SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
A/C Accumulator Nut to Evaporator	16 N.m	12 lb ft
A/C Belt Tensioner Bolts	50 N.m	37 lb ft
A/C Low Pressure Switch	6 N.m	53 lb in
A/C Refrigerant Filter Retaining Nuts	15 N.m	11 lb ft
A/C Refrigerant Pressure Sensor	6 N.m	53 lb in
Accumulator Bracket Nut	9 N.m	80 lb in
Accumulator Clamp Bolt	10 N.m	8 lb ft
Air Distribution Duct Screws	2 N.m	18 lb in
Air Distribution Housing Screws	2 N.m	18 lb in
Blower Motor Screws	2 N.m	18 lb in
Compressor Bracket Mounting Bolts	50 N.m	37 lb ft
Compressor Clutch Plate Retaining Bolt	18 N.m	13 lb ft
Compressor Discharge Hose to Condenser Nut	16 N.m	12 lb ft
Compressor Mounting Bolts	50 N.m	37 lb ft
Compressor Suction/Discharge Hose Bolt	16 N.m	12 lb ft
Compressor Suction Hose at Accumulator Nut	16 N.m	12 lb ft
Condenser Upper Insulator Retainer Bolts	9 N.m	80 lb in
Evaporator Core Cover Screws	2 N.m	18 lb in
Evaporator Tube Fitting at Orifice	25 N.m	18 lb ft
Evaporator Tube at Condenser Nut	16 N.m	12 lb ft
Evaporator Tube at Evaporator Nut	16 N.m	12 lb ft
Filter Access Door Screw	2 N.m	18 lb in
Floor Air Outlet Duct Screw	1.6 N.m	14 lb in
Heater Core Cover Screws	2 N.m	18 lb in
Hood Spring Mounting Bolt and Nut	17 N.m	13 lb ft
HVAC Module Mounting Bolts	4 N.m	35 lb in
HVAC Module Mounting Nuts	9 N.m	80 lb in
HVAC Module Screws	2 N.m	18 lb in
Mode Actuator Screws	2 N.m	18 lb in
Recirculation Actuator Screws	17 N.m	13 lb ft

REFRIGERANT SYSTEM CAPACITIES

Refrigerant System Capacities

Application	Specification	
	Metric	**English**
PAG Oil GM P/N 12378526 for United States PAG Oil GM P/N 88900060 for Canada		
Accumulator Replacement	-ml*	-oz*
• *Add 60 ml (2 oz) of PAG oil, plus the equal amount of oil drained from the accumulator.		
Compressor Replacement	60 ml	2 oz
• The Denso replacement compressor is precharged with 237 ml (8.0 oz) of PAG oil.		
Condenser Replacement	30 ml	1 oz
Evaporator Replacement	90 ml	3 oz
If more than the specified amount of PAG oil was drained from a component, add the equal amount drained.		
• Total System PAG Oil Capacity	210 ml	7.1 oz
R-134a		
• Refrigerant Charge	0.7 kg	1.6 lb

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC STARTING POINT - HEATING, VENTILATION AND AIR CONDITIONING

The Heating, Ventilation and Air Conditioning (HVAC) system is divided into two sections. The first, Heating, Ventilation and Air Conditioning, it has all of the replacement procedures that pertain to the HVAC components or functions that are associated with an automatic control system. The second, HVAC Systems-Automatic, has all of the diagnostic procedures specific to the automatic control system.

For systems with DTCs, begin the system diagnosis with the following procedures: **Diagnostic System Check - HVAC Systems - Automatic** in HVAC Systems-Automatic

The Diagnostic System Check will provide the following information:

- The identification of the control modules which command the system.
- The ability of the control modules to communicate through the class 2 serial data circuit.

The use of the Diagnostic System Check will identify and lead the technician to the correct diagnostic procedure.

Review the Description and Operation information to help you determine the correct symptom diagnostic procedure when a malfunction exists. Reviewing the Description and Operation information will also help you determine if the condition described by the customer is normal operation. The HVAC Description and Operation information is divided into:

- **Air Delivery Description and Operation** in HVAC Systems-Automatic
- **Air Temperature Description and Operation** in HVAC Systems-Automatic

The Air Delivery Description and Operation contains the following topics:

- HVAC Control Components
- Air Speed
- Air Delivery
- Recirculation Operation
- Automatic Operation

The Air Temperature Description and Operation contains the following topics:

- HVAC Control Components
- Heating and A/C Operation
- Automatic Operation
- Engine Coolant
- A/C Cycle

LEAK TESTING

Tools Required

- **J 39400-A** Halogen Leak Detector. See **Special Tools and Equipment** .
- **J 41447** R-134a A/C Tracer Dye - Box of 24. See **Special Tools and Equipment** .
- **J 42220** Universal 12V Leak Detection Lamp. See **Special Tools and Equipment** .
- **J 43872** Fluorescent Dye Cleaner. See **Special Tools and Equipment** .
- **J 46297** A/C Dye Injector Kit. See **Special Tools and Equipment** .
- **J 46297-12** Replacement Dye Cartridges. See **Special Tools and Equipment** .

Refrigerant Leak Testing

IMPORTANT: 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 glycel (PAG) oil throughout the refrigerant system.

Verifying some passive leaks may require using the **J 39400-A** , even though the A/C system contains fluorescent dye. See **Special Tools and Equipment** .

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.

IMPORTANT: 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 **J 42220** . See **Special Tools and Equipment** .
- 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 fluorescent dye cleaner **J 43872** . See **Special Tools and Equipment** .

Fluorescent Dye Injection

IMPORTANT: Use only fluorescent dye approved by General Motors.

- **J 41447 can be poured directly into a removed A/C component. See Special Tools and Equipment .**
- **J 46297-12 is injected into the low side port using J 46297 . See Special Tools and Equipment .**

- 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.

IMPORTANT: 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 **J 43872** . See **Special Tools and Equipment** .

Halogen Leak Detector

CAUTION: 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.

IMPORTANT: 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.

IMPORTANT: 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 **J 39400-A** . See **Special Tools and Equipment** .

AIR CONDITIONING (A/C) SYSTEM PERFORMANCE TEST

The following test measures the A/C system operating efficiency by comparing:

- The ambient air temperature
- The ambient air humidity
- The pressure at the high-pressure side of the refrigeration system
- The pressure at the low-pressure side of the refrigeration 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 there is enough refrigerant in the A/C system in order 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 air temperatures.

Air Conditioning (A/C) System Performance Test

Step	Action	Values	Yes	No
IMPORTANT: • **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 (about 2 minutes). 4. Ensure that the ignition key is in the OFF position. 5. Install the **J 43600** ACR 2000 Air Conditioning service center. See **Special Tools and Equipment** . 6. Record the ambient air temperature displayed on the **J 43600** . See **Special Tools and Equipment** . 7. Record readings of the low and high side STATIC pressures. Are both the low and high side pressures within the specified value?	• Above 16° C (60° F) - 345 kPa (50 psi) • Above 24° C (75° F) - 483 kPa (70 psi) • Above 33° C (90° F) - 690 kPa (100 psi)	Go to **Step 2**	Go to **Leak Testing**
	IMPORTANT: **Record the relative humidity and the ambient air temperature AT THE TIME OF THE TEST.** 1. Close the vehicle doors and windows. 2. Open the driver door window 13-15 cm (5-6 inches). 3. Set the HVAC control to the following positions: • The A/C ON • The blower control to the highest position • The HVAC control assembly to discharge air through the A/C outlets • Recirculation Mode			

2	• The temperature control to the coldest position • All A/C outlets OPEN 4. Install the temperature probes to the **J 43600** in the left and right center A/C air outlets. See **Special Tools and Equipment** . 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 allow to idle. 8. Operate the A/C system for 5 minutes. 9. Inspect for the following: • Abnormal frost areas • Unusual noises **IMPORTANT:** **When using the print function of the J 43600 for this step, press the RESET button first. In order to capture the correct information, wait 5 minutes after pressing the RESET button, before pressing the PRINT button. See Special Tools and Equipment .** 10. Record the following information: • The outlet air temperatures • The low-side pressure • The high-side pressure 11. Compare the low and high side pressures and the output temperatures to the table below. Does all the data recorded fall within the specified ranges of the table below?	-	Go to **Step 8**	Go to **Step 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.			

3	2. Record the pressures and temperatures again. 3. Compare the low and high side pressures and the output temperature to the table below. Does all the data recorded fall within the specified ranges of the table below?	-	Go to **Step 8**	Go to **Step 4**
4	Do the high and low side pressures fall within the specified ranges but the outlet temperatures do not?	-	Go to **Air Conditioning (A/C) Diagnostics - Pressure Zone A**	Go to **Step 5**
5	Is the low side pressure higher than the specified range and the high side pressure within or lower than the specified range?	-	Go to **Air Conditioning (A/C) Diagnostics - Pressure Zone B**	Go to **Step 6**
6	Are the low and high side pressures both higher than the specified ranges?	-	Go to **Air Conditioning (A/C) Diagnostics - Pressure Zone C**	Go to **Step 7**
7	Is the low side pressure within or lower than the specified range and the high side pressure higher than the specified range?	-	Go to **Air Conditioning (A/C) Diagnostics - Pressure Zone D**	Go to **Step 8**
8	Operate the system in order to verify the test results. Did you find the same results?	-	System OK	Go to **Symptoms - HVAC Systems - Automatic** in HVAC Systems - Automatic

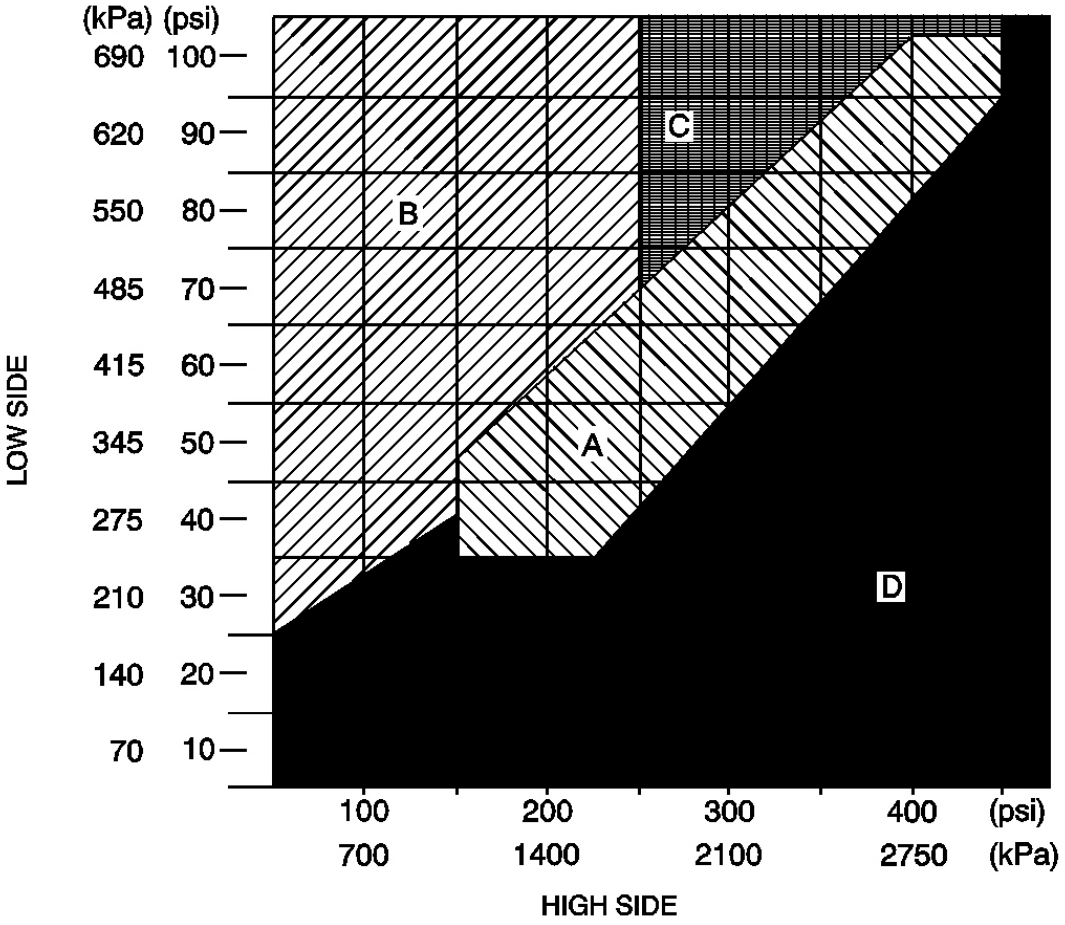


Fig. 1: A/C System Pressure - Zone Classification
Courtesy of GENERAL MOTORS CORP.

A/C Performance Table

Ambient Air Temperature	Relative Humidity	Service Port Pressure		Maximum Left Center Discharge Air Temperature
		Low Side	High Side	
13-16° C (55-65° F)	0-100%	200-283 kPa (29-41 psi)	945-1234 kPa (137-179 psi)	11° C (52° F)
19-24° C (66-75° F)	Below 40%	228-310 kPa (33-45 psi)	1082-1413 kPa (157-205 psi)	14° C (57° F)
	Above 40%	248-338 kPa (36-49 psi)	1131-1469 kPa (164-213 psi)	15° C (59° F)
25-29° C (76-85° F)	Below 35%	276-379 kPa (40-55 psi)	1303-1696 kPa (189-246 psi)	18° C (64° F)
	35-60%	276-379 kPa (40-55 psi)	1310-1709 kPa (190-248 psi)	18° C (64° F)

	Above 60%	290-400 kPa (42-58 psi)	1358-1765 kPa (197-256 psi)	19° C (66° F)
30-35° C (86-95° F)	Below 30%	317-434 kPa (46-63 psi)	1544-2006 kPa (224-291 psi)	22° C (72° F)
	30-50%	324-441 kPa (47-64 psi)	1558-2034 kPa (226-295 psi)	22° C (72° F)
	Above 50%	365-510 kPa (53-74 psi)	1675-2179 kPa (243-316 psi)	26° C (79° F)
36-41° C (96-105° F)	Below 20%	400-552 kPa (58-80 psi)	1917-2503 kPa (278-363 psi)	28° C (82° F)
	20-40%	393-546 kPa (57-79 psi)	1910-2496 kPa (274-357 psi)	28° C (82° F)
	Above 40%	400-552 kPa (58-80 psi)	1910-2496 kPa (277-362 psi)	28° C (82° F)
42-46° C (106-115° F)	Below 20%	448-621 kPa (65-90 psi)	2172-2834 kPa (315-411 psi)	31° C (88° F)
	Above 20%	462-634 kPa (67-92 psi)	2220-2896 kPa (322-420 psi)	32° C (90° F)
47-49° C (116-120° F)	Below 30%	531-731 kPa (77-106 psi)	2379-3116 kPa (347-452 psi)	43° C (109° F)

AIR CONDITIONING (A/C) DIAGNOSTICS - PRESSURE ZONE A

Air Conditioning (A/C) Diagnostics - Pressure Zone A

Step	Action	Yes	No
DEFINITION: The high and low side pressures may be normal or slightly less than normal. • Air delivery concern • Slight refrigerant under charge • Refrigerant contamination			
1	Were you sent here from the A/C System Performance Test?	Go to **Step 2**	Go to **Air Conditioning (A/C) System Performance Test**
2	Refer to the panel air outlet temperatures recorded during the A/C system performance test. Does the discharge air temperature between the right and left center panel outlets vary by more than 1-2° C (2-3° F)?	Go to **Step 7**	Go to **Step 3**
3	Did the customer mention that the A/C system output temperatures are good at first, but then turn warm during extended drives?	Go to **Step 4**	Go to **Step 5**
	Increase engine speed to 2,000 RPM. During extended operation of the A/C system, does	Go to **Air**	

4	the low side pressure decrease, possibly accompanied by heavy frost on the liquid line between the expansion device and the evaporator?	**Conditioning (A/C) Diagnostics - Pressure Zone D**	Go to **Step 5**
5	Refer to the pressures recorded during the A/C system performance test. Inspect for the following conditions: **CAUTION:** **Refer to Moving Parts and Hot Surfaces Caution in Cautions and Notices.** • The high side pressure is slightly greater than the specified pressure ranges but still within Zone A on the A/C Pressure-Zone Classification Chart in the A/C System Performance Test. Refer to **Air Conditioning (A/C) System Performance Test** . • The discharge line is hot. • The suction line is cool. Do the listed conditions exist?	Go to **Step 7**	Go to **Step 6**
6	Refer to the pressures recorded during the A/C system performance test. Inspect for the following conditions: **CAUTION:** **Refer to Moving Parts and Hot Surfaces Caution in Cautions and Notices.** • The low side pressure is slightly lower than the specified pressure ranges but still within Zone A on the A/C Pressure-Zone Classification Chart in the A/C System Performance Test. Refer to **Air Conditioning (A/C) System Performance Test** . • The discharge line is warm-to-hot. • The suction line is cool-to-warm. Do the listed conditions exist?	or Go to **Step 8**	Go to **Too Hot in Vehicle** in HVAC Systems - Automatic
	The A/C system may be undercharged. 1. Leak test A/C system. Refer to **Leak Testing** .		

7	2. Recharge the A/C system to specifications. Refer to **Refrigerant Recovery and Recharging** . Is the repair complete?	Go to **Step 14**	-
8	The A/C system may be contaminated. View the **J 43600** information screen for detection of foreign gases in the A/C system. See **Special Tools and Equipment** . Do foreign gases exist?	Go to **Step 9**	Go to **Step 10**
9	1. Evacuate the A/C system to a scavenging tank. Refer to **Refrigerant Recovery and Recharging** . 2. Recharge the A/C system to specifications. Is the repair complete?	Go to **Step 14**	-
10	The A/C system may contain too much moisture or air. 1. Evacuate and recharge the A/C system to specifications. Refer to **Refrigerant Recovery and Recharging** . 2. Operate the A/C system and inspect the panel outlet air temperatures. Refer to **Air Conditioning (A/C) System Performance Test** . Are the panel outlet temperatures within the specified ranges of the A/C Performance Test Table?	Go to **Step 15**	Go to **Step 11**
11	The A/C system may contain too much refrigerant oil. 1. Recover the refrigerant from the A/C system. Refer to **Refrigerant Recovery and Recharging** . 2. Remove the accumulator. Refer to **Accumulator Replacement** . 3. Drain and measure the refrigerant oil from the accumulator. Were more than 148 ml (5 oz) of refrigerant oil drained from the accumulator?	Go to **Step 12**	Go to **Step 13**

12	1. Reinstall the accumulator. Refer to **Accumulator Replacement** . 2. Flush the A/C system. Refer to **Flushing** . 3. Add the specified amount of refrigerant oil to the accumulator. Refer to **Refrigerant System Capacities** . 4. Recharge the A/C system. Refer to **Refrigerant Recovery and Recharging** . Are the repairs complete?	Go to **Step 14**	-
13	1. Add the specified amount of refrigerant oil to the accumulator. Refer to **Refrigerant System Capacities** . 2. Install the accumulator. Refer to **Accumulator Replacement** . 3. Recharge the A/C system. Refer to **Refrigerant Recovery and Recharging** . Are the repairs complete?	Go to **Step 14**	-
14	1. Record the low and high side pressures and the instrument panel (I/P) outlet air temperature. 2. Compare the outlet temperatures to those listed in the A/C System Performance Chart. Refer to **Air Conditioning (A/C) System Performance Test** . Are the high and low side pressures and I/P panel outlet temperatures within specifications?	Go to **Step 15**	Go to **Air Conditioning (A/C) System Performance Test**
15	Operate the system in order to verify the repair. Did you find and correct the condition?	System OK	Go to **Symptoms - HVAC Systems - Automatic** in HVAC Systems - Automatic

AIR CONDITIONING (A/C) DIAGNOSTICS - PRESSURE ZONE B

Air Conditioning (A/C) Diagnostics - Pressure Zone B

Step	Action	Yes	No
DEFINITION: The low side pressure is higher than normal and the high side pressure is lower than normal. • Malfunctioning A/C Compressor • Refrigerant Under Charge			
	Were you sent here from the A/C System Performance		Go to **Air Conditioning**

1	Test?	Go to **Step 2**	**(A/C) System Performance Test**
2	After continued operation of the air conditioning (A/C) system, do the low and the high side pressures equalize or become static?	Go to **Step 5**	Go to **Step 3**
3	Refer to the pressures recorded during the A/C System Performance Test. Inspect for the following conditions: **CAUTION:** **Refer to Moving Parts and Hot Surfaces Caution in Cautions and Notices.** • The low side pressure is equal to or greater than the specified pressure range of the A/C Performance Table. Refer to **Air Conditioning (A/C) System Performance Test** . • The high side pressure is less than the specified pressure range of the A/C Performance Table. Refer to **Air Conditioning (A/C) System Performance Test** . • The low side refrigerant line at the compressor feels cool-to-warm. • The high side refrigerant line at the compressor feels warm-to-hot. Do the listed conditions exist?	Go to **Step 5**	Go to **Step 4**
4	Refer to the pressures recorded during the A/C System Performance Test. Inspect for the following conditions: **CAUTION:** **Refer to Moving Parts and Hot Surfaces Caution in Cautions and Notices.** • The low side pressure is greater than the specified pressure range of the A/C Performance Table. Refer to **Air Conditioning (A/C) System Performance Test** . • The high side pressure is less than the specified pressure range of the A/C Performance Table. Refer to **Air Conditioning (A/C) System Performance Test** . • The low side refrigerant line at the compressor feels		

	warm. • The high side refrigerant line at the compressor feels warm to hot. Do the listed conditions exist ?	Go to **Step 5**	Go to **Air Conditioning (A/C) System Performance Test**
5	The A/C system has a low refrigerant charge. Evacuate and recharge the A/C system. Refer to **Refrigerant Recovery and Recharging** . Is the procedure complete?	Go to **Step 6**	-
6	1. Record the low and the high side pressures as well as the instrument panel (I/P) air outlet temperature after you perform the repairs. 2. Compare the pressures and the panel outlet temperature to those listed in the A/C Performance Chart. Refer to **Air Conditioning (A/C) System Performance Test** . Are the readings within the specified ranges found on the A/C Performance Chart?	Go to **Step 13**	Go to **Step 7**
7	The A/C compressor is malfunctioning. Remove the expansion device and inspect for contamination. Refer to **Expansion (Orifice) Tube Replacement** . Did you find metal flakes on the expansion device?	Go to **Step 9**	Go to **Step 8**
8	Inspect the expansion device for a brown, powdery residue indicating desiccant in the A/C system. Is a brown, powdery residue present?	Go to **Step 11**	Go to **Step 12**
9	1. Remove the suction and the discharge lines from the compressor. Refer to **Suction Hose Replacement** and to **Discharge Hose Replacement** . 2. Inspect for metal flake contamination at the line connections and the compressor ports. Is metal flake contamination present?	Go to **Step 10**	Go to **Step 12**
10	1. Replace the A/C compressor. Refer to **Compressor Replacement** . 2. Install an A/C refrigerant filter. Refer to **Air Conditioning (A/C) Refrigerant Filter Installation** . 3. Replace the orifice tube. Refer to **Expansion (Orifice) Tube Replacement** . 4. Evacuate and recharge the A/C system. Refer to **Refrigerant Recovery and Recharging** .		

	Is the repair complete?	Go to **Step 13**	-
11	1. Flush the A/C system. Refer to **Flushing** . 2. Replace the orifice tube. Refer to **Expansion (Orifice) Tube Replacement** . 3. Replace the A/C compressor. Refer to **Compressor Replacement** . 4. Replace the accumulator. Refer to **Accumulator Replacement** . 5. Evacuate and recharge the A/C system. Refer to **Refrigerant Recovery and Recharging** . Is the repair complete?	Go to **Step 13**	-
12	1. Replace the A/C compressor. Refer to **Compressor Replacement** . 2. Evacuate and recharge the A/C system. Refer to **Refrigerant Recovery and Recharging** . Is the repair complete?	Go to **Step 13**	-
13	Operate the system in order to verify the repair. Did you find and correct the condition?	System OK	Go to **Symptoms - HVAC Systems - Automatic** in HVAC Systems - Automatic

AIR CONDITIONING (A/C) DIAGNOSTICS - PRESSURE ZONE C

Air Conditioning (A/C) Diagnostics - Pressure Zone C

Step	Action	Yes	No
DEFINITION: The low and the high side pressures are both higher than normal. • Restricted condenser air flow • Cooling fan malfunction • Expansion device malfunction			
1	Were you sent here from the A/C System Performance Test?	Go to **Step 2**	Go to **Air Conditioning (A/C) System Performance Test**
2	1. With the engine idling, turn ON the A/C. 2. Inspect for proper cooling fan operation. Refer to **Cooling System Description and Operation** in Engine Cooling. Are the cooling fans ON and operating properly?	Go to **Step 3**	Go to **Step 5**
	Visually inspect for the following:		

3	• Restricted air flow • Damaged condenser cooling fins • Inspect for missing or misaligned air baffles. Do the following conditions exist?	Go to **Step 4**	Go to **Step 6**
4	Repair the air flow restriction. Is the repair complete?	Go to **Step 9**	-
5	Repair the cooling fan operation fault. Refer to **Fan Clutch Diagnosis** in Engine Cooling. Is the repair complete?	Go to **Step 9**	-
6	**CAUTION:** **Refer to Moving Parts and Hot Surfaces Caution in Cautions and Notices.** Feel the liquid line on both sides of the expansion device.Is the temperature the same before and after the expansion device?	Go to **Step 7**	Go to **Step 8**
7	Replace the damaged/faulty orifice tube. Refer to **Expansion (Orifice) Tube Replacement** . Is the repair complete?	Go to **Step 9**	-
8	Air is in the refrigerant system, or the system is overcharged. Refer to the view screen on the **J 43600** for foreign gas content in the refrigerant. See **Special Tools and Equipment** . Recover and recharge the A/C system. Refer to **Refrigerant Recovery and Recharging** . Is the repair complete?	Go to **Step 9**	-
9	1. Record the low and high side pressures and the instrument panel (I/P) outlet air temperature after repairs are performed. 2. Compare the pressures and outlet temperature to those listed in the A/C Performance Chart. Refer to **Air Conditioning (A/C) System Performance Test** . Are the readings within the specified ranges?	Go to **Step 10**	Go to **Air Conditioning (A/C) System Performance Test**
10	Operate the system in order to verify the repair. Did you find and correct the condition?	System OK	**Symptoms - HVAC Systems - Automatic** in HVAC Systems - Automatic

AIR CONDITIONING (A/C) DIAGNOSTICS - PRESSURE ZONE D

Air Conditioning (A/C) Diagnostics - Pressure Zone D

Step	Action	Yes	No
DEFINITION: The low side pressure is lower than normal and the high side pressure is higher than normal. • A restriction in the A/C system. • Debris in the A/C system.			
1	Were you sent here from the A/C System Performance Test?	Go to **Step 2**	Go to **Air Conditioning (A/C) System Performance Test**
2	**CAUTION:** **Refer to Moving Parts and Hot Surfaces Caution in Cautions and Notices.** Feel the liquid line before the expansion device.Is the liquid line cold before the expansion device?	Go to **Step 3**	Go to **Step 8**
3	Feel along the surfaces of the following high side components: • The compressor discharge hose • The condenser • The liquid line between the condenser and the expansion device Did you detect an abrupt drop in temperature along the surfaces of any of the listed components?	Go to **Step 7**	Go to **Step 4**
4	1. Feel the liquid line at the expansion device location for extreme cold, possibly accompanied by heavy frost. 2. Feel along the liquid line beyond the expansion device location for warm temperature. Is the liquid line extremely cold at the expansion device location and warm beyond the expansion device location?	Go to **Step 11**	Go to **Step 5**
5	Feel along the surfaces of the following low side components: • The evaporator inlet tube between the expansion device and the evaporator core • The evaporator outlet tube between the evaporator core and the compressor • The accumulator • The compressor suction hose		

	Did you feel an abrupt temperature change along the surfaces of any of the listed components?	Go to **Step 7**	Go to **Step 6**
6	Feel along the surfaces of the low and the high side components: • The evaporator inlet tube between the expansion device and the evaporator core • The evaporator outlet tube between the evaporator core and the accumulator • The accumulator • The compressor suction hose • The compressor discharge hose • The condenser • The evaporator inlet tube between the condenser and the expansion device Are the temperatures of these components only mildly warm?	Go to **Step 14**	Go to **Step 8**
7	1. Recover the refrigerant. Refer to **Refrigerant Recovery and Recharging** . 2. Remove the restriction from the component, or replace the component which produced an abrupt temperature drop. Is the repair complete?	Go to **Step 9**	-
8	1. Recover the refrigerant and evacuate the system. Refer to **Refrigerant Recovery and Recharging** . 2. Record the weight of the recovered refrigerant. 3. Compare the weight of the recovered refrigerant with the system capacity. Refer to **Refrigerant System Capacities** . Is the weight of the recovered refrigerant charge greater than 75% of the total system capacity?	Go to **Step 9**	Go to **Step 10**
9	Recharge the A/C system. Refer to **Refrigerant Recovery and Recharging** . Is the cooling performance improved?	Go to **Step 21**	Go to **Step 10**
10	1. Leak test the system. Refer to **Leak Testing** . 2. Repair any leaks.	Go to	

	Is the repair complete?	**Step 21**	-
11	The expansion device is restricted. Replace the expansion device. Refer to **Expansion (Orifice) Tube Replacement** . Are metal flakes present?	Go to **Step 12**	Go to **Step 13**
12	1. Remove the suction line from the vehicle. Refer to **Suction Hose Replacement** . 2. Inspect the hose for debris by blowing shop air through one end of the hose while covering the other end with a shop towel. 3. Observe the amount of debris collected in the shop towel. Did a large amount of debris collect in the shop towel?	Go to **Step 18**	Go to **Step 20**
13	If the expansion device was restricted with a brown or black residue, perform the following procedure: 1. Flush the A/C system. Refer to **Flushing** . 2. Replace the accumulator. Refer to **Accumulator Replacement** . Are the repairs complete?	Go to **Step 21**	-
14	1. Recover the refrigerant. Refer to **Refrigerant Recovery and Recharging** . 2. Disconnect the suction and the discharge lines from the compressor. Refer to **Suction Hose Replacement** and to **Discharge Hose Replacement** . 3. Inspect for the presence of debris in the compressor suction port. Is debris present in the compressor suction port?	Go to **Step 15**	Go to **Step 19**
15	1. Remove the debris from the suction port. 2. Inspect the expansion device for damage or debris. Refer to **Expansion (Orifice) Tube Replacement** . Did you find evidence of damage or debris?	Go to **Step 17**	Go to **Step 16**
	If the expansion device does not show any signs of damage or debris, perform the following procedure: 1. Remove the suction line from the vehicle. Refer to **Suction Hose Replacement** .		

16	2. Inspect the hose for debris by blowing shop air through one end of the hose while covering the other end with a shop towel. 3. Observe the amount of debris collected in the shop towel. Did a large amount of debris collect in the shop towel?	Go to **Step 18**	Go to **Step 19**
17	1. Replace the expansion device. Refer to **Expansion (Orifice) Tube Replacement** . 2. If the expansion device was restricted, observe the type of debris present. Are metal flakes present?	Go to **Step 12**	Go to **Step 13**
18	If a large amount of debris was collected in the shop towel from the compressor hose assembly, perform the following procedure: 1. Replace the accumulator. Refer to **Accumulator Replacement** . 2. Install an A/C refrigerant filter. Refer to **Air Conditioning (A/C) Refrigerant Filter Installation** . Is the repair complete?	Go to **Step 19**	-
19	Install the suction and the discharge lines. Refer to **Suction Hose Replacement** and to **Discharge Hose Replacement** . Are the repairs complete?	Go to **Step 21**	-
20	1. Install the suction and the discharge lines. Refer to **Suction Hose Replacement** and to **Discharge Hose Replacement** . 2. Install an A/C refrigerant filter. Refer to **Air Conditioning (A/C) Refrigerant Filter Installation** . 3. Recharge the A/C system. Refer to **Refrigerant Recovery and Recharging** . Are the repairs complete?	Go to **Step 21**	-
	1. Record the low and the high side pressures and the panel outlet air temperature after you perform the repairs.		

21	2. Compare the pressures and the panel outlet temperature to those listed in the A/C Performance Chart. Refer to **Air Conditioning (A/C) System Performance Test** . Are the readings within the specified ranges as shown on the A/C Performance Chart?	Go to **Step 22**	Go to **Air Conditioning (A/C) System Performance Test**
22	Operate the system in order to verify the repair. Did you find and correct the condition?	System OK	Go to **Symptoms - HVAC Systems - Automatic** in HVAC Systems - Automatic

HEATING PERFORMANCE DIAGNOSTIC

Heating Performance Diagnostic

Step	Action	Yes	No
DEFINITION: Heating system performance.			
1	Were you sent here from Symptoms or another diagnostic table?	Go to **Step 2**	Go to **Too Cold in Vehicle** in 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	**CAUTION:** **Refer to Moving Parts and Hot Surfaces Caution in Cautions and Notices.** 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 IP 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 IP PANEL air outlet • The heater core outlet hose 7. Compare the recorded temperatures. Are the two 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 **Diagnostic System Check - HVAC Systems - Automatic** in HVAC Systems - Automatic. 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 **Heater Core Replacement** . Is the repair complete?	Go to **Step 10**	-
9	Repair the low engine temperature concern. Refer to **Engine Fails To Reach Normal Operating Temperature** in Engine Cooling. 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 **Symptoms - HVAC Systems - Automatic** in HVAC Systems - Automatic
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 10**	Go to **Step 8**
4	1. Select the minimum blower speed. 2. Select the warmest temperature setting. **CAUTION:** **Refer to Moving Parts and Hot Surfaces Caution in Cautions and Notices.** 3. Feel the temperature of the inlet and outlet hoses at the heater core. Does the inlet heater hose feel warmer than the outlet heater 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 **HVAC Compressor Clutch Does Not Engage** in HVAC Systems - Automatic. Is the repair complete?	Go to **Step 14**	-
7	Perform the A/C system performance test. Refer to **Air Conditioning (A/C) System Performance Test** . 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 **Engine Fails To Reach Normal Operating Temperature** in Engine Cooling. 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. Refer to **Air Delivery Improper** in HVAC Systems - Automatic. Is the repair complete?	Go to **Step 14**	-

11	Repair the heating concern. Refer to **Heating Performance Diagnostic** . Is the repair complete?	Go to **Step 14**	-
12	Repair the A/C performance concern. Refer to **Air Conditioning (A/C) System Performance Test** . Is the repair complete?	Go to **Step 14**	-
13	Repair the recirculation door concern. Refer to **Air Recirculation Malfunction** in HVAC Systems - Automatic. Is the repair complete?	Go to **Step 14**	-
14	Operate the system in order to verify the repair. Did you find and correct the condition?	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** in 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 12**
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 12**
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 11**	Go to **Step 10**
8	Remove the foreign material. 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 12**	-
10	Install the blower motor. Refer to **Blower Motor Replacement** . Is the action complete?	Go to **Step 12**	-
11	Replace the blower motor impeller. Refer to **Blower Motor Impeller Replacement** . Is the action complete?	Go to **Step 12**	-
12	Operate the system in order to verify the repair. Did you find and correct the condition?	System OK	Go to **Step 2**

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** in 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 **Drive Belt Excessive Wear Diagnosis** in Engine Mechanical - 6.0L. Is the drive belt excessively worn?	Go to **Step 18**	Go to **Step 4**
4	Inspect the drive belt tension. Refer to **Drive Belt Tensioner Diagnosis** in Engine Mechanical - 6.0L. 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	**CAUTION:** **Refer to Moving Parts and Hot Surfaces Caution in Cautions and Notices.** 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**
	1. Idle the engine in PARK with the A/C compressor clutch engaged.		

14	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**
15	Verify that the A/C system is properly charged. Refer to **Refrigerant System Capacities** . 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 **Refrigerant Recovery and Recharging** . Is the abnormal compressor noise still present?	Go to **Step 24**	Go to **Step 26**
17	Repair the oil leak. Refer to **Oil Leak Diagnosis** in Engine Mechanical - 6.0L. Is the repair complete?	Go to **Step 26**	-
18	Replace the A/C drive belt. Refer to **Drive Belt Replacement - Air Conditioning** in Engine Mechanical - 6.0L. Is the repair complete?	Go to **Step 26**	-
19	Replace the A/C drive belt tensioner. Refer to **Drive Belt Tensioner Replacement - Air Conditioning** in Engine Mechanical - 6.0L. Is the repair 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 **Compressor Clutch Plate/Hub Assembly Replacement** . Is the repair complete?	Go to **Step 26**	-
24	Replace the A/C compressor. Refer to **Compressor Replacement** . Is the repair complete?	Go to **Step 26**	-
25	The concern may be caused by an engine related component. Refer to **Vibration Analysis - Engine** in Vibration Diagnosis and Correction. 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 **Symptoms - HVAC Systems - Automatic** in HVAC Systems - Automatic
2	1. Start the engine. 2. Cycle through all of the following: • Blower motor speeds • HVAC modes • Temperature control settings 3. 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 **Instrument Panel (I/P) Carrier Replacement** in Instrument Panel, Gauges, and Console. Is the action complete?	Go to **Step 7**	-
7	• Inspect the air flow doors for proper operation. • Inspect the ducts for obstructions or foreign 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 **Instrument Panel (I/P) Carrier Replacement** in Instrument Panel, Gauges, and		

	Console. 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**

ODOR DIAGNOSIS

Odor Diagnosis

Step	Action	Yes	No
DEFINITION: Odor originating or noticed through the HVAC system.			
1	Were you sent here from Symptoms or another diagnostic table?	Go to **Step 2**	Go to **Symptoms - HVAC Systems - Automatic** in HVAC Systems - Automatic
2	1. Sit inside the vehicle. 2. Close all of the doors and windows. 3. Start the engine. 4. Allow the engine to idle at normal operating temperature. 5. Select the maximum blower speed. 6. Select the PANEL air outlet mode. 7. Select the coldest temperature setting. 8. Cycle through all of the blower speeds, modes, and temperatures to define what type of odor is present. • Musty smell • Coolant smell • Oil smell Does the odor have a musty smell?	Go to **Step 3**	Go to **Step 8**
3	Inspect the HVAC grille for debris. Is debris present?	Go to **Step 4**	Go to **Step 5**
4	Remove any debris. Is the action complete?	Go to **Step 15**	-
5	Inspect for wet carpeting. Is the carpet wet?	Go to **Step 6**	Go to **Step 14**
6	Inspect for the following conditions: • Water leaks around the windshield • Blockage of the HVAC module drain • Leaks around the door seals Is a leak present?	Go to **Step 7**	Go to **Step 14**

7	Repair the leak as necessary. Is the repair complete?	Go to **Step 15**	-
8	Does the odor have a coolant smell?	Go to **Step 9**	Go to **Step 12**
9	Inspect the cooling system for leaks. Refer to **Loss of Coolant** in Engine Cooling. Is a leak present?	Go to **Step 10**	Go to **Step 12**
10	Inspect for coolant leaking inside the vehicle or for a film build-up on the windshield. Is the condition present?	Go to **Step 11**	Go to **Step 15**
11	Replace the heater core. Refer to **Heater Core Replacement** . Is the repair complete?	Go to **Step 15**	-
12	Does the odor have an oily smell?	Go to **Step 13**	Go to **Step 15**
13	1. Inspect the engine compartment for any leaks. Refer to the following procedures: • **Oil Leak Diagnosis** in Engine Mechanical - 6.0L • **Fluid Leak Diagnosis** in Automatic Transmission - 4L60-E • **Power Steering Fluid Leaks** in Power Steering System 2. Repair any oil leaks. Is the repair complete?	Go to **Step 15**	-
14	A musty odor can be caused by mold or mildew build-up on the evaporator or the heater core or inside of the HVAC module. Refer to **Odor Correction** . Is the action complete?	Go to **Step 15**	-
15	Operate the system in order 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.
- 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 eliminated. Perform the following procedure:

Deodorize the evaporator core using Deodorizing Aerosol Kit.

Perform the following steps in order to deodorize the A/C system:

1. Ensure that the plenum which draws outside air into the HVAC module is clear of debris.
2. Disable the A/C compressor clutch operation by disconnecting the clutch coil electrical connector.
3. Dry the evaporator core by performing the following steps:
    1. Start the engine.
    2. Select the warmest temperature setting.
    3. Select the recirculation mode.
    4. Run the blower motor on high for 10 minutes.
4. Locate an area in the air conditioning duct between the blower motor and the evaporator core downstream of the blower motor.
5. Drill a 3.175 mm (0.125 in) hole where the hole will not interfere with or damage the following components:
    - The blower motor
    - The evaporator core
    - Any other operating part the of system
6. Wear safety goggles and latex gloves in order to perform the following actions:
    1. Select the maximum blower speed.
    2. Insert the deodorizer extension tube into the hole to the mark on the extension tube.
    3. Use short spray bursts and vary the direction of spray for a 2-3 minute period of time.
7. Shut the engine OFF. Allow the vehicle to sit for 3-5 minutes.
8. Seal the 3.175 mm (0.125 in) hole with body sealer or RTV gasket compound.
9. Start the engine.
10. Operate the blower motor on high for 15-20 minutes to dry.
11. Reconnect the A/C compressor clutch coil electrical connector.
12. Verify proper clutch operation.

REFRIGERANT RECOVERY AND RECHARGING

Tools Required

- **J 43600** ACR 2000 Air Conditioning Service Center. See **Special Tools and Equipment** .
- **J 45037** A/C Oil Injector. See **Special Tools and Equipment** .

CAUTION: Avoid breathing the A/C Refrigerant 134a (R-134a) and the lubricant vapor

or the mist. Exposure may irritate the eyes, nose, and throat. Work in a well ventilated area. In order to remove R-134a from the A/C system, use service equipment that is certified to meet the requirements of SAE J 2210 (R-134a recycling equipment). If an accidental system discharge occurs, ventilate the work area before continuing service. Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

CAUTION: For personal protection, goggles and gloves should be worn and a clean cloth wrapped around fittings, valves, and connections when doing work that includes opening the refrigerant system. If R-134a 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.

NOTE: 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.

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

NOTE: 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.

NOTE: 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 **J 43600** is a complete air conditioning service center for R-134a. The ACR 2000 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. R-134a is recovered into and charged out of an internal storage vessel. The ACR 2000 automatically replenishes this vessel from an external source tank in order to maintain a constant 5.45-6.82 kg (12-15 lbs) of A/C refrigerant. See **Special Tools and Equipment** .

The ACR 2000 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 ACR 2000 will not recover the refrigerant from the A/C system.

The ACR 2000 also features automatic air purge, single pass recycling and an automatic oil drain.

Refer to the **J 43600** ACR 2000 manual for operation and setup instruction. Always recharge the A/C System with the proper amount of R-134a. Refer to **Refrigerant System Capacities** for the correct amount. See **Special Tools and Equipment** .

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 using **J 45037** . For the proper quantities of oil to add to the A/C refrigerant system, refer to **Refrigerant System Capacities** . See **Special Tools and Equipment** .

FLUSHING

Tools Required

- **J 43600** ACR 2000 Air Conditioning Service Center. See **Special Tools and Equipment** .
- **J 45268** Flush Adapter Kit. See **Special Tools and Equipment** .
- **J 41447** Leak Detection Dye. See **Special Tools and Equipment** .
- **J 42220** Universal 12V Leak Detection Lamp. See **Special Tools and Equipment** .

IMPORTANT: Flushing with the ACR 2000 is not intended to remove metal from the A/C system.

Flushing is intended to remove the following:

- Contaminated PAG oil
- Desiccant, following a desiccant bag failure
- Overcharge of PAG oil
- Refrigerant contamination

IMPORTANT: 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 orifice tube. Refer to **Expansion (Orifice) Tube Replacement** .
3. Connect the A/C lines with the orifice tube removed.
4. Remove the A/C compressor. Refer to **Compressor Replacement** .
5. Install J 45268-5 to the A/C discharge hose.
6. Install J 45268-4 to the A/C suction hose.

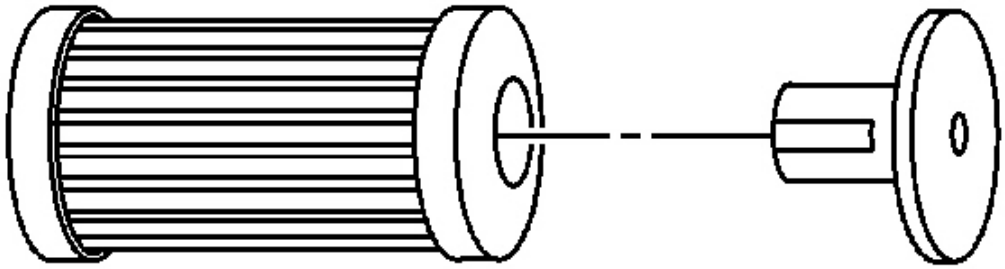


Fig. 2: Removing Check Valve
Courtesy of GENERAL MOTORS CORP.

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

   Perform the following procedure:

   IMPORTANT: The filter inside J 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.

      Connect J 45268-1 flush filter to the suction port of **J 45268** -4 flush adapter. See **Special Tools and Equipment** .

   2. Install the blue hose from **J 43600** to J 45268-1 flush filter adapter. See **Special Tools and Equipment** .
   3. Install the red hose from **J 43600** to J 45268-5. See **Special Tools and Equipment** .
8. Reverse flow refrigerant flushing is recommended for desiccant bag failure only.

   Perform the following procedure and replace the accumulator when the flush is complete:

   IMPORTANT: The filter inside J 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.

      Connect the J 45268-1 flush filter to the discharge port of the J 45268-5 flush adapter.

   2. Install the blue hose from **J 43600** to J 45268-1 flush filter adapter. See **Special Tools and**

Equipment .

3. Install the red hose from **J 43600** to the suction port of J 45268-4. See **Special Tools and Equipment** .

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

9. Flush the A/C system. Follow the instructions supplied with the **J 43600** . See **Special Tools and Equipment** .
10. Remove J 45268-4 from the A/C suction hose.
11. Remove J 45268-5 from the A/C discharge hose.

IMPORTANT: Flushing will remove all the PAG oil from the A/C system. The A/C system must be replenished with the correct amount of PAG oil.

12. Drain the PAG oil from the A/C Compressor. Rotate the compressor input shaft to assist in draining the PAG oil from the compressor.
13. Add back the total system capacity of PAG oil to the A/C compressor. Refer to **Refrigerant System Capacities** .

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

14. Add one bottle of **J 41447** directly to the A/C compressor. See **Special Tools and Equipment** .
15. Install the A/C compressor. Refer to **Compressor Replacement** .
16. Inspect the orifice tube for debris. Clean or replace as needed.
17. Install the orifice tube. Refer to **Expansion (Orifice) Tube Replacement** .
18. Evacuate and recharge the A/C system. Refer to **Refrigerant Recovery and Recharging** .
19. Leak test the fittings using the **J 42220** . See **Special Tools and Equipment** .

COMPRESSOR OIL BALANCING

Draining

IMPORTANT: Drain and measure as much of the refrigerant oil as possible from the removed compressor.

1. Drain the oil from both the suction and discharge ports of the removed compressor into a clean, graduated container.

   Rotate the compressor shaft to assist in draining the compressor.

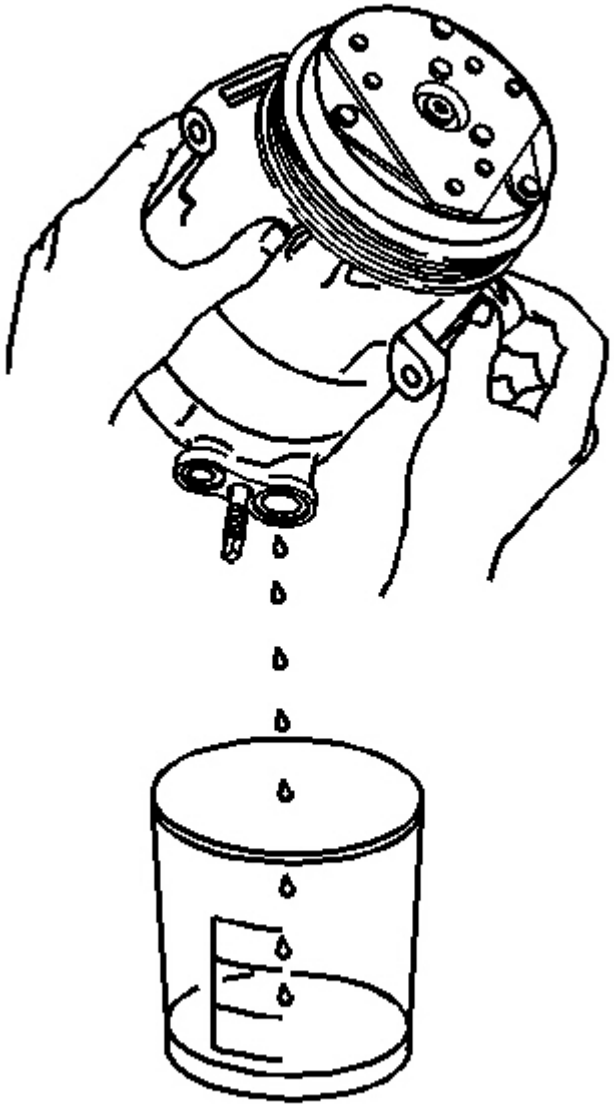


Fig. 3: Draining A/C Compressor Oil
Courtesy of GENERAL MOTORS CORP.

2. Measure and record the amount of oil drained from the removed compressor.

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

3. Properly discard the used refrigerant oil.

Balancing

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

1. The replacement compressor is shipped with the total system capacity of refrigerant oil.

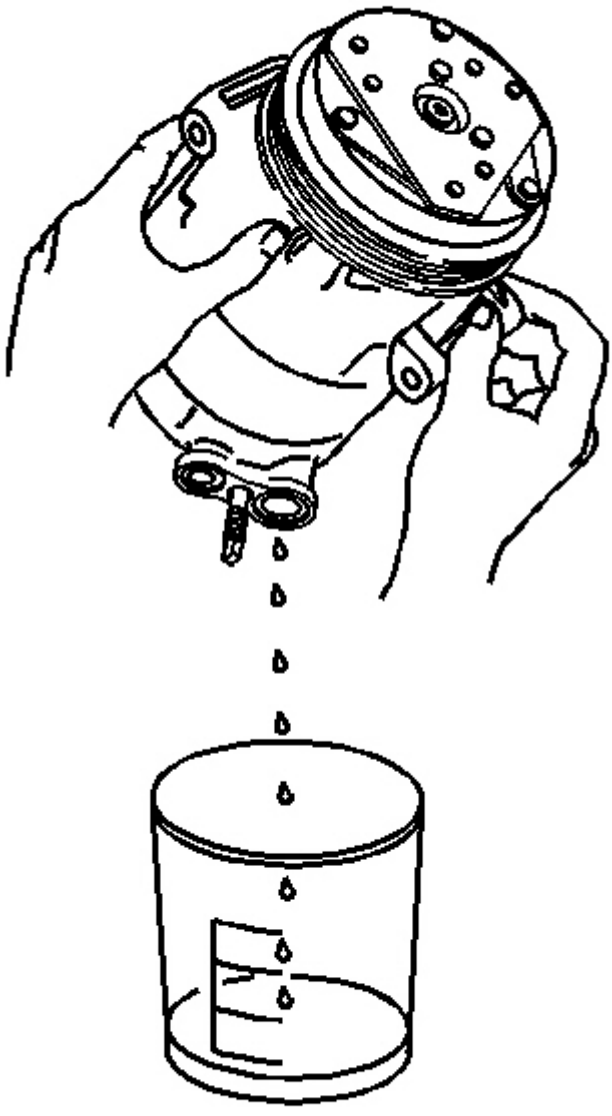


Fig. 4: Draining A/C Compressor Oil

Courtesy of GENERAL MOTORS CORP.

2. Before installing the compressor, the refrigerant oil will have to be partially drained:
    1. Refer to the amount of refrigerant oil recorded during the compressor removal.
    2. Subtract the amount recorded from the total system capacity. Refer to **Refrigerant System Capacities** .

       The difference between the total system capacity and the recorded amount is the calculated amount to be drained from the replacement compressor.

3. Drain the calculated amount of refrigerant oil from the replacement compressor.

COMPRESSOR REPLACEMENT

Tools Required

J 39400-A Halogen Leak Detector. See **Special Tools and Equipment** .

Removal Procedure

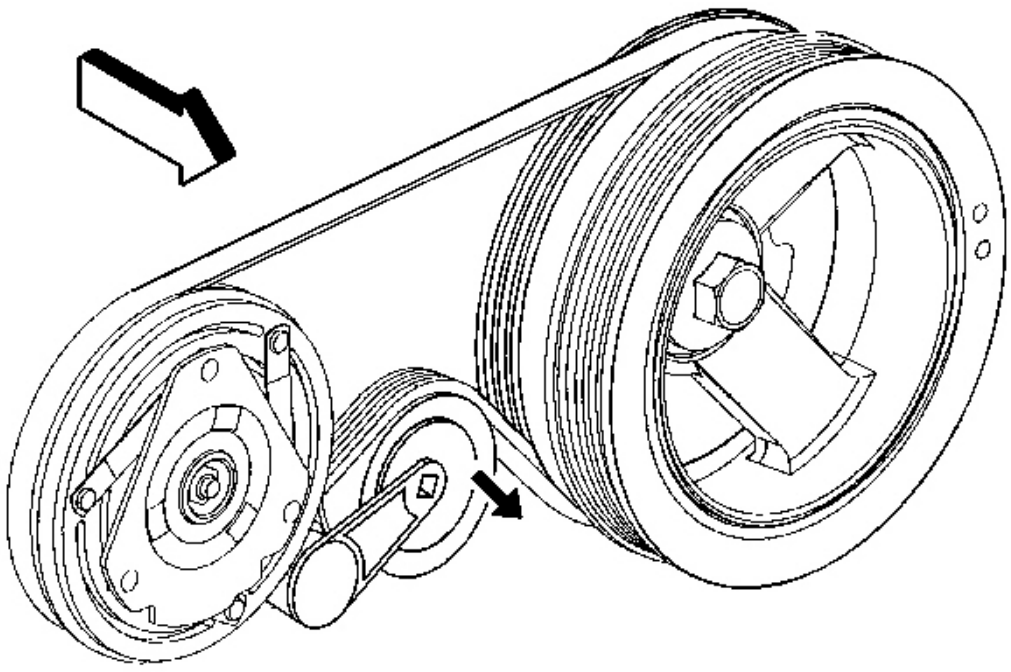


Fig. 5: A/C Belt Tensioner

Courtesy of GENERAL MOTORS CORP.

1. Recover the refrigerant. Refer to **Refrigerant Recovery and Recharging** .
2. Remove the fan shroud. Refer to **Fan Shroud Replacement** in Engine Cooling.
3. Install a ratchet into the air conditioning (A/C) belt tensioner adapter opening.
4. Rotate the A/C belt tensioner clockwise in order to relieve the tension on the belt.
5. Remove the A/C belt from the A/C compressor.
6. Slowly release the tension on the A/C belt tensioner.
7. Remove the A/C discharge hose bolt from the A/C compressor.
8. Remove the A/C discharge hose from the A/C compressor.
9. Remove the A/C suction hose bolt from the A/C compressor.
10. Remove the A/C suction hose from the A/C compressor.
11. Discard the sealing washers.
12. Cap or tape all of the hose and line ends.
13. Disconnect the electrical connector from the A/C compressor coil.

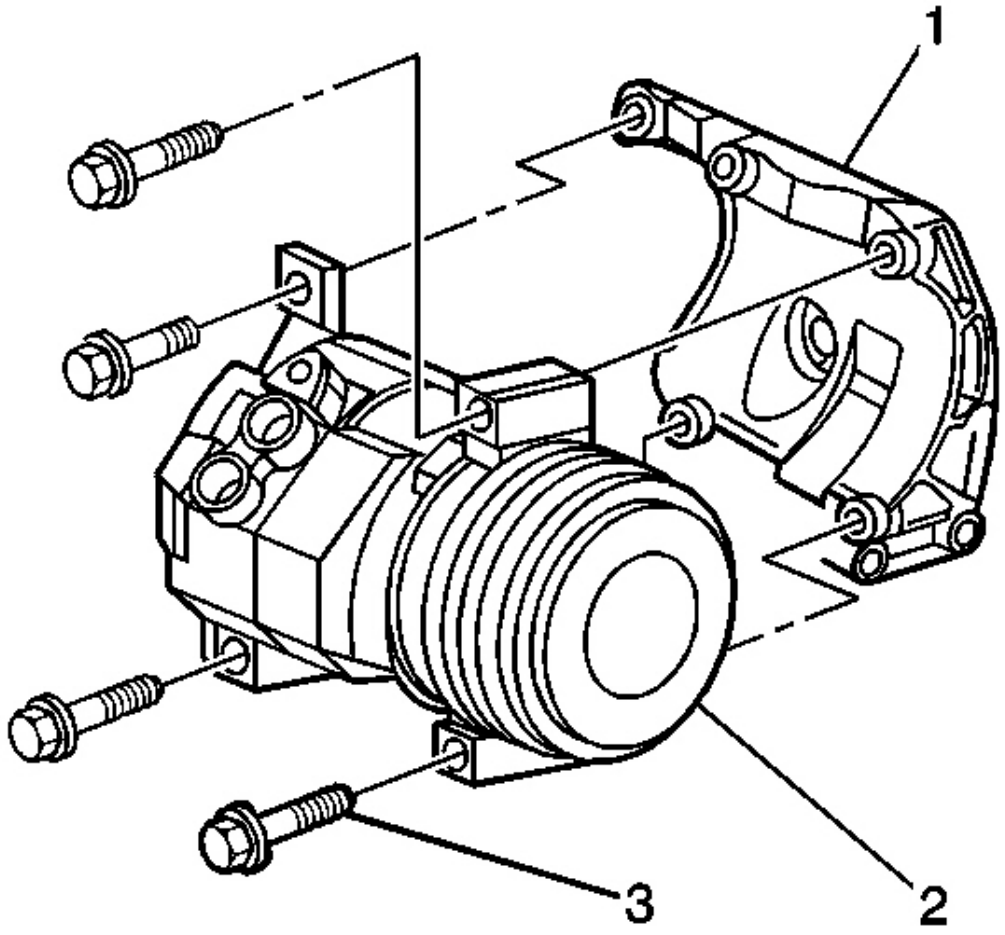


Fig. 6: A/C Compressor Mounting Bolts (L18)
Courtesy of GENERAL MOTORS CORP.

14. Remove the A/C compressor mounting bolts.
15. Remove the A/C compressor (2) from the bracket (1).
16. If replacing the A/C compressor. Refer to **Compressor Oil Balancing** .

Installation Procedure

1. Add the proper amount of PAG oil to the compressor crankcase. Refer to **Refrigerant System Capacities** .

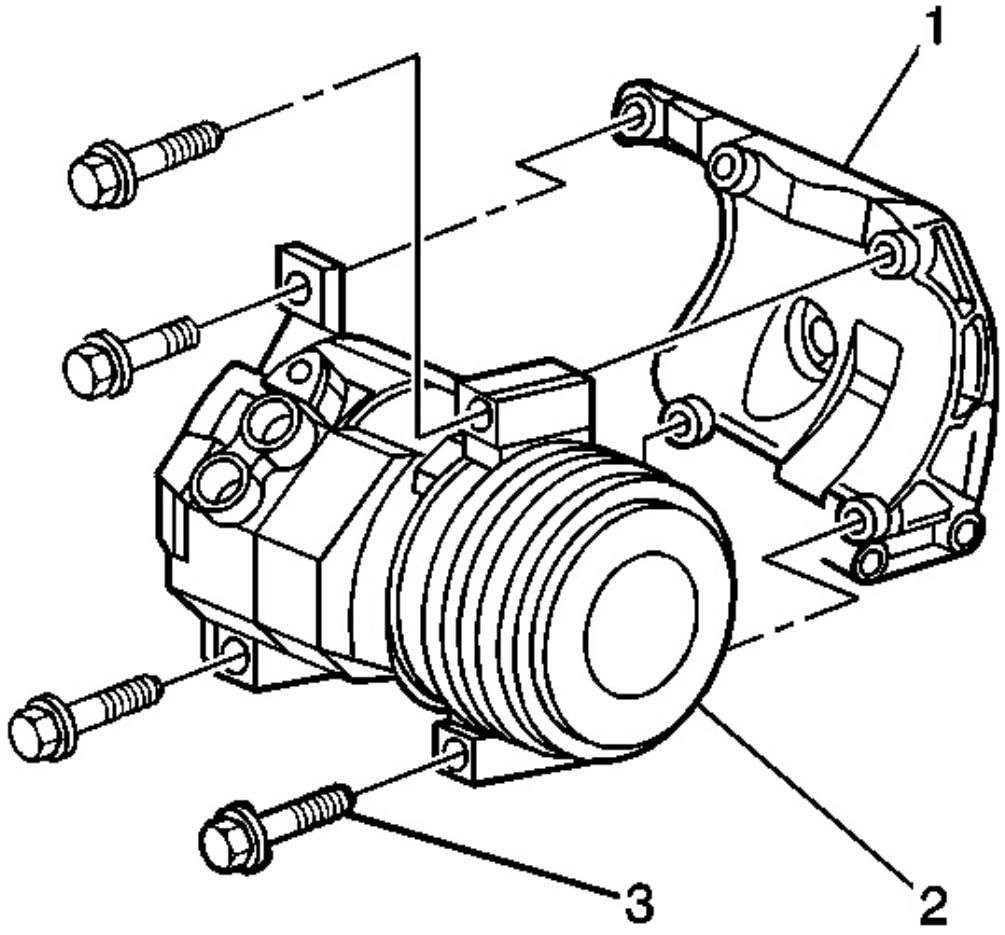


Fig. 7: A/C Compressor Mounting Bolts (L18)
Courtesy of GENERAL MOTORS CORP.

2. Install the A/C compressor (2) to the bracket (1).

NOTE: **Refer to Fastener Notice in Cautions and Notices.**

3. Install the A/C compressor mounting bolts.

   Tighten: Tighten the bolts to 50 N.m (37 lb ft).

4. Connect the electrical connector to the A/C compressor coil.
5. Remove the caps or tape from the hose and line ends.

6. Install the new sealing washers. Refer to **Sealing Washer Replacement** .
7. Install the A/C suction hose to the compressor.
8. Install the A/C suction hose bolt to the A/C compressor.

   Tighten: Tighten the bolt to 16 N.m (12 lb ft).

9. Install the A/C discharge hose to the A/C compressor.
10. Install the A/C discharge hose bolt to the A/C compressor.

    Tighten: Tighten the bolt to 16 N.m (12 lb ft).

11. Install the A/C drive belt. Refer to **Drive Belt Replacement - Air Conditioning** in Engine Mechanical - 6.0L.
12. Install the fan shroud. Refer to **Fan Shroud Replacement** in Engine Cooling.
13. Evacuate and recharge the A/C system. Refer to **Refrigerant Recovery and Recharging** .
14. Leak test the fittings of the component using the **J 39400-A** . See **Special Tools and Equipment** .

COMPRESSOR CLUTCH PLATE/HUB ASSEMBLY REPLACEMENT

Removal Procedure

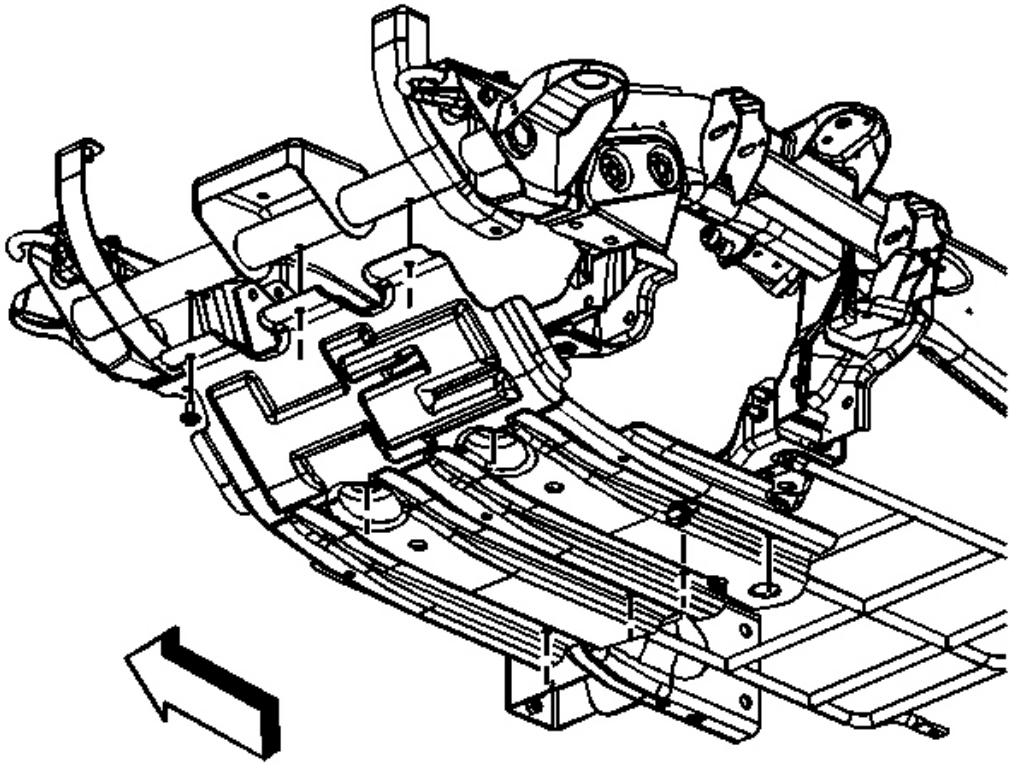


Fig. 8: Removing Engine Protection Shield
Courtesy of GENERAL MOTORS CORP.

1. Raise and suitably support the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
2. Remove the bolts from the engine protection shield.
3. Remove the engine protection shield.

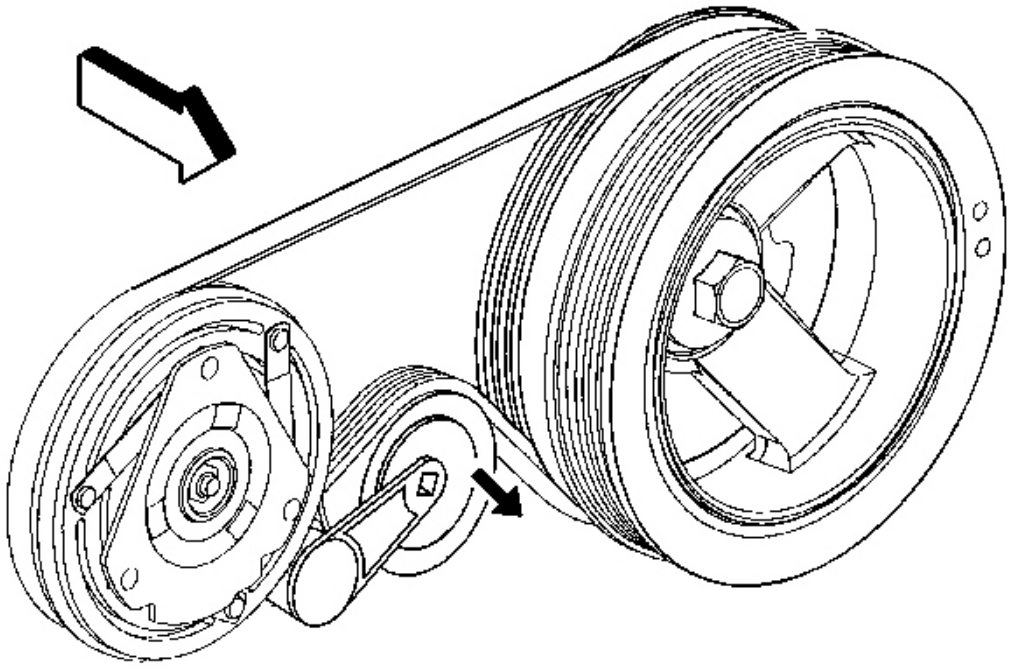


Fig. 9: A/C Belt Tensioner
Courtesy of GENERAL MOTORS CORP.

4. Install a ratchet into the air conditioning (A/C) belt tensioner adapter opening.
5. Rotate the A/C belt tensioner clockwise in order to relieve the tension on the belt.
6. Remove the A/C belt from the A/C compressor.
7. Slowly release the tension on the A/C belt tensioner.

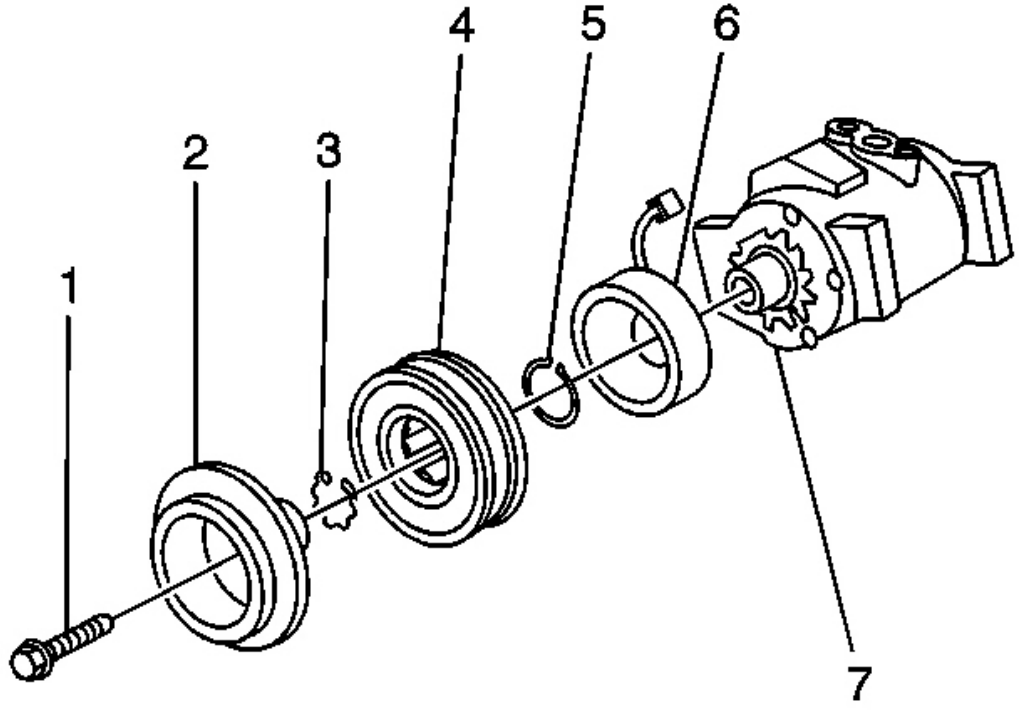


Fig. 10: Exploded View Of Compressor Clutch Plate Assembly
Courtesy of GENERAL MOTORS CORP.

8. Remove the clutch plate retaining bolt (1).
9. Remove the clutch plate assembly (2).
10. Remove the clutch hub/bearing snap ring (3).
11. Remove the clutch hub/bearing assembly (4).
12. Remove the snap ring (5) from the clutch coil (6).
13. Remove the clutch coil (6) from the A/C compressor (7).

Installation Procedure

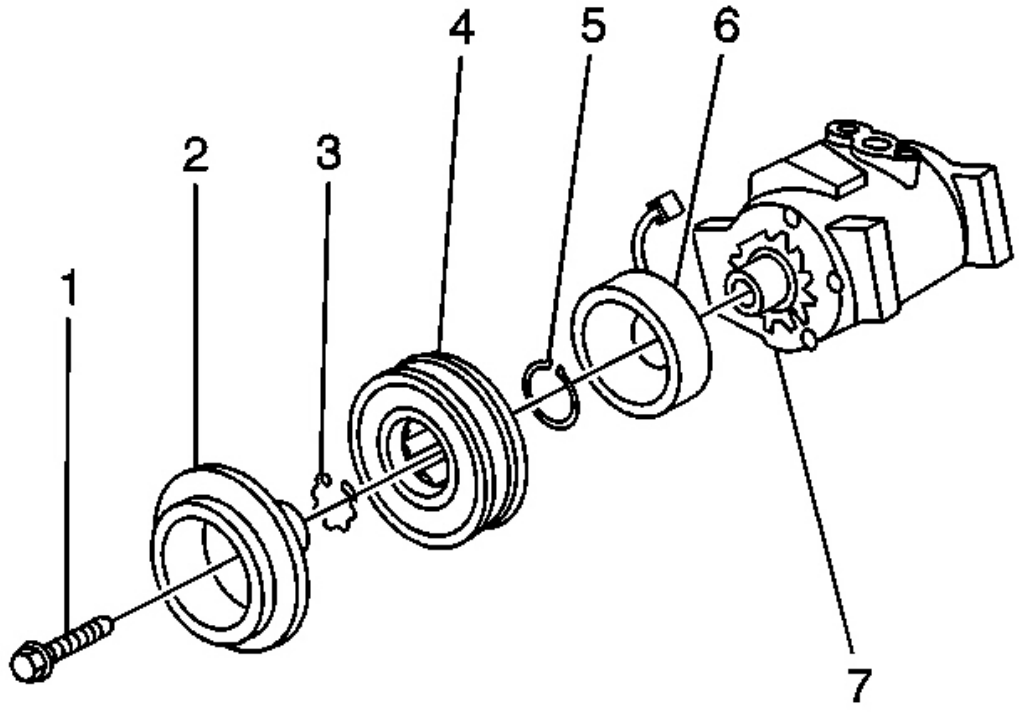


Fig. 11: Exploded View Of Compressor Clutch Plate Assembly
Courtesy of GENERAL MOTORS CORP.

1. Install the clutch coil (6) to the A/C compressor (7).
2. Install the snap ring (5) to the clutch coil (6).
3. Install the clutch hub/bearing assembly (4).
4. Install the clutch hub/bearing snap ring (3).
5. Install the clutch plate assembly (2).

NOTE: Refer to Fastener Notice in Cautions and Notices.

6. Install the clutch plate retaining bolt (1).

Tighten: Tighten the bolt to 18 N.m (13 lb ft).

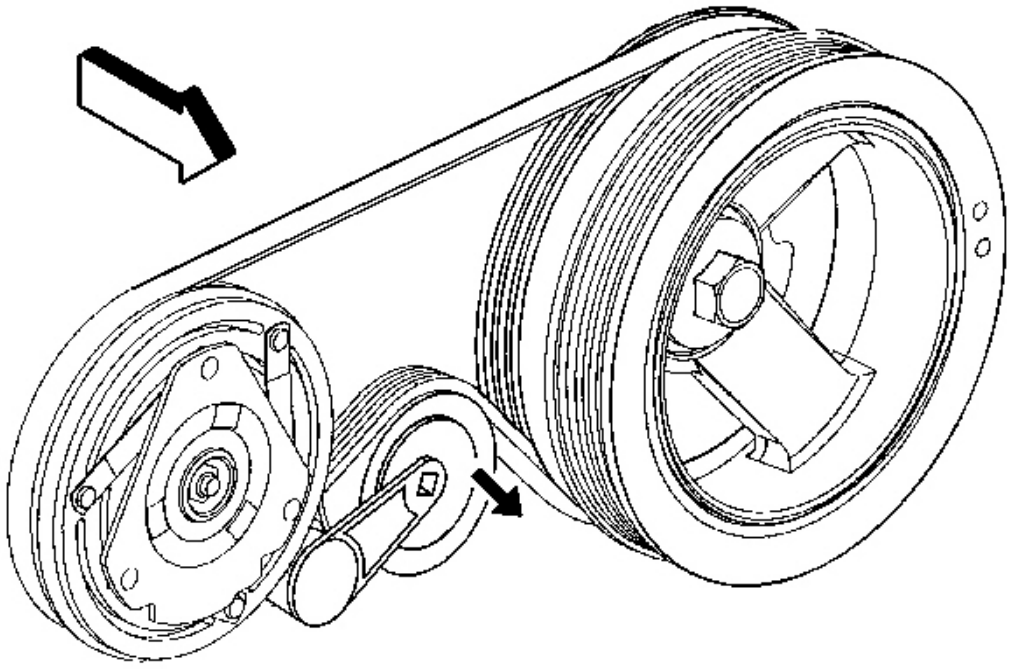


Fig. 12: A/C Belt Tensioner
Courtesy of GENERAL MOTORS CORP.

7. Install a ratchet into the A/C belt tensioner adapter opening.
8. Rotate the A/C belt tensioner clockwise in order to relieve the tension on the belt.
9. Install the A/C belt to the A/C compressor.
10. Slowly release the tension on the A/C belt tensioner.
11. Remove the ratchet from the A/C belt tensioner.
12. Install the engine protection shield.
13. Install the bolts to the engine protection shield.

    Tighten: Tighten the bolt to 30 N.m (22 lb ft).

14. Lower the vehicle.

COMPRESSOR MOUNTING BRACKET REPLACEMENT

Removal Procedure

1. Remove the A/C compressor. Refer to **Compressor Replacement** .

2. Remove the A/C belt tensioner bolts.
3. Remove the A/C belt tensioner.

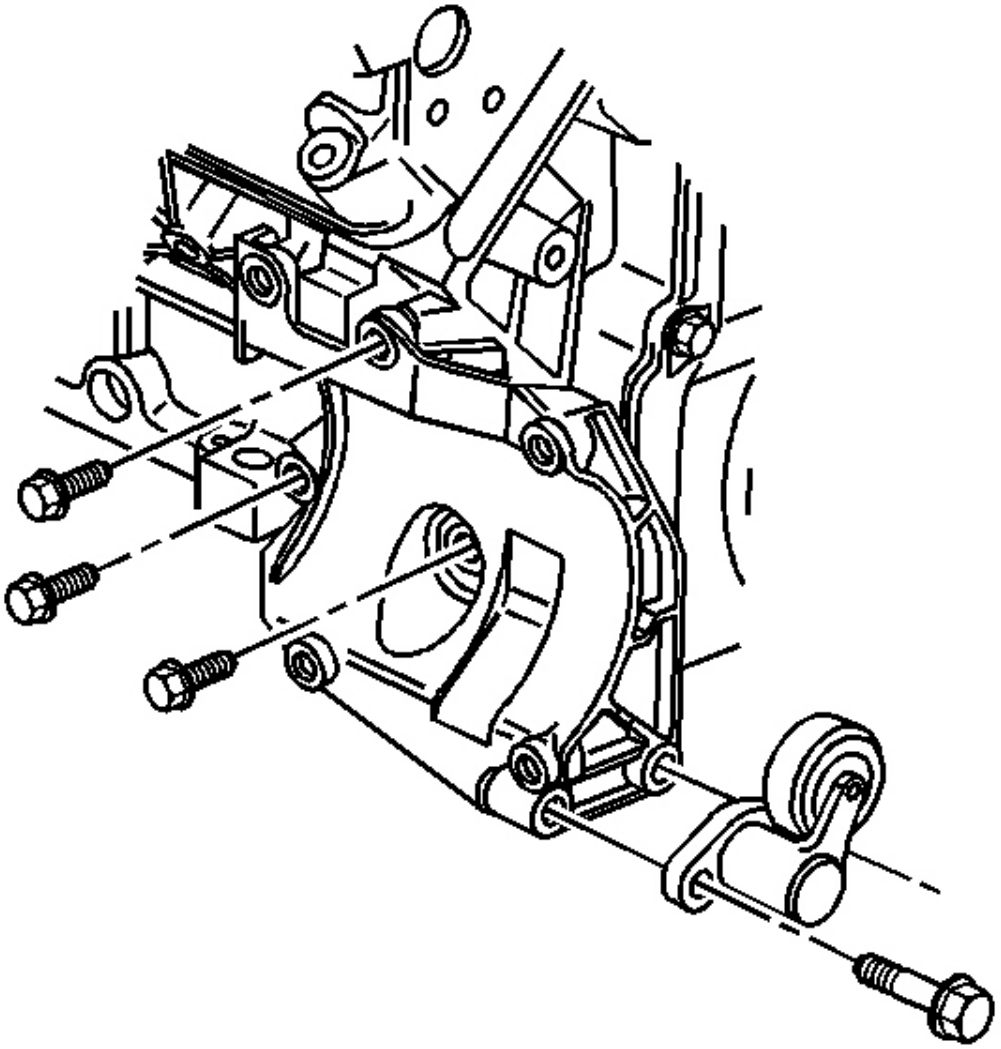


Fig. 13: A/C Compressor Bracket
Courtesy of GENERAL MOTORS CORP.

4. Remove the A/C compressor bracket mounting bolts.
5. Remove the A/C compressor bracket.

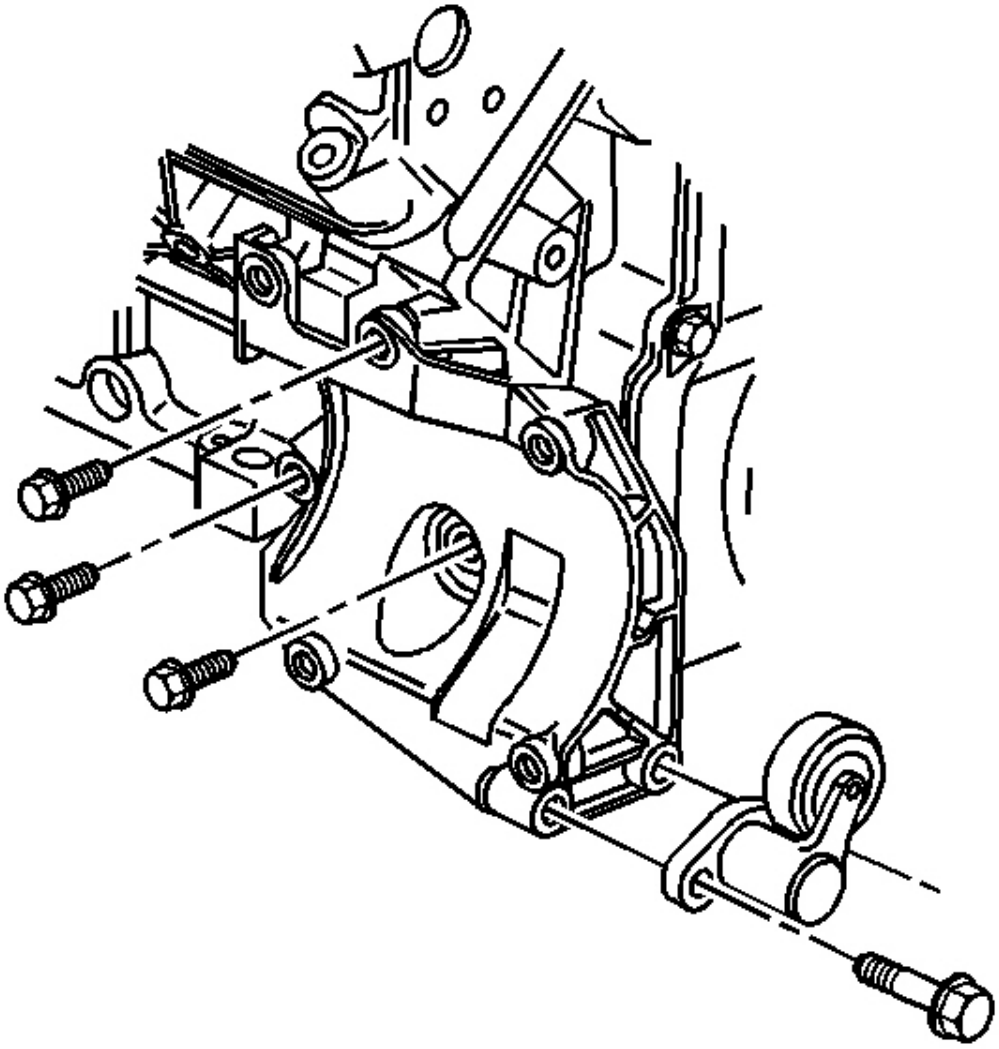


Fig. 14: A/C Compressor Bracket
Courtesy of GENERAL MOTORS CORP.

1. Install the A/C compressor bracket.

NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the A/C compressor bracket mounting bolts.

Tighten: Tighten the bolts to 50 N.m (37 lb ft).

3. Install the A/C belt tensioner.
4. Install the A/C belt tensioner bolts.

   Tighten: Tighten the bolts to 50 N.m (37 lb ft).

5. Install the A/C compressor. Refer to **Compressor Replacement** .

SEALING WASHER REPLACEMENT

Removal Procedure

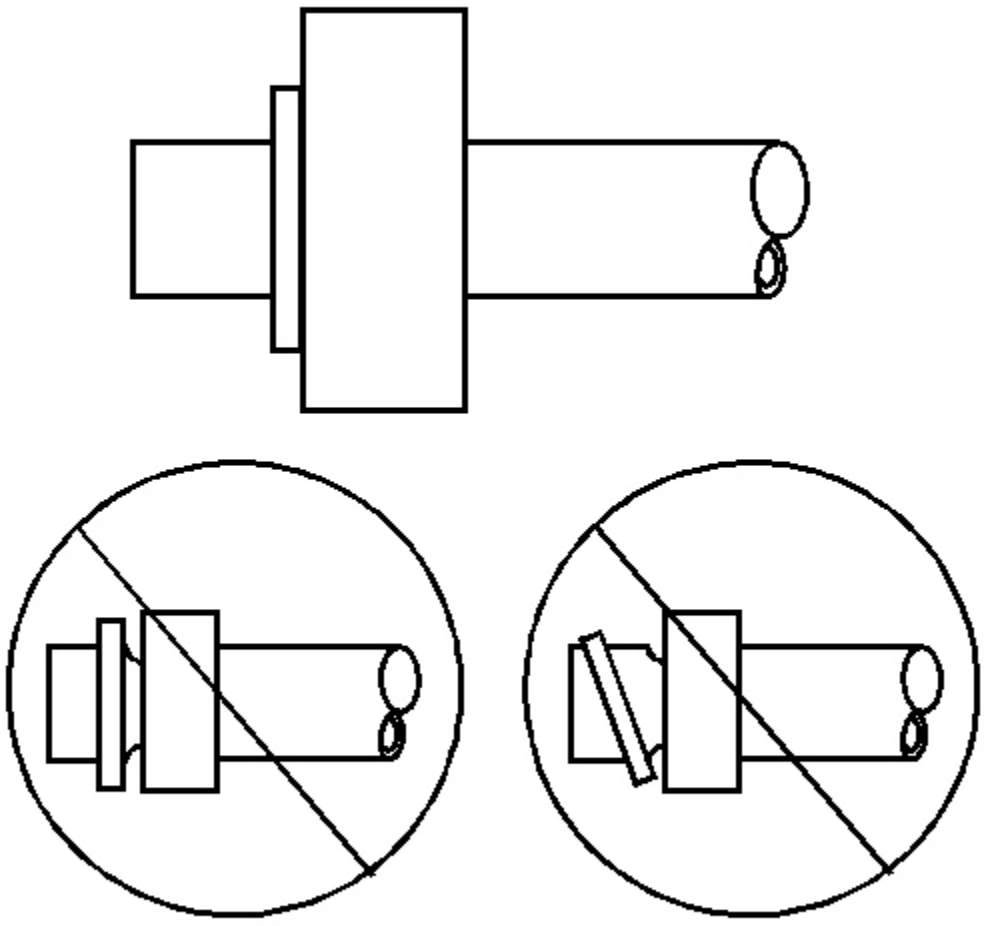


Fig. 15: Identifying Sealing Washer
Courtesy of GENERAL MOTORS CORP.

1. Remove the seal washer from the A/C refrigerant component.

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

2. Inspect the seal washer for signs of damage to help determine the root cause of the failure.
3. Inspect the A/C refrigerant components for damage or burrs. Repair if necessary.

IMPORTANT: DO NOT reuse sealing washer.

4. Discard the sealing washer.

Installation Procedure

IMPORTANT: Flat washer type seals do not require lubrication.

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

   Do not use a damaged seal washer.

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

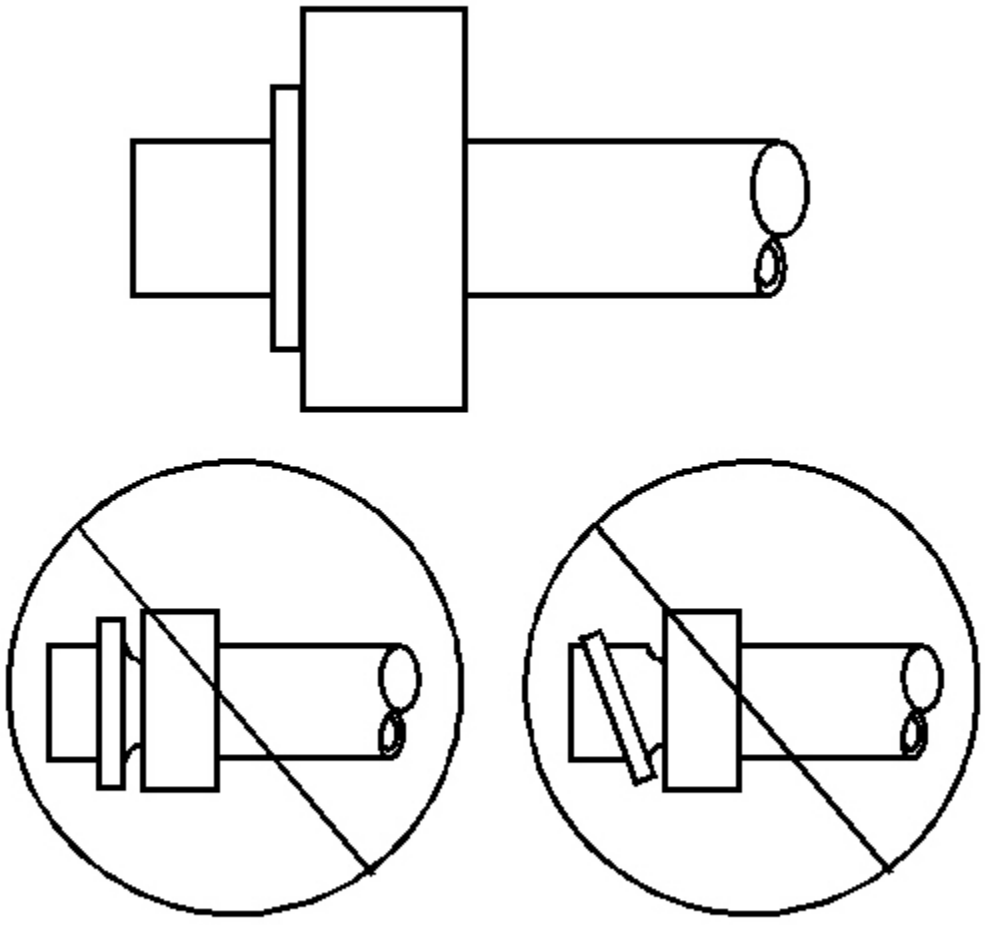


Fig. 16: Identifying Sealing Washer
Courtesy of GENERAL MOTORS CORP.

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

   The washer must completely bottom against the surface of the fitting.

IMPORTANT: After tightening the A/C components, there should be a slight sealing washer 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.

O-RING REPLACEMENT

Removal Procedure

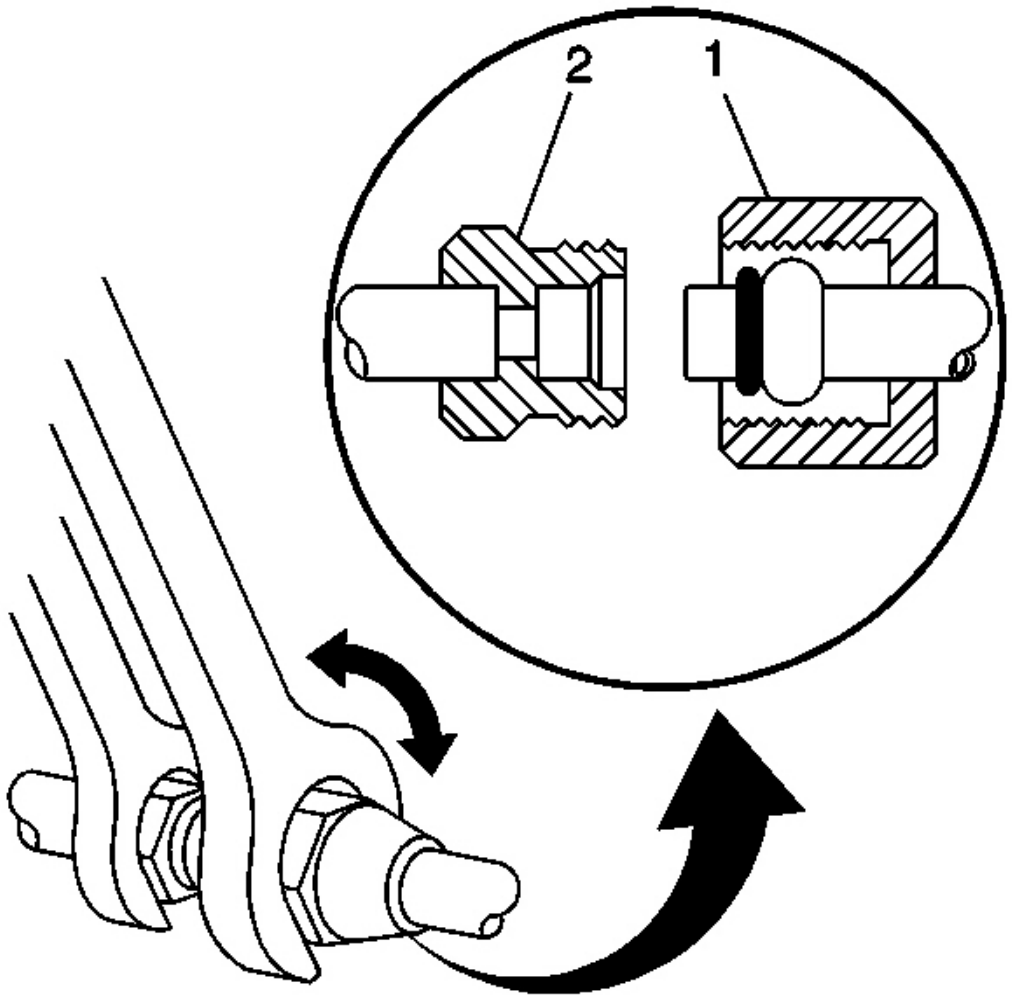


Fig. 17: Identifying A/C Line Fittings
Courtesy of GENERAL MOTORS CORP.

1. Disassemble the A/C refrigerant components. Refer to the appropriate repair procedure
    - For compression style fittings use a back up wrench on the fitting (2) and loosen the fitting nut (1).

- For banjo style fittings remove the bolt retaining the banjo type fitting.

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

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

5. Cap or tape the A/C refrigerant components.
6. Discard the O-ring seal.

Installation Procedure

1. Inspect the new O-ring seal for any sign or cracks, cuts, or damage. Replace if necessary.
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.

IMPORTANT: 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.

IMPORTANT: DO NOT reuse O-ring seals.

5. Carefully slide the new O-ring seal onto the A/C refrigerant component.

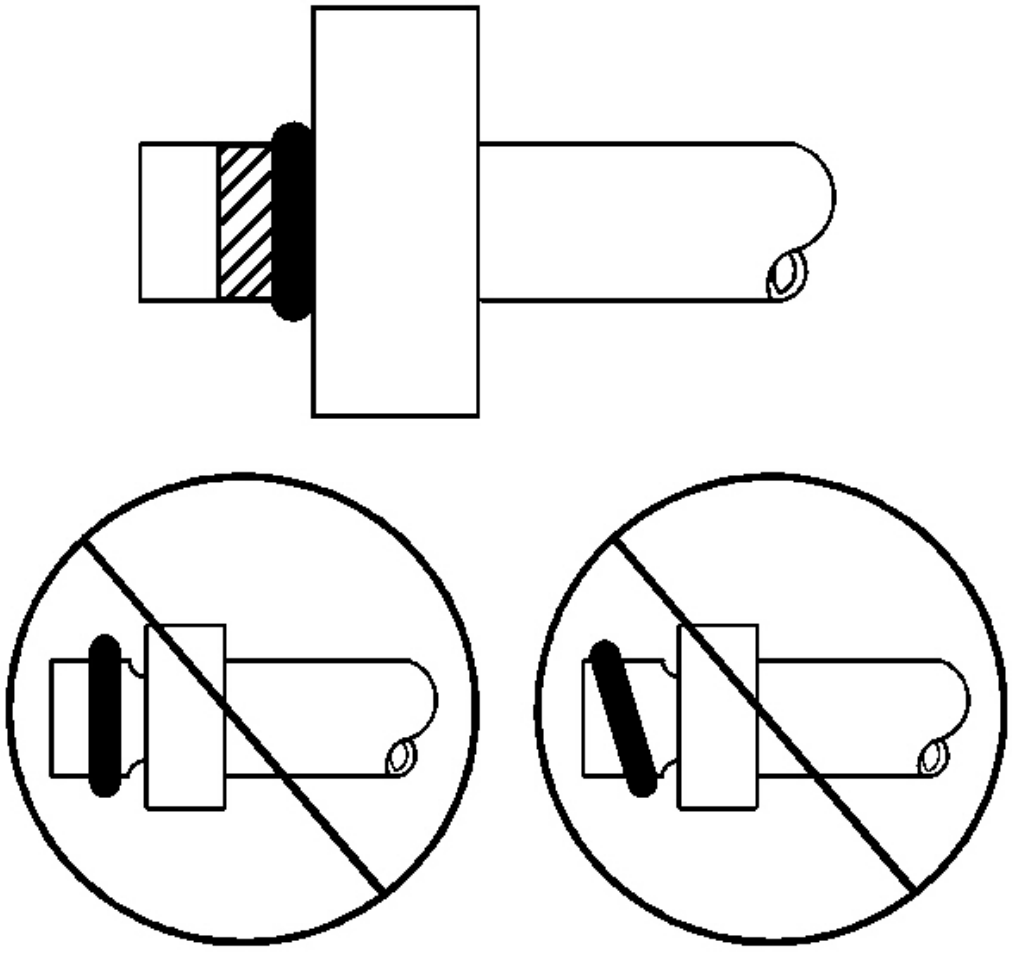


Fig. 18: Seating O-Ring
Courtesy of GENERAL MOTORS CORP.

6. The O-ring seal must be fully seated.

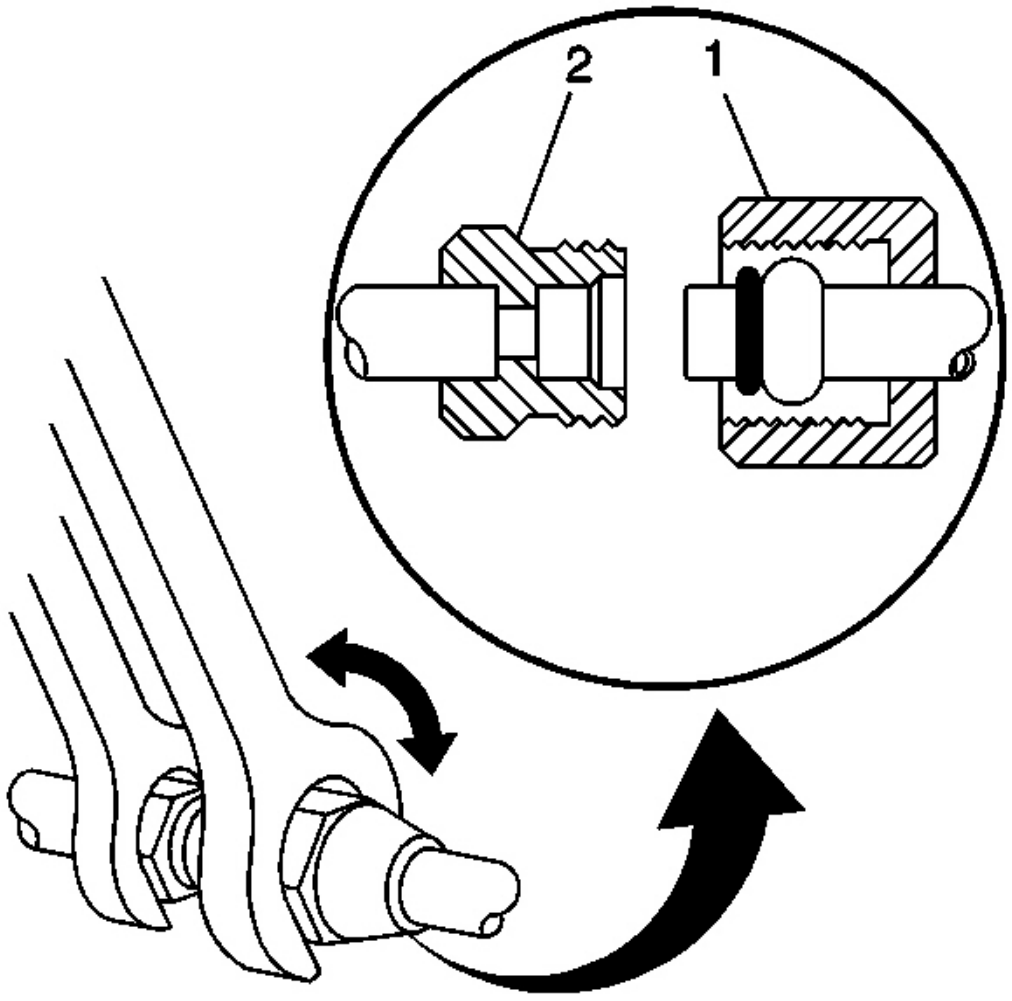


Fig. 19: Identifying A/C Line Fittings
Courtesy of GENERAL MOTORS CORP.

7. Assemble the A/C components.

   Refer to the appropriate repair procedure.

   - For compression style fittings use a back up wrench on the fitting (2) and tighten the fitting nut (1) to specification.
   - For banjo style fittings install the bolt retaining the banjo type fitting and tighten to specification.

DISCHARGE HOSE REPLACEMENT

Tools Required

J 39400-A Halogen Leak Detector. See **Special Tools and Equipment** .

Removal Procedure

1. Recover the refrigerant. Refer to **Refrigerant Recovery and Recharging** .
2. Disconnect the electrical connector from the A/C recirculation switch.
3. Remove the A/C recirculation switch from the A/C discharge hose.

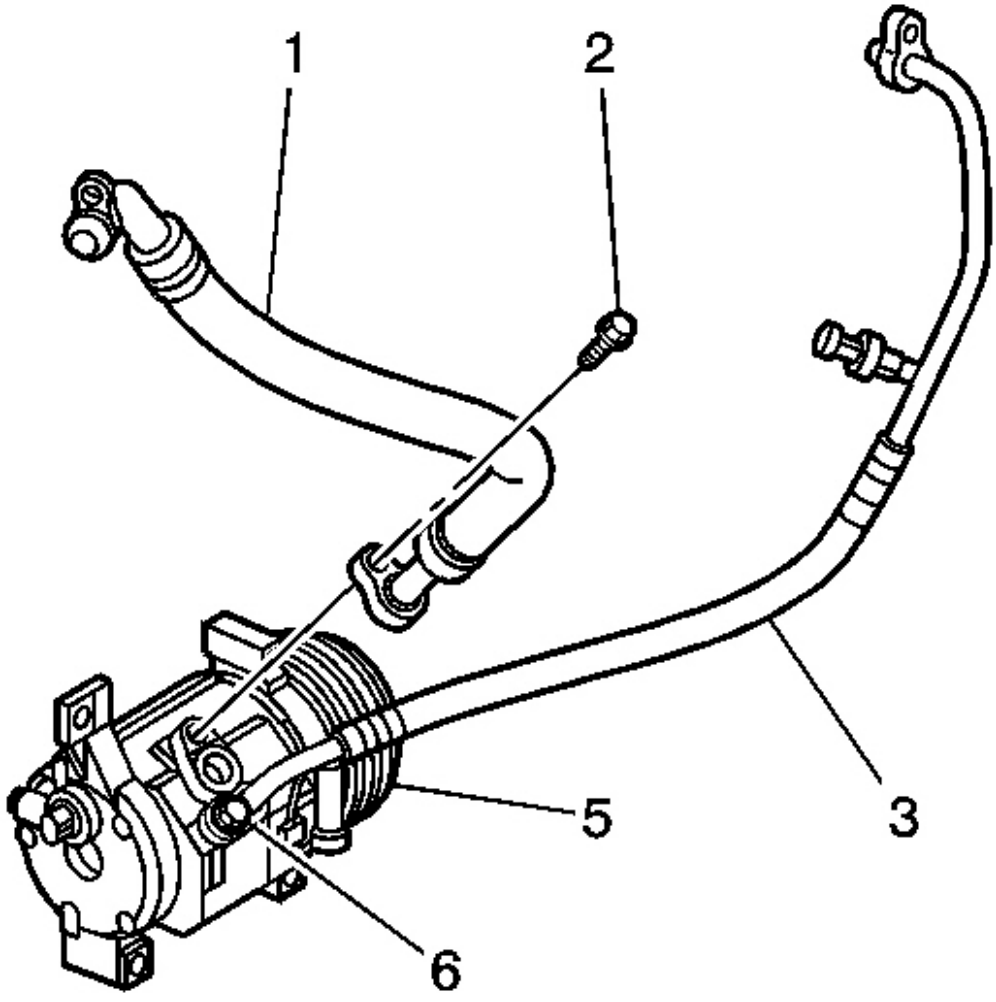


Fig. 20: Discharge Hose & A/C Compressor

Courtesy of GENERAL MOTORS CORP.

4. Remove the discharge hose bolt (6) from the A/C compressor (4).
5. Remove the discharge hose (5) from the A/C compressor (4).

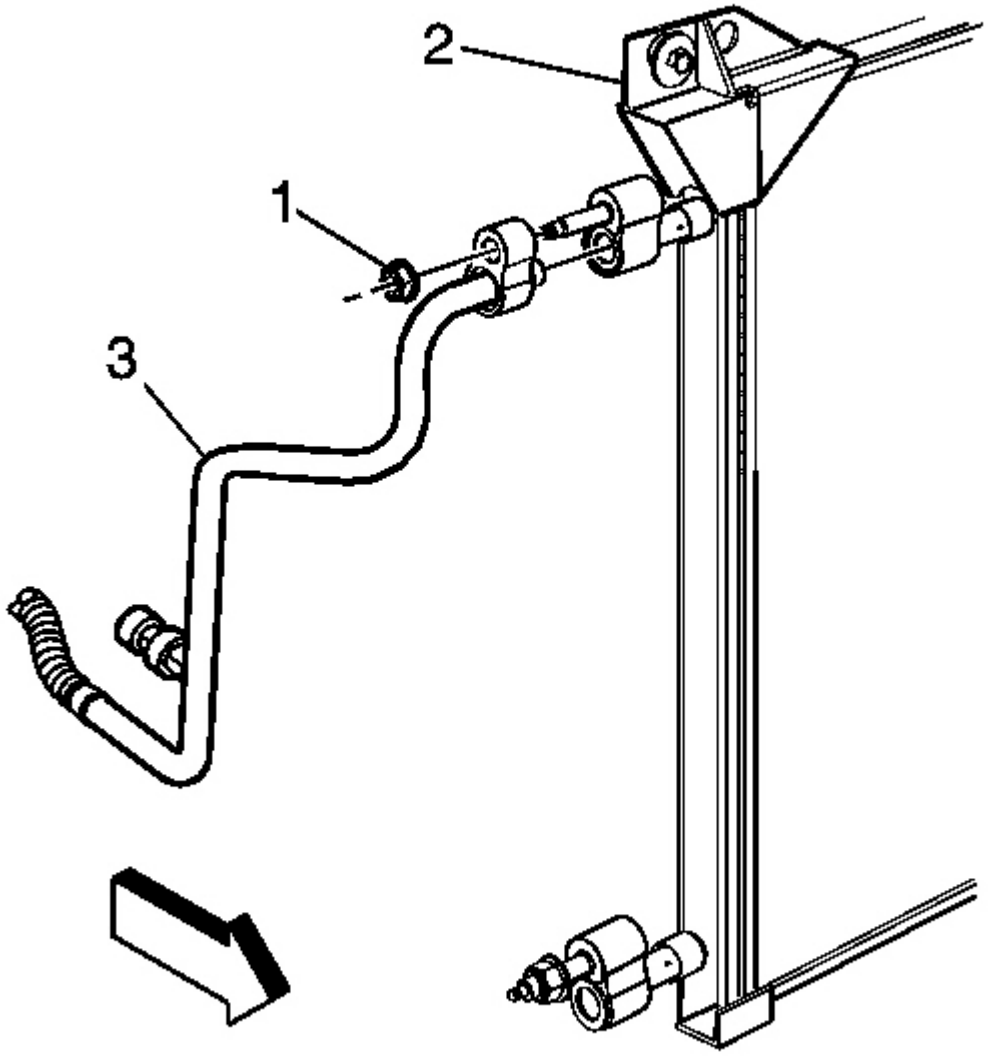


Fig. 21: Discharge Hose Nut & Condenser
Courtesy of GENERAL MOTORS CORP.

6. Remove the discharge hose nut (1) from the condenser (2).

7. Remove the discharge hose (3) from the condenser (2).
8. Remove the discharge hose (3) from the vehicle.
9. Discard all of the used sealing washers.
10. Cap all of the A/C system openings.

Installation Procedure

1. Install the new sealing washers. Refer to **Sealing Washer Replacement**

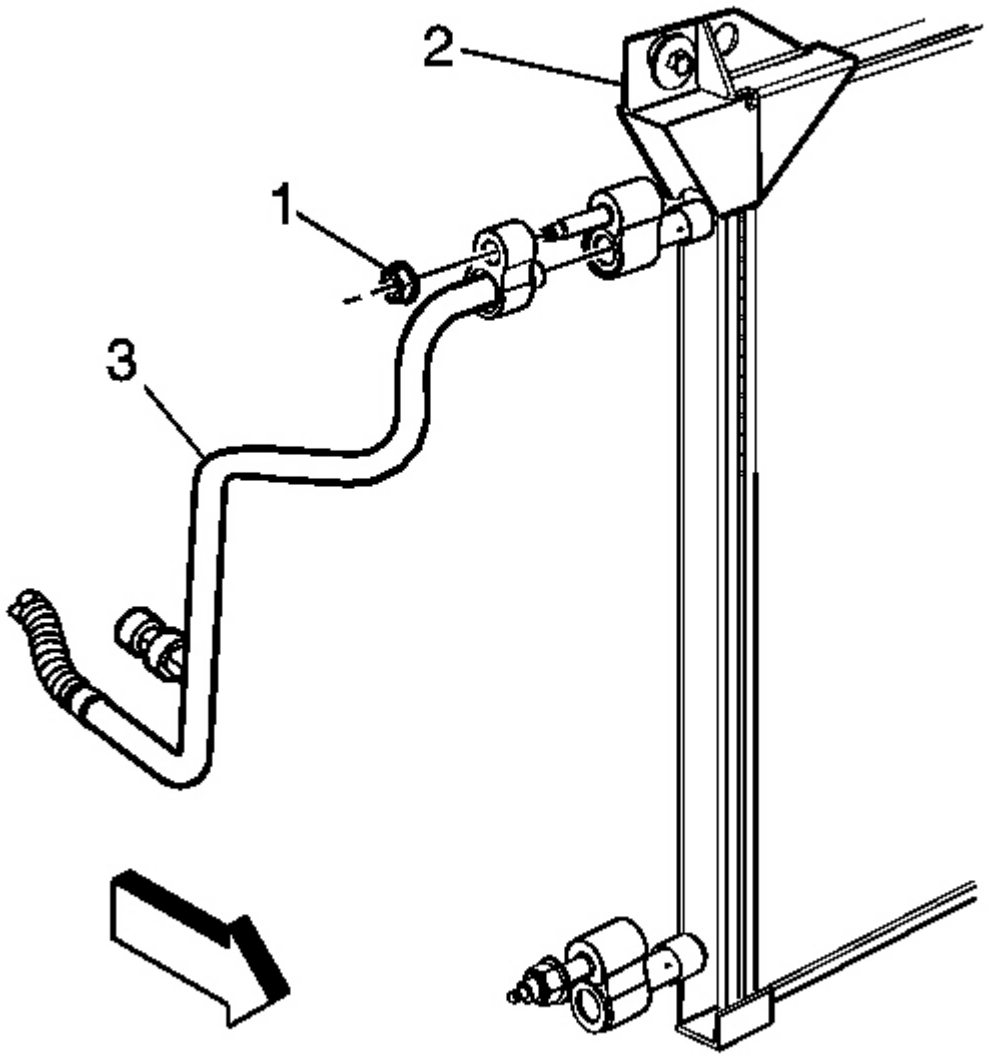


Fig. 22: Discharge Hose Nut & Condenser
Courtesy of GENERAL MOTORS CORP.

2. Install the discharge hose (3) to the vehicle.
3. Install the discharge hose (3) to the condenser (2).

NOTE: Refer to Fastener Notice in Cautions and Notices.

4. Install the nut (1) to the condenser (2).

Tighten: Tighten the nut to 16 N.m (12 lb ft).

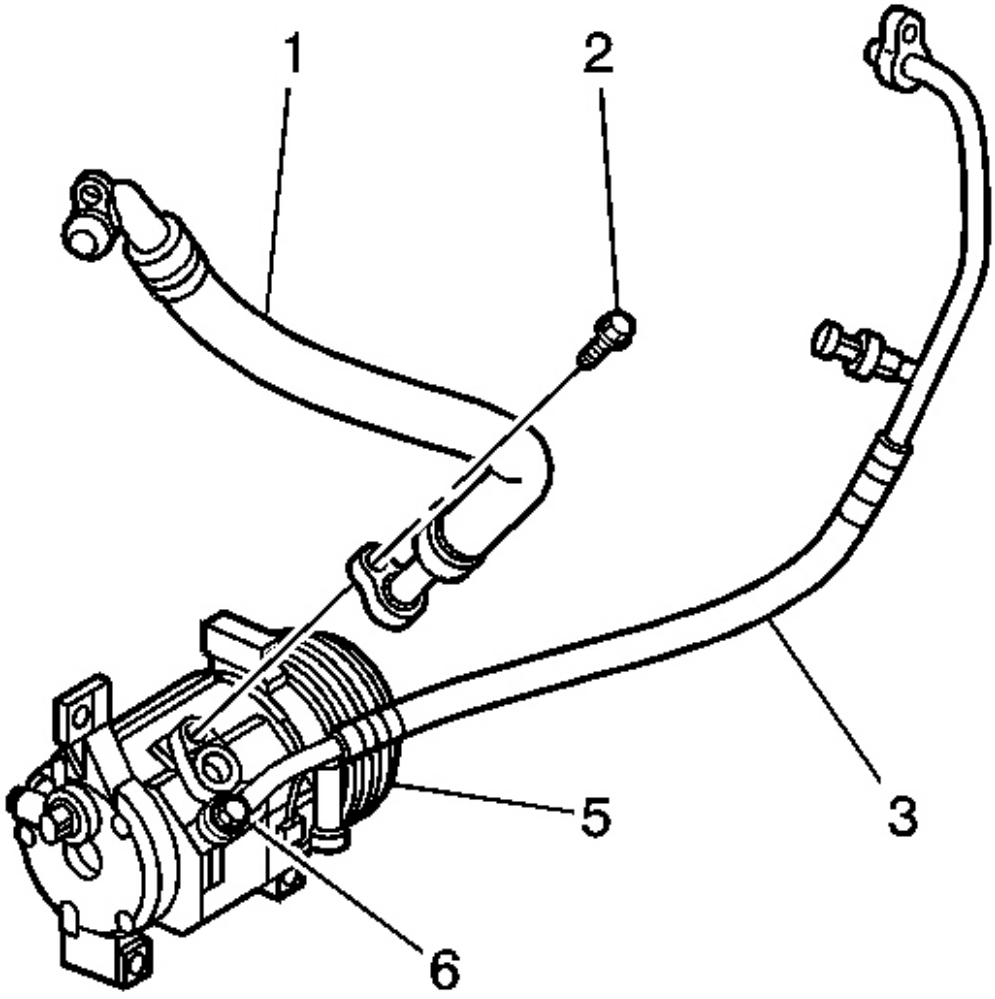


Fig. 23: Discharge Hose & A/C Compressor
Courtesy of GENERAL MOTORS CORP.

5. Install the discharge hose (5) to the A/C compressor (4).
6. Install the discharge hose bolt (6) to the A/C compressor (4).

   Tighten: Tighten the bolt to 16 N.m (12 lb ft).

7. Install the A/C recirculation switch to the discharge hose (5).

8. Connect the electrical connector to the A/C recirculation switch.
9. Evacuate and recharge the A/C system. Refer to **Refrigerant Recovery and Recharging** .
10. Leak test the fittings of the component using the **J 39400-A** . See **Special Tools and Equipment** .

SUCTION HOSE REPLACEMENT

Tools Required

J 39400-A Halogen Leak Detector. See **Special Tools and Equipment** .

Removal Procedure

1. Recover the refrigerant. Refer to **Refrigerant Recovery and Recharging** .

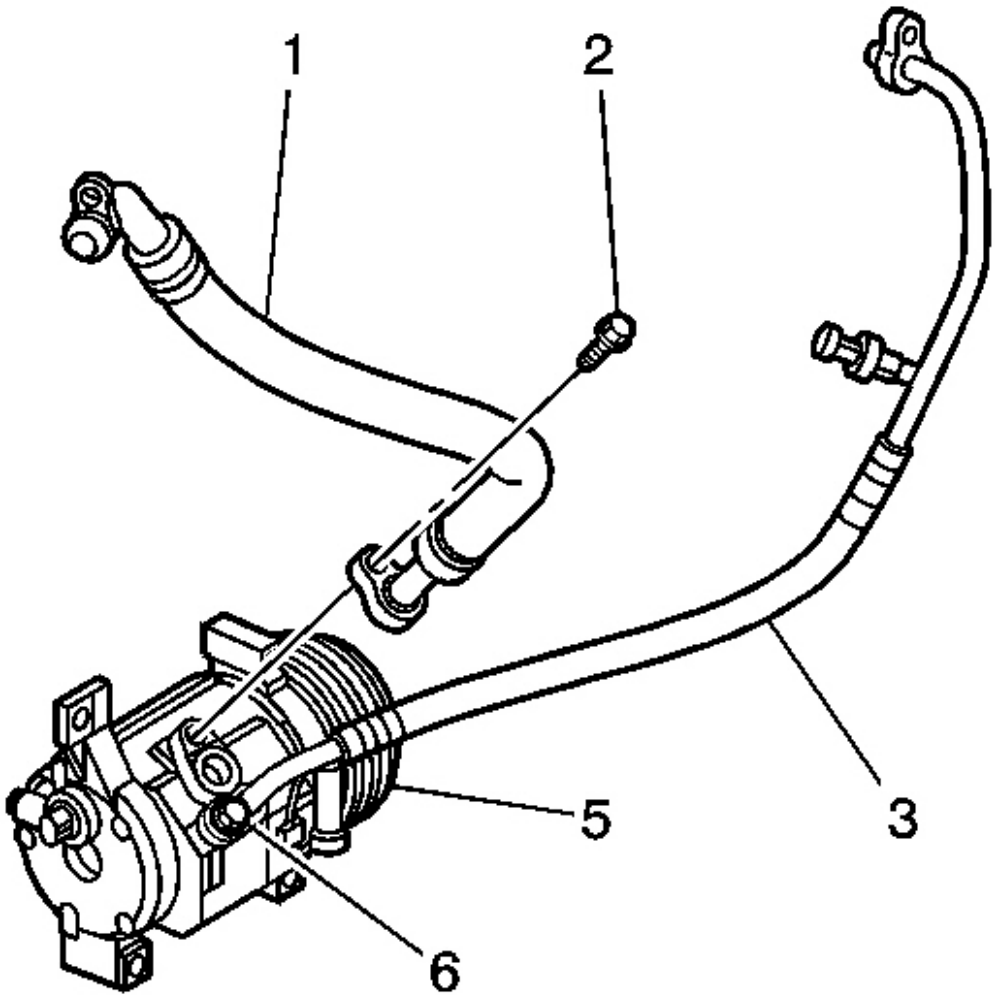


Fig. 24: Discharge Hose & A/C Compressor
Courtesy of GENERAL MOTORS CORP.

2. Remove the suction hose mounting bolt (2) from the A/C compressor (4).
3. Remove the suction hose (1) from the A/C compressor (4).

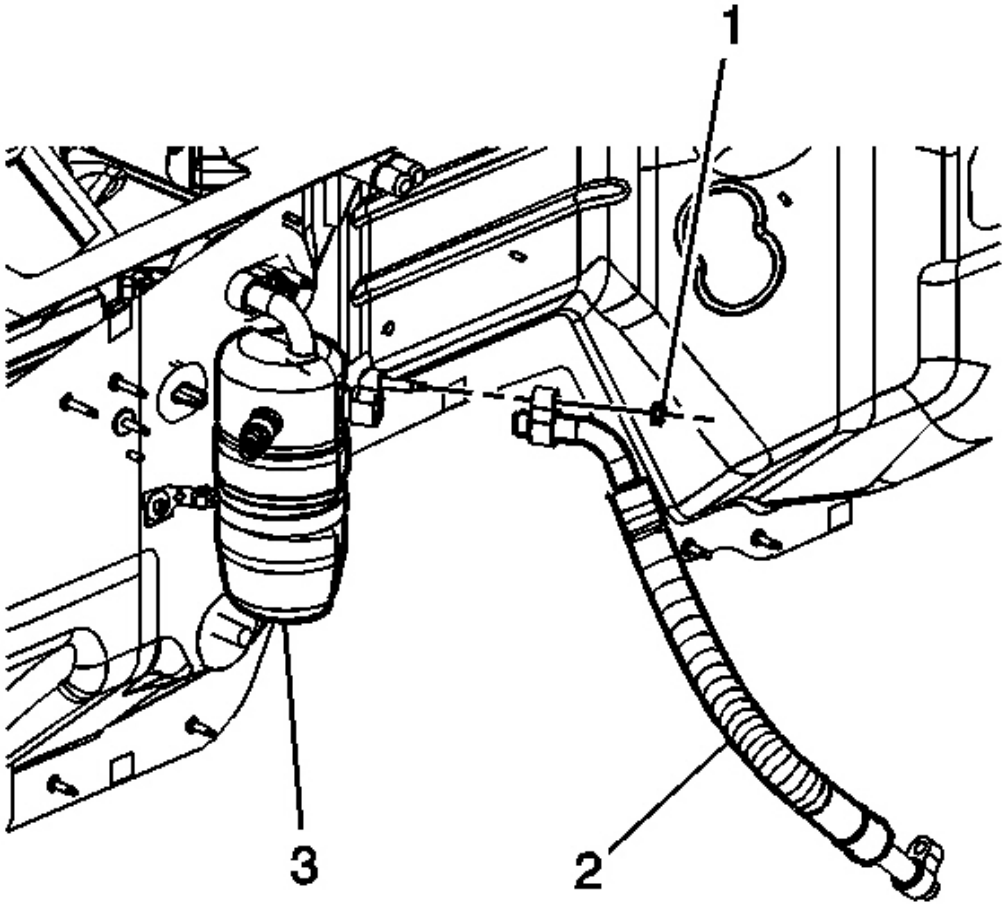


Fig. 25: Suction Hose & Accumulator
Courtesy of GENERAL MOTORS CORP.

4. Remove the suction hose nut (1) from the accumulator (3).
5. Remove the suction hose (2) from the accumulator (3).
6. Remove the suction hose (2) from the vehicle.
7. Discard all of the used sealing washers.
8. Cap all of the A/C system openings.

Installation Procedure

1. Install the suction hose assembly to the vehicle.
2. Install the new sealing washers. Refer to **Sealing Washer Replacement** .

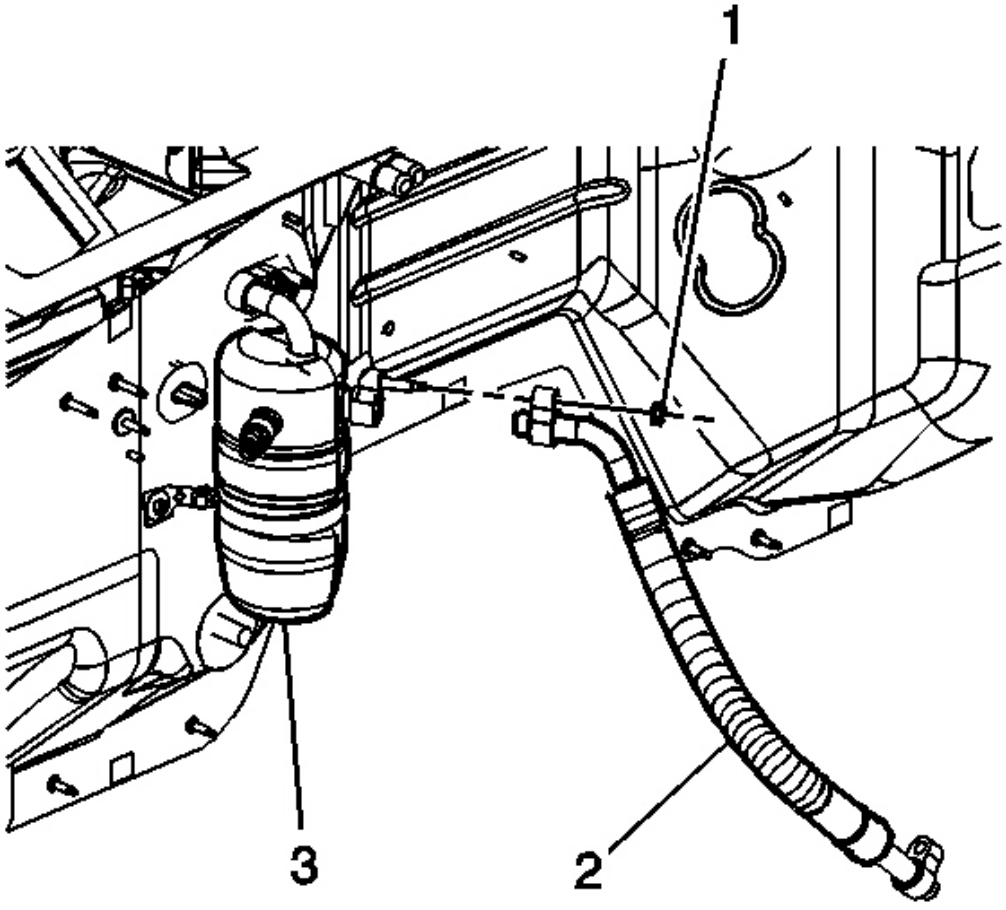


Fig. 26: Suction Hose & Accumulator
Courtesy of GENERAL MOTORS CORP.

3. Install the suction hose (2) to the accumulator (3).

NOTE: Refer to Fastener Notice in Cautions and Notices.

4. Install the suction hose nut (1) to the accumulator (3).

Tighten: Tighten the nut to 16 N.m (12 lb ft).

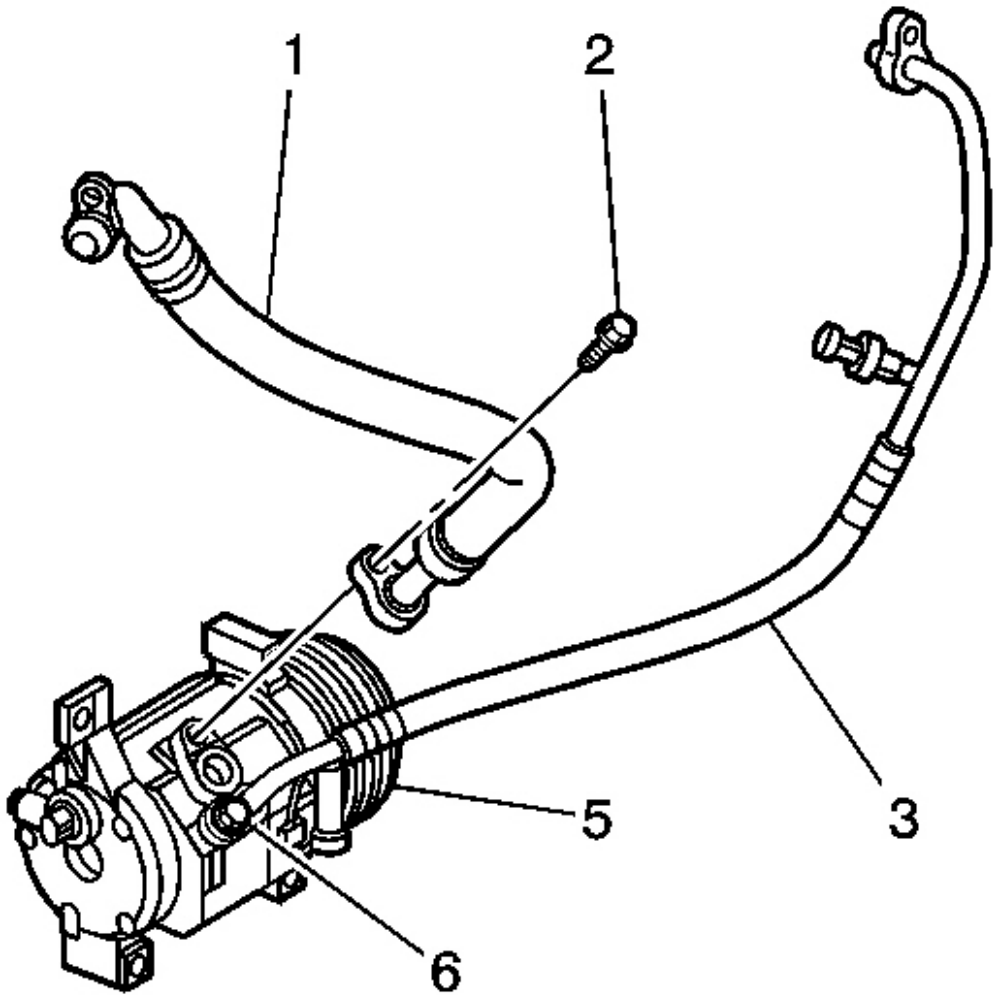


Fig. 27: Discharge Hose & A/C Compressor
Courtesy of GENERAL MOTORS CORP.

5. Install the suction hose (1) to the compressor (4).
6. Install the suction hose mounting bolt (2) to the A/C Compressor (4).

   Tighten: Tighten the bolt to 16 N.m (12 lb ft).

7. Evacuate and recharge the A/C system. Refer to **Refrigerant Recovery and Recharging** .
8. Leak test the fittings of the component using the **J 39400-A** . See **Special Tools and Equipment** .

EVAPORATOR TUBE REPLACEMENT

Tools Required

J 39400-A Halogen Leak Detector. See **Special Tools and Equipment** .

Removal Procedure

1. Recover the refrigerant from the A/C system. Refer to **Refrigerant Recovery and Recharging** .

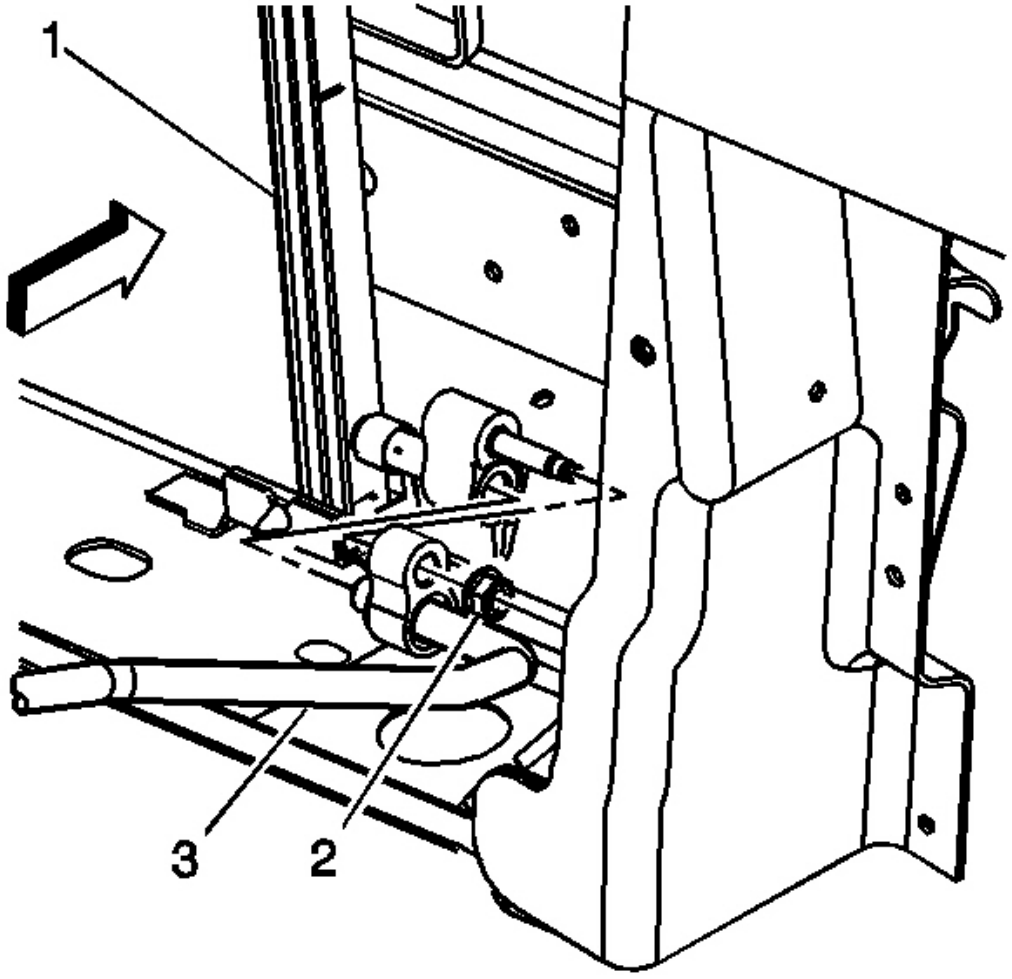


Fig. 28: Evaporator Tube & Condenser
Courtesy of GENERAL MOTORS CORP.

2. Remove the evaporator tube nut (2) from the condenser (1).
3. Remove the evaporator tube (3) from the condenser (1).

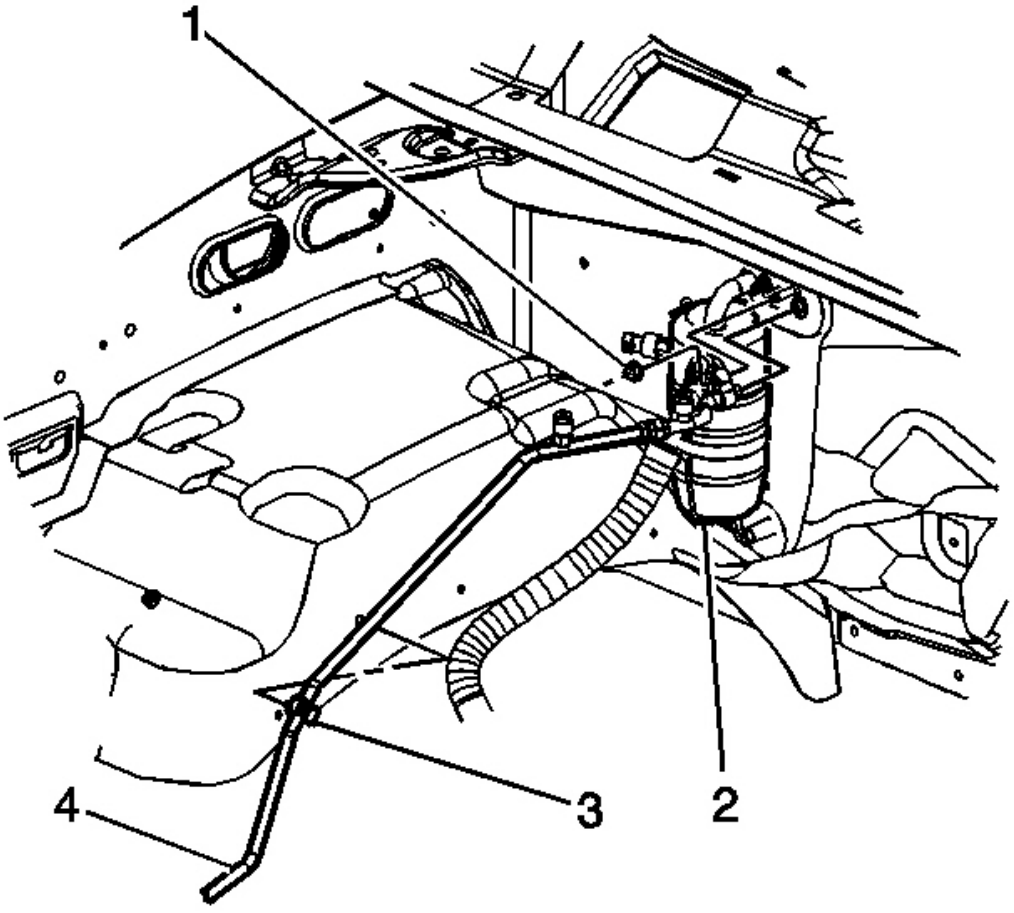


Fig. 29: Evaporator Tube Nut & Evaporator
Courtesy of GENERAL MOTORS CORP.

4. Remove the evaporator tube nut (1) from the evaporator.
5. Remove the evaporator tube (4) from the evaporator.
6. Remove the evaporator tube (4) from the body retaining clip (3).
7. Remove the evaporator tube (3) from the vehicle.
8. Discard all of the used sealing washers.
9. Cap all of the open connections.

Installation Procedure

1. Install the new sealing washers. Refer to **Sealing Washer Replacement** .
2. Install the evaporator tube (4) to the body retaining clip (3).
3. Install the evaporator tube (4) to the evaporator.

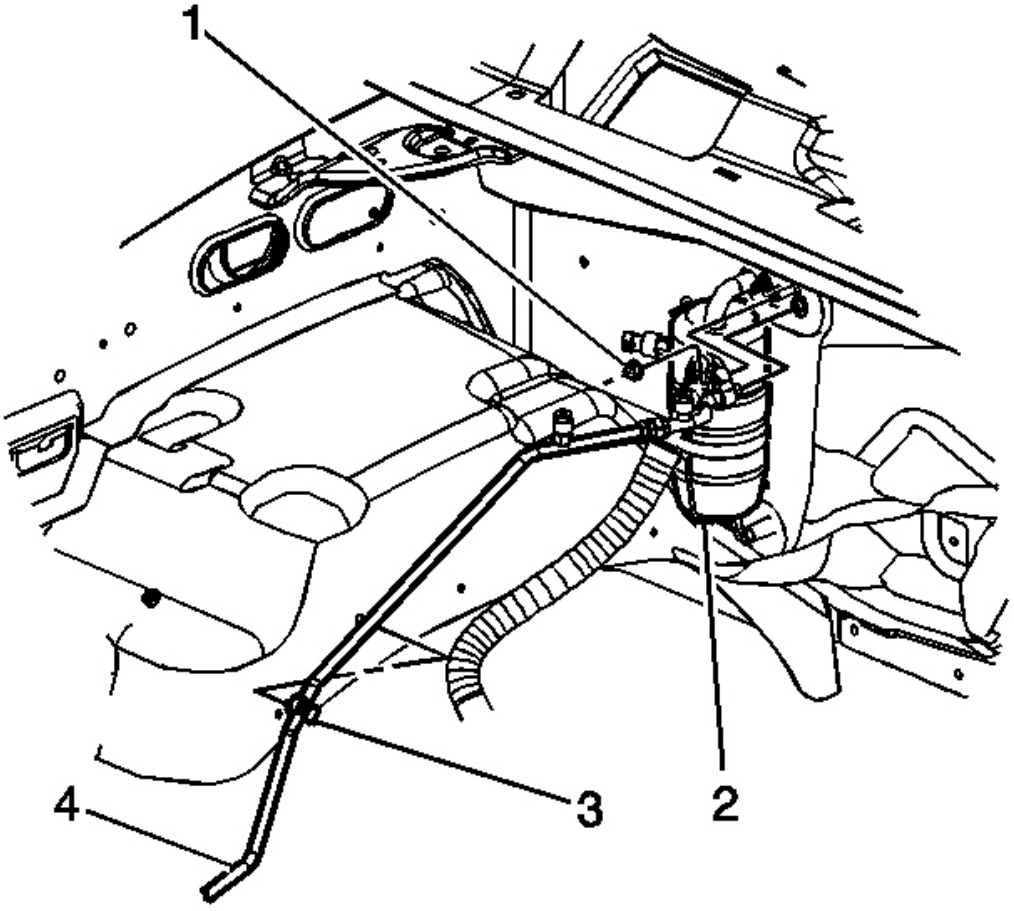


Fig. 30: Evaporator Tube Nut & Evaporator
Courtesy of GENERAL MOTORS CORP.

4. Install the evaporator tube nut (1) to the evaporator.

   Tighten: Tighten the nut to 16 N.m (12 lb ft).

5. Install the evaporator tube (3) to the condenser (1).

NOTE: **Refer to Fastener Notice in Cautions and Notices.**

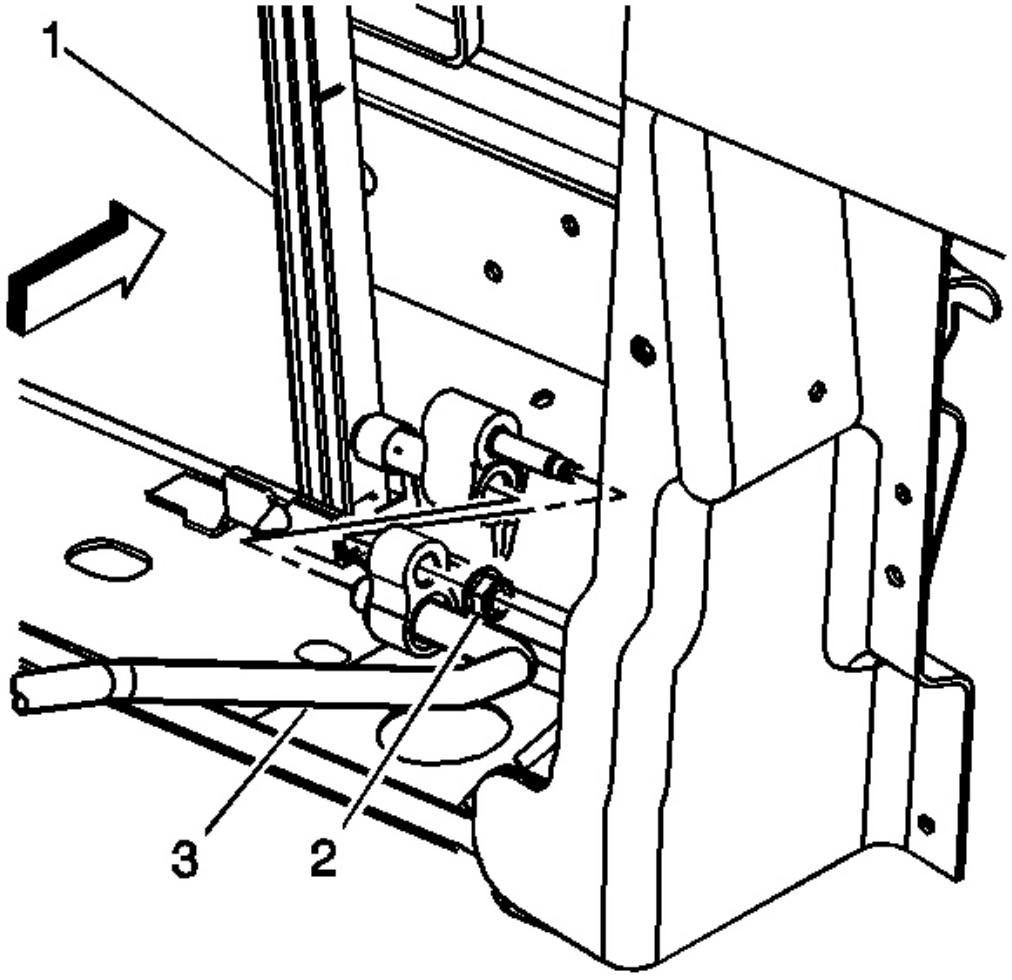


Fig. 31: Evaporator Tube & Condenser
Courtesy of GENERAL MOTORS CORP.

6. Install the evaporator tube nut (2) to the condenser (1).

   Tighten: Tighten the nut to 16 N.m (12 lb ft).

7. Evacuate and recharge the A/C system. Refer to **Refrigerant Recovery and Recharging** .
8. Leak test the fittings of the components using the **J 39400-A** . See **Special Tools and Equipment** .

AIR CONDITIONING (A/C) REFRIGERANT FILTER INSTALLATION

Tools Required

J 39400-A Halogen Leak Detector. See **Special Tools and Equipment** .

IMPORTANT: The A/C Refrigerant filter, ACDelco P/N 15-1696 must be installed to the A/C evaporator tube between the condenser and evaporator. The installation of this A/C refrigerant filter eliminates the need for flushing.

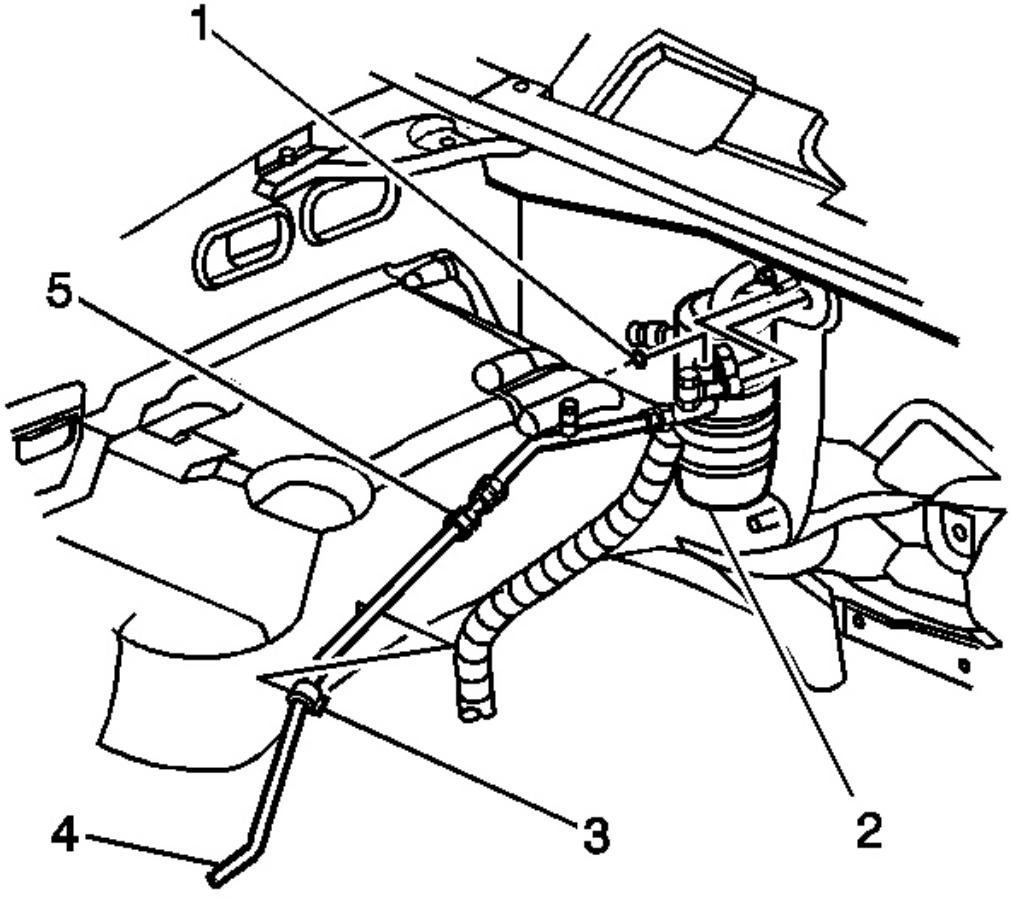


Fig. 32: A/C Refrigerant Filter & Evaporator Tube
Courtesy of GENERAL MOTORS CORP.

1. Remove the air cleaner. Refer to **Air Cleaner Assembly Replacement** in Engine Controls - 6.0 L.

2. Measure 50 mm (2 in) from the bend on the evaporator tube (4) near the expansion tube end and mark the location.
3. Measure 50.8 mm (2 in) from the mark on the evaporator tube (4) from the previous step.

IMPORTANT: Do not allow metal burrs to enter the evaporator tube (4) during cutting or when removing the burrs.

4. Using a tubing cutter, cut the marked section of the evaporator tube (4).
5. Remove the burrs from the evaporator tube (4).

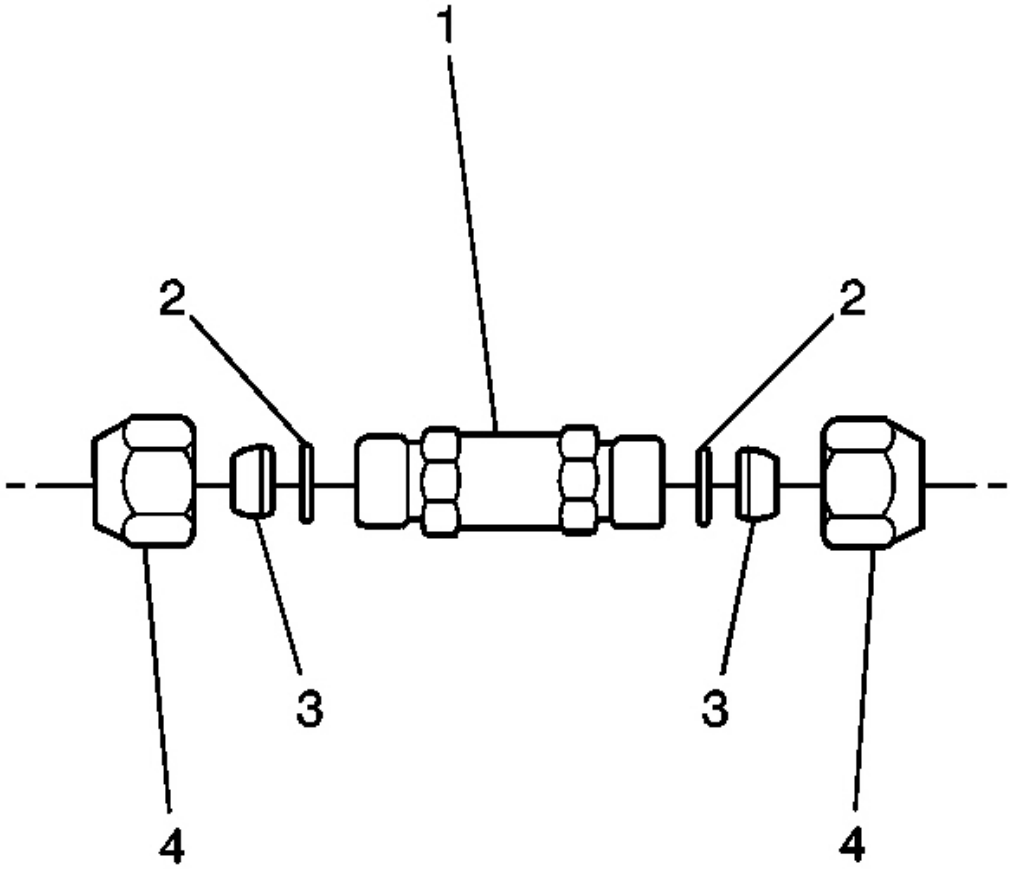


Fig. 33: A/C Refrigerant Filter Components
Courtesy of GENERAL MOTORS CORP.

6. Remove the nuts (4), the ferrules (3), and the O-rings (2) from the A/C refrigerant filter (1).

IMPORTANT: DO NOT install the O-rings (2) in this step.

7. Push the nuts (4) and ferrules (3) over each of the evaporator tube halves.
8. Install the ferrules (3) with the small end toward the nut (4).

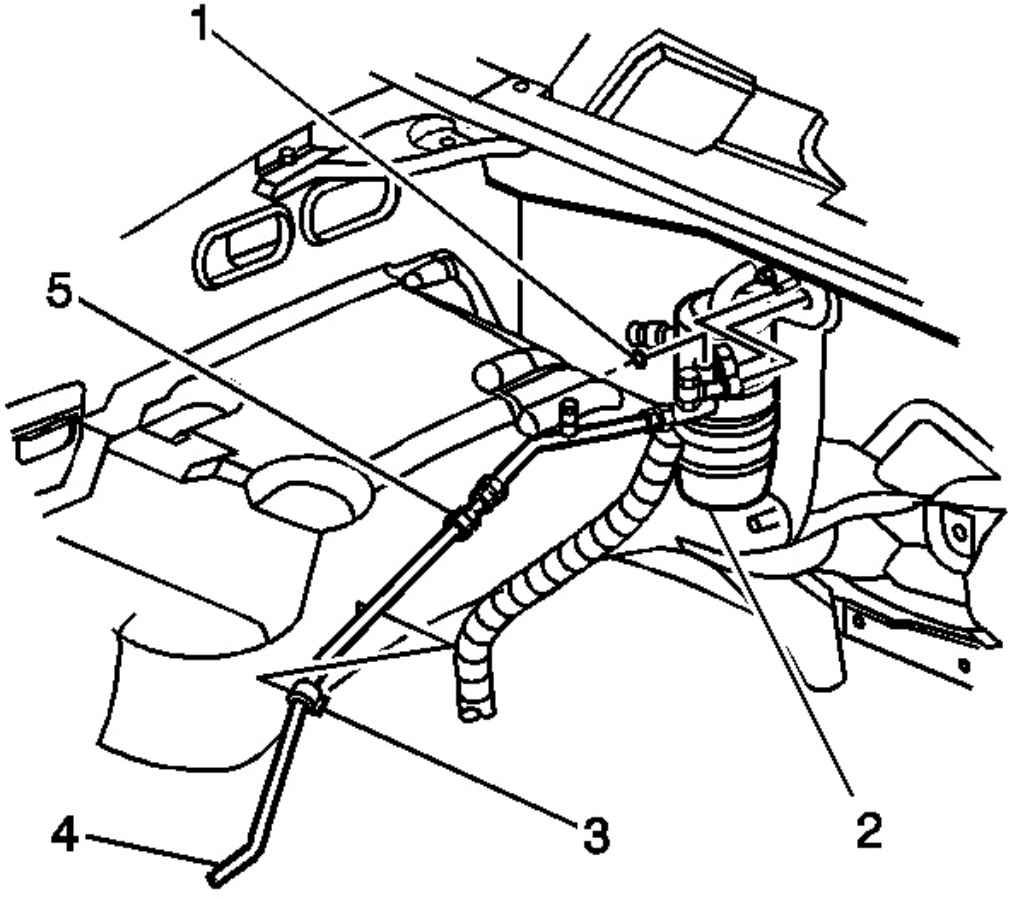


Fig. 34: A/C Refrigerant Filter & Evaporator Tube
Courtesy of GENERAL MOTORS CORP.

9. Install the A/C refrigerant filter (5) to the evaporator tube (4) with the flow arrow pointing towards the evaporator.

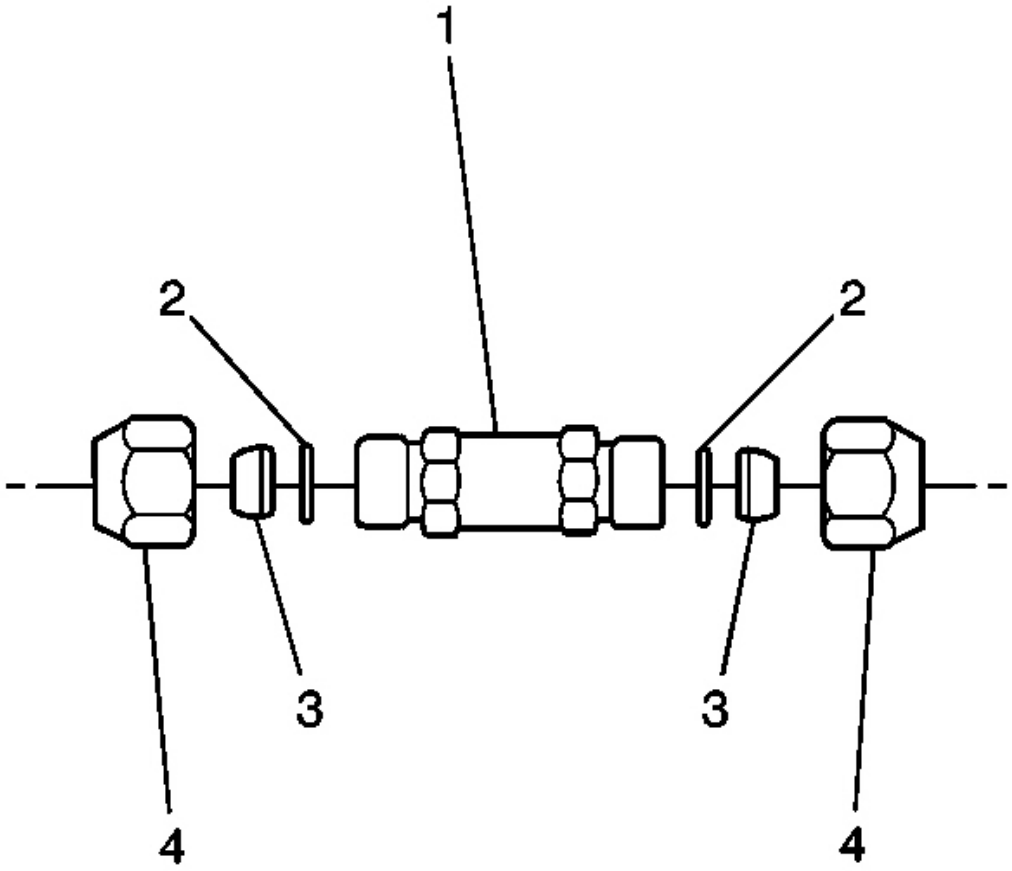


Fig. 35: A/C Refrigerant Filter Components
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

10. While holding the evaporator tube in the A/C refrigerant filter (1), tighten the nuts (4) to the A/C refrigerant filter (1).

    Tighten: Tighten the nuts to 15 N.m (11 lb ft).

11. Remove the nuts (4) from the A/C refrigerant filter (1).
12. Coat the O-rings (2) with 525 viscosity refrigerant oil.
13. Install the O-rings (2) to the evaporator tube halves.
14. Install the nuts (4) to the A/C refrigerant filter (1).

Tighten: Tighten the nuts to 15 N.m (11 lb ft).

15. Evacuate and recharge the A/C system. Refer to **Refrigerant Recovery and Recharging** .
16. Leak test the fittings of the component using the **J 39400-A** . See **Special Tools and Equipment** .
17. Install the air cleaner. Refer to **Air Cleaner Assembly Replacement** in Engine Controls - 6.0 L.

AIR CONDITIONING (A/C) REFRIGERANT FILTER REPLACEMENT

Tools Required

J 39400-A Halogen Leak Detector. See **Special Tools and Equipment** .

Removal Procedure

1. Recover the refrigerant from the system. Refer to **Refrigerant Recovery and Recharging** .
2. Remove the air cleaner. Refer to **Air Cleaner Assembly Replacement** in Engine Controls - 6.0 L.

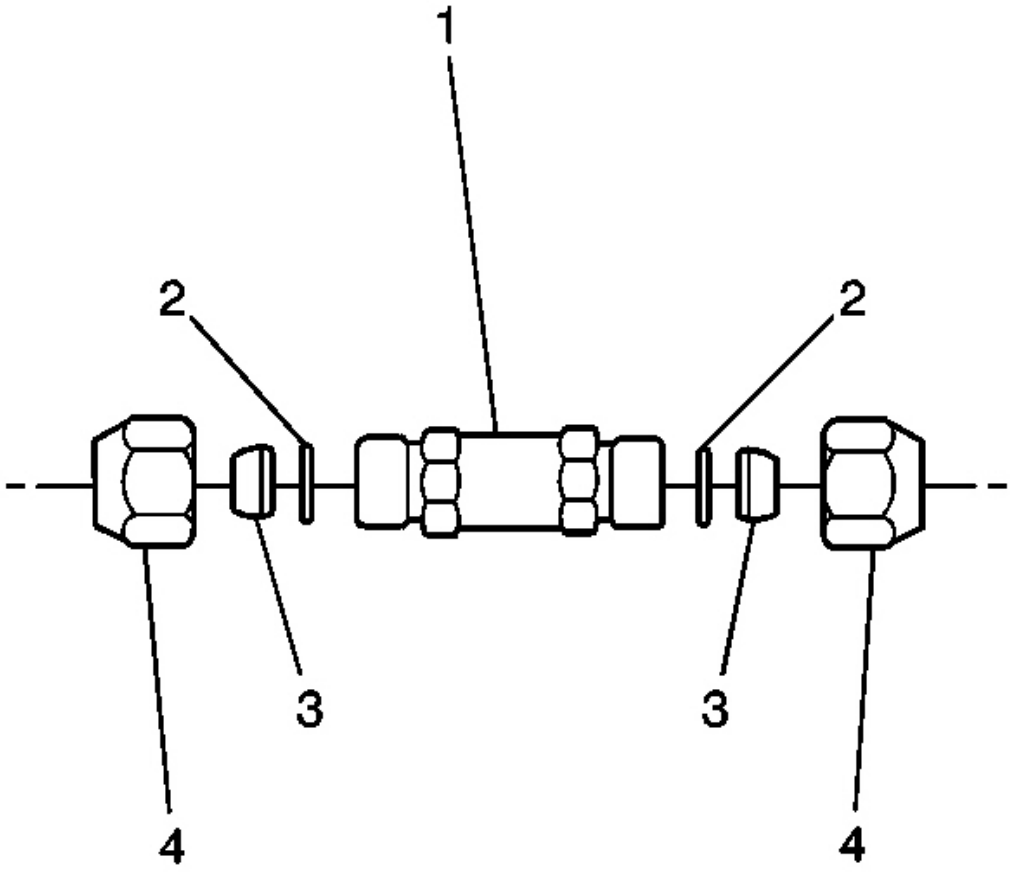


Fig. 36: A/C Refrigerant Filter Components
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: The nuts (4) and the ferrules (3) will remain on the evaporator tube. Do not try to remove.

3. Remove the nuts (4) from the A/C refrigerant filter (1).

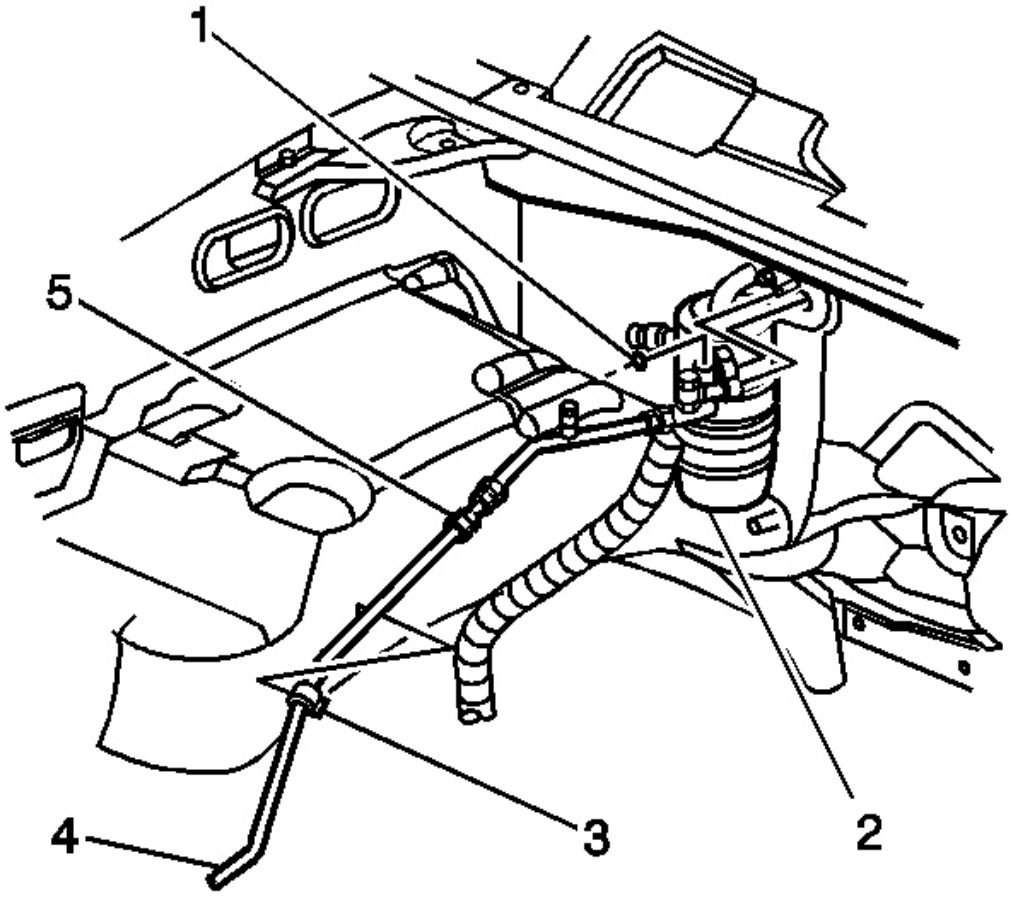


Fig. 37: A/C Refrigerant Filter & Evaporator Tube
Courtesy of GENERAL MOTORS CORP.

4. Remove the A/C refrigerant filter (5) from the evaporator tube (4).

Installation Procedure

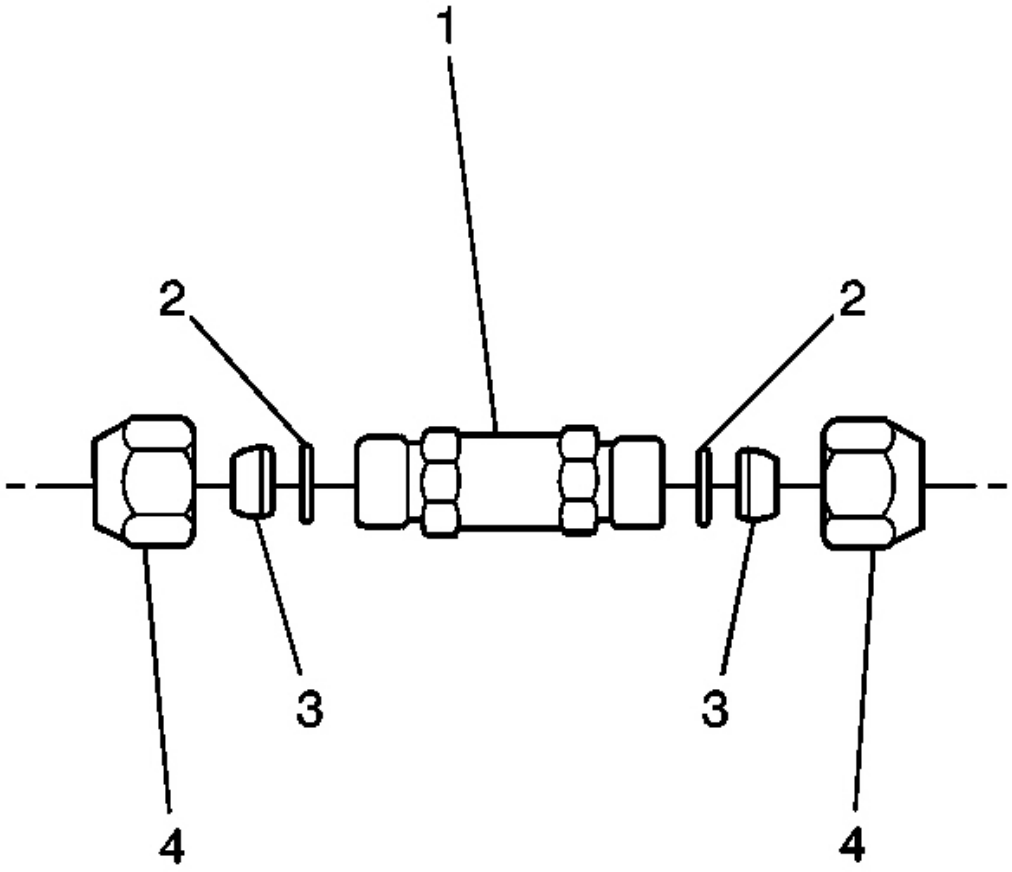


Fig. 38: A/C Refrigerant Filter Components
Courtesy of GENERAL MOTORS CORP.

1. Coat the O-rings (2) with 525 viscosity refrigerant oil.
2. Install the O-rings (2) to the evaporator tube.

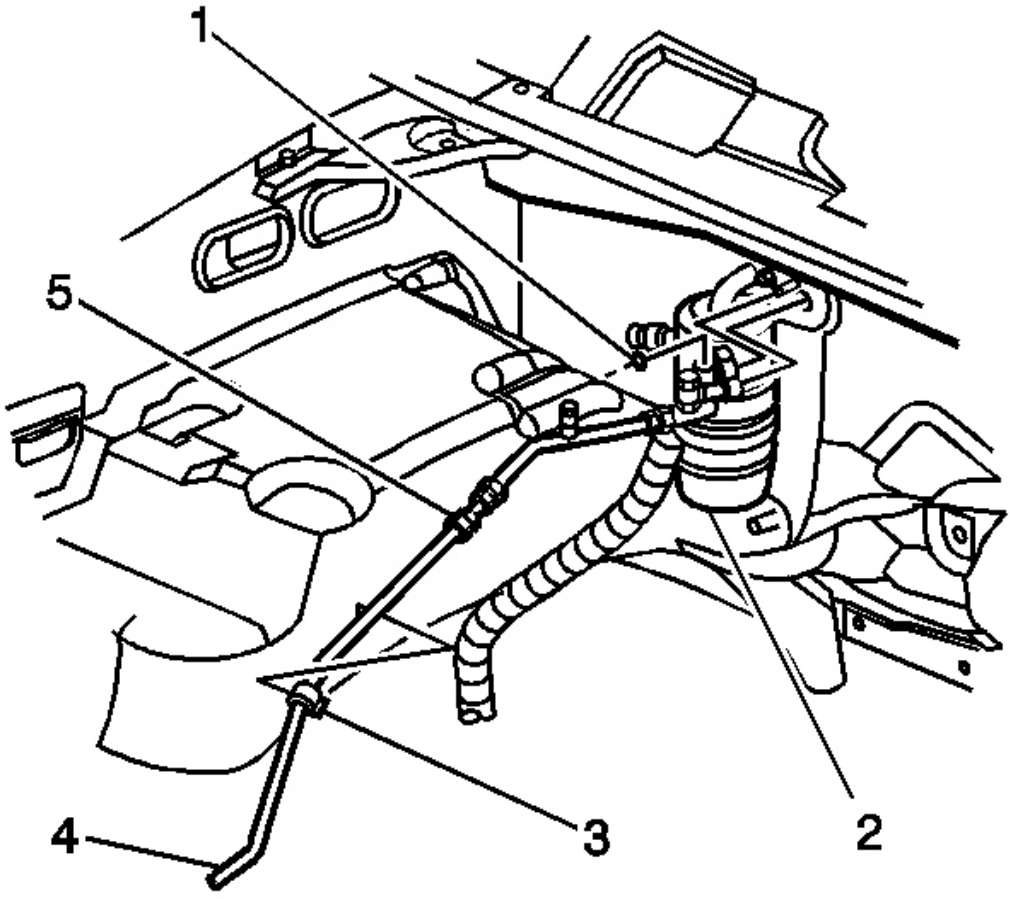


Fig. 39: A/C Refrigerant Filter & Evaporator Tube
Courtesy of GENERAL MOTORS CORP.

3. Install the A/C refrigerant filter (3) to the evaporator tube (2) with the flow arrow pointing towards the evaporator.

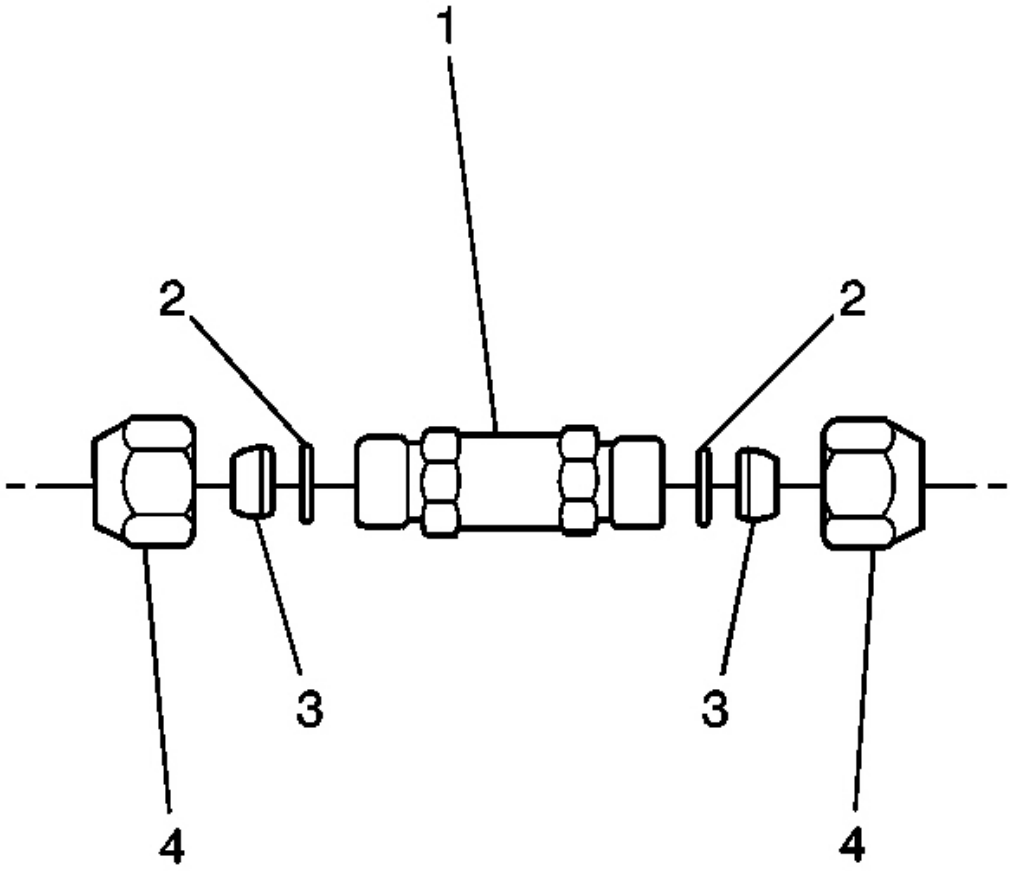


Fig. 40: A/C Refrigerant Filter Components
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

4. Install the nuts (4) to the A/C refrigerant filter (1).

   Tighten: Tighten the nuts to 15 N.m (11 lb ft).

5. Recharge the A/C system. Refer to **Refrigerant Recovery and Recharging** .
6. Leak test the fittings of the repaired or reinstalled component using the **J 39400-A** . See **Special Tools and Equipment** .
7. Install the air cleaner. Refer to **Air Cleaner Assembly Replacement** in Engine Controls - 6.0 L.

EXPANSION (ORIFICE) TUBE REPLACEMENT

Tools Required

- **J 26549-E** Orifice Tube Remover. See **Special Tools and Equipment** .
- **J 39400-A** Halogen Leak Detector. See **Special Tools and Equipment** .

Removal Procedure

1. Recover the refrigerant. Refer to **Refrigerant Recovery and Recharging** .

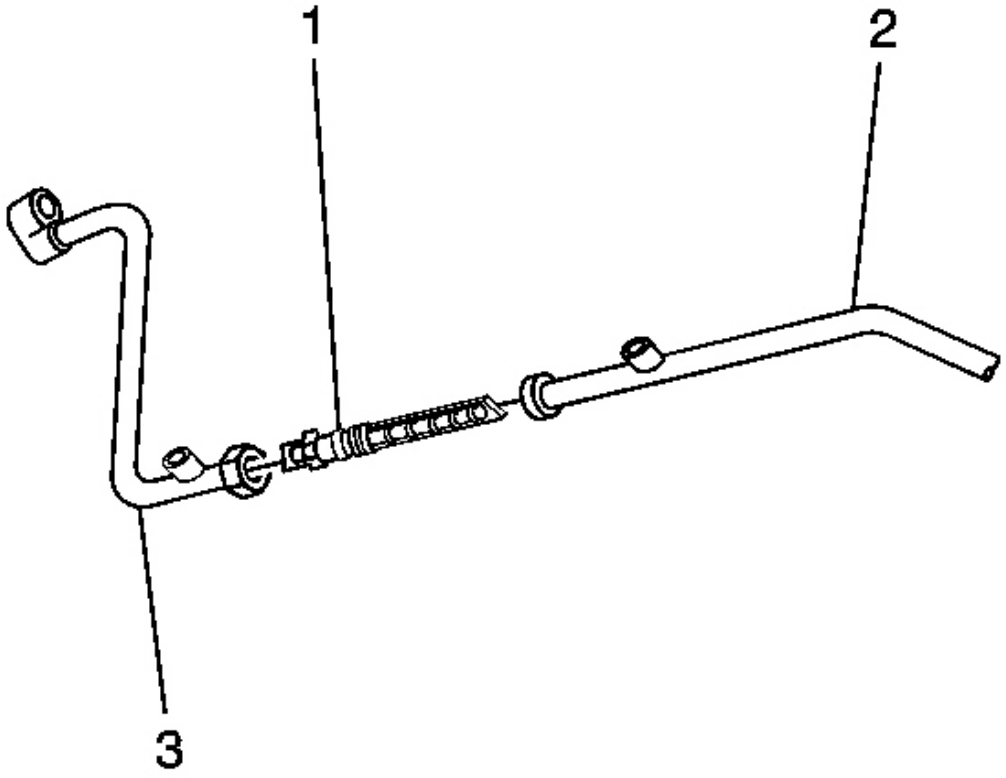


Fig. 41: Locating Evaporator Tube
Courtesy of GENERAL MOTORS CORP.

2. Loosen the nut from the evaporator tube fitting.
3. Use the **J 26549-E** in order to remove the orifice tube (1) from the evaporator tube (2). See **Special Tools and Equipment** .
4. Cap or plug the open line.

Installation Procedure

1. Uncap or unplug the evaporator tube.
2. Lubricate the new O-ring using new 525 viscosity refrigerant oil.

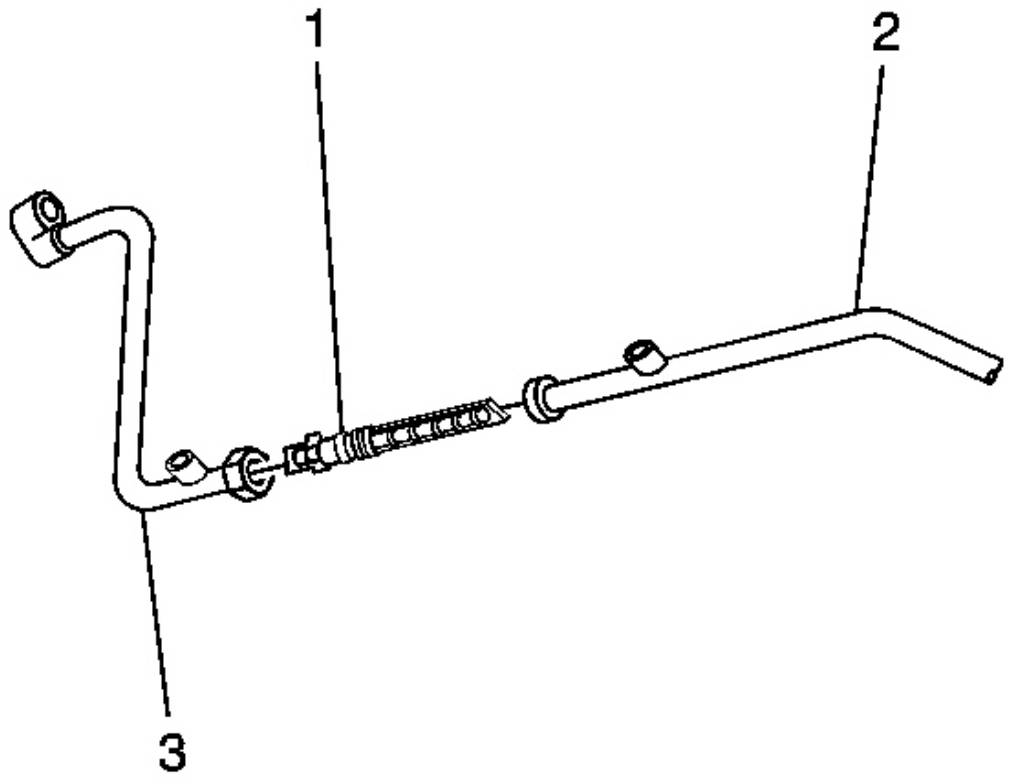


Fig. 42: Locating Evaporator Tube
Courtesy of GENERAL MOTORS CORP.

3. Install the new O-ring seal.
4. Install the orifice tube (1) to the evaporator tube (2).
    1. Coat the O-ring seal with 525 viscosity refrigerant oil.
    2. Insert the short screen end of the new orifice (1) into the evaporator tube.

NOTE: Refer to Fastener Notice in Cautions and Notices.

5. Connect the evaporator tube at the fitting.

Tighten: Tighten the fitting to 25 N.m (18 lb ft).

6. Evacuate and recharge the system. Refer to **Refrigerant Recovery and Recharging** .
7. Leak test the fittings of the repaired component using **J 39400-A** . See **Special Tools and Equipment** .

COMPRESSOR RELAY REPLACEMENT

Removal Procedure

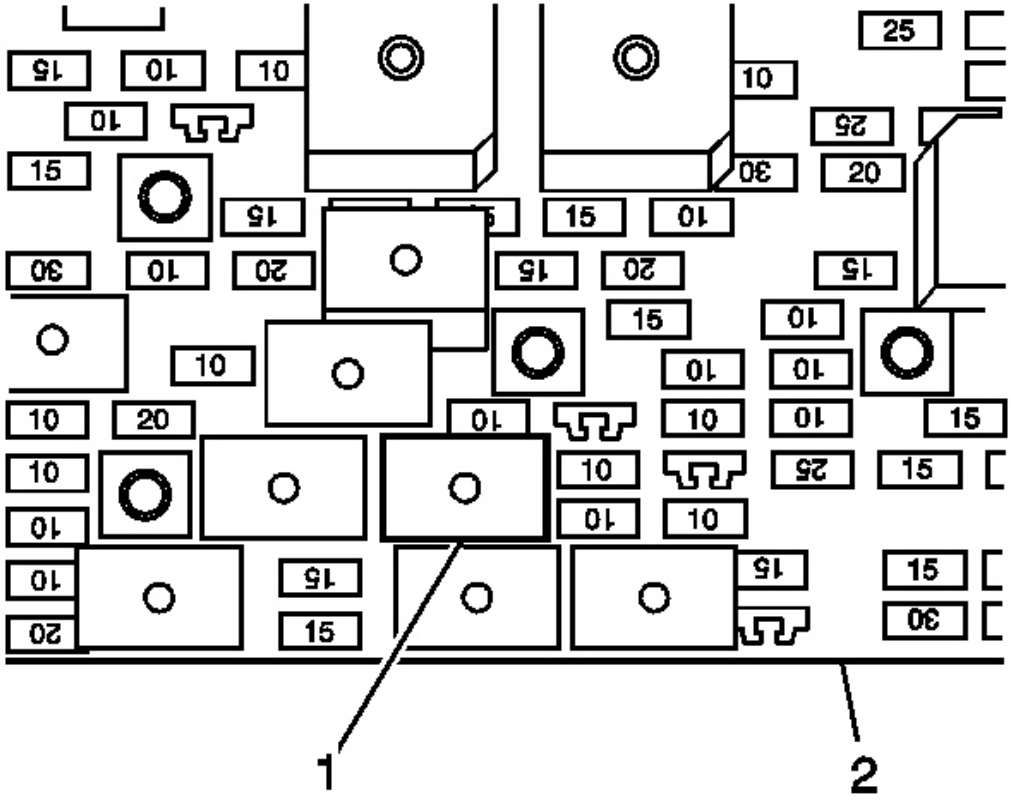


Fig. 43: A/C Compressor Relay & Convenience Center
Courtesy of GENERAL MOTORS CORP.

1. Remove the cover from the underhood convenience center (1).
2. Remove the A/C compressor relay (1) from the convenience center (2).

Installation Procedure

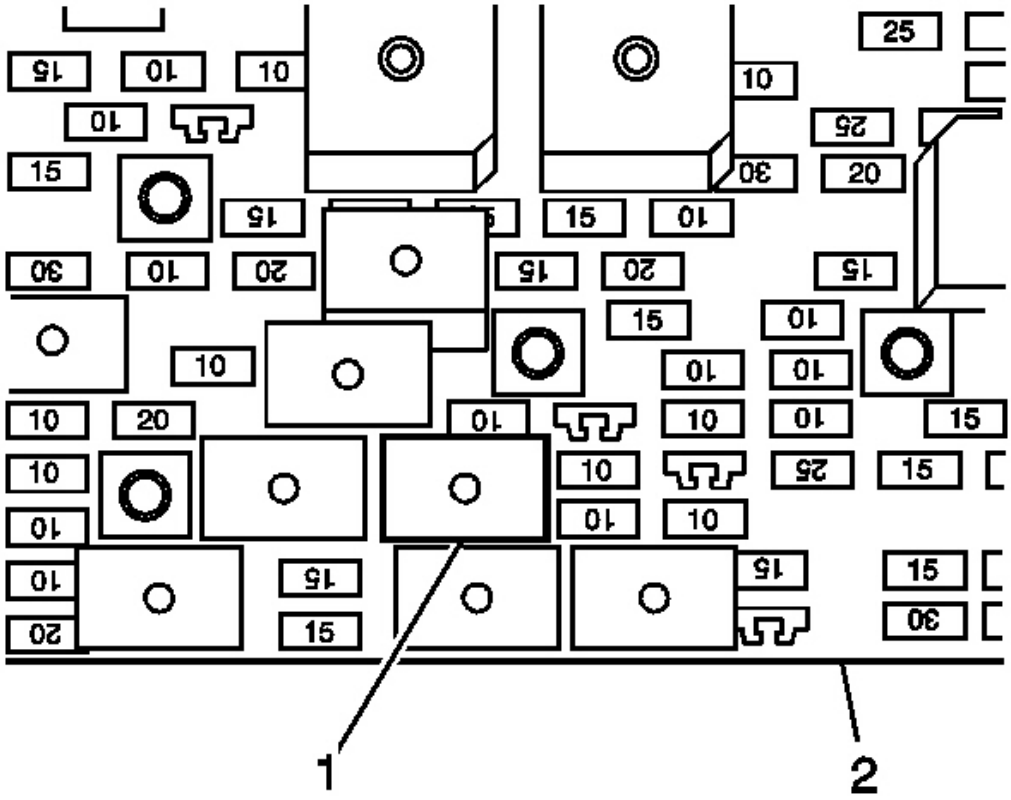


Fig. 44: A/C Compressor Relay & Convenience Center
Courtesy of GENERAL MOTORS CORP.

1. Install the A/C compressor relay (1) to the convenience center (2).
2. Install the cover to the underhood convenience center (1).

AIR CONDITIONING (A/C) LOW PRESSURE SWITCH REPLACEMENT

Removal Procedure

1. Disconnect the electrical connector from the A/C low pressure switch.

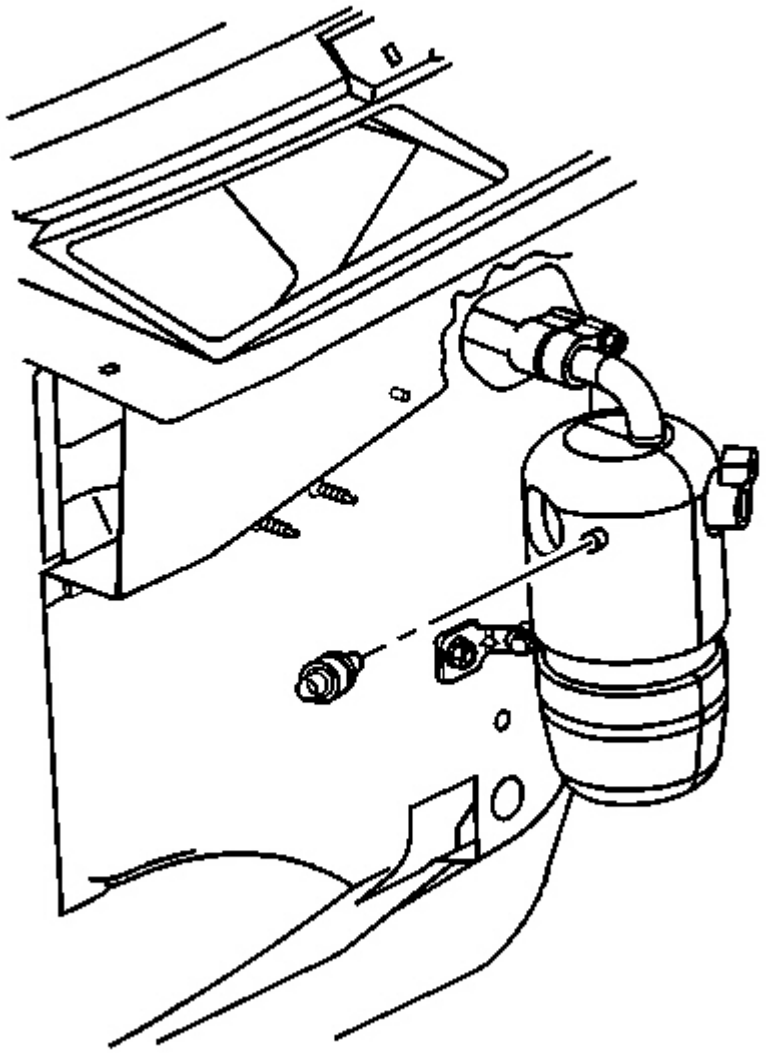


Fig. 45: A/C Low Pressure Switch & Accumulator
Courtesy of GENERAL MOTORS CORP.

2. Remove the A/C low pressure switch from the accumulator.
3. Remove the O-ring and discard.

Installation Procedure

1. Install the NEW O-ring seal to the switch. Refer to **O-Ring Replacement** .

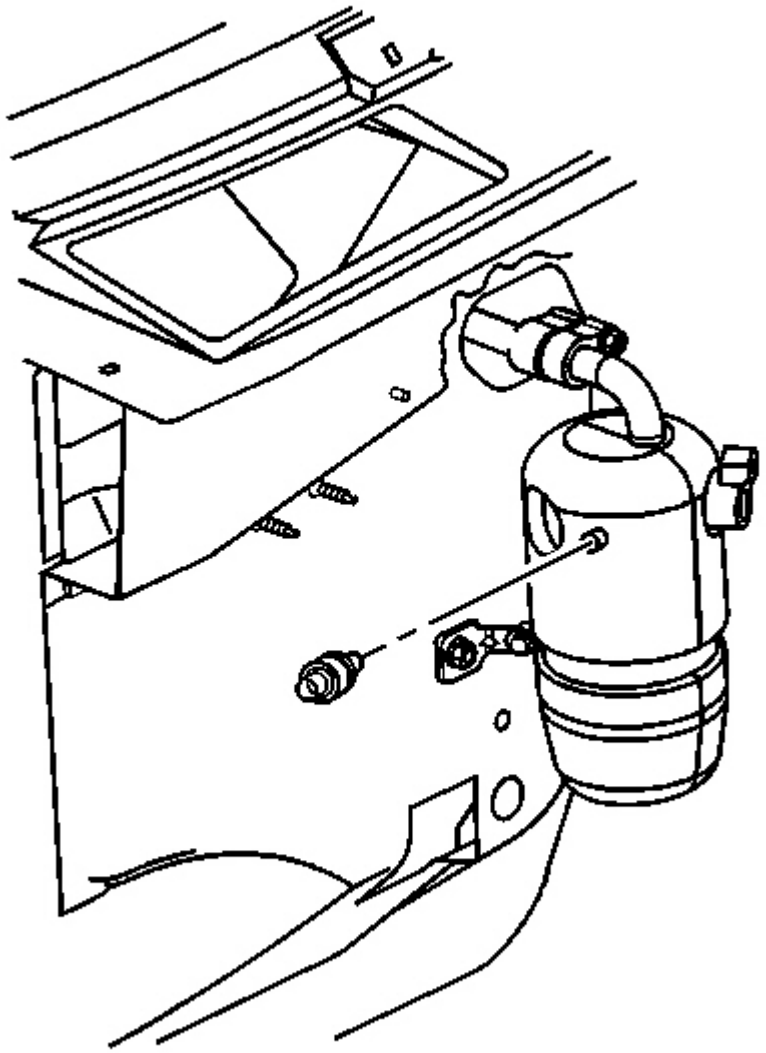


Fig. 46: A/C Low Pressure Switch & Accumulator
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the A/C low pressure switch to the accumulator.

   Tighten: Tighten the switch to 6 N.m (53 lb in).

3. Connect the electrical connector to the A/C low pressure switch.

AIR CONDITIONING (A/C) REFRIGERANT PRESSURE SENSOR REPLACEMENT

Removal Procedure

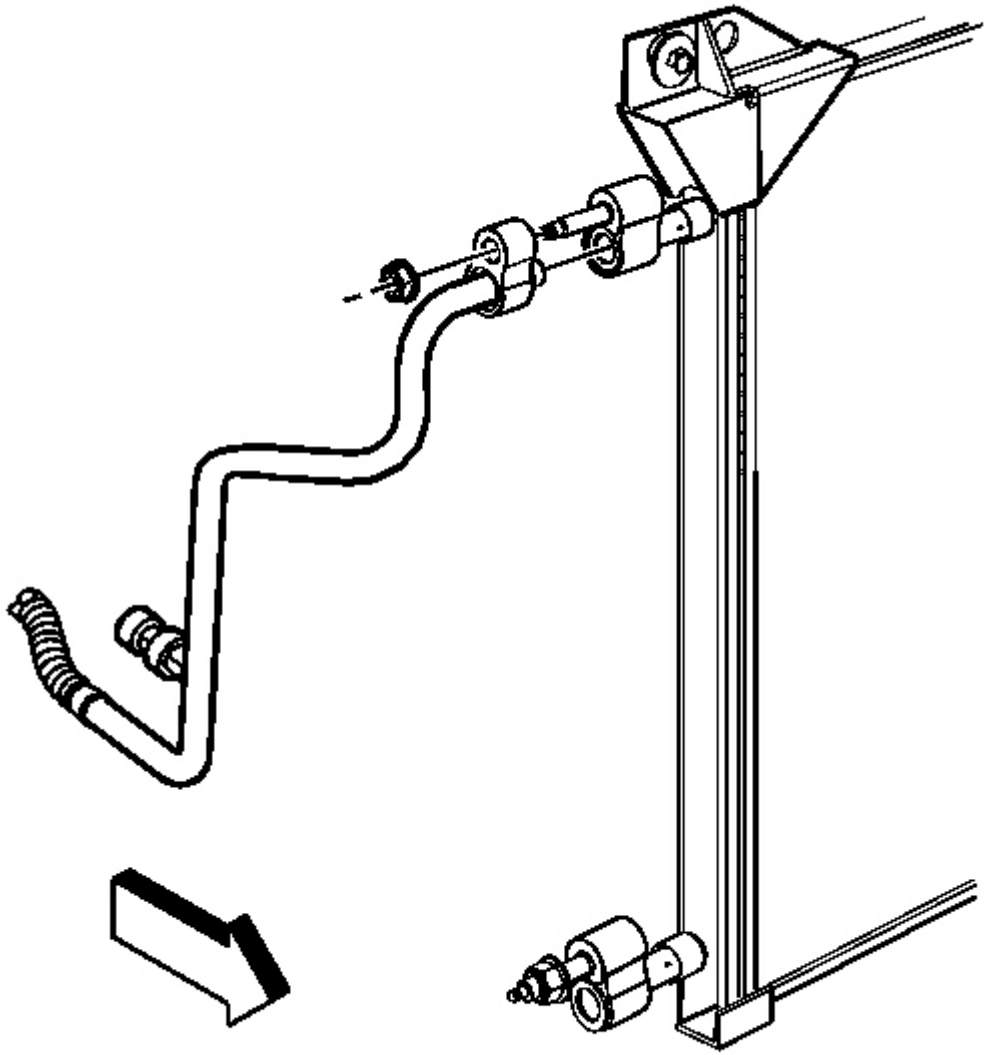


Fig. 47: A/C Refrigerant Pressure Sensor & Evaporator Tube
Courtesy of GENERAL MOTORS CORP.

1. Disconnect the electrical connector from the A/C refrigerant pressure sensor.
2. Remove the A/C refrigerant pressure sensor from the evaporator tube.

Installation Procedure

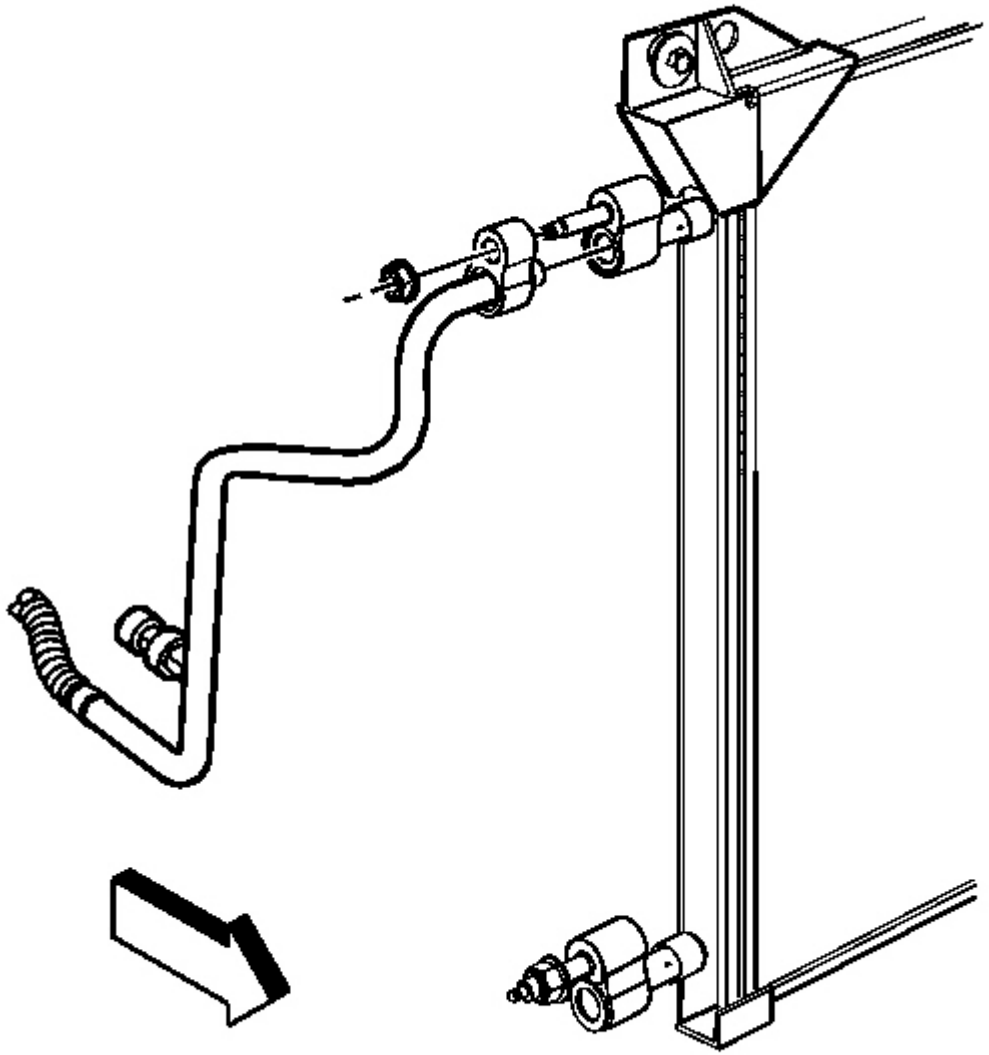


Fig. 48: A/C Refrigerant Pressure Sensor & Evaporator Tube
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

1. Install the A/C refrigerant pressure sensor.

   Tighten: Tighten the switch to 6 N.m (53 lb in).

2. Connect the electrical connector to the A/C refrigerant pressure sensor.

CONDENSER REPLACEMENT

Tools Required

J 39400-A Halogen Leak Detector. See **Special Tools and Equipment** .

Removal Procedure

1. Recover the refrigerant. Refer to **Refrigerant Recovery and Recharging** .
2. Remove the transmission oil cooler. Refer to **Transmission Fluid Auxiliary Cooler Replacement** in Automatic Transmission - 4L60-E.
3. Remove the power steering cooler. Refer to **Power Steering Cooler Replacement** in Power Steering System.
4. Remove the bolt and nut from the left hood spring.
5. Remove the bolt and nut from the right hood spring.

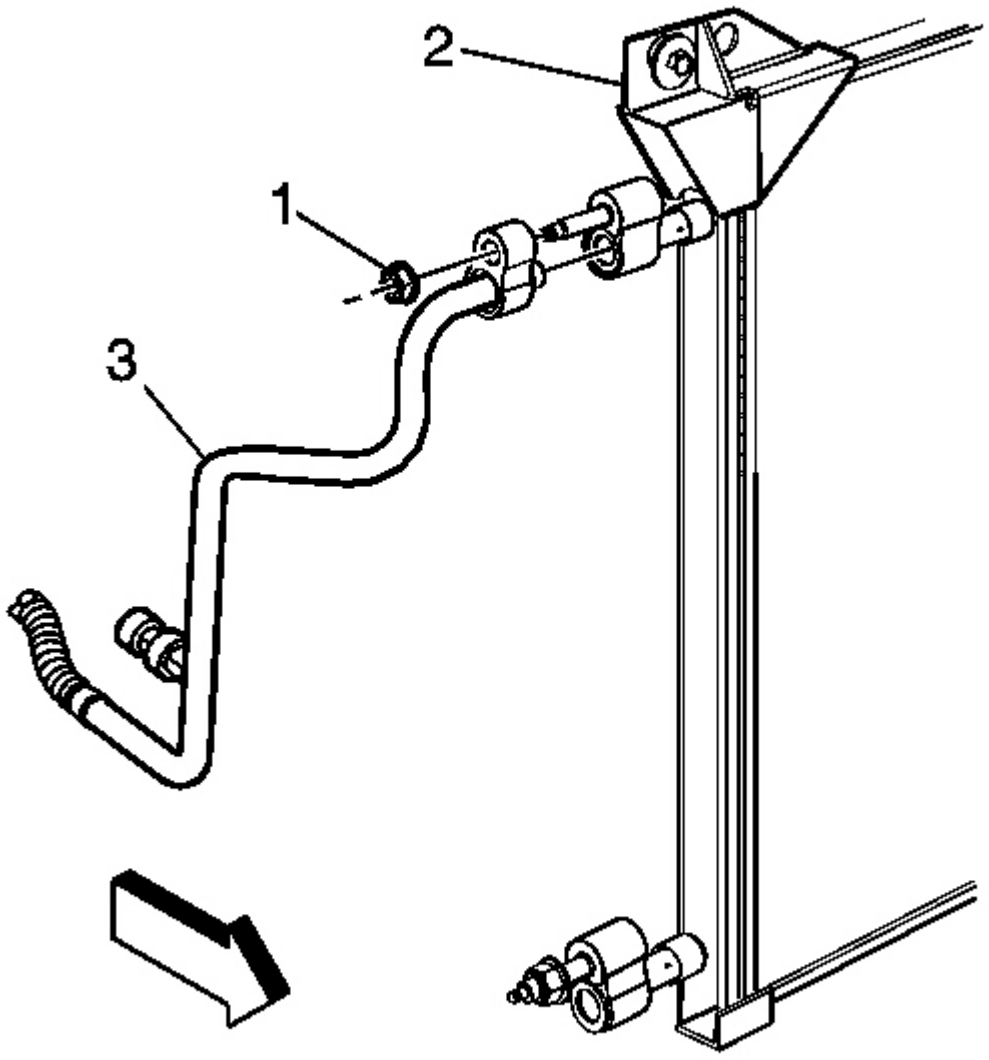


Fig. 49: Discharge Hose Nut & Condenser
Courtesy of GENERAL MOTORS CORP.

6. Remove the nut (1) from the condenser (2).
7. Remove the compressor discharge hose assembly (3) from the condenser (2).

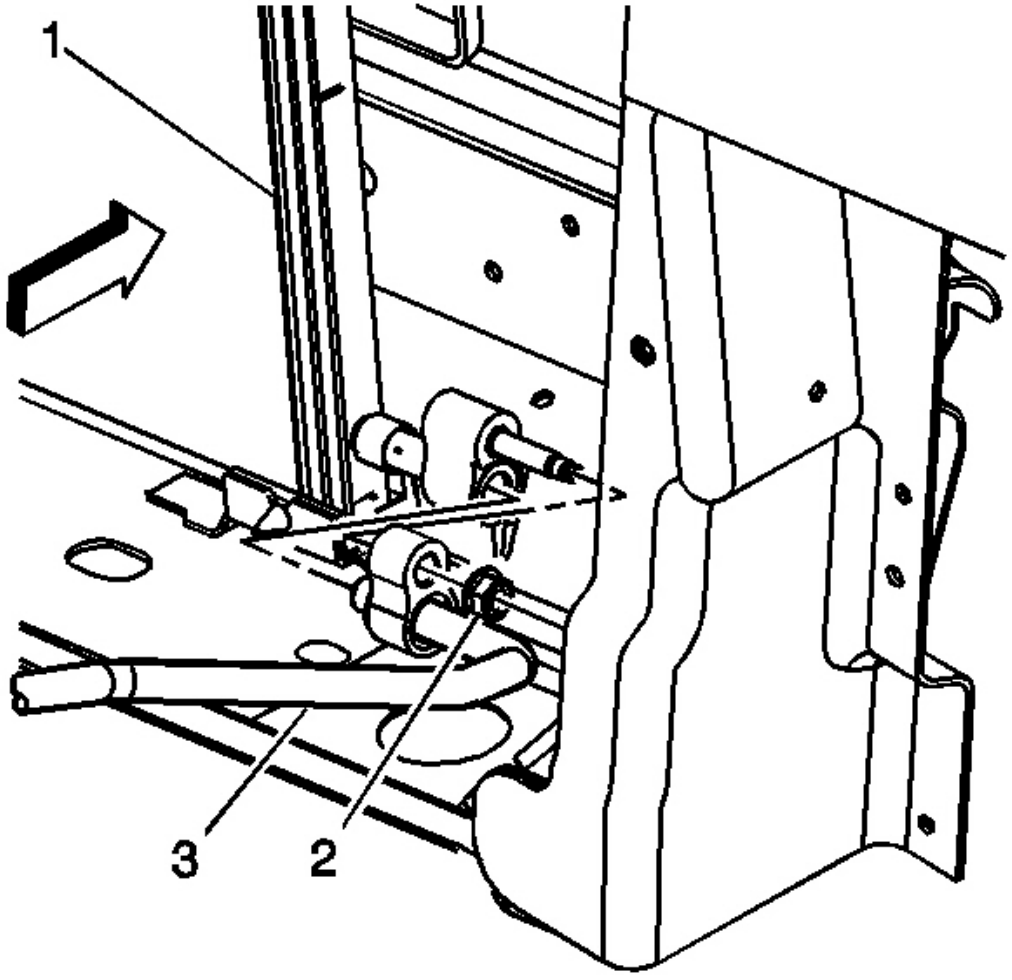


Fig. 50: Evaporator Tube & Condenser
Courtesy of GENERAL MOTORS CORP.

8. Remove the evaporator tube nut (2) from the condenser (1).
9. Remove the evaporator tube (3) from the condenser (1).
10. Remove the bolts (2) from the condenser (3).

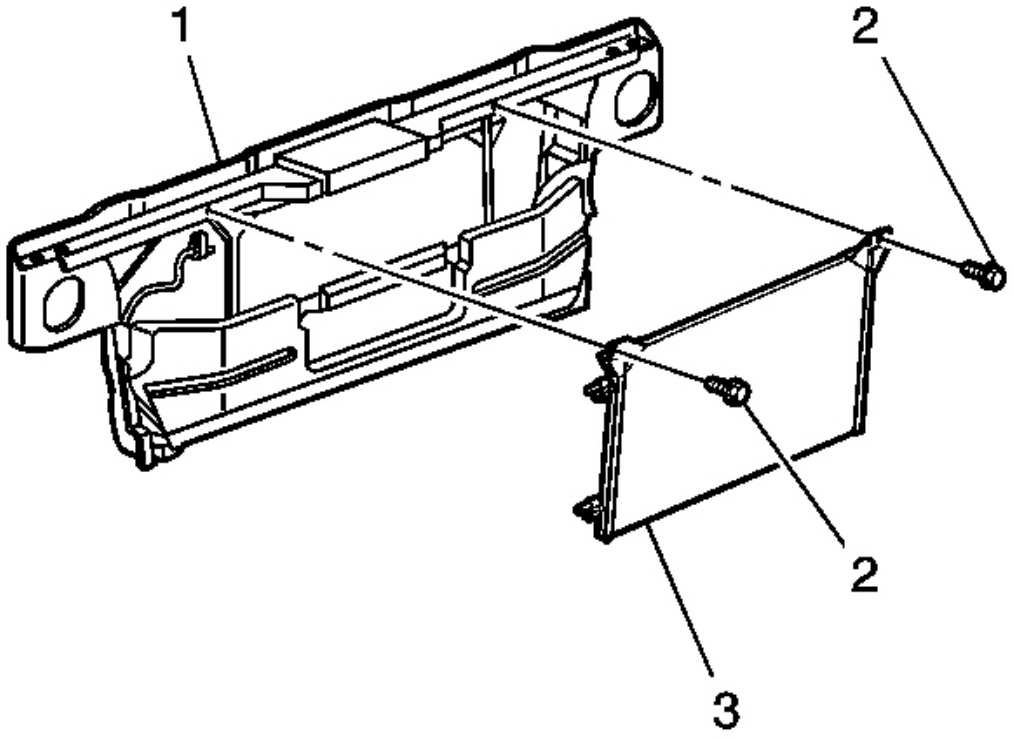


Fig. 51: Condenser & Mounting Bolts
Courtesy of GENERAL MOTORS CORP.

11. Remove the condenser (3) from the vehicle.

Installation Procedure

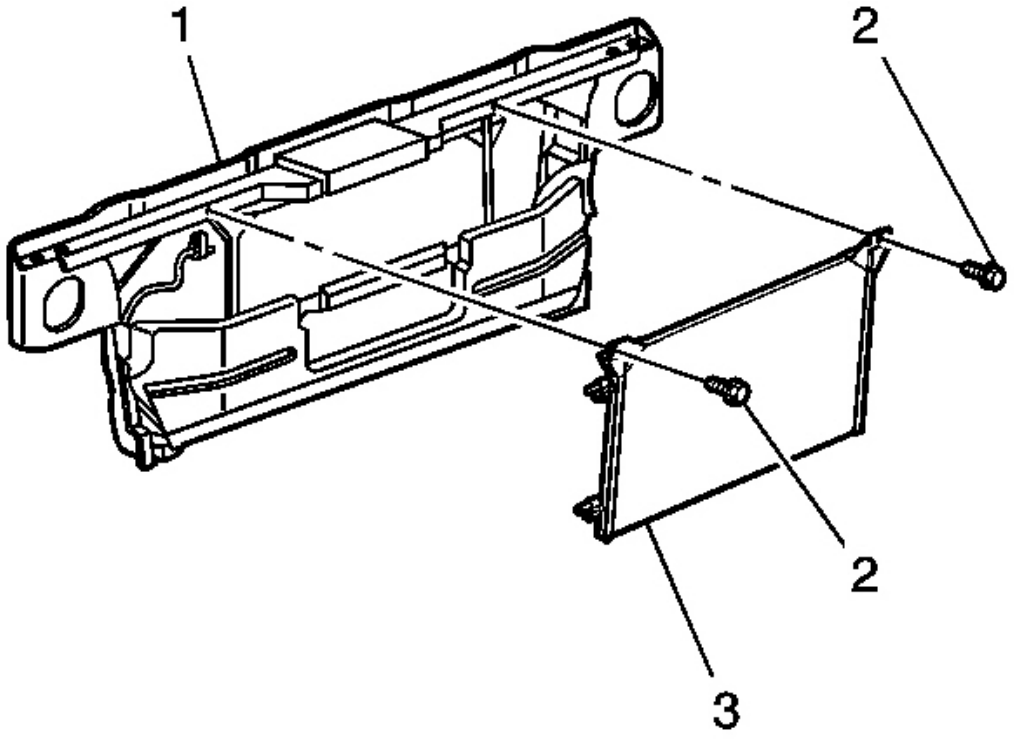


Fig. 52: Condenser & Mounting Bolts
Courtesy of GENERAL MOTORS CORP.

1. Add the proper amount of PAG oil to the condenser. Refer to **Refrigerant System Capacities** .
2. Install the condenser (3) to the vehicle.

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Install the bolts (2) to the condenser (3).

   Tighten: Tighten the bolts to 9 N.m (80 lb in).

4. Install the new sealing washers. Refer to **Sealing Washer Replacement** .

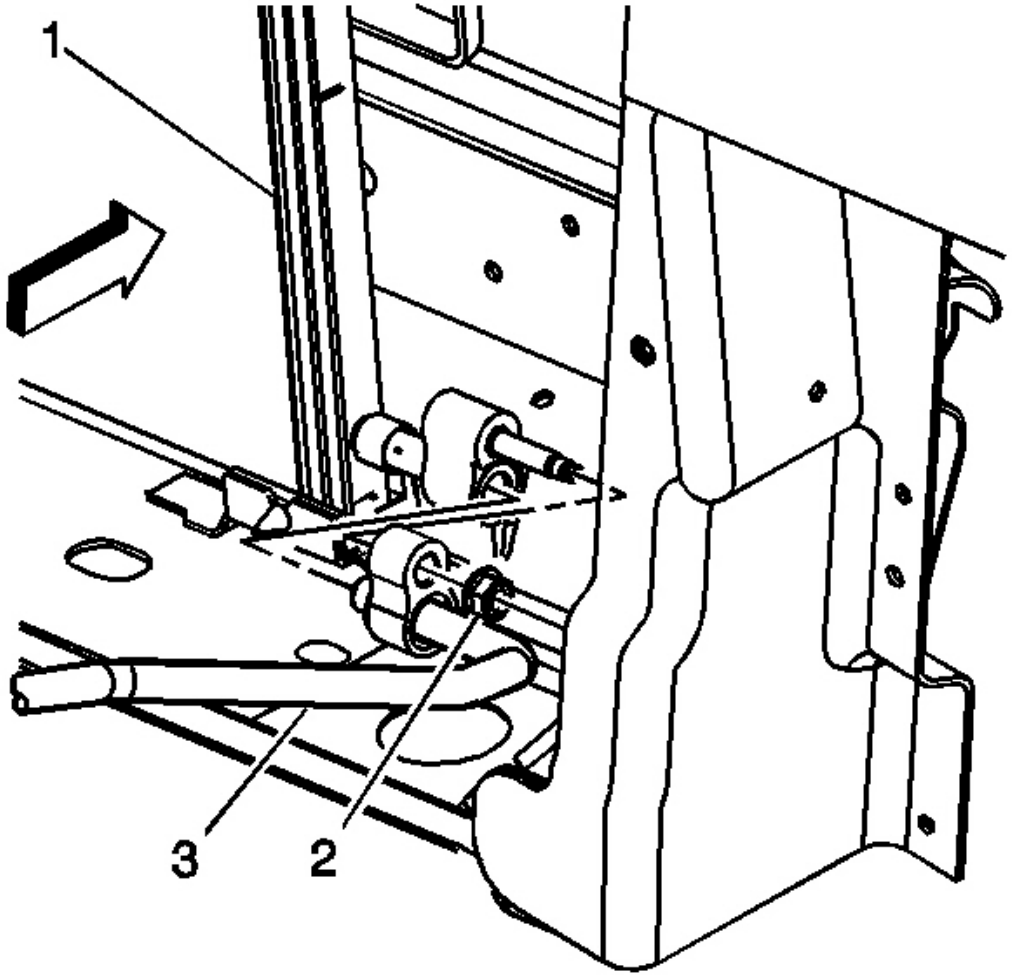


Fig. 53: Evaporator Tube & Condenser
Courtesy of GENERAL MOTORS CORP.

5. Install the evaporator tube (3) to the condenser (1).
6. Install the evaporator tube nut (2) to the condenser (1).

Tighten: Tighten the nut to 16 N.m (12 lb ft).

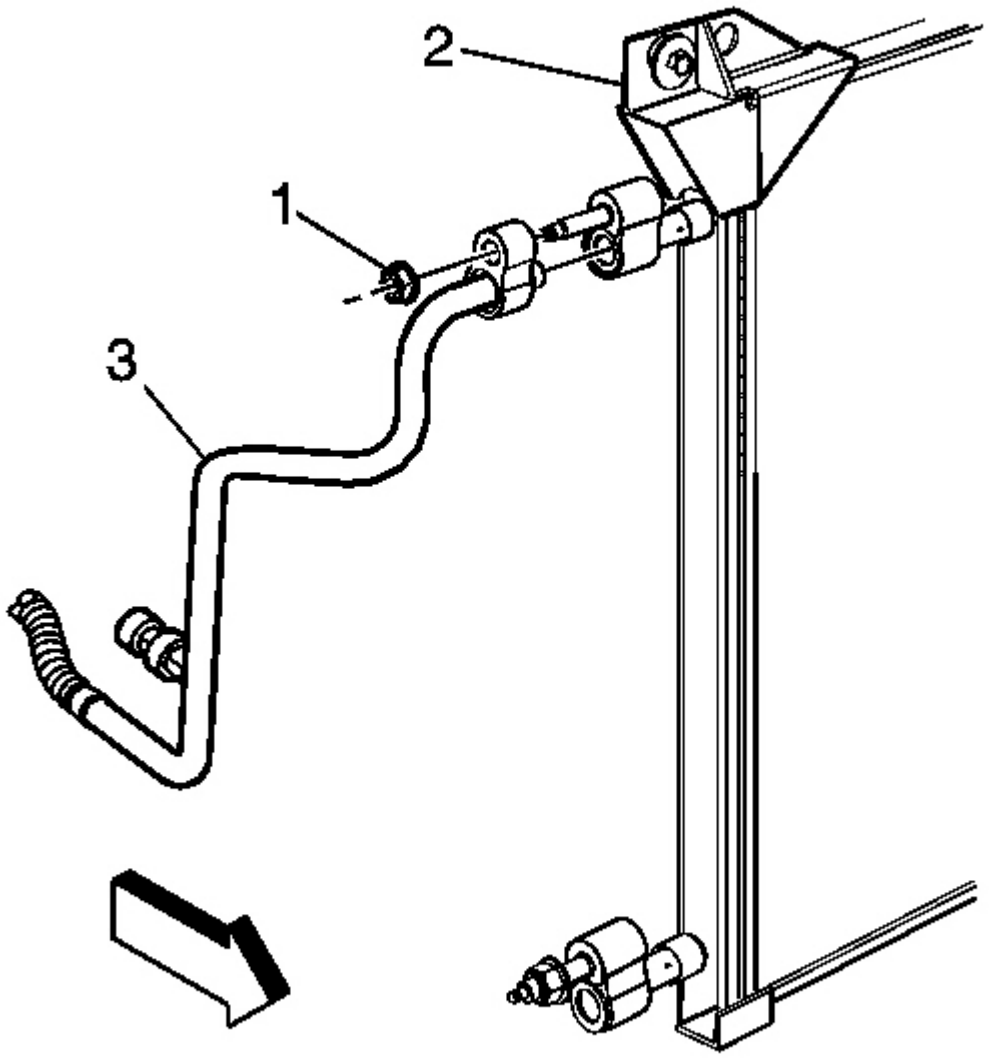


Fig. 54: Discharge Hose Nut & Condenser
Courtesy of GENERAL MOTORS CORP.

7. Install the compressor discharge hose (3) to the condenser (2).
8. Install the compressor discharge hose nut (1) to the condenser (2).

   Tighten: Tighten the nut to 16 N.m (12 lb ft).

9. Install the transmission oil cooler. Refer to **Transmission Fluid Auxiliary Cooler Replacement** in

Automatic Transmission - 4L60-E.

10. Install the power steering cooler. Refer to **Power Steering Cooler Replacement** in Power Steering System.
11. Install the bolt and nut from the right hood spring.

    Tighten: Tighten the nut to 16 N.m (12 lb ft).

12. Install the bolt and nut from the left hood spring.

    Tighten: Tighten the nut to 16 N.m (12 lb ft).

13. Evacuate and recharge the system. Refer to **Refrigerant Recovery and Recharging** .
14. Leak test the fittings of the component using the **J 39400-A** . See **Special Tools and Equipment** .

ACCUMULATOR REPLACEMENT

Tools Required

J 39400-A Halogen Leak Detector. See **Special Tools and Equipment** .

Removal Procedure

1. Recover the refrigerant. Refer to **Refrigerant Recovery and Recharging** .
2. Disconnect the electrical connector from the A/C low pressure switch.
3. Remove the compressor hose nut from the accumulator.
4. Remove the compressor hose from the accumulator.

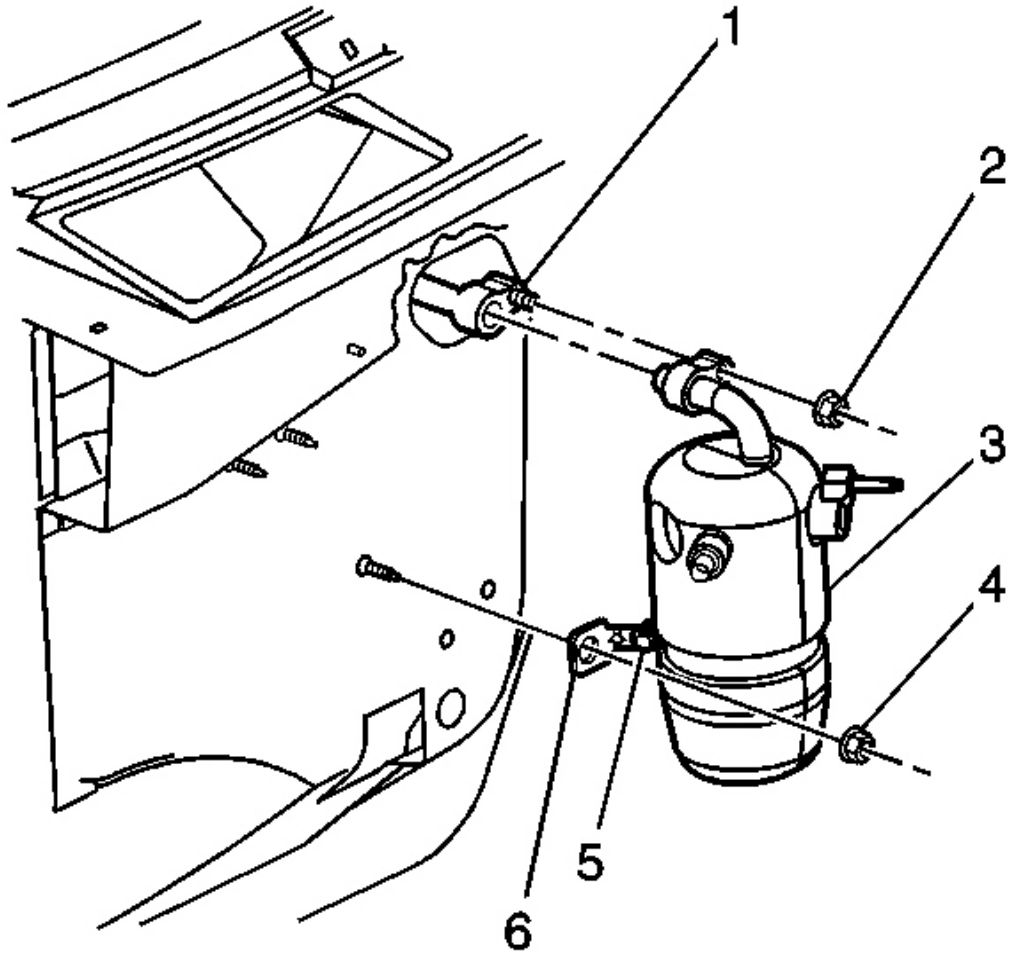


Fig. 55: Retaining Bracket & Accumulator
Courtesy of GENERAL MOTORS CORP.

5. Remove the nut (2) from the evaporator fitting.
6. Remove the accumulator bracket nut (4) from the retaining stud.
7. Remove the accumulator (3).
8. Remove the retaining bracket bolt (5).
9. Remove the retaining bracket (6) from the accumulator (3).
10. Remove and discard the O-ring seals.

Installation Procedure

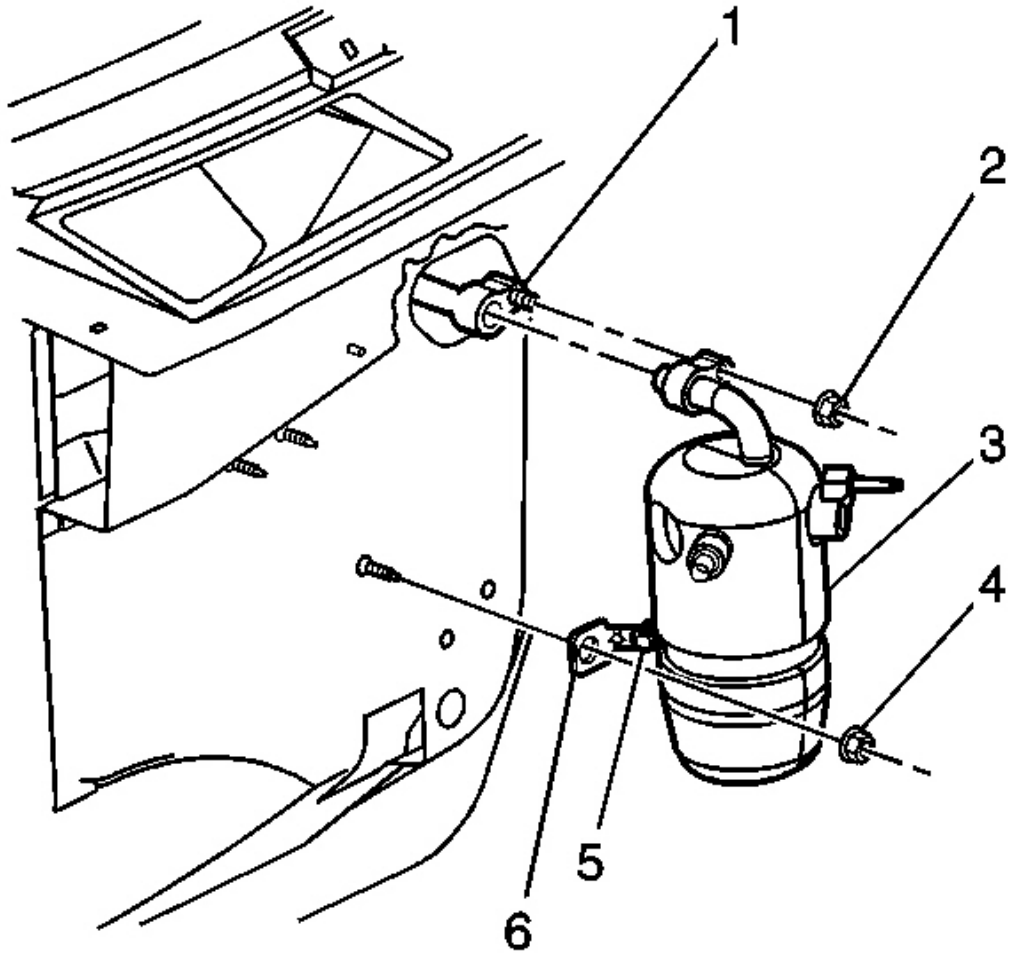


Fig. 56: Retaining Bracket & Accumulator
Courtesy of GENERAL MOTORS CORP.

1. Add the proper amount of PAG oil to the accumulator. Refer to **Refrigerant System Capacities** .
2. Install new O-ring seals. Refer to **O-Ring Replacement** .
3. Install the retaining bracket (6) to the accumulator.

NOTE: Refer to Fastener Notice in Cautions and Notices.

4. Install the retaining bracket bolt (5).

Tighten: Tighten the bolt to 10 N.m (89 lb in).

5. Install the accumulator (3).
6. Install the accumulator bracket nut (4).

   Tighten: Tighten the nut to 9 N.m (80 lb in).

7. Install the nut (2) to the evaporator fitting.

   Tighten: Tighten the nut to 16 N.m (12 lb ft).

8. Install the compressor hose to the accumulator.
9. Install the compressor hose nut to the accumulator.

   Tighten: Tighten the nut to 16 N.m (12 lb ft).

10. Connect the electrical connector to the A/C low pressure switch.
11. Evacuate and recharge the system. Refer to **Refrigerant Recovery and Recharging** .
12. Leak test the fittings of the component using the **J 39400-A** . See **Special Tools and Equipment** .

HVAC MODULE ASSEMBLY REPLACEMENT

Tools Required

J 43181 Quick Connect Connector Removal Tool

Removal Procedure

1. Drain the engine coolant. Refer to **Draining and Filling Cooling System** in Engine Cooling.

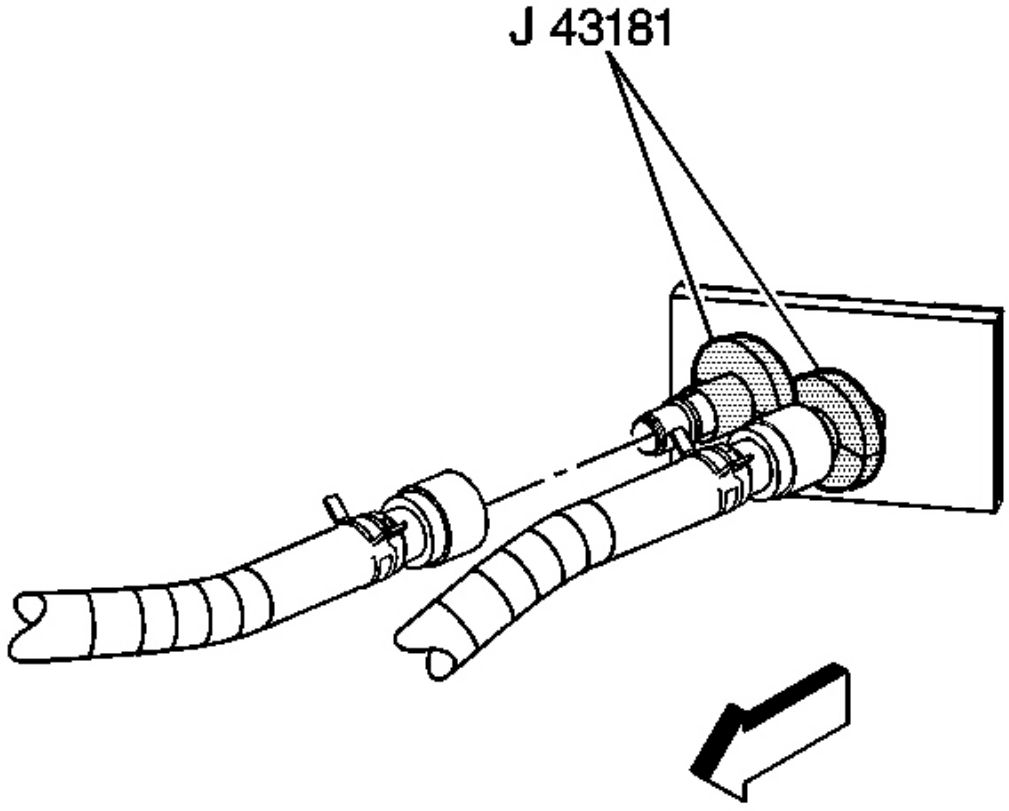


Fig. 57: Identifying Heater Hose To Heater Core Outlet
Courtesy of GENERAL MOTORS CORP.

2. Using the **J 43181** disconnect the inlet heater hose from the heater core.
    1. Install the **J 43181** to the heater core pipe.
    2. Close the tool around the heater core pipe.
    3. Firmly pull the tool into the quick connect end of the heater hose.
    4. Firmly grasp the heater hose. Pull the heater hose forward in order to disengage the inlet hose from the heater core.
3. Using the **J 43181** disconnect the surge tank outlet hose from the heater core.
    1. Install the **J 43181** to the heater core pipe.
    2. Close the tool around the heater core pipe.
    3. Firmly pull the tool into the quick connect end of the heater hose.
    4. Firmly grasp the heater hose. Pull the heater hose forward in order to disengage the surge tank outlet hose from the heater core.

4. Remove the accumulator. Refer to **Accumulator Replacement** .
5. Remove the instrument panel carrier. Refer to **Instrument Panel (I/P) Carrier Replacement** in Instrument Panel, Gauges and Console.
6. Remove the HVAC module drain hose.
7. Disconnect the electrical harnesses and the ground connections from the HVAC module assembly.

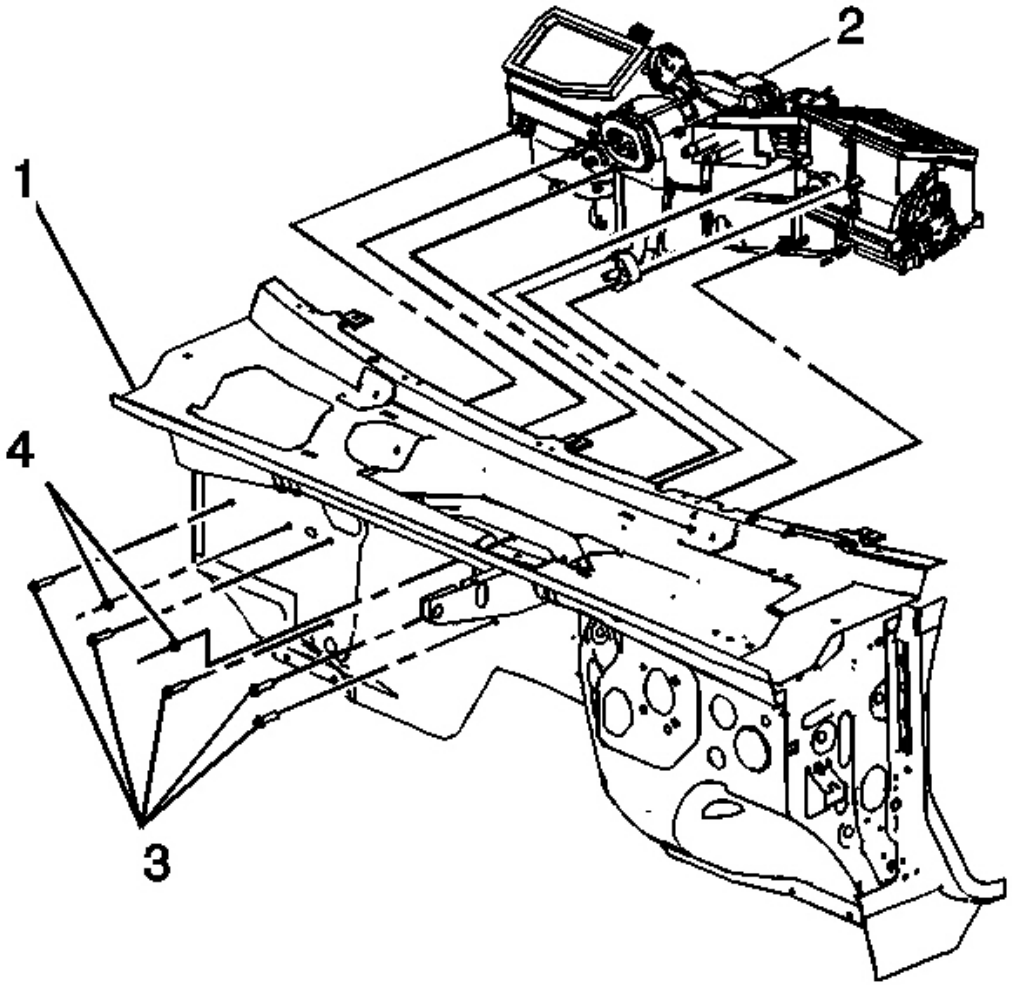


Fig. 58: HVAC Module Assembly
Courtesy of GENERAL MOTORS CORP.

8. Remove the nuts (4) from the HVAC module assembly (2).
9. Remove the bolts (3) from the HVAC module assembly (2).

10. Remove the HVAC module assembly (2) from the vehicle (1).

Installation Procedure

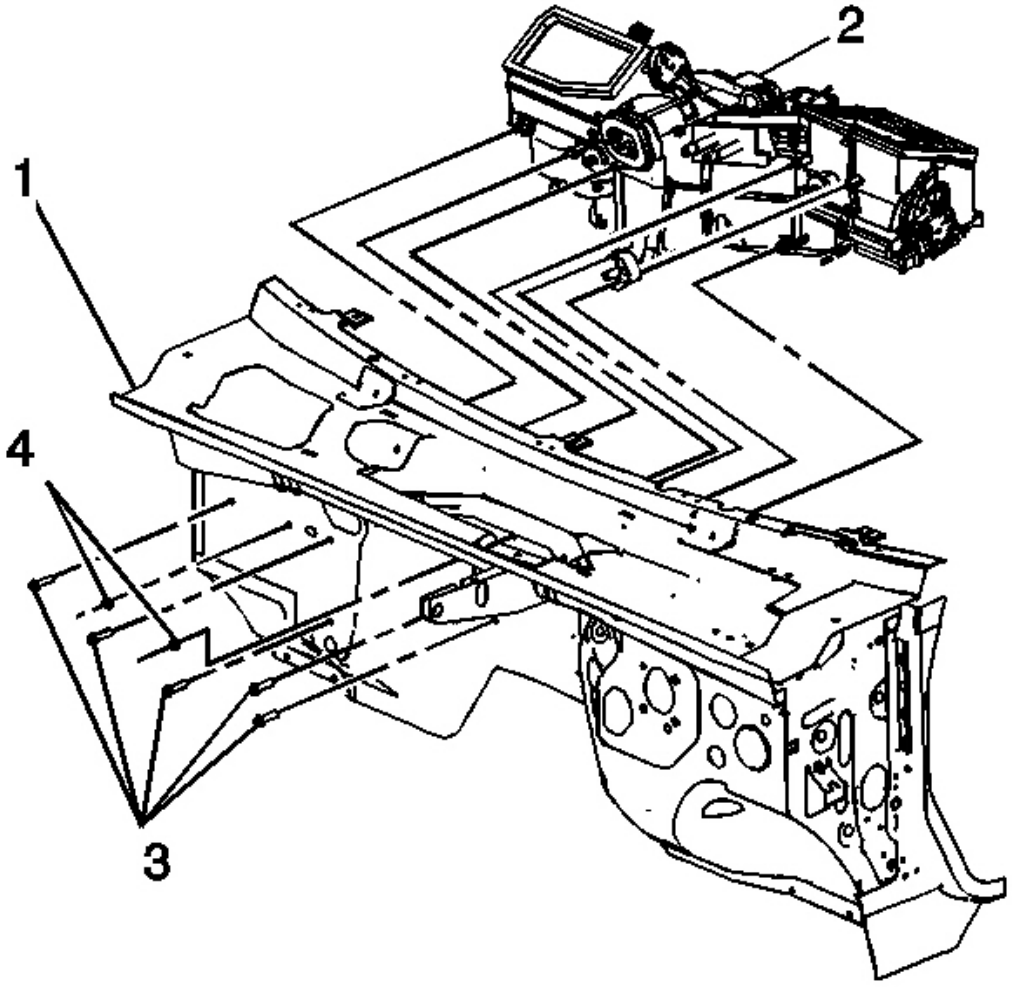


Fig. 59: HVAC Module Assembly
Courtesy of GENERAL MOTORS CORP.

1. If replacing the HVAC module, transfer the components from the old HVAC module as necessary.
2. Install the HVAC module assembly (2) to the vehicle (1).

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Install the nuts (4) to the HVAC module assembly (2).

   Tighten: Tighten the nuts to 9 N.m (80 lb in).

4. Install the bolts (4) to the HVAC module assembly (2).

   Tighten: Tighten the bolts to 4 N.m (35 lb in).

5. Connect the electrical harnesses and the ground connections.
6. Install the HVAC module drain hose.
7. Install the instrument panel carrier. Refer to **Instrument Panel (I/P) Carrier Replacement** in Instrument Panel, Gauges and Console.
8. Install the accumulator. Refer to **Accumulator Replacement** .

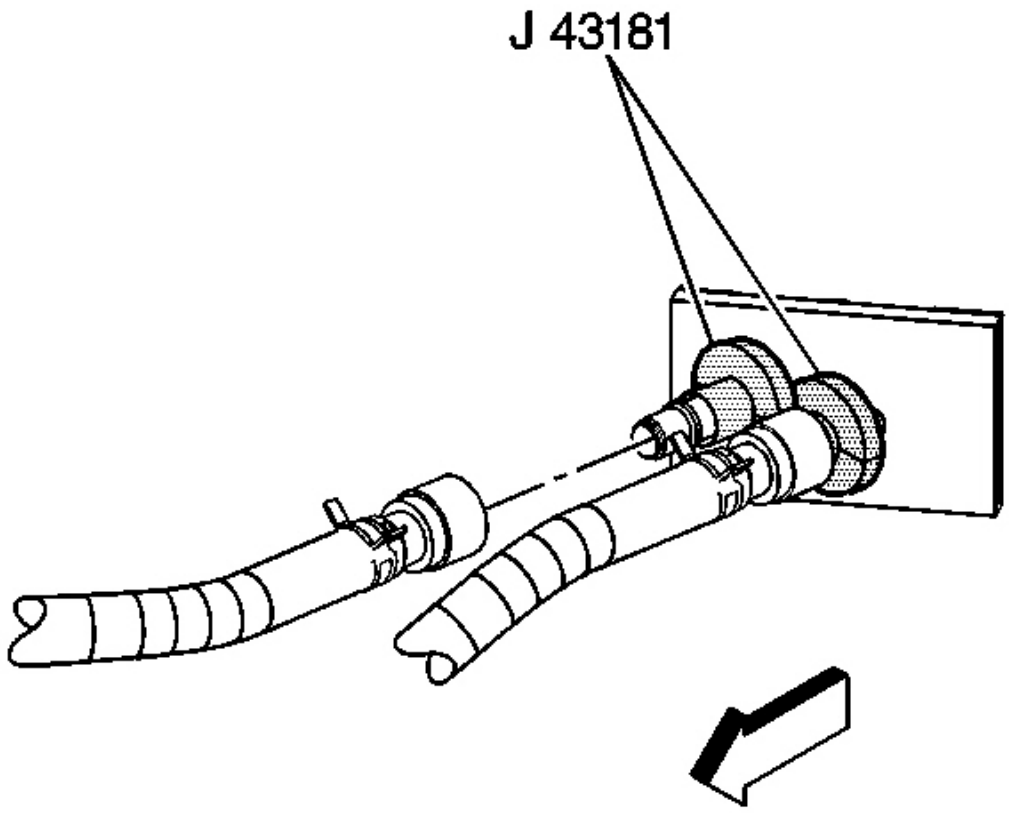


Fig. 60: Identifying Heater Hose To Heater Core Outlet
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Firmly push the quick connect onto the heater core pipe until you hear an audible click.

9. Install the surge tank outlet hose to the heater core.
10. Pull the surge tank outlet hose to ensure the connection.
11. Install the inlet heater hose to the heater core.

IMPORTANT: Firmly push the quick connect onto the heater core pipe until you hear an audible click.

12. Pull the inlet heater hose to ensure the connection.
13. Fill the engine coolant. Refer to **Draining and Filling Cooling System** in Engine Cooling.

EVAPORATOR CORE REPLACEMENT

Removal Procedure

1. Remove the HVAC module. Refer to **HVAC Module Assembly Replacement** .
2. Disconnect the electrical connector from the recirculation actuator.
3. Remove the harness from the evaporator cover.
4. Remove the screws from the recirculation actuator.
5. Remove the recirculation actuator from the HVAC module.
6. Remove the screws from the evaporator cover (1).

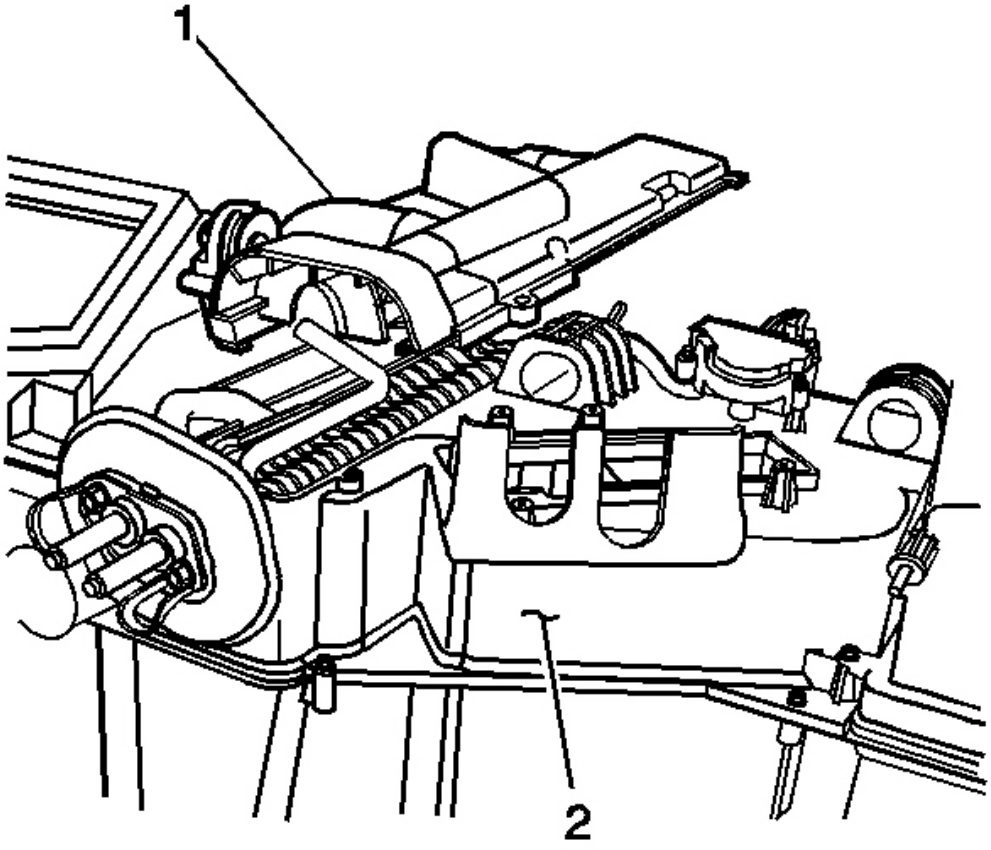


Fig. 61: Evaporator Cover & HVAC Module
Courtesy of GENERAL MOTORS CORP.

7. Remove the evaporator cover (1) from the HVAC module (2).

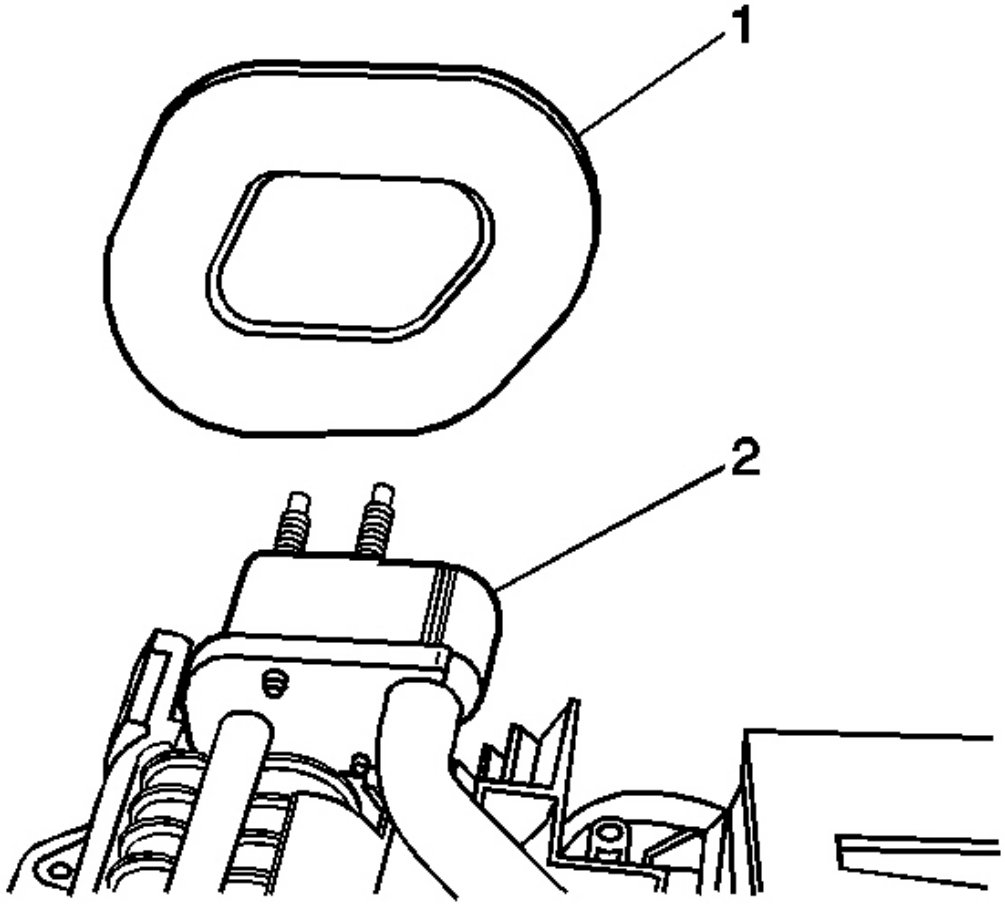


Fig. 62: Evaporator Cowl Gasket & Evaporator
Courtesy of GENERAL MOTORS CORP.

8. Remove the evaporator cowl gasket (1) from the evaporator (2).

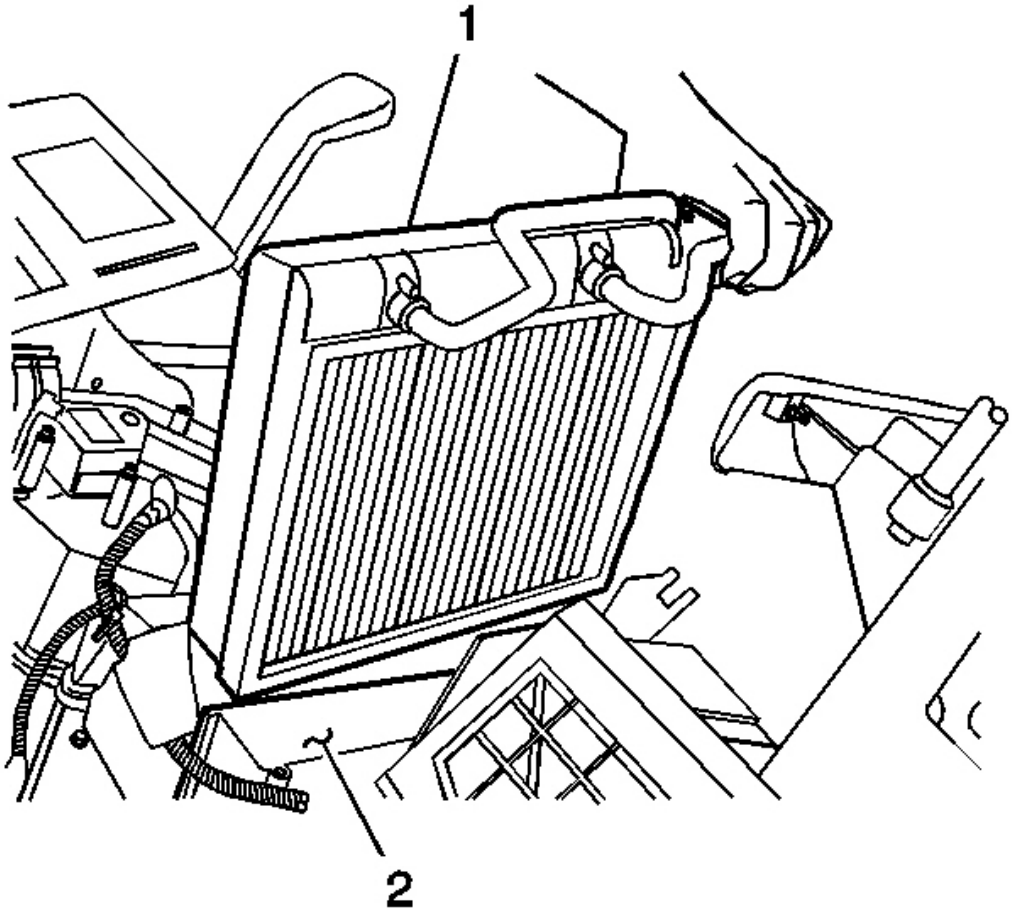


Fig. 63: Evaporator Core & HVAC Module
Courtesy of GENERAL MOTORS CORP.

9. Remove the evaporator core (1) from the HVAC module (2).

Installation Procedure

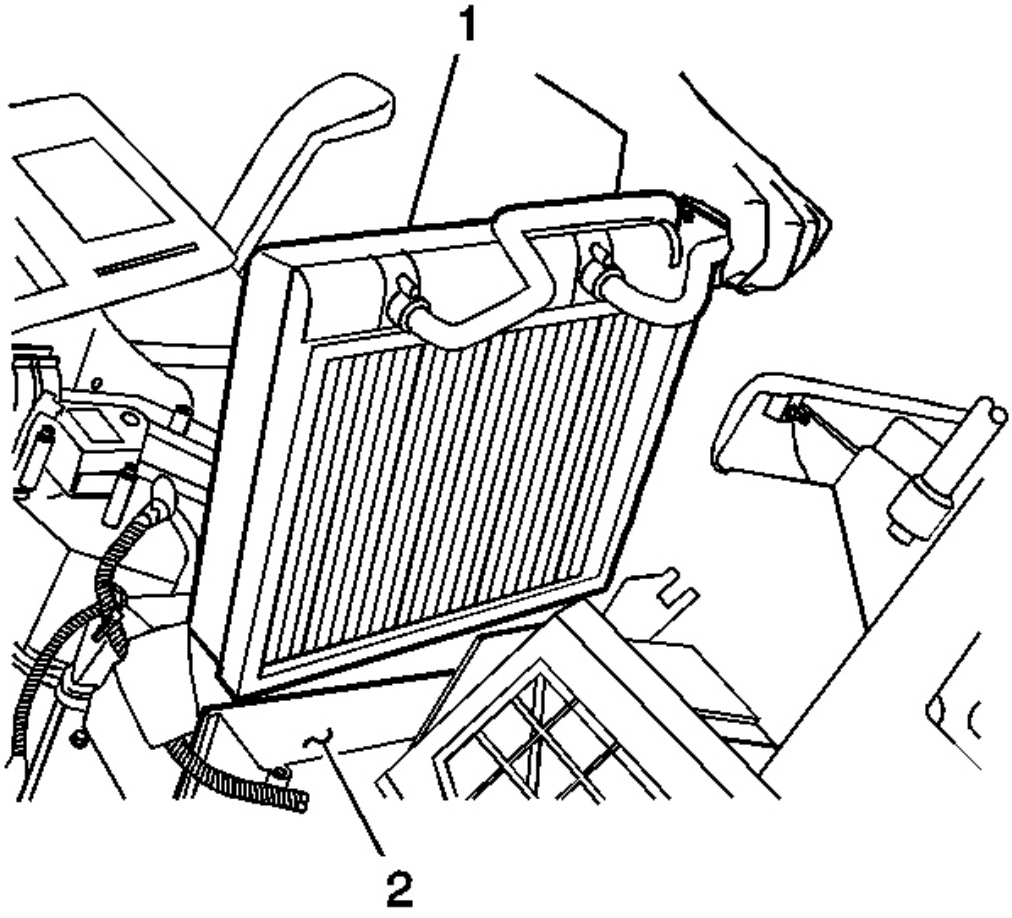


Fig. 64: Evaporator Core & HVAC Module
Courtesy of GENERAL MOTORS CORP.

1. Add the proper amount of PAG oil the evaporator. Refer to **Refrigerant System Capacities** .
2. Install the evaporator core (1) to the HVAC module (2).

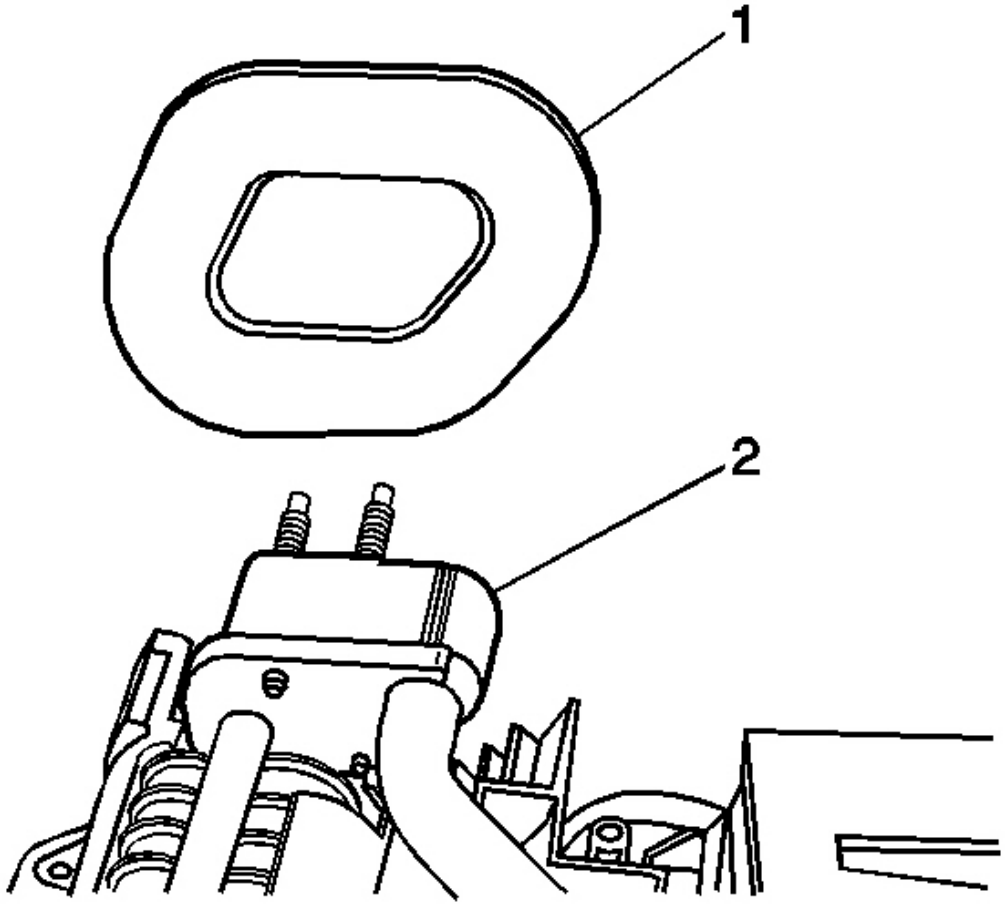


Fig. 65: Evaporator Cowl Gasket & Evaporator
Courtesy of GENERAL MOTORS CORP.

3. Install the evaporator cowl gasket (1) to the evaporator (2).

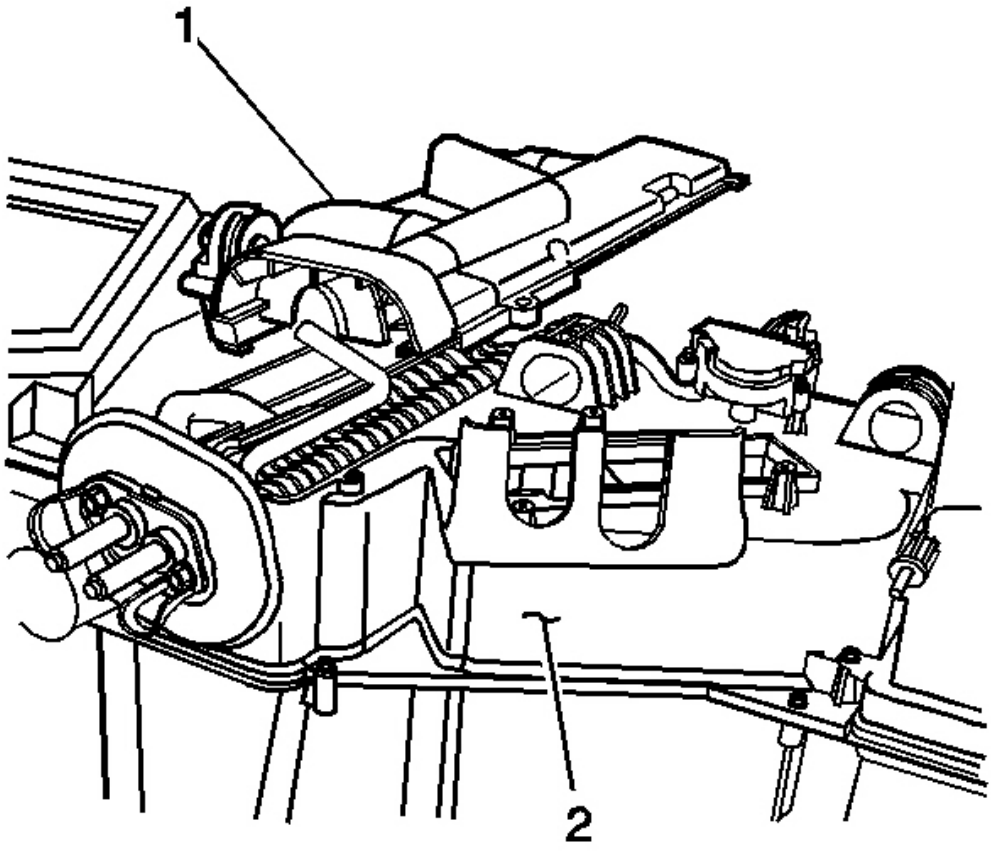


Fig. 66: Evaporator Cover & HVAC Module
Courtesy of GENERAL MOTORS CORP.

4. Install the evaporator cover (1) to the HVAC module (2).

NOTE: **Refer to Fastener Notice in Cautions and Notices.**

5. Install the screws to the evaporator cover (1).

Tighten: Tighten the screws to 2 N.m (18 lb in).

6. Install the recirculation actuator to the HVAC module.
7. Install the screws to the recirculation actuator.

Tighten: Tighten the screws to 2 N.m (18 lb in).

8. Install the harness to the evaporator cover.
9. Connect the electrical connector to the recirculation actuator (1).
10. Install the HVAC module. Refer to **HVAC Module Assembly Replacement** .

HEATER HOSE REPLACEMENT - INLET

Tools Required

J 43181 Quick Connect Connector Removal Tool

Removal Procedure

1. Drain the cooling system. Refer to **Draining and Filling Cooling System** in Engine Cooling.

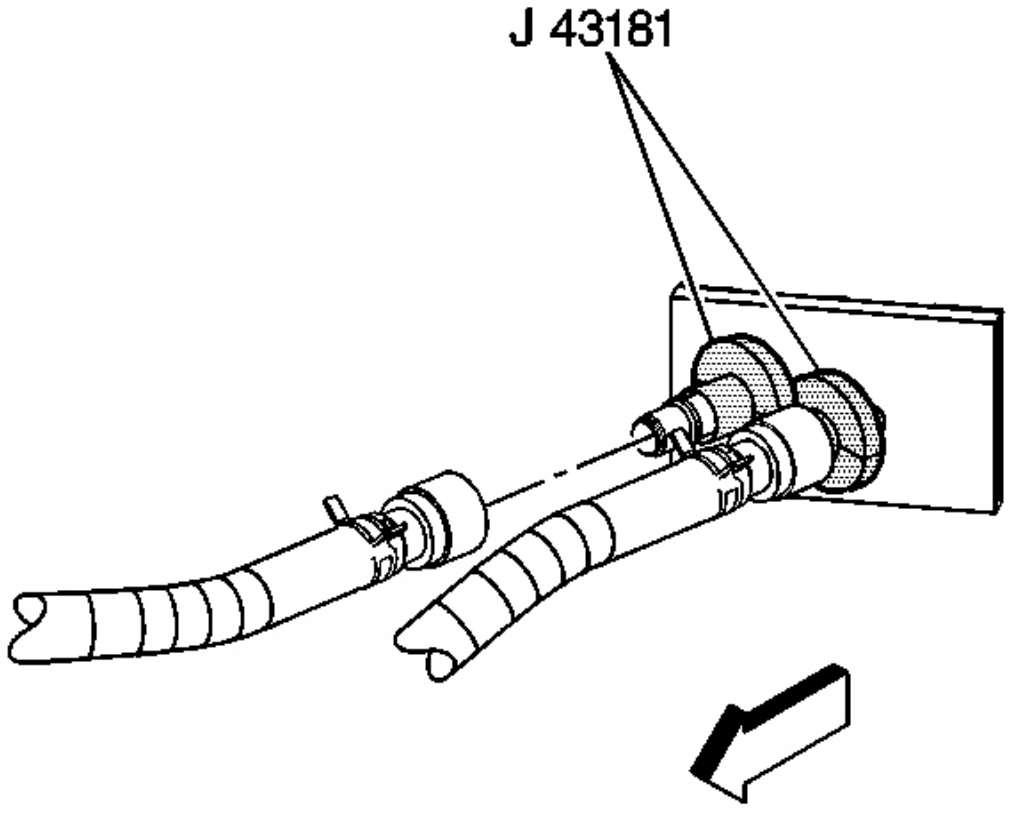


Fig. 67: Identifying Heater Hose To Heater Core Outlet

Courtesy of GENERAL MOTORS CORP.

2. Using the **J 43181** disconnect the inlet heater hose from the heater core.
    1. Install the **J 43181** to the inlet heater core pipe.
    2. Close the tool around the inlet heater core pipe.
    3. Firmly pull the tool into the quick connect end of the heater hose.
    4. Firmly grasp the heater hose. Pull the heater hose forward in order to disengage the hose from the heater core.

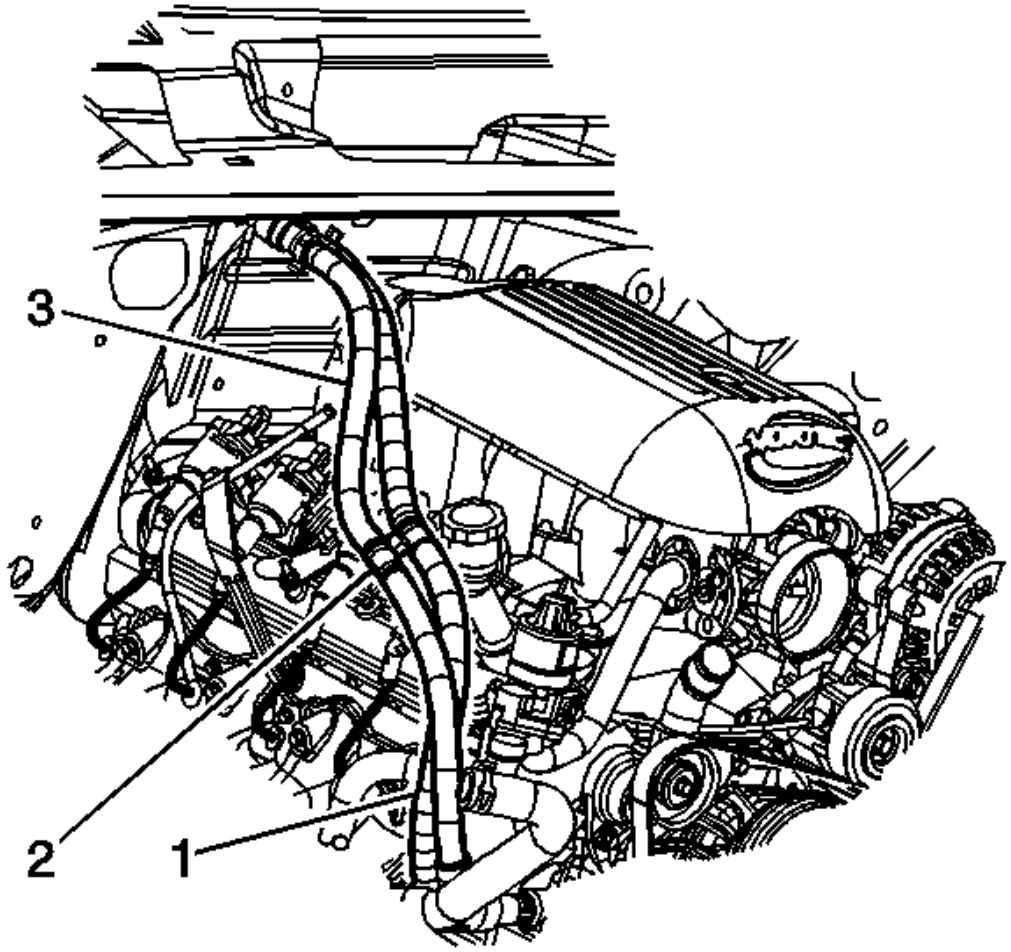


Fig. 68: Heater Inlet Hose & Mounting Clip
Courtesy of GENERAL MOTORS CORP.

3. Remove the heater inlet hose (1) from the mounting clip (2).

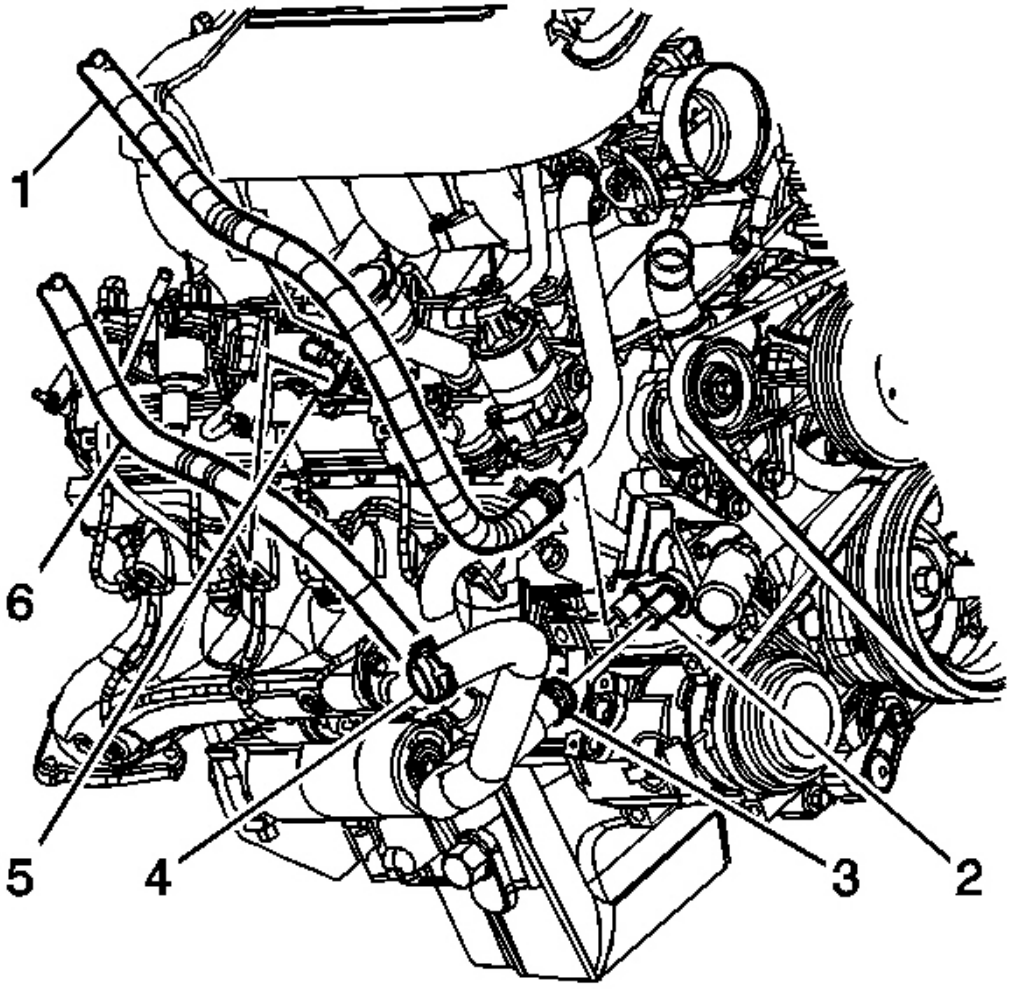


Fig. 69: Heater Inlet Hose & Engine
Courtesy of GENERAL MOTORS CORP.

4. Reposition the heater inlet hose clamp from the engine.
5. Remove the heater inlet hose (1) from the engine.
6. Remove the heater inlet hose (1) from the vehicle.

Installation Procedure

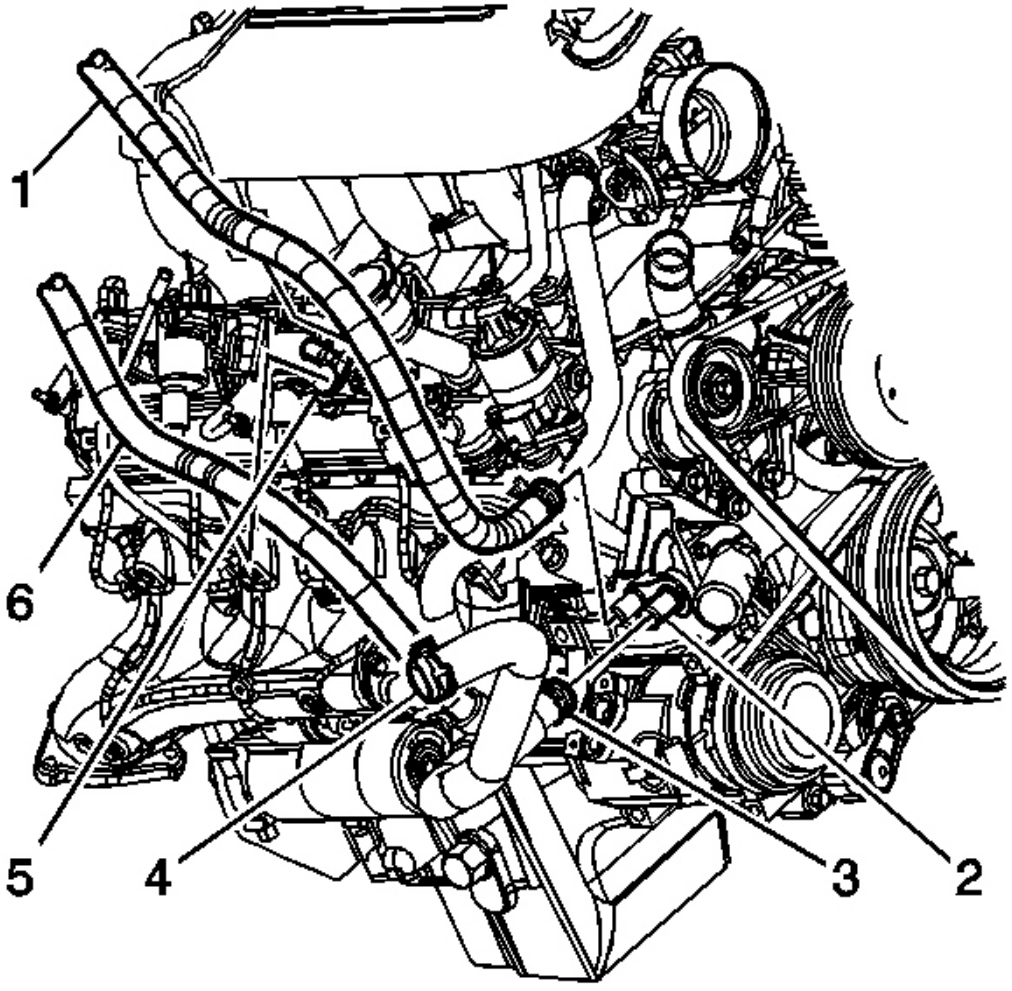


Fig. 70: Heater Inlet Hose & Engine
Courtesy of GENERAL MOTORS CORP.

1. Install the heater inlet hose (1) to the vehicle.
2. Install the heater inlet hose (1) to the engine.
3. Install the heater inlet hose clamp to the engine.

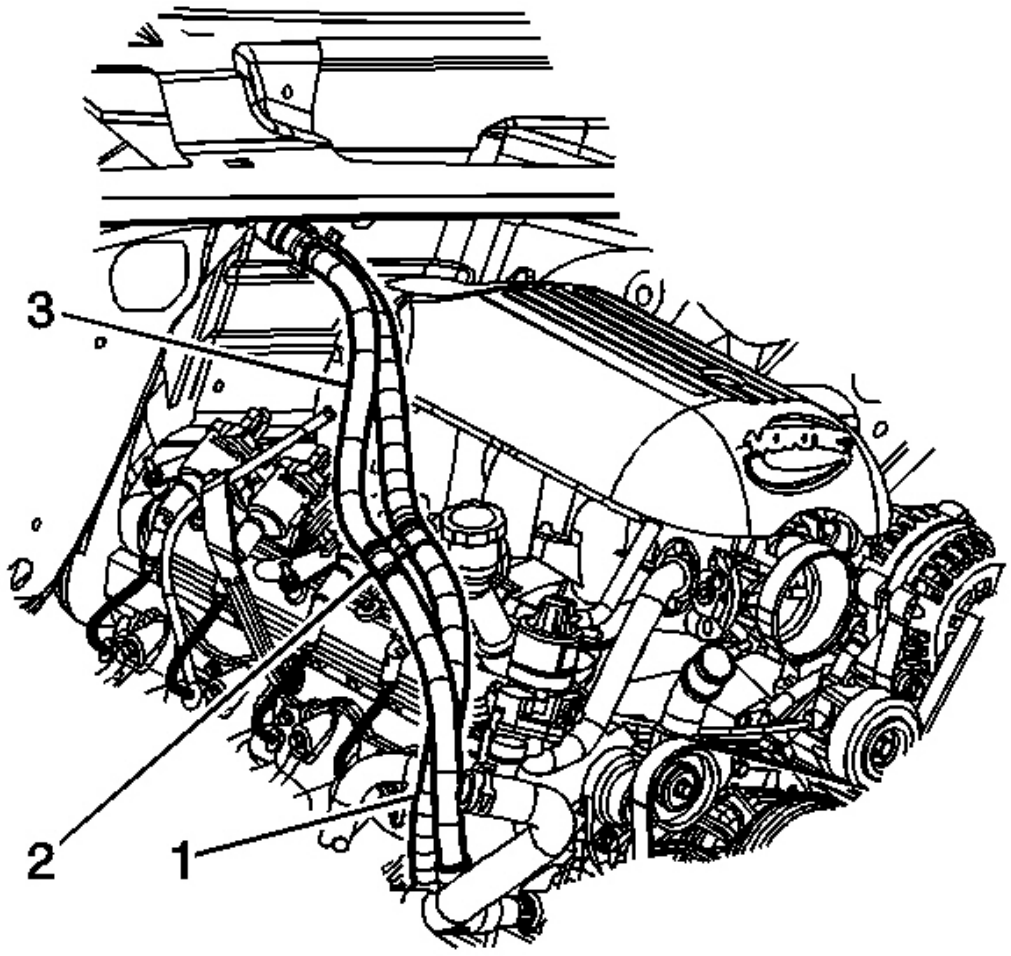


Fig. 71: Heater Inlet Hose & Mounting Clip
Courtesy of GENERAL MOTORS CORP.

4. Install the heater inlet hose (1) to the mounting clip (2).

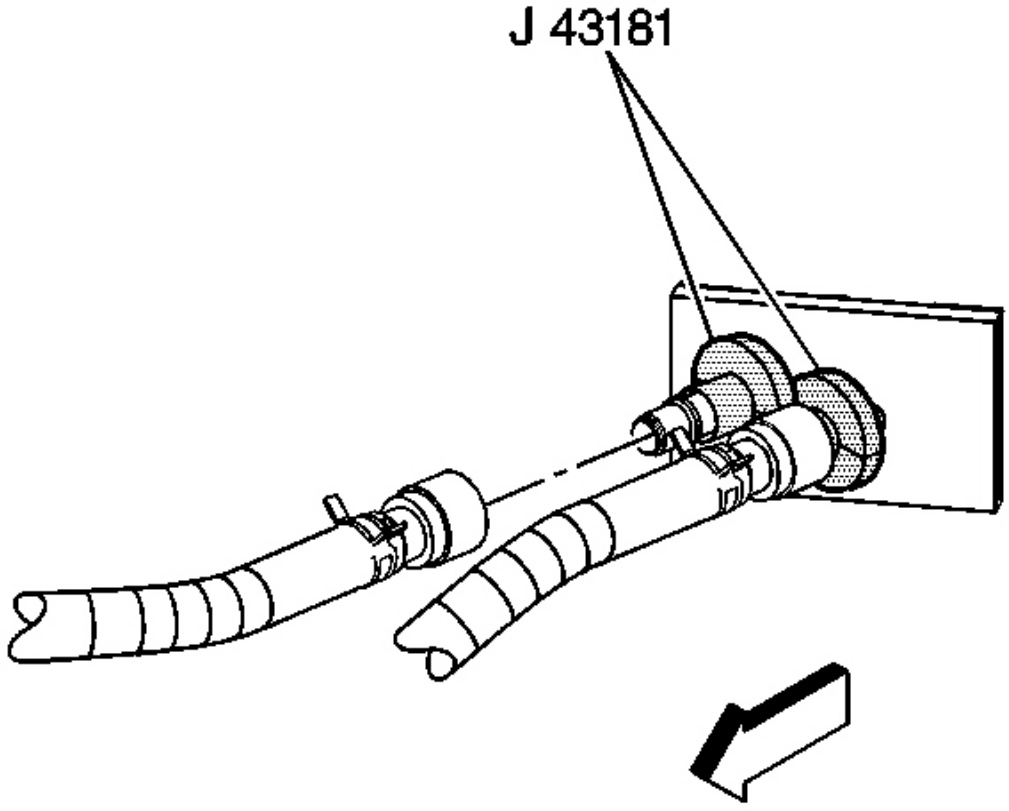


Fig. 72: Identifying Heater Hose To Heater Core Outlet
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Firmly push the quick connect onto the heater core pipe until you hear an audible click.

5. Connect the heater inlet hose to the heater core.
6. Pull the heater inlet hose to ensure the connection.
7. Fill the cooling system. Refer to **Draining and Filling Cooling System** in Engine Cooling.

HEATER HOSE REPLACEMENT - OUTLET

Tools Required

J 43181 Quick Connect Connector Removal Tool

Removal Procedure

1. Drain the cooling system. Refer to **Draining and Filling Cooling System** .

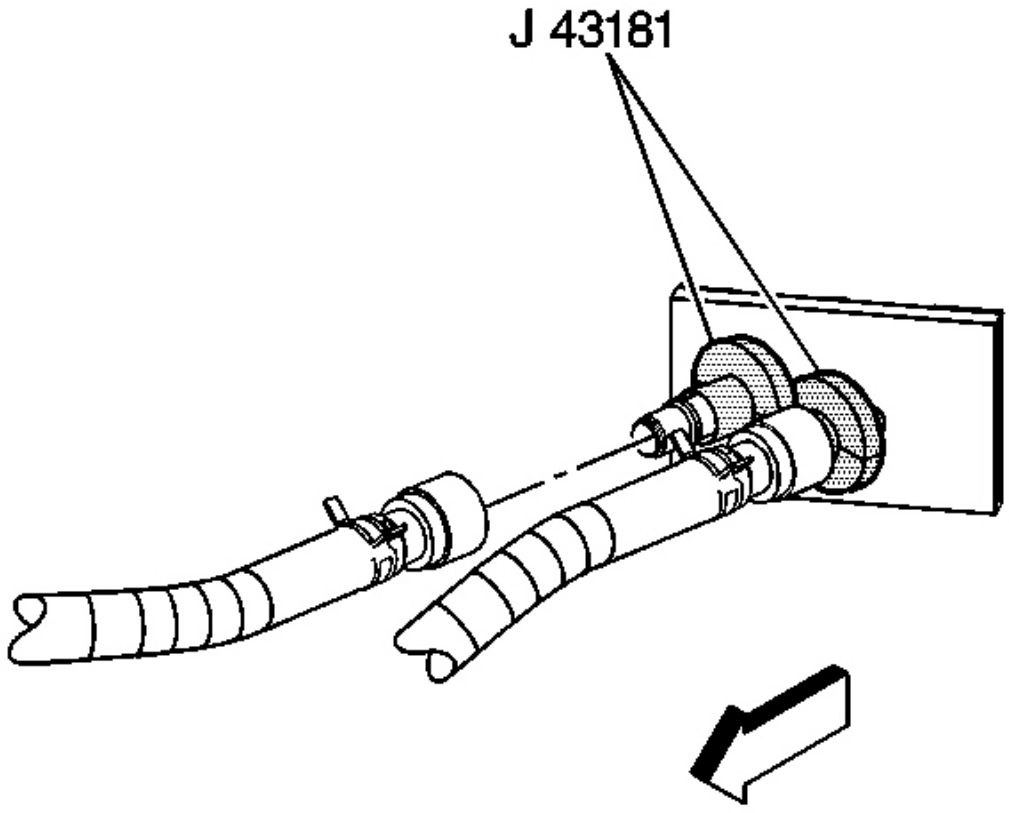


Fig. 73: Identifying Heater Hose To Heater Core Outlet
Courtesy of GENERAL MOTORS CORP.

2. Using the **J 43181** disconnect the inlet heater hose from the heater core.
    1. Install the **J 43181** to the heater core inlet pipe.
    2. Close the tool around the heater core inlet pipe.
    3. Firmly pull the tool into the quick connect end of the heater inlet hose.
    4. Firmly grasp the heater hose. Pull the heater hose forward in order to disengage the hose from the heater core.
3. Using the **J 43181** disconnect the surge tank outlet hose from the heater core outlet.
    1. Install the **J 43181** to the heater core outlet pipe.

2. Close the tool around the heater core outlet pipe.
3. Firmly pull the tool into the quick connect end of the heater outlet hose.
4. Firmly grasp the heater hose. Pull the heater hose forward in order to disengage the hose from the heater core.

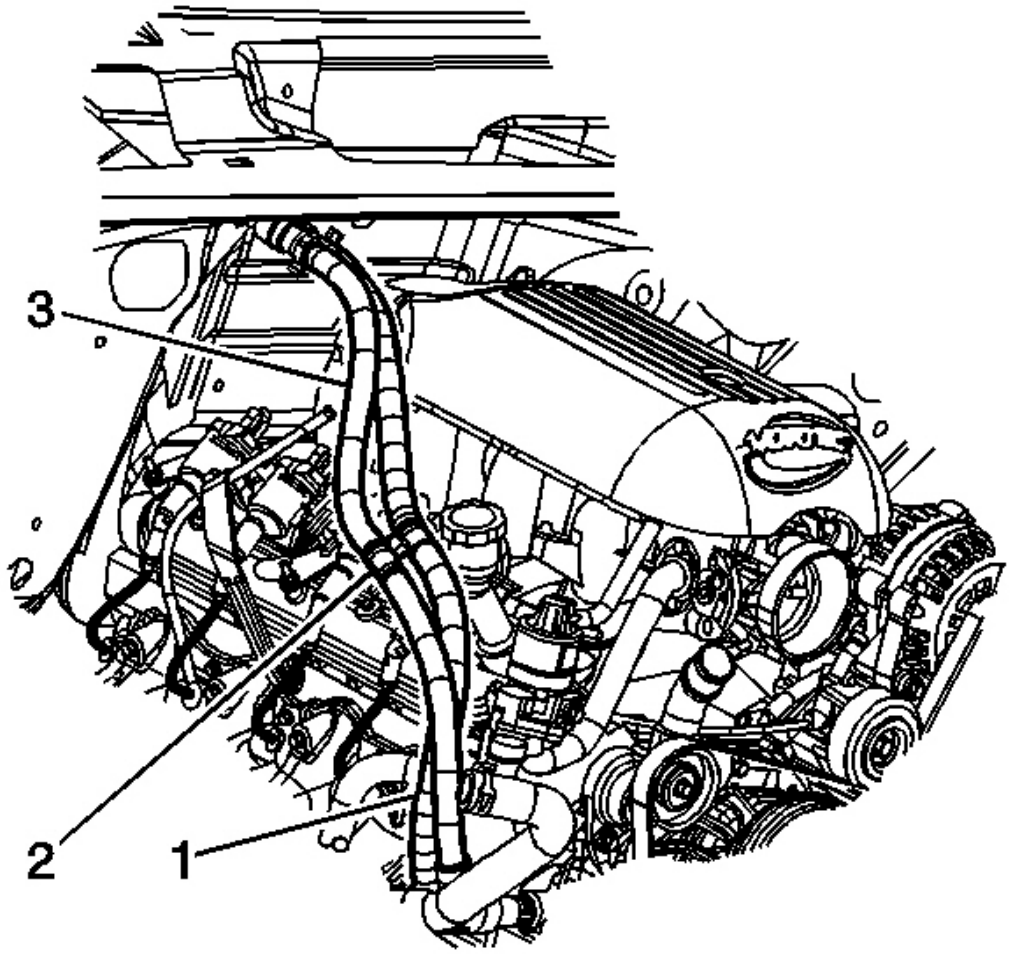


Fig. 74: Heater Inlet Hose & Mounting Clip
Courtesy of GENERAL MOTORS CORP.

4. Remove the surge tank outlet hose (3) from the mounting clip (2).

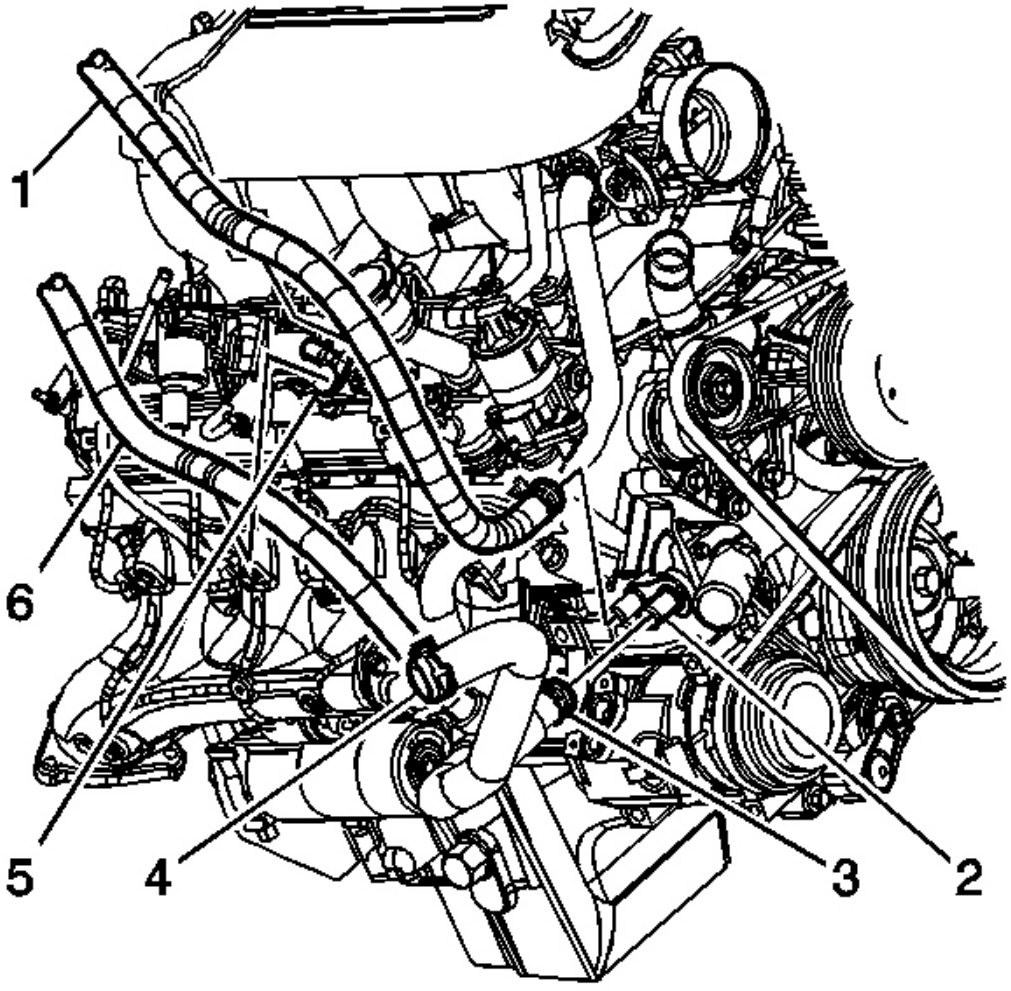


Fig. 75: Heater Inlet Hose & Engine
Courtesy of GENERAL MOTORS CORP.

5. Reposition the surge tank outlet hose clamp (3) from the engine (2).
6. Remove the surge tank outlet hose (6) from the engine (2).

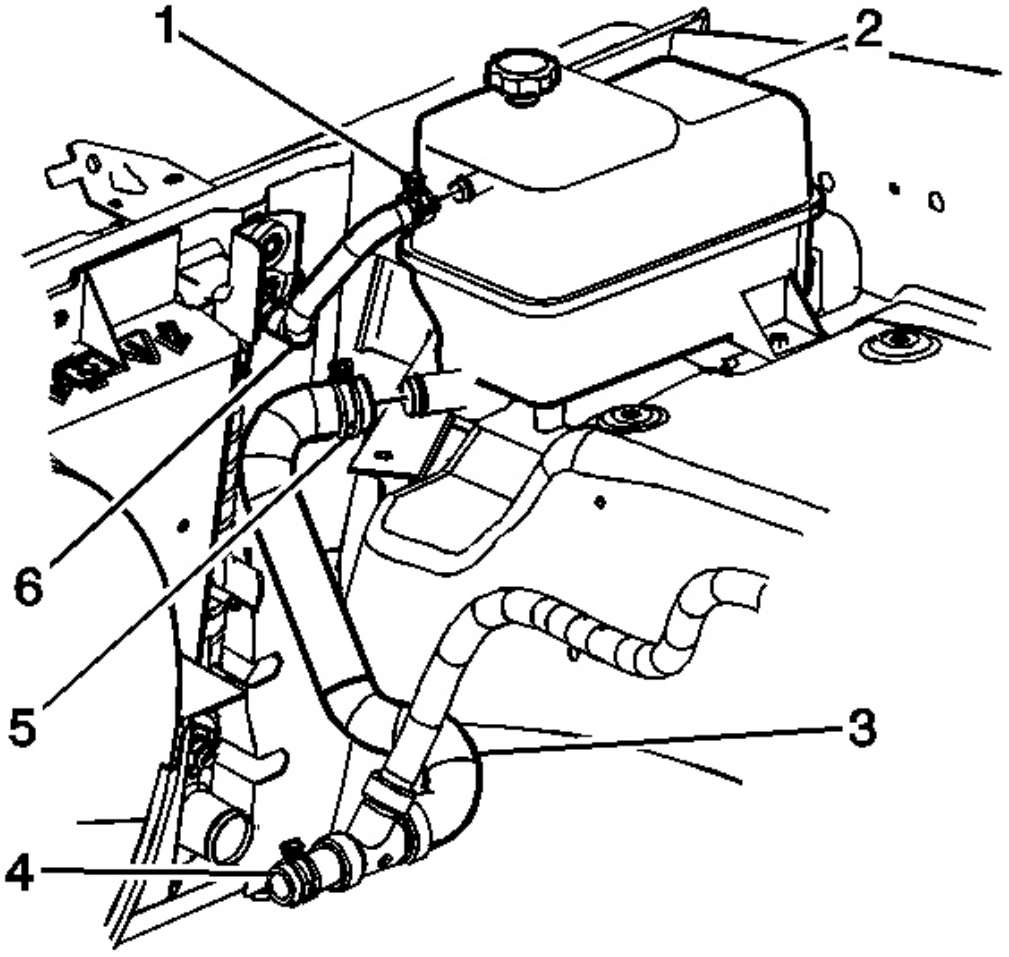


Fig. 76: Surge Tank Outlet Hose & Surge Tank
Courtesy of GENERAL MOTORS CORP.

7. Reposition the surge tank outlet hose clamp (5) from the surge tank (2).
8. Remove the surge tank outlet hose (3) from the surge tank (2).
9. Remove the surge tank outlet hose (3) from the vehicle.

Installation Procedure

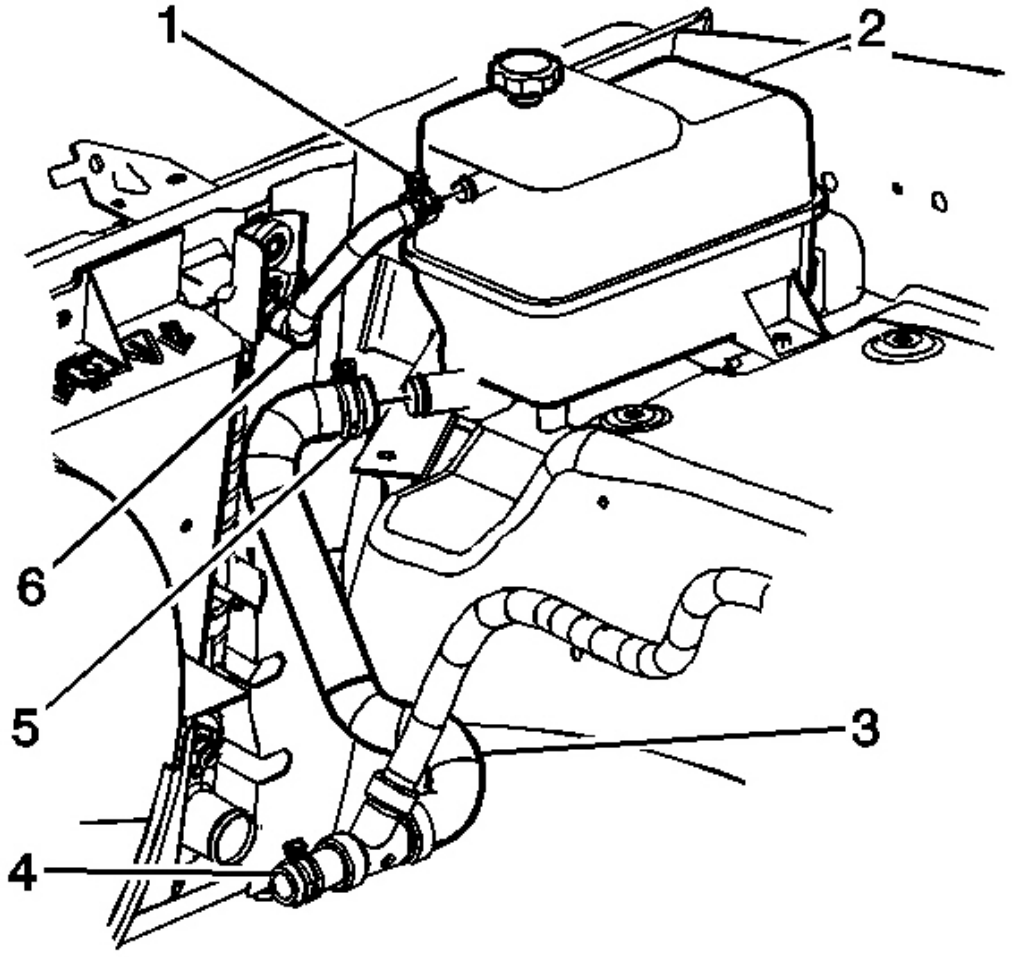


Fig. 77: Surge Tank Outlet Hose & Surge Tank
Courtesy of GENERAL MOTORS CORP.

1. Install the surge tank outlet hose (3) to the vehicle.
2. Install the surge tank outlet hose (3) to the surge tank (2).
3. Install the surge tank outlet hose clamp (5) to the surge tank (2).

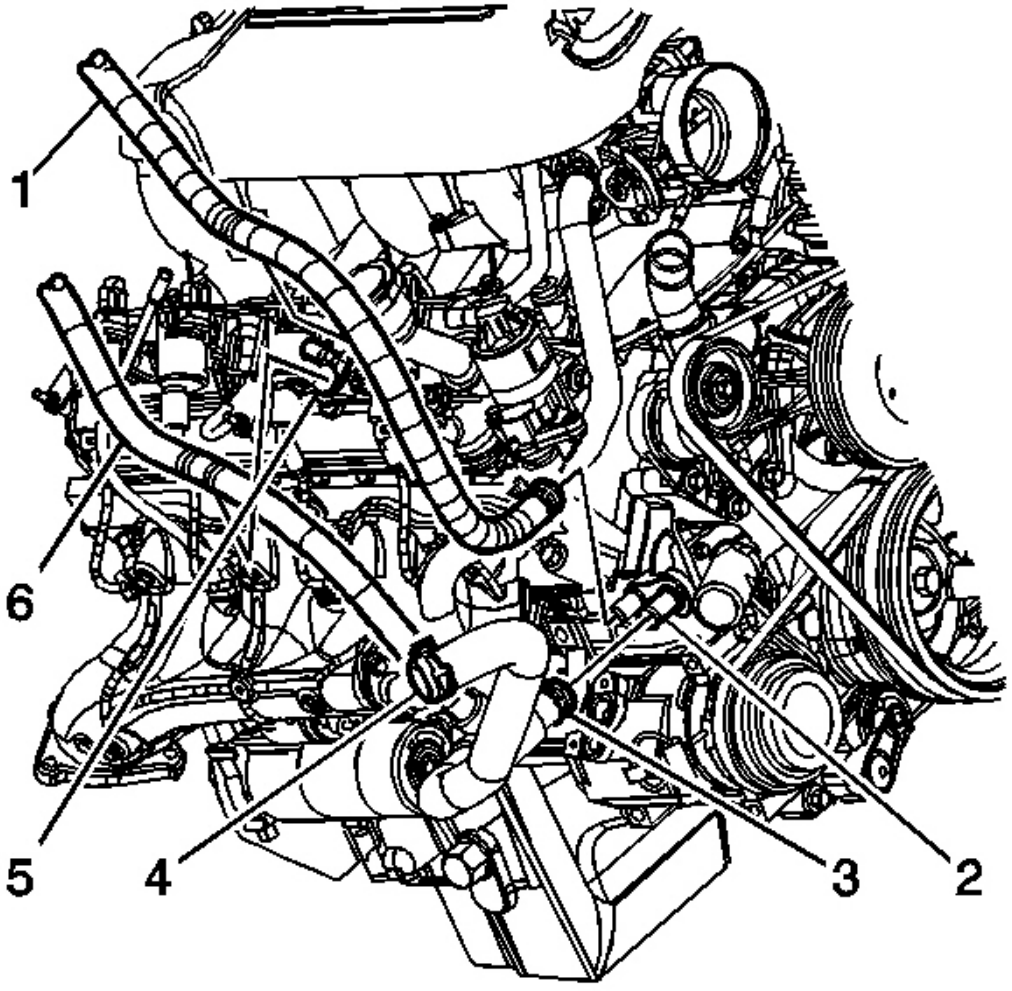


Fig. 78: Heater Inlet Hose & Engine
Courtesy of GENERAL MOTORS CORP.

4. Install the surge tank outlet hose (6) to the engine (2).
5. Install the surge tank outlet hose clamp (3) to the engine (2).
6. Install the surge tank outlet hose to the mounting clip.

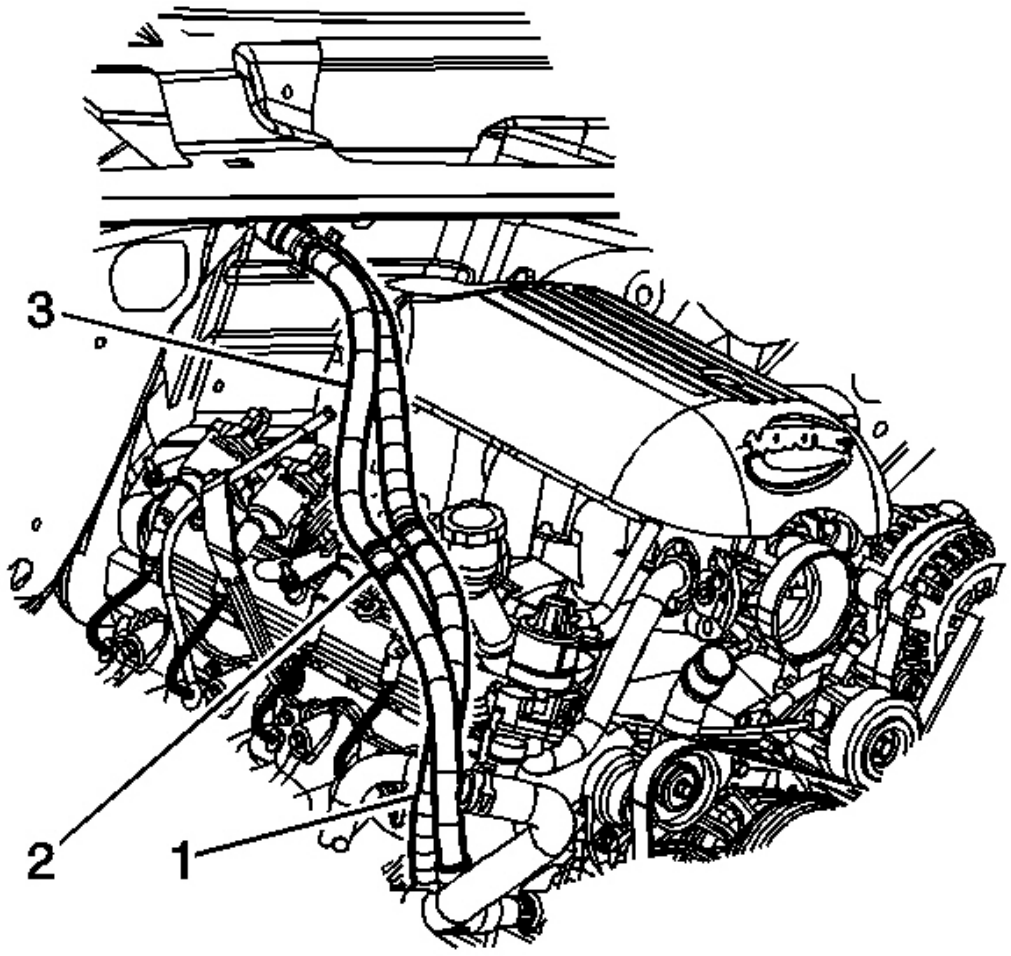


Fig. 79: Heater Inlet Hose & Mounting Clip
Courtesy of GENERAL MOTORS CORP.

7. Install the surge tank outlet hose (3) to the mounting clip (2).

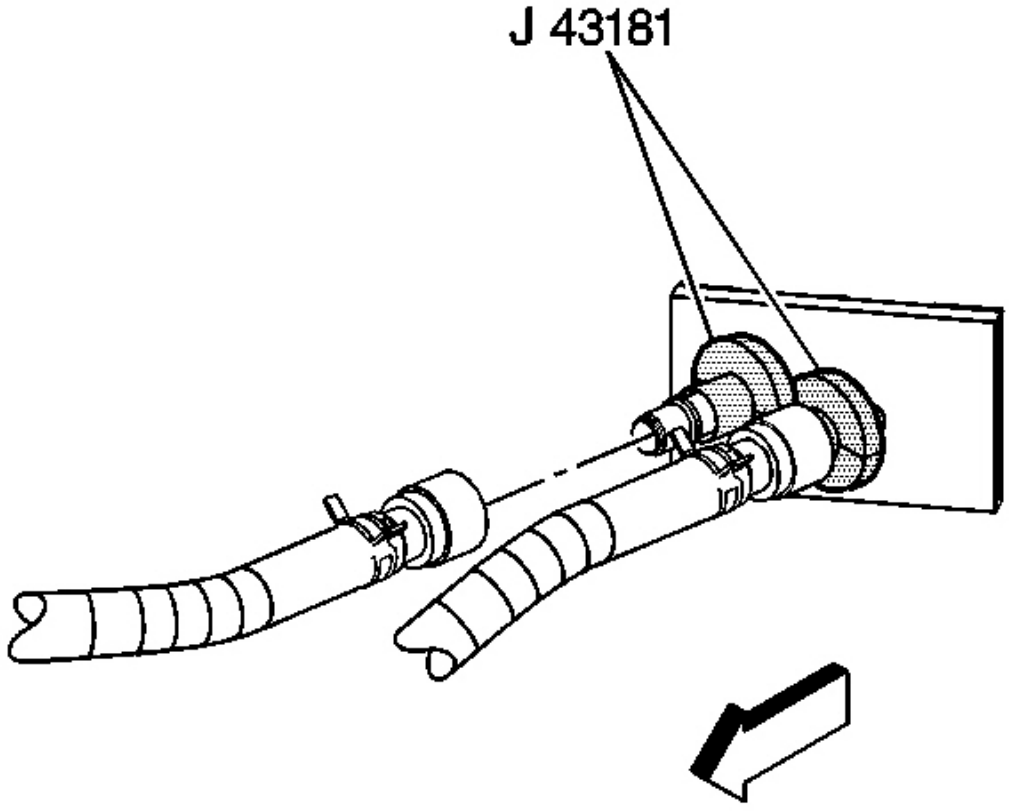


Fig. 80: Identifying Heater Hose To Heater Core Outlet
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Firmly push the quick connect onto the heater core pipe until you hear an audible click.

8. Install the surge tank outlet hose to the heater core outlet pipe.
9. Pull the surge tank outlet hose to ensure the connection.
10. Install the heater inlet hose to the heater core.

IMPORTANT: Firmly push the quick connect onto the heater core pipe until you hear an audible click.

11. Pull the inlet heater inlet hose to ensure the connection.
12. Fill the cooling system. Refer to **Draining and Filling Cooling System** .

BLOWER MOTOR REPLACEMENT

Removal Procedure

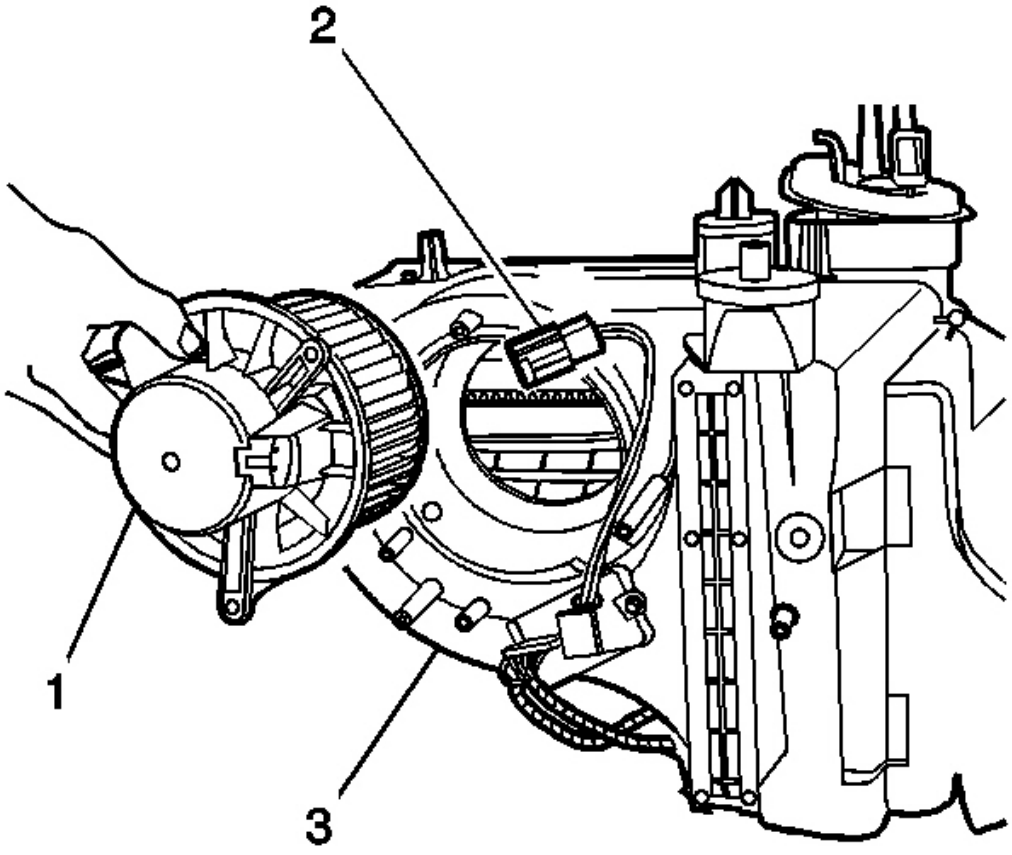


Fig. 81: Blower Motor Assembly
Courtesy of GENERAL MOTORS CORP.

1. Remove the sound insulator panel. Refer to **Insulator Replacement - Instrument Panel (I/P)** in Instrument Panel, Gauges, and Console.
2. Disconnect the electrical connector (2) from the blower motor (1).
3. Remove the screws from the blower motor (1).
4. Remove the blower motor (1) from the HVAC module (3).
5. Remove the retainer from the blower motor impeller.

   Discard the retainer.

6. Remove the blower motor impeller from the blower motor (1).

Installation Procedure

1. Install the blower motor impeller to the blower motor (1).
2. Install the new retainer to the blower motor impeller.
3. Install the blower motor (1) to the HVAC module (3).

NOTE: Refer to Fastener Notice in Cautions and Notices.

4. Install the screws to the blower motor (1).

   Tighten: Tighten the screws to 2 N.m (18 lb in).

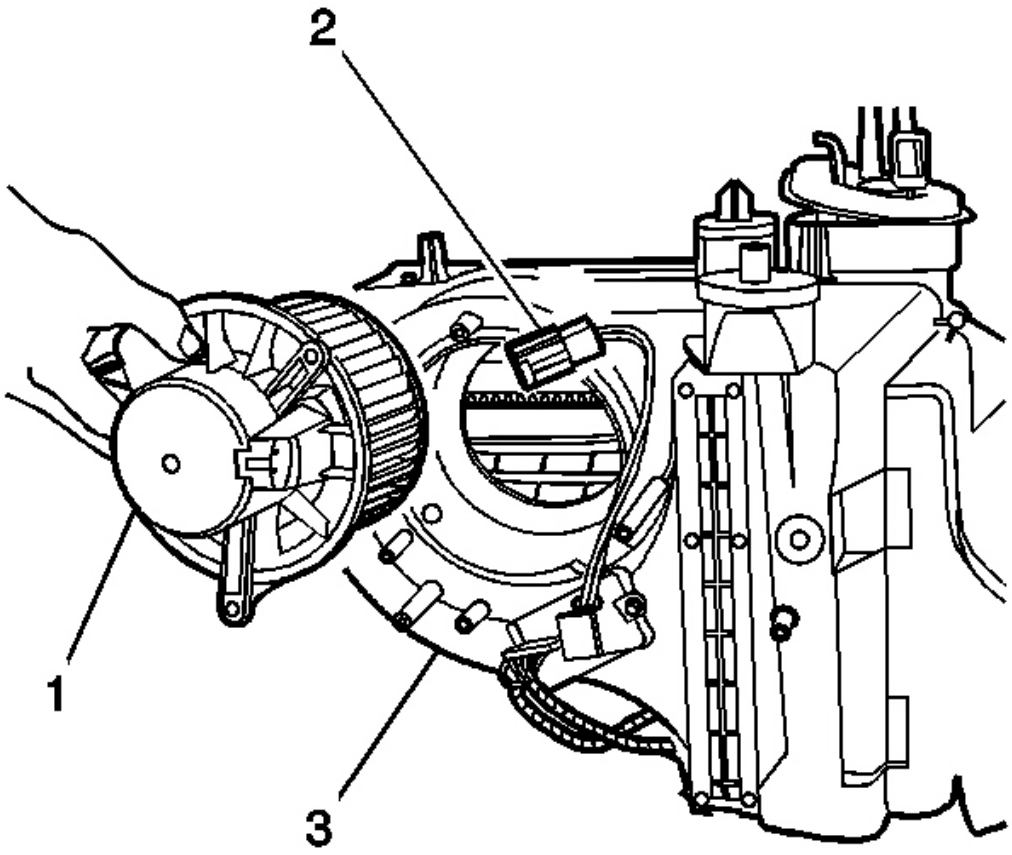


Fig. 82: Blower Motor Assembly

Courtesy of GENERAL MOTORS CORP.

5. Connect the electrical connector (2) to the blower motor (1).
6. Install the sound insulator panel. Refer to **Insulator Replacement - Instrument Panel (I/P)** in Instrument Panel, Gauges, and Console.

BLOWER MOTOR IMPELLER REPLACEMENT

Removal Procedure

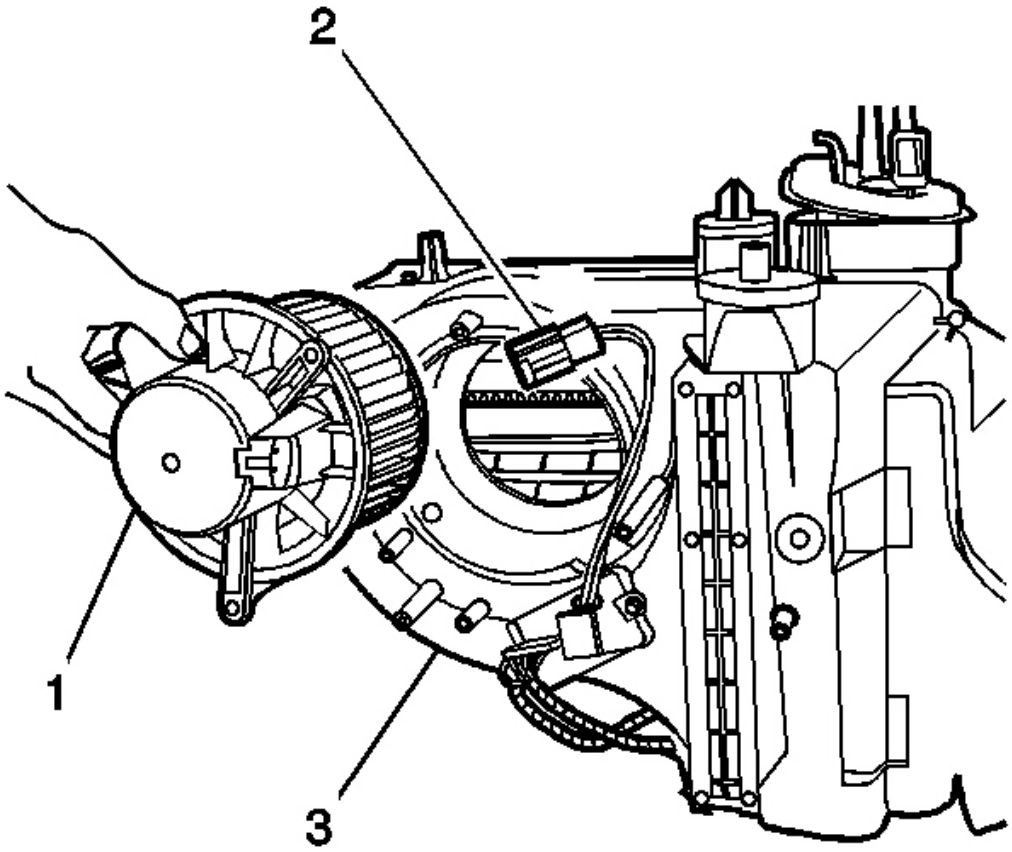


Fig. 83: Blower Motor Assembly
Courtesy of GENERAL MOTORS CORP.

1. Remove the sound insulator panel. Refer to **Insulator Replacement - Instrument Panel (I/P)** in Instrument Panel, Gauges, and Console.
2. Disconnect the electrical connector (2) from the blower motor (1).

3. Remove the screws from the blower motor (1).
4. Remove the blower motor (1) from the HVAC module (3).
5. Remove the retainer from the blower motor impeller.

   Discard the retainer.

6. Remove the blower motor impeller from the blower motor (1).

Installation Procedure

1. Install the blower motor impeller to the blower motor (1).
2. Install the new retainer to the blower motor impeller.
3. Install the blower motor (1) to the HVAC module (3).

NOTE: Refer to Fastener Notice in Cautions and Notices.

4. Install the screws to the blower motor (1).

   Tighten: Tighten the screws to 2 N.m (18 lb in).

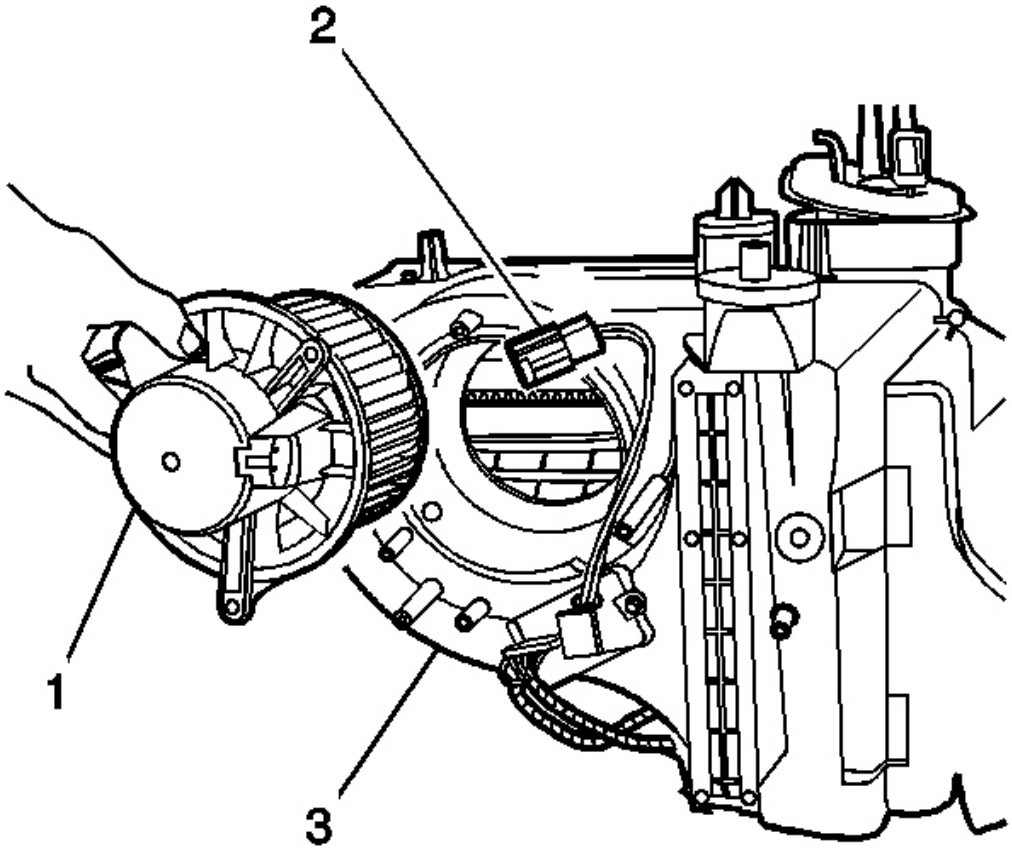


Fig. 84: Blower Motor Assembly
Courtesy of GENERAL MOTORS CORP.

5. Connect the electrical connector (2) to the blower motor (1).
6. Install the sound insulator panel. Refer to **Insulator Replacement - Instrument Panel (I/P)** in Instrument Panel, Gauges, and Console.

AIR DISTRIBUTOR DUCT REPLACEMENT

Removal Procedure

1. Remove the I/P trim panel. Refer to **Trim Pad Replacement - Instrument Panel (I/P) Upper** in Instrument Panel, Gauges and Console.

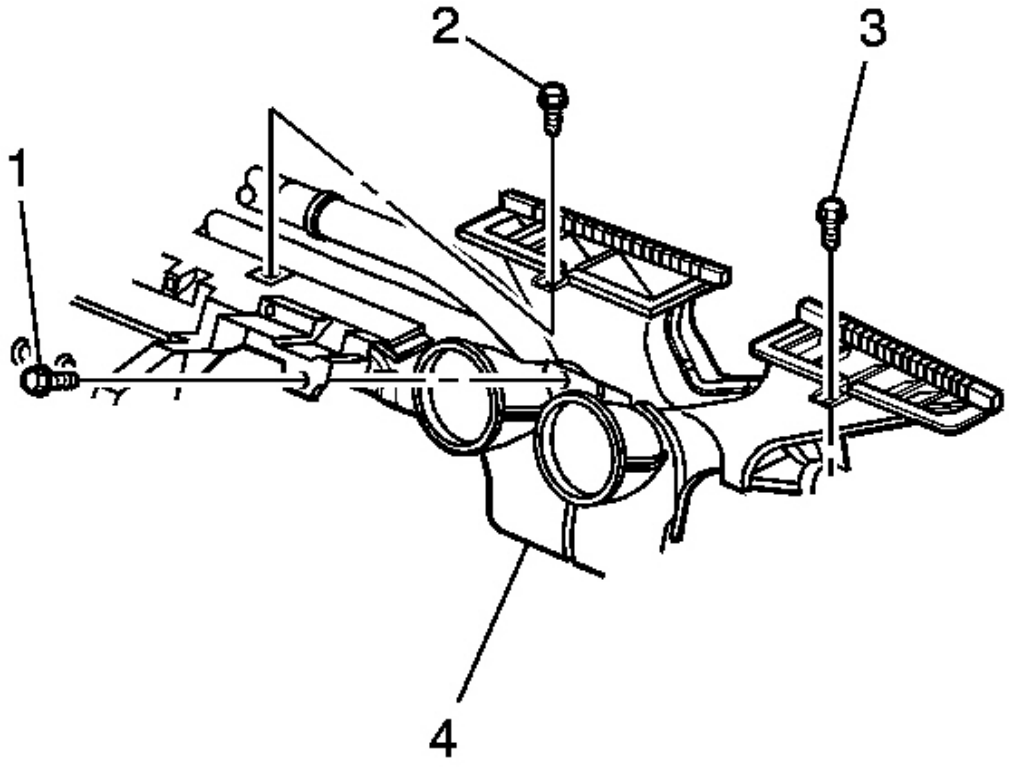


Fig. 85: Screw & Air Distribution Duct
Courtesy of GENERAL MOTORS CORP.

2. Remove the screw (1) from the air distribution duct (4).

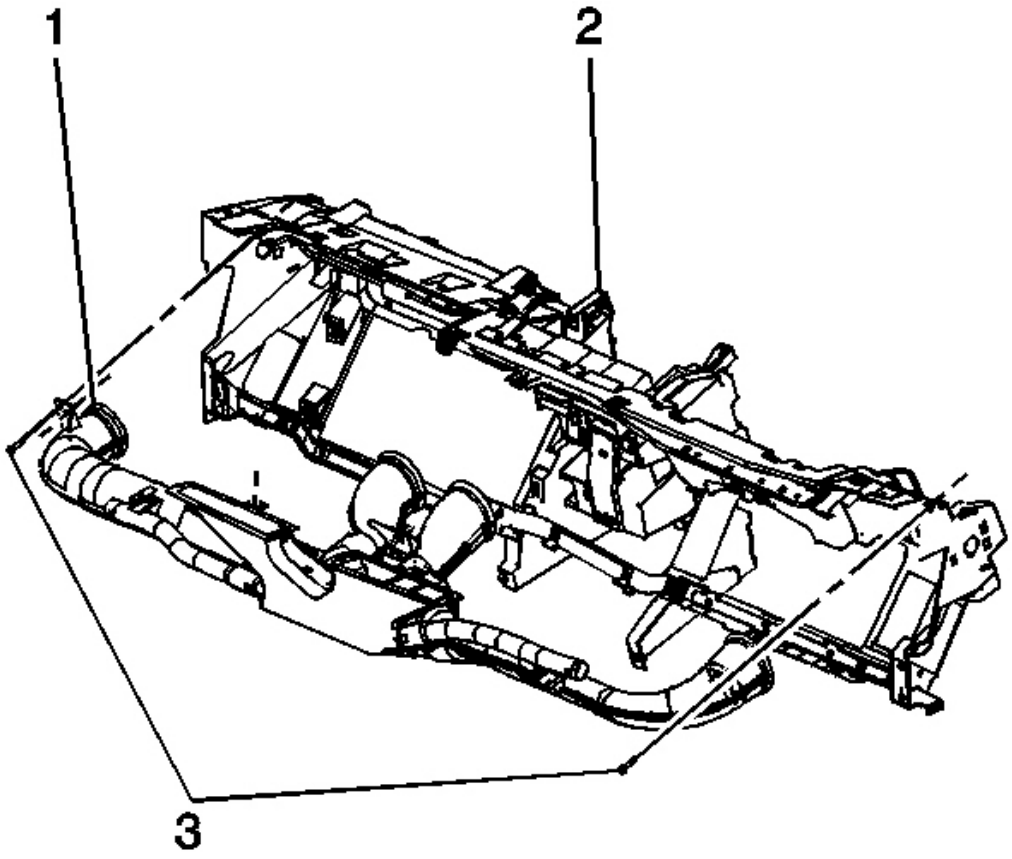


Fig. 86: Air Distribution Duct & I/P Trim Panel
Courtesy of GENERAL MOTORS CORP.

3. Remove the screws (3) from the air distribution duct (1).
4. Remove the air distribution duct (1) from the I/P trim panel (2).

Installation Procedure

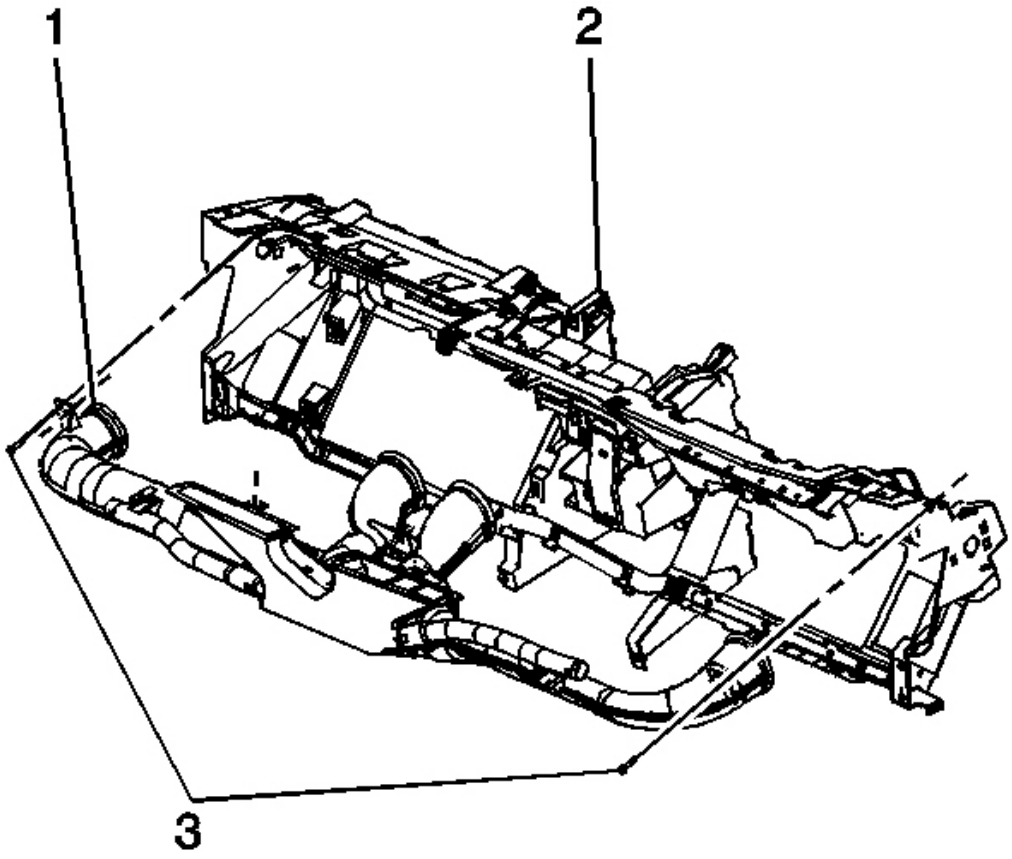


Fig. 87: Air Distribution Duct & I/P Trim Panel
Courtesy of GENERAL MOTORS CORP.

1. Install the air distribution duct (1) to the I/P trim Panel (2).

NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the screws (3) to the air distribution duct (1).

Tighten: Tighten the screws to 2 N.m (18 lb in).

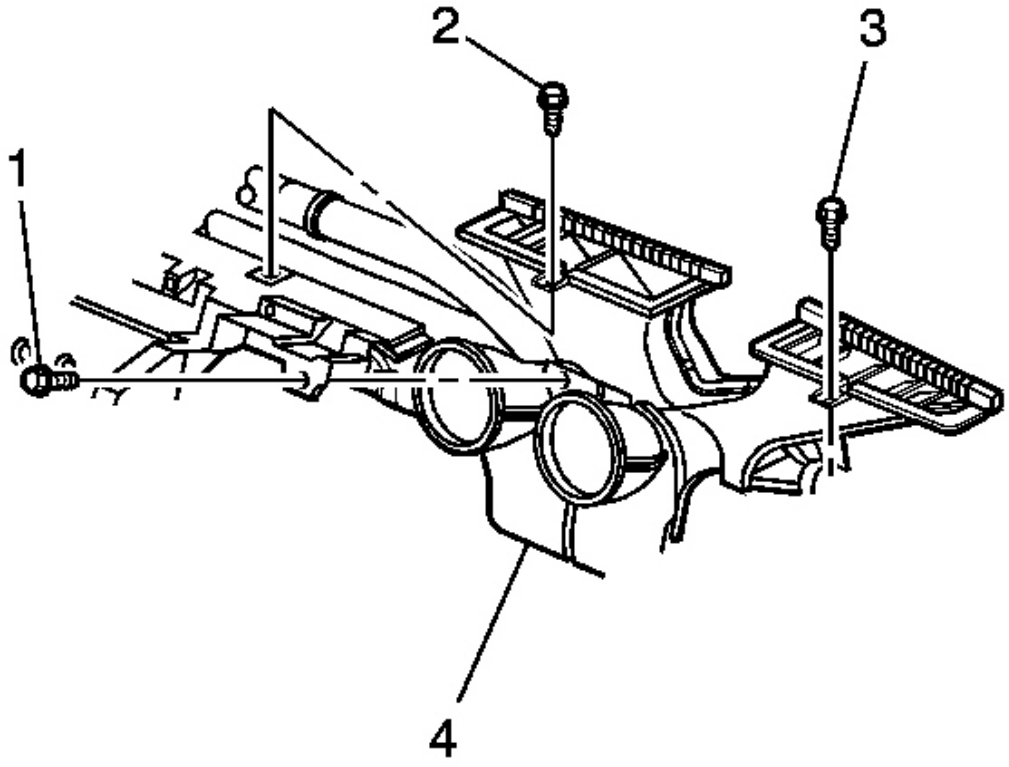


Fig. 88: Screw & Air Distribution Duct
Courtesy of GENERAL MOTORS CORP.

3. Install the screw (1) to the air distribution duct (4).

   Tighten: Tighten the screws to 2 N.m (18 lb in).

4. Install the I/P trim panel. Refer to **Trim Pad Replacement - Instrument Panel (I/P) Upper** in Instrument Panel, Gauges and Console.

DEFLECTOR REPLACEMENT - INSTRUMENT PANEL AIR - LEFT

Removal Procedure

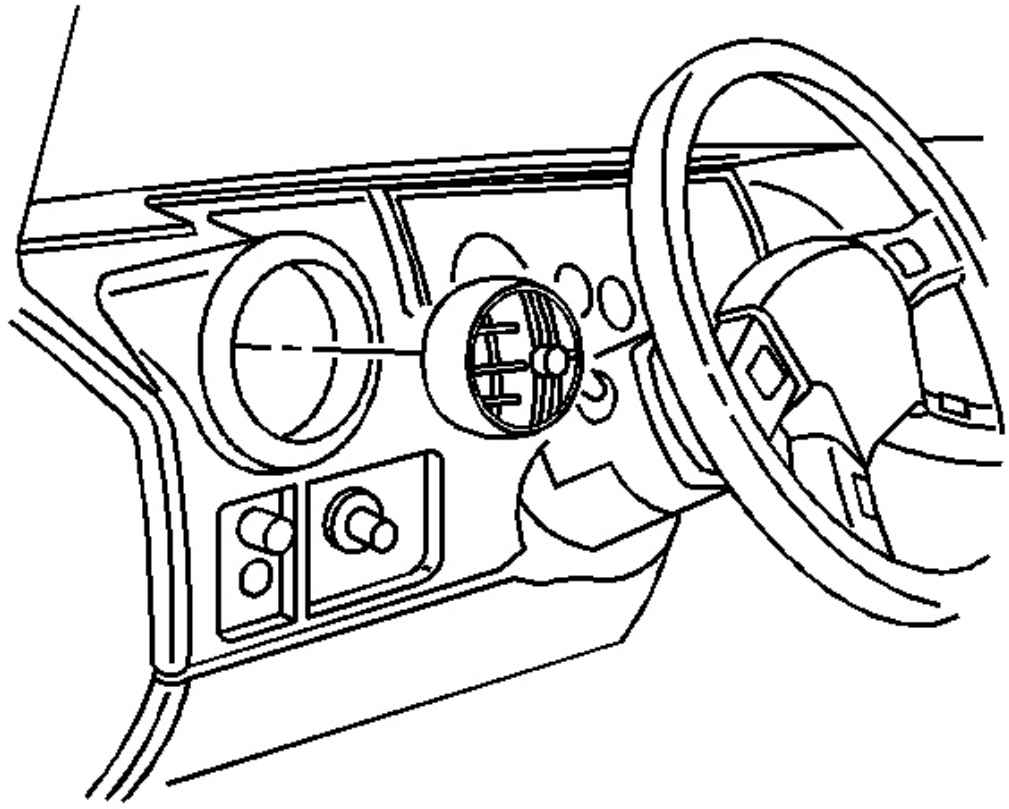


Fig. 89: Air Deflector & Trim Panel (Left)
Courtesy of GENERAL MOTORS CORP.

1. Use a flat bladed tool in order to remove the air deflector from the trim panel.
2. Remove the air reflector.

Installation Procedure

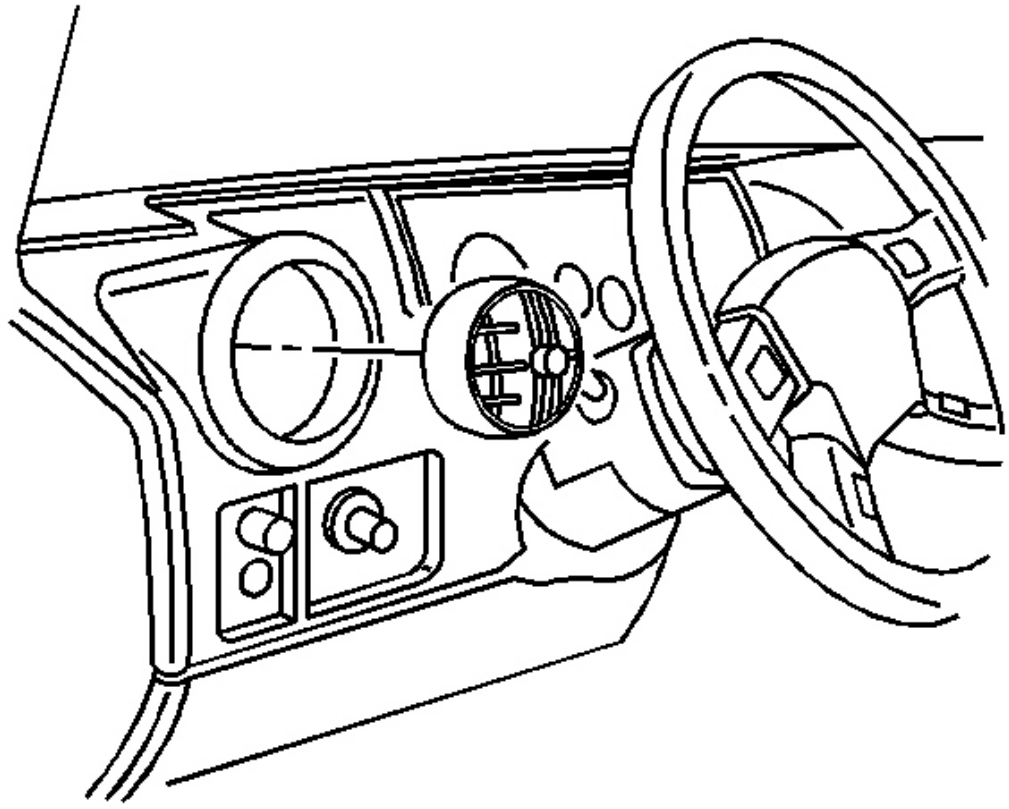


Fig. 90: Air Deflector & Trim Panel (Left)
Courtesy of GENERAL MOTORS CORP.

1. Align the air deflector into the opening in the trim panel accessory left.
2. Push the air outlet into the trim panel until the deflector snaps into place.

DEFLECTOR REPLACEMENT - INSTRUMENT PANEL AIR - CENTER

Removal Procedure

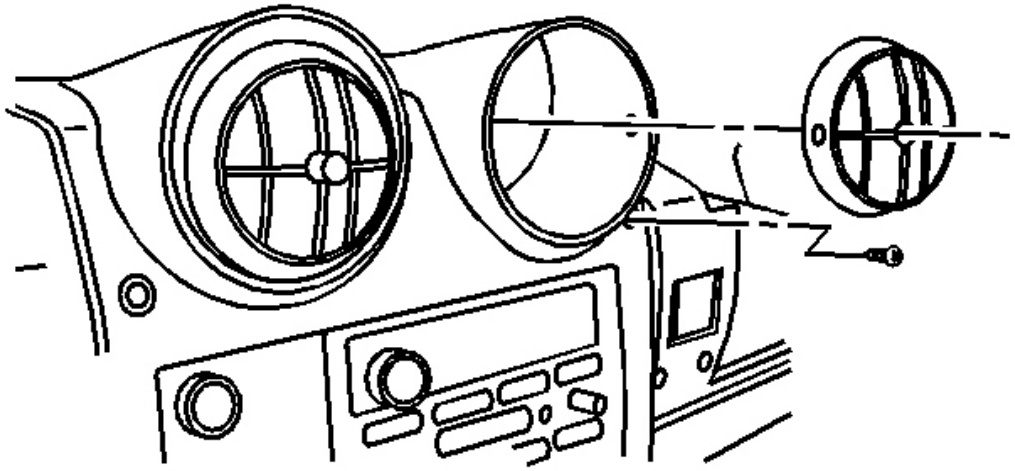


Fig. 91: Air Deflector Louver & Instrument Panel (Center)
Courtesy of GENERAL MOTORS CORP.

Using a flat bladed tool, remove the air deflector louver from the instrument panel.

Installation Procedure

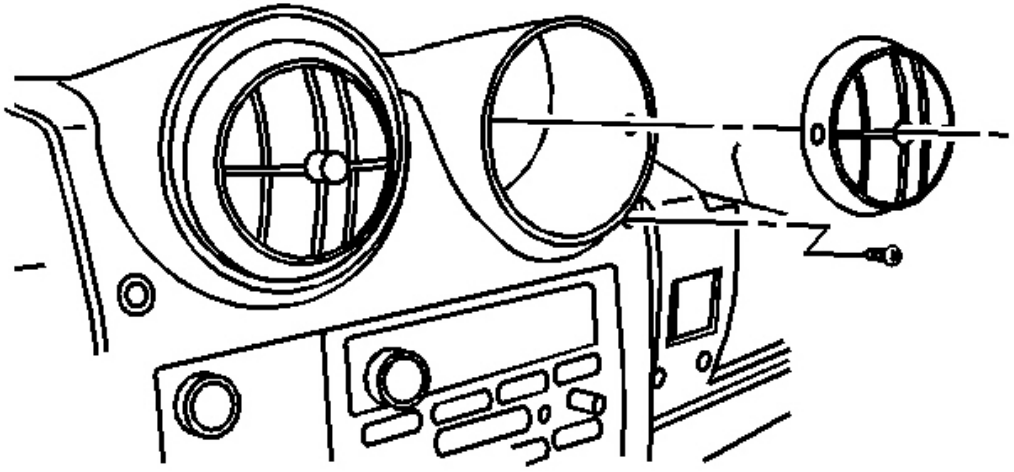


Fig. 92: Air Deflector Louver & Instrument Panel (Center)
Courtesy of GENERAL MOTORS CORP.

1. Align the air deflector into the opening in the trim panel I/P center.
2. Push the air outlet into the trim panel until the deflector snaps into place.

DEFLECTOR REPLACEMENT - INSTRUMENT PANEL AIR - RIGHT

Removal Procedure

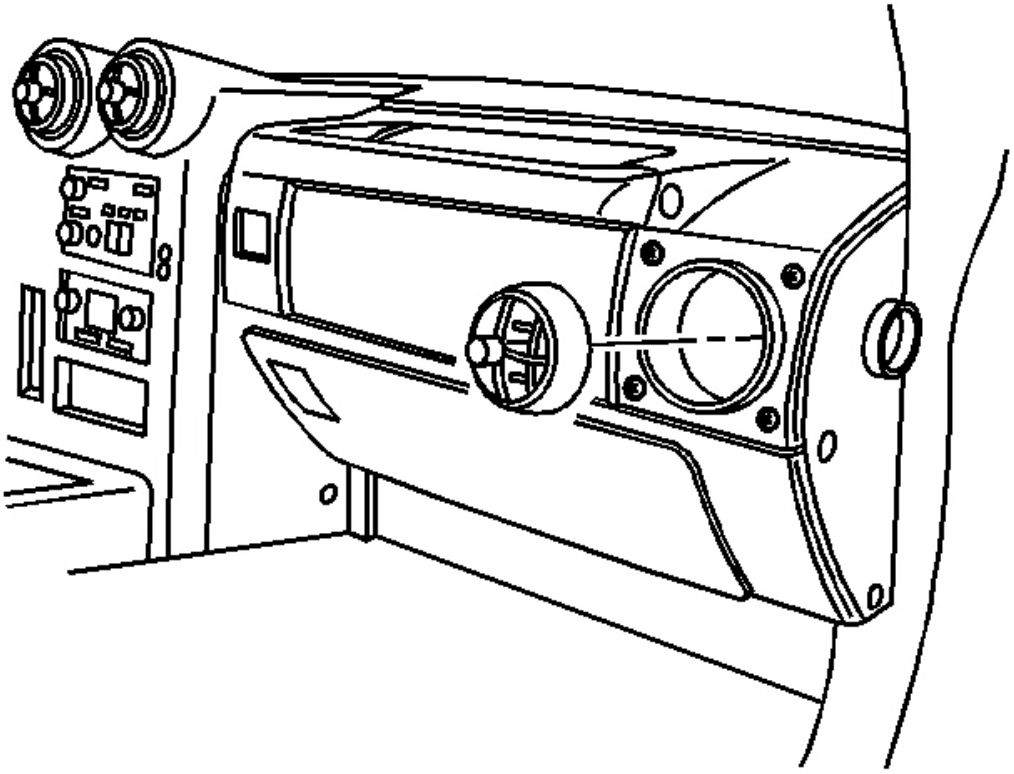


Fig. 93: Air Reflector Louver & Trim Panel
Courtesy of GENERAL MOTORS CORP.

1. Use a flat bladed tool in order to remove the air deflector from the trim panel.
2. Remove the air reflector louver.

Installation Procedure

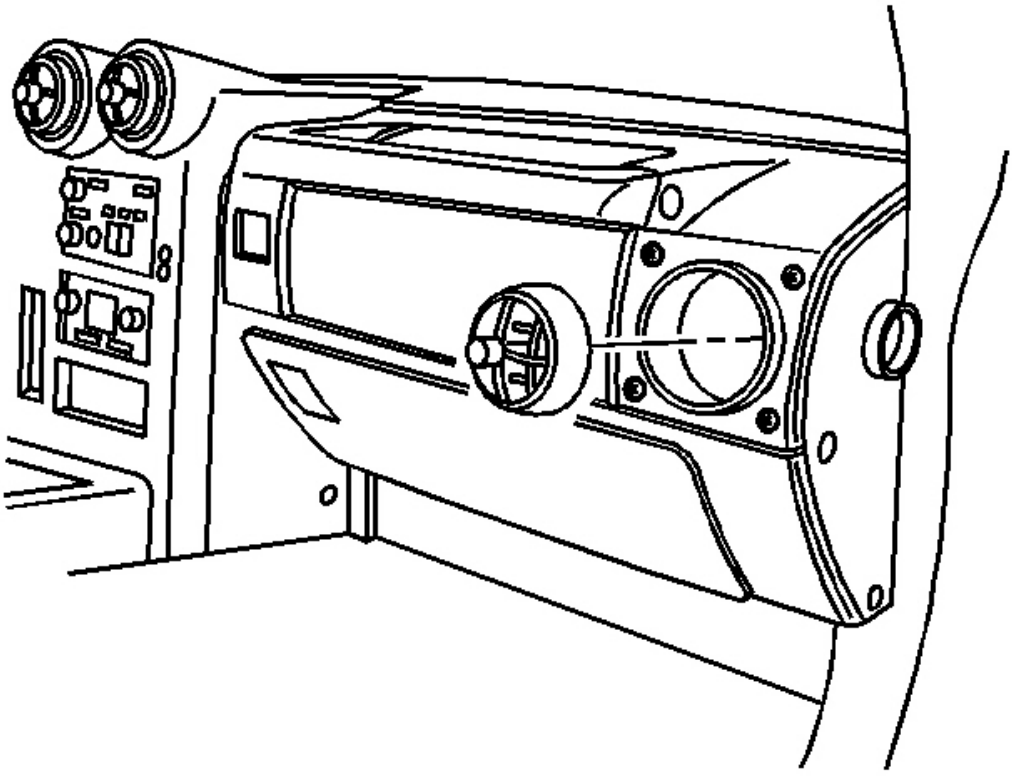


Fig. 94: Air Reflector Louver & Trim Panel
Courtesy of GENERAL MOTORS CORP.

1. Align the air deflector into the opening in the trim panel accessory right.
2. Push the air outlet into the trim panel until the deflector snaps into place.

AIR OUTLET REPLACEMENT - REAR FLOOR

Removal Procedure

1. Remove the console. Refer to **Console Replacement** in Instrument Panel, Gauges and Console.

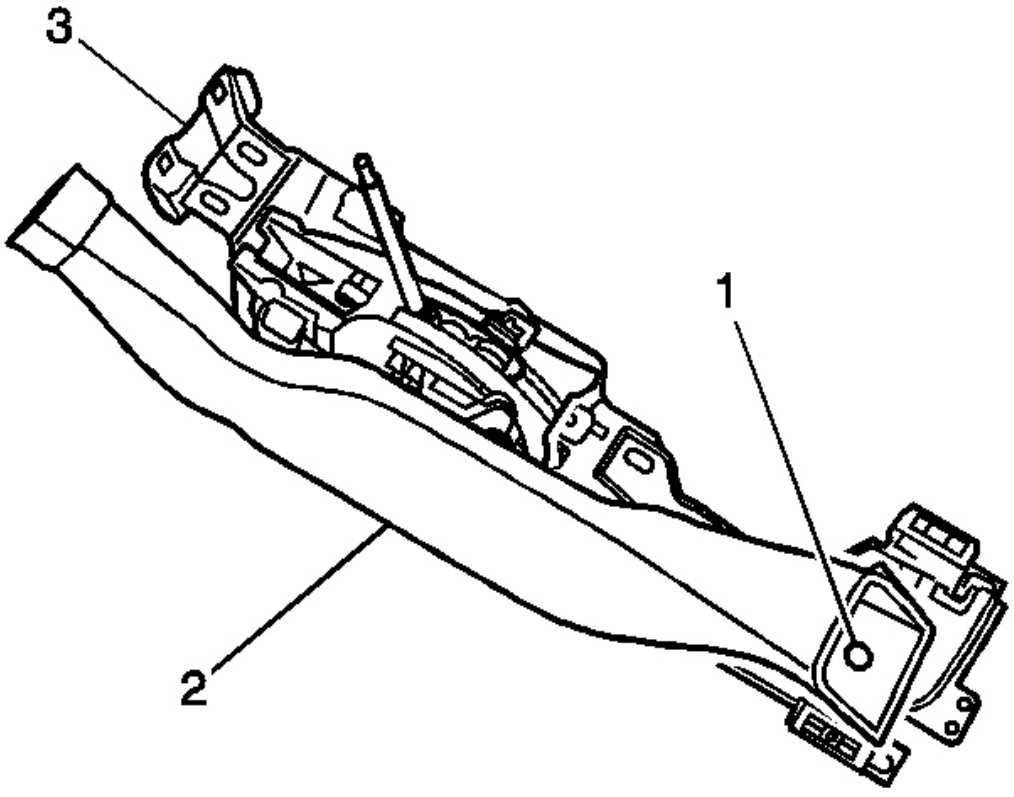


Fig. 95: Identifying Push Pin (Rear Floor)
Courtesy of GENERAL MOTORS CORP.

2. Remove the push pin (1).

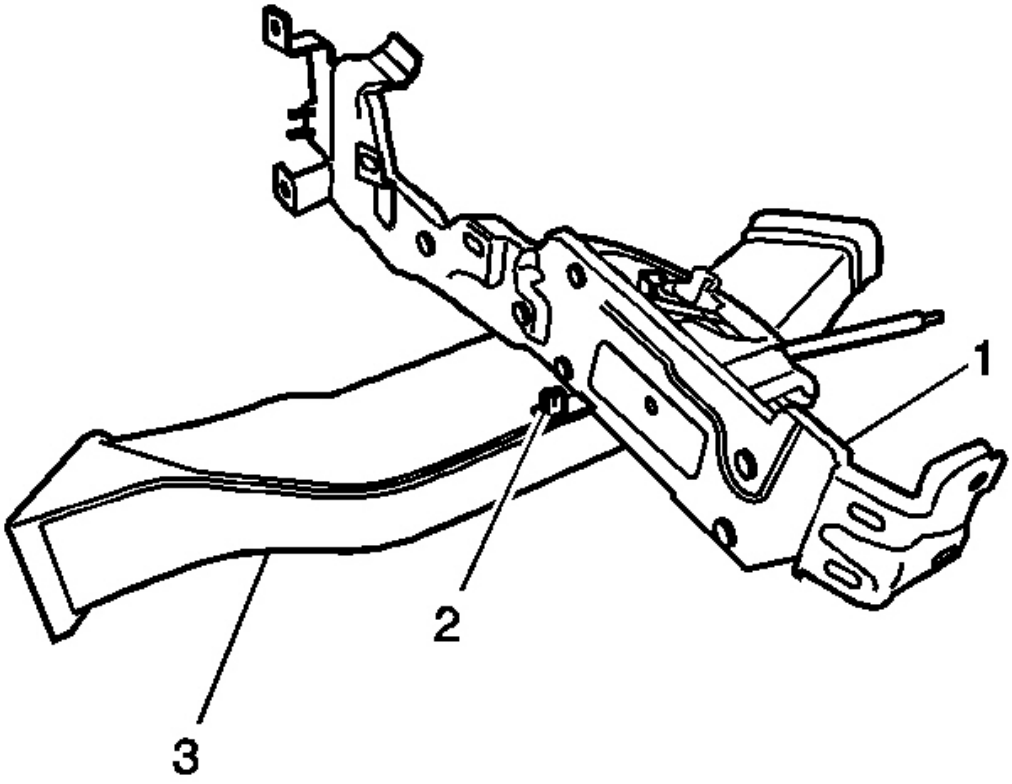


Fig. 96: Air Outlet Duct & Console Support Bracket (Rear Floor)
Courtesy of GENERAL MOTORS CORP.

3. Remove the air outlet duct-rear (3) from the console support bracket (1).

Installation Procedure

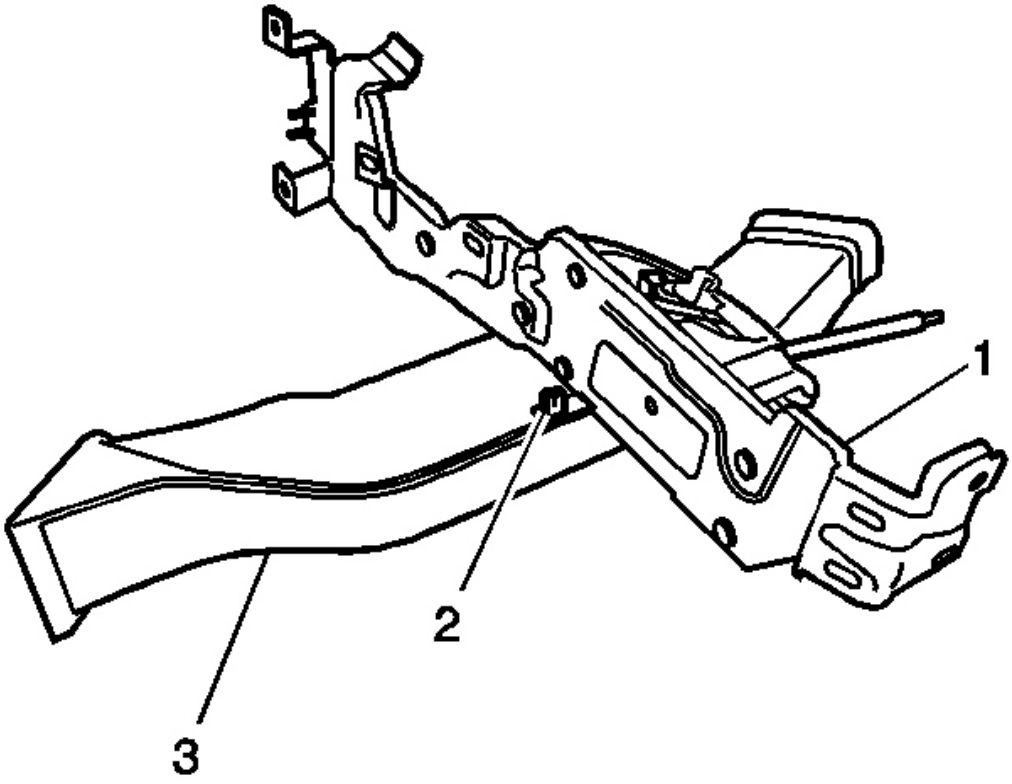


Fig. 97: Air Outlet Duct & Console Support Bracket (Rear Floor)
Courtesy of GENERAL MOTORS CORP.

1. Install the air outlet duct-rear (3) to the console support bracket (1).

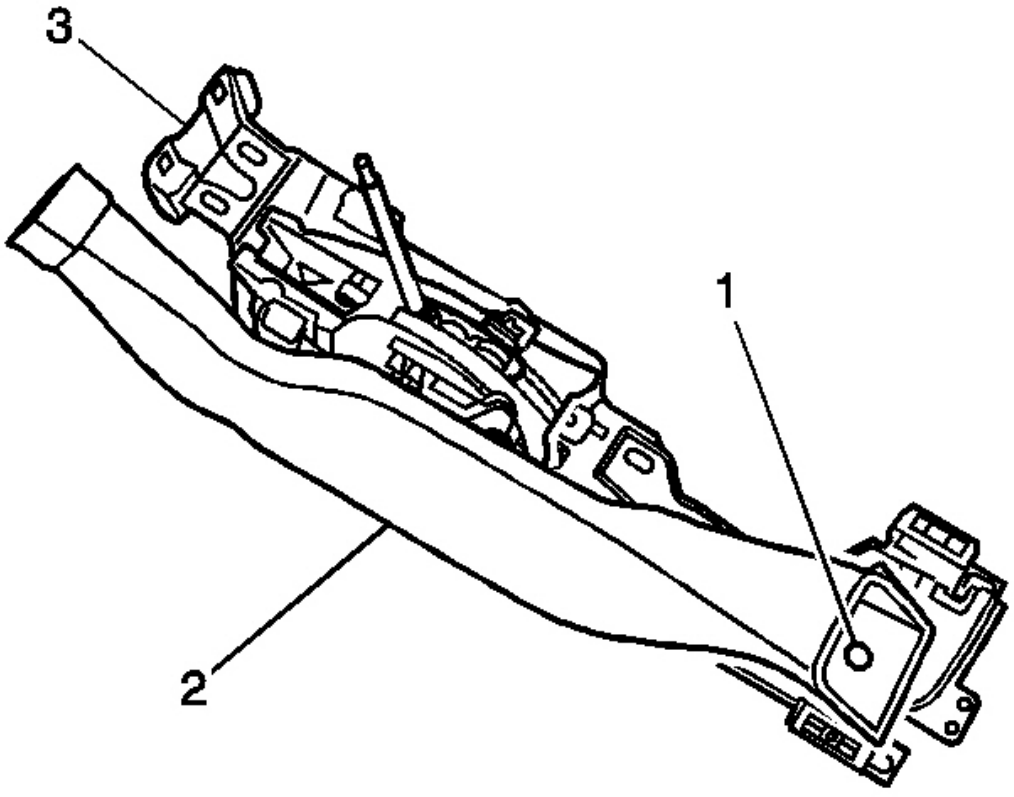


Fig. 98: Identifying Push Pin (Rear Floor)
Courtesy of GENERAL MOTORS CORP.

2. Install the push pin (1).
3. Install the console. Refer to **Console Replacement** in Instrument Panel, Gauges and Console.

AIR OUTLET DUCT REPLACEMENT - FLOOR, LH

Removal Procedure

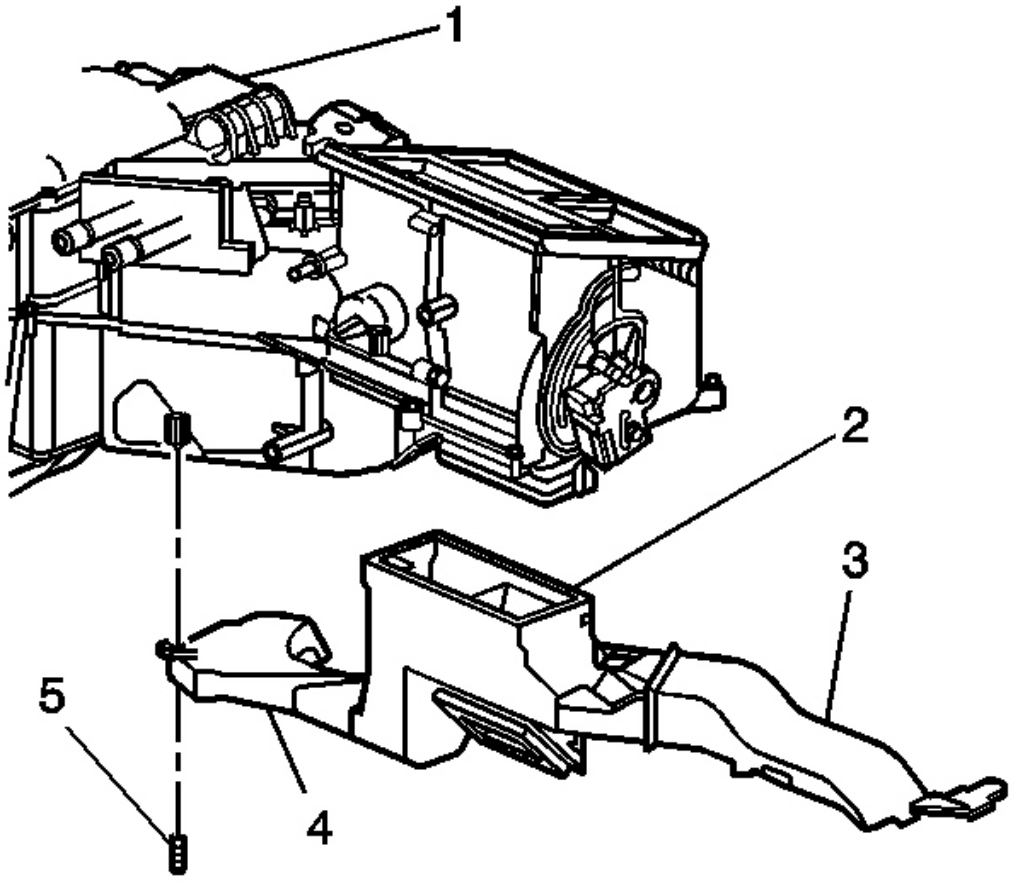


Fig. 99: Floor Air Outlet Duct (LH)
Courtesy of GENERAL MOTORS CORP.

1. Remove the push pin from the left floor air outlet duct (3).
2. Remove the left floor duct (3) from the HVAC module assembly (2).

Installation Procedure

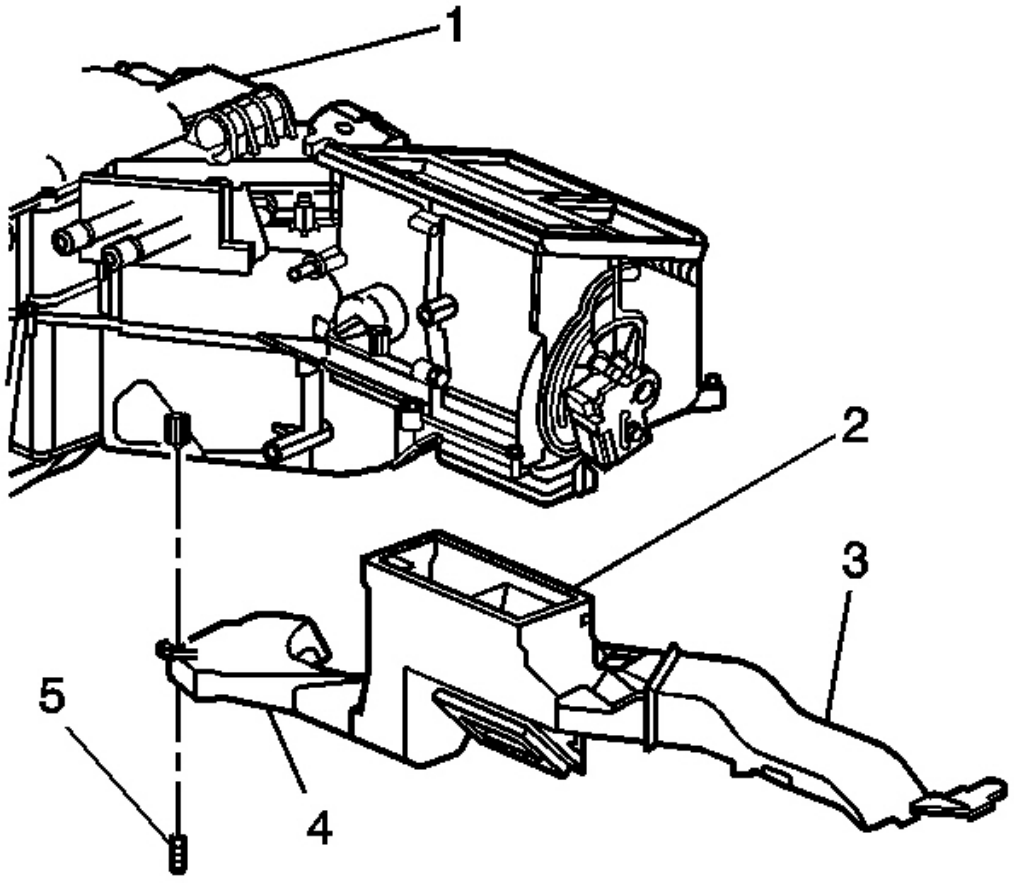


Fig. 100: Floor Air Outlet Duct (LH)
Courtesy of GENERAL MOTORS CORP.

1. Install the left floor air outlet duct (3) to the HVAC module assembly (2).
2. Install the push pin to the left floor air outlet duct (3).

AIR OUTLET DUCT REPLACEMENT - FLOOR, RH

Removal Procedure

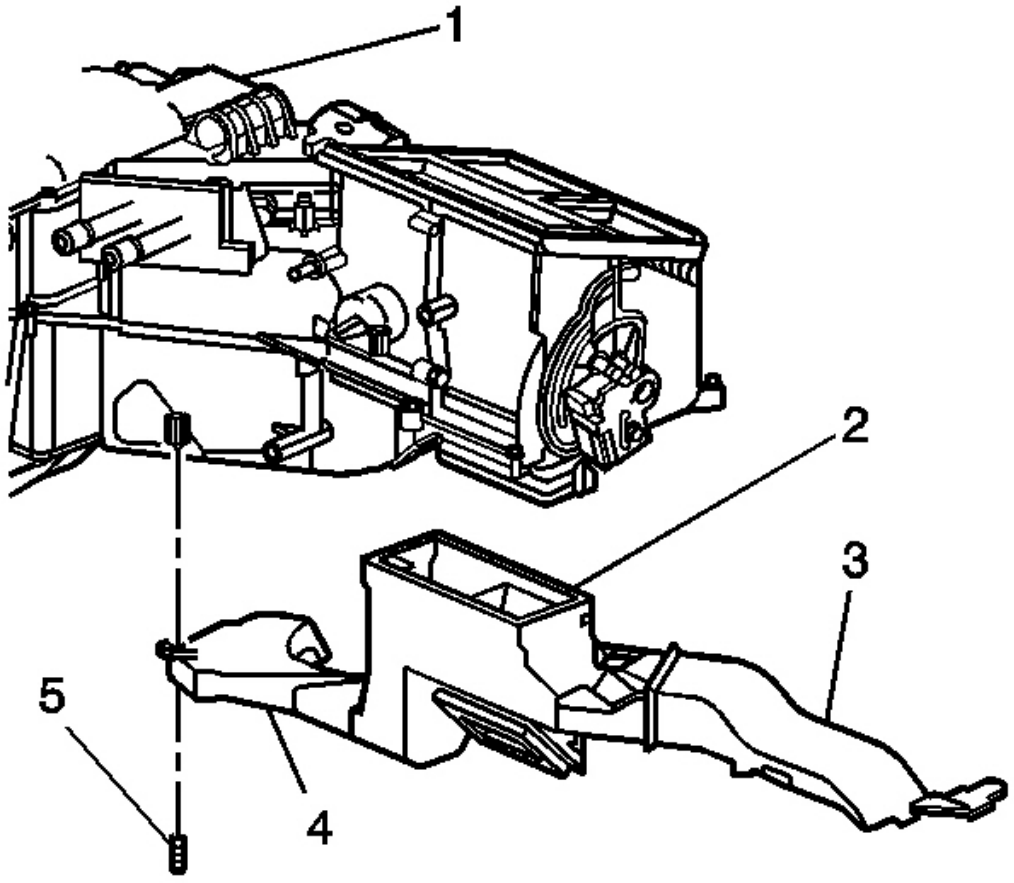


Fig. 101: Floor Air Outlet Duct (RH)
Courtesy of GENERAL MOTORS CORP.

1. Remove the right I/P insulator panel. Refer to **Insulator Replacement - Instrument Panel (I/P)** in Instrument Panel, Gauges, and Console.
2. Remove the screw (5) from the right floor air outlet duct (4).
3. Remove the right floor air outlet duct (4) from the HVAC module assembly (2).

Installation Procedure

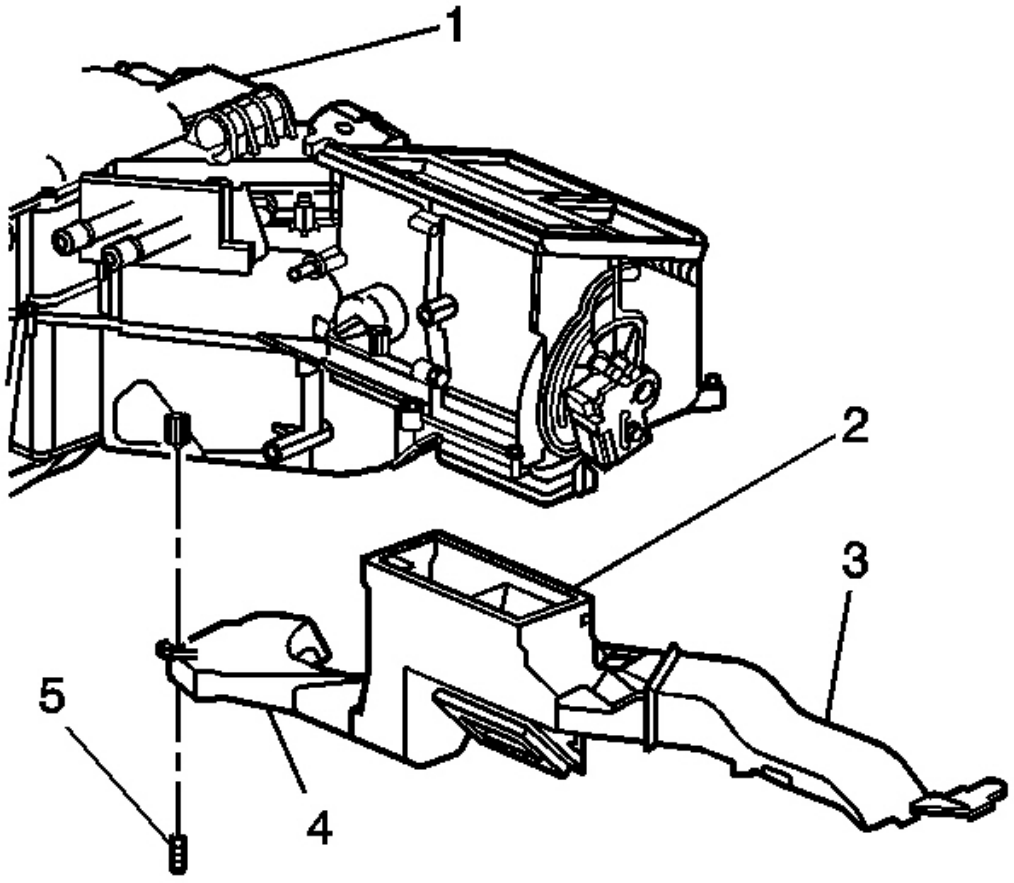


Fig. 102: Floor Air Outlet Duct (RH)
Courtesy of GENERAL MOTORS CORP.

1. Install the right floor air outlet duct (4) to the HVAC module assembly (2).

   NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the screw (5) to the right floor air outlet duct (4).

   Tighten: Tighten the screw to 1.6 N.m (14 lb in).

3. Install the right I/P insulator panel. Refer to **Insulator Replacement - Instrument Panel (I/P)** in Instrument Panel, Gauges, and Console.

AIR TEMPERATURE DOOR REPLACEMENT - RIGHT

Removal Procedure

1. Remove the HVAC module assembly. Refer to **HVAC Module Assembly Replacement** .

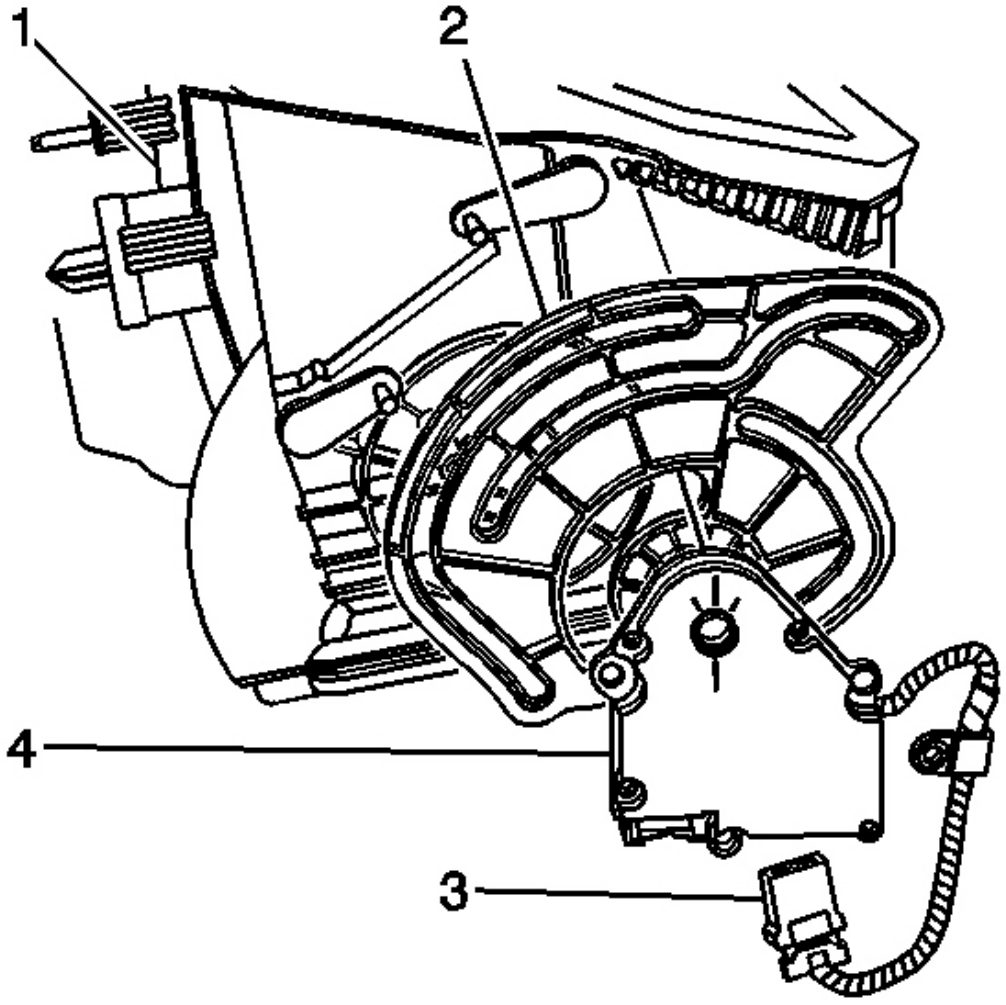


Fig. 103: Mode Actuator
Courtesy of GENERAL MOTORS CORP.

2. Disconnect the electrical connector (3) from the mode actuator (4).
3. Remove the screws from the mode actuator (4).
4. Remove the mode actuator (4) from the HVAC module assembly (1).
5. Remove the wiring harness from the air distribution housing (1).

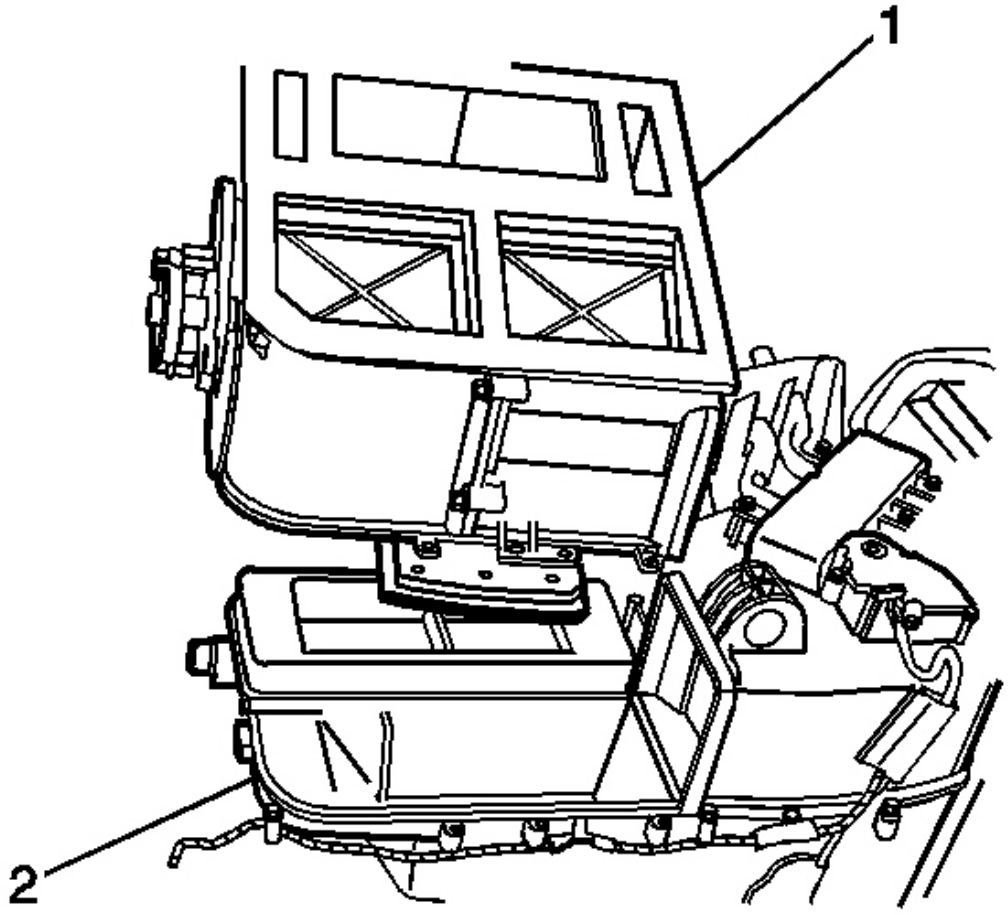


Fig. 104: Air Distribution Housing And HVAC Module Assembly
Courtesy of GENERAL MOTORS CORP.

6. Remove the screws from the air distribution housing (1).
7. Remove the air distribution housing (1) from the HVAC module assembly (2).

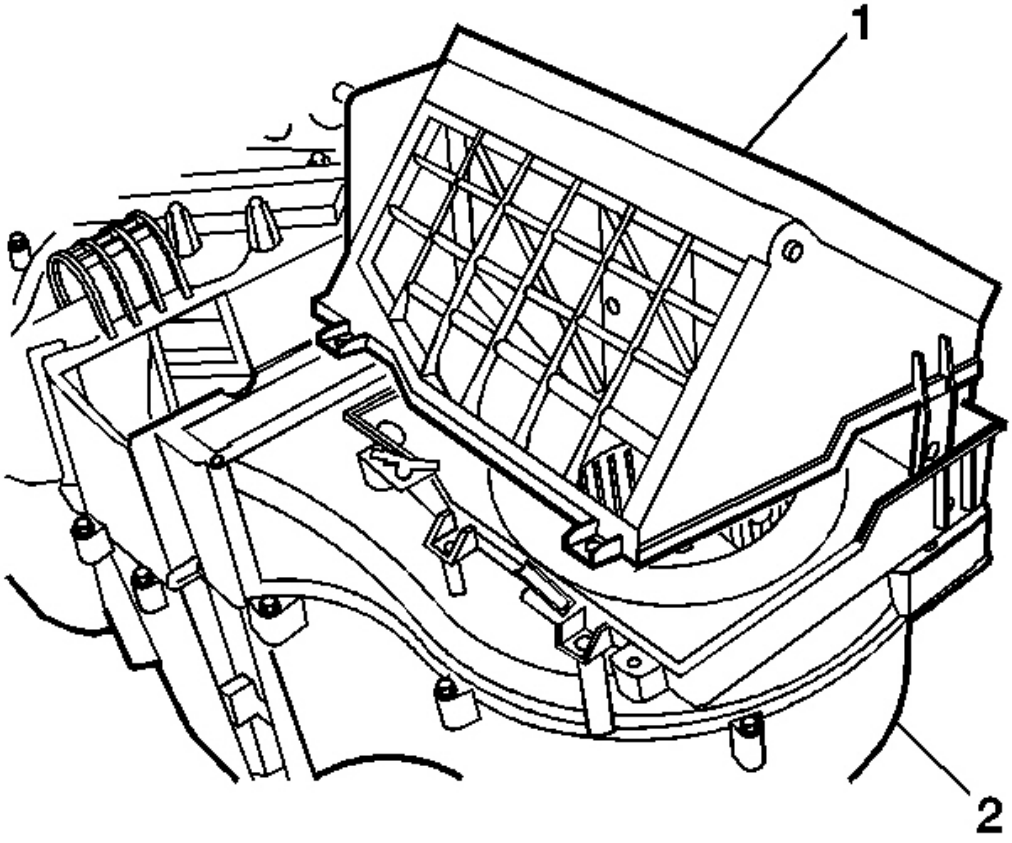


Fig. 105: Air Distribution Housing And HVAC Module
Courtesy of GENERAL MOTORS CORP.

8. Remove the screws from the upper recirulation housing (1).
9. Remove the upper recirulation housing (1) from the HVAC module assembly (2).

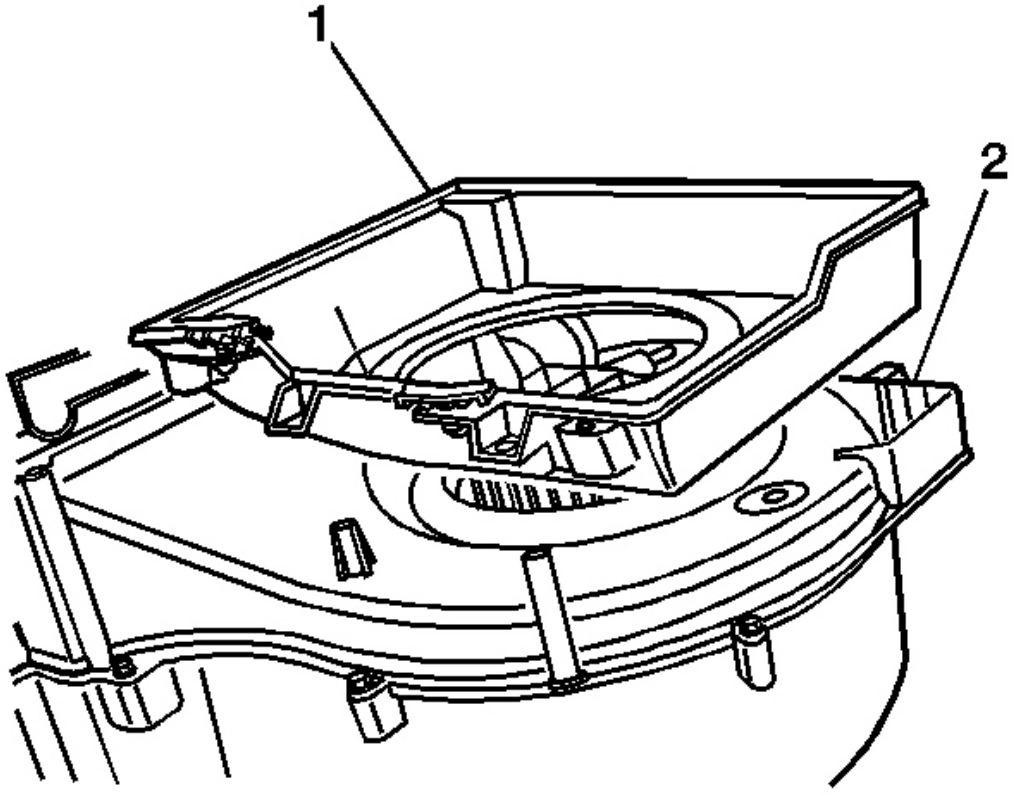


Fig. 106: Lower Recirulation Housing
Courtesy of GENERAL MOTORS CORP.

10. Remove the screws from the lower recirulation housing (1).
11. Remove the lower recirulation housing (1) from the HVAC module assembly (2).

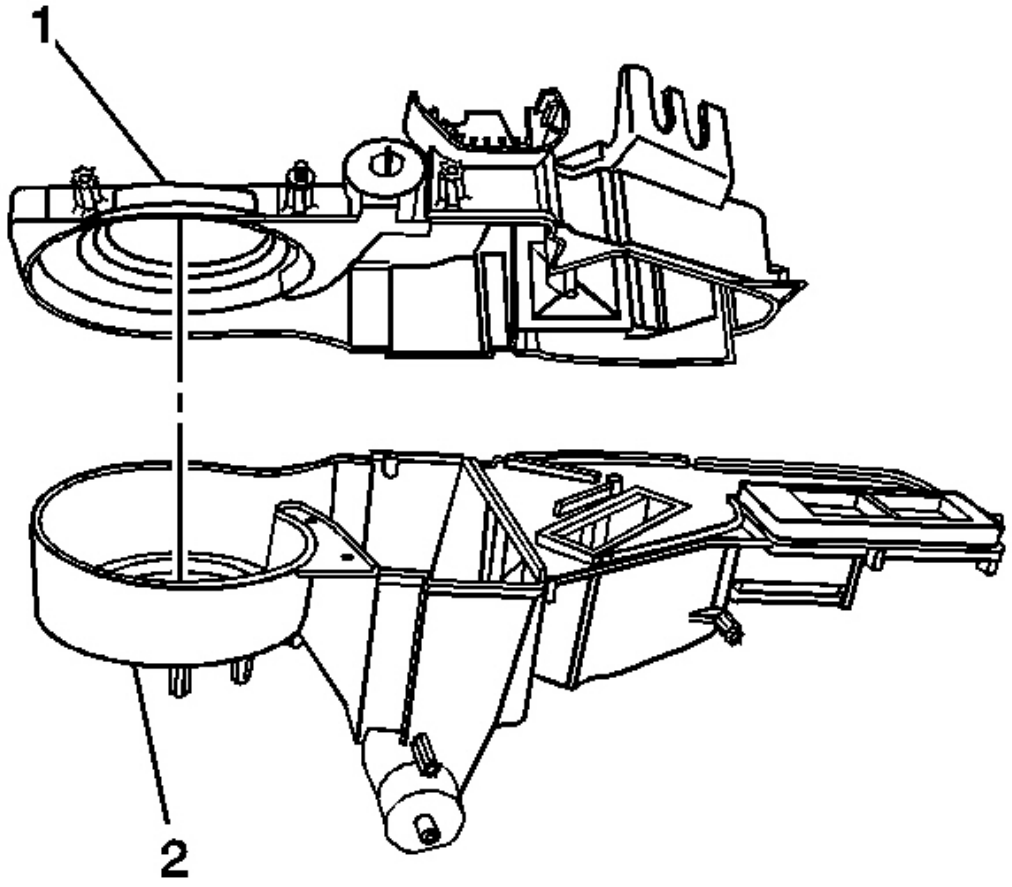


Fig. 107: Upper HVAC Module Case And Lower HVAC Module Case
Courtesy of GENERAL MOTORS CORP.

12. Remove the wiring harness from the HVAC module assembly.
13. Remove the screws from the HVAC module assembly.
14. Remove the upper HVAC module case (1) from the lower HVAC module case (2).

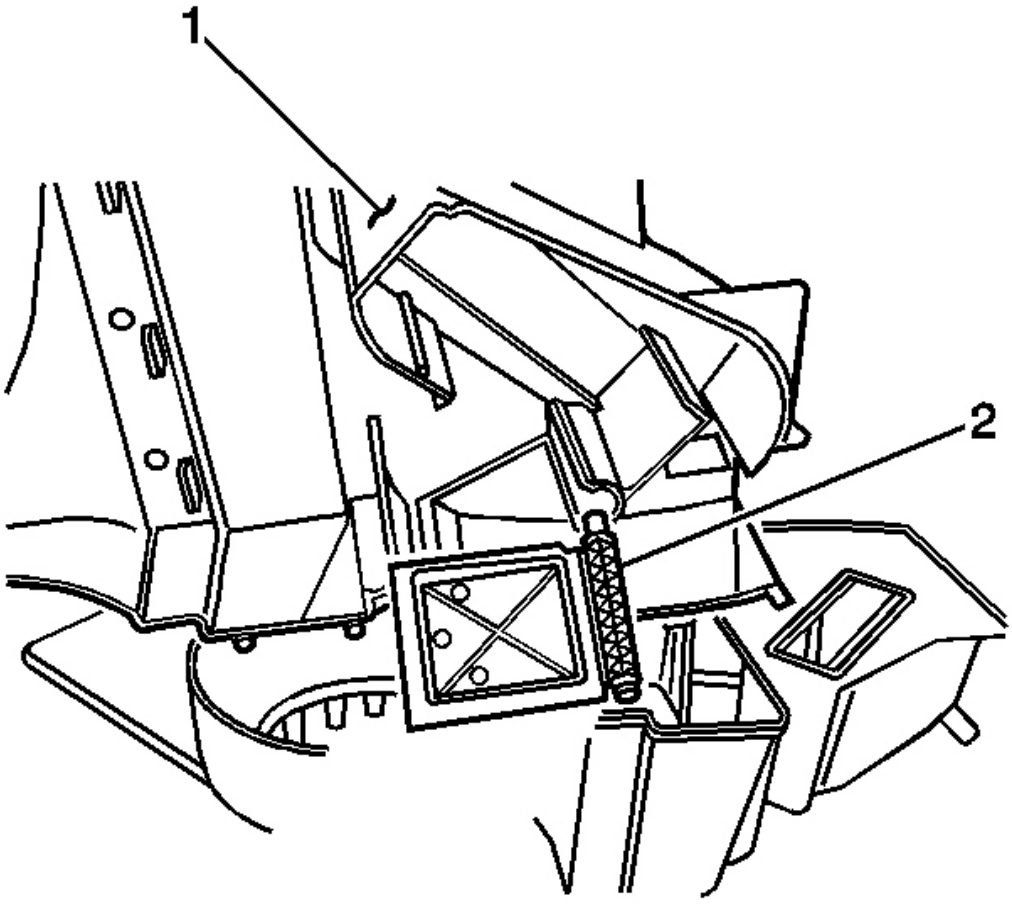


Fig. 108: Right Temperature Door & Upper HVAC Module Case
Courtesy of GENERAL MOTORS CORP.

15. Remove the right temperature door (2) to the upper HVAC module case (1).

Installation Procedure

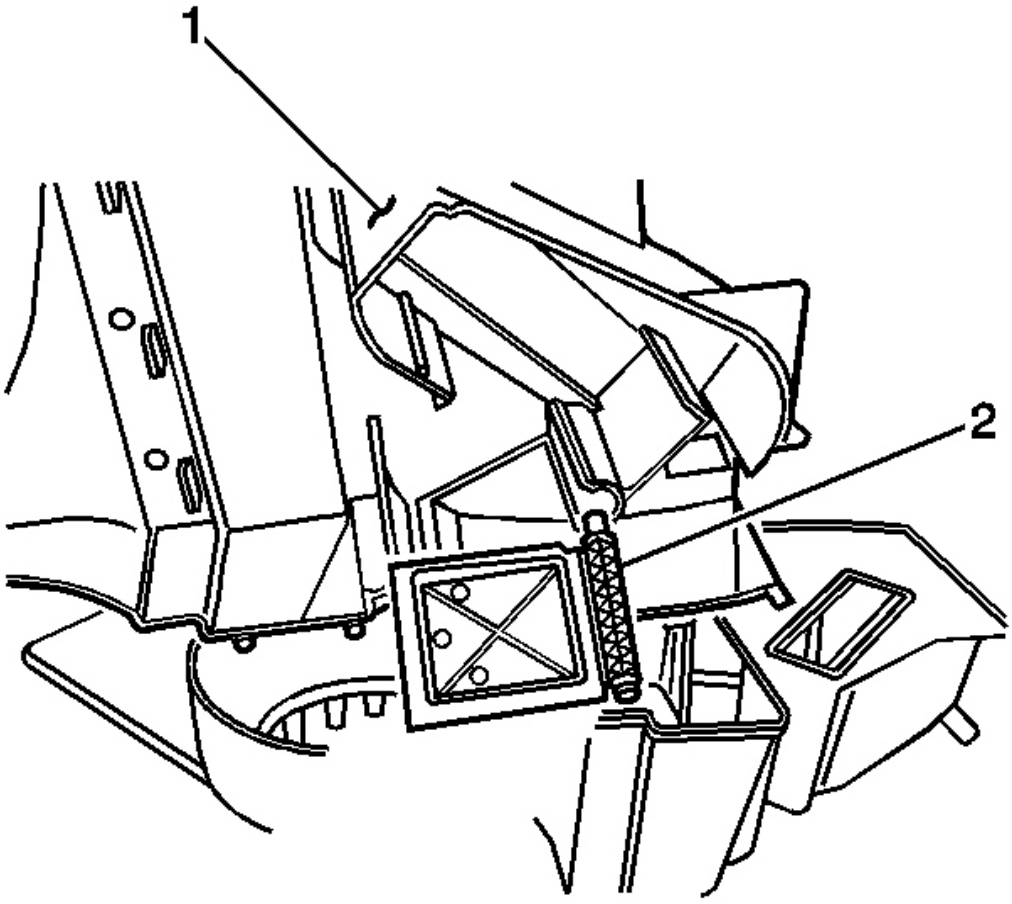


Fig. 109: Right Temperature Door & Upper HVAC Module Case
Courtesy of GENERAL MOTORS CORP.

1. Install the right temperature door (2) to the upper HVAC module case (1).
2. Install the upper HVAC module case (1) to the lower HVAC module case (2).

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Install the screws to the HVAC module assembly.

Tighten: Tighten the screws to 2 N.m (18 lb in).

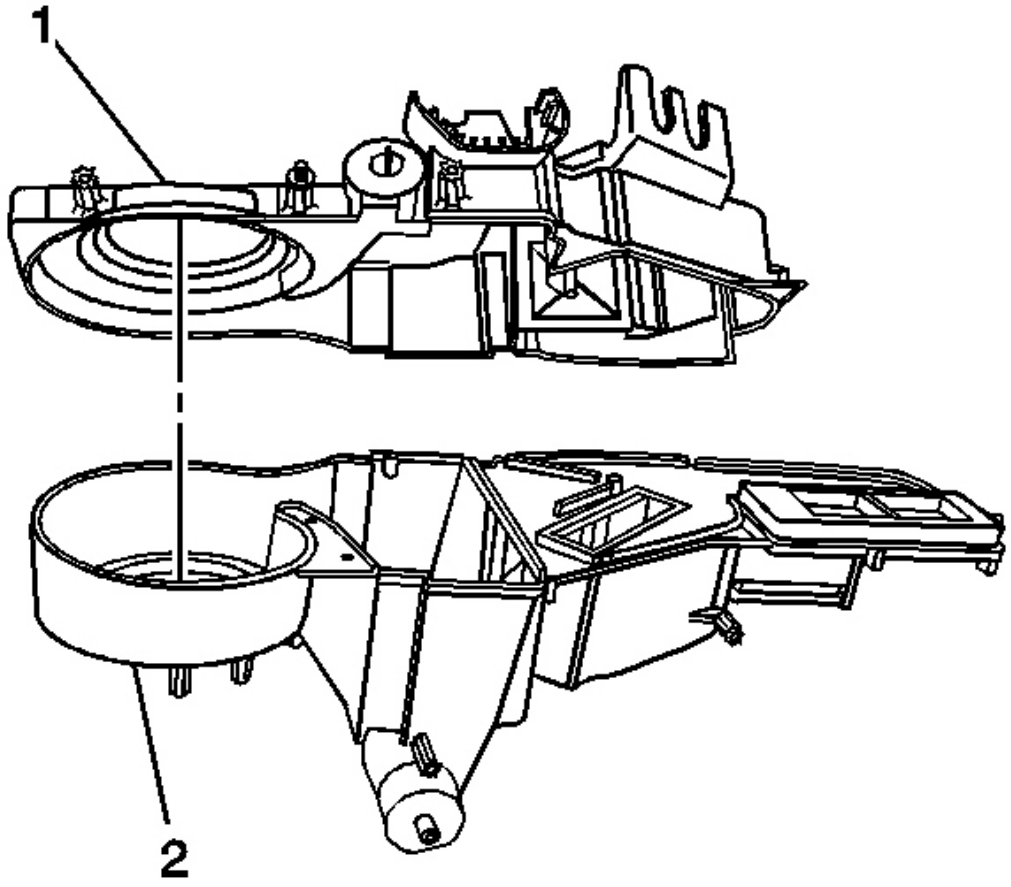


Fig. 110: Upper HVAC Module Case And Lower HVAC Module Case
Courtesy of GENERAL MOTORS CORP.

4. Install the wiring harness to the HVAC module assembly.
5. Install the lower recirulation housing (1) to the HVAC module assembly (2).

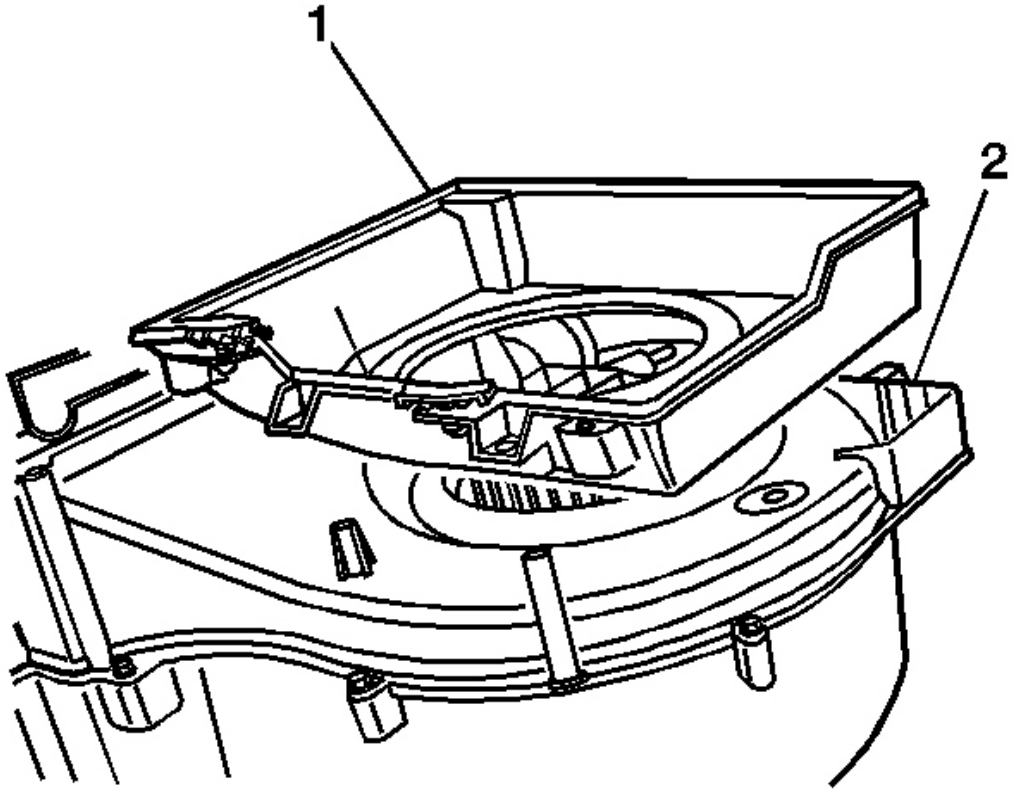


Fig. 111: Lower Recirulation Housing
Courtesy of GENERAL MOTORS CORP.

6. Install the screws to the lower recirulation housing (1).

   Tighten: Tighten the screws to 2 N.m (18 lb in).

7. Install the upper recirulation housing (1) to the HVAC module assembly (2).

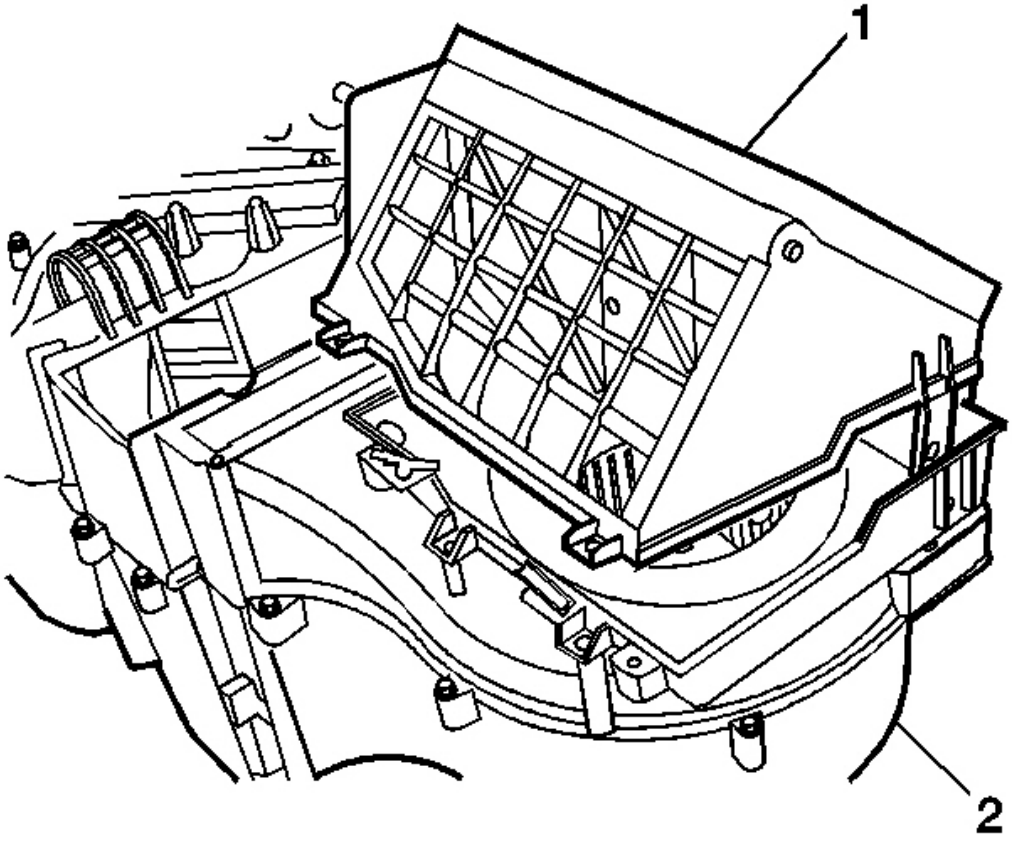


Fig. 112: Air Distribution Housing And HVAC Module
Courtesy of GENERAL MOTORS CORP.

8. Install the screws to the upper recirulation housing (1).

   Tighten: Tighten the screws to 2 N.m (18 lb in).

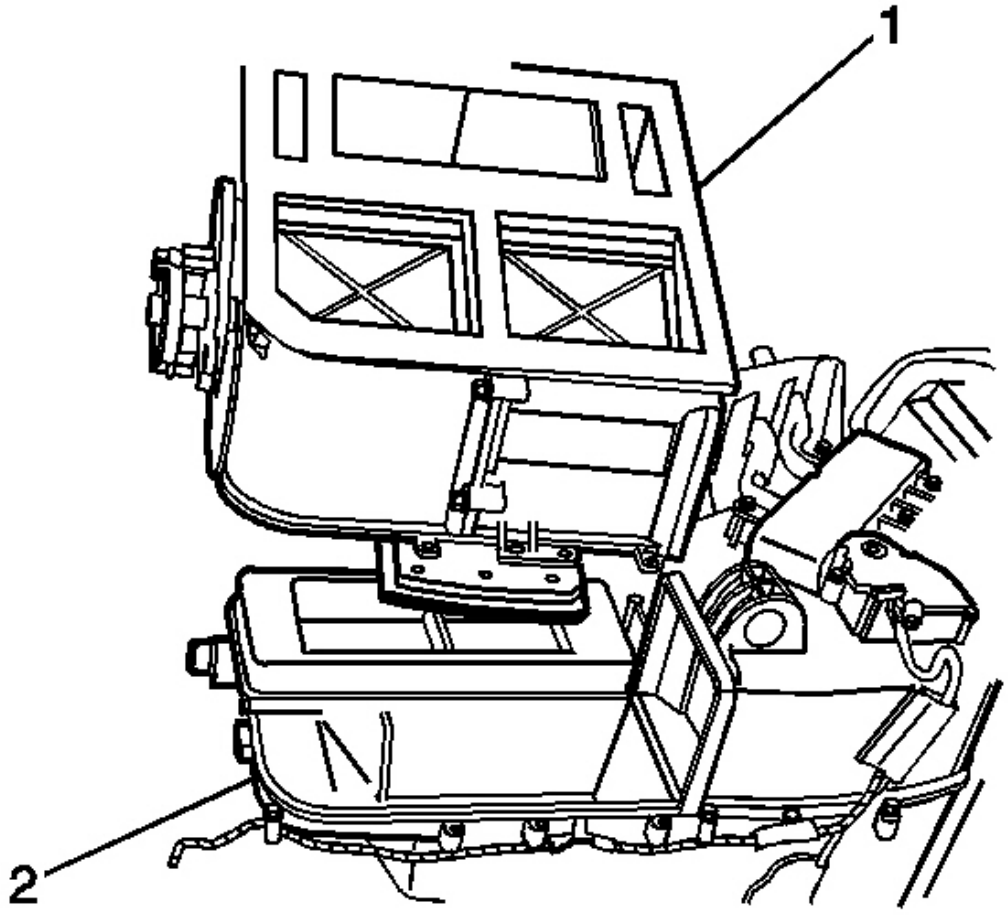


Fig. 113: Air Distribution Housing And HVAC Module Assembly
Courtesy of GENERAL MOTORS CORP.

9. Install the air distribution housing (1) to the HVAC module assembly (2).
10. Install the screws to the air distribution housing (1).

    Tighten: Tighten the screws to 2 N.m (18 lb in).

11. Install the wiring harness to the air distribution housing (1).
12. Install the mode actuator (4) to the HVAC module assembly (1).
13. Install the screws to the mode actuator (4).

    Tighten: Tighten the screws to 2 N.m (18 lb in).

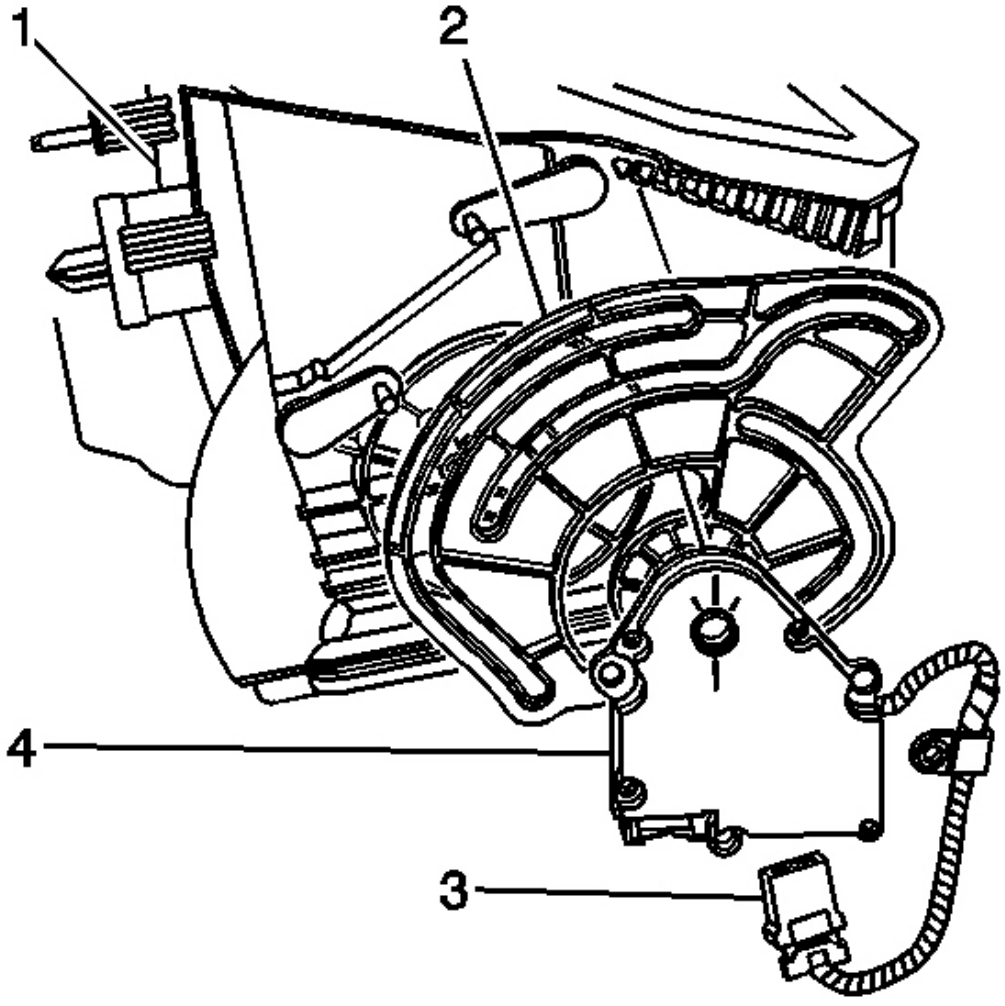


Fig. 114: Mode Actuator
Courtesy of GENERAL MOTORS CORP.

14. Connect the electrical connector (3) to the mode actuator (4).
15. Install the HVAC module assembly. Refer to **HVAC Module Assembly Replacement** .

AIR TEMPERATURE DOOR REPLACEMENT - LEFT

Removal Procedure

1. Remove the HVAC module assembly. Refer to **HVAC Module Assembly Replacement** .

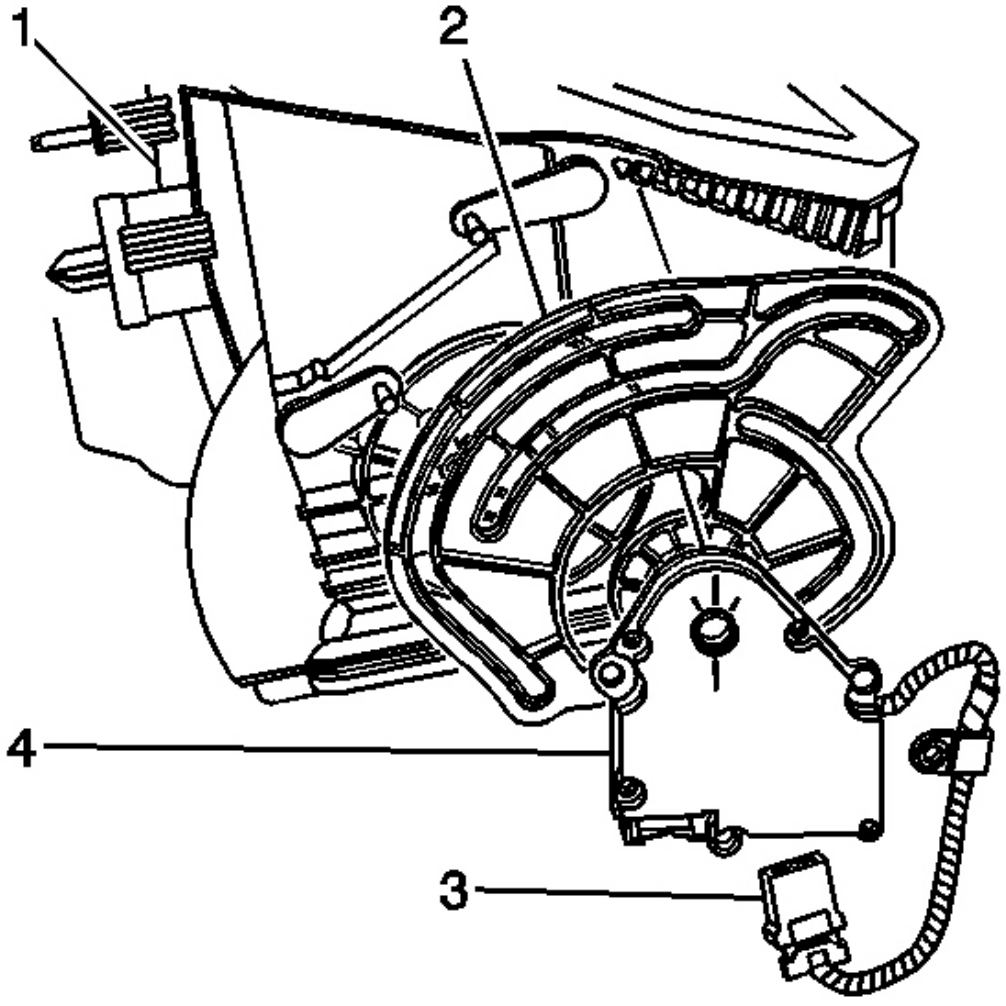


Fig. 115: Mode Actuator
Courtesy of GENERAL MOTORS CORP.

2. Disconnect the electrical connector (3) from the mode actuator (4).
3. Remove the screws from the mode actuator (4).
4. Remove the mode actuator (4) from the HVAC module assembly (1).
5. Remove the wiring harness from the air distribution housing (1).

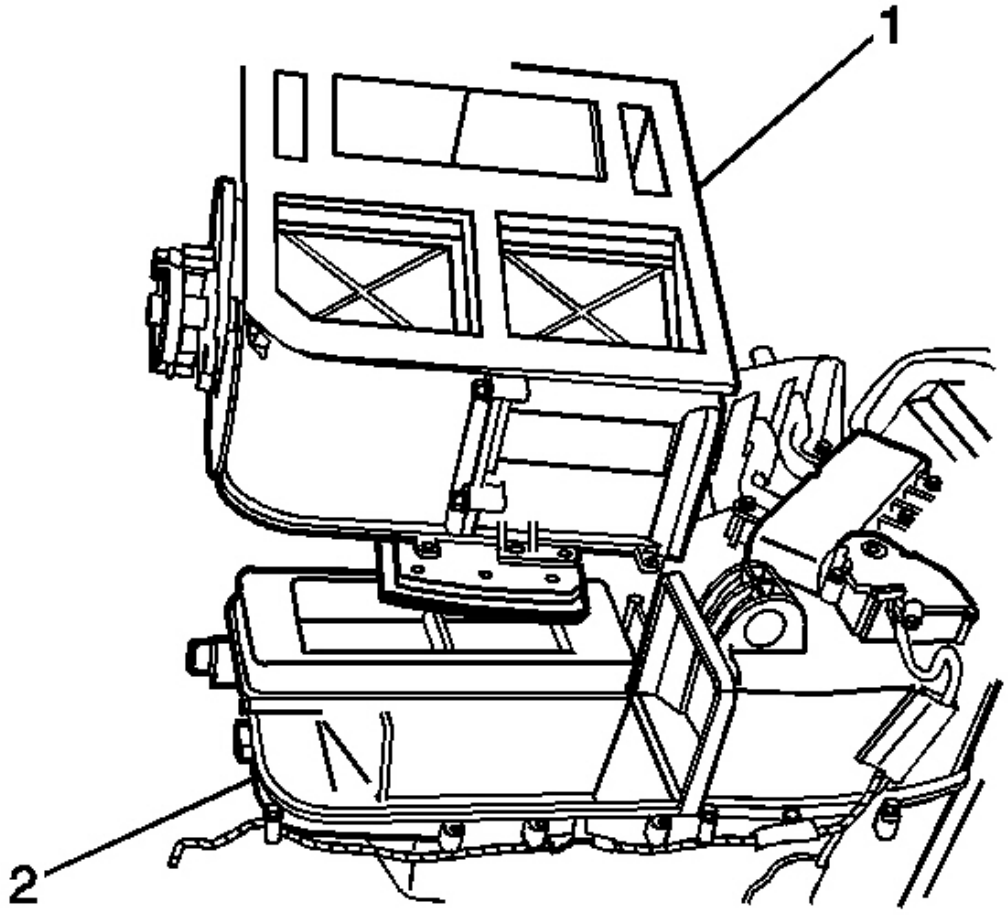


Fig. 116: Air Distribution Housing And HVAC Module Assembly
Courtesy of GENERAL MOTORS CORP.

6. Remove the screws from the air distribution housing (1).
7. Remove the air distribution housing (1) from the HVAC module assembly (2).

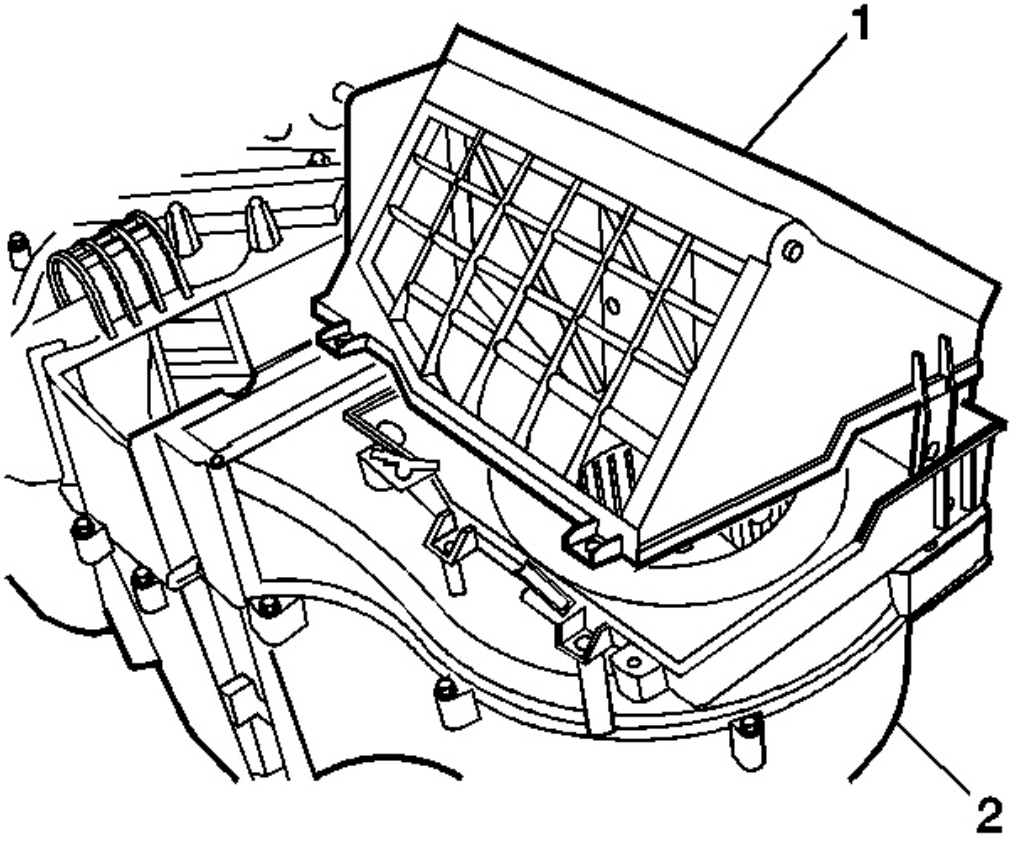


Fig. 117: Air Distribution Housing And HVAC Module
Courtesy of GENERAL MOTORS CORP.

8. Remove the screws from the upper recirulation housing (1).
9. Remove the upper recirulation housing (1) from the HVAC module assembly (2).

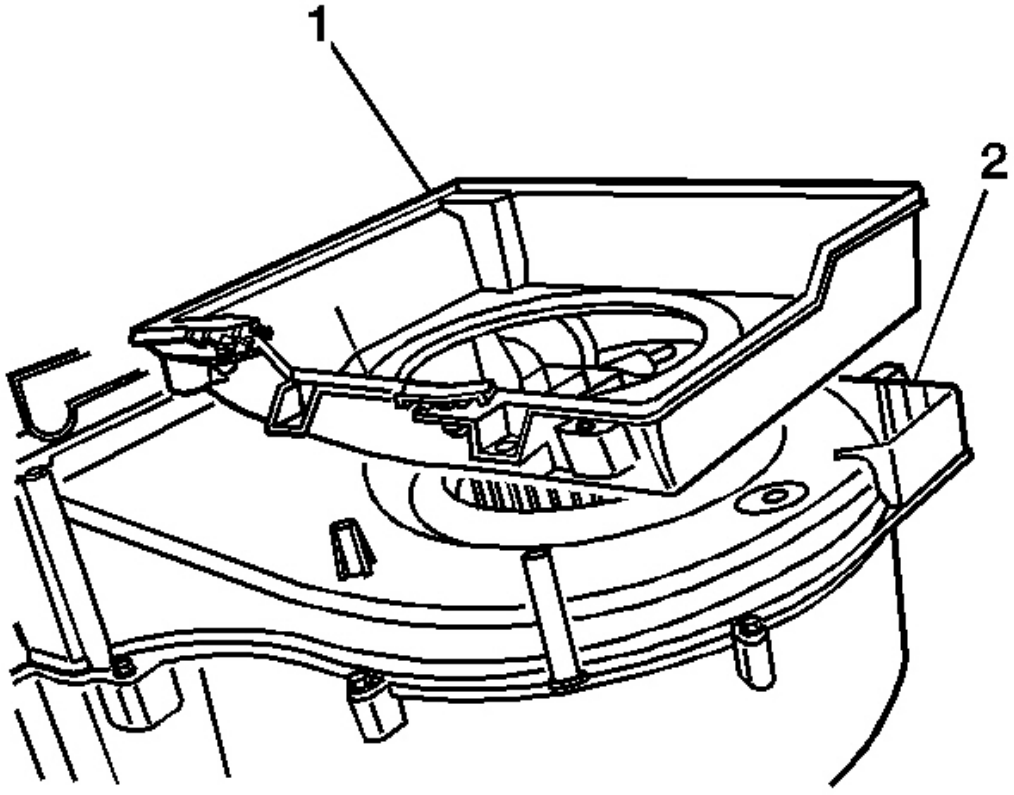


Fig. 118: Lower Recirulation Housing
Courtesy of GENERAL MOTORS CORP.

10. Remove the screws from the lower recirulation housing (1).
11. Remove the lower recirulation housing (1) from the HVAC module assembly (2).

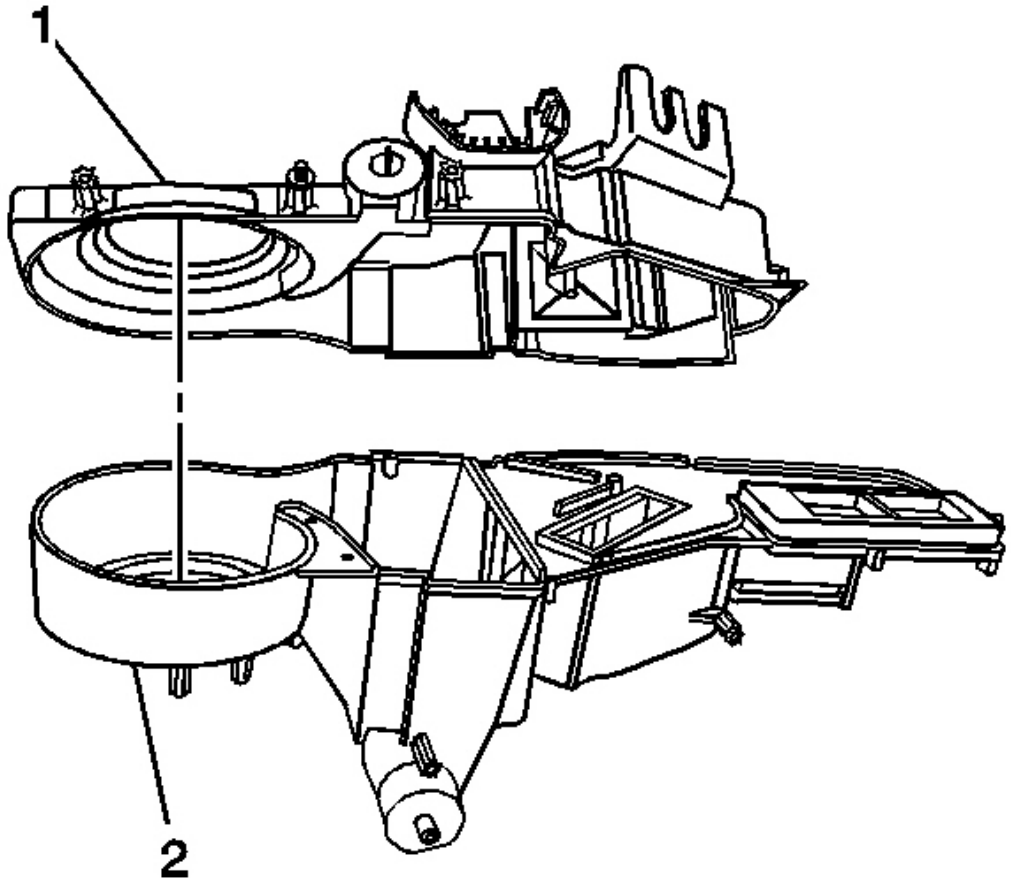


Fig. 119: Upper HVAC Module Case And Lower HVAC Module Case
Courtesy of GENERAL MOTORS CORP.

12. Remove the wiring harness from the HVAC module assembly.
13. Remove the screws from the HVAC module assembly.
14. Remove the upper HVAC module case (1) from the lower HVAC module case (2).

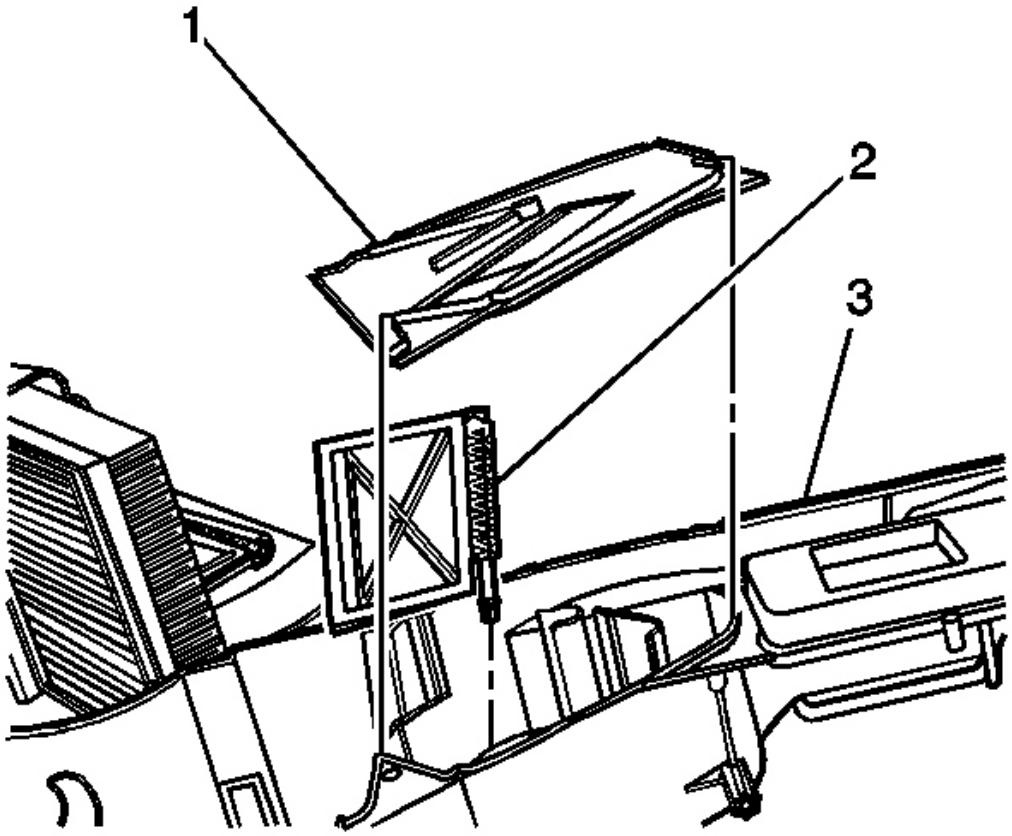


Fig. 120: Left Temperature Door & Lower HVAC Module Case
Courtesy of GENERAL MOTORS CORP.

15. Remove the HVAC module chamber plate (1) from the lower HVAC module case (3).
16. Remove the left temperature door (2) from the lower HVAC module case (3).

Installation Procedure

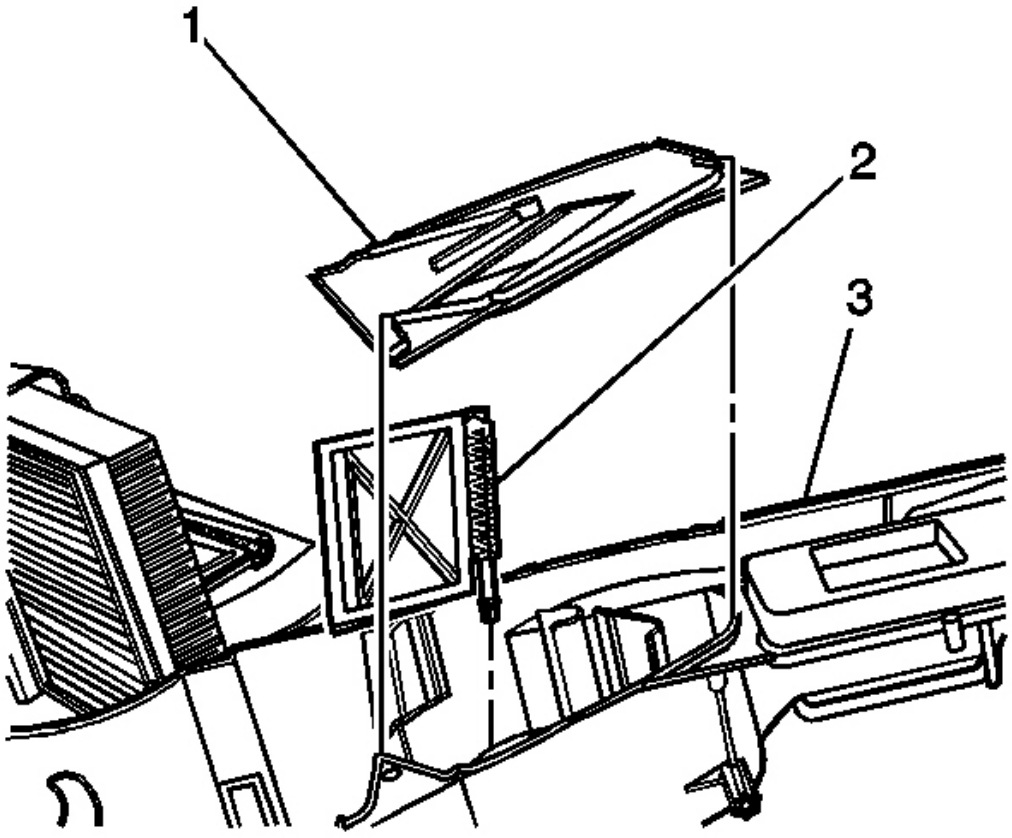


Fig. 121: Left Temperature Door & Lower HVAC Module Case
Courtesy of GENERAL MOTORS CORP.

1. Install the left temperature door (2) to the lower HVAC module case (3).
2. Install the HVAC module chamber plate (1) to the lower HVAC module case (3).
3. Install the upper HVAC module case (1) to the lower HVAC module case (2).

NOTE: Refer to Fastener Notice in Cautions and Notices.

4. Install the screws to the HVAC module assembly.

   Tighten: Tighten the screws to 2 N.m (18 lb in).

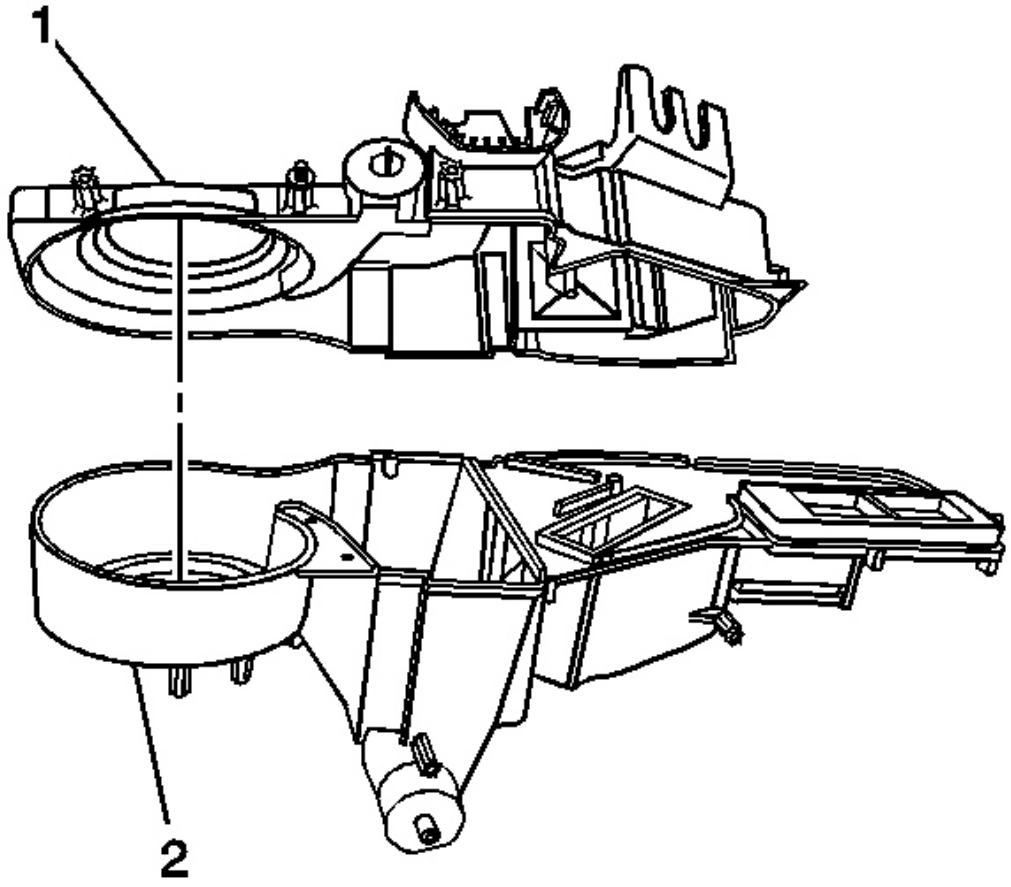


Fig. 122: Upper HVAC Module Case And Lower HVAC Module Case
Courtesy of GENERAL MOTORS CORP.

5. Install the wiring harness to the HVAC module.
6. Install the lower recirulation housing (1) to the HVAC module assembly (2).

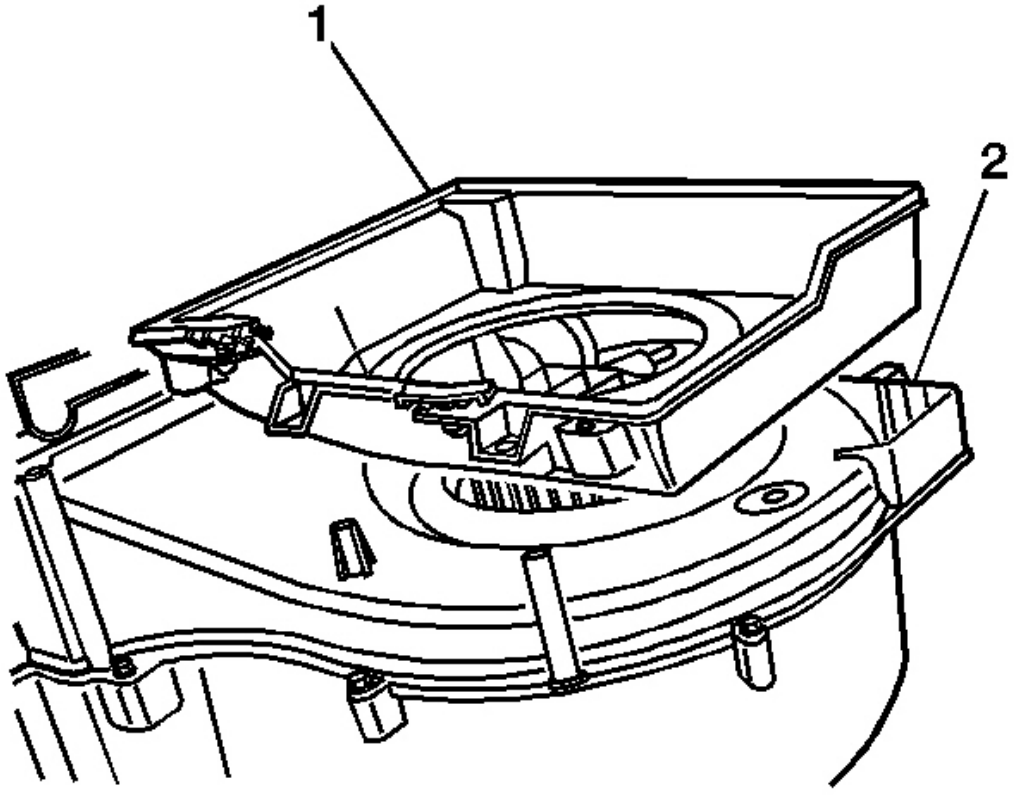


Fig. 123: Lower Recirulation Housing
Courtesy of GENERAL MOTORS CORP.

7. Install the screws to the lower recirulation housing (1).

   Tighten: Tighten the screws to 2 N.m (18 lb in).

8. Install the upper recirulation housing (1) to the HVAC module assembly (2).

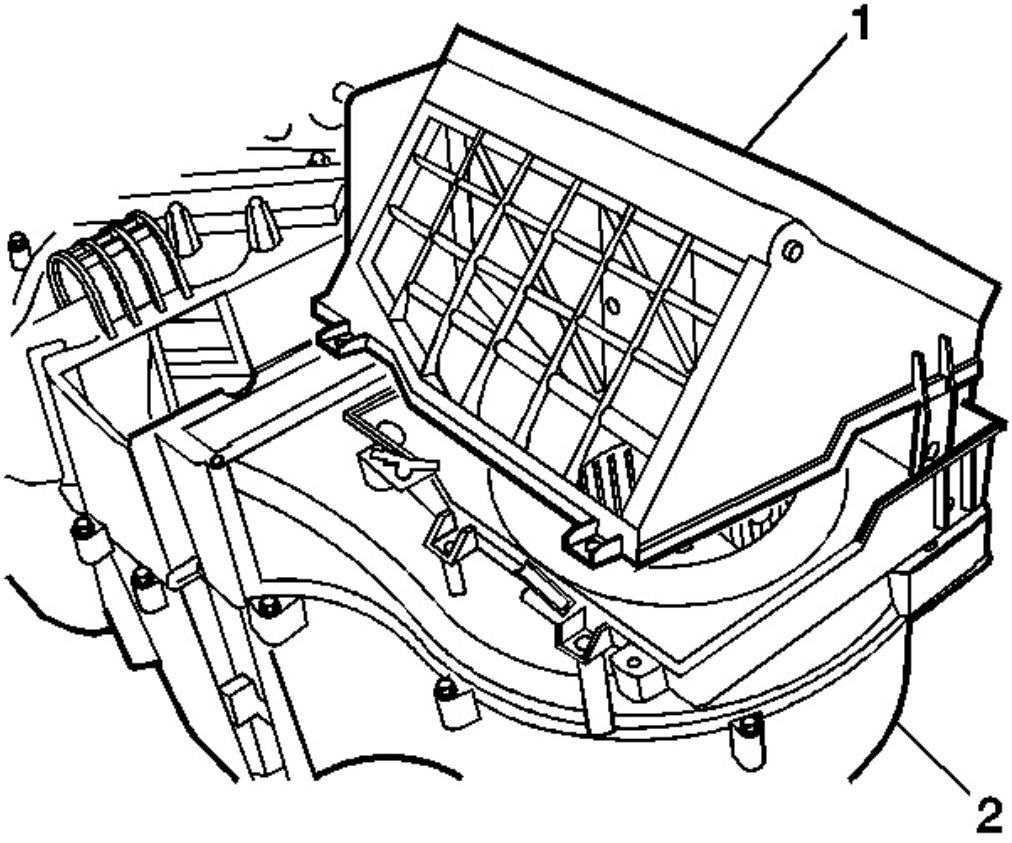


Fig. 124: Air Distribution Housing And HVAC Module
Courtesy of GENERAL MOTORS CORP.

9. Install the screws to the upper recirulation housing (1).

   Tighten: Tighten the screws to 2 N.m (18 lb in).

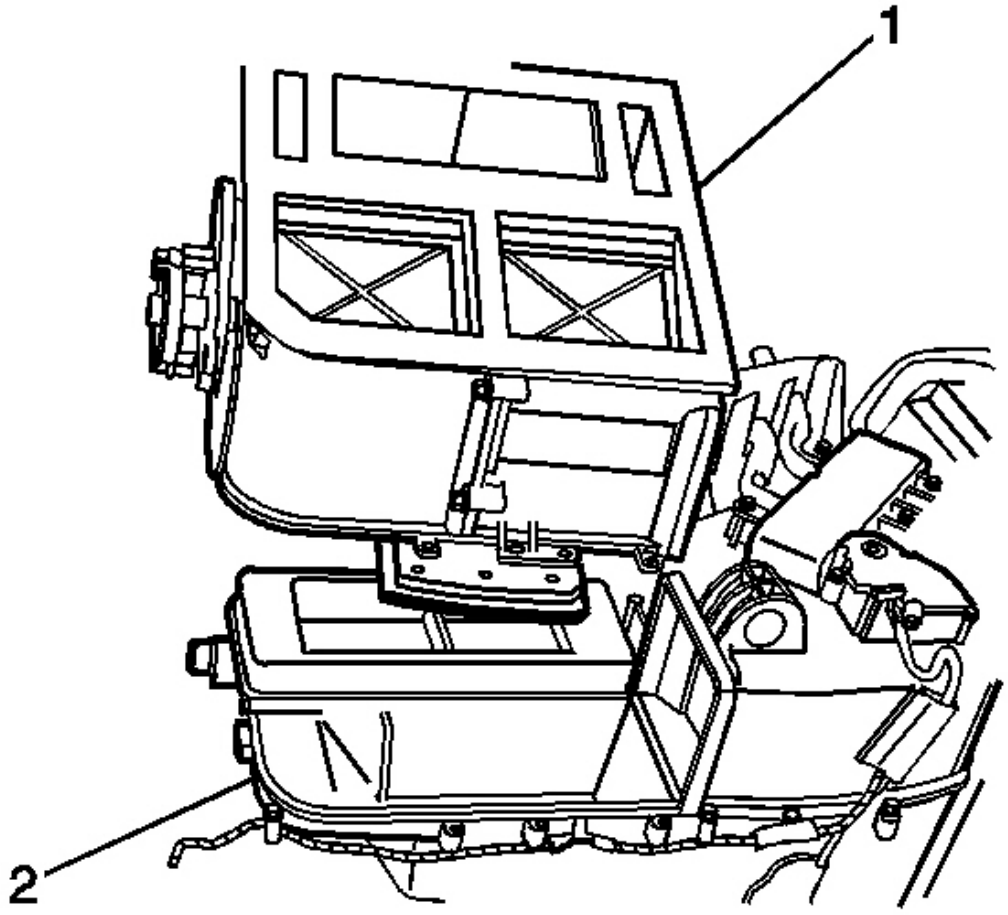


Fig. 125: Air Distribution Housing And HVAC Module Assembly
Courtesy of GENERAL MOTORS CORP.

10. Install the air distribution housing (1) to the HVAC module assembly (2).
11. Install the screws to the air distribution housing (1).

    Tighten: Tighten the screws to 2 N.m (18 lb in).

12. Install the wiring harness to the air distribution housing (1).
13. Install the mode actuator (4) to the HVAC module assembly (1).
14. Install the screws to the mode actuator (4).

    Tighten: Tighten the screws to 2 N.m (18 lb in).

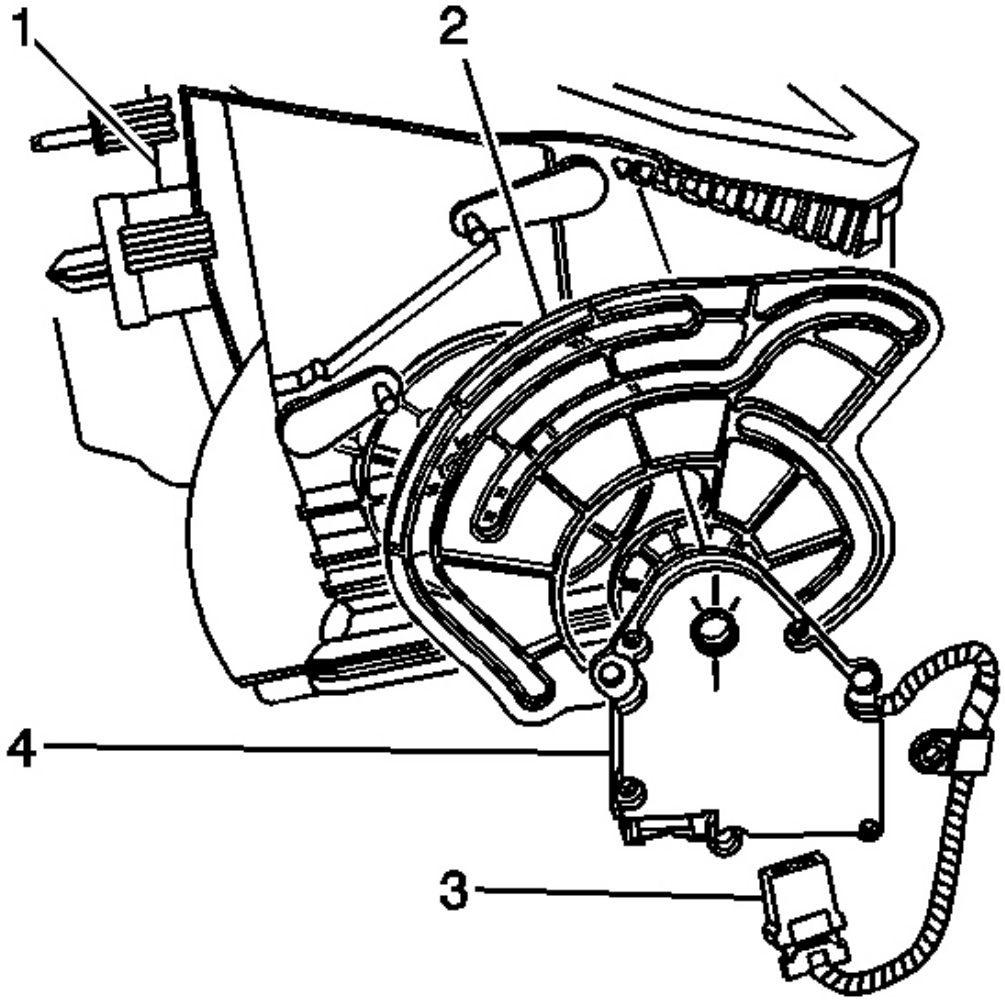


Fig. 126: Mode Actuator
Courtesy of GENERAL MOTORS CORP.

15. Connect the electrical connector (3) to the mode actuator (4).
16. Install the HVAC module assembly. Refer to **HVAC Module Assembly Replacement** .

MODE DOOR REPLACEMENT - LOWER

Removal Procedure

1. Remove the HVAC module assembly. Refer to **HVAC Module Assembly Replacement** .

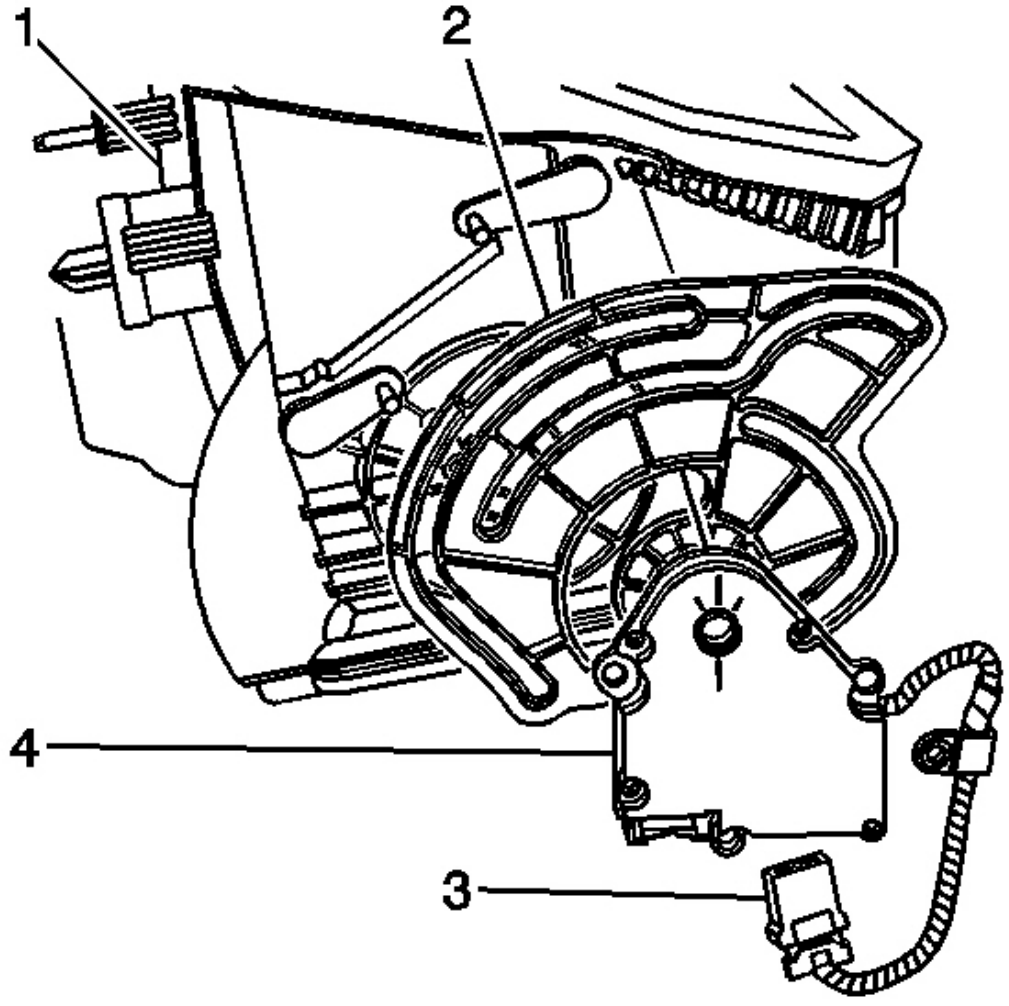


Fig. 127: Mode Actuator
Courtesy of GENERAL MOTORS CORP.

2. Disconnect the electrical connector (3) from the mode actuator (4).
3. Remove the screws from the mode actuator (4).
4. Remove the mode actuator (4) from the HVAC module assembly (1).
5. Remove the wiring harness from the air distribution housing (1).

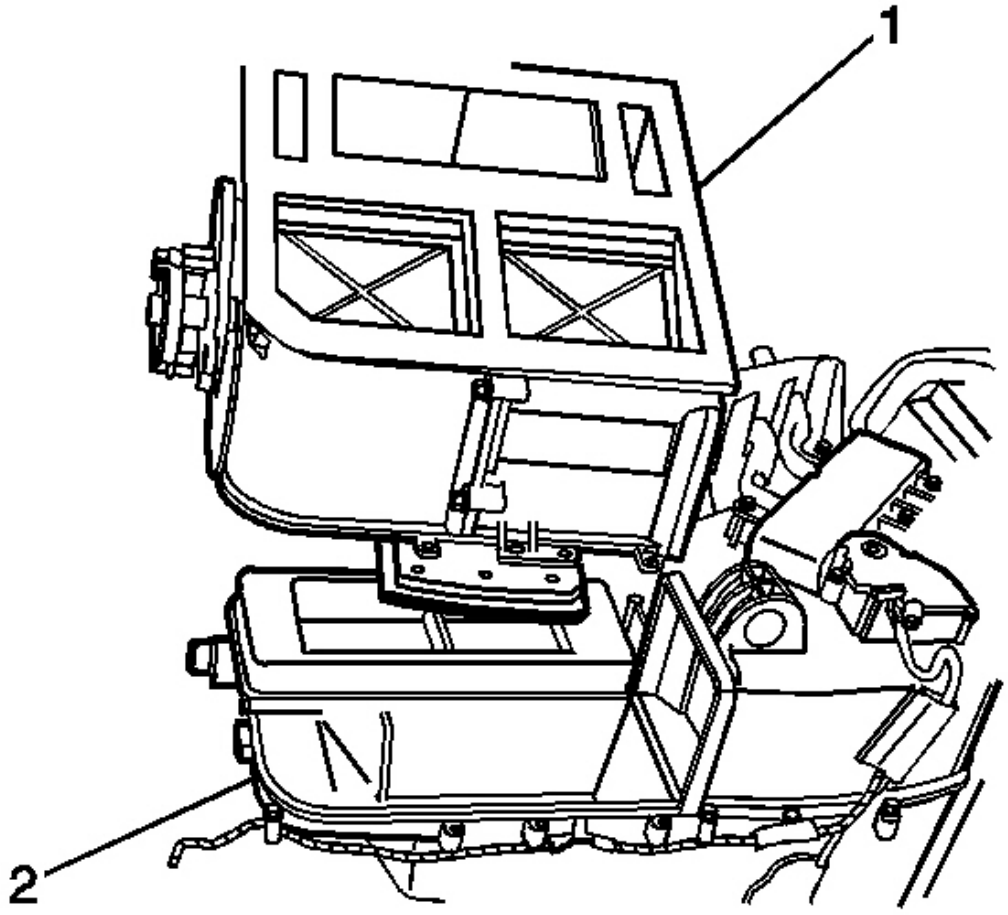


Fig. 128: Air Distribution Housing And HVAC Module Assembly
Courtesy of GENERAL MOTORS CORP.

6. Remove the screws from the air distribution housing (1).
7. Remove the air distribution housing (1) from the HVAC module assembly (2).

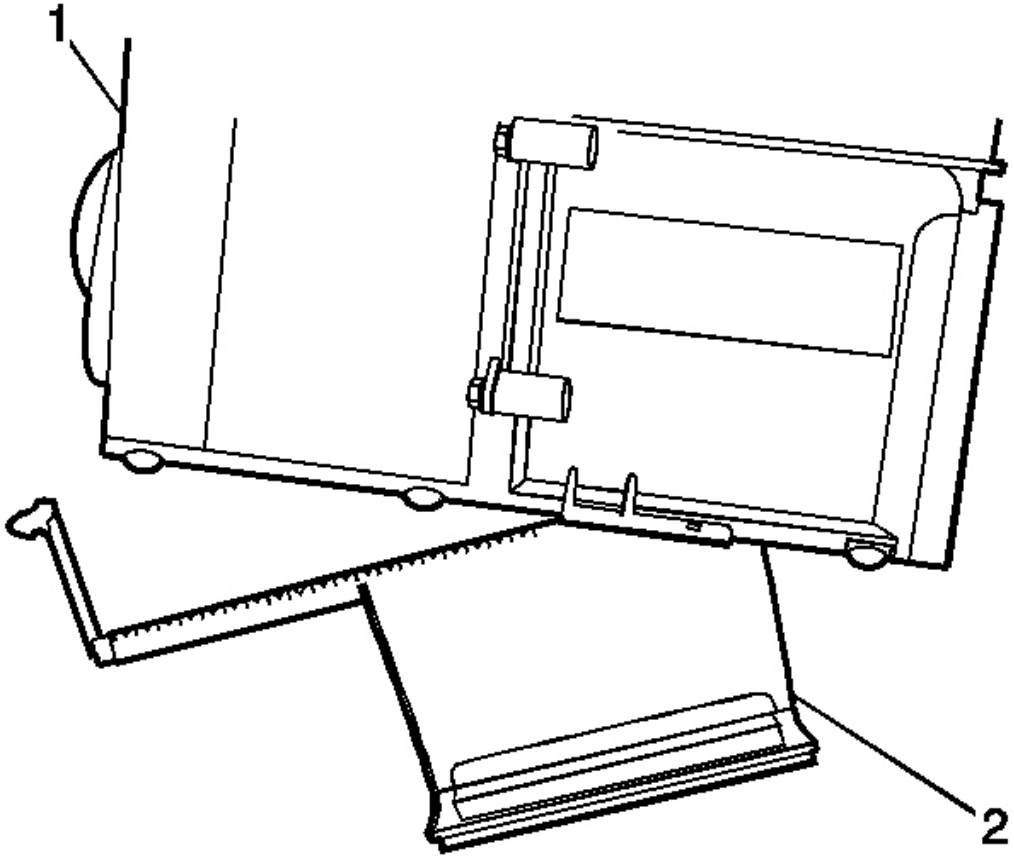


Fig. 129: Lower Mode Door & Air Distribution Housing
Courtesy of GENERAL MOTORS CORP.

8. Remove the mode door (2) from the air distribution housing (1).

Installation Procedure

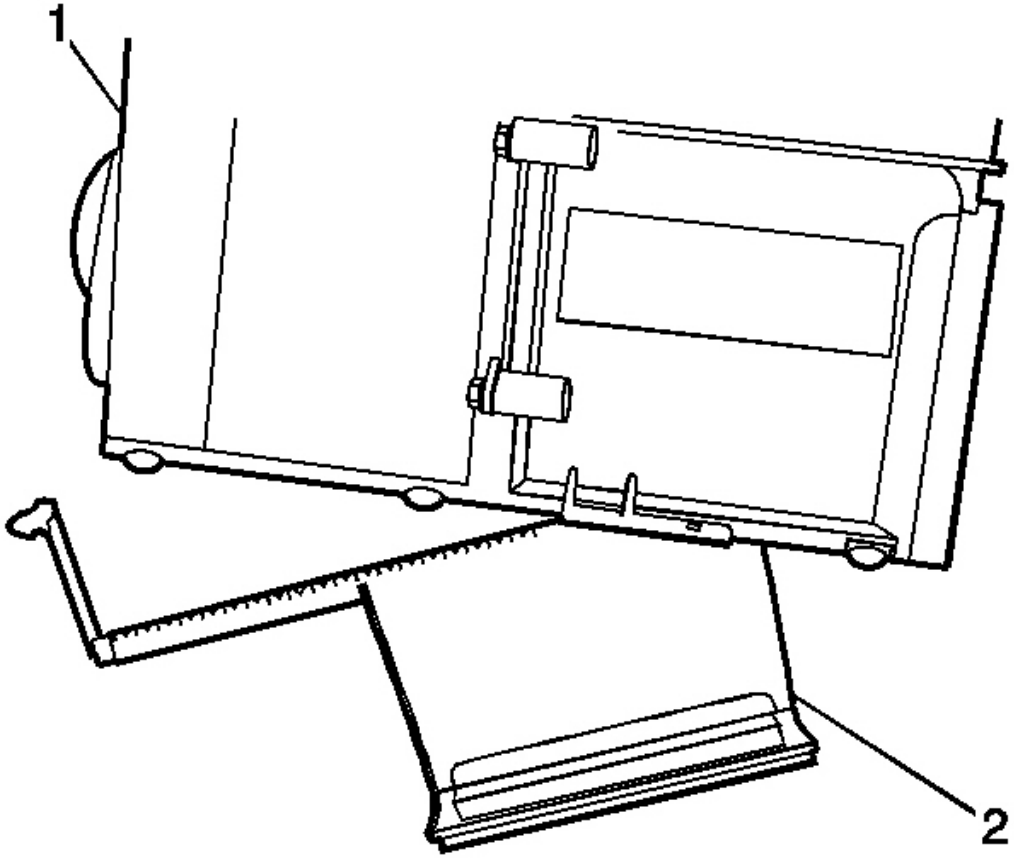


Fig. 130: Lower Mode Door & Air Distribution Housing
Courtesy of GENERAL MOTORS CORP.

1. Install the mode door (1) to the air distribution housing (1).

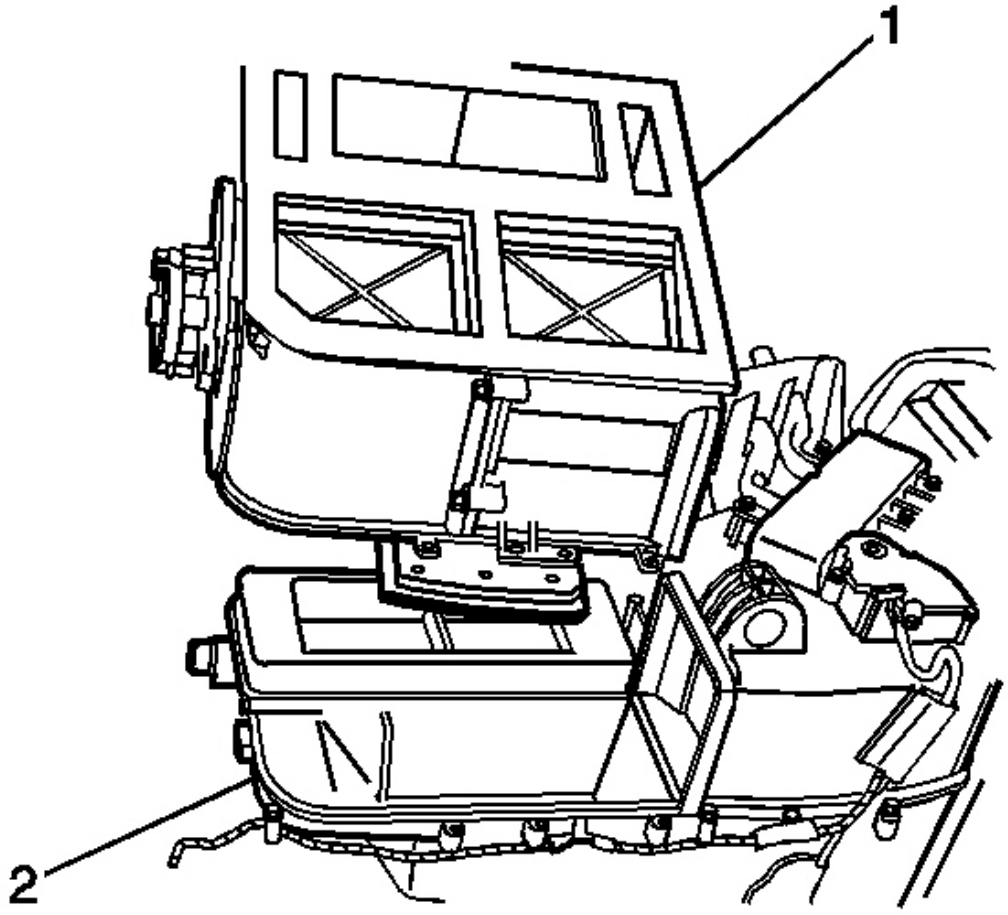


Fig. 131: Air Distribution Housing And HVAC Module Assembly
Courtesy of GENERAL MOTORS CORP.

2. Install the air distribution housing (1) to the HVAC module assembly (2).

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Install the screws to the air distribution housing (1).

Tighten: Tighten the screws to 2 N.m (18 lb in).

4. Install the wiring harness to the air distribution housing (1).

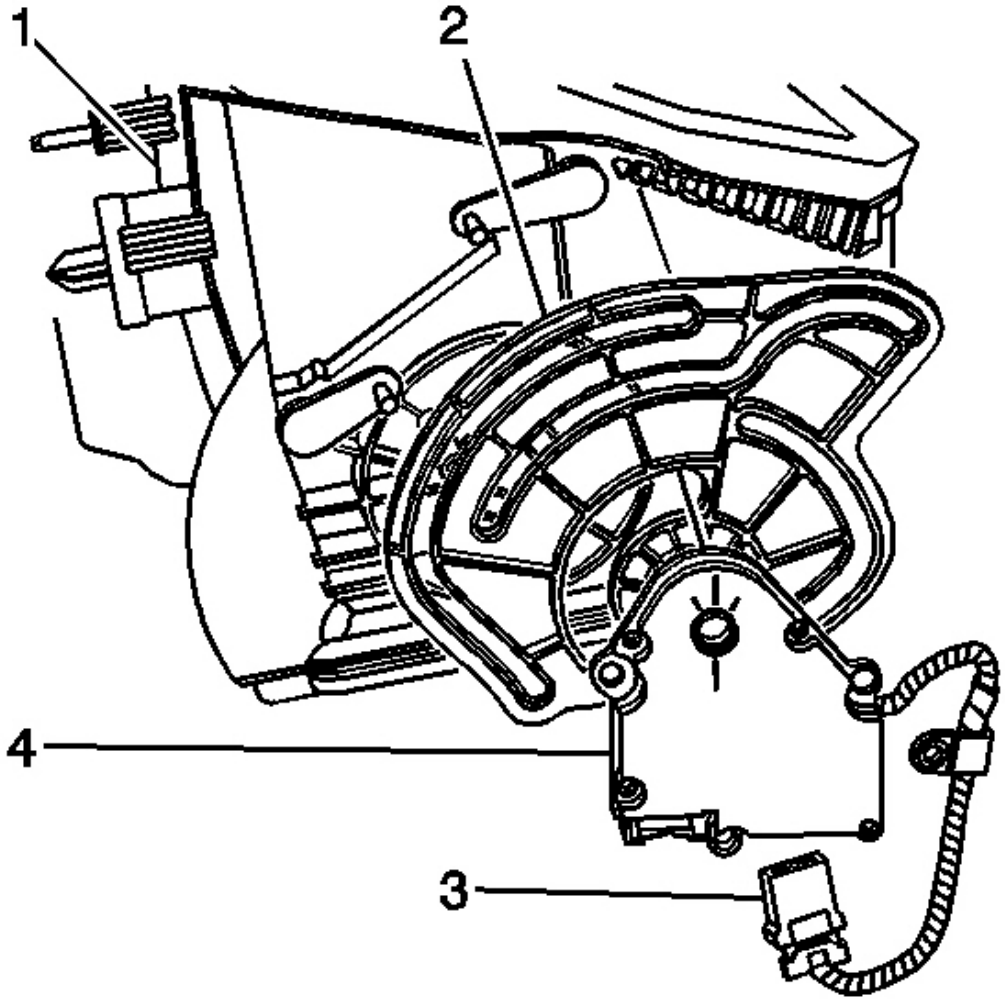


Fig. 132: Mode Actuator
Courtesy of GENERAL MOTORS CORP.

5. Connect the electrical connector (3) to the mode actuator (4).
6. Install the screws to the mode actuator (4).
7. Install the mode actuator (4) to the HVAC module assembly (1).
8. Install the HVAC module assembly. Refer to **HVAC Module Assembly Replacement** .

MODE DOOR REPLACEMENT - UPPER

Removal Procedure

1. Remove the HVAC module assembly. Refer to **HVAC Module Assembly Replacement** .

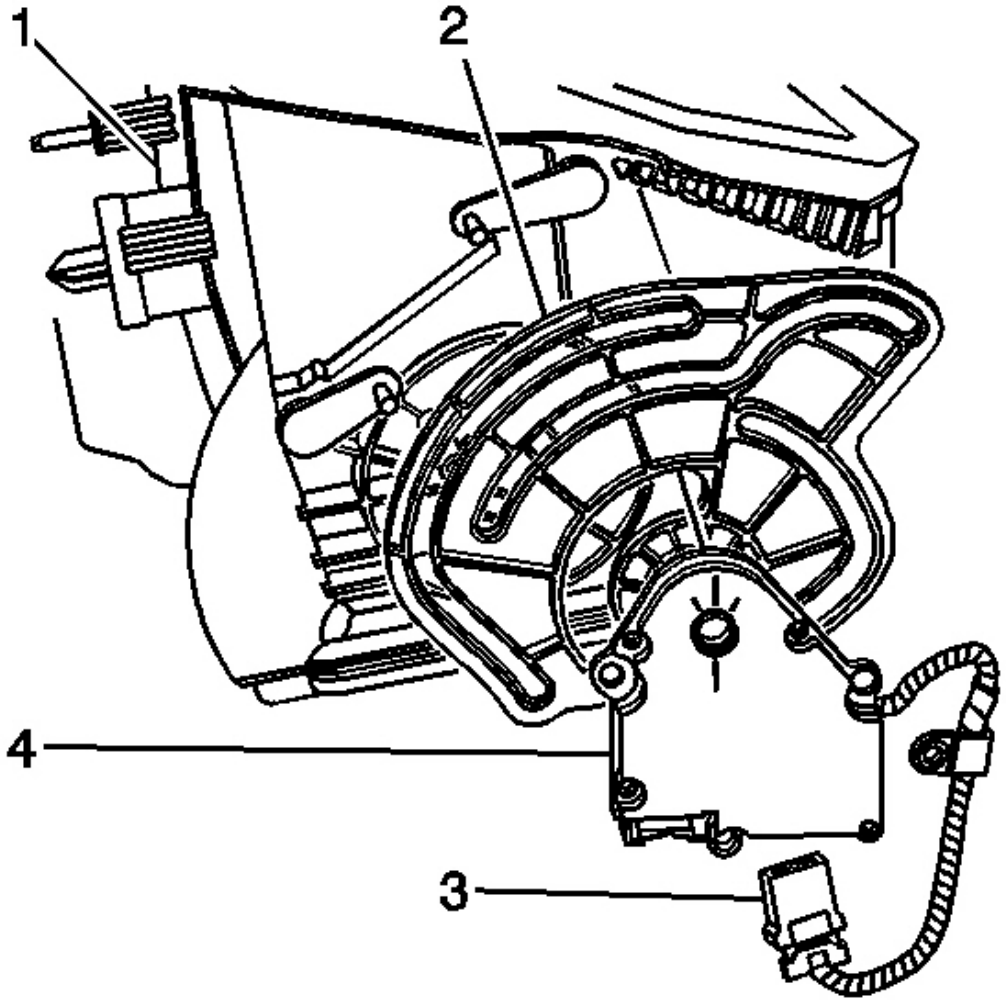


Fig. 133: Mode Actuator
Courtesy of GENERAL MOTORS CORP.

2. Disconnect the electrical connector (3) from the mode actuator (4).
3. Remove the screws from the mode actuator (4).
4. Remove the mode actuator (4) from the HVAC module assembly (1).
5. Remove the wiring harness from the air distribution housing (1).

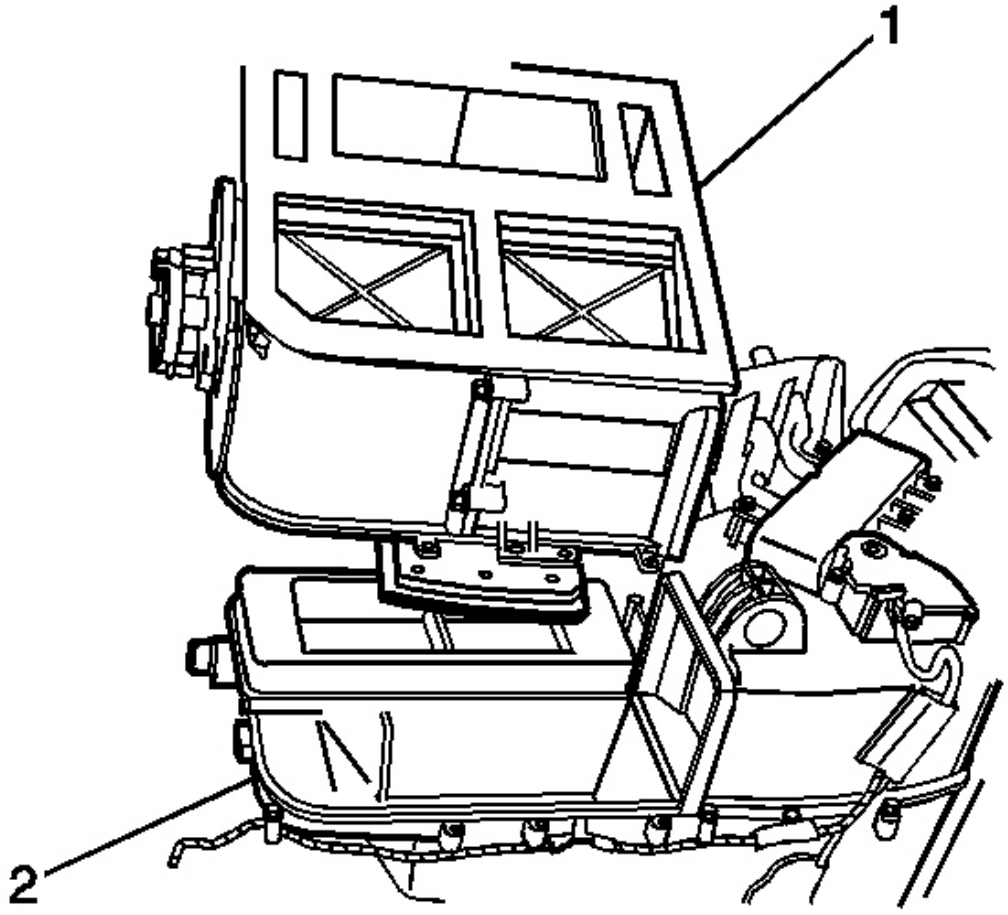


Fig. 134: Air Distribution Housing And HVAC Module Assembly
Courtesy of GENERAL MOTORS CORP.

6. Remove the screws from the air distribution housing (1).
7. Remove the air distribution housing (1) from the HVAC module assembly (2).

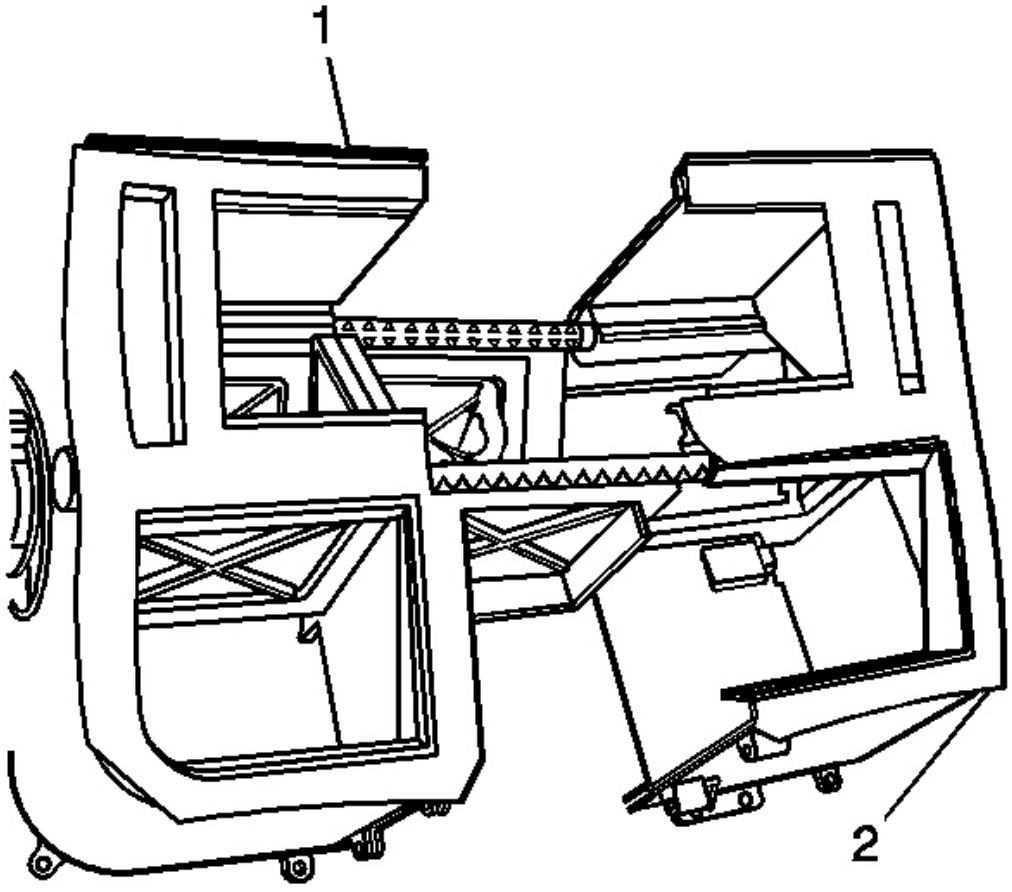


Fig. 135: Screws & Air Distribution Housing
Courtesy of GENERAL MOTORS CORP.

8. Remove the screws from the air distribution housing (1).
9. Separate the air distribution housing halves.

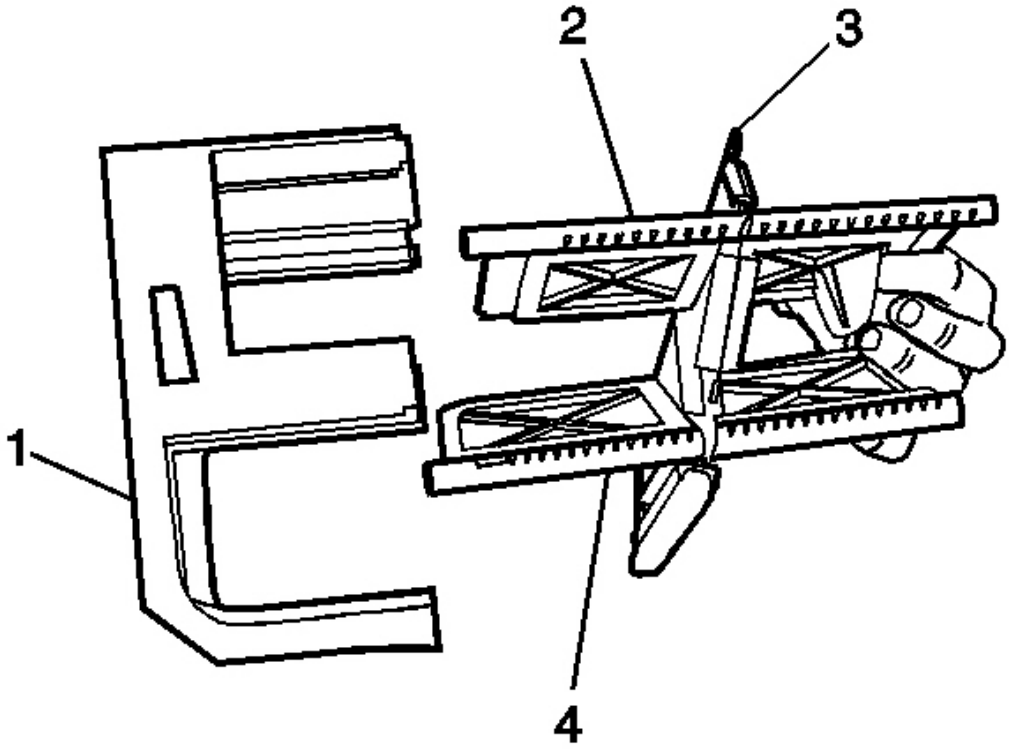


Fig. 136: Upper Mode Door & Door Assembly
Courtesy of GENERAL MOTORS CORP.

10. Remove the lever from the upper mode door (4).
11. Remove the lever from the defrost door (2).
12. Remove the door assembly (3) from the left air distribution housing (1).
13. Remove the mode door (4) from the door assembly (3).

Installation Procedure

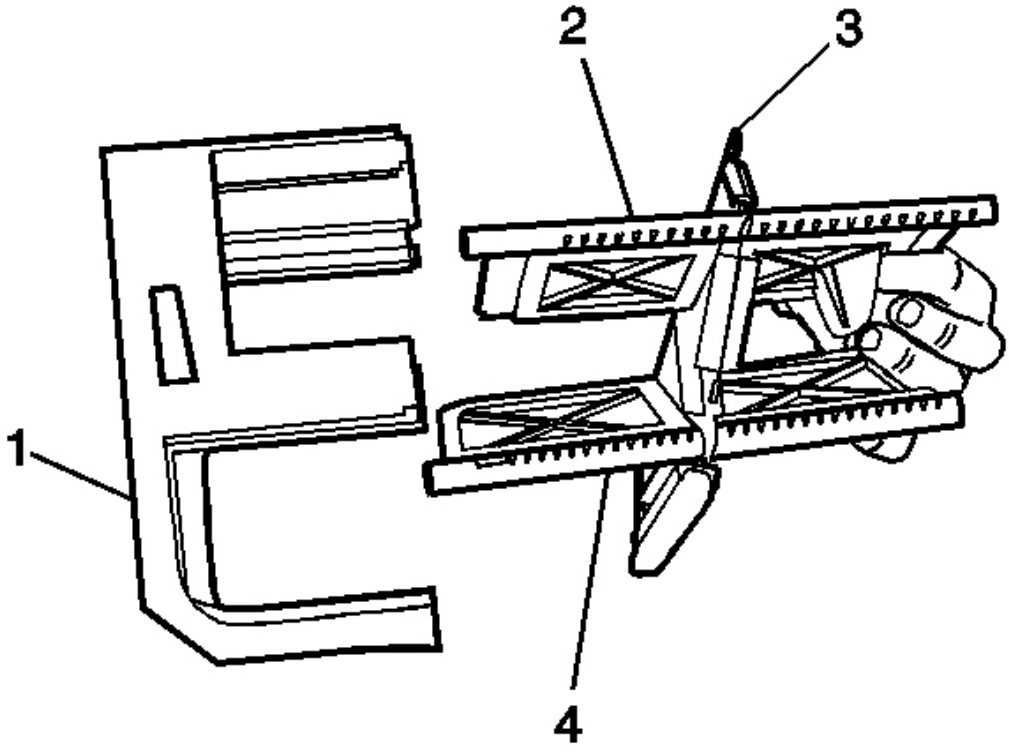


Fig. 137: Upper Mode Door & Door Assembly
Courtesy of GENERAL MOTORS CORP.

1. Install the mode door (4) to the door assembly (3).
2. Install the door assembly (3) to the left air distribution housing (1).
3. Install the lever to the defrost door (2).
4. Install the lever to the upper mode door (4).

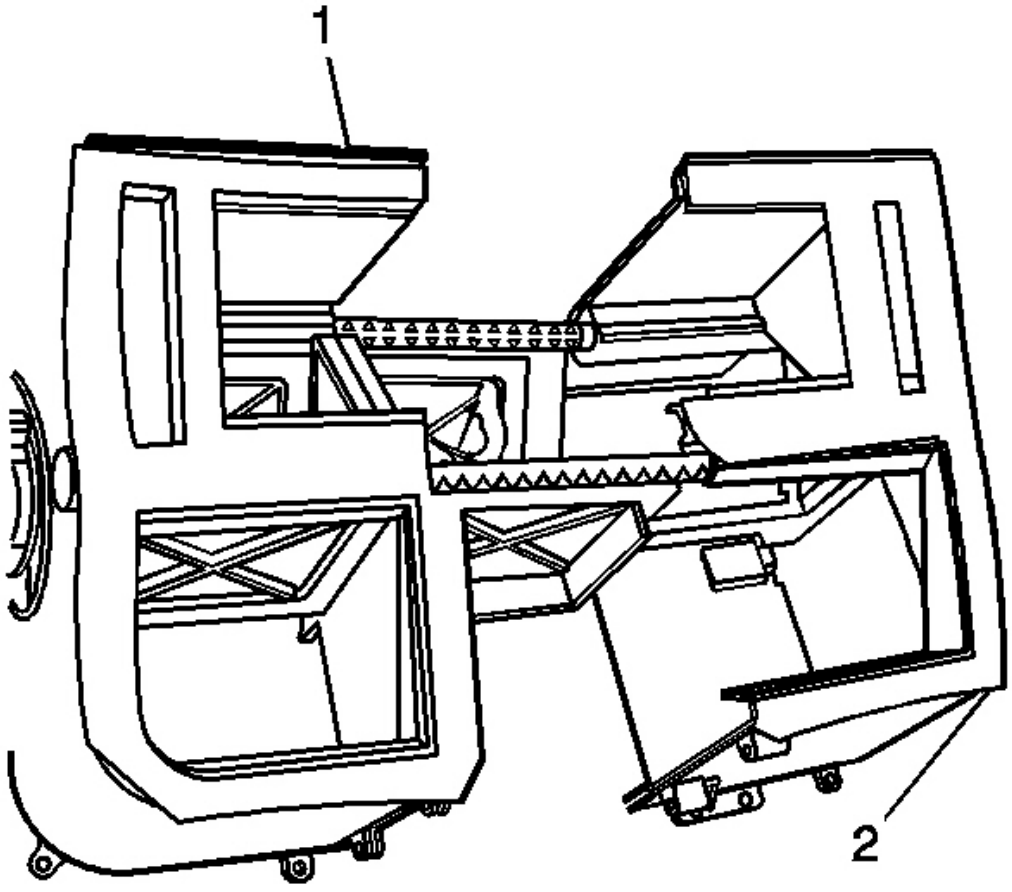


Fig. 138: Screws & Air Distribution Housing
Courtesy of GENERAL MOTORS CORP.

5. Install the air distribution housing halves.

NOTE: Refer to Fastener Notice in Cautions and Notices.

6. Install the screws to the air distribution housing (1).

Tighten: Tighten the screws to 2 N.m (18 lb in).

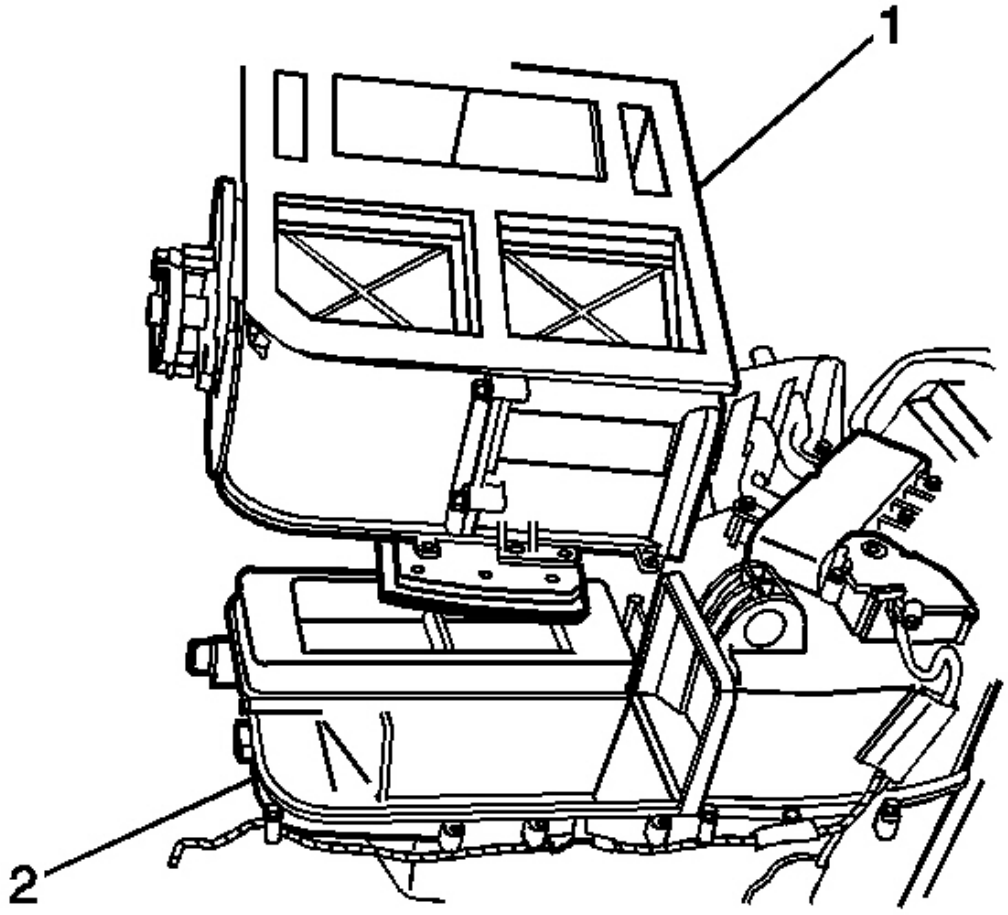


Fig. 139: Air Distribution Housing And HVAC Module Assembly
Courtesy of GENERAL MOTORS CORP.

7. Install the air distribution housing (1) to the HVAC module assembly (2).
8. Install the screws to the air distribution housing (1).

   Tighten: Tighten the screws to 2 N.m (18 lb in).

9. Install the wiring harness to the air distribution housing (1).

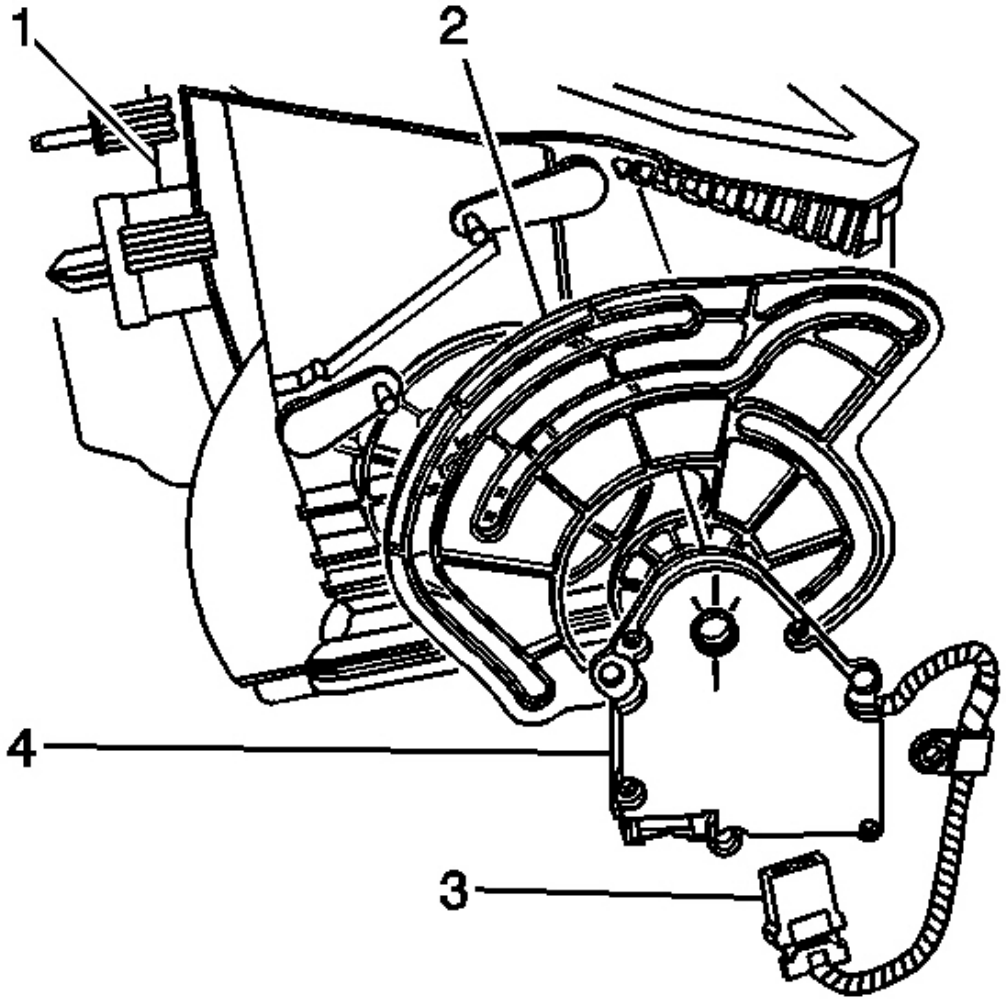


Fig. 140: Mode Actuator
Courtesy of GENERAL MOTORS CORP.

10. Connect the electrical connector (3) to the mode actuator (4).
11. Install the mode actuator (4) to the HVAC module assembly (1).
12. Install the screws to the mode actuator (4).

    Tighten: Tighten the screws to 2 N.m (18 lb in).

13. Install the HVAC module assembly. Refer to **HVAC Module Assembly Replacement** .

RECIRCULATION DOOR REPLACEMENT

Removal Procedure

1. Remove the HVAC module assembly. Refer to **HVAC Module Assembly Replacement** .
2. Remove the wiring harness from the recirculation housing (1).
3. Remove the screws from the upper recirculation housing (1).

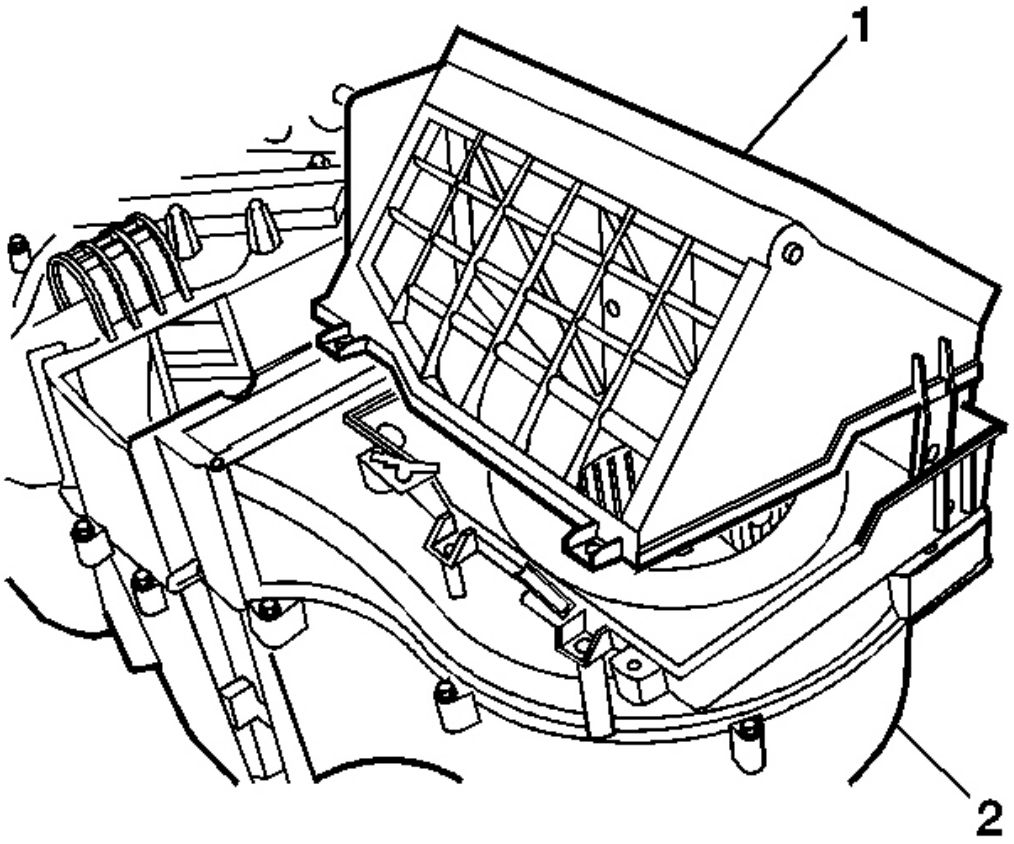


Fig. 141: Air Distribution Housing And HVAC Module
Courtesy of GENERAL MOTORS CORP.

4. Remove the upper recirculation housing (1) from the HVAC module assembly (2).
5. Disconnect the electrical connector from the recirculation actuator (1).
6. Remove the screws from the recirculation actuator (1).

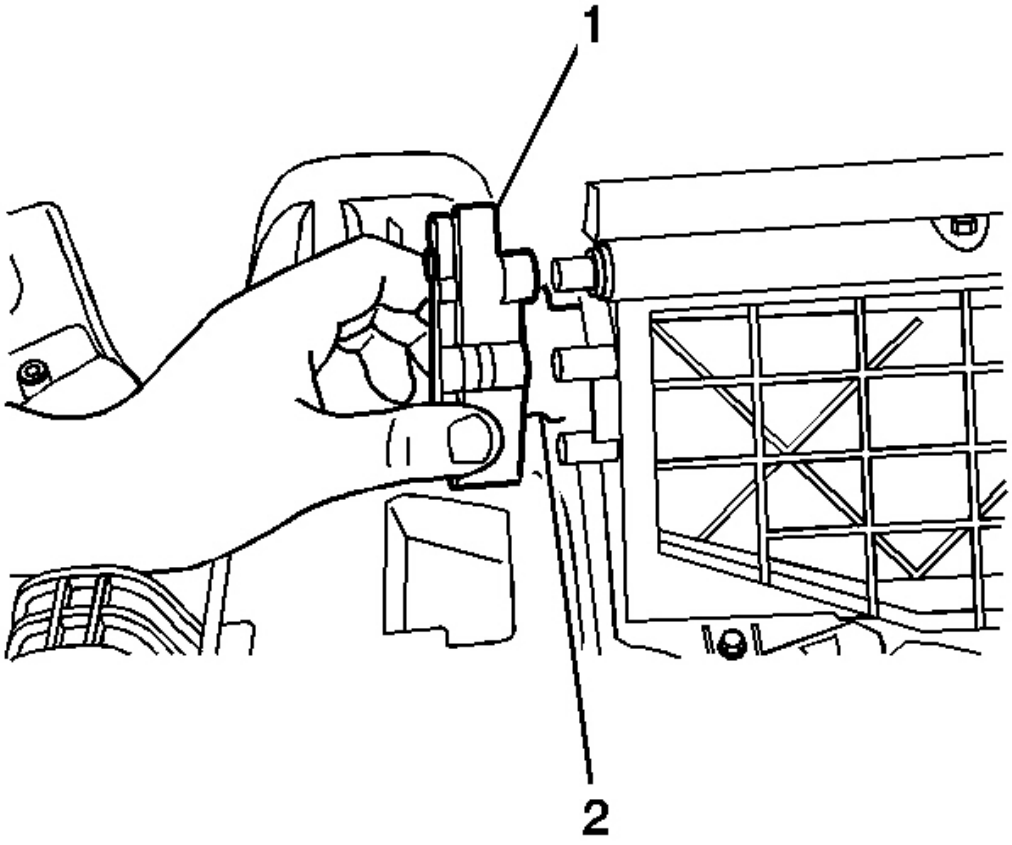


Fig. 142: Recirculation Actuator And Recirculation Housing
Courtesy of GENERAL MOTORS CORP.

7. Remove the recirculation actuator (1) from the recirculation housing (2).

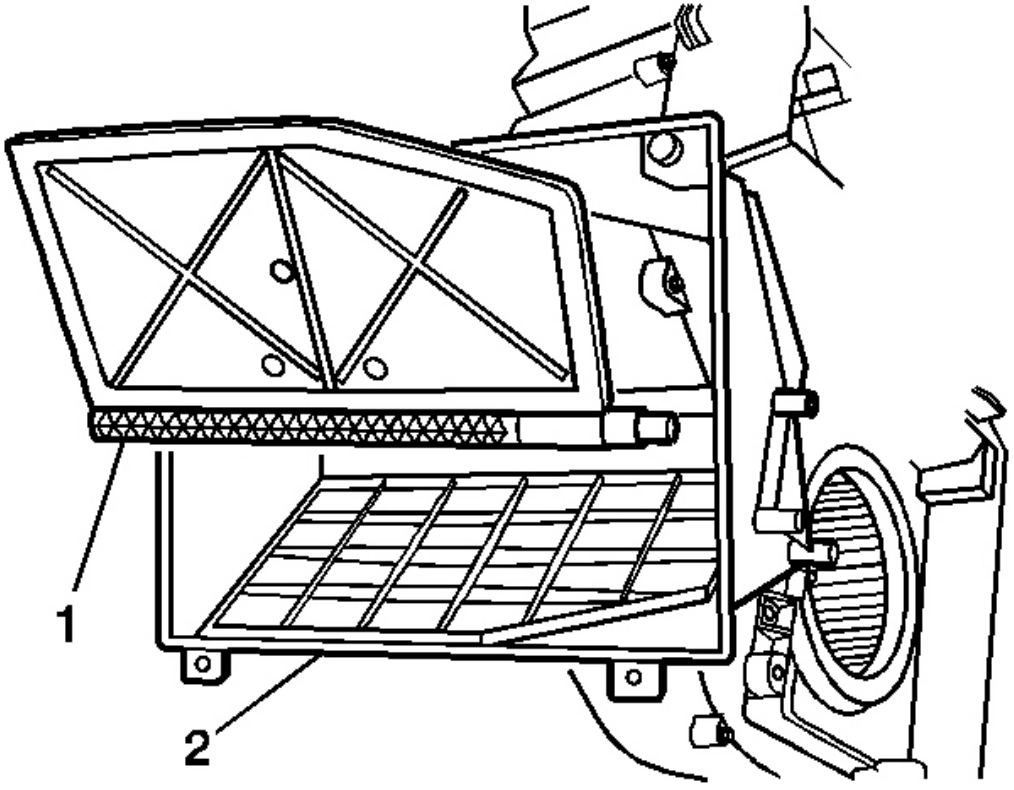


Fig. 143: Recirculation Door & Recirculation Housing
Courtesy of GENERAL MOTORS CORP.

8. Remove the recirculation door (1) from the recirculation housing (2).

Installation Procedure

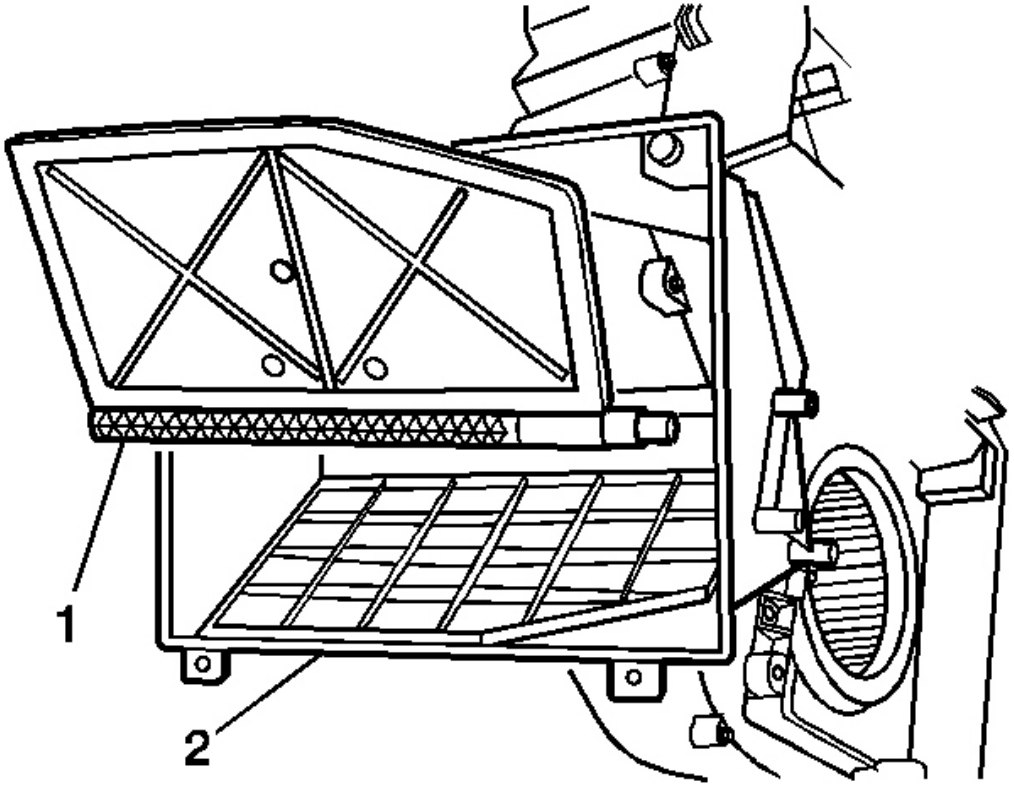


Fig. 144: Recirculation Door & Recirculation Housing
Courtesy of GENERAL MOTORS CORP.

1. Install the recirculation door (1) to the recirculation housing (2).

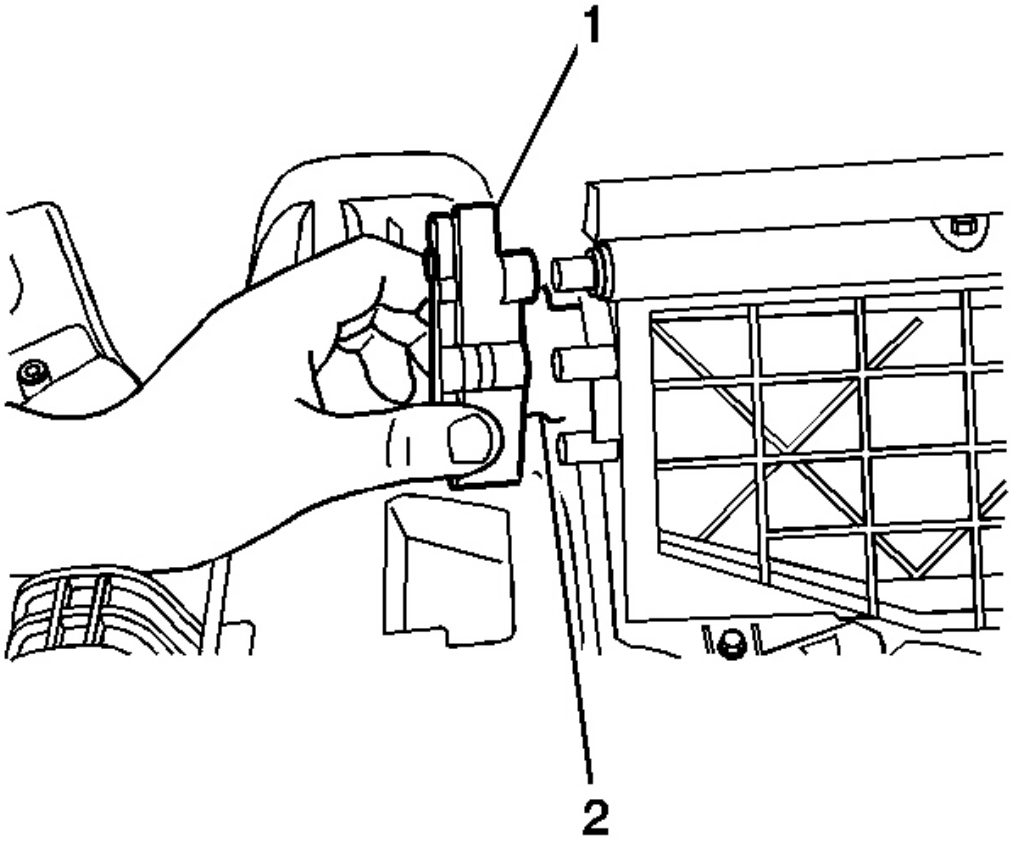


Fig. 145: Recirculation Actuator And Recirculation Housing
Courtesy of GENERAL MOTORS CORP.

2. Install the recirculation actuator (1) to the recirculation housing (2).

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Install the screws to the recirculation actuator (1).

   Tighten: Tighten the screws to 2 N.m (18 lb in).

4. Connect the electrical connection to the recirculation actuator (1).

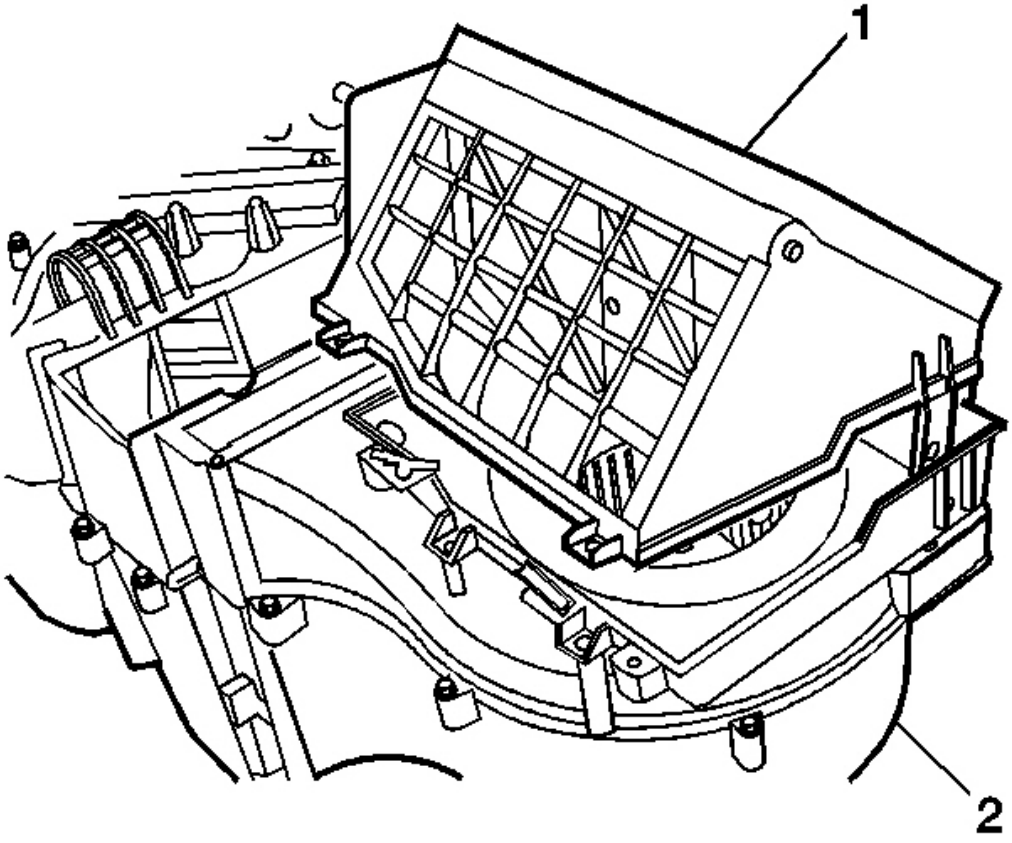


Fig. 146: Air Distribution Housing And HVAC Module
Courtesy of GENERAL MOTORS CORP.

5. Install the upper recirculation housing (1) to the HVAC module assembly (2).
6. Install the screws to the upper recirculation housing (1).

   Tighten: Tighten the screws to 2 N.m (18 lb in).

7. Install the wiring harness to the recirculation housing (1).
8. Install the HVAC module assembly. Refer to **HVAC Module Assembly Replacement** .

HEATER CORE REPLACEMENT

Removal Procedure

1. Remove the HVAC module assembly. Refer to **HVAC Module Assembly Replacement** .

2. Remove the screws from the heater core cover.

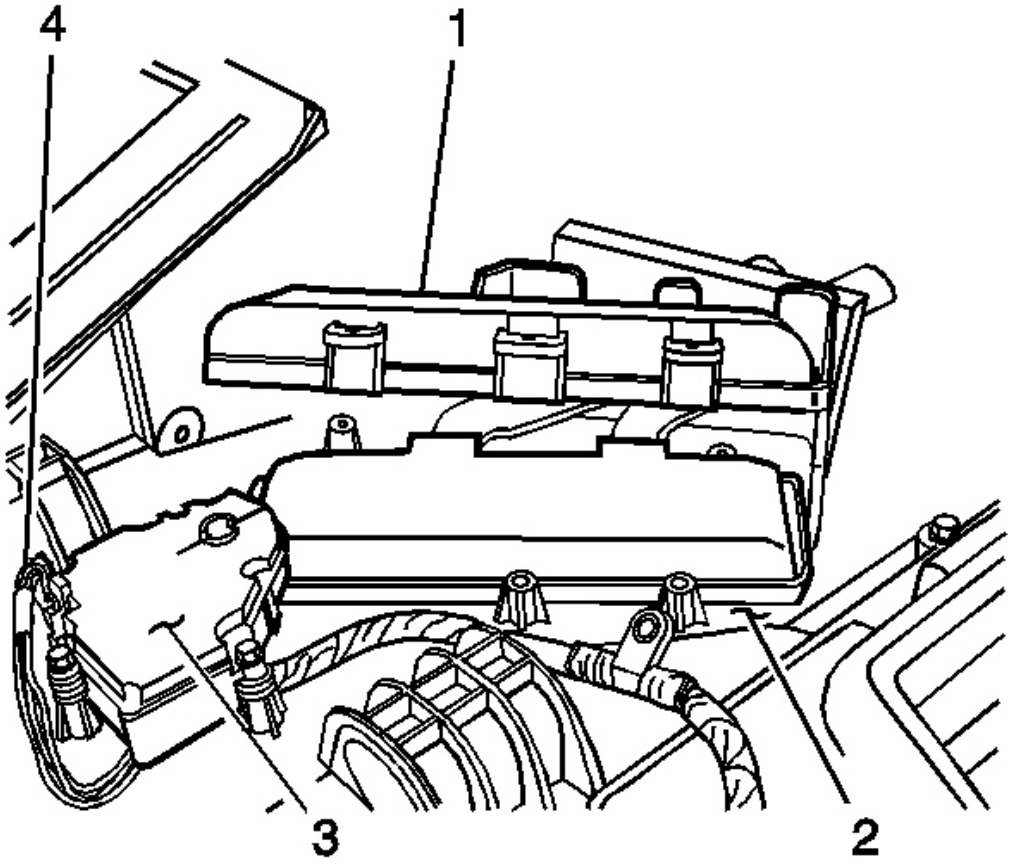


Fig. 147: Heater Core Cover And HVAC Module Assembly
Courtesy of GENERAL MOTORS CORP.

3. Remove the heater core cover (1) from the HVAC module assembly (2).

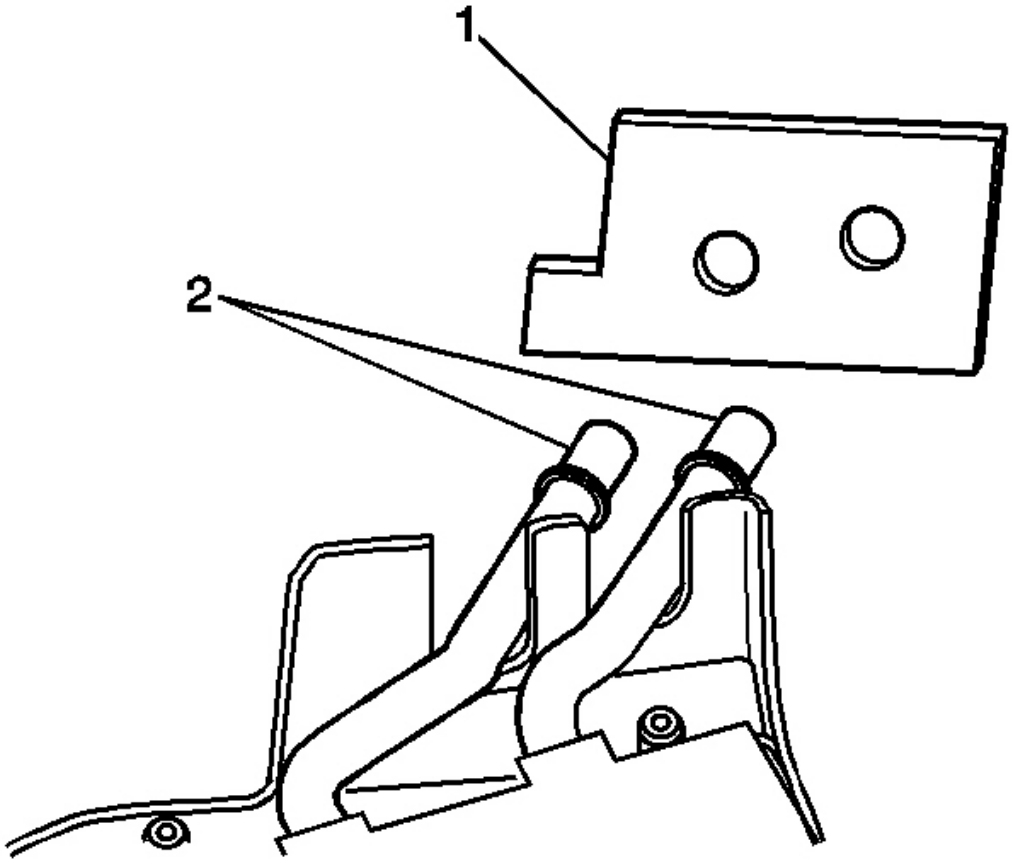


Fig. 148: Heater Core Cowl Gasket & Heater Core
Courtesy of GENERAL MOTORS CORP.

4. Remove the heater core cowl gasket (1) from the heater core (2).

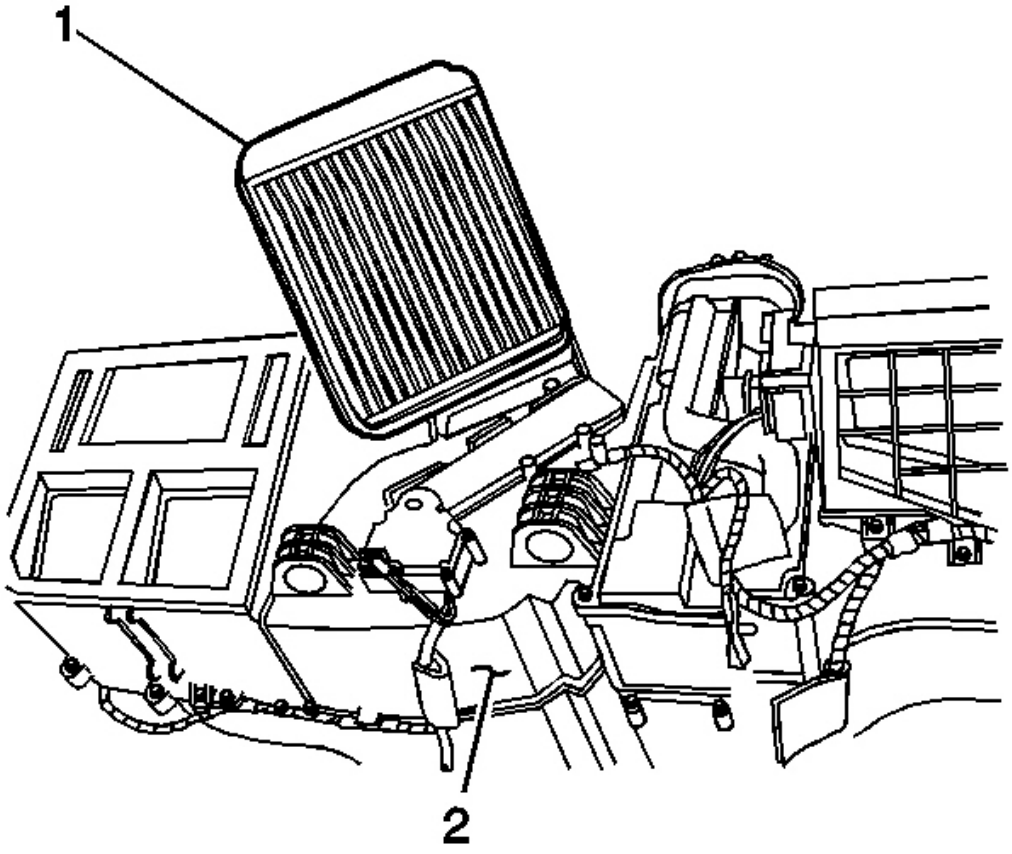


Fig. 149: Heater Core
Courtesy of GENERAL MOTORS CORP.

5. Remove the heater core (1) from the HVAC module assembly (2).

Installation Procedure

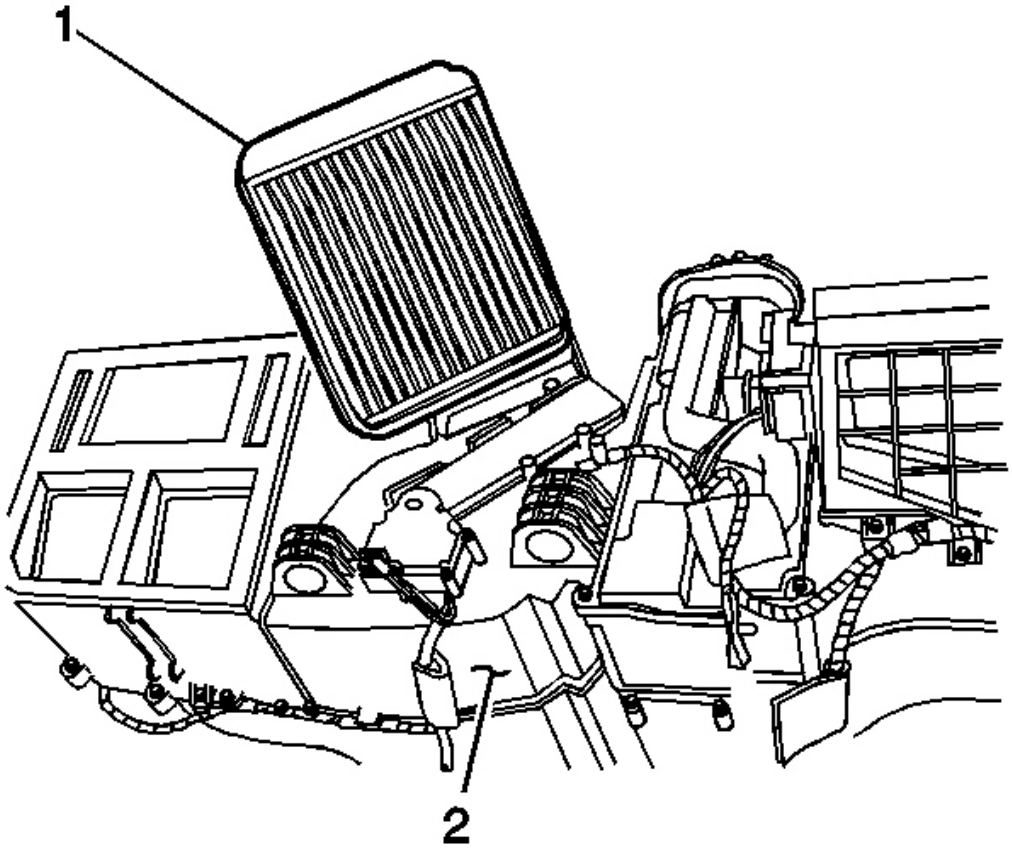


Fig. 150: Heater Core
Courtesy of GENERAL MOTORS CORP.

1. Install the heater core (1) to the HVAC module assembly (2).

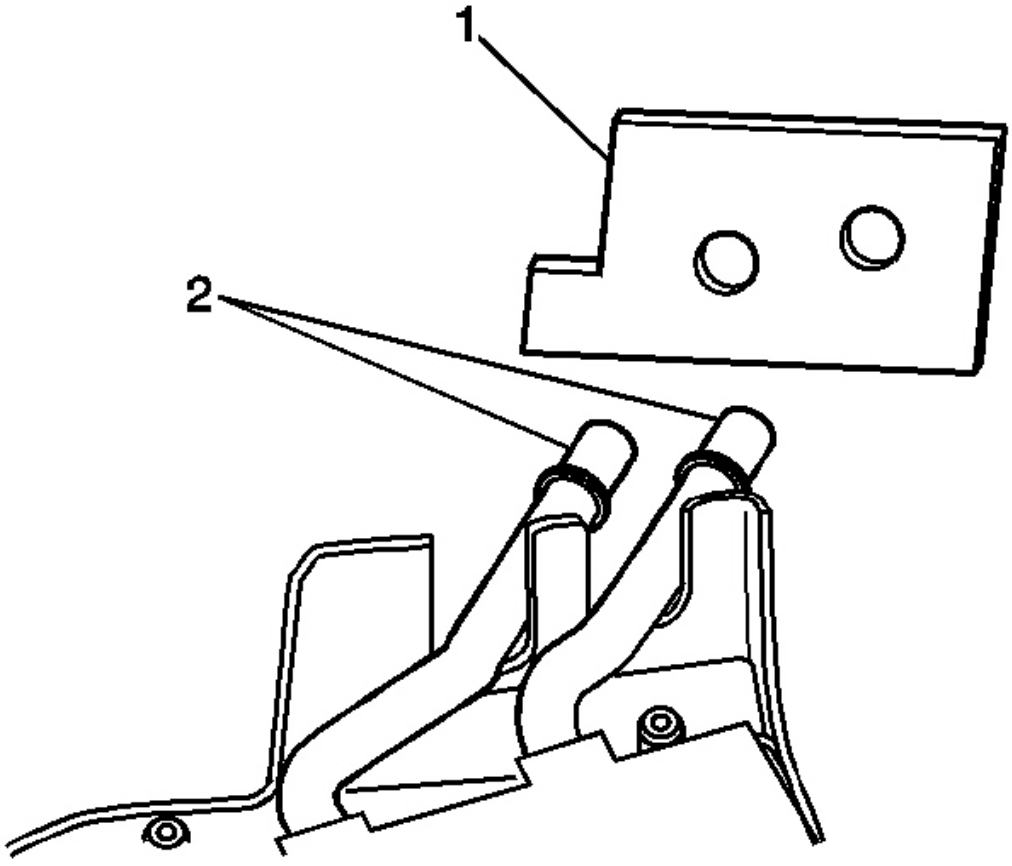


Fig. 151: Heater Core Cowl Gasket & Heater Core
Courtesy of GENERAL MOTORS CORP.

2. Install the heater core cowl gasket (1) to the HVAC module assembly (2).

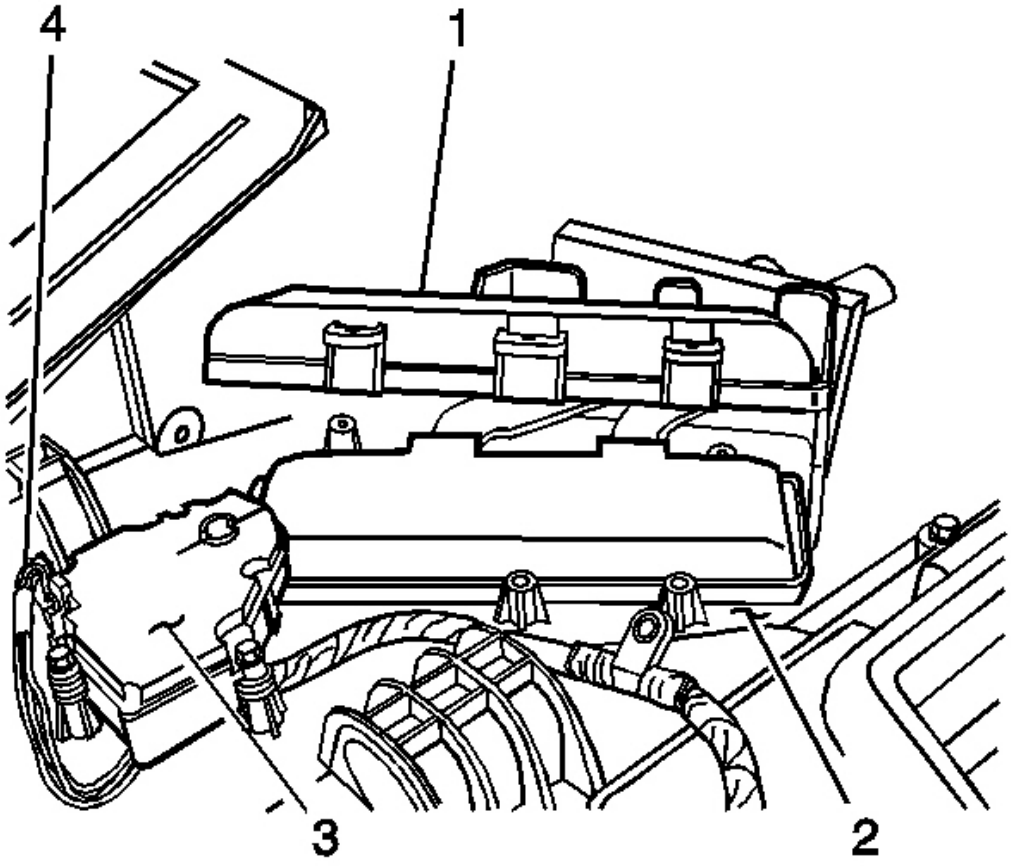


Fig. 152: Heater Core Cover And HVAC Module Assembly
Courtesy of GENERAL MOTORS CORP.

3. Install the heater core cover (1) to the HVAC module assembly (2).

NOTE: Refer to Fastener Notice in Cautions and Notices.

4. Install the screws to the heater core cover (1).

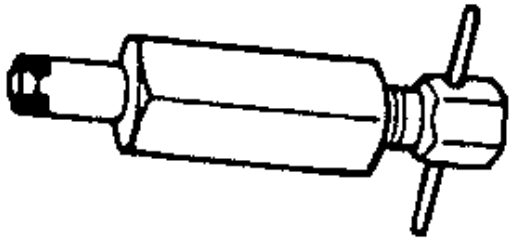
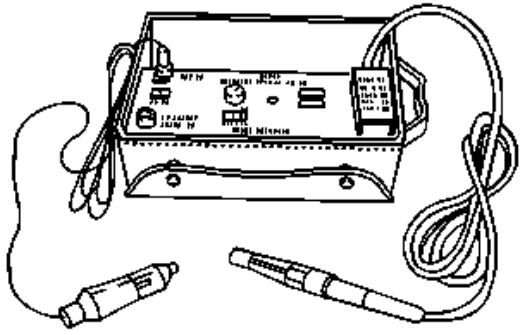
   Tighten: Tighten the screws to 2 N.m (18 lb in).

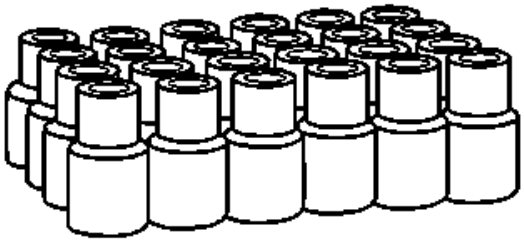
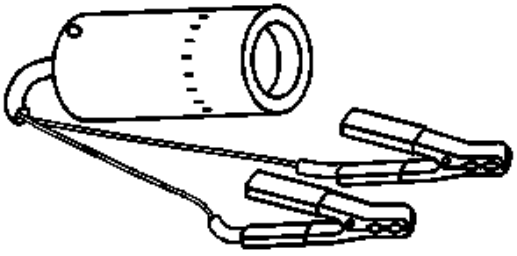
5. Install the HVAC module assembly. Refer to **HVAC Module Assembly Replacement** .

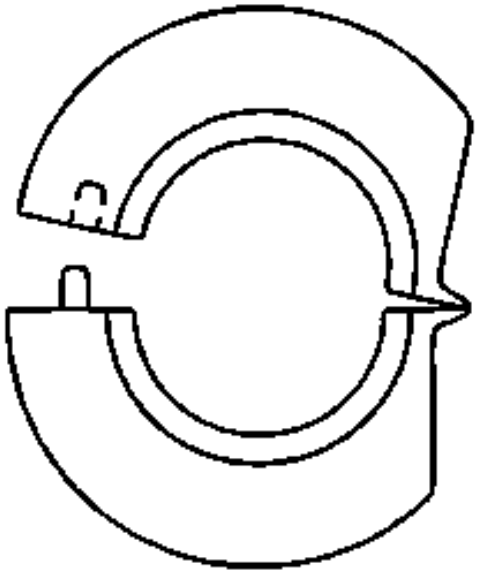
SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

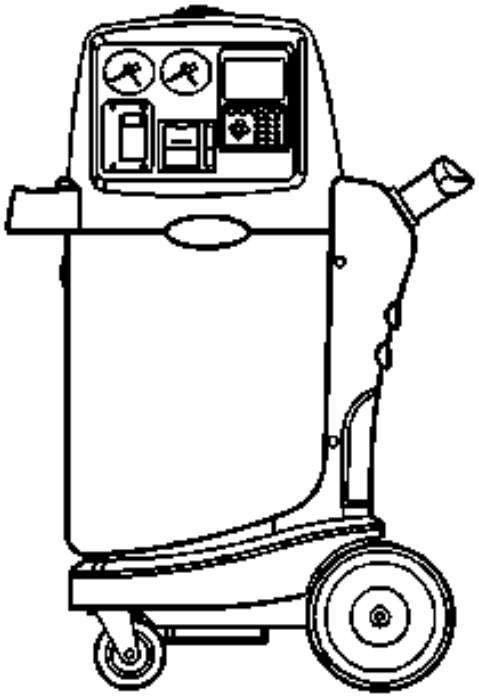
Special Tools

Illustration	Tool Number/Description
	J 26549-E Orifice Tube Remover
	J 39400-A Halogen Leak Detector
	J 41447 Fluorescent Tracer Dye- box of 24

	
	J 42220 Universal 12V Leak Detection Lamp
	J 43181 Quick Connect Connector Removal Tool

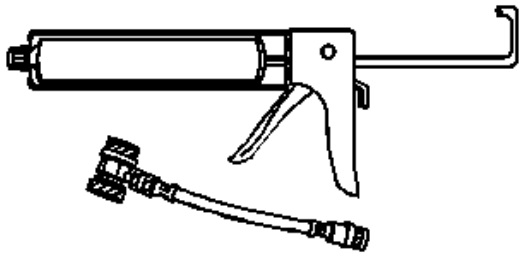
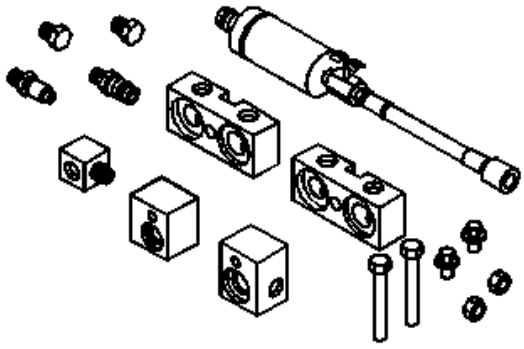
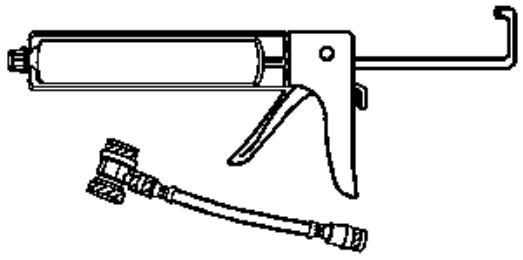


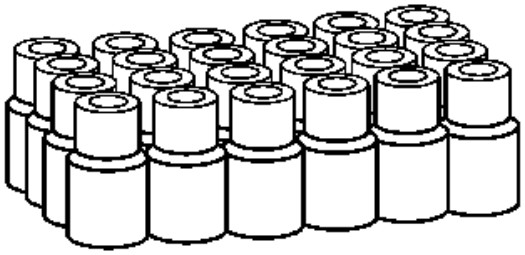
J 43600
ACR 2000 Air Conditioning Service Center



J 43872
Fluorescent Dye Cleaner

J 45037
A/C Oil Injector

	
	J 45268 Flush Adapter Kit
	J 46297 A/C Dye Injector Kit



J 46297-12
Replacement Dye Cartridges