remove the air conditioning compressor assembly from the vehicle. 2. Remove and discard sealing washers, replace with NEW only. Refer to <u>Air Conditioning System Seal Replacement</u>. 3. When replacing the A/C compressor, balance the compressor oil. Refer to <u>Air Conditioning Compressor Oil Balancing</u>.

AIR CONDITIONING COMPRESSOR REPLACEMENT (LCV)

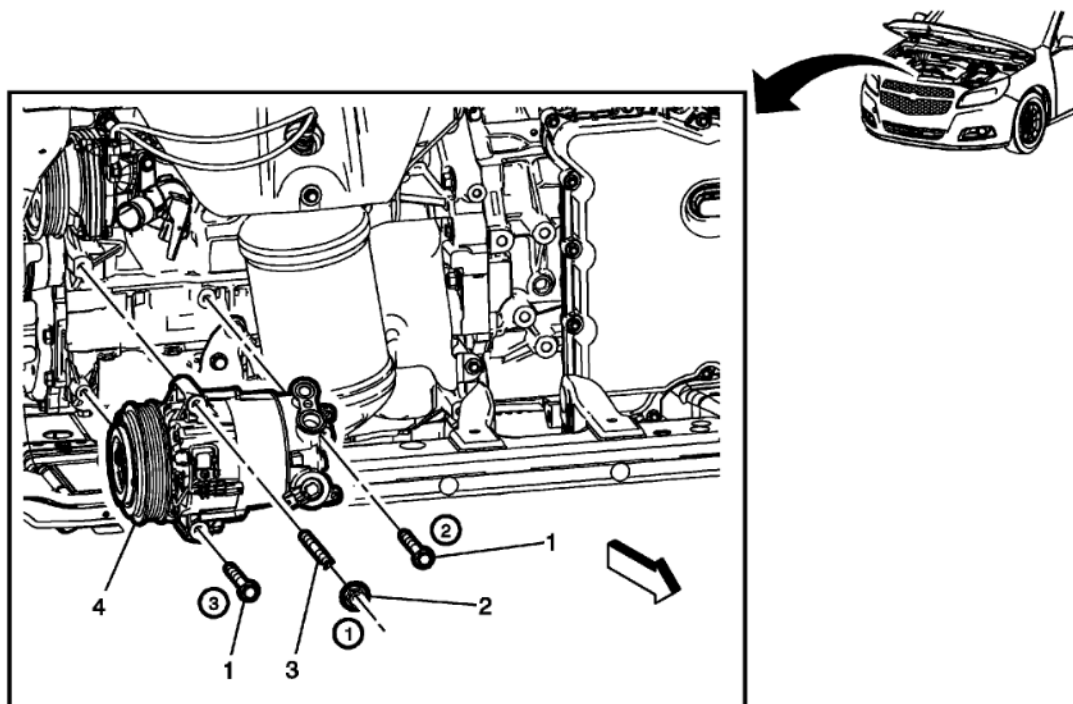


Fig. 5: Air Conditioning Compressor (LCV)
Courtesy of GENERAL MOTORS COMPANY

Air Conditioning Compressor Replacement (LCV)

Callout	Component Name
Preliminary Procedures	
1. Recover the refrigerant. Refer to <u>Refrigerant Recovery and Recharging</u>. 2. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u>. 3. Remove the drive belt. Refer to <u>Drive Belt Replacement</u>. 4. Disconnect the air conditioning compressor electrical connector. 5. Remove the air conditioning compressor and condenser hose from the compressor. Refer to <u>Air Conditioning Compressor and Condenser Hose Replacement</u>. 6. Remove the right front compartment splash shield. Refer to <u>Front Compartment Splash Shield Replacement</u>. 7. Remove the right front wheelhouse liner. Refer to <u>Front Wheelhouse Front Liner Replacement (Left Side)</u>, <u>Front Wheelhouse Front Liner Replacement (Right Side)</u>. 8. Remove the air conditioning compressor heat shield. Refer to <u>Air Conditioning Compressor Heat Shield Replacement (LCV)</u>.	
	Air Conditioning Compressor Bolt (Qty: 2) CAUTION: Refer to <u>Fastener Caution</u> .

1	NOTE: Tighten the air conditioning compressor mounting fasteners in sequence. Tighten 22 (16 lb ft)
2	Air Conditioning Compressor Nut Tighten 22 (16 lb ft)
3	Air Conditioning Compressor Stud Tighten 9 (80 lb in)
4	Air Conditioning Compressor Procedure 1. Remove and discard the old sealing washers and replace with NEW sealing washers. Refer to <u>Air Conditioning System Seal Replacement</u>. 2. When replacing the air conditioning compressor, balance the compressor oil. Refer to <u>Air Conditioning Compressor Oil Balancing</u>.

AIR CONDITIONING COMPRESSOR REPLACEMENT (LTG)

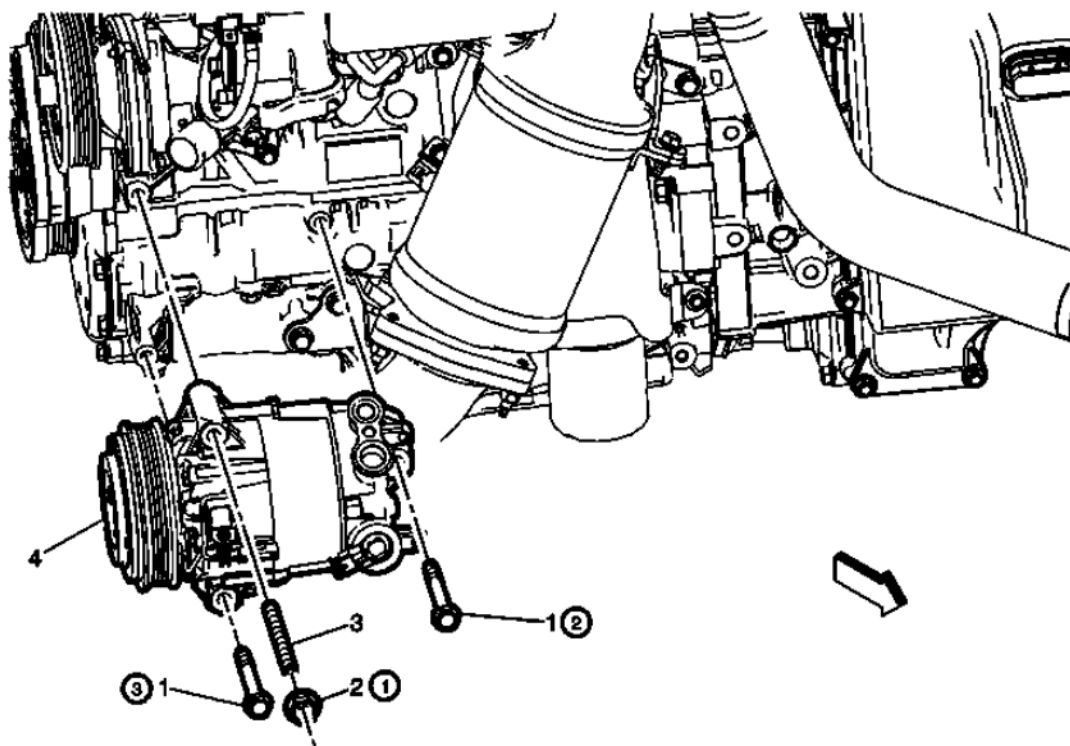


Fig. 6: Air Conditioning Compressor (LTG)
Courtesy of GENERAL MOTORS COMPANY

Air Conditioning Compressor Replacement (LTG)

Callout	Component Name
Preliminary Procedures	
1. Recover the refrigerant. Refer to <u>Refrigerant Recovery and Recharging</u>. 2. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u>. 3. Remove the drive belt. Refer to <u>Drive Belt Replacement</u>. 4. Remove the air conditioning compressor hose from the compressor. Refer to <u>Air Conditioning Compressor Hose Replacement (LTG)</u>. 5. Remove the right front compartment splash shield. Refer to <u>Front Compartment Splash Shield Replacement</u>. 6. Remove the right front wheelhouse liner. Refer to <u>Front Wheelhouse Front Liner Replacement (Left Side)</u>, <u>Front Wheelhouse Front Liner Replacement (Right Side)</u>. 7. Remove the air conditioning compressor heat shield. Refer to <u>Air Conditioning Compressor Heat Shield Replacement (LTG)</u>. 8. Disconnect the air conditioning compressor electrical connector.	
	Air Conditioning Compressor Bolt (Qty: 2) CAUTION: Refer to <u>Fastener Caution</u> .

1	NOTE: Tighten the air conditioning compressor mounting fasteners in sequence. Tighten 22 (12 lb ft)
2	Air Conditioning Compressor Nut Tighten 22 (12 lb ft)
3	Air Conditioning Compressor Stud Tighten 9 (80 lb in)
4	Air Conditioning Compressor Procedure 1. Remove and discard the old sealing washers and replace with NEW sealing washers. Refer to <u>Air Conditioning System Seal Replacement</u>. 2. When replacing the air conditioning compressor, balance the compressor oil. Refer to <u>Air Conditioning Compressor Oil Balancing</u>.

COMPRESSOR PRESSURE RELIEF VALVE REPLACEMENT

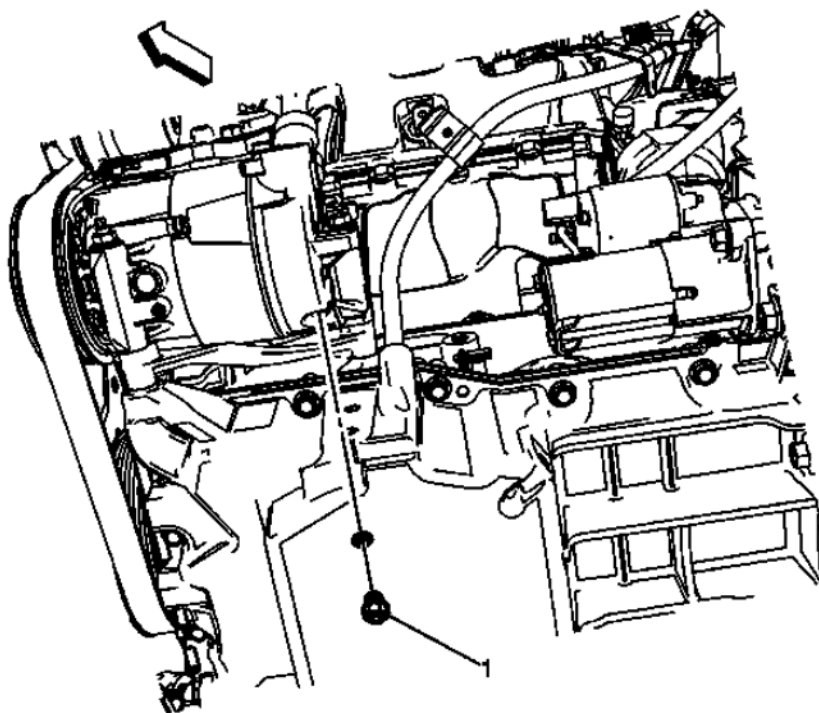


Fig. 7: Compressor Pressure Relief Valve
 Courtesy of GENERAL MOTORS COMPANY

Compressor Pressure Relief Valve Replacement

Callout	Component Name
Preliminary Procedures 1. Recover the refrigerant. Refer to <u>Refrigerant Recovery and Recharging</u>. 2. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u>.	
1	Compressor Pressure Relief Valve CAUTION: Refer to <u>Fastener Caution</u> . Procedure Remove and discard the sealing washer and replace with a NEW sealing washer. Refer to <u>Air Conditioning System Seal Replacement</u> . Tighten 8 (70 lb in)

AIR CONDITIONING COMPRESSOR HEAT SHIELD REPLACEMENT (LCV)

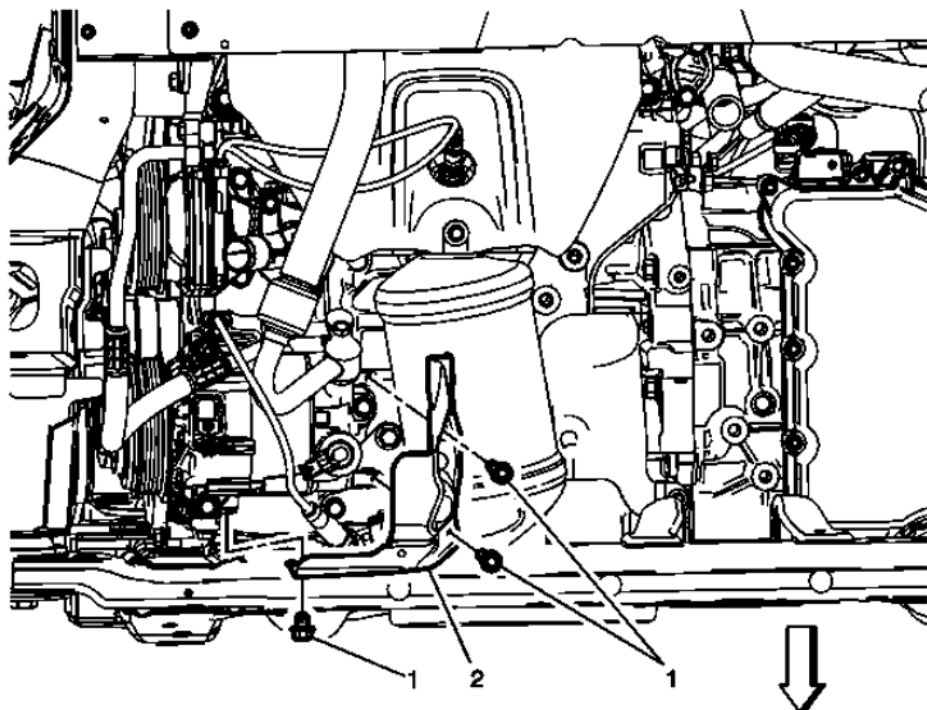


Fig. 8: Air Conditioning Compressor Heat Shield (LCV)

Courtesy of GENERAL MOTORS COMPANY

Air Conditioning Compressor Heat Shield Replacement (LCV)

Callout	Component Name
Preliminary Procedures 1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> . 2. Remove the right front compartment splash shield. Refer to <u>Front Compartment Splash Shield Replacement</u> .	
1	A/C Compressor Heat Shield Bolt (Qty: 3) CAUTION: Refer to <u>Fastener Caution</u> . Tighten 7.5 (66 lb in)
2	A/C Compressor Heat Shield

AIR CONDITIONING COMPRESSOR HEAT SHIELD REPLACEMENT (LTG)

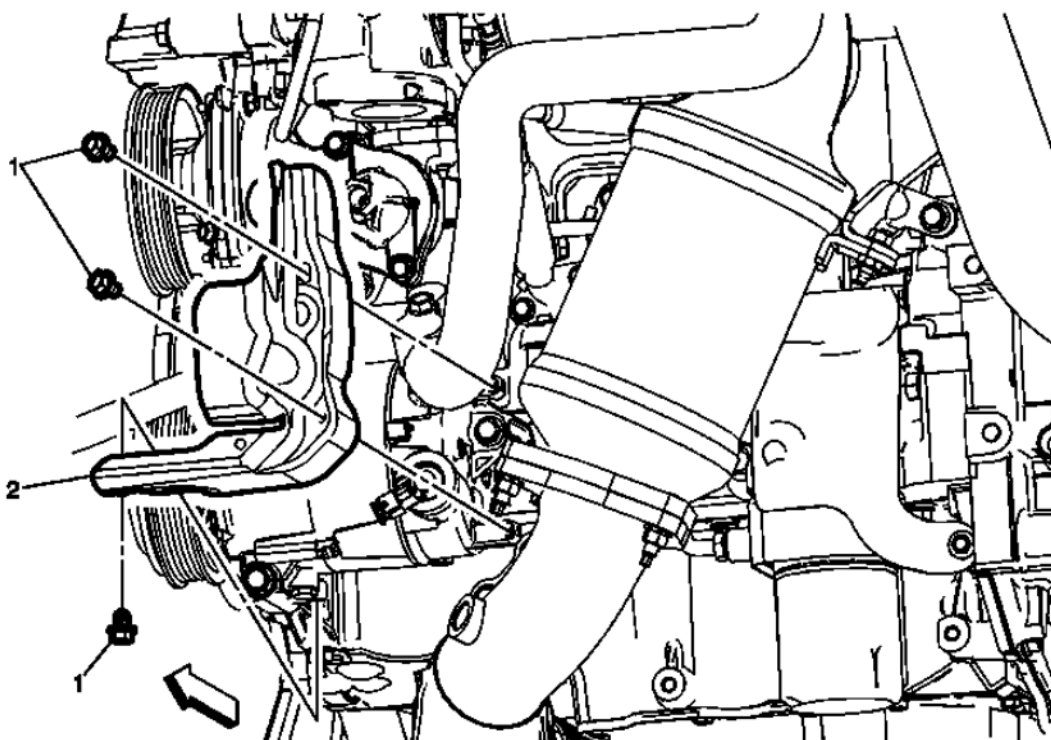


Fig. 9: Air Conditioning Compressor Heat Shield (LTG)

Courtesy of GENERAL MOTORS COMPANY

Air Conditioning Compressor Heat Shield Replacement (LTG)

Callout	Component Name
Preliminary Procedures Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> .	
1	A/C Compressor Heat Shield Bolt (Qty: 3) CAUTION: Refer to <u>Fastener Caution</u> . Tighten 7.5 (66 lb in)
2	A/C Compressor Heat Shield

AIR CONDITIONING SYSTEM SEAL REPLACEMENT

Removal Procedure

1. Disassemble the A/C refrigerant components. Refer to the appropriate repair procedure.

NOTE: Cap or tape the open A/C refrigerant components immediately to prevent system contamination.

2. Cap or tape the A/C refrigerant components.

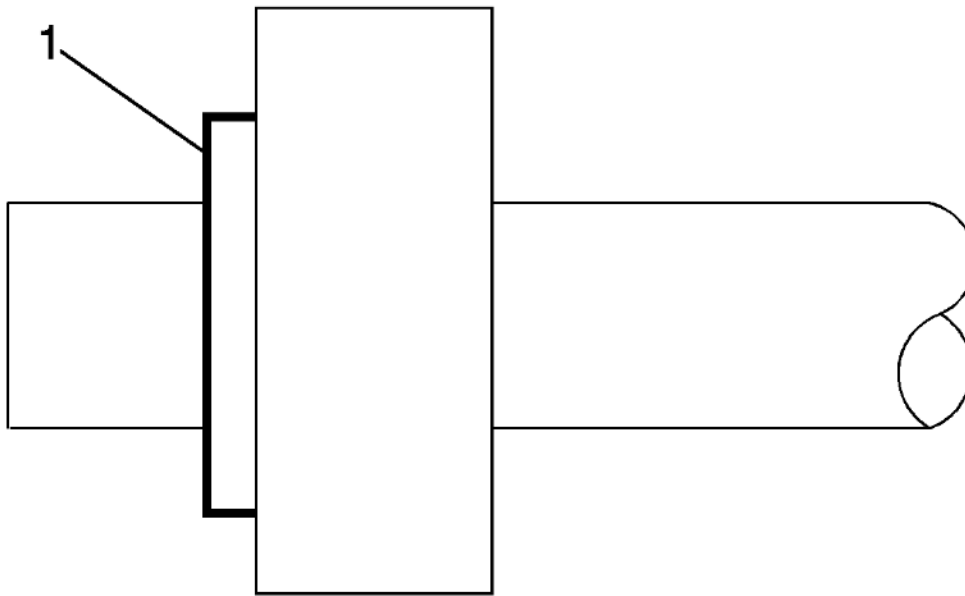


Fig. 10: Sealing Washer

Courtesy of GENERAL MOTORS COMPANY

3. Remove the sealing washer (1) from the A/C refrigerant component.
4. Inspect the seal washer for signs of damage to help determine the root cause of the failure.
5. Inspect the A/C refrigerant components for damage or burrs. Repair if necessary.

NOTE: DO NOT reuse sealing washer.

6. DISCARD the sealing washer.

Installation Procedure

NOTE: Flat washer type seals do not require lubrication.

1. Inspect the new sealing washer for any signs of cracks, cuts, or damage.

Do not use a damaged sealing washer.

2. Remove the cap or tape from the A/C refrigerant components.

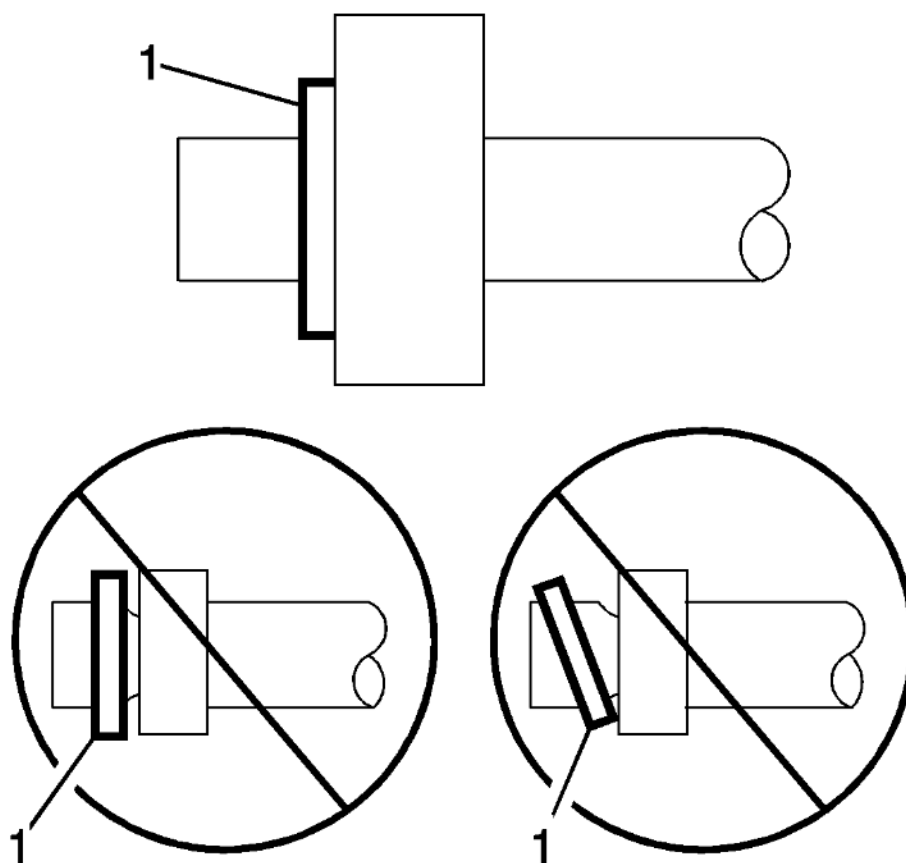


Fig. 11: Identifying Proper Seating Of A/C Refrigerant O-Ring
Courtesy of GENERAL MOTORS COMPANY

3. Using a lint-free clean, dry cloth, clean the sealing surfaces of the A/C refrigerant components.
4. Carefully install the NEW sealing washer (1) onto the A/C refrigerant component.

The sealing washer (1) must completely bottom against the surface of the fitting.

NOTE: After tightening the A/C components, there should be a slight sealing gap of approximately 1.2 mm (3/64 in) between the A/C line and the A/C component.

5. Assemble the remaining A/C refrigerant components. Refer to the appropriate repair procedure.

AIR CONDITIONING O-RING SEAL REPLACEMENT

Removal Procedure

1. Disassemble the A/C refrigerant components. Refer to the appropriate repair procedure

NOTE: Cap or tape the open A/C refrigerant components immediately to prevent system contamination.

2. Cap or tape the A/C refrigerant components.

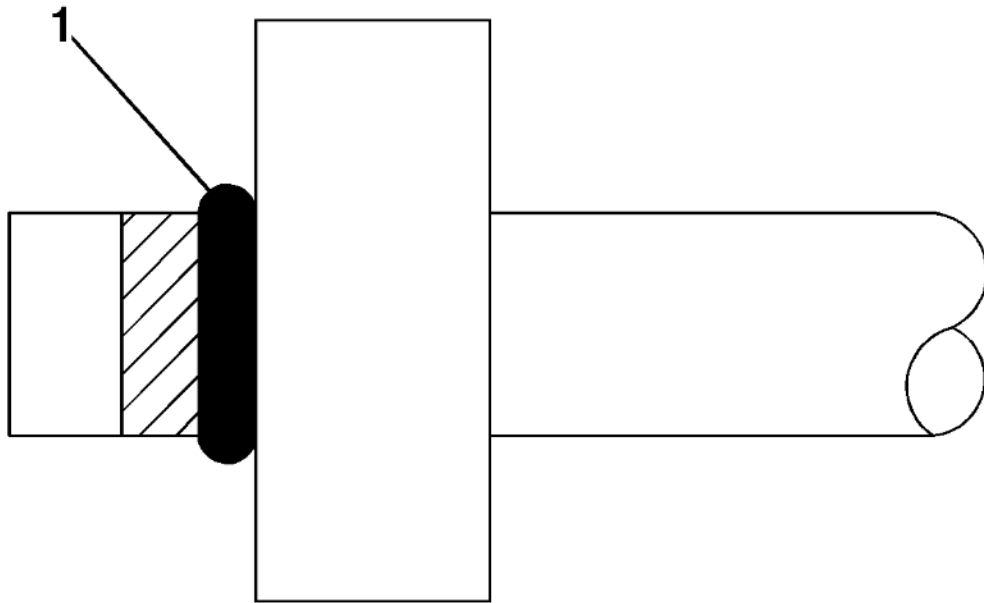


Fig. 12: O-ring seal

Courtesy of GENERAL MOTORS COMPANY

3. Remove the O-ring seal (1) from the A/C refrigerant component.
4. Inspect the O-ring seal for signs of damage to help determine the root cause of the failure.
5. Inspect the A/C refrigerant components for damage or burrs. Repair if necessary.
6. DISCARD the O-ring seal.

Installation Procedure

1. Inspect the new O-ring seal for any sign of cracks, cuts, or damage.
2. Remove the cap or tape from the A/C refrigerant components.
3. Using a lint-free clean, dry cloth, carefully clean the sealing surfaces of the A/C refrigerant components.

NOTE: **DO NOT allow any of the mineral base 525 viscosity refrigerant oil on the new O-ring seal to enter the refrigerant system.**

4. Lightly coat the new O-ring seal with mineral base 525 viscosity refrigerant oil.

NOTE: **DO NOT reuse O-ring seals.**

5. Carefully slide the NEW O-ring seal (1) onto the A/C refrigerant component.

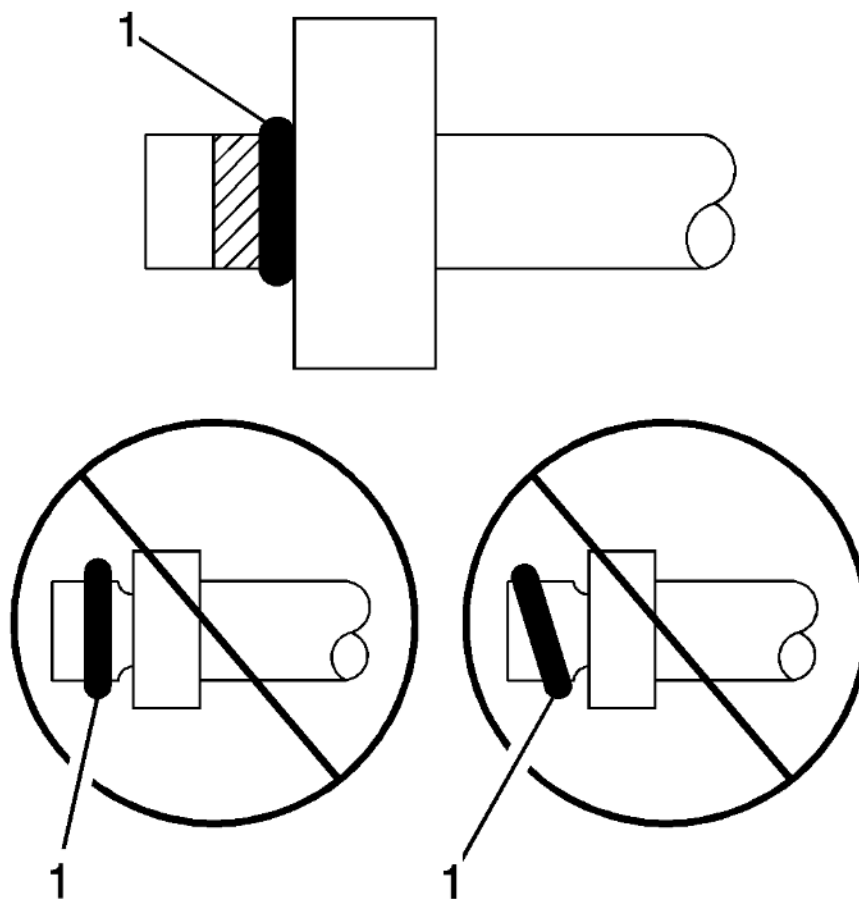


Fig. 13: Identifying Good & Bad Sealing Washer Positions
Courtesy of GENERAL MOTORS COMPANY

6. The O-ring seal (1) must be fully seated.
7. Assemble the A/C components.

Refer to the appropriate repair procedure.

AIR CONDITIONING COMPRESSOR HOSE REPLACEMENT (LCV)

Removal Procedure

1. Recover the refrigerant. Refer to Refrigerant Recovery and Recharging.
2. Remove the front bumper fascia assembly. Refer to Front Bumper Fascia Replacement.

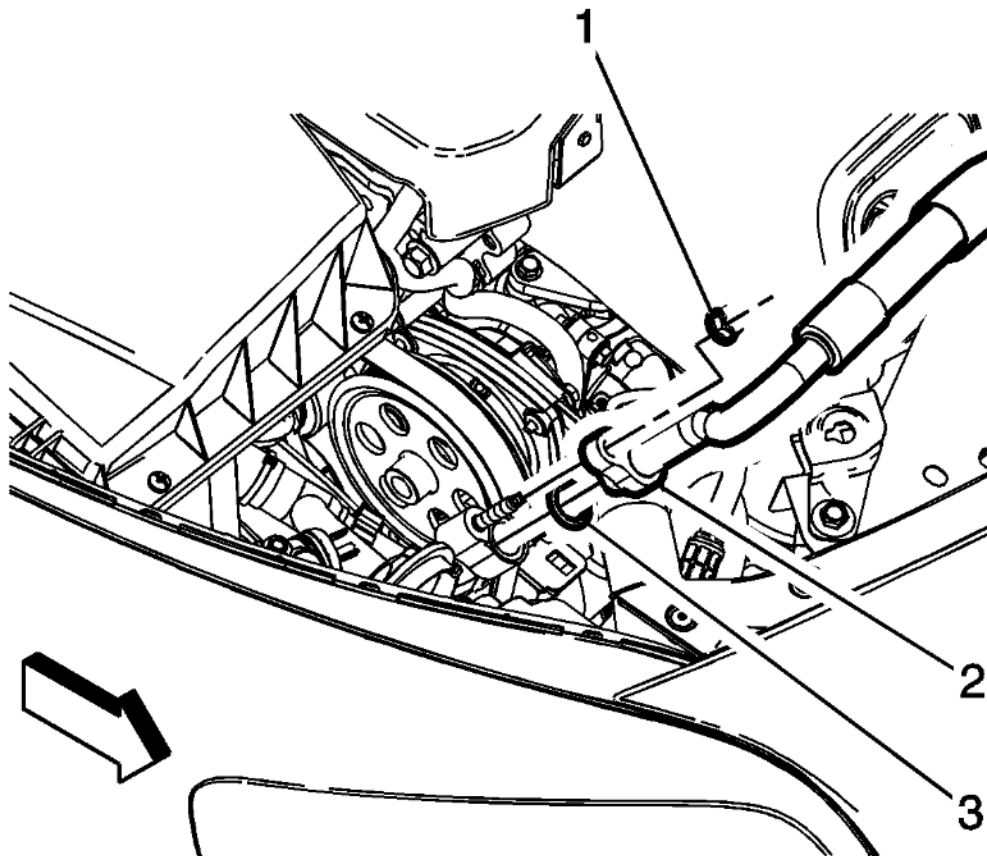


Fig. 14: Air Conditioning Compressor Hose Assembly Nut
Courtesy of GENERAL MOTORS COMPANY

3. Remove the air conditioning compressor hose assembly nut (1) from the evaporator hose assembly. Air Conditioning Compressor Hose Replacement (LCV).
4. Remove the air conditioning compressor hose assembly (2) from the evaporator hose assembly.

5. Remove and discard the old sealing washers (3) and replace with NEW sealing washers.

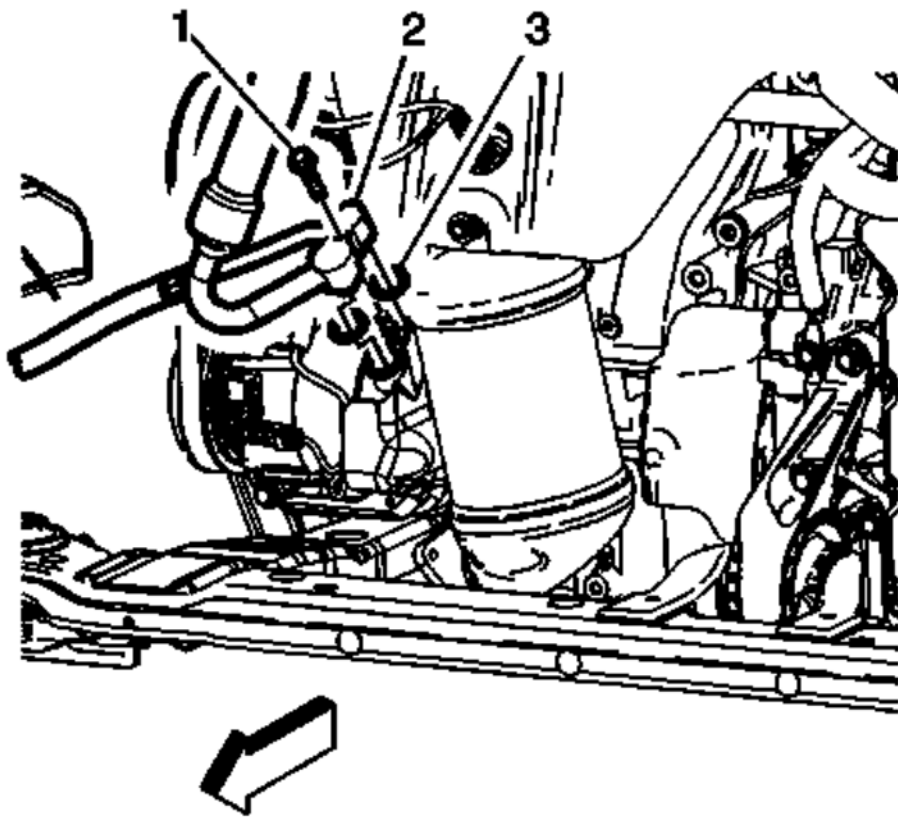


Fig. 15: Air Conditioning Compressor Hose Assembly Bolt
Courtesy of GENERAL MOTORS COMPANY

6. Remove air conditioning compressor hose assembly bolt (1) from the air conditioning compressor.
7. Remove air conditioning compressor hose assembly (2) from the air conditioning compressor.
8. Remove and discard the old sealing washers (3) and replace with NEW sealing washers.

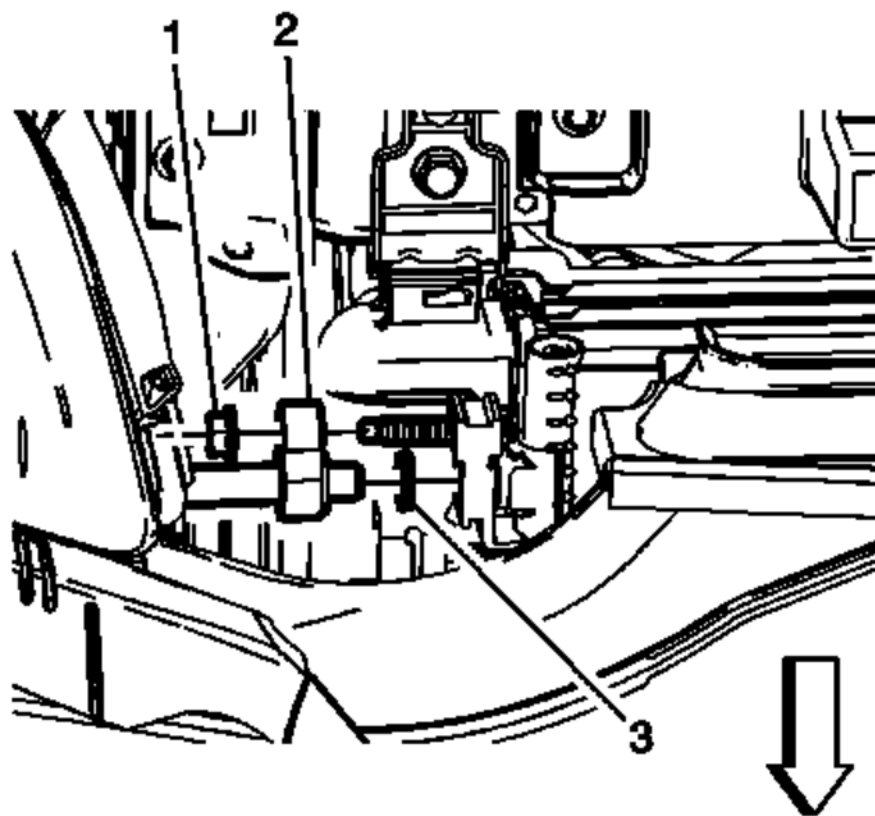


Fig. 16: Air Conditioning Compressor Hose Assembly Nut
Courtesy of GENERAL MOTORS COMPANY

9. Remove air conditioning compressor hose assembly nut (1) from the air conditioning condenser.
10. Remove air conditioning compressor hose assembly (2) from air conditioning condenser.
11. Remove and discard the old sealing washers (3) and replace with NEW sealing washers.

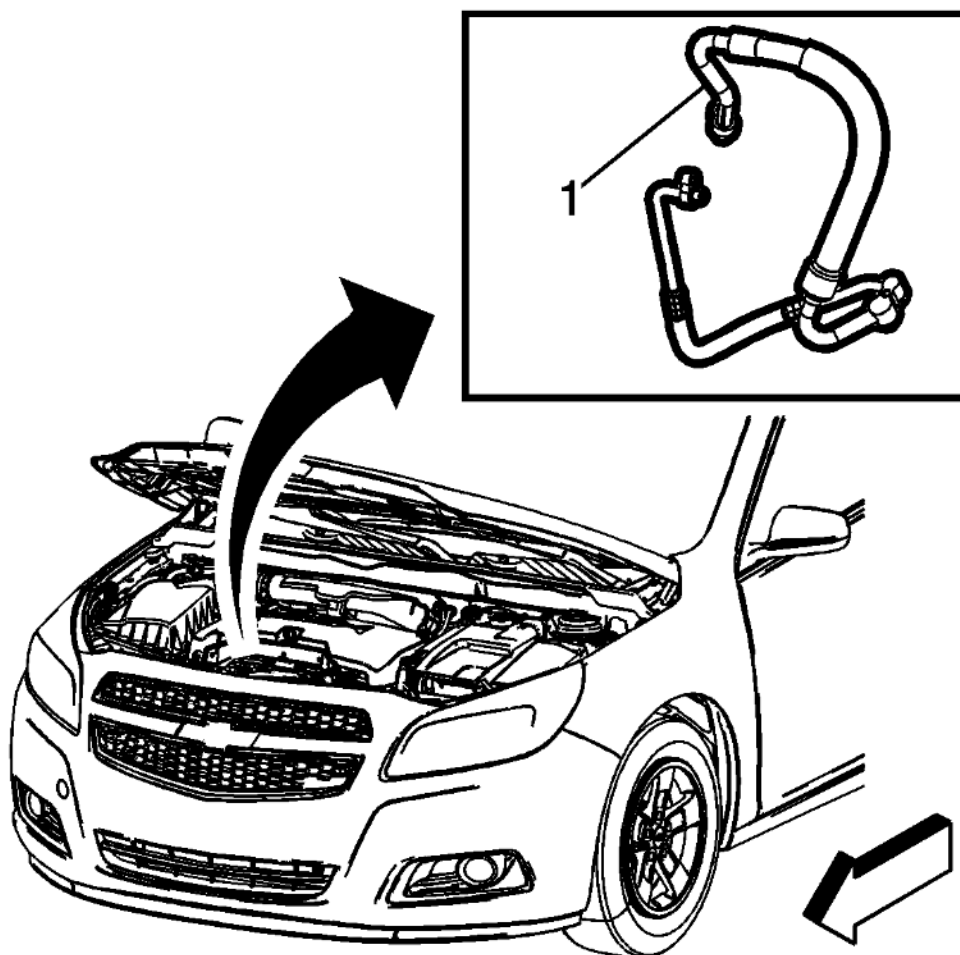


Fig. 17: Air Conditioning Compressor Hose Assembly
Courtesy of GENERAL MOTORS COMPANY

12. Remove air conditioning compressor hose assembly (1) from the vehicle.
13. Transfer all required parts

Installation Procedure

NOTE: Install NEW air conditioning sealing washers to the air conditioning compressor hose assembly. Refer to Air Conditioning System Seal Replacement.

1. Install air conditioning compressor hose assembly into the vehicle.

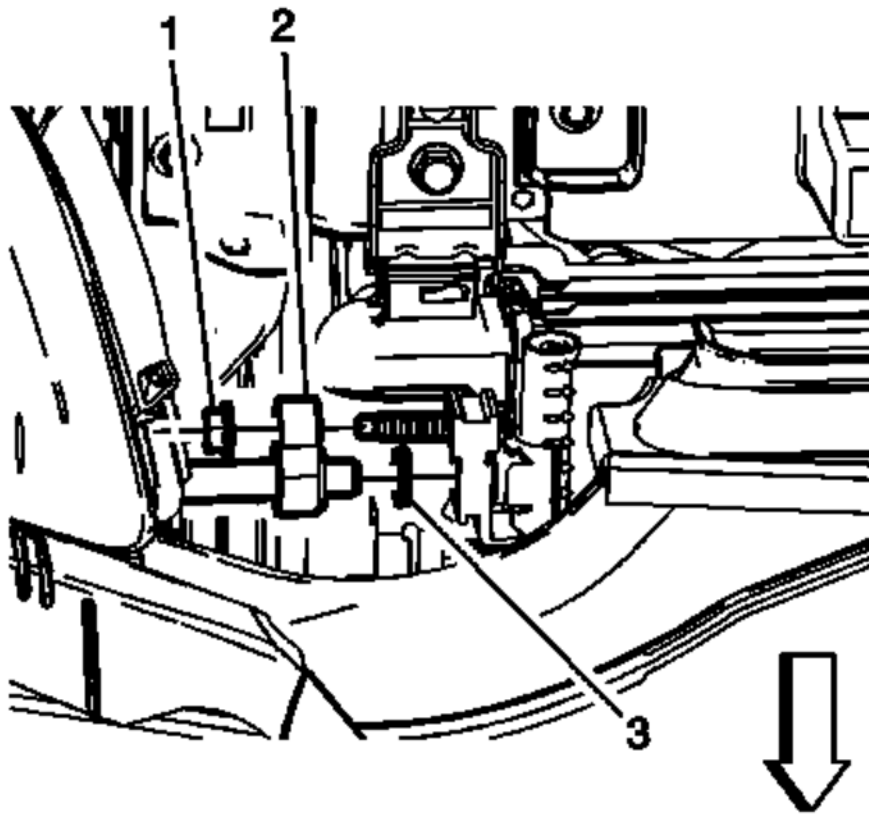


Fig. 18: Air Conditioning Compressor Hose Assembly Nut
Courtesy of GENERAL MOTORS COMPANY

2. Install NEW air conditioning sealing washer (3) to the air conditioning compressor hose assembly (2).
3. Install the air conditioning compressor hose assembly (2) to the air conditioning condenser assembly.

CAUTION: Refer to Fastener Caution .

4. Install the air conditioning compressor hose assembly nut (1) and tighten the nut to 22 N.m (16 lb ft).

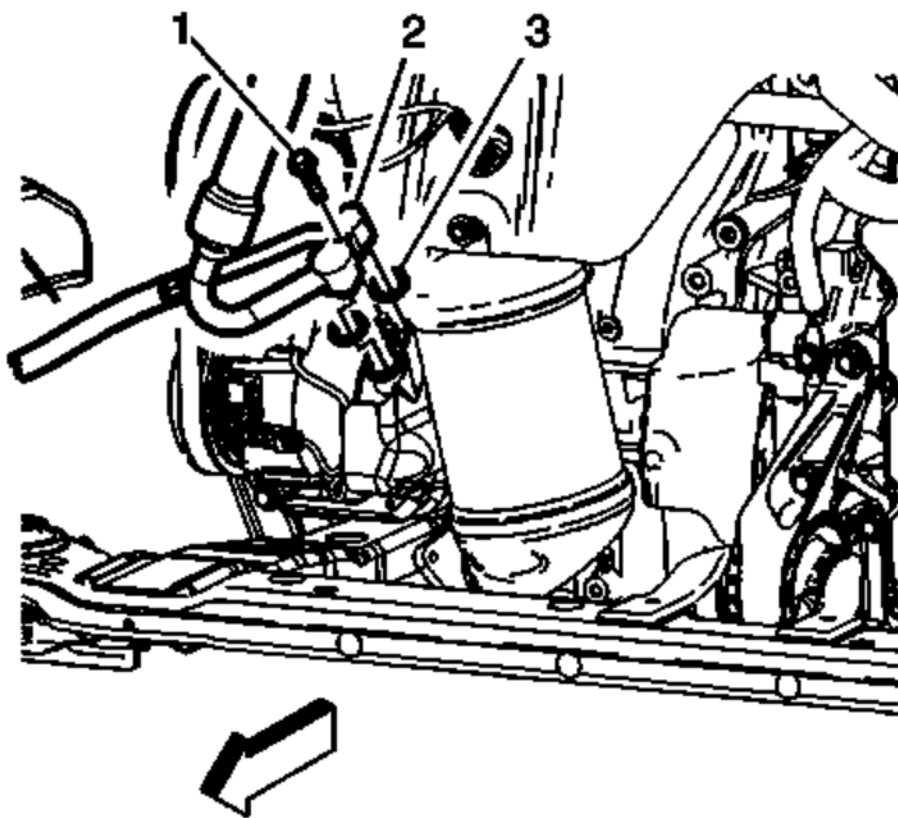


Fig. 19: Air Conditioning Compressor Hose Assembly Bolt
Courtesy of GENERAL MOTORS COMPANY

5. Install NEW air conditioning sealing washers (3) to the air conditioning compressor hose assembly.
6. Install the air conditioning compressor hose assembly (2) to the air conditioning compressor assembly.
7. Install the air conditioning compressor hose assembly bolt (1) and tighten the bolt to 22 N.m (16 lb ft).

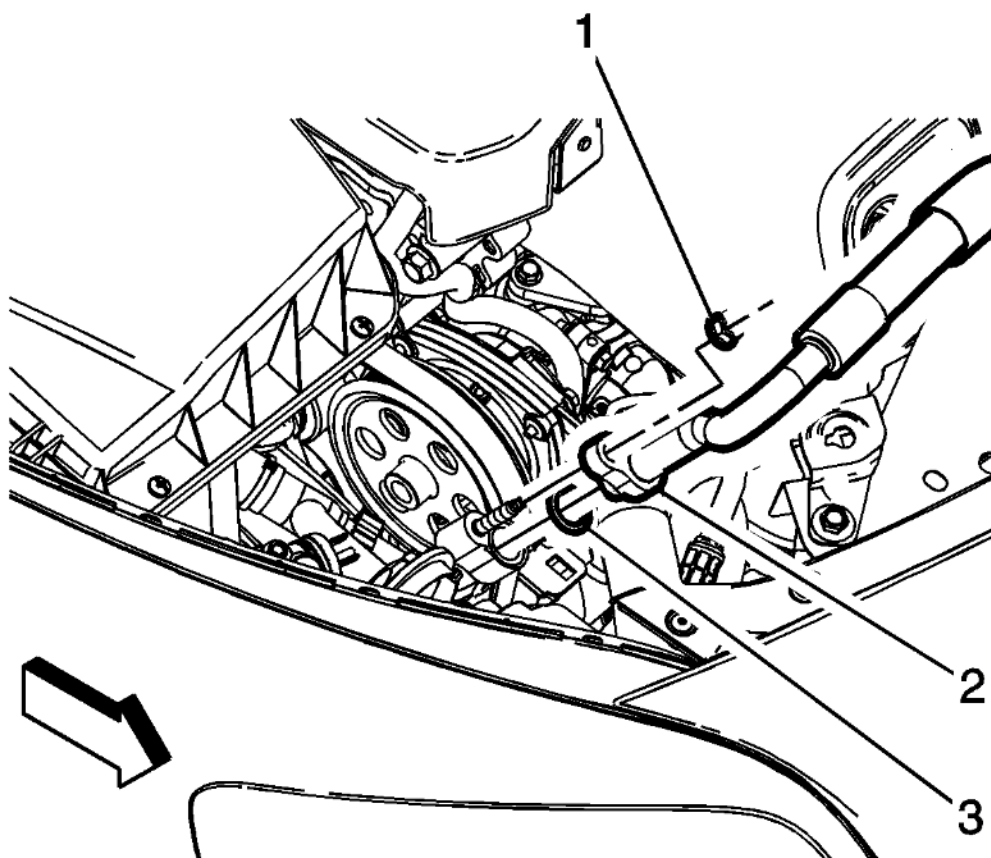


Fig. 20: Air Conditioning Compressor Hose Assembly Nut
 Courtesy of GENERAL MOTORS COMPANY

8. Install NEW air conditioning sealing washer (3) to the air conditioning compressor hose assembly (2).
9. Install the air conditioning compressor hose assembly (2) to the evaporator hose assembly.
10. Install the air compressor hose assembly nut (1) and tighten the nut to 22 N.m (16 lb ft).
11. Install the front bumper fascia assembly. Refer to **Front Bumper Fascia Replacement**.
12. Charge the refrigerant system. Refer to **Refrigerant Recovery and Recharging**.

AIR CONDITIONING COMPRESSOR HOSE REPLACEMENT (LTG)

Removal Procedure

1. Recover the refrigerant. Refer to **Refrigerant Recovery and Recharging**.
2. Remove the air cleaner outlet duct. Refer to **Air Cleaner Outlet Duct Replacement (LTG)**.
3. Remove the front bumper fascia assembly. Refer to **Front Bumper Fascia Replacement**.
4. Remove the charge air cooler inlet air tube. Refer to **Charge Air Cooler Inlet Air Tube Replacement**.

(LTG)

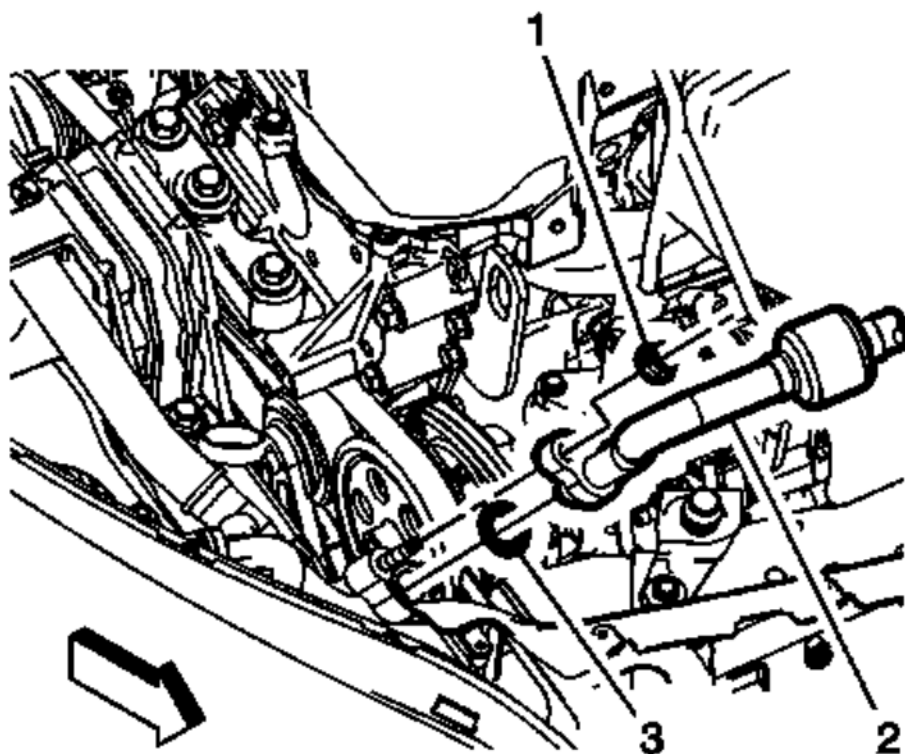


Fig. 21: Air Conditioning Compressor Hose Assembly
Courtesy of GENERAL MOTORS COMPANY

5. Remove the air conditioning compressor hose assembly nut (1) from the evaporator hose assembly. **Air Conditioning Compressor Hose Replacement (LTG)**.
6. Remove the air conditioning compressor hose assembly (2) from the evaporator hose assembly.
7. Remove and discard the old sealing washers (3).
8. Remove the front bumper fascia assembly. Refer to **Front Bumper Fascia Replacement**.

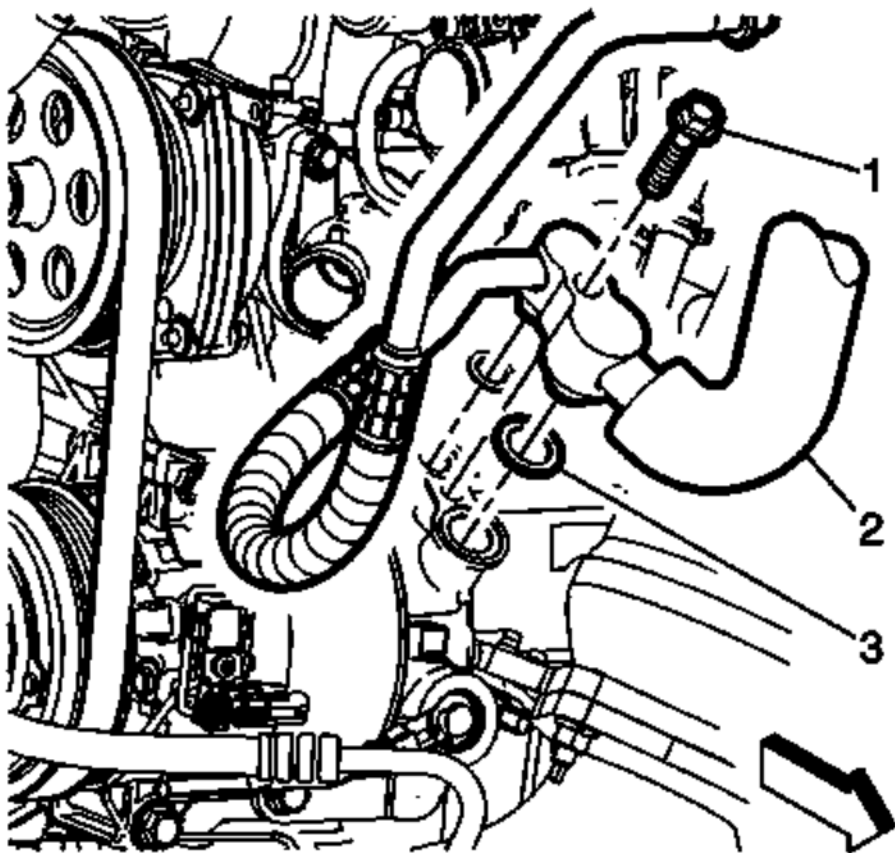


Fig. 22: Air Conditioning Compressor Hose Assembly Bolt
Courtesy of GENERAL MOTORS COMPANY

9. Remove air conditioning compressor hose assembly bolt (1) from the air conditioning compressor.
10. Remove air conditioning compressor hose assembly (2) from the air conditioning compressor.
11. Remove and discard the old sealing washers (3).

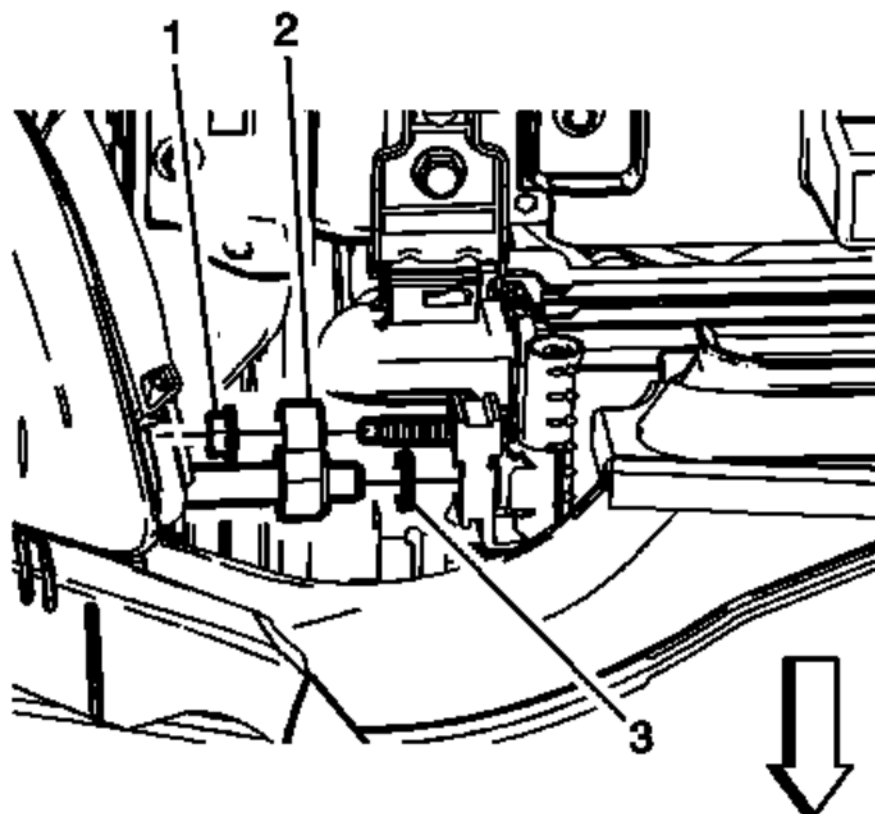


Fig. 23: Air Conditioning Compressor Hose Assembly Nut
Courtesy of GENERAL MOTORS COMPANY

12. Remove air conditioning compressor hose assembly nut (1) from the air conditioning condenser.
13. Remove air conditioning compressor hose assembly (2) from air conditioning condenser.
14. Remove and discard the old sealing washers (3).

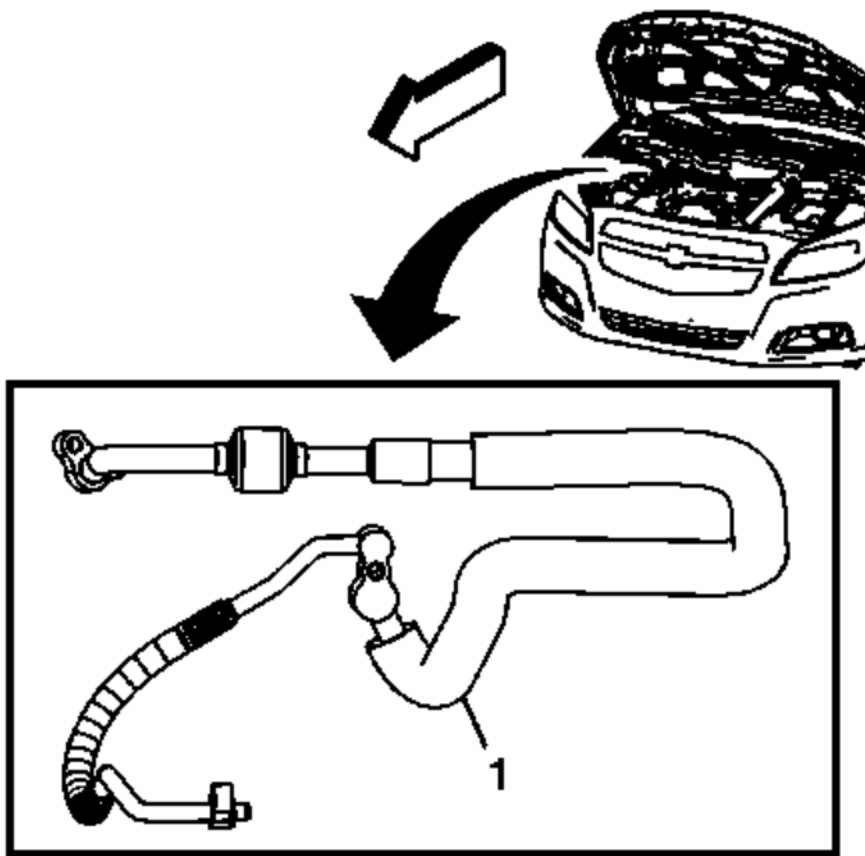


Fig. 24: Air Conditioning Compressor Hose Assembly
Courtesy of GENERAL MOTORS COMPANY

15. Remove air conditioning compressor hose assembly (1) from the vehicle.
16. Transfer all required parts

Installation Procedure

1. Install air conditioning compressor hose assembly into the vehicle.

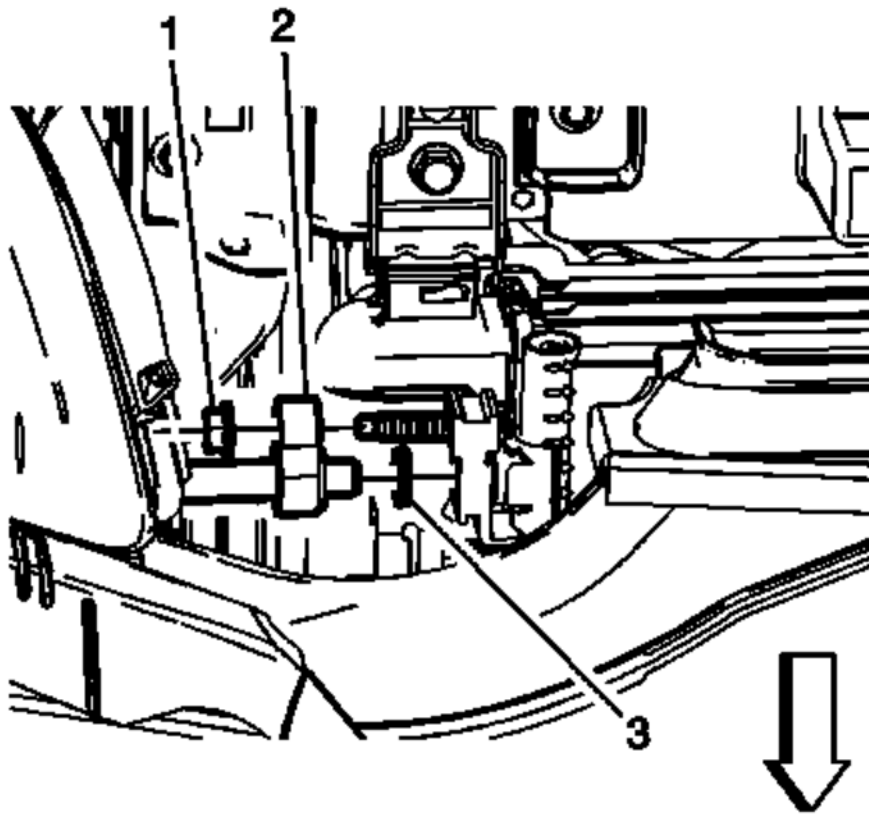


Fig. 25: Air Conditioning Compressor Hose Assembly Nut
Courtesy of GENERAL MOTORS COMPANY

2. Install NEW air conditioning sealing washer (3) to the air conditioning compressor hose assembly (2).
3. Install the air conditioning compressor hose assembly (2) to the air conditioning condenser assembly.

CAUTION: Refer to Fastener Caution .

4. Install the air conditioning compressor hose assembly nut (1) and tighten the nut to 22 N.m (16 lb ft).

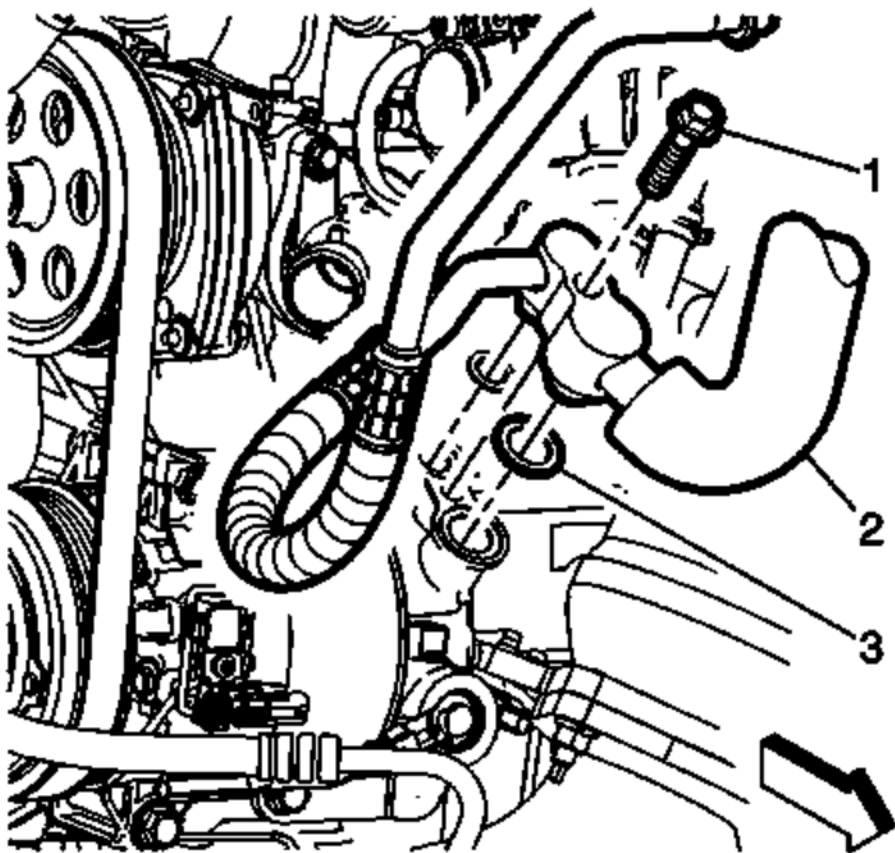


Fig. 26: Air Conditioning Compressor Hose Assembly Bolt
Courtesy of GENERAL MOTORS COMPANY

5. Install NEW air conditioning sealing washers (3) to the air conditioning compressor hose assembly.
6. Install the air conditioning compressor hose assembly (2) to the air conditioning compressor assembly.
7. Install the air conditioning compressor hose assembly bolt (1) and tighten the bolt to 22 N.m (16 lb ft).

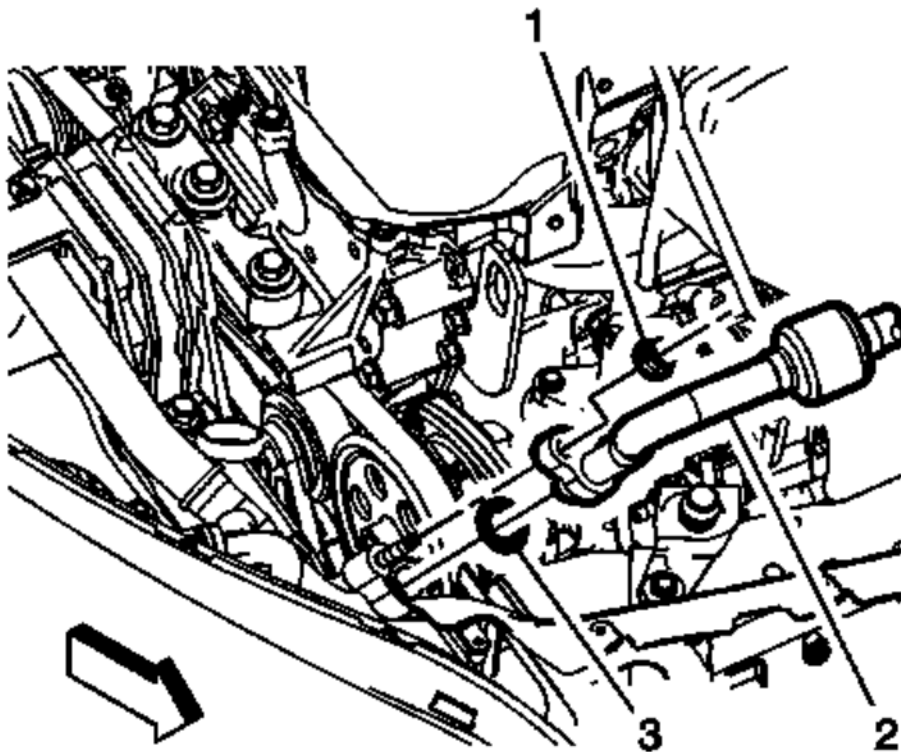


Fig. 27: Air Conditioning Compressor Hose Assembly
Courtesy of GENERAL MOTORS COMPANY

8. Install NEW air conditioning sealing washer (3) to the air conditioning compressor hose assembly (2).
9. Install the air conditioning compressor hose assembly (2) to the evaporator hose assembly.
10. Install the air compressor hose assembly nut (1) and tighten the nut to 22 N.m (16 lb ft).
11. Install the charge air cooler inlet air tube. Refer to **Charge Air Cooler Inlet Air Tube Replacement (LTG)**
12. Install the front bumper fascia assembly. Refer to **Front Bumper Fascia Replacement** .
13. Install the air cleaner outlet duct. Refer to **Air Cleaner Outlet Duct Replacement (LTG)** .
14. Evacuate and recharge the refrigerant system. Refer to **Refrigerant Recovery and Recharging**.

AIR CONDITIONING COMPRESSOR AND CONDENSER HOSE REPLACEMENT

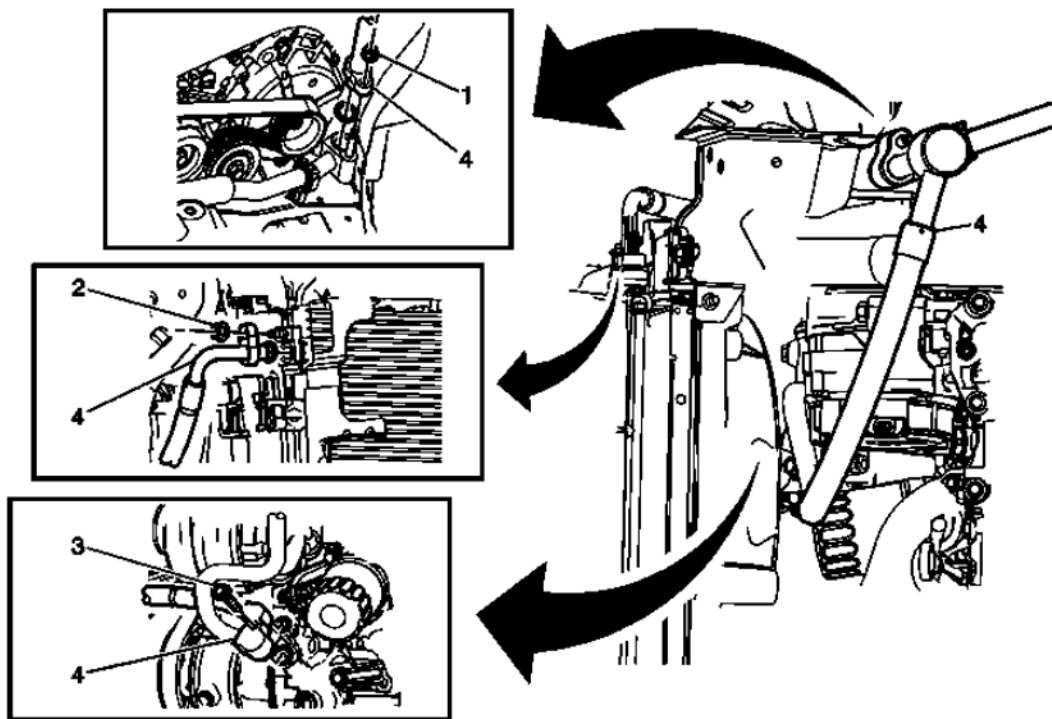


Fig. 28: Air Conditioning Compressor & Condenser Hose
 Courtesy of GENERAL MOTORS COMPANY

Air Conditioning Compressor and Condenser Hose Replacement

Callout	Component Name
Preliminary Procedures	
1. Disconnect the negative battery cable. Refer to <u>Battery Negative Cable Disconnection and Connection</u> . 2. Remove the air cleaner outlet duct assembly, if non-turbo equipped. Refer to <u>Air Cleaner Outlet Duct Replacement</u> . 3. Recover the refrigerant. Refer to <u>Refrigerant Recovery and Recharging</u> . 4. Remove the front bumper fascia assembly. Refer to <u>Front Bumper Fascia Replacement</u> .	
1	A/C Compressor and Condenser Hose Nut CAUTION: Refer to <u>Fastener Caution</u> . Procedure Remove and discard sealing washer. Refer to <u>Air Conditioning System Seal Replacement</u> . Tighten 20 N.m (15 lb ft)

2	A/C Compressor and Condenser Hose Nut Procedure Remove and discard sealing washer. Refer to <u>Air Conditioning System Seal Replacement.</u> Tighten 20 N.m (15 lb ft)
3	A/C Compressor and Condenser Hose Bolt Procedure Remove and discard sealing washer. Refer to <u>Air Conditioning System Seal Replacement.</u> Tighten 20 N.m (15 lb ft)
4	A/C Compressor and Condenser Hose

AIR CONDITIONING EVAPORATOR HOSE ASSEMBLY REPLACEMENT (LCV)

Removal Procedure

1. Remove the air cleaner assembly. Refer to **Air Cleaner Assembly Replacement (LCV)** .
2. Remove the air cleaner outlet duct. Refer to **Air Cleaner Outlet Duct Replacement (LCV)** .
3. Remove the air cleaner resonator and outlet duct. Refer to **Air Cleaner Resonator and Outlet Duct Replacement (LCV)** .
4. Recover the refrigerant from the air conditioning system. Refer to **Refrigerant Recovery and Recharging.**
5. Remove the right engine mount. Refer to **Engine Mount Replacement (LCV)** .
6. Remove the front bumper fascia assembly. Refer to **Front Bumper Fascia Replacement** .
7. Remove the air conditioning compressor hose assembly from the evaporator hose assembly and reposition out of the way. Refer to **Air Conditioning Compressor Hose Replacement (LCV).**

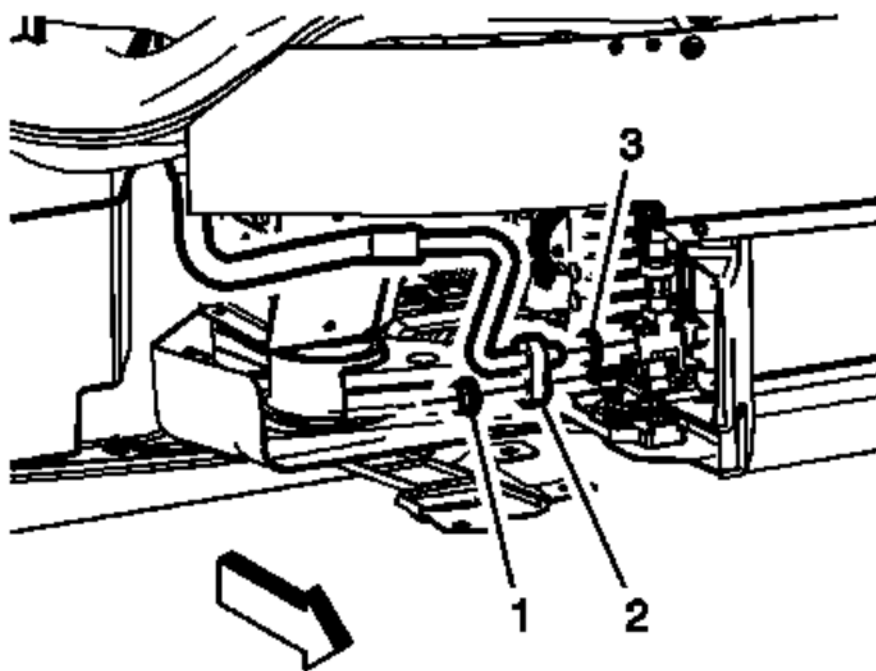


Fig. 29: Conditioning Evaporator Hose Assembly
Courtesy of GENERAL MOTORS COMPANY

8. Remove the air conditioning evaporator hose assembly nut (1) at condenser.
9. Remove the air conditioning evaporator hose assembly (2) from condenser.
10. Remove and discard the old sealing washers (3) and replace with NEW sealing washers.

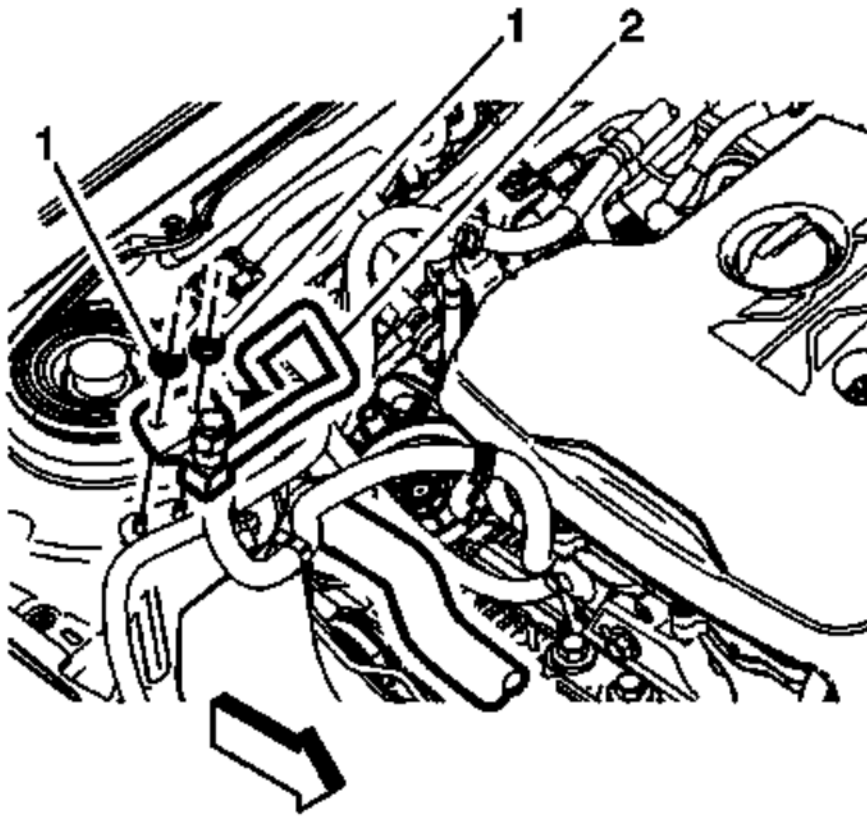


Fig. 30: Air Conditioning Evaporator Hose Assembly And Retaining Fasteners
Courtesy of GENERAL MOTORS COMPANY

11. Remove the air conditioning evaporator hose assembly retaining fasteners (1) from the front suspension strut housing.
12. Remove the air conditioning evaporator hose assembly (2) from the front suspension strut housing.

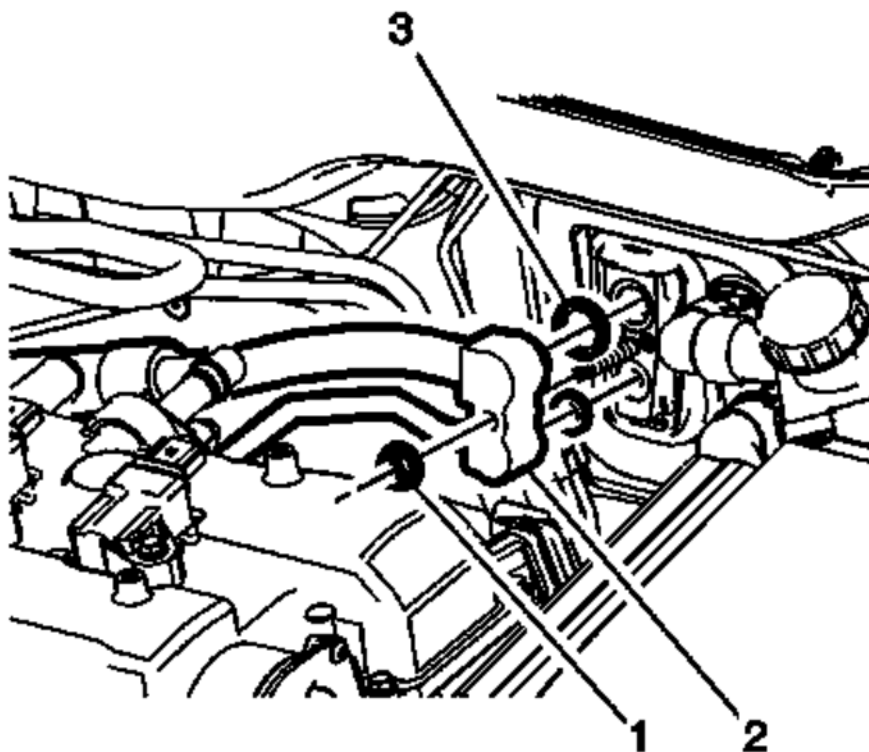


Fig. 31: Air Conditioning Evaporator Hose Assembly Nut
Courtesy of GENERAL MOTORS COMPANY

13. Remove the air conditioning evaporator hose assembly nut (1) at thermal expansion valve.
14. Remove the air conditioning evaporator hose assembly (2) from thermal expansion valve.
15. Remove and discard the old sealing washers (3) and replace with NEW sealing washers.
16. Remove the air conditioning evaporator hose from the retainers.

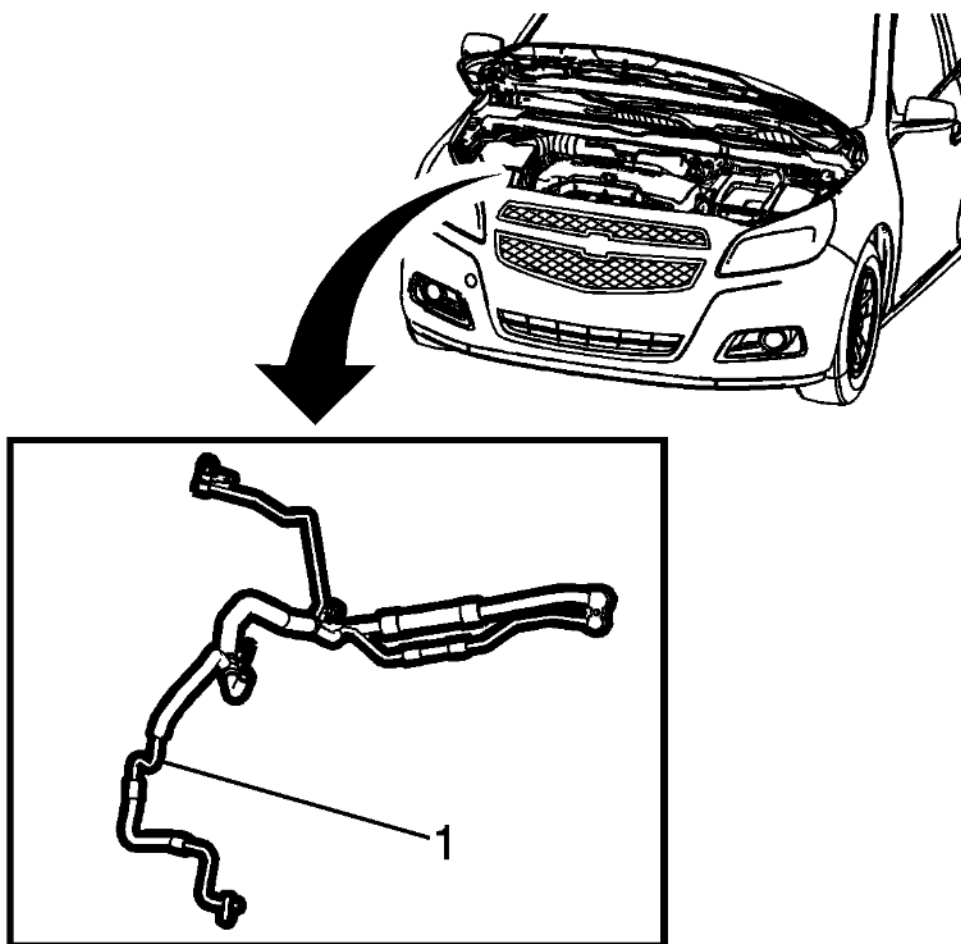


Fig. 32: Air Conditioning Evaporator Hose Assembly
Courtesy of GENERAL MOTORS COMPANY

17. Remove the air conditioning evaporator hose assembly (1) from vehicle.

Installation Procedure

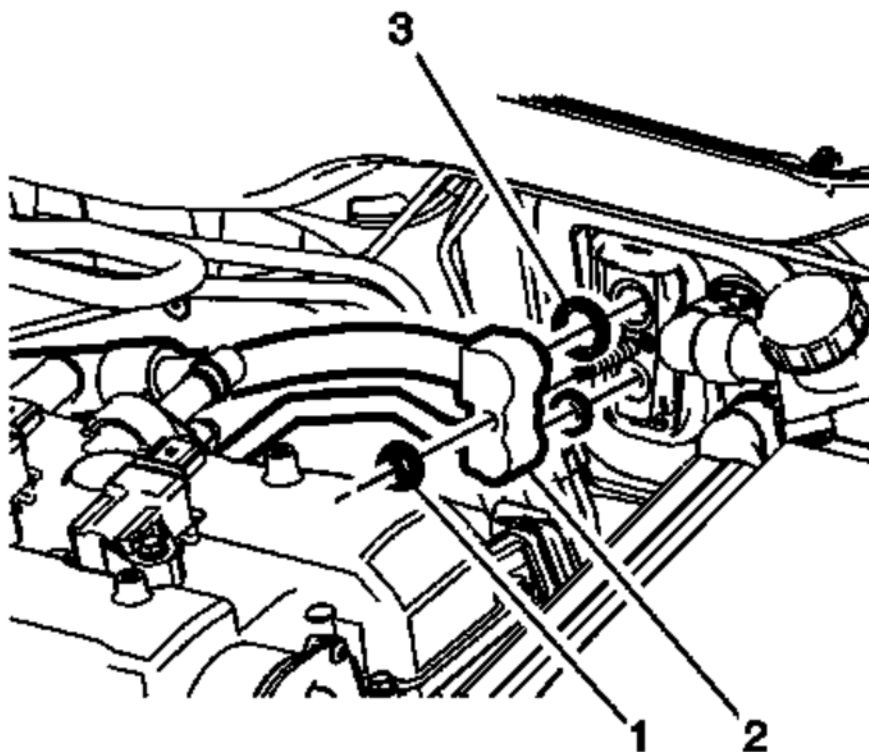


Fig. 33: Air Conditioning Evaporator Hose Assembly Nut
Courtesy of GENERAL MOTORS COMPANY

1. Install NEW sealing washers (3) to the air conditioning evaporator hose assembly (2). Refer to **Air Conditioning System Seal Replacement**.
2. Install the air conditioning evaporator hose assembly (2) to the vehicle.
3. Install the air conditioning evaporator hose (2) to the retainers.
4. Install the air conditioning evaporator hose assembly (2) to the thermal expansion valve.

CAUTION: Refer to Fastener Caution .

5. Install the air conditioning evaporator hose assembly nut (1) at thermal expansion valve and tighten to 22 N.m (16 lb ft).

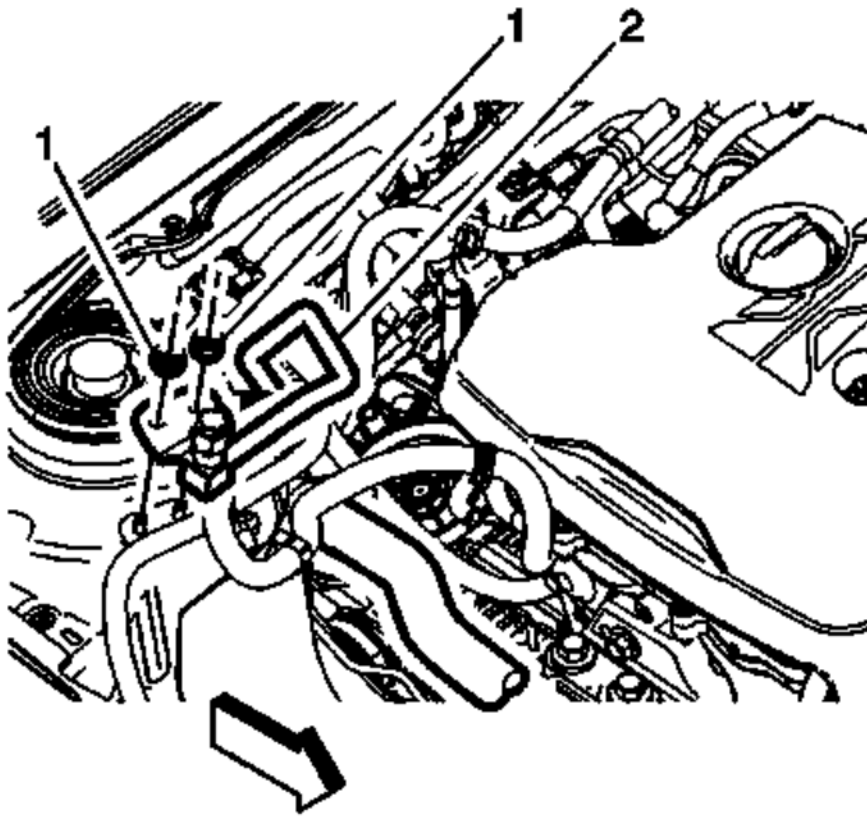


Fig. 34: Air Conditioning Evaporator Hose Assembly And Retaining Fasteners
Courtesy of GENERAL MOTORS COMPANY

6. Install the air conditioning evaporator hose assembly (2) to the front suspension strut housing.
7. Install the air conditioning compressor hose retaining fasteners (1) to the front suspension strut housing and tighten to 9 (80 lb in).

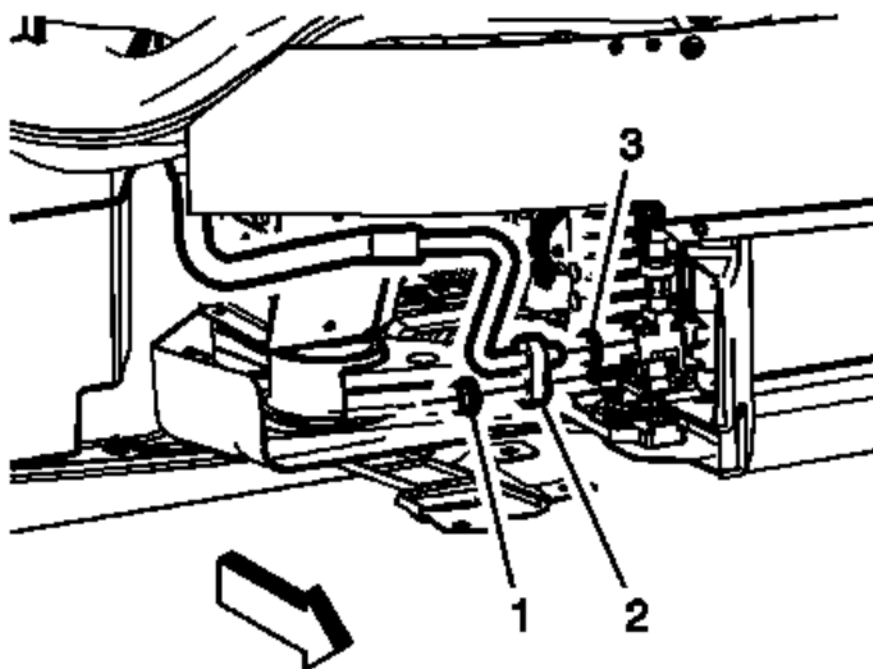


Fig. 35: Conditioning Evaporator Hose Assembly
 Courtesy of GENERAL MOTORS COMPANY

8. Install NEW sealing washers (3) to the air conditioning evaporator hose assembly (2). Refer to **Air Conditioning System Seal Replacement**.
9. Install the air conditioning evaporator hose assembly (2) to the condenser.
10. Install the air conditioning evaporator hose assembly nut (1) at condenser and tighten to 22 N.m (16 lb ft).
11. Install the air conditioning compressor hose assembly to the evaporator hose assembly. Refer to **Air Conditioning Compressor Hose Replacement (LCV)**.
12. Install the front bumper fascia assembly. Refer to **Front Bumper Fascia Replacement** .
13. Install the right engine mount. Refer to **Engine Mount Replacement (LCV)** .
14. Install the air cleaner resonator and outlet duct. Refer to **Air Cleaner Resonator and Outlet Duct Replacement (LCV)** .
15. Install the air cleaner outlet duct. Refer to **Air Cleaner Outlet Duct Replacement (LCV)** .
16. Install the air cleaner assembly. Refer to **Air Cleaner Assembly Replacement (LCV)** .
17. Evacuate and charge the air conditioning system. Refer to **Refrigerant Recovery and Recharging**.

AIR CONDITIONING EVAPORATOR HOSE ASSEMBLY REPLACEMENT (LTG)

Removal Procedure

1. Remove the air cleaner assembly. Refer to [Air Cleaner Assembly Replacement \(LTG\)](#) .
2. Remove the air cleaner outlet duct. Refer to [Air Cleaner Outlet Duct Replacement \(LTG\)](#) .
3. Recover the refrigerant from the air conditioning system. Refer to [Refrigerant Recovery and Recharging](#).
4. Remove the right engine mount. Refer to [Engine Mount Replacement \(LTG\)](#) .
5. Remove the front bumper fascia assembly. Refer to [Front Bumper Fascia Replacement](#) .

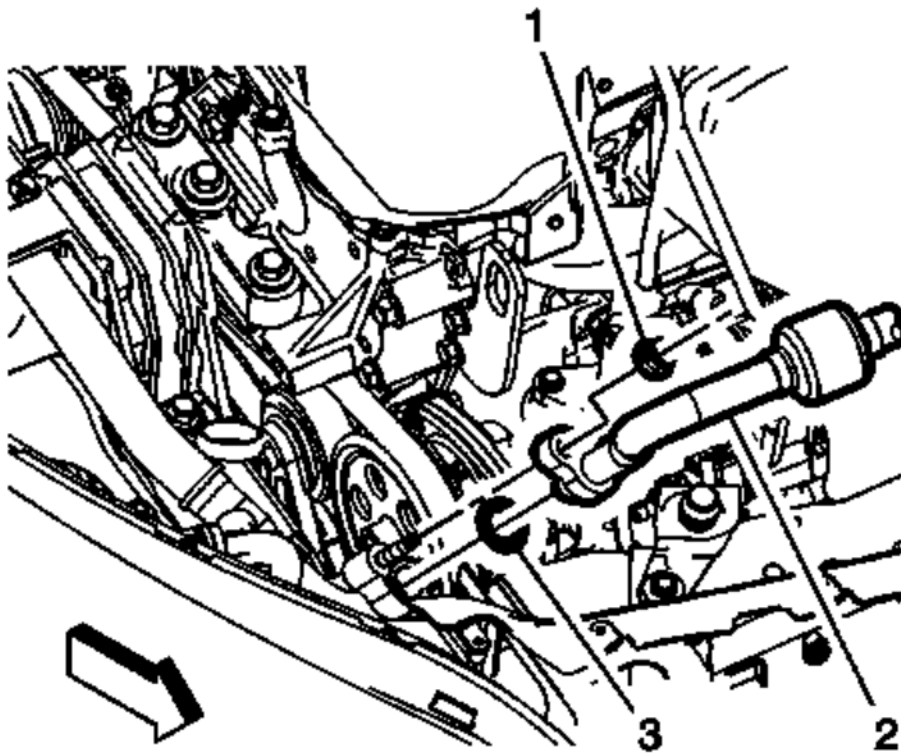


Fig. 36: Air Conditioning Compressor Hose Assembly
Courtesy of GENERAL MOTORS COMPANY

6. Remove the air conditioning compressor hose assembly nut (1) from the evaporator hose assembly (2).
7. Remove the air conditioning compressor hose assembly (2) from the evaporator hose assembly and reposition out of the way.
8. Remove and discard the old sealing washers (3) and replace with NEW sealing washers.

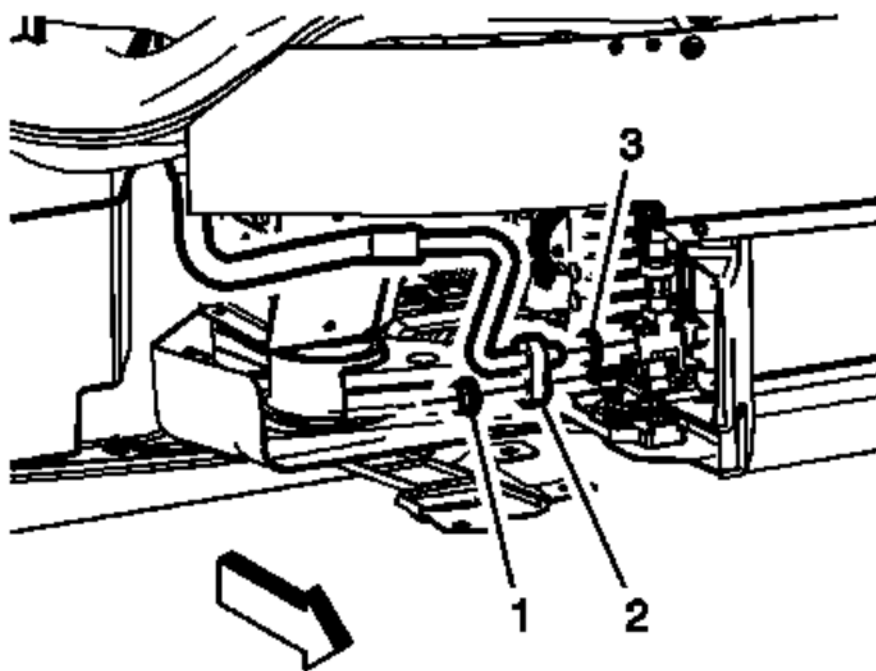


Fig. 37: Conditioning Evaporator Hose Assembly
Courtesy of GENERAL MOTORS COMPANY

9. Remove the air conditioning evaporator hose assembly nut (1) at condenser.
10. Remove the air conditioning evaporator hose assembly (2) from condenser.
11. Remove and discard the old sealing washers (3) and replace with NEW sealing washers.

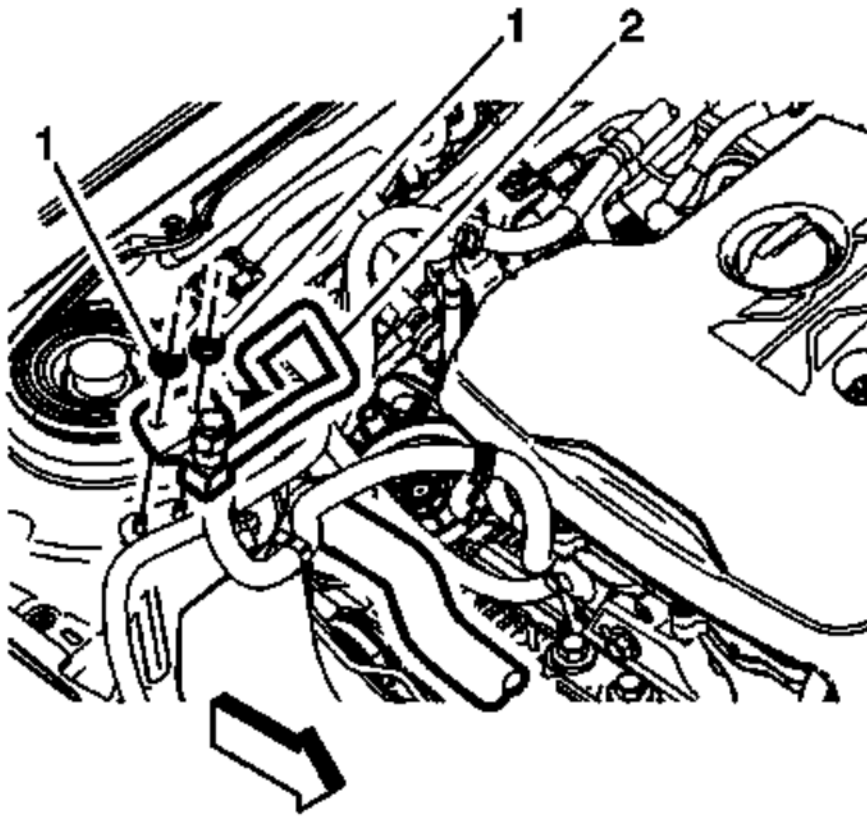


Fig. 38: Air Conditioning Evaporator Hose Assembly And Retaining Fasteners
Courtesy of GENERAL MOTORS COMPANY

12. Remove the air conditioning evaporator hose assembly retaining fasteners (1) from the front suspension strut housing.
13. Remove the air conditioning evaporator hose assembly (2) from the front suspension strut housing.

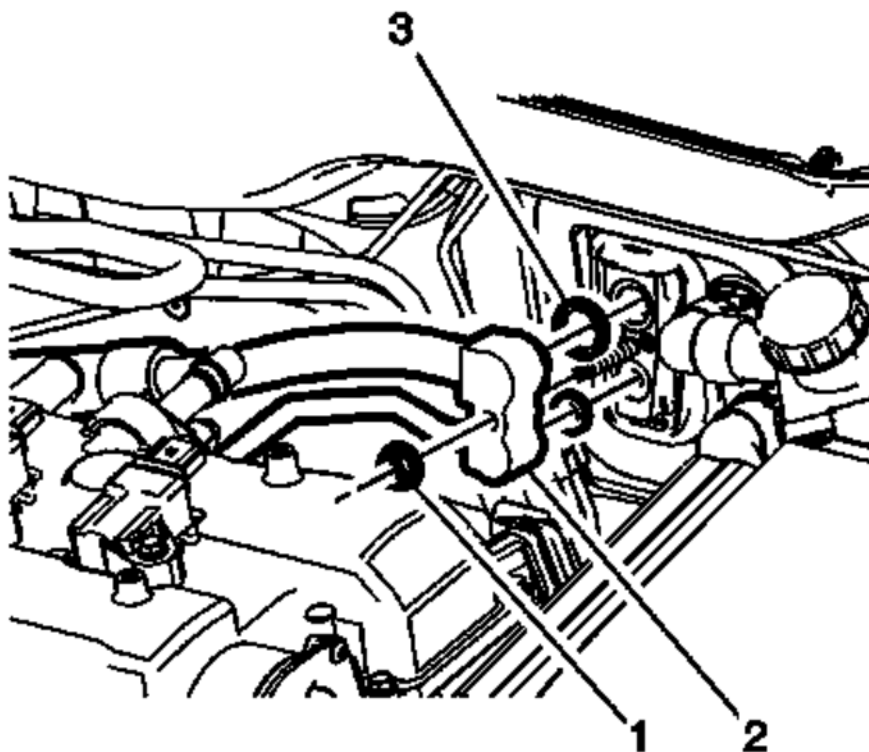


Fig. 39: Air Conditioning Evaporator Hose Assembly Nut
Courtesy of GENERAL MOTORS COMPANY

14. Remove the air conditioning evaporator hose assembly nut (1) at thermal expansion valve.
15. Remove the air conditioning evaporator hose assembly (2) from thermal expansion valve.
16. Remove and discard the old sealing washers (3) and replace with NEW sealing washers.
17. Remove the air conditioning evaporator hose from the retainers.

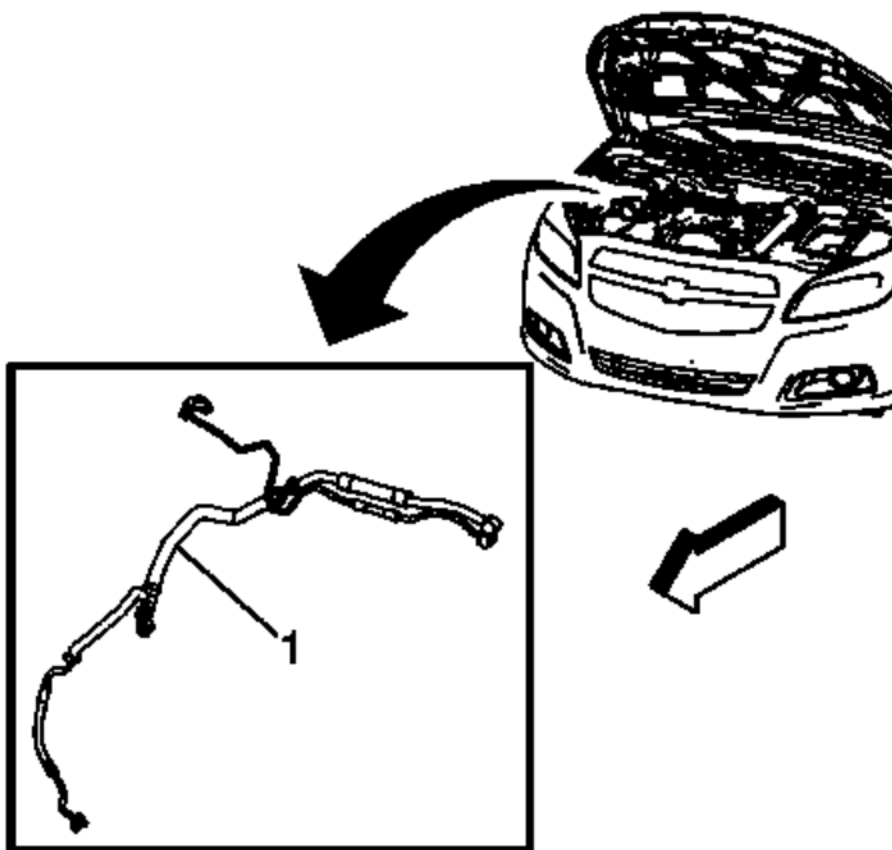


Fig. 40: Air Conditioning Evaporator Hose Assembly
Courtesy of GENERAL MOTORS COMPANY

18. Remove the air conditioning evaporator hose assembly (1) from vehicle.

Installation Procedure

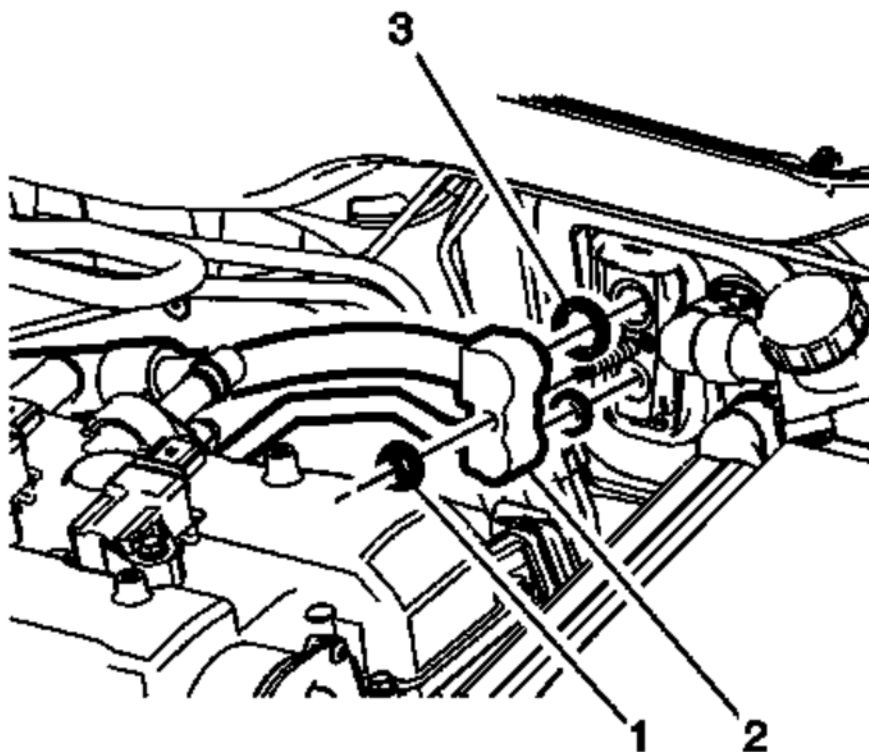


Fig. 41: Air Conditioning Evaporator Hose Assembly Nut
Courtesy of GENERAL MOTORS COMPANY

1. Install NEW sealing washers (3) to the air conditioning evaporator hose assembly (2). Refer to **Air Conditioning System Seal Replacement**.
2. Install the air conditioning evaporator hose assembly (2) to the vehicle.
3. Install the air conditioning evaporator hose (2) to the retainers.
4. Install the air conditioning evaporator hose assembly (2) to the thermal expansion valve.

CAUTION: Refer to Fastener Caution .

5. Install the air conditioning evaporator hose assembly nut (1) at thermal expansion valve and tighten to 22 N.m (16 lb ft).

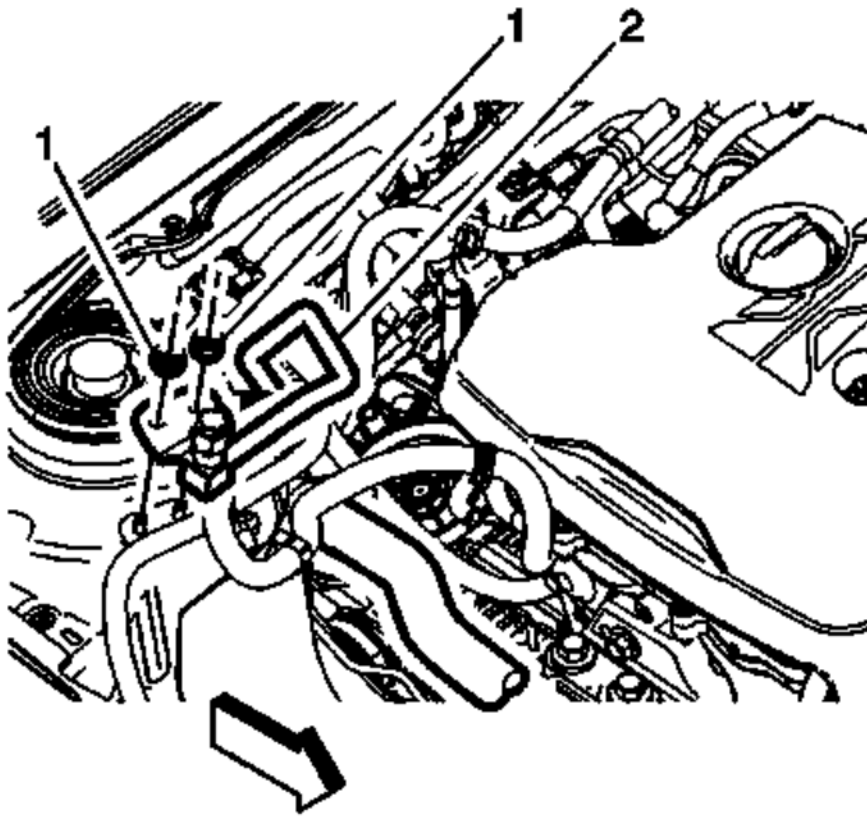


Fig. 42: Air Conditioning Evaporator Hose Assembl And Retaining Fasteners
Courtesy of GENERAL MOTORS COMPANY

6. Install the air conditioning evaporator hose assembly (2) to the front suspension strut housing.
7. Install the air conditioning compressor hose retaining fasteners (1) to the front suspension strut housing and tighten to 9 (80 lb in).

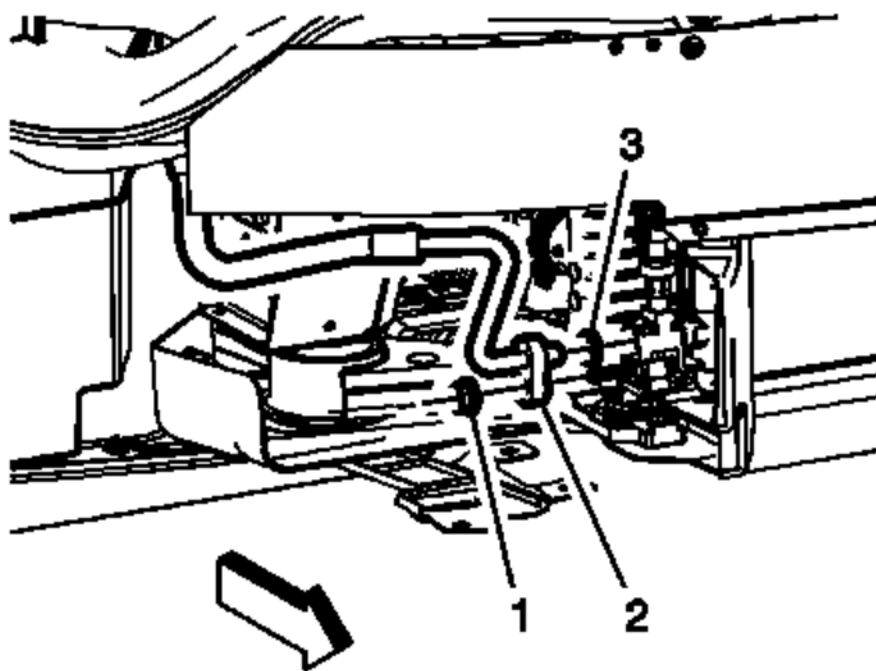


Fig. 43: Conditioning Evaporator Hose Assembly
Courtesy of GENERAL MOTORS COMPANY

8. Install NEW sealing washers (3) to the air conditioning evaporator hose assembly (2). Refer to **Air Conditioning System Seal Replacement**.
9. Install the air conditioning evaporator hose assembly (2) to the condenser.
10. Install the air conditioning evaporator hose assembly nut (1) at condenser and tighten to 22 N.m (16 lb ft).

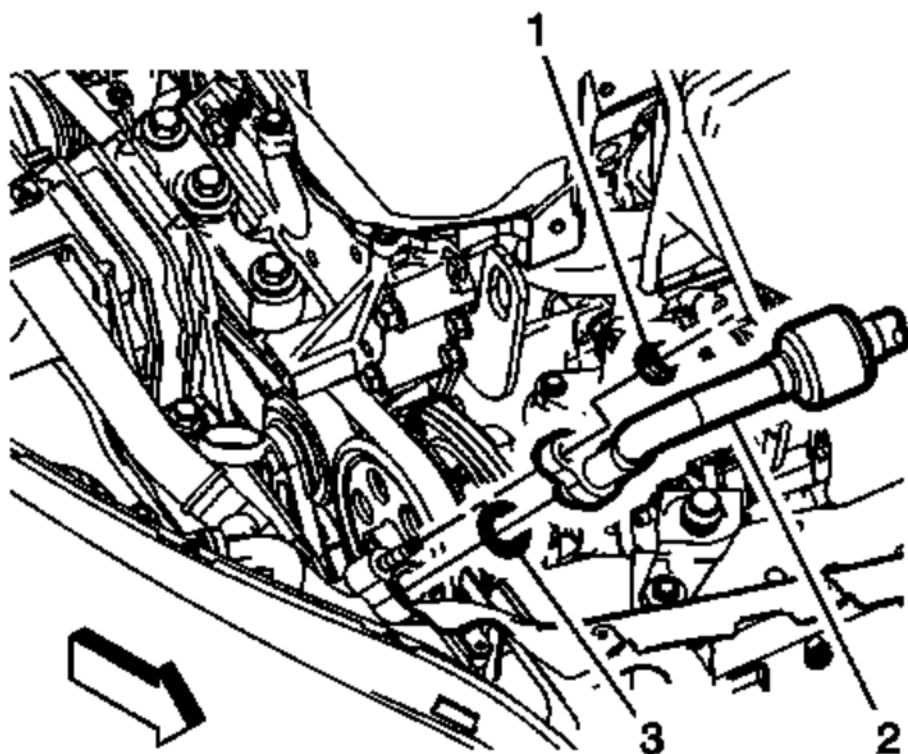


Fig. 44: Air Conditioning Compressor Hose Assembly
 Courtesy of GENERAL MOTORS COMPANY

11. Install NEW sealing washers (3) to the air conditioning compressor hose assembly (2). Refer to **Air Conditioning System Seal Replacement**.
12. Install the air conditioning compressor hose assembly (2) to the evaporator hose assembly.
13. Install the air conditioning compressor hose assembly nut (1) to the evaporator hose and tighten to 22 N.m (16 lb ft).
14. Install the front bumper fascia assembly. Refer to **Front Bumper Fascia Replacement** .
15. Install the right engine mount. Refer to **Engine Mount Replacement (LTG)** .
16. Install the air cleaner outlet duct. Refer to **Air Cleaner Outlet Duct Replacement (LTG)** .
17. Install the air cleaner assembly. Refer to **Air Cleaner Assembly Replacement (LTG)** .
18. Evacuate and charge the air conditioning system. Refer to **Refrigerant Recovery and Recharging**.

AIR CONDITIONING EVAPORATOR HOSE ASSEMBLY REPLACEMENT (LUK)

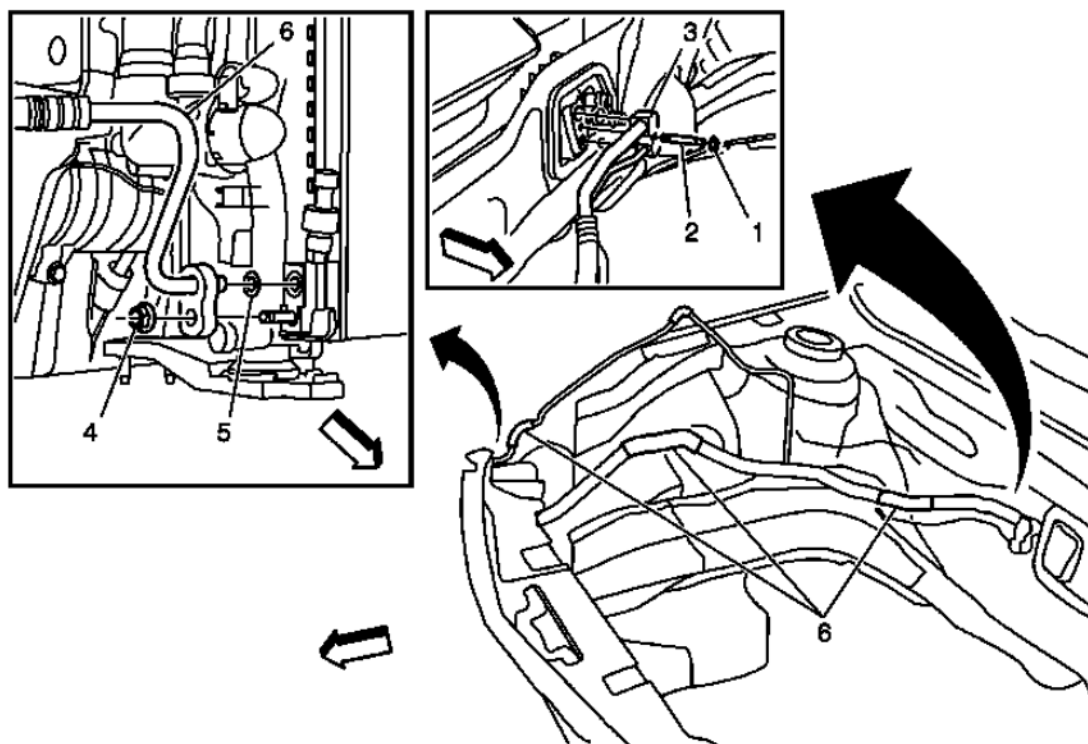


Fig. 45: Air Conditioning Evaporator Hose Assembly
Courtesy of GENERAL MOTORS COMPANY

Air Conditioning Evaporator Hose Assembly Replacement (LUK)

Callout	Component Name
Preliminary Procedures 1. Recover the refrigerant. Refer to <u>Refrigerant Recovery and Recharging</u>. 2. Remove the front bumper fascia assembly. Refer to <u>Front Bumper Fascia Replacement</u>. 3. Remove the headlamp-right side. Refer to <u>Headlamp Replacement (Left Side)</u>, <u>Headlamp Replacement (Right Side)</u>. 4. Remove the engine mount. Refer to <u>Engine Mount Replacement</u>, or <u>Engine Mount Replacement</u>. 5. Remove the air conditioning (A/C) compressor and condenser hose from the a/c evaporator hose. Refer to <u>Air Conditioning Compressor and Condenser Hose Replacement</u>. 6. Remove the air conditioning evaporator thermal expansion valve heat and brake pipe shield. Refer to <u>Air Conditioning Evaporator Thermal Expansion Valve Heat and Brake Pipe Shield Replacement</u>.	
1	A/C Evaporator Hose Fastener CAUTION: Refer to <u>Fastener Caution</u> .

	Tighten 20 N.m (15 lb ft)
2	A/C Evaporator Hose Stud Bolt Tighten 15 (11 lb ft)
3	A/C Evaporator Hose Assembly Procedure 1. Remove the a/c evaporator hose from the thermal expansion valve (TXV). 2. Remove and discard sealing washer and replace with NEW. Refer to <u>Air Conditioning System Seal Replacement</u>.
4	A/C Evaporator Hose Fastener Procedure Remove the A/C evaporator hose from the A/C Condenser and cap hose. Tighten 20 N.m (15 lb ft)
5	Sealing Washer Procedure Remove and discard sealing washer and replace with NEW. Refer to <u>Air Conditioning System Seal Replacement</u> .
6	Air Conditioning Evaporator Hose Assembly Procedure Release the A/C evaporator hose from the retaining clips.

AIR CONDITIONING REFRIGERANT DESICCANT REPLACEMENT (LTG)

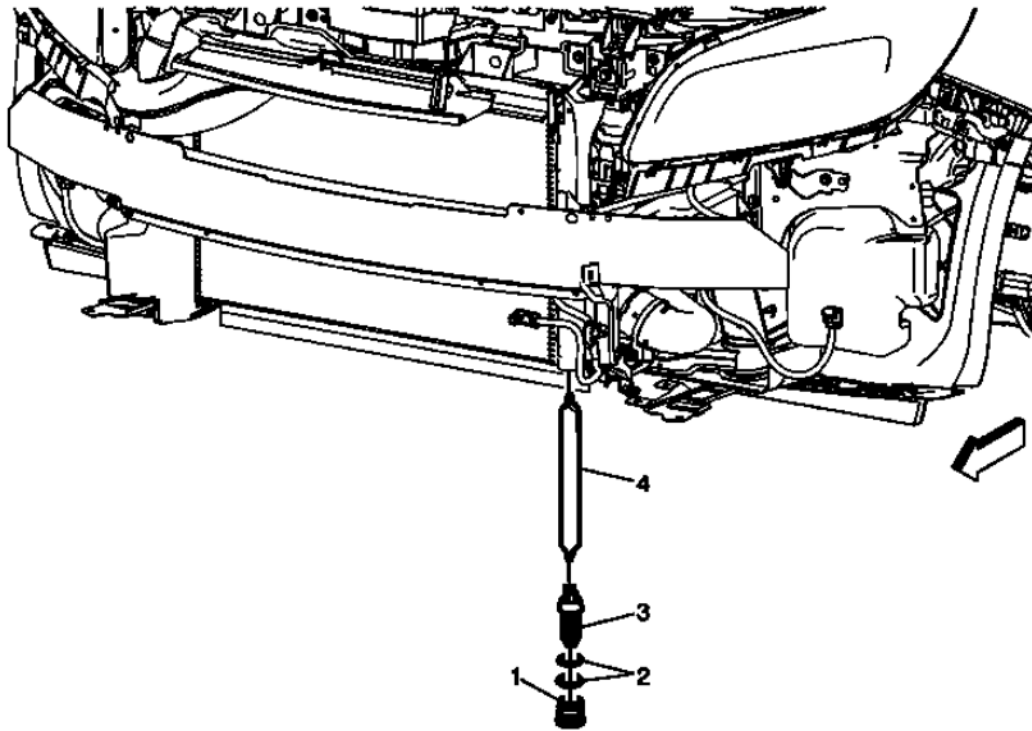


Fig. 46: Air Conditioning Refrigerant Desiccant (LTG)
 Courtesy of GENERAL MOTORS COMPANY

Air Conditioning Refrigerant Desiccant Replacement (LTG)

Callout	Component Name
Preliminary Procedure	
1. Recover the refrigerant. Refer to <u>Refrigerant Recovery and Recharging</u> . 2. Remove the front bumper fascia. Refer to <u>Front Bumper Fascia Replacement</u> . 3. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> . 4. Remove the left radiator air side baffle and deflector retainers. Refer to <u>Radiator Air Side Baffle and Deflector Replacement (Left LTG)</u> , <u>Radiator Air Side Baffle and Deflector Replacement (Right LTG)</u> . 5. Reposition the left radiator air side baffle and deflector to remove the receiver and dehydrator plug.	
1	Receiver and Dehydrator Plug CAUTION: Refer to <u>Fastener Caution</u> . Tighten 12 (9 lb ft)
2	Receiver and Dehydrator O-ring (Qty: 2)
3	Air Conditioning Refrigerant Filter

RECEIVER AND DEHYDRATOR REPLACEMENT (LUK)

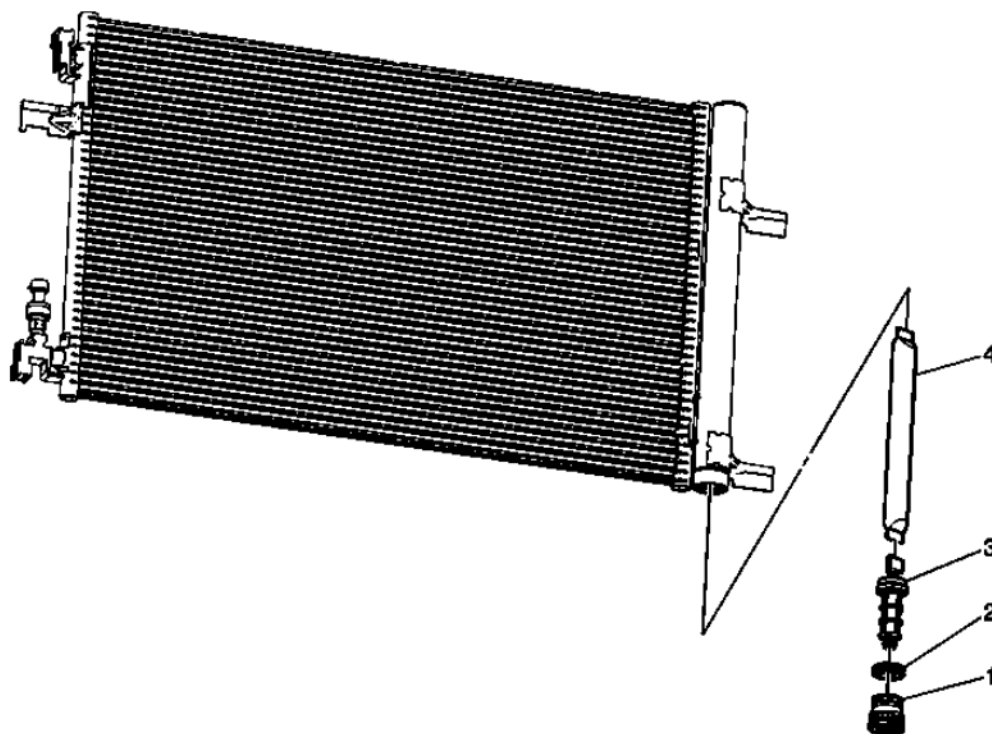


Fig. 47: Receiver And Dehydrator
 Courtesy of GENERAL MOTORS COMPANY

Receiver and Dehydrator Replacement (LUK)

Callout	Component Name
Preliminary Procedures 1. Recover the refrigerant from the air conditioning system. Refer to <u>Refrigerant Recovery and Recharging</u>. 2. Support the left side of the condenser and radiator assembly with mechanics wire or equivalent. 3. Remove the left radiator support bracket. Refer to <u>Radiator Support Bracket Replacement (LUK)</u>.	
1	Receiver and Dehydrator Plug CAUTION: Refer to <u>Fastener Caution</u> . Tighten 12 (9 lb ft)

2	Receiver and Dehydrator O-Ring
3	A/C Refrigerant Filter
4	A/C Refrigerant Dryer

RECEIVER AND DEHYDRATOR REPLACEMENT (LCV)

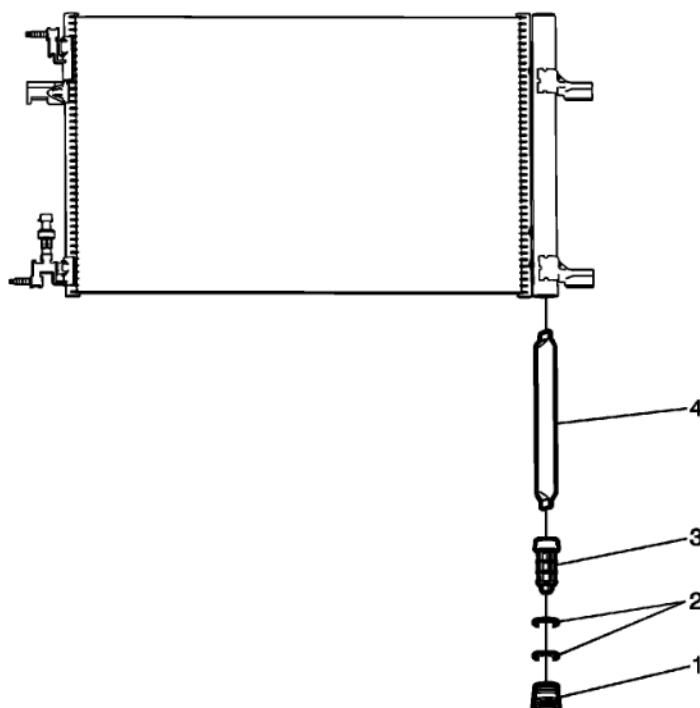


Fig. 48: Receiver and Dehydrator (LCV)
Courtesy of GENERAL MOTORS COMPANY

Receiver and Dehydrator Replacement (LCV)

Callout	Component Name
Preliminary Procedure	
Remove the air conditioning condenser. Refer to <u>Air Conditioning Condenser Replacement (LCV)</u> .	
1	Receiver and Dehydrator Plug CAUTION: Refer to <u>Fastener Caution</u> . Tighten 12 (9 lb ft)
2	Receiver and Dehydrator O-ring (Qty: 2)
3	Air Conditioning Refrigerant Filter
4	Air Conditioning Refrigerant Desiccant

AIR CONDITIONING EVAPORATOR THERMAL EXPANSION VALVE REPLACEMENT

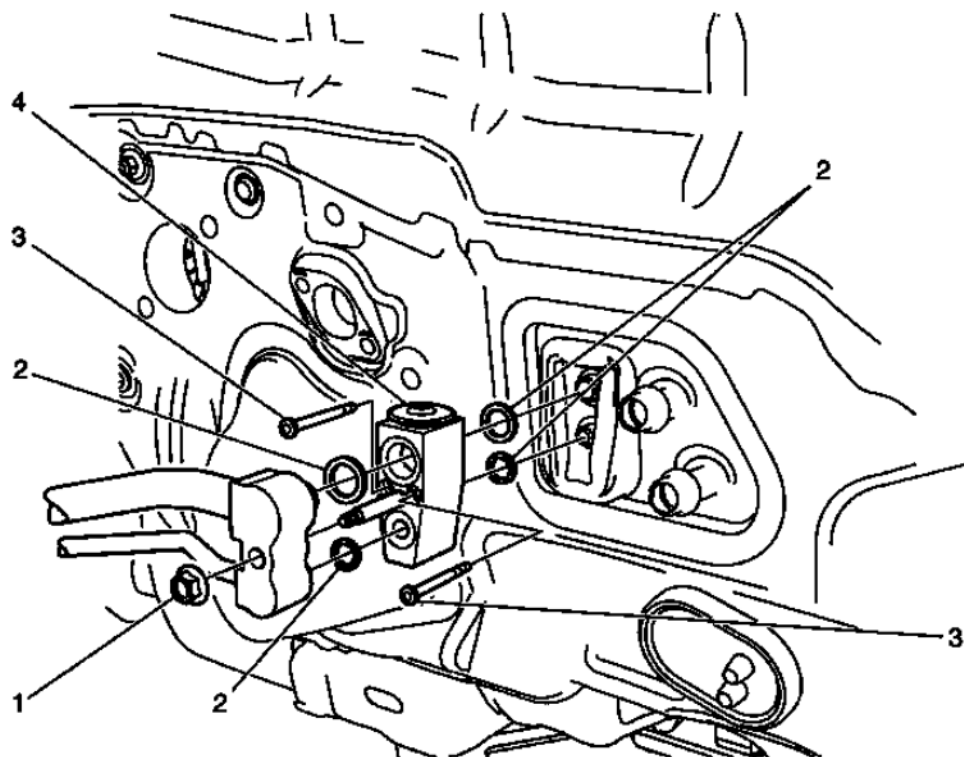


Fig. 49: Air Conditioning Evaporator Thermal Expansion Valve Components
Courtesy of GENERAL MOTORS COMPANY

Air Conditioning Evaporator Thermal Expansion Valve Replacement

Callout	Component Name
Preliminary Procedures 1. Recover the refrigerant. Refer to <u>Refrigerant Recovery and Recharging</u>. 2. Unclip and reposition the brake and fuel lines aside to gain access to the thermal expansion valve (TXV). 3. Remove the air conditioning evaporator hose assembly from the TXV only. Refer to <u>Air Conditioning Evaporator Hose Assembly Replacement (LCV)</u>, <u>Air Conditioning Evaporator Hose Assembly Replacement (LTG)</u>, <u>Air Conditioning Evaporator Hose Assembly Replacement (LUK)</u>.	
1	A/C Compressor Tube Assembly Nut CAUTION: Refer to <u>Fastener Caution</u> . Tighten 22 N.m (16 lb ft)

2	Sealing Washer (Qty: 4) Procedure Use new sealing washer. Refer to <u>Air Conditioning System Seal Replacement</u> .
3	Thermal Expansion Valve Bolt (Qty: 2) Tighten 7 N.m (62 lb in)
4	Air Conditioning Evaporator Thermal Expansion Valve (TXV)

AIR CONDITIONING EVAPORATOR THERMAL EXPANSION VALVE HEAT AND BRAKE PIPE SHIELD REPLACEMENT

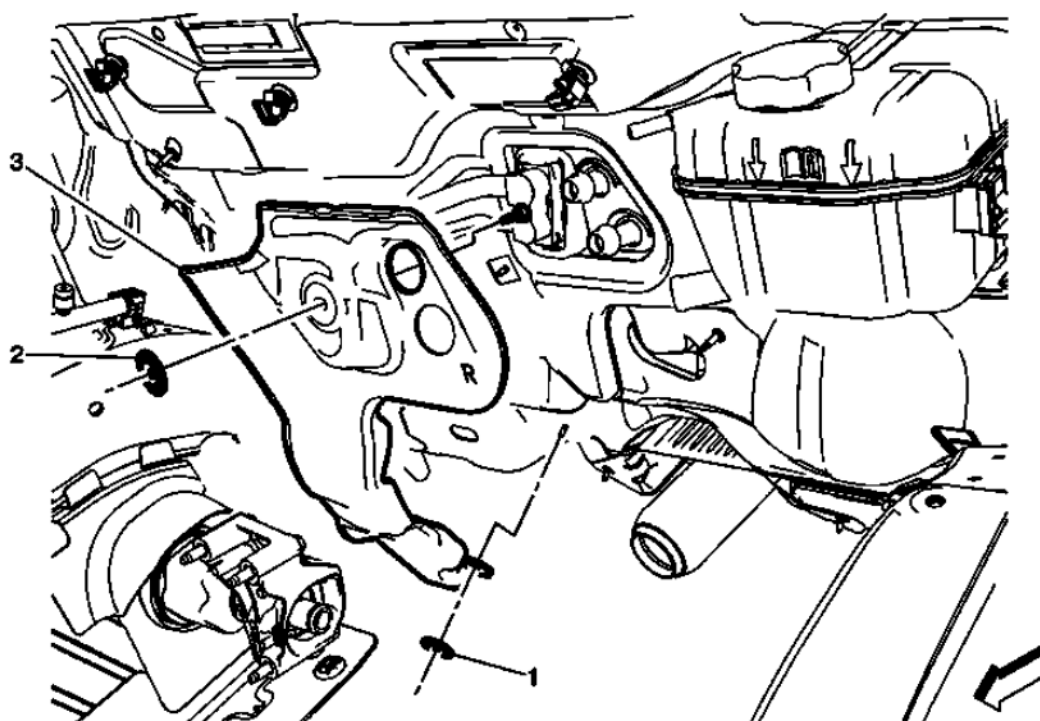


Fig. 50: Air Conditioning Evaporator Thermal Expansion Valve Heat and Brake Pipe Shield
Courtesy of GENERAL MOTORS COMPANY

Air Conditioning Evaporator Thermal Expansion Valve Heat and Brake Pipe Shield Replacement

Callout	Component Name
Preliminary Procedures	
1.	Drain the cooling system. Refer to <u>Cooling System Draining and Filling (GE 47716)</u> , <u>Cooling System Draining and Filling (Static Fill)</u> .
2.	Remove intake manifold cover. Refer to <u>Intake Manifold Cover Replacement</u> .
3.	Disconnect the heater outlet hose from the heater core tube. Refer to <u>Heater Outlet Hose Replacement (LUK)</u> , <u>Heater Outlet Hose Replacement (LCV)</u> , <u>Heater Outlet Hose Replacement (LTG)</u> .

4. Disconnect the heater inlet hose from the heater core tube. Refer to <u>Heater Inlet Hose Replacement (LUK)</u> , <u>Heater Inlet Hose Replacement (LCV)</u> , <u>Heater Inlet Hose Replacement (LTG)</u> .	
1	Air Conditioning Evaporator Throttle Expansion Valve and Brake Pipe Heat Shield Retainer CAUTION: Refer to <u>Fastener Caution</u> . Procedure Lift the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> .
2	Air Conditioning Evaporator Throttle Expansion Valve and Brake Pipe Heat Shield Retainer Procedures 1. Lower the vehicle. 2. Move the vacuum lines and any wiring harness out of the way.
3	Air Conditioning Evaporator Throttle Expansion Valve and Brake Pipe Heat Shield Procedures 1. Level the engine coolant to the proper level. Refer to <u>Cooling System Draining and Filling (GE 47716)</u> , <u>Cooling System Draining and Filling (Static Fill)</u> . 2. Inspect for engine coolant leaks.

AIR CONDITIONING (A/C) REFRIGERANT PRESSURE SENSOR REPLACEMENT (LUK)

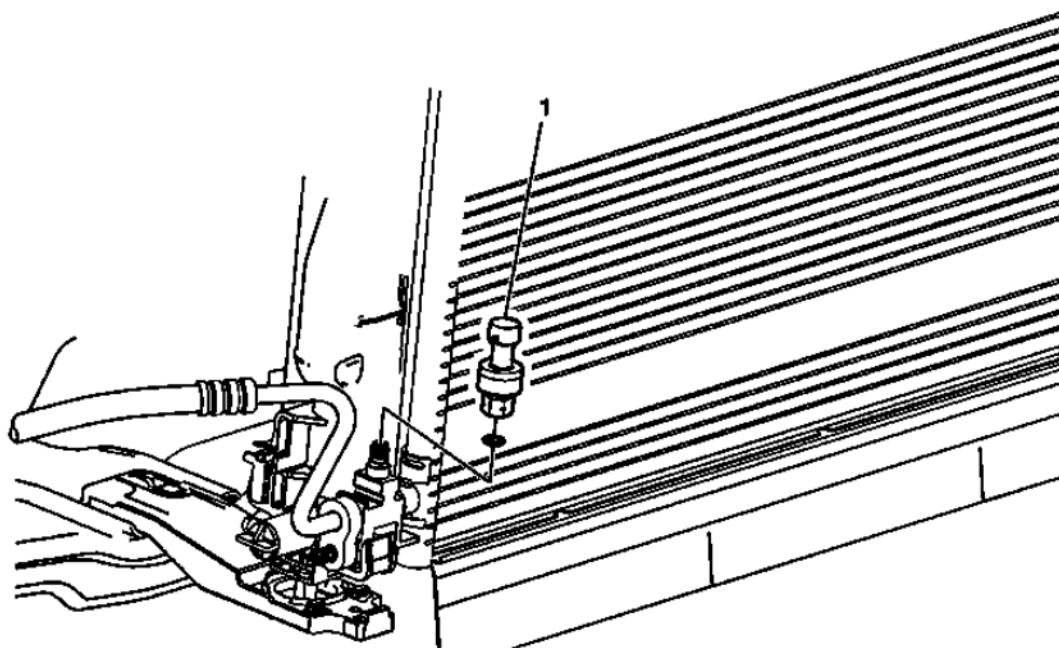


Fig. 51: Air Conditioning (A/C) Refrigerant Pressure Sensor
 Courtesy of GENERAL MOTORS COMPANY

Air Conditioning (A/C) Refrigerant Pressure Sensor Replacement (LUK)

Callout	Component Name
Preliminary Procedures Remove the front bumper fascia assembly. Refer to Front Bumper Fascia Replacement	
1	Air Conditioning (AC) Refrigerant Pressure Sensor CAUTION: Refer to Fastener Caution . Procedure 1. Disconnect the electrical connector from A/C refrigerant pressure sensor. 2. Remove the A/C refrigerant pressure sensor from the A/C condenser. 3. Remove and discard the O-ring. Refer to Air Conditioning O-Ring Seal Replacement Tighten 7.4 N.m(66 lb in)

AIR CONDITIONING (A/C) REFRIGERANT PRESSURE SENSOR REPLACEMENT (LCV, LTG)

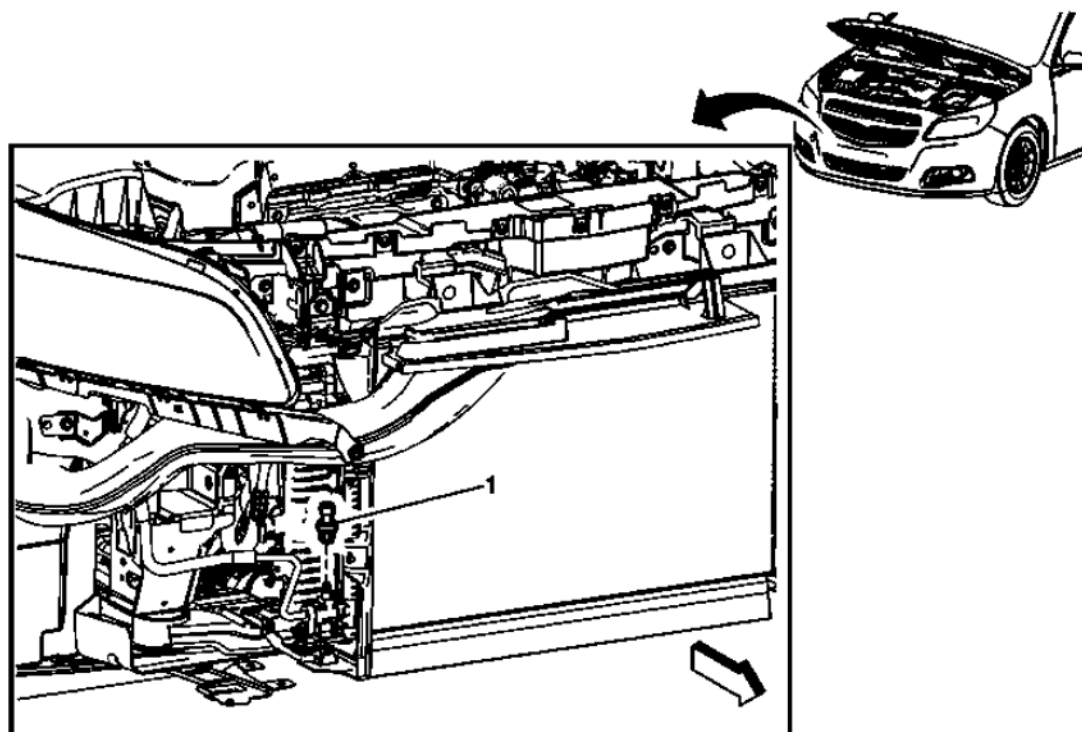


Fig. 52: Air Conditioning (A/C) Refrigerant Pressure Sensor (LCV, LTG)
Courtesy of GENERAL MOTORS COMPANY

Air Conditioning (A/C) Refrigerant Pressure Sensor Replacement (LCV, LTG)

Callout	Component Name
Preliminary Procedures 1. Remove the front bumper fascia. Refer to <u>Front Bumper Fascia Replacement</u> . 2. Disconnect the electrical connector from the pressure sensor.	
1	Air Conditioning Refrigerant Pressure Sensor CAUTION: Refer to <u>Fastener Caution</u> . NOTE: Remove and discard the O-ring and replace with NEW only. Refer to <u>Air Conditioning O-Ring Seal Replacement</u> . Tighten 6 (53 lb in)

AIR CONDITIONING CONDENSER REPLACEMENT (LUK)

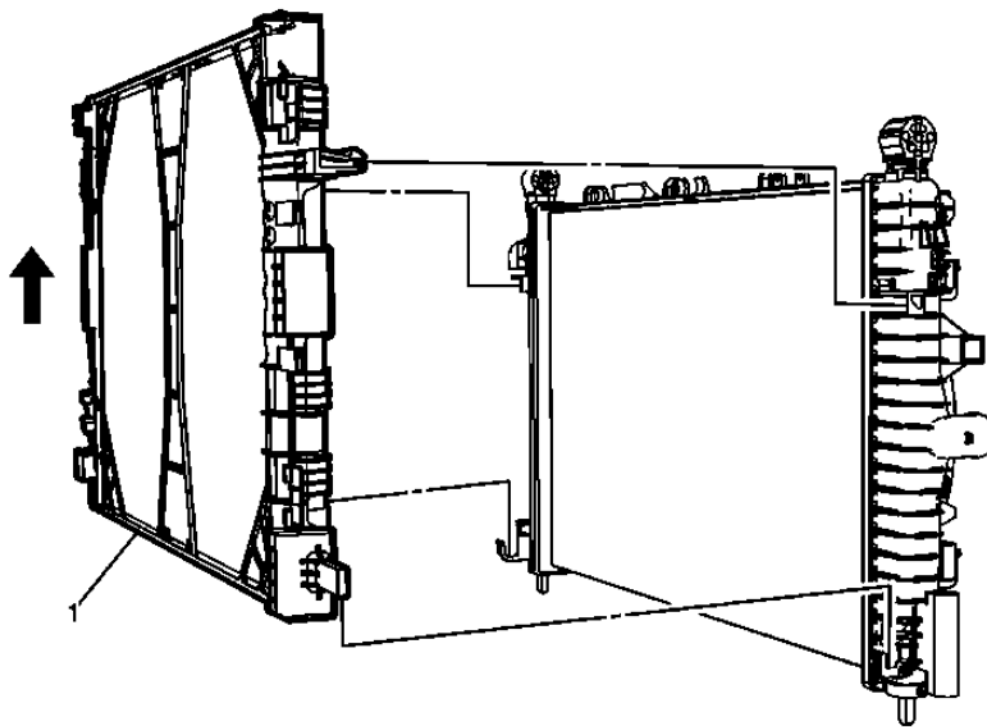


Fig. 53: Air Conditioning Condenser
 Courtesy of GENERAL MOTORS COMPANY

Air Conditioning Condenser Replacement (LUK)

Callout	Component Name
Preliminary Procedures 1. Recover the refrigerant. Refer to <u>Refrigerant Recovery and Recharging</u>. 2. Remove the front fascia. Refer to <u>Front Bumper Fascia Replacement</u>. 3. Remove the AC Compressor and Condenser Hose from condenser assembly. Refer to <u>Air Conditioning Compressor and Condenser Hose Replacement</u>. 4. Remove the AC Evaporator Hose from condenser. Refer to <u>Air Conditioning Evaporator Hose Assembly Replacement (LUK)</u>. 5. Remove the AC refrigerant pressure sensor. Refer to <u>Air Conditioning (A/C) Refrigerant Pressure Sensor Replacement (LUK)</u>. 6. Support the radiator and condenser assembly, then remove the radiator support brackets. Refer to <u>Radiator Support Bracket Replacement (LUK)</u>.	
1	Air Conditioning Condenser Assembly NOTE: Remove the condenser assembly from below. Procedure

1. Lower the radiator and condenser assembly enough to access condenser assembly retainers.
2. Release the 2 condenser assembly retainers.

AIR CONDITIONING CONDENSER REPLACEMENT (LCV)

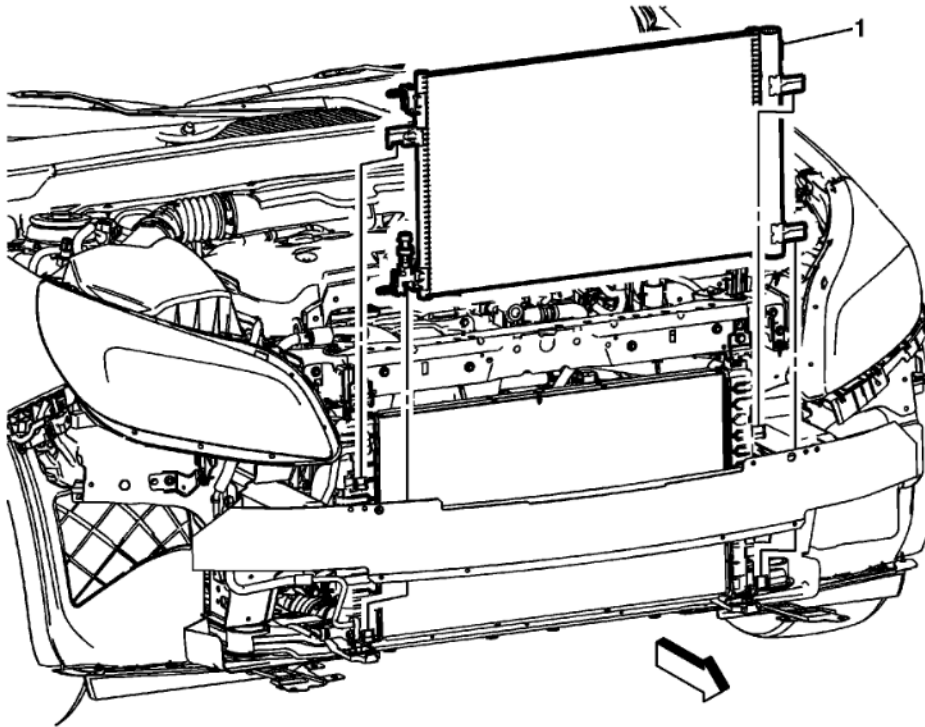


Fig. 54: Air Conditioning Condenser (LCV)
Courtesy of GENERAL MOTORS COMPANY

Air Conditioning Condenser Replacement (LCV)

Callout	Component Name
Preliminary Procedure	
1. Drain the refrigerant. Refer to <u>Refrigerant Recovery and Recharging</u>. 2. Remove the front bumper fascia assembly. Refer to <u>Front Bumper Fascia Replacement</u>. 3. Remove the front bumper fascia center support. Refer to <u>Front Bumper Fascia Center Support Replacement</u>. 4. Remove the radiator air upper baffle and deflector. Refer to <u>Radiator Air Upper Baffle and Deflector Replacement (LCV, LTG)</u>. 5. Remove the radiator air side baffle and deflectors. Refer to <u>Radiator Air Side Baffle and Deflector Replacement (Left LCV)</u>, <u>Radiator Air Side Baffle and Deflector Replacement (Right LCV)</u>. 6. Remove the air compressor and condenser hose assembly from the condenser and position out of	

the way. Refer to **Air Conditioning Compressor and Condenser Hose Replacement**.

7. Remove the air conditioning evaporator hose assembly from the condenser and position out of the way. Refer to **Air Conditioning Evaporator Hose Assembly Replacement (LCV)**.

1	Air Conditioning Condenser Assembly Procedure Transfer all necessary components.
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AIR CONDITIONING CONDENSER REPLACEMENT (LTG)

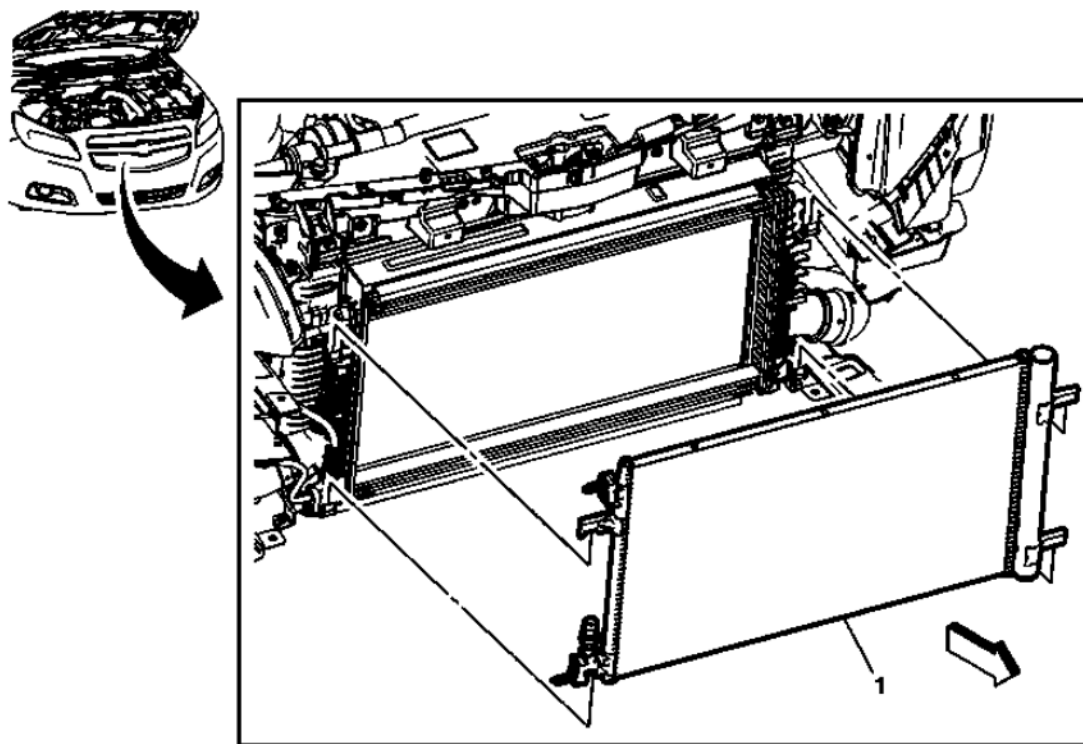


Fig. 55: Air Conditioning Condenser
Courtesy of GENERAL MOTORS COMPANY

Air Conditioning Condenser Replacement (LTG)

Callout	Component Name
Preliminary Procedure	
1.	Recover the refrigerant. Refer to <u>Refrigerant Recovery and Recharging</u> .
2.	Remove the front bumper impact bar. Refer to <u>Front Bumper Impact Bar Replacement</u> .
3.	Remove the radiator air upper baffle and deflector. Refer to <u>Radiator Air Upper Baffle and Deflector Replacement (LCV, LTG)</u> .
4.	Remove the left and right radiator air side baffle and deflectors. Refer to <u>Radiator Air Side Baffle and Deflector Replacement (Left LTG)</u> , <u>Radiator Air Side Baffle and Deflector Replacement (Right LTG)</u> .
5.	Remove the air compressor hose assembly from the condenser and position out of the way. Refer

to **Air Conditioning Compressor Hose Replacement (LTG)**.

6. Remove the air conditioning evaporator hose assembly from the condenser and position out of the way. Refer to **Air Conditioning Evaporator Hose Assembly Replacement (LTG)**.

1	Air Conditioning Condenser Assembly Procedure Transfer all necessary components.
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HEATER AND AIR CONDITIONING EVAPORATOR AND BLOWER MODULE REMOVAL AND INSTALLATION

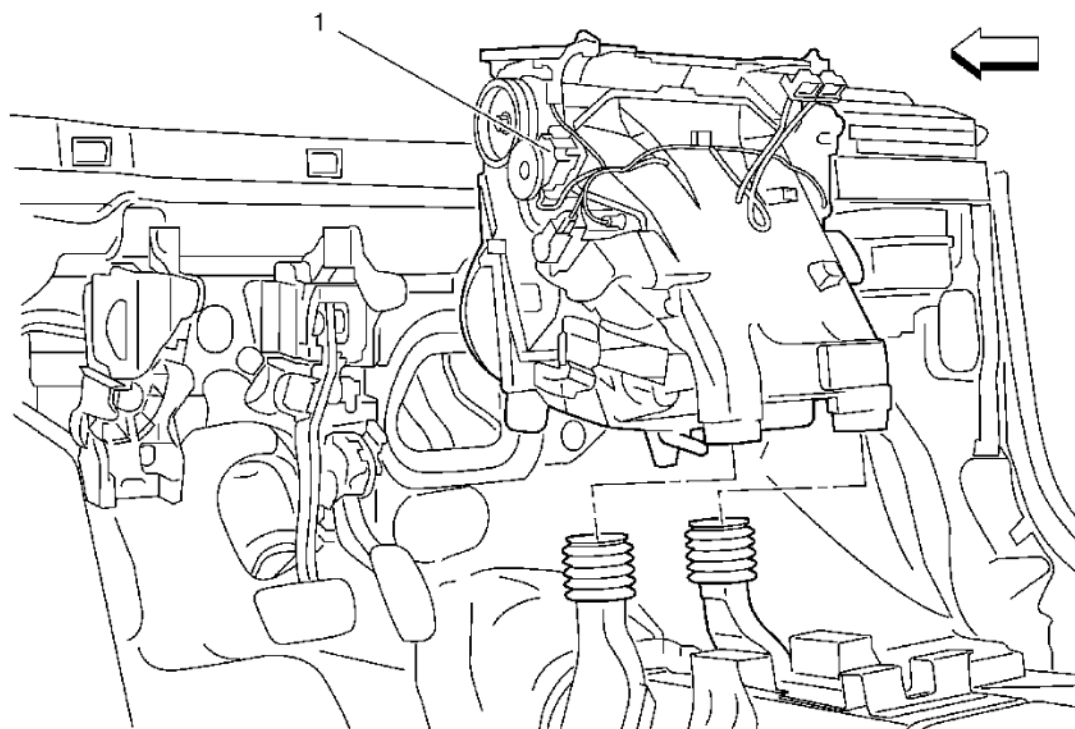


Fig. 56: Heater And Air Conditioning Evaporator & Blower Module
Courtesy of GENERAL MOTORS COMPANY

Heater and Air Conditioning Evaporator and Blower Module Removal and Installation

Callout	Component Name
Preliminary Procedures	
1.	Recover the refrigerant. Refer to <u>Refrigerant Recovery and Recharging</u> .
2.	Remove the heater inlet hose from the heater core tube. Refer to <u>Heater Inlet Hose Replacement (LUK)</u> , <u>Heater Inlet Hose Replacement (LCV)</u> , <u>Heater Inlet Hose Replacement (LTG)</u> .
3.	Remove the heater outlet hose from the heater core tube. Refer to <u>Heater Outlet Hose Replacement (LUK)</u> , <u>Heater Outlet Hose Replacement (LCV)</u> , <u>Heater Outlet Hose Replacement (LTG)</u> .
4.	Remove the evaporator hose assembly from the thermal expansion valve. Refer to <u>Air</u>

Conditioning Evaporator Thermal Expansion Valve Replacement.

5. Remove the Air Inlet Grille Panel Water Deflector. Refer to **Air Inlet Grille Panel Water Deflector Replacement** .
6. Remove the instrument panel assembly. Refer to **Instrument Panel Assembly Replacement** .
7. Remove the instrument panel tie bar. Refer to **Instrument Panel Tie Bar Replacement** .

1	Heater and Air Conditioning Evaporator and Blower Module Procedure 1. Disconnect electrical connections. 2. Disconnect the evaporator drain hose from the heater and air conditioning evaporator and blower module. 3. With the aid of an assistant, remove the heater and air conditioning evaporator and blower module from the vehicle.
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AIR CONDITIONING EVAPORATOR REPLACEMENT

Removal Procedure

1. Remove the instrument panel assembly. Refer to **Instrument Panel Assembly Replacement** .
2. Remove the instrument panel tie bar assembly. Refer to **Instrument Panel Tie Bar Replacement** .
3. Remove the heater and air conditioning evaporator and blower module assembly from the vehicle. Refer to **Heater and Air Conditioning Evaporator and Blower Module Removal and Installation**.

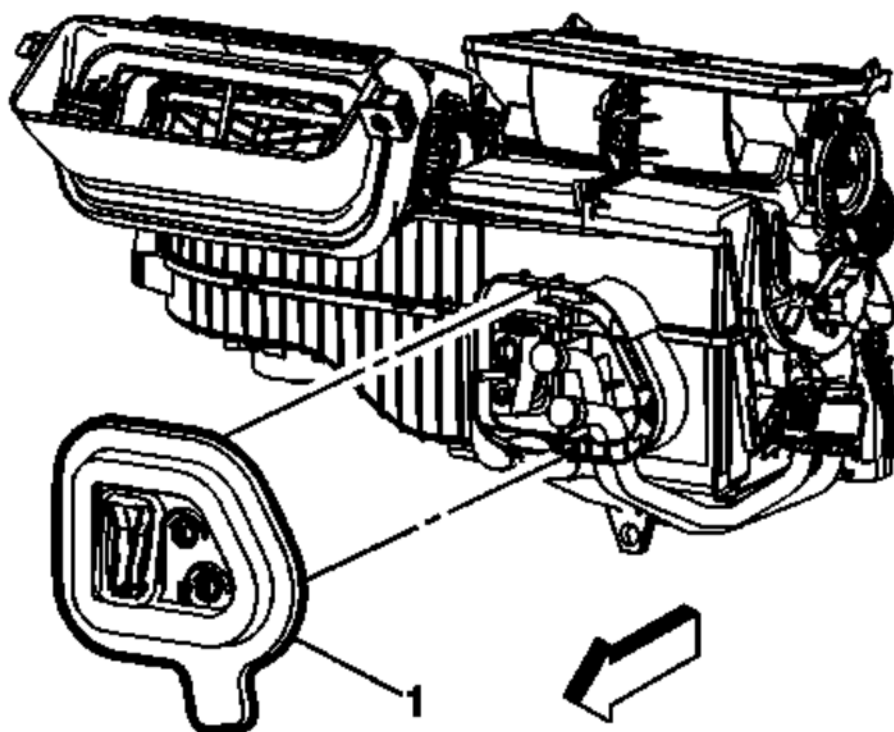


Fig. 57: Seal And Heater

Courtesy of GENERAL MOTORS COMPANY

4. Remove the heater and air conditioning evaporator and blower module assembly seal (1) from the case.

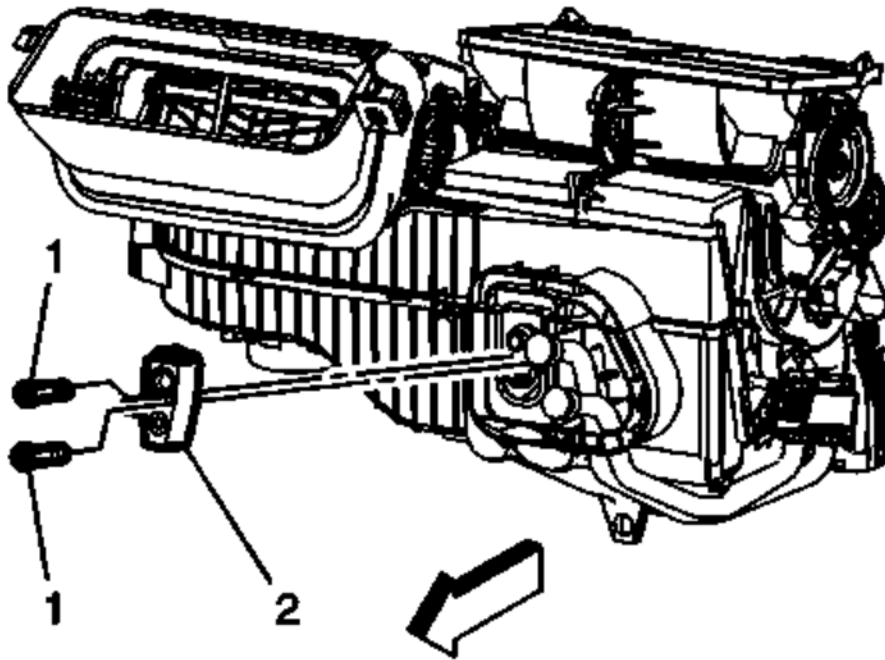


Fig. 58: Evaporator Thermal Expansion Valve
Courtesy of GENERAL MOTORS COMPANY

5. Remove the fasteners (1) and the evaporator thermal expansion valve (2) from the air conditioning evaporator.
6. Remove and discard the seals for the air conditioning evaporator thermal expansion valve.

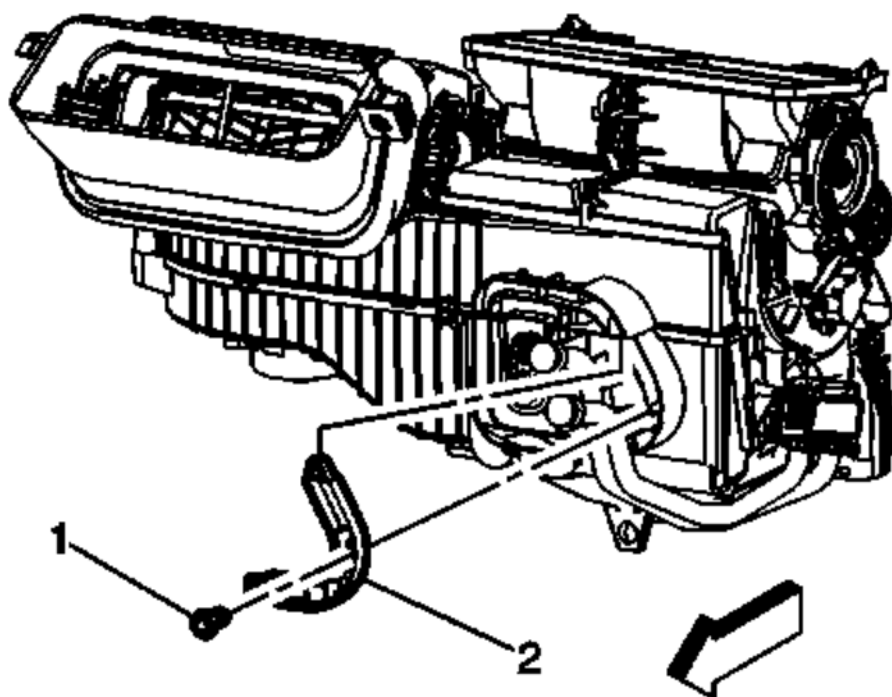


Fig. 59: Heater Core Tube Bracket
Courtesy of GENERAL MOTORS COMPANY

7. Remove the fastener (1) and the heater core tube bracket (2) from the heater and air conditioning evaporator and blower module assembly.

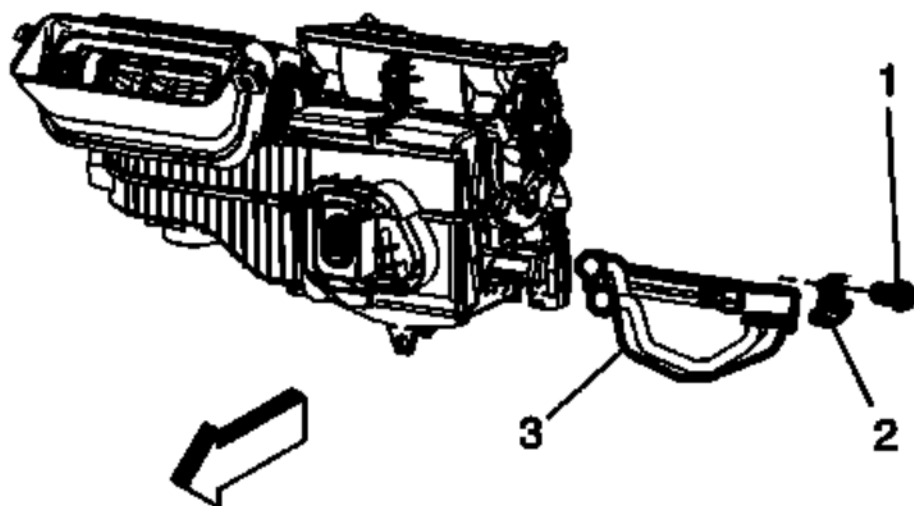


Fig. 60: Fastener And Heater Core Bracket
Courtesy of GENERAL MOTORS COMPANY

8. Remove the fastener (1) and the heater core bracket (2) from the heater and air conditioning evaporator and blower module assembly.
9. Carefully slide the heater core assembly (3) out of the heater and air conditioning evaporator and blower module assembly.

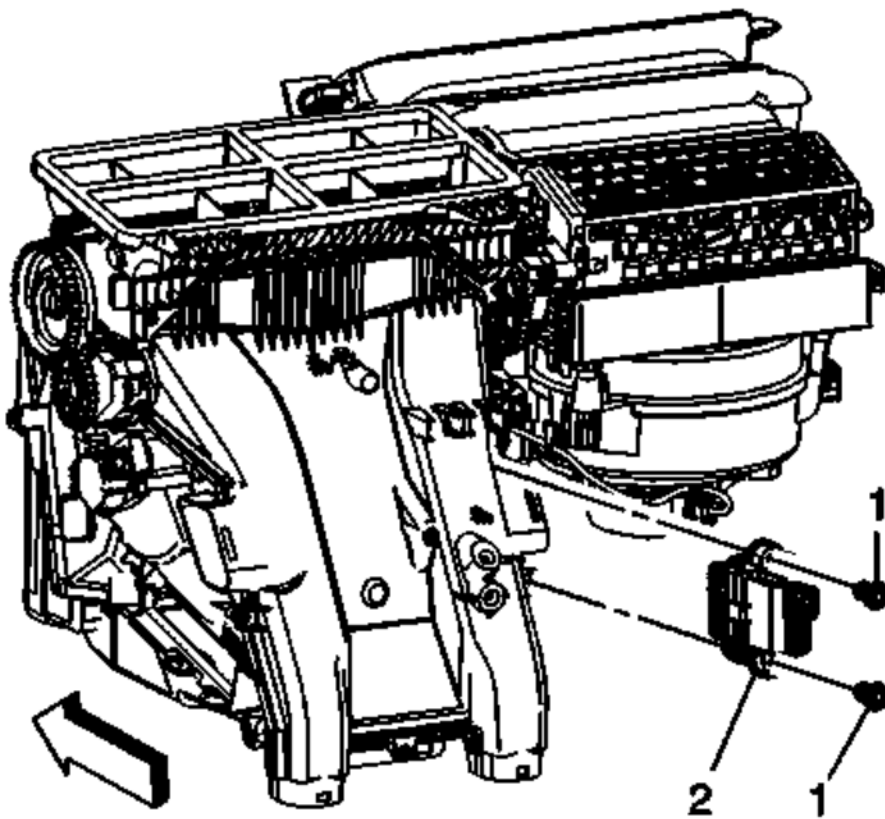


Fig. 61: Fasteners And Heater Control Module
Courtesy of GENERAL MOTORS COMPANY

10. Remove the fasteners (1) and the heater control module (2) from the heater and air conditioning evaporator and blower module assembly.

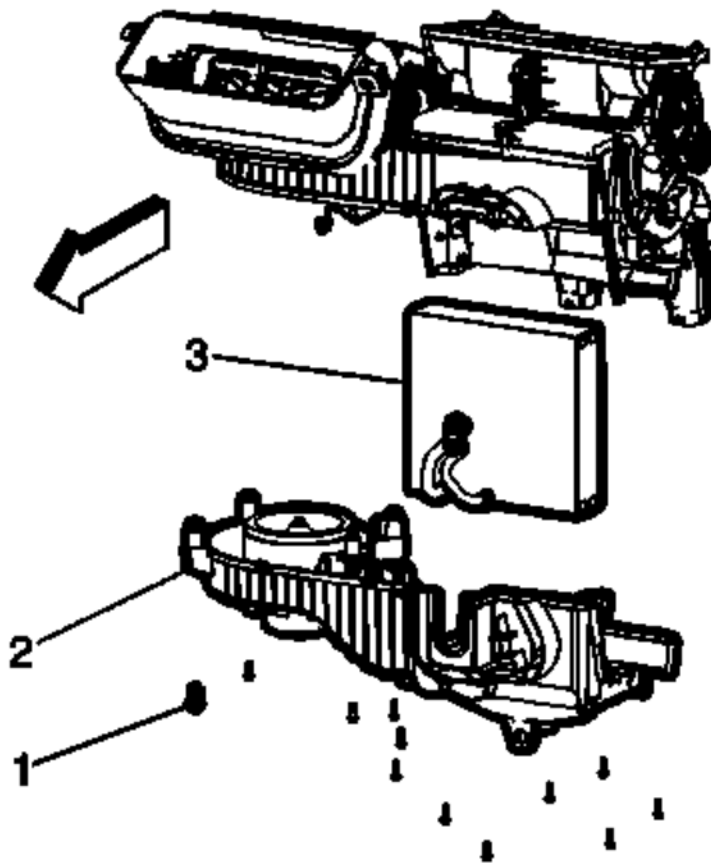


Fig. 62: Air Conditioning Evaporator And Fasteners
Courtesy of GENERAL MOTORS COMPANY

11. Remove the twelve fasteners (1) securing the lower heater and air conditioning evaporator case to the upper heater and air conditioning evaporator case.
12. Remove the lower heater and air conditioning evaporator case from the upper heater and air conditioning evaporator case.
13. Remove the air conditioning evaporator (3) from the two heater and air conditioning evaporator case halves.

Installation Procedure

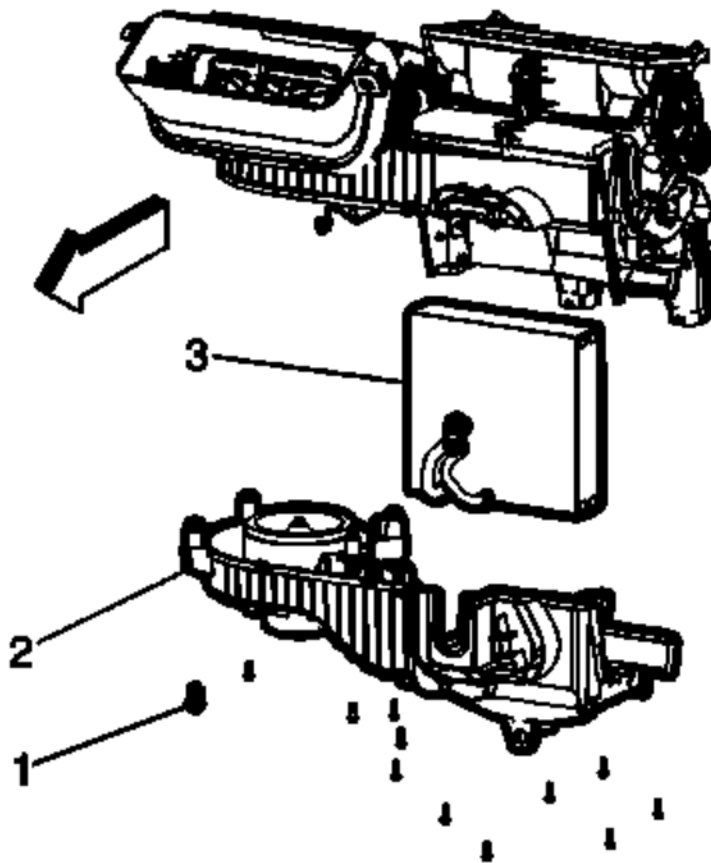


Fig. 63: Air Conditioning Evaporator And Fasteners
Courtesy of GENERAL MOTORS COMPANY

1. Position the air conditioning evaporator (3) into the two heater and air conditioning evaporator case halves.
2. Slide the two heater and air conditioning evaporator case halves together.

CAUTION: Refer to Fastener Caution .

3. Install the twelve fasteners (1) securing the lower heater and air conditioning evaporator case to the upper heater and air conditioning evaporator case.

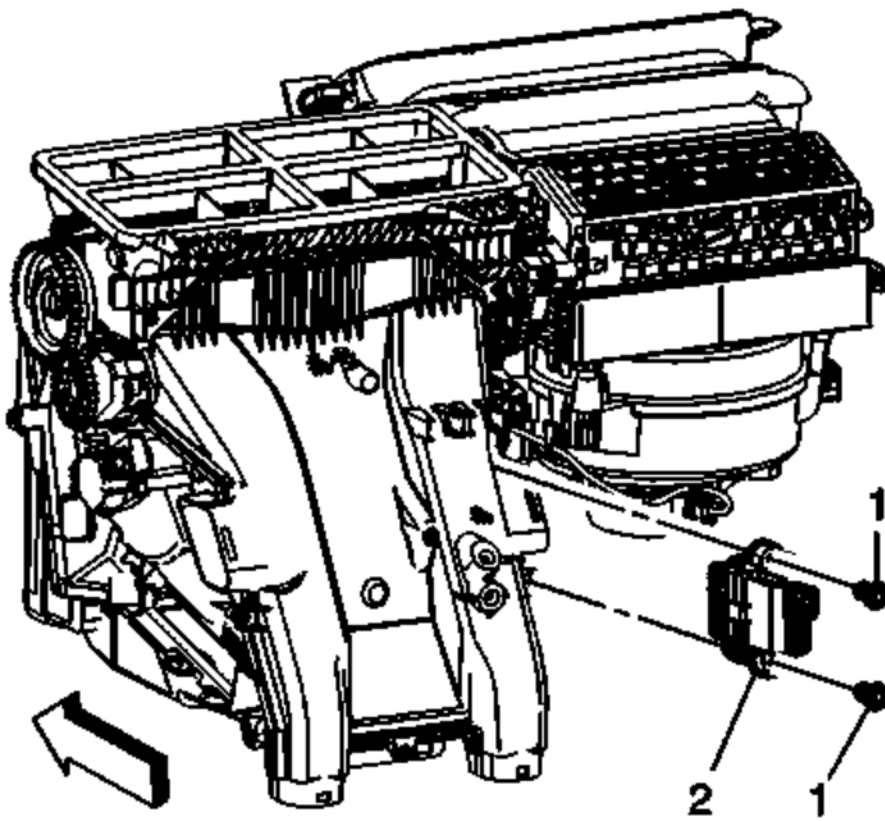


Fig. 64: Fasteners And Heater Control Module
Courtesy of GENERAL MOTORS COMPANY

4. Install the heater control module (2) and the fasteners (1) to the heater and air conditioning evaporator and blower module assembly.

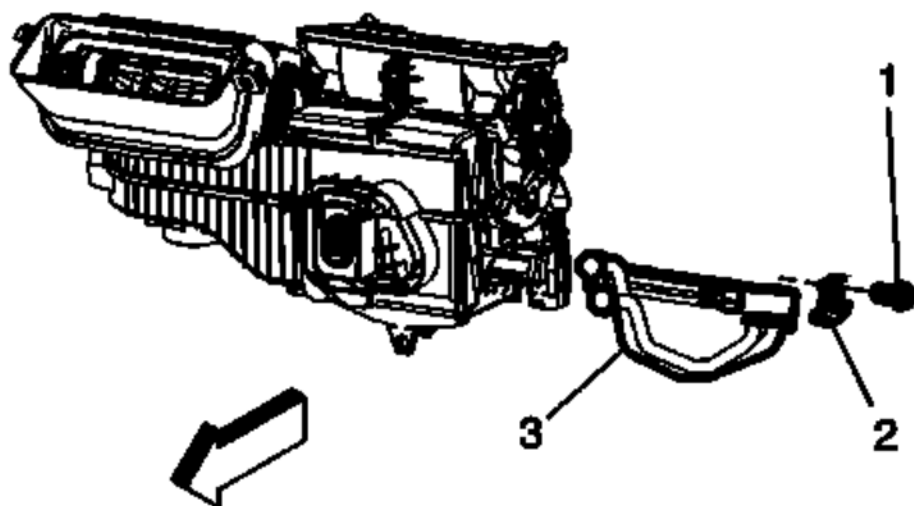


Fig. 65: Fastener And Heater Core Bracket
Courtesy of GENERAL MOTORS COMPANY

5. Carefully slide the heater core assembly (3) into the heater and air conditioning evaporator and blower module assembly.
6. Install the heater core bracket (2) and the fastener (1) to the heater and air conditioning evaporator and blower module assembly.

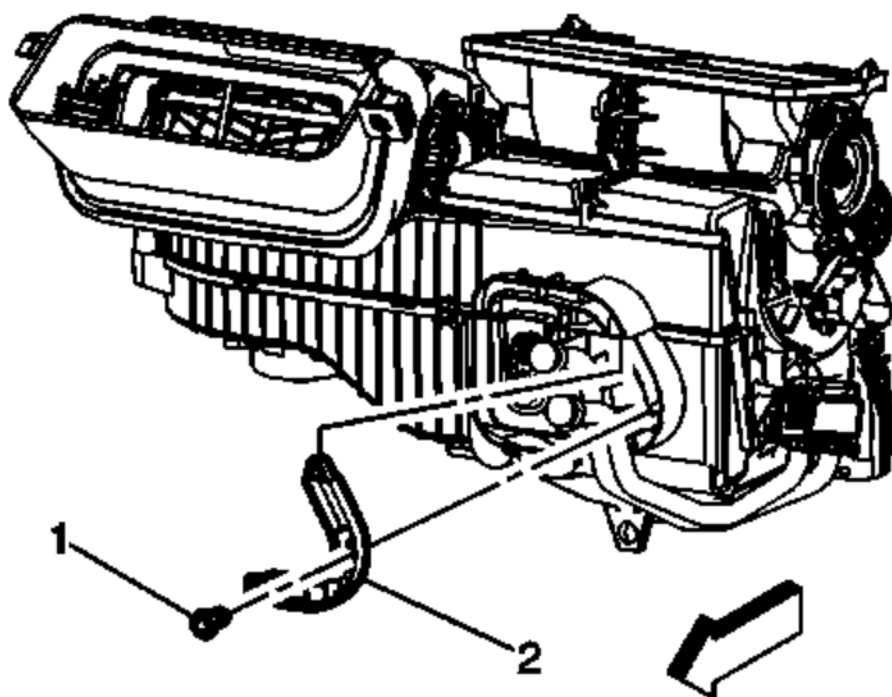


Fig. 66: Heater Core Tube Bracket
Courtesy of GENERAL MOTORS COMPANY

7. Install the heater core tube bracket (2) and the fastener (1) to the heater and air conditioning evaporator and blower module assembly.
8. Install new seals to the air conditioning evaporator thermal expansion valve.

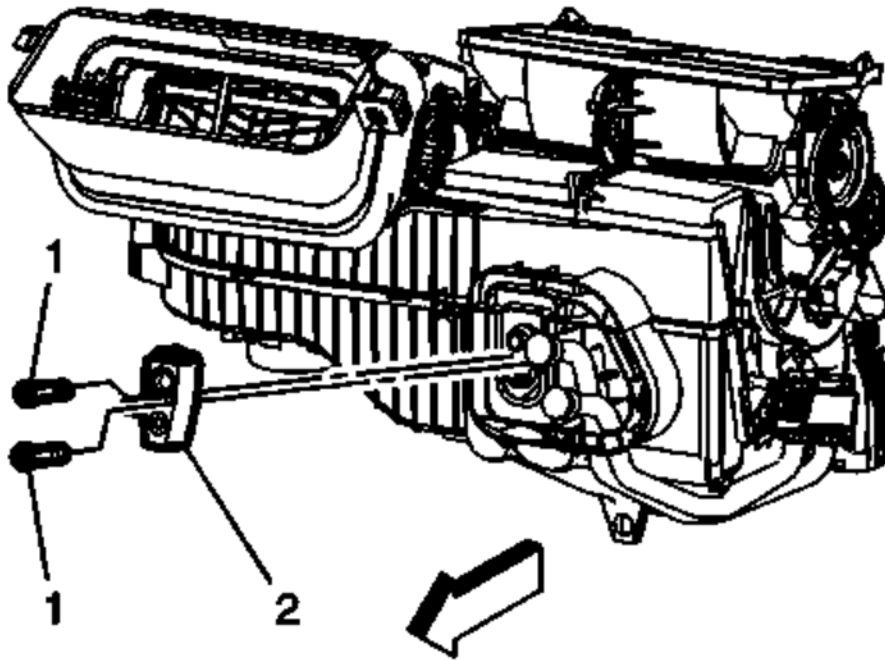


Fig. 67: Evaporator Thermal Expansion Valve
Courtesy of GENERAL MOTORS COMPANY

9. Install the evaporator thermal expansion valve (2) and the fasteners (1) to the air conditioning evaporator and tighten the fasteners to 7 N.m (62 lb in).

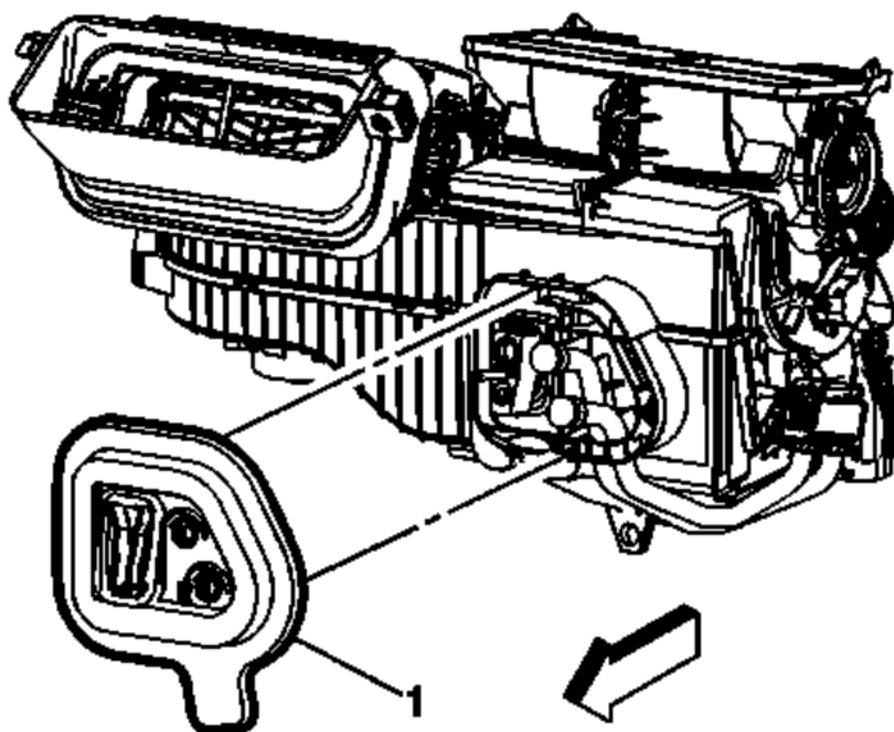


Fig. 68: Seal And Heater

Courtesy of GENERAL MOTORS COMPANY

10. Install the seal (1) to the heater and air conditioning evaporator and blower module assembly.
11. Install the heater and air conditioning evaporator and blower module assembly into the vehicle. Refer to **Heater and Air Conditioning Evaporator and Blower Module Removal and Installation**.
12. Install the instrument panel tie bar assembly. Refer to **Instrument Panel Tie Bar Replacement**.
13. Install the instrument panel assembly. Refer to **Instrument Panel Assembly Replacement**.

HEATER INLET HOSE REPLACEMENT (LUK)

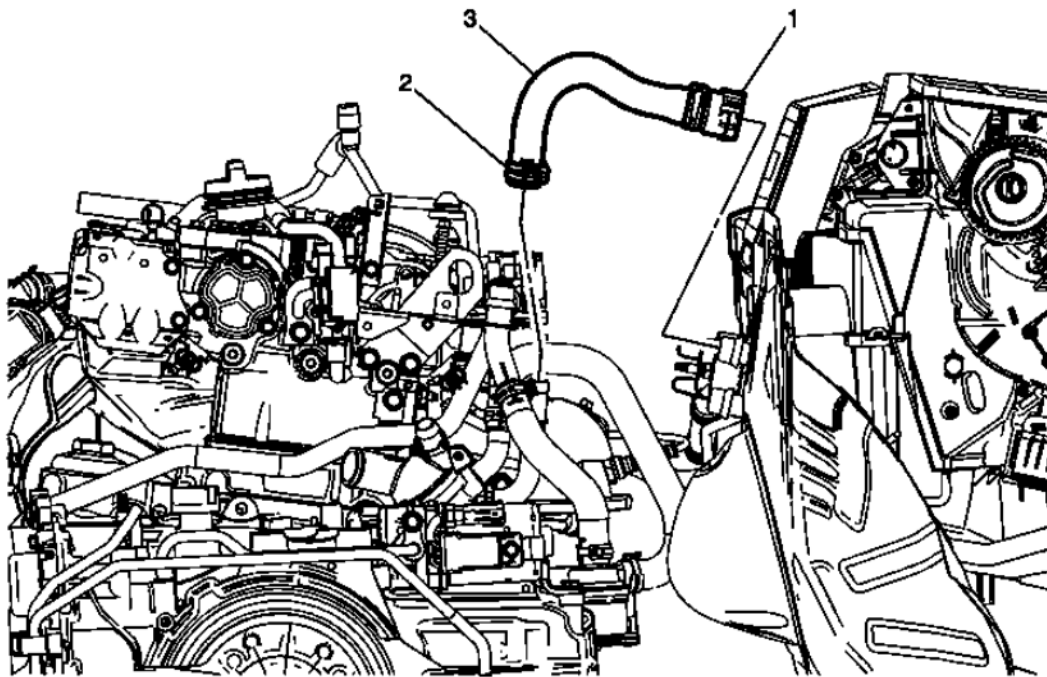


Fig. 69: Heater Inlet Hose, Clamp & Quick Disconnect
 Courtesy of GENERAL MOTORS COMPANY

Heater Inlet Hose Replacement (LUK)

Callout	Component Name
Preliminary Procedures	
1. Drain the cooling system. Refer to Cooling System Draining and Filling (GE 47716) , Cooling System Draining and Filling (Static Fill) . 2. Remove the intake manifold cover. Refer to Intake Manifold Cover Replacement .	
1	Heater Inlet Hose Quick Disconnect Procedure Release the clip and remove the heater inlet hose from the heater core tube.
2	Heater Inlet Hose Clamp Procedure Reposition the heater inlet hose clamp using BO-38185 pliers. Special Tools BO-38185 Hose Clamp Pliers For equivalent regional tools, refer to Special Tools .
3	Heater Inlet Hose

HEATER INLET HOSE REPLACEMENT (LCV)

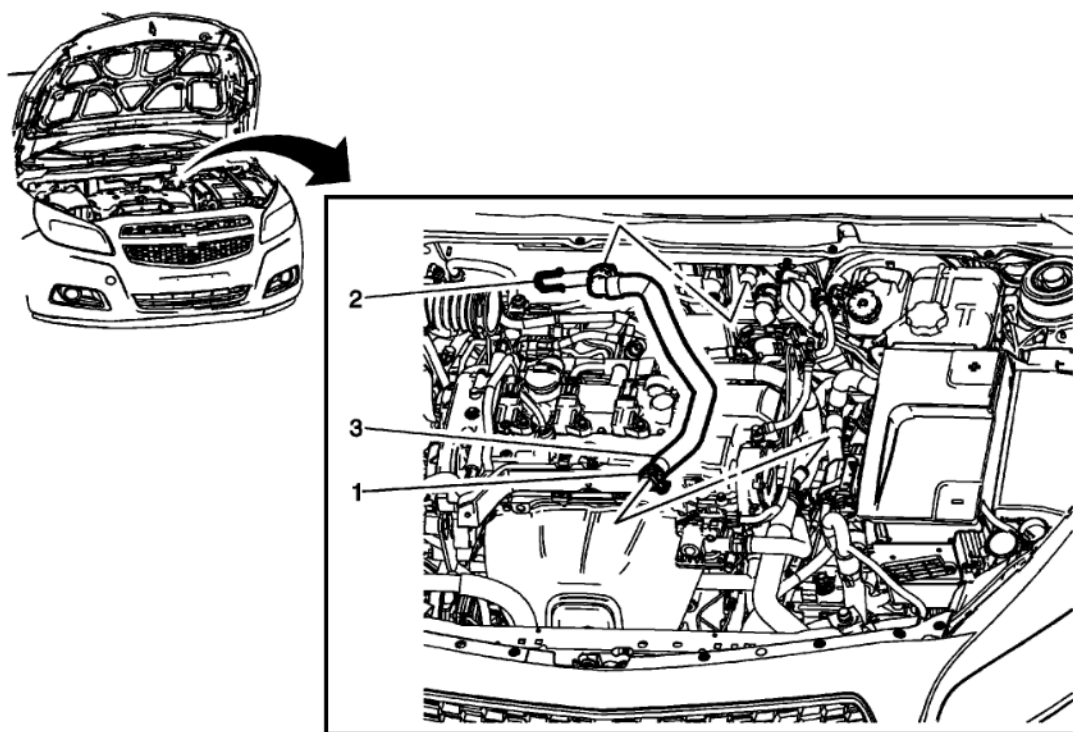


Fig. 70: Heater Inlet Hose (LCV)
 Courtesy of GENERAL MOTORS COMPANY

Heater Inlet Hose Replacement (LCV)

Callout	Component Name
Preliminary Procedures 1. Drain the cooling system. Refer to Cooling System Draining and Filling (GE 47716) , Cooling System Draining and Filling (Static Fill) . 2. Remove the intake manifold cover. Refer to Intake Manifold Cover Replacement (LCV) . 3. Remove the air cleaner resonator and outlet duct. Refer to Air Cleaner Resonator and Outlet Duct Replacement (LCV) .	
1	Heater Inlet Hose Clamp Special Tools BO-38185 Hose Clamp Pliers For equivalent regional tools, refer to Special Tools .
2	Heater Inlet Hose Clip
3	Heater Inlet Hose

HEATER INLET HOSE REPLACEMENT (LTG)

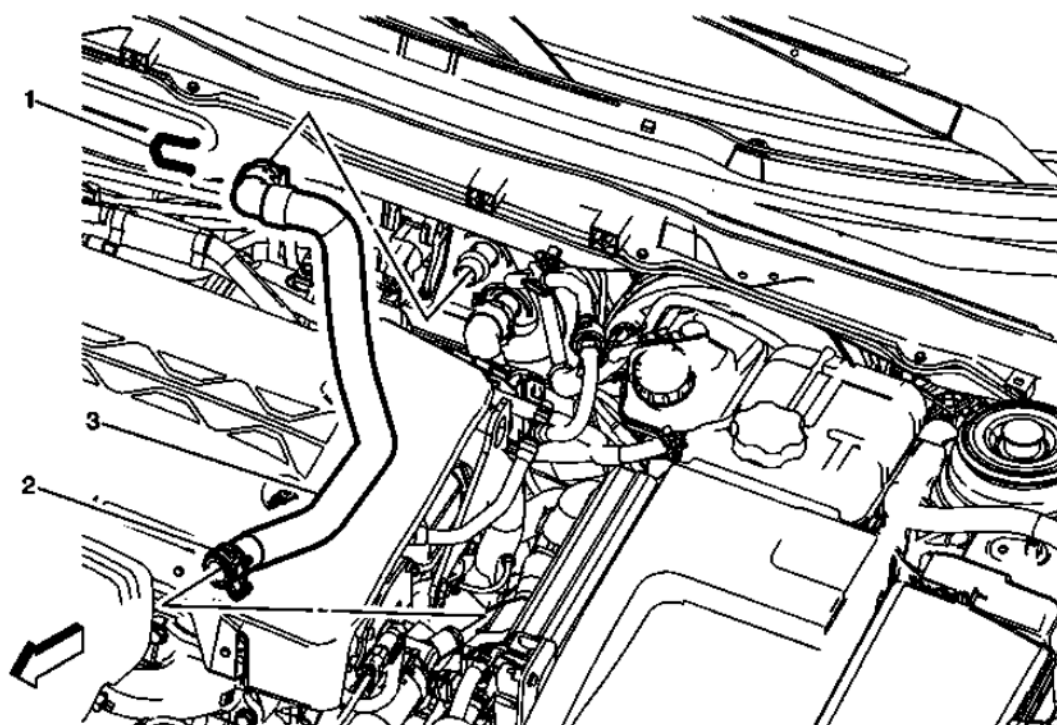


Fig. 71: Heater Inlet Hose (LTG)

Courtesy of GENERAL MOTORS COMPANY

Heater Inlet Hose Replacement (LTG)

Callout	Component Name
Preliminary Procedures	
1. Drain the cooling system. Refer to Cooling System Draining and Filling (GE 47716) , Cooling System Draining and Filling (Static Fill) . 2. Remove the engine control module. Refer to Engine Control Module Replacement (LTG) .	
1	Heater Inlet Hose Quick Connect Retainer
2	Heater Inlet Hose Clamp Procedure Reposition the heater inlet hose clamp using the BO-38185 hose clamp pliers. Special Tools BO-38185 Hose Clamp Pliers For equivalent regional tools. Refer to Special Tools .
3	Heater Inlet Hose Procedure 1. Fill the cooling system to the proper level. Refer to Cooling System Draining and Filling (GE 47716) , Cooling System Draining and Filling (Static Fill) .

2. Inspect the cooling system for leaks. Refer to **Cooling System Leak Testing** .

AUXILIARY HEATER OUTLET HOSE REPLACEMENT (LUK)

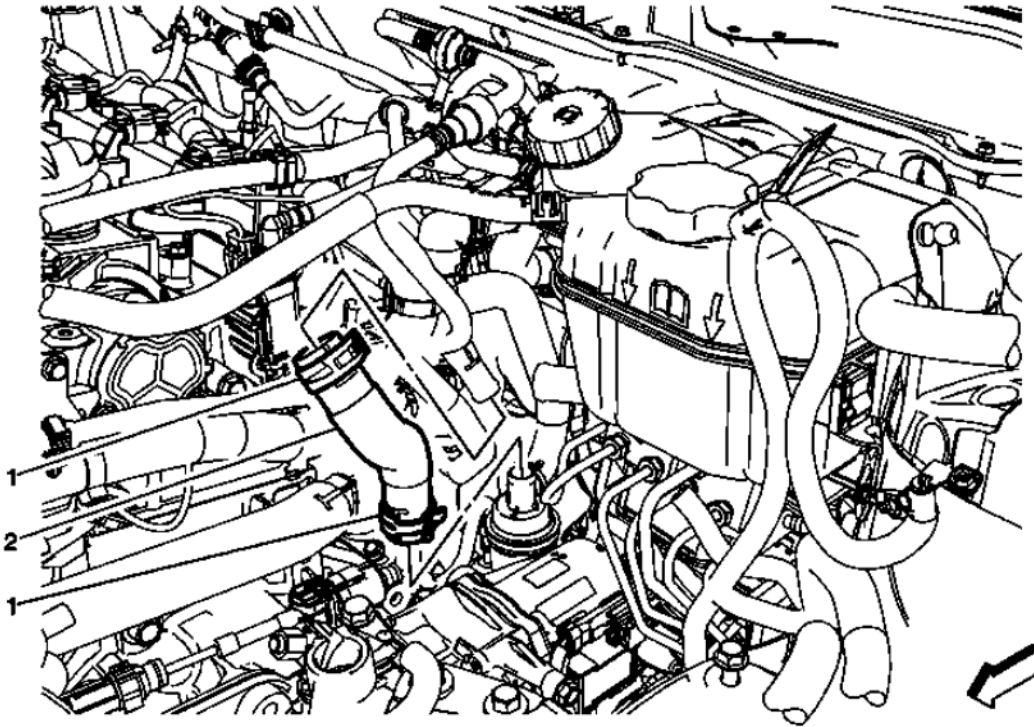


Fig. 72: Auxiliary Heater Outlet Hose (LUK)
Courtesy of GENERAL MOTORS COMPANY

Auxiliary Heater Outlet Hose Replacement (LUK)

Callout	Component Name
Preliminary Procedures	
1. Drain the cooling system. Refer to Cooling System Draining and Filling (GE 47716) , Cooling System Draining and Filling (Static Fill) . 2. Remove the intake manifold cover assembly. 3. Reposition the engine control module out of the way. Refer to Engine Control Module Replacement . 4. Remove the battery tray. Refer to Battery Tray Replacement . 5. Reposition the radiator surge tank outlet hose out of the way. Refer to Radiator Surge Tank Outlet Hose Replacement .	
1	Auxiliary Heater Outlet Hose Clamp (Qty: 2) Procedure Reposition the heater inlet hose clamp using the BO-38185 hose clamp pliers.

	Special Tools BO-38185 Hose Clamp Pliers For equivalent regional tools, refer to Special Tools .
2	Auxiliary Heater Outlet Hose

HEATER OUTLET HOSE REPLACEMENT (LUK)

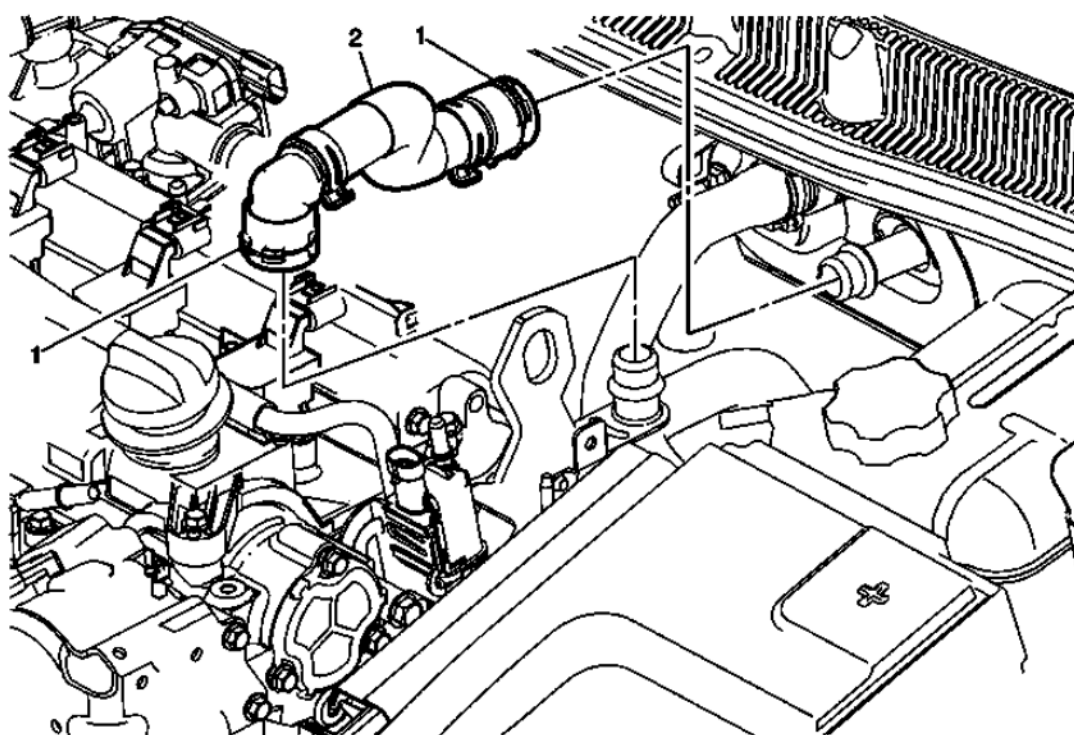


Fig. 73: Heater Outlet Hose & Quick Disconnect (LUK)

Courtesy of GENERAL MOTORS COMPANY

Heater Outlet Hose Replacement (LUK)

Callout	Component Name
Preliminary Procedures 1. Drain the cooling system. Refer to Cooling System Draining and Filling (GE 47716) , Cooling System Draining and Filling (Static Fill) . 2. Remove the intake manifold cover. Refer to Intake Manifold Cover Replacement .	
1	Heater Outlet Hose Quick Disconnect Procedure Release the clips and remove the heater outlet hose from the heater core tube.
2	Heater Outlet Hose

HEATER OUTLET HOSE REPLACEMENT (LCV)

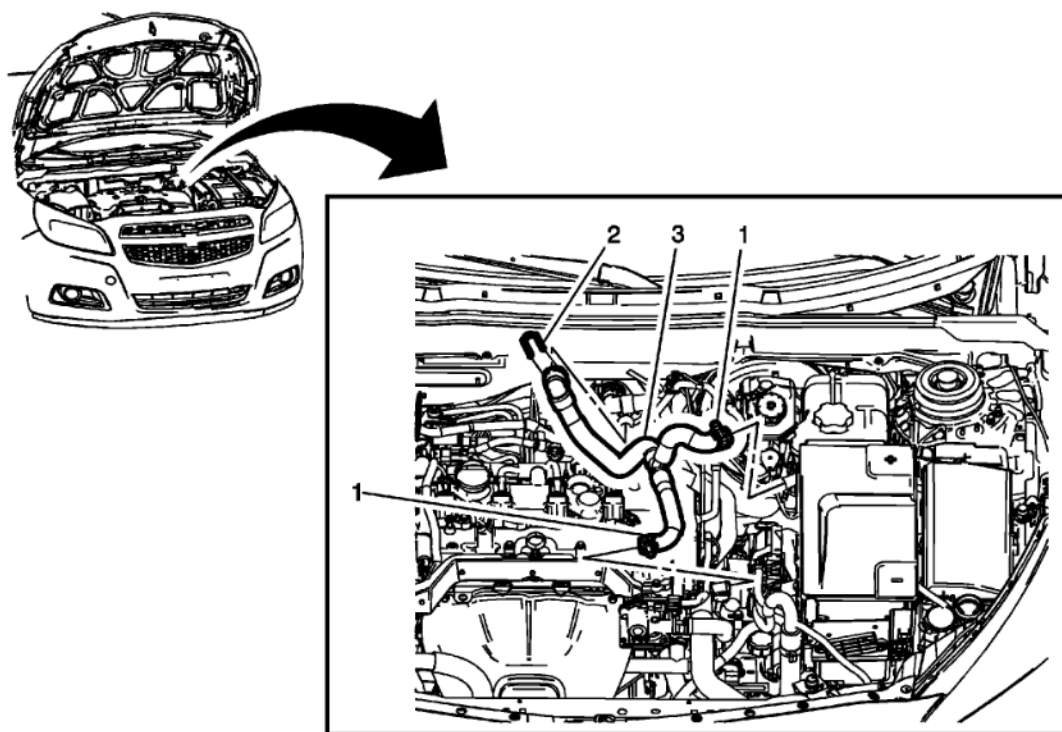


Fig. 74: Heater Outlet Hose (LCV)
 Courtesy of GENERAL MOTORS COMPANY

Heater Outlet Hose Replacement (LCV)

Callout	Component Name
Preliminary Procedures 1. Drain the cooling system. Refer to Cooling System Draining and Filling (GE 47716) , Cooling System Draining and Filling (Static Fill) . 2. Remove the intake manifold cover. Refer to Intake Manifold Cover Replacement (LCV) . 3. Remove the air cleaner resonator and outlet duct. Refer to Air Cleaner Resonator and Outlet Duct Replacement (LCV) .	
1	Heater Outlet Hose Clamp (Qty: 2) Special Tools BO-38185 Hose Clamp Pliers For equivalent regional tools, refer to Special Tools .
2	Heater Outlet Hose Clip
3	Heater Outlet Hose

HEATER OUTLET HOSE REPLACEMENT (LTG)

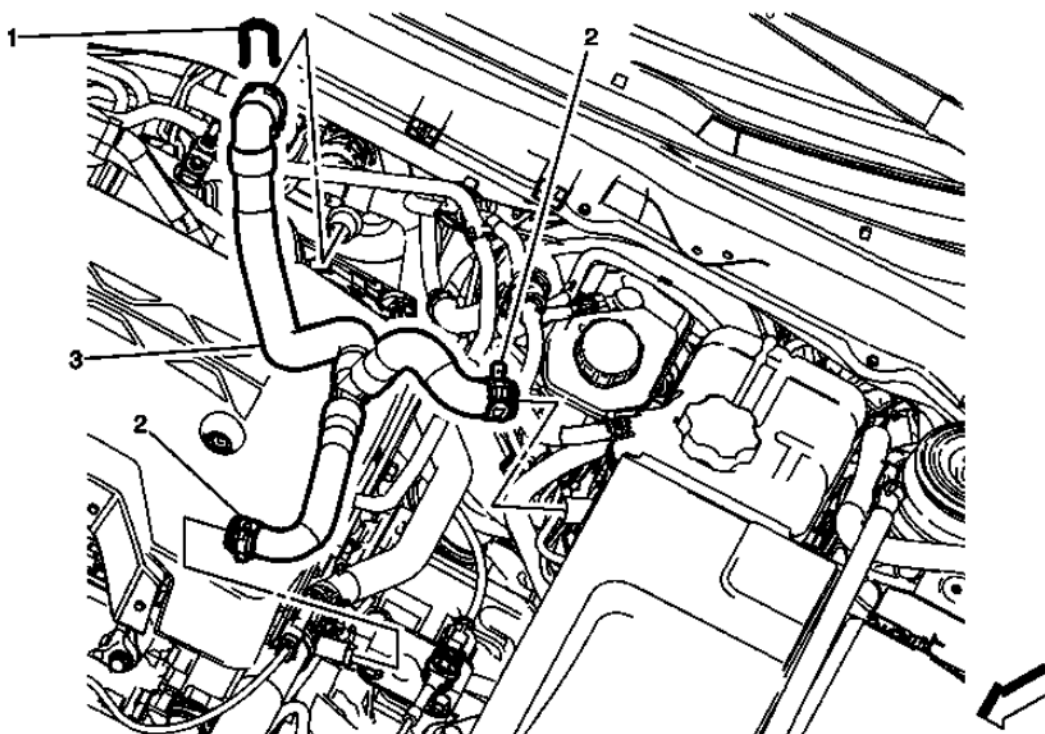


Fig. 75: Heater Outlet Hose (LTG)

Courtesy of GENERAL MOTORS COMPANY

Heater Outlet Hose Replacement (LTG)

Callout	Component Name
Preliminary Procedure 1. Remove the engine control module. Refer to <u>Engine Control Module Replacement (LTG)</u> . 2. Drain the cooling system. Refer to <u>Cooling System Draining and Filling (GE 47716)</u> , <u>Cooling System Draining and Filling (Static Fill)</u> .	
1	Heater Outlet Hose Connector Retaining Clip
2	Heater Outlet Hose Clamp (Qty: 2) Procedure Reposition the heater outlet hose clamps using the BO-38185 hose clamp pliers. Special Tools BO-38185 Hose Clamp Pliers For equivalent regional tools, refer to <u>Special Tools</u> .
3	Heater Outlet Hose Procedure 1. Fill the cooling system to the proper level. Refer to <u>Cooling System Draining and Filling (GE 47716)</u> , <u>Cooling System Draining and Filling (Static Fill)</u> .

2. Inspect the cooling system for leaks. Refer to **Cooling System Leak Testing** .

HEATER CORE OUTLET TUBE REPLACEMENT

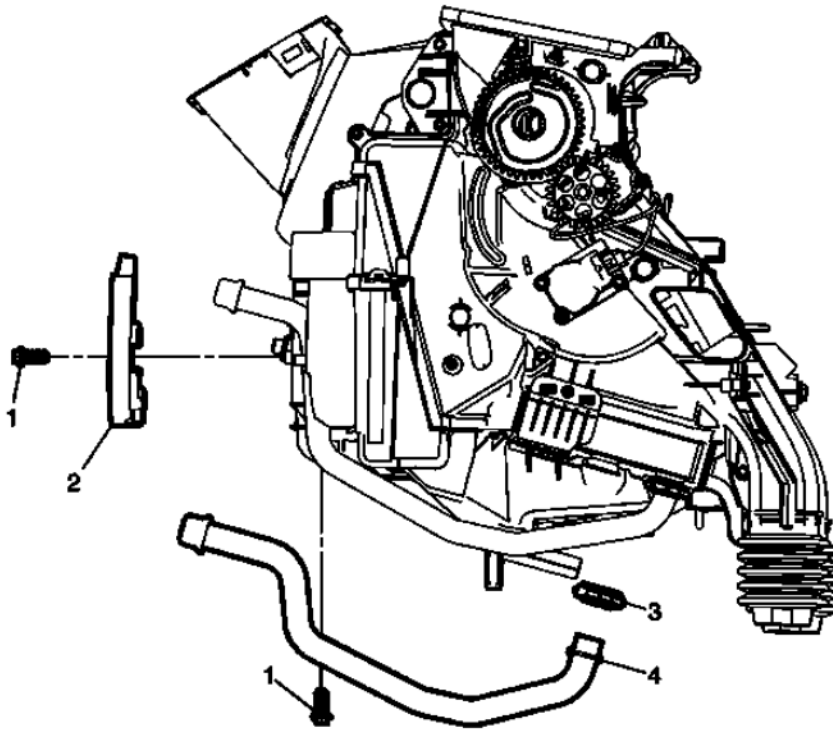


Fig. 76: Heater Core Outlet Tube
Courtesy of GENERAL MOTORS COMPANY

Heater Core Outlet Tube Replacement

Callout	Component Name
Preliminary Procedure Remove the heater and air conditioning evaporator case. Refer to Heater and Air Conditioning Evaporator and Blower Module Removal and Installation .	
1	Bracket Heater Core Outlet Tube Bolt (Qty: 2) CAUTION: Refer to Fastener Caution .
2	Heater Core Outlet Tube Brace
3	Heater Core Outlet Tube Clamp
4	Heater Core Outlet Tube

HEATER CORE INLET TUBE REPLACEMENT

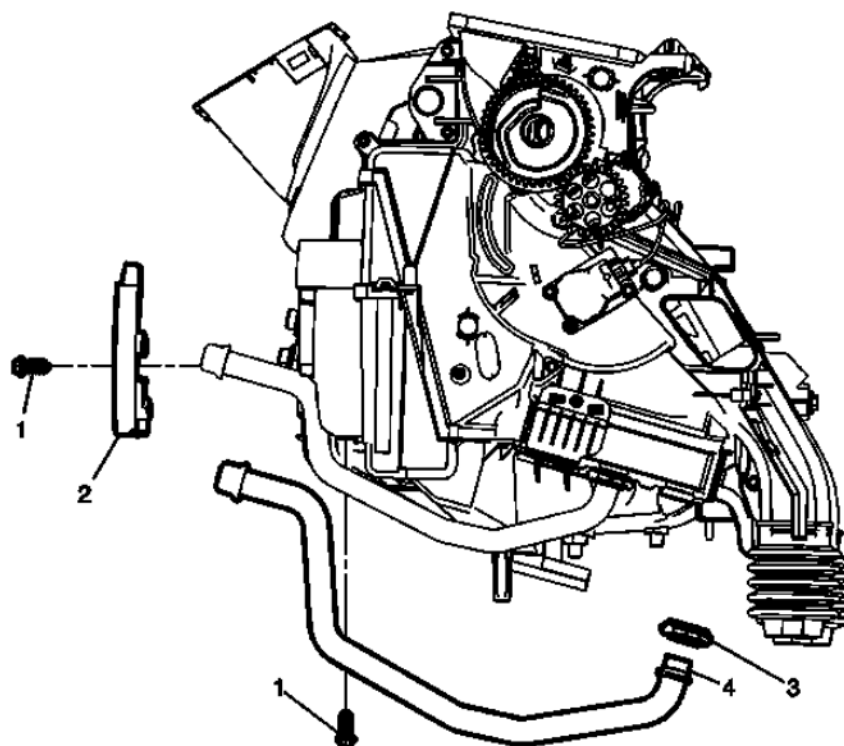


Fig. 77: Heater Core Inlet Tube
 Courtesy of GENERAL MOTORS COMPANY

Heater Core Inlet Tube Replacement

Callout	Component Name
Preliminary Procedure Remove the heater and air conditioning evaporator case. Refer to Heater and Air Conditioning Evaporator and Blower Module Removal and Installation .	
1	Bracket Heater Core Inlet Tube Bolt (Qty: 2) CAUTION: Refer to <u>Fastener Caution</u> .
2	Heater Core Outlet Tube Brace
3	Heater Core Outlet Tube Clamp
4	Heater Core Outlet Tube

AIR INLET ASSEMBLY REPLACEMENT

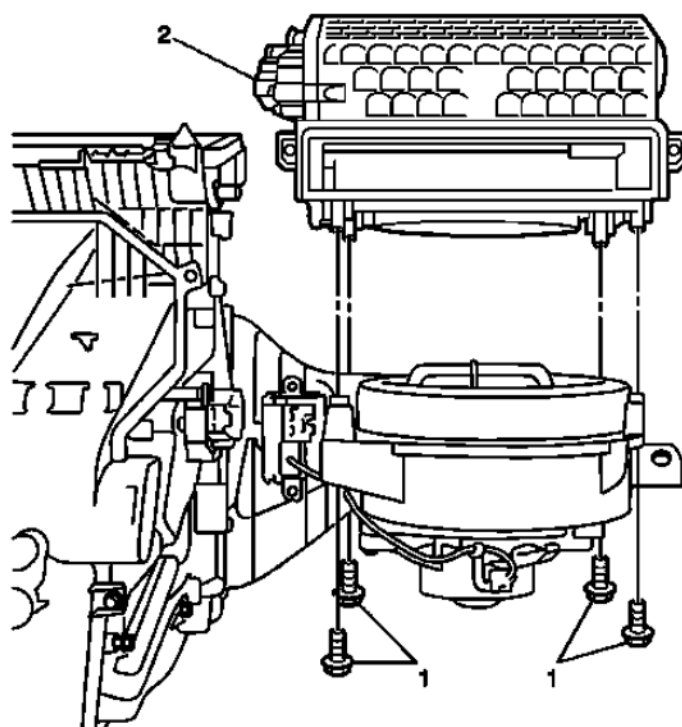


Fig. 78: Air Inlet Assembly

Courtesy of GENERAL MOTORS COMPANY

Air Inlet Assembly Replacement

Callout	Component Name
Preliminary Procedures 1. Remove the Heater and Air Conditioning Evaporator and Blower Module. Refer to <u>Heater and Air Conditioning Evaporator and Blower Module Removal and Installation</u>. 2. Disconnect the electrical connectors as necessary.	
1	Air Inlet Housing Fastener (Qty: 4) CAUTION: Refer to <u>Fastener Caution</u> .
2	Air Inlet Housing

BLOWER MOTOR REPLACEMENT

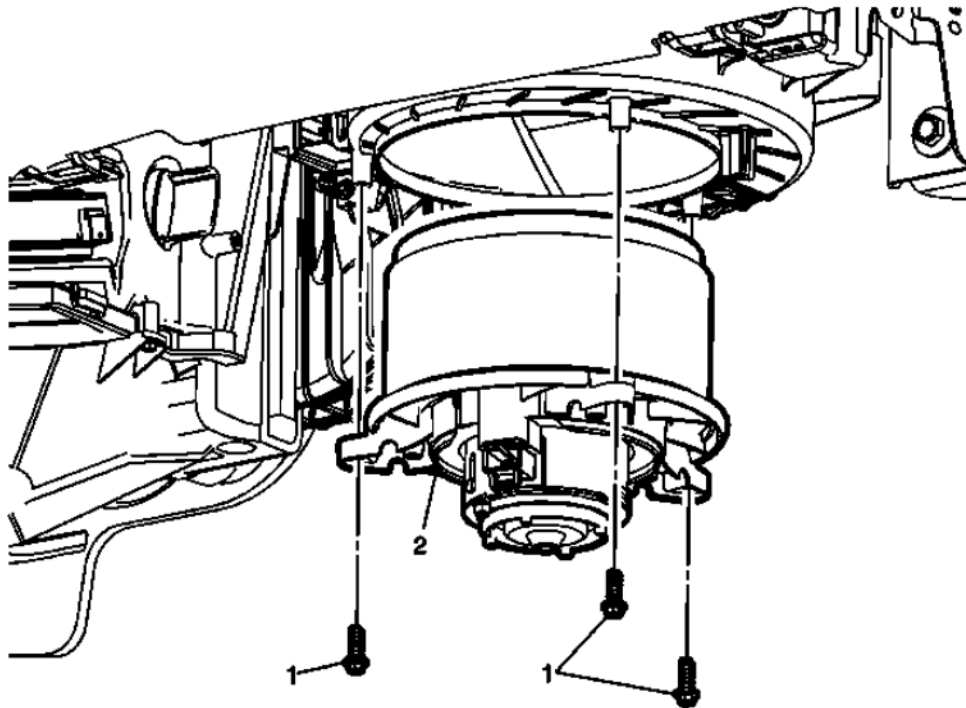


Fig. 79: Blower Motor
 Courtesy of GENERAL MOTORS COMPANY

Blower Motor Replacement

Callout	Component Name
Preliminary Procedure	
1. Remove the floor air outlet duct. Refer to <u>Floor Air Outlet Duct Replacement - Right Side</u> . 2. Disconnect the blower motor electrical connector.	
1	Blower Motor Fastener (Qty: 3) CAUTION: Refer to <u>Fastener Caution</u> .
2	Blower Motor

SIDE WINDOW DEFOGGER OUTLET GRILLE REPLACEMENT

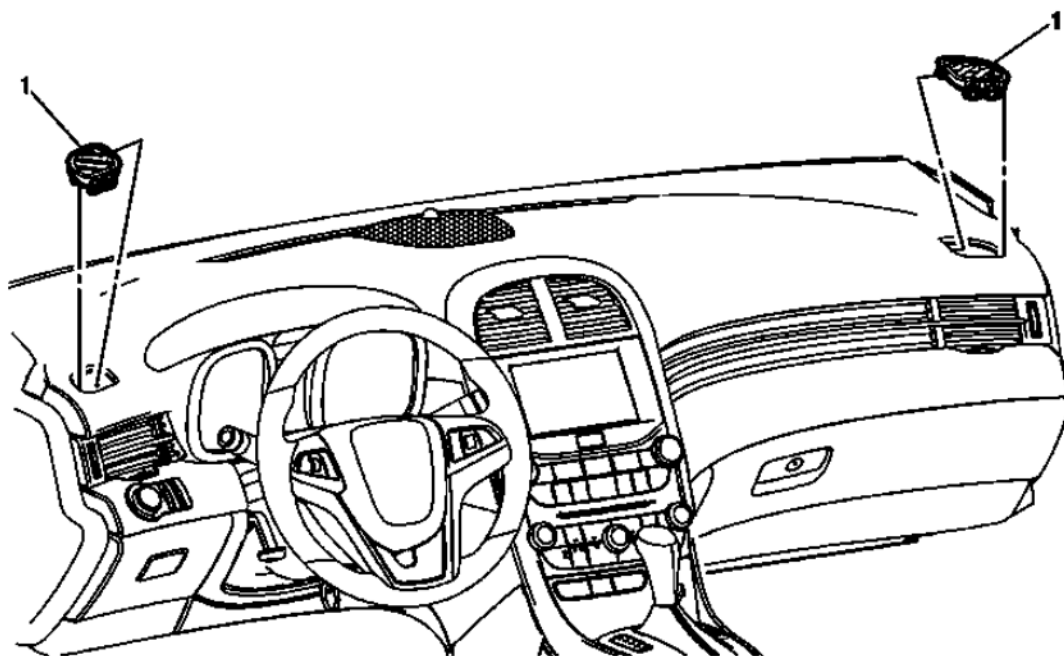


Fig. 80: Side Window Defogger Outlet Grille
 Courtesy of GENERAL MOTORS COMPANY

Side Window Defogger Outlet Grille Replacement

Callout	Component Name
1	Side Window Defogger Outlet Grille Assembly (Right or Left) Procedure Use a flat bladed plastic trim tool in order to release the right or left side window defogger outlet grille from the instrument panel.

INSTRUMENT PANEL OUTER AIR OUTLET REPLACEMENT - LEFT SIDE

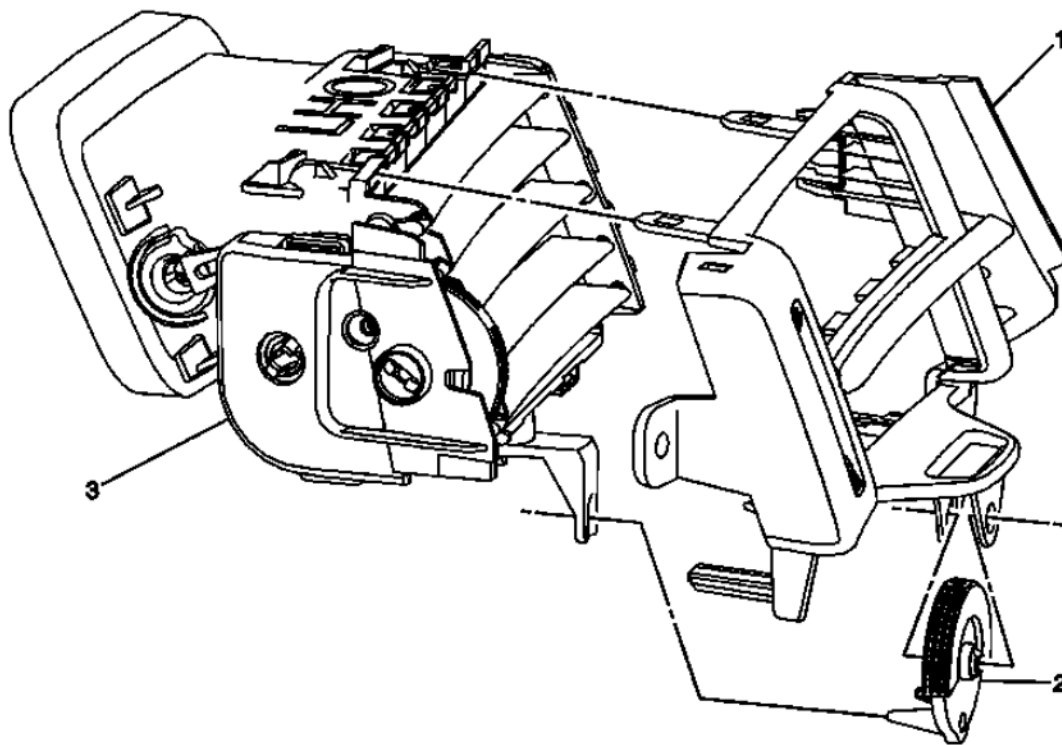


Fig. 81: Instrument Panel Outer Air Outlet - Left Side
 Courtesy of GENERAL MOTORS COMPANY

Instrument Panel Outer Air Outlet Replacement - Left Side

Callout	Component Name
1	Instrument Panel Trim Plate Applique Refer to <u>Instrument Panel Trim Plate Applique Replacement - Left Side</u> .
2	Air Outlet Vane Thumb Wheel Procedure Use a flat bladed tool to aid in the removal of the air outlet vane thumb wheel from the instrument panel trim plate applique.
3	Instrument Panel Outer Air Outlet Procedures 1. Release the retainer tabs securing the air outlet assembly to the instrument panel trim plate applique. 2. Ensure the air outlet assembly and the air outlet vane thumb wheel align properly when reassembling.

INSTRUMENT PANEL CENTER AIR OUTLET REPLACEMENT

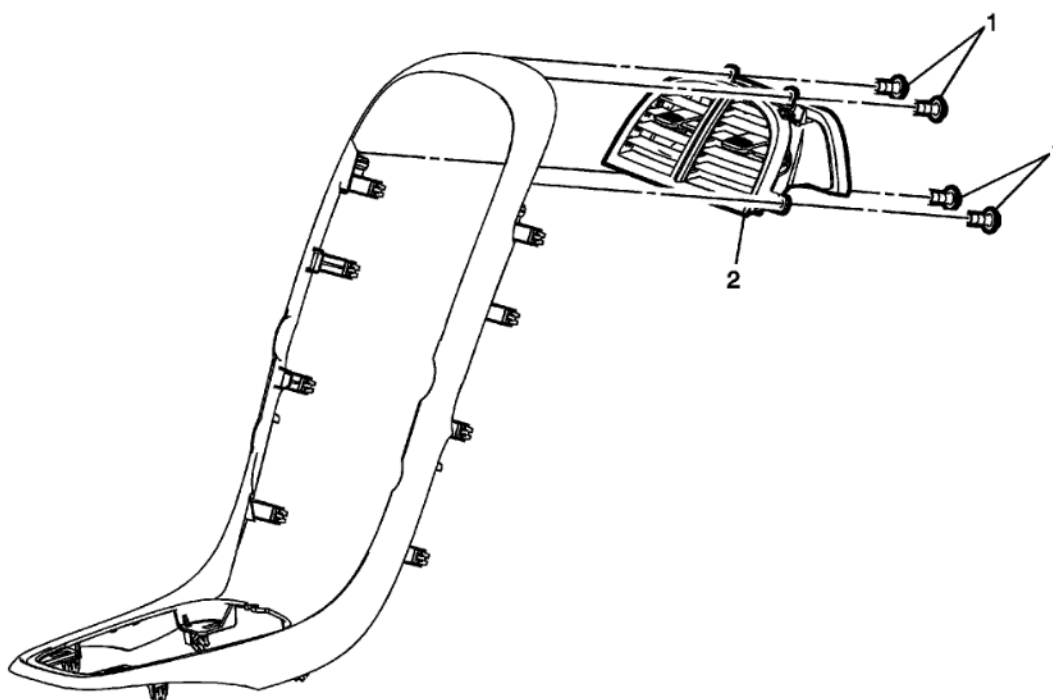


Fig. 82: Instrument Panel Center Air Outlet
 Courtesy of GENERAL MOTORS COMPANY

Instrument Panel Center Air Outlet Replacement

Callout	Component Name
Preliminary Procedure Remove the instrument panel accessory bezel. Refer to <u>Instrument Panel Accessory Bezel Replacement</u> .	
1	Instrument Panel Center Air Outlet Fasteners (Qty: 4) CAUTION: Refer to <u>Fastener Caution</u> .
2	Instrument Panel Center Air Outlet Assembly

INSTRUMENT PANEL OUTER AIR OUTLET REPLACEMENT - RIGHT SIDE

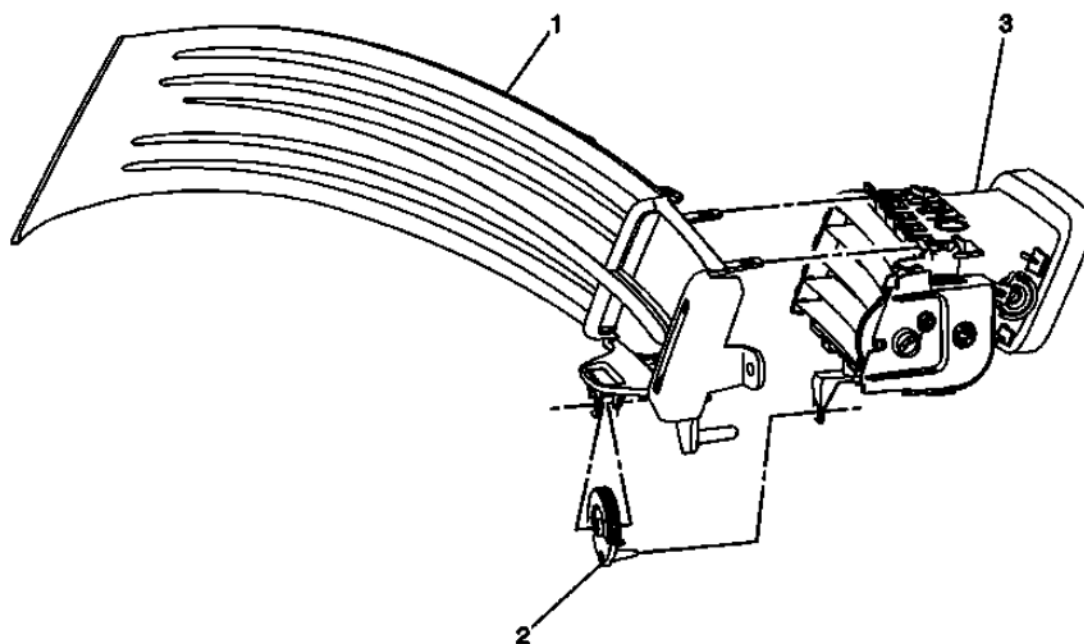


Fig. 83: Instrument Panel Outer Air Outlet - Right Side
 Courtesy of GENERAL MOTORS COMPANY

Instrument Panel Outer Air Outlet Replacement - Right Side

Callout	Component Name
1	Instrument Panel Molding Assembly Refer to Instrument Panel Molding Replacement - Passenger Side .
2	Air Outlet Vane Thumb Wheel Procedure Use a flat bladed tool to aid in the removal of the air outlet vane thumb wheel from the instrument panel trim plate applique.
3	Instrument Panel Outer Air Outlet Procedures 1. Release the retainer tabs securing the air outlet assembly to the instrument panel trim plate applique. 2. Ensure the air outlet assembly and the air outlet vane thumb wheel align properly when reassembling.

BODY AIR OUTLET DEFLECTOR REPLACEMENT

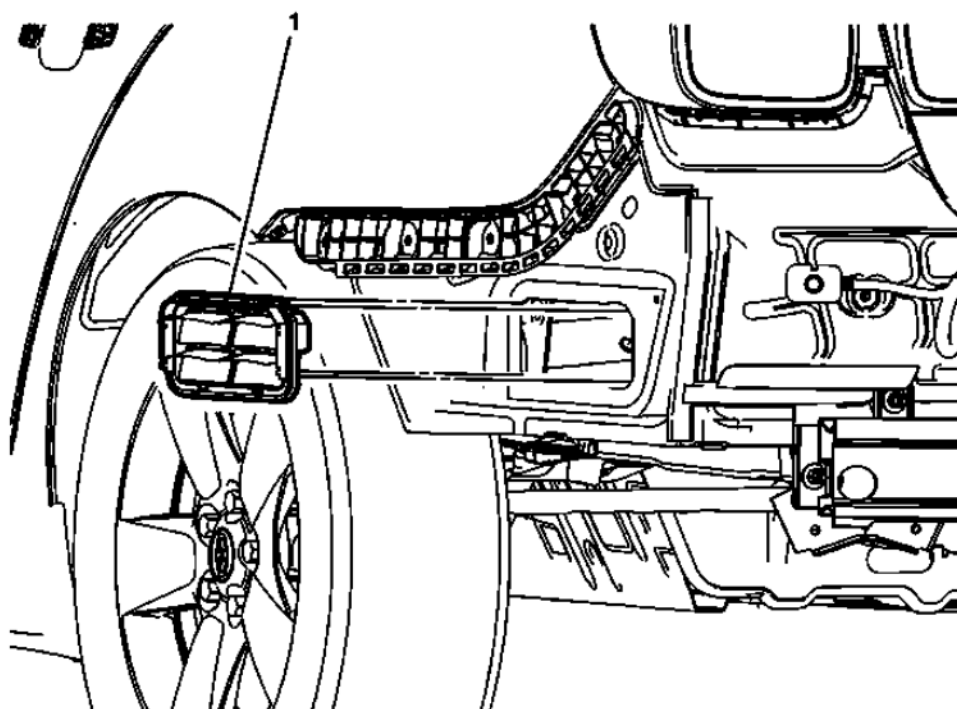


Fig. 84: Body Air Outlet Deflector
 Courtesy of GENERAL MOTORS COMPANY

Body Air Outlet Deflector Replacement

Callout	Component Name
Preliminary Procedure Remove the rear bumper fascia. Refer to <u>Rear Bumper Fascia Replacement</u> .	
1	Body Air Outlet Deflector NOTE: Use a small flat-bladed tool to release the body air outlet deflector

INSTRUMENT PANEL CENTER AIR OUTLET DUCT REPLACEMENT

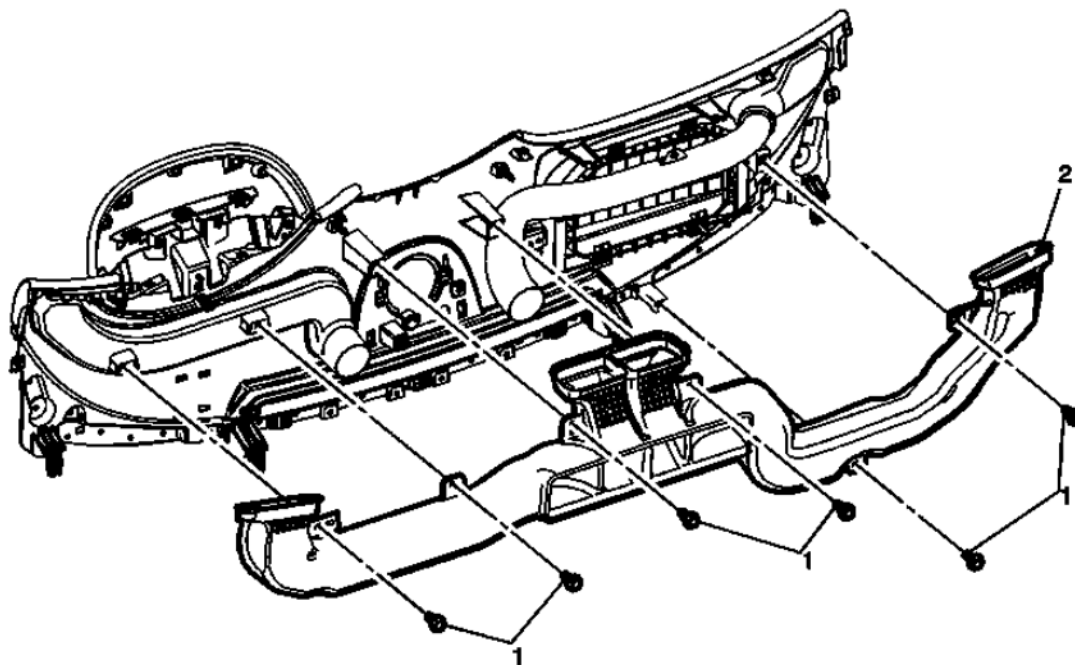


Fig. 85: Instrument Panel Center Air Outlet Duct
 Courtesy of GENERAL MOTORS COMPANY

Instrument Panel Center Air Outlet Duct Replacement

Callout	Component Name
Preliminary Procedures	
1. Remove the Instrument panel assembly. Refer to <u>Instrument Panel Assembly Replacement</u> . 2. Reposition any wiring or hoses to gain access to defroster duct.	
1	Center Air Outlet Duct Screw (Qty: 6) CAUTION: Refer to <u>Fastener Caution</u>
2	Center Air Outlet Duct

WINDSHIELD DEFROSTER NOZZLE DUCT REPLACEMENT

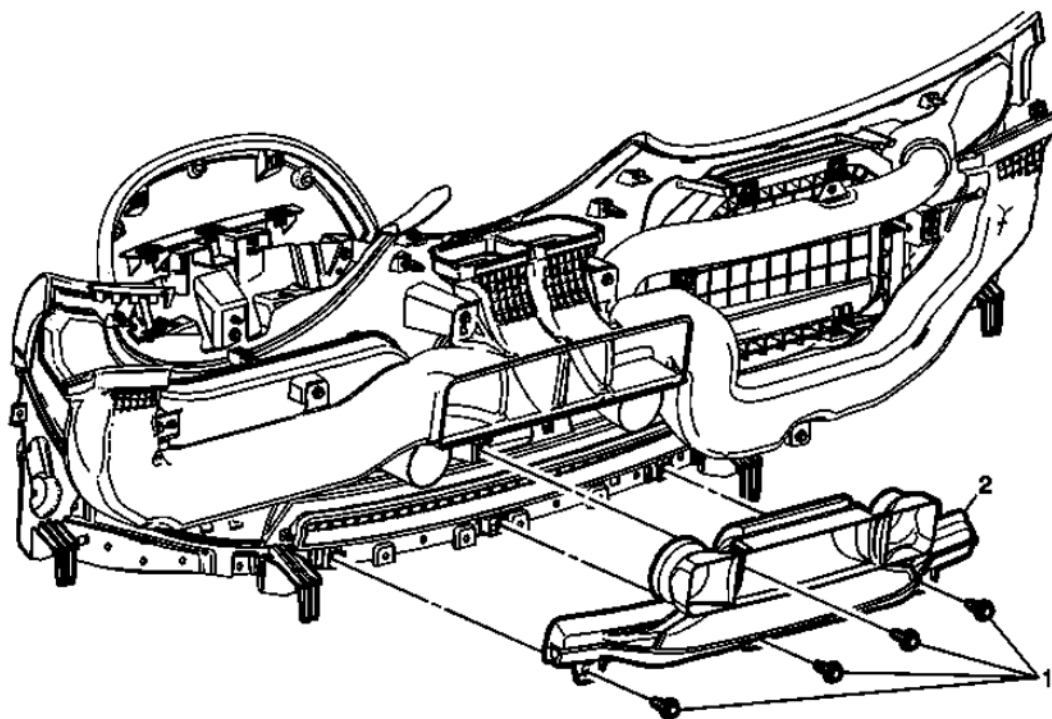


Fig. 86: Windshield Defroster Nozzle Duct
 Courtesy of GENERAL MOTORS COMPANY

Windshield Defroster Nozzle Duct Replacement

Callout	Component Name
Preliminary Procedure Remove the instrument panel assembly. Refer to <u>Instrument Panel Assembly Replacement</u> .	
1	Windshield Defroster Nozzle Duct Fasteners (Qty: 4) CAUTION: Refer to <u>Fastener Caution</u> .
2	Windshield Defroster Nozzle Duct

WINDSHIELD DEFROSTER NOZZLE AIR DEFLECTOR REPLACEMENT

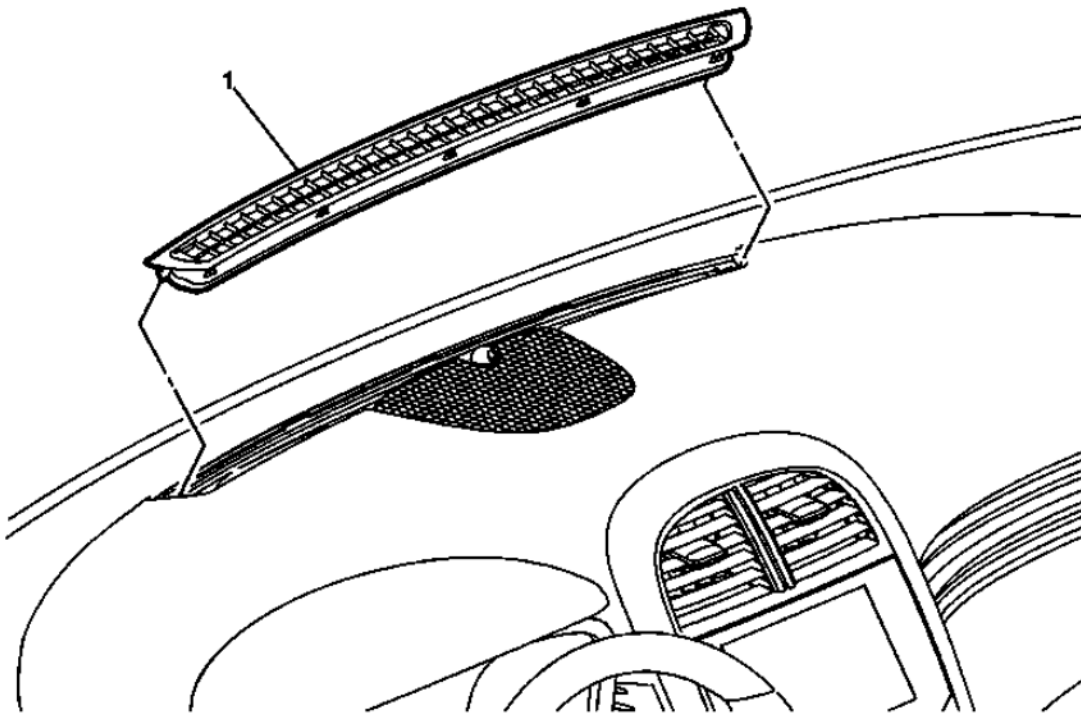


Fig. 87: Windshield Defroster Nozzle Air Deflector
 Courtesy of GENERAL MOTORS COMPANY

Windshield Defroster Nozzle Air Deflector Replacement

Callout	Component Name
1	Windshield Defroster Nozzle Air Deflector Assembly Procedure Use a flat bladed plastic trim tool in order to release the tabs securing the windshield defroster nozzle air deflector to the instrument panel assembly. NOTE: Use caution when re-installing the new defroster grill to avoid damage to the foam seal on the bottom.

SIDE WINDOW DEFOGGER OUTLET DUCT REPLACEMENT - RIGHT SIDE

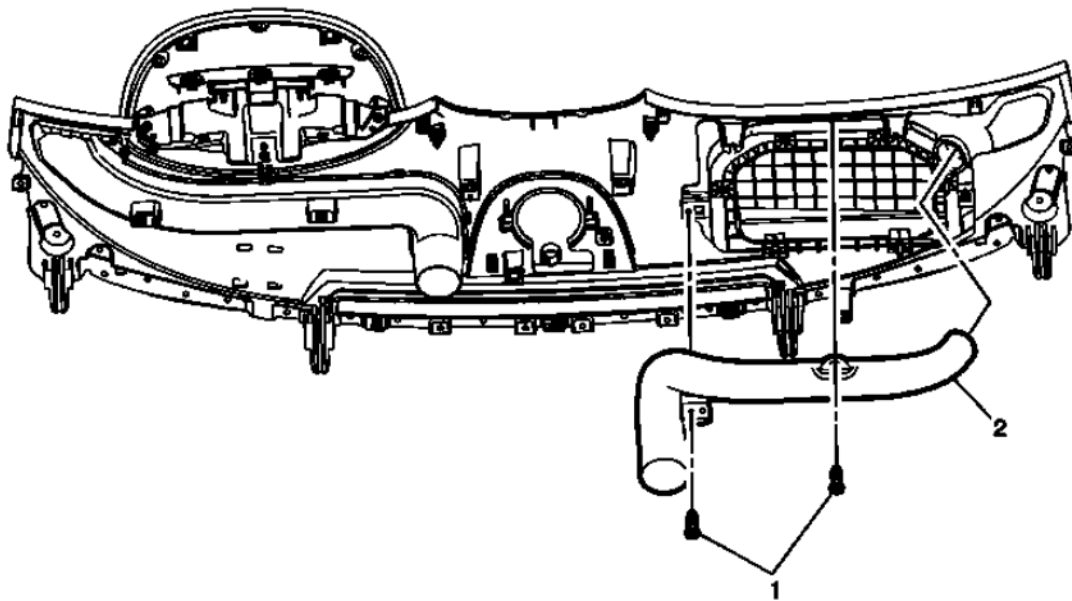


Fig. 88: Side Window Defogger Outlet Duct - Right Side
 Courtesy of GENERAL MOTORS COMPANY

Side Window Defogger Outlet Duct Replacement - Right Side

Callout	Component Name
Preliminary Procedure Remove the instrument panel center air outlet duct. Refer to <u>Instrument Panel Center Air Outlet Duct Replacement</u> .	
1	Side Window Defogger Outlet Duct Fastener (Qty: 2) CAUTION: Refer to <u>Fastener Caution</u> .
2	Side Window Defogger Outlet Duct - Right Side

FLOOR AIR OUTLET DUCT REPLACEMENT - LEFT SIDE

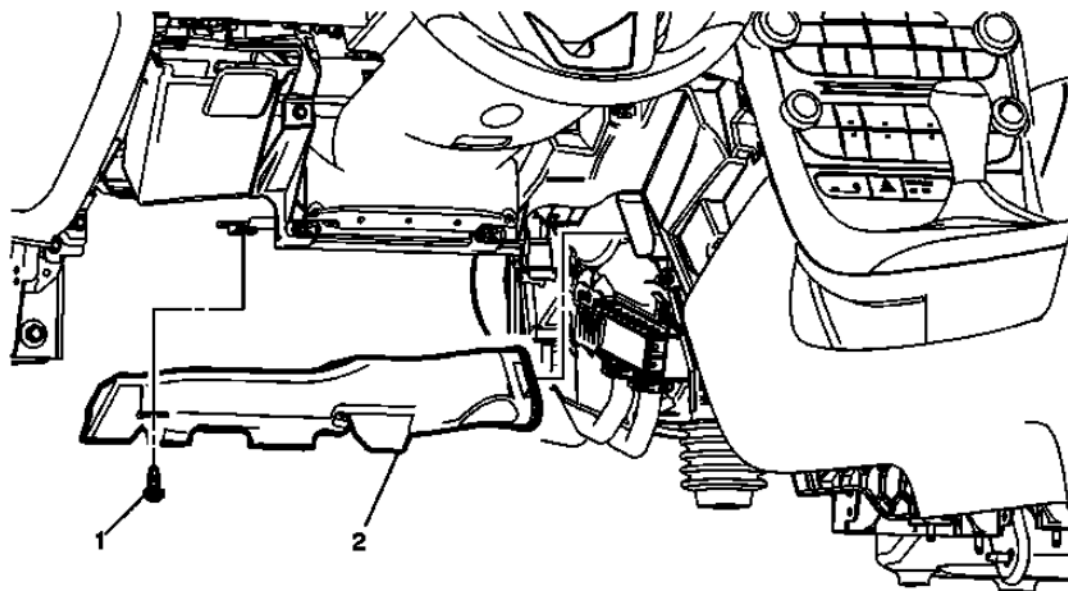


Fig. 89: Floor Air Outlet Duct - Left Side
 Courtesy of GENERAL MOTORS COMPANY

Floor Air Outlet Duct Replacement - Left Side

Callout	Component Name
Preliminary Procedures	
Remove the I/P insulator panel - left side. Refer to <u>Instrument Panel Insulator Replacement</u>	
1	Floor Air Outlet Duct Fastener
2	Floor Air Outlet Duct

FLOOR AIR OUTLET DUCT REPLACEMENT - RIGHT SIDE

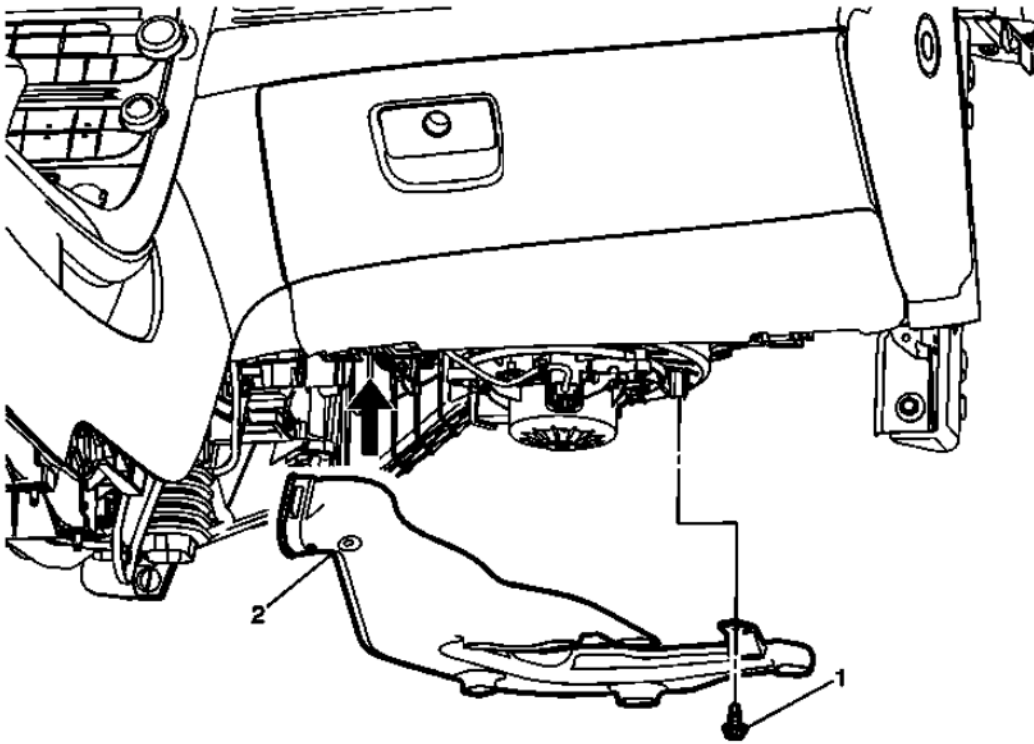


Fig. 90: Floor Air Outlet Duct - Right Side
 Courtesy of GENERAL MOTORS COMPANY

Floor Air Outlet Duct Replacement - Right Side

Callout	Component Name
Preliminary Procedures	
Remove the instrument panel compartment door frame. Refer to <u>Instrument Panel Compartment Door Opening Frame Replacement</u> .	
1	Floor Air Outlet Duct Fastener
2	Floor Air Outlet Duct

FLOOR REAR AIR OUTLET DUCT REPLACEMENT - LEFT SIDE

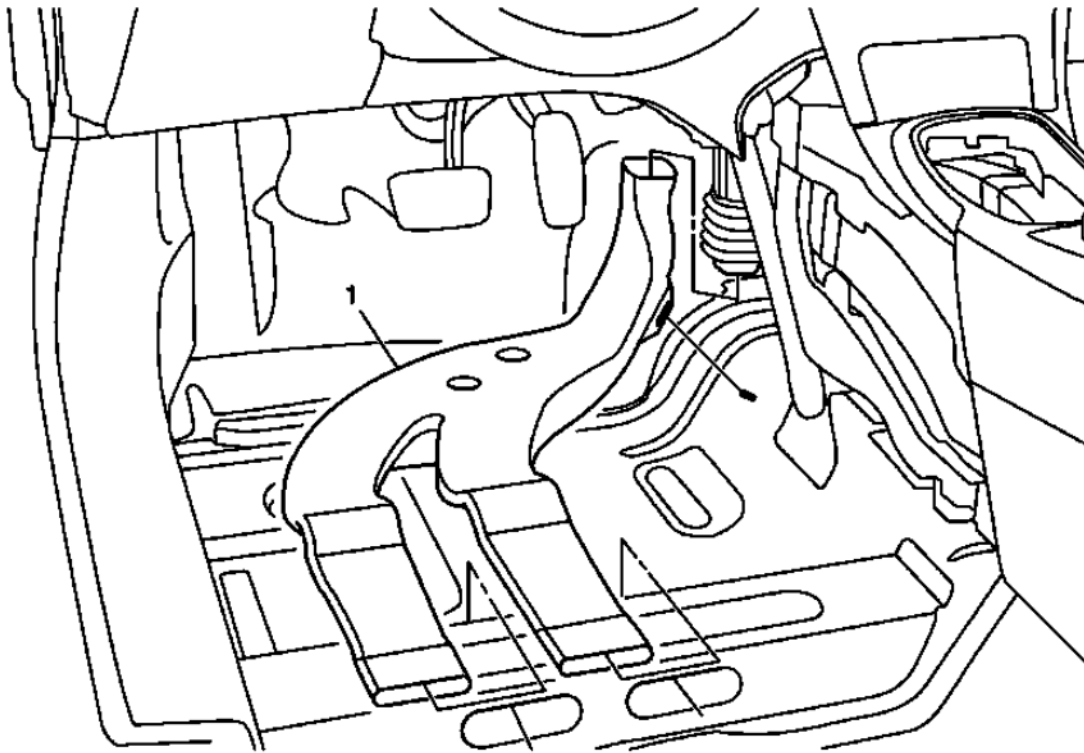


Fig. 91: Floor Rear Air Outlet Duct - Left Side (CJ2)
 Courtesy of GENERAL MOTORS COMPANY

Floor Rear Air Outlet Duct Replacement - Left Side

Callout	Component Name
Preliminary Procedure Remove the left front floor panel carpet. Refer to Front Floor Panel Carpet Replacement - Left Side .	
1	Floor Rear Air Outlet Duct Procedure 1. If equipped with temperature sensor, disconnect the electrical connector. 2. Remove the floor rear air outlet duct from the retainer and the heater air conditioning evaporator and blower module. 3. Remove the floor rear air outlet duct from the vehicle. 4. If replacing the floor rear air outlet duct, transfer all necessary components.

FLOOR REAR AIR OUTLET DUCT REPLACEMENT - RIGHT SIDE

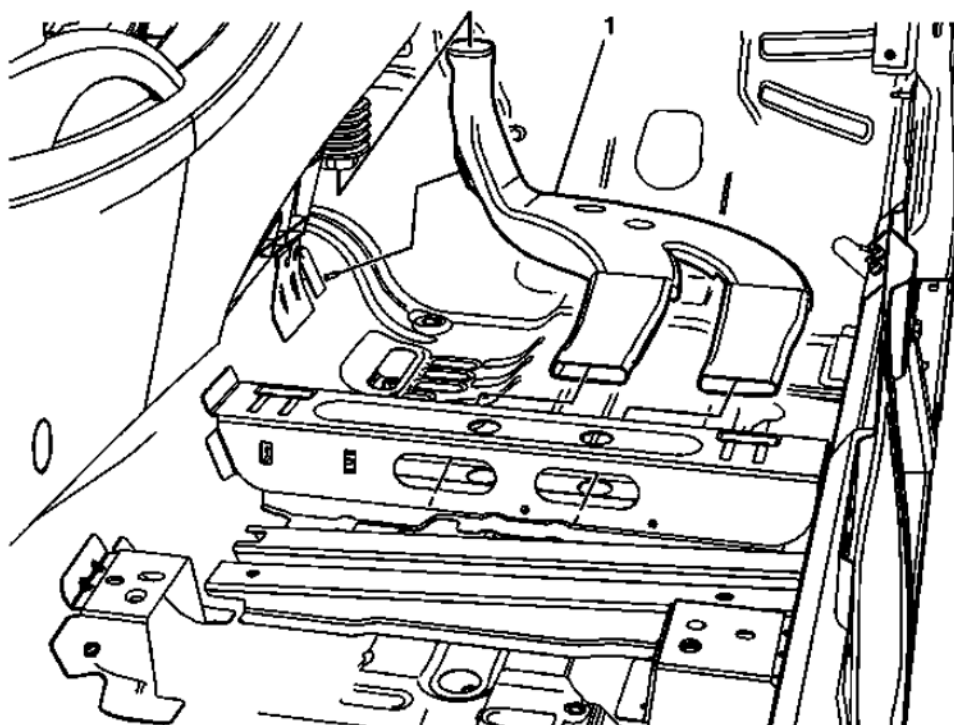


Fig. 92: Floor Rear Air Outlet Duct - Right Side
 Courtesy of GENERAL MOTORS COMPANY

Floor Rear Air Outlet Duct Replacement - Right Side

Callout	Component Name
Preliminary Procedure Remove the right front floor panel carpet. Refer to <u>Front Floor Panel Carpet Replacement - Right Side</u> .	
1	Floor Rear Air Outlet Duct Procedure 1. Remove the floor rear air outlet duct from the retainer and the heater air conditioning evaporator and blower module. 2. Remove the floor rear air outlet duct from vehicle.

HEATER CORE REPLACEMENT

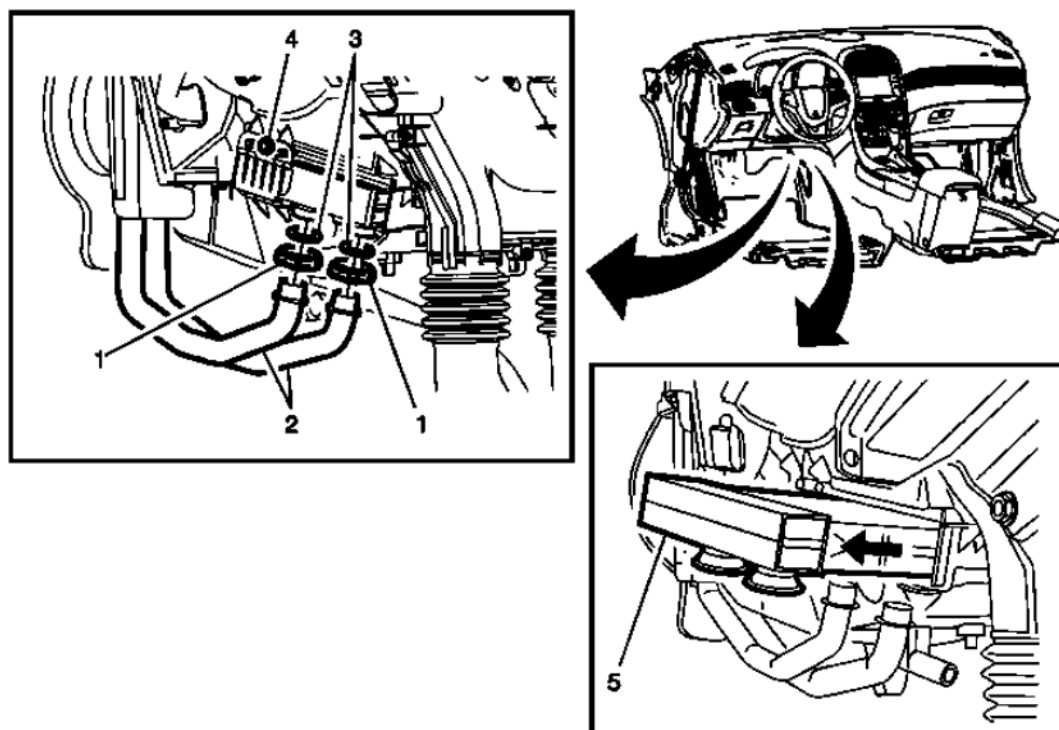


Fig. 93: Heater Core
Courtesy of GENERAL MOTORS COMPANY

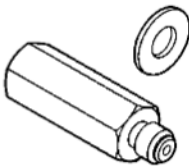
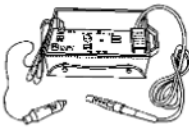
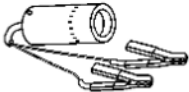
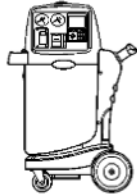
Heater Core Replacement

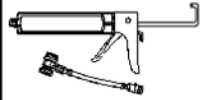
Callout	Component Name
Preliminary Procedure	
1. Drain the coolant system. Refer to <u>Cooling System Draining and Filling (GE 47716)</u> , <u>Cooling System Draining and Filling (Static Fill)</u> . 2. Remove the left front floor console extension. Refer to <u>Front Floor Console Extension Replacement - Left Side</u> . 3. Remove (I/P) steering column opening lower trim panel. Refer to <u>Steering Column Opening Lower Filler Replacement</u> . 4. Remove the floor air outlet duct - left side. Refer to <u>Floor Air Outlet Duct Replacement - Left Side</u> . 5. Position the left front floor carpet out of the way.	
1	Heater Core Tube Clamp (Qty: 2)
2	Heater Core Tube Assembly NOTE: Coolant may still be in the heater core, collect coolant or blow out heater core with compressed air.
3	Heater Core Tube Seal (Qty: 2)
	Heater Core Bracket Fastener

4	CAUTION: Refer to <u>Fastener Caution</u> .
5	Heater Core Procedure Pull out the heater core.

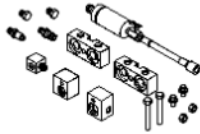
SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

Illustration	Tool Number / Description
	BO 38185 J 38185 Hose Clamp Pliers
	GE 39400-A J 39400-A Halogen Leak Detector
	GE 41447 J 41447 R-134a A/C Tracer Dye - Box of 24
	GE 42220 J 42220 Universal 12V Leak Detection Lamp
	GE-8800 J 43600 ACR 2000 Air Conditioning Service Center
	GE 43872 J 43872 Fluorescent Dye Cleaner



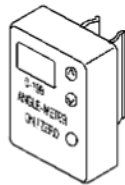
GE 45037
J 45037
A/C Oil Injector



GE 45268
J 45268
A/C Flushing Adapter Kit



GE 46297
J 46297
A/C Dye Injector Kit



GE 46297-12
J 46297-12
Replacement Dye Cartridges