

2008 Isuzu Ascender LS

2008 HVAC Heating, Ventilation & Air Conditioning - Ascender, Envoy & Trailblazer

2008 HVAC

Heating, Ventilation & Air Conditioning - Ascender, Envoy & Trailblazer

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

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

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Heater Inlet Hose Fitting at Intake Manifold	23.5 N.m	17 lb ft
Heater Outlet Hose 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
Intermediate Bracket Bolts	10 N.m	88 lb in
Knee Bolster Bracket Nuts	5.5 N.m	49 lb in

COMPRESSOR SUCTION SCREEN & TOOL SELECTION SPECIFICATIONS

Part Number	Screen Size	Fitting ID Application Range
J-44551-40	10.03 mm (0.395 in)	9.75-9.96 mm (0.384-0.392 in)
J-44551-60	11.96 mm (0.471 in)	11.68-11.89 mm (0.460-0.468 in)
J-44551-70	12.50 mm (0.492 in)	12.22-12.42 mm (0.481-0.489 in)
J-44551-80	12.70 mm (0.500 in)	12.42-12.62 mm (0.489-0.497 in)
J-44551-10	12.95 mm (0.510 in)	12.67-12.88 mm (0.499-0.507 in)
J-44551-20	14.02 mm (0.552 in)	13.74-13.94 mm (0.541-0.549 in)
J-44551-30	15.11 mm (0.595 in)	14.83-15.04 mm (0.584-0.592 in)
J-44551-90	0.600 in (15.24 mm)	14.96-15.16 mm (0.589-0.597 in)

REFRIGERANT SYSTEM CAPACITIES

Application	Specification	
	Metric	English
PAG Oil GM P/N 12345923 (Canadian P/N 10953486)		
Accumulator Replacement	60 ml*	2 oz*
<ul style="list-style-type: none">*Add PAG oil equal to the amount of oil drained from the old accumulator plus the specified additional amount.		
Compressor Replacement	60 ml ¹	2 oz ¹
<ul style="list-style-type: none">A Sanden scroll compressor containing 240 ml¹ of oil is used on this model year.		
Condenser Replacement	30 ml ¹	1 oz ¹
Evaporator Replacement	90 ml ¹	3 oz ¹
<ul style="list-style-type: none">Total System Oil Capacity	240 ml	8 oz
R-134a		
<ul style="list-style-type: none">Refrigerant Charge	0.86 kg	1.9 lb
<ul style="list-style-type: none">Refrigerant Charge with Rear A/C	1.2 kg	2.65 lb
¹ If more than the specified amount of oil was drained from a component, add the equal amount of oil drained.		

DIAGNOSTIC INFORMATION & PROCEDURES

DIAGNOSTIC STARTING POINT - HEATING, VENTILATION & AIR CONDITIONING

The heating, ventilation and air conditioning (HVAC) system is divided into 3 sections. The first, Heating, Ventilation and Air Conditioning, has all procedures that pertain to a HVAC component or function that are not specifically associated with an automatic or manual control system. The second, HVAC Systems - Manual, has all procedures specific to the manual control system. The third, HVAC Systems - Automatic, has all the procedures specific to the automatic control system.

For systems with DTCs, begin the system diagnosis with the Diagnostic System Check. Refer to **Diagnostic System Check - Vehicle** .

The Diagnostic System Check will provide the following information:

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

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

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

- **Air Delivery Description and Operation** for the manual system
- **Air Temperature Description and Operation** for the manual system
- **Air Delivery Description and Operation** for the automatic system
- **Air Temperature Description and Operation** for the automatic system

The Air Delivery Description and Operation contains the following topics:

- HVAC control components
- Air speed
- Air distribution
- Recirculation operation
- Automatic operation

The Air Temperature Description and Operation contains the following topics:

- HVAC control components
- Heating and A/C operation
- Automatic operation

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- Engine coolant
- A/C cycle

LEAK TESTING

Tools Required

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

Refrigerant Leak Testing

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

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

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

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

Fluorescent Leak Detector

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

IMPORTANT: PAG oil is water soluble.

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

Use the leak detection lamp in the following areas:

- All fittings or connections that use seal washers or O-rings
- All of the A/C components
- The A/C compressor shaft seal
- The A/C hoses and pressure switches

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- The HVAC module drain tube, if the evaporator core is suspected of leaking
- The service port sealing caps

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

- Follow the instructions supplied with the **J 42220** . See **Special Tools**.
- To prevent false diagnosis in the future, thoroughly clean the residual dye from any area where leaks were found. Use a rag and the approved **J 43872** . See **Special Tools**.

Fluorescent Dye Injection

IMPORTANT: Use only fluorescent dye approved by General Motors.

- **J 41447** can be poured directly into a removed A/C component. See **Special Tools**.
- **J 46297-12** is injected into the low side port using **J 46297** . See **Special Tools**.
- Not all of the fluorescent dyes are compatible with PAG oil. Some types of dye decrease the oil viscosity or may chemically react with the oil.
- R-134A leak detection dye requires time to work. Depending upon the leak rate, a leak may not become visible for between 15 minutes and 7 days.

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

- To prevent false diagnosis, thoroughly clean any residual dye from the service port with a rag and the approved fluorescent dye cleaner **J 43872** . See **Special Tools**.

Halogen Leak Detector

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

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

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

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

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

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

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

AIR CONDITIONING (A/C) SYSTEM PERFORMANCE TEST

Test Description

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

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

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

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

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

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

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

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	Are both the low and high side pressures within the specified value?		Go to Step 2	Go to <u>Leak Testing</u>
2	<p>IMPORTANT: Record the relative humidity and the ambient temperature at the time of the test.</p> <ol style="list-style-type: none"> 1. Close the vehicle doors and windows. 2. Open the driver door window 5 to 6 inches. 3. Select the following HVAC control settings: <ul style="list-style-type: none"> • The A/C on • The maximum blower speed • The Panel mode • The coldest temperature setting • All A/C outlets OPEN 4. Install the temperature probes of the J 43600 . See <u>Special Tools</u>. 5. Apply the parking brake. 6. Place the transaxle/transmission in PARK. 7. Start the engine. 8. Operate the A/C system for 5 minutes. 9. Inspect for the following conditions: <ul style="list-style-type: none"> • Abnormal frost areas • Unusual noises <p>IMPORTANT: When using the print function of the J 43600 for this step, press the RESET button before pressing the PRINT button in order to capture the correct information. See <u>Special Tools</u>.</p> <ol style="list-style-type: none"> 10. Print the following information: <ul style="list-style-type: none"> • The outlet air temperatures • The low-side pressure • The high-side pressure 11. Compare the low and high side pressures and the output temperatures to the table below. 	-		

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	Does all the data recorded fall within the specified ranges of the table below?		Go to Step 8	Go to Step 3
3	<p>If the pressures and temperatures recorded do not fall within the specified ranges:</p> <ol style="list-style-type: none"> 1. Continue to operate the A/C system for an additional 5 minutes. 2. Reset the J 43600 for this step, press the RESET and record the pressures and temperatures again. See Special Tools. 3. Compare the low and high side pressures and the output temperature to the table below. <p>Does all the data recorded fall within the specified ranges of the table below?</p>	-	Go to Step 8	Go to Step 4
4	Do the high and low side pressures fall within the specified ranges but the outlet temperatures do not?	-	Go to Air Conditioning (A/C) Diagnostics - Pressure Zone A	Go to Step 5
5	Is the low side pressure higher than the specified range and the high side pressure within or lower than the specified range?	-	Go to Air Conditioning (A/C) Diagnostics - Pressure Zone B	Go to Step 6
6	Are the low and high side pressures both higher than the specified ranges?	-	Go to Air Conditioning (A/C) Diagnostics - Pressure Zone C	Go to Step 7
7	Is the high side pressure greater than the specified range, but the low side pressure is within or less than the specified range?	-	Go to Air Conditioning (A/C) Diagnostics - Pressure Zone D	Go to Step 8
	Operate the system in order to verify the test results. Did you find the same results?			Go to Symptoms - HVAC Systems -

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8		-	<p><u>Manual</u> or Go to <u>Symptoms -</u> <u>HVAC</u> <u>Systems -</u> <u>Automatic</u></p> <p>System OK</p>
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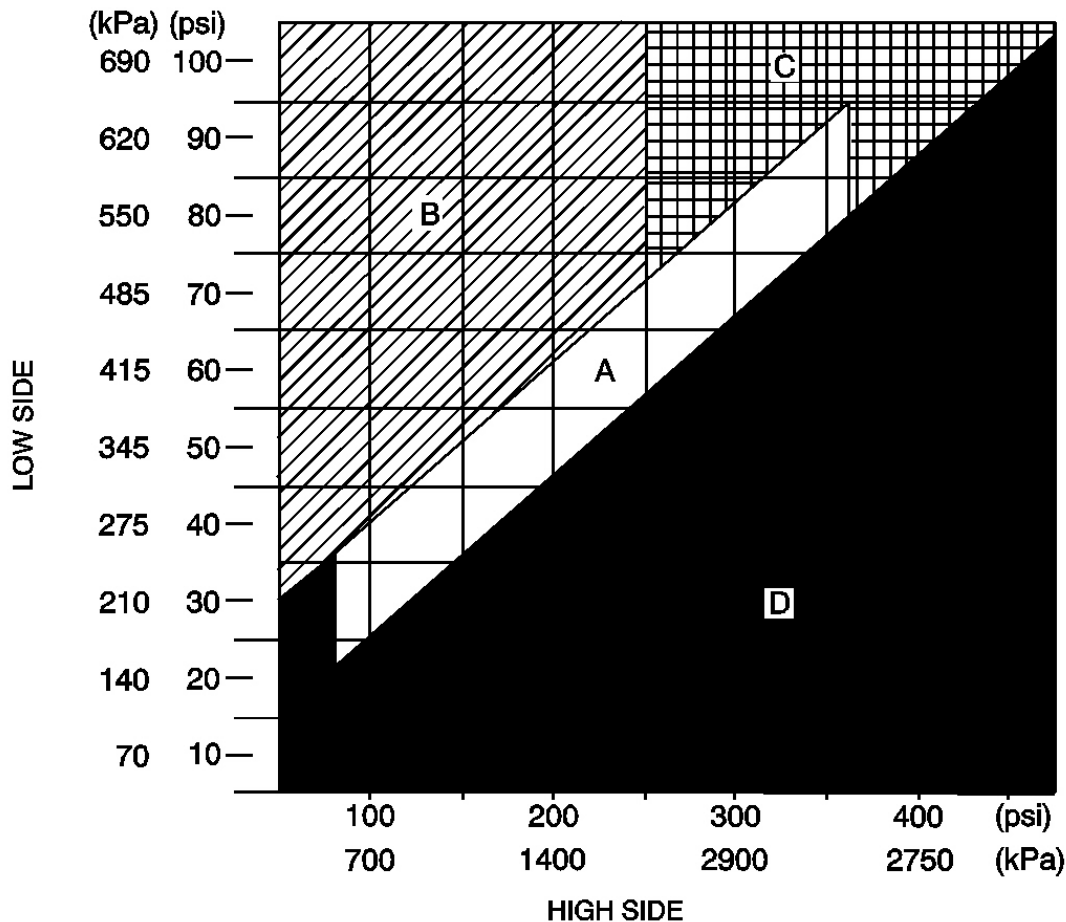


Fig. 1: A/C Performance Chart With Rear A/C
Courtesy of GENERAL MOTORS CORP.

A/C Performance Table

Ambient Temperature	Relative Humidity	Low Side Service Port Pressure	High Side Service Port Pressure	Maximum Left Center Discharge Air Temperature
13-18°C (55-65°)	0-100%	175-207 kPa (25-30	1030-1220 kPa (135-	7°C (45°F)

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F)		psi)	175 psi)	
19-24°C (66-75°F)	Below 40%	175-254 kPa (25-37 psi)	1200-1430 kPa (160-200 psi)	11°C (52°F)
	Above 40%	175-262 kPa (25-38 psi)	1170-1400 kPa (170-210 psi)	11°C (52°F)
25-29°C (76-85°F)	Below 35%	208-288 kPa (30-42 psi)	1370-1570 kPa (150-190 psi)	14°C (57°F)
	35-50%	213-292 kPa (31-42 psi)	1350-1570 kPa (160-200 psi)	14°C (57°F)
	Above 50%	216-300 kPa (31-44 psi)	1340-1550 kPa (160-200 psi)	15°C (59°F)
30-35°C (86-95°F)	Below 30%	242-328 kPa (35-48 psi)	1510-1750 kPa (200-240 psi)	17°C (63°F)
	30-50%	246-335 kPa (36-49 psi)	1500-1740 kPa (200-240 psi)	17°C (63°F)
	Above 50%	252-346 kPa (37-50 psi)	1490-1730 kPa (200-240 psi)	19°C (66°F)
36-41°C (96-105°F)	Below 20%	281-366 kPa (41-53 psi)	1680-1920 kPa (240-280 psi)	19°C (66°F)
	20-40%	285-374 kPa (41-54 psi)	1670-1920 kPa (245-285 psi)	21°C (70°F)
	Above 40%	292-383 kPa (42-56 psi)	1670-1910 kPa (250-265 psi)	22°C (72°F)
42-46°C (106-115°F)	Below 20%	322-400 kPa (47-58 psi)	1850-2070 kPa (250-290 psi)	22°C (72°F)
	Above 20%	326-410 kPa (47-60 psi)	1840-2060 kPa (260-300 psi)	23°C (73°F)
47-49°C (116-120°F)	Below 30%	360-426 kPa (52-62 psi)	1990-2150 kPa (290-330 psi)	24°C (75°F)

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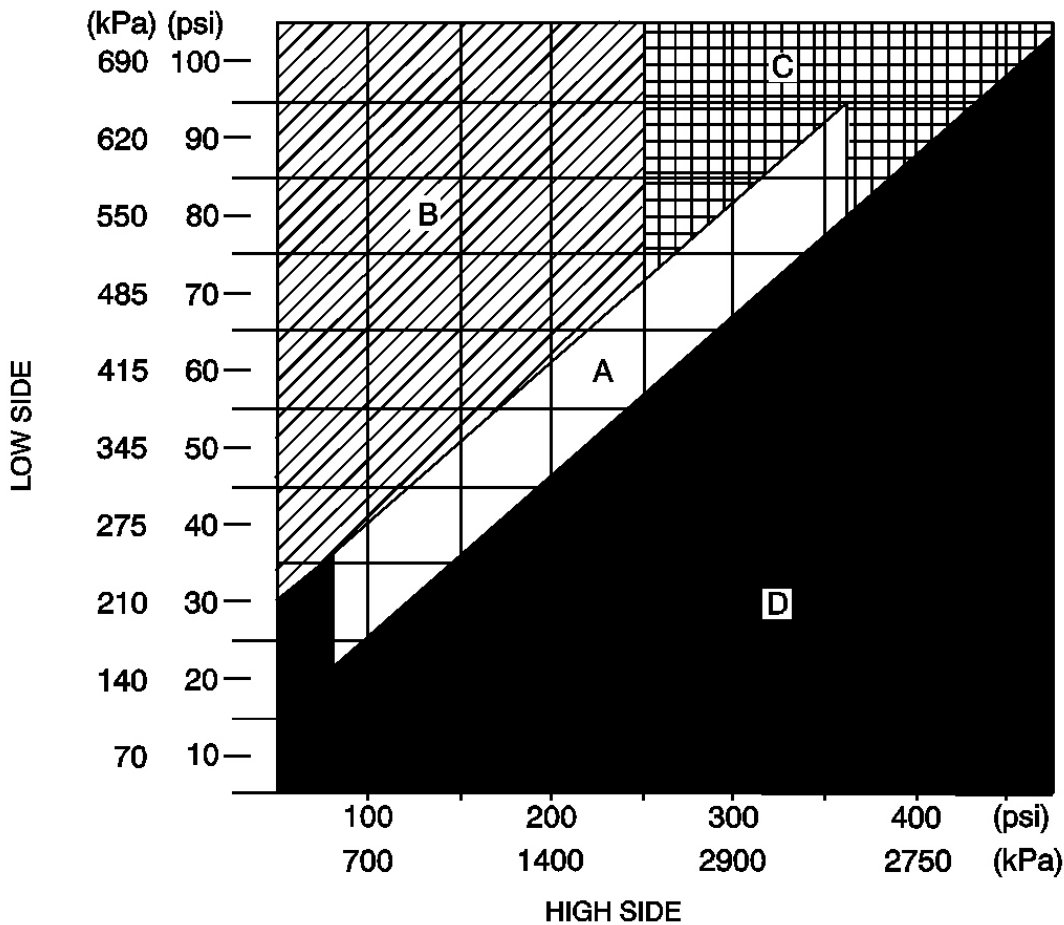


Fig. 2: A/C Performance Chart With Rear A/C
Courtesy of GENERAL MOTORS CORP.

A/C Performance Table -with Rear A/C

Ambient Air Temperature	Relative Humidity	Service Port Pressure		Maximum Discharge Air Temperature	
		Low Side	High Side	Left Center	Rear Center
13-18°C (55-65°F)	0-100%	184-273 kPa (27-40 psi)	600-1080 kPa (87-157 psi)	19°C (66°F)	17°C (62°F)
19-24°C (66-75°F)	Below 40%	227-335 kPa (33-49 psi)	720-1210 kPa (105-176 psi)	19°C (66°F)	20°C (68°F)
	Above 40%	234-349 kPa (34-51 psi)	840-1330 kPa (122-193 psi)	22°C (72°F)	21°C (70°F)
25-29°C (76-84°F)	Below 35%	286-383 kPa (42-56 psi)	1050-1440 kPa (152-209 psi)	21°C (70°F)	23°C (73°F)
	35-50%	293-390 kPa (43-57 psi)	1110-1470 kPa (161-213 psi)	22°C (72°F)	23°C (73°F)

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

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

Step	Action	Value	Yes	No
DEFINITION: The high and low side pressures may be normal or slightly less than normal.				
<ul style="list-style-type: none"> Air Delivery Concern Slight Refrigerant Under Charge Refrigerant Contamination 				
1	Were you sent here from the A/C System Performance Test?	-	Go to Step 2	Go to <u>Air Conditioning (A/C) System Performance Test</u>
2	Refer to the panel air outlet temperatures recorded during the A/C system performance test. Does the discharge air temperature between the right and left center panel outlets vary by more than 1-2°C (2-3°F)?	-	Go to Step 7	Go to Step 3
3	Did the customer mention that the A/C system output temperatures are good at first, but then turn warm during extended drives?	-	Go to Step 4	Go to Step 5

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4	<p>Increase engine speed to 2000 RPM. During extended operation of the A/C system, does the low side pressure decrease, possibly accompanied by heavy frost on the liquid line between the expansion device and the evaporator?</p>	-	<p>Go to <u>Air Conditioning (A/C) Diagnostics - Pressure Zone D</u></p>	Go to Step 5
5	<p>Refer to the pressures recorded during the A/C system performance test. Inspect for the following conditions:</p> <p>CAUTION: Refer to <u>Moving Parts and Hot Surfaces Caution</u> .</p> <ul style="list-style-type: none"> • The high side pressure is slightly greater than the specified pressure ranges but still within Zone A on the A/C Pressure-Zone Classification Chart in the A/C System Performance Test. Refer to <u>Air Conditioning (A/C) System Performance Test</u>. • The discharge line is hot. • The suction line is cool. <p>Do the listed conditions exist?</p>	-	Go to Step 7	Go to Step 6
6	<p>Refer to the pressures recorded during the A/C system performance test. Inspect for the following conditions:</p> <ul style="list-style-type: none"> • 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 <u>Air Conditioning (A/C) System Performance Test</u>. • The discharge line is warm-to-hot. • The suction line is cool-to-warm. <p>Do the listed conditions exist?</p>	-	Go to Step 8	Go to <u>Diagnostic Starting Point - Heating, Ventilation and Air Conditioning</u>
	<p>The A/C system may be undercharged.</p> <p>1. Leak test A/C system. Refer to <u>Leak</u></p>			

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7	<p><u>Testing.</u></p> <p>2. Recharge the A/C system to specifications. Refer to <u>Refrigerant Recovery and Recharging.</u></p>	-		
	Is the repair complete?		Go to Step 14	-
8	<p>The A/C system may be contaminated. View the ACR 2000 information screen for detection of foreign gases in the A/C system. Do foreign gases exist?</p>	-	Go to Step 9	Go to Step 10
9	<p>1. Evacuate the A/C system to a scavenging tank. Refer to <u>Refrigerant Recovery and Recharging.</u></p> <p>2. Recharge the A/C system to specifications.</p>	-		
	Is the repair complete?		Go to Step 14	-
10	<p>The A/C system may contain too much moisture or air.</p> <p>1. Evacuate and recharge the A/C system to specifications. Refer to <u>Refrigerant Recovery and Recharging.</u></p> <p>2. Operate the A/C system and inspect the panel outlet air temperatures. Refer to <u>Air Conditioning (A/C) System Performance Test.</u></p>	-		
	Are the panel outlet temperatures within the specified ranges of the A/C Performance Test Table?		Go to Step 15	Go to Step 11
11	<p>The A/C system may contain too much refrigerant oil.</p> <p>1. Recover the refrigerant from the A/C system. Refer to <u>Refrigerant Recovery and Recharging.</u></p> <p>2. Remove the accumulator. Refer to <u>Accumulator Replacement.</u></p> <p>3. Drain and measure the refrigerant oil from the accumulator.</p>	148 ml (5 oz)		

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	Was more than the specified amount of refrigerant oil drained from the accumulator?		Go to Step 12	Go to Step 13
12	<ol style="list-style-type: none"> 1. Reinstall the accumulator. Refer to <u>Accumulator Replacement</u>. 2. Flush the A/C system. Refer to <u>Flushing</u>. 3. Recharge the A/C system. Refer to <u>Refrigerant Recovery and Recharging</u>. <p>Are the repairs complete?</p>	-	Go to Step 14	-
13	<ol style="list-style-type: none"> 1. Add the specified amount of refrigerant oil to the accumulator. Refer to <u>Refrigerant System Capacities</u>. 2. Install the accumulator. Refer to <u>Accumulator Replacement</u>. 3. Recharge the A/C system. Refer to <u>Refrigerant Recovery and Recharging</u>. <p>Are the repairs complete?</p>	-	Go to Step 14	-
14	<ol style="list-style-type: none"> 1. Record the low and high side pressures and the instrument panel (I/P) outlet air temperature. 2. Compare the outlet temperatures to those listed in the A/C System Performance Chart. Refer to <u>Air Conditioning (A/C) System Performance Test</u>. <p>Are the high and low side pressures and I/P panel outlet temperatures within specifications?</p>	-	Go to Step 15	Go to <u>Air Conditioning (A/C) System Performance Test</u>
15	Operate the system in order to verify the repair. Did you find and correct the condition?	-	System OK	Go to <u>Symptoms - HVAC Systems - Manual</u> or Go to <u>Symptoms - HVAC Systems - Automatic</u>

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

Step	Action	Yes	No
DEFINITION: The low side pressures is higher than normal and the high pressure is lower than normal.			
<ul style="list-style-type: none"> • Malfunctioning A/C Compressor 			

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- Refrigerant Under Charge

1	Were you sent here from the A/C System Performance Test?	Go to Step 2	Go to <u>Air Conditioning (A/C) System Performance Test</u>
2	After continued operation of the A/C system, do the low and high side pressures equalize or become static?	Go to Step 5	Go to Step 3
3	<p>Refer to the pressures recorded during the A/C System Performance Test. Inspect for the following conditions:</p> <p>CAUTION: Refer to <u>Moving Parts and Hot Surfaces Caution</u> .</p> <ul style="list-style-type: none"> The low side pressure equal to or above the specified pressure range of the A/C Performance table. Refer to <u>Air Conditioning (A/C) System Performance Test</u>. The high side pressure is below the specified pressure range of the A/C Performance table. Refer to <u>Air Conditioning (A/C) System Performance Test</u>. The low side refrigerant line at the compressor feels cool-to-warm. The high side refrigerant line at the compressor feels warm-to-hot. <p>Do the listed conditions exist?</p>	Go to Step 5	Go to Step 4
4	<p>Refer to the pressures recorded during the A/C System Performance Test. Inspect for the following conditions:</p> <p>CAUTION: Refer to <u>Moving Parts and Hot Surfaces Caution</u> .</p> <ul style="list-style-type: none"> The low side pressure is above the specified pressure range of the A/C Performance table. Refer to <u>Air Conditioning (A/C) System Performance Test</u>. The high side pressure is below the specified pressure range of the A/C Performance table. Refer to <u>Air Conditioning (A/C) System Performance Test</u>. The low side refrigerant line at the compressor feels warm. The high side refrigerant line at the compressor feels 		Go to Air

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	warm to hot.		<u>Conditioning (A/C) System Performance Test</u>
	Do the listed conditions exist?	Go to Step 5	
5	The A/C system has a low refrigerant charge. Evacuate and recharge the A/C system. Refer to <u>Refrigerant Recovery and Recharging</u> . Is the procedure complete?	Go to Step 6	-
6	<ol style="list-style-type: none"> Record the low and high side pressures as well as the instrument panel (I/P) outlet air temperature after repairs are performed. Compare the pressures and outlet temperature to those listed in the A/C Performance Chart. Refer to <u>Air Conditioning (A/C) System Performance Test</u>. <p>Are the readings within the specified ranges?</p>	Go to Step 13	Go to Step 7
7	The A/C compressor is malfunctioning. Remove the expansion device and inspect for contamination. Refer to <u>Expansion (Orifice) Tube Replacement (Short Wheel Base)</u> . Are there metal flakes on the expansion device?	Go to Step 9	Go to Step 8
8	Inspect the expansion device for a brown, powdery residue indicating desiccant in the A/C system. Is there a brown, powdery residue present?	Go to Step 11	Go to Step 12
9	<ol style="list-style-type: none"> Remove the compressor hose from the compressor. Refer to <u>Compressor Hose Assembly Replacement (LL8)</u> or <u>Compressor Hose Assembly Replacement (LH6, LS2)</u>. Inspect for metal flake contamination at the line connections and the compressor ports. <p>Is there metal flake contamination present?</p>	Go to Step 10	Go to Step 12
10	<ol style="list-style-type: none"> Replace the A/C compressor. Refer to <u>Compressor Replacement (LL8)</u> or <u>Compressor Replacement (LH6, LS2)</u>. Replace the orifice tube. Refer to <u>Expansion (Orifice) Tube Replacement (Short Wheel Base)</u>. Evacuate and recharge the A/C system. Refer to <u>Refrigerant Recovery and Recharging</u>. <p>Is the repair complete?</p>	Go to Step 13	-
	<ol style="list-style-type: none"> Flush the A/C system. Refer to <u>Flushing</u>. Replace the orifice tube. Refer to <u>Expansion (Orifice) Tube Replacement (Short Wheel Base)</u>. 		

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11	<p>3. Replace the A/C compressor. Refer to <u>Compressor Replacement (LL8)</u> or <u>Compressor Replacement (LH6, LS2)</u>.</p> <p>4. Replace the accumulator. Refer to <u>Accumulator Replacement</u>.</p> <p>5. Evacuate and recharge the A/C system. Refer to <u>Refrigerant Recovery and Recharging</u>.</p> <p>Is the repair complete?</p>	Go to Step 13	-
12	<p>1. Replace the A/C compressor. Refer to <u>Compressor Replacement (LL8)</u> or <u>Compressor Replacement (LH6, LS2)</u>.</p> <p>2. Evacuate and recharge the A/C system. Refer to <u>Refrigerant Recovery and Recharging</u>.</p> <p>Is the repair complete?</p>	Go to Step 13	-
13	<p>Operate the system in order to verify the repair</p> <p>Did you find and correct the condition?</p>	System OK	<p>Go to <u>Symptoms - HVAC Systems - Manual</u></p> <p>or</p> <p>Go to <u>Symptoms - HVAC Systems - Automatic</u></p>

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

Step	Action	Yes	No
<p>DEFINITION: The low and the high side pressures are both higher than normal.</p> <ul style="list-style-type: none"> • Restricted Condenser Air Flow • Cooling Fan Malfunction • Expansion Device Malfunction 			
1	Were you sent here from the A/C System Performance Test?	Go to Step 2	Go to <u>Air Conditioning (A/C) System Performance Test</u>
2	<p>1. With the engine idling, turn ON the A/C.</p> <p>2. Inspect for proper cooling fan operation. Refer to <u>Cooling System Description and Operation</u>.</p>		

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	Are the cooling fans ON and operating properly?	Go to Step 3	Go to Step 5
3	<p>Visually inspect for the following:</p> <ul style="list-style-type: none"> • Restricted air flow • Damaged condenser cooling fins • Inspect for missing or misaligned air baffles. <p>Do the following conditions exist?</p>	Go to Step 4	Go to Step 6
4	<p>Repair the air flow restriction.</p> <p>Is the repair complete?</p>	Go to Step 9	-
5	<p>Repair the cooling fan operation fault. Refer to <u>Diagnostic System Check - Vehicle</u> .</p> <p>Is the repair complete?</p>	Go to Step 9	-
6	<p>CAUTION: Refer to <u>Moving Parts and Hot Surfaces Caution</u> .</p> <p>Feel the liquid line on both sides of the expansion device. Is the temperature the same before and after the expansion device?</p>	Go to Step 7	Go to Step 8
7	<p>Replace the damaged/faulty orifice tube. Refer to <u>Expansion (Orifice) Tube Replacement (Short Wheel Base)</u>.</p> <p>Is the repair complete?</p>	Go to Step 9	-
8	<p>Air is in the refrigerant system, or the system is overcharged. Refer to the view screen on the J 43600 ACR 2000 Air Conditioning Service Center for foreign gas content in the refrigerant. See <u>Special Tools</u>.</p> <p>Recover and recharge the A/C system. Refer to <u>Refrigerant Recovery and Recharging</u>.</p> <p>Is the repair complete?</p>	Go to Step 9	-
9	<ol style="list-style-type: none"> 1. Record the low and high side pressures and the instrument panel (I/P) outlet air temperature after repairs are performed. 2. Compare the pressures and outlet temperature to those listed in the A/C Performance Chart. Refer to <u>Air Conditioning (A/C) System Performance Test</u>. <p>Are the readings within the specified ranges?</p>	Go to Step 10	Go to <u>Air Conditioning (A/C) System Performance Test</u>
10	<p>Operate the system in order to verify the repair.</p> <p>Did you find and correct the condition?</p>		Go to <u>Symptoms - HVAC Systems - Manual</u> or <u>Symptoms - HVAC Systems</u>

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

Step	Action	Yes	No
DEFINITION: The low side pressure is lower than normal and the high side pressure is higher than normal. <ul style="list-style-type: none">• A restriction in the A/C system• Debris in the A/C system			
1	Were you sent here from the A/C System Performance Test?	Go to Step 2	Go to Air Conditioning (A/C) System Performance Test
2	CAUTION: Refer to <u>Moving Parts and Hot Surfaces Caution</u> . Feel the liquid line before the expansion device. Is the liquid line cold before the expansion device?	Go to Step 3	Go to Step 8
3	Feel along the surfaces of the following high side components: <ul style="list-style-type: none">• The compressor discharge hose• The condenser• The liquid line between the condenser and the expansion device Did you detect an abrupt drop in temperature along the surfaces of any of the listed components?	Go to Step 7	Go to Step 4
4	1. Feel the liquid line at the expansion device location for extreme cold, possibly accompanied by heavy frost. 2. Feel along the liquid line beyond the expansion device location for warm temperature. Is the liquid line extremely cold at the expansion device location and warm beyond the expansion device location?	Go to Step 11	Go to Step 5
	Feel along the surfaces of the following low side components. <ul style="list-style-type: none">• The evaporator inlet tube between the expansion device and the evaporator core		

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5	<ul style="list-style-type: none"> • The evaporator outlet tube between the evaporator core and the compressor • The accumulator • The compressor suction hose <p>Did you feel an abrupt temperature change along the surfaces of any of the listed components?</p>	Go to Step 7	Go to Step 6
6	<p>Feel along the surfaces of the low and the high side components.</p> <ul style="list-style-type: none"> • The evaporator inlet tube between the expansion device and the evaporator core • The evaporator outlet tube between the evaporator core and the accumulator • The accumulator • The compressor suction hose • The compressor discharge hose • The condenser • The evaporator inlet tube between the condenser and the expansion device <p>Are the temperatures of these components only mildly warm?</p>	Go to Step 14	Go to Step 8
7	<ol style="list-style-type: none"> 1. Recover the refrigerant. Refer to <u>Refrigerant Recovery and Recharging</u>. 2. Remove the restriction from the component, or replace the component which produced an abrupt temperature drop. <p>Is the repair complete?</p>	Go to Step 9	-
8	<ol style="list-style-type: none"> 1. Recover the refrigerant and evacuate the system. Refer to <u>Refrigerant Recovery and Recharging</u>. 2. Record the weight of the recovered refrigerant. 3. Compare the weight of the recovered refrigerant with the system capacity. Refer to <u>Refrigerant System Capacities</u>. <p>Is the weight of the recovered refrigerant charge greater than 75 percent of the total system capacity?</p>	Go to Step 9	Go to Step 10

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9	Recharge the A/C system. Refer to <u>Refrigerant Recovery and Recharging</u> . Is the cooling performance improved?	Go to Step 21	Go to Step 10
10	1. Leak test the system. Refer to <u>Leak Testing</u> . 2. Repair any leaks. Is the repair complete?	Go to Step 21	-
11	The expansion device is restricted. Replace the expansion device. Refer to <u>Expansion (Orifice) Tube Replacement (Short Wheel Base)</u> . Are metal flakes present?	Go to Step 12	Go to Step 13
12	1. Remove the compressor hose assembly from the vehicle. Refer to <u>Compressor Hose Assembly Replacement (LL8) or Compressor Hose Assembly Replacement (LH6, LS2)</u> . 2. Inspect the hose for debris by blowing shop air through one end of the hose while covering the other end with a shop towel. 3. Observe the amount of debris collected in the shop towel. Did a large amount of debris collect in the shop towel?	Go to Step 18	Go to Step 20
13	If the expansion device was restricted with a brown or black residue, perform the following procedure: 1. Flush the A/C system. Refer to <u>Flushing</u> . 2. Replace the accumulator. Refer to <u>Accumulator Replacement</u> . Are the repairs complete?	Go to Step 21	-
14	1. Recover the refrigerant. Refer to <u>Refrigerant Recovery and Recharging</u> . 2. Disconnect the compressor hose from the compressor. Refer to <u>Compressor Hose Assembly Replacement (LL8) or Compressor Hose Assembly Replacement (LH6, LS2)</u> . 3. Inspect for the presence of debris in the compressor suction port. Is debris present in the compressor suction port?	Go to Step 15	Go to Step 19
	1. Remove the debris from the suction port. 2. Inspect the expansion device for damage or		

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15	<p>debris. Refer to <u>Expansion (Orifice) Tube Replacement (Short Wheel Base)</u>.</p> <p>Did you find evidence of damage or debris?</p>	Go to Step 17	Go to Step 16
16	<p>If the expansion device does not show any signs of damage or debris, perform the following procedure:</p> <ol style="list-style-type: none"> 1. Remove the compressor hose assembly from the vehicle. Refer to <u>Compressor Hose Assembly Replacement (LL8)</u> or <u>Compressor Hose Assembly Replacement (LH6, LS2)</u>. 2. Inspect the hose for debris by blowing shop air through one end of the hose while covering the other end with a shop towel. 3. Observe the amount of debris collected in the shop towel. <p>Did a large amount of debris collect in the shop towel?</p>	Go to Step 18	Go to Step 19
17	<ol style="list-style-type: none"> 1. Replace the expansion device. Refer to <u>Expansion (Orifice) Tube Replacement (Short Wheel Base)</u>. 2. If the expansion device was restricted, observe the type of debris present. <p>Are metal flakes present?</p>	Go to Step 12	Go to Step 13
18	<p>If a large amount of debris was collected in the shop towel from the compressor hose assembly, perform the following procedure:</p> <p>Replace the accumulator. Refer to <u>Accumulator Replacement</u>.</p> <p>Is the repair complete?</p>	Go to Step 19	-
19	<p>Install the compressor hose assembly. Refer to <u>Compressor Hose Assembly Replacement (LL8)</u> or <u>Compressor Hose Assembly Replacement (LH6, LS2)</u>.</p> <p>Are the repairs complete?</p>	Go to Step 21	-
20	<ol style="list-style-type: none"> 1. Install the compressor hose assembly. Refer to <u>Compressor Hose Assembly Replacement (LL8)</u> or <u>Compressor Hose Assembly Replacement (LH6, LS2)</u>. 2. Recharge the A/C system. Refer to <u>Refrigerant Recovery and Recharging</u>. <p>Are the repairs complete?</p>	Go to Step 21	-

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21	<p>1. Record the low and the high side pressures and the panel outlet air temperature after you perform the repairs.</p> <p>2. Compare the pressures and the panel outlet temperature to those listed in the A/C Performance Chart. Refer to <u>Air Conditioning (A/C) System Performance Test</u>.</p> <p>Are the readings within the specified ranges as shown on the A/C Performance Chart?</p>	Go to Step 22	Go to <u>Air Conditioning (A/C) System Performance Test</u>
22	<p>Operate the system in order to verify the repair. Did you find and correct the condition?</p>	System OK	Go to <u>Symptoms - HVAC Systems - Manual</u> or Go to <u>Symptoms - HVAC Systems - Automatic</u>

HEATING PERFORMANCE DIAGNOSTIC

Step	Action	Yes	No
DEFINITION: Heating system performance			
1	<p>Were you sent here from Symptoms or another diagnostic table?</p>	Go to Step 2	Go to <u>Symptoms - HVAC Systems - Manual</u> or Go to <u>Symptoms - HVAC Systems - Automatic</u>
2	<p>1. Start the engine.</p> <p>2. Allow the engine to idle.</p> <p>Does the engine reach normal operating temperature?</p>	Go to Step 3	Go to Step 9
3	<p>CAUTION: Refer to <u>Moving Parts and Hot Surfaces Caution</u> .</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 Step 7	Go to Step 4
4	<ol style="list-style-type: none"> 1. Install a thermometer into the center instrument panel (I/P) PANEL air outlet. 2. Secure a thermometer to the heater core outlet heater hose. 3. Select the PANEL mode. 4. Select the maximum blower speed. 5. Select the warmest temperature setting. 6. Record the temperature at the following locations: <ul style="list-style-type: none"> • The center I/P PANEL air outlet • The heater core outlet heater hose 7. Compare the recorded temperatures. <p>Are the 2 temperature readings about equal?</p>	Go to Step 5	Go to Step 6
5	<ol style="list-style-type: none"> 1. Inspect and repair the following areas of the vehicle for cold air leaks: <ul style="list-style-type: none"> • The cowl • The recirculation door • The HVAC module case 2. Perform the necessary repairs. <p>Are the repairs complete?</p>	Go to Step 10	-
6	<ol style="list-style-type: none"> 1. Inspect the temperature door operation. Refer to <u>Diagnostic System Check - Vehicle</u> . 2. Perform any necessary repairs. <p>Are the repairs complete?</p>	Go to Step 10	-
7	<ol style="list-style-type: none"> 1. Turn OFF the engine. 2. Backflush the heater core. 3. Start the engine. 4. Select the FLOOR mode. 5. Select the minimum blower speed. 6. Select the warmest temperature setting. 7. Feel the temperature of the inlet and outlet heater hoses at the heater core. <p>Does the inlet heater hose feel warmer than the outlet heater hose?</p>	Go to Step 8	Go to Step 10

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8	Replace the heater core. Refer to <u>Heater Core Replacement</u> . Is the repair complete?	Go to Step 10	-
9	Repair the low engine temperature concern. Refer to <u>Engine Fails To Reach Normal Operating Temperature</u> . Is the repair complete?	Go to Step 10	-
10	Operate the system in order to verify the repair. Did you find and correct the condition?	System OK	Go to Step 2

DEFROSTING INSUFFICIENT

Step	Action	Yes	No
DEFINITION: Time required to defrost the windshield is longer than usual.			
1	Were you sent here from Symptoms or another diagnostic table?	Go to Step 2	Go to <u>Symptoms - HVAC Systems - Manual</u> or Go to <u>Symptoms - HVAC Systems - Automatic</u>
2	<ol style="list-style-type: none"> 1. Start the engine. 2. Select the DEFROST mode. 3. Select the maximum blower speed. Does sufficient air flow from the defroster outlets?	Go to Step 3	Go to Step 10
3	Measure the engine operating temperature. Does engine reach a normal operating temperature?	Go to Step 4	Go to Step 8
4	<ol style="list-style-type: none"> 1. Select the minimum blower speed. 2. Select the warmest temperature setting. <p>CAUTION: Refer to <u>Moving Parts and Hot Surfaces Caution</u> .</p> <ol style="list-style-type: none"> 3. Feel the temperature of the inlet and outlet hoses at the heater core. Does the inlet heater hose feel warmer than the outlet heater hose?	Go to Step 11	Go to Step 5
5	Test the operation of the A/C compressor clutch. Does the A/C compressor clutch engage?	Go to Step 7	Go to Step 6
	Repair the A/C compressor clutch. Refer to <u>Air Conditioning Compressor Malfunction</u> for the		

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6	automatic system or to <u>Air Conditioning Compressor Malfunction</u> for the manual system. Is the repair complete?	Go to Step 14	-
7	Perform the A/C system performance test. Refer to <u>Air Conditioning (A/C) System Performance Test</u> . Is the A/C system operating within the specifications?	Go to Step 9	Go to Step 12
8	Repair the low engine temperature concern. Refer to <u>Engine Fails To Reach Normal Operating Temperature</u> . Is the repair complete?	Go to Step 14	-
9	Inspect for correct operation of the recirculation door. Is the recirculation door operating correctly?	Go to Step 14	Go to Step 13
10	Repair the air delivery concern. Refer to <u>Diagnostic Starting Point - Heating, Ventilation and Air Conditioning</u> . Is the repair complete?	Go to Step 14	-
11	Repair the heating concern. Refer to <u>Heating Performance Diagnostic</u> . Is the repair complete?	Go to Step 14	-
12	Repair the A/C performance concern. Refer to <u>Air Conditioning (A/C) System Performance Test</u> . Is the repair complete?	Go to Step 14	-
13	Repair the recirculation door concern. Refer to <u>Diagnostic Starting Point - Heating, Ventilation and Air Conditioning</u> . Is the repair complete?	Go to Step 14	-
14	Operate the system in order to verify the repair. Did you find and correct the condition?	System OK	Go to Step 2

NOISE DIAGNOSIS - AUXILIARY BLOWER MOTOR

Step	Action	Yes	No
DEFINITION: Noise originating from the auxiliary blower motor.			
1	Were you sent here from Symptoms or another diagnostic table?	Go to Step 2	Go to <u>Symptoms - HVAC Systems - Manual</u> or <u>Diagnostic System Check - Vehicle</u>
2	<ol style="list-style-type: none"> Sit inside the vehicle. Close the vehicle doors and windows. Turn ON the ignition, with the engine OFF. Cycle the auxiliary blower motor through all of the speeds and modes in order to determine 		

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	where and when the noise occurs.		
	Is a noise evident during auxiliary blower operation?	Go to Step 3	Go to Step 10
3	Does the noise vary with the auxiliary blower speed?	Go to Step 4	Go to Step 5
4	Inspect for excessive vibration at each auxiliary blower motor speed by feeling the auxiliary blower case. Is excess vibration present?	Go to Step 5	Go to Step 10
5	1. Remove the auxiliary blower motor. Refer to <u>Auxiliary Blower Motor Replacement</u> . 2. Inspect the auxiliary blower motor for deposits of foreign material. Did you find foreign material on the auxiliary blower motor?	Go to Step 7	Go to Step 6
6	Inspect the auxiliary blower motor for the following conditions: <ul style="list-style-type: none"> • Cracked blades • A loose impeller retainer • Improper impeller alignment Did you find any of these conditions?	Go to Step 8	Go to Step 9
7	Remove the foreign material. Is the action complete?	Go to Step 10	-
8	Replace the auxiliary blower motor. Refer to <u>Auxiliary Blower Motor Replacement</u> . Is the action complete?	Go to Step 10	-
9	Install the auxiliary blower motor. Refer to <u>Auxiliary Blower Motor Replacement</u> . Is the action complete?	Go to Step 10	-
10	Operate the system in order to verify the repair. Did you find and correct the condition?	System OK	Go to Step 2

NOISE DIAGNOSIS - BLOWER MOTOR

Step	Action	Yes	No
DEFINITION: Noise originating from the blower motor.			
1	Were you sent here from Symptoms or another diagnostic table?	Go to Step 2	Go to <u>Symptoms - HVAC Systems - Manual</u> or to <u>Symptoms - HVAC Systems - Automatic</u>

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2	<ol style="list-style-type: none"> 1. Sit inside the vehicle. 2. Close the vehicle doors and windows. 3. Turn ON the ignition switch, with the engine OFF. 4. Cycle through all the blower motor speeds and modes in order to determine where noise occurs. <p>Is the noise evident during blower operations?</p>	Go to Step 3	Go to Step 10
3	Does the noise vary with the blower speed?	Go to Step 4	Go to Step 10
4	<p>Inspect for excess vibration at each blower motor speed by feeling the blower case.</p> <p>Is excess vibration present?</p>	Go to Step 5	Go to Step 10
5	<ol style="list-style-type: none"> 1. Remove the blower motor. Refer to <u>Blower Motor Replacement</u>. 2. Inspect the blower motor for deposits of foreign material. <p>Did you find any foreign material on the blower motor?</p>	Go to Step 7	Go to Step 6
6	<p>Inspect the blower motor for the following conditions:</p> <ul style="list-style-type: none"> • Cracked blades • A loose impeller retainer • Improper impeller alignment <p>Did you find any of these conditions?</p>	Go to Step 8	Go to Step 9
7	<p>Remove the foreign material.</p> <p>Is the action complete?</p>	Go to Step 10	-
8	<p>Replace the blower motor. Refer to <u>Blower Motor Replacement</u>.</p> <p>Is the action complete?</p>	Go to Step 10	-
9	<p>Install the blower motor. Refer to <u>Blower Motor Replacement</u>.</p> <p>Is the action complete?</p>	Go to Step 10	-
10	<p>Operate the system in order to verify the repair.</p> <p>Did you find and correct the condition?</p>	System OK	Go to Step 2

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.			
	Were you sent here from Symptoms or another diagnostic table?		Go to <u>Symptoms - HVAC Systems</u> -

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1		Go to Step 2	<u>Manual</u> or <u>Symptoms - HVAC Systems - Automatic</u>
2	<p>1. A/C system noises can be generally categorized into three areas:</p> <ul style="list-style-type: none"> • Screeching, squealing or chirping noises • Moaning noises • Vibration/Rattle noises <p>2. Start the engine.</p> <p>3. Ensure that the A/C is ON.</p> <p>Do you hear a screeching, squealing noise when you engage the A/C?</p>	Go to Step 3	Go to Step 9
3	<p>With the engine OFF, inspect the drive belt for excessive wear. Refer to <u>Drive Belt Falls Off and Excessive Wear Diagnosis</u> .</p> <p>Is the drive belt excessively worn?</p>	Go to Step 18	Go to Step 4
4	<p>Inspect the drive belt tension. Refer to <u>Drive Belt Tensioner Diagnosis</u> .</p> <p>Is the drive belt tension correct?</p>	Go to Step 5	Go to Step 19
5	<p>Inspect the drive belt for excessive oil coverage.</p> <p>Is the drive belt covered with oil?</p>	Go to Step 17	Go to Step 6
6	<p>1. Start the engine.</p> <p>2. Ensure that the A/C is ON.</p> <p>3. Inspect the compressor and the clutch.</p> <p>Is the A/C compressor locked up?</p>	Go to Step 23	Go to Step 7
7	<p>Is the A/C compressor clutch slipping?</p>	Go to Step 23	Go to Step 8
8	<p>Using a stethoscope, listen to the A/C compressor for any abnormal noises.</p> <p>Is the compressor causing an abnormal noise?</p>	Go to Step 15	Go to Step 10
9	<p>Does a moaning noise exist when the A/C clutch is engaged?</p>	Go to Step 10	Go to Step 12
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 Step 20	Go to Step 11
	<p>1. Start the engine.</p> <p>2. Engage the A/C compressor clutch.</p> <p>3. Using a stethoscope, move around the entire</p>		

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11	<p>refrigerant plumbing system. Listening for any abnormal noises caused by a component of the A/C system touching another component.</p> <p>Are any of the A/C components grounding out and causing a vibration noise?</p>	Go to Step 22	Go to Step 13
12	Does a vibration or rattle noise exist when the A/C clutch is engaged?	Go to Step 13	Go to Step 14
13	Does the noise stop when the A/C clutch is disengaged?	Go to Step 15	Go to Step 24
14	<p>1. Idle the engine in PARK with the A/C compressor clutch engaged.</p> <p>2. Using a stethoscope, move around the entire A/C system listening for any abnormal noises caused by a component.</p> <p>Do any of the A/C components cause an abnormal noise?</p>	Go to Step 21	Go to Step 24
15	<p>Verify that the A/C system is properly charged. Refer to <u>Refrigerant System Capacities</u>.</p> <p>Is the A/C system properly charged?</p>	Go to Step 24	Go to Step 16
16	<p>Recharge the A/C system to specification. Refer to <u>Refrigerant Recovery and Recharging</u>.</p> <p>Is the abnormal compressor noise still present?</p>	Go to Step 23	Go to Step 25
17	<p>Repair the oil leak. Refer to the appropriate repair procedure in Engine Mechanical.</p> <p>Is the repair complete?</p>	Go to Step 25	-
18	<p>Replace the drive belt. Refer to <u>Drive Belt Replacement</u>.</p> <p>Is the replacement complete?</p>	Go to Step 25	-
19	<p>Replace the drive belt tensioner. Refer to <u>Drive Belt Tensioner Replacement</u>.</p> <p>Is the replacement complete?</p>	Go to Step 25	-
20	<p>Repair or replace the A/C compressor mounting component.</p> <p>Is the repair complete?</p>	Go to Step 25	-
21	<p>Repair or replace the component which is causing the moaning concern as needed.</p> <p>Is the repair complete?</p>	Go to Step 25	-
22	<p>Correctly route or insulate the A/C component.</p> <p>Is the repair complete?</p>	Go to Step 25	-
23	<p>Replace the A/C compressor. Refer to <u>Compressor Replacement (LL8)</u> or <u>Compressor Replacement (LH6, LS2)</u>.</p> <p>Is the replacement complete?</p>	Go to Step 25	-
	The concern may be caused by an engine related		

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

NOISE DIAGNOSIS - HVAC MODULE

Step	Action	Yes	No
DEFINITION: Noise originating from the HVAC module.			
1	Were you sent here from Symptoms or another diagnostic table?	Go to Step 2	Go to <u>Symptoms - HVAC Systems - Manual</u> or <u>Symptoms - HVAC Systems - Automatic</u>
2	<ol style="list-style-type: none"> 1. Start the engine. 2. Cycle through all of the following: <ul style="list-style-type: none"> • Blower motor speeds • HVAC Modes • Temperature control settings 3. Attempt to define the type of noise: <ul style="list-style-type: none"> • Scrape, pop • Tick/click, chirp or groaning • Air rush/whistle <p>Is a scrape or pop noise evident when selecting modes or temperature settings?</p>	Go to Step 6	Go to Step 3
3	Is a tick/click, chirping, groaning or scraping noise present, but decreases as blower motor speed is decreased?	Go to Step 6	Go to Step 4
4	Is an air rush/whistle noise evident in all modes but not all temperature settings?	Go to Step 6	Go to Step 5
5	Is an air rush/whistle noise evident only in defrost or floor mode?	Go to Step 6	Go to Step 6
6	Remove the I/P carrier. Refer to <u>Instrument Panel Carrier Replacement</u> . Is the action complete?	Go to Step 7	-
7	<ol style="list-style-type: none"> 1. Inspect the air flow doors for proper operation. 2. Inspect the ducts for obstructions or foreign materials. <p>Were any of these conditions found?</p>	Go to Step 12	Go to Step 8

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

ODOR DIAGNOSIS

Step	Action	Yes	No
DEFINITION: Odor originating or noticed through the HVAC system.			
1	Were you sent here from Symptoms or another diagnostic table?	Go to Step 2	Go to <u>Symptoms - HVAC Systems - Manual</u> or <u>Symptoms - HVAC Systems - Automatic</u>
2	<ol style="list-style-type: none"> 1. Sit inside the vehicle. 2. Close all of the doors and windows. 3. Start the engine. 4. Allow the engine idle at normal operating temperature. 5. Select the maximum blower speed. 6. Select the PANEL air outlet mode. 7. Select the coldest temperature setting. 8. Cycle through all of the blower speeds, modes and temperatures to define what type of odor is present. <ul style="list-style-type: none"> • Musty smell • Coolant smell • Oil smell <p>Does the odor have a musty smell?</p>	Go to Step 3	Go to Step 8
3	Inspect the HVAC filter and the air inlet grille for debris. Is debris present?	Go to Step 4	Go to Step 5

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4	Remove any debris. Is the action complete?	Go to Step 15	-
5	Inspect for wet carpeting. Is the carpet wet?	Go to Step 6	Go to Step 14
6	Inspect for the following conditions: <ol style="list-style-type: none"> 1. Water leaks around the windshield 2. Blockage of the HVAC module drain 3. Leaks around the door seals Is a leak present?	Go to Step 7	Go to Step 14
7	Repair the leak as necessary. Is the repair complete?	Go to Step 15	-
8	Does the odor have a coolant smell?	Go to Step 9	Go to Step 12
9	Inspect the cooling system for leaks. Refer to <u>Loss of Coolant</u> . Is a leak present?	Go to Step 10	Go to Step 12
10	Inspect for coolant leaking inside the vehicle or for a film build-up on the windshield. Is the condition present?	Go to Step 11	Go to Step 15
11	Replace the heater core. Refer to <u>Heater Core Replacement</u> . Is the repair complete?	Go to Step 15	-
12	Does the odor have an oily smell?	Go to Step 13	Go to Step 15
13	<ol style="list-style-type: none"> 1. Inspect the engine compartment for any leaks. Refer to the following procedures: <ul style="list-style-type: none"> • <u>Oil Leak Diagnosis</u> • <u>Fluid Leak Diagnosis</u> • <u>Power Steering Fluid Leaks</u> 2. Repair any oil leaks. Is the repair complete?	Go to Step 15	-
14	A musty odor can be caused by mold or mildew build-up on the evaporator or the heater core or inside of the HVAC module. Refer to <u>Odor Correction</u> . Is the action complete?	Go to Step 15	-
15	Operate the system in order to verify the repair. Did you find and correct the condition?	System OK	Go to Step 2

REPAIR INSTRUCTIONS

ODOR CORRECTION

Eliminating Air Conditioning Odor

Odors may be emitted from the air conditioning system primarily at start up in hot, humid climates. The following conditions may cause the odor:

- Debris is present in the HVAC module.
- Microbial growth on the evaporator core

When the blower motor fan is turned on, the microbial growth may release an unpleasant musty odor into the passenger compartment. To remove odors of this type, the microbial growth must be eliminated. Perform the following procedure:

Deodorize the evaporator core using Deodorizing Aerosol Kit.

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

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

12. Verify proper clutch operation.

REFRIGERANT RECOVERY & 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

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a display screen that contains the function controls and displays prompts that will lead the technician through the recover, recycle, evacuate and recharge operations. R-134a is recovered into and charged out of an internal storage vessel. The ACR 2000 automatically replenishes this vessel from an external source tank in order to maintain a constant 5.45-6.82 kg (12-15 lbs) of A/C refrigerant.

The ACR 2000 has a built in A/C refrigerant identifier that will test for contamination, prior to recovery and will notify the technician if there are foreign gases present in the A/C system. If foreign gases are present, the ACR 2000 will not recover the refrigerant from the A/C system.

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

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

A/C Refrigerant System Oil Charge Replenishing

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

FLUSHING

Tools Required

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

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

Flushing is intended to remove the following:

Flushing Procedure

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

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

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

2. Remove the orifice tube. Refer to **Expansion (Orifice) Tube Replacement (Short Wheel Base)**.
3. Connect the A/C lines with the orifice tube removed.
4. Remove the A/C compressor. Refer to **Compressor Replacement (LL8)** or **Compressor Replacement (LH6, LS2)**.
5. Install **J 45268** -3 to the A/C compressor hose assembly. See **Special Tools**.

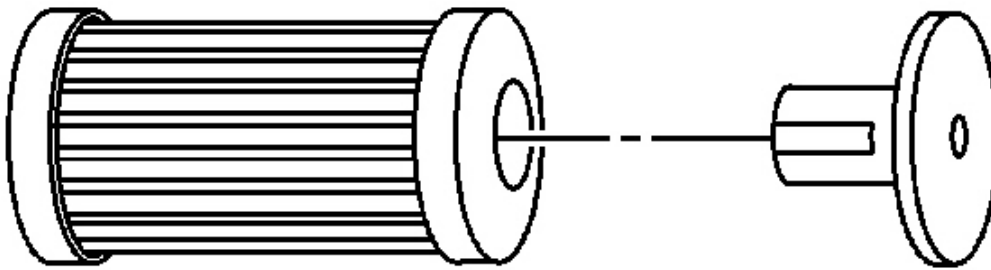


Fig. 3: View Of A/C Filter & Check Valve
Courtesy of GENERAL MOTORS CORP.

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

Perform the following procedure:

IMPORTANT: The filter inside J 45268 -1 is serviceable. See Special Tools. Remove and discard the check valve from the filter.

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

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

2. Connect the blue hose from the **J 43600** to **J 45268** -1 flush filter adapter. See **Special Tools**.
3. Connect the red hose from the **J 43600** to **J 45268** -3. See **Special Tools**.
7. Reverse flow refrigerant flushing is recommended for desiccant bag failure only. Perform the following procedure and replace the accumulator when the flush is complete:

IMPORTANT: The filter inside the J 45268-1 is serviceable. Remove and discard the check valve from the filter.

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

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

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

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

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

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

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

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

12. Add one bottle of **J 41447** directly to the A/C Compressor. See **Special Tools**.
13. Install the A/C compressor. Refer to **Compressor Replacement (LL8)** or **Compressor Replacement (LH6, LS2)**.
14. Inspect the orifice tube for debris. Clean or replace as needed.
15. Install the orifice tube. Refer to **Expansion (Orifice) Tube Replacement (Short Wheel Base)**.
16. Evacuate and recharge the A/C system. Refer to **Refrigerant Recovery and Recharging**.
17. Leak test the fittings using the **J 42220** . See **Special Tools**.

COMPRESSOR OIL BALANCING

Draining Procedure

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

1. 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.

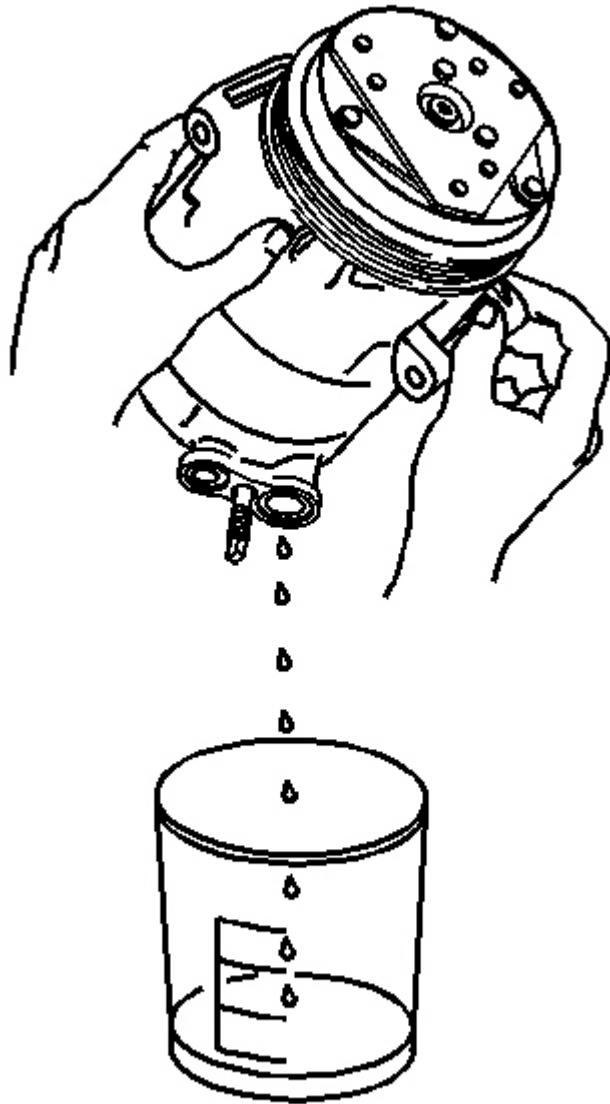


Fig. 4: Draining A/C Refrigerant Oil From Compressor
Courtesy of GENERAL MOTORS CORP.

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

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

3. Properly discard the used refrigerant oil.

Balancing Procedure

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

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

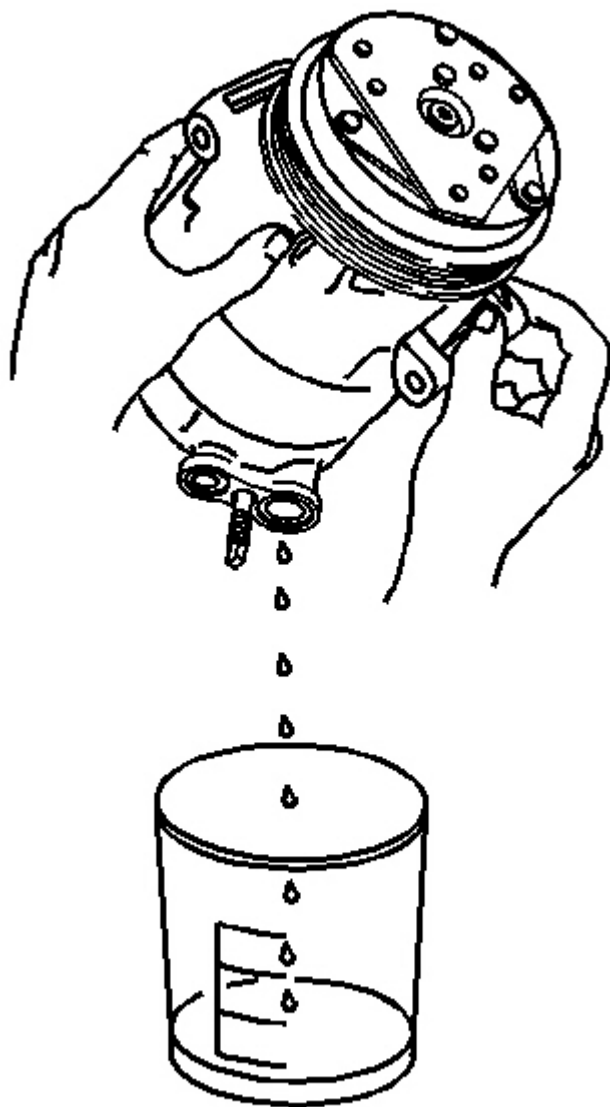


Fig. 5: Draining A/C Refrigerant Oil From Compressor

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Courtesy of GENERAL MOTORS CORP.

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

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

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

COMPRESSOR REPLACEMENT (LL8)

Tools Required

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

Removal Procedure

1. Recover the refrigerant. Refer to **Refrigerant Recovery and Recharging**.
2. Remove the generator. Refer to **Generator Replacement (With 4.2L Engine)** or **Generator Replacement (With V8 Engine)**.
3. Remove the idler pulley. Refer to **Drive Belt Idler Pulley Replacement**.
4. Disconnect the compressor electrical connectors.

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

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

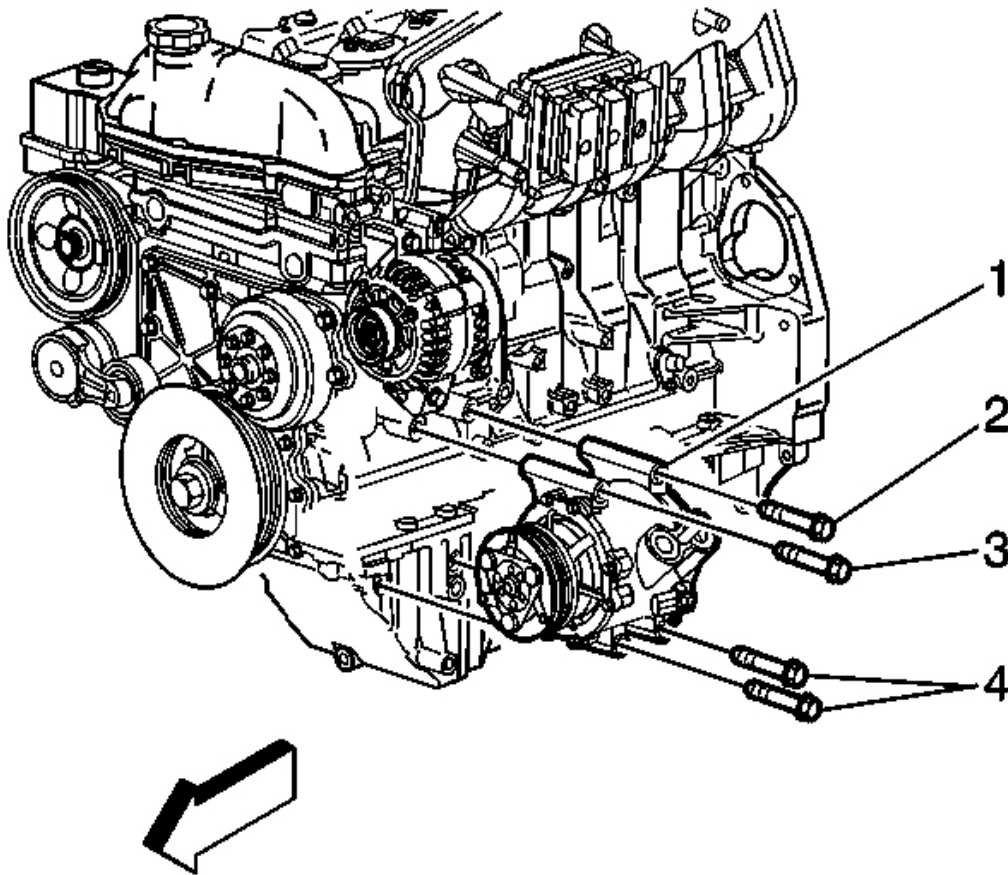


Fig. 6: View Of A/C Compressor & Mounting Bolts
Courtesy of GENERAL MOTORS CORP.

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

Installation Procedure

1. Add the proper amount of oil to the replacement compressor. Refer to **Compressor Oil Balancing**.
2. Install the compressor.

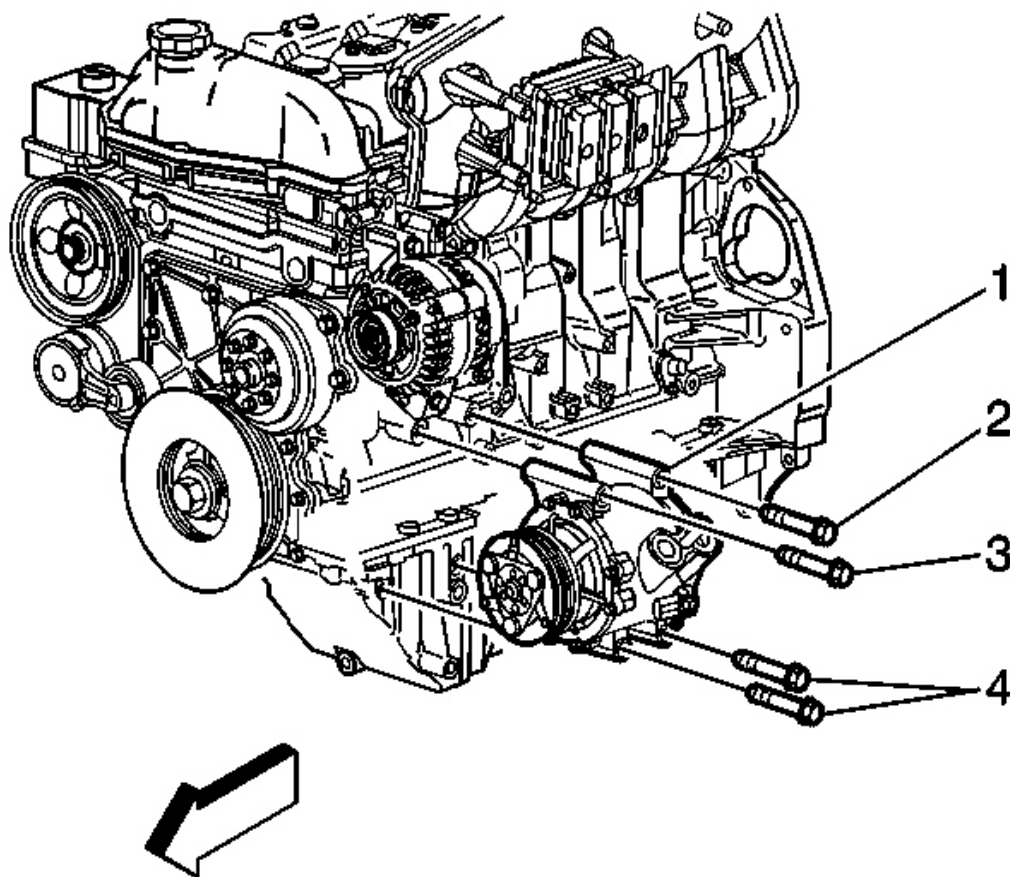


Fig. 7: View Of A/C Compressor & Mounting Bolts
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice .

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

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

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

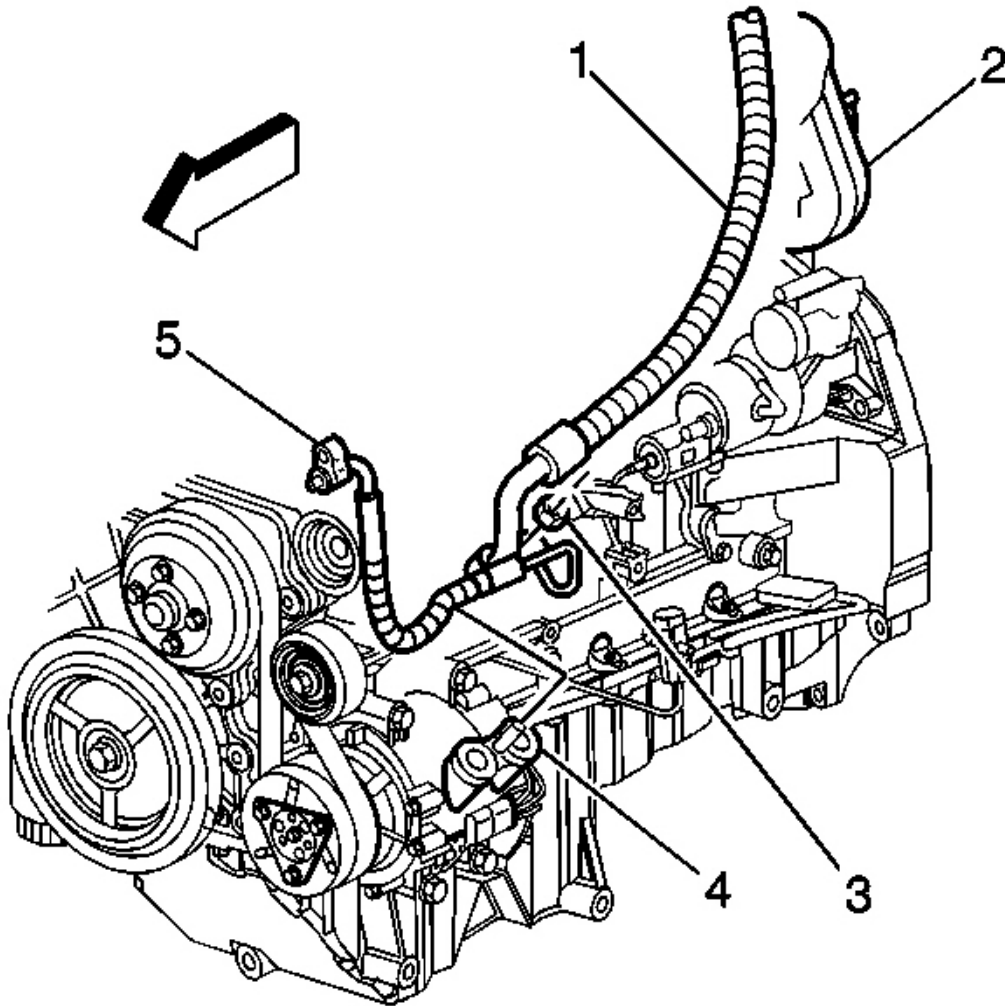


Fig. 8: View Of Compressor Hose Assembly
Courtesy of GENERAL MOTORS CORP.

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

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

6. Connect the compressor electrical connectors.
7. Install the idler pulley. Refer to **Drive Belt Idler Pulley Replacement** .
8. Install the generator. Refer to **Generator Replacement (With 4.2L Engine)** or **Generator Replacement (With V8 Engine)** .

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

COMPRESSOR REPLACEMENT (LH6, LS2)

Special Tools

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

Removal Procedure

1. Recover the refrigerant. Refer to **Refrigerant Recovery and Recharging**.
2. Remove the washer solvent container. Refer to **Windshield Washer Solvent Container Replacement (Envoy, TrailBlazer)** .
3. Remove the air cleaner resonator outlet duct. Refer to Air Cleaner Resonator Outlet Duct Replacement .
4. Remove the cooling fan and shroud. Refer to **Cooling Fan and Shroud Replacement** .
5. Remove the accessory drive belt from the air conditioning (A/C) compressor. Refer to Air Conditioning Compressor Belt Replacement .

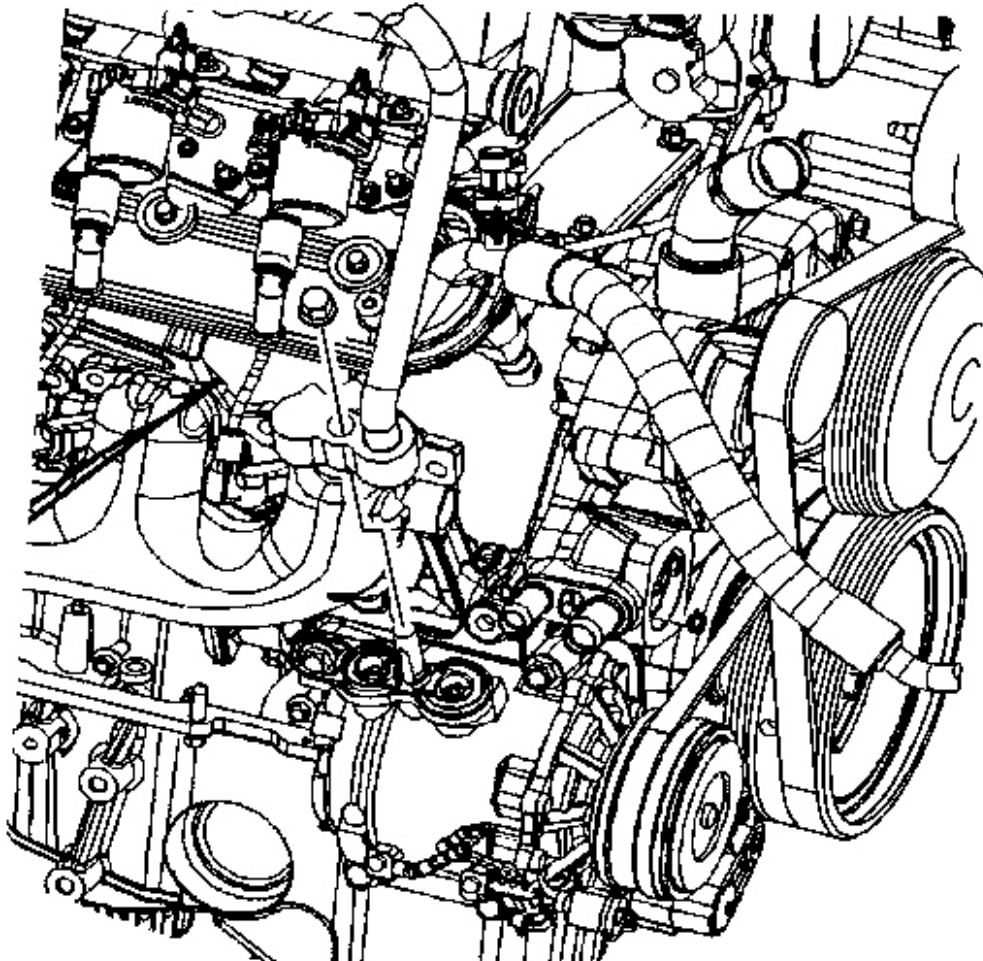


Fig. 9: Identifying Compressor Hose Assembly & Nut
Courtesy of GENERAL MOTORS CORP.

6. Remove the compressor hose assembly nut from the compressor.

IMPORTANT: Remove and discard the sealing washers.

7. Remove the compressor hose assembly from the compressor.

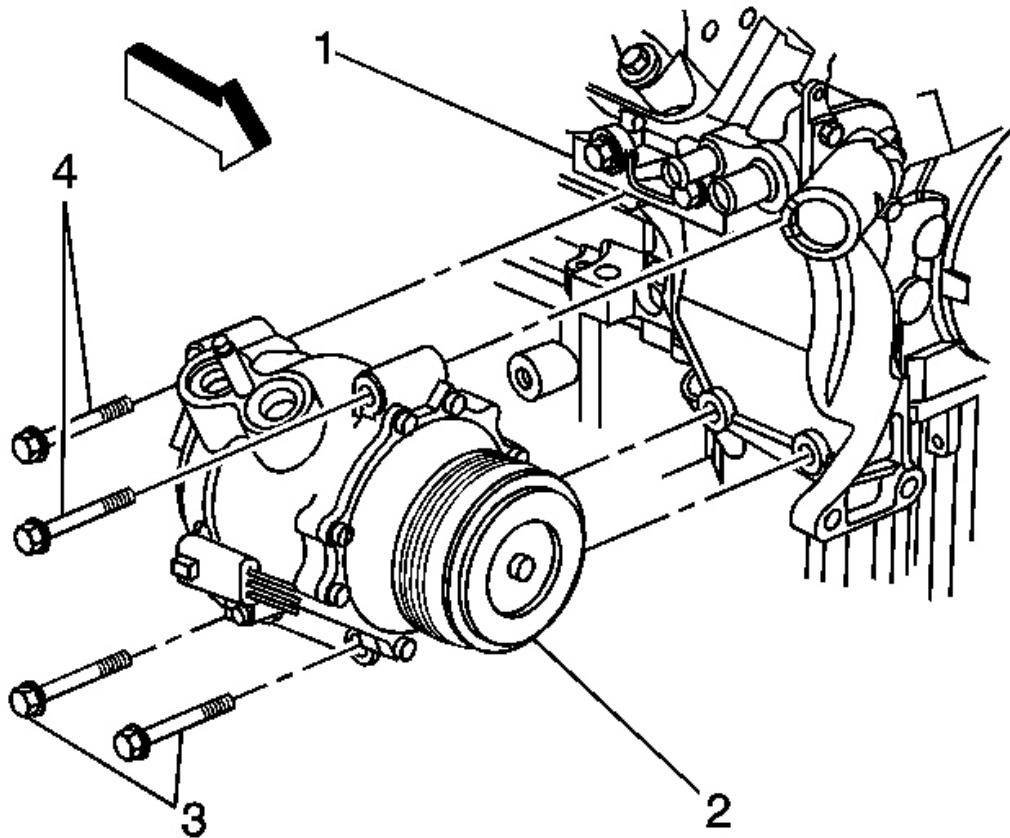


Fig. 10: View Of A/C Compressor Bracket Bolts
Courtesy of GENERAL MOTORS CORP.

8. Remove the upper A/C compressor mounting bracket bolts.
9. Remove the lower coolant hose. Refer to **Radiator Inlet Hose Replacement (LL8)** or **Radiator Inlet Hose Replacement (LH6, LS2)** .
10. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
11. Disconnect the A/C compressor electrical connector.
12. Remove the lower A/C compressor mounting bracket bolts (3).
13. Lower the vehicle.
14. Reposition the compressor and mounting bracket to access the remaining compressor to bracket bolts.
15. Remove the upper A/C compressor mounting bolts (4).
16. Remove the A/C compressor.

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IMPORTANT: Ensure proper compressor oil balancing when replacing the A/C compressor. Refer to Compressor Oil Balancing.

17. Remove the A/C compressor bracket.

Installation Procedure

1. Add the proper amount of polyalkylene glycol (PAG) oil to the compressor crankcase. Refer to Compressor Oil Balancing.
2. Position the A/C compressor mounting bracket partially into the vehicle.
3. Position the A/C compressor partially into the vehicle.

NOTE: Refer to Fastener Notice .

4. Install the upper compressor mounting bolts into the compressor mounting bracket.

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

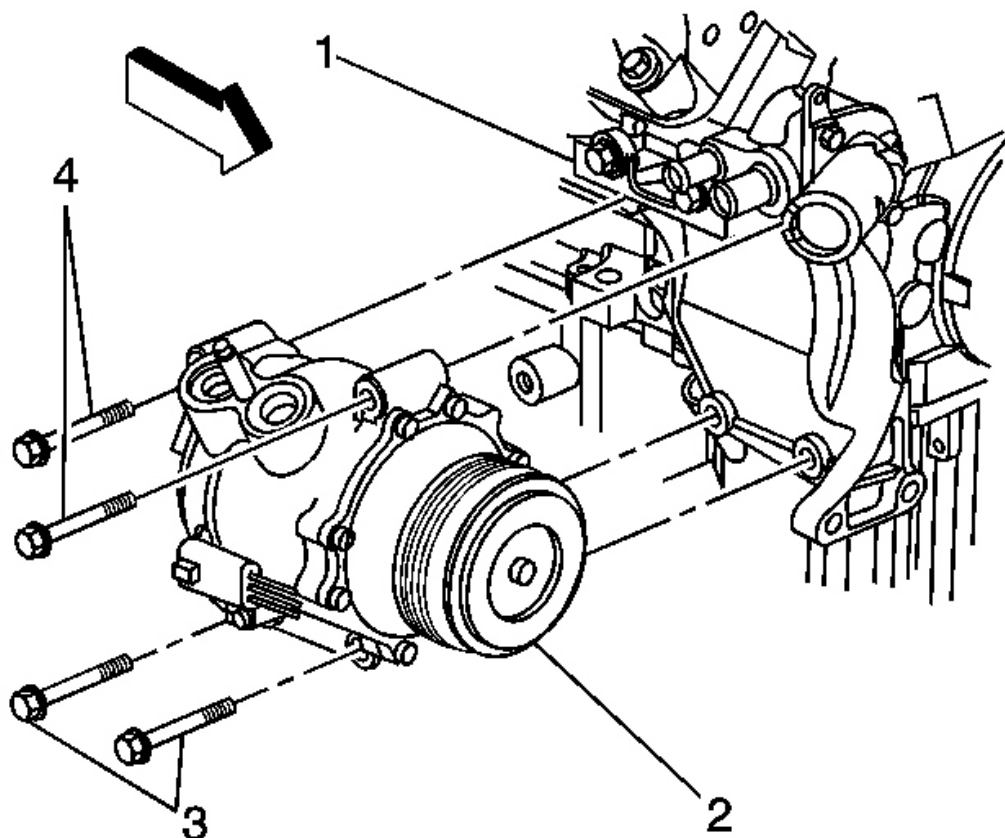


Fig. 11: View Of A/C Compressor Bracket Bolts
Courtesy of GENERAL MOTORS CORP.

5. Install the upper compressor mounting bolts (4) into the compressor and bracket assembly.
6. Position the compressor and bracket assembly into the correct location on the engine.
7. Tighten the upper compressor mounting bolts (4).

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

8. Raise the vehicle.
9. Install the lower compressor mounting bolts (3).

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

10. Connect the A/C compressor electrical connector.
11. Install the lower coolant hose. Refer to **Radiator Inlet Hose Replacement (LL8)** or **Radiator Inlet**

Hose Replacement (LH6, LS2) .

12. Lower the vehicle.

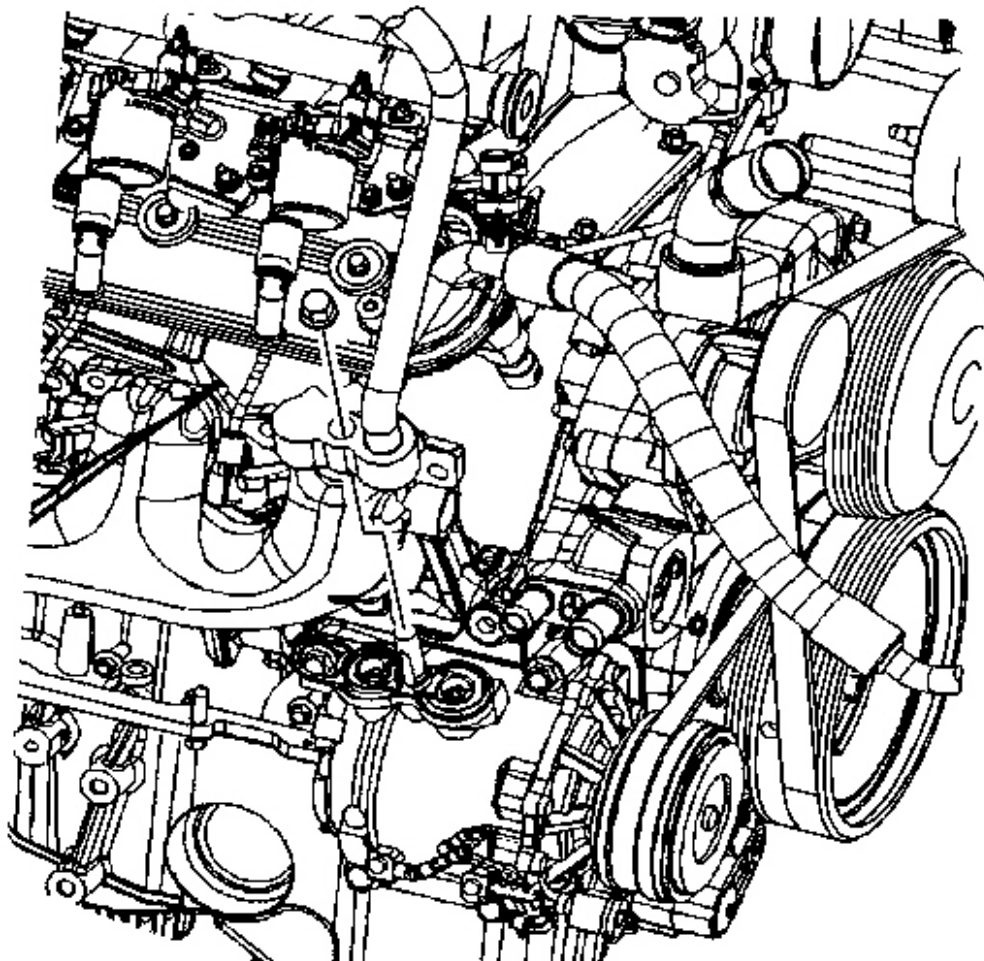


Fig. 12: Identifying Compressor Hose Assembly & Nut
Courtesy of GENERAL MOTORS CORP.

13. Install the compressor hose assembly to the compressor.
14. Install the compressor hose assembly nut to the compressor.

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

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15. Install the accessory drive belt. Refer to Air Conditioning Compressor Belt Replacement .
16. Install the cooling fan and shroud. Refer to **Cooling Fan and Shroud Replacement** .
17. Install the air cleaner resonator outlet duct. Refer to Air Cleaner Resonator Outlet Duct Replacement .
18. Install the washer solvent container. Refer to **Windshield Washer Solvent Container Replacement (Envoy, TrailBlazer)** .
19. Fill the cooling system. Refer to **Cooling System Draining and Filling (LL8)** or **Cooling System Draining and Filling (LH6, LS2)** .
20. Evacuate and recharge the A/C system. Refer to **Refrigerant Recovery and Recharging**.
21. Leak test the fittings of the component using the **J 39400-A** . See **Special Tools**.

SEALING WASHER REPLACEMENT

Removal Procedure

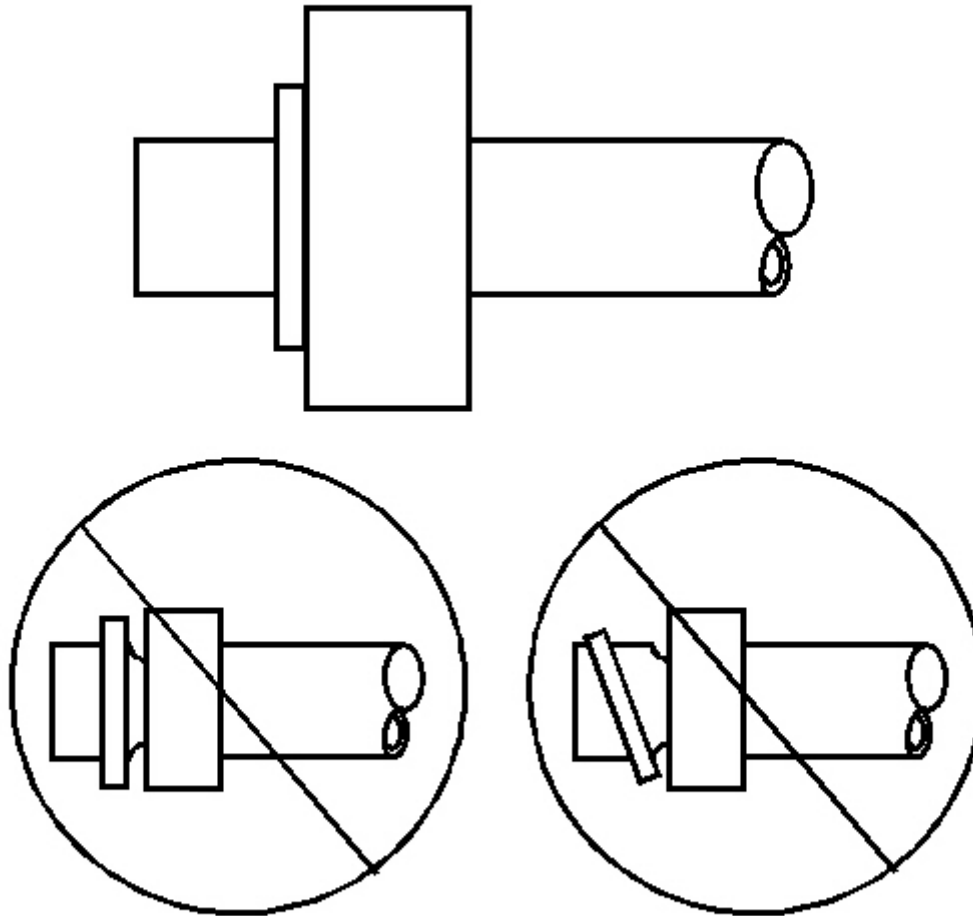


Fig. 13: Identifying Good & Bad Sealing Washer Positions
Courtesy of GENERAL MOTORS CORP.

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.

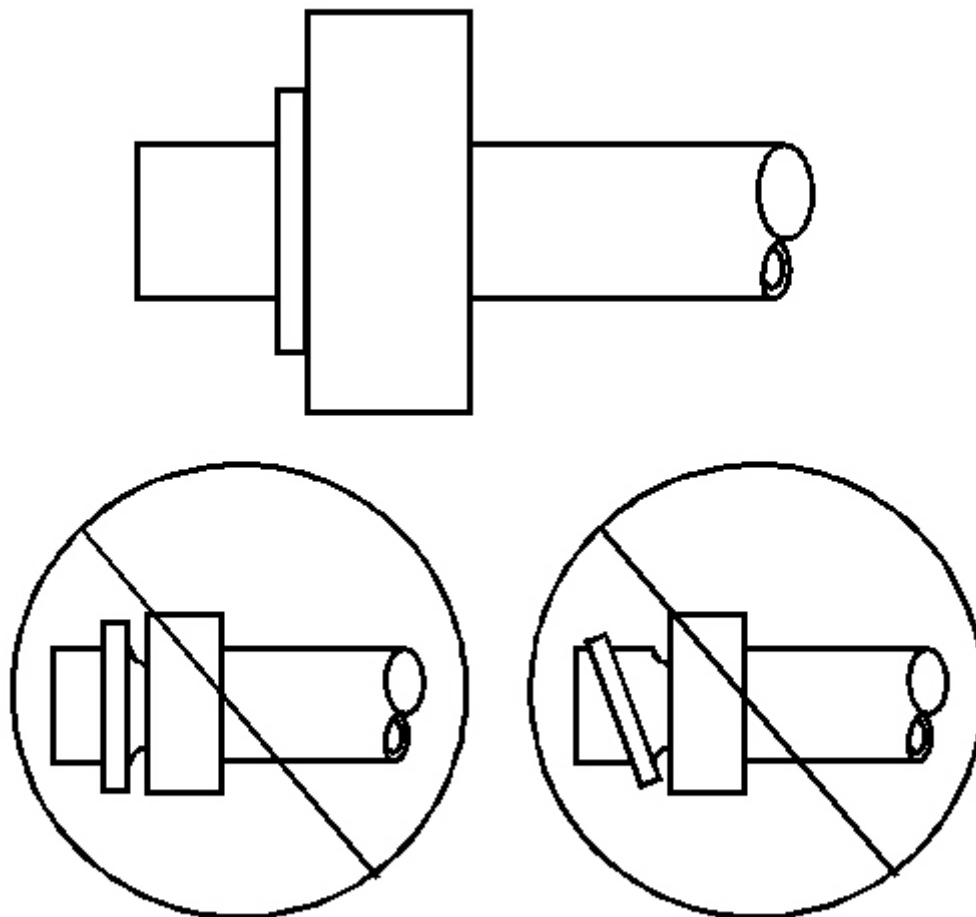


Fig. 14: Identifying Good & Bad Sealing Washer Positions

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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

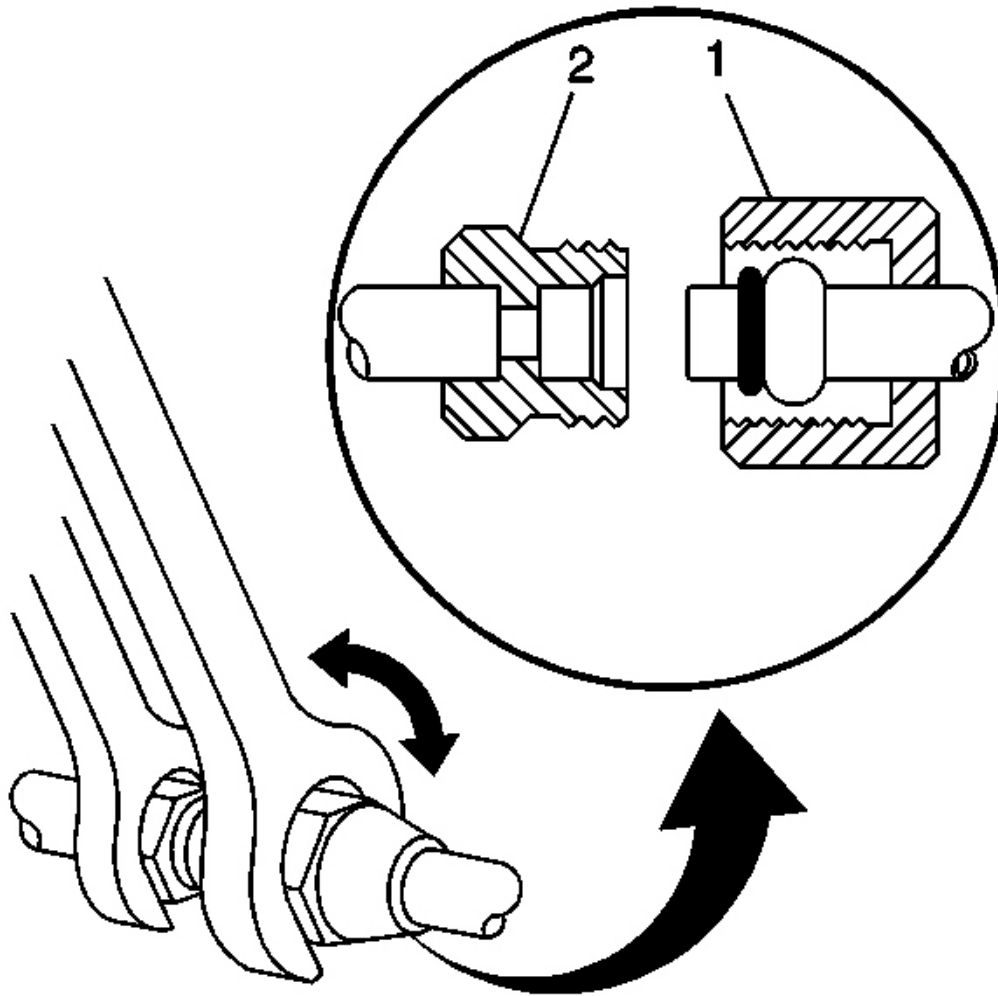


Fig. 15: Disassembling/Reassembling A/C Line Fittings
Courtesy of GENERAL MOTORS CORP.

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.

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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.

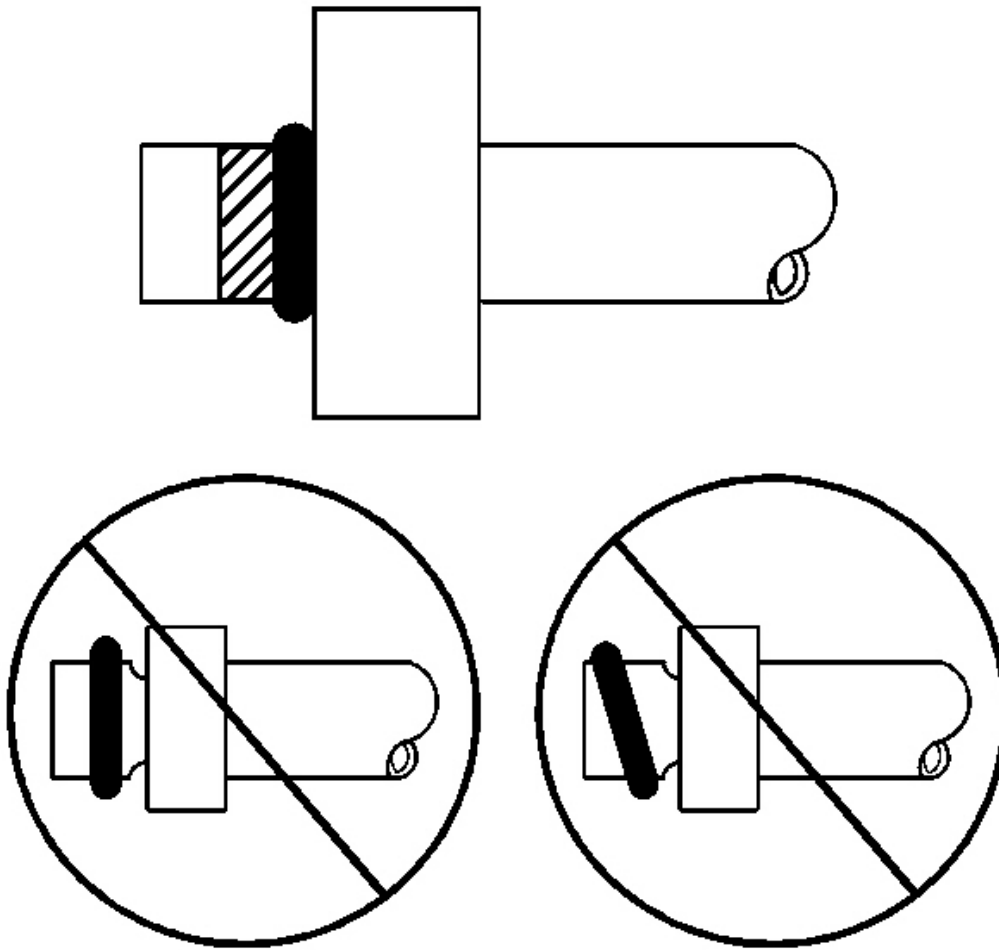


Fig. 16: Identifying Proper Seating Of A/C Refrigerant O-Ring
Courtesy of GENERAL MOTORS CORP.

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

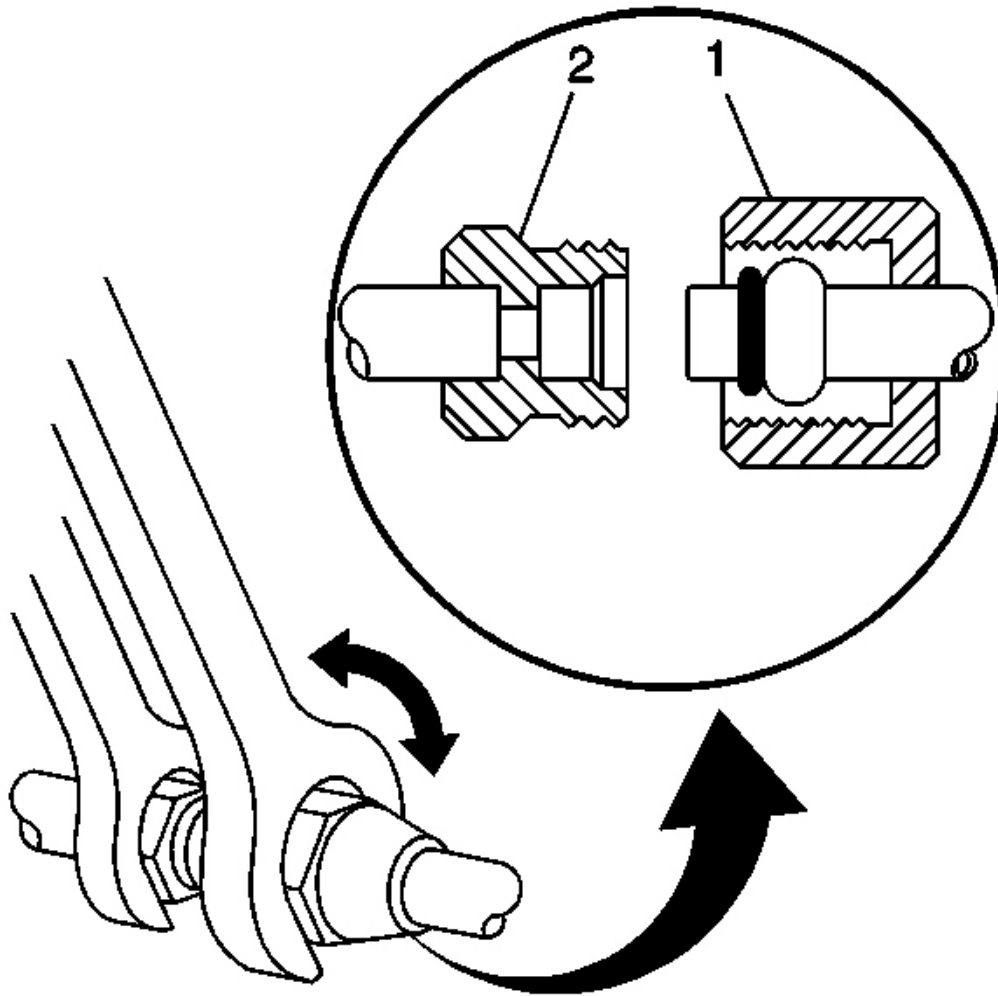


Fig. 17: Disassembling/Reassembling A/C Line Fittings
Courtesy of GENERAL MOTORS CORP.

7. Assemble the A/C components.

Refer to the appropriate repair procedure.

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

COMPRESSOR HOSE ASSEMBLY REPLACEMENT (LL8)

Tools Required

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

Removal Procedure

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

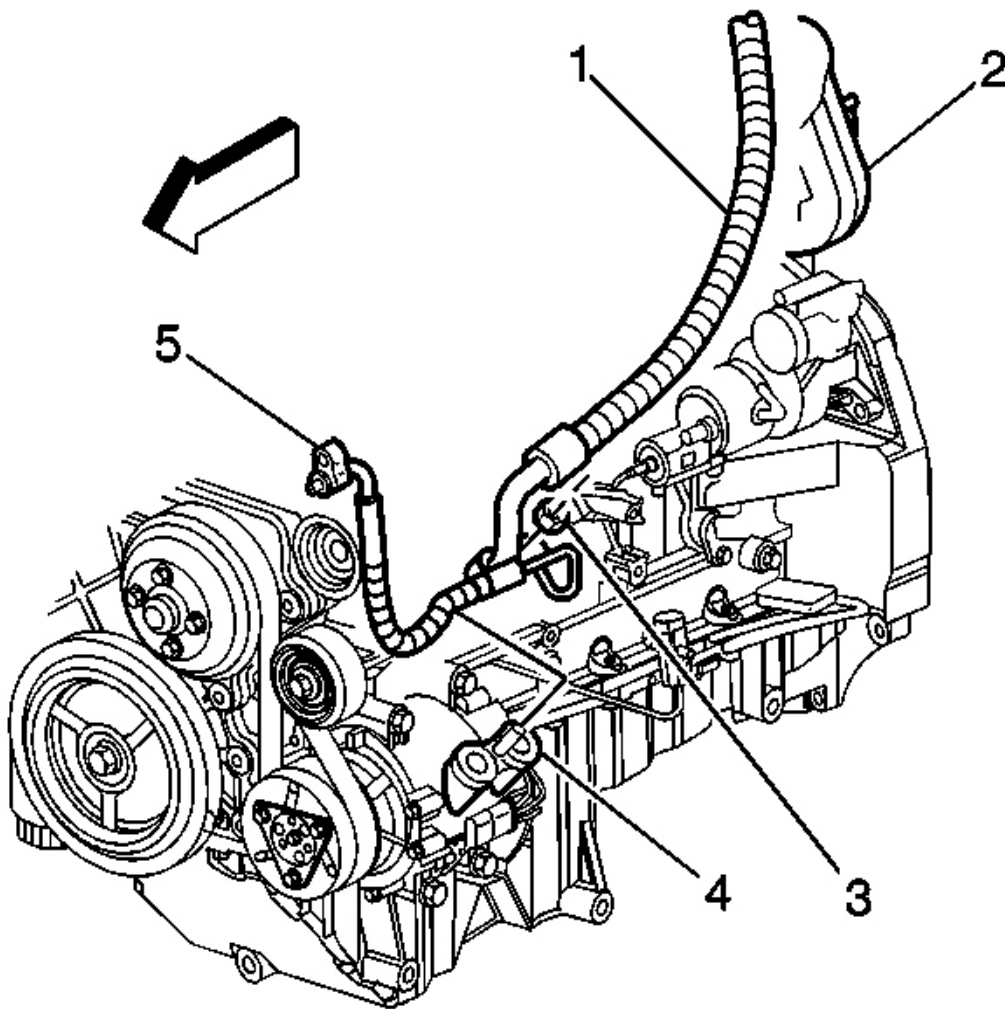


Fig. 18: View Of Compressor Hose Assembly
Courtesy of GENERAL MOTORS CORP.

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

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

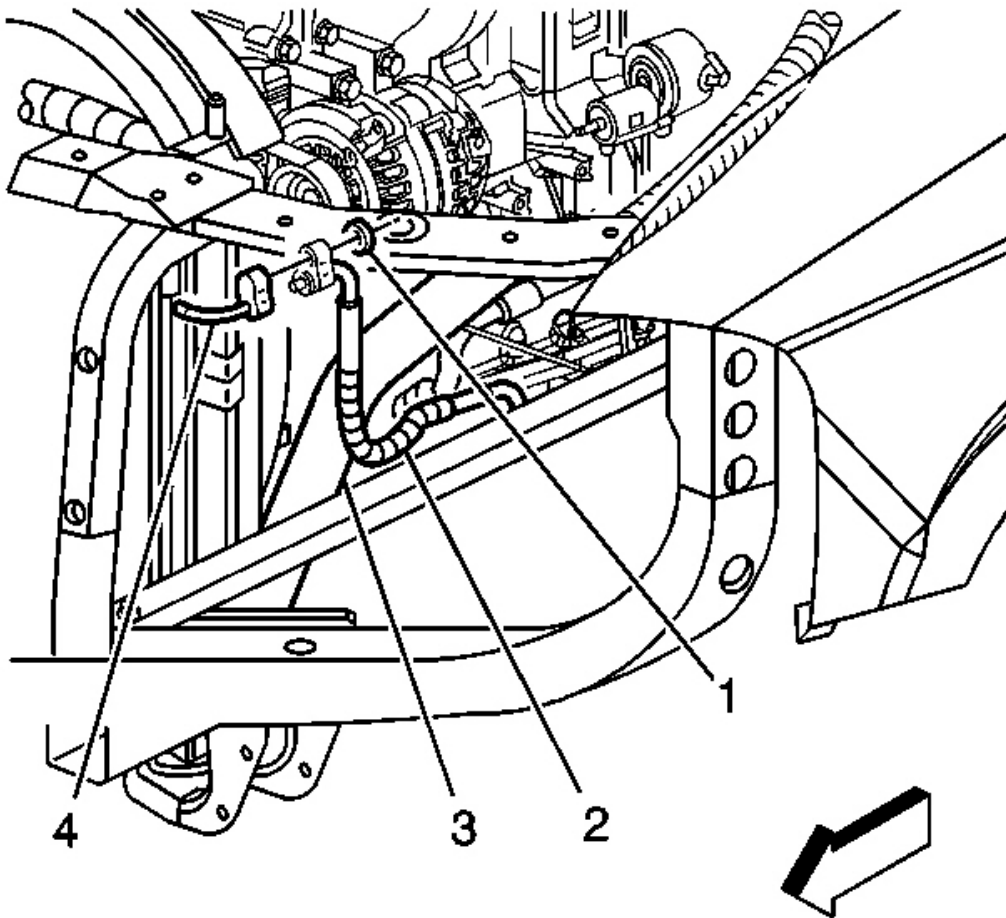


Fig. 19: View Of A/C Compressor Discharge Hose
Courtesy of GENERAL MOTORS CORP.

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

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

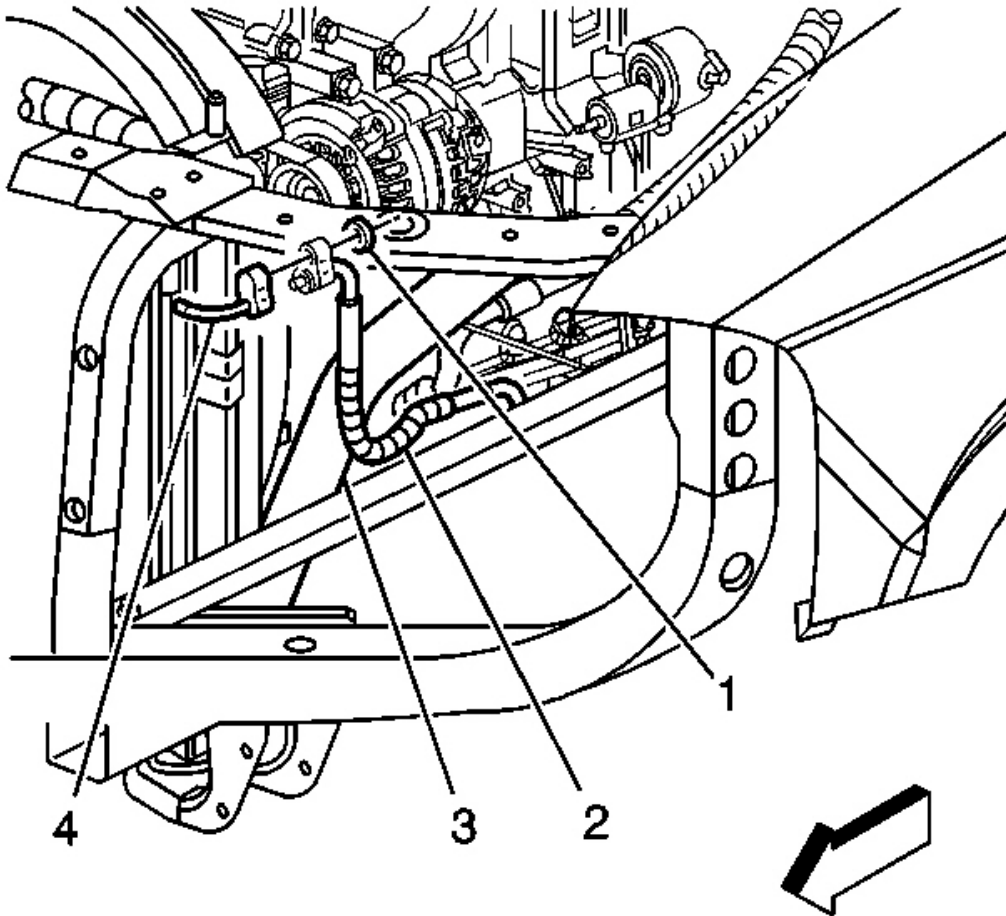
Installation Procedure

Fig. 20: View Of A/C Compressor Discharge Hose
Courtesy of GENERAL MOTORS CORP.

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

NOTE: Refer to **Fastener Notice** .

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3. Install the compressor discharge hose nut.

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

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

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

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

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

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

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

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

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

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

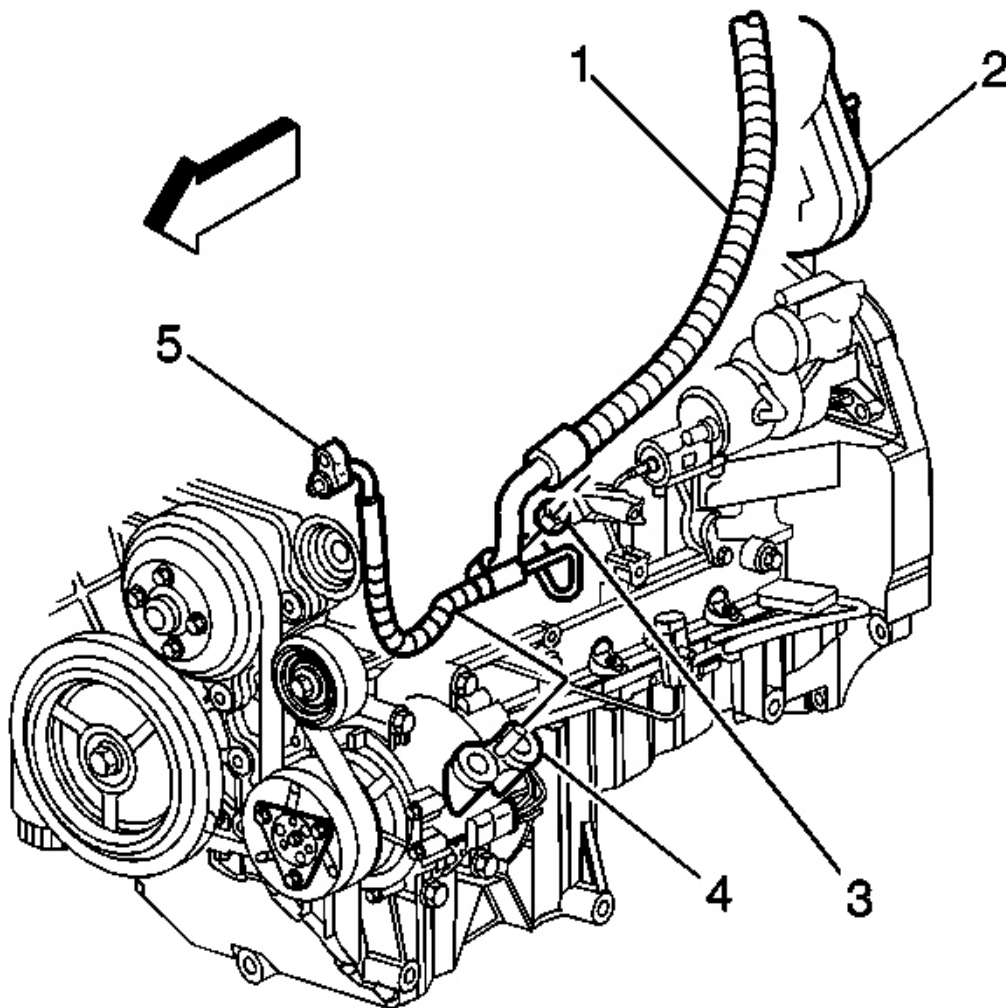


Fig. 21: View Of Compressor Hose Assembly
Courtesy of GENERAL MOTORS CORP.

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

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

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

COMPRESSOR HOSE ASSEMBLY REPLACEMENT (LH6, LS2)

Tools Required

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

Removal Procedure

1. Recover the refrigerant. Refer to Refrigerant Recovery and Recharging.
2. Remove the washer bottle. Refer to Windshield Washer Solvent Container Replacement (Envoy, TrailBlazer).

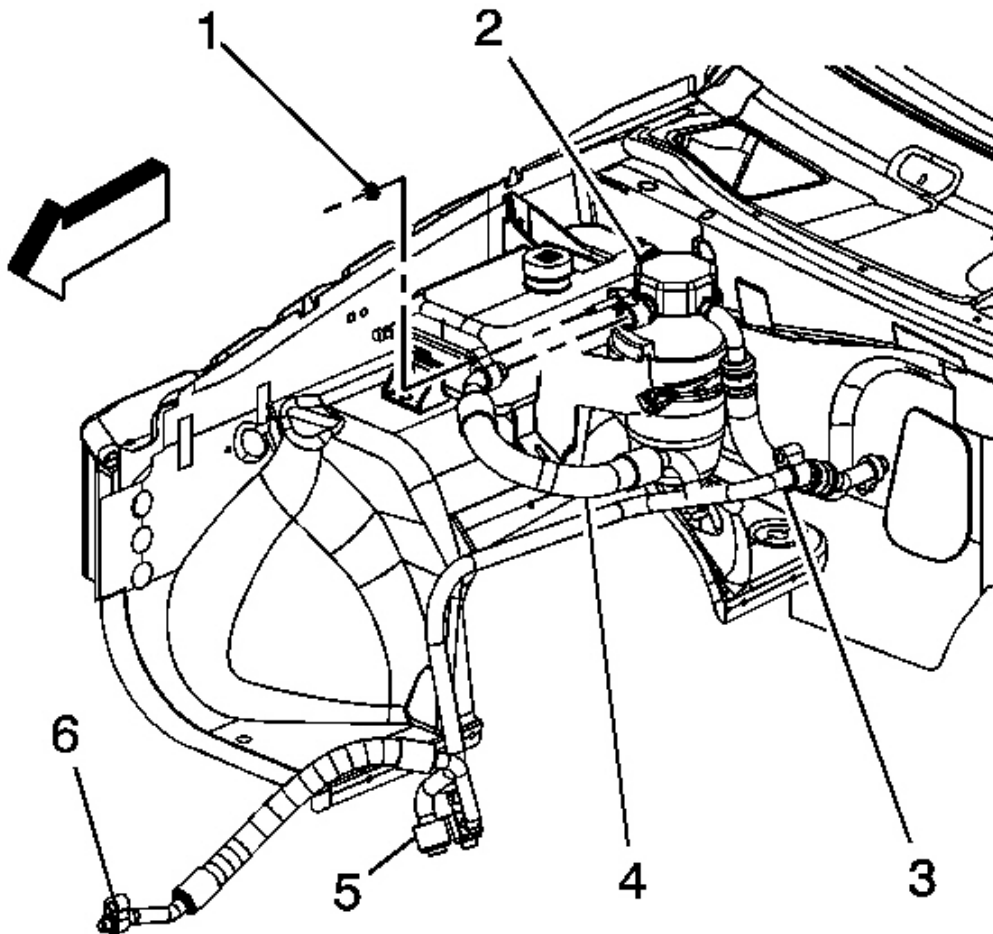


Fig. 22: Locating Compressor Discharge Hose At Accumulator

Courtesy of GENERAL MOTORS CORP.

3. Remove the retaining nut (1) from the compressor hose (4) at the accumulator (2).
4. Remove the retaining nut from the compressor hose at the auxiliary HVAC piping connection (3).
5. Remove the compressor hose from the accumulator (2).
6. Remove the compressor hose from the auxiliary HVAC piping.

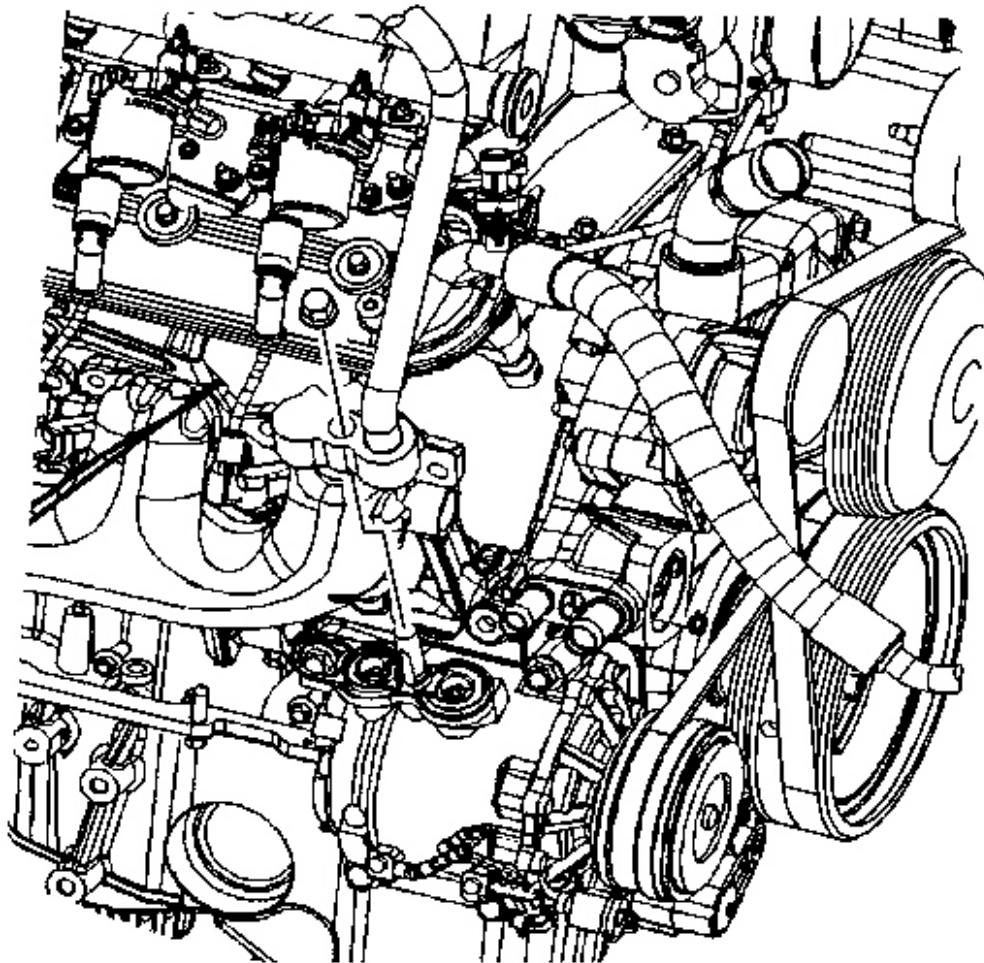


Fig. 23: Identifying Compressor Hose Assembly & Nut
Courtesy of GENERAL MOTORS CORP.

7. Disconnect the pressure sensor electrical connector.

8. Remove the compressor hose mounting nut from the A/C compressor.
9. Remove the heater hose bracket nut at the engine.
10. Remove the bracket from the stud.
11. Turn the compressor hose assembly to clear the heat shield.
12. Lift and remove the compressor hose assembly from the compressor.

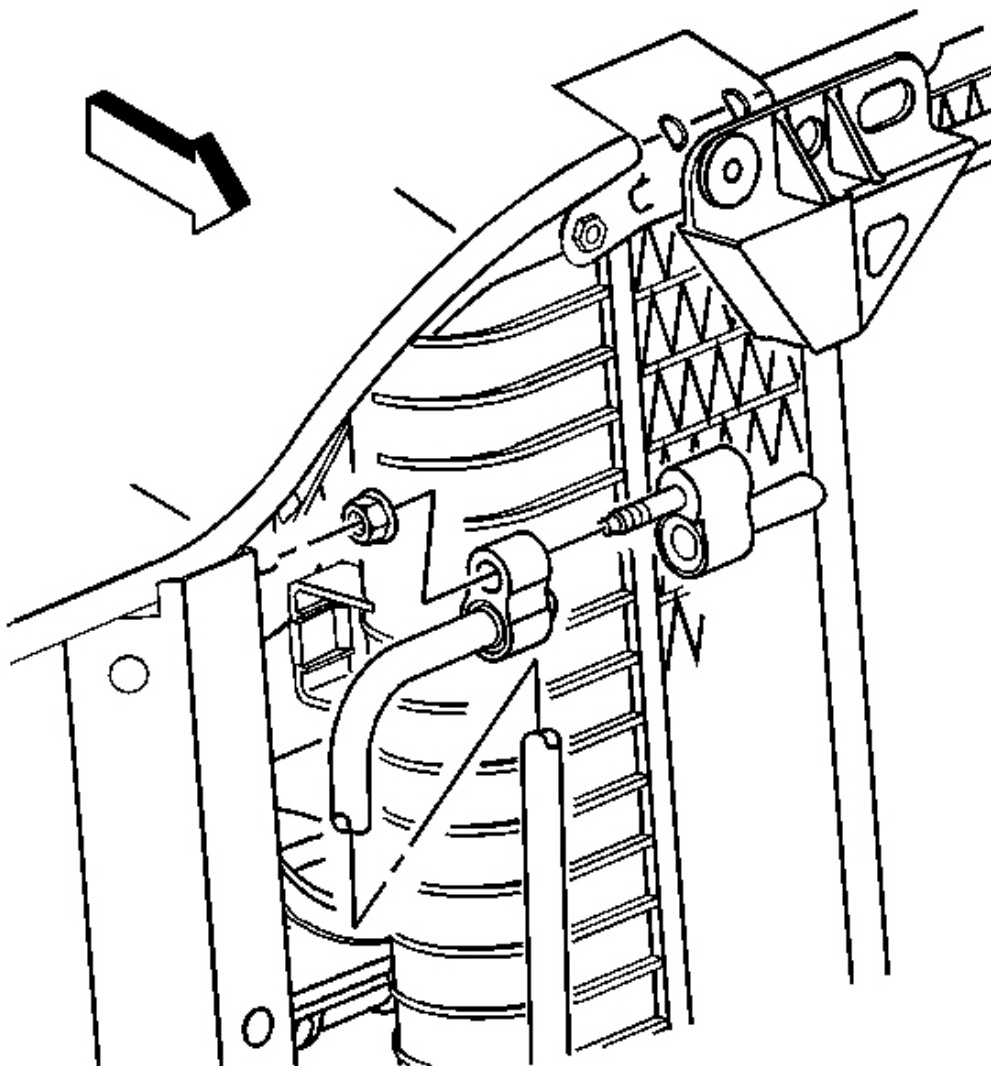


Fig. 24: View Of Discharge Hose At Condenser
Courtesy of GENERAL MOTORS CORP.

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

Installation Procedure

1. Install the compressor hose assembly.

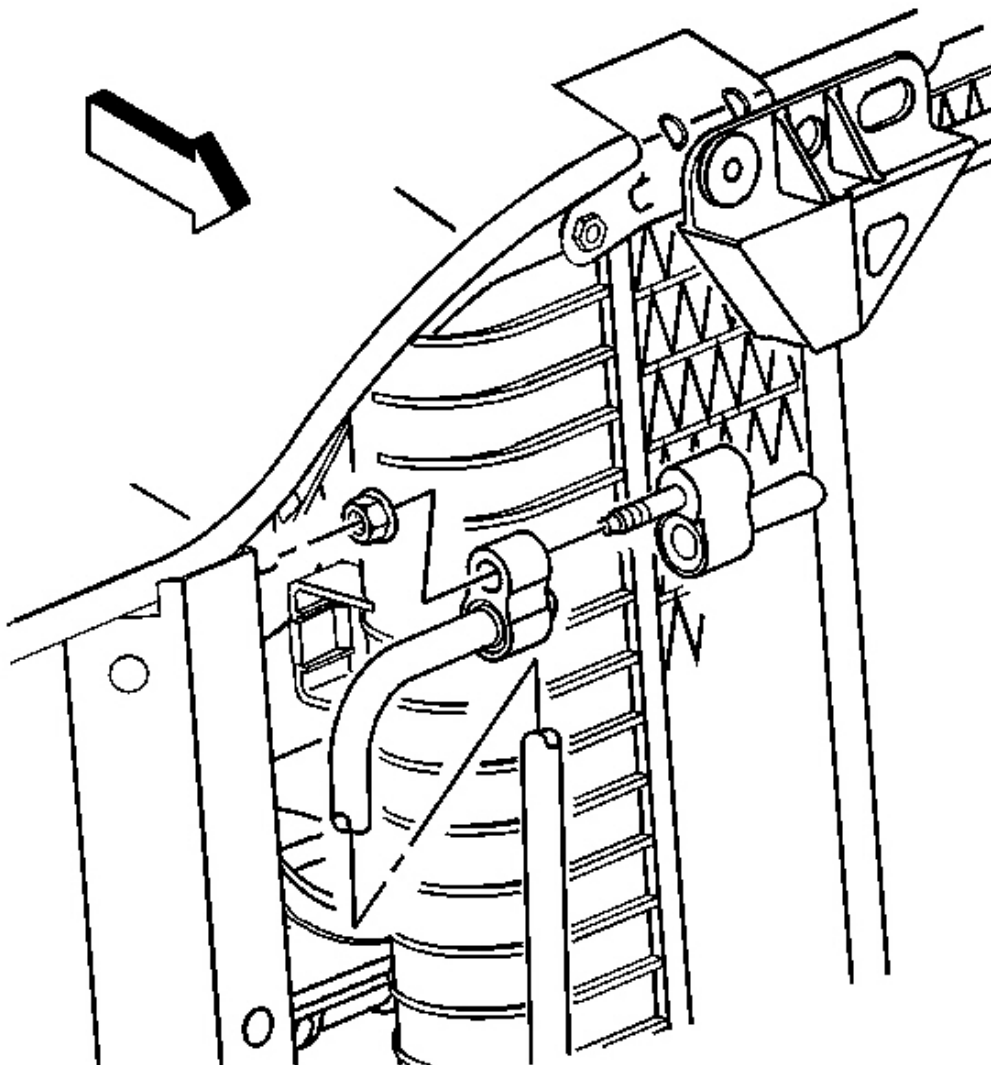


Fig. 25: View Of Discharge Hose At Condenser
Courtesy of GENERAL MOTORS CORP.

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

NOTE: Refer to **Fastener Notice** .

3. Install the compressor hose nut to the condenser.

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

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

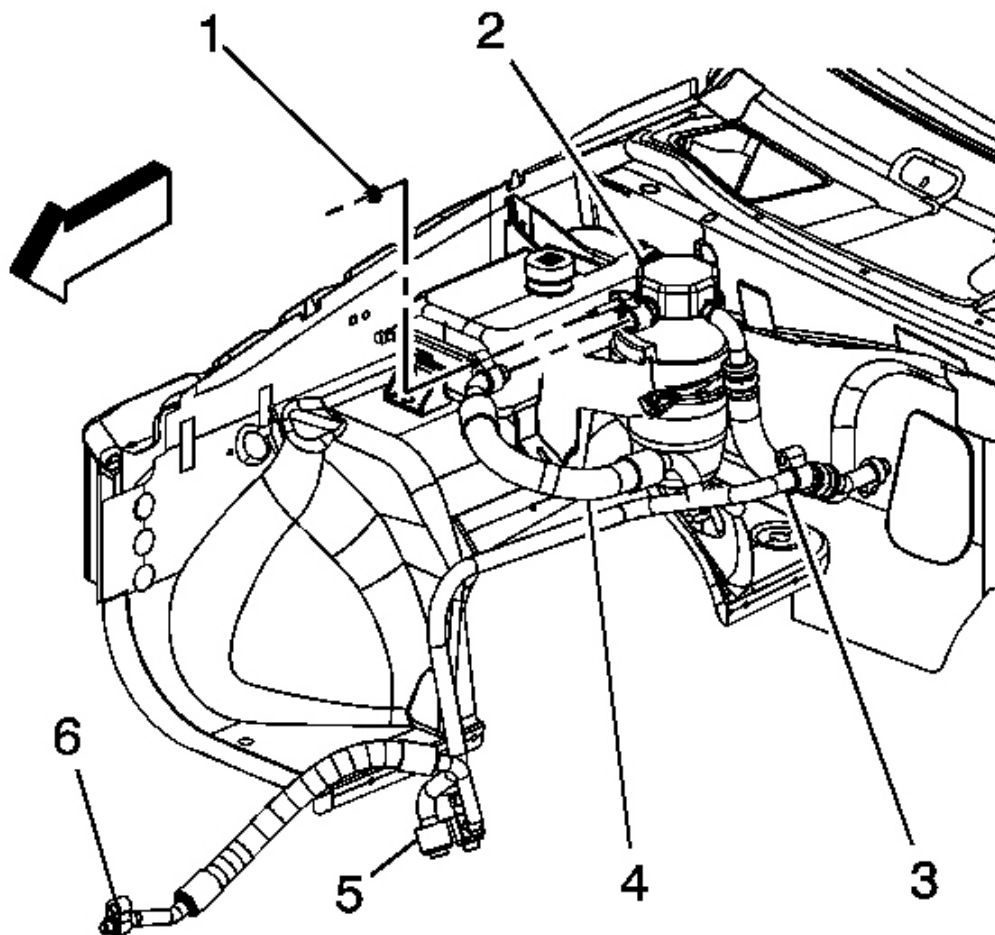


Fig. 26: Locating Compressor Discharge Hose At Accumulator
Courtesy of GENERAL MOTORS CORP.

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

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

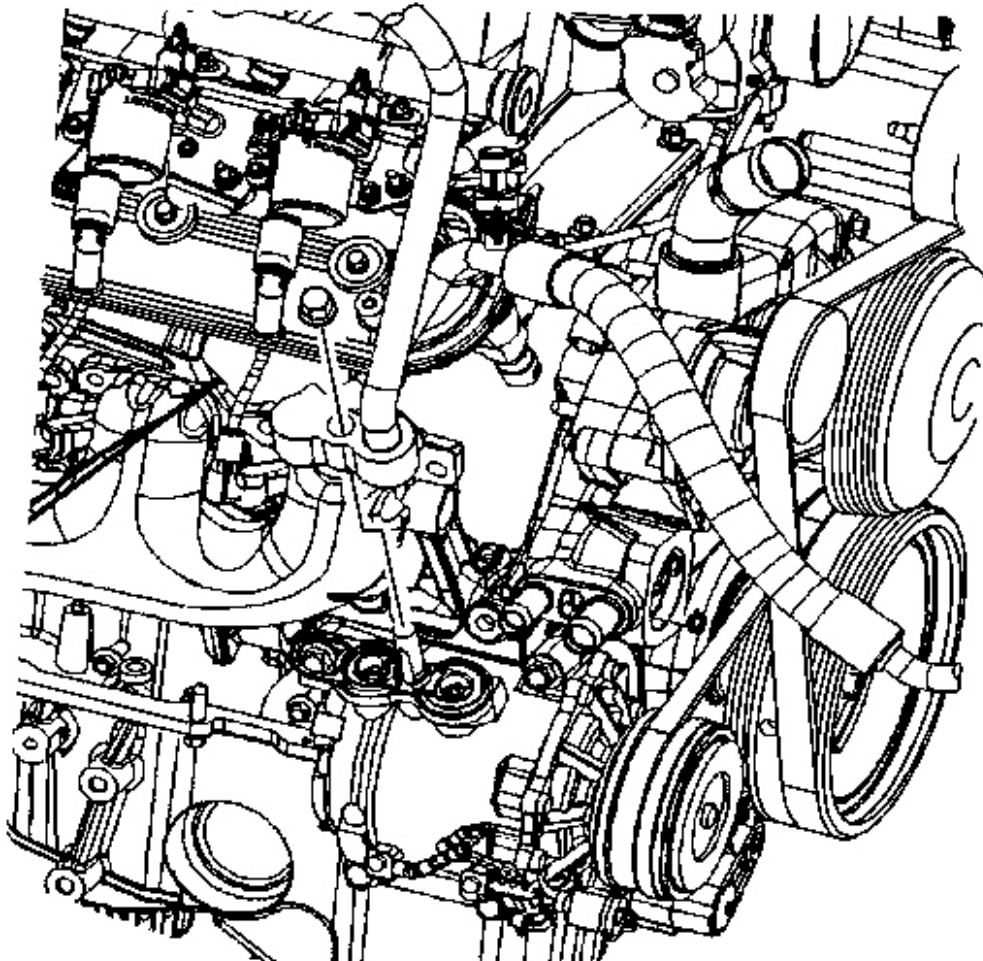


Fig. 27: Identifying Compressor Hose Assembly & Nut
Courtesy of GENERAL MOTORS CORP.

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

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

9. Install the washer bottle. Refer to **Windshield Washer Solvent Container Replacement (Envoy, TrailBlazer)**.
10. Evacuate and recharge the A/C system. Refer to **Refrigerant Recovery and Recharging**.

11. Leak test the fittings of the component using **J 39400-A** . See **Special Tools**.

EVAPORATOR TUBE REPLACEMENT

Tools Required

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

Removal Procedure

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

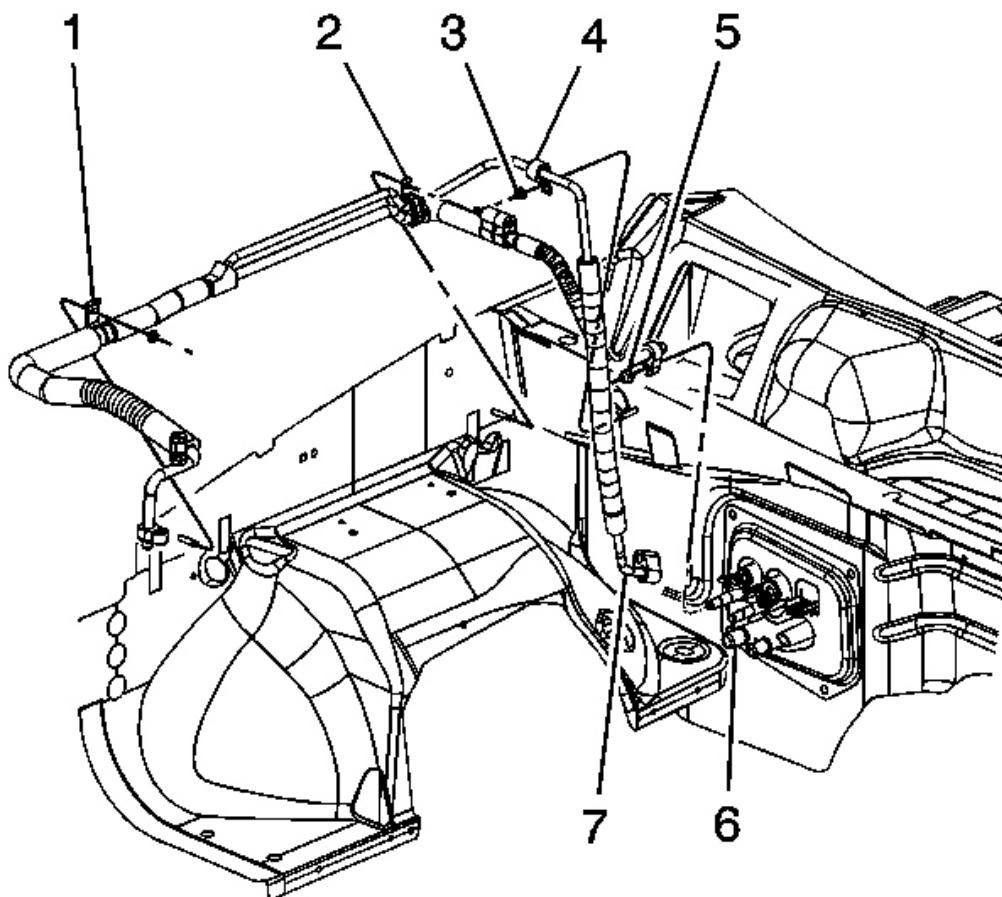


Fig. 28: Locating Evaporator Tube (Long Wheel Base)
Courtesy of GENERAL MOTORS CORP.

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

Installation Procedure

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

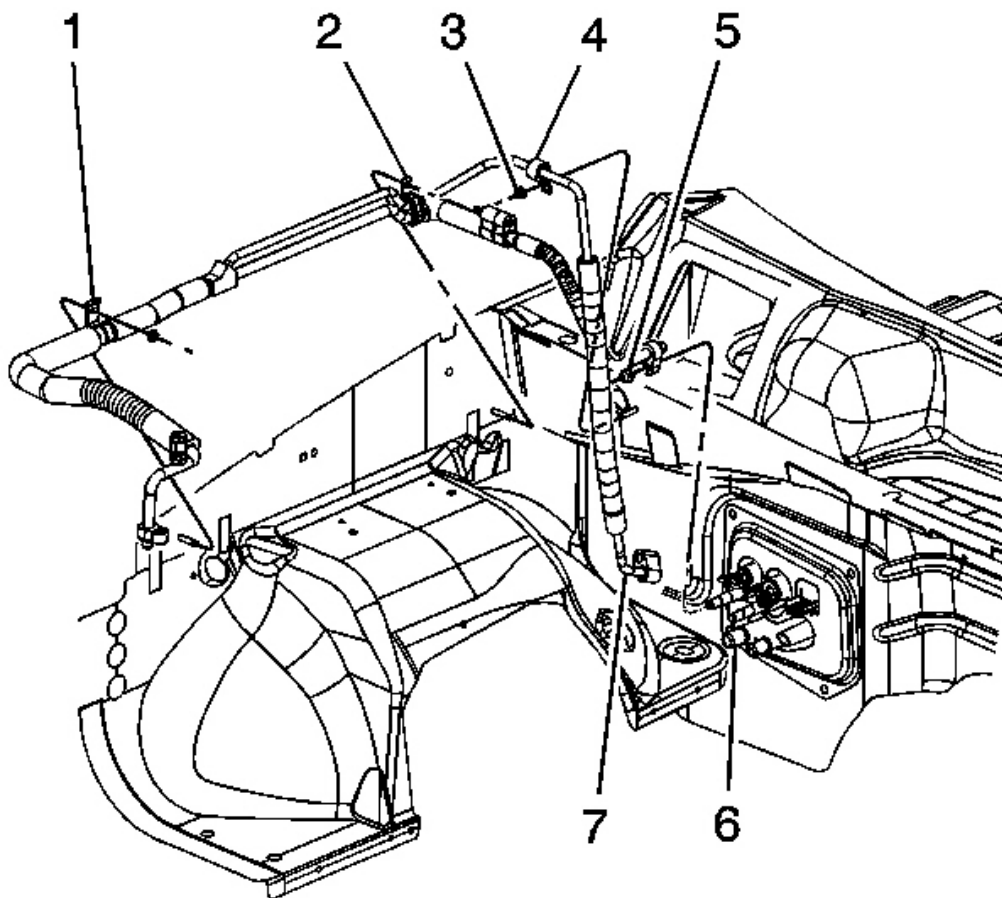


Fig. 29: Locating Evaporator Tube (Long Wheel Base)
Courtesy of GENERAL MOTORS CORP.

2. Install the evaporator tube.

NOTE: Refer to Fastener Notice .

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

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

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

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

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5. Connect the evaporator tube to the condenser.

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

6. Install the coolant recovery tank. Refer to Coolant Recovery Reservoir Replacement .
7. Install the washer solvent container. Refer to Windshield Washer Solvent Container Replacement (Envoy, TrailBlazer) .
8. Install the nuts (1, 2) retaining the evaporator tube to the fender.

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

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

EXPANSION (ORIFICE) TUBE REPLACEMENT (SHORT WHEEL BASE)

Tools Required

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

Removal Procedure

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

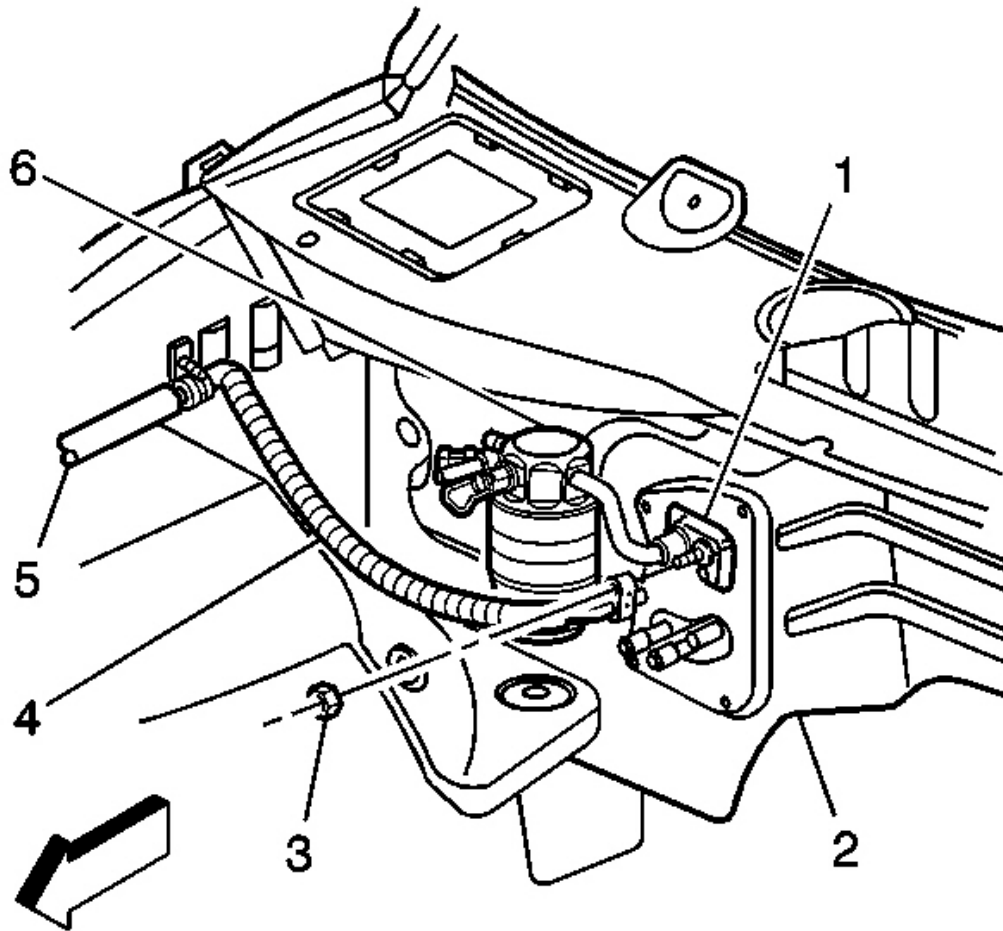


Fig. 30: Locating Evaporator Tube Components
Courtesy of GENERAL MOTORS CORP.

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

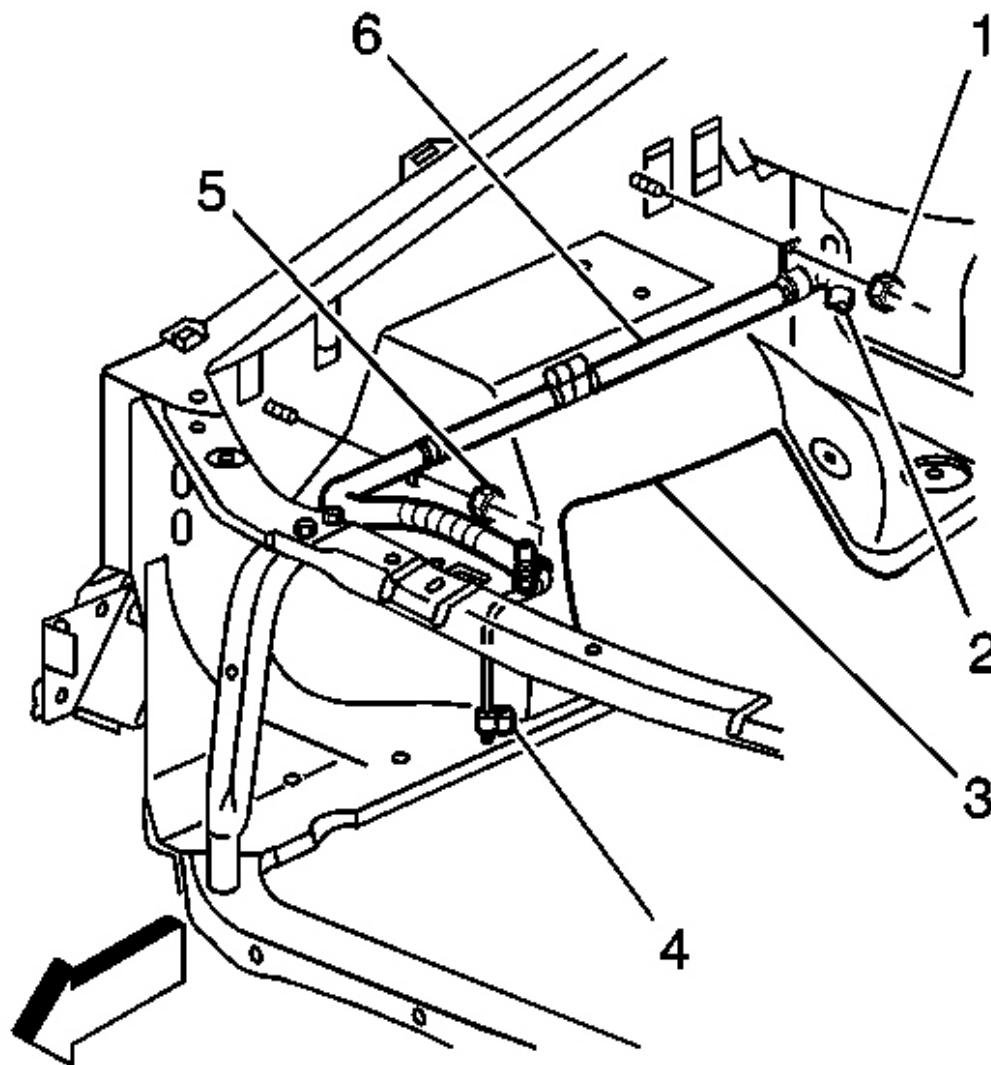


Fig. 31: Identifying Evaporator Tube Components
Courtesy of GENERAL MOTORS CORP.

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

Installation Procedure

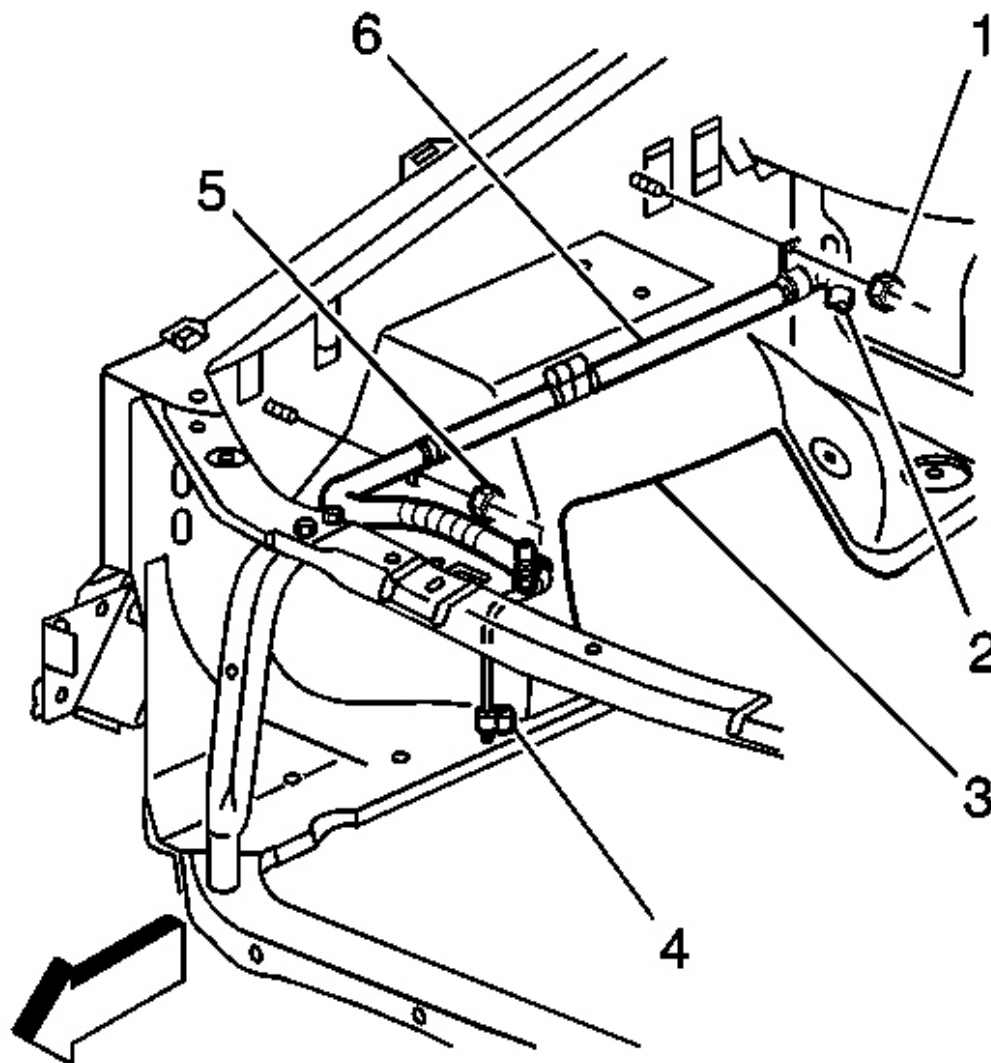


Fig. 32: Identifying Evaporator Tube Components
Courtesy of GENERAL MOTORS CORP.

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

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

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

NOTE: Refer to **Fastener Notice** .

4. Install the evaporator tube nut.

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

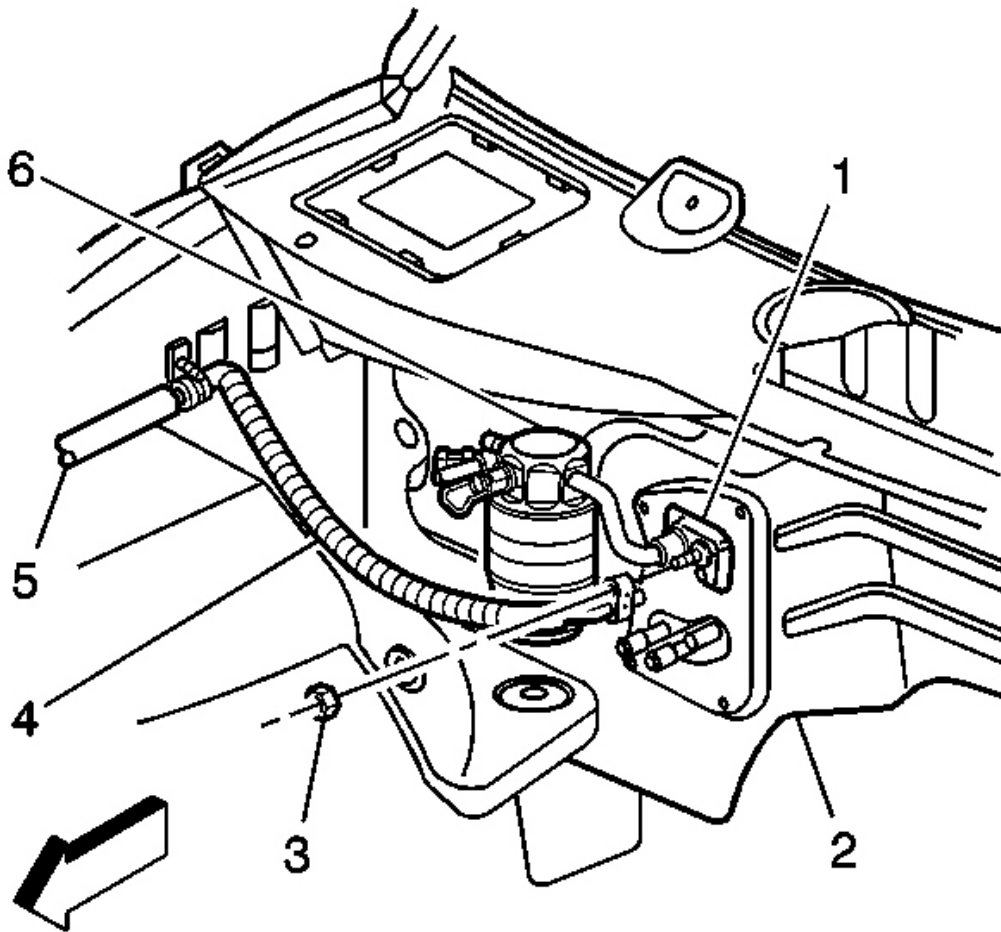


Fig. 33: Locating Evaporator Tube Components
Courtesy of GENERAL MOTORS CORP.

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

6. Install the nut (3).

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

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

SUCTION SCREEN REPLACEMENT

Tools Required

J 44551 Suction Screen Kit

Removal Procedure

IMPORTANT: Suction screens are intended to be installed in the suction hose after a major compressor failure.

1. Remove the A/C compressor hose assembly from the A/C compressor. Refer to Compressor Hose Assembly Replacement (LL8) or Compressor Hose Assembly Replacement (LH6, LS2).

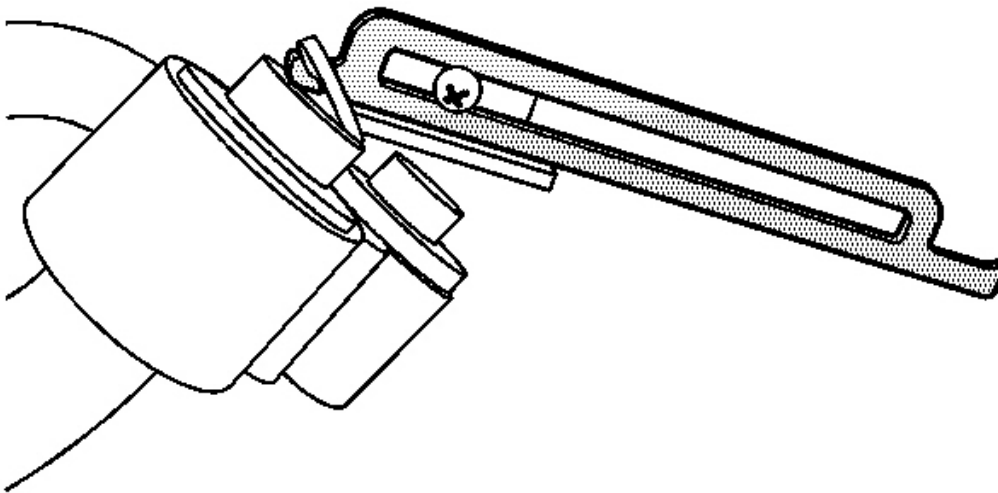


Fig. 34: View Of Universal Removal Tool
Courtesy of GENERAL MOTORS CORP.

- Using the J-44551-9 Universal Removal Tool, place the tip of the tool under the inside edge of the compression band of the suction screen and the cushioning fulcrum pad against the open end of the hose or manifold fitting.

IMPORTANT: Do not damage the end of the hose or manifold.

- Pry upward on the band and move the tool around the diameter of the screen as necessary to remove the screen.

Installation Procedure

- Using a caliper that reads to 3 decimal places, measure the ID of the suction hose or manifold suction fitting. To determine the correct size screen for the application, refer to **Compressor Suction Screen and Tool Selection Specifications**.

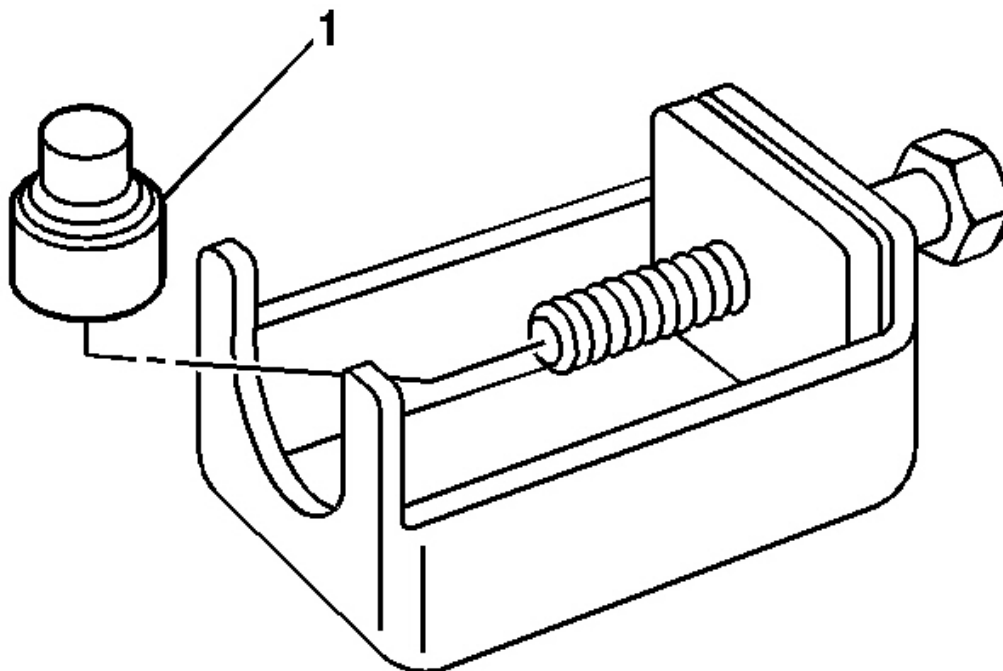


Fig. 35: View Of Mandrel & J 44551-5
Courtesy of GENERAL MOTORS CORP.

- Select and install the correct mandrel (1) on the threaded portion of the installation tool bolt:
 - The brass Universal Mandrel is for use on hose fittings with a smooth bore where the screen installs flush with the end of the fitting

- The 11.96 mm (0.471 in) Mandrel is only for the 11.96 mm (0.471 in) screen in hose fittings with an internal hourglass shape where the screen installs at the recessed, reduced diameter point.

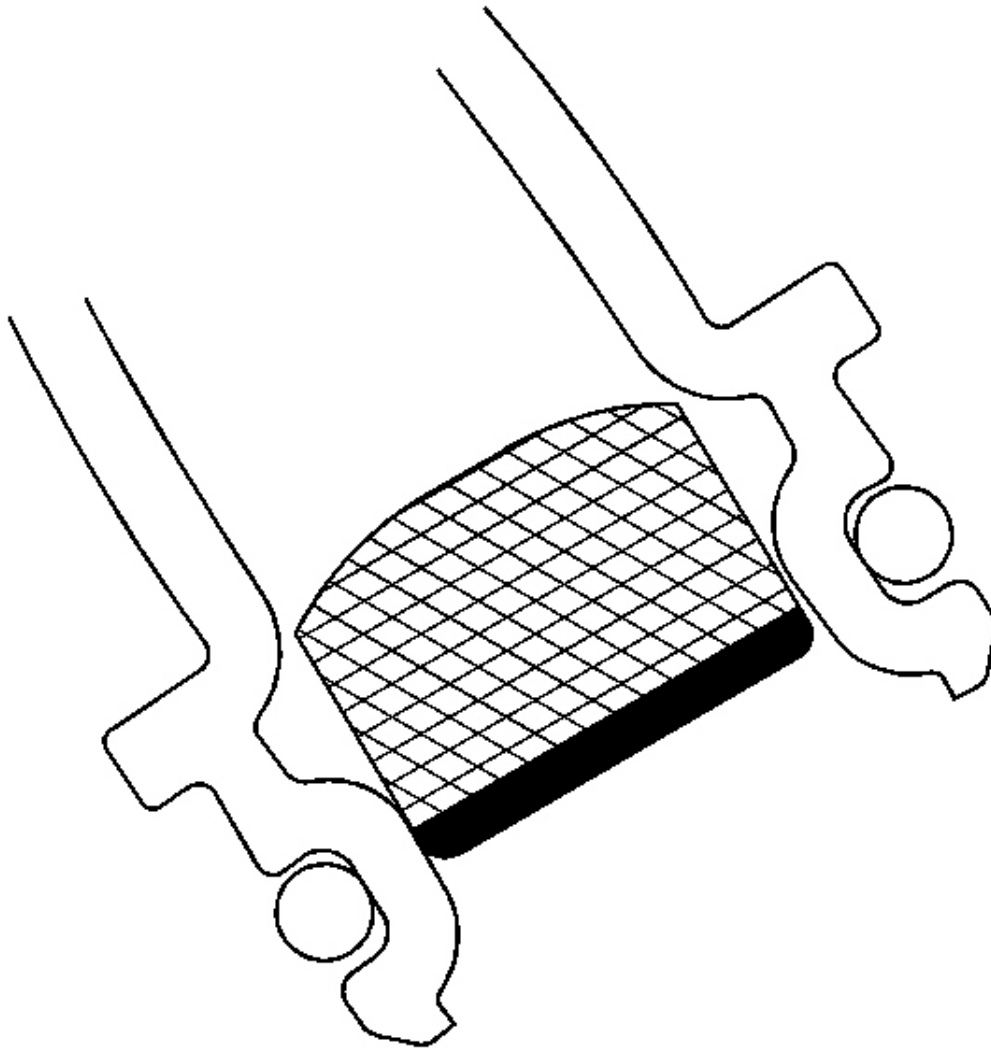


Fig. 36: View Of Installed Screen
Courtesy of GENERAL MOTORS CORP.

3. Install the 11.96 mm (0.471 in) screen in the middle of the reduced diameter point of the fitting.

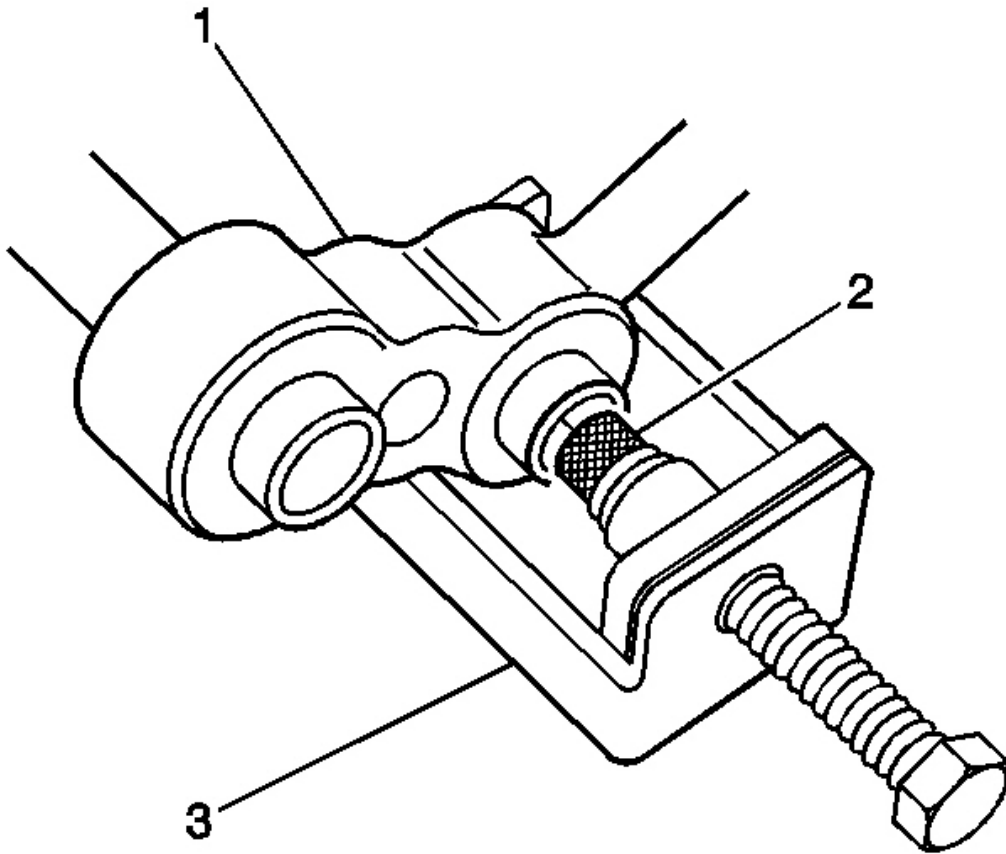


Fig. 37: Identifying Proper Placement Of J 44551-5
Courtesy of GENERAL MOTORS CORP.

4. Place the suction hose fitting or suction hose side of the manifold into the installation tool fixture J-44551-5 (3) so it is supported by the tools legs.

IMPORTANT: Correct placement of the J-44551-5 is critical.

5. Lubricate the A/C suction screen with the applicable refrigerant oil.
6. Align the screen (2), basket first, into the suction hose bore then hand tighten the bolt until contact is made between the hose, screen and tool.
7. Turn the bolt of the installation tool clockwise pressing the screen into the bore until the mandrel shoulder contacts the end of the hose fitting.
8. Unscrew the bolt and remove the installation tool from the hose or manifold.

IMPORTANT: Clean the surface to be used for attaching the label.

9. Install the J-44551-1 Suction Screen Notification Label.
10. Install the A/C compressor hose assembly to the A/C compressor. Refer to **Compressor Hose Assembly Replacement (LL8)** or **Compressor Hose Assembly Replacement (LH6, LS2)**.

COMPRESSOR RELAY REPLACEMENT

Removal Procedure

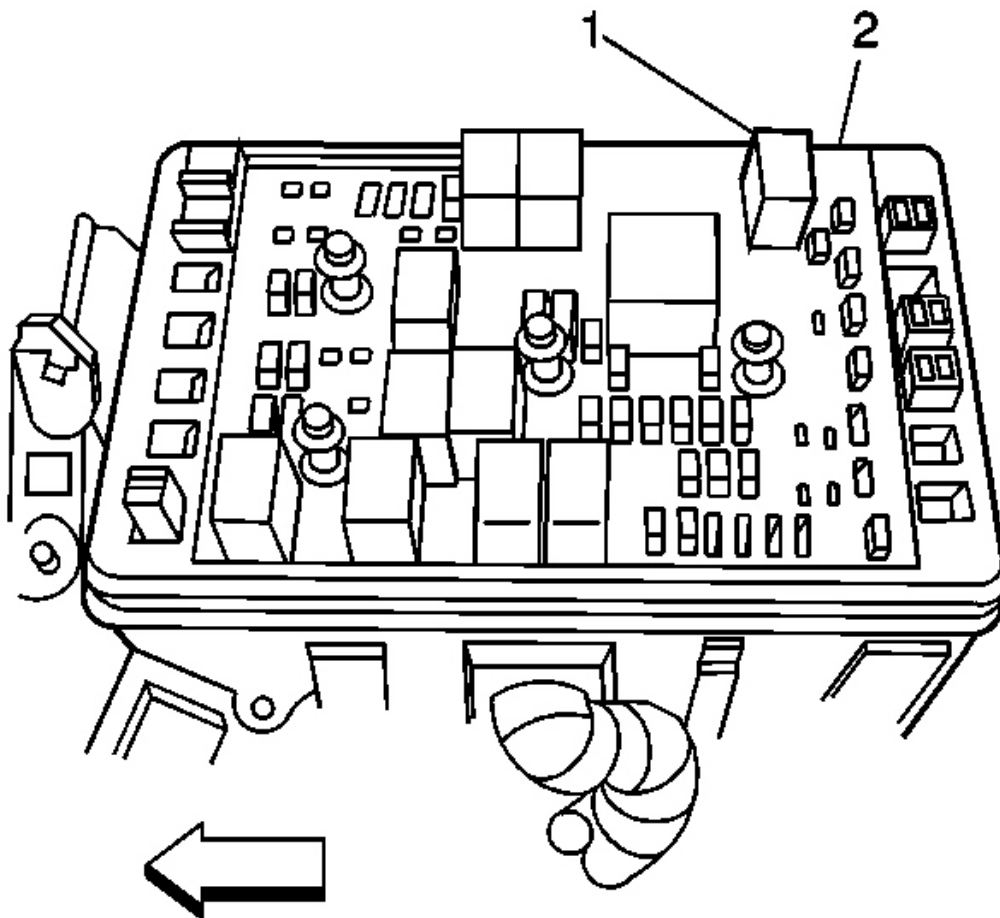


Fig. 38: Locating Cooling Fan Relay
Courtesy of GENERAL MOTORS CORP.

1. Remove the protective cover from the underhood fuse block.

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

Installation Procedure

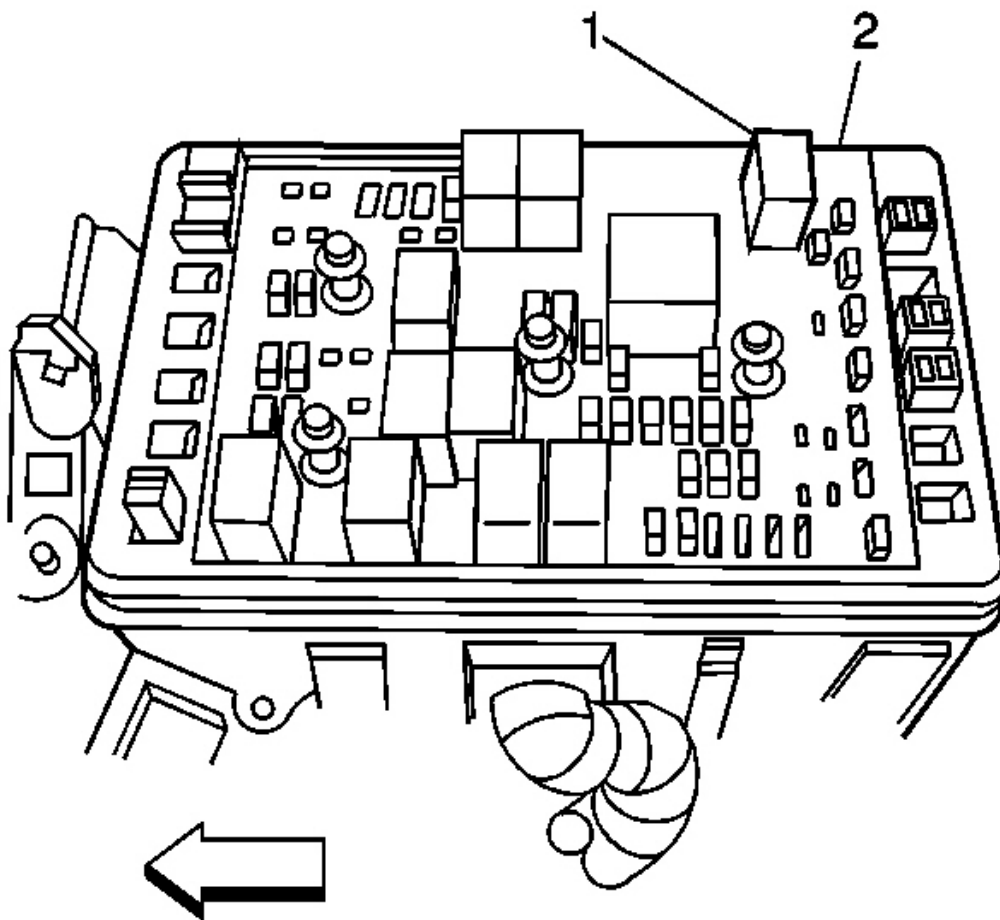


Fig. 39: Locating Cooling Fan Relay
Courtesy of GENERAL MOTORS CORP.

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

AIR CONDITIONING (A/C) LOW PRESSURE SWITCH REPLACEMENT

Tools Required

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

Removal Procedure

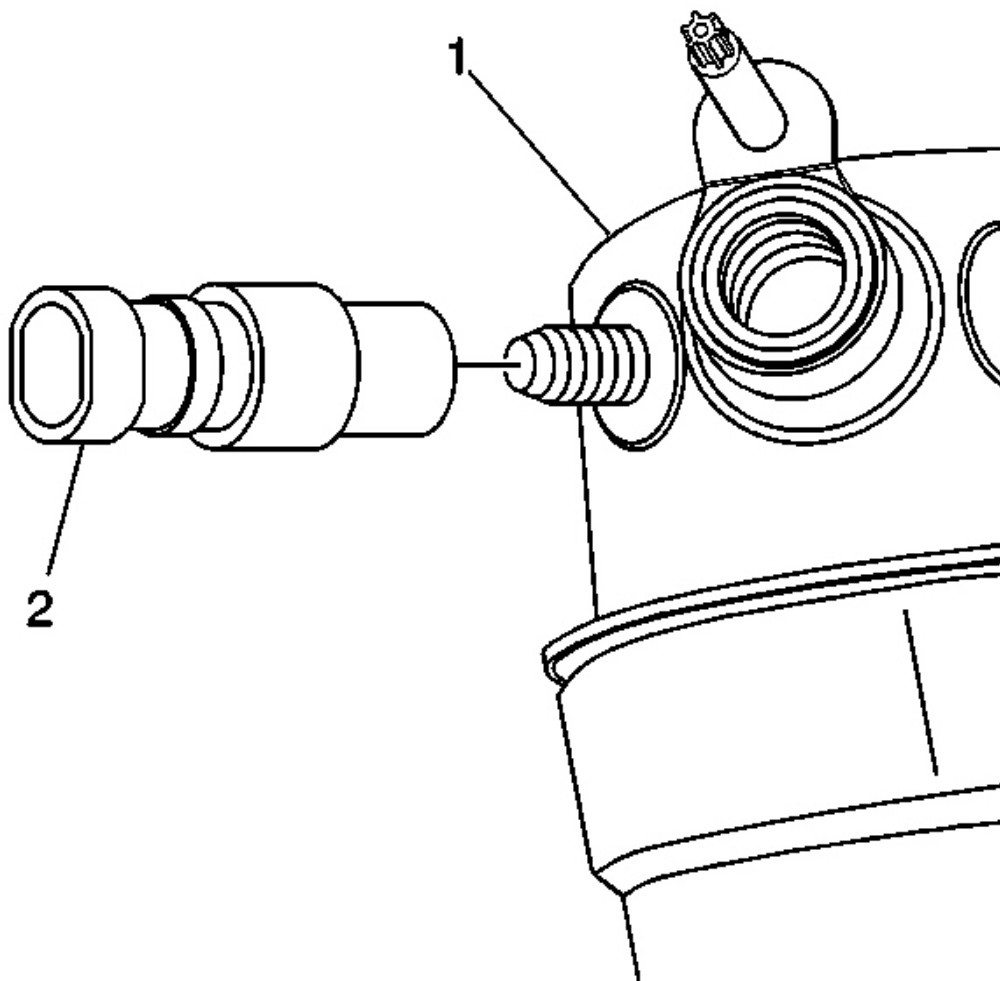


Fig. 40: View Of A/C Low Pressure Switch
Courtesy of GENERAL MOTORS CORP.

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

Installation Procedure

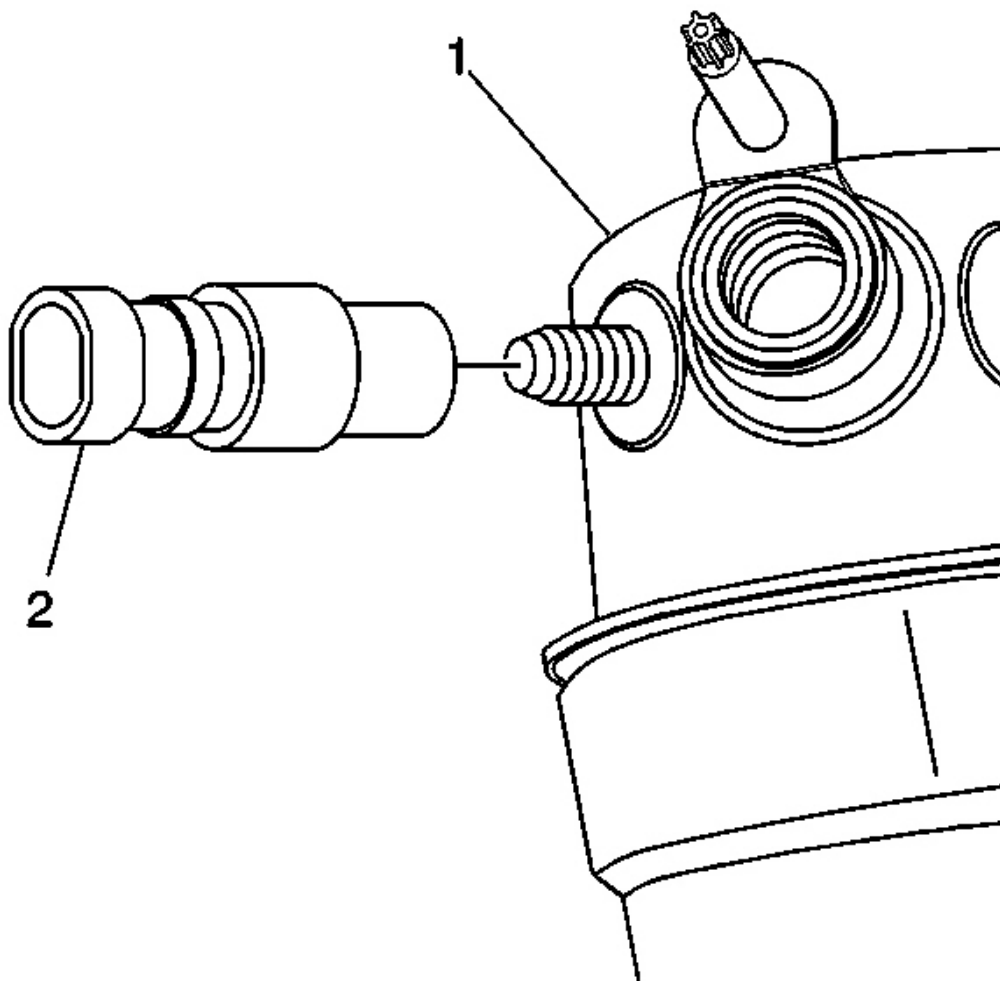


Fig. 41: View Of A/C Low Pressure Switch
Courtesy of GENERAL MOTORS CORP.

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

NOTE: Refer to **Fastener Notice** .

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

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

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

4. Leak test the fittings of the components using the **J 39400-A** . See **Special Tools**.

AIR CONDITIONING (A/C) REFRIGERANT PRESSURE SENSOR REPLACEMENT

Removal Procedure

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

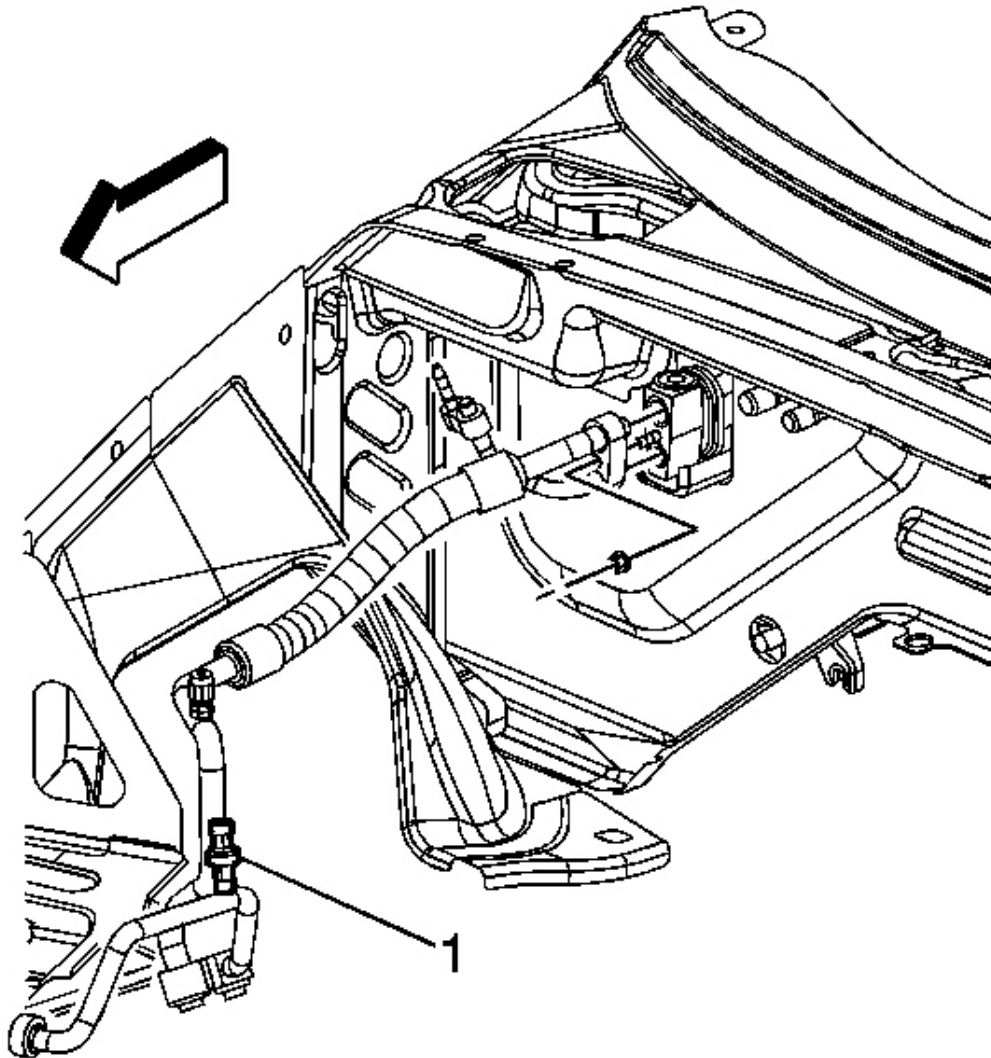


Fig. 42: View Of A/C Refrigerant Pressure Sensor & Compressor Hose Block
Courtesy of GENERAL MOTORS CORP.

3. Remove the A/C refrigerant pressure sensor from the compressor hose block (1).
4. Remove and discard the O-ring seal from the A/C refrigerant pressure sensor.

Installation Procedure

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

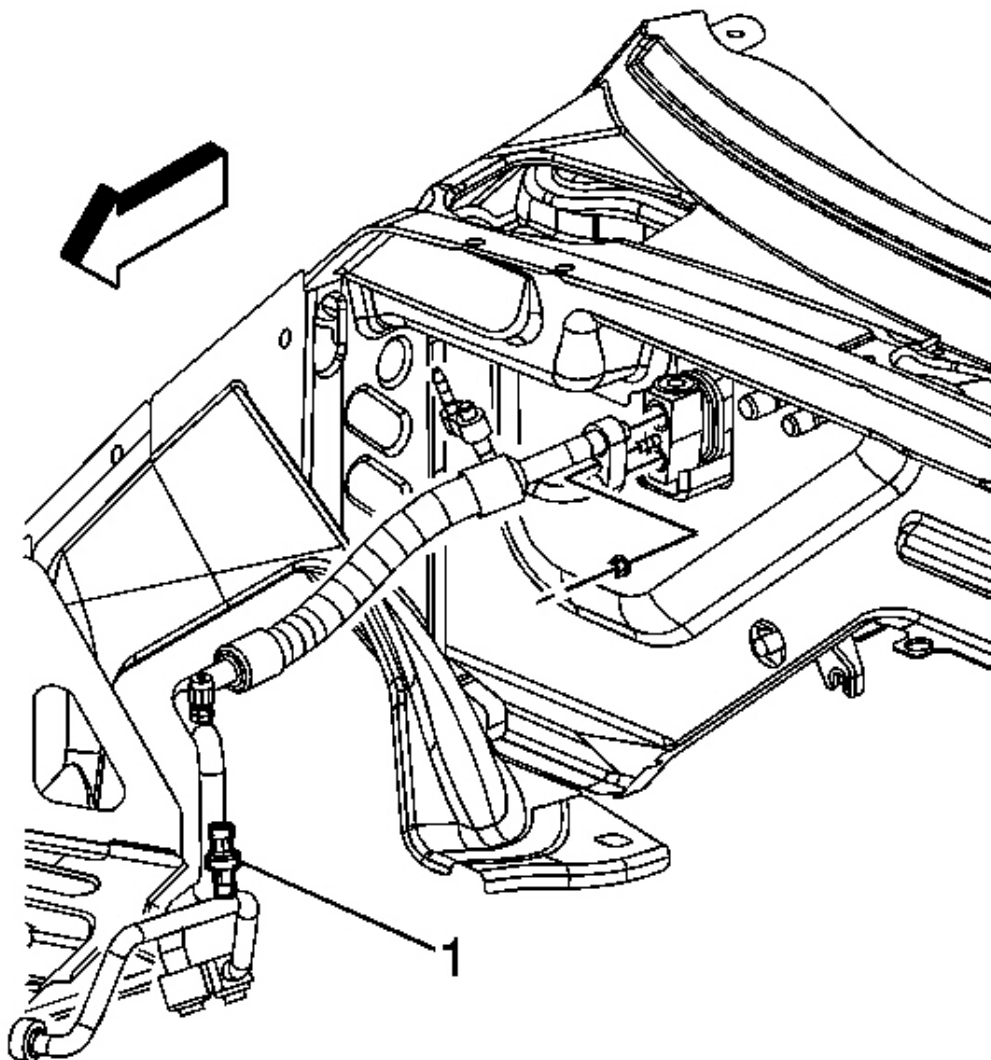


Fig. 43: View Of A/C Refrigerant Pressure Sensor & Compressor Hose Block
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice .

2. Install the A/C refrigerant pressure sensor to the compressor hose block (1).

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

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

CONDENSER REPLACEMENT

Special Tools

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

Removal Procedure

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

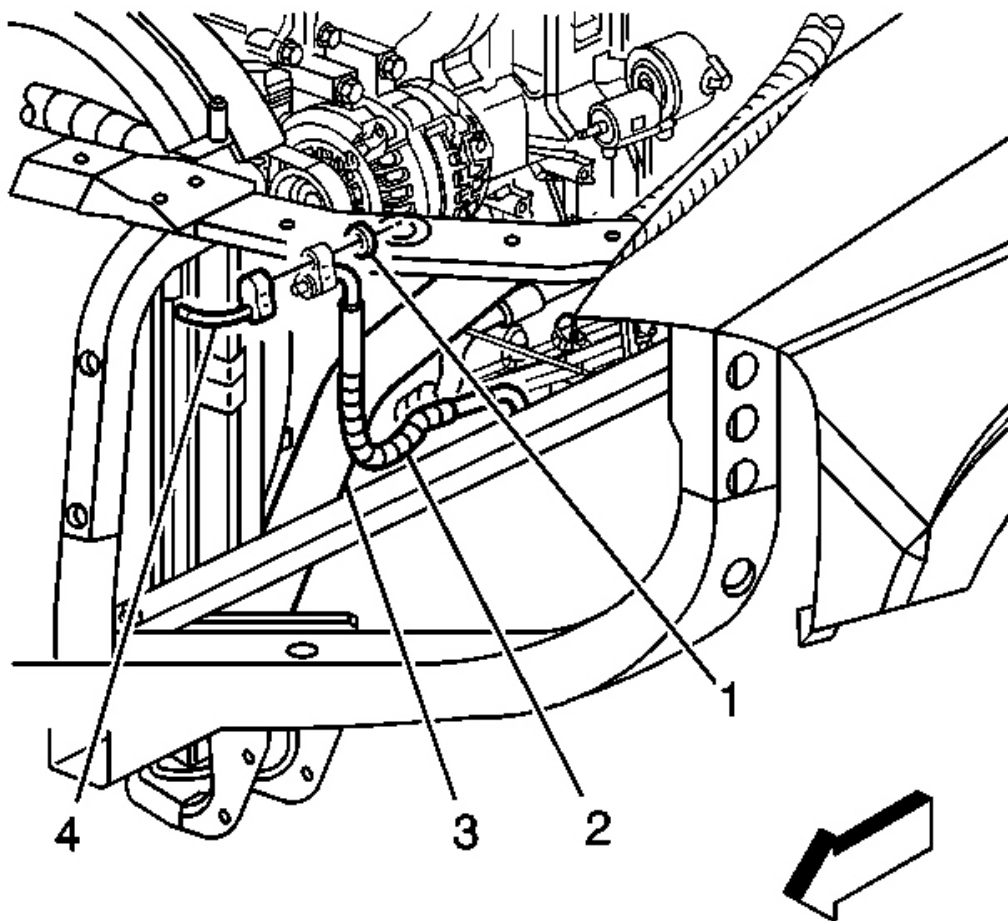


Fig. 44: View Of A/C Compressor Discharge Hose
Courtesy of GENERAL MOTORS CORP.

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

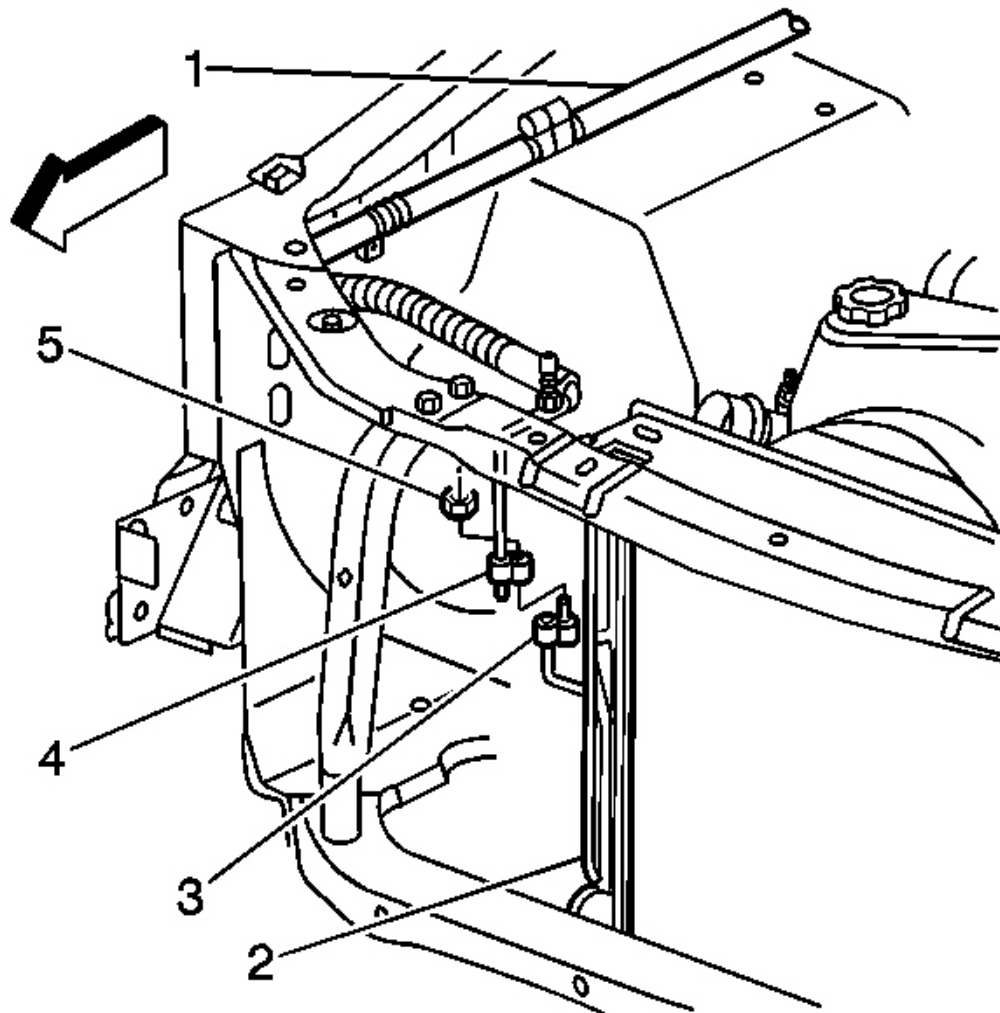


Fig. 45: View Of Condenser Components
Courtesy of GENERAL MOTORS CORP.

4. Remove the hood latch. Refer to **Hood Replacement** .
5. Remove the head lamp housing panel. Refer to **Headlamp Housing Panel Replacement (Envoy, Rainier)** or **Headlamp Housing Panel Replacement (TrailBlazer)** .
6. Remove the radiator diagonal brace. Refer to **Radiator Support Diagonal Brace Replacement** .
7. Remove the bolts from the upper radiator support.
8. Remove the upper radiator support.
9. Remove the evaporator tube nut (5) from the condenser.

10. Remove the evaporator tube (4) from the condenser.
11. Remove the studs from the condenser inlet and outlets.
12. Remove the condenser LH upper bracket bolt and bracket.
13. Remove the condenser to radiator bolts.
14. Remove the condenser from the radiator.

Installation Procedure

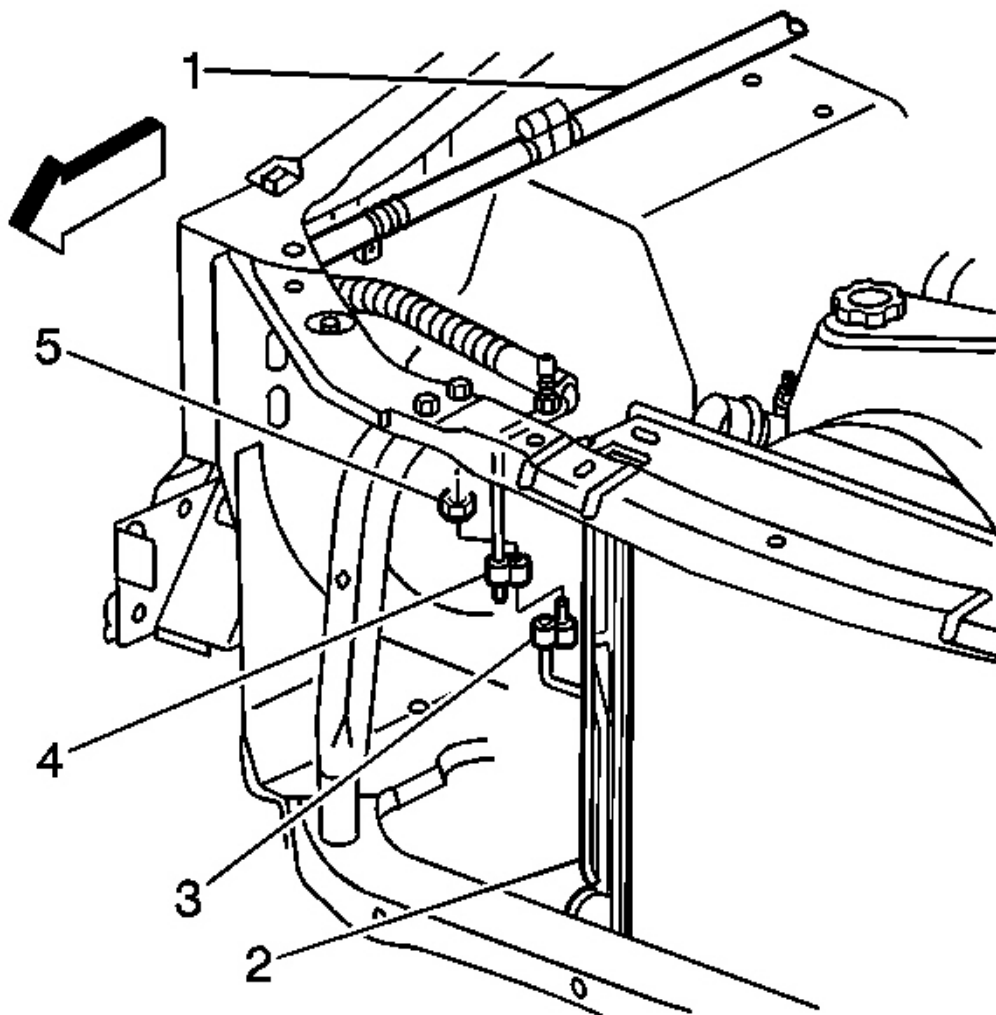


Fig. 46: View Of Condenser Components
Courtesy of GENERAL MOTORS CORP.

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

1. Install the condenser to the radiator.

NOTE: Refer to Fastener Notice .

2. Install the condenser to the radiator bolts.

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

3. Install the condenser LH upper bracket bolt and bracket.

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

4. Install the studs to the condenser inlet and outlets.

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

5. Install the evaporator tube (4) to the condenser.
6. Install the evaporator tube nut (5) to the condenser.

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

7. Install the upper radiator support bar.
8. Install the bolts to the upper radiator support bar.

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

9. Install the radiator diagonal base. Refer to Radiator Support Diagonal Brace Replacement .
10. Install the head lamp housing panel. Refer to Headlamp Housing Panel Replacement (Envoy, Rainier) or Headlamp Housing Panel Replacement (TrailBlazer) .
11. Install the hood latch. Refer to Hood Replacement .

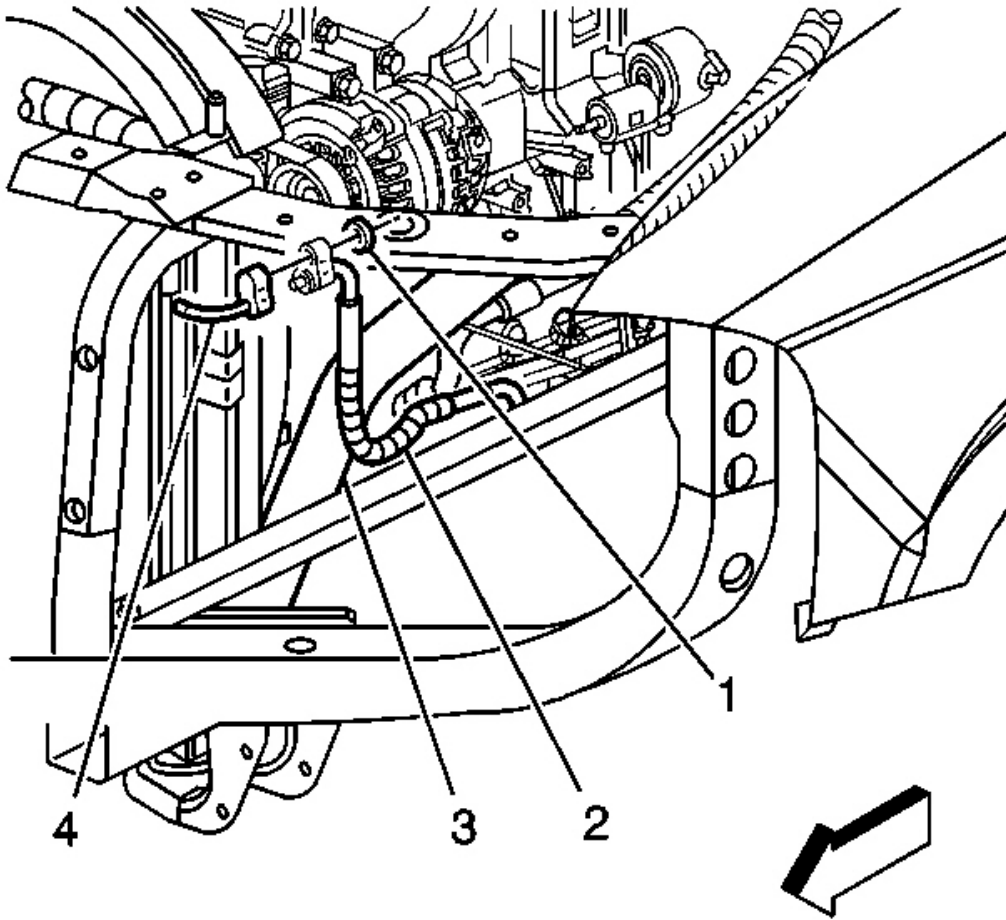


Fig. 47: View Of A/C Compressor Discharge Hose
Courtesy of GENERAL MOTORS CORP.

12. Connect the compressor discharge hose (2) to the condenser.
13. Install the compressor discharge hose nut (1) to the condenser.

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

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

ACCUMULATOR REPLACEMENT

Tools Required

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

Removal Procedure

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

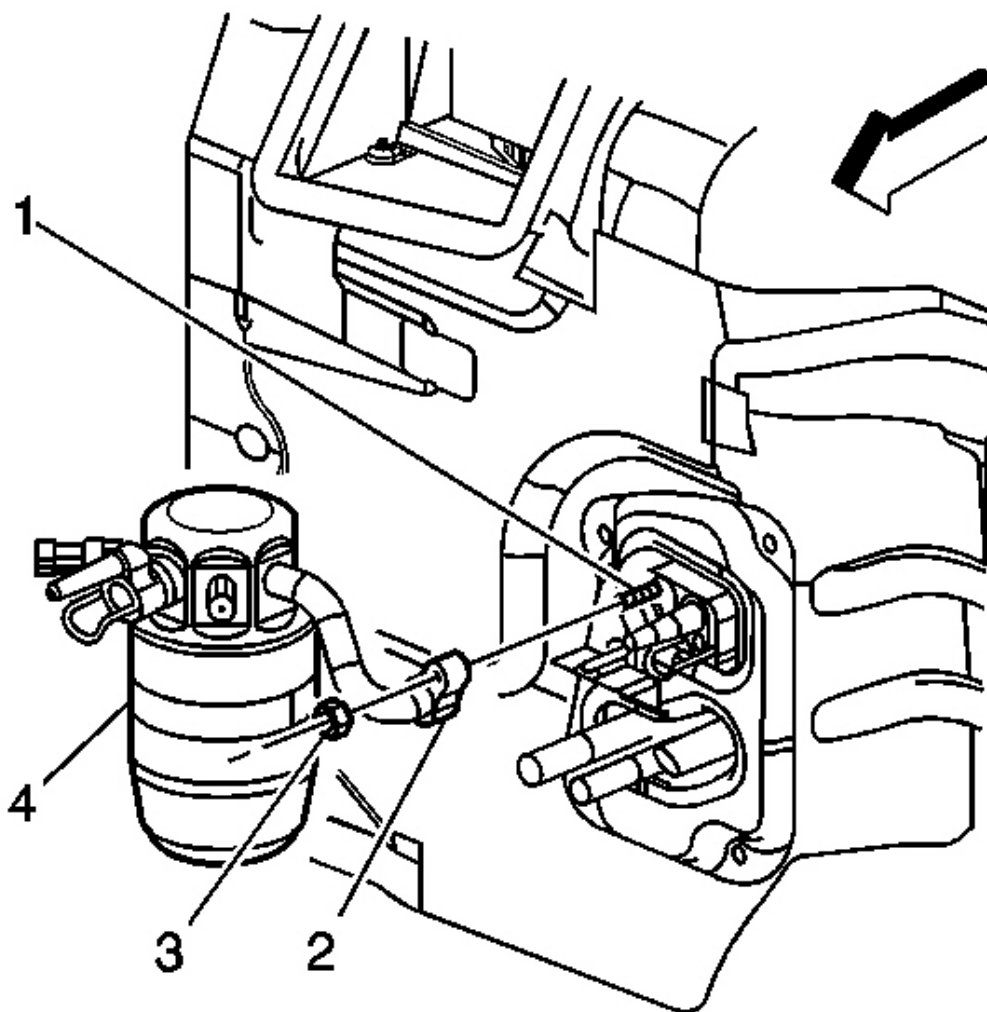


Fig. 48: View Of HVAC Accumulator
Courtesy of GENERAL MOTORS CORP.

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

Installation Procedure

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

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

NOTE: Refer to Fastener Notice .

3. Install the accumulator clamp nut.

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

4. Install the A/C low pressure switch.

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

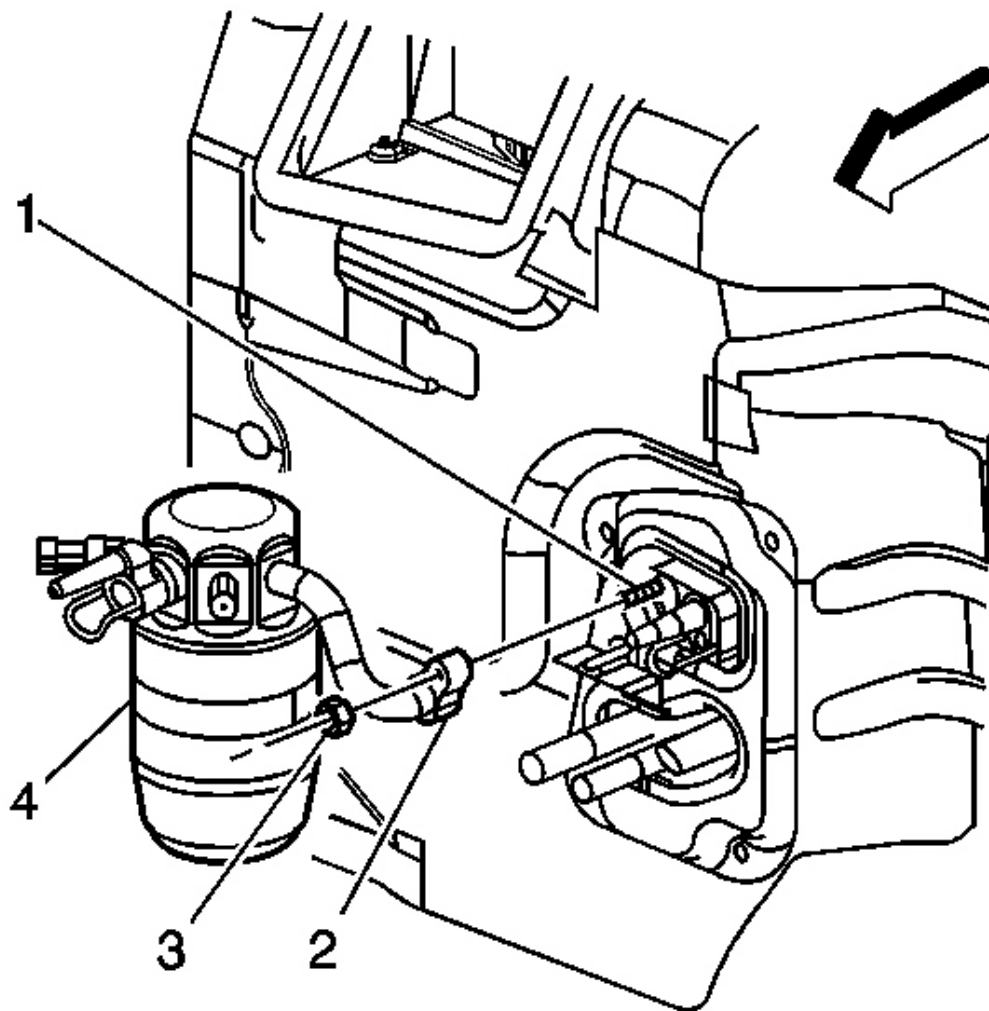


Fig. 49: View Of HVAC Accumulator
Courtesy of GENERAL MOTORS CORP.

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

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

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

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9. Install the suction hose nut.

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

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

HVAC MODULE ASSEMBLY REPLACEMENT

Tools Required

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

Removal Procedure

1. Drain the engine coolant. Refer to **Cooling System Draining and Filling (LL8)** or **Cooling System Draining and Filling (LH6, LS2)** .
2. Recover the refrigerant. Refer to **Refrigerant Recovery and Recharging**.
3. Remove the instrument panel (I/P) carrier. Refer to **Instrument Panel Carrier Replacement** .
4. Reposition the heater hose clamps using **J 43181** . See **Special Tools**.
5. Disconnect the heater hoses from the heater core.

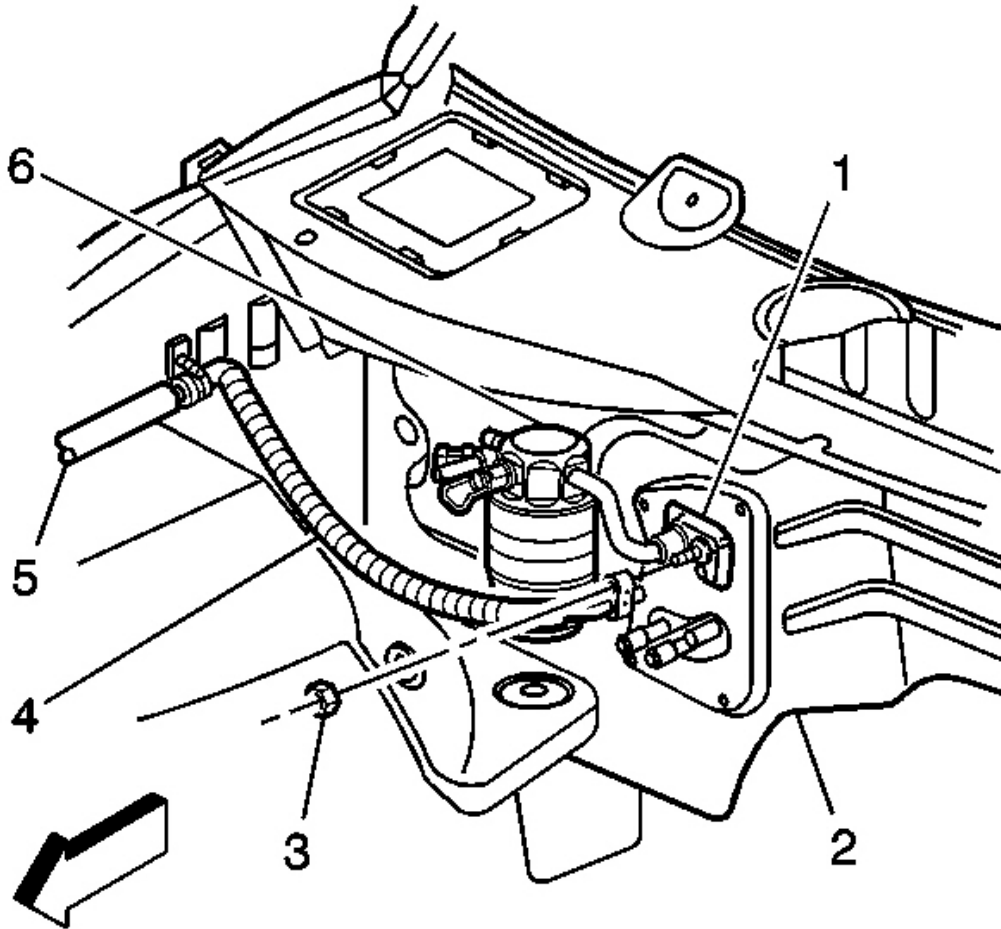


Fig. 50: Locating Evaporator Tube Components
Courtesy of GENERAL MOTORS CORP.

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

Installation Procedure

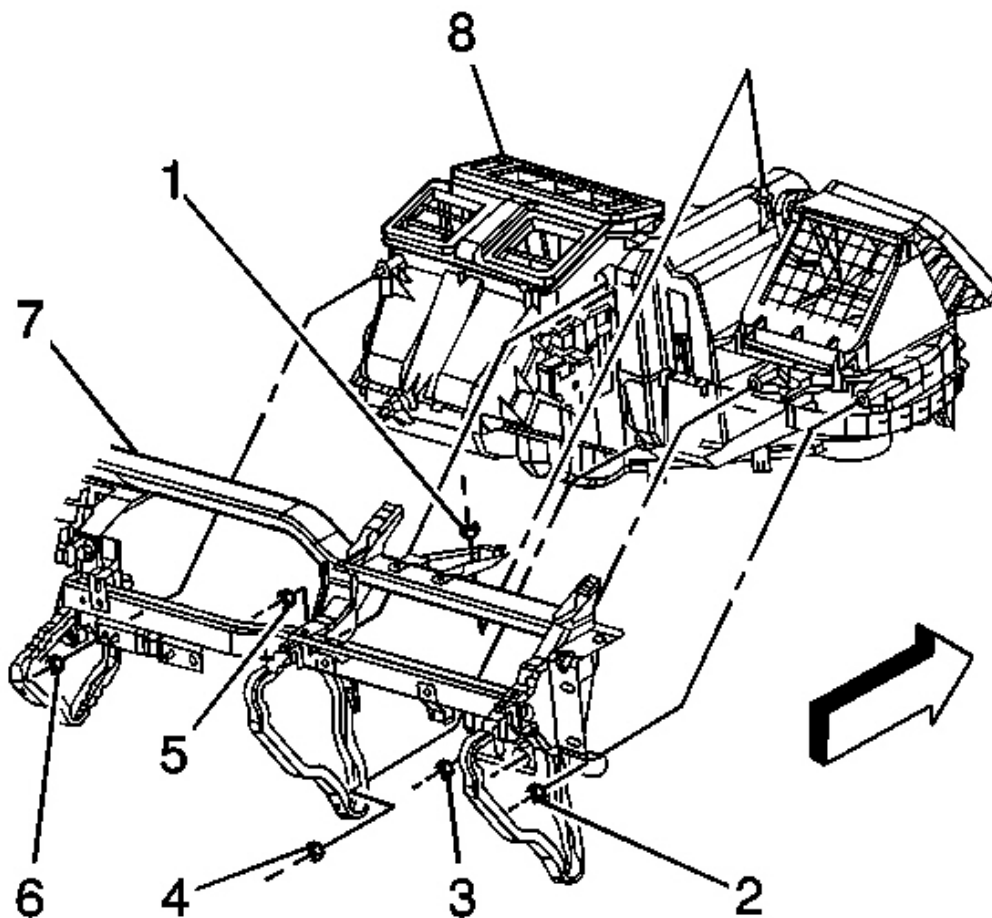


Fig. 51: View Of HVAC Module Assembly
Courtesy of GENERAL MOTORS CORP.

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

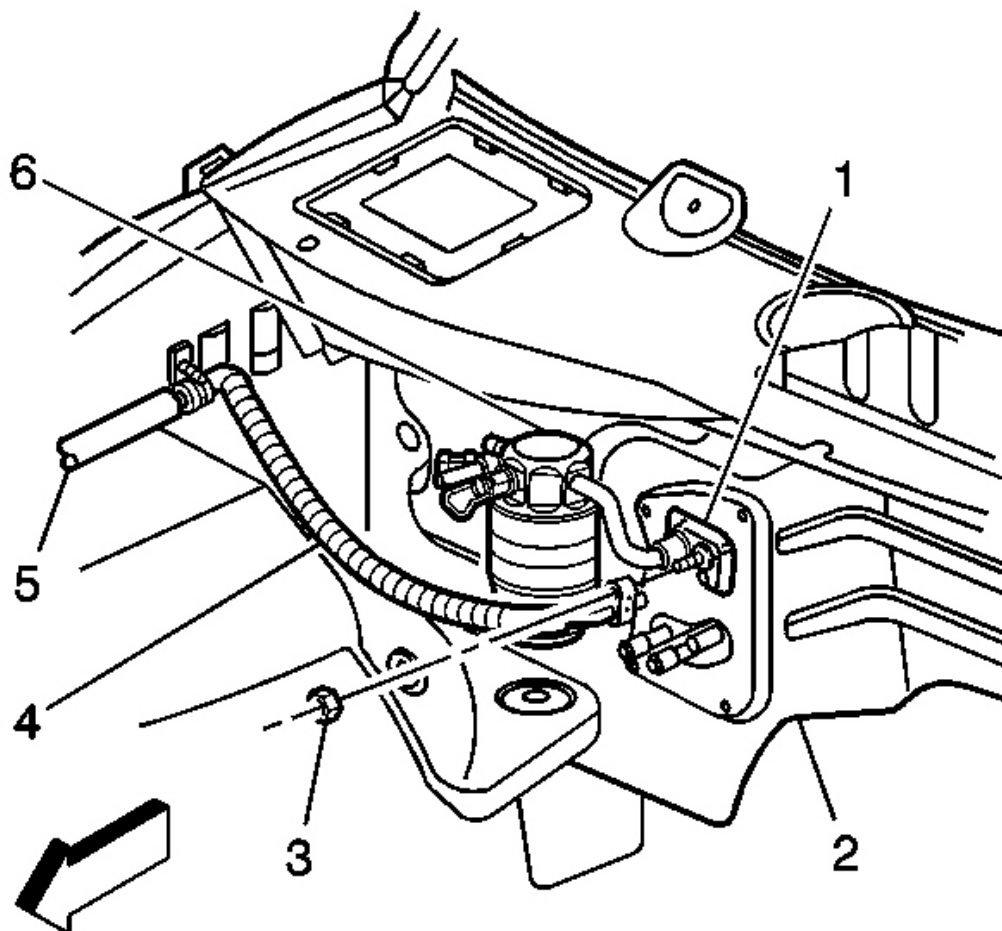


Fig. 52: Locating Evaporator Tube Components
Courtesy of GENERAL MOTORS CORP.

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

NOTE: Refer to Fastener Notice .

7. Tighten the accumulator retaining nut.

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

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8. Install the I/P carrier. Refer to **Instrument Panel Carrier Replacement** .
9. Evacuate and recharge the A/C system. Refer to **Refrigerant Recovery and Recharging**.
10. Leak test the fittings of the components using the **J 39400-A** . See **Special Tools**.
11. Refill the engine coolant. Refer to **Cooling System Draining and Filling (LL8)** or **Cooling System Draining and Filling (LH6, LS2)** .

AIR CONDITIONING EVAPORATOR CORE REPLACEMENT

Removal Procedure

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

IMPORTANT: Some screws are hidden under the foam insulation.

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

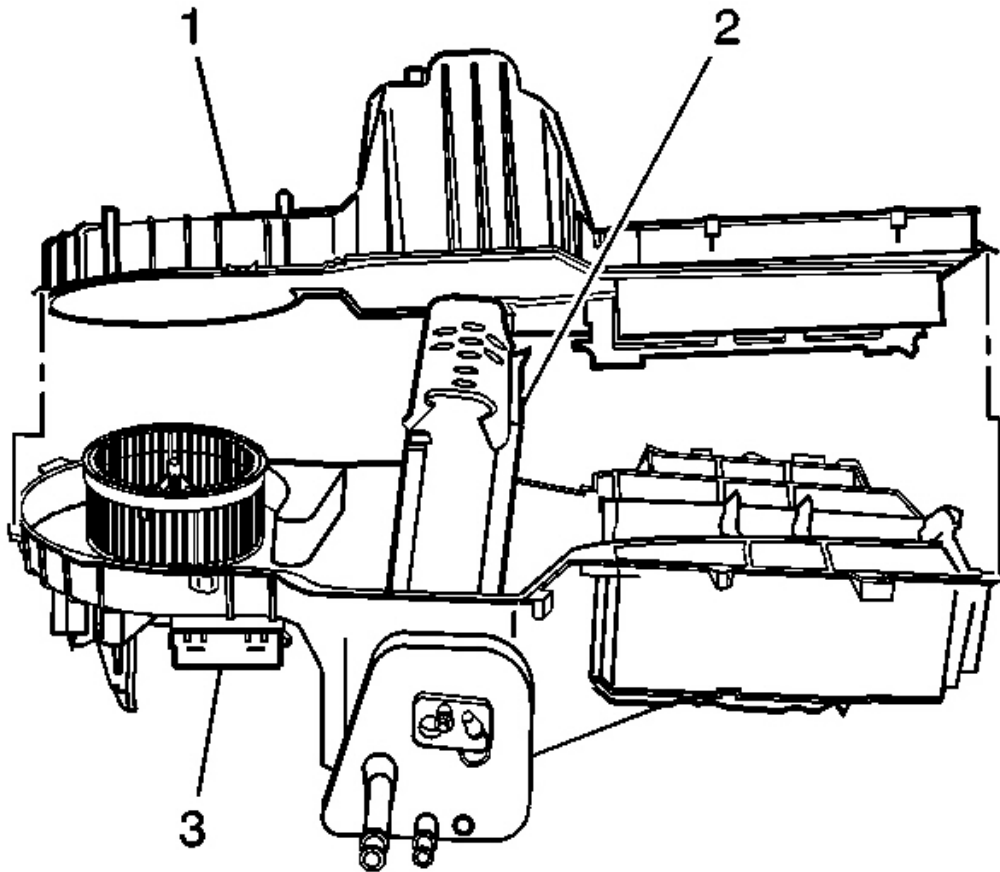


Fig. 53: View Of HVAC Module Assembly Halves
Courtesy of GENERAL MOTORS CORP.

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

Installation Procedure

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

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

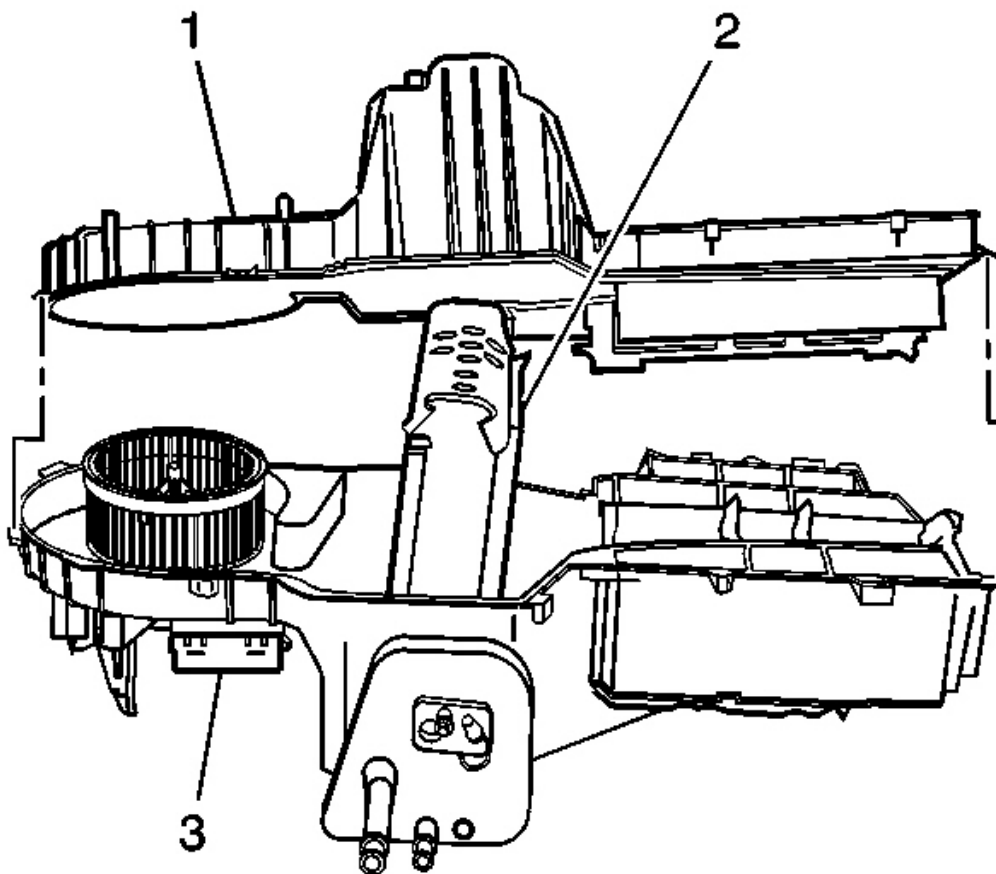


Fig. 54: View Of HVAC Module Assembly Halves
Courtesy of GENERAL MOTORS CORP.

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

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

3. Assemble the HVAC module assembly.

NOTE: Refer to Fastener Notice .

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

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

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

HEATER INLET HOSE REPLACEMENT (LL8)

Tools Required

- **J 43181** Heater Line Quick Connect Release Tool. See **Special Tools**.
- **GE-47622** Hose Clamp Pliers

Removal Procedure

1. Drain the engine coolant. Refer to **Cooling System Draining and Filling (LL8)** or **Cooling System Draining and Filling (LH6, LS2)** .

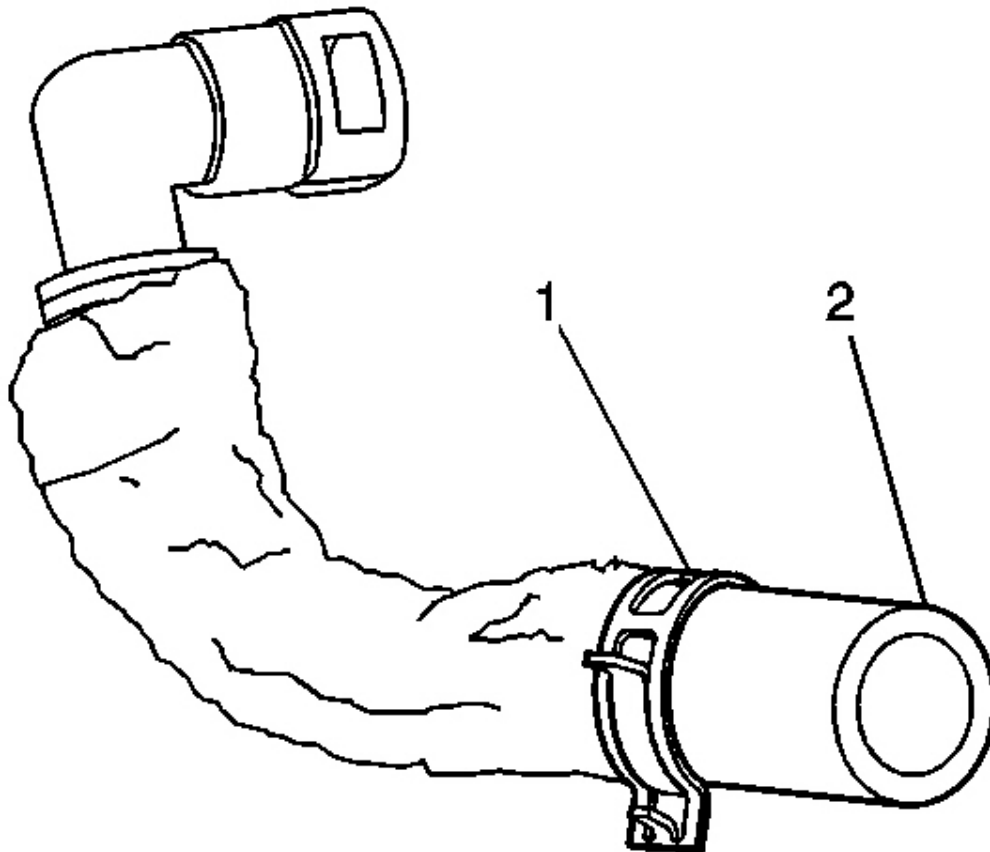


Fig. 55: View Of Inlet Heater Hose (Short Wheel Base)

Courtesy of GENERAL MOTORS CORP.

2. Using the **J 43181** , disconnect the inlet heater hose (2) from the heater core inlet tube. See **Special Tools**.
 1. Install the **J 43181** to the quick connect on the outlet heater core hose (2). See **Special Tools**.
 2. Close the tool around the inlet heater core hose.
 3. Firmly pull the tool into the quick connect end of the heater hose.
 4. Firmly grasp the heater hose (2). Pull the heater hose forward in order to disengage the hose from the heater core.
3. Position the inlet heater hose clamp (1) at the engine block using **GE-47622** .
4. Remove the heater inlet hose (2) from the inlet hose fitting at the engine block.
5. Remove the heater inlet hose.

Installation Procedure

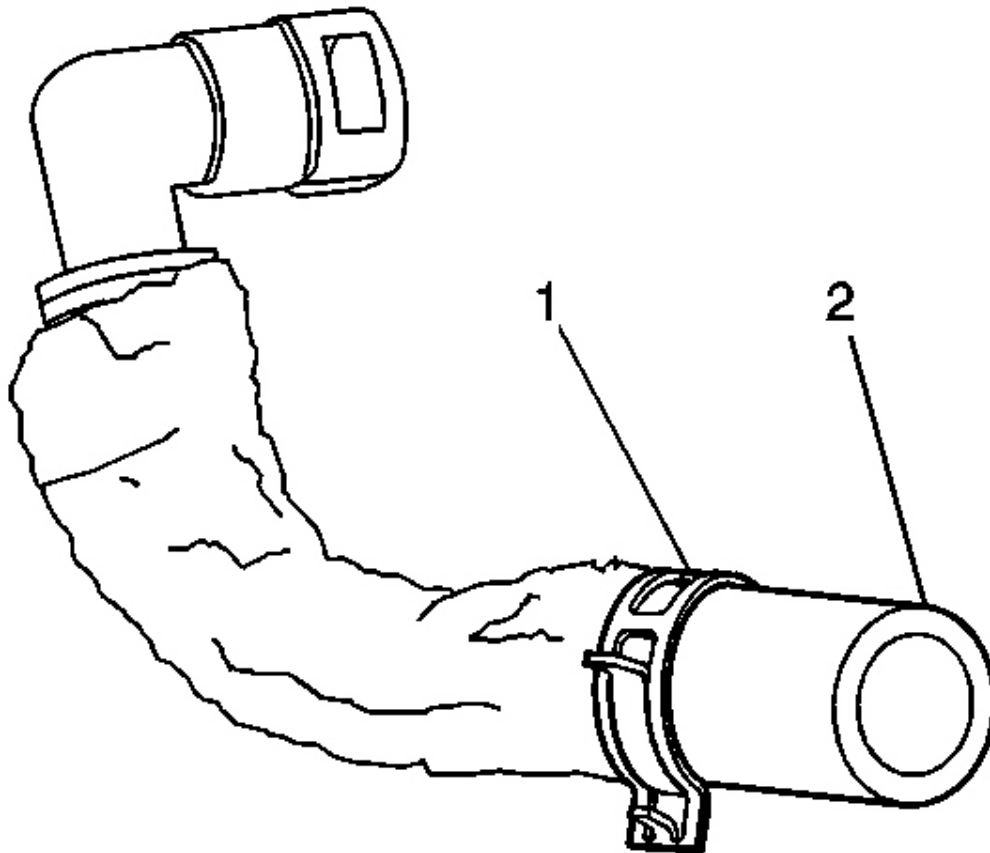


Fig. 56: View Of Inlet Heater Hose (Short Wheel Base)

Courtesy of GENERAL MOTORS CORP.

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

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

2. Install the heater inlet hose (2) to the inlet hose fitting at the engine block.
3. Position the inlet heater hose clamp (1) at the engine block using **GE-47622** .
4. Install the quick connect end of the outlet heater core hose (2) to the heater core.
5. Fill the engine cooling system. Refer to Cooling System Draining and Filling (LL8) or Cooling System Draining and Filling (LH6, LS2) .

HEATER INLET HOSE REPLACEMENT (LH6, LS2)

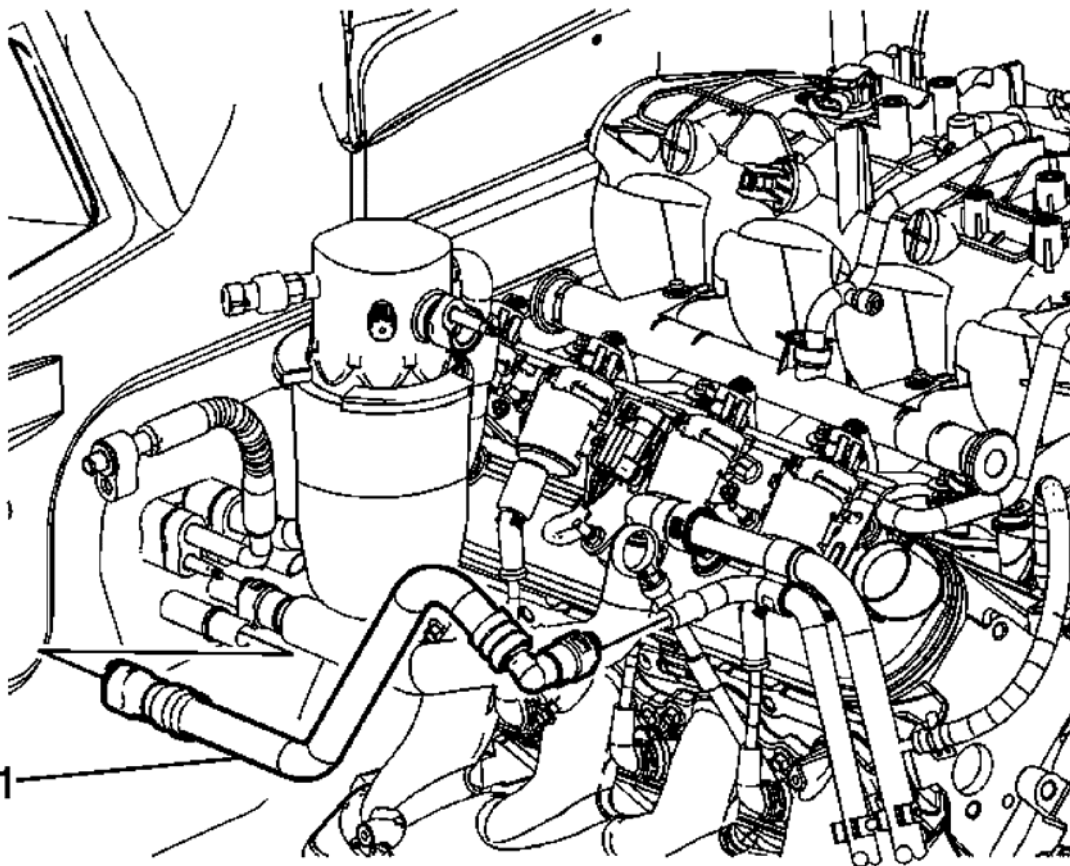


Fig. 57: Identifying Heater Inlet Hose (LH6)

Courtesy of GENERAL MOTORS CORP.

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Callout	Component Name
Preliminary Procedure: Partially drain the cooling system. Refer to <u>Cooling System Draining and Filling (LL8)</u> or <u>Cooling System Draining and Filling (LH6, LS2)</u> .	
1	Heater Inlet Hose Tip: Use GE-47622 Hose Clamp Pliers to release the heater inlet hose retainer.

HEATER OUTLET HOSE REPLACEMENT (LL8)

Tools Required

- **J 43181** Heater Line Quick Connect Release Tool. See Special Tools.
- **GE-47622** Hose Clamp Pliers

Removal Procedure

1. Drain the cooling system. Refer to Cooling System Draining and Filling (LL8) or Cooling System Draining and Filling (LH6, LS2) .
2. Remove the transmission. Refer to Transmission Replacement (LL8) or Transmission Replacement (LM4, LS2) .
3. Remove the generator. Refer to Generator Replacement (With 4.2L Engine) or Generator Replacement (With V8 Engine) .

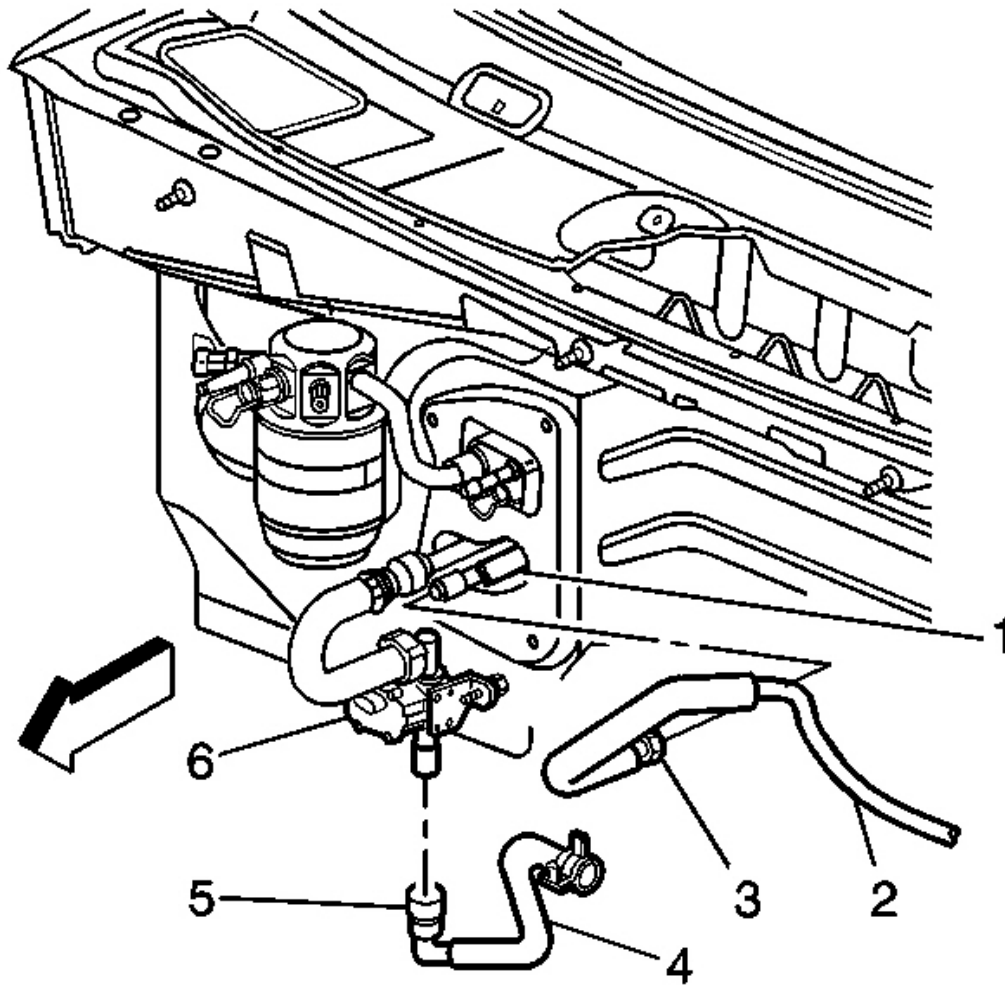


Fig. 58: View Of Heater Core & Hoses
Courtesy of GENERAL MOTORS CORP.

4. Using the **J 43181** , disconnect the outlet hose from the heater core outlet tube (1). See **Special Tools**.
 1. Install the **J 43181** to the outlet heater core hose. See **Special Tools**.
 2. Close the tool around the outlet heater core hose.
 3. Firmly pull the tool into the quick connect end of the heater hose.
 4. Firmly grasp the heater hose. Pull the heater hose forward in order to disengage the hose from the heater core.
5. Remove the heater outlet hose (3) from the heater core (1).

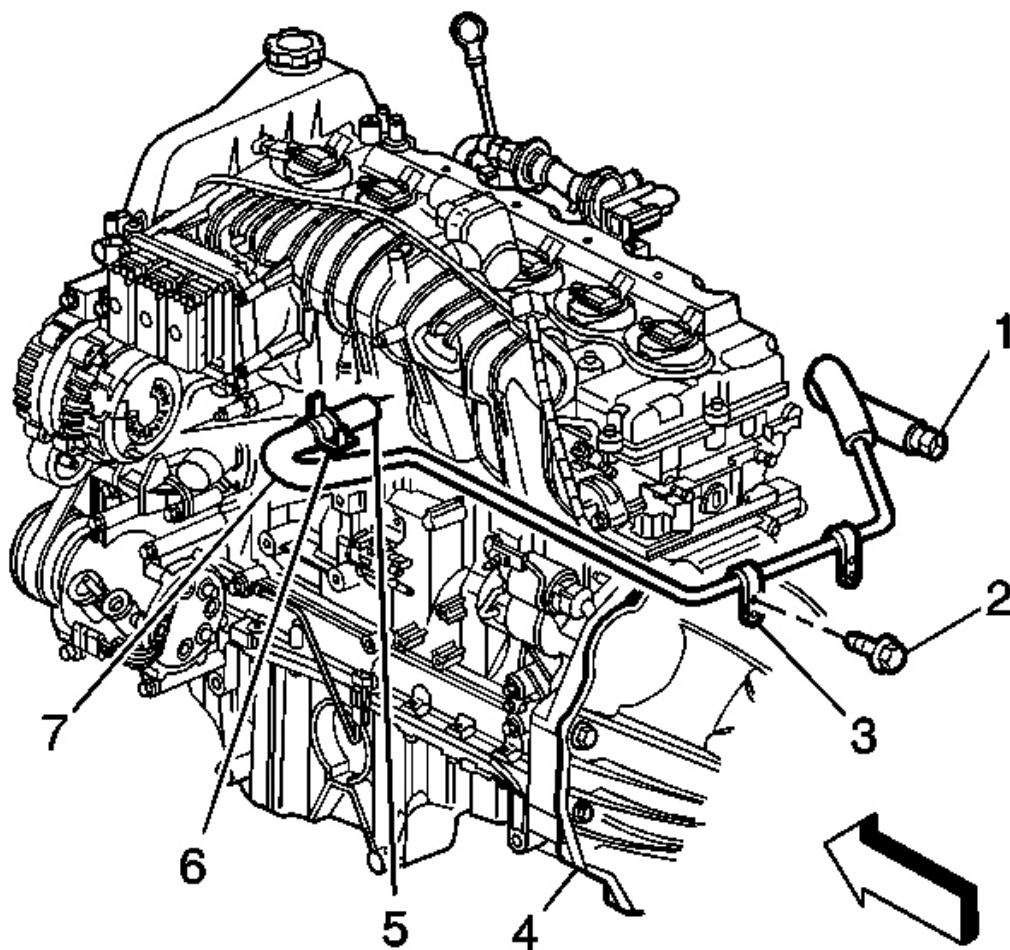


Fig. 59: View Of Heater Outlet Hose & Components
Courtesy of GENERAL MOTORS CORP.

6. Position the outlet heater hose clamp (6) at the water pump using **GE-47622** .
7. Remove the heater outlet hose (7) from the outlet hose fitting.
8. Remove the heater outlet hose.

Installation Procedure

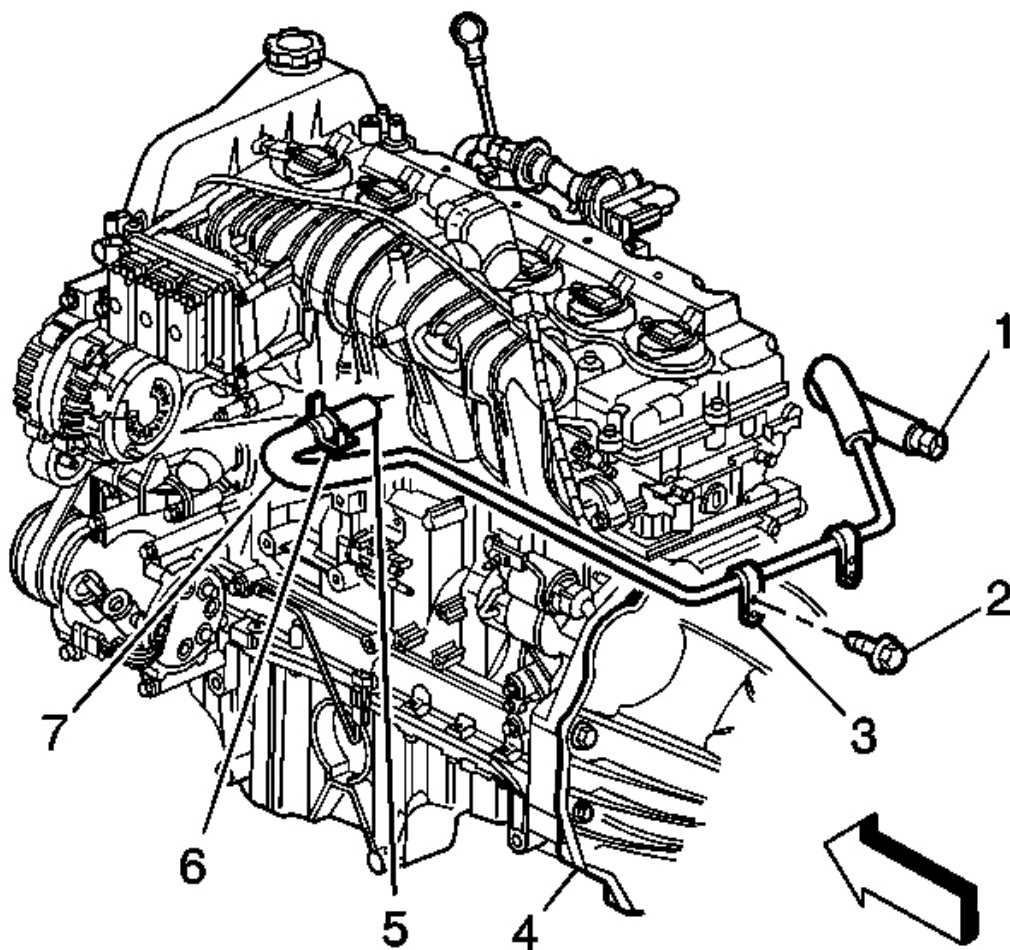


Fig. 60: View Of Heater Outlet Hose & Components
Courtesy of GENERAL MOTORS CORP.

1. Install the outlet heater hose.
2. Install the heater outlet hose (7) to the outlet hose fitting.
3. Position the outlet heater hose clamp (6) at the outlet hose fitting using **GE-47622**.

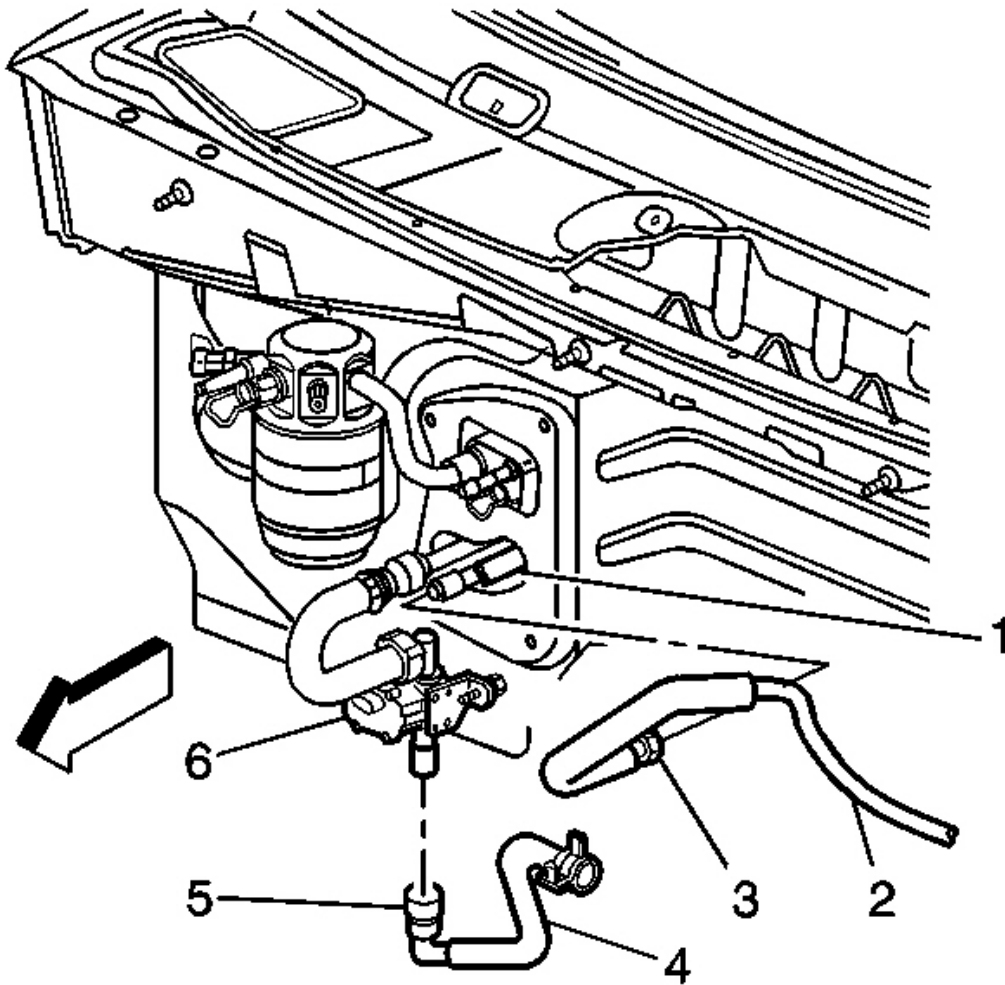


Fig. 61: View Of Heater Core & Hoses
Courtesy of GENERAL MOTORS CORP.

4. Install the heater outlet hose (3) to the heater core (1).
5. Firmly push the quick connect onto the heater core hose until you hear an audible click.
6. Install the transmission. Refer to **Transmission Replacement (LL8)** or **Transmission Replacement (LM4, LS2)** .
7. Install the generator. Refer to **Generator Replacement (With 4.2L Engine)** or **Generator Replacement (With V8 Engine)** .
8. Fill the cooling system. Refer to **Cooling System Draining and Filling (LL8)** or **Cooling System Draining and Filling (LH6, LS2)** .

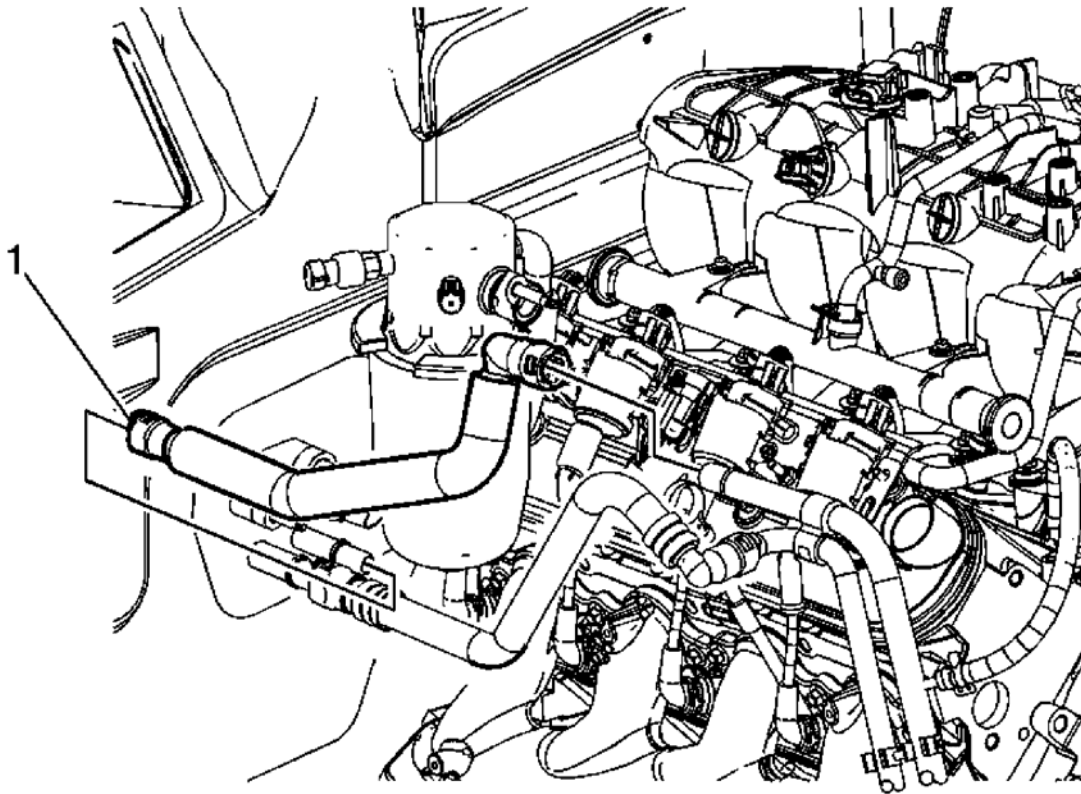
HEATER OUTLET HOSE REPLACEMENT (LH6, LS2)

Fig. 62: Identifying Heater Hose Replacement - Outlet (LH6)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Partially drain the cooling system. Refer to <u>Cooling System Draining and Filling (LL8)</u> or <u>Cooling System Draining and Filling (LH6, LS2)</u> .	
1	Heater Outlet Hose Tip: Use GE-47622 Hose Clamp Pliers to release the heater outlet hose retainer.

BLOWER MOTOR RELAY REPLACEMENT**Removal Procedure**

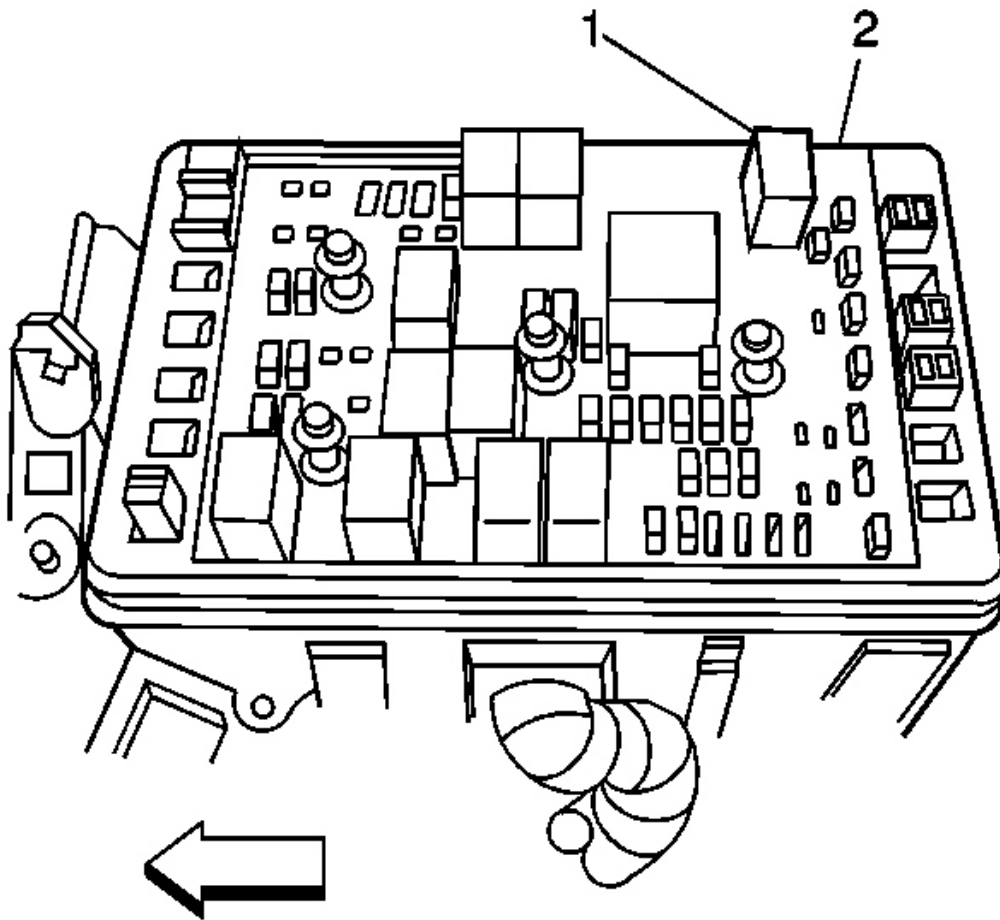


Fig. 63: Locating Cooling Fan Relay
Courtesy of GENERAL MOTORS CORP.

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

Installation Procedure

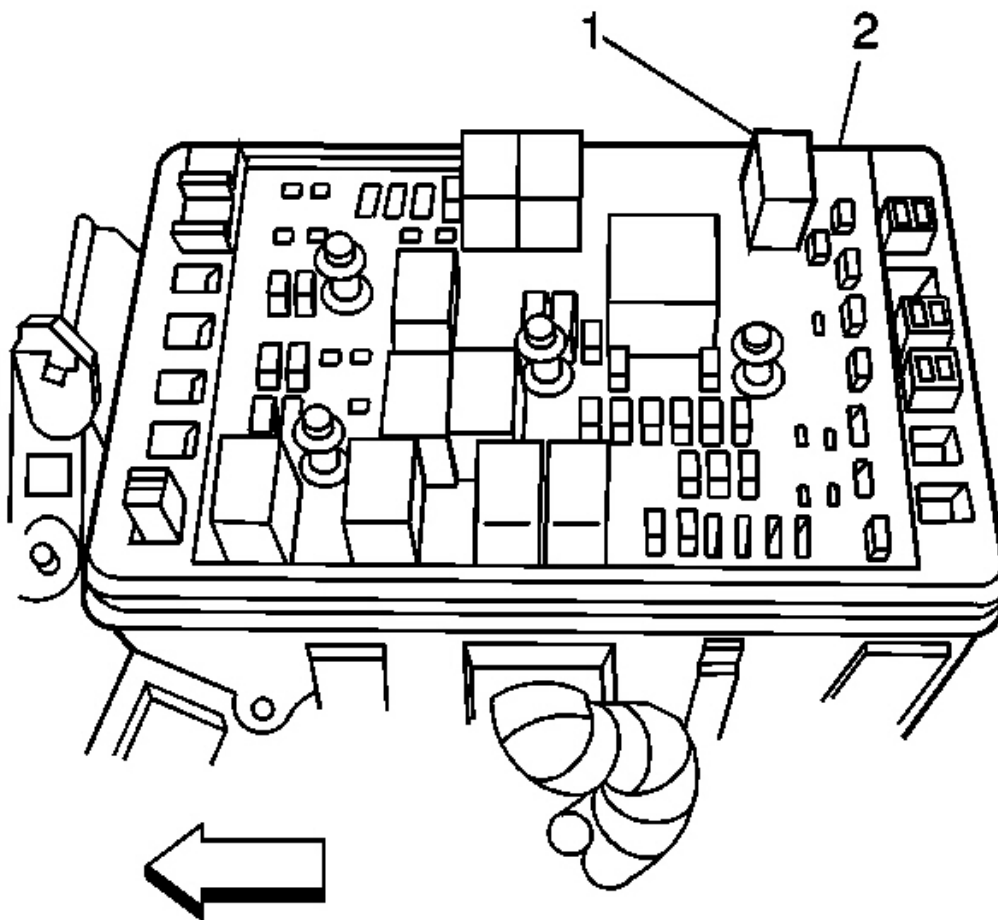


Fig. 64: Locating Cooling Fan Relay
Courtesy of GENERAL MOTORS CORP.

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

BLOWER MOTOR RESISTOR ASSEMBLY REPLACEMENT

Removal Procedure

1. Remove the right closeout/insulator panel. Refer to **Instrument Panel Insulator Panel Replacement - Right Side** .

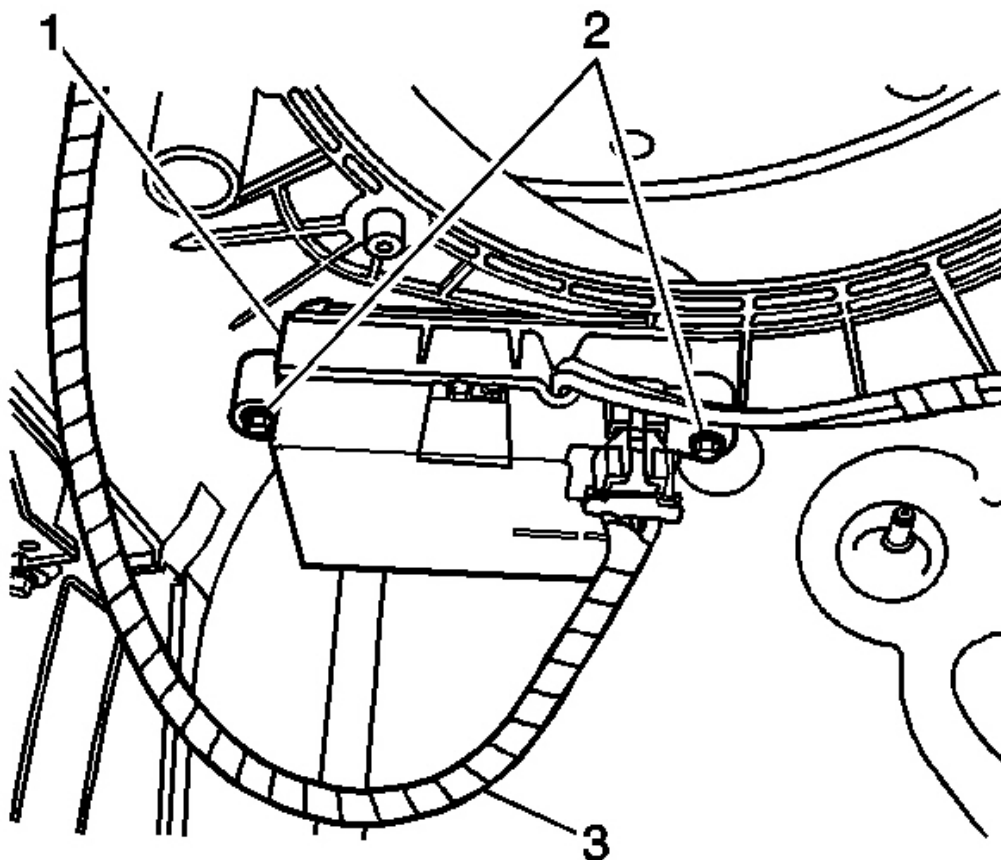


Fig. 65: View Of Electrical Connector, Blower Motor Control Processor & Mounting Screws
Courtesy of GENERAL MOTORS CORP.

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

Installation Procedure

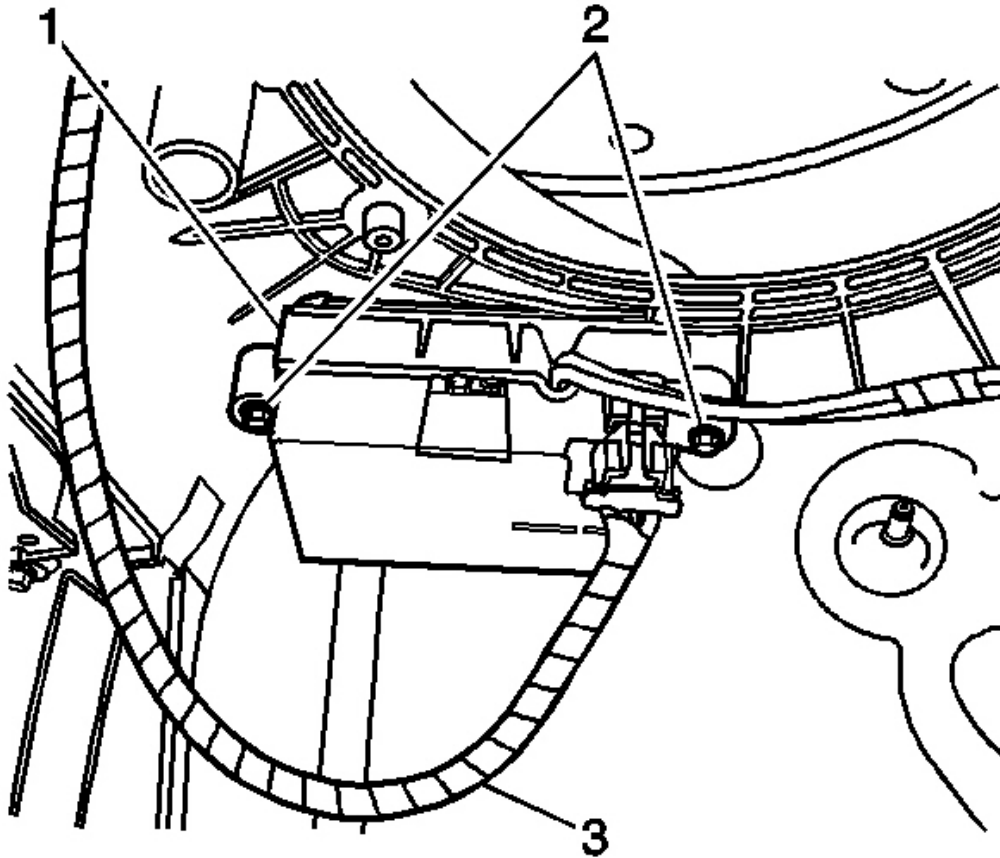


Fig. 66: View Of Electrical Connector, Blower Motor Control Processor & Mounting Screws
Courtesy of GENERAL MOTORS CORP.

1. Install the blower motor resistor (1).

NOTE: Refer to Fastener Notice .

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

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

3. Connect the blower motor resistor electrical connector (3).
4. Install the right closeout/insulator panel. Refer to Instrument Panel Insulator Panel Replacement - Right Side .

BLOWER MOTOR REPLACEMENT

Removal Procedure

1. Remove the right closeout/insulator panel. Refer to Instrument Panel Insulator Panel Replacement - Right Side .
2. Remove the I/P storage compartment door. Refer to Instrument Panel Compartment Door Replacement .

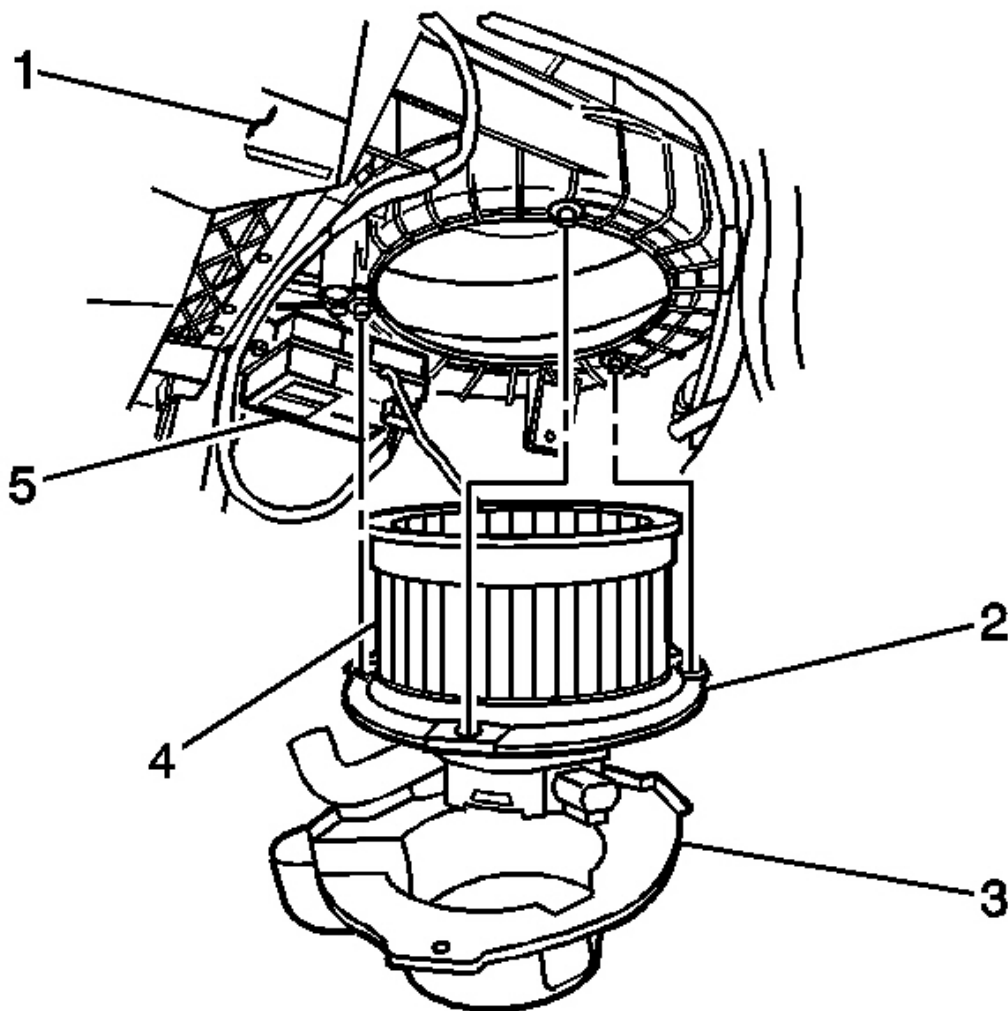


Fig. 67: View Of Blower Motor Components
Courtesy of GENERAL MOTORS CORP.

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

Installation Procedure

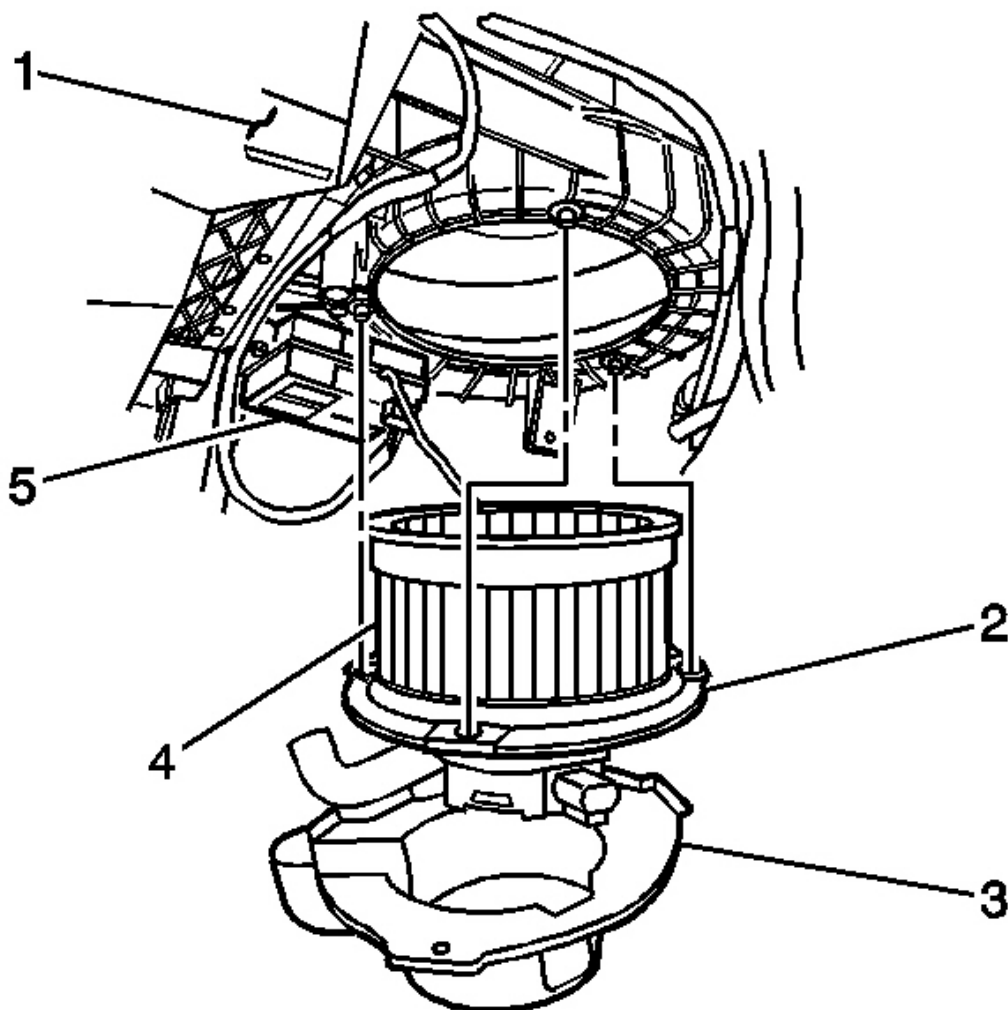


Fig. 68: View Of Blower Motor Components
Courtesy of GENERAL MOTORS CORP.

1. Install the blower motor (2).

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2. Install the blower motor cooling tube.

NOTE: Refer to Fastener Notice .

3. Install the blower motor mounting screws.

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

4. Connect the blower motor electrical connector.
5. Install the right closeout/insulator panel. Refer to Instrument Panel Insulator Panel Replacement - Right Side .

AIR DISTRIBUTOR DUCT REPLACEMENT

Removal Procedure

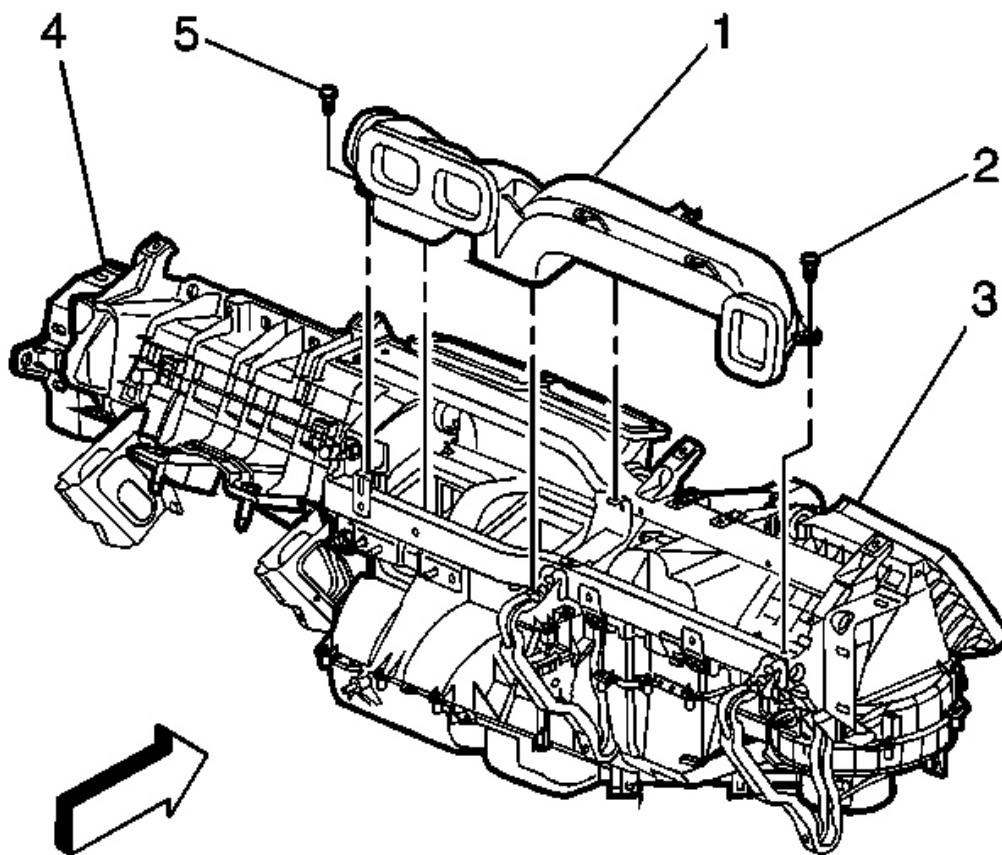


Fig. 69: View Of Air Distributor Duct & Components
Courtesy of GENERAL MOTORS CORP.

1. Remove the instrument panel (I/P) assembly. Refer to **Instrument Panel Assembly Replacement** .
2. Remove the driver side air distributor duct screws.
3. Remove the air distributor duct (1) from the I/P.
4. Unclip the radio antenna wire from the duct
5. Remove the air temperature sensor from the duct.

Installation Procedure

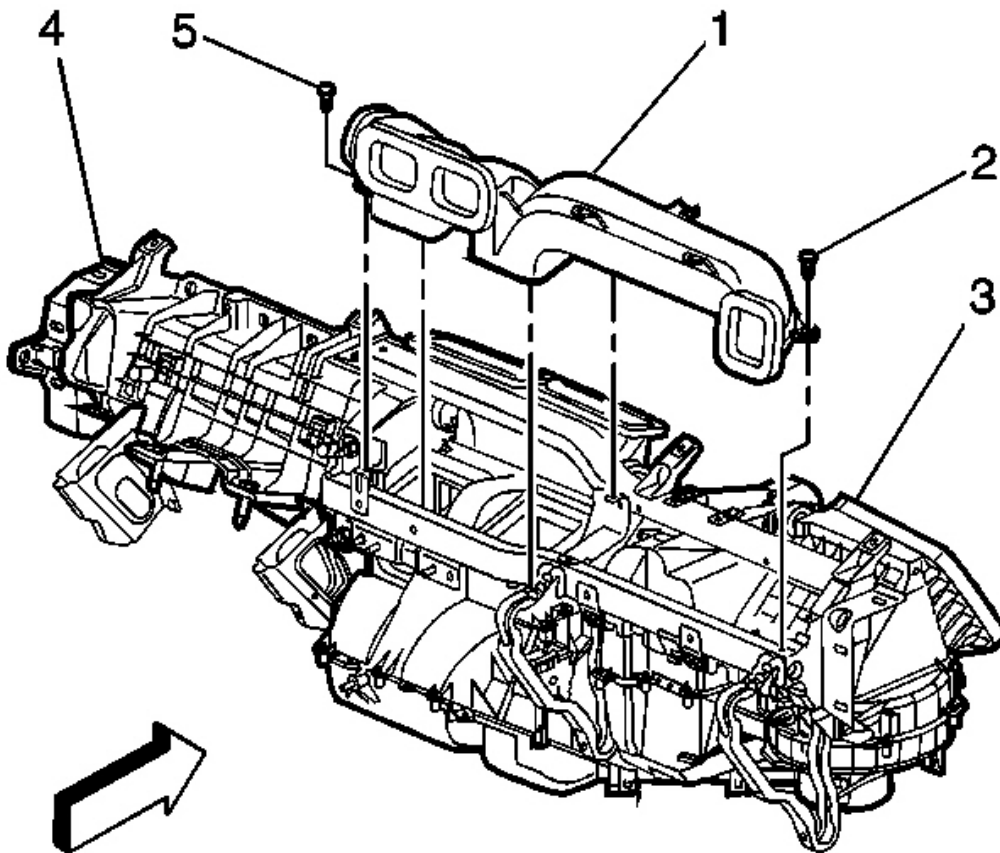


Fig. 70: View Of Air Distributor Duct & Components
Courtesy of GENERAL MOTORS CORP.

1. Install the air distributor duct (1) to I/P.

NOTE: Refer to Fastener Notice .

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

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

3. Install the air temperature sensor to the air distributor duct.
4. Clip the radio antenna wire to the duct.
5. Install the I/P assembly. Refer to Instrument Panel Assembly Replacement .

INSTRUMENT PANEL AIR OUTLET REPLACEMENT

Removal Procedure

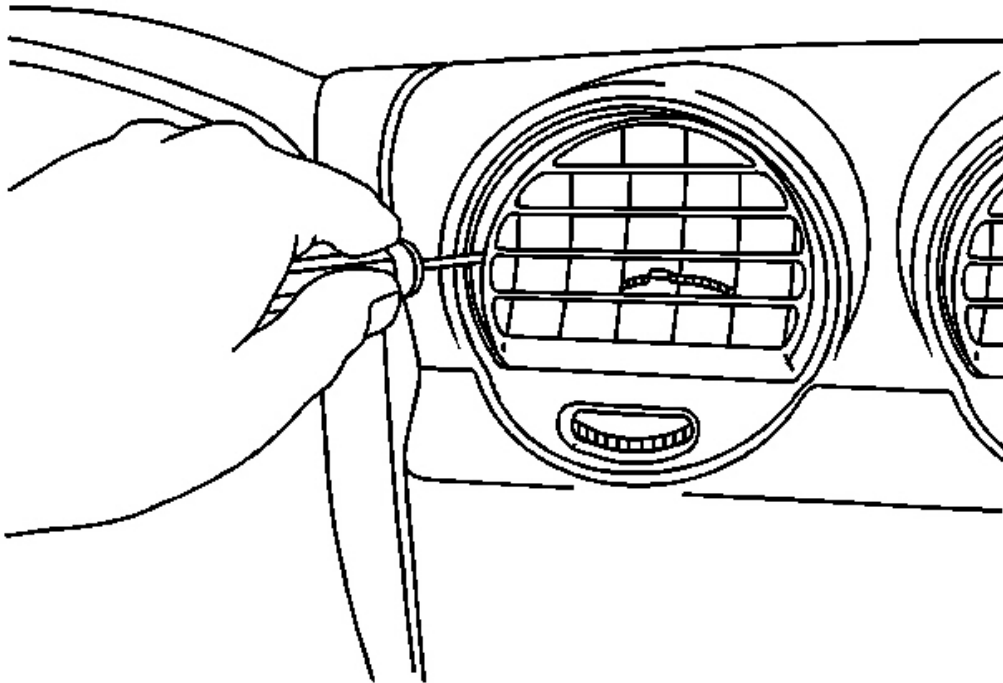


Fig. 71: Removing Left Housing Retaining Pin
Courtesy of GENERAL MOTORS CORP.

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

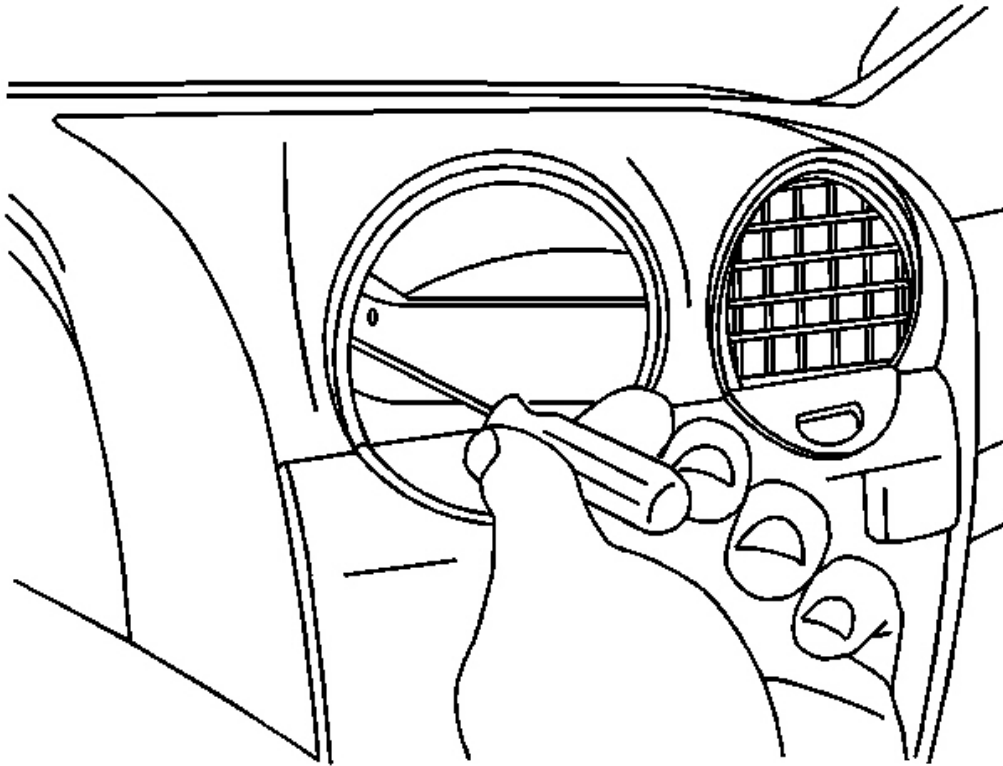


Fig. 72: Removing/Installing Left Side Of Air Outlet At Housing Assembly
Courtesy of GENERAL MOTORS CORP.

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

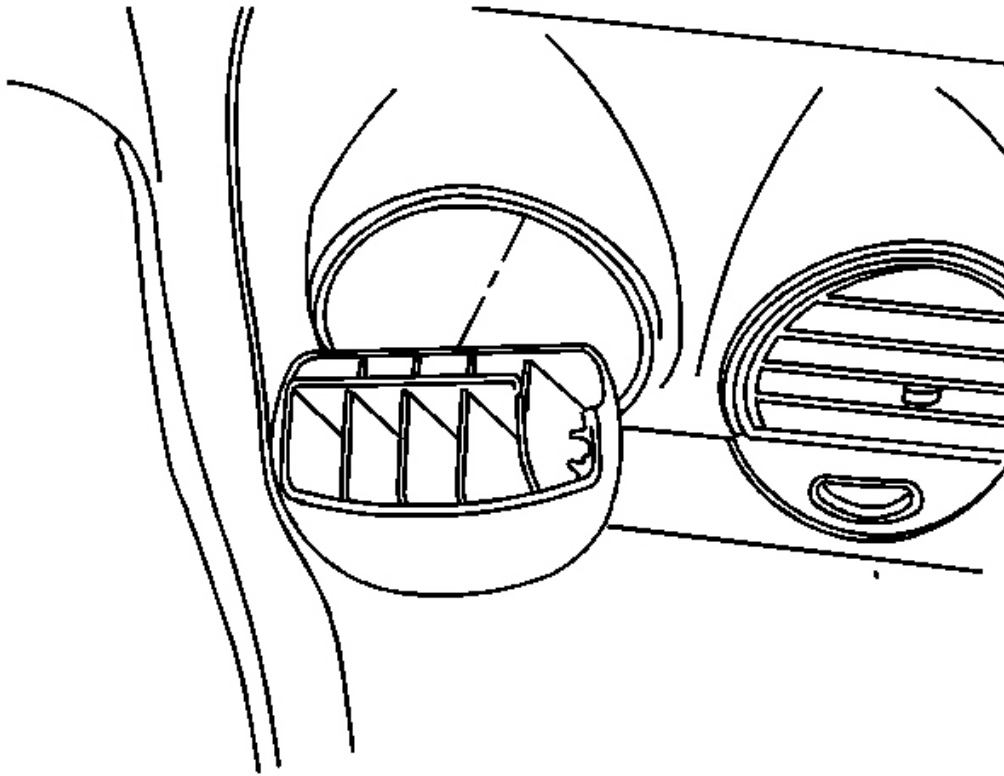


Fig. 73: Identifying Air Outlet
Courtesy of GENERAL MOTORS CORP.

4. Remove the air outlet from the housing assembly.

Installation Procedure

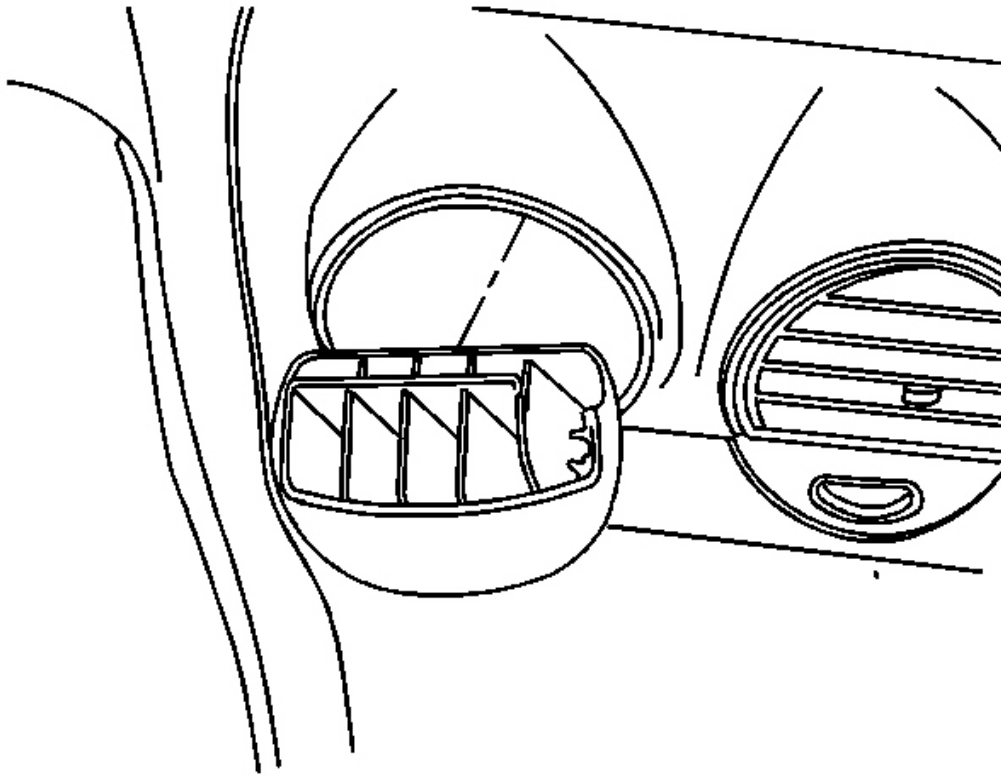


Fig. 74: Identifying Air Outlet

Courtesy of GENERAL MOTORS CORP.

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

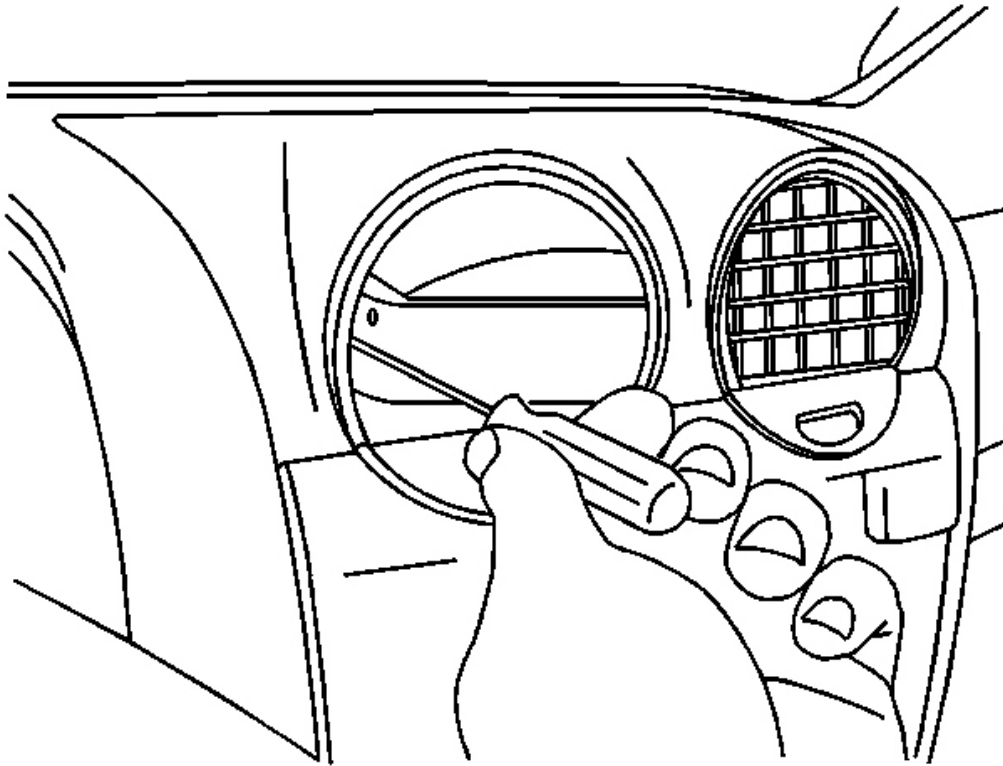


Fig. 75: Removing/Installing Left Side Of Air Outlet At Housing Assembly
Courtesy of GENERAL MOTORS CORP.

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

INSTRUMENT PANEL CENTER AIR OUTLET REPLACEMENT

Removal Procedure

1. Remove the left closeout/insulator panel. Refer to **Instrument Panel Insulator Panel Replacement - Left Side** .
2. Remove the knee bolster trim panel. Refer to **Driver Knee Bolster Panel Replacement** .
3. Remove the instrument panel (I/P) cluster bezel, Chevrolet only. Refer to **Instrument Panel Cluster Trim Plate Bezel Replacement (Chevrolet)** or **Instrument Panel Cluster Trim Plate Bezel Replacement (GMC, Buick)** .

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

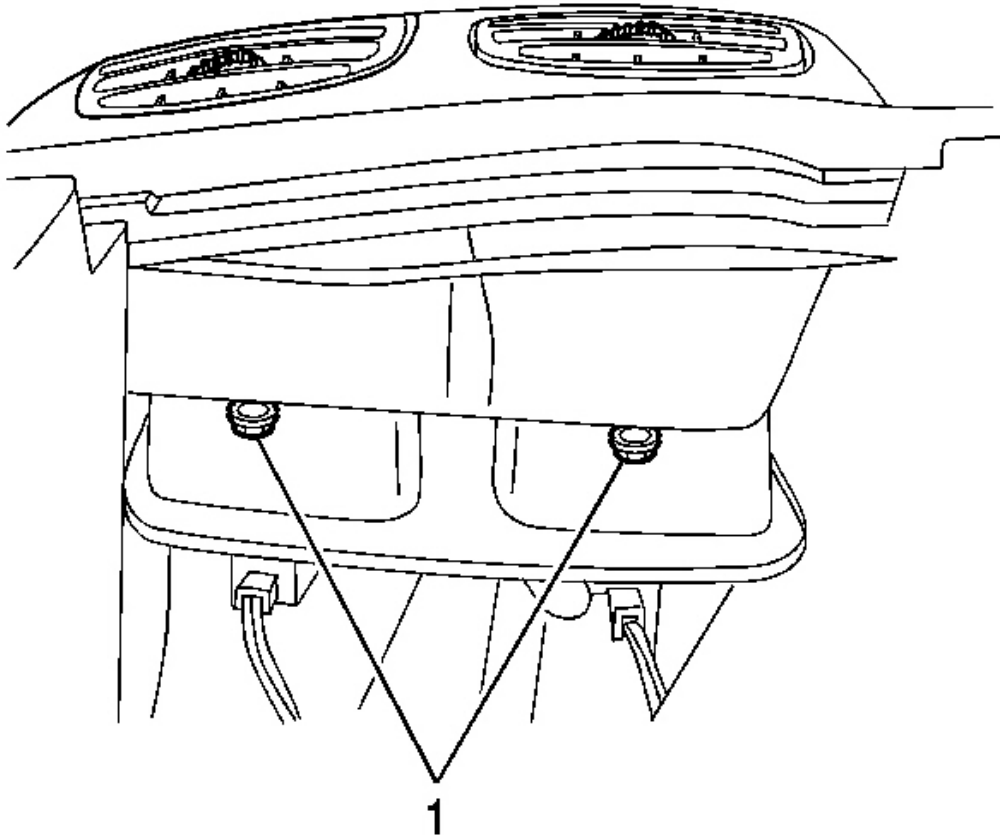


Fig. 76: Locating Screws At Bottom Of Air Outlet Assembly
Courtesy of GENERAL MOTORS CORP.

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

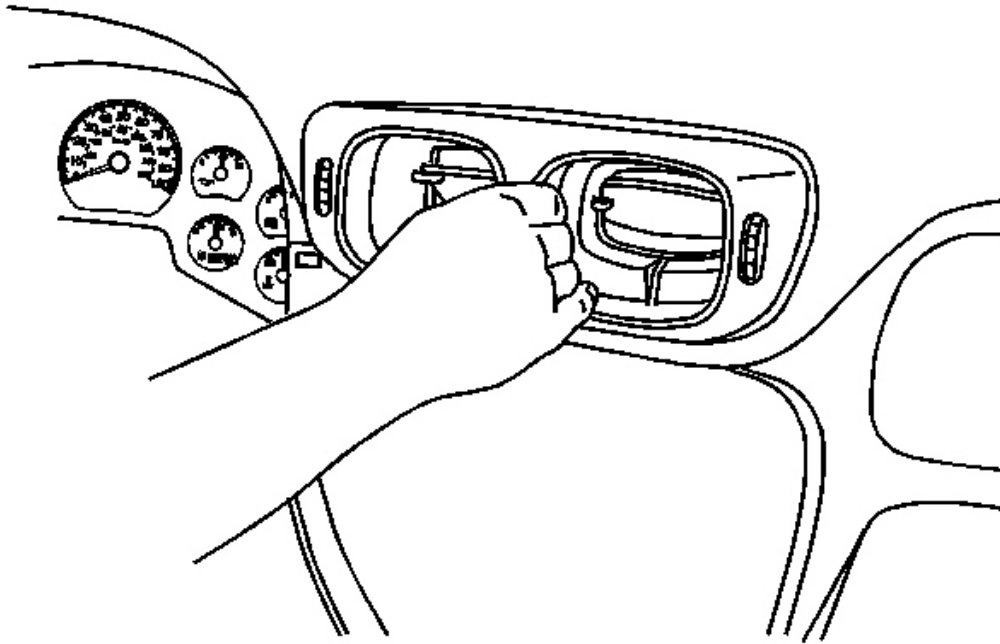


Fig. 77: Removing Air Deflectors From Outlet
Courtesy of GENERAL MOTORS CORP.

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

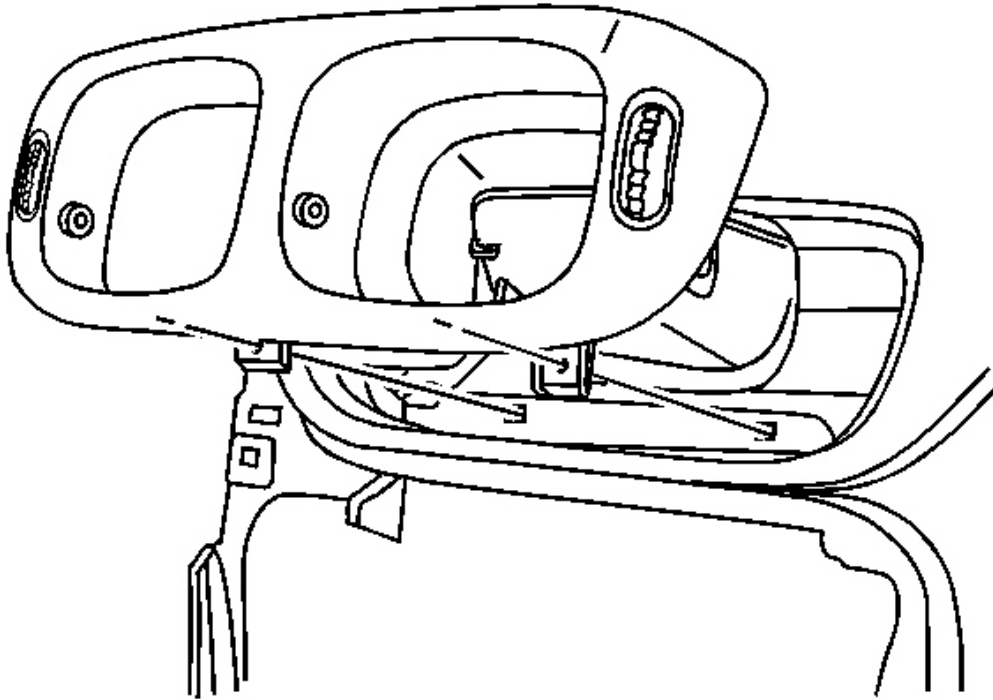


Fig. 78: View Of Air Outlet Assembly
Courtesy of GENERAL MOTORS CORP.

8. Remove the outlet from the vehicle.

Installation Procedure

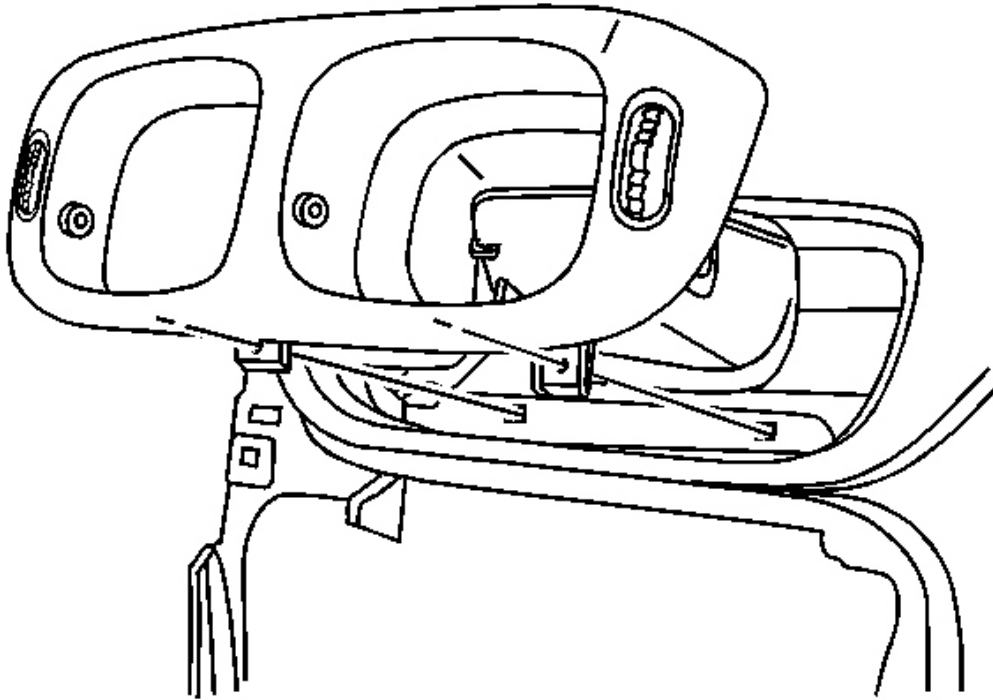


Fig. 79: View Of Air Outlet Assembly
Courtesy of GENERAL MOTORS CORP.

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

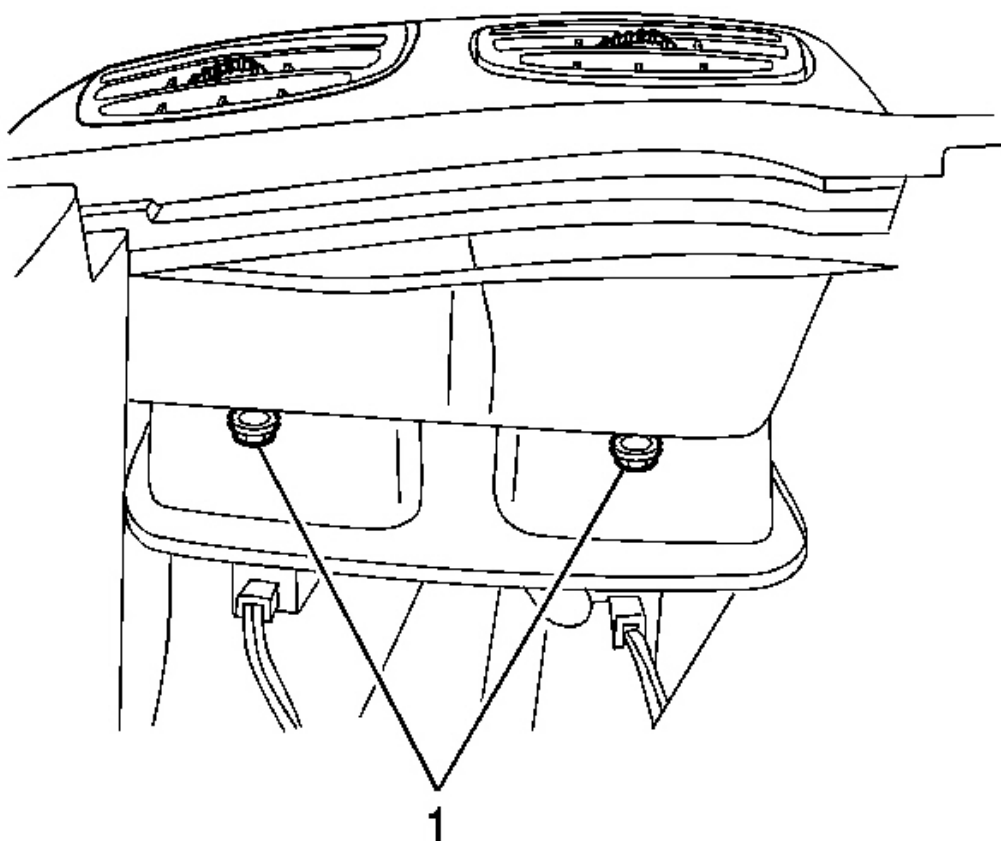


Fig. 80: Locating Screws At Bottom Of Air Outlet Assembly
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice .

3. Install the 2 retaining screws (1).

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

4. Install the radio. Refer to Radio Replacement .
5. Install the I/P cluster bezel, Chevrolet only. Refer to Instrument Panel Cluster Trim Plate Bezel Replacement (Chevrolet) or Instrument Panel Cluster Trim Plate Bezel Replacement (GMC, Buick) .
6. Install the knee bolster trim panel. Refer to Driver Knee Bolster Panel Replacement .
7. Install the left closeout/insulator panel. Refer to Instrument Panel Insulator Panel Replacement - Left

Side .

INSTRUMENT PANEL OUTER AIR OUTLET REPLACEMENT - RIGHT SIDE

Removal Procedure

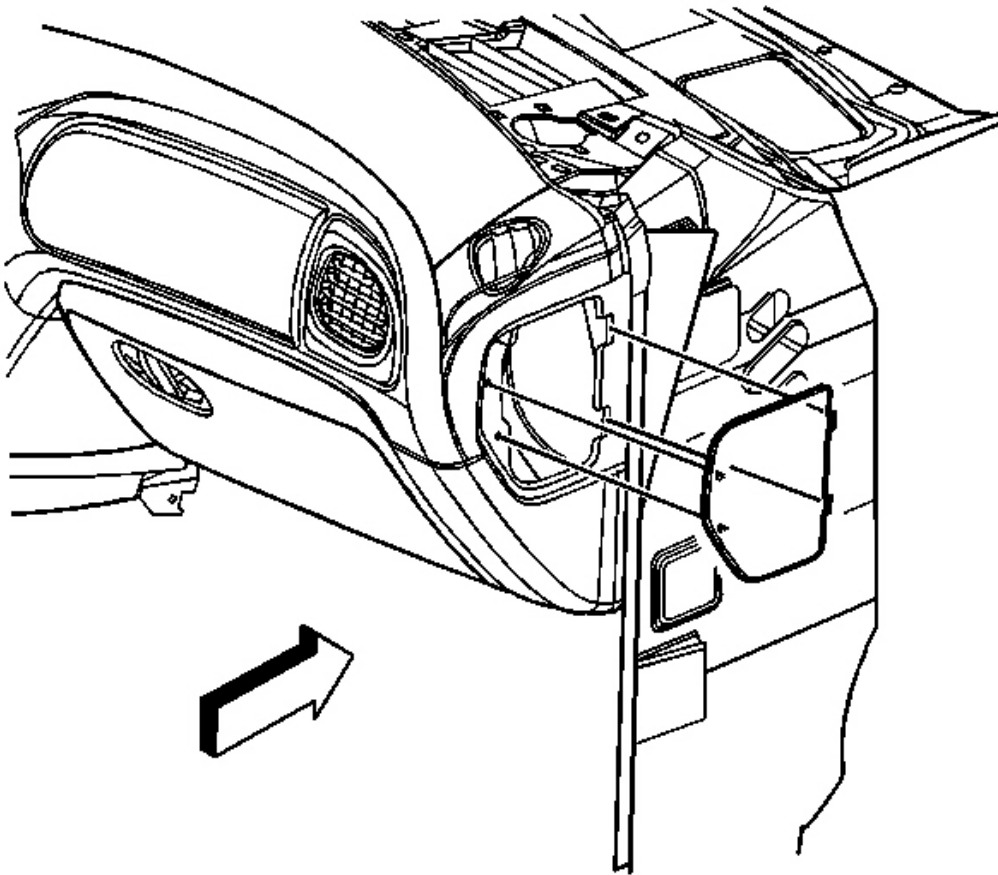


Fig. 81: Identifying Right I/P Access Cover
Courtesy of GENERAL MOTORS CORP.

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

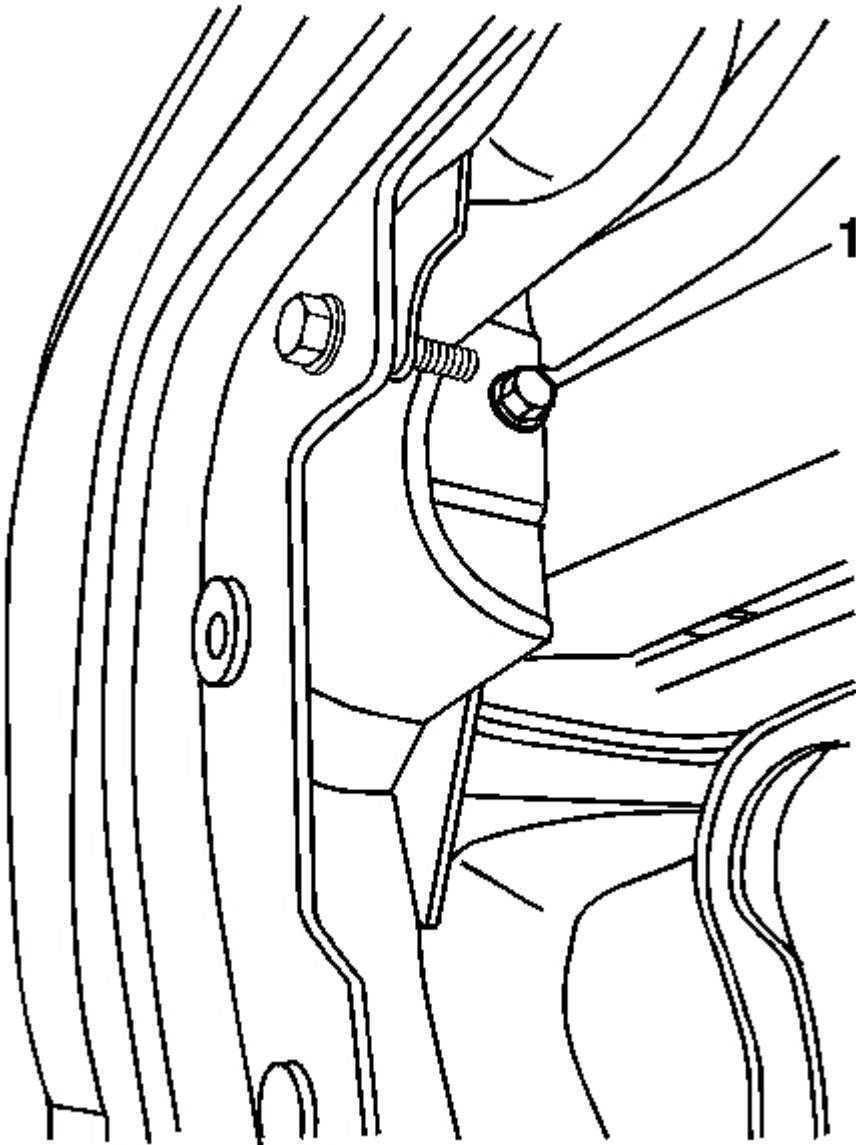


Fig. 82: Air Outlet Assembly Retaining Screw
Courtesy of GENERAL MOTORS CORP.

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

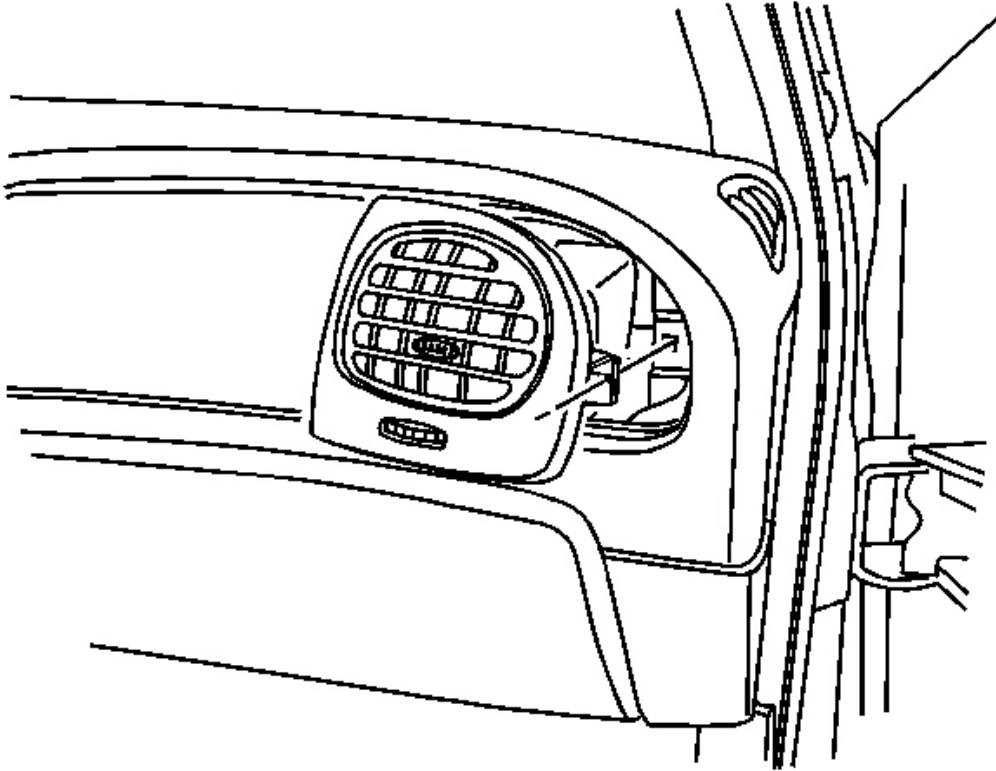


Fig. 83: View Of Outlet Assembly
Courtesy of GENERAL MOTORS CORP.

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

Installation Procedure

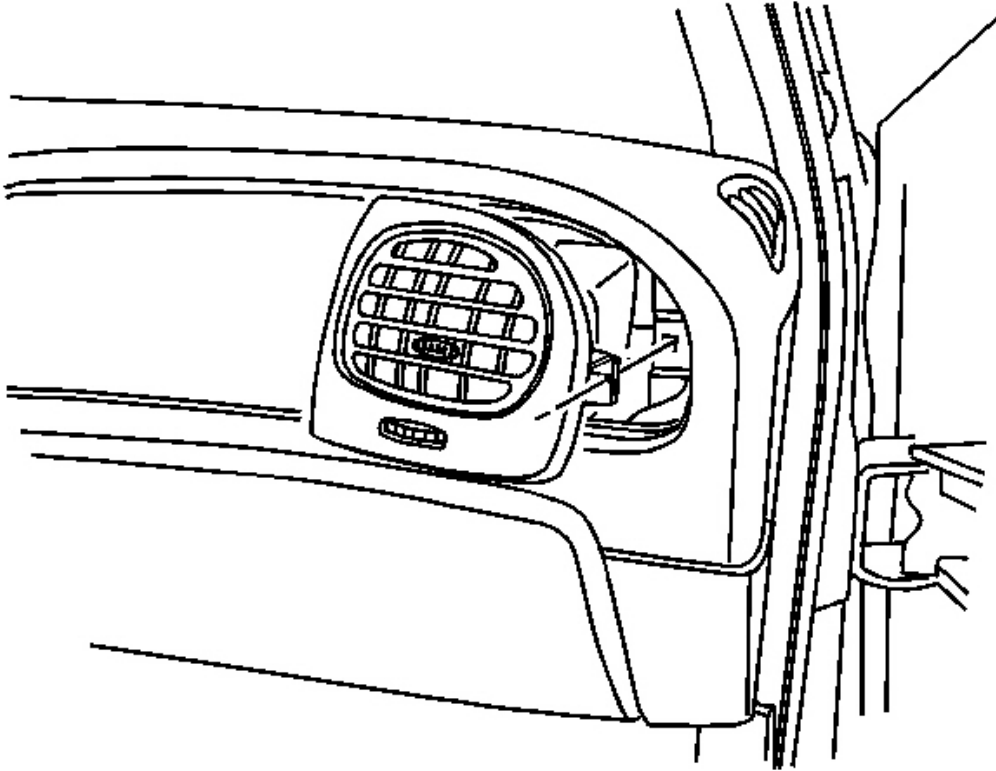


Fig. 84: View Of Outlet Assembly
Courtesy of GENERAL MOTORS CORP.

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

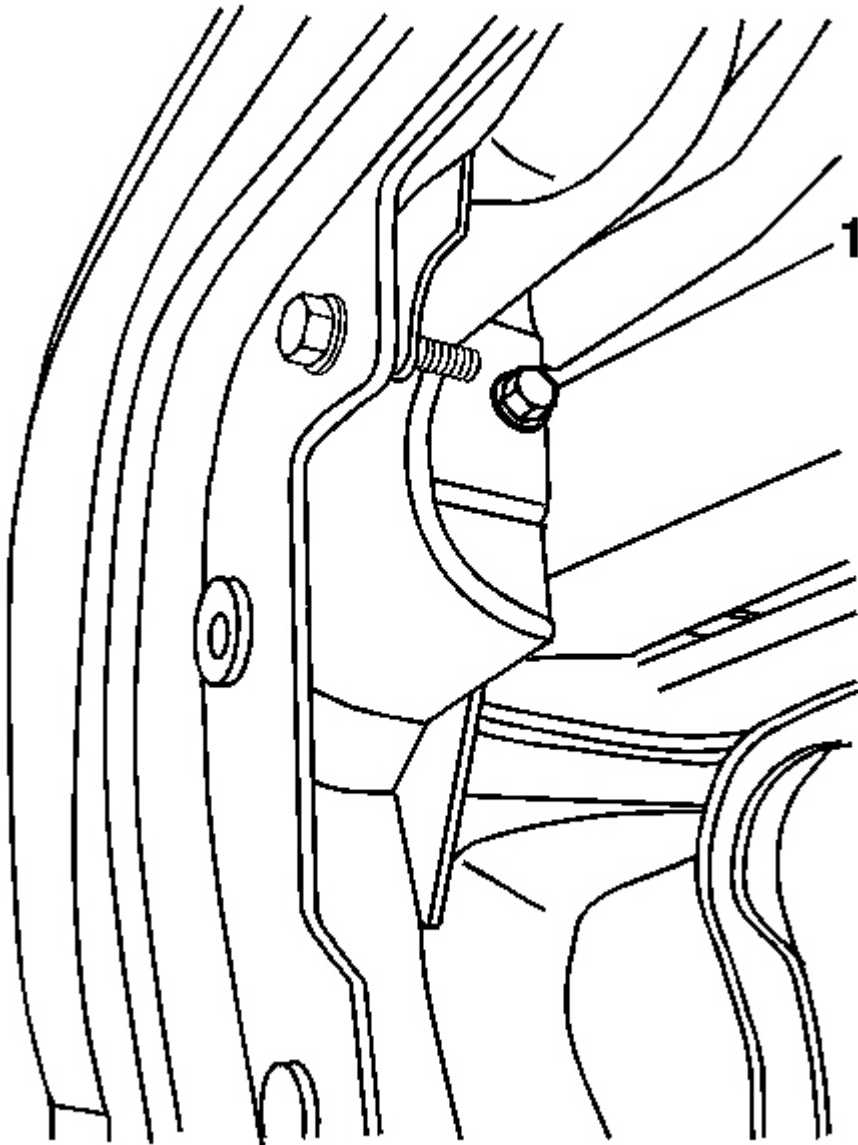


Fig. 85: Air Outlet Assembly Retaining Screw
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice .

2. Install the retaining screw.

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

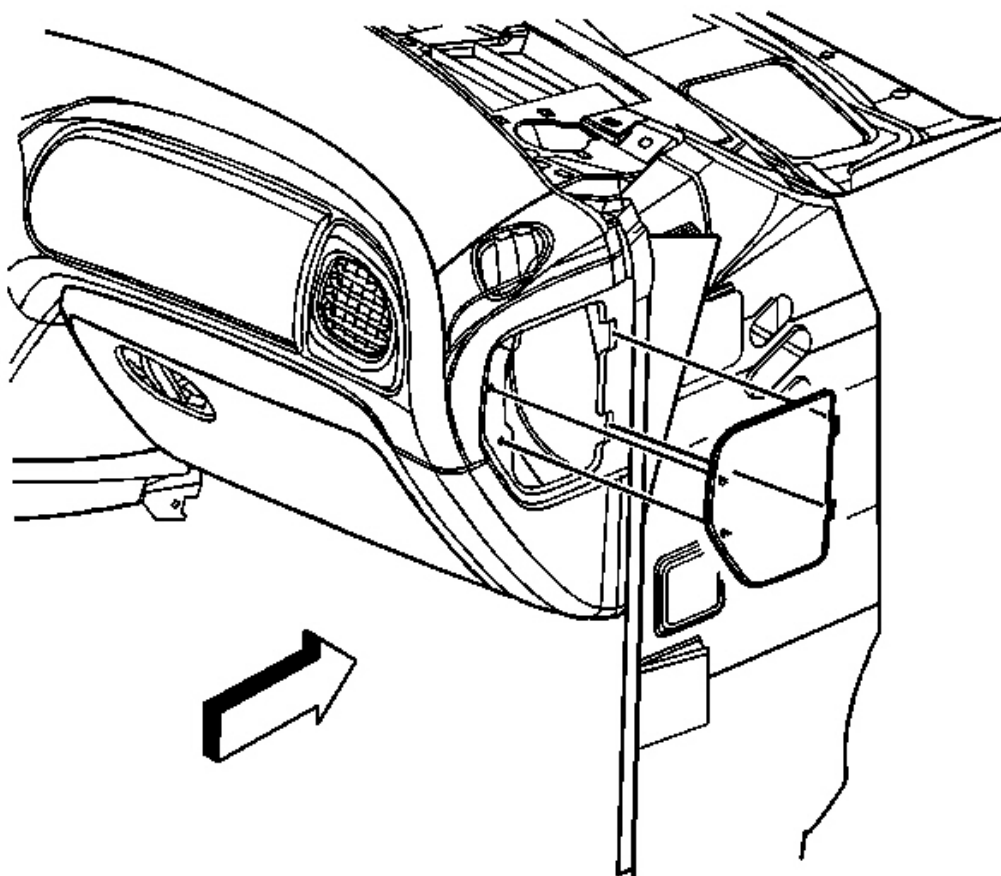


Fig. 86: Identifying Right I/P Access Cover
Courtesy of GENERAL MOTORS CORP.

3. Install the I/P access cover.

REAR FLOOR AIR OUTLET REPLACEMENT

Removal Procedure

1. Remove the console support bracket. Refer to **Floor Console Bracket Replacement** .

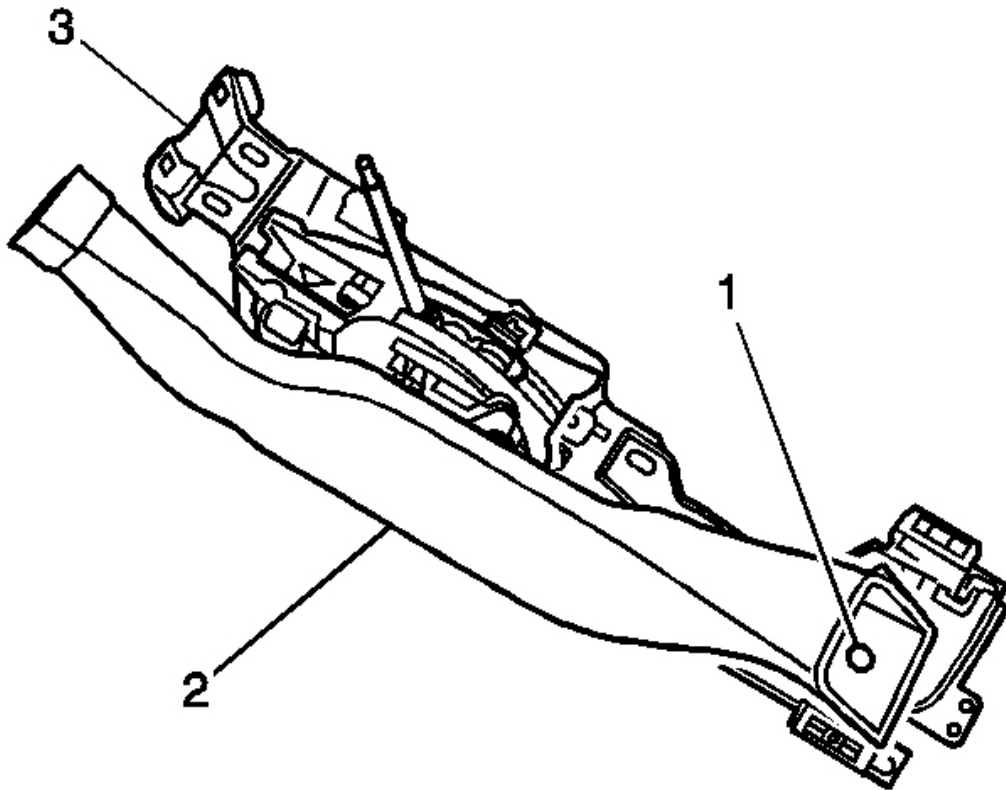


Fig. 87: Locating Pop Rivet

Courtesy of GENERAL MOTORS CORP.

2. Drill the pop rivet (1).

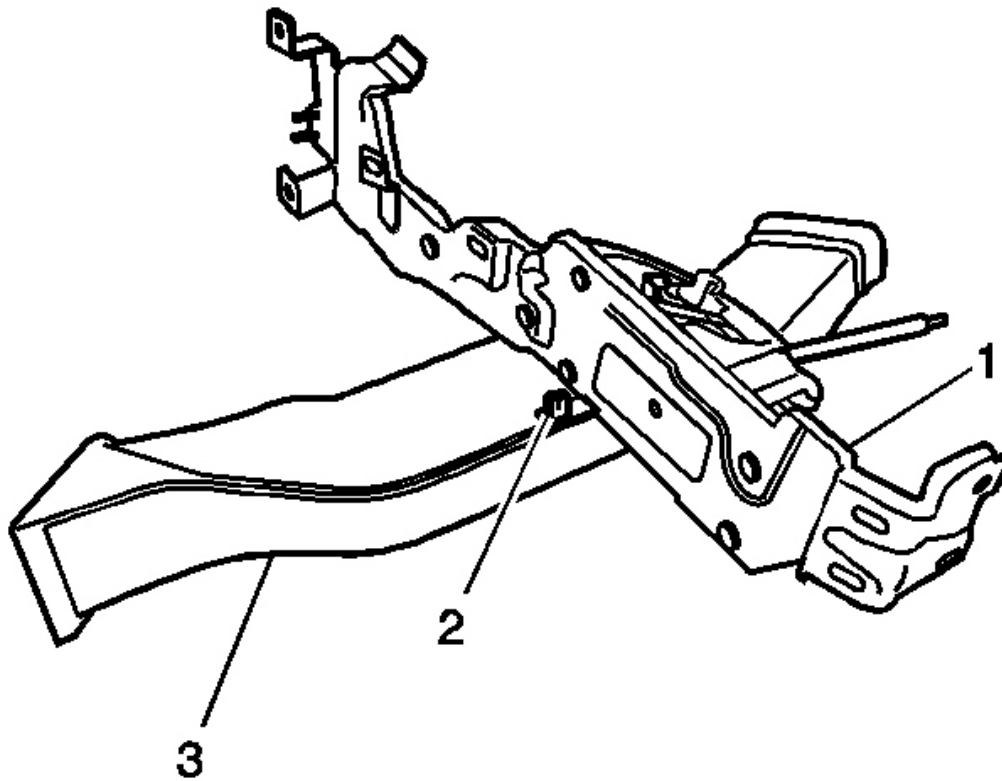


Fig. 88: Air Outlet Duct & Console Support Bracket (Rear Floor)
Courtesy of GENERAL MOTORS CORP.

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

Installation Procedure

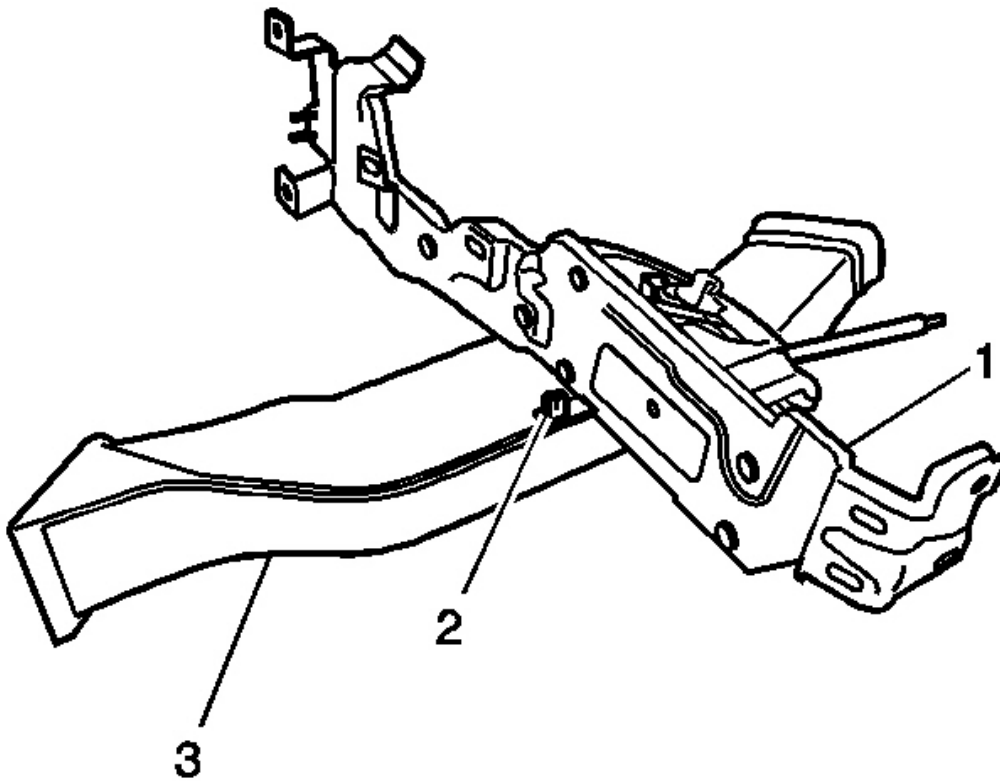


Fig. 89: Air Outlet Duct & Console Support Bracket (Rear Floor)
Courtesy of GENERAL MOTORS CORP.

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

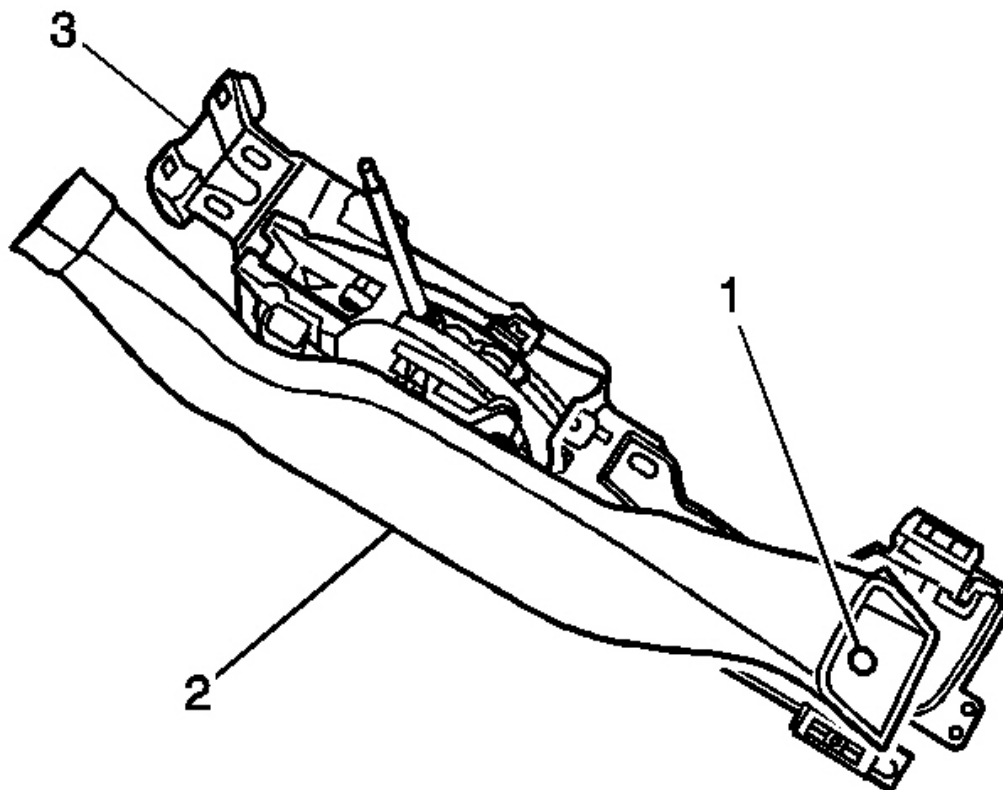


Fig. 90: Locating Pop Rivet

Courtesy of GENERAL MOTORS CORP.

2. Install a new pop rivet (1).
3. Install the console support bracket. Refer to **Floor Console Bracket Replacement** .

WINDSHIELD DEFROSTER DUCT REPLACEMENT

Removal Procedure

1. Remove the instrument panel (I/P) trim pad. Refer to **Instrument Panel Upper Trim Pad Replacement** .

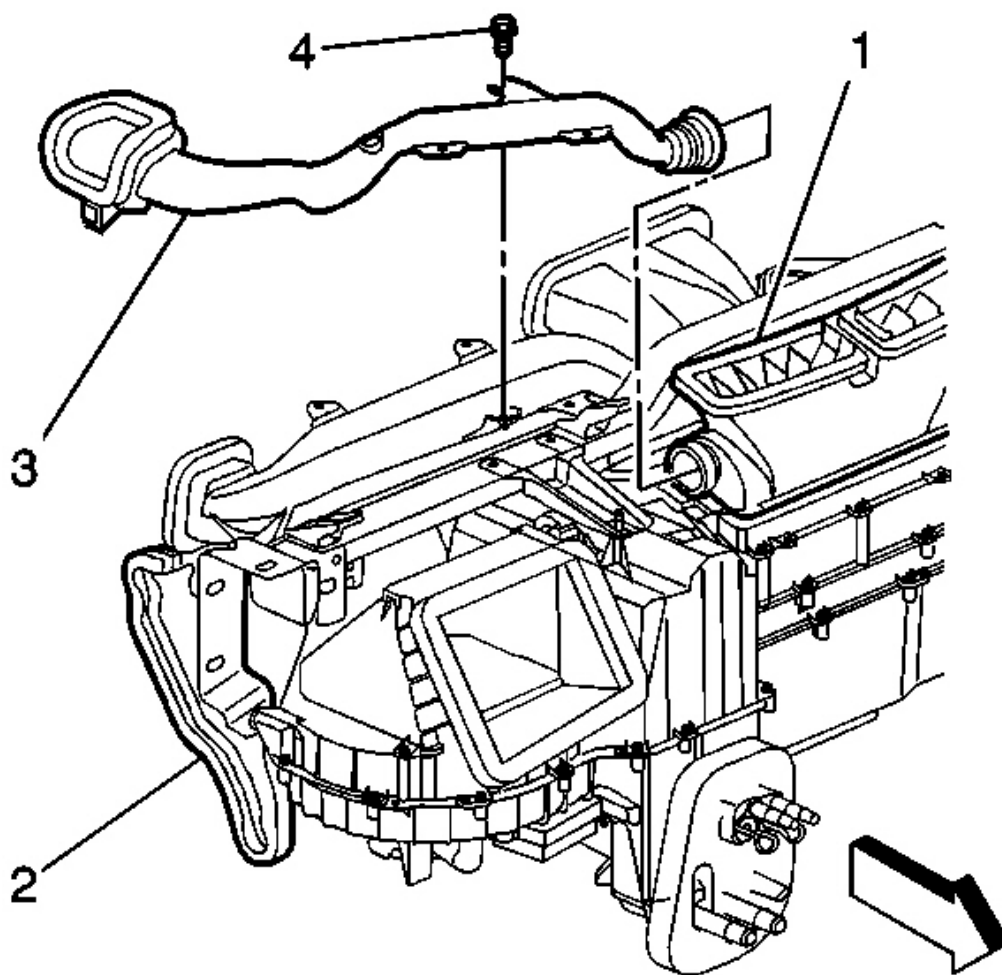


Fig. 91: View Of Passenger Side Window Defroster Duct
Courtesy of GENERAL MOTORS CORP.

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

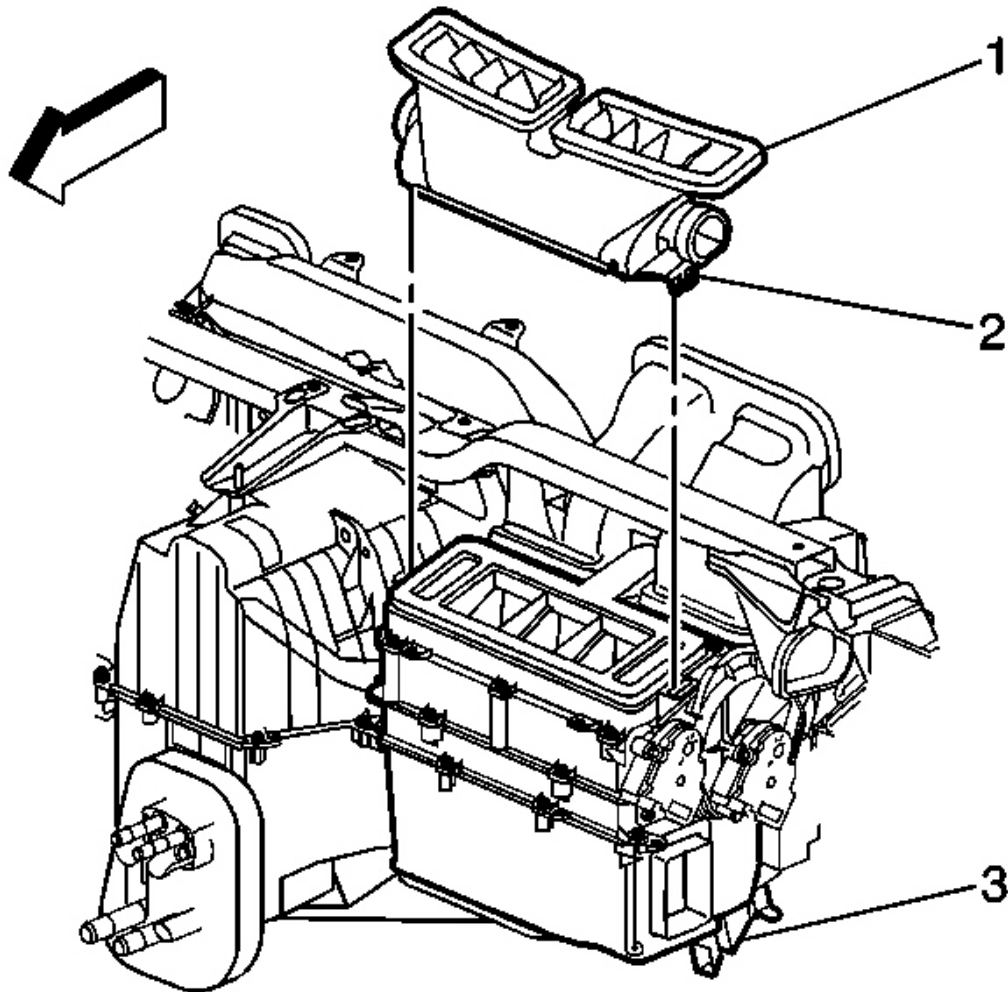


Fig. 92: View Of Defroster Duct
Courtesy of GENERAL MOTORS CORP.

5. Release locking tabs (2) from the defroster duct (1).
6. Remove the defroster duct (1).

Installation Procedure

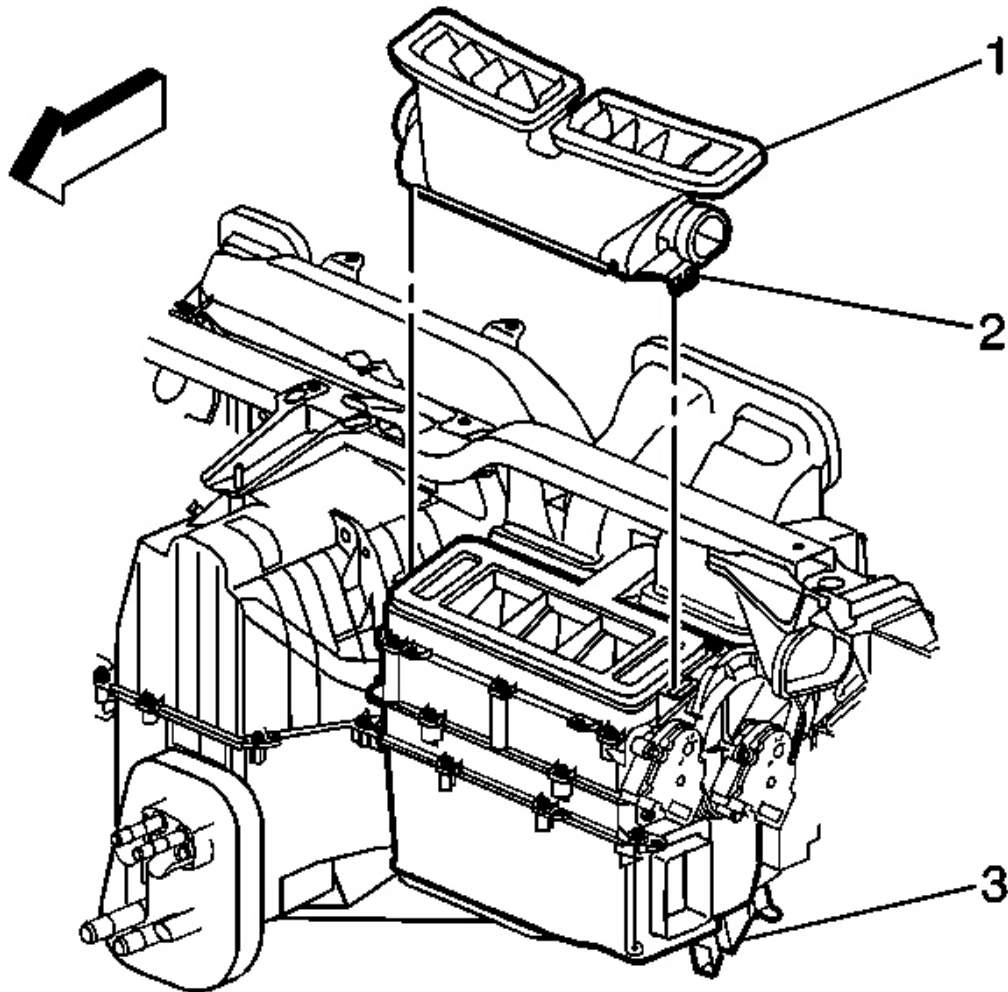


Fig. 93: View Of Defroster Duct
Courtesy of GENERAL MOTORS CORP.

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

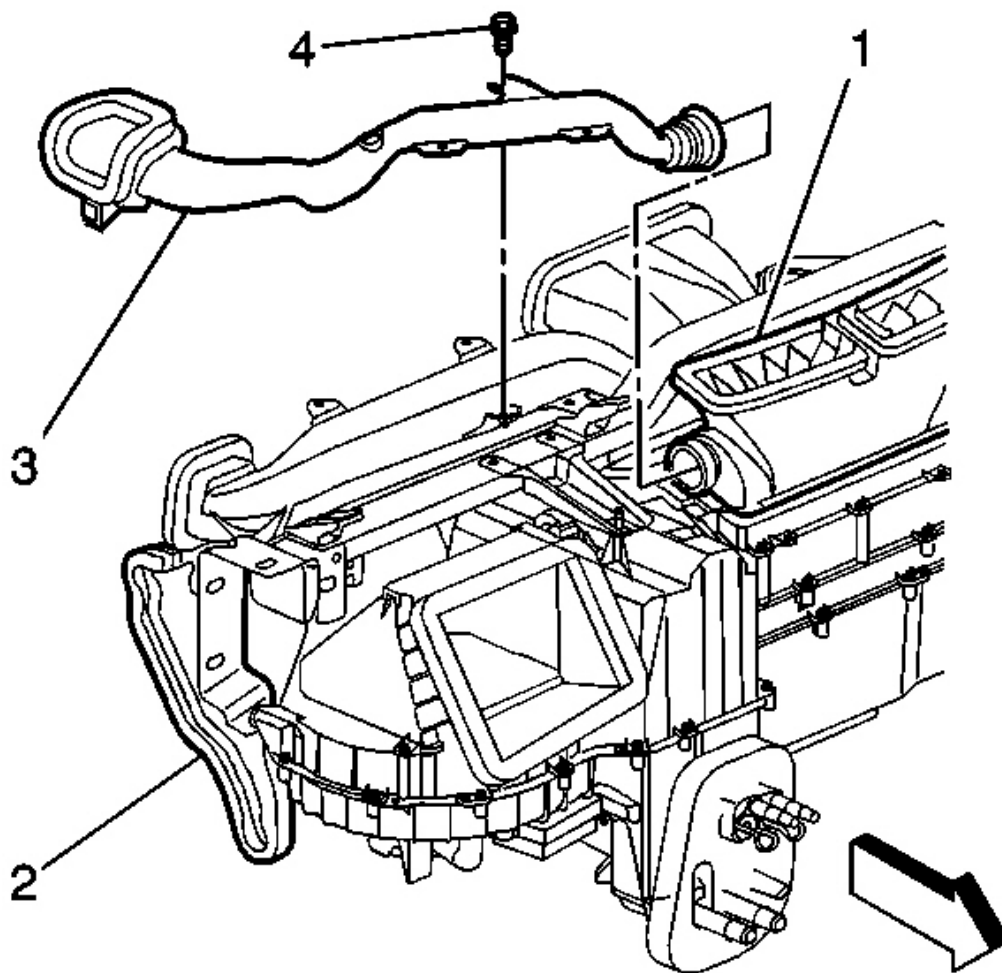


Fig. 94: View Of Passenger Side Window Defroster Duct
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice .

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

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

4. Install the I/P assembly. Refer to Instrument Panel Carrier Replacement .

Removal Procedure

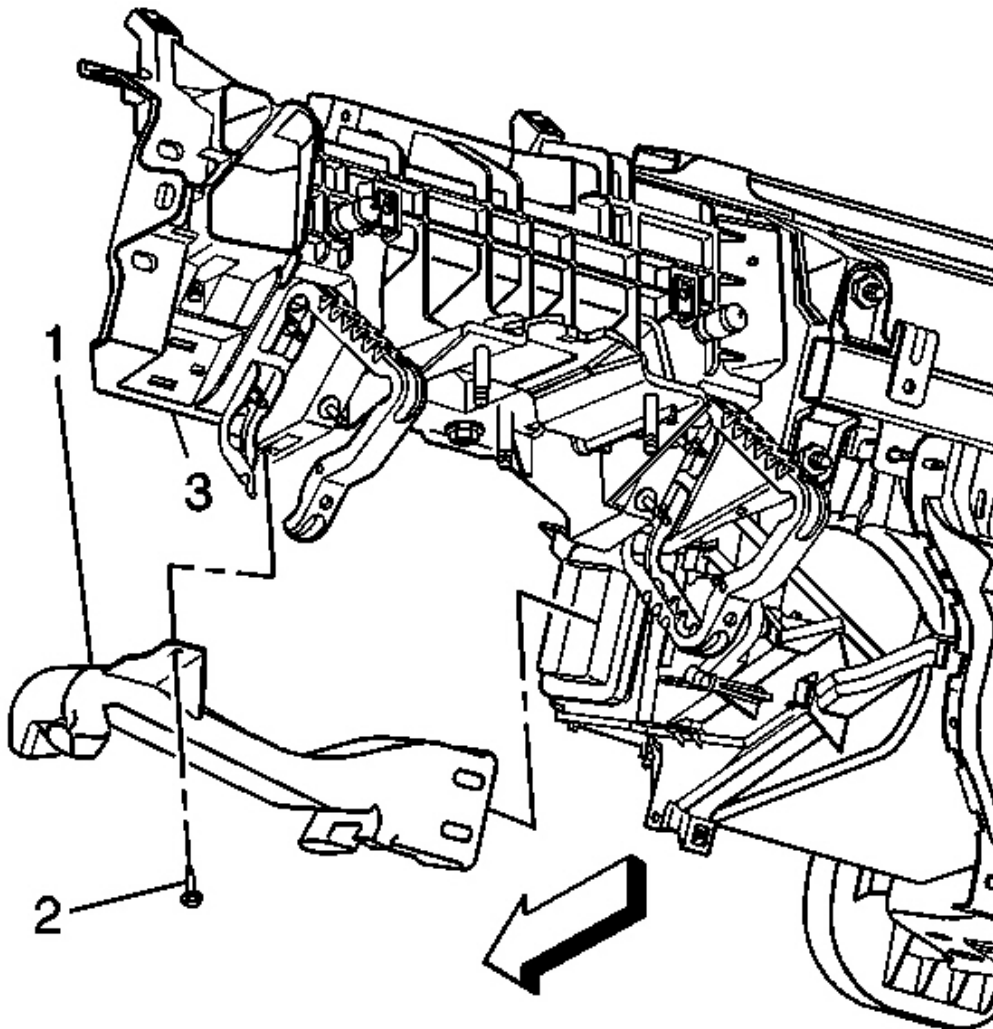


Fig. 95: View Of Left Side HVAC Floor Air Outlet Duct
Courtesy of GENERAL MOTORS CORP.

1. Remove the instrument panel (I/P) carrier. Refer to **Instrument Panel Carrier Replacement** .
2. Remove the push pin (2) retaining the floor air outlet duct (1) to the heater module.
3. Remove the floor duct (1).

Installation Procedure

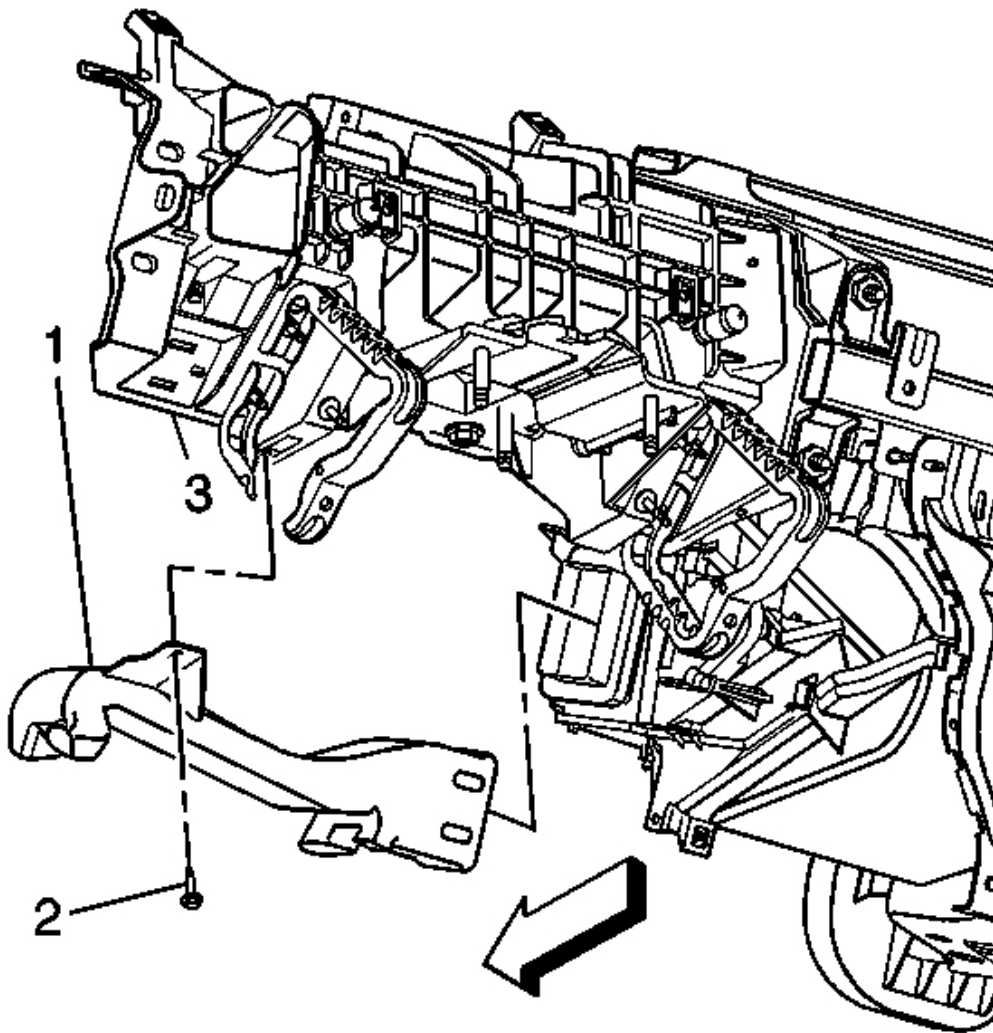


Fig. 96: View Of Left Side HVAC Floor Air Outlet Duct
Courtesy of GENERAL MOTORS CORP.

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

NOTE: Refer to Fastener Notice .

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

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

3. Install the I/P carrier. Refer to Instrument Panel Carrier Replacement .

FLOOR AIR OUTLET DUCT REPLACEMENT - LEFT SIDE (WITHOUT JF4)

Removal Procedure

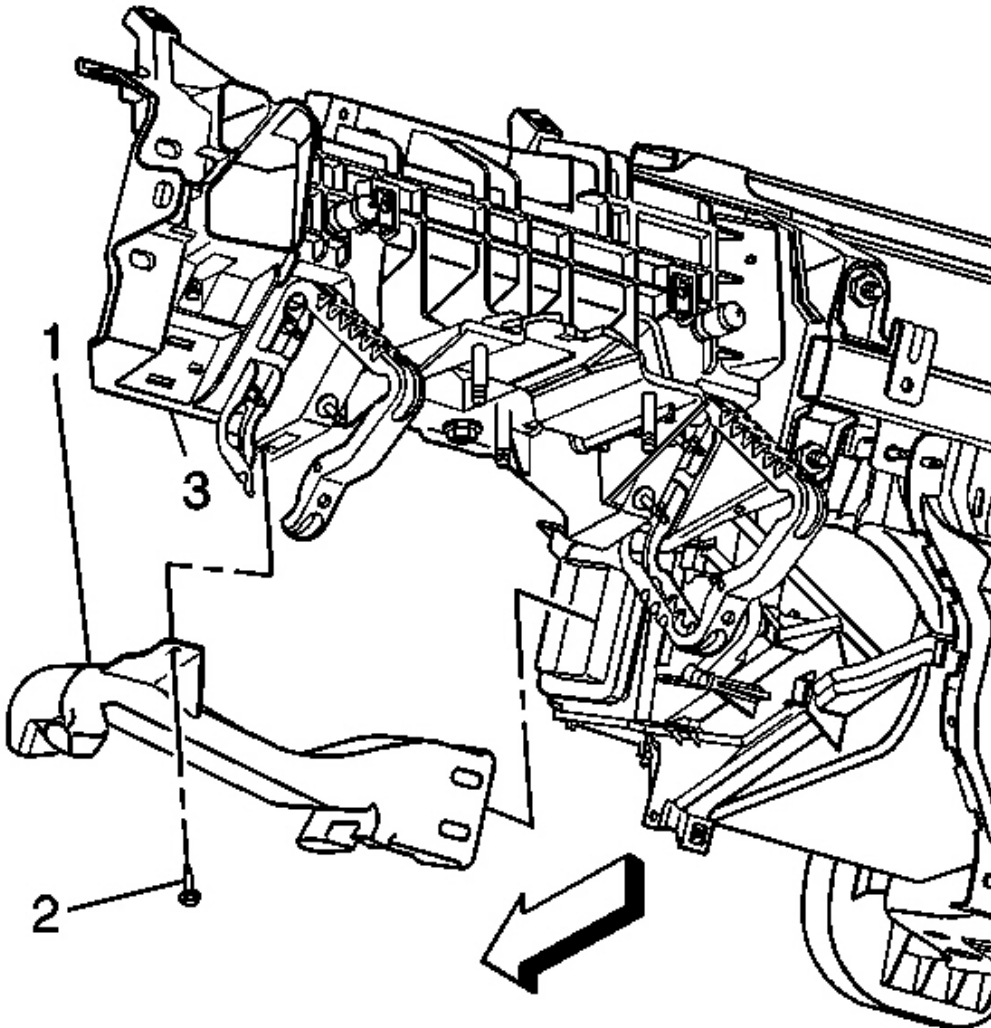


Fig. 97: View Of Left Side HVAC Floor Air Outlet Duct
Courtesy of GENERAL MOTORS CORP.

1. Remove the left lower insulator panel. Refer to Instrument Panel Insulator Panel Replacement - Left Side .

2. Remove the push pin (2) retaining the floor air outlet duct (1) to the heater module.
3. Remove the floor duct (1).

Installation Procedure

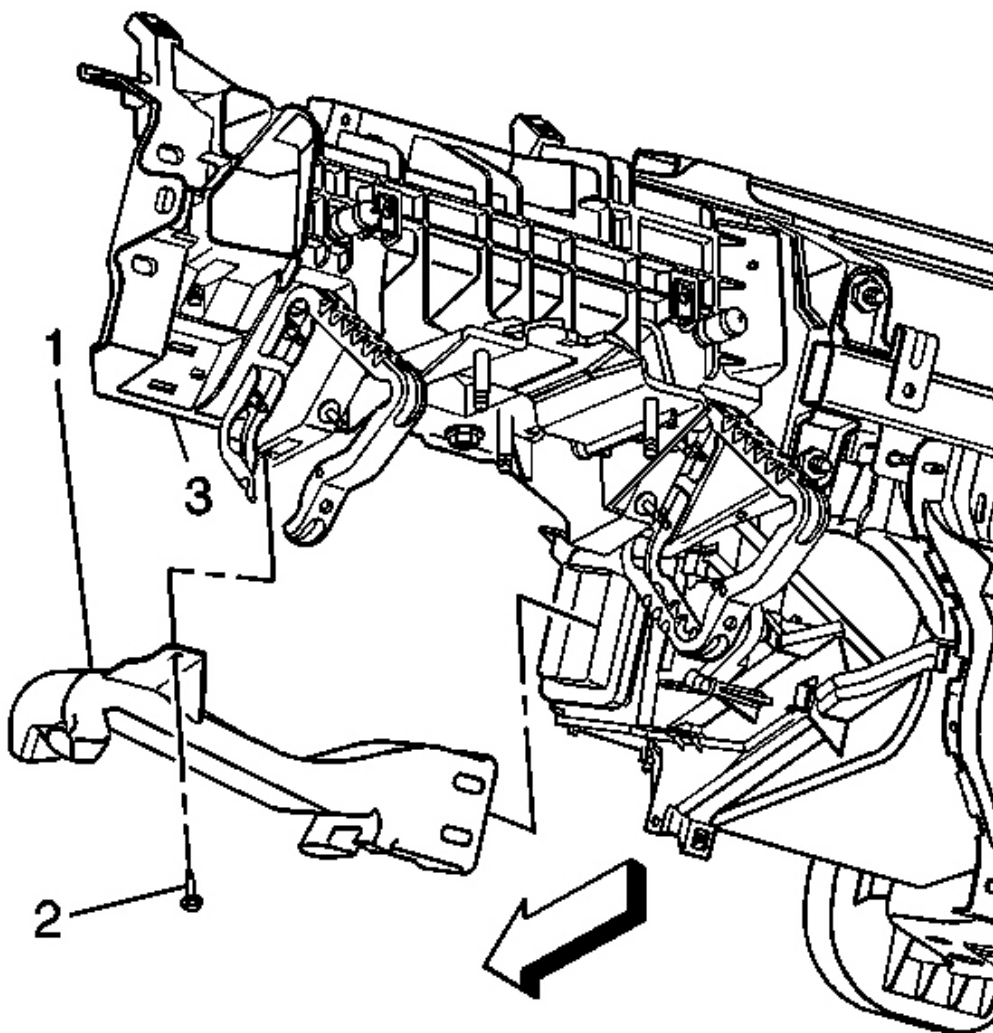


Fig. 98: View Of Left Side HVAC Floor Air Outlet Duct
Courtesy of GENERAL MOTORS CORP.

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

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NOTE: Refer to Fastener Notice .

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

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

3. Install the left lower insulator panel. Refer to Instrument Panel Insulator Panel Replacement - Left Side .

FLOOR AIR OUTLET DUCT REPLACEMENT - RIGHT SIDE

Removal Procedure

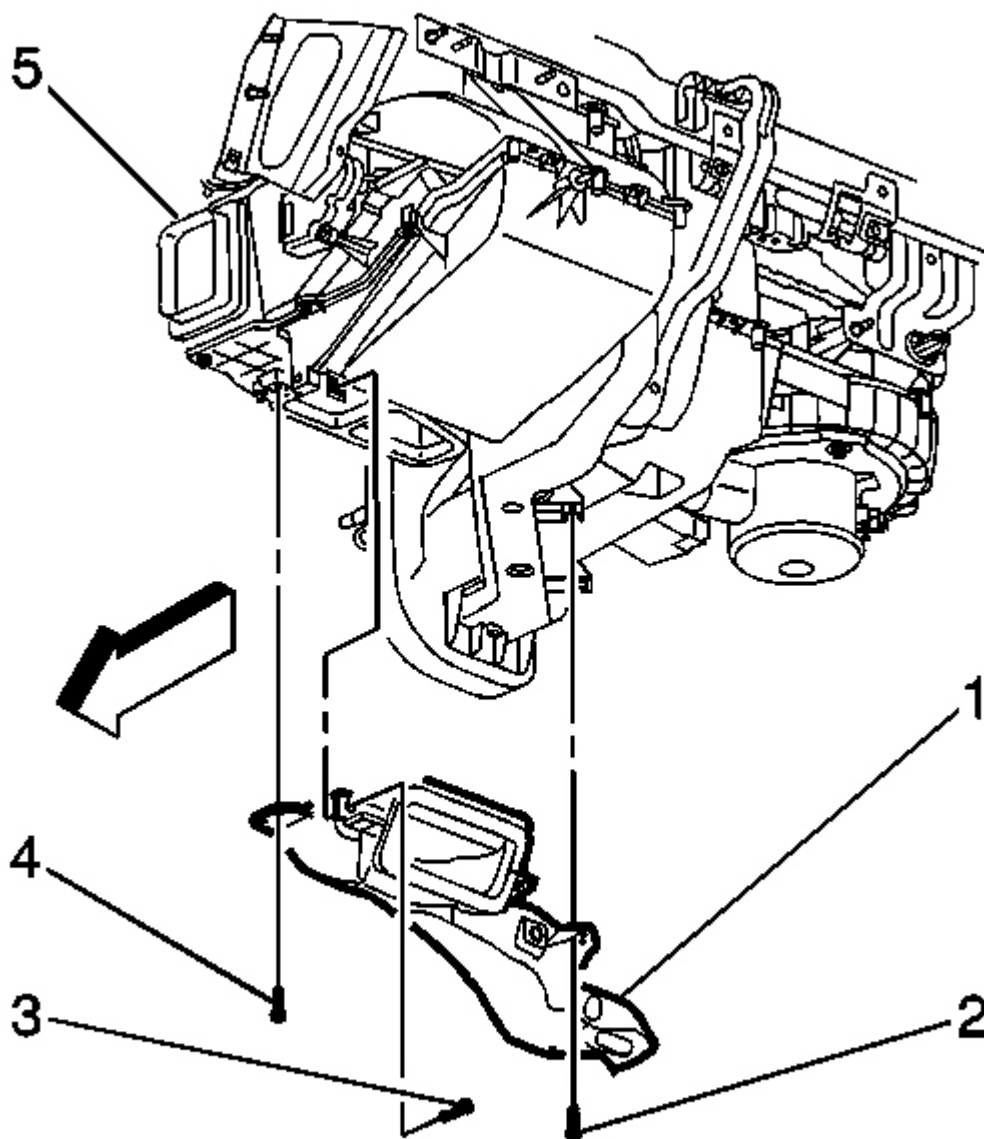


Fig. 99: Identifying RH Side Floor Air Outlet Duct
Courtesy of GENERAL MOTORS CORP.

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

Installation Procedure

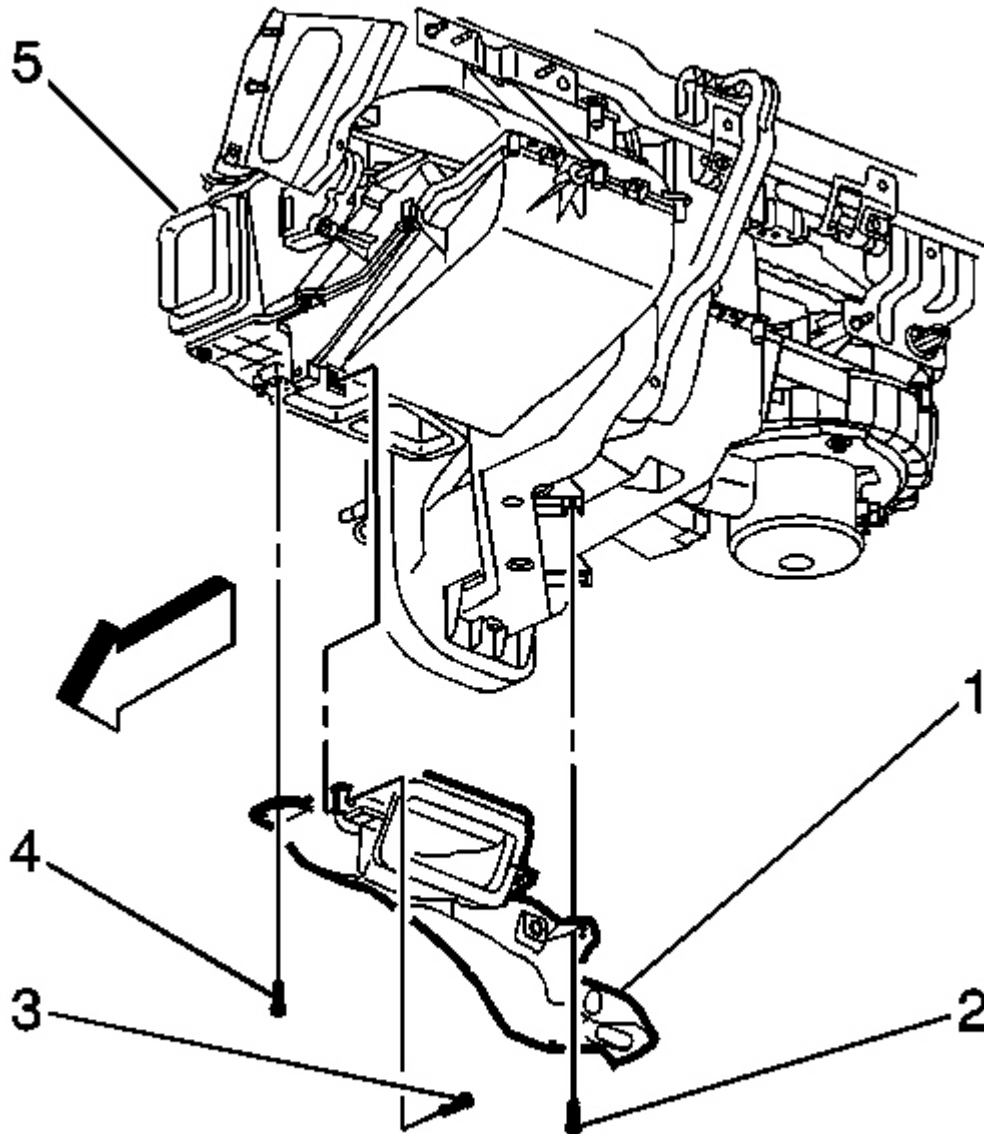


Fig. 100: Identifying RH Side Floor Air Outlet Duct
Courtesy of GENERAL MOTORS CORP.

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

NOTE: Refer to Fastener Notice .

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

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

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

AIR TEMPERATURE DOOR REPLACEMENT

Removal Procedure

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

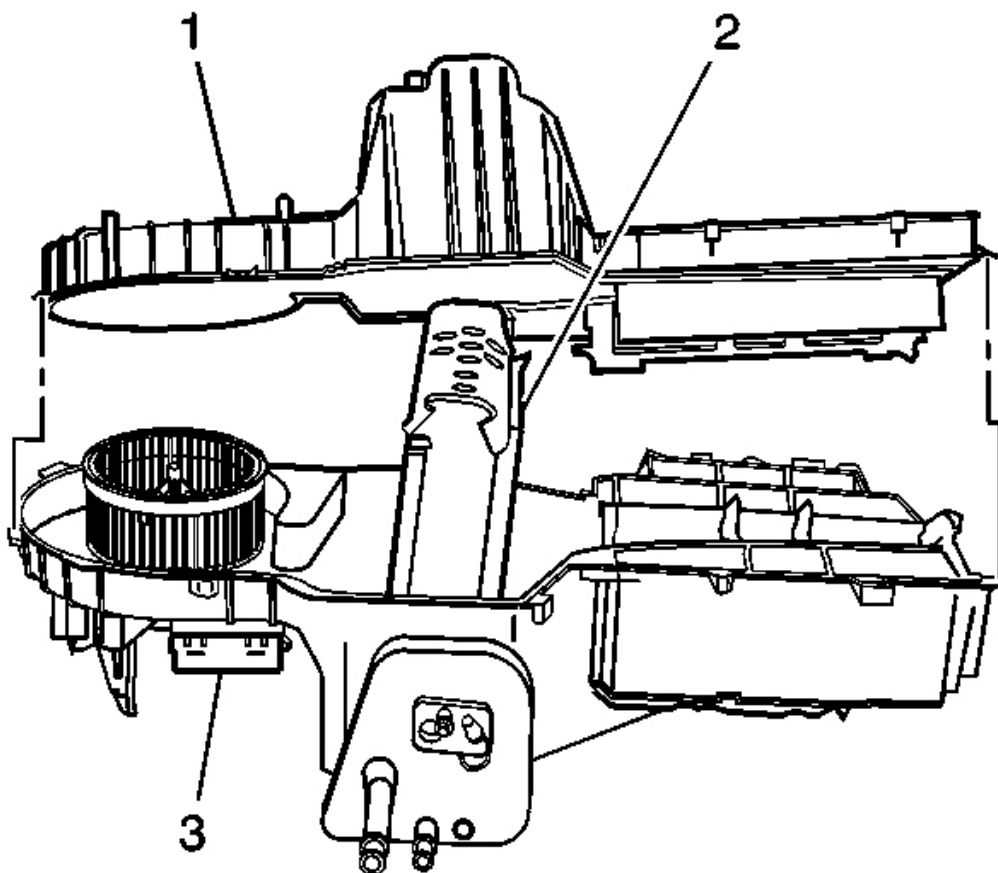


Fig. 101: View Of HVAC Module Assembly Halves

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Courtesy of GENERAL MOTORS CORP.

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

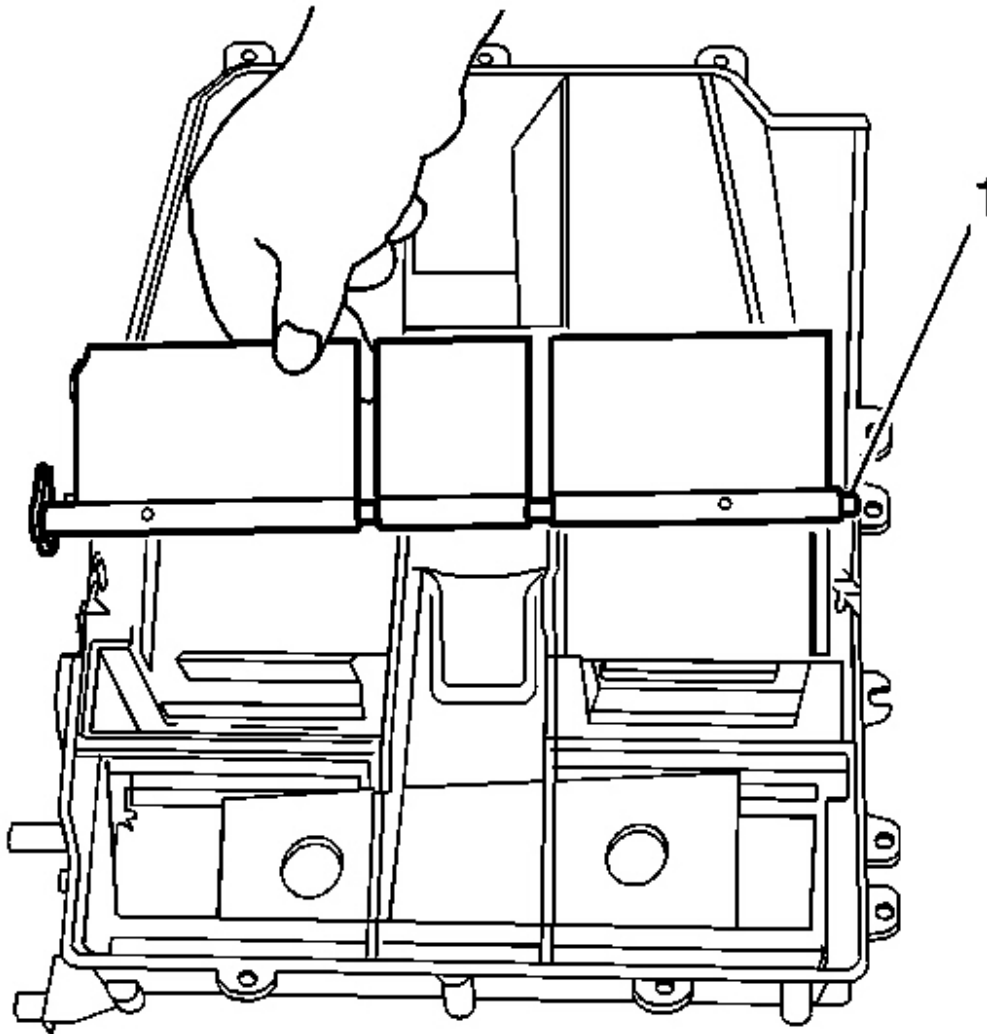


Fig. 102: Identifying Air Temperature Door
Courtesy of GENERAL MOTORS CORP.

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

Installation Procedure

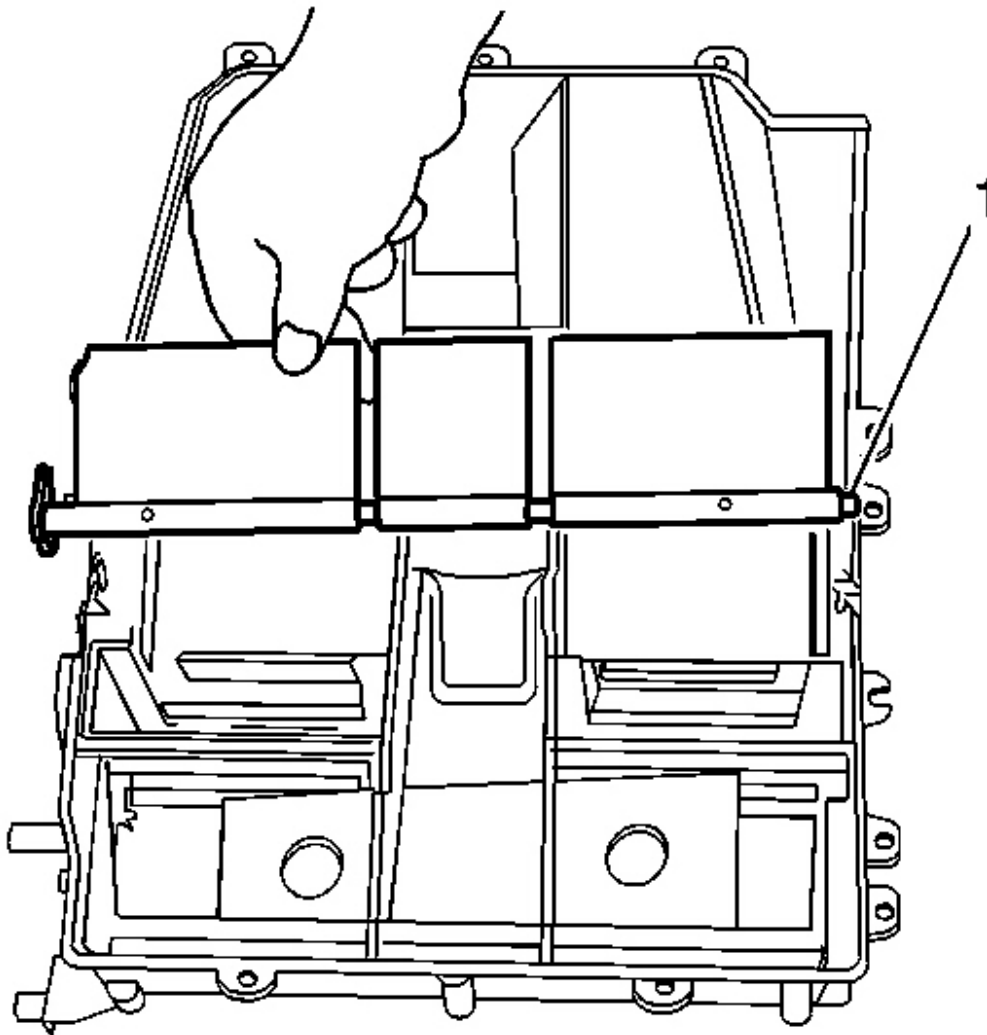


Fig. 103: Identifying Air Temperature Door
Courtesy of GENERAL MOTORS CORP.

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

NOTE: Refer to Fastener Notice .

4. Install the screws to the mode actuator.

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

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

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

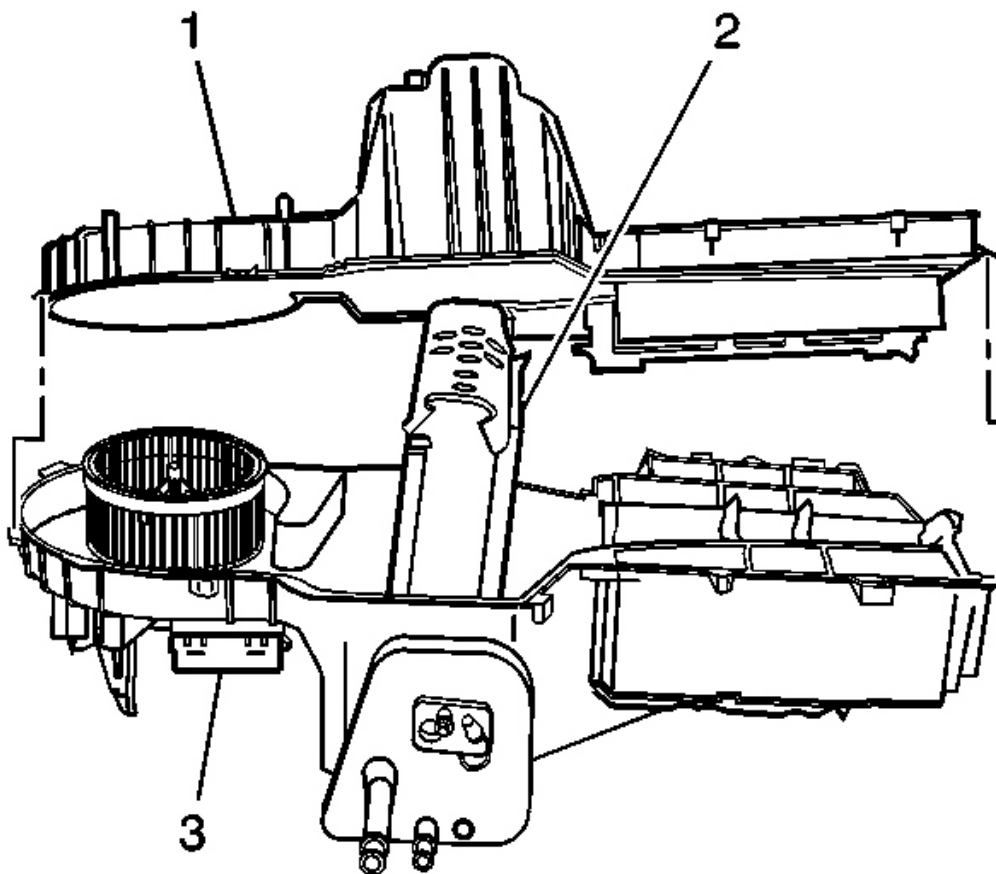


Fig. 104: View Of HVAC Module Assembly Halves
Courtesy of GENERAL MOTORS CORP.

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

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

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

DEFROSTER DOOR REPLACEMENT

Removal Procedure

1. Remove the I/P carrier. Refer to **Instrument Panel Carrier Replacement**.
2. Remove the screws from the defroster actuator.

3. Remove the defroster actuator.

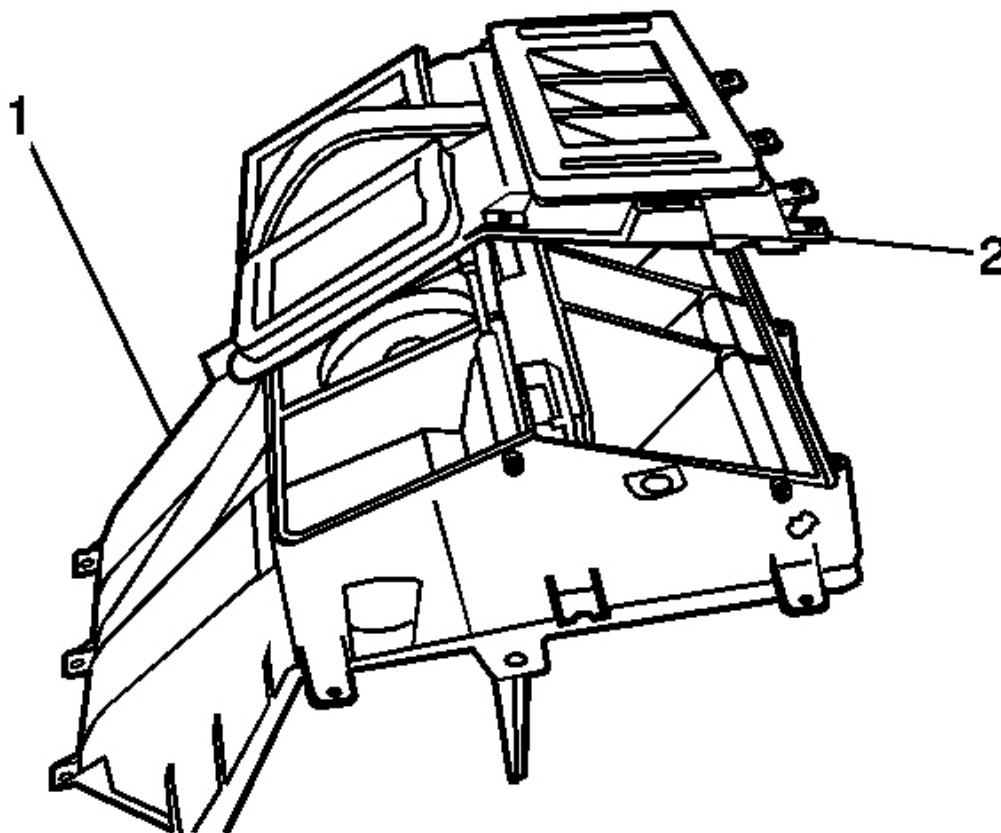


Fig. 105: View Of HVAC Case
Courtesy of GENERAL MOTORS CORP.

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

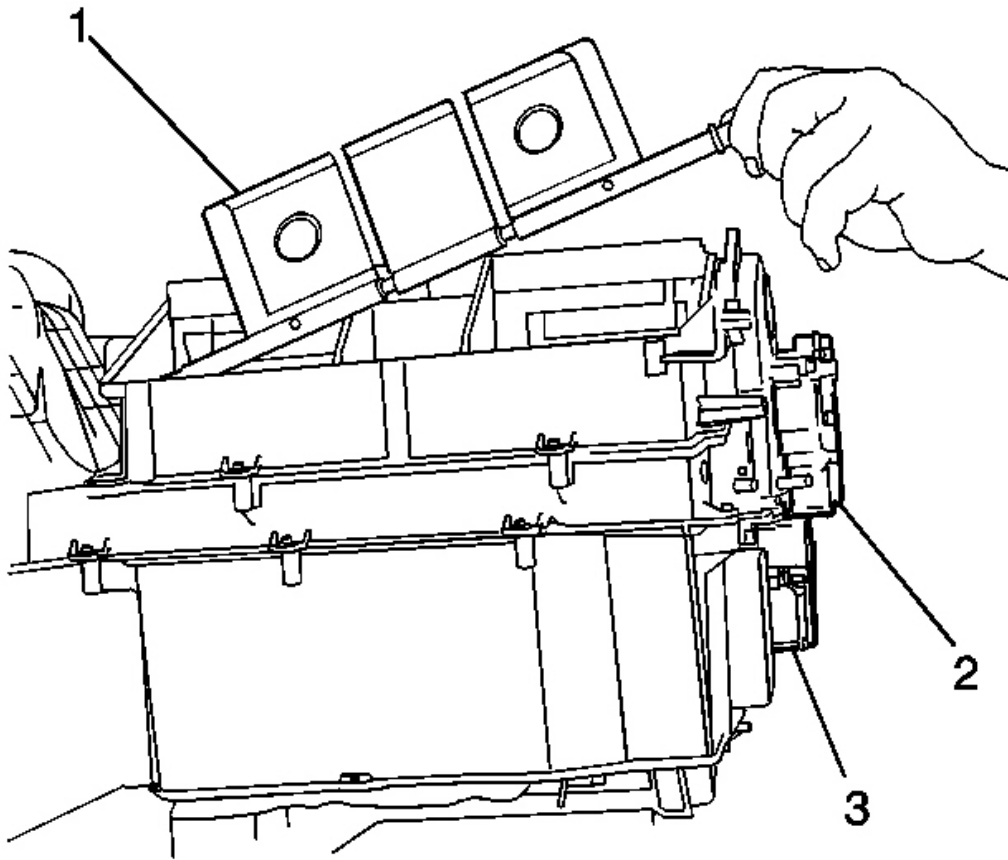


Fig. 106: View Of Defroster Door
Courtesy of GENERAL MOTORS CORP.

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

Installation Procedure

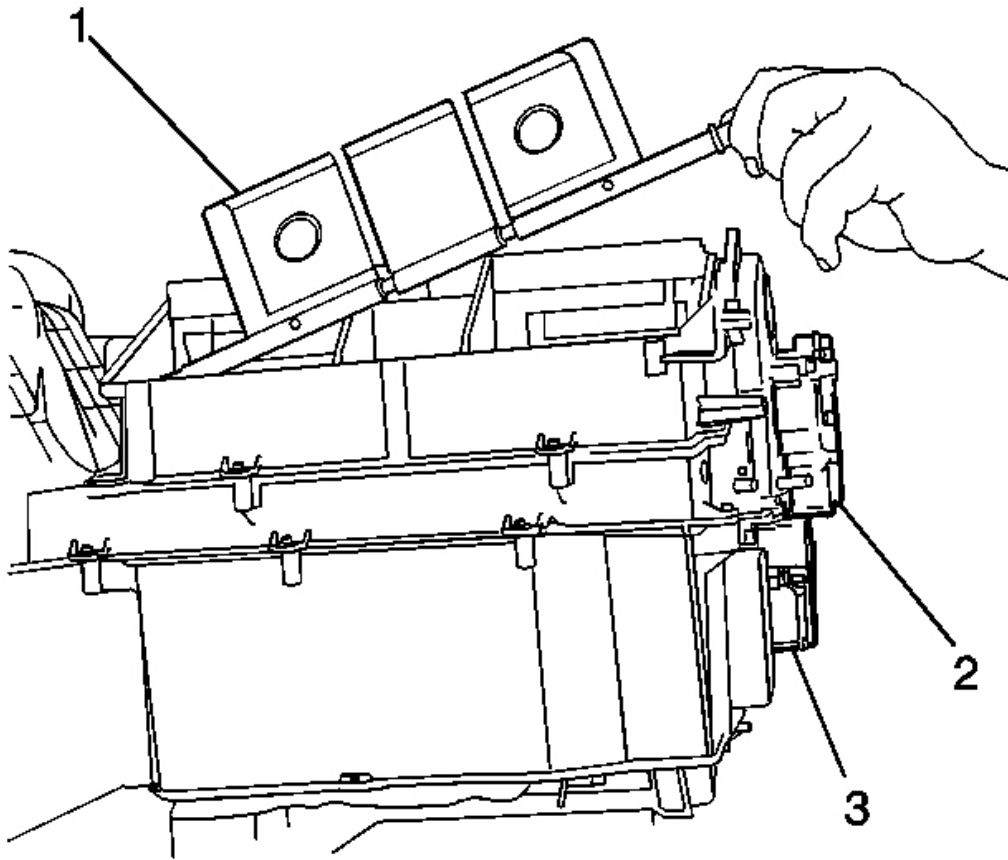


Fig. 107: View Of Defroster Door
Courtesy of GENERAL MOTORS CORP.

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

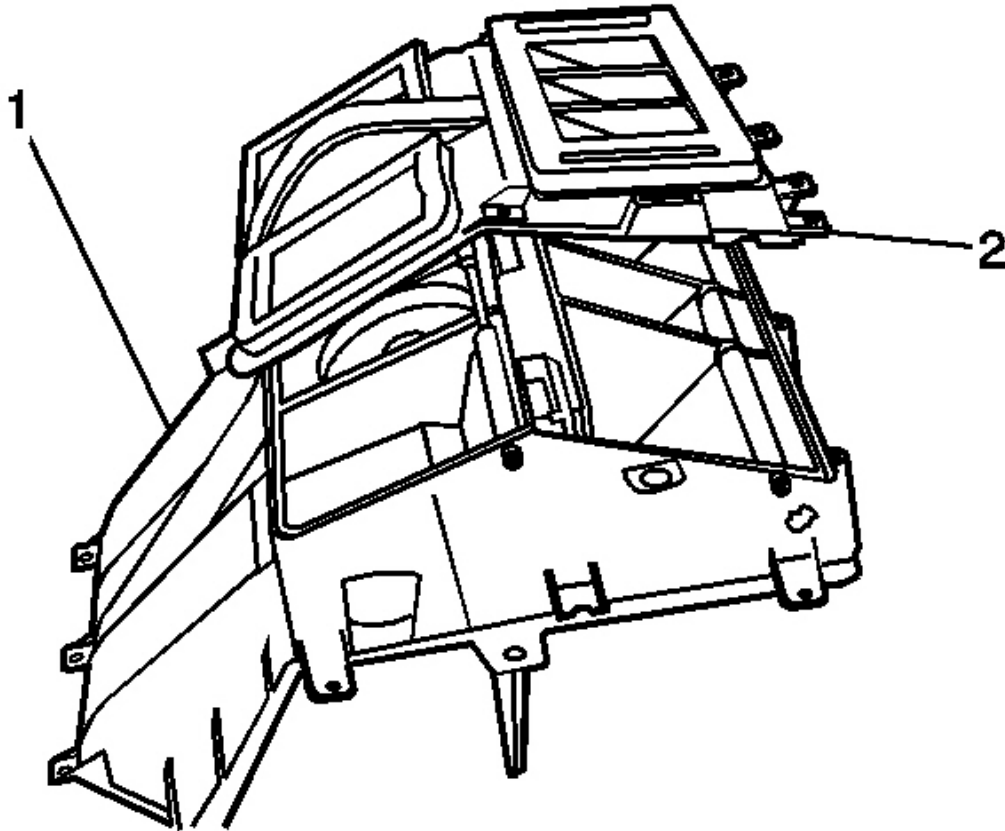


Fig. 108: View Of HVAC Case
Courtesy of GENERAL MOTORS CORP.

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

NOTE: Refer to Fastener Notice .

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

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

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

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

7. Install the I/P carrier. Refer to **Instrument Panel Carrier Replacement** .

MODE DOOR REPLACEMENT

Removal Procedure

1. Remove the I/P carrier. Refer to **Instrument Panel Carrier Replacement** .
2. Remove the screws from the mode actuator.
3. Remove the mode actuator.

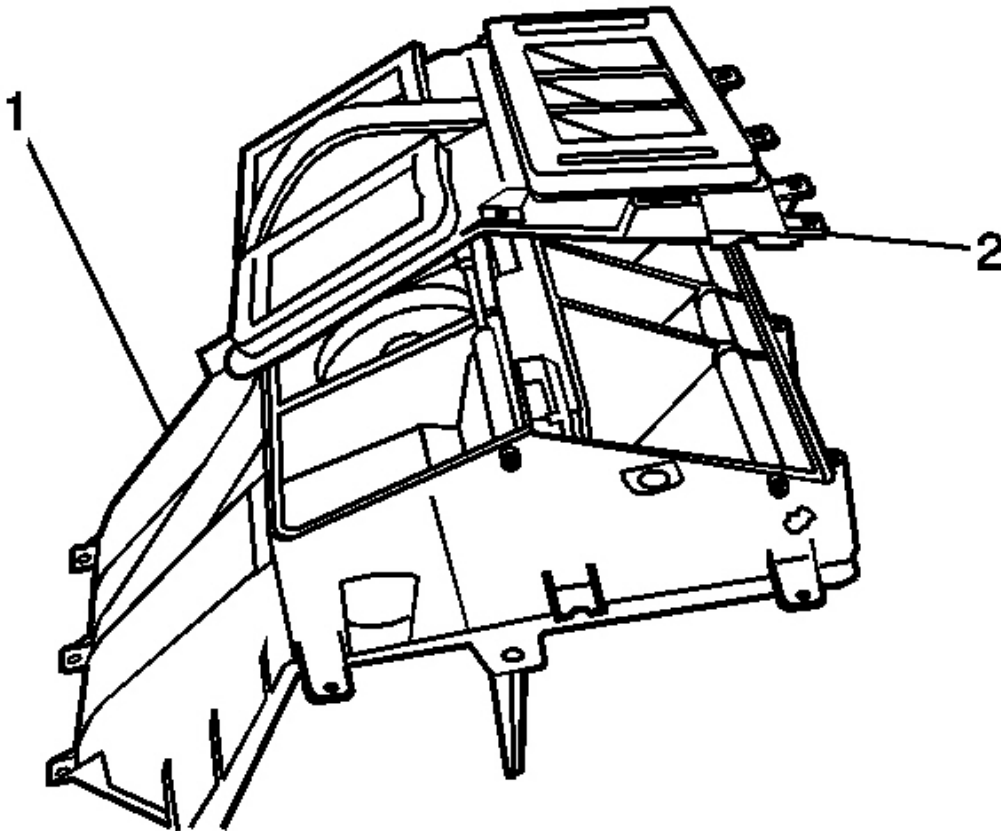


Fig. 109: View Of HVAC Case
Courtesy of GENERAL MOTORS CORP.

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

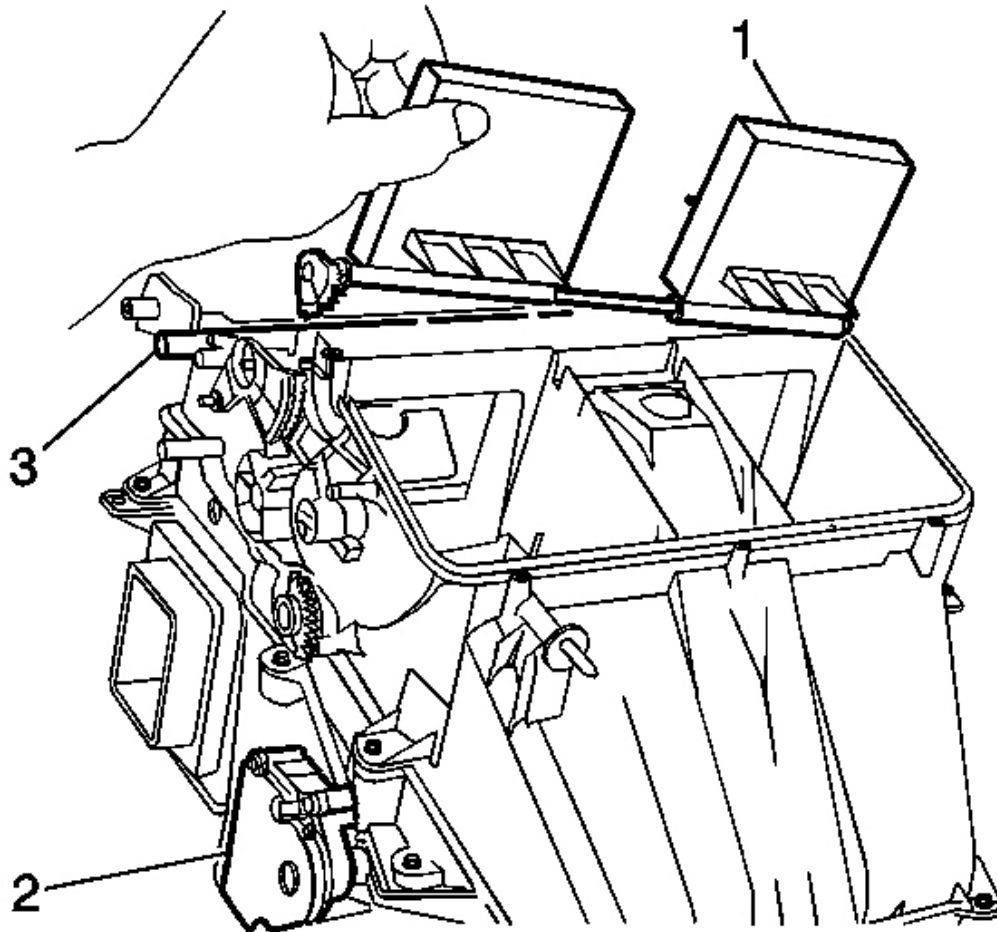


Fig. 110: Identifying Heater Module Mode Door
Courtesy of GENERAL MOTORS CORP.

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

Installation Procedure

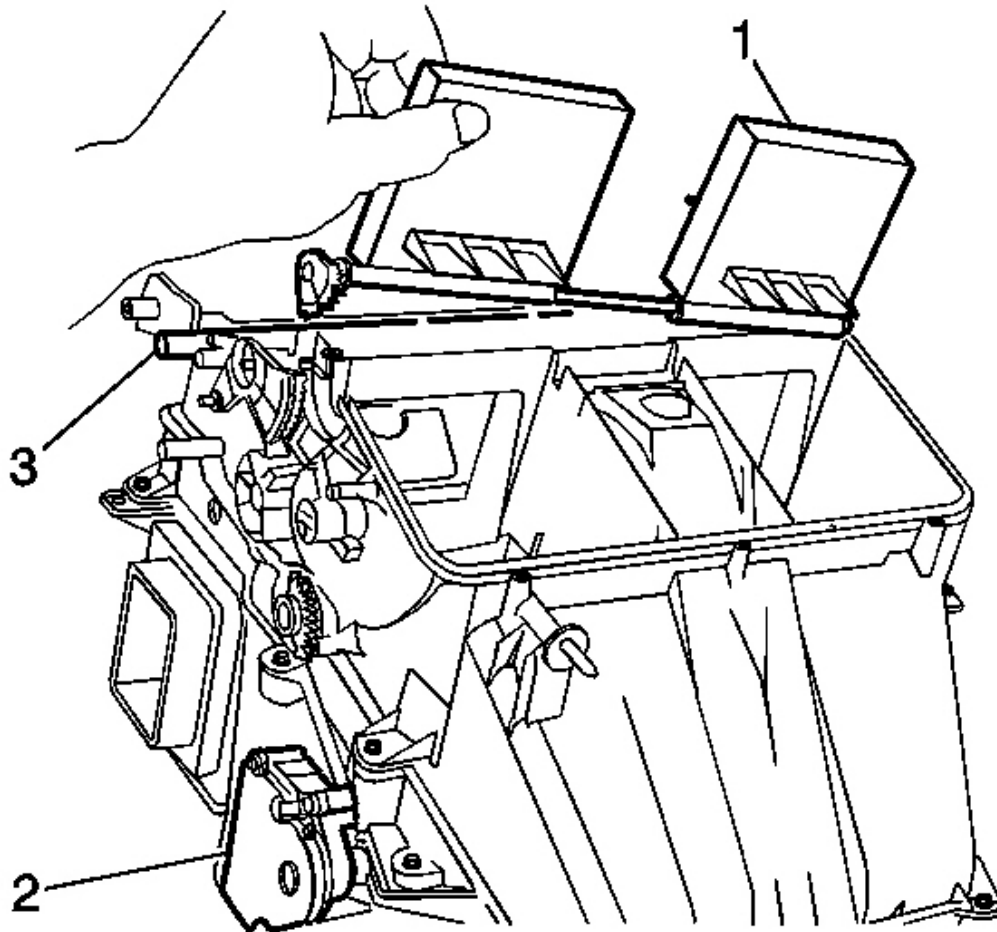


Fig. 111: Identifying Heater Module Mode Door
Courtesy of GENERAL MOTORS CORP.

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

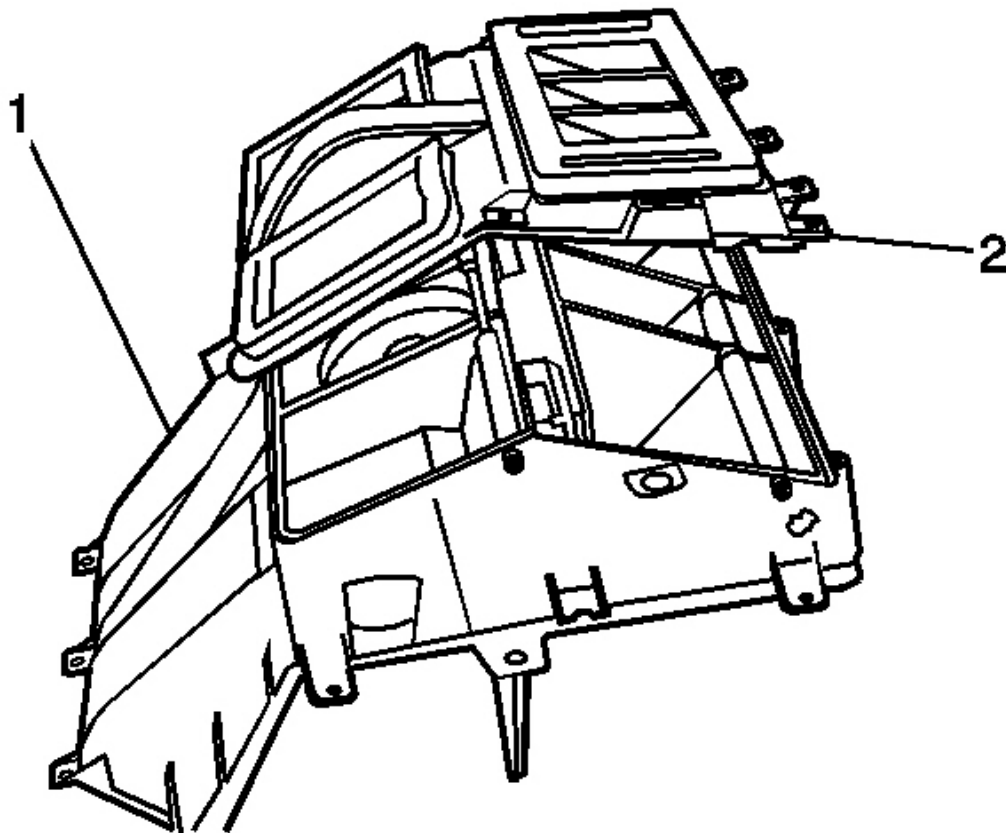


Fig. 112: View Of HVAC Case
Courtesy of GENERAL MOTORS CORP.

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

NOTE: Refer to Fastener Notice .

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

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

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

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

7. Install the I/P carrier. Refer to **Instrument Panel Carrier Replacement** .

RECIRCULATION DOOR REPLACEMENT

Removal Procedure

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

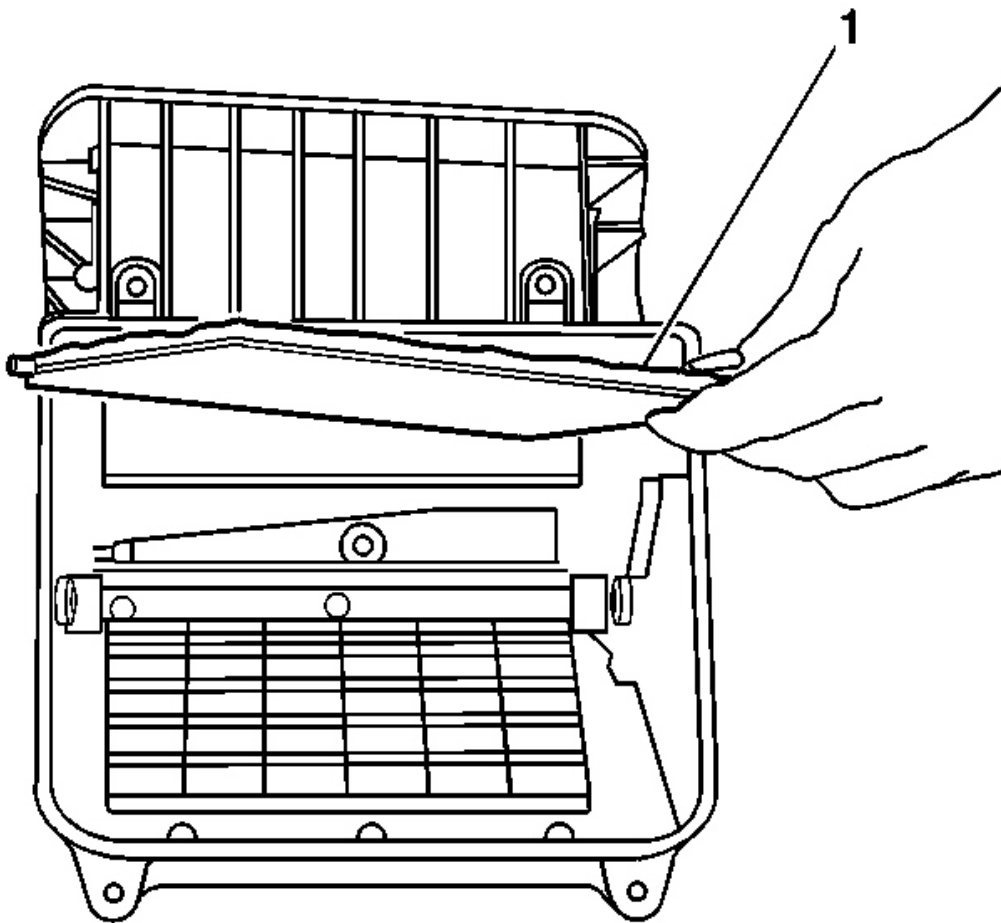


Fig. 113: Identifying Recirculation Door
Courtesy of GENERAL MOTORS CORP.

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

Installation Procedure

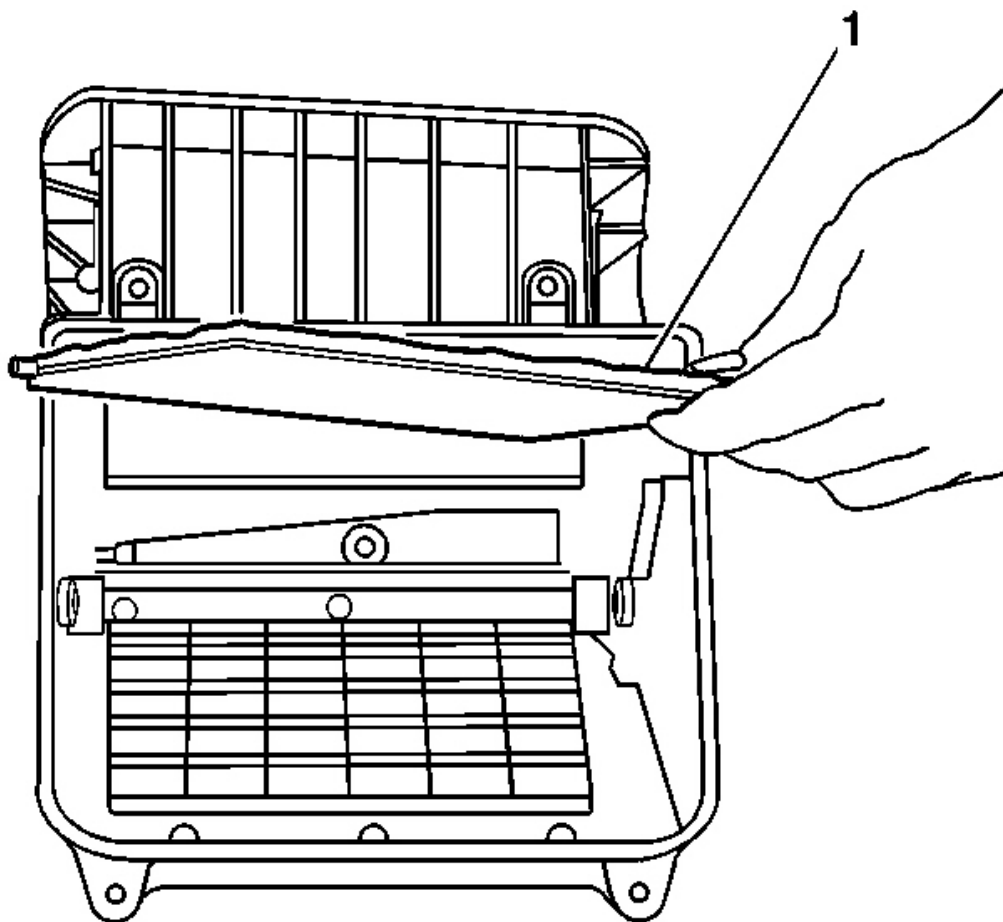


Fig. 114: Identifying Recirculation Door
Courtesy of GENERAL MOTORS CORP.

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

NOTE: Refer to Fastener Notice .

3. Install the screws to the recirculation actuator.

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

4. Install the screws to assemble the recirculation assembly.

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

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

HEATER CORE REPLACEMENT

Removal Procedure

1. Remove the HVAC module assembly. Refer to **HVAC Module Assembly Replacement**.
2. Remove the heater core access cover screws.
3. Remove the heater core access cover.

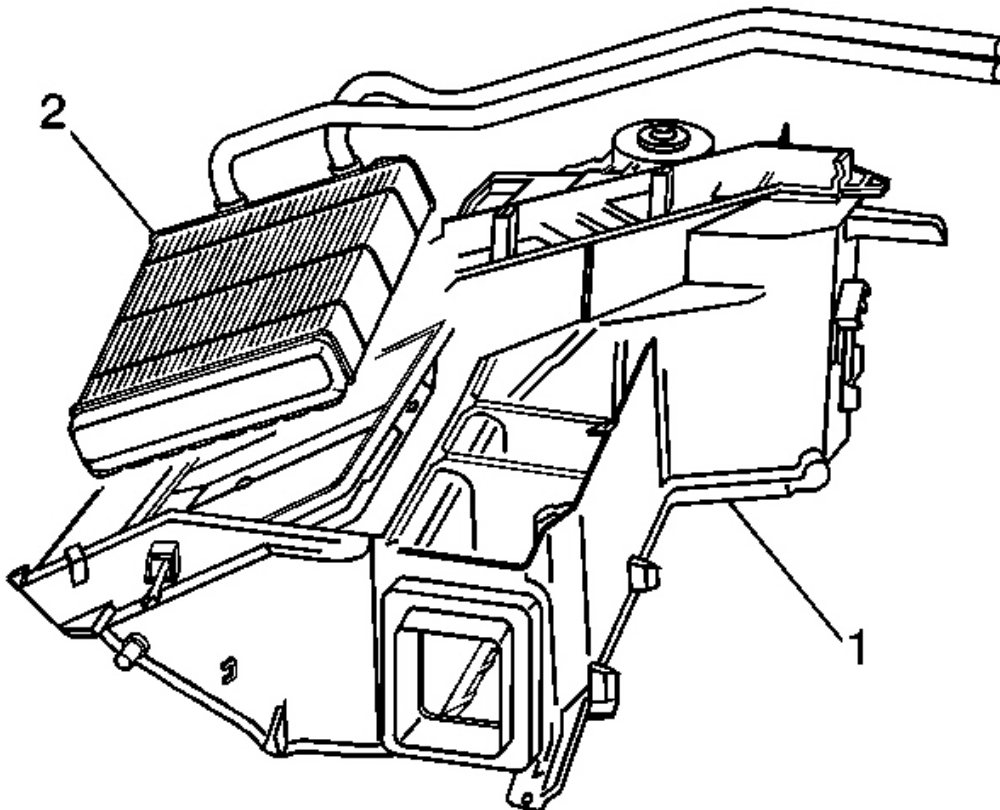


Fig. 115: Identifying Heater Core

Courtesy of GENERAL MOTORS CORP.

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

Installation Procedure

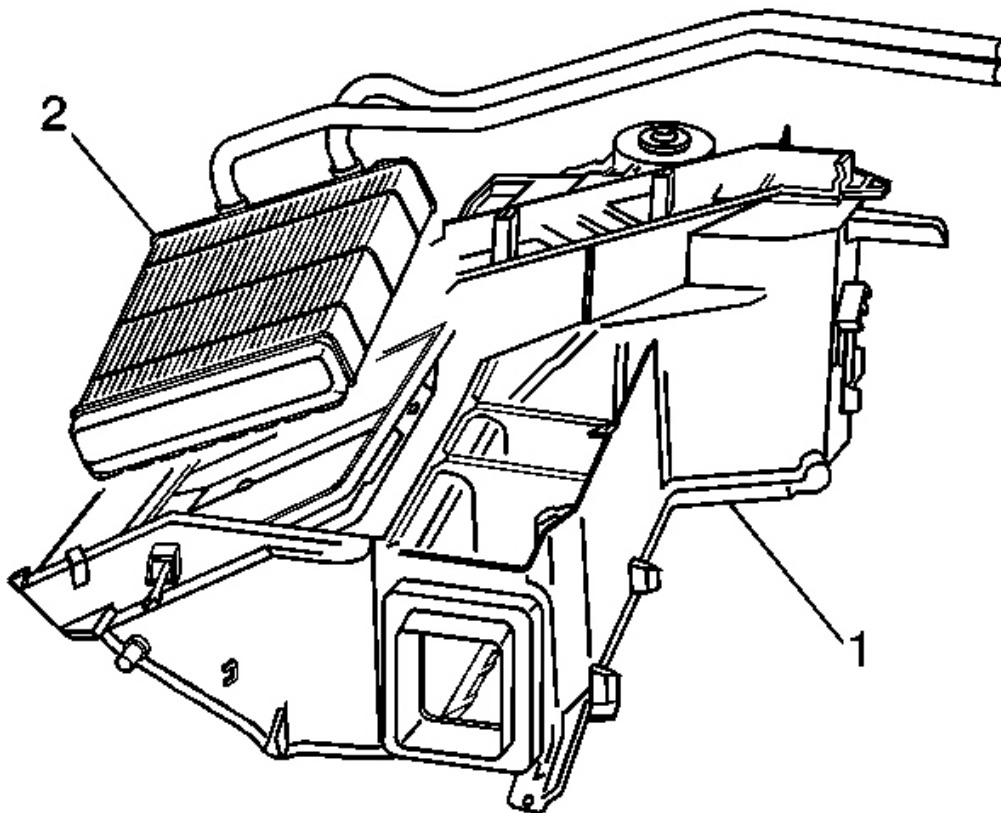


Fig. 116: Identifying Heater Core
Courtesy of GENERAL MOTORS CORP.

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

NOTE: Refer to Fastener Notice .

3. Install the heater core access cover screws.

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

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

AUXILIARY BLOWER MOTOR REPLACEMENT

Removal Procedure

1. Remove the instrument panel assembly. Refer to **Instrument Panel Assembly Replacement**.

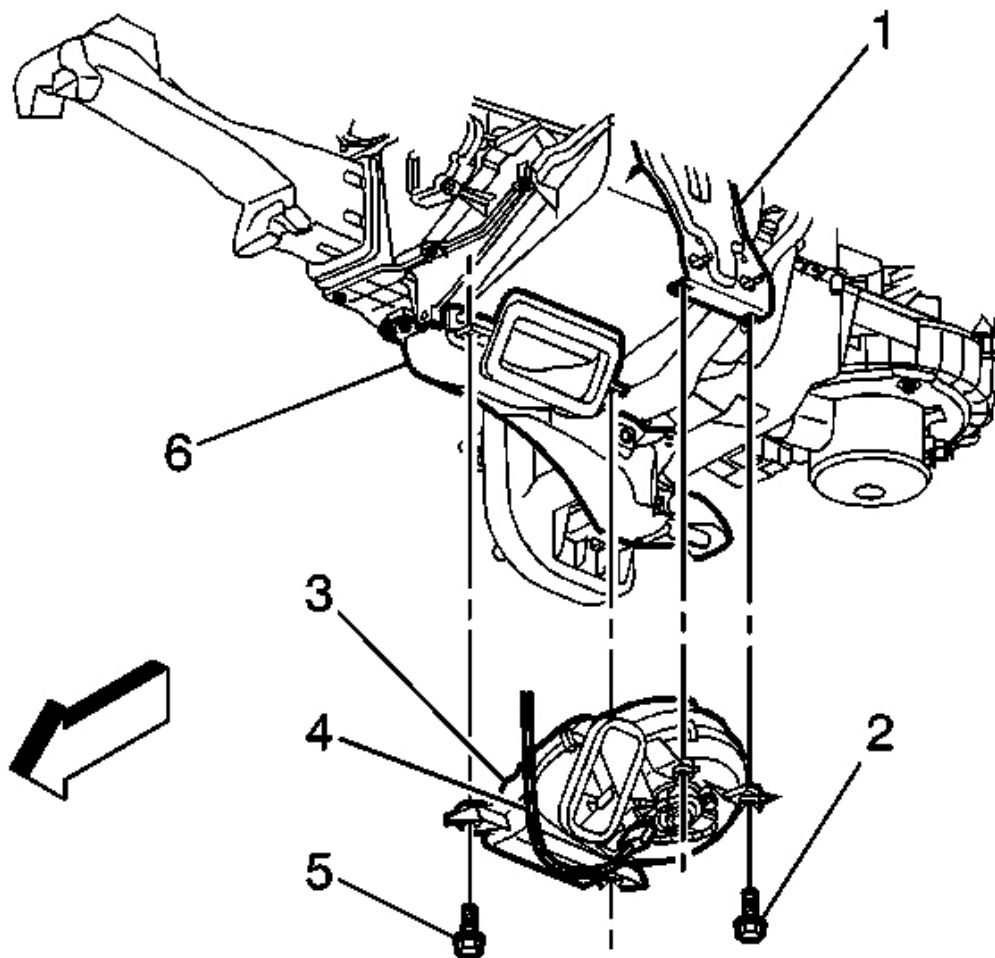


Fig. 117: Identifying Auxiliary Blower Motor & Components
Courtesy of GENERAL MOTORS CORP.

2. Disconnect the electrical connectors (4) from the blower motor-auxiliary (3).

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

Installation Procedure

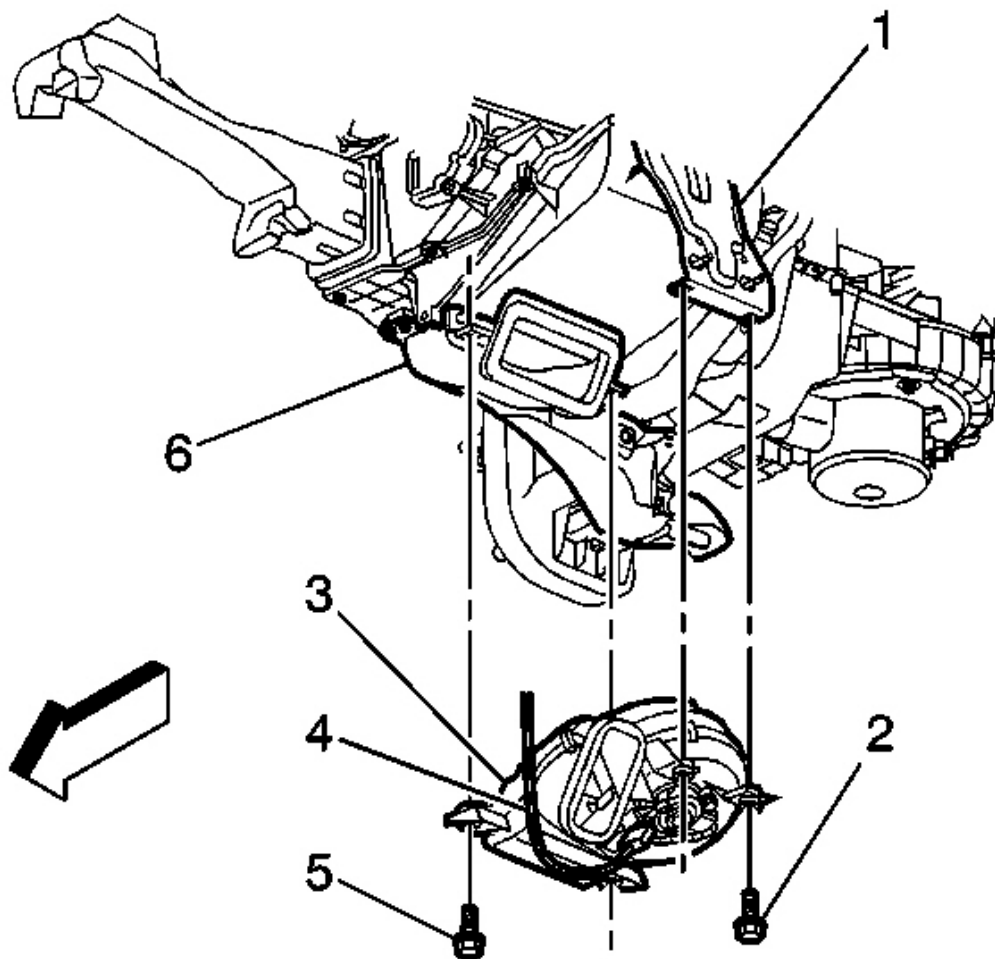


Fig. 118: Identifying Auxiliary Blower Motor & Components
Courtesy of GENERAL MOTORS CORP.

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

NOTE: Refer to Fastener Notice .

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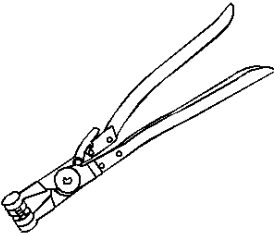
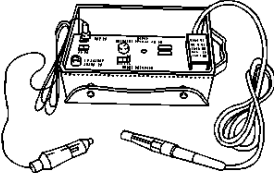
2. Install the retaining screws (2, 5) to the blower motor-auxiliary.

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

3. Install the air outlet duct to the blower motor-auxiliary.
4. Connect the electrical connectors (4) to the blower motor-auxiliary (3).
5. Install the instrument panel assembly. Refer to **Instrument Panel Assembly Replacement** .

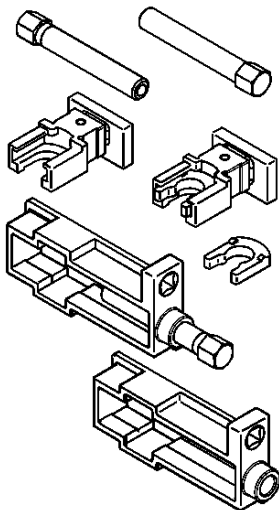
SPECIAL TOOLS & EQUIPMENT

SPECIAL TOOLS

Illustration	Tool Number/ Description
	J 26549-E Orifice Tube Remover
	J 38185 Hose Clamp Pliers
	J 39400-A Halogen Leak Detector

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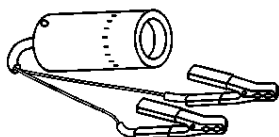
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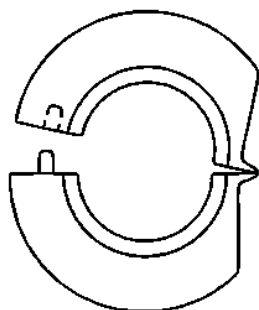
J 41425
AC Line Repair Kit



J 41447
R-134A A/C Tracer Dye - Box of 24



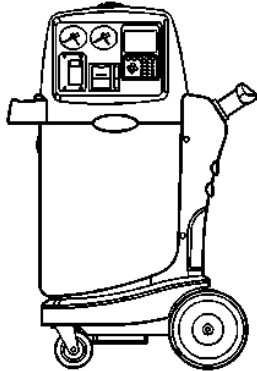
J 42220
Universal 12V Leak Detection Lamp



J 43181
Heater Line Q.C. Release Tool

2008 Isuzu Ascender LS

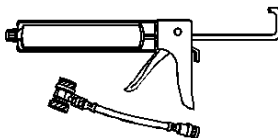
2008 HVAC Heating, Ventilation & Air Conditioning - Ascender, Envoy & Trailblazer



J 43600
ACR 2000 Air Conditioning Service Center



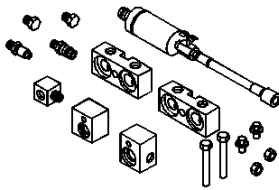
J 43872
Fluorescent Dye Cleaner



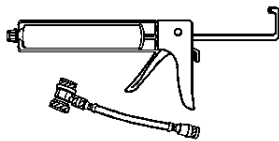
J 45037
A/C Oil Injector

2008 Isuzu Ascender LS

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J 45268
A/C Flush Adaptor Kit



J 46297
A/C Dye Injector Kit



J 46297-12
Replacement Dye Cartridges