2008 HVAC

Heating, Ventilation, and Air Conditioning - Cab & Chassis Sierra, Cab & Chassis Silverado, Sierra & Silverado

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Application	Specification	
	Metric	English
A/C High Pressure Recirculation Switch	6 N.m	53 lb in
A/C Low Pressure Switch	6 N.m	53 lb in
A/C Refrigerant Filter Retaining Nuts	15 N.m	11 lb ft
Accumulator Bracket Nut	9 N.m	80 lb in
Accumulator Clamp Bolt	10 N.m	8 lb ft
Air Distribution Duct Screws	1.6 N.m	14 lb in
Air Outlet Mounting Screw	1.6 N.m	14 lb in
Auxiliary A/C Tubes at the Auxiliary HVAC Module	16 N.m	12 lb ft
Auxiliary Evaporator Tube to TXV Nut	28 N.m	21 lb ft
Auxiliary HVAC Module A/C Line Nut	16 N.m	12 lb ft
Auxiliary HVAC Module Mounting Nuts to Vehicle	9 N.m	80 lb in
Blower Motor Insulating Cover Screw	1.6 N.m	14 lb in
Blower Motor Relay/Resistor Screw	1.6 N.m	14 lb in
Compressor Bracket Mounting Bolts	50 N.m	37 lb ft
Compressor Clutch Coil Connector Retaining Bracket Screw	9 N.m	80 lb in
Compressor Clutch Plate Retaining Bolt	18 N.m	13 lb ft
Compressor Discharge Hose Nut at Compressor	16 N.m	12 lb ft
Compressor Hose Bolt to Compressor (L18 Harrison)	34 N.m	25 lb ft
Compressor Mounting Bolts (L18 Harrison)	50 N.m	37 lb ft
Compressor Mounting Bolts (LR4, LM7, LQ4 Denso)	50 N.m	37 lb ft
Compressor Suction/Discharge Hose Bolt	34 N.m	25 lb ft
Compressor Suction Hose Nut to Accumulator	16 N.m	12 lb ft

Compressor Suction Hose to Accumulator	41 N.m	30 lb ft
Condenser Upper Insulator Retainer Bolts	2.4 N.m	21 lb in
Discharge Hose Mounting Bolt (LR4, LM7, LQ4 Denso)	16 N.m	12 lb ft
Evaporator Tube Fitting at Orifice	25 N.m	18 lb ft
Evaporator Tube Nut at Condenser	16 N.m	12 lb ft
Evaporator Tube Nut at Evaporator	16 N.m	12 lb ft
Evaporator Tube to the Auxiliary A/C Tube	16 N.m	12 lb ft
Filter Access Door Screw	1.6 N.m	14 lb in
Floor Air Outlet Duct Screw	1.6 N.m	14 lb in
Heater A/C Auxiliary Tubes Retaining Nuts	7 N.m	62 lb in
Heater Core Cover Screws	1.6 N.m	14 lb in
Heater Hose Outlet Mounting Nut and Bolt	25 N.m	18 lb ft
Heater/Ventilation Module Mounting Nuts	9 N.m	80 lb in
Heater/Ventilation Module Mounting Screws	4 N.m	35 lb in
Heater Ventilation Module Screws	1.6 N.m	14 lb in
Insulator Retainers and Bolts	2.4 N.m	21 lb in
Pressure Relief Valve	9 N.m	80 lb in
Suction Hose Mounting Bolt (LR4, LM7, LQ4 Denso)	16 N.m	12 lb ft

REFRIGERANT SYSTEM CAPACITIES

Application	Specification	
	Metric	**English**
PAG Oil GM P/N 12378526 for United States PAG Oil GM P/N 88900060 for Canada		
Accumulator Replacement	60 ml*	2 oz*
• * Add PAG oil equal to the amount of oil drained from the accumulator plus the specified additional amount.		
Compressor Replacement	60 ml[1]	2 oz[1]
• The Denso service compressor is precharged with 237 ml (8.0 oz) of PAG oil.		
Condenser Replacement	30 ml[1]	1 oz[1]
Evaporator Replacement	90 ml[1]	3 oz[1]

Evaporator, Rear Replacement	90 ml[1]	3 oz[1]
• Total System PAG Oil Capacity	210 ml	7.1 oz
• Total System PAG Oil Capacity with Rear A/C	330 ml	11 oz
R-134a		
• Refrigerant Charge	0.7 kg	1.6 lb
• Refrigerant Charge Utility with Front and Rear A/C	1.13 kg	2.5 lb
• Refrigerant Charge Suburban with Front and Rear A/C	1.4 kg	3.0 lb
[1] If more than the specified amount of PAG 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

Begin the system diagnosis with **Diagnostic System Check - Vehicle** . The Diagnostic System Check - Vehicle will provide the following information:

- The identification of the control modules which are not communicating.
- The identification of any stored diagnostic trouble codes (DTCs) and their status.

The use of the Diagnostic System Check - Vehicle will identify the correct procedures to begin vehicle diagnosis. These must be performed before system DTC or symptom diagnosis.

LEAK TESTING

Tools Required

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

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. See **Special Tools**.

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**.
- 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**.

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.**
- **J 46297-12 is injected into the low side port using J 46297 . See Special Tools.**

- 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**.

Halogen Leak Detector

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

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

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

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

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

IMPORTANT: Follow a continuous path in order to ensure that you will not miss

any possible leaks. Test all areas of the system for leaks.

Follow the instructions supplied with the **J 39400-A** . See **Special Tools**.

AIR CONDITIONING (A/C) SYSTEM PERFORMANCE TEST (DIESEL ENGINE)

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

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

Test Description

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

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

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

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

Step	Action	Values	Yes	No
IMPORTANT: • **The ambient air temperature must be at least 16°C (60°F).** • **Do not induce additional air flow across the front of the vehicle during the test.** • **If you were sent here from a DTC diagnostic table, clear the DTC upon completion of this test.**				
	1. Park the vehicle inside or in the shade. 2. Open the windows in order to ventilate the interior of the vehicle. 3. If the A/C system was operating, allow the A/C system to equalize for about 2 minutes. 4. Turn OFF the ignition. 5. Install the **J 43600** ACR 2000	• Above 16°C (60°F) 345 kPa (50 psi) • Above 24°C (75°F)		

1	Refrigerant Station. See **Special Tools**. 6. Record the ambient air temperature displayed on the **J 43600** . See **Special Tools**. 7. Record the low and high side STATIC pressure readings. Are both the low and high side pressures within the specified value?	483 kPa (70 psi) • Above 33°C (90°F) 690 kPa (100 psi)	Go to **Step 2**	Go to **Leak Testing**
2	**IMPORTANT:** **Record the relative humidity and the ambient air temperature at the time of the test.** 1. Close the vehicle doors and windows. 2. Open the drivers door window 127-152 mm (5-6 inches). 3. Select the following HVAC control settings: • The A/C ON • The coldest temperature setting • The maximum blower speed • The IP panel outlet mode • All IP panel outlets are OPEN • Recirculation mode 4. Install the temperature probes to the **J 43600** in the left and right center air outlets. See **Special Tools**. 5. Apply the parking brake. 6. Place the transaxle/transmission in one of the following positions: • PARK for Automatic • NEUTRAL for Manual	-		

	7. Start the engine. 8. Operate the A/C system for 5 minutes. 9. Inspect A/C components for the following conditions: • Abnormal frost areas • Unusual noises **IMPORTANT:** **Press the RESET button, before using the print function of the J 43600 . See Special Tools.** 10. Print the following information: • The panel outlet air temperatures • The low-side pressure • The high-side pressure 11. Compare the low and high side pressures and the panel output temperatures to the table below. Does all the data recorded fall within the specified ranges of the table below?		Go to **Step 8**	Go to **Step 3**
3	If the pressures and temperatures recorded do not fall within the specified ranges: 1. Continue to operate the A/C system for an additional 5 minutes. 2. RESET the **J 43600** and record the pressures and temperatures again. See **Special Tools**. 3. Compare the low and high side pressures and the panel output temperature to the table below.	-		

	Does all the data recorded fall within the specified ranges of the table below?		Go to **Step 8**	Go to **Step 4**
4	Do the high and low side pressures fall within the specified ranges but the panel outlet temperatures do not?	-	Go to **Air Conditioning (A/C) Diagnostics - Pressure Zone A**	Go to **Step 5**
5	Is the low side pressure greater than the specified range, but the high side pressure within or less 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 greater 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?	-	System OK	Go to **Symptoms - HVAC Systems - Manual** or Go to **Symptoms - HVAC Systems - Automatic**

A/C System Pressure Zone Classification Diesel Engine

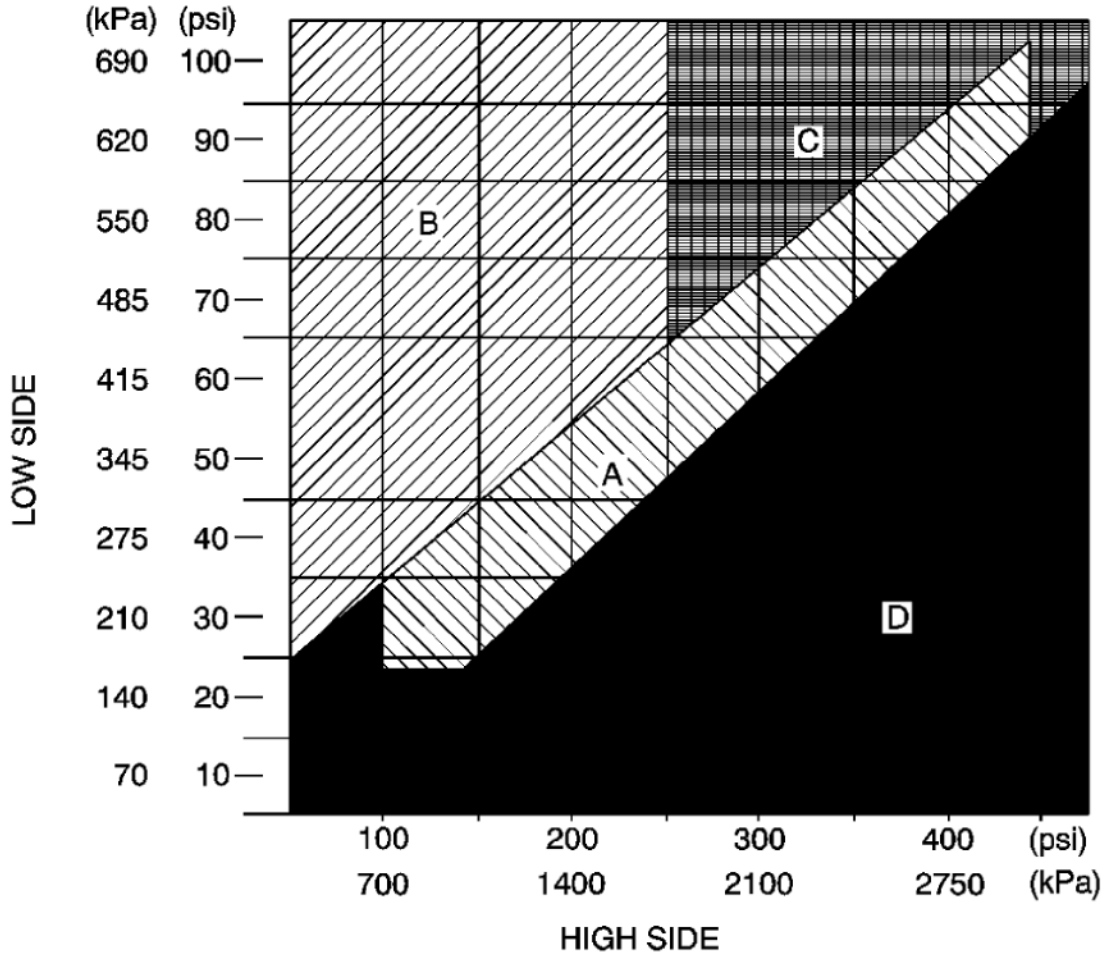


Fig. 1: A/C System Pressure (6.6L)
Courtesy of GENERAL MOTORS CORP.

A/C Performance Table - Diesel Engine

Ambient Air Temperature	Relative Humidity	Service Port Pressure		Maximum Discharge Air Temperature
		Low Side	High Side	
13-18°C (55-65°F)	0-100%	150-279 kPa (22-41 psi)	420-1140 kPa (61-165 psi)	9°C (48°F)
19-24°C (66-75°F)	Below 40%	150-298 kPa (22-43 psi)	531-1240 kPa (77-180 psi)	11°C (52°F)
	Above 40%	176-366 kPa (26-53 psi)	760-1510 kPa (110-219 psi)	14°C (57°F)
		216-359 kPa (31-52	990-1550 kPa (143-	

25-29°C (76-85°F)	Below 35%	psi)	225 psi)	15°C (59°F)
	35-50%	250-382 kPa (36-55 psi)	1130-1640 kPa (164-238 psi)	16°C (61°F)
	Above 50%	275-430 kPa (40-62 psi)	1230-1820 kPa (178-264 psi)	18°C (64°F)
30-35°C (86-95°F)	Below 30%	287-434 kPa (42-63 psi)	1350-1930 kPa (195-280 psi)	19°C (66°F)
	30-50%	311-463 kPa (45-67 psi)	1440-2040 kPa (209-296 psi)	21°C (70°F)
	Above 50%	342-506 kPa (50-73 psi)	1560-2190 kPa (226-318 psi)	23°C (73°F)
36-41°C (96-105°F)	Below 20%	366-506 kPa (53-73 psi)	1750-2300 kPa (254-334 psi)	23°C (73°F)
	20-40%	382-531 kPa (55-77 psi)	1800-2390 kPa (261-347 psi)	25°C (77°F)
	Above 40%	409-557 kPa (59-81 psi)	1900-2480 kPa (276-360 psi)	27°C (81°F)
42-46°C (106-115°F)	Below 20%	452-575 kPa (66-84 psi)	2180-2660 kPa (316-386 psi)	27°C (81°F)
	Above 20%	465-599 kPa (68-87 psi)	2220-2730 kPa (322-396 psi)	29°C (84°F)
47-49°C (116-120°F)	Below 30%	535-629 kPa (78-91 psi)	2580-2900 kPa (375-421 psi)	30°C (86°F)

AIR CONDITIONING (A/C) SYSTEM PERFORMANCE TEST (GAS ENGINE W/ ELECTRIC COOLING FAN)

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

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

Test Description

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

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

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

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

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

2	2. Open the drivers door window 127-152 mm (5-6 inches). 3. Select the following HVAC control settings: • The A/C ON • The coldest temperature setting • The maximum blower speed • The IP panel outlet mode • All IP panel outlets are OPEN • Recirculation mode 4. Install the temperature probes to the **J 43600** in the left and right center air outlets. See **Special Tools**. 5. Apply the parking brake. 6. Place the transaxle/transmission in one of the following positions: • PARK for Automatic • NEUTRAL for Manual 7. Start the engine. 8. Operate the A/C system for 5 minutes. 9. Inspect A/C components for the following conditions: • Abnormal frost areas • Unusual noises **IMPORTANT:** **Press the RESET button, before using the print function of the J 43600 . See Special Tools.** 10. Print the following information: • The panel outlet air temperatures	-			

	• The low-side pressure • The high-side pressure 11. Compare the low and high side pressures and the panel output temperatures to the table below. Does all the data recorded fall within the specified ranges of the table below?		Go to **Step 8**	Go to **Step 3**
3	If the pressures and temperatures recorded do not fall within the specified ranges: 1. Continue to operate the A/C system for an additional 5 minutes. 2. RESET the **J 43600** and record the pressures and temperatures again. See **Special Tools**. 3. Compare the low and high side pressures and the panel output temperature to the table below. Does all the data recorded fall within the specified ranges of the table below?	-	Go to **Step 8**	Go to **Step 4**
4	Do the high and low side pressures fall within the specified ranges but the panel outlet temperatures do not?	-	Go to **Air Conditioning (A/C) Diagnostics - Pressure Zone A**	Go to **Step 5**
5	Is the low side pressure greater than the specified range, but the high side pressure within or less than the specified range?	-	Go to **Air Conditioning (A/C) Diagnostics - Pressure Zone B**	Go to **Step 6**
	Are the low and high side pressures both greater than the specified ranges?		Go to **Air Conditioning**	

6		-	**(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?	-	System OK	Go to **Symptoms - HVAC Systems - Manual** or Go to **Symptoms - HVAC Systems - Automatic**

A/C System Pressure Zone Classification - Gas Engine With Electric Cooling Fan or RPO HP2

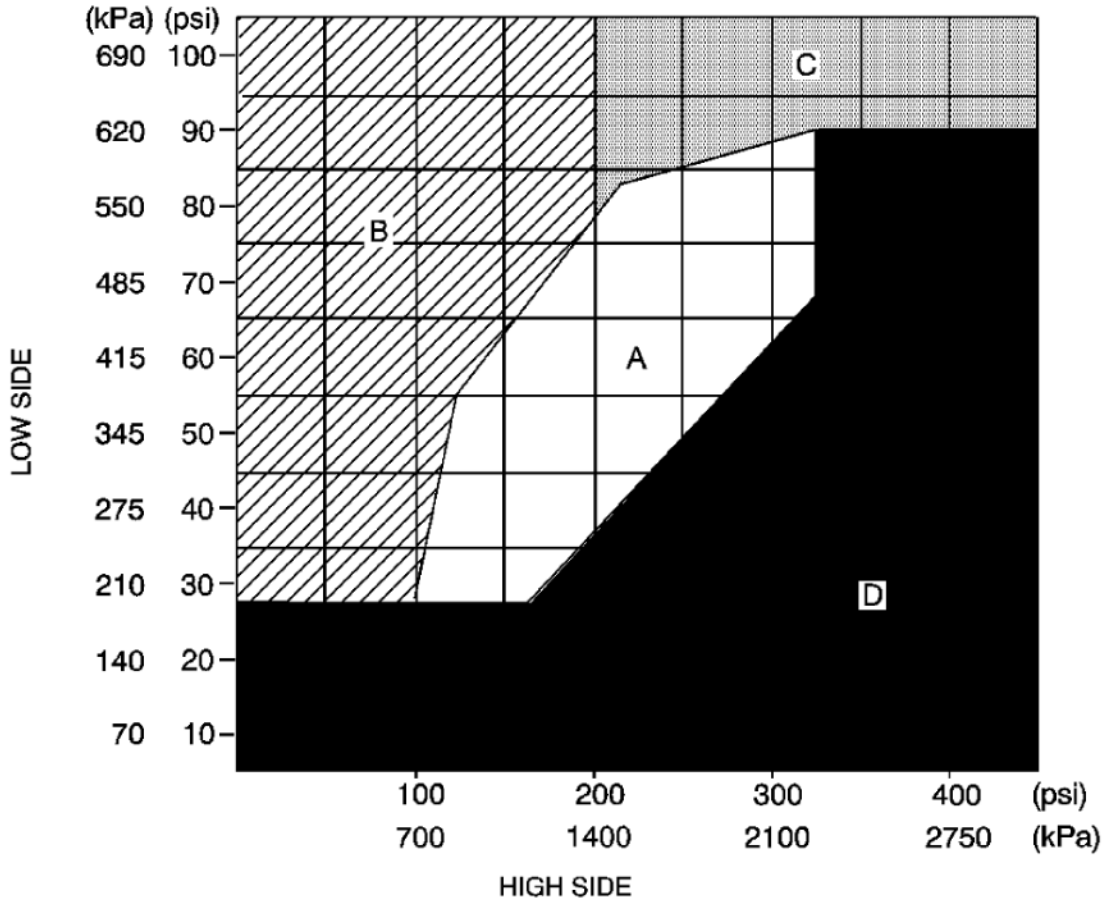


Fig. 2: A/C System Pressure Zone Classification - Gas Engine With Engine Driven Cooling Fan
Courtesy of GENERAL MOTORS CORP.

A/C Performance Table - Gas Engine With Electric Cooling Fan or RPO HP2

Ambient Air Temperature	Relative Humidity	Service Port Pressure		Maximum Discharge Air Temperature
		Low Side	High Side	
13-18°C (55-65°F)	0-100%	165-257 kPa (24-37 psi)	830-1180 kPa (120-171 psi)	10°C (50°F)
19-24°C (66-75°F)	Below 40%	185-290 kPa (27-42 psi)	1010-1340 kPa (147-194 psi)	11°C (52°F)
	Above 40%	202-313 kPa (29-45 psi)	990-1370 kPa (144-199 psi)	13°C (55°F)
	Below 35%	225-319 kPa (33-46	1180-1470 kPa (171-	14°C (57°F)

		psi)	213 psi)	
25-29°C (76-85°F)	35-50%	238-330 kPa (35-48 psi)	1180-1490 kPa (171-216 psi)	14°C (57°F)
	Above 50%	248-352 kPa (36-51 psi)	1190-1520 kPa (173-221 psi)	16°C (61°F)
30-35°C (86-95°F)	Below 30%	257-359 kPa (37-52 psi)	1320-1610 kPa (192-234 psi)	17°C (63°F)
	30-50%	267-375 kPa (39-54 psi)	1340-1650 kPa (194-239 psi)	18°C (64°F)
	Above 50%	281-399 kPa (41-58 psi)	1360-1710 kPa (197-248 psi)	20°C (68°F)
36-41°C (96-105°F)	Below 20%	290-393 kPa (42-57 psi)	1480-1760 kPa (215-255 psi)	19°C (66°F)
	20-40%	298-411 kPa (43-60 psi)	1500-1820 kPa (218-264 psi)	21°C (70°F)
	Above 40%	313-429 kPa (45-62 psi)	1540-1880 kPa (224-273 psi)	22°C (72°F)
42-46°C (106-115°F)	Below 20%	327-428 kPa (47-62 psi)	1650-1910 kPa (239-277 psi)	21°C (70°F)
	Above 20%	336-448 kPa (49-65 psi)	1680-1980 kPa (244-287 psi)	23°C (73°F)
47-49°C (116-120°F)	Below 30%	367-474 kPa (53-69 psi)	1830-2100 kPa (266-305 psi)	25°C (77°F)

AIR CONDITIONING (A/C) SYSTEM PERFORMANCE TEST (GAS ENGINE W/ENGINE DRIVE DRIVEN FAN)

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

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

Test Description

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

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

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

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

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

2	2. Open the drivers door window 127-152 mm (5-6 inches). 3. Select the following HVAC control settings: • The A/C ON • The coldest temperature setting • The maximum blower speed • The IP panel outlet mode • All IP panel outlets are OPEN • Recirculation mode 4. Install the temperature probes to the **J 43600** in the left and right center air outlets. See **Special Tools**. 5. Apply the parking brake. 6. Place the transaxle/transmission in one of the following positions: • PARK for Automatic • NEUTRAL for Manual 7. Start the engine. 8. Operate the A/C system for 5 minutes. 9. Inspect A/C components for the following conditions: • Abnormal frost areas • Unusual noises **IMPORTANT:** **Press the RESET button, before using the print function of the J 43600 . See Special Tools.** 10. Print the following information: • The panel outlet air temperatures	-			

	• The low-side pressure • The high-side pressure 11. Compare the low and high side pressures and the panel output temperatures to the table below. Does all the data recorded fall within the specified ranges of the table below?		Go to **Step 8**	Go to **Step 3**
3	If the pressures and temperatures recorded do not fall within the specified ranges: 1. Continue to operate the A/C system for an additional 5 minutes. 2. RESET the **J 43600** and record the pressures and temperatures again. See **Special Tools**. 3. Compare the low and high side pressures and the panel output temperature to the table below. Does all the data recorded fall within the specified ranges of the table below?	-	Go to **Step 8**	Go to **Step 4**
4	Do the high and low side pressures fall within the specified ranges but the panel outlet temperatures do not?	-	Go to **Air Conditioning (A/C) Diagnostics - Pressure Zone A**	Go to **Step 5**
5	Is the low side pressure greater than the specified range, but the high side pressure within or less than the specified range?	-	Go to **Air Conditioning (A/C) Diagnostics - Pressure Zone B**	Go to **Step 6**
	Are the low and high side pressures both greater than the specified ranges?		Go to **Air Conditioning**	

6		-	**(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?	-	System OK	Go to **Symptoms - HVAC Systems - Manual** or Go to **Symptoms - HVAC Systems - Automatic**

A/C System Pressure Zone Classification - Gas Engine With Engine Driven Cooling Fan

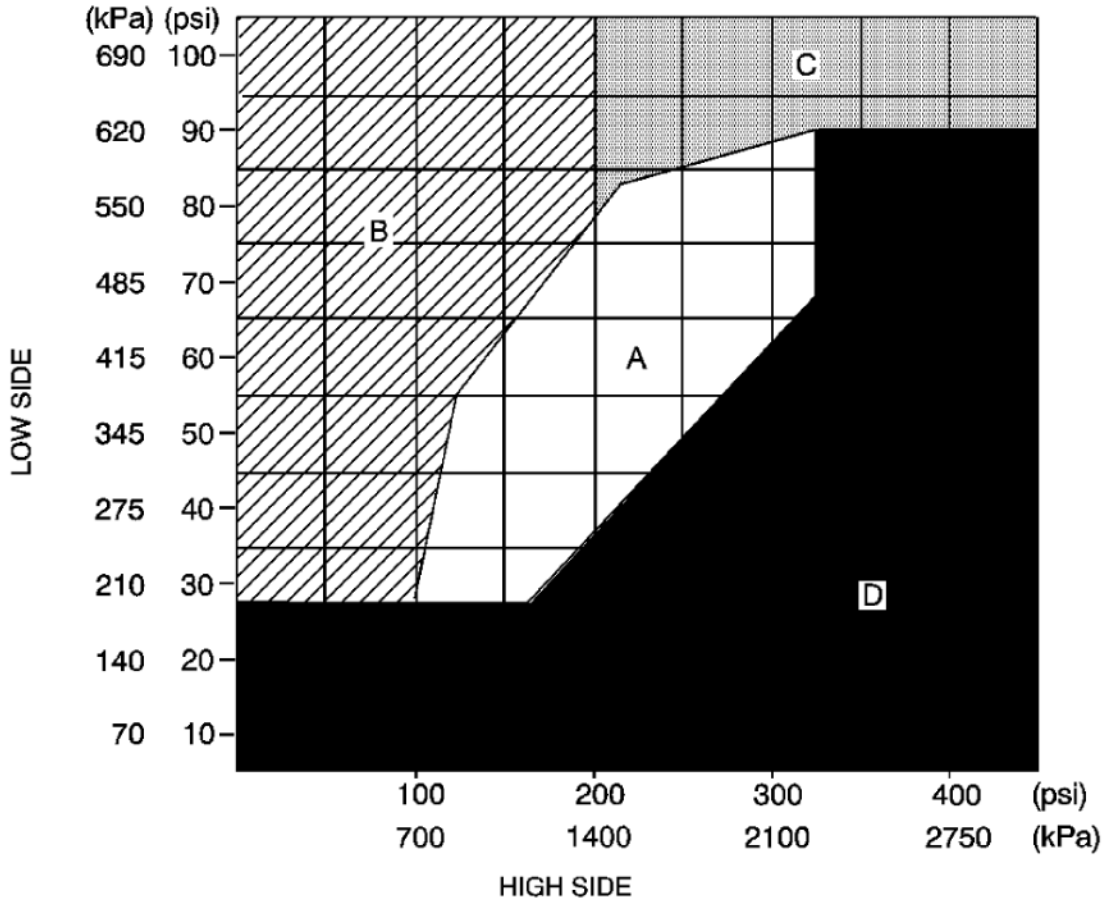


Fig. 3: A/C System Pressure Zone Classification - Gas Engine With Engine Driven Cooling Fan
Courtesy of GENERAL MOTORS CORP.

A/C Performance Table - Gas Engine With Engine Driven Cooling Fan

Ambient Air Temperature	Relative Humidity	Service Port Pressure		Maximum Left Center Discharge Air Temperature
		Low Side	High Side	
13-16°C (55-65°F)	0-100%	150-246 kPa (25-36 psi)	730-1190 kPa (106-173 psi)	12°C (54°F)
19-24°C (66-75°F)	Below 40%	150-280 kPa (22-41 psi)	900-1390 kPa (131-202 psi)	14°C (57°F)
	Greater than 40%	179-137 kPa (26-46 psi)	990-1500 kPa (144-218 psi)	16°C (61°F)

25-29°C (76-85°F)	Below 35%	218-328 kPa (32-48 psi)	1240-1640 kPa (180-238 psi)	17°C (63°F)
	35-60%	236-342 kPa (34-50 psi)	1290-1680 kPa (187-244 psi)	18°C (64°F)
	Above 60%	250-365 kPa (36-53 psi)	1340-1760 kPa (194-255 psi)	20°C (68°F)
30-35°C (86-95°F)	Below 30%	266-386 kPa (39-56 psi)	1500-1940 kPa (218-282 psi)	21°C (70°F)
	30-50%	280-397 kPa (41-58 psi)	1540-1990 kPa (224-289 psi)	22°C (72°F)
	Above 50%	330-430 kPa (44-62 psi)	1600-2070 kPa (232-300 psi)	24°C (75°F)
36-41°C (96-105°F)	Below 20%	328-439 kPa (48-64 psi)	1810-2240 kPa (263-325 psi)	25°C (77°F)
	20-40%	337-457 kPa (49-66 psi)	1840-2290 kPa (267-332 psi)	26°C (79°F)
	Above 40%	355-474 kPa (52-69 psi)	1890-2340 kPa (274-340 psi)	27°C (81°F)
42-46°C (106-115°F)	Below 20%	391-491 kPa (57-71 psi)	2130-2500 kPa (309-363 psi)	29°C (84°F)
	Above 20%	397-508 kPa (58-74 psi)	2160-2550 kPa (313-370 psi)	30°C (86°F)
47-49°C (116-120°F)	Below 30%	451-552 kPa (65-80 psi)	2420-2790 kPa (351-405 psi)	33°C (92°F)

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				
	Were you sent here from the A/C System Performance Test?			Go to **Air Conditioning (A/C) System Performance Test (Diesel**

1		-	Go to **Step 2**	**Engine)** or **Air Conditioning (A/C) System Performance Test (Gas Engine w/ Electric Cooling Fan)** or **Air Conditioning (A/C) System Performance Test (Gas Engine w/Engine Driven Fan)**
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**
	1. Refer to the pressures recorded during the A/C system performance test. 2. Inspect for the following conditions: **CAUTION:**			

5	**Refer to Moving Parts and Hot Surfaces Caution .** • 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 (Diesel Engine)Air Conditioning (A/C) System Performance Test (Gas Engine w/ Electric Cooling Fan)Air Conditioning (A/C) System Performance Test (Gas Engine w/Engine Driven Fan)** . • The discharge line is hot. • The suction line is cool. Do the listed conditions exist?	-	Go to **Step 7**	Go to **Step 6**
6	1. Refer to the pressures recorded during the A/C system performance test. 2. 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 (Diesel Engine)Air Conditioning (A/C) System Performance**	-		

	Test (Gas Engine w/ Electric Cooling Fan)Air Conditioning (A/C) System Performance Test (Gas Engine w/Engine Driven Fan) . • 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 **Diagnostic Starting Point - Heating, Ventilation and Air Conditioning**
7	The A/C system may be undercharged. 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 action complete?	-	Go to **Step 14**	-
8	The A/C system may be contaminated. View the information screen on **J 43600** ACS 2000 Air Conditioning Service Center for detection of foreign gases in the A/C system. See **Special Tools**. 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 action complete?	-	Go to **Step 14**	-
	The A/C system may contain too much moisture or air.			

10	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 (Diesel Engine)** or **Air Conditioning (A/C) System Performance Test (Gas Engine w/ Electric Cooling Fan)** or **Air Conditioning (A/C) System Performance Test (Gas Engine w/Engine Driven Fan)**. 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 **Air Conditioning Accumulator Replacement (Non-HP2)**. 3. Drain and measure the refrigerant oil from the accumulator. Was more than the specified amount of refrigerant oil drained from the accumulator?	148 ml (5 oz)	Go to **Step 12**	Go to **Step 13**
	1. Reinstall the accumulator. Refer to **Air Conditioning Accumulator Replacement (Non-HP2)**.			

12	2. Flush the A/C system. Refer to **Flushing**. 3. Recharge the A/C system. Refer to **Refrigerant Recovery and Recharging**. Are the actions 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 **Air Conditioning Accumulator Replacement (Non-HP2)**. 3. Recharge the A/C system. Refer to **Refrigerant Recovery and Recharging**. Are the actions 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 (Diesel Engine)** or **Air Conditioning (A/C) System Performance Test (Gas Engine w/ Electric Cooling Fan)** or **Air Conditioning (A/C) System Performance Test (Gas Engine w/Engine Driven Fan)**. Are the high and low side pressures and I/P panel outlet temperatures within specifications?	-		Go to **Air Conditioning (A/C) System Performance Test (Diesel Engine)** or **Air Conditioning (A/C) System Performance Test (Gas Engine w/ Electric Cooling Fan)** or **Air Conditioning (A/C) System Performance Test (Gas**

			Go to **Step 15**	**Engine w/Engine Driven Fan)**
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 Go to **Symptoms - HVAC Systems - Automatic**

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

Step	Action	Yes	No
DEFINITION: The low side pressure is higher than normal and the high side pressure is lower than normal. • Malfunctioning A/C compressor • Refrigerant under charge			
1	Were you sent here from the A/C System Performance Test?		Go to **Air Conditioning (A/C) System Performance Test (Diesel Engine)** or **Air Conditioning (A/C) System Performance Test (Gas Engine w/ Electric Cooling Fan)** or **Air Conditioning (A/C) System Performance**

		Go to **Step 2**	**Test (Gas Engine w/Engine Driven Fan)**
2	After continued operation of the A/C system, do the low and the high side pressures equalize or become static?	Go to **Step 5**	Go to **Step 3**
3	Refer to the pressures recorded during the A/C System Performance Test. Inspect for the following conditions: **CAUTION:** **Refer to Moving Parts and Hot Surfaces Caution .** • The low side pressure is equal to or greater than the specified pressure range of the A/C Performance Table. Refer to **Air Conditioning (A/C) System Performance Test (Diesel Engine)** or **Air Conditioning (A/C) System Performance Test (Gas Engine w/ Electric Cooling Fan)** or **Air Conditioning (A/C) System Performance Test (Gas Engine w/Engine Driven Fan)**. • The high side pressure is less than the specified pressure range of the A/C Performance Table. Refer to **Air Conditioning (A/C) System Performance Test (Diesel Engine)** or **Air Conditioning (A/C) System Performance Test (Gas Engine w/ Electric Cooling Fan)** or **Air Conditioning (A/C) System Performance Test (Gas Engine w/Engine Driven Fan)**. • 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 .** • The low side pressure is greater than the specified pressure range of the A/C Performance Table. Refer to **Air Conditioning (A/C) System Performance Test (Diesel Engine)** or **Air Conditioning (A/C) System Performance Test (Gas Engine w/ Electric Cooling Fan)** or **Air Conditioning (A/C) System Performance Test (Gas Engine w/Engine Driven Fan)**. • The high side pressure is less than the specified pressure range of the A/C Performance Table. Refer to **Air Conditioning (A/C) System Performance Test (Diesel Engine)** or **Air Conditioning (A/C) System Performance Test (Gas Engine w/ Electric Cooling Fan)** or **Air Conditioning (A/C) System Performance Test (Gas Engine w/Engine Driven Fan)**. • The low side refrigerant line at the compressor feels warm. • The high side refrigerant line at the compressor feels warm-to-hot.		Go to **Air Conditioning (A/C) System Performance Test (Diesel Engine)** or **Air Conditioning (A/C) System Performance Test (Gas Engine w/ Electric Cooling Fan)** or **Air Conditioning (A/C) System Performance Test (Gas**

	Do the listed conditions exist ?	Go to **Step 5**	**Engine w/Engine Driven Fan)**
5	The A/C system has a low refrigerant charge. Evacuate and recharge the A/C system. Refer to **Refrigerant Recovery and Recharging**. Is the procedure complete?	Go to **Step 6**	-
6	1. Record the low and the high side pressures as well as the instrument panel (I/P) air outlet temperature after you perform the repairs. 2. Compare the pressures and the panel outlet temperature to those listed in the A/C Performance Chart. Refer to **Air Conditioning (A/C) System Performance Test (Diesel Engine)** or **Air Conditioning (A/C) System Performance Test (Gas Engine w/ Electric Cooling Fan)** or **Air Conditioning (A/C) System Performance Test (Gas Engine w/Engine Driven Fan)**. Are the readings within the specified ranges found on the A/C Performance Chart?	Go to **Step 13**	Go to **Step 7**
7	The A/C compressor is malfunctioning. Remove the expansion device and inspect for contamination. Refer to **Expansion (Orifice) Tube Replacement**. Did you find metal flakes on the expansion device?	Go to **Step 9**	Go to **Step 8**
8	Inspect the expansion device for a brown, powdery residue indicating desiccant in the A/C system. Is a brown, powdery residue present?	Go to **Step 11**	Go to **Step 12**
	1. Remove the suction and the discharge lines from the compressor. Refer to **Suction Hose Replacement (LY2, LMF, L76**		

9	**and L92)** or **Suction Hose Replacement (LMM)** and **Discharge Hose Replacement (LY2, LMF, L76 and L92)** or **Discharge Hose Replacement (LMM)**. 2. Inspect for metal flake contamination at the line connections and the compressor ports. Is metal flake contamination present?	Go to **Step 10**	Go to **Step 12**
10	1. Replace the A/C compressor. Refer to **Air Conditioning Compressor Replacement (LY2, LY5, LH6, L76, L92 and LMG)** or **Air Conditioning Compressor Replacement (LLY/LMM)** or **Air Conditioning Compressor Replacement (LU3)**. 2. Replace the orifice tube. Refer to **Expansion (Orifice) Tube Replacement**. 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 **Flushing**. 2. Replace the orifice tube. Refer to **Expansion (Orifice) Tube Replacement**. 3. Replace the A/C compressor. Refer to **Air Conditioning Compressor Replacement (LY2, LY5, LH6, L76, L92 and LMG)** or **Air Conditioning Compressor Replacement (LLY/LMM)** or **Air Conditioning Compressor Replacement (LU3)**. 4. Replace the accumulator. Refer to **Air**		

	Conditioning Accumulator Replacement (Non-HP2). 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 **Air Conditioning Compressor Replacement (LY2, LY5, LH6, L76, L92 and LMG)** or **Air Conditioning Compressor Replacement (LLY/LMM)** or **Air Conditioning Compressor Replacement (LU3)**. 2. Evacuate and recharge the A/C system. Refer to **Refrigerant Recovery and Recharging**. Is the repair complete?	Go to **Step 13**	-
13	Operate the system in order to verify the repair Did you find and correct the condition?	System OK	Go to **Symptoms - HVAC Systems - Automatic**

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			
	Were you sent here from the A/C System Performance Test?		Go to **Air Conditioning (A/C) System Performance Test (Diesel Engine)** or **Air Conditioning**

1		Go to **Step 2**	**(A/C) System Performance Test (Gas Engine w/ Electric Cooling Fan)** or **Air Conditioning (A/C) System Performance Test (Gas Engine w/Engine Driven Fan)**
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** . 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 **Fan Clutch Diagnosis** . Is the repair complete?	Go to **Step 9**	-
6	**CAUTION:** **Refer to Moving Parts and Hot Surfaces Caution .** Feel the liquid line on both sides of the		

	expansion device.Is the temperature the same before and after the expansion device?	Go to **Step 7**	Go to **Step 8**
7	Replace the damaged/faulty orifice tube. Refer to **Expansion (Orifice) Tube Replacement**. Is the repair complete?	Go to **Step 9**	-
8	Air is in the refrigerant system, or the system is overcharged. Refer to the view screen on the **J 43600** ACR 2000 Refrigerant Station for foreign gas content in the refrigerant. See **Special Tools**. 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 Conditioning (A/C) System Performance Test (Diesel Engine)** or **Air Conditioning (A/C) System Performance Test (Gas Engine w/ Electric Cooling Fan)** or **Air Conditioning (A/C) System Performance Test (Gas Engine w/Engine Driven Fan)**. Are the readings within the specified ranges?	Go to **Step 10**	Go to **Air Conditioning (A/C) System Performance Test (Diesel Engine)** or **Air Conditioning (A/C) System Performance Test (Gas Engine w/ Electric Cooling Fan)** or **Air Conditioning (A/C) System Performance Test (Gas Engine w/Engine Driven Fan)**
10	Operate the system in order to verify the repair. Did you find and correct the condition?		Go to **Symptoms - HVAC Systems - Manual** or Go to **Symptoms - HVAC Systems**

		System OK	- **Automatic**

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.			
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 (Diesel Engine)** or **Air Conditioning (A/C) System Performance Test (Gas Engine w/ Electric Cooling Fan)** or **Air Conditioning (A/C) System Performance Test (Gas Engine w/Engine Driven Fan)**
2	**CAUTION:** **Refer to Moving Parts and Hot Surfaces Caution .** 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**
	Feel along the surfaces of the following high side components: • The compressor discharge hose • The condenser		

3	• 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**
	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		

6	• 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 percent 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**. Are metal flakes present?	Go to **Step 12**	Go to **Step 13**
12	1. Remove the suction line from the vehicle. Refer to **Suction Hose Replacement (LY2, LMF, L76 and L92)** or **Suction Hose Replacement (LMM)**. 2. Inspect the hose for debris by blowing shop air through one end of the hose while covering the other end with a shop towel. 3. Observe the amount of debris collected in the shop towel. Did a large amount of debris collect in the shop towel?	Go to **Step 18**	Go to **Step 20**
13	If the expansion device was restricted with a brown or black residue, perform the following procedure: 1. Flush the A/C system. Refer to **Flushing**. 2. Replace the accumulator. Refer to **Air Conditioning Accumulator Replacement (Non-HP2)**. Are the repairs complete?	Go to **Step 21**	-
14	1. Recover the refrigerant. Refer to **Refrigerant Recovery and Recharging**. 2. Disconnect the suction and the discharge lines from the compressor. Refer to **Suction Hose Replacement (LY2, LMF, L76 and L92)** or **Suction Hose Replacement (LMM)** and **Discharge Hose Replacement (LY2, LMF, L76 and L92)** or **Discharge Hose Replacement (LMM)**.		

	3. Inspect for the presence of debris in the compressor suction port. Is debris present in the compressor suction port?	Go to **Step 15**	Go to **Step 19**
15	1. Remove the debris from the suction port. 2. Inspect the expansion device for damage or debris. Refer to **Expansion (Orifice) Tube Replacement**. Did you find evidence of damage or debris?	Go to **Step 17**	Go to **Step 16**
16	If the expansion device does not show any signs of damage or debris, perform the following procedure: 1. Remove the suction line from the vehicle. Refer to **Suction Hose Replacement (LY2, LMF, L76 and L92)** or **Suction Hose Replacement (LMM)**. 2. Inspect the hose for debris by blowing shop air through one end of the hose while covering the other end with a shop towel. 3. Observe the amount of debris collected in the shop towel. Did a large amount of debris collect in the shop towel?	Go to **Step 18**	Go to **Step 19**
17	1. Replace the expansion device. Refer to **Expansion (Orifice) Tube Replacement**. 2. If the expansion device was restricted, observe the type of debris present. Are metal flakes present?	Go to **Step 12**	Go to **Step 13**
18	If a large amount of debris was collected in the shop towel from the compressor hose assembly, perform the following procedure: Replace the accumulator. Refer to **Air**		

	Conditioning Accumulator Replacement (Non-HP2). Is the repair complete?	Go to **Step 19**	-
19	Install the suction and the discharge lines. Refer to **Suction Hose Replacement (LY2, LMF, L76 and L92)** or **Suction Hose Replacement (LMM)** and **Discharge Hose Replacement (LY2, LMF, L76 and L92)** or **Discharge Hose Replacement (LMM)**. Are the repairs complete?	Go to **Step 21**	-
20	1. Install the suction and the discharge lines. Refer to **Suction Hose Replacement (LY2, LMF, L76 and L92)** or **Suction Hose Replacement (LMM)** and **Discharge Hose Replacement (LY2, LMF, L76 and L92)** or **Discharge Hose Replacement (LMM)**. 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 (Diesel Engine)** or **Air Conditioning (A/C) System Performance Test (Gas Engine w/ Electric Cooling Fan)** or **Air Conditioning (A/C) System Performance Test (Gas Engine w/Engine Driven Fan)**. Are the readings within the specified ranges as shown on the A/C Performance Chart?		Go to **Air Conditioning (A/C) System Performance Test (Diesel Engine)** or **Air Conditioning (A/C) System Performance Test (Gas Engine w/ Electric Cooling Fan)** or **Air Conditioning (A/C) System Performance Test (Gas Engine**

		Go to **Step 22**	**w/Engine Driven Fan)**
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** or Go to **Symptoms - HVAC Systems - Automatic**

HEATING PERFORMANCE DIAGNOSTIC

Step	Action	Yes	No
1	Were you sent here from Symptoms or another diagnostic table?	Go to **Step 2**	Go to **Symptoms - HVAC Systems - Manual** or Go to **Symptoms - HVAC Systems - Automatic**
2	1. Start the engine. 2. Allow the engine to idle. Does the engine reach a normal operating temperature?	Go to **Step 3**	Go to **Step 9**
3	**CAUTION:** **Refer to Moving Parts and Hot Surfaces Caution .** 1. Allow the engine to idle. 2. Select the FLOOR mode. 3. Select the minimum blower speed. 4. Select the warmest temperature setting. 5. Feel the temperature of the inlet and outlet heater hoses at the heater core.		

	Does the inlet heater hose feel warmer than the outlet heater hose?	Go to **Step 7**	Go to **Step 4**
4	1. Install a thermometer into the center IP PANEL air outlet. 2. Secure a thermometer to the heater core outlet hose. 3. Select the PANEL mode. 4. Select the maximum blower speed. 5. Select the warmest temperature setting. 6. Record the temperature at the following locations: • The center IP PANEL air outlet • The heater core outlet hose 7. Compare the recorded temperatures. Are the two temperature readings about equal?	Go to **Step 5**	Go to **Step 6**
5	1. Inspect and repair the following areas of the vehicle for cold air leaks: • The cowl • The recirculation door • The HVAC module case 2. Perform the necessary repairs. Are the repairs complete?	Go to **Step 10**	-
6	1. Inspect the temperature door operation. Refer to **Diagnostic System Check - Vehicle** . 2. Perform any necessary repairs. Are the repairs complete?	Go to **Step 10**	-
	1. Turn OFF the engine. 2. Backflush the heater core. 3. Start the engine. 4. Select the FLOOR mode.		

7	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** . 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

Step	Action	Yes	No
1	Were you sent here from Symptoms or another diagnostic table?	Go to **Step 2**	Go to **Symptoms - HVAC Systems - Manual** or Go to **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 10**	Go to **Step 8**
4	1. Select the minimum blower speed. 2. Select the warmest temperature setting. **CAUTION:** **Refer to Moving Parts and Hot Surfaces Caution .** 3. Feel the temperature of the inlet and outlet hoses at the heater core. Does the inlet heater hose feel warmer than the outlet heater hose?	Go to **Step 11**	Go to **Step 5**
5	Test the operation of the A/C compressor clutch. Does the A/C compressor clutch engage?	Go to **Step 7**	Go to **Step 6**
6	Repair the A/C compressor clutch. Refer to **Air Conditioning Compressor Malfunction** for the automatic system or to **Air Conditioning Compressor Malfunction** for the manual system. 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 (Diesel Engine)** or **Air Conditioning (A/C) System Performance Test (Gas Engine w/ Electric Cooling Fan)** or **Air Conditioning (A/C) System Performance Test (Gas Engine w/Engine Driven Fan)**. 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** . 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 **Diagnostic Starting Point - Heating, Ventilation and Air Conditioning**. Is the repair complete?	Go to **Step 14**	-
11	Repair the heating concern. Refer to **Heating Performance Diagnostic**. Is the repair complete?	Go to **Step 14**	-
12	Repair the A/C performance concern. Refer to **Air Conditioning (A/C) System Performance Test (Diesel Engine)** or **Air Conditioning (A/C) System Performance Test (Gas Engine w/ Electric Cooling Fan)** or **Air Conditioning (A/C) System Performance Test (Gas Engine w/Engine Driven Fan)**. Is the repair complete?	Go to **Step 14**	-
13	Repair the recirculation door concern. Refer to **Diagnostic Starting Point - Heating, Ventilation and Air Conditioning**. Is the repair complete?	Go to **Step 14**	-
14	Operate the system in order to verify the repair. Did you find and correct the condition?	System OK	Go to **Step 2**

NOISE DIAGNOSIS - BLOWER MOTOR

Step	Action	Yes	No
1	Were you sent here from Symptoms or another diagnostic table?	Go to **Step 2**	Go to **Symptoms - HVAC Systems - Manual** or Go to **Symptoms - HVAC Systems - Automatic**
2	Inspect the air inlet grille for debris. Is debris present?	Go to **Step 8**	Go to **Step 3**
	1. Sit inside the vehicle.		

3	2. Close the vehicle doors and windows. 3. Turn ON the ignition, with the engine OFF. 4. Cycle the blower motor through all of the speeds and modes in order to determine where and when the noise occurs. Is a noise evident during the blower operation?	Go to **Step 4**	Go to **Step 11**
4	Inspect for excessive vibration at each blower motor speed by feeling the blower case. Is excess vibration present?	Go to **Step 6**	Go to **Step 5**
5	Listen to the blower motor at each speed. Is the blower motor making a squeaking or chirping noise?	Go to **Step 9**	Go to **Step 11**
6	1. Remove the blower motor. Refer to **Blower Motor Replacement**. 2. Inspect the blower motor impeller for deposits of foreign material. 3. Inspect the blower motor for deposits of foreign material. Did you find any foreign material on the blower motor or blower motor impeller?	Go to **Step 8**	Go to **Step 7**
7	Inspect the blower motor for the following conditions: • Cracked blades • A loose impeller retainer • Improper impeller alignment Did you find any of these conditions?	Go to **Step 9**	Go to **Step 10**
8	Remove the foreign material. Is the action complete?	Go to **Step 10**	-
9	Replace the blower motor. Refer to **Blower Motor Replacement**. Is the repair complete?	Go to **Step 11**	-

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

NOISE DIAGNOSIS - AIR CONDITIONING (A/C) SYSTEM

Step	Action	Yes	No
1	Were you sent here from Symptoms or another diagnostic table?	Go to **Step 2**	Go to **Symptoms - HVAC Systems - Manual** or Go to **Symptoms - HVAC Systems - Automatic**
2	1. A/C system noises can be generally categorized into 3 areas: • Screeching, squealing, chirping noises • Moaning noises • Vibration/rattle noises 2. Start the engine. 3. Ensure that the A/C is ON. Is a screeching, squealing noise heard when the A/C is engaged?	Go to **Step 3**	Go to **Step 9**
3	With the engine OFF, inspect the drive belt for excessive wear. Refer to **Drive Belt Falls Off and Excessive Wear Diagnosis** . 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** . Is the drive belt tension correct?	Go to **Step 19**	Go to **Step 5**
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 compressor locked up?	Go to **Step 24**	Go to **Step 7**
7	Is the A/C compressor clutch slipping?	Go to **Step 23**	Go to **Step 8**
8	Using a stethoscope, listen to the A/C compressor for any abnormal noises. Is the compressor causing an abnormal noise?	Go to **Step 15**	Go to **Step 10**
9	Does a moaning noise exist when the A/C clutch is engaged?	Go to **Step 10**	Go to **Step 12**
10	Listen to the A/C compressor components and mounting for noise concerns using a stethoscope. Are any of these components loose, damaged or excessively worn?	Go to **Step 20**	Go to **Step 11**
11	1. Idle the engine. 2. Engage the A/C compressor clutch. 3. Using a stethoscope, move around the entire refrigerant plumbing system, inspecting for any abnormal noises caused by component ground-out. Are any of the A/C components grounding out and causing a 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 14**
14	1. Idle the engine in PARK with the A/C compressor clutch engaged. 2. Using a stethoscope, move around the entire A/C system testing for any abnormal noises caused by a component. Do any of the A/C components cause an abnormal noise?	Go to **Step 21**	Go to **Step 25**
	Verify that the A/C system is properly charged.		

15	Refer to **Refrigerant System Capacities**. Is the A/C system properly charged?	Go to **Step 26**	Go to **Step 16**
16	Recharge the A/C system to specification. Refer to **Refrigerant Recovery and Recharging**. Is the abnormal compressor noise still present?	Go to **Step 25**	Go to **Step 26**
17	Repair the oil leak. Refer to the appropriate repair procedure in Engine Mechanical. Is the repair complete?	Go to **Step 26**	-
18	Replace the A/C drive belt. Refer to **Air Conditioning Compressor Belt Replacement** . Is the replacement complete?	Go to **Step 26**	-
19	Replace the A/C drive belt tensioner. Refer to **Drive Belt Tensioner Replacement - Air Conditioning** . Is the replacement complete?	Go to **Step 26**	-
20	Repair or replace the A/C compressor mounting component. Is the repair complete?	Go to **Step 26**	-
21	Repair or replace the component which is causing the moaning concern as needed. Is the repair complete?	Go to **Step 26**	-
22	Correctly route or insulate the A/C component. Is the repair complete?	Go to **Step 26**	-
23	Replace the A/C compressor clutch. Refer to **Compressor Clutch Plate/Hub Assembly Replacement (4.3L, 6.6L)** or **Compressor Clutch Plate/Hub Assembly Replacement (V8 - Gas)**. Is the replacement complete?	Go to **Step 26**	-
24	Replace the A/C compressor. Refer to **Air Conditioning Compressor Replacement (LY2, LY5, LH6, L76, L92 and LMG)** or **Air Conditioning Compressor Replacement (LLY/LMM)** or **Air Conditioning Compressor Replacement (LU3)**. Is the replacement complete?	Go to **Step 26**	-
	The concern may be caused by an engine related		

25	component. Refer to **Vibration Analysis - Engine** . Did you find and correct the condition?	Go to **Step 26**	-
26	Operate the system in order to verify the repair. Did you find and correct the condition?	System OK	Go to **Step 2**

NOISE DIAGNOSIS - HVAC MODULE

Step	Action	Yes	No
1	Were you sent here from Symptoms or another diagnostic table?	Go to **Step 2**	Go to **Symptoms - HVAC Systems - Manual** or Go to **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. Determine the type of noise: • Scrape, pop • Tick/click, chirp or groaning • Air rush/whistle Is a scrape or pop noise evident when selecting modes or temperature settings?	Go to **Step 6**	Go to **Step 3**
3	Is a tick/click, chirping, groaning or scraping noise present, but decreases as blower motor speed is decreased?	Go to **Step 6**	Go to **Step 4**
4	Is an air rush/whistle noise evident in all modes but not all temperature settings?	Go to **Step 6**	Go to **Step 5**
5	Is an air rush/whistle noise evident only in defrost or floor mode?	Go to **Step 6**	Go to **Step 6**

6	Remove the instrument panel I/P carrier. Refer to **Instrument Panel Carrier Replacement** . 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 10**	Go to **Step 8**
8	Inspect the mode and temperature doors and seals for warping or cracking. Are the doors in normal condition?	Go to **Step 11**	Go to **Step 9**
9	Replace the appropriate door and/or seals. Is the repair complete?	Go to **Step 11**	-
10	Remove any obstructions or foreign material found. Is the action complete?	Go to **Step 11**	-
11	Install the I/P carrier. Refer to **Instrument Panel Carrier Replacement** . 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

Step	Action	Yes	No
1	Were you sent here from Symptoms or another diagnostic table?	Go to **Step 2**	Go to **Symptoms - HVAC Systems - Manual** or Go to **Symptoms - HVAC Systems - Automatic**
	1. Sit inside the vehicle. 2. Close all of the doors and windows.		

2	3. Start the engine. 4. Allow the engine idle at normal operating temperature. 5. Select the maximum blower speed. 6. Select the PANEL air outlet mode. 7. Select the coldest temperature setting. 8. Cycle through all of the blower speeds, modes and temperatures to define what type of odor is present. • Musty smell • Coolant smell • Oil smell Does the odor have a musty smell?	Go to **Step 3**	Go to **Step 8**
3	Inspect the HVAC 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: • Water leaks around the windshield • Blockage of the HVAC module drain • Leaks around the door seals Is a leak present?	Go to **Step 7**	Go to **Step 14**
7	Repair the leak as necessary. Is the repair complete?	Go to **Step 15**	-
8	Does the odor have a coolant smell?	Go to **Step 9**	Go to **Step 12**
9	Inspect the cooling system for leaks. Refer to **Loss of Coolant** . Is a leak present?	Go to **Step 10**	Go to **Step 12**
10	Inspect for coolant leaking inside the vehicle or for a film build-up on the windshield.		

	Is the condition present?	Go to **Step 11**	Go to **Step 15**
11	Replace the heater core. Refer to **Heater Core Replacement**. Is the repair complete?	Go to **Step 15**	-
12	Does the odor have an oily smell?	Go to **Step 13**	Go to **Step 15**
13	1. Inspect the engine compartment for any leaks. Refer to the following procedures: • **Oil Leak Diagnosis** • **Fluid Leak Diagnosis** • **Power Steering Fluid Leaks** 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, 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**.
- **J 45037** A/C Oil Injector. See **Special Tools**.

Recovery and Recharge

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**. 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**. 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**. For the proper quantities of oil to add to the A/C refrigerant system, refer to **Refrigerant System Capacities**.

FLUSHING

Tools Required

- **J 41447** Leak Detection Dye. See **Special Tools**.
- **J 42220** Universal 12V Leak Detection Lamp. See **Special Tools**.
- **J 43600** ACR 2000 Refrigerant Station. See **Special Tools**.
- **J 45268** Flush Adapter Kit. See **Special Tools**.

Flush

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

Flushing is intended to remove the following:

- Contaminated PAG oil

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

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

1. Recover the refrigerant. Refer to **Refrigerant Recovery and Recharging**.
2. Remove the orifice tube. Refer to **Expansion (Orifice) Tube Replacement**.
3. Connect the A/C lines with the orifice tube removed.
4. Remove the A/C compressor. Refer to **Air Conditioning Compressor Replacement (LY2, LY5, LH6, L76, L92 and LMG)** or **Air Conditioning Compressor Replacement (LLY/LMM)** or **Air Conditioning Compressor Replacement (LU3)**.
5. Install **J 45268** -3 to the A/C compressor hose assembly. See **Special Tools**.

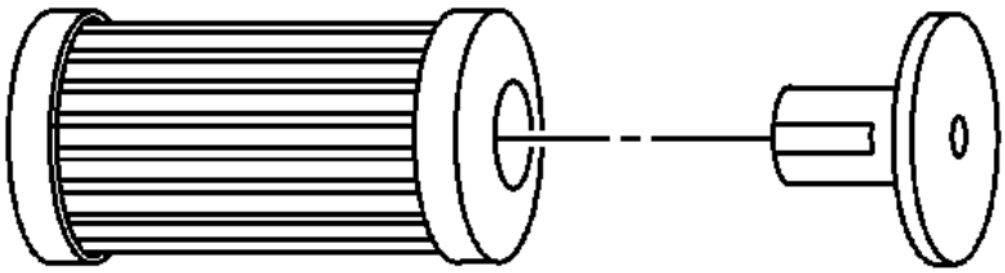


Fig. 4: View Of A/C Filter And Check Valve
Courtesy of GENERAL MOTORS CORP.

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. See Special Tools. 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 the **J 45268** -3 flush adapter. See **Special Tools**.

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

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 the J 45268-1 is serviceable. Remove and discard the check valve from the filter.

1. Service the filter with ACDelco P/N GF 470, before each flush.

   Connect the J 45268-1 flush filter to the discharge port of **J 45268** -3 flush adapter. See **Special Tools**.

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

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

8. Flush the A/C system. Follow the instructions supplied with the **J 43600** . See **Special Tools**.
9. Remove the **J 45268** -3 from the A/C compressor hose assembly. See **Special Tools**.

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. Drain the PAG oil from the A/C compressor. Rotate the compressor input shaft to assist in draining the PAG oil from the compressor.
11. Add back the total system capacity of PAG oil to the A/C compressor. Refer to

Refrigerant System Capacities.

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

12. Add one bottle of **J 41447** directly to the A/C Compressor. See **Special Tools**.
13. Install the A/C compressor. Refer to **Air Conditioning Compressor Replacement (LY2, LY5, LH6, L76, L92 and LMG)** or **Air Conditioning Compressor Replacement (LLY/LMM)** or **Air Conditioning Compressor Replacement (LU3)**.
14. Inspect the orifice tube for debris. Clean or replace as needed.
15. Install the orifice tube. Refer to **Expansion (Orifice) Tube Replacement**.
16. Evacuate and recharge the A/C system. Refer to **Refrigerant Recovery and Recharging**.
17. Leak test the fittings using the **J 42220** . See **Special Tools**.

COMPRESSOR OIL BALANCING

Draining Procedure

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

1. Before draining oil, position the compressor verdically (clutch facing upwards) and let it sit for 1 minute.
2. Position the compressor horizontally, with the ports facing downward, rotate the clutch and shake the compressor in order to remove as much oil from the compressor as possible.
3. 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.

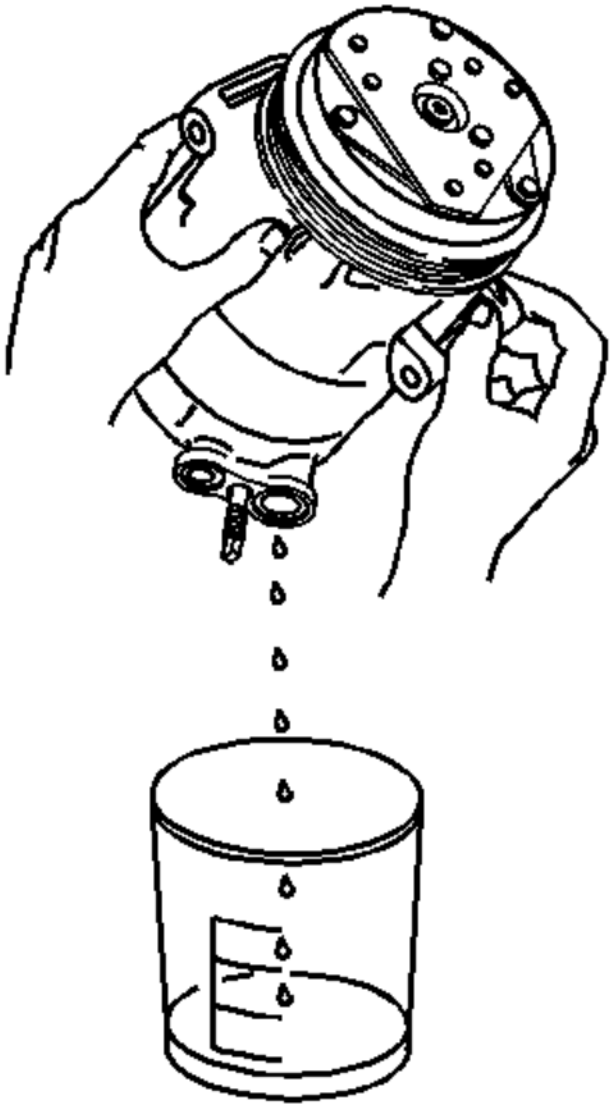


Fig. 5: Draining A/C Refrigerant Oil From Compressor
Courtesy of GENERAL MOTORS CORP.

4. Measure and record the amount of oil drained from the removed compressor. This measurement will be used during installation of the replacement compressor.
5. Properly discard the used refrigerant oil.

Balancing Procedure

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

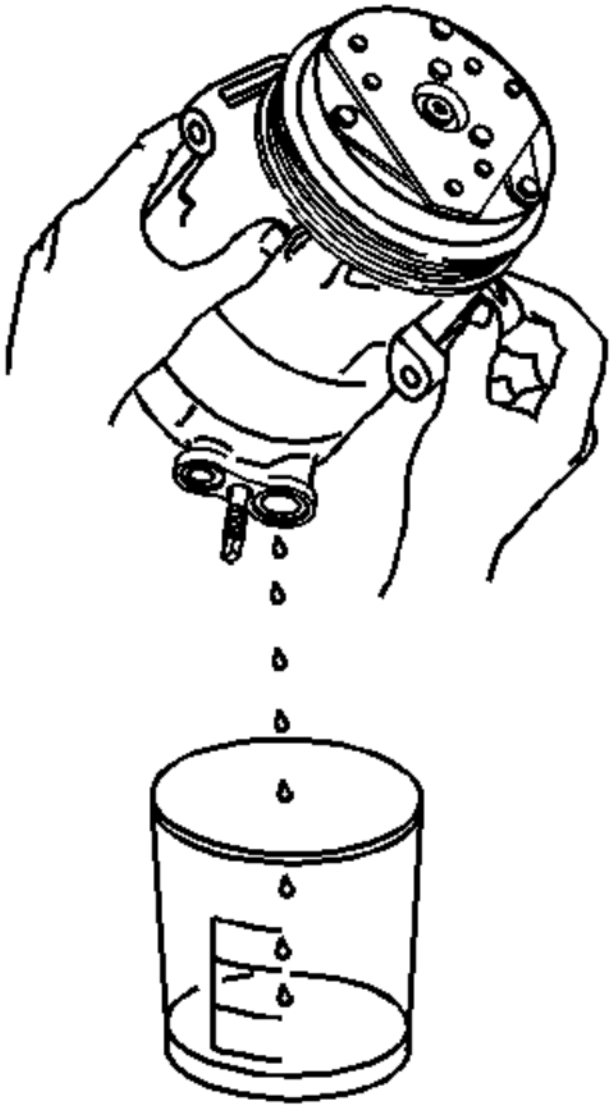


Fig. 6: Draining A/C Refrigerant Oil From Compressor
Courtesy of GENERAL MOTORS CORP.

1. Before installing the compressor, the refrigerant oil will have to be fully drained.
2. Add back the same quantity of polyalkylene glycol (PAG) oil as drained from the removed compressor.

   Refer to the amount of refrigerant oil recorded during the compressor removal.

AIR CONDITIONING COMPRESSOR REPLACEMENT (LY2, LY5, LH6, L76, L92 AND LMG)

Special Tools

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

Removal Procedure

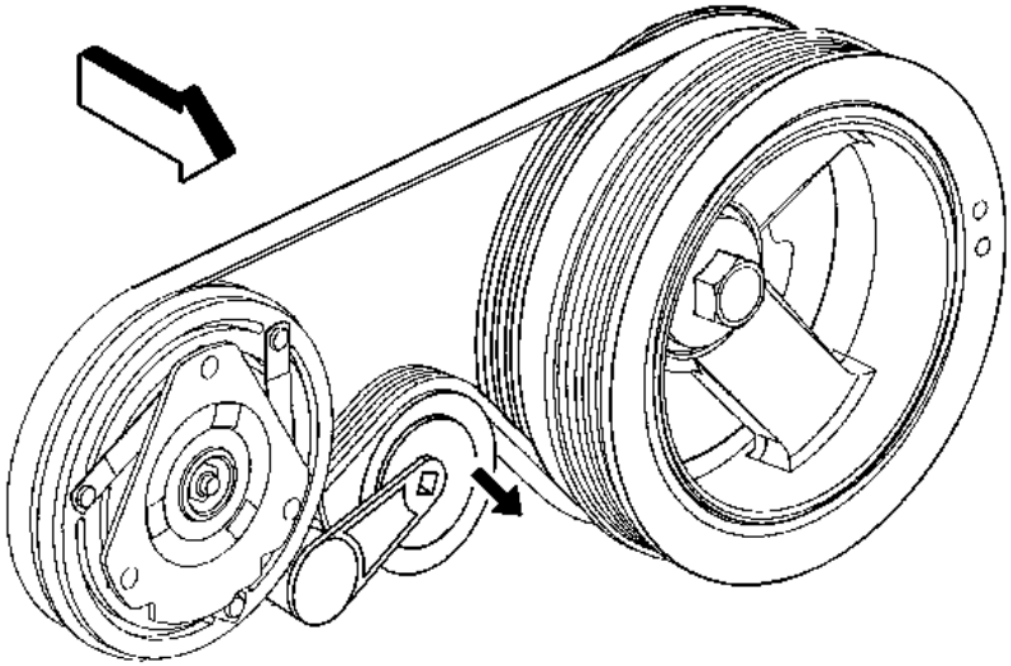


Fig. 7: A/C Belt Tensioner
Courtesy of GENERAL MOTORS CORP.

1. Recover the refrigerant. Refer to **Refrigerant Recovery and Recharging**.
2. Install a ratchet into the air conditioning (A/C) belt tensioner adapter opening.

3. Remove the air cleaner resonator outlet duct. Refer to **Air Cleaner Resonator Outlet Duct Replacement** .
4. Rotate the A/C belt tensioner clockwise in order to relieve the tension on the belt.
5. Remove the A/C belt from the A/C compressor.
6. Slowly release the tension on the A/C belt tensioner.
7. Remove the discharge hose bolt from the A/C compressor.
8. Remove the discharge hose from the A/C compressor.
9. Remove the suction hose bolt from the A/C compressor.
10. Remove the suction hose from the A/C compressor.
11. Discard the sealing washers. Cap all of the openings.
12. Disconnect the electrical connections.

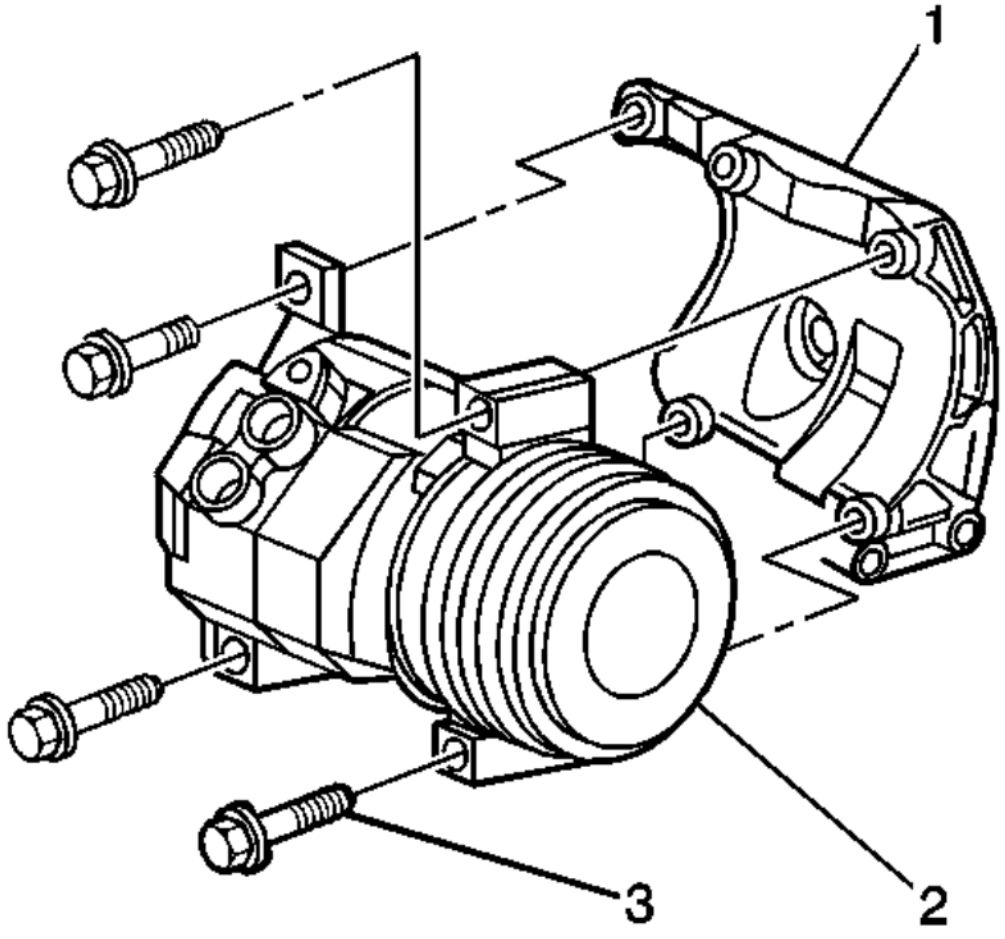


Fig. 8: View of A/C Compressor & Bolts
Courtesy of GENERAL MOTORS CORP.

13. Remove the A/C compressor mounting bolts. The lower right bolt (3) will stay with the compressor due to a lack of clearance.
14. Remove the A/C compressor (2) from the bracket (1).
15. If replacing the A/C compressor. Refer to **Compressor Oil Balancing**.

Installation Procedure

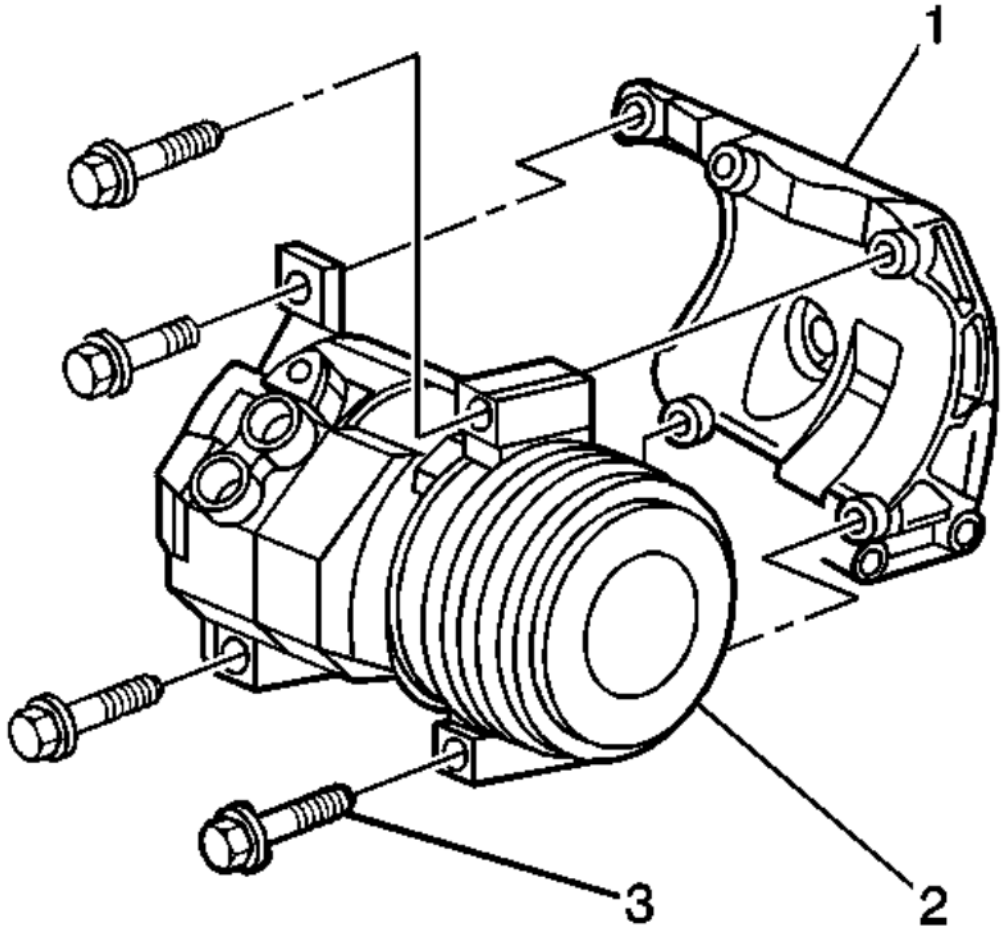


Fig. 9: View of A/C Compressor & Bolts
Courtesy of GENERAL MOTORS CORP.

1. Install the A/C compressor (2) to the bracket (1) through the fender well. Insert the mounting bolt (3) into the lower right mounting boss before installing the A/C compressor.
2. Install the A/C compressor to the bracket. Insert the mounting bolt into the lower right mount before installing the A/C compressor.

NOTE: Refer to Fastener Notice .

3. Install the A/C compressor mounting bolts.

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

4. Connect the electrical connector to the A/C compressor.
5. Install the A/C discharge hose to the compressor using new sealing washers. Refer to **Sealing Washer Replacement**.
6. Install the A/C discharge hose bolt to the A/C compressor.

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

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

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

9. Install the A/C drive belt. Refer to **Air Conditioning Compressor Belt Replacement** .
10. Evacuate and recharge the A/C system. Refer to **Refrigerant Recovery and Recharging**.
11. Install the air cleaner resonator outlet duct. Refer to **Air Cleaner Resonator Outlet Duct Replacement** .
12. Leak test the fittings of the component using the **J 39400-A** . See **Special Tools**.

AIR CONDITIONING COMPRESSOR REPLACEMENT (LLY/LMM)

Tools Required

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

Removal Procedure

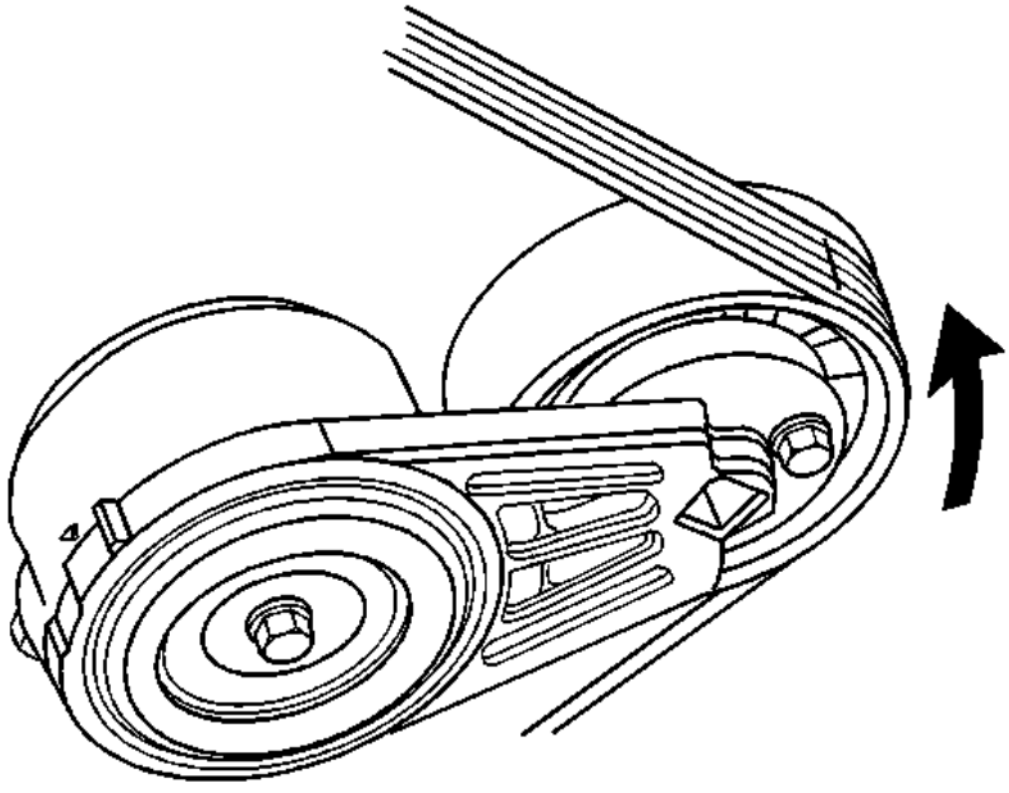


Fig. 10: View Of Drive Belt Tensioner
Courtesy of GENERAL MOTORS CORP.

1. Recover the refrigerant. Refer to **Refrigerant Recovery and Recharging**.
2. Install a ratchet into the belt tensioner adapter opening.
3. Rotate the belt tensioner counterclockwise in order to relieve the tension on the belt.
4. Remove the belt from the A/C compressor.
5. Slowly release the tension on the belt tensioner.

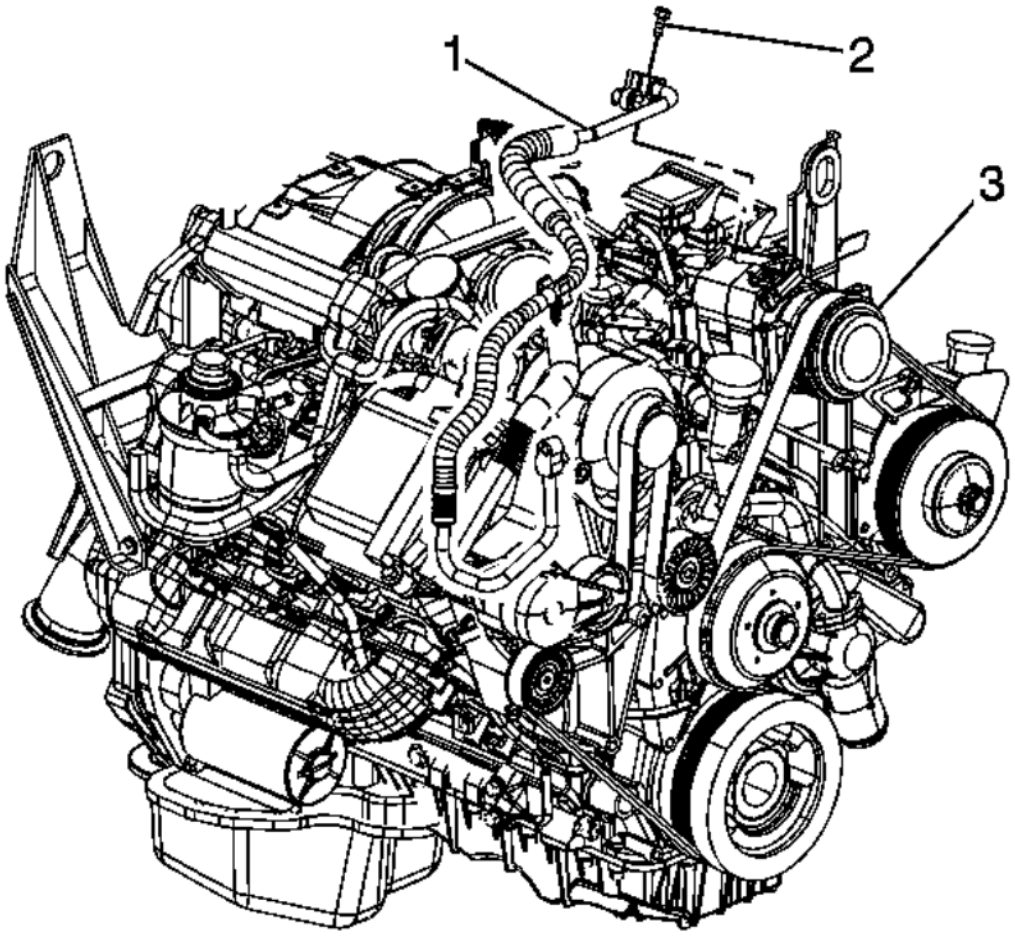


Fig. 11: A/C Discharge & Suction Hoses (LB7)
Courtesy of GENERAL MOTORS CORP.

6. Remove the discharge hose bolt (2) from the A/C compressor (3).
7. Remove the discharge hose (1) from the A/C compressor (3).

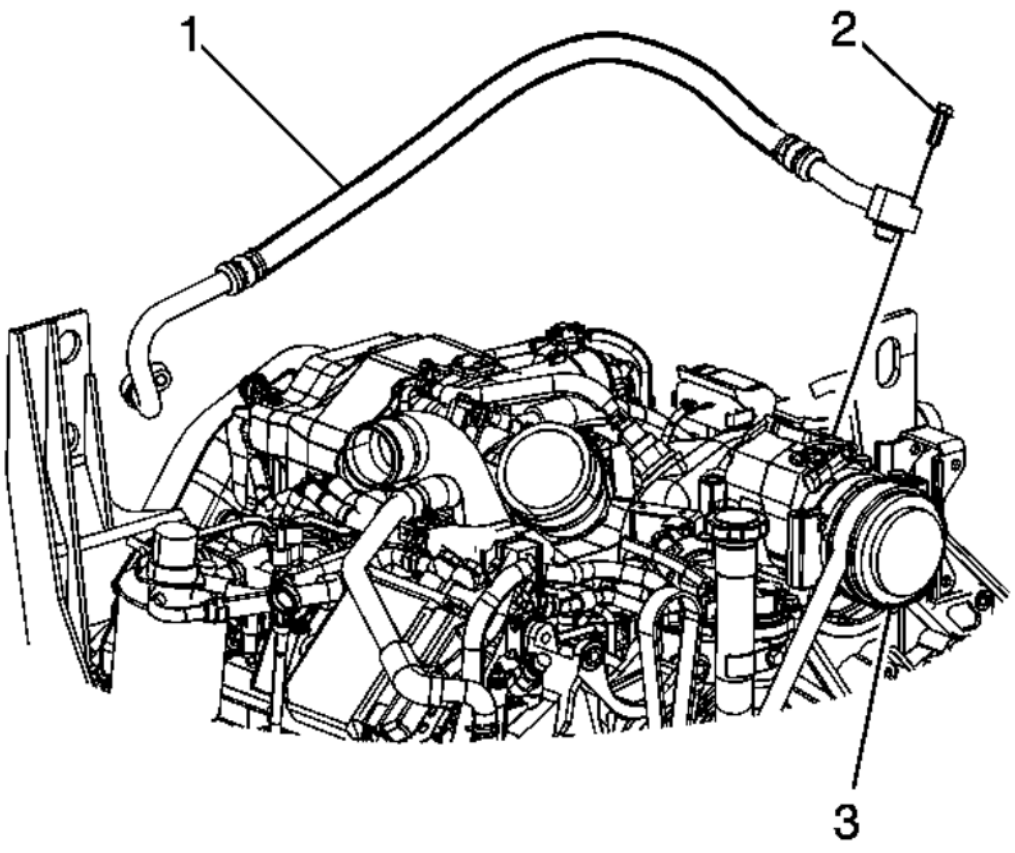


Fig. 12: View Of A/C Suction Hose (LB7)
Courtesy of GENERAL MOTORS CORP.

8. Remove the suction hose bolt (2) from the A/C compressor (3).
9. Remove the suction hose (1) from the A/C compressor (3).
10. Discard the sealing washers. Cap all of the openings.
11. Disconnect the electrical connections.

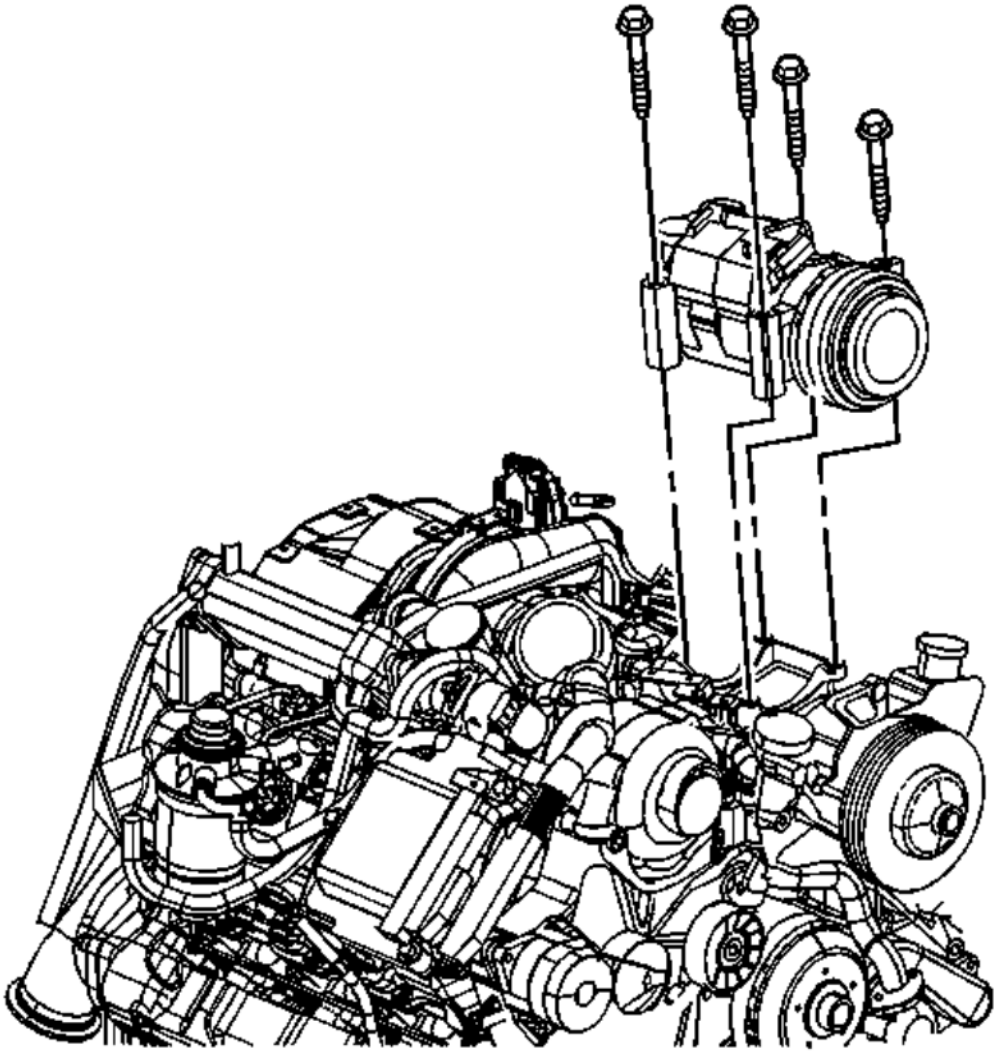


Fig. 13: View Of A/C Compressor (LB7)
Courtesy of GENERAL MOTORS CORP.

12. Remove the A/C compressor mounting bolts.
13. If replacing the A/C compressor. Refer to **Compressor Oil Balancing**.

Installation Procedure

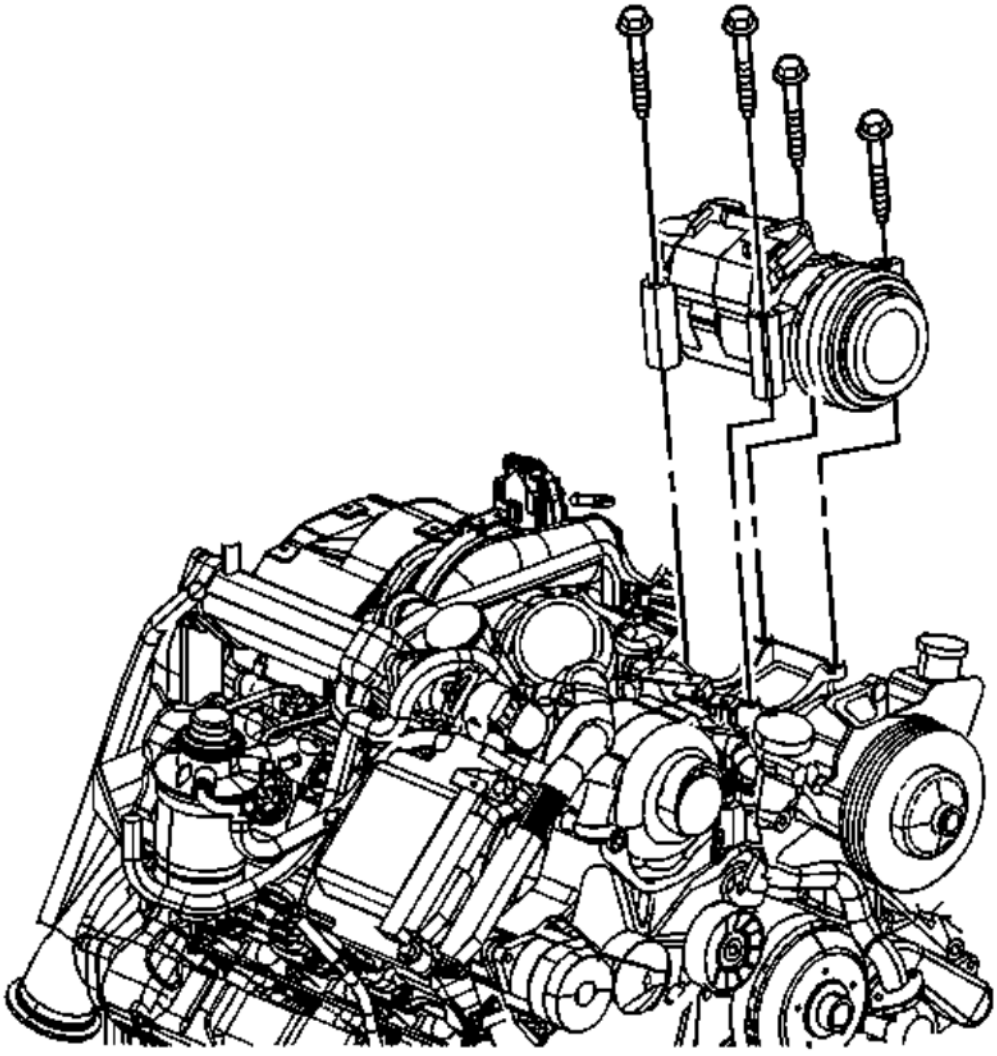


Fig. 14: View Of A/C Compressor (LB7)
Courtesy of GENERAL MOTORS CORP.

1. Remove the caps or tape from the hose and line ends.
2. Install the A/C compressor.

NOTE: Refer to Fastener Notice .

3. Install the A/C compressor mounting bolts.

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

4. Connect the electrical connection.

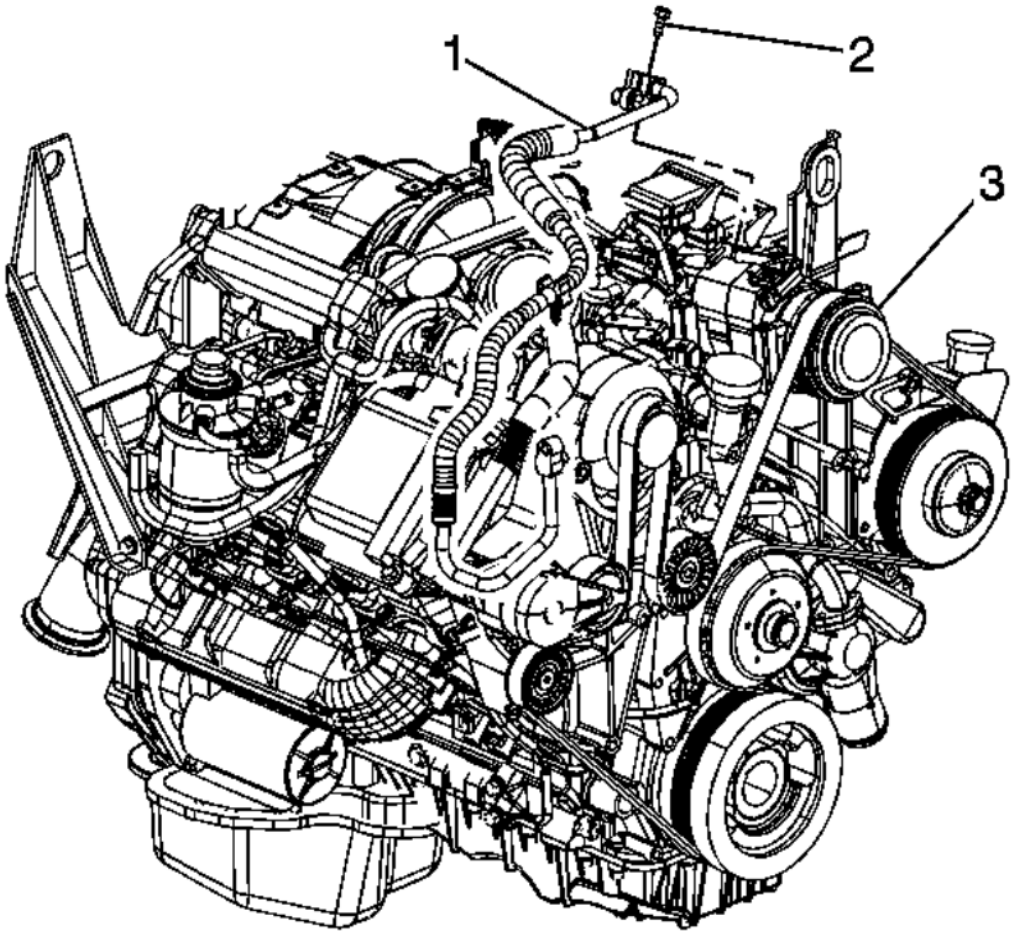


Fig. 15: A/C Discharge & Suction Hoses (LB7)
Courtesy of GENERAL MOTORS CORP.

5. Install the A/C discharge hose (1) to the compressor (3) using new sealing washers.
6. Install the A/C discharge hose bolt (2) to the A/C compressor (3).

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

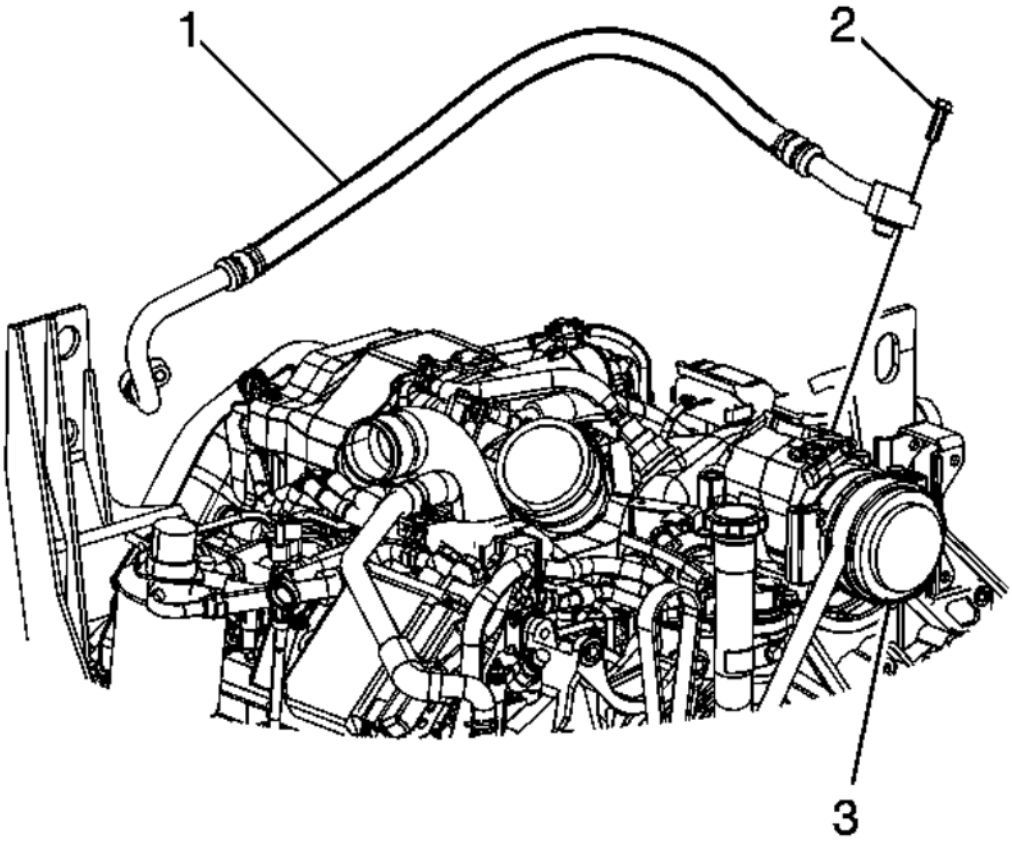


Fig. 16: View Of A/C Suction Hose (LB7)
Courtesy of GENERAL MOTORS CORP.

7. Install the A/C suction hose (1) to the compressor (3) using new sealing washers.
8. Install the A/C suction hose bolt (2) to the A/C compressor (3).

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

9. Install the drive belt. Refer to **Drive Belt Replacement** .
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** . See **Special Tools**.

AIR CONDITIONING COMPRESSOR REPLACEMENT (LU3)

Tools Required

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

Removal Procedure

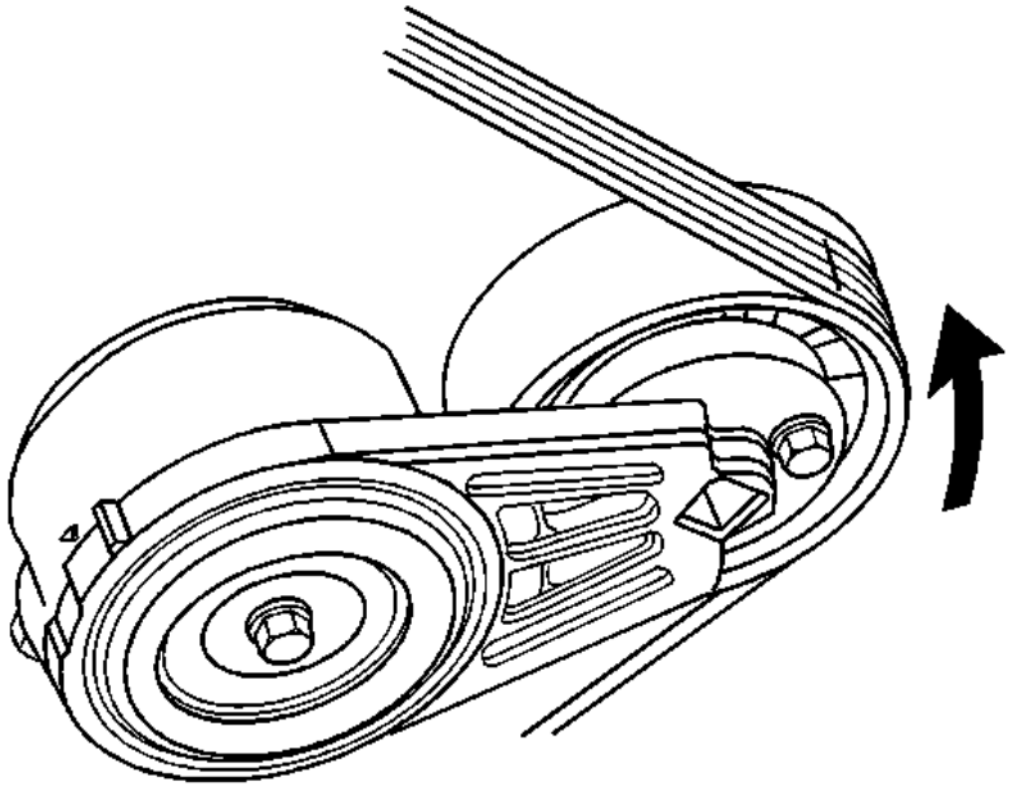


Fig. 17: View Of Drive Belt Tensioner
Courtesy of GENERAL MOTORS CORP.

1. Recover the refrigerant. Refer to **Refrigerant Recovery and Recharging**.
2. Install a ratchet into the belt tensioner adapter opening.
3. Rotate the belt tensioner counterclockwise in order to relieve the tension on the belt.
4. Remove the belt from the A/C compressor.

5. Slowly release the tension on the belt tensioner.

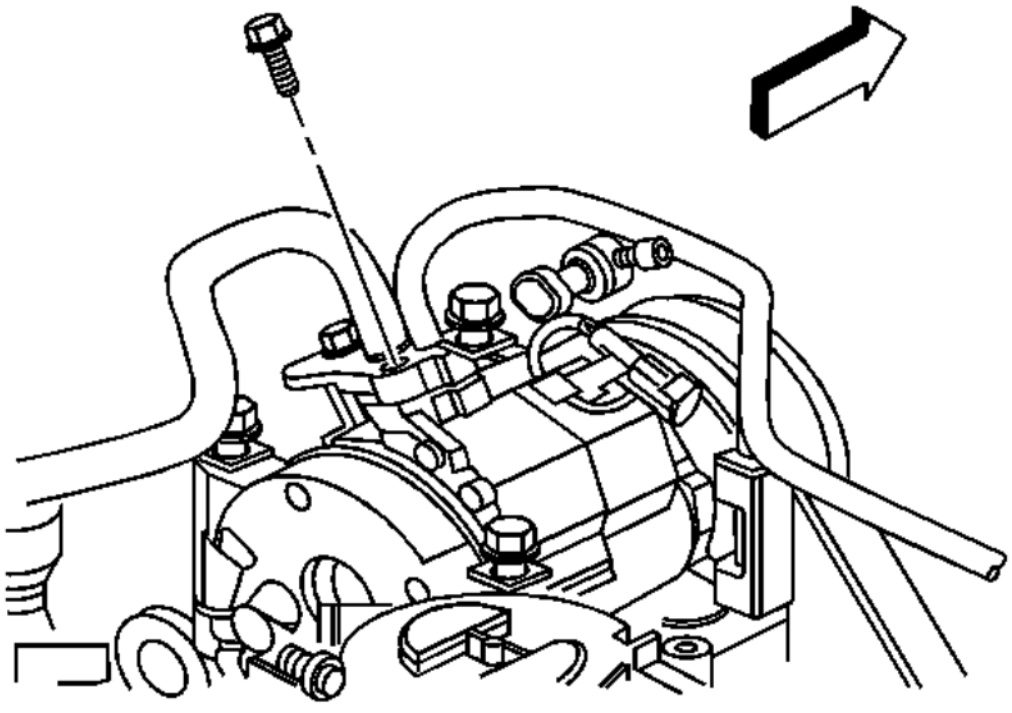


Fig. 18: View Of Discharge & Suction Hose Bolt
Courtesy of GENERAL MOTORS CORP.

6. Remove the discharge and suction hose bolt from the A/C compressor.
7. Remove the discharge and suction hose from the A/C compressor.
8. Discard the sealing washers. Cap all of the openings.
9. Disconnect the electrical connections.

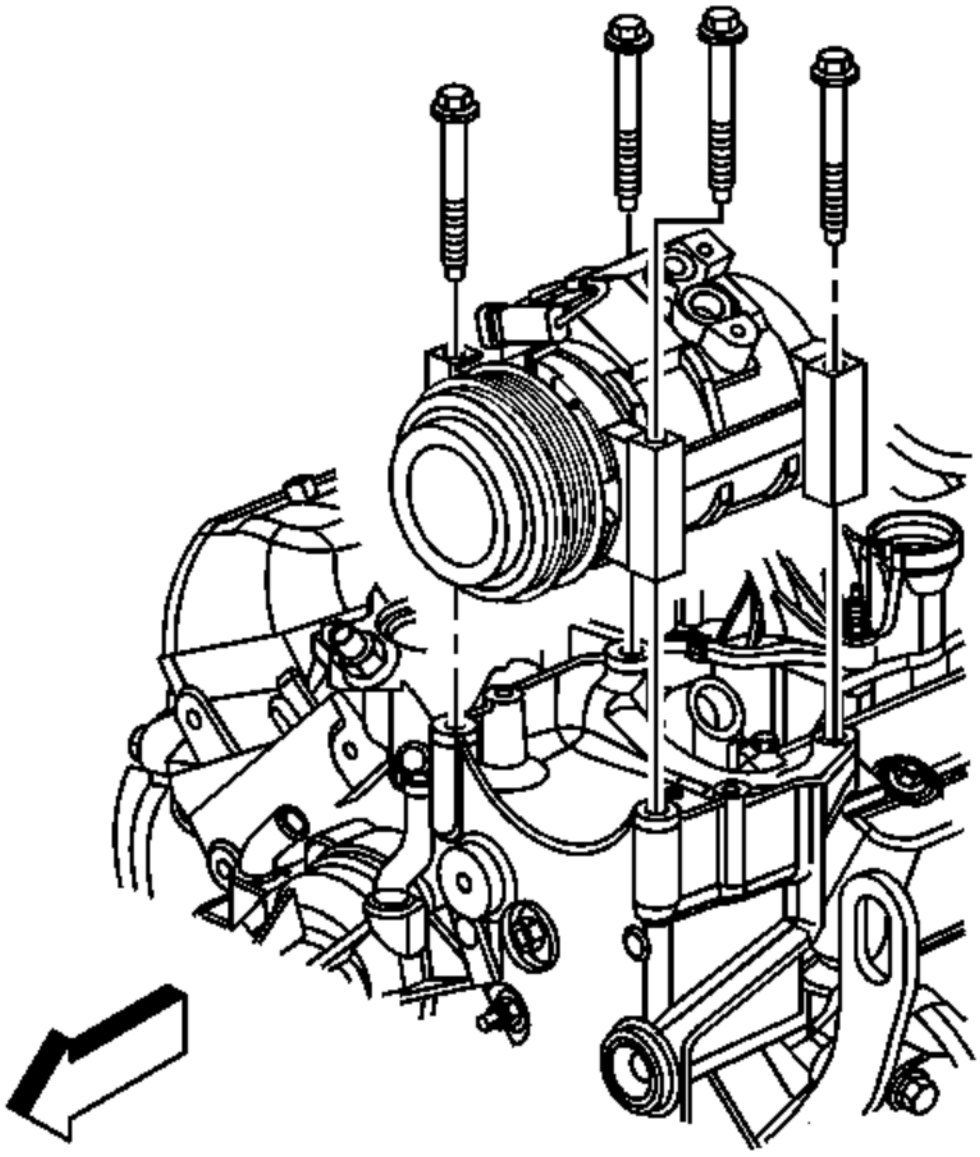


Fig. 19: View Of A/C Compressor & Mounting Bolts
Courtesy of GENERAL MOTORS CORP.

10. Remove the A/C compressor mounting bolts.
11. If replacing the A/C compressor. Refer to **Compressor Oil Balancing**.

Installation Procedure

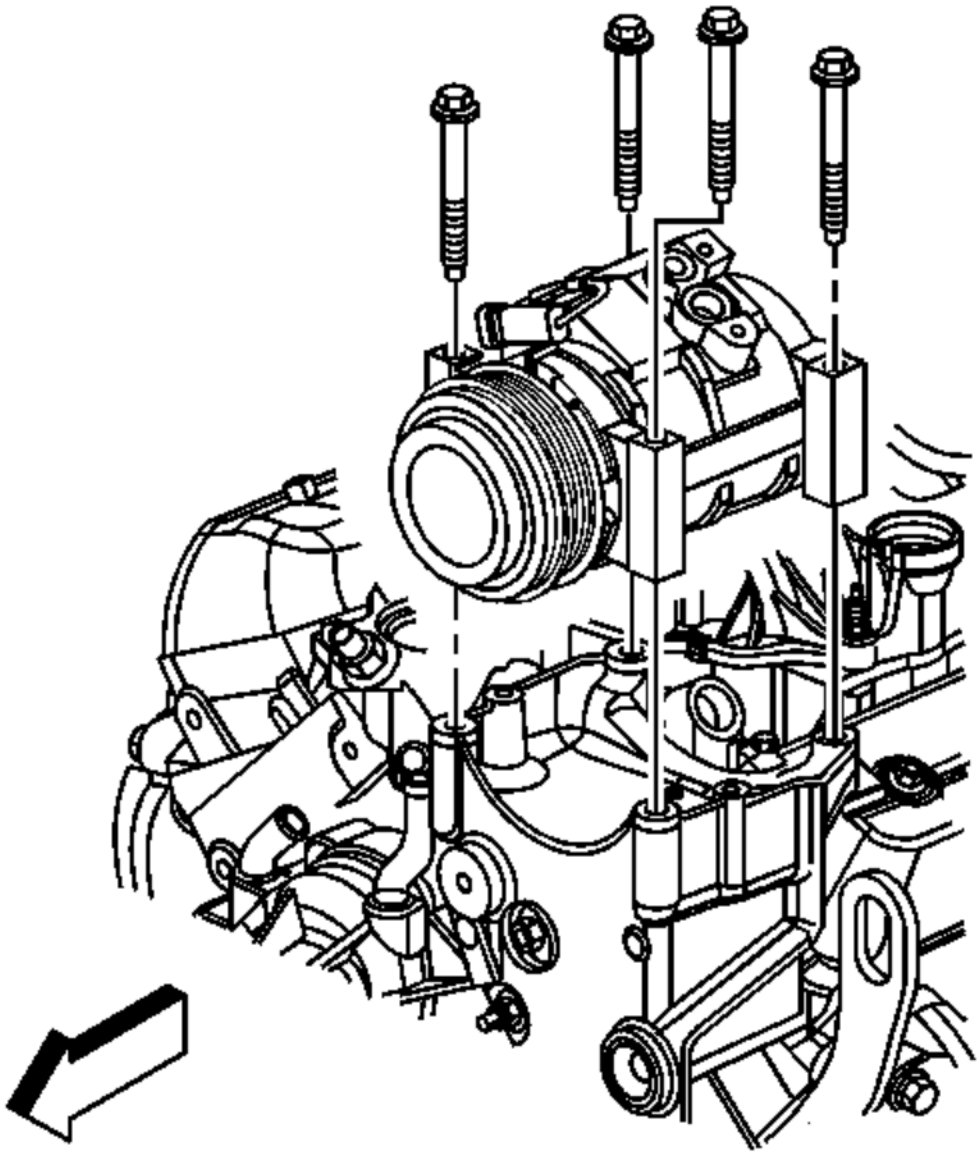


Fig. 20: View Of A/C Compressor & Mounting Bolts
Courtesy of GENERAL MOTORS CORP.

1. Remove the caps or tape from the hose and line ends.

2. Install the A/C compressor.

NOTE: Refer to Fastener Notice .

3. Install the A/C compressor mounting bolts.

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

4. Connect the electrical connection.

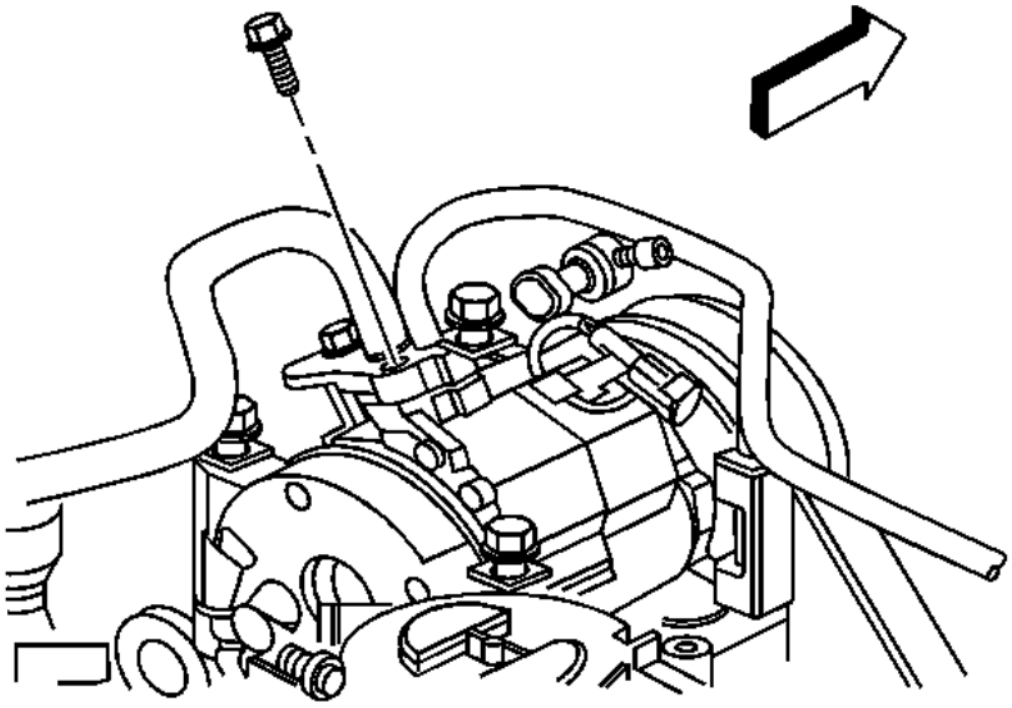


Fig. 21: View Of Discharge & Suction Hose Bolt
Courtesy of GENERAL MOTORS CORP.

5. Install the A/C discharge and suction hose to the compressor using new sealing washers.
6. Install the A/C discharge and suction hose bolt to the A/C compressor.

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

7. Install the drive belt. Refer to **Drive Belt Replacement** .
8. Evacuate and recharge the A/C system. Refer to **Refrigerant Recovery and Recharging**.
9. Leak test the fittings of the component using the **J 39400-A** . See **Special Tools**.

COMPRESSOR CLUTCH PLATE/HUB ASSEMBLY REPLACEMENT (4.3L, 6.6L)

Removal Procedure

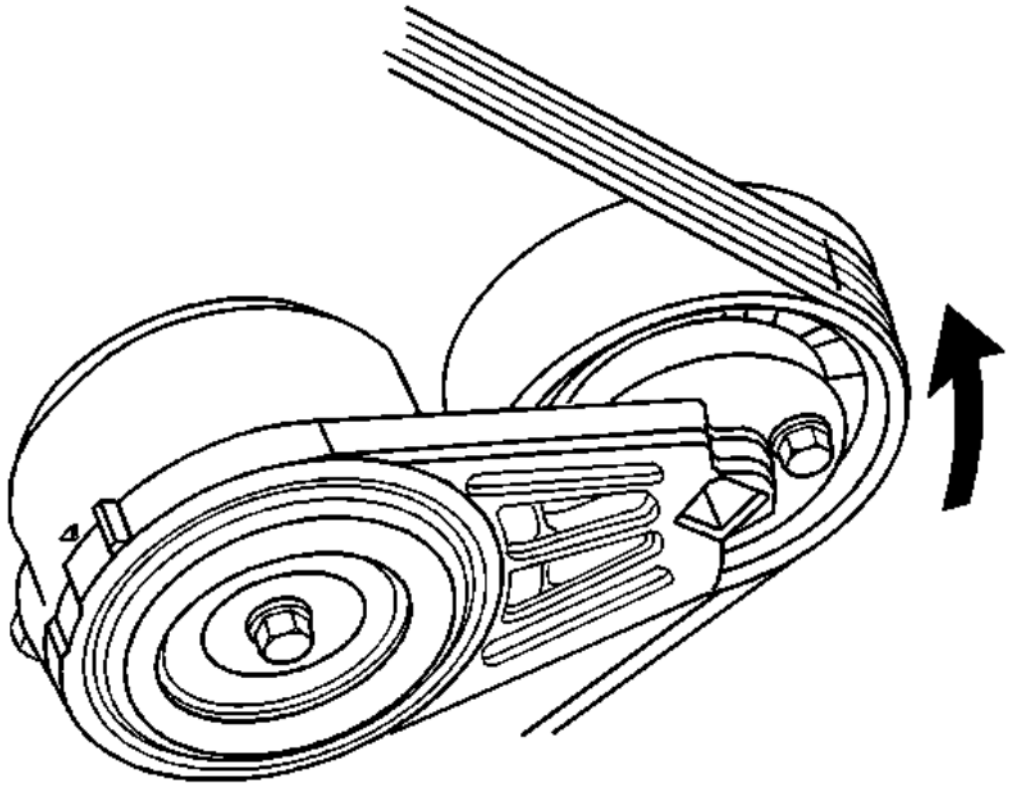


Fig. 22: View Of Drive Belt Tensioner
Courtesy of GENERAL MOTORS CORP.

1. Install a ratchet into the air conditioning belt tensioner adapter opening.
2. Rotate the belt tensioner counterclockwise in order to relieve the tension on the belt.
3. Remove the belt from the air conditioning (A/C) compressor.

4. Slowly release the tension on the A/C belt tensioner.

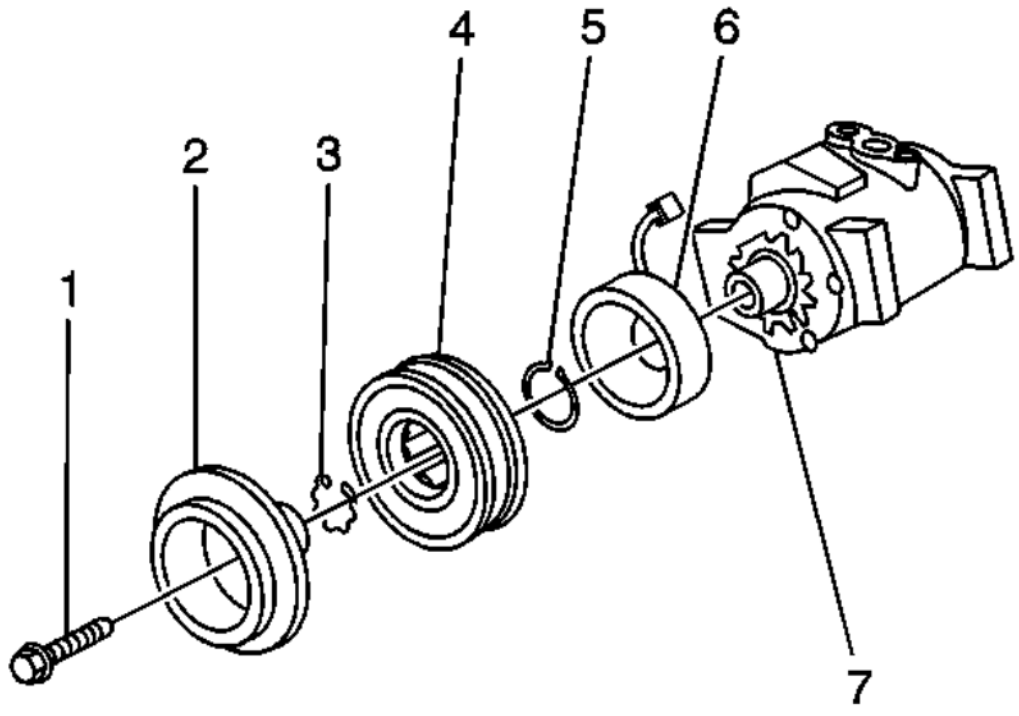


Fig. 23: Exploded View Of Compressor Clutch Plate Assembly
Courtesy of GENERAL MOTORS CORP.

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

Installation Procedure

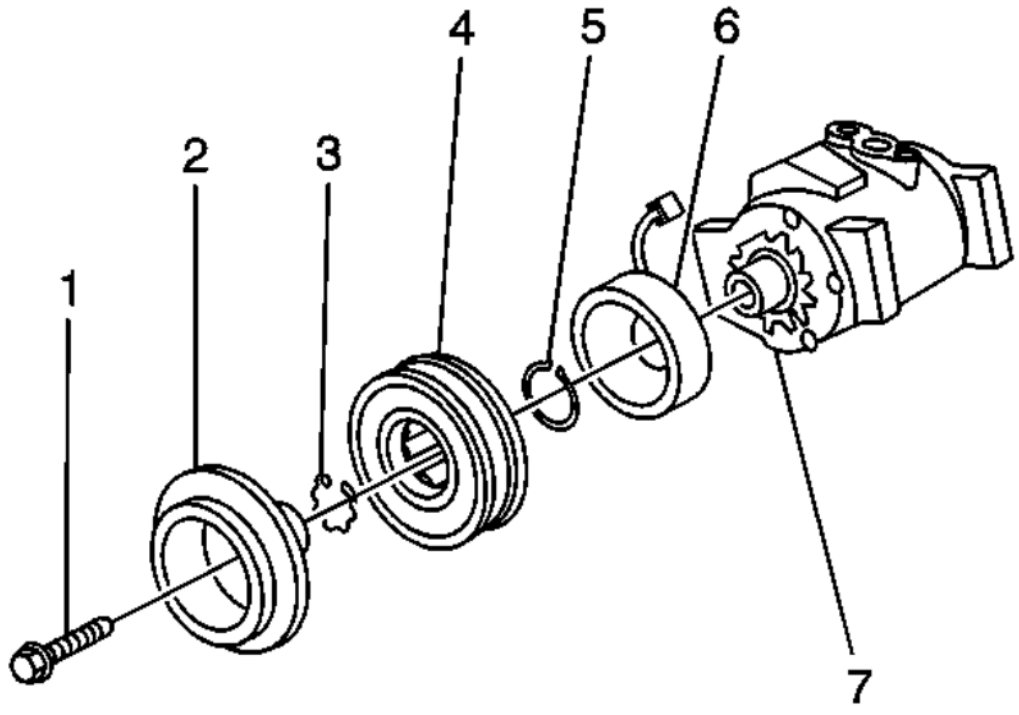


Fig. 24: Exploded View Of Compressor Clutch Plate Assembly
Courtesy of GENERAL MOTORS CORP.

1. Install the clutch coil (6) to the A/C compressor (7).
2. Install the snap ring (5) to the clutch coil (6).
3. Install the clutch hub/bearing assembly (4).
4. Install the clutch hub/bearing snap ring (3).
5. Place a small amount of oil on the thinnest air gap shim and place it inside the clutch plate.

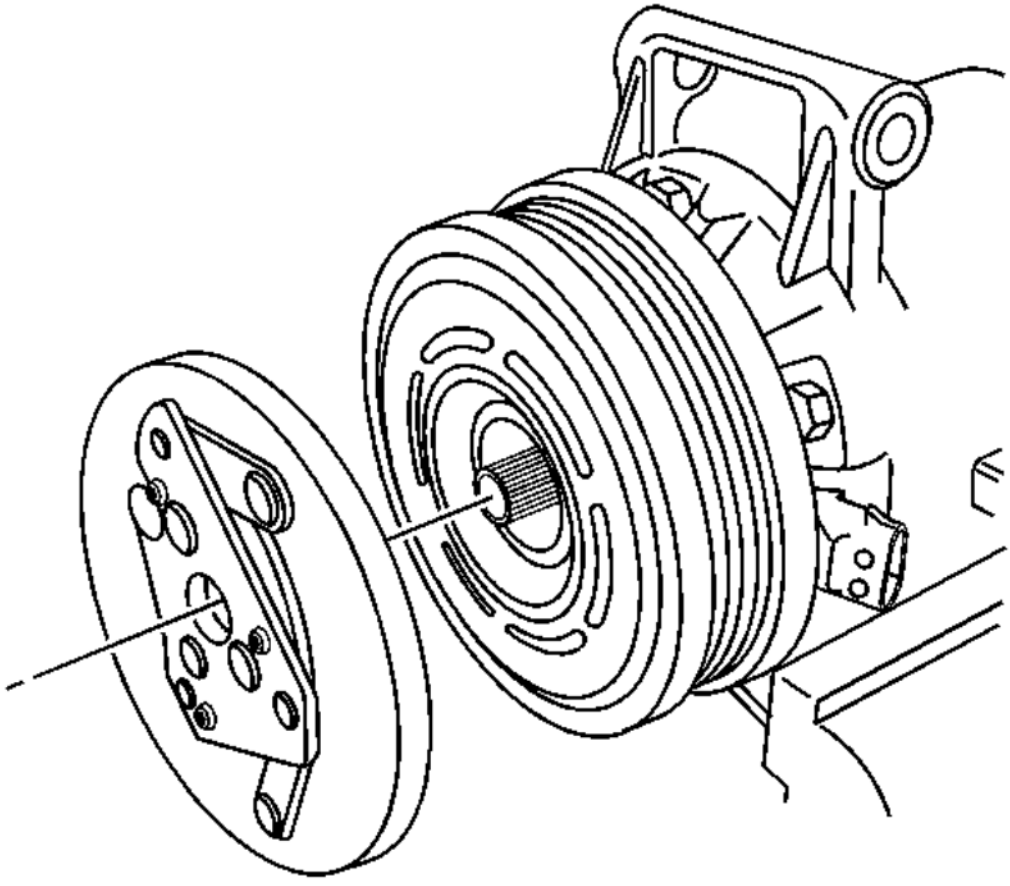


Fig. 25: Identifying Compressor Clutch Plate
Courtesy of GENERAL MOTORS CORP.

6. Install the clutch plate assembly (2).

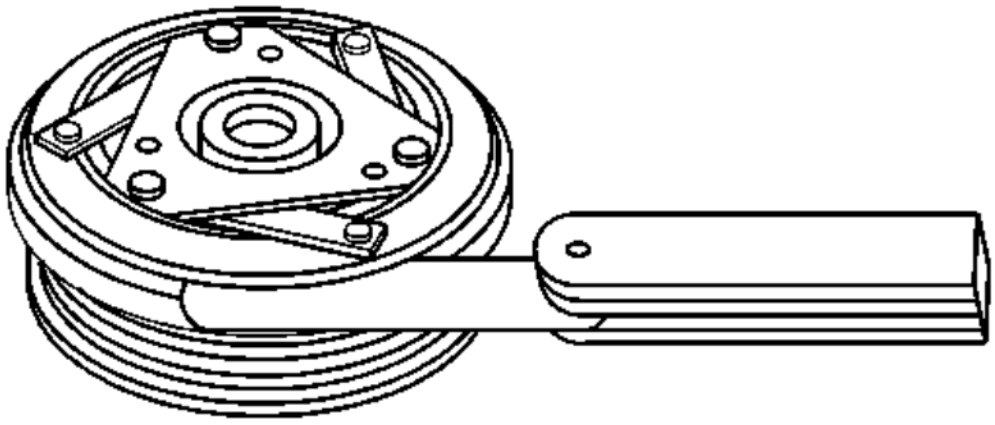


Fig. 26: View Of Air Gap Between Pulley And Drive Plate
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Ensure the drive plate does not drag against the pulley when the pulley is rotated.

7. Measure the air gap between the pulley and the drive plate. Adjust the shims to achieve a 0.35-0.65 mm (0.014-0.026 in) air gap.

NOTE: Refer to Fastener Notice .

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

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

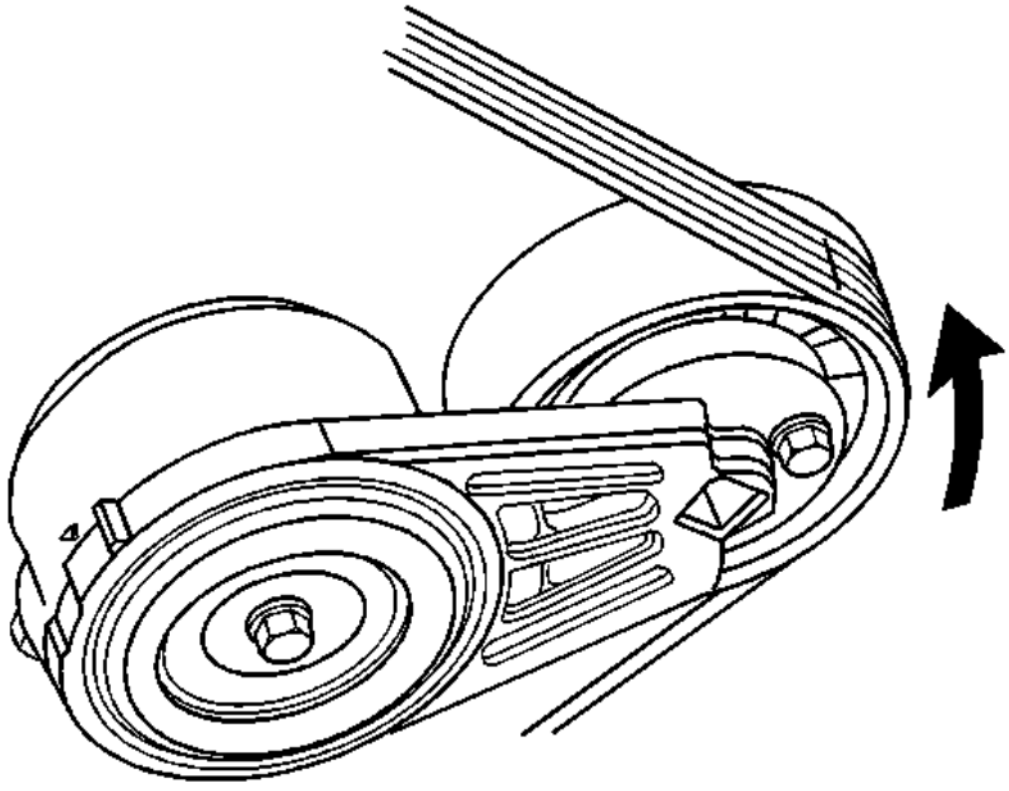


Fig. 27: View Of Drive Belt Tensioner
Courtesy of GENERAL MOTORS CORP.

9. Install a ratchet into the belt tensioner adapter opening.
10. Rotate the belt tensioner counterclockwise in order to relieve the tension on the belt.
11. Install the belt to the A/C compressor.
12. Slowly release the tension on the belt tensioner.
13. Remove the ratchet from the belt tensioner.

COMPRESSOR CLUTCH PLATE/HUB ASSEMBLY REPLACEMENT (V8 - GAS)

Removal Procedure

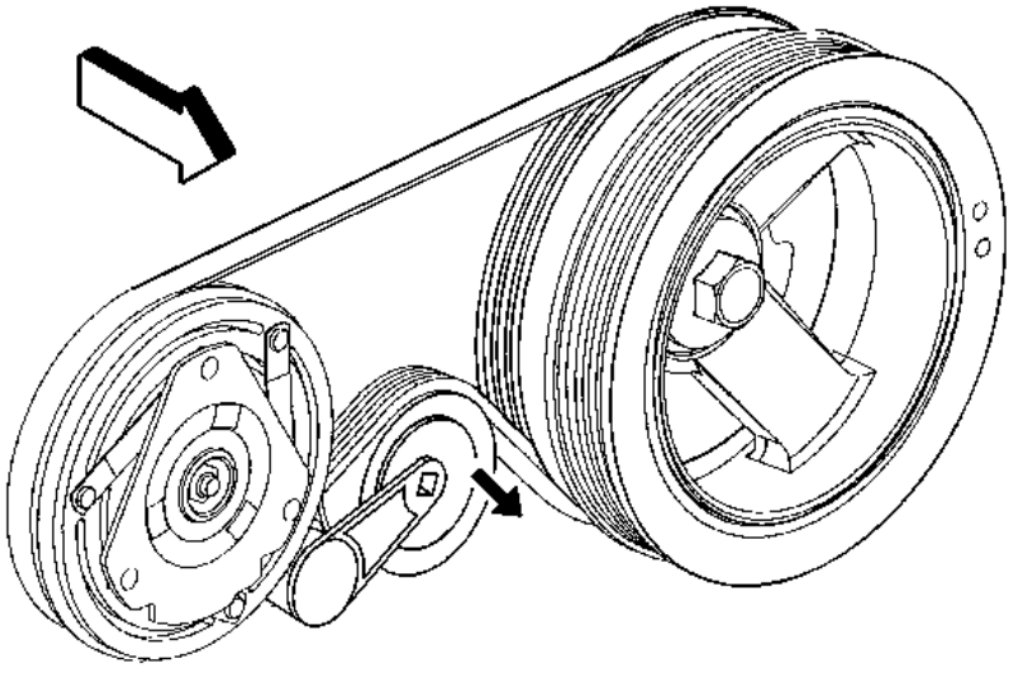


Fig. 28: A/C Belt Tensioner
Courtesy of GENERAL MOTORS CORP.

1. Raise and suitably support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
2. Remove the engine protection shield.
3. Install a ratchet into the air conditioning (A/C) belt tensioner adapter opening.
4. Rotate the A/C belt tensioner clockwise in order to relieve the tension on the belt.
5. Remove the A/C belt from the A/C compressor.
6. Slowly release the tension on the A/C belt tensioner.

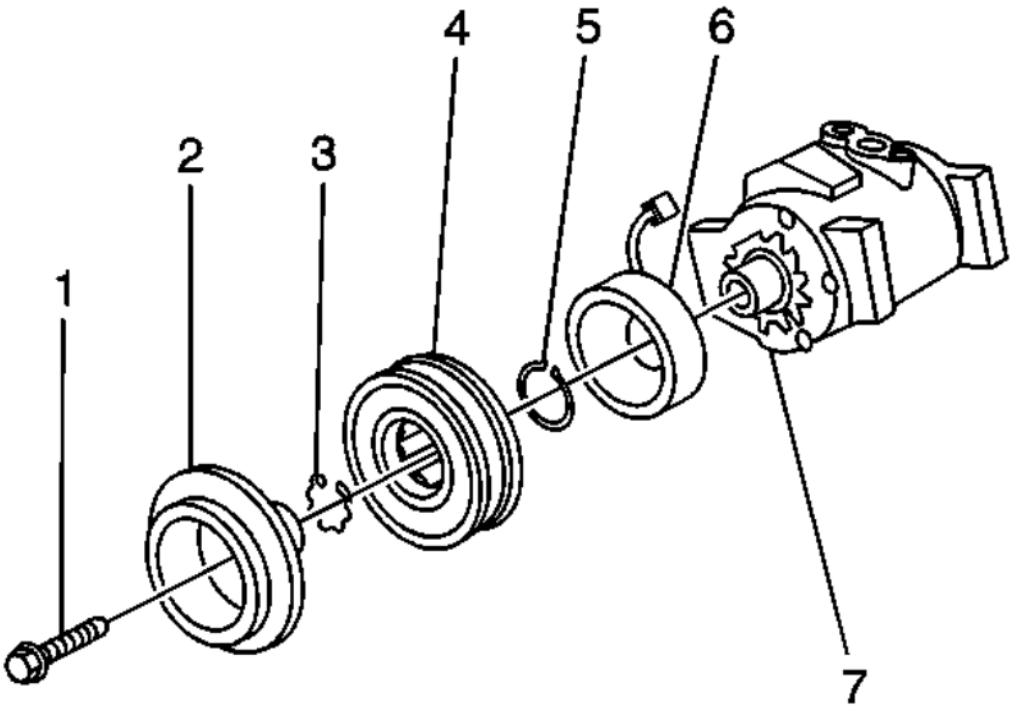


Fig. 29: Exploded View Of Compressor Clutch Plate Assembly
Courtesy of GENERAL MOTORS CORP.

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

Installation Procedure

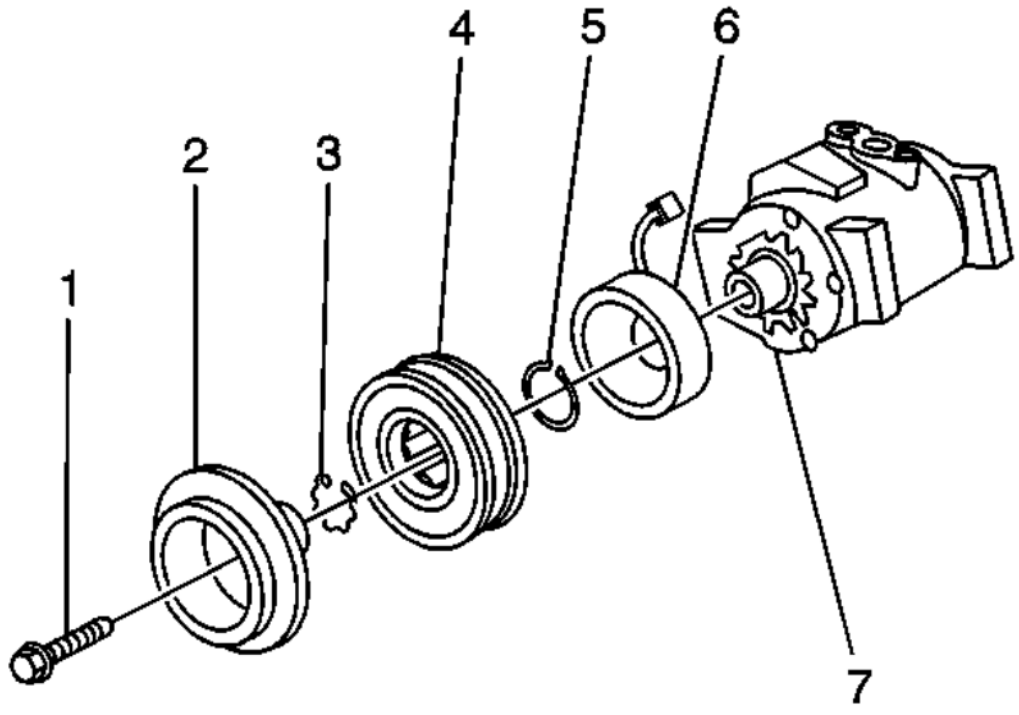


Fig. 30: Exploded View Of Compressor Clutch Plate Assembly
Courtesy of GENERAL MOTORS CORP.

1. Install the clutch coil (6) to the A/C compressor (7).
2. Install the snap ring (5) to the clutch coil (6).
3. Install the clutch hub/bearing assembly (4).
4. Install the clutch hub/bearing snap ring (3).
5. Place a small amount of oil on the thinnest air gap shim and place it inside the clutch plate.

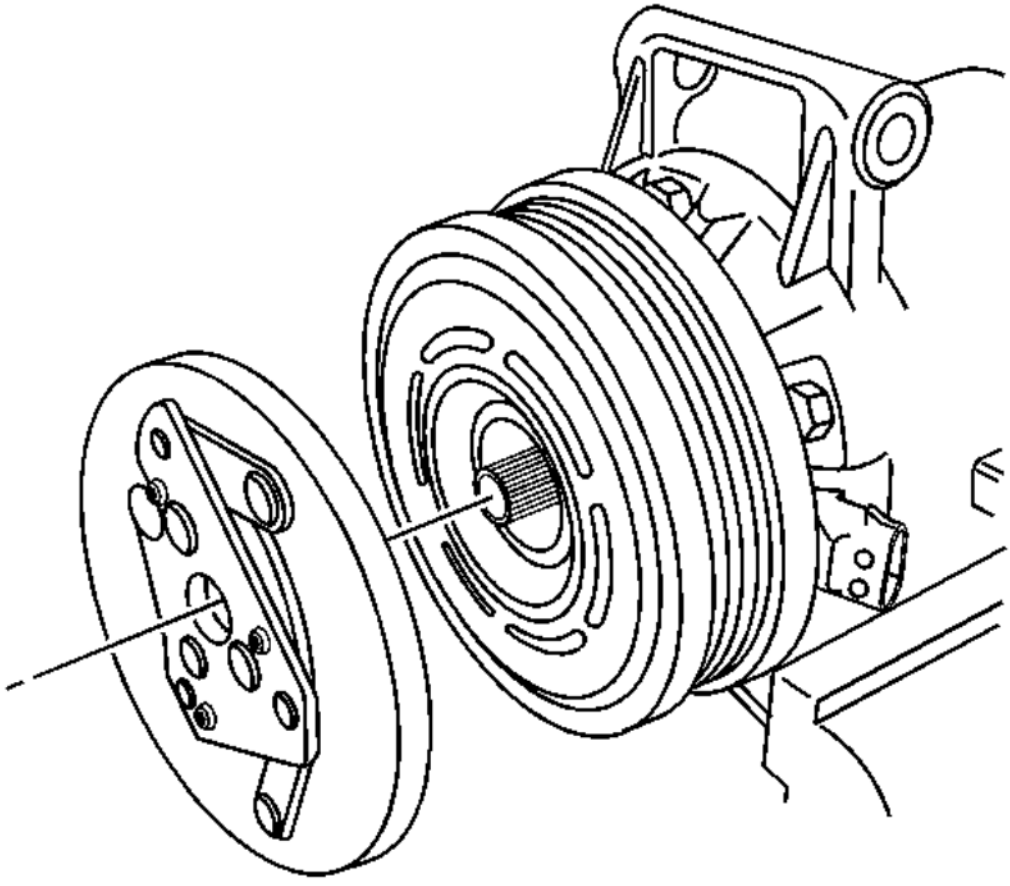


Fig. 31: Identifying Compressor Clutch Plate
Courtesy of GENERAL MOTORS CORP.

6. Install the clutch plate assembly (2).

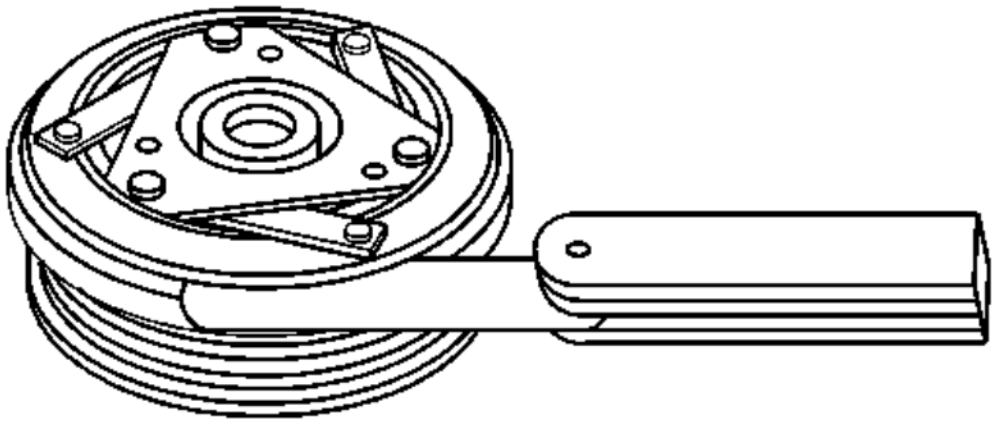


Fig. 32: View Of Air Gap Between Pulley And Drive Plate
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Ensure the drive plate does not drag against the pulley when the pulley is rotated.

7. Measure the air gap between the pulley and the drive plate. Adjust the shims to achieve a 0.35-0.65 mm (0.014-0.026 in) air gap.

NOTE: Refer to Fastener Notice .

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

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

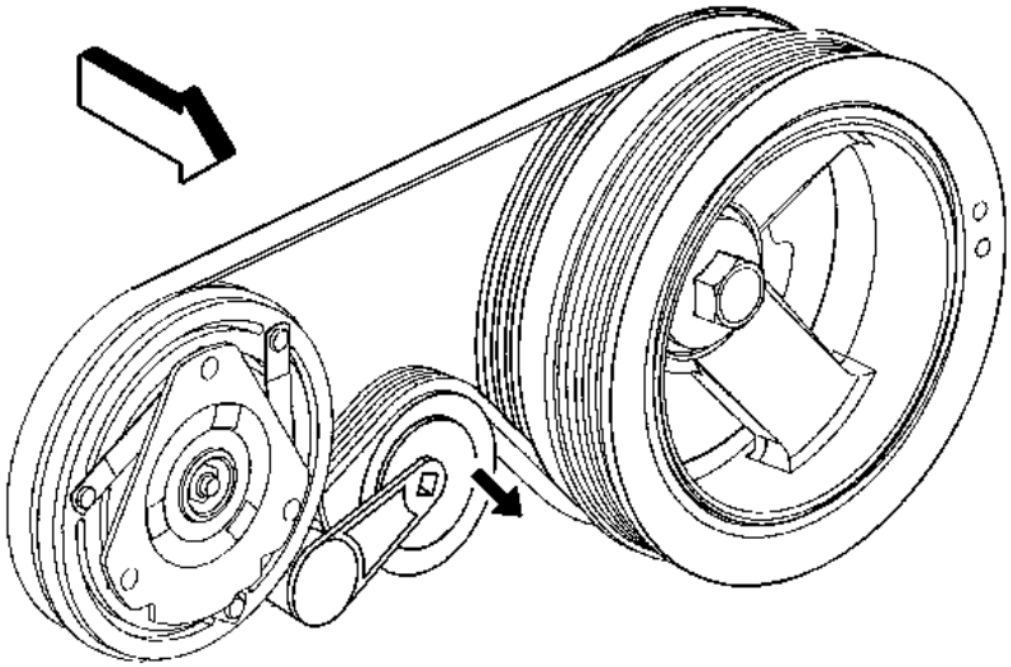


Fig. 33: A/C Belt Tensioner
Courtesy of GENERAL MOTORS CORP.

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

COMPRESSOR MOUNTING BRACKET REPLACEMENT (NON HP2)

Removal Procedure

1. Remove the A/C compressor. Refer to **Air Conditioning Compressor Replacement (LY2, LY5, LH6, L76, L92 and LMG)** or **Air Conditioning Compressor Replacement**

(LLY/LMM) or **Air Conditioning Compressor Replacement (LU3)**.

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

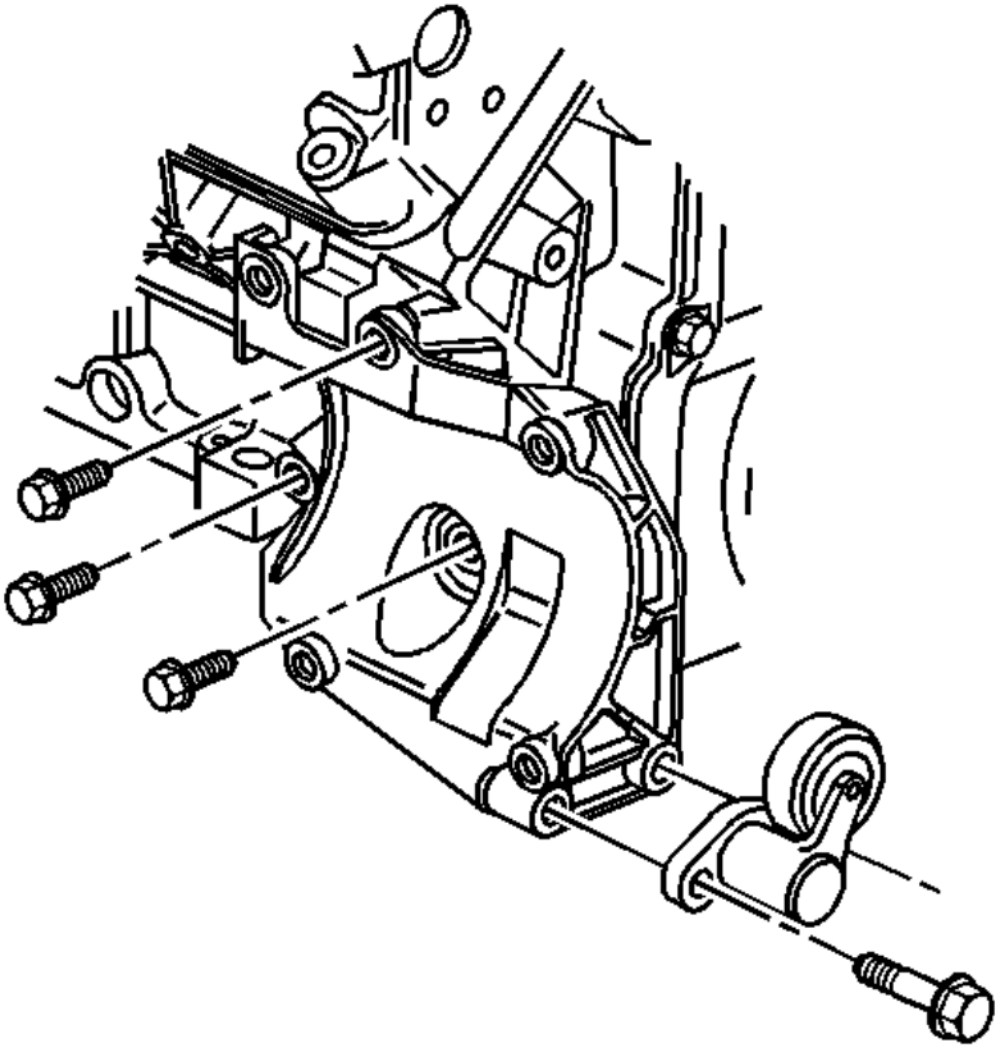


Fig. 34: A/C Compressor Bracket Mounting Bolts
Courtesy of GENERAL MOTORS CORP.

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

5. Remove the A/C compressor bracket.

Installation Procedure

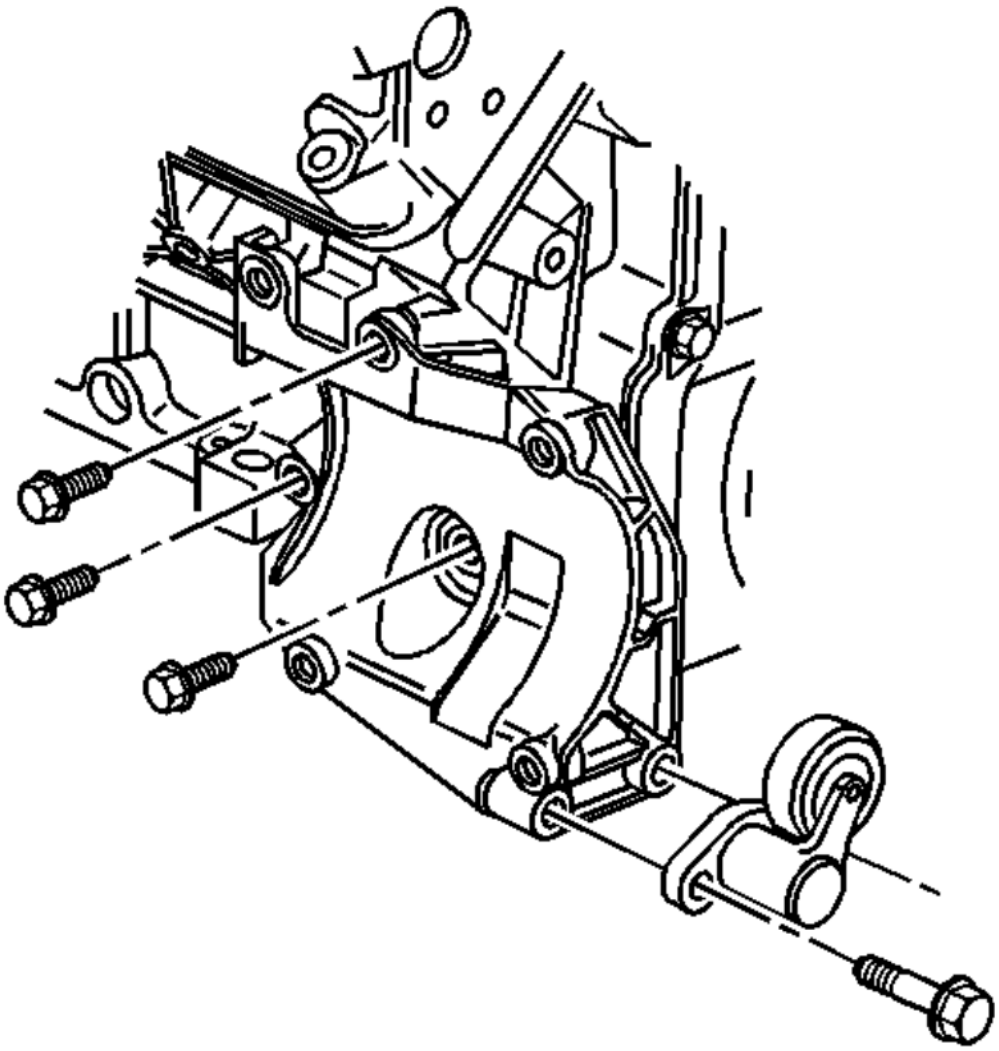


Fig. 35: A/C Compressor Bracket Mounting Bolts
Courtesy of GENERAL MOTORS CORP.

1. Install the A/C compressor bracket.

NOTE: Refer to Fastener Notice .

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

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

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

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

5. Install the A/C compressor. Refer to **Air Conditioning Compressor Replacement (LY2, LY5, LH6, L76, L92 and LMG)** or **Air Conditioning Compressor Replacement (LLY/LMM)** or **Air Conditioning Compressor Replacement (LU3)**.

SEALING WASHER REPLACEMENT

Removal Procedure

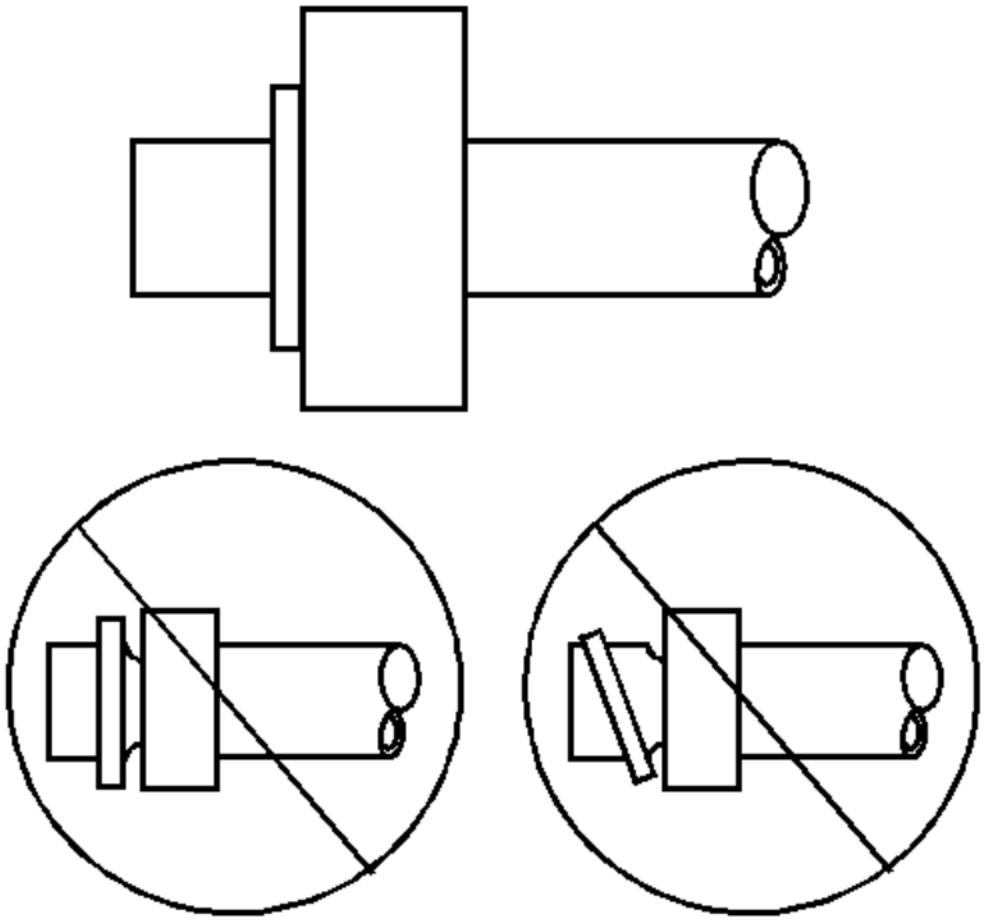


Fig. 36: Identifying Good And Bad Sealing Washer Positions
Courtesy of GENERAL MOTORS CORP.

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.

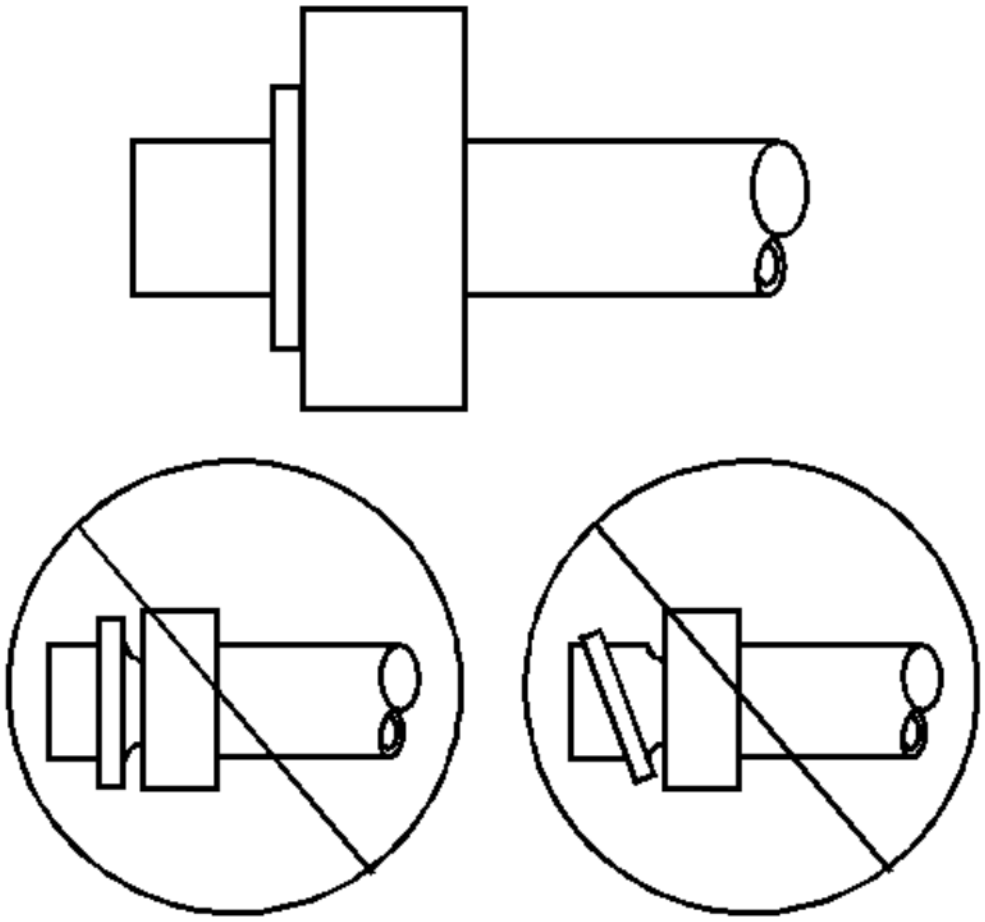


Fig. 37: Identifying Good And Bad Sealing Washer Positions
Courtesy of GENERAL MOTORS CORP.

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

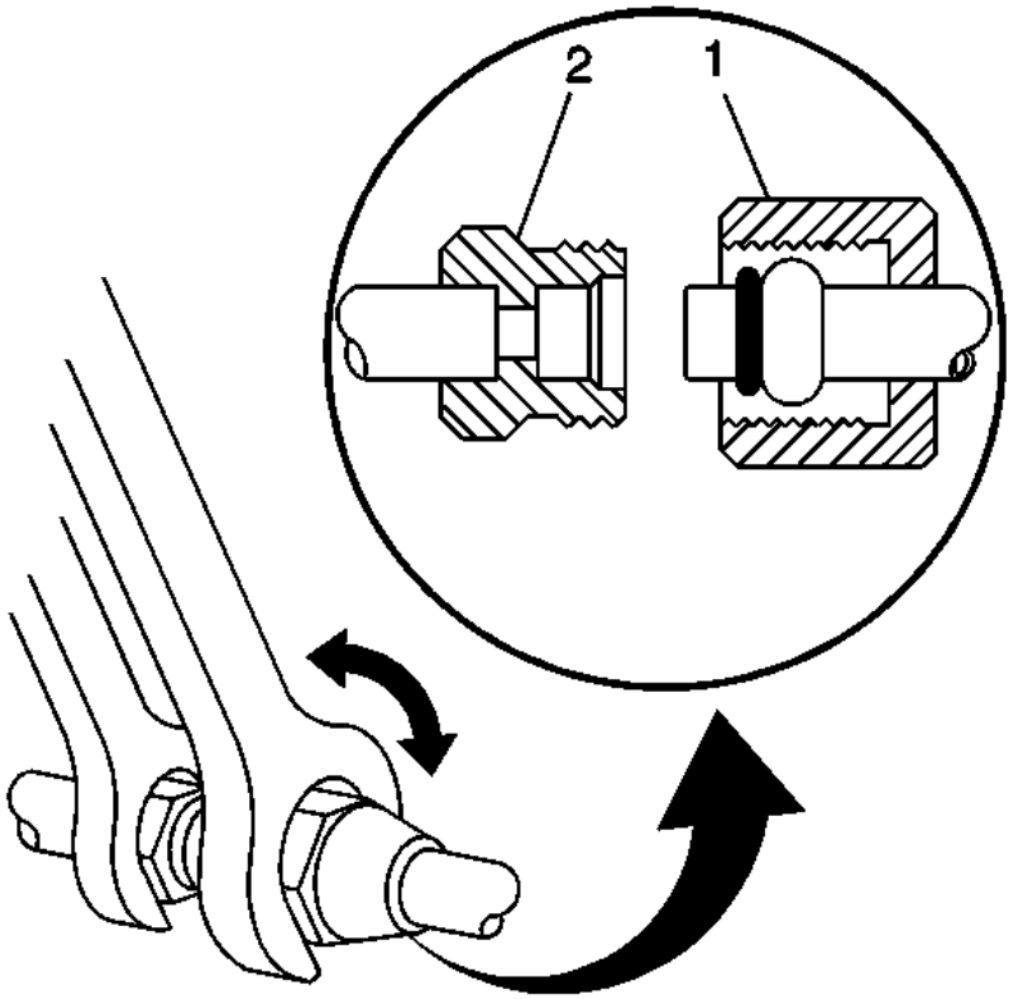


Fig. 38: Disassembling/Reassembling A/C Line Fittings
Courtesy of GENERAL MOTORS CORP.

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.

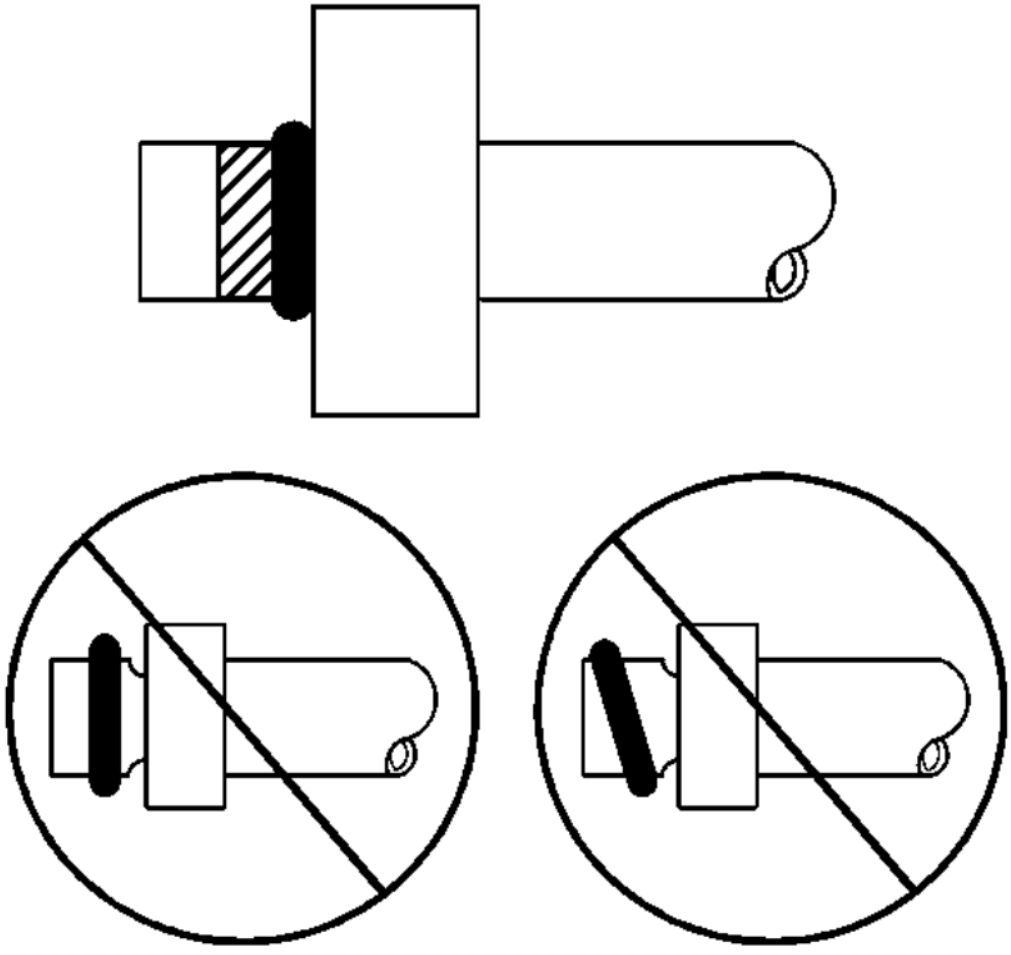


Fig. 39: Identifying Proper Seating Of A/C Refrigerant O-Ring
Courtesy of GENERAL MOTORS CORP.

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

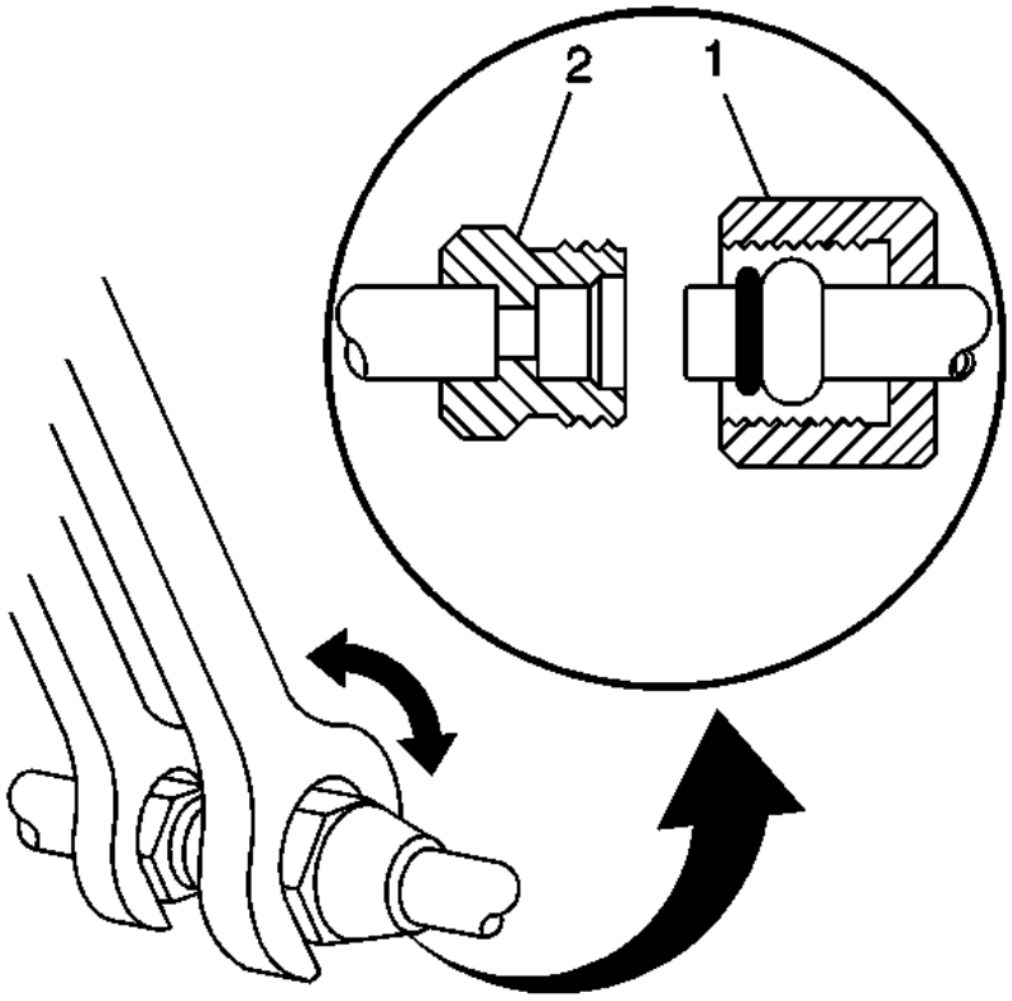


Fig. 40: Disassembling/Reassembling A/C Line Fittings
Courtesy of GENERAL MOTORS CORP.

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.

DISCHARGE HOSE REPLACEMENT (LY2, LMF, L76 AND L92)

Tools Required

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

Removal Procedure

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

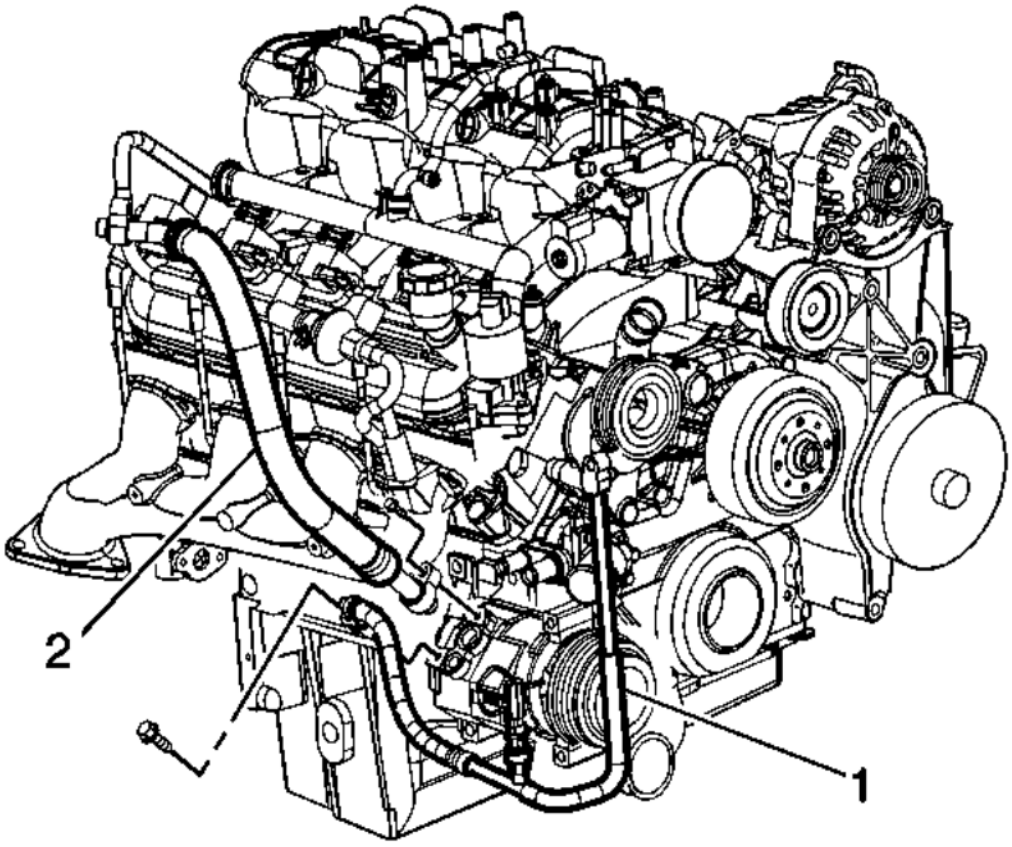


Fig. 41: Identifying Suction/Discharge Hoses To A/C Compressor
Courtesy of GENERAL MOTORS CORP.

2. Remove the discharge hose mounting bolt (2) from the A/C compressor.
3. Remove the discharge hose (1) from the A/C compressor.
4. Remove the upper radiator baffle. Refer to **Radiator Air Upper Baffle and Deflector Replacement** .

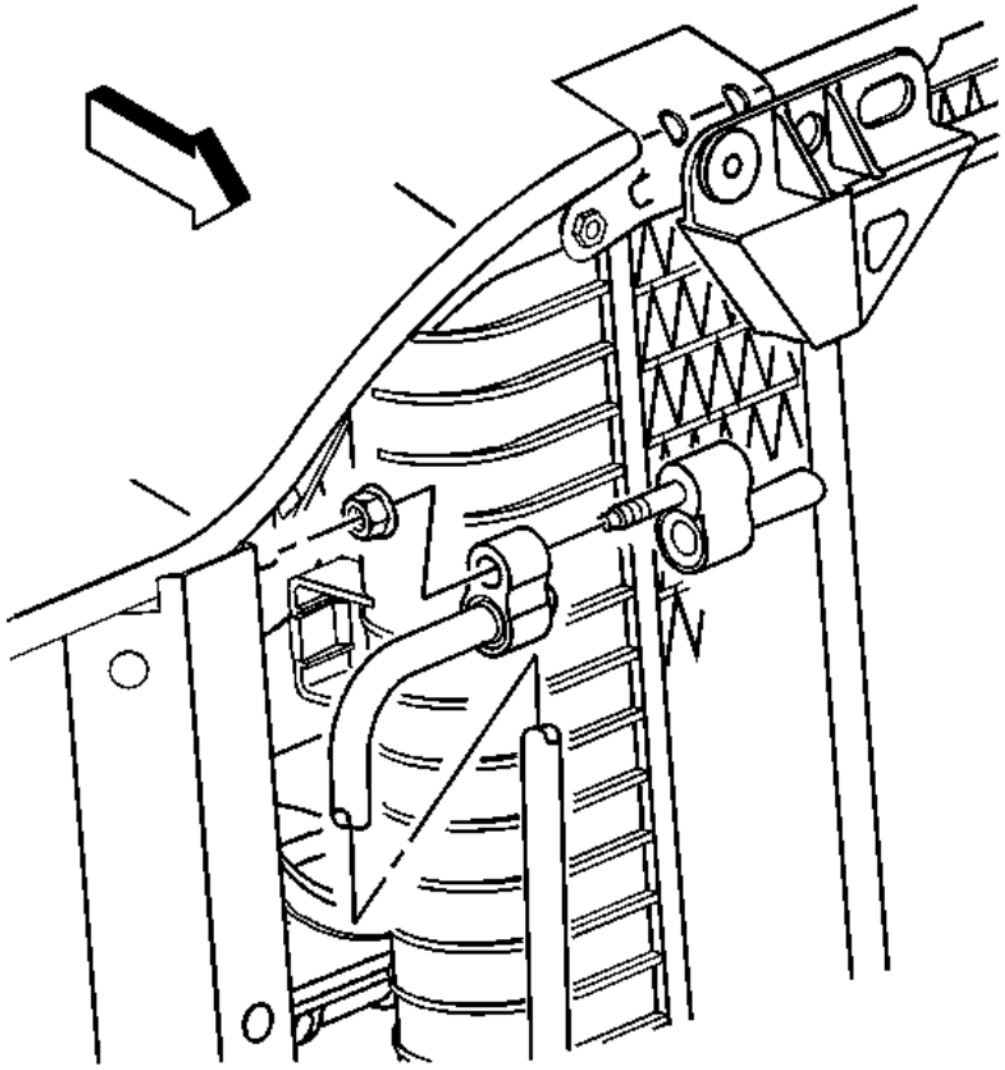


Fig. 42: View Of Discharge Hose At Condenser
Courtesy of GENERAL MOTORS CORP.

5. Remove the discharge hose nut from the condenser.
6. Remove the discharge hose from the condenser.
7. Disconnect the electrical connector from the A/C recirculation switch.
8. Remove the discharge hose from the vehicle.
9. Discard all of the used sealing washers. Cap the system openings.

Installation Procedure

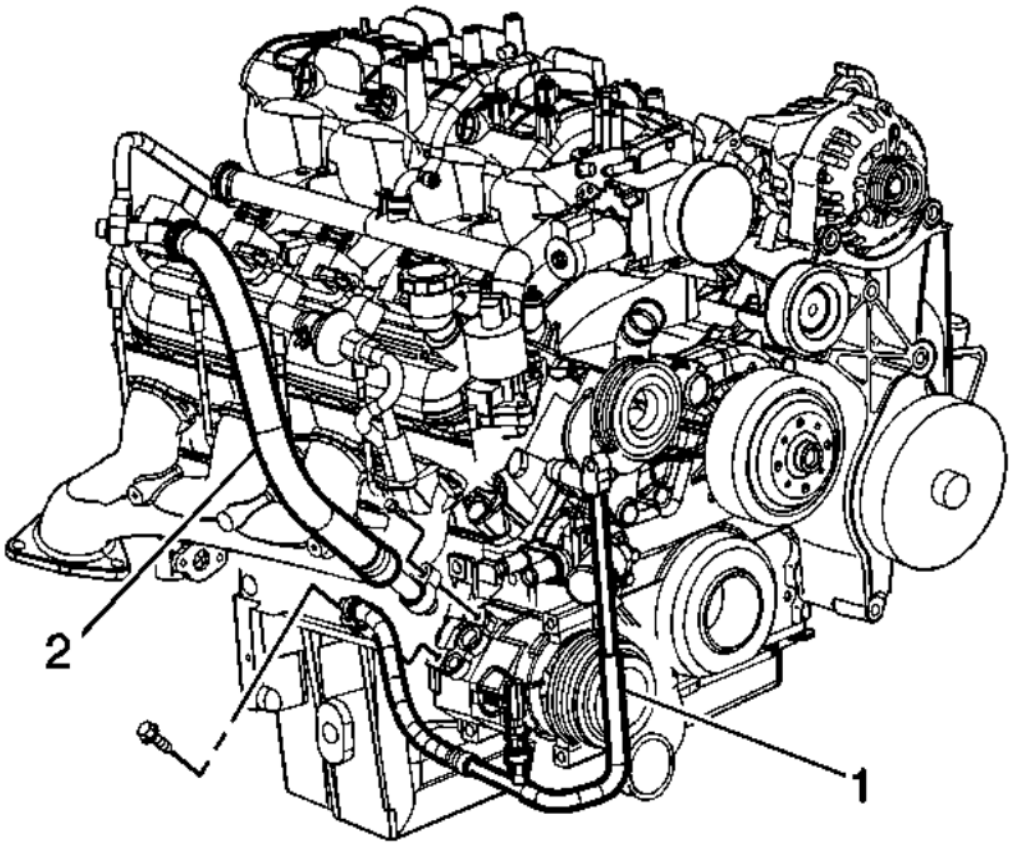


Fig. 43: Identifying Suction/Discharge Hoses To A/C Compressor
Courtesy of GENERAL MOTORS CORP.

1. Install the discharge hose (1) to the vehicle.
2. Connect the electrical connector to the A/C recirculation switch.

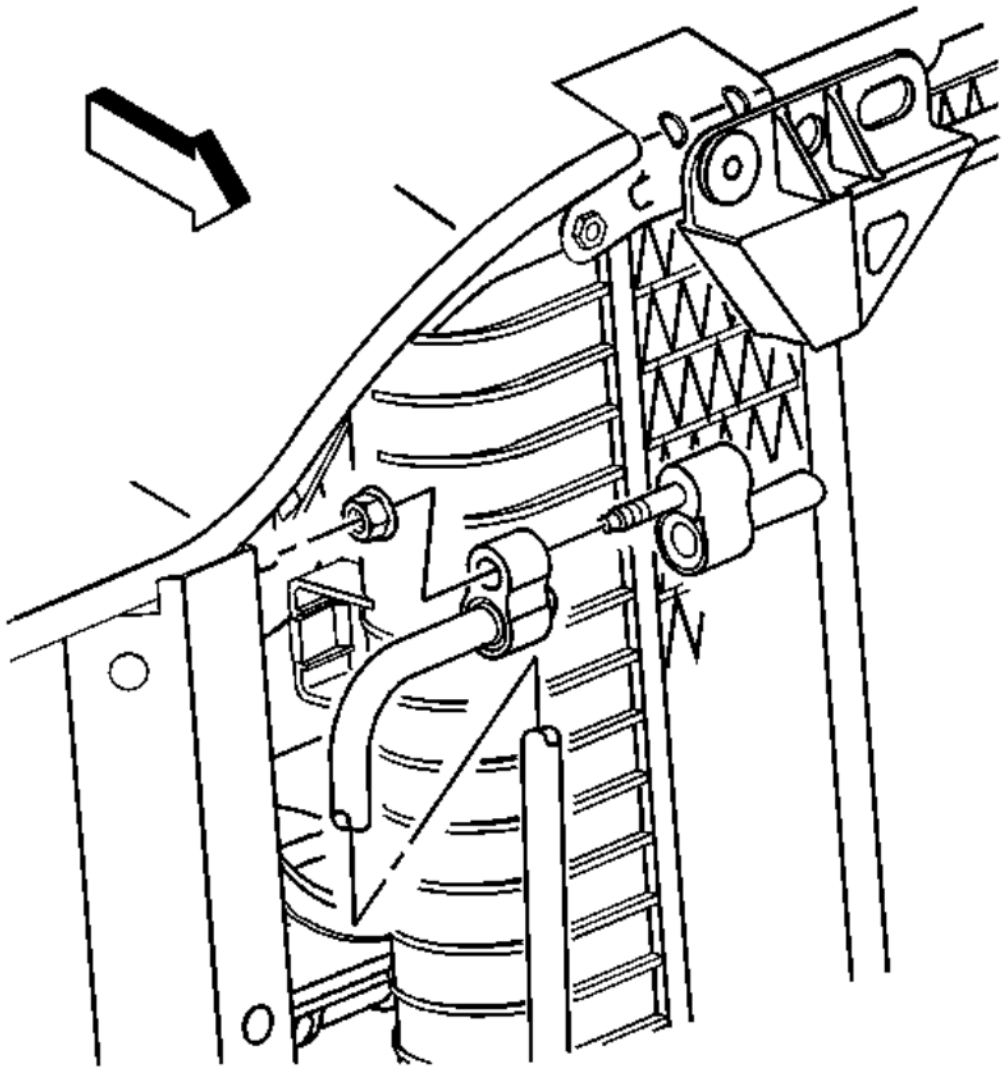


Fig. 44: View Of Discharge Hose At Condenser
Courtesy of GENERAL MOTORS CORP.

3. Install the discharge hose to the condenser using new sealing washers. Refer to **Sealing Washer Replacement**.

NOTE: Refer to Fastener Notice .

4. Install the discharge hose nut to the condenser.

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

5. Install the upper air baffle. Refer to **Radiator Air Upper Baffle and Deflector Replacement** .

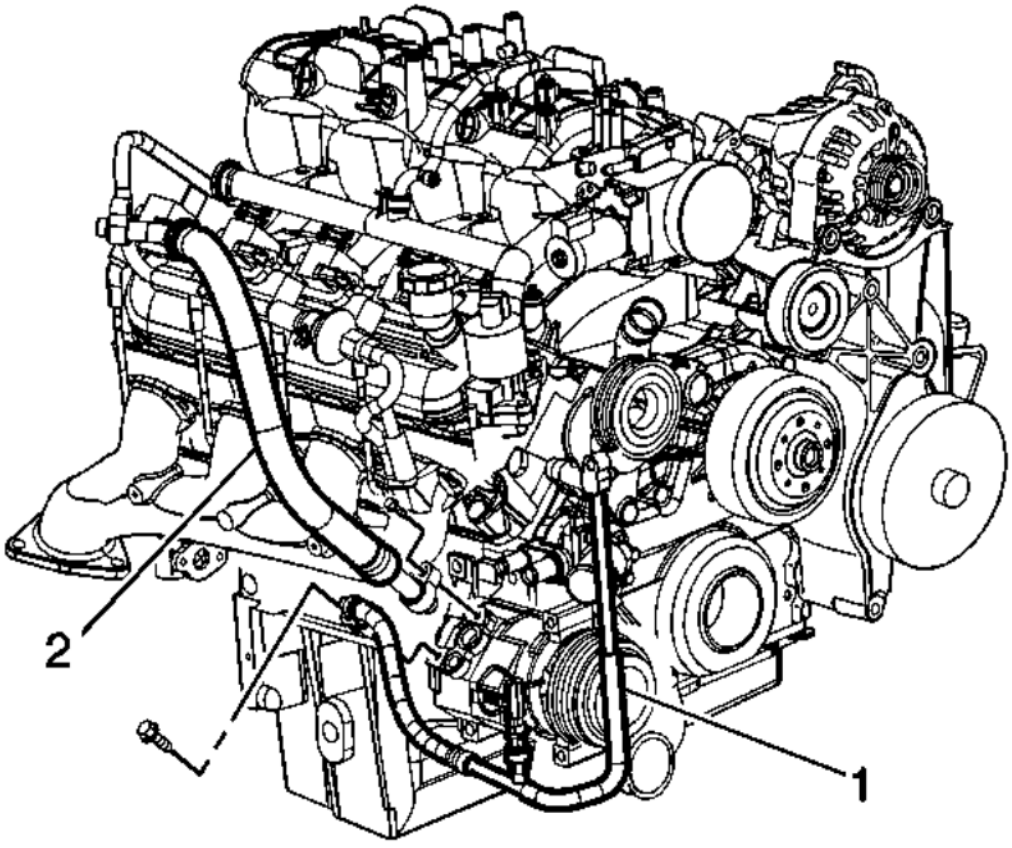


Fig. 45: Identifying Suction/Discharge Hoses To A/C Compressor
Courtesy of GENERAL MOTORS CORP.

6. Install the discharge hose (1) to the A/C compressor using new sealing washers. Refer to **Sealing Washer Replacement**.
7. Install the discharge hose mounting bolt.

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

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

DISCHARGE HOSE REPLACEMENT (LMM)

Tools Required

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

Removal Procedure

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

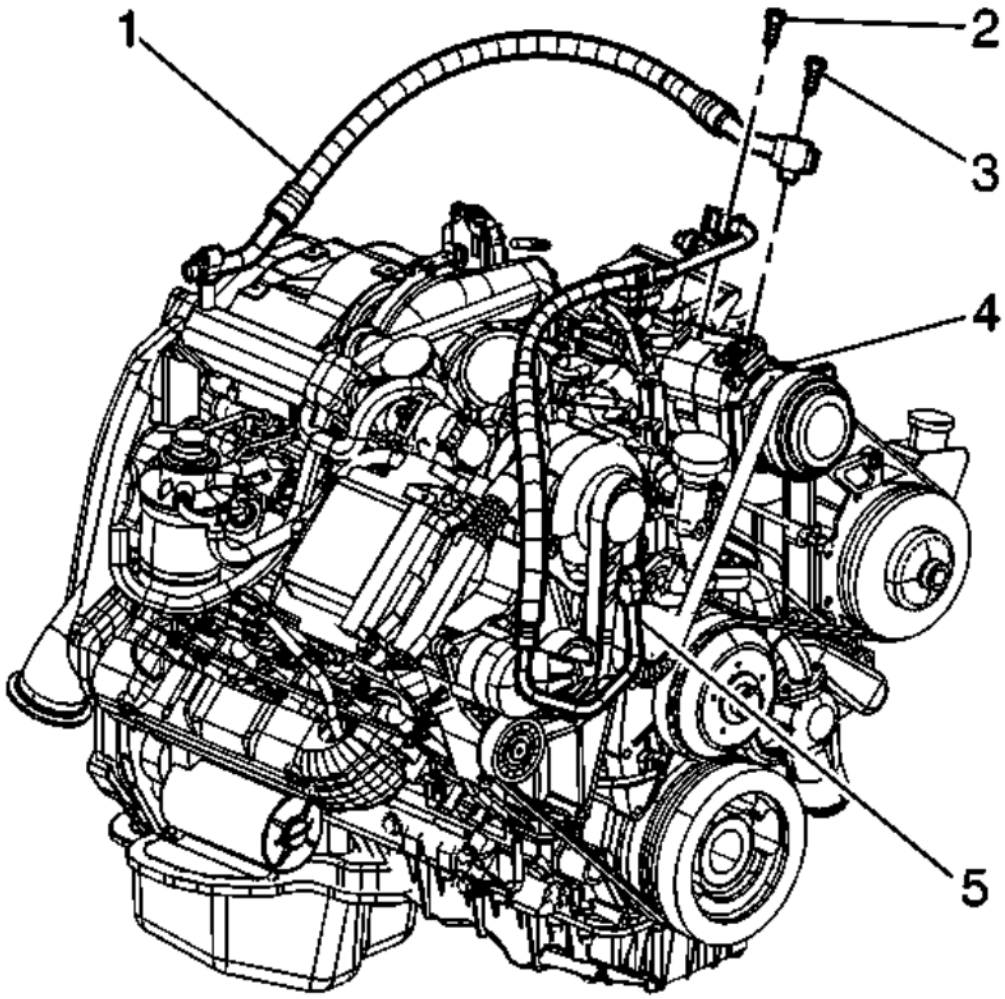


Fig. 46: View Of Discharge Hose & Connectors
Courtesy of GENERAL MOTORS CORP.

2. Remove the discharge hose mounting bolt (2) from the A/C compressor.

   Discard the bolt.

3. Remove the discharge hose (5) from the A/C compressor.
4. Remove the upper radiator air baffle. Refer to **Radiator Air Upper Baffle and Deflector Replacement** .

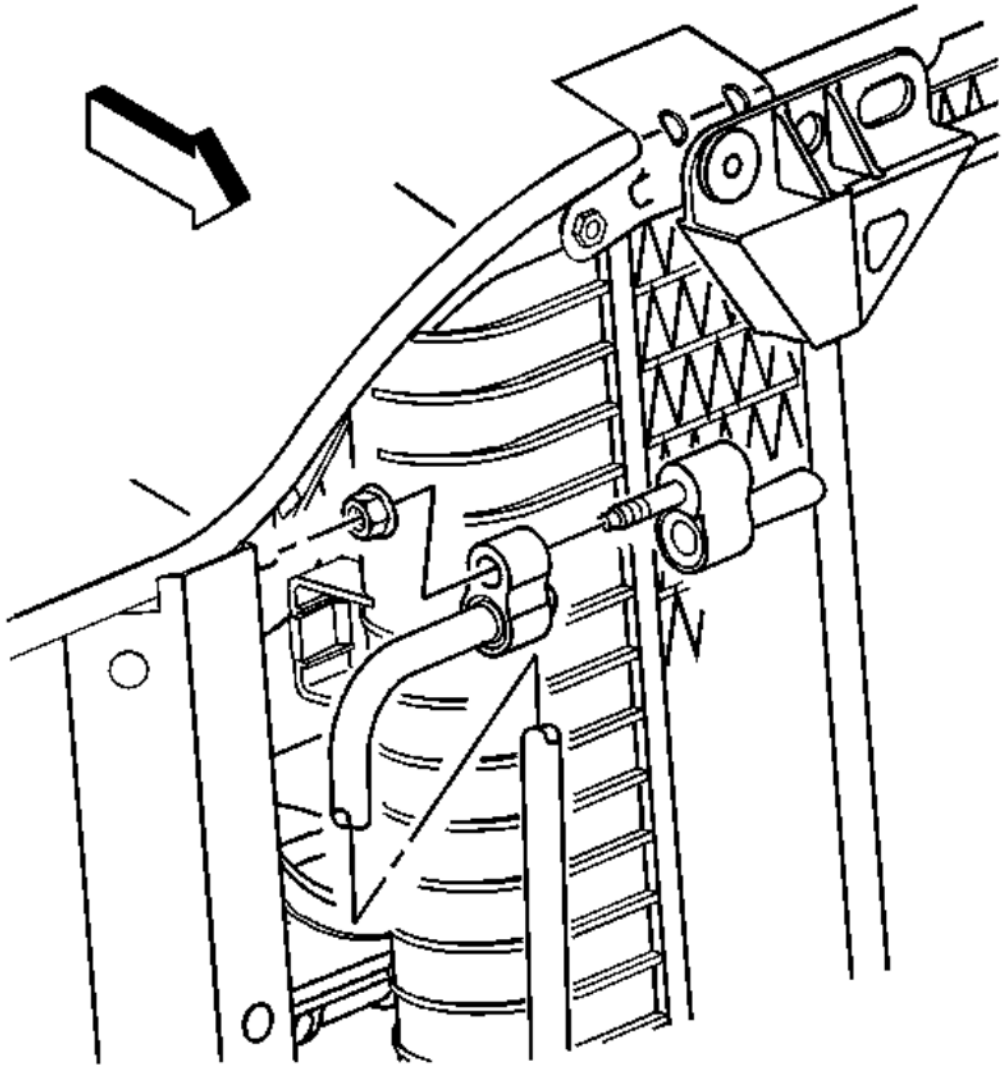


Fig. 47: View Of Discharge Hose At Condenser
Courtesy of GENERAL MOTORS CORP.

5. Remove the discharge hose nut from the condenser.

   Discard the nut.

6. Remove the discharge hose from the condenser.

7. Disconnect the A/C recirculation switch from the discharge hose.
8. Remove the discharge hose from the vehicle.
9. Discard all of the used sealing washers. Cap the system openings.

Installation Procedure

1. Install the discharge hose to the vehicle.
2. Connect the A/C recirculation switch to the discharge hose.

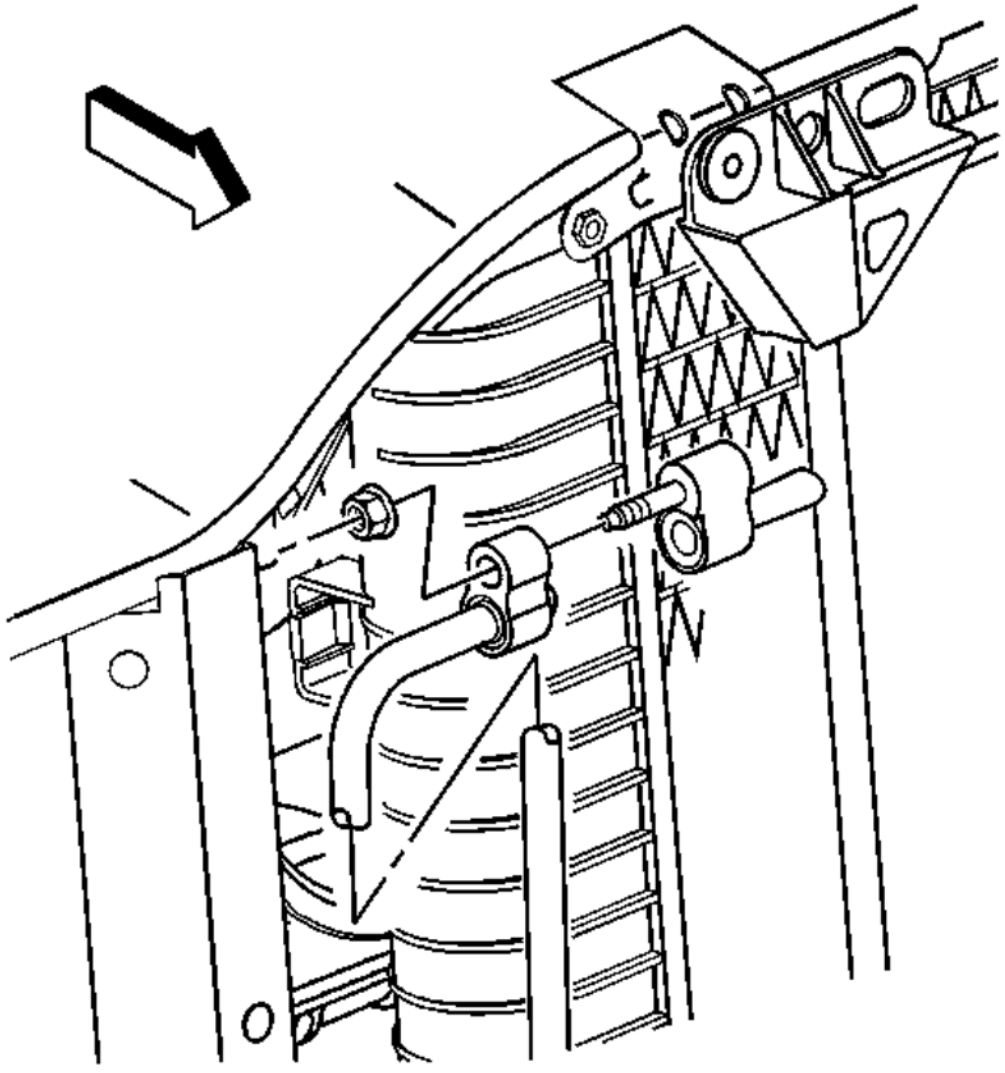


Fig. 48: View Of Discharge Hose At Condenser
Courtesy of GENERAL MOTORS CORP.

3. Install the discharge hose to the condenser using new sealing washers.

NOTE: Refer to Fastener Notice .

4. Install the NEW discharge hose nut to the condenser.

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

5. Install the upper radiator air baffle. Refer to **Radiator Air Upper Baffle and Deflector Replacement** .

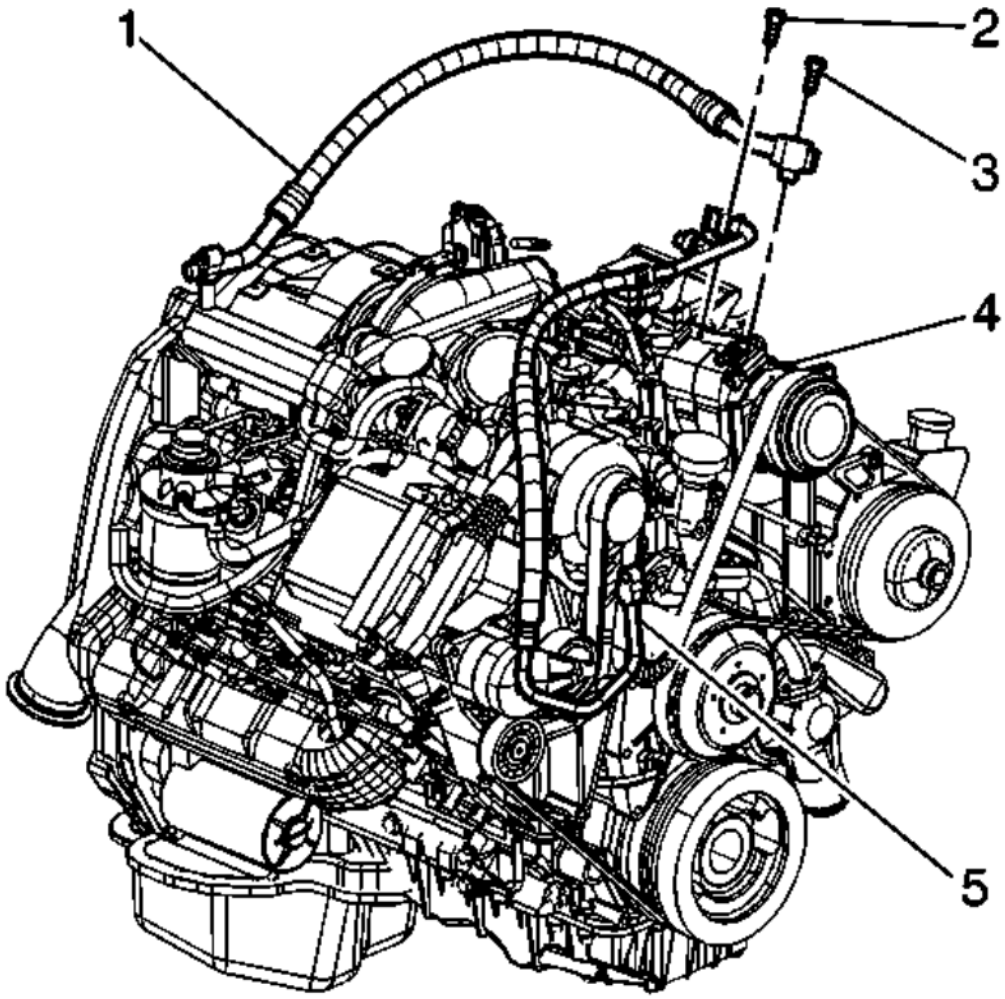


Fig. 49: View Of Discharge Hose & Connectors
Courtesy of GENERAL MOTORS CORP.

6. Install the discharge hose (5) to the compressor using new sealing washers.
7. Install the NEW discharge hose mounting bolt (2) to the A/C compressor.

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

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

SUCTION HOSE REPLACEMENT (LY2, LMF, L76 AND L92)

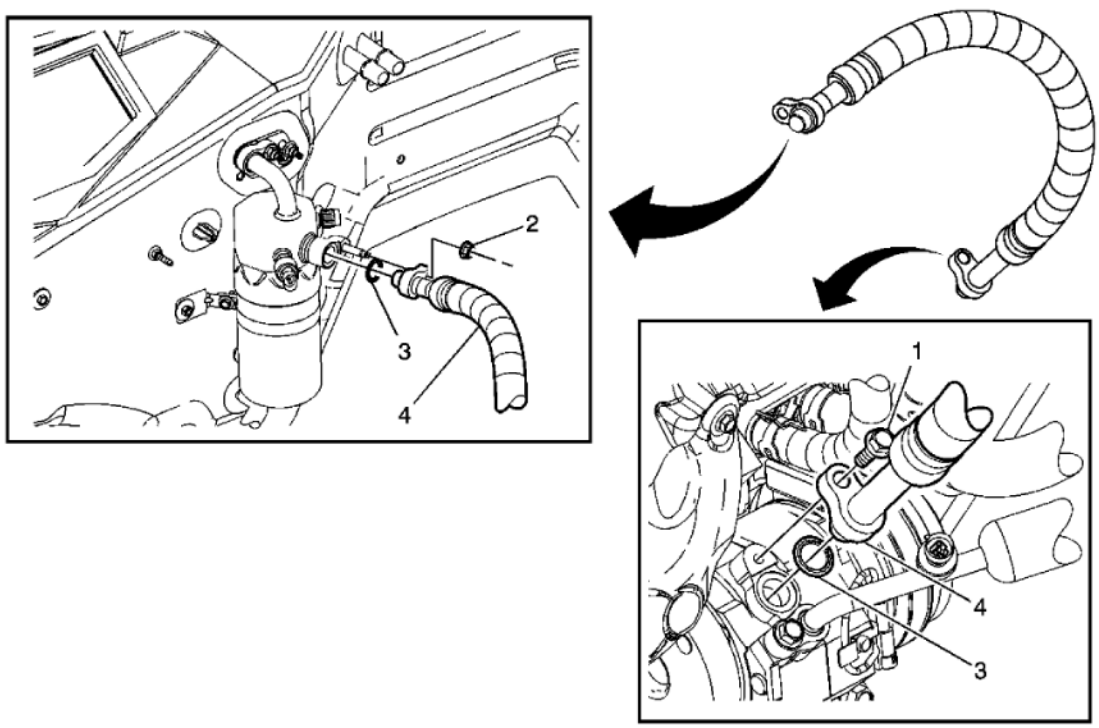


Fig. 50: View Of A/C Suction Hose & Components
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Recover the refrigerant. Refer to **Refrigerant Recovery and Recharging**.	
1	Suction Hose Bolt **NOTE:** **Refer to Fastener Notice .** **Tighten:** 9 N.m (80 lb in)

2	Suction Hose Nut **Tighten:** 9 N.m (80 lb in)
3	Sealing Washer **Tip:** Remove and discard sealing washer. Refer to **Sealing Washer Replacement**.
4	A/C Suction Hose

SUCTION HOSE REPLACEMENT (LMM)

Tools Required

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

Removal Procedure

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

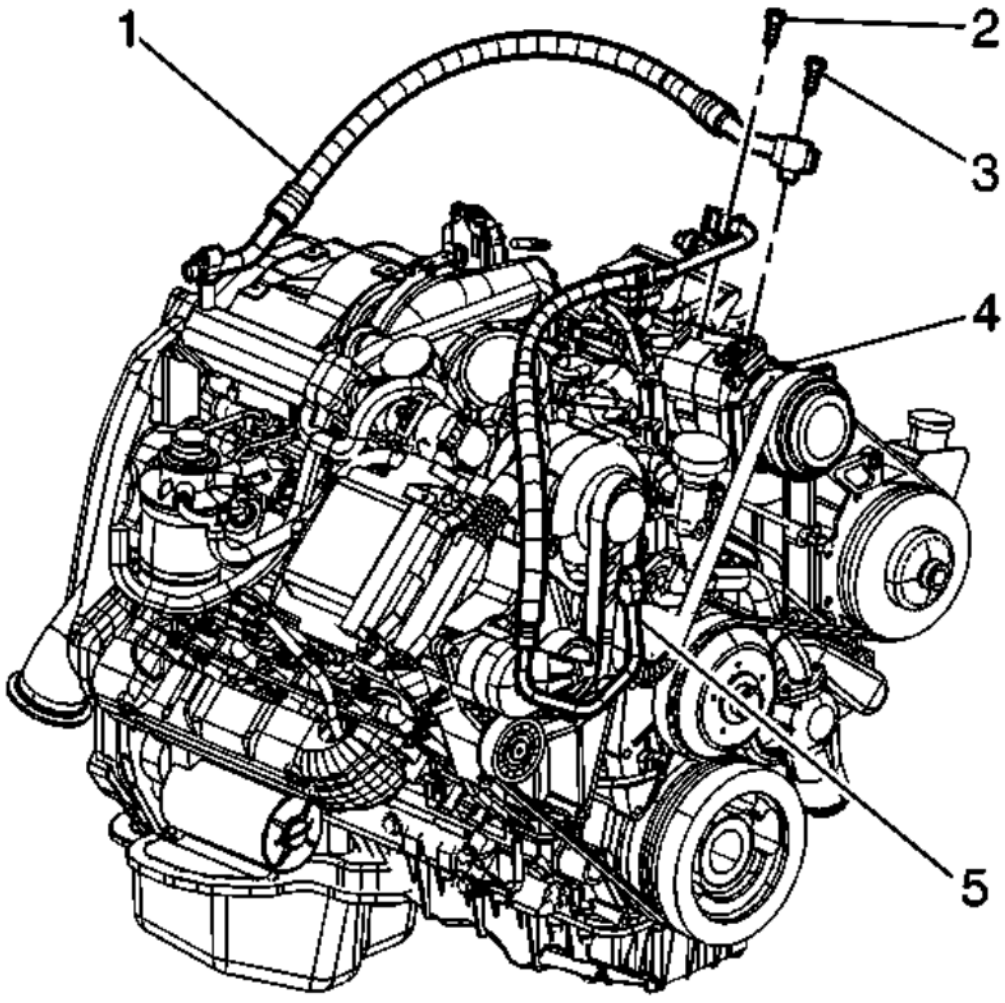


Fig. 51: View Of Discharge Hose & Connectors
Courtesy of GENERAL MOTORS CORP.

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

   Discard the bolt.

3. Remove the suction hose (1) from the compressor.

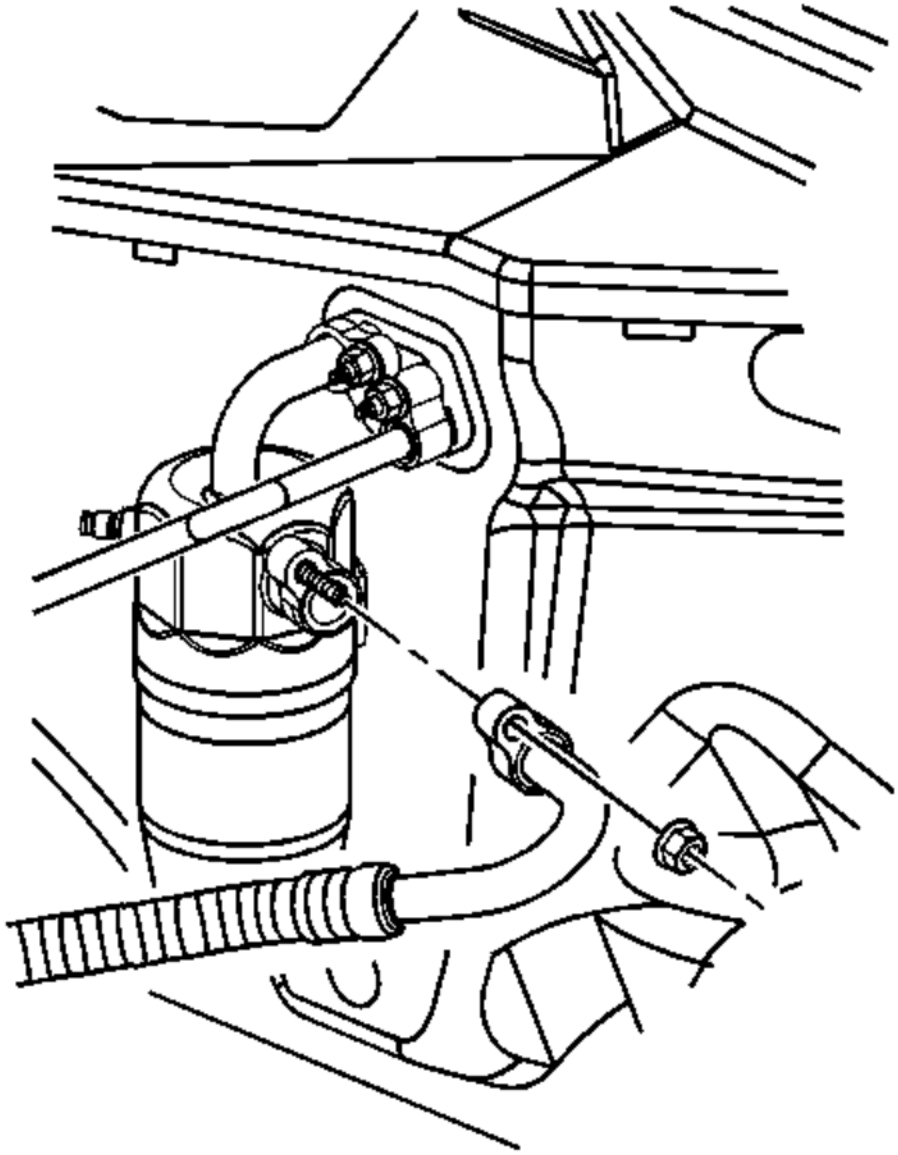


Fig. 52: Removing/Installing Suction Hose From Accumulator
Courtesy of GENERAL MOTORS CORP.

4. Remove the suction hose nut from the accumulator.

   Discard the nut.

5. Remove the suction hose from the accumulator.
6. Remove the suction hose from the vehicle.
7. Discard all of the used sealing washers. Cap the system openings.

Installation Procedure

1. Install the suction hose to the vehicle using new sealing washers.

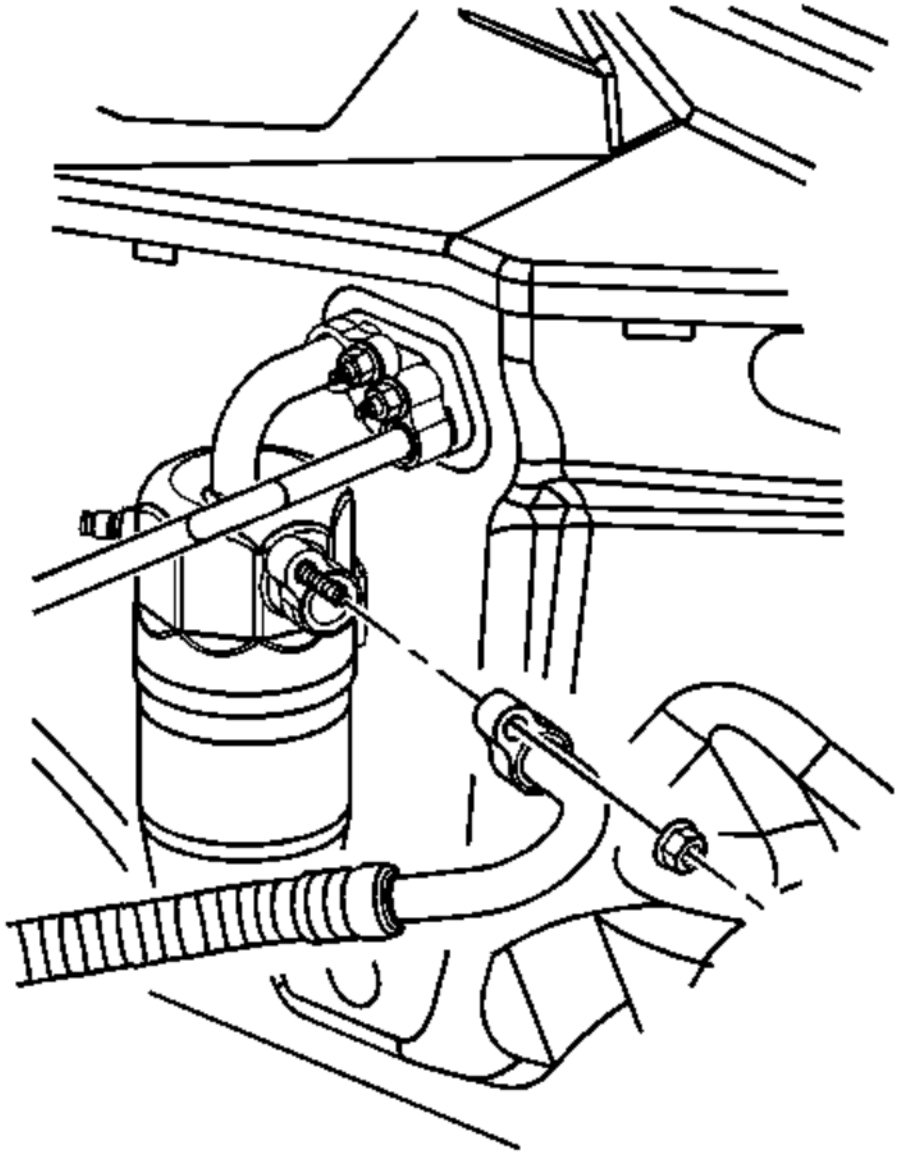


Fig. 53: Removing/Installing Suction Hose From Accumulator
Courtesy of GENERAL MOTORS CORP.

2. Install the suction hose to the accumulator.

NOTE: Refer to Fastener Notice .

3. Install the NEW suction hose nut to the accumulator.

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

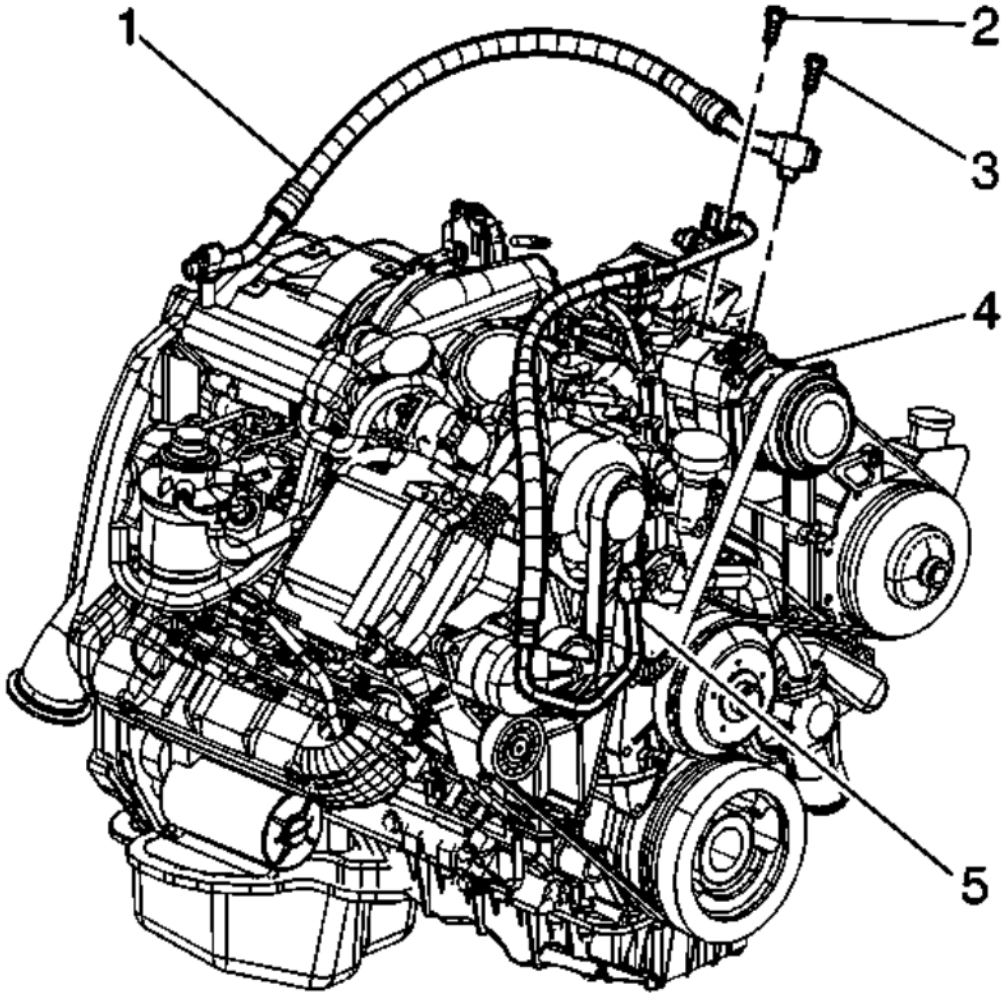


Fig. 54: View Of Discharge Hose & Connectors
Courtesy of GENERAL MOTORS CORP.

4. Install the suction hose to the compressor (1).

5. Install the NEW suction hose mounting bolt (3).

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

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

EVAPORATOR TUBE REPLACEMENT (NON HP2)

Tools Required

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

Removal Procedure

1. Recover the refrigerant. Refer to **Refrigerant Recovery and Recharging**.
2. Remove the upper radiator air baffle and deflector. Refer to **Radiator Air Upper Baffle and Deflector Replacement** .
3. Remove the air cleaner assembly. Refer to **Air Cleaner Assembly Replacement** .
4. Remove the surge tank hold down nut and bolt and position aside.

IMPORTANT: Do not open cooling system.

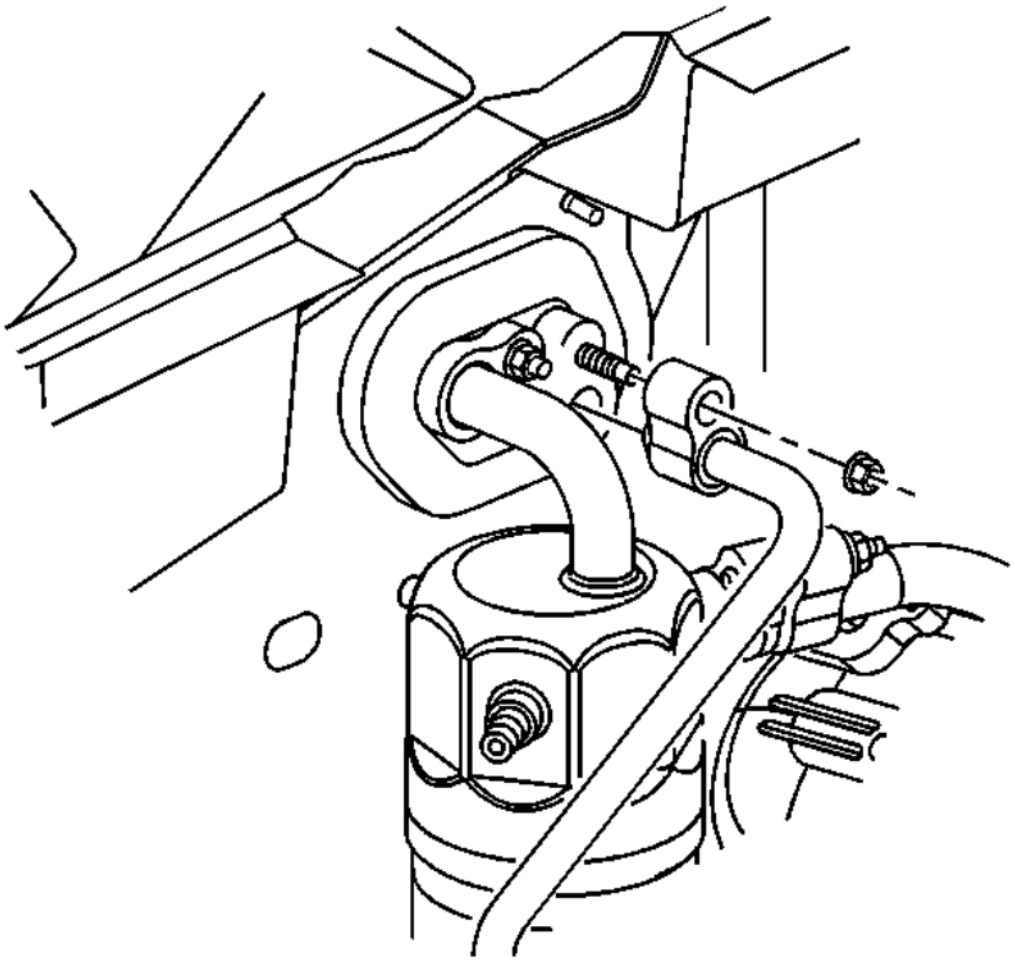


Fig. 55: Removing/Installling Evaporator Tube At Evaporator
Courtesy of GENERAL MOTORS CORP.

5. Remove the evaporator tube nut from the evaporator.
6. Disconnect the evaporator tube from the evaporator.
7. Remove the evaporator tube nut from the auxiliary A/C tube, if equipped.
8. Disconnect the evaporator tube from the auxiliary A/C tube, if equipped.

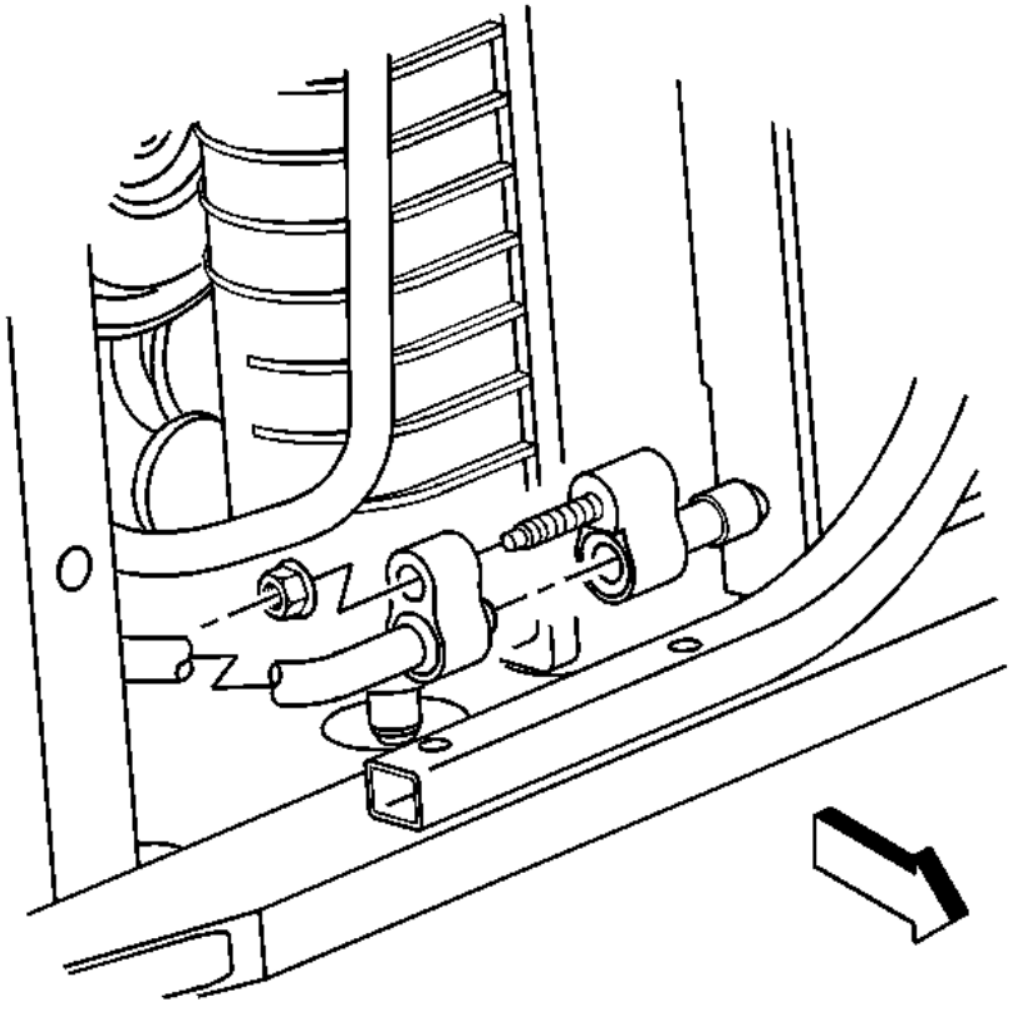


Fig. 56: Evaporator Tube To Condenser
Courtesy of GENERAL MOTORS CORP.

9. Remove the evaporator tube nut from the condenser.
10. Disconnect the evaporator tube from the condenser.
11. Remove the evaporator tube from the vehicle.
12. Discard all of the used sealing washers. Cap all of the open connections.

Installation Procedure

1. Connect the evaporator tube to the condenser using new sealing washers. Refer to **Sealing Washer Replacement**.

NOTE: Refer to Fastener Notice .

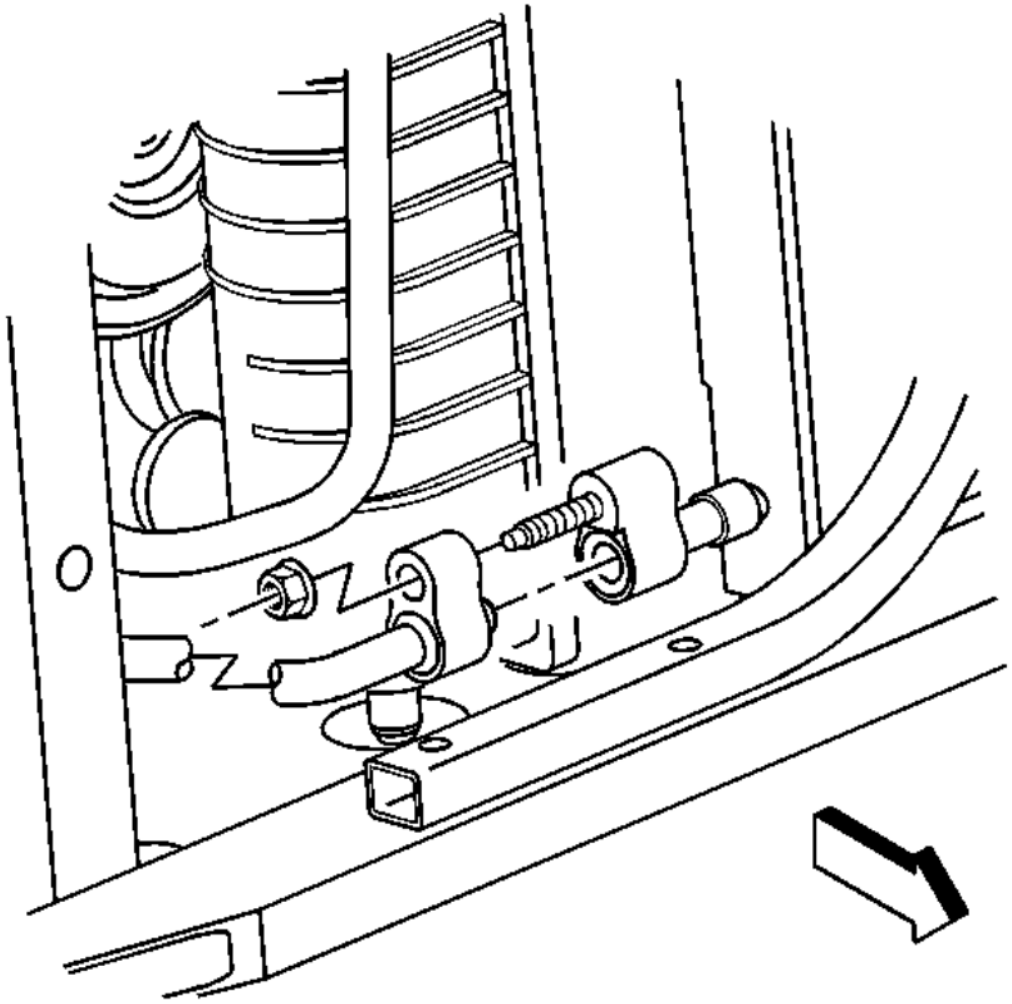


Fig. 57: Evaporator Tube To Condenser
Courtesy of GENERAL MOTORS CORP.

2. Install the evaporator tube nut to the condenser.

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

3. Connect the evaporator tube to the auxiliary A/C tube using new sealing washers, if equipped. Refer to **Sealing Washer Replacement**.
4. Install the evaporator tube nut to the auxiliary A/C tube, if equipped.

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

5. Install the evaporator tube to the evaporator.

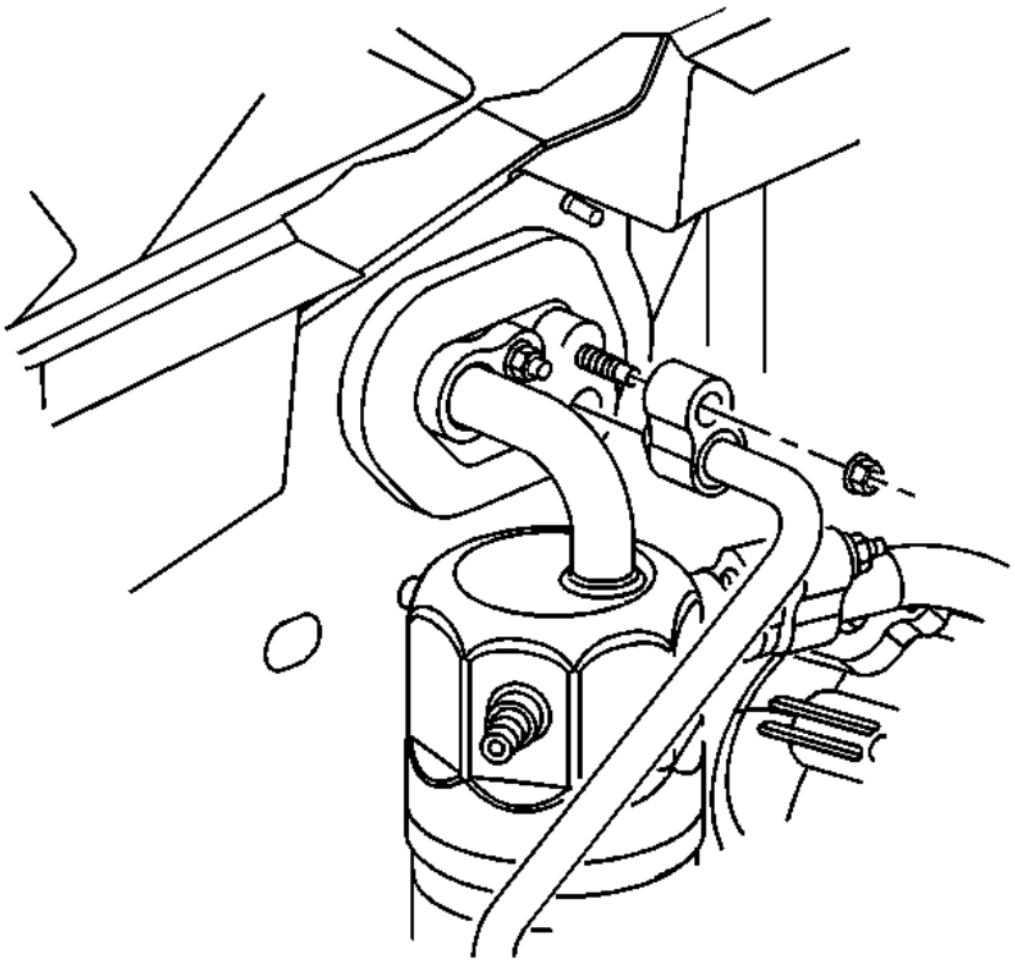


Fig. 58: Removing/Installling Evaporator Tube At Evaporator

Courtesy of GENERAL MOTORS CORP.

6. Install the evaporator tube nut to the evaporator.

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

7. Install the surge tank hold down nut and bolt and position aside.
8. Install the air cleaner assembly. Refer to **Air Cleaner Assembly Replacement** .
9. Install the upper radiator air baffle and deflector. Refer to **Radiator Air Upper Baffle and Deflector Replacement** .
10. Evacuate and recharge the system. Refer to **Refrigerant Recovery and Recharging**.
11. Leak test the fittings of the components using the **J 39400-A** . See **Special Tools**.

EXPANSION (ORIFICE) TUBE REPLACEMENT

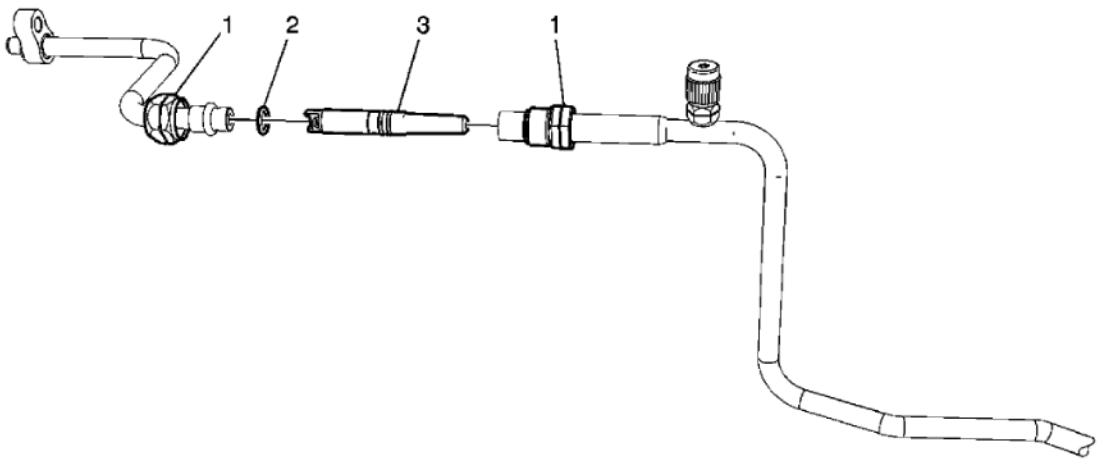


Fig. 59: View Of Orifice Tube Assembly & Components
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure 1. Recover the refrigerant. Refer to **Refrigerant Recovery and Recharging**. 2. Remove the air cleaner outlet duct. Refer to **Air Cleaner Resonator Outlet Duct Replacement** . 3. Remove the air cleaner assembly. Refer to **Air Cleaner Assembly Replacement** .	
	Orifice Tube Fitting

1	**NOTE:** **Refer to Fastener Notice .** **Tip:** Loosen orifice tub fitting and separate the pressure line to access the orifice. **Tighten:** 9 N.m (80 lb in)
2	O-ring Seal **Tip:** Remove and discard O-ring. Refer to **O-Ring Replacement**.
3	Orifice Tube Assembly **Tip:** Use **J 26549-E** to remove orifice tube. See **Special Tools**.

AIR CONDITIONING (A/C) LOW PRESSURE SWITCH REPLACEMENT (NON-HP2)

Removal Procedure

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

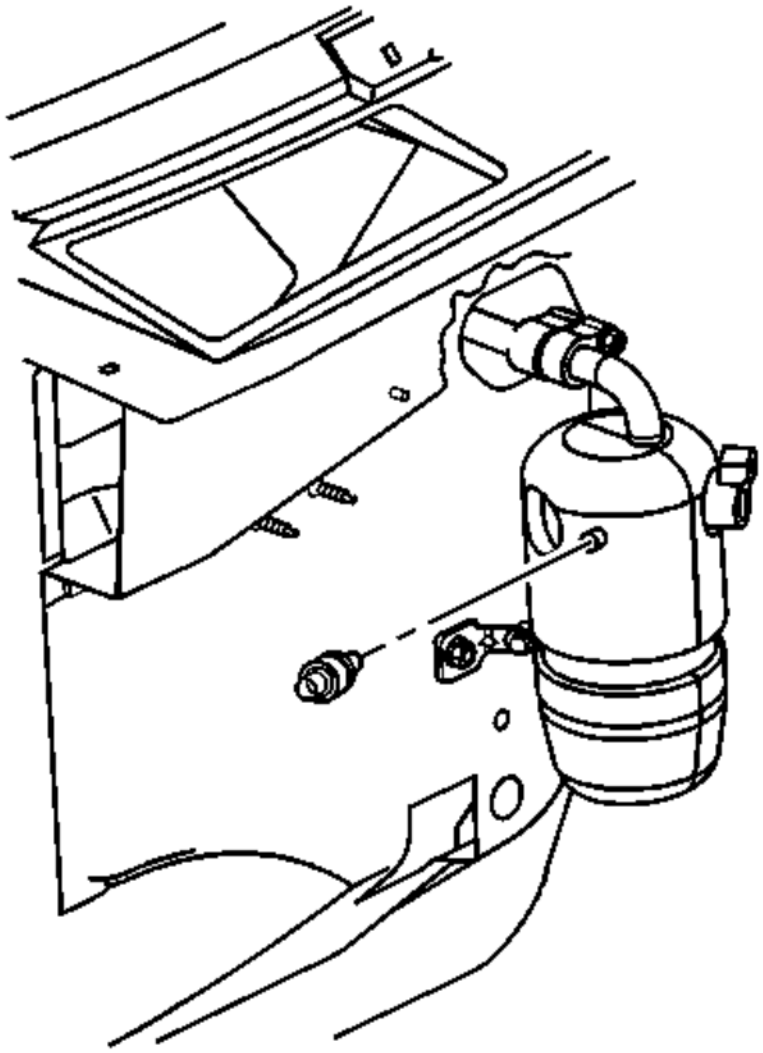


Fig. 60: A/C Low Pressure Switch
Courtesy of GENERAL MOTORS CORP.

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

Installation Procedure

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

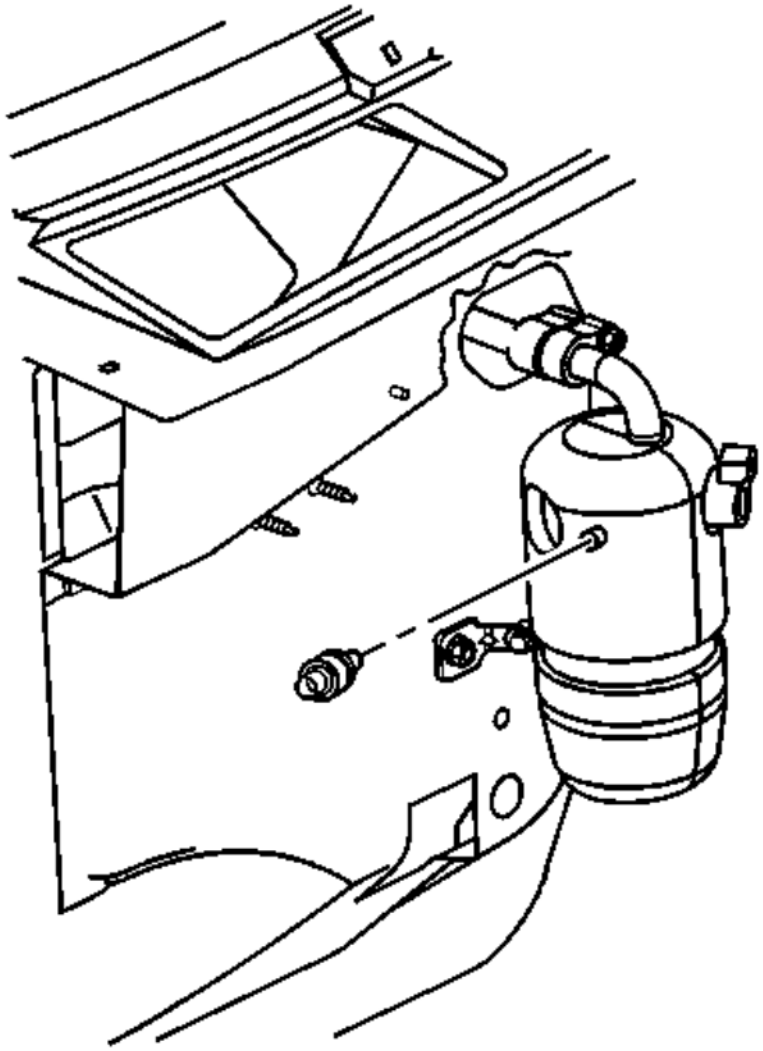


Fig. 61: A/C Low Pressure Switch
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice .

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

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

3. Connect the electrical connector to the A/C low pressure switch.
4. Leak test the fittings of the components using the **J 39400-A** . See **Special Tools**.

AIR CONDITIONING (A/C) REFRIGERANT PRESSURE SENSOR REPLACEMENT (NON-HP2) HP2)

Tools Required

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

Removal Procedure

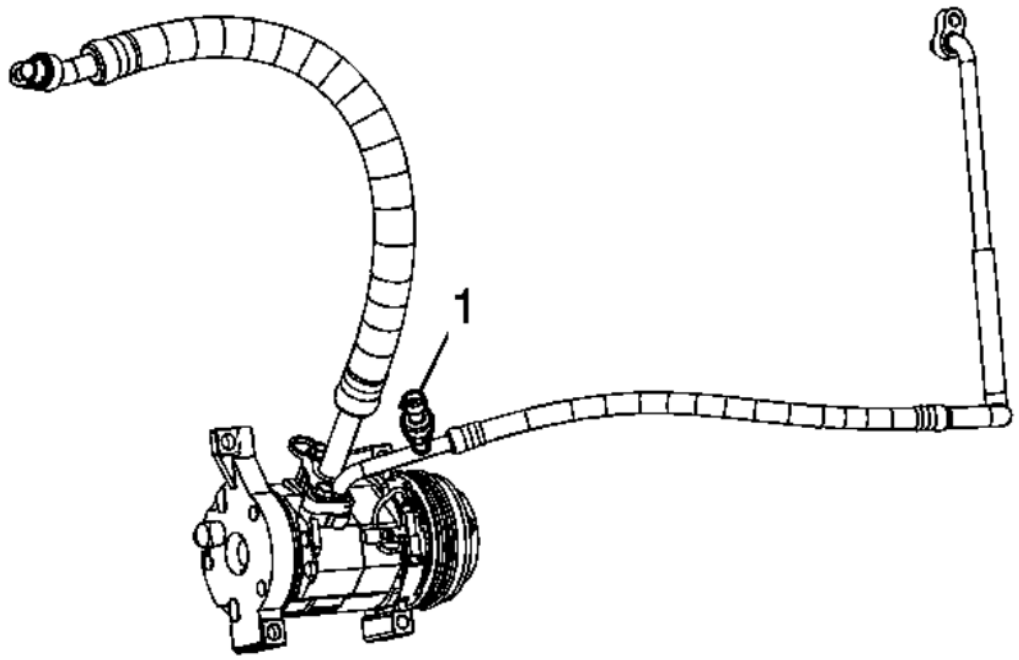


Fig. 62: View Of A/C High Pressure Recirculation Switch
Courtesy of GENERAL MOTORS CORP.

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

Installation Procedure

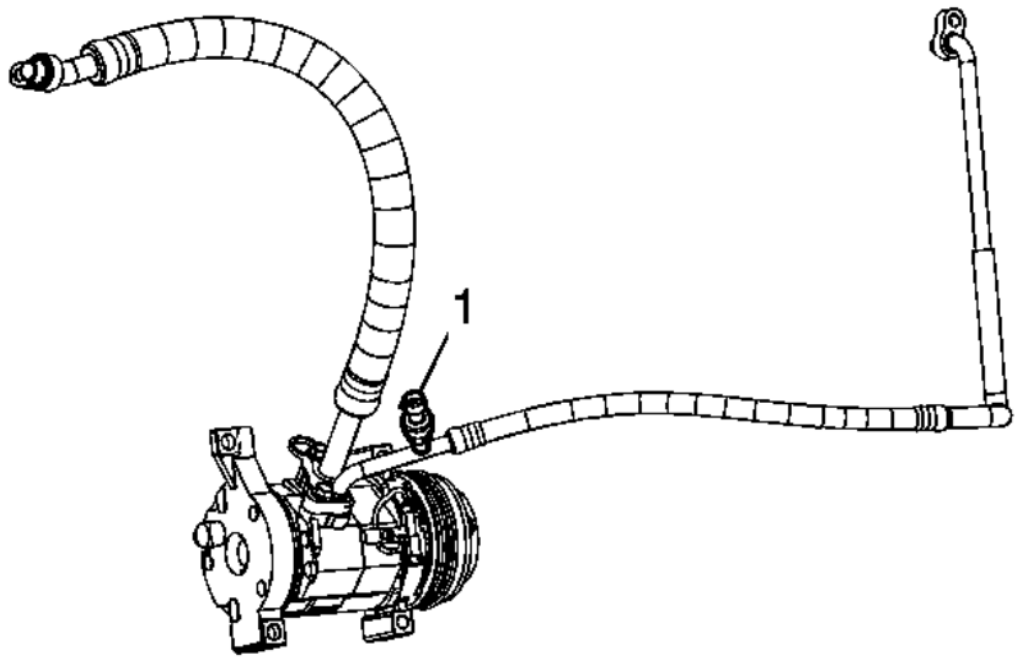


Fig. 63: View Of A/C High Pressure Recirculation Switch
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice .

1. Install the A/C refrigerant pressure sensor (1).

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

2. Connect the electrical connector to the A/C refrigerant pressure sensor.
3. Leak test the fittings of the components using the **J 39400-A** . See **Special Tools**.
4. Lower the vehicle.

CONDENSER REPLACEMENT

Special Tools

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

Removal Procedure

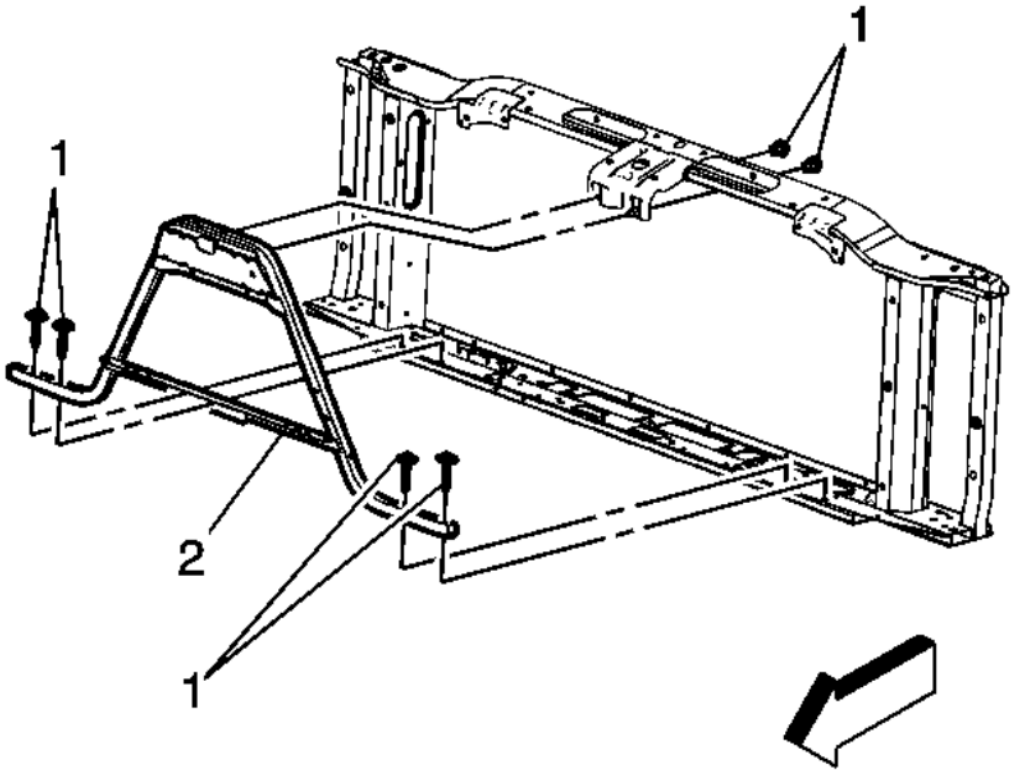


Fig. 64: Radiator Support Bolts
Courtesy of GENERAL MOTORS CORP.

1. Recover the refrigerant. Refer to **Refrigerant Recovery and Recharging**.
2. Remove the fascia.
3. Remove radiator support bolts (1). Access the bolts from the rear of the upper radiator support. Refer to **Radiator Support Replacement** .
4. Remove radiator support bracket bolts (1).

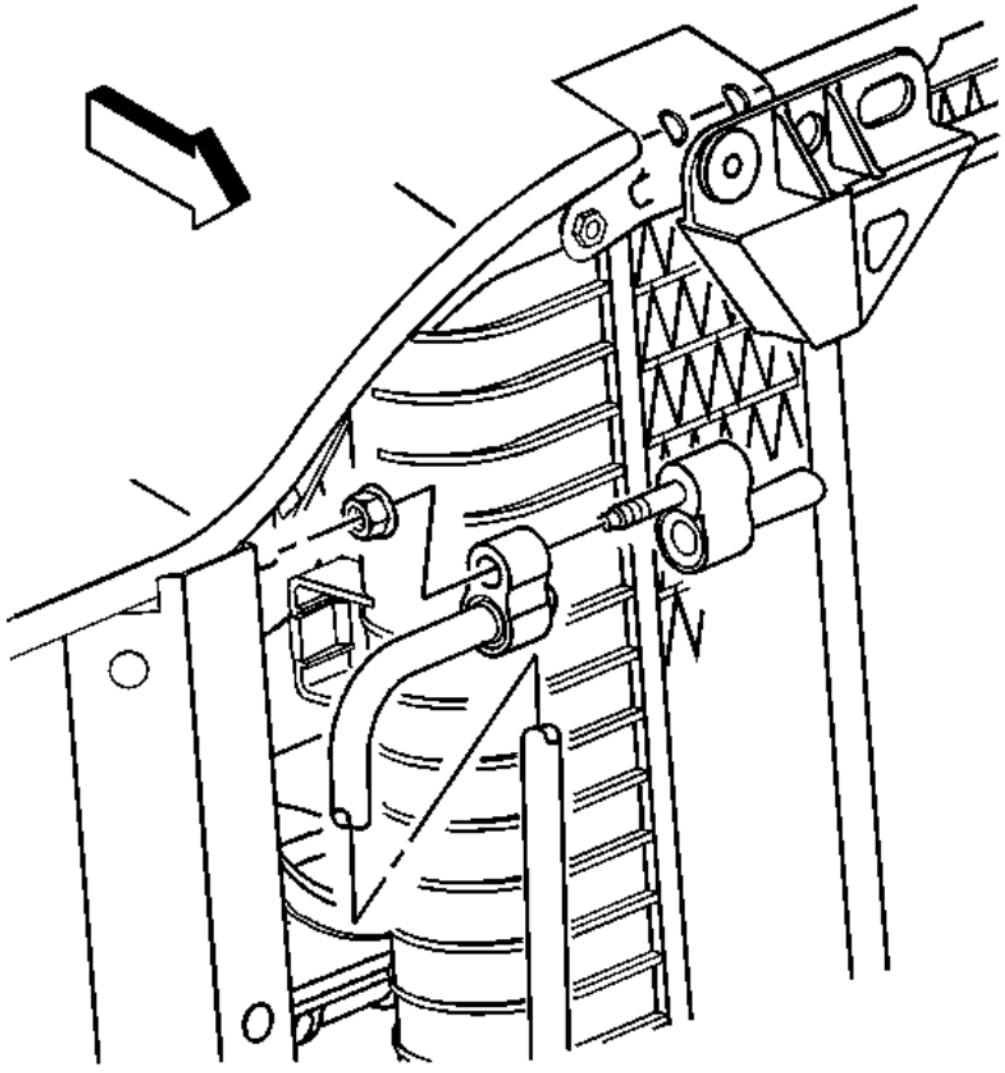


Fig. 65: View Of Discharge Hose At Condenser
Courtesy of GENERAL MOTORS CORP.

5. Remove the compressor discharge hose assembly bolt from the condenser.
6. Disconnect the compressor discharge hose assembly from the condenser.

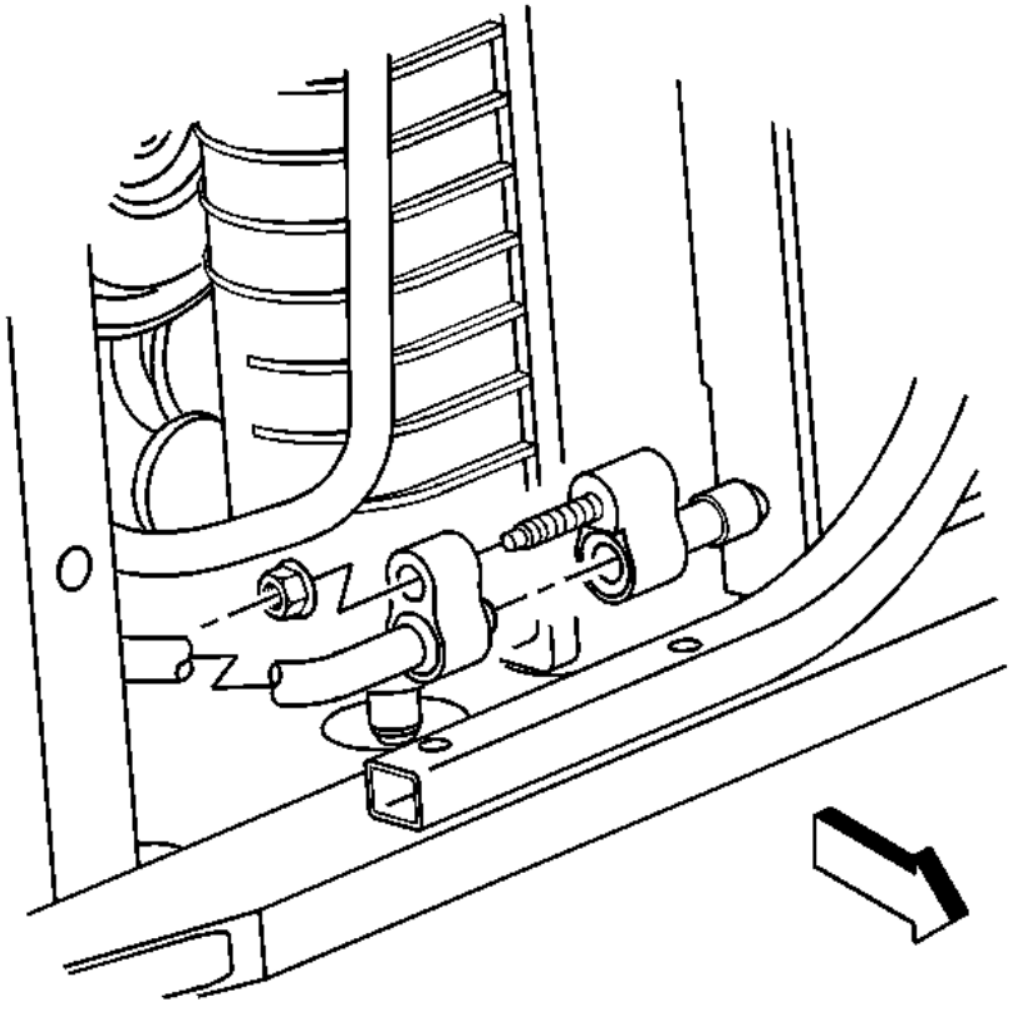


Fig. 66: Evaporator Tube To Condenser
Courtesy of GENERAL MOTORS CORP.

7. Remove the evaporator tube nut from the condenser.
8. Disconnect the evaporator tube from the condenser.
9. Remove the insulator retainer bolts and the upper insulator retainers.
10. Remove the condenser from the vehicle.

Installation Procedure

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

1. Install the condenser to the vehicle.

   NOTE: Refer to Fastener Notice .

2. Install the upper insulator retainers and the insulator retainer bolts.

   Tighten: Tighten the bolts to 2.4 N.m (21 lb in).

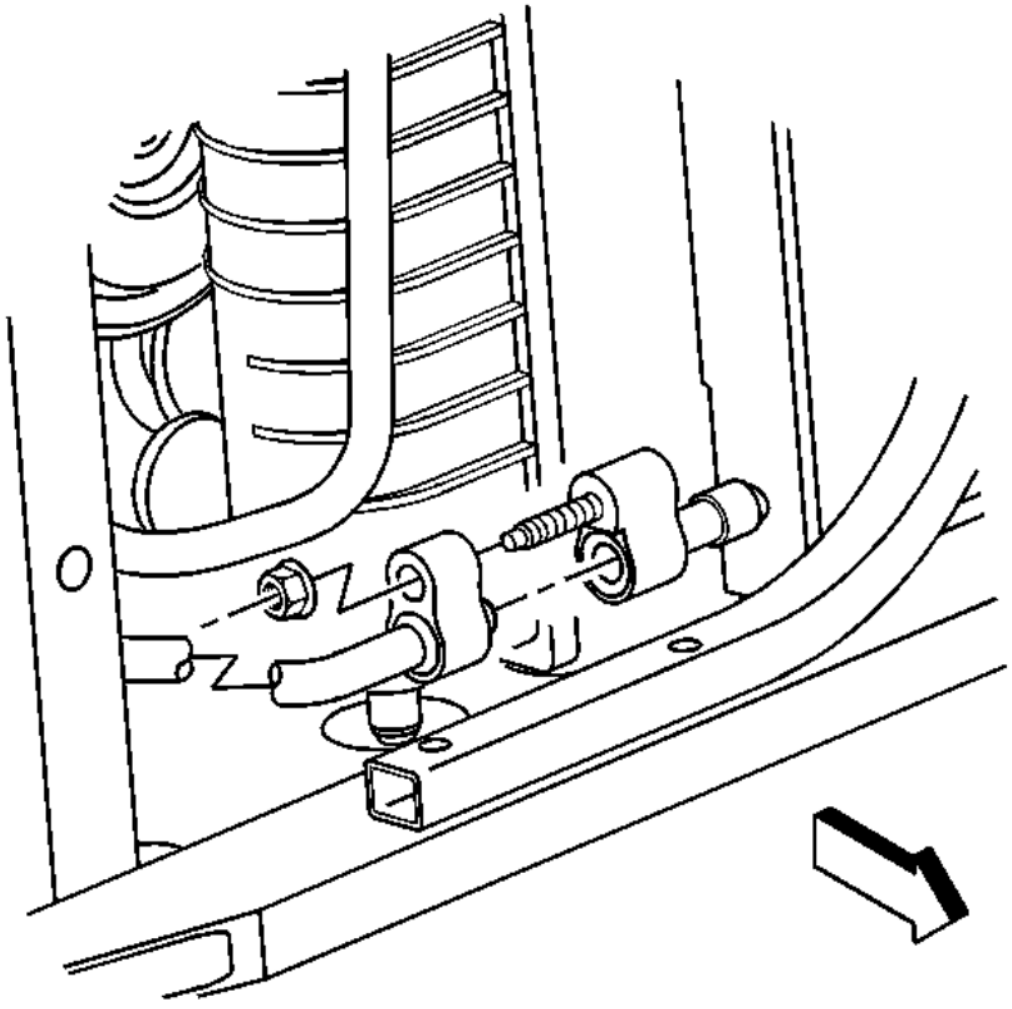


Fig. 67: Evaporator Tube To Condenser
Courtesy of GENERAL MOTORS CORP.

3. Connect the evaporator tube to the condenser using new sealing washers. Refer to **Sealing Washer Replacement**.
4. Install the evaporator tube nut to the condenser.

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

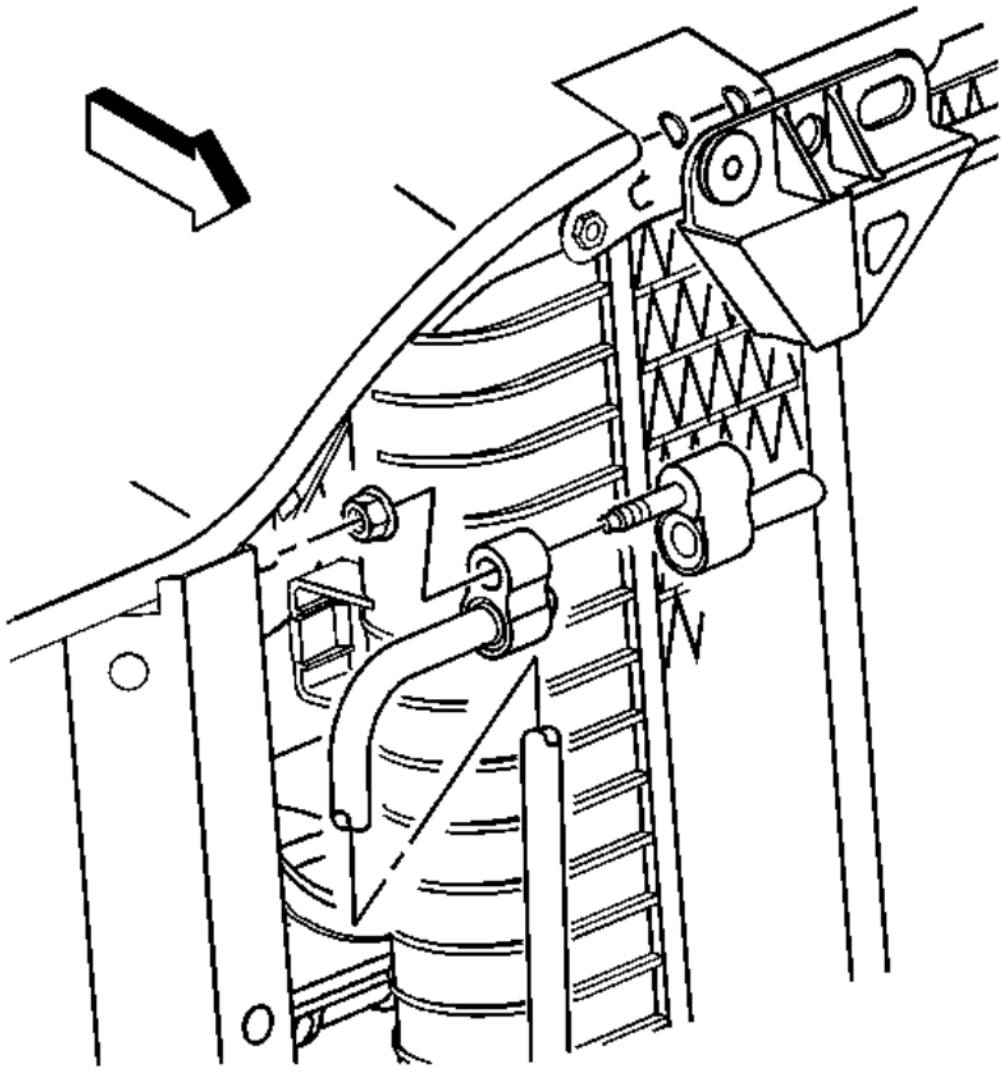


Fig. 68: View Of Discharge Hose At Condenser
Courtesy of GENERAL MOTORS CORP.

5. Connect the compressor discharge hose to the condenser using new sealing washers. Refer to **Sealing Washer Replacement**.
6. Install the compressor discharge hose nut to the condenser.

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

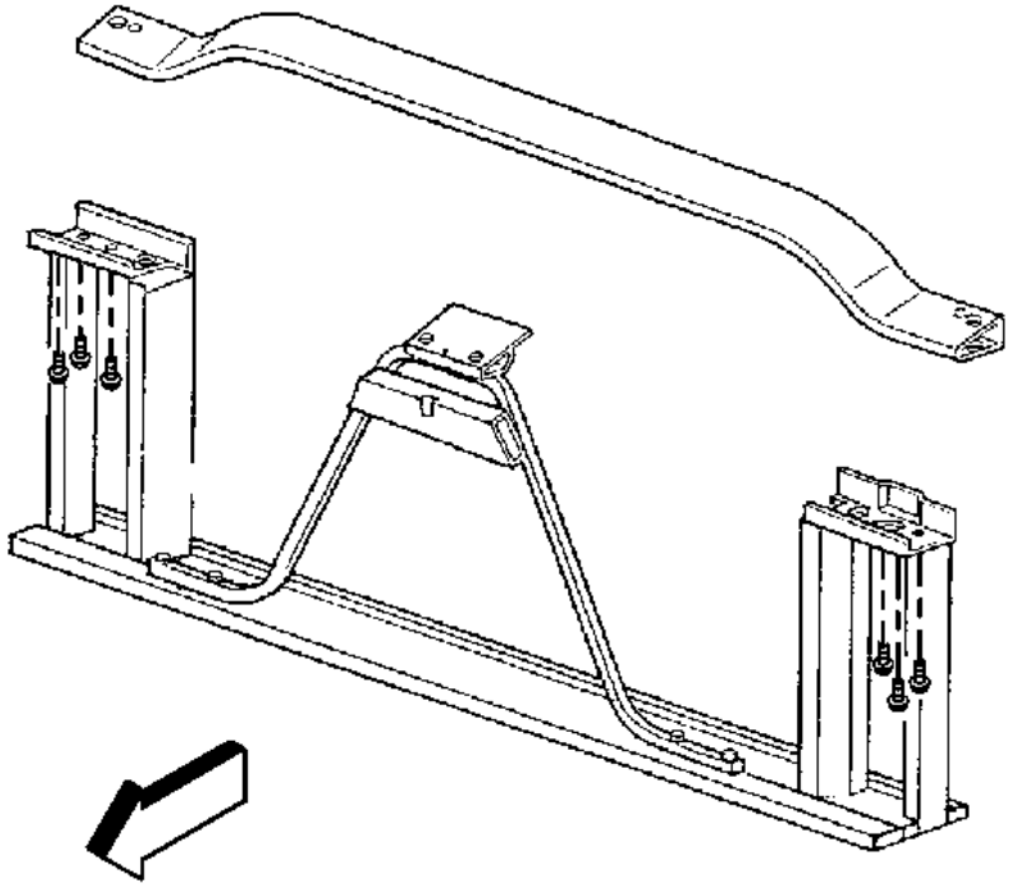


Fig. 69: Tie Bar & Bolts
Courtesy of GENERAL MOTORS CORP.

7. Install the lower bolts to the hood latch support bracket.

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

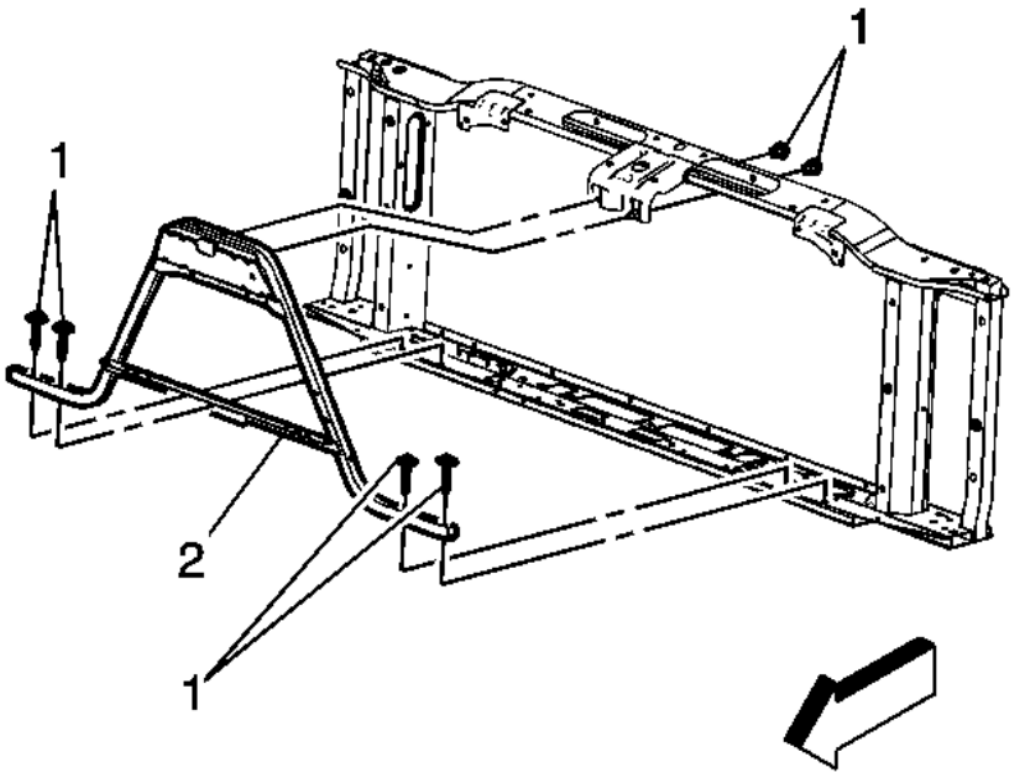


Fig. 70: Radiator Support Bolts
Courtesy of GENERAL MOTORS CORP.

8. Install the radiator support. Access the bolts (1) from the rear of the upper radiator support. Refer to **Radiator Support Replacement** .

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

9. Install radiator support bracket bolts (1).
10. Install the fascia.
11. Evacuate and recharge the system. Refer to **Refrigerant Recovery and Recharging**.
12. Leak test the fittings of the component using the **J 39400-A** . See **Special Tools**.

AIR CONDITIONING ACCUMULATOR REPLACEMENT (NON-HP2)

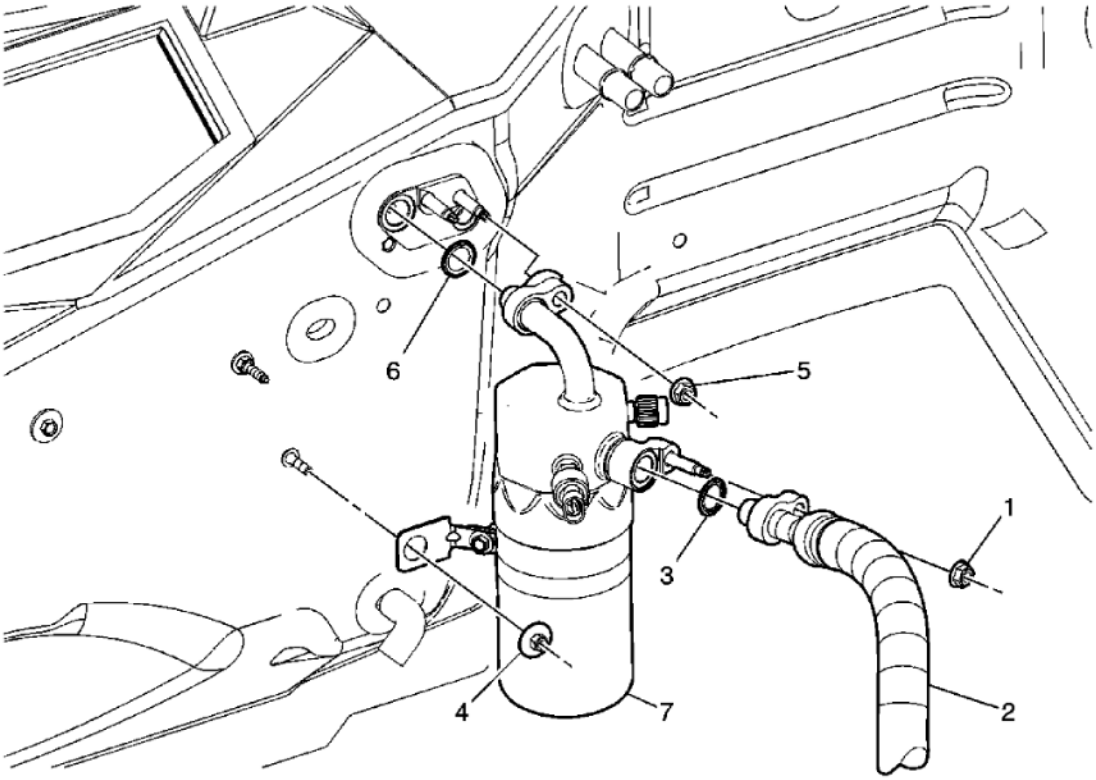


Fig. 71: View Of Accumulator & Components
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Recover the refrigerant. Refer to **Refrigerant Recovery and Recharging**.	
1	Suction Hose Nut **NOTE:** **Refer to Fastener Notice .** **Tip:** Large A/C compressor hose to A/C evaporator. **Tighten:** 16 N.m (12 lb in)
2	A/C Suction Hose
3	Sealing Washer **Tip:** Remove and discard sealing washer. Refer to **Sealing Washer Replacement**.

4	Accumulator Mounting Bracket Nut **Tighten:** 16 N.m (12 lb in)
5	Accumulator Nut **Tighten:** 16 N.m (12 lb in)
6	Sealing Washer **Tip:** Remove and discard sealing washer. Refer to **Sealing Washer Replacement**.
7	Accumulator **Tip:** Replacement service accumulators are shipped dry (no PAG oil). Add proper amount of oil to system before operating. Refer to **Refrigerant System Capacities**.

HVAC MODULE ASSEMBLY REPLACEMENT

Tools Required

J 43181 Heater Line QC Release Tool

Removal Procedure

1. Drain the engine coolant. Refer to **Cooling System Draining and Filling (Vac-N-Fill)** or **Cooling System Draining and Filling (Static Fill)** .

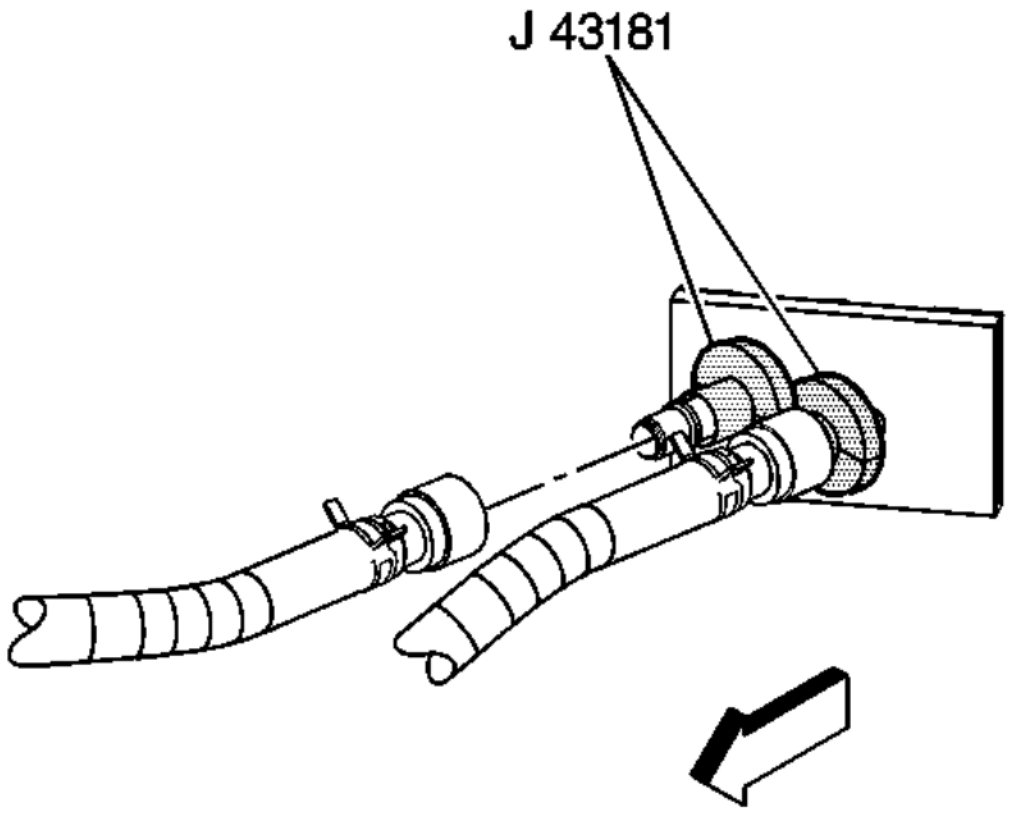


Fig. 72: Identifying Heater Hose To Heater Core Fittings
Courtesy of GENERAL MOTORS CORP.

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

4. Firmly grasp the heater hose. Pull the heater hose forward in order to disengage the surge tank outlet hose from the heater core.

4. Remove the upper intake manifold sight shield. Refer to **Upper Intake Manifold Sight Shield Replacement** .
5. Remove the battery. Refer to **Battery Replacement** .
6. Remove the accumulator. Refer to **Air Conditioning Accumulator Replacement (Non-HP2)**.
7. Remove the instrument panel to the service position. Refer to **Instrument Panel Service Positioning (Without SLT)** or **Instrument Panel Service Positioning (With SLT)** .

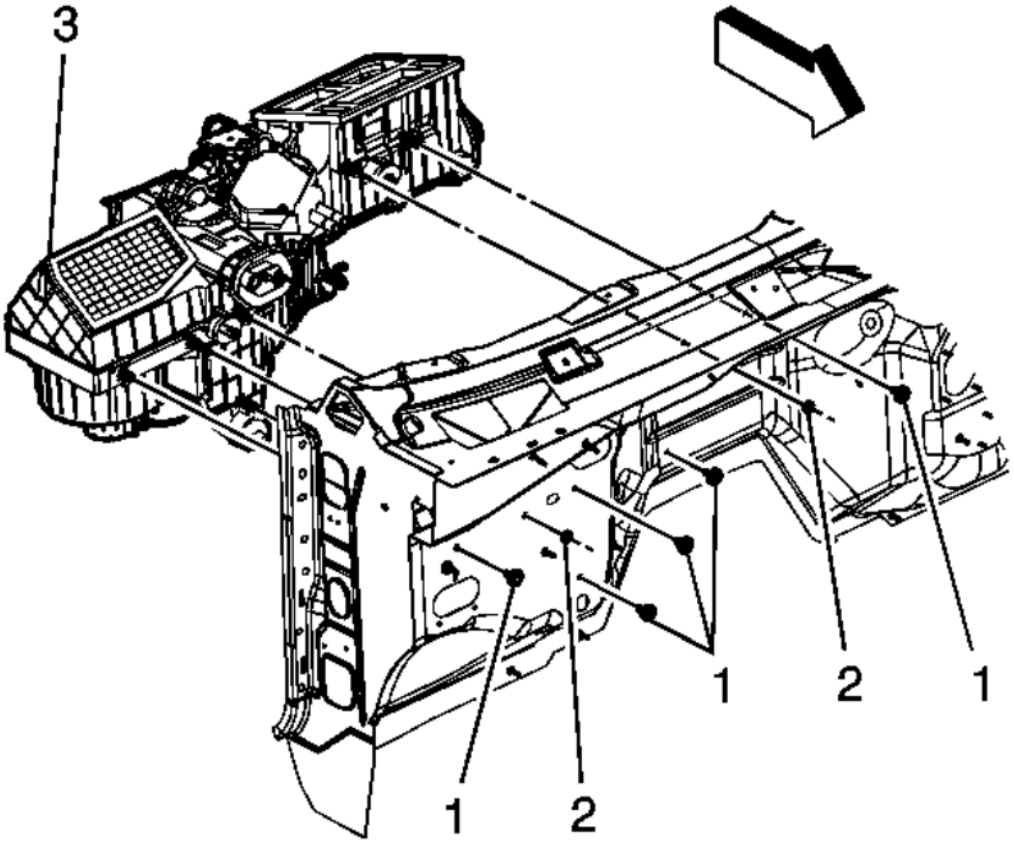


Fig. 73: View Of HVAC Module, Nuts & Bolts
Courtesy of GENERAL MOTORS CORP.

8. Remove the nuts (2) from the HVAC module (3).
9. Remove the bolts (1) from the HVAC module (3).
10. Remove the HVAC module (3).

Installation Procedure

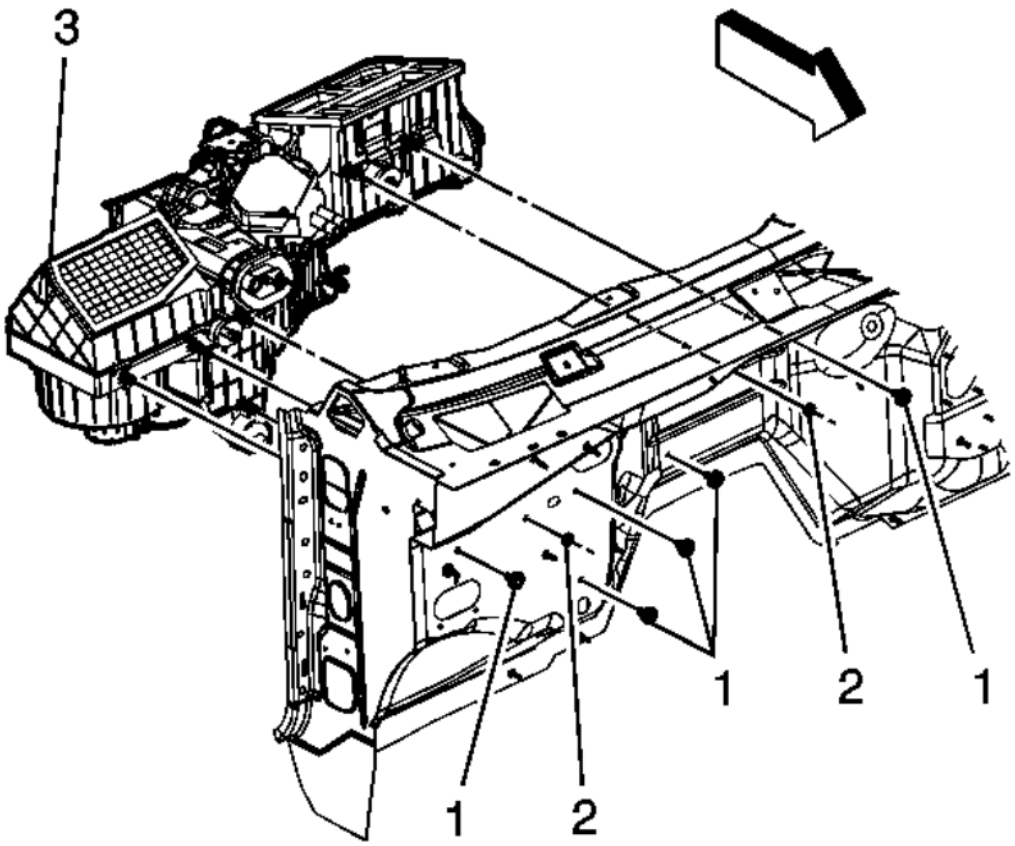


Fig. 74: View Of HVAC Module, Nuts & Bolts
Courtesy of GENERAL MOTORS CORP.

1. If replacing the HVAC module, transfer the components from the old HVAC module as necessary.
2. Install the HVAC module (3).

NOTE: Refer to Fastener Notice .

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

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

4. Install the bolts (1) to the HVAC module (3).

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

5. Connect the electrical harness and the ground connections.
6. Install the HVAC module drain hose.
7. Install the instrument panel. Refer to **Instrument Panel Service Positioning (Without SLT)** or **Instrument Panel Service Positioning (With SLT)** .
8. Install the upper intake manifold sight shield. Refer to **Upper Intake Manifold Sight Shield Replacement** .
9. Install the battery. Refer to **Battery Replacement** .
10. Install the accumulator. Refer to **Air Conditioning Accumulator Replacement (Non-HP2)**.

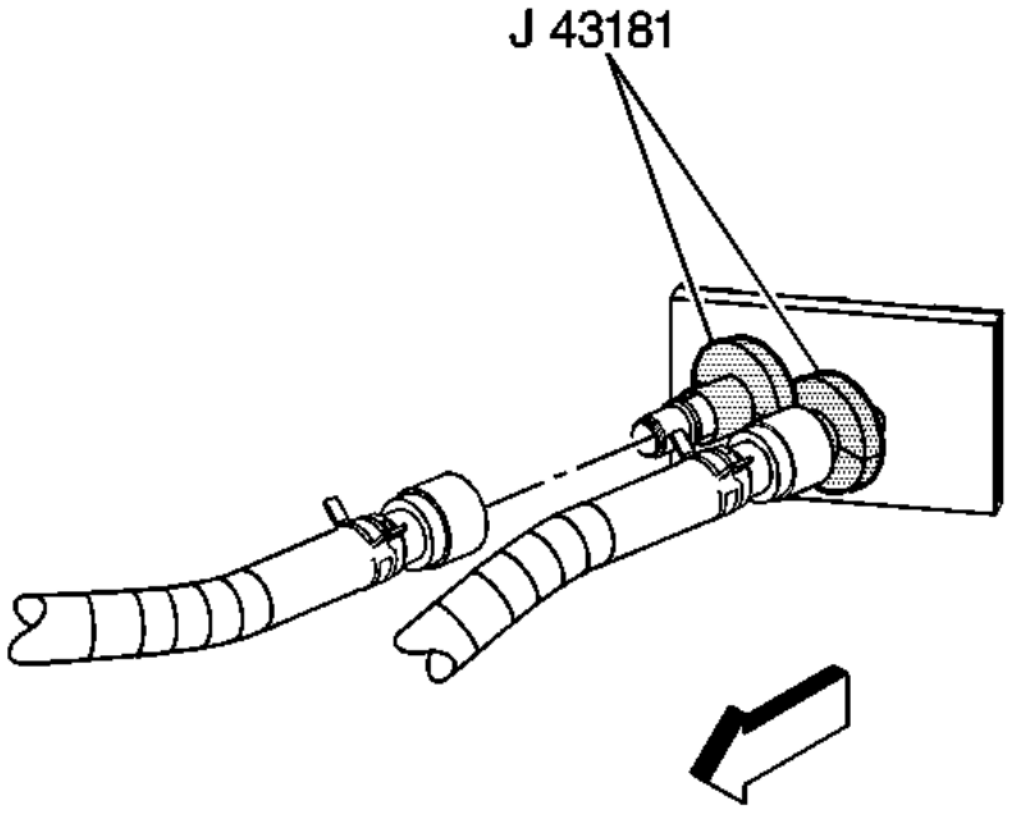


Fig. 75: Identifying Heater Hose To Heater Core Fittings
Courtesy of GENERAL MOTORS CORP.

11. Install the surge tank outlet hose to the heater core.

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

12. Install the inlet heater hose to the heater core.

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

13. Fill the engine coolant. Refer to **Cooling System Draining and Filling (Vac-N-Fill)** or **Cooling System Draining and Filling (Static Fill)** .

AIR CONDITIONING EVAPORATOR CORE REPLACEMENT

Removal Procedure

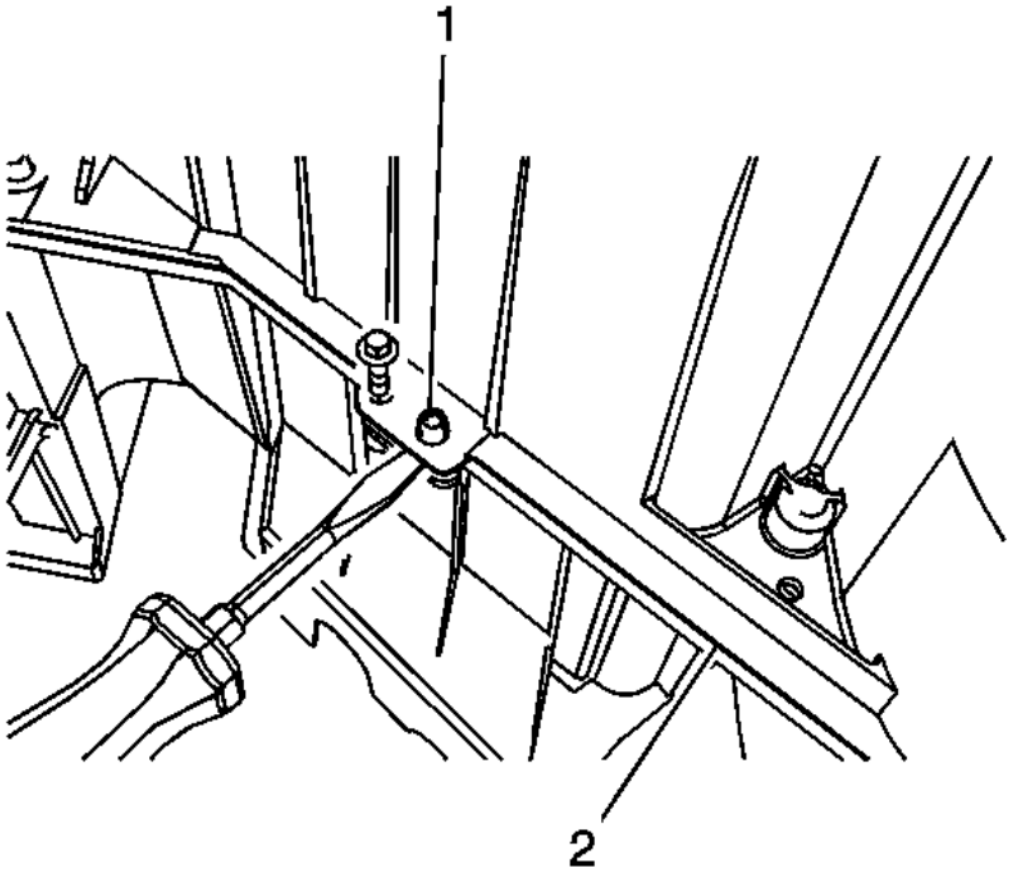


Fig. 76: Heat Stakes
Courtesy of GENERAL MOTORS CORP.

1. Remove the HVAC module. Refer to **HVAC Module Assembly Replacement**.
2. If equipped remove the heat stakes (1) from the HVAC module (2) with a screw driver and a hammer.
3. Disconnect all wiring connections from blower motor, blower motor control module and sensors. Also, remove all wiring from retainers before removal.

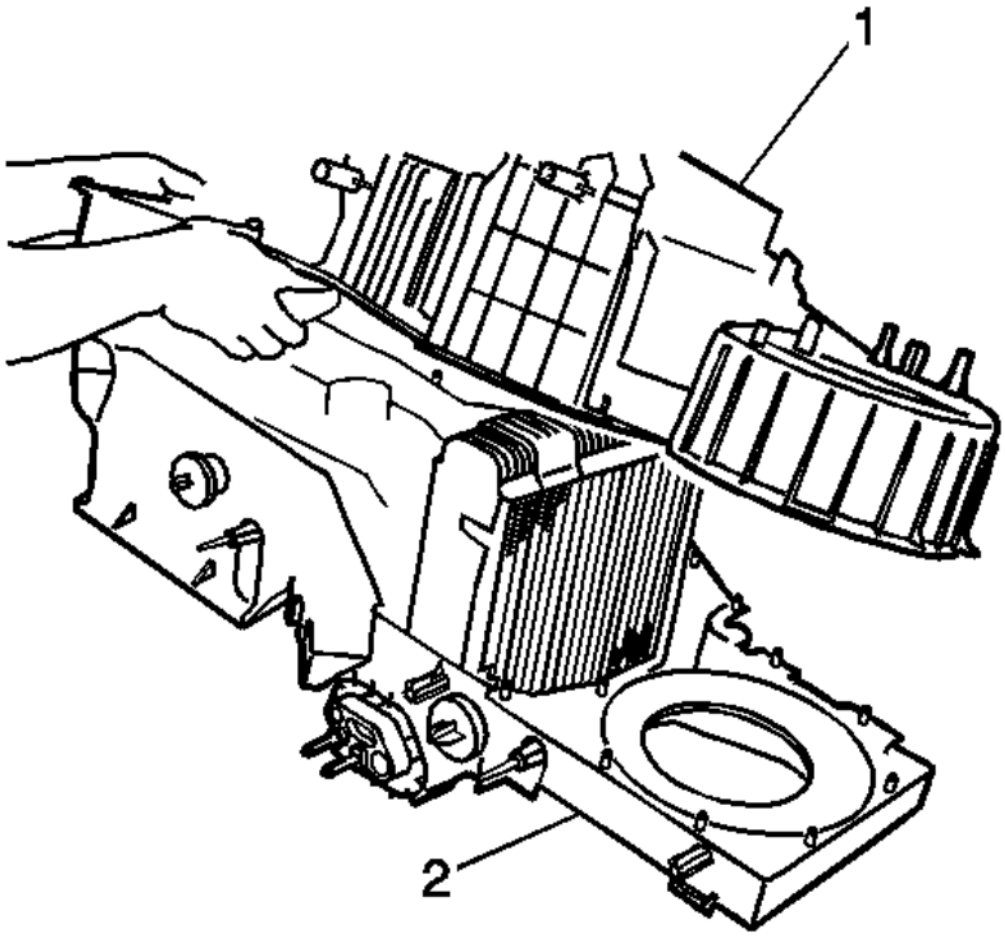


Fig. 77: View Of Upper & Lower HVAC Module Assemblies (Delphi)
Courtesy of GENERAL MOTORS CORP.

4. If equipped remove the screws from the HVAC module assembly.
5. Remove the evaporator cowl gasket from the evaporator.
6. Separate the upper HVAC module assembly (2) from the lower HVAC module assembly (1)

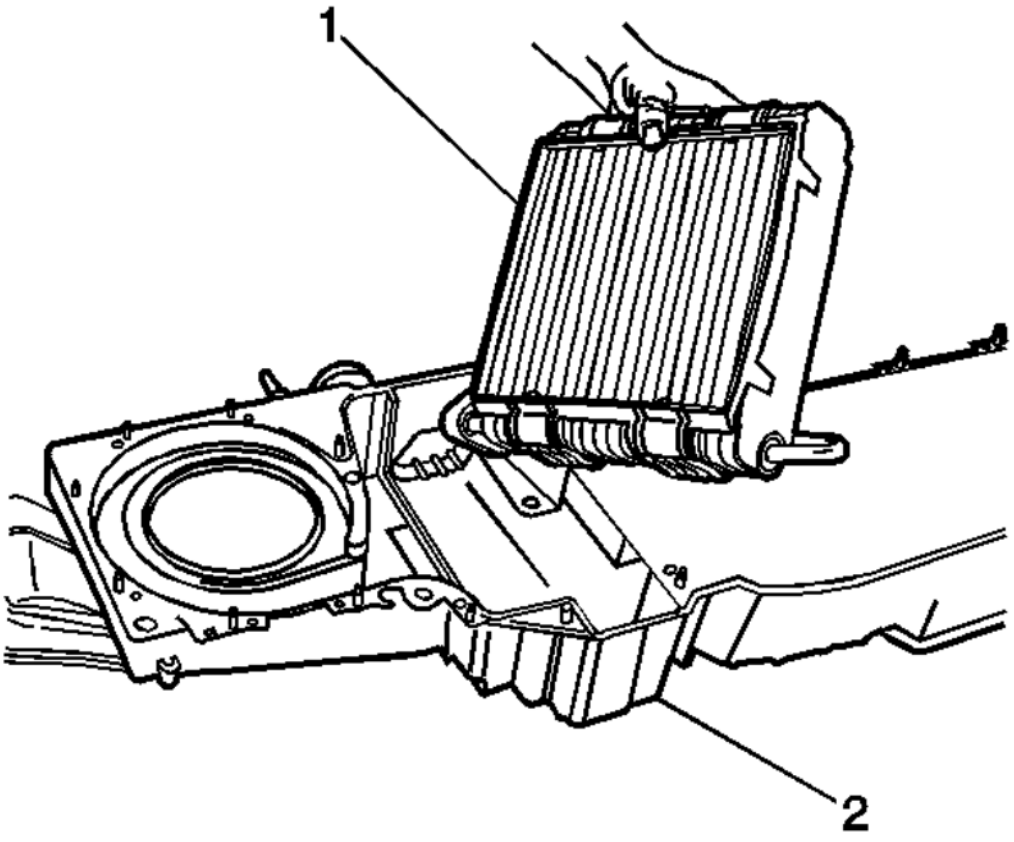


Fig. 78: View Of Evaporator Core (Delphi)
Courtesy of GENERAL MOTORS CORP.

7. Remove the evaporator core (1) from the upper HVAC module assembly (2).

Installation Procedure

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

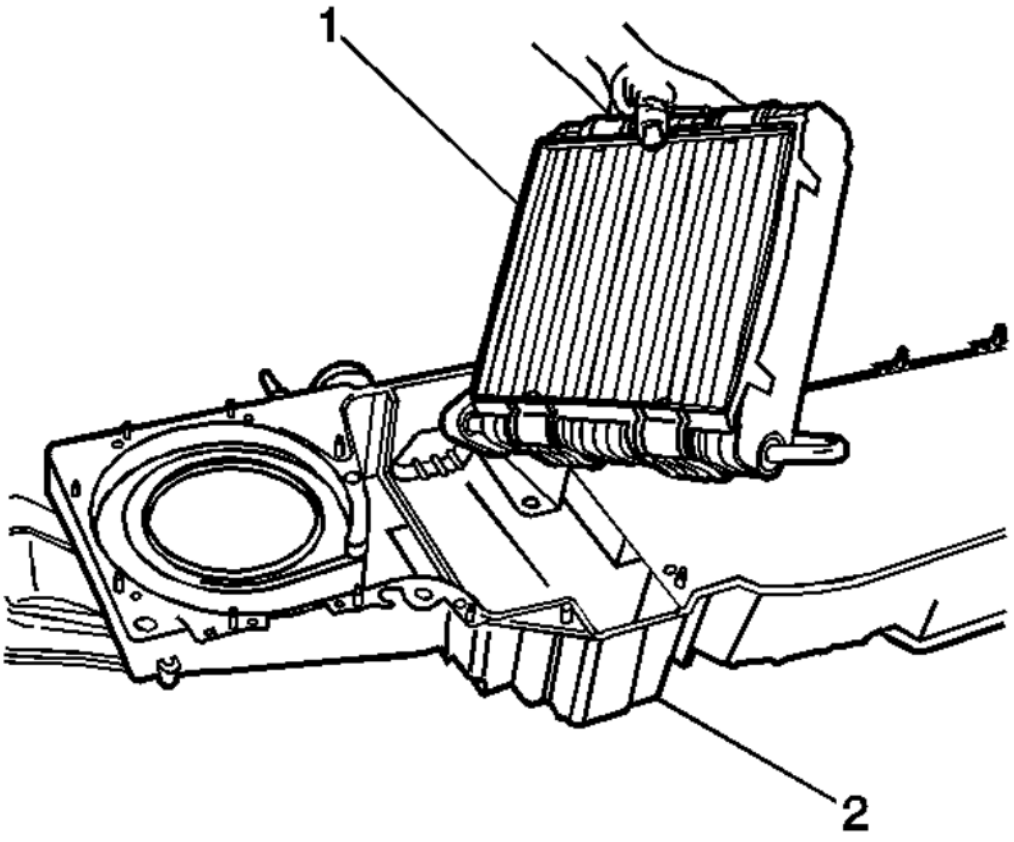


Fig. 79: View Of Evaporator Core (Delphi)
Courtesy of GENERAL MOTORS CORP.

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

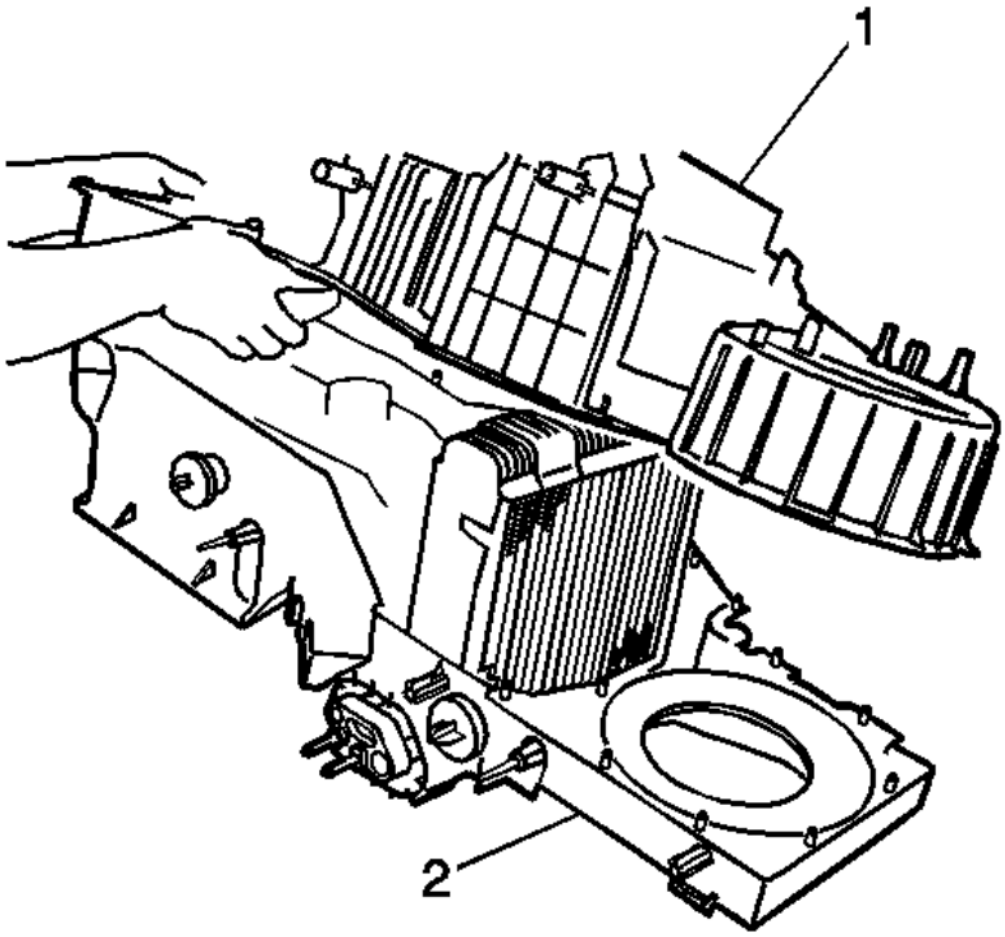


Fig. 80: View Of Upper & Lower HVAC Module Assemblies (Delphi)
Courtesy of GENERAL MOTORS CORP.

2. Install the upper HVAC module assembly (2) from the lower HVAC module assembly (1)
3. Install the evaporator cowl gasket to the evaporator.

NOTE: Refer to Fastener Notice .

4. Install the screws to the HVAC module assembly.

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

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

HEATER INLET HOSE REPLACEMENT (NON-HP2)

Removal Procedure

1. Drain the cooling system. Refer to **Cooling System Draining and Filling (Vac-N-Fill)** or **Cooling System Draining and Filling (Static Fill)** .
2. Remove the air intake tube.
3. Remove the heater and surge tank hoses from the mounting clip.

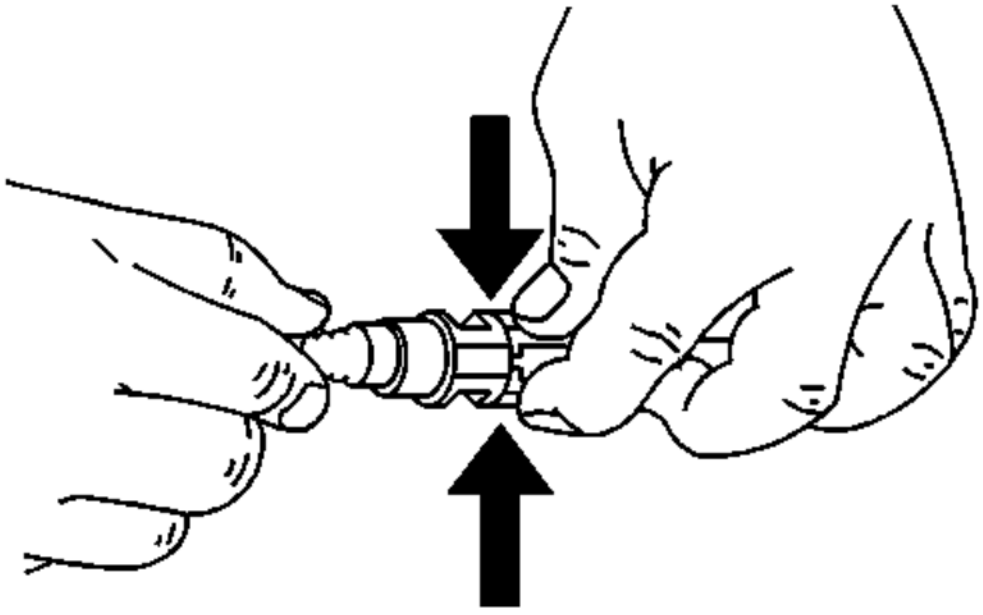


Fig. 81: Squeezing Quick Connect Fitting Release Tabs (Plastic Collar)
Courtesy of GENERAL MOTORS CORP.

4. Squeeze the plastic retainer release tabs.

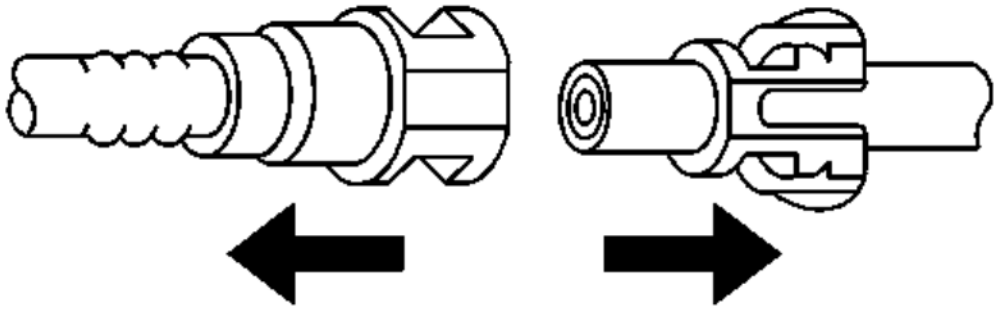


Fig. 82: Pulling Connection Apart (Plastic Collar)
Courtesy of GENERAL MOTORS CORP.

5. Pull the connection apart.

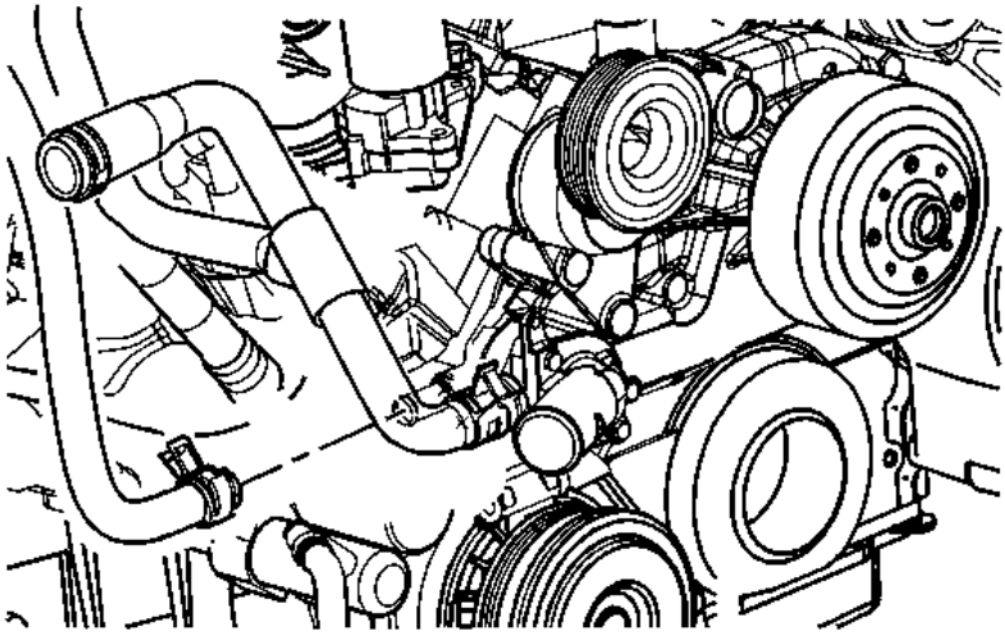


Fig. 83: Removing/Installing Heater Hose To Engine
Courtesy of GENERAL MOTORS CORP.

6. Remove the inlet heater hose from the water pump.

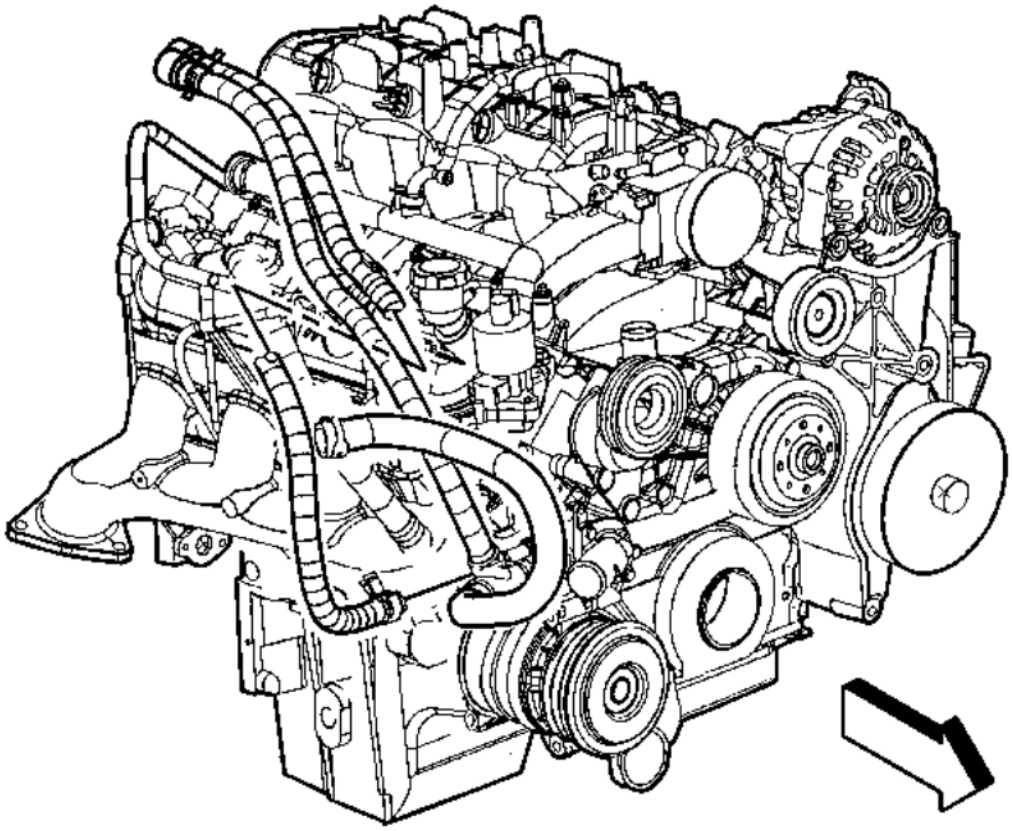


Fig. 84: View Of Inlet & Outlet Heater Hoses (LR4, LM7, LQ4)
Courtesy of GENERAL MOTORS CORP.

7. Remove the inlet heater hose.

Installation Procedure

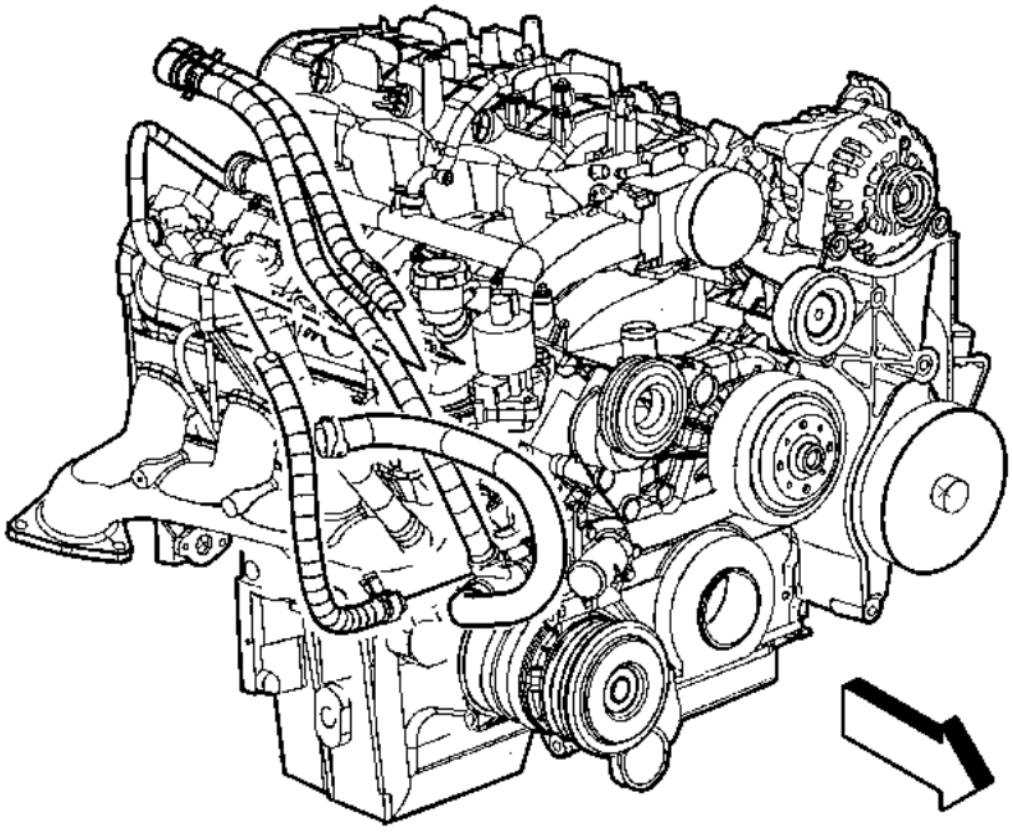


Fig. 85: View Of Inlet & Outlet Heater Hoses (LR4, LM7, LQ4)
Courtesy of GENERAL MOTORS CORP.

1. Install the inlet heater hose.

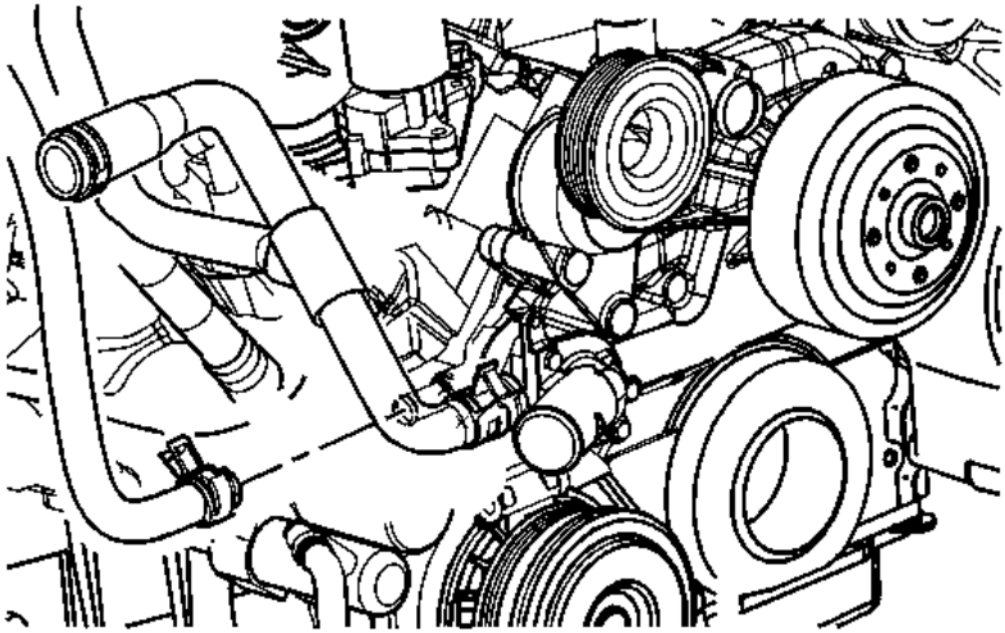


Fig. 86: Removing/Installing Heater Hose To Engine
Courtesy of GENERAL MOTORS CORP.

2. Install the inlet heater hose to the water pump.

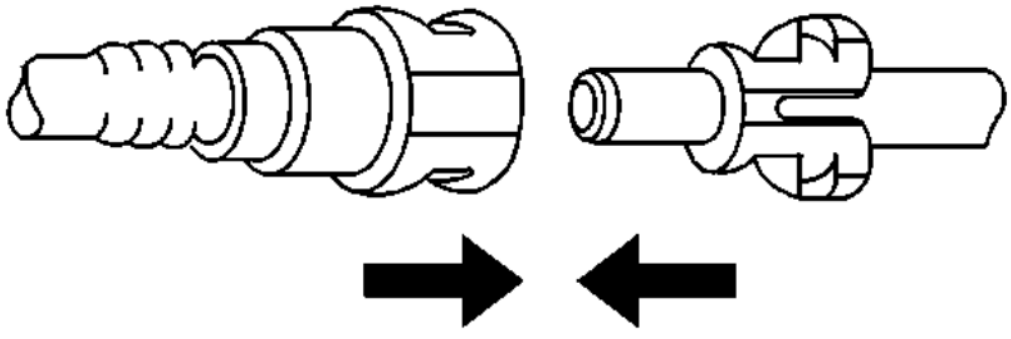


Fig. 87: Connecting Quick-Connect Fittings
Courtesy of GENERAL MOTORS CORP.

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

3. Connect the heater hose to the heater core.
4. Install the heater and surge tank hoses to the mounting clip.
5. Install the air intake tube.
6. Fill the cooling system. Refer to **Cooling System Draining and Filling (Vac-N-Fill)** or **Cooling System Draining and Filling (Static Fill)** .

HEATER OUTLET HOSE REPLACEMENT

Removal Procedure

1. Drain the cooling system. Refer to **Cooling System Draining and Filling (Vac-N-Fill)** or **Cooling System Draining and Filling (Static Fill)** .
2. Remove the air intake tube.
3. Remove the heater and surge tank hoses from the mounting clip.

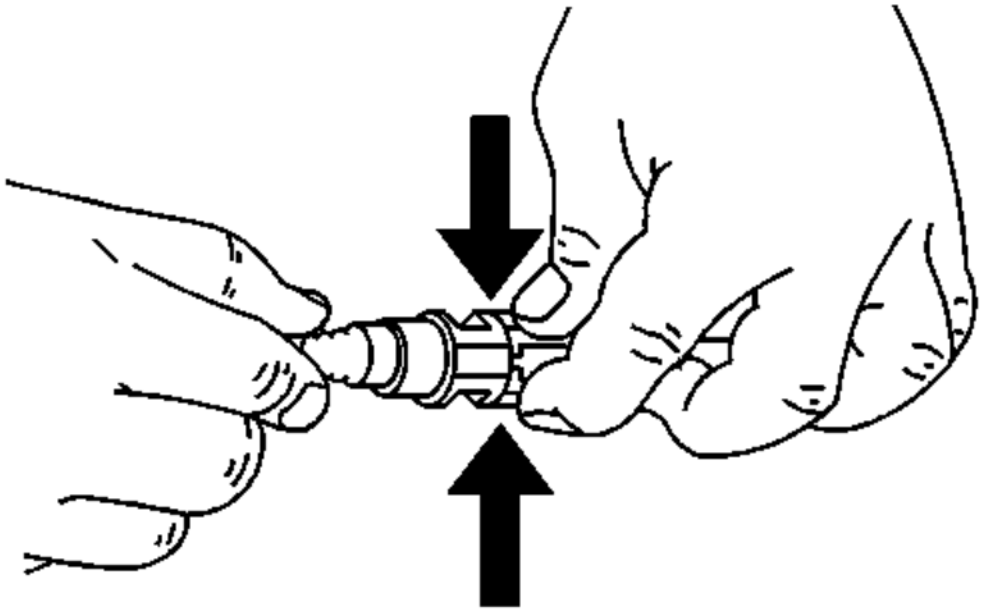


Fig. 88: Squeezing Quick Connect Fitting Release Tabs (Plastic Collar)
Courtesy of GENERAL MOTORS CORP.

4. Squeeze the plastic retainer release tabs.

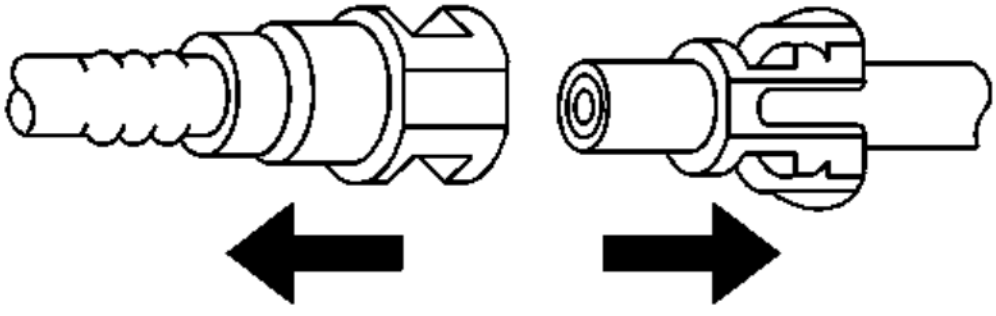


Fig. 89: Pulling Connection Apart (Plastic Collar)
Courtesy of GENERAL MOTORS CORP.

5. Pull the connection apart.

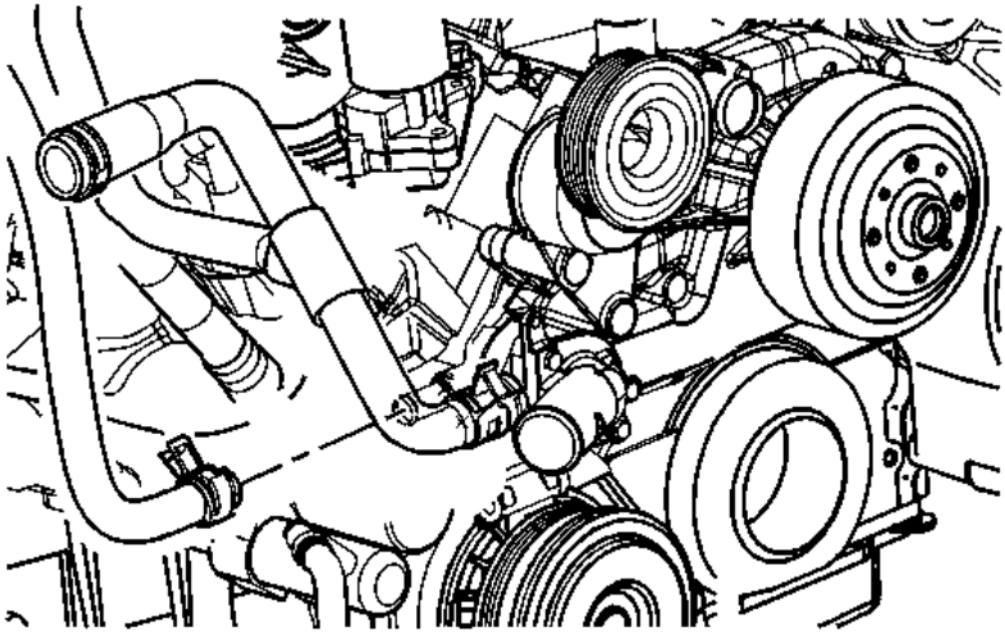


Fig. 90: Removing/Installing Heater Hose To Engine
Courtesy of GENERAL MOTORS CORP.

6. Remove the outlet heater hose from the water pump.
7. Reposition the outlet heater hose clamp at the surge tank.
8. Remove the outlet heater hose from the surge tank.

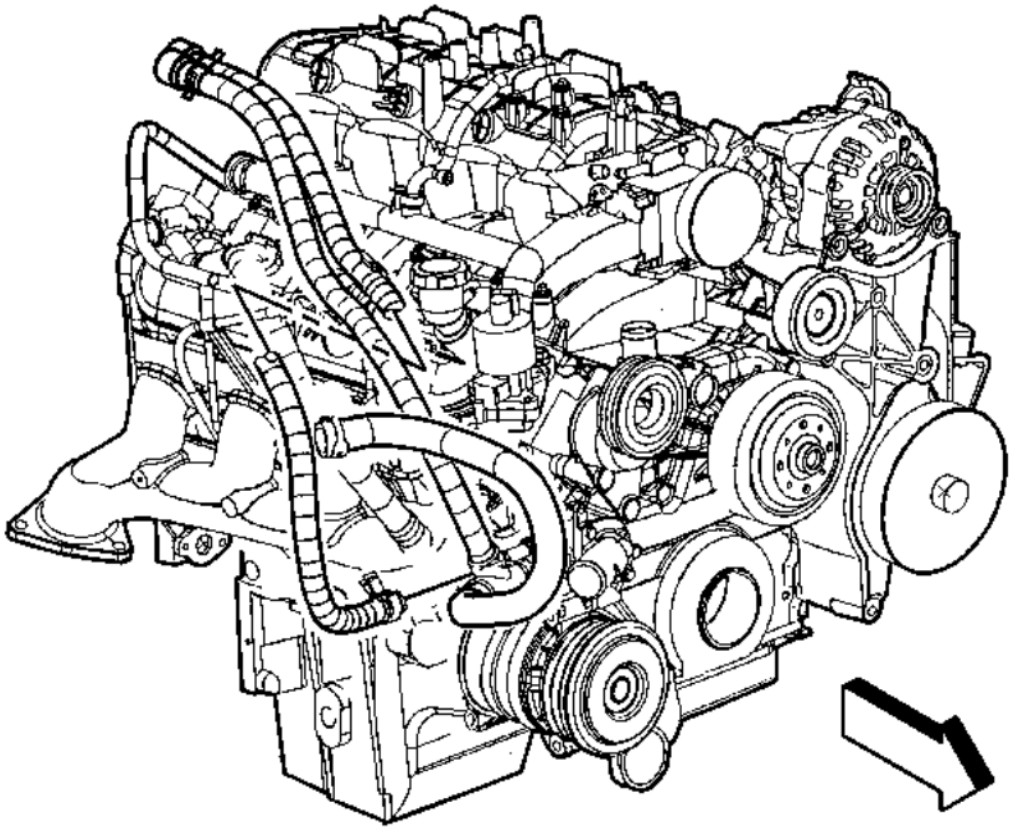


Fig. 91: View Of Inlet & Outlet Heater Hoses (LR4, LM7, LQ4)
Courtesy of GENERAL MOTORS CORP.

9. Remove the outlet heater hose.

Installation Procedure

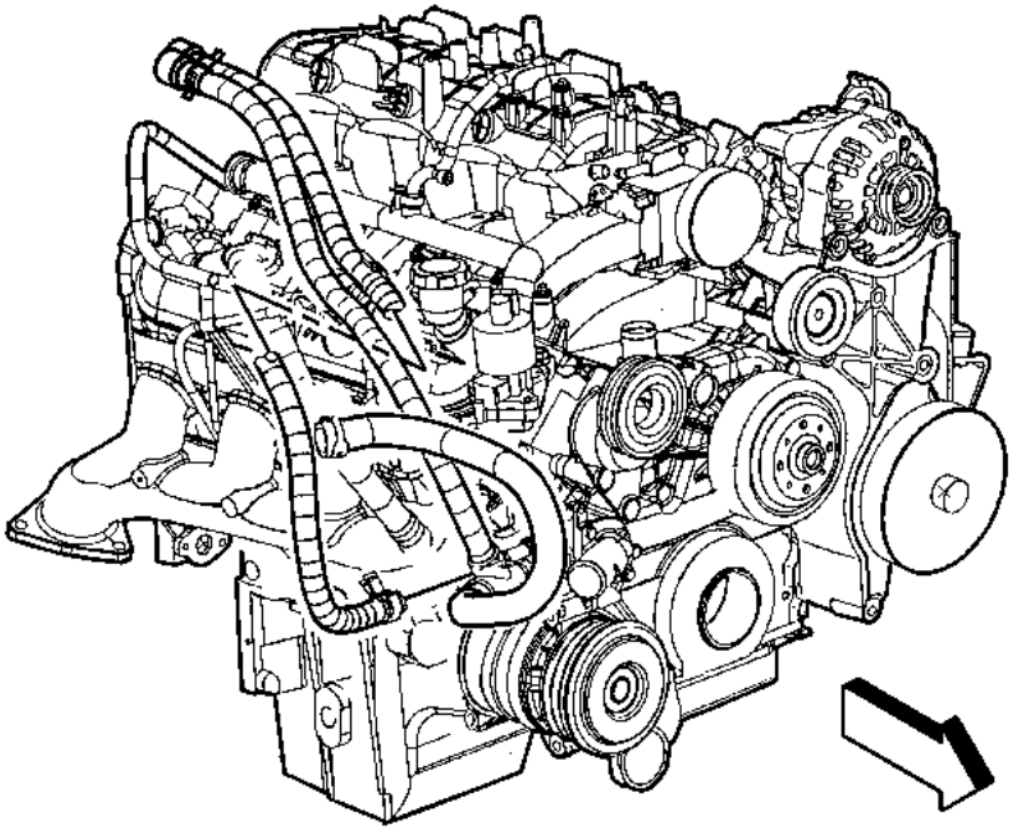


Fig. 92: View Of Inlet & Outlet Heater Hoses (LR4, LM7, LQ4)
Courtesy of GENERAL MOTORS CORP.

1. Install the outlet heater hose.

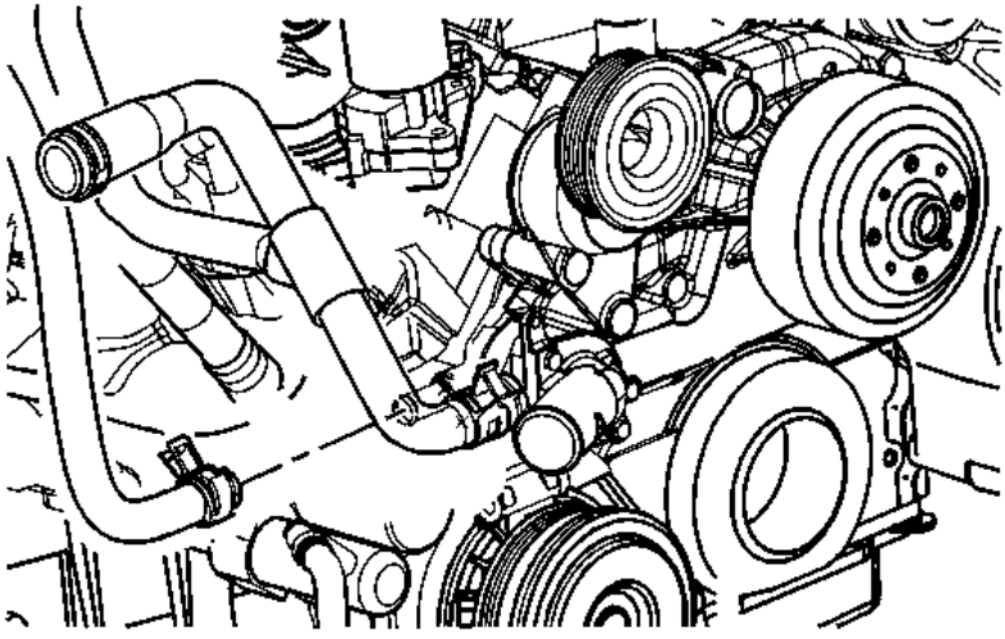


Fig. 93: Removing/Installing Heater Hose To Engine
Courtesy of GENERAL MOTORS CORP.

2. Install the outlet heater hose to the water pump.
3. Install the outlet heater hose to the surge tank.
4. Install the outlet heater hose clamp to the surge tank.

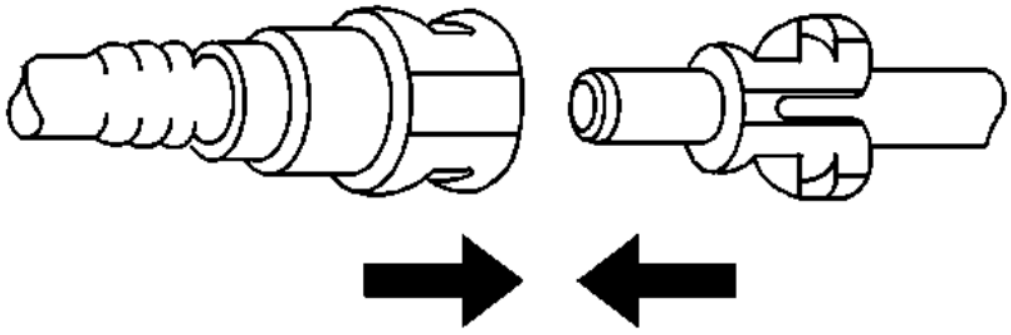


Fig. 94: Connecting Quick-Connect Fittings
Courtesy of GENERAL MOTORS CORP.

5. Connect the heater and surge tank hoses to the heater core.

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

6. Pull the heater outlet hose to ensure the connection.
7. Install the heater and surge tank hoses to the mounting clip.
8. Install the air intake tube.
9. Fill the cooling system. Refer to **Cooling System Draining and Filling (Vac-N-Fill)** or **Cooling System Draining and Filling (Static Fill)** .

AIR INLET ASSEMBLY REPLACEMENT

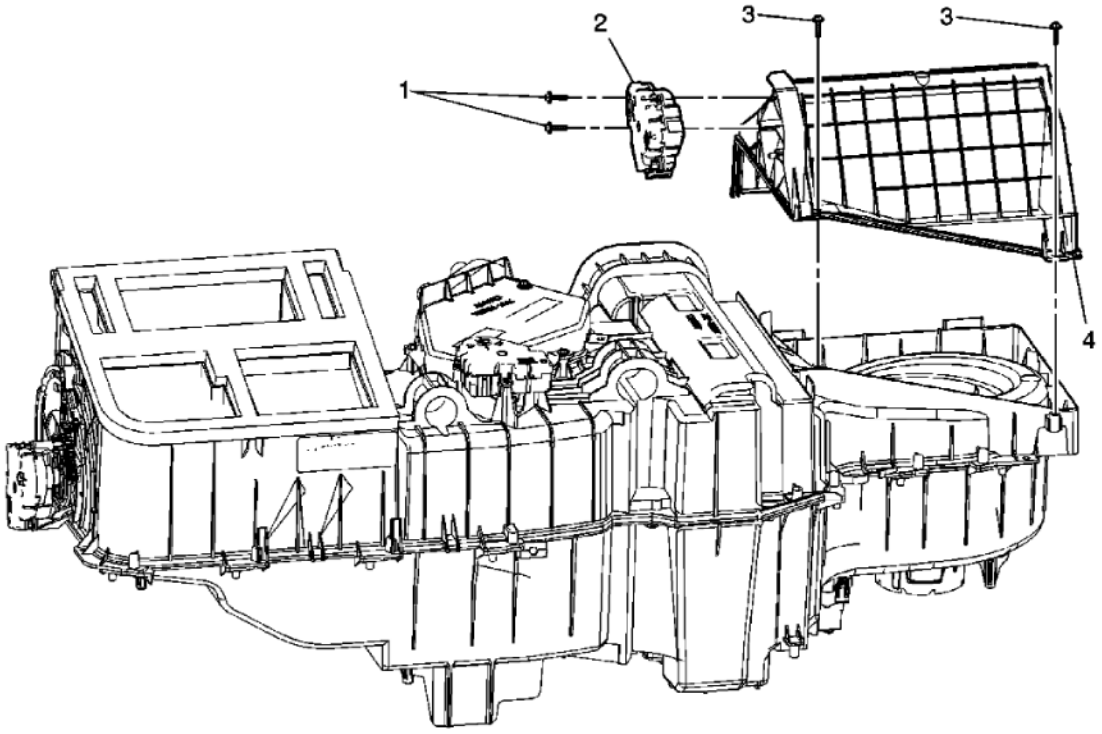


Fig. 95: View Of Air Inlet Assembly & Components
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure 1. Remove the HVAC module assembly. Refer to **HVAC Module Assembly Replacement**. 2. Disconnect the electrical connector from the recirculation actuator.	
1	Recirculation Actuator Screw (Qty: 2) **NOTE:** **Refer to Fastener Notice .** **Tighten:** 1.5 N.m (13 lb in)
2	Recirculation Actuator
3	Air Inlet Assembly Screw (Qty: 2) **Tighten:** 1.5 N.m (13 lb in)
	Air Inlet Assembly

4	**Tip:** Tilt the rear of the air inlet assembly upward to release front mounting tabs.

BLOWER MOTOR CONTROL MODULE REPLACEMENT

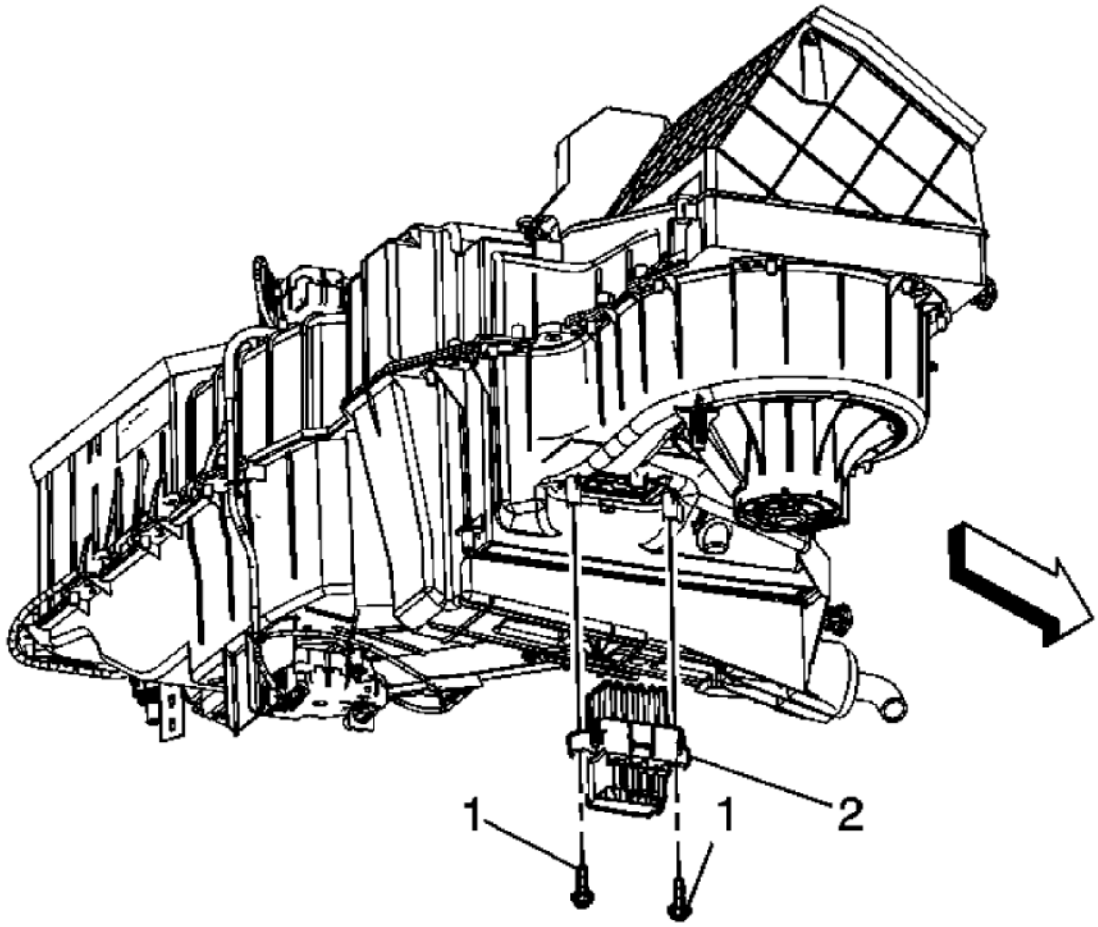


Fig. 96: View Of Blower Motor Control Module & Screws
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure 1. Remove the I/P insulator panel. Refer to **Instrument Panel Insulator Replacement (with RPO SLT)** or **Instrument Panel Insulator Replacement (without RPO SLT)** . 2. Disconnect the blower motor control module electrical connector.	

1	Blower Motor Control Module Screw (Qty: 2) **NOTE:** **Refer to Fastener Notice .** **Tighten:** 1.5 N.m (13 lb in)
2	Blower Motor Control Module

BLOWER MOTOR REPLACEMENT

Removal Procedure

1. If equipped, remove the sound insulator panel. Refer to **Instrument Panel Insulator Replacement (with RPO SLT)** or **Instrument Panel Insulator Replacement (without RPO SLT)** .
2. Remove the blower motor insulating cover screws.
3. Disconnect the electrical connector from the blower motor.
4. Remove the blower motor insulating cover.

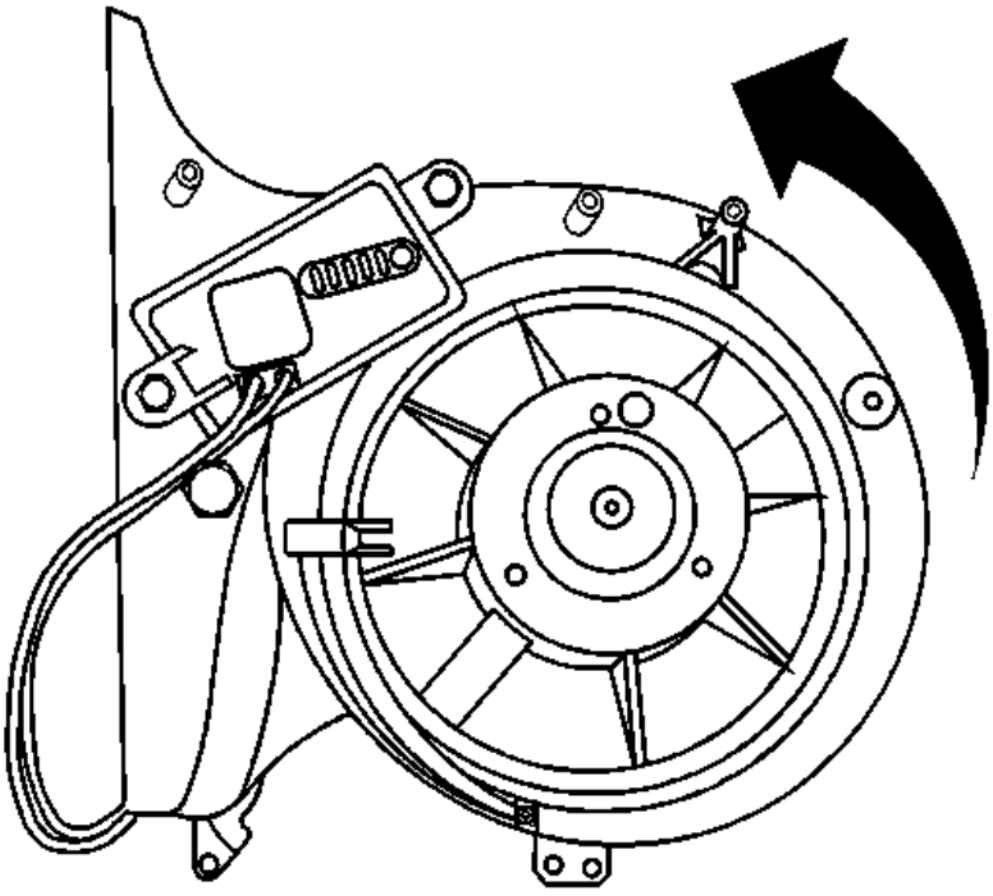


Fig. 97: Disengaging Blower Motor (Delphi)
Courtesy of GENERAL MOTORS CORP.

5. Pull the retaining tab down while turning the blower motor counterclockwise in order to disengage the blower motor from the heater/ventilation module.

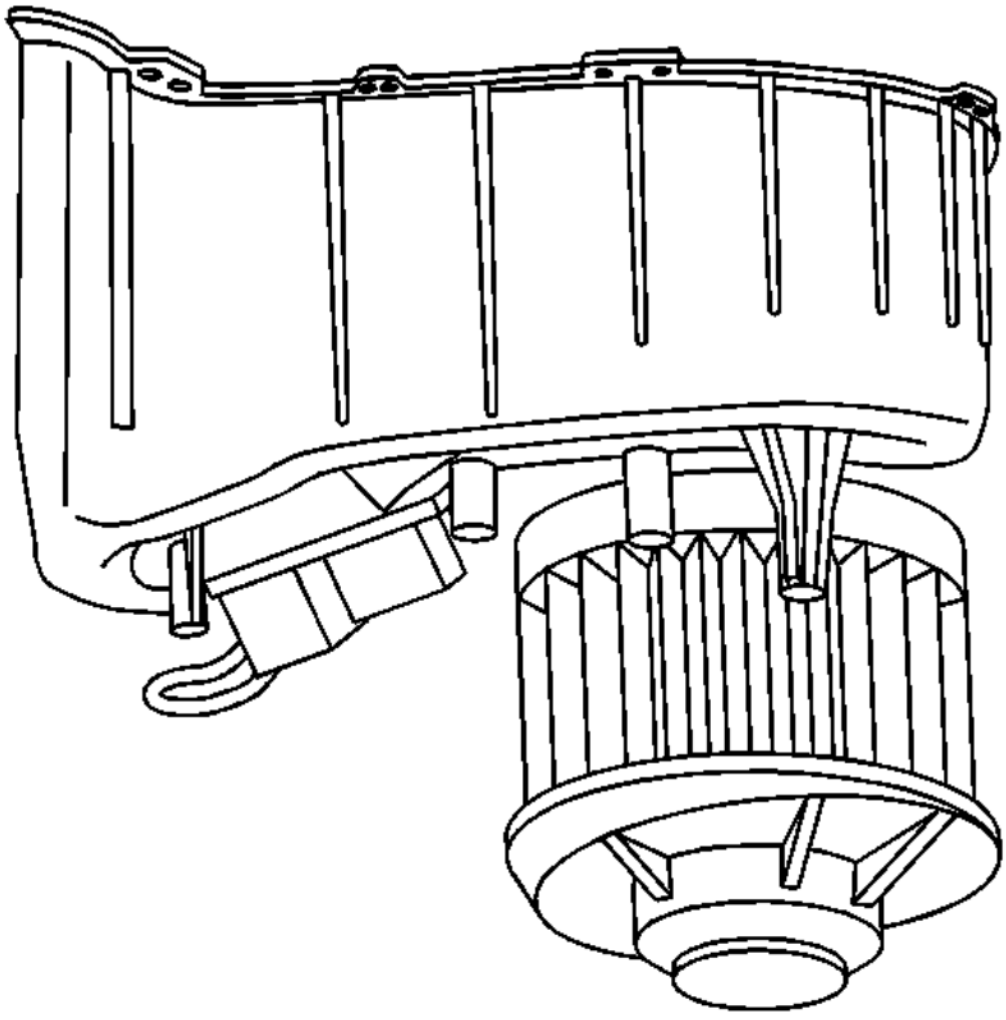


Fig. 98: View Of Blower Motor (Delphi)
Courtesy of GENERAL MOTORS CORP.

6. Remove the blower motor.

Installation Procedure

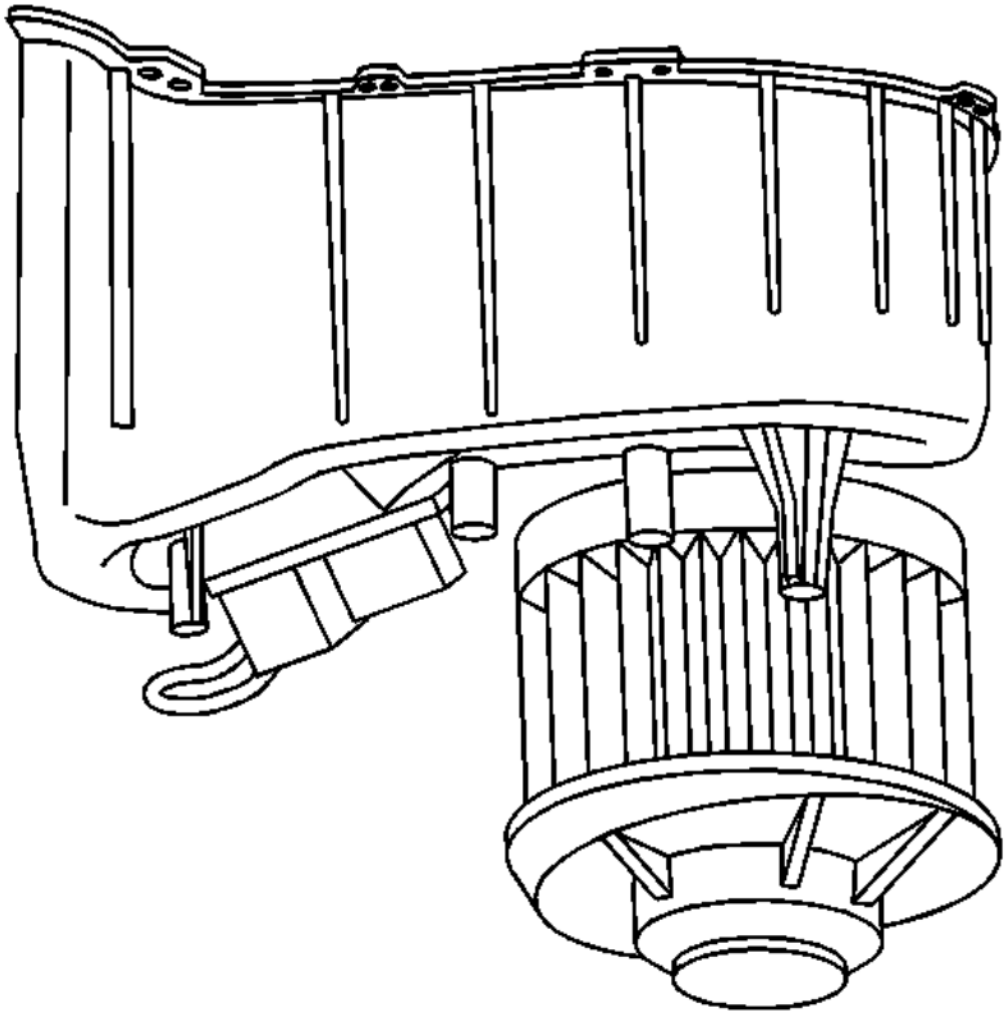


Fig. 99: View Of Blower Motor (Delphi)
Courtesy of GENERAL MOTORS CORP.

1. Install the blower motor.

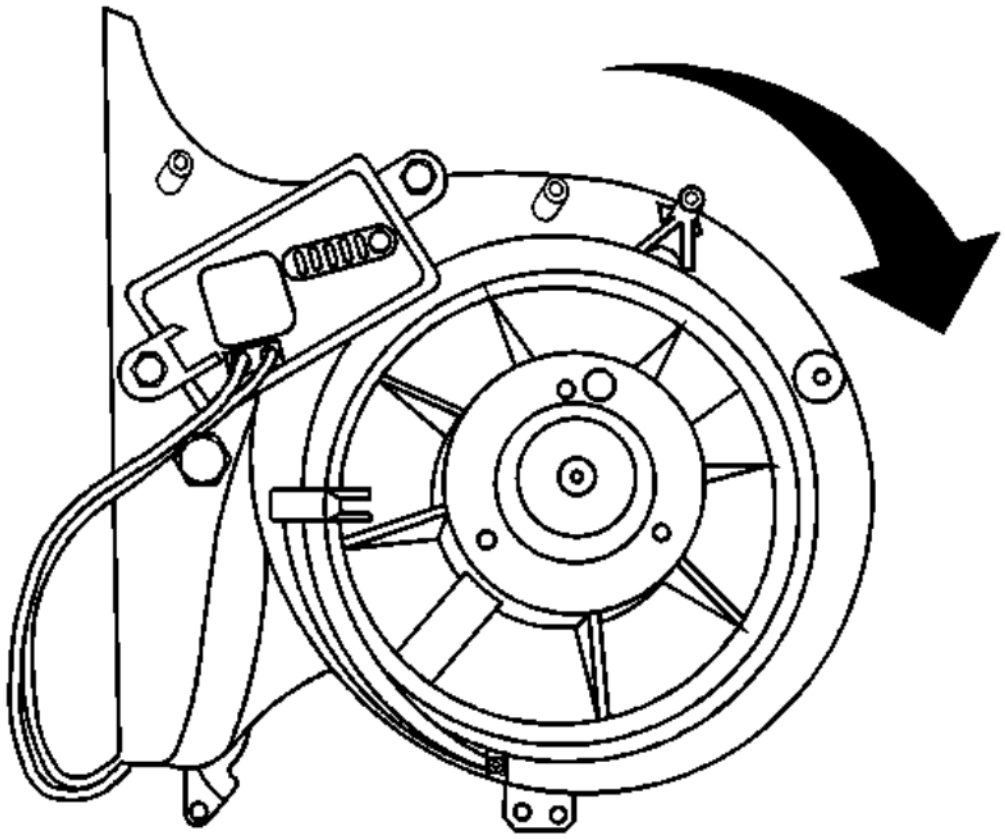


Fig. 100: Turning Blower Assembly Clockwise (Delphi)
Courtesy of GENERAL MOTORS CORP.

2. Install the blower motor to the heater/ventilation module. Turn the blower assembly clockwise until the retaining tab locks into place.
3. Install the blower motor insulating cover.
4. Connect the electrical connector to the blower motor.

NOTE: **Refer to Fastener Notice .**

5. Install the blower motor insulating cover screws.

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

6. If equipped, install the sound insulator panel. Refer to **Instrument Panel Insulator Replacement (with RPO SLT)** or **Instrument Panel Insulator Replacement (without RPO SLT)** .

AIR DISTRIBUTOR DUCT REPLACEMENT

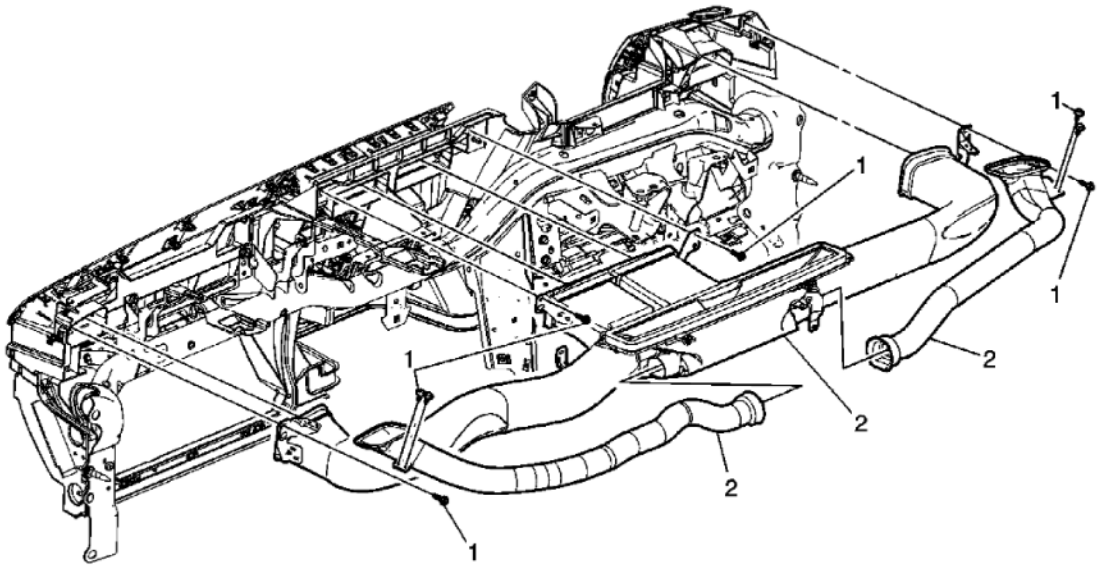


Fig. 101: View Of Air Distributor Duct, Bolts & Rivets
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the instrument panel to the service position. Refer to **Instrument Panel Service Positioning (Without SLT)** or **Instrument Panel Service Positioning (With SLT)** .	
1	Air Distributor Bolts and Rivets (Qty: 6) **NOTE:** Refer to **Fastener Notice** . **Tighten:** 2.5 N.m (16 lb in)
2	Air Distributor Duct

SIDE WINDOW AIR OUTLET REPLACEMENT

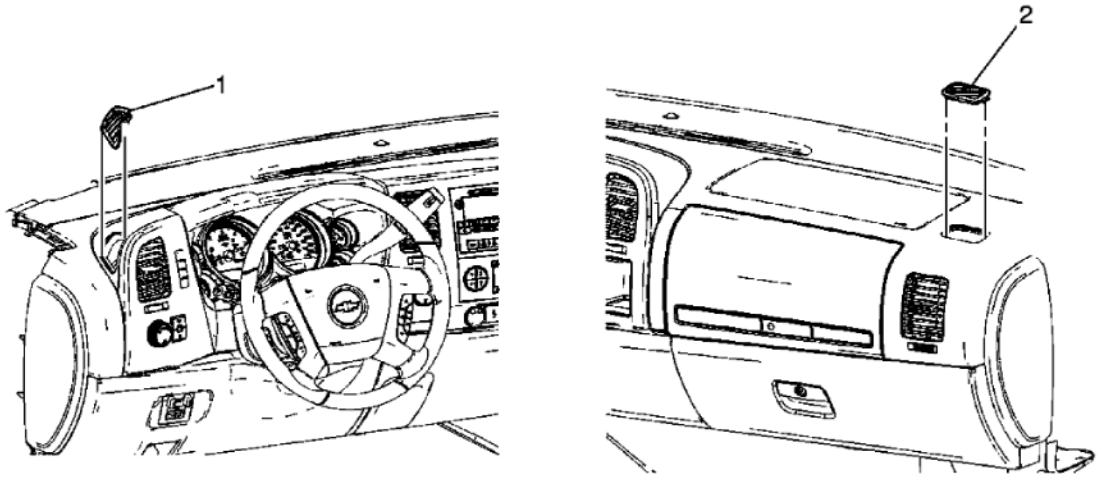


Fig. 102: View Of Side Window Air Outlets
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Air Outlet Assembly - Side Window - Left **Tip:** Insert a flat-bladed plastic trim tool along the forward edge of the outlet and release the retaining tabs securing the outlet to the instrument panel.
2	Air Outlet Assembly - Side Window - Right **Tip:** Insert a flat-bladed plastic trim tool along the left inboard edge of the outlet and release the retaining tabs securing the outlet to the instrument panel.

INSTRUMENT PANEL OUTER AIR OUTLET REPLACEMENT - LEFT SIDE (WITHOUT RPO SLT)

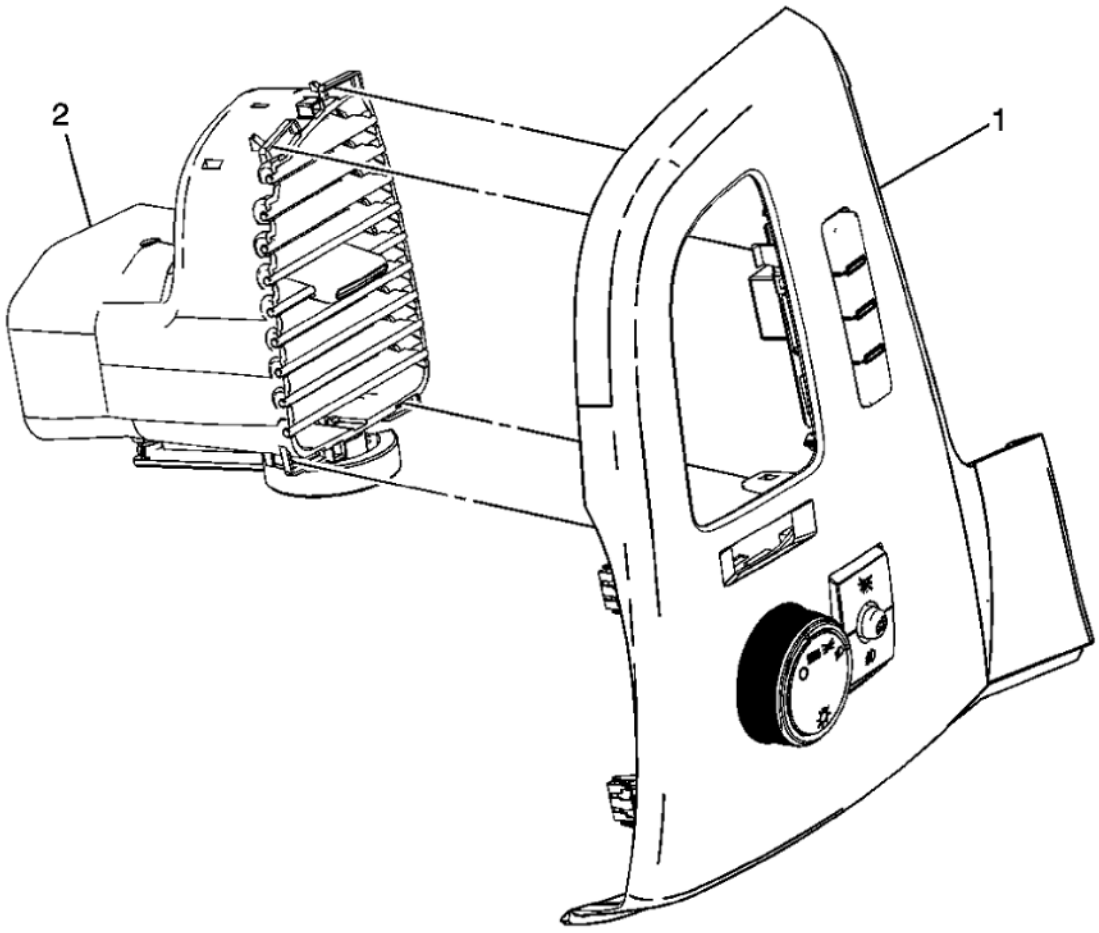


Fig. 103: View Of Instrument Panel Trim Plate & Air Outlet Assembly
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Instrument Panel Trim Plate Refer to **Instrument Panel Trim Plate Replacement (Without RPO SLT)**
2	Instrument Panel Air Outlet Assembly - Left **Tip:** Release the retaining tabs securing the outlet to the instrument panel trim plate.

INSTRUMENT PANEL OUTER AIR OUTLET REPLACEMENT - LEFT SIDE (WITH RPO SLT)

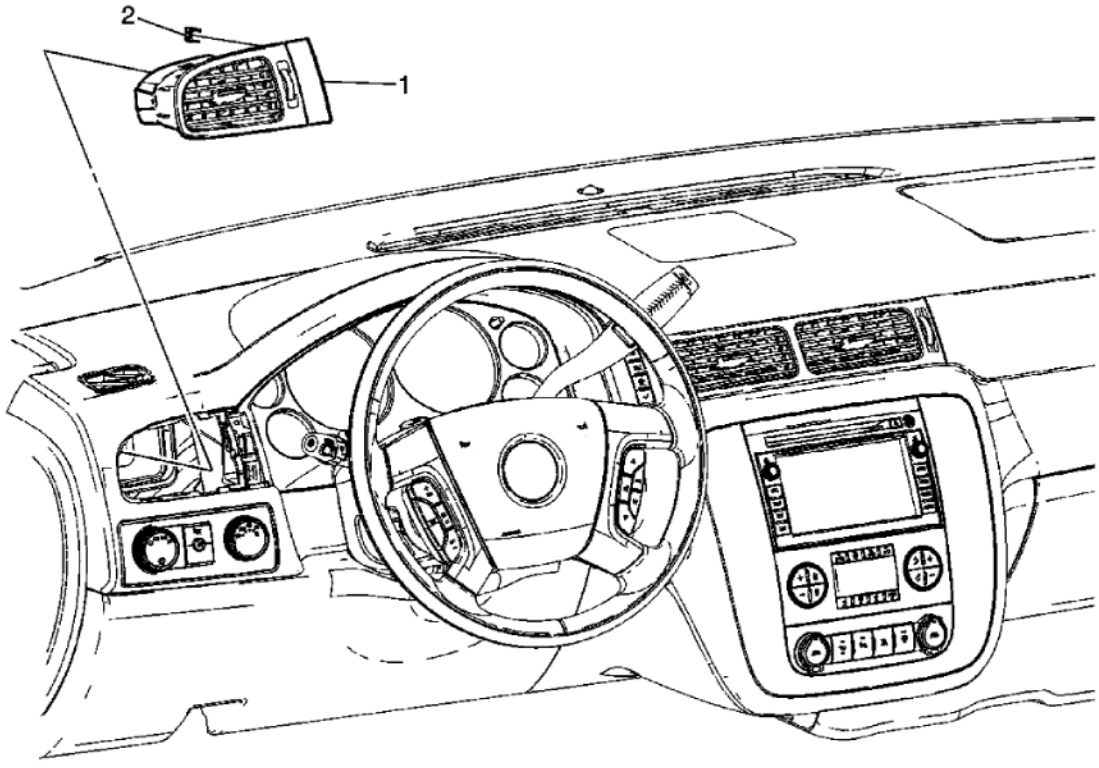


Fig. 104: View Of Instrument Panel Air Deflector & Retainer Clip
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Instrument Panel Air Outlet Assembly - Left **Tip:** Use a flat-bladed plastic trim tool to release the retainer clip on the right side of the air outlet assembly, securing the air outlet assembly to the instrument panel.
2	Retainer Clip (Qty: 1)

INSTRUMENT PANEL CENTER AIR OUTLET REPLACEMENT (WITHOUT RPO SLT)

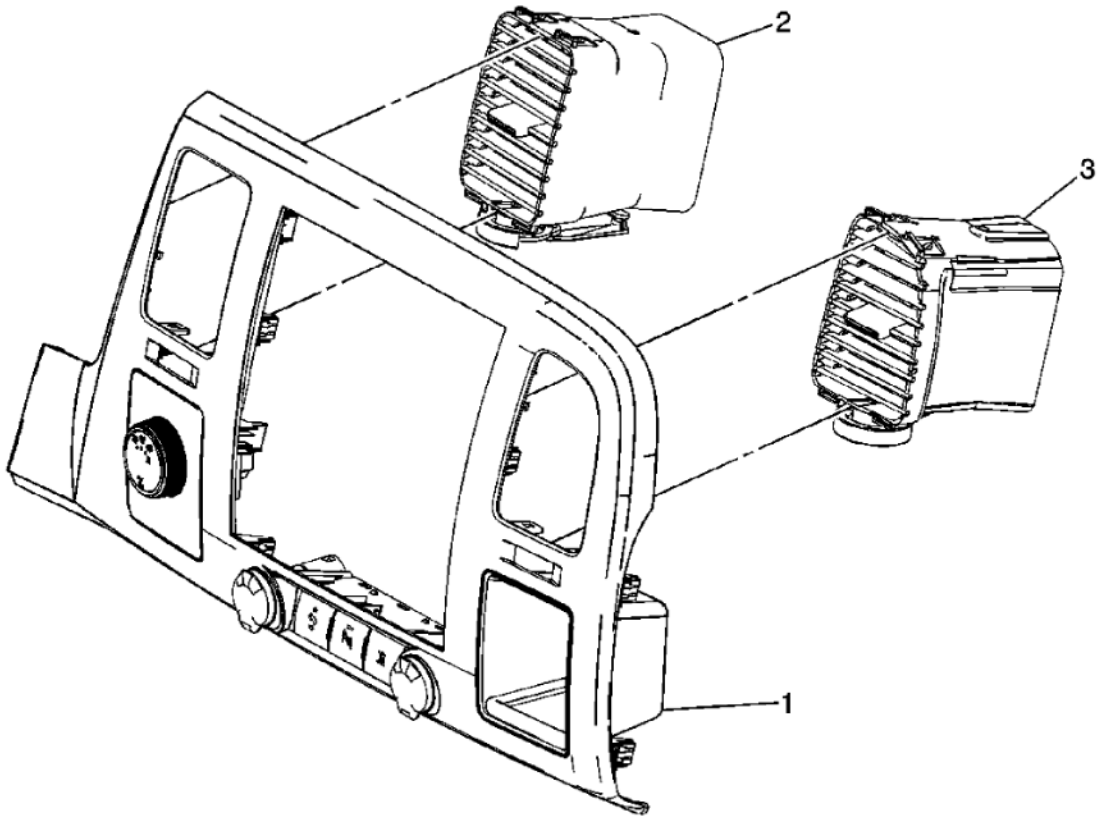


Fig. 105: View Of Instrument Panel Accessory Trim Plate & Air Outlet Assemblies
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Instrument Panel Accessory Trim Plate Refer to **Instrument Panel Accessory Trim Plate Replacement (without RPO SLT)** or **Instrument Panel Accessory Trim Plate Replacement (with RPO SLT)**
2	Instrument Panel Center Air Outlet Assembly - Left **Tip:** Release the retaining tabs securing the outlet to the instrument panel accessory trim plate.
3	Instrument Panel Center Air Outlet Assembly - Right **Tip:** Release the retaining tabs securing the outlet to the instrument panel accessory trim plate.

INSTRUMENT PANEL CENTER AIR OUTLET REPLACEMENT (WITH RPO SLT)

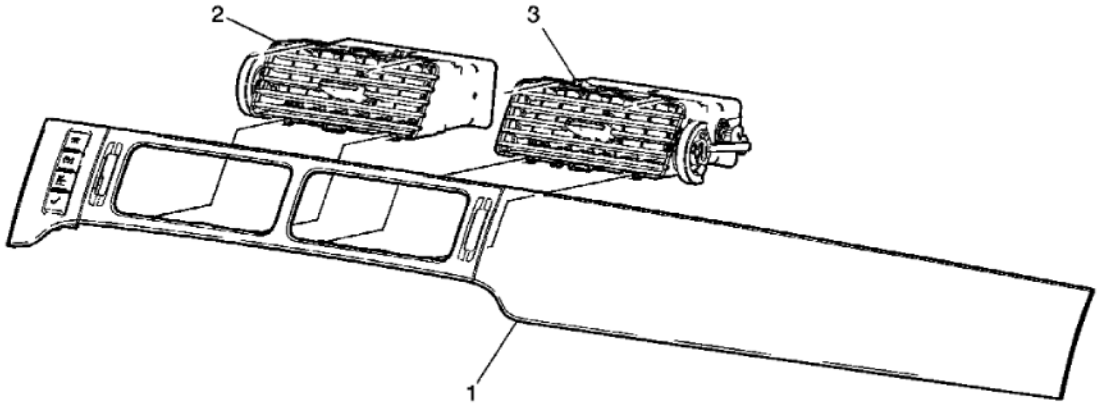


Fig. 106: View Of Instrument Panel Center Air Deflectors & Trim Panel
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Instrument Panel Center Trim Panel Refer to **Instrument Panel Center Trim Panel Replacement (with RPO SLT)** .
2	Instrument Panel Center Air Deflector - Left **Tip:** Release the tabs securing the air deflector to the trim panel.
3	Instrument Panel Center Air Deflector - Right **Tip:** Release the tabs securing the air deflector to the trim panel.

INSTRUMENT PANEL OUTER AIR OUTLET REPLACEMENT - RIGHT SIDE (WITHOUT RPO SLT)

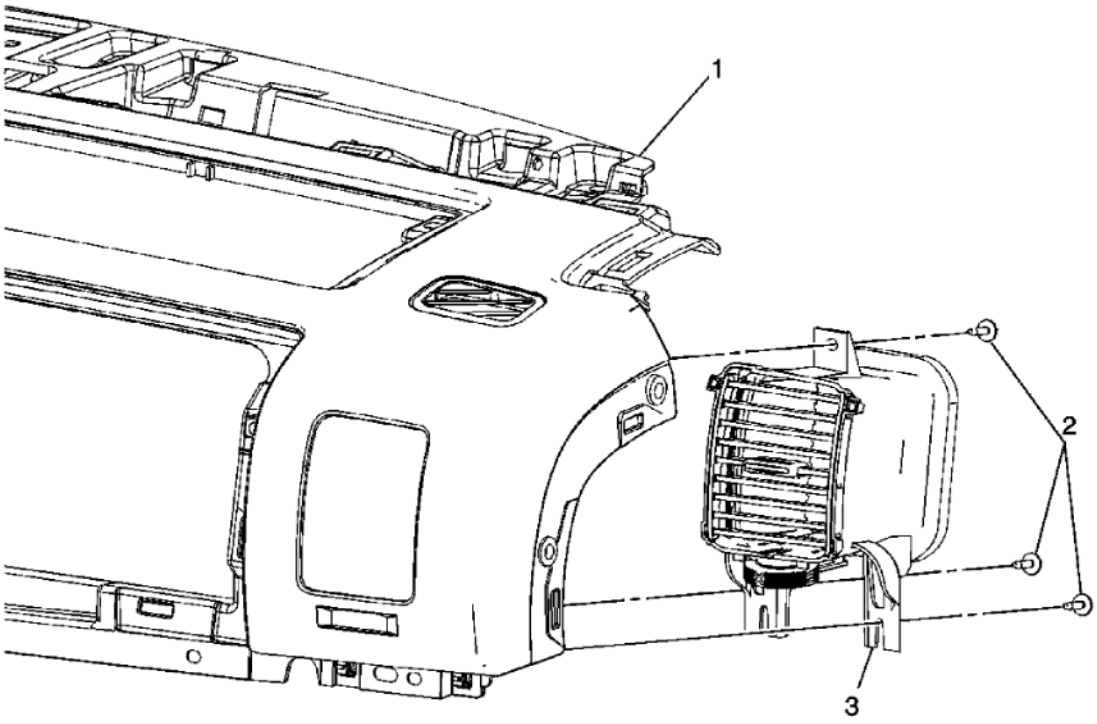


Fig. 107: View Of Upper Trim Panel, Air Outlet Assembly & Screws
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Instrument Panel Upper Trim Panel Refer to **Instrument Panel Upper Trim Panel Replacement (without RPO SLT)** or **Instrument Panel Upper Trim Panel Replacement (with RPO SLT)** .
2	Instrument Panel Air Outlet Screw (Qty: 3) **NOTE:** **Refer to Fastener Notice .** **Tighten:** 2 N.m (18 lb in)
3	Instrument Panel Air Outlet Assembly - Right

INSTRUMENT PANEL OUTER AIR OUTLET REPLACEMENT - RIGHT SIDE (WITH RPO SLT)

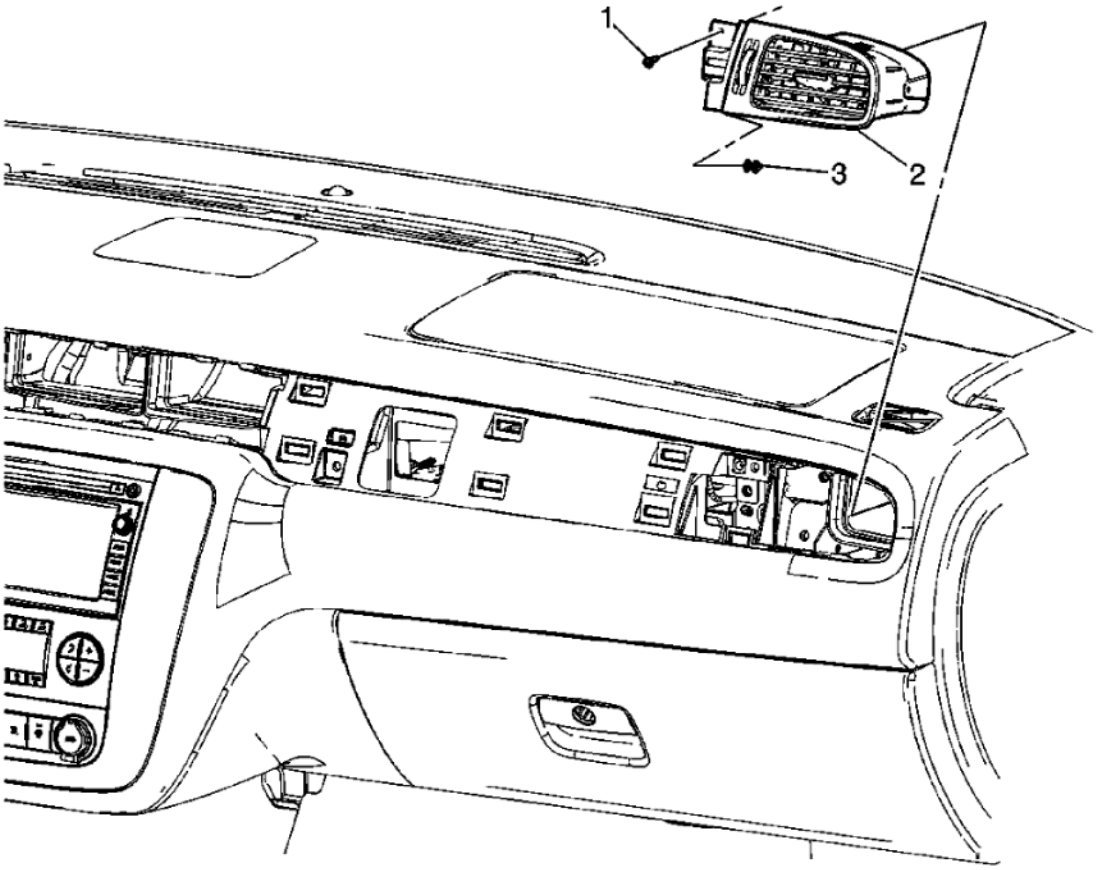


Fig. 108: View Of Instrument Panel Air Deflector & Components
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the instrument panel center trim panel. Refer to **Instrument Panel Center Trim Panel Replacement (with RPO SLT)** .	
1	Instrument Panel Air Outlet Assembly Screw (Qty: 1) **NOTE:** **Refer to Fastener Notice .** **Tighten:** 2 N.m (18 lb in)
2	Instrument Panel Air Outlet - Right **Tip:** Use a flat-bladed plastic trim tool to release the retainer clip on the left side of the air outlet assembly, securing the air outlet assembly to the instrument panel.
3	Instrument Panel Air Deflector

3	Retainer Clip (Qty: 1)

FLOOR AIR OUTLET DUCT REPLACEMENT - LEFT SIDE

Removal Procedure

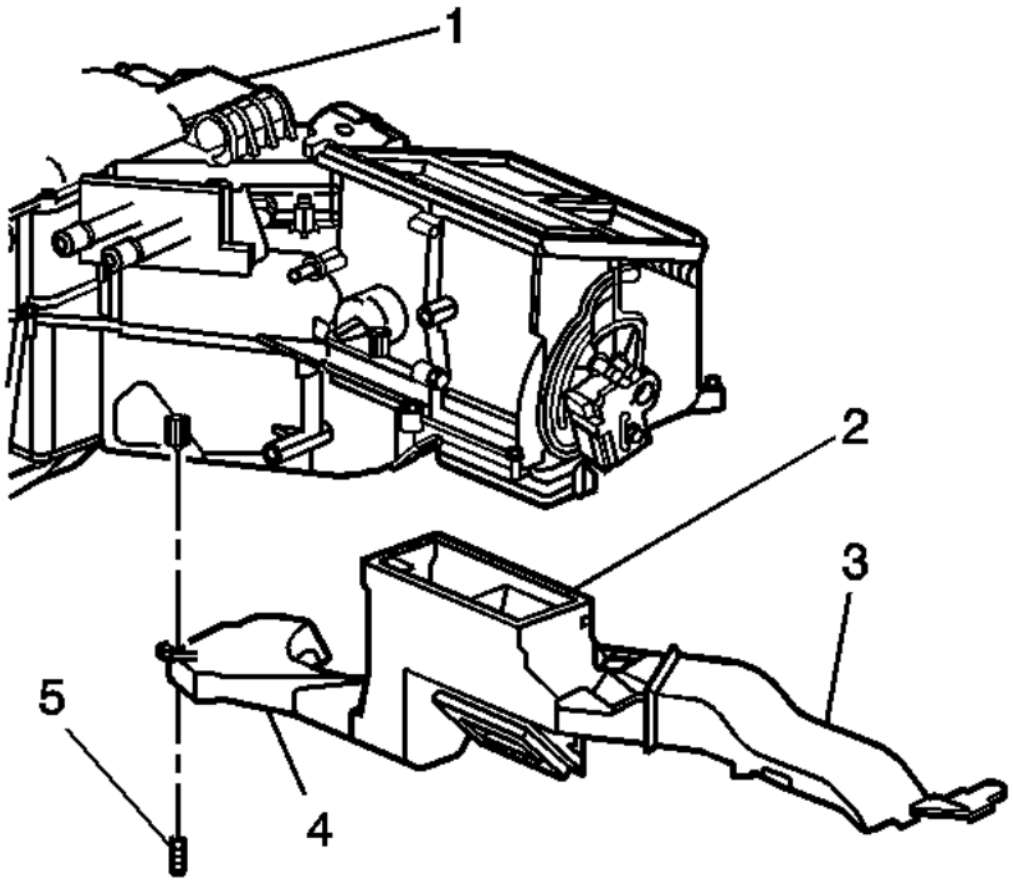


Fig. 109: View Of Floor Air Outlet Duct
Courtesy of GENERAL MOTORS CORP.

1. Remove the push pin (5) from the left floor air outlet duct (4).
2. Remove the left floor duct (1) from the HVAC module (2).

Installation Procedure

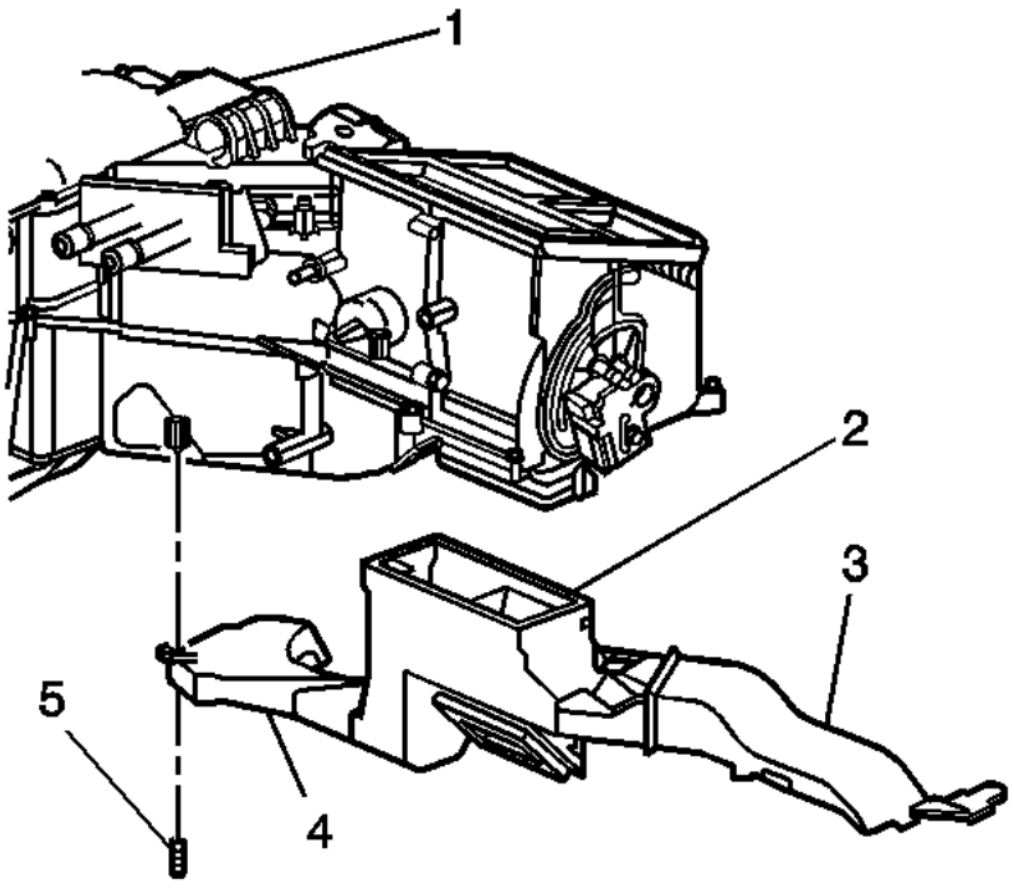


Fig. 110: View Of Floor Air Outlet Duct
Courtesy of GENERAL MOTORS CORP.

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

FLOOR AIR OUTLET DUCT REPLACEMENT - RIGHT SIDE

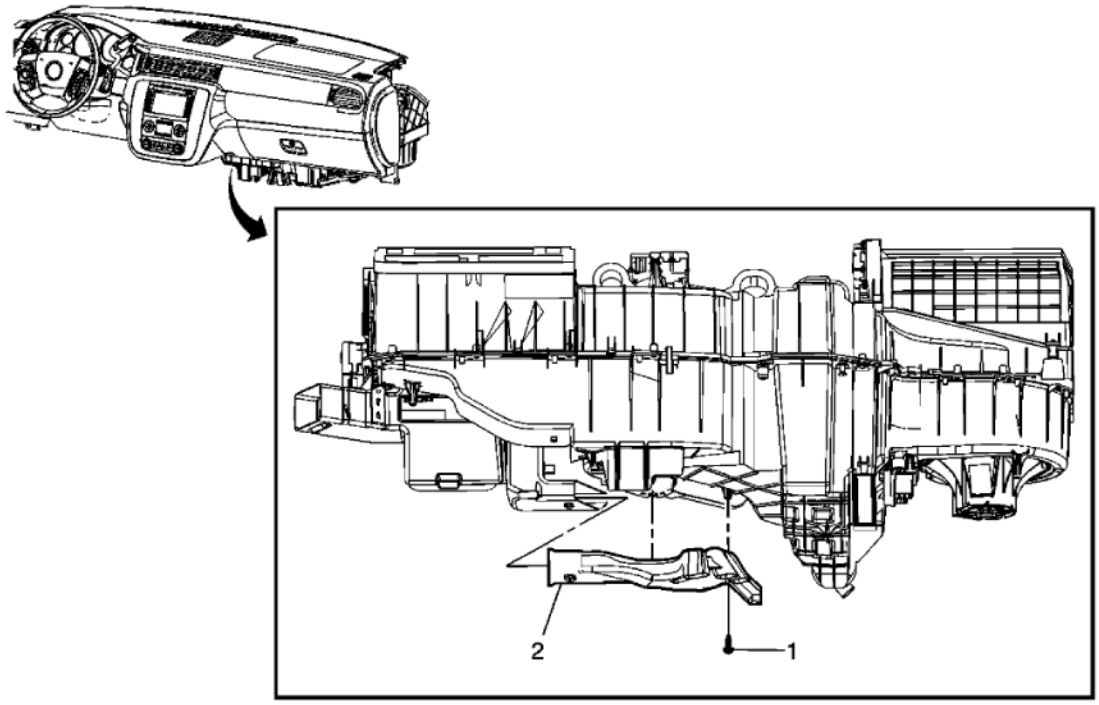


Fig. 111: View Of Air Outlet Duct & Bolt
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure 1. Remove the I/P insulator. Refer to **Instrument Panel Insulator Replacement (with RPO SLT)** or **Instrument Panel Insulator Replacement (without RPO SLT)** . 2. Remove the front floor console side trim panel - right. Refer to **Front Floor Console Side Trim Panel Replacement - Right Side (with RPO SLT)** .	
1	Air Duct Bolt **NOTE:** Refer to Fastener Notice . **Tighten:** 1.5 N.m (13 lb in)
2	Air Outlet Duct - Floor RH **Tip:** Slide Duct to the right and remove.

AIR TEMPERATURE DOOR REPLACEMENT - RIGHT SIDE

Removal Procedure

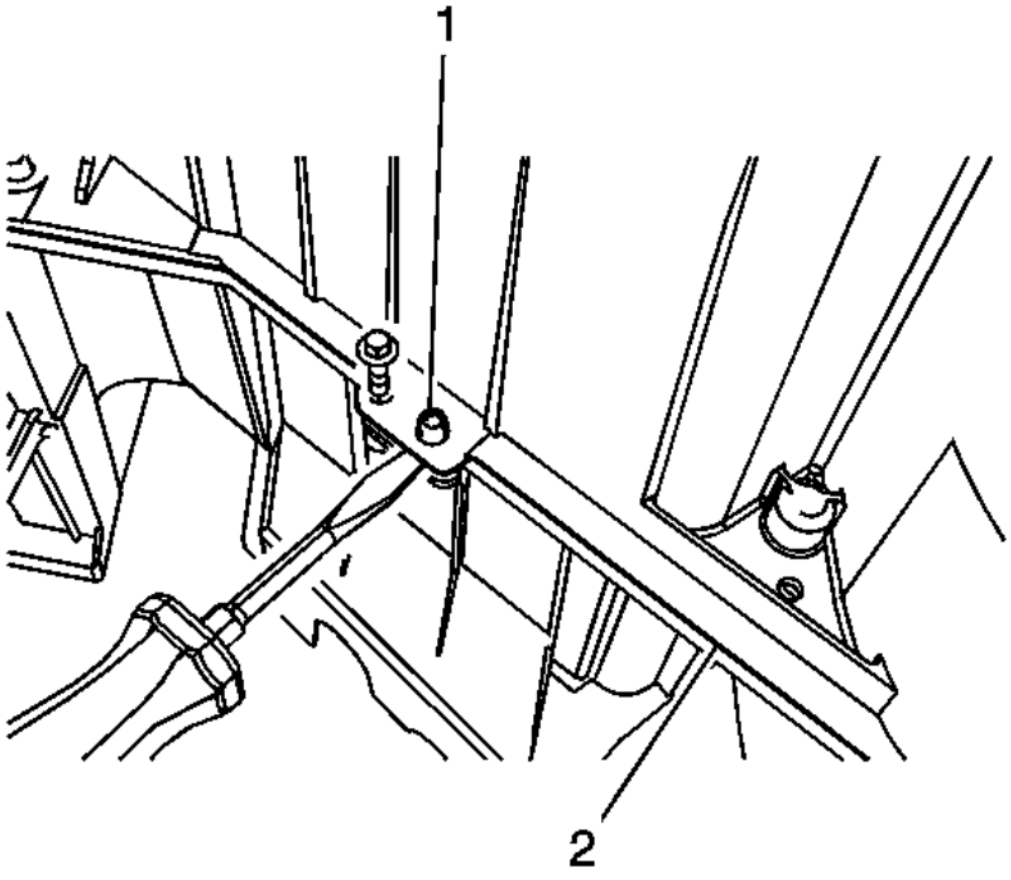


Fig. 112: Heat Stakes
Courtesy of GENERAL MOTORS CORP.

1. Remove the instrument panel to the service position. Refer to **Instrument Panel Service Positioning (Without SLT)** or **Instrument Panel Service Positioning (With SLT)** .
2. If equipped remove the heat stakes (1) from the HVAC module (2) with a screwdriver and a hammer.

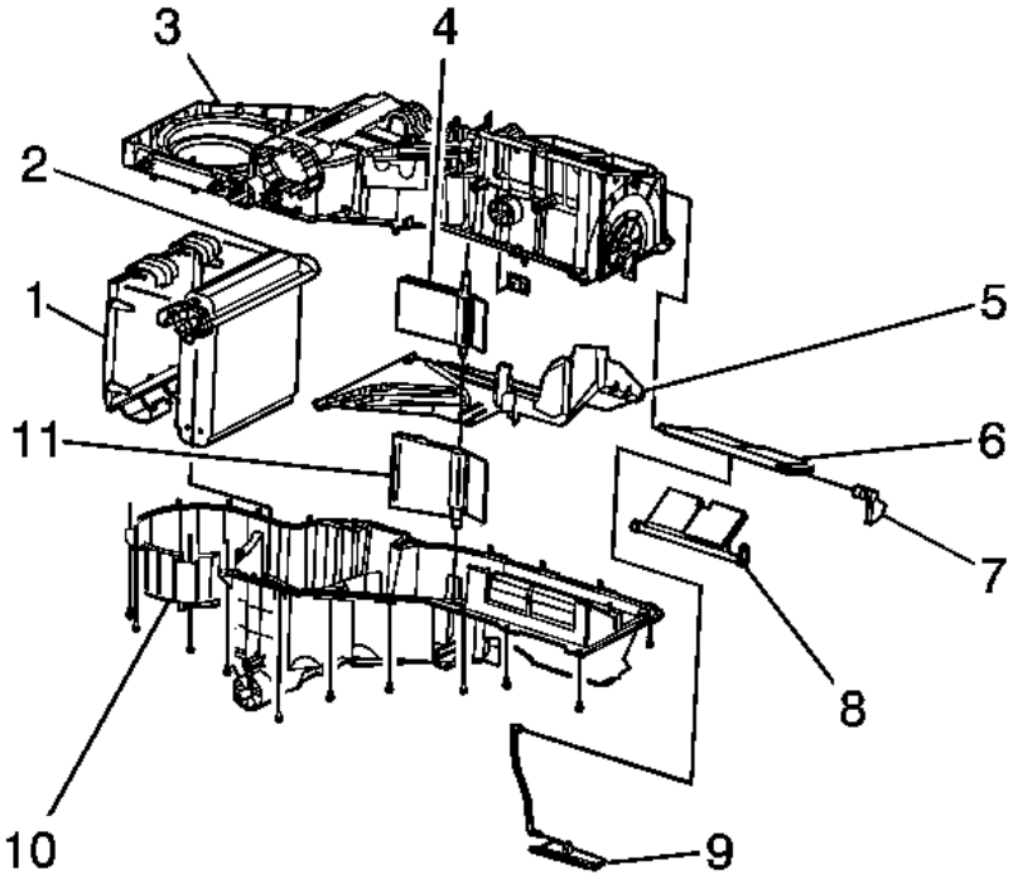


Fig. 113: Exploded View Of HVAC Module Assembly
Courtesy of GENERAL MOTORS CORP.

3. If equipped remove the HVAC module assembly screws.
4. Remove the upper HVAC module case (1) from the lower HVAC module case (2).
5. Remove the right temperature door (4) from the upper HVAC module case (3).

Installation Procedure

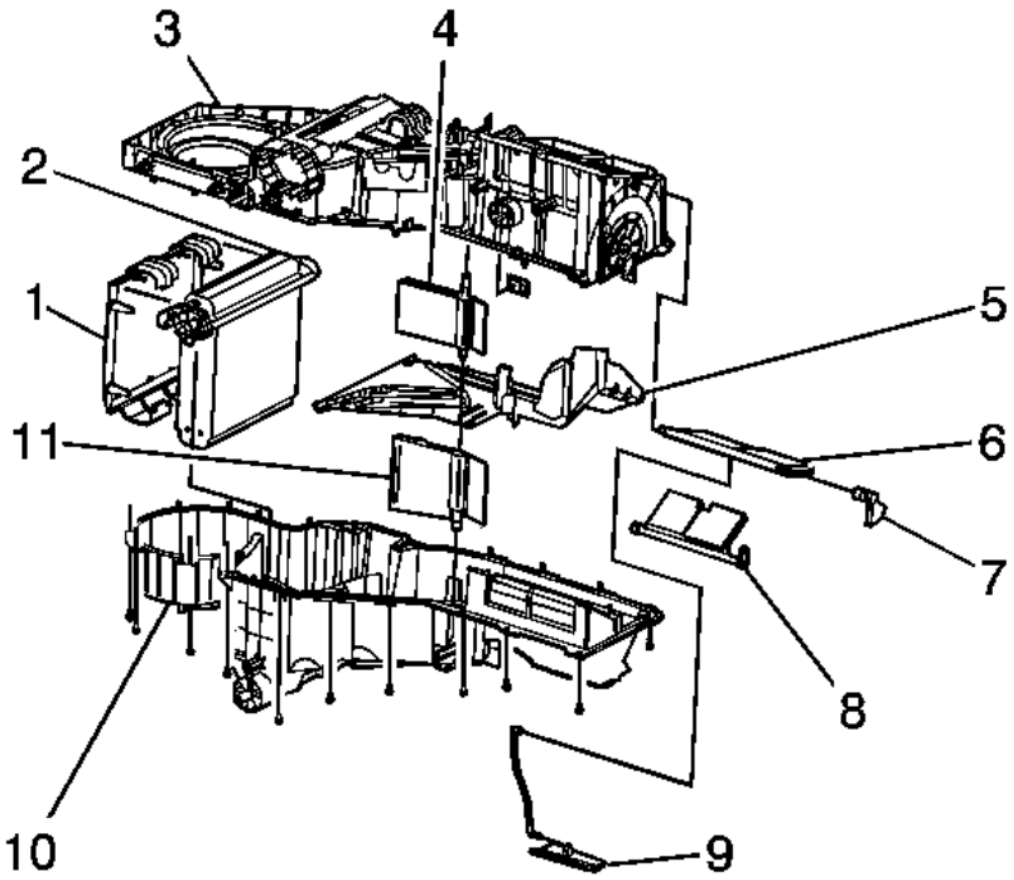


Fig. 114: Exploded View Of HVAC Module Assembly
Courtesy of GENERAL MOTORS CORP.

1. Install the right temperature door (4) to the upper HVAC module case (3).
2. Install the upper HVAC module case (1) to the lower HVAC module case (2).

NOTE: Refer to Fastener Notice .

IMPORTANT: For every heat stake removed ensure that you install a screw.

3. Install the screws to the HVAC module assembly.

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

4. Install the instrument panel. Refer to **Instrument Panel Service Positioning (Without SLT)** or **Instrument Panel Service Positioning (With SLT)** .

AIR TEMPERATURE DOOR REPLACEMENT - LEFT SIDE

Removal Procedure

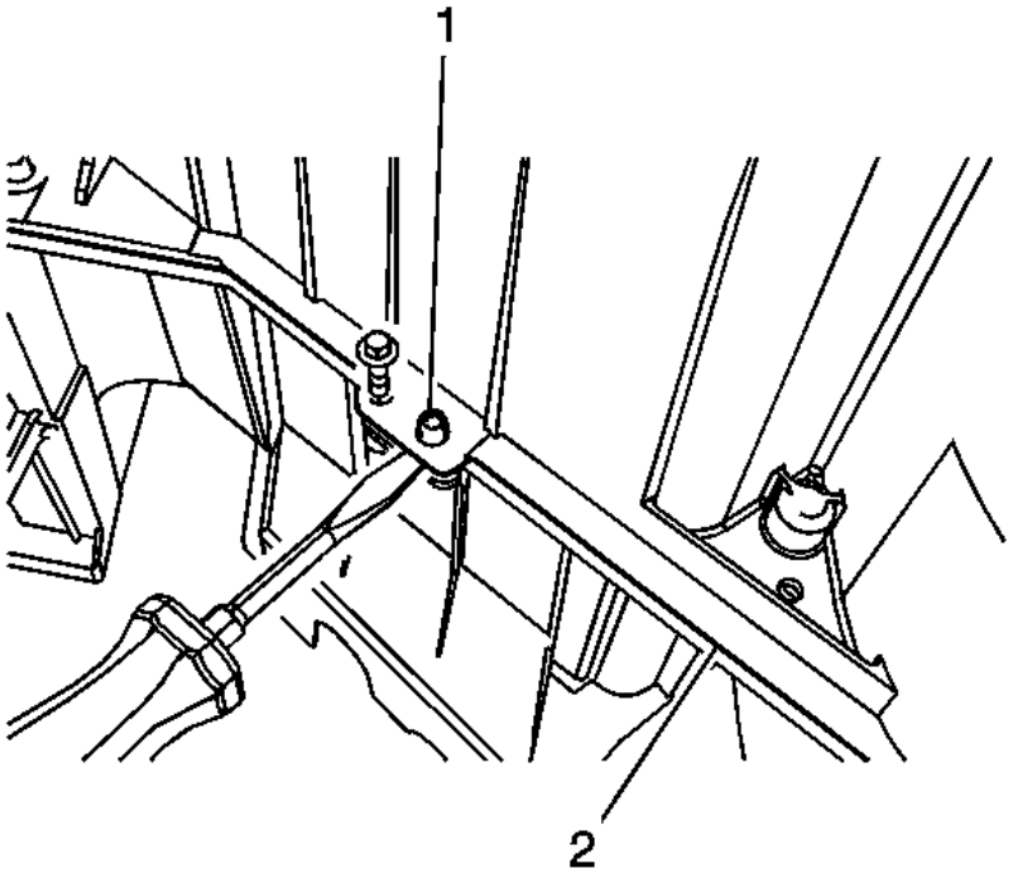


Fig. 115: Heat Stakes
Courtesy of GENERAL MOTORS CORP.

1. Remove the instrument panel to the service position. Refer to **Instrument Panel Service Positioning (Without SLT)** or **Instrument Panel Service Positioning (With SLT)** .
2. If equipped remove the heat stakes (1) from the HVAC module (2) with a screw driver and

a hammer.

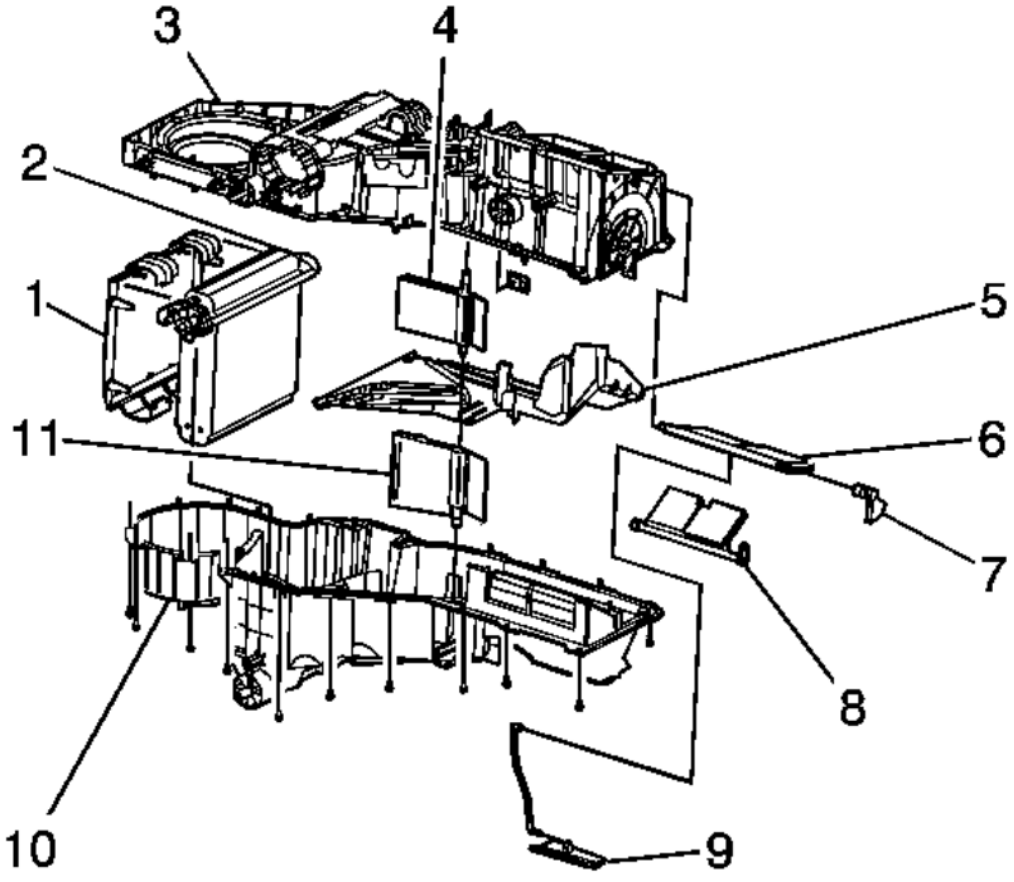


Fig. 116: Exploded View Of HVAC Module Assembly
Courtesy of GENERAL MOTORS CORP.

3. If equipped remove the HVAC module assembly screws.
4. Remove the upper HVAC module case (3) from the lower HVAC module case (10).
5. Remove the air temperature separator plate (5) from the lower HVAC module case (10).
6. Remove the left temperature door (11) from the lower HVAC module case (10).

Installation Procedure

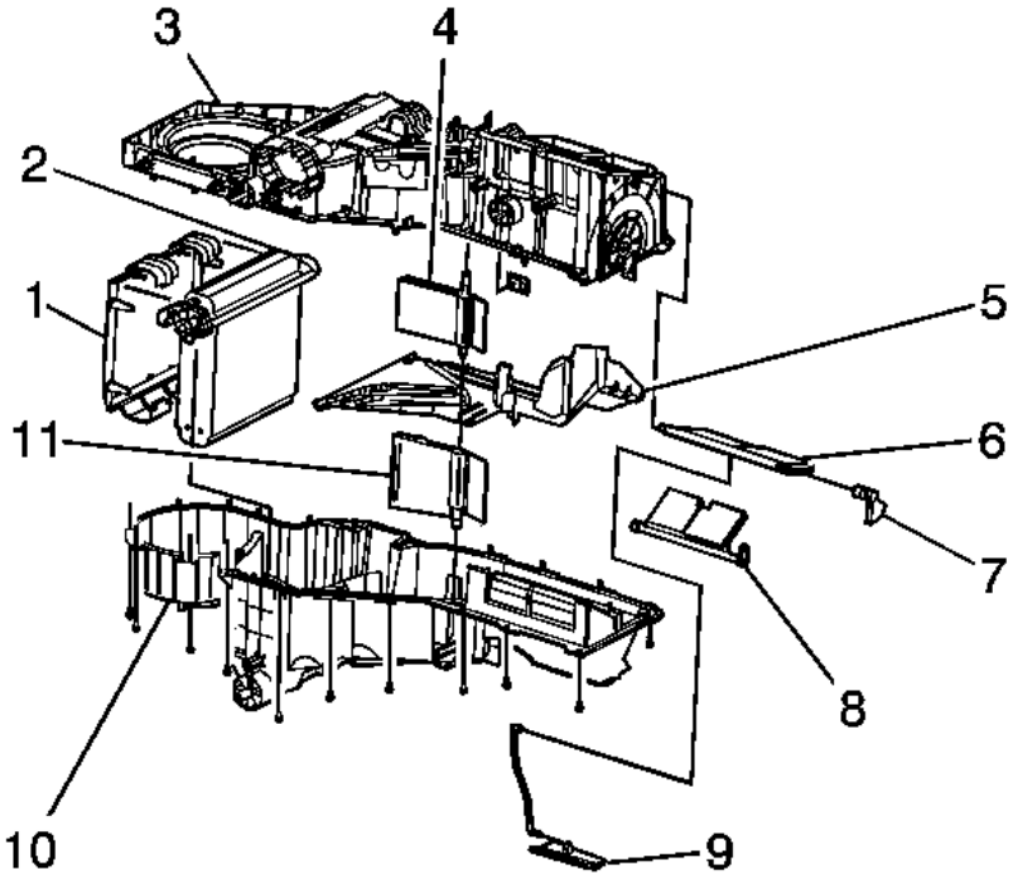


Fig. 117: Exploded View Of HVAC Module Assembly
Courtesy of GENERAL MOTORS CORP.

1. Install the left temperature door (11) to the lower HVAC module case (10).
2. Install the air temperature separator plate (5) to the lower HVAC module case (10).
3. Install the upper HVAC module case (3) to the lower HVAC module case (10).

NOTE: Refer to Fastener Notice .

IMPORTANT: For every heat stake removed ensure that you install a screw.

4. Install the screws to the HVAC module assembly.

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

5. Install the instrument panel. Refer to **Instrument Panel Service Positioning (Without SLT)** or **Instrument Panel Service Positioning (With SLT)** .

DEFROSTER DOOR REPLACEMENT

Removal Procedure

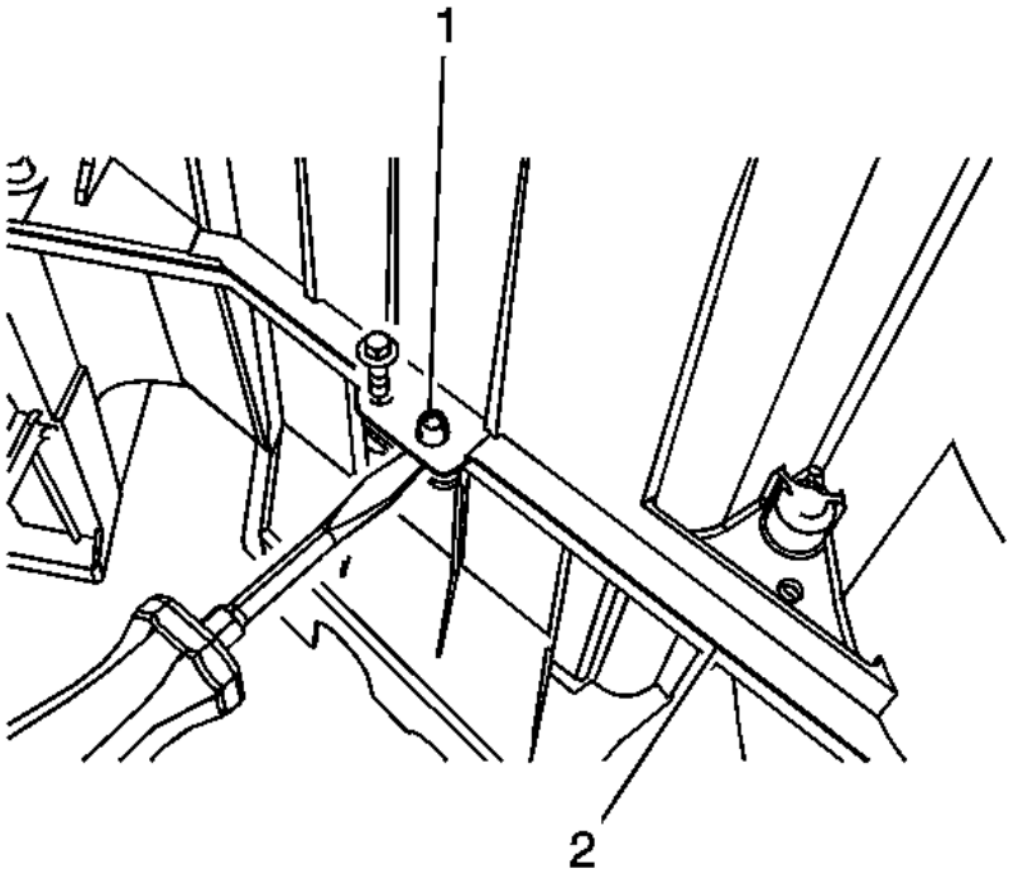


Fig. 118: Heat Stakes
Courtesy of GENERAL MOTORS CORP.

1. Remove the instrument panel to the service position. Refer to **Instrument Panel Service Positioning (Without SLT)** or **Instrument Panel Service Positioning (With SLT)** .

2. If equipped remove the heat stakes (1) from the HVAC module (2) with a screwdriver and a hammer.

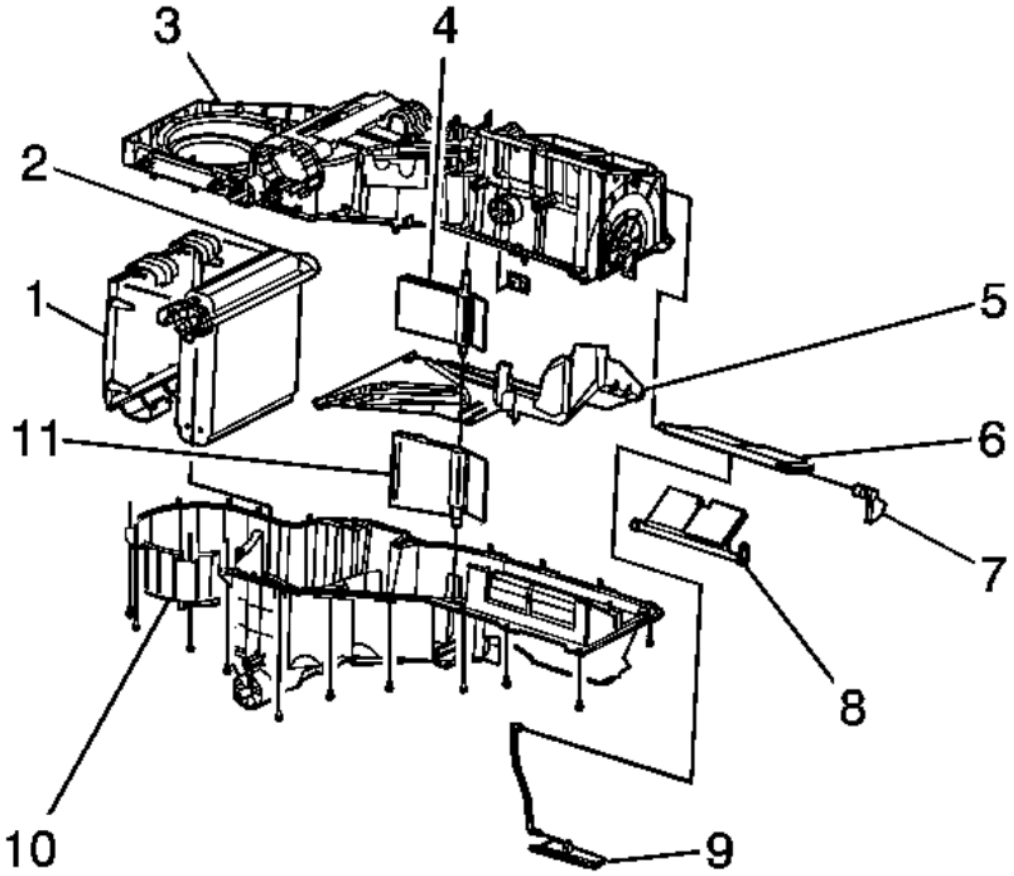


Fig. 119: Exploded View Of HVAC Module Assembly
Courtesy of GENERAL MOTORS CORP.

3. If equipped remove the HVAC module assembly screws.
4. Separate the HVAC module assembly.
5. Remove the mode actuator screws.
6. Remove the mode actuator.
7. Remove the mode actuator cam assembly.
8. Remove the defroster door (8).

Installation Procedure

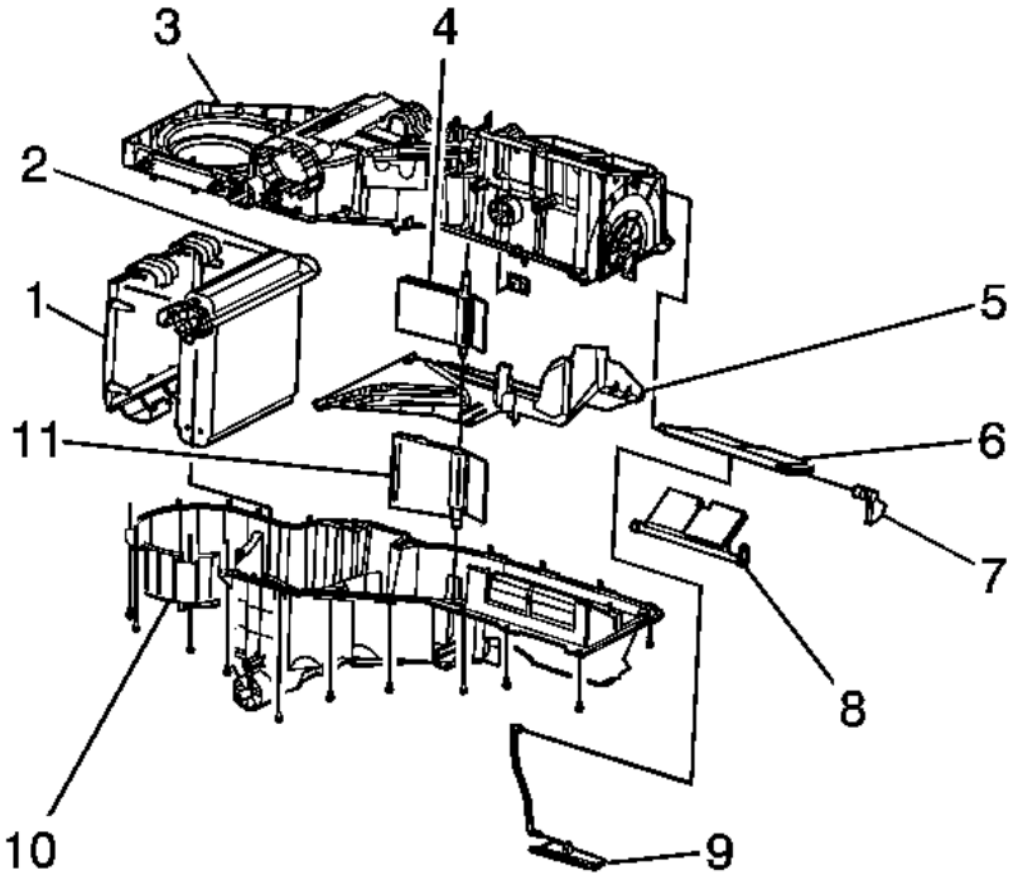


Fig. 120: Exploded View Of HVAC Module Assembly
Courtesy of GENERAL MOTORS CORP.

1. Install the defroster door (8).
2. Install the mode actuator cam assembly.
3. Install the mode actuator.

NOTE: Refer to Fastener Notice .

4. Install the mode actuator screws.

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

5. Install the HVAC module assembly halves.

IMPORTANT: For every heat stake removed ensure that you install a screw.

6. Install the screws to the HVAC module assembly.

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

7. Install the instrument panel. Refer to **Instrument Panel Service Positioning (Without SLT)** or **Instrument Panel Service Positioning (With SLT)** .

MODE DOOR REPLACEMENT - LOWER

Removal Procedure

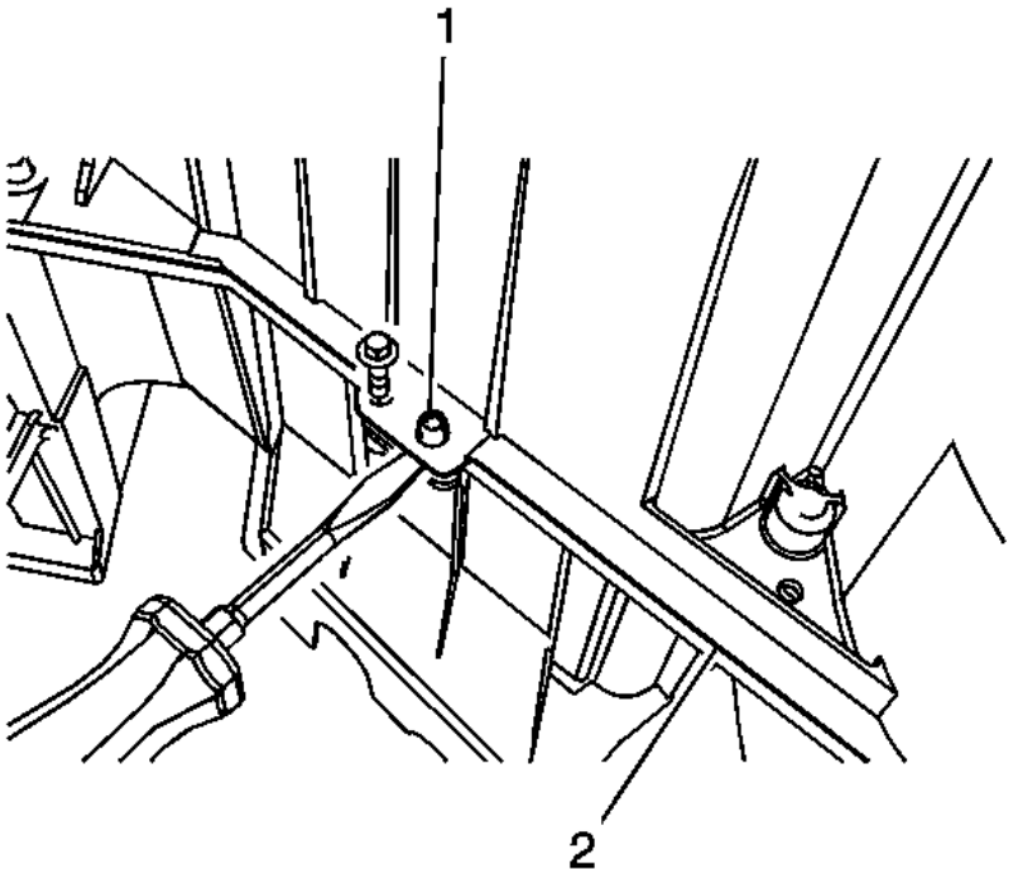


Fig. 121: Heat Stakes
Courtesy of GENERAL MOTORS CORP.

1. Remove the instrument panel to the service position. Refer to **Instrument Panel Service Positioning (Without SLT)** or **Instrument Panel Service Positioning (With SLT)** .
2. If equipped remove the heat stakes (1) from the HVAC module (2) with a screwdriver and a hammer.

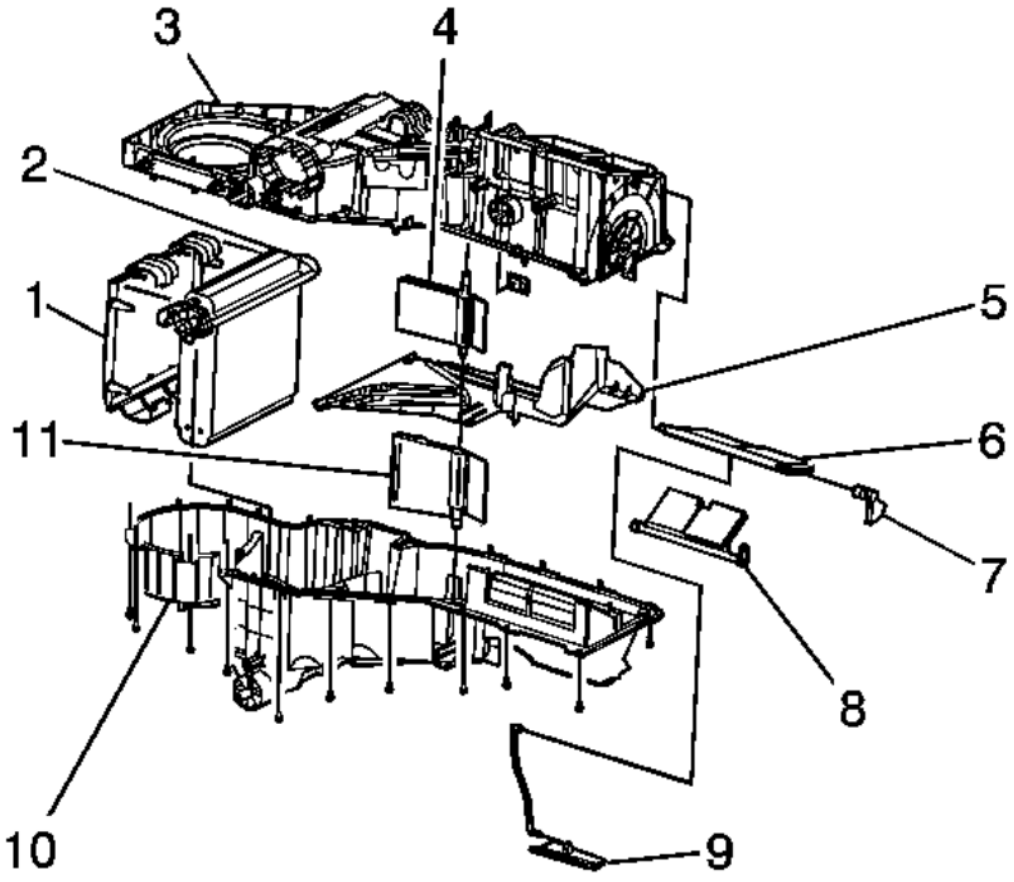


Fig. 122: Exploded View Of HVAC Module Assembly
Courtesy of GENERAL MOTORS CORP.

3. If equipped remove the HVAC module assembly screws.
4. Separate the HVAC module assembly.
5. Remove the air temperature separator plate (5) from the HVAC module assembly (10).
6. Remove the lower mode door (9) from the HVAC module assembly (10).

Installation Procedure

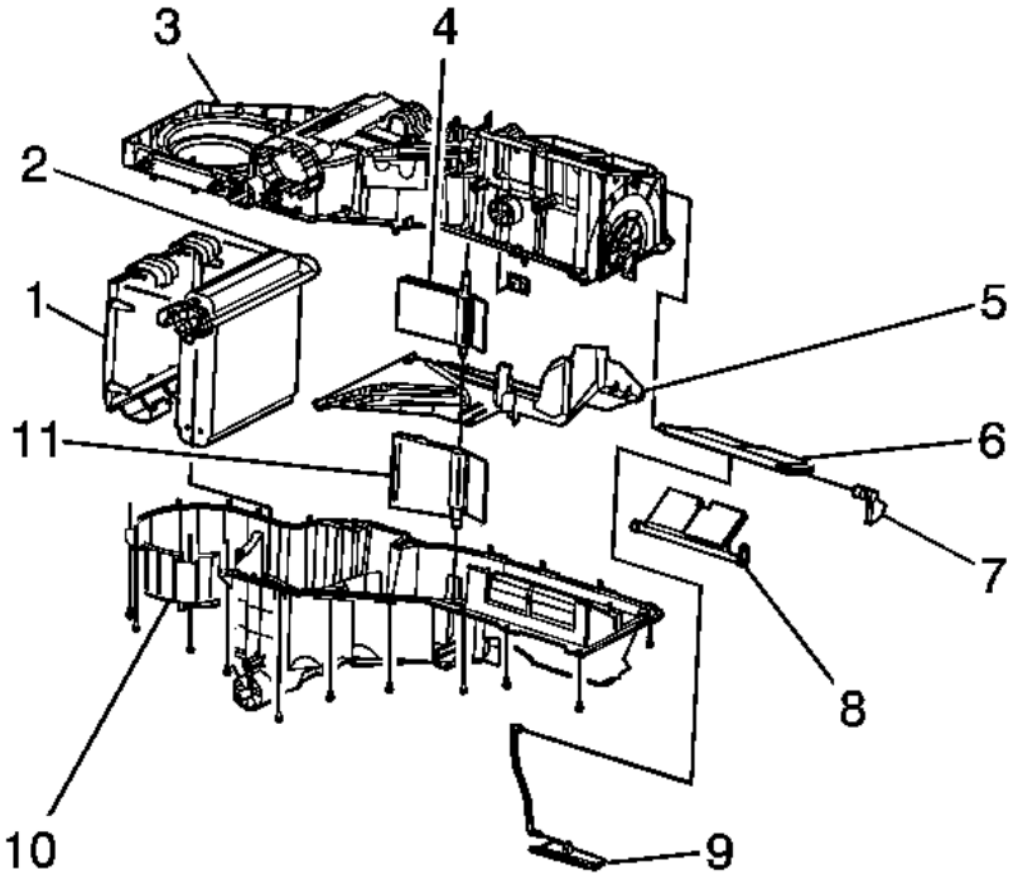


Fig. 123: Exploded View Of HVAC Module Assembly
Courtesy of GENERAL MOTORS CORP.

1. Install the lower mode door (9) to the HVAC module assembly (10).
2. Install the air temperature separator plate (5) to the HVAC module assembly (10).
3. Install the HVAC module assembly halves.

NOTE: Refer to Fastener Notice .

IMPORTANT: For every heat stake removed ensure that you install a screw.

4. Install the screws to the HVAC module assembly.

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

5. Install the instrument panel. Refer to **Instrument Panel Service Positioning (Without SLT)** or **Instrument Panel Service Positioning (With SLT)** .

MODE DOOR REPLACEMENT - UPPER

Removal Procedure

IMPORTANT: The upper mode door is serviced with the upper HVAC module case.

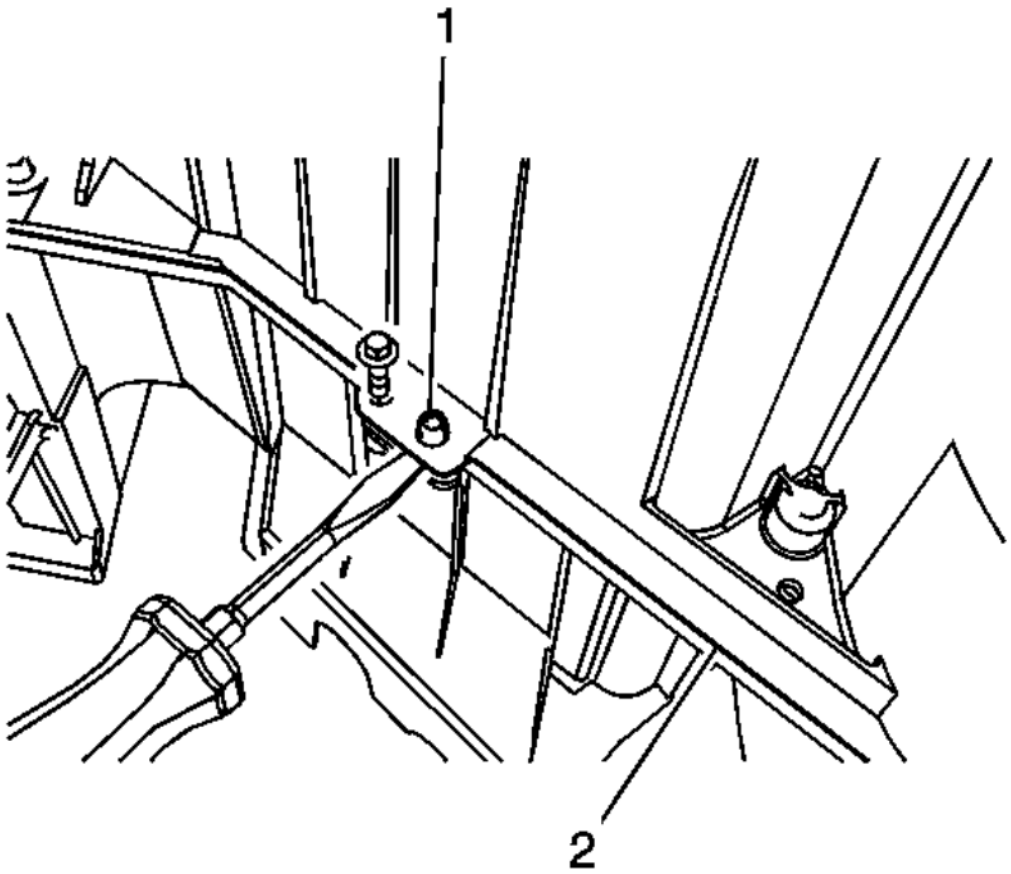


Fig. 124: Heat Stakes
Courtesy of GENERAL MOTORS CORP.

1. Remove the instrument panel to the service position. Refer to **Instrument Panel Service Positioning (Without SLT)** or **Instrument Panel Service Positioning (With SLT)** .
2. Disconnect the electrical connector from the mode actuator.
3. Remove the screws from the mode actuator.
4. Remove the mode actuator from the HVAC module assembly (1).
5. If equipped remove the heat stakes (1) from the HVAC module (2) with a screwdriver and a hammer.

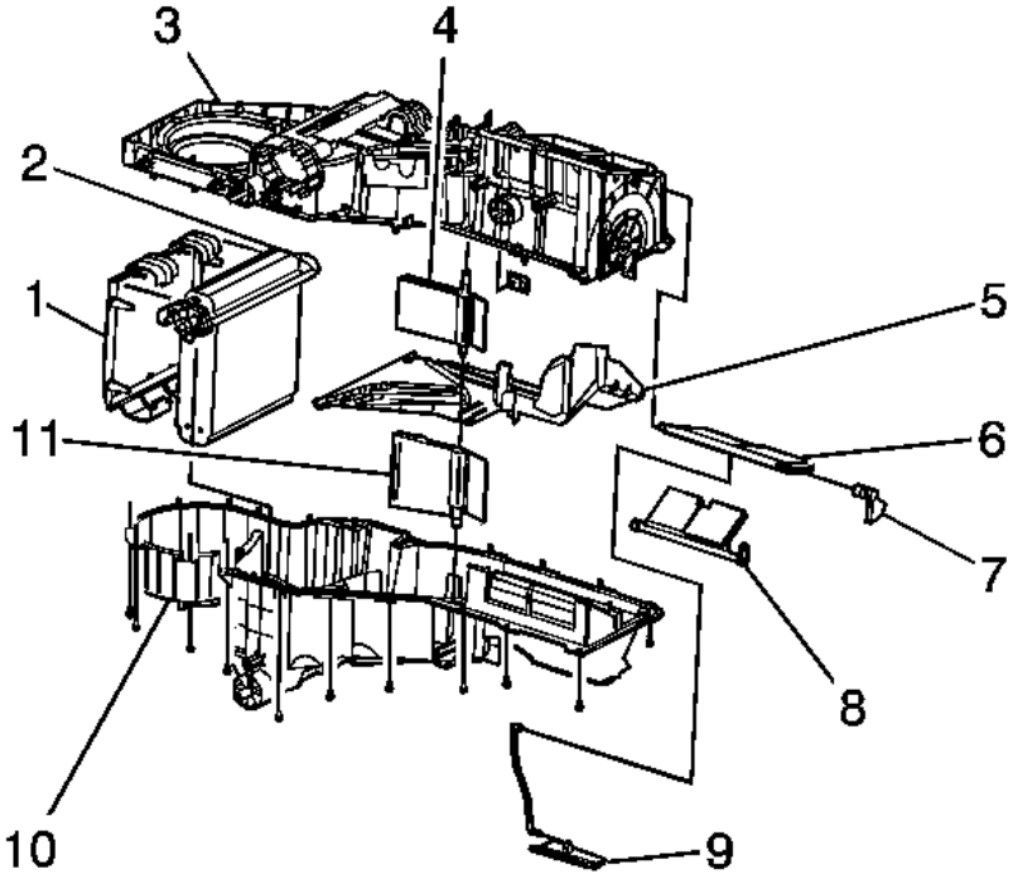


Fig. 125: Exploded View Of HVAC Module Assembly
Courtesy of GENERAL MOTORS CORP.

6. If equipped remove the HVAC module assembly screws.

7. Separate the HVAC module assembly.
8. Remove the lever (7) from the upper mode door/upper HVAC module case (6).

Installation Procedure

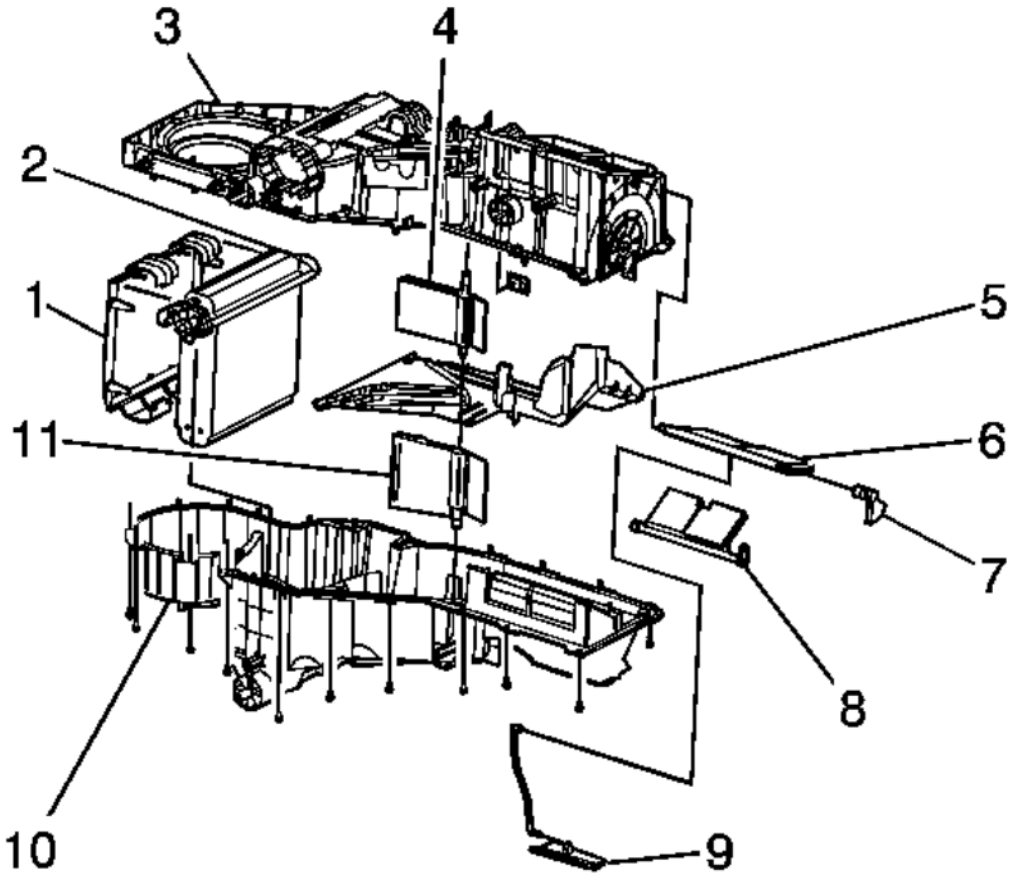


Fig. 126: Exploded View Of HVAC Module Assembly
Courtesy of GENERAL MOTORS CORP.

1. Install the lever (7) to the upper mode door/upper HVAC module case (6).
2. Install the HVAC module assembly halves.

NOTE: **Refer to Fastener Notice .**

IMPORTANT: For every heat stake removed ensure that you install a screw.

3. Install the screws to the HVAC module assembly.

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

4. Install the mode actuator to the HVAC module assembly.
5. Install the screws to the mode actuator.

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

6. Connect the electrical connector to the mode actuator.
7. Install the instrument panel. Refer to **Instrument Panel Service Positioning (Without SLT)** or **Instrument Panel Service Positioning (With SLT)** .

HEATER CORE COVER REPLACEMENT

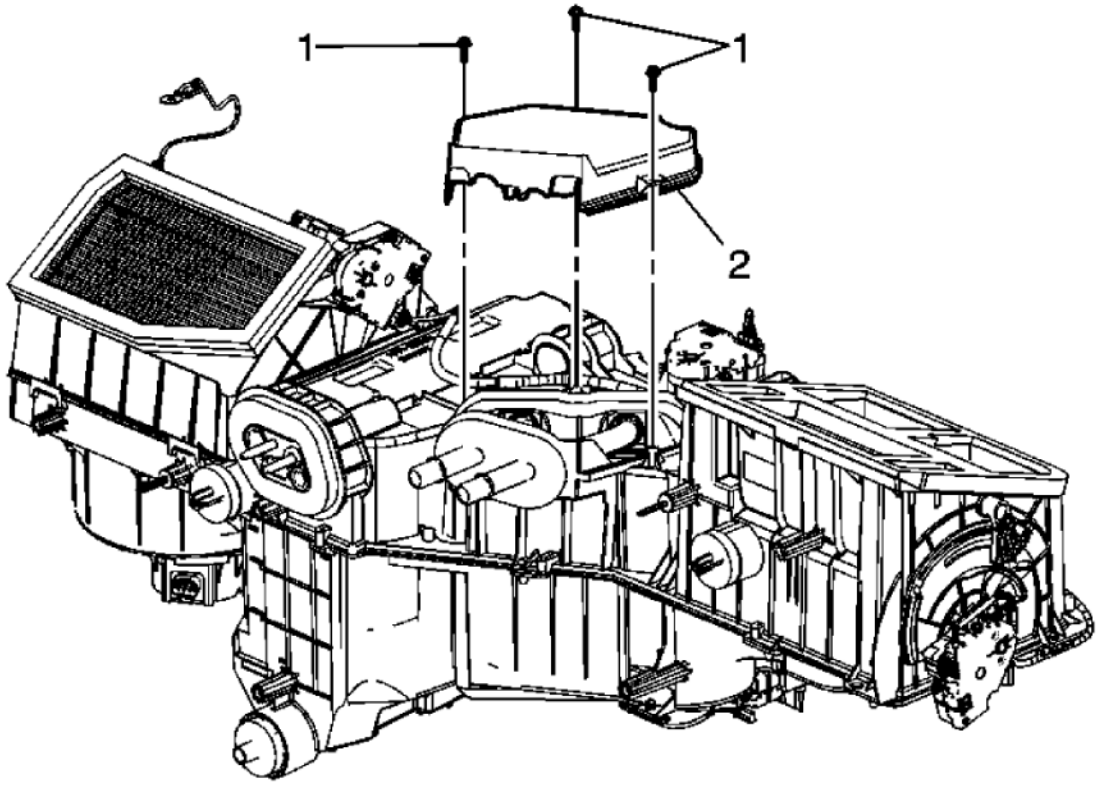


Fig. 127: View Of Heater Core Cover & Screw
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the HVAC module. Refer to **HVAC Module Assembly Replacement**.	
1	Heater Core Cover Screw **NOTE:** **Refer to Fastener Notice .** **Tighten:** 1.5 N.m (13 lb in)
2	Heater Core Cover

HEATER CORE REPLACEMENT

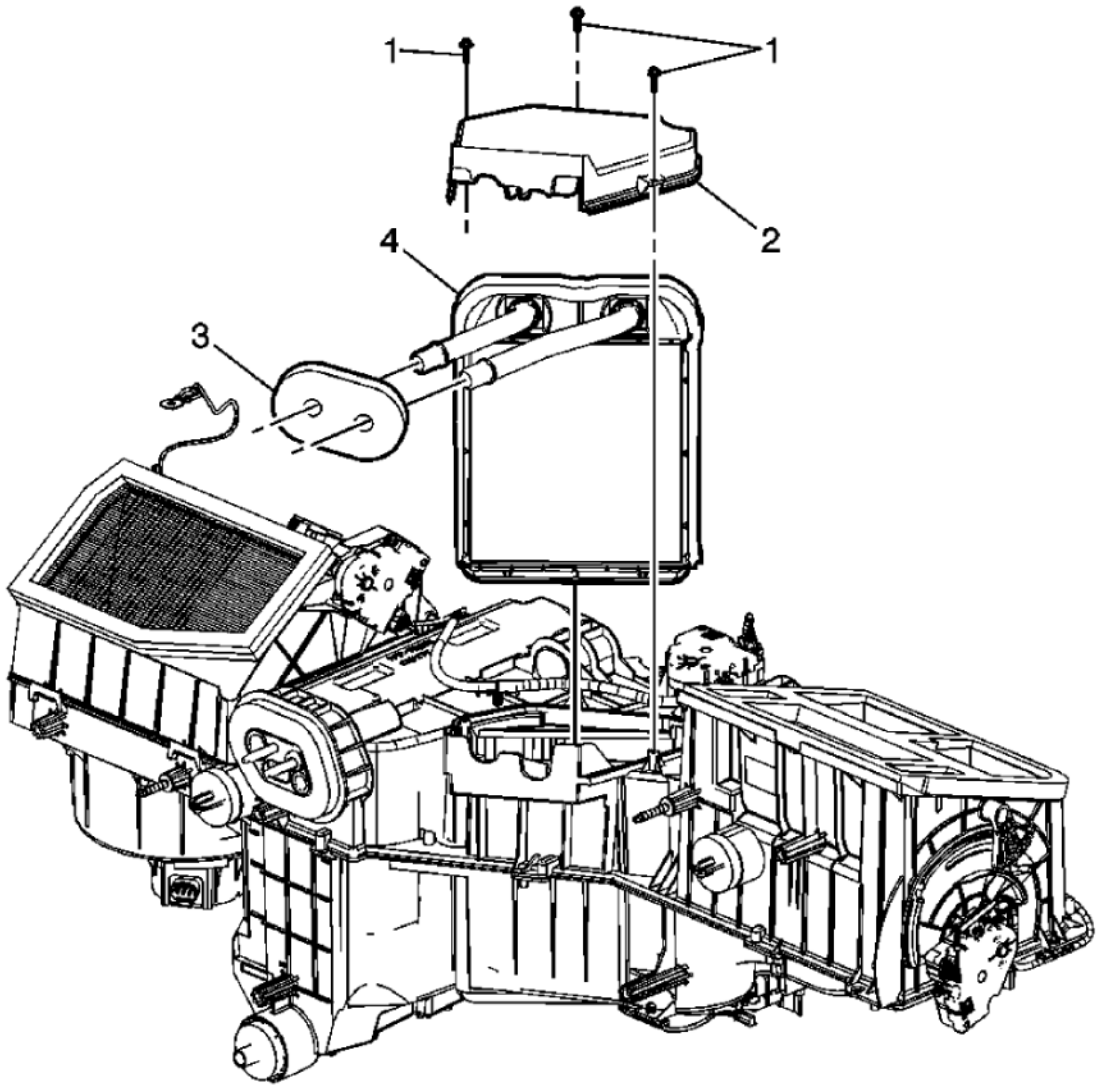


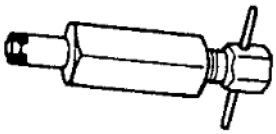
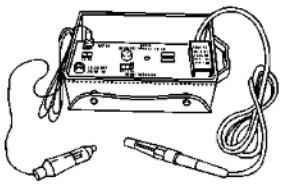
Fig. 128: View Of Heater Core & Components
Courtesy of GENERAL MOTORS CORP.

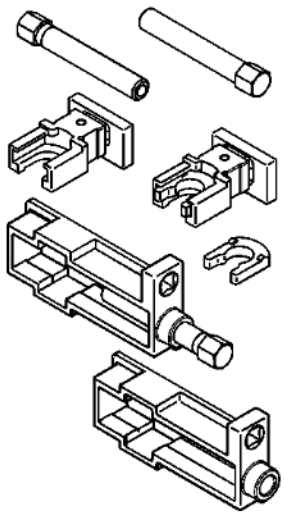
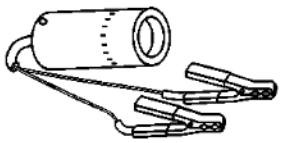
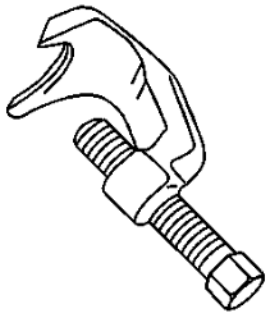
Callout	Component Name
Preliminary Procedure 1. Remove the HVAC module. Refer to **HVAC Module Assembly Replacement**. 2. Disconnect the wiring harness retainer from the heater core cover.	
1	Heater Core Cover Screw **NOTE:** **Refer to Fastener Notice .**

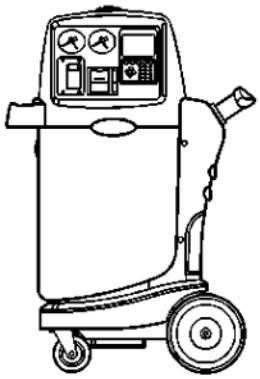
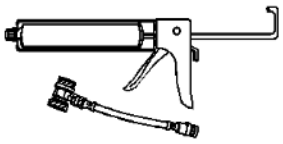
	Tighten: 1.5 N.m (14 lb in)
2	Heater Core Cover **Tighten:** 1.5 N.m (14 lb in)
3	Heater Core Pass Through Seal
4	Heater Core

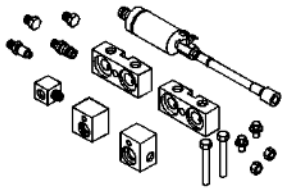
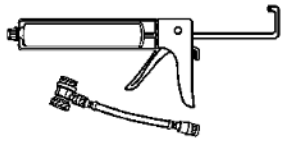
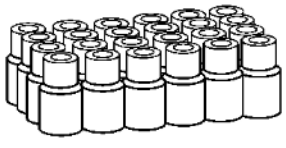
SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

Illustration	Tool Number/ Description
	J 26549-E Orifice Tube Remover
	J 39400-A Halogen Leak Detector
	J 41425 A/C Line Repair Kit

	
	J 41447 R-134A A/C Tracer Dye - Box of 24
	J 42220 Universal 12V Leak Detection Lamp
	J 43181 Heater Line Q.C. Release Tool

	J 43600 ACR 2000 Air Conditioning Service Center
	J 43872 Fluorescent Dye Cleaner
	J 45037 A/C Oil Injector

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