

## 2007 Hummer H3

2007 HVAC Heating, Ventilation and Air Conditioning - H3

### 2007 HVAC

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## SPECIFICATIONS

### FASTENER TIGHTENING SPECIFICATIONS

#### Fastener Tightening Specifications

Application	Specification	
	Metric	English
A/C Compressor Mounting Bolt	50 N.m	37 lb ft
A/C Refrigerant Pressure Sensor	4.8 N.m	42 lb in
Air Distributor Duct Mounting Screw	1.9 N.m	17 lb in
Air Inlet Assembly Mounting Stud	4.5 N.m	40 lb in
Blower Motor and Fan Assembly Mounting Screw	1.9 N.m	17 lb in
Blower Motor Relay Bracket Mounting Screw	1.9 N.m	17 lb in
Blower Motor Resistor Mounting Screw	1.9 N.m	17 lb in
Compressor Discharge Hose to Condenser Fitting	28 N.m	21 lb ft
Compressor Suction and Discharge Hose to Compressor	33 N.m	24 lb ft
Compressor Suction Hose to TXV	48 N.m	35 lb ft
Evaporator Case Section to Blower Case Section Retaining Screw	1.9 N.m	17 lb in
Evaporator Tube to Condenser Fitting	28 N.m	21 lb ft
Floor Air Outlet Mounting Screw	1.9 N.m	17 lb in
Heater Core Access Cover Screw	1.9 N.m	17 lb in
Heater Inlet and Outlet Hoses Bracket Bolt	25 N.m	18 lb ft
Heater/Vent Module Mounting Nut	4.5 N.m	40 lb in
Heater/Vent Module Mounting Screw	4.5 N.m	40 lb in
Heater/Vent Module Mounting Stud	4.5 N.m	40 lb in
Receiver Drier Clamp Screw	10 N.m	88 lb in

### REFRIGERANT SYSTEM CAPACITIES

#### Refrigerant System Capacities

	Specification	

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Application	Metric	English
PAG Oil GM P/N 12378526 (Canadian P/N 88900060)		
• The Denso service compressor is precharged with 74 ml (2.5 oz.) of PAG oil.		
Receiver Dryer Replacement	23 ml*	0.8 oz.*
• *Add the same amount of PAG oil drained from the failed receiver dryer, plus the specified amount.		
Condenser Replacement	44 ml <sup>1</sup>	1.5 oz. <sup>1</sup>
Evaporator Replacement	15 ml <sup>1</sup>	0.5 oz. <sup>1</sup>
• Total System Oil Capacity	119 ml	4 oz.
• Refrigerant Charge	0.68 kg	1.5 lb

## DIAGNOSTIC INFORMATION AND PROCEDURES

### DIAGNOSTIC STARTING POINT - HEATING, VENTILATION AND AIR CONDITIONING

The Heating, Ventilation and Air Conditioning (HVAC) system is divided into 2 separate sections. The first, Heating, Ventilation and Air Conditioning, has all procedures that pertain to a HVAC component or function that is not specifically associated with the manual control system. The second, HVAC Systems - Manual, has all procedures specific to the Manual control system.

Begin the system diagnosis with the **Diagnostic System Check - Vehicle** .

The Diagnostic System Check will provide the identification of the control modules which command the system.

The use of the Diagnostic System Check will identify the correct procedure for diagnosing the system and where the procedure is located.

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

- **Air Delivery Description and Operation**
- **Air Temperature Description and Operation**

The Air Delivery Description and Operation contains the following topics:

- HVAC Control Components
- Air Speed
- Air Distribution
- Recirculation Operation

The Air temperature Description and Operation contains the following topics:

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

## LEAK TESTING

### Tools Required

- **J 39400-A** Halogen Leak Detector
- **J 41447** Leak Detection Dye. See **Special Tools**.
- **J 42220** Leak Detection Lamp. See **Special Tools**.
- **J 43872** Fluorescent Dye Cleaner
- **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.

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** .

**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**.

#### Halogen Leak Detector

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

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

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

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

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

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

Follow the instructions supplied with the **J 39400-A**.

#### **AIR CONDITIONING (A/C) SYSTEM PERFORMANCE TEST**

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

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

- 1:** This step determines if the A/C system has at least the minimum refrigerant charge required to operate the system without damage.
- 2:** This step measures the performance of the A/C system.
- 3:** This step is to allow for vehicle variations as well as high ambient temperatures.

### Air Conditioning (A/C) System Performance Test

Step	Action	Values	Yes	No
<b>IMPORTANT:</b>				
<ul style="list-style-type: none"> <li>• The ambient air temperature must be at least 16°C (60°F).</li> <li>• Do not induce additional air flow across the front of the vehicle during the test.</li> <li>• If you were sent here from a DTC diagnostic table, clear the DTC upon completion of this test.</li> </ul>				
<b>1</b>	<ol style="list-style-type: none"> <li>1. Park the vehicle inside or in the shade.</li> <li>2. Open the windows in order to ventilate the interior of the vehicle.</li> <li>3. If the A/C system was operating, allow the A/C system to equalize for about 2 minutes.</li> <li>4. Turn OFF the ignition.</li> <li>5. Install the <b>J 43600</b> ACR 2000 Air Conditioning Service Center. See <b>Special Tools</b>.</li> <li>6. Record the ambient air temperature displayed on the <b>J 43600</b> . See <b>Special Tools</b>.</li> <li>7. Record the low and high side STATIC pressure readings.</li> </ol> <p>Are both the low side and high side pressures within the specified value?</p>	<p>More than 16°C (60°F) - 345 kPa (50 psi)</p> <p>More than 24°C (75°F) - 483 kPa (70 psi)</p> <p>More than 33°C (90°F) - 690 kPa (100 psi)</p>	Go to <b>Step 2</b>	Go to <b>Leak Testing</b>
<b>IMPORTANT:</b>				

2

**Record the relative humidity and the ambient air temperature at the time of the test.**

1. Close the vehicle doors and windows.
2. Open the driver door window 12.7-15.2 cm (5-6 in).
3. Select the following HVAC control settings:
  - The A/C is ON.
  - The coldest temperature setting
  - The maximum blower speed
  - Recirculation mode
  - The I/P panel outlet mode
  - All I/P panel outlets are OPEN
4. Install the temperature probes of the **J 43600** in the left and right center panel air outlets. See **Special Tools**.
5. Apply the parking brake.
6. Place the transaxle/transmission in one of the following positions:
  - PARK (Automatic)
  - NEUTRAL (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

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	<ul style="list-style-type: none"> <li>• Unusual noises</li> </ul> <p><b>IMPORTANT:</b> Press the <b>RESET</b> button, before using the print function of the <b>J 43600</b> . See <u>Special Tools</u>.</p> <p>10. Print the following information:</p> <ul style="list-style-type: none"> <li>• The panel outlet air temperatures</li> <li>• The low side pressure</li> <li>• The high side pressure</li> </ul> <p>11. Compare the low and high side pressures and the panel output temperatures to the A/C performance table below.</p> <p>Does all the data recorded fall within the specified ranges of the A/C performance table?</p>			
<p><b>3</b></p>	<p>If the pressures and temperatures recorded do not fall within the specified ranges:</p> <ol style="list-style-type: none"> <li>1. Continue to operate the A/C system for an additional 5 minutes.</li> <li>2. <b>RESET</b> the <b>J 43600</b> and record the pressures and temperatures again. See <u>Special Tools</u>.</li> <li>3. Compare the low and high side pressures and the panel output temperature to the A/C performance table.</li> </ol>	<p>-</p>	<p>Go to <b>Step 8</b></p>	<p>Go to <b>Step 3</b></p>



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	Does all the data recorded fall within the specified ranges of the A/C performance table?		Go to <b>Step 8</b>	Go to <b>Step 4</b>
4	Do the high and low side pressures fall within the specified ranges, but the panel outlet temperatures do not?	-	Go to <u><b>Air Conditioning (A/C) Diagnostics - Pressure Zone A</b></u>	Go to <b>Step 5</b>
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 <u><b>Air Conditioning (A/C) Diagnostics - Pressure Zone B</b></u>	Go to <b>Step 6</b>
6	Are the low and high side pressures both greater than the specified ranges?	-	Go to <u><b>Air Conditioning (A/C) Diagnostics - Pressure Zone C</b></u>	Go to <b>Step 7</b>
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 <u><b>Air Conditioning (A/C) Diagnostics - Pressure Zone D</b></u>	Go to <b>Step 8</b>
8	Operate the system in order to verify the test results. Did you find the same results?	-	System OK	Go to <u><b>Symptoms - HVAC Systems - Manual</b></u>

**A/C Performance Table**

<b>Ambient Temperature</b>	<b>Relative Humidity</b>	<b>Low Side Service Port Pressure</b>	<b>High Side Service Port Pressure</b>	<b>Maximum Left Center Discharge Air Temperature</b>
13-18°C (55-65°)		151-192 kPa	716-1198 kPa	

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F)	0-100%	(22-28 psi)	(104-174 psi)	7°C (43°F)
19-24°C (66-75° F)	Below 40%	151-248 kPa (22-36 psi)	888-1391 kPa (129-202 psi)	8°C (46°F)
	Above 40%	158-234 kPa (23-34 psi)	992-1481 kPa (144-215 psi)	8°C (46°F)
25-29°C (76-85° F)	Below 35%	199-275 kPa (29-40 psi)	1247-1646 kPa (181-239 psi)	12°C (52°F)
	35-50%	199-268 kPa (29-39 psi)	1302-1667 kPa (189-242 psi)	12°C (52°F)
	Above 50%	192-254 kPa (28-37 psi)	1329-1708 kPa (193-248 psi)	12°C (52°F)
30-35°C (86-95° F)	Below 30%	206-316 kPa (30-46 psi)	1543-1970 kPa (224-286 psi)	15°C (59°F)
	30-50%	220-303 kPa (32-44 psi)	1557-1977 kPa (226-287 psi)	15°C (59°F)
	Above 50%	220-289 kPa (32-42 psi)	1591-1991 kPa (231-289 psi)	16°C (60°F)
36-41°C (96-105° F)	Below 20%	275-372 kPa (40-54 psi)	1887-2321 kPa (274-337 psi)	20°C (68°F)
	20-40%	282-351 kPa (41-51 psi)	1887-2301 kPa (274-334 psi)	20°C (68°F)
	Above 40%	254-330 kPa (37-48 psi)	1901-2280 kPa (276-331 psi)	21°C (69°F)
42-46°C (106- 115°F)	Below 20%	310-406 kPa (45-59 psi)	2239-2597 kPa (325-377 psi)	23°C (73°F)
	Above 20%	330-431 kPa (48-60 psi)	2239-2569 kPa (325-373 psi)	24°C (75°F)
47-49°C (116- 120°F)	Below 30%	372-468 kPa (54-68 psi)	2521-2859 kPa (366-415 psi)	27°C (80°F)

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

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

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

Step	Action	Value	Yes	No
DEFINITION: The high and low side pressures may be normal or slightly less than normal.				
<ul style="list-style-type: none"> <li>• Air Delivery Concern</li> <li>• Slight Refrigerant Under Charge</li> <li>• Refrigerant Contamination</li> </ul>				
1	Were you sent here from the A/C System Performance Test?	-	Go to <b>Step 2</b>	Go to <b><u>Air Conditioning (A/C) System Performance Test</u></b>

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2	<p>Refer to the instrument panel outlet air temperatures recorded during the A/C system performance test.</p> <p>Does the discharge air temperature between the right and left center instrument panel outlets vary by more than 1-2°C (2-3°F)?</p>	-	Go to <b>Step 7</b>	Go to <b>Step 3</b>
3	<p>Did the customer mention that the A/C system output temperatures are good at first, but then turn warm during extended drives?</p>	-	Go to <b>Step 4</b>	Go to <b>Step 5</b>
4	<p>Increase engine speed to 2,000 RPM.</p> <p>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?</p>	-	Go to <u><b>Air Conditioning (A/C) Diagnostics - Pressure Zone D</b></u>	Go to <b>Step 5</b>
5	<p>1. Refer to the pressures recorded during the A/C system performance test.</p> <p>2. Inspect for the following conditions:</p> <p align="center"><b>CAUTION:</b> <b>Refer to <u>Moving Parts and Hot Surfaces Caution</u> .</b></p> <ul style="list-style-type: none"> <li>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</li> </ul>	-		

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	<p>to <b><u>Air Conditioning (A/C) System Performance Test</u></b> .</p> <ul style="list-style-type: none"> <li>• The discharge line is hot.</li> <li>• The suction line is cool.</li> </ul>			
	Do the listed conditions exist?		Go to <b>Step 7</b>	Go to <b>Step 6</b>
6	<ol style="list-style-type: none"> <li>1. Refer to the pressures recorded during the A/C system performance test.</li> <li>2. Inspect for the following conditions: <ul style="list-style-type: none"> <li>• 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 <b><u>Air Conditioning (A/C) System Performance Test</u></b> .</li> <li>• The discharge line is warm-to-hot.</li> <li>• The suction line is cool-to-warm.</li> </ul> </li> </ol>	-		
	Do the listed conditions exist?		Go to <b>Step 8</b>	Go to <b><u>Too Hot in Vehicle</u></b>
7	<p>The A/C system may be undercharged.</p> <ol style="list-style-type: none"> <li>1. Leak test A/C system. Refer to <b><u>Leak Testing</u></b>.</li> <li>2. Recharge the A/C system to specifications. Refer to</li> </ol>	-		

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	<p><b><u>Refrigerant Recovery and Recharging.</u></b></p> <p>Is the action complete?</p>		Go to <b>Step 14</b>	-
8	<p>The A/C system may be contaminated.</p> <p>View the information screen on <b>J 43600</b> ACR 2000 Air Conditioning Service Center for detection of foreign gases in the A/C system. See <b><u>Special Tools.</u></b></p> <p>Do foreign gases exist?</p>	-	Go to <b>Step 9</b>	Go to <b>Step 10</b>
9	<ol style="list-style-type: none"> <li>1. Evacuate the A/C system to a scavenging tank. Refer to <b><u>Refrigerant Recovery and Recharging.</u></b></li> <li>2. Recharge the A/C system to specifications.</li> </ol> <p>Is the action complete?</p>	-	Go to <b>Step 14</b>	-
10	<p>The A/C system may contain too much moisture or air.</p> <ol style="list-style-type: none"> <li>1. Evacuate and recharge the A/C system to specifications. Refer to <b><u>Refrigerant Recovery and Recharging.</u></b></li> <li>2. Operate the A/C system and inspect the instrument panel outlet air temperatures. Refer to <b><u>Air Conditioning (A/C) System Performance Test.</u></b></li> </ol> <p>Are the instrument panel outlet air temperatures within the specified ranges of the A/C Performance Test Table?</p>	-	Go to <b>Step 15</b>	Go to <b>Step 11</b>

<p>11</p>	<p>The A/C system may contain too much refrigerant oil.</p> <p><b>IMPORTANT:</b> Operate the A/C system on low, in order to enhance oil flow to the high side of the system.</p> <ol style="list-style-type: none"> <li>1. Operate the A/C system with the engine at idle speed and the blower speed on low for approximately 15 minutes.</li> <li>2. Recover the refrigerant from the A/C system. Refer to <b><u>Refrigerant Recovery and Recharging</u></b>.</li> <li>3. Remove the receiver dehydrator. Refer to <b><u>Receiver Dehydrator Replacement</u></b>.</li> <li>4. Drain and measure the refrigerant oil from the receiver dehydrator.</li> </ol> <p>Was more than the specified amount of refrigerant oil drained from the receiver?</p>	<p>148 ml (5 oz.)</p>	<p>Go to <b>Step 12</b></p>	<p>Go to <b>Step 13</b></p>
<p>12</p>	<ol style="list-style-type: none"> <li>1. Reinstall the receiver dehydrator. Refer to <b><u>Receiver Dehydrator Replacement</u></b>.</li> <li>2. Flush the A/C system. Refer to <b><u>Flushing</u></b>.</li> <li>3. Recharge the A/C system. Refer to <b><u>Refrigerant Recovery and Recharging</u></b>.</li> </ol> <p>Are the actions complete?</p>	<p>-</p>	<p>Go to <b>Step 14</b></p>	<p>-</p>

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13	<ol style="list-style-type: none"> <li>1. Add the specified amount of refrigerant oil to the receiver dehydrator. Refer to <b><u>Refrigerant System Capacities.</u></b></li> <li>2. Install the receiver dehydrator. Refer to <b><u>Receiver Dehydrator Replacement.</u></b></li> <li>3. Recharge the A/C system. Refer to <b><u>Refrigerant Recovery and Recharging.</u></b></li> </ol> <p>Are the actions complete?</p>	-	Go to <b>Step 14</b>	-
14	<ol style="list-style-type: none"> <li>1. Record the low and high side pressures and the instrument panel outlet air temperature.</li> <li>2. Compare the instrument panel outlet air temperatures to those listed in the A/C System Performance Chart. Refer to <b><u>Air Conditioning (A/C) System Performance Test.</u></b></li> </ol> <p>Are the high and low side pressures and instrument panel outlet air temperatures within specifications?</p>	-	Go to <b>Step 15</b>	Go to <b><u>Air Conditioning (A/C) System Performance Test</u></b>
15	Operate the system in order to verify the repair. Did you find and correct the condition?	-	System OK	Go to <b><u>Symptoms - HVAC Systems - Manual</u></b>

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

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

Step	Action	Yes	No
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DEFINITION: The low side pressure is higher than normal and the high side pressure is



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lower than normal.

- Malfunctioning A/C Compressor
- Refrigerant Under Charge

1	Were you sent here from the A/C System Performance Test?	Go to <b>Step 2</b>	Go to <b><u>Air Conditioning (A/C) System Performance Test</u></b>
2	After continued operation of the A/C system, do the low and the high side pressures equalize or become static?	Go to <b>Step 5</b>	Go to <b>Step 3</b>
3	<p>1. Refer to the pressures recorded during the A/C System Performance Test.</p> <p>2. Inspect for the following conditions:</p> <p style="text-align: center;"><b>CAUTION:</b> Refer to <b><u>Moving Parts and Hot Surfaces Caution</u></b> .</p> <ul style="list-style-type: none"> <li>• The low side pressure is equal to or greater than the specified pressure range of the A/C Performance Table. Refer to <b><u>Air Conditioning (A/C) System Performance Test</u></b> .</li> <li>• The high side pressure is less than the specified pressure range of the A/C Performance Table. Refer to <b><u>Air Conditioning (A/C) System Performance Test</u></b> .</li> <li>• The low side refrigerant line at the compressor feels cool-to-warm.</li> <li>• The high side refrigerant line at the compressor feels warm-to-hot.</li> </ul>		

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	Do the listed conditions exist?	Go to <b>Step 5</b>	Go to <b>Step 4</b>
4	<p>1. Refer to the pressures recorded during the A/C System Performance Test.</p> <p>2. Inspect for the following conditions:</p> <p align="center"><b>CAUTION:</b> Refer to <b><u>Moving Parts and Hot Surfaces Caution</u></b> .</p> <ul style="list-style-type: none"> <li>• The low side pressure is greater than the specified pressure range of the A/C Performance Table. Refer to <b><u>Air Conditioning (A/C) System Performance Test</u></b> .</li> <li>• The high side pressure is less than the specified pressure range of the A/C Performance Table. Refer to <b><u>Air Conditioning (A/C) System Performance Test</u></b> .</li> <li>• The low side refrigerant line at the compressor feels warm.</li> <li>• The high side refrigerant line at the compressor feels warm-to-hot.</li> </ul>		Go to <b><u>Air Conditioning (A/C) System Performance Test</u></b>
	Do the listed conditions exist?	Go to <b>Step 5</b>	<b><u>Test</u></b>
5	<p>The A/C system has a low refrigerant charge.</p> <p>Evacuate and recharge the A/C system. Refer to <b><u>Refrigerant Recovery and Recharging</u></b>.</p> <p>Is the action complete?</p>		-
	<p>1. After you perform the repairs, record the following:</p> <ul style="list-style-type: none"> <li>• The low and the high side pressures</li> </ul>		

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6	<ul style="list-style-type: none"> <li>• The instrument panel outlet air temperature</li> </ul> <ol style="list-style-type: none"> <li>2. Compare the pressures and the temperature to those listed in the A/C Performance Chart. Refer to <b><u>Air Conditioning (A/C) System Performance Test</u></b>.</li> </ol> <p>Are the readings within the specified ranges found on the A/C Performance Chart?</p>	Go to <b>Step 13</b>	Go to <b>Step 7</b>
7	<p>The A/C compressor is malfunctioning. Remove the expansion device and inspect for contamination. Refer to <b><u>Thermal Expansion Valve Replacement (Left Hand Drive)</u></b> or <b><u>Thermal Expansion Valve Replacement (Right Hand Drive)</u></b>. Did you find metal flakes on the expansion device?</p>	Go to <b>Step 9</b>	Go to <b>Step 8</b>
8	<p>Inspect the expansion device for a brown, powdery residue indicating desiccant in the A/C system. Is a brown, powdery residue present?</p>	Go to <b>Step 11</b>	Go to <b>Step 12</b>
9	<ol style="list-style-type: none"> <li>1. Remove the suction and the discharge lines from the compressor. Refer to <b><u>Suction Hose Replacement (Left Hand Drive)</u></b> or <b><u>Suction Hose Replacement (Right Hand Drive)</u></b> and to <b><u>Discharge Hose Replacement</u></b>.</li> <li>2. Inspect for metal flake contamination at the line connections and the compressor ports.</li> </ol> <p>Is metal flake contamination present?</p>	Go to <b>Step 10</b>	Go to <b>Step 12</b>
	<ol style="list-style-type: none"> <li>1. Replace the A/C compressor. Refer to <b><u>Compressor Replacement</u></b>.</li> <li>2. Replace the thermal expansion valve. Refer to <b><u>Thermal Expansion Valve</u></b></li> </ol>		

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10	<p><b><u>Replacement (Left Hand Drive) or Thermal Expansion Valve Replacement (Right Hand Drive).</u></b></p> <p>3. Evacuate and recharge the A/C system. Refer to <b><u>Refrigerant Recovery and Recharging.</u></b></p> <p>Is the action complete?</p>	Go to <b>Step 13</b>	-
11	<p>1. Flush the A/C system. Refer to <b><u>Flushing.</u></b></p> <p>2. Replace the thermal expansion valve. Refer to <b><u>Thermal Expansion Valve Replacement (Left Hand Drive) or Thermal Expansion Valve Replacement (Right Hand Drive).</u></b></p> <p>3. Replace the A/C compressor. Refer to <b><u>Compressor Replacement.</u></b></p> <p>4. Replace the receiver dehydrator. Refer to <b><u>Receiver Dehydrator Replacement.</u></b></p> <p>5. Evacuate and recharge the A/C system. Refer to <b><u>Refrigerant Recovery and Recharging.</u></b></p> <p>Is the action complete?</p>	Go to <b>Step 13</b>	-
12	<p>1. Replace the A/C compressor. Refer to <b><u>Compressor Replacement.</u></b></p> <p>2. Evacuate and recharge the A/C system. Refer to <b><u>Refrigerant Recovery and Recharging.</u></b></p> <p>Is the action complete?</p>	Go to <b>Step 13</b>	-
13	<p>Operate the system in order to verify the repair. Did you find and correct the condition?</p>	System OK	Go to <b><u>Symptoms - HVAC Systems - Manual</u></b>

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

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

Step	Action	Yes	No
DEFINITION: The low and the high side pressures are both higher than normal.			
<ul style="list-style-type: none"> <li>• Restricted Condenser Air Flow</li> <li>• Cooling Fan Malfunction</li> <li>• Expansion Device Malfunction</li> </ul>			
1	Were you sent here from the A/C System Performance Test?	Go to <b>Step 2</b>	Go to <b><u>Air Conditioning (A/C) System Performance Test</u></b>
2	1. Start the engine. 2. Turn ON the A/C. 3. Inspect for proper cooling fan operation. Refer to <b><u>Cooling System Description and Operation</u></b> .  Are the cooling fans ON and operating properly?	Go to <b>Step 3</b>	Go to <b>Step 5</b>
3	Visually inspect for the following conditions: <ul style="list-style-type: none"> <li>• Damaged condenser cooling fins</li> <li>• Missing or misaligned air baffles</li> <li>• Restricted air flow</li> </ul> Do any of these conditions exist?	Go to <b>Step 4</b>	Go to <b>Step 6</b>
4	Repair the air flow restriction. Is the action complete?	Go to <b>Step 9</b>	-
5	Repair the fault to the cooling fan operation. Refer to <b><u>Diagnostic System Check - Vehicle</u></b> . Is the repair complete?	Go to <b>Step 9</b>	-
<b>CAUTION:</b>			

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6	<p>Refer to <b><u>Moving Parts and Hot Surfaces Caution</u></b> .</p> <p>Feel the liquid line on both sides of the expansion device.Are the temperatures on both sides of the expansion device similar?</p>	Go to <b>Step 7</b>	Go to <b>Step 8</b>
7	<p>Replace the damaged or faulty thermal expansion valve. Refer to <b><u>Thermal Expansion Valve Replacement (Left Hand Drive)</u></b> or <b><u>Thermal Expansion Valve Replacement (Right Hand Drive)</u></b>.</p> <p>Is the action complete?</p>	Go to <b>Step 9</b>	-
8	<ol style="list-style-type: none"> <li>1. Air is in the refrigerant system or the system is overcharged. Refer to the view screen on <b>J 43600</b> ACR 2000 Air Conditioning Service Center for foreign gas content in the refrigerant. See <b><u>Special Tools</u></b>.</li> <li>2. Recover and recharge the A/C system. Refer to <b><u>Refrigerant Recovery and Recharging</u></b>.</li> </ol> <p>Is the action complete?</p>	Go to <b>Step 9</b>	-
9	<ol style="list-style-type: none"> <li>1. Record the low and high side pressures and the instrument panel outlet air temperature after you have performed the repairs.</li> <li>2. Compare the pressures and the instrument panel outlet air temperature to those listed in the A/C Performance Chart. Refer to <b><u>Air Conditioning (A/C) System Performance Test</u></b>.</li> </ol> <p>Are the readings within the specified ranges listed in the A/C Performance Chart?</p>	Go to <b>Step 10</b>	Go to <b><u>Air Conditioning (A/C) System Performance Test</u></b>

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10	Operate the system in order to verify the repair. Did you find and correct the condition?	System OK	Go to <b>Symptoms - HVAC Systems - Manual</b>

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

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

Step	Action	Yes	No
<p>DEFINITION: The low side pressure is lower than normal and the high side pressure is higher than normal.</p> <ul style="list-style-type: none"> <li>• A restriction in the A/C system</li> <li>• Debris in the A/C system</li> </ul>			
1	Were you sent here from the A/C System Performance Test?	Go to <b>Step 2</b>	Go to <b>Air Conditioning (A/C) System Performance Test</b>
2	<p><b>CAUTION:</b> Refer to <b><u>Moving Parts and Hot Surfaces Caution</u></b> .</p> <p>Feel the liquid line before the expansion device. Is the liquid line cold before the expansion device?</p>	Go to <b>Step 3</b>	Go to <b>Step 8</b>
3	<p>Feel along the surfaces of the following high side components:</p> <ul style="list-style-type: none"> <li>• The compressor discharge hose</li> <li>• The condenser</li> <li>• The liquid line between the condenser and the expansion device</li> </ul> <p>Did you detect an abrupt drop in temperature along the surfaces of any of the listed components?</p>	Go to <b>Step 7</b>	Go to <b>Step 4</b>
	1. Feel the liquid line at the expansion		

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<p align="center">4</p>	<p>device location for extreme cold, possibly accompanied by heavy frost.</p> <p>2. Feel along the liquid line beyond the expansion device location for warm temperature.</p> <p>Is the liquid line extremely cold at the expansion device location and warm beyond the expansion device location?</p>	<p align="center"><b>Go to Step 11</b></p>	<p align="center"><b>Go to Step 5</b></p>
<p align="center">5</p>	<p>Feel along the surfaces of the following low side components:</p> <ul style="list-style-type: none"> <li>• The evaporator inlet tube between the expansion device and the evaporator core</li> <li>• The evaporator outlet tube between the evaporator core and the compressor suction hose</li> <li>• The compressor suction hose</li> </ul> <p>Did you feel an abrupt temperature change along the surfaces of any of the listed components?</p>	<p align="center"><b>Go to Step 7</b></p>	<p align="center"><b>Go to Step 6</b></p>
<p align="center">6</p>	<p>Feel along the surfaces of the low and the high side components.</p> <ul style="list-style-type: none"> <li>• The evaporator inlet tube between the expansion device and the evaporator core</li> <li>• The evaporator outlet tube and the compressor</li> <li>• The compressor suction hose</li> <li>• The compressor discharge hose</li> <li>• The condenser</li> <li>• The evaporator inlet tube between the condenser and the expansion device</li> </ul>		



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	Are the temperatures of these components only mildly warm?	Go to <b>Step 14</b>	Go to <b>Step 8</b>
7	<ol style="list-style-type: none"> <li>1. Recover the refrigerant. Refer to <b><u>Refrigerant Recovery and Recharging</u></b>.</li> <li>2. Remove the restriction from the component or replace the component which produced an abrupt temperature drop.</li> </ol>		
	Is the action complete?	Go to <b>Step 9</b>	-
8	<ol style="list-style-type: none"> <li>1. Recover the refrigerant and evacuate the system. Refer to <b><u>Refrigerant Recovery and Recharging</u></b>.</li> <li>2. Record the weight of the recovered refrigerant.</li> <li>3. Compare the weight of the recovered refrigerant with the system capacity. Refer to <b><u>Refrigerant System Capacities</u></b>.</li> </ol>		
	Is the weight of the recovered refrigerant charge greater than 75% of the total system capacity?	Go to <b>Step 9</b>	Go to <b>Step 10</b>
9	<p>Recharge the A/C system. Refer to <b><u>Refrigerant Recovery and Recharging</u></b>.</p> <p>Is the cooling performance improved?</p>	Go to <b>Step 21</b>	Go to <b>Step 10</b>
10	<ol style="list-style-type: none"> <li>1. Leak test the system. Refer to <b><u>Leak Testing</u></b>.</li> <li>2. Repair any leaks.</li> </ol>		
	Is the action complete?	Go to <b>Step 21</b>	-
	<p>The expansion device is restricted.</p> <ol style="list-style-type: none"> <li>1. Replace the expansion device. Refer to <b><u>Thermal Expansion Valve Replacement (Left Hand Drive)</u></b> or</li> </ol>		

<p>11</p>	<p><b><u>Thermal Expansion Valve Replacement (Right Hand Drive).</u></b></p> <p>2. If the expansion device was restricted, note the type of debris present.</p>		
	<p>Are metal flakes present?</p>	<p>Go to <b>Step 12</b></p>	<p>Go to <b>Step 13</b></p>
<p>12</p>	<p>1. Remove the suction line from the vehicle. Refer to <b><u>Suction Hose Replacement (Left Hand Drive)</u></b> or <b><u>Suction Hose Replacement (Right Hand Drive).</u></b></p> <p>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.</p> <p>3. Observe the amount of debris collected in the shop towel.</p>		
	<p>Did a large amount of debris collect in the shop towel?</p>	<p>Go to <b>Step 18</b></p>	<p>Go to <b>Step 20</b></p>
<p>13</p>	<p>If the expansion device was restricted with a brown or black residue, perform the following procedure:</p> <p>1. Flush the A/C system. Refer to <b><u>Flushing.</u></b></p> <p>2. Replace the receiver dehydrator. Refer to <b><u>Receiver Dehydrator Replacement.</u></b></p>		
	<p>Are the actions complete?</p>	<p>Go to <b>Step 21</b></p>	<p>-</p>
	<p>1. Recover the refrigerant. Refer to <b><u>Refrigerant Recovery and Recharging.</u></b></p> <p>2. Disconnect the suction and the</p>		

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<p>14</p>	<p>discharge lines from the compressor. Refer to <b><u>Suction Hose Replacement (Left Hand Drive)</u></b> or <b><u>Suction Hose Replacement (Right Hand Drive)</u></b> and to <b><u>Discharge Hose Replacement</u></b>.</p> <p>3. Inspect for the presence of debris in the compressor suction port.</p> <p>Is debris present in the compressor suction port?</p>	<p>Go to <b>Step 15</b></p>	<p>Go to <b>Step 19</b></p>
<p>15</p>	<p>1. Remove the debris from the suction port.</p> <p>2. Inspect the expansion device for damage or debris. Refer to <b><u>Thermal Expansion Valve Replacement (Left Hand Drive)</u></b> or <b><u>Thermal Expansion Valve Replacement (Right Hand Drive)</u></b>.</p> <p>Did you find evidence of damage or debris?</p>	<p>Go to <b>Step 17</b></p>	<p>Go to <b>Step 16</b></p>
<p>16</p>	<p>If the expansion device does not show any signs of damage or debris, perform the following procedure:</p> <p>1. Remove the suction line from the vehicle. Refer to <b><u>Suction Hose Replacement (Left Hand Drive)</u></b> or <b><u>Suction Hose Replacement (Right Hand Drive)</u></b>.</p> <p>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.</p> <p>3. Observe the amount of debris collected in the shop towel.</p>		

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	Did a large amount of debris collect in the shop towel?	Go to <b>Step 18</b>	Go to <b>Step 19</b>
17	<ol style="list-style-type: none"> <li>1. Replace the expansion device. Refer to <b><u>Thermal Expansion Valve Replacement (Left Hand Drive)</u></b> or <b><u>Thermal Expansion Valve Replacement (Right Hand Drive)</u></b>.</li> <li>2. If the expansion device was restricted, observe the type of debris present.</li> </ol>		
	Are metal flakes present?	Go to <b>Step 12</b>	Go to <b>Step 13</b>
18	<p>If a large amount of debris was collected in the shop towel from the suction hose, replace the receiver dehydrator. Refer to <b><u>Receiver Dehydrator Replacement</u></b>.</p> <p>Is the action complete?</p>	Go to <b>Step 19</b>	-
19	<p>Install the suction and the discharge lines. Refer to <b><u>Suction Hose Replacement (Left Hand Drive)</u></b> or <b><u>Suction Hose Replacement (Right Hand Drive)</u></b> and <b><u>Discharge Hose Replacement</u></b>.</p> <p>Is the action complete?</p>	Go to <b>Step 21</b>	-
20	<ol style="list-style-type: none"> <li>1. Install the suction and the discharge lines. Refer to <b><u>Suction Hose Replacement (Left Hand Drive)</u></b> or <b><u>Suction Hose Replacement (Right Hand Drive)</u></b> and to <b><u>Discharge Hose Replacement</u></b>.</li> <li>2. Recharge the A/C system. Refer to <b><u>Refrigerant Recovery and Recharging</u></b>.</li> </ol>		
	Are the actions complete?	Go to <b>Step 21</b>	-
	<ol style="list-style-type: none"> <li>1. Record the low and the high side pressures and the instrument panel outlet air temperature after you</li> </ol>		

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

**HEATING PERFORMANCE DIAGNOSTIC**

**Heating Performance Diagnostic**

Step	Action	Yes	No
DEFINITION: Heating system performance.			
1	Were you sent here from Symptoms or another diagnostic table?	Go to <b>Step 2</b>	Go to <b><u>Too Cold in Vehicle</u></b>
2	<p>1. Start the engine.</p> <p>2. Allow the engine to idle.</p> <p>Does the engine reach a normal operating temperature?</p>	Go to <b>Step 3</b>	Go to <b>Step 9</b>
3	<p><b>CAUTION:</b> <b>Refer to <u>Moving Parts and Hot Surfaces Caution</u> .</b></p> <p>1. Allow the engine to idle.</p> <p>2. Select the FLOOR mode.</p> <p>3. Select the minimum blower speed.</p> <p>4. Select the warmest temperature setting.</p> <p>5. Feel the temperature of the inlet and outlet heater hoses at the heater core.</p>		

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	Does the inlet heater hose feel warmer than the outlet heater hose?	Go to <b>Step 7</b>	Go to <b>Step 4</b>
4	<ol style="list-style-type: none"> <li>1. Install a thermometer into the center I/P PANEL air outlet.</li> <li>2. Secure a thermometer to the heater core outlet hose.</li> <li>3. Select the PANEL mode.</li> <li>4. Select the maximum blower speed.</li> <li>5. Select the warmest temperature setting.</li> <li>6. Record the temperature at the following locations: <ul style="list-style-type: none"> <li>• The center I/P PANEL air outlet</li> <li>• The heater core outlet hose</li> </ul> </li> <li>7. Compare the recorded temperatures.</li> </ol> <p>Are the two temperature readings about equal?</p>	Go to <b>Step 5</b>	Go to <b>Step 6</b>
5	<ol style="list-style-type: none"> <li>1. Inspect and repair the following areas of the vehicle for cold air leaks: <ul style="list-style-type: none"> <li>• The cowl</li> <li>• The recirculation door</li> <li>• The HVAC module case</li> </ul> </li> <li>2. Perform the necessary repairs.</li> </ol> <p>Are the repairs complete?</p>	Go to <b>Step 10</b>	-
6	<ol style="list-style-type: none"> <li>1. Inspect the temperature door operation.</li> <li>2. Perform any necessary repairs.</li> </ol> <p>Are the repairs complete?</p>	Go to <b>Step 10</b>	-
	<ol style="list-style-type: none"> <li>1. Turn OFF the engine.</li> <li>2. Backflush the heater core.</li> <li>3. Start the engine.</li> <li>4. Select the FLOOR mode.</li> <li>5. Select the minimum blower speed.</li> </ol>		

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7	<p>6. Select the warmest temperature setting. 7. Feel the temperature of the inlet and outlet heater hoses at the heater core.</p> <p>Does the inlet heater hose feel warmer than the outlet heater hose?</p>	Go to <b>Step 8</b>	Go to <b>Step 10</b>
8	<p>Replace the heater core. Refer to <b><u>Heater Core Replacement (Left Hand Drive)</u></b> or <b><u>Heater Core Replacement (Right Hand Drive)</u></b>. Is the repair complete?</p>	Go to <b>Step 10</b>	-
9	<p>Repair the low engine temperature concern. Refer to <b><u>Engine Fails To Reach Normal Operating Temperature</u></b> . Is the repair complete?</p>	Go to <b>Step 10</b>	-
10	<p>Operate the system in order to verify the repair. Did you find and correct the condition?</p>	System OK	Go to <b>Step 2</b>

**DEFROSTING INSUFFICIENT**

**Defrosting Insufficient**

Step	Action	Yes	No
DEFINITION: Time required to defrost the windshield is longer than usual.			
1	<p>Were you sent here from Symptoms or another diagnostic table?</p>	Go to <b>Step 2</b>	Go to <b><u>Symptoms - HVAC Systems - Manual</u></b>
2	<p>1. Start the engine. 2. Select the DEFROST mode. 3. Select the maximum blower speed.</p> <p>Does sufficient air flow from the defroster outlets?</p>	Go to <b>Step 3</b>	Go to <b>Step 11</b>
3	<p>Measure the engine operating temperature. Does engine reach normal operating temperature?</p>	Go to <b>Step 4</b>	Go to <b>Step 9</b>

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4	<p>1. Select the minimum blower speed.</p> <p>2. Select the warmest temperature setting.</p> <p><b>CAUTION:</b> Refer to <b><u>Moving Parts and Hot Surfaces Caution</u></b> .</p> <p>3. Feel the temperature of the inlet and outlet hoses at the heater core.</p> <p>Does the inlet heater hose feel warmer than the outlet heater hose?</p>	Go to <b>Step 12</b>	Go to <b>Step 5</b>
5	Is the vehicle equipped with A/C?	Go to <b>Step 6</b>	Go to <b>Step 14</b>
6	<p>Test the operation of the A/C compressor clutch.</p> <p>Does the A/C compressor clutch engage?</p>	Go to <b>Step 8</b>	Go to <b>Step 7</b>
7	<p>Repair the A/C compressor clutch. Refer to <b><u>HVAC Compressor Clutch Does Not Engage</u></b> .</p> <p>Is the repair complete?</p>	Go to <b>Step 15</b>	-
8	<p>Perform the A/C system performance test. Refer to <b><u>Air Conditioning (A/C) System Performance Test</u></b>.</p> <p>Is the A/C system operating within the specifications?</p>	Go to <b>Step 10</b>	Go to <b>Step 13</b>
9	<p>Repair the low engine temperature concern. Refer to <b><u>Engine Fails To Reach Normal Operating Temperature</u></b> .</p> <p>Is the repair complete?</p>	Go to <b>Step 15</b>	-
10	<p>Inspect for correct operation of the recirculation door.</p> <p>Is the recirculation door operating correctly?</p>	Go to <b>Step 15</b>	Go to <b>Step 14</b>
11	<p>Repair the air delivery concern. Refer to <b><u>Air Delivery Improper</u></b> .</p> <p>Is the repair complete?</p>	Go to <b>Step 15</b>	-
	Repair the heating concern. Refer to		



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12	<b><u>Heating Performance Diagnostic.</u></b> Is the repair complete?	Go to <b>Step 15</b>	-
13	Repair the A/C performance concern. Refer to <b><u>Air Conditioning (A/C) System Performance Test.</u></b> Is the repair complete?	Go to <b>Step 15</b>	-
14	Repair the recirculation door concern. Refer to <b><u>Air Recirculation Malfunction .</u></b> Is the repair complete?	Go to <b>Step 15</b>	-
15	Operate the system in order to verify the repair. Did you find and correct the condition?	System OK	Go to <b>Step 2</b>

**NOISE DIAGNOSIS - BLOWER MOTOR**

**Noise Diagnosis - Blower Motor**

Step	Action	Yes	No
DEFINITION: Noise originating from the blower motor.			
1	Were you sent here from Symptoms or another diagnostic table?	Go to <b>Step 2</b>	Go to <b><u>Symptoms - HVAC Systems - Manual</u></b>
2	Inspect the air inlet grille for debris. Is debris present?	Go to <b>Step 8</b>	Go to <b>Step 3</b>
3	<ol style="list-style-type: none"> <li>1. Sit inside the vehicle.</li> <li>2. Close the vehicle doors and windows.</li> <li>3. Turn ON the ignition, with the engine OFF.</li> <li>4. Cycle the blower motor through all of the speeds and modes in order to determine where and when the noise occurs.</li> </ol> Is a noise evident during the blower operation?	Go to <b>Step 4</b>	Go to <b>Step 11</b>
	Inspect for excessive vibration at each blower motor speed by feeling the blower		

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4	<p>case. Is excess vibration present?</p>	Go to <b>Step 6</b>	Go to <b>Step 5</b>
5	<p>Listen to the blower motor at each speed. Is the blower motor making a squeaking or chirping noise?</p>	Go to <b>Step 9</b>	Go to <b>Step 11</b>
6	<ol style="list-style-type: none"> <li>1. Remove the blower motor. Refer to <b><u>Blower Motor Replacement (Left Hand Drive)</u></b> or <b><u>Blower Motor Replacement (Right Hand Drive)</u></b>.</li> <li>2. Inspect the blower motor impeller for deposits of foreign material.</li> <li>3. Inspect the blower motor for deposits of foreign material.</li> </ol> <p>Did you find any foreign material on the blower motor or blower motor impeller?</p>	Go to <b>Step 8</b>	Go to <b>Step 7</b>
7	<p>Inspect the blower motor for the following conditions:</p> <ul style="list-style-type: none"> <li>• Cracked blades</li> <li>• A loose impeller retainer</li> <li>• Improper impeller alignment</li> </ul> <p>Did you find any of these conditions?</p>	Go to <b>Step 9</b>	Go to <b>Step 10</b>
8	<p>Remove the foreign material. Is the action complete?</p>	Go to <b>Step 10</b>	-
9	<p>Replace the blower motor. Refer to <b><u>Blower Motor Replacement (Left Hand Drive)</u></b> or <b><u>Blower Motor Replacement (Right Hand Drive)</u></b>. Is the repair complete?</p>	Go to <b>Step 11</b>	-
10	<p>Install the blower motor. Refer to <b><u>Blower Motor Replacement (Left Hand Drive)</u></b> or <b><u>Blower Motor Replacement (Right Hand Drive)</u></b>. Is the action complete?</p>	Go to <b>Step 11</b>	-
	<p>Operate the system in order to verify the</p>		

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11	repair. Did you find and correct the condition?	System OK	Go to <b>Step 2</b>
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**NOISE DIAGNOSIS - AIR CONDITIONING (A/C) SYSTEM**

**Noise Diagnosis - Air Conditioning (A/C) System**

Step	Action	Yes	No
DEFINITION: Noise originating from the A/C compressor, drive belt or the A/C lines.			
1	Were you sent here from Symptoms or another diagnostic table?	Go to <b>Step 2</b>	Go to <b>Symptoms - HVAC Systems - Manual</b>
2	1. A/C system noises can be generally categorized into three areas: <ul style="list-style-type: none"> <li>• Screeching, Squealing, Chirping noises</li> <li>• Moaning noises</li> <li>• Vibration/Rattle noises</li> </ul> 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 <b>Step 3</b>	Go to <b>Step 9</b>
3	With the engine OFF, inspect the drive belt for excessive wear. Refer to <b><u>Drive Belt Falls Off and Excessive Wear Diagnosis</u></b> . Is the drive belt excessively worn?	Go to <b>Step 18</b>	Go to <b>Step 4</b>
4	Inspect the drive belt tension. Refer to <b><u>Drive Belt Tensioner Diagnosis</u></b> . Is the drive belt tension correct?	Go to <b>Step 5</b>	Go to <b>Step 19</b>
5	Inspect the drive belt for excessive oil coverage. Is the drive belt covered with oil?	Go to <b>Step 17</b>	Go to <b>Step 6</b>
6	1. Start the engine. 2. Ensure that the A/C is ON. 3. Inspect the compressor and the clutch.		

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	Is the A/C compressor locked up?	Go to <b>Step 24</b>	Go to <b>Step 7</b>
7	Is the A/C compressor clutch slipping?	Go to <b>Step 23</b>	Go to <b>Step 8</b>
8	<p><b>CAUTION:</b> Refer to <b><u>MOVING PARTS AND HOT SURFACES</u></b> <b>CAUTION</b> .</p> <p>Using a stethoscope, listen to the A/C compressor for any abnormal noises. Is the compressor causing an abnormal noise?</p>	Go to <b>Step 15</b>	Go to <b>Step 10</b>
9	Does a moaning noise exist when the A/C clutch is engaged?	Go to <b>Step 10</b>	Go to <b>Step 12</b>
10	<p>Listen to the A/C compressor components and mounting for noise concerns using a stethoscope.</p> <p>Are any of these components loose, damaged or excessively worn?</p>	Go to <b>Step 20</b>	Go to <b>Step 11</b>
11	<ol style="list-style-type: none"> <li>1. Idle the engine.</li> <li>2. Engage the A/C compressor clutch.</li> <li>3. Using a stethoscope, move around the entire refrigerant plumbing system. Listening for any abnormal noises caused by a component of the A/C system touching another component.</li> </ol> <p>Are any of the A/C components grounding out and causing a vibration noise?</p>	Go to <b>Step 22</b>	Go to <b>Step 13</b>
12	Does a vibration or rattle noise exist when the A/C clutch is engaged?	Go to <b>Step 13</b>	Go to <b>Step 14</b>
13	Does the noise stop when the A/C clutch is disengaged?	Go to <b>Step 15</b>	Go to <b>Step 25</b>
14	<ol style="list-style-type: none"> <li>1. Idle the engine in PARK with the A/C compressor clutch engaged.</li> <li>2. Using a stethoscope, move around the entire A/C system testing for any abnormal noises caused by a component.</li> </ol> <p>Do any of the A/C components cause an</p>		

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	abnormal noise?	Go to <b>Step 21</b>	Go to <b>Step 25</b>
15	Verify that the A/C system is properly charged. Refer to <b><u>Refrigerant System Capacities</u></b> . Is the A/C system properly charged?	Go to <b>Step 26</b>	Go to <b>Step 16</b>
16	Recharge the A/C system to specification. Refer to <b><u>Refrigerant Recovery and Recharging</u></b> . Is the abnormal compressor noise still present?	Go to <b>Step 24</b>	Go to <b>Step 26</b>
17	Repair the oil leak. Refer to the appropriate repair procedure for the 3.7L engine. Is the repair complete?	Go to <b>Step 26</b>	-
18	Replace the drive belt. Refer to <b><u>Drive Belt Replacement (Without A/C)</u></b> or <b><u>Drive Belt Replacement (With A/C)</u></b> . Is the replacement complete?	Go to <b>Step 26</b>	-
19	Replace the drive belt tensioner. Refer to <b><u>Drive Belt Tensioner Replacement</u></b> . Is the replacement complete?	Go to <b>Step 26</b>	-
20	Repair or replace the A/C compressor mounting component. Is the repair complete?	Go to <b>Step 26</b>	-
21	Repair or replace the component which is causing the moaning concern as needed. Is the repair complete?	Go to <b>Step 26</b>	-
22	Correctly route or insulate the A/C component. Is the repair complete?	Go to <b>Step 26</b>	-
23	Replace the A/C compressor clutch. Refer to <b><u>Compressor Clutch Plate/Hub Assembly Replacement</u></b> . Is the repair complete?	Go to <b>Step 26</b>	-
24	Replace the A/C compressor. Refer to <b><u>Compressor Replacement</u></b> . Is the repair complete?	Go to <b>Step 26</b>	-
	The concern may be caused by an engine related component. Refer to <b><u>Vibration</u></b>		

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25	<b><u>Analysis - Engine</u></b> Did you find and correct the condition?	Go to <b>Step 26</b>	-
26	Operate the system in order to verify the repair. Did you find and correct the condition?	System OK	Go to <b>Step 2</b>

**NOISE DIAGNOSIS - HVAC MODULE**

**Noise Diagnosis - HVAC Module**

Step	Action	Yes	No
<b>DEFINITION:</b> Noise originating from the HVAC module.			
1	Were you sent here from Symptoms or another diagnostic table?	Go to <b>Step 2</b>	Go to <b><u>Symptoms - HVAC Systems - Manual</u></b>
2	<ol style="list-style-type: none"> <li>1. Start the engine.</li> <li>2. Cycle through all of the following:                             <ul style="list-style-type: none"> <li>• Blower motor speeds</li> <li>• HVAC modes</li> <li>• Temperature control settings</li> </ul> </li> <li>3. Determine the type of noise:                             <ul style="list-style-type: none"> <li>• Scrape, pop</li> <li>• Tick/click, chirp or groaning</li> <li>• Air rush/whistle</li> </ul> </li> </ol> <p>Is a scrape or pop noise evident when selecting modes or temperature settings?</p>	Go to <b>Step 6</b>	Go to <b>Step 3</b>
3	Is a tick/click, chirping, groaning or scraping noise present, but decreases as blower motor speed is decreased?	Go to <b>Step 6</b>	Go to <b>Step 4</b>
4	Is an air rush/whistle noise evident in all modes but not all temperature settings?	Go to <b>Step 6</b>	Go to <b>Step 5</b>
5	Is an air rush/whistle noise evident only in defrost or floor mode?	Go to <b>Step 6</b>	Go to <b>Step 6</b>
	Remove the instrument panel (I/P) assembly. Refer to <b><u>Instrument Panel Assembly Replacement (Left Hand</u></b>		

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6	<u>Drive) or Instrument Panel Assembly Replacement (Right Hand Drive) .</u> Is the action complete?	Go to <b>Step 7</b>	-
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 <b>Step 10</b>	Go to <b>Step 8</b>
8	Inspect the mode and temperature doors and seals for warping or cracking. Are the doors in normal condition?	Go to <b>Step 11</b>	Go to <b>Step 9</b>
9	Replace the air distribution case. Refer to <u>HVAC Module Assembly Replacement (Left Hand Drive) or HVAC Module Assembly Replacement (Right Hand Drive).</u> Is the repair complete?	Go to <b>Step 11</b>	-
10	Remove any obstructions or foreign material found. Is the action complete?	Go to <b>Step 11</b>	-
11	Install the I/P assembly. Refer to <u>Instrument Panel Assembly Replacement (Left Hand Drive) or Instrument Panel Assembly Replacement (Right Hand Drive) .</u> Is the action complete?	Go to <b>Step 12</b>	-
12	Operate the system to verify the repair. Did you find and correct the condition?	System OK	Go to <b>Step 2</b>

**ODOR DIAGNOSIS**

**Odor Diagnosis**

Step	Action	Yes	No
DEFINITION: Odor originating or noticed through the HVAC system.			
1	Were you sent here from Symptoms or another diagnostic table?	Go to <b>Step 2</b>	Go to <u><b>Symptoms</b></u> - <u><b>HVAC Systems</b></u> - <u><b>Manual</b></u>

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2	<ol style="list-style-type: none"> <li>1. Sit inside the vehicle.</li> <li>2. Close all of the doors and windows.</li> <li>3. Start the engine.</li> <li>4. Allow the engine idle at normal operating temperature.</li> <li>5. Select the maximum blower speed.</li> <li>6. Select the PANEL air outlet mode.</li> <li>7. Select the coldest temperature setting.</li> <li>8. Cycle through all of the blower speeds, modes and temperatures to define what type of odor is present. <ul style="list-style-type: none"> <li>• Musty smell</li> <li>• Coolant smell</li> <li>• Oil smell</li> </ul> </li> </ol>		
	Does the odor have a musty smell?	Go to <b>Step 3</b>	Go to <b>Step 8</b>
3	<p>Inspect the HVAC filter and the air inlet grille for debris.</p> <p>Is debris present?</p>	Go to <b>Step 4</b>	Go to <b>Step 5</b>
4	<p>Remove any debris.</p> <p>Is the action complete?</p>	Go to <b>Step 15</b>	-
5	<p>Inspect for wet carpeting.</p> <p>Is the carpet wet?</p>	Go to <b>Step 6</b>	Go to <b>Step 14</b>
6	<p>Inspect for the following conditions:</p> <ul style="list-style-type: none"> <li>• Water leaks around the windshield</li> <li>• Blockage of the HVAC module drain</li> <li>• Leaks around the door seals</li> </ul>		
	Is a leak present?	Go to <b>Step 7</b>	Go to <b>Step 14</b>
7	<p>Repair the leak as necessary.</p> <p>Is the repair complete?</p>	Go to <b>Step 15</b>	-
8	Does the odor have a coolant smell?	Go to <b>Step 9</b>	Go to <b>Step 12</b>



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9	<p>Inspect the cooling system for leaks. Refer to <b><u>Cooling System Leak Testing</u></b>.</p> <p>Is a leak present?</p>	Go to <b>Step 10</b>	Go to <b>Step 12</b>
10	<p>Inspect for coolant leaking inside the vehicle or for a film build-up on the windshield.</p> <p>Is the condition present?</p>	Go to <b>Step 11</b>	Go to <b>Step 15</b>
11	<p>Replace the heater core. Refer to <b><u>Heater Core Replacement (Left Hand Drive)</u></b> or <b><u>Heater Core Replacement (Right Hand Drive)</u></b>.</p> <p>Is the repair complete?</p>	Go to <b>Step 15</b>	-
12	<p>Does the odor have an oily smell?</p>	Go to <b>Step 13</b>	Go to <b>Step 15</b>
13	<p>1. Inspect the engine compartment for any leaks. Refer to the following procedures:</p> <ul style="list-style-type: none"> <li>• <b><u>Oil Leak Diagnosis</u></b></li> <li>• <b><u>Fluid Leak Diagnosis</u></b></li> <li>• <b><u>Power Steering Fluid Leaks</u></b></li> </ul> <p>2. Repair any oil leaks.</p> <p>Is the repair complete?</p>	Go to <b>Step 15</b>	-
14	<p>A musty odor can be caused by mold or mildew build-up on the evaporator or the heater core or inside of the HVAC module. Refer to <b><u>Odor Correction</u></b>.</p> <p>Is the action complete?</p>	Go to <b>Step 15</b>	-
15	<p>Operate the system in order to verify the repair.</p> <p>Did you find and correct the condition?</p>	System OK	Go to <b>Step 2</b>

## 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.

**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 43600** Air Conditioning Service Center. See **Special Tools**.

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

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

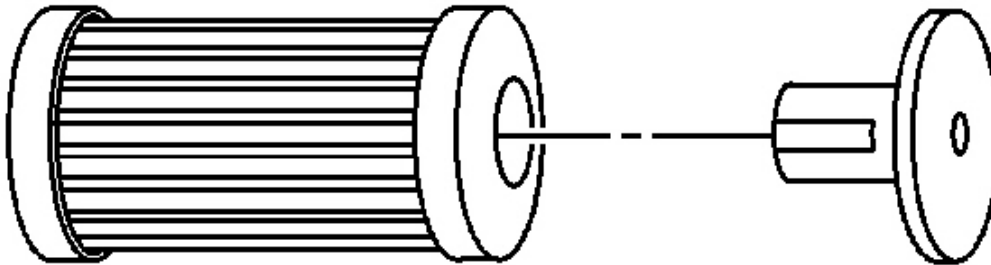
Flushing is intended to remove the following contaminants:

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

#### Flushing Procedure

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

1. Recover the refrigerant. Refer to Refrigerant Recovery and Recharging.
2. Remove the thermal expansion valve (TXV). Refer to Thermal Expansion Valve Replacement (Left Hand Drive) or Thermal Expansion Valve Replacement (Right Hand Drive).
3. Install **J 45268** - 103. See Special Tools.
4. Remove the A/C compressor. Refer to Compressor Replacement.
5. Install **J 45268** - 5 to the discharge hose. See Special Tools.
6. Install **J 45268** - 4 to the suction hose. See Special Tools.



**Fig. 2: View Of A/C Filter And Check Valve**  
**Courtesy of GENERAL MOTORS CORP.**

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

Perform the following procedure:

**IMPORTANT: The filter inside J 45268 - 1 is serviceable. 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 **J 45268 - 4** 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 **J 45268 - 5** flush adapter. See **Special Tools**.

8. Reverse flow refrigerant flush is recommended for desiccant bag failure. Replace the receiver dehydrator when the A/C flush is complete and 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 discharge port of **J 45268** - 5 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** - 4 flush adapter. See **Special Tools**.
9. Flush the A/C system. Follow the instructions supplied with **J 43600** . See **Special Tools**. Close the valve on the external refrigerant tank, before starting the flush process.
10. Remove **J 45268** - 4 from the suction hose. See **Special Tools**.
11. Remove **J 45268** - 5 from the discharge hose. See **Special Tools**.
12. Remove **J 45268** - 1 from **J 43600** . 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.**

13. Drain the PAG oil from the A/C compressor.

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

14. Add 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.**

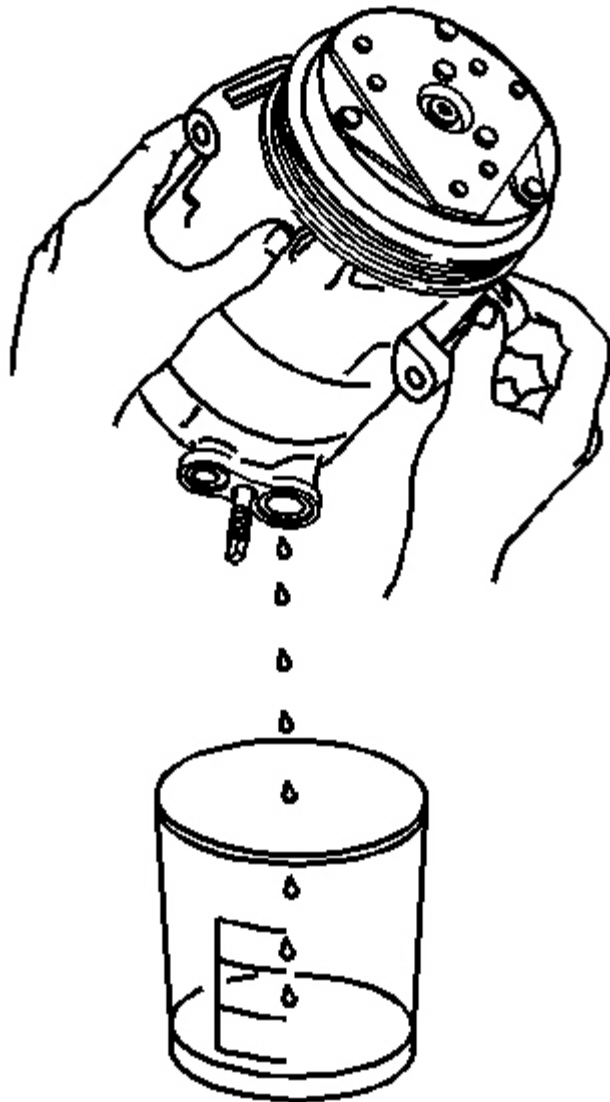
15. Add one bottle of **J 41447** directly to the A/C compressor. See **Special Tools**.
16. Install the A/C compressor. Refer to **Compressor Replacement**.
17. Remove **J 45268** - 103. See **Special Tools**.
18. Install new seal washers. Refer to **Sealing Washer Replacement**.
19. Inspect the TXV for debris. Clean or replace as needed.
20. Install the TXV. Refer to **Thermal Expansion Valve Replacement (Left Hand Drive)** or **Thermal Expansion Valve Replacement (Right Hand Drive)**.
21. Evacuate and recharge the A/C system. Refer to **Refrigerant Recovery and Recharging**.
22. Leak test the fittings using **J 42220** . See **Special Tools**.

**Draining Procedure**

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

1. Drain the oil from both the suction and discharge ports of the removed compressor into a clean, graduated container. Rotate the compressor shaft to assist in draining the compressor.





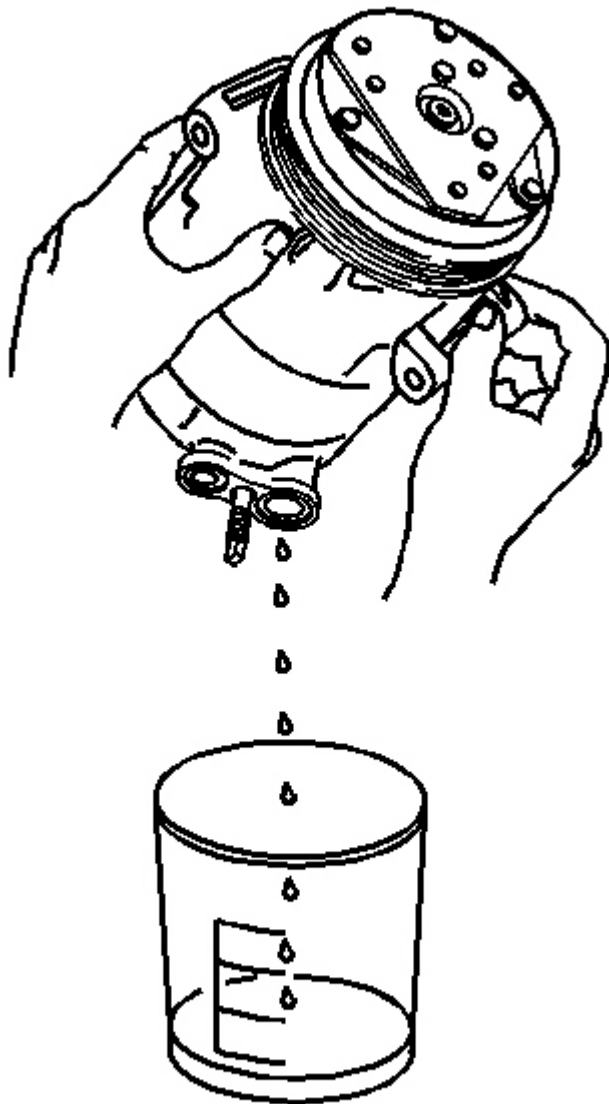
**Fig. 3: Draining A/C Refrigerant Oil From Compressor**  
**Courtesy of GENERAL MOTORS CORP.**

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

**Balancing Procedure**

1. The Denso replacement compressor is shipped with 74 ml (2.5 oz.) of refrigerant oil.

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



**Fig. 4: Draining A/C Refrigerant Oil From Compressor**  
**Courtesy of GENERAL MOTORS CORP.**

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

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

**COMPRESSOR REPLACEMENT**

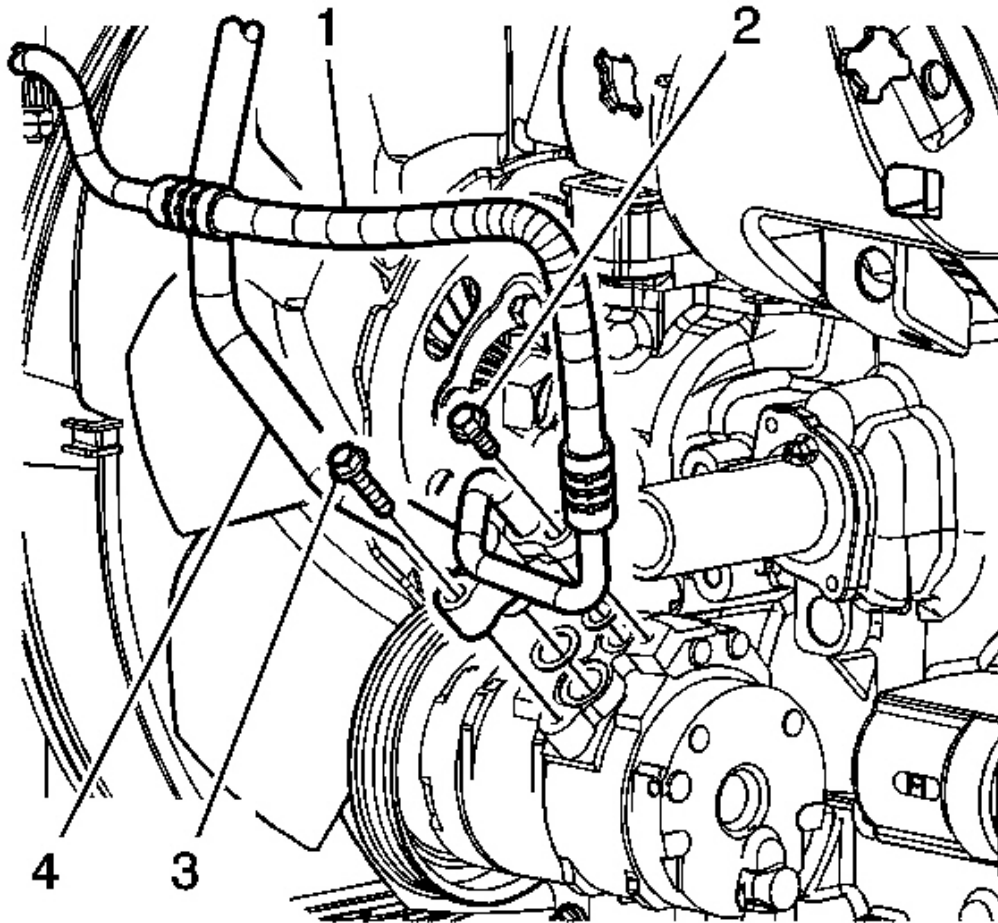
**Tools Required**

**J 39400-A** Halogen Leak Detector

**Removal Procedure**

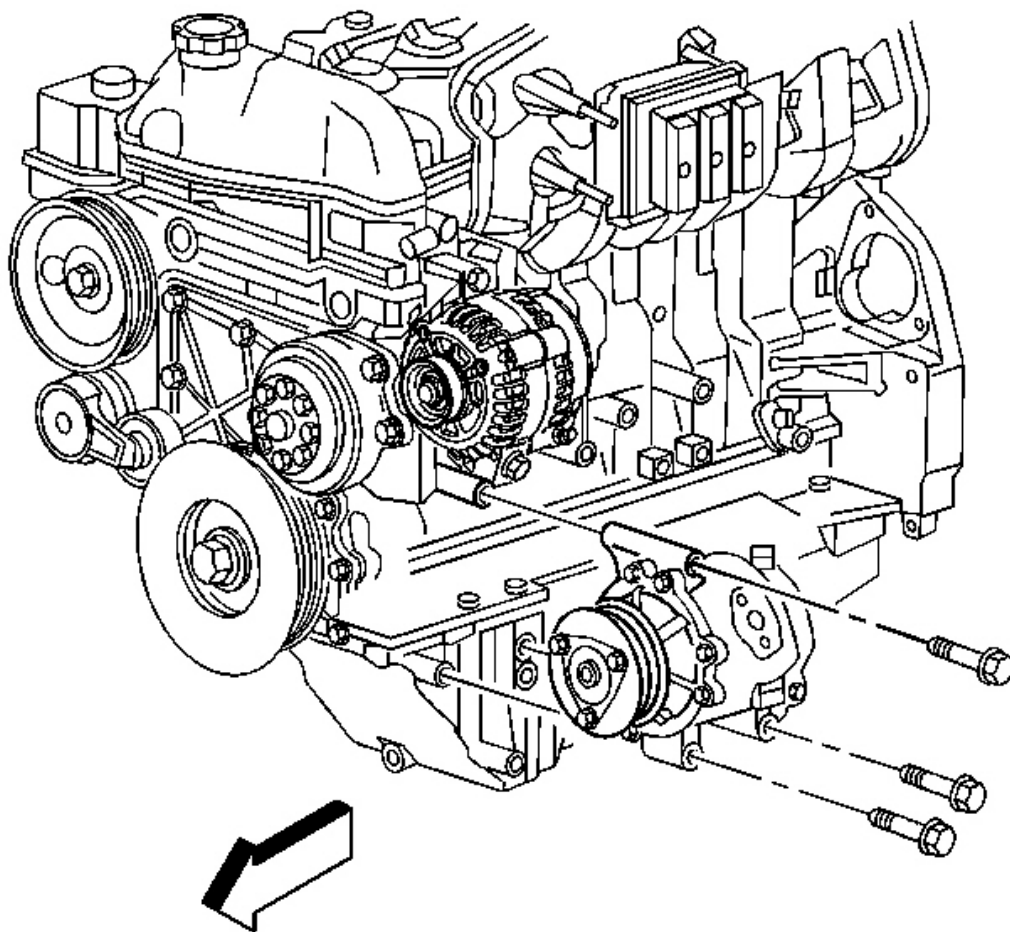
1. Recover the air conditioner (A/C) refrigerant. Refer to **Refrigerant Recovery and Recharging**.
2. Remove the drive belt. Refer to **Drive Belt Replacement (Without A/C)** or **Drive Belt Replacement (With A/C)** .
3. Remove the cooling fan and shroud. Refer to **Fan Replacement** .
4. Disconnect the A/C compressor electrical connector.
5. Remove the left front tire. Refer to **Tire and Wheel Removal and Installation** .
6. Remove the left front wheelhouse panel. Refer to **Wheelhouse Panel Replacement (Front)** or **Wheelhouse Panel Replacement (Rear)** .

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



**Fig. 5: Identifying Discharge Hose**  
**Courtesy of GENERAL MOTORS CORP.**

7. Remove the A/C discharge hose bolt 2 from the A/C compressor.
8. Remove the A/C suction hose bolt 3 from the compressor.
9. Remove the A/C compressor hoses (1,4) from the A/C compressor.
10. Remove and discard the sealing washers.

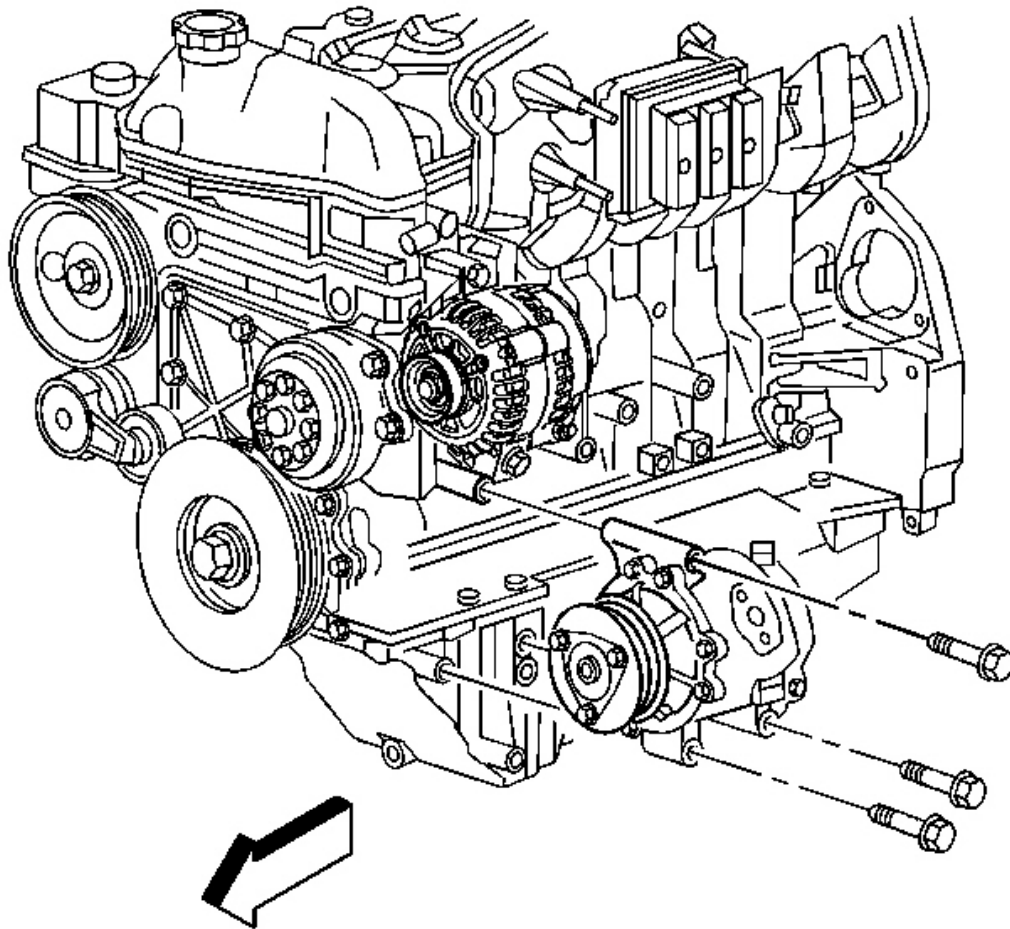


**Fig. 6: Removing/Installing A/C compressor**  
**Courtesy of GENERAL MOTORS CORP.**

11. Remove the A/C compressor mounting bolts from the A/C compressor.
12. Remove the A/C compressor from the vehicle.
13. Drain and measure the A/C compressor oil. Refer to **Compressor Oil Balancing**.

**Installation Procedure**

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



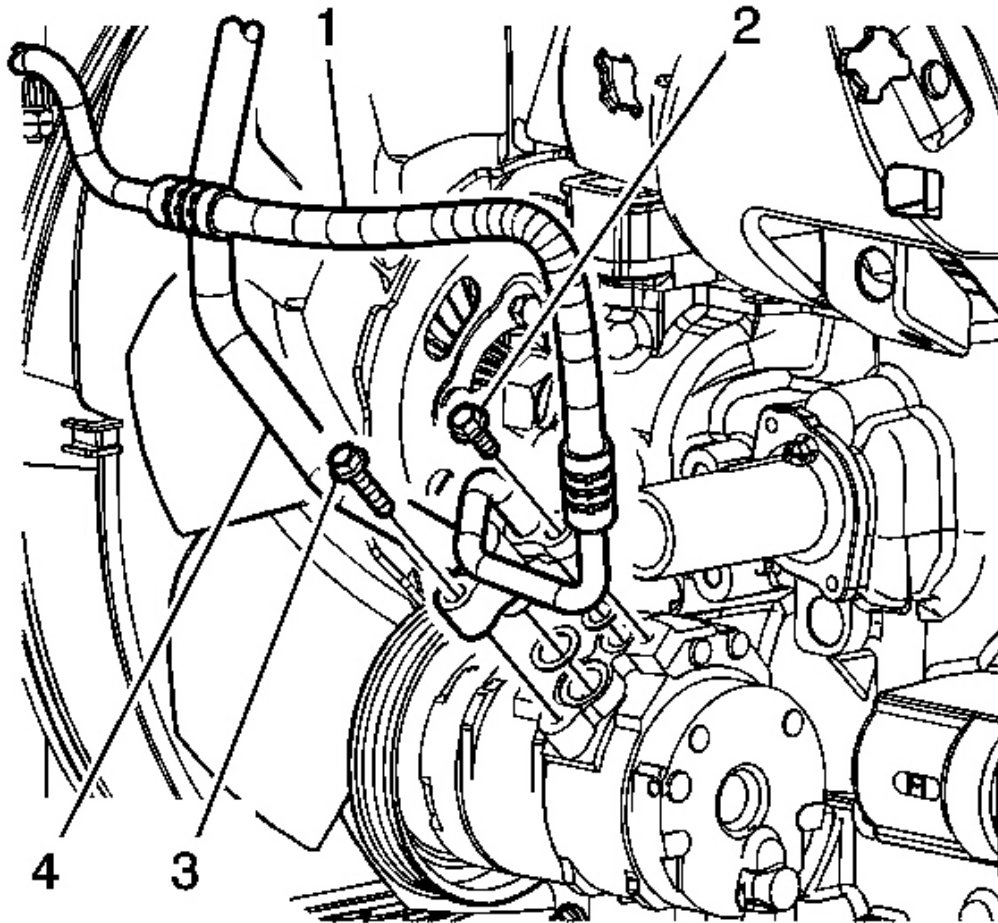
**Fig. 7: Removing/Installing A/C compressor**  
Courtesy of GENERAL MOTORS CORP.

2. Install A/C the compressor to the vehicle.

**NOTE:** Refer to Fastener Notice .

3. Install the A/C compressor mounting bolts.

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



**Fig. 8: Identifying Discharge Hose**  
Courtesy of GENERAL MOTORS CORP.

4. Install new sealing washers to the A/C hoses.
5. Install the A/C compressor hoses to the A/C compressor.
6. Install the A/C suction hose bolt (3).
7. Install the A/C discharge hose bolt.

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

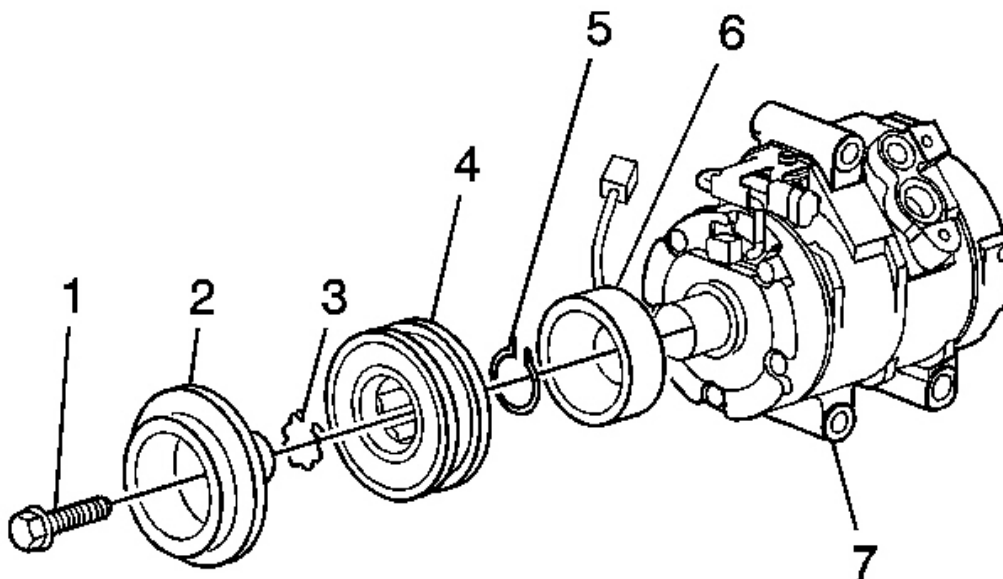
8. Connect the compressor electrical connectors.

9. Install the cooling fan and shroud. Refer to **Fan Replacement** .
10. Install the drive belt. Refer to **Drive Belt Replacement (Without A/C)** or **Drive Belt Replacement (With A/C)** .
11. Install the left front wheelhouse liner. Refer to **Wheelhouse Panel Replacement (Front)** or **Wheelhouse Panel Replacement (Rear)** .
  - Install the left front tire. Refer to **Tire and Wheel Removal and Installation** .
12. Evacuate and recharge the A/C system. Refer to **Refrigerant Recovery and Recharging**.
13. Using **J 39400-A** leak test the fittings.

### COMPRESSOR CLUTCH PLATE/HUB ASSEMBLY REPLACEMENT

#### Removal Procedure

1. Remove the skid plate. Refer to **Oil Pan Skid Plate Replacement** .
2. Remove the engine belt. Refer to **Drive Belt Replacement (Without A/C)** or **Drive Belt Replacement (With A/C)** .

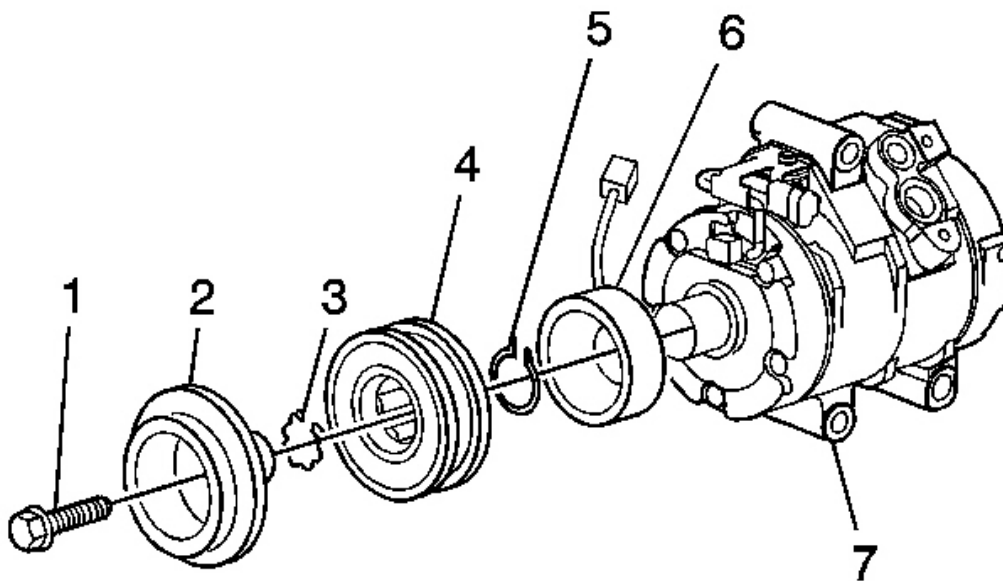


**Fig. 9: Exploded View Of Clutch Hub/Bearing Assembly**  
Courtesy of GENERAL MOTORS CORP.



3. Remove the clutch plate retaining bolt (1).
4. Remove the cooling fan. Refer to **Fan Replacement** .
5. Remove the clutch plate assembly (2).
6. Remove the clutch hub/bearing snap ring (3).
7. Remove the clutch hub/bearing assembly (4).

#### Installation Procedure



**Fig. 10: Exploded View Of Clutch Hub/Bearing Assembly**  
Courtesy of GENERAL MOTORS CORP.

1. Install the clutch hub/bearing assembly (4).
2. Install the clutch hub/bearing snap ring (3).
3. Install the clutch plate assembly (2).

**NOTE:** Refer to **Fastener Notice** .

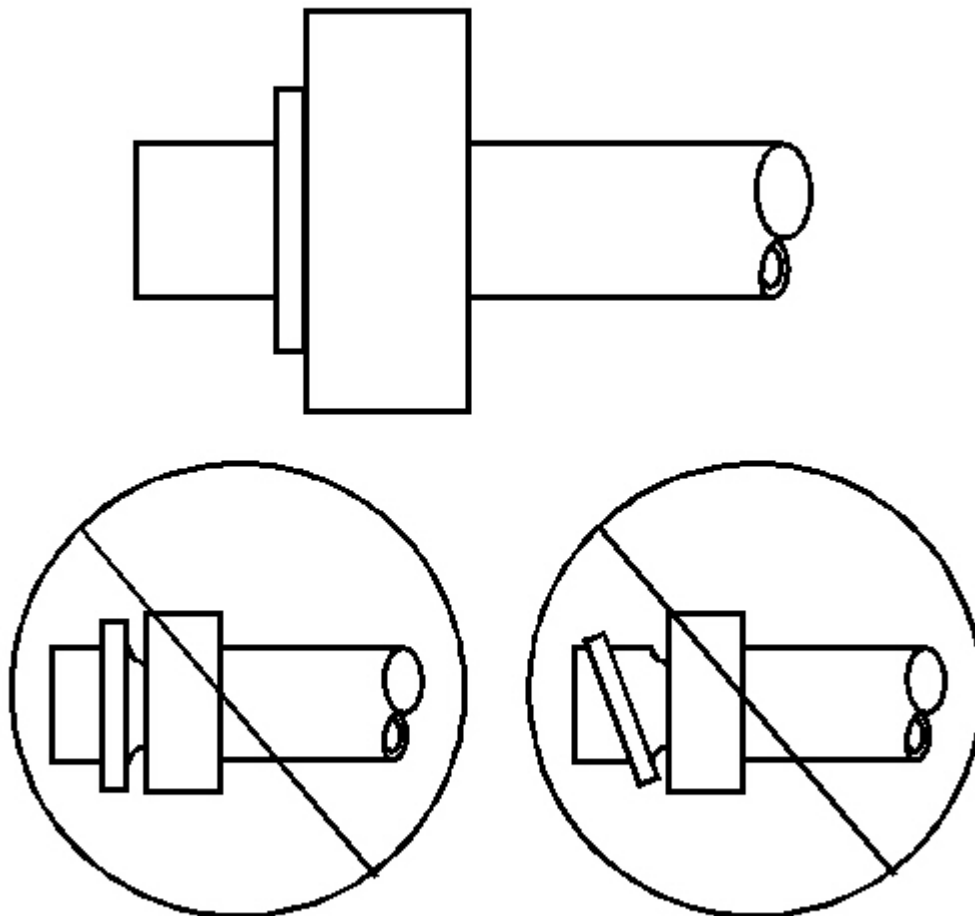
4. Install the clutch plate retaining bolt (1).

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

5. Install the cooling fan. Refer to **Fan Replacement** .
6. Install the engine belt. Refer to **Drive Belt Replacement (Without A/C)** or **Drive Belt Replacement (With A/C)** .
7. Install the skid plate. Refer to **Oil Pan Skid Plate Replacement** .

### SEALING WASHER REPLACEMENT

#### Removal Procedure



**Fig. 11: 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.

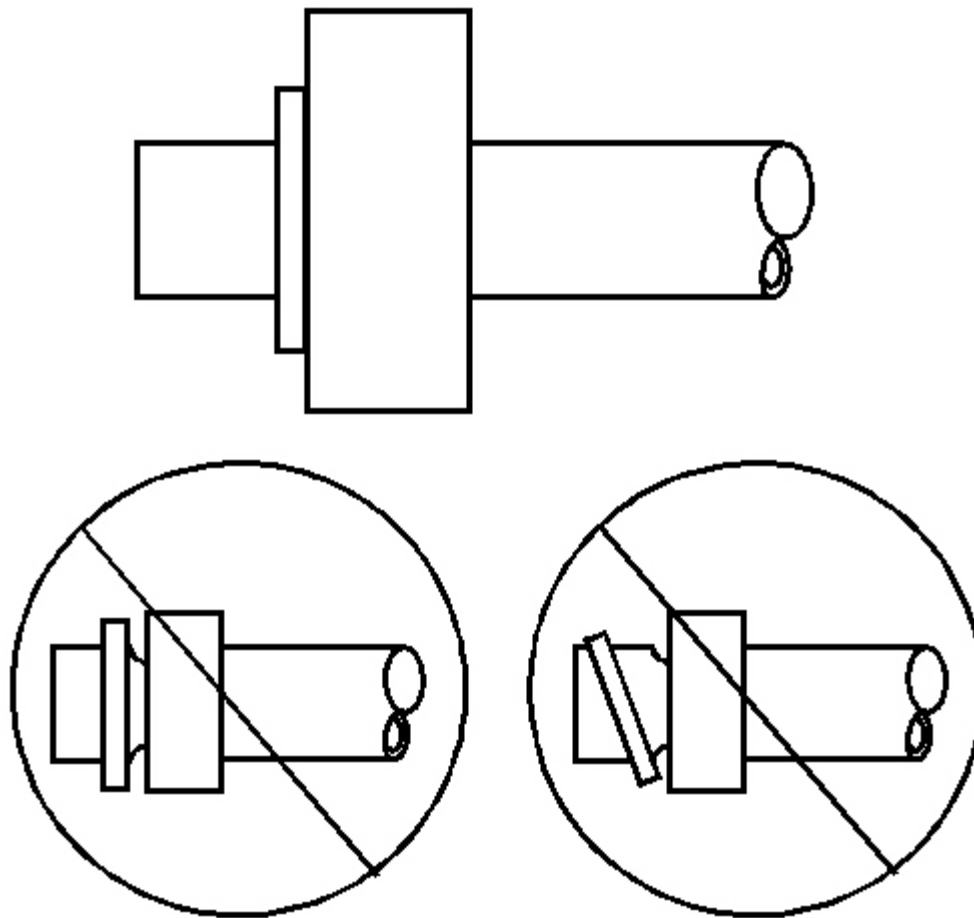
**Installation Procedure**

**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. 12: 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.

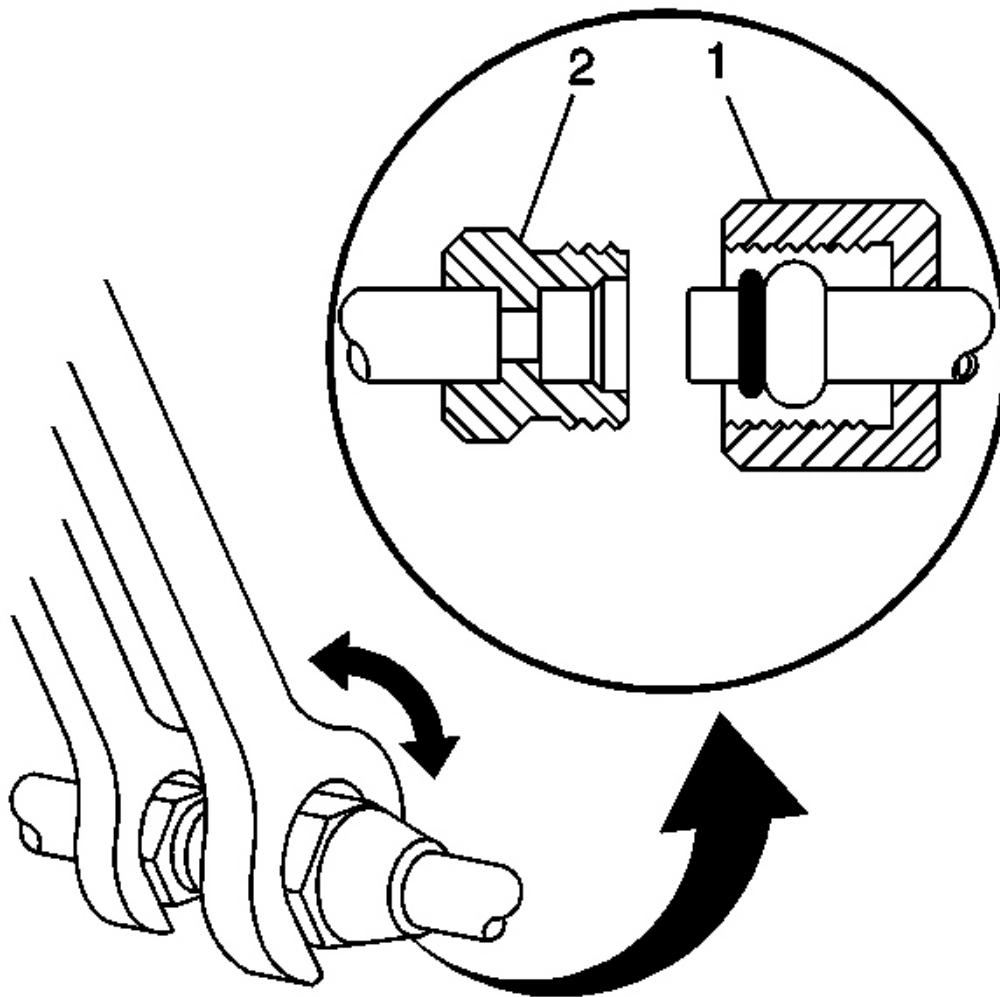
**IMPORTANT:** After tightening the A/C components, there should be a slight sealing washer gap of approximately 1.2 mm (3/64 in)

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. 13: 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**

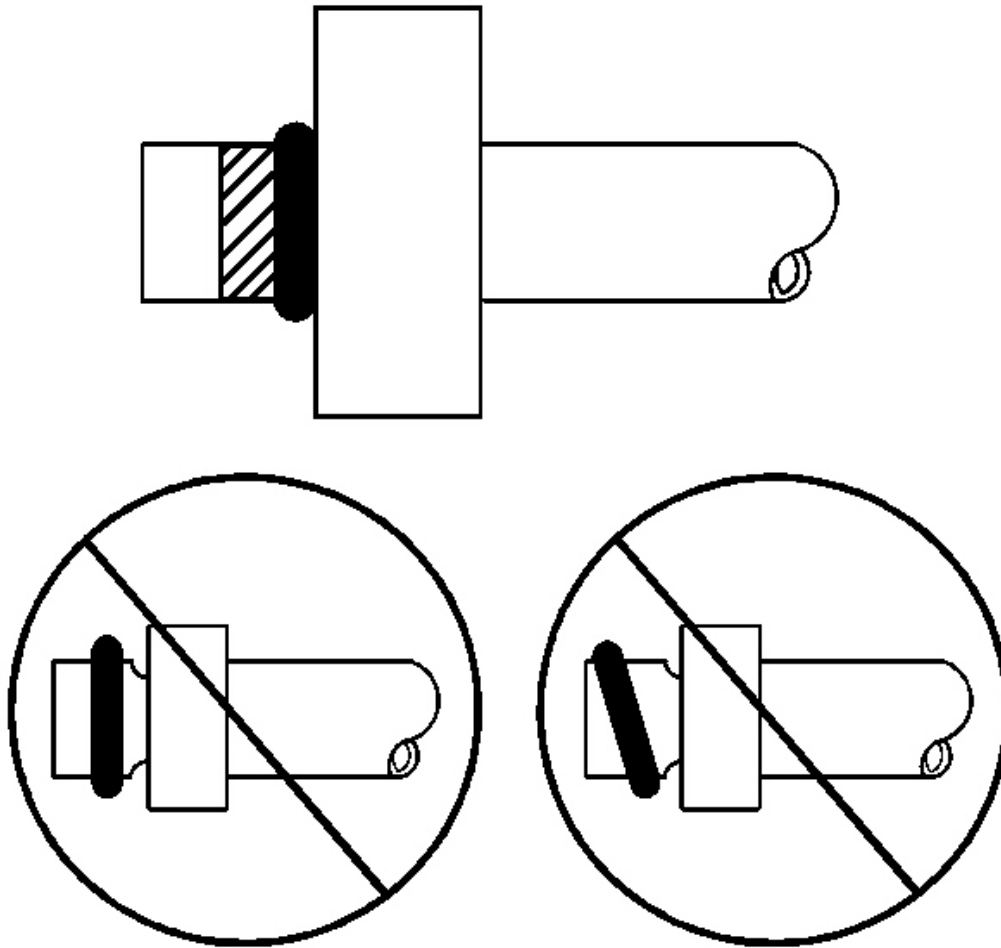
1. Inspect the new O-ring seal for any sign or cracks, cuts or damage. Replace if necessary.
2. Remove the cap or tape from the A/C refrigerant components.
3. Using a lint-free clean, dry cloth, carefully clean the sealing surfaces of the A/C refrigerant components.

**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.

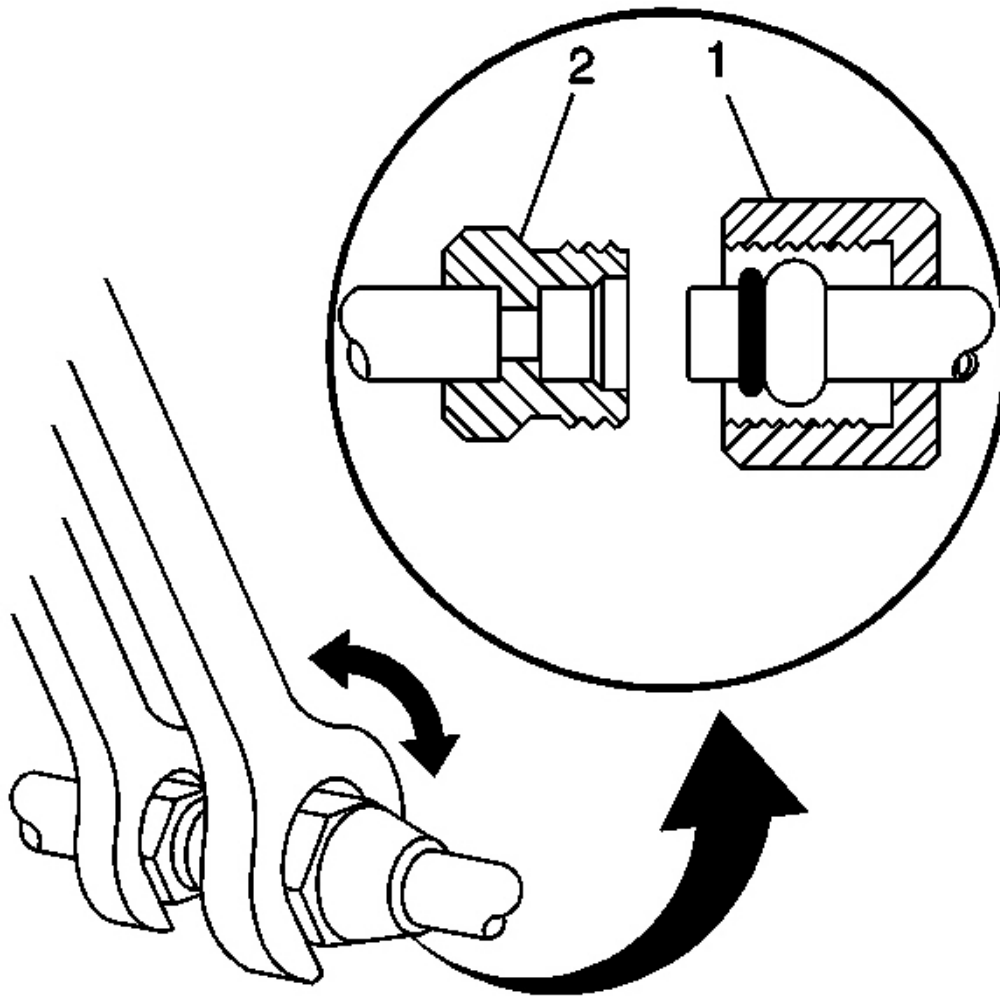
**IMPORTANT: DO NOT reuse O-ring seals.**

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



**Fig. 14: Identifying Proper Seating Of A/C Refrigerant O-Ring**  
Courtesy of GENERAL MOTORS CORP.

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



**Fig. 15: 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**

**Fig. 16: Discharge Hose Replacement**  
**Courtesy of GENERAL MOTORS CORP.**

**Discharge Hose Replacement**

Callout	Component Name
<p><b>NOTE:</b>  Refer to <u>Fastener Notice</u> .</p> <p><b>Fastener Tightening Specifications:</b> Refer to <u>Fastener Tightening Specifications</u>.</p> <p><b>Preliminary Procedure</b></p> <ol style="list-style-type: none"> <li>1. Evacuate the A/C system. Refer to <u>Refrigerant Recovery and Recharging</u>.</li> <li>2. Remove the grille assembly. Refer to <u>Grille Replacement</u> .</li> <li>3. Remove the left front wheelhouse panel. Refer to <u>Wheelhouse Panel Replacement (Front)</u> or <u>Wheelhouse Panel Replacement (Rear)</u> .</li> </ol>	
	A/C Compressor and Condenser - Hose Assembly Bolt

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1	<b>Tighten:</b> 16 N.m (12 lb ft)
2	Sealing Washer <b>Tip:</b> <ul style="list-style-type: none"><li>• Remove and discard the sealing washer.</li><li>• Cap the systems openings. Refer to <b><u>Sealing Washer Replacement.</u></b></li></ul>
3	A/C Compressor and Condenser - Hose Assembly Nut <b>Tighten:</b> 16 N.m (12 lb ft)
4	Sealing Washer <b>Tip:</b> <ul style="list-style-type: none"><li>• Remove and discard the sealing washer. Refer to <b><u>Sealing Washer Replacement.</u></b></li><li>• Cap the A/C systems openings. Refer to <b><u>Sealing Washer Replacement.</u></b></li></ul>
5	A/C Compressor and Condenser Hose Assembly

### SUCTION HOSE REPLACEMENT (LEFT HAND DRIVE)

**Fig. 17: Suction Hose Replacement (Left Hand Drive)**  
 Courtesy of GENERAL MOTORS CORP.

**Suction Hose Replacement (Left Hand Drive)**

Callout	Component Name
<p><b>Preliminary Procedure</b></p> <ol style="list-style-type: none"> <li>1. Recover the A/C system. Refer to <b><u>Refrigerant Recovery and Recharging</u></b>.</li> <li>2. Remove the air cleaner assembly. Refer to <b><u>Air Cleaner Assembly Replacement</u></b> .</li> <li>3. Remove the left front wheelhouse panel. Refer to <b><u>Wheelhouse Panel Replacement (Front)</u></b> or <b><u>Wheelhouse Panel Replacement (Rear)</u></b> .</li> </ol>	
<p>1</p>	<p>A/C Compressor Tube Assembly Nut</p> <p><b>NOTE:</b></p>

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	Refer to <b>Fastener Notice</b> . <b>Tighten:</b> 16 N.m (12 lb ft)
2	Sealing Washer <b>Tip:</b> Remove and discard the sealing washer. Refer to <b>Sealing Washer Replacement</b> .
3	A/C Compressor Tube Assembly Bolt <b>Tighten:</b> 16 N.m (12 lb ft)
4	A/C Compressor Tube Assembly Bolt <b>Tighten:</b> 16 N.m (12 lb ft)
5	A/C Compressor Tube Assembly Bolt <b>Tighten:</b> 16 N.m (12 lb ft)
6	Sealing Washer <b>Tip:</b> <ul style="list-style-type: none"><li>• Remove and discard the sealing washer. Refer to <b>Sealing Washer Replacement</b>.</li><li>• Cap the A/C systems openings.</li></ul>
7	A/C Compressor Tube Assembly

### SUCTION HOSE REPLACEMENT (RIGHT HAND DRIVE)

**Fig. 18: Suction Hose Replacement (Right Hand Drive)**  
 Courtesy of GENERAL MOTORS CORP.

**Suction Hose Replacement (Right Hand Drive)**

Callout	Component Name
<b>Preliminary Procedure</b>	
<ol style="list-style-type: none"> <li>1. Recover the A/C system. Refer to <b><u>Refrigerant Recovery and Recharging</u></b>.</li> <li>2. Remove the air cleaner assembly. Refer to <b><u>Air Cleaner Assembly Replacement</u></b> .</li> <li>3. Remove the left front wheelhouse panel. Refer to <b><u>Wheelhouse Panel Replacement (Front)</u></b> or <b><u>Wheelhouse Panel Replacement (Rear)</u></b> .</li> </ol>	
1	<p>A/C Compressor Tube Assembly Nut</p> <p><b>NOTE:</b>                      Refer to <b><u>Fastener Notice</u></b> .</p> <p><b>Procedure:</b>                      Remove and discard the sealing washer. Refer to <b><u>Sealing Washer Replacement</u></b>.</p>

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	<b>Tighten:</b> 16 N.m (12 lb ft)
2	A/C Compressor Tube Assembly Bolt <b>Procedure:</b> Remove and discard the sealing washer. Refer to <b><u>Sealing Washer Replacement</u></b> . <b>Tighten:</b> 16 N.m (12 lb ft)
3	A/C Compressor Tube Assembly

**EVAPORATOR TUBE REPLACEMENT (LEFT HAND DRIVE)**

**Fig. 19: Evaporator Tube Replacement (Left Hand Drive)**  
Courtesy of GENERAL MOTORS CORP.

**Evaporator Tube Replacement (Left Hand Drive)**

<b>Callout</b>	<b>Component Name</b>
<b>Preliminary Procedure</b>	
1. Recover the refrigerant. Refer to <b><u>Refrigerant Recovery and Recharging</u></b> .	
2. Remove the air cleaner assembly. Refer to <b><u>Air Cleaner Assembly Replacement</u></b> .	

3. Remove the grille. Refer to **Grille Replacement** .

1	Evaporator Tube and Condenser Nut  <b>NOTE:</b> Refer to <b><u>Fastener Notice</u></b> .  <b>Tighten:</b> 28 N.m (21 lb ft)
2	Sealing Washer - Refer to <b><u>Sealing Washer Replacement</u></b> .
3	Thermal Expansion Valve Nut  <b>Tighten:</b> 9 N.m (80 lb in)
4	Sealing Washer - Refer to <b><u>Sealing Washer Replacement</u></b> .
5	Tube Assembly - A/C Condenser and A/C Evaporator

**EVAPORATOR TUBE REPLACEMENT (RIGHT HAND DRIVE)**

**Evaporator Tube Replacement (Right Hand Drive)**

Callout	Component Name
<b>Preliminary Procedure</b>  1. Recover the refrigerant. Refer to <b><u>Refrigerant Recovery and Recharging</u></b> . 2. Remove the battery. Refer to <b><u>Battery Replacement</u></b> . 3. Remove the grille. Refer to <b><u>Grille Replacement</u></b> .	
1	Thermal Expansion Valve Nut  <b>NOTE:</b> Refer to <b><u>Fastener Notice</u></b> .  <b>Procedure:</b> Remove and discard the sealing washer. Refer to <b><u>Sealing Washer Replacement</u></b> .  <b>Tighten:</b> 9 N.m (80 lb in)
2	Evaporator Tube and Condenser Retainer
3	Evaporator Tube and Condenser Nut <b>Procedure:</b> Remove and discard the sealing washer. Refer to <b><u>Sealing Washer Replacement</u></b> .  <b>Tighten:</b> 28 N.m (21 lb ft)
4	Tube Assembly - A/C Condenser and A/C Evaporator

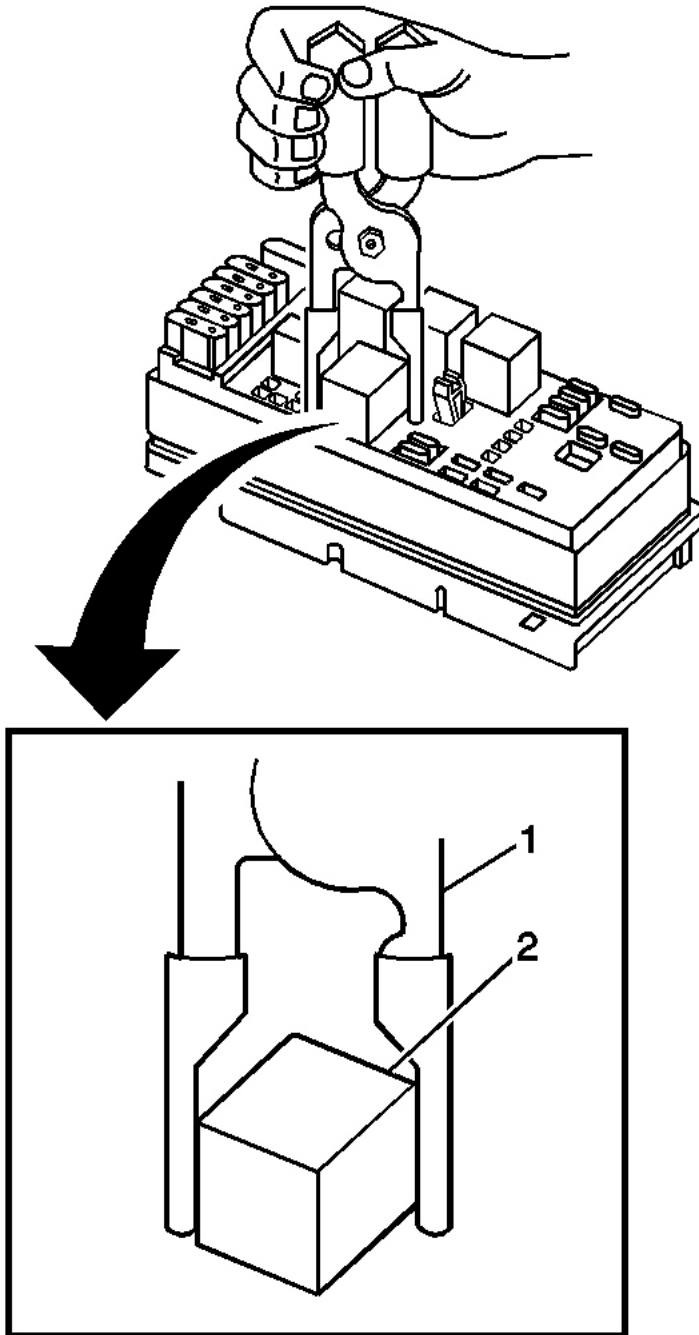
**COMPRESSOR RELAY REPLACEMENT****Tools Required****J 43244** Relay Puller Pliers**Removal Procedure**

1. Remove the electrical center cover.
2. Locate the compressor relay. Refer to **Electrical Center Identification Views** to locate the electrical center where the compressor relay exists.



**IMPORTANT:**

- **Always note the orientation of the relay.**
- **Make sure the electrical center is secure, as not to put added stress on the wires or terminals.**



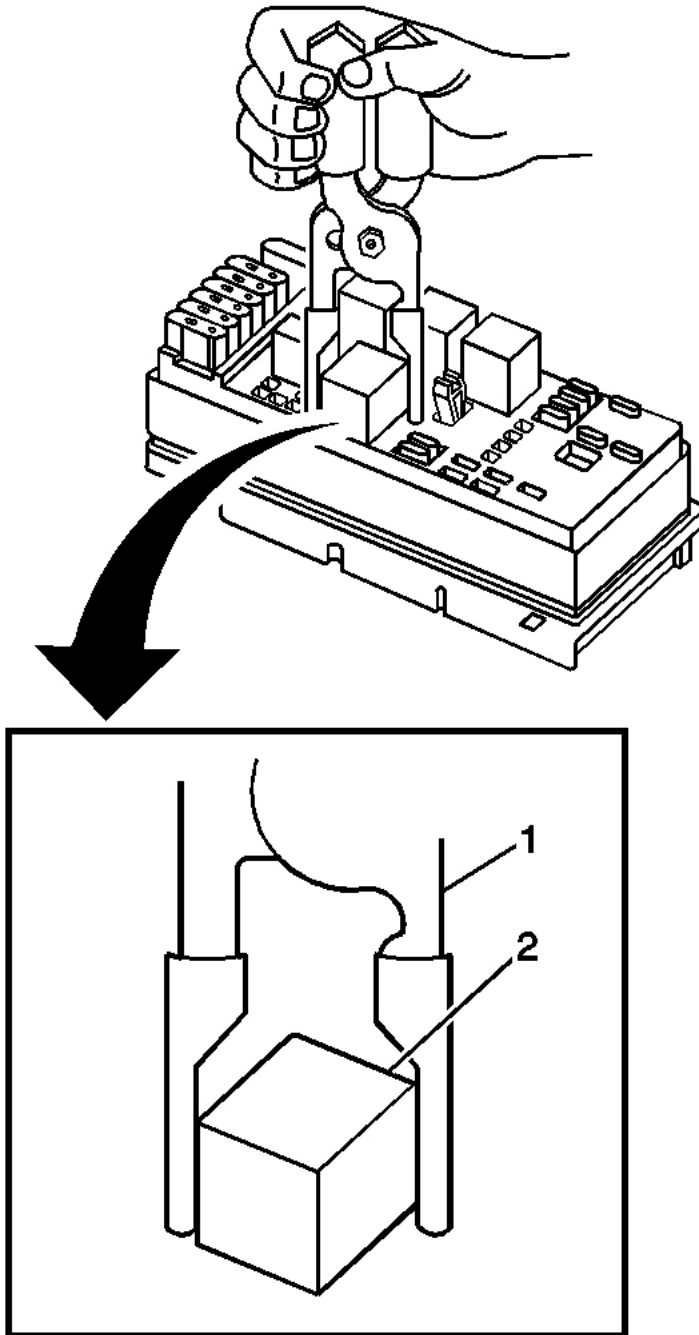
**Fig. 21: Removing/Installing Relay Using J 43244**  
Courtesy of GENERAL MOTORS CORP.

3. Using the **J 43244** (1) position the tool on opposing corners of the compressor relay (2).

**NOTE: Use J43244 to pull the relay straight out from the electrical center terminals. The use of pliers or a flat bladed tool could damage the electrical center.**

4. Remove the compressor relay (2) from the electrical center.

**Installation Procedure**



**Fig. 22: Removing/Installing Relay Using J 43244**  
Courtesy of GENERAL MOTORS CORP.

1. Install the compressor relay (2) in the same position as removed.

2. Install the electrical center cover.

## RECEIVER DEHYDRATOR REPLACEMENT

**Fig. 23: Receiver Dehydrator Replacement**  
**Courtesy of GENERAL MOTORS CORP.**

### Receiver Dehydrator Replacement

Callout	Component Name
<b>Preliminary Procedures</b>	
<ol style="list-style-type: none"> <li>1. Recover the refrigerant. Refer to <b><u>Refrigerant Recovery and Recharging</u></b>.</li> <li>2. Remove the radiator air baffle assembly. Refer to <b><u>Radiator Air Baffle Assemblies and Deflectors</u></b> .</li> </ol>	
1	Receiver Dehydrator Screw  <b>NOTE:</b> Refer to <b><u>Fastener Notice</u></b> .  <b>Tighten:</b> 1.6 N.m (14 lb in)
2	Receiver Dehydrator Bracket

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3	Receiver Dehydrator Screw <b>Tighten:</b> 1.6 N.m (14 lb in)
4	Receiver Dehydrator O-Ring Refer to <b><u>O-Ring Replacement</u></b> .
5	A/C Receiver and Dehydrator Assembly

**THERMAL EXPANSION VALVE REPLACEMENT (LEFT HAND DRIVE)**

**Fig. 24: Thermal Expansion Valve Replacement (Left Hand Drive)**  
 Courtesy of GENERAL MOTORS CORP.

**Thermal Expansion Valve Replacement (Left Hand Drive)**

Callout	Component Name
<b>Preliminary Procedure:</b> Recover the A/C system. Refer to <b><u>Refrigerant Recovery and Recharging</u></b> .	
1	Compressor Suction Hose to TXV Nut  <b>NOTE:</b> Refer to <b><u>Fastener Notice</u></b> .  <b>Tighten:</b> 16 N.m (12 lb ft)
2	Sealing Washer <b>Tip:</b> Remove and discard the sealing washer. Refer to <b><u>Sealing Washer Replacement</u></b> .
	Thermal Expansion Valve Bolt

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3	<b>Tighten:</b> 16 N.m (12 lb ft)
4	Sealing Washer <b>Tip:</b> Remove and discard the sealing washer. Refer to <b><u>Sealing Washer Replacement</u></b> .
5	Thermal Expansion Valve

**THERMAL EXPANSION VALVE REPLACEMENT (RIGHT HAND DRIVE)**

**Fig. 25: Thermal Expansion Valve Replacement (Right Hand Drive)**  
Courtesy of GENERAL MOTORS CORP.

**Thermal Expansion Valve Replacement (Right Hand Drive)**

Callout	Component Name
<b>Preliminary Procedure:</b> Recover the A/C system. Refer to <b><u>Refrigerant Recovery and Recharging</u></b> .	
	Compressor Suction Hose to TXV Nut  <b>NOTE:</b> Refer to <b><u>Fastener Notice</u></b> .

1	<p><b>Procedure:</b> Remove and discard the sealing washer. Refer to <u>Sealing Washer Replacement</u>.</p> <p><b>Tighten:</b> 16 N.m (12 lb ft)</p>
2	<p>Thermal Expansion Valve Bolt (Qty: 2)</p> <p><b>Tighten:</b> 16 N.m (12 lb ft)</p>
3	<p>Thermal Expansion Valve</p> <p><b>Procedure:</b> Remove and discard the sealing washer. Refer to <u>Sealing Washer Replacement</u>.</p>

**AIR CONDITIONING (A/C) REFRIGERANT PRESSURE SENSOR REPLACEMENT (LEFT HAND HAND DRIVE)**

**Fig. 26: Air Conditioning (A/C) Refrigerant Pressure Sensor Replacement (Left Hand Drive)**

Courtesy of GENERAL MOTORS CORP.

**Air Conditioning (A/C) Refrigerant Pressure Sensor Replacement (Left Hand Drive)**

Callout	Component Name
<p><b>NOTE:</b> Refer to <u>Fastener Notice</u> .</p>	



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**Preliminary Procedure:** Disconnect the electrical connector from the pressure sensor.

1	A/C Refrigerant Pressure Sensor <b>Tighten:</b> 5 N.m (44 lb in)
2	Seal O-ring <b>Tip:</b> Remove and discard the O-ring. Refer to <b><u>O-Ring Replacement</u></b> .

**AIR CONDITIONING (A/C) REFRIGERANT PRESSURE SENSOR REPLACEMENT (RIGHT HAND HAND DRIVE)**

**Fig. 27: Air Conditioning (A/C) Refrigerant Pressure Sensor Replacement (Right Hand Drive)**

Courtesy of GENERAL MOTORS CORP.

**Air Conditioning (A/C) Refrigerant Pressure Sensor Replacement (Right Hand Drive)**

Callout	Component Name
<b>Preliminary Procedure:</b> Disconnect the electrical connector from the pressure sensor.	
	A/C Refrigerant Pressure Sensor

1	<p><b>NOTE:</b> Refer to <u>Fastener Notice</u> .</p> <p><b>Procedure:</b> Remove and discard the O-ring. Refer to <u>O-Ring Replacement</u>.</p> <p><b>Tighten:</b> 5 N.m (44 lb in)</p>
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**EVAPORATOR TEMPERATURE SENSOR REPLACEMENT (LEFT HAND DRIVE)**

**Fig. 28: Evaporator Temperature Sensor Replacement (Left Hand Drive)**  
Courtesy of GENERAL MOTORS CORP.

**Evaporator Temperature Sensor Replacement (Left Hand Drive)**

Callout	Component Name
<b>Preliminary Procedures</b>	
1.	Remove the instrument panel assembly. Refer to <u>Instrument Panel Assembly Replacement (Left Hand Drive)</u> or <u>Instrument Panel Assembly Replacement (Right Hand Drive)</u> .

2. Remove the heater core cover. Refer to **Heater Core Replacement (Left Hand Drive)** or **Heater Core Replacement (Right Hand Drive)**.
3. Disconnect the evaporator temperature sensor electrical connector.

1

Evaporator Temperature Sensor

**Tip:** Insert the temperature sensor in the evaporator case and twist clockwise till the ball on the sensor rests in the notch in the evaporator case. This will insure proper air flow over sensor.

**EVAPORATOR TEMPERATURE SENSOR REPLACEMENT (RIGHT HAND DRIVE)**

**Fig. 29: Evaporator Temperature Sensor Replacement (Right Hand Drive)**  
 Courtesy of GENERAL MOTORS CORP.

**Evaporator Temperature Sensor Replacement (Right Hand Drive)**

Callout	Component Name
<b>Preliminary Procedures</b>	
<ol style="list-style-type: none"> <li>1. Remove the instrument panel assembly. Refer to <b><u>Instrument Panel Assembly Replacement (Left Hand Drive)</u></b> or <b><u>Instrument Panel Assembly Replacement (Right Hand Drive)</u></b> .</li> </ol>	

2. Remove the heater core cover. Refer to **Heater Core Replacement (Left Hand Drive)** or **Heater Core Replacement (Right Hand Drive)**.
3. Disconnect the evaporator temperature sensor electrical connector.

1	Evaporator Temperature Sensor <b>Procedure:</b> Insert the temperature sensor in the evaporator case and twist clockwise till the ball on the sensor rests in the notch in the evaporator case. This will insure proper air flow over sensor.
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**CONDENSER REPLACEMENT**

**Fig. 30: View Of Condenser assembly**  
 Courtesy of GENERAL MOTORS CORP.

**Condenser Replacement**

Callout	Component Name
<b>Preliminary Procedures</b>	
1.	Evacuate the air conditioning (A/C) system. Refer to <b><u>Refrigerant Recovery and Recharging</u></b> .

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2. Remove the evaporator tube from the condenser. Refer to **Evaporator Tube Replacement (Left Hand Drive)** or **Evaporator Tube Replacement (Right Hand Drive)**.
3. Remove the discharge hose from the condenser. Refer to **Discharge Hose Replacement**.
4. Remove the fan shroud. Refer to **Fan Shroud Replacement (LLR)**.

1	Radiator Support Bracket Bolt  <b>NOTE:</b> Refer to <b><u>Fastener Notice</u></b> .  <b>Tighten:</b> 25 N.m (18 lb ft)
2	Radiator Support Bracket
3	Condenser Assembly Stud  <b>Tighten:</b> 10 N.m (89 lb in)
4	Condenser Assembly Bolt <b>Tip:</b> Tilt the radiator assembly toward the rear of the vehicle to access the right condenser bolt.  <b>Tighten:</b> 28 N.m (21 lb ft)
5	Condenser Assembly - A/C <b>Tip:</b> Tilt the radiator toward the rear of the vehicle to remove the condenser.

### BLOWER CASE ASSEMBLY REPLACEMENT (LEFT HAND DRIVE)

**Fig. 31: Blower Case Assembly Replacement (Left Hand Drive)**  
Courtesy of GENERAL MOTORS CORP.

**Blower Case Assembly Replacement (Left Hand Drive)**

Callout	Component Name
<b>NOTE:</b> Refer to <u>Fastener Notice</u> .	
<b>Fastener Tightening Specifications:</b> Refer to <u>Fastener Tightening Specifications</u> .	

**Preliminary Procedure**

1. Remove the HVAC module assembly. Refer to **HVAC Module Assembly Replacement (Left Hand Drive)** or **HVAC Module Assembly Replacement (Right Hand Drive)**.
2. Remove the blower motor. Refer to **Blower Motor Replacement (Left Hand Drive)** or **Blower Motor Replacement (Right Hand Drive)**.

1	Screw, Air Outlet Duct - Rear Floor <b>Tighten:</b> 1.6 N.m (14 lb in)
2	Duct, Air Outlet - Rear Floor
3	Seal, A/C Evaporator Case
4	Screw, A/C Evaporator Case - Lower <b>Tighten:</b> 1.6 N.m (14 lb in)
5	Case, A/C Evaporator Lower
6	Baffle, Blower Motor Housing

**BLOWER CASE ASSEMBLY REPLACEMENT (RIGHT HAND DRIVE)**

**Fig. 32: Blower Case Assembly Replacement (Right Hand Drive)**  
**Courtesy of GENERAL MOTORS CORP.**

**Blower Case Assembly Replacement (Right Hand Drive)**

<b>Callout</b>	<b>Component Name</b>
<b>Preliminary Procedure</b>	



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1. Remove the HVAC module assembly. Refer to **HVAC Module Assembly Replacement (Left Hand Drive)** or **HVAC Module Assembly Replacement (Right Hand Drive)**.
2. Remove the blower motor. Refer to **Blower Motor Replacement (Left Hand Drive)** or **Blower Motor Replacement (Right Hand Drive)**.

1	Rear Floor Air Outlet Duct Screw  <b>NOTE:</b> Refer to <u><b>Fastener Notice</b></u> .  <b>Tighten:</b> 1.6 N.m (14 lb in)
2	Rear Floor Air Outlet Duct
3	A/C Evaporator Case Seal
4	Lower A/C Evaporator Case Screw (Qty: 11)  <b>Tighten:</b> 1.6 N.m (14 lb in)
5	Lower A/C Evaporator Case
6	Blower Motor Housing Baffle

### HVAC MODULE ASSEMBLY REPLACEMENT (LEFT HAND DRIVE)

**Fig. 33: HVAC Module Assembly Replacement (Left Hand Drive)**  
 Courtesy of GENERAL MOTORS CORP.

**HVAC Module Assembly Replacement (Left Hand Drive)**

Callout	Component Name
<b>Preliminary Procedures</b>	
<ol style="list-style-type: none"> <li>1. Drain the cooling system. Refer to <u>Cooling System Draining and Filling (Static Fill)</u> or <u>Cooling System Draining and Filling (Vac-N-Fill)</u> .</li> <li>2. Recover the refrigerant. Refer to <u>Refrigerant Recovery and Recharging</u>.</li> <li>3. Remove the evaporator tube from the thermal expansion valve. Refer to <u>Evaporator Tube Replacement (Left Hand Drive)</u> or <u>Evaporator Tube Replacement (Right Hand Drive)</u>.</li> <li>4. Remove the heater inlet hose from the heater core. Refer to <u>Heater Inlet Hose Replacement (LLR-Left Hand Drive)</u> or <u>Heater Inlet Hose Replacement (Right Hand Drive)</u>.</li> <li>5. Remove the heater outlet hose from the heater core. Refer to <u>Heater Outlet Hose Replacement (LLR-Left Hand Drive)</u> or <u>Heater Outlet Hose Replacement (Right Hand Drive)</u>.</li> <li>6. Remove center console. Refer to <u>Console Replacement (Left Hand Drive)</u> or <u>Console Replacement (Right Hand Drive)</u> .</li> <li>7. Remove center rear floor air duct. Refer to <u>Rear Floor Air Outlet Replacement (Left Hand Drive)</u> or <u>Rear Floor Air Outlet Replacement (Right Hand Drive - Left Side)</u>.</li> <li>8. Remove the instrument panel carrier. Refer to <u>Instrument Panel Carrier Replacement (Left Hand Drive)</u> or <u>Instrument Panel Carrier Replacement (Right Hand Drive)</u> .</li> <li>9. Disconnect the HVAC module assembly electrical connectors.</li> </ol>	
1	HVAC Module Assembly Nut  <b>NOTE:</b> Refer to <u>Fastener Notice</u> .  <b>Tip:</b> Tighten the nuts in sequence.  <b>Tighten:</b> 9 N.m (80 lb in)

**HVAC MODULE ASSEMBLY REPLACEMENT (RIGHT HAND DRIVE)**

**Fig. 34: HVAC Module Assembly Replacement (Right Hand Drive)**  
 Courtesy of GENERAL MOTORS CORP.

**HVAC Module Assembly Replacement (Right Hand Drive)**

Callout	Component Name
<b>Preliminary Procedures</b>	
1.	Drain the cooling system. Refer to <b><u>Cooling System Draining and Filling (Static Fill)</u></b> or <b><u>Cooling System Draining and Filling (Vac-N-Fill)</u></b> .
2.	Recover the refrigerant. Refer to <b><u>Refrigerant Recovery and Recharging</u></b> .
3.	Remove the evaporator tube from the thermal expansion valve. Refer to <b><u>Evaporator Tube Replacement (Left Hand Drive)</u></b> or <b><u>Evaporator Tube Replacement (Right Hand Drive)</u></b> .
4.	Remove the heater inlet hose from the heater core. Refer to <b><u>Heater Inlet Hose Replacement (LLR-Left Hand Drive)</u></b> or <b><u>Heater Inlet Hose Replacement (Right Hand Drive)</u></b> .
5.	Remove the heater outlet hose from the heater core. Refer to <b><u>Heater Outlet Hose</u></b>

**Replacement (LLR-Left Hand Drive) or Heater Outlet Hose Replacement (Right Hand Drive).**

6. Remove center console. Refer to **Console Replacement (Left Hand Drive) or Console Replacement (Right Hand Drive)** .
7. Remove center rear floor air duct. Refer to **Rear Floor Air Outlet Replacement (Left Hand Drive) or Rear Floor Air Outlet Replacement (Right Hand Drive - Left Side)**.
8. Remove the instrument panel carrier. Refer to **Instrument Panel Carrier Replacement (Left Hand Drive) or Instrument Panel Carrier Replacement (Right Hand Drive)** .
9. Disconnect the HVAC module assembly electrical connectors.

1	<p>HVAC Module Assembly Nut</p> <p><b>NOTE:</b> Refer to <b><u>Fastener Notice</u></b> .</p> <p><b>Tip:</b> Tighten the nuts in sequence.</p> <p><b>Tighten:</b> 9 N.m (80 lb in)</p>
2	HVAC Assembly Module

**EVAPORATOR CORE REPLACEMENT (LEFT HAND DRIVE)**

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**Fig. 35: Evaporator Core Replacement (Left Hand Drive)**  
 Courtesy of GENERAL MOTORS CORP.

**Evaporator Core Replacement (Left Hand Drive)**

Callout	Component Name
<b>Preliminary Procedure:</b> Remove the HVAC module assembly. Refer to <b><u>HVAC Module Assembly Replacement (Left Hand Drive)</u></b> or <b><u>HVAC Module Assembly Replacement (Right Hand Drive)</u></b> .	
1	Evaporator Case Seal
2	Thermal Expansion Valve Bolt  <b>NOTE:</b> Refer to <b><u>Fastener Notice</u></b> .  <b>Tighten:</b> 1.5 N.m (13 lb in)
3	Thermal Expansion Valve
4	Sealing Washer <b>Tip:</b> Remove and discard seals. Refer to <b><u>Sealing Washer Replacement</u></b> .
5	Rear Air Outlet Duct Screw
6	Rear Air Outlet Duct
7	Evaporator Case Assembly Screw  <b>Tighten:</b> 1.6 N.m (14 lb in)
8	Evaporator Lower Case
9	Air Conditioning Evaporator

**EVAPORATOR CORE REPLACEMENT (RIGHT HAND DRIVE)**

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**Fig. 36: Evaporator Core Replacement (Right Hand Drive)**  
 Courtesy of GENERAL MOTORS CORP.

**Evaporator Core Replacement (Right Hand Drive)**

Callout	Component Name
<b>Preliminary Procedure:</b> Remove the HVAC module assembly. Refer to <b><u>HVAC Module Assembly Replacement (Left Hand Drive)</u></b> or <b><u>HVAC Module Assembly Replacement (Right Hand Drive)</u></b> .	
1	Evaporator Case Seal
2	Thermal Expansion Valve Bolt (Qty: 2)  <b>NOTE:</b> Refer to <b><u>Fastener Notice</u></b> .  <b>Tighten:</b> 1.5 N.m (13 lb in)
3	Thermal Expansion Valve
4	Sealing Washer <b>Procedure:</b> Remove and discard seals. Refer to <b><u>Sealing Washer Replacement</u></b> .
5	Rear Air Outlet Duct Screw
6	Rear Air Outlet Duct
7	Evaporator Case Assembly Screw  <b>Tighten:</b> 1.6 N.m (14 lb in)
8	Evaporator Lower Case
9	Air Conditioning Evaporator

**HEATER INLET HOSE REPLACEMENT (LLR-LEFT HAND DRIVE)**



**Fig. 37: Heater Inlet Hose Replacement (LLR-Left Hand Drive)**  
**Courtesy of GENERAL MOTORS CORP.**

**Heater Inlet Hose Replacement (LLR-Left Hand Drive)**

Callout	Component Name
<b>Preliminary Procedures</b>	
<ol style="list-style-type: none"> <li>1. Drain the cooling system. Refer to <b><u>Cooling System Draining and Filling (Static Fill)</u></b> or <b><u>Cooling System Draining and Filling (Vac-N-Fill)</u></b> .</li> <li>2. Remove the generator. Refer to <b><u>Generator Replacement</u></b> .</li> <li>3. Using <b>J 38185</b> , reposition the hose clamp at the heater outlet fitting.</li> <li>4. Remove the heater inlet hose from the heater outlet fitting.</li> <li>5. Remove the heater inlet hose from the heater core.</li> </ol>	
	Transmission Housing Bolt

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1	<b>NOTE:</b> Refer to <u>Fastener Notice</u> .  <b>Tighten:</b> 50 N.m (37 lb ft)
2	Heater Inlet Hose <b>Tip:</b> Check for coolant leak around the heater inlet hose connections.

### HEATER INLET HOSE REPLACEMENT (RIGHT HAND DRIVE)

**Fig. 38: Heater Inlet Hose Replacement (Right Hand Drive)**  
Courtesy of GENERAL MOTORS CORP.

#### Heater Inlet Hose Replacement (Right Hand Drive)

Callout	Component Name
<b>Preliminary Procedure</b>	
1. Drain the cooling system. Refer to <u>Cooling System Draining and Filling (Static Fill)</u> or <u>Cooling System Draining and Filling (Vac-N-Fill)</u> .	
2. Remove the battery. Refer to <u>Battery Replacement</u> .	
3. Use <b>J 38185</b> to release the radiator hose clamp and <b>J 43181</b> to release the quick connect. See <u>Special Tools</u> .	
1	Heater inlet hose clamp
	Heater inlet hose bracket bolt

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2	<b>Tighten:</b> 9 N.m (7 lb ft)
3	Heater inlet hose quick connect fitting
4	Heater inlet hose assembly

**HEATER OUTLET HOSE REPLACEMENT (LLR-LEFT HAND DRIVE)**

**Fig. 39: Heater Outlet Hose Replacement (LLR-Left Hand Drive)**  
**Courtesy of GENERAL MOTORS CORP.**

**Heater Outlet Hose Replacement (LLR-Left Hand Drive)**

<b>Callout</b>	<b>Component Name</b>
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**Preliminary Procedure**

1. Drain the cooling system. Refer to **Cooling System Draining and Filling (Static Fill)** or **Cooling System Draining and Filling (Vac-N-Fill)** .
2. Remove the air cleaner assembly. Refer to **Air Cleaner Assembly Replacement** .

1

Heater Outlet Hose Assembly

**Tip:** Use **J 38185** to release the radiator hose clamp and **J 43181** to release the quick connect. See **Special Tools**.

**HEATER OUTLET HOSE REPLACEMENT (RIGHT HAND DRIVE)**

**Fig. 40: Heater Outlet Hose Replacement (Right Hand Drive)**  
 Courtesy of GENERAL MOTORS CORP.

**Heater Outlet Hose Replacement (Right Hand Drive)**

Callout	Component Name
<b>Preliminary Procedure</b>	
<ol style="list-style-type: none"> <li>1. Drain the cooling system. Refer to <b><u>Cooling System Draining and Filling (Static Fill)</u></b> or <b><u>Cooling System Draining and Filling (Vac-N-Fill)</u></b> .</li> <li>2. Remove the battery. Refer to <b><u>Battery Replacement</u></b> .</li> </ol>	

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3. Use **J 38185** to release the radiator hose clamp and **J 43181** to release the quick connect. See **Special Tools**.

1	Heater outlet hose clamp
2	Transmission housing bolts (Qty: 2) <b>Tighten:</b> 50 N.m (37 lb ft)
3	Heater outlet hose quick connect fitting
4	Heater outlet hose assembly

### HEATER INLET PIPE REPLACEMENT (LLR)

**Fig. 41: Heater Pipe Replacement - Inlet**  
Courtesy of GENERAL MOTORS CORP.

### Heater Inlet Pipe Replacement (LLR)

Callout	Component Name
<b>NOTE:</b> Refer to <u>Fastener Notice</u> .	
<b>Fastener Tightening Specifications:</b> Refer to <u>Fastener Tightening Specifications</u> .	
<b>Preliminary Procedure</b>	
1. Drain the cooling system. Refer to <u>Cooling System Draining and Filling (Static Fill)</u> or <u>Cooling System Draining and Filling (Vac-N-Fill)</u> .	
2. Remove the air cleaner assembly. Refer to <u>Air Cleaner Assembly Replacement</u> .	

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3. Remove the heater outlet hose from the heater inlet tube. Refer to **Heater Outlet Hose Replacement (LLR-Left Hand Drive)** or **Heater Outlet Hose Replacement (Right Hand Drive)**.

1	Bolt, Heater Inlet Tube <b>Tip:</b> Apply sealant GM P/N 12346004 (Canadian P/N 10953480) or equivalent to the threads of the heater inlet tube bolt. <b>Tighten:</b> 45 N.m (33 lb ft)
2	Tube, Heater Inlet
3	O-ring, Heater Inlet Tube <b>Tip:</b> Remove and discard O-ring.

### HEATER OUTLET PIPE REPLACEMENT (LLR)

**Fig. 42: Heater Pipe Replacement - Outlet**  
Courtesy of GENERAL MOTORS CORP.

### Heater Outlet Pipe Replacement (LLR)

Callout	Component Name
NOTE:	

Refer to Fastener Notice .

**Fastener Tightening Specifications:** Refer to Fastener Tightening Specifications.

**Preliminary Procedure**

1. Drain the cooling system. Refer to Cooling System Draining and Filling (Static Fill) or Cooling System Draining and Filling (Vac-N-Fill) .
2. Remove the generator. Refer to Generator Replacement .
3. Using **J 38185** , Hose Clamp Pliers, reposition the hose clamp.
4. Remove the heater inlet hose from the heater outlet fitting.

1	Heater Outlet Fitting <b>Tip:</b> Apply sealant GM P/N 12346004 (Canadian P/N 10953480) or equivalent to the heater outlet hose fitting threads.  <b>Tighten:</b> 45 N.m (33 lb ft)
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**AIR INLET ASSEMBLY REPLACEMENT (LEFT HAND DRIVE)**

**Fig. 43: Air Inlet Assembly Replacement (Left Hand Drive)**  
 Courtesy of GENERAL MOTORS CORP.

**Air Inlet Assembly Replacement (Left Hand Drive)**

Callout	Component Name
<b>Preliminary Procedures</b>  1. Remove the HVAC module assembly. Refer to <b><u>HVAC Module Assembly Replacement (Left Hand Drive)</u></b> or <b><u>HVAC Module Assembly Replacement (Right Hand Drive)</u></b> . 2. Disconnect the recirculation actuator electrical connector.	
1	Recirculation Housing Screw (Qty: 4)  <b>NOTE:</b> Refer to <b><u>Fastener Notice</u></b> .  <b>Tighten:</b> 1.5 N.m (14 lb in)
2	Recirculation Housing
3	Recirculation Actuator Screw (Qty: 3)  <b>Tighten:</b> 1.5 N.m (13 lb in)
4	Recirculation Actuator

**AIR INLET ASSEMBLY REPLACEMENT (RIGHT HAND DRIVE)**



**Fig. 44: Air Inlet Assembly Replacement (Right Hand Drive)**  
**Courtesy of GENERAL MOTORS CORP.**

**Air Inlet Assembly Replacement (Right Hand Drive)**

Callout	Component Name
<b>Preliminary Procedures</b>	
<ol style="list-style-type: none"> <li>1. Remove the HVAC module assembly. Refer to <b><u>HVAC Module Assembly Replacement (Left Hand Drive)</u></b> or <b><u>HVAC Module Assembly Replacement (Right Hand Drive)</u></b>.</li> <li>2. Disconnect the recirculation actuator electrical connector.</li> </ol>	
1	Recirculation Housing Screw (Qty: 4)  <b>NOTE:</b> Refer to <b><u>Fastener Notice</u></b> .  <b>Tighten:</b> 1.5 N.m (14 lb in)
2	Recirculation Housing
3	Recirculation Actuator Screw (Qty: 3)

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	<b>Tighten:</b> 1.5 N.m (13 lb in)
4	Recirculation Actuator

**BLOWER MOTOR RESISTOR ASSEMBLY REPLACEMENT (LEFT HAND DRIVE)**

**Fig. 45: Blower Motor Resistor Assembly Replacement (Left Hand Drive)**  
Courtesy of GENERAL MOTORS CORP.

**Blower Motor Resistor Assembly Replacement (Left Hand Drive)**

<b>Callout</b>	<b>Component Name</b>
<b>NOTE:</b> Refer to <u>Fastener Notice</u> .	
<b>Fastener Tightening Specifications:</b> Refer to <u>Fastener Tightening Specifications</u> . <b>Preliminary Procedure:</b> Disconnect the blower motor resistor electrical connector.	
1	Screw, Blower Motor Resistor <b>Tighten:</b> 1.5 N.m (13 lb in)
2	Resistor, Blower Motor

**BLOWER MOTOR RESISTOR ASSEMBLY REPLACEMENT (RIGHT HAND DRIVE)**

**Fig. 46: Blower Motor Resistor Assembly Replacement (Right Hand Drive)**  
 Courtesy of GENERAL MOTORS CORP.

**Blower Motor Resistor Assembly Replacement (Right Hand Drive)**

Callout	Component Name
<b>Preliminary Procedure:</b> Disconnect the blower motor resistor electrical connector.	
1	Blower Motor Resistor Screw (Qty: 2)  <b>NOTE:</b> Refer to <u>Fastener Notice</u> .  <b>Tighten:</b> 1.5 N.m (13 lb in)
2	Blower Motor Resistor

**BLOWER MOTOR REPLACEMENT (LEFT HAND DRIVE)**

**Fig. 47: Blower Motor Replacement (Left Hand Drive)**  
**Courtesy of GENERAL MOTORS CORP.**

**Blower Motor Replacement (Left Hand Drive)**

Callout	Component Name
<p><b>Preliminary Procedures</b></p> <ol style="list-style-type: none"> <li>1. Remove the cowl side trim panel. Refer to <b><u>Cowl Side Trim Panel Replacement</u></b> .</li> <li>2. Remove I/P compartment door. Refer to <b><u>Instrument Panel Compartment Door Replacement</u></b> .</li> <li>3. Remove I/P outer trim cover. Refer to <b><u>Instrument Panel Outer Trim Cover Replacement - Right Side (Left Hand Drive)</u></b> or <b><u>Instrument Panel Outer Trim Cover Replacement - Right Side (Right Hand Drive)</u></b> .</li> <li>4. Remove right side courtesy lamp.</li> <li>5. Remove relay.</li> <li>6. <b>Tip:</b>  Reposition right corner of I/P to gain clearance to blower motor for removal.</li> </ol>	
	Blower Motor Resistor Screw (Qty: 2)

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1	<b>NOTE:</b> Refer to <u>Fastener Notice</u> . <b>Tighten:</b> 1.5 N.m (13 lb in)
2	Blower Motor Resistor
3	Blower Motor Screw (Qty: 3) <b>Tighten:</b> 1.5 N.m (13 lb in)
4	Blower Motor Assembly

**BLOWER MOTOR REPLACEMENT (RIGHT HAND DRIVE)**

**Fig. 48: Blower Motor Replacement (Right Hand Drive)**  
Courtesy of GENERAL MOTORS CORP.

**Blower Motor Replacement (Right Hand Drive)**

Callout	Component Name
<b>Preliminary Procedures</b>	
1. Remove the cowl side trim panel. Refer to <b>Cowl Side Trim Panel Replacement</b> .	

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2. Remove I/P compartment door. Refer to **Instrument Panel Compartment Door Replacement** .
3. Remove I/P outer trim cover. Refer to **Instrument Panel Outer Trim Cover Replacement - Right Side (Left Hand Drive)** or **Instrument Panel Outer Trim Cover Replacement - Right Side (Right Hand Drive)** .
4. Remove left side courtesy lamp.
5. Remove relay.
6. **Tip:**

Reposition right corner of I/P to gain clearance to blower motor for removal.

1	Blower Motor Resistor Screw (Qty: 2)  <b>NOTE:</b> Refer to <b><u>Fastener Notice</u></b> .  <b>Tighten:</b> 1.5 N.m (13 lb in)
2	Blower Motor Resistor
3	Blower Motor Screw (Qty: 3)  <b>Tighten:</b> 1.5 N.m (13 lb in)
4	Blower Motor Assembly

### AIR DISTRIBUTOR DUCT REPLACEMENT (LEFT HAND DRIVE)

**Fig. 49: Air Distributor Duct Replacement (Left Hand Drive)**  
 Courtesy of GENERAL MOTORS CORP.

**Air Distributor Duct Replacement (Left Hand Drive)**

Callout	Component Name
<p><b>NOTE:</b>                      Refer to <u>Fastener Notice</u> .</p> <p><b>Fastener Tightening Specifications:</b> Refer to <u>Fastener Tightening Specifications</u>.  <b>Preliminary Procedure:</b> Remove the instrument panel assembly. Refer to <u>Instrument Panel Assembly Replacement (Left Hand Drive)</u> or <u>Instrument Panel Assembly Replacement (Right Hand Drive)</u> .</p>	
1	Bolt, Duct Assembly - Air Distributor Center  <b>Tighten:</b> 1.6 N.m (14 lb in)

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2	Bolt, Duct Assembly - Air Distributor Center <b>Tighten:</b> 1.6 N.m (14 lb in)
3	Bolt, Air Defogger Duct, Side Window <b>Tighten:</b> 1.6 N.m (14 lb in)
4	Duct, Air Defogger Side Window - Left
5	Duct, Air Defogger Side Window - Right
6	Duct Assembly - Air Distributor Center

### **AIR DISTRIBUTOR DUCT REPLACEMENT (RIGHT HAND DRIVE)**

**Fig. 50: Air Distributor Duct Replacement (Right Hand Drive)**  
Courtesy of GENERAL MOTORS CORP.

### **Air Distributor Duct Replacement (Right Hand Drive)**

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Callout	Component Name
<b>Preliminary Procedure:</b> Remove the instrument panel assembly. Refer to <u>Instrument Panel Assembly Replacement (Left Hand Drive)</u> or <u>Instrument Panel Assembly Replacement (Right Hand Drive)</u> .	
1	Air Distributor Center Duct Assembly Bolt  <b>NOTE:</b> Refer to <u>Fastener Notice</u> .  <b>Tighten:</b> 1.6 N.m (14 lb in)
2	Air Distributor Center Duct Assembly Bolt  <b>Tighten:</b> 1.6 N.m (14 lb in)
3	Side Window Air Defogger Duct Bolt  <b>Tighten:</b> 1.6 N.m (14 lb in)
4	Right Air Defogger Side Window Duct
5	Left Air Defogger Side Window Duct
6	Air Distributor Center Duct Assembly

### INSTRUMENT PANEL OUTER AIR OUTLET REPLACEMENT - LEFT SIDE

**Fig. 51: Air Outlet Replacement - Instrument Panel - Left Side**  
**Courtesy of GENERAL MOTORS CORP.**

**Instrument Panel Outer Air Outlet Replacement - Left Side**

Callout	Component Name
<b>Fastener Tightening Specifications:</b> Refer to <u>Fastener Tightening Specifications</u> .	
1	Grille Assembly, Instrument Panel Outer Air Outlet - Left <b>Tip:</b> Using a plastic trim tool around the outer perimeter release the grille assembly from the I/P trim pad.

**INSTRUMENT PANEL CENTER AIR OUTLET REPLACEMENT**

**Fig. 52: Air Outlet Replacement - Instrument Panel - Center**  
 Courtesy of GENERAL MOTORS CORP.

### **Instrument Panel Center Air Outlet Replacement**

Callout	Component Name
	<p><b>Fastener Tightening Specifications:</b> Refer to <b><u>Fastener Tightening Specifications</u></b>.  <b>Preliminary Procedure:</b>            Remove the center instrument panel trim plate. Refer to <b><u>Instrument Panel Center Trim Panel Replacement (Left Hand Drive)</u></b> or <b><u>Instrument Panel Center Trim Panel Replacement (Right Hand Drive)</u></b> .</p>
	Air Center Grille Outlet

1 **Tip:** Depress the tab and pull the air outlet grille from the center instrument panel trim plate.

**INSTRUMENT PANEL OUTER AIR OUTLET REPLACEMENT - RIGHT SIDE**

**Fig. 53: Air Outlet Replacement - Instrument Panel - Right Side**  
 Courtesy of GENERAL MOTORS CORP.

**Instrument Panel Outer Air Outlet Replacement - Right Side**

Callout	Component Name
<b>Fastener Tightening Specifications:</b> Refer to <b><u>Fastener Tightening Specifications.</u></b>	
1	Grille Assembly, Instrument Panel Outer Air Outlet - Right <b>Tip:</b> Using a plastic trim tool around the outer perimeter release the grille assembly from the I/P trim pad.

**REAR FLOOR AIR OUTLET REPLACEMENT (LEFT HAND DRIVE)**

**Fig. 54: Air Outlet Replacement - Rear Floor (Left Hand Drive)**  
 Courtesy of GENERAL MOTORS CORP.

**Rear Floor Air Outlet Replacement (Left Hand Drive)**

Callout	Component Name
<p><b>Fastener Tightening Specifications:</b> Refer to <u>Fastener Tightening Specifications</u>.</p>	
<p><b>Preliminary Procedure</b></p>	
<p>1. Remove front driver seat. Refer to <u>Front Seat Replacement - Bucket</u> .</p>	
<p>2. Remove the driver door sill plate. Refer to <u>Front Side Door Sill Plate Replacement</u> .</p>	
<p>3. Remove front passenger seat. Refer to <u>Front Seat Replacement - Bucket</u> .</p>	
<p>4. Remove the passenger door sill plate. Refer to <u>Front Side Door Sill Plate Replacement</u> .</p>	
<p>5. Remove the console. Refer to <u>Console Replacement (Left Hand Drive)</u> or <u>Console Replacement (Right Hand Drive)</u> .</p>	

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6. Pull carpet back to access the rear floor duct.

1	Push Pin <b>Tip:</b> Use <b>J 38778</b> to remove the push pin.
2	Floor Rear Air Outlet Duct - Left Hand
3	Floor Rear Air Outlet Duct - Right Hand
4	Floor Rear Air Outlet Duct

**REAR FLOOR AIR OUTLET REPLACEMENT (RIGHT HAND DRIVE - LEFT SIDE)**

**Fig. 55: Rear Floor Air Outlet Replacement (Right Hand Drive - Left Side)**  
Courtesy of GENERAL MOTORS CORP.

**Rear Floor Air Outlet Replacement (Right Hand Drive - Left Side)**

Callout	Component Name
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**Preliminary Procedures**

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1. Remove front passenger seat. Refer to **Front Seat Replacement - Bucket** .
2. Remove the passenger door sill plate. Refer to **Front Side Door Sill Plate Replacement** .
3. Pull carpet back to access the rear floor duct.

1	Push Pin <b>J 38778</b> to remove the push pin.
2	Left Hand Rear Floor Air Outlet Duct

**SIDE WINDOW DEFOGGER OUTLET DUCT REPLACEMENT - LEFT SIDE (LEFT HAND DRIVE DRIVE)**

**Fig. 56: Defogger Outlet Duct Replacement - Left Side (Left Hand Drive)**  
Courtesy of GENERAL MOTORS CORP.

**Side Window Defogger Outlet Duct Replacement - Left Side (Left Hand Drive)**

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Callout	Component Name
<b>NOTE:</b> Refer to <u>Fastener Notice</u> .  <b>Fastener Tightening Specifications:</b> Refer to <u>Fastener Tightening Specifications</u> . <b>Preliminary Procedure:</b> Remove the instrument panel assembly. Refer to <u>Instrument Panel Assembly Replacement (Left Hand Drive)</u> or <u>Instrument Panel Assembly Replacement (Right Hand Drive)</u> .	
1	Bolt, Duct Assembly - Air Distributor Center <b>Tighten:</b> 1.6 N.m (14 lb in)
2	Bolt, Duct Assembly - Air Distributor Center <b>Tighten:</b> 1.6 N.m (14 lb in)
3	Bolt, Air Defogger Duct, Side Window - Left <b>Tighten:</b> 1.6 N.m (14 lb in)
4	Duct, Air Defogger Side Window - Left

**SIDE WINDOW DEFOGGER OUTLET DUCT REPLACEMENT - LEFT SIDE (RIGHT HAND DRIVE)**



**Fig. 57: Side Window Defogger Outlet Duct Replacement - Left Side (Right Hand Drive)**  
 Courtesy of GENERAL MOTORS CORP.

**Side Window Defogger Outlet Duct Replacement - Left Side (Right Hand Drive)**

Callout	Component Name
<p><b>Preliminary Procedure:</b>                      Remove the instrument panel assembly. Refer to <b><u>Instrument Panel Assembly Replacement (Left Hand Drive)</u></b> or <b><u>Instrument Panel Assembly Replacement (Right Hand Drive)</u></b> .</p>	
<p>1</p>	<p>Air Distributor Center Duct Assembly Bolt</p> <p><b>NOTE:</b>                      Refer to <b><u>Fastener Notice</u></b> .</p> <p><b>Tighten:</b> 1.6 N.m (14 lb in)</p>

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2	Air Distributor Center Duct Assembly Bolt <b>Tighten:</b> 1.6 N.m (14 lb in)
3	Left Side Window Air Defogger Duct Bolt <b>Tighten:</b> 1.6 N.m (14 lb in)
4	Left Side Window Air Defogger Duct

**SIDE WINDOW DEFOGGER OUTLET DUCT REPLACEMENT - RIGHT SIDE (LEFT HAND DRIVE)**

**Fig. 58: Side Window Defogger Outlet Duct Replacement - Right Side (Left Hand Drive)**  
Courtesy of GENERAL MOTORS CORP.

**Side Window Defogger Outlet Duct Replacement - Right Side (Left Hand Drive)**

## 2007 Hummer H3

2007 HVAC Heating, Ventilation and Air Conditioning - H3

Callout	Component Name
<b>NOTE:</b> Refer to <u>Fastener Notice</u> .  <b>Fastener Tightening Specifications:</b> Refer to <u>Fastener Tightening Specifications</u> . <b>Preliminary Procedure:</b> Remove the instrument panel assembly. Refer to <u>Instrument Panel Assembly Replacement (Left Hand Drive)</u> or <u>Instrument Panel Assembly Replacement (Right Hand Drive)</u> .	
1	Bolt, Duct Assembly - Air Distributor Center <b>Tighten:</b> 1.6 N.m (14 lb in)
2	Bolt, Duct Assembly - Air Distributor Center <b>Tighten:</b> 1.6 N.m (14 lb in)
3	Bolt, Air Defogger Duct, Side Window - Right <b>Tighten:</b> 1.6 N.m (14 lb in)
4	Duct, Air Defogger Side Window - Right

**SIDE WINDOW DEFOGGER OUTLET DUCT REPLACEMENT - RIGHT SIDE (RIGHT HAND DRIVE)**

**Fig. 59: Side Window Defogger Outlet Duct Replacement - Right Side (Right Hand Drive)**

Courtesy of GENERAL MOTORS CORP.

**Side Window Defogger Outlet Duct Replacement - Right Side (Right Hand Drive)**

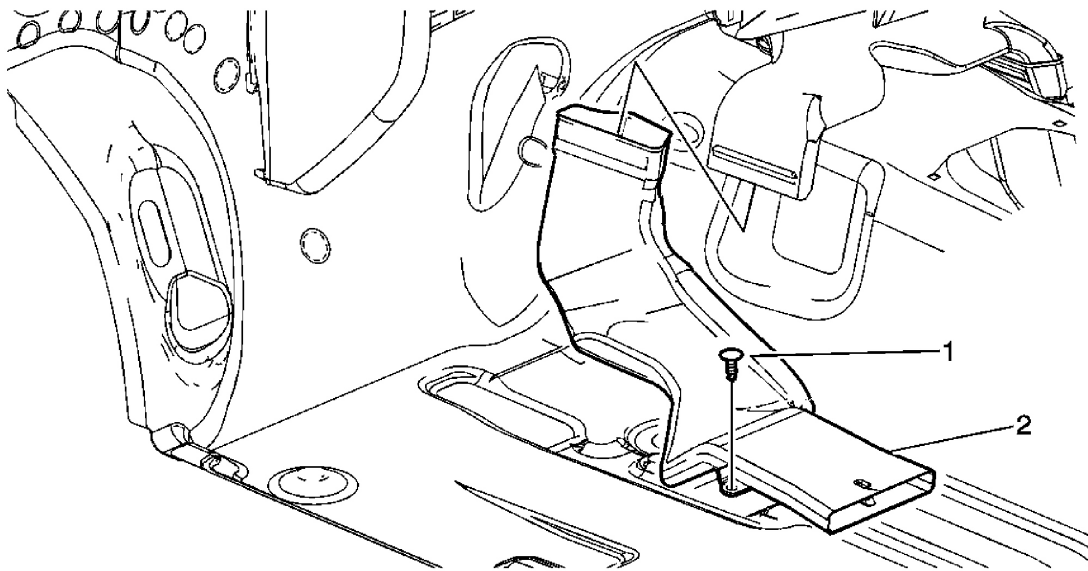
Callout	Component Name
<b>Preliminary Procedure:</b> Remove the instrument panel assembly. Refer to <b><u>Instrument Panel Assembly Replacement (Left Hand Drive)</u></b> or <b><u>Instrument Panel Assembly Replacement (Right Hand Drive)</u></b> .	
1	Air Distributor Center Duct Assembly Bolt  <b>NOTE:</b> Refer to <b><u>Fastener Notice</u></b> .

## 2007 Hummer H3

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	<b>Tighten:</b> 1.6 N.m (14 lb in)
2	Distributor Center Duct Assembly Bolt <b>Tighten:</b> 1.6 N.m (14 lb in)
3	Right Side Window Air Defogger Duct Bolt <b>Tighten:</b> 1.6 N.m (14 lb in)
4	Right Side Window Air Defogger Duct

### REAR FLOOR AIR OUTLET DUCT REPLACEMENT - LEFT SIDE (LEFT HAND DRIVE)



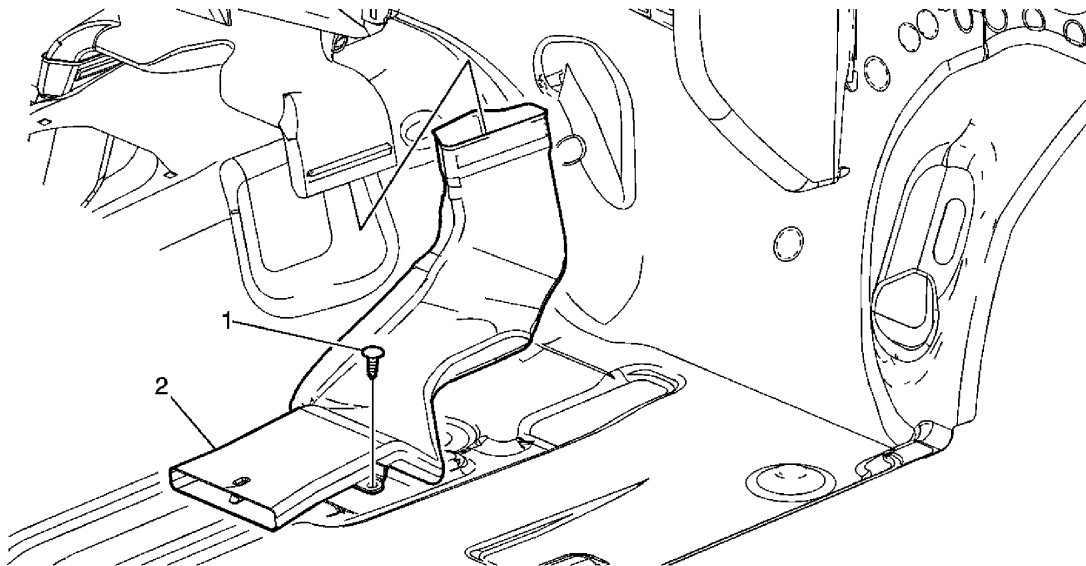
**Fig. 60: Rear Floor Air Outlet Duct Replacement - Left Side (Left Hand Drive)**  
Courtesy of GENERAL MOTORS CORP.

### Rear Floor Air Outlet Duct Replacement - Left Side (Left Hand Drive)

Callout	Component Name
<b>Fastener Tightening Specifications:</b> Refer to <u>Fastener Tightening Specifications</u> .	
<b>Preliminary Procedures</b>	
1. Remove front drivers seat. Refer to <u>Front Seat Replacement - Bucket</u> .	
2. Remove the front drivers sill plate. Refer to <u>Front Side Door Sill Plate Replacement</u> .	
3. Pull carpet back to access the rear floor duct.	

1	Push Pin <b>Tip:</b> Use <b>J 38778</b> , Door Trim Pad Clip Remover to remove the push pin.
2	Floor Rear Air Outlet Duct - Left Hand

**REAR FLOOR AIR OUTLET DUCT REPLACEMENT - LEFT SIDE (RIGHT HAND DRIVE)**



**Fig. 61: Rear Floor Air Outlet Duct Replacement - Left Side (Right Hand Drive)**  
 Courtesy of GENERAL MOTORS CORP.

**Rear Floor Air Outlet Duct Replacement - Left Side (Right Hand Drive)**

Callout	Component Name
<b>Preliminary Procedures</b>	
1. Remove front drivers seat. Refer to <b><u>Front Seat Replacement - Bucket</u></b> .	
2. Remove the front drivers sill plate. Refer to <b><u>Front Side Door Sill Plate Replacement</u></b> .	
3. Pull carpet back to access the rear floor duct.	
1	Push Pin <b>J 38778</b> to remove the push pin.
2	Right Hand Rear Floor Air Outlet Duct

**REAR FLOOR AIR OUTLET DUCT REPLACEMENT - RIGHT SIDE (LEFT HAND DRIVE)**