Heating, Ventilation, and Air Conditioning

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Description and Operation

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Heating and Air Conditioning System Description and Operation

Engine Coolant

Engine coolant is the key element of the heating system. The thermostat controls engine operating coolant temperature. The thermostat also creates a restriction for the cooling system that promotes a positive coolant flow and helps prevent cavitation. Coolant enters the heater core through the inlet heater hose, in a pressurized state.

The heater core is located inside the HVAC module. The heat of the coolant flowing through the heater core is absorbed by the ambient air drawn through the HVAC module. Heated air is distributed to the passenger compartment, through the HVAC module, for passenger comfort.

The amount of heat delivered to the passenger compartment is controlled by opening or closing the HVAC module air temperature door. The coolant exits the heater core through the return heater hose and recirculated back through the engine cooling system.

AC Cycle

Refrigerant is the key element in an air conditioning system. R-134a is presently the only EPA approved refrigerant for automotive use. R-134a is an very low temperature gas that can transfer the undesirable heat and moisture from the passenger compartment to the outside air.

The AC compressor is belt driven and operates when the magnetic clutch is engaged. The compressor builds pressure on the vapor refrigerant. Compressing the refrigerant also adds heat to the refrigerant. The refrigerant is discharged from the compressor, through the discharge hose, and forced to flow to the condenser and then through the balance of the AC system. The AC system is mechanically protected with the use of a high pressure relief valve. If the high pressure switch were to fail or if the refrigerant system becomes restricted and refrigerant pressure continued to rise, the high pressure relief will pop open and release refrigerant from the system.

Compressed refrigerant enters the condenser in a high temperature, high pressure vapor state. As the refrigerant flows through the condenser, the heat of the refrigerant is transferred to the ambient air passing through the condenser. Cooling the refrigerant causes the refrigerant to condense and change from a vapor to a liquid state.

The condenser is located in front of the radiator for maximum heat transfer. The condenser is made of aluminum and aluminum cooling fins, which allows rapid heat transfer for the refrigerant. The semi-cooled liquid refrigerant exits the condenser and flows through the liquid line, to the thermal expansion valve.

The thermal expansion valve is located in the liquid line between the condenser and the evaporator. The thermal expansion valve is the dividing point for the high and the low pressure sides of the AC system. As the refrigerant passes through the thermal expansion valve, the pressure of the refrigerant is lowered. Due to the pressure differential of the liquid refrigerant, the refrigerant will begin to vaporize at the thermal expansion valve. The thermal expansion valve also meters the amount of liquid refrigerant that can flow into the evaporator.

Refrigerant exiting the thermal expansion valve flows into the evaporator core in a low pressure, liquid state. Ambient air is drawn through the HVAC module and passes through the evaporator core. Warm and moist air will cause the liquid refrigerant boil inside of the evaporator core. The boiling refrigerant absorbs heat from the ambient air and draws moisture onto the evaporator. The refrigerant exits the evaporator back through the thermal expansion valve and into the suction line and back to the compressor, in a vapor state completing the AC cycle of heat removal. At the compressor, the refrigerant is compressed again and the cycle of heat removal is repeated.

The conditioned air is distributed through the HVAC module for passenger comfort. The heat and moisture removed from the passenger compartment will also change form, or condense, and is discharged from the HVAC module as water under the vehicle.

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Diagnostic Information and Procedures

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Leak Testing

Special Tools

- *BO-42220* Universal 12V Leak Detection Lamp
- *GE-39400-A* Halogen Leak Detector
- *GE-41447* R-134A A/C Tracer Dye-Box of 24
- *GE-43872* Fluorescent Dye Cleaner

For equivalent regional tools, refer to Special Tools.

Refrigerant Leak Testing

Note:

These vehicles are not now manufactured with fluorescent dye installed directly into the air conditioning (A/C) system. Therefore, if refrigerant leak testing is required, add florescent dye into the air conditioning (A/C) system.

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

Verifying some passive leaks may require using the *GE-39400-A* detector, even though the A/C system contains fluorescent dye.

Fluorescent Leak Detector

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

- Note:

  PAG oil is water soluble.

- Condensation on the evaporator core or the refrigerant lines may wash the PAG oil and fluorescent dye away from the actual leak. Condensation may also carry dye through the HVAC module drain.
- Leaks in the A/C system will be indicated in a light green or yellow color when using the leak detection lamp.
- Use the leak detection lamp in the following areas:
-
  - All fittings or connections that use seal washers or O-rings
  - All of the A/C components
  - The A/C compressor shaft seal
  - The A/C hoses and pressure switches
  - The HVAC module drain tube, if the evaporator core is suspected of leaking
  - The service port sealing caps
  - The sealing cap is the primary seal for the service ports.
- Follow the instructions supplied with the *BO-42220* lamp.
- To prevent false diagnosis in the future, thoroughly clean the residual dye from any area where leaks were found. Use a rag and the approved *GE-43872* cleaner.

Fluorescent Dye Injection

Note:

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Use only fluorescent dye approved by General Motors.

Note:

Do NOT overcharge the A/C system with dye.

- *GE-41447* dye can be poured directly into a removed A/C component.
- Not all of the fluorescent dyes are compatible with PAG oil. Some types of dye decrease the oil viscosity or may chemically react with the oil.
- R-134A leak detection dye requires time to work. Depending upon the leak rate, a leak may not become visible for between 15â€‰minutes and 7â€‰days.
- To prevent false diagnosis, thoroughly clean any residual dye from the service port with a rag and the approved fluorescent dye cleaner *GE-43872* dye cleaner.

Halogen Leak Detector

Warning:

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

Ensure that the vehicle has at least 15â€‰percent of the specified refrigerant charge in the A/C refrigeration system in order to perform a leak test. Refer to Refrigerant Recovery and Recharging for recharging the A/C system.

Note:

Halogen leak detectors are sensitive to the following items:

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

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

Note:

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

Follow the instructions supplied with the *GE-39400-A* detector.

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Air Conditioning (A/C) System Performance Test

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

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

Test Description

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

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

Step	Action	Values	Yes	No
Note: • The ambient air temperature must be at least 16Â°C (60Â°F). • Do not induce additional air flow across the front of the vehicle during the test. • If you were sent here from a DTC diagnostic table, clear the DTC upon completion of this test.				
1	1. Park the vehicle inside or in the shade. 2. Open the windows in order to ventilate the interior of the vehicle. 3. If the A/C system was operating, allow the A/C system to equalize for about 2â€‰minutes. 4. Turn OFF the ignition. 5. Install the *J-43600* ACR 2000 Air Conditioning Service Center or *GE-48800* CoolTech A/C Recharge Machine. 6. Record the ambient air temperature and humidity. 7. Record the low and high side STATIC pressure readings. Are both the low side and high side pressures within the specified value?	More than 16Â°C (60Â°F) â€“ 345â€‰kPa (50â€‰psi) More than 24Â°C (75Â°F) â€“ 483â€‰kPa (70â€‰psi) More than 33Â°C (90Â°F) â€“ 690â€‰kPa (100â€‰psi)	Go to Stepâ€‰2	Go to Leak Testing

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Step	Action	Values	Yes	No
2	1. Note: Record the relative humidity and the ambient air temperature at the time of the test. 2. Close the vehicle doors and windows. 3. Open the drivers door window 12.7â€“15.2â€‰cm (5â€“6â€‰in). 4. Select the following HVAC control settings: 5. ◦ The A/C is ON. ◦ The coldest temperature setting ◦ The maximum blower speed ◦ Recirculation mode ◦ The instrument panel (I/P) outlet mode ◦ All I/P outlets are OPEN. 6. Install thermometers in the left and right center panel air outlets. 7. Apply the parking brake. 8. Place the transaxle/transmission in one of the following positions: 9. ◦ PARK (Automatic) ◦ NEUTRAL (Manual) 10. Start the engine and warm to operating temperature. 11. Operate the A/C system for 5â€‰minutes. 12. Inspect A/C components for the following conditions: 13. ◦ Abnormal frost areas ◦ Unusual noises 14. Record the following information: 15. ◦ The panel outlet air temperatures ◦ The low-side pressure ◦ The high-side pressure 16. Compare the low and high side pressures and the panel output temperatures to the A/C Performance Table below. Does all the data recorded fall within the specified ranges of the A/C Performance Table below?	â€”	Go to Stepâ€‰5	Go to Stepâ€‰3

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Step	Action	Values	Yes	No
3	If the pressures and temperatures recorded do not fall within the specified ranges: 1. Continue to operate the A/C system for an additional 5â€‰minutes. 2. Record the pressures and temperatures again. 3. Compare the low and high side pressures and the panel output temperature to the A/C Performance Table below. Does all the data recorded fall within the specified ranges of the A/C Performance Table below?	â€”	Go to Stepâ€‰5	Go to Stepâ€‰4
4	Perform the necessary repairs. Refer to A/C Diagnostics Chart. Is the action complete?	â€”	Go to Stepâ€‰5	â€”
5	Operate the system in order to verify the test results. Did you find the same results?	â€”	System OK	Go to Symptoms - HVAC Systems - Manual

A/C Performance Table

Ambient Temperature	Relative Humidity	Low Side Service Port Pressure	High Side Service Port Pressure	Maximum Left Center Discharge Air Temperature
13â€“18Â°C (55â€“65Â°F)	0â€“100%	151â€–206â€‰kPa (22â€–30â€‰psi)	868â€–1191â€‰kPa (126â€–173â€‰psi)	17Â°C (61Â°F)
19â€“24Â°C (66â€–75Â°F)	Below 40%	151â€–234â€‰kPa (30â€–34â€‰psi)	992â€–1329â€‰kPa (144â€–193â€‰psi)	14Â°C (57Â°F)
	Above 40%	158â€–248â€‰kPa (23â€–36â€‰psi)	1040â€–1419â€‰kPa (151â€–206â€‰psi)	18Â°C (63Â°F)
25â€–29Â°C (76â€–85Â°F)	Below 35%	186â€–261â€‰kPa (27â€–38â€‰psi)	1198â€–1488â€‰kPa (174â€–216â€‰psi)	15Â°C (59Â°F)
	35â€–50%	192â€–261â€‰kPa (28â€–38â€‰psi)	1240â€–1529â€‰kPa (180â€–222â€‰psi)	17Â°C (61Â°F)
	Above 50%	199â€–275â€‰kPa (29â€–40â€‰psi)	1267â€–1612â€‰kPa (184â€–234â€‰psi)	18Â°C (64Â°F)
30â€–35Â°C (86â€–95Â°F)	Below 30%	206â€–289â€‰kPa (30â€–42â€‰psi)	1357â€–1688â€‰kPa (197â€–245â€‰psi)	18Â°C (63Â°F)
	30â€–50%	213â€–296â€‰kPa (31â€–43â€‰psi)	1398â€–1750â€‰kPa (203â€–254â€‰psi)	19Â°C (64Â°F)
	Above 50%	227â€–310â€‰kPa (33â€–45â€‰psi)	1446â€–1839â€‰kPa (210â€–267â€‰psi)	19Â°C (66Â°F)
36â€–41Â°C (96â€–105Â°F)	Below 20%	241â€–316â€‰kPa (35â€–46â€‰psi)	1543â€–1860â€‰kPa (224â€–270â€‰psi)	19Â°C (66Â°F)
	20â€–40%	241â€–323â€‰kPa (35â€–47â€‰psi)	1577â€–1929â€‰kPa (229â€–280â€‰psi)	19Â°C (66Â°F)
	Above 40%	254â€–337â€‰kPa (37â€–49â€‰psi)	1639â€–1998â€‰kPa (238â€–290â€‰psi)	20Â°C (68Â°F)
42â€–46Â°C (106â€–115Â°F)	Below 20%	268â€–337â€‰kPa (39â€–49â€‰psi)	1743â€–2018â€‰kPa (253â€–293â€‰psi)	22Â°C (70Â°F)
	Above 20%	275â€–351â€‰kPa (40â€–51â€‰psi)	1777â€–2101â€‰kPa (258â€–305â€‰psi)	22Â°C (70Â°F)
47â€–49Â°C (116â€–120Â°F)	Below 30%	303â€–372â€‰kPa (44â€–54â€‰psi)	1942â€–2232â€‰kPa (282â€–324â€‰psi)	23Â°C (73Â°F)

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A/C Diagnostics Chart

Low Side Gauge Reading	High Side Gauge Reading	Potential Causes
Low	Low	Low Refrigerant Charge
		Restriction between Compressor and High Side port
	Low/Normal	Evaporator Freezing
	High	Restriction between the Low Side and High Side ports or Restricted TXV/Orifice Tube
		Compressor Stuck at Maximum Displacement
High	Low	Compressor has Low Displacement or Internal Malfunction
	High	Malfunctioning Cooling Fans
		Refrigerant Overcharge
		Restriction between the Low Side Port and Compressor Inlet
		Restricted Condenser Air Flow
		Expansion Device Stuck Open
		Air in A/C System
Normal/High	Normal/High	Refrigerant Contamination
		PAG or POE Oil Overcharge

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Noise Diagnosis - Blower Motor

Step	Action	Yes	No
DEFINITION: Noise originating from the blower motor.			
1	Were you sent here from Symptoms or another diagnostic table?	Go to Stepâ€‰2	Go to Symptoms - HVAC Systems - Manual
2	Inspect the air inlet grille for debris. Is debris present?	Go to Stepâ€‰8	Go to Stepâ€‰3
3	1. Sit inside the vehicle. 2. Close the vehicle doors and windows. 3. Turn ON the ignition, with the engine OFF. 4. Cycle the blower motor through all of the speeds and modes in order to determine where and when the noise occurs. Is a noise evident during the blower operation?	Go to Stepâ€‰4	Go to Stepâ€‰11
4	Inspect for excessive vibration at each blower motor speed by feeling the blower case. Is excess vibration present?	Go to Stepâ€‰6	Go to Stepâ€‰5
5	Listen to the blower motor at each speed. Is the blower motor making a squeaking or chirping noise?	Go to Stepâ€‰9	Go to Stepâ€‰11
6	1. Remove the blower motor. Refer to Blower Motor Replacement. 2. Inspect the blower motor impeller for deposits of foreign material. 3. Inspect the blower motor for deposits of foreign material. Did you find any foreign material on the blower motor or blower motor impeller?	Go to Stepâ€‰8	Go to Stepâ€‰7
7	Inspect the blower motor for the following conditions: • Cracked blades • A loose impeller retainer • Improper impeller alignment Did you find any of these conditions?	Go to Stepâ€‰9	Go to Stepâ€‰10
8	Remove the foreign material. Is the action complete?	Go to Stepâ€‰10	â€”
9	Replace the blower motor. Refer to Blower Motor Replacement. Is the repair complete?	Go to Stepâ€‰11	â€”
10	Install the blower motor. Refer to Blower Motor Replacement. Is the action complete?	Go to Stepâ€‰11	â€”
11	Operate the system in order to verify the repair. Did you find and correct the condition?	System OK	Go to Stepâ€‰2

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Air Conditioning Compressor Oil Diagnosis

Condition	Corrective Action
Note: **To avoid repeat compressor failure, always inspect the condition of the refrigerant oil and take the appropriate corrective action before installing the replacement compressor.**	
Clean oil no debris present	No corrective action necessary.
Clean oil with debris present	• Replace the desiccant or component containing the desiccant. • Replace the desiccant filter if applicable. • Remove and inspect the high pressure side filter (if applicable). • Remove, inspect, clean, or replace the orifice tube. • If the system has a front orifice tube and is equipped with a filter in the rear auxiliary line, remove, inspect, clean, or replace the filter.
Dark brown/black and/or pungent/unusual odor with no debris present	• Replace the desiccant or component containing the desiccant. • Replace the desiccant filter if applicable. • Flush the refrigerant system.
Dark brown/black and/or pungent/unusual odor with debris present	• Replace the desiccant or component containing the desiccant. • Replace the desiccant filter if applicable. • Flush the refrigerant system. • Remove and inspect the high pressure side filter if applicable. • Remove, inspect, clean, or replace the orifice tube. • If the system has a front orifice tube and is equipped with a filter in the rear auxiliary line, remove, inspect, clean or replace the filter.
Oil overcharge	Flush the refrigerant system.
Refrigerant contamination	Flush the refrigerant system.
Hybrid polyolester refrigerant oil (POE) contamination	• Flush the refrigerant system. • Replace the desiccant or component containing the desiccant. • Replace the desiccant filter if applicable.

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Noise Diagnosis - Air Conditioning (A/C) System

Step	Action	Yes	No
DEFINITION: Noise originating from the A/C compressor, drive belt, or the A/C lines.			
1	Were you sent here from Symptoms or another diagnostic table?	Go to Stepâ€‰2	Go to Symptoms - HVAC Systems - Manual
2	1. A/C system noises can be generally categorized into 3 areas: 2. ○ Screeching, squealing, chirping noises ○ Moaning noises ○ Vibration/rattle noises 3. Start the engine. 4. Ensure that the A/C is ON. Is a screeching, squealing noise heard when the A/C is engaged?	Go to Stepâ€‰3	Go to Stepâ€‰9
3	With the engine OFF, inspect the drive belt for excessive wear. Refer to Drive Belt Falls Off and Excessive Wear Diagnosis. Is the drive belt excessively worn?	Go to Stepâ€‰18	Go to Stepâ€‰4
4	Inspect the drive belt tension. Is the drive belt tension correct?	Go to Stepâ€‰5	Go to Stepâ€‰19
5	Inspect the drive belt for excessive oil coverage. Is the drive belt covered with oil?	Go to Stepâ€‰17	Go to Stepâ€‰6
6	1. Start the engine. 2. Ensure that the A/C is ON. 3. Inspect the compressor and the clutch. Is the A/C compressor locked up?	Go to Stepâ€‰24	Go to Stepâ€‰7
7	Is the A/C compressor clutch slipping?	Go to Stepâ€‰23	Go to Stepâ€‰8
8	Warning: Refer to Moving Parts and Hot Surfaces Warning. Using a stethoscope, listen to the A/C compressor for any abnormal noises. Is the compressor causing an abnormal noise?	Go to Stepâ€‰15	Go to Stepâ€‰10
9	Does a moaning noise exist when the A/C clutch is engaged?	Go to Stepâ€‰10	Go to Stepâ€‰12
10	Listen to the A/C compressor components and mounting for noise concerns using a stethoscope. Are any of these components loose, damaged, or excessively worn?	Go to Stepâ€‰20	Go to Stepâ€‰11
11	1. Idle the engine. 2. Engage the A/C compressor clutch. 3. Using a stethoscope, move around the entire refrigerant plumbing system, listening for any abnormal noises caused by a component of the A/C system touching another component. Are any of the A/C components grounding out and causing a vibration noise?	Go to Stepâ€‰22	Go to Stepâ€‰13

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Step	Action	Yes	No
12	Does a vibration or rattle noise exist when the A/C clutch is engaged?	Go to Stepâ€‰13	Go to Stepâ€‰14
13	Does the noise stop when the A/C clutch is disengaged?	Go to Stepâ€‰15	Go to Stepâ€‰25
14	1. Idle the engine in PARK with the A/C compressor clutch engaged. 2. Using a stethoscope, move around the entire A/C system testing for any abnormal noises caused by a component. Do any of the A/C components cause an abnormal noise?	Go to Stepâ€‰21	Go to Stepâ€‰25
15	Verify that the A/C system is properly charged. Refer to Approximate Fluid Capacities. Is the A/C system properly charged?	Go to Stepâ€‰26	Go to Stepâ€‰16
16	Recharge the A/C system to specification. Refer to Refrigerant Recovery and Recharging. Is the abnormal compressor noise still present?	Go to Stepâ€‰24	Go to Stepâ€‰26
17	Repair the oil leak. Refer to Oil Leak Diagnosis. Is the repair complete?	Go to Stepâ€‰18	â€”
18	Replace the drive belt. Refer to Drive Belt Replacement. Is the replacement complete?	Go to Stepâ€‰26	â€”
19	Replace the drive belt tensioner. Refer to Drive Belt Tensioner Replacement. Is the replacement complete?	Go to Stepâ€‰26	â€”
20	Repair or replace the A/C compressor mounting component. Is the repair complete?	Go to Stepâ€‰26	â€”
21	Repair or replace the component which is causing the moaning concern as needed. Is the repair complete?	Go to Stepâ€‰26	â€”
22	Correctly route or insulate the A/C component. Is the repair complete?	Go to Stepâ€‰26	â€”
23	Replace the A/C compressor clutch. Refer to Air Conditioning Clutch Replacement. Is the repair complete?	Go to Stepâ€‰26	â€”
24	Replace the A/C compressor. Refer to Air Conditioning Compressor Replacement. Is the repair complete?	Go to Stepâ€‰26	â€”
25	The concern may be caused by an engine related component. Refer to Vibration Analysis - Engine. Did you find and correct the condition?	Go to Stepâ€‰26	â€”
26	Operate the system in order to verify the repair. Did you find and correct the condition?	System OK	Go to Stepâ€‰2

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Noise Diagnosis - HVAC Module

Step	Action	Yes	No
DEFINITION: Noise originating from the HVAC module.			
1	Were you sent here from Symptoms or another diagnostic table?	Go to Stepâ€‰2	Go to Symptoms - HVAC Systems - Manual
2	1. Start the engine. 2. Cycle through all of the following: 3. ◦ Blower motor speeds ◦ HVAC modes ◦ Temperature control settings 4. Determine the location of noise: 5. ◦ Recirculation door ◦ Temperature door ◦ Mode valve Is noise evident when selecting recirculation?	Go to Stepâ€‰6	Go to Stepâ€‰3
3	Is noise evident when selecting temperature?	Go to Stepâ€‰6	Go to Stepâ€‰4
4	Is noise evident when selecting mode ?	Go to Stepâ€‰5	Go to Stepâ€‰2
5	1. Remove the HVAC module. Refer to Air Conditioning (A/C) Evaporator and Blower Module Assembly Replacement. 2. Inspect the mode valve for dust, dirt or debris. Is dust, dirt or debris present?	Go to Stepâ€‰11	Go to Stepâ€‰12
6	Remove the HVAC module. Refer to Air Conditioning (A/C) Evaporator and Blower Module Assembly Replacement. Is action complete?	Go to Stepâ€‰7	â€”
7	1. Inspect the air flow door for proper operation. 2. Inspect the ducts for obstructions or foreign materials. Were any of these conditions found?	Go to Stepâ€‰10	Go to Stepâ€‰8
8	Inspect air flow door for warping or cracking. Is air flow door in normal condition?	Go to Stepâ€‰13	Go to Stepâ€‰9
9	Replace air flow door. Is repair complete?	Go to Stepâ€‰13	â€”
10	Remove any obstructions or foreign material found. Is action complete?	Go to Stepâ€‰13	â€”
11	Vacuum and remove dust, dirt and debris. Is action complete?	Go to Stepâ€‰14	â€”

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Step	Action	Yes	No
12	Replace the upper evaporator case. Refer to Air Conditioning Evaporator Core Replacement. Is action complete?	Go to Stepâ€‰14	â€”
13	Install the HVAC Module. Refer to Air Conditioning (A/C) Evaporator and Blower Module Assembly Replacement. Is action complete?	Go to Stepâ€‰14	â€”
14	Operate the system to verify the repair. Did you find and correct the condition?	System OK	Go to Stepâ€‰2

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Repair Instructions

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Refrigerant Recovery and Recharging

Special Tools

GE-45037 A/C Oil Injector

For equivalent regional tools, refer to Special Tools.

Warning:

To prevent personal injury, avoid breathing A/C Refrigerant and lubricant vapor or mist. Work in a well ventilated area. To remove refrigerant from the A/C System, use service equipment designed for recovery that is certified to meet the requirements of the appropriate SAE Standards. If an accidental system discharge occurs, ventilate the work area before continuing service. Additional health and safety information may be obtained from the refrigerant, refrigerant recovery, and lubricant manufacturers.

Warning:

For personal protection, goggles and lint-free gloves should be worn and a clean cloth wrapped around fittings, valves, and connections when doing work that includes opening the refrigerant system. If refrigerant 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.

Caution:

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.

Caution:

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

Caution:

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.

Caution:

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 air conditioning filling device service center is a complete air conditioning service center for R-134a. The ACRâ€‰2000 recovers, recycles, evacuates and recharges A/C refrigerant quickly, accurately and automatically. The unit has a display screen that contains the function controls and displays prompts that will lead the technician through the recover, recycle, evacuate and recharge operations. R-134a is recovered into and charged out of an internal storage vessel. The ACRâ€‰2000 automatically replenishes this vessel from an external source tank in order to maintain a constant 5.45â€“6.82â€‰kg (12â€“15â€‰lb) of A/C refrigerant.

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

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

Refer to the air conditioning filling device service center manual for operation and setup instruction. Always recharge the A/C system with the proper amount of R-134a. Refer to Approximate Fluid Capacities for the correct amount.

A/C Refrigerant System Oil Charge Replenishing

If oil was removed from the A/C system during the recovery process or due to component replacement, the oil must be replenished. Oil can be injected into a charged system using *GE-45037* injector. For the proper quantities of oil to add to the A/C refrigerant system, refer to Approximate Fluid Capacities.

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Air Conditioning Compressor Oil Balancing

Draining Procedure

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2. Note:

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

3. Drain the oil from both the suction and discharge ports of the removed compressor into a clean, graduated container. Rotate the compressor shaft to assist in draining the compressor.
4. Measure and record the amount of oil drained from the removed compressor. This measurement will be used during installation of the replacement compressor.
5. Inspect the oil drained from removed compressor. Refer to Air Conditioning Compressor Oil Diagnosis.
6. Properly discard the used refrigerant oil.

Balancing Procedure

1. Note:

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

2. The replacement compressor is shipped with the total system capacity of refrigerant oil.

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3. Click here for full size

4. Before installing the compressor, the refrigerant oil will have to be partially drained:

5.
    - Refer to the amount of refrigerant oil recorded during the compressor removal.
    - Subtract the amount recorded from the total system capacity. Refer to Approximate Fluid Capacities.
    - The difference between the total system capacity and the recorded amount is the calculated amount to be drained from the replacement compressor.

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

Related Part Information

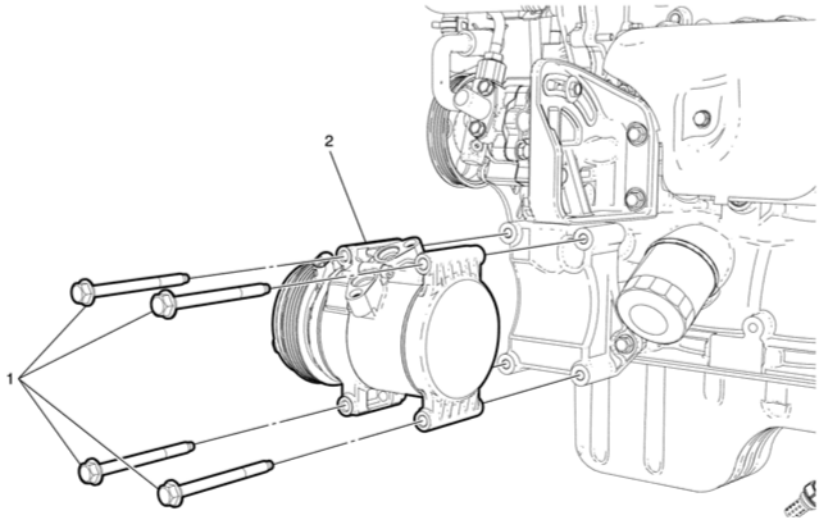
Part Name	Catalog Name	Part Code
Air Conditioning Compressor Oil	OIL,A/C CMPR	0225A

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Air Conditioning Compressor Replacement

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Callout	Component Name
	Preliminary Procedures 1. Recover the refrigerant. Refrigerant Recovery and Recharging 2. Remove the drive belt. Drive Belt Replacement 3. Raise and support the vehicle. Lifting and Jacking the Vehicle 4. Remove the front bumper fascia opening lower cover. Front Bumper Fascia Opening Lower Cover Replacement 5. Disconnect the A/C compressor electrical connector. 6. Remove the compressor hose assembly from the compressor. Air Conditioning Compressor and Condenser Hose Replacement and Air Conditioning Evaporator Hose Replacement

Callout	Component Name
1	Air Conditioning Compressor Bolt (Qty:â€‰4) Caution: Refer to Fastener Caution. Tighten 22â€‰N-m (16â€‰lbâ€‰ft)
2	Air Conditioning Compressor Assembly Procedure 1. Use a low viscosity, poly-alkylene glycol (PAG) oil. Use of the incorrect oil can result in compressor failure. 2. When replacing the A/C compressor, balance the compressor oil. Air Conditioning Compressor Oil Balancing 3. Using *GE 39400-A* Electronic Halogen Leak Detector test A/C compressor fittings. Special Tools *GE 39400-A* Electronic Halogen Leak Detector Equivalent regional tools: Special Tools

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Air Conditioning Clutch Replacement (1.19L LC5, and 1.2L LMU, LKY)

Special Tools

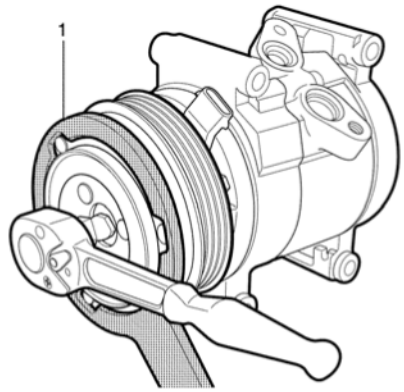
- *CH-50198* Clutch Plate Holder
- *GE-39400â€“A* Halogen Leak Detector

For equivalent regional tools, refer to Special Tools.

Removal Procedure

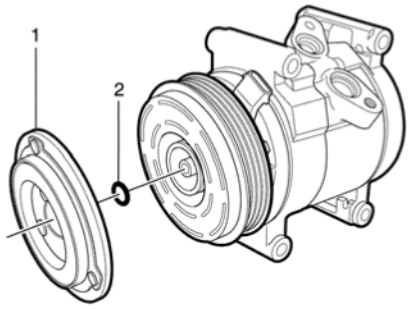
1. Remove the compressor. Refer to Air Conditioning Compressor Replacement.

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2. Click here for full size
3. Use the *CH-50198* holder â€‰(1) to hold the compressor clutch plate from turning.
4. Remove the compressor clutch plate bolt from the compressor.

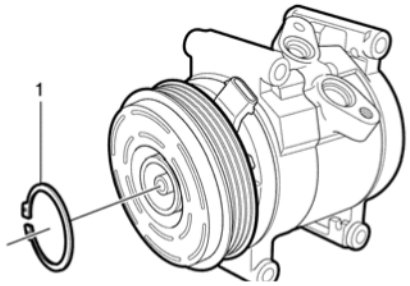
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5.
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6. Remove the compressor clutch plateâ€‰(1) and air gap shimâ€‰(2) from the compressor.

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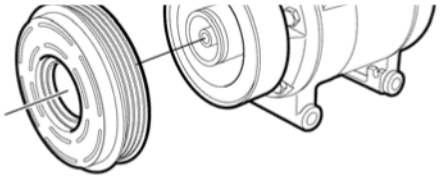


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8. Remove the compressor pulley snap ringâ€‰(1) using a ring pryer.

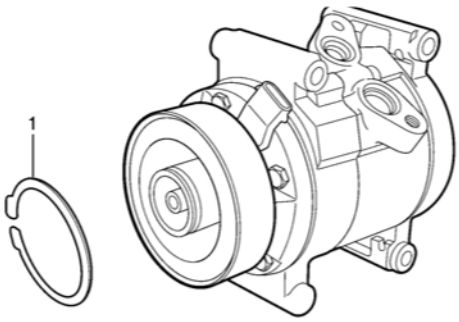


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9. Click here for full size
10. Remove the compressor pulleyâ€‰(1) from the compressor.

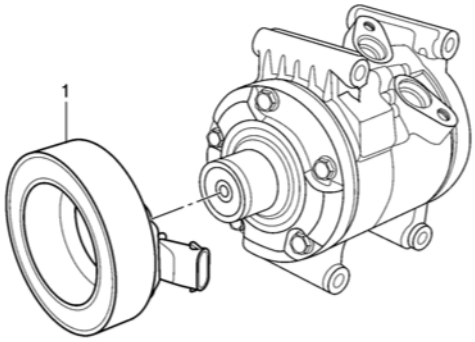
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12. Remove the compressor clutch coil snap ringâ€‰(1) using a ring pryer.

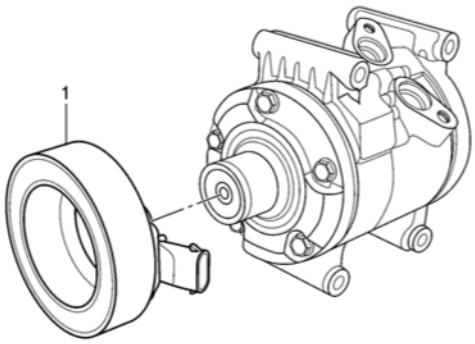
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14. Remove the compressor clutch coilâ€‰(1) from the compressor.

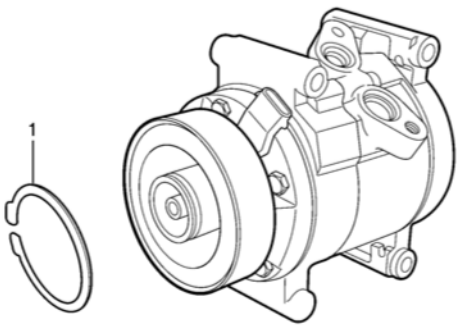
Installation Procedure

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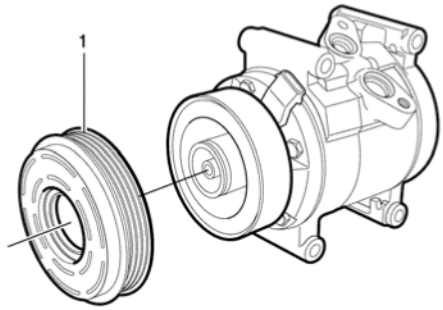
1. Click here for full size
2. Install the compressor clutch coilâ€‰(1) to the compressor.



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3. Click here for full size

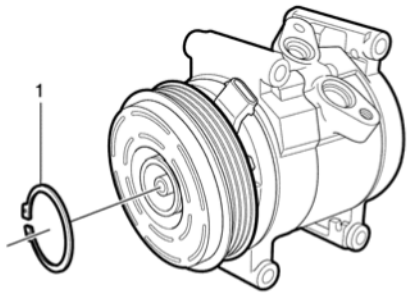
4. Install the compressor clutch coil snap ringâ€‰(1) using a ring pryer.



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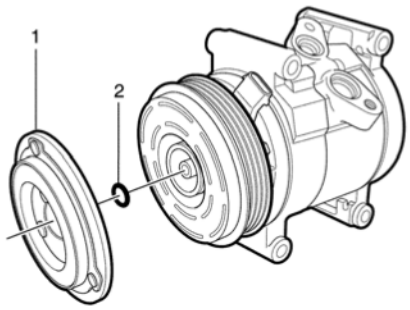
6. Install the compressor pulleyâ€‰(1) to the compressor.



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8. Install the compressor pulley snap ringâ€‰(1) using a ring pryer.

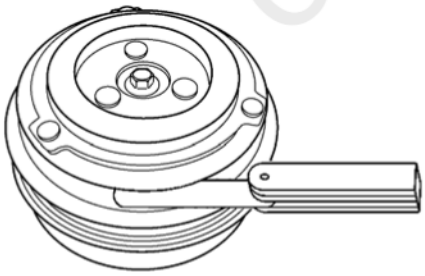


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10. Install the compressor clutch plateâ€‰(1) and air gap shimâ€‰(2) to the compressor.

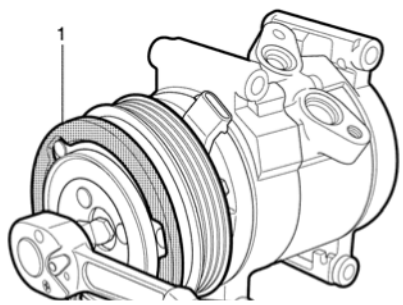


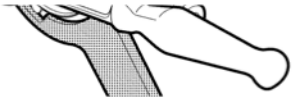
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12. Measure the air gap between the pulley and the drive plate. Adjust the shims to achieve a 0.3-0.6â€‰mm (0.012-0.024â€‰in) air gap.

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13. Click here for full size
14. Use the *CH-50198* holder â€‰(1) to hold the compressor clutch plate from turning.
15. Caution**:**

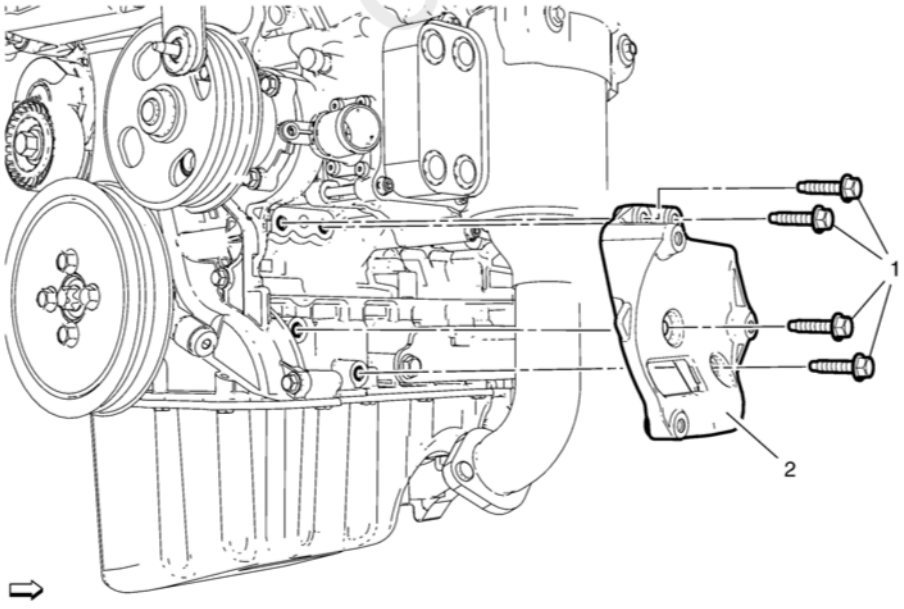
    Refer to Fastener Caution.
16. Install the compressor clutch plate bolt and tighten to 14â€‰N-m (10â€‰lb ft).
17. Install the compressor. Refer to Air Conditioning Compressor Replacement.
18. Leak test the fittings using the *GE 39400-A* detector .

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Air Conditioning Compressor Bracket Replacement

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Callout	Component Name
Preliminary Procedures Remove the air conditioning compressor. Refer to Air Conditioning Compressor Replacement.	
1	Air Conditioning Compressor Bracket Boltâ€‰(Qty:â€‰4) Caution: Refer to Fastener Caution. Tighten 22â€‰N-mâ€‰(16â€‰lbâ€‰ft)
2	Air Conditioning Compressor Bracket

Related Part Information

Part Name	Catalog Name	Part Code
Air Conditioning Compressor Bracket	BRACKET,A/C CMPR	2350A
Air Conditioning Compressor Bracket	BRACKET,A/C CMPR	2400A
Air Conditioning Compressor Bracket	BRACKET,A/C CMPR (MCHG)	2400L
Air Conditioning Compressor Bracket	BRACKET,A/C CMPR (CSTG)	2400M
Air Conditioning Compressor Bracket	BRACKET,A/C CMPR	SJ128

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Air Conditioning System Seal Replacement

Removal Procedure

1. Disassemble the A/C refrigerant components. Refer to the appropriate repair procedure.
2. Note**:**

   Cap or tape the open A/C refrigerant components immediately to prevent system contamination.
3. Cap or tape the A/C refrigerant components.
4. Click here for full size
5. Remove the sealing washerâ€‰(1) from the A/C refrigerant component.
6. Inspect the seal washer for signs of damage to help determine the root cause of the failure.
7. Inspect the A/C refrigerant components for damage or burrs. Repair if necessary.
8. Note**:**

   DO NOT reuse sealing washer.
9. DISCARD the sealing washer.

Installation Procedure

1. Note**:**

   Flat washer type seals do not require lubrication.
2. Inspect the new sealing washer for any signs of cracks, cuts, or damage.
3. Do not use a damaged sealing washer.
4. Remove the cap or tape from the A/C refrigerant components.
5. Click here for full size
6. Using a lint-free clean, dry cloth, clean the sealing surfaces of the A/C refrigerant components.
7. Carefully install the NEW sealing washerâ€‰(1) onto the A/C refrigerant component.
8. The sealing washerâ€‰(1) must completely bottom against the surface of the fitting.
9. Note**:**

   After tightening the A/C components, there should be a slight sealing gap of approximately 1.2â€‰mm (3/64â€‰in) between the A/C line and the A/C component.
10. Assemble the remaining A/C refrigerant components. Refer to the appropriate repair procedure.

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Air Conditioning O-Ring Seal Replacement

Removal Procedure

1. Disassemble the A/C refrigerant components. Refer to the appropriate repair procedure.
2. Remove the O-ring seal from the A/C refrigerant component.
3. Inspect the O-ring seal for signs of damage to help determine the root cause of the failure.
4. Inspect the A/C components for damage or burrs. Repair if necessary.
5. Note**:**

   Cap or tape the open A/C refrigerant components immediately to prevent system contamination.
6. Cap or tape the A/C refrigerant components.
7. Discard the O-ring seal.

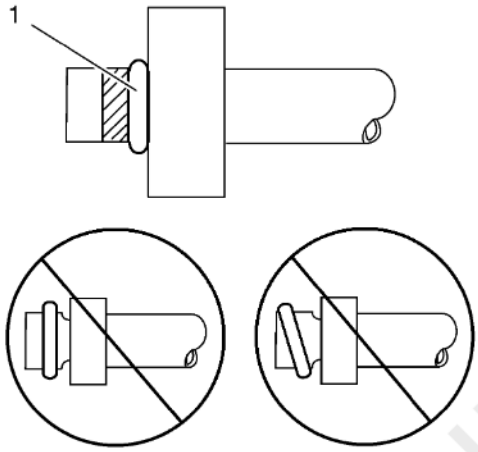
Installation Procedure

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

   DO NOT allow any of the mineral base 525â€‰viscosity refrigerant oil on the new O-ring seal to enter the refrigerant system.
5. Lightly coat the new O-ring seal with mineral base 525â€‰viscosity refrigerant oil.
6. Note**:**

   DO NOT reuse O-ring seals.
7. Carefully slide the new O-ring seal onto the A/C refrigerant component.

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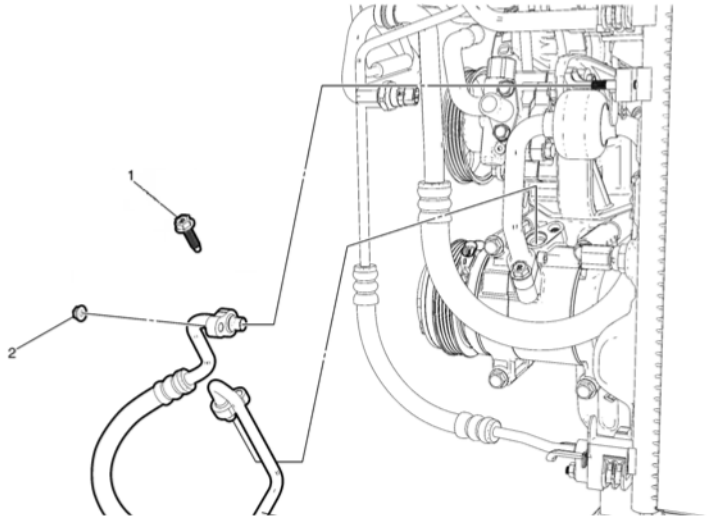
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8. Click here for full size
9. The O-ring sealâ€‰(1) must be fully seated.
10. Assemble the A/C components.

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Air Conditioning Compressor and Condenser Hose Replacement

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Callout	Component Name
	Preliminary Procedures 1. Recover the refrigerant. Refer to Refrigerant Recovery and Recharging. 2. Remove the front bumper fascia opening lower cover. Refer to Front Bumper Fascia Opening Lower Cover Replacement.
1	Air Conditioning Compressor and Condenser Hose Bolt to Air Conditioning Compressor Caution: Refer to Fastener Caution. Tighten 22â€‰N-mâ€‰(16â€‰lbâ€‰ft)
2	Air Conditioning Compressor and Condenser Hose Nut to Air Conditioning Condenser Tighten 9â€‰N-mâ€‰(80â€‰lbâ€‰in)

Callout	Component Name
3	Air Conditioning Compressor and Condenser Hose

Related Part Information

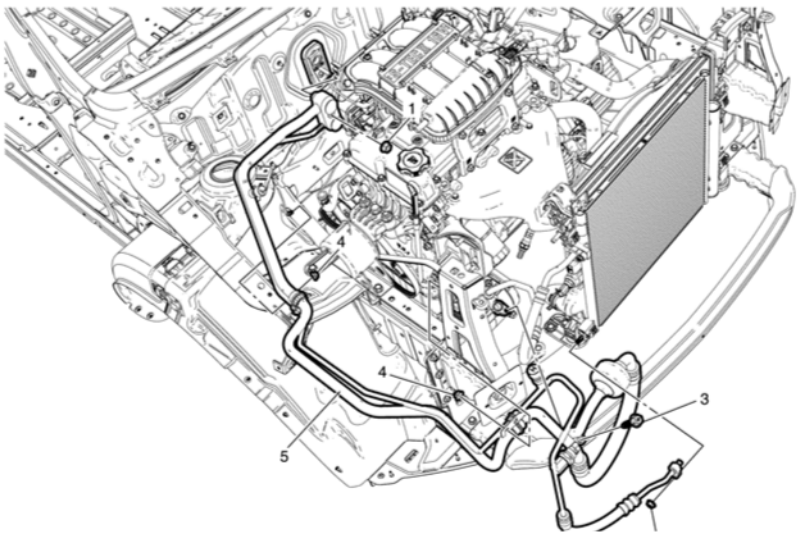
Part Name	Catalog Name	Part Code
Air Conditioning Compressor and Condenser Hose	HOSE,A/C CMPR & CNDSR	0275A
Air Conditioning Compressor and Condenser Hose	HOSE,A/C CMPR & CNDSR	0275B
Air Conditioning Compressor and Condenser Hose	HOSE,A/C CMPR & CNDSR (W/HTR OTLT HOSE)	0275C

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Air Conditioning Evaporator Hose Replacement (1.2L LMU, LKY)

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Callout	Component Name
	Preliminary Procedures 1. Recover the refrigerant. Refer to Refrigerant Recovery and Recharging. 2. Remove the air cleaner assembly. Refer to Air Cleaner Assembly Replacement. 3. Remove the front bumper fascia opening lower cover. Refer to Front Bumper Fascia Opening Lower Cover Replacement. 4. Remove the plenum lower panel. Refer to Plenum Lower Panel Replacement. 5. Put aside the power steering fluid reservoir and radiator surge tank after removing the screws. Refer to Power Steering Fluid Reservoir Replacement and Radiator Surge Tank Replacement. 6. Disconnect the left rear (LR) and right rear (RR) brake pipes from the brake pressure modulator valve (BPMV). Refer to Brake Pressure Modulator Valve Replacement. 7. Disconnect the A/C refrigerant pressure sensor electrical connector.

Callout	Component Name
1	Air Conditioning Evaporator Hose Assembly Nut to Air Conditioning Evaporator Thermal Expansion Valve (Qty:â€‰1) Caution: Refer to Fastener Caution. Tighten 20â€‰N-m (15â€‰lbâ€‰ft)
2	Air Conditioning Evaporator Hose Assembly Nut to Air Conditioning Condenser (Qty:â€‰1) Tighten 10â€‰N-m (89â€‰lbâ€‰ft)
3	Air Conditioning Evaporator Hose Assembly Bolt to Air Conditioning Compressor (Qty:â€‰1) Tighten 22â€‰N-m (16â€‰lbâ€‰ft)
4	Air Conditioning Evaporator Hose Assembly Mounting Bracket Nut (Qty:â€‰2) Tighten 10â€‰N-m (89â€‰lbâ€‰in)
5	Air Conditioning Evaporator Hose Assembly

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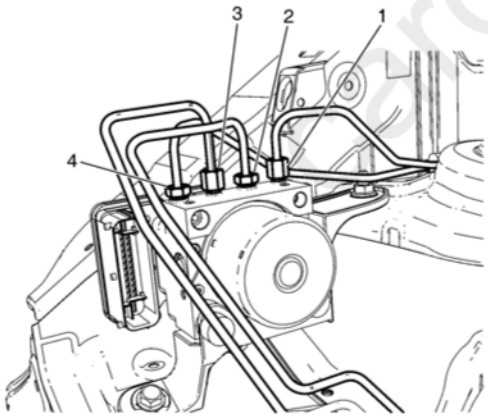
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Air Conditioning Evaporator Hose Replacement (1.19L LC5)

Removal Procedure

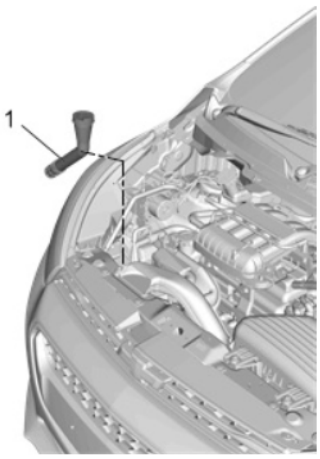
1. Recover the refrigerant. Refrigerant Recovery and Recharging

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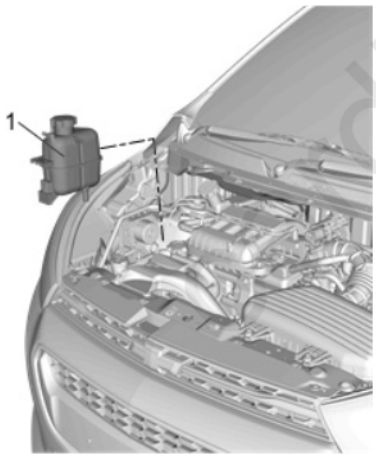
2. Click here for full size

3. Disconnect the left rear (LR)â€‰(2) and right rear (RR)â€‰(3) brake pipes from the brake pressure modulator valve (BPMV). Brake Pressure Modulator Valve Replacement

4. 

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5. Remove the windshield washer solvent container filler tubeâ€‰(1). Windshield Washer Solvent Container Filler Tube Replacement.

6. 

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7. Remove the radiator surge tankâ€‰(1). Radiator Surge Tank Replacement.

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8. 

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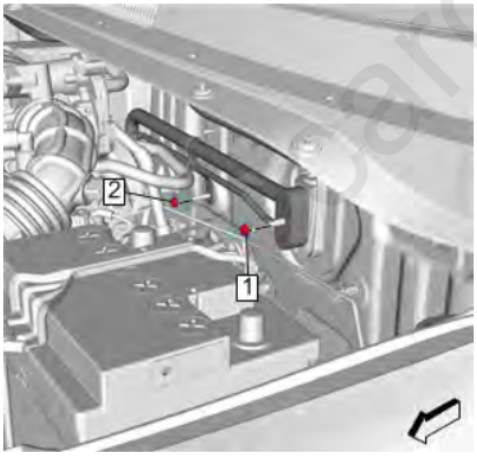
9. Remove the air cleaner outlet ductâ€‰(1). Air Cleaner Assembly Replacement.

10. 

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11. Remove the front bumper fascia opening lower coverâ€‰(1). Front Bumper Fascia Opening Lower Cover Replacement

12. Unclip the power brake booster vacuum hose from the dash panel.

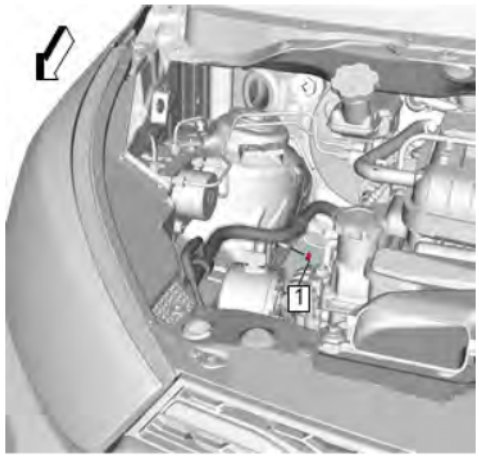
13. 

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14. Remove the air conditioning evaporator hose fitting nutâ€‰(1) from the air conditioning evaporator thermal expansion valve.

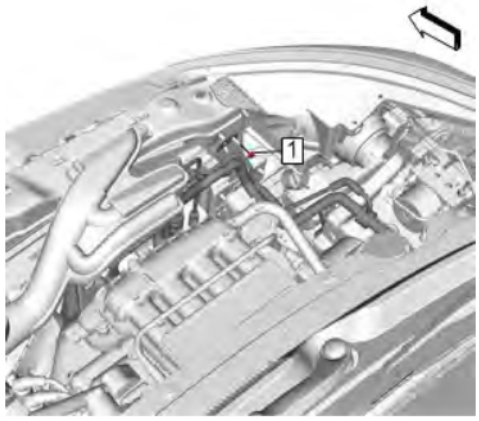
15. Remove the air conditioning evaporator hose bracket nutâ€‰(2) from the dash panel.

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16. 

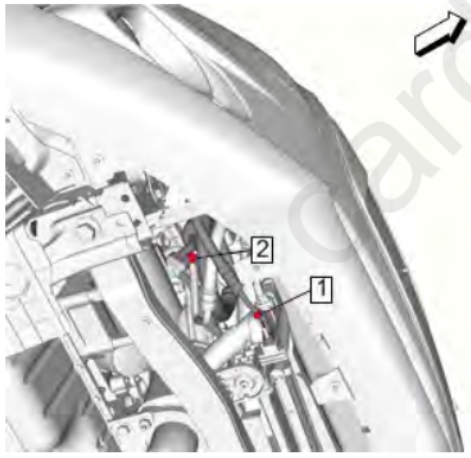
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17. Remove the air conditioning evaporator hose bracket nutâ€‰(1) from the front compartment front inner side rail.

18. 

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19. Remove the air conditioning evaporator hose fitting nutâ€‰(1) from the front end upper tie bar support.

20. 

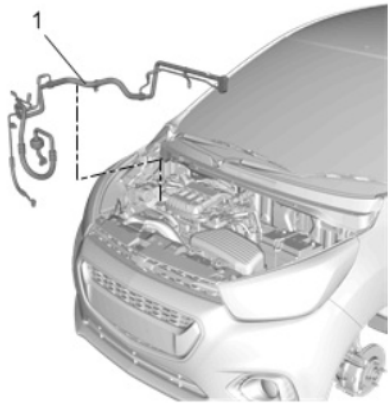
Click here for full size

21. Remove the air conditioning evaporator hose fitting nutâ€‰(1) from the condenser assembly.

22. Remove the air conditioning evaporator hose boltâ€‰(2) from the compressor assembly.

23. Disconnect the electrical connector from the air conditioning (A/C) refrigerant pressure sensor.

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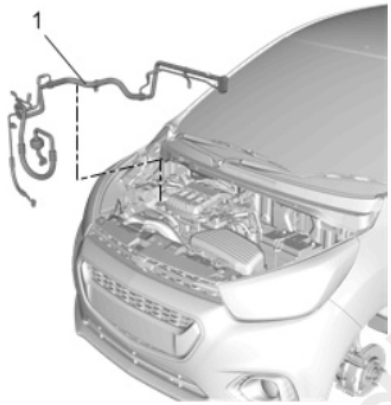
24. 

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25. Remove the air conditioning evaporator hose assemblyâ€‰(1).

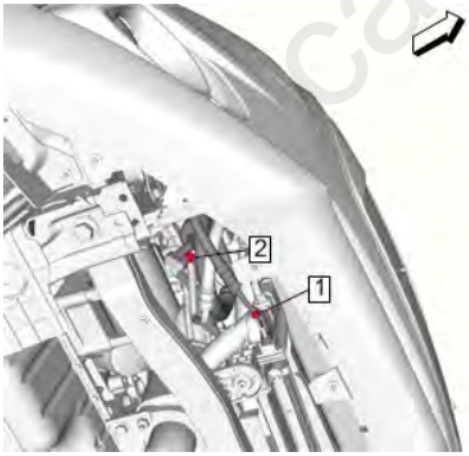
Installation Procedure

1. Install NEW system seals to the air conditioning compressor hose, air conditioning evaporator hose and to the air conditioning condenser hose. Air Conditioning System Seal Replacement.

2. 

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3. Install the air conditioning evaporator hose assemblyâ€‰(1).

4. 

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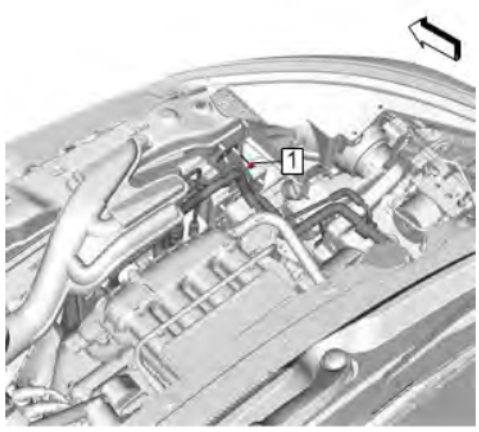
5. Caution:

   Refer to Fastener Caution.

6. Install the air conditioning evaporator hose boltâ€‰(2) to the compressor assembly and tighten to 10N-m (89 lb in).

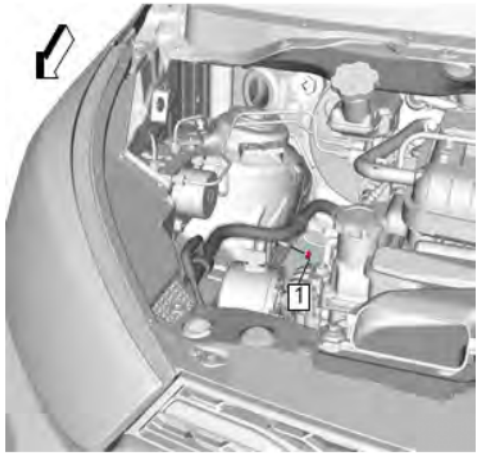
7. Install the air conditioning evaporator hose fitting nutâ€‰(1) to the condenser assembly and tighten to 22â€‰N-mâ€‰(16â€‰lbâ€‰ft).

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8. 

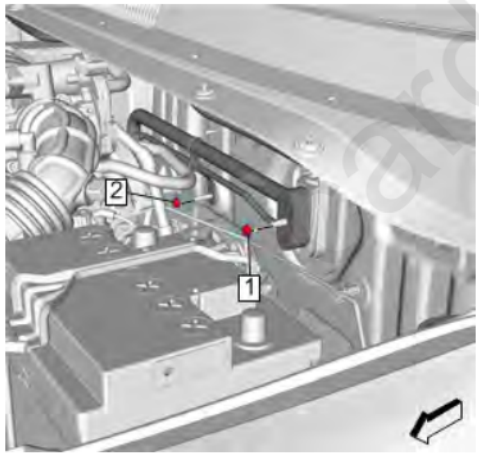
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9. Install the air conditioning evaporator hose fitting nutâ€‰(1) to the front end upper tie bar support and tighten to 10N-m (89 lb in).

10. 

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11. Install the air conditioning evaporator hose bracket nutâ€‰(2) to the front compartment front inner side rail and tighten to 10N-m (89 lb in).

12. 

Click here for full size

13. Install the air conditioning evaporator hose bracket nutâ€‰(2) to the dash panel and tighten to 10N-m (89 lb in).

14. Install the air conditioning evaporator hose fitting nutâ€‰(1) to the air conditioning evaporator thermal expansion valve and tighten to 20N-m (15 lb ft).

15. Connect the electrical connector to the air conditioning (A/C) refrigerant pressure sensor.

16. Install the power brake booster vacuum hose to the dash panel.

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17. 

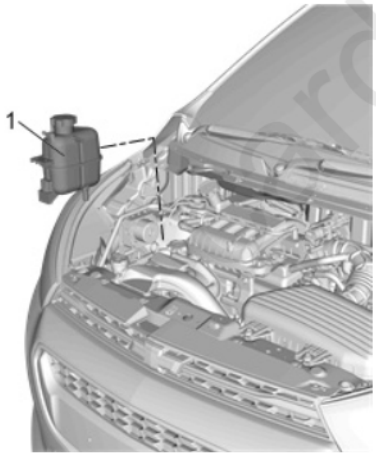
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18. Install the front bumper fascia opening lower coverâ€‰(1). Front Bumper Fascia Opening Lower Cover Replacement

19. 

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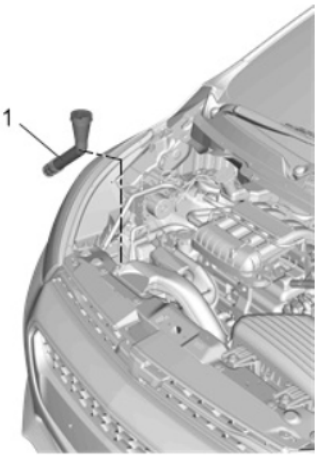
20. Install the air cleaner outlet ductâ€‰(1). Air Cleaner Assembly Replacement

21. 

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22. Install the radiator surge tankâ€‰(1). Radiator Surge Tank Replacement

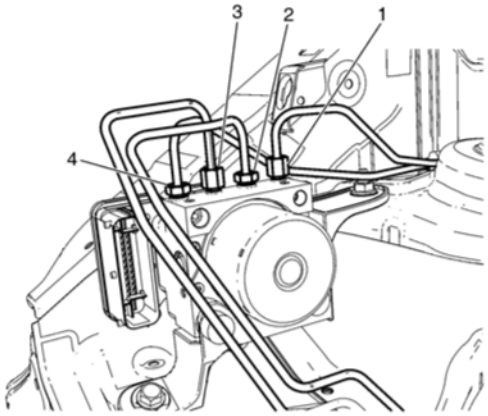
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23. 

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24. Install the windshield washer solvent container filler tubeâ€‰(1). Windshield Washer Solvent Container Filler Tube Replacement.

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25.
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26. Connect the left rear (LR)â€‰(2) and right rear (RR)â€‰(3) brake pipes to the brake pressure modulator valve (BPMV). Brake Pressure Modulator Valve Replacement

27. Evacuate and charge the refrigerant system. Refer to Refrigerant Recovery and Recharging.

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3. REPAIR INSTRUCTIONS
4.

Air Conditioning Refrigerant Service Valve Core Replacement

Special Tools

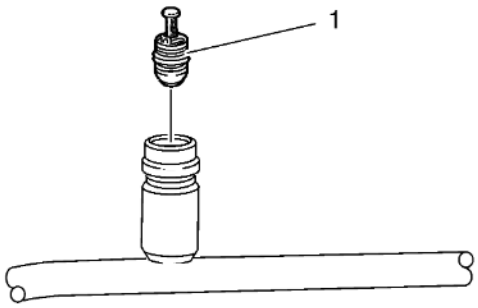
- *GE-39400-A* Halogen Leak Detector
- *GE-46246* Valve Core Removal Tool

For equivalent regional tools, refer to Special Tools.

Removal Procedure

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

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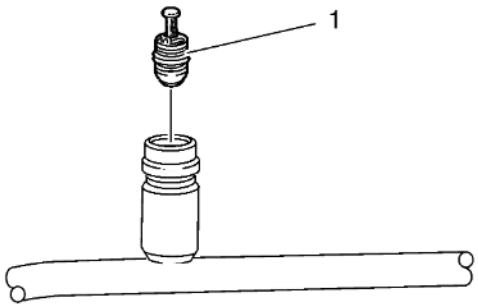


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2. Click here for full size

3. Remove the service port valve coreâ€‰(1) using the *GE-46246* remover .

Installation Procedure



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1. Click here for full size
2. Caution:

   Refer to Fastener Caution.

3. Install the service port valve coreâ€‰(1) using the *GE-46246* remover and tighten to 0.4â€‰N-m (4â€‰lb in).

4. Evacuate and charge the refrigerant system. Refer to Refrigerant Recovery and Recharging.
5. Leak test the fittings using the *GE-39400-A* detector .

Related Part Information

Part Name	Catalog Name	Part Code
Air Conditioning Refrigerant Service Valve Core	CORE,A/C REFRIG SERV VLV	3590A

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Receiver and Dehydrator Replacement

Special Tools

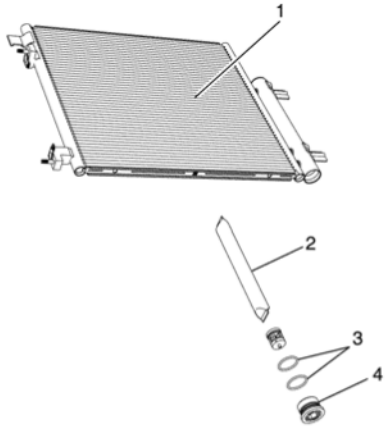
GE 39400-A Halogen Leak Detector

For equivalent regional tools, refer to Special Tools.

Removal Procedure

1. Recover the refrigerant. Refer to Refrigerant Recovery and Recharging.
2. Remove the front bumper fascia opening lower cover. Refer to Front Bumper Fascia Opening Lower Cover Replacement.

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3. Click here for full size
4. Note**:**

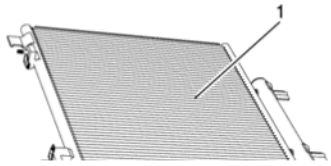
   Cap all A/C components immediately to prevent system contamination.

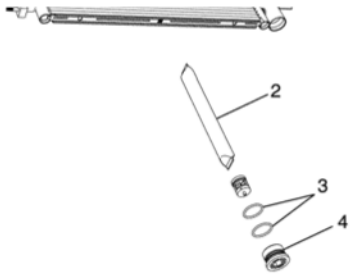
5. Remove the air conditioning receiver and dehydrator plugâ€‰(4).
6. Remove and discard the sealing washersâ€‰(3).
7. Remove the refrigerant desiccantâ€‰(2) from the condenserâ€‰(1).

Installation Procedure

1. Uncap A/C components.
2. Install new sealing washersâ€‰(3). Refer to Air Conditioning O-Ring Seal Replacement.

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3. Click here for full size
4. Install the refrigerant desiccant (2) into the air conditioning condenserâ€‰(1).
5. Install the air conditioning receiver and dehydrator plugâ€‰(4).
6. Install the front bumper fascia opening lower cover. Refer to Front Bumper Fascia Opening Lower Cover Replacement.
7. Evacuate and charge the refrigerant system. Refer to Refrigerant Recovery and Recharging.
8. Leak test the fittings using the *GE 39400-A* detector.

Related Part Information

Part Name	Catalog Name	Part Code
Air Conditioning Receiver and Dehydrator	RECEIVER & DEHYDRATOR KIT,A/C	2449Z
Air Conditioning Receiver and Dehydrator	RECEIVER & DEHYDRATOR,A/C	2450A
Air Conditioning Receiver and Dehydrator	RECEIVER & DEHYDRATOR,A/C	2450B
Air Conditioning Refrigerant Dryer	DRYER,A/C REFRIG	X0063

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Air Conditioning Evaporator Thermal Expansion Valve Replacement

Special Tools

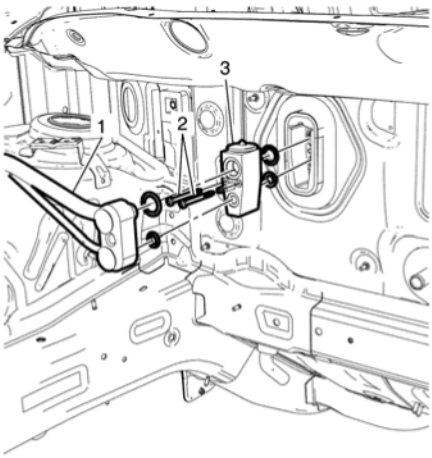
GE-39400-A Halogen Leak Detector

For equivalent regional tools, refer to Special Tools.

Removal Procedure

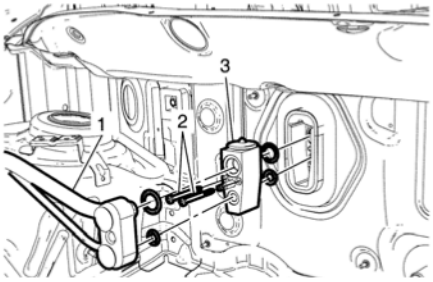
1. Recover the refrigerant. Refer to Refrigerant Recovery and Recharging.
2. Remove the radiator surge tank screws. Refer to Radiator Surge Tank Replacement.
3. Remove the A/C evaporator hose assembly mounting bracket nut from the wheelhouse panel side. Refer to Air Conditioning Evaporator Hose Replacement.

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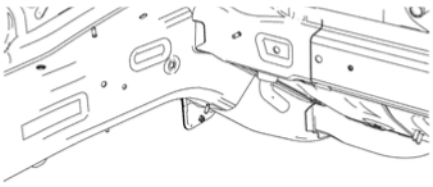


4. Click here for full size
5. Disconnect the A/C evaporator hoseâ€‰(1) from A/C evaporator TXV. Refer to Air Conditioning Evaporator Hose Replacement.
6. Remove the 2â€‰A/C TXV boltsâ€‰(2).
7. Remove the TXVâ€‰(3).

Installation Procedure



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1. Click here for full size
2. Caution:

   Refer to Fastener Caution.

3. Note:

   Use NEW O-ring seals. Refer to Air Conditioning O-Ring Seal Replacement.

4. Install A/C TXVâ€‰(3) and the 2 A/C TXV boltsâ€‰(2) and tighten to 3.5â€‰N-m (31â€‰lbâ€‰in) .
5. Connect the air conditioning evaporator hoseâ€‰(1) to A/C evaporator TXVâ€‰(3). Refer to Air Conditioning Evaporator Hose Replacement.
6. Install the A/C evaporator hose assembly mounting bracket nut from the wheelhouse panel side. Refer to Air Conditioning Evaporator Hose Replacement.
7. Install the radiator surge tank screws. Refer to Radiator Surge Tank Replacement.
8. Evacuate and charge the refrigerant system. Refer to Refrigerant Recovery and Recharging.
9. Leak test the fittings using the *GE-39400-A* detector .

Related Part Information

Part Name	Catalog Name	Part Code
Air Conditioning Evaporator Thermal Expansion Valve	VALVE KIT,A/C EVPR THERMAL EXPN	1609Z
Air Conditioning Evaporator Thermal Expansion Valve	VALVE,A/C EVPR THERMAL EXPN	1610A

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Air Conditioning (A/C) Refrigerant Pressure Sensor Replacement

Special Tools

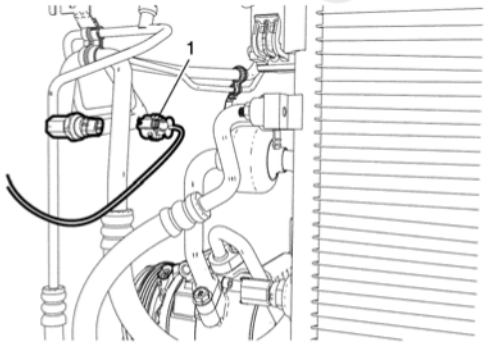
GE-39400-A Halogen Leak Detector

For equivalent regional tools, refer to Special Tools.

Removal Procedure

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

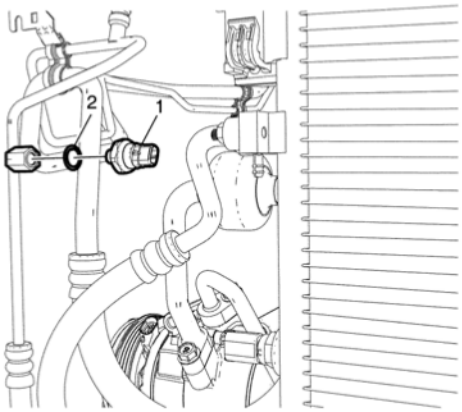
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2.
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3. Remove the air conditioning refrigerant pressure sensor wire harness connectorâ€‰(1).

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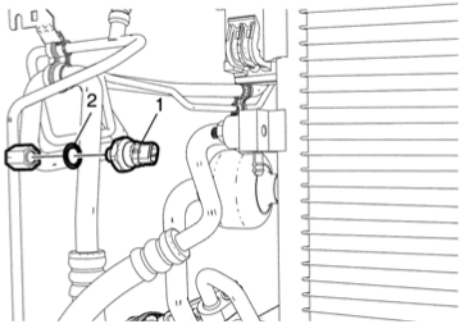


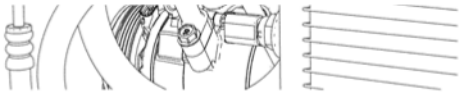
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5. Remove the air conditioning refrigerant pressure sensorâ€‰(1).
6. Remove and discard the O-ringâ€‰(2).

Installation Procedure

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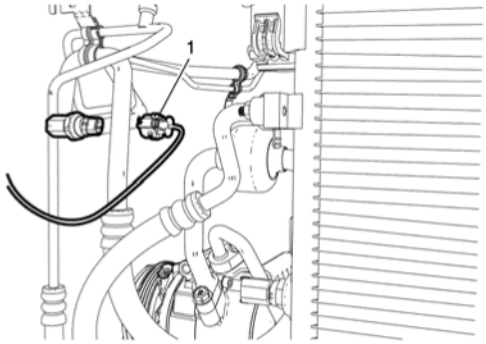




1. Click here for full size
2. Install a new O-ringâ€‰(2). Refer to Air Conditioning O-Ring Seal Replacement.
3. Caution:

   Refer to Fastener Caution.
4. Install the air conditioning refrigerant pressure sensorâ€‰(1) and tighten to 12â€‰N-m (9â€‰lbâ€‰ft).

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5. Click here for full size
6. Install the air conditioning refrigerant pressure sensor wire harness connectorâ€‰(1).
7. Evacuate and charge the refrigerant system. Refer to Refrigerant Recovery and Recharging.
8. Leak test the fittings using the *GE-39400-A* detector.

Related Part Information

Part Name	Catalog Name	Part Code
Air Conditioning Refrigerant Pressure Sensor	SENSOR,A/C REFRIG PRESS	5310A

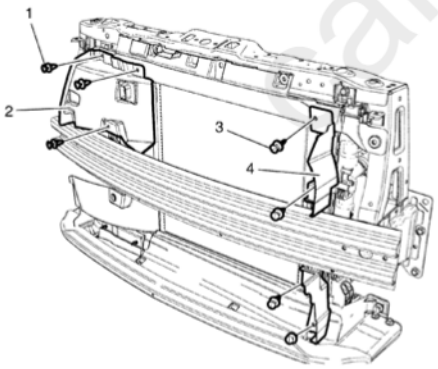
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Air Conditioning Condenser Replacement

Removal Procedure

1. Recover the refrigerant. Refer to Refrigerant Recovery and Recharging.
2. Remove the front bumper fascia. Refer to Front Bumper Fascia Replacement.

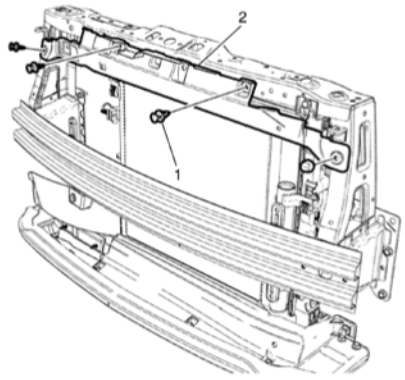


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3.
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4. Remove the 3 right side opening cover retainerâ€‰(1) and right side opening coverâ€‰(2).
5. Remove the 4 left side opening cover retainerâ€‰(3) and left side opening coverâ€‰(4).

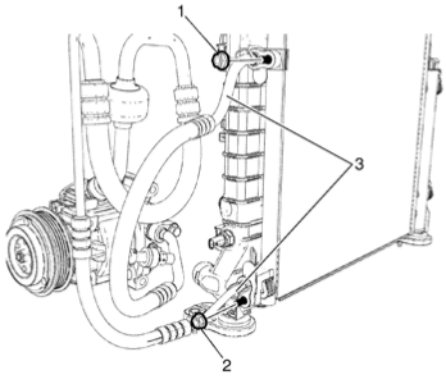
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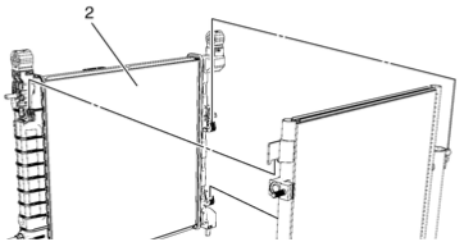
7. Remove the 4 upper opening cover retainerâ€‰(1) and upper opening coverâ€‰(2).

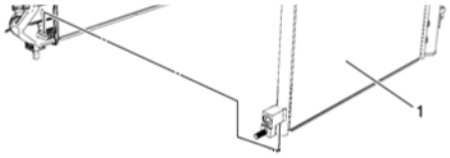
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8. Click here for full size
9. Remove air conditioning compressor and condenser hose nutâ€‰(1).
10. Remove air conditioning evaporator hose assembly nutâ€‰(2).
11. Remove air conditioning hosesâ€‰(3) from the air conditioning condenser.

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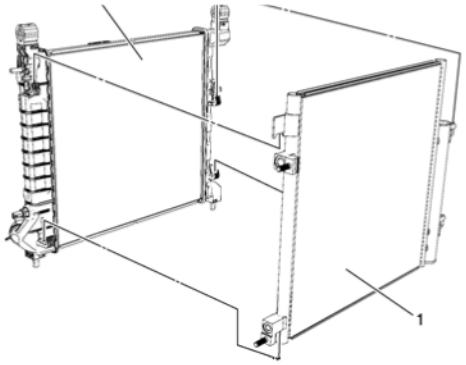


12. Click here for full size
13. Unclip air conditioning condenserâ€‰(1) from the radiatorâ€‰(2).

Installation Procedure

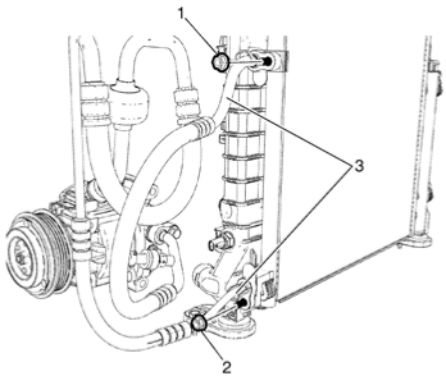
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1. Click here for full size
2. Clip the air conditioning condenserâ€‰(1) to the radiatorâ€‰(2).

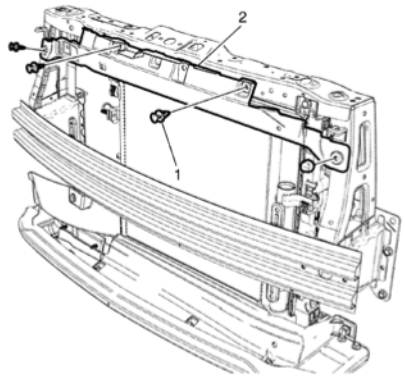
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3. Click here for full size
4. Install air conditioning hosesâ€‰(3) to the air conditioning condenser.
5. Caution:

   Refer to Fastener Caution.
6. Install air conditioning evaporator hose assembly nutâ€‰(2) and tighten to 22â€‰N-m (16â€‰lbâ€‰in).
7. Install air conditioning compressor and condenser nutâ€‰(1) and tighten to 22â€‰N-m (16â€‰lbâ€‰in).

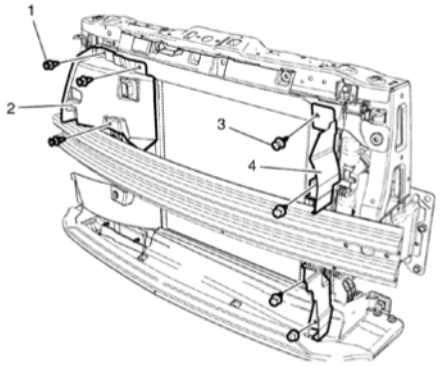
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8. Click here for full size

9. Install the upper opening coverâ€‰(2) and 4 upper opening cover retainerâ€‰(1).



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10. Click here for full size
11. Install the left side opening coverâ€‰(4) and 4 left side opening cover retainerâ€‰(3).
12. Install the right side opening coverâ€‰(2) and 3 right side opening cover retainerâ€‰(1).
13. Install the front bumper fascia. Refer to Front Bumper Fascia Replacement.

14. Charge the refrigerant system. Refer to Refrigerant Recovery and Recharging.

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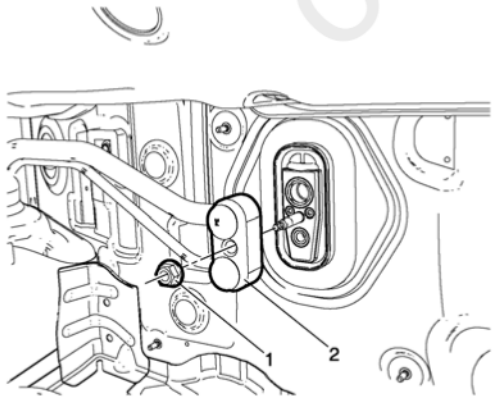
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Air Conditioning (A/C) Evaporator and Blower Module Assembly Replacement

Removal Procedure

1. Drain the cooling system. Refer to Cooling System Draining and Filling.
2. Recover the refrigerant. Refer to Refrigerant Recovery and Recharging.
3. Disconnect the heater hoses from the heater core. Refer to Heater Inlet Hose Replacement and Heater Outlet Hose Replacement.
4. Remove the instrument panel (IP) tie bar. Refer to Instrument Panel Tie Bar Replacement.

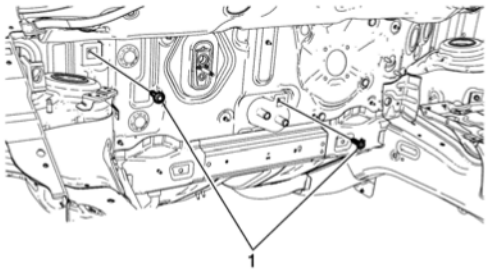
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5.
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6. Remove the A/C evaporator hose assembly nutâ€‰(1).
7. Disconnect the A/C evaporator hose assemblyâ€‰(2) from the thermal expansion valve.

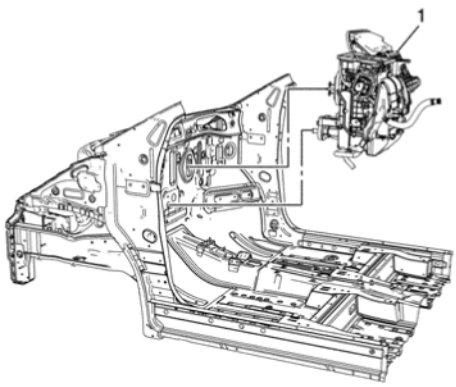
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9. Remove the HVAC module assembly to dash panel boltsâ€‰(1).

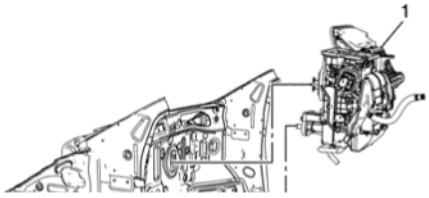
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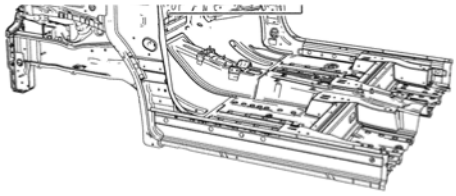
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11. Remove the HVAC module assemblyâ€‰(1).

Installation Procedure

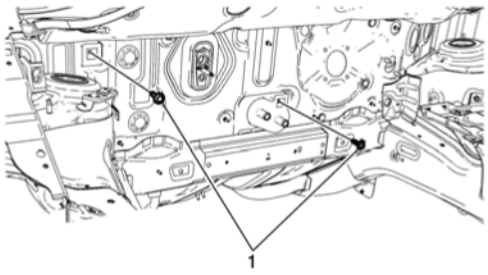


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1. Click here for full size
2. Install the HVAC module assemblyâ€‰(1).

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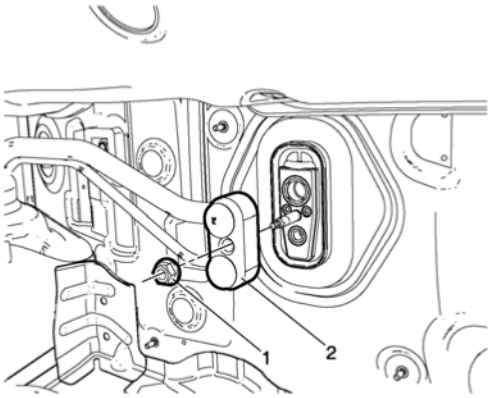


3. Click here for full size
4. Caution:

   Refer to Fastener Caution.

5. Install the HVAC module assembly to dash panel boltsâ€‰(1) and tighten to 6â€‰N-m (53â€‰lbâ€‰in) .

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6. Click here for full size
7. Connect the A/C evaporator hose assemblyâ€‰(2) to the thermal expansion valve.
8. Install the A/C evaporator hose assembly nutâ€‰(1) and tighten to 20â€‰N-m (15â€‰lbâ€‰ft).
9. Install the IP tie bar. Refer to Instrument Panel Tie Bar Replacement.
10. Connect the heater hoses to the heater core. Refer to Heater Inlet Hose Replacement and Heater Outlet Hose Replacement.
11. Evacuate and charge the refrigerant system. Refer to Refrigerant Recovery and Recharging.
12. Fill the cooling system. Refer to Cooling System Draining and Filling.

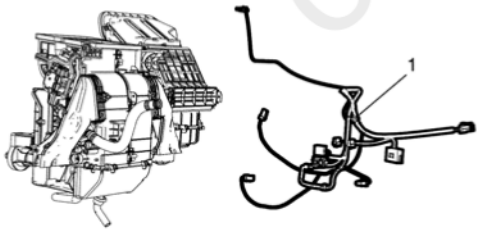
1. **HVAC**
2. HEATING, VENTILATION, AND AIR CONDITIONING
3. REPAIR INSTRUCTIONS
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Air Conditioning Evaporator Core Replacement

Removal Procedure

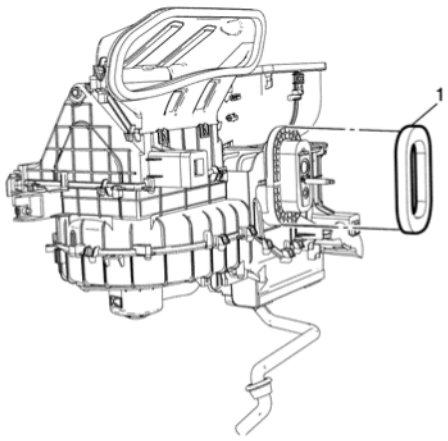
1. Recover the refrigerant. Refer to Refrigerant Recovery and Recharging.
2. Remove the air conditioning (AC) evaporator and blower module assembly. Refer to Air Conditioning (A/C) Evaporator and Blower Module Assembly Replacement.

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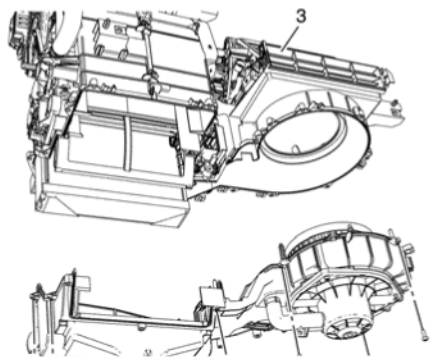
3. Click here for full size
4. Disconnect the electrical connectors.
5. Remove the A/C module wiring harnessâ€‰(1).
6. Remove the floor air outlet ducts. Refer to Floor Air Outlet Duct Replacement - Left Side and Floor Air Outlet Duct Replacement - Right Side.
7. Remove the heater core. Refer to Heater Core Replacement.

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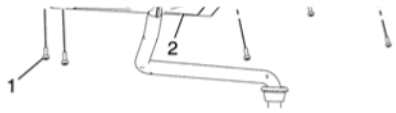


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9. Remove the AC evaporator tube sealâ€‰(1).



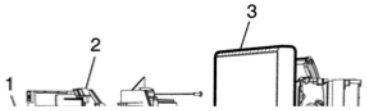
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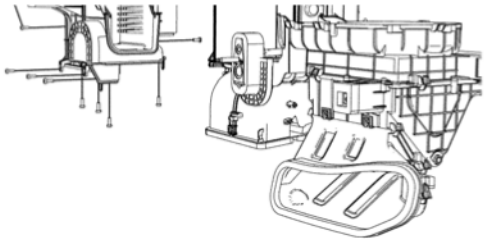
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11. Remove the heater and AC evaporator case screwsâ€‰(1).

12. Remove the heater and AC evaporator caseâ€‰(2) from AC evaporator and blower module assemblyâ€‰(3).



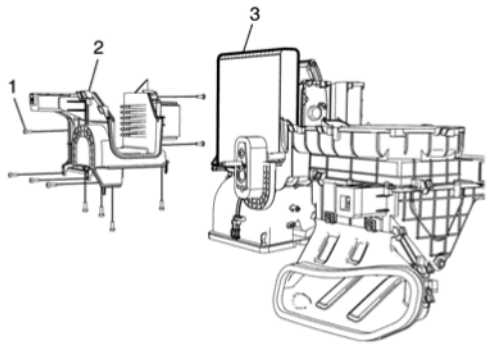
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13. Click here for full size
14. Remove the evaporator rear cover screwsâ€‰(1).
15. Remove the evaporator rear coverâ€‰(2) from AC evaporator and blower module assembly.
16. Remove the AC evaporator coreâ€‰(3).

Installation Procedure

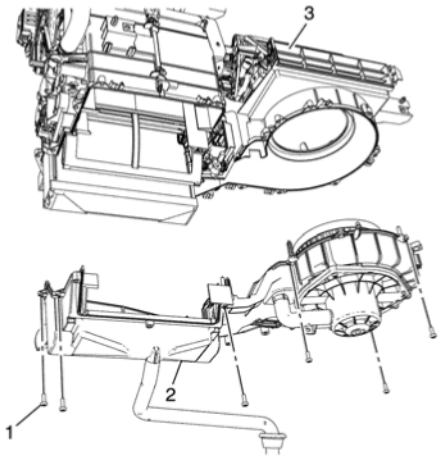
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1. Click here for full size
2. Install the AC evaporator coreâ€‰(3).
3. Install the evaporator rear coverâ€‰(2) to AC evaporator and blower module assembly.
4. Caution:

   Refer to Fastener Caution.
5. Install the evaporator rear cover screwsâ€‰(1) and tighten to 1.2â€‰N-m (11â€‰lbâ€‰in).

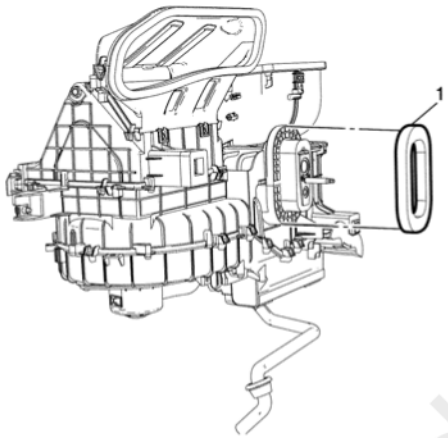


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6. Click here for full size

7. Install the heater and AC evaporator caseâ€‰(2) to AC evaporator and blower module assemblyâ€‰(3).

8. Install the heater and AC evaporator case screwsâ€‰(1) and tighten to 1.2â€‰N-m (11â€‰lbâ€‰in).

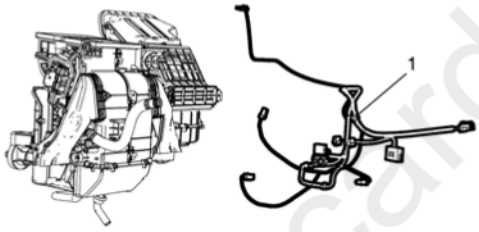


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9. [Click here for full size]

10. Install the AC evaporator tube sealâ€¦(1)

10. Install the AC evaporator tube sealing(1).
11. Install the heater core. Refer to Heater Core Replacement.
12. Install the floor air outlet ducts. Refer to Floor Air Outlet Duct Replacement - Left Side and Floor Air Outlet Duct Replacement - Right Side.



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14. Install the AC module wiring harnessâ€‰(1).

15. Connect the electrical connectors.

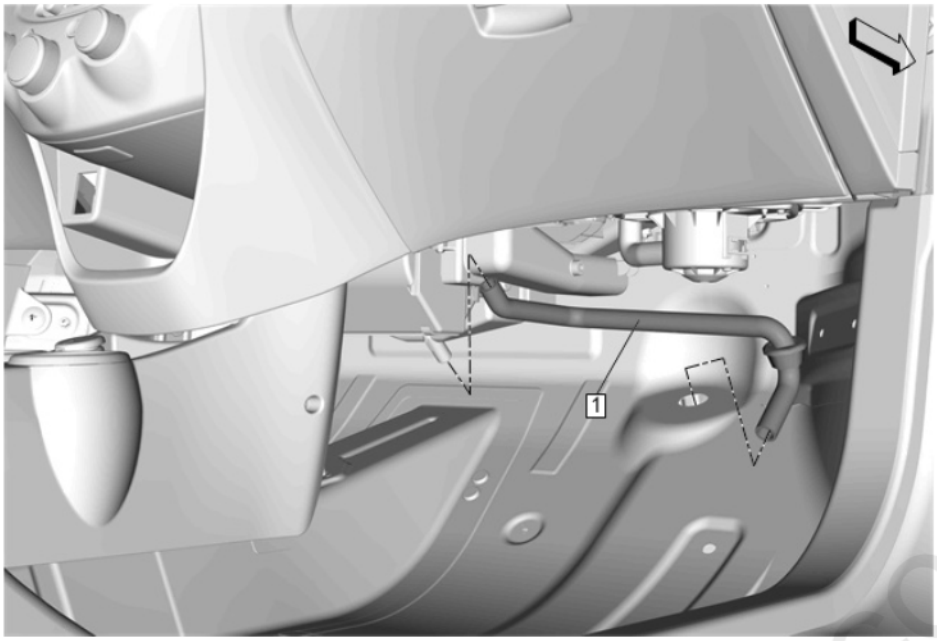
16. Install the AC evaporator and blower module assembly. Refer to Air Conditioning (A/C) Evaporator and Blower Module Assembly Replacement.

17. Evacuate and charge the refrigerant system. Refer to Refrigerant Recovery and Recharging.

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Air Conditioning Evaporator Module Drain Hose Replacement



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Callout	Component Name
Caution: Refer to HVAC Module Drain Tube Caution. Preliminary Procedure If needed, slightly raise the floor carpet that covers drain hose to remove.	
1>	Air Conditioning Evaporator Module Drain Hose Procedure Release and pull off the drain hose from the HVAC module assembly and unsnap the drain fitting grommet from the front floor panel.

Related Part Information

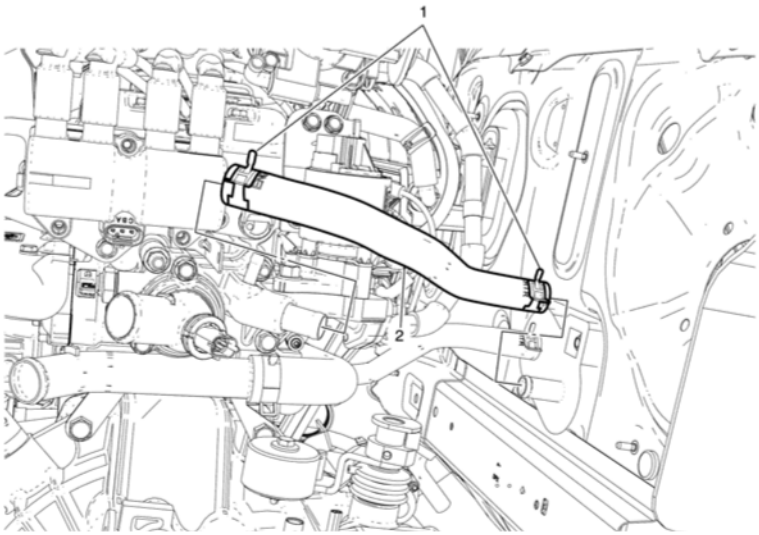
Part Name	Catalog Name	Part Code
Air Conditioning Evaporator Module Drain Hose	HOSE,A/C EVPR MDL DRN	1445B

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Heater Inlet Hose Replacement

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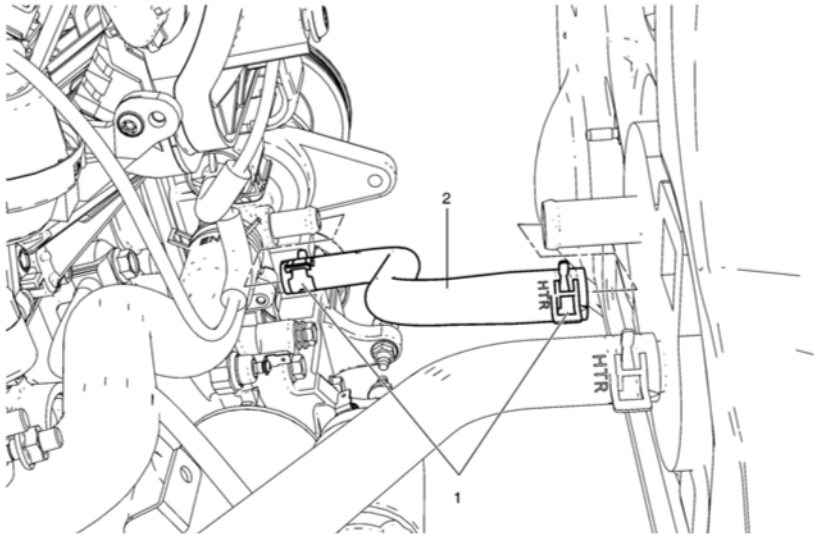
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Callout	Component Name
Preliminary Procedure Drain the cooling system. Refer to Cooling System Draining and Filling.	
1	Heater Inlet Clamp (Qty:â€‰2)
2	Heater Inlet Hose

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Heater Outlet Hose Replacement

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Callout	Component Name
Preliminary Procedures 1. Drain the cooling system. Refer to Cooling System Draining and Filling. 2. Remove the air cleaner assembly. Refer to Air Cleaner Assembly Replacement.	
1	Heater Outlet Clamp (Qty:â€‰2)
2	Heater Outlet Hose

Related Part Information

Part Name	Catalog Name	Part Code
Heater Outlet Hose	HOSE,HTR OTLT	0250A
Heater Outlet Hose	HOSE KIT,HTR OTLT	0250K
Heater Outlet Hose	HOSE,HTR OTLT (TO ENGINE)	0255A
Heater Outlet Hose	HOSE,HTR OTLT	0300A

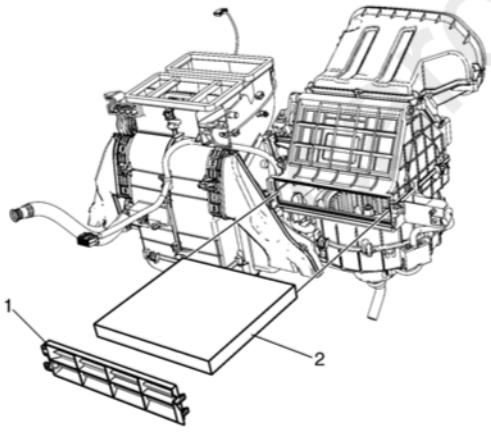
1. **HVAC**
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3. REPAIR INSTRUCTIONS
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Passenger Compartment Air Filter Replacement

Removal Procedure

1. Remove the instrument panel (I/P) compartment. Refer to Instrument Panel Compartment Replacement.

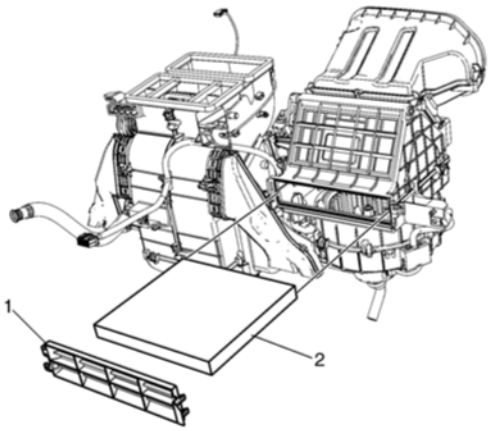
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3. Remove the passenger compartment air filter housing coverâ€‰(1).
4. Remove the passenger compartment air filterâ€‰(2).

Installation Procedure

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2. Install the passenger compartment air filterâ€‰(2).
3. Install the passenger compartment air filter housing coverâ€‰(1).
4. Install the I/P compartment. Refer to Instrument Panel Compartment Replacement.

Related Part Information

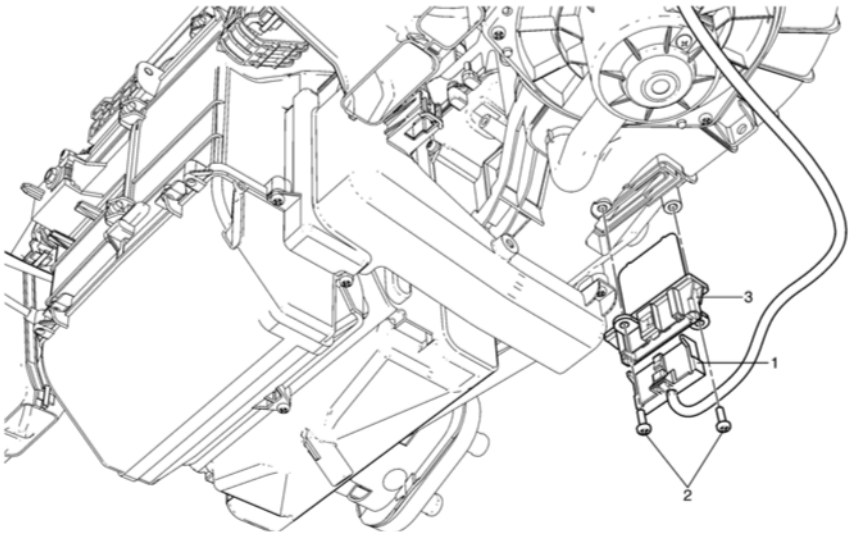
Part Name	Catalog Name	Part Code
Passenger Compartment Air Filter	FILTER KIT,PASS COMPT AIR	8098Z
Passenger Compartment Air Filter	FILTER,PASS COMPT AIR	8099A
Passenger Compartment Air Filter	FILTER,PASS COMPT AIR	8099B

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Blower Motor Resistor Replacement

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Callout	Component Name
Preliminary Procedure Disconnect the battery negative cable. Refer to Battery Negative Cable Disconnection and Connection.	
1	Blower Motor Resistor Electrical Connector
2	Blower Motor Resistor Screw (Qty:â€‰2) Caution: Refer to Fastener Caution. Tighten 1.2â€‰N-m (11â€‰lbâ€‰in)
3	Blower Motor Resistor

Related Part Information

Part Name	Catalog Name	Part Code

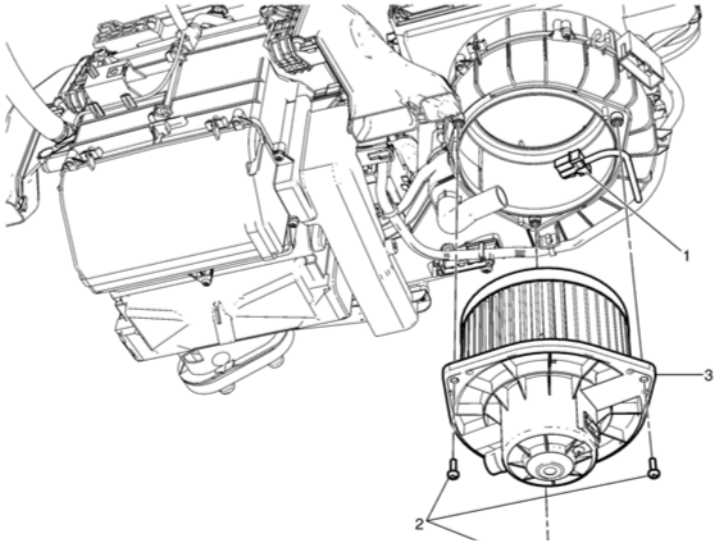
Part Name	Catalog Name	Part Code
Blower Motor Resistor	RESISTOR,BLO MOT	1525A

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Blower Motor Replacement

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Callout	Component Name
Preliminary Procedure Disconnect the battery negative cable. Refer to Battery Negative Cable Disconnection and Connection.	
1	Blower Motor Wiring Harness Connector
2	Blower Motor Screw (Qty:â€‰3) Caution: Refer to Fastener Caution. Tighten 1.2â€‰N-m (11â€‰lbâ€‰in)
3	Blower Motor Procedure Disconnect the blower motor tube.

Related Part Information

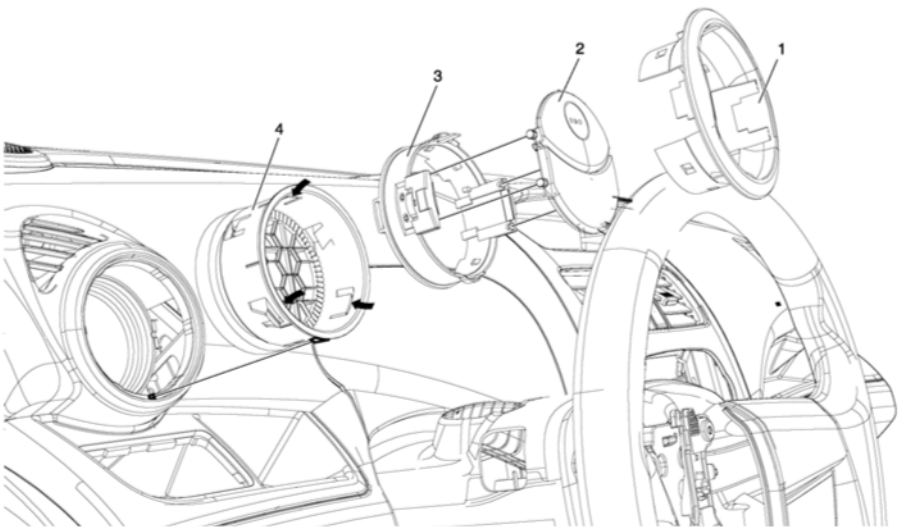
Part Name	Catalog Name	Part Code
Blower Motor	MOTOR KIT,BLO	0418A
Blower Motor	MOTOR KIT,BLO (W/ IMPLR)	0418Z
Blower Motor	MOTOR,BLO (W/IMPLR)	0419A
Blower Motor	MOTOR,BLO	0420A

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Instrument Panel Outer Air Outlet Replacement - Left Side

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Callout	Component Name
1	Inner Air Outlet Nozzle Tip Carefully use a flat-bladed screwdriver to remove the inner air outlet nozzle.
2	Air Outlet Cover
3	Outer Air Outlet Nozzle
4	Air Outlet Nozzle Housing Tip Release the portion shown as the arrow with a flat-bladed screwdriver to remove the nozzle housing.

Related Part Information

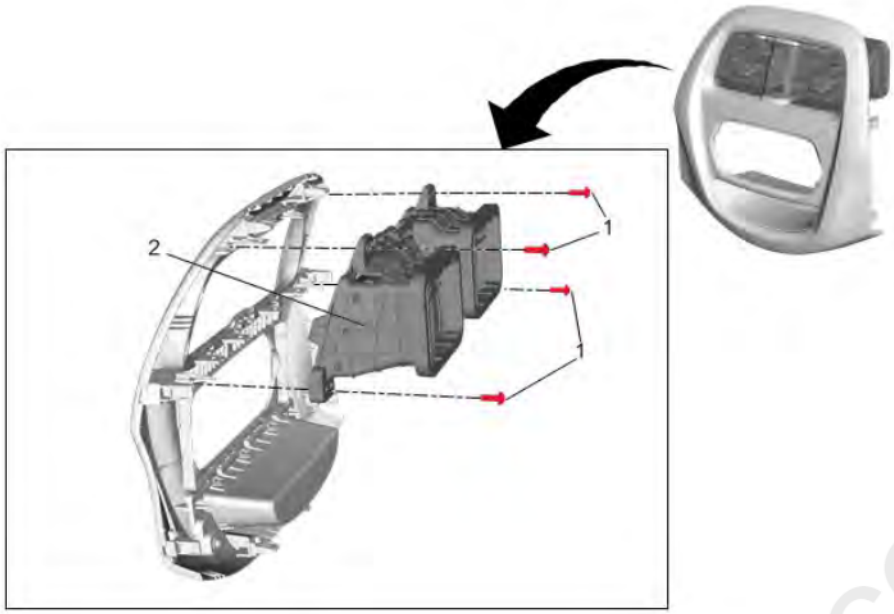
Part Name	Catalog Name	Part Code
Instrument Panel Outer Air Outlet	OUTLET,I/P OTR AIR(W/CUP HLDR)	5074A
Instrument Panel Outer Air Outlet	OUTLET KIT,I/P OTR AIR	5074Y

Part Name	Catalog Name	Part Code
Instrument Panel Outer Air Outlet	OUTLET KIT,I/P OTR AIR	5074Z
Instrument Panel Outer Air Outlet	OUTLET,I/P OTR AIR	5075A
Instrument Panel Outer Air Outlet	OUTLET,I/P OTR AIR	5075B

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Instrument Panel Center Air Outlet Replacement (PMC)



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Callout	Component Name
Preliminary Procedure Remove the instrument panel center molding. Instrument Panel Center Molding Replacement.	
1	Instrument Panel Center Air Outlet Screw [4>x] Caution: Refer to Fastener Caution. Tighten 2>N-m (18 lb in)
2	Instrument Panel Center Air Outlet Procedure 1. Use a flat bladed plastic trim tool. 2. Release the tabs to remove the air outlet.

Related Part Information

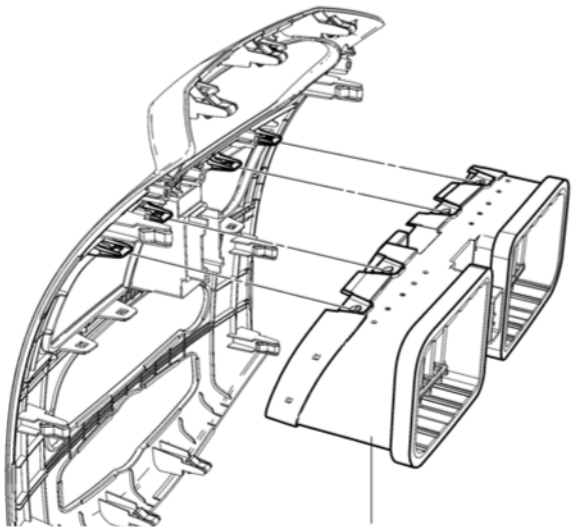
Part Name	Catalog Name	Part Code
Instrument Panel Center Air Outlet	OUTLET,I/P CTR AIR	4300A
Instrument Panel Center Air Outlet	OUTLET,I/P CTR AIR	4300B

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Instrument Panel Center Air Outlet Replacement

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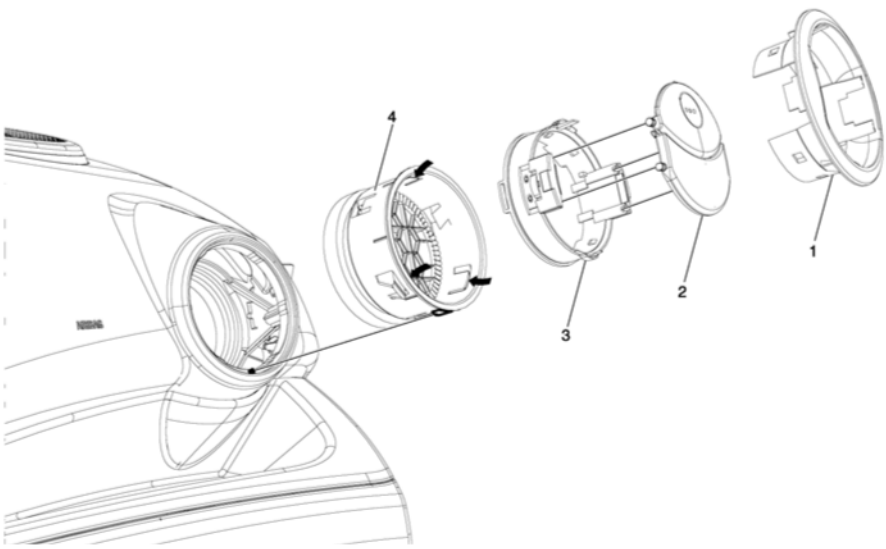
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Callout	Component Name
Preliminary Procedure Remove the instrument panel center molding. Refer to Instrument Panel Center Molding Replacement.	
1	Instrument Panel Center Air Outlet

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Instrument Panel Outer Air Outlet Replacement - Right Side

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Callout	Component Name
1	Inner Air Outlet Nozzle Tip Carefully use a flat-bladed screwdriver to remove the inner air outlet nozzle.
2	Air Outlet Cover
3	Outer Air Outlet Nozzle
4	Air Outlet Nozzle Housing Tip Release the portion shown as the arrow with a flat-bladed screwdriver to remove the nozzle housing.

Related Part Information

Part Name	Catalog Name	Part Code
Instrument Panel Outer Air Outlet	OUTLET,I/P OTR AIR(W/CUP HLDR)	5074A
Instrument Panel Outer Air Outlet	OUTLET KIT,I/P OTR AIR	5074Y

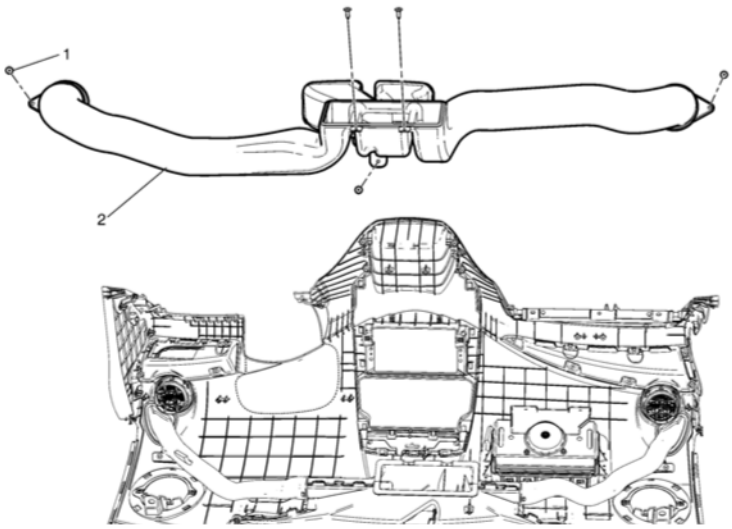
Part Name	Catalog Name	Part Code
Instrument Panel Outer Air Outlet	OUTLET KIT,I/P OTR AIR	5074Z
Instrument Panel Outer Air Outlet	OUTLET,I/P OTR AIR	5075A
Instrument Panel Outer Air Outlet	OUTLET,I/P OTR AIR	5075B

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Instrument Panel Outer Air Outlet Duct Replacement

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Instrument Panel Outer Air Outlet Duct Replacement

Callout	Component Name
Preliminary Procedure Remove the instrument panel (I/P) assembly. Refer to Instrument Panel Assembly Replacement.	
1	I/P Outer Air Outlet Duct Screw (Qty: 5) Caution: Refer to Fastener Caution. Tighten 1.3â€‰N-m (12â€‰lbâ€‰in)
2	I/P Outer Air Outlet Duct

Related Part Information

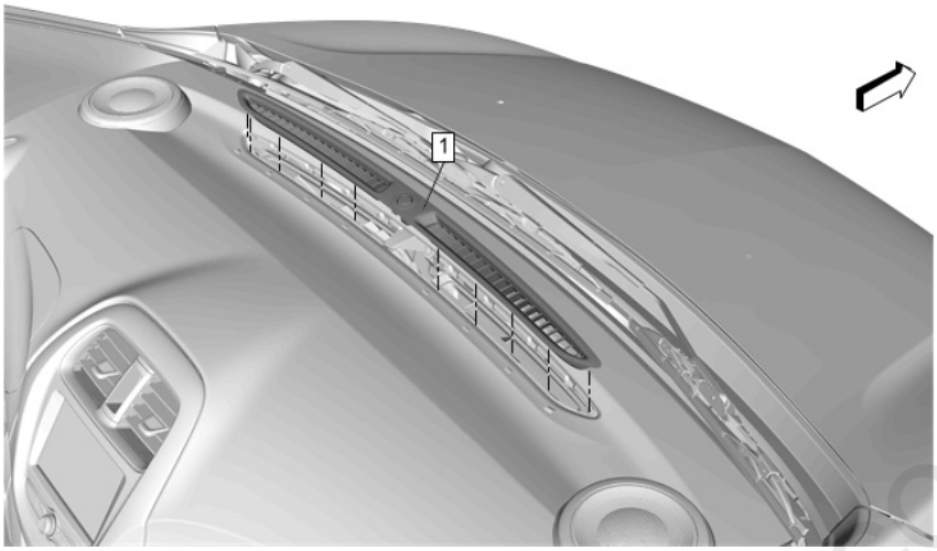
Part Name	Catalog Name	Part Code

Part Name	Catalog Name	Part Code
Instrument Panel Outer Air Outlet Duct	DUCT,I/P OTR AIR OTLT	5725A
Instrument Panel Outer Air Outlet Duct	DUCT,I/P OTR AIR OTLT	5750A

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Windshield Defroster Nozzle Grille Replacement



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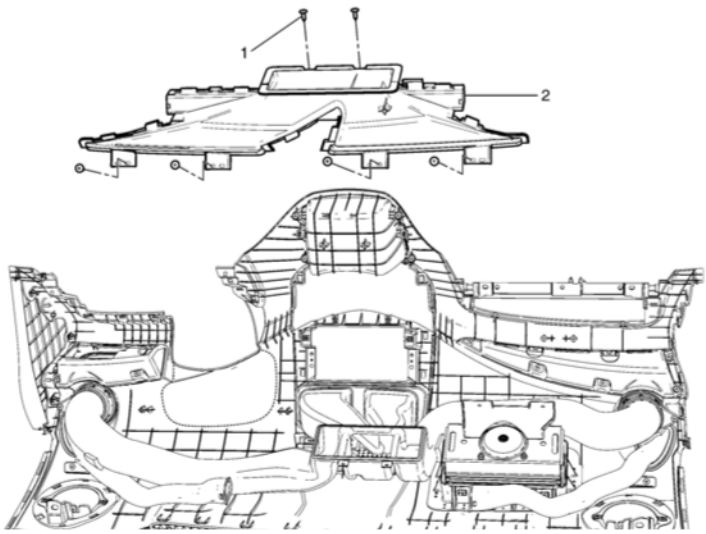
Callout	Component Name
1	Windshield Defroster Nozzle Grille Procedure 1. Use a flat bladed plastic tool to remove the grille. 2. If needed, disconnect the electrical connector.

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Windshield Defroster Nozzle Replacement

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Callout	Component Name
Preliminary Procedure Remove the instrument panel (I/P) assembly. Refer to Instrument Panel Assembly Replacement.	
1	Windshield Defroster Nozzle Screw (Qty:â€‰6) Caution: Refer to Fastener Caution. Tighten 1.3â€‰N-m (12â€‰lbâ€‰in)
2	Windshield Defroster Nozzle

Related Part Information

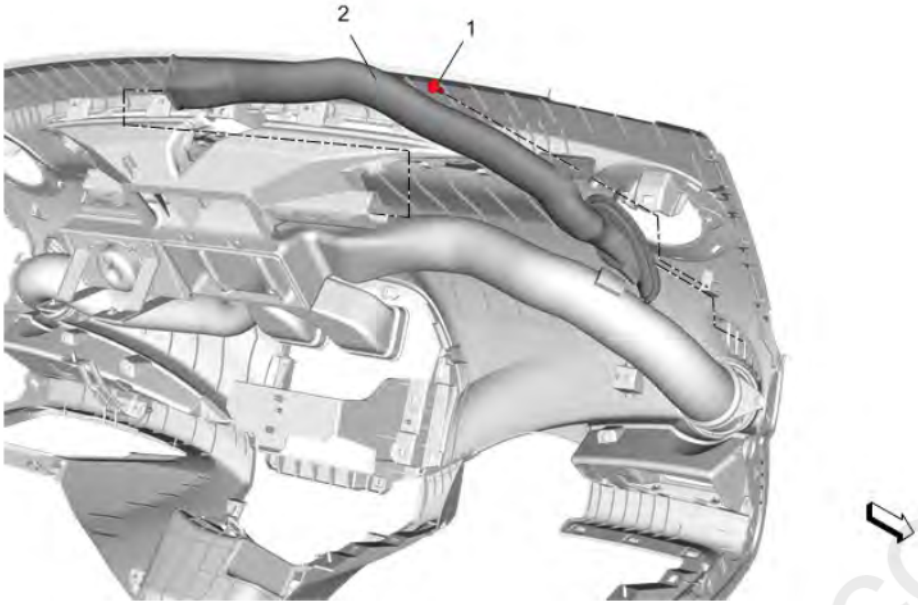
Part Name	Catalog Name	Part Code
Windshield Defroster Nozzle	NOZZLE,W/S DEFR	6525A

Part Name	Catalog Name	Part Code
Windshield Defroster Nozzle	NOZZLE,W/S DEFR	6525B

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3. REPAIR INSTRUCTIONS
4.

Side Window Defogger Outlet Duct Replacement - Left Side



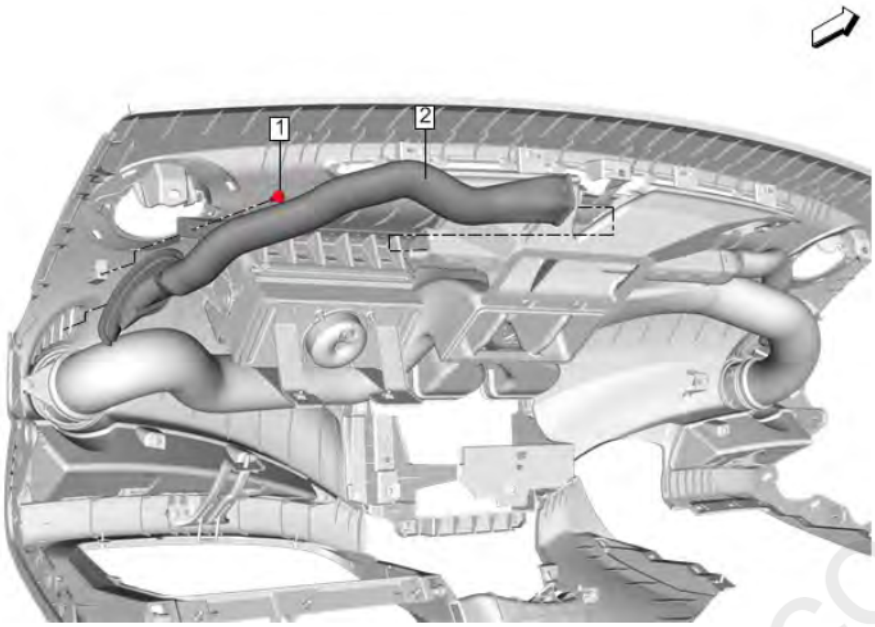
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Callout	Component Name
Preliminary Procedure Instrument Panel Assembly Replacement	
1>	Side Window Defogger Outlet Duct Bolt Caution : Fastener Caution Tighten 2>N-m (18 lb in)
2>	Side Window Defogger Outlet Duct - Left Side

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Side Window Defogger Outlet Duct Replacement - Right Side



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Callout	Component Name
Preliminary Procedure Instrument Panel Assembly Replacement	
1>	Side Window Defogger Outlet Duct Bolt Caution : Fastener Caution Tighten 2>N-m (18 lb in)
2>	Side Window Defogger Outlet Duct - Right Side

Related Part Information

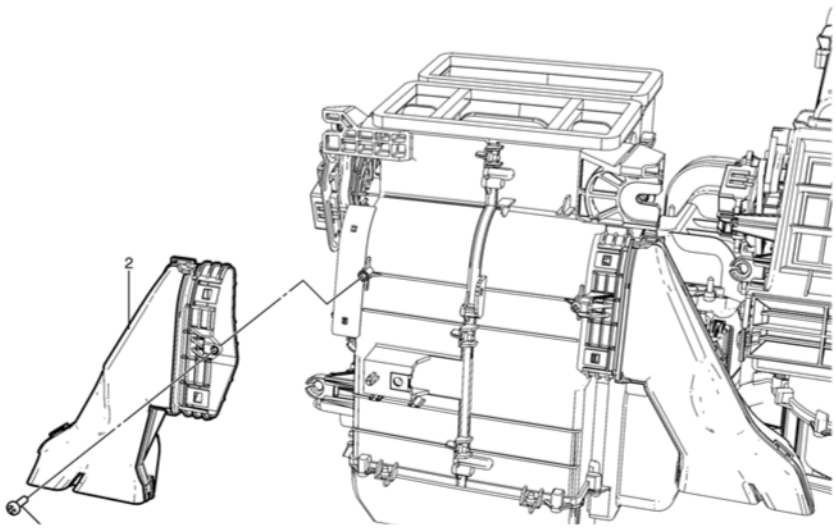
Part Name	Catalog Name	Part Code
Side Window Defogger Outlet Duct	DUCT,SI WDO DEFG OTLT	7175A
Side Window Defogger Outlet Duct	DUCT,SI WDO DEFG OTLT	7200A

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Floor Air Outlet Duct Replacement - Left Side

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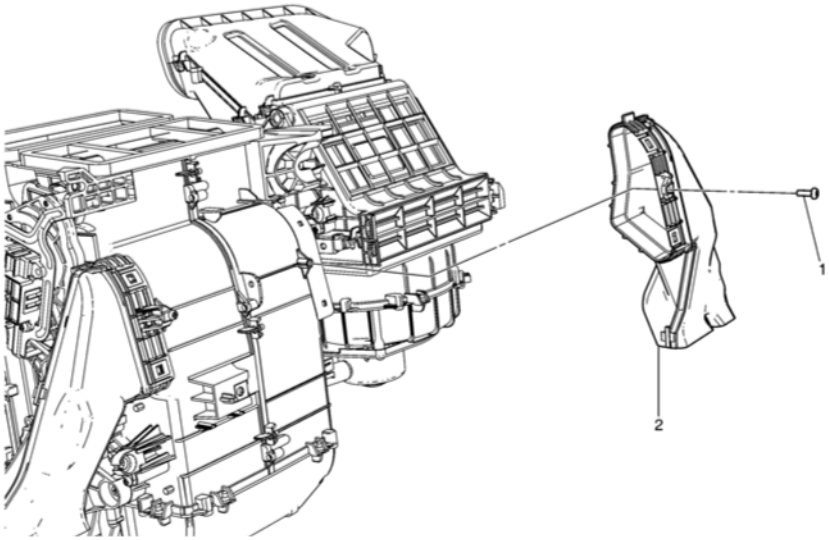
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Callout	Component Name
	Preliminary Procedure 1. Remove the steering column opening filler. Refer to Steering Column Opening Filler Replacement. 2. Remove the radio. Refer to Radio Replacement.
1	Left Floor Air Outlet Duct Screw (Qty:â€‰1) Caution: Refer to Fastener Caution. Tighten 1.2â€‰N·m (11â€‰lbâ€‰in)
2	Floor Air Outlet Duct â€“ Left

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Floor Air Outlet Duct Replacement - Right Side

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Callout	Component Name
Preliminary Procedure Remove the instrument panel compartment. Refer to Instrument Panel Compartment Replacement.	
1	Right Floor Air Outlet Duct Screw (Qty:â€‰1) Caution: Refer to Fastener Caution. Tighten 1.2â€‰N-m (11â€‰lbâ€‰in)
2	Floor Air Outlet Duct â€“ Right

Related Part Information

Part Name	Catalog Name	Part Code
Floor Air Outlet Duct	DUCT KIT,FLR AIR OTLT	4199A

Part Name	Catalog Name	Part Code
Floor Air Outlet Duct	DUCT,FLR AIR OTLT	4200A
Floor Air Outlet Duct	DUCT,FLR AIR OTLT	4225A

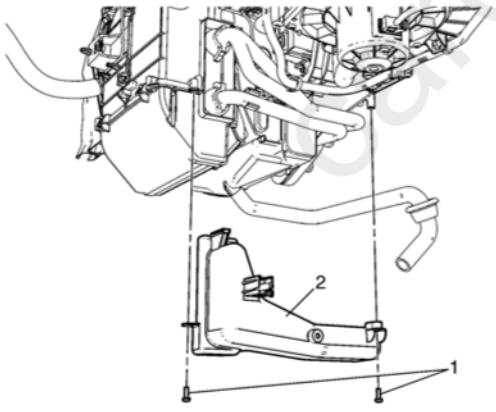
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Heater Core Replacement

Removal Procedure

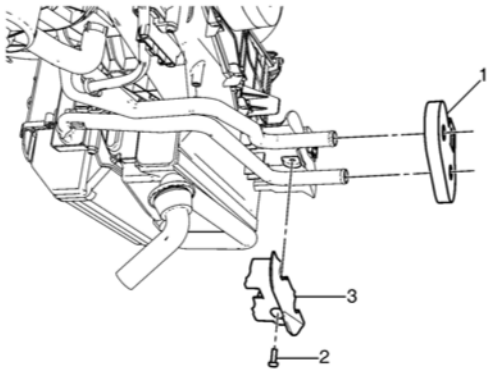
1. Remove the air conditioning (A/C) evaporator and blower module assembly. Refer to Air Conditioning (A/C) Evaporator and Blower Module Assembly Replacement.



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2. Click here for full size
3. Disconnect the evaporator air temperature sensor connector from the heater core pipe side cover.
4. Remove the heater core pipe side cover screwsâ€‰(1).
5. Remove the heater core pipe side coverâ€‰(2).

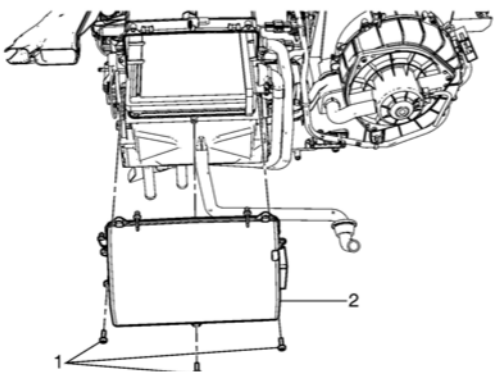
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6.
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7. Remove the heater core pipe tube sealâ€‰(1).
8. Remove the heater core pipe under cover screwâ€‰(2).
9. Remove the heater core pipe under coverâ€‰(3).

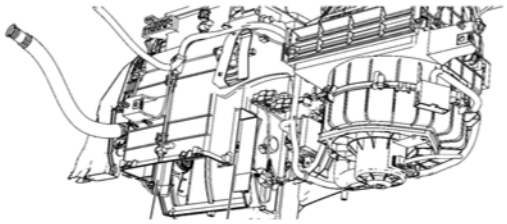
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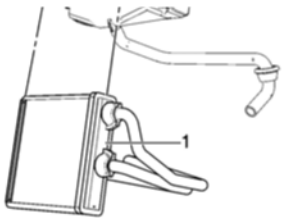
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11. Remove the heater core cover screwsâ€‰(1).

12. Remove the heater core coverâ€‰(2).



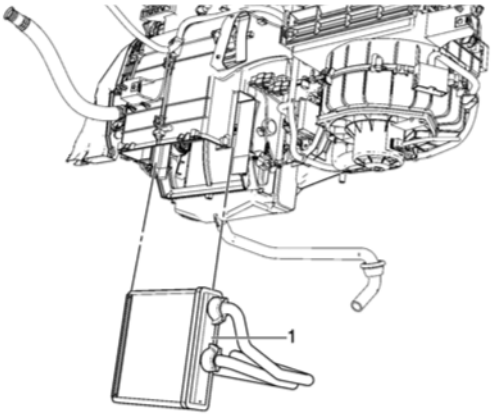
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13. Click here for full size
14. Remove the heater coreâ€‰(1) from the air conditioning evaporator and blower module assembly.

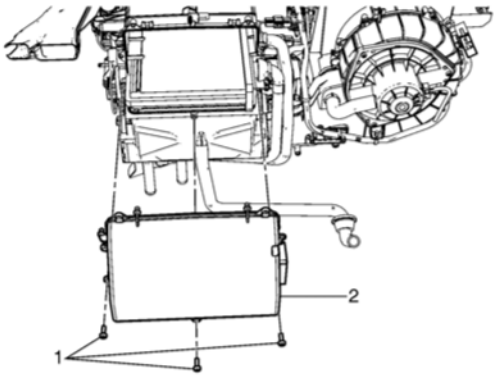
Installation Procedure

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1. Click here for full size
2. Install the heater coreâ€‰(1) to the air conditioning evaporator and blower module assembly.

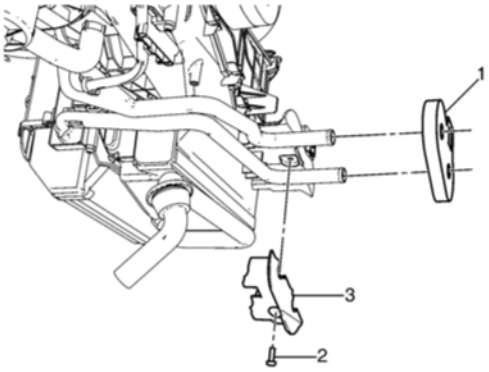
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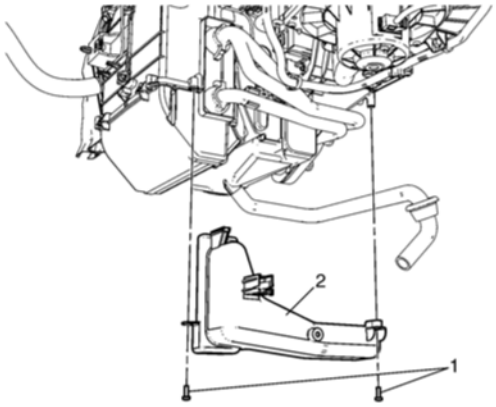
3. Click here for full size
4. Install the heater core coverâ€‰(2).
5. Caution:

   Refer to Fastener Caution.
6. Install the heater core cover screwsâ€‰(1) and tighten to 1.2â€‰N-m (11â€‰lbâ€‰in).



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7. Click here for full size
8. Install the heater core pipe under coverâ€‰(3).
9. Install the heater core pipe under cover screwâ€‰(2) and tighten to 1.2â€‰N-m (11â€‰lbâ€‰in).
10. Install the heater core pipe tube sealâ€‰(1).



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11. Click here for full size
12. Install the heater core pipe side coverâ€‰(2).
13. Install the heater core pipe side cover screwsâ€‰(1) and tighten to 1.2â€‰N-m (11â€‰lbâ€‰in).

14. Connect the evaporator air temperature sensor connector to the heater core pipe side cover.
15. Install the air conditioning evaporator and blower module assembly. Refer to Air Conditioning (A/C) Evaporator and Blower Module Assembly Replacement.

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Specifications

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Fastener Specifications (1.0L Diesel LEB)

Reusable Threaded Fastener Tightening Specifications

Note: All fasteners listed in this table can be reused after removal.	
Application	**Specification**
	Metric (English)
Air Conditioning Compressor and Condenser Hose Bolt to Air Conditioning Compressor	22N-m (16 lb ft)
Air Conditioning Compressor and Condenser Hose Nut to Air Conditioning Condenser LSF	10N-m(89 lb in)
Air Conditioning Compressor and Condenser Hose Nut to Air Conditioning Condenser LEB	9>N-m(80 lb in)
Air Conditioning Compressor Bolt	22N-m (16 lb ft)
Air Conditioning Compressor Bracket Bolt	22N-m (16 lb ft)
Air Conditioning Compressor Hose Bolt to Air Conditioning Compressor LEB	22N-m (16 lb ft)
Air Conditioning Compressor Hose Nut to Air Conditioning Evaporator Hose Assembly LEB	9>N-m(80 lb in)
Air Conditioning Evaporator Hose Assembly Bolt to Air Conditioning Compressor LSF	22N-m (16 lb ft)
Air Conditioning Evaporator Hose Bracket Bolt to Front Compartment Front Inner Side Rail LEB	9>N-m(80 lb in)
Air Conditioning Evaporator Hose Bracket Nut to Front Compartment Front Inner Side Rail LEB	9>N-m(80 lb in)
Air Conditioning Evaporator Hose Bracket Nut to Dash Panel LEB	9>N-m(80 lb in)
Air Conditioning Evaporator Hose Assembly Mounting Bracket Nuts LSF	10N-m(89 lb in)
Air Conditioning Evaporator Hose Assembly Nut to Air Conditioning Condenser LSF	10N-m(89 lb in)
Air Conditioning Evaporator Hose Assembly Nut to Air Conditioning Compressor Hose LEB	22N-m (16 lb ft)
Air Conditioning Evaporator Hose Assembly Nut to Air Conditioning Evaporator Thermal Expansion Valve LSF	20N-m(15 lb ft)
Air Conditioning Evaporator Hose Assembly Nut to Air Conditioning Evaporator Thermal Expansion Valve LEB	22N-m (16 lb ft)
Air Conditioning Evaporator Thermal Expansion Valve Bolt	3.5N-m(31 lb in)
Air Conditioning Refrigerant Pressure Sensor	1.2N-m(11 lb in)
Blower Motor Resistor Screws	1.2N-m(11 lb in)
Blower Motor Screws	1.2N-m(11 lb in)
Compressor Clutch Plate Bolt	14N-m(124thinsp;lb in)
Condenser Outlet Tube Nut to Air Conditioning Condenser LEB	9>N-m(80 lb in)
Evaporator Rear Cover Screws	1.2N-m(11 lb in)
Heater and Air Conditioning Evaporator Case Screws	1.2N-m(11 lb in)
Heater Core Cover Screws	1.2N-m(11 lb in)
Heater Core Pipe Side Cover Screws	1.2N-m(11 lb in)
Heater Core Pipe Under Cover Screw	1.2N-m(11 lb in)
HVAC Module Assembly to Dash Panel Bolts	6>N-m(53 lb in)
Instrument Panel Outer Air Outlet Duct Screw	1.3N-m(12 lb in)
Left Floor Air Outlet Duct Screw	1.2N-m(11 lb in)
Right Floor Air Outlet Duct Screw	1.2N-m(11 lb in)
Service Port Valve Core	0.3N-m(3> lb in)
Windshield Defroster Nozzle Screw	1.3N-m(12 lb in)

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Approximate Fluid Capacities

Application	Specification	
	Metric	English
PAG Oil ISU 105		
Compressor Replacement The service compressor for the 1.0â€‰L/1.2â€‰L engine is precharged with 110â€‰ml (3.7â€‰oz) of PAG oil.		
Condenser Replacement	30â€“40â€‰ml	1.0â€“1.4â€‰oz
Evaporator Replacement	30â€“40â€‰ml	1.0â€“1.4â€‰oz
Total System PAG Oil Capacity	110â€‰ml	3.7â€‰oz
R-134a		
• Refrigerant Charge	450â€‰g	15.9â€‰oz

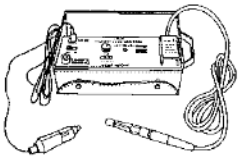
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Special Tools and Equipment

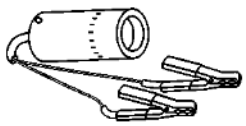
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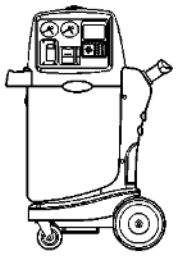
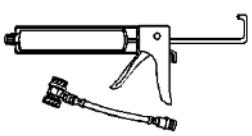
Special Tools

Illustration	Tool Number/ Description
 Click here for full size	CH-50198 Clutch Plate Holder
 Click here for full size	J-39400 GE-39400 Electronic Halogen Leak Detector

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Illustration	Tool Number/ Description
 Click here for full size	J-39400-A GE-39400-A Halogen Leak Detector
 Click here for full size	J-41447 GE-41447 R-134A AC Tracer Dyeâ€“ Box of 24
 Click here for full size	J-42220 BO-42220 Universal 12V Leak Detection Lamp

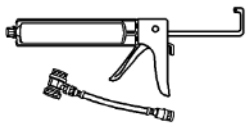
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Illustration	Tool Number/ Description
 Click here for full size	J-43600 ACR 2000 Air Conditioning Service Center
 Click here for full size	J-43872 GE-43872 Florescent Dye Cleaner
 Click here for full size	J-45037 GE-45037-A AC Oil Injector

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Illustration	Tool Number/ Description
 Click here for full size	J-46246 GE-46246 Valve Core Tool

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Illustration	Tool Number/ Description
 Click here for full size	J-46297 GE-46297 AC Dye Injector Kit

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Illustration	Tool Number/ Description
 Click here for full size	J-46297-12 GE-46297-12 Replacement Dye Cartridges

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