2004 HVAC

Heating, Ventilation and Air Conditioning - Ascender

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
A/C Compressor Cycling Switch	5 N.m	44 in. lb.
A/C Compressor Mounting Bolt	50 N.m	37 ft. lb.
A/C Compressor Rear Bracket Bolt	25 N.m	18 ft. lb.
A/C Evaporator and Blower Module Shield Screws	2.2 N.m	19 in. lb.
A/C Refrigerant Pressure Sensor	4.8 N.m	42 in. lb.
Accumulator Clamp Screw	10 N.m	88 in. lb.
Accumulator to Evaporator Fitting	28 N.m	21 ft. lb.
Air Distributor Duct Mounting Screw	1.9 N.m	17 in. lb.
Air Inlet Assembly Mounting Stud	4.5 N.m	40 in. lb.
Air Outlet Assembly Retaining Screw	2.5 N.m	22 in. lb.
Air Temperature Actuator Retaining Screw	1.9 N.m	17 in. lb.
Blower Assembly Mounting Nut (RPO C42)	4.5 N.m	40 in. lb.
Blower Assembly Mounting Screw (RPO C42)	4.5 N.m	40 in. lb.
Blower Assembly Mounting Stud (RPO C42)	4.5 N.m	40 in. lb.
Blower Motor Access Cover Screw (RPO C60 and C68)	2.5 N.m	22 in. lb.
Blower Motor and Fan Assembly Mounting Screw	1.9 N.m	17 in. lb.
Blower Motor Relay Bracket Mounting Screw	1.9 N.m	17 in. lb.
Blower Motor Resistor Mounting Screw	1.9 N.m	17 in. lb.
Body Harness Connector Support Bracket Mounting Nuts	9.0 N.m	80 in. lb.
Compressor Discharge Hose to Condenser Fitting	28 N.m	21 ft. lb.
Compressor Pressure Relief Valve	9 N.m	80 in. lb.
Compressor Suction/Discharge Hose to Compressor Bolt	33 N.m	24 ft. lb.
Compressor Suction Hose to Accumulator Fitting	48 N.m	35 ft. lb.
Condenser Insulator Retaining Screw	1.9 N.m	17 in. lb.
Evaporator Case Section to Blower Case Section Retaining Screw	1.9 N.m	17 in. lb.
Evaporator Tube Clip Screw	1.9 N.m	17 in. lb.
Evaporator Tube to Condenser Fitting	28 N.m	21 ft. lb.
Floor Air Outlet Mounting Screw	1.9 N.m	17 in. lb.
Heater Core Access Cover Screw	1.9 N.m	17 in. lb.
Heater Inlet and Outlet Hoses Bracket Bolt	25 N.m	18 ft. lb.

Heater Inlet Hose Fitting at Intake Manifold	23.5 N.m	17 ft. lb.
Heater Outlet Hose Bracket Bolt	25 N.m	18 ft. lb.
Heater/Vent Module Mounting Nut	4.5 N.m	40 in. lb.
Heater/Vent Module Mounting Screw	4.5 N.m	40 in. lb.
Heater/Vent Module Mounting Stud	4.5 N.m	40 in. lb.
Intermediate Bracket Bolts	10 N.m	88 in. lb.
Knee Bolster Bracket Nuts	5.5 N.m	49 in. lb.

REFRIGERANT SYSTEM CAPACITIES

Refrigerant System Capacities

Application	Specification	
	Metric	English
PAG Oil GM P/N 12345923 (Canadian P/N 10953486)		
Accumulator Replacement	60 ml*	2 oz*
• *Add PAG oil equal to the amount of oil drained from the old accumulator plus the specified additional amount.		
Compressor Replacement	60 ml[1]	2 oz[1]
• A Sanden scroll compressor containing 240 ml[1] of oil is used on this model year.		
Condenser Replacement	30 ml[1]	1 oz[1]
Evaporator Replacement	90 ml[1]	3 oz[1]
• Total System Oil Capacity	240 ml	8 oz
R-134a		
• Refrigerant Charge	0.86 kg	1.9 lb
• Refrigerant Charge with Rear A/C	1.2 kg	2.65 lb
[1] If more than the specified amount of oil was drained from a component, add the equal amount of oil drained.		

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC STARTING POINT - HEATING, VENTILATION AND AIR CONDITIONING

The Heating, Ventilation and Air Conditioning (HVAC) system is divided into three sections. The first, Heating, Ventilation and Air Conditioning, has all procedures that pertain to a HVAC component or function that are not specifically associated with an automatic or manual control system. The second, HVAC Systems-Manual, has all procedures specific to the manual control system. The third, HVAC Systems-Automatic, has all the procedures specific to the automatic control system.

For systems with DTCs, begin the system diagnosis with the following procedures:

- **Diagnostic System Check - HVAC Systems - Manual** in HVAC Systems-Manual

- **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-Manual
- **Air Temperature Description and Operation** in HVAC Systems-Manual
- **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 Distribution
- 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
- **J 41447** Leak Detection Dye. See **Special Tools and Equipment**.
- **J 42220** 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 glycol (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.

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 **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. See Special Tools and Equipment.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 .

AIR CONDITIONING (A/C) SYSTEM PERFORMANCE TEST

Test Description

The following test measures the A/C system under the following conditions:

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

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

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

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

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

Air Conditioning (A/C) System Performance Test

Step	Action	Values	Yes	No
IMPORTANT: • **The ambient 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. Allow the A/C system to equalize. 4. Instal **J 43600** ACR 2000 Air Conditioning Service Center. See **Special Tools and Equipment**. 5. Record the ambient temperature displayed on **J 43600** . See **Special Tools and Equipment**. 6. Record readings of the low and high side STATIC pressures. Are both the low and high side pressures within the specified value?	Greater than 16°C (60°F): 345 kPa (50 psi) Greater than 24°C (75°F): 483 kPa (70 psi) Greater than 33°C (90°F): 690 kPa (100 psi)	Go to **Step 2**	Go to **Leak Testing**
	IMPORTANT: **Record the relative humidity and the ambient temperature at the time of the test.** 1. Close the vehicle doors and windows.			

2	2. Open the driver door window 127-152 mm (5-6 inches). 3. Select the following HVAC control settings: • The A/C on • The maximum blower speed • The Panel mode • The coldest temperature setting • All A/C outlets OPEN 4. Install the temperature probes of **J 43600** . See **Special Tools and Equipment**. 5. Apply the parking brake. 6. Place the transaxle/transmission in PARK 7. Start the engine. 8. Operate the A/C system for 5 minutes. 9. Inspect for the following conditions: • Abnormal frost areas • Unusual noises **IMPORTANT:** **When using the print function of J 43600 for this step, press the RESET button before pressing the PRINT button in order to capture the correct information. See Special Tools and Equipment.** 10. Print 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 A/C Performance Table?	-	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. 2. Reset **J 43600** for this step, press the			

3	RESET and record the pressures and temperatures again. See **Special Tools and Equipment**. 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 A/C Performance Table?	-	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 high side pressure greater than the specified range, but the low side pressure is within or less 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?	-		Go to **Symptoms - HVAC Systems - Manual** in HVAC Systems- Manual or **Symptoms - HVAC Systems - Automatic** in

			System OK	HVAC Systems-Automatic

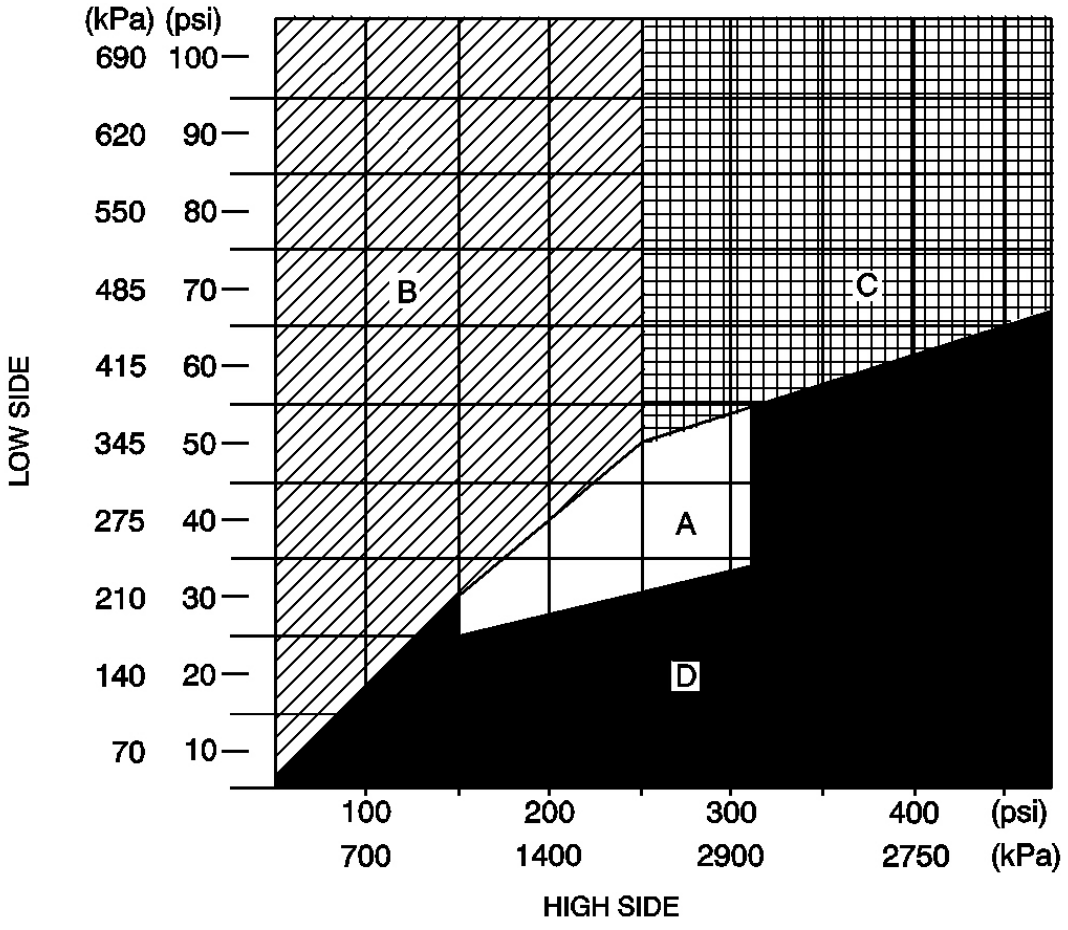


Fig. 1: A/C Performance Chart - Front A/C
Courtesy of GENERAL MOTORS CORP.

A/C Performance Table - Front A/C

Ambient Temperature	Relative Humidity	Low Side Service Port Pressure	High Side Service Port Pressure	Maximum Left Center Discharge Air Temperature
13-18°C (55-65° F)	0-100%	175-207 kPa (25-30 psi)	1030-1220 kPa (135-175 psi)	7°C (45°F)
19-24°C (66-75° F)	Less than 40%	175-254 kPa (25-37 psi)	1200-1430 kPa (160-200 psi)	11°C (52°F)
	Greater than 40%	175-262 kPa (25-38	1170-1400 kPa (170-	11°C (52°F)

		psi)	210 psi)	
25-29°C (76-85° F)	Less than 35%	208-288 kPa (30-42 psi)	1370-1570 kPa (150-190 psi)	14°C (57°F)
	35-50%	213-292 kPa (31-42 psi)	1350-1570 kPa (160-200 psi)	14°C (57°F)
	Greater than 50%	216-300 kPa (31-44 psi)	1340-1550 kPa (160-200 psi)	15°C (59°F)
30-35°C (86-95° F)	Less than 30%	242-328 kPa (35-48 psi)	1510-1750 kPa (200-240 psi)	17°C (63°F)
	30-50%	246-335 kPa (36-49 psi)	1500-1740 kPa (200-240 psi)	17°C (63°F)
	Greater than 50%	252-346 kPa (37-50 psi)	1490-1730 kPa (200-240 psi)	19°C (66°F)
36-41°C (96-105° F)	Less than 20%	281-366 kPa (41-53 psi)	1680-1920 kPa (240-280 psi)	19°C (66°F)
	20-40%	285-374 kPa (41-54 psi)	1670-1920 kPa (245-285 psi)	21°C (70°F)
	Greater than 40%	292-383 kPa (42-56 psi)	1670-1910 kPa (250-265 psi)	22°C (72°F)
42-46°C (106-115°F)	Less than 20%	322-400 kPa (47-58 psi)	1850-2070 kPa (250-290 psi)	22°C (72°F)
	Greater than 20%	326-410 kPa (47-60 psi)	1840-2060 kPa (260-300 psi)	23°C (73°F)
47-49°C (116-120°F)	Less than 30%	360-426 kPa (52-62 psi)	1990-2150 kPa (290-330 psi)	24°C (75°F)

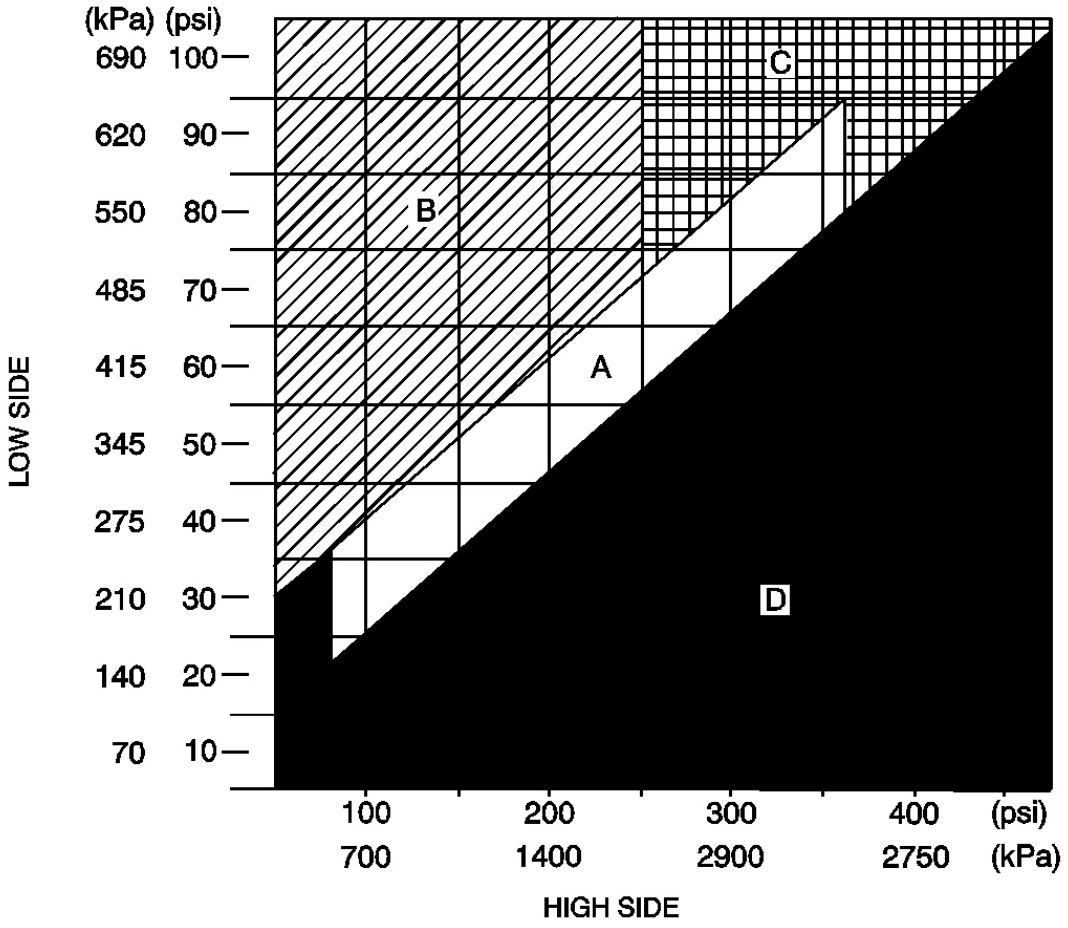


Fig. 2: A/C Performance Chart - with Rear A/C
Courtesy of GENERAL MOTORS CORP.

A/C Performance Table - with Rear A/C

Ambient Air Temperature	Relative Humidity	Service Port Pressure		Maximum Discharge Air Temperature	
		Low Side	High Side	Left Center	Rear Center
13-18°C (55-65°F)	0-100%	184-273 kPa (27-40 psi)	600-1080 kPa (87-157 psi)	19°C (66°F)	17°C (62°F)
19-24°C (66-75°F)	Less than 40%	227-335 kPa (33-49 psi)	720-1210 kPa (105-176 psi)	19°C (66°F)	20°C (68°F)
	Greater than 40%	234-349 kPa (34-51 psi)	840-1330 kPa (122-193 psi)	22°C (72°F)	21°C (70°F)
25-29°C (76-	Less than 35%	286-383 kPa (42-56 psi)	1050-1440 kPa (152-209 psi)	21°C (70°F)	23°C (73°F)
	35-50%	293-390 kPa (43-57	1110-1470 kPa (161-	22°C (72°F)	23°C (73°F)

85°F)		psi)	213 psi)		
	Greater than 50%	298-403 kPa (43-59 psi)	1160-1550 kPa (168-225 psi)	24°C (75°F)	24°C (75°F)
30-35°C (86-95°F)	Less than 30%	334-440 kPa (49-64 psi)	1310-1720 kPa (190-250 psi)	24°C (75°F)	27°C (81°F)
	30-50%	341-452 kPa (51-68 psi)	1340-1750 kPa (195-254 psi)	25°C (77°F)	27°C (81°F)
	Greater than 50%	350-469 kPa (51-68 psi)	1390-1800 kPa (202-261 psi)	27°C 81°F)	28°C (82°F)
36-41°C (96-105°F)	Less than 20%	388-492 kPa (56-71 psi)	1600-2000 kPa (232-290 psi)	27°C (81°F)	30°C (86°F)
	20-40%	394-506 kPa (57-73 psi)	1620-2020 kPa (235-293 psi)	28°C (82°F)	31°C (88°F)
	Greater than 40%	406-520 kPa (59-76 psi)	1660-2040 kPa (241-296 psi)	29°C (84°F)	32°C (90°F)
42-46°C (106-115°F)	Less than 20%	445-541 kPa (65-79 psi)	1910-2260 kPa (277-328 psi)	30°C (86°F)	34°C (93°F)
	Greater than 20%	452-557 kPa (66-81 psi)	1920-2260 kPa (279-328 psi)	31°C (88°F)	34°C (93°F)
47-49°C (116-120°F)	Less than 30%	501-579 kPa (73-84 psi)	2180-2410 kPa (316-350 psi)	32°C (90°F)	36°C (97°F)

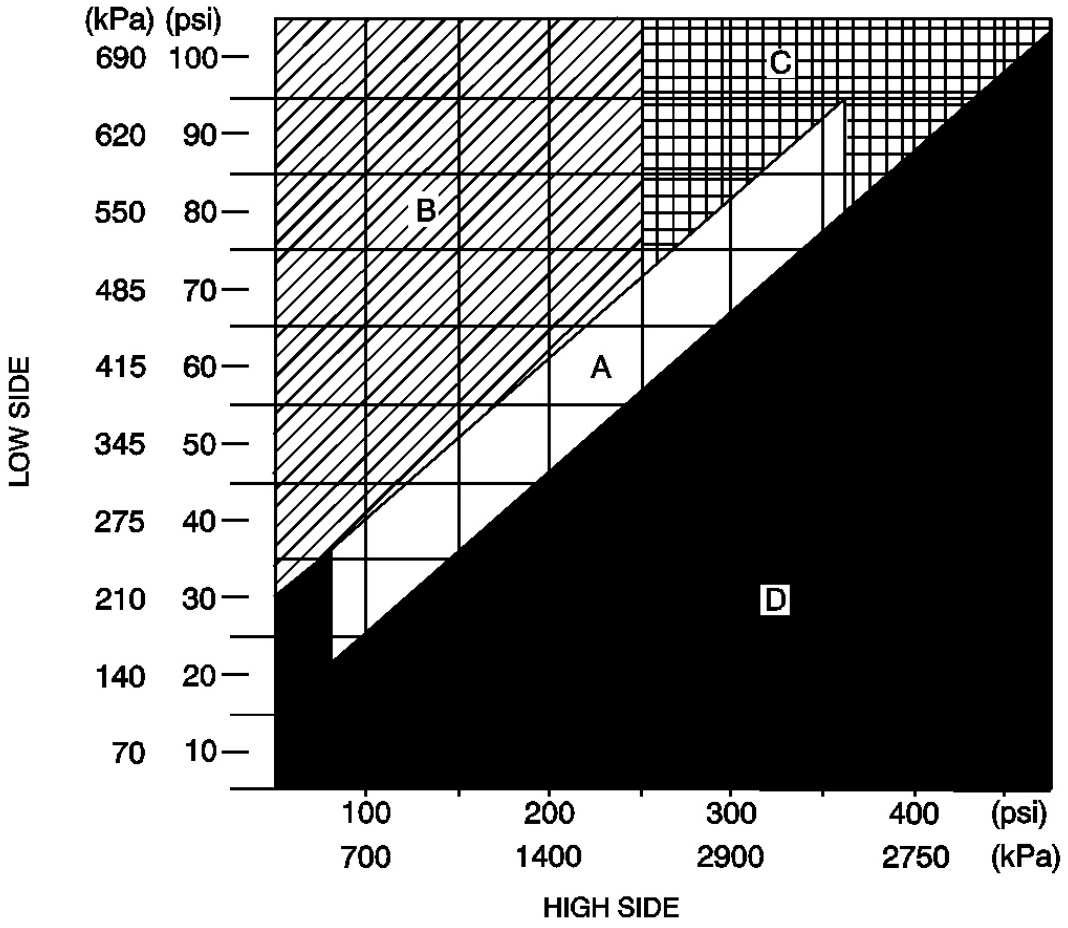


Fig. 3: A/C Performance Chart - With Rear A/C & V8
Courtesy of GENERAL MOTORS CORP.

A/C Performance Table - With Rear A/C & V8

Ambient Air Temperature	Relative Humidity	Service Port Pressure		Maximum Discharge Air Temperature	
		Low Side	High Side	Left Center	Rear Center
13-18°C (55-65°F)	0-100%	175-265 kPa (25-39 psi)	760-1070 kPa (110-155 psi)	13°C (55°F)	16°C (61°F)
19-24°C (66-75°F)	Less than 40%	186-294 kPa (27-43 psi)	910-1240 kPa (132-180 psi)	14°C (57°F)	17°C (63°F)
	Greater than 40%	207-326 kPa (30-47 psi)	940-1300 kPa (136-189 psi)	16°C (61°F)	19°C (66°F)
25-29°C (76-	Less than 35%	234-328 kPa (34-48 psi)	1120-1410 kPa (163-205 psi)	16°C (61°F)	20°C (68°F)
	35-50%	250-341 kPa (36-50	1150-1450 kPa (167-	17°C (63°F)	20°C (68°F)

85°F)		psi)	209 psi)		
	Greater than 50%	262-368kPa (38-53 psi)	1180-1500 kPa (171-218 psi)	19°C (66°F)	22°C (72°F)
30-35°C (86-95°F)	Less than 30%	271-370 kPa (39-54 psi)	1300-1620 kPa (189-235 psi)	19°C (66°F)	23°C (73°F)
	30-50%	284-389 kPa (41-56 psi)	1320-1670 kPa (192-242 psi)	21°C (70°F)	24°C (75°F)
	Greater than 50%	301-418 kPa (44-61 psi)	1360-1740 kPa (197-253 psi)	23°C (73°F)	25°C (77°F)
36-41°C (96-105°F)	Less than 20%	310-405 kPa (45-59 psi)	1490-1800 kPa (216-261 psi)	22°C (72°F)	25°C (77°F)
	20-40%	320-426 kPa (46-62 psi)	1510-1860 kPa (219-270 psi)	23°C (73°F)	27°C (81°F)
	Greater than 40%	339-447 kPa (49-65 psi)	1560-1920 kPa (226-279 psi)	25°C (77°F)	26°C (79°F)
42-46°C (106-115°F)	Less than 20%	354-442 kPa (51-64 psi)	1700-1980 kPa (247-287 psi)	24°C (75°F)	28°C (82°F)
	Greater than 20%	365-465 kPa (53-68 psi)	1720-2040 kPa (250-296 psi)	26°C (79°F)	29°C (84°F)
47-49°C (116-120°F)	Less than 30%	402-477 kPa (58-69 psi)	1900-2120 kPa (276-308 psi)	27°C (81°F)	30°C (86°F)

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

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

Step	Action	Value	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**
4	Increase engine speed to 2000 RPM. During extended operation of the A/C system, does the low side pressure decrease, possibly accompanied by heavy frost on the liquid line between the expansion device and the evaporator?	-	Go to **Air 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: • 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?	-	Go to **Step 8**	Go to **Too Hot in Vehicle** in HVAC Systems - Manual or **Too Hot in Vehicle** in HVAC Systems - Automatic
	The A/C system may be undercharged.			

7	1. Leak test A/C system. Refer to **Leak Testing**. 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 ACR 2000 information screen for detection of foreign gases in the A/C system. 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.	148 ml (5 oz)		

	Was more than the specified amount 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 (Short Wheel Base)Flushing (Long Wheel Base)**. 3. 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 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 - Manual** or **Symptoms - 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 pressures is higher than normal and the high pressure is lower than normal.			

- Malfunctioning A/C Compressor
- Refrigerant Under Charge

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	After continued operation of the A/C system, do the low and 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 equal to or above the specified pressure range of the A/C Performance table. Refer to **Air Conditioning (A/C) System Performance Test**. • The high side pressure is below 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 above the specified pressure range of the A/C Performance table. Refer to **Air Conditioning (A/C) System Performance Test**. • The high side pressure is below 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 high side pressures as well as the 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 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 (Short Wheel Base)** or **Expansion (Orifice) Tube Replacement (Long Wheel Base)**. Are there 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 there a brown, powdery residue present?	Go to **Step 11**	Go to **Step 12**
9	1. Remove the compressor hose from the compressor. Refer to **Compressor Hose Assembly Replacement (Short Wheel Base)** or **Compressor Hose Assembly Replacement (Long Wheel Base)**. 2. Inspect for metal flake contamination at the line connections and the compressor ports. Is there metal flake contamination present?	Go to **Step 10**	Go to **Step 12**
10	1. Replace the A/C compressor. Refer to **Compressor Replacement (Short Wheel Base)** or **Compressor Replacement (Long Wheel Base)**. 2. Replace the orifice tube. Refer to **Expansion (Orifice) Tube Replacement (Short Wheel Base)** or **Expansion (Orifice) Tube Replacement (Long Wheel Base)**. 3. 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 or **Flushing (Long Wheel Base)**. 2. Replace the orifice tube. Refer to **Expansion (Orifice) Tube Replacement (Short Wheel Base)** or **Expansion (Orifice) Tube Replacement (Long Wheel Base)**. 3. Replace the A/C compressor. Refer to **Compressor Replacement (Short Wheel Base)** or **Compressor Replacement (Long Wheel Base)**. 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 (Short Wheel Base)** or **Compressor Replacement (Long Wheel Base)**. 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 - Manual** in HVAC - Manual OR Go to **Symptoms - HVAC Systems - Automatic** in HVAC - 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**
3	Visually inspect for the following: • 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 **Diagnostic System Check - Engine Cooling** 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 (Short Wheel Base)** or **Expansion (Orifice) Tube Replacement (Long Wheel Base)**. 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 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**		Go to **Air Conditioning**

	Conditioning (A/C) System Performance Test. Are the readings within the specified ranges?	Go to **Step 10**	**(A/C) System Performance Test**
10	Operate the system in order to verify the repair. Did you find and correct the condition?	System OK	Go to **Symptoms - HVAC Systems - Manual** in HVAC - Manual OR **Symptoms - HVAC Systems - Automatic** in HVAC - 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. Is the repair complete?	Go to **Step 21**	-
11	The expansion device is restricted. Replace the expansion device. Refer to **Expansion (Orifice) Tube Replacement (Short Wheel Base)** or **Expansion (Orifice) Tube Replacement (Long Wheel Base)**. Are metal flakes present?	Go to **Step 12**	Go to **Step 13**
12	1. Remove the compressor hose assembly from the vehicle. Refer to **Compressor Hose Assembly Replacement (Short Wheel Base)** or **Compressor Hose Assembly Replacement (Long Wheel Base)**. 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 (Short Wheel Base)** or **Flushing (Long Wheel Base)**. 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 compressor hose from the compressor. Refer to **Compressor Hose Assembly Replacement (Short Wheel Base)** or **Compressor Hose Assembly Replacement (Long Wheel Base)**. 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 (Short Wheel Base)** or **Expansion (Orifice) Tube Replacement (Long Wheel Base)**. Did you find evidence of damage or debris?	Go to **Step 17**	Go to **Step 16**
16	If the expansion device does not show any signs of damage or debris, perform the following procedure: 1. Remove the compressor hose assembly from the vehicle. Refer to **Compressor Hose Assembly Replacement (Short Wheel Base)** or **Compressor Hose Assembly Replacement (Long Wheel Base)**. 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 (Short Wheel Base)** or **Expansion (Orifice) Tube Replacement (Long Wheel Base)**. 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: Replace the accumulator. Refer to **Accumulator Replacement**. Is the repair complete?	Go to **Step 19**	-
19	Install the compressor hose assembly. Refer to **Compressor Hose Assembly Replacement (Short Wheel Base)** or **Compressor Hose Assembly Replacement (Long Wheel Base)**. Are the repairs complete?	Go to **Step 21**	-
20	1. Install the compressor hose assembly. Refer to **Compressor Hose Assembly Replacement (Short Wheel Base)** or **Compressor Hose Assembly Replacement (Long Wheel Base)**. 2. Recharge the A/C system. Refer to **Refrigerant Recovery and Recharging**. Are the repairs complete?	Go to **Step 21**	-
21	1. Record the low and the high side pressures and the panel outlet air 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 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 - Manual** in HVAC Systems - Manual or **Symptoms - HVAC Systems - Automatic** in HVAC Systems - Automatic

HEATING PERFORMANCE DIAGNOSTIC (BODY VIN TYPE 6)

Heating Performance Diagnostic (Body VIN Type 6)

Step	Action	Yes	No
DEFINITION: Heating system performance of the auxiliary heater.			
1	Were you sent here from Symptoms or another diagnostic table?	Go to **Step 2**	Go to **Symptoms - HVAC Systems - Manual** or **Symptoms - HVAC Systems - Automatic**
2	1. Start the engine. 2. Allow the engine to idle. Does the engine reach a normal operating temperature?	Go to **Step 3**	Go to **Step 14**
3	**CAUTION:** **Refer to Moving Parts and Hot Surfaces Caution in Cautions and Notices.** 1. Allow the engine to idle. 2. Select the maximum auxiliary temperature setting. 3. Select the minimum auxiliary blower speed. 4. Feel the temperature of the inlet and outlet heater hoses to the auxiliary hot water bypass valve. Does the inlet heater hose feel warmer than the outlet heater hose?	Go to **Step 4**	Go to **Step 6**
4	Disconnect the vacuum hose from the coolant bypass valve. Is vacuum being applied to the valve?	Go to **Step 13**	Go to **Step 5**
5	1. Remove the coolant bypass valve. Refer to **Coolant Bypass Valve Replacement**. 2. Inspect the coolant bypass valve for the following conditions: • Binding • Restrictions • Damage Are any of these conditions present?	-	Go to **Step 16**
6	1. Allow the engine to idle. 2. Select the minimum auxiliary blower speed. 3. Select the warmest auxiliary temperature setting. 4. Feel the temperature of the inlet and outlet heater hoses to the auxiliary heater core.		

	Does the inlet heater hose feel warmer than the outlet heater hose?	Go to **Step 10**	Go to **Step 7**
7	1. Install a thermometer into an auxiliary air outlet. 2. Secure a thermometer on the outlet heater hose of the auxiliary heater core. 3. Select the maximum auxiliary blower speed. 4. Select the warmest auxiliary temperature setting. 5. Record the temperature at the following locations: • The auxiliary air outlet • The auxiliary heater core outlet hose 6. Compare the recorded temperatures. Are the two temperature readings about equal?	Go to **Step 8**	Go to **Step 9**
8	1. Inspect the following areas of the vehicle for cold air leaks: • The auxiliary HVAC module case • The auxiliary air ducts 2. Perform any necessary repairs. Is the repair complete?	Go to **Step 16**	-
9	Inspect the auxiliary HVAC module for correct temperature door operation. Refer to **Diagnostic System Check - HVAC Systems - Manual** or **Diagnostic System Check - HVAC Systems - Automatic** . Does the temperature door operate correctly?	Go to **Step 16**	Go to **Step 15**
10	1. Turn OFF the engine. 2. Backflush the auxiliary heater core. 3. Start the engine and allow the engine to idle. 4. Select the minimum auxiliary blower speed. 5. Select the warmest auxiliary temperature setting. 6. Feel the temperature of the inlet and outlet heater hoses at the auxiliary heater core. Does the inlet heater hose feel warmer than the outlet heater hose?	Go to **Step 11**	Go to **Step 16**
11	Replace the auxiliary heater core. Refer to **Heater Core Replacement**. Is the repair complete?	Go to **Step 16**	-
	Replace the coolant bypass valve. Refer to **Coolant**		

12	**Bypass Valve Replacement**. Is the repair complete?	Go to **Step 16**	-
13	Repair the vacuum condition. Refer to **Vacuum Control System Diagnostic** in HVAC Systems - Manual or **Vacuum Control System Diagnostic** in HVAC Systems - Automatic. Is the repair complete?	Go to **Step 16**	-
14	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 16**	-
15	Repair the temperature door operation. Is the repair complete?	Go to **Step 16**	-
16	Operate the system in order to verify the repair. Did you find and correct the condition?	System OK	Go to **Step 2**

HEATING PERFORMANCE DIAGNOSTIC (BODY VIN TYPE 3)

Heating Performance Diagnostic (Body VIN Type 3)

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 **Symptoms - HVAC Systems - Manual** or **Symptoms - HVAC Systems - Automatic**
2	1. Start the engine. 2. Allow the engine to idle. Does the engine reach a normal operating temperature?	Go to **Step 3**	Go to **Step 9**
3	**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 I/P PANEL air outlet. 2. Secure a thermometer to the heater core outlet hose. 3. Select the PANEL mode. 4. Select the maximum blower speed. 5. Select the warmest temperature setting. 6. Record the temperature at the following locations: • The center I/P PANEL air outlet • The heater core outlet hose 7. Compare the recorded temperatures. Are the 2 temperature readings about equal?	Go to **Step 5**	Go to **Step 6**
5	1. Inspect and repair the following areas of the vehicle for cold air leaks: • The cowl • The recirculation door • The HVAC module case 2. Perform the necessary repairs. Are the repairs complete?	Go to **Step 10**	-
6	1. Inspect the temperature door operation. Refer to **Diagnostic System Check - HVAC Systems - Manual** or **Diagnostic System Check - 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 usual.			
1	Were you sent here from Symptoms or another diagnostic table?	Go to **Step 2**	Go to **Symptoms - HVAC Systems - Manual** or **Symptoms - 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 4**	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**
	Repair the A/C compressor clutch. Refer to **HVAC Compressor Clutch Does Not Engage** in HVAC		

6	Systems-Automatic or to **HVAC Compressor Clutch Does Not Engage** in HVAC Systems-Manual. 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 or to **Air Delivery Improper** in HVAC Systems - Manual. Is the repair complete?	Go to **Step 14**	-
11	Repair the heating concern. Refer to **Heating Performance Diagnostic (Body VIN Type 6)** or **Heating Performance Diagnostic (Body VIN Type 3)**. 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 or to **Air Recirculation Malfunction** in HVAC Systems - Manual. 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 - AUXILIARY BLOWER MOTOR

Noise Diagnosis - Auxiliary Blower Motor

Step	Action	Yes	No
DEFINITION: Noise originating from the auxiliary blower motor.			
1	Were you sent here from Symptoms or another diagnostic table?	Go to **Step 2**	Go to **Symptoms - HVAC Systems - Manual** or **Diagnostic System Check - HVAC Systems - Automatic**
	1. Sit inside the vehicle.		

2	2. Close the vehicle doors and windows. 3. Turn ON the ignition, with the engine OFF. 4. Cycle the auxiliary blower motor through all of the speeds and modes in order to determine where and when the noise occurs. Is a noise evident during auxiliary blower operation?	Go to **Step 3**	Go to **Step 10**
3	Does the noise vary with the auxiliary blower speed?	Go to **Step 4**	Go to **Step 5**
4	Inspect for excessive vibration at each auxiliary blower motor speed by feeling the auxiliary blower case. Is excess vibration present?	Go to **Step 5**	Go to **Step 10**
5	1. Remove the auxiliary blower motor. Refer to **Blower Motor Replacement - Auxiliary (Body VIN Type 6)** or **Blower Motor Replacement - Auxiliary (Body VIN Type 3)**. 2. Inspect the auxiliary blower motor for deposits of foreign material. Did you find foreign material on the auxiliary blower motor?	Go to **Step 7**	Go to **Step 6**
6	Inspect the auxiliary 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 8**	Go to **Step 9**
7	Remove the foreign material. Is the action complete?	Go to **Step 9**	-
8	Replace the auxiliary blower motor. Refer to **Blower Motor Replacement - Auxiliary (Body VIN Type 6)** or **Blower Motor Replacement - Auxiliary (Body VIN Type 3)**. Is the action complete?	Go to **Step 10**	-
9	Install the auxiliary blower motor. Refer to **Blower Motor Replacement - Auxiliary (Body VIN Type 6)** or **Blower Motor Replacement - Auxiliary (Body VIN Type 3)**. Is the action 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**

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 - Manual** or to **Symptoms - HVAC Systems - Automatic**
2	1. Sit inside the vehicle. 2. Close the vehicle doors and windows. 3. Turn ON the ignition switch, with the engine OFF. 4. Cycle through all the blower motor speeds and modes in order to determine where noise occurs. Is the noise evident during blower operations?	Go to **Step 3**	Go to **Step 10**
3	Does the noise vary with the blower speed?	Go to **Step 4**	Go to **Step 10**
4	Inspect for excess vibration at each blower motor speed by feeling the blower case. Is excess vibration present?	Go to **Step 5**	Go to **Step 10**
5	1. Remove the blower motor. Refer to **Blower Motor Replacement**. 2. Inspect the blower motor for deposits of foreign material. Did you find any foreign material on the blower motor?	Go to **Step 7**	Go to **Step 6**
6	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 8**	Go to **Step 9**
7	Remove the foreign material. Is the action complete?	Go to **Step 10**	-
8	Replace the blower motor. Refer to **Blower Motor Replacement**. Is the action complete?	Go to **Step 10**	-
	Install the blower motor. Refer to **Blower Motor**		

9	**Replacement**. Is the action 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**

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 - Manual** in HVAC Systems Manual or **Symptoms - HVAC Systems - Automatic** in HVAC Systems Automatic
2	1. A/C system noises can be generally categorized into three areas: • Screeching, squealing or chirping noises • Moaning noises • Vibration/Rattle noises 2. Start the engine. 3. Ensure that the A/C is ON. Do you hear a screeching, squealing noise when you engage the A/C?	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. 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. 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 23**	Go to **Step 7**

7	Is the A/C compressor clutch slipping?	Go to **Step 23**	Go to **Step 8**
8	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. Start 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 24**
14	1. Idle the engine in PARK with the A/C compressor clutch engaged. 2. Using a stethoscope, move around the entire A/C system listening 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 24**
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 24**	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 23**	Go to **Step 25**
17	Repair the oil leak. Refer to the appropriate repair procedure in Engine Mechanical. Is the repair complete?	Go to **Step 25**	-
18	Replace the drive belt. Refer to **Drive Belt Replacement** in Engine Mechanical. Is the replacement complete?	Go to **Step 25**	-
19	Replace the drive belt tensioner. Refer to **Drive Belt Tensioner Replacement** in Engine Mechanical.		

	Is the replacement complete?	Go to **Step 25**	-
20	Repair or replace the A/C compressor mounting component. Is the repair complete?	Go to **Step 25**	-
21	Repair or replace the component which is causing the moaning concern as needed. Is the repair complete?	Go to **Step 25**	-
22	Correctly route or insulate the A/C component. Is the repair complete?	Go to **Step 25**	-
23	Replace the A/C compressor. Refer to **Compressor Replacement (Short Wheel Base)** or **Compressor Replacement (Long Wheel Base)**. Is the replacement complete?	Go to **Step 25**	-
24	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 25**	-
25	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 - Manual** or **Symptoms - HVAC Systems - Automatic**
2	1. Start the engine. 2. Cycle through all of the following: • Blower motor speeds • HVAC Modes • Temperature control settings 3. Attempt to define 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 I/P carrier. Refer to **Instrument Panel (I/P) Carrier Replacement** in Instrument Panel, Gages and Console. Is the action complete?	Go to **Step 7**	-
7	1. Inspect the air flow doors for proper operation. 2. Inspect the ducts for obstructions or foreign materials. Were any of these conditions found?	Go to **Step 12**	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 10**	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, Gages 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 - Manual** or 49126
	1. Sit inside the vehicle. 2. Close all of the doors and windows. 3. Start the engine. 4. Allow the engine idle at normal operating temperature.		

2	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 filter and the air inlet 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: 1. Water leaks around the windshield 2. Blockage of the HVAC module drain 3. 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**
	1. Inspect the engine compartment for any leaks. Refer to the following procedures: • **Oil Leak Diagnosis** in Engine		

13	Mechanical - 4.2L • **Fluid Leak Diagnosis** in Automatic Transmission - 4L 60-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. See **Special Tools and Equipment**. 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.

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. See **Special Tools and Equipment**. Always recharge the A/C System with the proper amount of R-134a. Refer to **Refrigerant System Capacities** for the correct amount.

A/C Refrigerant System Oil Charge Replenishing

If oil was removed from the A/C system during the recovery process or due to component replacement, the oil must be replenished. Oil can be injected into a charged system using **J 45037** . See **Special Tools and Equipment**. For the proper quantities of oil to add to the A/C refrigerant system, refer to **Refrigerant System Capacities**.

FLUSHING (SHORT WHEEL BASE)

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 41459** Leak Detection Dye Injector. 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 contaminants:

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

Procedure

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 (Short Wheel Base)** or **Expansion (Orifice) Tube Replacement (Long Wheel Base)**.
3. Connect the A/C lines with the orifice tube removed.
4. Remove the A/C compressor. Refer to **Compressor Replacement (Short Wheel Base)** or **Compressor Replacement (Long Wheel Base)**.
5. Install J 45268-2 to the A/C compressor hose assembly.

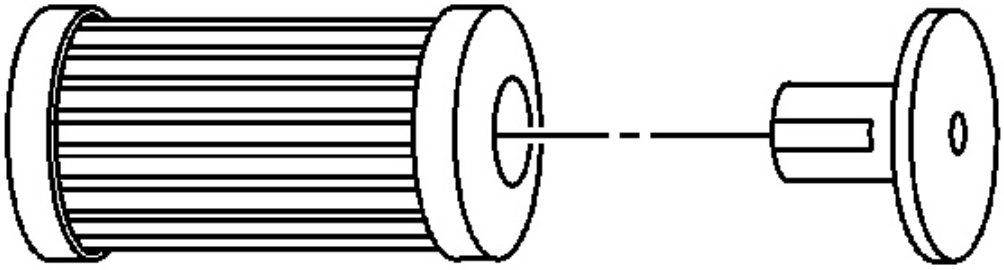


Fig. 4: View Of A/C Filter And Check Valve
Courtesy of GENERAL MOTORS CORP.

6. 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.

   2. Connect the blue hose from **J 43600** to J 45268-1 flush filter adapter. See **Special Tools and Equipment**.
   3. Connect the red hose from **J 43600** to J 45268-5. See **Special Tools and Equipment**.
7. 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.
   2. Connect J 45268-1 flush filter to the discharge port of J 45268-5 flush adapter.
   3. Connect the blue hose from **J 43600** to J 45268-1 flush filter adapter. See **Special Tools and Equipment**.
   4. Connect 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.

8. Flush the front A/C system. Follow the instructions supplied with the **J 43600** . See **Special Tools and Equipment**.
9. Remove J 45268-4 from the A/C compressor hose assembly.

   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.

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

Tighten: Tighten the drain plug to 20 N.m (15 ft. lb.).

4. Add the total system capacity of PAG oil to the A/C compressor. Refer to **Refrigerant System Capacities**.

11. If you will replace the A/C compressor after flushing the system, perform the following procedure:
    1. Determine if the new service compressor is shipped with PAG oil. Refer to the **Refrigerant System Capacities**.
    2. The service compressor is shipped with PAG oil, DO NOT drain the new PAG oil from the compressor.
    3. Deduct the amount of PAG oil shipped with the service compressor from the amount of PAG oil listed in the capacities table. Refer to **Refrigerant System Capacities**.
    4. Add the calculated amount to the compressor, as needed.
12. Install the A/C compressor. Refer to **Compressor Replacement (Short Wheel Base)** or **Compressor Replacement (Long Wheel Base)**.
13. Inspect the orifice tube for debris. Clean or replace as needed.
14. Install the orifice tube. Refer to **Expansion (Orifice) Tube Replacement (Short Wheel Base)** or **Expansion (Orifice) Tube Replacement (Long Wheel Base)**.
15. Evacuate and recharge the A/C system. Refer to **Refrigerant Recovery and Recharging**.

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

16. Add one bottle of **J 41447** using. See **Special Tools and Equipment**.**J 41459** . See **Special Tools and Equipment**.
17. Leak test the fittings using **J 42220** . See **Special Tools and Equipment**.

FLUSHING (LONG WHEEL BASE)

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 41459** Leak Detection Dye Injector. See **Special Tools and Equipment**.
- **J 42220** Universal 12 V 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 contaminants:

- Contaminated PAG oil

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

Procedure

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 (Short Wheel Base)** or **Expansion (Orifice) Tube Replacement (Long Wheel Base)**.
3. Connect the A/C lines with the orifice tube removed.
4. Remove the A/C compressor. Refer to **Compressor Replacement (Short Wheel Base)** or **Compressor Replacement (Long Wheel Base)**.
5. Inspect the end of the suction hose for a suction screen.
6. Remove the suction screen, if installed.
7. Install J 45268-2 to the A/C compressor hose assembly.

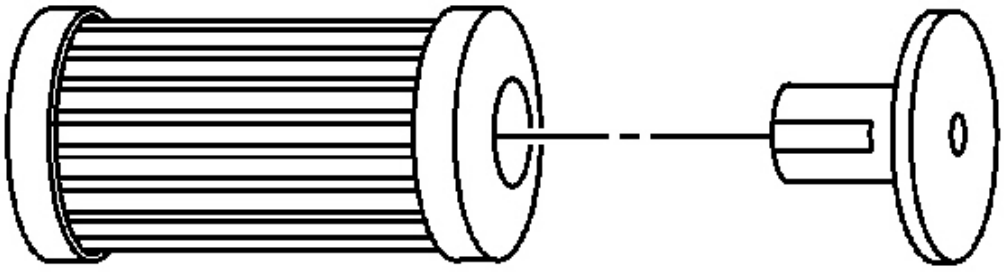


Fig. 5: View Of A/C Filter And Check Valve
Courtesy of GENERAL MOTORS CORP.

8. 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 45268-2 flush adapter.

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

9. Reverse flow refrigerant flushing is recommended for desiccant bag failure. Perform the following procedure and replace the accumulator when the flush procedure 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.
   2. Connect J 45268-1 flush filter to the discharge port of J 45268-2 flush adapter.
   3. Connect the blue hose from **J 43600** to J 45268-1 flush filter adapter. See **Special Tools and Equipment**.
   4. Connect the red hose from **J 43600** to the suction port of J 45268-2 flush adapter. See **Special Tools and Equipment**.

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

10. Flush the front A/C system. Follow the instructions supplied with the **J 43600** . See **Special Tools and Equipment**.

    IMPORTANT: Flush the front A/C system before flushing the auxiliary A/C system.

11. If the vehicle is equipped with rear A/C, flush the auxiliary A/C system separately.

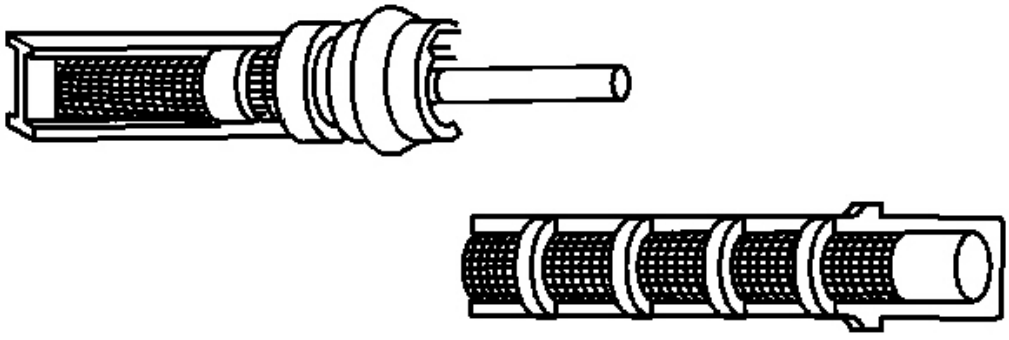


Fig. 6: Accessing End Of Orifice Tube
Courtesy of GENERAL MOTORS CORP.

12. Cut the orifice tube frame and screen, enough to access the end of the orifice tube. Pinch off the orifice tube.

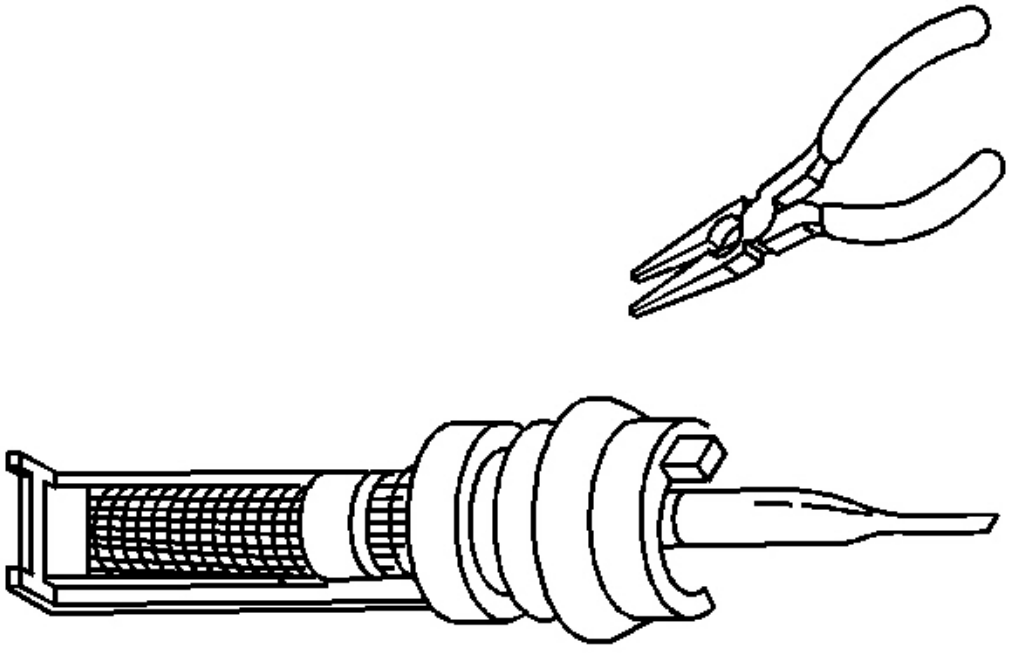


Fig. 7: Installing Pinched Orifice Tube
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Pinch off the orifice tube in order to prevent refrigerant flow to the front system during the auxiliary system flush.

13. Install the pinched orifice tube. Refer to **Expansion (Orifice) Tube Replacement (Short Wheel Base)** or **Expansion (Orifice) Tube Replacement (Long Wheel Base)**.
14. Remove the auxiliary TXV. Refer to **Thermal Expansion Valve Replacement - Auxiliary**.
15. Install J 45268-108.

IMPORTANT: The auxiliary evaporator core can be flushed without totally reassembling into the auxiliary HVAC module.

16. Install the auxiliary evaporator core to the A/C lines.
17. Raise the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
18. Connect the auxiliary A/C lines to the auxiliary evaporator core.
19. Lower the vehicle.
20. Flush the auxiliary A/C system. Follow the instructions supplied with the **J 43600** . See **Special Tools**

and Equipment.

21. Raise the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
22. Remove the auxiliary A/C lines from the auxiliary evaporator core.
23. Lower the vehicle.
24. Remove J 45268-108.
25. Inspect the TXV for debris.

    Clean or replace as needed.

26. Install the auxiliary TXV. Refer to **Thermal Expansion Valve Replacement - Auxiliary**.
27. Remove J 45268-2 from the A/C compressor hose assembly.

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.

28. If the removed A/C compressor is being reinstalled, perform the following procedure:
    1. Remove the A/C compressor drain plug.
    2. Drain the PAG oil from the A/C compressor.

       Rotate the compressor input shaft to assist in draining the PAG oil from the compressor.

       NOTE: Refer to Fastener Notice in Cautions and Notices.

    3. Install the A/C compressor drain plug.

       Tighten: Tighten the drain plug to 20 N.m (15 ft. lb.).

    4. Add the total system capacity of PAG oil to the A/C compressor. Refer to **Refrigerant System Capacities**.
29. If you will replace the A/C compressor after flushing the system, perform the following procedure:
    1. Determine if the new service compressor is shipped with PAG oil. Refer to the **Refrigerant System Capacities**.
    2. If the service compressor is shipped with PAG oil, DO NOT drain the new PAG oil from the compressor.
    3. Deduct the amount of PAG oil shipped with the service compressor from the amount of PAG oil listed in the capacities table. Refer to **Refrigerant System Capacities**.
    4. Add the calculated amount to the compressor, as needed.
    5. If the service compressor is shipped dry, no calculation is required. Add the total system capacity of PAG oil to the compressor. Refer to **Refrigerant System Capacities**.
30. Install the A/C compressor. Refer to **Compressor Replacement (Short Wheel Base)** or **Compressor Replacement (Long Wheel Base)**.
31. Install a new orifice tube. Refer to **Expansion (Orifice) Tube Replacement (Short Wheel Base)** or

Expansion (Orifice) Tube Replacement (Long Wheel Base).

32. Evacuate and recharge the A/C system. Refer to **Refrigerant Recovery and Recharging**.

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

33. Add one bottle of **J 41447** using. See **Special Tools and Equipment**.**J 41459** . See **Special Tools and Equipment**.
34. Leak test the fittings using **J 42220** . See **Special Tools and Equipment**.

COMPRESSOR OIL BALANCING

Draining Procedure

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.

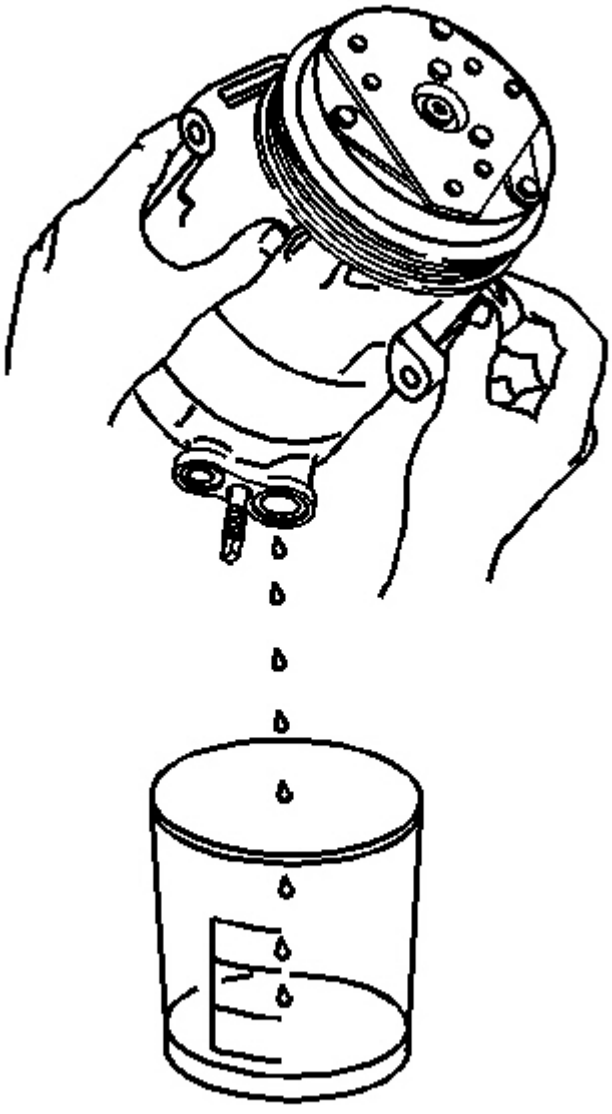


Fig. 8: Draining A/C Refrigerant Oil From Compressor
Courtesy of GENERAL MOTORS CORP.

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 Procedure

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

1. The replacement compressor is shipped with 240 ml (8.0 oz) of refrigerant oil.

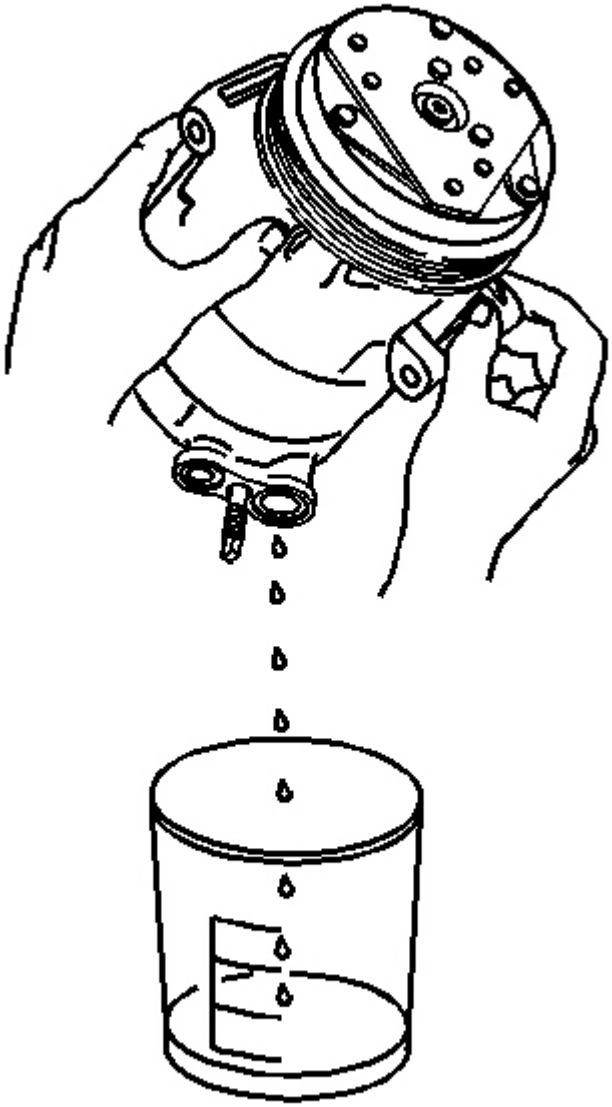


Fig. 9: Draining A/C Refrigerant Oil From Compressor

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 (SHORT WHEEL BASE)

Tools Required

J 39400-A Halogen Leak Detector

Removal Procedure

1. Recover the refrigerant. Refer to **Refrigerant Recovery and Recharging**.
2. Remove the generator. Refer to **Generator Replacement (4.2L Engine)** or **Generator Replacement (5.3L Engine)** in Engine Electrical.
3. Remove the idler pulley. Refer to **Drive Belt Idler Pulley Replacement** in Engine Mechanical-4.2L.
4. Disconnect the compressor electrical connectors.

IMPORTANT: Some system pressure may still exist in the A/C compressor crankcase after you evacuate the system.

5. Remove the compressor hose assembly bolt from the compressor.
6. Remove the compressor hose assembly block from the compressor.

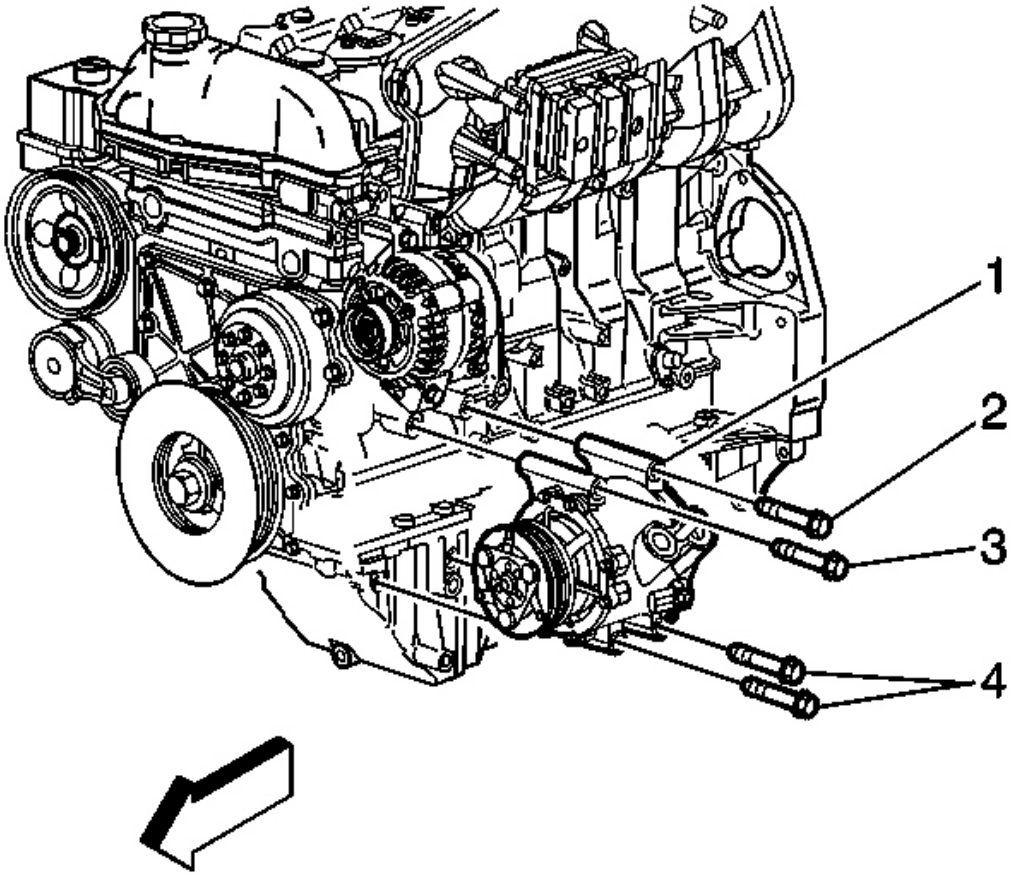


Fig. 10: Removing/Installing Compressor
Courtesy of GENERAL MOTORS CORP.

7. Remove the compressor mounting bolts from the compressor (1).
8. Remove the compressor.
9. Drain and measure the compressor oil. Refer to **Compressor Oil Balancing**.

Installation Procedure

1. Adjust the proper amount of oil to the replacement compressor. Refer to **Refrigerant System Capacities**.
2. Install the compressor.

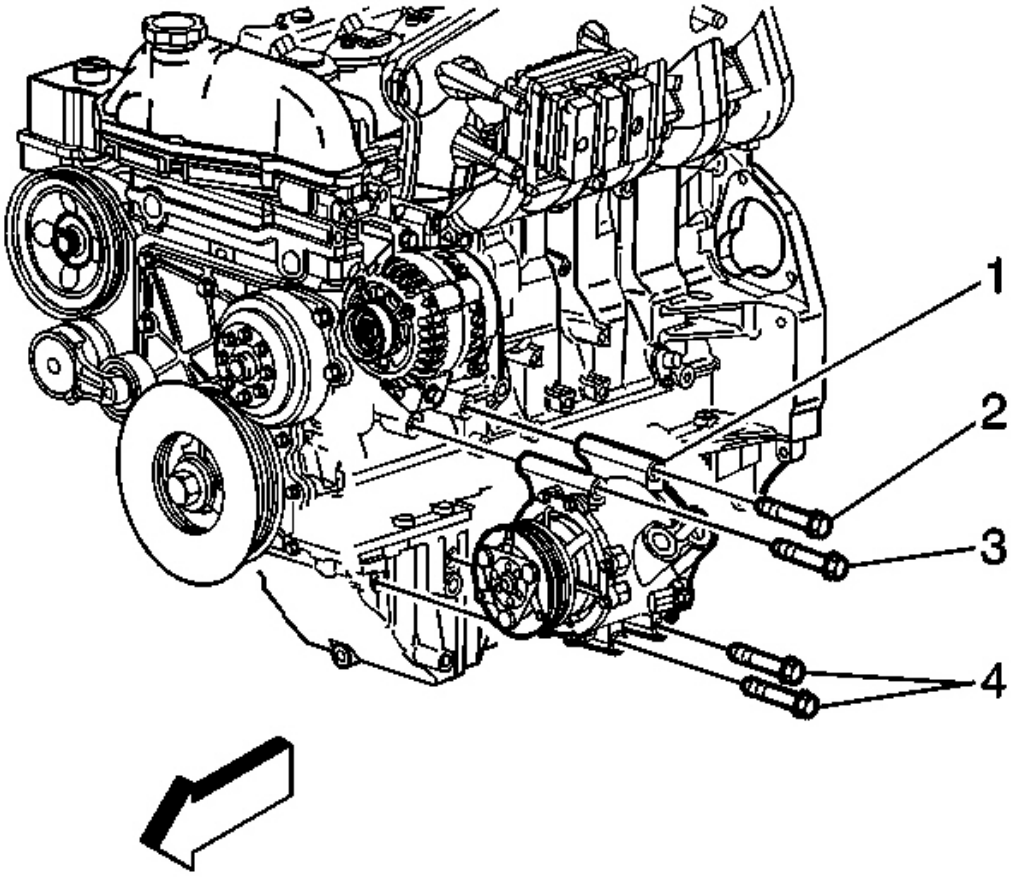


Fig. 11: Removing/Installing Compressor
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Install the compressor mounting bolts to the compressor (1).

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

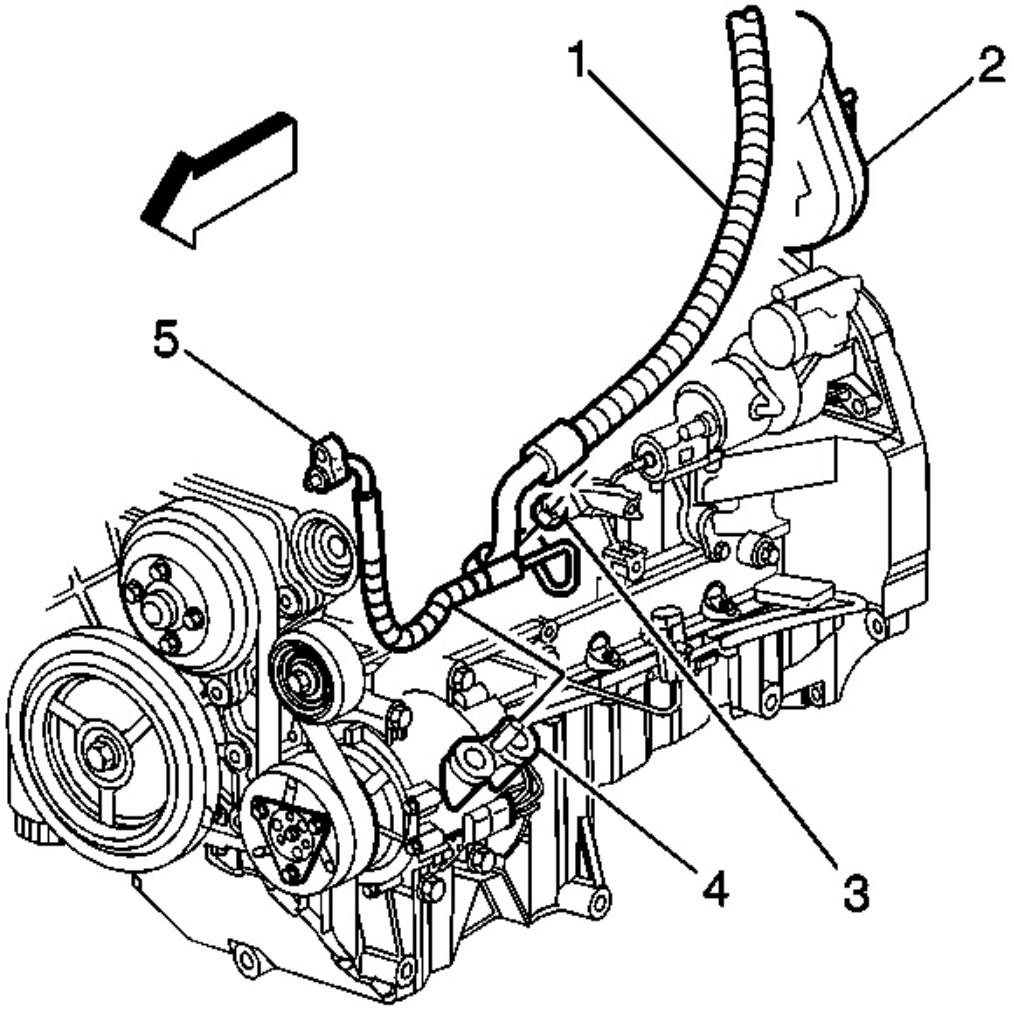


Fig. 12: Removing/Installing Compressor Hose Assembly
Courtesy of GENERAL MOTORS CORP.

4. Install the compressor hose assembly block to the compressor.

   Install the compressor hose assembly bolt to the compressor (1).

   Tighten: Tighten the bolt to 33 N.m (24 ft. lb.).

5. Connect the compressor electrical connectors.
6. Install the idler pulley. Refer to **Drive Belt Idler Pulley Replacement** in Engine Mechanical.

7. Install the generator. Refer to **Generator Replacement (4.2L Engine)** or **Generator Replacement (5.3L Engine)** in Engine Electrical.
8. Evacuate and recharge the A/C system. Refer to **Refrigerant Recovery and Recharging**.
9. Leak test the fittings of the components using the J 39400-A .

COMPRESSOR REPLACEMENT (LONG WHEEL BASE)

Tools Required

J 39400-A Halogen Leak Detector

Removal Procedure

1. Recover the refrigerant. Refer to **Refrigerant Recovery and Recharging**.
2. Drain the cooling system. Refer to **Draining and Filling Cooling System (Body VIN Code 6)** in Engine Cooling.
3. Remove the cooling fan and shroud. Refer to **Cooling Fan and Shroud Replacement** in Engine Cooling.
4. Remove the engine drive belt. Refer to **Drive Belt Replacement - Accessory** in Engine Mechanical 4.8L, 5.3L and 6.0L.
5. Release the tension on the air conditioning drive belt.
6. Reposition the air conditioning drive belt from the compressor pulley.
7. Remove the compressor hose assembly. Refer to **Compressor Hose Assembly Replacement (Short Wheel Base)** or **Compressor Hose Assembly Replacement (Long Wheel Base)**.
8. Remove the lower coolant hose. Refer to **Radiator Hose Replacement - Inlet (Short Wheel Base)** or **Radiator Hose Replacement - Inlet (Long Wheel Base)** in Engine Cooling.

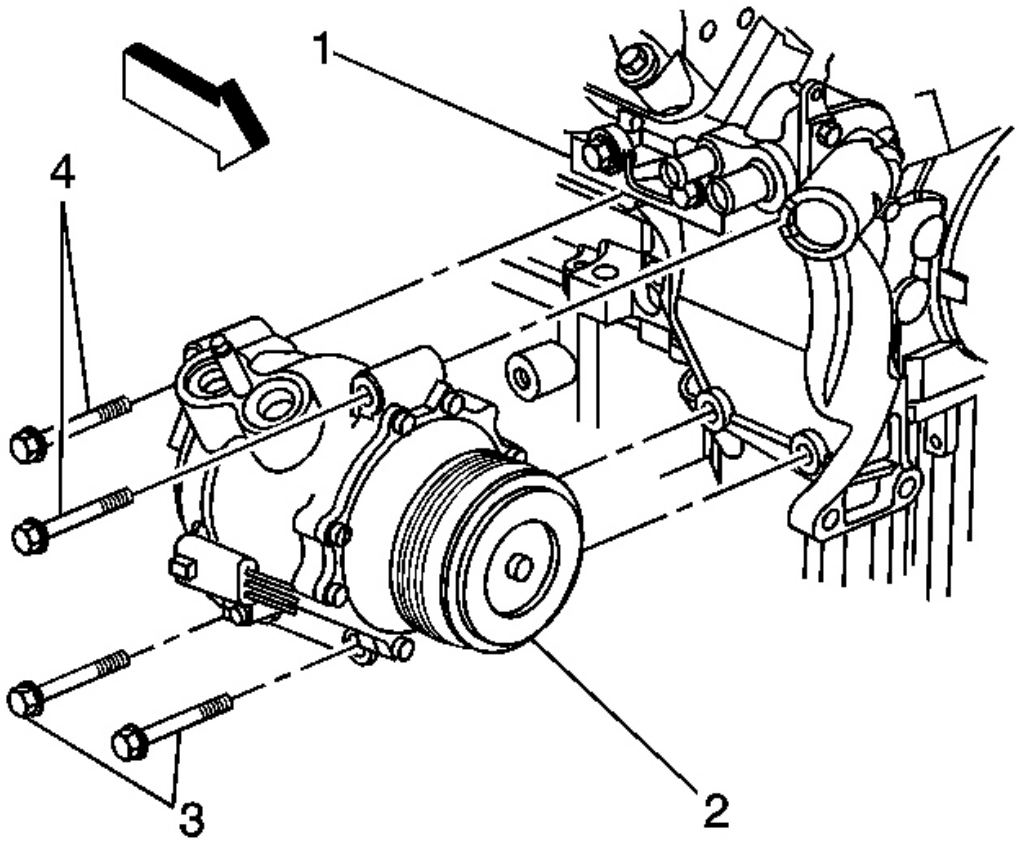


Fig. 13: Removing/Installing Compressor Mounting Bracket Bolts
Courtesy of GENERAL MOTORS CORP.

9. Remove the upper A/C compressor mounting bracket bolts (4).
10. Raise the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
11. Remove the lower A/C compressor mounting bracket bolts (3).
12. Remove the upper A/C compressor mounting bolts.
13. Remove the lower A/C compressor mounting bracket bolts. The accessory drive belt tensioner will be removed with one of the bolts.
14. Remove the last A/C compressor mounting bolt with the compressor removed from the engine.
15. Remove the electrical connection from the compressor.
16. Lower the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
17. Remove the A/C compressor from the bracket.
18. Remove the compressor.

19. If replacing the A/C compressor. Refer to **Compressor Oil Balancing**.

Installation Procedure

1. Adjust the proper amount of PAG oil to the compressor crankcase. Refer to **Refrigerant System Capacities**.
2. Install the A/C compressor.
3. Install the A/C compressor to the bracket.

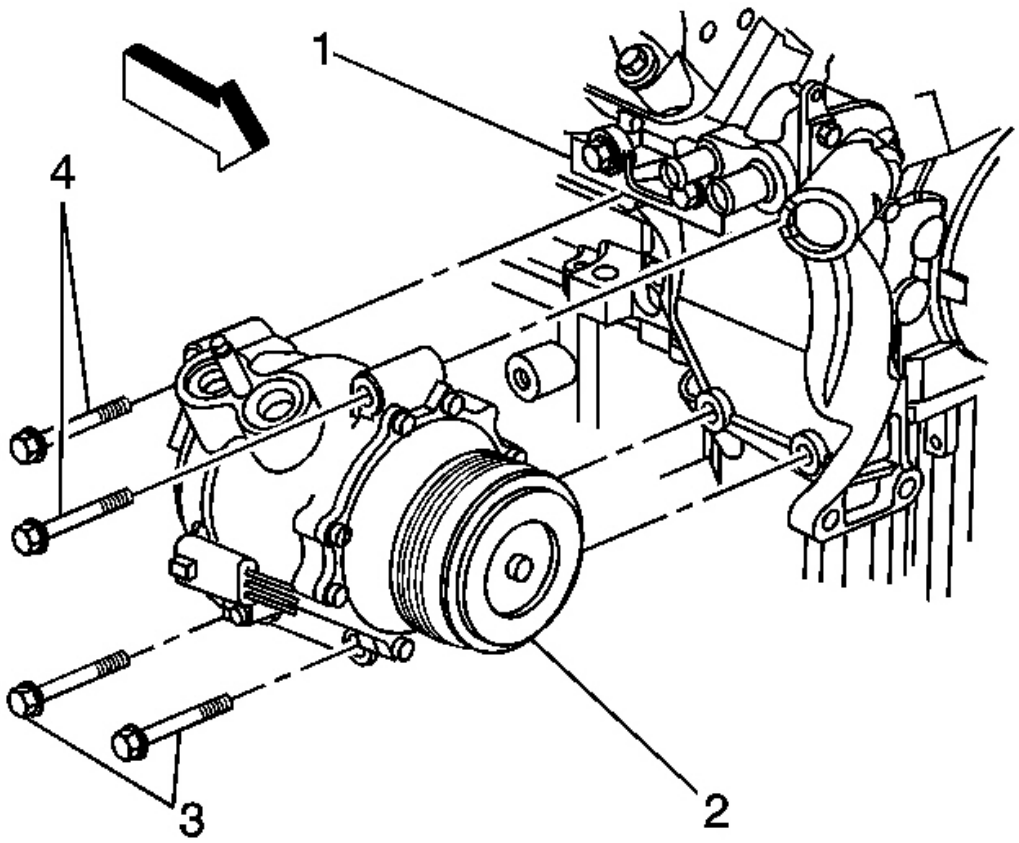


Fig. 14: Removing/Installing Compressor Mounting Bracket Bolts
Courtesy of GENERAL MOTORS CORP.

4. Align the bracket with the long bolts before tightening the compressor (2) to the bracket (1).

NOTE: Refer to Fastener Notice in Cautions and Notices.

5. Install the upper rear compressor mounting bolt.

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

6. Install the accessory drive belt tensioner to the compressor mounting bracket
7. Install the bolts to the accessory drive belt tensioner.

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

8. Raise the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
9. Install the A/C compressor mounting bolts (3).

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

10. Connect the electrical connector to the A/C compressor.
11. Lower the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
12. Install the upper A/C compressor mounting bracket bolts (4).

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

13. Install the compressor hose assembly. Refer to **Compressor Hose Assembly Replacement (Short Wheel Base)** or **Compressor Hose Assembly Replacement (Long Wheel Base)**.
14. Install the lower coolant hose. Refer to **Radiator Hose Replacement - Inlet (SWB (Short Wheel Base))** or **Radiator Hose Replacement - Inlet (LWB (Long Wheel Base))** in Engine Cooling.
15. Install the A/C drive belt. Refer to**Drive Belt Replacement - Air Conditioning** in Engine Mechanical - 4.8L, 5.3L, and 6.0L.
16. Install the engine drive belt. Refer to **Drive Belt Replacement - Accessory** in Engine Mechanical - 4.8L, 5.3L, and 6.0L.
17. Install the fan and shroud. Refer to **Cooling Fan and Shroud Replacement** in Engine Cooling.
18. Fill the cooling system. Refer to **Draining and Filling Cooling System (Body VIN Code 6)** In Engine Cooling.
19. Evacuate and recharge the A/C system. Refer to **Refrigerant Recovery and Recharging**.
20. Leak test the fittings of the component using the J 39400-A .

SEALING WASHER REPLACEMENT

Removal Procedure

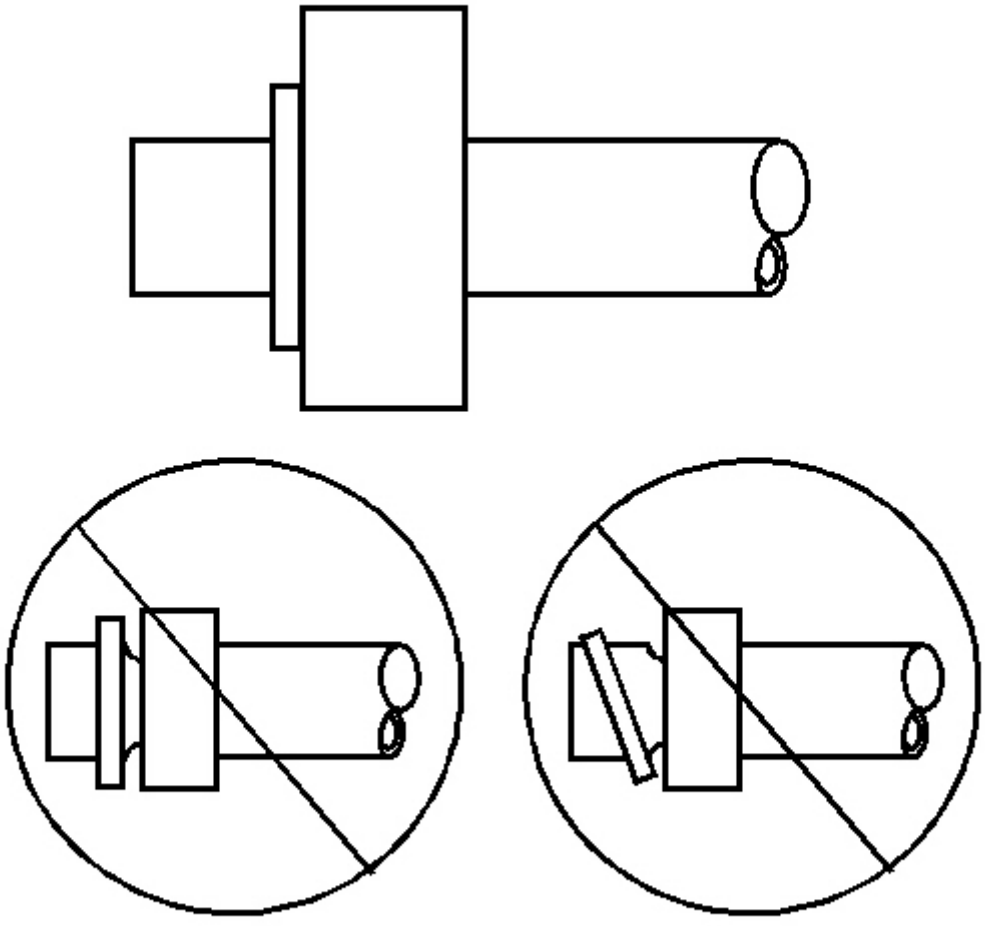


Fig. 15: Identifying Good And Bad Sealing Washer Positions
Courtesy of GENERAL MOTORS CORP.

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.

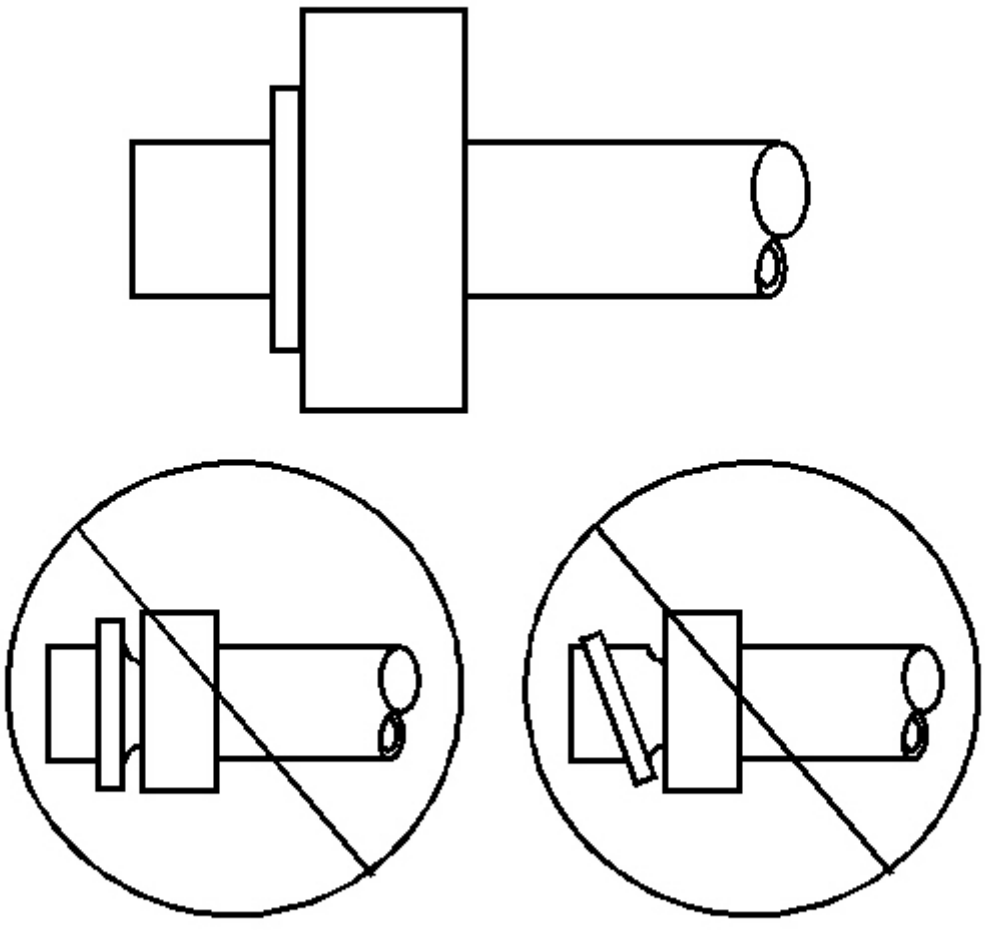


Fig. 16: Identifying Good And Bad Sealing Washer Positions

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

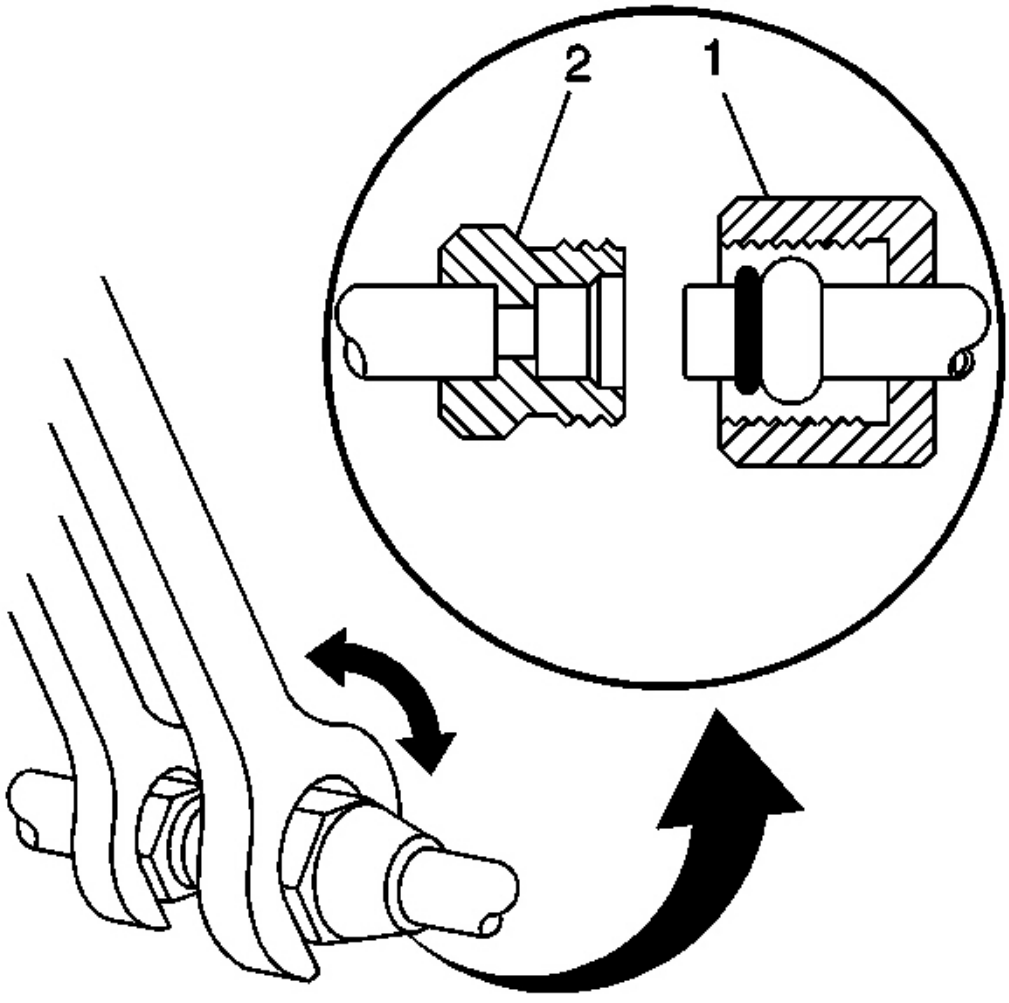


Fig. 17: Disassembling/Reassembling A/C Line Fittings
Courtesy of GENERAL MOTORS CORP.

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.

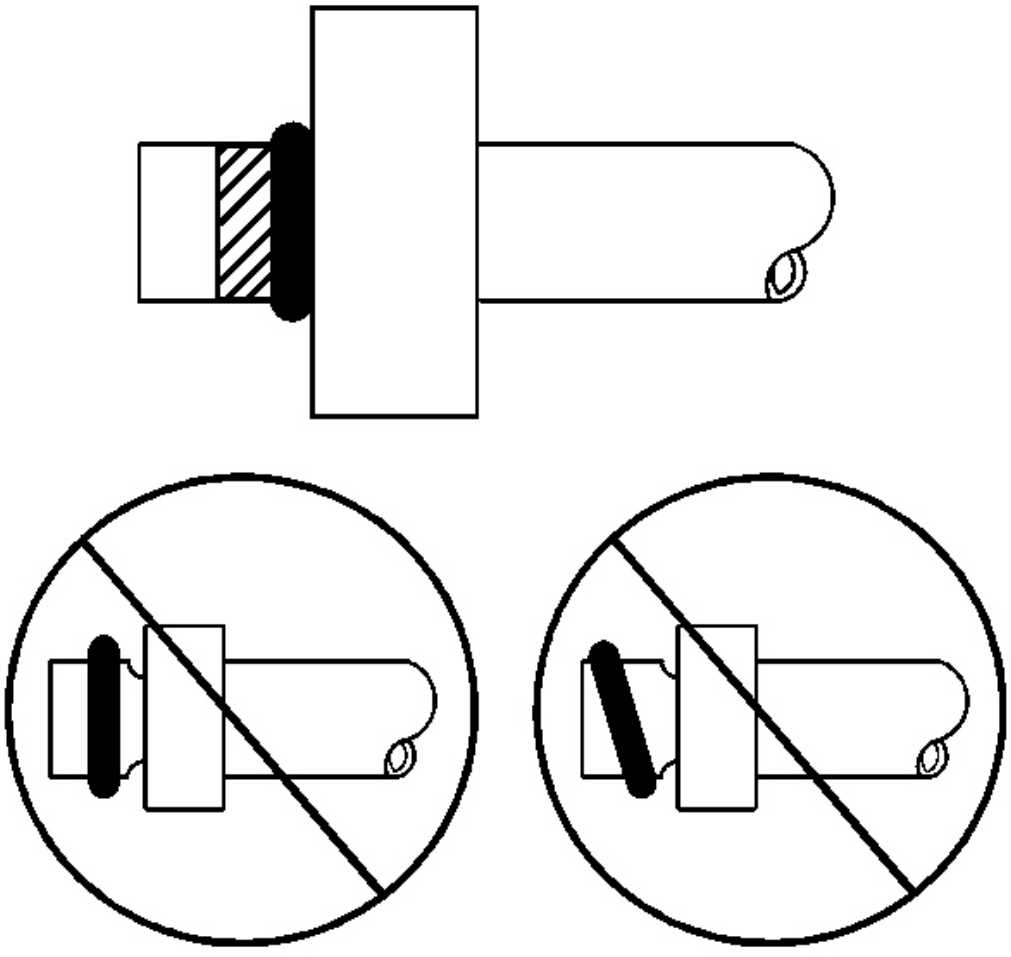


Fig. 18: Identifying Proper Seating Of A/C Refrigerant O-Ring
Courtesy of GENERAL MOTORS CORP.

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

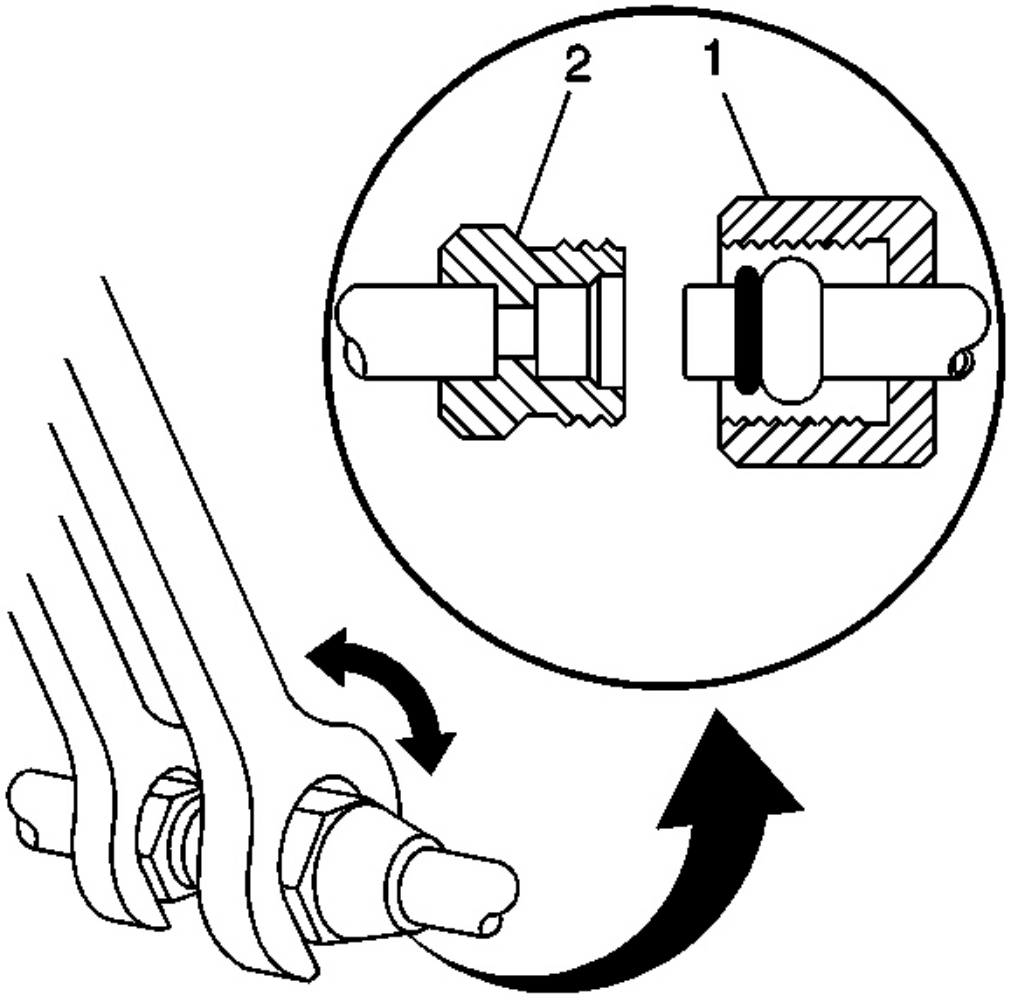


Fig. 19: Disassembling/Reassembling A/C Line Fittings
Courtesy of GENERAL MOTORS CORP.

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.

COMPRESSOR HOSE ASSEMBLY REPLACEMENT (SHORT WHEEL BASE)

Tools Required

J 39400-A Halogen Leak Detector

Removal Procedure

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

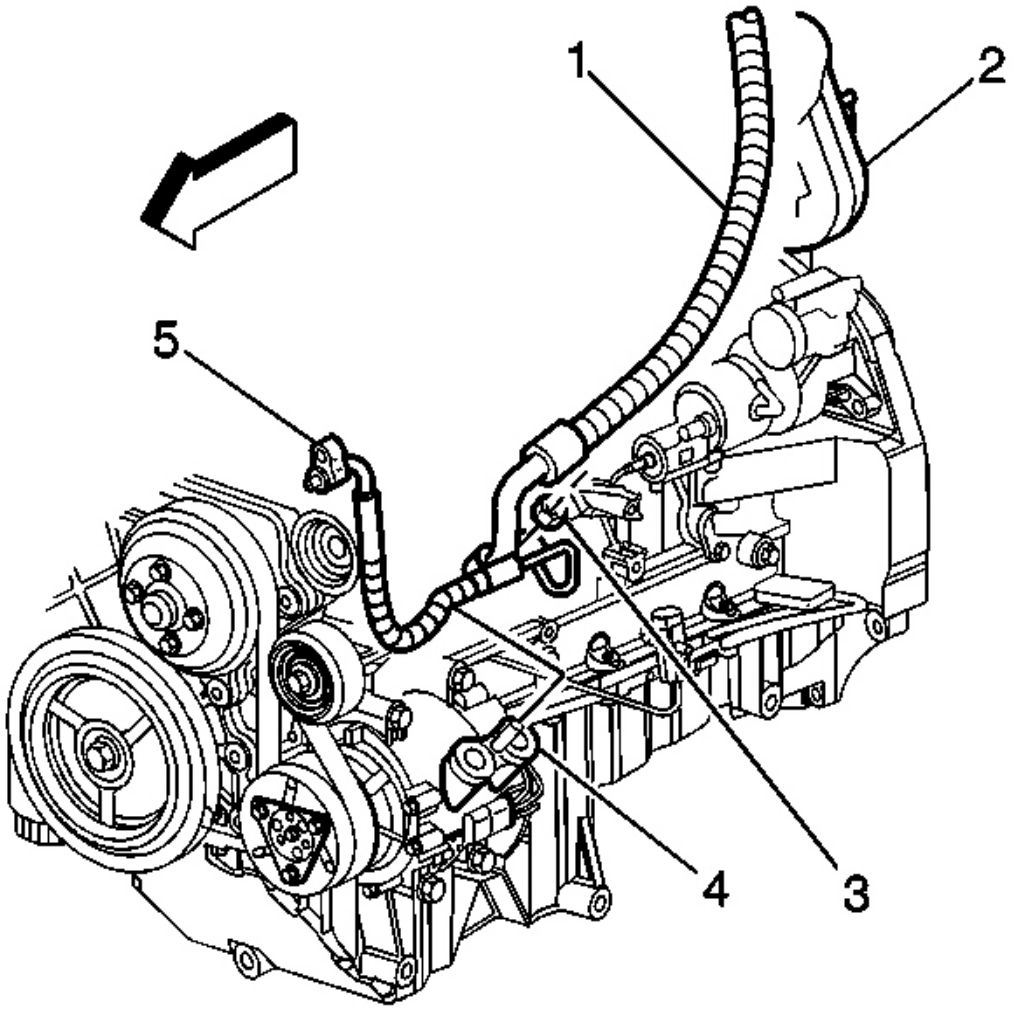


Fig. 20: Removing/Installing Compressor Hose Assembly
Courtesy of GENERAL MOTORS CORP.

2. Remove the compressor hose assembly nut (3).

3. Remove the compressor hose assembly from the compressor (4).
4. Remove the sealing washers.
5. Remove the compressor suction hose nut from the accumulator.
6. Remove the compressor suction hose from the accumulator.
7. Remove the O-ring seal.
8. Remove the bolt from the lift bracket.
9. Remove the nut from the engine stud.

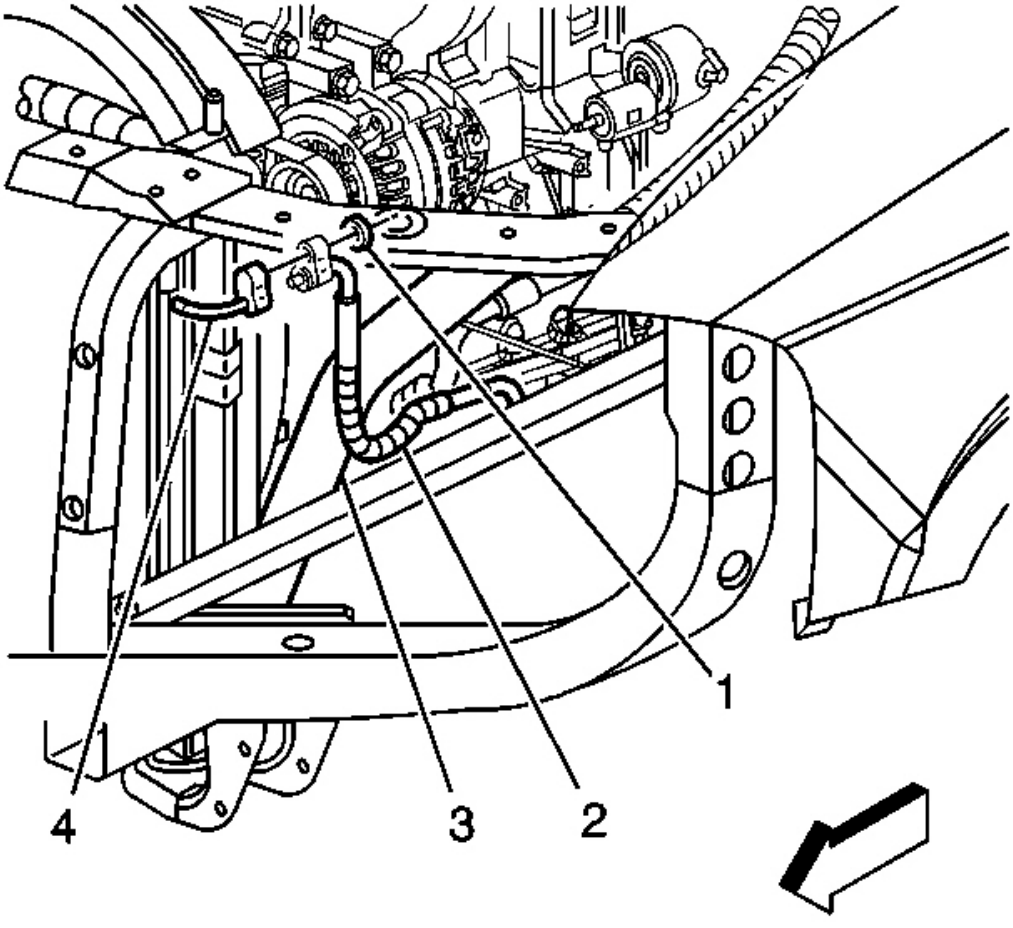


Fig. 21: Removing/Installing Compressor Discharge Hose At Condenser
Courtesy of GENERAL MOTORS CORP.

10. Remove the compressor discharge hose (2) from the condenser (4).

11. Remove the nut from compressor hose connection in driver wheel opening.
12. Remove the O-ring seals.
13. Cap or plug all of the open connections.

Installation Procedure

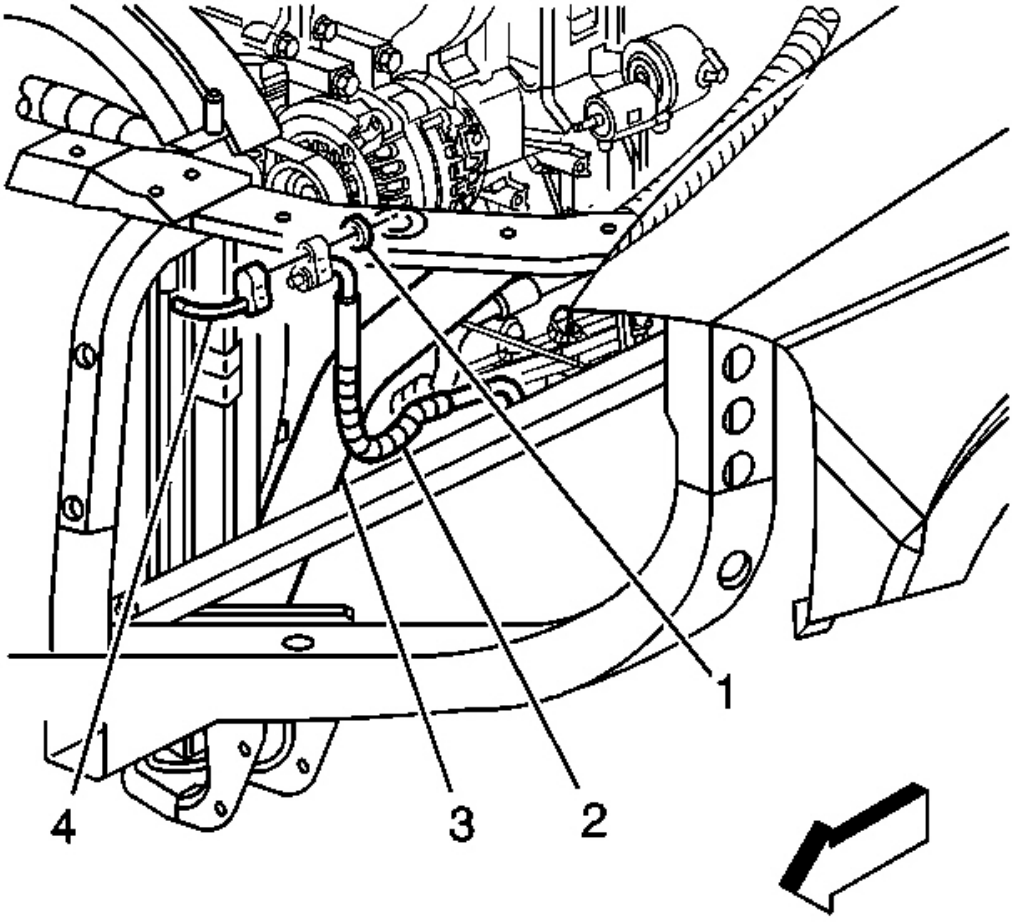


Fig. 22: Removing/Installing Compressor Discharge Hose At Condenser
Courtesy of GENERAL MOTORS CORP.

1. Install new O-ring seals. Refer to **O-Ring Replacement**.
2. Install the compressor discharge hose (2) to the condenser (4).

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Install the compressor discharge hose nut.

   Tighten: Tighten the hose nut to 28 N.m (21 ft. lb.).

4. Install the compressor hose to the connector through the driver wheel opening.
5. Install the nut.

   Tighten: Tighten the nut to 48 N.m (35 ft. lb.).

6. Install the compressor suction hose to the stud on the engine.
7. Install the nut.

   Tighten: Tighten the nut to 48 N.m (35 ft. lb.).

8. Install the compressor suction hose to the engine lift bracket.
9. Install the bolt.

   Tighten: Tighten the bolt to 48 N.m (35 ft. lb.).

10. Connect the compressor suction hose (1) to the accumulator.
11. Install the compressor suction hose nut to the accumulator.

    Tighten: Tighten the nut to 48 N.m (35 ft. lb.).

12. Install the sealing washers. Refer to **Sealing Washer Replacement**.

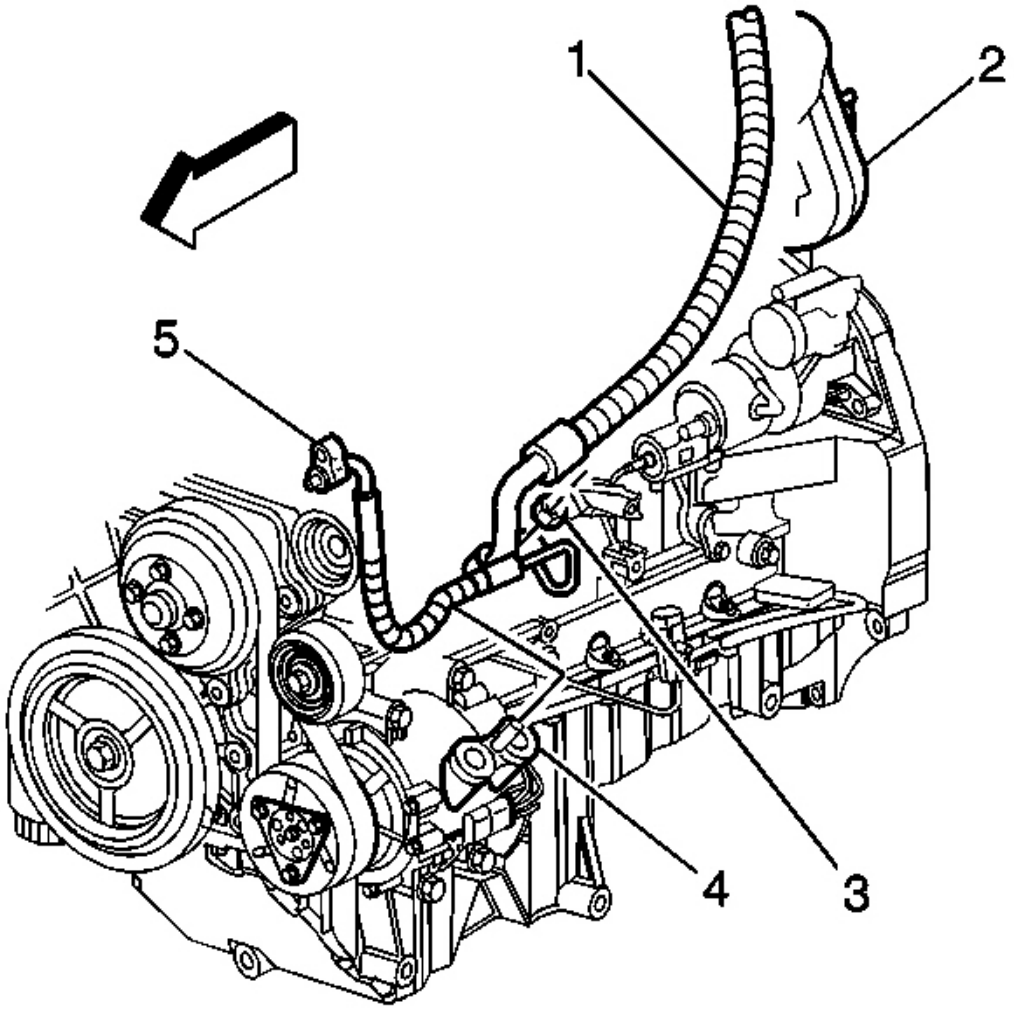


Fig. 23: Removing/Installing Compressor Hose Assembly
Courtesy of GENERAL MOTORS CORP.

13. Connect the compressor hose assembly hose to the compressor (4).
14. Install the compressor hose assembly washers.
15. Install the retaining nut (3).

    Tighten: Tighten the nut to 33 N.m (24 ft. lb.).

16. Evacuate and recharge the A/C system. Refer to **Refrigerant Recovery and Recharging**.
17. Leak test the fittings of the components using the J 39400-A .

COMPRESSOR HOSE ASSEMBLY REPLACEMENT (LONG WHEEL BASE)

Tools Required

J 39400-A Halogen Leak Detector

Removal Procedure

1. Recover the refrigerant. Refer to **Refrigerant Recovery and Recharging**.
2. Remove the washer bottle. Refer to **Washer Solvent Container Replacement** in Wipers/Washer Systems.

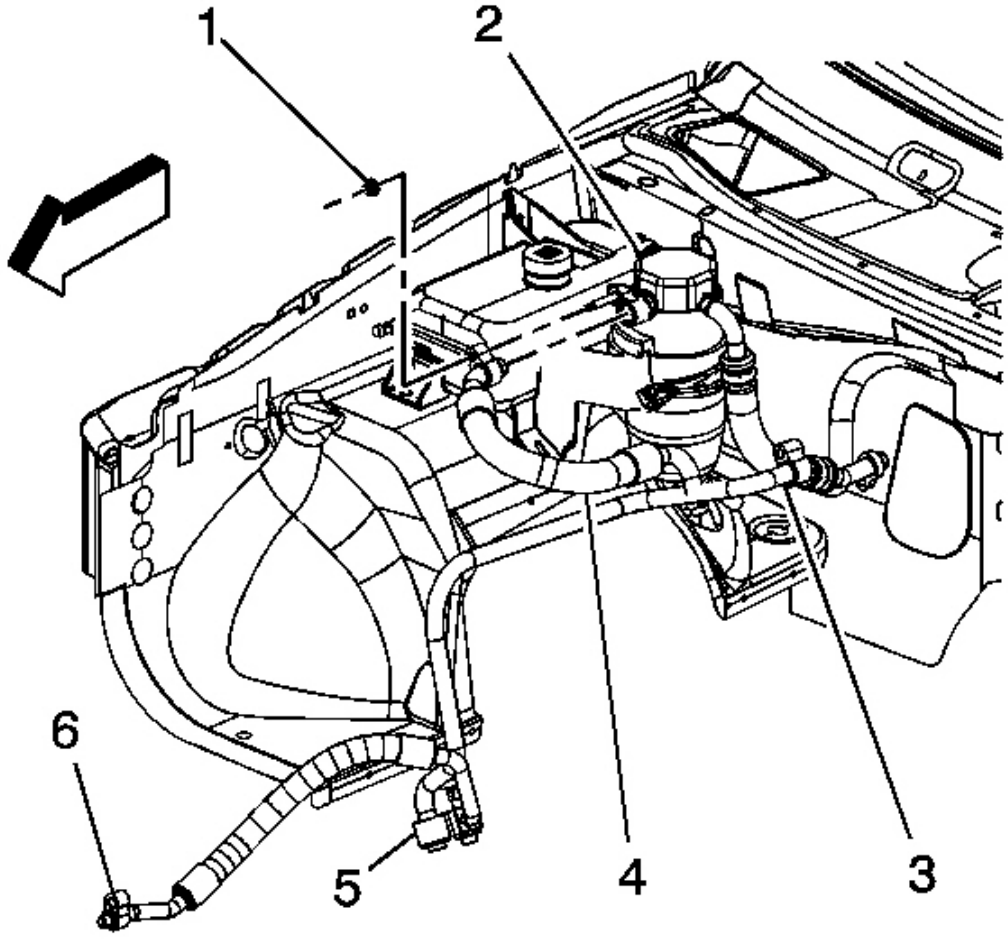


Fig. 24: Removing/Installing Compressor Discharge Hose At Accumulator

Courtesy of GENERAL MOTORS CORP.

3. Remove the retaining nut (1) from the compressor hose (4) at the accumulator (2).
4. Remove the retaining nut from the compressor hose at the auxiliary HVAC piping connection (3).
5. Remove the compressor hose from the accumulator (2).
6. Remove the compressor hose from the auxiliary HVAC piping.
7. Lift the vehicle to access the compressor hose assembly at the compressor. Refer to **Lifting and Jacking the Vehicle** in General Information.

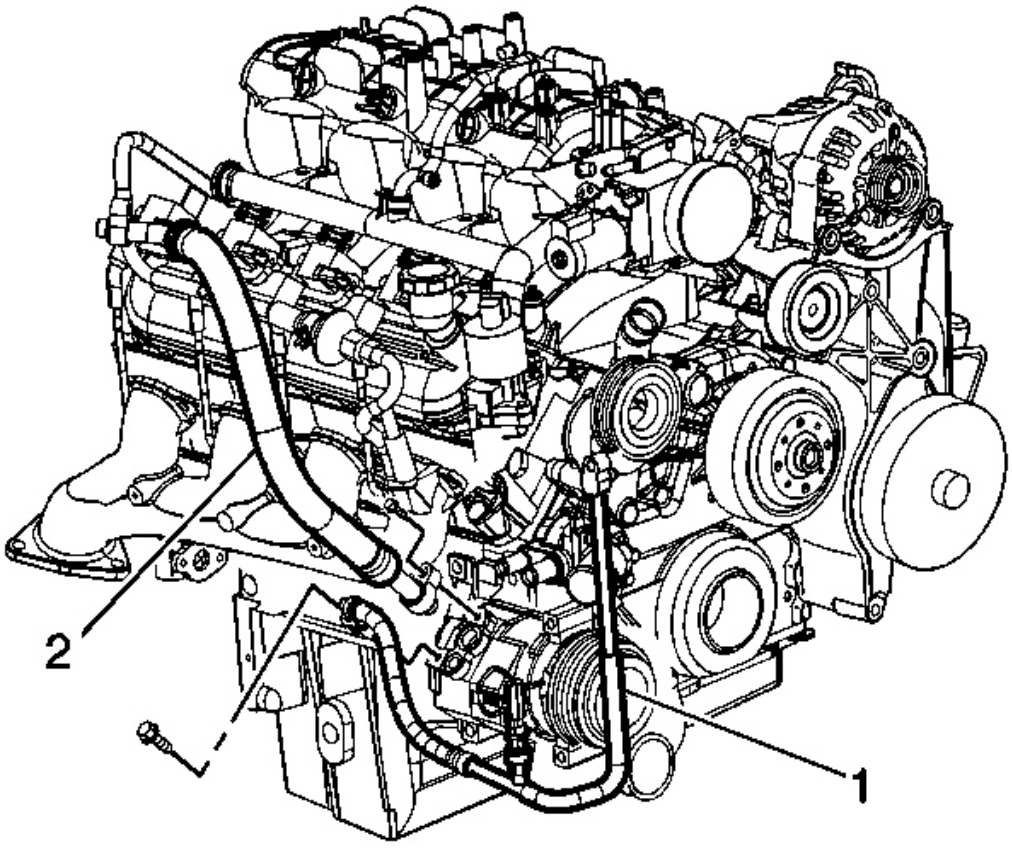


Fig. 25: Identifying Suction/Discharge Hoses To A/C Compressor
Courtesy of GENERAL MOTORS CORP.

8. Remove the compressor hose mounting nut (2) from the A/C compressor.
9. Lower the vehicle.
10. Remove the heater hose bracket nut at the engine.

11. Remove the bracket from the stud.
12. Turn the compressor hose assembly to clear the heat shield.
13. Lift and remove the compressor hose assembly from the compressor.
14. Remove the electrical connection.

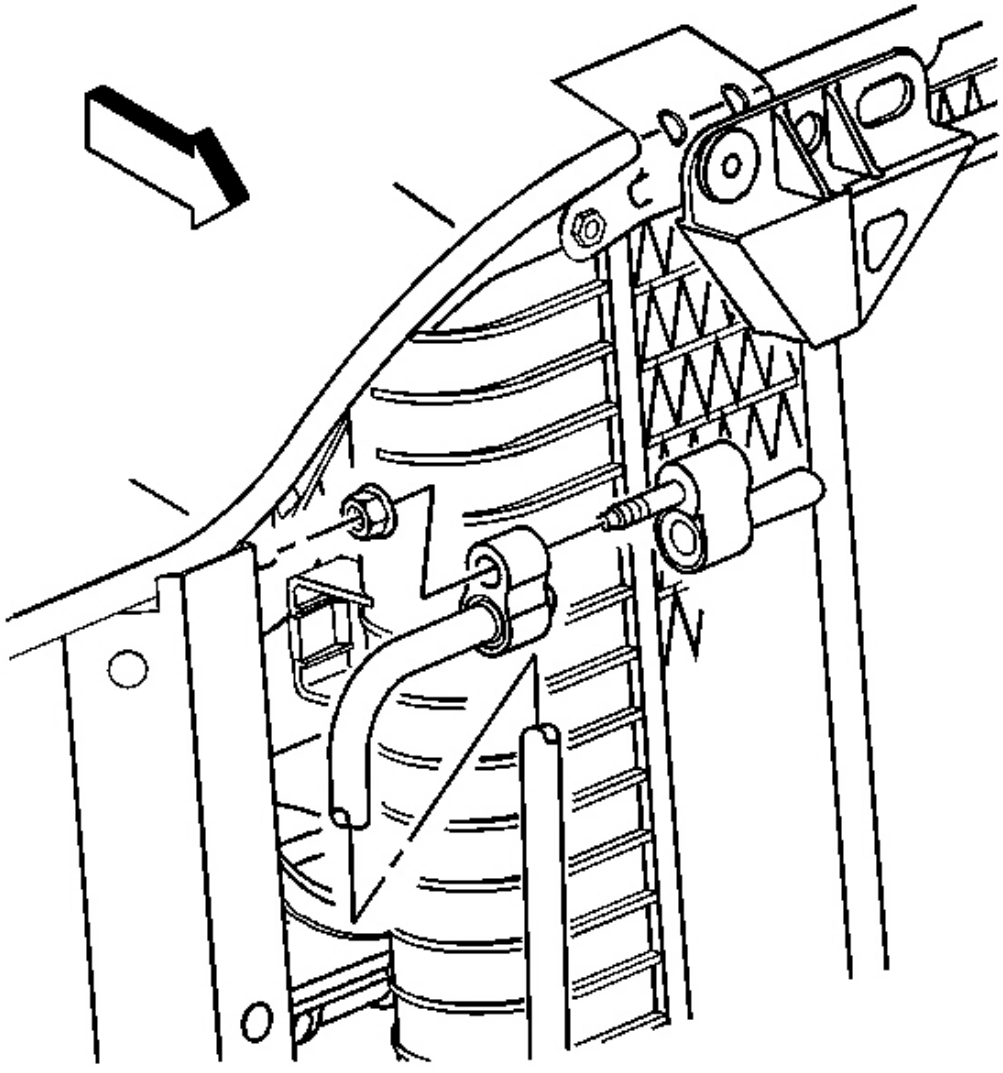


Fig. 26: View Of Discharge Hose At Condenser
Courtesy of GENERAL MOTORS CORP.

15. Remove the compressor hose assembly from the condenser.

16. Remove the compressor hose assembly.
17. Remove the compressor hose from the A/C compressor.
18. Remove the compressor hose from the condenser.
19. Disconnect the electrical connector from the A/C recirculation switch.
20. Remove the nut from the compressor hose at the accumulator.
21. Remove the compressor hose from the accumulator.
22. Remove the compressor hose from the vehicle.
23. Discard all of the used sealing washers. Cap the system openings.

Installation Procedure

1. Install the compressor hose assembly.

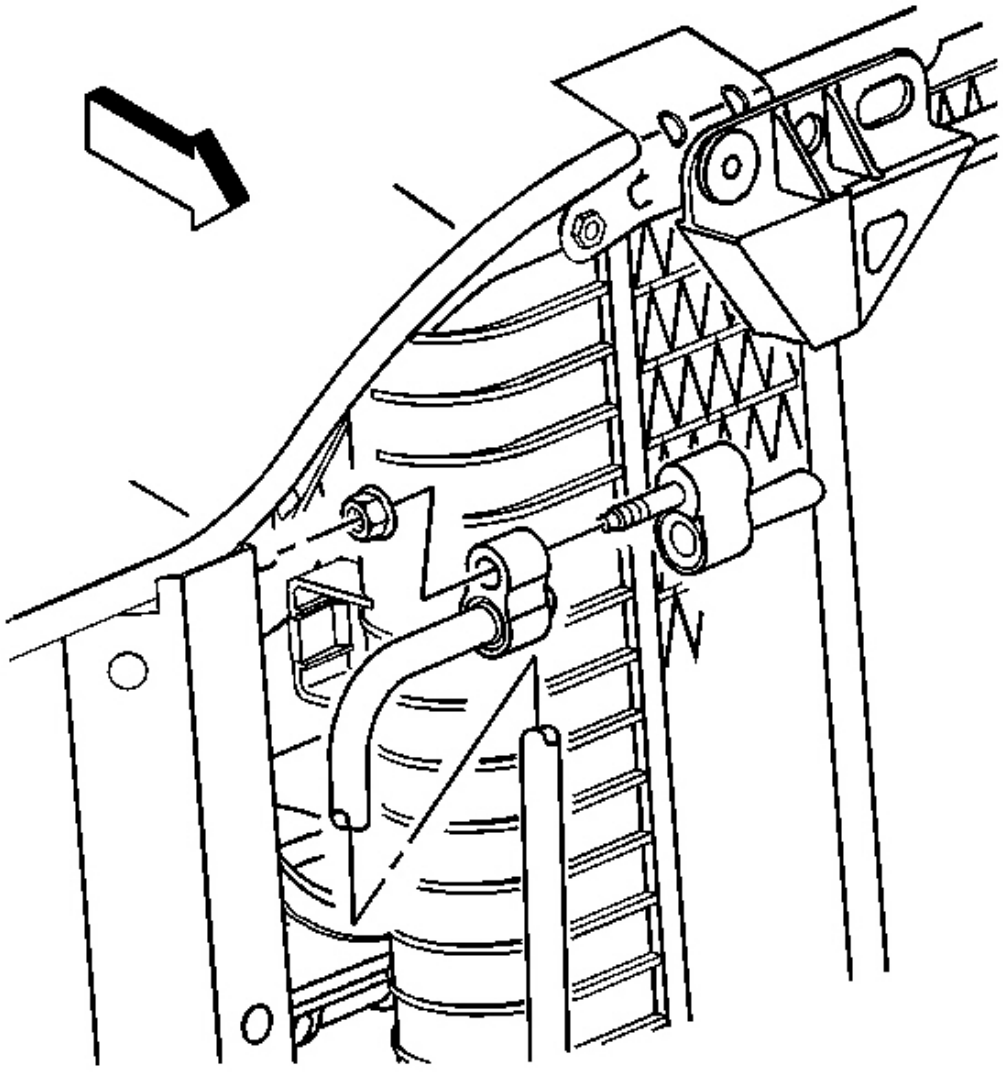


Fig. 27: View Of Discharge Hose At Condenser
Courtesy of GENERAL MOTORS CORP.

2. Install the compressor hose to the condenser using new sealing washers. Refer to **Sealing Washer Replacement**.

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Install the compressor hose nut to the condenser.

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

4. Connect the electrical connector to the A/C recirculation switch.

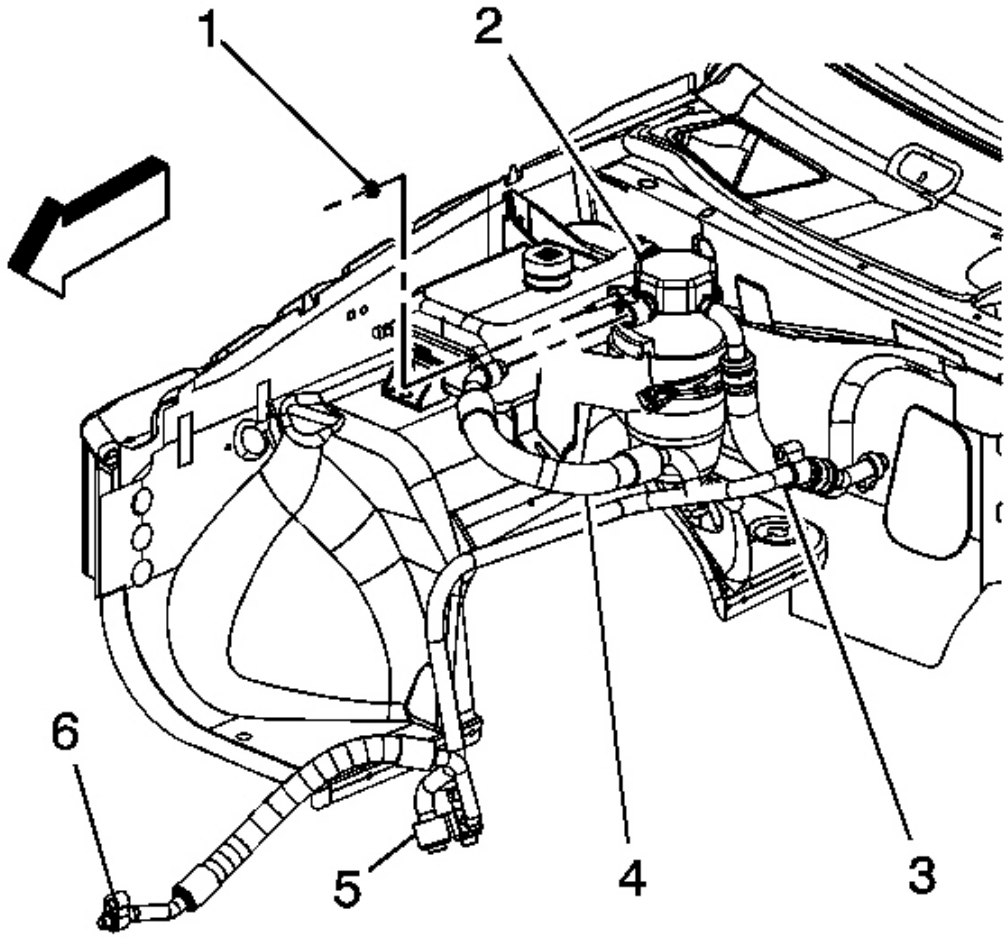


Fig. 28: Removing/Installing Compressor Discharge Hose At Accumulator
Courtesy of GENERAL MOTORS CORP.

5. Install the compressor hose to the accumulator using new sealing washers. Refer to **Sealing Washer Replacement**.
6. Install the nut (1) to the accumulator.

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

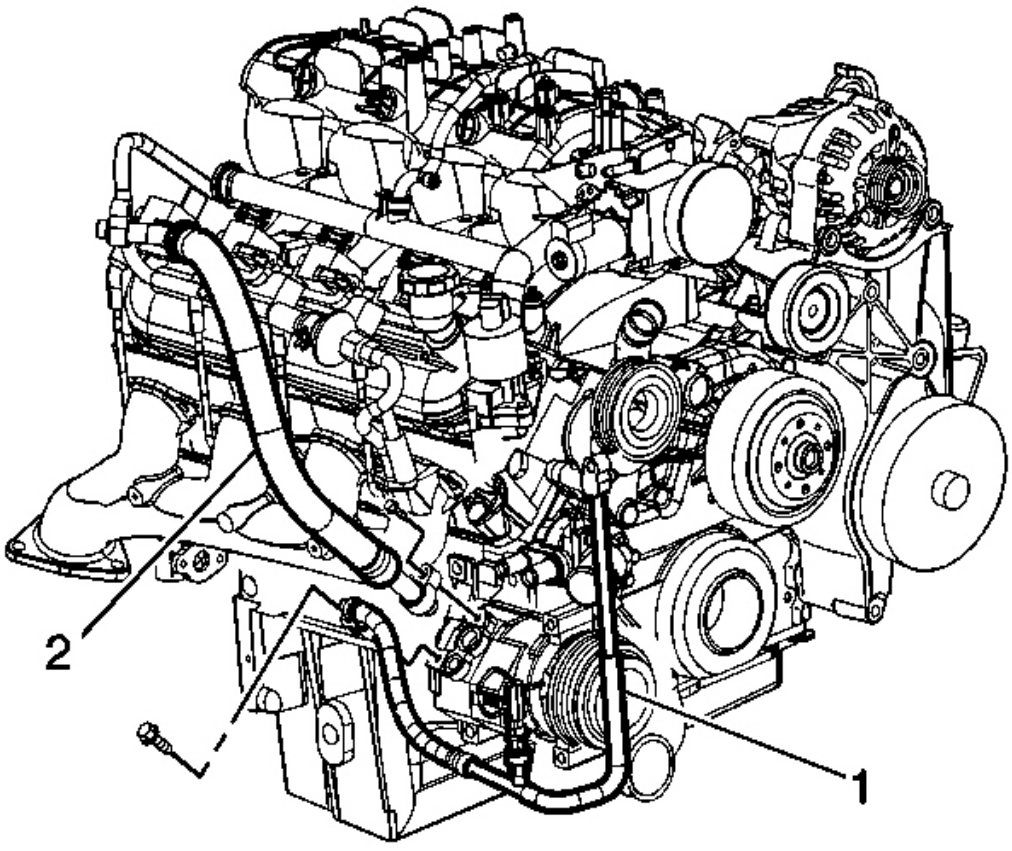


Fig. 29: Identifying Suction/Discharge Hoses To A/C Compressor
Courtesy of GENERAL MOTORS CORP.

7. Install the compressor hose (1) to the A/C compressor using new sealing washers. Refer to **Sealing Washer Replacement**.
8. Install the compressor hose nut.

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

9. Install the washer bottle. Refer to **Washer Solvent Container Replacement** in Wipers/Washer Systems.
10. Evacuate and recharge the A/C system. Refer to **Refrigerant Recovery and Recharging**.
11. Leak test the fittings of the component using the J 39400-A .

EVAPORATOR TUBE REPLACEMENT (SHORT WHEEL BASE)

Tools Required

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

Removal Procedure

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

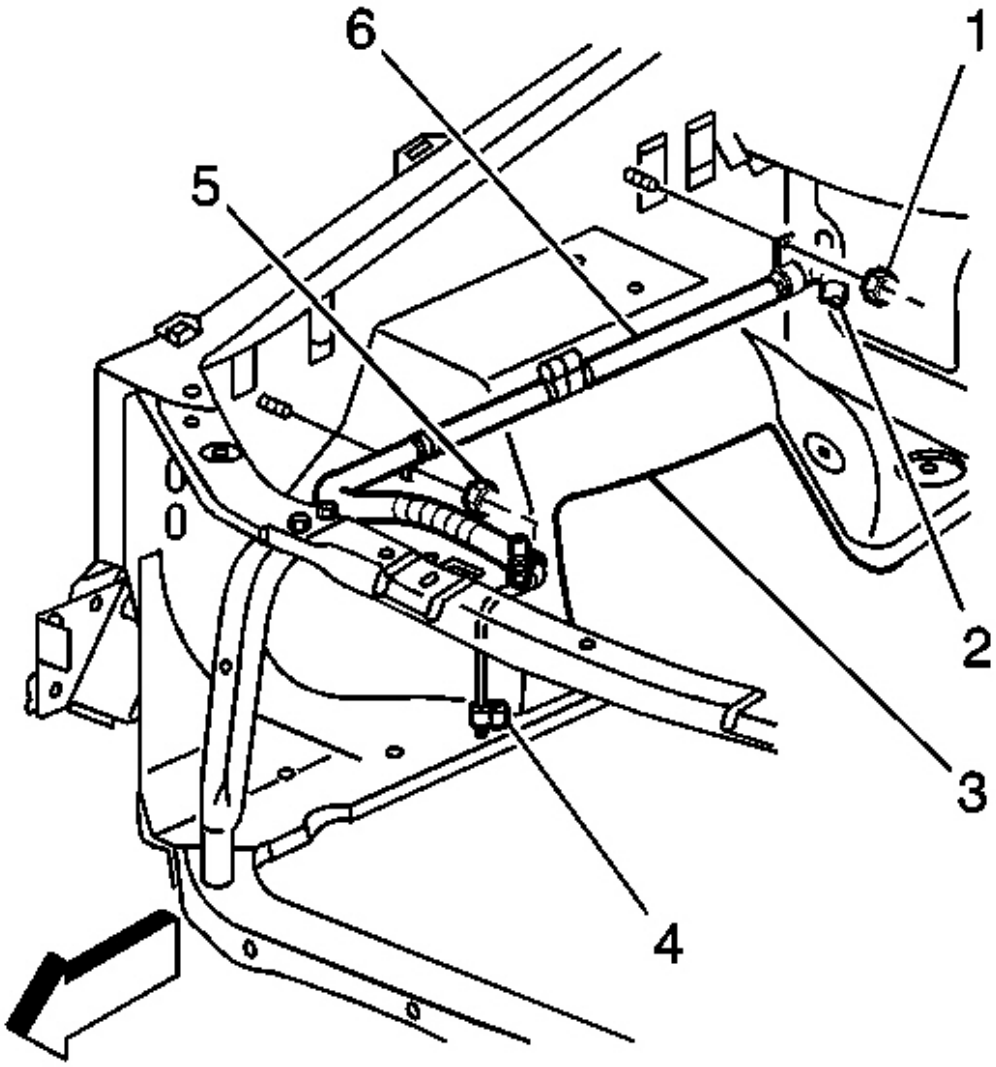


Fig. 30: Removing/Installing Evaporator Tube (Short Wheel Base)
Courtesy of GENERAL MOTORS CORP.

2. Loosen the evaporator tube (6) from the evaporator.
3. Remove the evaporator tube nut from the condenser.
4. Remove the nuts (1,5) retaining the evaporator tube to the fender.
5. Remove the washer solvent container. Refer to **Washer Solvent Container Replacement** in Wipers/Washer Systems.
6. Remove the coolant recovery tank. Refer to **Coolant Recovery Reservoir Replacement** in Engine Cooling.
7. Remove the evaporator tube using **J 26549-E** . See **Special Tools and Equipment**.
8. Remove the O-ring seal and discard.

Installation Procedure

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

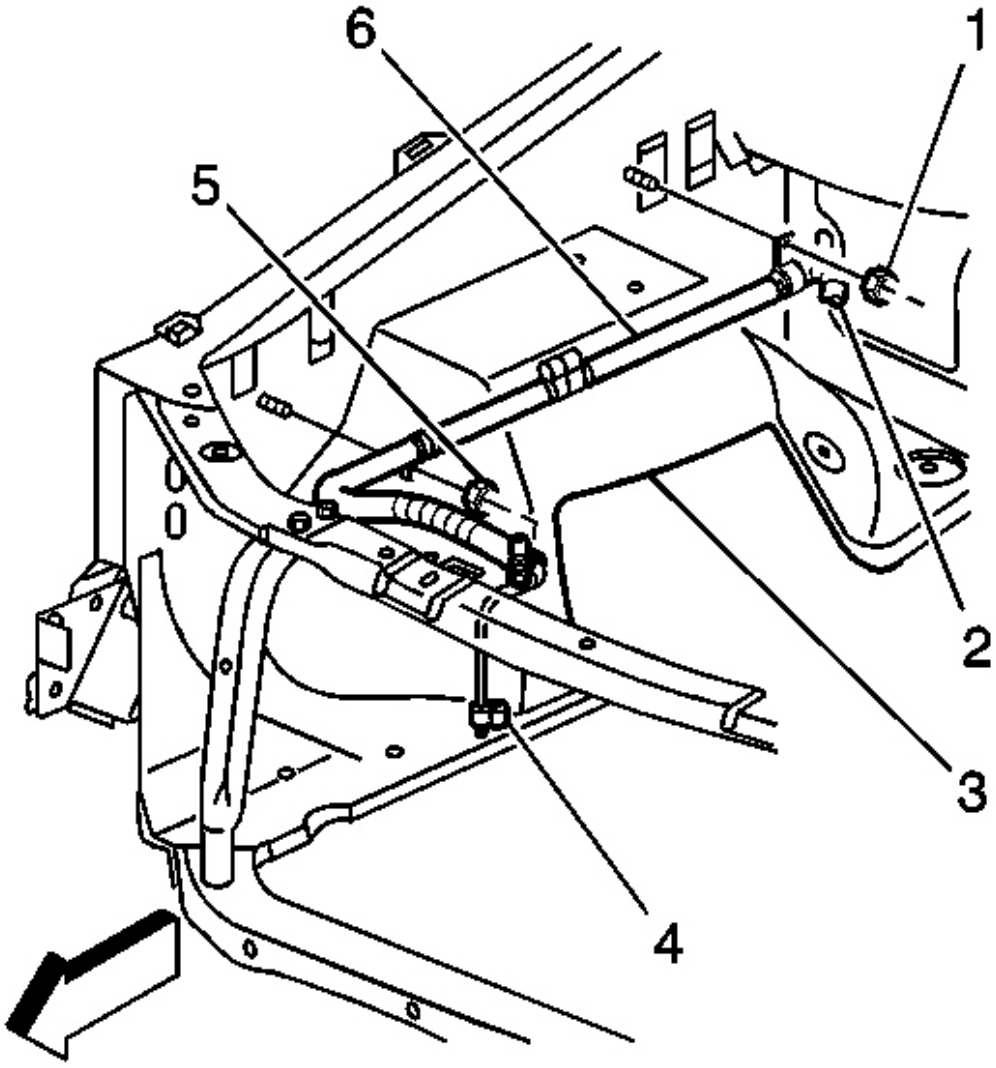


Fig. 31: Removing/Installing Evaporator Tube (Short Wheel Base)
Courtesy of GENERAL MOTORS CORP.

2. Install the evaporator tube.

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Install the evaporator tube.

Connect the evaporator tube to the evaporator.

Tighten: Tighten the nut to 28 N.m (21 ft. lb.).

4. Connect the evaporator tube to the condenser.

   Tighten: Tighten the nut to 28 N.m (21 ft. lb.).

5. Install the coolant recovery tank. Refer to **Coolant Recovery Reservoir Replacement** in Engine Cooling.
6. Install the washer solvent container. Refer to **Washer Solvent Container Replacement** in Wipers/Washer Systems.
7. Install the nuts (1,5) retaining the evaporator tube to the fender.

   Tighten: Tighten the nuts to 28 N.m (21 ft. lb.).

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

EVAPORATOR TUBE REPLACEMENT (LONG WHEEL BASE)

Tools Required

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

Removal Procedure

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

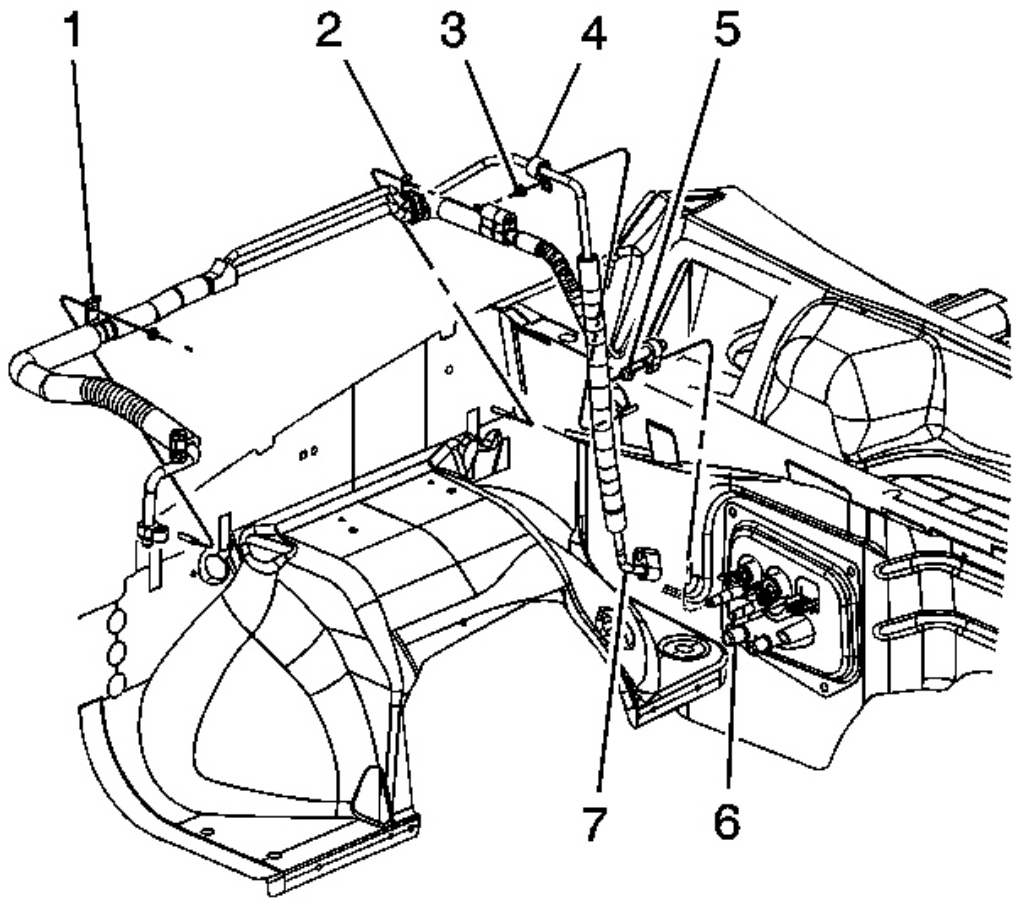


Fig. 32: Removing/Installing Evaporator Tube (Long Wheel Base)
Courtesy of GENERAL MOTORS CORP.

2. Loosen the evaporator tube (5) from the evaporator.
3. Loosen the auxiliary evaporator tube (7) from the auxiliary piping.
4. Remove the evaporator tube nut from the condenser.
5. Remove the nuts (1,2) retaining the evaporator tube to the fender.
6. Remove the washer solvent container. Refer to **Washer Solvent Container Replacement** in Wipers/Washer Systems.
7. Remove the coolant recovery tank. Refer to **Coolant Recovery Reservoir Replacement** in Engine Cooling.
8. Remove the evaporator tube using **J 26549-E** . See **Special Tools and Equipment**.
9. Remove the O-ring seal and discard.

Installation Procedure

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

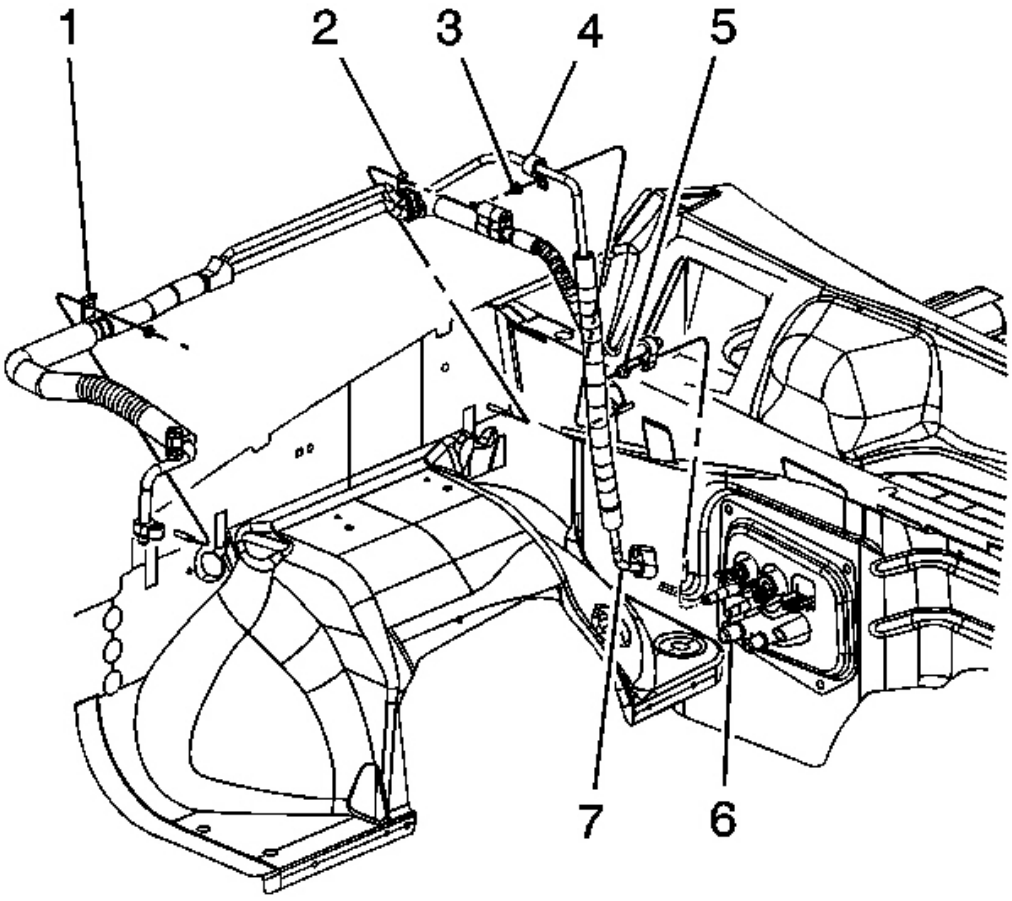


Fig. 33: Removing/Installing Evaporator Tube (Long Wheel Base)
Courtesy of GENERAL MOTORS CORP.

2. Install evaporator tube.

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Connect the evaporator tube to the evaporator (5).

Tighten: Tighten the nut to 28 N.m (21 ft. lb.).

4. Connect the auxiliary evaporator tube to the auxiliary piping.

   Tighten: Tighten the nut to 28 N.m (21 ft. lb.).

5. Connect the evaporator tube to the condenser.

   Tighten: Tighten the nut to 28 N.m (21 ft. lb.).

6. Install the coolant recovery tank. Refer to **Coolant Recovery Reservoir Replacement** in Engine Cooling.
7. Install the washer solvent container. Refer to **Washer Solvent Container Replacement** in Wipers/Washer Systems.
8. Install the nuts (1,2) retaining the evaporator tube to the fender.

   Tighten: Tighten the nuts to 28 N.m (21 ft. lb.).

9. Evacuate and recharge the A/C system. Refer to **Refrigerant Recovery and Recharging**.
10. Leak test the fittings of the components using the J 39400-A .

EXPANSION (ORIFICE) TUBE REPLACEMENT (SHORT WHEEL BASE)

Tools Required

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

Removal Procedure

1. Recover the refrigerant. Refer to **Refrigerant Recovery and Recharging**.
2. Remove the accumulator. Refer to **Accumulator Replacement**.
3. Remove the coolant reservoir. Refer to **Coolant Recovery Reservoir Replacement** in Engine Cooling.

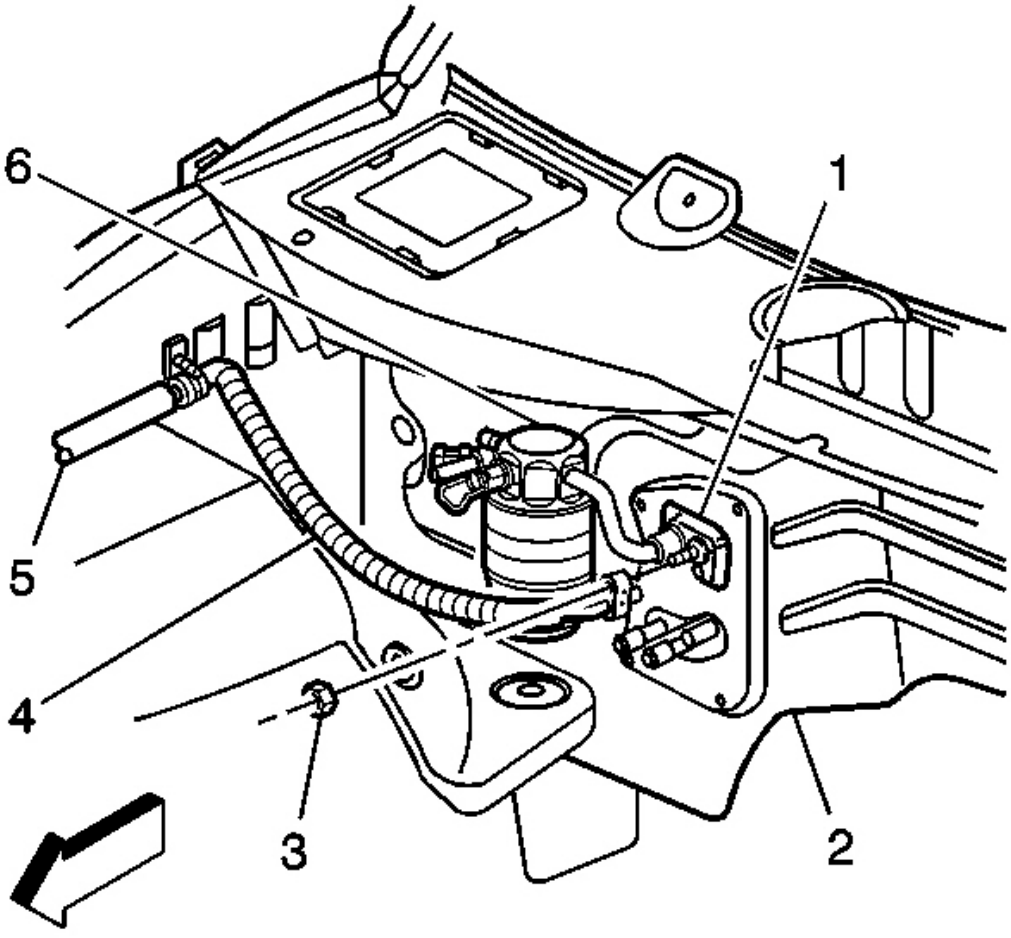


Fig. 34: Removing/Installing Evaporator Tube At Evaporator
Courtesy of GENERAL MOTORS CORP.

4. Remove the evaporator tube nut (3) at the evaporator (1).
5. Remove the evaporator tube (4) from the evaporator (1).

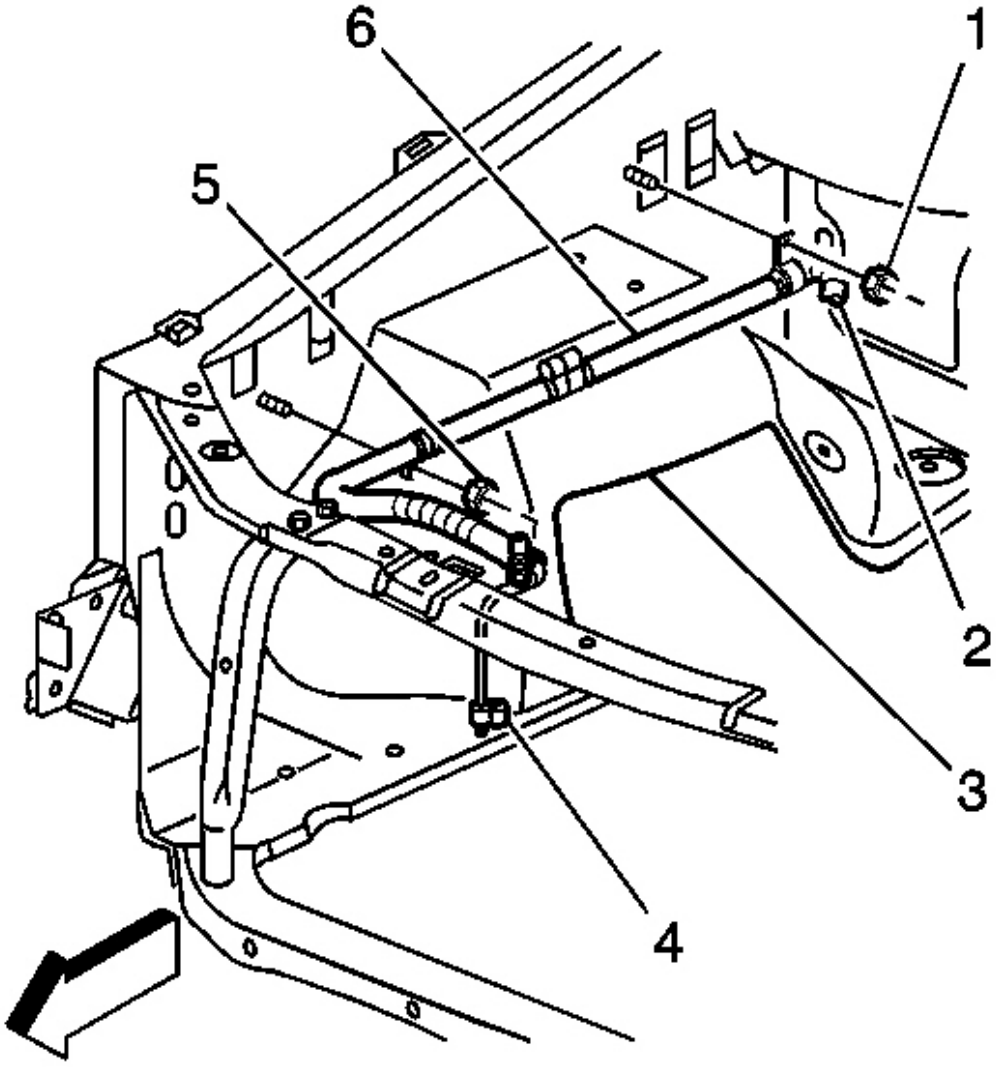


Fig. 35: Removing/Installing Evaporator Tube (Short Wheel Base)
Courtesy of GENERAL MOTORS CORP.

6. Remove the O-ring seal and discard.
7. Remove the nut from the evaporator tube block fitting.
8. Separate the evaporator tubes (4, 6) at the block fitting.
9. Use the **J 26549-E** in order to remove the expansion tube. See **Special Tools and Equipment**.
10. Remove the expansion tube from the evaporator tube (6).

Installation Procedure

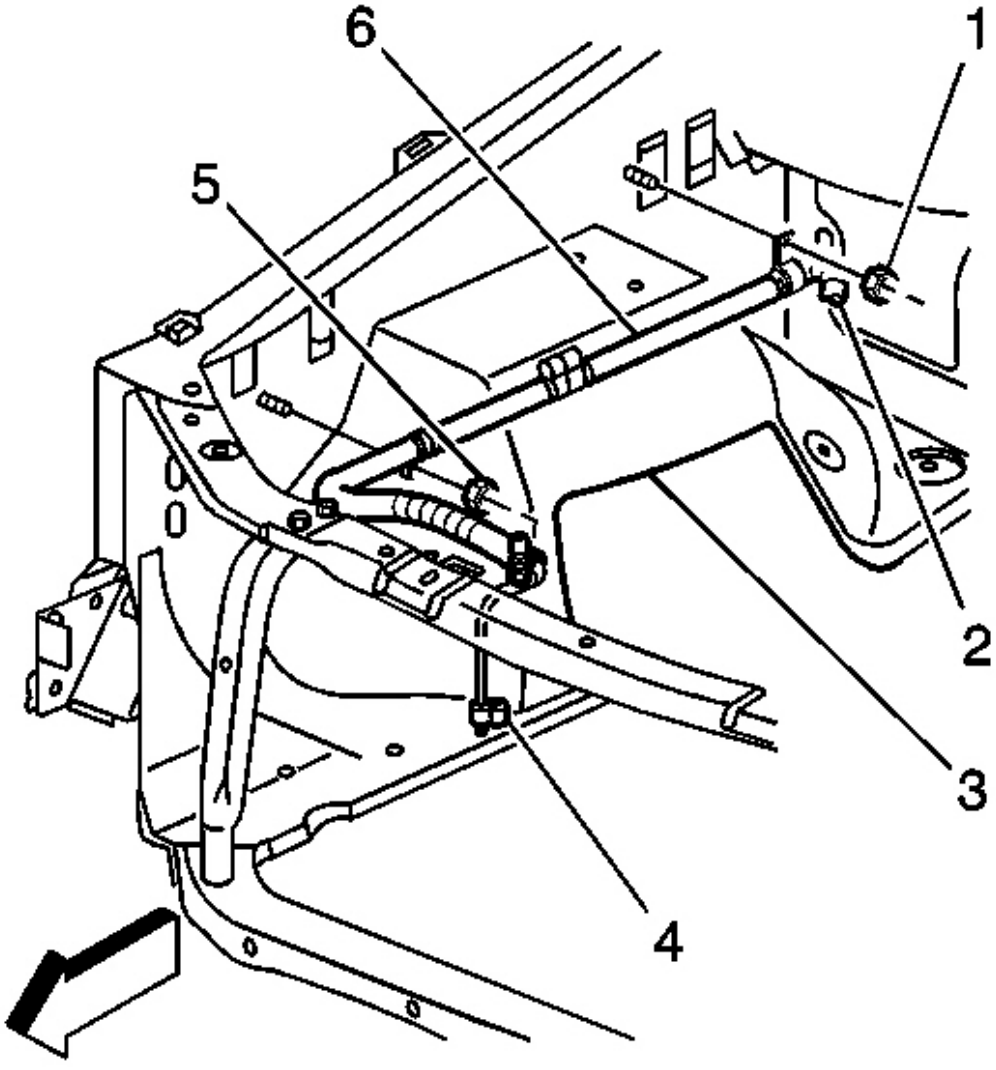


Fig. 36: Removing/Installing Evaporator Tube (Short Wheel Base)
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Install the shorter screen end of the expansion tube into the evaporator tube (6) first.

1. Use the **J 26549-E** in order to install the expansion tube. See **Special Tools and Equipment**.

2. Install the new O-ring seal. Refer to **O-Ring Replacement**.
3. Assemble the evaporator tubes (4, 6).

NOTE: Refer to Fastener Notice in Cautions and Notices.

4. Install the evaporator tube nut.

Tighten: Tighten the nut to 28 N.m (21 ft. lb.).

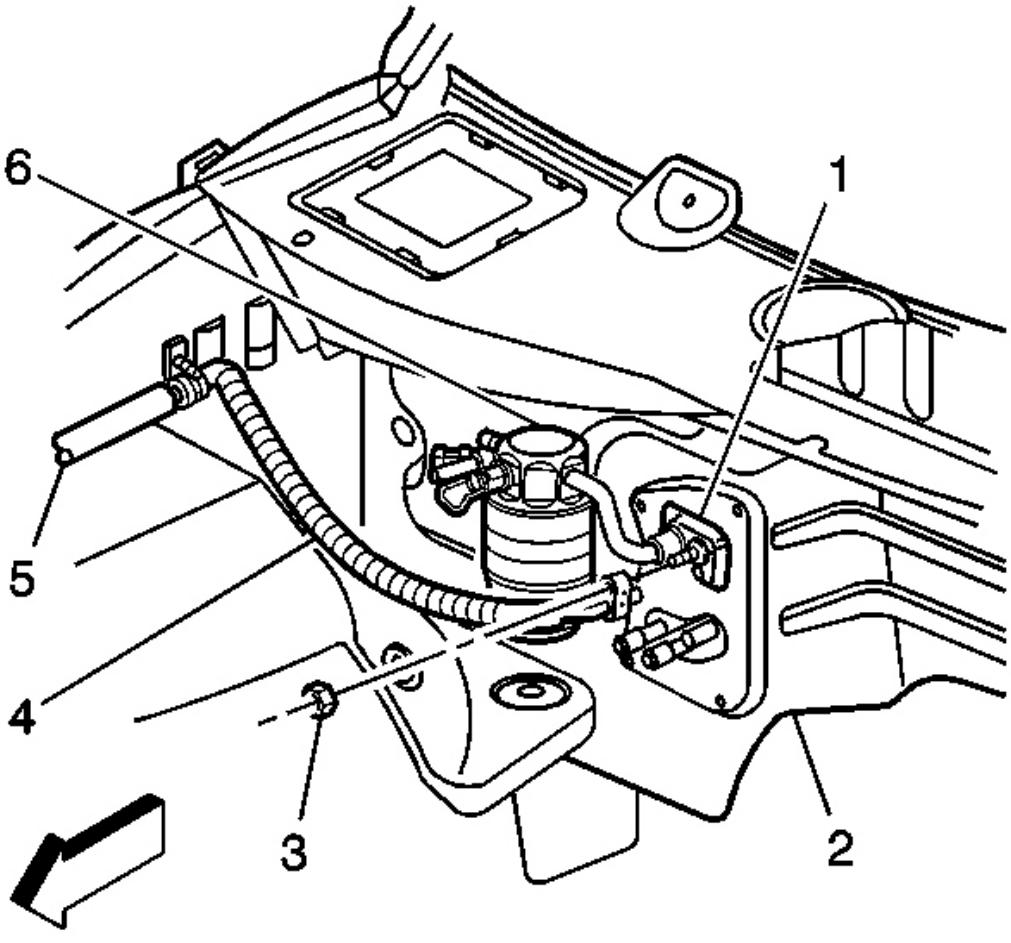


Fig. 37: Removing/Installing Evaporator Tube At Evaporator
Courtesy of GENERAL MOTORS CORP.

5. Connect the evaporator tube (4) to the evaporator (1).

6. Install the nut (3).

   Tighten: Tighten the nut to 28 N.m (21 ft. lb.).

7. Install the coolant reservoir. Refer to **Coolant Recovery Reservoir Replacement** in Engine Cooling.
8. Install the accumulator. Refer to **Accumulator Replacement**.
9. Recharge the refrigerant system. Refer to **Refrigerant Recovery and Recharging**.
10. Leak test the fittings of the components using the J 39400-A .

EXPANSION (ORIFICE) TUBE REPLACEMENT (LONG WHEEL BASE)

Tools Required

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

Removal Procedure

1. Recover the refrigerant. Refer to **Refrigerant Recovery and Recharging**.
2. Remove the accumulator. Refer to **Accumulator Replacement**.
3. Remove the coolant reservoir. Refer to **Coolant Recovery Reservoir Replacement** in Engine Cooling.

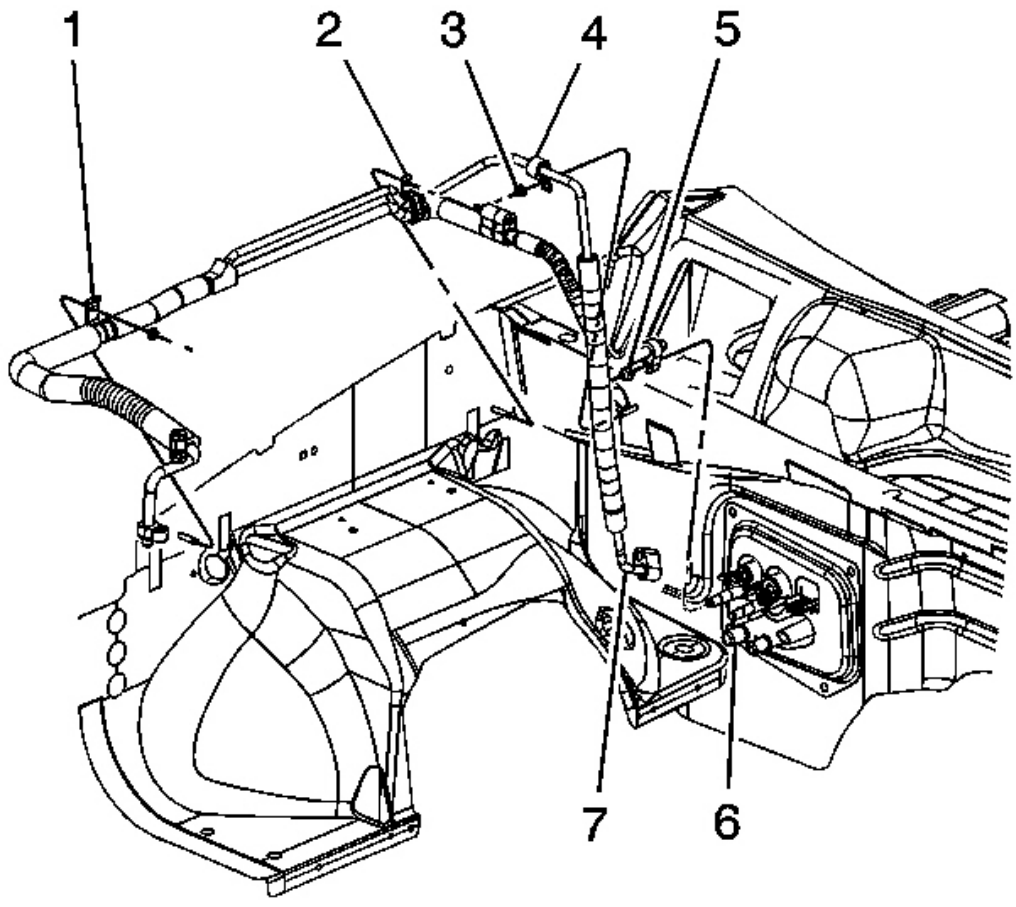


Fig. 38: Removing/Installing Evaporator Tube (Long Wheel Base)
Courtesy of GENERAL MOTORS CORP.

4. Loosen the evaporator tube nut (5) from the evaporator.
5. Remove the evaporator tube from the evaporator.

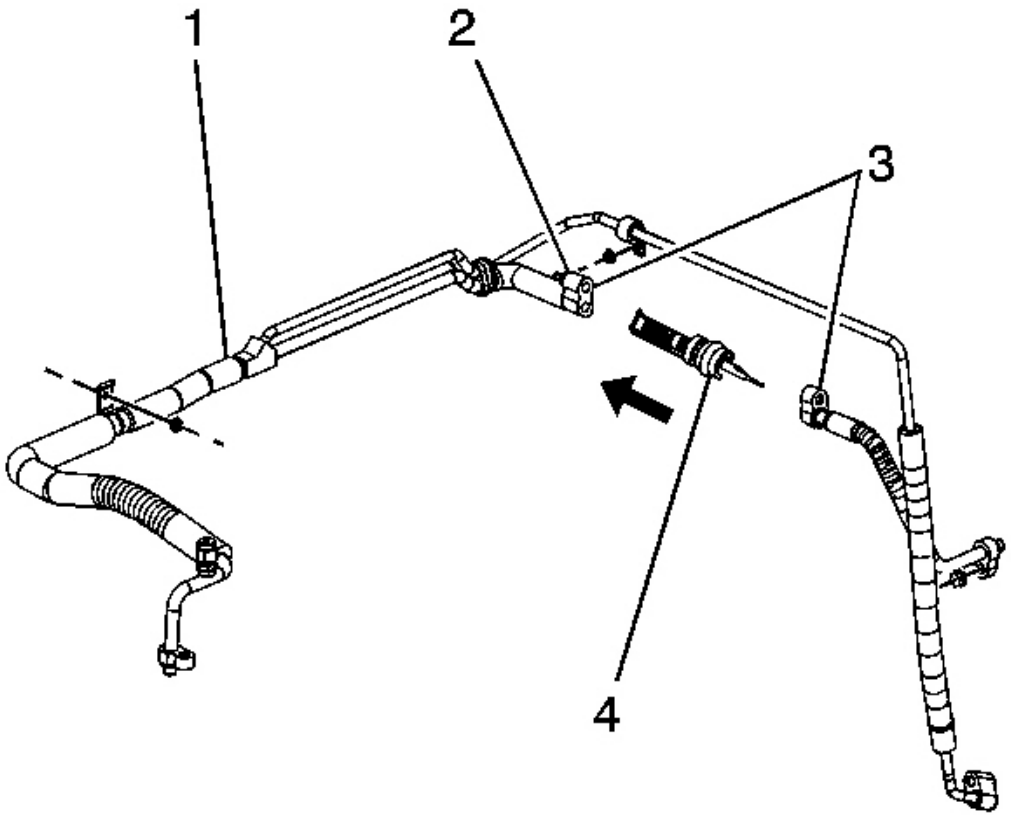


Fig. 39: Removing/Installing Expansion Tube
Courtesy of GENERAL MOTORS CORP.

6. Remove the nut (2) from the evaporator tube block (3).
7. Separate the evaporator tube at the block fitting (3).
8. Use the **J 26549-E** in order to remove the expansion tube (4). See **Special Tools and Equipment**.
9. Remove the O-ring seal and discard.
10. Remove the expansion tube (4) from the evaporator tube (1).

Installation Procedure

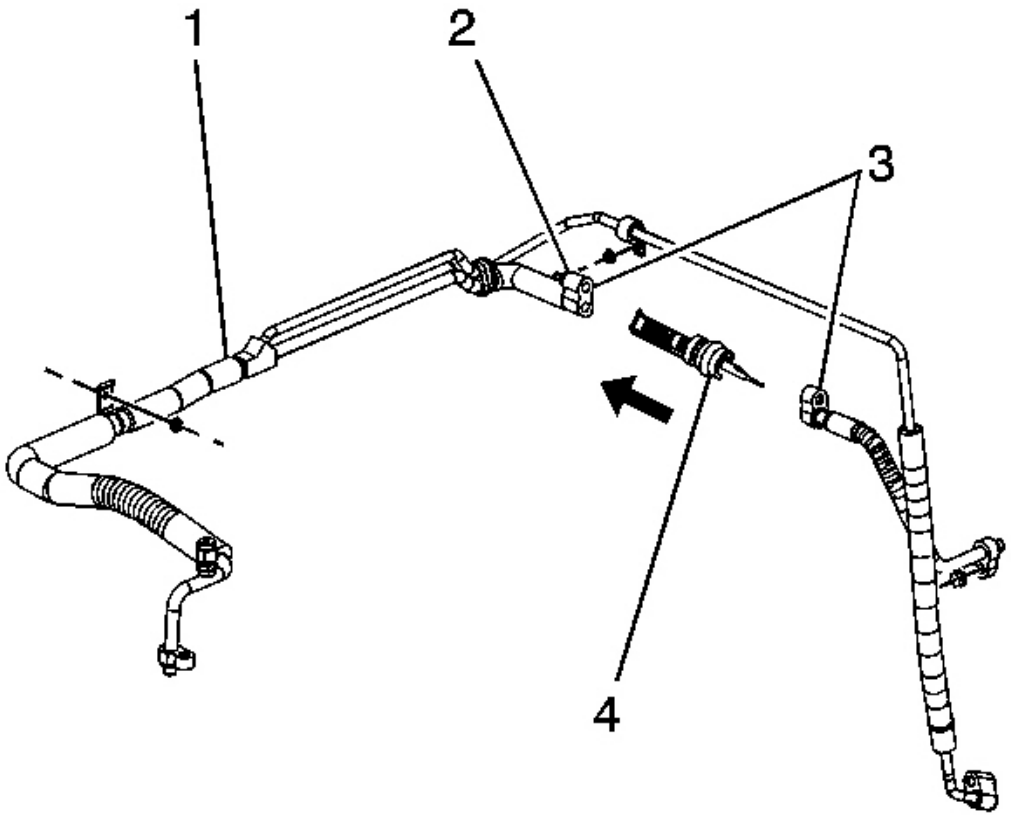


Fig. 40: Removing/Installing Expansion Tube
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Install the shorter screen end of the expansion tube into the evaporator tube first.

1. Install the expansion tube (4) to the evaporator tube (1).
2. Use the **J 26549-E** in order to install the expansion tube (4). See **Special Tools and Equipment**.
3. Install the new O-ring seal. Refer to **O-Ring Replacement**.
4. Assemble the evaporator tube at the block fitting (3).
5. Install the nut (2) to the evaporator tube block (3).

NOTE: Refer to Fastener Notice in Cautions and Notices.

Install the evaporator tube nut.

Tighten: Tighten the nut to 28 N.m (21 ft. lb.).

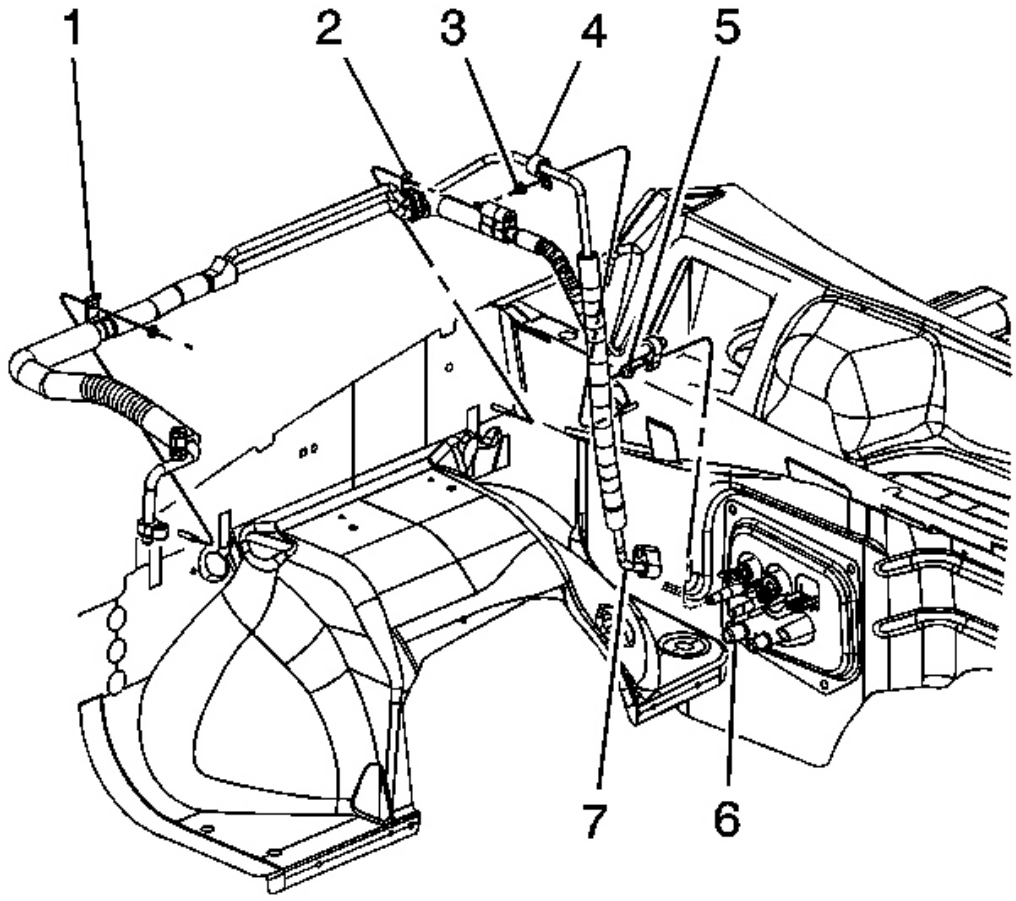


Fig. 41: Removing/Installing Evaporator Tube (Long Wheel Base)
Courtesy of GENERAL MOTORS CORP.

6. Install the evaporator tube to the evaporator.
7. Install the evaporator tube nut (5) to the evaporator.

   Tighten: Tighten the nut to 28 N.m (21 ft. lb.).

8. Install the coolant reservoir. Refer to **Coolant Recovery Reservoir Replacement** in Engine Cooling.
9. Install the accumulator. Refer to **Accumulator Replacement**.
10. Recharge the refrigerant system. Refer to **Refrigerant Recovery and Recharging**.
11. Leak test the fittings of the components using the J 39400-A .

COMPRESSOR RELAY REPLACEMENT

Removal Procedure

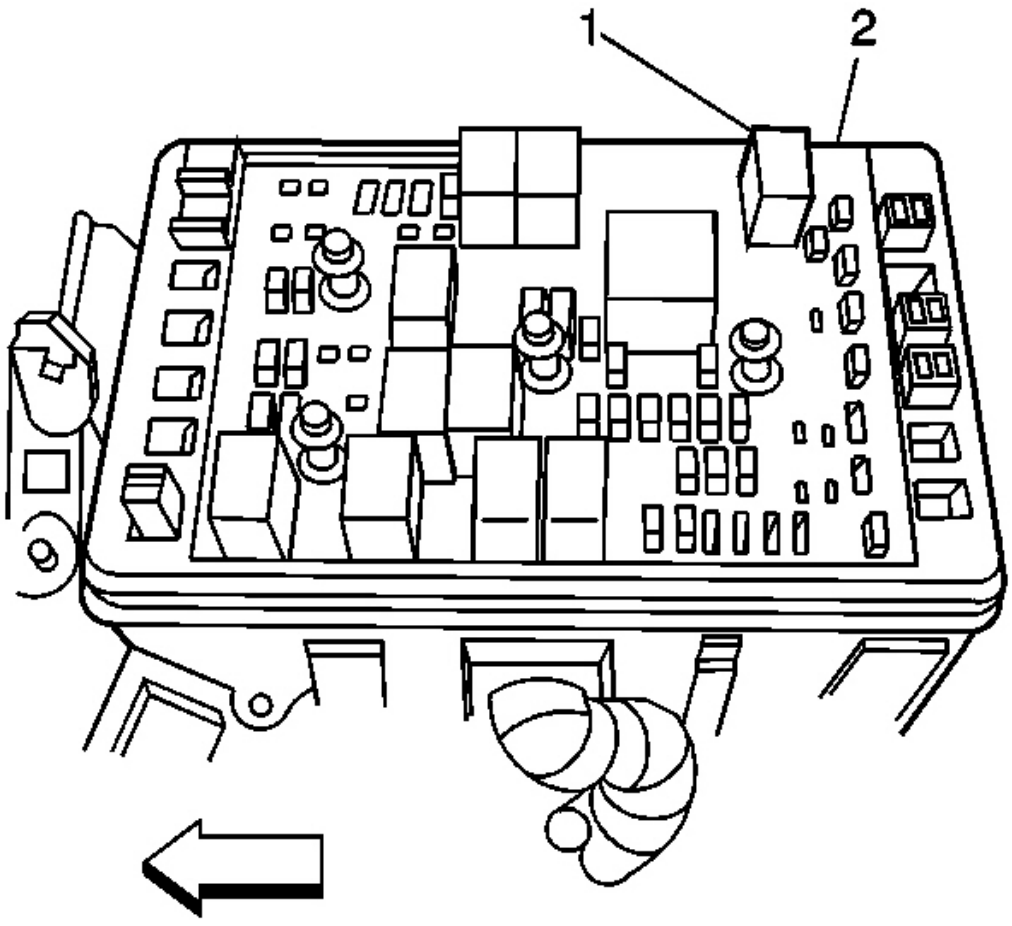


Fig. 42: Removing/Installation Cooling Fan Relay
Courtesy of GENERAL MOTORS CORP.

1. Remove the protective cover from the underhood fuse block.
2. Remove the compressor relay (1) from the underhood fuse block (2).

Installation Procedure

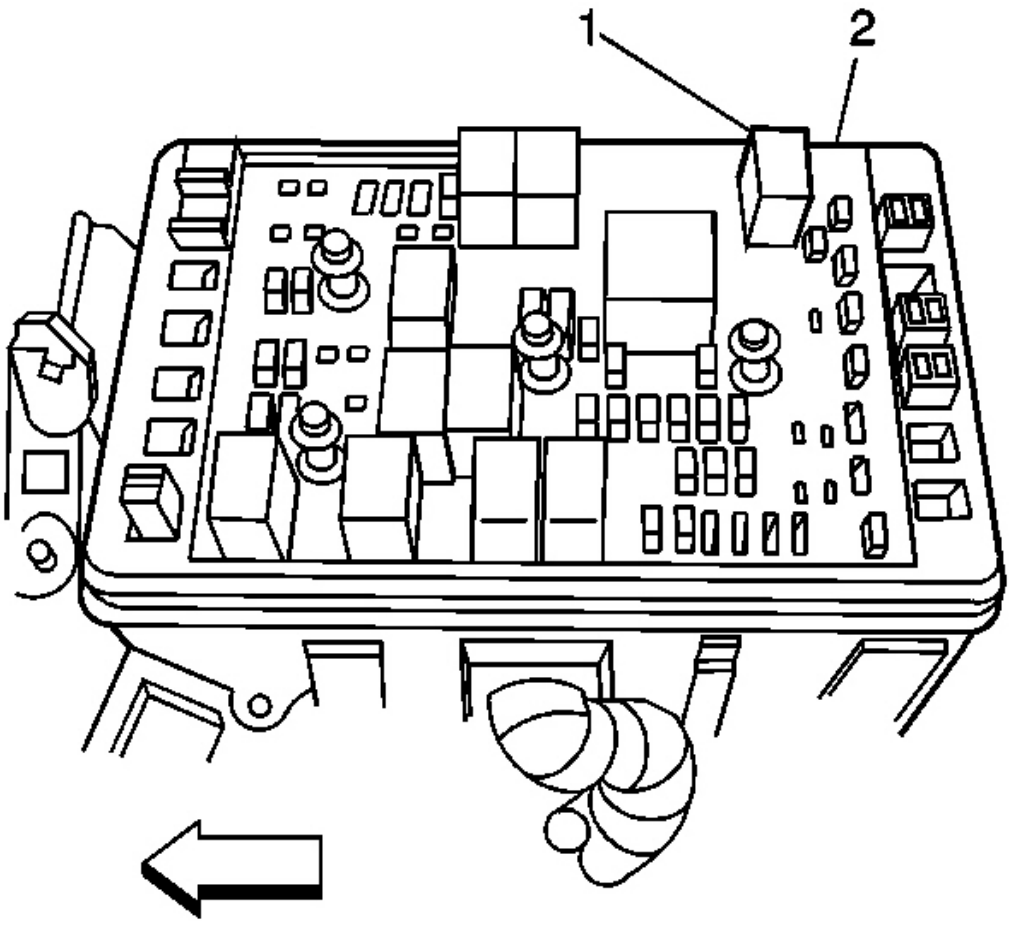


Fig. 43: Removing/Installation Cooling Fan Relay
Courtesy of GENERAL MOTORS CORP.

1. Install the compressor relay (1) to the underhood fuse block (2).
2. Install the protective hood to the underhood fuse block.

AIR CONDITIONING (A/C) LOW PRESSURE SWITCH REPLACEMENT

Tools Required

J 39400-A Halogen Leak Detector

Removal Procedure

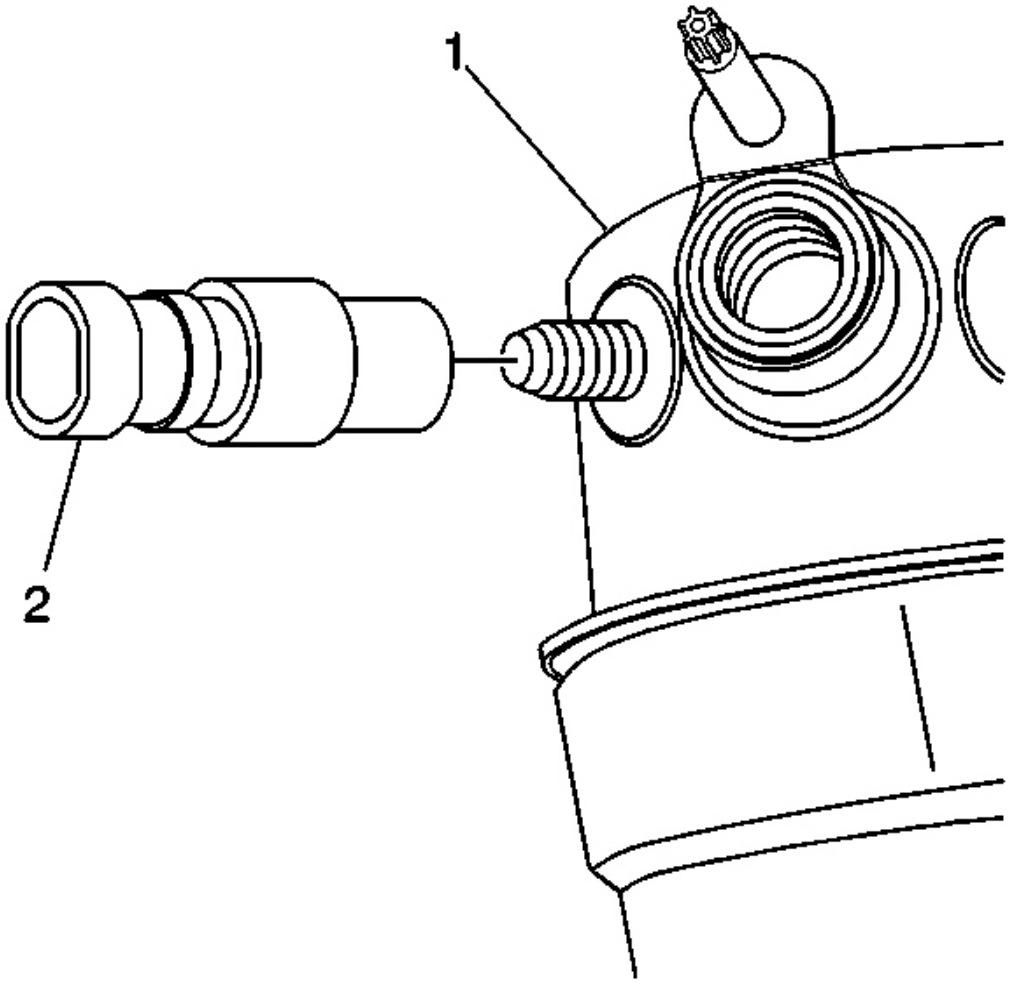


Fig. 44: Removing/Installing A/C Low Pressure Switch
Courtesy of GENERAL MOTORS CORP.

1. Disconnect the A/C low pressure switch electrical connector.
2. Remove the A/C low pressure switch (2) from the accumulator (1).
3. Remove and discard the O-ring seal from the A/C low pressure switch port on the accumulator.

Installation Procedure

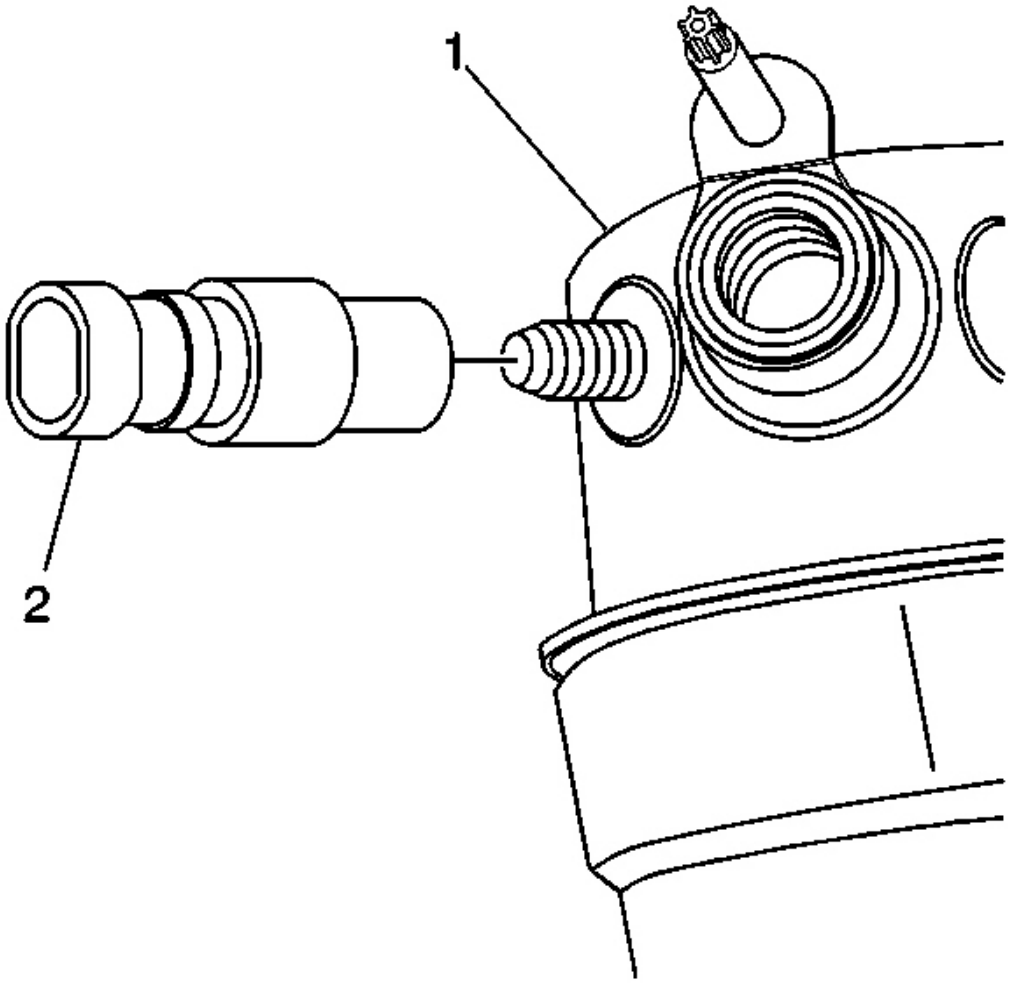


Fig. 45: Removing/Installing A/C Low Pressure Switch
Courtesy of GENERAL MOTORS CORP.

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

NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the A/C low pressure switch (2) to the accumulator (1).

   Tighten: Tighten the A/C low pressure switch to 4.8 N.m (42 in. lb.).

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

4. Leak test the fittings of the components using the J 39400-A .

AIR CONDITIONING (A/C) REFRIGERANT PRESSURE SENSOR REPLACEMENT

Removal Procedure

1. Raise the vehicle. Refer to**Lifting and Jacking the Vehicle** in General Information.
2. Disconnect the electrical connector from the A/C refrigerant pressure sensor. The connector is accessible through the lower control arm.

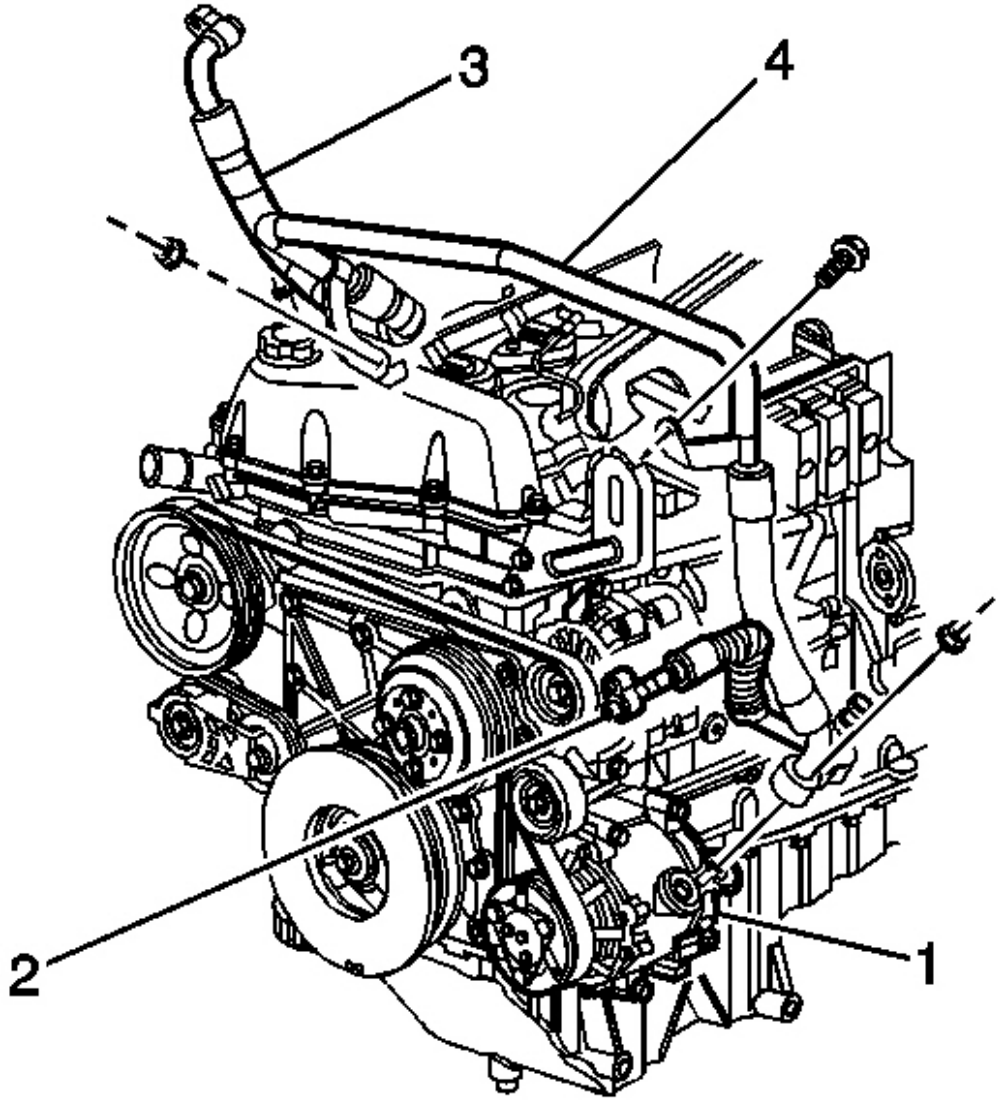


Fig. 46: Removing/Installing A/C Refrigerant Pressure Sensor
Courtesy of GENERAL MOTORS CORP.

3. Remove the A/C refrigerant pressure sensor from the compressor hose block.
4. Remove and discard the O-ring seal from the A/C refrigerant pressure sensor.

Installation Procedure

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

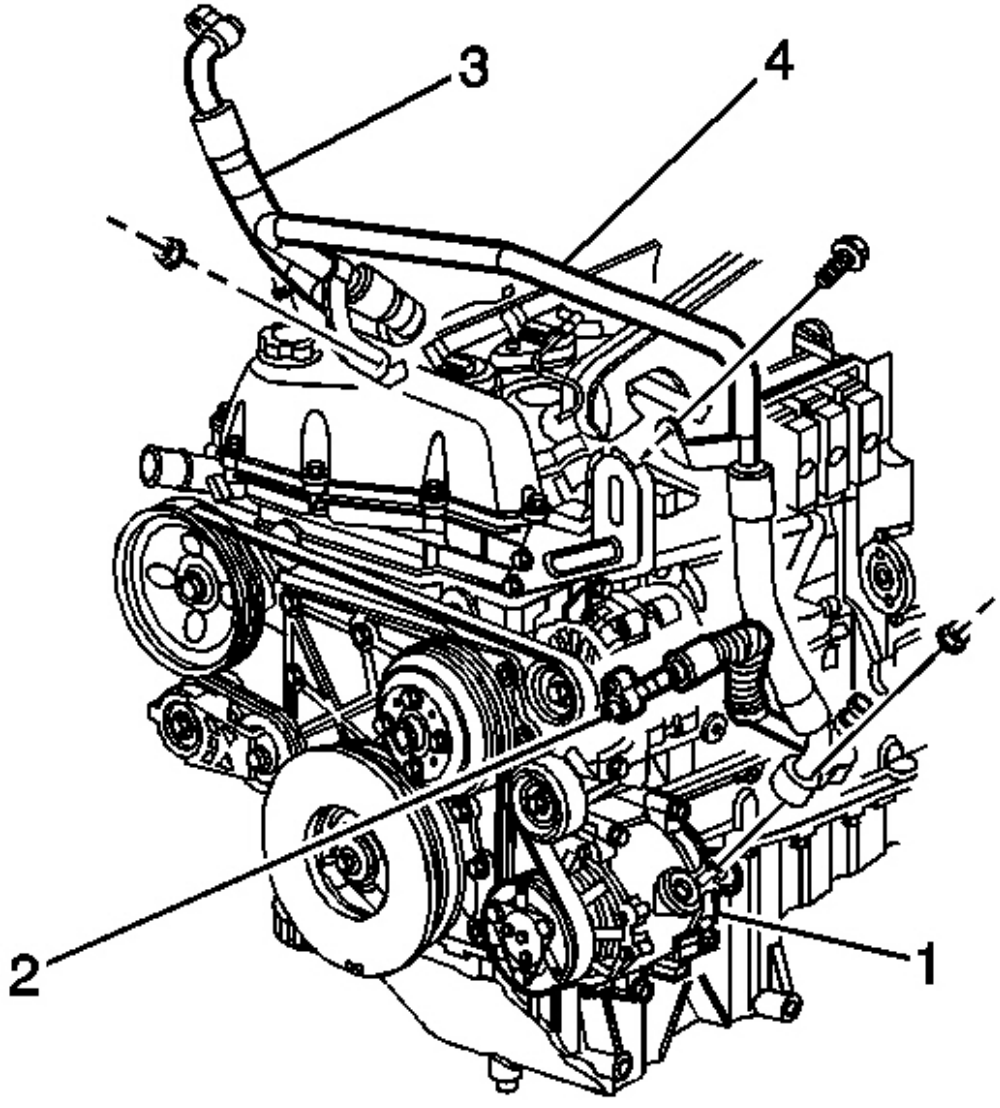


Fig. 47: Removing/Installing A/C Refrigerant Pressure Sensor
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the A/C refrigerant pressure sensor to the compressor hose block.

Tighten: Tighten the A/C refrigerant pressure sensor to 4.8 N.m (42 in. lb.).

3. Connect the electrical connector to the A/C refrigerant pressure sensor.
4. Leak test the fittings of the component using J 39400-A .
5. Lower the vehicle.

CONDENSER REPLACEMENT

Tools Required

J 39400-A Halogen Leak Detector

Removal Procedure

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

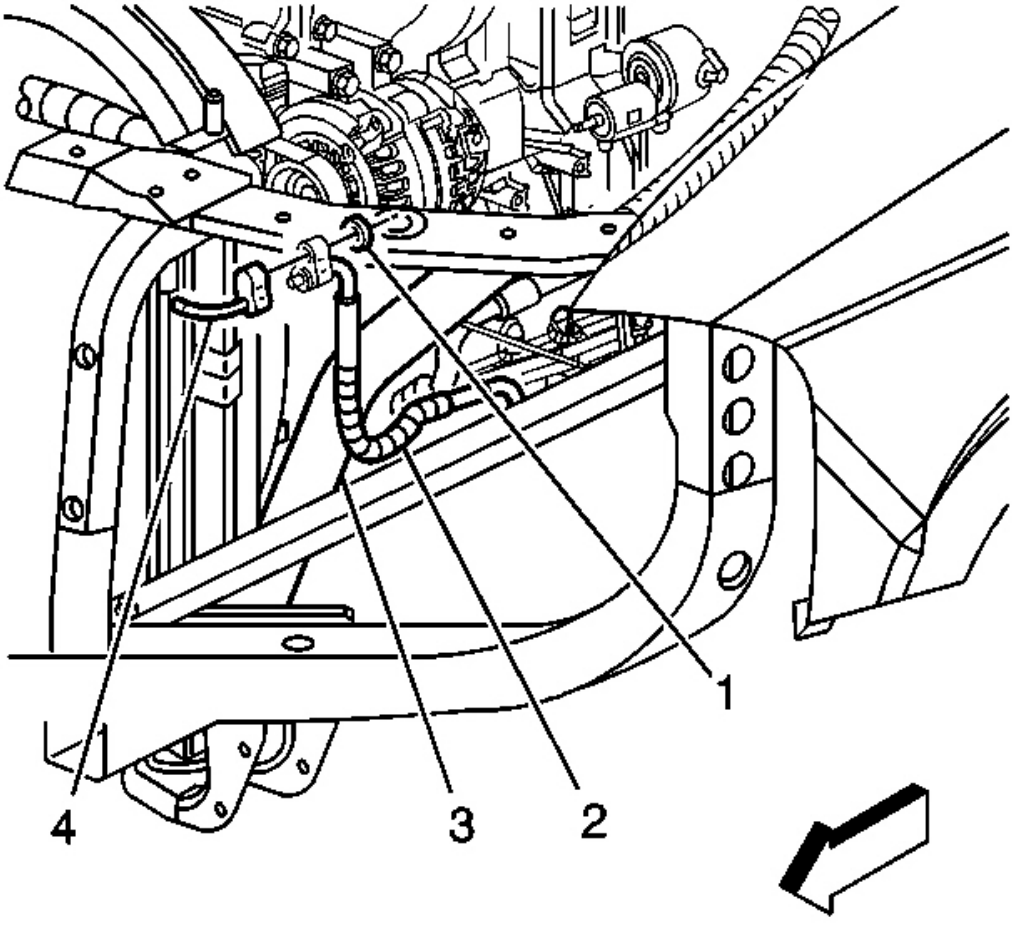


Fig. 48: Removing/Installing Compressor Discharge Hose At Condenser
Courtesy of GENERAL MOTORS CORP.

2. Remove the compressor discharge hose nut (1) from the condenser (4).
3. Remove the compressor discharge hose (2) from the condenser (4).

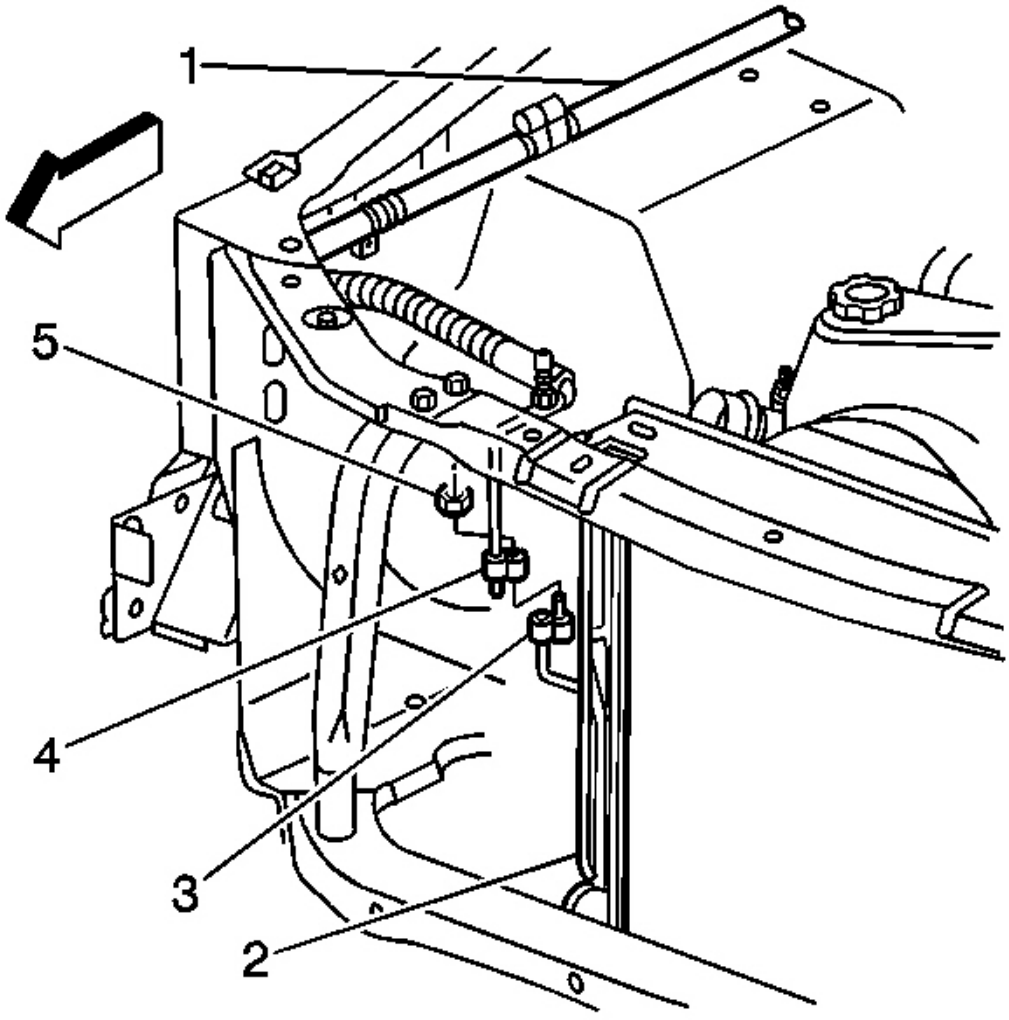


Fig. 49: Removing/Installing Condenser
Courtesy of GENERAL MOTORS CORP.

4. Remove the evaporator tube nut (5) from the condenser (3).
5. Remove the evaporator tube (4) from the condenser (3).
6. Remove the radiator. Refer to **Radiator Replacement (SWB - Short Wheel Base)** or **Radiator Replacement (LWB - Long Wheel Base)** in Engine Cooling.
7. Remove the retaining screws from the condenser.
8. Remove the condenser from the radiator.

Installation Procedure

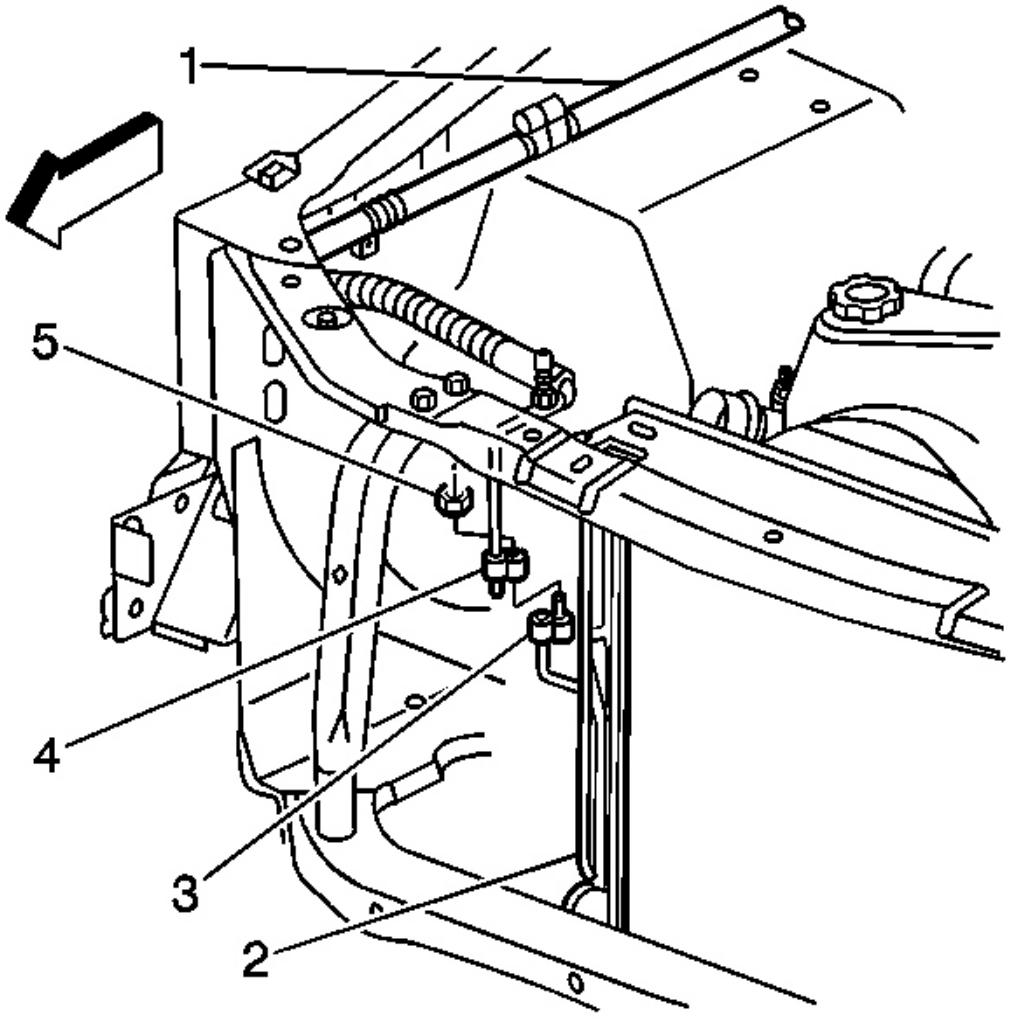


Fig. 50: Removing/Installing Condenser
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: If replacing the condenser, add the refrigerant oil to the condenser. Refer to Refrigerant System Capacities for the capacity information.

1. Install the condenser to the radiator.

   NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the retaining screws to the condenser.

Tighten: Tighten the screws to 5 N.m (44 in. lb.).

3. Install the radiator. Refer to **Radiator Replacement (SWB - Short Wheel Base)** or **Radiator Replacement (LWB - Long Wheel Base)** in Engine Cooling.
4. Connect the evaporator tube (4) to the condenser (3).
5. Install the retaining nut to the evaporator tube (4) at the condenser (3).

Tighten: Tighten the nut to 28 N.m (21 ft. lb.).

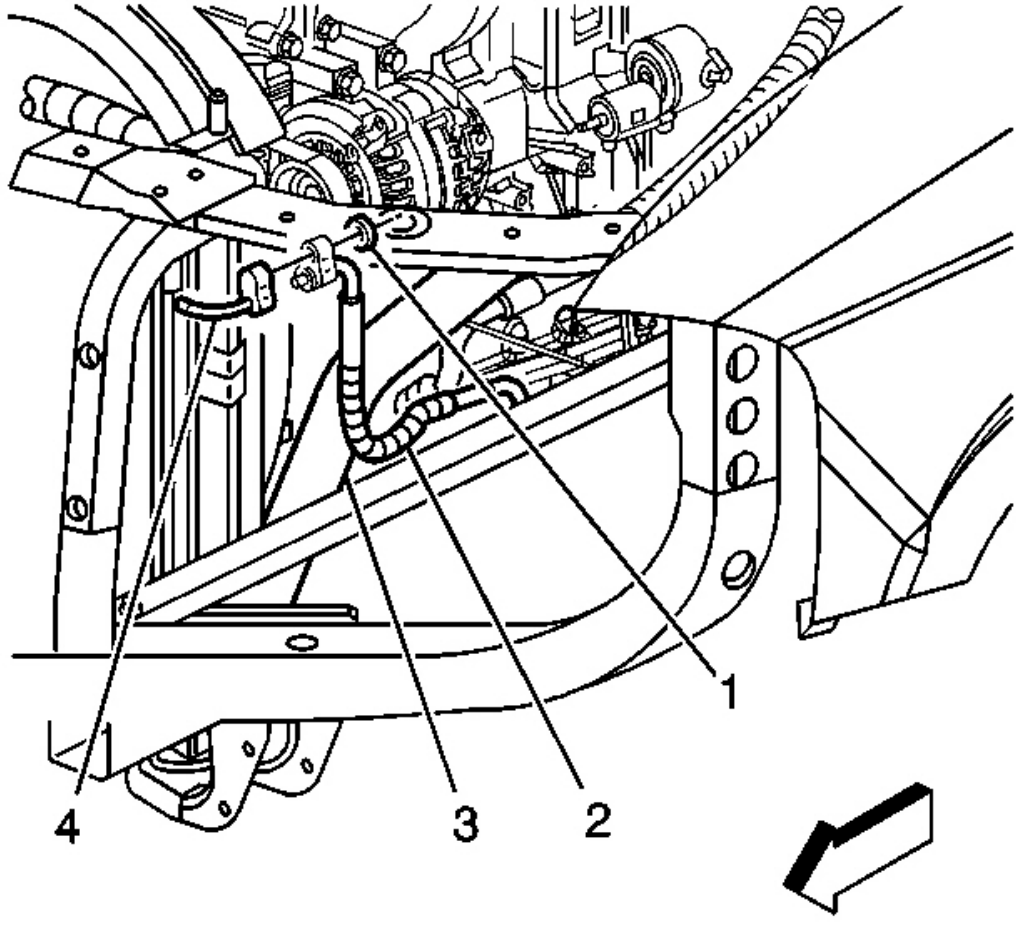


Fig. 51: Removing/Installing Compressor Discharge Hose At Condenser
Courtesy of GENERAL MOTORS CORP.

6. Connect the compressor discharge hose (2) to the condenser (4).
7. Install the retaining nut (1) to the compressor discharge hose (2) at the condenser (4).

Tighten: Tighten the nut to 28 N.m (21 ft. lb.).

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

ACCUMULATOR REPLACEMENT

Tools Required

J 39400-A Halogen Leak Detector

Removal Procedure

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

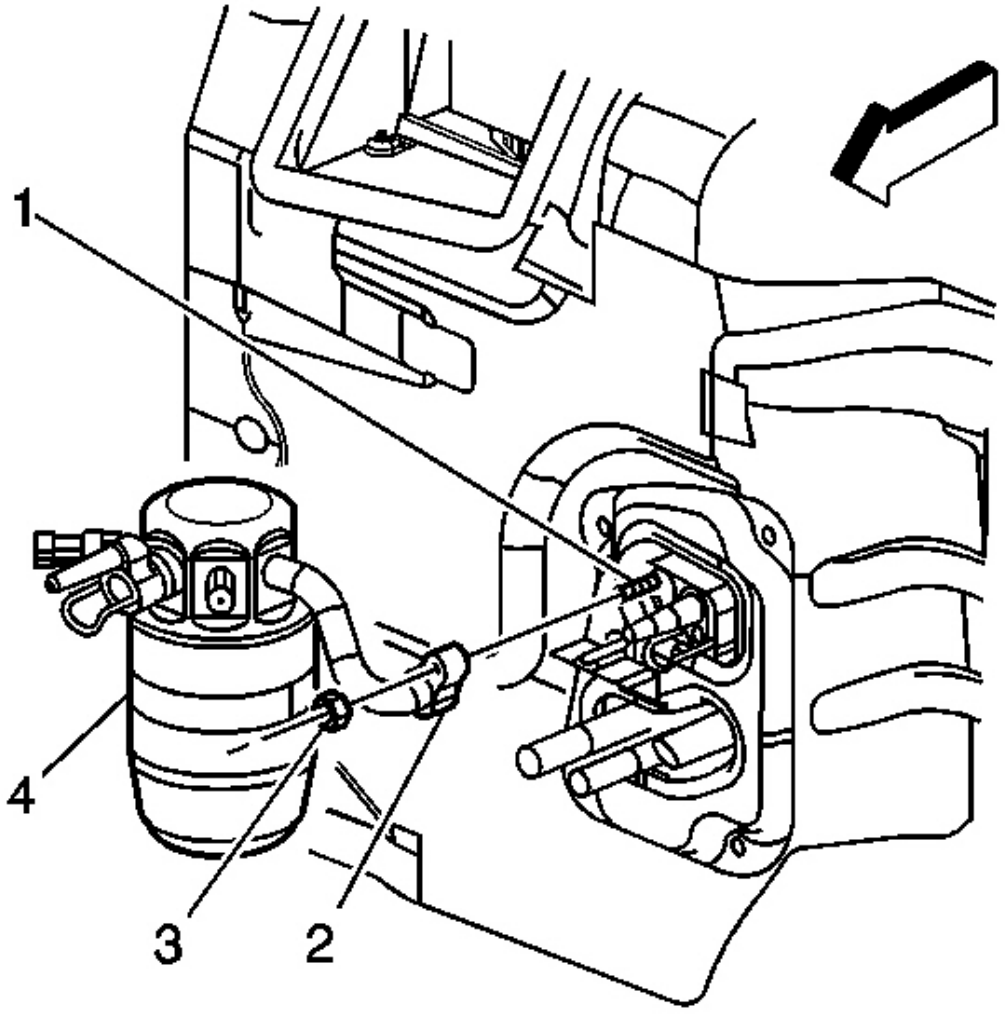


Fig. 52: Removing/Installing Accumulator
Courtesy of GENERAL MOTORS CORP.

4. Remove the nut (3) retaining the accumulator (4) to evaporator (1).
5. Remove the compressor suction hose assembly from the accumulator.
6. Remove and discard the O-ring seals.
7. Remove the accumulator clamp nut.
8. Remove the accumulator from the vehicle.

Installation Procedure

IMPORTANT: If replacing the accumulator, add the refrigerant oil to the accumulator. Refer to Refrigerant System Capacities for the capacity information.

1. Install the accumulator to the vehicle.
2. Install the accumulator into the accumulator clamp.

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Install the accumulator clamp nut.

   Tighten: Tighten the nut to 10 N.m (88 in. lb.).

4. Install the A/C low pressure switch.

   Tighten: Tighten the A/C low pressure switch to 5 N.m (44 in. lb.).

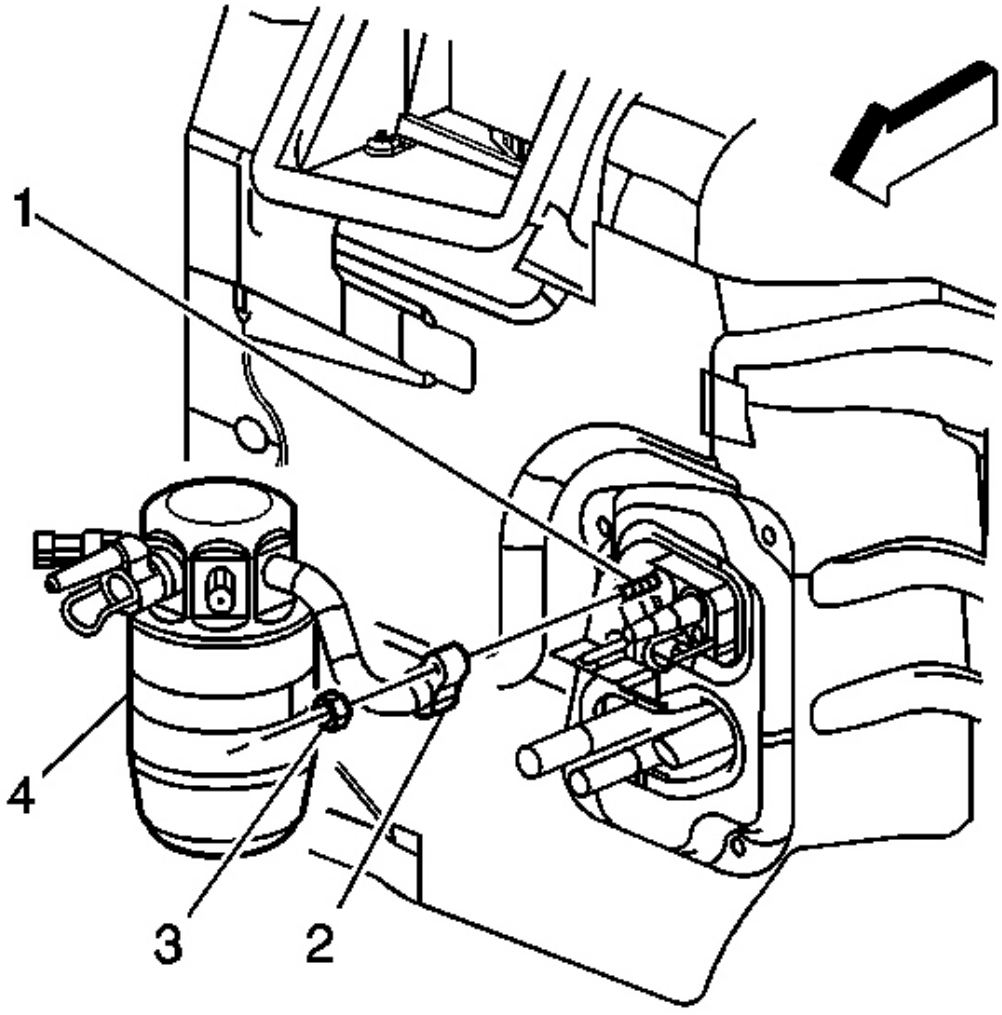


Fig. 53: Removing/Installing Accumulator
Courtesy of GENERAL MOTORS CORP.

5. Install new O-ring seals. Refer to **O-Ring Replacement**.
6. Install the accumulator to the evaporator.
7. Install the accumulator retaining nut.

   Tighten: Tighten the nut to 28 N.m (21 ft. lb.).

8. Connect the compressor suction hose to the accumulator (4).

9. Install the suction hose nut.

   Tighten: Tighten the nut to 48 N.m (35 ft. lb.).

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

HVAC MODULE ASSEMBLY REPLACEMENT

Tools Required

- **J 43181** Heater Line Quick Connect Release Tool. See **Special Tools and Equipment**.
- J 39400-A Halogen Leak Detector

Removal Procedure

1. Drain the engine coolant. Refer to **Draining and Filling Cooling System (Body VIN Code 6)** in Engine Cooling.
2. Recover the refrigerant. Refer to **Refrigerant Recovery and Recharging**.
3. Remove the instrument panel (I/P) carrier. Refer to **Instrument Panel (I/P) Carrier Replacement** in Instrument Panel, Gages and Console.
4. Reposition the heater hose clamps using **J 43181** . See **Special Tools and Equipment**.
5. Disconnect the heater hoses from the heater core.

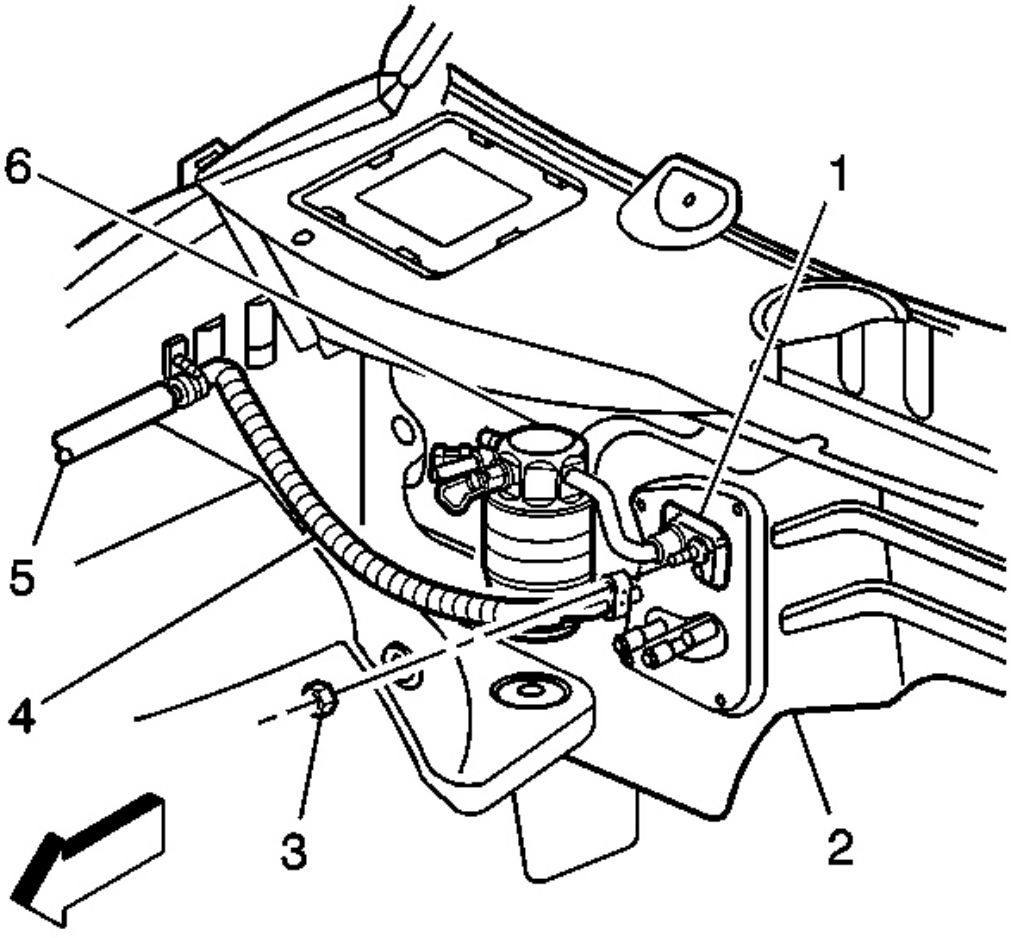


Fig. 54: Removing/Installing Evaporator Tube At Evaporator
Courtesy of GENERAL MOTORS CORP.

6. Remove the retaining nut (3) from the accumulator (6) at the evaporator (1).
7. Disconnect the accumulator (6) from the evaporator (1).
8. Disconnect the evaporator tube (4) from the evaporator (1).
9. Disconnect all of the electrical connectors to the HVAC module assembly.
10. Remove the HVAC module assembly.

Installation Procedure

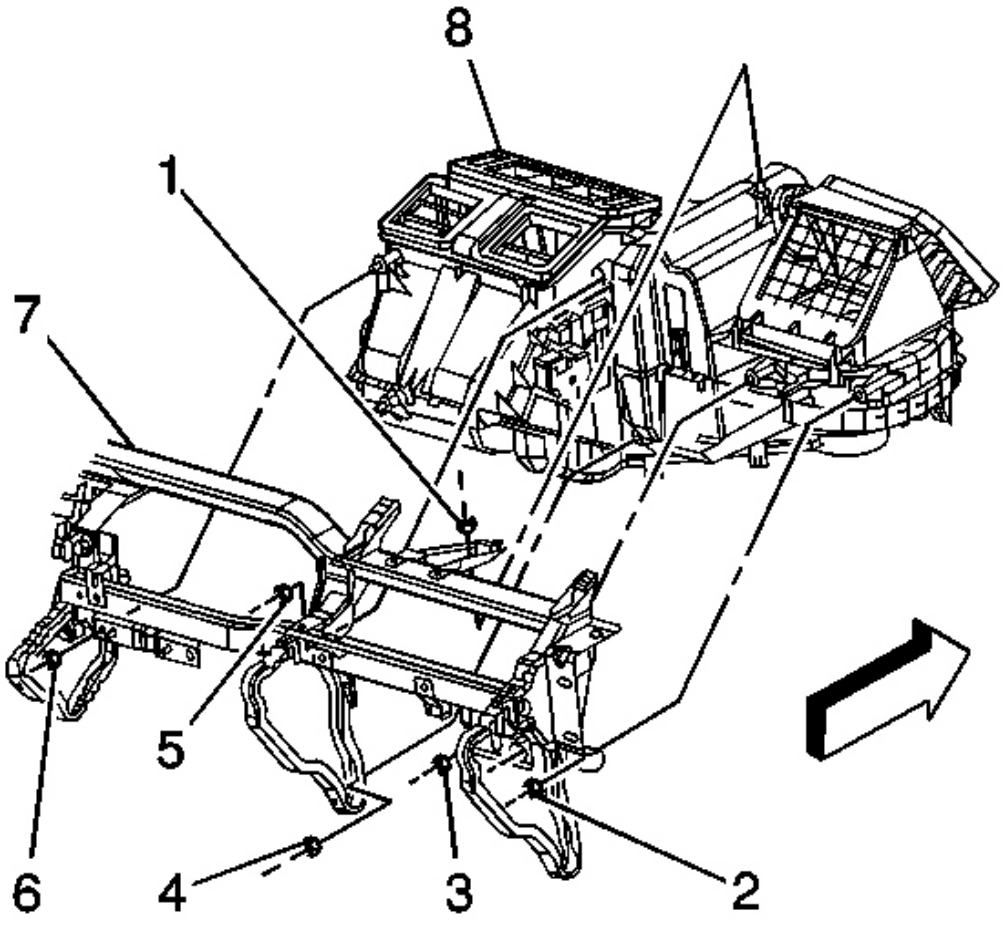


Fig. 55: Removing/Installing HVAC Module Assembly
Courtesy of GENERAL MOTORS CORP.

1. If replacing the HVAC module assembly (8), transfer the components from the old HVAC module assembly as necessary.
2. Install the HVAC module assembly (8).
3. Connect all of the electrical connectors to the HVAC module assembly.

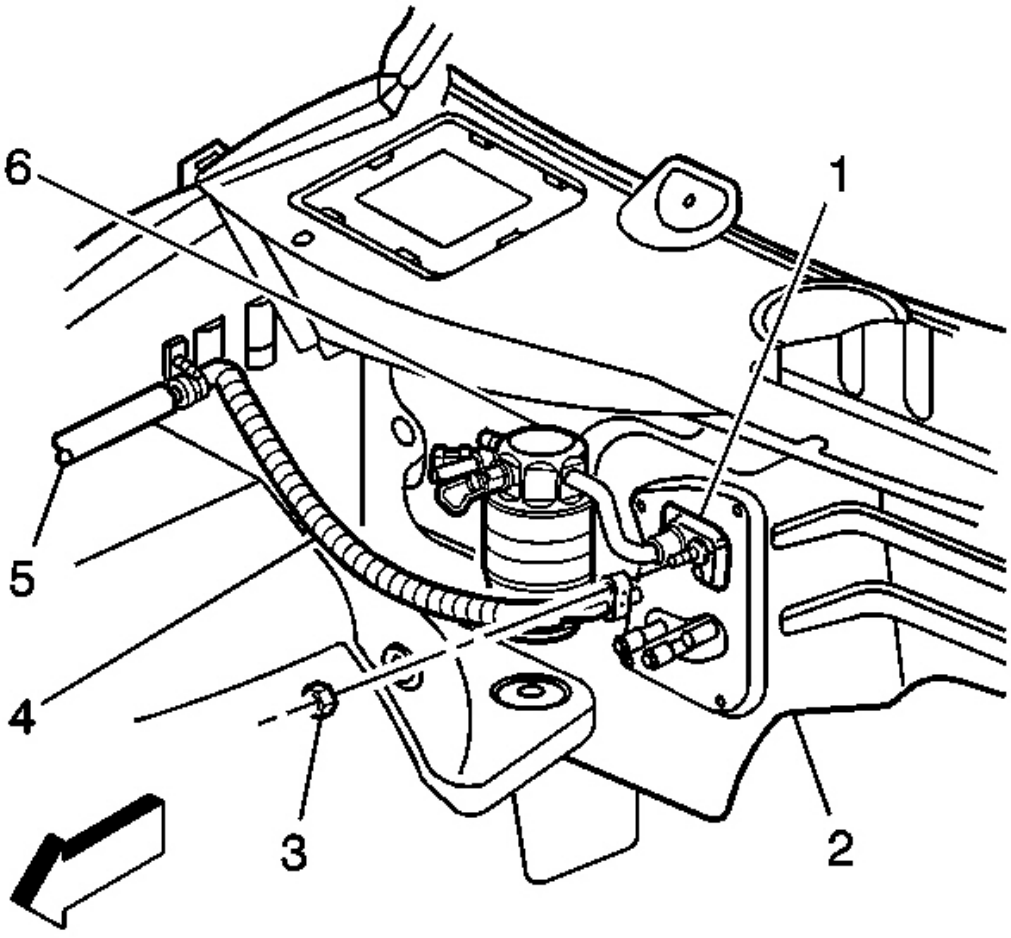


Fig. 56: Removing/Installing Evaporator Tube At Evaporator
Courtesy of GENERAL MOTORS CORP.

4. Connect the heater hoses to the heater core.
5. Connect the evaporator tube (4) to the evaporator (1).
6. Install the accumulator (6) to the evaporator (1).

NOTE: Refer to Fastener Notice in Cautions and Notices.

7. Tighten the accumulator retaining nut.

Tighten: Tighten the nut to 4.5 N.m (40 in. lb.).

8. Install the I/P carrier. Refer to **Instrument Panel (I/P) Carrier Replacement** in Instrument Panel, Gages and Console.
9. Evacuate and recharge the A/C system. Refer to **Refrigerant Recovery and Recharging**.
10. Leak test the fittings of the components using the J 39400-A .
11. Refill the engine coolant. Refer to **Draining and Filling Cooling System (Body VIN Code 6)** in Engine Cooling.

EVAPORATOR CORE REPLACEMENT

Removal Procedure

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

IMPORTANT: Some screws are hidden under the foam insulation.

2. Remove the screws to separate the HVAC module assembly halves.

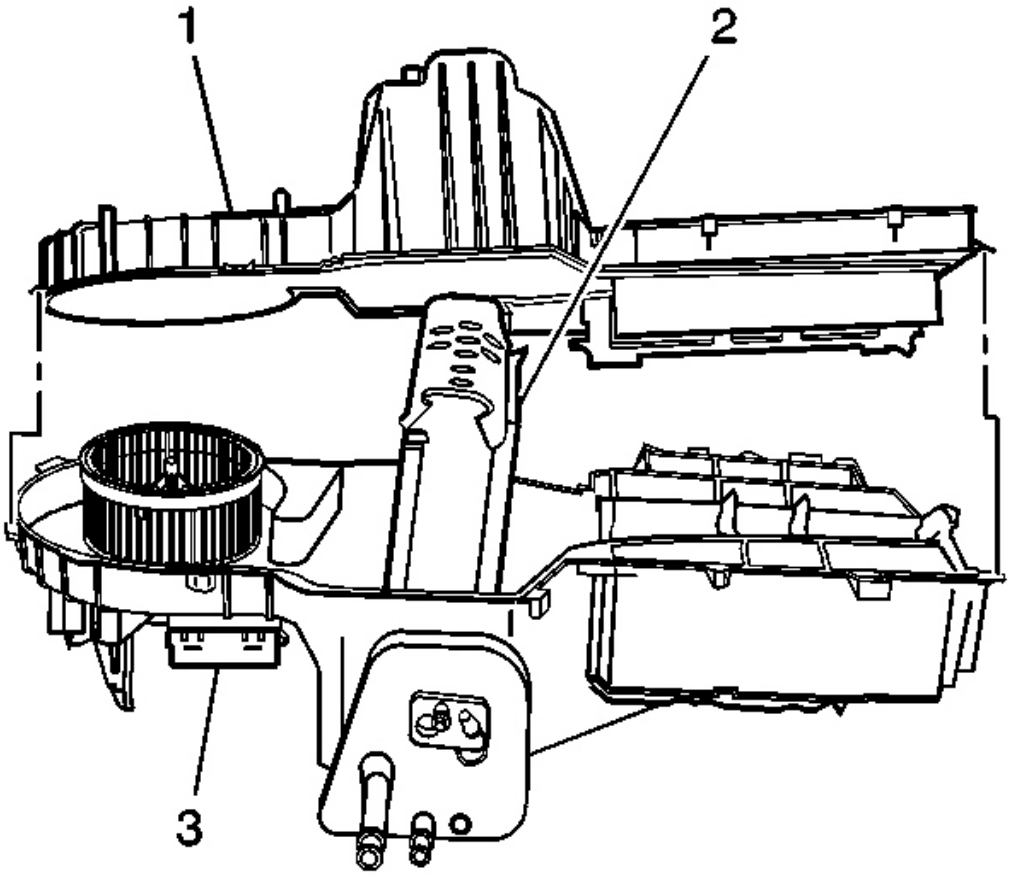


Fig. 57: Separating/Reassembling HVAC Module Case Halves
Courtesy of GENERAL MOTORS CORP.

3. Separate the HVAC module assembly (1).
4. Remove the evaporator core (2) from the HVAC module assembly (1).
5. Remove the seal between the HVAC module assembly halves.

Installation Procedure

IMPORTANT: If replacing the evaporator core, add the refrigerant oil to the evaporator core. Refer to Refrigerant System Capacities for system capacity information.

1. Install the seal between the HVAC module assembly halves.

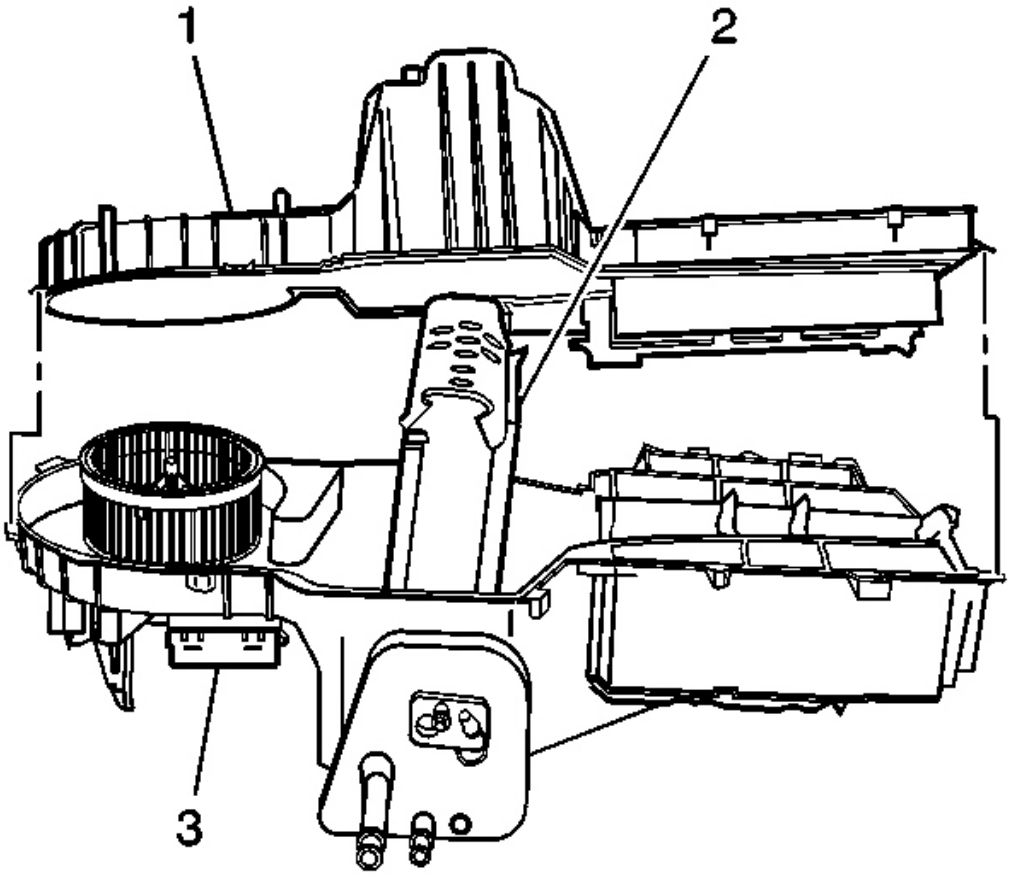


Fig. 58: Separating/Reassembling HVAC Module Case Halves
Courtesy of GENERAL MOTORS CORP.

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

IMPORTANT: Ensure that the seal between the 2 case sections is in place.

3. Assemble the HVAC module assembly.

NOTE: Refer to Fastener Notice in Cautions and Notices.

4. Install the screws to join the HVAC module assembly halves.

Tighten: Tighten the screws to 1.9 N.m (17 in. lb.).

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

HEATER HOSE REPLACEMENT - INLET (SHORT WHEEL BASE)

Tools Required

- **J 43181** Heater Line Quick Connect Release Tool. See **Special Tools and Equipment**.
- **J 38185** Hose Clamp Pliers

Removal Procedure

1. Drain the engine coolant. Refer to **Draining and Filling Cooling System (Body VIN Code 6)** in Engine Cooling.

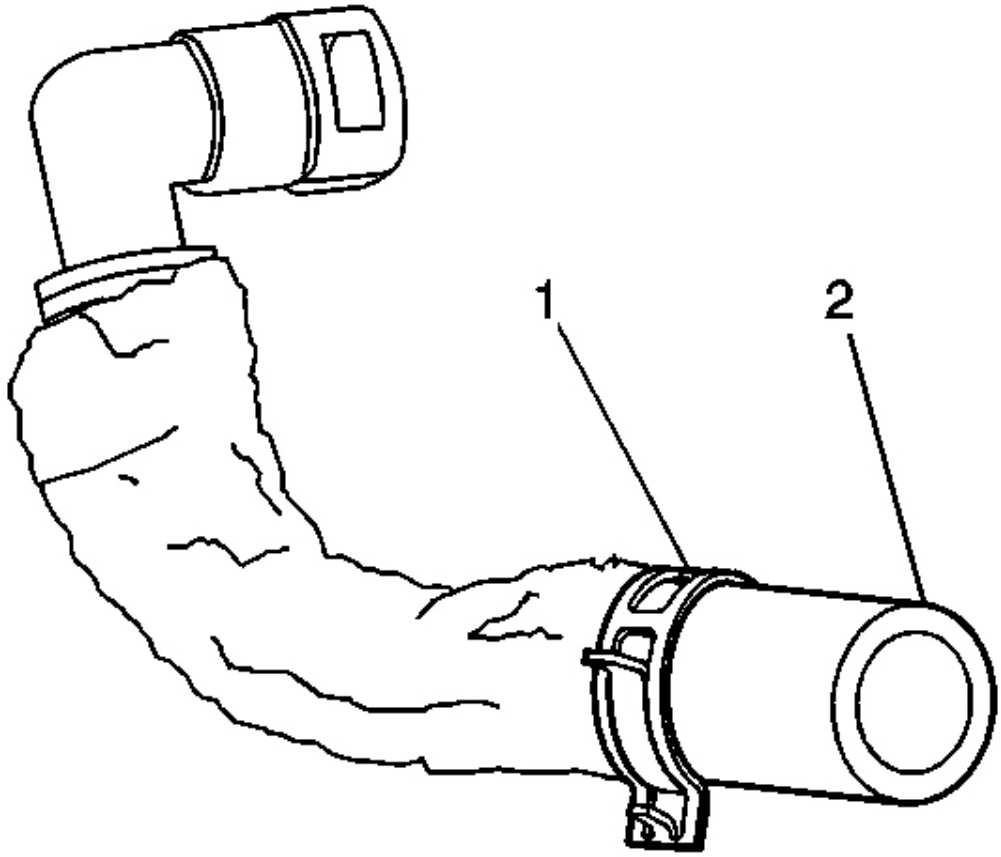


Fig. 59: Removing/Installing Heater Inlet Hose - (Short Wheel Base)

Courtesy of GENERAL MOTORS CORP.

2. Using the **J 43181** , disconnect the inlet heater hose (2) from the heater core inlet tube. See **Special Tools and Equipment**.
    1. Install the **J 43181** to the quick connect on the outlet heater core hose (2). See **Special Tools and Equipment**.
    2. Close the tool around the inlet heater core hose.
    3. Firmly pull the tool into the quick connect end of the heater hose.
    4. Firmly grasp the heater hose (2). Pull the heater hose forward in order to disengage the hose from the heater core.
3. Position the inlet heater hose clamp (1) at the engine block using**J 38185** .
4. Remove the heater inlet hose (2) from the inlet hose fitting at the engine block.
5. Remove the heater inlet hose.

Installation Procedure

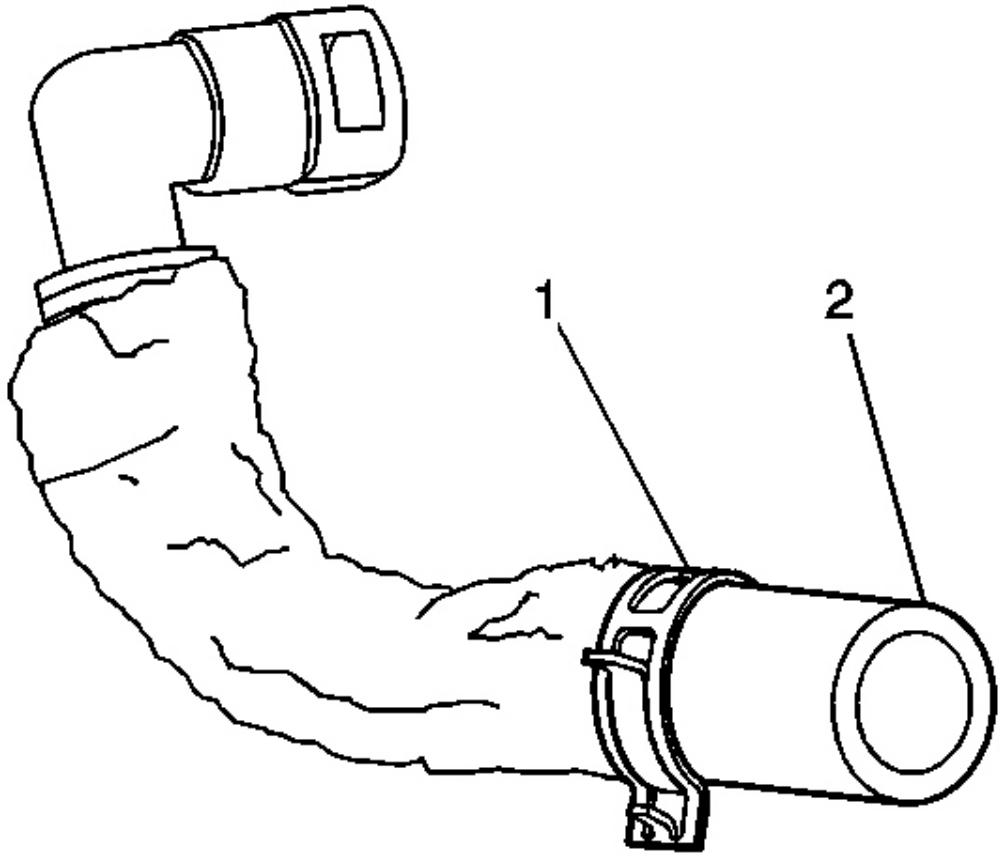


Fig. 60: Removing/Installing Heater Inlet Hose - (Short Wheel Base)
Courtesy of GENERAL MOTORS CORP.

1. Apply coolant to the end of the heater inlet hose.

IMPORTANT: When installing a new heater inlet hose, place the clamps on the hose before installing the hose to the inlet hose fitting at the engine block.

2. Install the heater inlet hose (2) to the inlet hose fitting at the engine block.
3. Position the inlet heater hose clamp (1) at the engine block using**J 38185** .
4. Install the quick connect end of the outlet heater core hose (2) to the heater core.
5. Fill the engine cooling system. Refer to **Draining and Filling Cooling System (Body VIN Code 6)** in Engine Cooling.

HEATER HOSE REPLACEMENT - INLET (LWB (LONG WHEEL BASE))

Tools Required

- **J 43181** Heater Line Quick Connect Release Tool. See **Special Tools and Equipment**.
- **J 38185** Hose Clamp Pliers

Removal Procedure

1. Drain the engine coolant. Refer to **Draining and Filling Cooling System (Body VIN Code 6)** in Engine Cooling.
2. Remove the coolant recovery reservoir. Refer to **Coolant Recovery Reservoir Replacement** in Engine Cooling.

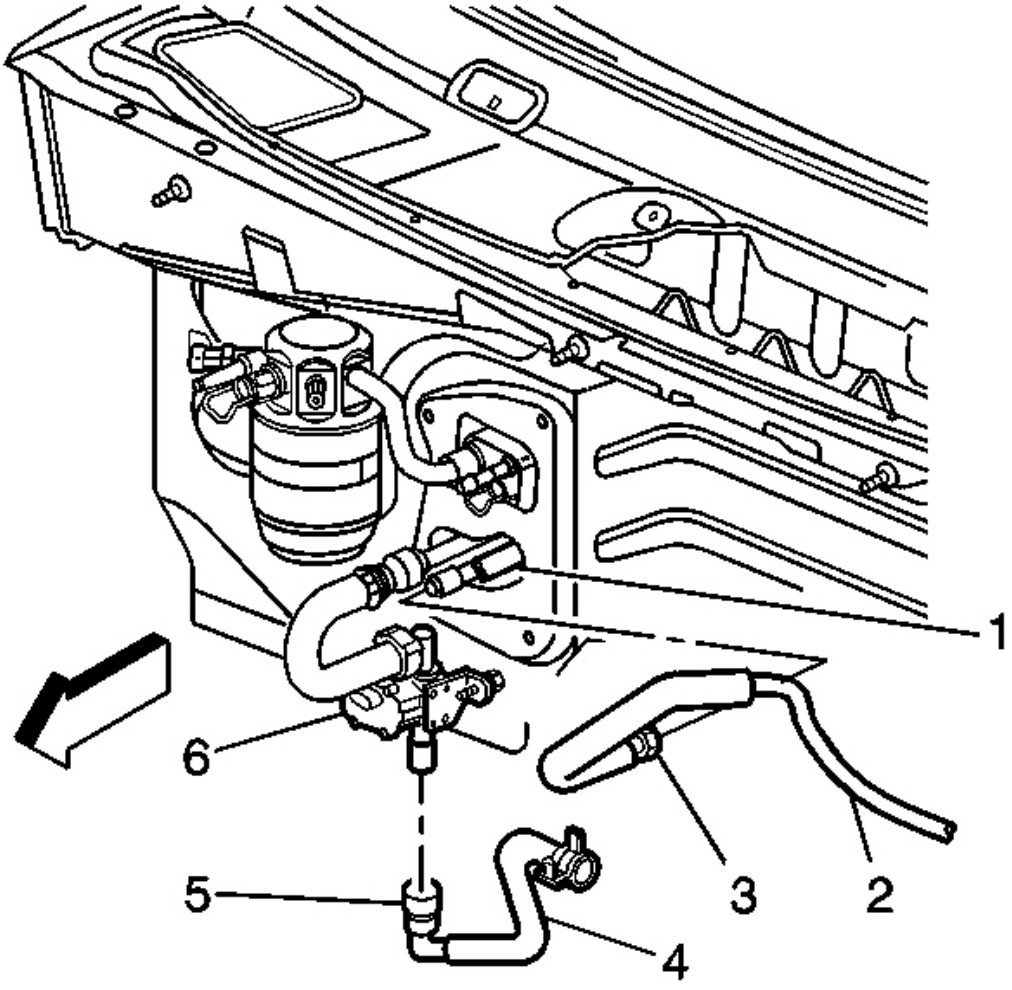


Fig. 61: Identifying Hoses
Courtesy of GENERAL MOTORS CORP.

3. Using the **J 43181** disconnect the inlet heater hose (2) from the heater core inlet tube. See **Special Tools and Equipment**.
    1. Install the **J 43181** to the quick connect on the outlet heater core hose (2). See **Special Tools and Equipment**.
    2. Close the tool around the inlet heater core hose.
    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.

4. Reposition the hose clamp at the engine outlet using **J 38185** .
5. Remove the heater inlet hose (4) from the engine block.
6. Remove the nut retaining the coolant bypass valve to the cowl.
7. Remove the heater inlet hose.

Installation Procedure

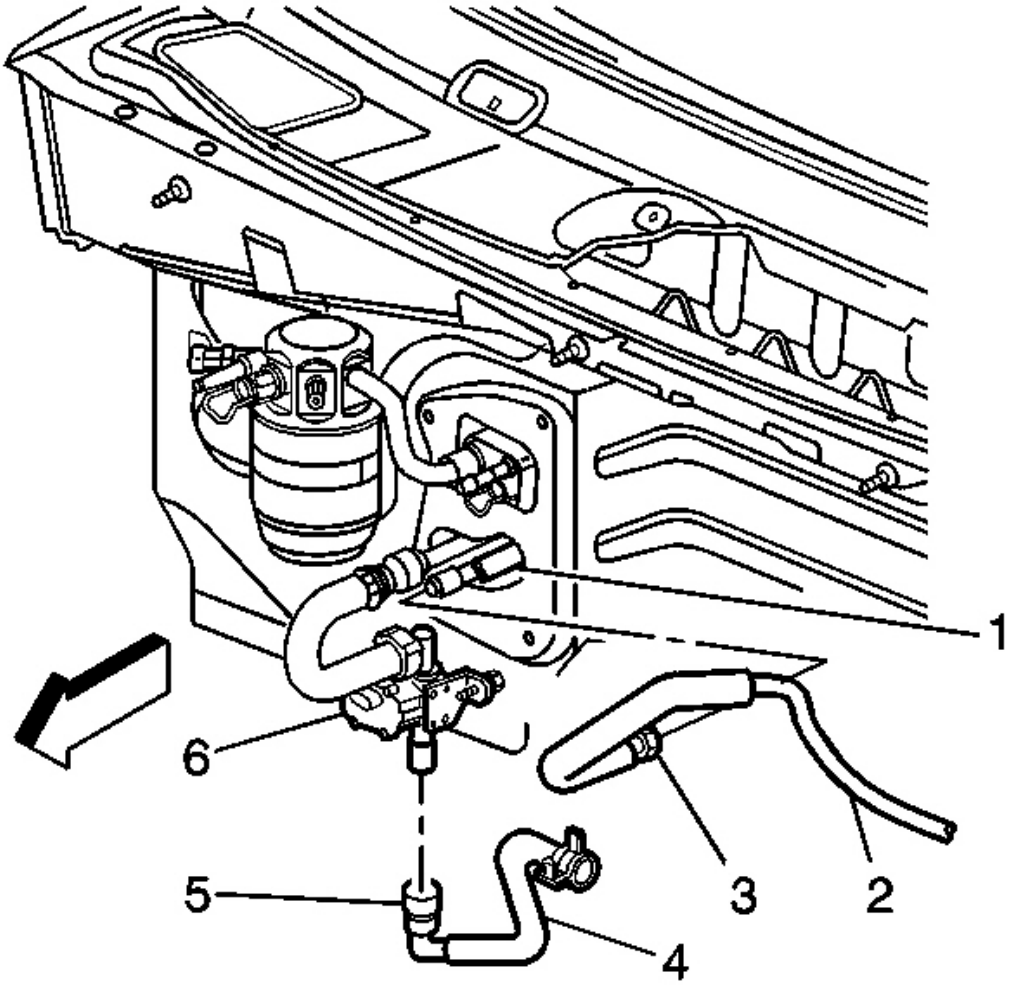


Fig. 62: Identifying Hoses
Courtesy of GENERAL MOTORS CORP.

1. Apply coolant to the end of the heater inlet hoses.

IMPORTANT: When installing a new heater inlet hose, place the clamps on the hose before installing the hose to the inlet hose fitting at the engine block.

2. Install the heater inlet hose to the inlet hose fitting at the engine block.

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Install the nut retaining the coolant bypass valve to the cowl.

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

4. Install the inlet heater hose to the engine block.
5. Reposition the inlet heater hose clamp at the engine block using **J 38185** .
6. Install the quick connect end of the inlet heater core hose to the heater core.
7. Install the coolant recovery reservoir. Refer to **Coolant Recovery Reservoir Replacement** in Engine Cooling.
8. Fill the engine cooling system. Refer to **Draining and Filling Cooling System (Body VIN Code 6)** in Engine Cooling.

HEATER HOSE REPLACEMENT - OUTLET (SWB (SHORT WHEEL BASE))

Tools Required

- **J 43181** Heater Line Quick Connect Release Tool. See **Special Tools and Equipment**.
- **J 38185** Hose Clamp Pliers

Removal Procedure

1. Drain the cooling system. Refer to **Draining and Filling Cooling System (Body VIN Code 6)** in Engine Cooling.
2. Remove the transmission. Refer to **Transmission Replacement (LM4)** or **Transmission Replacement (LL8)** in Automatic Transmission -4L60/4L65-E.
3. Remove the generator. Refer to **Generator Replacement (4.2L Engine)** or **Generator Replacement (5.3L Engine)** in Engine Electrical.

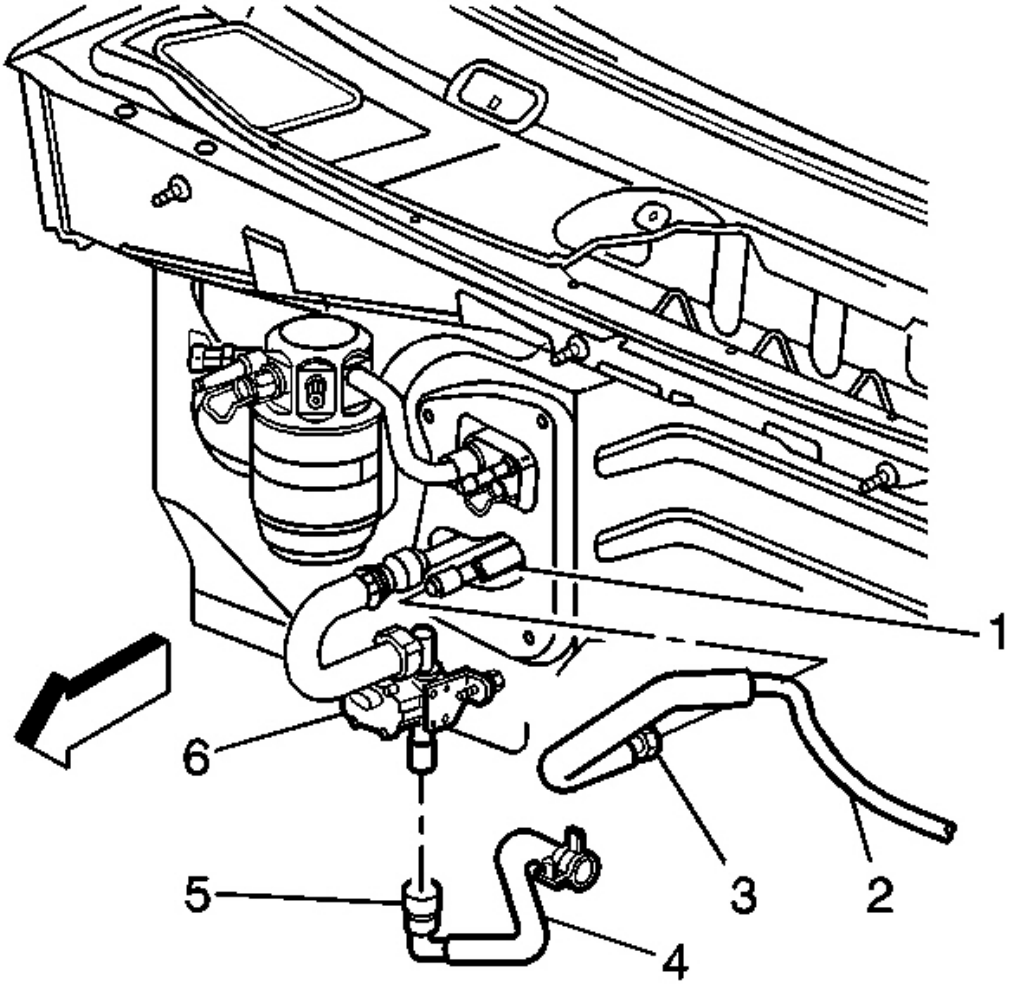


Fig. 63: Identifying Hoses
Courtesy of GENERAL MOTORS CORP.

4. Using the **J 43181** disconnect the outlet hose from the heater core outlet tube (1). See **Special Tools and Equipment**.
    1. Install the **J 43181** to the outlet heater core hose. See **Special Tools and Equipment**.
    2. Close the tool around the outlet heater core hose.
    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.
5. Remove the heater outlet hose (3) from the heater core (1).

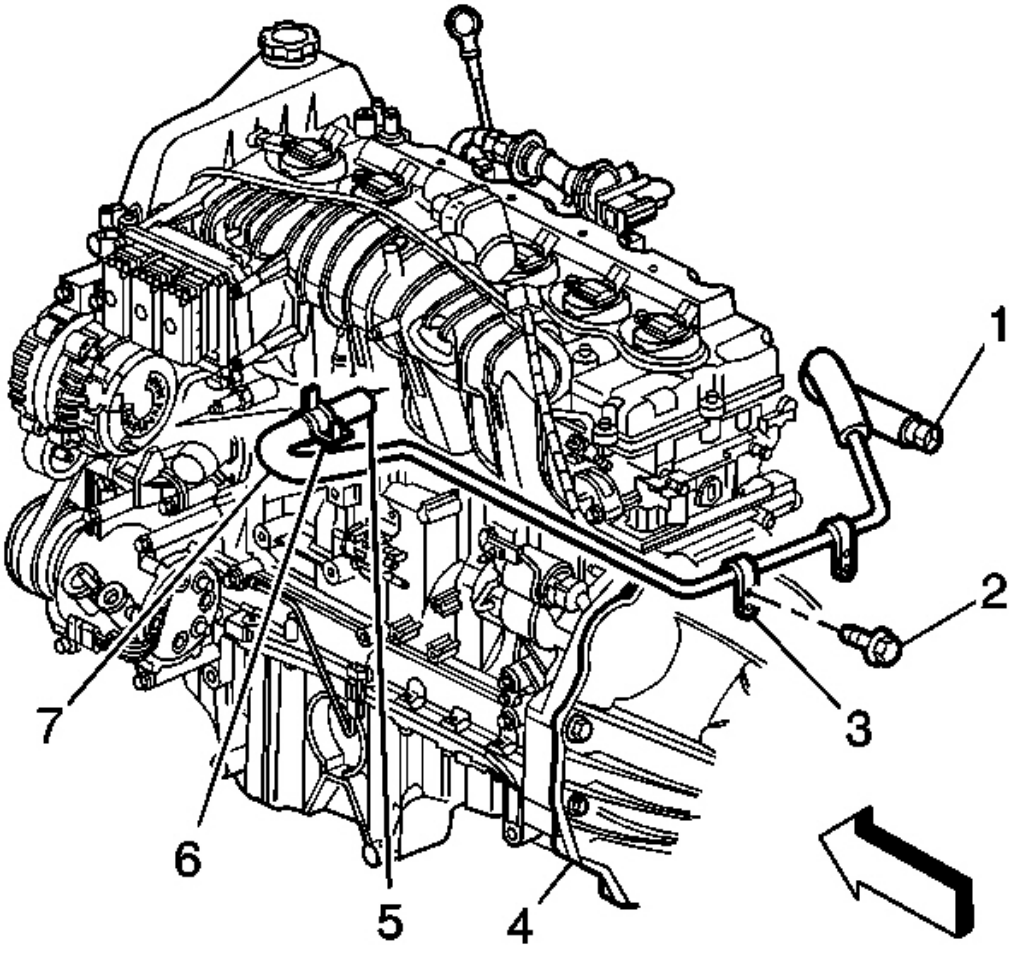


Fig. 64: Removing/Installing Heater Outlet Hose
Courtesy of GENERAL MOTORS CORP.

6. Position the outlet heater hose clamp (6) at the water pump using **J 38185** .
7. Remove the heater outlet hose (7) from the outlet hose fitting.
8. Remove the heater outlet hose.

Installation Procedure

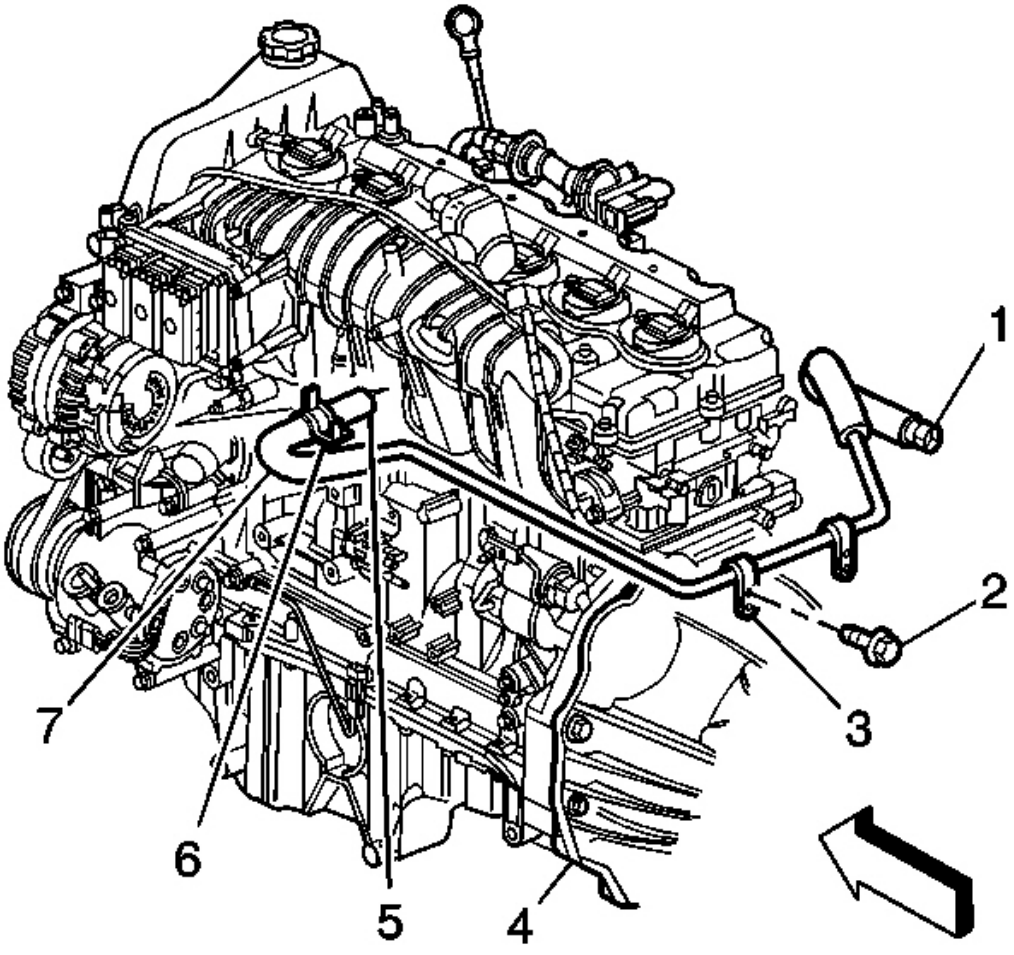


Fig. 65: Removing/Installing Heater Outlet Hose
Courtesy of GENERAL MOTORS CORP.

1. Install the outlet heater hose.
2. Install the heater outlet hose (7) to the outlet hose fitting.
3. Position the outlet heater hose clamp (6) at the outlet hose fitting using **J 38185** .

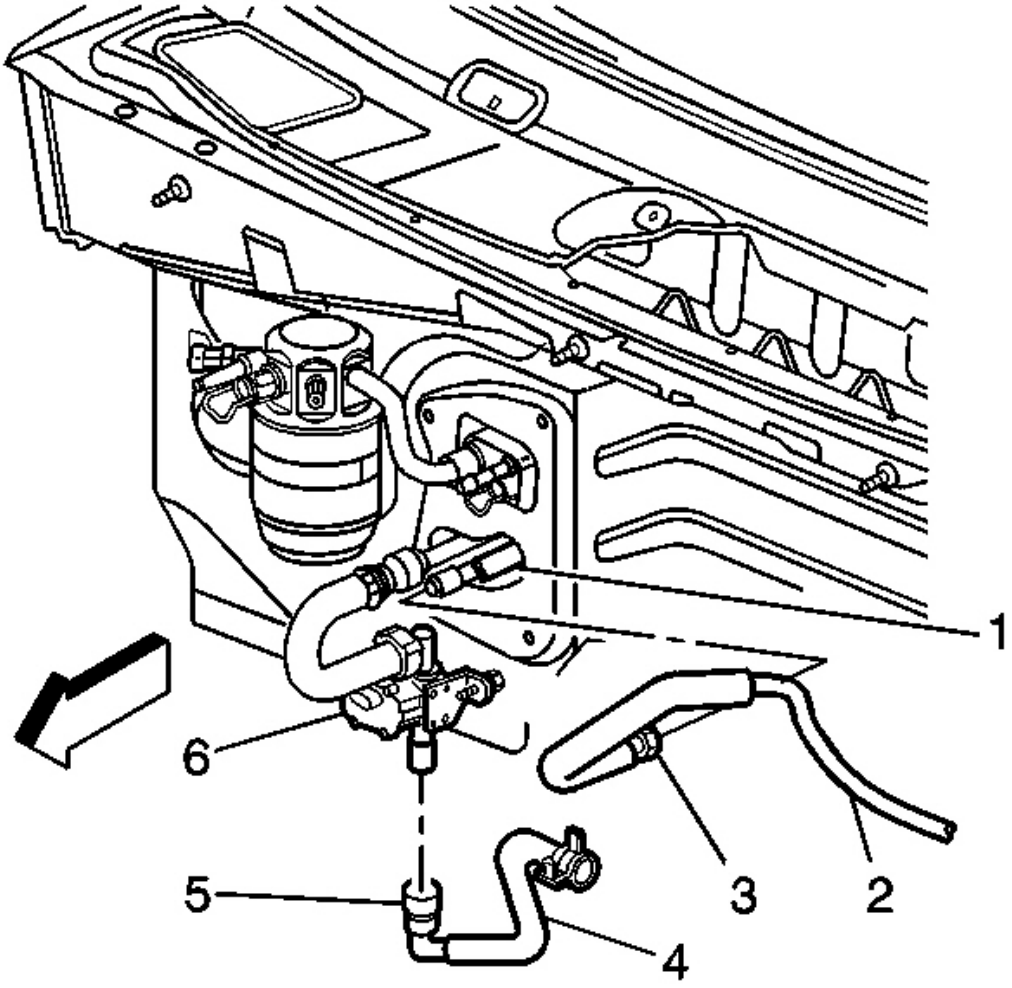


Fig. 66: Identifying Hoses
Courtesy of GENERAL MOTORS CORP.

4. Install the heater outlet hose (3) to the heater core (1).
5. Firmly push the quick connect onto the heater core hose until you hear an audible click.
6. Install the transmission. Refer to **Transmission Replacement (LM4)** or **Transmission Replacement (LL8)** in Automatic Transmission -4L60/4L65-E.
7. Install the generator. Refer to **Generator Replacement (4.2L Engine)** or **Generator Replacement (5.3L Engine)** in Engine Electrical.
8. Fill the cooling system. Refer to **Draining and Filling Cooling System (Body VIN Code 6)** in Engine Cooling.

HEATER HOSE REPLACEMENT - OUTLET (LWB (LONG WHEEL BASE))

Tools Required

- **J 43181** Heater Line Quick Connect Release Tool. See **Special Tools and Equipment**.
- **J 38185** Hose Clamp Pliers

Removal Procedure

1. Remove the coolant bypass valve. Refer to **Coolant Bypass Valve Replacement**.
2. Remove the transmission. Refer to **Transmission Replacement (LM4)** or **Transmission Replacement (LL8)** in Automatic Transmission -4L60/4L65-E.

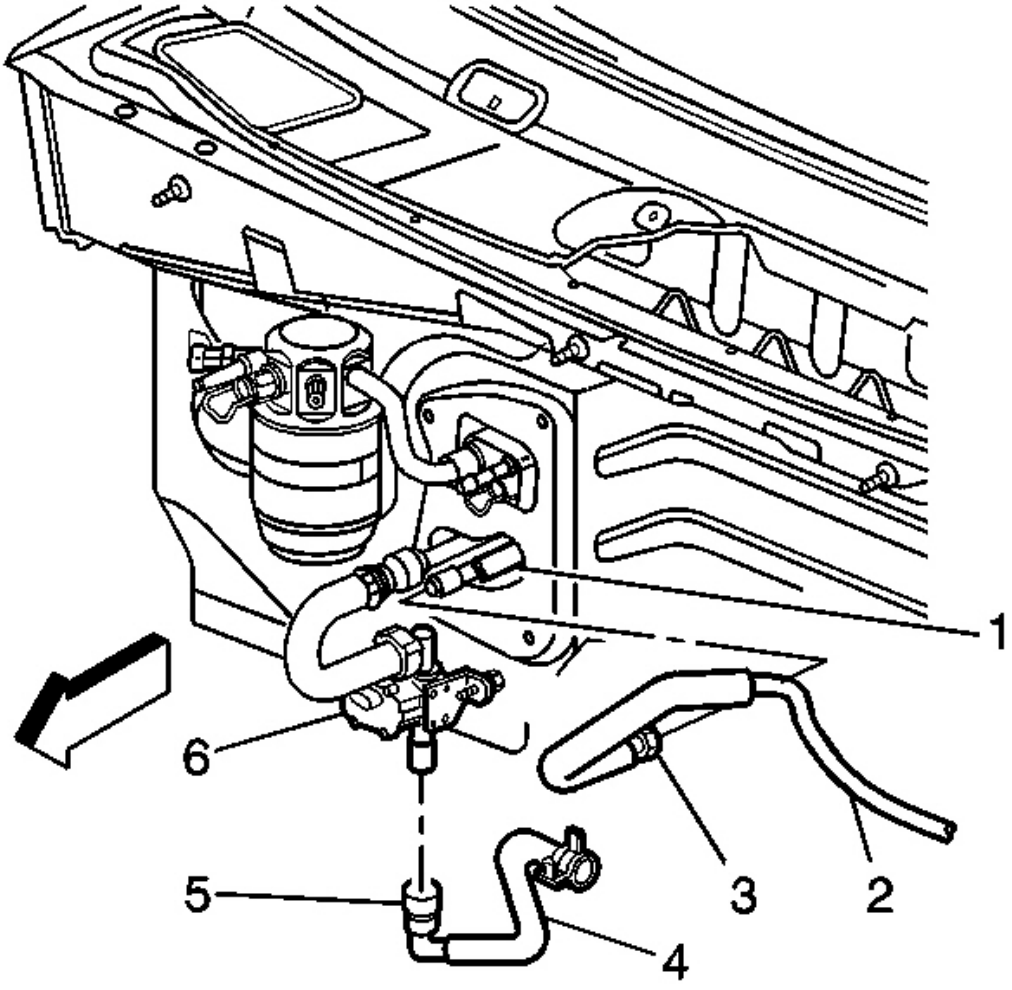


Fig. 67: Identifying Hoses
Courtesy of GENERAL MOTORS CORP.

3. Remove the heater outlet hose (3) from the heater core (1).

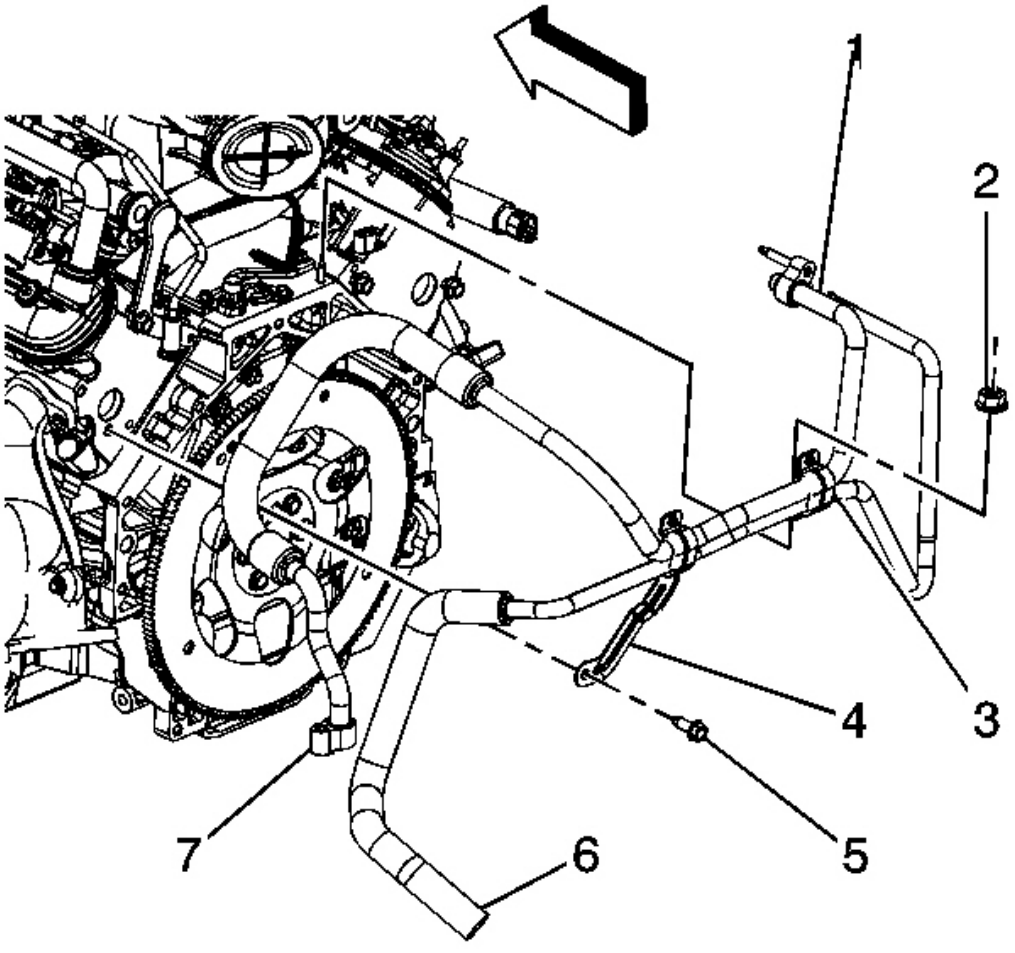


Fig. 68: View Of Rear A/C Lines
Courtesy of GENERAL MOTORS CORP.

4. Position the outlet heater hose clamp (6) at the water pump using **J 38185** .
5. Remove the heater outlet hose (7) from the outlet hose fitting.
6. Remove the heater outlet hose.

Installation Procedure

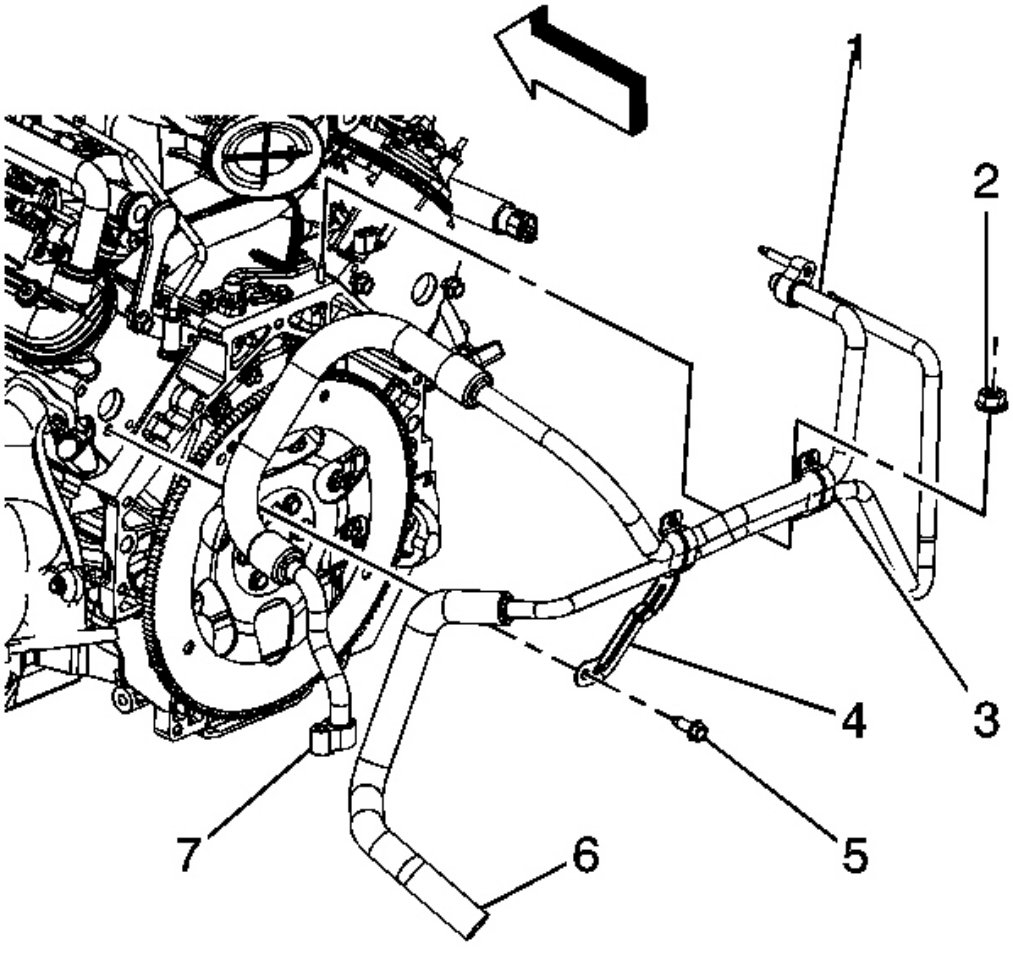


Fig. 69: View Of Rear A/C Lines
Courtesy of GENERAL MOTORS CORP.

1. Install the outlet heater hose.
2. Install the heater outlet hose (7) to the outlet hose fitting.
3. Position the outlet heater hose clamp (6) at the outlet hose fitting using **J 38185** .

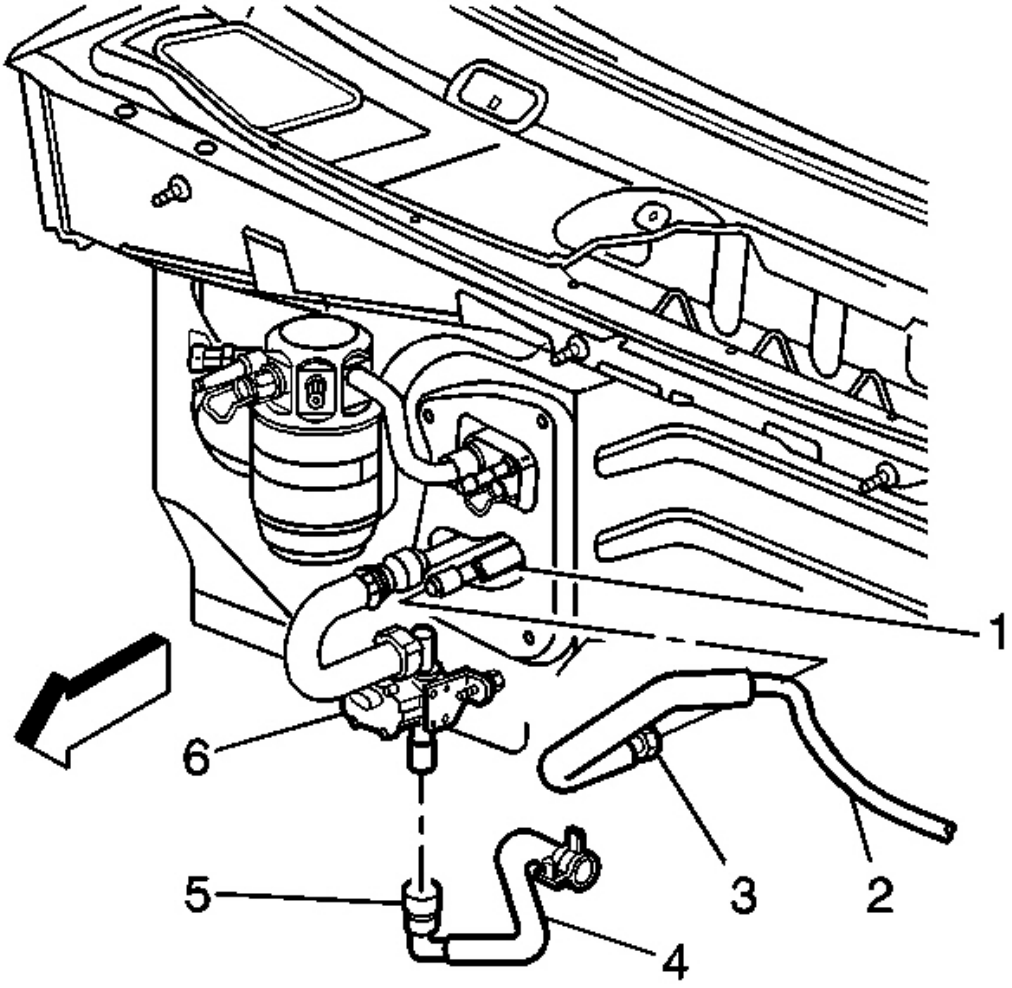


Fig. 70: Identifying Hoses
Courtesy of GENERAL MOTORS CORP.

4. Install the heater outlet hose (3) to the heater core (1).
5. Firmly push the quick connect onto the heater core hose until you hear an audible click.
6. Install the transmission. Refer to **Transmission Replacement (LM4)** or **Transmission Replacement (LL8)** in Automatic Transmission -4L60/4L65-E.
7. Install the coolant bypass valve. Refer to **Coolant Bypass Valve Replacement**.

COOLANT BYPASS VALVE REPLACEMENT

Tools Required

- **J 43181** Heater Line Quick Connect Release Tool. See **Special Tools and Equipment**.
- **J 38185** Hose Clamp Pliers

Removal Procedure

1. Drain the engine coolant. Refer to **Draining and Filling Cooling System (Body VIN Code 6)** in Engine Cooling.
2. Remove the coolant recovery reservoir. Refer to **Coolant Recovery Reservoir Replacement** in Engine Cooling.
3. Using the **J 43181** , disconnect the inlet heater hose from the heater core. See **Special Tools and Equipment**.
    1. Install the **J 43181** to the quick connect on the outlet heater core hose (2). See **Special Tools and Equipment**.
    2. Close the tool around the inlet heater core hose.
    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.

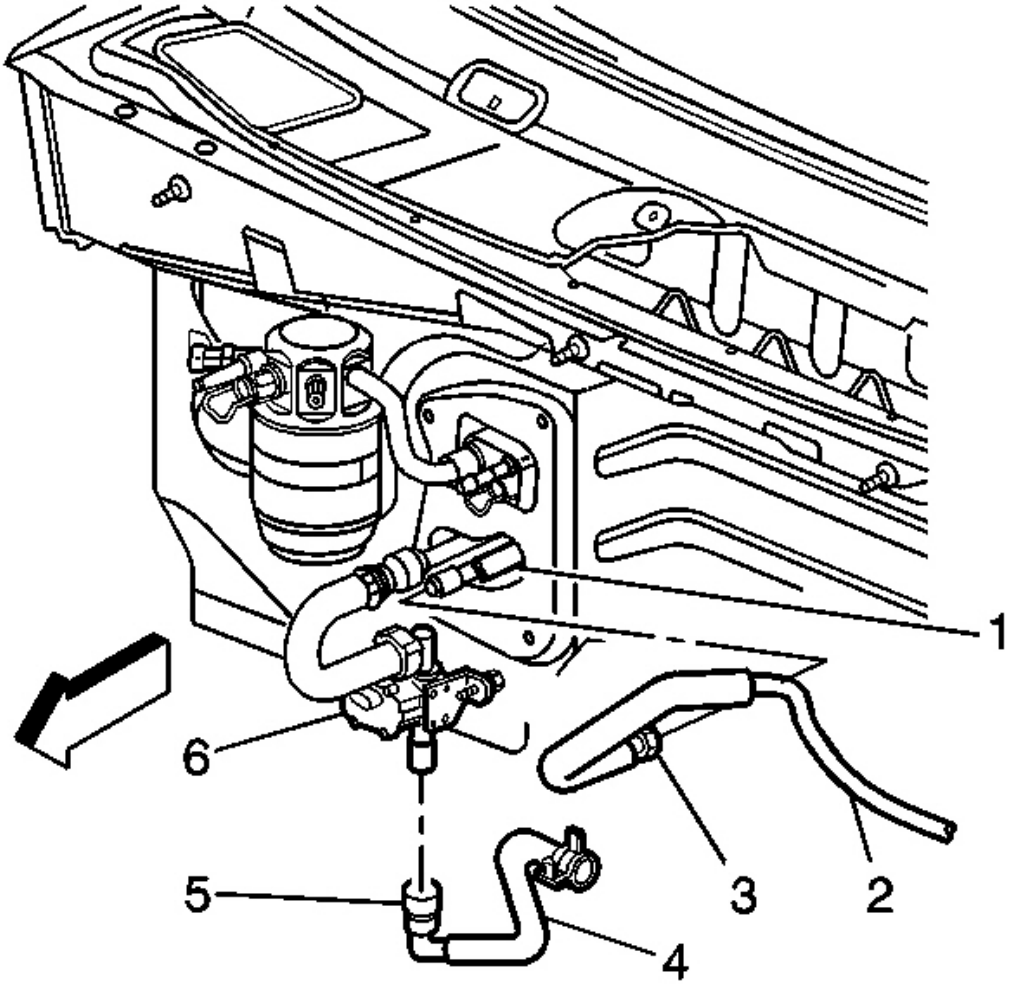


Fig. 71: Identifying Hoses
Courtesy of GENERAL MOTORS CORP.

4. Position the hose clamp at the engine outlet using **J 38185** .
5. Remove the heater inlet hose (4) from the engine block.
6. Remove the nut retaining the coolant bypass valve to the cowl.
7. Remove the vacuum hose from the coolant bypass valve.
8. Remove the coolant bypass valve.
9. Position the clamps at the coolant bypass valve.
10. Remove the heater inlet hoses form the coolant bypass valve.

Installation Procedure

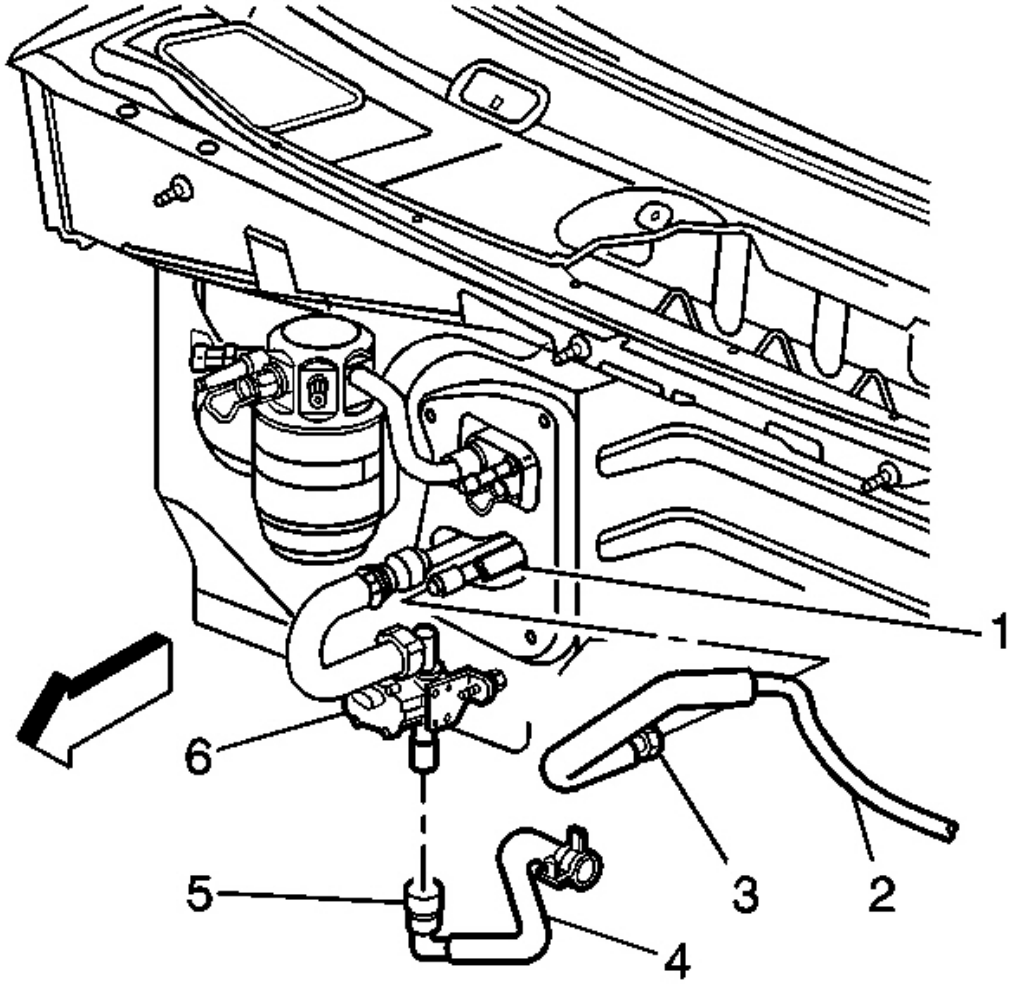


Fig. 72: Identifying Hoses
Courtesy of GENERAL MOTORS CORP.

1. Apply coolant to the end of the heater inlet hoses.

IMPORTANT: When installing a new heater inlet hose, place the clamps on the hose before installing the hose to the inlet hose fitting at the engine block.

2. Install the heater inlet hose to the inlet hose fitting at the engine block.
3. Install the coolant bypass valve (6).

NOTE: Refer to Fastener Notice in Cautions and Notices.

4. Install the nut retaining the coolant bypass valve to the cowl.

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

5. Install the vacuum hose to the coolant bypass valve.
6. Install the inlet heater hose to the engine block.
7. Position the inlet heater hose clamp at the engine block using **J 38185** .
8. Connect 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.

9. Install the coolant recovery reservoir. Refer to **Coolant Recovery Reservoir Replacement** in Engine Cooling.
10. Fill the engine cooling system. Refer to **Draining and Filling Cooling System (Body VIN Code 6)** in Engine Cooling.

BLOWER MOTOR RELAY REPLACEMENT

Removal Procedure

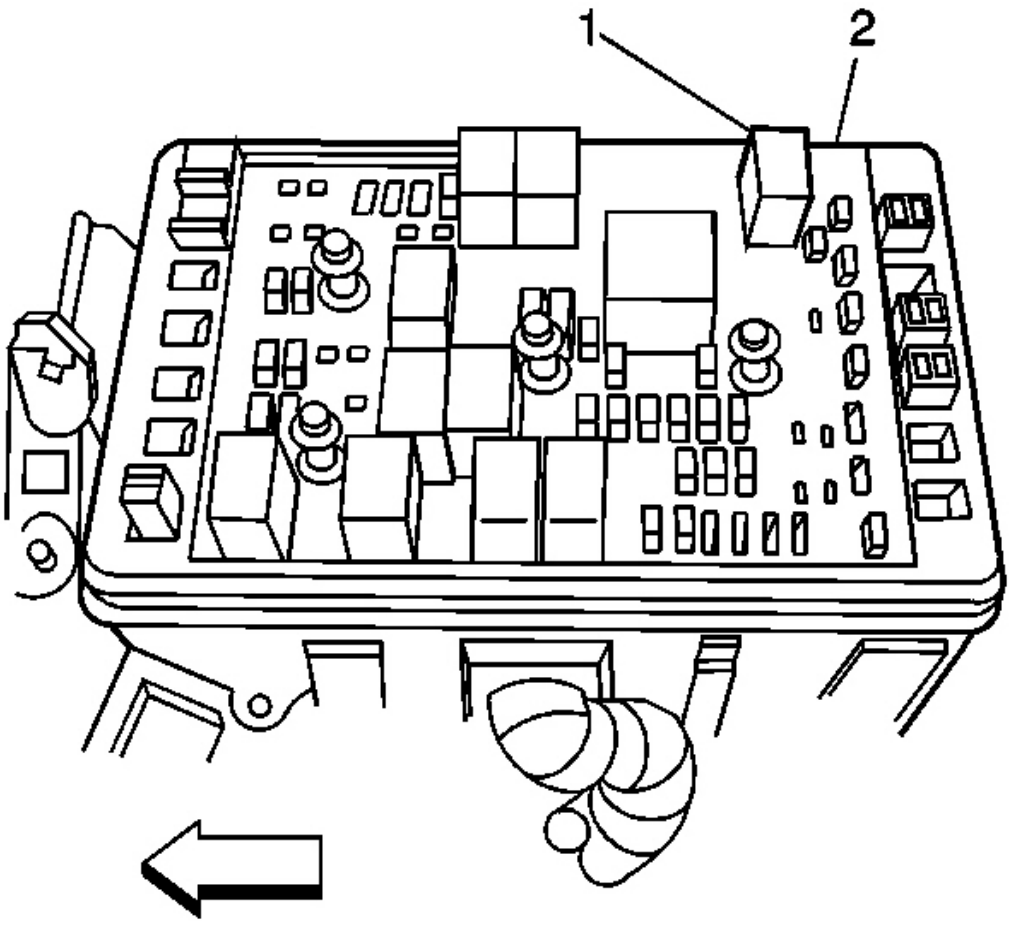


Fig. 73: Removing/Installation Cooling Fan Relay
Courtesy of GENERAL MOTORS CORP.

1. Remove the cover of the under hood fuse block.
2. Remove the blower motor relay (1) from the under hood fuse block (2).

Installation Procedure

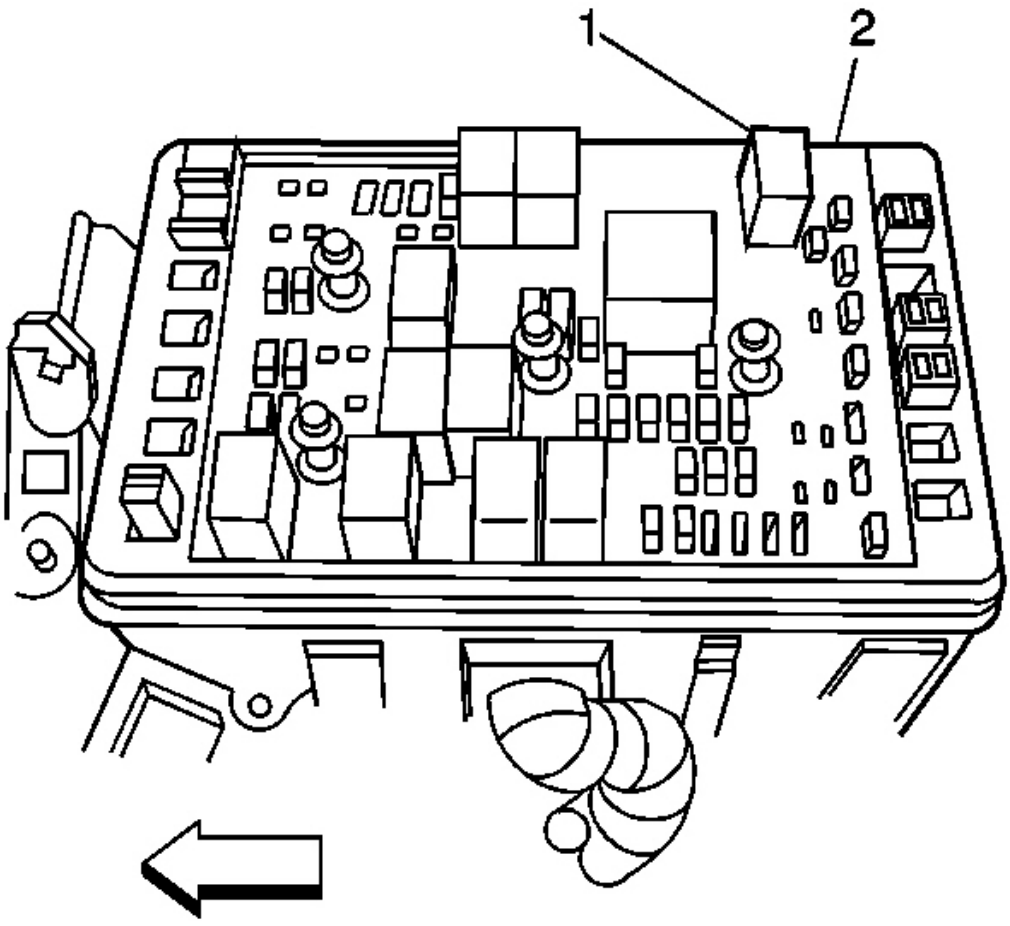


Fig. 74: Removing/Installation Cooling Fan Relay
Courtesy of GENERAL MOTORS CORP.

1. Install the blower motor relay (1) to the under hood fuse block.
2. Install the cover of the under hood fuse block.

BLOWER MOTOR RESISTOR ASSEMBLY REPLACEMENT

Removal Procedure

1. Remove the right closeout/insulator panel. Refer to **Closeout/Insulator Panel Replacement - Right** in Interior Trim.

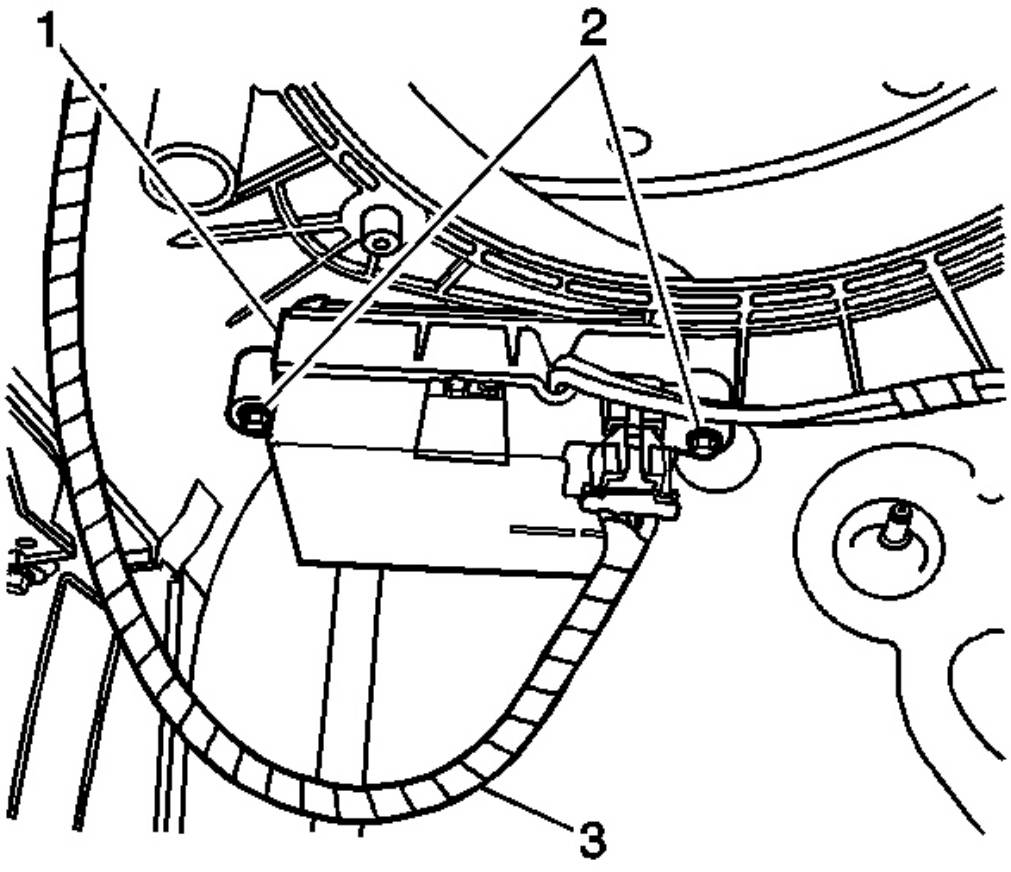


Fig. 75: Removing/Installation Blower Motor Resistor
Courtesy of GENERAL MOTORS CORP.

2. Disconnect the blower motor resistor electrical connector (3).
3. Remove the blower motor resistor mounting screws (2).
4. Remove the blower motor resistor (1).

Installation Procedure

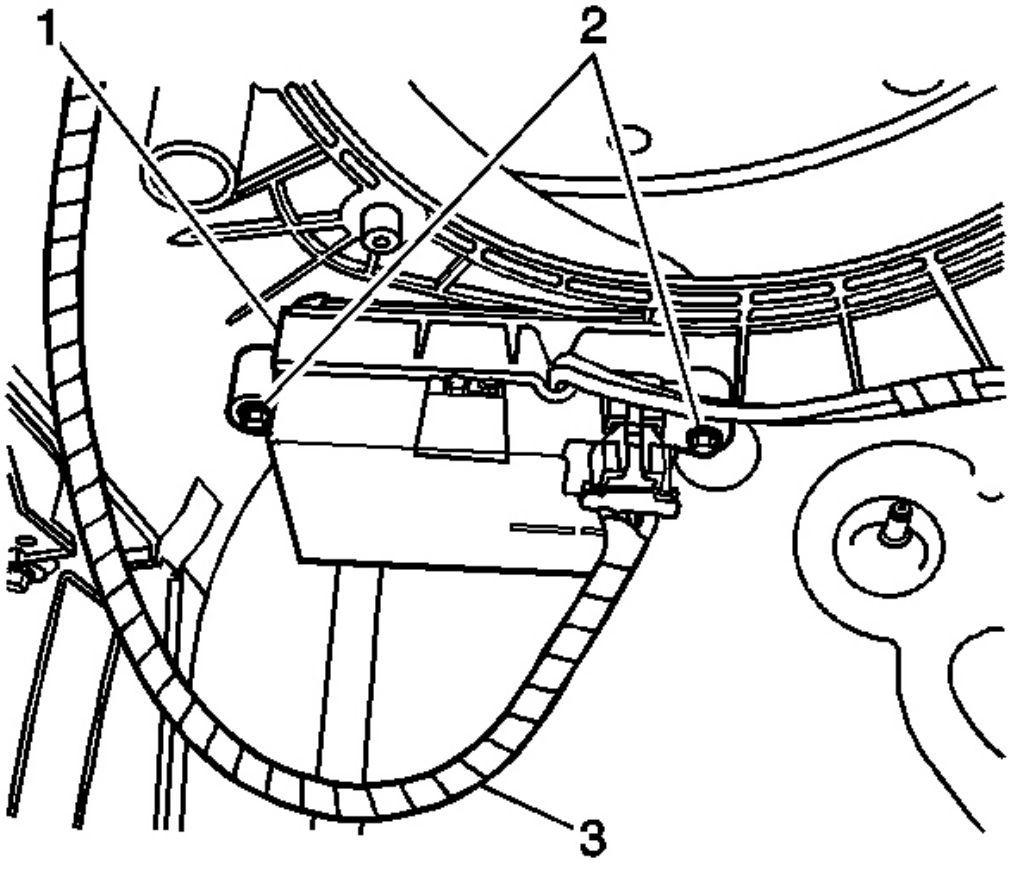


Fig. 76: Removing/Installation Blower Motor Resistor
Courtesy of GENERAL MOTORS CORP.

1. Install the blower motor resistor (1).

NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the blower motor resistor mounting screws (2).

   Tighten: Tighten the screws to 1.9 N.m (17 in. lb.).

3. Connect the blower motor resistor electrical connector (3).
4. Install the right closeout/insulator panel. Refer to **Closeout/Insulator Panel Replacement - Right** in Interior Trim.

BLOWER MOTOR REPLACEMENT

Removal Procedure

1. Remove the right closeout/insulator panel. Refer to **Closeout/Insulator Panel Replacement - Right** in Interior Trim.
2. Remove the I/P storage compartment door. Refer to **Door Replacement - Instrument Panel (I/P) Compartment** in Instrument Panel, Gages and Console.

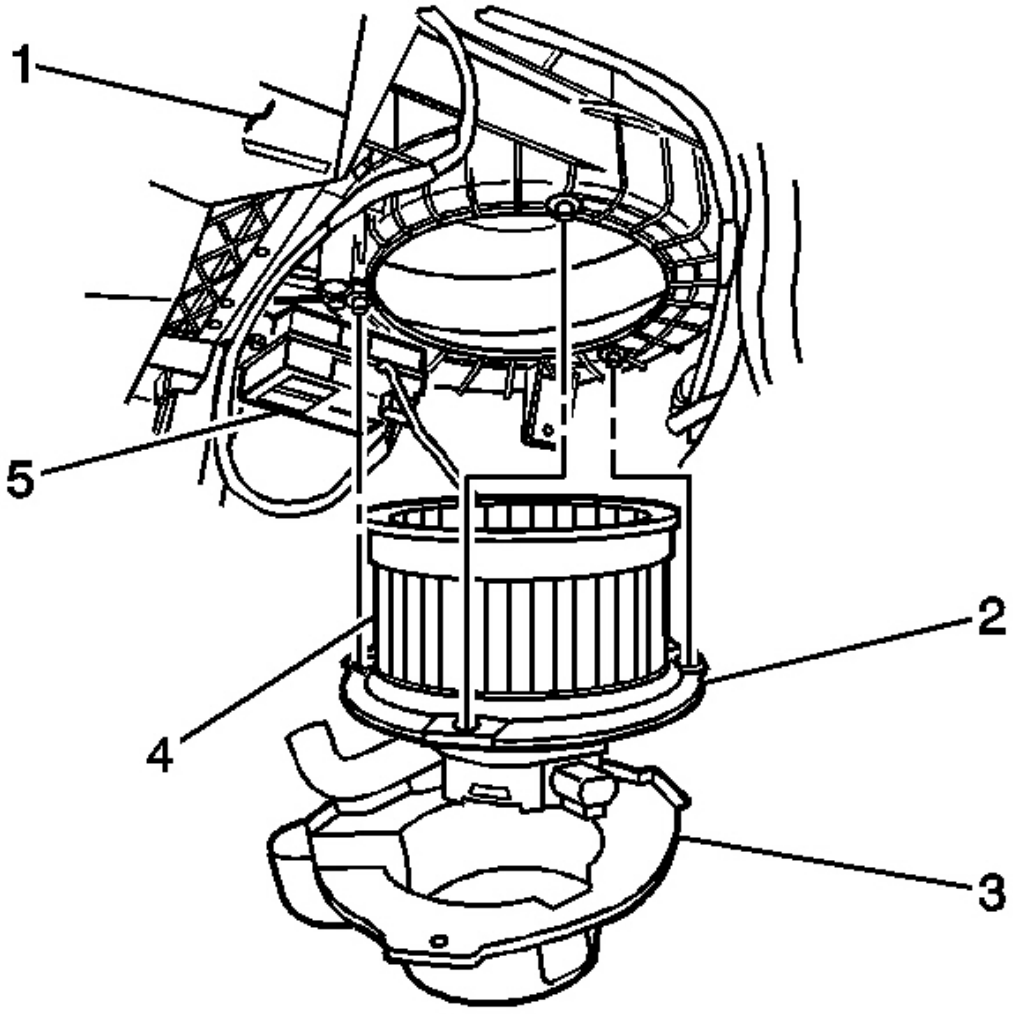


Fig. 77: Removing/Installing Blower Motor
Courtesy of GENERAL MOTORS CORP.

3. Disconnect the blower motor electrical connector.
4. Remove the blower motor mounting screws.
5. Remove the blower motor cooling tube.
6. Remove the blower motor (2).

Installation Procedure

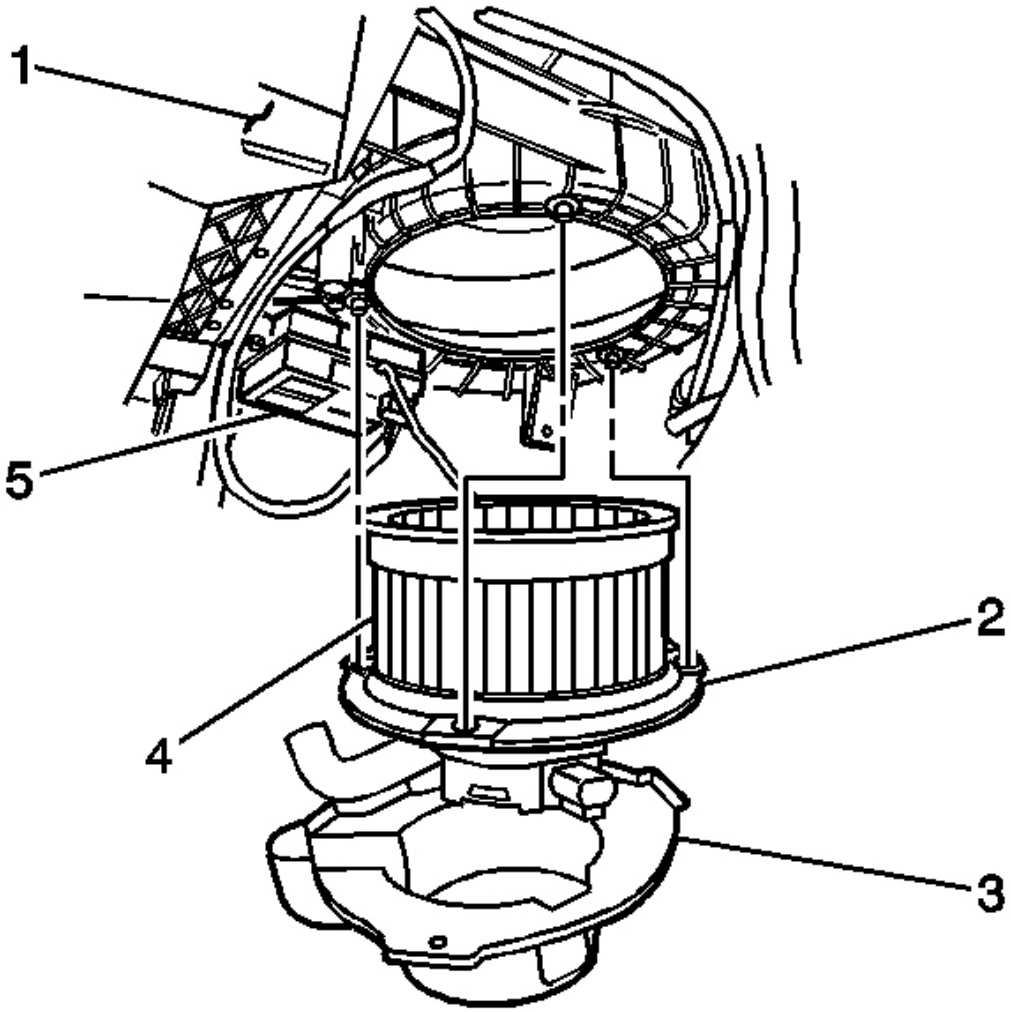


Fig. 78: Removing/Installing Blower Motor
Courtesy of GENERAL MOTORS CORP.

1. Install the blower motor (2).

2. Install the blower motor cooling tube.

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Install the blower motor mounting screws.

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

4. Connect the blower motor electrical connector.
5. Install the right closeout/insulator panel. Refer to **Closeout/Insulator Panel Replacement - Right** in Interior Trim.

AIR DISTRIBUTOR DUCT REPLACEMENT

Removal Procedure

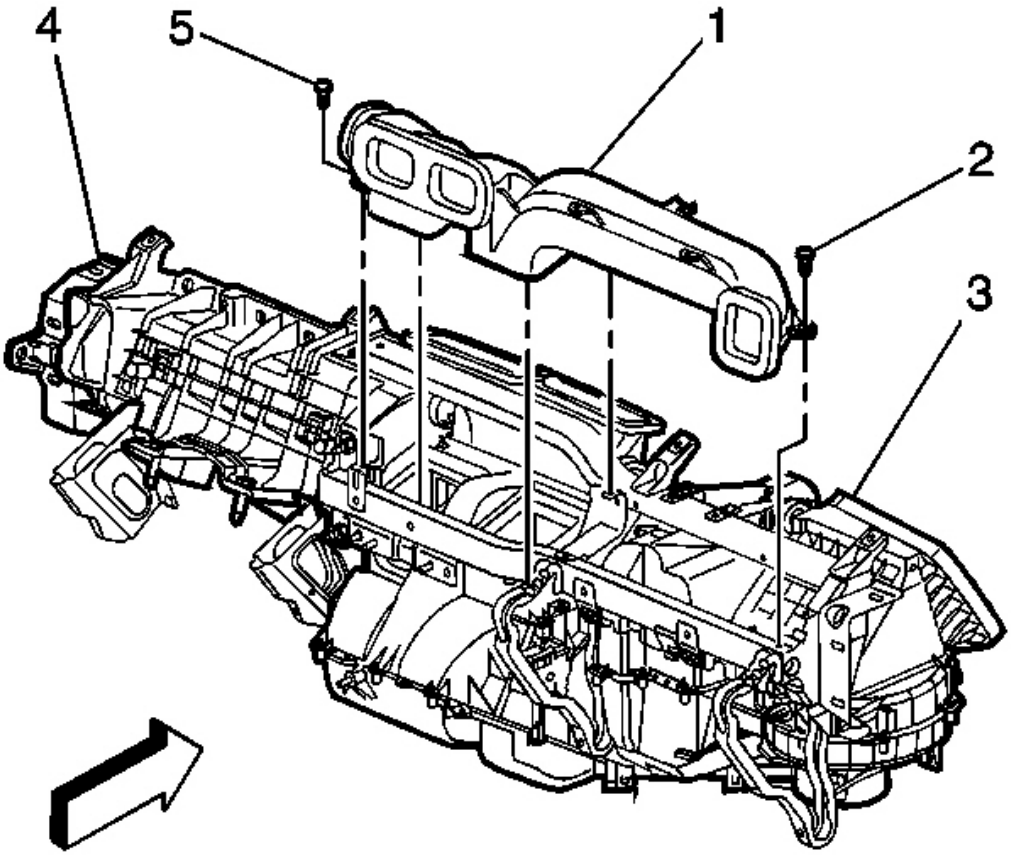


Fig. 79: Removing/Installing Air Distributor Duct
Courtesy of GENERAL MOTORS CORP.

1. Remove the I/P assembly. Refer to **Instrument Panel (I/P) Assembly Replacement** in Instrument Panel, Gages and Console.
2. Remove the driver side air distributor duct screws.
3. Remove the air distributor duct (1) from the instrument panel.

Installation Procedure

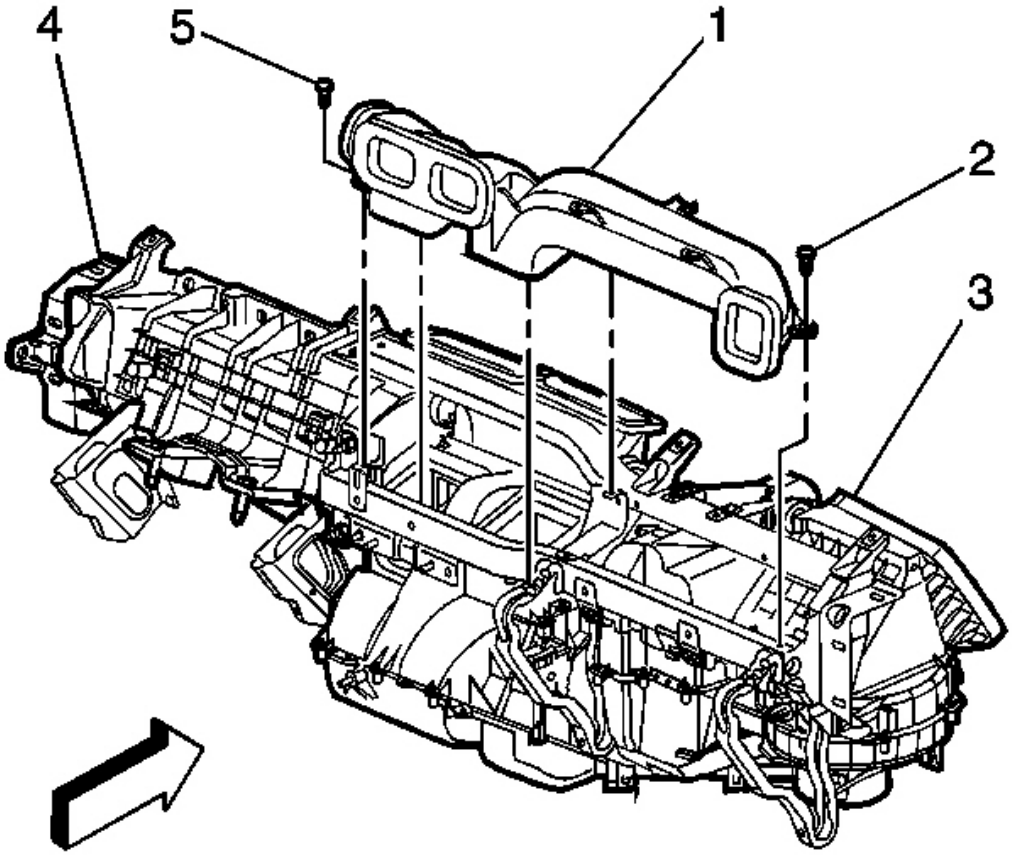


Fig. 80: Removing/Installing Air Distributor Duct
Courtesy of GENERAL MOTORS CORP.

1. Install the air distributor duct (1) to the instrument panel.

NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the retaining screws to the air distributor duct.

   Tighten: Tighten the screws to 1.9 N.m (17 in. lb.).

3. Install the I/P assembly. Refer to **Instrument Panel (I/P) Assembly Replacement** in Instrument Panel, Gages and Console.

AIR OUTLET REPLACEMENT - INSTRUMENT PANEL

Removal Procedure

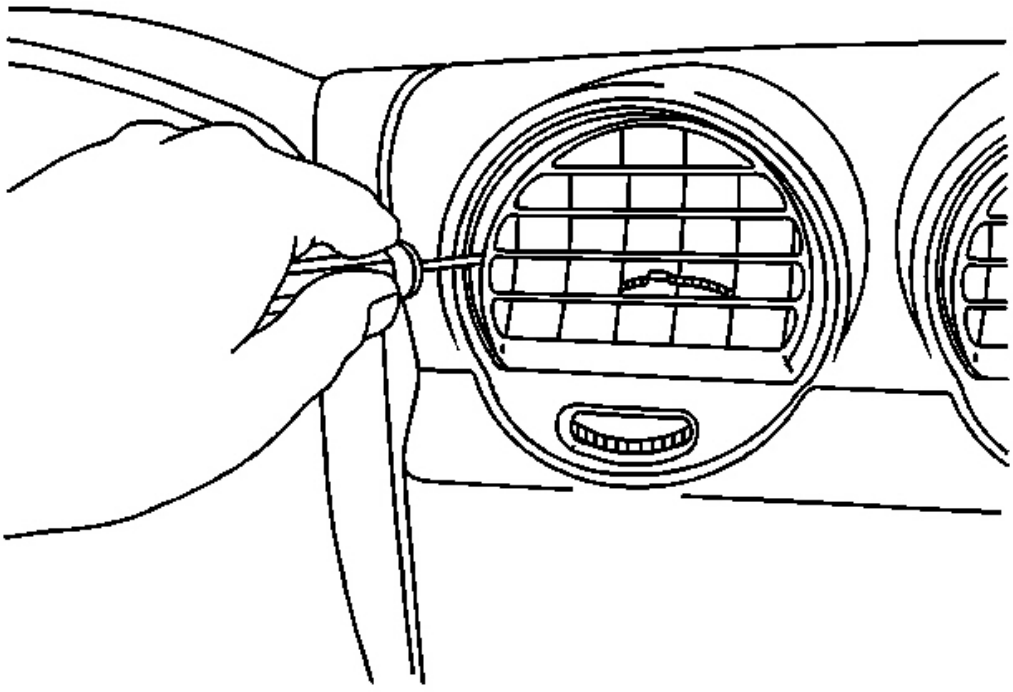


Fig. 81: Removing Left Housing Retaining Pin
Courtesy of GENERAL MOTORS CORP.

1. Using a flat-bladed tool, release the left housing retaining pin and gently push the left side of the air outlet into the housing assembly.

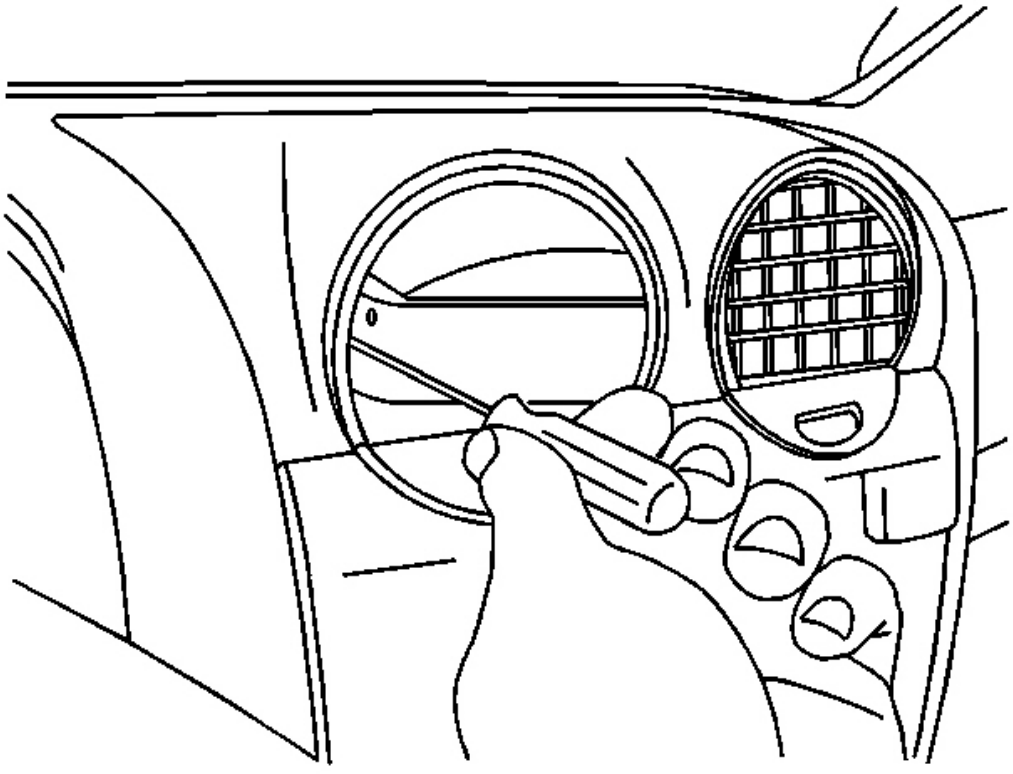


Fig. 82: Removing/Installing Left Side Of Air Outlet At Housing Assembly
Courtesy of GENERAL MOTORS CORP.

2. With the air outlet in the housing assembly, rotate the air outlet face down.
3. Using a flat bladed tool, remove the left side of the air outlet from the housing assembly.

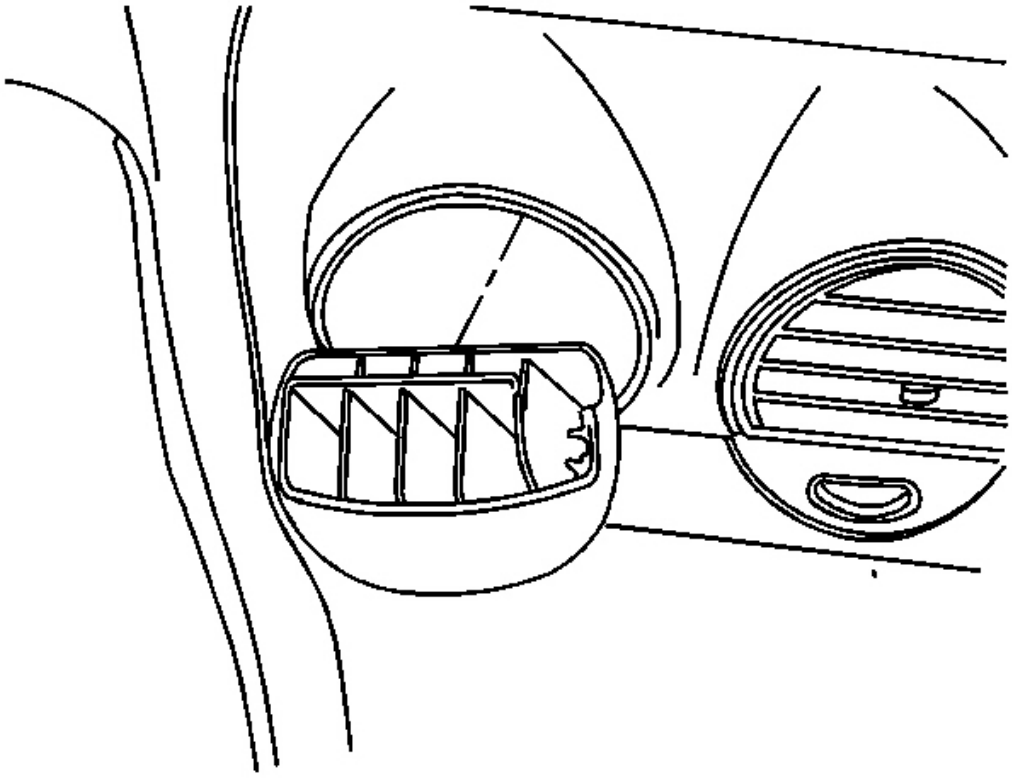


Fig. 83: Removing/Installing Air Outlet
Courtesy of GENERAL MOTORS CORP.

4. Remove the air outlet from the housing assembly.

Installation Procedure

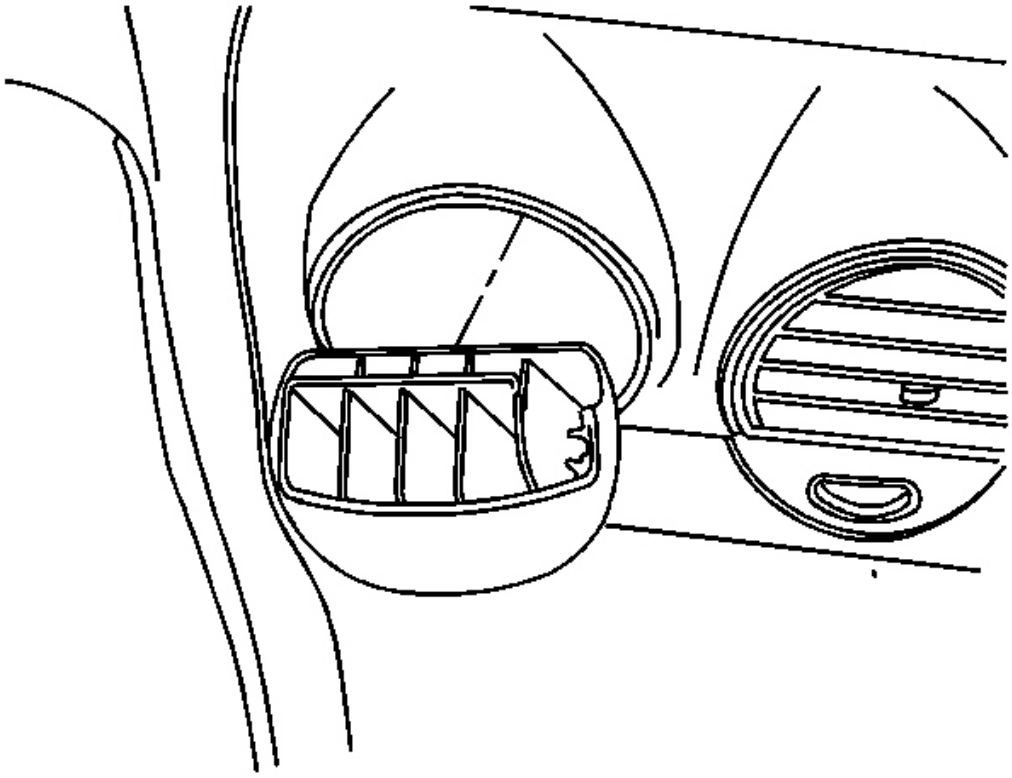


Fig. 84: Removing/Installing Air Outlet
Courtesy of GENERAL MOTORS CORP.

1. Position the air outlet face down at the housing opening.
2. Position the right side of the air outlet below the housing retaining pin.
3. Seat the right side of the air outlet to the housing retaining pin by lifting upward.

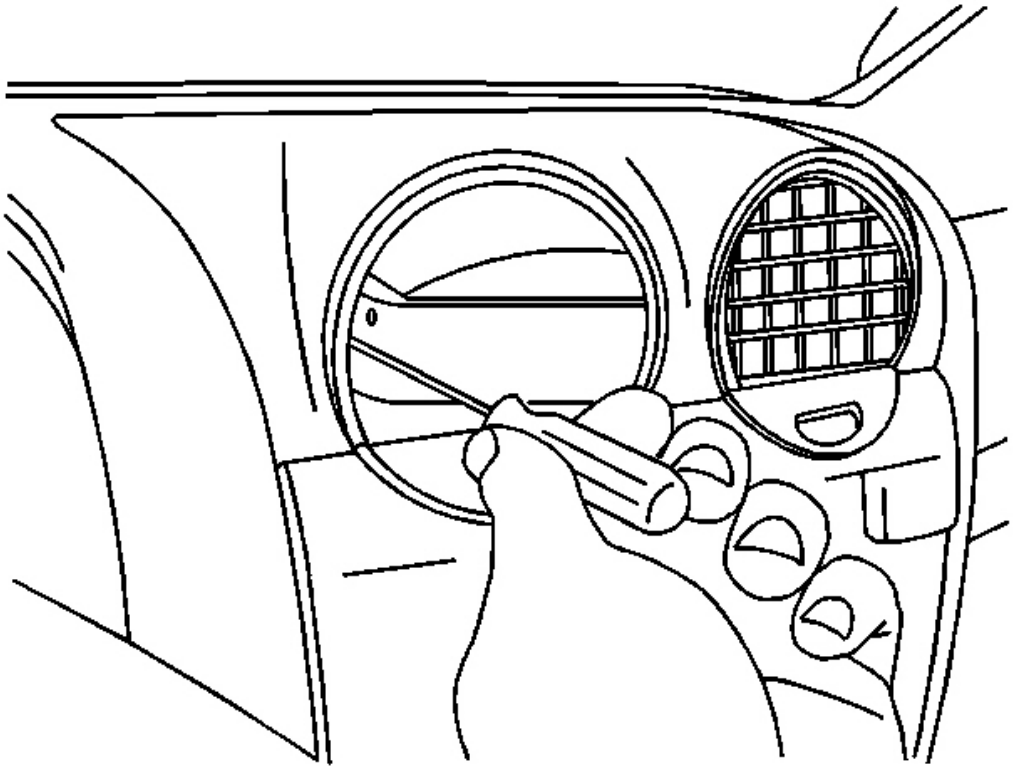


Fig. 85: Removing/Installing Left Side Of Air Outlet At Housing Assembly
Courtesy of GENERAL MOTORS CORP.

4. Seat the left side of the air outlet to the housing retaining pin.
5. Rotate the air outlet upward past the detent position.
6. Adjust the air outlet to the original position.

AIR OUTLET REPLACEMENT - INSTRUMENT PANEL - CENTER

Removal Procedure

1. Remove the left closeout/insulator panel. Refer to **Closeout/Insulator Panel Replacement - Left** in Instrument Panel, Gages, and Console.
2. Remove the knee bolster trim panel. Refer to **Trim Panel Replacement - Knee Bolster** in Instrument Panel, Gages, and Console.
3. Remove the instrument panel (I/P) cluster bezel, Chevrolet only. Refer to **Bezel Replacement - Instrument Panel (I/P) Cluster** in Instrument Panel, Gages, and Console.

4. Remove the radio. Refer to **Radio Replacement** in Entertainment.

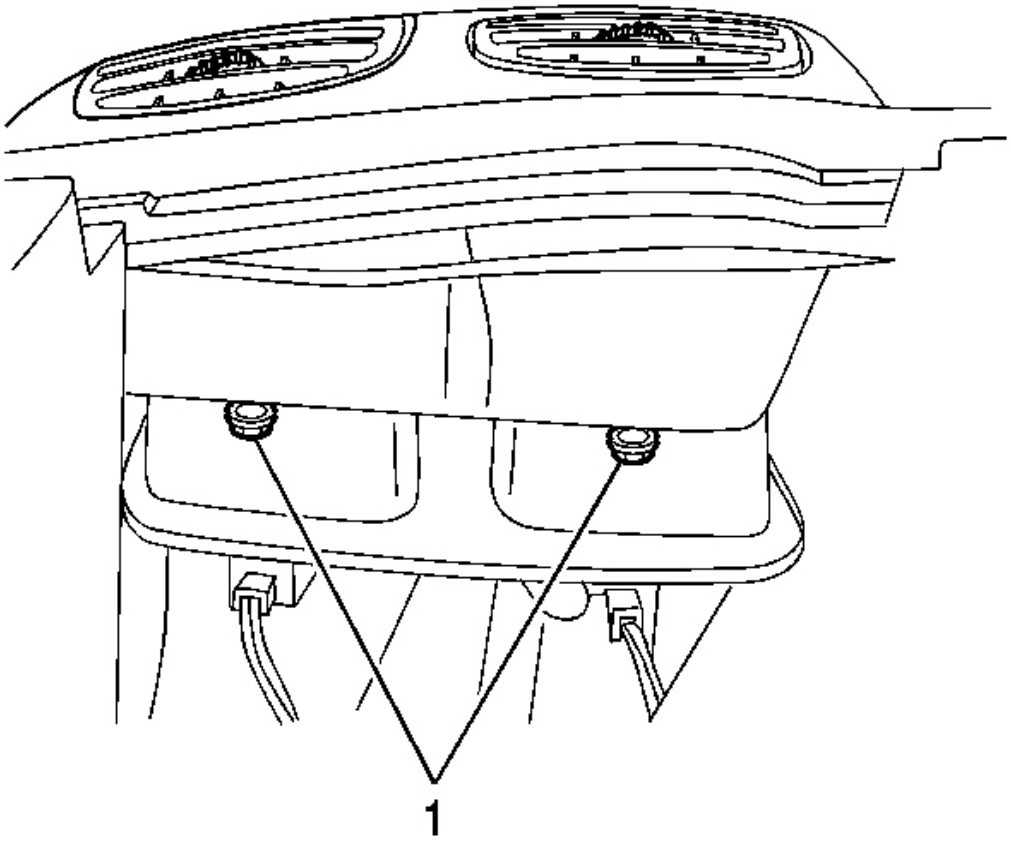


Fig. 86: Removing/Installing Screws At Bottom Of Air Outlet Assembly
Courtesy of GENERAL MOTORS CORP.

5. Remove the 2 screws (1) from the bottom of the air outlet assembly.

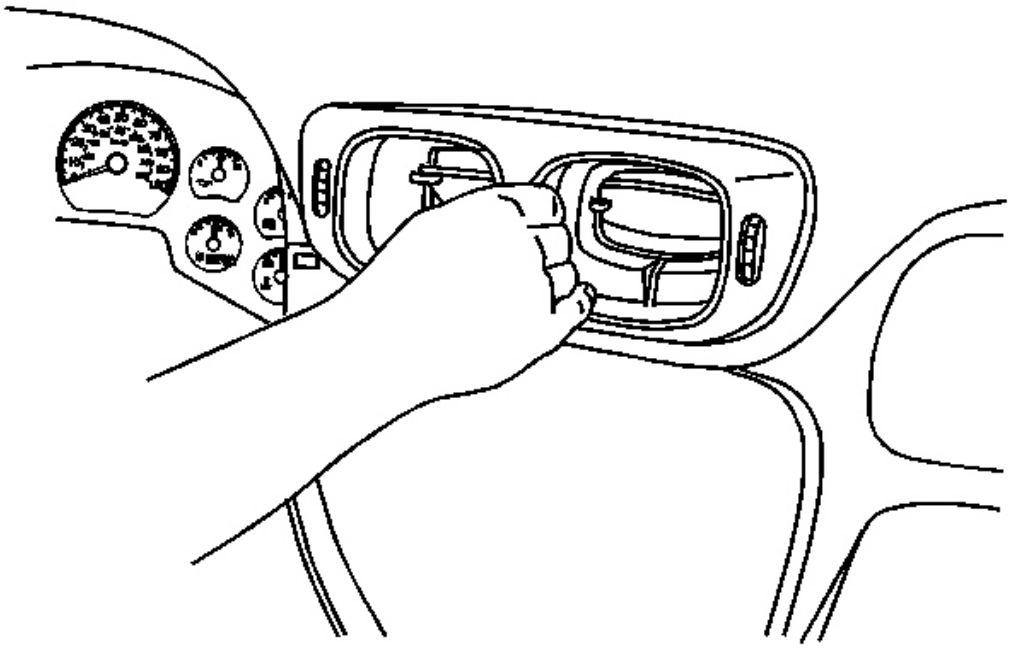


Fig. 87: Removing Air Deflectors From Outlet
Courtesy of GENERAL MOTORS CORP.

6. Remove the air deflectors from the outlet. Refer to **Air Outlet Replacement - Instrument Panel**.
7. Grasp and pull the outlet rearward from the I/P.

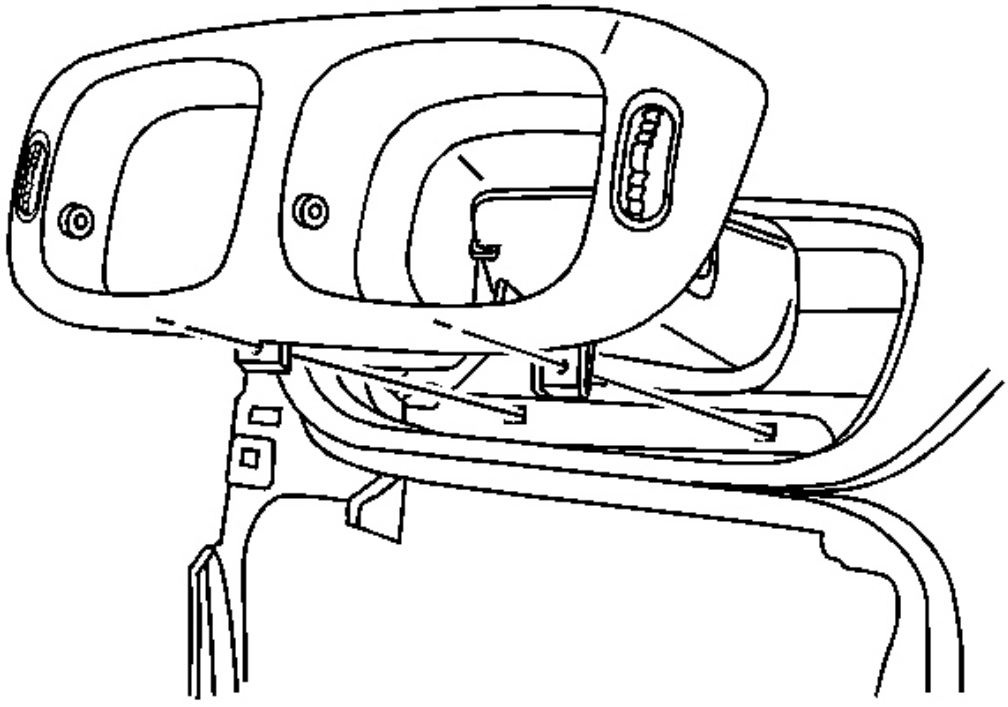


Fig. 88: Removing/Installing Air Outlet
Courtesy of GENERAL MOTORS CORP.

8. Remove the outlet from the vehicle.

Installation Procedure

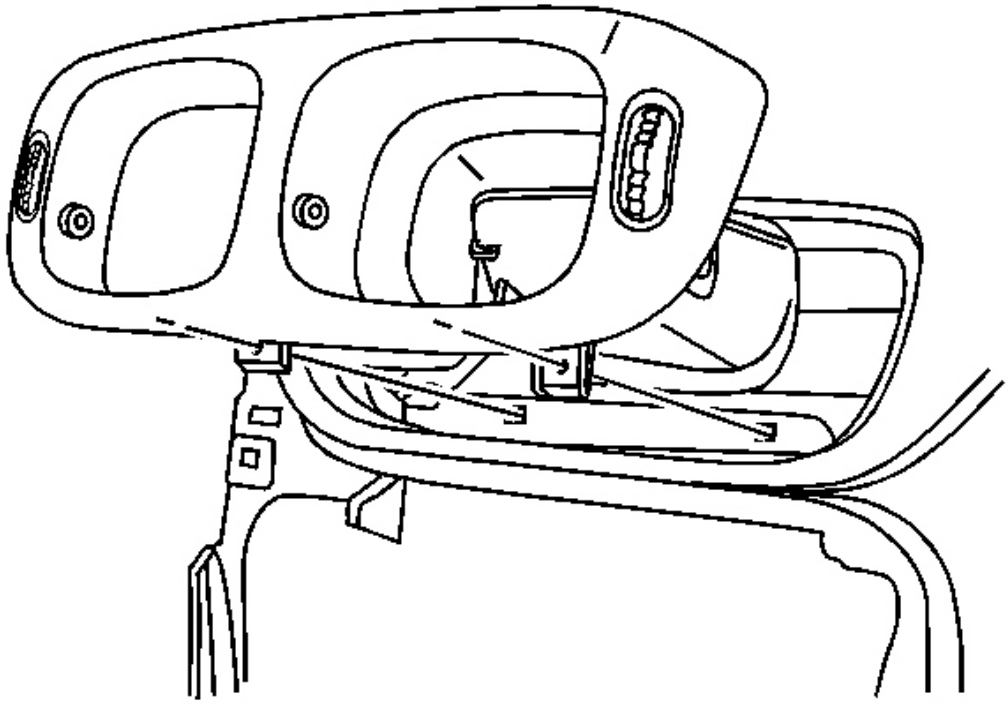


Fig. 89: Removing/Installing Air Outlet
Courtesy of GENERAL MOTORS CORP.

1. If reinstalling the original outlet, install the air deflectors in the outlet. Refer to **Air Outlet Replacement - Instrument Panel**.
2. Install the outlet assembly to the I/P.

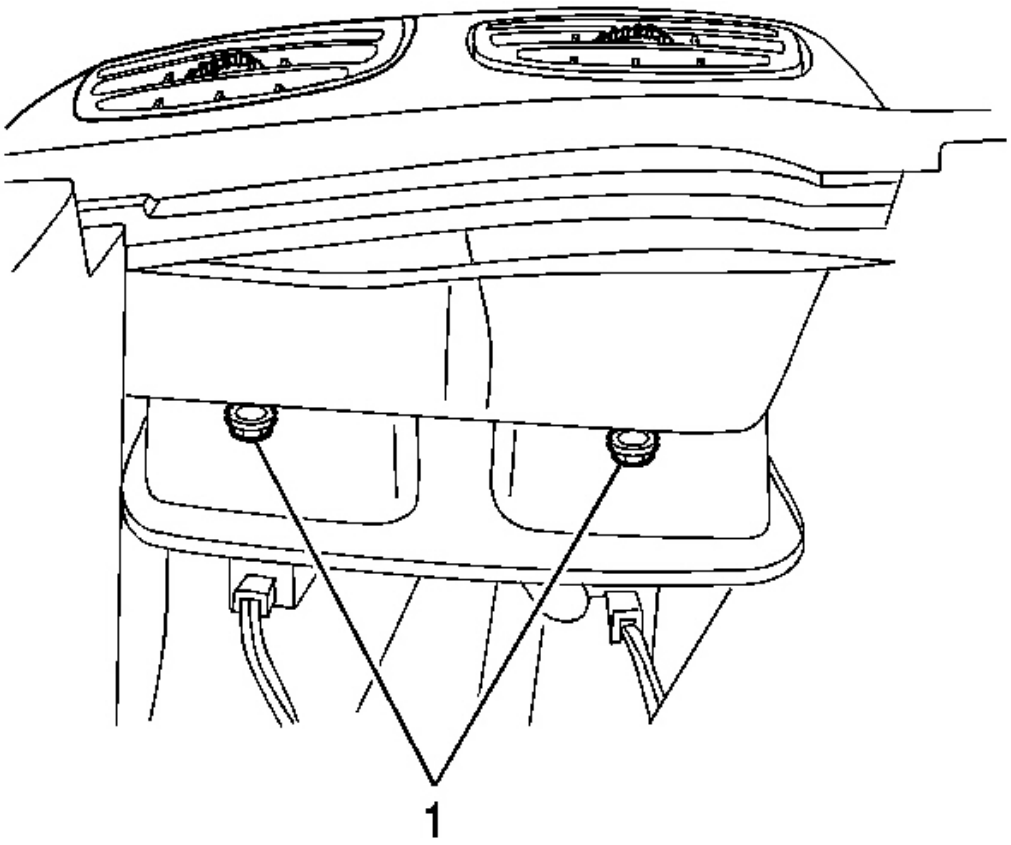


Fig. 90: Removing/Installing Screws At Bottom Of Air Outlet Assembly
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Install the 2 retaining screws (1).

   Tighten: Tighten the screws to 2.5 N.m (22 in. lb.).

4. Install the radio. Refer to **Radio Replacement** in Entertainment.
5. Install the I/P cluster bezel, Chevrolet only. Refer to **Bezel Replacement - Instrument Panel (I/P) Cluster** in Instrument Panel, Gages, and Console.
6. Install the knee bolster trim panel. Refer to **Trim Panel Replacement - Knee Bolster** Instrument Panel, Gages, and Console.
7. Install the left closeout/insulator panel. Refer to **Closeout/Insulator Panel Replacement - Left**

Instrument Panel, Gages, and Console.

AIR OUTLET REPLACEMENT - INSTRUMENT PANEL - RIGHT

Removal Procedure

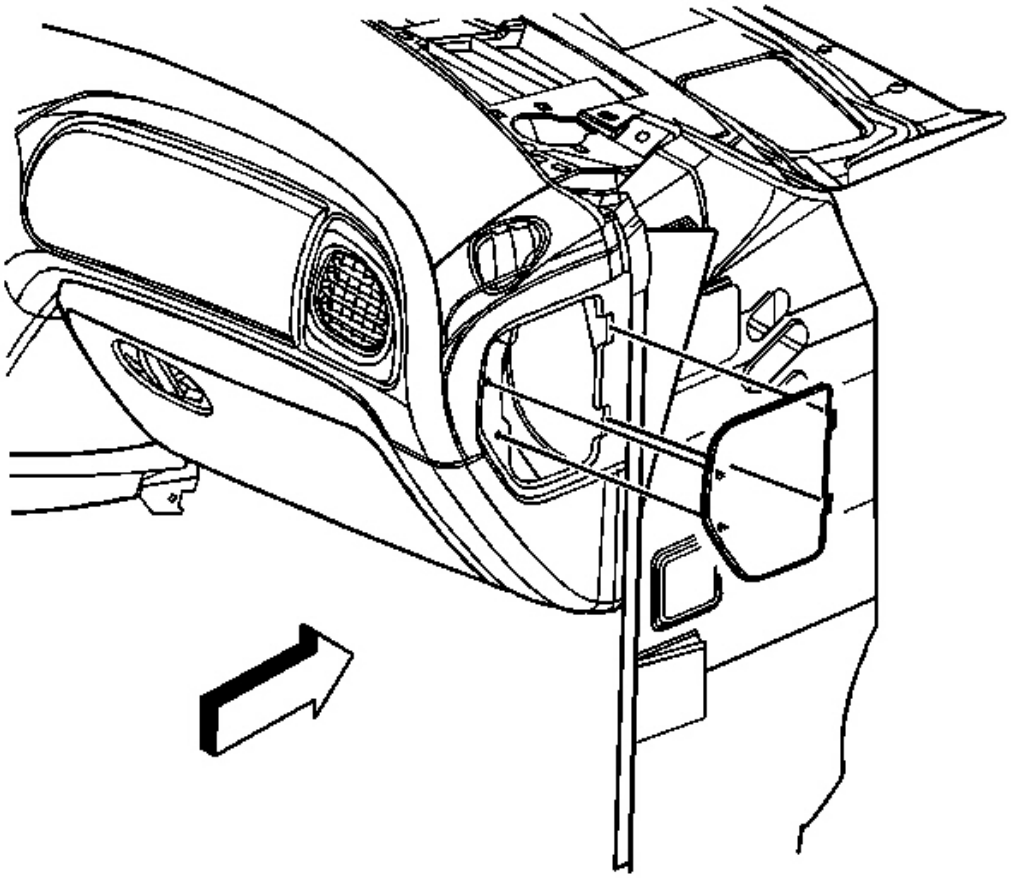


Fig. 91: Identifying Right I/P Access Cover
Courtesy of GENERAL MOTORS CORP.

1. Remove the right instrument panel (I/P) access cover.

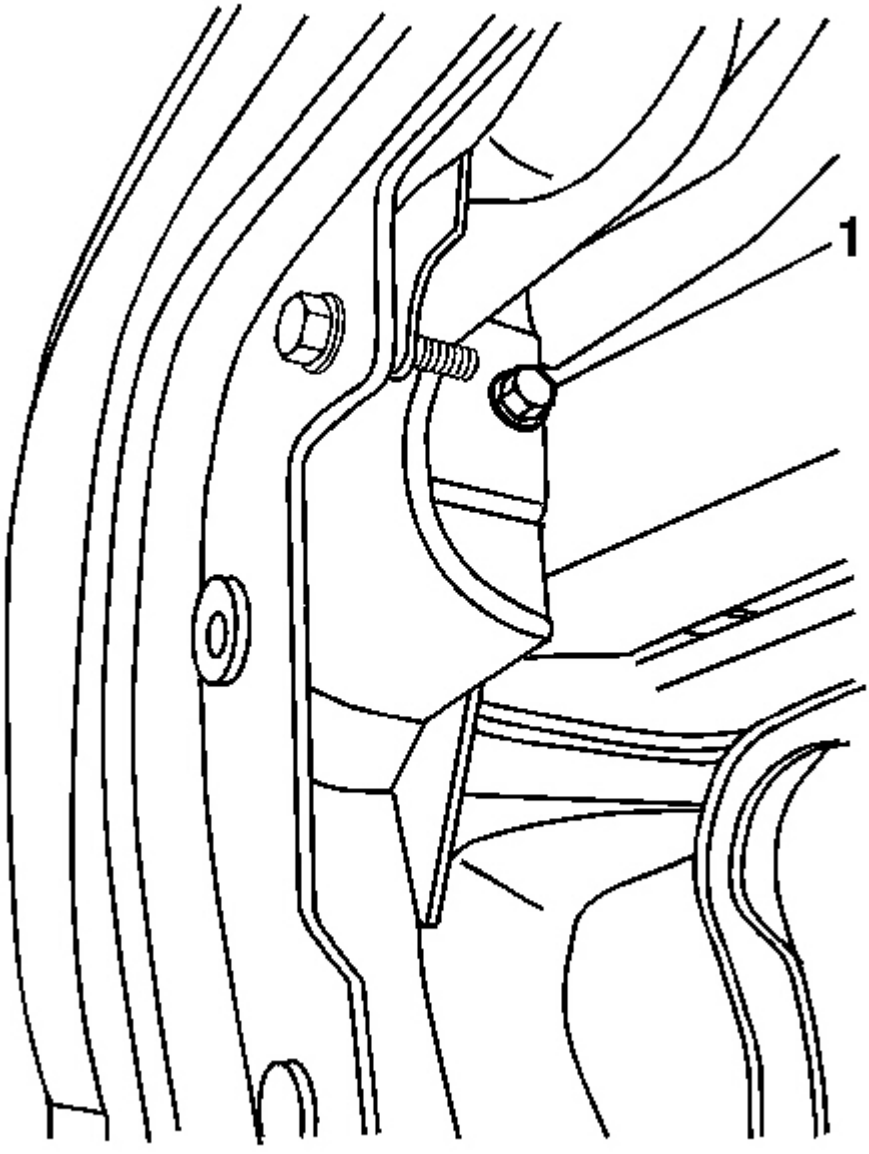


Fig. 92: Removing/Installing Air Outlet Assembly Retaining Screw
Courtesy of GENERAL MOTORS CORP.

2. Remove the screw (1) retaining the air outlet assembly to the I/P.

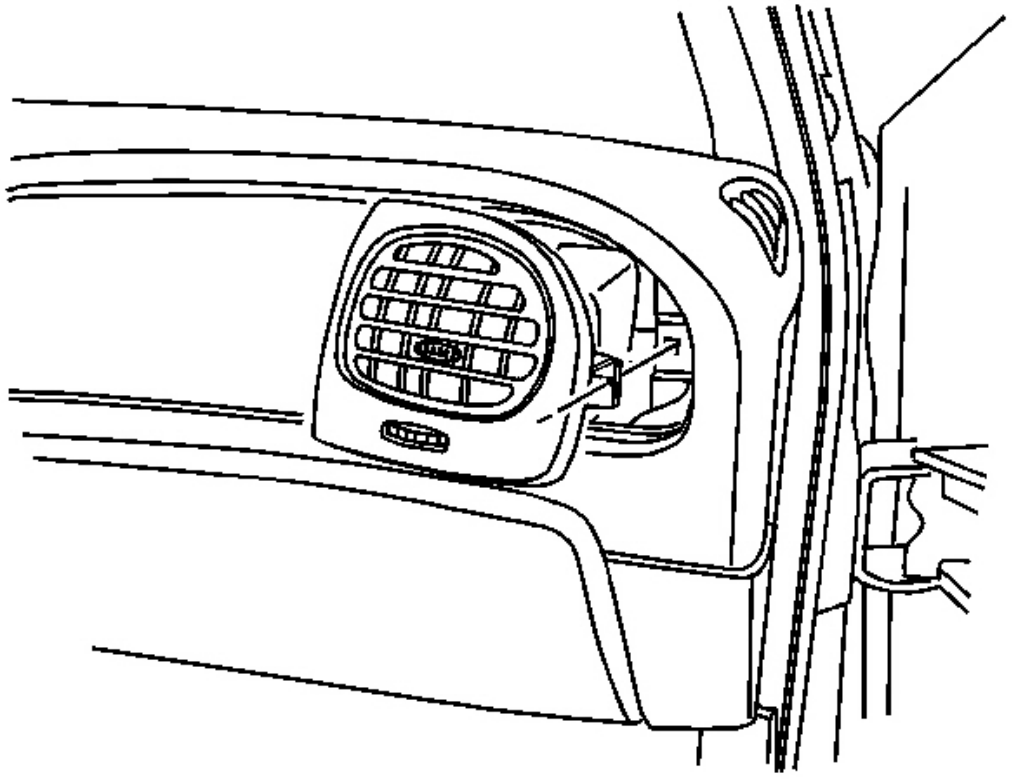


Fig. 93: Removing/Installing Outlet Assembly
Courtesy of GENERAL MOTORS CORP.

3. Grasp and pull the outlet assembly rearward from the I/P.
4. Remove the outlet assembly from the vehicle.

Installation Procedure

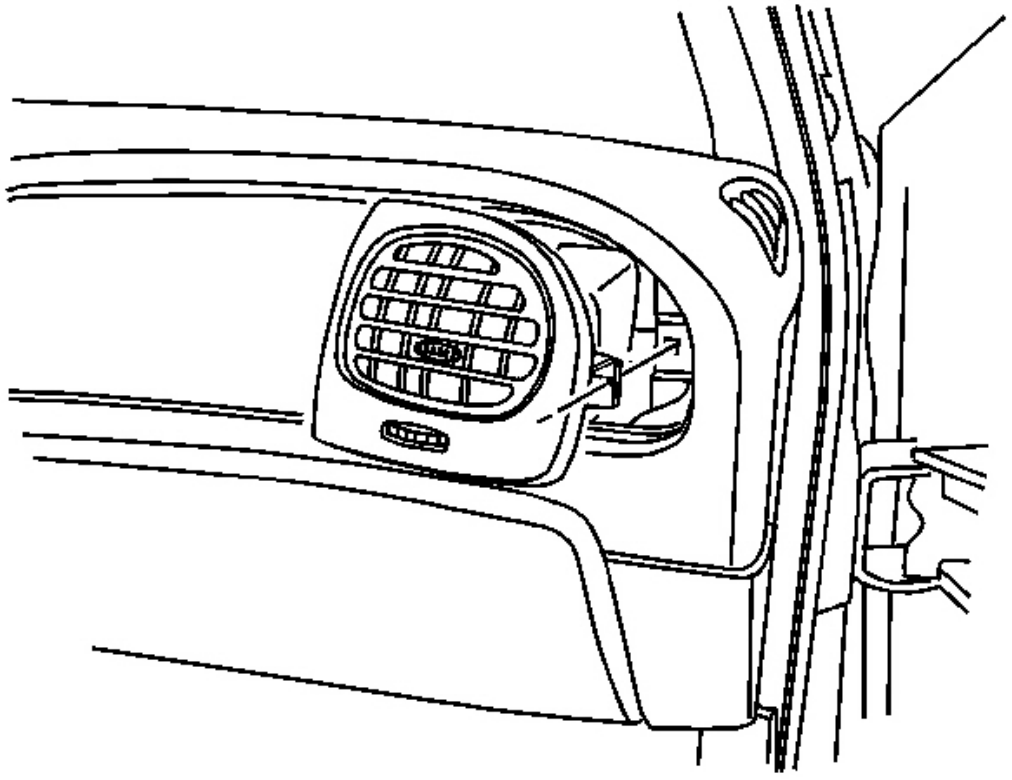


Fig. 94: Removing/Installing Outlet Assembly
Courtesy of GENERAL MOTORS CORP.

1. Install the outlet assembly to the I/P.

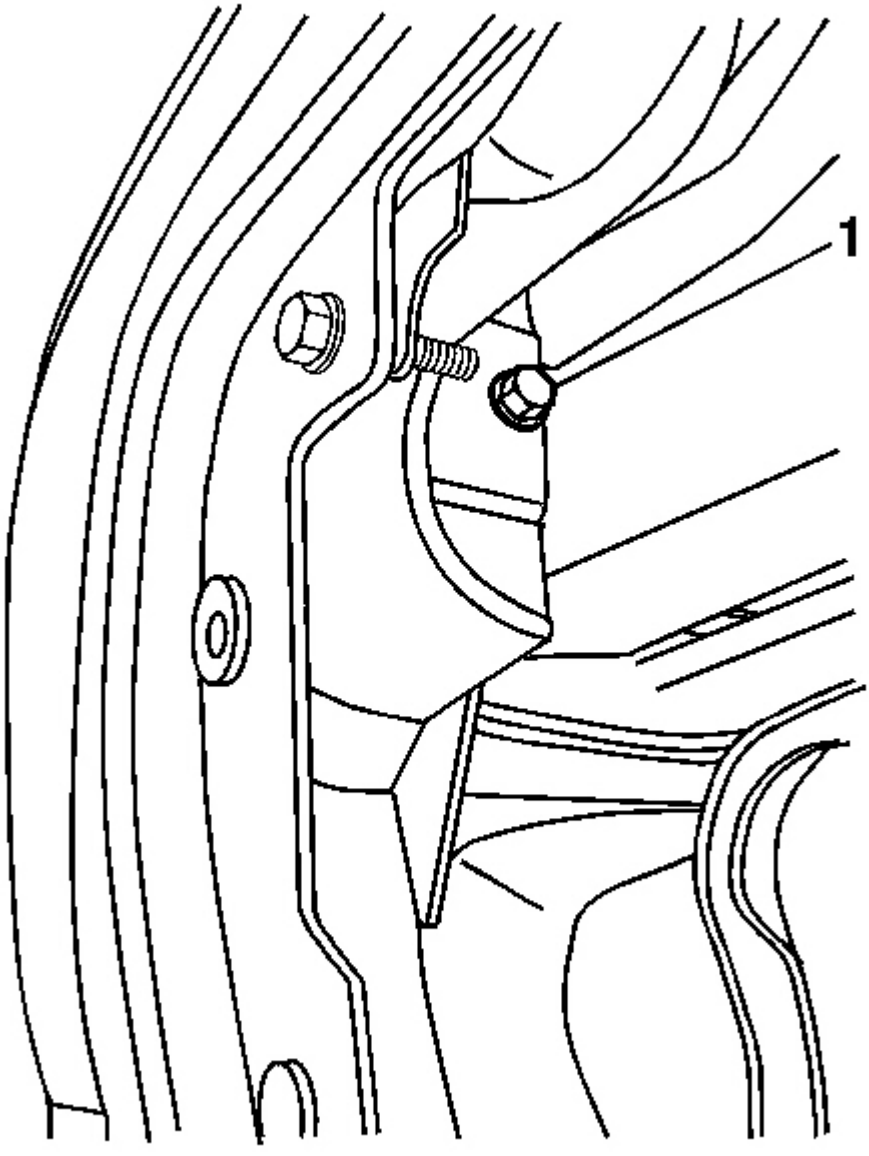


Fig. 95: Removing/Installing Air Outlet Assembly Retaining Screw
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the retaining screw.

Tighten: Tighten the screw to 2.5 N.m (22 in. lb.).

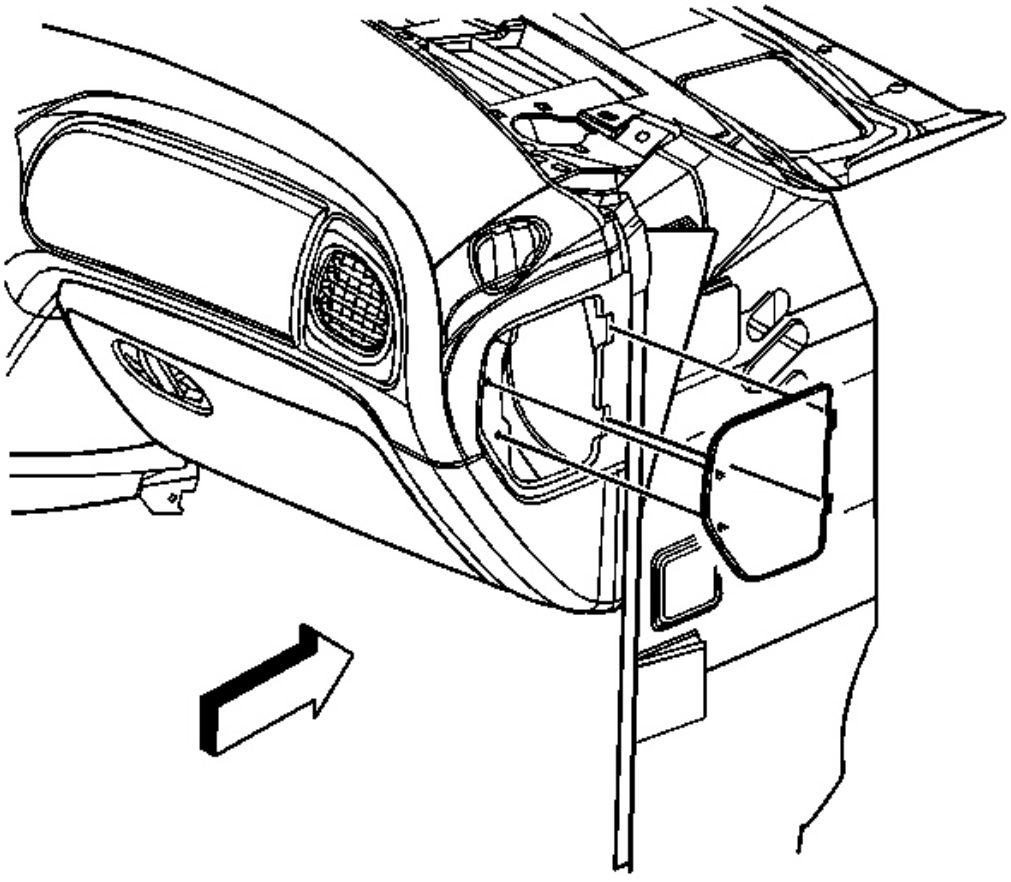


Fig. 96: Identifying Right I/P Access Cover
Courtesy of GENERAL MOTORS CORP.

3. Install the I/P access cover.

AIR OUTLET REPLACEMENT - REAR FLOOR

Removal Procedure

1. Remove the console support bracket. Refer to **Bracket Replacement - Console Floor** in Instrument Panel, Gages and Console.

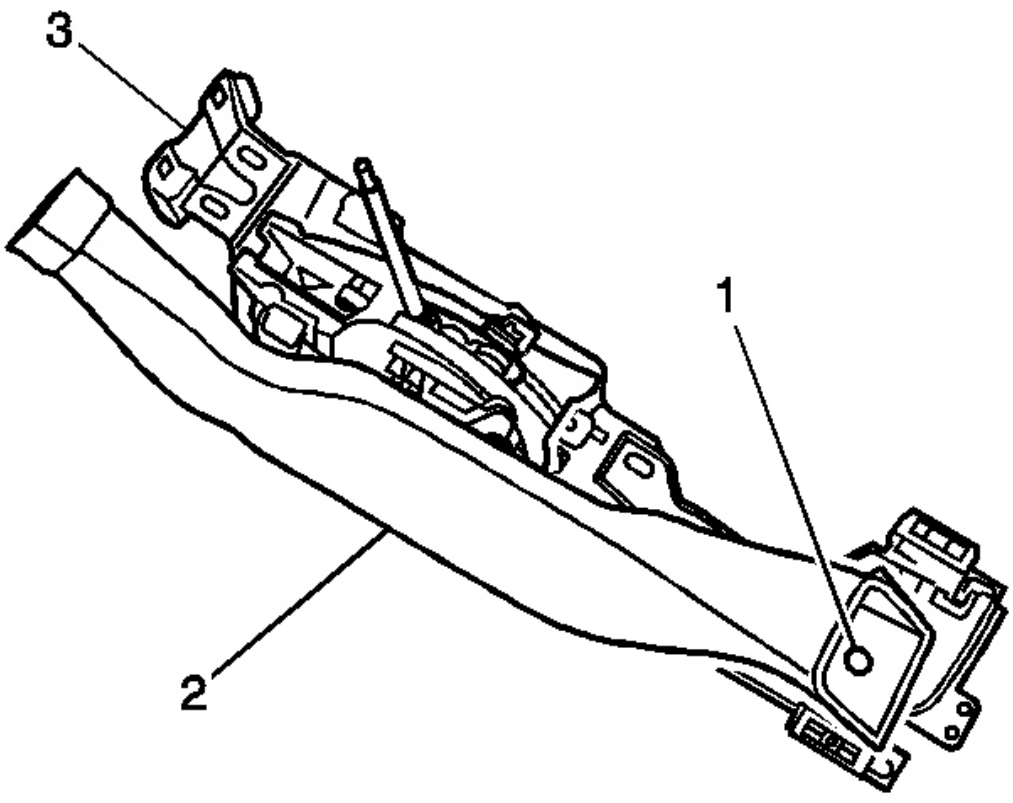


Fig. 97: Removing/Installing Push Pin
Courtesy of GENERAL MOTORS CORP.

2. Remove the push pin (1).

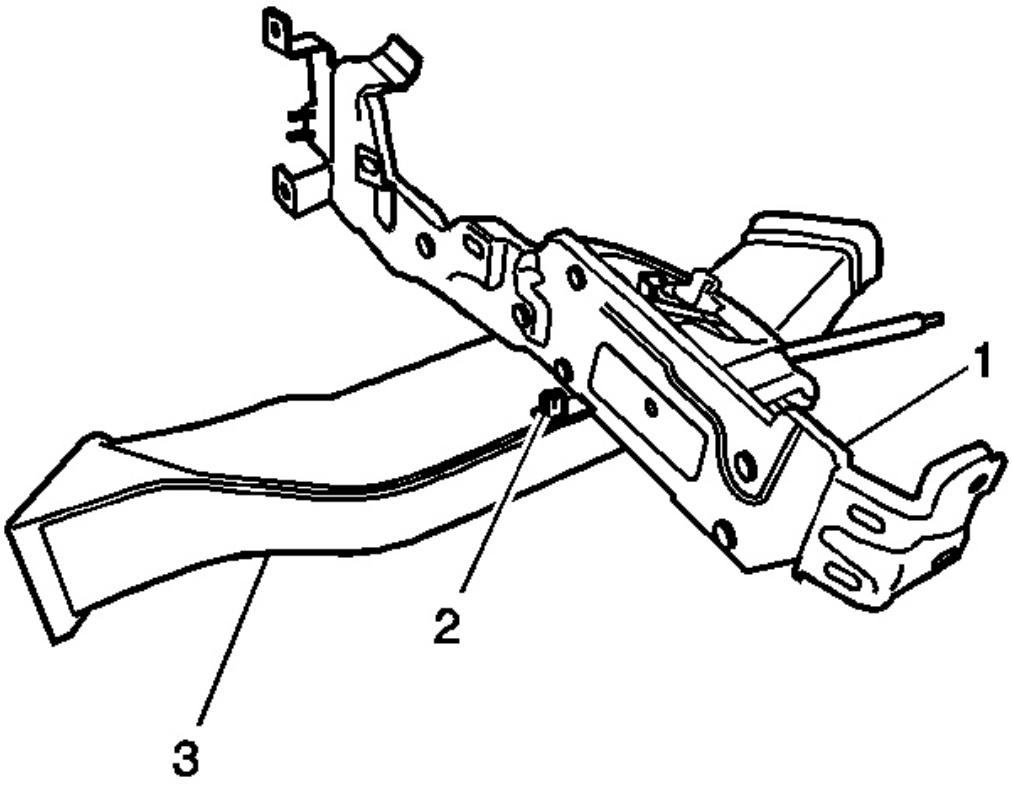


Fig. 98: Removing/Installing Rear Air Outlet Duct
Courtesy of GENERAL MOTORS CORP.

3. Rotate the air outlet duct-rear (3) to remove from the console support bracket (1).
4. Remove the air outlet duct-rear from the vehicle.

Installation Procedure

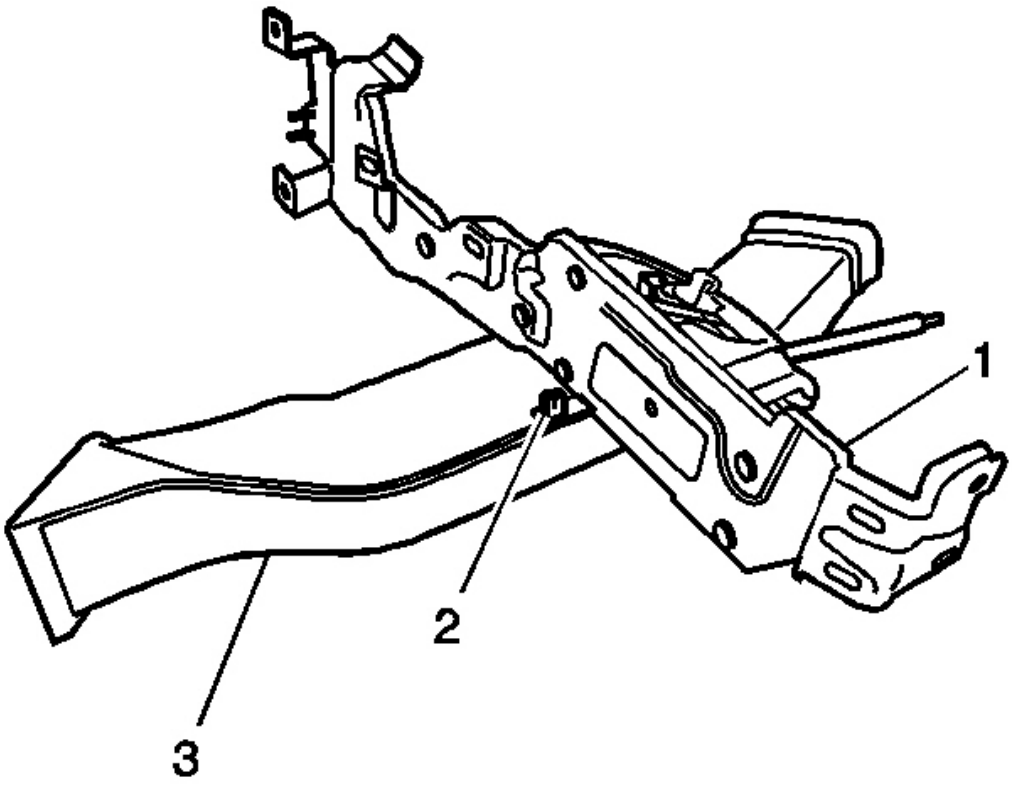


Fig. 99: Remove the air outlet duct-rear
Courtesy of GENERAL MOTORS CORP.

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

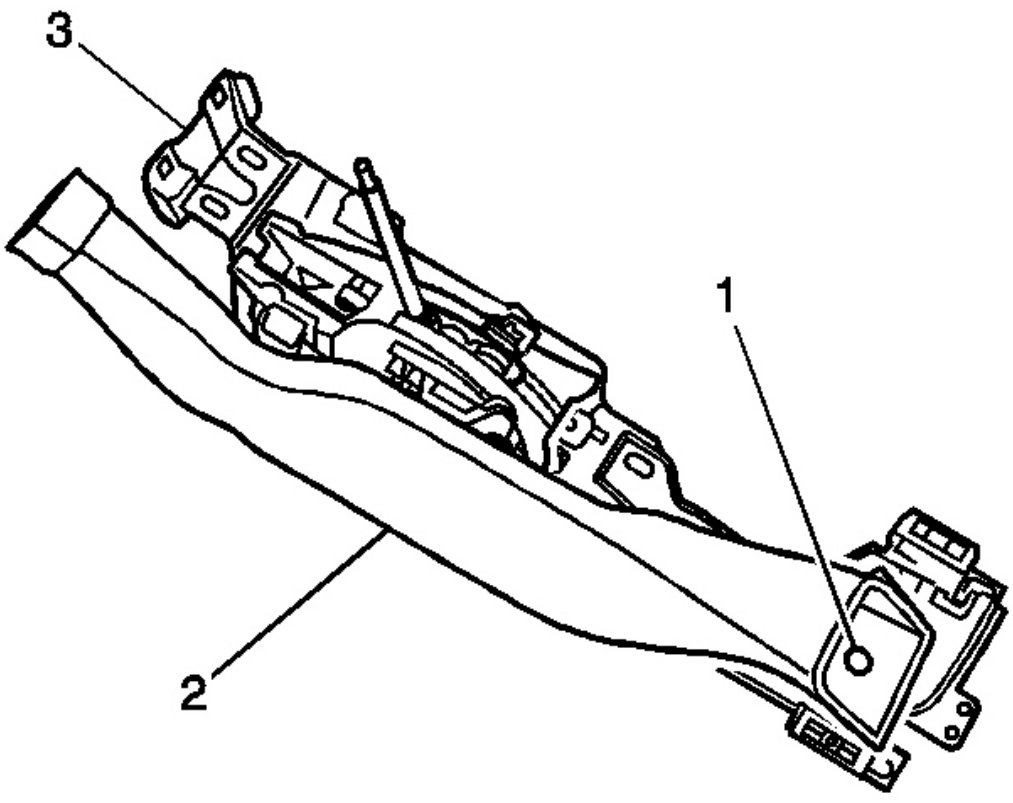


Fig. 100: Removing/Installing Push Pin
Courtesy of GENERAL MOTORS CORP.

2. Install the push pin (1).
3. Install the console support bracket. Refer to **Bracket Replacement - Console Floor** in Instrument Panel, Gages and Console.

DEFROSTER DUCT REPLACEMENT - WINDSHIELD

Removal Procedure

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

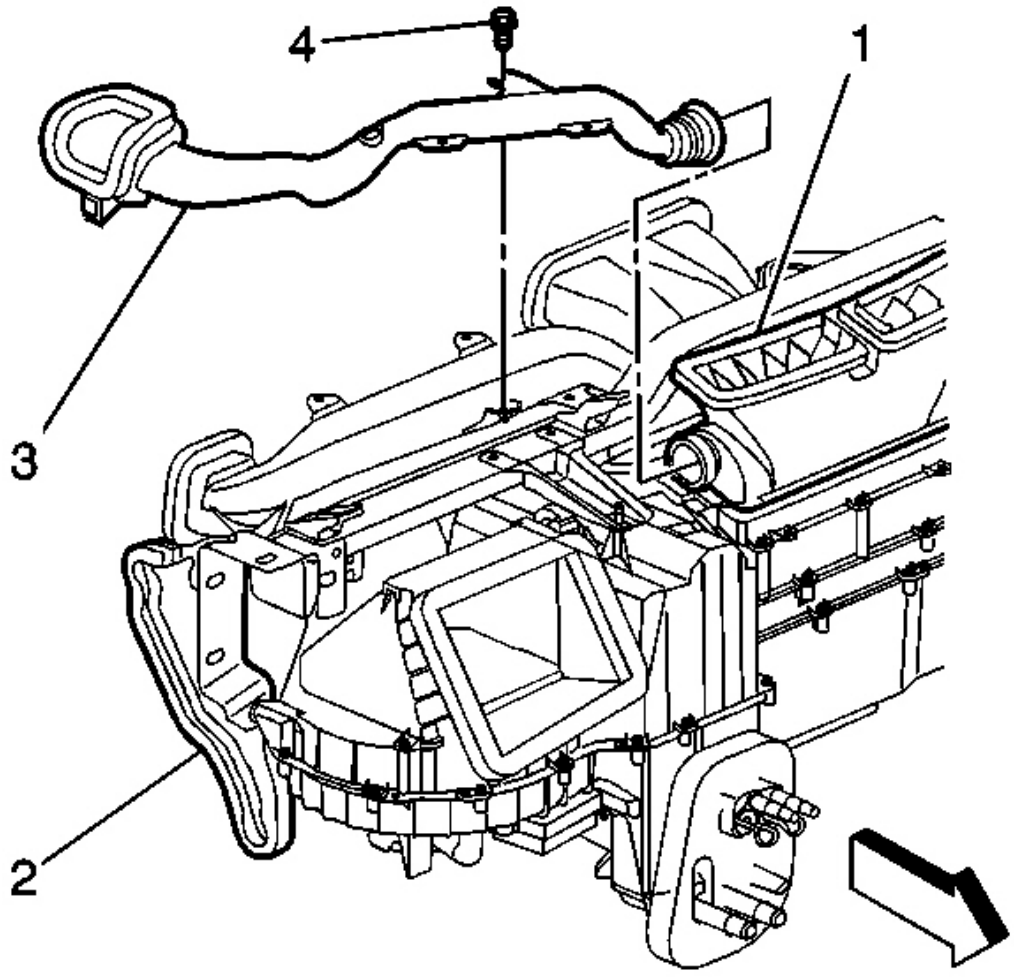


Fig. 101: Removing/Installing Passenger Side Window Defroster Duct
Courtesy of GENERAL MOTORS CORP.

2. Remove the side window defroster duct (3) retaining screw (4).
3. Remove the passenger side window defroster duct.

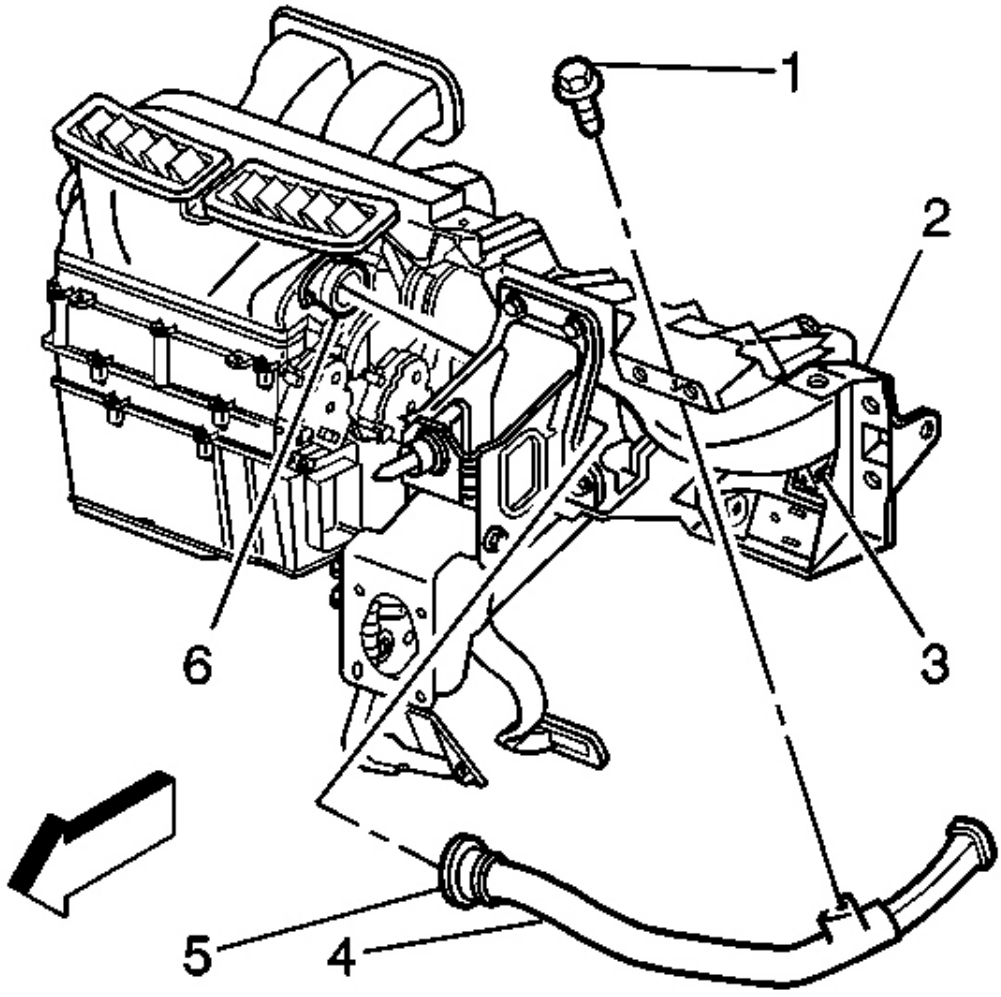


Fig. 102: Removing/Installing Driver Side Window Defroster Duct
Courtesy of GENERAL MOTORS CORP.

4. Remove the retaining screw (1) from the driver side window defroster duct (4).
5. Remove the driver side window defroster duct.

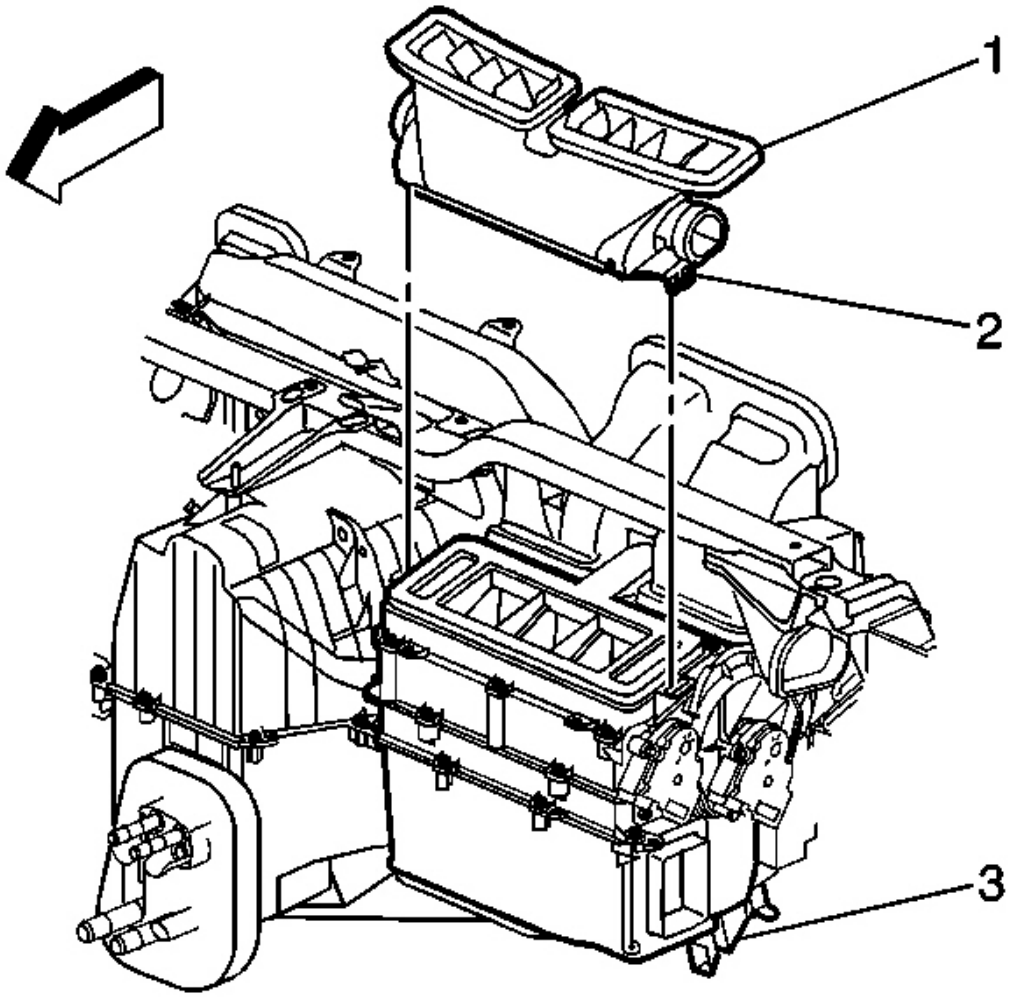


Fig. 103: Removing/Installing Defroster Duct
Courtesy of GENERAL MOTORS CORP.

6. Release retaining clips (2) from the defroster duct (1).
7. Remove the defroster duct (1).

Installation Procedure

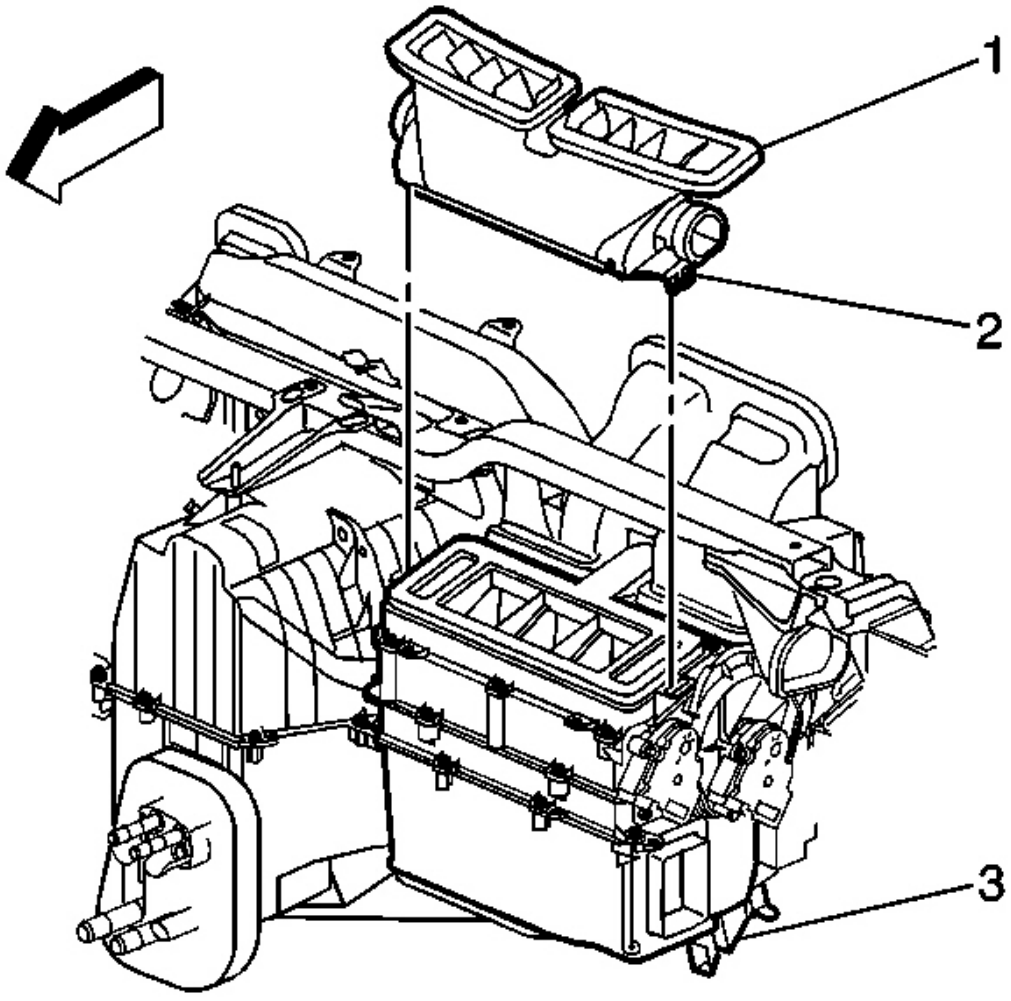


Fig. 104: Removing/Installing Defroster Duct
Courtesy of GENERAL MOTORS CORP.

1. Install the defroster duct.
2. Insert defroster duct into retaining slots.

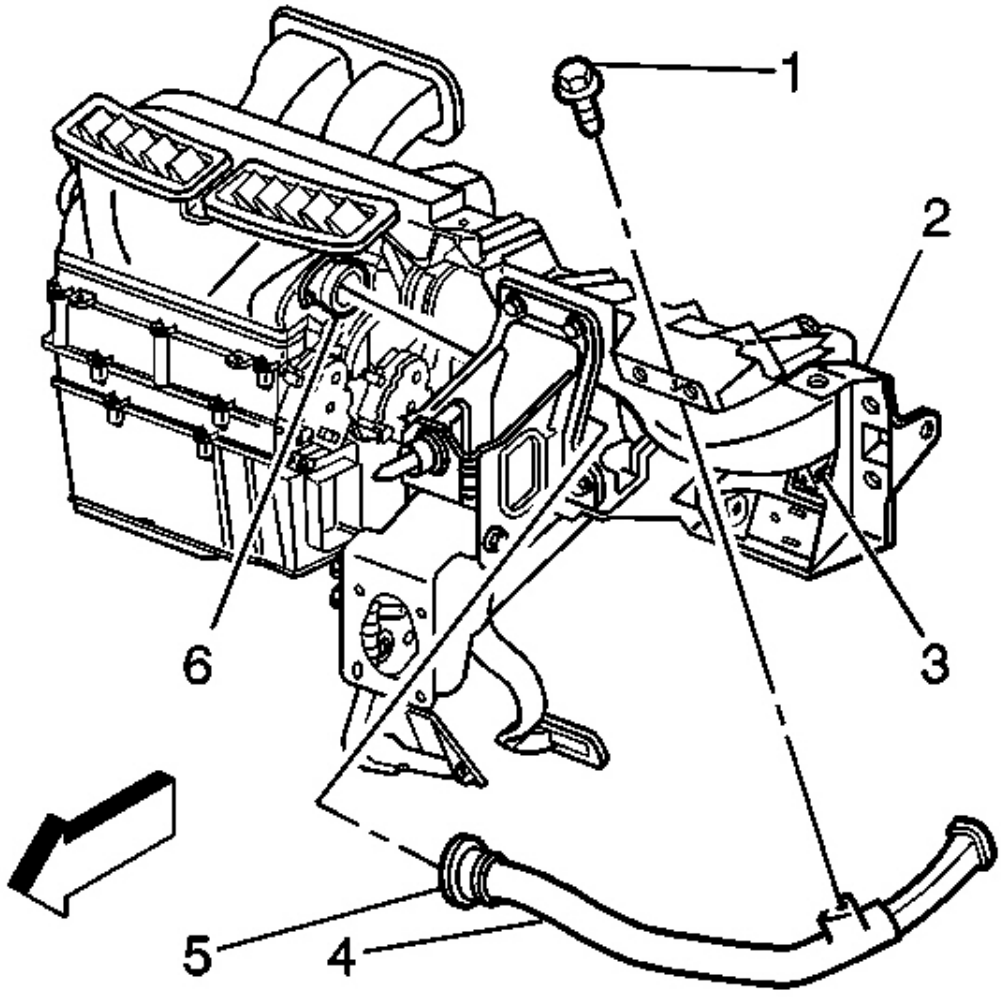


Fig. 105: Removing/Installing Driver Side Window Defroster Duct
Courtesy of GENERAL MOTORS CORP.

3. Install the driver side window defroster duct.

NOTE: Refer to Fastener Notice in Cautions and Notices.

4. Install the retaining screw (1) to the driver side window defroster duct (4).

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

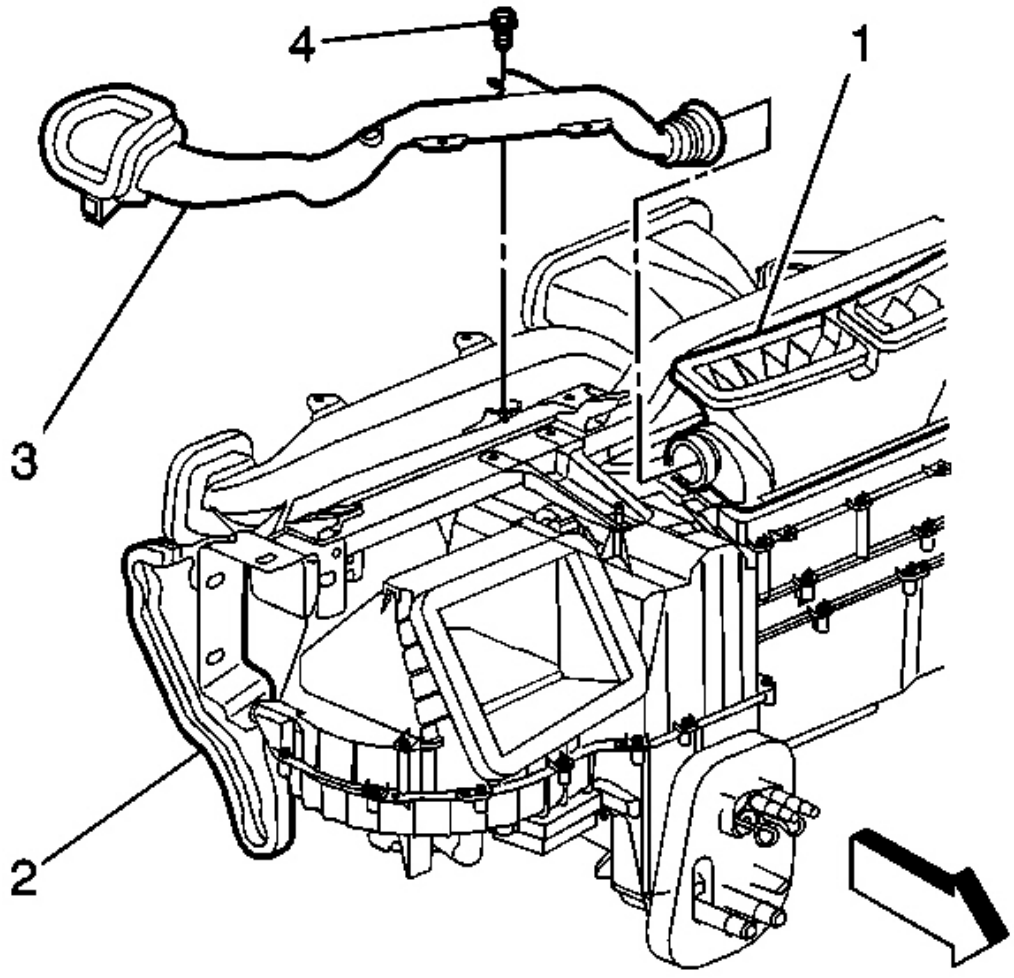


Fig. 106: Removing/Installing Passenger Side Window Defroster Duct
Courtesy of GENERAL MOTORS CORP.

5. Install the passenger side window defroster duct.
6. Install the passenger side window defroster duct (3) retaining screw (4).

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

7. Install the I/P assembly. Refer to **Instrument Panel (I/P) Carrier Replacement** in Instrument Panel, Gages and Console.

AIR OUTLET DUCT REPLACEMENT - FLOOR, LH

Removal Procedure

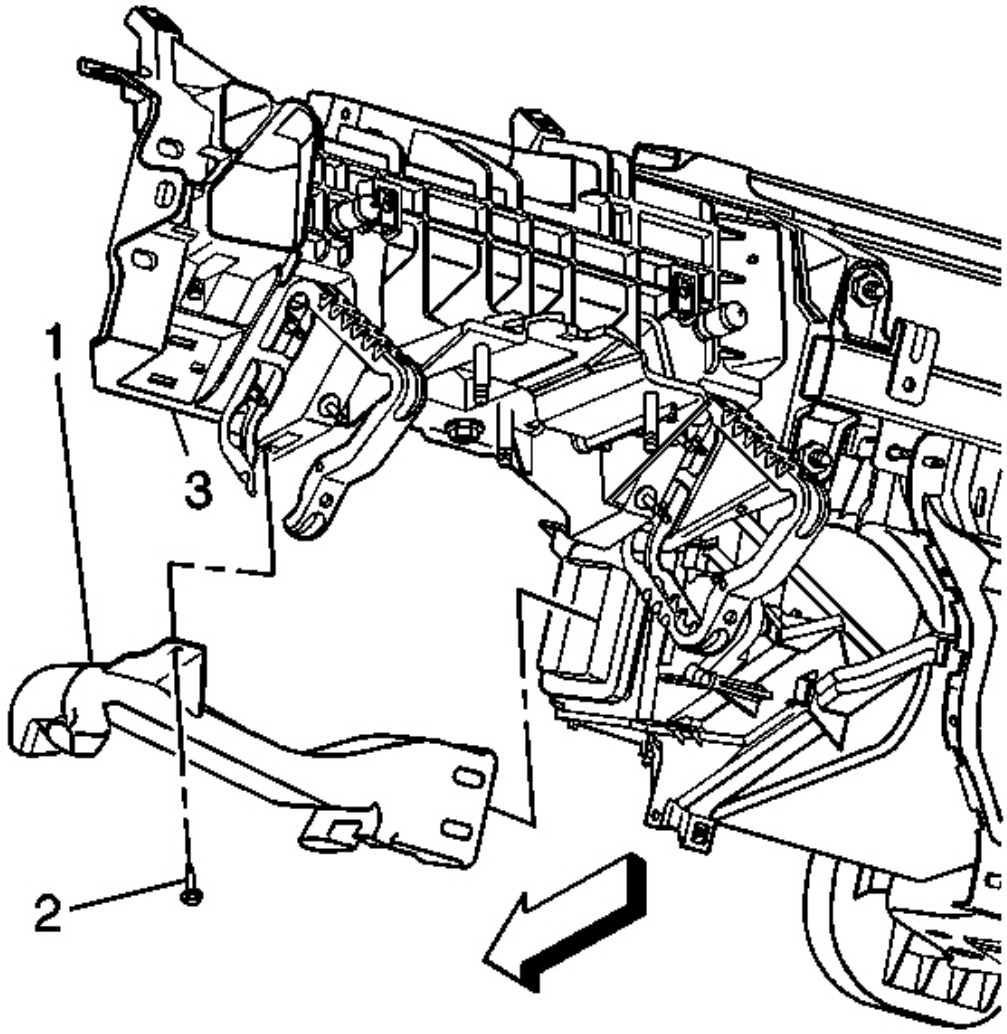


Fig. 107: Removing/Installing Left Side HVAC Floor Air Outlet Duct
Courtesy of GENERAL MOTORS CORP.

1. Remove the LH lower closeout/insulator panel. Refer to **Closeout/Insulator Panel Replacement - Left** in Instrument Panel, Gages and Console.
2. Remove the push pin (2) retaining the floor air outlet duct (1) to the heater module.
3. Remove the floor duct (1).

Installation Procedure

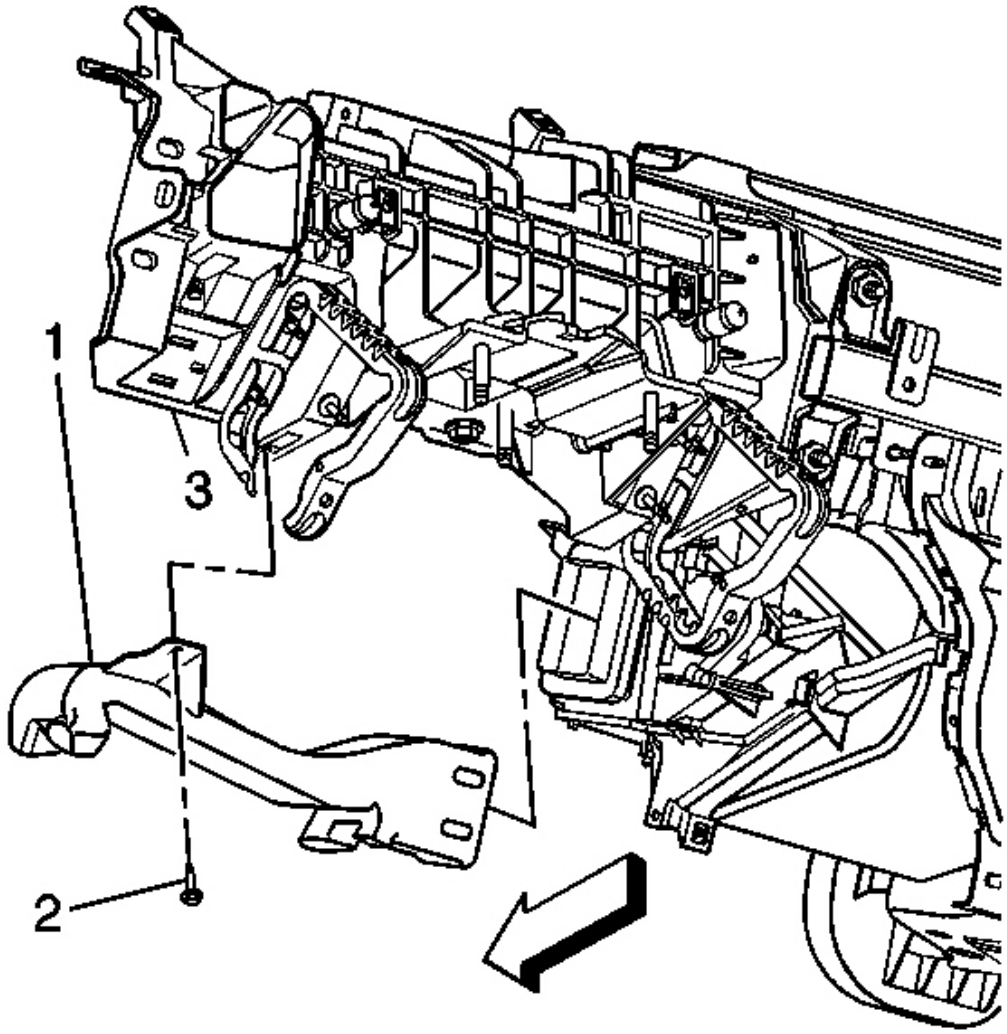


Fig. 108: Removing/Installing Left Side HVAC Floor Air Outlet Duct
Courtesy of GENERAL MOTORS CORP.

1. Install the floor air outlet duct (1) into position.

NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the floor air outlet duct retaining push pin (2).

Tighten: Tighten the screws to 1.9 N.m (17 in. lb.).

3. Install the LH lower closeout/insulator panel. Refer to **Closeout/Insulator Panel Replacement - Left** in Instrument Panel, Gages and Console.

AIR OUTLET DUCT REPLACEMENT - FLOOR, RH

Removal Procedure

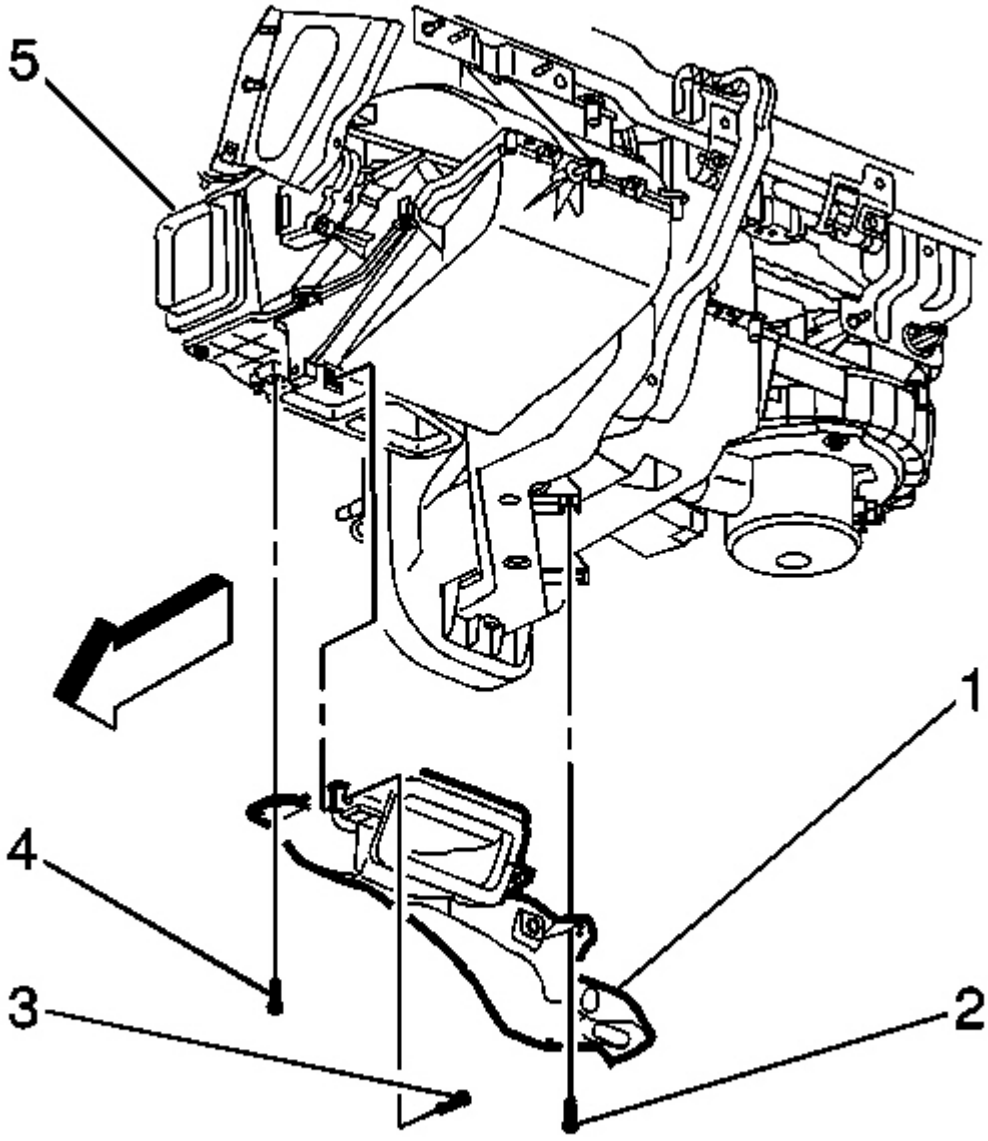


Fig. 109: Removing/Installing RH Side Floor Air Outlet Duct
Courtesy of GENERAL MOTORS CORP.

1. Remove the HVAC module assembly. Refer to **HVAC Module Assembly Replacement**.
2. Remove the floor air outlet duct retaining screws (2,3,4).
3. Remove the RH side floor air outlet duct (1).

Installation Procedure

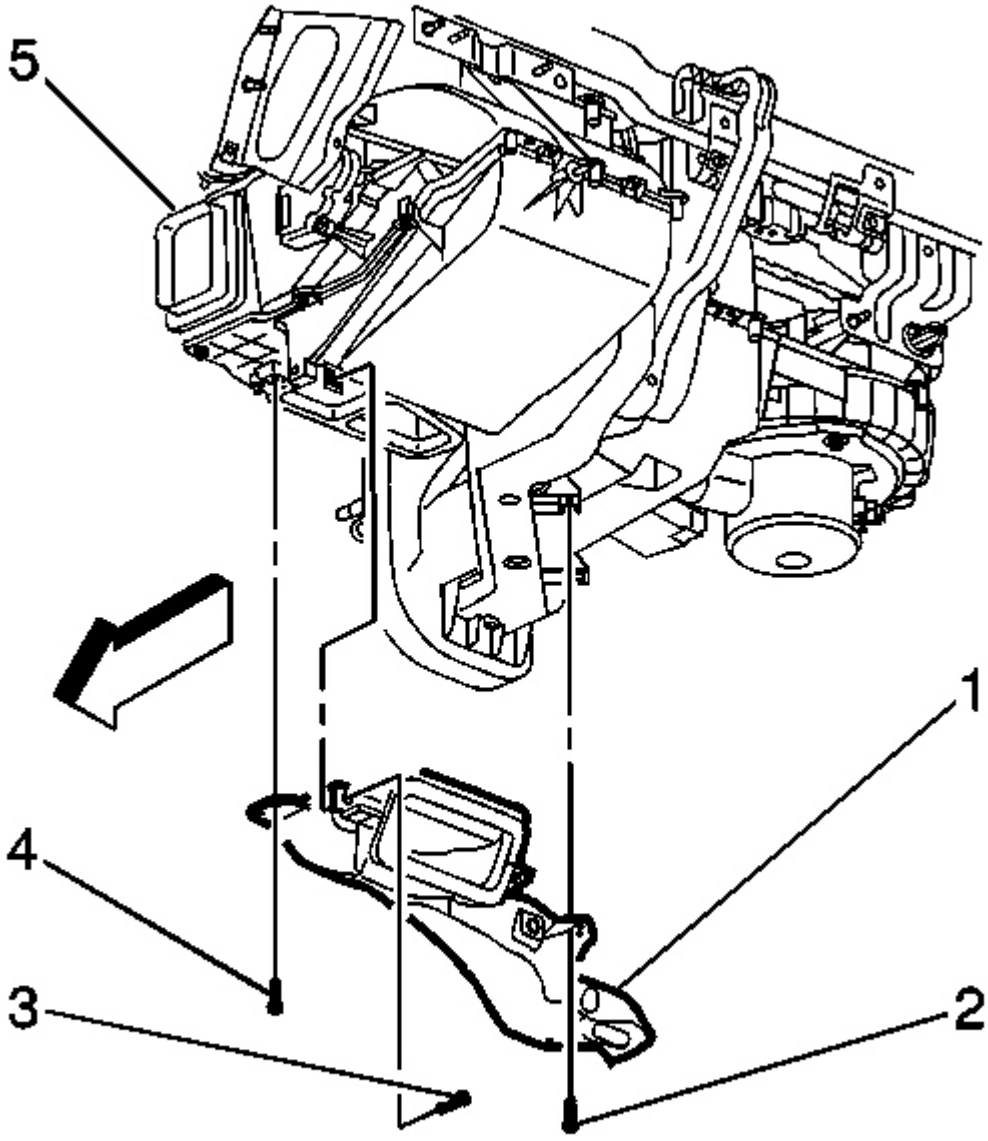


Fig. 110: Removing/Installing RH Side Floor Air Outlet Duct
Courtesy of GENERAL MOTORS CORP.

1. Install the floor air outlet duct (1) into position.

NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the floor air outlet duct retaining screws (2,3,4).

   Tighten: Tighten the screws to 1.9 N.m (17 in. lb.).

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

AIR TEMPERATURE DOOR REPLACEMENT

Removal Procedure

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

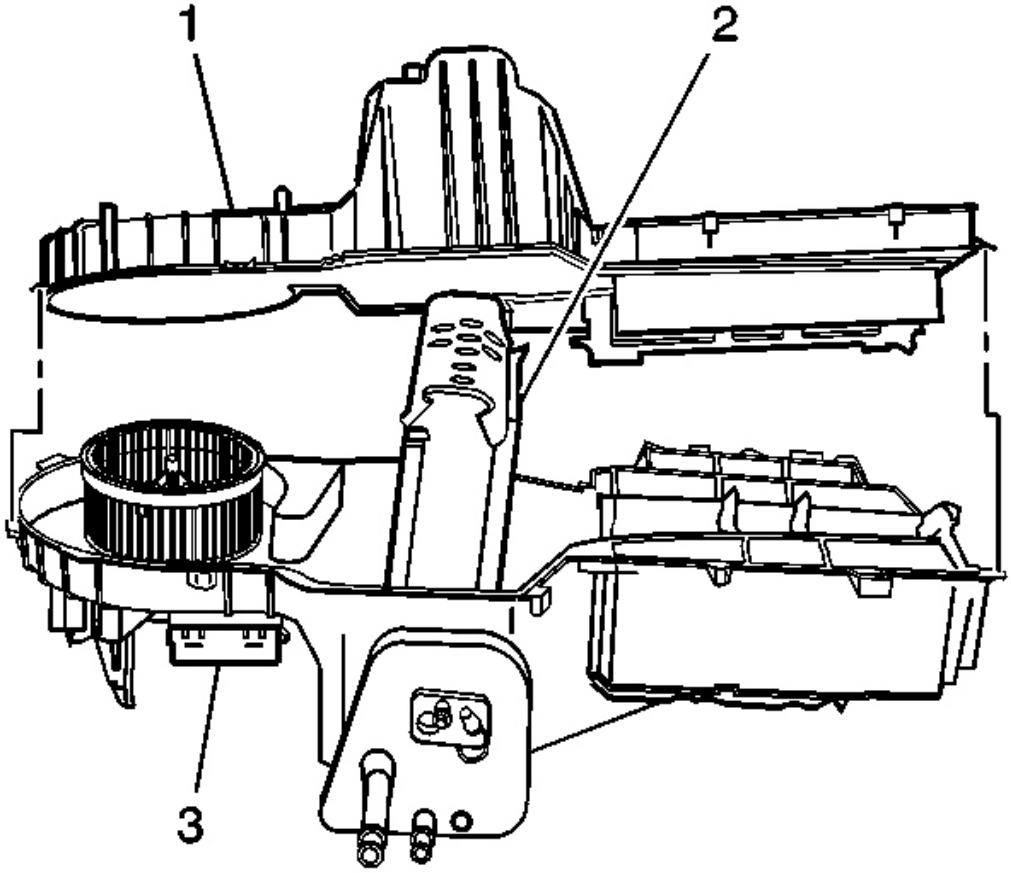


Fig. 111: Separating/Reassembling HVAC Module Case Halves

Courtesy of GENERAL MOTORS CORP.

2. Remove screws in order to separate the HVAC module assembly.
3. Remove the screws from the air temperature actuator.
4. Remove the air temperature actuator.
5. Remove the screws from the mode actuator.
6. Remove the mode actuator.
7. Separate the HVAC module case halves.

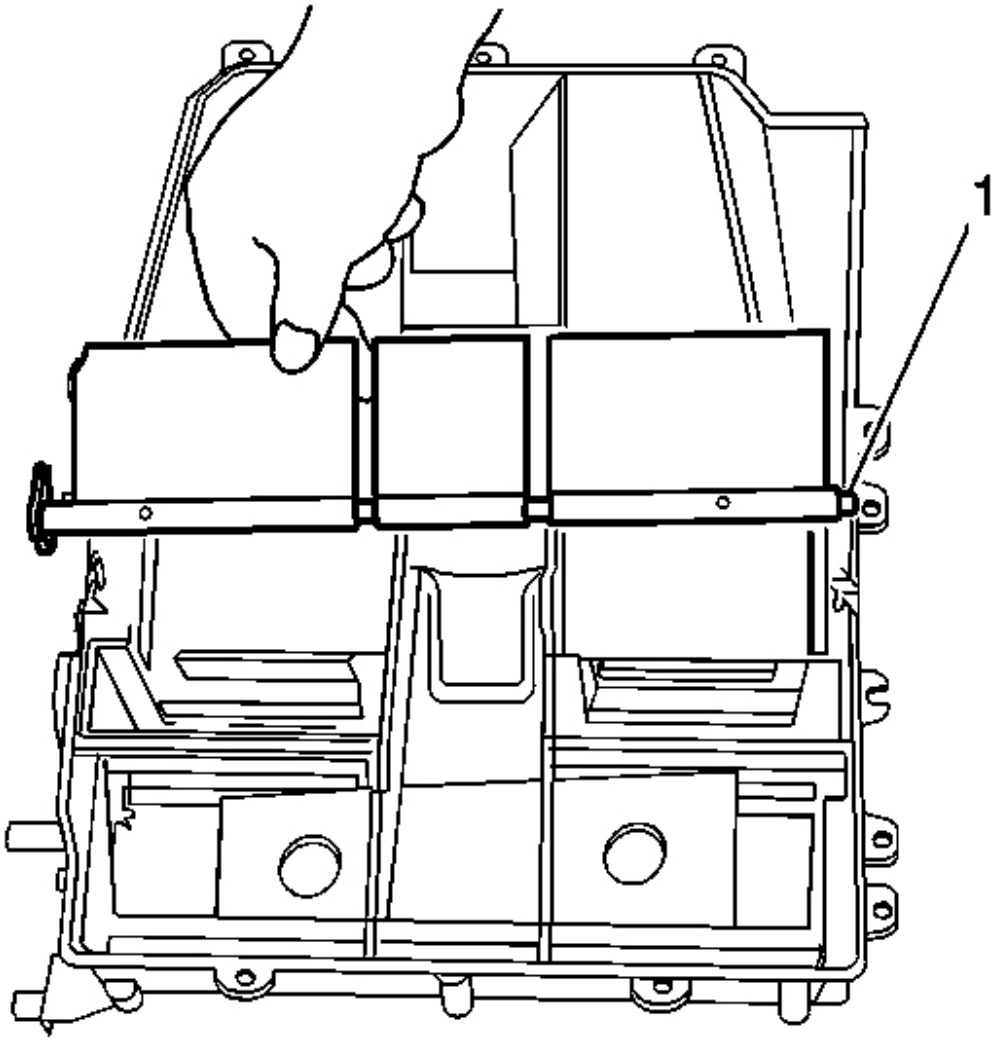


Fig. 112: Removing/Installing Air Temperature Door
Courtesy of GENERAL MOTORS CORP.

8. Remove the air temperature door (1) from the lower module half.

Installation Procedure

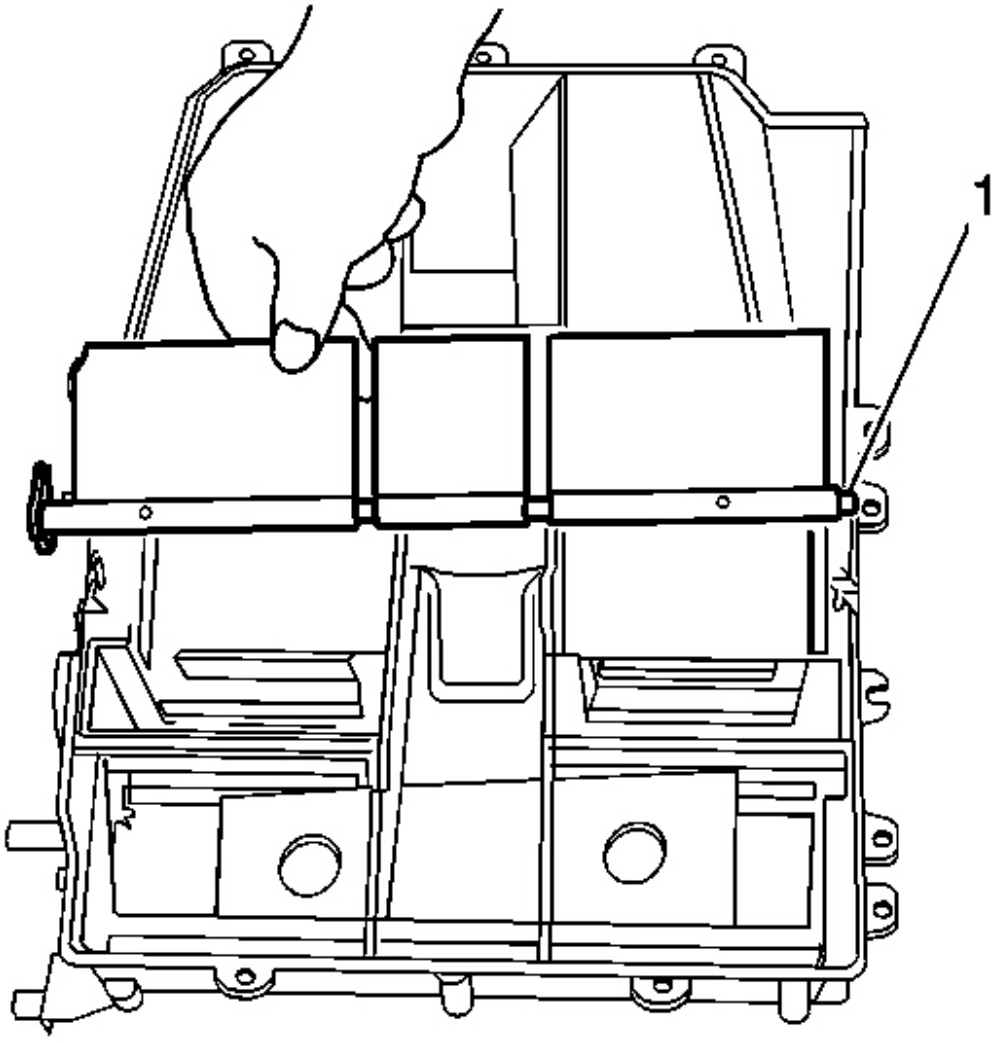


Fig. 113: Removing/Installing Air Temperature Door
Courtesy of GENERAL MOTORS CORP.

1. Install the air temperature door (1) to the lower module half.
2. Assemble the HVAC module case halves.
3. Install the mode actuator.

NOTE: Refer to Fastener Notice in Cautions and Notices.

4. Install the screws to the mode actuator.

   Tighten: Tighten the screws to 1.9 N.m (17 in. lb.).

5. Install the air temperature actuator.
6. Install the screws to the air temperature actuator.

   Tighten: Tighten the screws to 1.9 N.m (17 in. lb.).

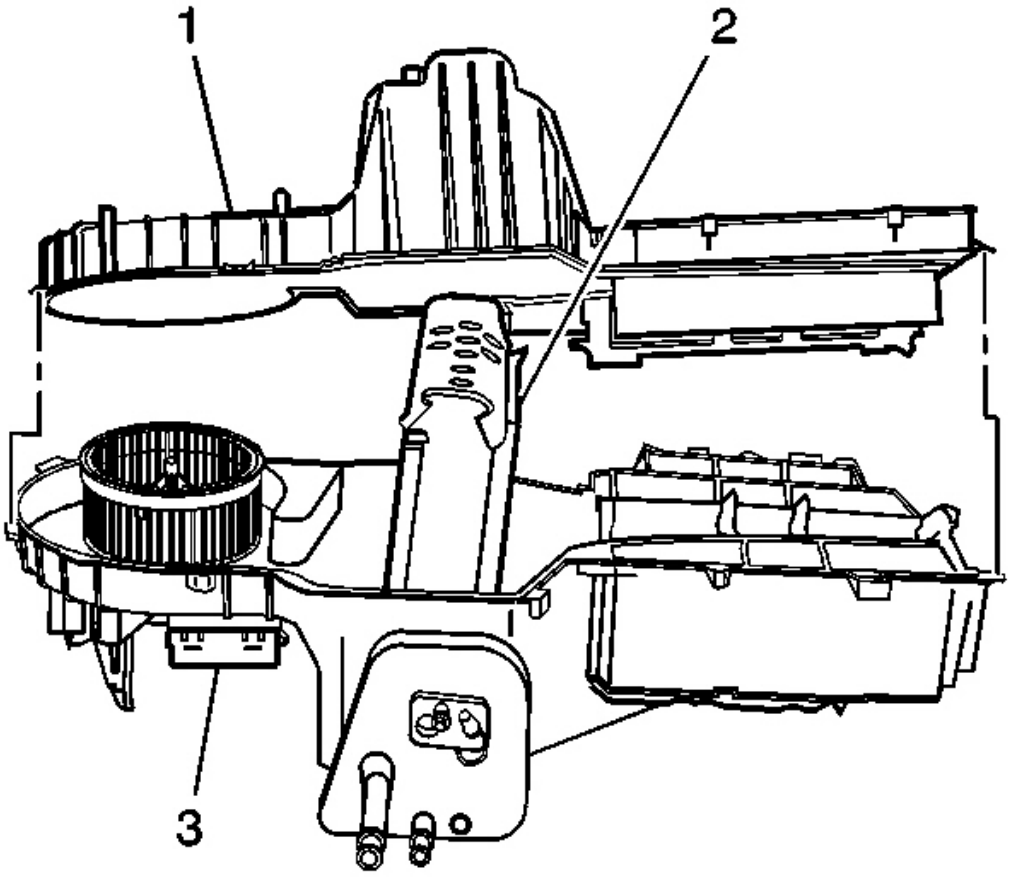


Fig. 114: Separating/Reassembling HVAC Module Case Halves
Courtesy of GENERAL MOTORS CORP.

7. Install the screws in order to assemble the HVAC module.

   Tighten: Tighten the screws to 1.9 N.m (17 in. lb.).

8. Install the HVAC module assembly (1). Refer to **HVAC Module Assembly Replacement**.

DEFROSTER DOOR REPLACEMENT

Removal Procedure

1. Remove the I/P carrier. Refer to **Instrument Panel (I/P) Carrier Replacement** in Instrument Panel, Gages and Console.

2. Remove the screws from the defroster actuator.
3. Remove the defroster actuator.

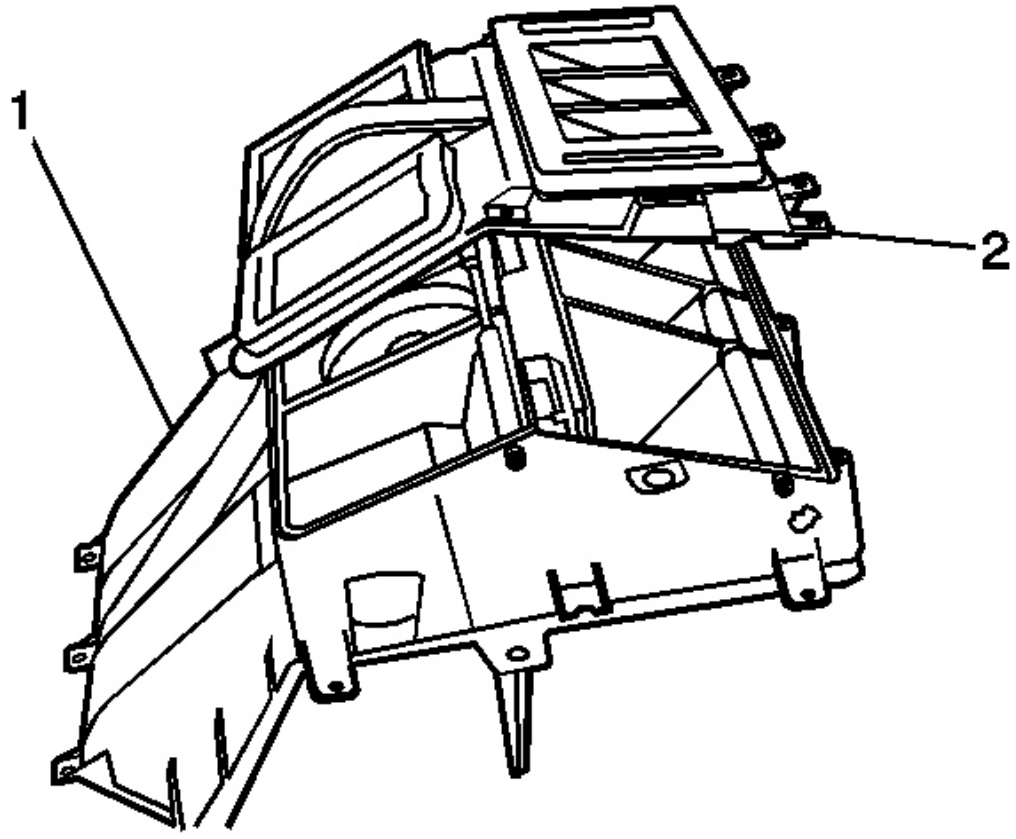


Fig. 115: HVAC Case
Courtesy of GENERAL MOTORS CORP.

4. Remove screws in order to separate the defroster/mode outlet cover (2) from the HVAC module assembly (1).
5. Remove the defroster/mode outlet cover.

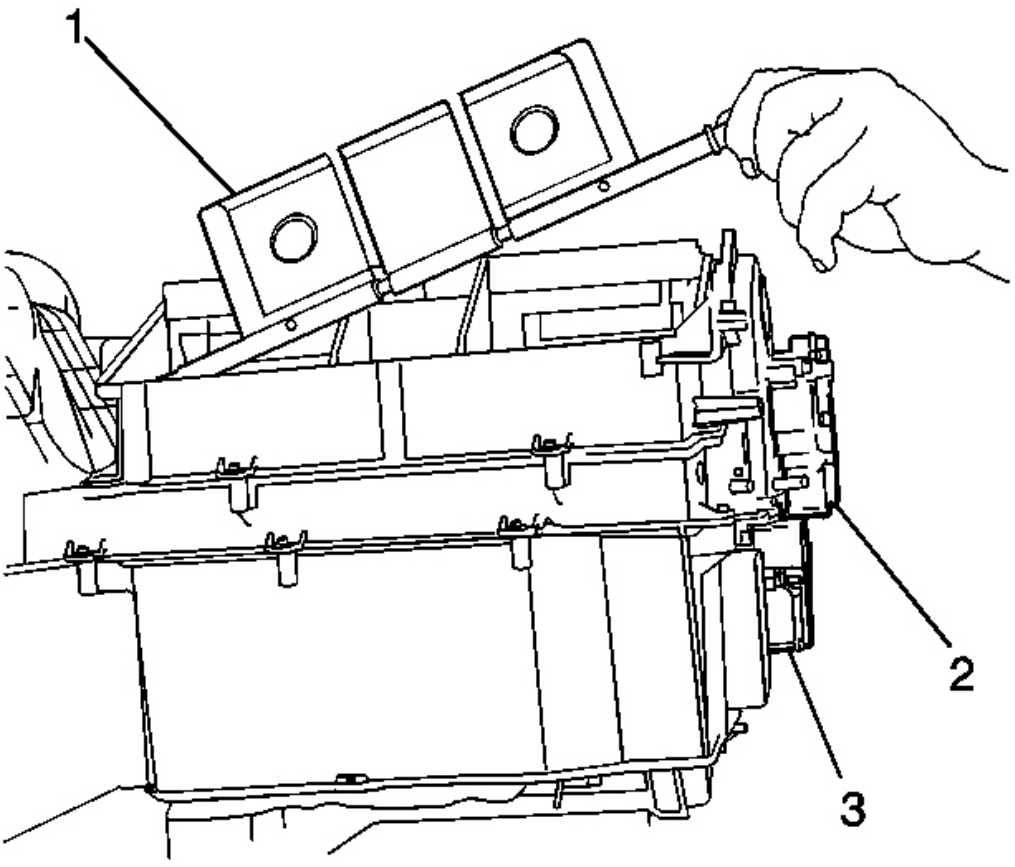


Fig. 116: Removing/Installing Defroster Door
Courtesy of GENERAL MOTORS CORP.

6. Remove the defroster door (1) from the HVAC module assembly.

Installation Procedure

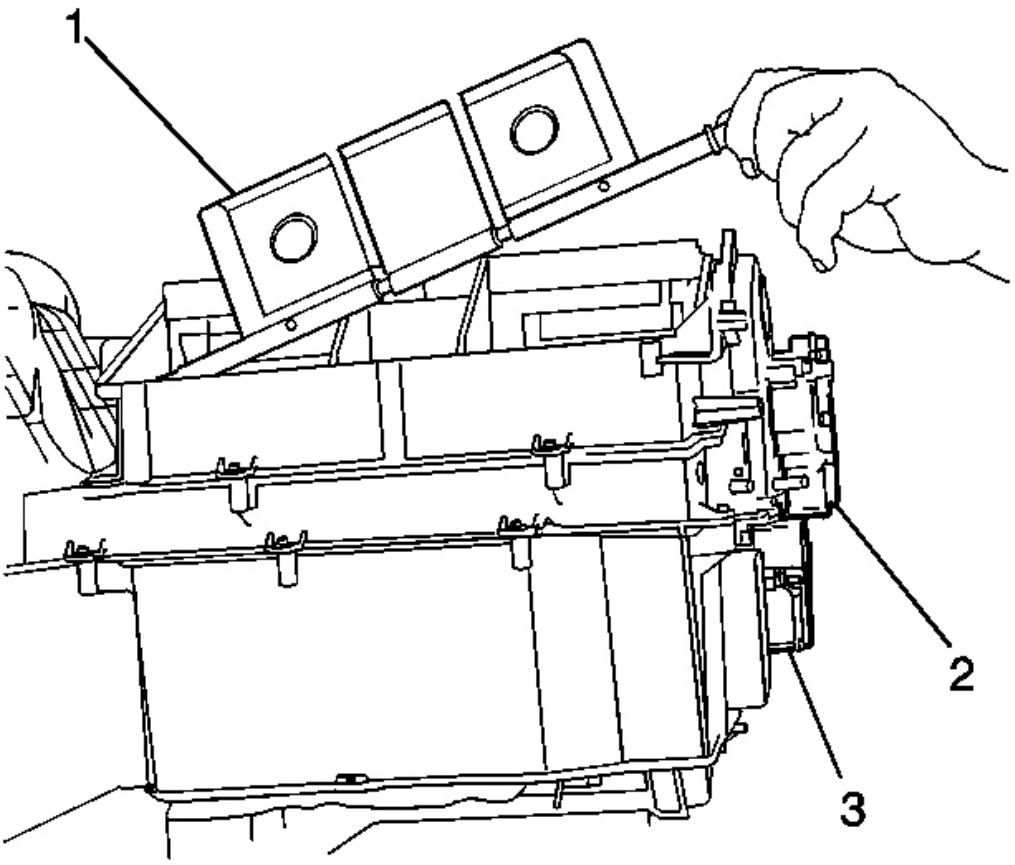


Fig. 117: Removing/Installing Defroster Door
Courtesy of GENERAL MOTORS CORP.

1. Install the defroster door (1) to the HVAC module assembly.
2. Install the defroster/mode outlet cover.

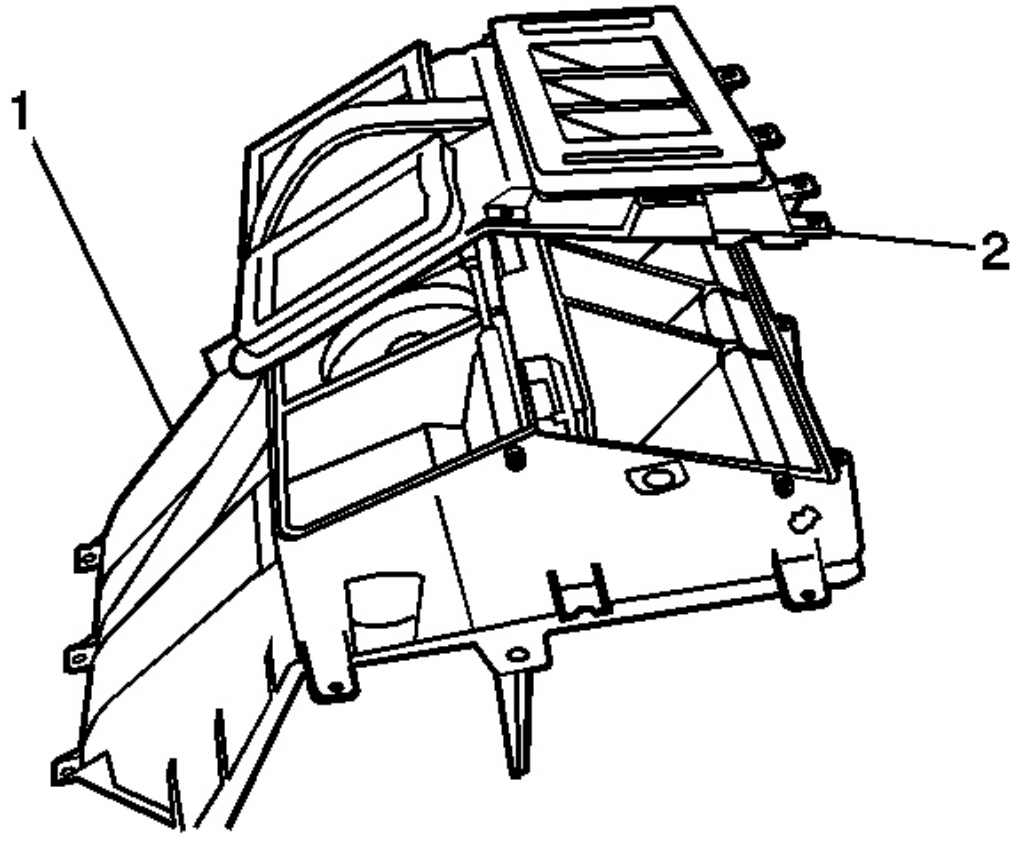


Fig. 118: HVAC Case
Courtesy of GENERAL MOTORS CORP.

3. Install the defroster/mode outlet cover screws to the HVAC module assembly (1).

NOTE: Refer to Fastener Notice in Cautions and Notices.

4. Install the screws to assemble the defroster/mode outlet to the HVAC module assembly.

Tighten: Tighten the screws to 1.9 N.m (18 in. lb.).

5. Install the defroster actuator.
6. Install the screws to the defroster actuator.

Tighten: Tighten the screws to 1.9 N.m (18 in. lb.).

7. Install the I/P carrier. Refer to **Instrument Panel (I/P) Carrier Replacement** in Instrument Panel, Gages and Console.

MODE DOOR REPLACEMENT

Removal Procedure

1. Remove the I/P carrier. Refer to **Instrument Panel (I/P) Carrier Replacement** in Instrument Panel, Gages and Console.
2. Remove the screws from the mode actuator.
3. Remove the mode actuator.

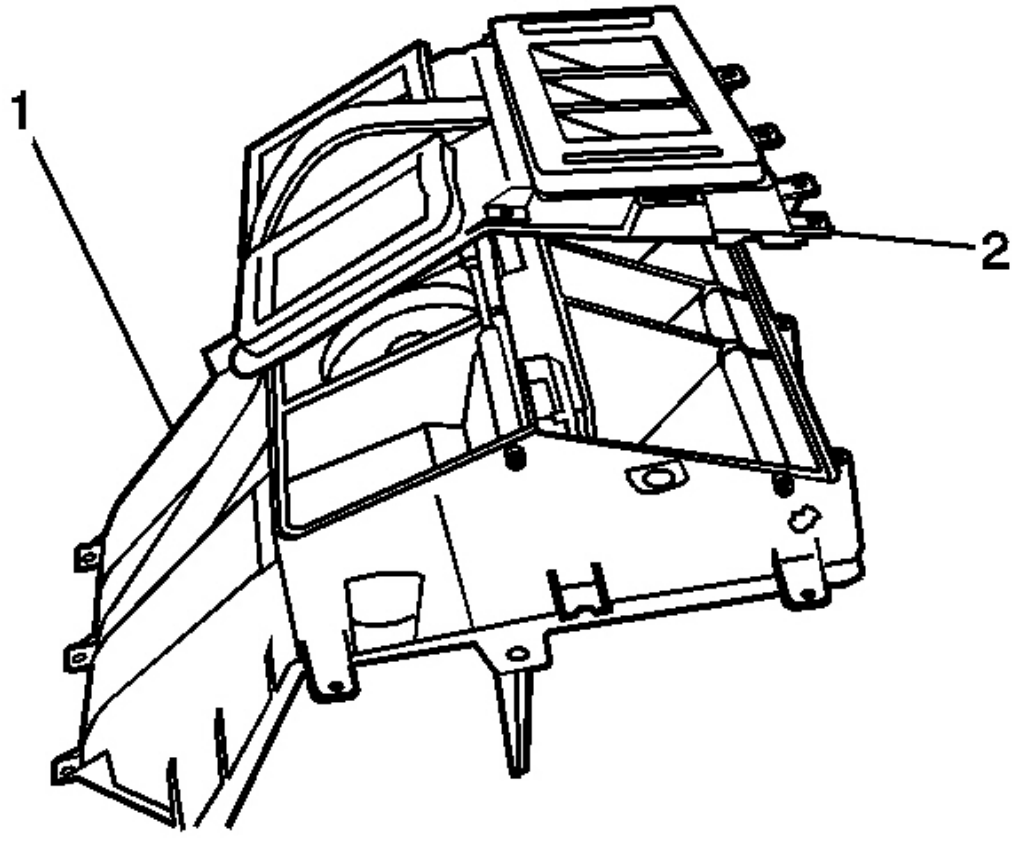


Fig. 119: HVAC Case
Courtesy of GENERAL MOTORS CORP.

4. Remove screws in order to separate the defroster/mode outlet cover (2) from the HVAC module assembly

(1).

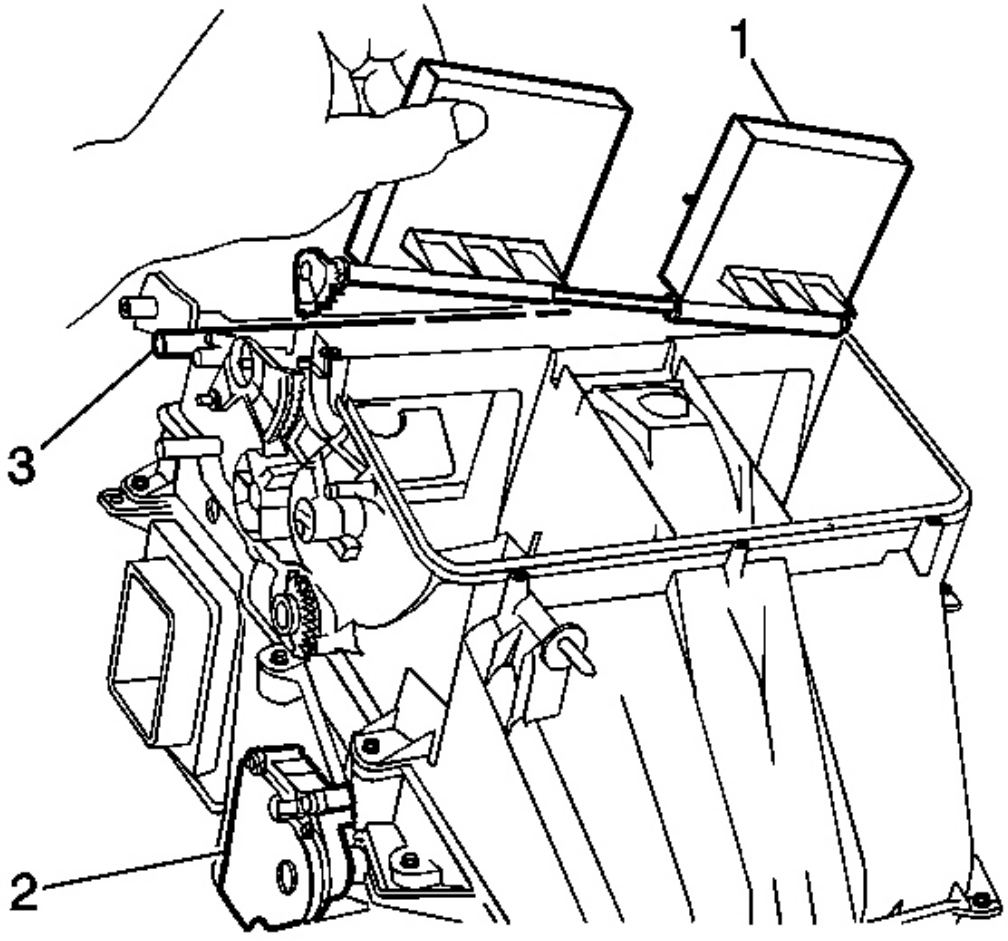


Fig. 120: Removing/Installing Mode Door
Courtesy of GENERAL MOTORS CORP.

5. Remove the mode door (1) from the heater module.

Installation Procedure

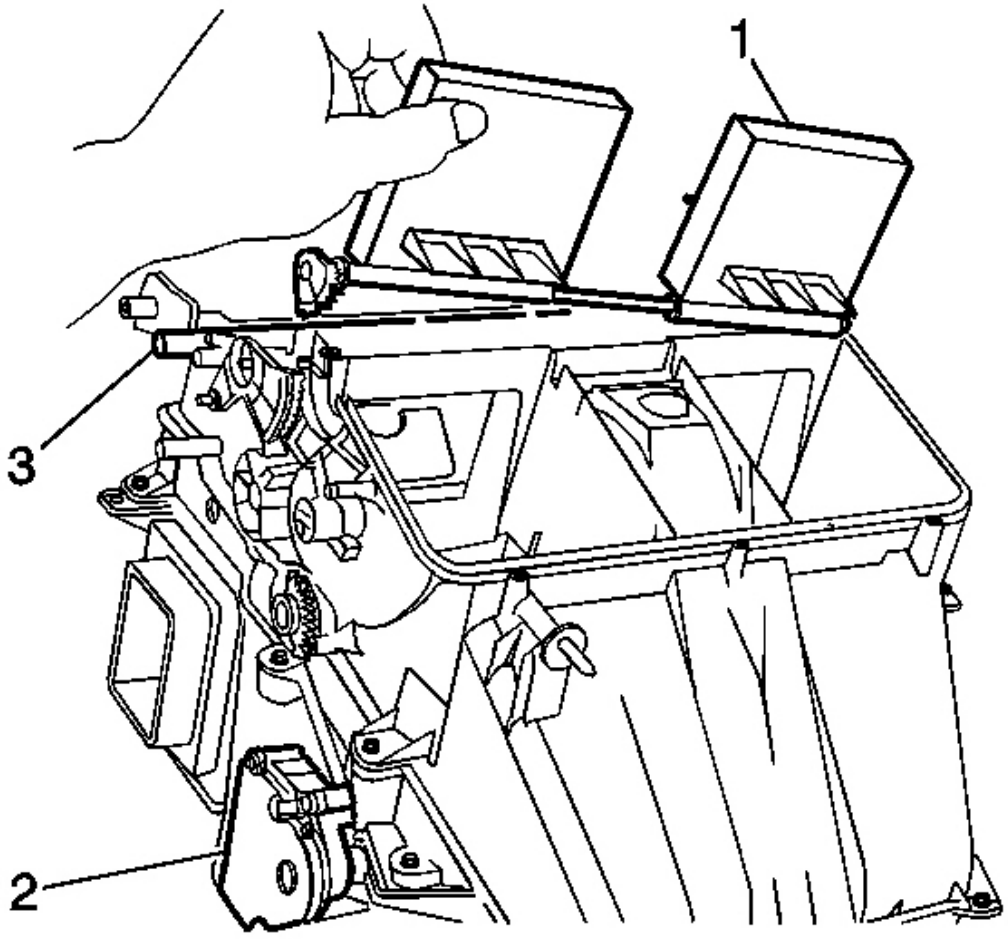


Fig. 121: Removing/Installing Mode Door
Courtesy of GENERAL MOTORS CORP.

1. Install the mode door (1) to the HVAC module assembly.
2. Install the defroster/mode outlet cover.

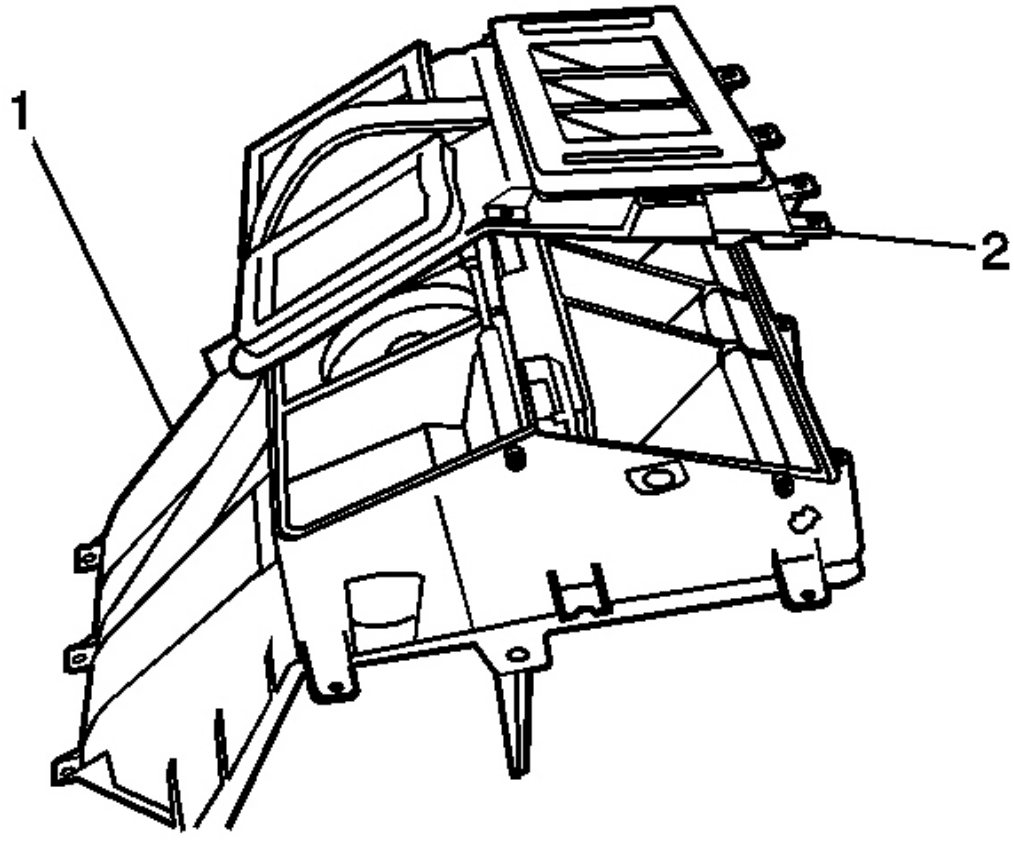


Fig. 122: HVAC Case
Courtesy of GENERAL MOTORS CORP.

3. Install the defroster/mode outlet cover screws to the HVAC module assembly (1).

NOTE: Refer to Fastener Notice in Cautions and Notices.

4. Install the screws to assemble the defroster/mode outlet to the HVAC module assembly.

   Tighten: Tighten the screws to 1.9 N.m (18 in. lb.).

5. Install the mode actuator.
6. Install the screws to the mode actuator.

   Tighten: Tighten the screws to 1.9 N.m (18 in. lb.).

7. Install the I/P carrier. Refer to **Instrument Panel (I/P) Carrier Replacement** Instrument Panel, Gages and Console.

RECIRCULATION DOOR REPLACEMENT

Removal Procedure

1. Remove the HVAC module assembly. Refer to **HVAC Module Assembly Replacement**.
2. Remove the screws retaining the recirculation assembly to the HVAC module assembly.
3. Remove the screws from the recirculation actuator.
4. Remove recirculation actuator.

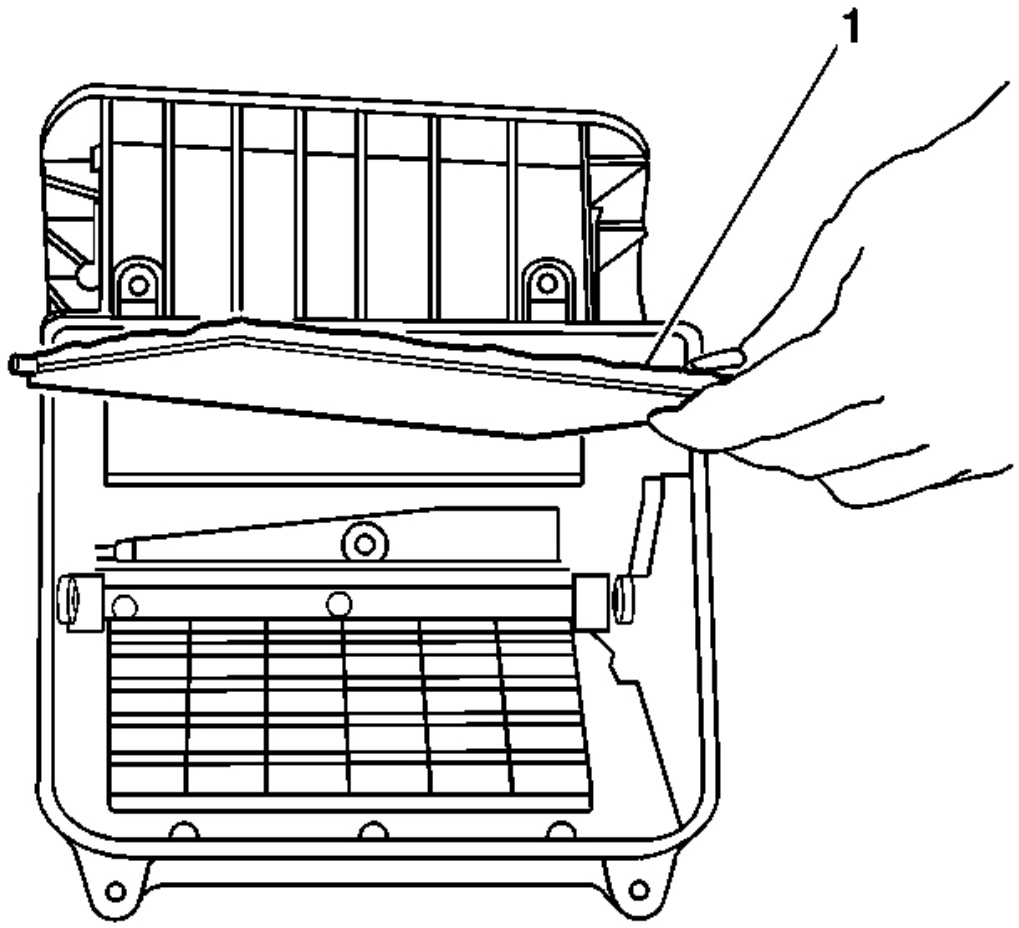


Fig. 123: Removing/Installing Recirculation Door

Courtesy of GENERAL MOTORS CORP.

5. Remove the recirculation door (1) from the recirculation assembly.

Installation Procedure

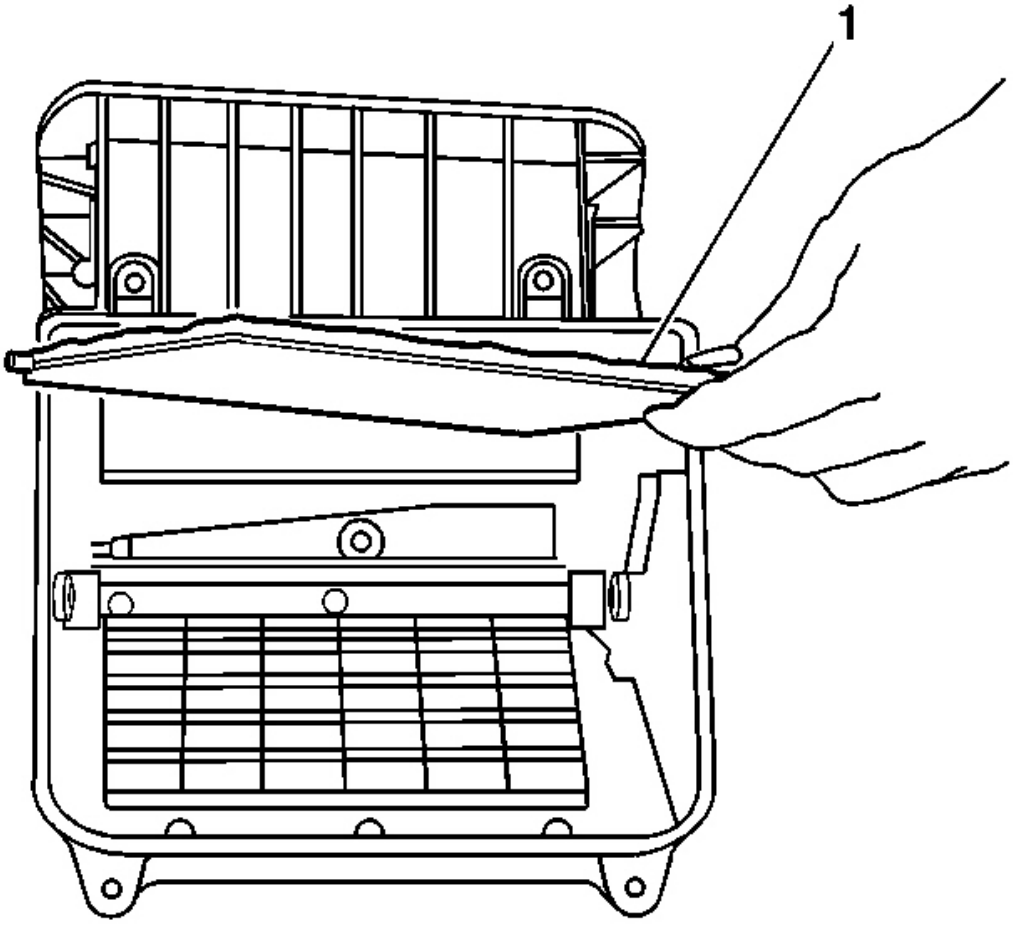


Fig. 124: Removing/Installing Recirculation Door
Courtesy of GENERAL MOTORS CORP.

1. Install the recirculation door (1) to the recirculation assembly.
2. Install the recirculation actuator.

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Install the screws to the recirculation actuator.

   Tighten: Tighten the screws to 1.9 N.m (18 in. lb.).

4. Install the screws to assemble the recirculation assembly.

   Tighten: Tighten the screws to 1.9 N.m (18 in. lb.).

5. 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 heater core access cover screws.
3. Remove the heater core access cover.

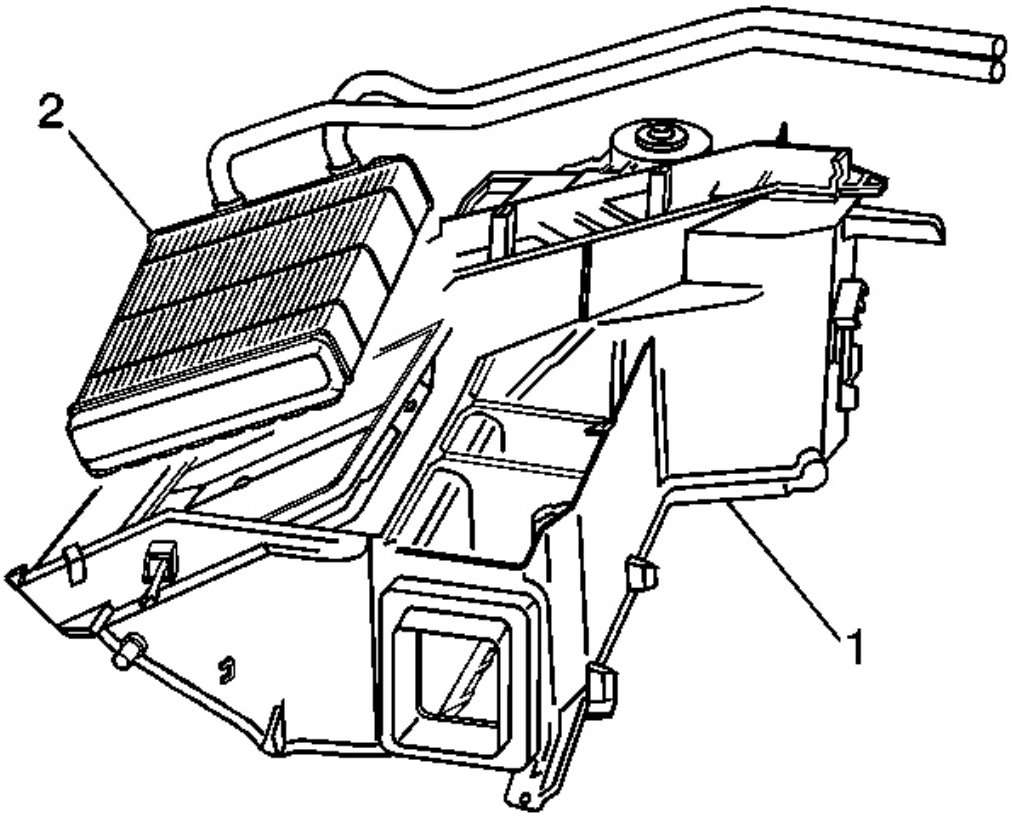


Fig. 125: Removing/Installing Heater Core
Courtesy of GENERAL MOTORS CORP.

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

Installation Procedure

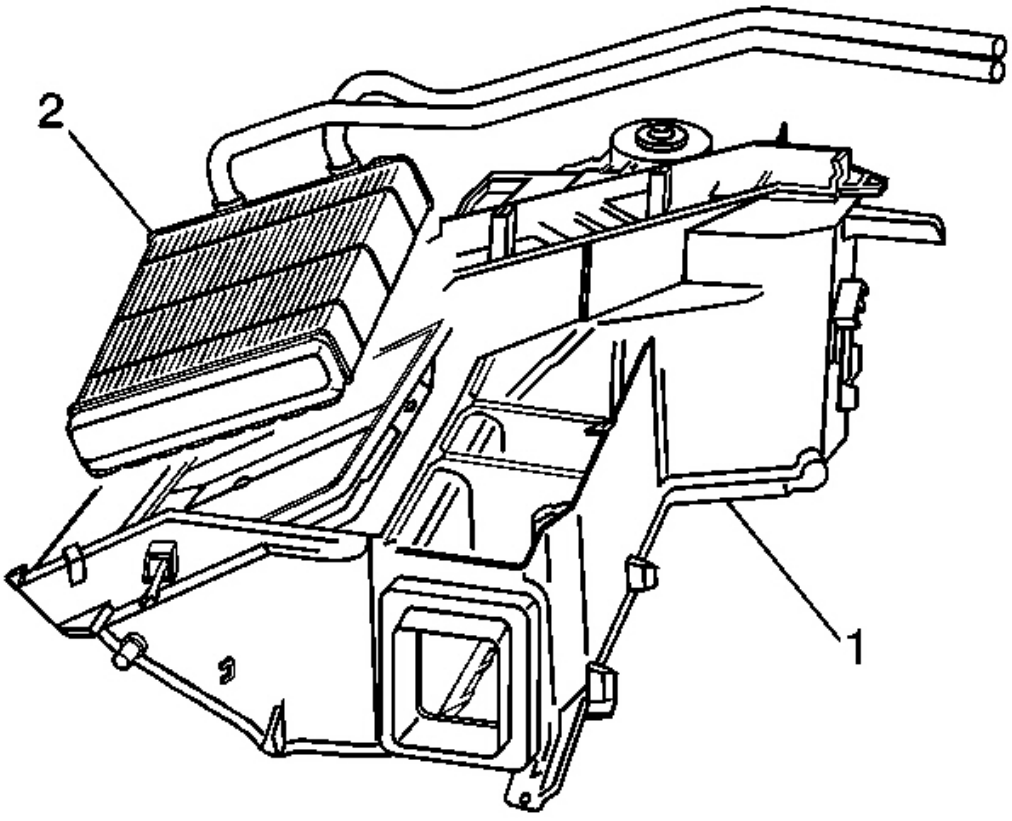


Fig. 126: Removing/Installing Heater Core
Courtesy of GENERAL MOTORS CORP.

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

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Install the heater core access cover screws.

   Tighten: Tighten the screws to 1.9 N.m (17 in. lb.).

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

BLOWER MOTOR RESISTOR REPLACEMENT - AUXILIARY

Removal Procedure

1. Remove the rear HVAC module assembly. Refer to **HVAC Module Replacement - Auxiliary**.

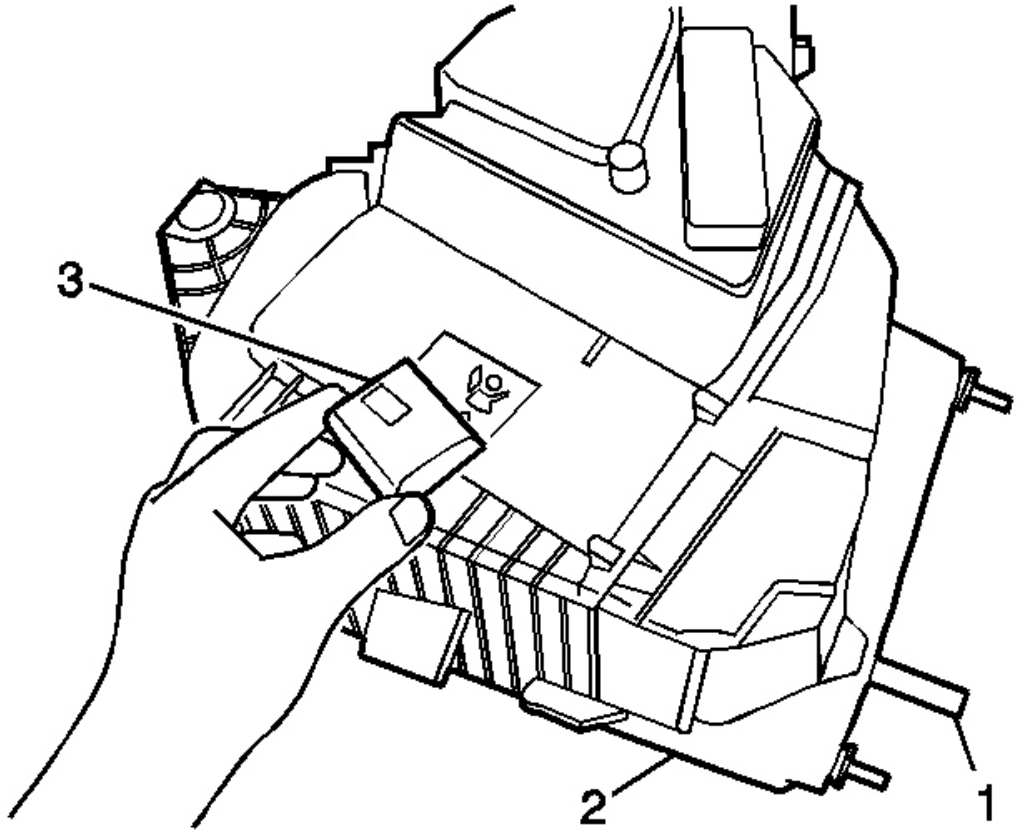


Fig. 127: Removing/Installing Blower Motor Control Processor - Auxiliary
Courtesy of GENERAL MOTORS CORP.

2. Disconnect the electrical connector from the blower motor control processor-auxiliary (3).
3. Remove the screws from the blower motor control processor-auxiliary (3).
4. Remove the blower motor control processor-auxiliary (3).
5. Remove the thermal gasket from the evaporator core-auxiliary surface.

Installation Procedure

1. Install the thermal gasket to the blower motor control processor-auxiliary.

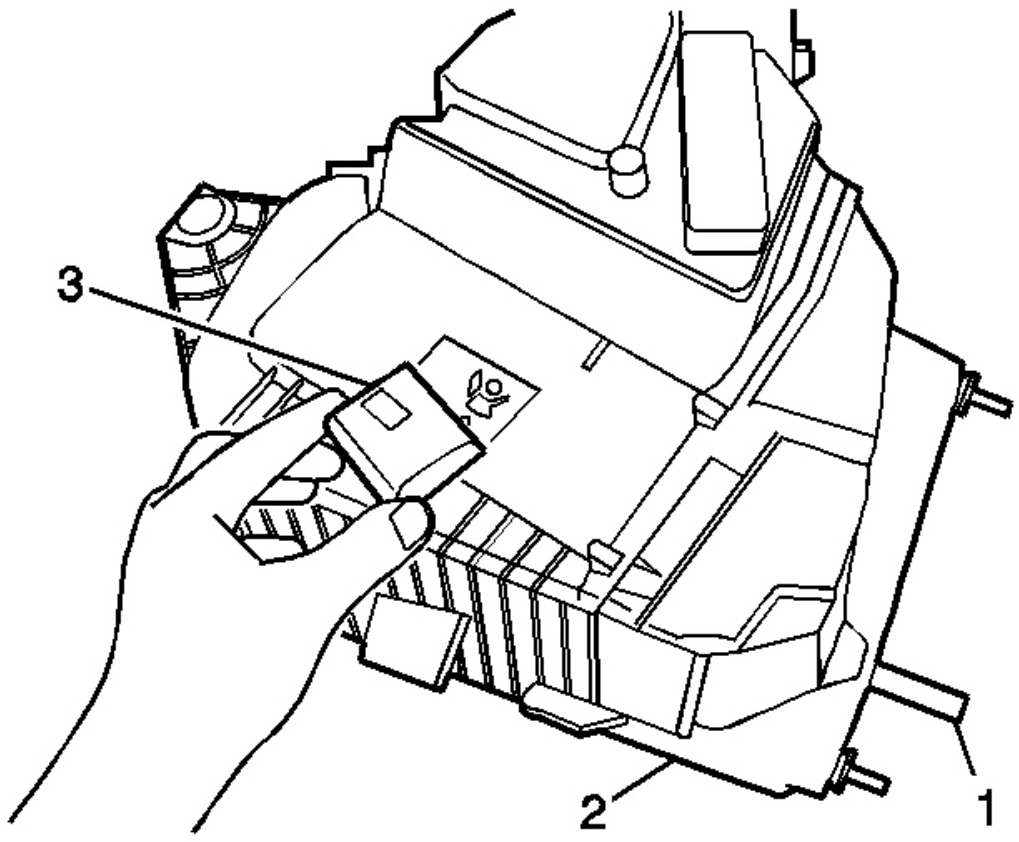


Fig. 128: Removing/Installing Blower Motor Control Processor - Auxiliary
Courtesy of GENERAL MOTORS CORP.

2. Install the blower motor control processor-auxiliary (3).

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Install the screws to the blower motor control processor-auxiliary (3).

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

4. Connect the electrical connector to the blower motor control processor-auxiliary (3).
5. Install the HVAC module-auxiliary. Refer to **HVAC Module Replacement - Auxiliary**.

BLOWER MOTOR REPLACEMENT - AUXILIARY (BODY VIN TYPE 6)

Removal Procedure

1. Remove the right rear quarter trim panel. Refer to **Trim Panel Replacement - Rear Quarter - Right (Short Wheelbase)** or **Trim Panel Replacement - Rear Quarter - Right (Long Wheelbase)** in Interior Trim.

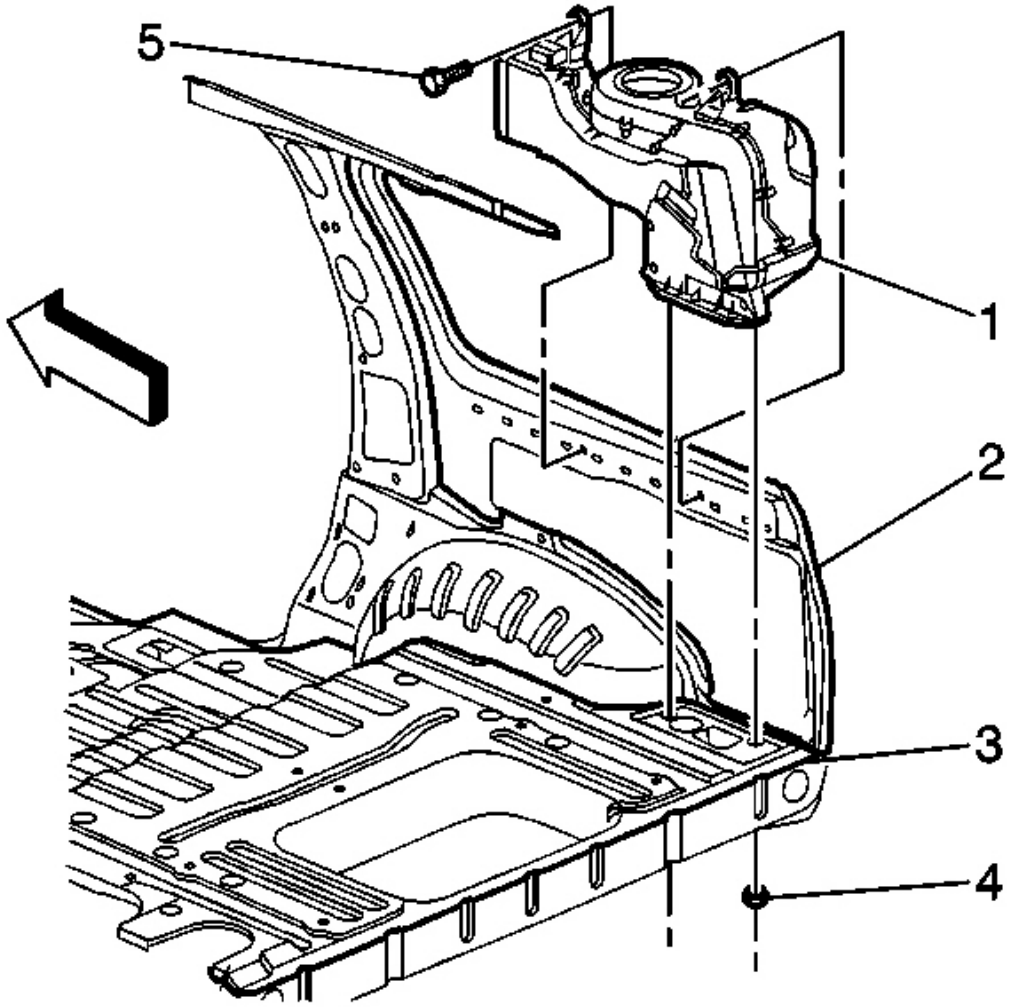


Fig. 129: Removing/Installing Auxiliary HVAC Module (Body VIN Type 6)
Courtesy of GENERAL MOTORS CORP.

2. Remove the retaining bolts (5) from the HVAC module-auxiliary (1).
3. Remove the retaining nuts (4) from the HVAC module-auxiliary (1) under the vehicle.

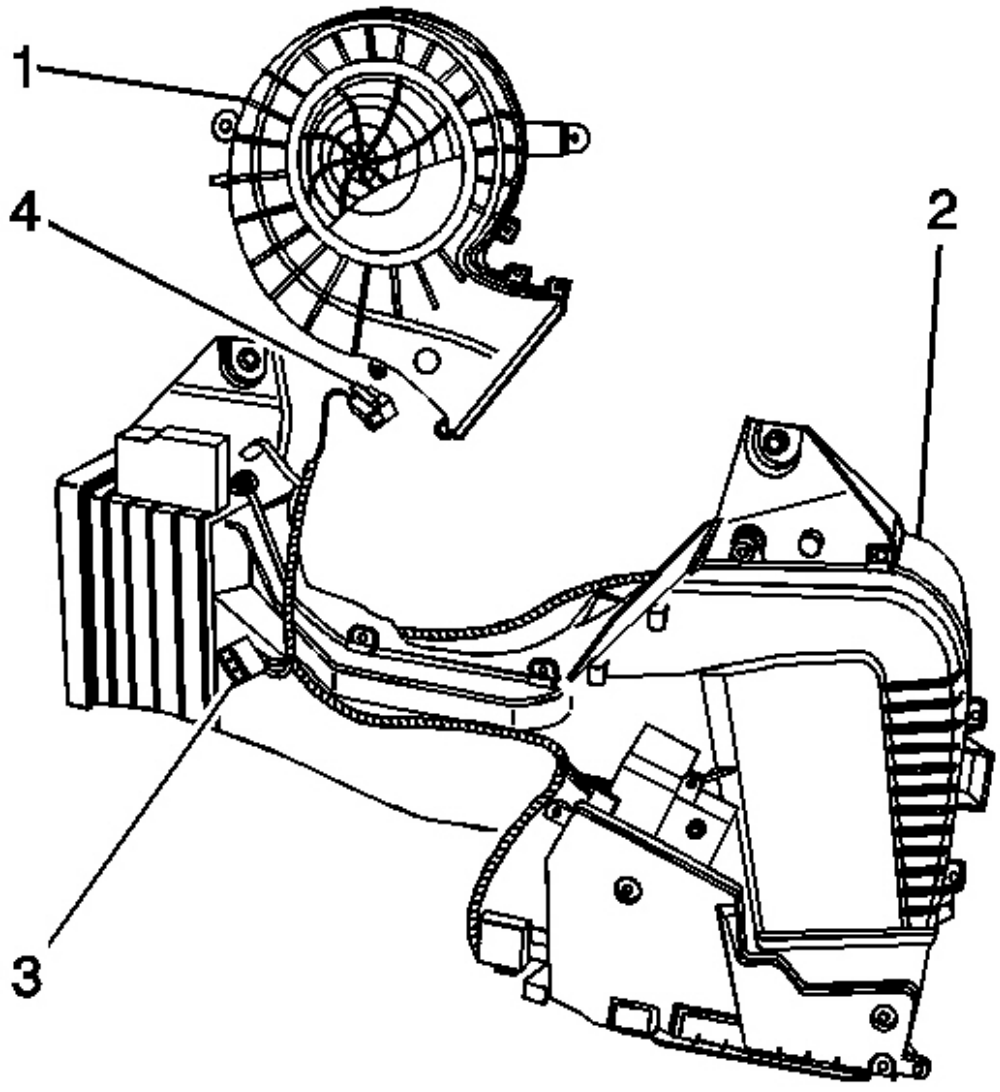


Fig. 130: Removing/Installing Auxiliary Blower Motor (Body VIN Type 6)
Courtesy of GENERAL MOTORS CORP.

4. Disconnect the electrical connectors (3,4).
5. Remove the blower motor screws.
6. Remove the blower motor (1) from the HVAC module-auxiliary (2).

Installation Procedure

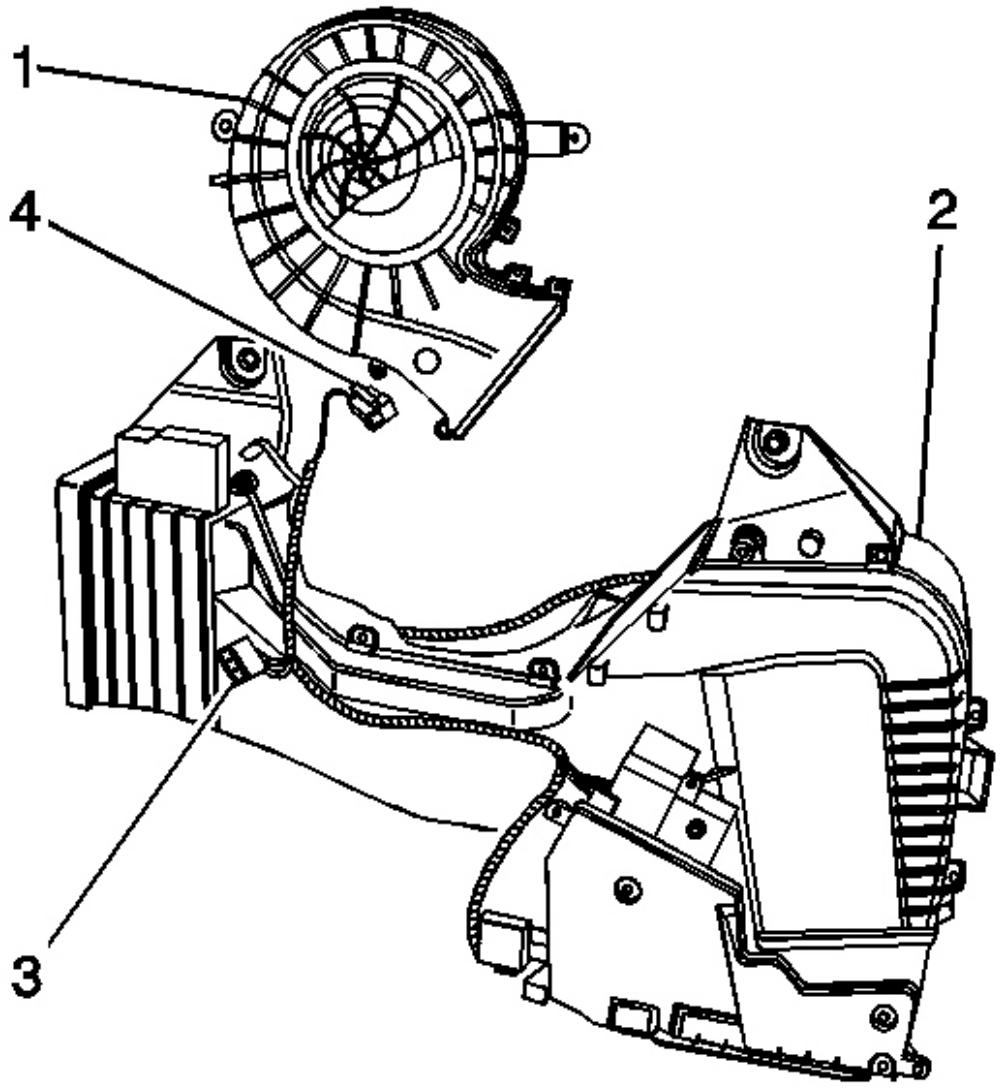


Fig. 131: Removing/Installing Auxiliary Blower Motor (Body VIN Type 6)
Courtesy of GENERAL MOTORS CORP.

1. Install the blower motor-auxiliary (1) to the HVAC module-auxiliary (2).

NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the blower motor-auxiliary screws.

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

3. Connect the electrical connectors (3,4).

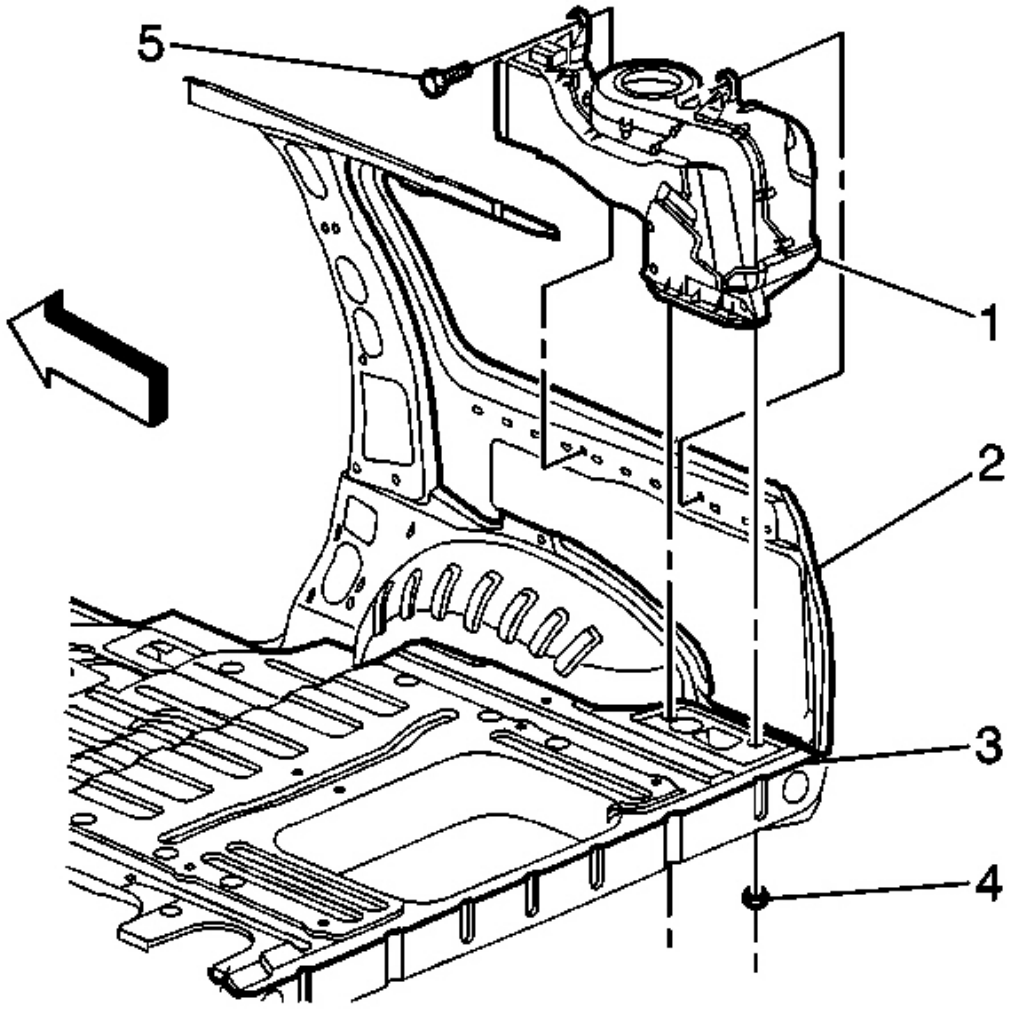


Fig. 132: Removing/Installing Auxiliary HVAC Module (Body VIN Type 6)
Courtesy of GENERAL MOTORS CORP.

4. Install the retaining bolts (5) to the HVAC module-auxiliary.

NOTE: Refer to Fastener Notice in Cautions and Notices.

5. Tighten the HVAC module-auxiliary retaining bolts (5).

   Tighten: Tighten the bolts to 10 N.m (88 in. lb.).

6. Install the retaining nuts (4) to the HVAC module-auxiliary (1) under the vehicle.

   Tighten: Tighten the nuts to 10 N.m (88 in. lb.).

7. Install the right rear quarter trim. Refer to **Trim Panel Replacement - Rear Quarter - Right (Short Wheelbase)** or **Trim Panel Replacement - Rear Quarter - Right (Long Wheelbase)** in Interior Trim.

BLOWER MOTOR REPLACEMENT - AUXILIARY (BODY VIN TYPE 3)

Removal Procedure

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

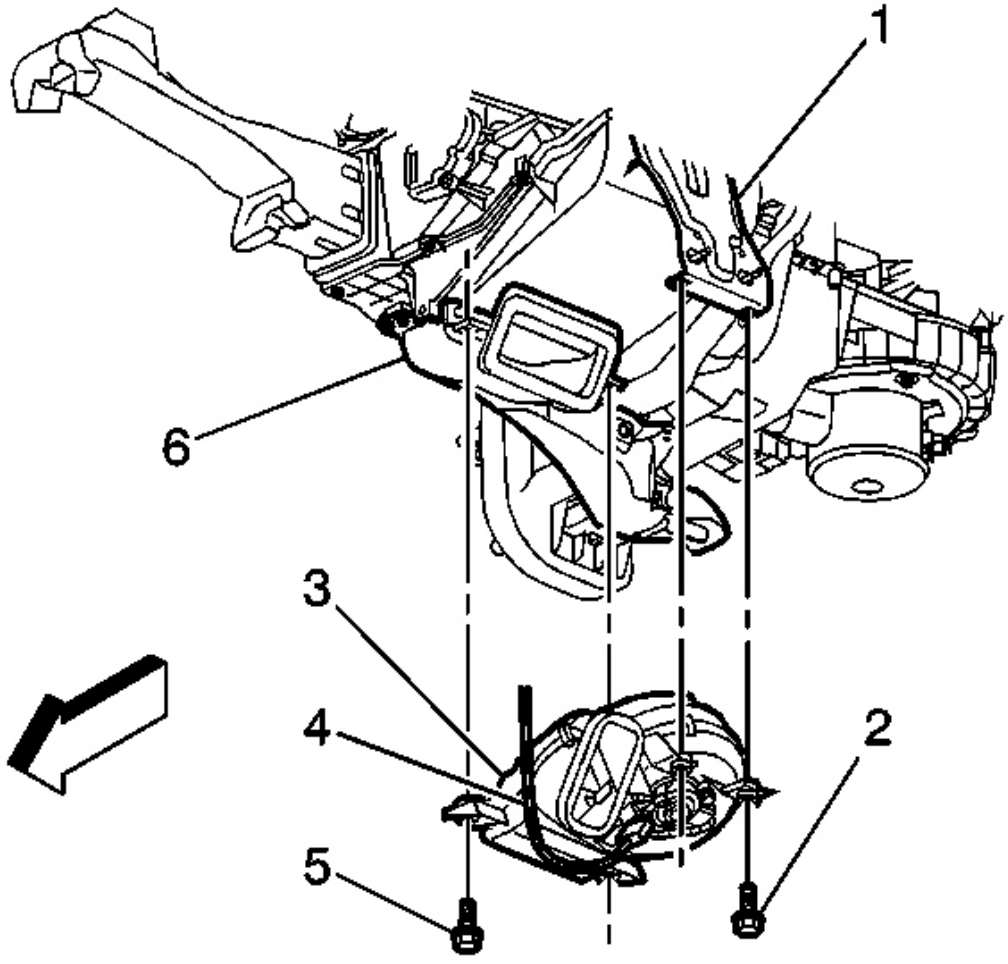


Fig. 133: Removing/Installing Auxiliary Blower Motor (Body VIN Type 3)
Courtesy of GENERAL MOTORS CORP.

2. Disconnect the electrical connectors (4) from the blower motor-auxiliary (3).
3. Remove the air outlet duct from the blower motor-auxiliary.
4. Remove the screws (2,5) from the blower motor-auxiliary.
5. Remove the blower motor-auxiliary (3).

Installation Procedure

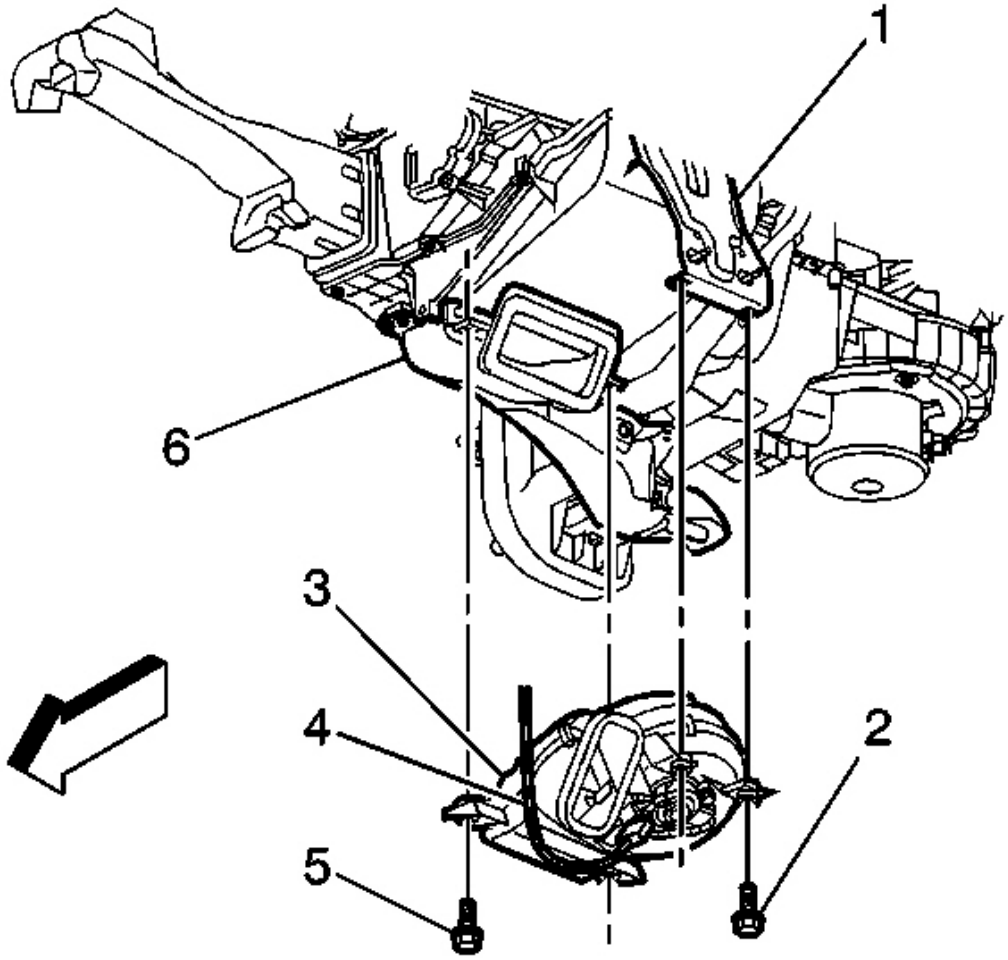


Fig. 134: Removing/Installing Auxiliary Blower Motor (Body VIN Type 3)
Courtesy of GENERAL MOTORS CORP.

1. Install the blower motor-auxiliary (3).

NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the retaining screws (2,5) to the blower motor-auxiliary.

   Tighten: Tighten the screws to 10 N.m (88 in. lb.).

3. Install the air outlet duct to the blower motor-auxiliary.

4. Connect the electrical connectors (4) to the blower motor-auxiliary (3).
5. Install the HVAC module assembly. Refer to **HVAC Module Assembly Replacement**.

AIR DISTRIBUTION DUCTS REPLACEMENT - AUXILIARY (LOWER)

Removal Procedure

1. Remove the right rear quarter trim panel. Refer to **Trim Panel Replacement - Rear Quarter - Right (Short Wheelbase)** or **Trim Panel Replacement - Rear Quarter - Right (Long Wheelbase)** in Interior Trim.

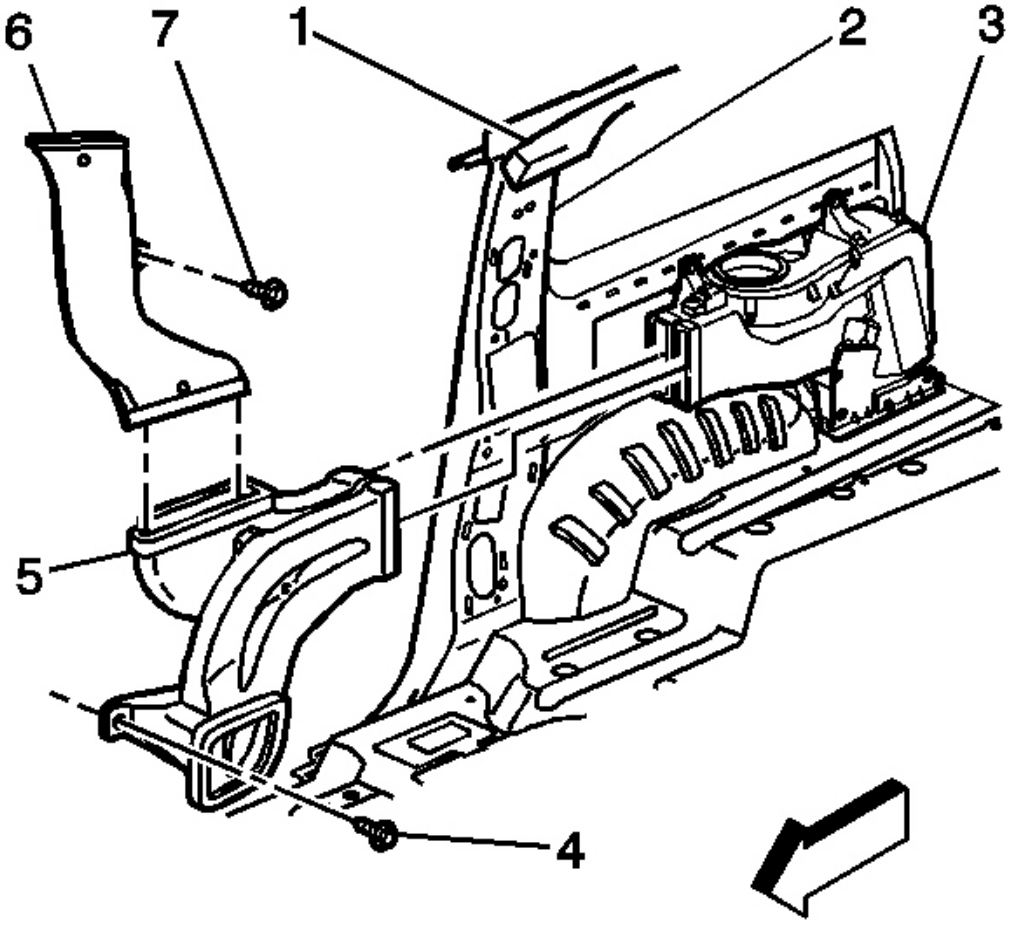


Fig. 135: Removing/Installing Rear Ducting
Courtesy of GENERAL MOTORS CORP.

2. Remove the lower air duct fastener (4).
3. Remove the mid-upper air distribution fastener (6).
4. Remove the mid-upper air distribution duct (6).
5. Remove the lower air duct (5) from the vehicle.

Installation Procedure

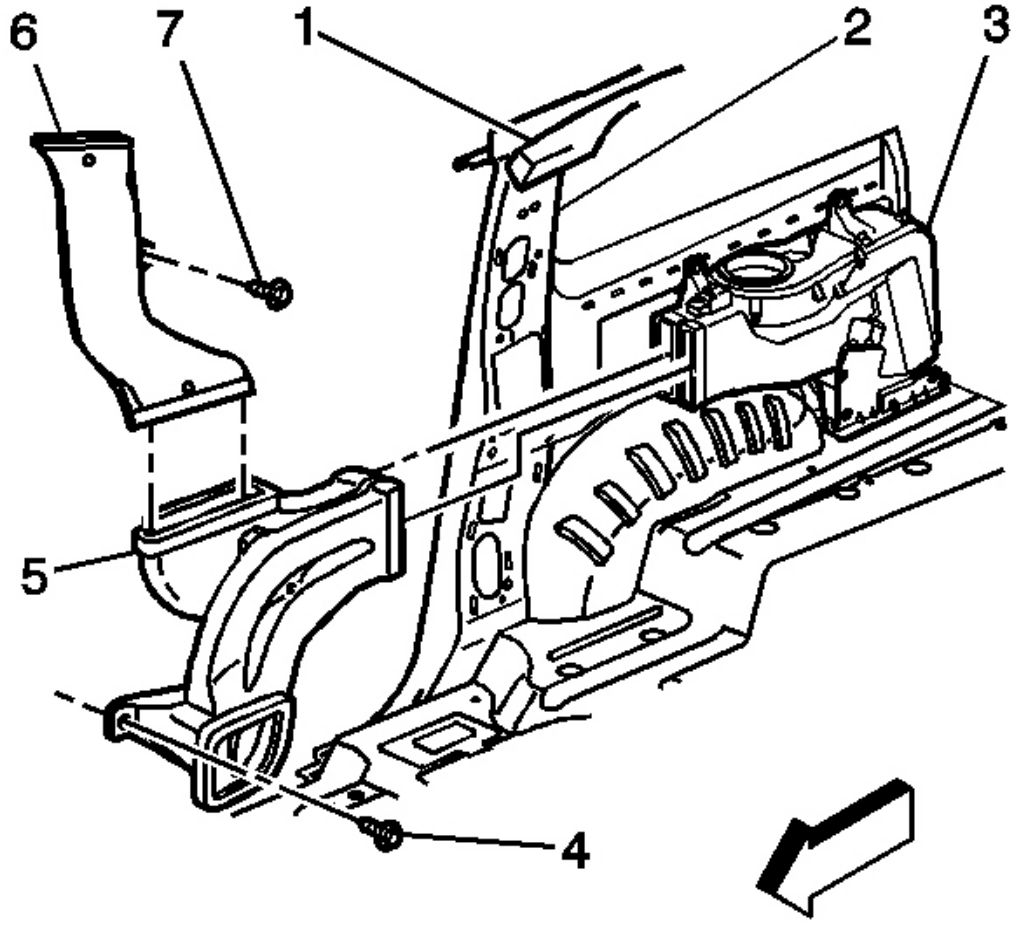


Fig. 136: Removing/Installing Rear Ducting
Courtesy of GENERAL MOTORS CORP.

1. Install the mid-upper air distribution duct (6).
2. Install the mid-upper air distribution fastener (7).

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Tighten the mid-upper air distribution screw.

   Tighten: Tighten the screw to 1.9 N.m (17 in. lb.).

4. Install the lower air duct (5) to the vehicle.

   Tighten: Tighten the screw to 1.9 N.m (17 in. lb.).

5. Install the lower air duct screw (4).
6. Install the right rear quarter trim panel. Refer to **Trim Panel Replacement - Rear Quarter - Right (Short Wheelbase)** or **Trim Panel Replacement - Rear Quarter - Right (Long Wheelbase)** in Interior Trim.

AIR DISTRIBUTION DUCTS REPLACEMENT - AUXILIARY (UPPER)

Removal Procedure

1. Remove the right rear quarter trim panel. Refer to **Trim Panel Replacement - Rear Quarter - Right (Short Wheelbase)** or **Trim Panel Replacement - Rear Quarter - Right (Long Wheelbase)** in Interior Trim.
2. Remove the headliner. Refer to **Headliner Replacement (Long Wheelbase)** or **Headliner Replacement (Short Wheelbase)** in Interior Trim.

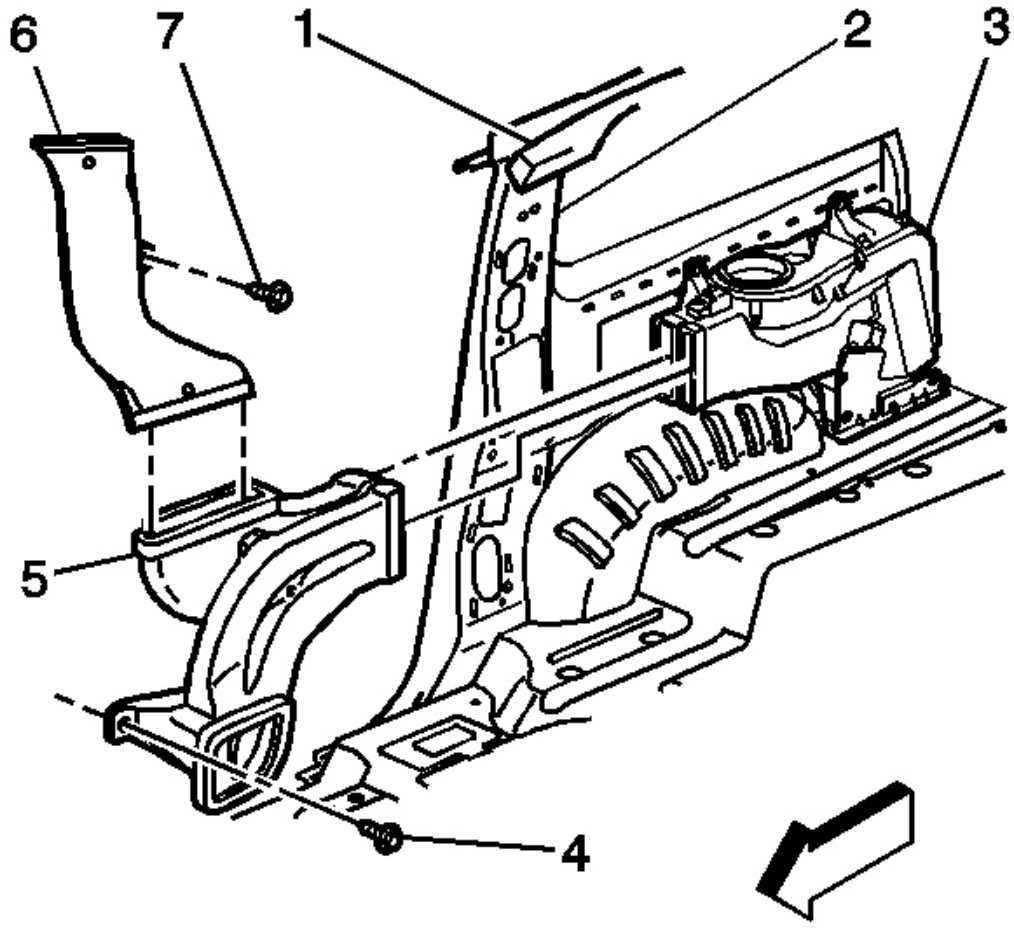


Fig. 137: Removing/Installing Rear Ducting
Courtesy of GENERAL MOTORS CORP.

3. Remove the mid upper air distribution duct retaining fastener (7).
4. Remove the mid upper air distribution duct (6) from the C-pillar.
5. Remove the lower air distribution duct (5) from the C-pillar.

Installation Procedure

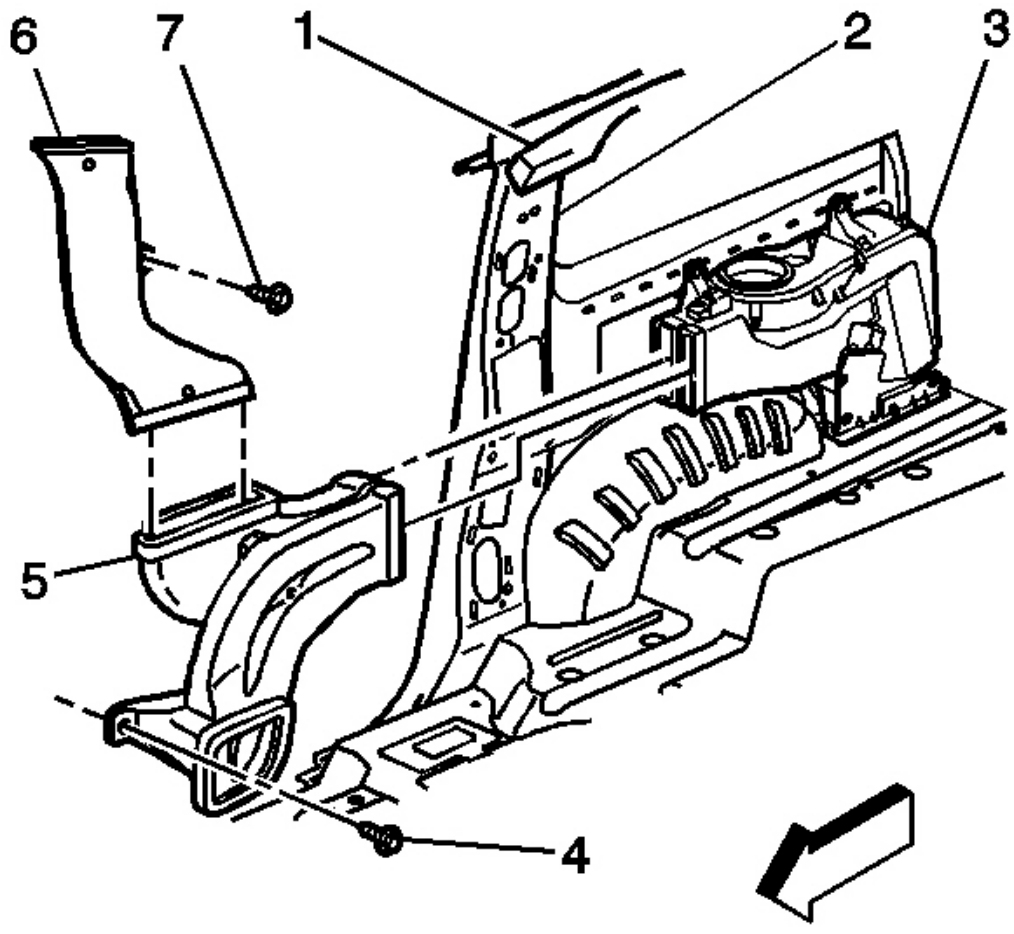


Fig. 138: Removing/Installing Rear Ducting
Courtesy of GENERAL MOTORS CORP.

1. Install the lower air distribution duct (5) to the C-pillar.
2. Install the lower air distribution duct retaining screw (4).

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Tighten the lower air distribution duct retaining screw.

   Tighten: Tighten the screw to 1.9 N.m (17 in. lb.).

4. Install the upper air distribution duct (6) to the C-pillar.

5. Install the upper air distribution duct retaining screw (7).

   Tighten: Tighten the screw to 1.9 N.m (17 in. lb.).

6. Install the headliner. Refer to **Headliner Replacement (Long Wheelbase)** or **Headliner Replacement (Short Wheelbase)** in Interior Trim.
7. Install the right rear quarter trim. Refer to **Trim Panel Replacement - Rear Quarter - Right (Short Wheelbase)** or **Trim Panel Replacement - Rear Quarter - Right (Long Wheelbase)** in Interior Trim.

HEATER CORE REPLACEMENT - AUXILIARY

Removal Procedure

1. Remove the HVAC module-auxiliary. Refer to **HVAC Module Replacement - Auxiliary**.

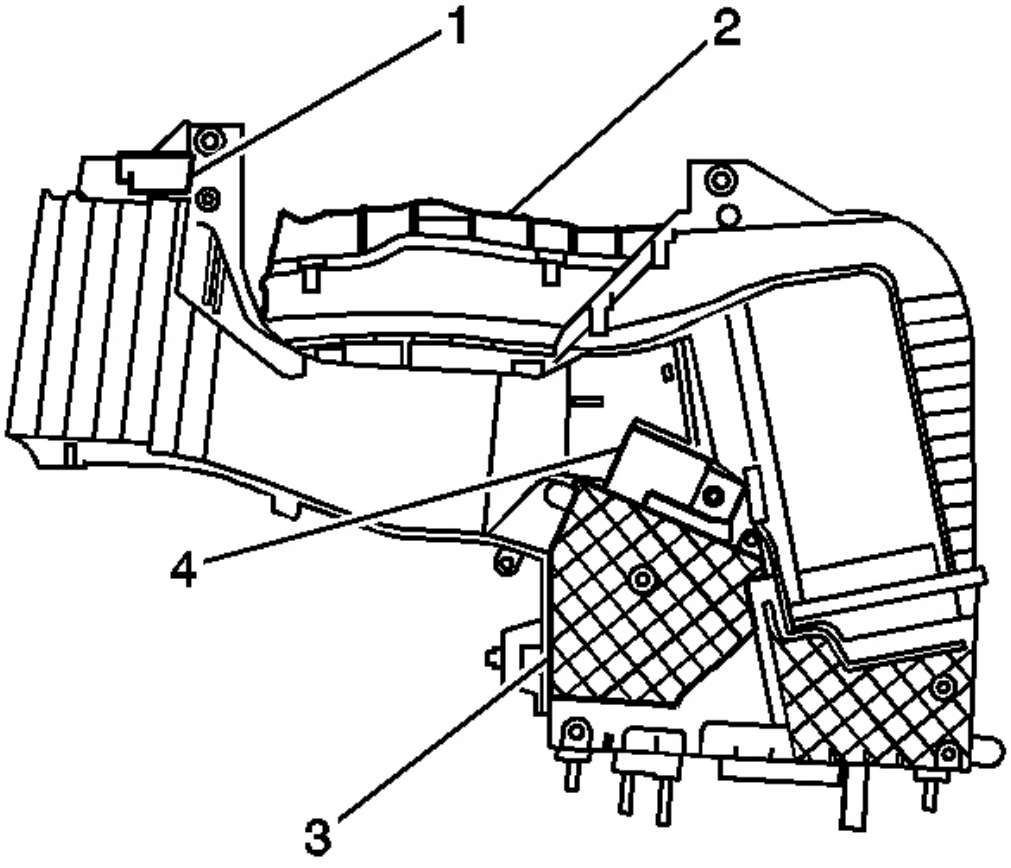


Fig. 139: Removing/Installing Auxiliary Heater Core Cover
Courtesy of GENERAL MOTORS CORP.

2. Remove the screws from heater core cover-auxiliary (3) from the HVAC module-auxiliary.
3. Remove the heater core cover-auxiliary (3).

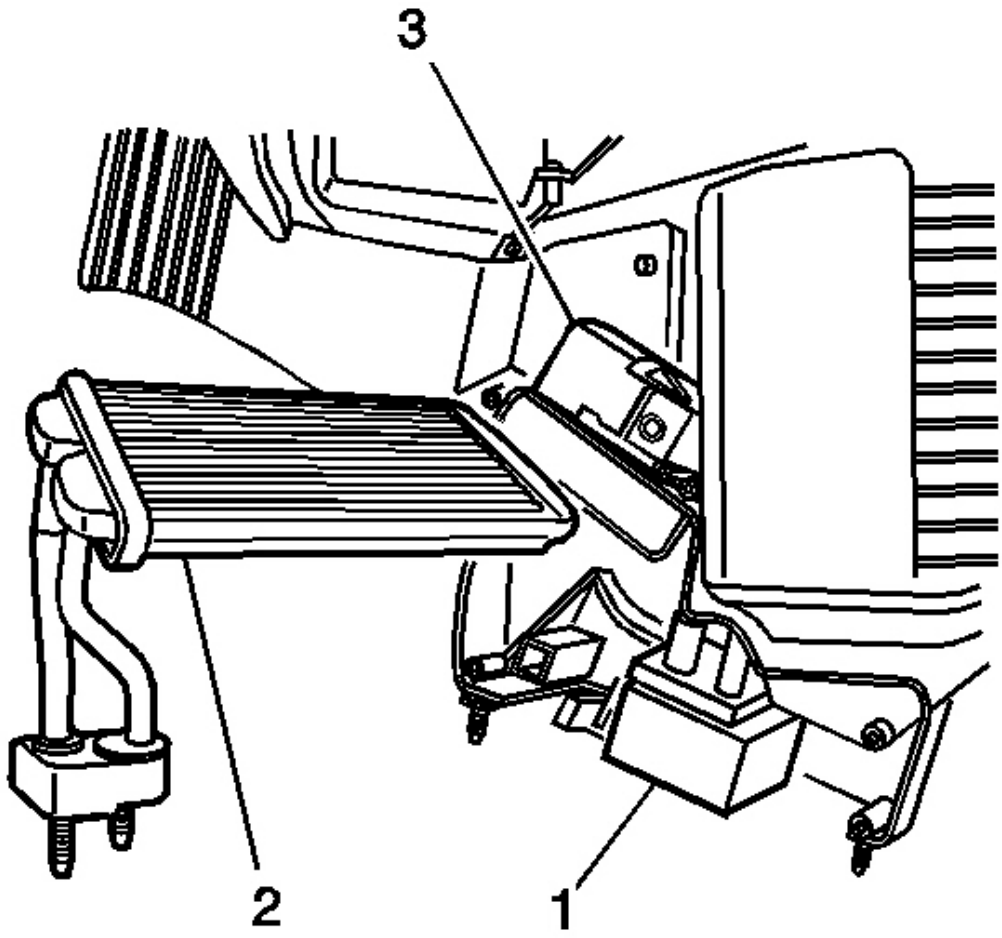


Fig. 140: Removing/Installing Auxiliary Heater Core
Courtesy of GENERAL MOTORS CORP.

4. Remove the HVAC module pass thru seal-auxiliary.
5. Remove the heater core-auxiliary (2) from the HVAC module-auxiliary.

Installation Procedure

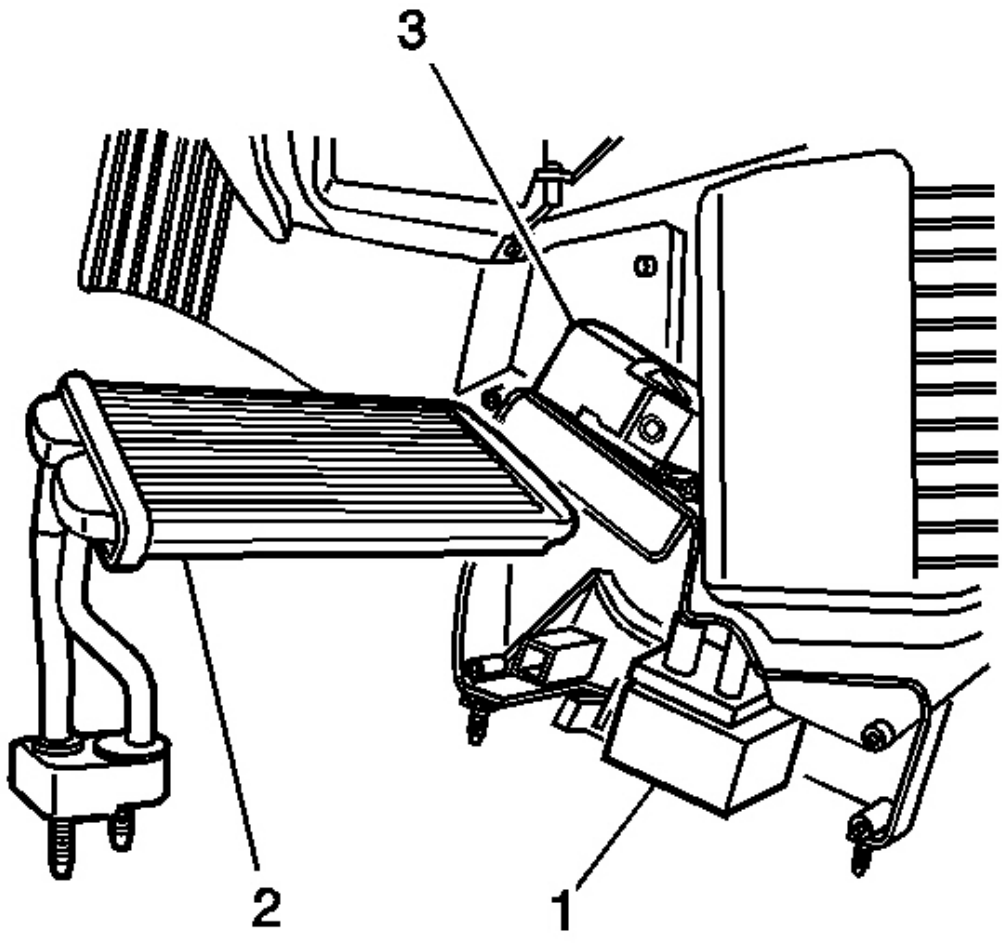


Fig. 141: Removing/Installing Auxiliary Heater Core
Courtesy of GENERAL MOTORS CORP.

1. Install the heater core-auxiliary (2) to the HVAC module-auxiliary.
2. Install the HVAC module pass thru seal-auxiliary.

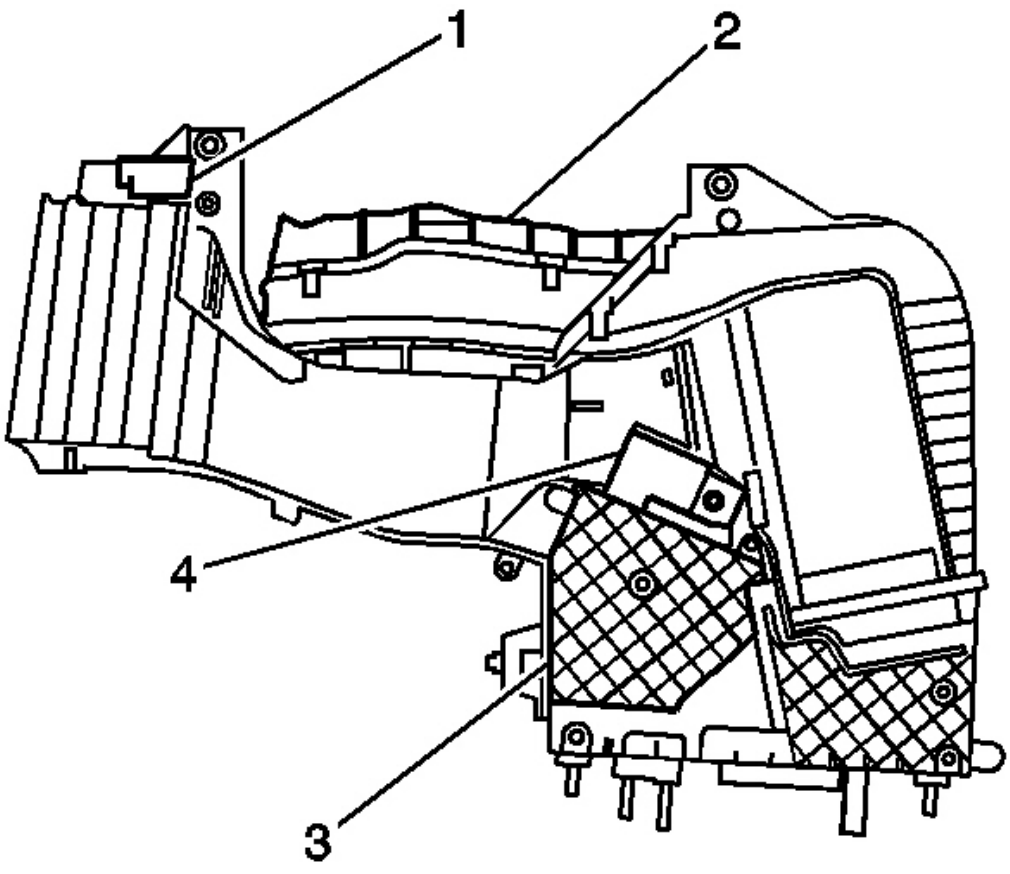


Fig. 142: Removing/Installing Auxiliary Heater Core Cover
Courtesy of GENERAL MOTORS CORP.

3. Install the heater core access cover-auxiliary (3) to the HVAC module-auxiliary.

NOTE: Refer to Fastener Notice in Cautions and Notices.

4. Install the screws to the heater core access cover-auxiliary (3).

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

5. Install the HVAC module-auxiliary. Refer to **HVAC Module Replacement - Auxiliary**.

HEATER CORE COVER REPLACEMENT - AUXILIARY

Removal Procedure

1. Remove the right rear quarter trim panel. Refer to **Trim Panel Replacement - Rear Quarter - Right (Short Wheelbase)** or **Trim Panel Replacement - Rear Quarter - Right (Long Wheelbase)** in Interior Trim.

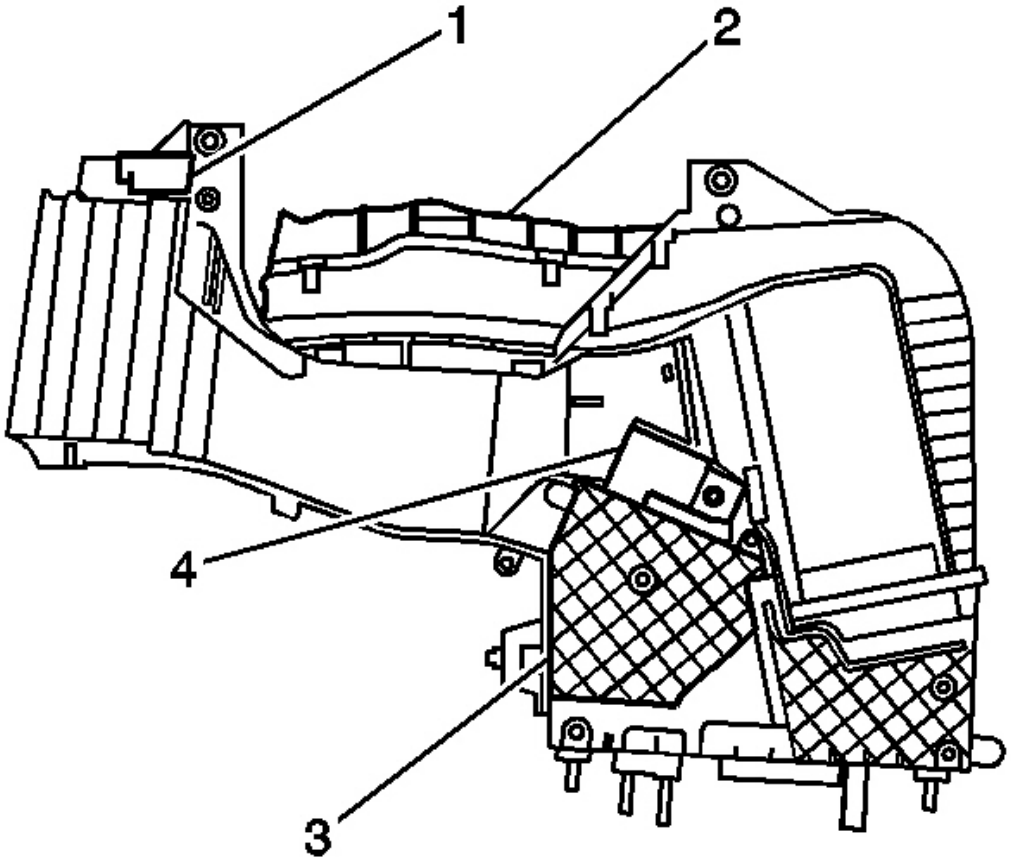


Fig. 143: Removing/Installing Auxiliary Heater Core Cover
Courtesy of GENERAL MOTORS CORP.

2. Remove the screws from the heater core cover-auxiliary (3).
3. Remove the heater core cover-auxiliary (3).

Installation Procedure

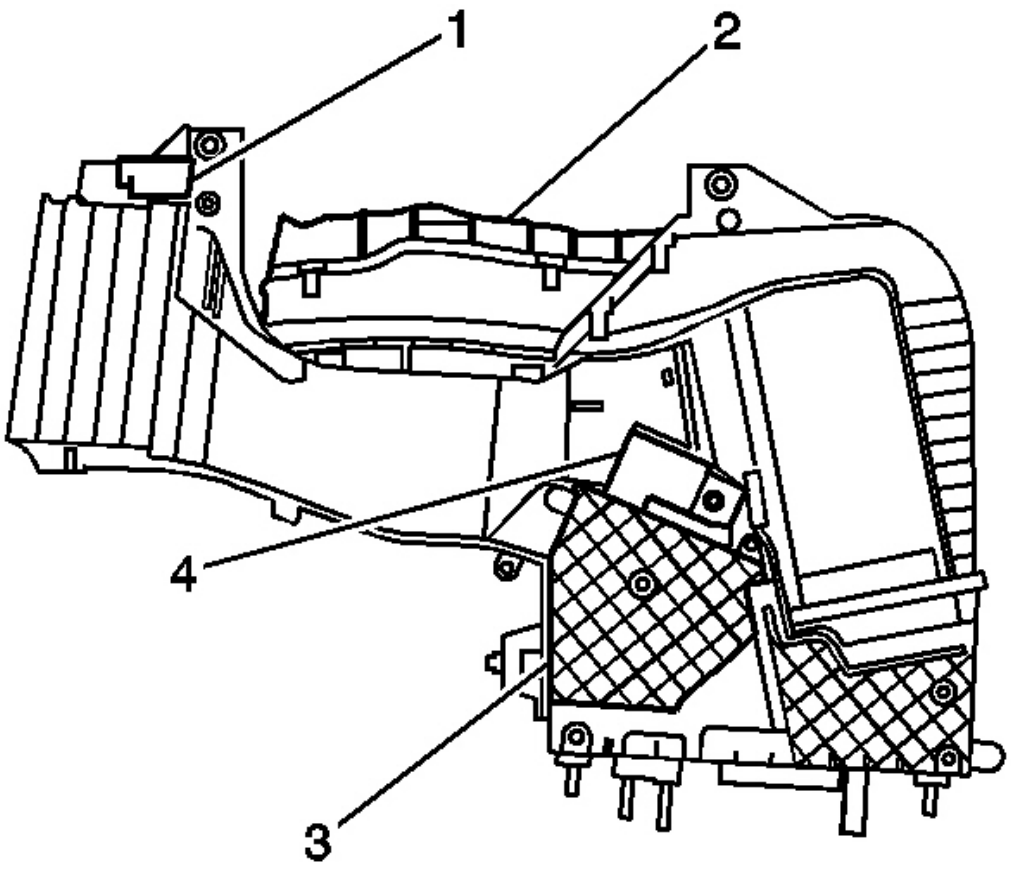


Fig. 144: Removing/Installing Auxiliary Heater Core Cover
Courtesy of GENERAL MOTORS CORP.

1. Install the heater core cover-auxiliary (3).

NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the screws to the heater core cover-auxiliary.

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

3. Install the right rear quarter trim panel. Refer to **Trim Panel Replacement - Rear Quarter - Right (Short Wheelbase)** or **Trim Panel Replacement - Rear Quarter - Right (Long Wheelbase)** in Interior Trim.

THERMAL EXPANSION VALVE REPLACEMENT - AUXILIARY

Removal Procedure

1. Remove the evaporator core-auxiliary. Refer to **Evaporator Core Replacement - Auxiliary**.

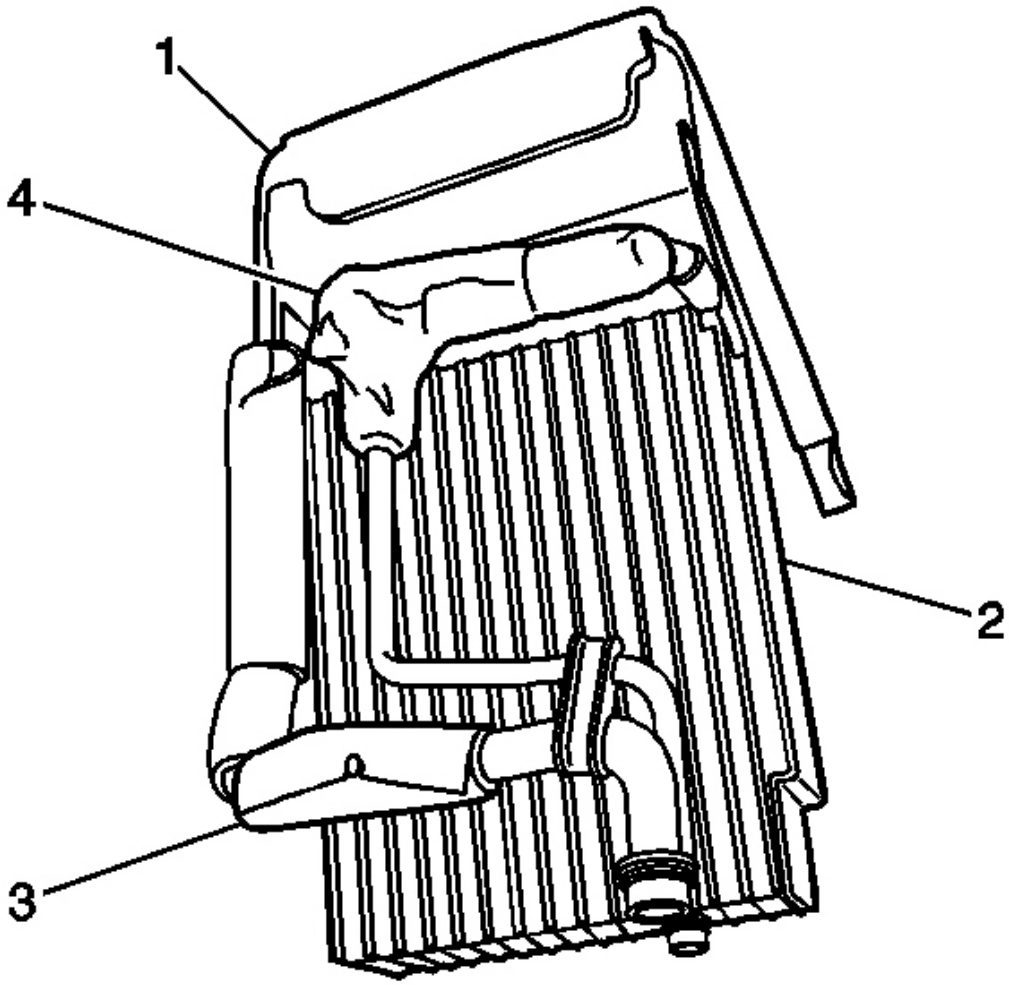


Fig. 145: Removing/Installing Auxiliary Thermal Expansion Valve
Courtesy of GENERAL MOTORS CORP.

2. Remove the foam insulators (3) from the evaporator core-auxiliary lines.
3. Remove the foam insulators from the thermal expansion valve-auxiliary (4).
4. Using a back up wrench loosen the flare nuts from the thermal expansion valve-auxiliary.
5. Remove the auxiliary thermal expansion valve sensing bulb and retaining clip from the evaporator core-auxiliary lines.

6. Remove the thermal expansion valve-auxiliary from the evaporator core-auxiliary.

IMPORTANT: Cap or tape the open A/C refrigerant lines immediately.

7. Remove and discard the O-ring seals from the evaporator core-auxiliary. Cap or tape the lines to prevent contamination of the evaporator core-auxiliary.

Installation Procedure

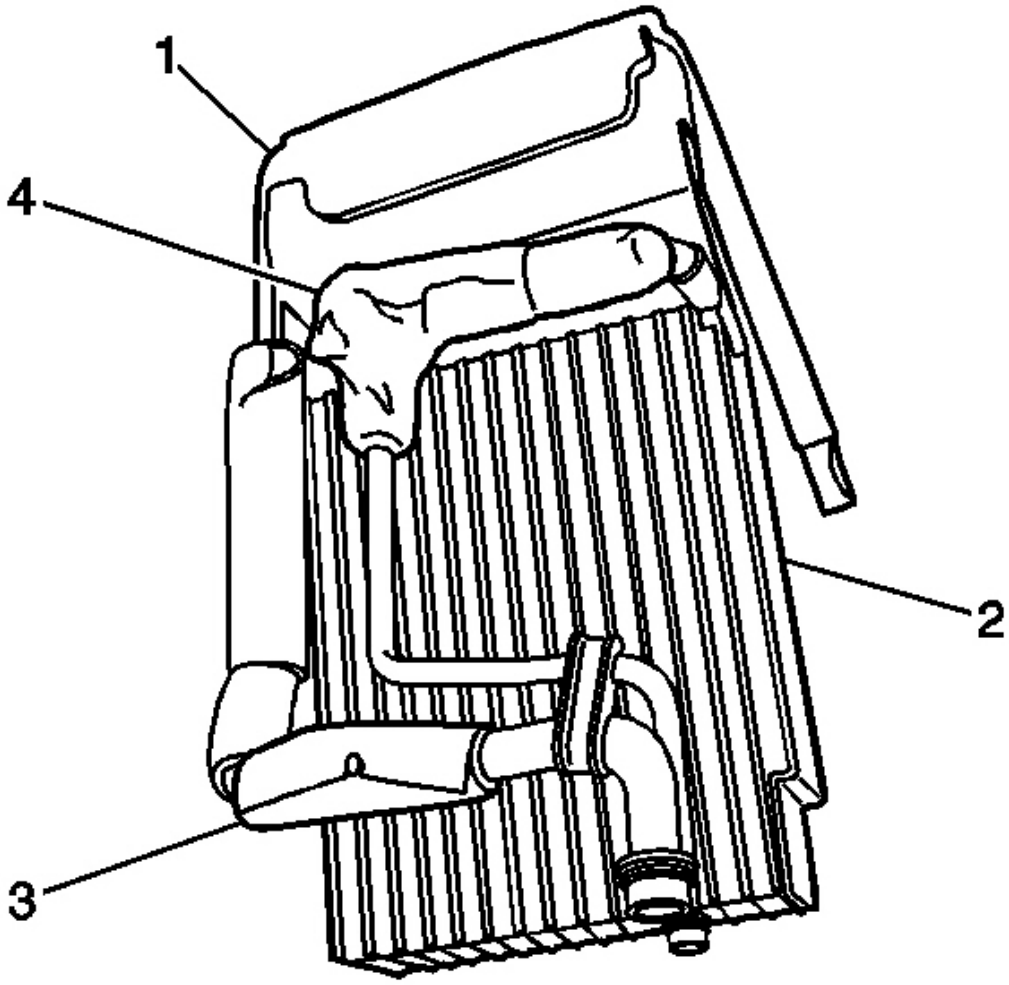


Fig. 146: Removing/Installing Auxiliary Thermal Expansion Valve
Courtesy of GENERAL MOTORS CORP.

1. Remove the cap or tape from the evaporator core-auxiliary lines.
2. Install the new O-ring. Refer to **O-Ring Replacement**.
3. Install the thermal expansion valve-auxiliary onto the evaporator core-auxiliary lines.

NOTE: Refer to Fastener Notice in Cautions and Notices.

4. Using a back up wrench, install the flare nuts from the evaporator core-auxiliary lines to the thermal expansion valve-auxiliary.

   Tighten: Tighten the nuts to 5 N.m (44 in. lb.).

5. Install the foam insulators to the evaporator core-auxiliary lines (3).
6. Install the foam insulators to the thermal expansion valve-auxiliary (4).
7. Install the evaporator core-auxiliary. Refer to **Evaporator Core Replacement - Auxiliary**.

HVAC MODULE REPLACEMENT - AUXILIARY

Tools Required

J 39400-A Halogen Leak Detector

Removal Procedure

1. Recover the refrigerant. Refer to **Refrigerant Recovery and Recharging**.
2. Drain the cooling system. Refer to **Draining and Filling Cooling System (Body VIN Code 6)** in Engine Cooling.
3. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.

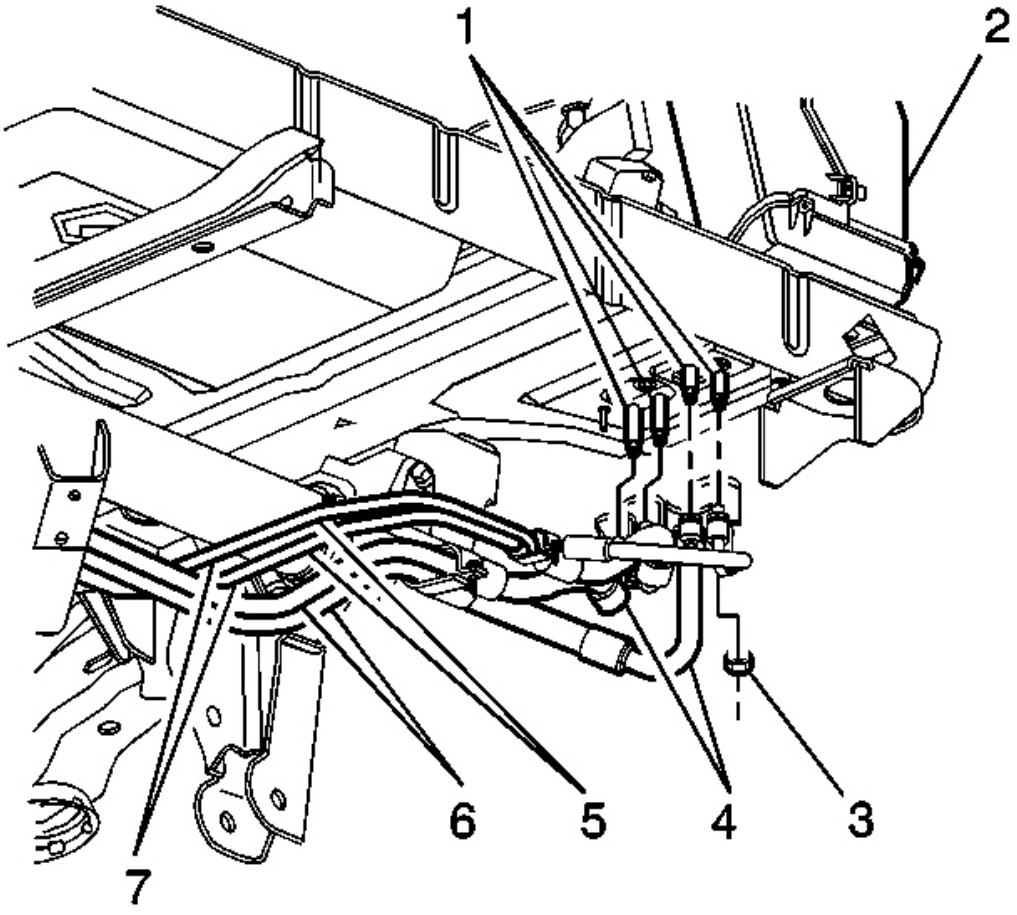


Fig. 147: Identifying Auxiliary HVAC Assembly Tubes, Hoses & Fasteners
Courtesy of GENERAL MOTORS CORP.

4. Remove the nuts (3) from rear A/C line block fittings.

IMPORTANT: Cap or tape the open A/C refrigerant lines immediately.

5. Remove the A/C line block fittings and discard the O-ring seals.

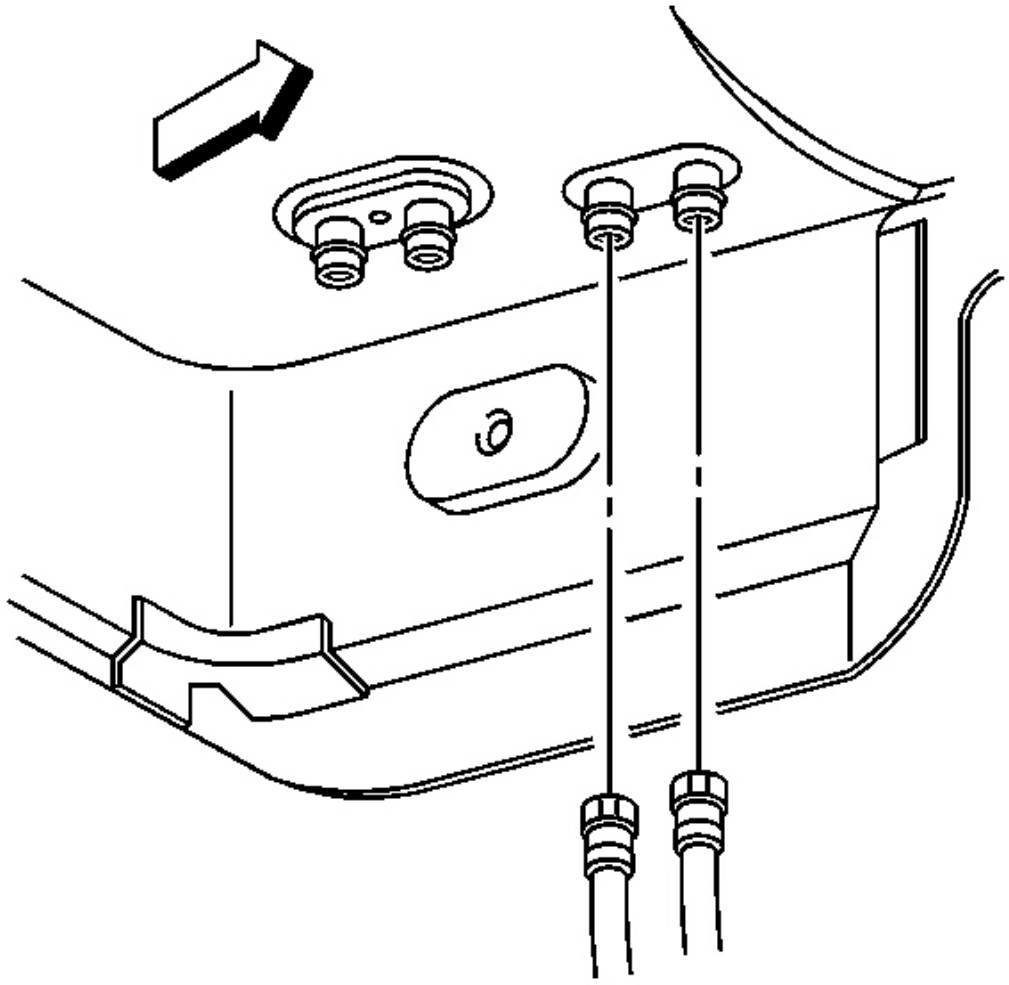


Fig. 148: Disconnecting/Reconnecting Heater Hoses Block Fittings
Courtesy of GENERAL MOTORS CORP.

6. Remove the nuts from the heater hoses block fittings.
7. Remove the heater hoses block fittings from the HVAC module-auxiliary.
8. Remove the nuts from the HVAC module studs.
9. Lower the vehicle.
10. Remove the right side rear quarter trim. Refer to **Trim Panel Replacement - Rear Quarter - Right (Short Wheelbase)** or **Trim Panel Replacement - Rear Quarter - Right (Long Wheelbase)** in Interior Trim.

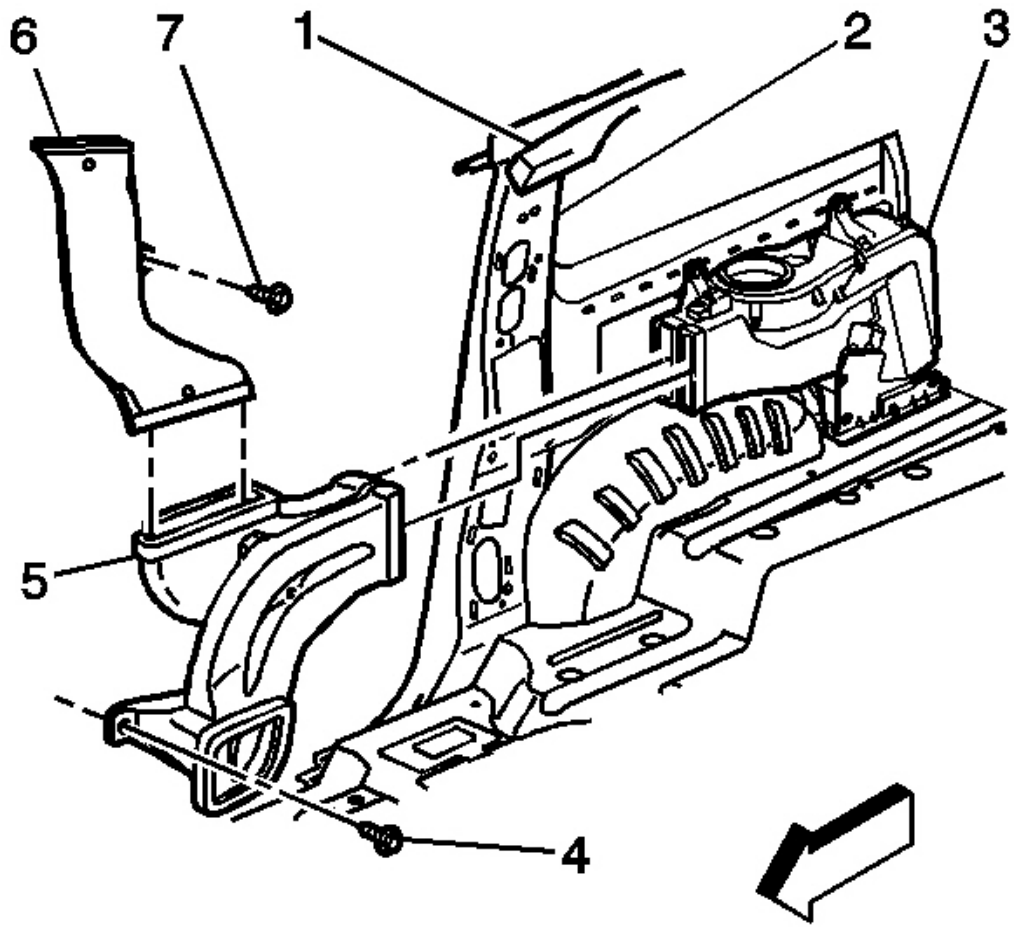


Fig. 149: Removing/Installing Rear Ducting
Courtesy of GENERAL MOTORS CORP.

11. Disconnect the electrical connectors from the HVAC module.
12. Disconnect the rear compartment air outlet ducts (5) from the HVAC module (3).

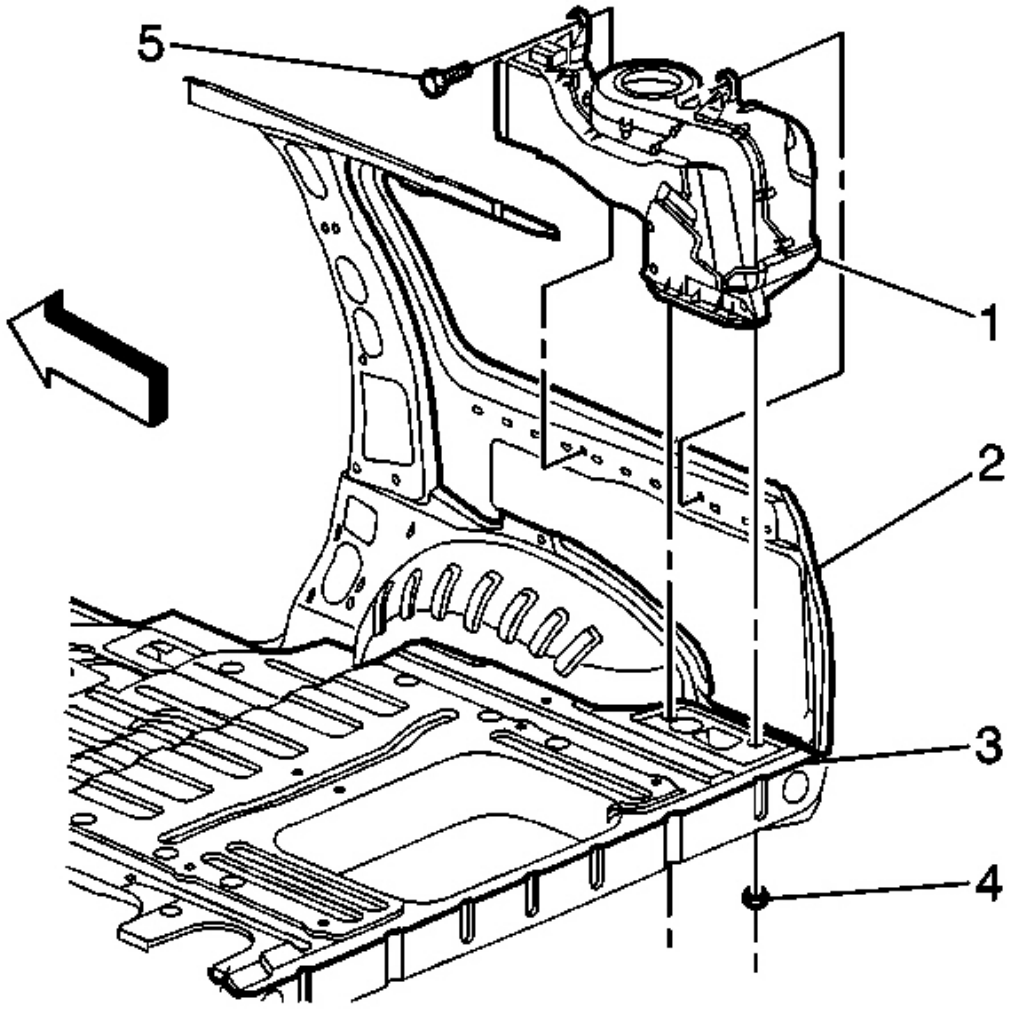


Fig. 150: Removing/Installing Auxiliary HVAC Module
Courtesy of GENERAL MOTORS CORP.

13. Remove the mounting bolts (5) from the HVAC module.
14. Remove the HVAC module (1).
15. Remove and discard the HVAC module pass through seal.

Installation Procedure

1. Install new HVAC module pass through seal. Refer to **HVAC Module Pass Thru Seal Replacement - Auxiliary**.

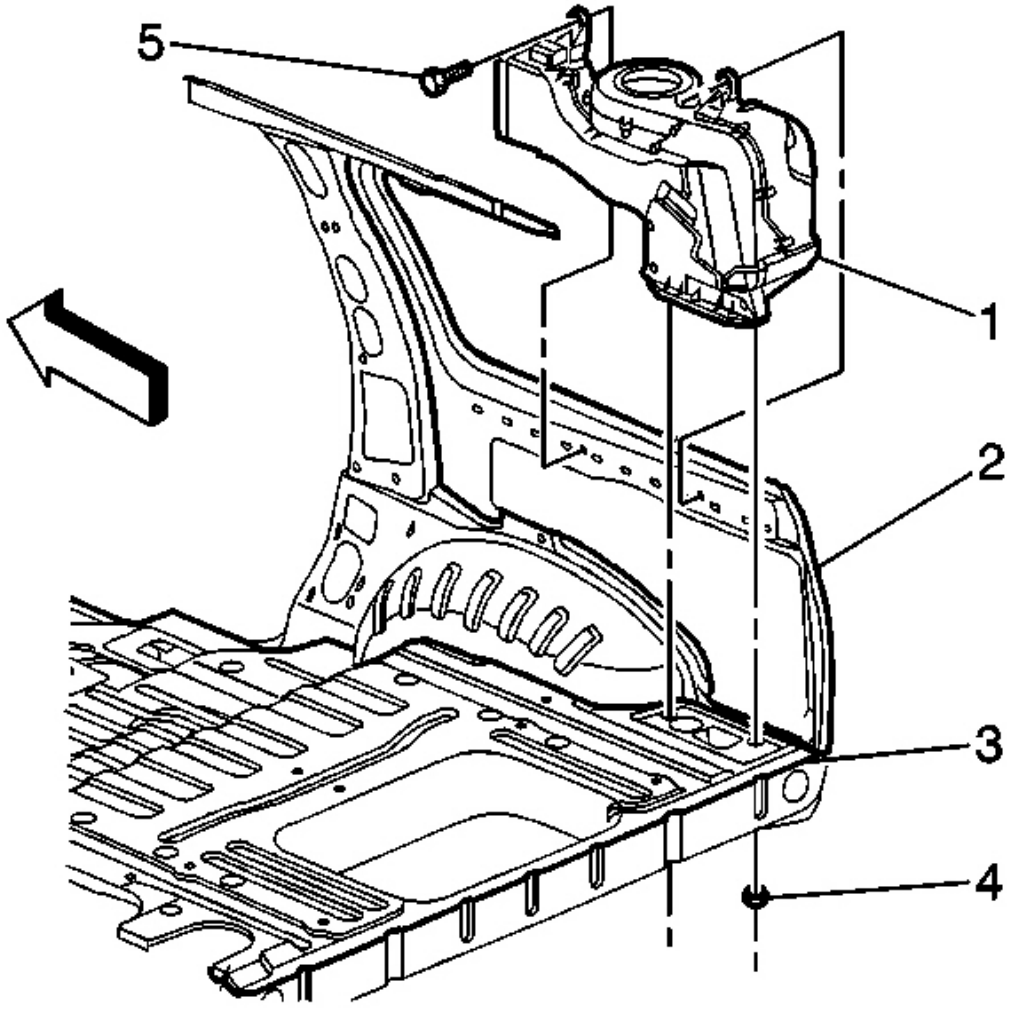


Fig. 151: Removing/Installing Auxiliary HVAC Module
Courtesy of GENERAL MOTORS CORP.

2. Install the HVAC module (1).

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Install the HVAC module mounting bolts (5).

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

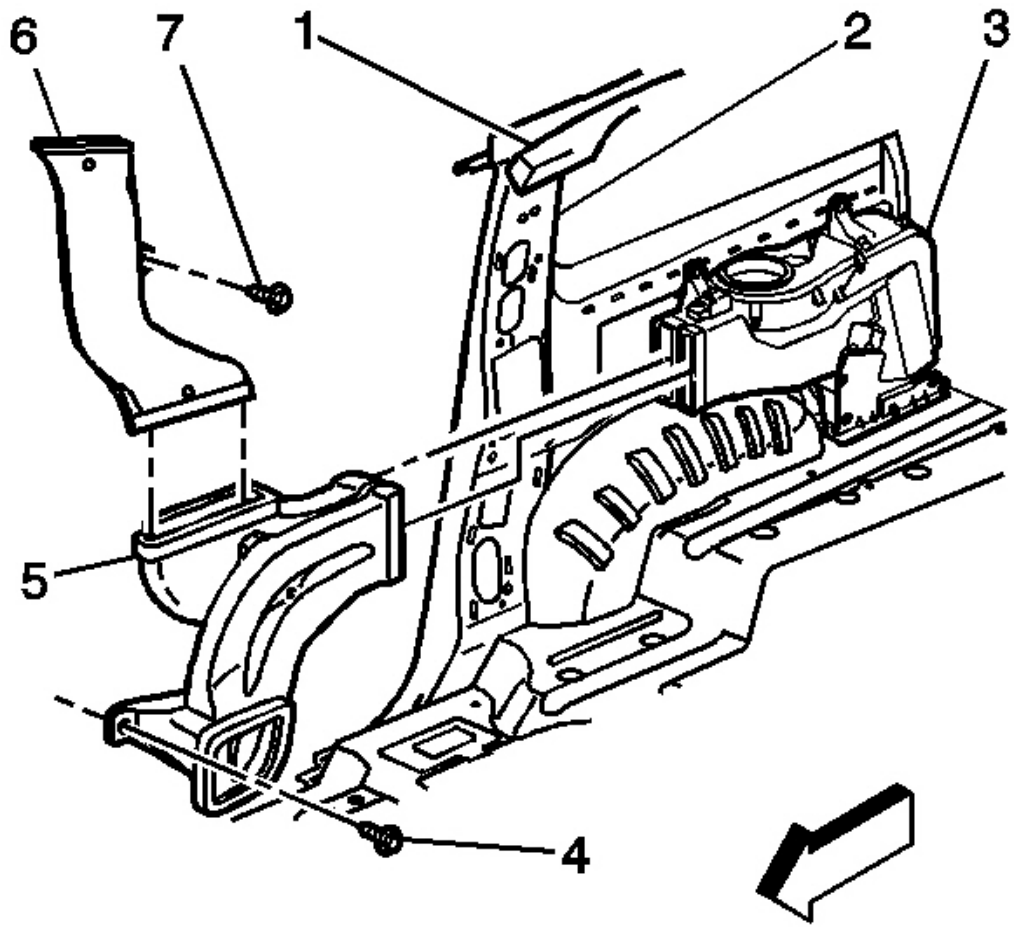


Fig. 152: Removing/Installing Rear Ducting
Courtesy of GENERAL MOTORS CORP.

4. Install the air outlet ducts (5).
5. Connect the electrical connectors.
6. Install the right side rear quarter trim panel. Refer to **Trim Panel Replacement - Rear Quarter - Right (Short Wheelbase)** or **Trim Panel Replacement - Rear Quarter - Right (Long Wheelbase)** in Interior Trim.
7. Raise and support the vehicle.

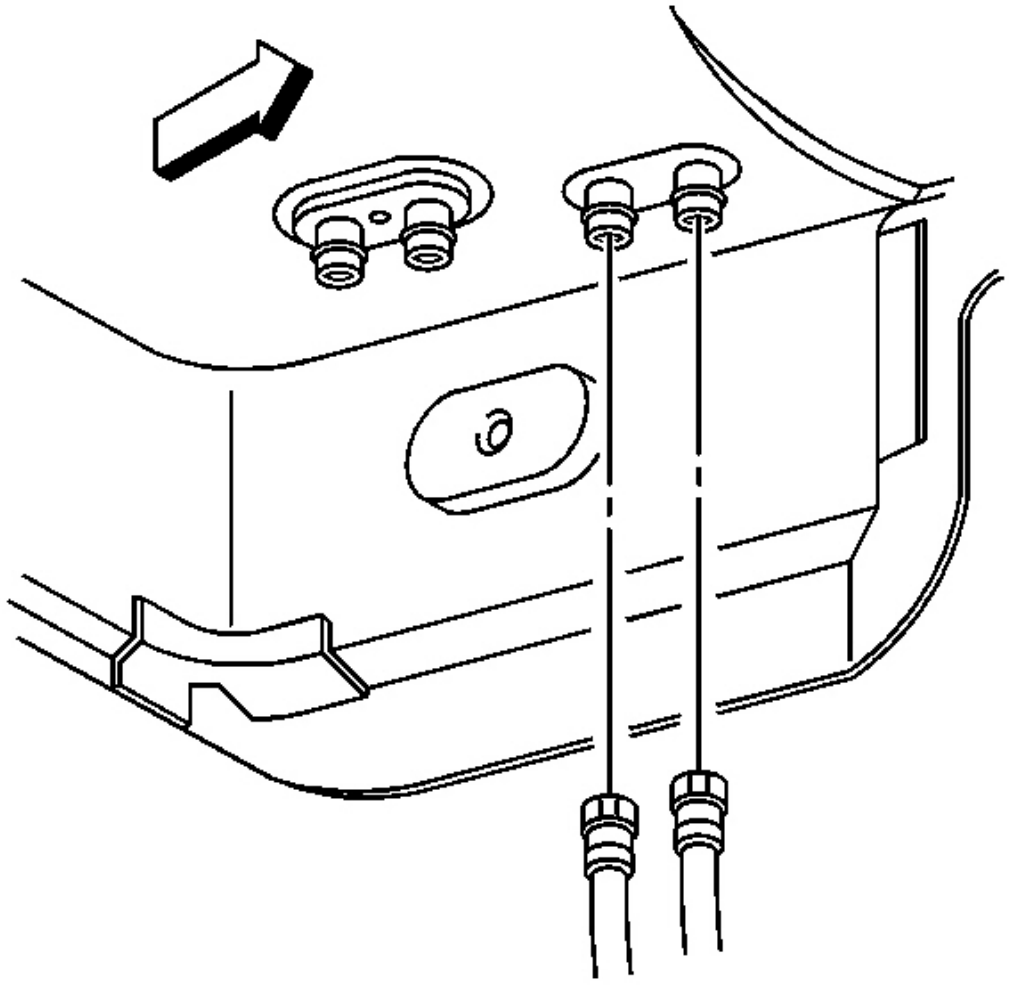


Fig. 153: Disconnecting/Reconnecting Heater Hoses Block Fittings
Courtesy of GENERAL MOTORS CORP.

8. Connect the heater hoses to the heater core.
9. Install the nuts to the HVAC module studs.

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

10. Remove the cap or tape from the A/C lines.
11. Install the new O-ring seals. Refer to **O-Ring Replacement**.

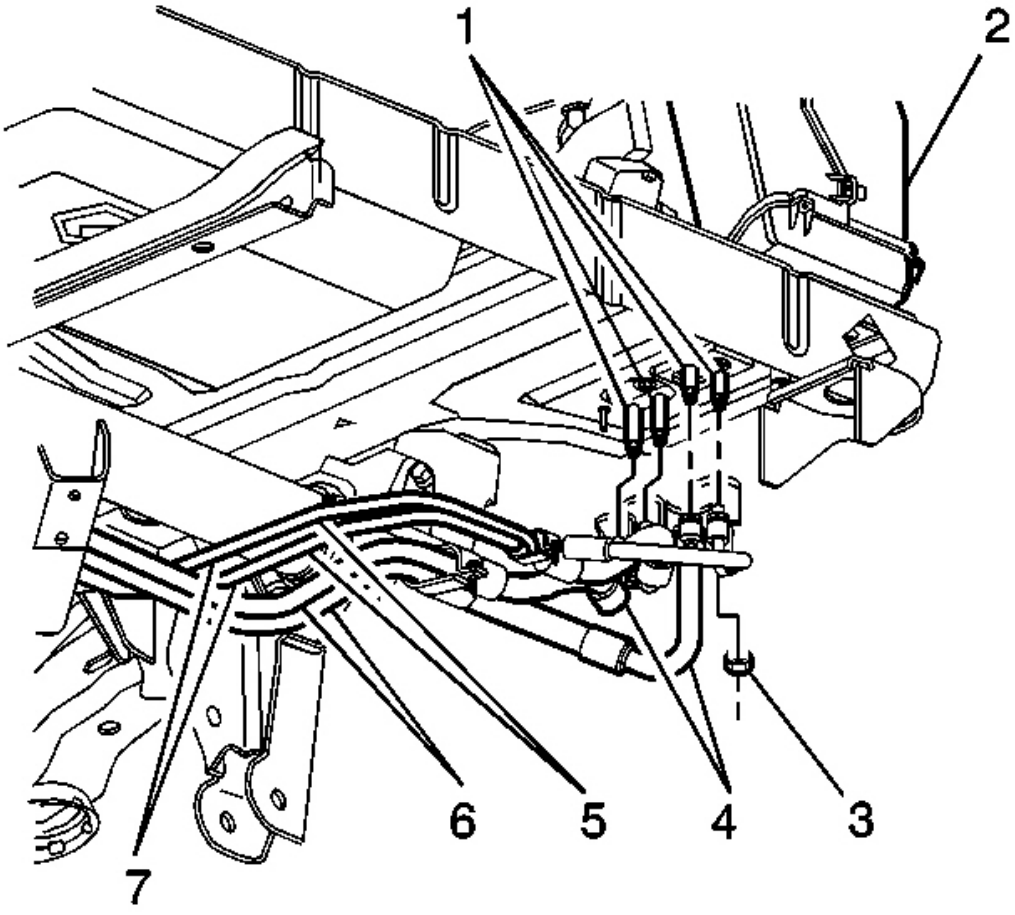


Fig. 154: Identifying Auxiliary HVAC Assembly Tubes, Hoses & Fasteners
Courtesy of GENERAL MOTORS CORP.

12. Install the nuts (3) to the evaporator core studs.

    Tighten: Tighten the nuts to 20 N.m (15 ft. lb.).

13. Lower the vehicle.
14. Fill the cooling system. Refer to **Draining and Filling Cooling System (Body VIN Code 6)** in Engine Cooling.
15. Evacuate and charge the system. Refer to **Refrigerant Recovery and Recharging**.
16. Leak test the fittings of the components using the J 39400-A .

HVAC MODULE CASE REPLACEMENT - AUXILIARY

Removal Procedure

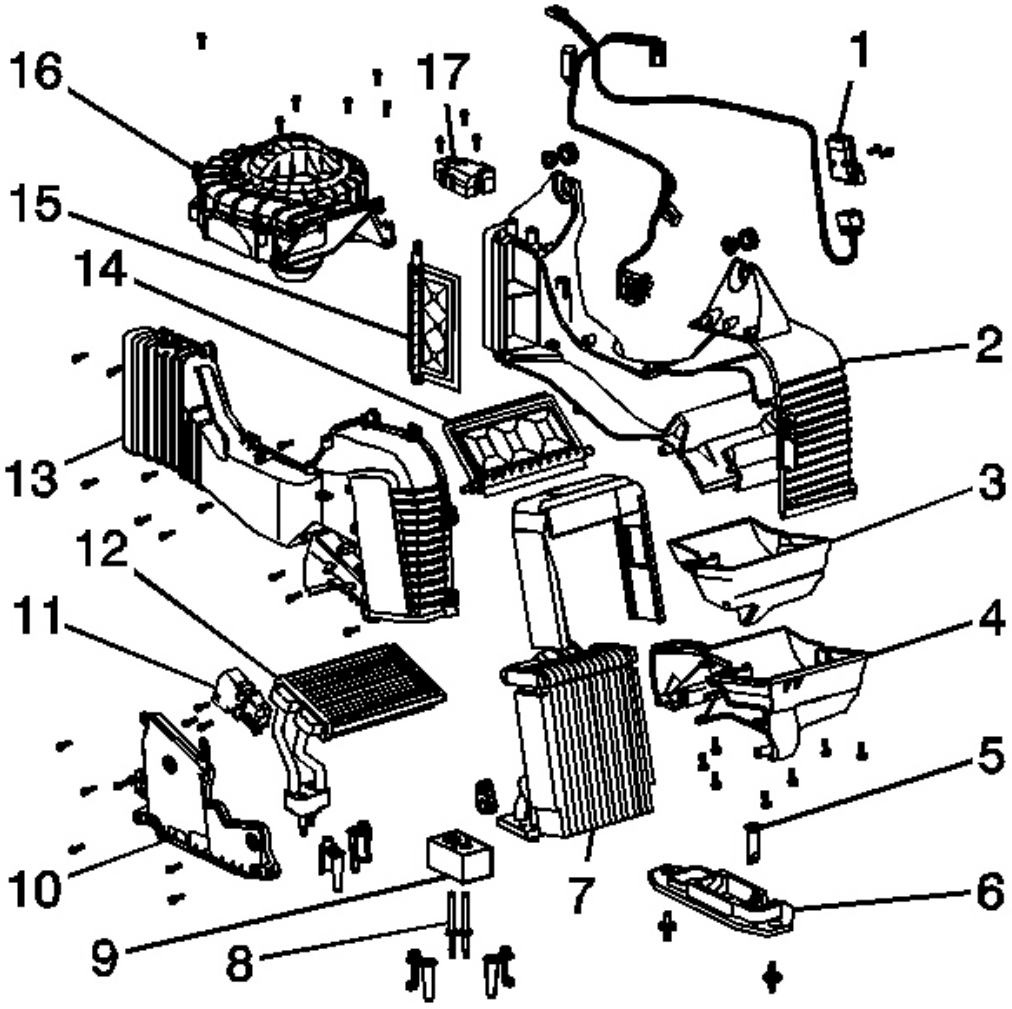


Fig. 155: Identifying Auxiliary HVAC System Components
Courtesy of GENERAL MOTORS CORP.

1. Remove the HVAC module-auxiliary. Refer to **HVAC Module Replacement - Auxiliary**.
2. Remove the screws from the blower motor-auxiliary.
3. Remove the blower motor-auxiliary.
4. Disconnect the electrical connectors.
5. Remove the evaporator core-auxiliary. Refer to **Evaporator Core Replacement - Auxiliary**.
6. Remove the screws from the air temperature actuator-auxiliary.

7. Remove the air temperature actuator-auxiliary.
8. Disconnect the electrical connector.
9. Remove the screws from the mode actuator-auxiliary.
10. Remove the mode actuator-auxiliary.
11. Disconnect the electrical connector.
12. Remove all of the screws from the HVAC module-auxiliary.
13. Separate the HVAC module-auxiliary case halves (2,13).
14. Remove the mode door (15) from the HVAC module-auxiliary case half (2).
15. Remove the air temperature door (14) from the HVAC module-auxiliary case half (2).

Installation Procedure

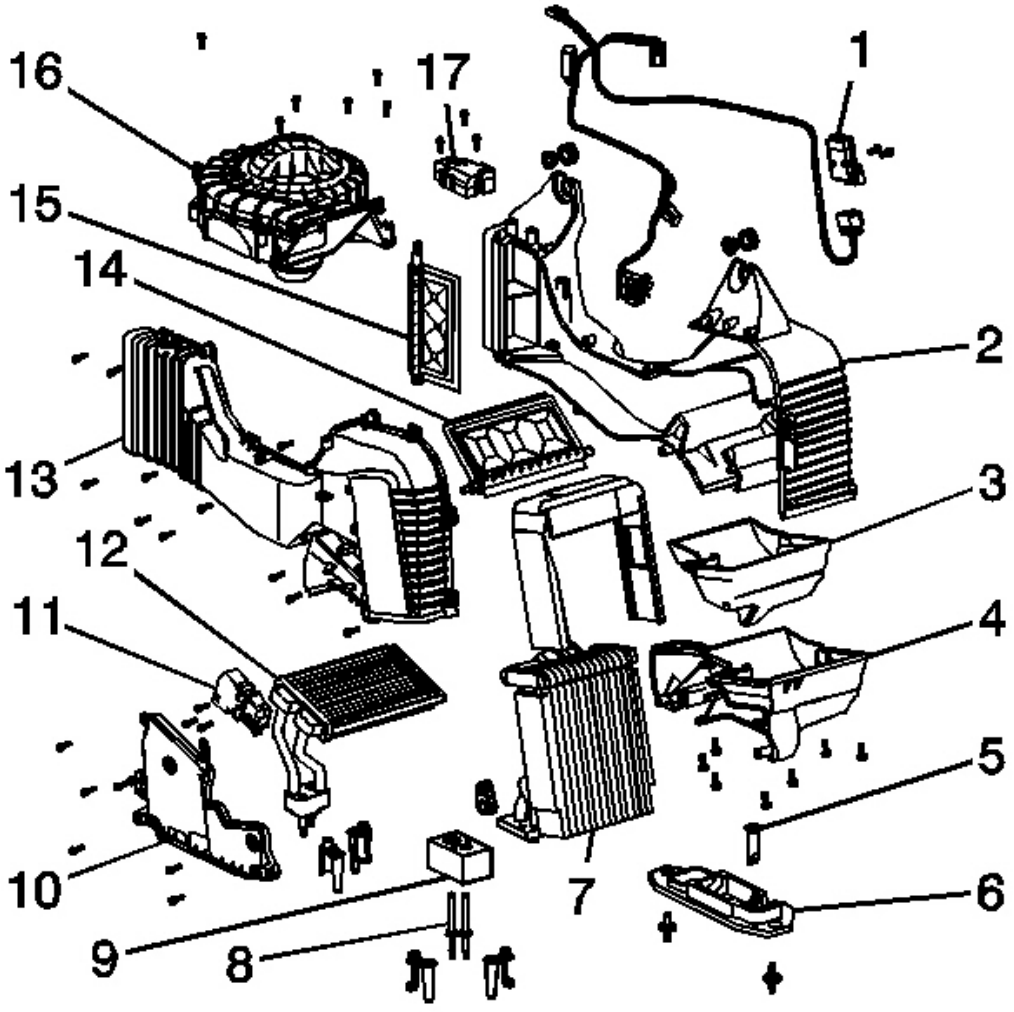


Fig. 156: Identifying Auxiliary HVAC System Components
Courtesy of GENERAL MOTORS CORP.

1. Transfer the air temperature door (14) to the HVAC module-auxiliary case half (2).
2. Transfer the mode door (15) to the HVAC module-auxiliary case half (2).
3. Assemble the HVAC module-auxiliary case halves (2,13).

NOTE: Refer to Fastener Notice in Cautions and Notices.

4. Install all of the screws to the HVAC module-auxiliary.

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

5. Install the mode actuator-auxiliary.
6. Install the mode actuator-auxiliary screws.

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

7. Install the air temperature actuator-auxiliary.
8. Install the air temperature actuator-auxiliary screws.

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

9. Install the evaporator core-auxiliary. Refer to **Evaporator Core Replacement - Auxiliary**.
10. Install the blower motor-auxiliary.
11. Install the blower motor-auxiliary screws.

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

12. Install the HVAC module-auxiliary. Refer to **HVAC Module Replacement - Auxiliary**.

HVAC MODULE CASE SUMP REPLACEMENT - AUXILIARY

Removal Procedure

1. Remove the evaporator core-auxiliary. Refer to **Evaporator Core Replacement - Auxiliary**.

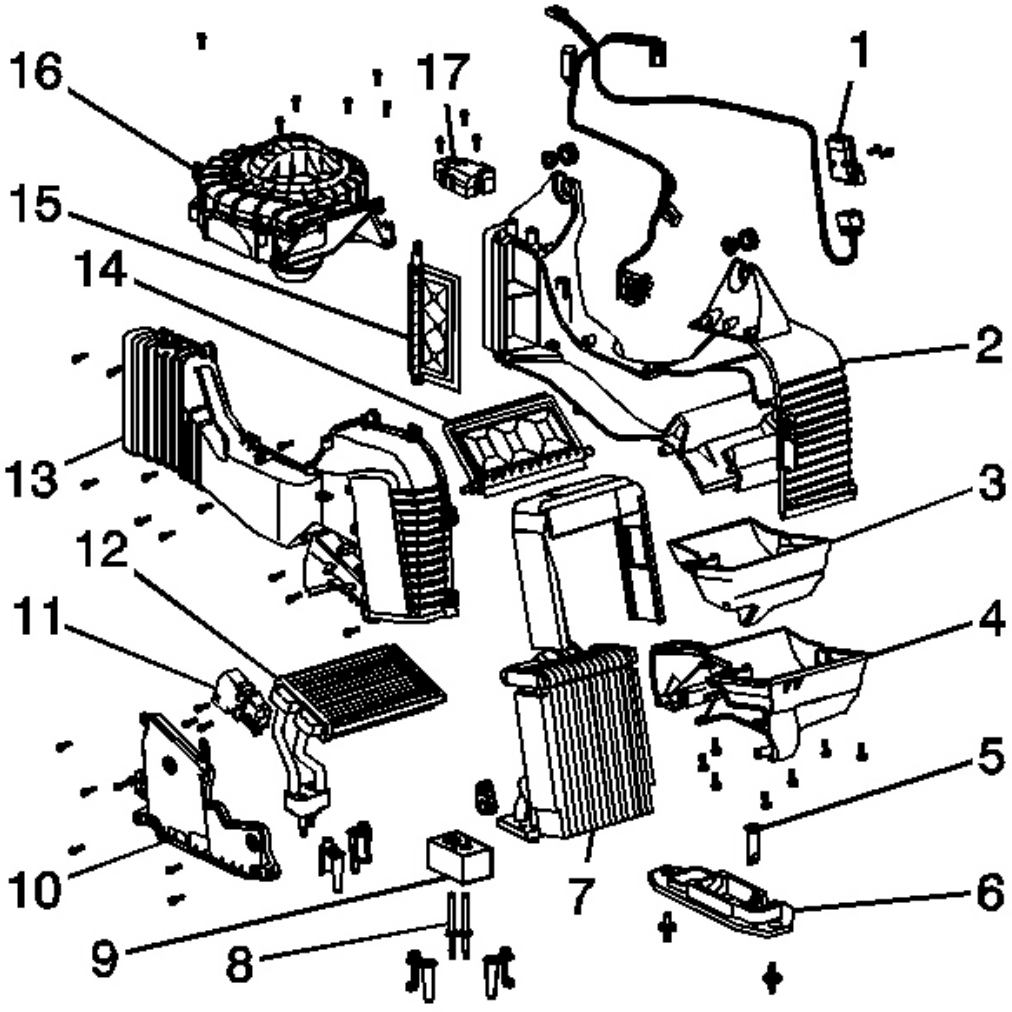


Fig. 157: Identifying Auxiliary HVAC System Components
Courtesy of GENERAL MOTORS CORP.

2. Remove the HVAC module-auxiliary case sump (4) from the HVAC module.

Installation Procedure

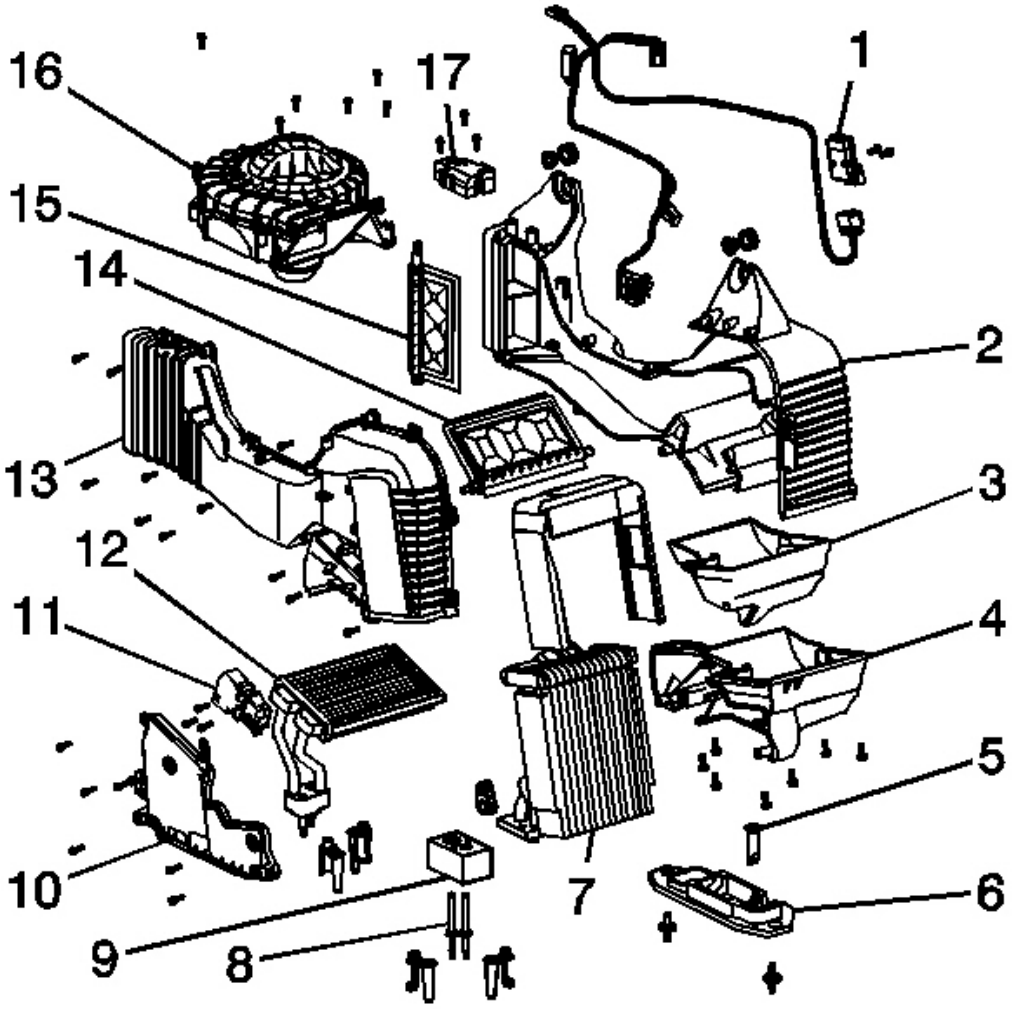


Fig. 158: Identifying Auxiliary HVAC System Components
Courtesy of GENERAL MOTORS CORP.

1. Install the HVAC module-auxiliary case sump (4) to the HVAC module.
2. Install the evaporator core-auxiliary. Refer to **Evaporator Core Replacement - Auxiliary**.

HVAC MODULE PASS THRU SEAL REPLACEMENT - AUXILIARY

Tools Required

J 39400-A Halogen Leak Detector

Removal Procedure

1. Remove the HVAC Module-Auxiliary. Refer to **HVAC Module Replacement - Auxiliary**.
2. Remove the screws from the heater core cover-auxiliary.
3. Remove the heater core cover-auxiliary.

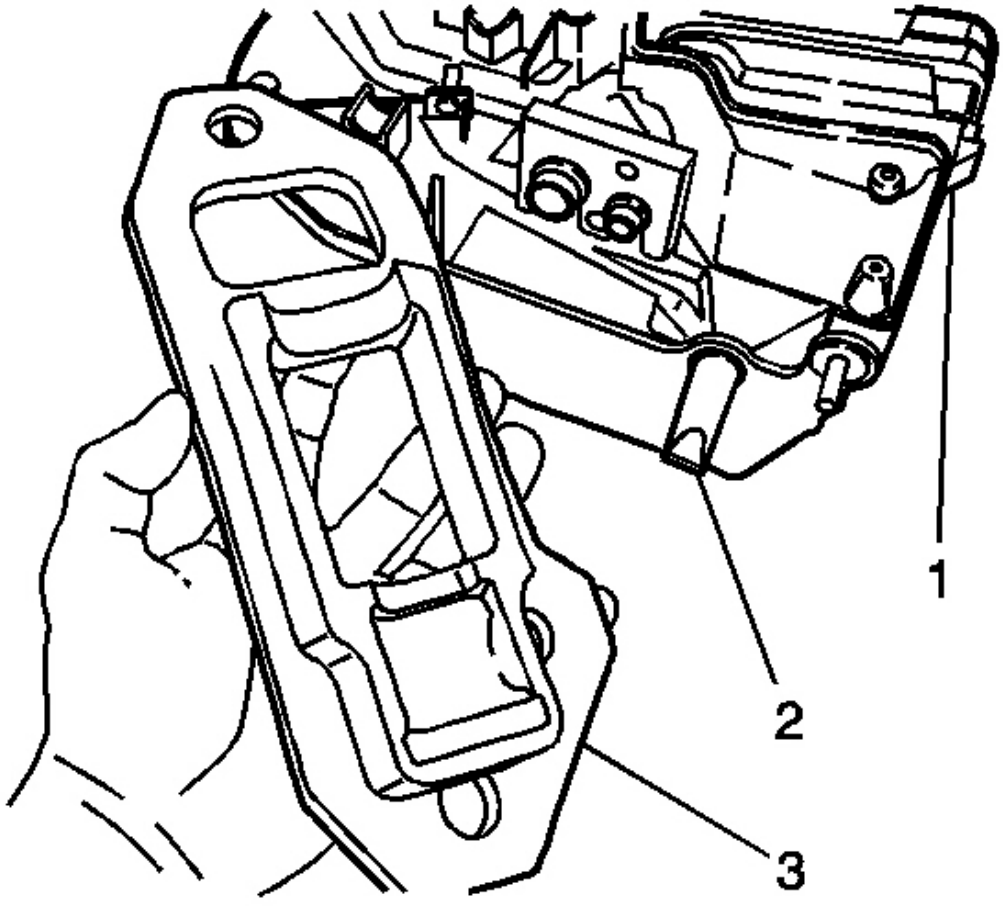


Fig. 159: Removing/Installing HVAC Pass-Thru Seal & Drain Hose - Auxiliary
Courtesy of GENERAL MOTORS CORP.

4. Remove the HVAC pass thru seal (3) from the HVAC module-auxiliary (1).

Installation Procedure

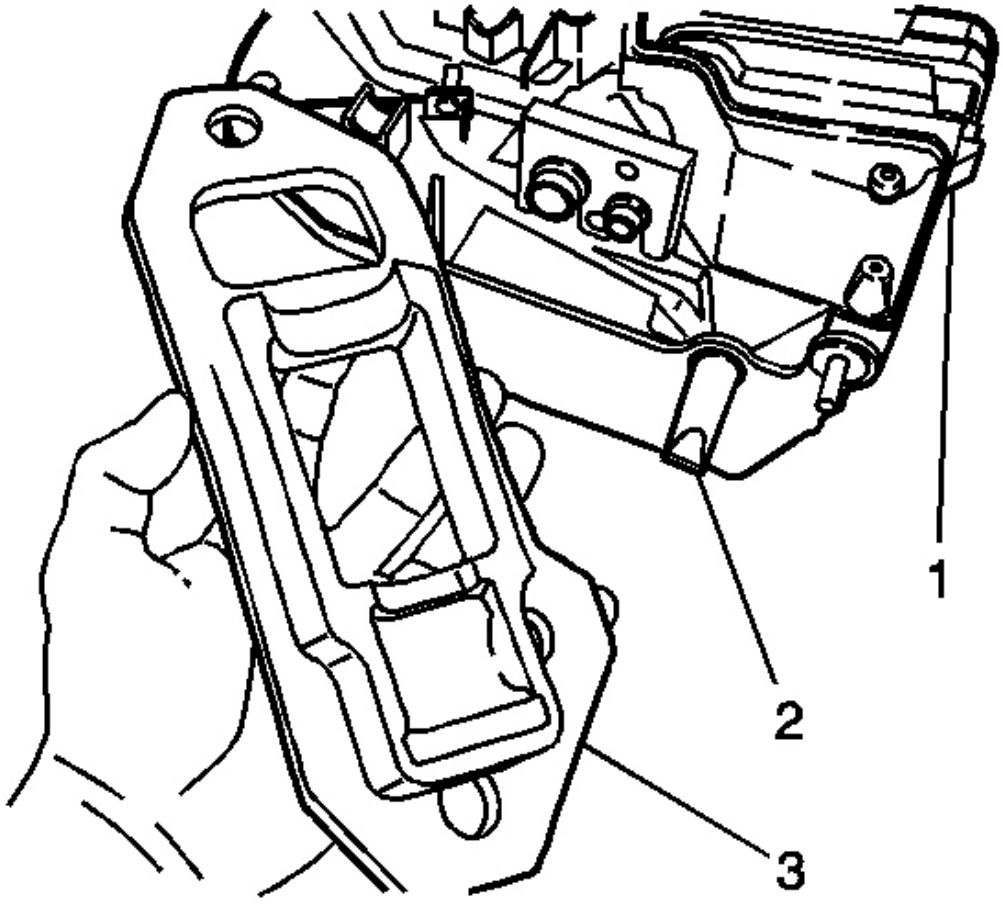


Fig. 160: Removing/Installing HVAC Pass-Thru Seal & Drain Hose - Auxiliary
Courtesy of GENERAL MOTORS CORP.

1. Install the HVAC pass thru seal (3) to the HVAC module-auxiliary (1).
2. Install the heater core cover-auxiliary.

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Install the screws to the heater core cover-auxiliary.

   Tighten: Tighten the screws to 1.9 N.m (18 in. lb.).

4. Install the HVAC Module-Auxiliary. Refer to **HVAC Module Replacement - Auxiliary**.

EVAPORATOR CORE REPLACEMENT - AUXILIARY

Tools Required

J 39400-A Halogen Leak Detector

Removal Procedure

1. Remove the HVAC module assembly. Refer to **HVAC Module Assembly Replacement**.
2. Remove the heater core-auxiliary. Refer to **Heater Core Replacement - Auxiliary**.
3. Remove the inverted TORX studs from the evaporator block-auxiliary.

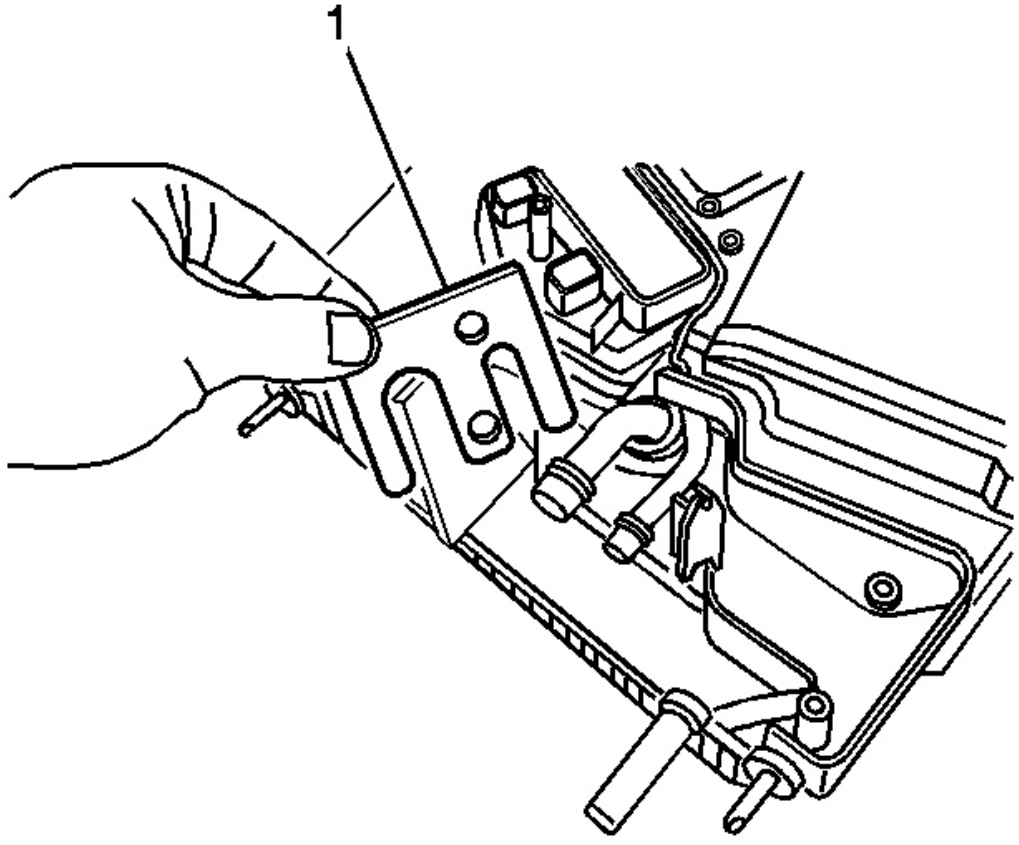


Fig. 161: Removing/Installing Backing Plate
Courtesy of GENERAL MOTORS CORP.

4. Remove the backing plate (1) from the evaporator core.

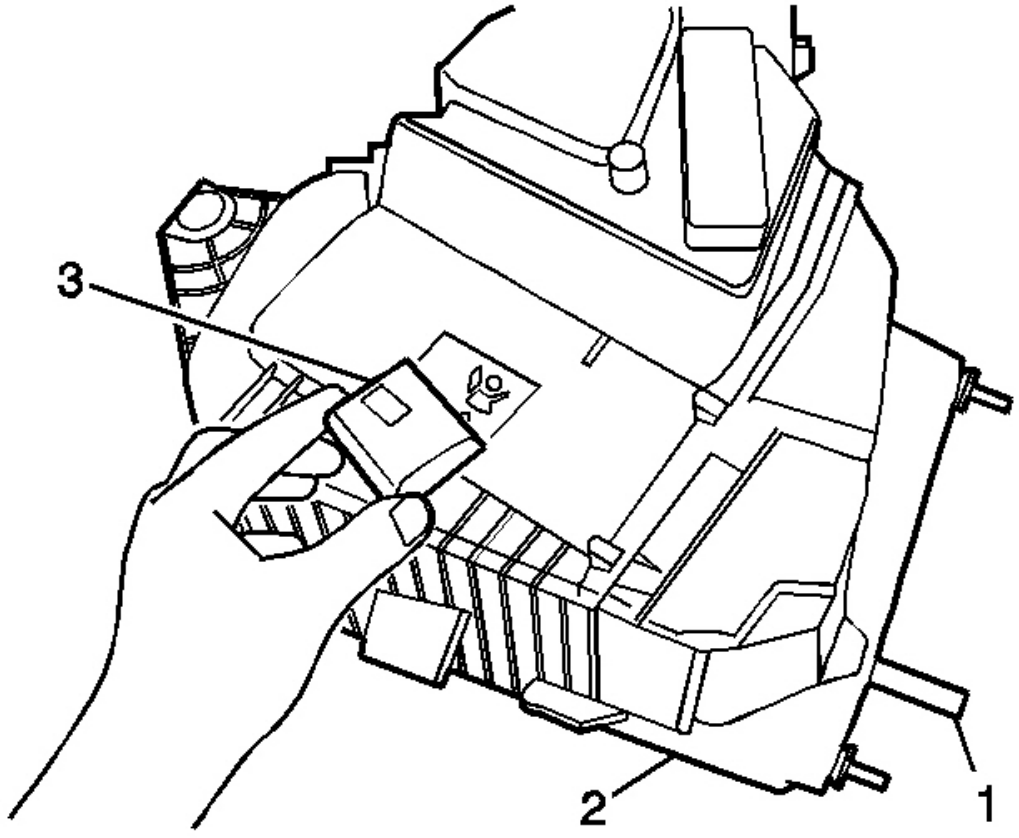


Fig. 162: Removing/Installing Blower Motor Control Processor - Auxiliary
Courtesy of GENERAL MOTORS CORP.

5. Remove the screws from the blower motor control processor-auxiliary.
6. Remove the blower motor control processor-auxiliary.
7. Remove the screws from the HVAC module-auxiliary case sump (2).
8. Remove the HVAC module-auxiliary case sump (2).

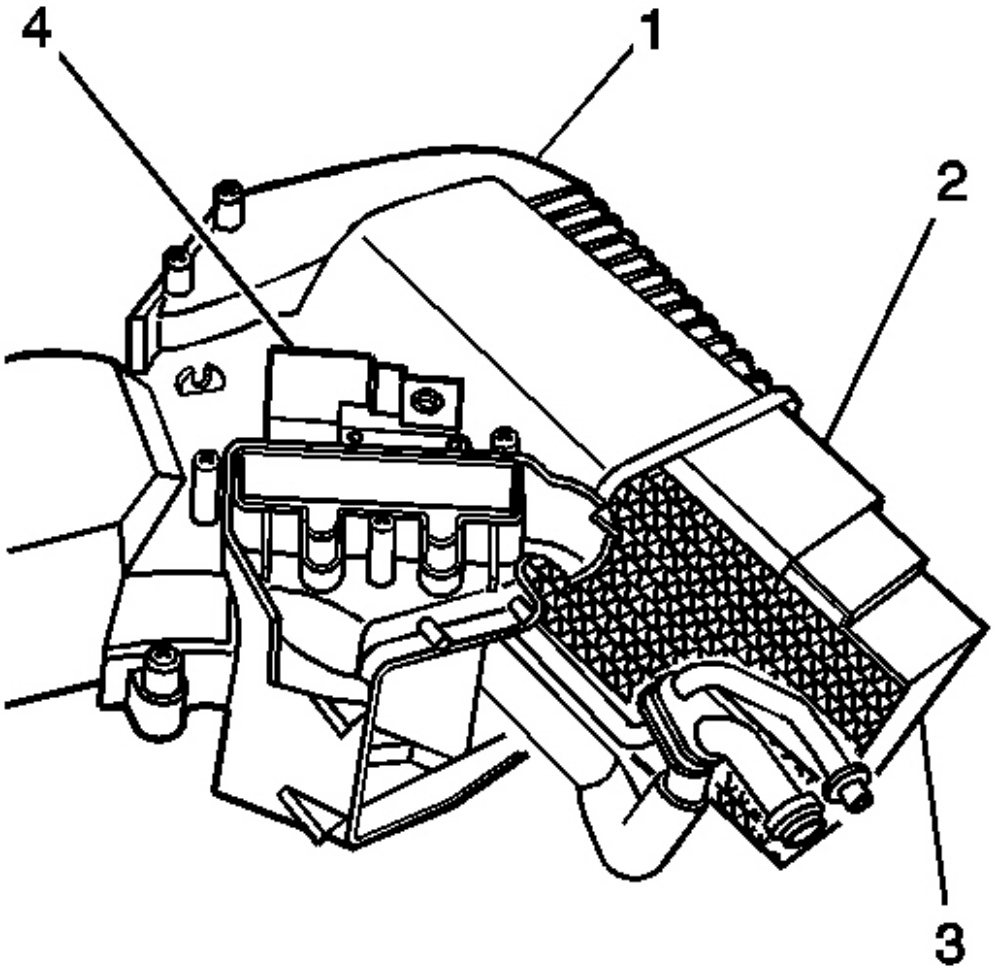


Fig. 163: Removing/Installing Evaporator Core - Auxiliary
Courtesy of GENERAL MOTORS CORP.

9. Remove the evaporator core (3) from the HVAC module-auxiliary (1).
10. Carefully remove the foam insulator (2) from around the evaporator core-auxiliary (3).

Installation Procedure

1. If replacing the evaporator core, add the proper amount of refrigerant oil to the evaporator. Refer to **Refrigerant System Capacities** for the capacity information.

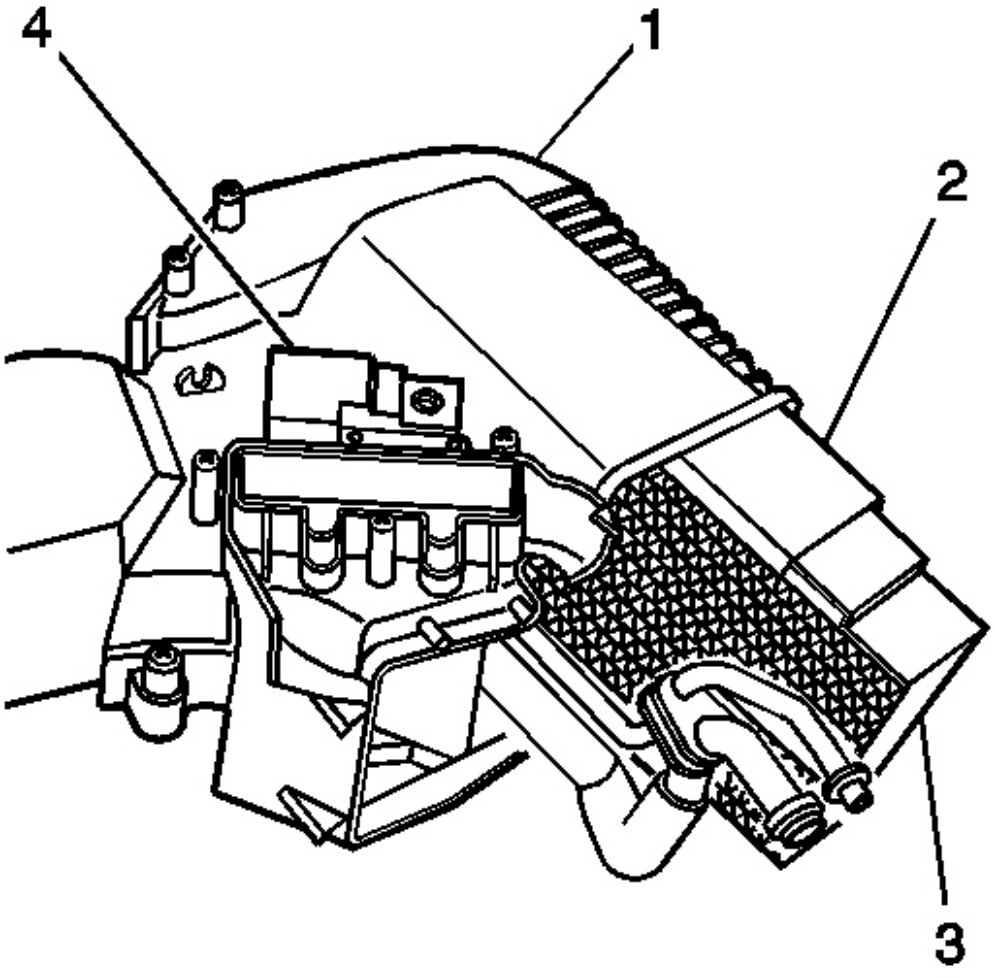


Fig. 164: Removing/Installing Evaporator Core - Auxiliary
Courtesy of GENERAL MOTORS CORP.

2. Transfer the foam insulator (2) to the replacement evaporator core-auxiliary (3).
3. Transfer the thermal expansion valve-auxiliary to the replacement evaporator core-auxiliary.

Install the evaporator core-auxiliary (3) to the rear HVAC module-auxiliary (1).

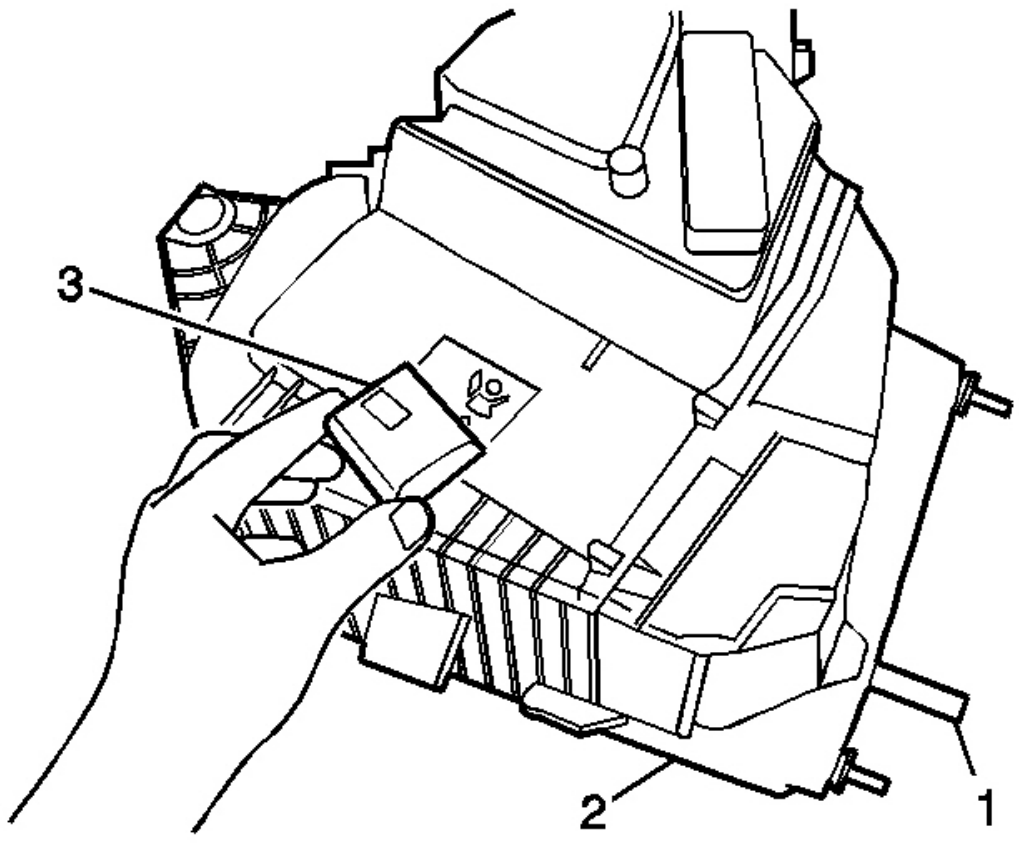


Fig. 165: Removing/Installing Blower Motor Control Processor - Auxiliary
Courtesy of GENERAL MOTORS CORP.

4. Install the HVAC module-auxiliary case sump (2).

NOTE: Refer to Fastener Notice in Cautions and Notices.

5. Install the screws to the HVAC module-auxiliary case sump.

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

6. Install the blower motor control processor-auxiliary.

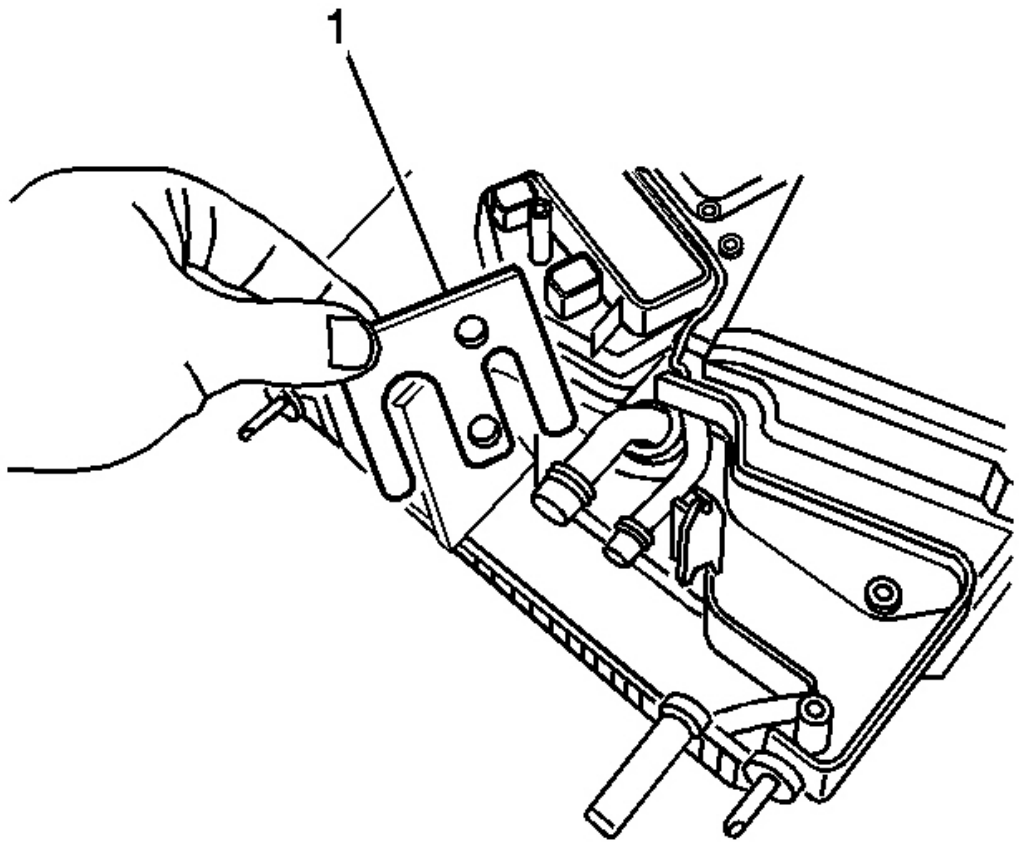


Fig. 166: Removing/Installing Backing Plate
Courtesy of GENERAL MOTORS CORP.

7. Install the backing plate (1) to the evaporator core-auxiliary.
8. Install the evaporator block-auxiliary.
9. Install the inverted TORX studs to the evaporator block-auxiliary.

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

10. Install the heater core-auxiliary. Refer to **Heater Core Replacement - Auxiliary**.
11. Install the HVAC module assembly. Refer to **HVAC Module Assembly Replacement**.
12. Leak test the fittings of the component using the J 39400-A .

EVAPORATOR BLOCK REPLACEMENT - AUXILIARY

Removal Procedure

1. Remove the HVAC module-auxiliary. Refer to **HVAC Module Replacement - Auxiliary**.
2. Remove the TORX studs from the evaporator block-auxiliary.

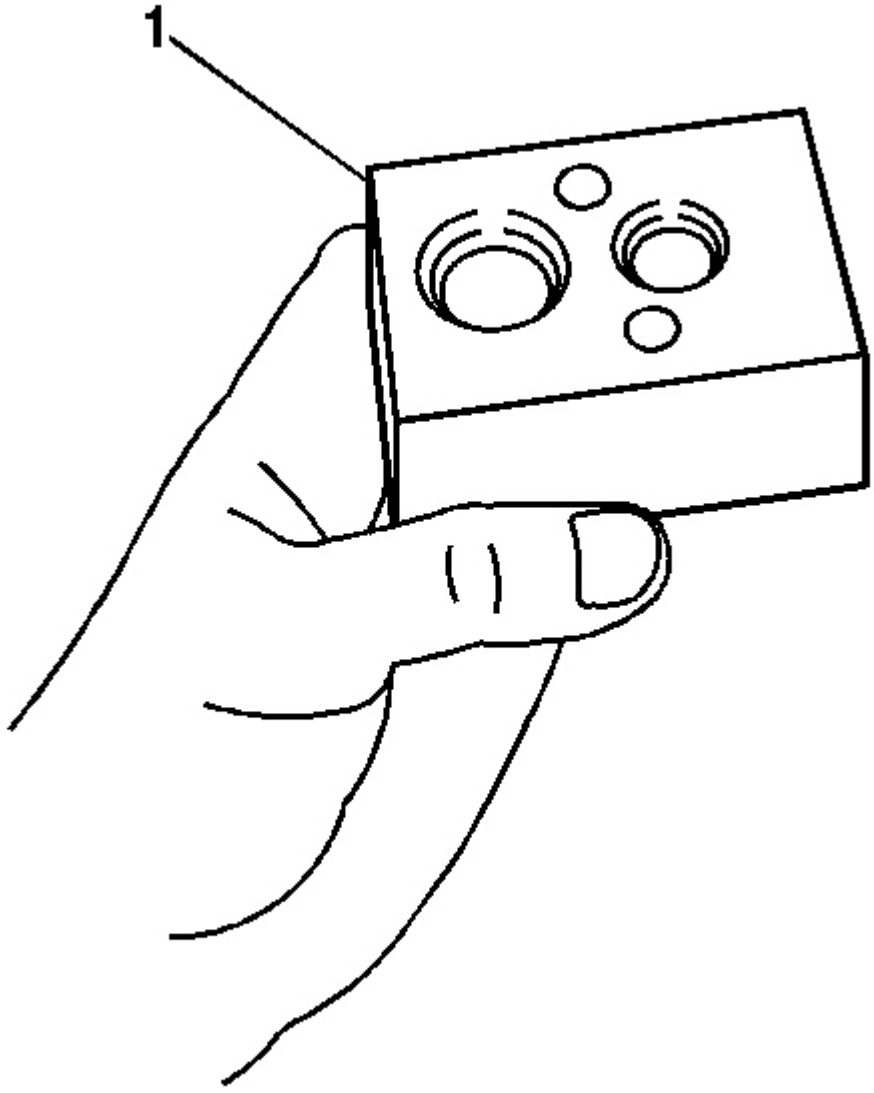


Fig. 167: Removing/Installing Evaporator Block
Courtesy of GENERAL MOTORS CORP.

3. Remove the evaporator block-auxiliary (1) from the HVAC module-auxiliary.

Installation Procedure

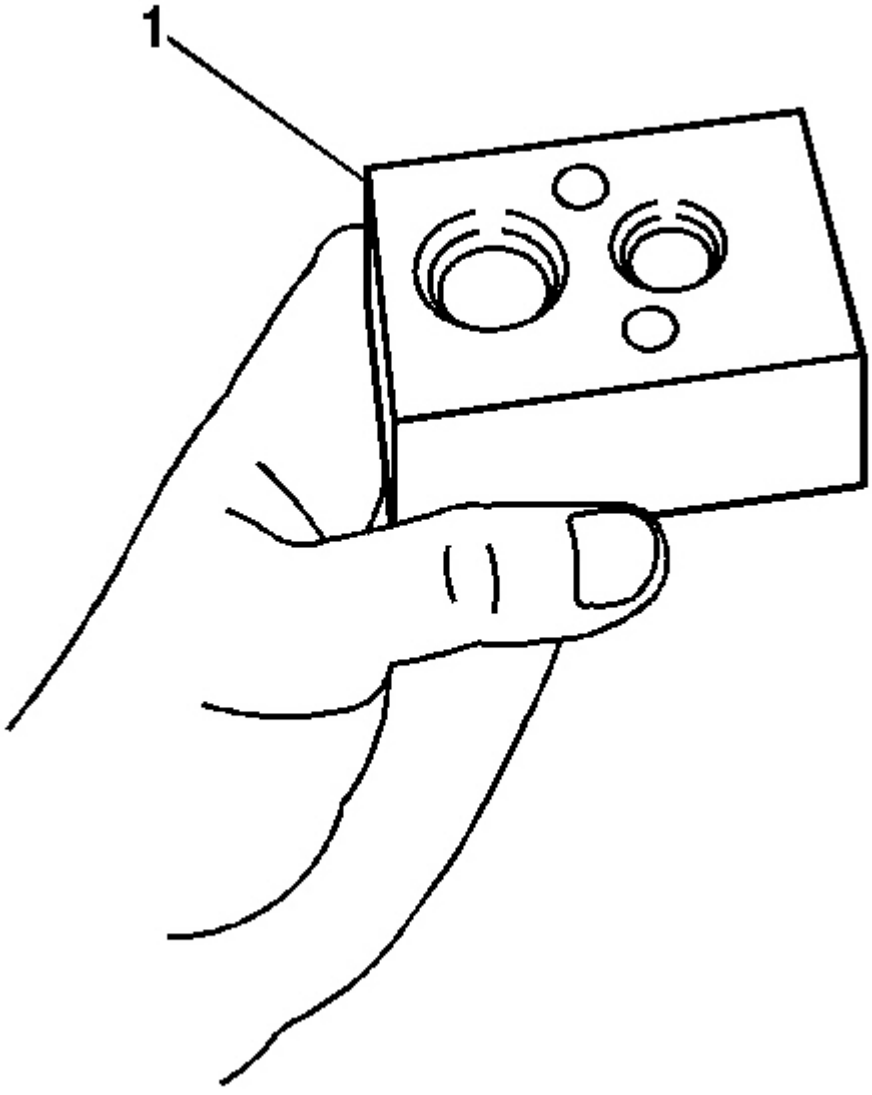


Fig. 168: Removing/Installing Evaporator Block
Courtesy of GENERAL MOTORS CORP.

1. Install the evaporator block-auxiliary (1) to the HVAC module-auxiliary.

NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the TORX studs to the evaporator block-auxiliary.

   Tighten: Tighten the studs to 14 N.m (124 in. lb.).

3. Install the HVAC module-auxiliary. Refer to **HVAC Module Replacement - Auxiliary**.

HEATER AND AIR CONDITIONING (A/C) PIPE REPLACEMENT/REPAIR - AUXILIARY

Tools Required

J 41425 A/C Line Repair Kit. See **Special Tools and Equipment**.

Do not service the rear A/C or heater lines as a complete unit. Service the rear A/C or heater lines as a sectional repair.

You can obtain the various sections of line through GMSPO.

Use the **J 41425** when any of the following actions damage the rear A/C or heater lines:. See **Special Tools and Equipment**.

- Rub-through
- Collision damage
- Leakage in the system

Minimum Tube Length Required Table

IMPORTANT: When sectioning the rear A/C or heater lines, ensure that the correct minimum length remains in the straight part of the line on both sides of the splice.

Follow the Straight Line Repair procedure in order to repair line damage in a straight section of line.

Follow the Line Sectioning Repair procedure in order to repair any damage in a bend area. Do not repair the rear A/C or heater lines in a bend area, replace the lines. Maintaining the original line shape will prevent vibrations and rub-through.

Heater and Air Conditioning (A/C) Pipe Replacement/Repair - Auxiliary

Tube Size	Dim A Standard Installation	Dim A Jaw Reversed Installation
8 mm (5/16 in)	29 mm (1 1/8 in) MIN	19-29 mm (3/4-1 1/8 in)
10 mm (3/8 in)	29 mm (1 1/8 in) MIN	19-29 mm (3/4-1 1/8 in)
13 mm (1/2 in)	29 mm (1 1/8 in) MIN	19-29 mm (3/4-1 1/8 in)
16 mm (5/8 in)	32 mm (1 1/4 in) MIN	23-32 mm (7/8-1 1/4 in)
19 mm (3/4 in)	34 mm (1 5/16 in) MIN	23-34 mm (7/8-1 5/16 in)

Straight Line Repair

1. Recover the refrigerant, if repairing the A/C lines. Refer to **Refrigerant Recovery and Recharging**.
2. Drain the coolant, if repairing the heater lines. Refer to **Draining and Filling Cooling System (Body VIN Code 6)** in Engine Cooling.
3. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
4. Locate the area that requires repair.
5. Obtain a length of replacement line to make the repair.
6. Use a tubing cutter in order to cut and remove the section of damaged line.

IMPORTANT: The length of the replacement line must be the same as the section being replaced.

7. Use a tubing cutter in order to cut the replacement line to length.
8. Use the cleaning pad from the **J 41425** in order to clean any burrs or grease from the line ends. See **Special Tools and Equipment**. Be sure to clean at least 19 mm (0.75 in) from the line splice area.
9. Use the LOK prep sealant in order to prep the line ends.
10. Apply one drop of the J 41425-3 sealing compound to the outside of each end of the line.
11. Insert the line ends into the LOK fitting.
12. Rotate the LOK fitting one complete turn in order to evenly distribute the sealing compound around the lines.
13. Install the correct LOK fitting jaws into the J 41425-1 tool.
14. Install the J 41425-1 tool over the LOK connectors.

    Verify that the LOK connector ends are positioned in the counter bores of the jaws.

IMPORTANT: Hold the J 41425-1 tool body with a 3/8" breaker bar.

15. Tighten the forcing screw of the J 41425-1 tool.

    When fully seated, the LOK connector collars will bottom out on the center shoulder of the LOK fitting.

16. Loosen the forcing screw and remove the J 41425-1 tool from the repaired line.
17. Repeat Step 8 through Step 16 to complete the line splice.
18. Verify that the LOK fittings are correctly installed.
19. Lower the vehicle.
20. Refill the coolant, if drained. Refer to **Draining and Filling Cooling System (Body VIN Code 6)** in Engine Cooling.
21. Evacuate and recharge the refrigerant, if repairing the A/C lines. Refer to **Refrigerant Recovery and Recharging**.

Line Sectioning Repair

1. Recover the refrigerant, if repairing the A/C lines. Refer to **Refrigerant Recovery and Recharging**.

2. Drain the coolant, if repairing the heater lines. Refer to **Draining and Filling Cooling System (Body VIN Code 6)** in Engine Cooling.
3. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
4. Obtain a new A/C or heater line for sectioning.

IMPORTANT: Stagger the splices if repairing more than one line.

5. Scribe a mark on the line that will be sectioned.
6. Use a tubing cutter in order to cut the line or lines being replaced.
7. Remove the section of line being replaced from the vehicle.

IMPORTANT: The length of the replacement line must be the same as the line being replaced.

8. Install the replacement line to the vehicle.
9. Use a tubing cutter in order to cut the replacement line to length.
10. Use the cleaning pad from the **J 41425** in order to clean any burrs or grease. See **Special Tools and Equipment**. Be sure to clean at least 19 mm (0.75 in) from the line splice area.
11. Use the LOK prep sealant in order to prep the line ends.
12. Apply one drop of the J 41425-3 sealing compound to the outside of each line end.
13. Insert the line ends into the LOK fitting.
14. Rotate the LOK fitting one complete turn in order to evenly distribute the sealing compound around the lines.
15. Install the correct LOK fitting jaws into the J 41425-1 tool.
16. Install the J 41425-1 tool over the LOK connectors.

    Verify that the LOK connector ends are positioned in the counter bores of the jaws.

17. Hold the tool body with a 3/8" breaker bar. Turn the forcing screw until both of the connector collars bottom on the center shoulder of the LOK fitting.
18. Loosen the forcing screw. Remove the tool from the repaired line.
19. Verify that the LOK fitting is correctly installed.
20. Lower the vehicle.
21. Refill the coolant, if drained. Refer to **Draining and Filling Cooling System (Body VIN Code 6)** in Engine Cooling.
22. Evacuate and recharge the refrigerant, if repairing the A/C lines. Refer to **Refrigerant Recovery and Recharging**.

EVAPORATOR DRAIN HOSE REPLACEMENT - AUXILIARY

Removal Procedure

1. Remove the HVAC module-auxiliary. Refer to **HVAC Module Replacement - Auxiliary**.

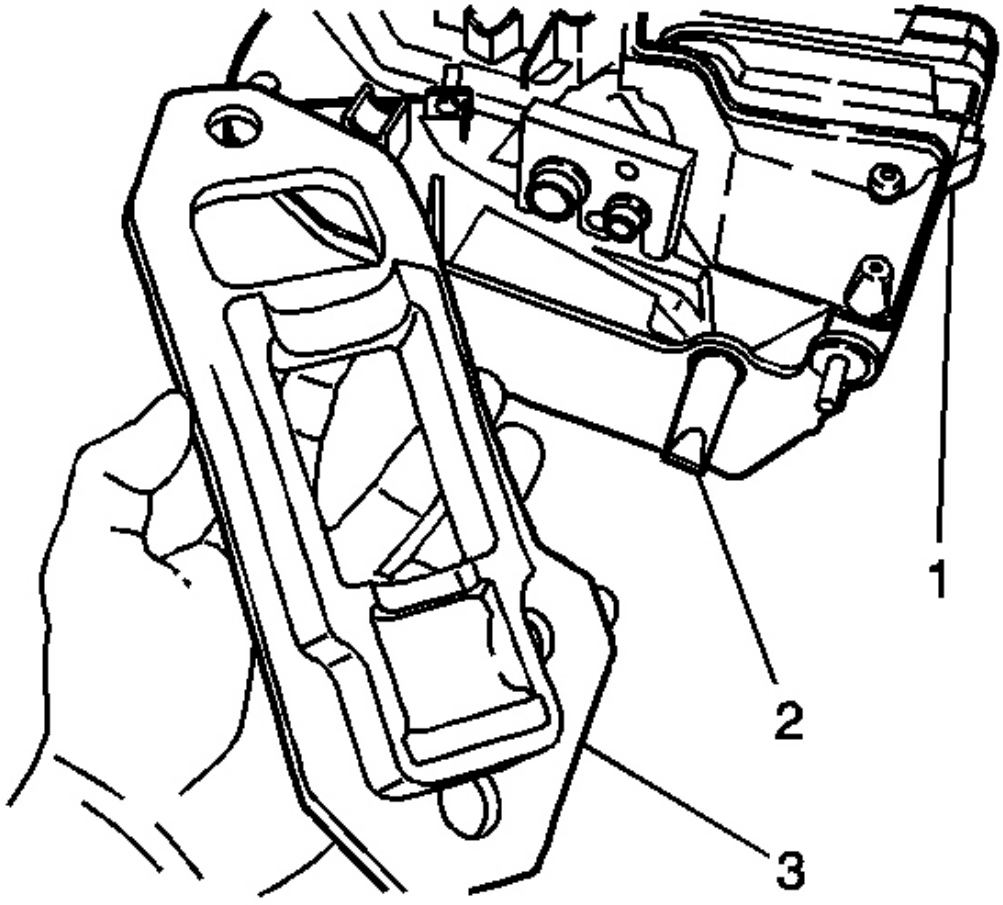


Fig. 169: Removing/Installing HVAC Pass-Thru Seal & Drain Hose - Auxiliary
Courtesy of GENERAL MOTORS CORP.

2. Remove the HVAC module pass through seal (3) from the HVAC module-auxiliary (1).
3. Remove the evaporator drain hose-auxiliary (2) from the HVAC module-auxiliary (1).

Installation Procedure

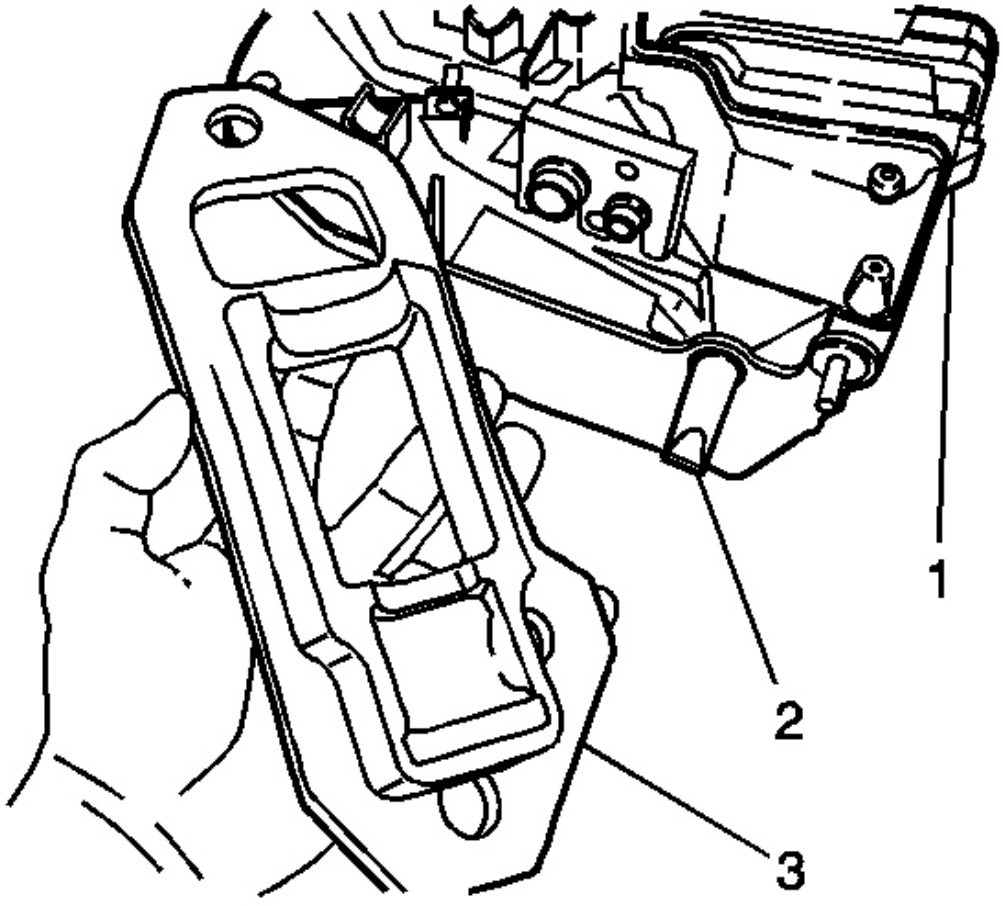


Fig. 170: Removing/Installing HVAC Pass-Thru Seal & Drain Hose - Auxiliary
Courtesy of GENERAL MOTORS CORP.

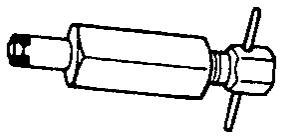
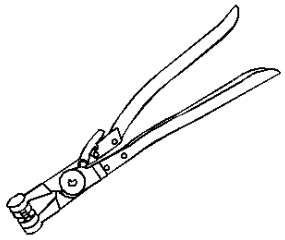
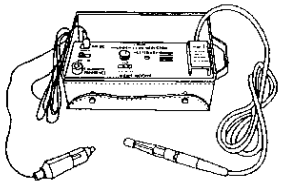
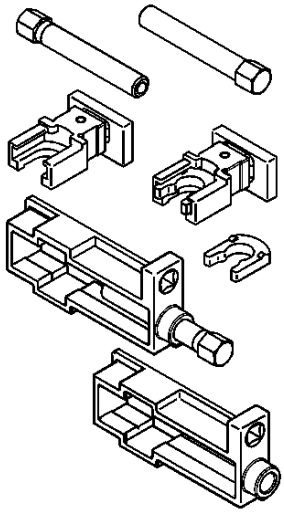
1. Install the evaporator drain hose-auxiliary (2) to the HVAC module-auxiliary (1).
2. Install the HVAC module pass through seal (3) to the HVAC module-auxiliary (1).
3. Install the HVAC module-auxiliary. Refer to **HVAC Module Replacement - Auxiliary**.

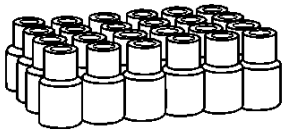
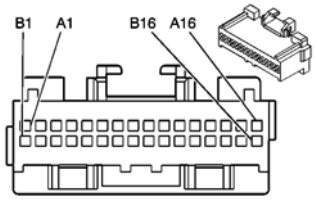
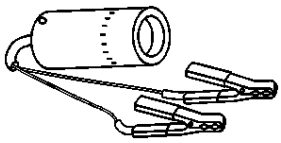
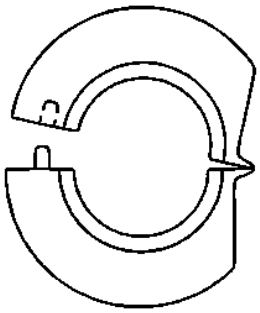
SPECIAL TOOLS AND EQUIPMENT

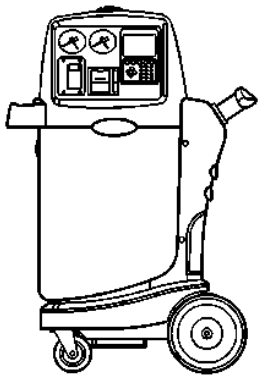
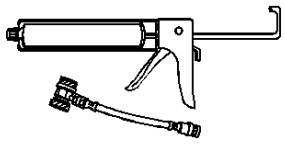
SPECIAL TOOLS

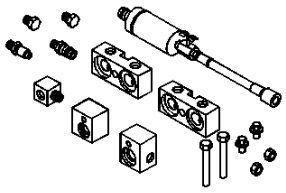
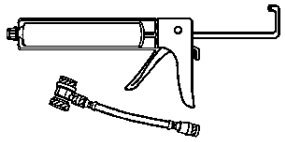
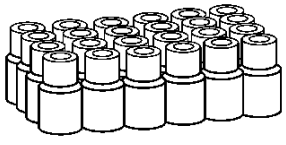
Special Tools

Illustration	Tool Number/ Description

	J 26549-E Orifice Tube Remover
	J 38185 Hose Clamp Pliers
	J 39400-A Halogen Leak Detector
	J 41425 AC Line Repair Kit

	J 41447 R-134a Tracer Dye-Box of 24
	J 41459 R-134a A/C Tracer Dye Injector
	J 42220 Universal 12V Leak Detection Lamp
	J 43181 Heater Line Quick Connect Release Tool
	J 43600 ACR 2000 Air Conditioning Service Center

	
	J 43872 Fluorescent Dye Cleaner
	J 45037 A/C Oil Injector

	J 45268 Flush Adaptor Kit
	J 46297 A/C Dye Injector Kit
	J 46297-12 Replacement Dye Cartridges