

Heating, Ventilation and Air Conditioning

Specifications

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Air Conditioning Accumulator Bracket Bolt	6 N·m	53 lb ft
Air Conditioning Accumulator Bolt (At Module)	16 N·m	12 lb ft
Air Conditioning Accumulator Hose Bracket Nut (At Strut Tower)	8 N·m	71 lb in
Air Conditioning Compressor and Condenser Hose Bolt (At Accumulator)	16 N·m	12 lb ft
Air Conditioning Compressor and Condenser Hose Nut (At Condenser)	16 N·m	12 lb ft
Air Conditioning Compressor and Condenser Hose Bolt (At Compressor)	33 N·m	24 lb ft
Air Conditioning Compressor Bracket Bolt (3.8 L)	50 N·m	37 lb ft
Air Conditioning Compressor Bracket Rear Bolt (3.8 L)	30 N·m	22 lb ft
Air Conditioning Compressor Bracket Bolt (5.7 L)	50 N·m	37 lb ft
Air Conditioning Compressor Bolt (5.7 L)	50 N·m	37 lb ft
Air Conditioning Compressor Bolt (3.8 L)	50 N·m	37 lb ft
Air Conditioning Crankcase Oil Drain Bolt	20 N·m	15 lb ft
Air Conditioning Compressor Rear Bolt (3.8 L)	30 N·m	22 lb ft
Air Conditioning Evaporator Bracket Bolt	2 N·m	18 lb in
Air Conditioning Evaporator Tube Bolt (At Module)	16 N·m	12 lb ft
Air Conditioning Evaporator Tube Bolt (At Condenser)	16 N·m	12 lb ft
Air Conditioning Evaporator Upper and Lower Case Bolt	2 N·m	18 lb in
Heater Core Clamp Bolt	1.8 N·m	16 lb in
Heater Core Tube Clamp Bolt	2.0 N·m	18 lb in
Heater Hose Bracket Bolt	14 N·m	10 lb ft
Heater Rear Case Bolt	2.0 N·m	18 lb in
Negative Battery Cable Nut to Engine Block Stud (3.8L)	25 N·m	18 lb ft
Temperature Control Cable Bolt	1.9 N·m	17 lb in

Fitting and Line Tightening Specifications

Application	Specification	
	Metric	English
Air Conditioning Refrigerant Pressure Sensor	6 N·m	53 lb in
Air Conditioning Refrigerant Service Valve	11 N·m	98 lb in
Compressor Pressure Relief Valve	9 N·m	80 lb in

System Capacities

Application	Specification	
	Metric	English
Air Conditioning (A/C) System R-134a Charge Capacity	0.68 kg	1.50 lb

Refrigerant Oil Distribution Specifications

Application	Specification	
	Metric	English
DEFINITION: During A/C refrigerant system component replacement and conditions stated, new refrigerant system oil quantities should be added to the system as indicated.		
A/C Compressor	60 ml	2 oz
Accumulator	Add 60 ml (2 oz) more than amount drained from old accumulator	
Condenser	30 ml	1 oz
Evaporator	90 ml	3 oz
Abrupt oil loss due to large refrigerant leak	Add 90 ml (3 oz) plus required amount for the component being replaced (cause of large leak)	

GM SPO Group Numbers

Application	GM SPO Group Number
Air Conditioning Accumulator	9.000
Air Conditioning Clutch	9.000
Air Conditioning Clutch Coil	9.000
Air Conditioning Compressor	9.000
Air Conditioning Compressor and Condenser Hose Assembly	9.000
Air Conditioning Compressor Pressure Relief Valve	9.000
Air Conditioning Compressor Pulley	9.000
Air Conditioning Compressor Pulley Bearing	9.000
Air Conditioning Compressor Relay	9.000
Air Conditioning Compressor Shaft Seal Kit	9.000
Air Conditioning Compressor Suction Screen	9.000
Air Conditioning Compressor Variable Displacement Control Valve	9.000
Air Conditioning Condenser	9.000
Air Conditioning Evaporator	9.000
Air Conditioning Evaporator Tube	9.000
Air Conditioning Evaporator Tube Orifice	9.000
Air Conditioning Refrigerant Pressure Sensor	9.000
Air Conditioning Refrigerant Service Valve	9.000
Blower Motor Relay	9.000
Temperature Control Cable	9.000

Diagnostic Information and Procedures

Leak Testing

A refrigerant leak test should be performed on the system whenever a leak is suspected due to system indication of low charge or after any service operation which disturbs the components, lines, or connections. Many methods and special tools are available for this purpose; however, no matter which tool is used, care and diligence are the biggest keys to success.

Electronic Leak Detection Method

Tools Required

J 39400-A Halogen Leak Detector

Use the electronic leak detector when inspecting for refrigeration system leaks. This unit operates on a 12 volt DC. The leak detector provides an audible signal which increases in frequency when a refrigerant leak is detected. Properly calibrate the tool. Use the tool at the proper setting for the system that you are testing. The electronic leak detector has the following three settings:

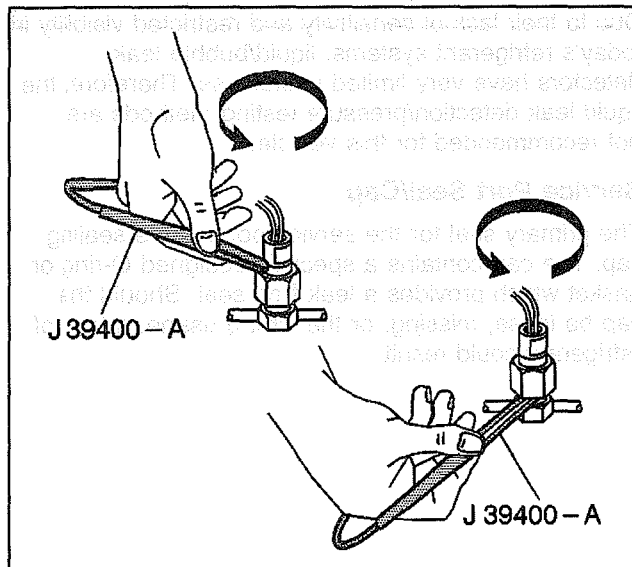
- R-12
- R-134a
- Gross leaks

This setting isolates very large leaks that are found at one of the other settings

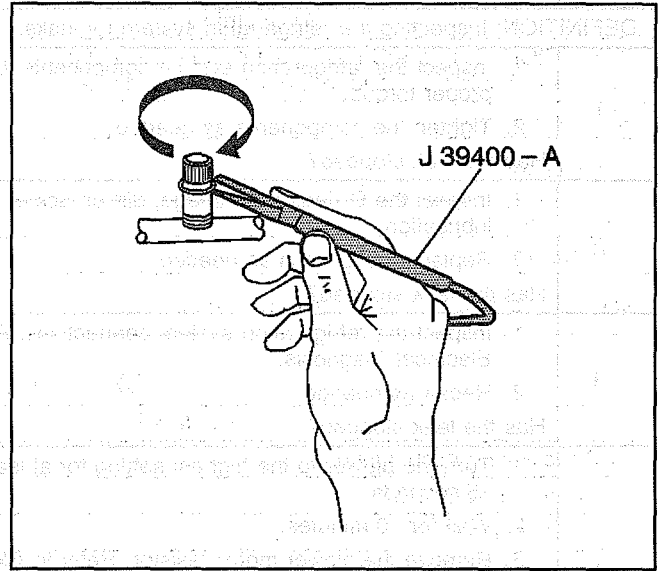
The halogen leak detectors are sensitive to windshield washing solution, many solvents and cleaners, and some adhesives. Work on a clean and dry surface. Complete the following actions when you test the joints:

- Completely circle each joint.
- Move the tool 25-50 mm (1-2 inch) per second.
- Ensure that the tip of the probe is no more than 6 mm (0.25 inch) from the surface.

You may use this detector in order to inspect the following joints:

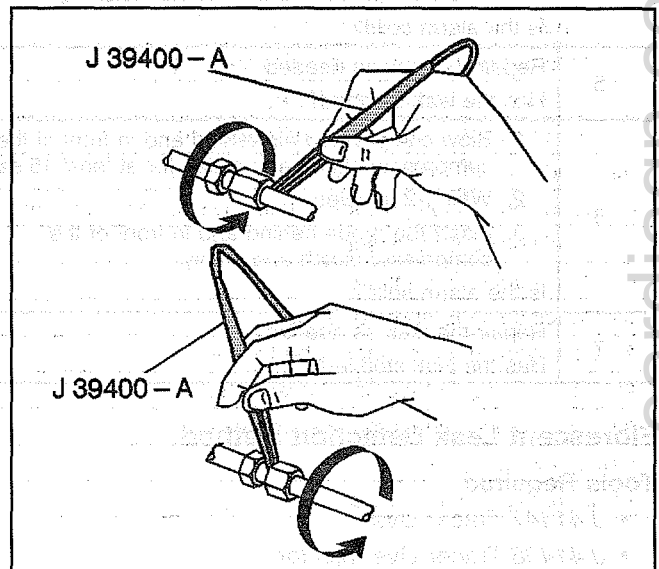


1. Refrigerant pressure sensor.



82101

2. Service valves.



82106

3. Evaporator inlet/outlet.

4. Accumulator dryer inlet/outlet.

5. Compressor rear head.

6. Compressor housing joints.

7. A leak is indicated when the audible tone goes from a steady 1-2 clicks per second to a solid alarm. Adjust the balance knob frequently in order to maintain the 1-2 clicks per second.

If a leak is not found, proceed to the Refrigerant Leak Diagnosis table.

Refrigerant Leak Diagnosis

Step	Action	Value(s)	Yes	No
DEFINITION: Inspecting the refrigeration system for leaks.				
1	1. Inspect the refrigeration system components for proper torque. 2. Tighten the components as needed. Has the leak stopped?	—	System OK	Go to Step 2
2	1. Inspect the O-rings for damage, dirt or lack of lubrication. 2. Replace the O-rings as needed. Has the leak stopped?	—	System OK	Go to Step 3
3	1. Inspect the refrigeration system connections. Refer to Electrical Diagnosis. 2. Repair as needed. Has the leak stopped?	—	System OK	Go to Step 4
4	1. Turn the blower to the highest setting for at least 15 seconds. 2. Wait for 10 minutes. 3. Remove the blower motor resistor. Refer to <i>Blower Motor Resistor Replacement</i> in HVAC Systems - Manual. 4. Insert the probe into the resistor opening. Is the alarm solid?	—	Go to Step 5	Go to Step 6
5	Repair the leak as needed. Has the leak stopped?	—	System OK	Go to Step 6
6	1. Blow compressed air behind and in front of the compressor clutch and pulley for at least 15 seconds. 2. Wait 1-2 minutes. 3. Insert the probe behind and in front of the compressor clutch and pulley. Is the alarm solid?	—	Go to Step 7	System OK
7	Repair the leak as needed. Has the leak stopped?	—	System OK	—

Florescent Leak Detection Method

Tools Required

- J 41447 Tracer Dye
- J 41436 Tracer Dye Injector
- J 28428-E High Intensity Black Light

The R-134a refrigerant is uniquely different from the R-12 used in the past and may require additional methods for leak detection. The R-134a molecule is smaller than the R-12 molecule and can leak through smaller openings. R-134a also does not contain chlorine, which is easily detected using the black light. The efflorescence leak detection method is meant to be used in conjunction with the electronic method, and will pinpoint smaller leaks. The R-134a takes time to work. Depending on the rate of the leak, the dye may take up to 7 days to become visible.

Liquid Leak Detection/Pressure Testing Methods

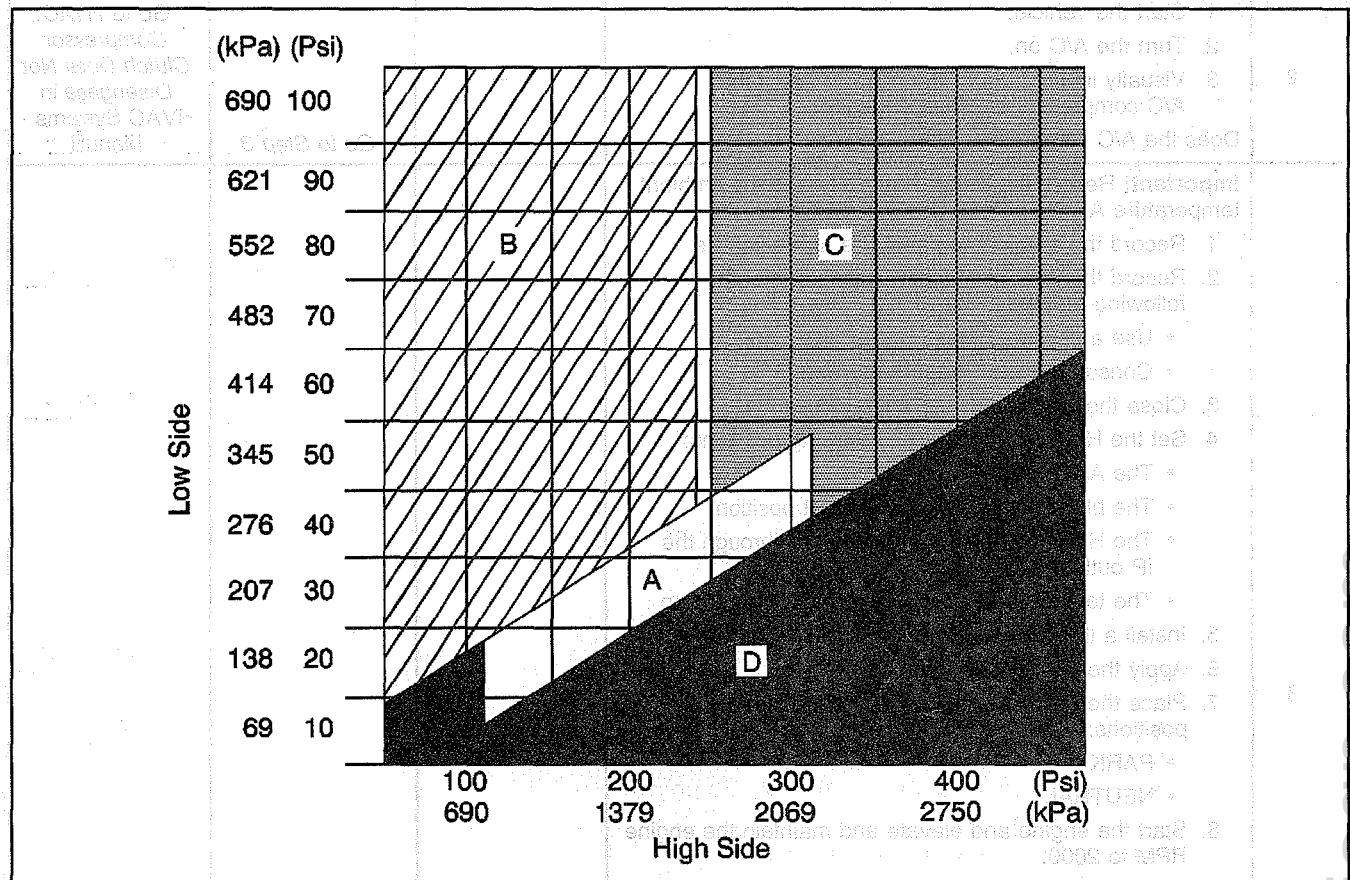
Due to their lack of sensitivity and restricted visibility in today's refrigerant systems, liquid/bubble leak detectors have very limited usefulness. Therefore, the liquid leak detection/pressure testing methods are not recommended for this vehicle.

Service Port Seal/Cap

The primary seal for the service ports is the sealing cap. The cap contains a specially designed O-ring or gasket which provides a leak free seal. Should the cap be loose, missing, or the wrong usage, a loss of refrigerant could result.

Cooling Insufficient, A/C System

A/C System Pressure - Zone Classification Graph



590674

Cooling Insufficient, A/C System

Step	Action	Value(s)	Yes	No
The following test measures the air conditioning (A/C) system operating efficiency by comparing the following: • The ambient air temperature • The ambient air humidity • The pressure at the high-pressure side of the refrigeration system • The pressure at the low-pressure side of the refrigeration system • The temperature of the air being discharged into the passenger compartment				
1	1. Park the vehicle inside or in the shade. 2. Open the windows in order to ventilate the interior of the vehicle. 3. If the engine is at operating temperature, allow the engine to cool. 4. Ensure that the ignition key is in the OFF position. 5. Install J 39500-B. 6. Record the readings of the low and high side STATIC pressures. The low and high side pressure readings should be almost equal to each other once the system has come to rest. Are both the low and high side pressures above the specified value?	345 kPa (50 psi)	Go to Step 2	Go to Leak Testing.

Cooling Insufficient, A/C System (cont'd)

Step	Action	Value(s)	Yes	No
2	1. Start the vehicle. 2. Turn the A/C on. 3. Visually inspect under the hood to see if the A/C compressor clutch is engaged. Does the A/C compressor clutch engage?	—	Go to Step 3	Go to HVAC Compressor Clutch Does Not Disengage in HVAC Systems - Manual
3	Important: Record the relative humidity and the ambient temperature AT THE TIME OF THE TEST. 1. Record the ambient temperature at the vehicle. 2. Record the relative humidity, using one of the following methods: • Use a psychrometer • Consult the local weather bureau 3. Close the vehicles doors and windows. 4. Set the HVAC control to the following positions: • The A/C on • The blower control to the highest position • The HVAC control to discharge air through the IP outlets • The temperature control to the coldest position 5. Install a thermometer into the IP center air outlet. 6. Apply the park brake. 7. Place the transmission in one of the following positions: • PARK • NEUTRAL 8. Start the engine and elevate and maintain the engine RPM to 2000. 9. Run the A/C until the outlet air temperature reaches the lowest temperature. This will take approximately 3 minutes. 10. Record the following information: • The outlet air temperature • The low-side pressure • The high-side pressure 11. Compare the low and high side pressures and the output temperature to the table. Does all the data recorded fall within the specified ranges of the table below?	—	Go to Step 8	Go to Step 4
4	Compare the recorded pressures to the <i>A/C System Pressure - Zone Classification Graph</i> . Do both the low and high side pressures fall within Zone A on the graph?	—	Go to Cooling Insufficient, A/C System - Pressure Zone A	Go to Step 5
5	Do the pressures fall within Zone B?	—	Go to Cooling Insufficient, A/C System - Pressure Zone B	Go to Step 6

Cooling Insufficient, A/C System (cont'd)

Step	Action	Value(s)	Yes	No
6	Do the pressures fall within Zone C?	—	Go to <i>Cooling Insufficient, A/C System - Pressure Zone C</i>	Go to Step 7
7	Do the pressures fall within Zone D?	—	Go to <i>Cooling Insufficient, A/C System - Pressure Zone D</i>	Go to Step 8
8	Operate the system in order to verify the repair. Did you correct the condition?	—	System OK	Go to <i>Symptoms in HVAC System - Manual</i>

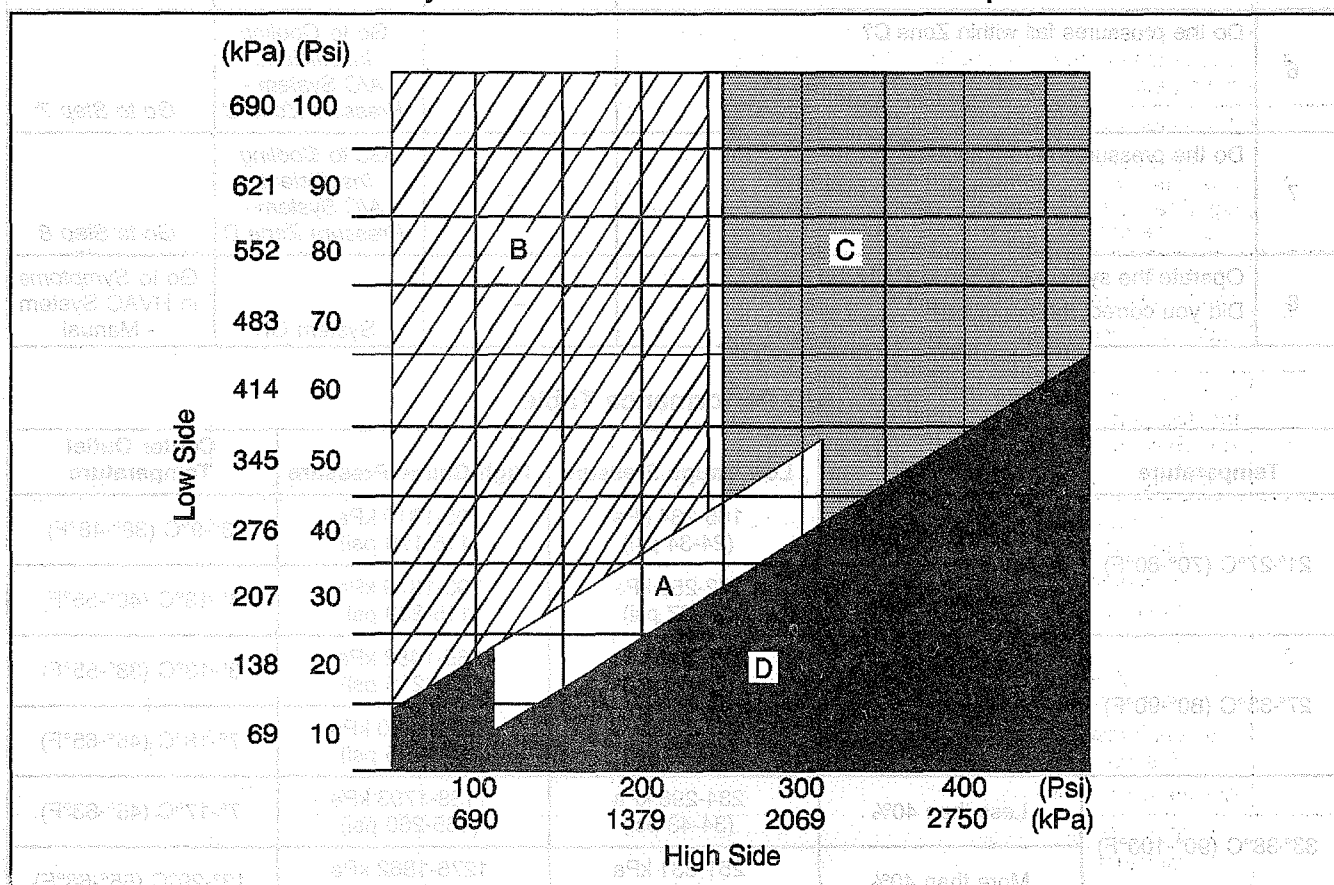
A/C Performance Table

Temperature	Humidity	Low Gauge Pressure	High Gauge Pressure	Center Outlet Temperature
21°-27°C (70°-80°F)	Less than 50%	165-234 kPa (24-34 psi)	793-1310 kPa (115-190 psi)	3°-9°C (38°-48°F)
	More than 50%	172-255 kPa (25-37 psi)	793-1379 kPa (115-200 psi)	4°-13°C (40°-55°F)
27°-33°C (80°-90°F)	Less than 50%	193-262 kPa (28-38 psi)	965-1482 kPa (140-215 psi)	3°-13°C (38°-55°F)
	More than 50%	207-276 kPa (30-40 psi)	1034-1620 kPa (150-235 psi)	7°-18°C (45°-65°F)
33°-38°C (90°-100°F)	Less than 40%	234-296 kPa (34-43 psi)	1138-1793 kPa (165-260 psi)	7°-17°C (45°-63°F)
	More than 40%	251-331 kPa (36-48 psi)	1276-1862 kPa (185-270 psi)	13°-20°C (55°-68°F)
38°-44°C (100°-110°F)	Less than 20%	276-338 kPa (40-49 psi)	1448-2000 kPa (210-290 psi)	12°-18°C (53°-64°F)
	More than 20%	296-359 kPa (43-52 psi)	1517-2137 kPa (220-310 psi)	14°-21°C (58°-70°F)

Go to <i>Cooling Insufficient, A/C System - Manual</i>	Go to Step 2	—	Were you sent here from the Cooling Insufficient, A/C System diagnostic table?	1
Go to Step 7	Go to Step 6	—	During continued operation of the A/C system, does the compressor clutch disengage and re-engage with no substantial change to the low and high side pressures?	2
Go to Step 10	Go to Step 9	—	1. Check for an intermittent in the clutch coil and/or the clutch coil circuit. Refer to HVAC Compressor Clutch Coil Not Engage in HVAC System - Manual. 2. If adjustment of the clutch coil is necessary, remove the refrigerant. 3. Replace the clutch coil and/or repair the clutch coil circuit. 4. For clutch coil replacement, refer to Compressor Clutch Coil Removal (VS - Conventional Mount) and Compressor Clutch Coil Install (VS - Conventional Mount) or Compressor Clutch Coil Removal (V2 - Direct Mount) and Compressor Clutch Coil Install (V2 - Direct Mount).	3

Cooling Insufficient, A/C System - Pressure Zone A

A/C System Pressure - Zone Classification Graph



590674

Cooling Insufficient, A/C System - Pressure Zone A

Step	Action	Value(s)	Yes	No
1	Were you sent here from the Cooling Insufficient, A/C System diagnostic table?	—	Go to Step 2	Go to <i>Cooling Insufficient, A/C System</i>
2	During continued operation of the A/C system, does the compressor clutch disengage and re-engage with no abnormal change to the low and high side pressure readings?	—	Go to Step 3	Go to Step 4
3	1. Check for an intermittent in the clutch coil and/or the clutch coil circuit. Refer to <i>HVAC Compressor Clutch Does Not Engage</i> in <i>HVAC Systems - Manual</i>. 2. If replacement of the clutch coil is necessary, recover the refrigerant. 3. Replace the clutch coil and/or repair the clutch coil circuit. For clutch coil replacement, refer to <i>Compressor Clutch Coil Removal (V5 - Conventional Mount)</i> and <i>Compressor Clutch Coil Install (V5 - Conventional Mount)</i> or <i>Compressor Clutch Coil Removal (V7 - Direct Mount)</i> and <i>Compressor Clutch Coil Install (V7 - Direct Mount)</i>. Is the repair complete?	—	Go to Step 12	—

Cooling Insufficient, A/C System - Pressure Zone A (cont'd)

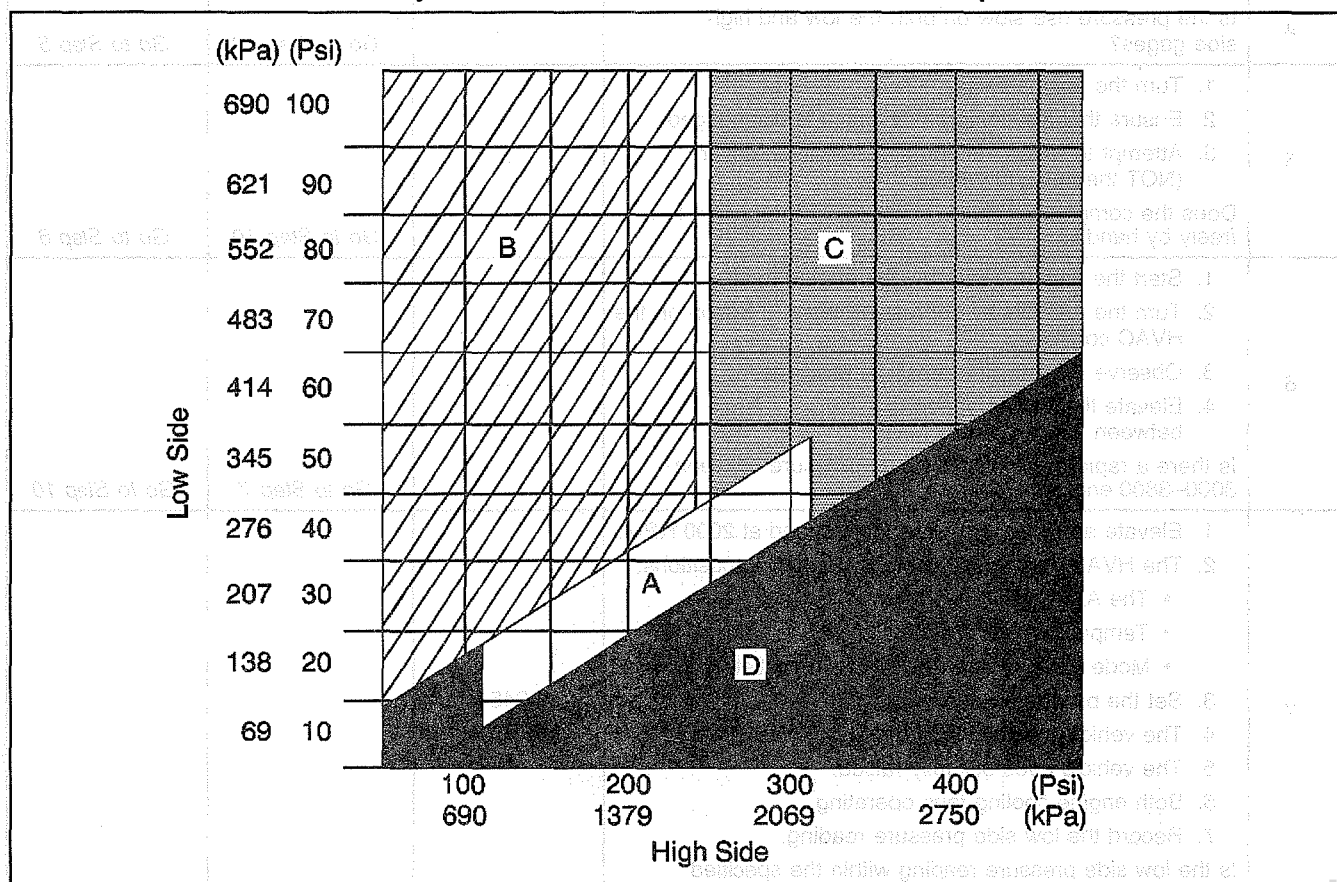
Step	Action	Value(s)	Yes	No
4	Did the customer concern mention that the A/C system output temperatures are good at first, but then turn warm during extended drives?	—	Go to Step 5	Go to Step 7
5	The engine still running with a speed of 2000 RPM. During extended operation of the A/C system, does the low side (and possibly the high side) pressure increase significantly (possibly accompanied by heavy frost on the liquid line between the orifice and the evaporator)?	—	Go to Cooling Insufficient, A/C System - Pressure Zone B	Go to Step 6
6	Take the vehicle on a test drive under the same conditions as the customer, to verify the concern. Has the concern been verified?	—	Go to Cooling Insufficient, A/C System - Pressure Zone B	Go to Step 11
7	Compare the low and high side pressures to those listed in the A/C performance table. Refer to <i>Cooling Insufficient, A/C System</i> . Is the high side pressure slightly above normal pressure?	—	Go to Step 8	Go to Step 9
8	1. The refrigerant system oil charge level may be too high. 2. Evacuate the refrigerant system. 3. Check the amount of refrigerant oil removed from the system. 4. Charge the refrigerant system to specifications, using care to maintain the proper oil level. 5. Leak test the refrigerant system. Refer to <i>Leak Testing</i>. Are the operations completed?	—	Go to Step 10	—
9	1. The refrigerant system may contain too much moisture. 2. Evacuate the refrigerant system. 3. Charge the refrigerant system to specifications. 4. Leak test the refrigerant system. Refer to <i>Leak Testing</i>. 5. If no leaks are found, replace the accumulator. Refer to <i>Accumulator Replacement</i>. Are the operations completed?	—	Go to Step 10	—
10	Compare the outlet temperature to those listed in the A/C performance table. Refer to <i>Cooling Insufficient, A/C System</i> . Is the outlet temperature within specifications?	—	Go to A Diagnostic System Check in HVAC Systems - Manual	—

Cooling Insufficient, A/C System - Pressure Zone A (cont'd)

Step	Action	Value(s)	Yes	No
11	1. Start the engine and allow the engine to idle.			
	2. With an accurate thermometer still installed to the IP center air outlet.			
	3. Set the HVAC control to the following positions: • The A/C on • The temperature control to coldest position • The mode control knob to UPPER (IP outlets) • The blower switch to high			
	4. Elevate and maintain the engine speed at 2000 RPM.			
	5. Allow the low and high side pressure readings to stabilize, if necessary. (Stabilization usually requires 2–3 minutes.)	—		
	6. Record the low and high pressure readings and the delivered air output temperature.			
	7. Compare the low and high side pressures and the output temperatures to those listed in the A/C Performance Table. Refer to <i>Cooling Insufficient, A/C System</i> .			
	Are both the low and high side pressures as well as the output temperatures within specifications?		System OK	
12	1. Evacuate and charge the refrigerant system.			
	2. Leak test the refrigerant system. Refer to <i>Leak Testing</i> .			
	Are the operations completed?		Go to Step 13	
13	1. Start the engine and allow the engine to idle.			
	2. With an accurate thermometer still installed to the IP center air outlet.			
	3. Set the HVAC control to the following positions: • A/C button to ON • Temperature control to full cold • Mode control knob to UPPER (IP outlets) • Blower switch to high			
	4. Elevate and maintain the engine speed at 2000 RPM.			
	5. Allow the low and high side pressure readings to stabilize, if necessary. (Stabilization usually requires 2–3 minutes.)	—		
	6. Record the low and high pressure readings and the delivered air output temperature.			
	7. Compare the low and high side pressures and the output temperatures to those listed in the A/C Performance Table. Refer to <i>Cooling Insufficient, A/C System</i> .			
	Are both the low and high side pressures as well as the output temperatures within specifications?		Go to A Diagnostic System Check in HVAC Systems - Manual	

Cooling Insufficient, A/C System - Pressure Zone B

A/C System Pressure - Zone Classification Graph



590674

Cooling Insufficient, A/C System - Pressure Zone B

Step	Action	Value(s)	Yes	No
1	Were you sent here from the Cooling Insufficient, A/C System — Pressure Zone A.	—	Go to Step 3	Go to Step 2
2	Were you sent here from the Cooling Insufficient, A/C System.	—	Go to Step 3	Go to Cooling Insufficient, A/C System
3	1. The engine still idling in PARK. 2. The HVAC control still set to the following positions: • A/C button to ON • Temperature control to full cold • Mode control knob to UPPER (IP outlets) • Blower switch to high 3. Close the vehicle windows and doors. 4. The vehicle hood fully raised. 5. Both engine cooling fans operating. 6. Elevate and maintain the engine speed to 3000 RPM. 7. Cycle the A/C from ON to OFF to ON — by depressing the A/C button on the HVAC control — every 20 seconds for 3 minutes. 8. Record the low and high side pressure readings. Are the low and high side pressure readings within 207 kPa (30 psi) of each other?	—	Go to Step 4	Go to Step 11

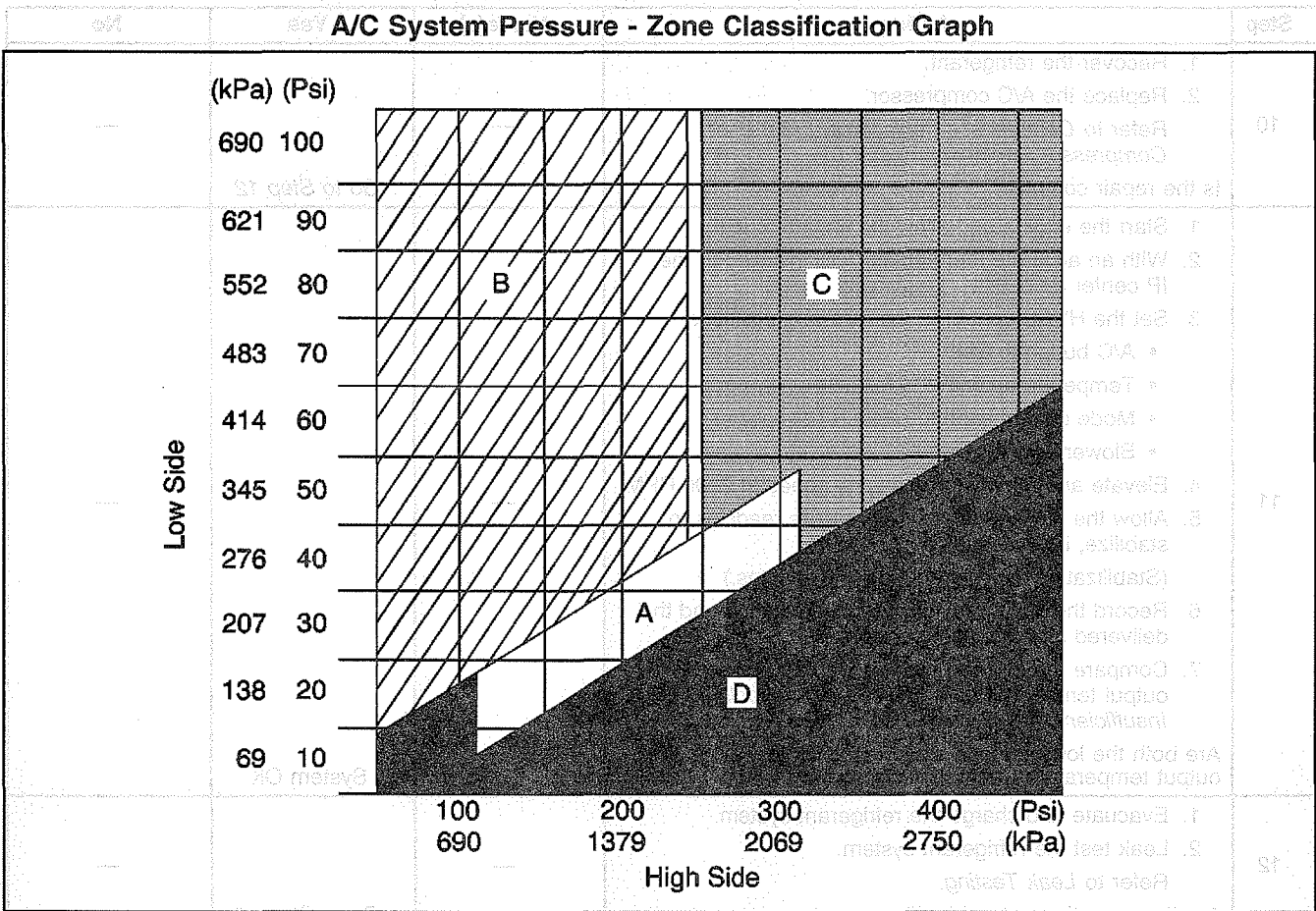
Cooling Insufficient, A/C System - Pressure Zone B (cont'd)

Step	Action	Value(s)	Yes	No
4	Is the pressure rise slow on both the low and high side gages?	—	Go to Step 10	Go to Step 5
5	1. Turn the engine OFF. 2. Ensure that the compressor clutch is disengaged. 3. Attempt to rotate the compressor clutch driver (NOT the pulley) by hand. Does the compressor clutch driver (NOT the pulley) turn freely by hand?	—	Go to Step 10	Go to Step 6
6	1. Start the engine and allow the engine to idle. 2. Turn the A/C ON by depressing the A/C button on the HVAC control. 3. Observe the low side pressure readings. 4. Elevate the engine speed to between 3000–3800 RPM. Is there a rapid rise in the low side pressure between 3000–3800 engine RPM?	—	Go to Step 7	Go to Step 10
7	1. Elevate and maintain the engine speed at 2000 RPM. 2. The HVAC control still set to the following positions: • The A/C on • Temperature control to full cold • Mode control knob to UPPER (IP outlets) 3. Set the blower switch to low 4. The vehicle windows and doors still closed. 5. The vehicle hood still fully raised. 6. Both engine cooling fans operating. 7. Record the low side pressure reading. Is the low side pressure reading within the specified values?	69-345 kPa (10-50 psi)	Go to Step 8	Go to Step 9
8	1. The engine still idling in PARK. 2. The HVAC control set to the following positions: • A/C button to ON • Temperature control to full cold • Mode control knob to UPPER (IP outlets) • Blower switch to high 3. Elevate and maintain the engine speed at 2000 RPM. 4. Allow the low and high side pressure readings to stabilize, if necessary. (Stabilization usually requires 2–3 minutes.) 5. Record the low and high pressure readings. 6. Compare the low and high side pressures to the A/C System Pressure - Zone Classification Graph above. Do both the low and high side pressures fall within Zone B on the chart (low side pressure still high and high side pressure still low)?	—	Go to Step 10	Go to Step 11
9	1. Recover the refrigerant. 2. Replace the control valve. Refer to <i>Compressor Pressure Relief Valve Removal (V5 - Conventional Mount)</i> and <i>Compressor Pressure Relief Valve Install (V5 - Conventional Mount)</i> or <i>Compressor Pressure Relief Valve Removal (V7 - Direct Mount)</i> and <i>Compressor Pressure Relief Valve Install (V7 - Direct Mount)</i> . Is the repair complete?	—	Go to Step 12	—

Cooling Insufficient, A/C System - Pressure Zone B (cont'd)

Step	Action	Value(s)	Yes	No
10	1. Recover the refrigerant. 2. Replace the A/C compressor. Refer to <i>Compressor Replacement (3.8 L)</i> or <i>Compressor Replacement (5.7 L)</i> . Is the repair complete?	—	Go to Step 12	—
11	1. Start the engine and allow the engine to idle. 2. With an accurate thermometer still installed to the IP center air outlet. 3. Set the HVAC control to the following positions: • A/C button to ON • Temperature control to full cold • Mode control knob to UPPER (IP outlets) • Blower switch to high 4. Elevate and maintain the engine speed at 2000 RPM. 5. Allow the low and high side pressure readings to stabilize, if necessary. (Stabilization usually requires 2–3 minutes.) 6. Record the low and high pressure readings and the delivered air output temperature. 7. Compare the low and high side pressures and the output temperatures to those listed in <i>Cooling Insufficient, A/C System</i> . Are both the low and high side pressures as well as the output temperatures within specifications?	—	System OK	—
12	1. Evacuate and charge the refrigerant system. 2. Leak test the refrigerant system. Refer to <i>Leak Testing</i> . Are the operations completed?	—	Go to Step 13	—
13	1. Start the engine and allow the engine to idle. 2. An accurate thermometer still installed to the IP center air outlet. 3. Set the HVAC control to the following positions: • A/C button to ON • Temperature control to full cold • Mode control knob to UPPER (IP outlets) • Blower switch to high 4. Elevate and maintain the engine speed at 2000 RPM. 5. Allow the low and high side pressure readings to stabilize, if necessary. (Stabilization usually requires 2–3 minutes.) 6. Record the low and high pressure readings and the delivered air output temperature. 7. Compare the low and high side pressures and the output temperatures to those listed in the A/C Performance Table. Refer to <i>Cooling Insufficient, A/C System</i> . Are both the low and high side pressures as well as the output temperatures within specifications?	—	Go to A Diagnostic System Check in HVAC Systems - Manual	—

Cooling Insufficient, A/C System - Pressure Zone C



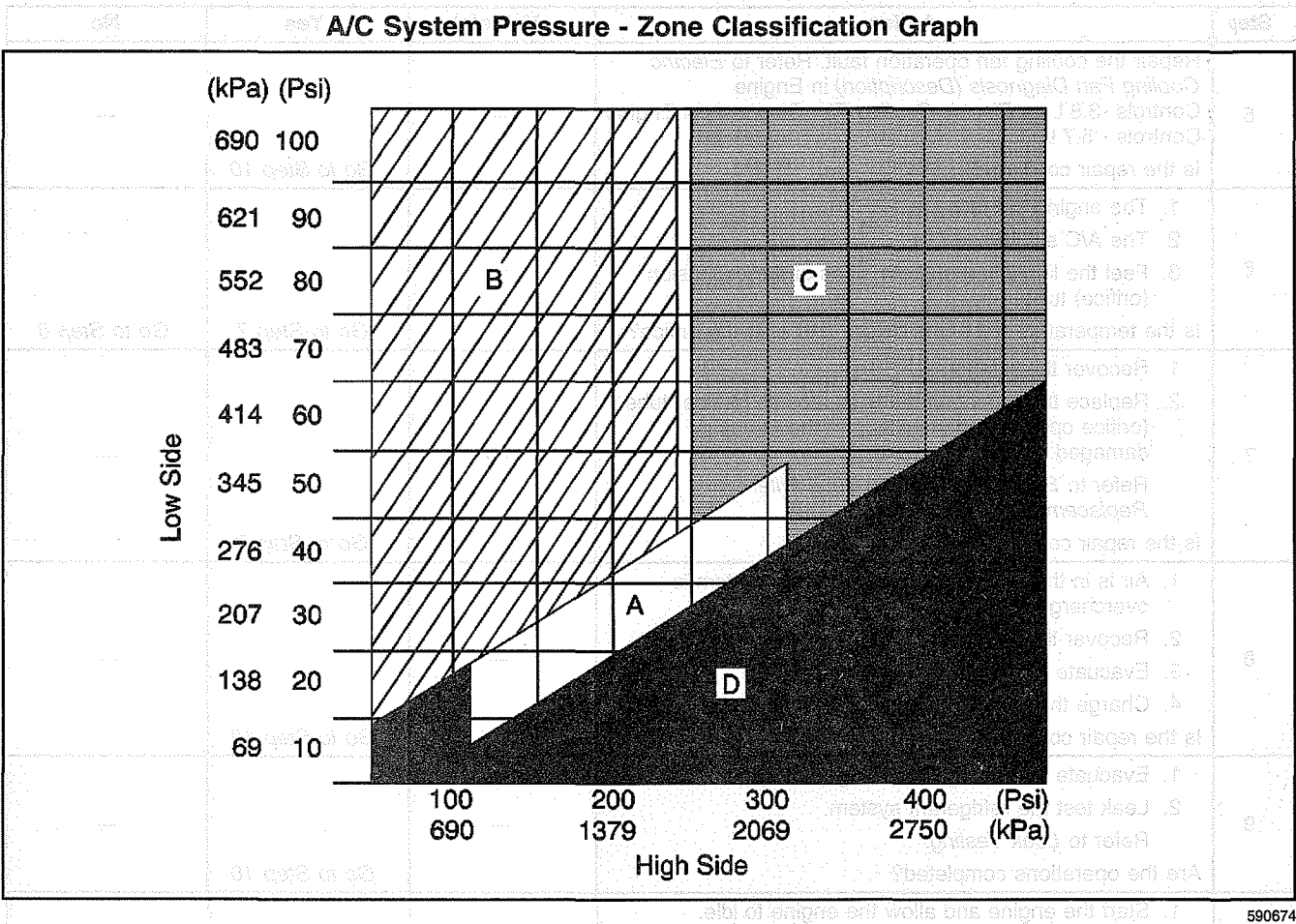
Cooling Insufficient, A/C System - Pressure Zone C

Step	Action	Value(s)	Yes	No
1	Were you sent here from the Cooling Insufficient, A/C System diagnostic table?	—	Go to Step 2	Go to Cooling Insufficient, A/C System
2	Visually inspect for restricted air flow at the condenser. Is the air flow through the condenser restricted	—	Go to Step 3	Go to Step 4
3	1. Repair the condition (air flow restriction) or replace the condenser, if damaged. 2. If replacement of the condenser is necessary, recover the refrigerant, then refer to <i>Condenser Replacement</i> . 3. Evacuate and charge the refrigerant system. 4. Leak test the refrigerant system. Refer to <i>Leak Testing</i> . Is the repair complete?	—	Go to Step 4	—
4	1. Start the engine and allow the engine to idle. 2. Turn ON the A/C, using the A/C button. 3. Inspect for proper cooling fan operation. Refer to <i>Electric Cooling Fan Diagnosis (Description)</i> in Engine Controls - 3.8 L or <i>Electric Cooling Fan Diagnosis</i> in Engine Controls - 5.7 L. Are the cooling fans ON and operating properly?	—	Go to Step 6	Go to Step 5

Cooling Insufficient, A/C System - Pressure Zone C (cont'd)

Step	Action	Value(s)	Yes	No
5	Repair the cooling fan operation fault. Refer to <i>Electric Cooling Fan Diagnosis (Description)</i> in Engine Controls - 3.8 L or <i>Electric Cooling Fan Diagnosis</i> in Engine Controls - 5.7 L. Is the repair complete?	—	Go to Step 10	—
6	1. The engine still idling in PARK. 2. The A/C still turned ON. 3. Feel the liquid line on both sides of the expansion (orifice) tube. Is the temperature the same before and after the orifice?	—	Go to Step 7	Go to Step 8
7	1. Recover the refrigerant. 2. Replace the damaged/faulty expansion (orifice) tube (orifice opening too large and/or the O-ring is damaged or missing). Refer to <i>Expansion (Orifice) Tube Filter Replacement</i> . Is the repair complete?	—	Go to Step 9	—
8	1. Air is in the refrigerant system, or the system is overcharged. 2. Recover the refrigerant. 3. Evacuate the refrigerant system. 4. Charge the refrigerant system to specifications. Is the repair complete?	—	Go to Step 10	—
9	1. Evacuate and charge the refrigerant system. 2. Leak test the refrigerant system. Refer to <i>Leak Testing</i> . Are the operations completed?	—	Go to Step 10	—
10	1. Start the engine and allow the engine to idle. 2. With an accurate thermometer still installed to the IP center air outlet. 3. Set the HVAC control to the following positions: • A/C button to ON • Temperature control to full cold • Mode control knob to UPPER (IP outlets) • Blower switch to high 4. Elevate and maintain the engine speed at 2000 RPM. 5. Allow the low and high side pressure readings to stabilize, if necessary. (Stabilization usually requires 2–3 minutes.) 6. Record the low and high pressure readings and the delivered air output temperature. 7. Compare the low and high side pressures and the output temperatures to those listed in the A/C Performance Table. Refer to <i>Cooling Insufficient, A/C System</i> . Are both the low and high side pressures as well as the output temperatures within specifications?	—	Go to A Diagnostic System Check in HVAC Systems - Manual	—

Cooling Insufficient, A/C System - Pressure Zone D



Cooling Insufficient, A/C System - Pressure Zone D

Step	Action	Value(s)	Yes	No
1	Were you sent here from the Cooling Insufficient, A/C System diagnostic table?	—	Go to Step 2	Go to Cooling Insufficient, A/C System
2	1. The engine still idling in PARK. 2. The A/C still ON. 3. Feel the liquid line before the expansion (orifice) tube. Is the liquid line cold before the orifice?	—	Go to Step 3	Go to Step 5
3	1. The A/C system still operating. 2. Carefully feel along the surfaces of the following high side components for a sudden drop in temperature. (The high side components should feel warm/hot from the compressor all the way to the orifice.) • The compressor discharge hose • The condenser • The liquid line between the condenser and the orifice. Was an abrupt drop in temperature noted along the surfaces of any of the components listed?	—	Go to Step 4	Go to Step 5
4	1. Recover the refrigerant. 2. Remove the restriction from the component, or replace the component which produced an abrupt temperature drop Is the repair complete?	—	Go to Step 17	—

Cooling Insufficient, A/C System - Pressure Zone D (cont'd)

Step	Action	Value(s)	Yes	No
5	1. Recover the refrigerant. 2. Evacuate the system. 3. Weigh the charge which was removed. Is the weight of the removed refrigerant charge equal to or above the specified value?	0.68 kg (1.50 lb)	Go to Step 9	Go to Step 6
6	Add 0.40 kg (14 oz) of R-134a to the refrigerant system. Does the cooling performance improve?	—	Go to Step 7	Go to Step 9
7	Leak test the system. Refer to <i>Leak Testing</i> . Was a refrigerant leak found?	—	Go to Step 8	Go to Step 17
8	Repair the refrigerant leak. Is the repair complete?	—	Go to Step 17	—
9	1. The A/C system still operating. 2. Feel the liquid line at the orifice location for extreme cold, possibly accompanied by heavy frost, then feel along the liquid line after the orifice location for warm temperature. Was the liquid line extremely cold at the orifice location and warm after the orifice location?	—	Go to Step 10	Go to Step 11
10	1. The orifice tube is nearly plugged or damaged/faulty (opening too small). 2. Recover the refrigerant. 3. Replace the orifice tube. Refer to <i>Expansion (Orifice) Tube Filter Replacement</i> . 4. If the orifice tube was plugged or nearly plugged, note the amount of debris present. 5. If heavy debris is present, components in-line before the orifice may need to be flushed. Is the repair complete?	—	Go to Step 17	—
11	1. The A/C system still operating. 2. Carefully feel along the surfaces of the following low side components for a sudden change in temperature. • The liquid line between the orifice and the evaporator core • The vapor hose between the evaporator core and the accumulator • The accumulator • The compressor suction hose Was an abrupt temperature change noted along the surfaces of any of the components listed?	—	Go to Step 12	Go to Step 13
12	1. Recover the refrigerant. 2. Remove the restriction from the component, or replace the component which produced an abrupt temperature drop Are the operations complete?	—	Go to Step 17	—
13	1. The A/C system still operating. Ensure that the A/C has been operating for several minutes. 2. Carefully feel along the surfaces of the following low AND high side components to compare the overall temperatures of the low and high sides. • The liquid line between the orifice and the evaporator core • The vapor hose between the evaporator core and the accumulator • The accumulator • The compressor suction hose • The compressor discharge hose • The condenser • The liquid line between the condenser and the orifice. Are the overall temperatures of the low and high side components close to the same (both only mildly warm)?	—	Go to Step 14	Go to Step 18

Cooling Insufficient, A/C System - Pressure Zone D (cont'd)

Step	Action	Value(s)	Yes	No
14	1. Recover the refrigerant. 2. Disconnect the compressor hose from the compressor. Refer to <i>Compressor Hose Assembly Replacement (3.8 L)</i> or <i>Compressor Hose Assembly Replacement (5.7 L)</i> . 3. Inspect for the presence of heavy debris on the compressor suction port screen. Is heavy debris present on the compressor suction port screen?	—	Go to Step 15	Go to Step 16
15	1. Remove the debris from the suction port screen. 2. Inspect the orifice for damage, in order to determine if the debris originated from the high side. 3. If the orifice does not show any signs of damage, inspect the accumulator for damage, in order to determine if the debris originated from the evaporator core. 4. Replace any components found damaged. Is the repair complete?	—	Go to Step 17	Go to Step 17
16	Install components or connectors which were removed or disconnected. Is the action complete?	—	Go to Step 17	Go to Step 17
17	1. Evacuate and charge the refrigerant system. 2. Leak test the refrigerant system. Refer to <i>Leak Testing</i> . Are the operations completed?	—	Go to Step 18	Go to Step 18
18	1. Start the engine and allow the engine to idle. 2. With an accurate thermometer still installed to the IP center air outlet. 3. Set the HVAC control to the following positions: • A/C button to ON • Temperature control to full cold • Mode control knob to UPPER (IP outlets) • Blower switch to high 4. Elevate and maintain the engine speed at 1000 RPM. 5. Allow the low and high side pressure readings to stabilize, if necessary. (Stabilization usually requires 2–3 minutes.) 6. Record the low and high pressure readings and the delivered air output temperature. 7. Compare the low and high side pressures and the output temperatures to those listed in the A/C Performance Table. Refer to <i>Cooling Insufficient, A/C System</i> . Are both the low and high side pressures as well as the output temperatures within specifications?	—	Go to A Diagnostic System Check in HVAC Systems - Manual	Go to A Diagnostic System Check in HVAC Systems - Manual

Defrosting Insufficient

1. Inspect for an obstruction in both of the defroster nozzles.
Perform the following steps, as necessary:
 - Remove any foreign objects.
 - Repair any loose instrument panel pad that blocks an outlet.
2. Inspect for the proper operation of the defroster air valve.
3. Inspect for one of the following conditions.
Replace the defroster vacuum actuator or hose if one of the following conditions exist:
 - A faulty defroster air valve vacuum actuator
 - A faulty defroster air valve vacuum hose
4. Inspect for insufficient heating.
Refer to *Heating Insufficient*.

Heating Insufficient

1. Inspect the duct work for the following conditions:
 - The proper installation
 - Obstructions
2. Inspect the blower operation.
3. Inspect the following components for the proper installation and the proper operation:
 - The temperature lever
 - The temperature motor

4. Inspect for the incorrect operation of the controls.
Advise the driver of the proper operation of the controls.

5. Inspect the engine for low engine coolant level.
Perform the following steps, as necessary:
 - Add coolant.
 - Inspect the engine for coolant leaks.
 - Run the engine in order to clear any air locks.

6. Inspect for a faulty engine thermostat.
Replace the thermostat, if necessary.

7. Inspect for a kinked heater hose.
Perform the following steps, as necessary:
 - Straighten the heater hose.
 - Replace the heater hose.

8. Inspect for obstructed heater core tubes.
An obstruction usually causes a squishing noise in the heater core.

- Perform the following steps, as necessary:
- Remove any foreign material from the heater core.
 - Replace the heater core.

9. Inspect for one of the following conditions:
 - A faulty blower motor
Replace a faulty blower motor.
 - A faulty blower circuit
Repair or replace faulty wires or connections.

Noise Diagnosis - Blower Motor

Step	Action	Value(s)	Yes	No
DEFINITION: Noise originating from the blower motor and/or the air delivery system. No loss of battery or ground is occurring in the blower motor circuit. The blower motor resistor and the blower motor are not exhibiting any intermittent internal shorts. For electrical diagnosis of the blower motor circuit, refer to <i>Blower Motor Inoperative at Any Speed</i> in HVAC Systems - Manual				
1	Were you sent here from A Diagnostic System Check?	—	Go to Step 2	Go to A Diagnostic System Check in HVAC Systems - Manual
2	1. Sit inside the vehicle. 2. Close the vehicle doors and windows. 3. Turn the ignition switch to ON; engine OFF. 4. Turn the blower switch to position 5 (high). 5. Set the temperature control to full cold. 6. Set the mode control to UPPER (I/P outlets). 7. Cycle through all the blower motor speeds, modes (including outside air and recirc) and temperature control positions to determine where noise occurs and where noise does not occur. 8. Attempt to define the type of noise: • Scrape, pop • Tick/click, chirping, groaning, scraping • Air rush/whistle Is a scrape or pop noise evident when selecting modes or temperature settings (moving a mode or temperature valve)?	—	Go to Step 12	Go to Step 3

Noise Diagnosis - Blower Motor (cont'd)

Step	Action	Value(s)	Yes	No
3	Is a tick/click, chirping, groaning or scraping noise present — constantly but decreases as blower motor speed is decreased, or only at start-up/intermittent — in all modes?	—	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 13	Go to Step 5
5	Is an air rush/whistle noise evident only in defrost or lower mode?	—	Go to Step 14	Go to Step 15
6	Check for blower motor and impeller excess vibration at each blower motor speed by feeling the blower case. Is excessive vibration present?	—	Go to Step 7	Go to Step 9
7	1. Remove the blower motor (w/impeller). Refer to <i>Blower Motor and Fan Replacement</i>. 2. Examine the blower motor impeller for the following conditions: • Deposits of foreign material • Wear spots • Cracked blades • Cracked hub • Loose impeller retainer • Improper impeller alignment Does the blower motor impeller exhibit any of these abnormal conditions?	—	Go to Step 8	Go to Step 9
8	1. Repair or replace the blower motor impeller. 2. Install the blower motor and impeller. Refer to <i>Blower Motor and Fan Replacement</i>. Is the action complete?	—	Go to Step 16	—
9	1. Remove the blower motor (w/impeller). Refer to <i>Blower Motor and Fan Replacement</i>. 2. Check for the presence of foreign material at the opening of the blower intake. Was foreign material found?	—	Go to Step 11	Go to Step 10
10	1. Replace the blower motor. 2. Install the blower motor and impeller. Refer to <i>Blower Motor and Fan Replacement</i>. Is the repair complete?	—	Go to Step 17	—
11	1. Remove the foreign material from the blower case. 2. Repair as necessary. Is the action complete?	—	Go to Step 17	—
12	1. Remove the instrument panel (IP) upper trim pad. Refer to <i>Trim Pad Replacement - IP Upper</i> in Instrument Panel, Gauges and Console. 2. Check the defroster, mode, air inlet and temperature valve function. 3. Repair or replace as necessary. Is the action complete?	—	Go to Step 17	—

Noise Diagnosis - Blower Motor (cont'd)

Step	Action	Value(s)	Yes	No
13	1. Remove the IP upper trim pad. Refer to <i>Trim Pad Replacement - IP Upper</i> in Instrument Panel, Gauges and Console. 2. Check the temperature valve seals. 3. Repair or replace as necessary. Is the action complete?	—	Go to Step 17	—
14	1. Remove the IP upper trim pad. Refer to <i>Trim Pad Replacement - IP Upper</i> in Instrument Panel, Gauges and Console. 2. Check the ducts for obstructions or foreign materials. 3. Remove any obstructions or foreign material found. 4. Check the defroster valve function. 5. Repair or replace as necessary. Is the action complete?	—	Go to Step 17	—
15	1. Remove the IP upper trim pad. Refer to <i>Trim Pad Replacement - IP Upper</i> in Instrument Panel, Gauges and Console. 2. Check the ducts for obstructions or foreign materials. 3. Remove any obstructions or foreign material found. 4. Check the defroster valve seals. 5. Repair or replace as necessary. Is the action complete?	—	Go to Step 17	—
16	1. Turn OFF the ignition switch. 2. Reconnect or install any connectors or components which were disconnected or removed. 3. Recheck for the presence of blower motor/air delivery system noise. Is the noise still present?	—	Go to Step 10	Go to A Diagnostic System Check in HVAC Systems - Manual
17	1. Turn OFF the ignition switch. 2. Reconnect or install any connectors or components which were disconnected or removed. 3. Recheck for the presence of blower motor/air delivery system noise. Is the noise still present?	—	Go to Step 2	Go to A Diagnostic System Check in HVAC Systems - Manual

Noise Diagnosis - A/C System

Step	Action	Value(s)	Yes	No
1	Were you sent here from A Diagnostic System Check?	—	Go to Step 2	Go to A Diagnostic System Check in HVAC Systems - Manual
2	1. Sit inside the vehicle. 2. Close the vehicle doors and windows. 3. Turn the ignition switch to the ON position; engine OFF. 4. Turn the blower switch to position 5 (high). 5. Set the temperature control to the full cold position. 6. Set the mode control to the UPPER (I/P outlets). 7. Depress the air conditioning (A/C) button to the OFF position. Is an abnormal noise present?	—	Go to Noise Diagnosis - Blower Motor	Go to Step 3
3	1. Start the engine and allow the engine to idle in PARK. 2. Depress the A/C button to the ON position. Is the A/C clutch engaged and supplying cold air to the passenger compartment?	—	Go to Step 4	Go to HVAC Compressor Clutch Does Not Engage in HVAC Systems - Manual
4	A/C system noises can be generally categorized into three areas: • Screech/Squealing noises • Moaning noises • Vibration/Rattle noises Is a screech/squealing noise heard when the A/C clutch is engaged?	—	Go to Step 5	Go to Step 14
5	Inspect the A/C compressor drive belt for excessive wear or oil coverage. Is the drive belt excessively worn or covered with oil?	—	Go to Step 6	Go to Step 7
6	1. Repair the source of the oil leak, if a leak was present. Refer to <i>Oil Leak Diagnosis</i> in Engine Mechanical. 2. Replace the A/C compressor drive belt. Refer to <i>Drive Belt Replacement</i> in Engine Mechanical - 3.8 L or <i>Drive Belt Replacement - A/C</i> in Engine Mechanical - 5.7 L. Is the repair complete?	—	Go to Step 30	—
7	1. Start the engine and allow the engine to idle in PARK. 2. Engage the A/C compressor clutch. 3. Using a stethoscope, check the A/C compressor drive belt idler pulley for any abnormal noises. Is the idler pulley operating normally without abnormal noise?	—	Go to Step 9	Go to Step 8
8	Replace the A/C compressor drive belt idler pulley. Refer to <i>Drive Belt Idler Pulley Replacement</i> in Engine Mechanical - 3.8 L or <i>Drive Belt Idler Pulley Replacement - A/C</i> in Engine Mechanical - 5.7 L. Is the repair complete?	—	Go to Step 30	—

Noise Diagnosis - A/C System (cont'd)

Step	Action	Value(s)	Yes	No
9	1. A/C compressor clutch engaged and engine idling in PARK. 2. Using a stethoscope, check the A/C compressor drive belt tensioner pulley for any abnormal noises. 3. Turn the ignition switch to the OFF position. 4. Check the tensioner for proper spring load. Is the tensioner pulley operating normally with proper tension and without noise?	—	Go to Step 11	Go to Step 10
10	Replace the A/C compressor drive belt tensioner/tensioner pulley as needed. Refer to <i>Drive Belt Tensioner Replacement</i> in Engine Mechanical - 3.8 L or <i>Drive Belt Tensioner Replacement - A/C</i> in Engine Mechanical - 5.7 L. Is the repair complete?	—	Go to Step 30	—
11	Is the A/C compressor locked up?	—	Go to Step 12	Go to Step 13
12	1. Recover the refrigerant. 2. Replace the A/C compressor. Refer to <i>Compressor Replacement</i> (3.8 L) or <i>Compressor Replacement</i> (5.7 L). Is the repair complete?	—	Go to Step 31	—
13	1. Recover the refrigerant. 2. Remove the A/C compressor clutch coil. Refer to <i>Compressor Clutch Coil Removal</i> (V5 - Conventional Mount) or <i>Compressor Clutch Coil Removal</i> (V7 - Direct Mount). 3. Install the compressor clutch coil. Refer to <i>Compressor Clutch Coil Install</i> (V5 - Conventional Mount) or <i>Compressor Clutch Coil Install</i> (V7 - Direct Mount). Is the repair complete?	—	Go to Step 31	—
14	Does a moaning noise exist when the A/C clutch is engaged?	—	Go to Step 15	Go to Step 23
15	1. Connect an R-134a manifold gage set to the low and high side service ports on the vehicle refrigerant system. 2. Increase and maintain the engine speed at 2000 RPM, in PARK. 3. Engage the A/C clutch. 4. Check the low and high side refrigerant pressures. 5. Compare the pressure readings to those listed in the Cooling Insufficient, A/C System. Refer to <i>Cooling Insufficient, A/C System</i>. Are the high and low side refrigerant pressures within the normal specified limits?	—	Go to Step 17	Go to Step 16
16	1. Recover the refrigerant, evacuate and charge the refrigerant system to specifications. 2. Start the engine and allow the engine to idle in PARK. 3. Engage the A/C compressor clutch. Does the moaning noise exist when the A/C clutch is engaged?	—	Go to Step 32	Go to Step 17
17	Inspect the A/C compressor mounting, idler pulley, and tensioner for concerns using a stethoscope. Are any of these components loose, damaged or excessively worn?	—	Go to Step 18	Go to Step 19

Noise Diagnosis - A/C System (cont'd)

Step	Action	Value(s)	Yes	No
18	Repair or replace the A/C compressor mounting, idler pulley or tensioner/tensioner pulley as needed. - For A/C compressor drive belt idler pulley replacement, refer to <i>Drive Belt Idler Pulley Replacement</i> in Engine Mechanical - 3.8 L or <i>Drive Belt Idler Pulley Replacement - A/C</i> in Engine Mechanical - 5.7 L. - For A/C compressor drive belt tensioner/tensioner pulley replacement, refer to <i>Drive Belt Tensioner Replacement</i> in Engine Mechanical - 3.8 L or <i>Drive Belt Tensioner Replacement - A/C</i> in Engine Mechanical - 5.7 L. Is the repair or replacement complete?	—	Go to Step 30	
19	1. A/C compressor clutch engaged and engine idling in PARK. 2. Using a stethoscope, move around the entire refrigerant plumbing system checking for any abnormal noises being caused by component ground-out. Are any of the A/C components grounding out and causing a noise?	—	Go to Step 20	Go to Step 21
20	1. Recover the refrigerant, if necessary. 2. Repair or replace the component which is causing the moaning concern as needed. Is the repair or replacement complete?	—	Go to Step 31	
21	Does the concern go away with the A/C clutch disengaged and the engine idling in PARK?	—	Go to Step 22	Go to Engine Related Vibration in Vibration Diagnosis and Correction
22	1. Recover the refrigerant. 2. Replace the A/C compressor. Refer to <i>Compressor Replacement (3.8 L)</i> or <i>Compressor Replacement (5.7 L)</i> . Is the repair complete?	—	Go to Step 31	
23	Does a vibration or rattle noise exist when the A/C clutch is engaged?	—	Go to Step 24	System OK
24	Inspect the A/C compressor mounting, idler pulley, and tensioner for concerns using a stethoscope. Are any of these components loose, damaged or excessively worn?	—	Go to Step 18	Go to Step 25
25	Is the A/C compressor drive belt misaligned?	—	Go to Step 26	Go to Step 27
26	Repair any alignment concern with the A/C pulley system and replace the drive belt as needed. Refer to <i>Drive Belt Replacement</i> in Engine Mechanical - 3.8 L or <i>Drive Belt Replacement - A/C</i> in Engine Mechanical - 5.7 L. Is the repair complete?	—	Go to Step 30	
27	1. A/C compressor clutch engaged and engine idling in PARK. 2. Using a stethoscope, move around the entire A/C system checking for any abnormal noises being caused by a component. Are any of the A/C components causing an abnormal noise?	—	Go to Step 28	Go to Step 29
28	1. Recover the refrigerant. 2. Repair or replace the component which is causing the vibration/rattle concern as needed. Is the repair complete?	—	Go to Step 31	

Noise Diagnosis - A/C System (cont'd)

Step	Action	Value(s)	Yes	No
29	Is the vibration/rattle coming from the A/C compressor internally?	—	Go to Step 12	Go to Engine Related Vibration in Vibration Diagnosis and Correction
30	1. Turn OFF the ignition switch. 2. Reconnect or install any connectors or components which were disconnected or removed. 3. Recheck for the presence of the A/C system noise. Is the A/C system noise still present?	—	Go to Step 2	Go to A Diagnostic System Check in HVAC Systems - Manual
31	1. Evacuate and charge the refrigerant system. 2. Leak test the refrigerant system. Refer to <i>Leak Testing</i> . Are the actions completed?	—	Go to Step 32	—
32	Recheck for the presence of the A/C system noise. Is the A/C system noise still present?	—	Go to Step 2	Go to A Diagnostic System Check in HVAC Systems - Manual

Cold Drafts on Floor

1. Inspect for a partially open air inlet valve.

Ensure that the air inlet valve closes properly in all modes except the MAX air conditioning mode.

Perform repairs as necessary.

2. Inspect all of the side door seals for the following conditions. Repair or replace faulty seals as necessary.

- Damaged seals
- Missing seals

Odor Diagnosis

Problem	Possible Cause	Correction
Musty Smell	• Water leaks (body) • The evaporator drain is blocked. • There is mold or mildew on the evaporator core.	• Locate and repair any water leaks. Refer to the appropriate repair procedure in Water Leaks. • Clean the evaporator drain. • Clean the evaporator. Refer to <i>Odor Correction</i>.
Coolant Smell	• The heater core is leaking. • The heater core pipes or hoses are leaking.	• Replace the heater core. Refer to <i>Heater Core Replacement</i>. • Replace the heater core pipes or hoses. Refer to <i>Heater Hose Assembly Replacement (3.8 L)</i> or <i>Heater Hose Assembly Replacement (5.7 L)</i>.
Refrigerant Oil Smell	The evaporator core is leaking.	Replace the evaporator core. Refer to <i>Evaporator Core Replacement</i> .
Mold/mildew odor problem—Under certain climate and operating conditions a musty odor can develop. The odor is caused by a microbial growth in the evaporator core. This odor is generally temporary, and as climate conditions change, the odor will disappear. Should the odor persist it may become necessary to clean the evaporator core with an appropriate cleaner.		

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 heating, ventilation and air conditioning (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.

A service kit that can correct the condition is available through General Motors Service Parts Operation (GMSPO) to address this condition.

To remove odors of this type, it is necessary to eliminate the microbial growth and prevent its recurrence. To accomplish this, these two procedures must be completed.

- Deodorize the evaporator core using Deodorizing Aerosol Kit P/N 12377951
- Install the new air conditioning (A/C) Delayed Blower Control Package, P/N 12370470

The blower control package will enable the blower to run at high speed for 5 minutes. It will do so approximately 50 minutes after the ignition has been turned off if the compressor had been engaged for 4 or more minutes prior to shutting off the engine. By doing so, the evaporator case and core are dried out, reducing the chances of a recurring A/C odor.

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

1. Ensure that the plenum that draws outside air into the HVAC module is clear of all 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:
 - 3.1. Start the vehicle.
 - 3.2. Set the temperature control on maximum heat.
 - 3.3. Set the control to the MAX setting.
 - 3.4. 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 it will not interfere with, or damage the following components:
 - The blower motor
 - The evaporator core
 - Any other operating part of the system
6. Wear safety goggles and latex gloves in order to perform the following actions:
 - 6.1. Continue to operate the blower motor on high.
 - 6.2. Insert the extension tube of the deodorizer GM P/N 12377951 into the hole, past the mark on the extension tube.

- 6.3. Use short spray bursts and vary the direction of spray for a 2-3 minute period of time, in order to dispense the contents of the can into the duct.

7. Shut the engine OFF. Allow the vehicle to sit for 3-5 minutes.
8. Seal the 3.175 mm (0.125 in) hole with body sealer or RTV gasket compound.
9. Start the engine.
10. Operate the blower motor on high for 15-20 minutes to dry.
11. Reconnect the A/C compressor clutch coil electrical connector.
12. Verify proper clutch operation.

Refrigerant Recovery and Recharging

Tools Required

- J 39500-B A/C Refrigerant Recovery, Recycling and Recharging (ACR4) System
- J 41810 PureGuard 2
- J-41810-100A Active Flow Control Valve

Caution: Refer to Caution - Breathing R-134a in Cautions and Notices.

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.

Notice: 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.

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

Notice: 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.

Notice: 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 39500-B removes the Refrigerant-134a from the vehicle's A/C system. The recovery procedure uses one filtering cycle. The evacuation procedure uses an automatic multiple pass filtering cycle. These filtering cycles ensure a constant supply of clean, dry refrigerant for A/C system charging.

The Initial Set-Up Instruction Manual, provided with the J 39500-B, contains specific procedures for proper recovery, evacuation and recharging.

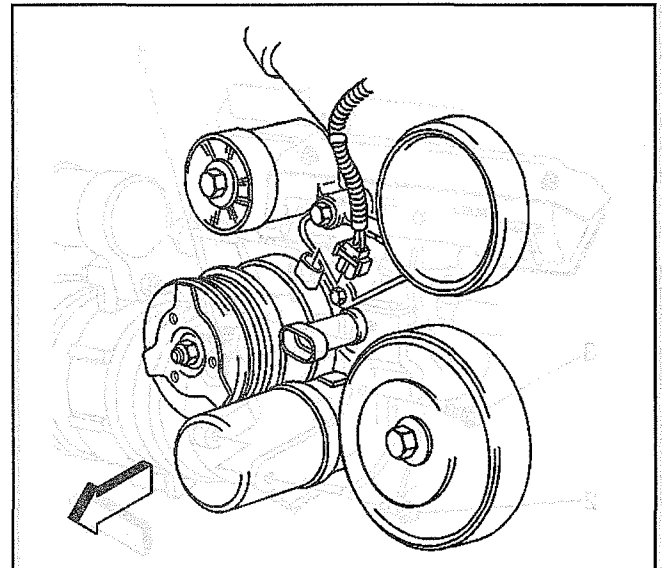
For ACR4 technical assistance in the U.S., call 1-800-345-2233.

Compressor Replacement (3.8 L)

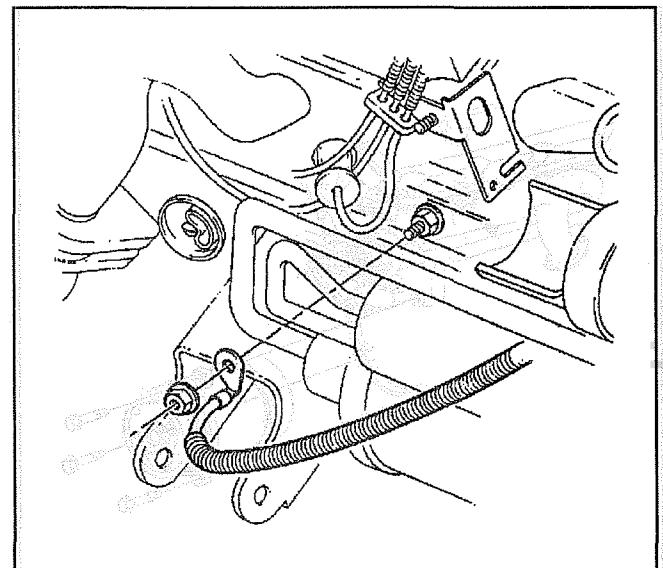
Removal Procedure

Important: Compressor related noise is generally air conditioning (A/C) system related and not always caused by the compressor itself. Prior to replacing compressor, refer to *Noise Diagnosis - A/C System*.

1. Recover the refrigerant. Refer to *Refrigerant Recovery and Recharging*.
2. Remove the serpentine drive belt. Refer to *Drive Belt Replacement* in Engine Mechanical - 3.8 L.
3. Disconnect the electrical connector at the air conditioning (A/C) compressor.
4. Remove the negative battery cable nut from the engine block stud.
5. Remove the negative battery cable from the stud.
6. Raise and support the vehicle. Refer to *Lifting and Jacking the Vehicle* in General Information.

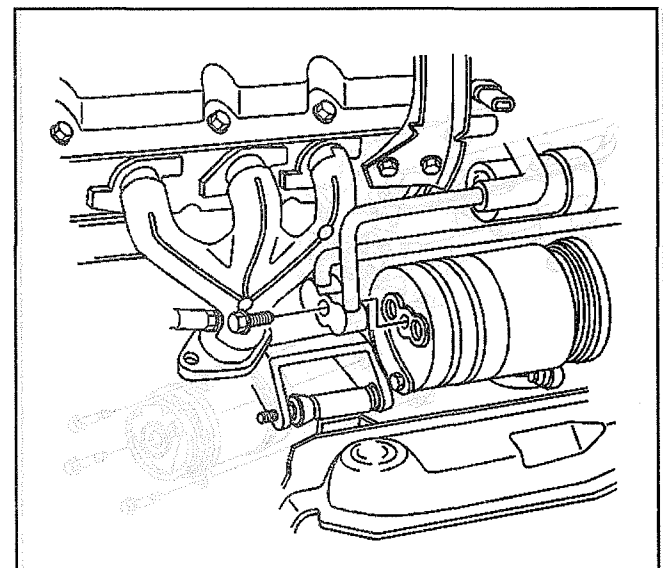


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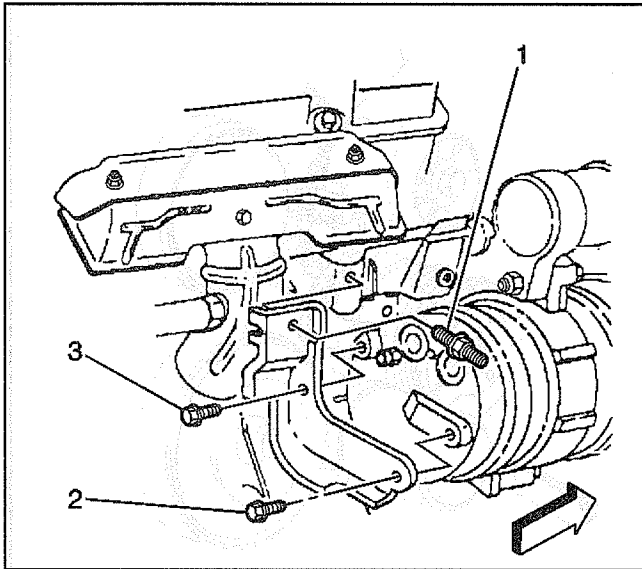


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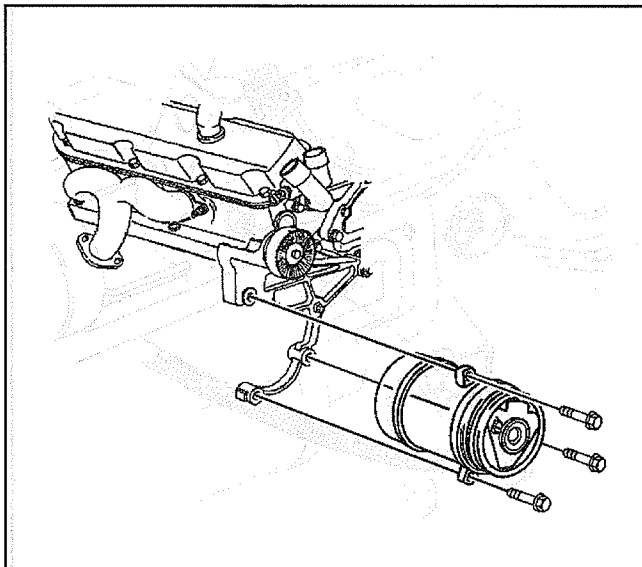
7. Remove the A/C compressor and condenser hose bolt.
8. Discard the O-ring.



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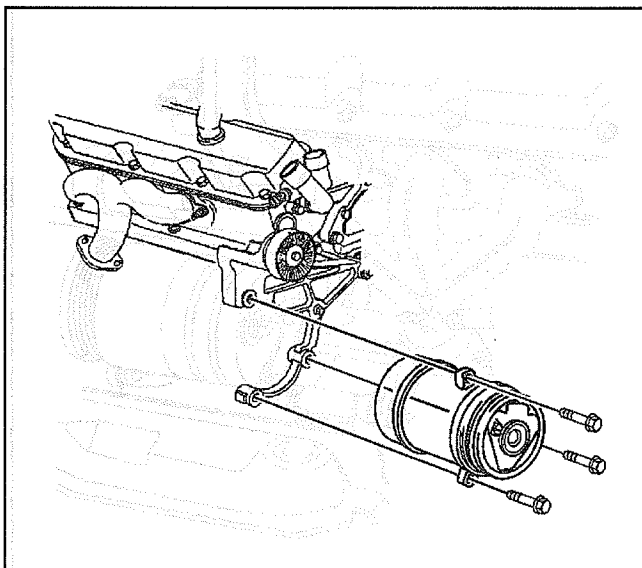


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9. Remove the A/C compressor rear bolts (2, 3).

10. Remove the A/C compressor bolts.

11. Remove the A/C compressor.

Installation Procedure

Important: NEW A/C compressors are shipped WITHOUT poly-alkylene glycol (PAG) oil.

1. If a NEW A/C compressor is being installed, add 60 ml (2 oz) of PAG oil to the compressor.
2. If reinstalling the old A/C compressor perform the following:
 - 2.1. Drain, measure and record the amount of PAG oil in the A/C compressor.
 - 2.2. If the measured amount of PAG oil drained is less than or equal to 60 ml (2 oz), add 60 ml (2 oz) of new, clean PAG oil to the A/C compressor.
 - 2.3. If the measured amount of PAG oil drained is greater than 60 ml (2 oz), add the same amount of new, clean PAG oil to the A/C compressor.

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

- 2.4. Install the compressor crankcase oil drain bolt to the replacement compressor.

Tighten

Tighten the compressor crankcase oil drain bolt to 20 N·m (15 lb ft).

3. Install the A/C compressor.
4. Install the A/C compressor bolts.

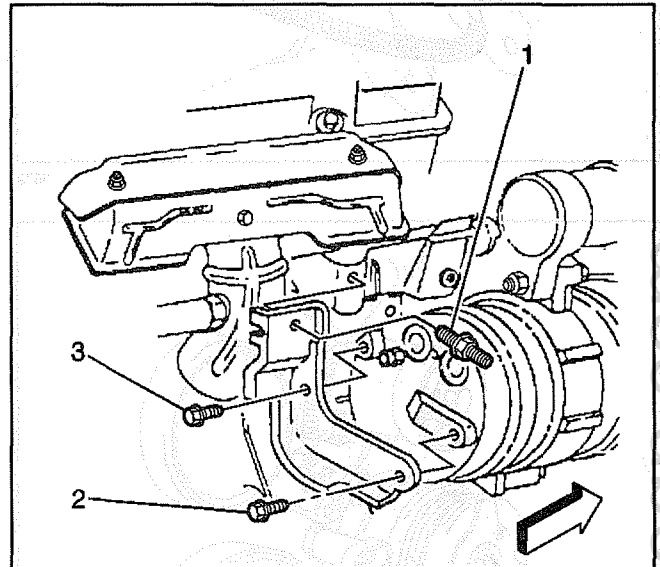
Tighten

Tighten the A/C compressor bolts to 50 N·m (37 lb ft).

5. Install the A/C compressor rear bolts (2, 3).

Tighten

Tighten the A/C compressor rear bolts (2, 3) to 30 N·m (22 lb ft).



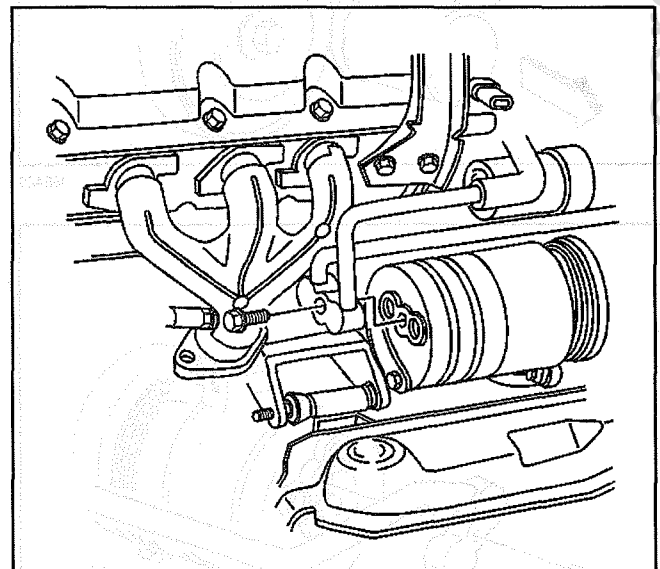
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6. Install a new O-ring.
Lightly coat the O-ring with a mineral base 525 viscosity refrigerant oil.
7. Install the A/C compressor and condenser hose bolt.

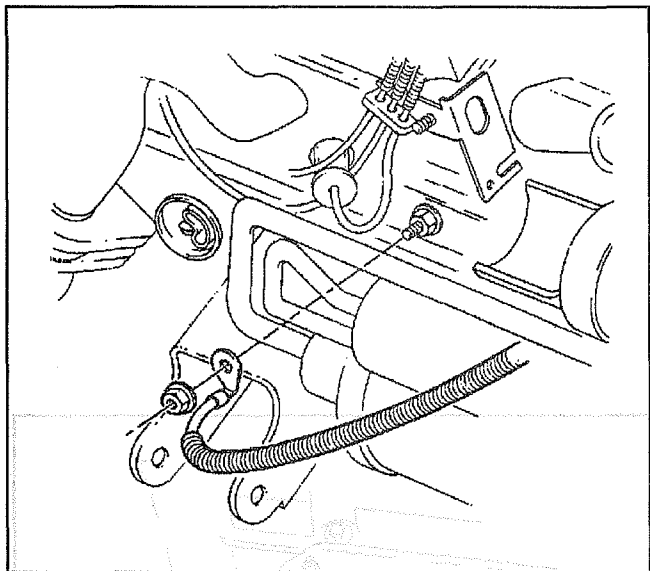
Tighten

Tighten the A/C compressor and condenser hose bolt to 33 N·m (24 lb ft).

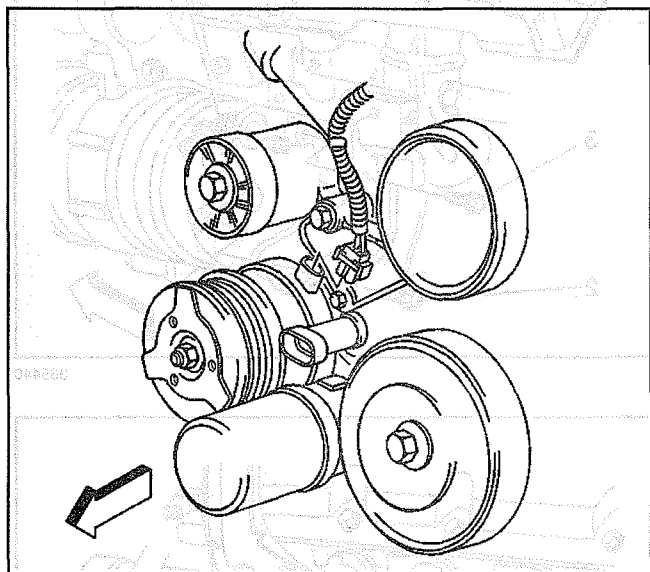
8. Lower the vehicle.



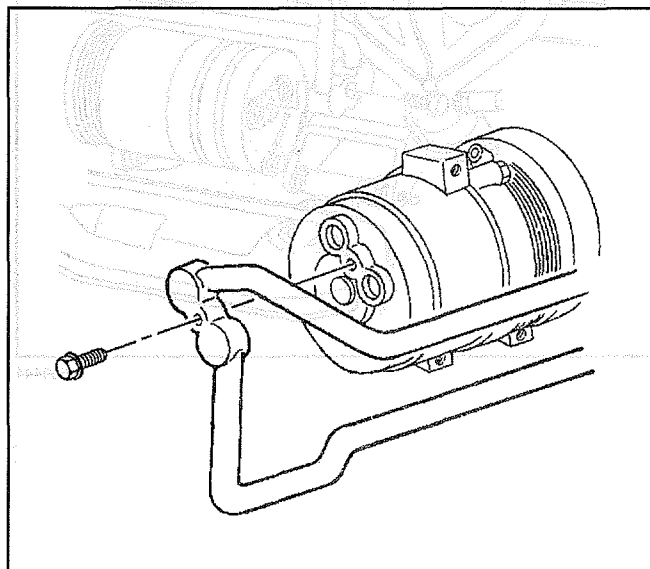
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9. Install the negative battery cable to the stud.
10. Install the negative battery cable nut to the engine block stud.

Tighten

Tighten the negative battery cable nut to the engine block stud to 25 N·m (18 lb·ft).

11. Connect the electrical connector at the A/C compressor.
12. Install the serpentine drive belt. Refer to *Drive Belt Replacement* in Engine Mechanical - 3.8 L.
13. Charge the A/C system. Refer to *Refrigerant Recovery and Recharging*.
14. Perform a leak test on the A/C system. Refer to *Leak Testing*.

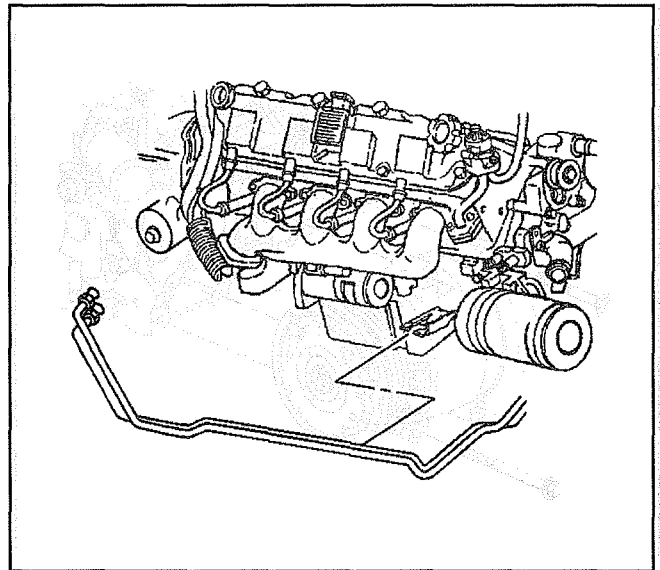
Compressor Replacement (5.7 L)

Removal Procedure

Important: Compressor related noise is generally air conditioning (A/C) system related and not always the compressor itself. Prior to replacing the compressor, refer to *Noise Diagnosis - A/C System*.

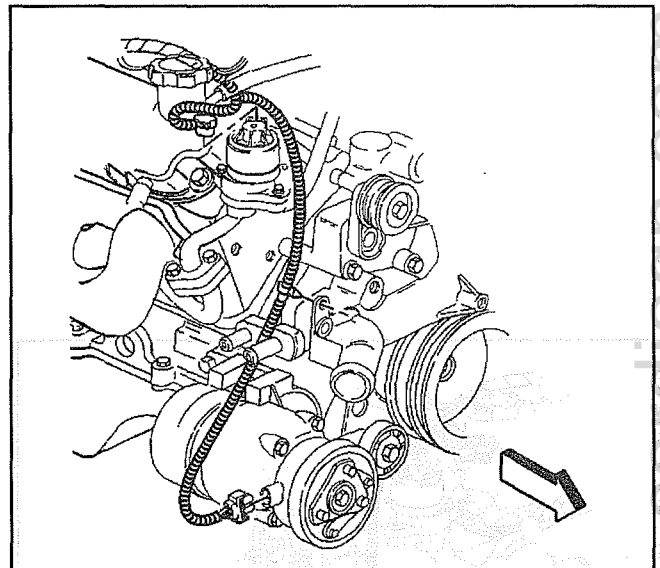
1. Recover the refrigerant. Refer to *Refrigerant Recovery and Recharging*.
2. Raise and suitably support the vehicle. Refer to *Lifting and Jacking the Vehicle* in General Information.
3. Remove the serpentine drive belt. Refer to *Drive Belt Replacement - A/C* in Engine Mechanical - 5.7 L.
4. Remove the air conditioning (A/C) compressor and condenser hose bolt.
5. Discard the O-ring.

6. Remove the transmission oil cooler pipes from the engine bracket, if necessary.



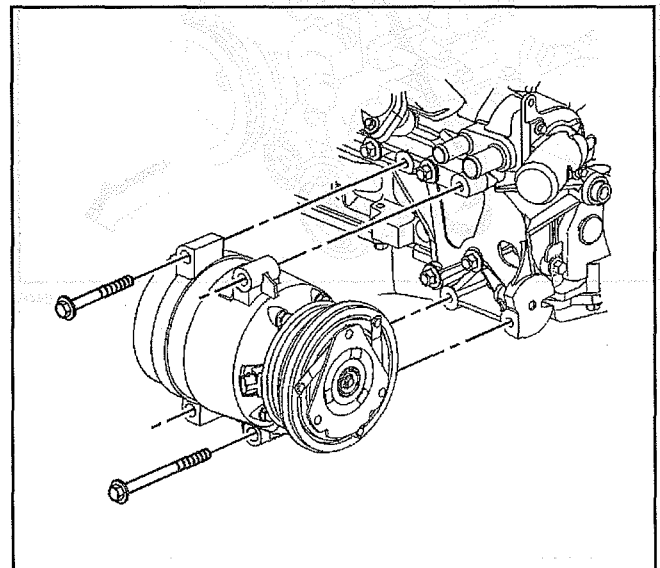
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7. Disconnect the electrical connector from the A/C compressor.

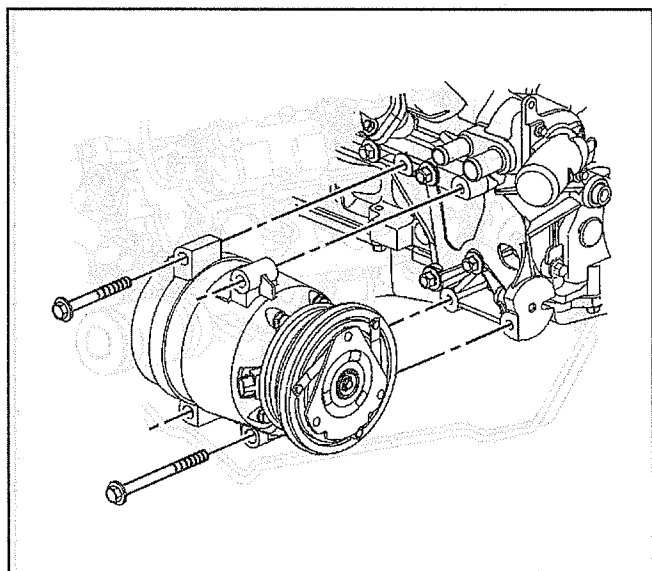


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8. Remove the A/C compressor bolts.
9. Remove the A/C compressor.



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Installation Procedure

Important: NEW A/C compressors are shipped WITHOUT poly-alkylene glycol (PAG) oil.

1. If a NEW A/C compressor is being installed, add 60 ml (2 oz) of PAG oil to the compressor.
2. If reinstalling the old A/C compressor perform the following:
 - 2.1. Drain, measure and record the amount of PAG oil in the A/C compressor.
 - 2.2. If the measured amount of PAG oil drained is less than or equal to 60 ml (2 oz), add 60 ml (2 oz) of new, clean PAG oil to the A/C compressor.
 - 2.3. If the measured amount of PAG oil drained is greater than 60 ml (2 oz), add the same amount of new, clean PAG oil to the A/C compressor.

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

- 2.4. Install the compressor crankcase oil drain bolt (1) to the replacement compressor.

Tighten

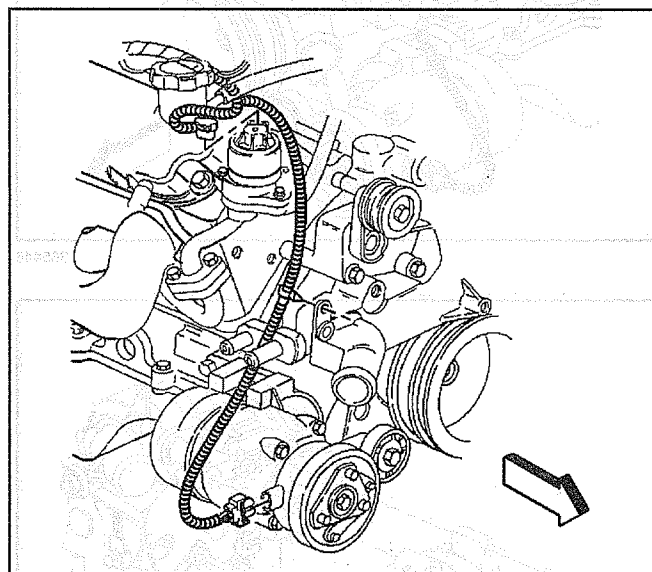
Tighten the compressor crankcase oil drain bolt (1) to 20 N·m (15 lb ft).

3. Install the A/C compressor.
4. Install the A/C compressor bolts.

Tighten

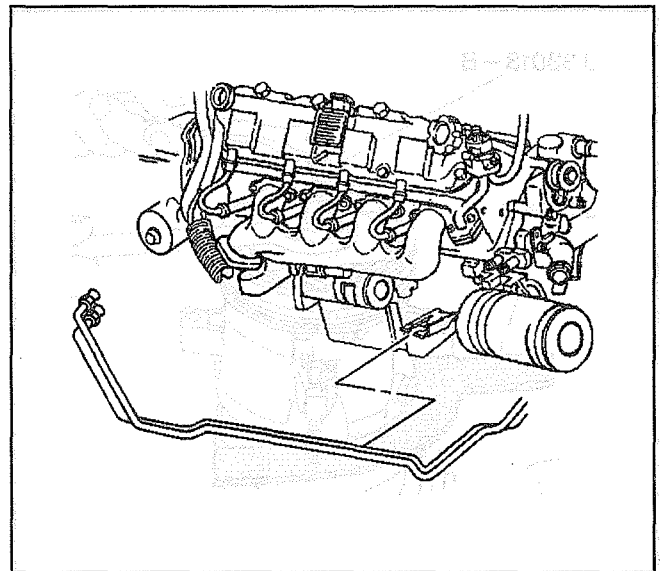
Tighten the A/C compressor bolts to 50 N·m (37 lb ft).

5. Connect the electrical connector to the A/C compressor.



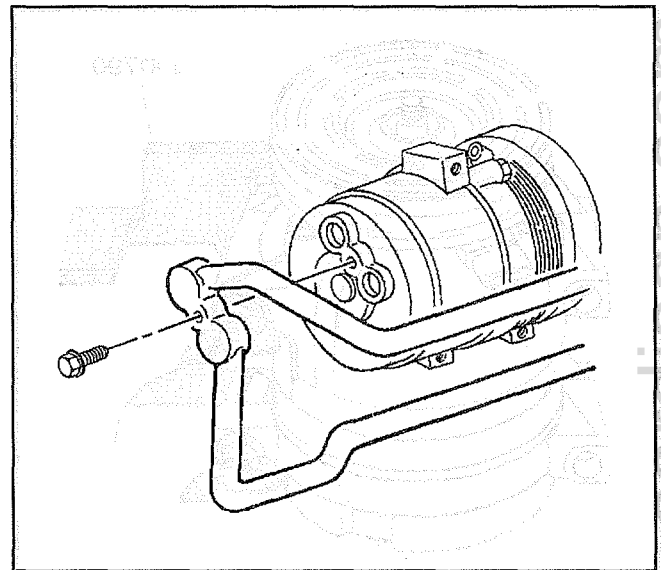
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6. Install the transmission oil cooler pipes to the engine bracket, if removed.



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7. Install a new O-ring.
Lightly coat the O-ring with a mineral base 525 viscosity refrigerant oil.
8. Install the A/C compressor and condenser hose bolt.
Tighten
Tighten the A/C compressor and condenser hose bolt to 33 N·m (24 lb ft).
9. Install the serpentine drive belt. Refer to *Drive Belt Replacement - A/C* in Engine Mechanical 5.7 L.
10. Lower the vehicle.
11. Recharge the A/C system. Refer to *Refrigerant Recovery and Recharging*.
12. Perform a leak test on the A/C system. Refer to *Leak Testing*.



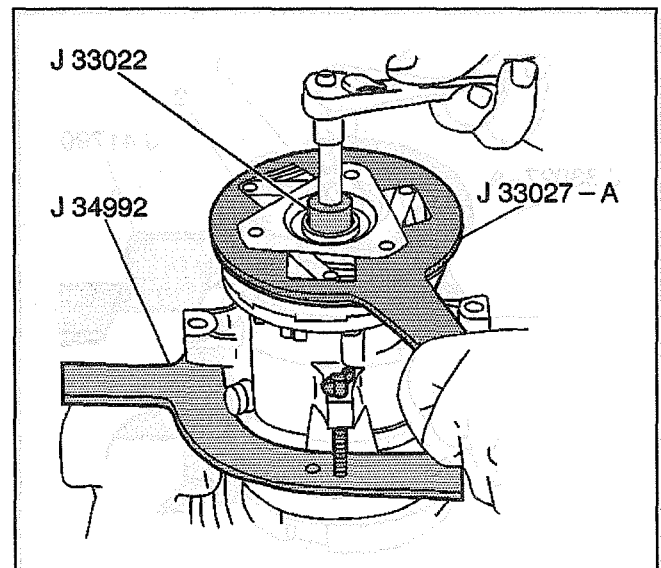
365448

Compressor Clutch Plate and Hub Assembly Removal (V5 - Conventional Mount)

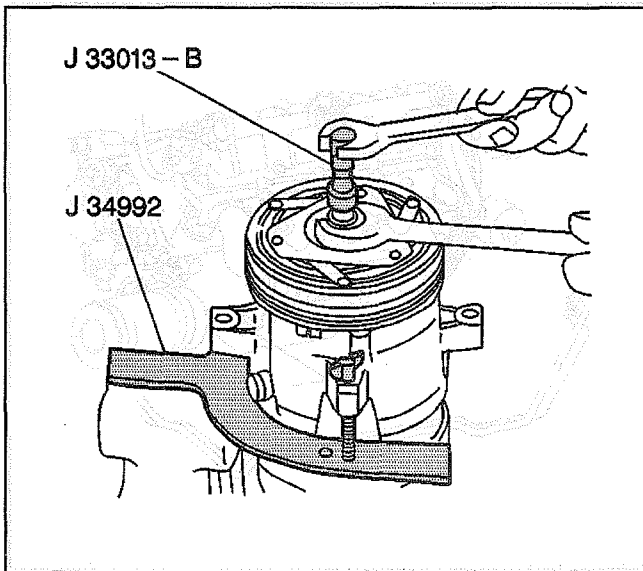
Tools Required

- J 33022 Shaft Nut Socket
- J 33027-A Clutch Hub Holding Tool
- J 33013-B Hub And Drive Plate Remover And Installer
- J 34992 Compressor Holding Fixture

1. Clamp the J 34992 in a vise.
2. Attach the compressor to the holding fixture using the thumb screws.
3. Use the J 33027-A in order to prevent the clutch hub and drive plate assembly from turning.
4. Use the J 33022 in order to remove the shaft nut.

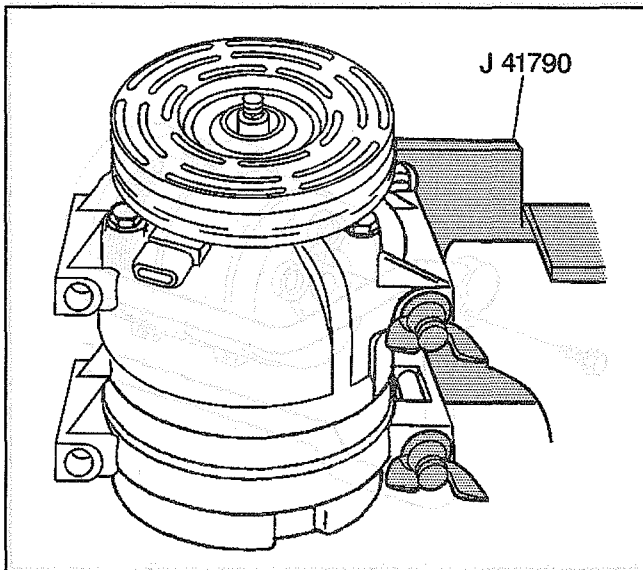


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5. Thread the *J 33013-B* into the hub.
6. Use a wrench in order to hold the body of the *J 33013-B*.
7. Turn the center screw into the body of the *J 33013-B* in order to remove the clutch plate and hub assembly.
8. Remove the shaft key. Retain the shaft key for reassembly.



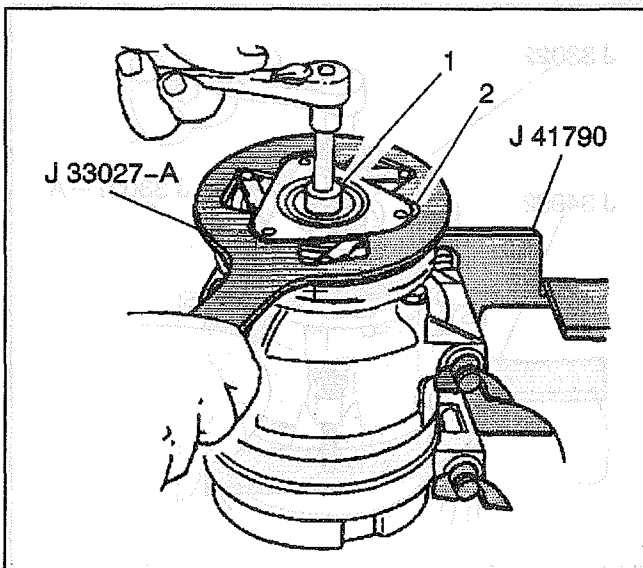
157595

Compressor Clutch Plate and Hub Assembly Removal (V7 - Direct Mount)

Tools Required

- *J 33013-B* Hub and Drive Plate Remover/Installer
- *J 33027-A* Clutch Hub Holding Tool
- *J 41790* Compressor Holding Fixture

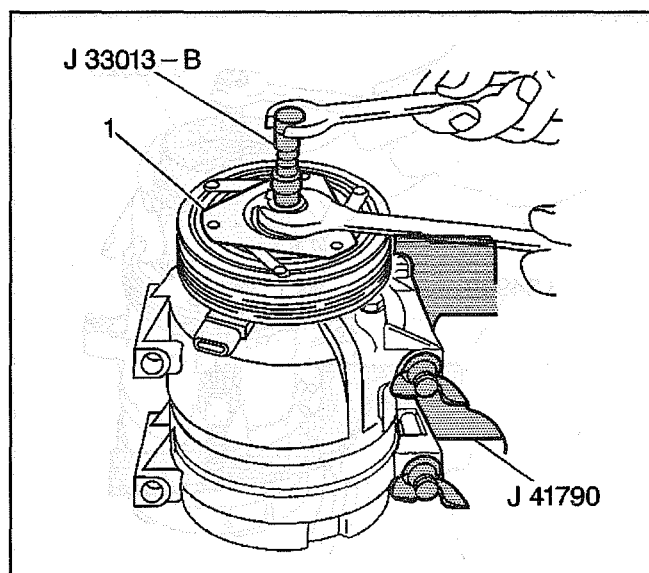
1. Remove the compressor from the vehicle.
2. Clamp the compressor holding fixture, *J 41790* in a vise and attach the compressor to the *J 41790*.



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3. Hold the clutch hub and drive plate assembly (2) in place using the *J 33027-A*.
4. Remove the compressor shaft nut with a 13 mm socket (1).

5. Thread the *J 33013-B* into the hub.
6. Remove the hub and drive plate assembly (1) by turning the center screw into the body of the *J 33013-B* and against the compressor shaft.
7. Remove the shaft key and retain for reassembly.

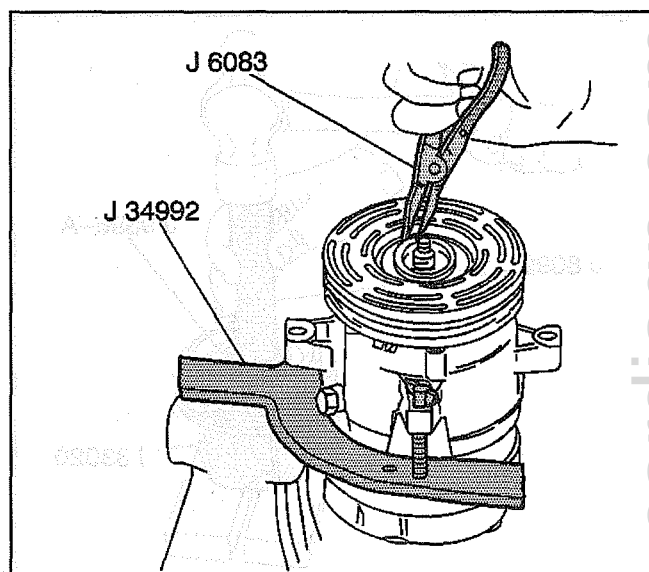


157221

Clutch Rotor and/or Bearing Removal (V5 - Conventional Mount)

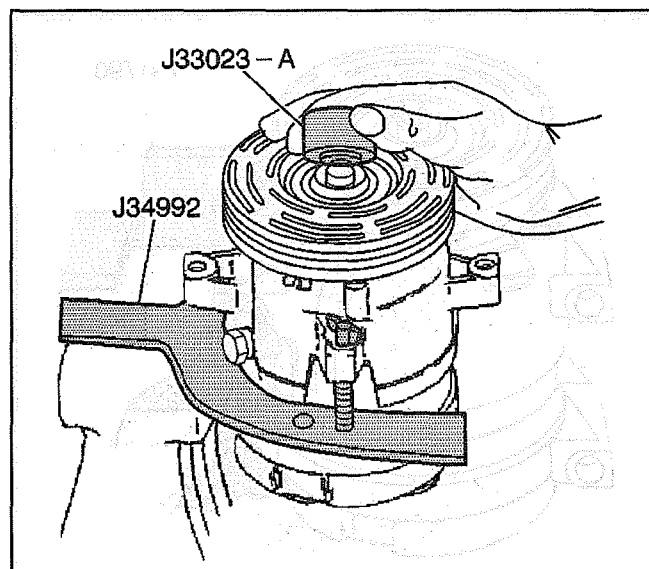
Tools Required

- *J 6083* Snap Ring Pliers
 - *J 9398* Bearing Remover
 - *J 8092* Driver Handle
 - *J 33020* Pulley Puller
 - *J 33023-A* Puller Pilot
1. Remove the clutch plate and hub assembly. Refer to *Compressor Clutch Plate and Hub Assembly Removal (V5 - Conventional Mount)*.
 2. Use the *J 6083* in order to remove the rotor and bearing assembly retaining ring.

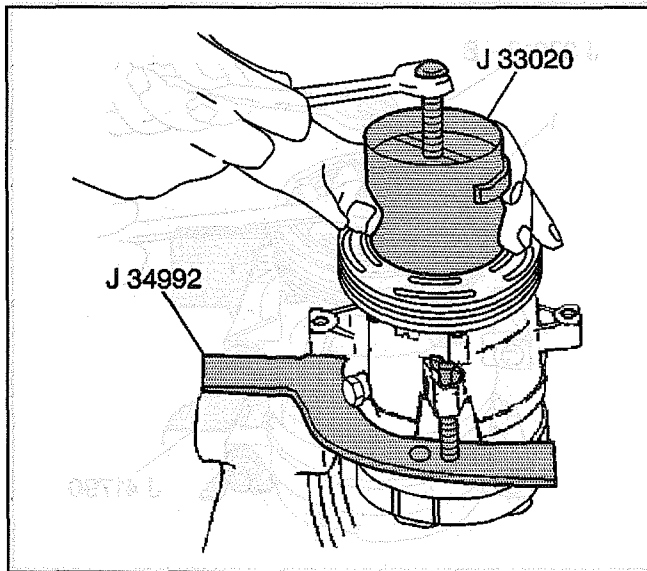


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3. Install the *J 33023-A* to the front head.

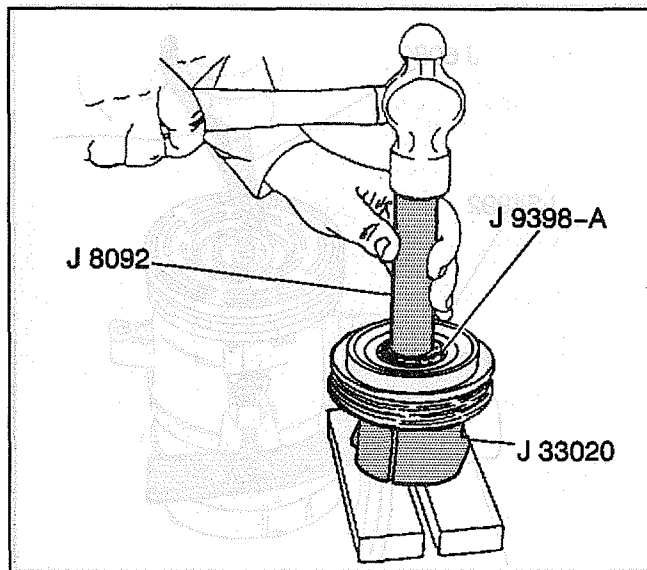


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4. Install the *J 33020* into the inner circle of slots in the rotor.
5. Turn the *J 33020* clockwise in the slots in order to engage the tangs of the puller with the segments between the slots in the rotor.
6. Hold the *J 33020* in place. Tighten the puller screw against the puller guide in order to remove the puller rotor and bearing assembly.

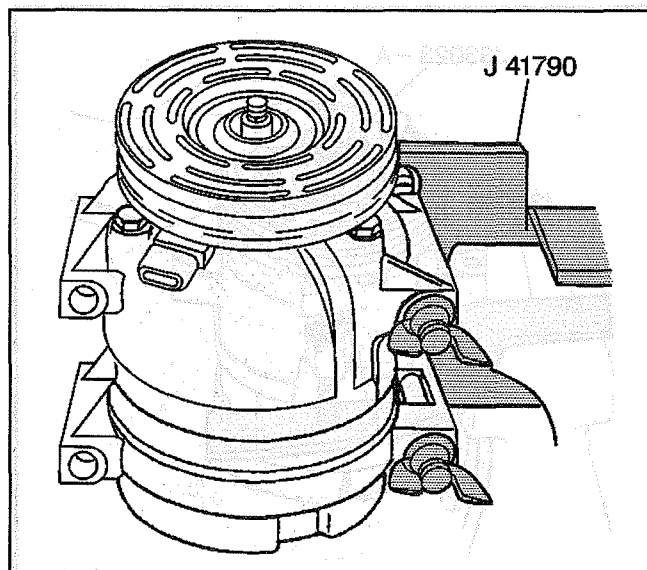


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7. Support the rotor hub in order to prevent damage to the pulley rotor during bearing removal.
 - 7.1. Remove the forcing screw from the *J 33020*.
 - 7.2. With the tangs of the *J 33020* still engaged in the rotor slots, invert the assembly onto a solid, flat surface or blocks.

Notice: It is not necessary to remove the staking in front of the bearing to remove the bearing, however, it will be necessary to file away the old stake metal for proper clearance for the new bearing to be installed into the rotor bore or the bearing may be damaged.

8. Use a *J 9398* with the *J 8092* in order to drive the bearing out of the rotor hub.



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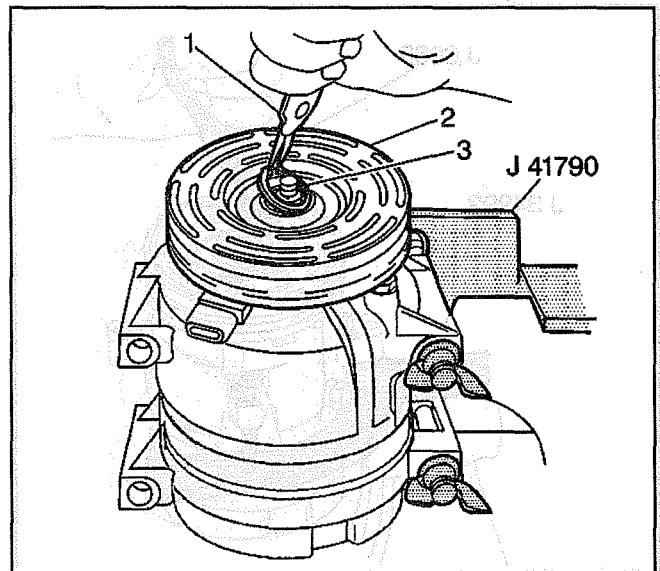
Clutch Rotor and/or Bearing Removal (V7 - Direct Mount)

Tools Required

- *J 33023-A* Puller Pilot
- *J 41552* Compressor Pulley Puller
- *J 41790* Compressor Holding Fixture

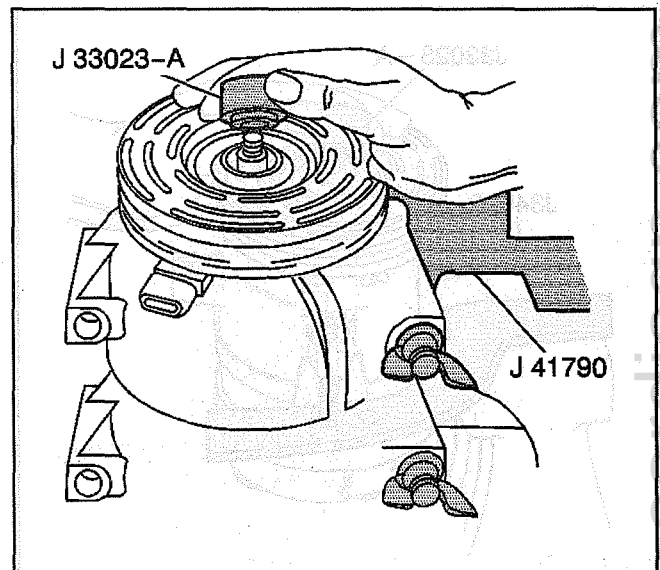
1. Remove the compressor from the vehicle.
2. Clamp the compressor holding fixture, *J 41790* in a vise and attach the compressor to the *J 41790*.

3. Remove the clutch plate and hub assembly. Refer to *Compressor Clutch Plate and Hub Assembly Removal (V7 - Direct Mount)*.
4. Using external snap ring pliers (1), remove the clutch rotor and bearing assembly retaining ring (3).



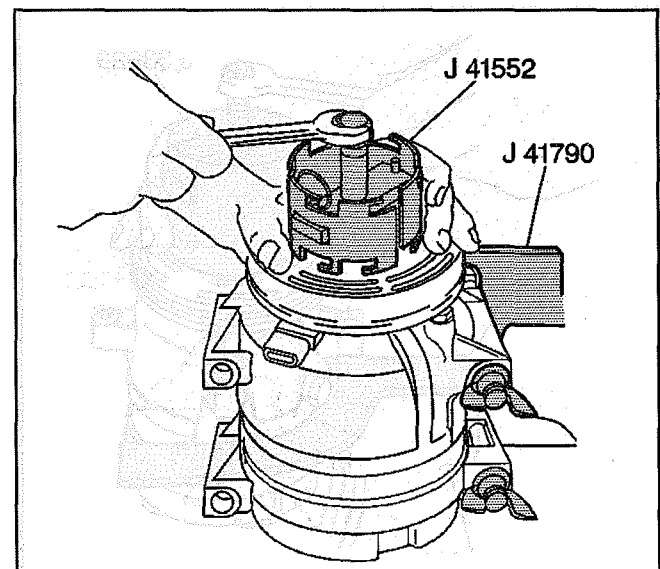
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5. Place the J 33023-A on the clutch rotor.

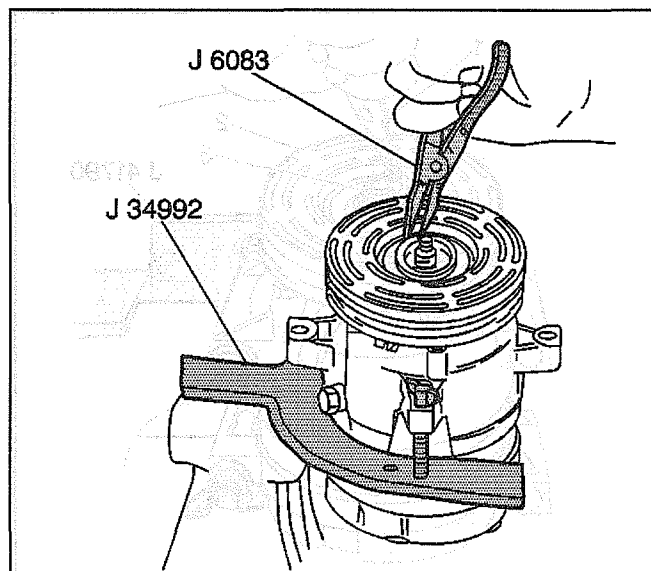


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6. Install the J 41552 down into the inner circle of slots in the rotor.
7. Turn the J 41552 clockwise in the slots to engage the puller tangs with the rotor.
8. Hold the J 41552 in place and use a wrench to turn the center forcing screw against the J 33023-A to remove the clutch rotor and bearing assembly.



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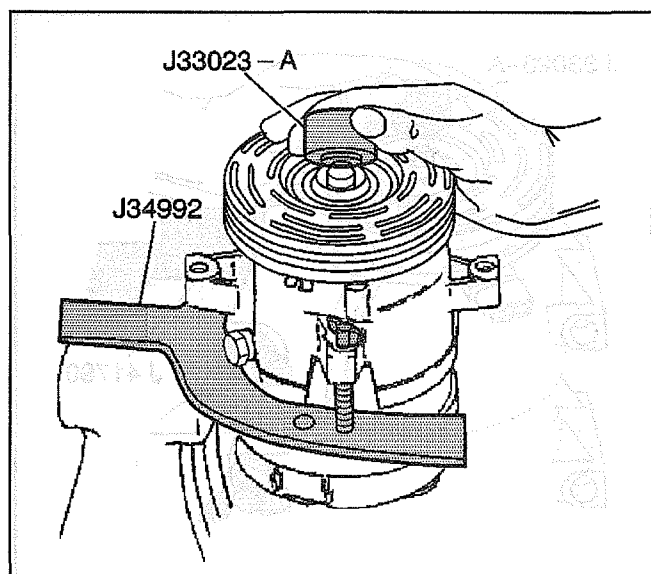


Compressor Clutch Coil Removal (V5 - Conventional Mount)

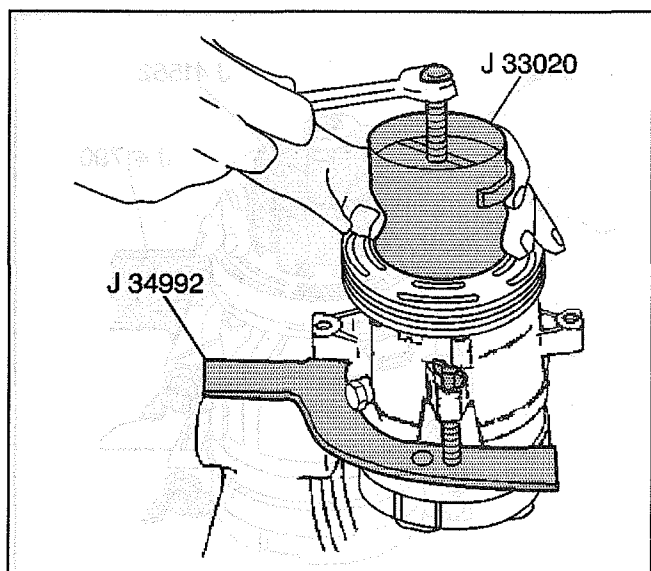
Tools Required

- J 6083 Snap Ring Pliers
- J 8433-1 Puller Bar
- J 8433-3 Forcing Screw
- J 33020 Pulley Puller
- J 33023-A Puller Pilot
- J 33025 Clutch Coil Puller Legs

1. Remove the clutch plate and hub assembly. Refer to *Compressor Clutch Plate and Hub Assembly Removal (V5 - Conventional Mount)*.
2. Use the J 6083 in order to remove the rotor and bearing assembly retaining ring.

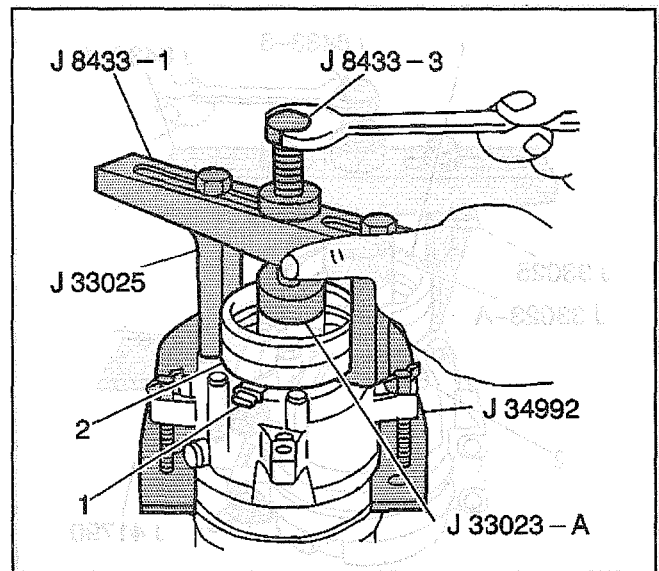


3. Install the J 33023-A to the front head.



4. Install the J 33020 into the inner circle of slots in the rotor.
5. Turn the J 33020 clockwise in the slots in order to engage the tangs of the puller with the segments between the slots in the rotor.
6. Hold the J 33020 in place. Tighten the puller screw against the puller guide in order to remove the puller rotor and bearing assembly.

7. Mark the location of the clutch coil terminal (1) on the compressor front head.
8. Install the *J 33023-A* on the front head of the compressor.
9. Install the *J 8433-1* and the *J 8433-3* with the *J 33025* on the front head of the compressor.
10. Tighten the *J 8433-3* against the *J 33023-A* in order to remove the clutch coil (2).



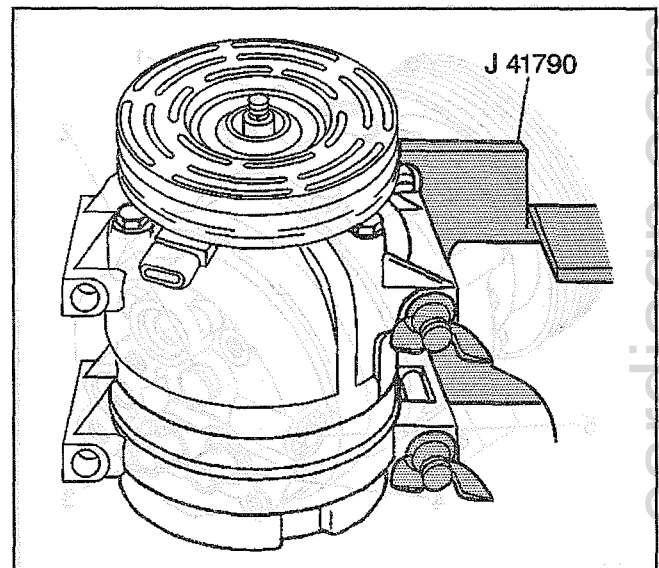
237123

Compressor Clutch Coil Removal (V7 - Direct Mount)

Tools Required

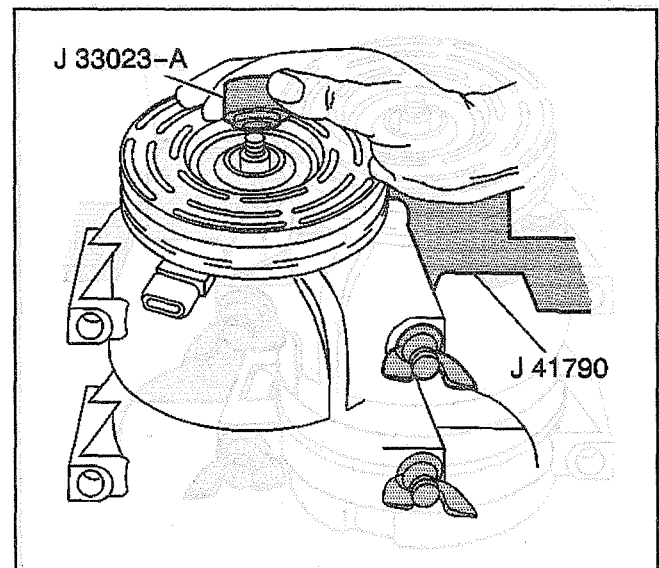
- *J 8433* Compressor Pulley Puller
- *J 8433-3* Forcing Screw
- *J 33023-A* Puller Pilot
- *J 33025* Clutch Coil Puller Legs
- *J 41790* Compressor Holding Fixture

1. Remove the compressor from the vehicle.
2. Clamp the compressor holding fixture, *J 41790* in a vise and attach the compressor to the *J 41790*.

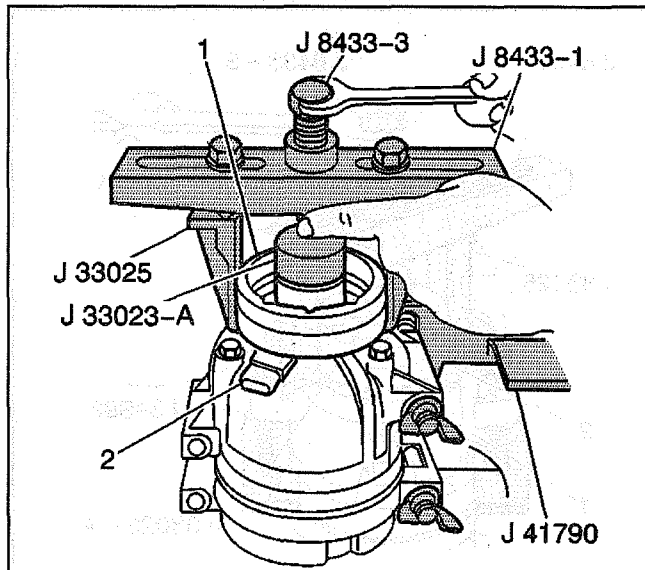


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3. Remove the compressor clutch plate and hub assembly. Refer to *Compressor Clutch Plate and Hub Assembly Removal (V7 - Direct Mount)*.
4. Install the *J 33023-A* onto the front head of the compressor.
5. Remove the compressor rotor and bearing assembly. Refer to *Clutch Rotor and/or Bearing Removal (V7 - Direct Mount)*.

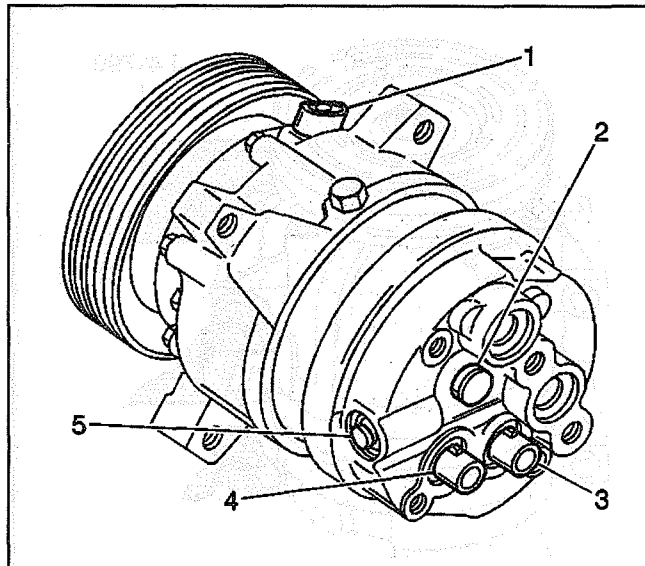


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6. Mark the clutch coil terminal location (2) on the compressor front head.
7. Install the *J 33025* onto the *J 8433*.
8. Install the *J 8433* onto the compressor clutch coil (1) and tighten the puller leg bolts.
9. Tighten the center forcing screw *J 8433-3* of the compressor pulley puller *J 8433* against the *J 33023-A* to remove the compressor clutch coil from the compressor.
10. Remove the *J 8433-3*, the *J 33023-A*, the *J 33025* and the *J 8433*.



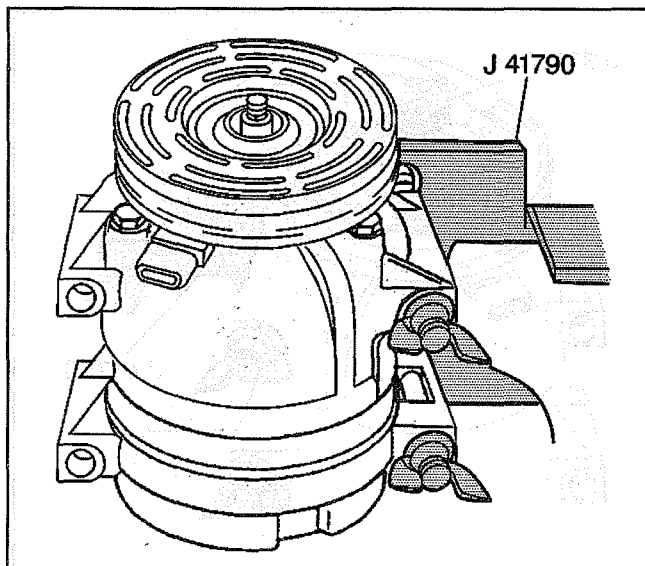
237069

Compressor Control Valve Assembly Removal (V5 - Conventional Mount)

Tools Required

- *J 5403* Snap Ring Pliers
- *J 39500-B* A/C Refrigerant Recovery, Recycling and Recharging (ACR4) System

1. Recover the refrigerant using the *J 39500-B*.
2. Remove the control valve retaining ring using the *J 5403*.
3. Remove the control valve assembly (5).



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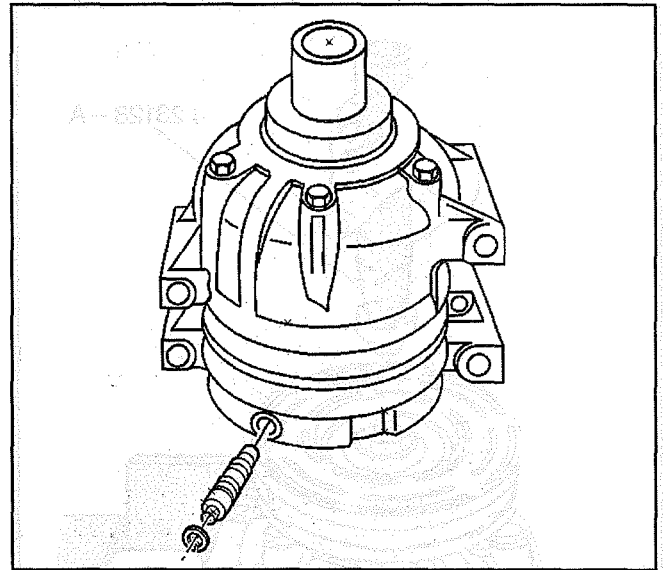
Compressor Control Valve Assembly Removal (V7 - Direct Mount)

Tools Required

J 41790 Compressor Holding Fixture

1. Remove the compressor from the vehicle.
2. Clamp the compressor holding fixture, *J 41790* in a vise and attach the compressor to the *J 41790*.

3. Using internal snap ring pliers, remove the compressor control valve retaining ring.
4. Remove the compressor control valve from the compressor.



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Compressor Shaft Seal Removal (V5 - Conventional Mount)

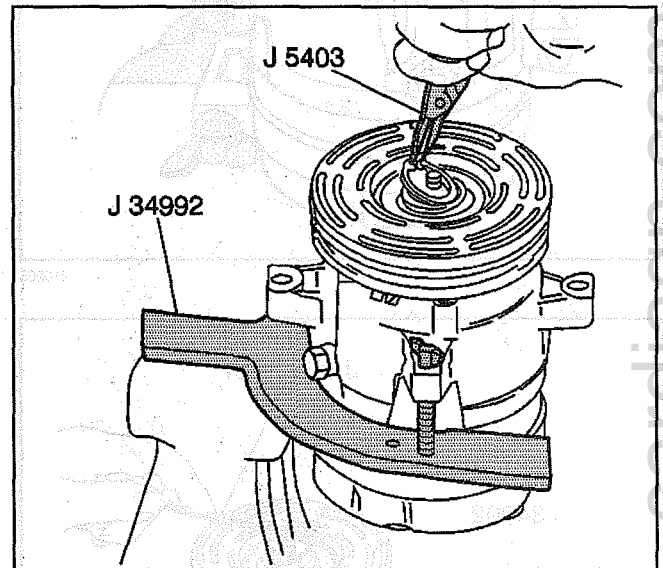
Tools Required

- J 34992 Compressor Holding Fixture
- J 39400-A Electronic Halogen Leak Detector
- J 9553-01 O-Ring Remover
- J 5403 Snap Ring Pliers
- J 23128-A Seal Seat Installer and Remover

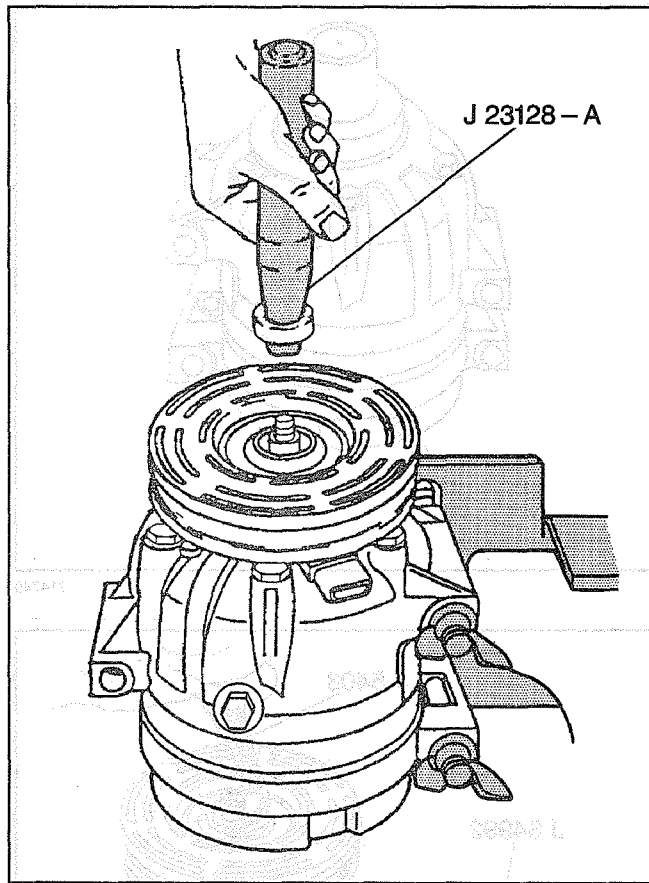
Important: Do not change a shaft seal because of small amounts of oil found on an adjacent surface. The seal allows some oil to pass for lubrication purposes. Change the shaft seal when the following conditions exist:

- A large amount of sprayed oil is found.
- Actual refrigerant leak is found; using a J 39400-A or equivalent.

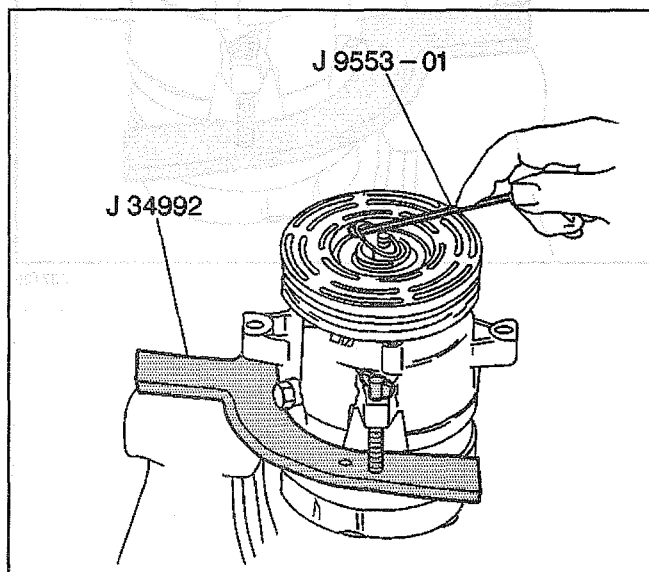
1. Install the compressor into the J 34992.
2. Remove the clutch plate and hub assembly. Refer to *Compressor Clutch Plate and Hub Assembly Removal (V5 - Conventional Mount)*.
3. Remove the shaft seal retaining ring using the J 5403.
4. In order to prevent dirt or foreign material from damaging the compressor, thoroughly clean the following parts:
 - The inside of the compressor neck area surrounding the shaft
 - The exposed portion of the seal
 - The compressor shaft
 - The O-ring groove



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Important: Securely hand-tighten the handle of the J 23128-A. Do not use a wrench or pliers.

5. Fully engage the knurled tangs of the J 23128-A into the recessed portion of the seal by turning the handle clockwise.
6. Remove the seal from the compressor using a rotary-pulling motion. Discard the seal.

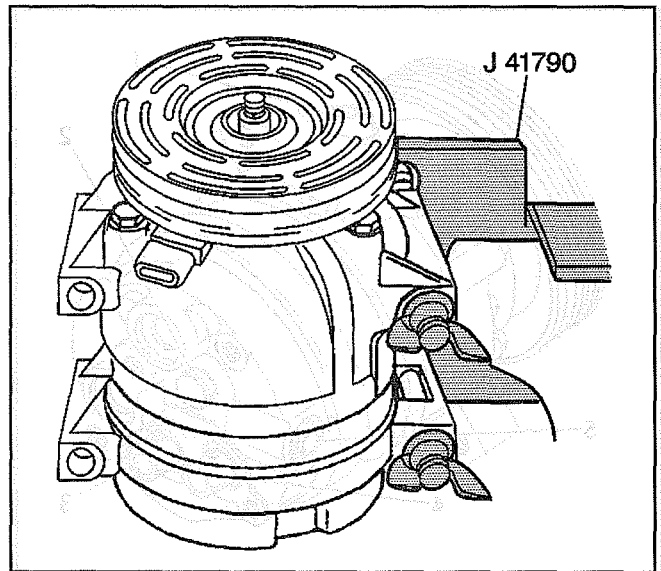
7. Remove the seal O-ring from the compressor neck using the J 9553-01. Discard the seal O-ring.
8. Inspect the shaft and the inside of the compressor neck again for dirt and foreign material.
9. Ensure that the shaft and the inside of the compressor neck are perfectly clean prior to installing new parts.

Compressor Shaft Seal Removal (V7 - Direct Mount)

Tools Required

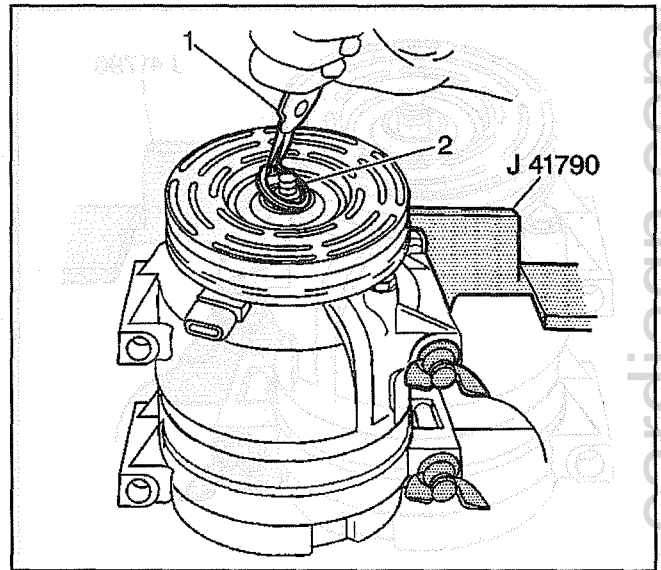
- J 41790 Compressor Holding Tool
- J 42136 A/C Lip Seal Remover (P/OA) prignisiceP

1. Remove the compressor from the vehicle.
2. Clamp the compressor holding fixture, J 41790 in a vise and attach the compressor to the J 41790.



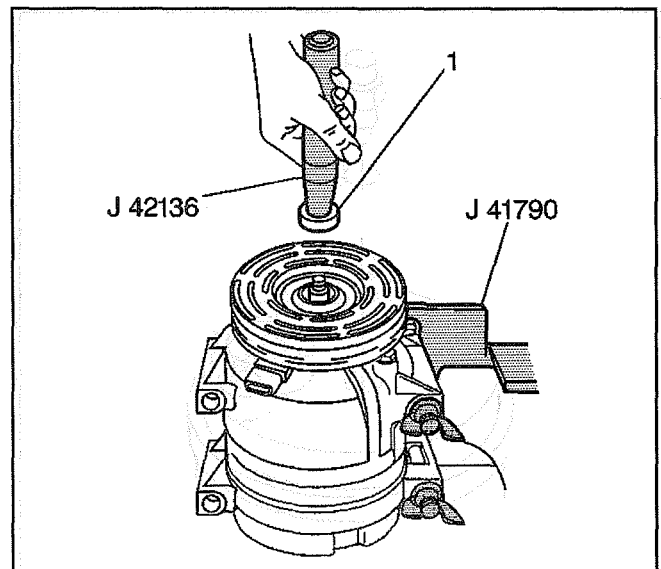
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3. Remove the compressor clutch plate and hub assembly. Refer to *Compressor Clutch Plate and Hub Assembly Removal (V7 - Direct Mount)*.
4. Using internal snap ring pliers (1), remove the compressor shaft seal retainer ring (2).
5. To keep any dirt or foreign material from getting into the compressor, thoroughly clean the following components:
 - The inside of the compressor neck area surrounding the shaft
 - The exposed portion of the compressor shaft seal
 - The compressor shaft
 - The O-ring groove

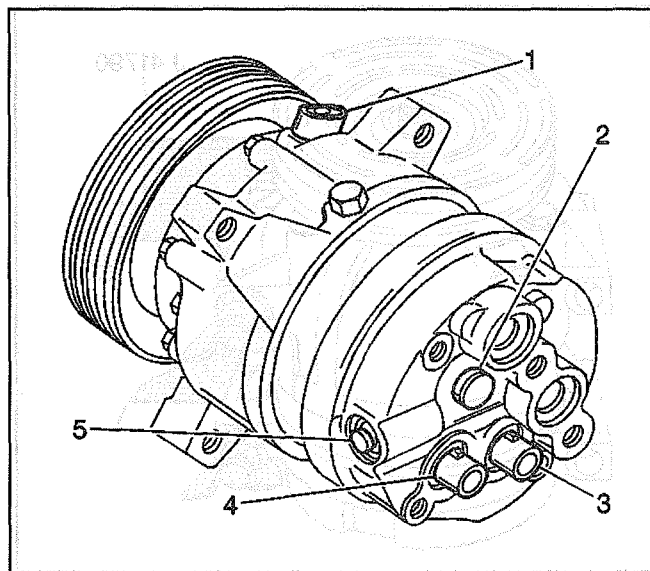


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6. Fully engage the lip of the J 42136 into the recessed portion of the seal (1) by turning the handle clockwise.
7. Remove the compressor shaft seal from the compressor with a rotary pulling motion.
8. Recheck the shaft and inside of the compressor neck for dirt or foreign material and make sure these areas are perfectly clean before installing the new compressor shaft seal.



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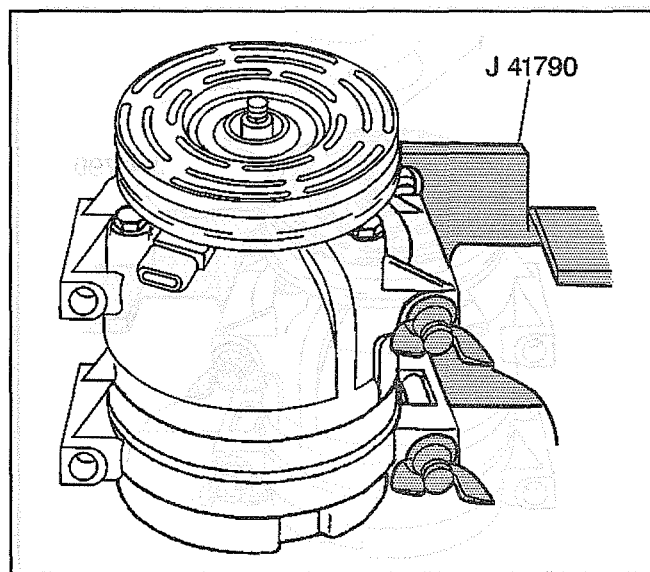
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Compressor Pressure Relief Valve Removal (V5 - Conventional Mount)

Tools Required

J 39500-B A/C Refrigerant Recovery, Recycling and Recharging (ACR4) System

1. Recover the refrigerant using the *J 39500-B*.
2. Remove the pressure relief valve (2).



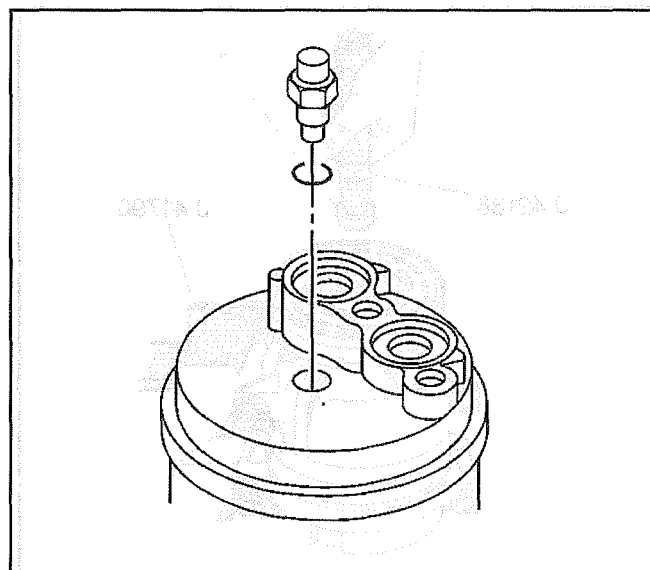
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Compressor Pressure Relief Valve Removal (V7 - Direct Mount)

Tools Required

J 41790 Compressor Holding Fixture

1. Remove the compressor from the vehicle.
2. Clamp the compressor holding fixture, *J 41790* in a vise and attach the compressor to the *J 41790*.



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3. Remove the pressure relief valve from the rear head of the compressor.

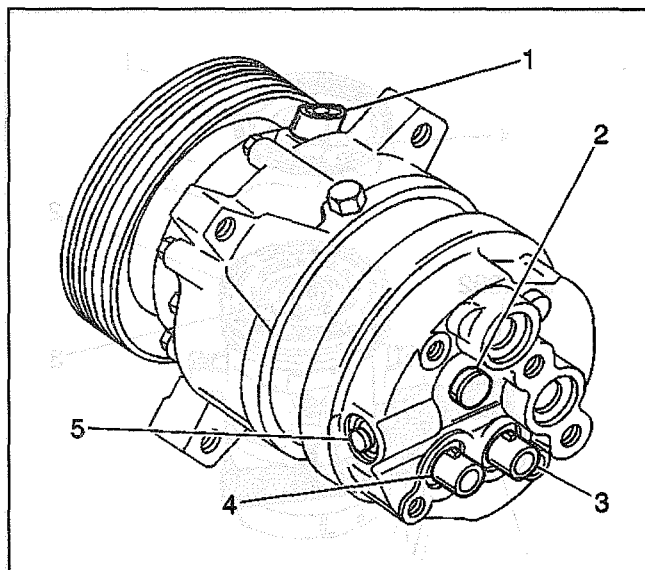
Compressor Control Switches Removal (V5 - Conventional Mount)

Tools Required

- J 5403 Snap Ring Pliers
 - J 9553-01 O-Ring Remover
 - J 39500-B R-134a Air Conditioning Refrigerant Recovery, Recycling And Recharging System
1. Recover the refrigerant using the J 39500-B.
 2. Disconnect the electrical connector from the switch (3 or 4) in the rear head of the compressor.
 3. Remove the switch retaining ring using the J 5403.
 4. Remove the switch (3 or 4) from the compressor.

Notice: If the existing switch will be reinstalled in the compressor, a new O-ring seal must be used and preferably a new retainer should also be used. A new switch kit has the O-ring and retainer ring included.

5. Remove the old O-ring seal from the switch cavity using the J 9553-01.



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Compressor Control Valve Assembly Install (V5 - Conventional Mount)

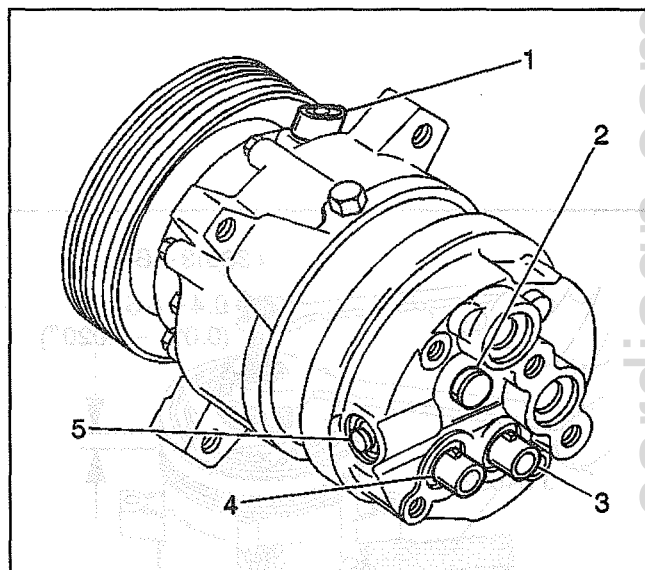
Tools Required

J 5403 Snap Ring Pliers

1. Coat the O-rings with 525 viscosity refrigeration oil.
2. Using thumb pressure, push the O-rings in place.

Important: Ensure that the retaining ring is properly seated in the ring groove.

3. Using the J 5403, install the valve retaining ring (5) with the high point of the curved sides against the valve housing.
4. Evacuate the system. Recharge the system.
5. Perform a leak test. Refer to *Compressor Leak Testing (V5 - Conventional Mount)*.



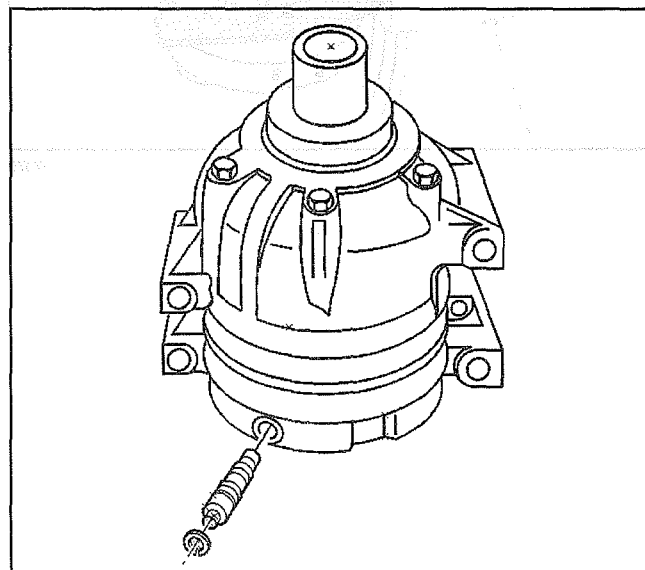
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Compressor Control Valve Assembly Install (V7 - Direct Mount)

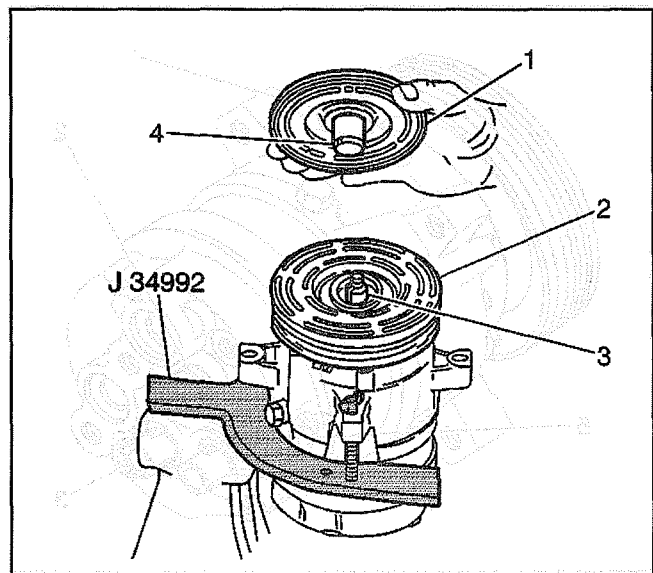
Tools Required

J 41790 Compressor Holding Fixture

1. Coat the control valve O-rings with clean 525 viscosity refrigeration oil.
2. Push the compressor control valve into the compressor with thumb pressure.
3. Using internal snap ring pliers, install the compressor control valve retaining ring. Make sure the retaining ring is properly seated in the ring groove.
4. Remove the compressor from the J 41790.
5. Install the compressor into the vehicle.



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Compressor Clutch Plate/Hub Assembly Install (V5 - Conventional Mount)

Tools Required

- J 33013-B Hub And Drive Plate Remover And Installer
- J 33022 Shaft Nut Socket
- J 33027-A Clutch Hub Holding Tool
- J 34992 Compressor Holding Fixture

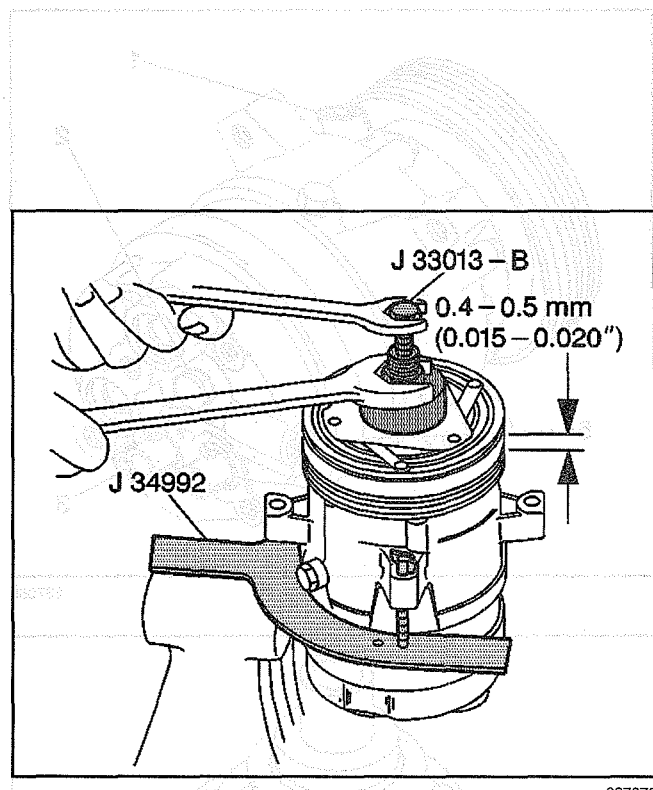
1. Install the compressor into the J 34992.
2. Install the shaft key (1) into the key groove of the clutch plate and hub (1).
 - Allow the key to project 3.2 mm (0.126 in) out of the key groove.
 - The shaft key is curved slightly in order to provide an interference fit in the key groove of the hub.
3. Clean the frictional surfaces of the clutch plate and hub and the clutch pulley rotor (2).
4. Align the shaft key with the shaft keyway (3).

Notice: Do not drive or pound on the clutch hub or the shaft. Internal damage to the compressor may result.

5. Place the clutch plate and hub assembly onto the compressor shaft.
6. Remove the center screw from the J 33013-B.
7. Reverse the body direction of the center screw of the J 33013-B.
8. Install the J 33013-B with the bearing.
9. Back off the body of the J 33013-B in order to allow the center screw to be threaded onto the end of the compressor shaft.
10. Hold the center screw of the J 33013-B with a wrench.

Notice: If the center screw is threaded fully onto the end of the compressor shaft, or if the body of the installer is held and the center screw is rotated, the key will wedge and will break the clutch hub.

11. Tighten the hex portion of the body of the J 33013-B in order to press the hub onto the shaft.
12. Tighten the body of the J 33013-B several turns.
13. Remove the J 33013-B.
14. Verify that the shaft key remains in the keyway before installing the clutch plate and hub assembly to the final position.
15. Ensure that the gap between the frictional surfaces of the clutch plate and the clutch rotor is within 0.40–0.50 mm (0.016–0.020 in).
16. Remove the J 33013-B.
17. Verify that the shaft key is even with or slightly above the clutch hub.
18. Install the shaft nut.
19. Hold the clutch plate and hub assembly with the J 33027-A.



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

20. Tighten the shaft nut against the crankshaft shoulder, using a 17.5 N·m (12.5 lb ft) torque wrench and the *J 33022*.

Tighten

Tighten the nut to 16.5 N·m (12 lb ft).

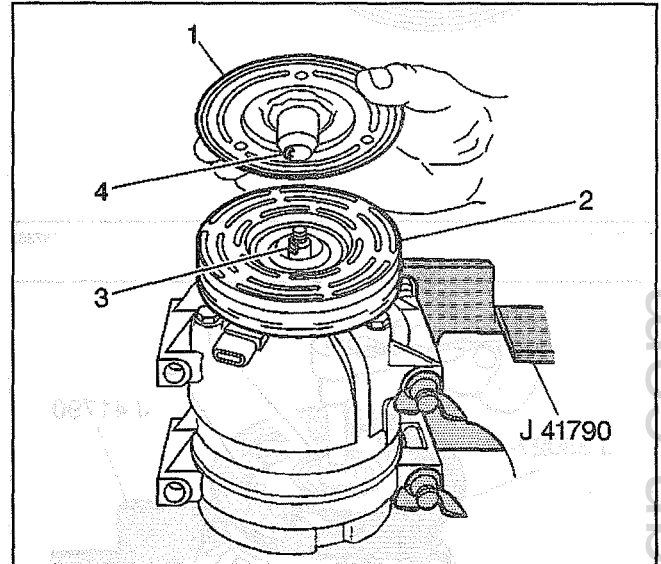
21. Spin the pulley rotor by hand in order to verify that the rotor does not rub the clutch drive plate.

Compressor Clutch Plate/Hub Assembly Install (V7 - Direct Mount)

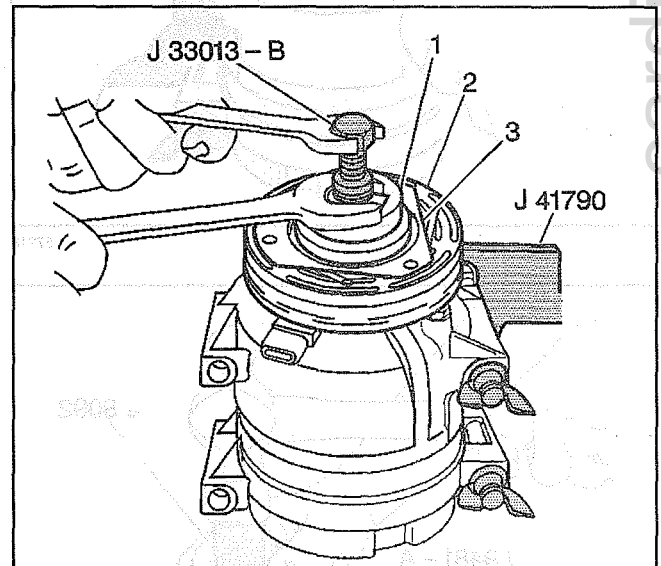
Tools Required

- *J 33013-B* Hub and Drive Plate Remover/Installer
- *J 33017* Pulley and Bearing Assembly Installer
- *J 33027-A* Clutch Hub Holding Tool

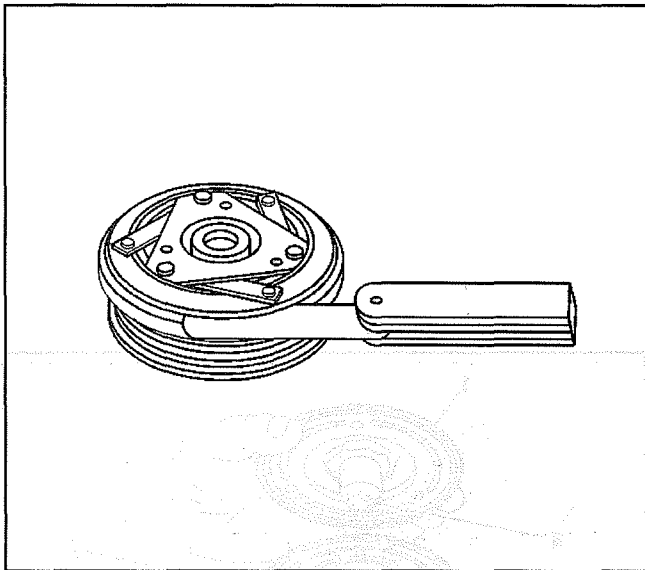
1. Install the shaft key into the hub key groove (4) approximately 3.2 mm (1/8 in) out of the keyway. The shaft key is curved slightly to provide an interference fit in the hub key groove.
2. Clean the surfaces of the clutch plate (1) and the clutch rotor (2) before installing the clutch plate and hub assembly.
3. Align the shaft key with the shaft keyway in the clutch plate and the hub assembly and place onto the compressor shaft (3).
4. Remove the *J 33013-B*.
 - 4.1. Remove the center screw from the body of the *J 33013-B*.
 - 4.2. Install the center screw into the opposite end of the *J 33013-B*.
5. Install the *J 33013-B* and bearing tools (1) onto the clutch plate (3) and the hub assembly (2).
 - 5.1. Back the body of the *J 33013-B* off enough to allow the center screw to be threaded onto the end of the compressor shaft.
 - 5.2. Thread the center screw several turns onto the end of the compressor shaft. Do not tighten the center screw on the compressor shaft.
6. Hold the center screw with a wrench.
 - 6.1. Tighten the hex portion of the *J 33013-B* body several turns.
 - 6.2. Remove the *J 33013-B* from the clutch plate and hub.
 - 6.3. Make sure that the shaft key is still in place in the keyway.
7. Reinstall the *J 33013-B*.



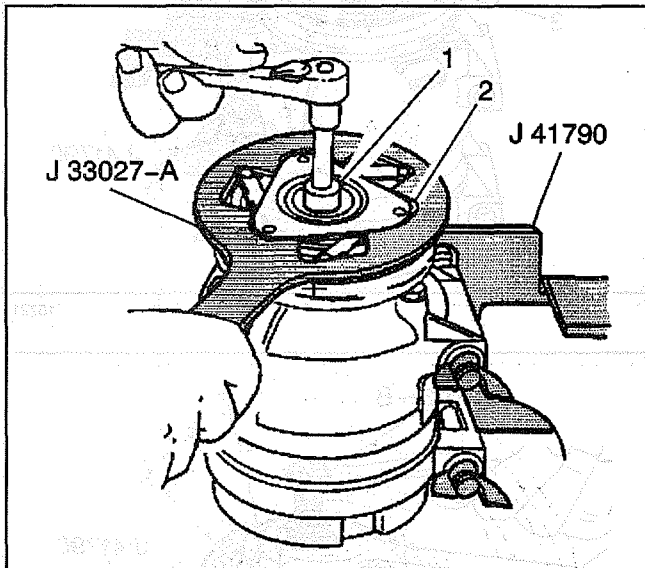
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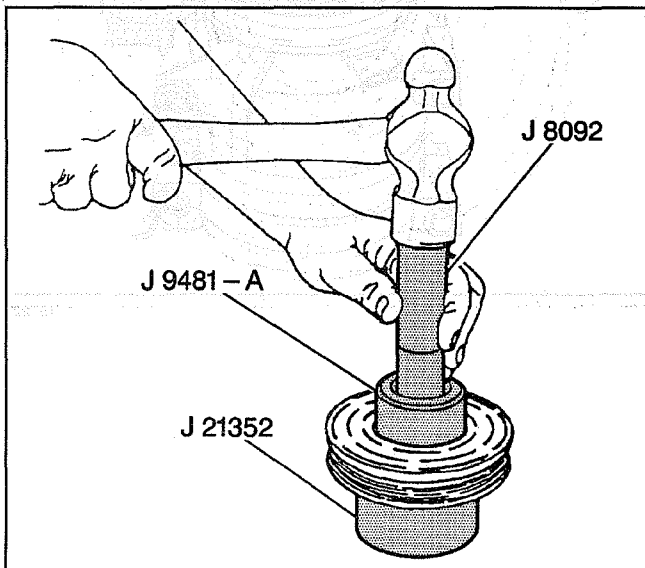
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8. Place a feeler gage between the clutch plate and the clutch rotor.

Important: Make sure that the air gap is even all around the clutch plate and hub assembly.

9. Tighten the hex portion of the *J 33013-B* until the air gap between the clutch plate and clutch rotor is 0.40 mm (0.015 in).

10. Remove the *J 33013-B*.
11. Hold the clutch plate and hub assembly (2) with the *J 33027-A*.
12. Install the compressor shaft nut.

Tighten

Tighten the compressor shaft nut to 17.5 N·m (13 lb ft).

13. Spin the pulley rotor by hand to make sure the rotor is not rubbing against the clutch drive plate.
14. Remove the compressor from the *J 41790*.
15. Install the compressor into the vehicle.

Clutch Rotor and/or Bearing Install (V5 - Conventional Mount)

Tools Required

- *J 6083* Snap Ring Pliers
- *J 8092* Driver Handle
- *J 8433-1* Puller Bar
- *J 8433-3* Forcing Screw
- *J 9481-A* Bearing Installer
- *J 21352-A* Support Block
- *J 33017* Pulley And Bearing Assembly Installer
- *J 33019* Bearing Staking Tool
- *J 33023-A* Puller Pilot
- *J 34992* Compressor Holding Fixture

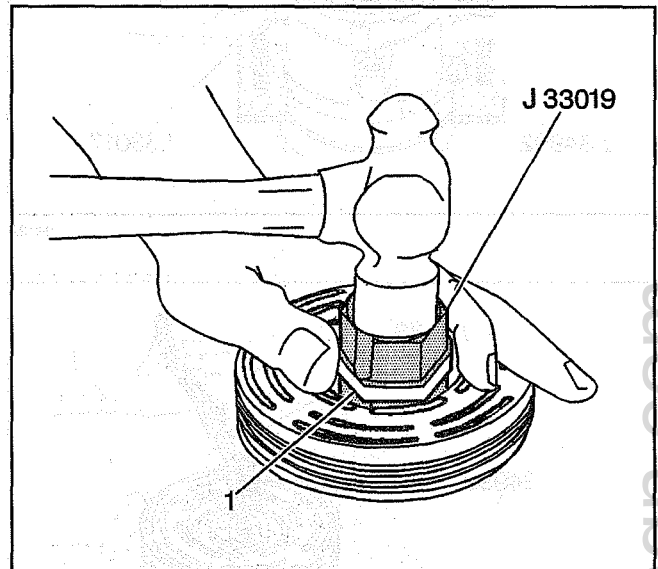
Notice: Do not support the rotor by resting the pulley rim on a flat surface during the bearing installation or the rotor face will be bent.

1. Place the pulley rotor on the *J 21352-A* in order to fully support the rotor hub during the bearing installation.
2. Align the new bearing with the hub bore.
3. Using the *J 9481-A* and the *J 8092*, drive the bearing into the hub.
The *J 9481-A* applies force to the outer race of the bearing.
4. Place the *J 33019* and the staking pin in the hub bore.
5. Shift the rotor and bearing assembly on the *J 21352-A* in order to fully support of the hub under the location of the staking pin.
6. Use a heavy-duty rubber band (1) in order to hold the stake pin in the guide of the *J 33019*.

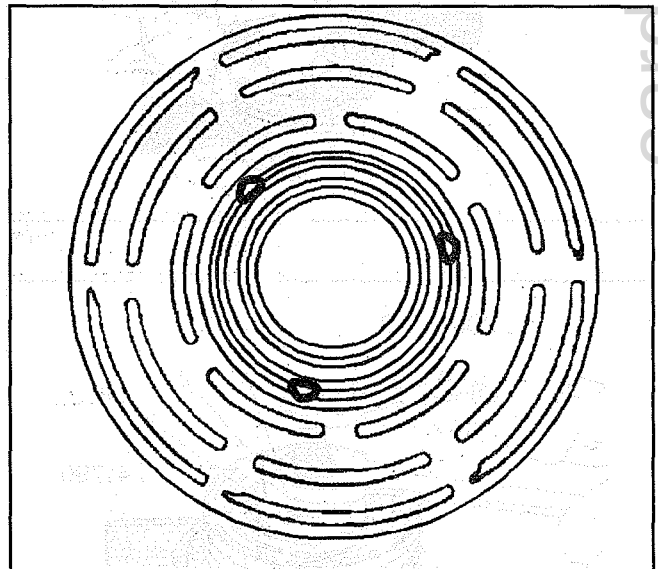
Important: Do not allow a metal stake to contact the outer face of the bearing in order to prevent distortion of the outer race.

7. Using care in order to prevent injury, strike the staking pin of the *J 33019*. Properly position the stake pin in the guide after each impact on the pin.
8. Continue to strike the pin of the *J 33019* until a stake, similar to the original stake, is formed down to, but not touching, the bearing.

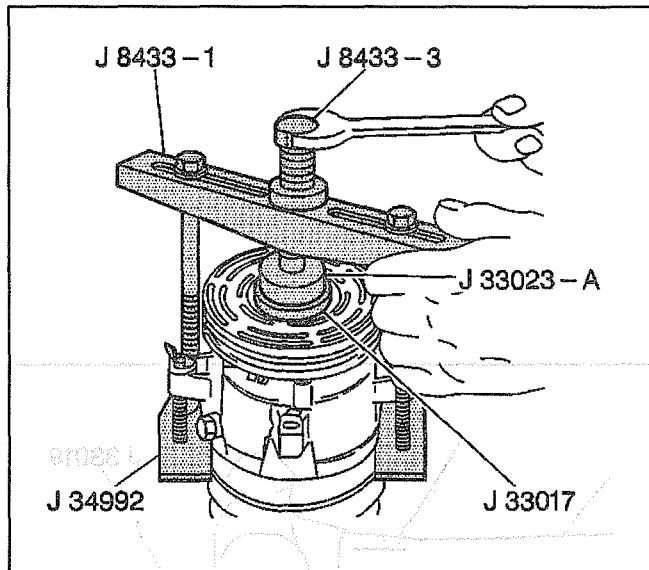
9. Stake three places 120 degrees apart.



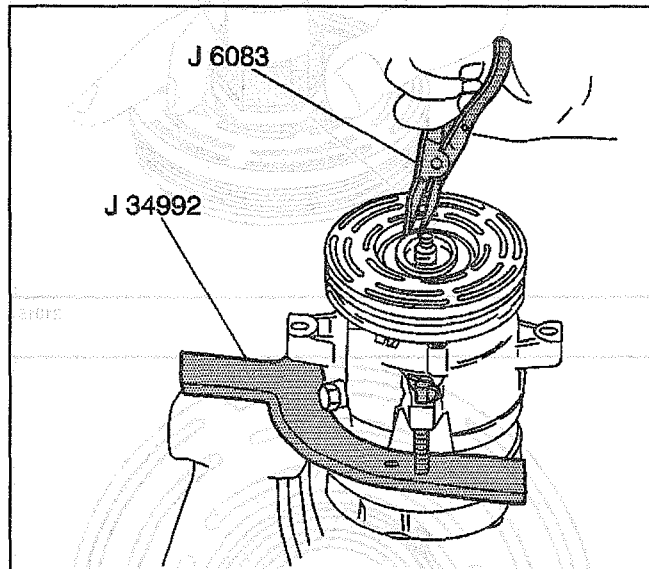
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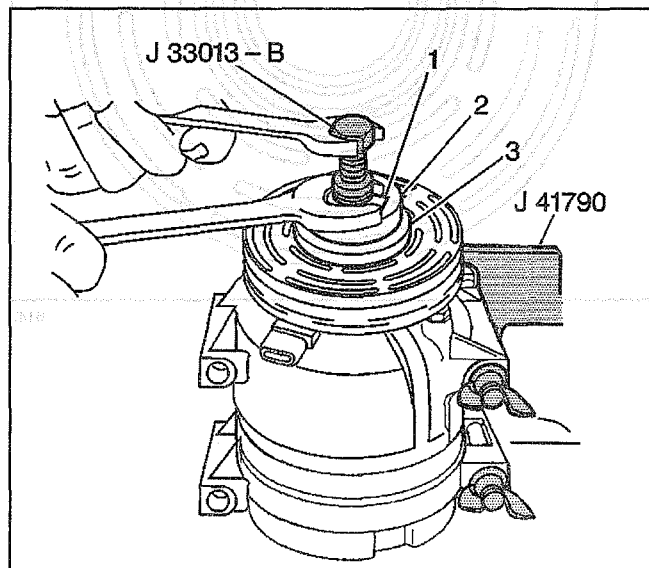
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10. With the compressor mounted to the J 34992, position the rotor and bearing assembly on the front head.
11. Position the J 33017 and the J 33023-A directly over the inner race of the bearing.
12. Position the J 8433-1 on the J 33023-A.
13. Assemble the two through bolts and the washers of the J 34992 through the slots of the J 8433-1.
14. Thread the two through bolts into the J 34992. Ensure that the thread of the through bolts engages the full thickness of the J 34992.
15. Tighten the J 8433-3 in the J 8433-1 in order to force the pulley rotor and bearing assembly onto the front head of the compressor.
16. If the J 33017 slips off direct, in-line contact with inner face of the bearing, use the following steps:
 - 16.1. Loosen the J 8433-3.
 - 16.2. Realign the J 33017 and the J 33023-A in order to ensure that the installer clears the front head.
17. Install the rotor and bearing assembly retainer ring using the J 6083.
18. Install the clutch plate and hub assembly. Refer to *Compressor Clutch Plate/Hub Assembly Install (V5 - Conventional Mount)*.

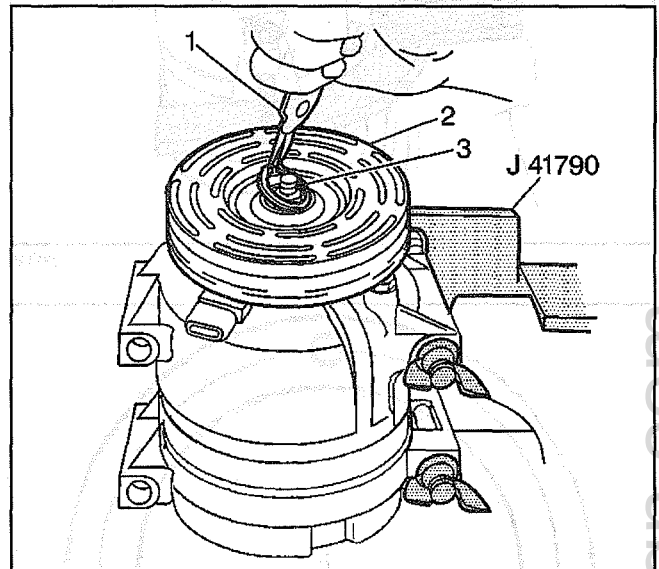
Clutch Rotor and/or Bearing Install (V7 - Direct Mount)

Tools Required

- J 33013-B Hub and Drive Plate Remover/Installer
- J 33017 Pulley and Bearing Assembly Installer

1. Position the clutch rotor and bearing assembly (2) onto the compressor.
2. Position the J 33017 and bearing (1) from the J 33013-B directly over the inner race of the bearing.
3. Place the washer (3) from the J 42126 tool kit onto the body of the J 33013-B.
4. Remove the center screw from the body of the J 33013-B.
5. Install the center screw into the opposite end of the J 33013-B.

6. Back the body of the *J 33013-B* off enough to allow the center screw to be threaded onto the end of the compressor shaft.
7. Thread the center screw several turns onto the end of the compressor shaft.
Do not tighten the center screw on the compressor shaft.
8. Hold the center screw with a wrench.
9. Tighten the hex portion of the *J 33013-B* body several turns.
10. Remove the *J 33013-B* from the clutch rotor and bearing assembly.
11. Make sure that the clutch rotor and bearing (2) is pressed onto the nose of the compressor far enough to clear the groove for the retaining ring.
If the clutch rotor and bearing does not clear the groove, repeat steps 7, 8 and 9.
12. Install the clutch rotor and bearing retaining ring (3) using external snap ring pliers (1).
Make sure that the camphor side of the retaining ring is facing up when the retaining ring is being installed.
13. Install the clutch plate and hub assembly. Refer to *Compressor Clutch Plate/Hub Assembly Install (V7 - Direct Mount)*.
14. Remove the compressor from the *J 41790*.
15. Install the compressor into the vehicle.



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Compressor Clutch Coil Install (V5 - Conventional Mount)

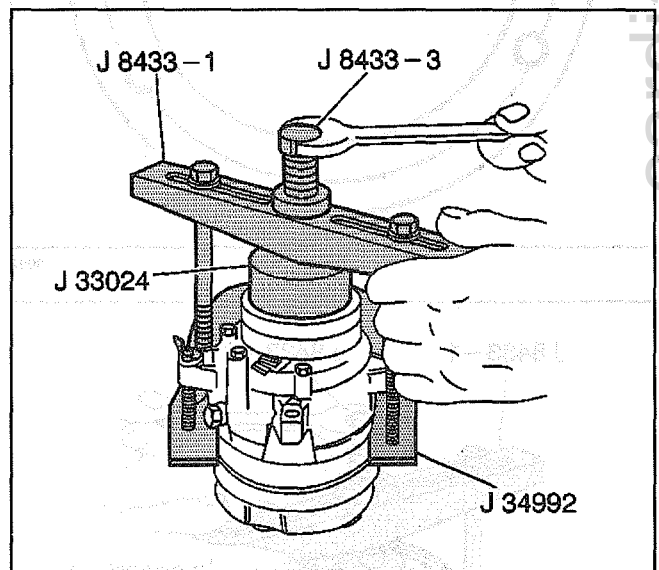
Tools Required

- *J 8433-1* Puller Bar
- *J 8433-3* Forcing Screw
- *J 33024* Clutch Coil Installer
- *J 34992* Compressor Holding Fixture
- *J 33025* Clutch Coil Puller Legs

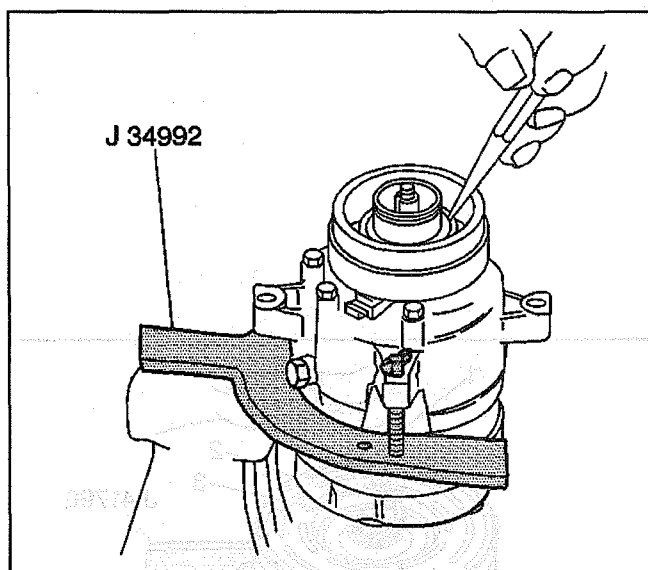
1. Place the clutch coil assembly on the front head with the terminals positioned at the marked location.
2. Place the *J 33024* over the internal opening of the clutch coil housing.
3. Align the *J 33024* with the compressor front head.
4. Center the *J 8433-1* on the countersunk center hole of the *J 33024*.
5. Install the through bolts and the washers of the *J 34992* through the slots in the *J 8433-1*.
6. Thread the through bolts into the *J 33025* in order to achieve full fixture thickness.

Important: Ensure that the clutch coil and the *J 33024* stay in-line during the installation.

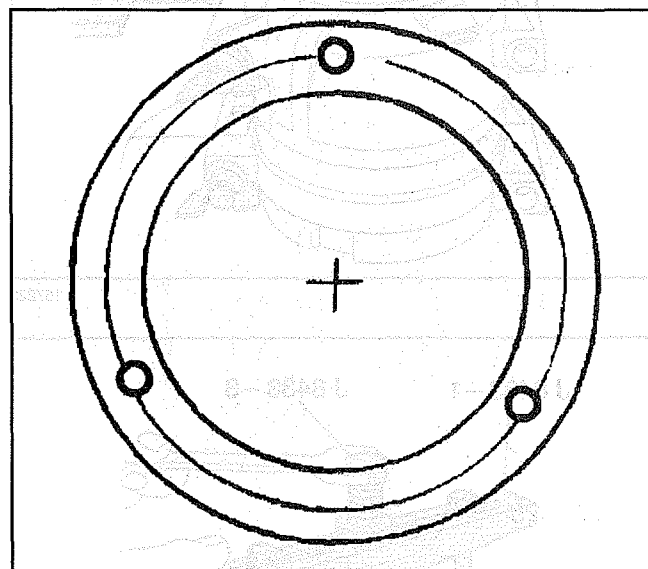
7. Turn the *J 8433-3* of the *J 8433-1* in order to force the clutch coil onto the head.



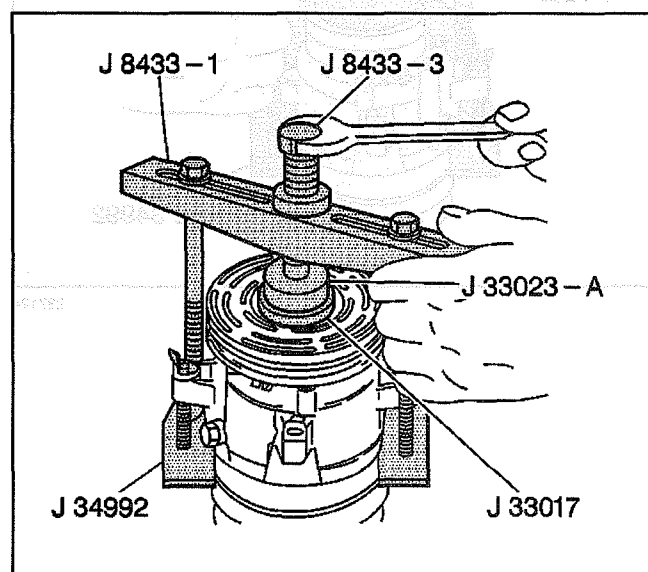
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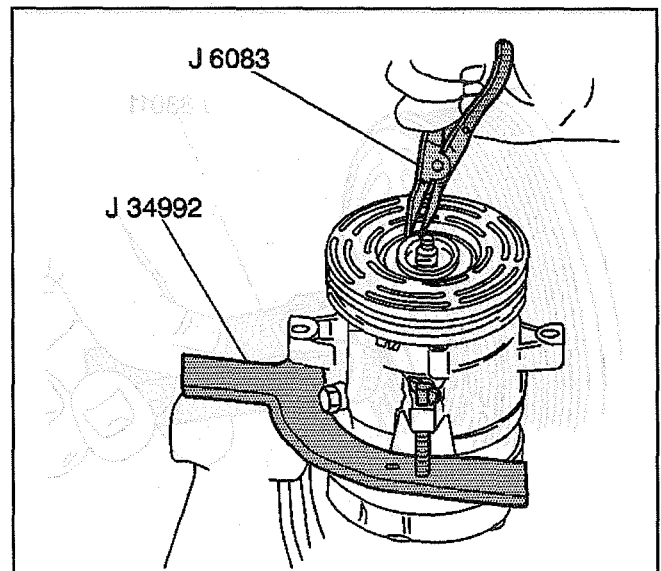
8. With the compressor still mounted to the *J 34992* and the coil seated on the front head, stake the front head using a drift punch with a diameter of 3.175 mm (0.125 in).

9. Tighten the hex portion of the *J 33023-B* body several turns.
10. Remove the *J 33023-B* from the clutch rotor and bearing assembly.
11. Make sure that the clutch rotor and bearing (S) is pressed onto the nose of the compressor far enough to clear the groove for the retaining ring. If the clutch rotor and bearing does not clear the groove, repeat steps 7, 8 and 9.
12. Install the clutch rotor and bearing retaining ring (S) using external snap ring pliers (T).

9. Stake the front head at 3 places 120 degrees apart in order to ensure that the clutch coil remains in position.
10. Ensure that the stake size is only one half of the area of the punch tip and only 0.28–0.35 mm (0.010–0.015 in) in depth.

11. With the compressor mounted to the *J 34992*, position the rotor and bearing assembly on the front head.
12. Position the *J 33017* and the *J 33023-A* directly over the inner race of the bearing.
13. Position the *J 8433-1* on the *J 33023-A*.
14. Assemble the two through bolts and the washers of the *J 34992* through the slots of the *J 8433-1*.
15. Thread the two through bolts into the *J 34992*. Ensure that the thread of the through bolts engages the full thickness of the *J 34992*.
16. Tighten the *J 8433-3* in the *J 8433-1* in order to force the pulley rotor and bearing assembly onto the front head of the compressor.
17. If the *J 33017* slips off direct, in-line contact with inner face of the bearing, use the following steps:
 - 17.1. Loosen the *J 8433-3*.
 - 17.2. Realign the *J 33017* and the *J 33023-A* in order to ensure that the installer clears the front head.

18. Install the rotor and bearing assembly retainer ring using the *J 6083*.
19. Install the clutch plate and hub assembly. Refer to *Compressor Clutch Plate/Hub Assembly Install (V5 - Conventional Mount)*.
20. Install the shaft nut.



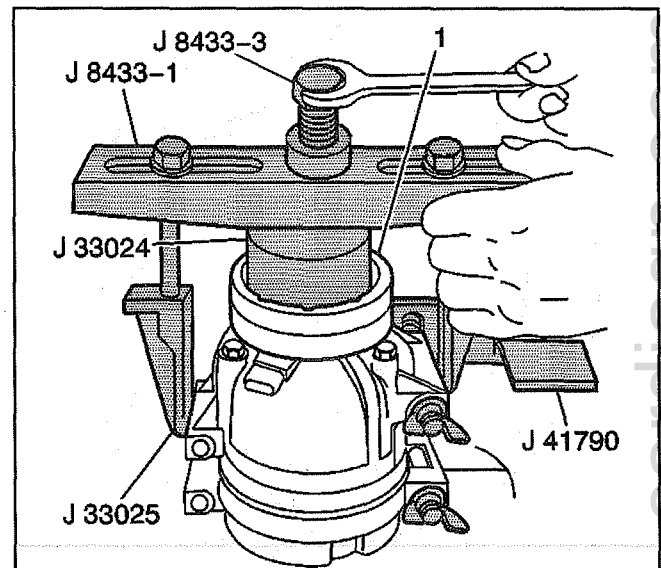
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Compressor Clutch Coil Install (V7 - Direct Mount)

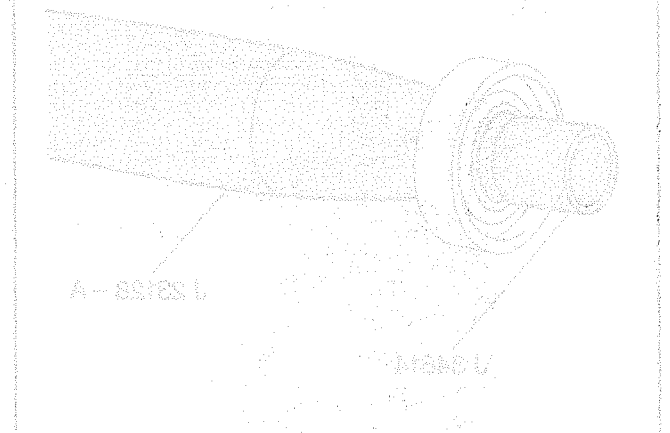
Tools Required

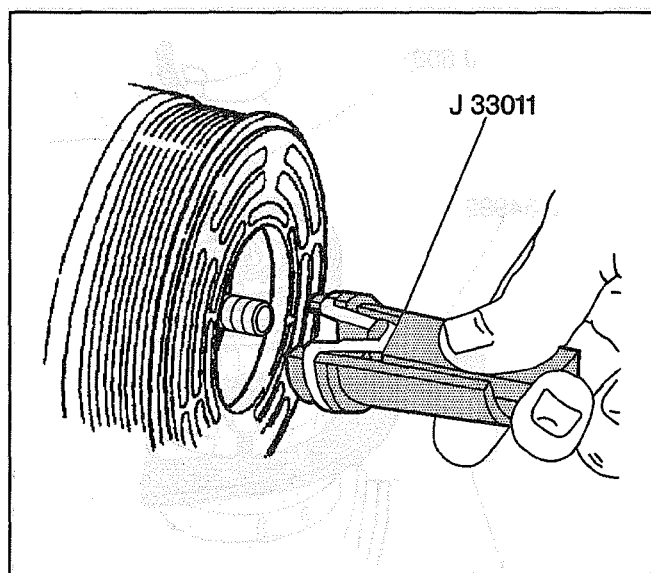
- *J 8433* Compressor Pulley Puller
- *J 8433-3* Forcing Screw
- *J 33024* Clutch Coil Installer Adaptor
- *J 33025* Clutch Coil Puller Legs
- *J 41790* Compressor Holding Fixture

1. Place the clutch coil assembly (1) on the front head with the clutch coil terminal positioned at the mark made during disassembly.
2. Place the *J 33024* over the internal opening of the clutch coil housing and align installer with the compressor front head.
3. Install the *J 8433-3* into the *J 8433* and center the screw in the countersunk center hole of the *J 33024*.
4. Install the 4 inch through bolts and washers from the *J 42136* tool kit into the *J 33025* and attach them to the compressor mounting bosses.
5. Turn the center forcing screw of the *J 8433* to press the clutch coil onto the front head until the clutch coil is fully seated.
Make sure the clutch coil and the *J 33024* stay in-line with each other while pressing the clutch coil onto the compressor.
6. Install the compressor clutch rotor and bearing assembly. Refer to *Clutch Rotor and/or Bearing Install (V7 - Direct Mount)*.
7. Install the compressor clutch plate and hub assembly. Refer to *Compressor Clutch Plate/Hub Assembly Install (V7 - Direct Mount)*.
8. Remove the compressor from the *J 41790*.
9. Install the compressor into the vehicle.

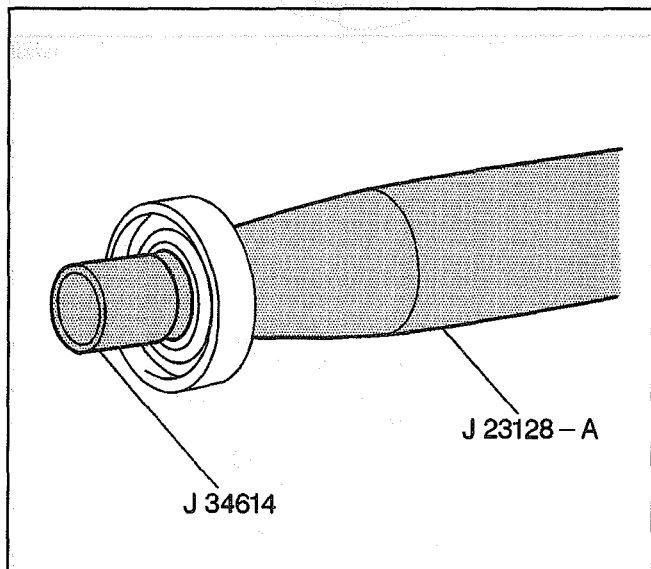
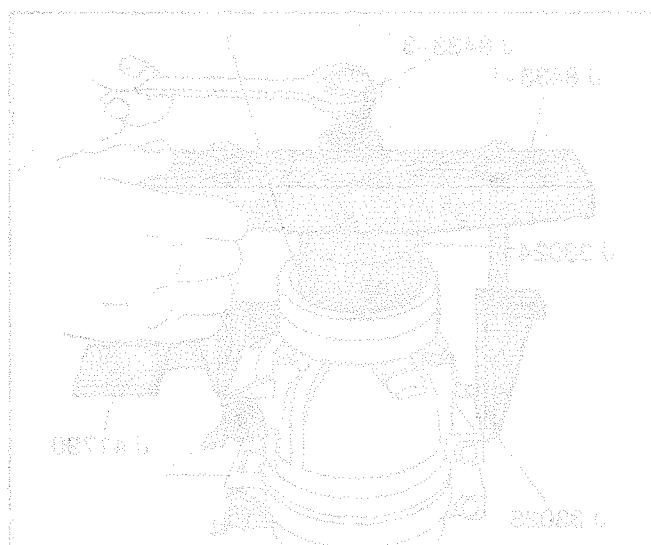


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Compressor Shaft Seal Install (V5 - Conventional Mount)

Tools Required

- J 5403 Snap Ring Pliers
- J 23128-A Seal Seat Installer And Remover
- J 33011 O-Ring Installer
- J 34614 Shaft Seal Protector
- J 39500-B A/C Refrigerant Recovery, Recycling And Recharging System
- J 39893 Pressure Testing Connector

Notice: Seals should not be re-used. Always use a new specification service seal kit. Be sure that the seal to be installed is not scratched or damaged in any way. Make sure that the seal is free of lint and dirt that could damage the seal surface or prevent sealing.

1. Thoroughly clean the seal O-ring groove in the front head.
2. Dip the new seal O-ring in clean 525 viscosity refrigerant oil.

Notice: Any attempt to use makeshift or inadequate service tools or equipment may result in damage and/or improper compressor operation.

3. Assemble the O-ring onto the J 33011.
4. Install the O-ring.
 - 4.1. Insert the J 33011 into the compressor neck until the installer bottoms out.

Important: The top groove in the compressor neck is for the shaft seal retainer ring.

- 4.2. Lower the moveable slide of the J 33011 in order to release the O-ring into the seal O-ring lower groove.
- 4.3. Rotate the J 33011 in order to seat the O-ring.
- 4.4. Remove the installer.

5. Dip the new shaft seal in clean 525 viscosity refrigerant oil.
6. Assemble the seal to the J 23128-A by turning the handle clockwise.
 - 6.1. Ensure that the stamped steel case side of the lip seal engages with the knurled tangs of the J 23128-A.
 - 6.2. Ensure that the flared-out side of the lip seal faces toward the compressor.

Notice: Use care when handling the seal protector. Do not nick the seal protector. This may damage the seal during installation. Ensure that the bottom of the seal protector is not flared. This may damage the seal during installation.

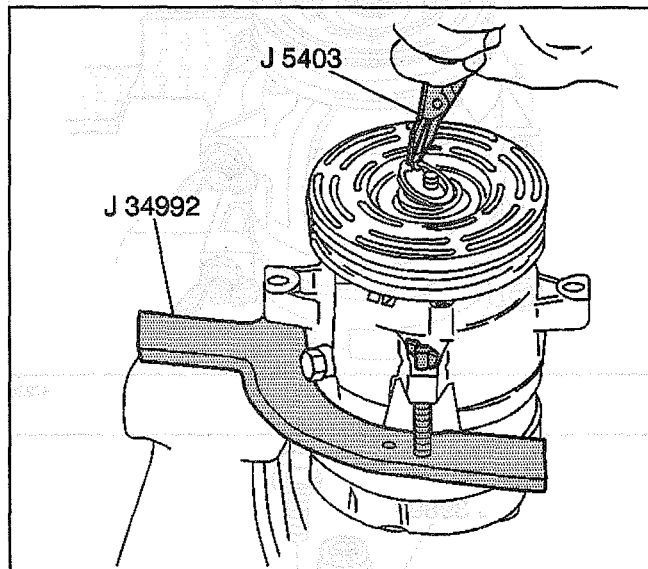
7. Install the J 34614 on the lip seal.
 - 8.1. Place the J 34614 over the end of the compressor shaft.
 - 8.2. Slide the new seal onto the shaft using a rotary motion of the J 23128-A.

- 8.3. Ensure that the seal makes good contact with the O-ring.
Do not dislodge the O-ring.
- 8.4. Disengage the *J 23128-A* from the seal.
- 8.5. Remove the *J 23128-A* and the *J 34614* from the compressor.
9. Use the *J 5403* in order to install the new seal retainer ring with the flat side against the seal.
10. Use the sleeve of the *J 33011* in order to press in the seal retainer ring. Ensure that the ring snaps into the groove.
11. Leak test the compressor.
 - 11.1. Install the *J 39893* on the rear head of the compressor.
 - 11.2. Connect the gage charging lines using the *J 39500-B*.
 - 11.3. Pressurize the suction and the high-side of the compressor using R-134a Refrigerant.
 - 11.4. Temporarily install the shaft nut.
 - 11.5. With the compressor in a horizontal position, rotate by hand the compressor shaft several turns in the operating direction.
 - 11.6. Leak test the seal area. Correct any leaks found.
 - 11.7. Recover the refrigerant.
 - 11.8. Remove the shaft nut.
12. Remove any excess oil from the shaft and the inside of the compressor neck.
13. Install the clutch plate and hub assembly. Refer to *Compressor Clutch Plate/Hub Assembly Install (V5 - Conventional Mount)*.
14. Install the compressor and the compressor belt. Tighten the bracket.
15. Evacuate and charge the refrigerant system using the *J 39500-B*.

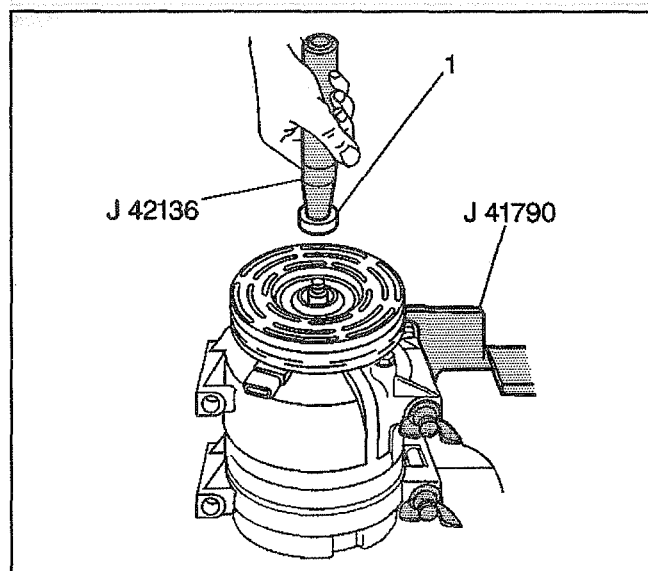
Compressor Shaft Seal Install (V7 - Direct Mount)

Tools Required

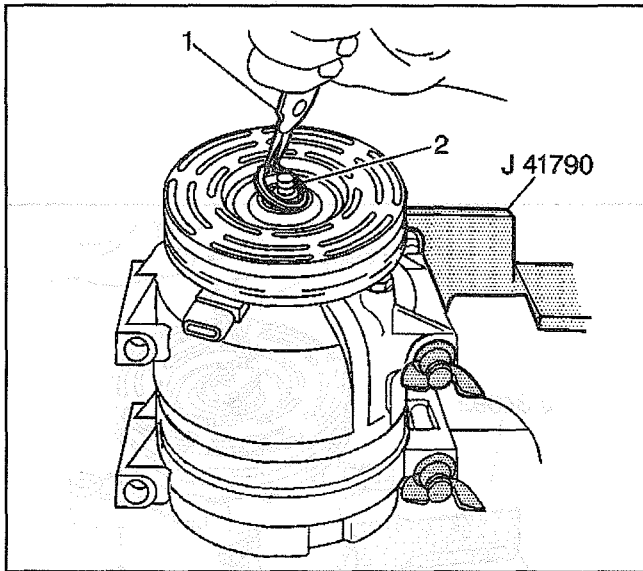
- *J 39893* Pressure Test Adaptor
 - *J 34614* Shaft Seal Protector
 - *J 42136* A/C Lip Seal Remover
1. Dip the new compressor shaft seal (1) in clean 525 viscosity refrigerant oil and assemble the seal onto the *J 42136*, by turning the handle clockwise.
 2. Install the *J 34614* onto the compressor shaft.
 3. Using a rotary motion, slide the new compressor shaft seal onto the compressor shaft until the seal is fully seated.
 4. Remove the *J 34614* by turning the handle counterclockwise.



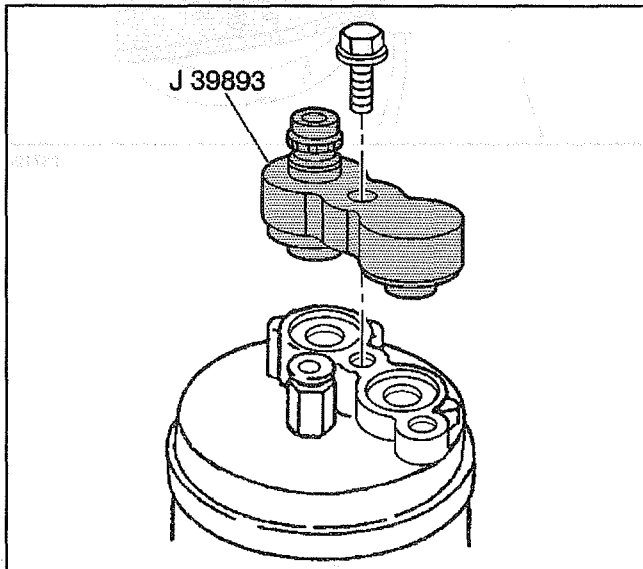
237126



157231



157228



157239

5. Install a new compressor shaft seal retaining ring (2), using internal snap ring pliers (1). Make sure that the chamfer side of the retaining ring is facing up and that the retaining ring snaps into the groove.

6. Leak test the compressor, using the J 39893.
- 6.1. Install the J 39893 onto the compressor and pressurize the suction and high-side of the compressor with R-134a.
- 6.2. Temporarily install the shaft nut.
- 6.3. With the compressor in a horizontal position, rotate the compressor shaft in the normal direction of rotation, several turns by hand.
- 6.4. Leak test the seal area and repair if necessary.
7. Recover the refrigerant.
8. Remove the J 39893.
9. Remove and clean any excess oil resulting from installing the new seal parts from the shaft and inside the compressor neck.
10. Install the compressor clutch plate and hub assembly. Refer to *Compressor Clutch Plate/Hub Assembly Install (V7 - Direct Mount)*.
11. Remove the compressor from the J 41790.
12. Install the compressor into the vehicle.

1. Remove the J 39893.
2. Clean the compressor shaft and the high-side of the compressor with R-134a.
3. Install the J 39893 onto the compressor shaft and the high-side of the compressor.
4. Pressurize the suction and high-side of the compressor with R-134a.
5. Leak test the seal area and repair if necessary.
6. Remove the shaft nut.
7. Recover the refrigerant.
8. Remove the J 39893.
9. Remove and clean any excess oil resulting from installing the new seal parts from the shaft and inside the compressor neck.
10. Install the compressor clutch plate and hub assembly. Refer to *Compressor Clutch Plate/Hub Assembly Install (V7 - Direct Mount)*.
11. Remove the compressor from the J 41790.
12. Install the compressor into the vehicle.

Compressor Pressure Relief Valve Install (V5 - Conventional Mount)

1. Clean the valve seat area on the rear head.
2. Lubricate the O-ring of the new pressure relief valve and the O-ring assembly using new 525 viscosity refrigerant oil.

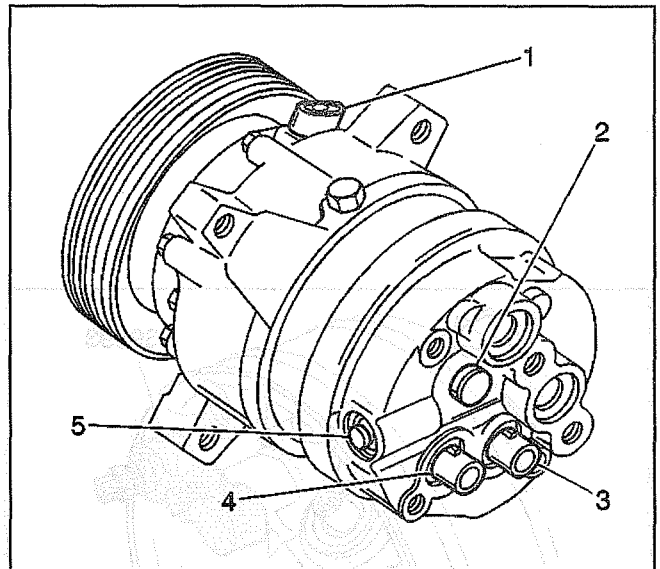
Notice: Refer to *Fastener Notice* in Cautions and Notices.

3. Install the new pressure relief valve (2).

Tighten

Tighten the valve to 9 N·m (80 lb in).

4. Evacuate and recharge the system.
5. Perform a leak test. Refer to *Compressor Leak Testing (V5 - Conventional Mount)*.



237069

Compressor Pressure Relief Valve Install (V7 - Direct Mount)

Tools Required

J 41790 Compressor Holding Fixture

1. Clean the pressure relief valve seat area of the rear head.
2. Lubricate the O-ring of the new pressure relief valve with clean 525 viscosity refrigerant oil.

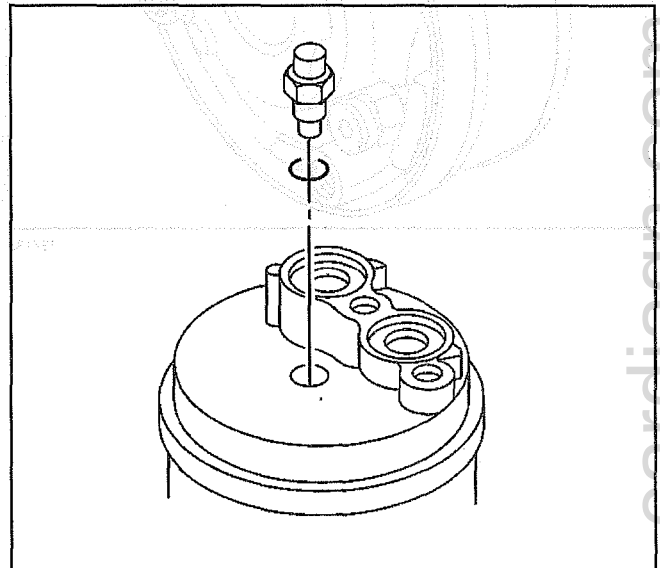
Notice: Refer to *Fastener Notice* in Cautions and Notices.

3. Install the new pressure relief valve into the compressor.

Tighten

Tighten the compressor pressure relief valve to 9 N·m (80 lb in).

4. Remove the compressor from the J 41790.
5. Install the compressor into the vehicle.



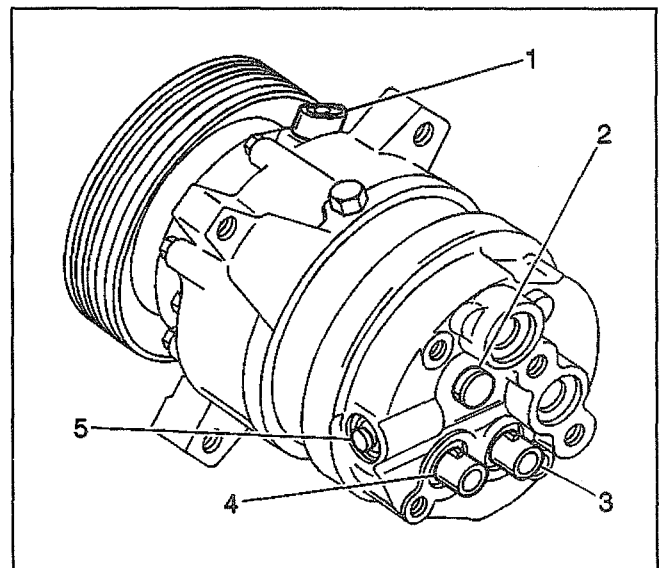
186933

Compressor Control Switches Install (V5 - Conventional Mount)

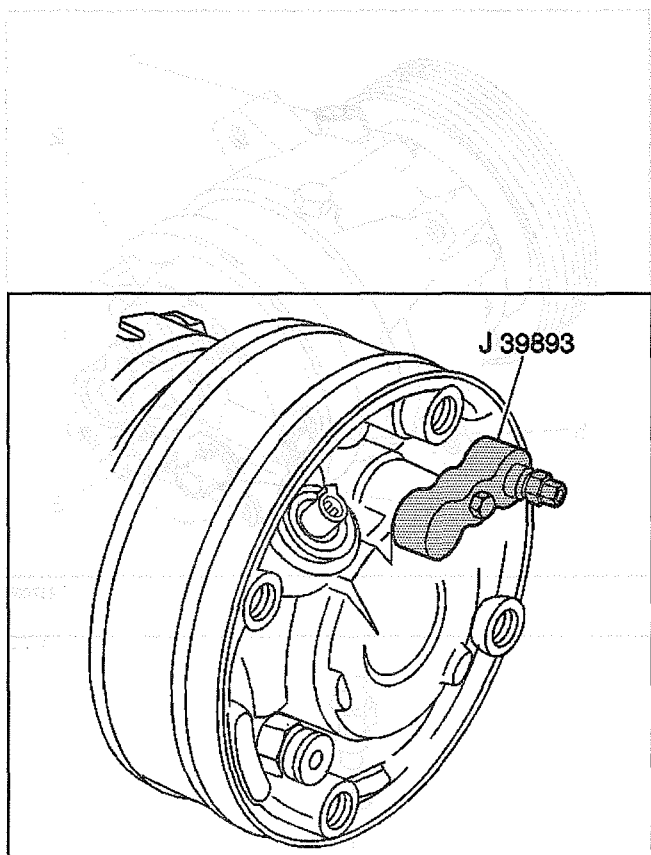
Tools Required

J 5403 Snap Ring Pliers

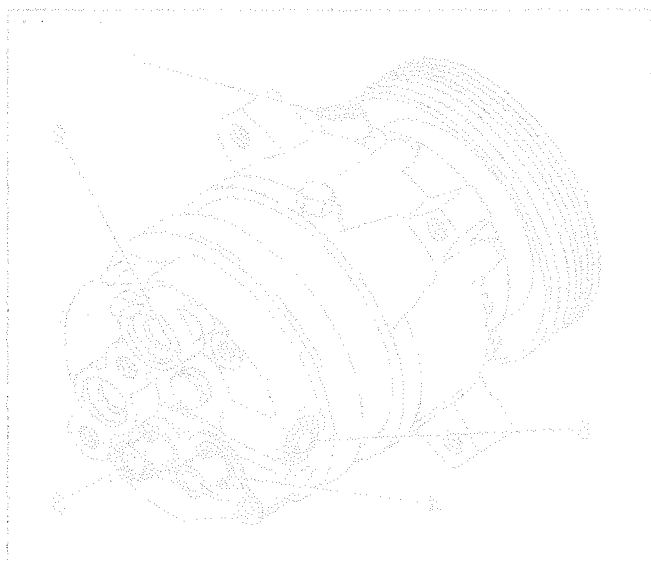
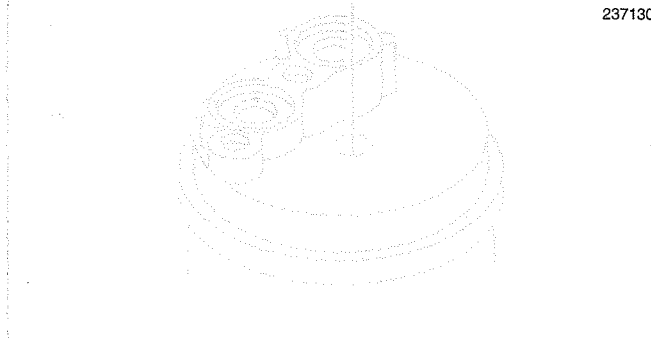
1. Inspect the switch cavity and the O-ring groove in the rear head for dirt or foreign material.
Clean the cavity and groove as necessary.
2. Coat the new O-ring using clean 525 viscosity refrigerant oil.
3. Install the O-ring into the groove in the switch cavity.
4. Lubricate the switch housing using clean 525 viscosity refrigerant oil.
5. Carefully insert the switch (3 or 4) into the switch cavity until the switch bottoms in the cavity.



237069



237130



6. Using the *J 5403*, install the switch retaining ring with the high point of the curved sides adjacent to the switch housing.
7. Ensure that the retaining ring is seated in the retaining ring groove in the switch cavity.
8. Evacuate and recharge the system.
9. Perform a leak test. Refer to *Compressor Leak Testing (V5 - Conventional Mount)*.

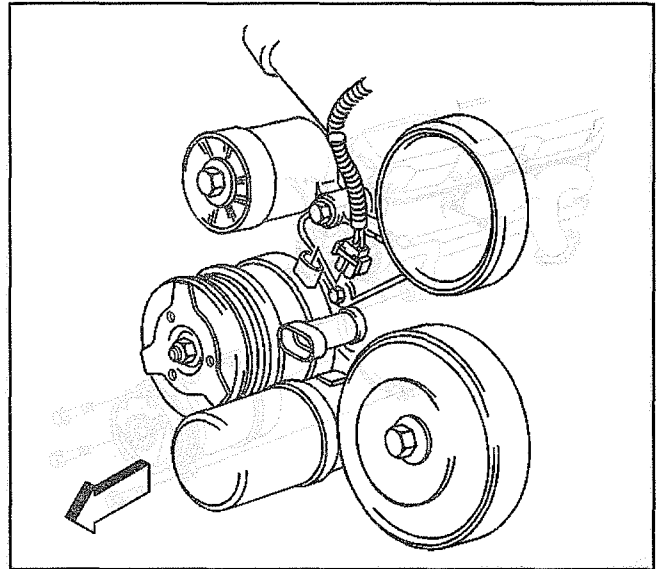
Compressor Leak Testing (V5 - Conventional Mount)

- *J 39400-A* Electronic Halogen Leak Detector
 - *J 39500-B* A/C Refrigerant Recovery, Recycling and Recharging (ACR4) System
 - *J 39893* Pressure Testing Connector
1. With the sealing washers in place, install the *J 39893* on the rear head of the compressor.
 2. Connect the gage charging lines and the *J 39500-B*.
 3. Pressurize the suction and the high-side of the compressor using R-134a refrigerant.
 4. With the compressor in a horizontal position, rotate the compressor shaft several turns by hand in the operating direction.
 5. Using the *J 39400-A*, inspect for leaks at the following locations:
 - The pressure relief valve
 - The rear head switch
 - The front head seal
 - The rear head seal
 - The through bolt head gaskets
 - The compressor shaft seal
 6. Perform the measures necessary to correct any external leaks found.
 7. Inspect for leaks again following any repair.
 8. Recover the refrigerant.
 9. Disconnect the hoses from the *J 39893*.
 10. Remove the *J 39893*.

Compressor Mounting Bracket Replacement (3.8 L)

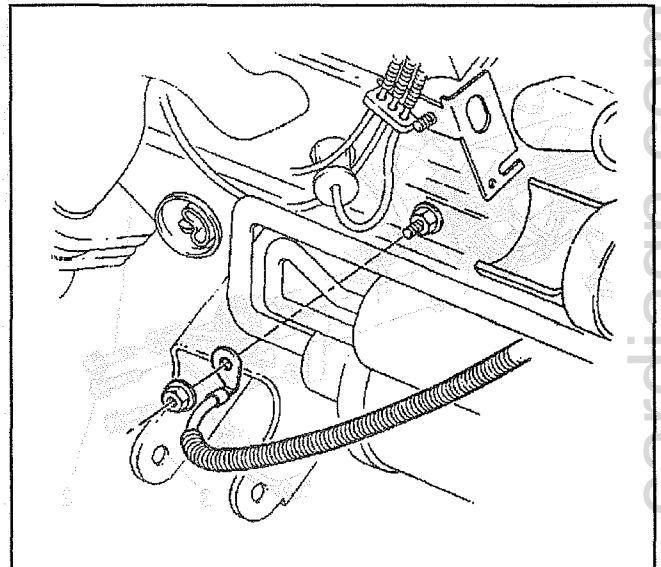
Removal Procedure

1. Remove the serpentine drive belt. Refer to *Drive Belt Replacement* in Engine Mechanical - 3.8 L.
2. Disconnect the electrical connector at the air conditioning (A/C) compressor.



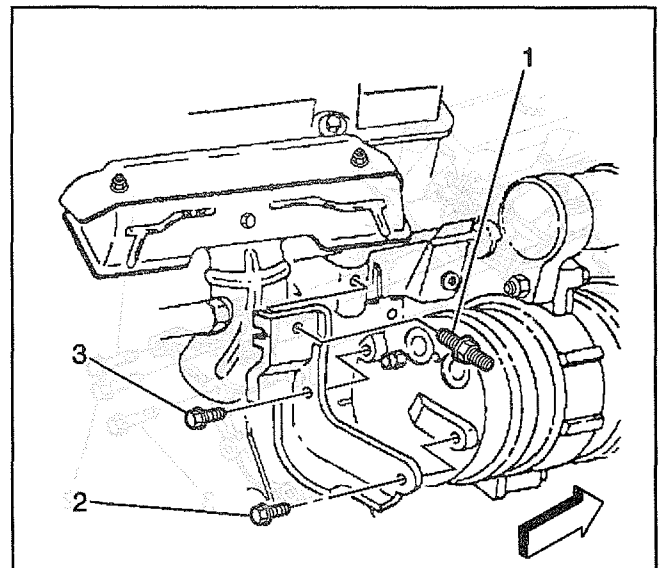
365420

3. Remove the negative battery cable nut from the engine block stud.
4. Remove the negative battery cable from the stud.
5. Raise and support the vehicle. Refer to *Lifting and Jacking the Vehicle* in General Information.

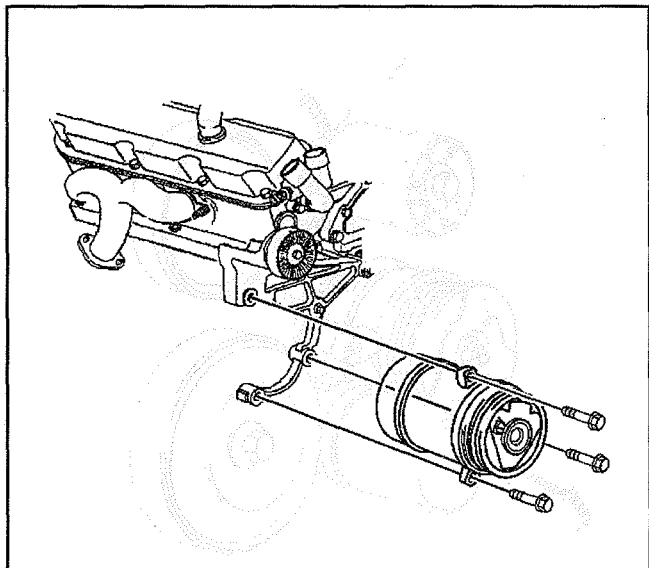


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6. Remove the A/C compressor bracket rear bolts (2, 3).

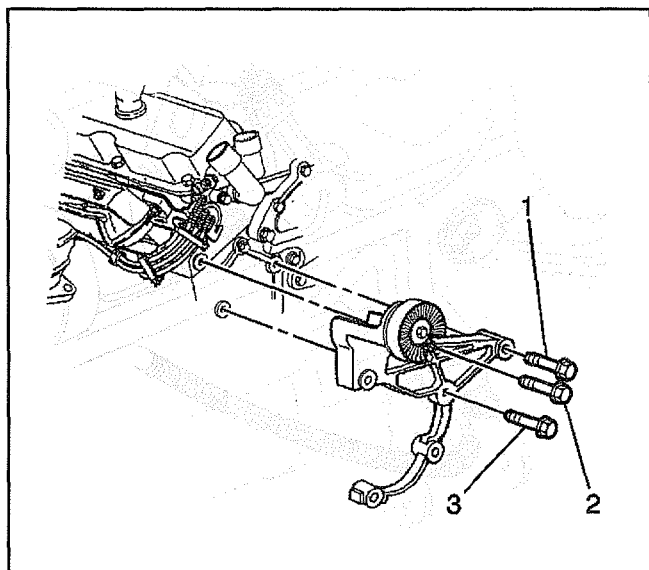


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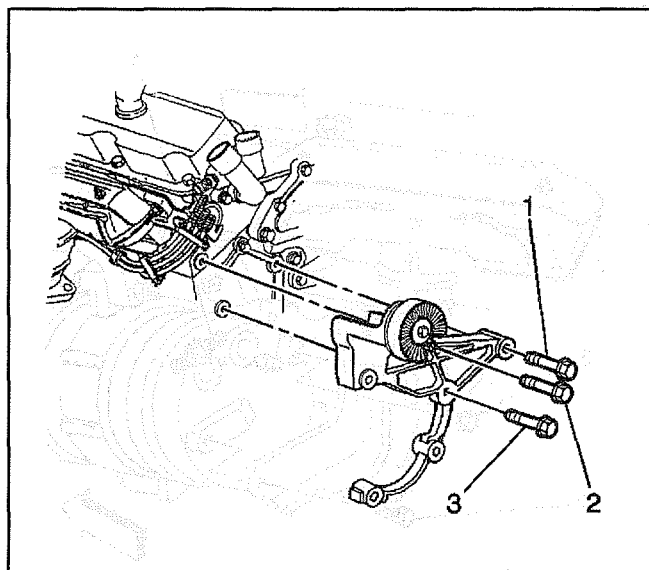
282953

7. Remove the A/C compressor bolts.
8. Move the A/C compressor forward in order to allow access to the bracket.



282958

9. Remove the A/C compressor bracket bolts (1, 2, 3).
 10. Remove the A/C compressor bracket.
- Transfer the idler pulley from the old bracket to the new bracket.



282958

Installation Procedure

1. Install the A/C compressor bracket.

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

2. Install the A/C compressor bracket bolts (1, 2, 3).

Tighten

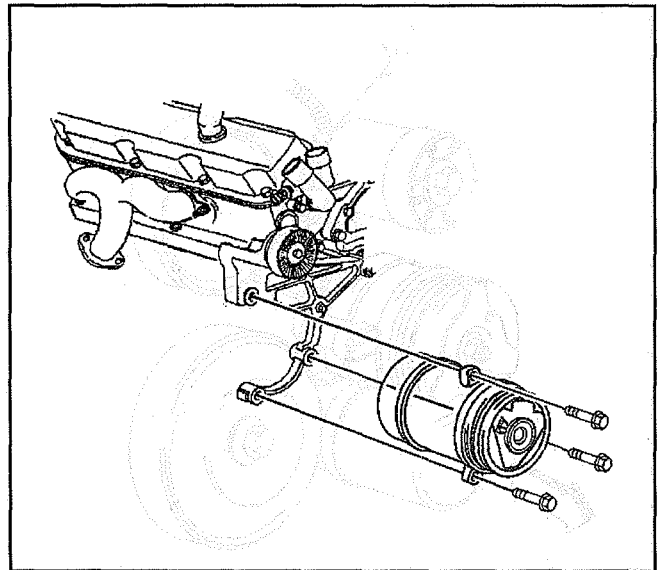
- Tighten the A/C compressor bracket bolt (1) to 30 N·m (22 lb ft).
- Tighten the A/C compressor bracket bolts (2, 3) to 50 N·m (37 lb ft).

3. Move the A/C compressor rearward to the bracket.

4. Install the A/C compressor bolts.

Tighten

Tighten the A/C compressor bracket bolts to 50 N·m (37 lb ft).



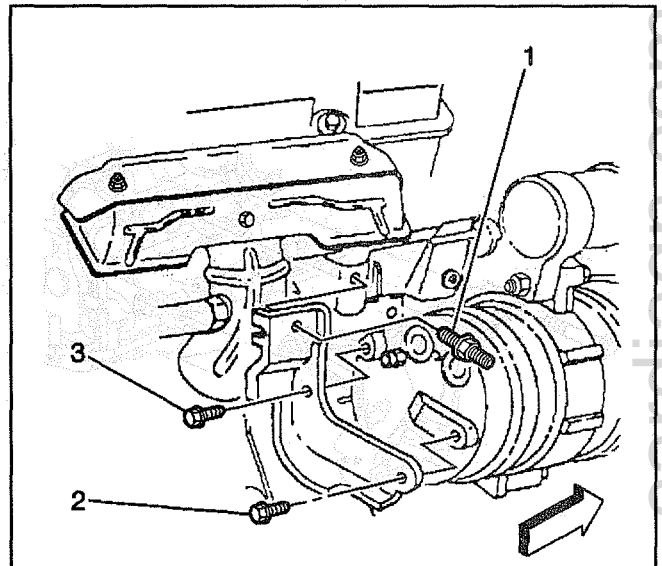
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5. Install the A/C compressor rear bolts (2, 3).

Tighten

Tighten the A/C compressor bracket rear bolts (2, 3) to 30 N·m (22 lb ft).

6. Lower the vehicle.



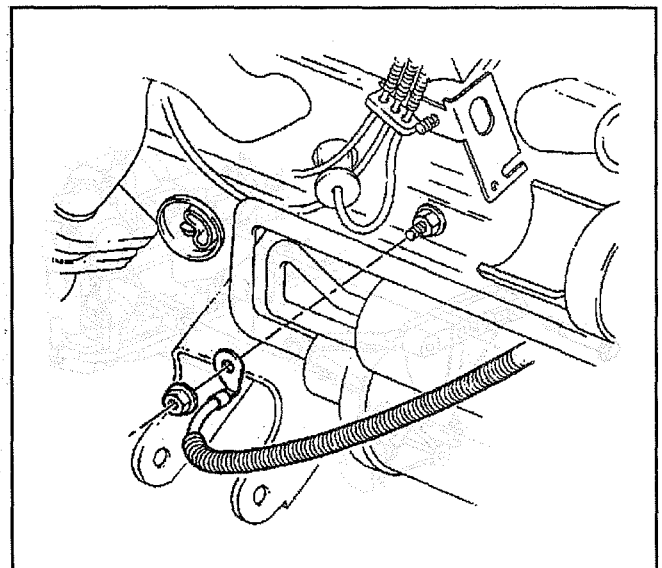
365440

7. Install the negative battery cable to the stud.

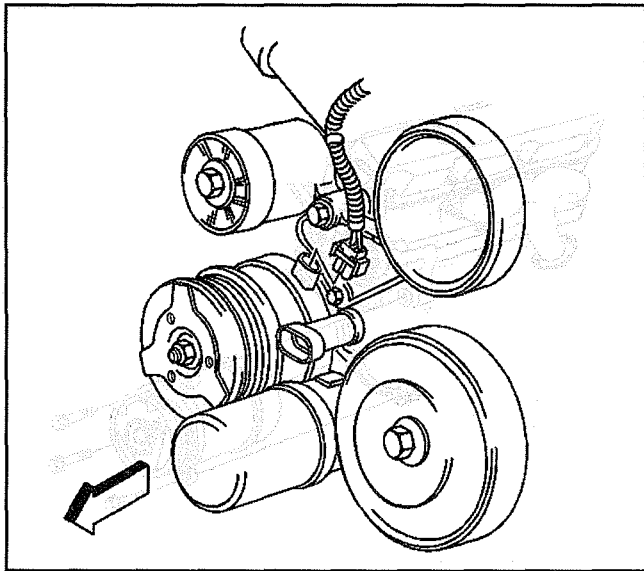
8. Install the negative battery cable nut to the engine block stud.

Tighten

Tighten the negative battery cable nut to the engine block to 25 N·m (18 lb ft).



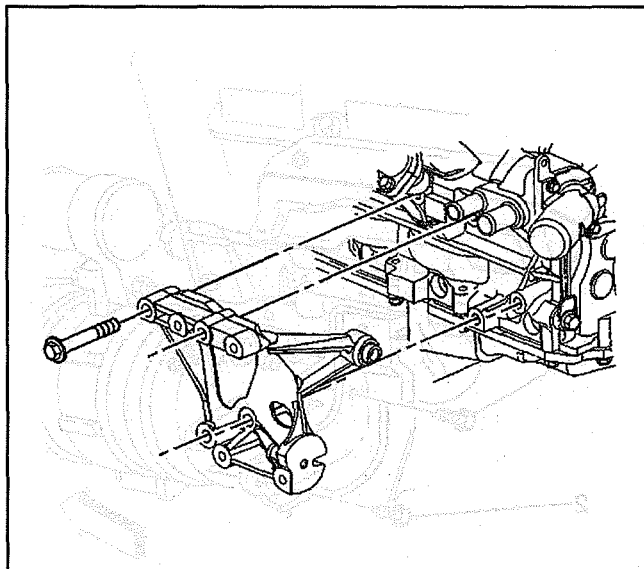
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9. Connect the electrical connector at the A/C compressor.
10. Install the serpentine drive belt. Refer to *Drive Belt Replacement* in Engine Mechanical - 3.8 L.

Tighten the A/C compressor bracket bolts to 50 N·m (37 lb ft).

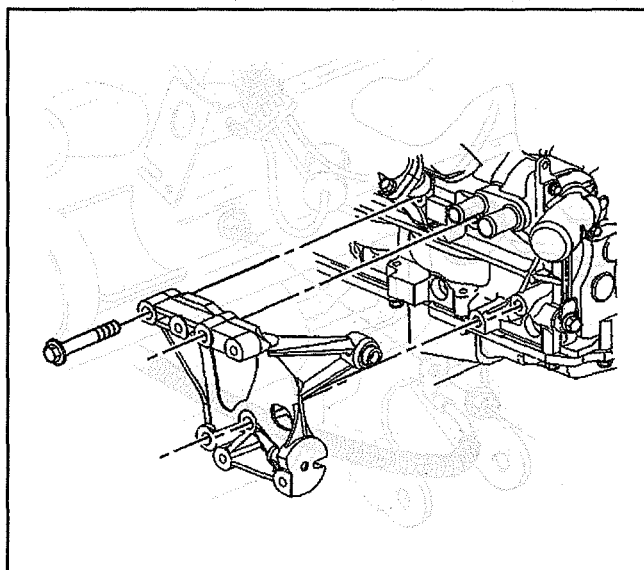


282957

Compressor Mounting Bracket Replacement (5.7 L)

Removal Procedure

1. Remove the air conditioning (A/C) compressor. Refer to *Compressor Replacement* (5.7 L).
2. Remove the A/C compressor bracket bolts.
3. Remove the A/C compressor bracket.
4. Remove the A/C belt tensioner from the bracket. Refer to *Drive Belt Tensioner Replacement - A/C* in Engine Mechanical - 5.7 L.
5. Remove the A/C belt idler pulley from the bracket. Refer to *Drive Belt Idler Pulley Replacement - A/C* in Engine Mechanical - 5.7 L.



282957

Installation Procedure

1. Install the A/C belt idler pulley from the bracket. Refer to *Drive Belt Idler Pulley Replacement - A/C* in Engine Mechanical - 5.7 L.
2. Install the A/C belt tensioner from the bracket. Refer to *Drive Belt Tensioner Replacement - A/C* in Engine Mechanical - 5.7 L.
3. Install the A/C compressor bracket.

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

4. Install the A/C compressor bracket bolts.

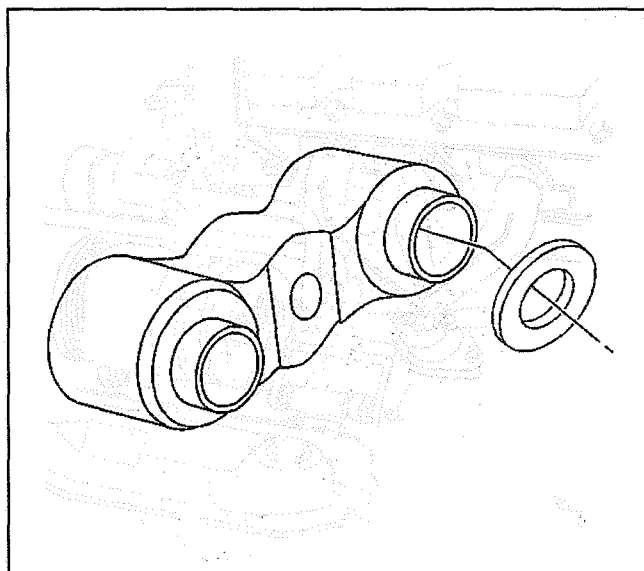
Tighten

Tighten the A/C compressor bracket bolts to 50 N·m (37 lb ft).

5. Install the A/C compressor. Refer to *Compressor Replacement* (5.7 L).

Compressor Sealing Washers Replacement

1. Keep dirt and foreign material from the sealing surfaces of the washers, the hose block, and the compressor ports.
Clean all of the sealing surfaces with a lint-free rag.
2. Do not reuse sealing washers.
3. The sealing washers do not need oiling prior to assembly.
4. Ensure that the sealing washers are seated within the compressor machined surfaces.
5. The washers must bottom against the surface of the block fitting.

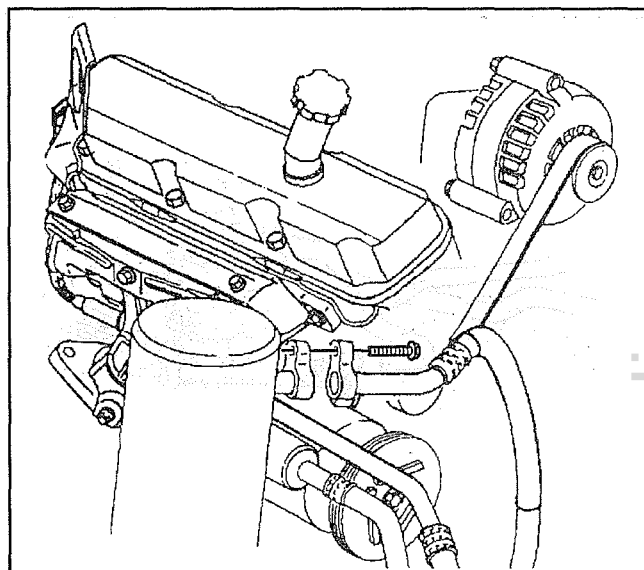


257968

Compressor Hose Assembly Replacement (3.8 L)

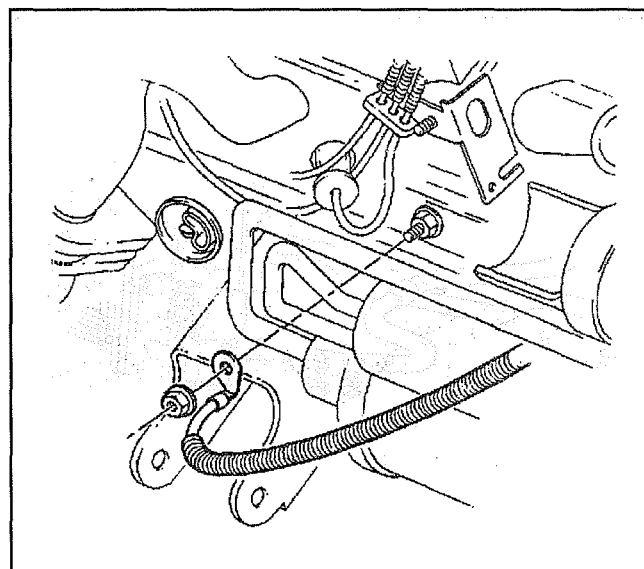
Removal Procedure

1. Recover the refrigerant. Refer to *Refrigerant Recovery and Recharging*.
2. Remove the air conditioning (A/C) compressor and condenser hose bolt at the accumulator.
3. Discard the O-ring.

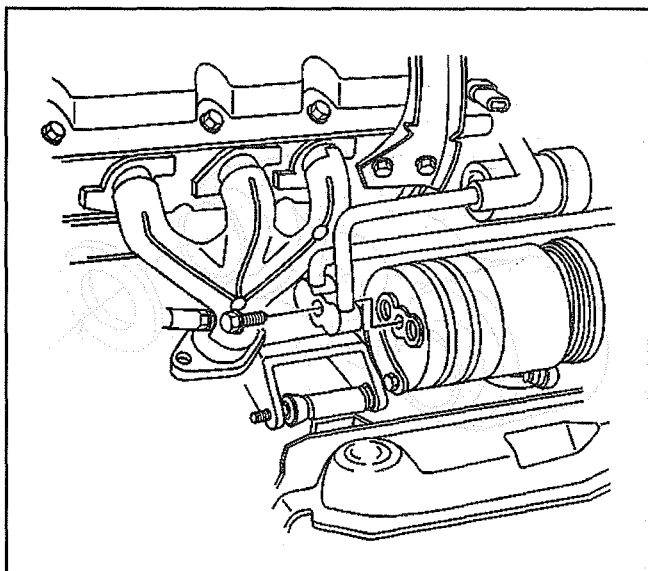


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4. Remove the negative battery cable nut from the engine block stud.
5. Remove the negative battery cable from the stud.
6. Raise and suitably support the vehicle. Refer to *Lifting and Jacking the Vehicle* in General Information.



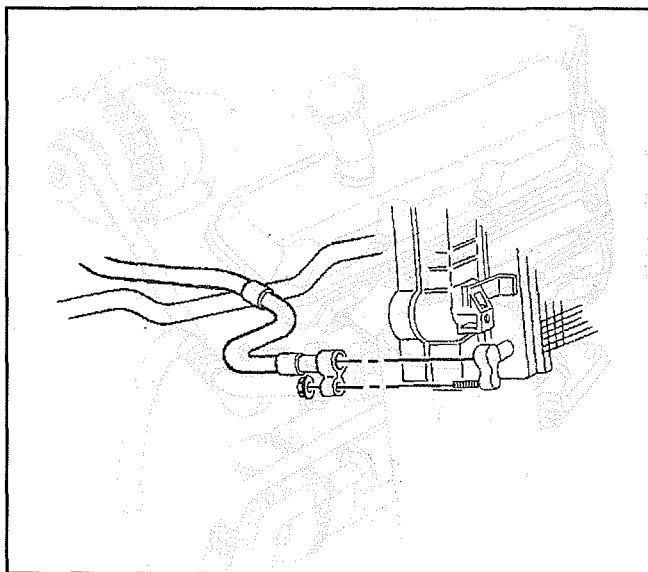
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7. Remove the A/C compressor and condenser hose bolt.

8. Discard the O-ring.



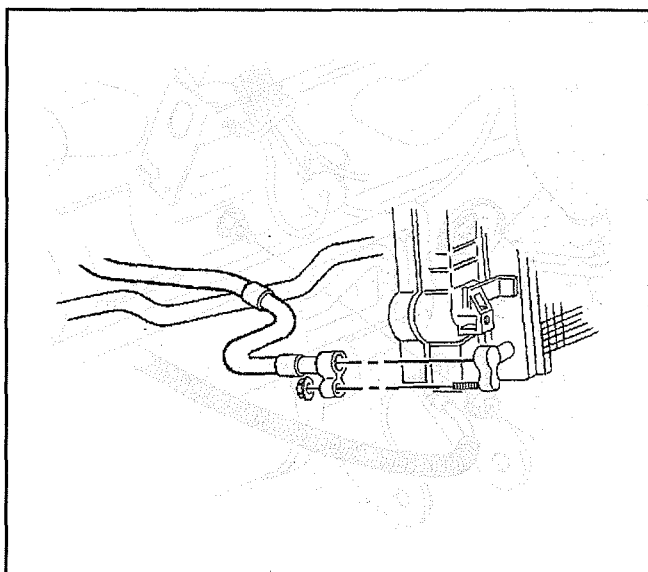
365450

9. Remove the A/C compressor and condenser hose nut at the condenser.

10. Discard the O-ring.

11. Lower the vehicle.

12. Remove the A/C compressor and condenser hose from the vehicle.



365450

Installation Procedure
Lightly coat the O-rings with a mineral base 525 viscosity refrigerant oil.

1. Install the A/C compressor and condenser hose to the vehicle.
2. Raise and suitably support the vehicle. Refer to *Lifting and Jacking the Vehicle* in General Information.
3. Install a new O-ring.

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

4. Install the A/C compressor and condenser hose nut at the condenser.

Tighten

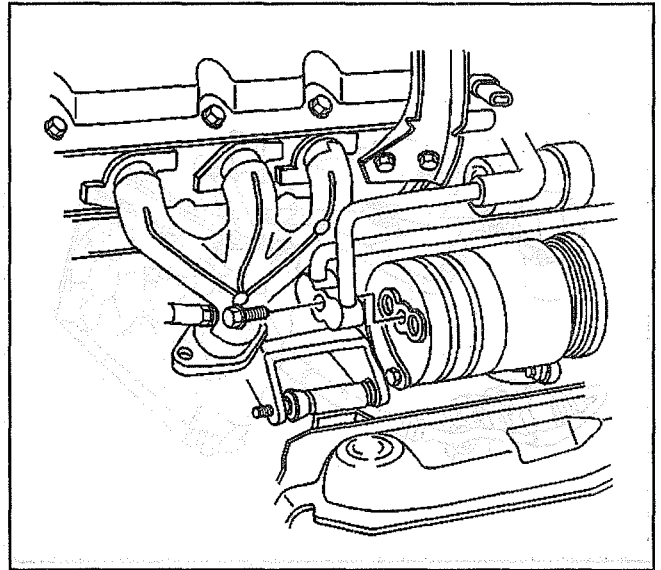
Tighten the A/C compressor and condenser hose nut at the condenser to 16 N·m (12 lb ft).

5. Install a new O-ring.
6. Install the A/C compressor and condenser hose bolt.

Tighten

Tighten the A/C compressor and condenser hose bolt to 33 N·m (24 lb ft).

7. Lower the vehicle.

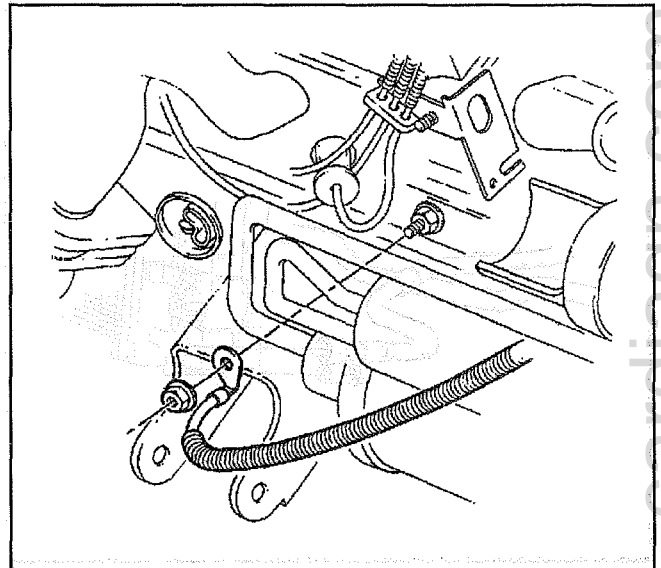


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8. Install the negative battery cable to the stud.
9. Install the negative battery cable nut to the engine block stud.

Tighten

Tighten the negative battery cable nut to the engine block stud to 25 N·m (18 lb ft).



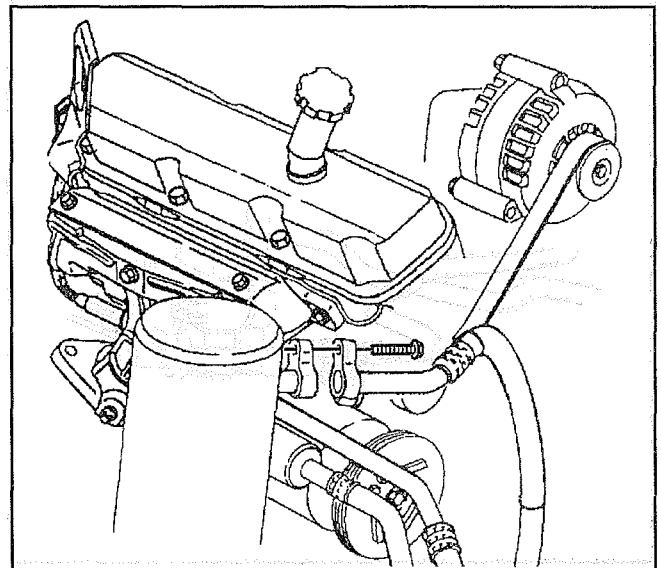
43679

10. Install a new O-ring.
11. Install the A/C compressor and condenser hose bolt at the accumulator.

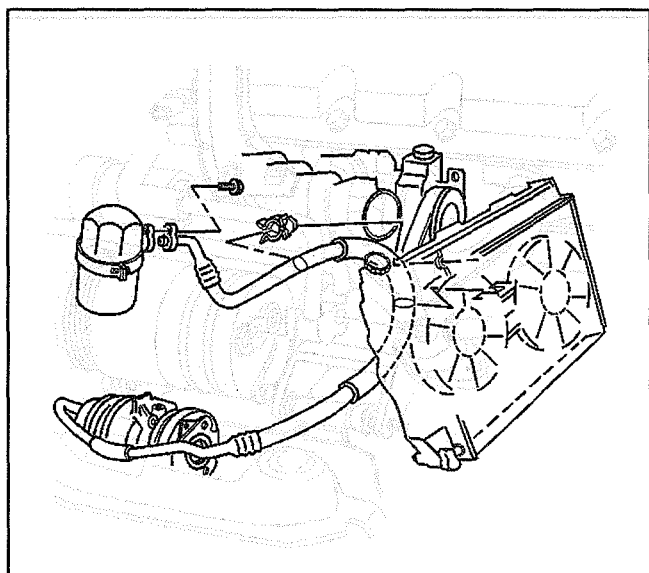
Tighten

Tighten the A/C compressor and condenser hose bolt at the accumulator to 16 N·m (12 lb ft).

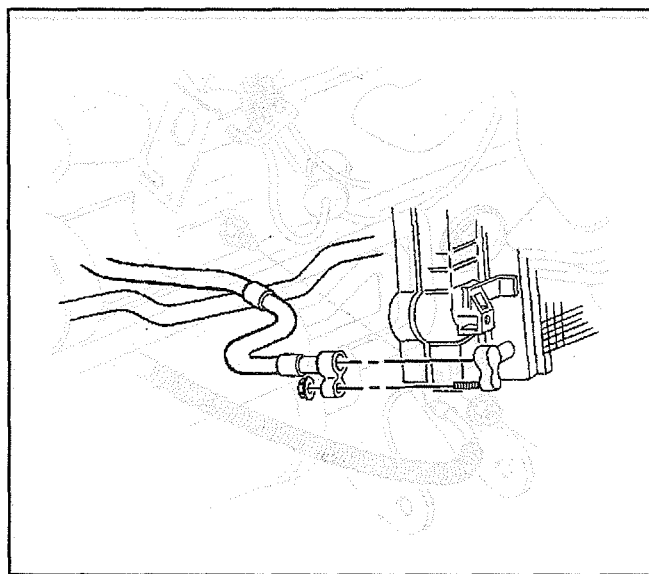
12. Recharge the A/C system. Refer to *Refrigerant Recovery and Recharging*.
13. Perform a leak test on the A/C system. Refer to *Leak Testing*.



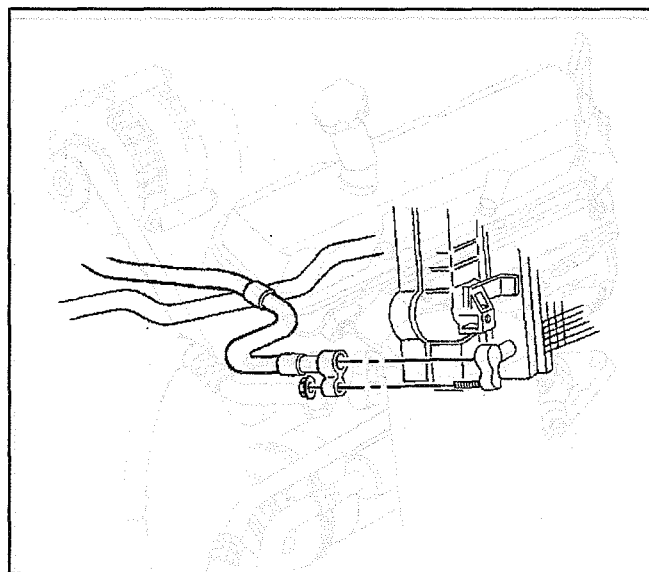
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365450

Compressor Hose Assembly Replacement (5.7 L)

Removal Procedure

1. Recover the refrigerant. Refer to *Refrigerant Recovery and Recharging*.
2. Remove the air conditioning (A/C) compressor and condenser hose from the clip on the fan shroud.
3. Remove the A/C compressor and condenser hose bolt at the accumulator.
4. Discard the O-ring.
5. Raise and suitably support the vehicle. Refer to *Lifting and Jacking the Vehicle* in General Information.
6. Remove the A/C compressor and condenser hose nut at the condenser.
7. Discard the O-ring.
8. Remove the A/C compressor. Refer to *Compressor Replacement (5.7 L)*.
9. Remove the A/C compressor and condenser hose from the vehicle.
10. Discard the O-ring.

Installation Procedure

Lightly coat the O-rings with the mineral base 525 viscosity refrigerant oil.

1. Install a new O-ring to the A/C compressor and condenser hose.
2. Install the compressor and condenser hose to the vehicle.
3. Install the A/C compressor. Refer to *Compressor Replacement (5.7 L)*.
4. Install a new O-ring.

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

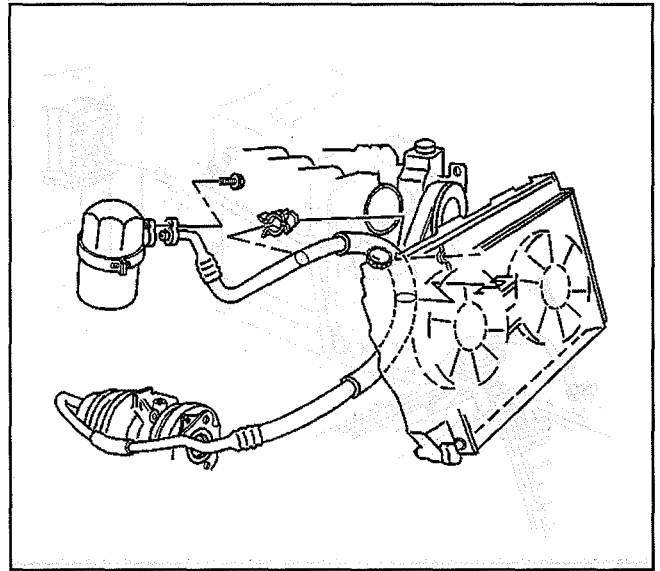
5. Install the A/C compressor and condenser hose nut at the condenser.

Tighten

Tighten the A/C compressor and condenser hose nut at the condenser to 16 N·m (12 lb ft).

6. Lower the vehicle.

7. Install a new O-ring.
8. Install the A/C compressor and condenser hose bolt at the accumulator.
- Tighten**
Tighten the A/C compressor and condenser hose bolt at the accumulator to 16 N·m (12 lb ft).
9. Install the A/C compressor and condenser hose to the clip on the fan shroud.
10. Recharge the A/C system. Refer to *Refrigerant Recovery and Recharging*.
11. Perform a leak test on the A/C system. Refer to *Leak Testing*.

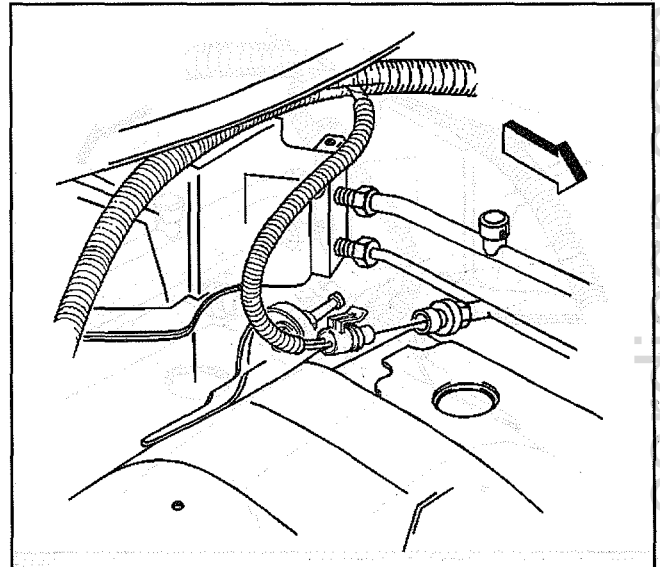


282941

Evaporator Tube Replacement

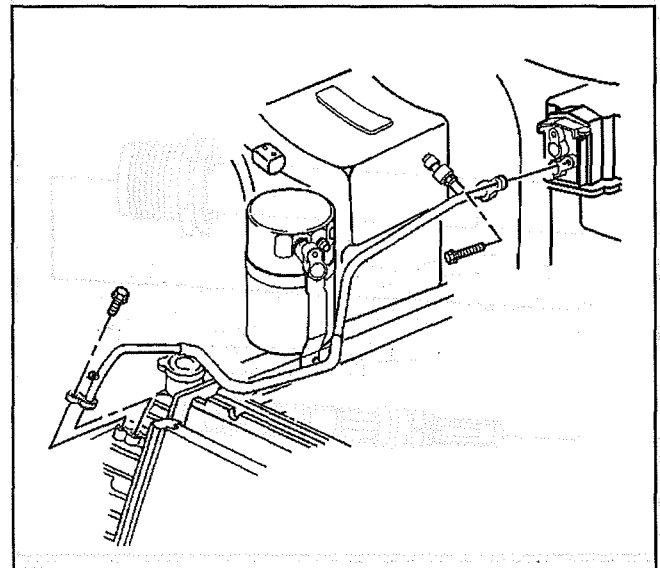
Removal Procedure

1. Recover the refrigerant. Refer to *Refrigerant Recovery and Recharging*.
2. Disconnect the electrical connector at the air conditioning (A/C) refrigerant pressure sensor.

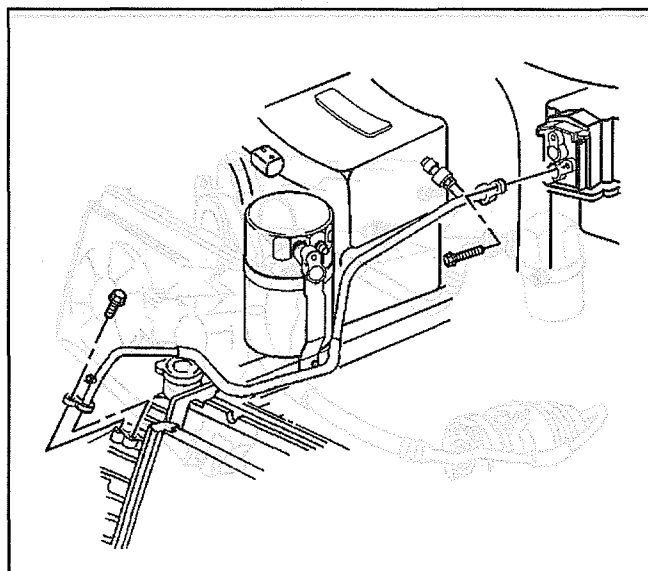


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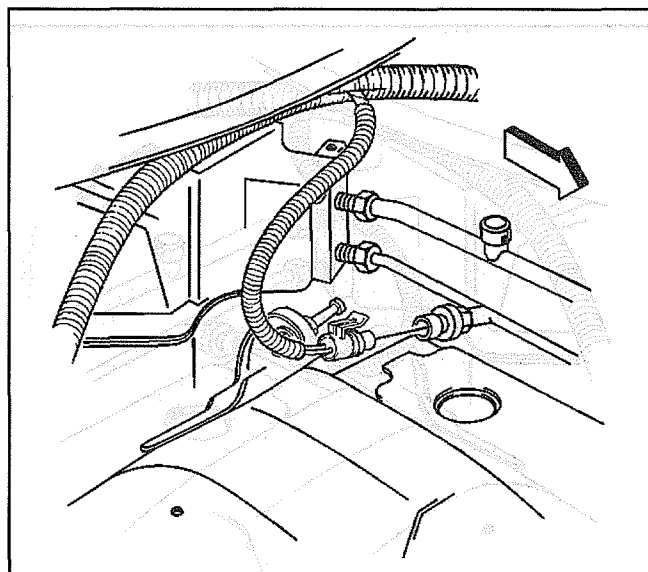
3. Remove the A/C evaporator tube bolt at the module.
4. Remove the A/C evaporator tube bolt at the condenser.
5. Remove the A/C evaporator tube from the vehicle.
6. Discard the O-rings.
7. Remove the orifice and the pressure sensor, if replacing the tube.



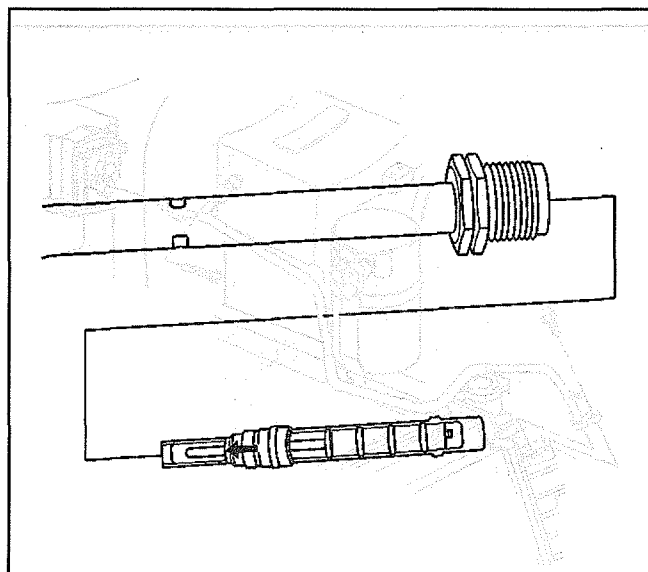
282946



282946



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247323

Installation Procedure

1. Lightly coat the O-rings with a mineral base 525 viscosity refrigerant oil.
2. Install the orifice and the pressure sensor, if replacing the tube.
3. Install new O-rings.
4. Install the A/C evaporator tube to the vehicle.

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

5. Install the A/C evaporator tube bolt at the condenser.

Tighten

Tighten the A/C evaporator tube bolt at the condenser to 16 N·m (12 lb ft).

6. Install the A/C evaporator tube bolt at the module.

Tighten

Tighten the A/C evaporator tube bolt at the module to 16 N·m (12 lb ft).

7. Connect the electrical connector at the A/C refrigerant pressure sensor.
8. Recharge the A/C system. Refer to *Refrigerant Recovery and Recharging*.
9. Perform a leak test on the A/C system. Refer to *Leak Testing*.

Expansion (Orifice) Tube Filter Replacement

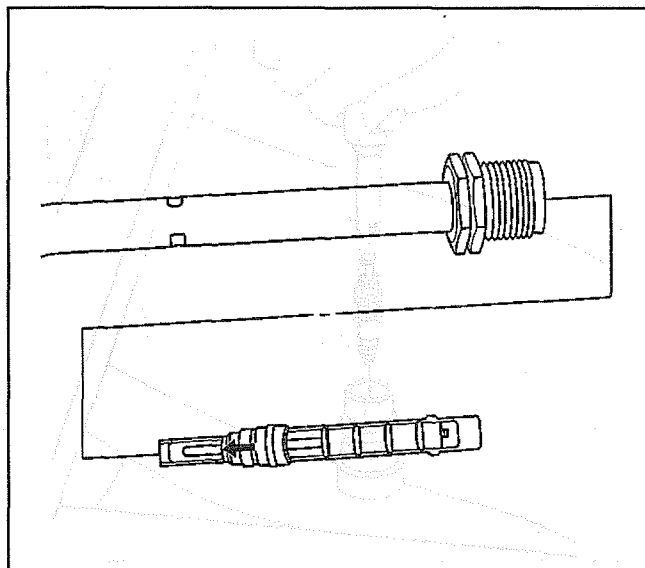
Removal Procedure

1. Recover the refrigerant. Refer to *Refrigerant Recovery and Recharging*.
2. Remove the air conditioning (A/C) evaporator. Refer to *Accumulator Replacement*.
3. Remove the orifice from the A/C evaporator tube.

Installation Procedure

Important: Install the long screen inlet end toward the condenser.

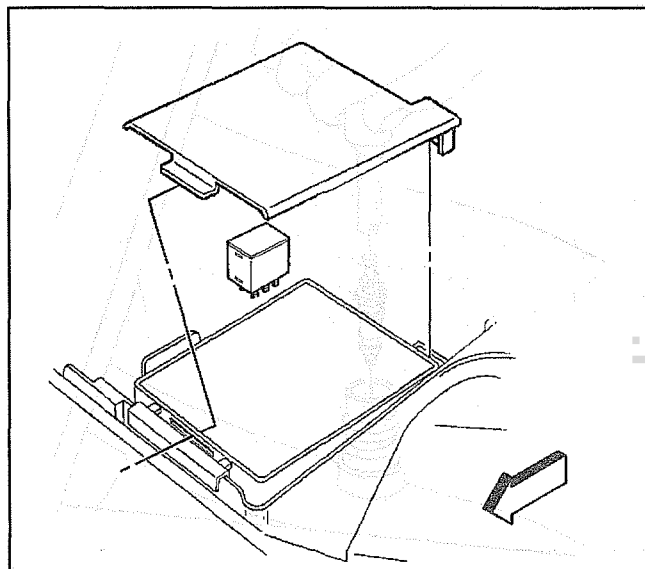
1. Install the orifice in the A/C evaporator tube.
2. Install the A/C evaporator. Refer to *Accumulator Replacement*.
3. Recharge the A/C system. Refer to *Refrigerant Recovery and Recharging*.
4. Leak test the fitting for leaks. Refer to *Leak Testing*.



247323

Compressor Relay Replacement**Removal Procedure**

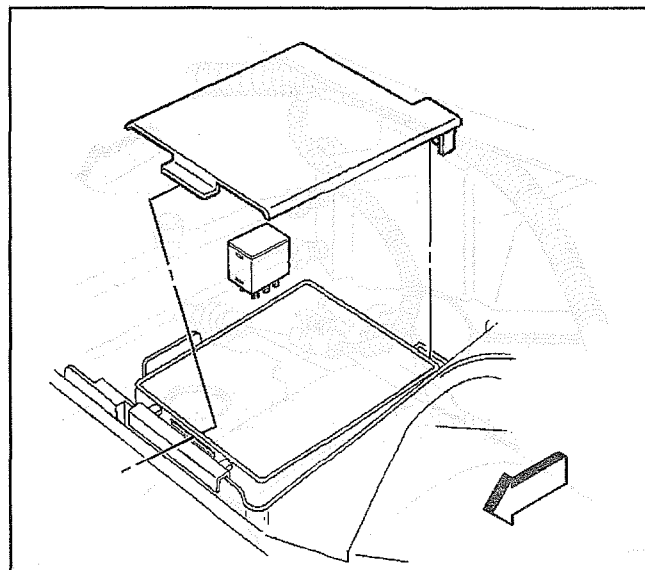
1. Remove the cover from the number 2 underhood electrical center.
2. Remove the air conditioning (A/C) compressor relay. Refer to *Electrical Center Identification Views in Wiring Systems*.



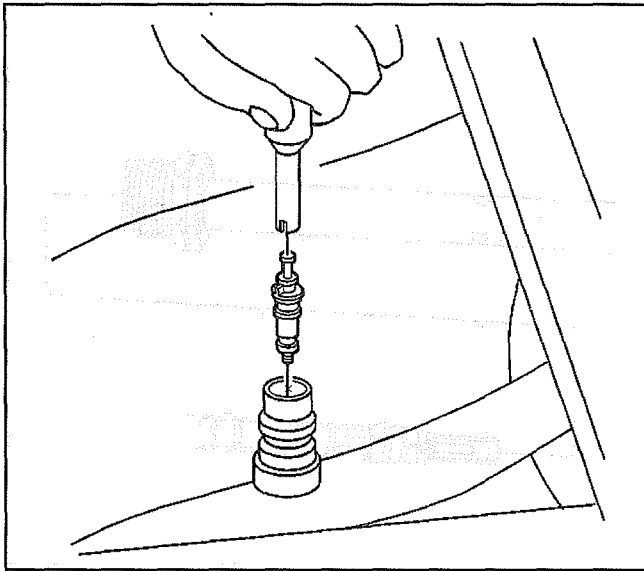
401242

Installation Procedure

1. Install the A/C compressor relay. Refer to *Electrical Center Identification Views in Wiring Systems*.
2. Install the cover on the number 2 underhood electrical center.



401242



297244

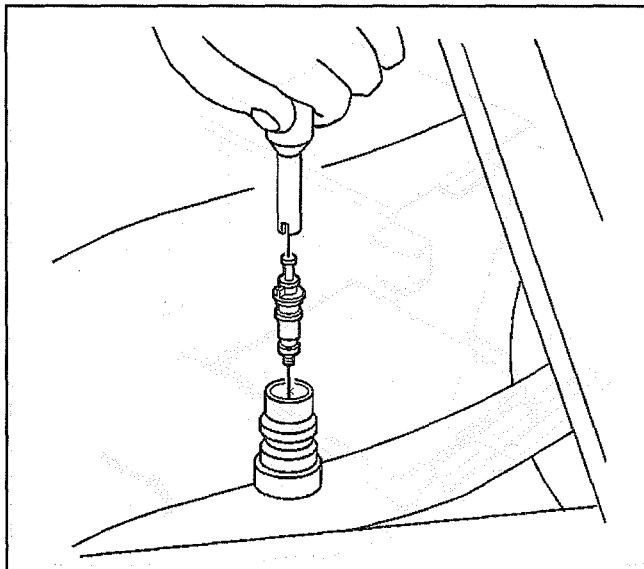
Service Port Valve Core Replacement

Removal Procedure

Tools Required

J 34611-A Valve Core Remover and Installer

1. Recover the refrigerant. Refer to *Refrigerant Recovery and Recharging*.
2. Remove the valve core using J 34611-A.



297244

Installation Procedure

Tools Required

J 34611-A Valve Core Remover and Installer

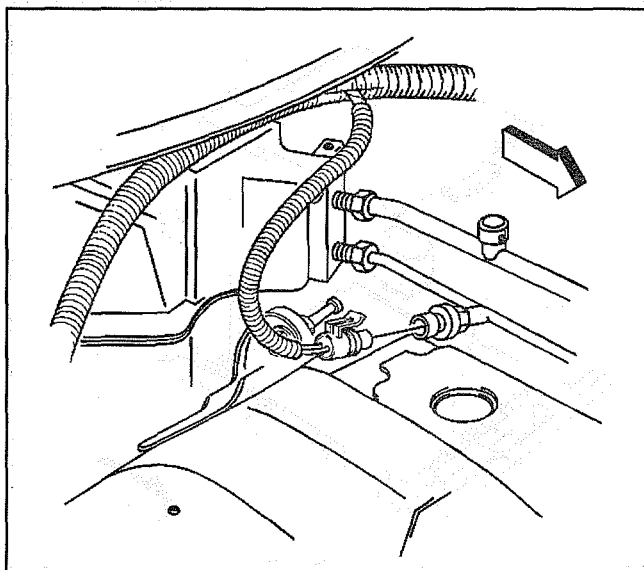
Notice: Refer to *Fastener Notice* in Cautions and Notices.

1. Install the valve core using J 34611-A.

Tighten

Tighten the service core to 11 N·m (97 lb in).

2. Recharge the air conditioning (A/C) system. Refer to *Refrigerant Recovery and Recharging*.
3. Test the fitting for leaks. Refer to *Leak Testing*.



282947

A/C Refrigerant Pressure Sensor Replacement

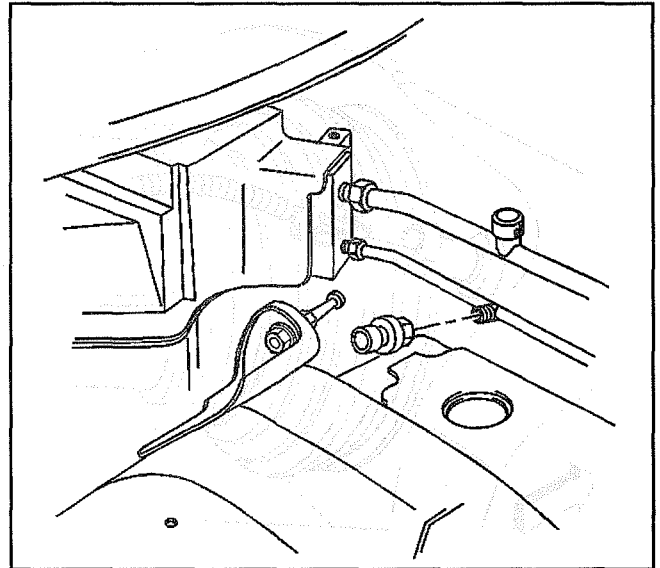
Removal Procedure

Important: The air conditioning (A/C) refrigerant pressure sensor is mounted on a Schrader® valve. Recovery of the air conditioning A/C system is not needed.

1. Disconnect the electrical connector at the A/C refrigerant pressure sensor.

2. Remove the A/C refrigerant pressure sensor and the seal.
3. Discard the seal.

Remove the seal from the A/C refrigerant pressure sensor fitting. Discard the seal. (TA) Disconnect the intake air temperature (IAT) sensor connector at the air intake duct if equipped with the 3.8 L engine.



282951

Installation Procedure

Coat the seal with a mineral base 525 viscosity refrigerant oil.

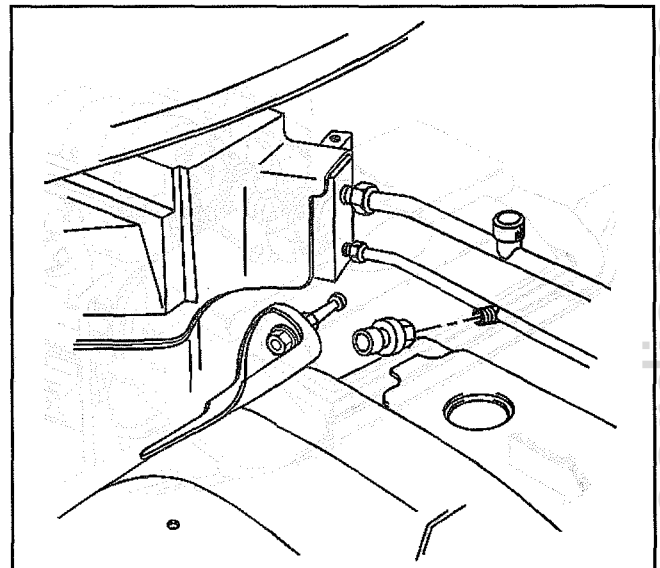
1. Install a new seal to the A/C refrigerant pressure sensor fitting.

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

2. Install the A/C refrigerant pressure sensor.

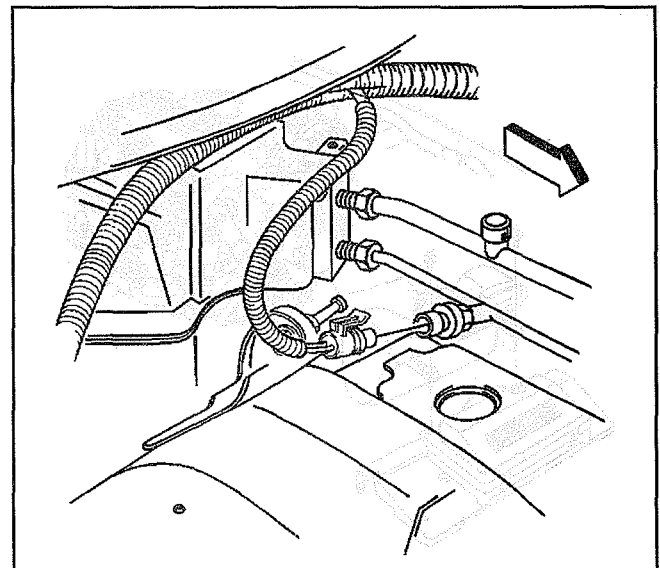
Tighten

Tighten the A/C refrigerant pressure sensor to 6 N·m (53 lb in).



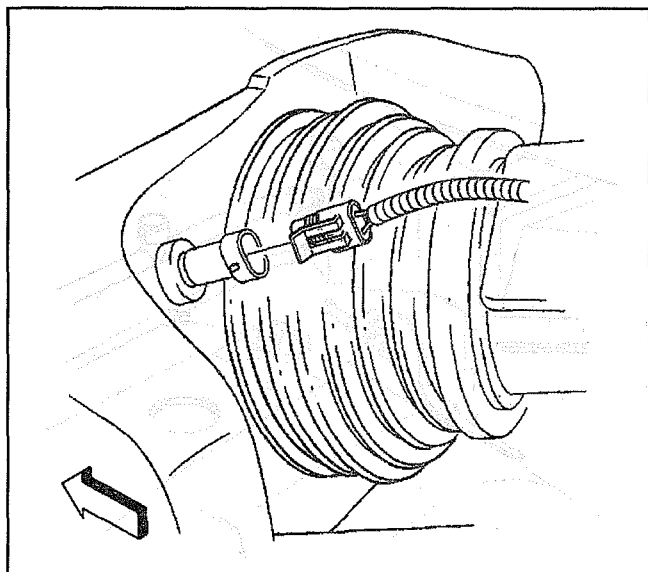
282951

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



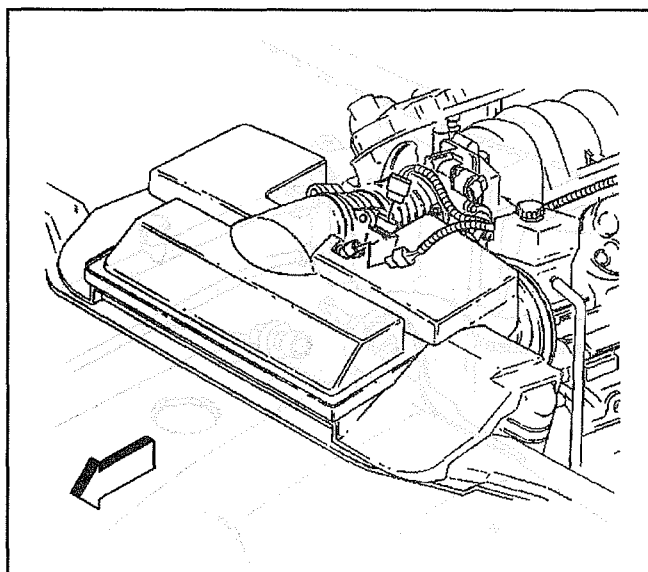
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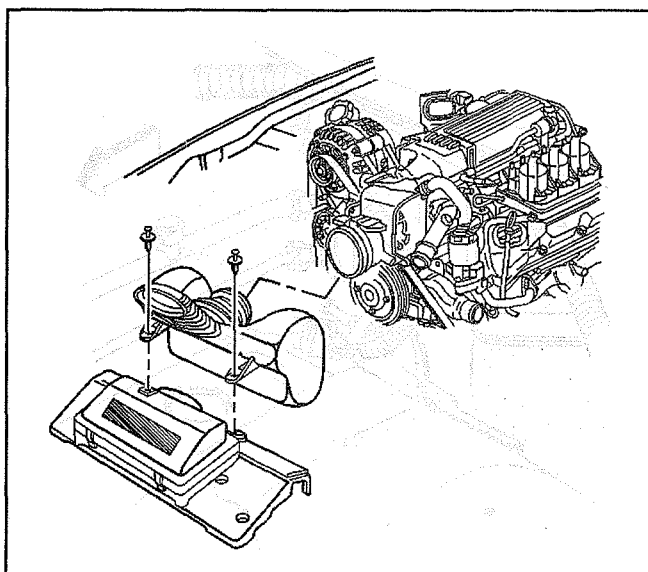
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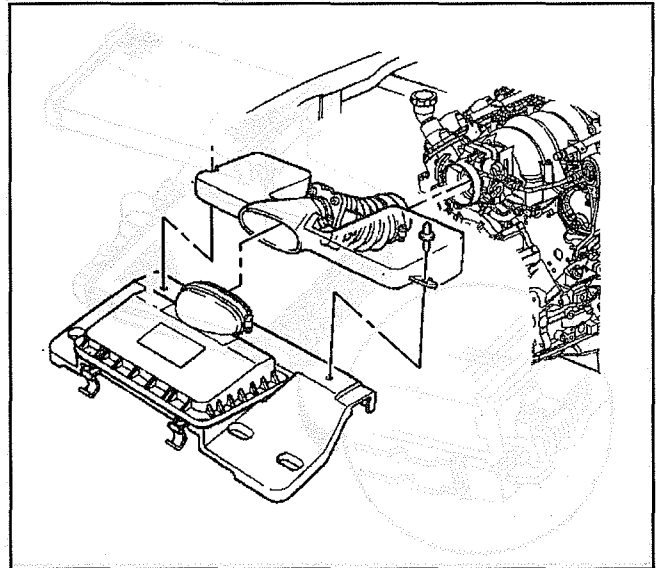
554755

Condenser Replacement

Removal Procedure

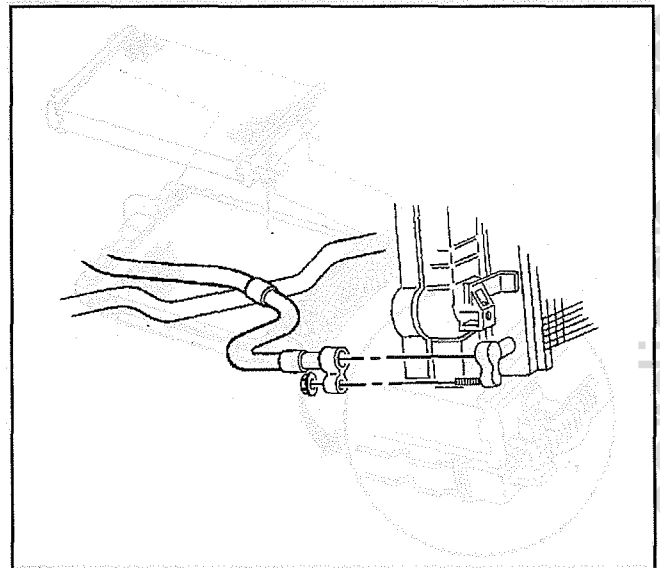
1. Recover the refrigerant. Refer to *Refrigerant Recovery and Recharging*.
2. Disconnect the intake air temperature (IAT) sensor connector at the air intake duct, if equipped with the 3.8 L engine.
3. Disconnect the intake air temperature (IAT) sensor and mass airflow (MAF) sensor connectors at the air intake duct, if equipped with the 5.7 L engine.
4. Remove the air intake duct, if equipped with the 3.8 L engine.

5. Remove the air intake duct, if equipped with the 5.7 L engine.
6. Remove the radiator support. Refer to *Radiator Support Replacement* in Engine Cooling.
7. Raise and suitably support the vehicle. Refer to *Lifting and Jacking the Vehicle* in General Information.



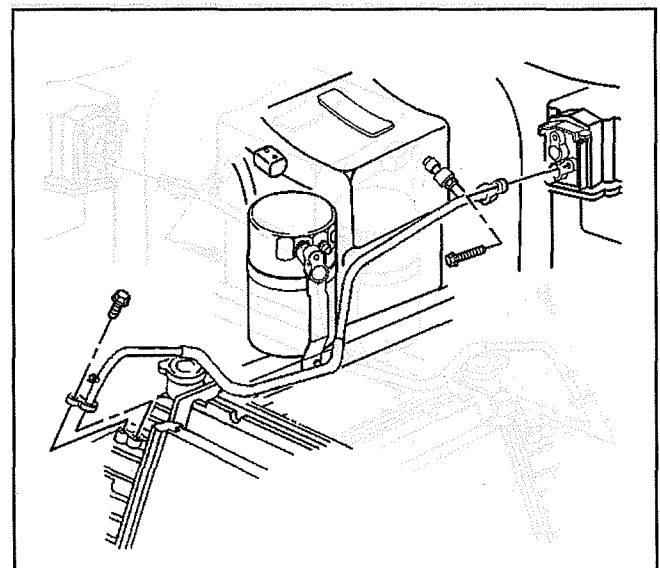
208569

8. Remove the air conditioning (A/C) compressor and condenser hose nut at the condenser.
9. Discard the O-ring.

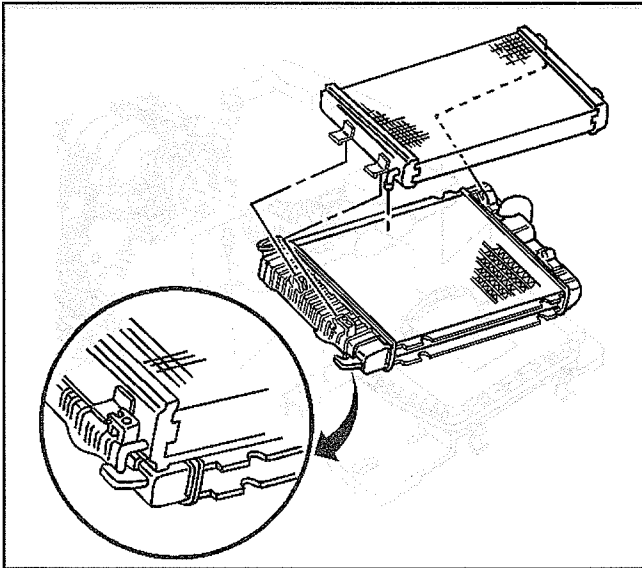


365450

10. Remove the A/C evaporator tube bolt at the condenser.
11. Discard the O-ring.
12. Remove the radiator air upper baffle from the condenser. Refer to *Radiator Air Baffle Assemblies and Deflectors (Upper)* in Engine Cooling.

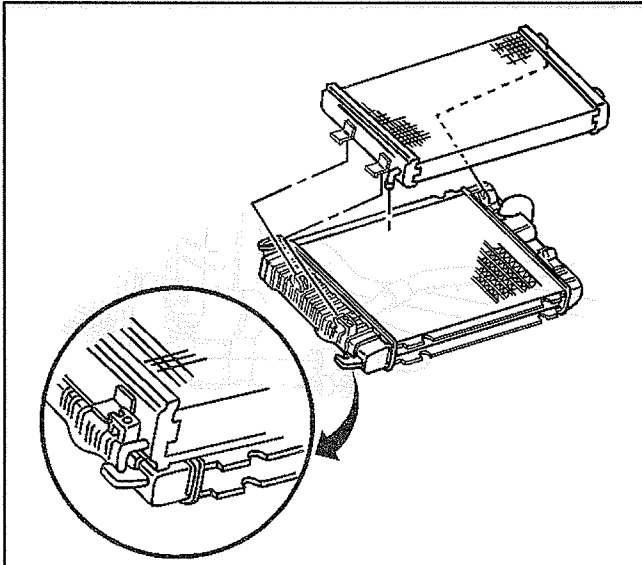


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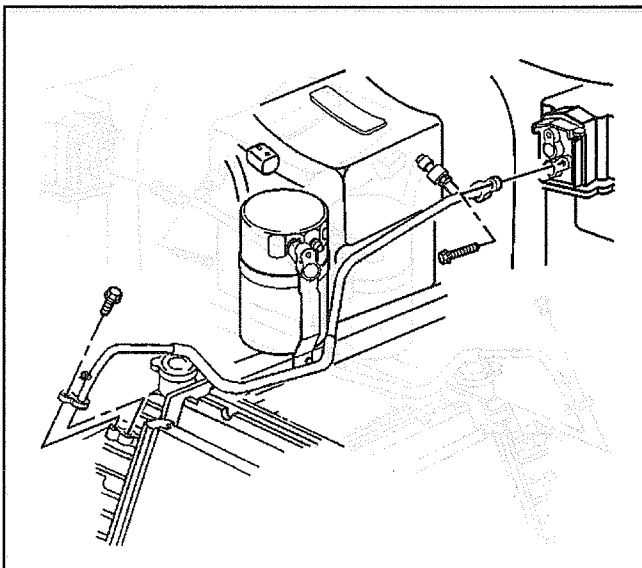
13. Remove the condenser from the radiator.



282959

Installation Procedure

1. Install the condenser to the radiator.
2. Install the radiator air upper baffle to the condenser. Refer to *Radiator Air Baffle Assemblies and Deflectors (Upper)* in Engine Cooling.



282946

3. Install a new O-ring.

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

4. Install the A/C evaporator tube bolt at the condenser.

Tighten

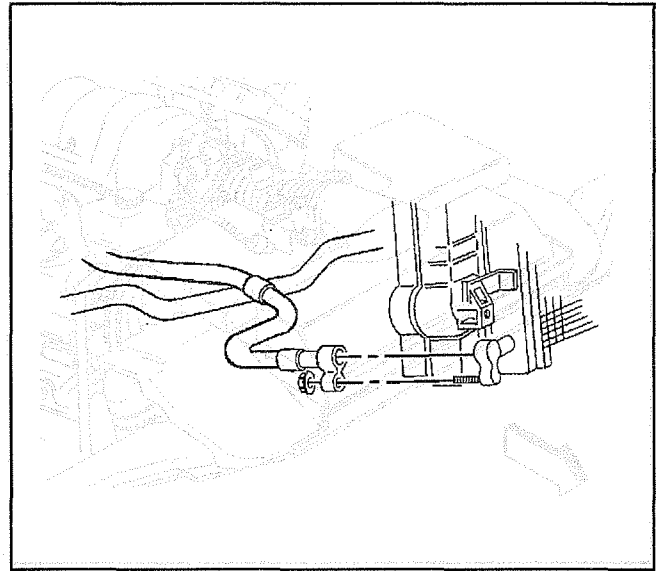
Tighten the A/C evaporator tube bolt at the condenser to 16 N·m (12 lb ft).

5. Install a new O-ring.
6. Install the A/C compressor and condenser hose nut at the condenser.

Tighten

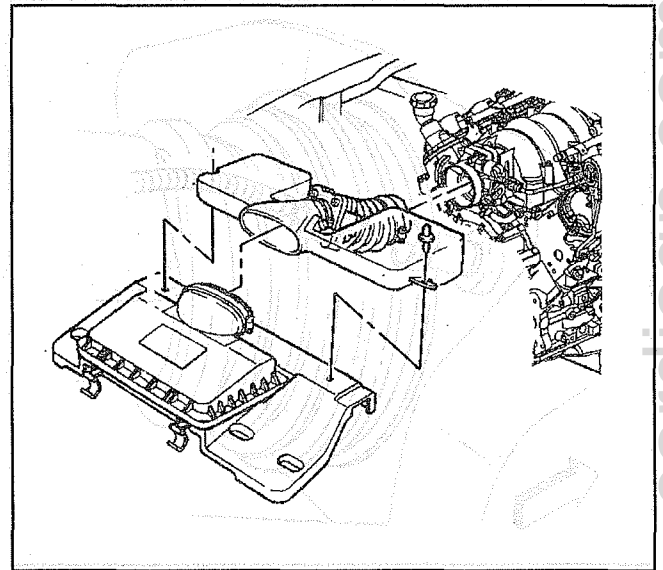
Tighten the A/C compressor and condenser hose nut at the condenser to 16 N·m (12 lb ft).

7. Lower the vehicle.
8. Install the radiator support. Refer to *Radiator Support Replacement* in Engine Cooling.



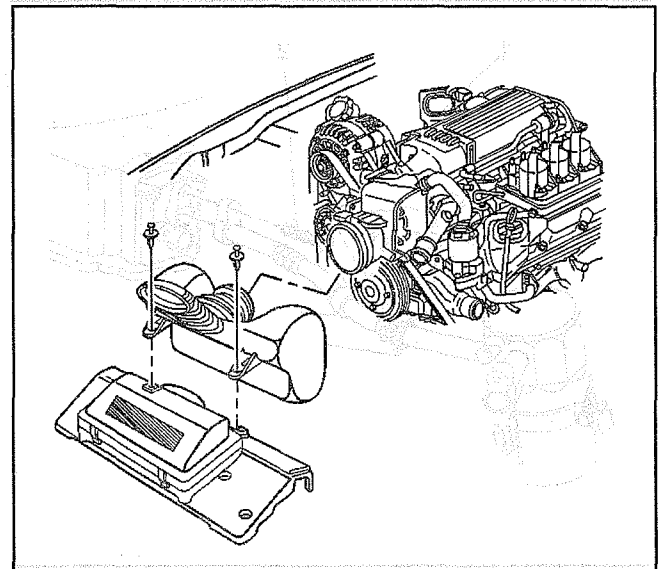
365450

9. Install the air intake duct, if equipped with the 5.7 L engine.

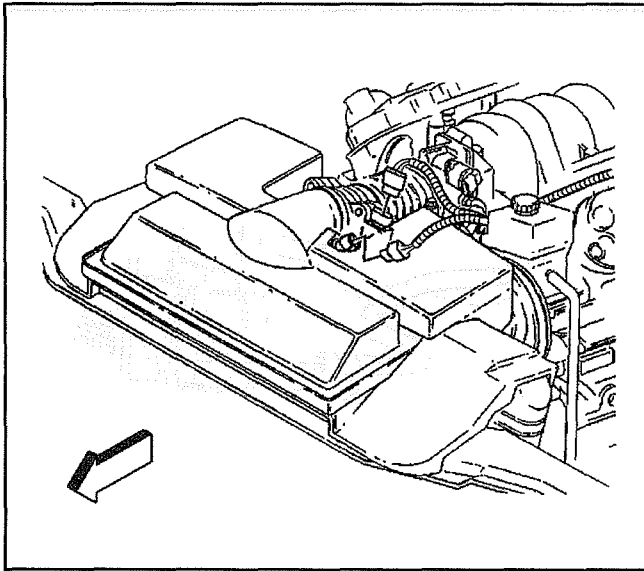


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10. Install the air intake duct, if equipped with the 3.8 L engine.

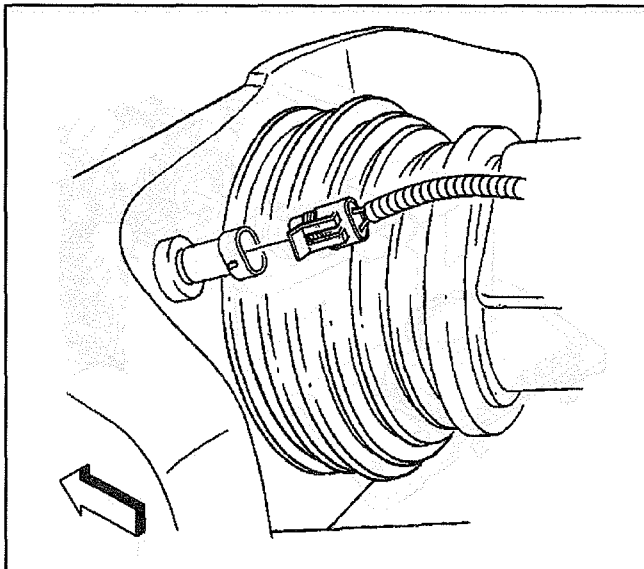


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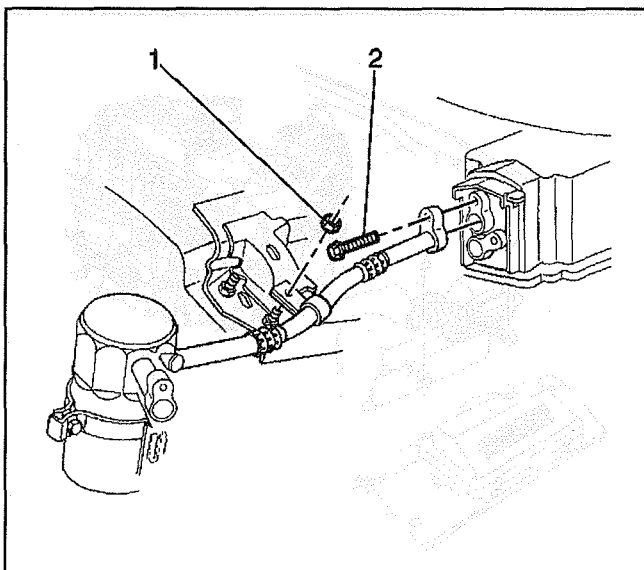
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11. Connect the intake air temperature (IAT) sensor and mass airflow (MAF) sensor connectors at the air intake duct, if equipped with the 5.7 L engine.



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12. Connect the intake air temperature (IAT) sensor connector at the air intake duct, if equipped with the 3.8 L engine.
13. Recharge the A/C system. Refer to *Refrigerant Recovery and Recharging*.
14. Perform a leak test on the A/C system. Refer to *Leak Testing*.



282943

Accumulator Replacement

Removal Procedure

1. Recover the refrigerant. Refer to *Refrigerant Recovery and Recharging*.
2. Disconnect the air conditioning (A/C) compressor and condenser hose bolt at the accumulator.
3. Remove the accumulator bolt (2) at the module.
4. Remove the accumulator hose bracket nut (1) at the strut tower.
5. Remove the accumulator bracket bolt.
6. Remove the accumulator from the bracket.
7. Discard the O-rings.

Installation Procedure

1. Before installing a new, or reinstalling the old accumulator perform the following:
 - 1.1. Drain, measure and record the amount of poly-alkylene glycol (PAG) oil in the accumulator that was removed.
 - 1.2. Add 60 ml (2 oz) of new, clean PAG oil MORE than the amount drained from the removed accumulator.
2. Install the new O-ring.
3. Install the accumulator to the bracket.

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

4. Install the accumulator bracket bolt.

Tighten

Tighten the accumulator bracket bolt to 6 N·m (53 lb in).

5. Install the accumulator hose bracket nut (1) at the strut tower.

Tighten

Tighten the accumulator hose bracket nut (1) at the strut tower to 8 N·m (71 lb in).

6. Install the accumulator bolt (2) at the module.

Tighten

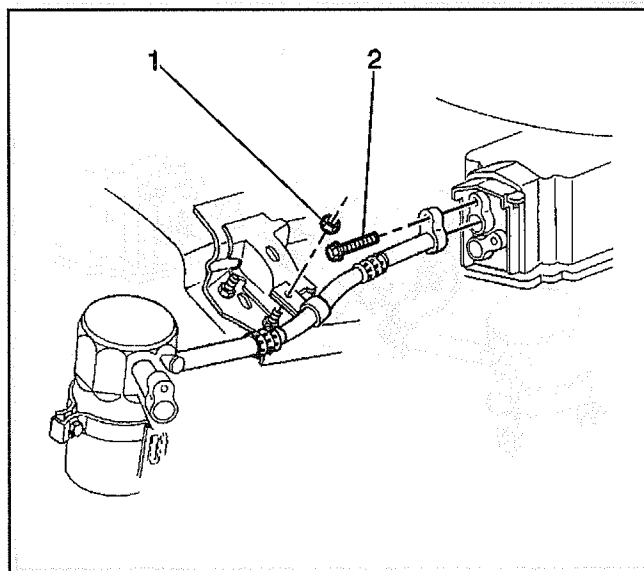
Tighten the accumulator bolt (2) at the module to 16 N·m (12 lb ft).

7. Connect the A/C compressor and condenser hose bolt at the accumulator.

Tighten

Tighten the A/C compressor and condenser hose bolt at the accumulator to 16 N·m (12 lb ft).

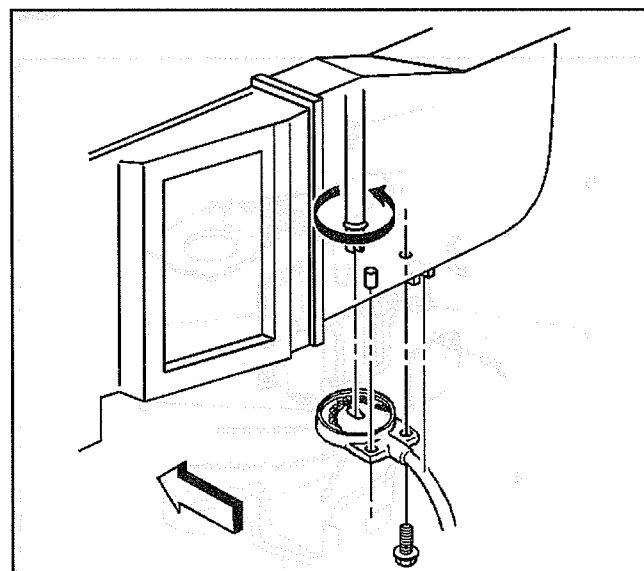
8. Recharge the A/C system. Refer to *Refrigerant Recovery and Recharging*.
9. Perform a leak test on the A/C system. Refer to *Leak Testing*.



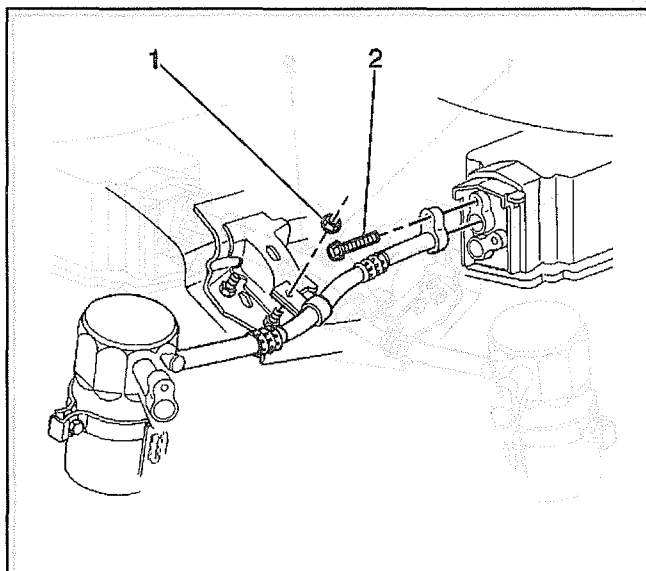
282943

Evaporator Core Replacement**Removal Procedure**

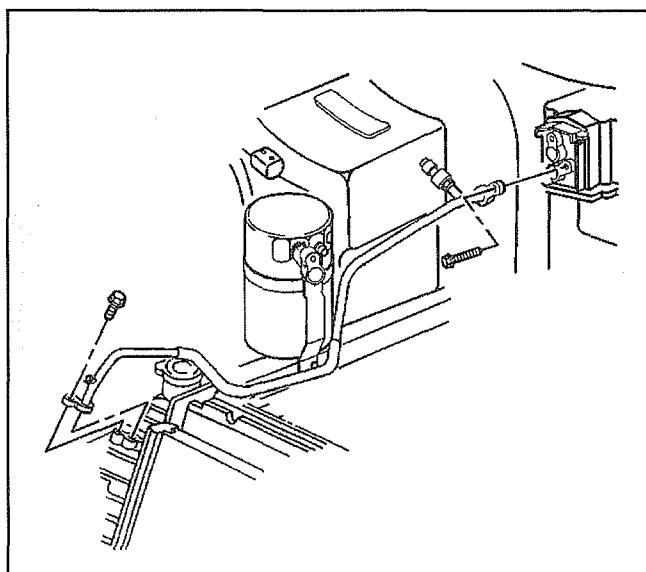
1. Drain the engine coolant. Refer to *Draining and Filling Cooling System (3.8 L)* or *Draining and Filling Cooling System (5.7 L)* in Engine Cooling.
2. Recover the refrigerant. Refer to *Refrigerant Recovery and Recharging*.
3. Remove the heater core. Refer to *Heater Core Replacement*.
4. Remove the temperature control cable bolt.
5. Remove the temperature control cable from the module.



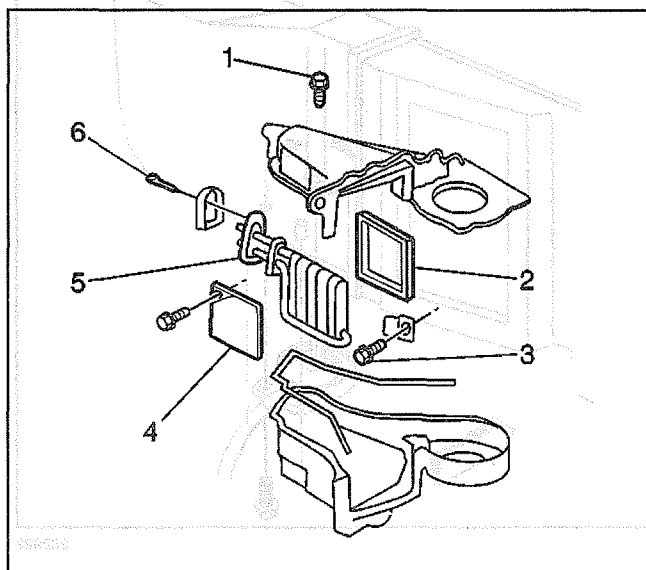
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6. Remove the accumulator bolt (2) at the module.

7. Discard the O-ring seal.

8. Remove the air conditioning (A/C) evaporator tube bolt at the module.

9. Discard the O-ring seal.

10. Remove the heater rear case bolts.

11. Remove the heater rear case (4):

11.1. Slide the heater rear case (4) downward in order to disengage the upper case clip.

11.2. Remove the heater rear case.

11.3. Use a small hand saw to remove the perforated section of the heating, ventilation and air conditioning (HVAC) evaporator module.

This section will be reused.

11.4. Water may leak onto the carpeting when performing this procedure. Place a mat on the passenger side floor.

11.5. Remove the A/C evaporator bracket nut (1).

11.6. Remove the A/C evaporator bracket.

- 11.7. Remove the bolts from the engine compartment side of the A/C evaporator upper and lower case.
- Open the case slightly.
- 11.8. Remove the A/C evaporator seal.
- 11.9. Remove the evaporator (6).
- 11.10. Transfer the A/C evaporator air filter (5) to the new evaporator.

Installation Procedure

1. Install the NEW A/C evaporator (6).
2. install a NEW A/C evaporator seal.
3. Apply sealer between the evaporator upper and lower case.

Do not use epoxy glue as a sealer.

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

4. Install the bolts to the engine side of the A/C evaporator upper and lower case.

Tighten

Tighten the A/C evaporator upper and lower case bolts to 2 N·m (18 in).

5. Install the A/C evaporator bracket.
6. Install the A/C evaporator bracket bolt (1).

Tighten

Tighten the A/C evaporator bracket bolt (1) to 2 N·m (18 lb in).

7. Position the perforated section of the evaporator module.

Use epoxy glue in order to adhere the perforated section to the module.

Allow the epoxy to dry.

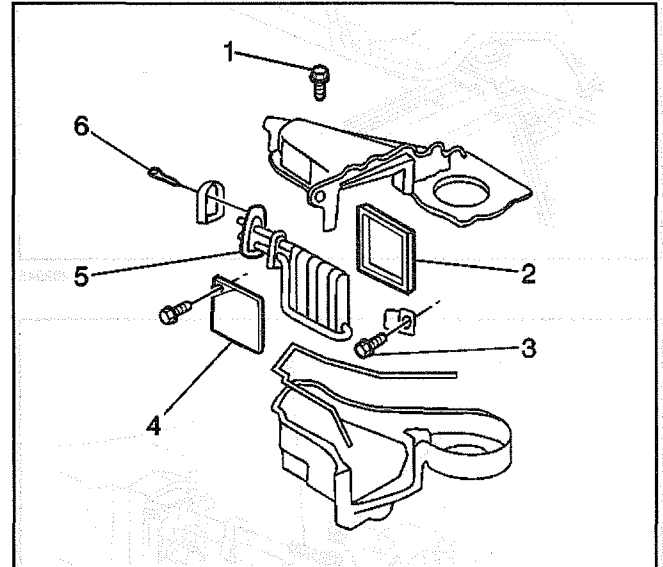
8. Use your thumb in order to grade the sealant on the inside and the outside in order to ensure a water-tight seal.

9. Use the following steps in order to install the heater rear case (4):

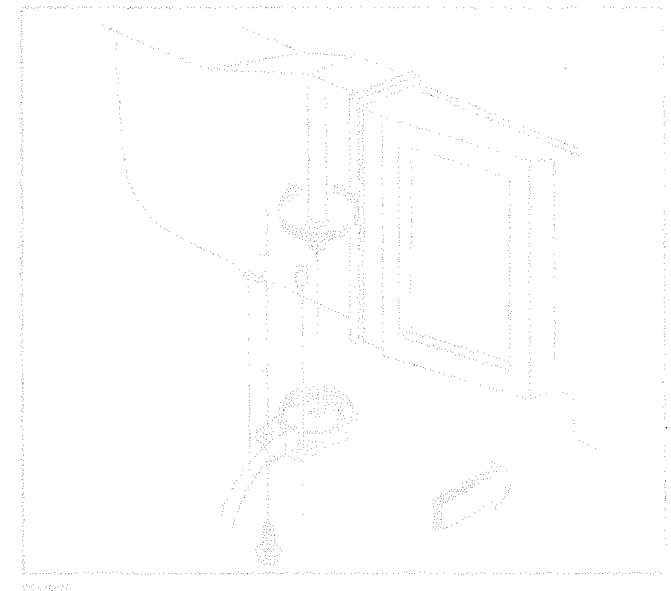
- 9.1. Slide the heater rear case upward into position until the upper clip engages.
- 9.2. Engage the snap on the left edge of the heater rear case to the distributor case.
- 9.3. Install the bolts to the heater rear case.

Tighten

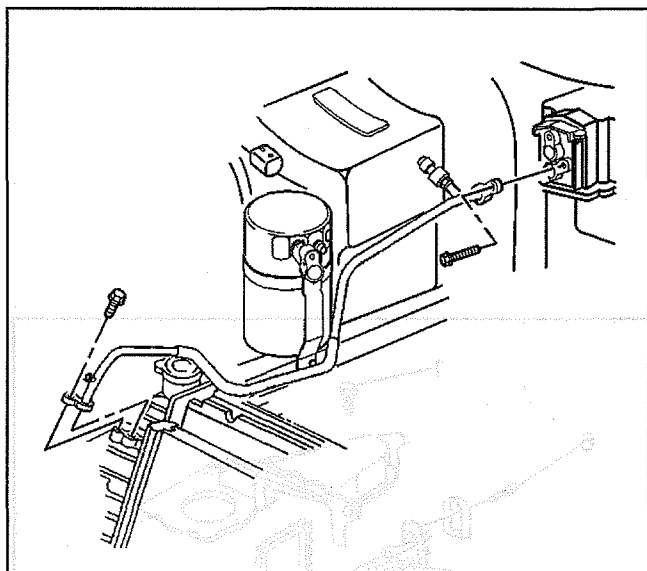
Tighten the heater rear case bolts to 2.0 N·m (18 lb in).



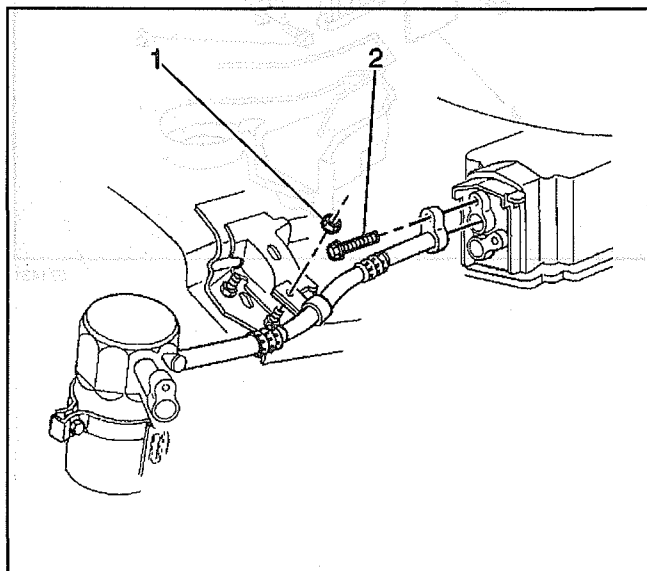
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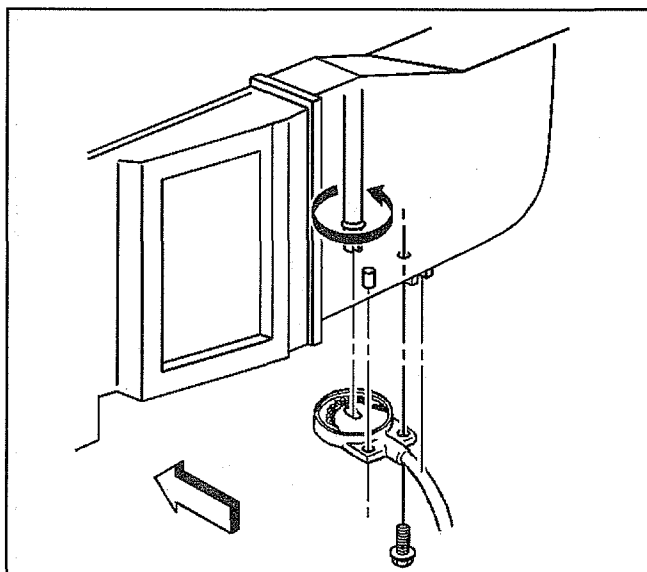
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10. Install a new O-ring seal.
11. Install the A/C evaporator tube bolt at the module.

Tighten

Tighten the A/C evaporator tube bolt to 16 N·m (12 lb ft).

12. Install a new O-ring seal.
13. Install the accumulator bolt at the module.

Tighten

Tighten the accumulator bolt (2) to 16 N·m (12 lb ft).

14. Install the temperature control cable to the module.
15. Install the temperature control cable bolt.

Tighten

Tighten the temperature control cable bolt to 1.9 N·m (17 lb in).

16. Install the heater core. Refer to *Heater Core Replacement*.
17. Recharge the refrigerant. Refer to *Refrigerant Recovery and Recharging*.
18. Refill the cooling system. Refer to *Draining and Filling Cooling System (3.8 L)* or *Draining and Filling Cooling System (5.7 L)* in Engine Cooling.

Heater Hose Assembly Replacement (3.8 L)

Removal Procedure

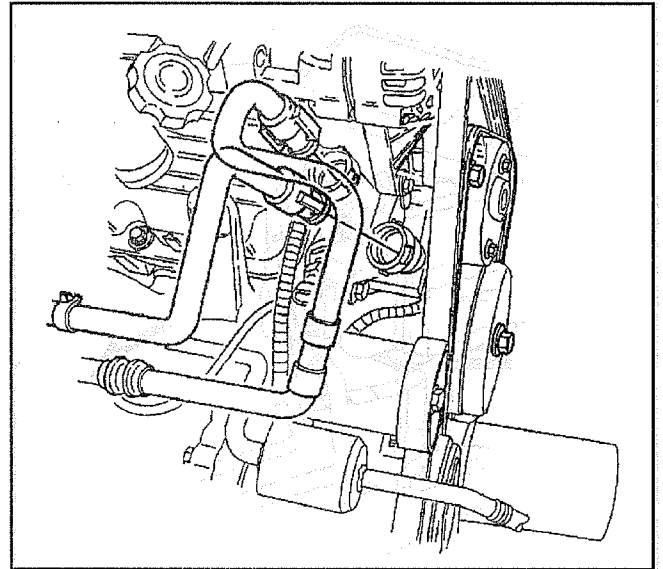
1. Partially drain the engine coolant.

Notice: Remove the heater hose quick connect fittings by hand. Do not attempt to pry the quick connect fittings from the drive belt tensioner. Prying the quick connect fittings may damage the quick connect fittings.

2. Disconnect the heater hose quick connect fittings from the drive belt tensioner.

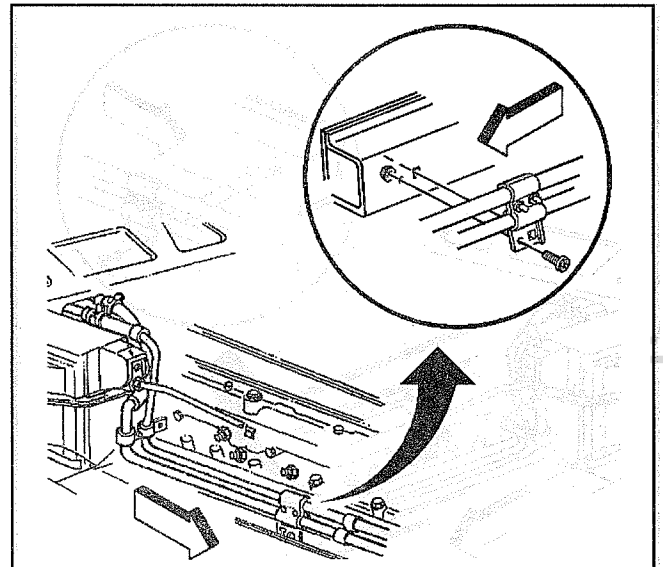
Twist and pull the quick connect fittings from the drive belt tensioner.

3. Discard the O-rings.



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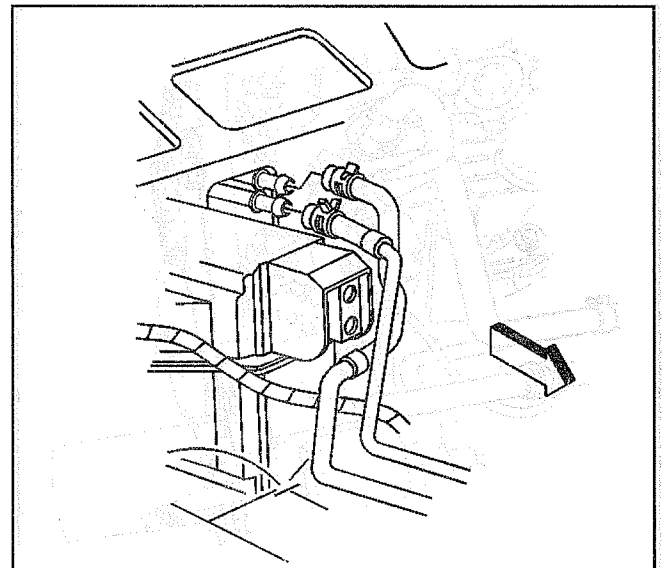
4. Remove the bolt attaching the inlet and outlet hose bracket at the mid rail.



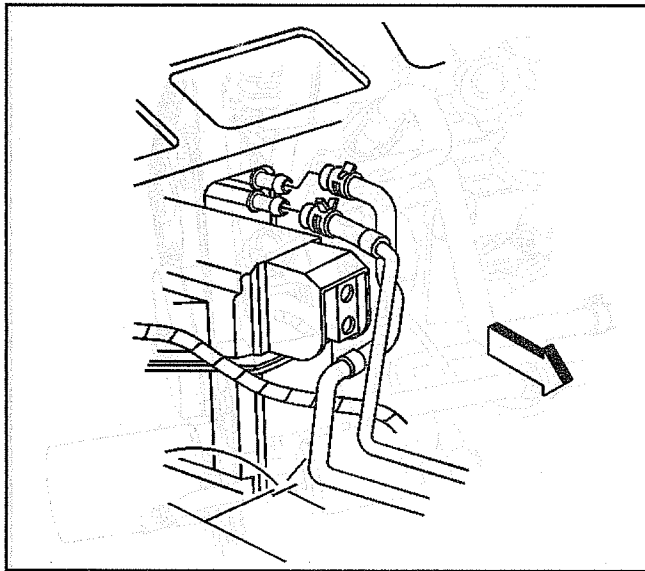
282932

Notice: Do not apply excessive force on the heater core pipes during hose removal. Applying excessive force on the heater core pipes may damage the heater core pipes.

5. Remove the inlet and outlet hoses from the heater core.
 - 5.1. Squeeze the hose clamp with the pliers.
 - 5.2. Slide the clamp away from the heater core fittings.
 - 5.3. Gently twist and pull the heater hose from the heater core fitting.
6. Remove the inlet hose from the module retainer.
7. Remove the inlet and outlet hoses (4) from the vehicle.



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Installation Procedure

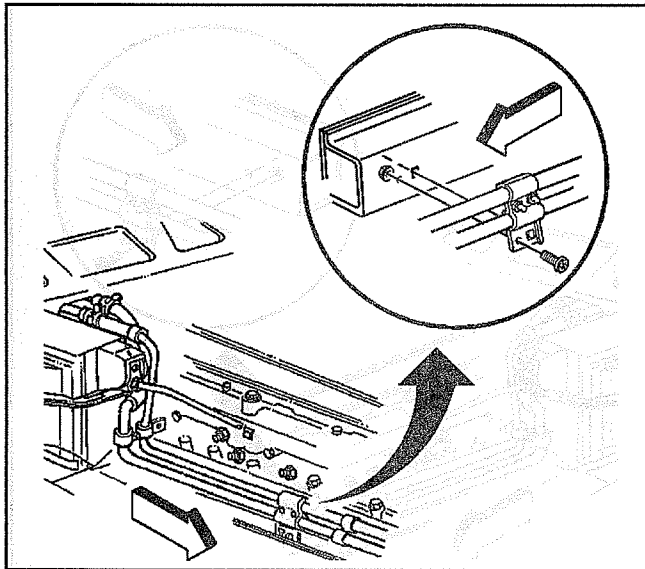
1. Install the inlet and outlet hoses to the vehicle.
2. Install the inlet hose to the module retainer.
3. Install the inlet and outlet hoses to the heater core.
 - 3.1. Apply lubricant to the inside diameter of the heater hose, if necessary.
 - 3.2. Push the heater hose onto the fitting with a twisting motion.
 - 3.3. Squeeze the hose clamp ends together and slide the clamp over the end of the heater hose.
 - 3.4. Install the clamp beyond the bead around the fitting.
 - 3.5. Install the other heater hose.

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

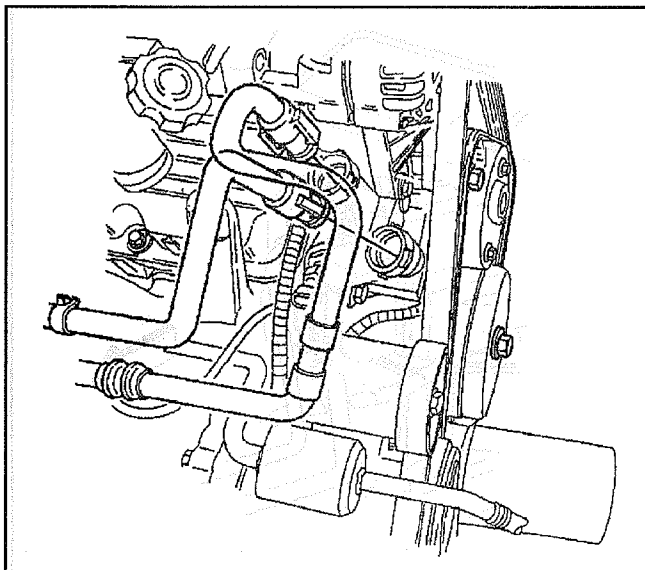
4. Install the bolt attaching the inlet and outlet hose bracket at the mid rail.

Tighten

Tighten the heater hose bracket bolt to 14 N·m (10 lb ft).



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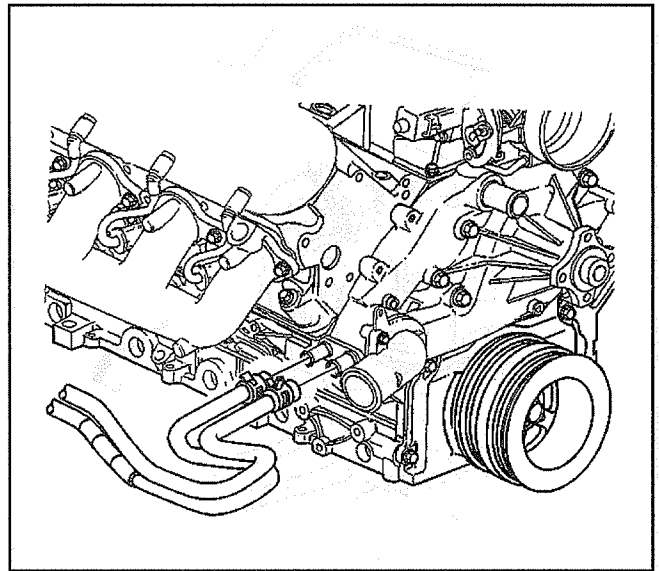


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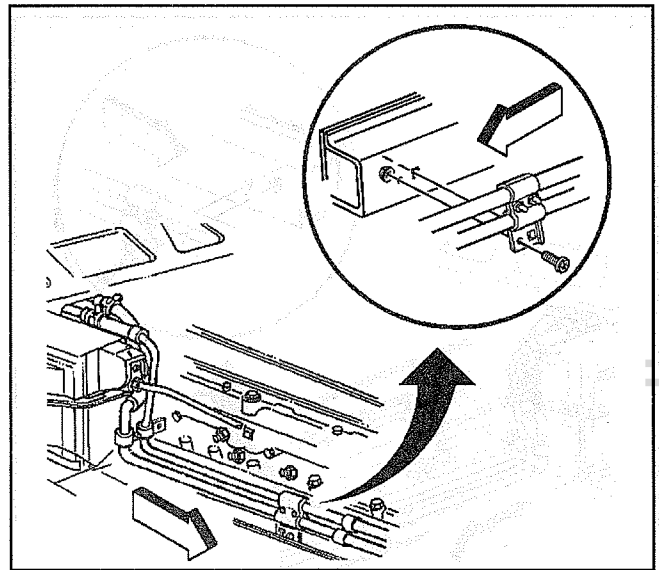
5. Install the O-rings to the quick connect fittings. Snap the quick connect fittings to the drive belt tensioner.
6. Pull back on the quick connect fittings in order to verify proper connector engagement.
7. Add the engine coolant.
 - If the previously drained coolant is uncontaminated, use the previously drained coolant.
 - If the previously drained coolant is contaminated, discard the contaminated coolant.
 Then, add a fresh 50/50 DEX-COOL and water mixture.

Heater Hose Assembly Replacement (5.7 L)**Removal Procedure**

1. Partially drain the engine coolant.
2. Remove the inlet and outlet heater hoses from the water pump.
 - 2.1. Squeeze the hose clamp together with pliers.
 - 2.2. Slide the hose clamp away from the water pump fitting.
 - 2.3. Gently twist and pull the heater hose from the water pump fitting.
 - 2.4. Remove the heater hose.
 - 2.5. If the heater hoses cannot be removed easily perform the following steps:
 - 2.5.1. Cut the hose forward of the hose pipe.
 - 2.5.2. Cut the hose remaining on the water pump fitting lengthwise.
 Remove the heater hose.
3. Remove the bolt attaching the inlet and outlet hose bracket at the mid rail.



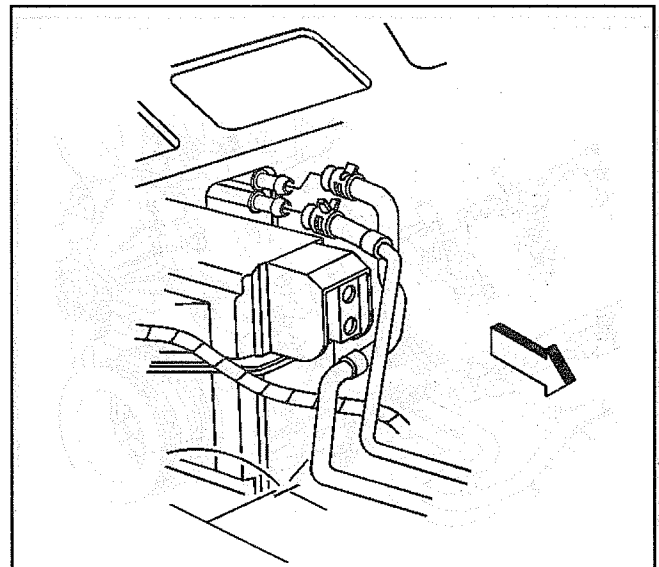
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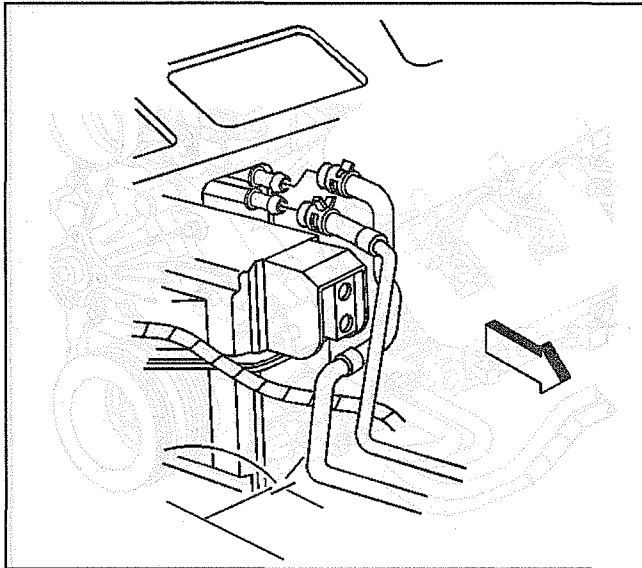
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Notice: Do not apply excessive force on the heater core pipes during hose removal. Applying excessive force on the heater core pipes may damage the heater core pipes.

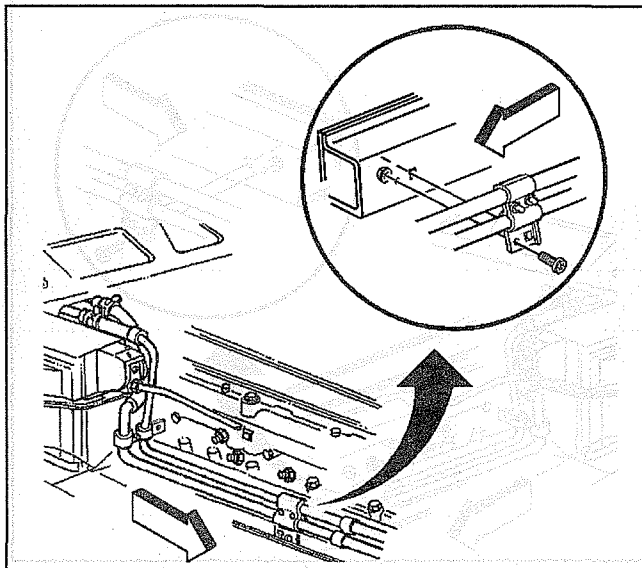
4. Remove the inlet and outlet hoses from the heater core.
 - 4.1. Squeeze the hose clamp with pliers.
 - 4.2. Slide the clamp away from the heater core fittings.
 - 4.3. Gently twist and pull the heater hose from the heater core fitting.
5. Remove the inlet hose from the module retainer.
6. Remove the inlet and outlet hoses from the vehicle.



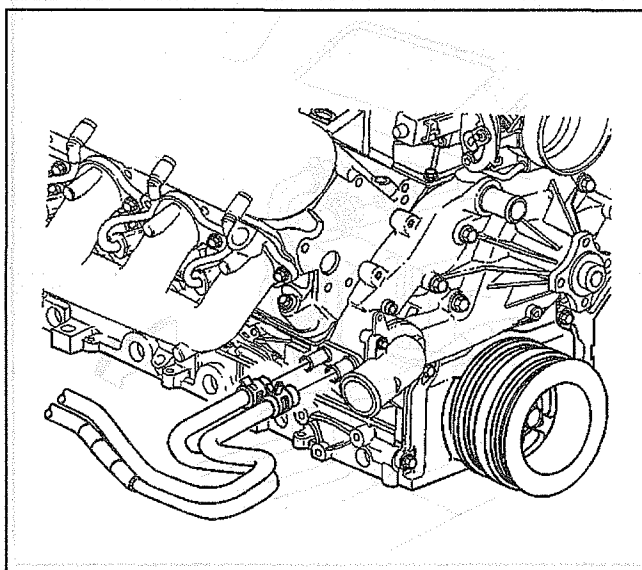
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Installation Procedure

1. Install the inlet and outlet hoses to the vehicle.
2. Install the inlet hose to the module retainer.
3. Install the inlet and outlet hoses to the heater core.
 - 3.1. Apply lubricant to the inside diameter of the heater hose, if necessary.
 - 3.2. Push the heater hose onto the fitting with a twisting motion.
 - 3.3. Squeeze the hose clamp ends together and slide the clamp over the end of the heater hose.
 - 3.4. Install the clamp beyond the bead around the fitting.
 - 3.5. Install the other heater hose.

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

4. Install the bolt attaching the inlet and outlet hose bracket at the mid rail.

Tighten

Tighten the heater hose bracket bolt to 14 N·m (10 lb ft).

5. Install the inlet and outlet heater hoses to the water pump.
 - 5.1. Apply lubricant to the inside diameter of the heater hose, if necessary.
 - 5.2. Push the heater hose onto the fitting with a twisting motion.
 - 5.3. Squeeze the hose clamp ends together and slide the clamp over the end of the heater hose.
 - 5.4. Slide the hose clamp away from the water pump fitting.
 - 5.5. Install the clamp beyond the bead around the fitting.
 - 5.6. Install the other heater hose.

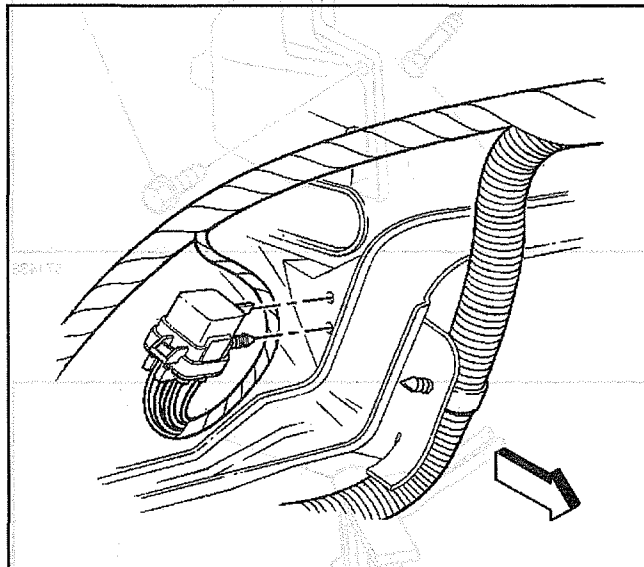
6. Add the engine coolant:

- If the previously drained coolant is uncontaminated, use the previously drained coolant.
- If the previously drained coolant is contaminated, discard the contaminated coolant.

Then, add a fresh 50/50 DEX-COOL and water mixture.

Blower Motor Relay Replacement**Removal Procedure**

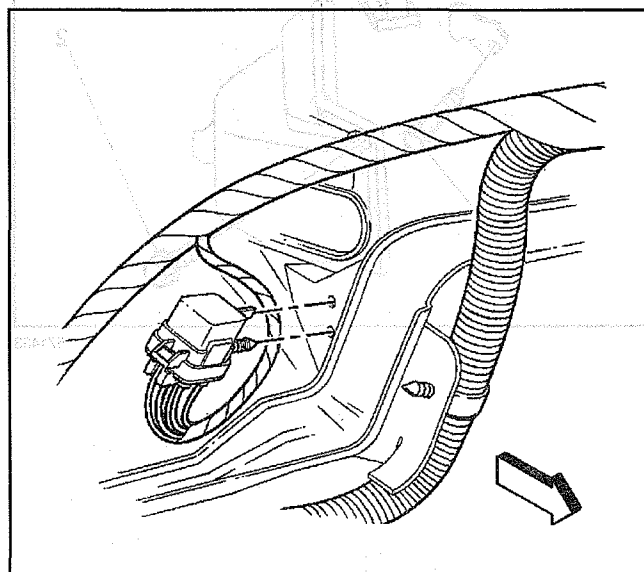
1. Remove the driver side instrument panel (IP) insulator. Refer to *Closeout/Insulator Panel Replacement - Left in Instrument Panel, Gauges and Console*.
2. Remove the knee bolster. Refer to *Knee Bolster Replacement - Left in Instrument Panel, Gauges and Console*.
3. Remove the blower motor relay from the IP tie bar.
4. Disconnect the electrical connector from the blower motor relay.



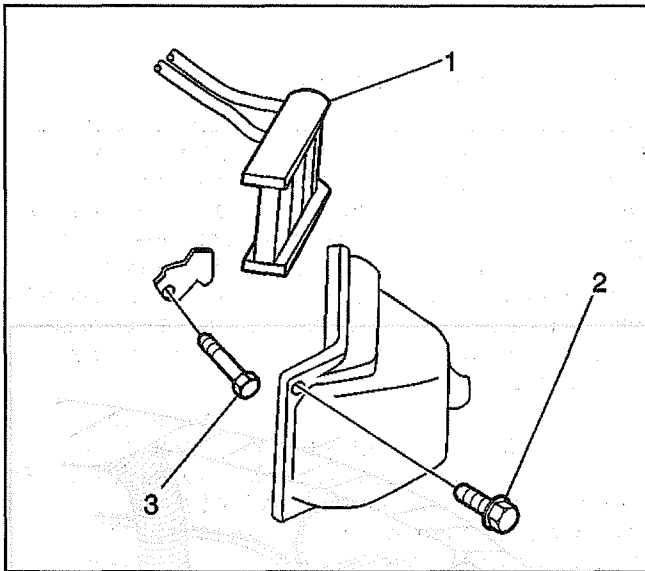
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Installation Procedure

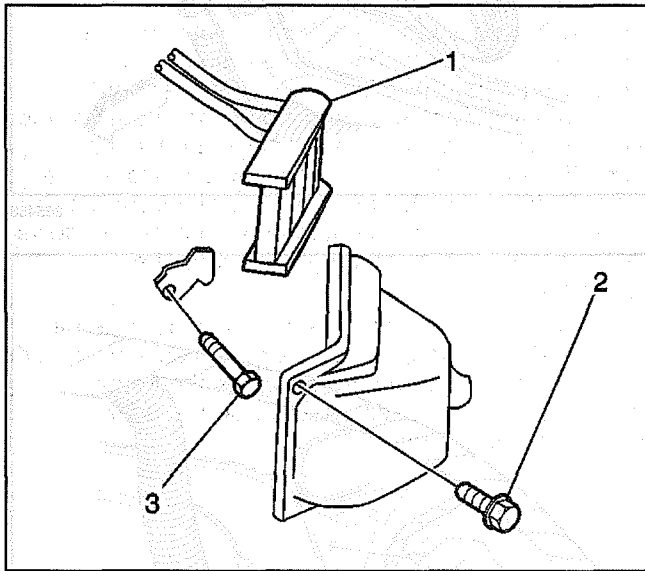
1. Connect the electrical connector to the blower motor relay.
2. Install the blower motor relay to the IP tie bar.
3. Install the knee bolster. Refer to *Knee Bolster Replacement - Left in Instrument Panel, Gauges and Console*.
4. Install the driver side IP insulator. Refer to *Closeout/Insulator Panel Replacement - Left in Instrument Panel, Gauges and Console*.



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Heater Core Replacement

Removal Procedure

1. Drain the engine coolant. Refer to *Draining and Filling Cooling System (3.8 L)* or *Draining and Filling Cooling System (5.7 L)* in Engine Cooling.
2. Remove the heater hoses/pipes. Refer to *Heater Hose Assembly Replacement (3.8 L)* or *Heater Hose Assembly Replacement (5.7 L)*.
3. Remove the heater core tube clamp bolt.
4. Remove the heater core tube clamp.
5. Remove the heater core shroud seal.
6. Remove the heater rear case bolts (2).
7. Remove the heater rear case (4):
 - 7.1. Slide the heater rear case (4) downward in order to disengage the upper case clip.
 - 7.2. Remove the heater rear case.
8. Remove the instrument panel (IP) compartment door. Refer to *Door Replacement - IP Storage Compartment Door*.
9. Remove the heater core clamp bolt (3).
10. Remove the heater core clamp.
11. Remove the heater core (1).

Installation Procedure

1. Install the heater core.
 2. Install the heater core clamp.
- Notice:** Refer to *Fastener Notice* in Cautions and Notices.

3. Install the heater core clamp bolt.

Tighten

Tighten the heater core clamp bolt to 1.8 N·m (16 lb in).

4. Use the following steps in order to install the heater rear case (4):
 - 4.1. Slide the heater rear case upward into position until the upper clip engages.
 - 4.2. Engage the snap on the left edge of the heater rear case to the distributor case.
 - 4.3. Install the bolts to the heater rear case.

Tighten

Tighten the heater rear case bolts to 2.0 N·m (18 lb in).

5. Install the heater core shroud seal.
6. Install the heater core tube clamp.
7. Remove the heater core tube clamp bolt.

Tighten

Tighten the heater core tube clamp bolt to 2 N·m (18 lb in).

8. Remove the instrument panel (IP) compartment door. Refer to *Door Replacement - IP Storage Compartment Door*.
9. Install the heater hoses/pipes. Refer to *Heater Hose Assembly Replacement (3.8 L)* or *Heater Hose Assembly Replacement (5.7 L)*.
10. Drain the engine coolant. Refer to *Draining and Filling Cooling System (3.8 L)* or *Draining and Filling Cooling System (5.7 L)* in Engine Cooling.

Description and Operation

A/C System Description

The heating, ventilation and air conditioning (HVAC) system delivers air that has been heated or cooled and dehumidified for occupant comfort. The HVAC system also provides the following features:

- Ventilation
- Windshield defrosting
- Side window defogging

During most operating condition, the blower motor draws the outside air through the heater and air conditioning module. The forward movement of the vehicle forces additional air into the vehicle. The following actions occur in the evaporator core when the compressor is on:

- The air is filtered
- The air is dehumidified
- The air is cooled to about 2°C (35°F)

Some of the air then passes through the heater core where the flow of hot coolant reheats the air. Depending on the temperature door position, the heated air is mixed with cold air from the evaporator before the air enters into the passenger compartment. The air enters the passenger compartment through the upper, lower, or defroster outlets. This provides positive air flow even if the windows are closed.

When the Recirc mode is selected, most of the air entering the evaporator and heater core module is recirculated from the passenger compartment. Recirculated air is most likely cooler and dryer than outside air in very hot weather.

Heater Core Description

The heater core is the main component of the heater system. The heater core is located inside of the heater and evaporator module. Engine coolant is pumped into the heater core from the engine whenever the engine is operating. The heater core fins transfers the heat from the engine coolant to the air passing over the heater core. The heater core has specific inlet and outlet tubes. The placement of the heater hoses should be noted prior to servicing the heater core or the heater hoses.

The temperature control is linked to the temperature valve by a flexible control cable. When you rotate temperature control counterclockwise to the full COLD position, the temperature valve is held snugly against the air entrance to the heater core. The following actions occur:

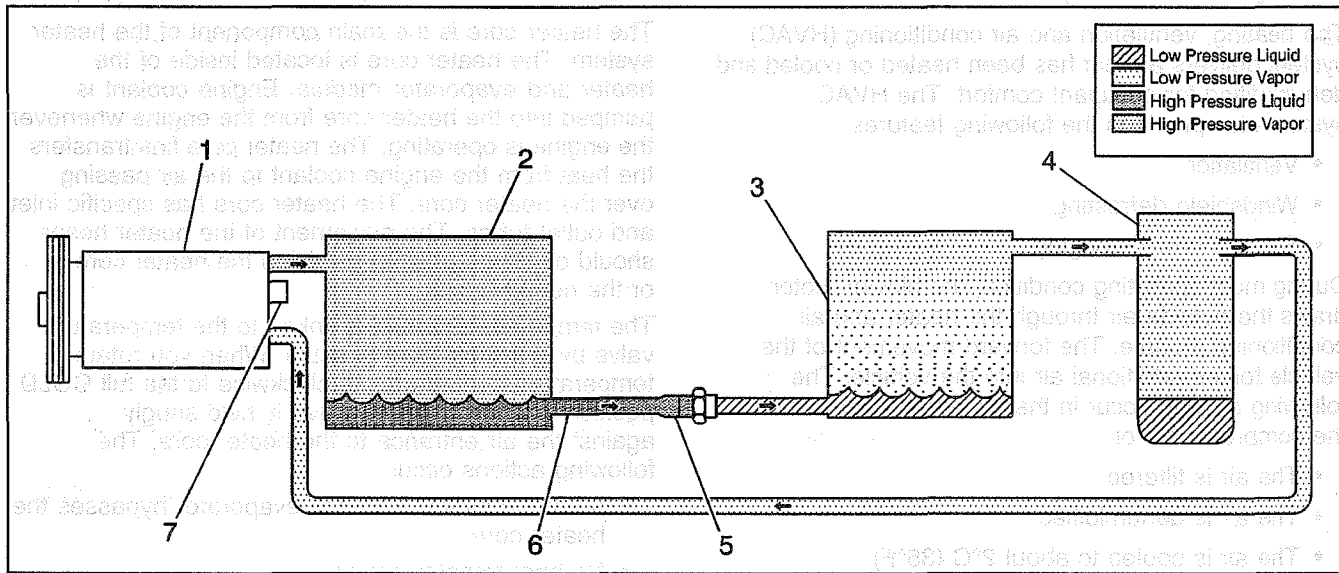
- All of the airflow from the evaporator bypasses the heater core.
- No heat transfer occurs.

When you turn the temperature control away from the full COLD position, the temperature valve begins to direct air to the heater core. This action allows air to flow through the heater core. The farther the temperature control is rotated clockwise, the more the temperature valve directs air through the heater core. The air discharge is warmer when most of the airflow is heated in this manner. The air discharge is warmer because the heated and unheated air flows join and mix together thoroughly beyond the heater core.

When you rotate the temperature lever clockwise to the full HOT position, the temperature valve blocks off the passage that allows air to bypass the heater core. This action causes passage of the airflow through the heater core.

Refrigeration System Description

VDOT Refrigeration System



Legend

- (1) Compressor
- (2) Condenser
- (3) Evaporator
- (4) Accumulator

- (5) Expansion (Orifice) Tube
- (6) Liquid Line
- (7) Pressure Relief Valve

The variable displacement orifice tube (VDOT) system is comprised of the following components:

- A variable displacement compressor (1)
- A fixed expansion tube (5)

This system matches the air conditioning demands under all modes without cycling. The basic compressor mechanism is a variable angle wobble-plate with five cylinders. The five cylinders are oriented around a common axis. The center of control of the compressor displacement is the control valve. The control valve is actuated by a bellows. The control valve is located in the rear head of the compressor (1) that senses compressor suction pressure. the crankcase-suction pressure differential controls the following conditions:

- The wobble-plate angle
- The compressor displacement

When the A/C capacity demand is high, the suction pressure will be above the control point. The valve performs the following functions:

- Maintains a bleed discharge gas into the crankcase
- Closes off a passage from the crankcase to the suction plenum

The angle of the wobble-plate is controlled by a force balance on the five pistons. A slight elevation of the crankcase suction pressure differential creates a total force on the pistons. The force on the pistons produces a movement about the wobble-plate pivot pin that reduces the plate angle.

Refrigerant R-134a

Caution: Refer to Caution - Breathing R-134a in Cautions and Notices.

Refrigerant performs the following functions in the air conditioning system:

- Absorbs heat
- Carries heat
- Releases heat

These vehicles use Refrigerant-134a (R-134a). Refrigerant-134a is a nontoxic, nonflammable, clear, colorless liquefied gas.

Handling Refrigerant R-134a

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.

Important:

- Use only the approved lubricant for the R-134a system and the R-134a components. If lubricants other than those specified are used, compressor failure may occur. Coat all of the fittings and the O-ring seals with a clean approved refrigerant oil. This action will provide a leak-proof seal and to aid in assembly and disassembly.
- Do not store or heat the refrigerant containers above 125°F (52°C).
- Do not heat a refrigerant container with an open flame. If the container must be warmed, place the bottom of the container in a pail of warm water.
- Do not drop, puncture, or incinerate the refrigerant containers.
- Refrigerant will displace oxygen. Work in well-ventilated areas in order to prevent suffocation.
- Do not introduce compressed air to any refrigerant container or refrigerant component. The action may cause the contamination of the refrigerant.
- If it is necessary to carry a container of Dot CFR Refrigerant-134a in a vehicle, do not carry it in the passenger compartment.

Handling Compressor Oil

Use approved compressor oil from a closed, sealed container. When adding refrigerant oil, the transfer device and container should be clean and dry to minimize the possibility of contamination. Refrigerant oil is moisture-free and will readily absorb moisture from the air. Do not open the oil container until the service procedure requires oil. Cap the oil immediately after use. Always store compressor oil in a closed sealed container. Compressor oil left in open or improperly sealed containers will absorb moisture. Do not reuse oil that has been removed from the refrigeration system. Dispose of used oil properly, according to local regulations.

Handling of Refrigerant Lines and Fittings

- Ensure that the metal lines do not exhibit the following conditions.
This will prevent the loss of system capacity due to line restriction:
 - Dents
 - Kinks
- Do not bend the flexible hose line to a radius of less than 4 times the diameter of the hose.
- Do not allow the flexible hose line to come within a distance of 63.5 mm (2 1/2 in) of the exhaust manifold.
- Inspect the flexible hose lines regularly.
Replace the flexible hose line with new hose if one of the following conditions exist:
 - Leaks
 - Brittleness
 - Deterioration
- Before disconnecting any fitting in the refrigeration system, discharge all of the Refrigerant-134a. Refer to *Refrigerant Recovery and Recharging*.
- Once you open a refrigerant line to the atmosphere, cap or tape the line immediately.
This will prevent any of the following items from entering the line:
 - Moisture
 - Dirt
- Use the proper wrenches when you make connections on the O-ring fittings.
Back-up the opposing fitting with a wrench in order to prevent distortion of the following areas:
 - The connecting lines
 - The components

- Tighten all of the tubing connections to the specified torque.
Too much or too little torque may result in the following conditions:
 - Loose joints
 - Deformed joint parts
 - Refrigerant leakage
 - An inoperative A/C system
- Ensure that the O-rings and the seats are in perfect condition.
A burr or a piece of dirt may cause a refrigerant leak.
- Install new O-rings that you have lubricated with the mineral base 525 viscosity refrigerant oil.
Do not use polyalkylene glycol (PAG) synthetic oil.
Do not wipe the threads with a cloth.
- Keep PAG synthetic refrigerant oil off fitting threads. Long term contact of PAG synthetic oil on threads may cause future disassembly difficulties. Flush threads of fitting with mineral base 525 viscosity refrigerant oil. Do not use PAG synthetic oil. Do not wipe threads with a cloth.

Handling A/C Compressor

Do not strike, drop, or turn the compressor upside down. If the compressor is knocked over or turned upside down, rotate the compressor's clutch 5–6 times by hand to circulate the oil which has settled in the cylinder. Sudden rotating with oil in the cylinder can cause valve damage and adversely affect durability.

Maintaining Chemical Stability

The chemical stability of the refrigeration system plays an important role in the efficient operation and longevity of the A/C system.

When air, moisture or particulate contamination are introduced into the refrigeration system, the following results will occur:

- The chemical stability of R-134a and polyalkylene glycol (PAG) synthetic lubricant will change.
- The pressure/temperature symmetry will change.
- The A/C system efficiency will be diminished.
- Internal A/C system parts may corrode and/or wear in an abnormal manner.

Use the following general practices to maintain chemical stability in the refrigeration system:

- Wipe away dirt and/or oil before you break a refrigerant connection. This will reduce the possibility of particulate contamination.
- Cap, plug or tape both sides of an open connection as soon as possible. This will minimize the amount of dirt and moisture entering the system.
- Ensure that the following remain clean and dry:
 - The tools being used for the repair
 - The surrounding area of the repair
 - The hoses and connectors for the ACR4 machine or manifold gage set
 - The replacement parts
- When adding polyalkylene glycol (PAG) lubricant, ensure the transfer device and the container remain clean and dry to minimize moisture intrusion.
- Do not leave the A/C system open any longer than necessary.
- Before recharging an A/C system that has been opened, properly evacuate and vacuum test the system.
- Service parts are dehydrated and sealed prior to shipping. Retain the parts in their sealed packages until you are ready to use them.
- Ensure the parts are at room temperature before opening the packages. This prevents condensation on the parts from humidity in the atmosphere.
- Attach the A/C service equipment quick-connects as soon as possible after removing the service caps.

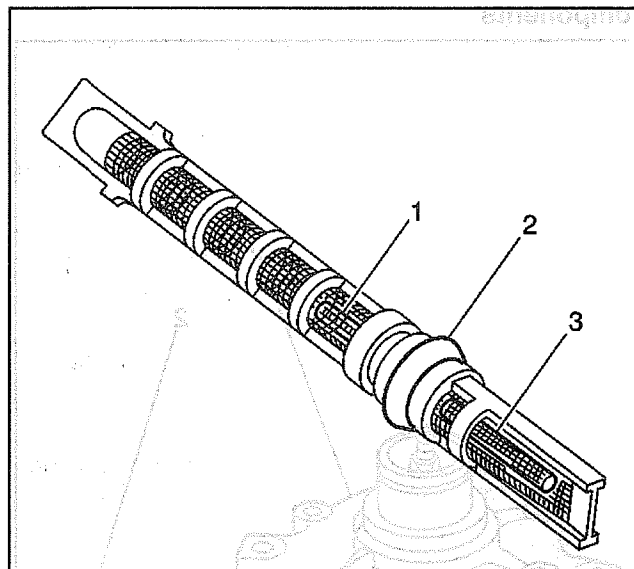
Refrigerant Oil Distribution

Notice: 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.

The following informations should be used to service the air conditioning (A/C) system:

- A/C system internal lubricant (including compressor) use GM P/N 12345923 or equivalent.
- A/C system O-ring and fitting lubricant use GM P/N 12301108 or equivalent.

Expansion (Orifice) Tube Description



82109

The plastic expansion (orifice) tube (2) is made of a mesh-screen (1) and orifice (3). The expansion (orifice) tube is located in the evaporator inlet pipe at the orifice connection. The tube restricts the high pressure liquid refrigerant in the liquid line. This restriction meters the refrigerant flow to the evaporator as a low pressure liquid. The expansion tube and orifice have filter screens which protect from contamination on both the inlet and outlet sides of the tube. When the engine is OFF the refrigerant in the system flows from the high pressure side of the system to the low pressure side until the pressure is equalized. This may be detected as a hissing sound for 30–60 seconds and is a normal condition.

Evaporator Description

The evaporator cools and dehumidifies air before the air enters the passenger compartment. The following events occur in the evaporator:

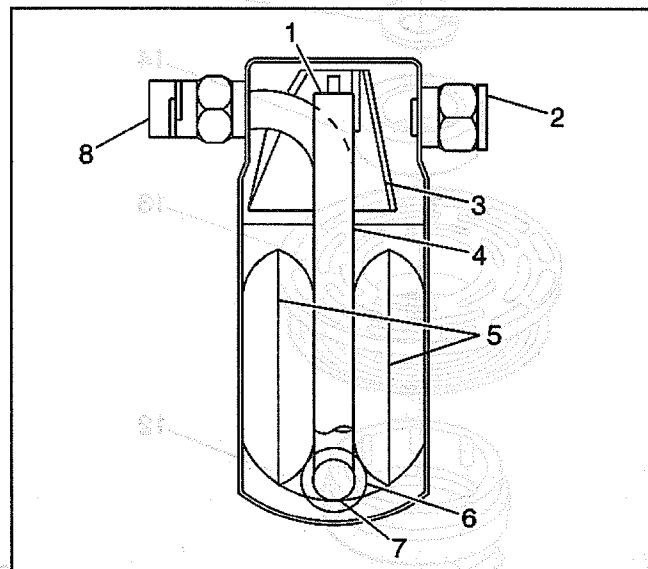
1. Low-pressure, low temperature liquid/vapor refrigerant enters the evaporator.
2. The refrigerant flows through the evaporator's tubing.
3. The refrigerant evaporates.
4. The refrigerant exits the evaporator as low-pressure, low temperature, mostly vapor refrigerant.
5. As the refrigerant evaporates, the refrigerant absorbs heat from the air flowing over the evaporator.

As the process of heat loss from the air to the evaporator core is taking place, any moisture (humidity) in the air condenses on the outside surface of the evaporator core and the moisture drains off as water.

Condenser Description

The condenser receives high pressure, high temperature refrigerant vapor from the A/C compressor. The condenser is made up of aluminum tubing and cooling fins which allow rapid heat transfer away from the high-pressure, high temperature refrigerant vapor. The cooling fins cause the high pressure, high temperature refrigerant vapor to condense into a high-pressure, medium temperature liquid.

Accumulator Description



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Legend

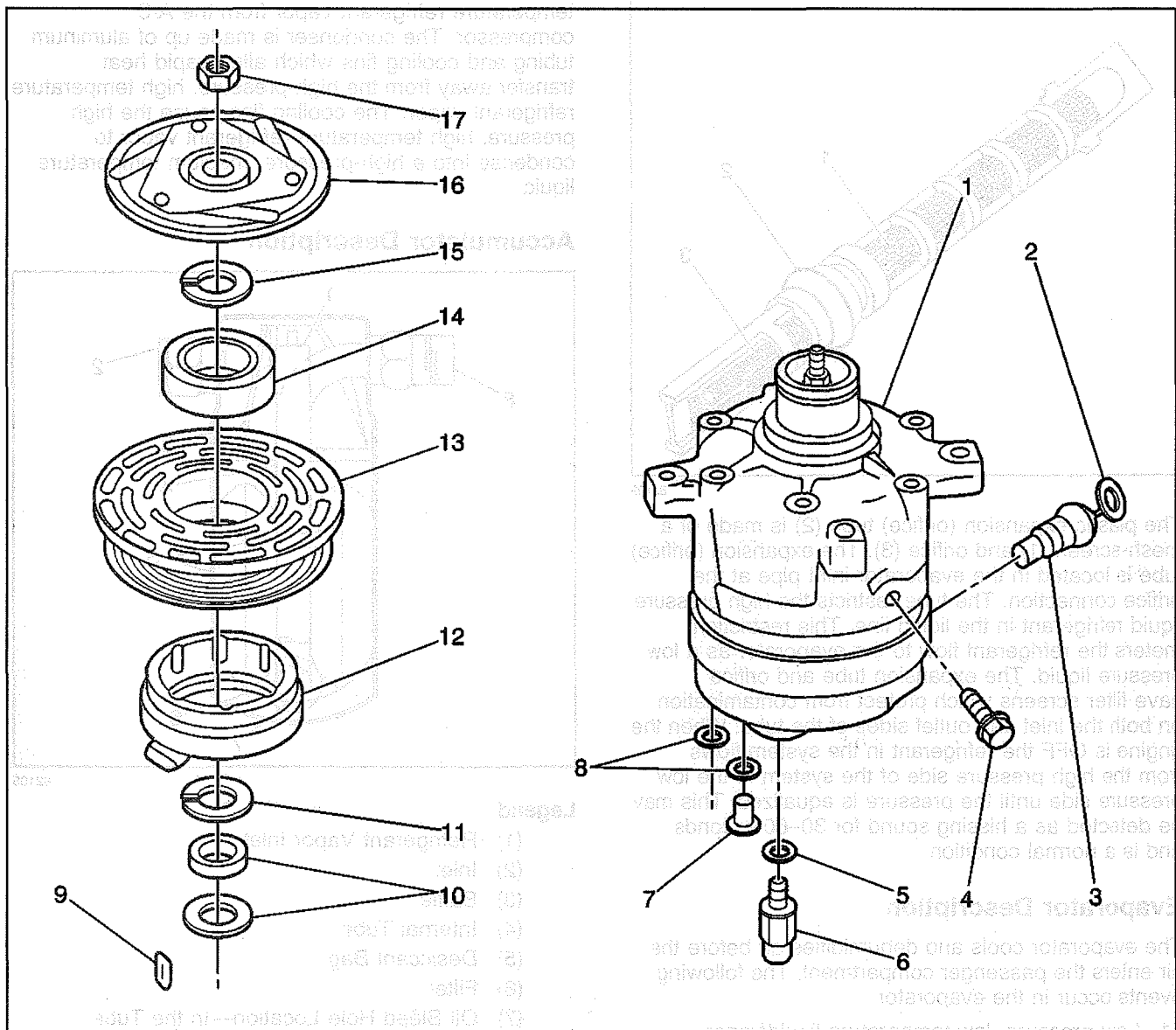
- (1) Refrigerant Vapor Inlet
- (2) Inlet
- (3) Baffle
- (4) Internal Tube
- (5) Desiccant Bag
- (6) Filter
- (7) Oil Bleed Hole Location—In the Tube
- (8) Outlet

The sealed accumulator is connected to the evaporator outlet pipe. The accumulator stores the refrigerant (vapor and liquid) and the oil from the evaporator. A desiccant at the accumulator bottom dries any moisture in the system. An oil bleed hole at the accumulator outlet pipe end provides the oil return path to the compressor. The accumulator is not serviceable and should only be replaced when leaking due to the following conditions:

- Perforation
- A damaged sealing area
- Damaged fastener threads
- Outside air has entered the system for extended periods of time

Compressor Description (3.8 L)

V5 Compressor Components



Legend

- (1) Compressor
- (2) Variable Displacement Control Valve Ring
- (3) Variable Displacement Control Valve
- (4) Oil Drain Plug
- (5) Pressure Relief Valve Seal
- (6) Pressure Relief Valve
- (7) Suction Port Screen
- (8) Seal Washers
- (9) Clutch Hub Key

- (10) Shaft Seals
- (11) Shaft Seal Snap Ring
- (12) Clutch Coil
- (13) Clutch Rotor
- (14) Clutch Rotor Bearing
- (15) Clutch Rotor and Bearing Snap Ring
- (16) Clutch Plate and Hub
- (17) Shaft Nut

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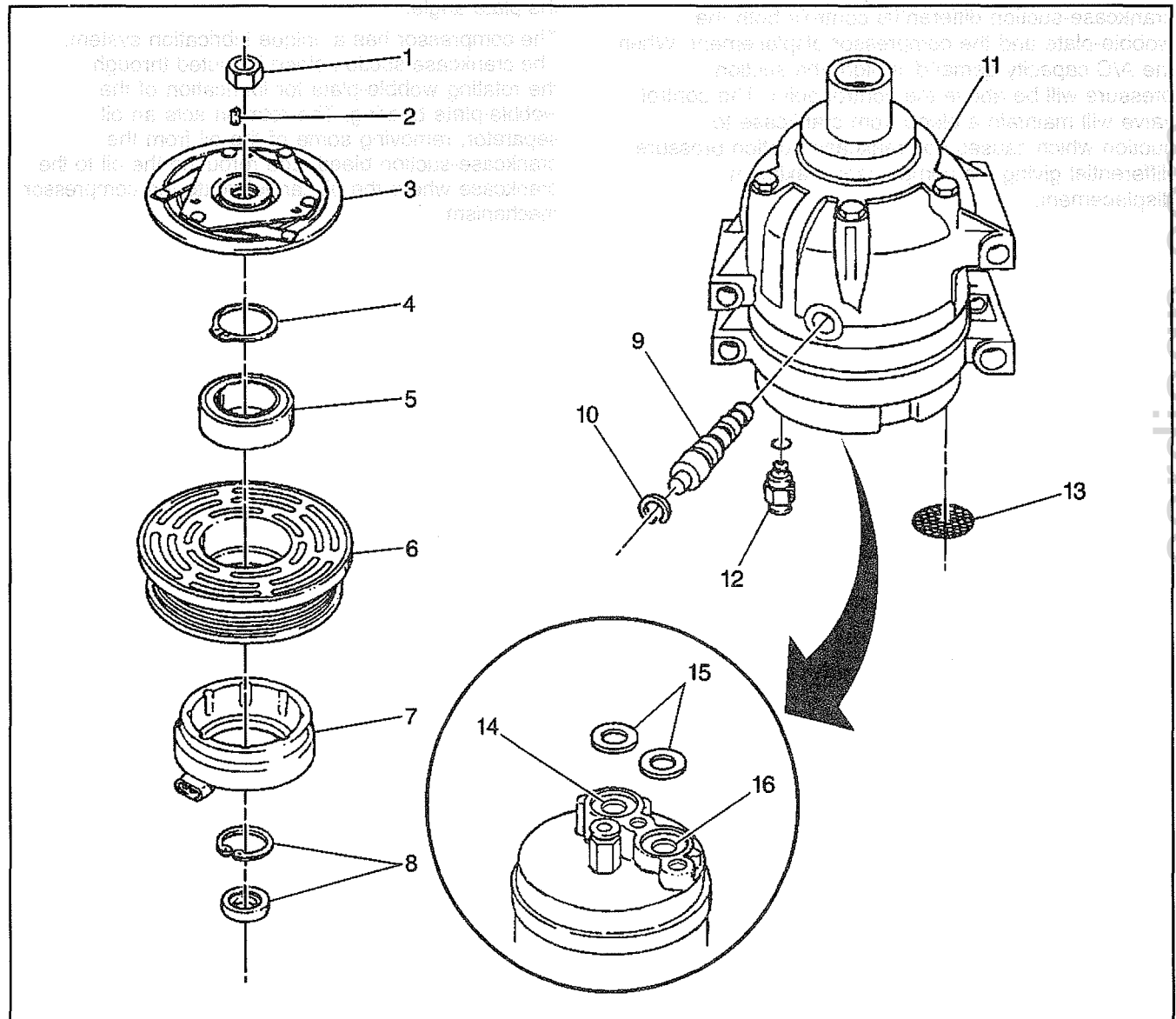
The V5 compressor is a variable displacement compressor that can match the automotive air conditioning demand under all conditions without cycling. The basic compressor mechanism is a variable angle wobble-plate with five axially oriented cylinders. A bellows actuated control valve located in the rear head of the compressor senses the compressor suction pressure and is the center of control for the compressor displacement. The crankshaft-suction differential controls both the wobble-plate and the control displacement. When the A/C capacity demand is high, the suction which causes no crankcase-suction pressure differential giving the compressor maximum displacement. When the A/C capacity demand is lower

and the suction pressure reaches the control point, the valve will bleed discharge gas into the crankcase and close off a passage from the crankcase to the suction plenum. The wobble-plate angle is controlled by a force balance on the five pistons. A slight increase in the wobble-plate pivot pin that reduces the plate angle.

The compressor has a unique lubrication system. The crankcase-suction bleed is routed through the rotating wobble-plate for lubrication of the wobble-plate bearing. The rotation acts as an oil separator, removing some of the oil from the crankcase-suction bleed, and rerouting the oil to the crankcase where the oil can be lubricate the compressor mechanism.

Compressor Description (5.7 L)

V7 Compressor Components



Legend

- | | |
|--------------------|--|
| (1) Shaft Nut | (3) Clutch Plate and Hub |
| (2) Clutch Hub Key | (4) Clutch Rotor and Bearing Snap Ring |

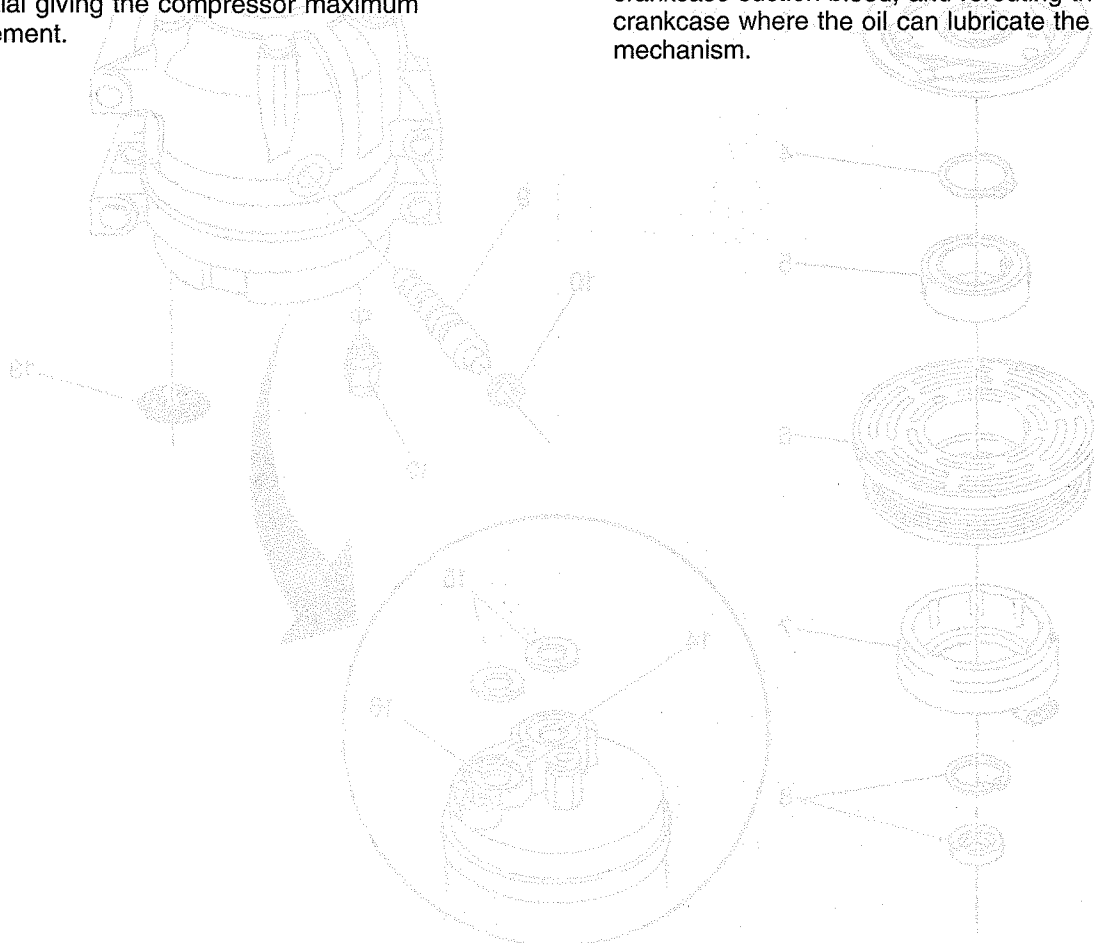
- (5) Clutch Rotor Bearing
- (6) Clutch Rotor
- (7) Clutch Coil
- (8) Compressor Shaft Seal and Snap Ring
- (9) Compressor Control Valve
- (10) Compressor Control Valve Retaining Ring

- (11) Compressor
- (12) Pressure Relief Valve
- (13) Suction Port Screen
- (14) Special R-134a Suction Port
- (15) Seal Washers
- (16) Special R-134a Discharge Port

The V7 compressor is a variable displacement compressor that can match the automotive air conditioning demand under all conditions without cycling. The basic compressor mechanism is a variable angle wobble-plate with seven axially oriented cylinders. A bellows actuated control valve located in the rear head of the compressor senses the compressor suction pressure and is the center of control for the compressor displacement. The crankcase-suction differential controls both the wobble-plate and the compressor displacement. When the A/C capacity demand is high, the suction pressure will be above the control point. The control valve will maintain a bleed from crankcase to suction which causes no crankcase-suction pressure differential giving the compressor maximum displacement.

When the A/C capacity demand is lower and the suction pressure reaches the control point, the valve will bleed discharge gas into the crankcase and close of a passage from the crankcase to the suction plenum. The wobble-plate angle is controlled by a force balance on the seven pistons. A slight increase in the crankcase-suction pressure differential creates a force on the pistons. This results in a movement of the wobble-plate pivot pin that reduces the plate angle.

The compressor has a unique lubrication system. The crankcase-suction bleed is routed through the rotating wobble-plate for lubrication of the wobble-plate bearing. The rotation acts an oil separator, removing some of the oil from the crankcase-suction bleed, and rerouting the oil to the crankcase where the oil can lubricate the compressor mechanism.



High Pressure Relief Valve Description

The V7 compressor is equipped with a pressure relief valve which is placed in the system as a safety factor.

Under certain conditions, the refrigerant on the discharge side may exceed the designed operating pressure. The valve is designed to open automatically at approximately 3036 kPa (440 psi) in order to prevent system damage.

Correct any condition that causes the valve to open. Replace refrigerant oil as necessary. Inspect the air conditioning refrigerant pressure sensor for proper calibration. Refer to *DTC P0530 Air Conditioning (A/C) Refrigerant Pressure Sensor Circuit* in Engine Controls-5.7 L.

Relays and Sensors Description

Blower Motor Relay

Use the blower motor relay in order to provide battery voltage to the blower motor only during high blower motor speed. Use the blower motor resistor in order to provide power to the blower motor at all other speed settings. The blower motor relay is located under the instrument panel. Refer to *Blower Motor Relay Replacement*.

Air Conditioning (A/C) Compressor Relay

Use the A/C compressor relay in order to provide battery voltage to the compressor clutch coil. The powertrain control module (PCM) controls the relay. The relay is located in the underhood electrical center. Refer to *Compressor Relay Replacement*.

O-Ring/Flat Washer Description

Install new approved service replacement air conditioning O-ring(s) and flat washers whenever a joint or fitting is disassembled.

Some vehicles use flat sealing washers and O-ring(s) to seal the refrigerant system. The flat washers are used on block fittings of refrigerant components. The O-ring(s) is used to seal the refrigerant tubes.

The O-ring fitting consists of:

- An aluminum alloy, externally threaded fitting which is welded to an aluminum tube.
- A free-spinning internally threaded nut.
- An aluminum tube end which accommodates the O-ring(s).

Verify that the flat washers or O-ring(s) have not been damaged prior to installation. Replace damaged parts.

Coat O-ring(s) and flat washers with the approved refrigerant oil.

Failure to use the proper service replacement parts and procedures may result in a leak.

Service Caps Seal

The primary seal for the service ports is the sealing cap. The cap contains a specially designed O-ring or gasket which provides a leak free seal. Should the cap be loose, missing, or the wrong usage, a loss of refrigerant could result.

Special Tools and Equipment

Illustration	Tool Number/ Description
 10767	J 5403 Snap Ring Pliers
 6183	J 6083 Snap Ring Pliers
 2015	J 8092 Driver Handle
 6185	J 8433 Compressor Pulley Puller
 210221	J 8433-1 Puller Bar

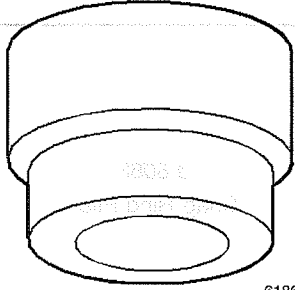
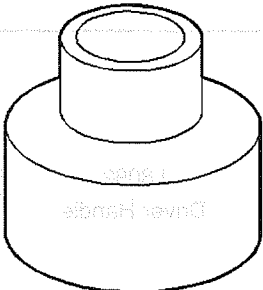
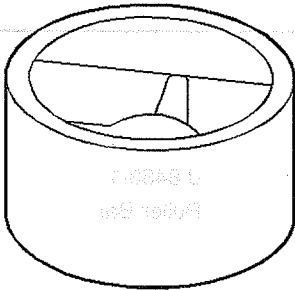
Illustration	Tool Number/ Description
 7029	J 8433-3 Forcing Screw
 6186	J 9398 Bearing Remover
 210053	J 9481-A Bearing Installer
 6190	J 9553-01 O-Ring Remover
 6192	J 21352-A Support Block

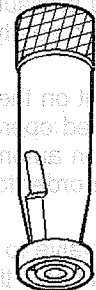
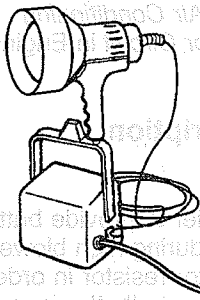
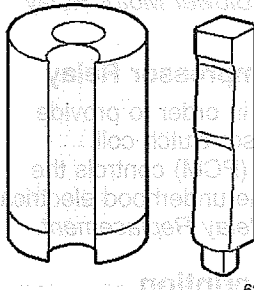
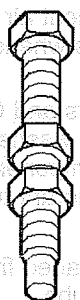
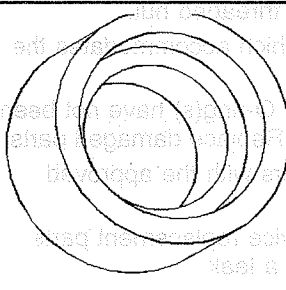
Illustration	Tool Number/ Description
 6193	J 23128-A Seal Seat Installer and Remover
 62292	J 28428-E High Intensity Black Light
 6207	J 33011 O-Ring Installer
 6187	J 33013-B Hub and Drive Plate Remover and Installer
 7032	J 33017 Pulley and Bearing Assembly Installer

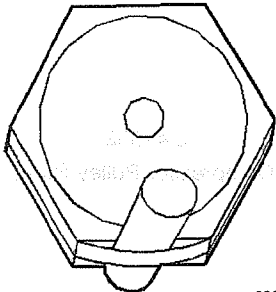
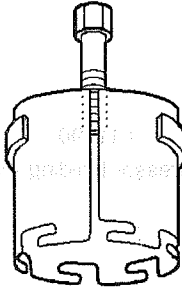
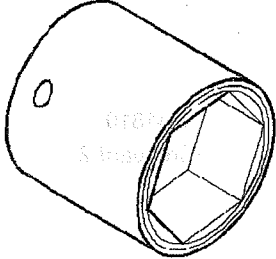
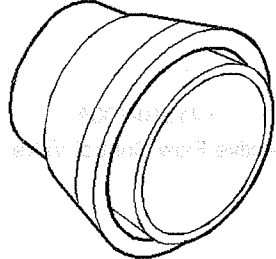
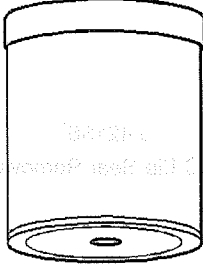
Illustration	Tool Number/ Description
 6200	J 33019 Bearing Staking Tool
 210049	J 33020 Pulley Puller
 7033	J 33022 Shaft Nut Socket
 7035	J 33023-A Puller Pilot
 7036	J 33024 Clutch Coil Installer

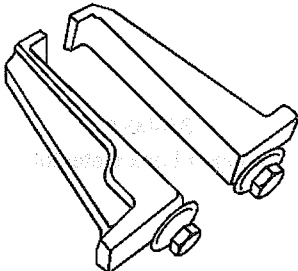
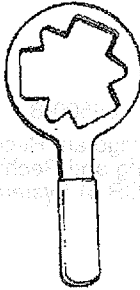
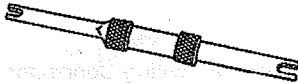
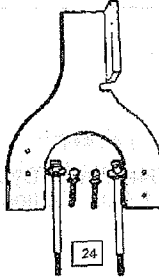
Illustration	Tool Number/ Description
 7037	J 33025 Clutch Coil Puller Legs
 7039	J 33027-A Clutch Hub Holding Tool
 283643	J 34611-A (or J 39923) Valve Core Remover and Installer
 6206	J 34614 Shaft Seal Protector
 7038	J 34992 Compressor Holding Fixture

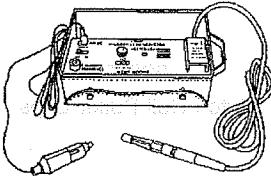
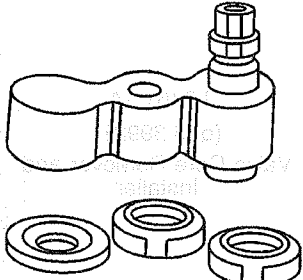
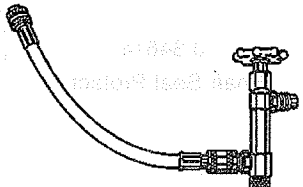
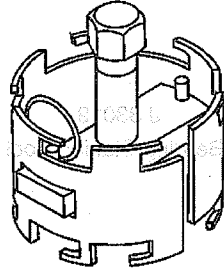
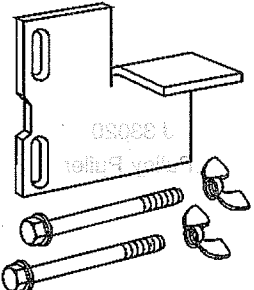
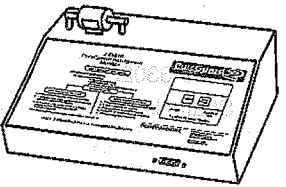
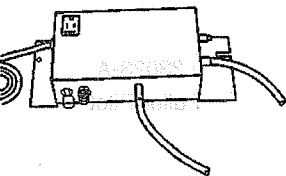
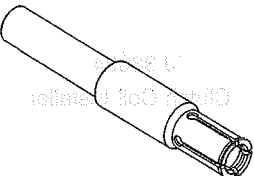
Illustration	Tool Number/ Description
 82132	J 39400-A Halogen Leak Detector
 82133	J 39500-B A/C Refrigerant Recovery, Recycling and Recharging (ACR 4) System
 210224	J 39893 Pressure Testing Connector
 283642	J 41436 Tracer Dye Injector
 258343	J 41447 R134a Tracer Dye (24 1/4 oz. Bottles)

Illustration	Tool Number/ Description
 157245	J 41552 Compressor Pulley Puller
 157244	J 41790 Compressor Holding Fixture
 353273	J 41810 Pureguard 2
 347269	J 41810-100A Active Flow Control Valve
 208026	J 42136 A/C Lip Seal Remover