Heating, Ventilation, and Air Conditioning

Specifications

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Air Conditioning Compressor and Condenser Hose Bolt	22 N•m	16 lb ft
Air Conditioning Compressor and Condenser Hose Nut	22 N•m	16 lb ft
Air Conditioning Compressor Bolts	22 N•m	16 lb ft
Air Conditioning Compressor Clutch Bolt	14 N•m	124 lb in
Air Conditioning Evaporator Hose Nut	22 N•m	16 lb ft
Air Conditioning Refrigerant Pressure Sensor	6 N•m	53 lb in
Heater and Air Conditioning Evaporator and Blower Module Assembly Fastener	22 N•m	16 lb ft
Thermal Expansion Valve (TXV) Block Nut	22 N•m	16 lb ft
Thermal Expansion Valve (TXV) Mounting Bolts	7 N•m	62 lb in

Adhesives, Fluids, Lubricants, and Sealers

Application	Type of Material	GM Part Number	
		United States	Canada
PAG Oil	Lubricant	88901445	88900060

Refrigerant System Specifications

Application	Specification	
	Metric	English
PAG Oil - Refer to *Adhesives, Fluids, Lubricants, and Sealers on page 10-3.*		
Compressor Replacement The service compressor for all Engines for T300 is precharged with 70 ml (2.5 oz) of PAG oil.		
Condenser Replacement	30-40 ml	1.0-1.4 oz
Evaporator Replacement	30-40 ml	1.0-1.4 oz
Total System PAG Oil Capacity	110 ml	3.7 oz
R-134a		
Refrigerant Charge	500 g	17.6 oz

Diagnostic Information and Procedures

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
- *GE-46297* A/C Dye Injector Kit
- *GE-46297-12* Replacement Dye Cartridges

For equivalent regional tools, refer to *Special Tools on page 10-61*.

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: 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.
- *GE-46297-12* dye cartridge is injected into the low side port using *GE-46297* injector kit.
- Not all of the fluorescent dyes are compatible with PAG oil. Some types of dye decrease the oil viscosity or may chemically react with the oil.
- R-134A leak detection dye requires time to work. Depending upon the leak rate, a leak may not become visible for between 15 minutes and 7 days.
- 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 0.45 kg (1 lb) of refrigerant in the A/C refrigeration system in order to perform a leak test. Refer to *Refrigerant Recovery and Recharging on page 10-13* 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.

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.

Air Conditioning (A/C) System Performance Test

Step	Action	Values	Yes	No
Note: • The ambient air temperature must be at least 16°C (60°F). • Do not induce additional air flow across the front of the vehicle during the test. • If you were sent here from a DTC diagnostic table, clear the DTC upon completion of this test.				
1	1. Park the vehicle inside or in the shade. 2. Open the windows in order to ventilate the interior of the vehicle. 3. If the A/C system was operating, allow the A/C system to equalize for about 2 minutes. 4. Turn OFF the ignition. 5. Install the *J-43600* ACR 2000 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 16°C (60°F) – 345 kPa (50 psi) More than 24°C (75°F) – 483 kPa (70 psi) More than 33°C (90°F) – 690 kPa (100 psi)	Go to *Step 2*	Go to *Leak Testing on page 10-4*
2	**Note:** Record the relative humidity and the ambient air temperature at the time of the test. 1. Close the vehicle doors and windows. 2. Open the drivers door window 12.7–15.2 cm (5–6 in). 3. Select the following HVAC control settings: • The A/C is ON. • The coldest temperature setting • The maximum blower speed • Recirculation mode • The instrument panel (I/P) outlet mode • All I/P outlets are OPEN. 4. Install thermometers in the left and right center panel air outlets. 5. Apply the parking brake. 6. Place the transaxle/transmission in one of the following positions: • PARK (Automatic) • NEUTRAL (Manual) 7. Start the engine and warm to operating temperature. 8. Operate the A/C system for 5 minutes. 9. Inspect A/C components for the following conditions: • Abnormal frost areas • Unusual noises 10. Record the following information: • The panel outlet air temperatures • The low-side pressure • The high-side pressure 11. Compare the low and high side pressures and the panel output temperatures to the A/C Performance Table below. Does all the data recorded fall within the specified ranges of the A/C Performance Table below?	—	Go to *Step 5*	Go to *Step 3*

Air Conditioning (A/C) System Performance Test (cont'd)

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 5 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?	—	Go to *Step 5*	Go to *Step 4*
4	Perform the necessary repairs. Refer to *A/C Diagnostics Chart on page 10-7*. Is the action complete?	—	Go to *Step 5*	—
5	Operate the system in order to verify the test results. Did you find the same results?	—	System OK	Go to *Symptoms - HVAC Systems - Manual on page 10-75*

A/C Performance Table

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

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

Heating Performance Diagnostic

Step	Action	Yes	No
DEFINITION: Heating system performance.			
1	Were you sent here from Symptoms or another diagnostic table?	Go to *Step 2*	Go to *Symptoms - HVAC Systems - Manual on page 10-75*
2	1. Start the engine. 2. Allow the engine to idle. Does the engine reach a normal operating temperature?	Go to *Step 3*	Go to *Step 9*
3	1. Allow the engine to idle. 2. Select the FLOOR mode. 3. Select the minimum blower speed. 4. Select the warmest temperature setting. 5. Feel the temperature of the inlet and outlet heater hoses near the heater core. Does the inlet heater hose feel warmer than the outlet heater hose?	Go to *Step 7*	Go to *Step 4*
4	1. Install a thermometer into the center I/P panel air outlet. 2. Secure a thermometer to the heater core outlet hose. 3. Select the PANEL mode. 4. Select the maximum blower speed. 5. Select the warmest temperature setting. 6. Record the temperature at the following locations: • The center I/P panel air outlet • The heater core outlet hose 7. Compare the recorded temperatures. Are the two temperature readings about equal?	Go to *Step 5*	Go to *Step 6*

Heating Performance Diagnostic (cont'd)

Step	Action	Yes	No
5	1. Inspect and repair the following areas of the vehicle for cold air leaks: • The cowl • The recirculation door • The HVAC module case 2. Perform the necessary repairs. Are the repairs complete?	Go to *Step 10*	—
6	1. Inspect the temperature door operation. Refer to *Heating and Air Conditioning System Description and Operation on page 10-61*. 2. Perform any necessary repairs. Are the repairs complete?	Go to *Step 10*	—
7	1. Turn OFF the engine. 2. Backflush the heater core. 3. Start the engine. 4. Select the FLOOR mode. 5. Select the minimum blower speed. 6. Select the warmest temperature setting. 7. Feel the temperature of the inlet and outlet heater hoses near the heater core. Does the inlet heater hose feel warmer than the outlet heater hose?	Go to *Step 8*	Go to *Step 10*
8	Replace the heater core. Refer to *Heater Core Replacement on page 10-60*. Is the repair complete?	Go to *Step 10*	—
9	Repair the low engine temperature concern. Refer to *Engine Fails To Reach Normal Operating Temperature on page 9-627*. Is the repair complete?	Go to *Step 10*	—
10	Operate the system in order to verify the repair. Did you find and correct the condition?	System OK	Go to *Step 2*

Defrosting Insufficient

Step	Action	Yes	No
DEFINITION: Time required to defrost the windshield is longer than normal.			
1	Were you sent here from Symptoms or another diagnostic table?	Go to *Step 2*	Go to *Symptoms - HVAC Systems - Manual on page 10-75*
2	1. Start the engine. 2. Select the DEFROST mode. 3. Select the maximum blower speed. Does sufficient air flow from the defroster outlets?	Go to *Step 3*	Go to *Step 9*
3	Measure the engine operating temperature. Does engine reach a normal operating temperature?	Go to *Step 4*	Go to *Step 7*
4	1. Select the minimum blower speed. 2. Select the maximum temperature setting. 3. Feel the temperature of the inlet and outlet hoses near the heater core. Does the inlet hose feel warmer than the outlet hose?	Go to *Step 10*	Go to *Step 5*
5	Test the operation of the A/C compressor clutch. Does the A/C compressor clutch engage?	Go to *Step 8*	Go to *Step 6*
6	Repair the A/C compressor clutch concern. Refer to *DTC P0645, P0646, or P0647 on page 10-73*. Is the repair complete?	Go to *Step 12*	—

Defrosting Insufficient (cont'd)

Step	Action	Yes	No
7	Repair the low engine temperature concern. Refer to *Engine Fails To Reach Normal Operating Temperature on page 9-627*. Is the repair complete?	Go to *Step 12*	—
8	Inspect for correct operation of the air inlet door. Is the air inlet door operating correctly?	Go to *Step 12*	Go to *Step 11*
9	Repair the air delivery concern. Refer to *Diagnostic Starting Point - Vehicle on page 6-66*. Is the repair complete?	Go to *Step 12*	—
10	Repair the heating concern. Refer to *Heating Performance Diagnostic on page 10-7*. Is the repair complete?	Go to *Step 12*	—
11	Repair the air inlet door concern. Refer to *Diagnostic Starting Point - Vehicle on page 6-66*. Is the repair complete?	Go to *Step 12*	—
12	Operate the system in order to verify the repair. Did you find and correct the problem?	System OK	Go to *Step 2*

Noise Diagnosis - Blower Motor

Step	Action	Yes	No
DEFINITION: Noise originating from the blower motor.			
1	Were you sent here from Symptoms or another diagnostic table?	Go to *Step 2*	Go to *Symptoms - HVAC Systems - Manual on page 10-75*
2	Inspect the air inlet grille for debris. Is debris present?	Go to *Step 8*	Go to *Step 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 *Step 4*	Go to *Step 11*
4	Inspect for excessive vibration at each blower motor speed by feeling the blower case. Is excess vibration present?	Go to *Step 6*	Go to *Step 5*
5	Listen to the blower motor at each speed. Is the blower motor making a squeaking or chirping noise?	Go to *Step 9*	Go to *Step 11*
6	1. Remove the blower motor. Refer to *Blower Motor Replacement on page 10-49*. 2. Inspect the blower motor impeller for deposits of foreign material. 3. Inspect the blower motor for deposits of foreign material. Did you find any foreign material on the blower motor or blower motor impeller?	Go to *Step 8*	Go to *Step 7*
7	Inspect the blower motor for the following conditions: • Cracked blades • A loose impeller retainer • Improper impeller alignment Did you find any of these conditions?	Go to *Step 9*	Go to *Step 10*
8	Remove the foreign material. Is the action complete?	Go to *Step 10*	—

Noise Diagnosis - Blower Motor (cont'd)

Step	Action	Yes	No
9	Replace the blower motor. Refer to *Blower Motor Replacement on page 10-49.* Is the repair complete?	Go to *Step 11*	—
10	Install the blower motor. Refer to *Blower Motor Replacement on page 10-49.* Is the action complete?	Go to *Step 11*	—
11	Operate the system in order to verify the repair. Did you find and correct the condition?	System OK	Go to *Step 2*

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.

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 *Step 2*	Go to *Symptoms - HVAC Systems - Manual on page 10-75*

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

Step	Action	Yes	No
2	1. A/C system noises can be generally categorized into 3 areas: • Screeching, squealing, chirping noises • Moaning noises • Vibration/rattle noises 2. Start the engine. 3. Ensure that the A/C is ON. Is a screeching, squealing noise heard when the A/C is engaged?	Go to *Step 3*	Go to *Step 9*
3	With the engine OFF, inspect the drive belt for excessive wear. Is the drive belt excessively worn?	Go to *Step 18*	Go to *Step 4*
4	Inspect the drive belt tension. Is the drive belt tension correct?	Go to *Step 5*	Go to *Step 19*
5	Inspect the drive belt for excessive oil coverage. Is the drive belt covered with oil?	Go to *Step 17*	Go to *Step 6*
6	1. Start the engine. 2. Ensure that the A/C is ON. 3. Inspect the compressor and the clutch. Is the A/C compressor locked up?	Go to *Step 24*	Go to *Step 7*
7	Is the A/C compressor clutch slipping?	Go to *Step 23*	Go to *Step 8*
8	Using a stethoscope, listen to the A/C compressor for any abnormal noises. Is the compressor causing an abnormal noise?	Go to *Step 15*	Go to *Step 10*
9	Does a moaning noise exist when the A/C clutch is engaged?	Go to *Step 10*	Go to *Step 12*
10	Listen to the A/C compressor components and mounting for noise concerns using a stethoscope. Are any of these components loose, damaged, or excessively worn?	Go to *Step 20*	Go to *Step 11*
11	1. Idle the engine. 2. Engage the A/C compressor clutch. 3. Using a stethoscope, move around the entire refrigerant plumbing system, 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 *Step 22*	Go to *Step 13*
12	Does a vibration or rattle noise exist when the A/C clutch is engaged?	Go to *Step 13*	Go to *Step 14*
13	Does the noise stop when the A/C clutch is disengaged?	Go to *Step 15*	Go to *Step 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 *Step 21*	Go to *Step 25*
15	Verify that the A/C system is properly charged. Refer to *Refrigerant System Specifications on page 10-3.* Is the A/C system properly charged?	Go to *Step 26*	Go to *Step 16*
16	Recharge the A/C system to specification. Refer to *Refrigerant Recovery and Recharging on page 10-13.* Is the abnormal compressor noise still present?	Go to *Step 24*	Go to *Step 26*
17	Repair the oil leak. Is the repair complete?	Go to *Step 18*	—
18	Replace the drive belt. Refer to *Drive Belt Replacement on page 9-784* for 1.2L or 1.4L or *Drive Belt Replacement on page 9-964* for 1.6L or 1.8L. Is the replacement complete?	Go to *Step 26*	—

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

Step	Action	Yes	No
19	Replace the drive belt tensioner. Refer to *Drive Belt Tensioner Replacement on page 9-786* for 1.2L or 1.4L or *Drive Belt Tensioner Replacement on page 9-966* for 1.6L or 1.8L. . Is the replacement complete?	Go to *Step 26*	—
20	Repair or replace the A/C compressor mounting component. Is the repair complete?	Go to *Step 26*	—
21	Repair or replace the component which is causing the moaning concern as needed. Is the repair complete?	Go to *Step 26*	—
22	Correctly route or insulate the A/C component. Is the repair complete?	Go to *Step 26*	—
23	Replace the A/C compressor clutch. Refer to *Air Conditioning Clutch Assembly Replacement (LUV) on page 10-18* or *Air Conditioning Clutch Assembly Replacement (LDE/LUW/LWE) on page 10-19.* Is the repair complete?	Go to *Step 26*	—
24	Replace the A/C compressor. Refer to *Air Conditioning Compressor Replacement (LDE, LUW, LWE) on page 10-16* or *Air Conditioning Compressor Replacement (LUV) on page 10-17.* Is the repair complete?	Go to *Step 26*	—
25	The concern may be caused by an engine related component. Refer to *Vibration Analysis - Engine on page 1-48.* Did you find and correct the condition?	Go to *Step 26*	—
26	Operate the system in order to verify the repair. Did you find and correct the condition?	System OK	Go to *Step 2*

Noise Diagnosis - HVAC Module

Step	Action	Yes	No
DEFINITION: Noise originating from the HVAC module.			
1	Were you sent here from Symptoms or another diagnostic table?	Go to *Step 2*	Go to *Symptoms - HVAC Systems - Manual on page 10-75*
2	1. Start the engine. 2. Cycle through all of the following: • Blower motor speeds • HVAC modes • Temperature control settings 3. Determine the type of noise: • Scrape, pop • Tick/click, chirp or groaning • Air rush/whistle Is a scrape or pop noise evident when selecting modes or temperature settings?	Go to *Step 6*	Go to *Step 3*
3	Is a tick/click, chirping, groaning or scraping noise present, but decreases as blower motor speed is decreased?	Go to *Step 6*	Go to *Step 4*
4	Is an air rush/whistle noise evident in all modes but not all temperature settings?	Go to *Step 6*	Go to *Step 5*
5	Is an air rush/whistle noise evident only in defrost or floor mode?	Go to *Step 6*	Go to *Step 6*
6	Remove the I/P Assembly. Refer to *Instrument Panel Tie Bar Replacement on page 2-51.* Is the action complete?	Go to *Step 7*	—
7	1. Inspect the mode valve assembly for proper operation. 2. Inspect the ducts for obstructions or foreign materials. Were any of these conditions found?	Go to *Step 10*	Go to *Step 8*

Noise Diagnosis - HVAC Module (cont'd)

Step	Action	Yes	No
8	Inspect the mode valve assembly and temperature doors and seals for warping or cracking. Are the mode valve assembly and temperature doors in normal condition?	Go to *Step 11*	Go to *Step 9*
9	Replace the appropriate component. Is the repair complete?	Go to *Step 11*	—
10	Remove any obstructions or foreign material found. Is the action complete?	Go to *Step 11*	—
11	Install the I/P assembly. Refer to *Instrument Panel Tie Bar Replacement on page 2-51*. Is the action complete?	Go to *Step 12*	—
12	Operate the system to verify the repair. Did you find and correct the condition?	System OK	Go to *Step 2*

Repair Instructions

Refrigerant Recovery and Recharging

Special Tools

GE-45037 A/C Oil Injector

For equivalent regional tools, refer to *Special Tools on page 10-61*.

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

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

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

Refer to the 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 *Refrigerant System Specifications on page 10-3* 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 *Refrigerant System Specifications on page 10-3*.

Flushing

Special Tools

- *BO 42220* Universal 12V Leak Detection Lamp
- *GE 41447* R-134A A/C Tracer Dye Box of 24
- *GE 45268* A/C Flush Adapter Kit

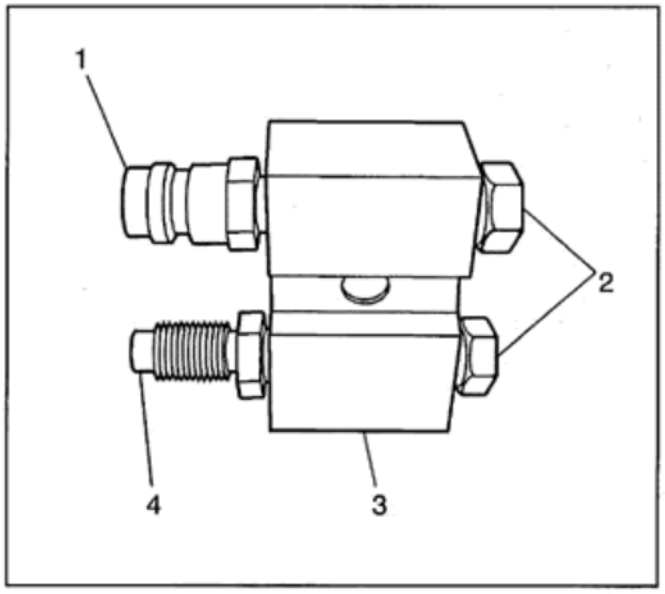
For equivalent regional tools, refer to *Special Tools on page 10-61*.

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

Flushing is intended to remove the following:

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

Forward Flushing Setup



1162447

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

Note: Inspect and lubricate *GE 45268* adapter kit fitting O-rings. Refer to *Air Conditioning O-Ring Seal Replacement on page 10-21*

1. Install both *GE 45268-9* fitting O-ring onto *GE 45268-10* adapter.
2. Install *GE 45268-8* fitting O-ring onto suction side of *GE 45268-10* adapter.
3. Install *GE 45268-7* fitting O-ring onto discharge side of *GE 45268-10* adapter.

Reverse Flushing Setup

Note:

- Reverse flow refrigerant flush is recommended for desiccant bag failure. Replace condenser/ receiver dehydrator assembly when A/C flush is complete and perform the following procedure:
- Inspect and lubricate *GE 45268* adapter kit fitting O-rings. Refer to *Air Conditioning O-Ring Seal Replacement on page 10-21*

1. Install both *GE 45268-9* fitting O-ring onto *GE 45268-10* adapter.
2. Install *GE 45268-8* fitting O-ring onto suction side of *GE 45268-10* adapter.
3. Install *GE 45268-7* fitting O-ring onto discharge side of *GE 45268-10* adapter.

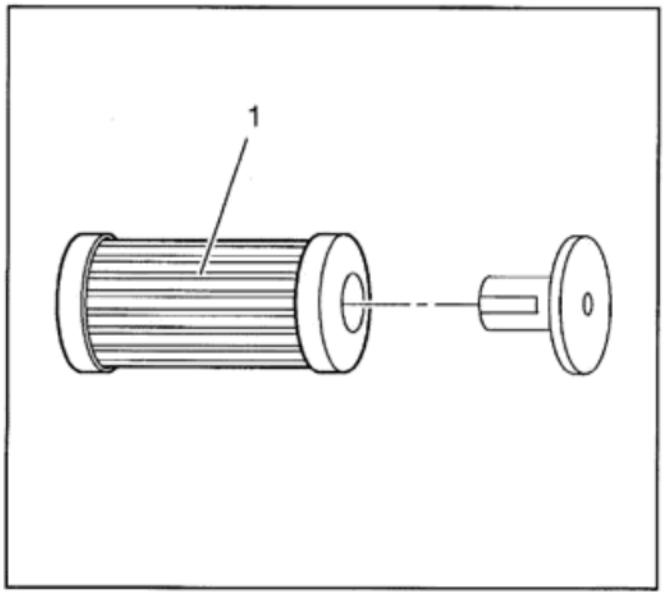
Flush Procedure

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

1. Recover the refrigerant. Refer to *Refrigerant Recovery and Recharging on page 10-13*.
2. Remove the thermal expansion valve (TXV). Refer to *Air Conditioning Evaporator Thermal Expansion Valve Replacement on page 10-29*.
3. Install the TXV stud onto *GE 45268-115* adapter.
4. Install new sealing washers onto evaporator core. Refer to *Air Conditioning O-Ring Seal Replacement on page 10-21*.
5. Install *GE 45268-115* adapter in place of the TXV.

Caution: Refer to *Fastener Caution on page 0-8*.

6. Install the TXV mounting bolts and tighten to **7 N•m (62 lb in)**.
7. Install new washers onto liquid line and suction hose. Refer to *Air Conditioning O-Ring Seal Replacement on page 10-21*.
8. Connect liquid line and suction hose to *GE 45268-115* adapter.
9. Install the TXV block fitting nut and tighten to **22 N•m (16 lb ft)**.
10. Remove the A/C compressor. Refer to *Air Conditioning Compressor Replacement (LDE, LUW, LWE) on page 10-16* or *Air Conditioning Compressor Replacement (LUV) on page 10-17*.



2027401

11. Remove the A/C refrigerant filter (1). Refer to *Air Conditioning (AC) Refrigerant Filter Replacement on page 10-27*.

Note: The filter inside *GE 45628-1* adapter is serviceable. Remove and discard check valve from the filter.

12. Service the filter before each flush.

Note: Assure that suction and discharge ports on J 45268-10 correspond to suction and discharge ports on compressor hose assembly.

13. Install new sealing washers onto A/C compressor and condenser hose. Refer to *Air Conditioning O-Ring Seal Replacement on page 10-21*. Assure that suction and discharge ports on *GE 45268-10* adapter correspond to suction and discharge ports on A/C compressor to condenser hose.
14. Install *GE 45268-10* filter adapter to the A/C compressor to condenser hose.
15. Connect *GE 45268-1* filter to *J 45268-7* adapter.
16. Connect blue hose from A/C filling device to *GE 45268* adapter.
17. Connect red hose from A/C filling device to *GE 45268* adapter.
18. Disconnect blue hose from A/C filling device to *GE 45268-1* adapter.
19. Disconnect *GE 45268-1* adapter from *GE 45268-10* adapter.
20. Remove *GE 45268-10* adapter from the A/C compressor to condenser hose.

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

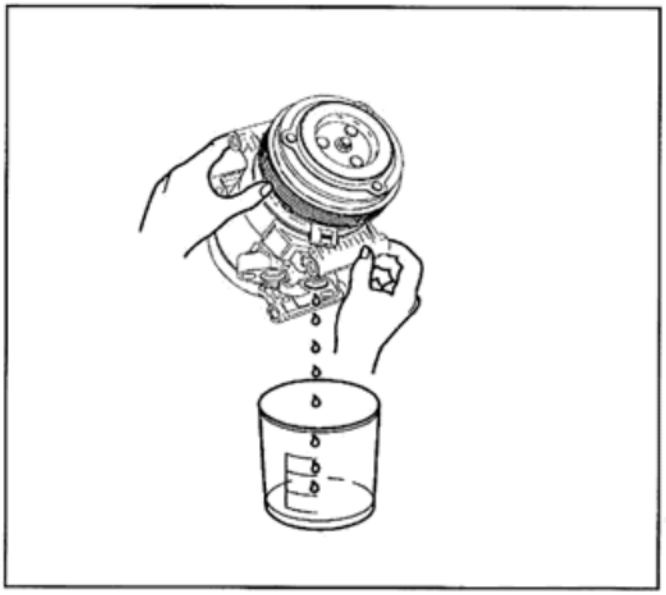
21. If you will reinstall the removed A/C compressor, perform the following procedure:
    - Drain PAG oil from the A/C compressor. Rotate compressor input shaft to assist in draining the PAG oil from compressor.
    - Add the total system capacity of PAG oil to A/C compressor. Refer to *Refrigerant System Specifications on page 10-3*.
    - Add one bottle of *GE 41447* tracer dye.

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

22. Install the A/C compressor. Refer to *Air Conditioning Compressor Replacement (LDE, LUW, LWE) on page 10-16* or *Air Conditioning Compressor Replacement (LUV) on page 10-17*.
23. Install new A/C refrigerant filter. Refer to *Air Conditioning (AC) Refrigerant Filter Replacement on page 10-27*.
24. Remove the TXV block fitting nut.
25. Disconnect liquid line and suction line from *GE 45268-115* adapter.
26. Remove the TXV bolts retaining *GE 45268-115* adapter.
27. Remove *GE 45268-115* adapter.
28. Inspect the TXV for debris. Clean or replace as needed.
29. Install the TXV. Refer to *Air Conditioning Evaporator Thermal Expansion Valve Replacement on page 10-29*.
30. Evacuate and recharge the A/C system. Refer to *Refrigerant Recovery and Recharging on page 10-13*.
31. Leak test fittings using *BO 42220* lamp.

Air Conditioning Compressor Oil Balancing

Draining Procedure

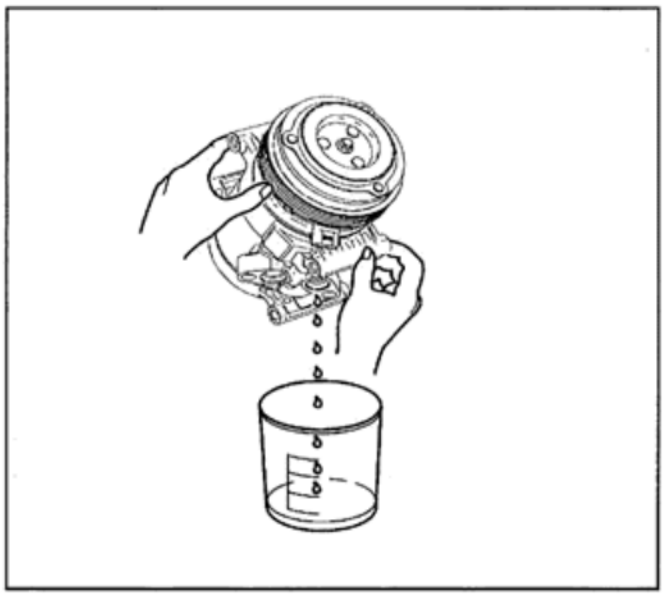


2308732

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

1. Drain the oil from both the suction and discharge ports of the removed compressor into a clean, graduated container. Rotate the compressor shaft to assist in draining the compressor.
2. Measure and record the amount of oil drained from the removed compressor. This measurement will be used during installation of the replacement compressor.
3. Inspect the oil drained from removed compressor. Refer to *Air Conditioning Compressor Oil Diagnosis on page 10-10*.
4. Properly discard the used refrigerant oil.

Balancing Procedure



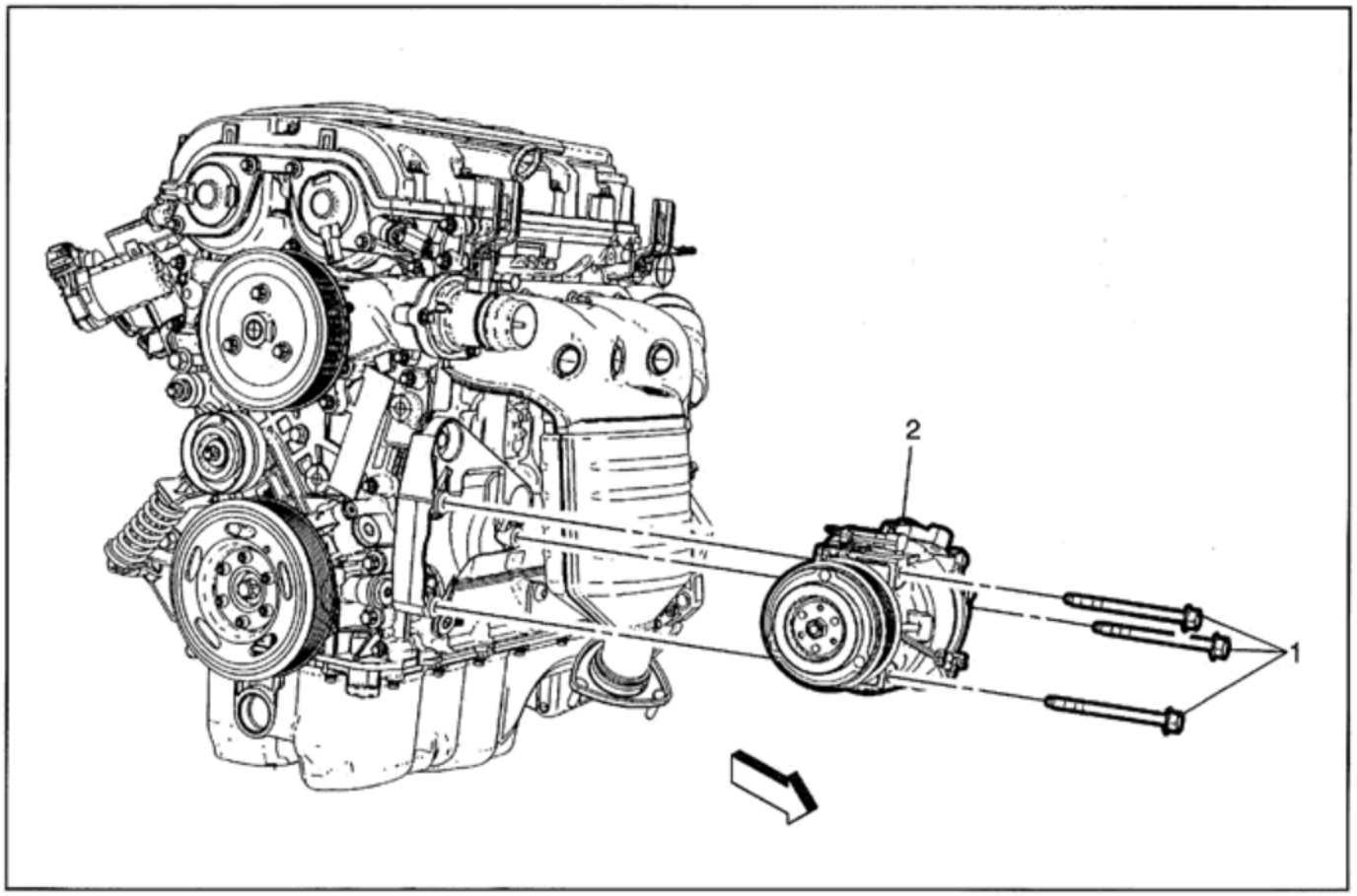
2308732

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

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

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

Air Conditioning Compressor Replacement (LDE, LUW, LWE)

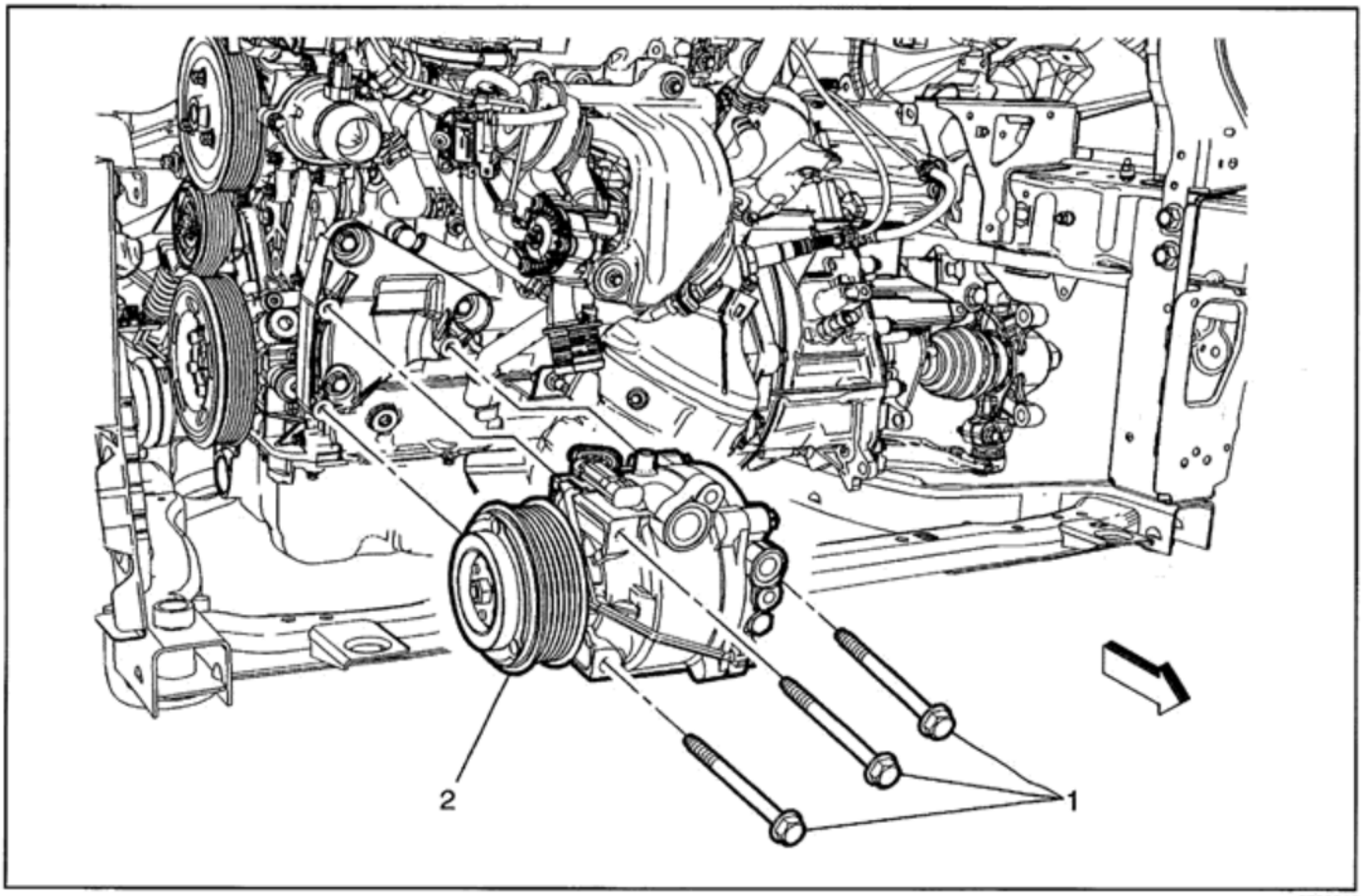


2893492

Air Conditioning Compressor Replacement (LDE, LUW, LWE)

Callout	Component Name
Preliminary Procedure 1. Recover the refrigerant. Refer to *Refrigerant Recovery and Recharging on page 10-13.* 2. Raise and support the vehicle. Refer to *Lifting and Jacking the Vehicle on page 1-31.* 3. Remove the drive belt from the compressor. Refer to *Drive Belt Replacement on page 9-964.* 4. Remove the air conditioning compressor and condenser hose from the compressor. Refer to *Air Conditioning Compressor and Condenser Hose Replacement (LUW) on page 10-21* or *Air Conditioning Compressor and Condenser Hose Replacement (LUV) on page 10-23* or *Air Conditioning Compressor and Condenser Hose Replacement (LDE/LWE) on page 10-25.* 5. Disconnect the electrical connector.	
1	Air Conditioning Compressor Bolt (Qty :3) **Caution:** Refer to *Fastener Caution on page 0-8.* **Tighten** 22 N•m (16 lb ft)
2	Air Conditioning Compressor Assembly **Procedure** When replacing the air conditioning compressor, balance the compressor oil. Refer to *Air Conditioning Compressor Oil Balancing on page 10-15.*

Air Conditioning Compressor Replacement (LUV)

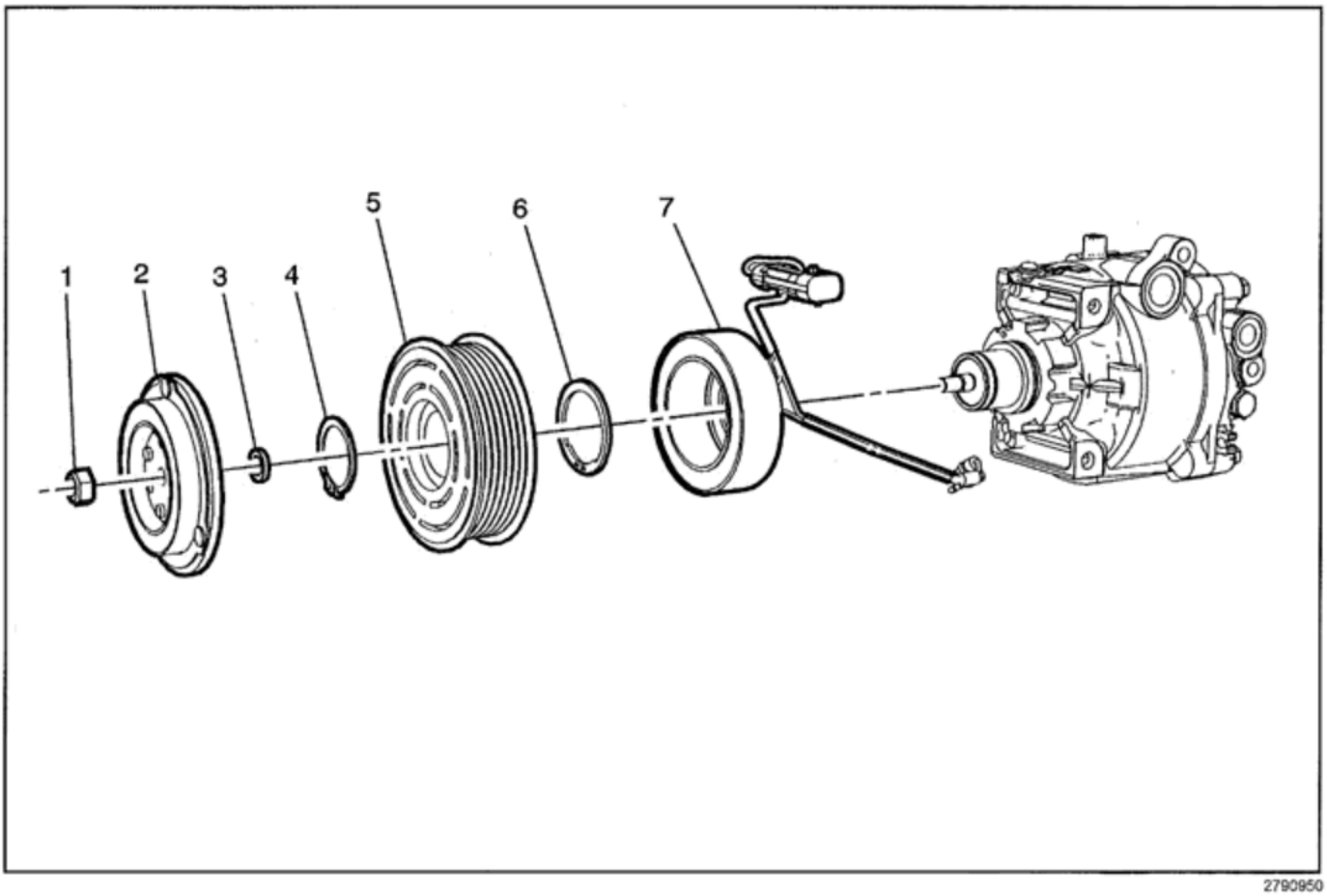


2790946

Air Conditioning Compressor Replacement (LUV)

Callout	Component Name
Preliminary Procedure 1. Recover the refrigerant. Refer to *Refrigerant Recovery and Recharging on page 10-13*. 2. Raise and support the vehicle. Refer to *Lifting and Jacking the Vehicle on page 1-31*. 3. Remove the drivetrain and front suspension frame skid plate if equipped. Refer to *Drivetrain and Front Suspension Frame Skid Plate Replacement on page 3-143*. 4. Remove the charge air cooler inlet air hose. Refer to *Charge Air Cooler Inlet Air Hose Replacement on page 9-292*. 5. Remove the engine drive belt from the air conditioning compressor. Refer to *Drive Belt Replacement on page 9-784*. 6. Remove the air conditioning compressor and condenser hose from the compressor assembly and position out of the way. Refer to *Air Conditioning Compressor and Condenser Hose Replacement (LUW) on page 10-21* or *Air Conditioning Compressor and Condenser Hose Replacement (LUV) on page 10-23* or *Air Conditioning Compressor and Condenser Hose Replacement (LDE/LWE) on page 10-25*. 7. Disconnect the electrical connector.	
1	Air Conditioning Compressor Bolt (Qty :3) **Caution:** Refer to *Fastener Caution on page 0-8*. **Tighten** 22 N•m (16 lb ft)
2	Air Conditioning Compressor Assembly **Procedure** When replacing the air conditioning compressor, balance the compressor oil. Refer to *Air Conditioning Compressor Oil Balancing on page 10-15*.

Air Conditioning Clutch Assembly Replacement (LUV)

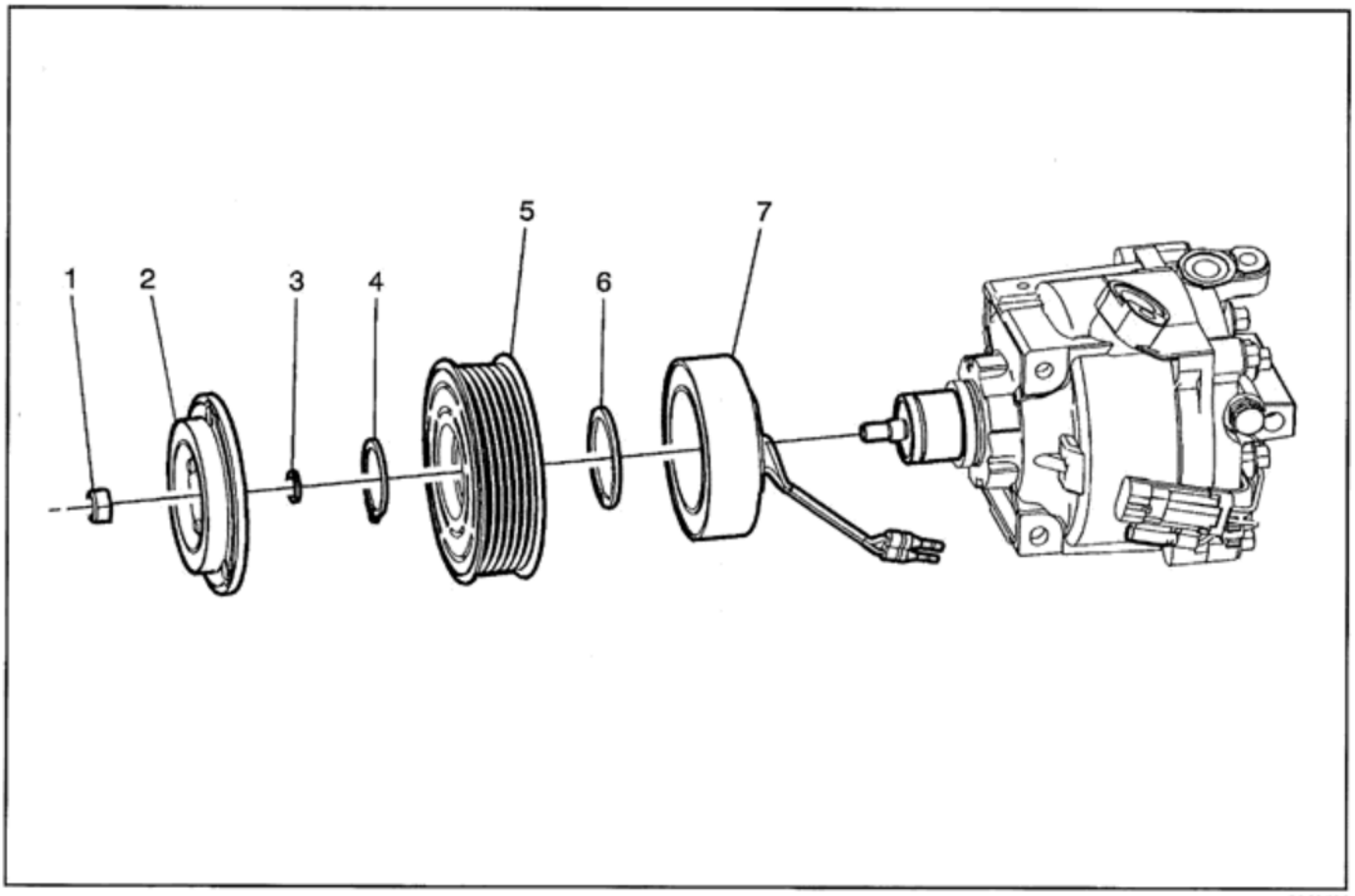


2790950

Air Conditioning Clutch Assembly Replacement (LUV)

Callout	Component Name
Preliminary Procedure Remove the air conditioning compressor. Refer to *Air Conditioning Compressor Replacement (LDE, LUW, LWE) on page 10-16* or *Air Conditioning Compressor Replacement (LUV) on page 10-17*.	
1	Air Conditioning Compressor Clutch Nut **Caution:** Refer to *Fastener Caution on page 0-8*. **Procedure** Use the *CH-37872* holder to hold the compressor clutch plate from turning when removing the nut. **Special Tools** *CH-37872* Clutch Plate Holder For equivalent regional tools, refer to *Special Tools on page 10-61*.
2	Air Conditioning Compressor Clutch
3	Air Conditioning Compressor Clutch Shim (Qty: 5)
4	Retaining Ring
5	Air Conditioning Compressor Pulley
6	Retaining Ring
7	Air Conditioning Compressor Coil

Air Conditioning Clutch Assembly Replacement (LDE/LUW/LWE)



2810588

Air Conditioning Clutch Assembly Replacement (LDE/LUW/LWE)

Callout	Component Name
Preliminary Procedure Remove the air conditioning compressor. Refer to *Air Conditioning Compressor Replacement (LDE, LUW, LWE) on page 10-16* or *Air Conditioning Compressor Replacement (LUV) on page 10-17*.	
1	Air Conditioning Compressor Clutch Nut **Caution:** Refer to *Fastener Caution on page 0-8*. **Procedure** Use the *CH-37872* holder to hold the compressor clutch plate from turning when removing the nut. **Special Tools** *CH-37872* Clutch Plate Holder For equivalent regional tools, refer to *Special Tools on page 10-61*.
2	Air Conditioning Compressor Clutch
3	Air Conditioning Compressor Clutch Shim (Qty: 5)
4	Retaining Ring
5	Air Conditioning Compressor Pulley
6	Retaining Ring
7	Air Conditioning Compressor Coil

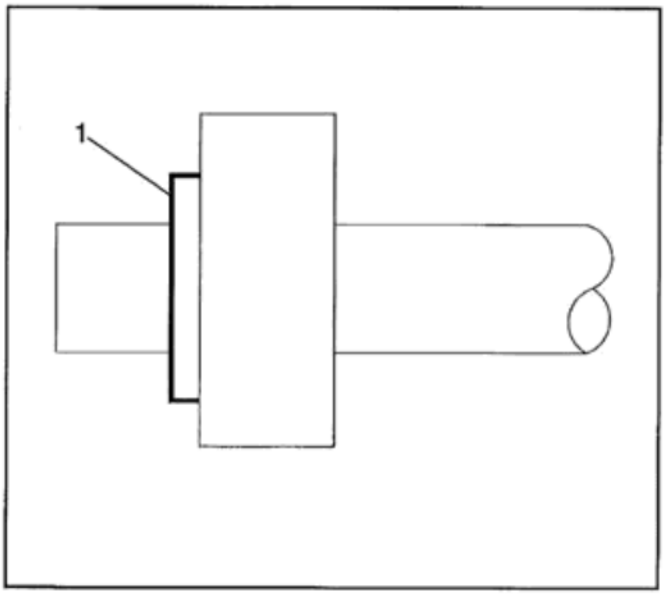
Air Conditioning System Seal Replacement

Removal Procedure

1. Disassemble the A/C refrigerant components. Refer to the appropriate repair procedure.

Note: Cap or tape the open A/C refrigerant components immediately to prevent system contamination.

2. Cap or tape the A/C refrigerant components.



2611419

3. Remove the sealing washer (1) from the A/C refrigerant component.
4. Inspect the seal washer for signs of damage to help determine the root cause of the failure.
5. Inspect the A/C refrigerant components for damage or burrs. Repair if necessary.

Note: DO NOT reuse sealing washer.

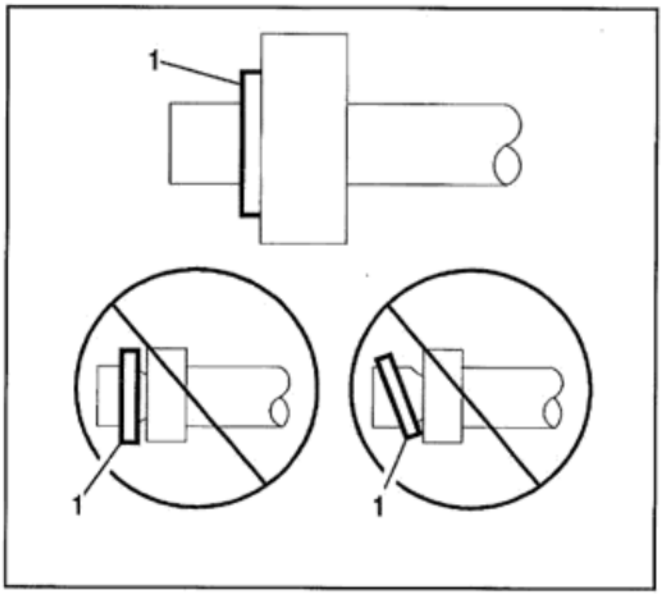
6. DISCARD the sealing washer.

Installation Procedure

Note: Flat washer type seals do not require lubrication.

1. Inspect the new sealing washer for any signs of cracks, cuts, or damage.

   Do not use a damaged sealing washer.
2. Remove the cap or tape from the A/C refrigerant components.



662315

3. Using a lint-free clean, dry cloth, clean the sealing surfaces of the A/C refrigerant components.
4. Carefully install the NEW sealing washer (1) onto the A/C refrigerant component.

   The sealing washer (1) must completely bottom against the surface of the fitting.

Note: After tightening the A/C components, there should be a slight sealing gap of approximately 1.2 mm (3/64 in) between the A/C line and the A/C component.

5. Assemble the remaining A/C refrigerant components. Refer to the appropriate repair procedure.

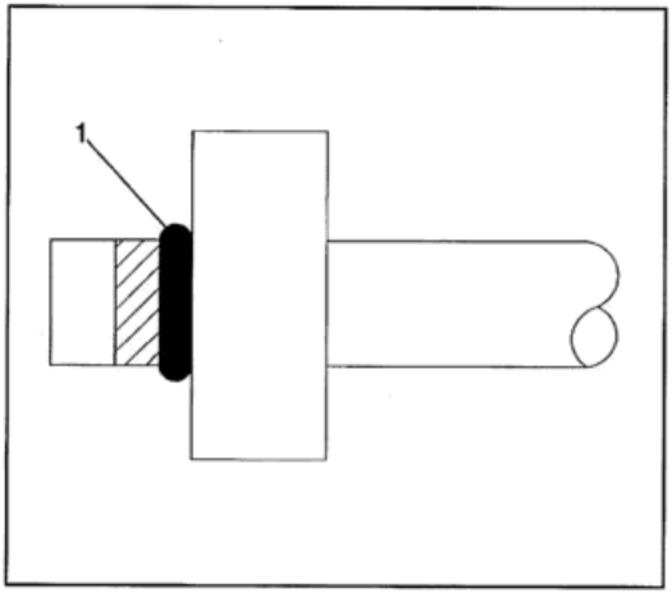
Air Conditioning O-Ring Seal Replacement

Removal Procedure

1. Disassemble the A/C refrigerant components. Refer to the appropriate repair procedure

Note: Cap or tape the open A/C refrigerant components immediately to prevent system contamination.

2. Cap or tape the A/C refrigerant components.



2611417

3. Remove the O-ring seal (1) from the A/C refrigerant component.
4. Inspect the O-ring seal for signs of damage to help determine the root cause of the failure.
5. Inspect the A/C refrigerant components for damage or burrs. Repair if necessary.
6. DISCARD the O-ring seal.

Installation Procedure

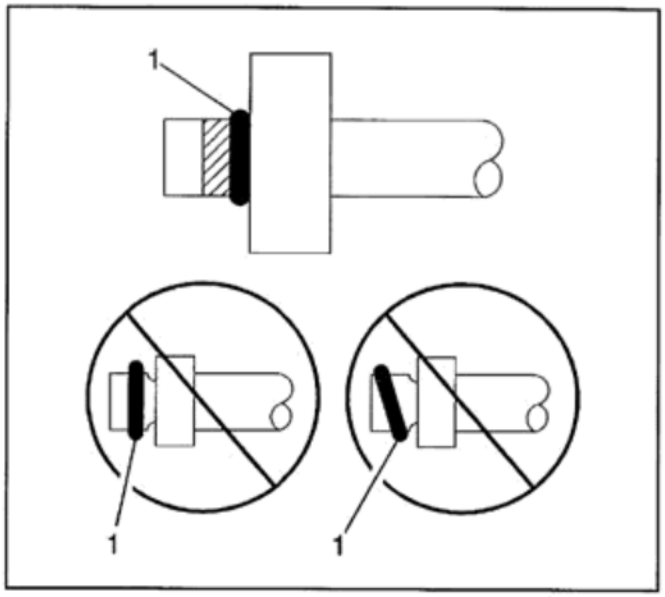
1. Inspect the new O-ring seal for any sign of cracks, cuts, or damage.
2. Remove the cap or tape from the A/C refrigerant components.
3. Using a lint-free clean, dry cloth, carefully clean the sealing surfaces of the A/C refrigerant components.

Note: DO NOT allow any of the mineral base 525 viscosity refrigerant oil on the new O-ring seal to enter the refrigerant system.

4. Lightly coat the new O-ring seal with mineral base 525 viscosity refrigerant oil.

Note: DO NOT reuse O-ring seals.

5. Carefully slide the NEW O-ring seal (1) onto the A/C refrigerant component.



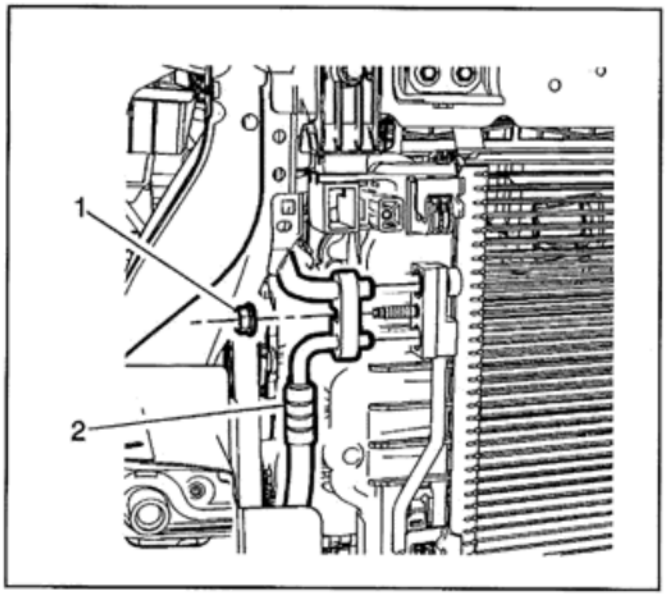
818438

6. The O-ring seal (1) must be fully seated.
7. Assemble the A/C components. Refer to the appropriate repair procedure.

Air Conditioning Compressor and Condenser Hose Replacement (LUW)

Removal Procedure

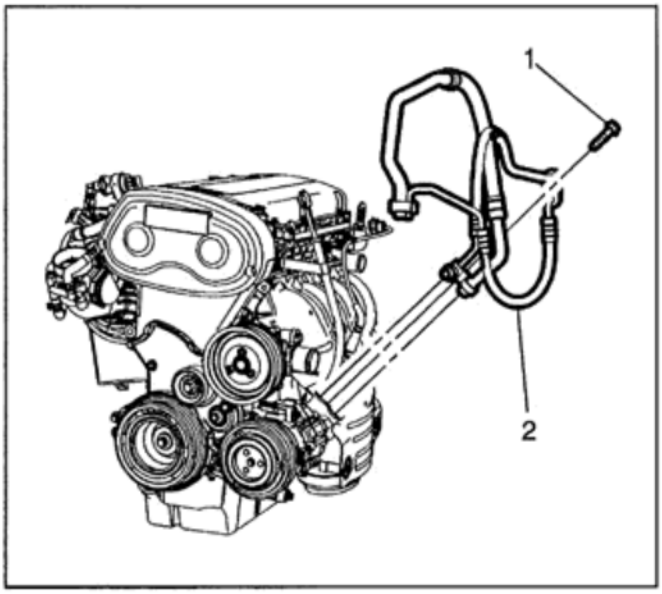
1. Recover the refrigerant. Refer to *Refrigerant Recovery and Recharging on page 10-13.*
2. Disconnect the A/C refrigerant pressure sensor electrical connector.



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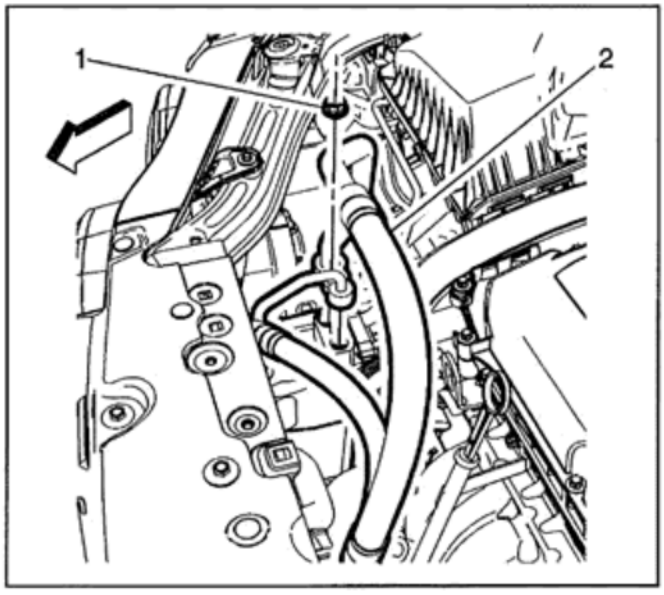
3. Remove air conditioning compressor and condenser hose nut (1).

4. Remove air conditioning compressor and condenser hose (2) from A/C condenser.



2497604

5. Remove A/C compressor and condenser hose bolt (1).
6. Remove A/C compressor and condenser hose (2) from A/C compressor.



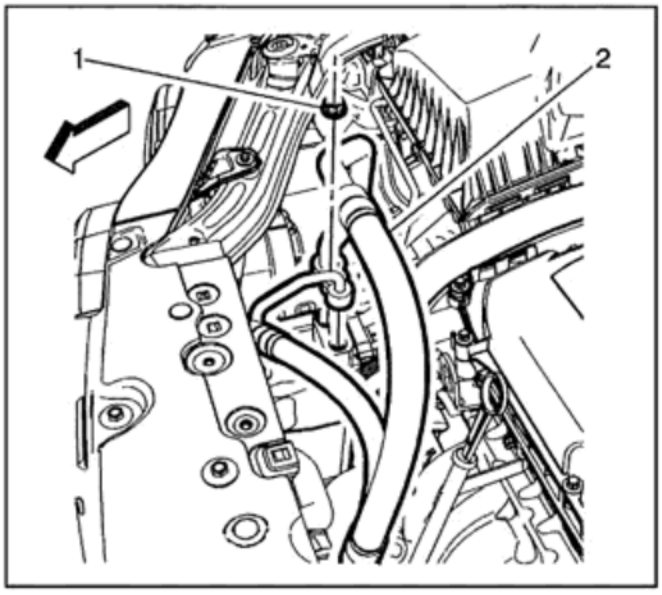
2497607

7. Remove air conditioning compressor and condenser hose nut (1).
8. Remove air conditioning compressor and condenser hose (2) from refrigerant hose.
9. Remove air conditioning compressor and condenser hose from the vehicle.

Installation Procedure

Note: Use NEW system seals. Refer to *Air Conditioning System Seal Replacement on page 10-20*.

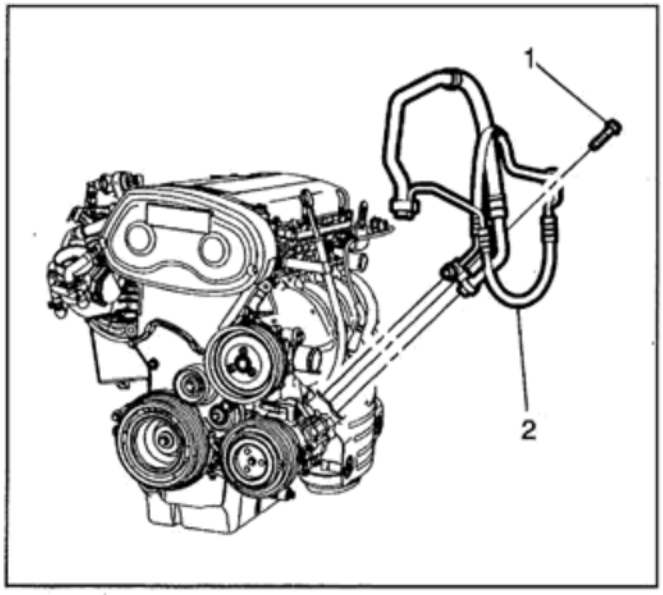
1. Install air conditioning compressor and condenser hose.



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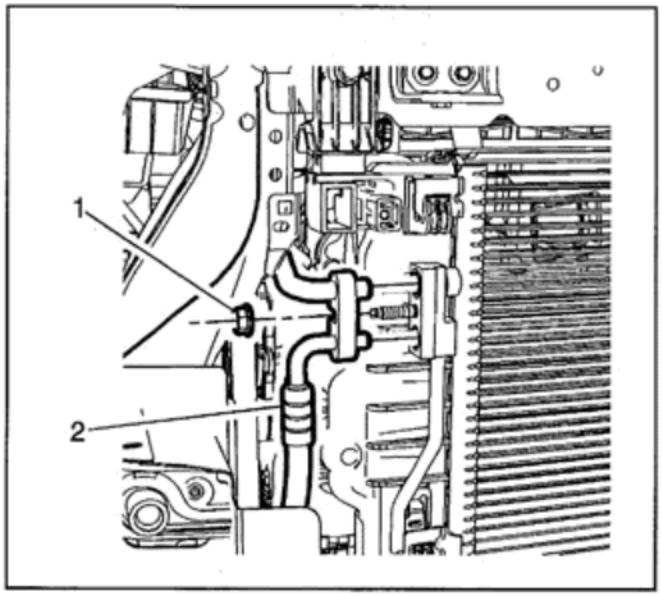
Caution: Refer to *Fastener Caution on page 0-8*.

2. Install air conditioning compressor and condenser hose (2) to the refrigerant hose.
3. Install air conditioning compressor and condenser hose nut (1). Tighten nut to **22** N•m **(16 lb ft)**.



2497604

4. Install air conditioning compressor and condenser hose (2) to the A/C compressor.
5. Install air conditioning compressor and condenser hose bolt (1). Tighten bolt to **22** N•m **(16 lb ft)**.



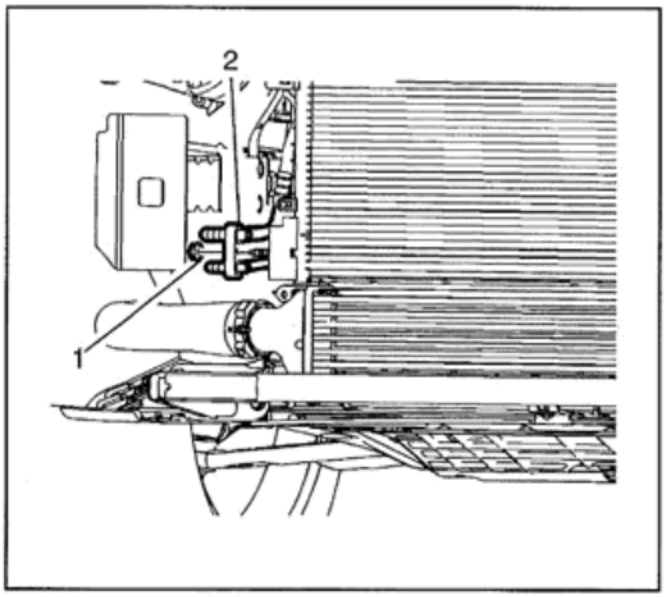
2497611

6. Install air conditioning compressor and condenser hose (2) to the A/C condenser.
7. Install air conditioning compressor and condenser hose nut (1). Tighten nut to **22** N•m **(16 lb ft)**.
8. Connect the A/C refrigerant pressure sensor electrical connector.
9. Evacuate and charge the refrigerant system. Refer to *Refrigerant Recovery and Recharging on page 10-13*.

Air Conditioning Compressor and Condenser Hose Replacement (LUV)

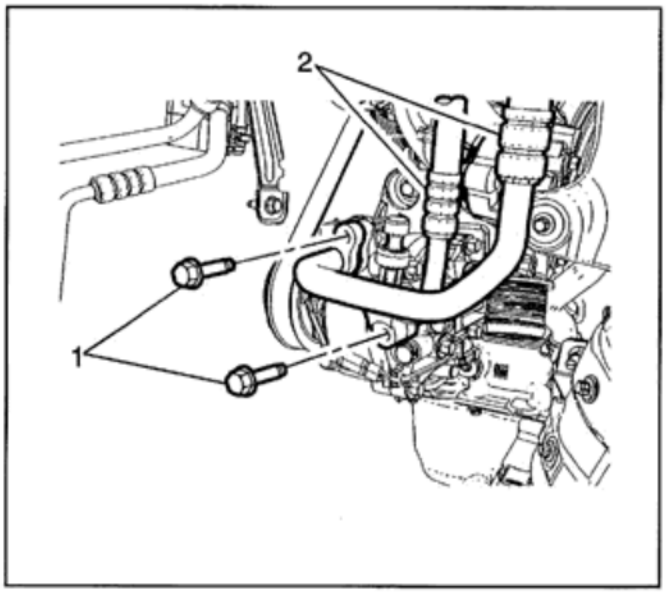
Removal Procedure

1. Recover the refrigerant. Refer to *Refrigerant Recovery and Recharging on page 10-13*.
2. Remove the drivetrain and front suspension frame skid plate if equipped. Refer to *Drivetrain and Front Suspension Frame Skid Plate Replacement on page 3-143*.
3. Remove the front fascia assembly. Refer to *Front Bumper Fascia Replacement on page 3-55*.
4. Disconnect the A/C refrigerant pressure sensor electrical connector.



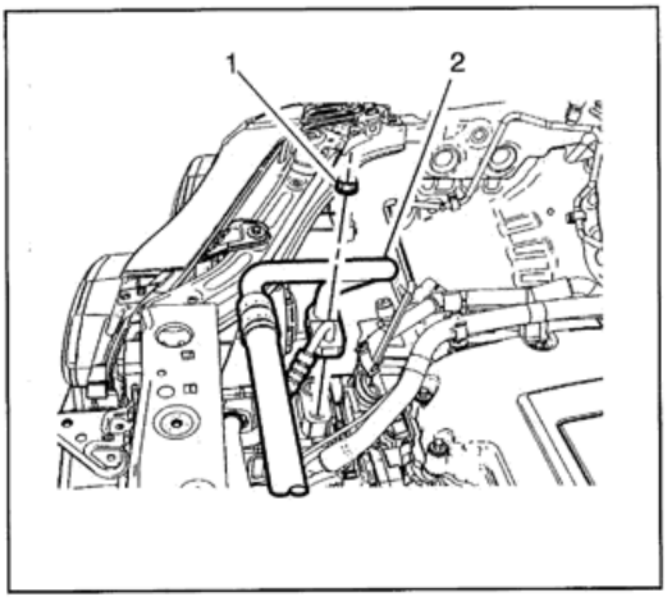
2693643

5. Remove air conditioning compressor and condenser hose nut (1).
6. Remove air conditioning compressor and condenser hose (2) from A/C condenser.



2893727

7. Remove A/C compressor and condenser hose bolts (1).
8. Remove A/C compressor and condenser hose (2) from A/C compressor.

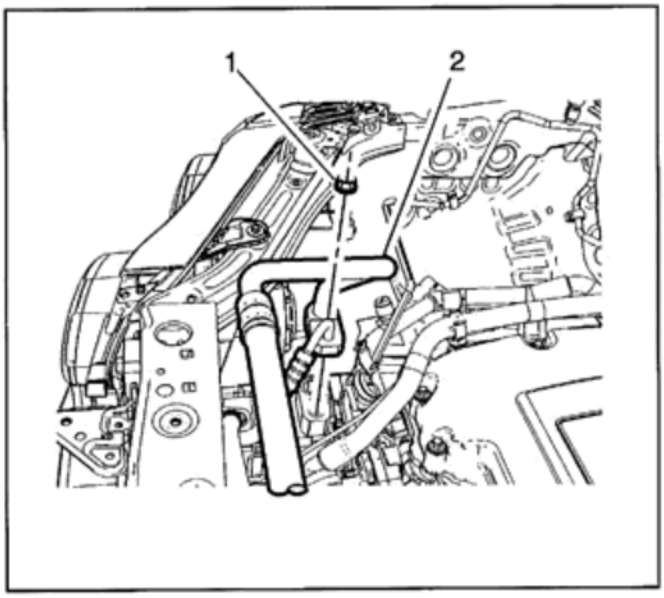


2893729

9. Remove air conditioning compressor and condenser hose nut (1).
10. Remove air conditioning compressor and condenser hose (2) from refrigerant hose.
11. Remove air conditioning compressor and condenser hose from the vehicle.
12. Discard all the old air conditioning seals.
13. Transfer the air conditioning pressure sensor to the new line assembly.

Installation Procedure

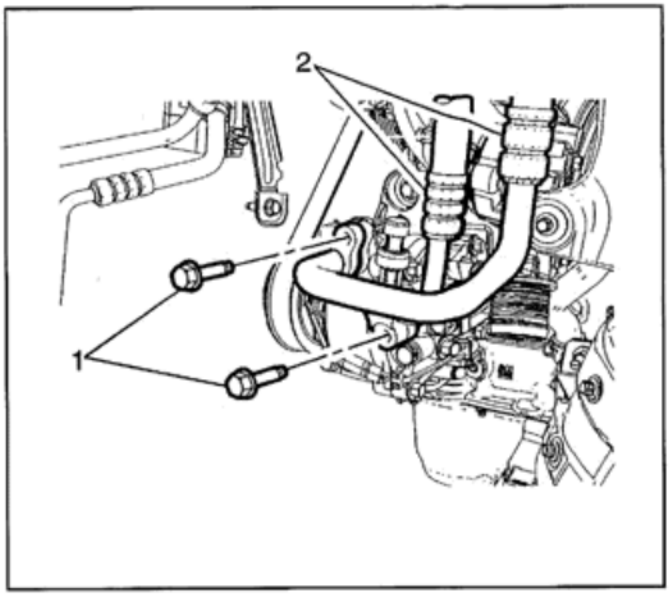
1. Install NEW air conditioning system seals. Refer to *Air Conditioning System Seal Replacement on page 10-20*.
2. Install air conditioning compressor and condenser hose assembly into the vehicle.



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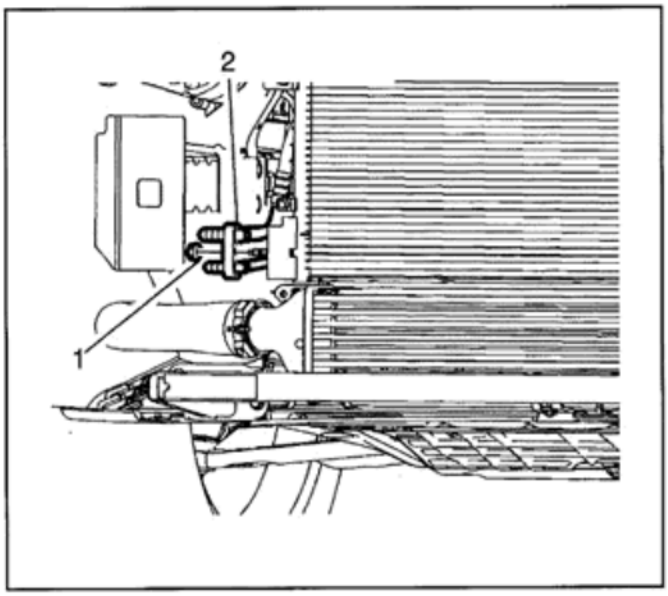
Caution: Refer to *Fastener Caution on page 0-8*.

3. Install air conditioning compressor and condenser hose (2) to the refrigerant hose.
4. Install air conditioning compressor and condenser hose nut (1) and tighten the nut to **22 N•m (16 lb ft)**.



2893727

5. Install air conditioning compressor and condenser hose (2) to the A/C compressor.
6. Install air conditioning compressor and condenser hose bolts (1) and tighten the bolt to **22 N•m (16 lb ft)**.



2693643

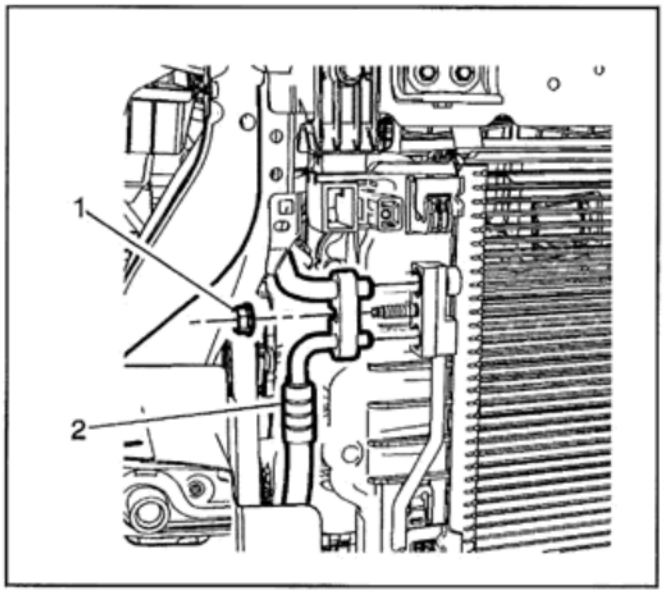
7. Install air conditioning compressor and condenser hose (2) to the A/C condenser.
8. Install air conditioning compressor and condenser hose nut (1) and tighten the nut to **22 N•m (16 lb ft)**.
9. Connect the A/C refrigerant pressure sensor electrical connector.
10. Install the front fascia assembly. Refer to *Front Bumper Fascia Replacement on page 3-55*.

11. Install the drivetrain and front suspension frame skid plate if equipped. Refer to *Drivetrain and Front Suspension Frame Skid Plate Replacement on page 3-143*.
12. Charge the refrigerant system. Refer to *Refrigerant Recovery and Recharging on page 10-13*.

Air Conditioning Compressor and Condenser Hose Replacement (LDE/LWE)

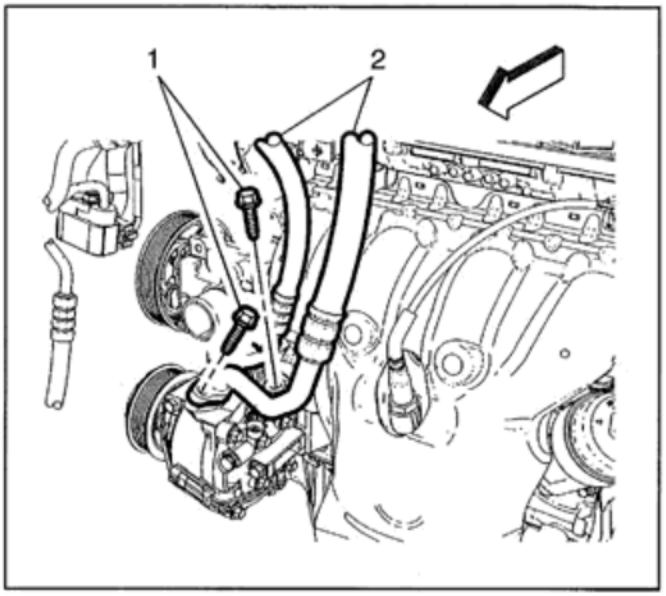
Removal Procedure

1. Recover the refrigerant. Refer to *Refrigerant Recovery and Recharging on page 10-13*.
2. Disconnect the A/C refrigerant pressure sensor electrical connector.



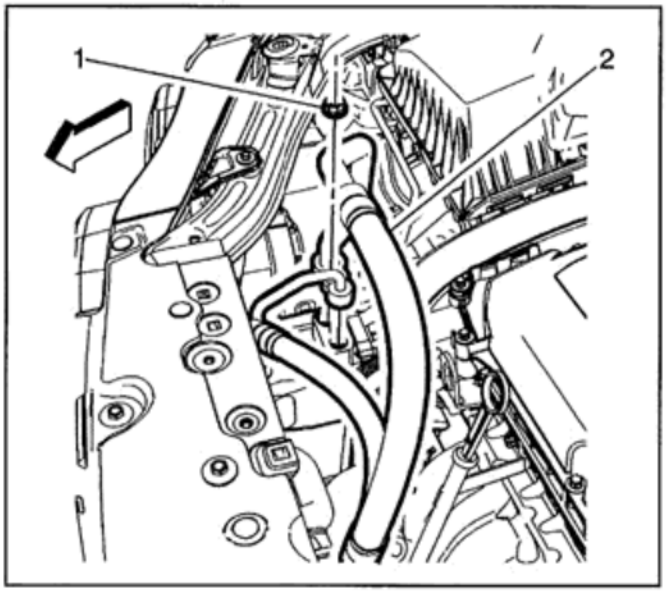
2497611

3. Remove air conditioning compressor and condenser hose nut (1).
4. Remove air conditioning compressor and condenser hose (2) from A/C condenser.



2893465

5. Remove A/C compressor and condenser hose bolts (1).
6. Remove A/C compressor and condenser hose (2) from A/C compressor.



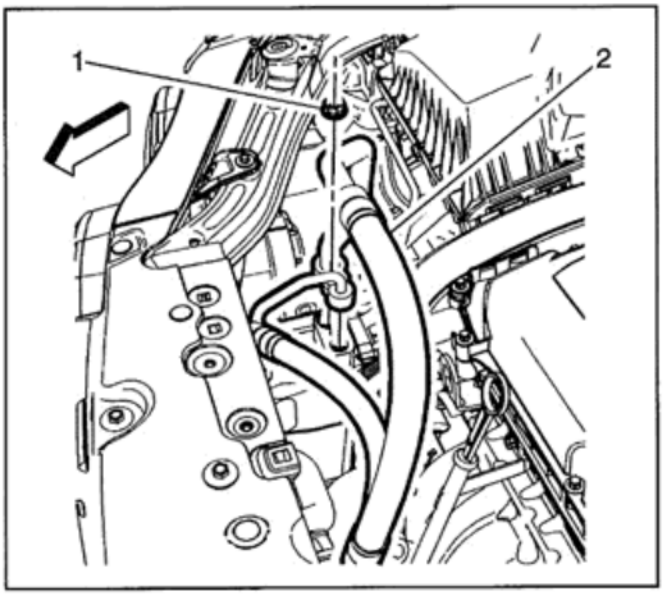
2497607

7. Remove air conditioning compressor and condenser hose nut (1).
8. Remove air conditioning compressor and condenser hose (2) from refrigerant hose.
9. Remove air conditioning compressor and condenser hose from the vehicle.

Installation Procedure

Note: Use NEW system seals. Refer to *Air Conditioning System Seal Replacement on page 10-20*.

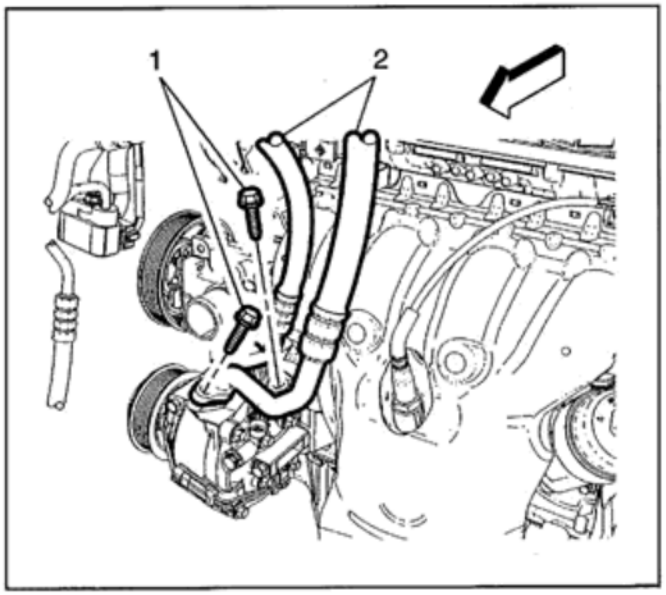
1. Install air conditioning compressor and condenser hose.



2497607

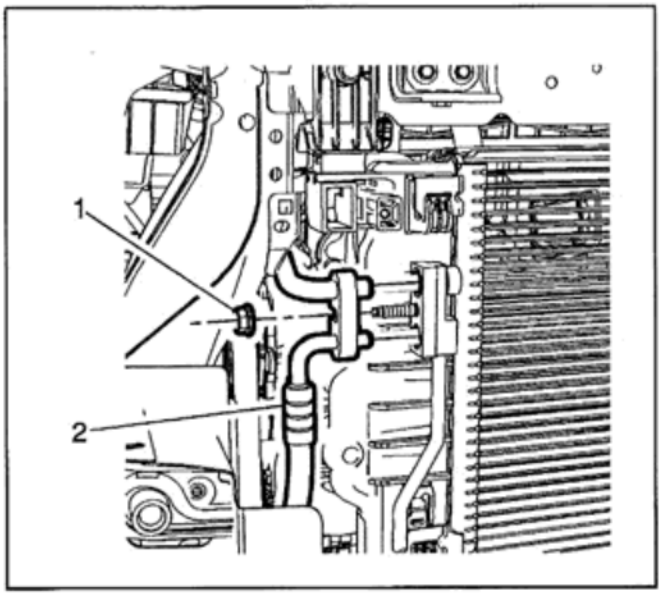
Caution: Refer to *Fastener Caution on page 0-8*.

2. Install air conditioning compressor and condenser hose (2) to the refrigerant hose.
3. Install air conditioning compressor and condenser hose nut (1). Tighten nut to **22** N•m **(16 lb ft)**.



2893465

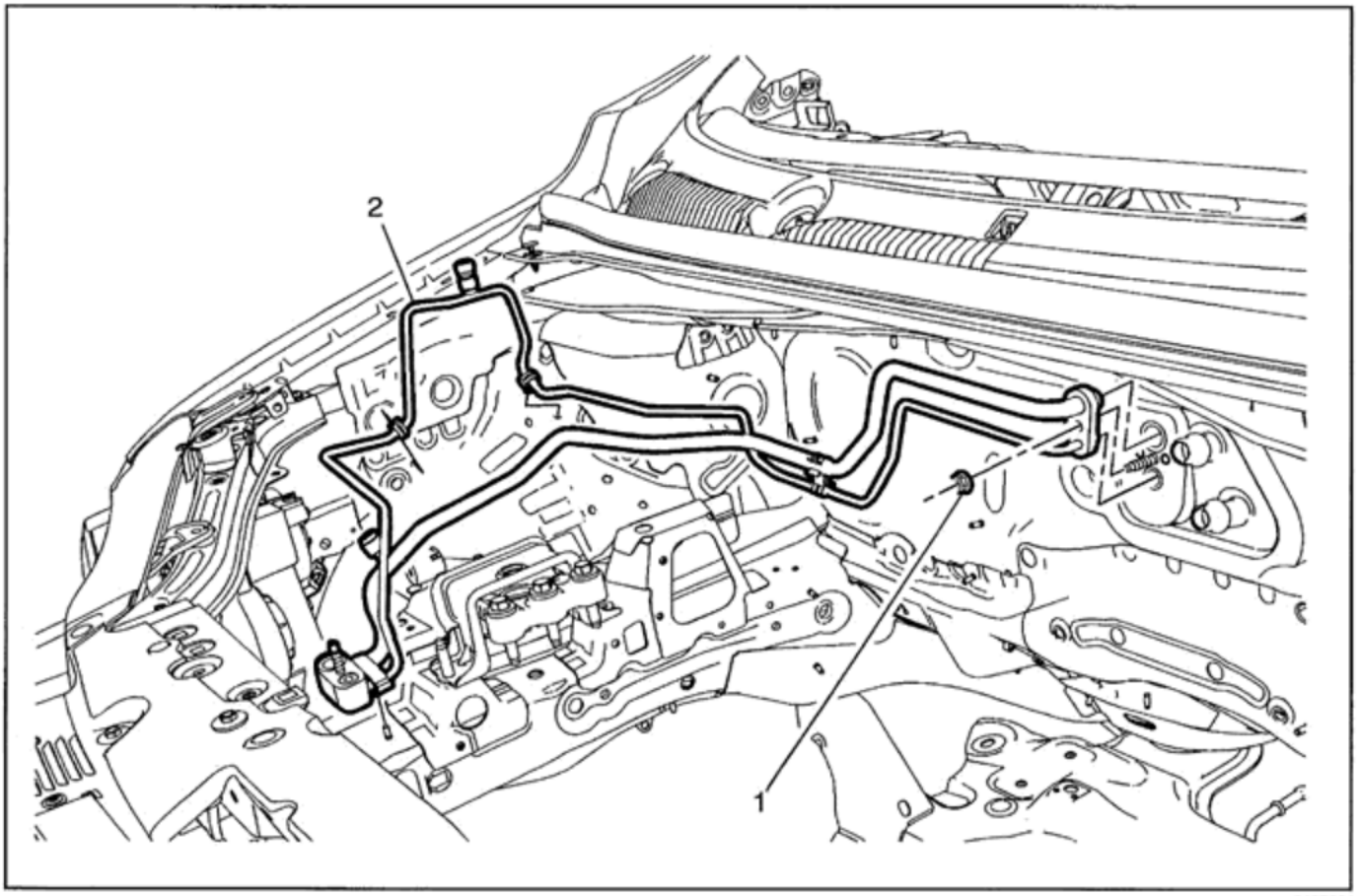
4. Install air conditioning compressor and condenser hose (2) to the A/C compressor.
5. Install air conditioning compressor and condenser hose bolts (1). Tighten bolt to **22** N•m **(16 lb ft)**.



2497611

6. Install air conditioning compressor and condenser hose (2) to the A/C condenser.
7. Install air conditioning compressor and condenser hose nut (1). Tighten nut to **22** N•m **(16 lb ft)**.
8. Connect the A/C refrigerant pressure sensor electrical connector.
9. Evacuate and charge the refrigerant system. Refer to *Refrigerant Recovery and Recharging on page 10-13*.

Air Conditioning Evaporator Hose Assembly Replacement



2497601

Air Conditioning Evaporator Hose Assembly Replacement

Callout	Component Name
1	Air Conditioning Evaporator Hose Assembly Nut. **Caution:** Refer to *Fastener Caution on page 0-8.* **Tighten** 22 N•m (16 lb ft)
2	Air Conditioning Evaporator Hose Assembly **Procedure** Discard and replace all sealing washers. Refer to *Air Conditioning System Seal Replacement on page 10-20.*

Air Conditioning (AC) Refrigerant Filter Replacement

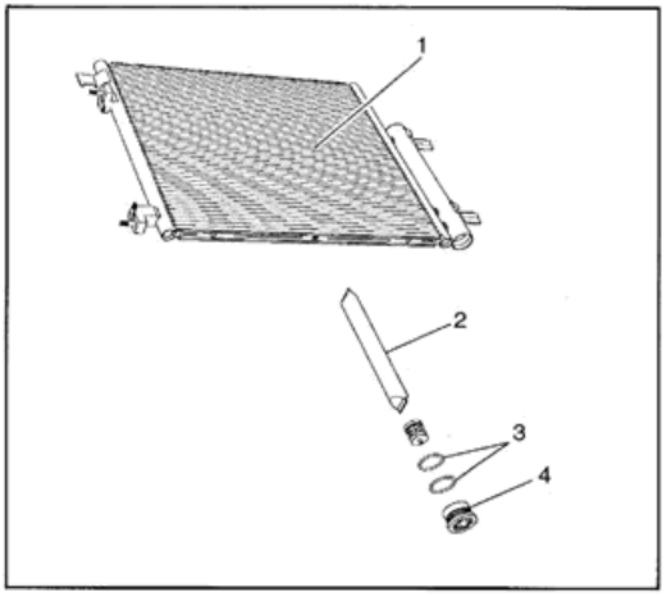
Special Tools

GE 39400-A Halogen Leak Detector

For equivalent regional tools, refer to *Special Tools on page 10-61.*

Removal Procedure

1. Recover the refrigerant. Refer to *Refrigerant Recovery and Recharging on page 10-13.*
2. Remove the air conditioning condenser. Refer to *Air Conditioning Condenser Replacement (LDE,LUW) on page 10-33* or *Air Conditioning Condenser Replacement (LUV) on page 10-34.*

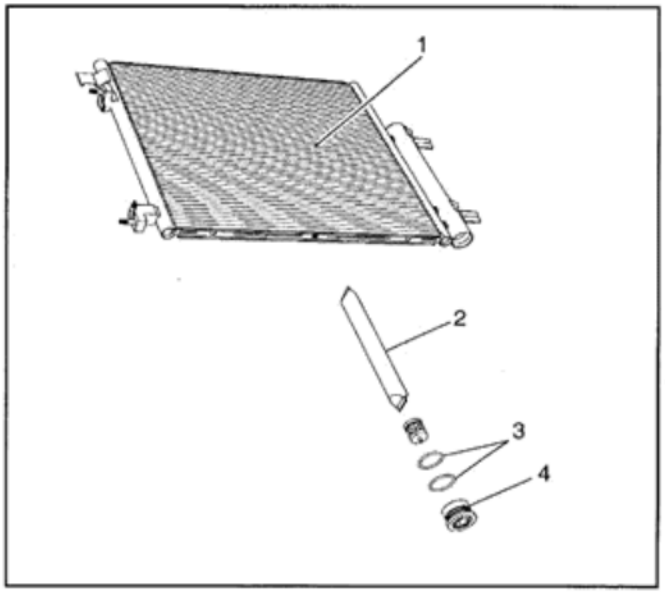


2308720

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

3. Remove the air conditioning receiver and dehydrator plug (4).
4. Remove and discard the sealing washers (3).
5. Remove the refrigerant filter (2) from the condenser (1).

Installation Procedure



2308720

1. Uncap A/C components.
2. Install new sealing washers (3). Refer to *Air Conditioning O-Ring Seal Replacement on page 10-21*.
3. Install the refrigerant filter (2) into the air conditioning condenser (1).
4. Install the air conditioning receiver and dehydrator plug (4).
5. Install the air conditioning condenser. Refer to *Air Conditioning Condenser Replacement (LDE,LUW) on page 10-33* or *Air Conditioning Condenser Replacement (LUV) on page 10-34*.
6. Evacuate and charge the refrigerant system. Refer to *Refrigerant Recovery and Recharging on page 10-13*.
7. Leak test the fittings using the *GE 39400-A* detector.

Air Conditioning Refrigerant Service Valve Core Replacement

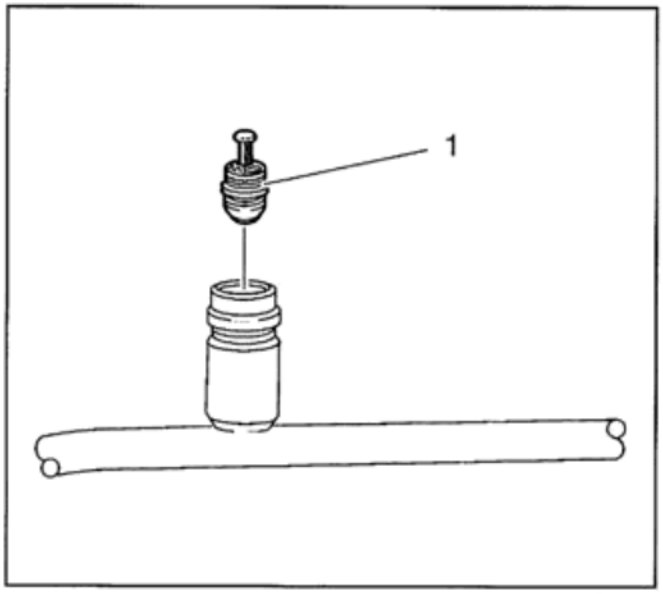
Special Tools

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

For equivalent regional tools, refer to *Special Tools on page 10-61*.

Removal Procedure

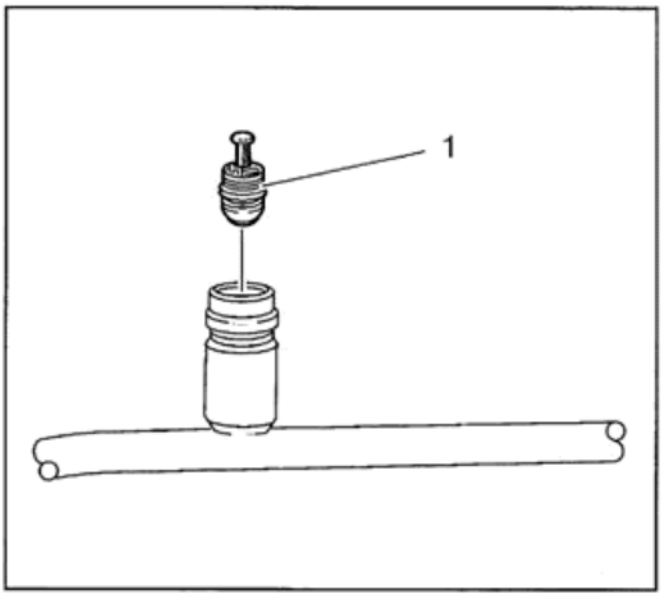
1. Recover the refrigerant. Refer to *Refrigerant Recovery and Recharging on page 10-13*.



2026977

2. Remove the service port valve core (1) using the *GE-46246* remover.

Installation Procedure

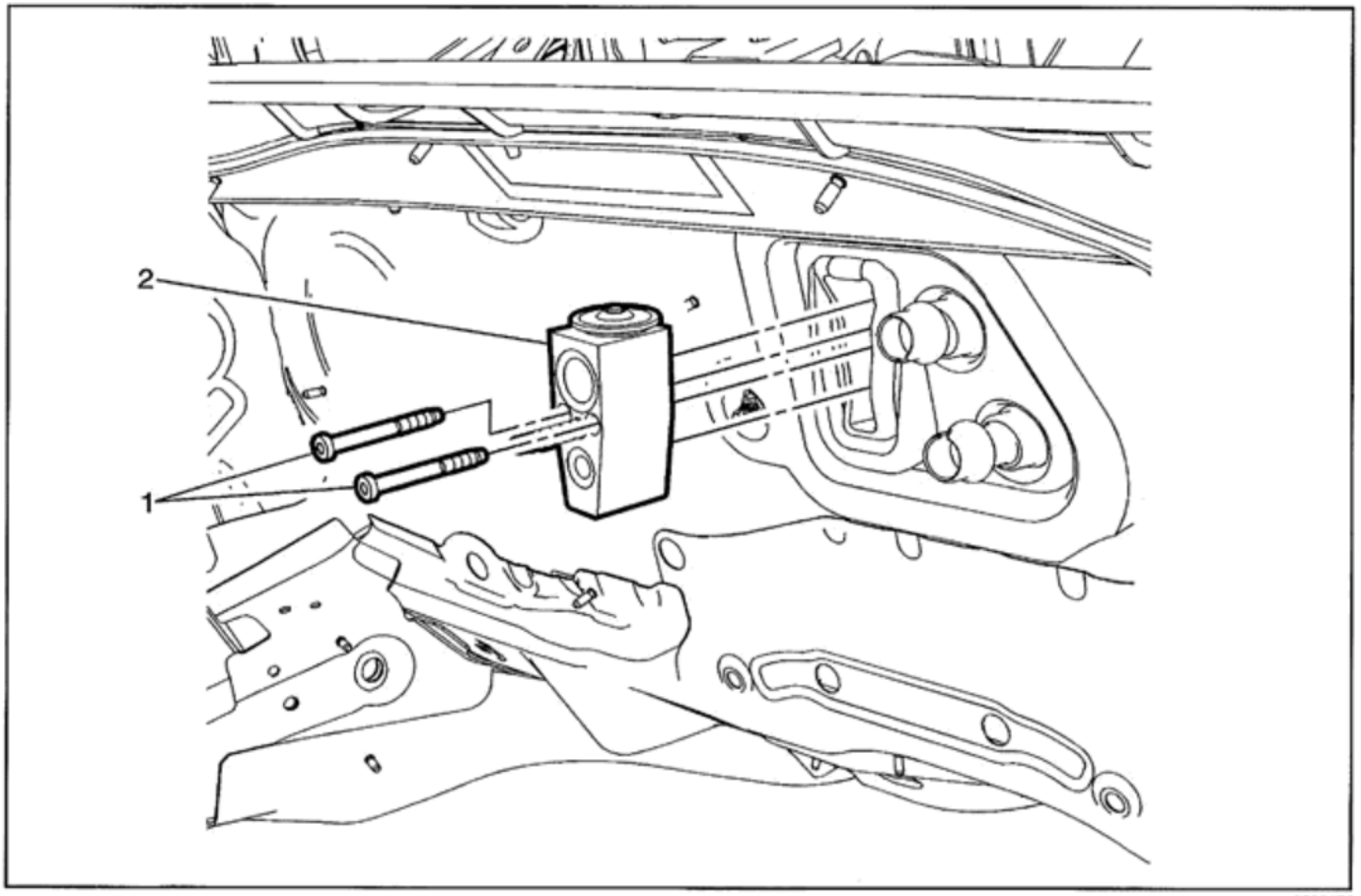


2026977

Caution: Refer to *Fastener Caution on page 0-8.*

1. Install the service port valve core (1) using the *GE-46246* remover.
2. Evacuate and charge the refrigerant system. Refer to *Refrigerant Recovery and Recharging on page 10-13.*
3. Leak test the fittings using the *GE-39400-A* detector.

Air Conditioning Evaporator Thermal Expansion Valve Replacement

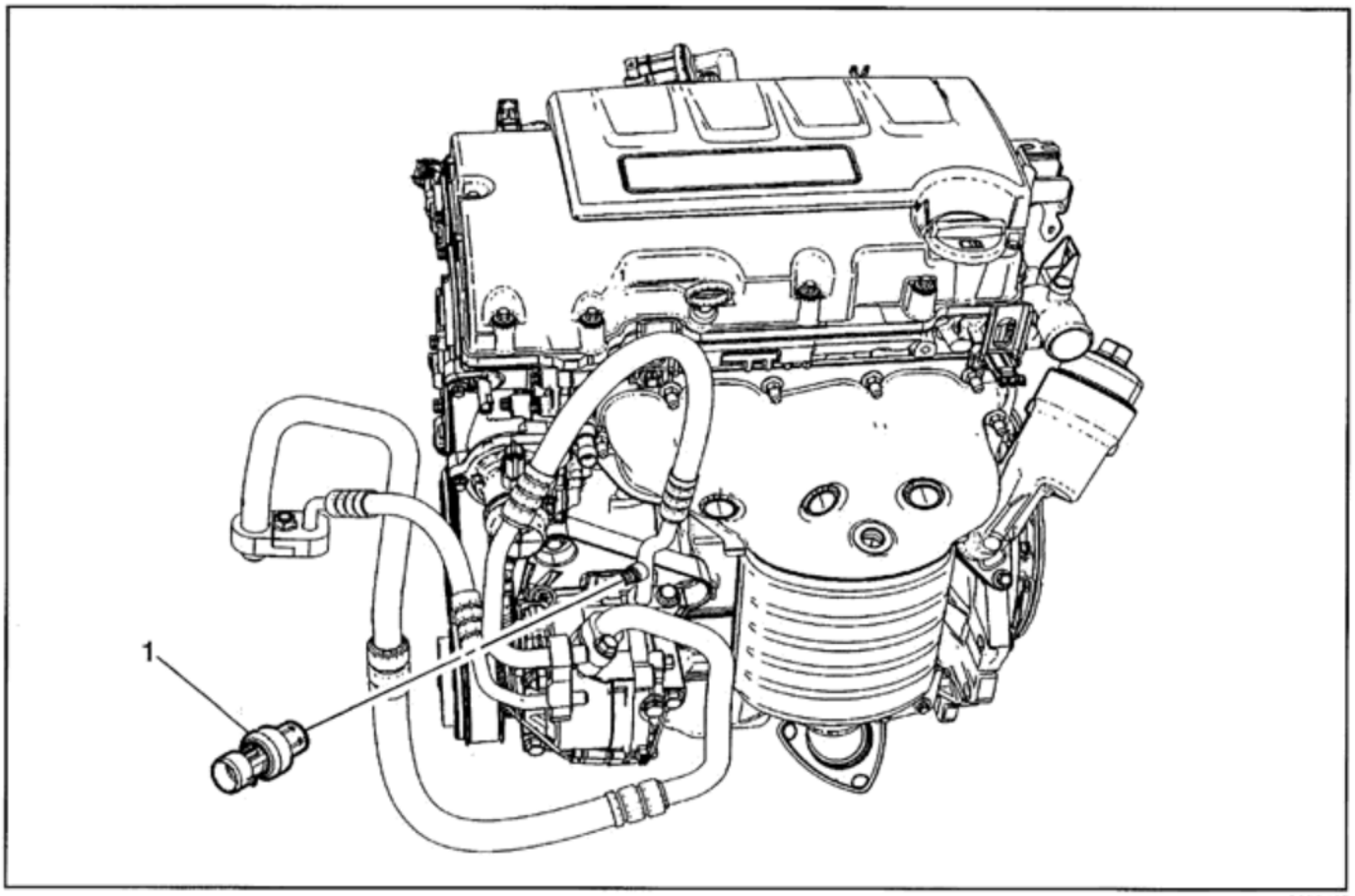


2508176

Air Conditioning Evaporator Thermal Expansion Valve Replacement

Callout	Component Name
Preliminary Procedure 1. Recover the refrigerant. Refer to *Refrigerant Recovery and Recharging on page 10-13.* 2. Remove the air conditioning evaporator hose assembly from the thermal expansion valve. Refer to *Air Conditioning Evaporator Hose Assembly Replacement on page 10-27.*	
1	Thermal Expansion Valve Bolts (Qty :2) **Caution:** Refer to *Fastener Caution on page 0-8.* **Tighten** 7 N•m (62 lb in)
2	Thermal Expansion Valve **Note:** Use NEW system seals. Refer to *Air Conditioning System Seal Replacement on page 10-20.*

Air Conditioning (A/C) Refrigerant Pressure Sensor Replacement (1.4L)



2892467

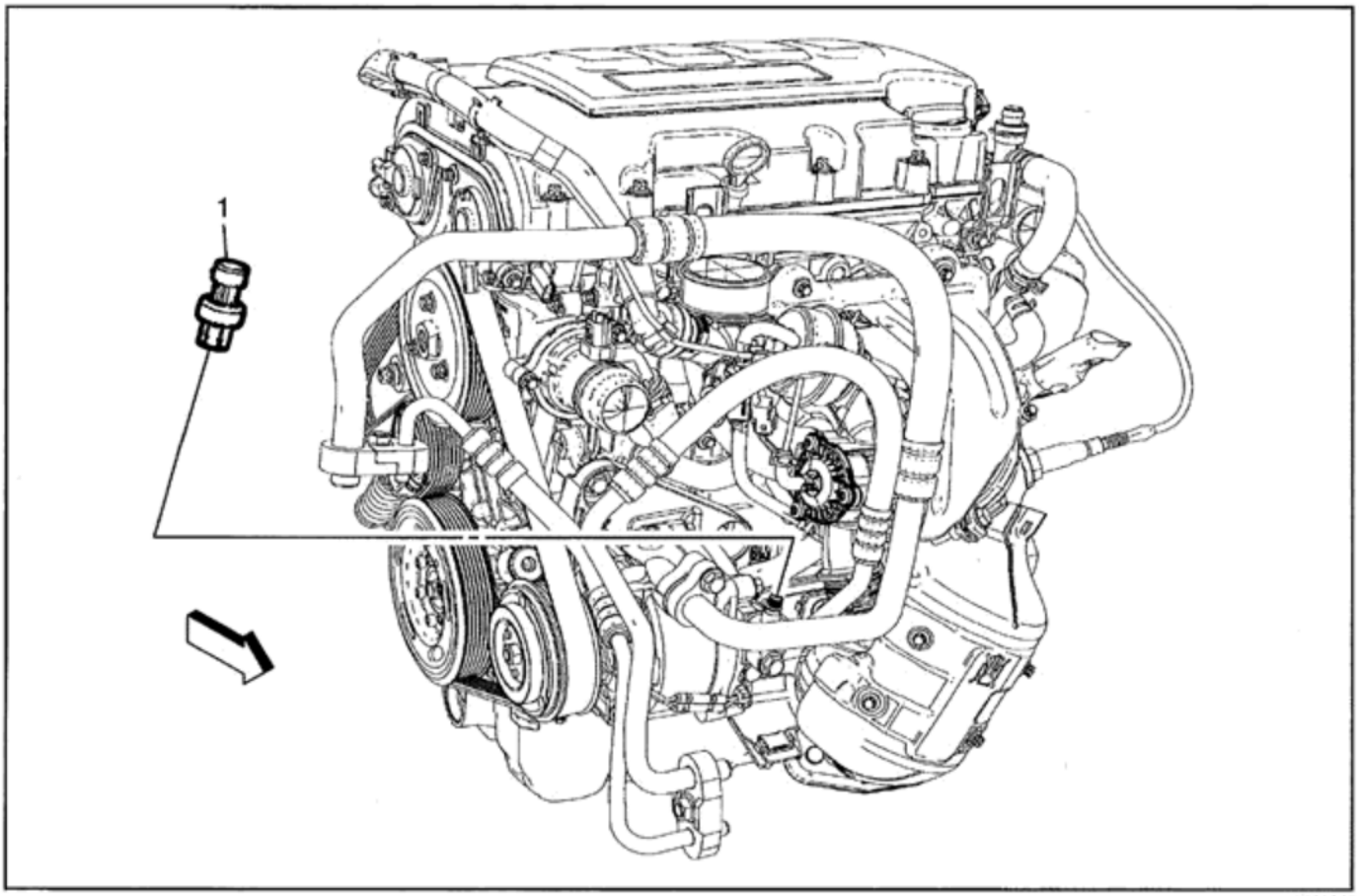
Air Conditioning (A/C) Refrigerant Pressure Sensor Replacement (1.4L)

Callout	Component Name
Preliminary Procedures 1. Raise and support the vehicle. Refer to *Lifting and Jacking the Vehicle on page 1-31.* 2. Remove the front bumper fascia opening lower cover. Refer to *Front Bumper Fascia Opening Lower Cover Replacement on page 3-58.*	

Air Conditioning (A/C) Refrigerant Pressure Sensor Replacement (1.4L) (cont'd)

Callout	Component Name
1	Air Conditioning Refrigerant Pressure Sensor **Caution:** Refer to *Fastener Caution on page 0-8.* **Procedures** 1. Disconnect the air conditioning refrigerant pressure sensor connector. 2. Remove and discard the O-ring and replace with NEW. Refer to *Air Conditioning O-Ring Seal Replacement on page 10-21.* **Tighten** 6 N•m (54 lb in)

Air Conditioning (A/C) Refrigerant Pressure Sensor Replacement (LUV)

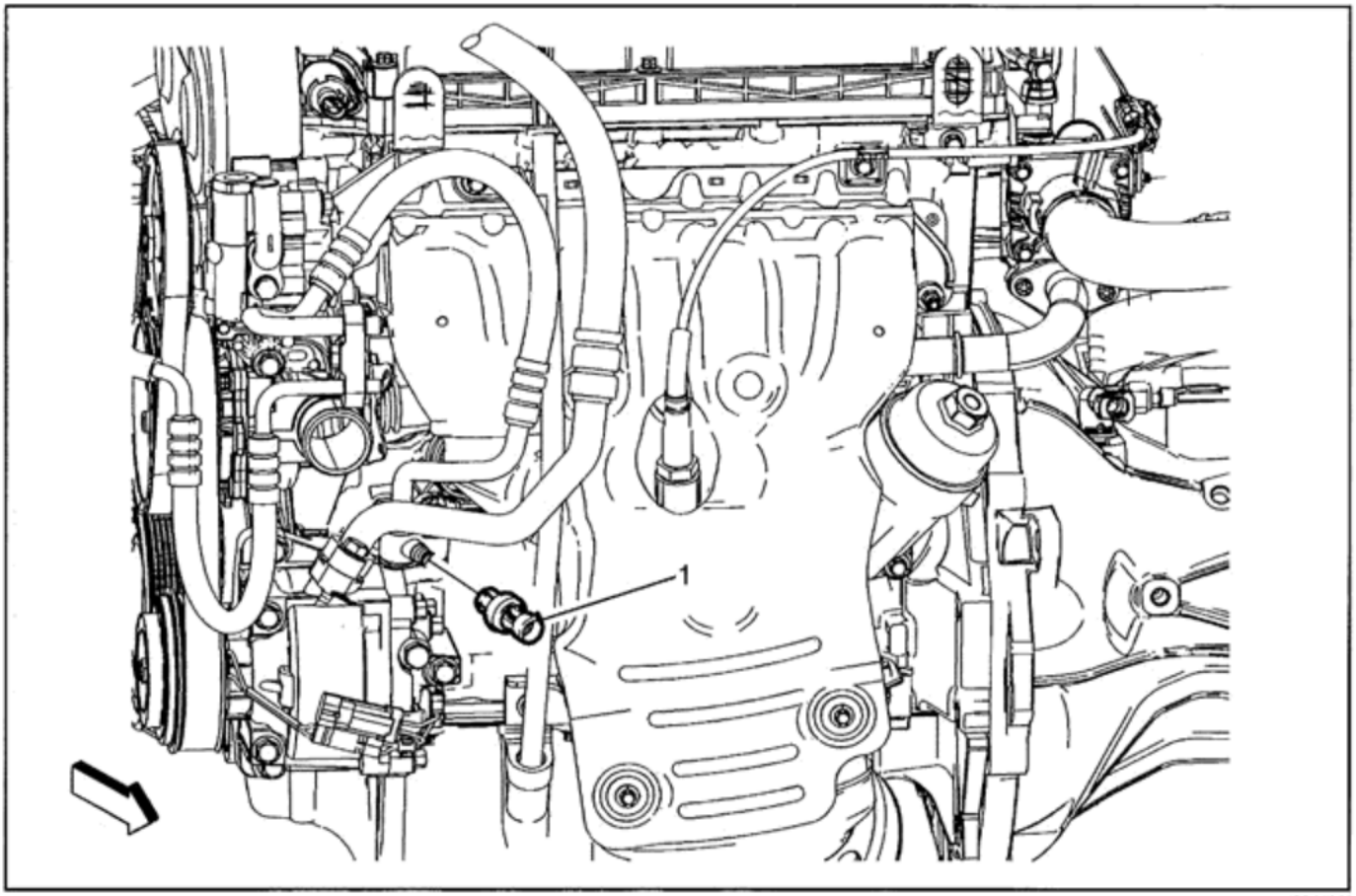


2893617

Air Conditioning (A/C) Refrigerant Pressure Sensor Replacement (LUV)

Callout	Component Name
1	Air Conditioning Refrigerant Pressure Sensor **Caution:** Refer to *Fastener Caution on page 0-8.* **Procedures** 1. Disconnect the air conditioning refrigerant pressure sensor connector. 2. Remove and discard the O-ring and replace with NEW. Refer to *Air Conditioning O-Ring Seal Replacement on page 10-21.* **Tighten** 6 N•m (54 lb in)

Air Conditioning (A/C) Refrigerant Pressure Sensor Replacement (LDE/ LUW/LWE)

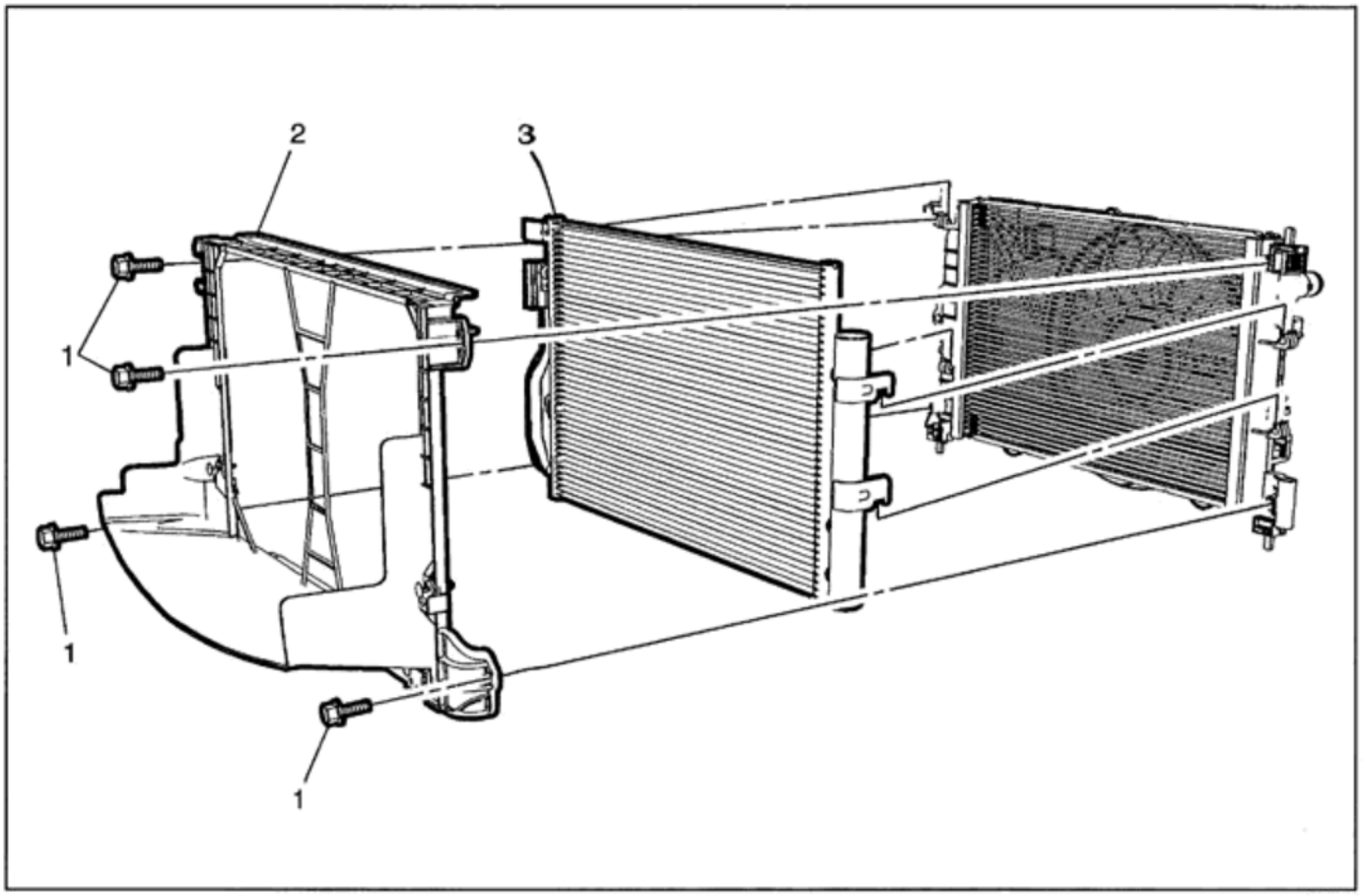


2811444

Air Conditioning (A/C) Refrigerant Pressure Sensor Replacement (LDE/LUW/LWE)

Callout	Component Name
1	Air Conditioning Refrigerant Pressure Sensor **Caution:** Refer to *Fastener Caution on page 0-8.* **Procedure** 1. Disconnect the air conditioning refrigerant pressure sensor connector. 2. Remove and discard the O-ring and replace with NEW. Refer to *Air Conditioning O-Ring Seal Replacement on page 10-21.* **Tighten** 6 N•m (53 lb in)

Air Conditioning Condenser Replacement (LDE,LUW)

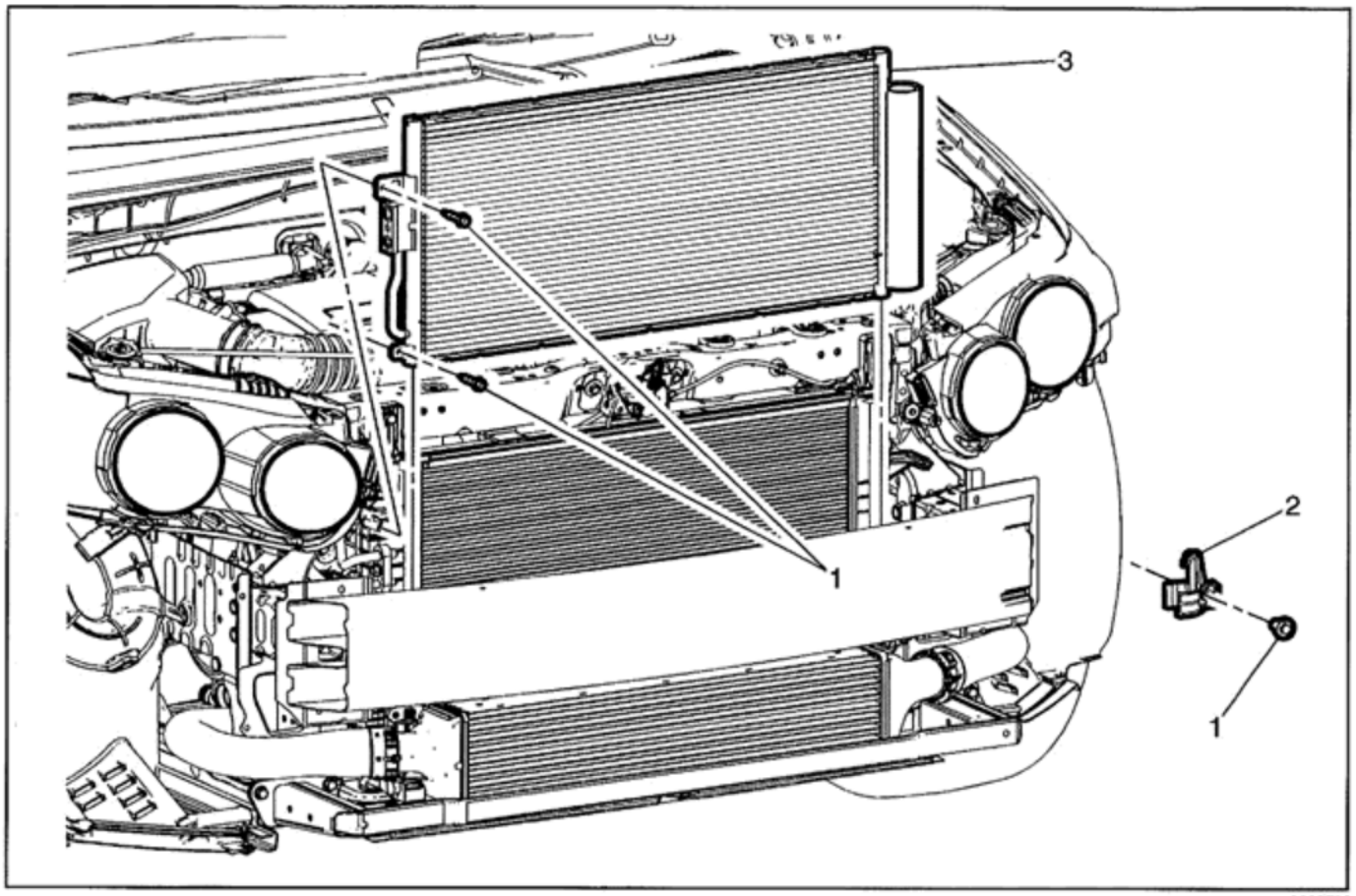


2539259

Air Conditioning Condenser Replacement (LDE,LUW)

Callout	Component Name
Preliminary Procedure 1. Recover the refrigerant. Refer to *Refrigerant Recovery and Recharging on page 10-13.* 2. Remove front bumper fascia. Refer to *Front Bumper Fascia Replacement on page 3-55.* 3. Remove the air conditioning compressor and condenser hose from the condenser. Refer to *Air Conditioning Compressor and Condenser Hose Replacement (LUW) on page 10-21* or *Air Conditioning Compressor and Condenser Hose Replacement (LUV) on page 10-23* or *Air Conditioning Compressor and Condenser Hose Replacement (LDE/LWE) on page 10-25.*	
1	Air Conditioning Condenser Baffel Bolt (Qty: 4) **Caution:** Refer to *Fastener Caution on page 0-8* **Tighten** 10 N•m (89 lb in)
2	Air Conditioning Condenser Baffel
3	Air Conditioning Condenser **Procedure** Unclip the air conditioning condenser from the radiator assembly.

Air Conditioning Condenser Replacement (LUV)

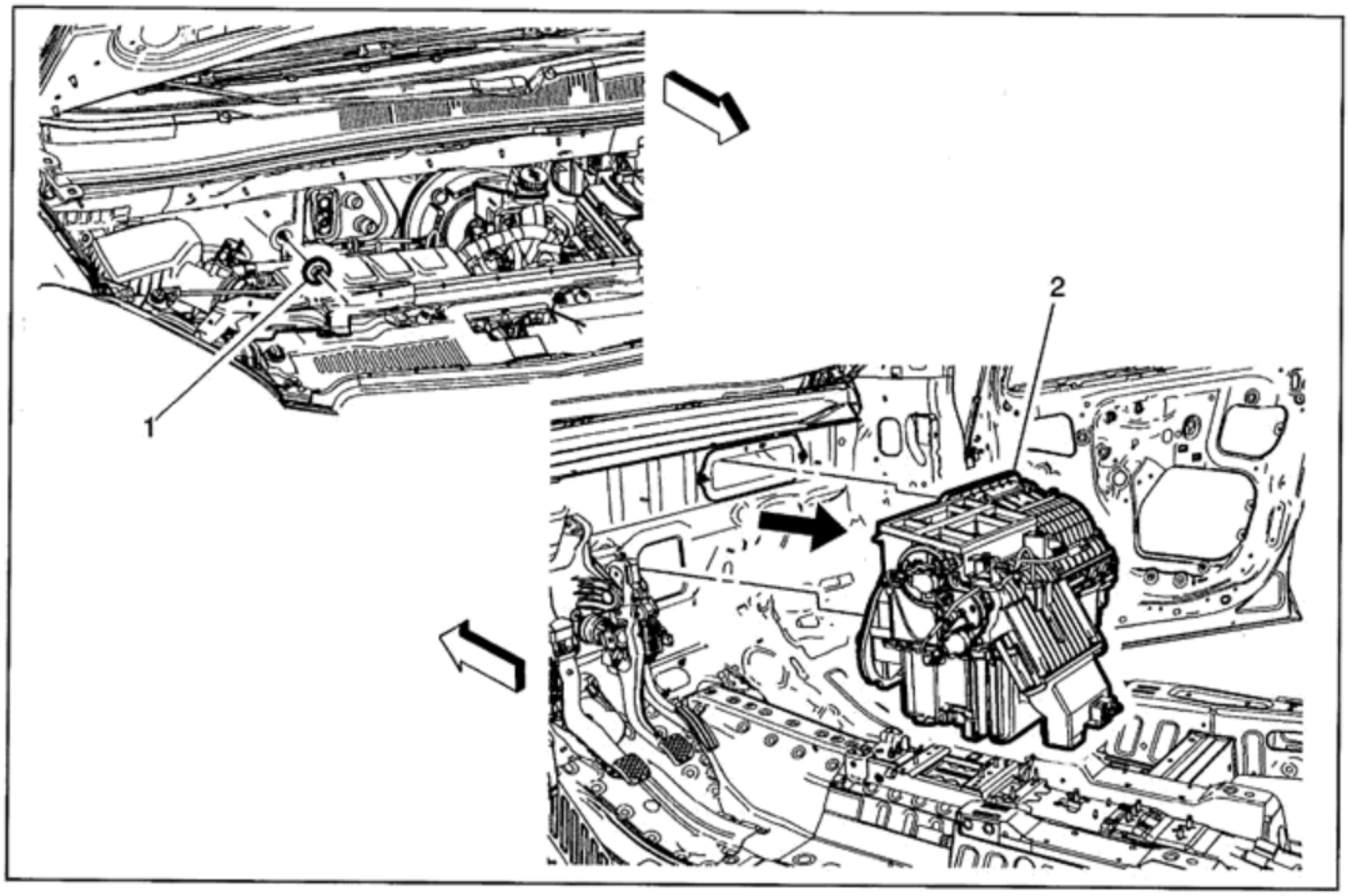


2680736

Air Conditioning Condenser Replacement (LUV)

Callout	Component Name
Preliminary Procedure 1. Drain the refrigerant. Refer to *Refrigerant Recovery and Recharging on page 10-13* 2. Remove the front bumper fascia assembly. Refer to *Front Bumper Fascia Replacement on page 3-55.* 3. Remove air compressor and condenser hose assembly from the condenser and position out of the way. Refer to *Air Conditioning Compressor and Condenser Hose Replacement (LUW) on page 10-21* or *Air Conditioning Compressor and Condenser Hose Replacement (LUV) on page 10-23* or *Air Conditioning Compressor and Condenser Hose Replacement (LDE/LWE) on page 10-25.* 4. Remove the radiator upper air baffle. Refer to *Radiator Air Baffle Replacement (LUV, LUW) on page 9-679*	
1	Air Conditioning Condenser Fasteners (Qty: 3) **Caution:** Refer to *Fastener Caution on page 0-8.*
2	Air Conditioning Condenser Bracket
3	Air Conditioning Condenser Assembly **Procedure** Transfer all necessary components.

Heater and Air Conditioning Evaporator and Blower Module Removal and Installation

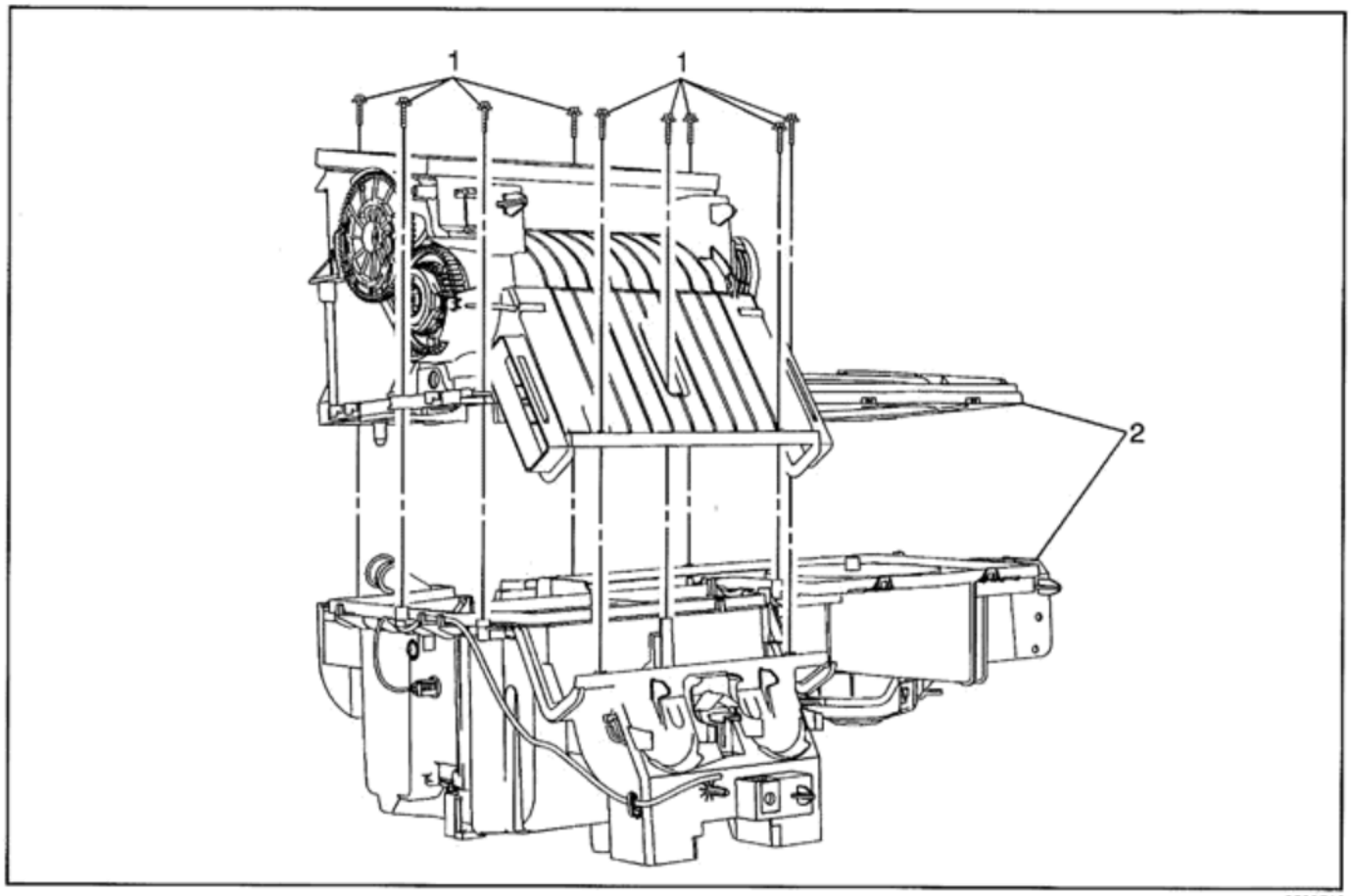


2783242

Heater and Air Conditioning Evaporator and Blower Module Removal and Installation

Callout	Component Name
Preliminary Procedures 1. Recover the refrigerant. Refer to *Refrigerant Recovery and Recharging on page 10-13.* 2. Drain the cooling system. Refer to *Cooling System Draining and Filling on page 9-628.* 3. Remove the instrument panel tie bar. Refer to *Instrument Panel Tie Bar Replacement on page 2-51.* 4. Disconnect the HVAC module electrical connectors. 5. Remove the air conditioning evaporator hose assembly from the thermal expansion valve. Refer to *Air Conditioning Evaporator Hose Assembly Replacement on page 10-27.* 6. Remove the heater outlet hose if equipped. Refer to *Heater Outlet Hose Replacement (LUV) on page 10-40* or *Heater Outlet Hose Replacement (LDE, LUW) on page 10-40.* 7. Remove the heater inlet hose if equipped. Refer to *Heater Inlet Hose Replacement (LDE, LUW) on page 10-38* or *Heater Inlet Hose Replacement (LUV) on page 10-38.*	
1	Heater and Air Conditioning Evaporator and Blower Module Fastener **Caution:** Refer to *Fastener Caution on page 0-8.* **Tighten** 22 N•m (16 lb ft)
2	Heater and Air Conditioning Evaporator and Blower Module Assembly

Heater and Air Conditioning Evaporator Case Replacement

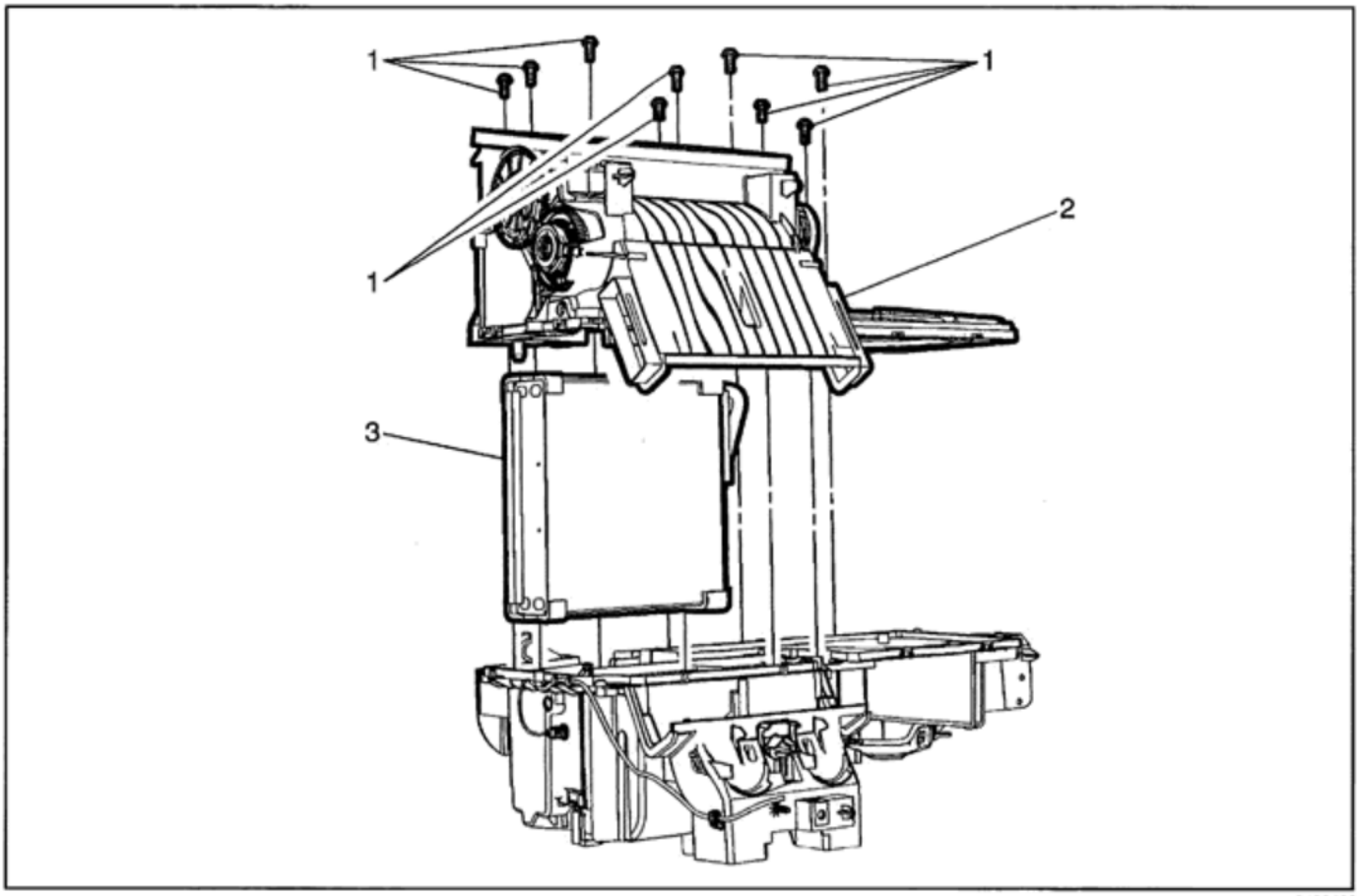


2500519

Heater and Air Conditioning Evaporator Case Replacement

Callout	Component Name
Preliminary Procedure 1. Remove the instrument panel tie bar. Refer to *Instrument Panel Tie Bar Replacement on page 2-51.* 2. Remove HVAC module. Refer to *Heater and Air Conditioning Evaporator and Blower Module Removal and Installation on page 10-35.* 3. Remove air inlet assembly Refer to *Air Inlet Assembly Replacement on page 10-47*	
1	Heater and Air Conditioning Evaporator Case Fasteners (Qty: 9) **Caution:** Refer to *Fastener Caution on page 0-8.*
2	Upper Heater and Air Conditioning Evaporator Case

Air Conditioning Evaporator Core Replacement

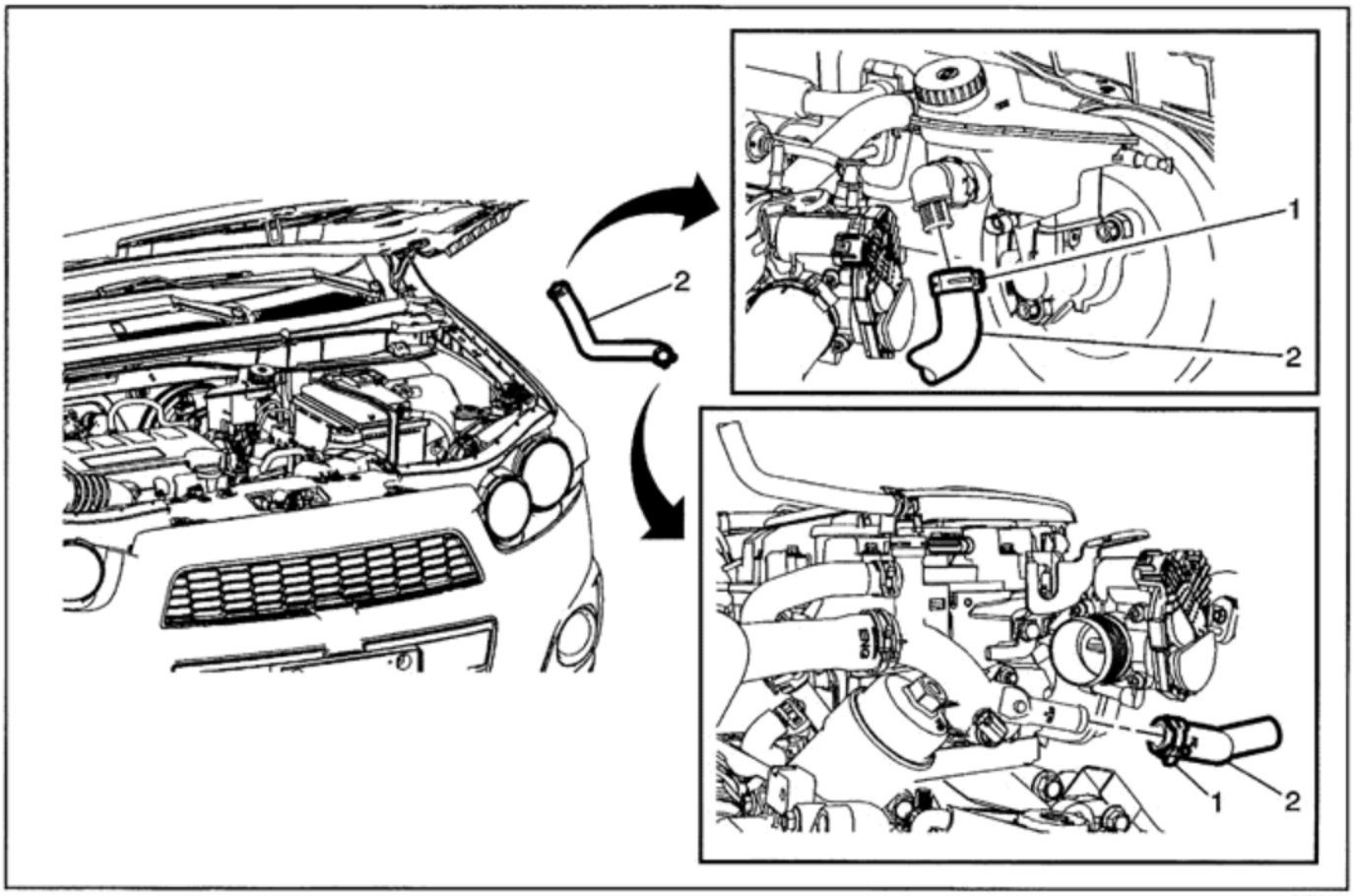


2493409

Air Conditioning Evaporator Core Replacement

Callout	Component Name
Preliminary Procedure 1. Remove the instrument panel tie bar. Refer to *Instrument Panel Tie Bar Replacement on page 2-51.* 2. Remove HVAC module. Refer to *Heater and Air Conditioning Evaporator and Blower Module Removal and Installation on page 10-35.* 3. Remove air inlet assembly Refer to *Air Inlet Assembly Replacement on page 10-47*	
1	Upper Heater and Air Conditioning Evaporator Case Fasteners (Qty: 9) **Caution:** Refer to *Fastener Caution on page 0-8.*
2	Upper Heater and Air Conditioning Evaporator Case Assembly
3	Evaporator Core Assembly

Heater Inlet Hose Replacement (LUV)



2678191

Heater Inlet Hose Replacement (LUV)

Callout	Component Name
Preliminary Procedures 1. Drain the engine coolant. Refer to *Cooling System Draining and Filling on page 9-628.* 2. Remove the charge air cooler outlet hose. Refer to *Charge Air Cooler Outlet Air Hose Replacement on page 9-293.*	
1	Heater Inlet Hose Clamp (Qty: 2) **Special Tools** *BO-38185* Hose Clamp Pliers For equivalent regional tools, refer to *Special Tools on page 9-681.*
2	Heater Inlet Hose

Heater Inlet Hose Replacement (LDE, LUW)

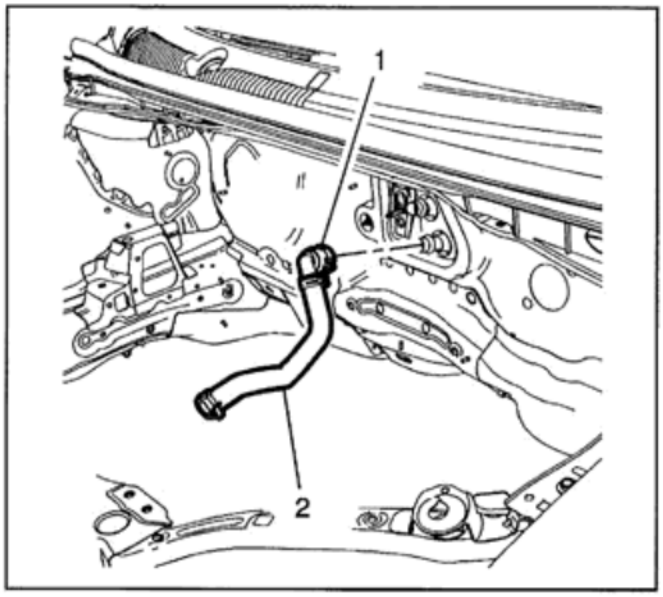
Special Tools

BO-38185 Hose Clamp Pliers

For equivalent regional tools, refer to *Special Tools on page 9-681.*

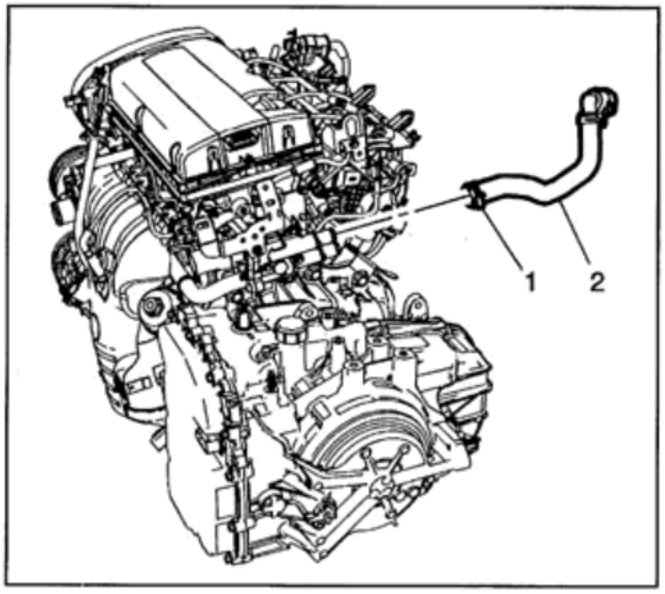
Removal Procedure

1. Drain the cooling system. Refer to *Cooling System Draining and Filling on page 9-628.*



2495162

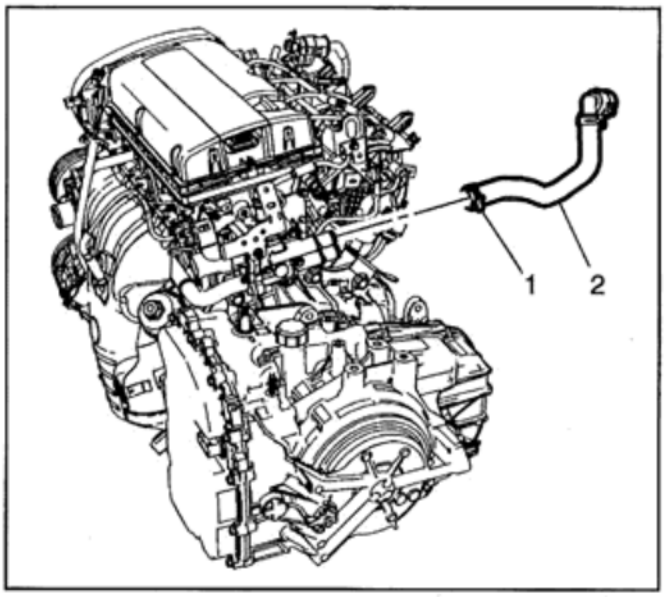
2. Disengage the heater inlet hose quick connect clip (1) at the heater core.
3. Remove the heater inlet hose (2) from the heater core.



2495184

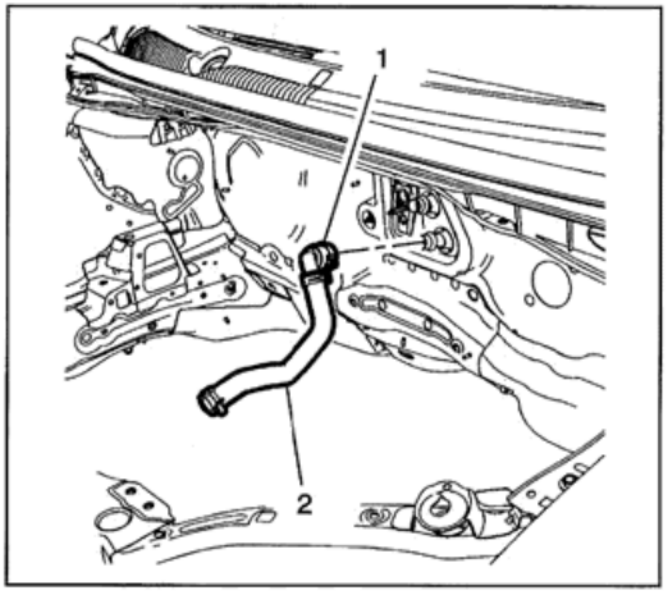
4. Remove the heater inlet hose clamp (1) at the engine using *BO-38185* Hose Clamp Pliers.
5. Remove the heater inlet hose (2) from the engine.
6. Remove the heater inlet hose from the vehicle.

Installation Procedure



2495184

1. Install the heater inlet hose to the vehicle.
2. Install the heater inlet hose (2) to the engine.
3. Install the heater inlet hose clamp (1) at the engine using *BO-38185* Hose Clamp Pliers.

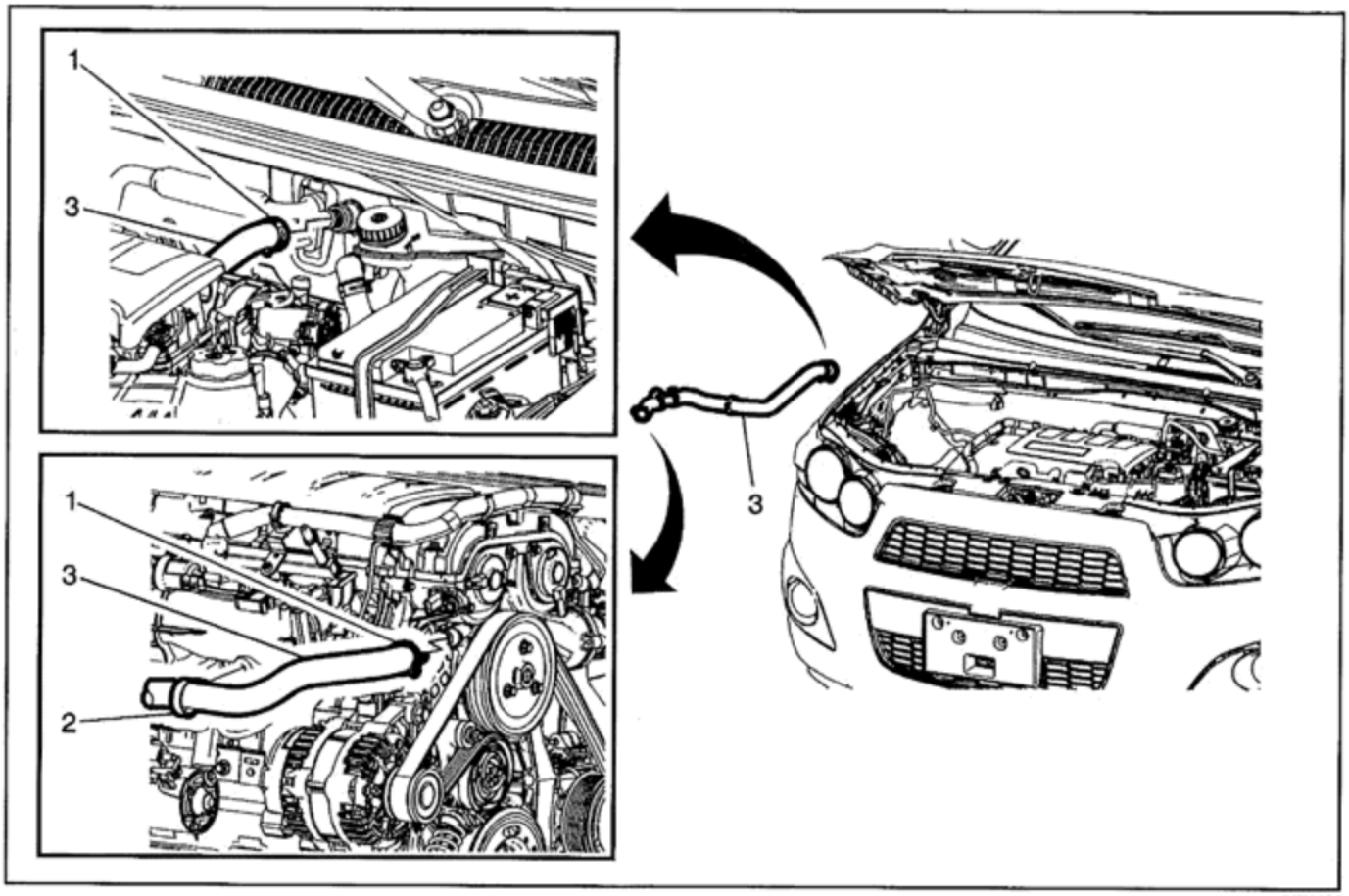


2495162

Note: The quick connector has an internal anti-rotation feature. The ensure the quick connector is properly aligned to the heater core pipe, position the white mark to the 12:00 O'clock position during installation.

4. Install the heater inlet hose (2) to the heater core.
5. Engage the heater inlet hose quick connect clip (1) at the heater core.
6. Fill the cooling system. Refer to *Cooling System Draining and Filling on page 9-628*.

Heater Outlet Hose Replacement (LUV)



2678190

Heater Outlet Hose Replacement (LUV)

Callout	Component Name
Preliminary Procedures 1. Drain the engine coolant. Refer to *Cooling System Draining and Filling on page 9-628.* 2. Remove the air cleaner assembly. Refer to *Air Cleaner Assembly Replacement on page 9-290.*	
1	Heater Outlet Hose Clamp (Qty: 2) **Special Tools** *BO-38185* Hose Clamp Pliers For equivalent regional tools, refer to *Special Tools on page 9-681.*
2	Heater Outlet Hose Retainer
3	Heater Outlet Hose

Heater Outlet Hose Replacement (LDE, LUW)

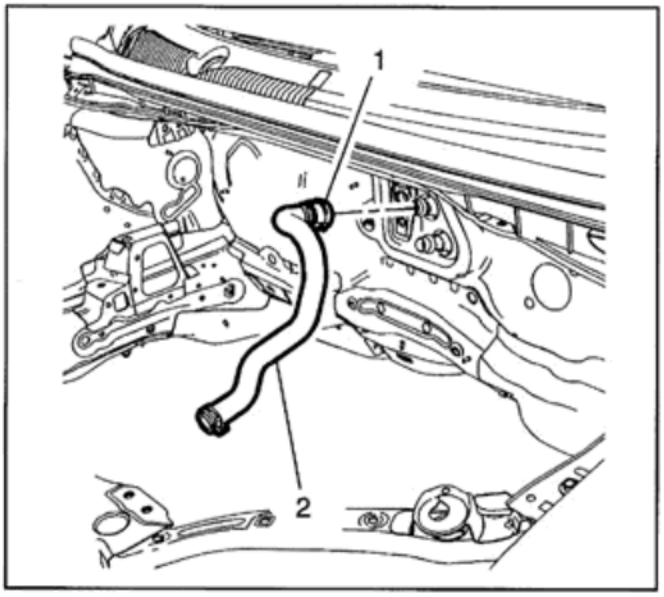
Special Tools

BO-38185 Hose Clamp Pliers

For equivalent regional tools, refer to *Special Tools on page 9-681.*

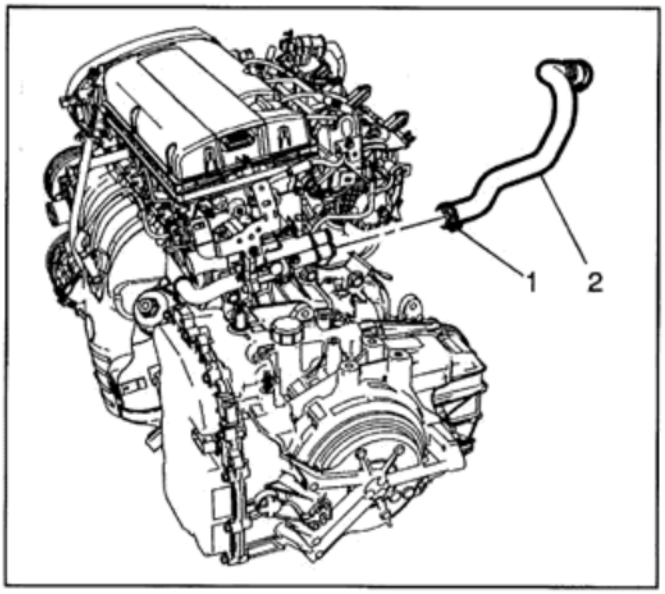
Removal Procedure

1. Drain the cooling system. Refer to *Cooling System Draining and Filling on page 9-628.*



2495174

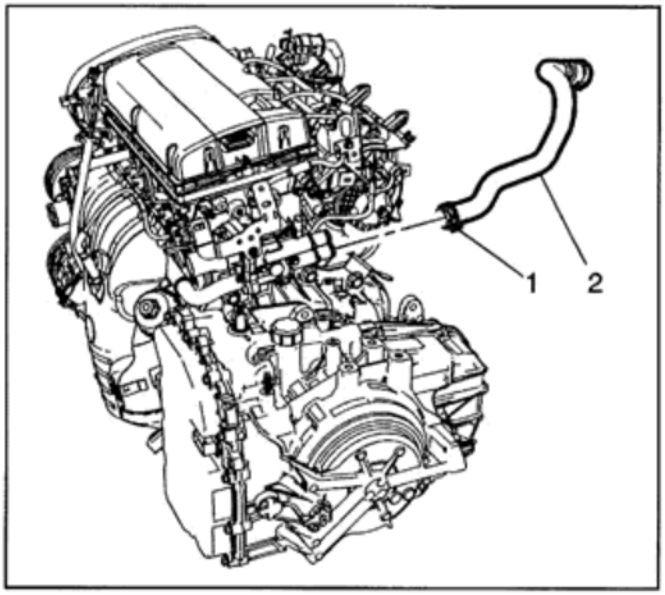
2. Disengage the heater outlet hose quick connect clip (1) at the heater core.
3. Remove the heater outlet hose (2) from the heater core.



2495189

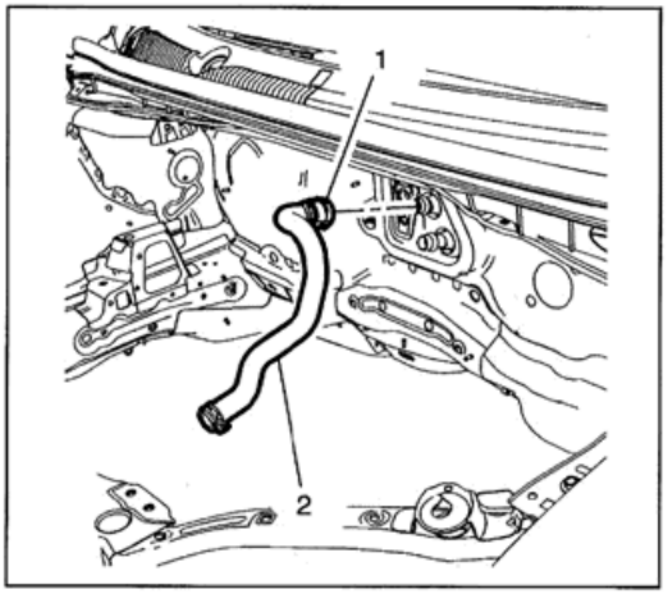
4. Remove the heater outlet hose clamp (1) at the engine using *BO-38185* Hose Clamp Pliers.
5. Remove the heater outlet hose (2) from the engine.
6. Remove the heater outlet hose from the vehicle.

Installation Procedure



2495189

1. Install the heater outlet hose to the vehicle.
2. Install the heater outlet hose (2) to the engine.
3. Install the heater outlet hose clamp (1) at the engine using *BO-38185* Hose Clamp Pliers.

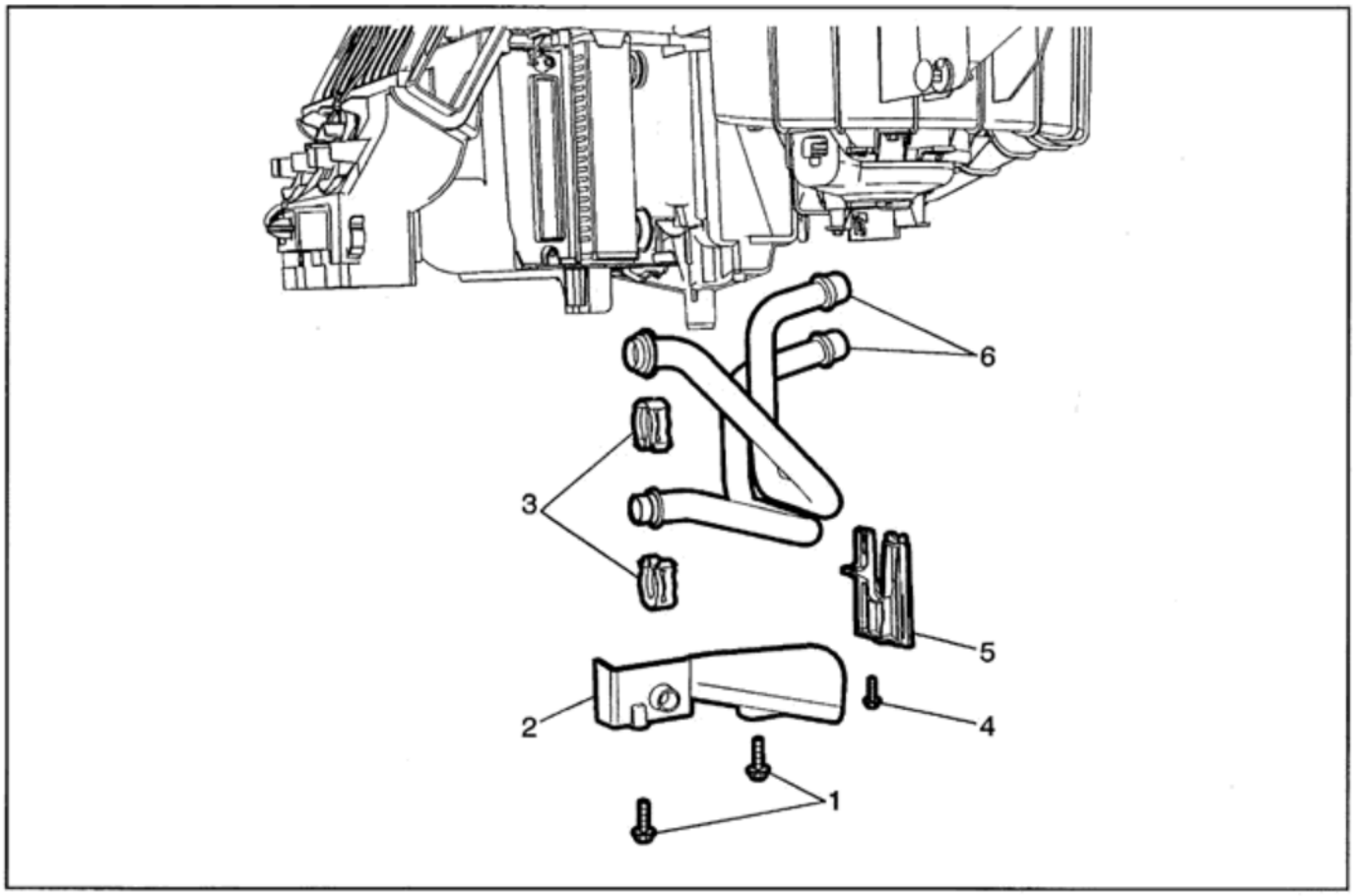


2495174

Note: The quick connector has an internal anti-rotation feature. The ensure the quick connector is properly aligned to the heater core pipe, position the white mark to the 12:00 O'clock position during installation.

4. Install the heater outlet hose (2) to the heater core.
5. Engage the heater outlet hose quick connect clip (1) at the heater core.
6. Fill the cooling system. Refer to *Cooling System Draining and Filling on page 9-628*.

Heater Core Outlet Tube Replacement

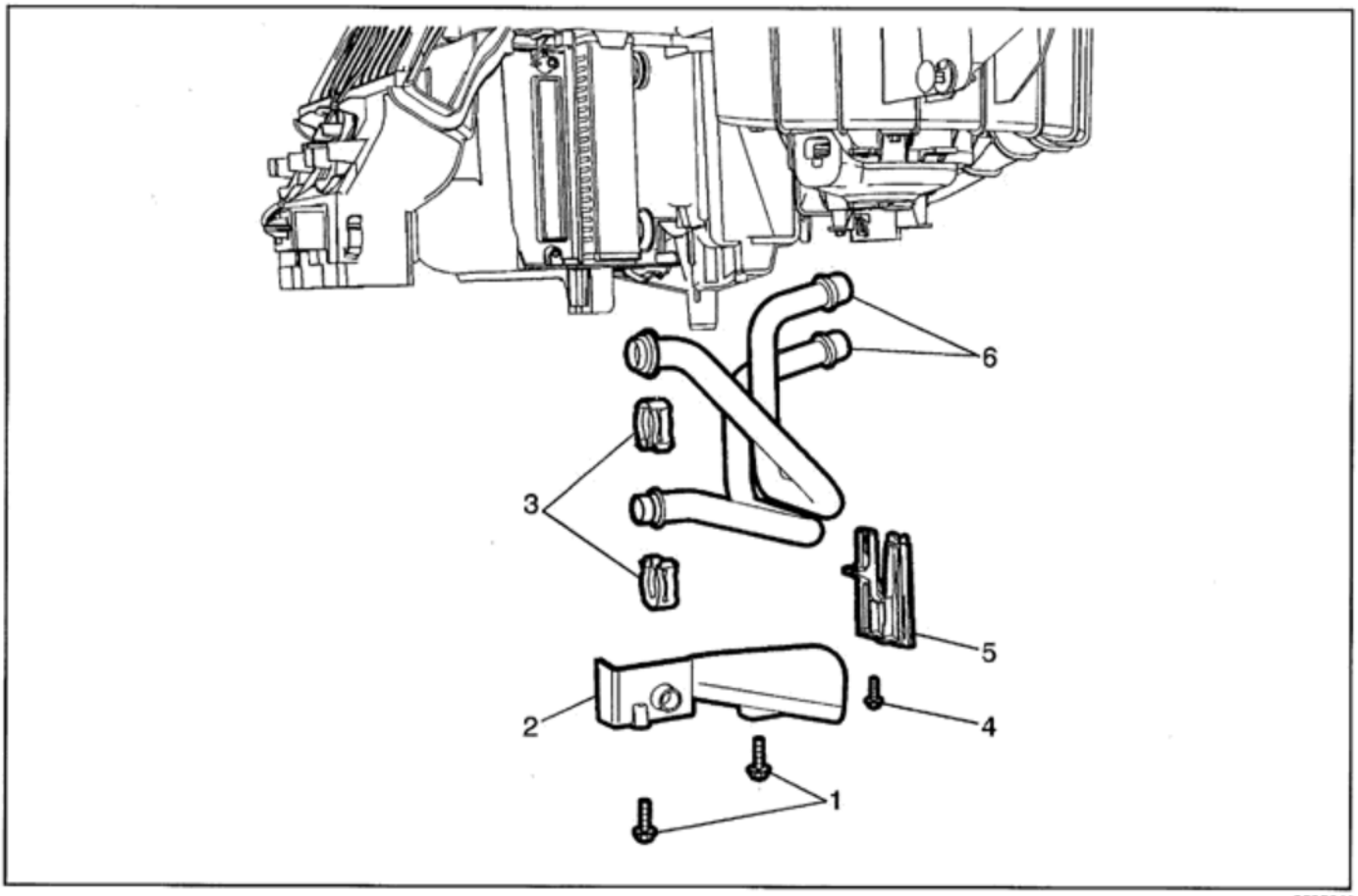


2535311

Heater Core Outlet Tube Replacement

Callout	Component Name
Preliminary Procedures 1. Remove the Heater and Air Conditioning Evaporator and Blower Module. Refer to *Heater and Air Conditioning Evaporator and Blower Module Removal and Installation on page 10-35*. 2. Disconnect the electrical connectors as necessary.	
1	Heater Core Tube Cover Bolt (Qty: 2) **Caution:** Refer to *Fastener Caution on page 0-8*.
2	Heater Core Tube Cover
3	Heater Core Tube Clamp (Qty: 2)
4	Heater Core Tube Rear Cover Bolt
5	Heater Core Tube Rear Cover
6	Heater Core Tube **Note:** Heater Core tubes are serviced as a kit .

Heater Core Inlet Tube Replacement

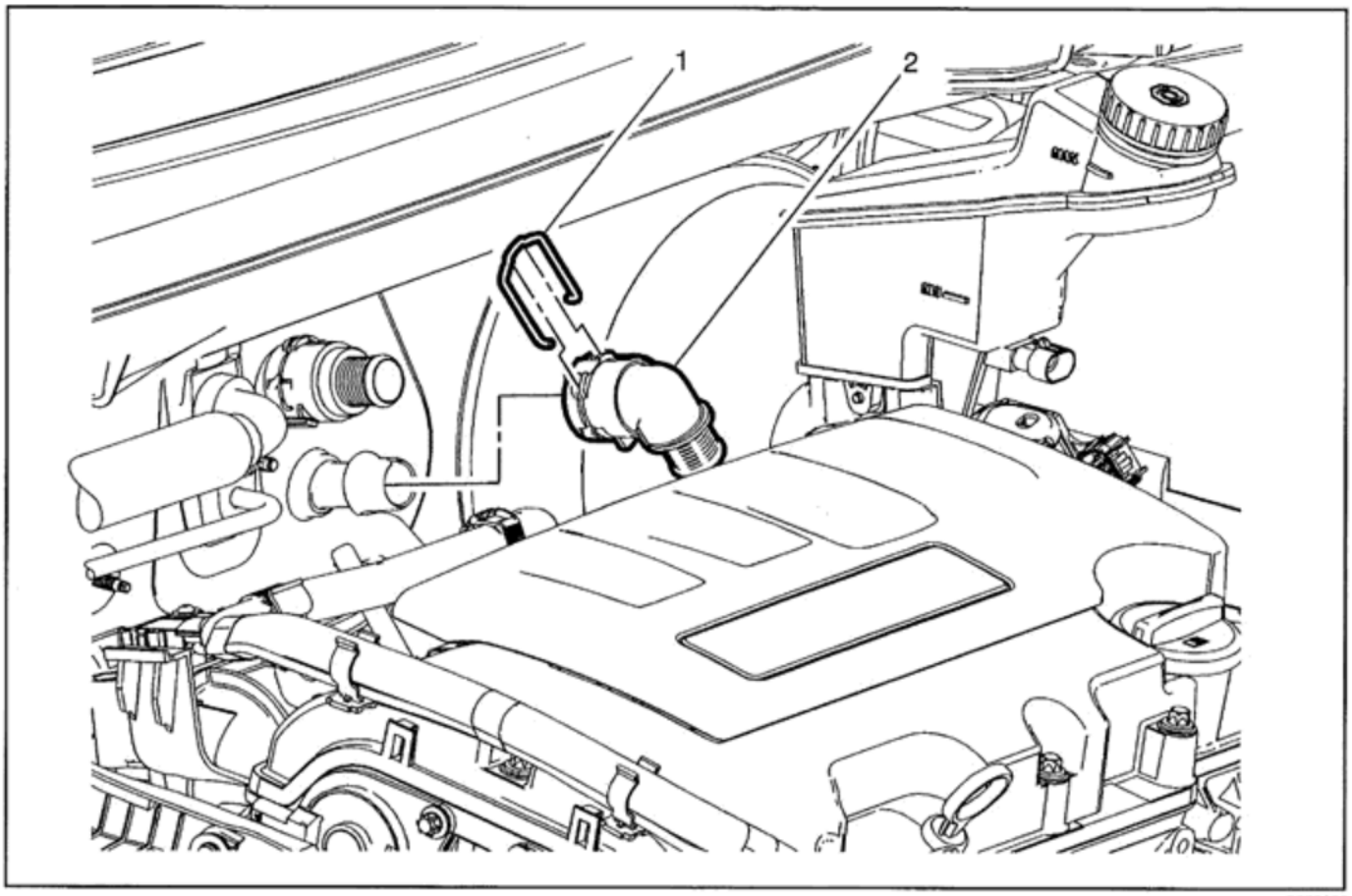


2535311

Heater Core Inlet Tube Replacement

Callout	Component Name
Preliminary Procedures 1. Remove the Heater and Air Conditioning Evaporator and Blower Module. Refer to *Heater and Air Conditioning Evaporator and Blower Module Removal and Installation on page 10-35.* 2. Disconnect the electrical connectors as necessary.	
1	Heater Core Tube Cover Bolt (Qty: 2) **Caution:** Refer to *Fastener Caution on page 0-8.*
2	Heater Core Tube Cover
3	Heater Core Tube Clamp (Qty: 2)
4	Heater Core Tube Rear Cover Bolt
5	Heater Core Tube Rear Cover
6	Heater Core Tube **Note:** Heater Core tubes are serviced as a kit .

Heater Inlet Hose Connector Replacement (LUV)

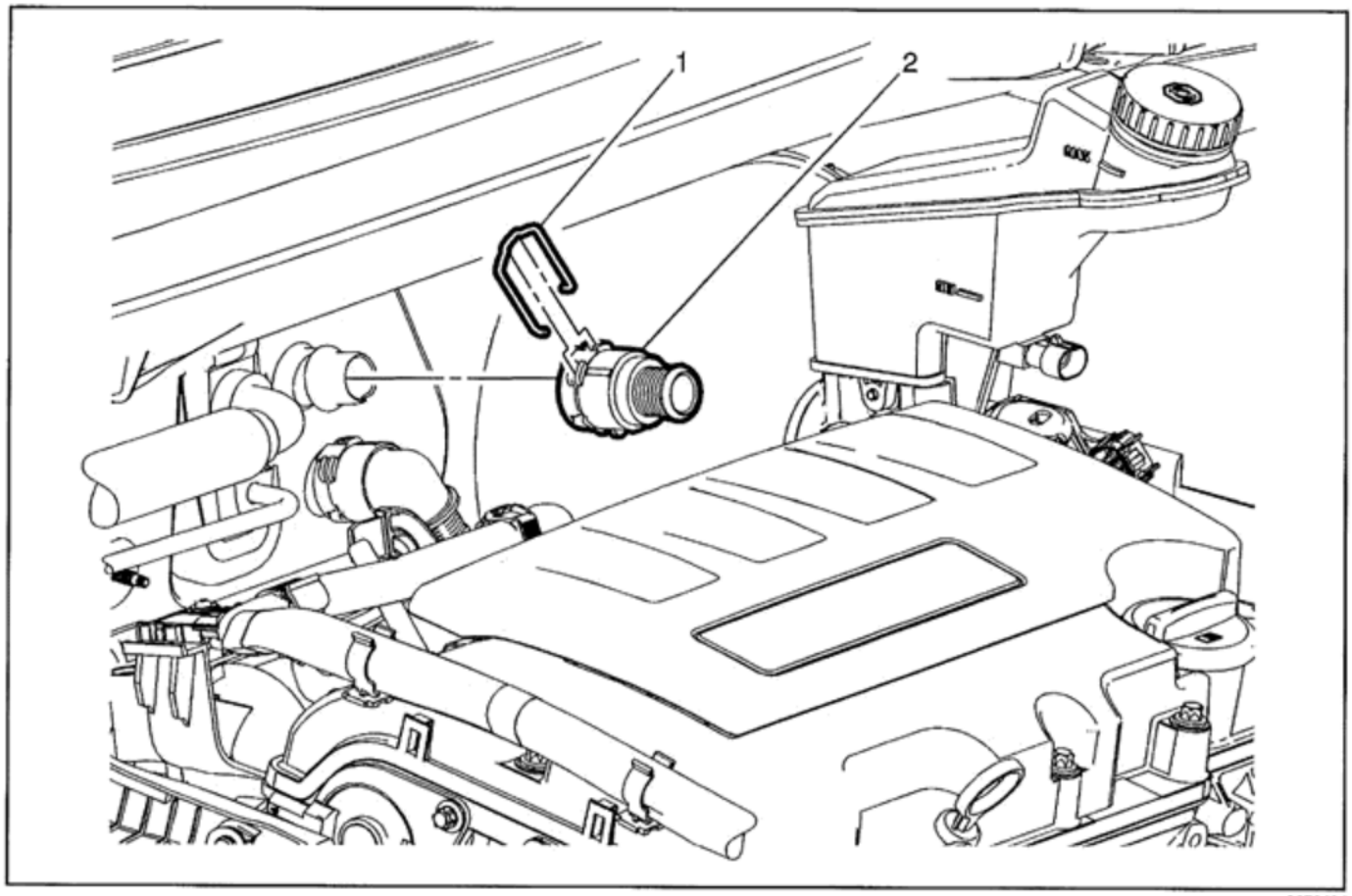


2678193

Heater Inlet Hose Connector Replacement (LUV)

Callout	Component Name
Preliminary Procedures 1. Drain the engine coolant. Refer to *Cooling System Draining and Filling on page 9-628*. 2. Remove the heater inlet hose. Refer to *Heater Inlet Hose Replacement (LDE, LUW) on page 10-38* or *Heater Inlet Hose Replacement (LUV) on page 10-38*	
1	Heater Inlet Hose Connector Retaining Clip
2	Heater Inlet Hose Connector

Heater Outlet Hose Connector Replacement

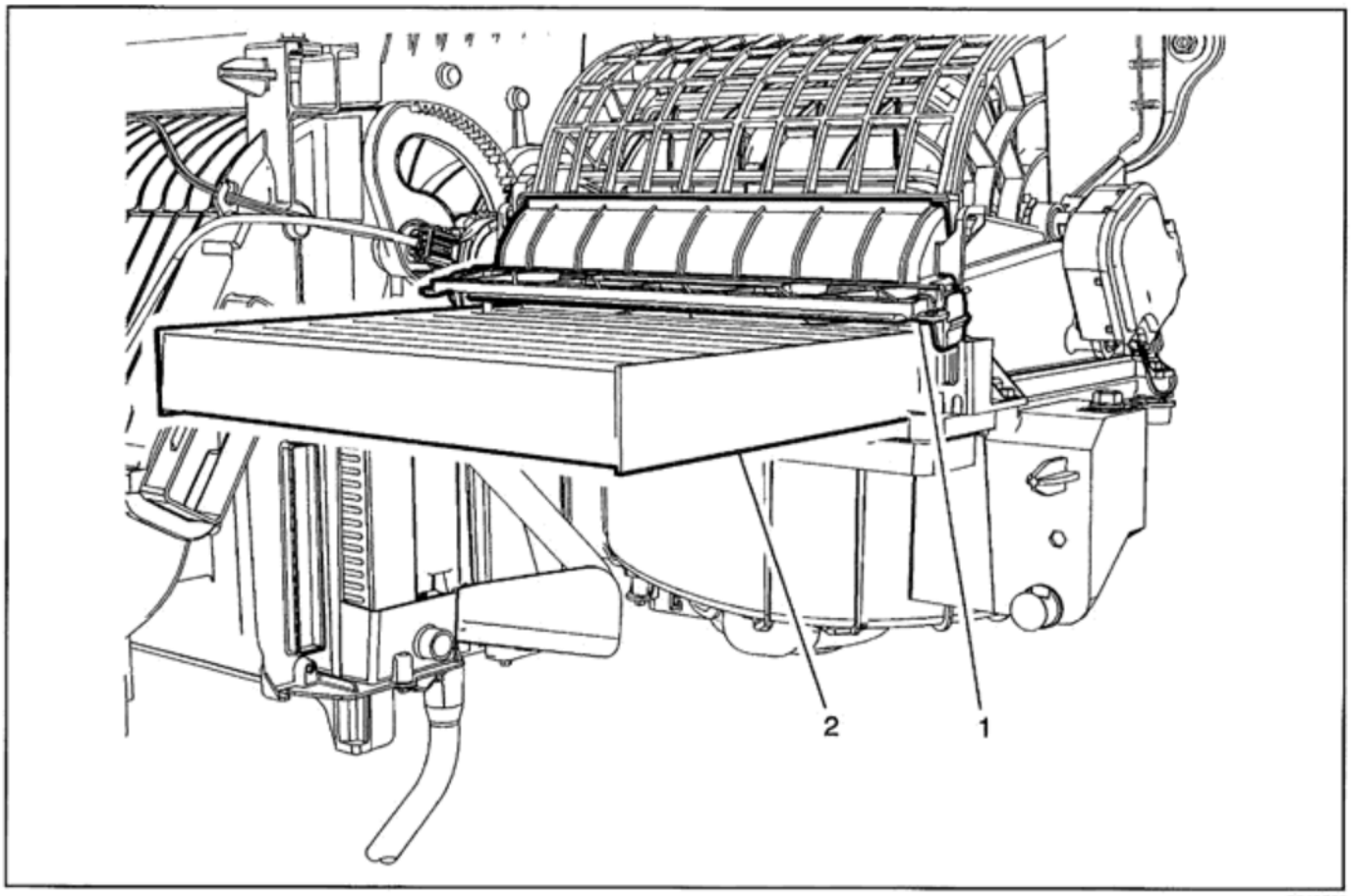


2678194

Heater Outlet Hose Connector Replacement

Callout	Component Name
Preliminary Procedures 1. Drain the engine coolant. Refer to *Cooling System Draining and Filling on page 9-628*. 2. Remove the heater outlet hose. Refer to *Heater Outlet Hose Replacement (LUV) on page 10-40* or *Heater Outlet Hose Replacement (LDE, LUW) on page 10-40*	
1	Heater Outlet Hose Connector Retaining Clip
2	Heater Outlet Hose Connector

Passenger Compartment Air Filter Replacement (LHD)

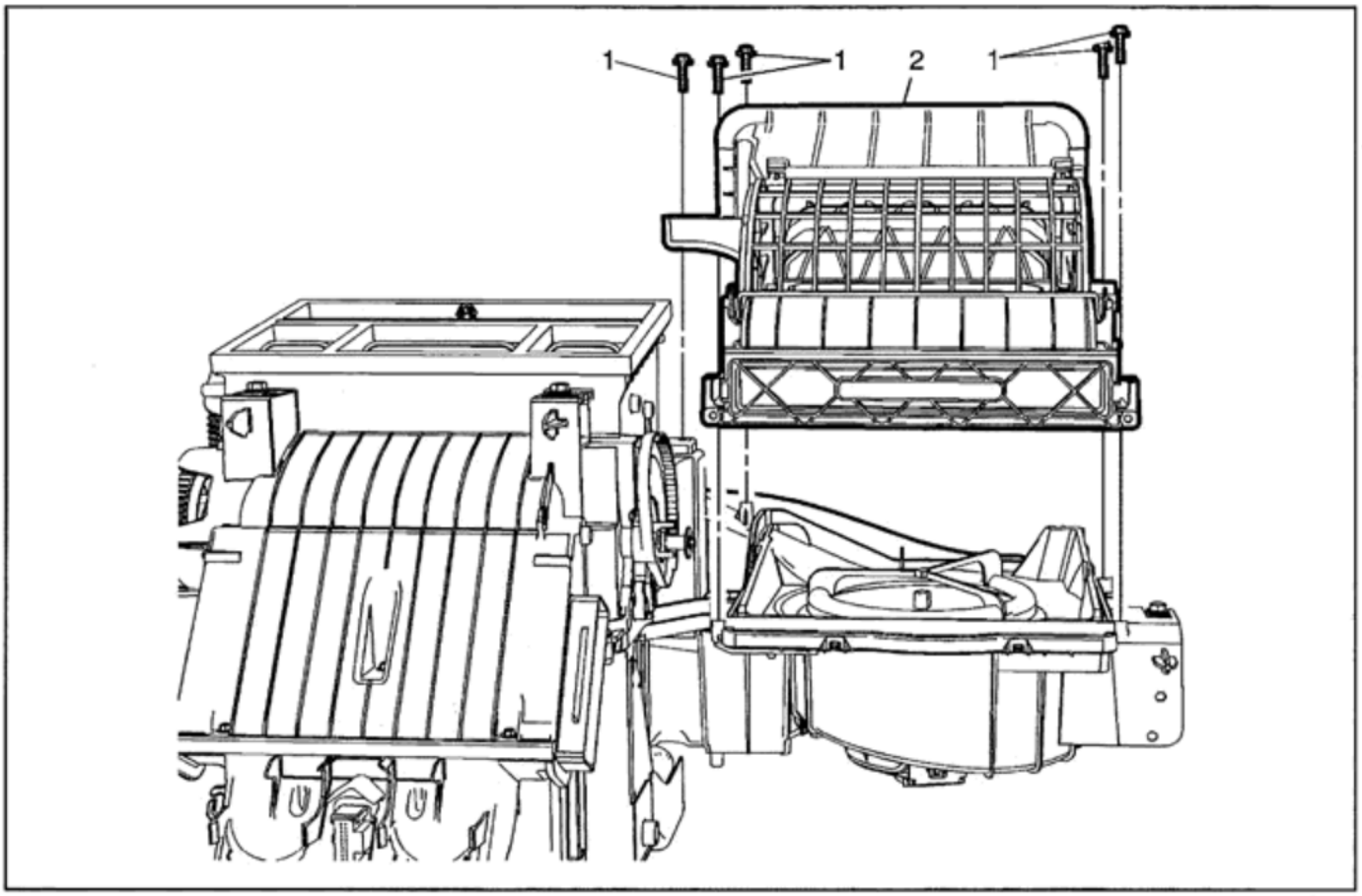


2543558

Passenger Compartment Air Filter Replacement (LHD)

Callout	Component Name
Preliminary Procedure Remove IP compartment. Refer to *Instrument Panel Lower Compartment Replacement on page 2-44*.	
1	Passenger Compartment Air Filter Service Lid Retainer **Procedure** Release the retainer and open the service lid.
2	Passenger Compartment Air Filter

Air Inlet Assembly Replacement

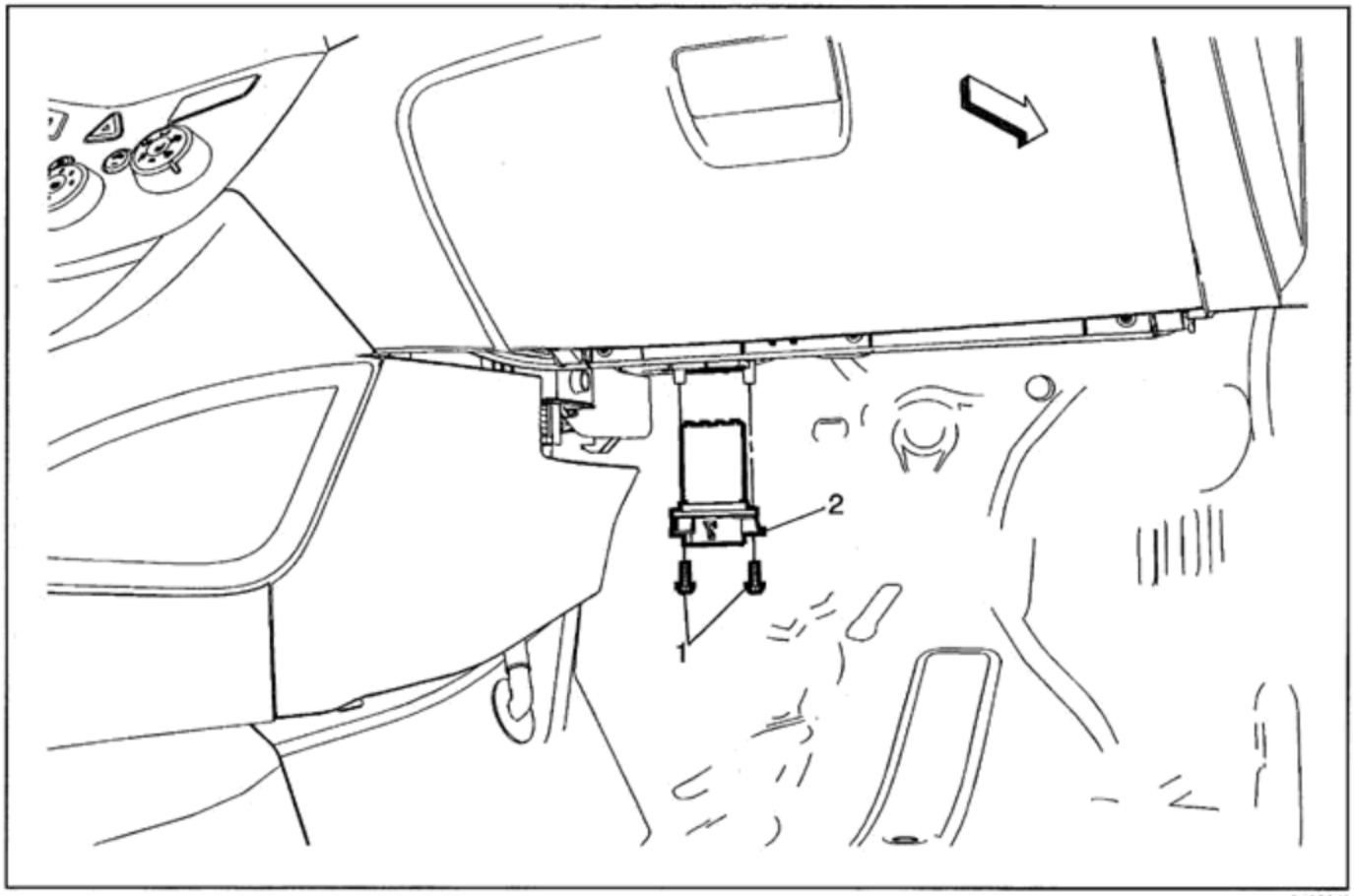


2492781

Air Inlet Assembly Replacement

Callout	Component Name
Preliminary Procedures 1. Remove the Heater and Air Conditioning Evaporator and Blower Module. Refer to *Heater and Air Conditioning Evaporator and Blower Module Removal and Installation on page 10-35.* 2. Disconnect the electrical connectors.	
1	Air Inlet Housing Fastener (Qty: 5) **Caution:** Refer to *Fastener Caution on page 0-8.*
2	Air Inlet Housing

Blower Motor Resistor Replacement

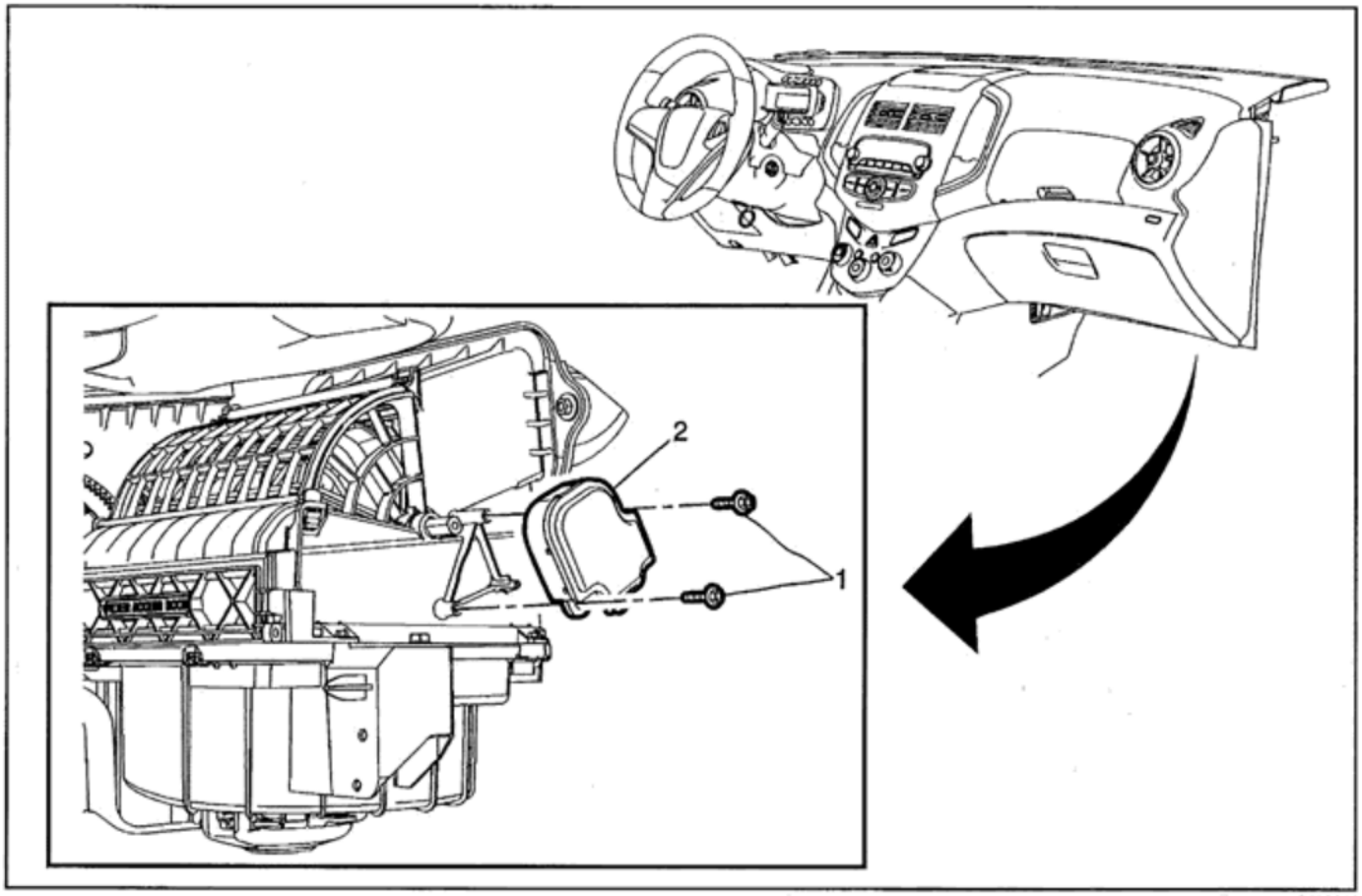


2492649

Blower Motor Resistor Replacement

Callout	Component Name
Preliminary Procedure Remove the instrument panel insulator, if equipped.	
1	Blower Motor Resistor Screw (Qty: 2) **Caution:** Refer to *Fastener Caution on page 0-8*.
2	Blower Motor Resistor **Procedure** Disconnect the wiring connector.

Air Inlet Valve Actuator Replacement (LHD)



2493810

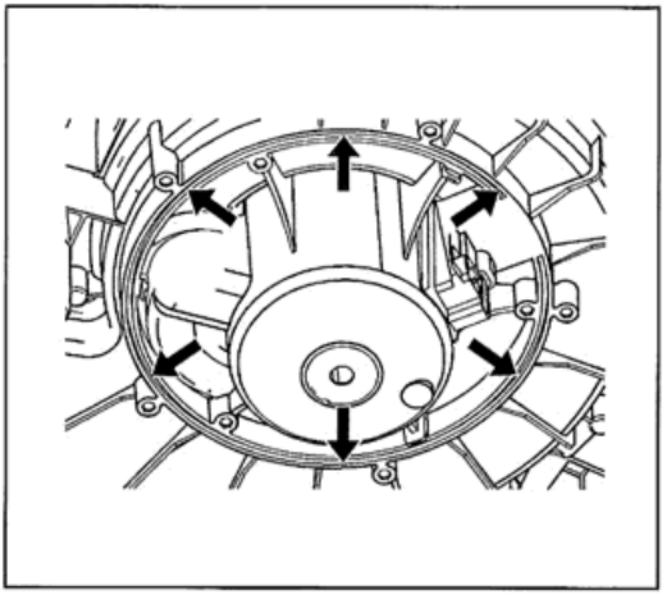
Air Inlet Valve Actuator Replacement (LHD)

Callout	Component Name
Preliminary Procedures 1. Remove the instrument panel compartment. Refer to *Instrument Panel Lower Compartment Replacement on page 2-44*. 2. Reposition any wiring or hoses to gain access to air inlet valve actuator.	
1	Air Inlet Valve Actuator Screw (Qty: 2) **Caution:** Refer to *Fastener Caution on page 0-8*.
2	Air Inlet Valve Actuator

Blower Motor Replacement

Removal Procedure — Production Blower Motor

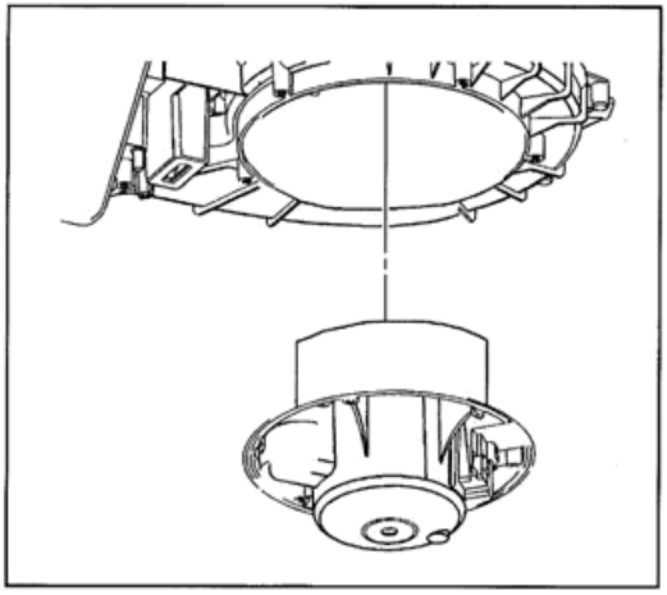
1. Remove the passenger side instrument panel insulator. Refer to *Instrument Panel Insulator Replacement on page 2-29*.
2. Remove the passenger side inflatable restraint instrument panel lower module. Refer to *Instrument Panel Lower Airbag Replacement - Passenger Side on page 13-123*.
3. Remove the right side floor heater duct. Refer to *Floor Air Outlet Duct Replacement - Right Side (LHD) on page 10-57*.
4. Remove the 3 blower motor cover screws, and remove the blower motor cover.
5. Disconnect the blower motor wire harness connector.



1203607

Note: The blower motor is molded into heater and air conditioning evaporator and blower lower module case during the manufacturing process, therefore heater and air conditioning evaporator and blower lower module case must be cut to remove blower motor assembly. Cut through the case as straight as possible because the blower motor cup must be reused. In order to prevent damage to the component, do not cut any deeper than necessary to remove the blower motor cup.

6. Cut out the blower motor assembly using a utility knife, following the narrow groove around the blower motor assembly in the lower case.

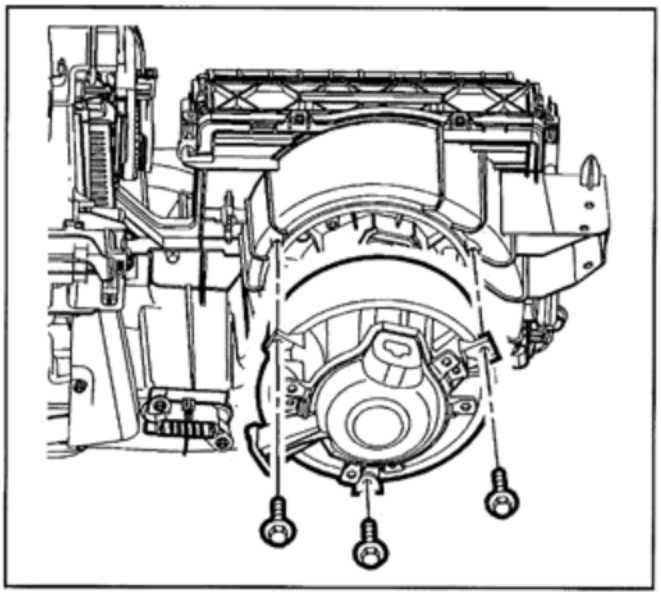


1203608

7. Remove the blower motor assembly.

Removal Procedure - Service Blower Motor

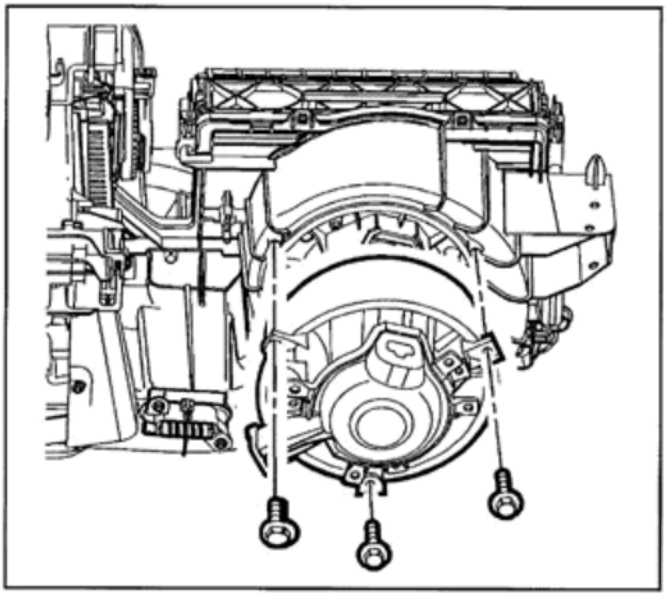
1. Remove the passenger side instrument panel insulator. Refer to *Instrument Panel Insulator Replacement on page 2-29*.
2. Remove the passenger side inflatable restraint instrument panel lower module. Refer to *Instrument Panel Lower Airbag Replacement - Passenger Side on page 13-123*.
3. Remove the right side floor heater duct. Refer to *Floor Air Outlet Duct Replacement - Right Side (LHD) on page 10-57*.
4. Remove the blower motor cover (if required).
5. Disconnect the blower motor wire harness connector.



2538622

6. Remove the 3 outer most screws from blower motor service ring, or blower integrated ring.
7. Remove the blower motor assembly.

Installation Procedure



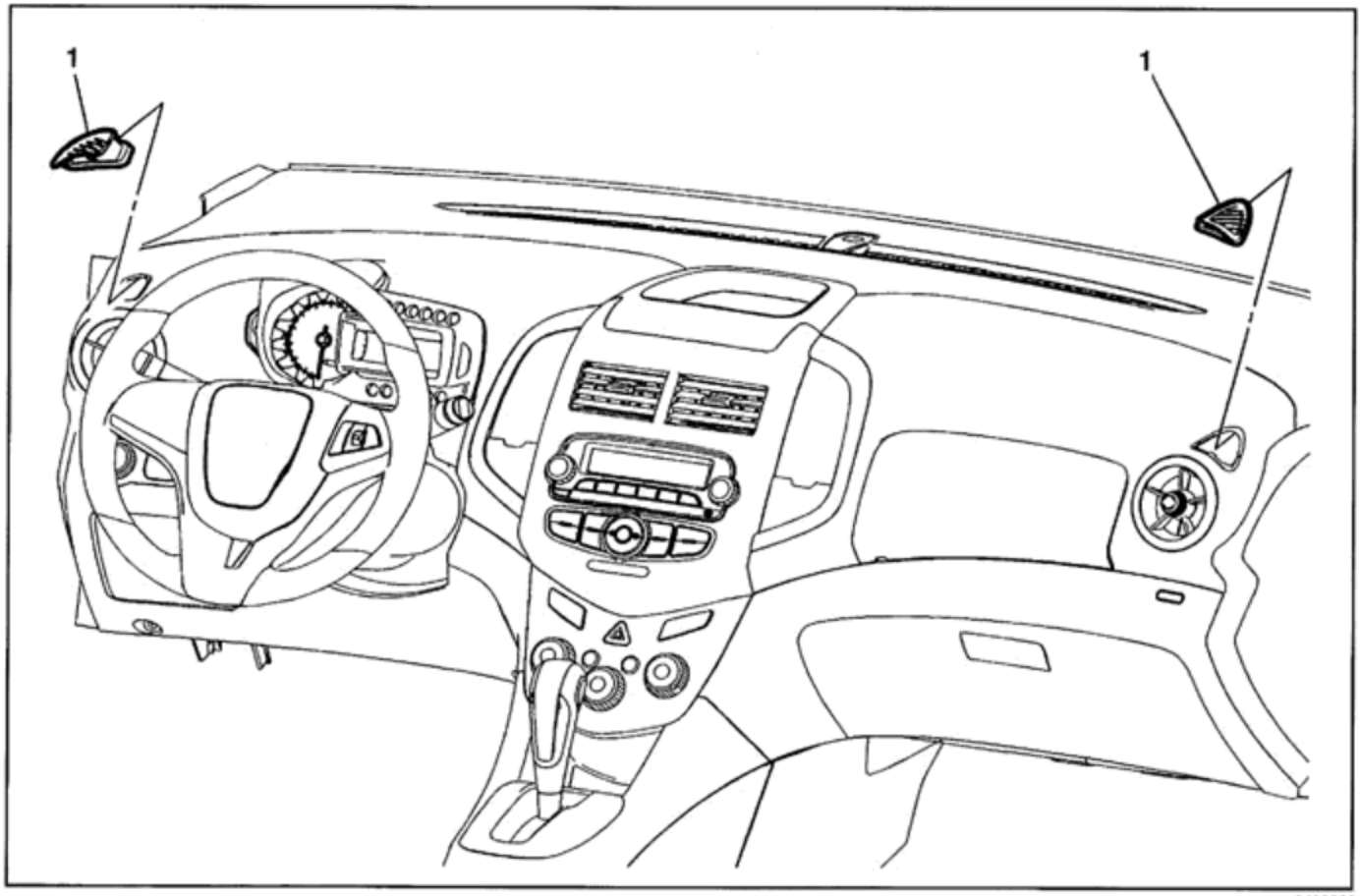
2538822

1. Clean and smooth the rough edges, and remove any burs of plastic from heater and air conditioning evaporator and blower lower module case, where the original blower motor assembly was cut out of the heater and air conditioning evaporator and blower lower module case.

Caution: Refer to *Fastener Caution on page 0-8.*

2. Attach the blower motor service ring to the blower motor assembly using the service screws.
3. When using the original blower motor assembly that has been cut out of the lower case, install the blower motor assembly with the service ring assembly to the heater and air conditioning evaporator and blower module lower case, with the additional service screws, and tighten the screws.
4. When using the service blower motor kit, install the service blower motor assembly to the heater and air conditioning evaporator and blower lower module case, with additional service screws, and tighten the screws.
5. Install the blower motor cover.
6. Connect the blower motor wire harness connector.
7. Install the right side floor heater duct. Refer to *Floor Air Outlet Duct Replacement - Right Side (LHD) on page 10-57.*
8. Install the passenger side inflatable restraint instrument panel lower module. Refer to *Instrument Panel Lower Airbag Replacement - Passenger Side on page 13-123.*
9. Install the passenger side instrument panel insulator. Refer to *Instrument Panel Insulator Replacement on page 2-29.*

Side Window Defogger Outlet Grille Replacement

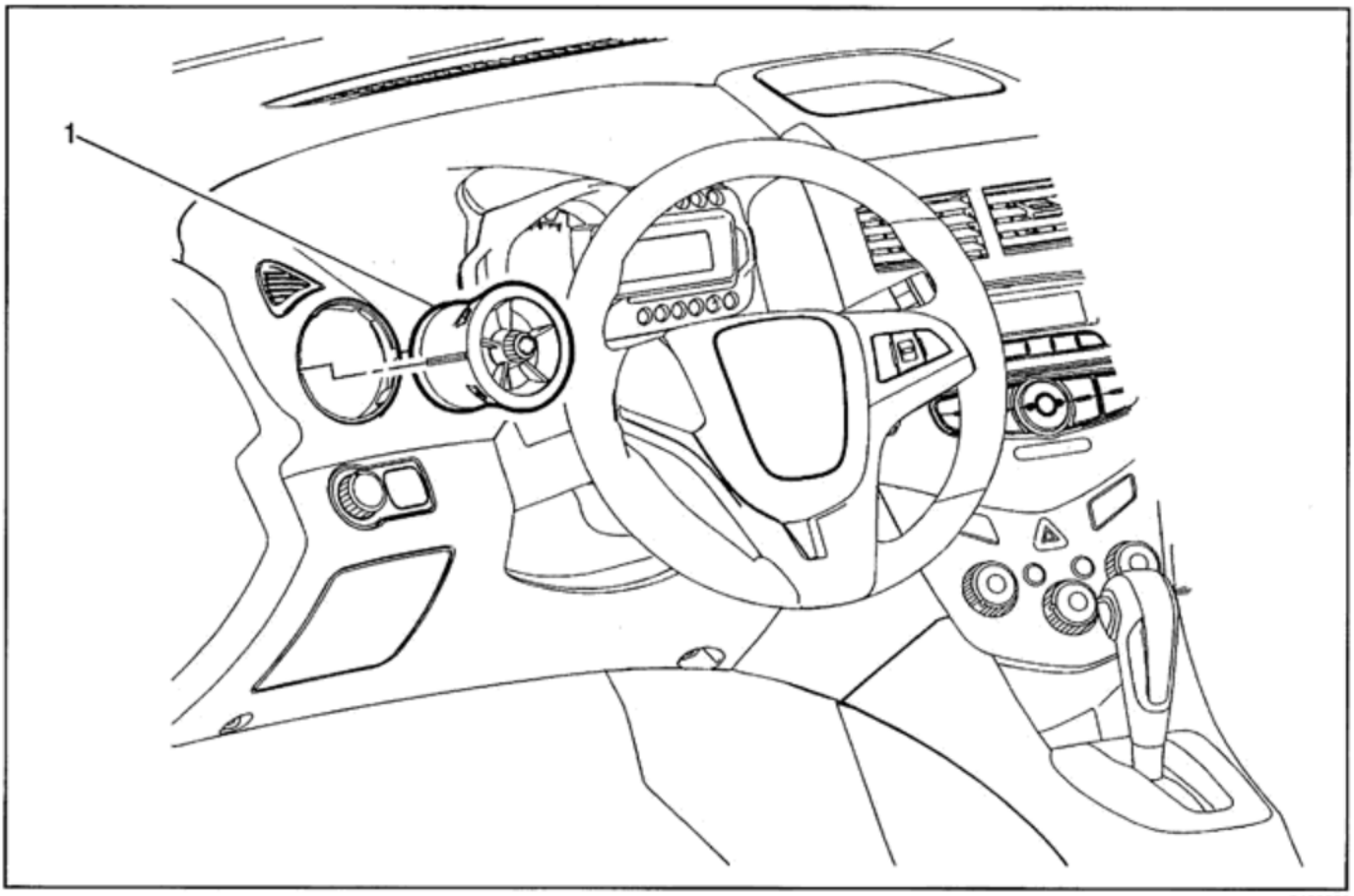


2498222

Side Window Defogger Outlet Grille Replacement

Callout	Component Name
1	Side Window Defroster Outlet Grille (Qty: 2) **Procedure** Use a flat bladed plastic trim tool to aid in the removal of the grille assemblies from the instrument panel.

Instrument Panel Outer Air Outlet Replacement - Left Side

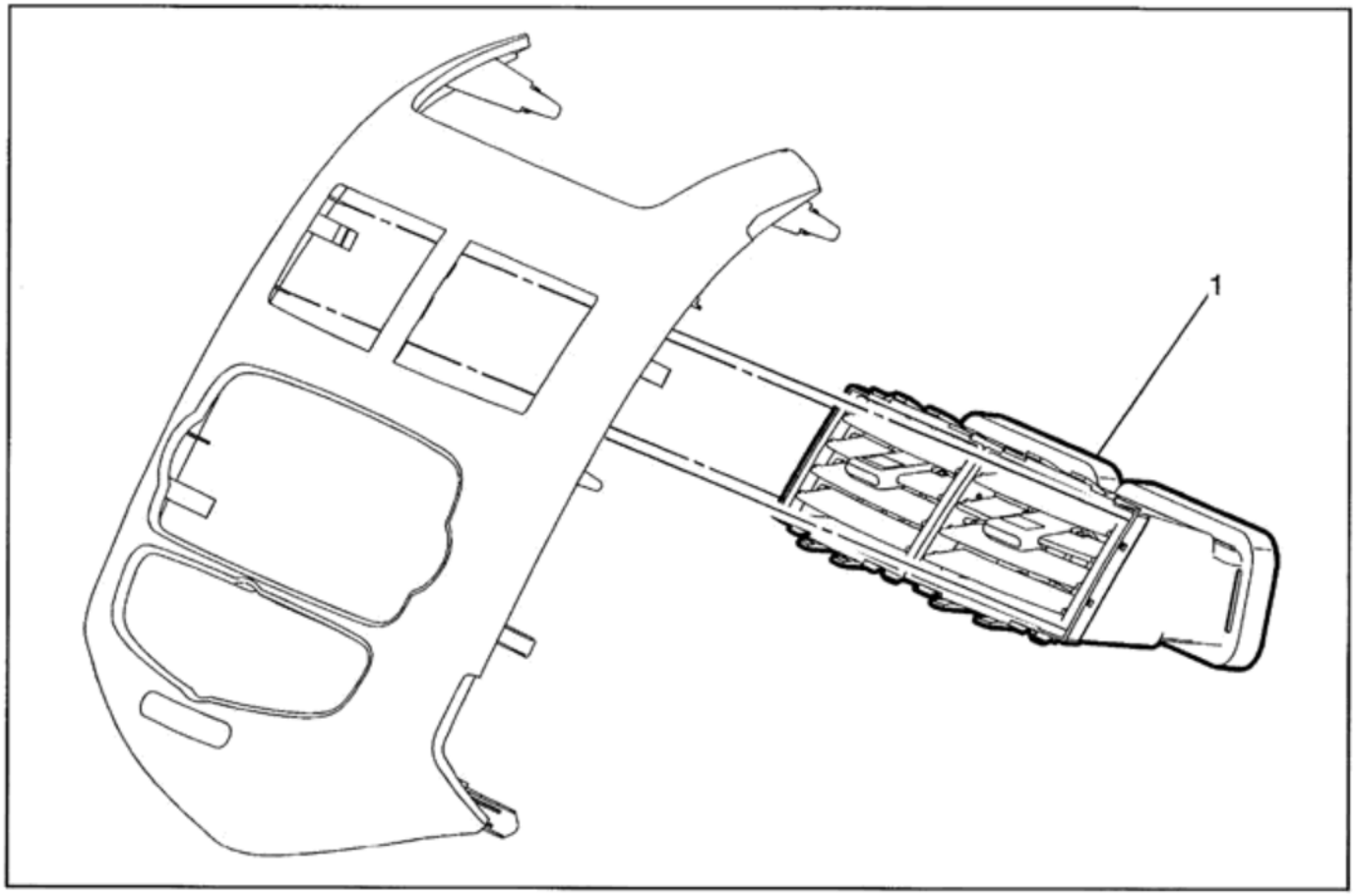


2498233

Instrument Panel Outer Air Outlet Replacement - Left Side

Callout	Component Name
1	Instrument Panel Outer Air Outlet Assembly **Procedure** Use a flat bladed plastic trim tool to aid in the removal of the air outlet assembly from the instrument panel.

Instrument Panel Center Air Outlet Replacement

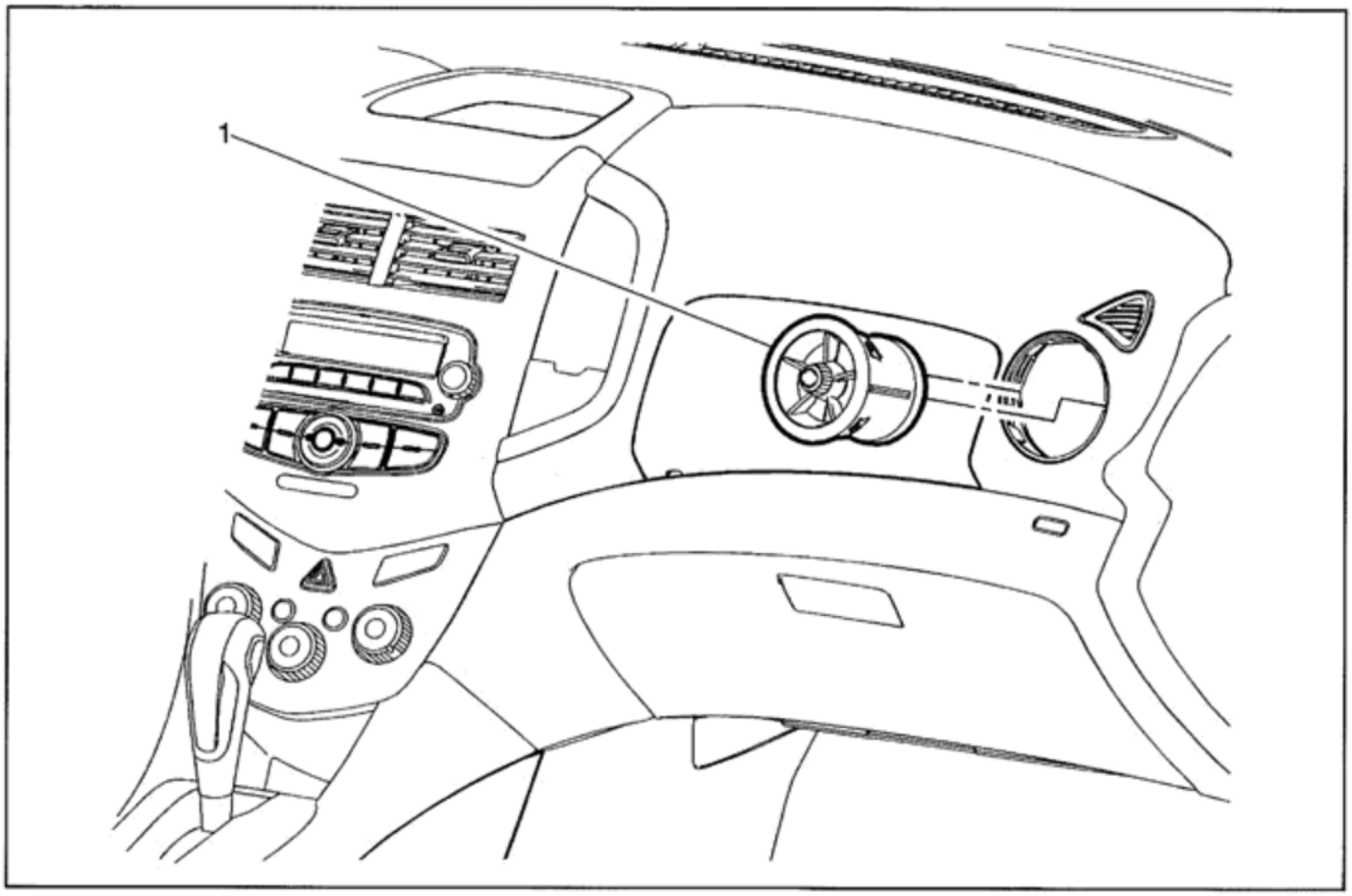


2498237

Instrument Panel Center Air Outlet Replacement

Callout	Component Name
Preliminary Procedure Remove the instrument panel center molding. Refer to *Instrument Panel Center Molding Replacement (With U58) on page 2-47* or *Instrument Panel Center Molding Replacement (Without U58) on page 2-48*.	
1	Instrument Panel Center Air Outlet Assembly **Procedure** Unsnap the instrument panel center air outlet from the center molding assembly.

Instrument Panel Outer Air Outlet Replacement - Right Side

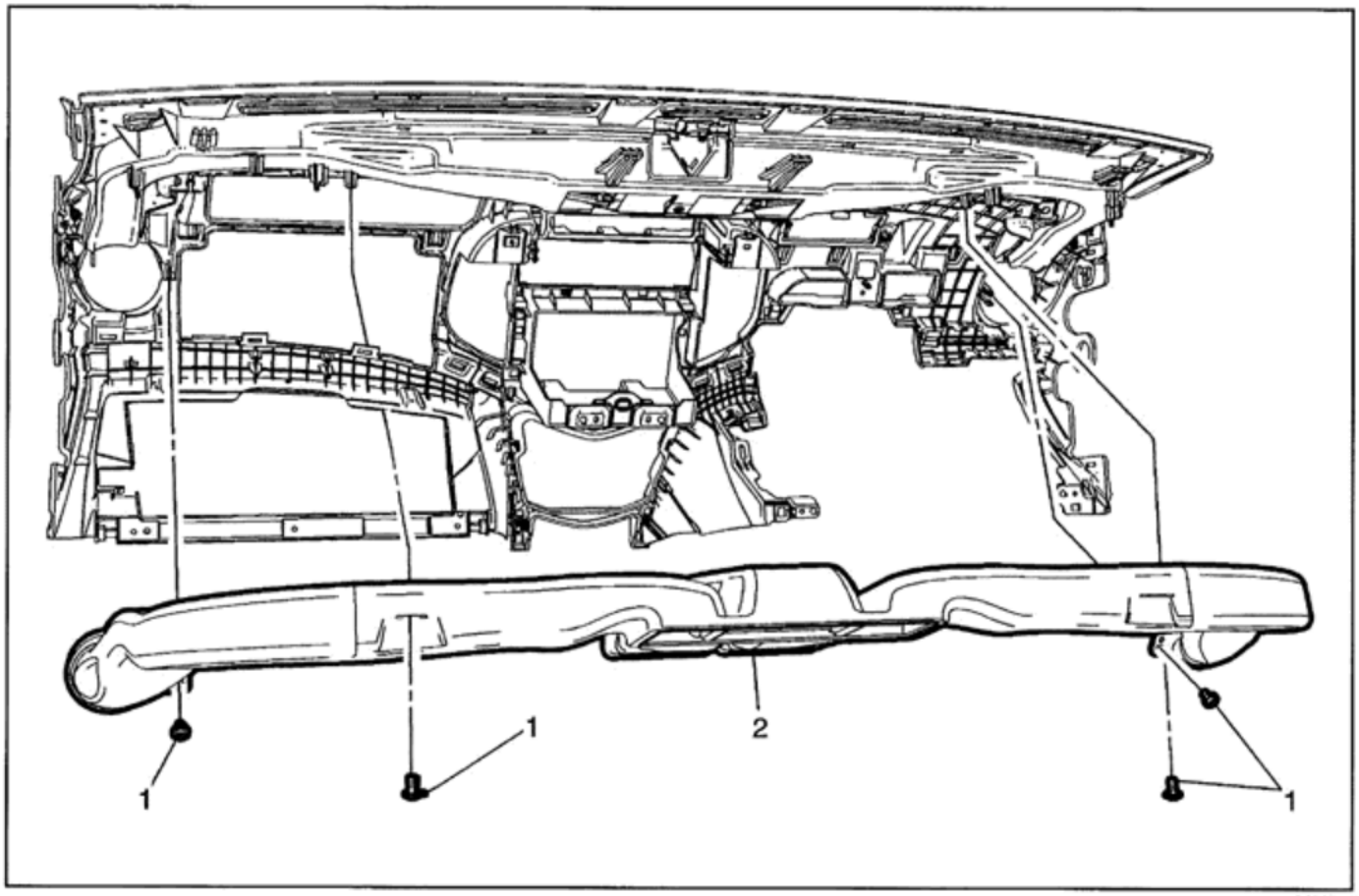


2498230

Instrument Panel Outer Air Outlet Replacement - Right Side

Callout	Component Name
1	Instrument Panel Outer Air Outlet Assembly **Procedure** Use a flat bladed plastic trim tool to aid in the removal of the air outlet assembly from the instrument panel.

Instrument Panel Outer Air Outlet Duct Replacement

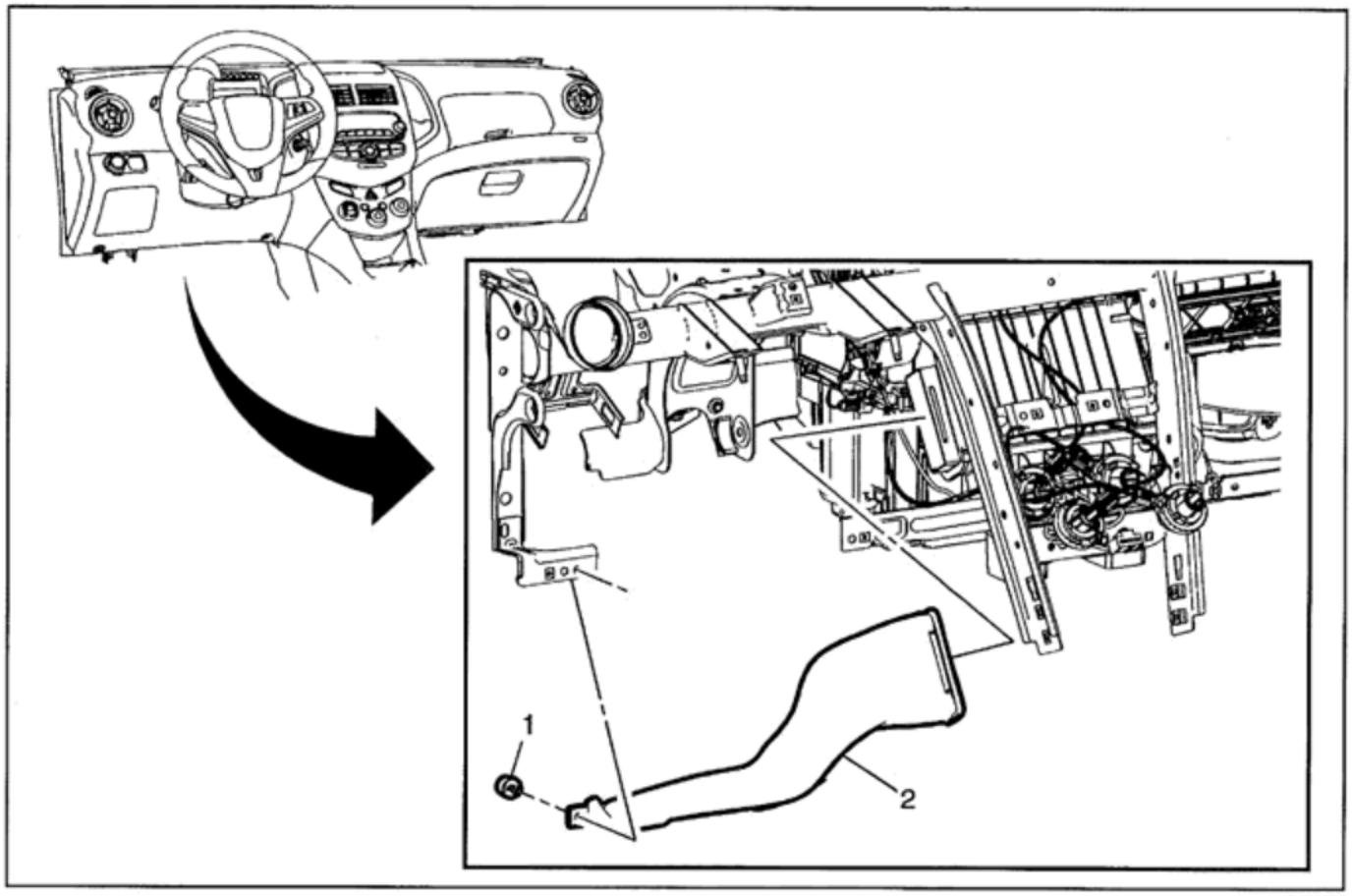


2493375

Instrument Panel Outer Air Outlet Duct Replacement

Callout	Component Name
Preliminary Procedures 1. Remove the instrument panel assembly. Refer to *Instrument Panel Assembly Replacement on page 2-49*. 2. Reposition any wiring or hoses to gain access to air duct.	
1	Center Air Distributor Duct Screw (Qty: 4) **Caution:** Refer to *Fastener Caution on page 0-8*.
2	Center Air Distributor Duct

Floor Air Outlet Duct Replacement - Left Side (LHD)

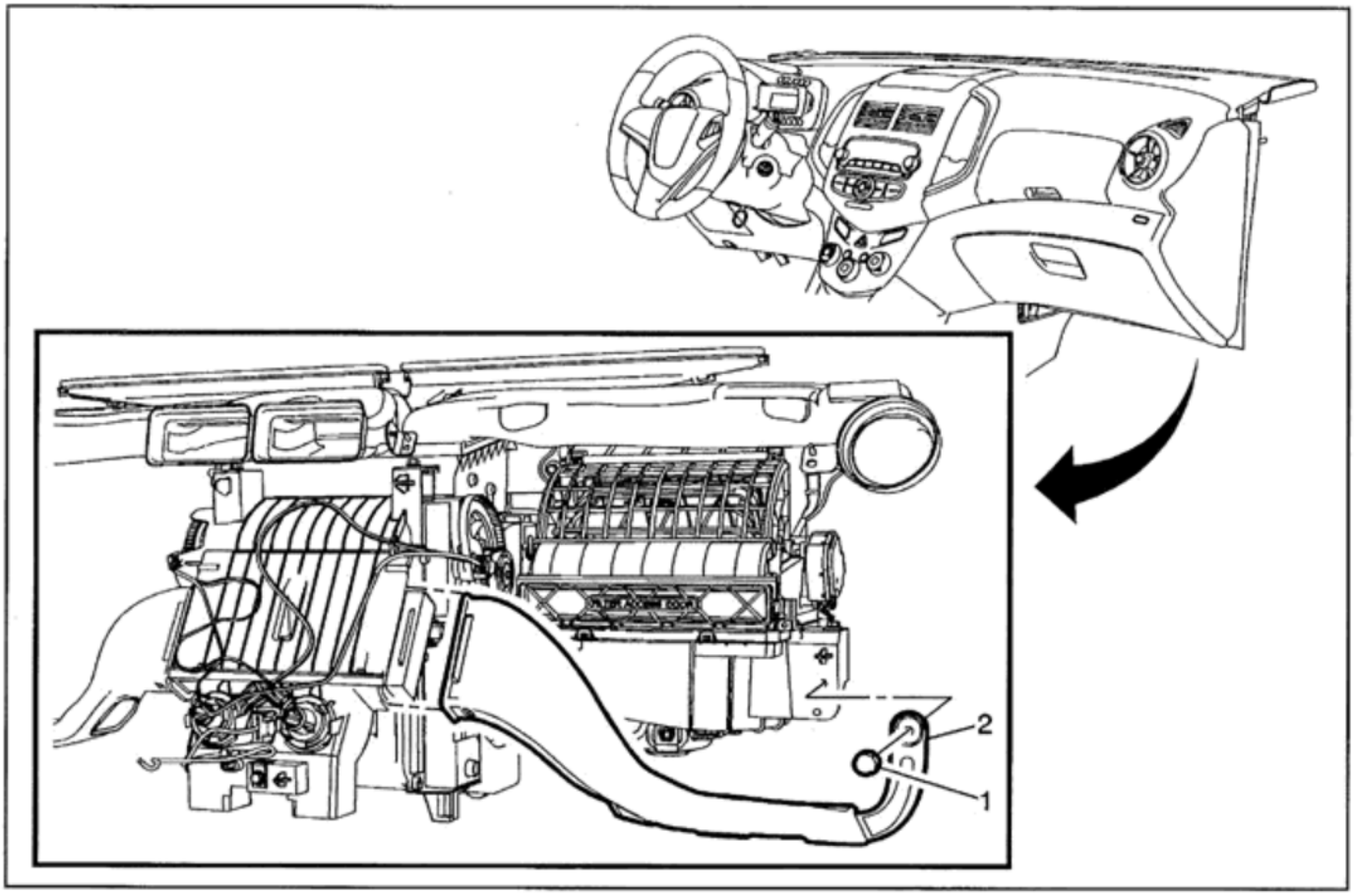


2493812

Floor Air Outlet Duct Replacement - Left Side (LHD)

Callout	Component Name
Preliminary Procedure 1. Remove the instrument panel insulator, if equipped. 2. Remove the instrument panel lower trim pad cover. Refer to *Instrument Panel Lower Trim Pad Cover Replacement (Without AAL) on page 2-40* or *Instrument Panel Lower Trim Pad Cover Replacement (With AAL) on page 2-41*.	
1	Floor Air Outlet Duct Fastener
2	Floor Air Outlet Duct

Floor Air Outlet Duct Replacement - Right Side (LHD)

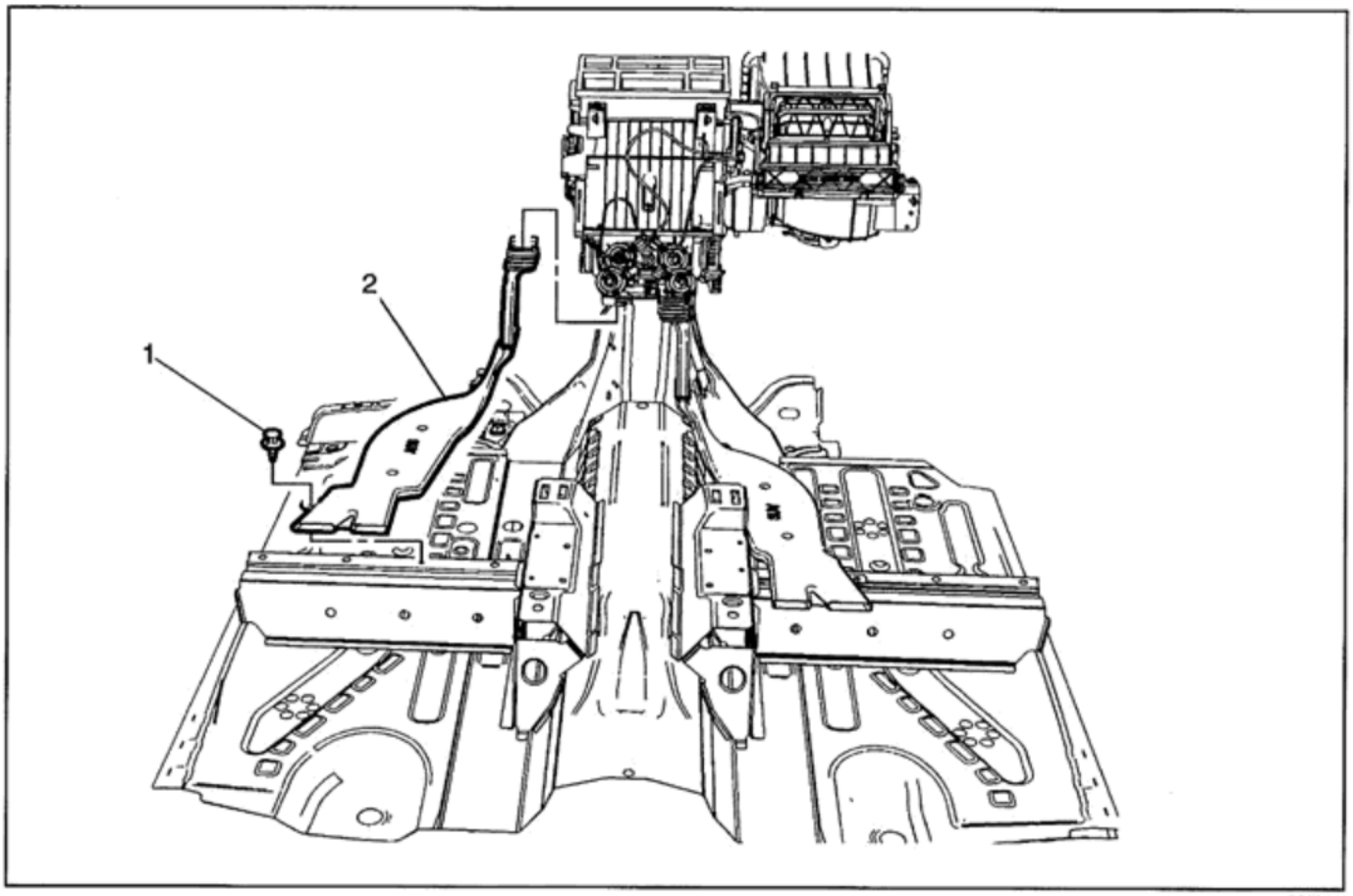


2493815

Floor Air Outlet Duct Replacement - Right Side (LHD)

Callout	Component Name
Preliminary Procedure Remove the instrument panel insulator, if equipped.	
1	Floor Air Outlet Duct Fastener
2	Floor Air Outlet Duct

Floor Rear Air Outlet Duct Replacement - Left Side

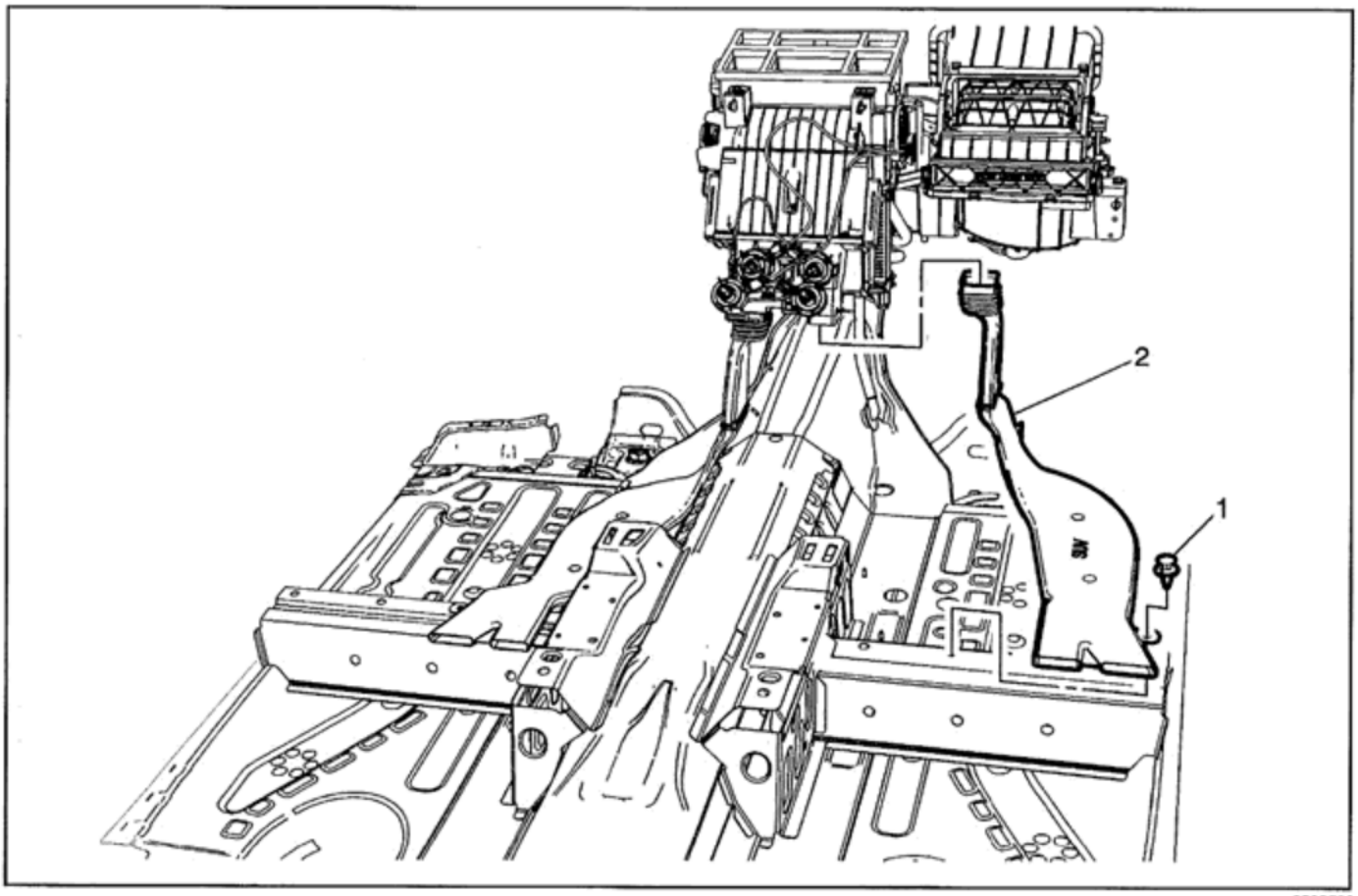


2503511

Floor Rear Air Outlet Duct Replacement - Left Side

Callout	Component Name
Preliminary Procedure Remove the floor panel carpet . Refer to *Floor Panel Carpet Replacement on page 2-19*.	
1	Floor Rear Air Outlet Duct Push-In Fastener
2	Floor Rear Air Outlet Duct

Floor Rear Air Outlet Duct Replacement - Right Side

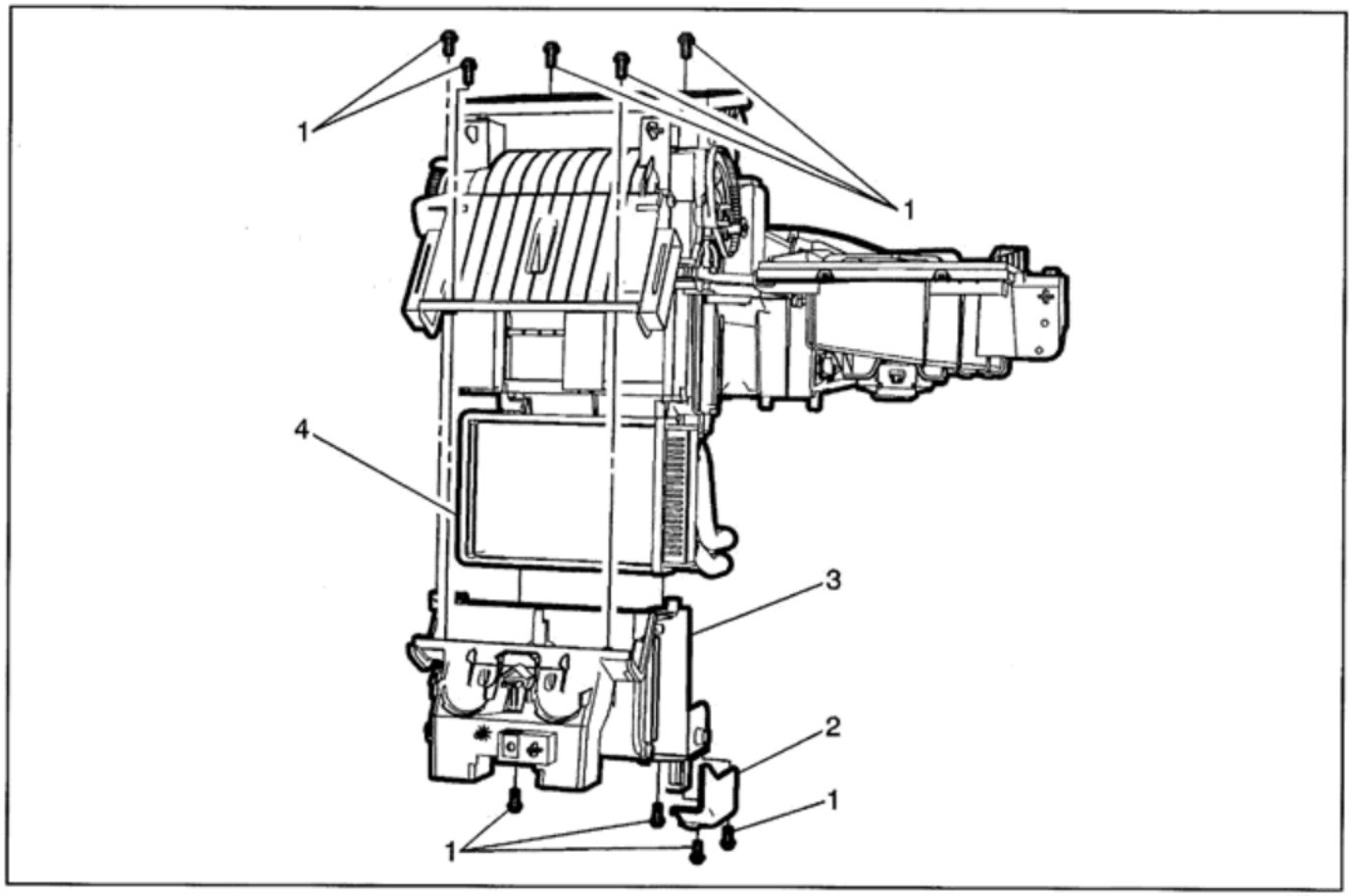


2503506

Floor Rear Air Outlet Duct Replacement - Right Side

Callout	Component Name
Preliminary Procedure Remove the front floor carpet. Refer to *Floor Panel Carpet Replacement on page 2-19*.	
1	Floor Rear Air Outlet Duct Fastener
2	Floor Rear Air Outlet Duct **Procedure** Transfer all necessary components.

Heater Core Replacement



2493454

Heater Core Replacement

Callout	Component Name
Preliminary Procedures 1. Remove the Heater and Air Conditioning Evaporator and Blower Module. Refer to *Heater and Air Conditioning Evaporator and Blower Module Removal and Installation on page 10-35*. 2. Disconnect the electrical connectors as necessary.	
1	Lower Heater Case Fasteners (Qty: 9) **Caution:** Refer to *Fastener Caution on page 0-8*.
2	Heater Tube Cover
3	Lower Heater Core Case
4	Heater Core **Procedure** Pull out the heater core.

Description and Operation

Heating and Air Conditioning System Description and Operation

Engine Coolant

Engine coolant is the key element of the heating system. The engine thermostat controls the normal engine operating coolant temperature. Coolant pumped out of the engine enters the heater core through the inlet heater hose. The air flowing through the HVAC module absorbs the heat of the coolant flowing through the heater core. The coolant then exits the heater core through the heater outlet hose and returns back to the engine block.

A/C 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 a very low temperature gas that can transfer the undesirable heat from the passenger compartment to the outside air.

A Delphi model CSP-17 compressor is used on this model year vehicle. The A/C compressor is belt driven and operates when the magnetic clutch is engaged. The compressor builds pressure in the A/C system. 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 A/C system. The A/C system is mechanically protected with the use of a high pressure relief valve. If the high pressure A/C 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 tubing 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 TXV.

The TXV is located at the evaporator inlet. The TXV is the dividing point for the high and the low pressure sides of the A/C system. As the refrigerant passes through the TXV, the refrigerant is lowered. Due to the pressure differential on the liquid refrigerant, the refrigerant will begin to boil at the TXV. The TXV also meters the amount of liquid refrigerant that can flow into the evaporator.

Refrigerant exiting the TXV 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 to boil inside the evaporator core. The boiling refrigerant absorbs heat from the ambient air and draws moisture onto the evaporator. The refrigerant exits the evaporator through the suction line and back to the compressor, in a vapor state. This completes the A/C 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 moisture removed from the passenger compartment will also change form, or condense, and is discharged from the HVAC module as water.

Special Tools and Equipment

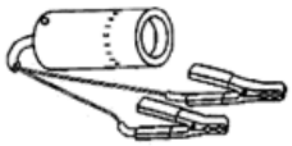
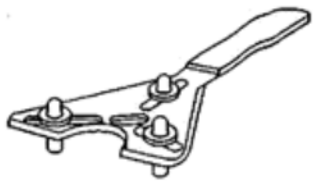
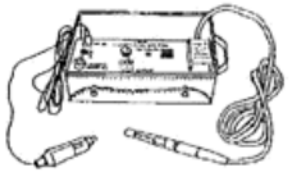
Illustration	Tool Number/ Description
 14013	BO-38185 J-38185 Hose Clamp Pliers
 677808	BO-42220 J-42220 Universal 12V Leak Detection Lamp
 227469	CH-37872 GE-30206952 3-0206952 J-37872 DT-48280 Clutch Plate Holder
 82132	GE-39400 J-39400 GE-50078 Electric Halogen Leak Detector

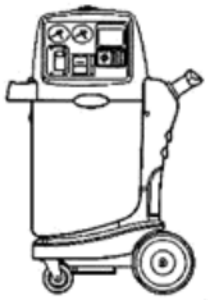
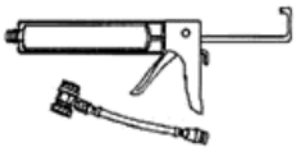
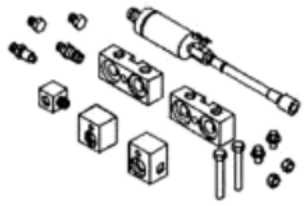
Illustration	Tool Number/ Description
 728982	GE-39400-A J-39400-A GE-50078 Halogen Leak Detector
 258343	GE-41447 J-41447 R-134A A/C Tracer Dye - Box of 24
 660165	GE-43600 GE-48800 J-43600 ACR 2000 Air Conditioning Service Center
 748416	GE-43872 J-43872 Florescent Dye Cleaner
 817931	GE-45037 J-45037 A/C Oil Injector

Illustration	Tool Number/ Description
 767049	GE-45268 J-45268 A/C Flushing Adapter Kit
 900408	GE-46246 J-46246 Valve Core Tool
 1389566	GE-46297 J-46297 A/C Dye Injector Kit
 1389563	GE-46297-12 J-46297-12 Replacement Dye Cartridges