

2013 Chevrolet Cruze

2013 HVAC Heating, Ventilation, and Air Conditioning - Cruze

2013 HVAC

Heating, Ventilation, and Air Conditioning - Cruze

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Air Conditioning Compressor Bolt	22 N.m	16 lb ft
Air Conditioning Compressor Oil Drain Plug	15 N.m	11 lb ft
Air Conditioning Control Module Bolt	2.5 N.m	22 lb in
Air Conditioning Evaporator Case Bolt	2.5 N.m	22 lb in
Air Conditioning Evaporator Hose Assembly Nut to Air Conditioning Condenser	19 N.m	14 lb ft
Air Conditioning Evaporator Hose Assembly Nut to Air Conditioning Compressor and Condenser Hose	19 N.m	14 lb ft
Air Conditioning Evaporator Hose Assembly Nut to Air Conditioning Evaporator Thermal Expansion Valve	19 N.m	14 lb ft
Air Conditioning Evaporator Thermal Expansion Valve Bolt	15 N.m	11 lb ft
Air Conditioning Refrigerant Pressure Sensor	6 N.m	53 lb in
Air Inlet Housing Bolt	2.5 N.m	22 lb in
Air Outlet Duct Bolt	2.5 N.m	22 lb in
Blower Motor Bolt	4.5 N.m	40 lb in
Blower Motor Cup Bolt	2.5 N.m	22 lb in
Bracket Heater Core Outlet Tube Bolt	2.5 N.m	22 lb in
Condenser Hose And Condenser Hose Bolt	19 N.m	14 lb ft
Floor Air Outlet Duct Bolt	2.5 N.m	22 lb in
Heater and Air Conditioning Evaporator Case Bolt	2.5 N.m	22 lb in
Heater and Blower and Air Conditioning Control Module Bolt	2.5 N.m	22 lb in
Instrument Panel Bracket Bolt	9 N.m	80 lb in
Instrument Panel Tie Bar Bolt	22 N.m	16 lb ft
Instrument Panel Tie Bar Nuts	9 N.m	80 lb in
Mode Control Cam Actuator Screws	2.5 N.m	22 lb in
Refrigerant Pressure Sensor	6 N.m	53 lb in
Service Valve Core	3 N.m	27 lb in
TXV Block Fitting Nut	19 N.m	14 lb ft
TXV Mounting Bolts	19 N.m	11 lb ft

2013 Chevrolet Cruze

2013 HVAC Heating, Ventilation, and Air Conditioning - Cruze

COMPRESSOR SUCTION SCREEN AND TOOL SELECTION SPECIFICATIONS

Compressor Suction Screen and Tool Selection Specifications

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

REFRIGERANT SYSTEM SPECIFICATIONS

Refrigerant System Specifications

Application	Specification	
	Metric	English
PAG Oil GM P/N 12378526 for United States PAG Oil GM P/N 88900060 for Canada		
Total System Refrigerant R134-a	0.6 kg	1.4 lb
Total System PAG Oil	125 ml	4.23 oz
Compressor Oil, see <u>Air Conditioning Compressor Oil Balancing</u>		
Condenser	30 ml	1.0 oz
Evaporator	30 ml	1.0 oz
Desiccant Cartridge	15 ml	0.5 oz
Abrupt Refrigerant Loss	60 ml	2.0 oz
Abrupt refrigerant loss due to large leak, hose rupture, collision, or pressure relief valve opening. Conditions that allow the refrigerant to seep or bleed off over time do not cause this oil loss. Upon replacement of a component that caused a large refrigerant loss, also add the required amount of oil for the particular component.		

DIAGNOSTIC INFORMATION AND PROCEDURES

LEAK TESTING

Refrigerant Leak Testing

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

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

Verifying some passive leaks may require using a halogen leak detector, even though the A/C system contains

fluorescent dye.

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

Fluorescent Leak Detector

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

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 detection lamp.
 - To prevent false diagnosis in the future, thoroughly clean the residual dye from any area where leaks were found. Use a rag and an approved fluorescent dye cleaner.

Fluorescent Dye Injection

NOTE: Use only fluorescent dye approved by General Motors.

- 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.

NOTE: Do NOT overcharge the A/C system with dye.

- 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 an approved fluorescent 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**.

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

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

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 halogen leak tester.

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

2013 Chevrolet Cruze

2013 HVAC Heating, Ventilation, and Air Conditioning - Cruze

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	- Park the vehicle inside or in the shade. - Open the windows in order to ventilate the interior of the vehicle. - If the A/C system was operating, allow the A/C system to equalize for about 2 minutes. - Turn OFF the ignition. - Install the J-43600 ACR 2000 Air Conditioning Service Center or GE-48800 CoolTech A/C Recharge Machine. - Record the ambient air temperature and humidity. - 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
	NOTE: Record the relative humidity and the ambient air temperature at the time of the test. - Close the vehicle doors and windows. - Open the drivers door window 12.7-15.2 cm (5-6 in). - 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.			

2013 Chevrolet Cruze

2013 HVAC Heating, Ventilation, and Air Conditioning - Cruze

2	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
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 <u>A/C Diagnostics Chart</u>. Is the action complete?	-	Go to Step 5	-

2013 Chevrolet Cruze

2013 HVAC Heating, Ventilation, and Air Conditioning - Cruze

5	Operate the system in order to verify the test results. Did you find the same results?	-	System OK	Go to Symptoms - HVAC Systems - Automatic
---	---	---	-----------	--

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%	151-213 kPa (22-31 psi)	840-1026 kPa (122-149 psi)	7°C (43°F)
19-24°C (66-75°F)	Less than 40%	151-241 kPa (22-35 psi)	1123-1378 kPa (163-200)	9°C (48)
	Greater than 40%	158-268 kPa (23-39 psi)	1047-1336 kPa (152-194 psi)	12°C (52°F)
25-29°C (76-85°F)	Less than 35%	186-275 kPa (27-40 psi)	1322-1591 kPa (192-231 psi)	13°C (55°F)
	35-50%	199-289 kPa (29-42 psi)	1302-1591 kPa (189-231 psi)	13°C (55°F)
	Greater than 50%	206-310 kPa (30-45 psi)	1288-1598 kPa (187-232 psi)	15°C (59°F)
30-35°C (86-95°F)	Less than 30%	220-316 kPa (32-46 psi)	1502-1818 kPa (218-264 psi)	15°C (59°F)
	30-50%	227-330 kPa (33-48 psi)	1502-1853 kPa (218-269 psi)	18°C (63°F)
	Greater than 50%	248-358 kPa (36-52 psi)	1508-1901 kPa (219-276 psi)	19°C (66°F)
36-41°C (96-105°F)	Less than 20%	254-351 kPa (37-51 psi)	1708-2018 kPa (248-293 psi)	18°C (64°F)
	20-40%	261-365 kPa (38-53 psi)	1722-2087 kPa (250-303 psi)	20°C (68°F)
	Greater than 40%	282-385 kPa (41-56 psi)	1756-2149 kPa (255-312 psi)	23°C (72°F)
42-46°C (106-115°F)	Less than 20%	296-385 kPa (43-56 psi)	1908-2211 kPa (277-321 psi)	20°C (68°F)
	Greater than 20%	310-406 kPa (45-59 psi)	1942-2287 kPa (282-332 psi)	23°C (73°F)
47-49°C (116-120°F)	Below 30%	344-434 kPa (50-63 psi)	2129-2452 kPa (309-356 psi)	25°C (77°F)

A/C DIAGNOSTICS CHART

A/C Diagnostics Chart

Low Side Gauge Reading	High Side Gauge Reading	Potential Causes
		Low Refrigerant Charge

2013 Chevrolet Cruze

2013 HVAC Heating, Ventilation, and Air Conditioning - Cruze

Low	Low	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
Normal/High	Normal/High	Air in A/C System
		Refrigerant Contamination PAG or POE Oil Overcharge

HEATING PERFORMANCE DIAGNOSTIC

Heating Performance Diagnostic

Step	Action	Yes	No
DEFINITION: Heating system performance.			
1	Were you sent here from Symptoms or another diagnostic table?	Go to Step 2	Go to Symptoms - HVAC Systems - Manual or Go to Symptoms - HVAC Systems - Automatic
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	WARNING: Refer to <u>Moving Parts and Hot Surfaces Warning</u> . 1. Allow the engine to idle. 2. Select the FLOOR mode. 3. Select the minimum blower speed.		

2013 Chevrolet Cruze

2013 HVAC Heating, Ventilation, and Air Conditioning - Cruze

	- Select the warmest temperature setting. - Feel the temperature of the inlet and outlet heater hoses at the heater core. Does the inlet heater hose feel warmer than the outlet heater hose?	Go to Step 7	Go to Step 4
4	- Install a thermometer into the center I/P PANEL air outlet. - Secure a thermometer to the heater core outlet hose. - Select the PANEL mode. - Select the maximum blower speed. - Select the warmest temperature setting. - Record the temperature at the following locations: - The center I/P PANEL air outlet - The heater core outlet hose - Compare the recorded temperatures. Are the 2 temperature readings about equal?	Go to Step 5	Go to Step 6
5	- Inspect and repair the following areas of the vehicle for air leaks: - Floor air outlet duct-Refer to <u>Floor Air Outlet Replacement</u>. - LH floor air outlet duct-Refer to <u>Floor Air Outlet Duct Replacement - Left Side</u>. - RH floor air outlet duct-Refer to <u>Floor Air Outlet Duct Replacement - Right Side</u>. - LH rear floor air outlet duct-Refer to <u>Floor Rear Air Outlet Duct Replacement - Left Side</u>. - RH rear floor air outlet duct-Refer to <u>Floor Rear Air Outlet Duct Replacement - Right Side</u>. - Perform the necessary repairs. Are the repairs complete?	Go to Step 10	-
6	- Inspect the temperature door operation. Refer to <u>Diagnostic System Check - Vehicle</u>. - Perform any necessary repairs.		

2013 Chevrolet Cruze

2013 HVAC Heating, Ventilation, and Air Conditioning - Cruze

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

DEFROSTING INSUFFICIENT (WITH Y8X)

Defrosting Insufficient (with Y8X)

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 <u>Symptoms - HVAC Systems - Manual</u> , or <u>Symptoms - HVAC Systems - Automatic</u>
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 10
3	Measure the engine operating temperature. Does engine reach a normal operating temperature?	Go to Step 4	Go to Step 8
	1. Select the minimum blower speed. 2. Select the maximum temperature		

2013 Chevrolet Cruze

2013 HVAC Heating, Ventilation, and Air Conditioning - Cruze

4	setting.		
	WARNING: Refer to <u>Moving Parts and Hot Surfaces Warning</u> .		
	3. Feel the temperature of the inlet and outlet hoses at the heater core.		
	Does the inlet hose feel warmer than the outlet hose?	Go to Step 11	Go to Step 5
5	Test the operation of the A/C compressor clutch. Does the A/C compressor clutch engage?	Go to Step 7	Go to Step 6
6	Repair the A/C compressor clutch. Refer to <u>Symptoms - HVAC Systems - Manual</u> . Is the repair complete?	Go to Step 14	-
7	Perform the A/C system performance test. Refer to <u>Air Conditioning (A/C) System Performance Test</u> . Is the A/C system operating within the specifications?	Go to Step 9	Go to Step 12
8	Repair the low engine temperature concern. Refer to <u>Engine Fails To Reach Normal Operating Temperature</u> . Is the repair complete?	Go to Step 14	-
9	Inspect for correct operation of the air inlet valve. Is the air inlet valve operating correctly?	Go to Step 14	Go to Step 13
10	Repair the air delivery concern. Refer to <u>Symptoms - HVAC Systems - Manual</u> . Is the repair complete?	Go to Step 14	-
11	Repair the heating concern. Refer to <u>Heating Performance Diagnostic</u> . Is the repair complete?	Go to Step 14	-
12	Repair the A/C performance concern. Refer to <u>Symptoms - HVAC Systems - Manual</u> , or <u>Symptoms - HVAC Systems - Automatic</u> . Is the repair complete?	Go to Step 14	-
13	Repair the air inlet valve concern. Refer to <u>Symptoms - HVAC Systems - Manual</u> . Is the repair complete?	Go to Step 14	-
14	Operate the system in order to verify the repair. Did you find and correct the problem?	System OK	Go to Step 2

2013 Chevrolet Cruze

2013 HVAC Heating, Ventilation, and Air Conditioning - Cruze

DEFROSTING INSUFFICIENT (WITHOUT Y8X)

Defrosting Insufficient (without Y8X)

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 , or Symptoms - HVAC Systems - Automatic
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 8
3	Measure the engine operating temperature. Does engine reach a normal operating temperature?	Go to Step 4	Go to Step 6
4	1. Select the minimum blower speed. 2. Select the maximum temperature setting. WARNING: Refer to <u>Moving Parts and Hot Surfaces Warning</u> . 3. Feel the temperature of the inlet and outlet hoses at the heater core. Does the inlet hose feel warmer than the outlet hose?	Go to Step 9	Go to Step 5
5	Perform the A/C system performance test. Refer to <u>Air Conditioning (A/C) System Performance Test</u>. Is the A/C system operating within the specifications?	Go to Step 7	Go to Step 10
6	Repair the low engine temperature concern. Refer to <u>Engine Fails To Reach Normal Operating Temperature</u> . Is the repair complete?	Go to Step 12	-
7	Inspect for correct operation of the air inlet valve. Is the air inlet valve operating correctly?	Go to Step 12	Go to Step 11
8	Repair the air delivery concern. Refer to <u>Symptoms - HVAC Systems - Manual</u> .		

2013 Chevrolet Cruze

2013 HVAC Heating, Ventilation, and Air Conditioning - Cruze

	Is the repair complete?	Go to Step 12	-
9	Repair the heating concern. Refer to <u>Heating Performance Diagnostic</u> . Is the repair complete?	Go to Step 12	-
10	Repair the A/C performance concern. Refer to <u>Symptoms - HVAC Systems - Manual</u> , or <u>Symptoms - HVAC Systems - Automatic</u> . Is the repair complete?	Go to Step 12	-
11	Repair the air inlet valve concern. Refer to <u>Symptoms - HVAC Systems - Manual</u> . 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

Noise Diagnosis - Blower Motor

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

2013 Chevrolet Cruze

2013 HVAC Heating, Ventilation, and Air Conditioning - Cruze

6	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	-
9	Replace the blower motor. Refer to <u>Blower Motor Replacement</u> . Is the repair complete?	Go to Step 11	-
10	Install the blower motor. Refer to <u>Blower Motor Replacement</u> . 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

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	• Inspect the suction port of the replacement compressor for presence of a suction screen. If the replacement compressor does NOT contain a suction screen, install a suction screen in the line. • Replace the desiccant or component containing the desiccant. • Replace the desiccant filter if applicable. • Remove and inspect the high pressure side filter

2013 Chevrolet Cruze

2013 HVAC Heating, Ventilation, and Air Conditioning - Cruze

	(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. • Inspect the suction port of the replacement compressor for presence of a suction screen. If the replacement compressor does NOT contain a suction screen, install a suction screen. • 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 (WITH Y8X)

Noise Diagnosis - Air Conditioning (A/C) System (with Y8X)

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 <u>Symptoms - HVAC Systems - Manual</u> or Go to <u>Symptoms -</u>

2013 Chevrolet Cruze

2013 HVAC Heating, Ventilation, and Air Conditioning - Cruze

		Go to Step 2	HVAC Systems - Automatic
2	- A/C system noises can be generally categorized into 3 areas: - Screeching, squealing, chirping noises - Moaning noises - Vibration/rattle noises - Start the engine. - Ensure that the A/C is ON. Is a screeching, squealing noise heard when the A/C is ON?	Go to Step 3	Go to Step 9
3	With the engine OFF, inspect the drive belt for excessive wear. Refer to the appropriate procedure: <u>Drive Belt Falls Off and Excessive Wear Diagnosis</u> for the 1.4L engine <u>Drive Belt Falls Off and Excessive Wear Diagnosis</u> for the 1.8L engine Is the drive belt excessively worn?	Go to Step 18	Go to Step 4
4	Inspect the drive belt tension. Refer to the appropriate procedure: <u>Drive Belt Tensioner Diagnosis</u> for the 1.4L engine <u>Drive Belt Tensioner Diagnosis</u> for the 1.8L engine 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	- Start the engine. - Ensure that the A/C is ON. - 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	WARNING: Refer to <u>Moving Parts and Hot Surfaces Warning</u> .		

2013 Chevrolet Cruze

2013 HVAC Heating, Ventilation, and Air Conditioning - Cruze

	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 in PARK. 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 . 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 . Is the abnormal compressor noise still present?	Go to Step 24	Go to Step 26
17	Repair the oil leak. Refer to the appropriate procedure: • Oil Leak Diagnosis for the 1.4L engine • Oil Leak Diagnosis for the 1.8L engine Is the repair complete?	Go to Step 18	-
	Replace the drive belt. Refer to the appropriate procedure:		

2013 Chevrolet Cruze

2013 HVAC Heating, Ventilation, and Air Conditioning - Cruze

18	• <u>Drive Belt Replacement</u> for the 1.4L engine • <u>Drive Belt Replacement</u> for the 1.8L engine		
	Is the replacement complete?	Go to Step 26	-
19	Replace the drive belt tensioner. Refer to the appropriate procedure: • <u>Drive Belt Tensioner Replacement</u> for the 1.4L engine • <u>Drive Belt Tensioner Replacement</u> for the 1.8L engine		
	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 <u>Air Conditioning Clutch Assembly Replacement</u> . Is the repair complete?	Go to Step 26	-
24	Replace the A/C compressor. Refer to <u>Air Conditioning Compressor Replacement (1.8L LUW and LWE), Air Conditioning Compressor Replacement (1.4L LUV)</u> . Is the repair complete?	Go to Step 26	-
25	The concern may be caused by an engine related component. Refer to <u>Vibration Analysis - Engine</u> . 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 - AIR CONDITIONING (A/C) SYSTEM (WITHOUT Y8X)

Noise Diagnosis - Air Conditioning (A/C) System (without Y8X)

Step	Action	Yes	No
DEFINITION: Noise originating from the A/C compressor, drive belt, or the A/C lines.			
	Were you sent here from Symptoms or another diagnostic table?		Go to <u>Symptoms - HVAC Systems - Manual</u>

2013 Chevrolet Cruze

2013 HVAC Heating, Ventilation, and Air Conditioning - Cruze

1		Go to Step 2	or Go to Symptoms - HVAC Systems - Automatic
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 ON?	Go to Step 3	Go to Step 8
3	With the engine OFF, inspect the drive belt for excessive wear. Refer to the appropriate procedure: • <u>Drive Belt Falls Off and Excessive Wear Diagnosis</u> for the 1.4L engine • <u>Drive Belt Falls Off and Excessive Wear Diagnosis</u> for the 1.8L engine Is the drive belt excessively worn?	Go to Step 14	Go to Step 4
4	Inspect the drive belt tension. Refer to the appropriate procedure: • <u>Drive Belt Tensioner Diagnosis</u> for the 1.4L engine • <u>Drive Belt Tensioner Diagnosis</u> for the 1.8L engine Is the drive belt tension correct?	Go to Step 5	Go to Step 15
5	Inspect the drive belt for excessive oil coverage. Is the drive belt covered with oil?	Go to Step 13	Go to Step 6
6	1. Start the engine. 2. Ensure that the A/C is ON. 3. Inspect the compressor. Is the A/C compressor locked up?	Go to Step 19	Go to Step 7
	WARNING: Refer to <u>Moving Parts and Hot Surfaces Warning</u> .		

2013 Chevrolet Cruze

2013 HVAC Heating, Ventilation, and Air Conditioning - Cruze

7	Using a stethoscope, listen to the A/C compressor for any abnormal noises. Is the compressor causing an abnormal noise?	Go to Step 11	Go to Step 8
8	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 16	Go to Step 9
9	1. Idle the engine in PARK. 2. 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 18	Go to Step 10
10	1. Idle the engine in PARK with the A/C ON. 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 17	Go to Step 20
11	Verify that the A/C system is properly charged. Refer to <u>Refrigerant System Specifications</u> . Is the A/C system properly charged?	Go to Step 21	Go to Step 12
12	Recharge the A/C system to specification. Refer to <u>Refrigerant Recovery and Recharging</u> . Is the abnormal compressor noise still present?	Go to Step 19	Go to Step 21
13	Repair the oil leak. Refer to the appropriate procedure: • <u>Oil Leak Diagnosis</u> for the 1.4L engine • <u>Oil Leak Diagnosis</u> for the 1.8L engine Is the repair complete?	Go to Step 14	-
14	Replace the drive belt. Refer to the appropriate procedure: • <u>Drive Belt Replacement</u> for the 1.4L engine • <u>Drive Belt Replacement</u> for the 1.8L engine Is the replacement complete?	Go to Step 21	-
	Replace the drive belt tensioner. Refer to the		

2013 Chevrolet Cruze

2013 HVAC Heating, Ventilation, and Air Conditioning - Cruze

15	appropriate procedure: • <u>Drive Belt Tensioner Replacement</u> for the 1.4L engine • <u>Drive Belt Tensioner Replacement</u> for the 1.8L engine Is the replacement complete?	Go to Step 21	-
16	Repair or replace the A/C compressor mounting component. Is the repair complete?	Go to Step 21	-
17	Repair or replace the component which is causing the moaning concern as needed. Is the repair complete?	Go to Step 21	-
18	Correctly route or insulate the A/C component. Is the repair complete?	Go to Step 21	-
19	Replace the A/C compressor. Refer to <u>Air Conditioning Compressor Replacement (1.8L LUW and LWE)</u>, <u>Air Conditioning Compressor Replacement (1.4L LUV)</u>. Is the repair complete?	Go to Step 21	-
20	The concern may be caused by an engine related component. Refer to <u>Vibration Analysis - Engine</u> . Did you find and correct the condition?	Go to Step 21	-
21	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

Noise Diagnosis - HVAC Module

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

2013 Chevrolet Cruze

2013 HVAC Heating, Ventilation, and Air Conditioning - Cruze

	• 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 HVAC module. Refer to <u>Heater and Air Conditioning Evaporator Case Replacement</u> Is the action complete?	Go to Step 7	-
7	• Inspect the air flow doors for proper operation. • Inspect the ducts for obstructions or foreign materials.		
	Were any of these conditions found?	Go to Step 10	Go to Step 8
8	Inspect the mode and temperature doors and seals for warping or cracking. Are the doors in normal condition?	Go to Step 11	Go to Step 9
9	Replace the appropriate door and/or seals. Is the repair complete?	Go to Step 11	-
10	Remove any obstructions or foreign material found. Is the action complete?	Go to Step 11	-
11	Install the HVAC module. Refer to <u>Heater and Air Conditioning Evaporator Case Replacement</u> Is the action complete?	Go to Step 12	-
12	Operate the system to verify the repair. Did you find and correct the condition?	System OK	Go to Step 2

ODOR DIAGNOSIS

Odor Diagnosis

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

2013 Chevrolet Cruze

2013 HVAC Heating, Ventilation, and Air Conditioning - Cruze

		Go to Step 2	Go to Symptoms - HVAC Systems - Automatic
2	1. Sit inside the vehicle. 2. Close all of the doors and windows. 3. Start the engine. 4. Allow the engine idle at normal operating temperature. 5. Select the maximum blower speed. 6. Select the PANEL air outlet mode. 7. Select the coldest temperature setting. 8. Cycle through all of the blower speeds, modes and temperatures to define what type of odor is present. • Musty smell • Coolant smell • Oil smell Does the odor have a musty smell?	Go to Step 3	Go to Step 8
3	Inspect the HVAC filter and the air inlet grille for debris. Is debris present?	Go to Step 4	Go to Step 5
4	Remove any debris. Is the action complete?	Go to Step 15	-
5	Inspect for wet carpeting. Is the carpet wet?	Go to Step 6	Go to Step 14
6	Inspect for the following conditions: • Water leaks around the windshield • Blockage of the HVAC module drain • Leaks around the door seals Is a leak present?	Go to Step 7	Go to Step 14
7	Repair the leak as necessary. Is the repair complete?	Go to Step 15	-
8	Does the odor have a coolant smell?	Go to Step 9	Go to Step 12
9	Inspect the cooling system for leaks. Refer to Loss of Coolant. Is a leak present?	Go to Step 10	Go to Step 12
10	Inspect for coolant leaking inside the vehicle or for a film build-up on the windshield. Is the condition present?	Go to Step 11	Go to Step 15

2013 Chevrolet Cruze

2013 HVAC Heating, Ventilation, and Air Conditioning - Cruze

11	Replace the heater core. Refer to <u>Heater Core Replacement</u> . Is the repair complete?	Go to Step 15	-
12	Does the odor have an oily smell?	Go to Step 13	Go to Step 15
13	1. Inspect the engine compartment for any leaks. Refer to the following procedures: • <u>Oil Leak Diagnosis</u> for the 1.4L engine • <u>Oil Leak Diagnosis</u> for the 1.8L engine • <u>Fluid Leak Diagnosis (Non Hybrid)</u> for the 6T40/4T45 transmission 2. Repair any oil leaks. Is the repair complete?	Go to Step 15	-
14	A musty odor can be caused by mold or mildew build-up on the evaporator or the heater core or inside of the HVAC module. Refer to <u>Odor Correction</u> . Is the action complete?	Go to Step 15	-
15	Operate the system in order to verify the repair. Did you find and correct the condition?	System OK	Go to Step 2

REPAIR INSTRUCTIONS

HVAC ASSEMBLY PLANT REPAIR EXCEPTIONS (DO NOT RELEASE)

Introduction:

NOTE: *This document must never be released to the Service Community. This document must remain in WIP status for Assembly Plant usage only.*

NOTE: Heating, Ventilation, and Air Conditioning (HVAC) systems are pressurized refrigeration, high voltage (Hybrid) and impact environmental issues with recycling. Prior to repairing these systems, operators should receive appropriate service and safety training in mobile HVAC.

For various reasons, vehicles assembled in Assembly Plants may require Heating, Ventilation, and Air Conditioning System (HVAC) repairs. These repairs require diagnostics, special tools, non-production parts, and a specific repair procedure. The Repair procedures for given model vehicles is published for GM dealerships under SI (Service Information) The information is updated daily and has been reviewed by appropriate service engineering support. To provide Assembly Plant HVAC repair person with specific written procedures for diagnostics and repair procedures, the repair personnel shall follow these procedures except under the following circumstances:

Diagnostics:

2013 Chevrolet Cruze

2013 HVAC Heating, Ventilation, and Air Conditioning - Cruze

1. Follow diagnostic methods described in the SI but include information from ALD test write-ups as well as the inspection reports. Confirm this information with the MDI (when possible) prior to repair. Clear all DTC's after work
2. Employ and record refrigerant information from recovery equipment when confirming charge. Do not employ Vacuum only recovery equipment. This equipment does not have the ability to measure vehicle refrigerant charge, nor the amount of lubricant removed.
3. Refrigerant Leak Detection may be hampered since dye circulation may not have sufficiently occurred. Therefore, use of the electronic leak detector is mandatory. If leak dye is required, injection of additional service dye (as per SI) is authorized (up to 1/4oz service dye)

Remove and Replace Components/Sub-Assemblies - Exception to SI for Assembly Plant

HVAC Module Components - Exceptions for Part R&R

1. Evaporator Core is replaced in the SI documentation. However, for assembly plant repair, the entire module with the evaporator core should be replaced as a unit. Install new seal washers on the evaporator.
2. Heater Core is generally replaced as a separate unit. Unless SI details how to remove the heater core w/o disassembly of the HVAC module, the entire module is required to be replaced.
3. Broken/Cracked HVAC Module Case - these defects are not to be repaired per SI directions. The plastic assembly or module requires replacement

Condensors - Exceptions for Part R&R

1. Condensers are serviced in SI documentation as individual units. However, majority of units employed arrive as CRA's (Condenser Radiator Assembly) If the condenser or radiator require replacement, the replacement should be a replacement CRA.
2. RD desiccant bag replacement. Internal desiccant bag replacement although authorized in SI, is not to be done at assembly plant. If material contamination - from failed compressor or desiccant bag is noted, entire assembly to be replaced and not flushed.

A/C Hoses/Lines- Exceptions for Part R&R

1. Line Splice - line rub through or damage are to be replaced with new assemblies and not line spliced.
2. In-Line filters - Assembly plant is not authorized to employ install these filters
3. Compressor Suction line screens - Assembly plant is not authorized to install suction screens or screen blocks unless specifically authorized by platform engineering.

Control Heads and Sensors - Exceptions for Part R&R

1. Replace and reprogram control head.
2. R&R sensors - do not splice into wire harness.
3. Replace electrical terminals per spec. Do not splice connectors.

ODOR CORRECTION

Eliminating Air Conditioning Odor

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

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

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

Deodorize the evaporator core using a deodorizing aerosol kit.

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

1. Ensure that the plenum which draws outside air into the HVAC module is clear of debris.
2. Disable the A/C compressor clutch operation by disconnecting the clutch coil electrical connector.
3. Dry the evaporator core by performing the following steps:
 1. Start the engine.
 2. Select the warmest temperature setting.
 3. Select the recirculation mode.
 4. Run the blower motor on high for 10 minutes.
4. Remove the passenger compartment air filter. Refer to **Passenger Compartment Air Filter Replacement**.

NOTE: Do not mix with other chemicals.

5. Fill the pressure cup gun with a special probe be closed gently, then connect the pressure cup gun air side.
6. Pour the cleaner away immediately after use up.
7. The contaminated cleaning agent will be drained through the air conditioning evaporator and blower module drain hose, therefore place a collecting basin underneath.
8. To get access to the evaporator core remove parts as necessary:
 1. Blower motor control module.
 2. Blower motor.
 3. Refrigerant temperature sensor.
 4. HVAC actuators.
9. Insert the probe through suitable opening.
10. By activating the pressure cup gun and a back- and forward moving of the probe the evaporator and housing, will be cleaned, rinsed thoroughly and disinfected by the cleaning agent.
11. After half of the spraying operation check a possible blocking of the air conditioning evaporator and blower module drain hose and repair, then spray the remaining content.

2013 Chevrolet Cruze

2013 HVAC Heating, Ventilation, and Air Conditioning - Cruze

12. Let the cleaning agent react on for 30 min in order to assure a bacteria-mortification.
13. Vent the conditioning evaporator for 2 minutes using pressurized air gun and the special probe.
14. Start the engine.
15. Open the air ducts.
16. Operate the blower motor on high for 15-20 minutes to dry.
17. Replace the passenger compartment air filter. Refer to **Passenger Compartment Air Filter Replacement**
18. Reconnect the A/C compressor clutch coil electrical connector.
19. Verify proper clutch operation.
20. Vent the vehicle interior for about 3h with fresh air.

REFRIGERANT RECOVERY AND RECHARGING

Special Tools

GE-45037-A A/C Oil Injector

For equivalent regional tools, refer to **Special Tools**.

Refrigerant Recovery and Recharging

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: Do not mix refrigerant oils. Use of incorrect refrigerant oil will cause compressor failure.

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 AC filling device is a complete air conditioning service center for R-134a. The AC filling device 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 AC filling device automatically replenishes this vessel from an external source tank in order to maintain a constant volume of A/C refrigerant.

The AC filling device 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 AC filling device will not recover the refrigerant from the A/C system.

The AC filling device also features automatic air purge, single pass recycling and an automatic oil drain.

Refer to the AC filling device manual for operation and setup instruction. Always recharge the A/C System with the proper amount of R-134a. Refer to **Refrigerant System Specifications**.

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-A** injector. For the proper quantities of oil to add to the A/C refrigerant system, refer to **Refrigerant System Specifications**.

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**.

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

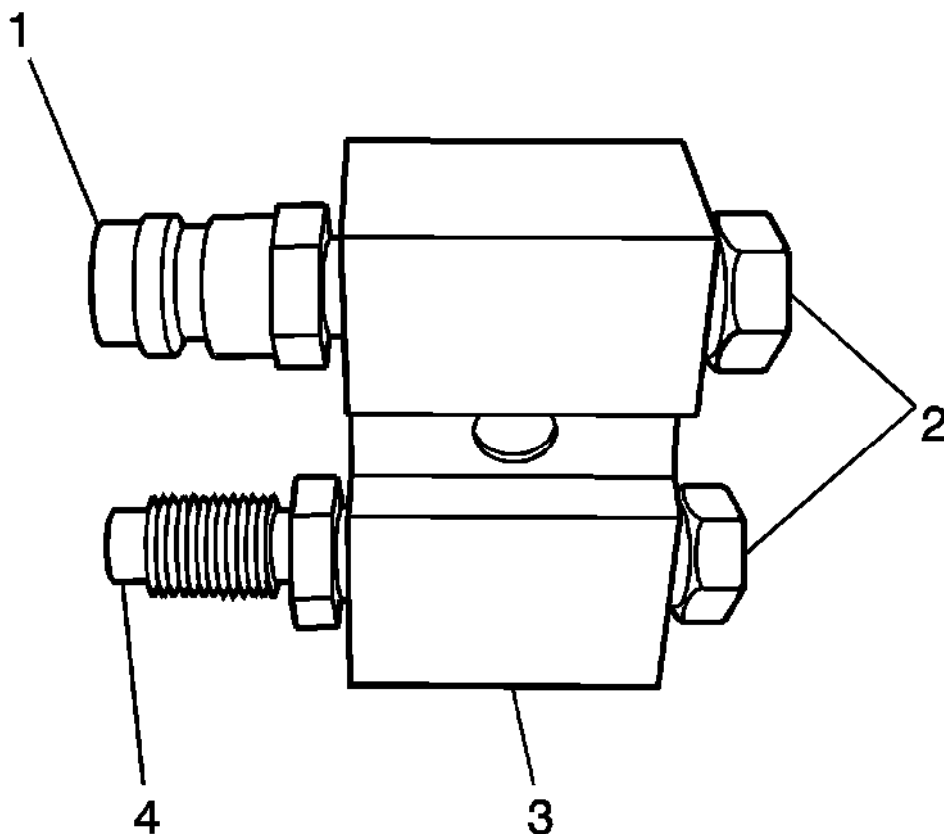
Forward Flushing Setup

Fig. 1: Identifying J 45268-2 (3), J 45268-7 (1), J 45268-8 (4), & J 45268-9 (2)
Courtesy of GENERAL MOTORS COMPANY

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](#).

1. Install both GE 45268-9 fitting O-ring onto GE 45268-10 adapter.

2013 Chevrolet Cruze

2013 HVAC Heating, Ventilation, and Air Conditioning - Cruze

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**.

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**.
2. Remove the thermal expansion valve (TXV). Refer to **Air Conditioning Evaporator Thermal Expansion Valve Replacement**.
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**.
5. Install **GE-45268-115** adapter in place of the TXV, using an oversized seal washer.

CAUTION: Refer to Fastener Caution .

6. Install the TXV mounting bolts and tighten to 15 N.m (11 lb in).
7. Install new washers onto liquid line and suction hose. Refer to **Air Conditioning O-Ring Seal Replacement**.
8. Connect liquid line and suction hose to **GE-45268-115** adapter using an oversized seal washer.
9. Install the TXV block fitting nut and tighten to 19 N.m (14 lb in).
10. Remove the A/C compressor. Refer to **Air Conditioning Compressor Replacement (1.8L LUW and LWE), Air Conditioning Compressor Replacement (1.4L LUV)**.

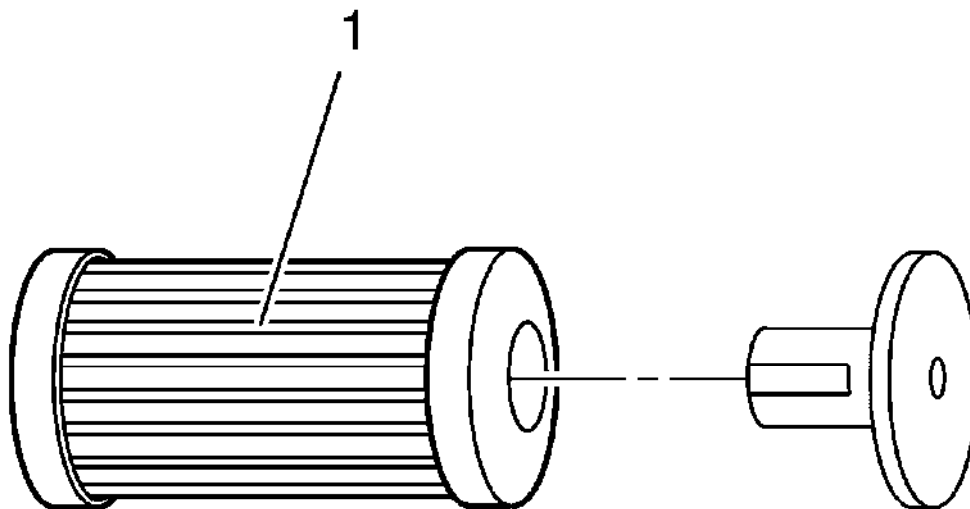


Fig. 2: A/C Refrigerant Filter

Courtesy of GENERAL MOTORS COMPANY

11. Remove the A/C refrigerant filter (1). Refer to **Air Conditioning Refrigerant Desiccant Replacement**.

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**. Assure that suction and discharge ports on **GE 45268-10** adapter correspond to suction and discharge ports on A/C compressor to condenser hose.

2013 Chevrolet Cruze

2013 HVAC Heating, Ventilation, and Air Conditioning - Cruze

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:
 - Remove the A/C compressor drain plug. Refer to **Air Conditioning Compressor Oil Drain Plug Replacement (1.8L LUW and LWE), Air Conditioning Compressor Oil Drain Plug Replacement (1.4L LUV)**.
 - 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**.
 - Add one bottle of **GE-41447** tracer dye.
 - Install the A/C compressor drain plug. Refer to **Air Conditioning Compressor Oil Drain Plug Replacement (1.8L LUW and LWE), Air Conditioning Compressor Oil Drain Plug Replacement (1.4L LUV)**.

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

22. Install the A/C compressor. Refer to **Air Conditioning Compressor Replacement (1.8L LUW and LWE), Air Conditioning Compressor Replacement (1.4L LUV)**.
23. Install new A/C refrigerant filter. Refer to **Air Conditioning Refrigerant Desiccant Replacement**.
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**.
30. Evacuate and recharge the A/C system. Refer to **Refrigerant Recovery and Recharging**.
31. Leak test fittings using **BO-42220** lamp.

AIR CONDITIONING COMPRESSOR OIL BALANCING

Draining Procedure

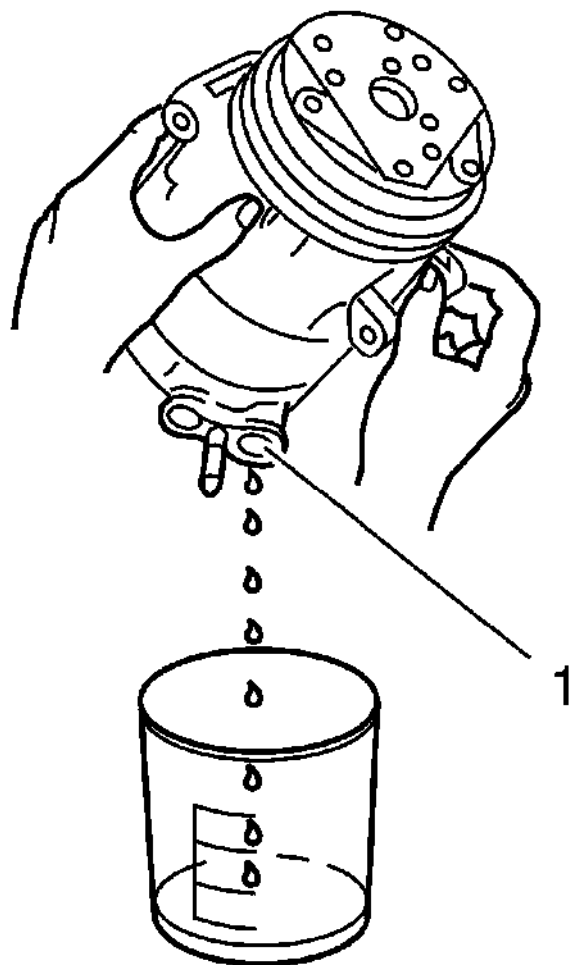


Fig. 3: Draining And Measuring Refrigerant Oil

Courtesy of GENERAL MOTORS COMPANY

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

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

1. The service compressor contains 40 ml (1.4 oz) of compressor manufacturers OE PAG Oil. Service only with GM PAG oil. Refer to **Refrigerant System Specifications** for the vehicle specific oil requirements.
2. If the sum of the amount of oil drained from the removed compressor and the amount of oil removed during refrigerant recovery is:
 - Less than 40 ml (1.4 oz), no balancing is required. Install the replacement compressor as it is. It contains 40 ml (1.4 oz) oil. Refer to **Air Conditioning Compressor Replacement (1.8L LUW and LWE)**, **Air Conditioning Compressor Replacement (1.4L LUV)**.
 - More than 40 ml (1.4 oz), additional oil is required. Subtract 40 ml (1.4 oz) from the sum of removed oil (oil drained and oil recovered). Add this amount of service oil to the replacement compressor.

AIR CONDITIONING COMPRESSOR OIL DRAIN PLUG REPLACEMENT (1.4L LUV)

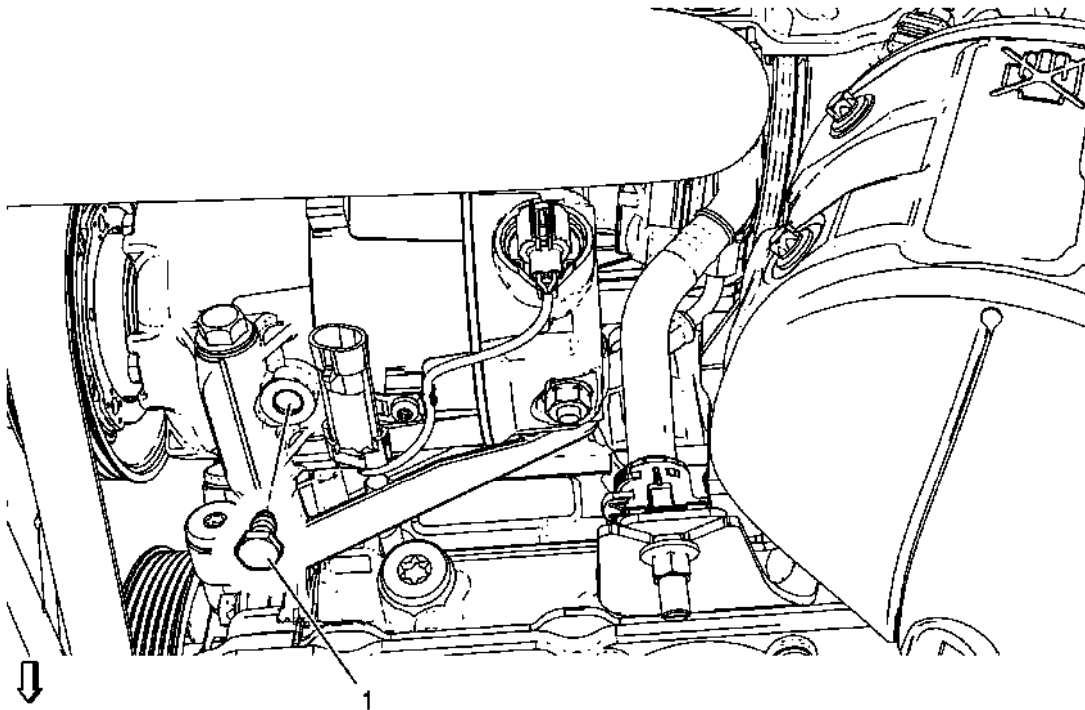


Fig. 4: Air Conditioning Compressor Oil Drain Plug - (1.4L LUV)

Courtesy of GENERAL MOTORS COMPANY

Air Conditioning Compressor Oil Drain Plug Replacement (1.4L LUV)

Callout	Component Name
Preliminary Procedures	
Recover the refrigerant. Refer to <u>Refrigerant Recovery and Recharging</u> .	
1	Air Conditioning Compressor Oil Drain Plug CAUTION: Refer to <u>Fastener Caution</u> .

2013 Chevrolet Cruze

2013 HVAC Heating, Ventilation, and Air Conditioning - Cruze

Tighten
15 N.m (11 lb ft)

AIR CONDITIONING COMPRESSOR OIL DRAIN PLUG REPLACEMENT (1.8L LUW AND LWE)

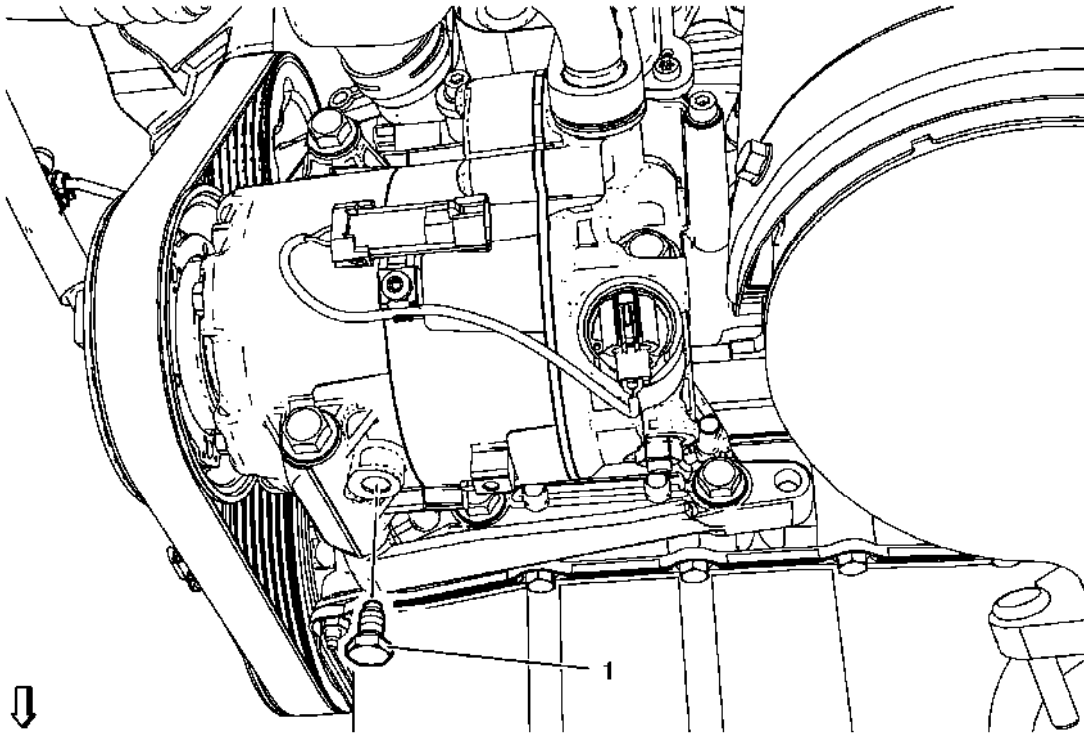


Fig. 5: Air Conditioning Compressor Oil Drain Plug - (1.8L LUW and LWE)
Courtesy of GENERAL MOTORS COMPANY

Air Conditioning Compressor Oil Drain Plug Replacement (1.8L LUW and LWE)

Callout	Component Name
Preliminary Procedures Recover the refrigerant. Refer to <u>Refrigerant Recovery and Recharging</u> .	
1	Air Conditioning Compressor Oil Drain Plug CAUTION: Refer to <u>Fastener Caution</u> . Tighten 15 N.m (11 lb ft)

AIR CONDITIONING COMPRESSOR REPLACEMENT (1.4L LUV)

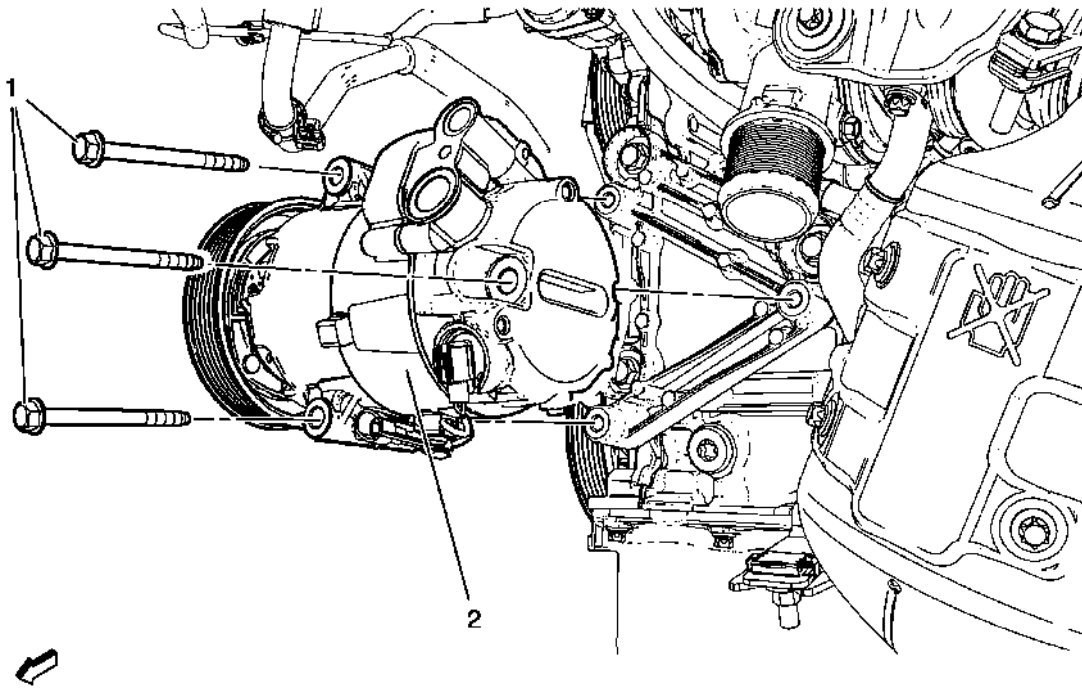


Fig. 6: Air Conditioning Compressor And Bolts
 Courtesy of GENERAL MOTORS COMPANY

Air Conditioning Compressor Replacement (1.4L LUV)

Callout	Component Name
Preliminary Procedures 1. Recover the refrigerant. Refer to <u>Refrigerant Recovery and Recharging</u>. 2. Remove drive belt. Refer to <u>Drive Belt Replacement</u>. 3. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u>. 4. Disconnect the air conditioning compressor electrical connector. 5. Remove air conditioning compressor and condenser hose from air conditioning compressor. Refer to <u>Air Conditioning Compressor and Condenser Hose Replacement (1.8L LUW and LWE)</u>, <u>Air Conditioning Compressor and Condenser Hose Replacement (1.4L LUV)</u>. 6. Remove charge air cooler inlet air hose. Refer to <u>Charge Air Cooler Inlet Air Hose Replacement</u>.	
1	Air Conditioning Compressor Bolt (Qty: 3) CAUTION: Refer to <u>Fastener Caution</u> . Tighten 22 N.m (17 lb ft)

2	Air Conditioning Compressor Procedure 1. Use a low viscosity, poly-alkylene glycol (PAG) oil. Use of the incorrect oil can result in compressor failure. 2. When replacing the A/C compressor, balance the compressor oil. Refer to <u>Air Conditioning Compressor Oil Balancing</u>. 3. Using GE 39400-A detector leak test A/C compressor fittings. Special Tools GE 39400-A Electronic Halogen Leak Detector For equivalent regional tools, refer to <u>Special Tools</u>.
---	--

AIR CONDITIONING COMPRESSOR REPLACEMENT (1.8L LUW AND LWE)

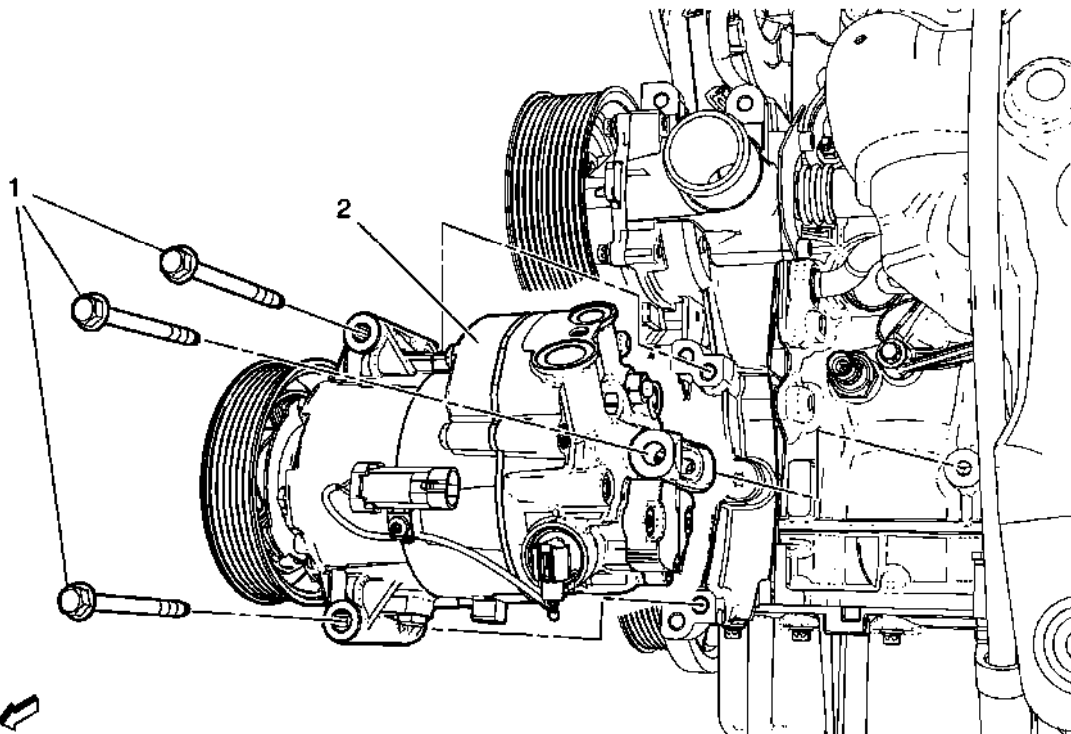


Fig. 7: Air Conditioning Compressor And Bolts
 Courtesy of GENERAL MOTORS COMPANY

Air Conditioning Compressor Replacement (1.8L LUW and LWE)

Callout	Component Name
Preliminary Procedures 1. Recover the refrigerant. Refer to <u>Refrigerant Recovery and Recharging</u>.	

2013 Chevrolet Cruze

2013 HVAC Heating, Ventilation, and Air Conditioning - Cruze

2. Remove the drive belt. Refer to **Drive Belt Replacement**.
3. Disconnect the air conditioning compressor electrical connector.
4. Loosen the air conditioning compressor and condenser hose from the air conditioning compressor. Refer to **Air Conditioning Compressor and Condenser Hose Replacement (1.8L LUW and LWE)**, **Air Conditioning Compressor and Condenser Hose Replacement (1.4L LUV)**.

1	Air Conditioning Compressor Bolt (Qty: 3) CAUTION: Refer to <u>Fastener Caution</u>. Tighten 22 (17 lb ft)
2	Air Conditioning Compressor Procedure • Use a low viscosity, poly-alkylene glycol (PAG) oil. Use of the incorrect oil can result in compressor failure. • When replacing the A/C compressor, balance the compressor oil. Refer to <u>Air Conditioning Compressor Oil Balancing</u> • Use GE-39400 detector leak test A/C compressor fittings. Special Tools GE-39400 Electronic Halogen Leak Detector For equivalent regional tools, refer to <u>Special Tools</u>.

AIR CONDITIONING CLUTCH ASSEMBLY REPLACEMENT

Special Tools

GE-48965 Holding Wrench

For equivalent regional tools, refer to **Special Tools**.

Removal Procedure

1. Remove the A/C compressor. Refer to **Air Conditioning Compressor Replacement (1.8L LUW and LWE)**, **Air Conditioning Compressor Replacement (1.4L LUV)**.
2. Clamp air conditioning compressor in a soft jawed vice.

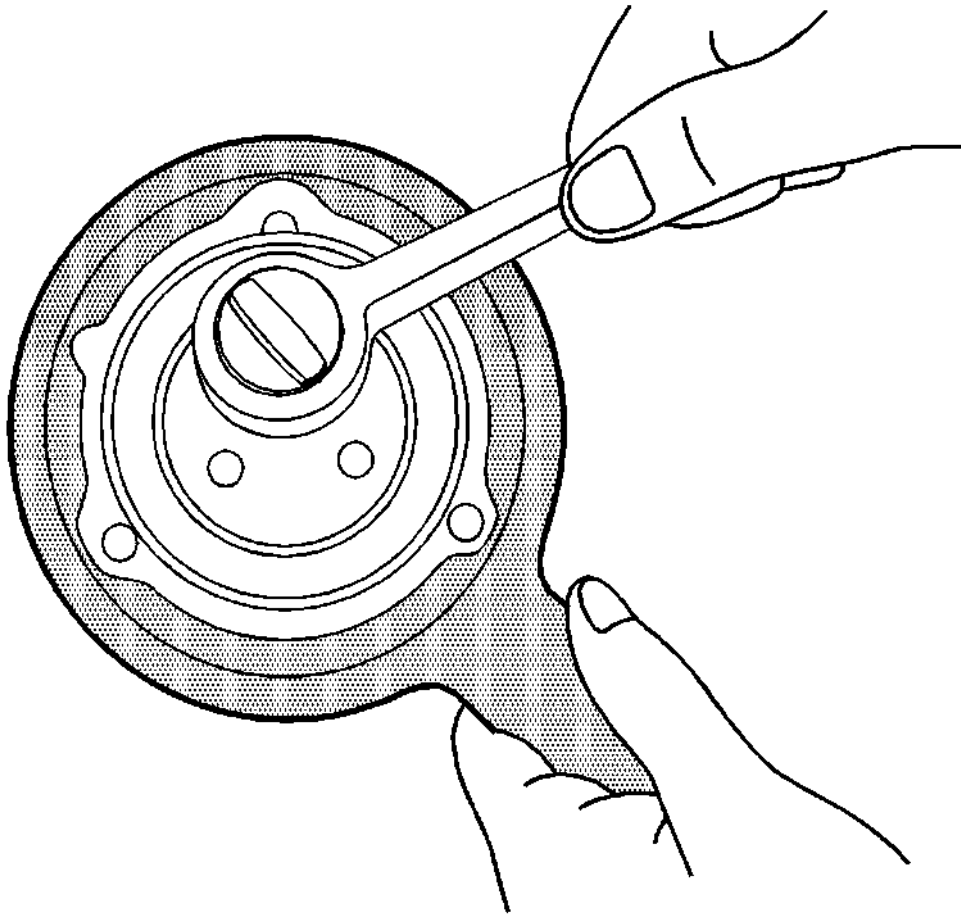


Fig. 8: Compressor Clutch Plate And Special Tool
Courtesy of GENERAL MOTORS COMPANY

3. Remove the compressor clutch plate.
 - Remove the bolt.
 - Counterhold with **GE-48965** wrench.

NOTE: **Re-use spacer washers when refitting.**

4. Remove the spacer washers.

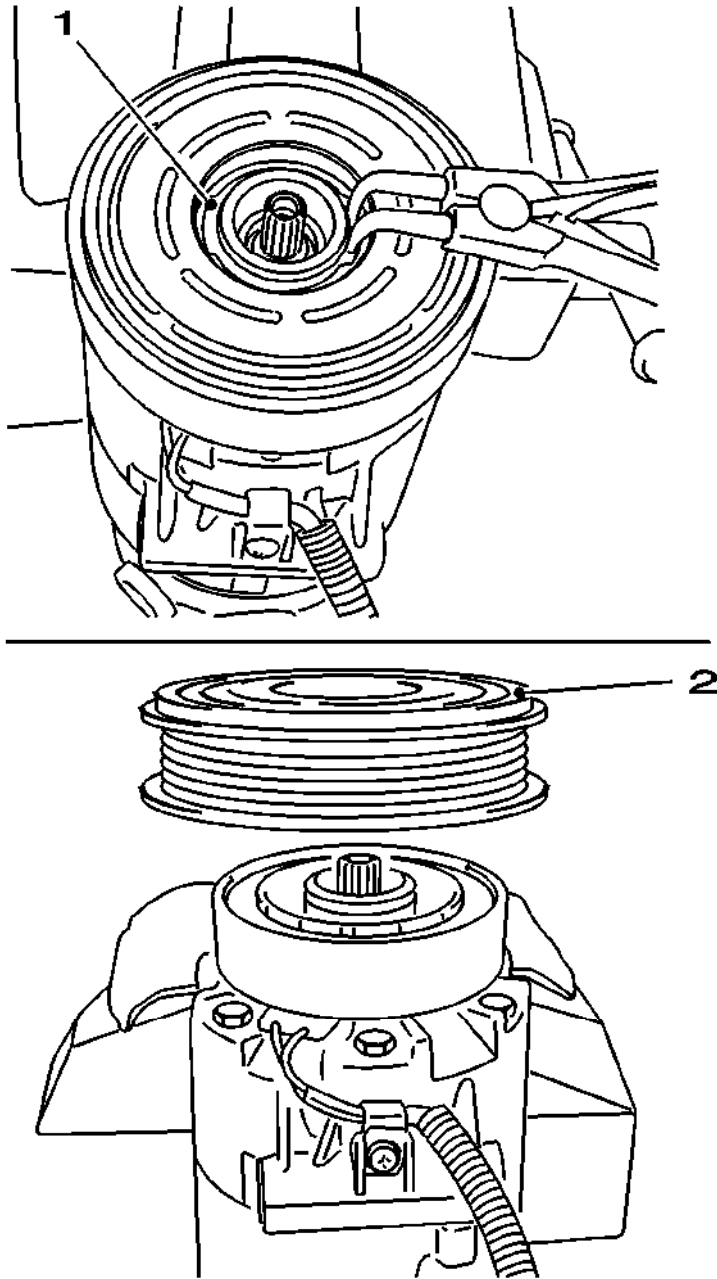


Fig. 9: View Of Retaining Ring And Compressor Pulley
Courtesy of GENERAL MOTORS COMPANY

5. Remove the retaining ring (1) from belt pulley.
6. Pull off the compressor pulley (2).

Installation Procedure

1. Install the compressor pulley on the compressor housing.
2. Install the retaining ring in the groove in the compressor housing.

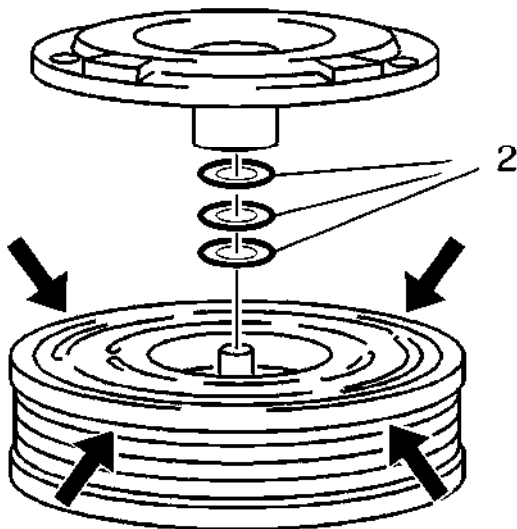
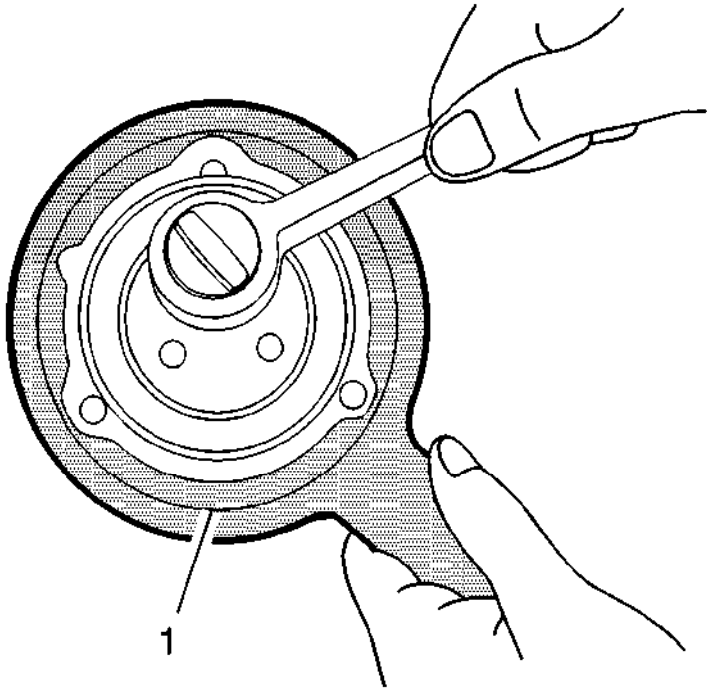


Fig. 10: Compressor Clutch Plate And Spacing Washer
Courtesy of GENERAL MOTORS COMPANY

3. Install the compressor clutch plate.

Insert the spacing washer (2).

CAUTION: Refer to Fastener Caution .

4. Tighten the compressor clutch plate bolt to 13.5 N.m (119 lb in). Counterhold with **GE-48965** wrench (1).

NOTE: Check reference gap between clutch plate and the belt pulley at 4 points with feeler gauge and form mean value.

5. Inspect reference gap of compressor clutch.

Reference value: 0.3 mm - 0.6 mm (0.012 in - 0.024 in).

NOTE: If the reference gap is too large, install thicker spacing washer (2) between compressor shaft and clutch, install a thinner one if the reference gap is too small. Spacing washers available: 0.1 mm, 0.3 mm, 0.5 mm.

6. Correct the reference gap for the compressor clutch.

Detach the compressor clutch plate and change spacing washer.

7. Repeat inspection as described.
8. Remove the A/C compressor from the bench vise.
9. Install the A/C compressor. Refer to **Air Conditioning Compressor Replacement (1.8L LUW and LWE)**, **Air Conditioning Compressor Replacement (1.4L LUV)**.

COMPRESSOR PRESSURE RELIEF VALVE REPLACEMENT (1.4L LUV)

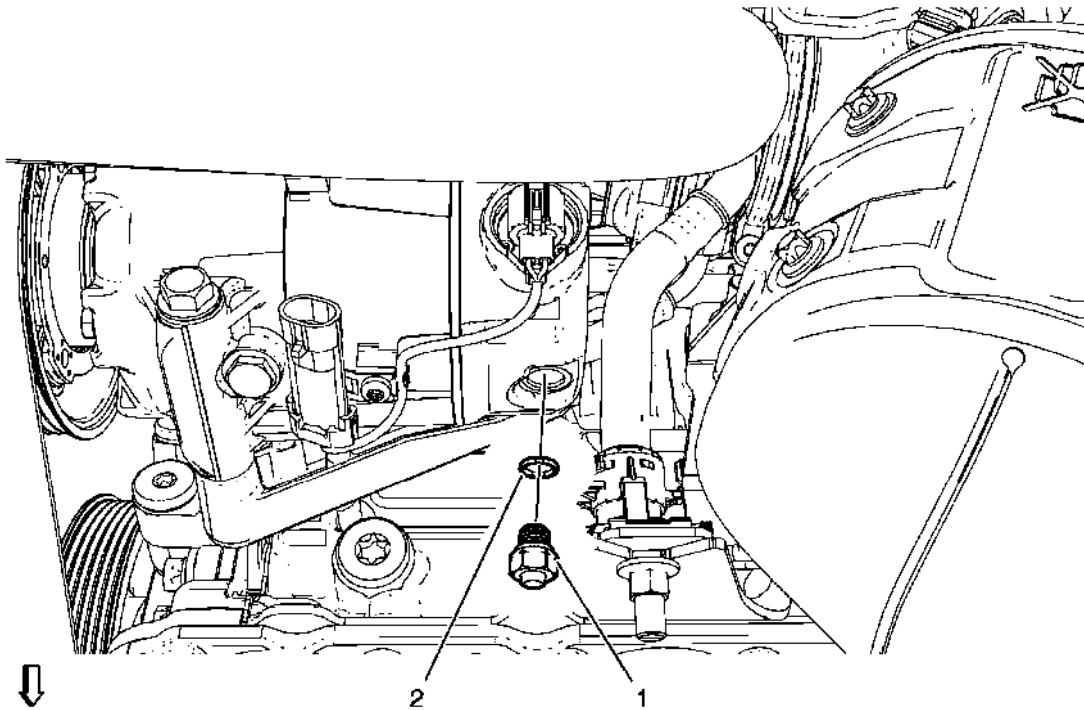


Fig. 11: Compressor Pressure Relief Valve
Courtesy of GENERAL MOTORS COMPANY

Compressor Pressure Relief Valve Replacement (1.4L LUV)

Callout	Component Name
Preliminary Procedures Recover the refrigerant. Refer to <u>Refrigerant Recovery and Recharging</u> .	
1	Air Conditioning Compressor Pressure Relief Valve CAUTION: Refer to <u>Fastener Caution</u> . Tighten 10 N.m (89 lb in)
2	Air Conditioning Compressor Pressure Relief Valve Sealing Ring

COMPRESSOR PRESSURE RELIEF VALVE REPLACEMENT (1.8L LUW)

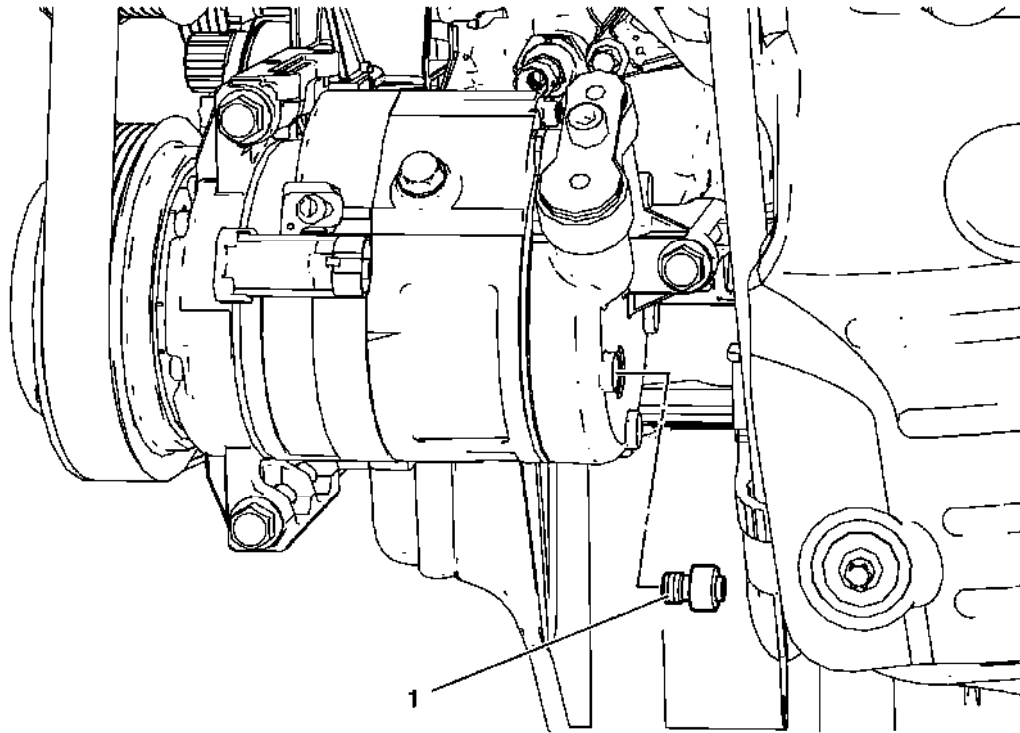


Fig. 12: Compressor Pressure Relief Valve - (1.8L LUW)

Courtesy of GENERAL MOTORS COMPANY

Compressor Pressure Relief Valve Replacement (1.8L LUW)

Callout	Component Name
Preliminary Procedures Recover the refrigerant. Refer to <u>Refrigerant Recovery and Recharging</u> .	
1	Air Conditioning Compressor Pressure Relief Valve CAUTION: Refer to <u>Fastener Caution</u> Tighten 10 N.m (89 lb in)

COMPRESSOR PRESSURE RELIEF VALVE REPLACEMENT (1.8L LWE)

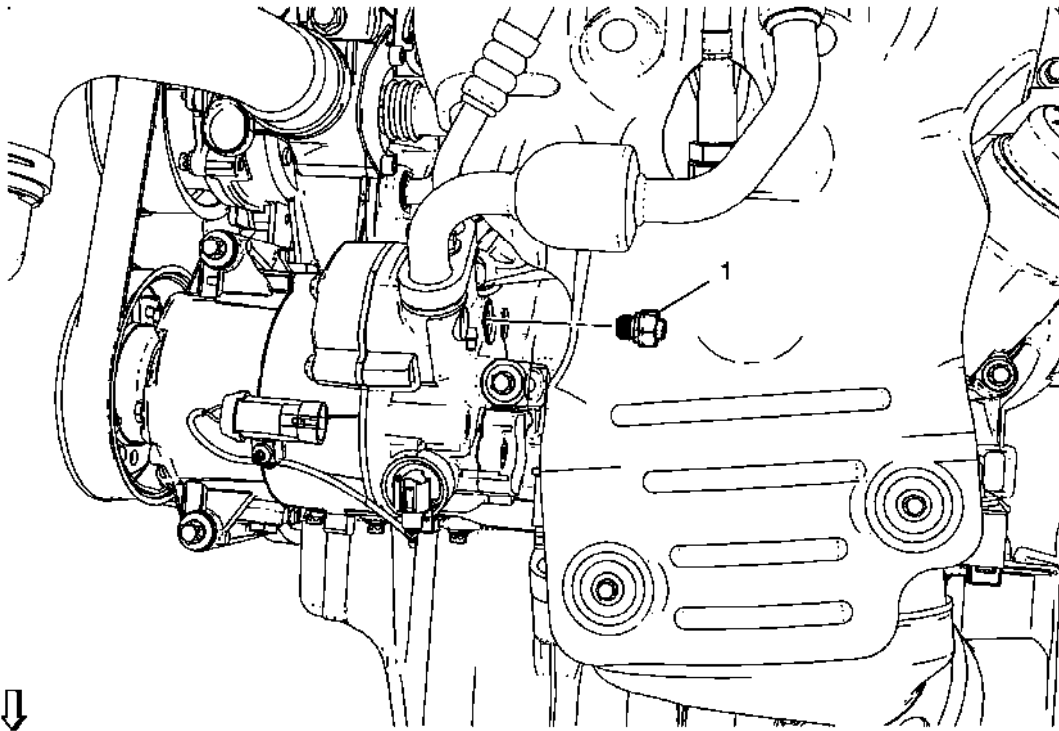


Fig. 13: Compressor Pressure Relief Valve (1.8L LWE)

Courtesy of GENERAL MOTORS COMPANY

Compressor Pressure Relief Valve Replacement (1.8L LWE)

Callout	Component Name
Preliminary Procedures	
1. Disconnect the negative battery cable. Refer to <u>Battery Negative Cable Disconnection and Connection</u> . 2. Recover the refrigerant. Refer to <u>Refrigerant Recovery and Recharging</u>. 3. Remove the oil level indicator tube. Refer to <u>Oil Level Indicator Tube Replacement</u> .	
1	Compressor Pressure Relief Valve CAUTION: Refer to <u>Fastener Caution</u> . Tighten 10 N.m (89 lb in)

AIR CONDITIONING COMPRESSOR BRACKET REPLACEMENT

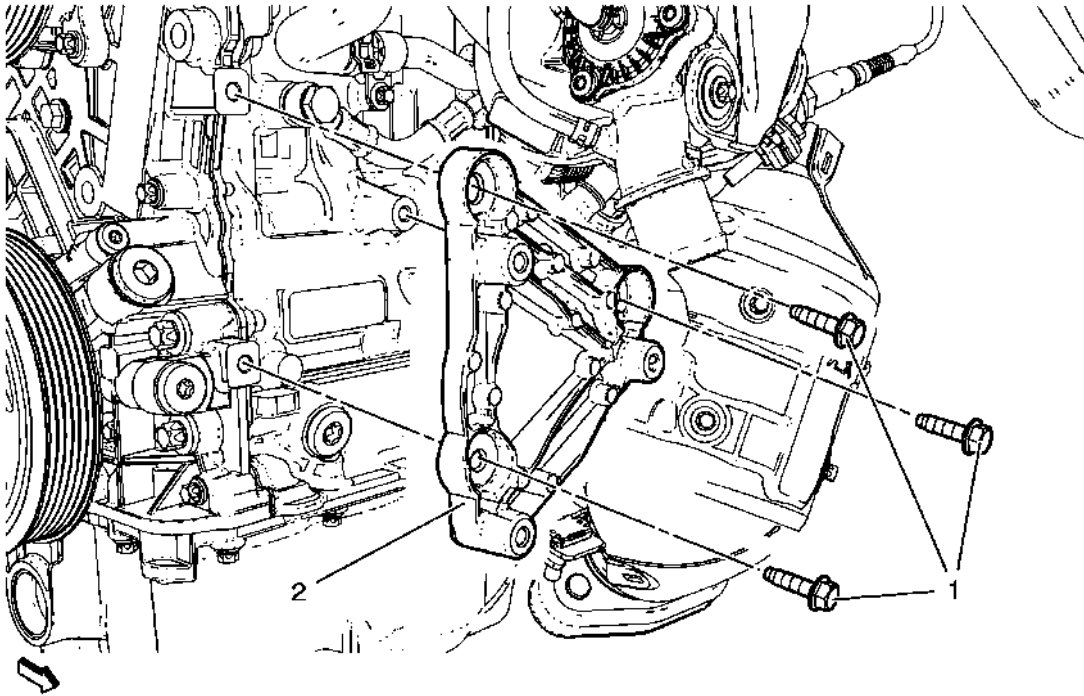


Fig. 14: Air Conditioning Compressor Bracket
Courtesy of GENERAL MOTORS COMPANY

Air Conditioning Compressor Bracket Replacement

Callout	Component Name
Preliminary Procedures Remove air conditioning compressor. Refer to <u>Air Conditioning Compressor Replacement (1.8L LUW and LWE)</u> , <u>Air Conditioning Compressor Replacement (1.4L LUV)</u> .	
1	Air Conditioning Compressor Bracket Bolt (Qty: 3) CAUTION: Refer to <u>Fastener Caution</u> . Tighten 22 N.m (16 lb ft)
2	Air Conditioning Compressor Bracket

AIR CONDITIONING SYSTEM SEAL REPLACEMENT

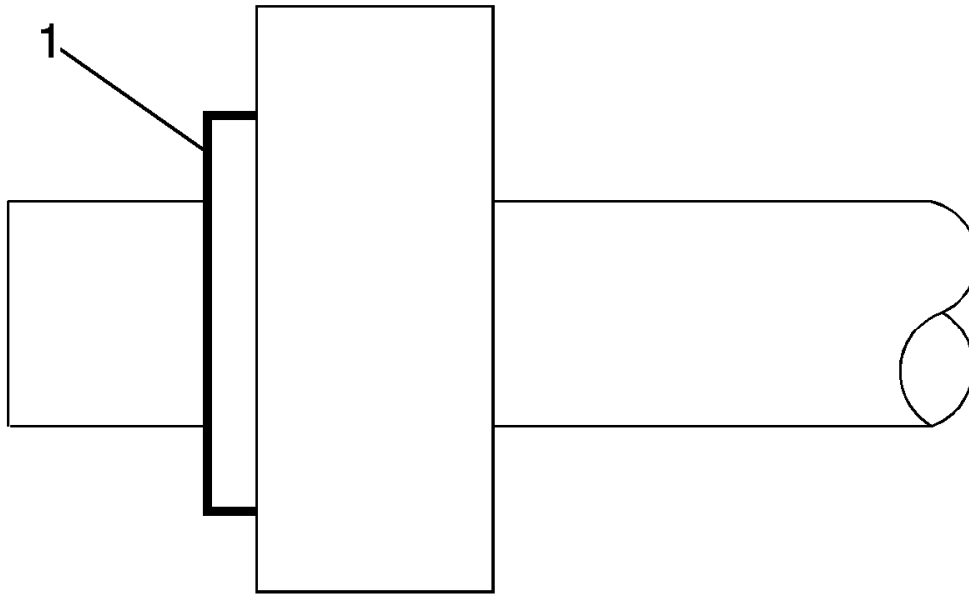
Removal Procedure

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.

**Fig. 15: Sealing Washer****Courtesy of GENERAL MOTORS COMPANY**

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.

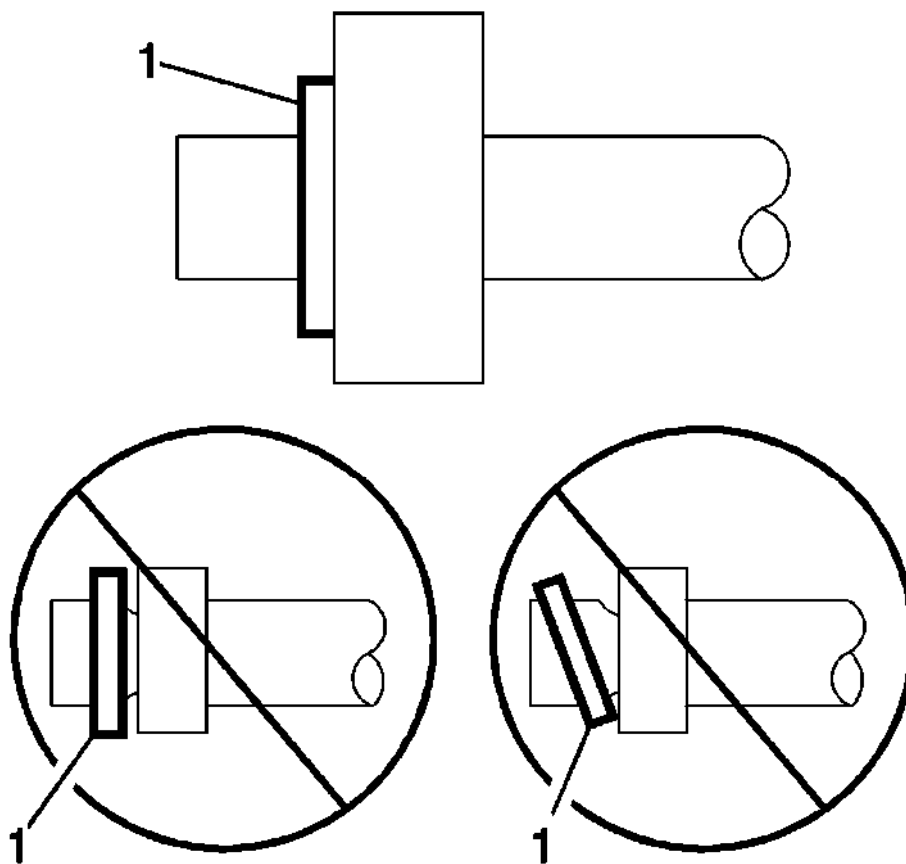


Fig. 16: Identifying Proper Seating Of A/C Refrigerant O-Ring
Courtesy of GENERAL MOTORS COMPANY

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

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

5. Cap or tape the A/C refrigerant components.
6. Discard the O-ring seal.

Installation Procedure

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

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 onto the A/C refrigerant component.

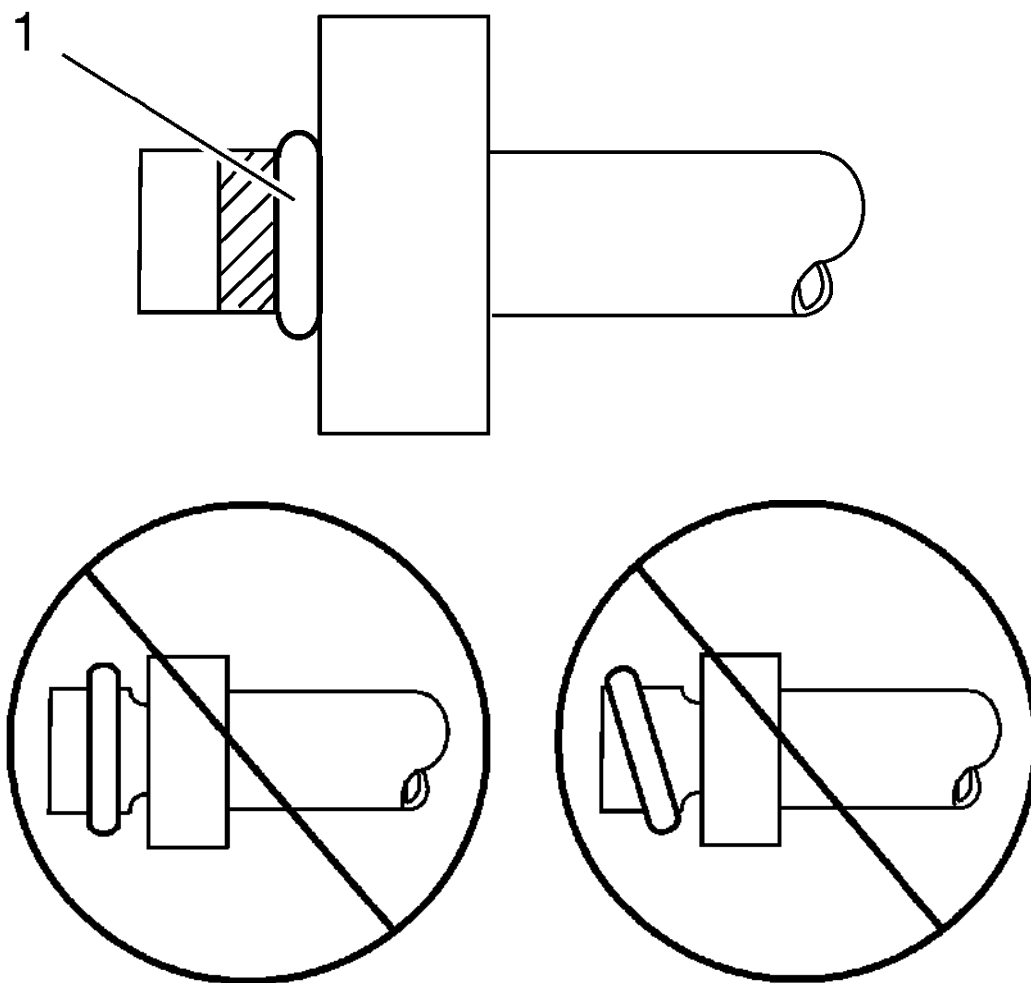


Fig. 17: O-ring

Courtesy of GENERAL MOTORS COMPANY

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

AIR CONDITIONING COMPRESSOR AND CONDENSER HOSE REPLACEMENT (1.4L LUV)

Removal Procedure

1. Recover the refrigerant. Refer to **Refrigerant Recovery and Recharging**.
2. Remove front bumper fascia. Refer to **Front Bumper Fascia Replacement**.
3. Remove headlamp - right side. Refer to **Headlamp Replacement**.

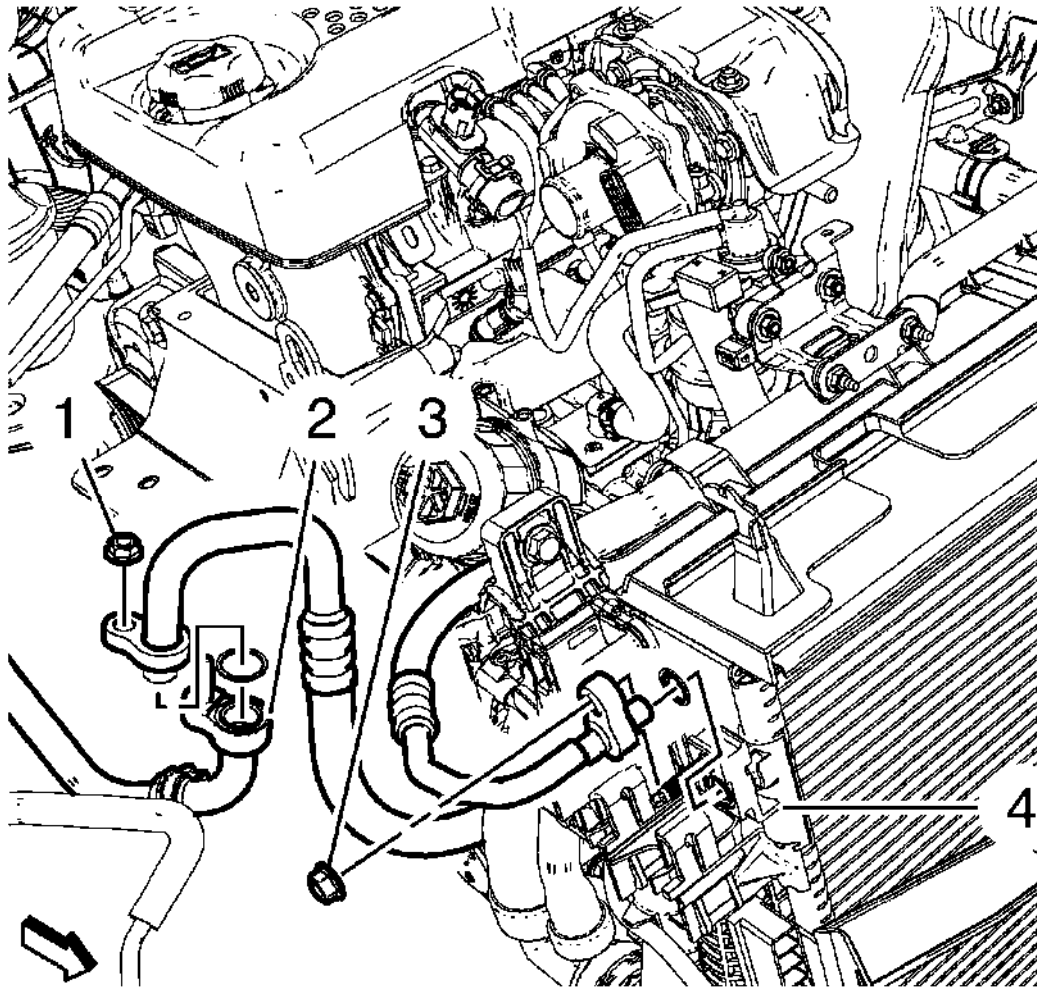


Fig. 18: Condenser Hose Nut

Courtesy of GENERAL MOTORS COMPANY

4. Remove air conditioning compressor and condenser hose nut (1) from refrigerant hose (2).
5. Remove air conditioning compressor and condenser hose nut (3) from air conditioning condenser (4).
6. Remove and DISCARD the seals from the air conditioning compressor and condenser hose.

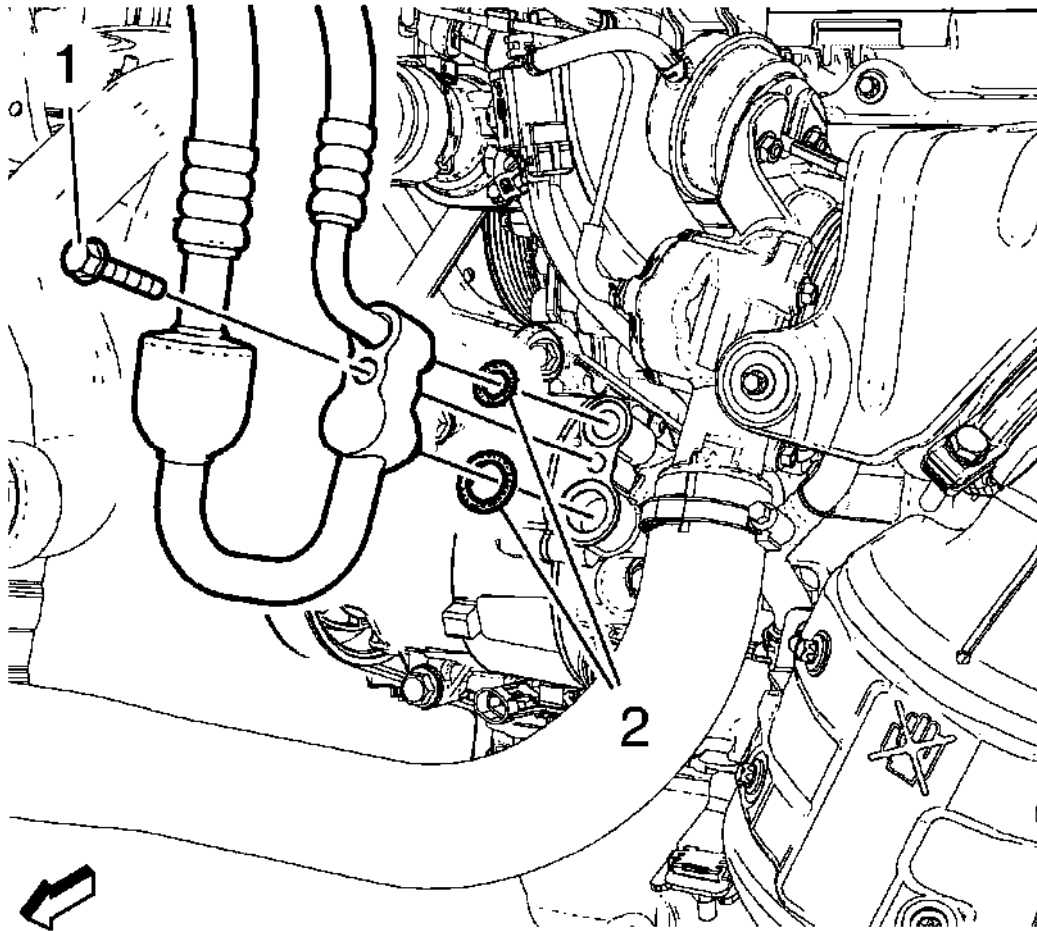


Fig. 19: Condenser Hose Bolt

Courtesy of GENERAL MOTORS COMPANY

7. Remove air conditioning compressor and condenser hose bolt (1).
8. Remove air conditioning compressor and condenser hose.
9. Remove and DISCARD the air conditioning compressor and condenser hose seals (2).

Installation Procedure

1. Install 4 NEW system seals to the air conditioning compressor and condenser hose. Refer to **Air Conditioning System Seal Replacement**.
2. Install air conditioning compressor and condenser hose.

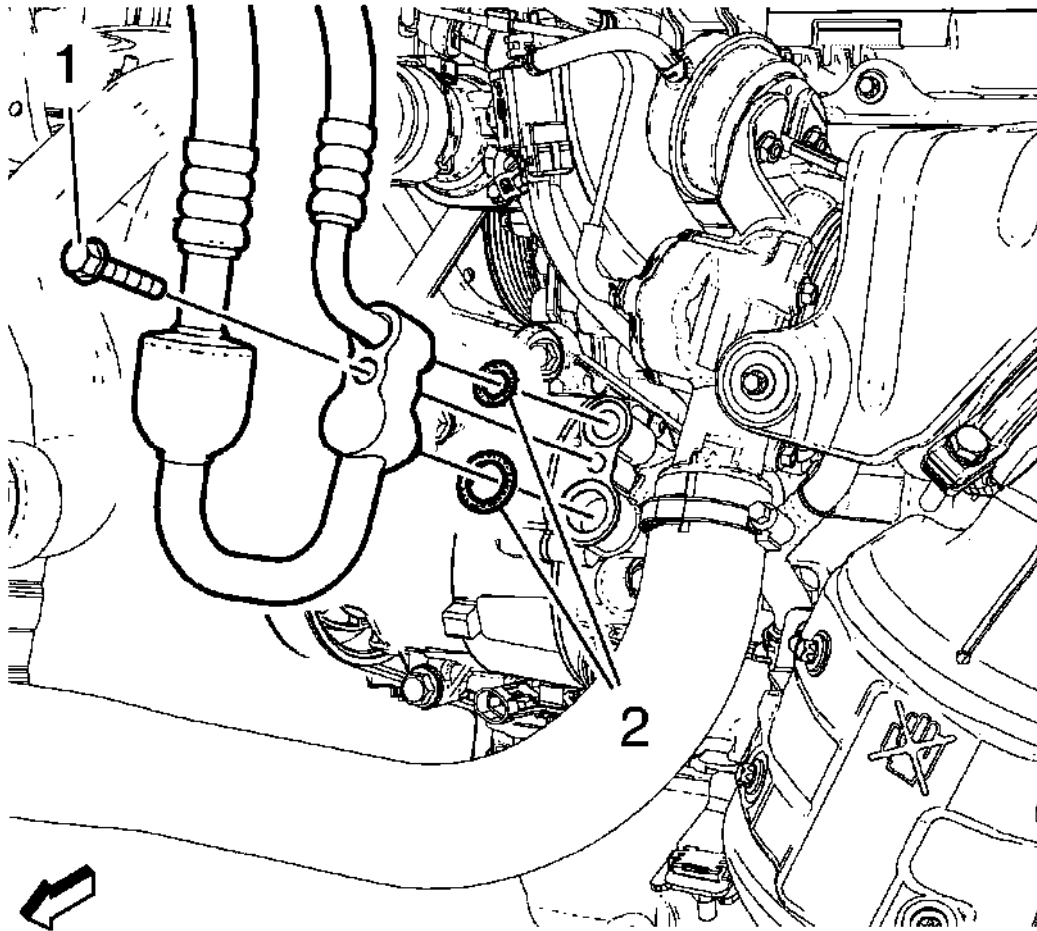


Fig. 20: Condenser Hose Bolt

Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to Fastener Caution .

3. Install air conditioning compressor and condenser hose bolt (1) tighten to 19 N.m (14 lb ft).

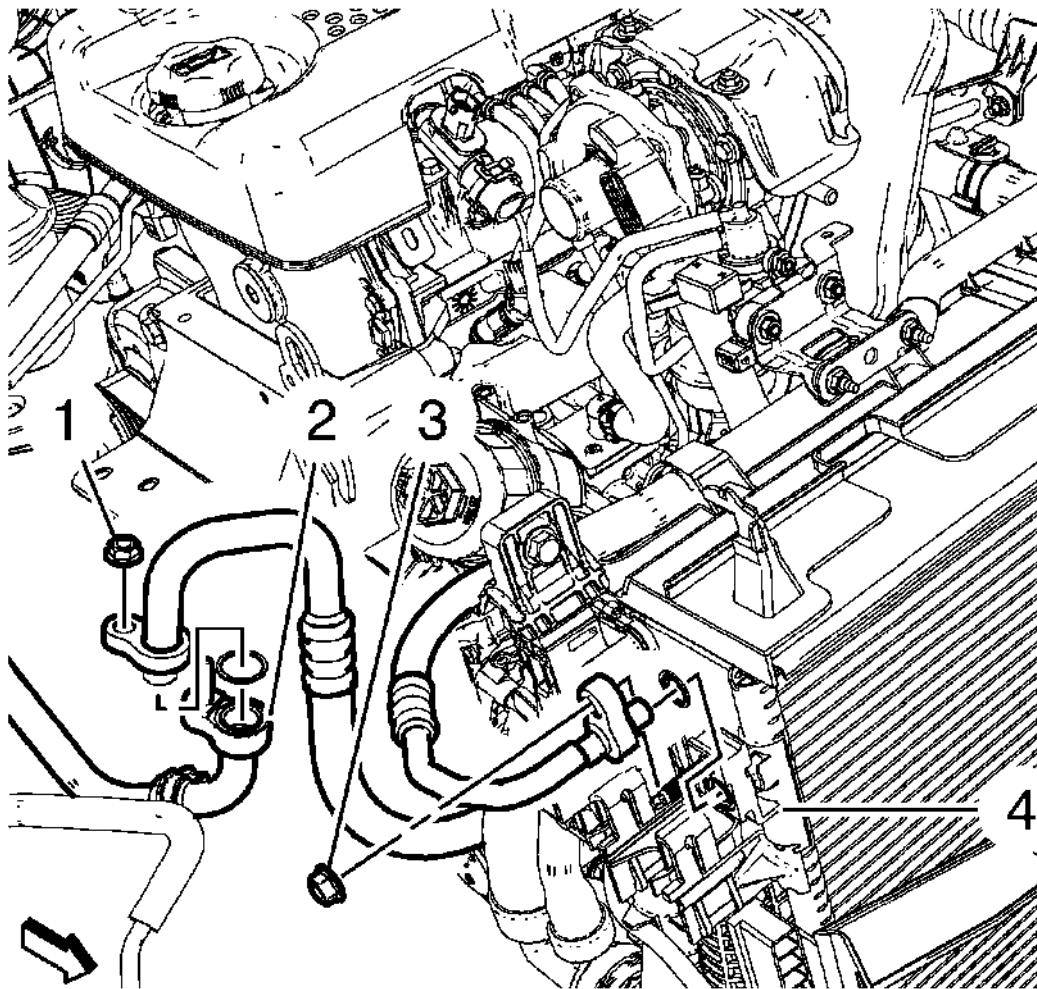


Fig. 21: Condenser Hose Nut

Courtesy of GENERAL MOTORS COMPANY

4. Install air conditioning compressor and condenser hose nut (3) to air conditioning condenser (4) and tighten to 19 N.m (14 lb ft).
5. Install air conditioning compressor and condenser hose nut (1) to air conditioning refrigerant hose (2) and tighten to 19 N.m (14 lb ft).
6. Install headlamp - right side. Refer to **Headlamp Replacement** .
7. Install front bumper fascia. Refer to **Front Bumper Fascia Replacement** .
8. Evacuate and charge the refrigerant system. Refer to **Refrigerant Recovery and Recharging**.

AIR CONDITIONING COMPRESSOR AND CONDENSER HOSE REPLACEMENT (1.8L LUW AND LWE)

Removal Procedure

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

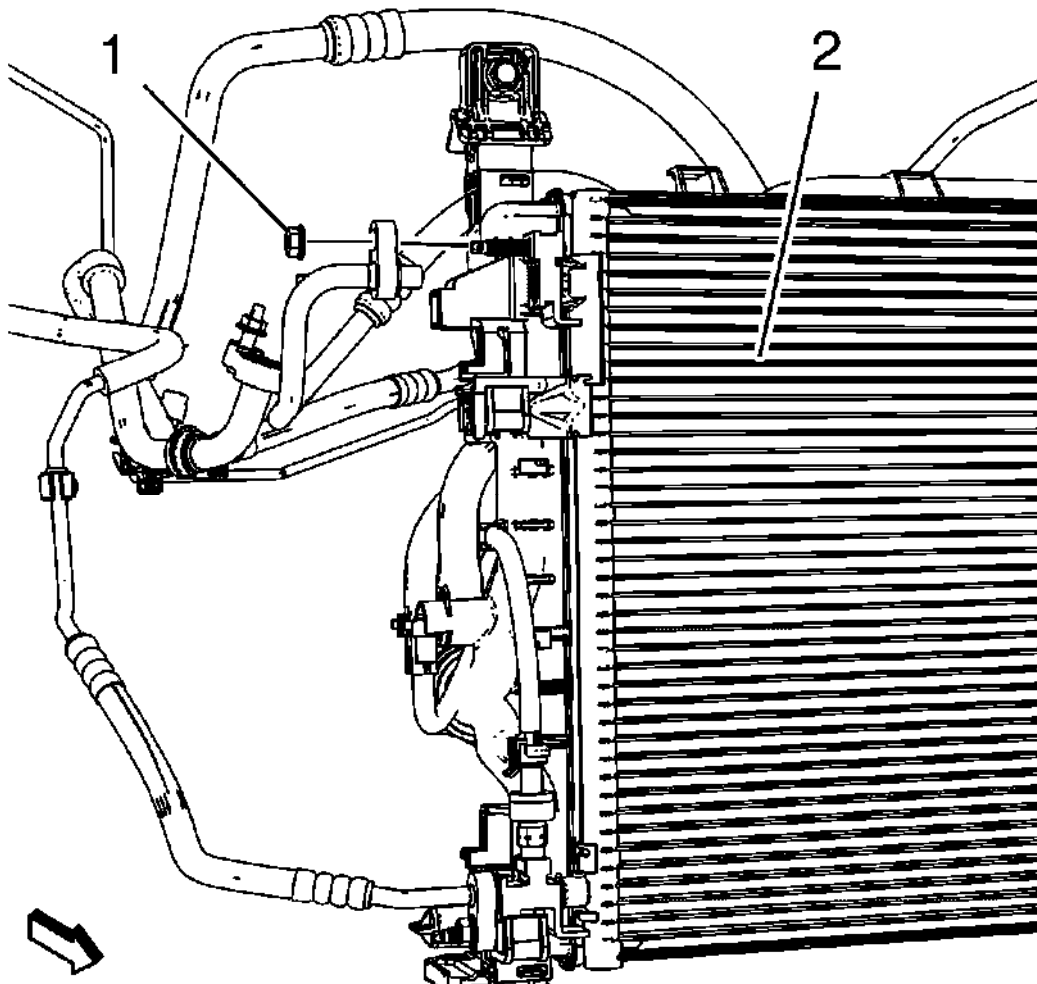


Fig. 22: Air Conditioning Condenser
Courtesy of GENERAL MOTORS COMPANY

3. Remove air conditioning compressor and condenser hose nut (1) from air conditioning condenser (2).

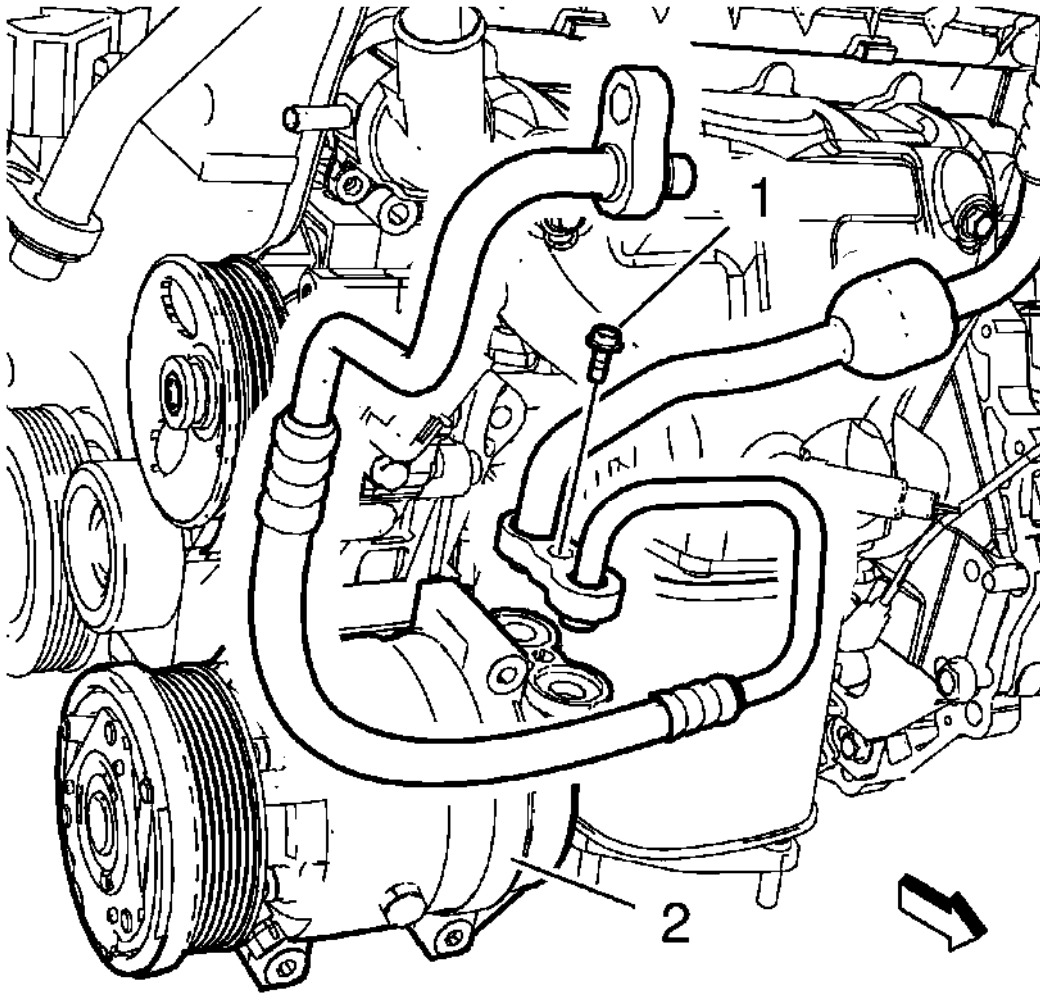


Fig. 23: Air Conditioning Compressor
Courtesy of GENERAL MOTORS COMPANY

4. Remove air conditioning compressor and condenser hose bolt (1) from air conditioning compressor (2).

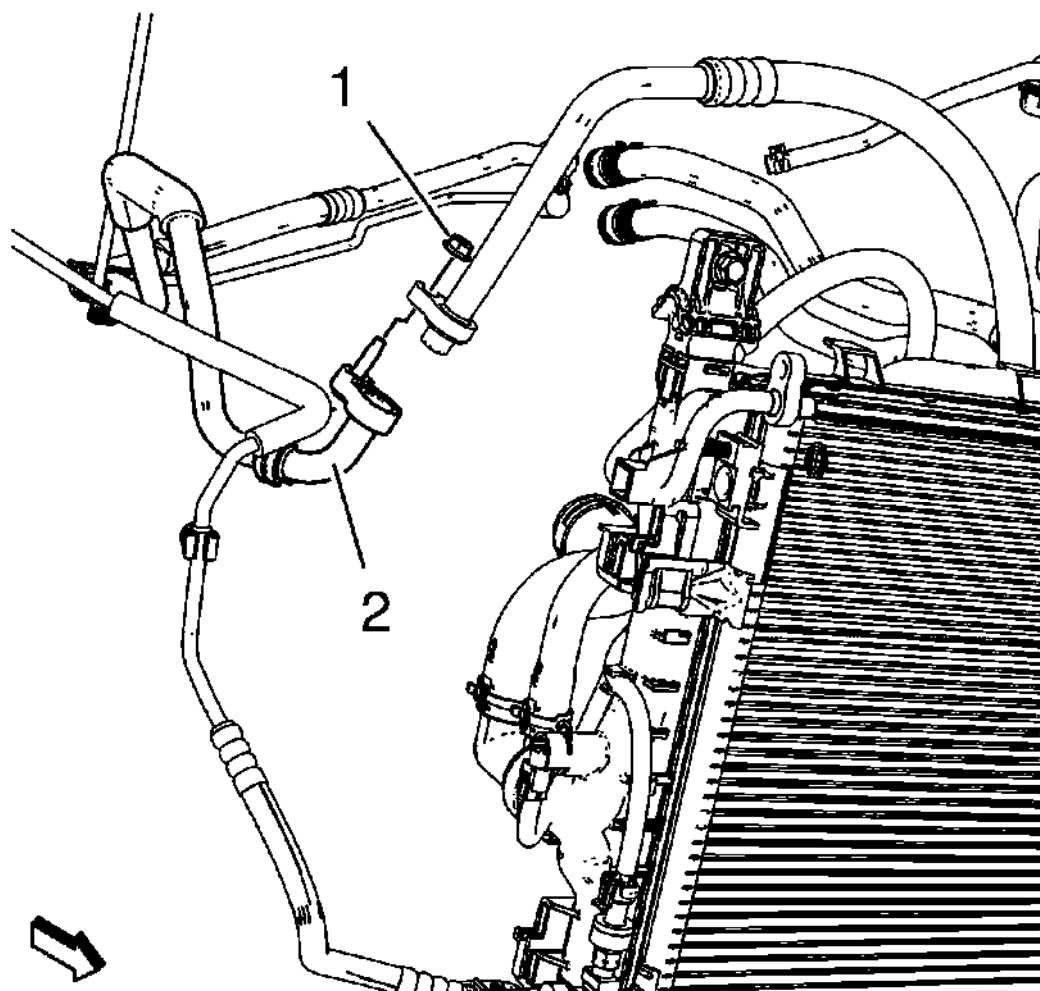


Fig. 24: Air Conditioning Evaporator Hose
Courtesy of GENERAL MOTORS COMPANY

5. Remove air conditioning compressor and condenser hose nut (1) from air conditioning evaporator hose (2).
6. Remove air conditioning compressor and condenser hose.
7. Remove and DISCARD 4 air conditioning compressor and condenser hose seals.

Installation Procedure

1. Install 4 NEW air conditioning compressor and condenser hose seals. Refer to **Air Conditioning System Seal Replacement**.
2. Install air conditioning compressor and condenser hose.

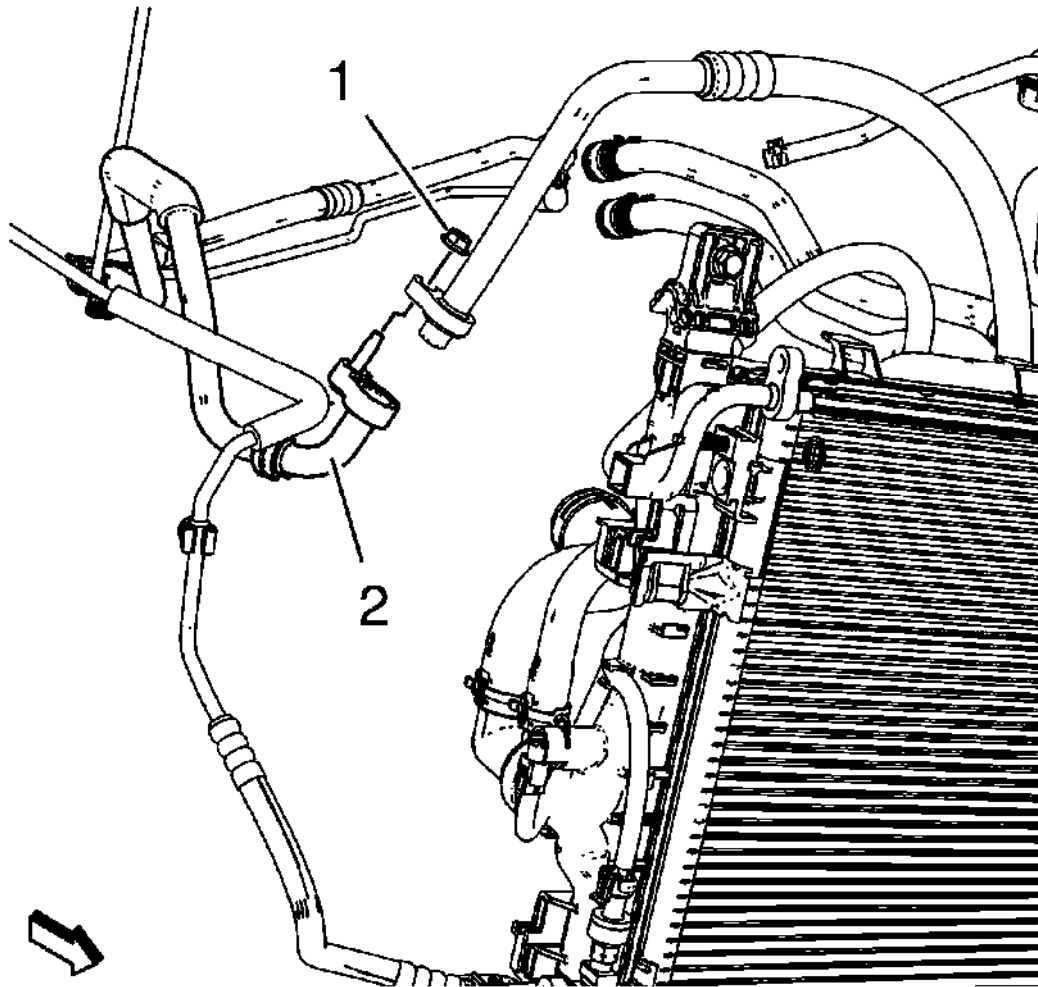


Fig. 25: Air Conditioning Evaporator Hose
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to Fastener Caution .

3. Install air conditioning compressor and condenser hose nut (1) to air conditioning evaporator hose (2). Tighten nut to 19 N.m (14 lb ft).

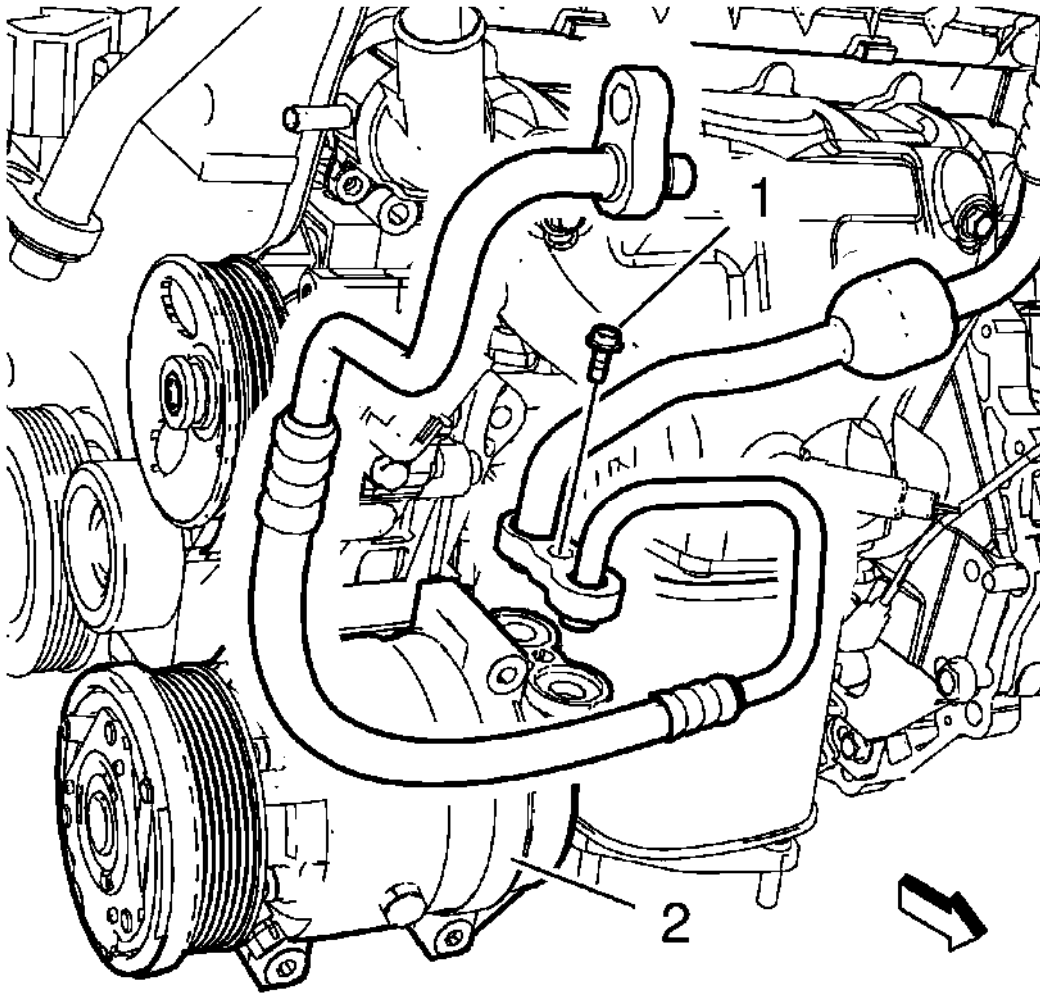


Fig. 26: Air Conditioning Compressor
Courtesy of GENERAL MOTORS COMPANY

4. Install air conditioning compressor and condenser hose bolt (1) to air conditioning compressor (2). Tighten bolt to 19 N.m (14 lb ft).

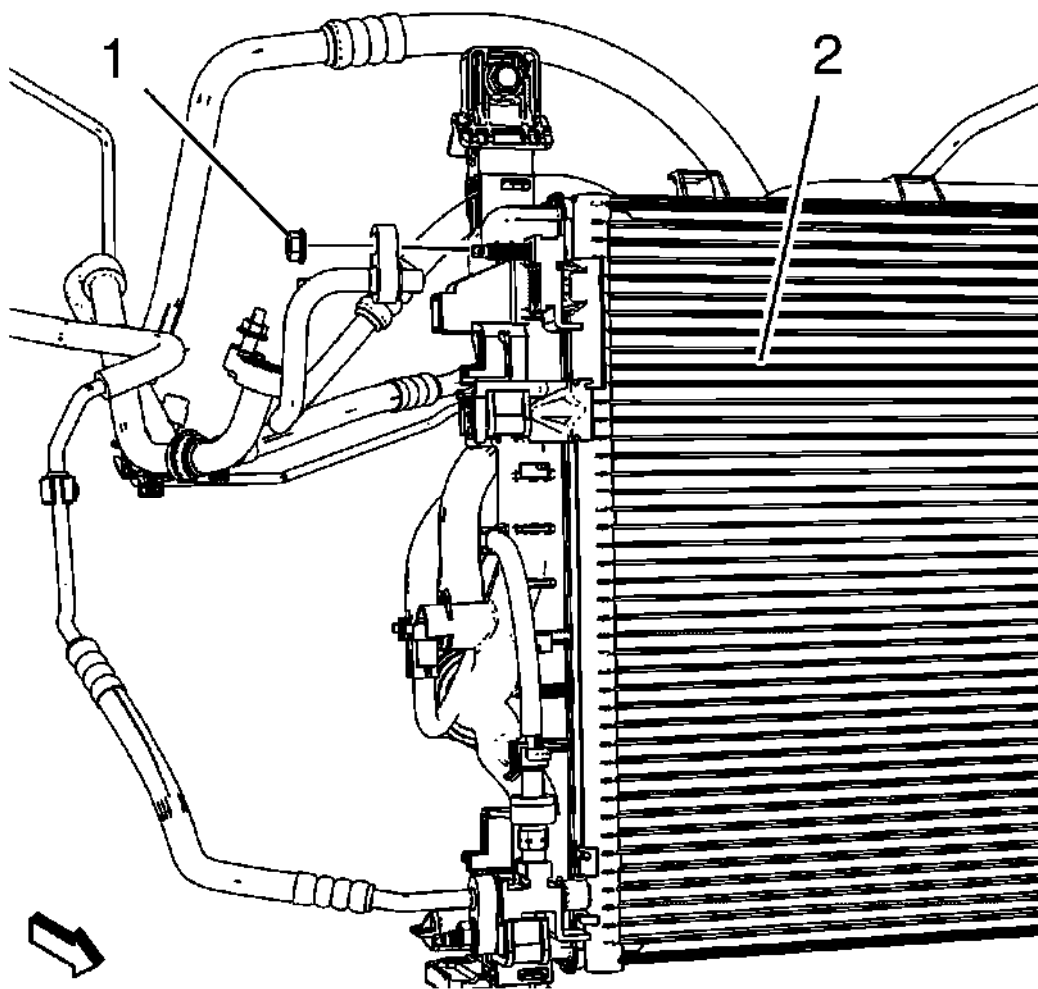


Fig. 27: Air Conditioning Condenser

Courtesy of GENERAL MOTORS COMPANY

5. Install air conditioning compressor and condenser hose nut (1) to air conditioning condenser (2). Tighten nut to 19 N.m (14 lb ft).
6. Install front bumper fascia. Refer to **Front Bumper Fascia Replacement**.
7. Evacuate and charge the refrigerant system. Refer to **Refrigerant Recovery and Recharging**.

AIR CONDITIONING EVAPORATOR HOSE ASSEMBLY REPLACEMENT

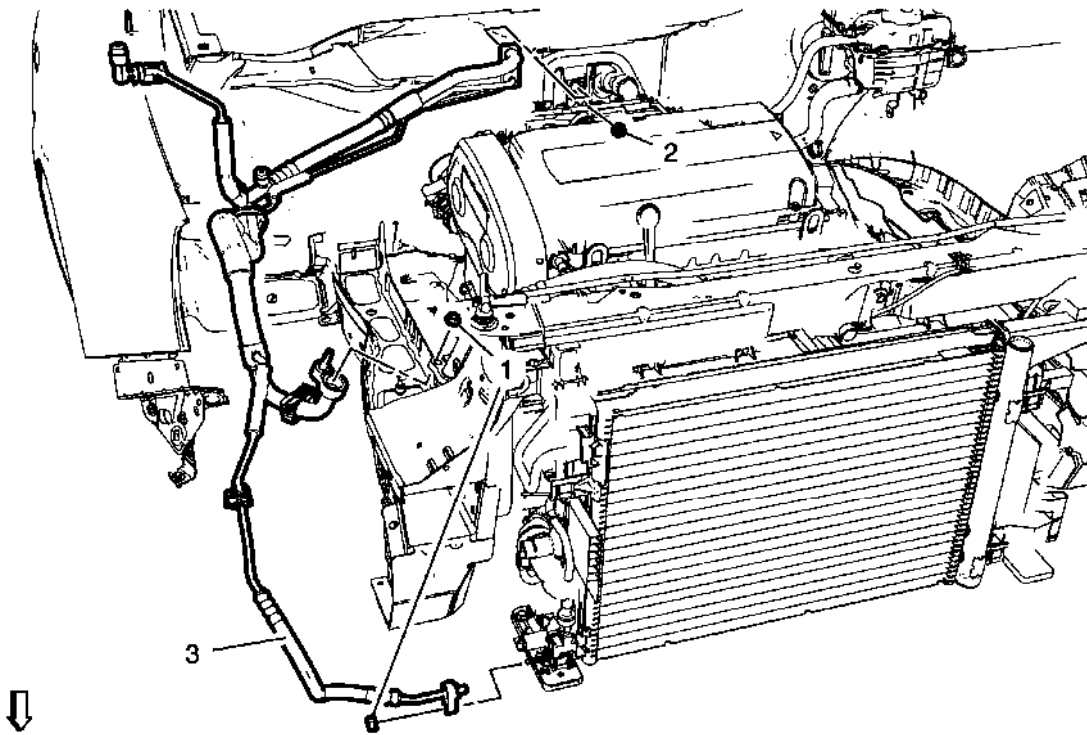


Fig. 28: Air Conditioning Evaporator Hose Assembly
 Courtesy of GENERAL MOTORS COMPANY

Air Conditioning Evaporator Hose Assembly Replacement

Callout	Component Name
Preliminary Procedures 1. Disconnect the negative battery cable. Refer to <u>Battery Negative Cable Disconnection and Connection</u> . 2. Recover the refrigerant. Refer to <u>Refrigerant Recovery and Recharging</u>. 3. Remove the headlamp - right side. Refer to <u>Headlamp Replacement</u> . 4. Remove the brake pipes from the dash lower extension panel. 5. Remove engine mount. • 1.4L LUV - Refer to <u>Engine Mount Replacement - Right Side</u> . • 1.8L LUW and LWE - Refer to <u>Engine Mount Replacement - Right Side</u> .	
1	Air Conditioning Evaporator Hose Assembly Nut (Qty: 2) CAUTION: Refer to <u>Fastener Caution</u> . Tighten 19 N.m (14 lb ft)

2	Air Conditioning Evaporator Hose Assembly Nut to Air Conditioning Evaporator Thermal Expansion Valve Tighten 19 N.m (14 lb ft)
3	Air Conditioning Evaporator Hose Assembly Procedure Unclip from body.

SUCTION SCREEN INSTALLATION

Special Tools

GE-44551 Suction Screen Kit

Installation Procedure

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

1. Remove the A/C compressor and condenser hose from the A/C compressor. Refer to **Air Conditioning Compressor and Condenser Hose Replacement (1.8L LUW and LWE)**, **Air Conditioning Compressor and Condenser Hose Replacement (1.4L LUV)**.
2. Using a caliper that reads to 3 decimal places, measure the ID of the manifold suction fitting. To determine the correct size screen for the application, refer to **Compressor Suction Screen and Tool Selection Specifications**.

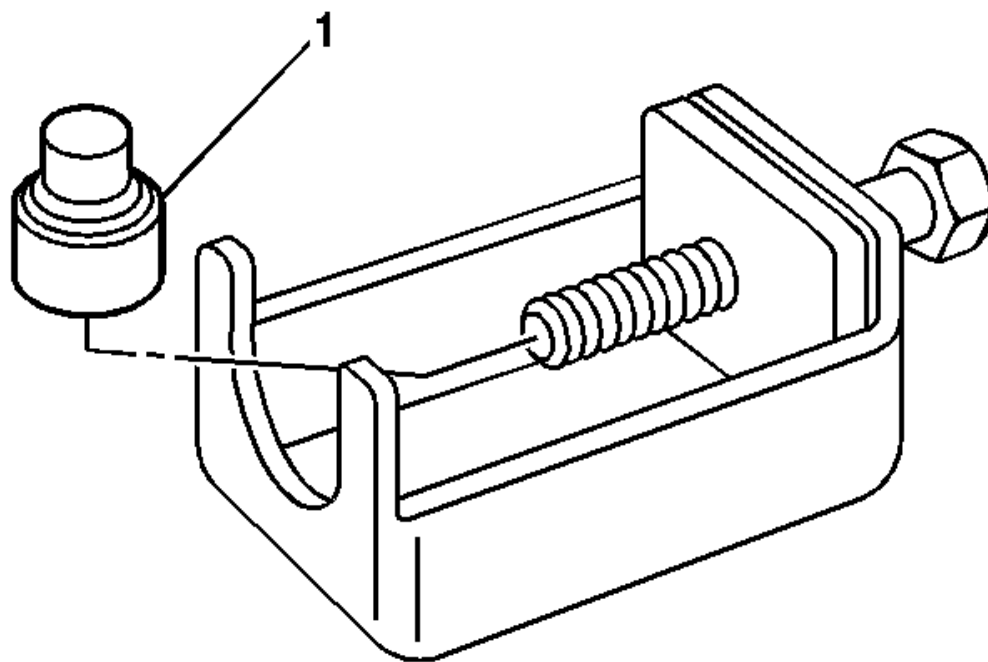


Fig. 29: View Of Mandrel And Special Tool
Courtesy of GENERAL MOTORS COMPANY

3. Select and install the correct mandrel (1) on the threaded portion of the installation tool bolt:
 - The brass universal mandrel is for use on hose fittings with a smooth bore where the screen installs flush with the end of the fitting.
 - The 11.96 mm (0.471 in) mandrel is only for the 11.96 mm (0.471 in) screen in hose fittings with an internal hourglass shape where the screen installs at the recessed, reduced diameter point.

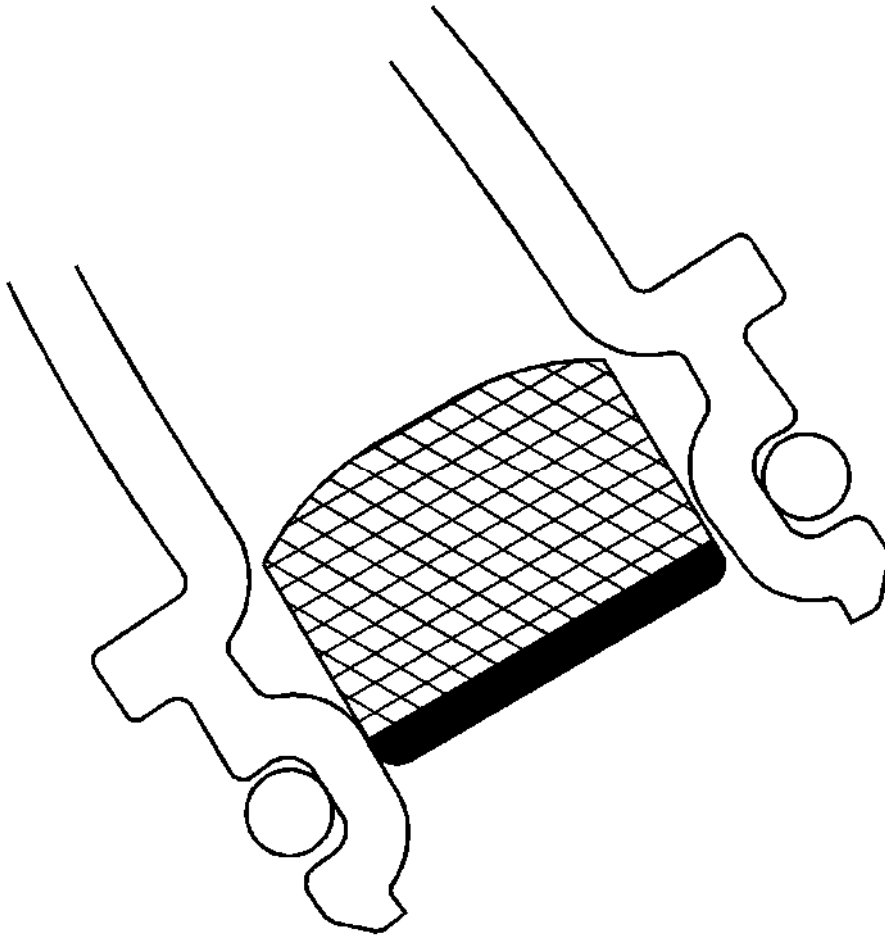


Fig. 30: View of Screen

Courtesy of GENERAL MOTORS COMPANY

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

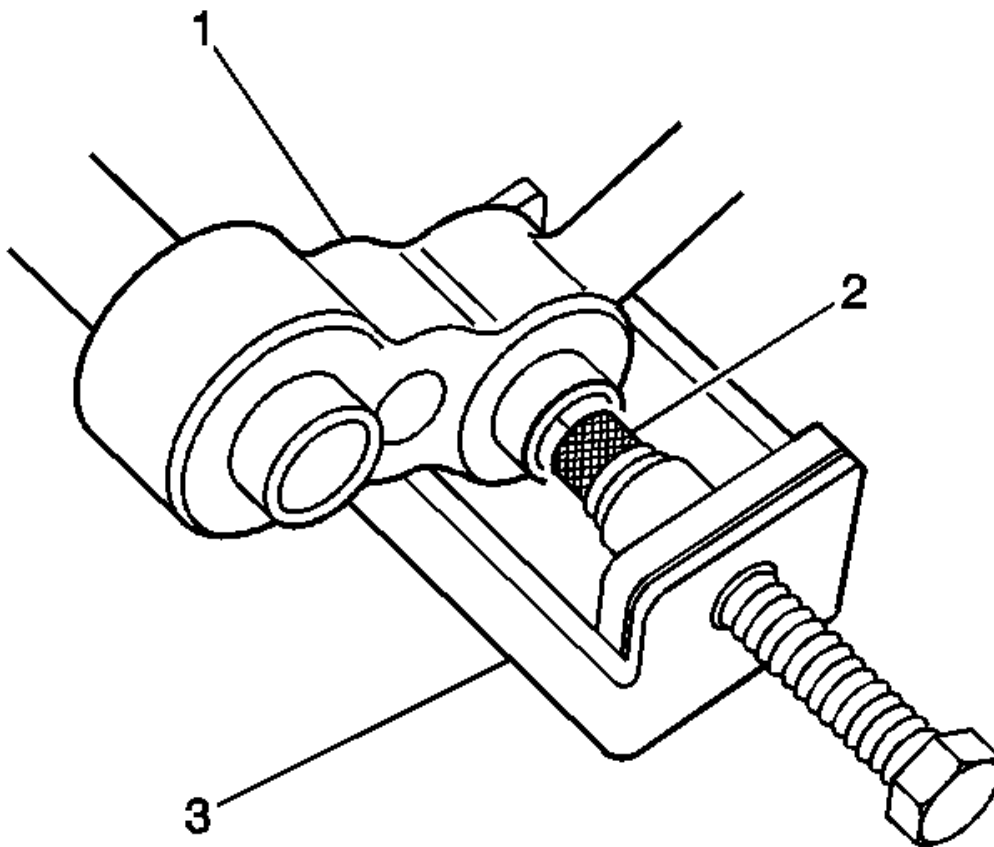


Fig. 31: Proper Placement Of J 44551-5
Courtesy of GENERAL MOTORS COMPANY

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

NOTE: **Correct placement of the GE-44551-5 installation tool fixture is critical.**

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

NOTE: **Clean the surface to be used for attaching the label.**

10. Install the **GE-44551-1** Suction Screen Notification Label.

11. Install the A/C compressor and condenser hose to the A/C compressor. Refer to **Air Conditioning Compressor and Condenser Hose Replacement (1.8L LUW and LWE)**, **Air Conditioning Compressor and Condenser Hose Replacement (1.4L LUV)**.

AIR CONDITIONING COMPRESSOR SUCTION SCREEN REPLACEMENT

Special Tools

GE-44551 Suction Screen Kit

Removal Procedure

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

1. Remove the A/C compressor and condenser hose from the A/C compressor. Refer to **Air Conditioning Compressor and Condenser Hose Replacement (1.8L LUW and LWE)**, **Air Conditioning Compressor and Condenser Hose Replacement (1.4L LUV)**.

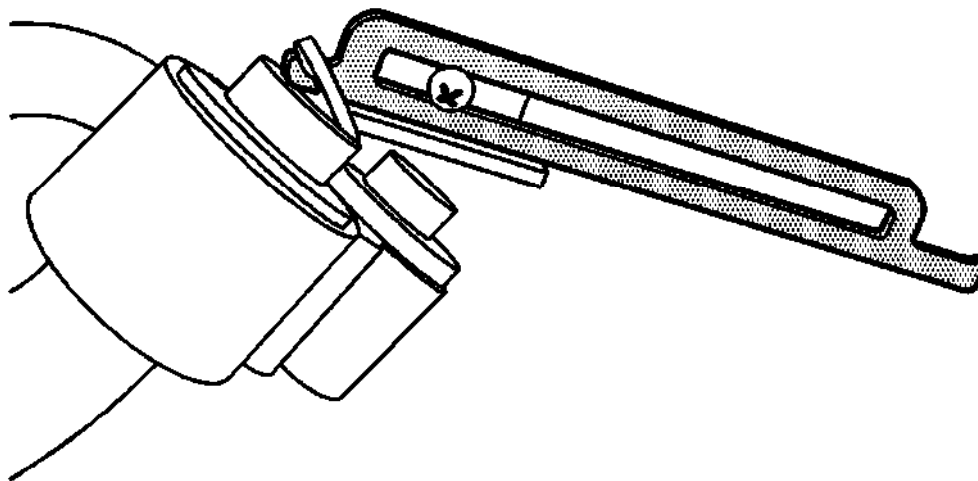


Fig. 32: View Of Universal Removal Tool**Courtesy of GENERAL MOTORS COMPANY**

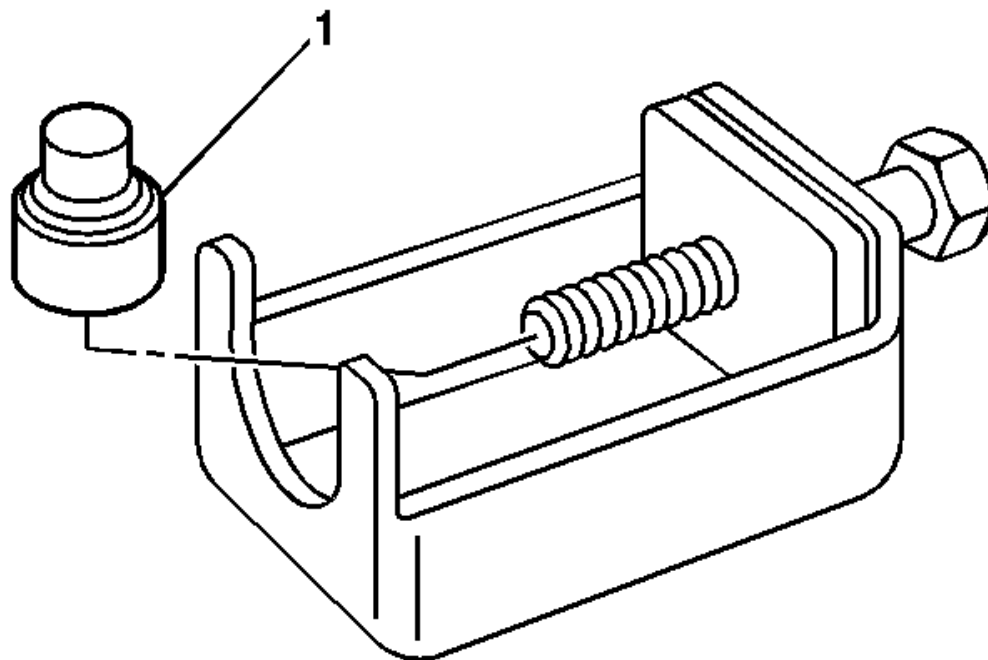
2. Using the **GE-44551-9** Universal Removal Tool, place the tip of the tool under the inside edge of the compression band of the suction screen and the cushioning fulcrum pad against the open end of the manifold fitting.

NOTE: **Do not damage the end of the hose or manifold.**

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

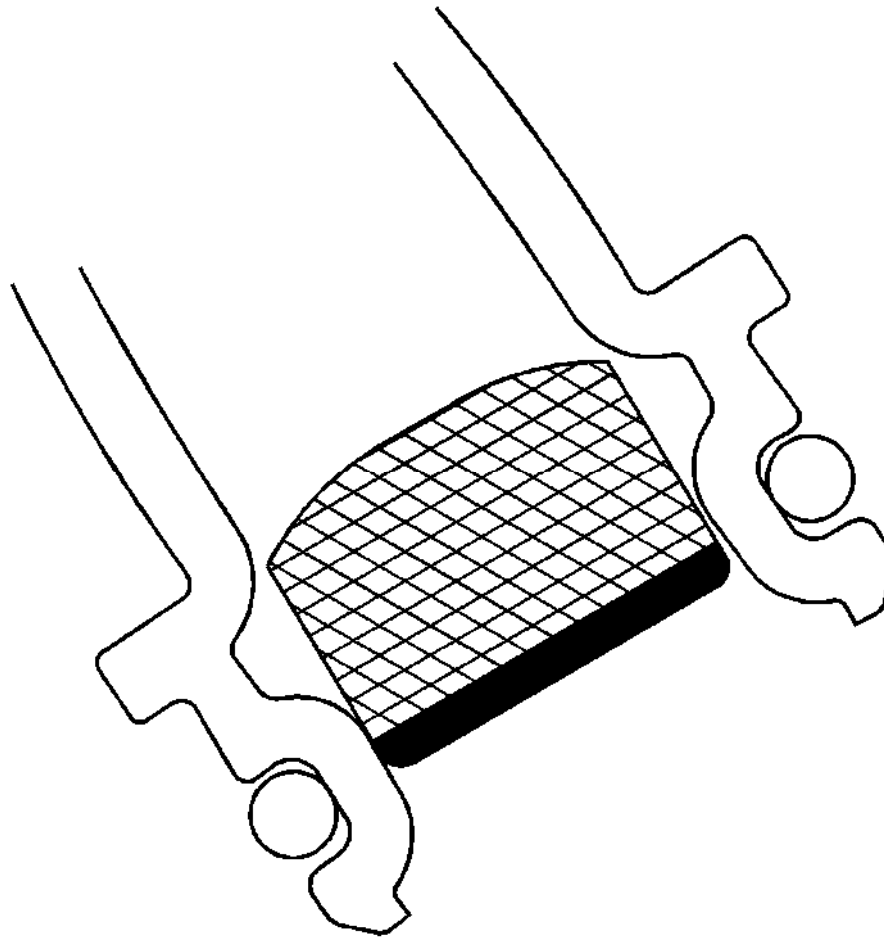
Installation Procedure

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

**Fig. 33: View Of Mandrel And Special Tool**

Courtesy of GENERAL MOTORS COMPANY

2. Select and install the correct mandrel (1) on the threaded portion of the installation tool bolt:
 - The brass universal mandrel is for use on hose fittings with a smooth bore where the screen installs flush with the end of the fitting.
 - The 11.96 mm (0.471 in) mandrel is only for the 11.96 mm (0.471 in) screen in hose fittings with an internal hourglass shape where the screen installs at the recessed, reduced diameter point.

**Fig. 34: View of Screen****Courtesy of GENERAL MOTORS COMPANY**

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

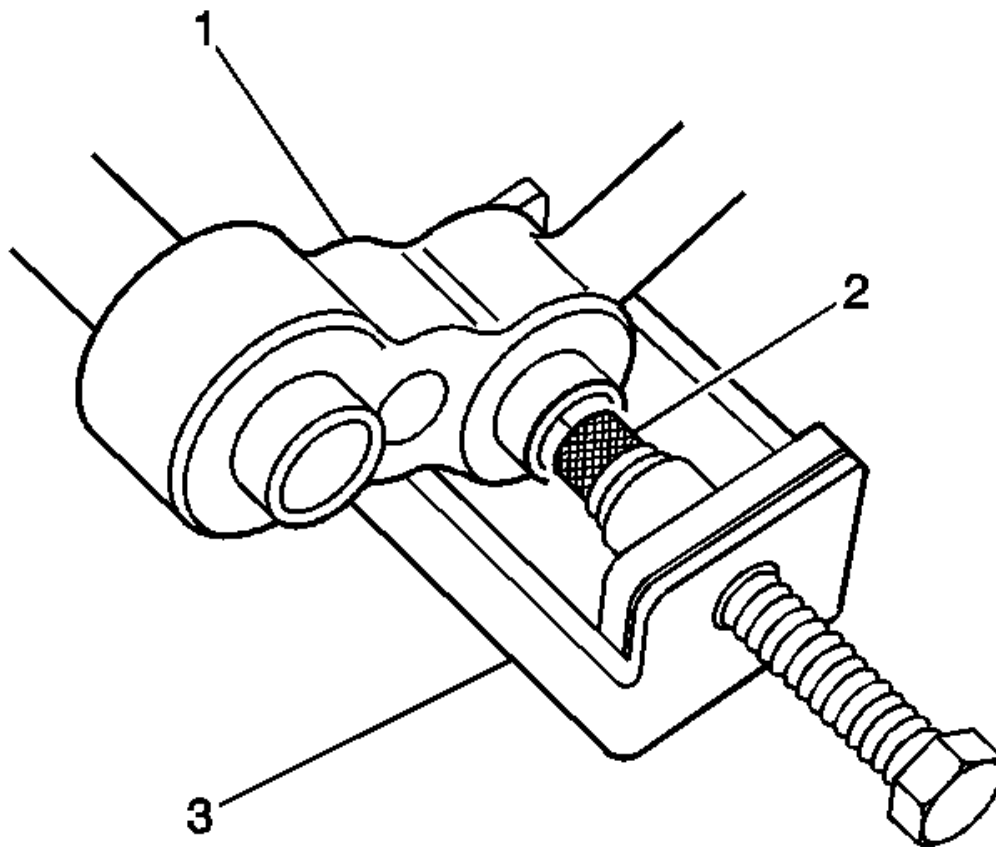


Fig. 35: Proper Placement Of J 44551-5
Courtesy of GENERAL MOTORS COMPANY

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

NOTE: Correct placement of the **GE-44551-5** installation tool fixture is critical.

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

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

8. Install the **GE-44551-1** Suction Screen Notification Label.

9. Install the A/C compressor and condenser hose to the A/C compressor. Refer to **Air Conditioning Compressor and Condenser Hose Replacement (1.8L LUW and LWE)**, **Air Conditioning Compressor and Condenser Hose Replacement (1.4L LUV)**.

AIR CONDITIONING REFRIGERANT SERVICE VALVE CORE REPLACEMENT

Special Tools

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

For equivalent regional tools, refer to **Special Tools**.

Removal Procedure

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

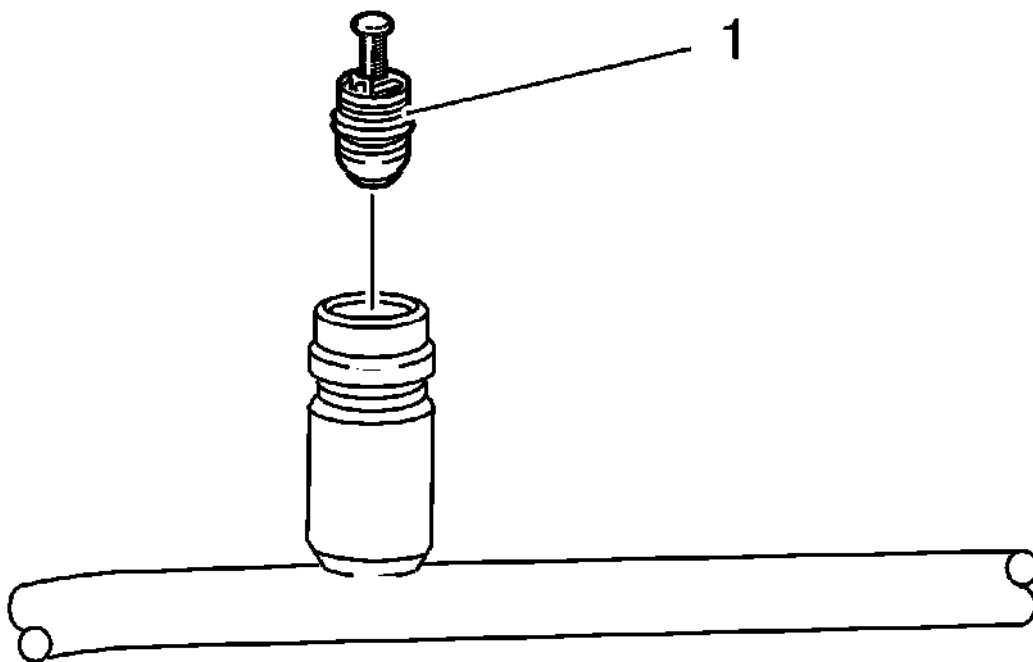


Fig. 36: Service Port Valve Core

Courtesy of GENERAL MOTORS COMPANY

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

Installation Procedure

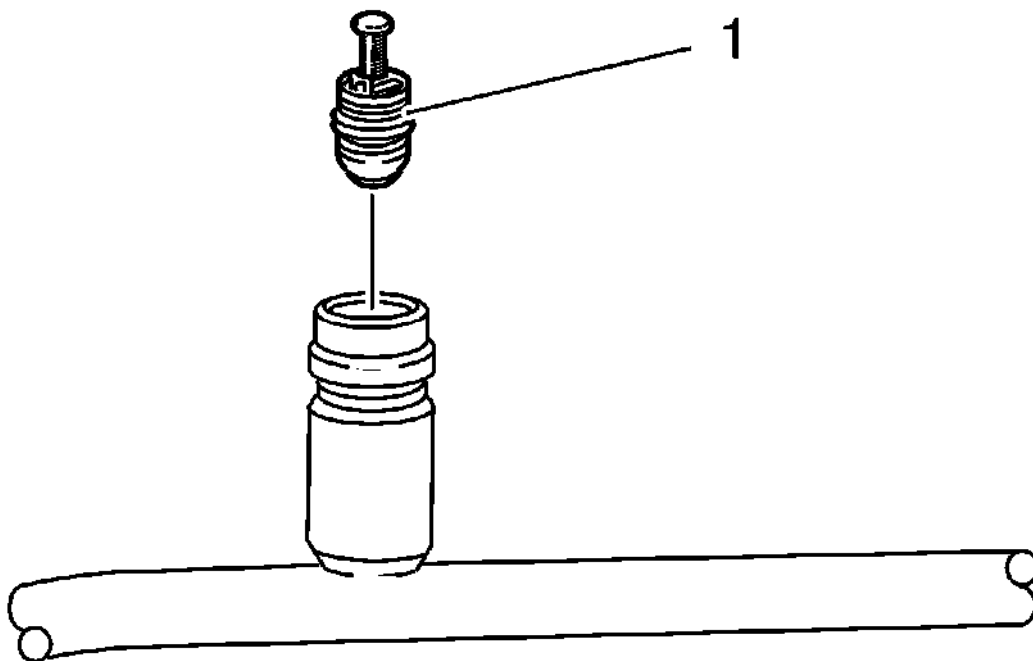


Fig. 37: Service Port Valve Core

Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to Fastener Caution .

1. Install the service port valve core using (1) **GE-46246** remover and tighten to 3 N.m (22 lb in).
2. Evacuate and charge the refrigerant system. Refer to Refrigerant Recovery and Recharging.
3. Leak test the fittings using the **GE-39400-A** detector.

AIR CONDITIONING REFRIGERANT DESICCANT REPLACEMENT**Special Tools**

GE 39400-A Halogen Leak Detector

For equivalent regional tools, refer to **Special Tools**.

Removal Procedure

1. Disconnect the negative battery cable. Refer to **Battery Negative Cable Disconnection and Connection** .
2. Recover the refrigerant. Refer to **Refrigerant Recovery and Recharging**.
3. Remove the front bumper fascia opening lower cover. Refer to **Front Bumper Fascia Opening Lower Cover Replacement** .

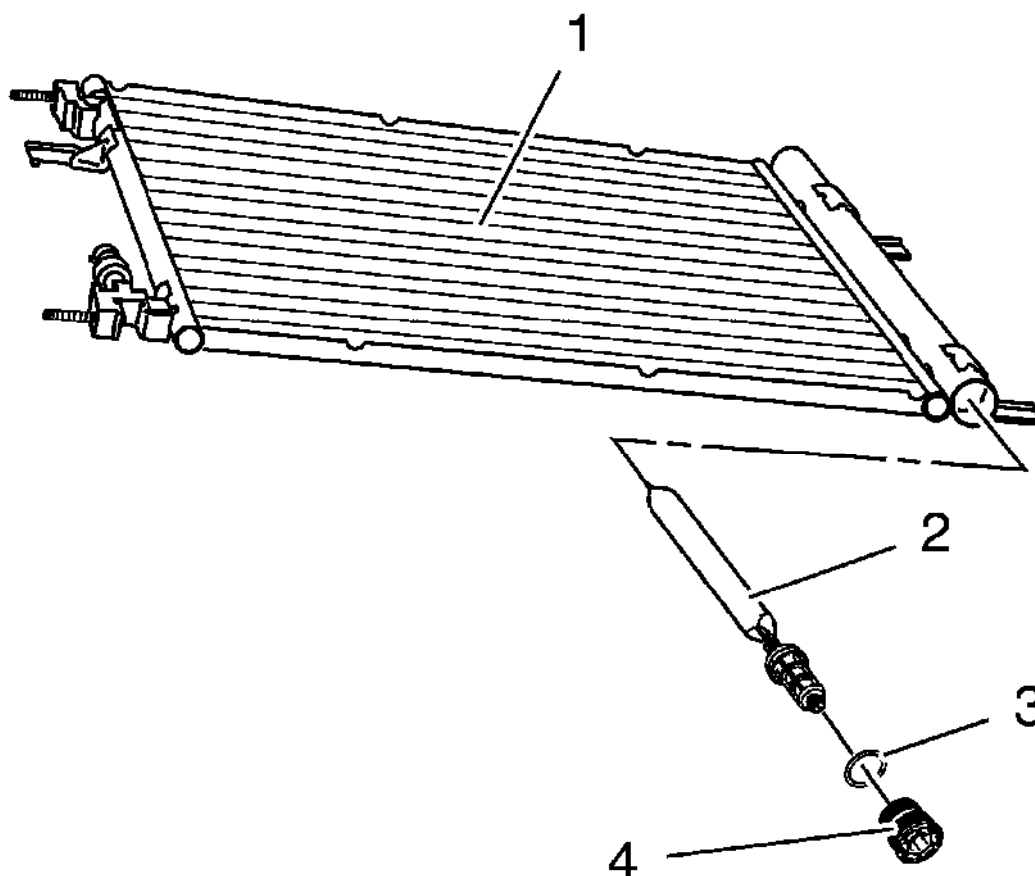


Fig. 38: Air Conditioning Receiver And Dehydrator Plug

Courtesy of GENERAL MOTORS COMPANY

4. Remove the air conditioning receiver and dehydrator plug (4).

NOTE: Cap all air conditioning components immediately to prevent system contamination.

5. Remove and DISCARD the sealing washers (3).
6. Remove the air conditioning refrigerant desiccant (2) from the air conditioning condenser (1).

Installation Procedure

1. Uncap air conditioning components.

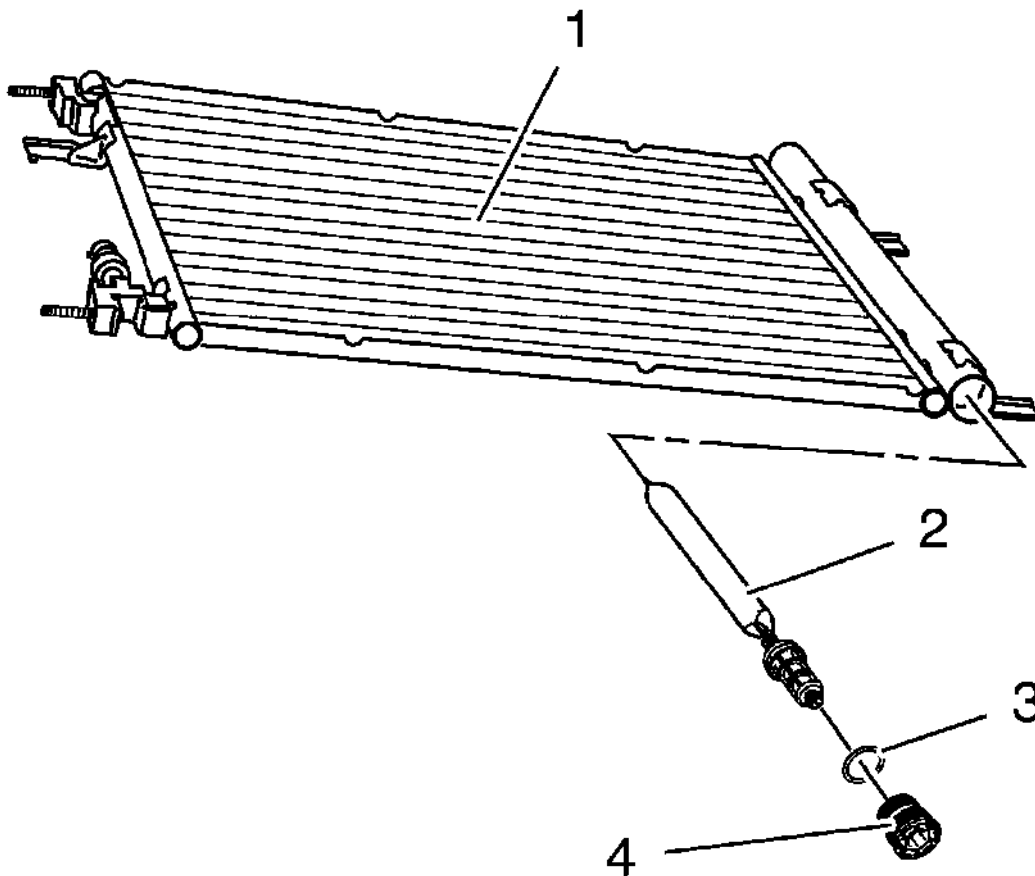


Fig. 39: Air Conditioning Receiver And Dehydrator Plug
Courtesy of GENERAL MOTORS COMPANY

2013 Chevrolet Cruze

2013 HVAC Heating, Ventilation, and Air Conditioning - Cruze

2. Install NEW sealing washers (3).
3. Install the air conditioning refrigerant desiccant (2) into air conditioning condenser (1).
4. Install the air conditioning receiver and dehydrator plug (4).
5. Install the front bumper fascia opening lower cover. Refer to **Front Bumper Fascia Opening Lower Cover Replacement** .
6. Evacuate and charge the refrigerant system. Refer to **Refrigerant Recovery and Recharging**.
7. Leak test the fittings using the **GE 39400-A** detector.
8. Connect the negative battery cable. Refer to **Battery Negative Cable Disconnection and Connection** .

AIR CONDITIONING EVAPORATOR THERMAL EXPANSION VALVE REPLACEMENT

Special Tools

GE 39400-A Halogen Leak Detector

For equivalent regional tools, refer to **Special Tools**.

Removal Procedure

1. Recover the refrigerant. Refer to **Refrigerant Recovery and Recharging**.
2. Unclip brake pipes.

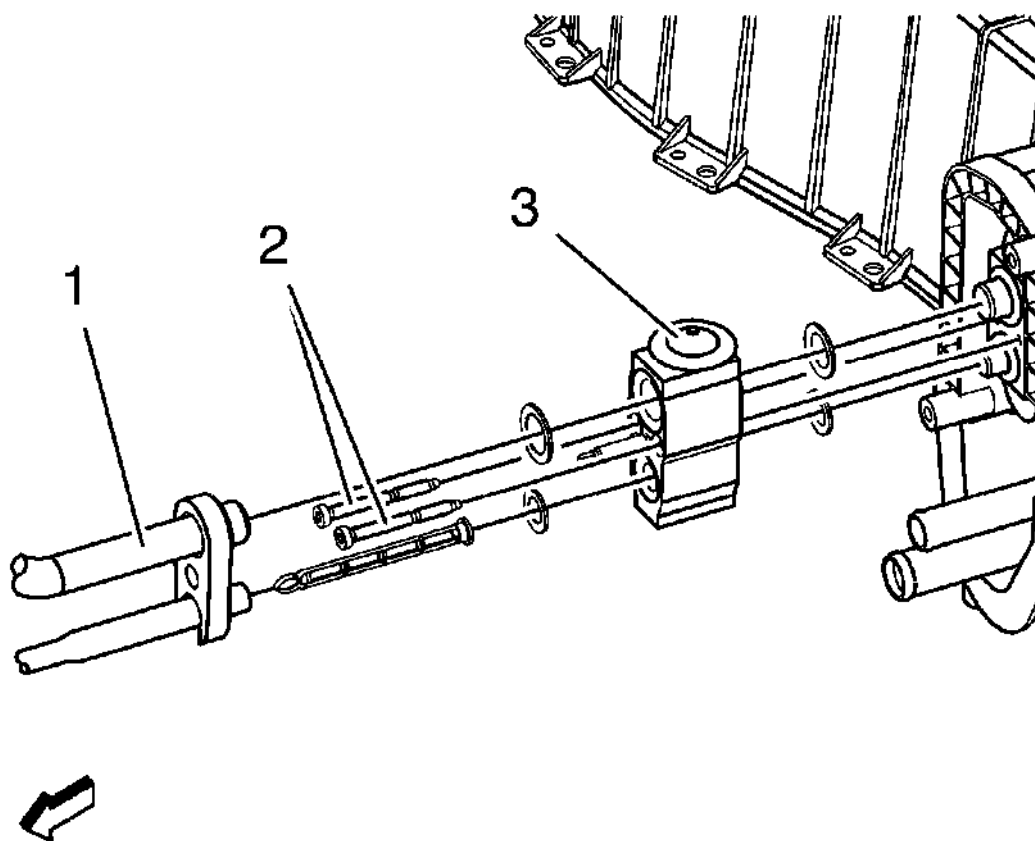


Fig. 40: Air Conditioning Evaporator Hose, Thermal Expansion Valve And Bolts
Courtesy of GENERAL MOTORS COMPANY

3. Remove the air conditioning evaporator hose bolt from the air conditioning evaporator thermal expansion valve.
4. Remove the air conditioning evaporator hose (1) from air conditioning evaporator thermal expansion valve.
5. Remove the 2 air conditioning evaporator thermal expansion valve bolts (2).
6. Remove the air conditioning evaporator thermal expansion valve (3).
7. Remove and DISCARD the seals from the air conditioning evaporator hose and from the evaporator core pipes.

Installation Procedure

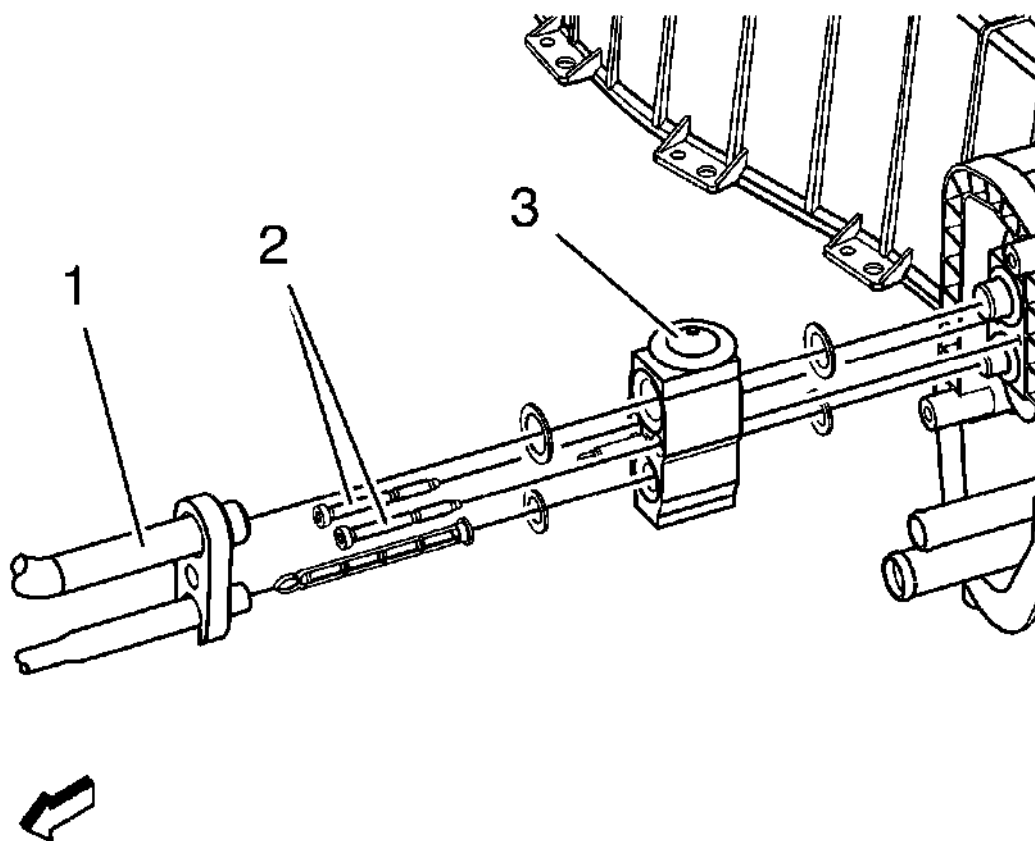


Fig. 41: Air Conditioning Evaporator Hose, Thermal Expansion Valve And Bolts
Courtesy of GENERAL MOTORS COMPANY

1. Install NEW system seals. Refer to **Air Conditioning System Seal Replacement**.

CAUTION: Refer to **Fastener Caution** .

2. Install air conditioning evaporator thermal expansion valve (3) and the 2 air conditioning evaporator thermal expansion valve bolts (2) and tighten to 15 N.m (11 lb ft).
3. Install air conditioning evaporator hose (1) to air conditioning evaporator thermal expansion valve (3).

Install and tighten hose bolt to 19 N.m (14 lb ft).

4. Install brake pipes.
5. Evacuate and charge the refrigerant system. Refer to **Refrigerant Recovery and Recharging**.

6. Leak test the fittings using the **GE 39400-A** detector.

AIR CONDITIONING (A/C) REFRIGERANT PRESSURE SENSOR REPLACEMENT

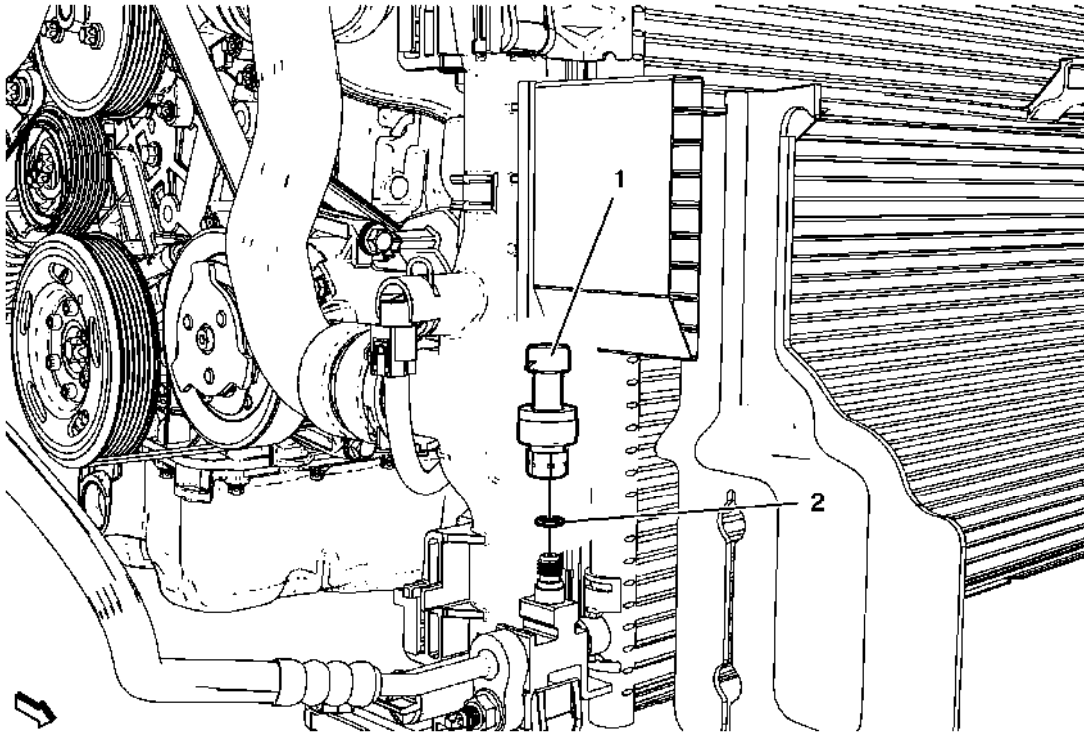


Fig. 42: Air Conditioning Refrigerant Pressure Sensor
Courtesy of GENERAL MOTORS COMPANY

Air Conditioning (A/C) Refrigerant Pressure Sensor Replacement

Callout	Component Name
Preliminary Procedures Remove front bumper fascia. Refer to Front Bumper Fascia Replacement .	
1	Air Conditioning Refrigerant Pressure Sensor CAUTION: Refer to Fastener Caution . Procedure Disconnect electrical connector. Tighten 6 N.m (53 lb in)
2	Air Conditioning Refrigerant Pressure Sensor O-ring Procedure Using GE 39400-A detector leak test A/C compressor fittings. Special Tools

GE 39400-A Electronic Halogen Leak Detector
For equivalent regional tools, refer to **Special Tools**.

AIR CONDITIONING CONDENSER REPLACEMENT

Removal Procedure

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

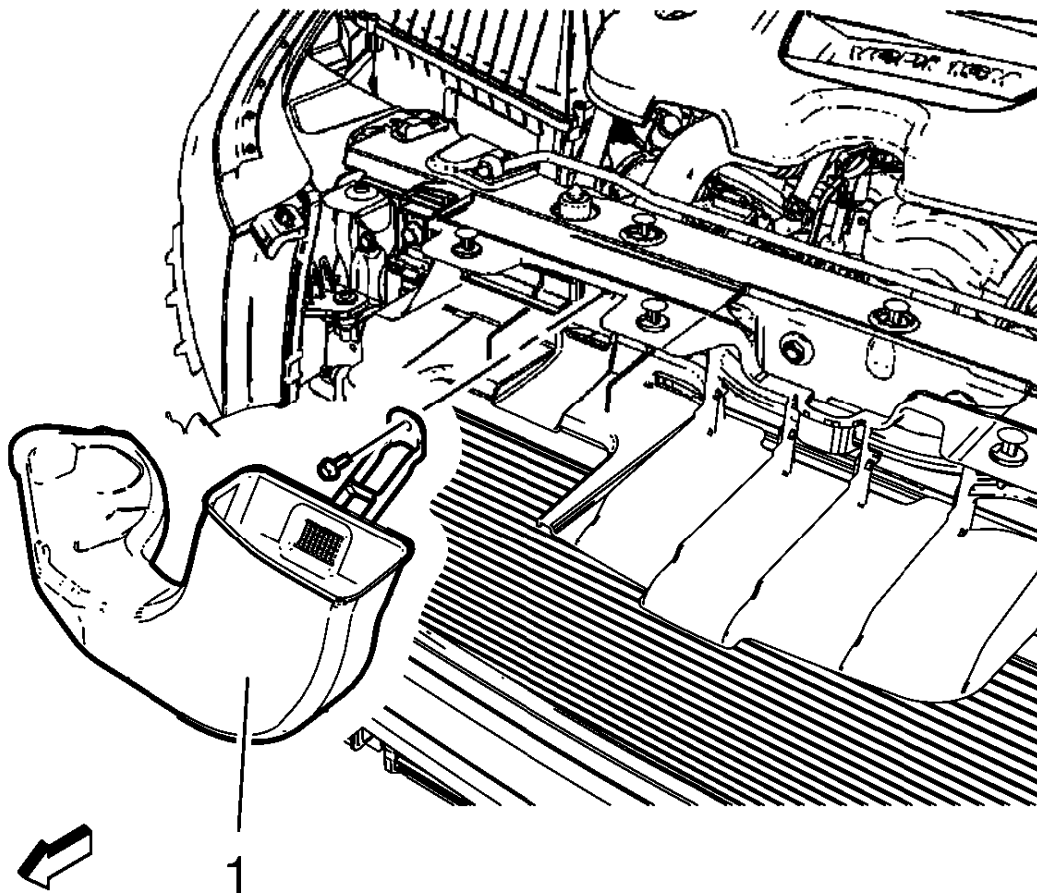


Fig. 43: Air Intake Duct

Courtesy of GENERAL MOTORS COMPANY

3. Remove air intake duct (1).
4. Remove air conditioning compressor and condenser hose from condenser. Refer to **Air Conditioning Compressor and Condenser Hose Replacement (1.8L LUW and LWE)**, **Air Conditioning Compressor and Condenser Hose Replacement (1.4L LUV)**.

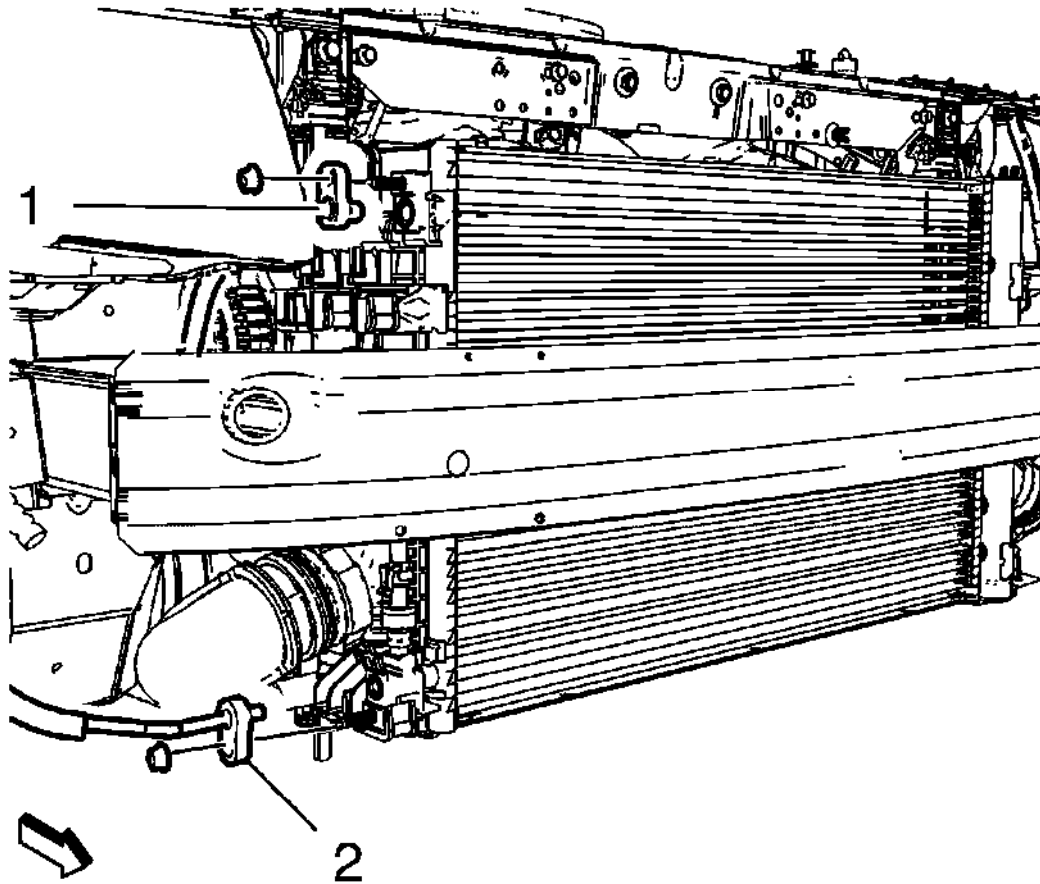


Fig. 44: Air Conditioning Condenser Hose

Courtesy of GENERAL MOTORS COMPANY

5. Remove air conditioning condenser hose bolt and air conditioning condenser hose (1, 2).
6. Remove air conditioning refrigerant pressure sensor. Refer to **Air Conditioning (A/C) Refrigerant Pressure Sensor Replacement**.

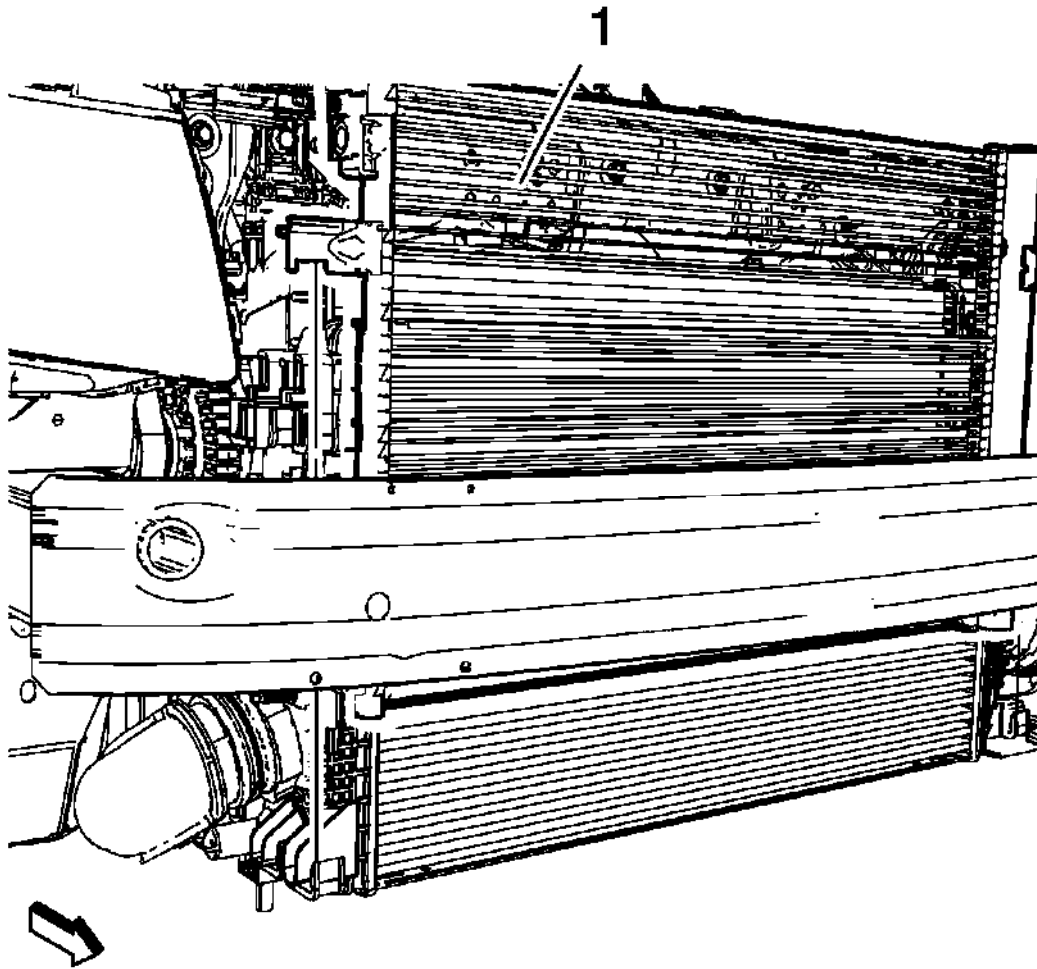


Fig. 45: Air Conditioning Condensor
Courtesy of GENERAL MOTORS COMPANY

7. Remove air conditioning condenser (1).

Installation Procedure

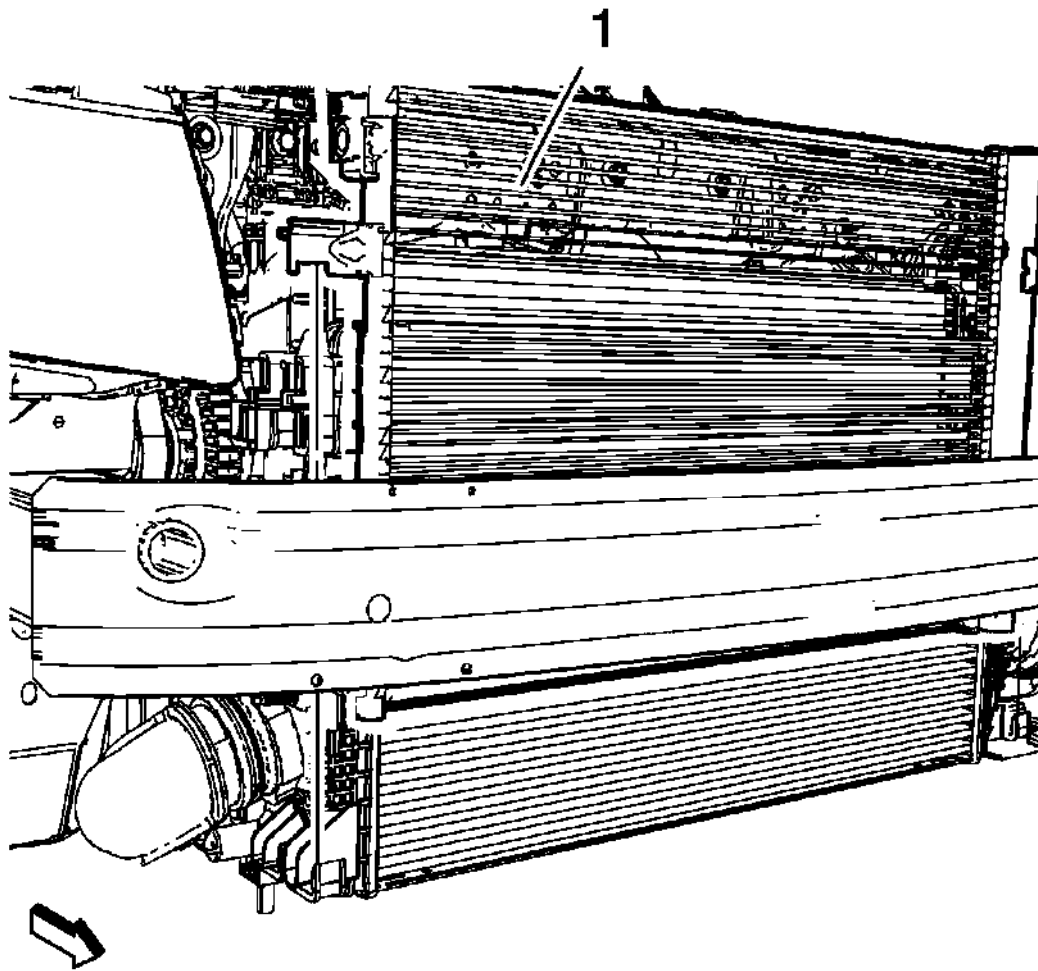


Fig. 46: Air Conditioning Condensor

Courtesy of GENERAL MOTORS COMPANY

1. Install air conditioning condenser (1).
2. Install air conditioning refrigerant pressure sensor. Refer to **Air Conditioning (A/C) Refrigerant Pressure Sensor Replacement.**

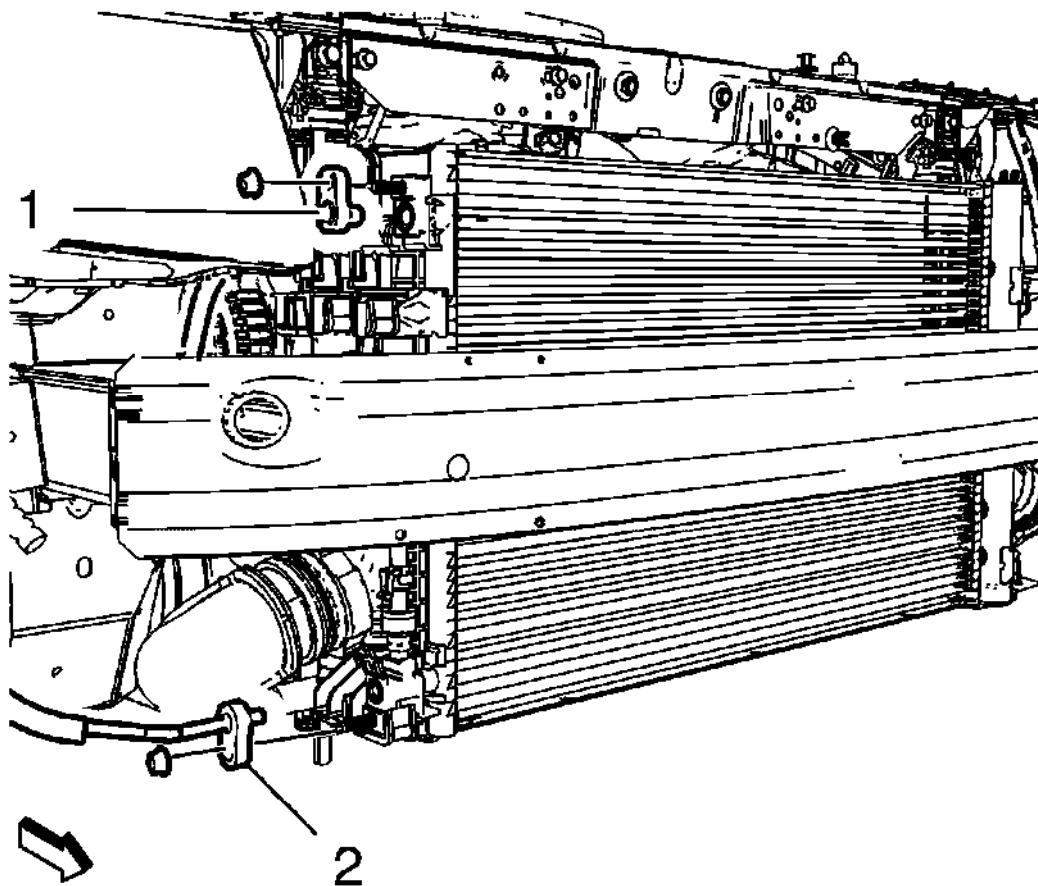


Fig. 47: Air Conditioning Condenser Hose
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to Fastener Caution .

3. Install air conditioning condenser hose (1, 2) and air conditioning condenser hose bolt and tighten to 19 N.m (14 lb ft).
4. Install air conditioning compressor and condenser hose to air conditioning condenser. Refer to **Air Conditioning Compressor and Condenser Hose Replacement (1.8L LUW and LWE)**, **Air Conditioning Compressor and Condenser Hose Replacement (1.4L LUV)**.

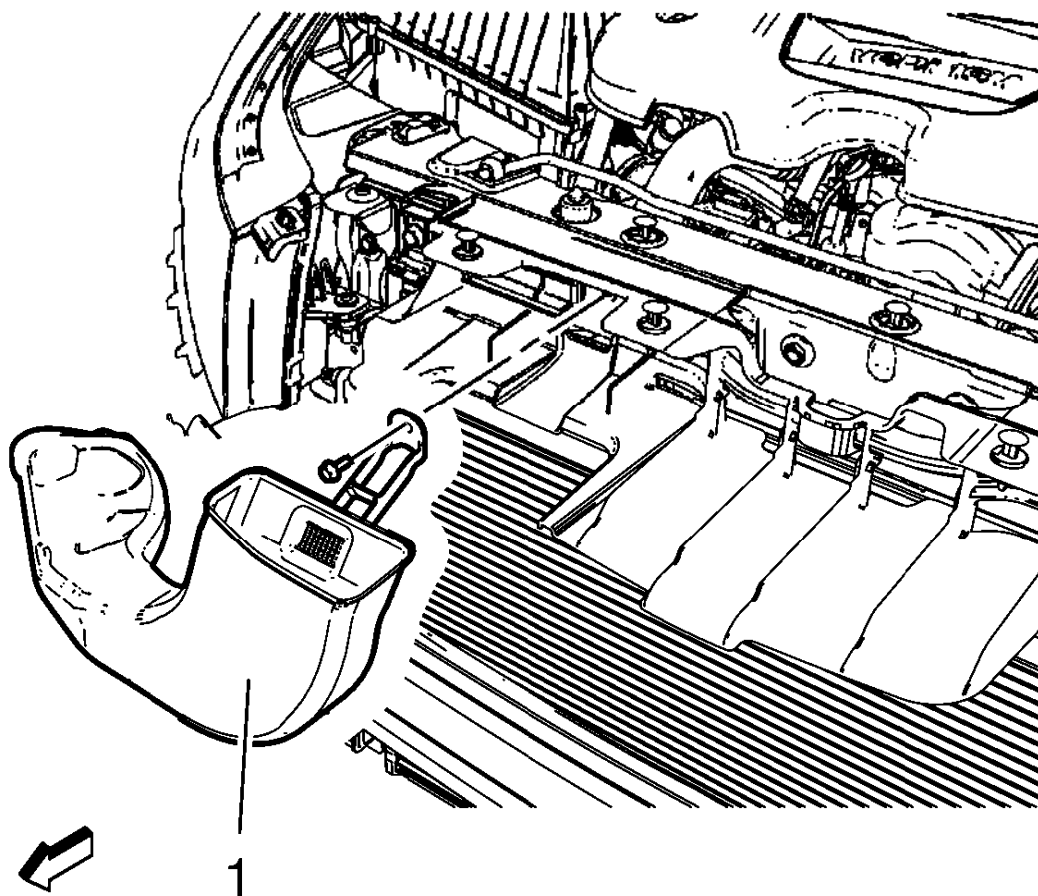


Fig. 48: Air Intake Duct

Courtesy of GENERAL MOTORS COMPANY

5. Install air intake duct (1).
6. Install front bumper fascia. Refer to **Front Bumper Fascia Replacement** .
7. Evacuate and charge the refrigerant system. Refer to **Refrigerant Recovery and Recharging**.

HEATER AND AIR CONDITIONING EVAPORATOR CASE REPLACEMENT

Removal Procedure

1. Recover the refrigerant. Refer to **Refrigerant Recovery and Recharging**.
2. Drain the cooling system. **Cooling System Draining and Filling (Static Fill)** , **Cooling System Draining and Filling (GE-47716 Fill)** .
3. Remove instrument panel assembly. Refer to **Instrument Panel Assembly Replacement** .

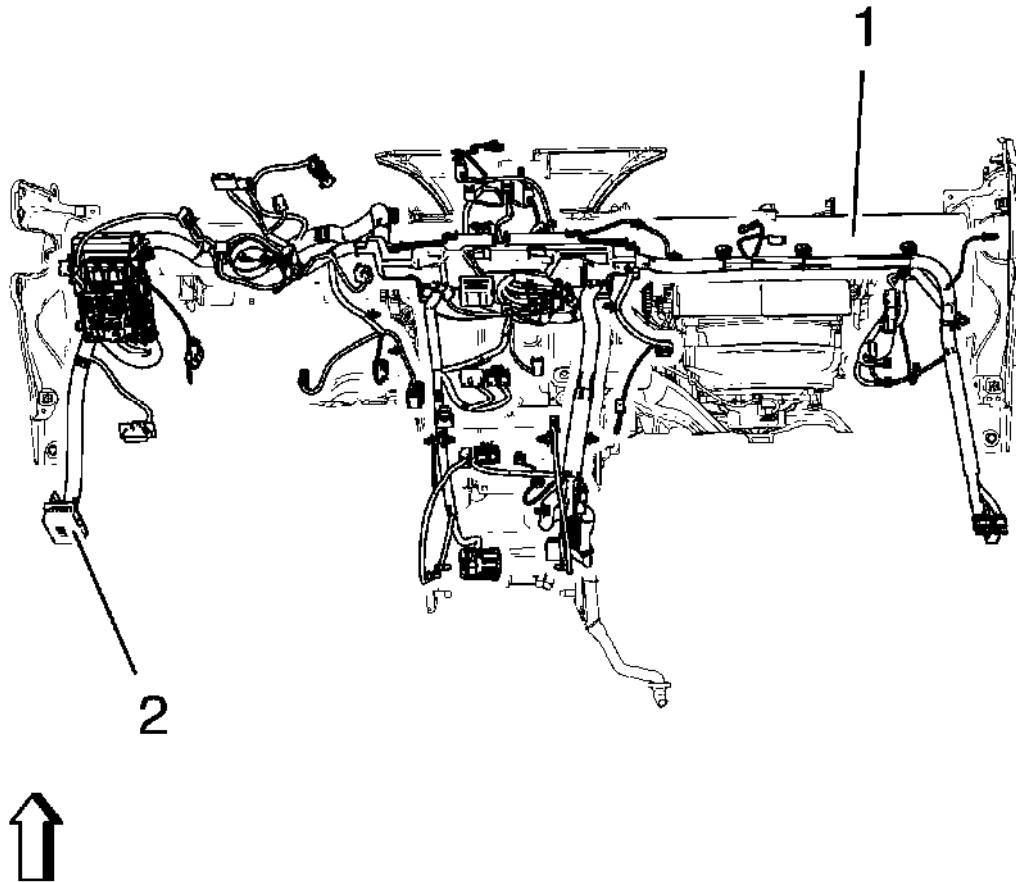


Fig. 49: Instrument Panel Wiring Harness And Instrument Panel Tie Bar
Courtesy of GENERAL MOTORS COMPANY

4. Remove instrument panel wiring harness (2) from instrument panel tie bar (1).
Disconnect electrical connectors.

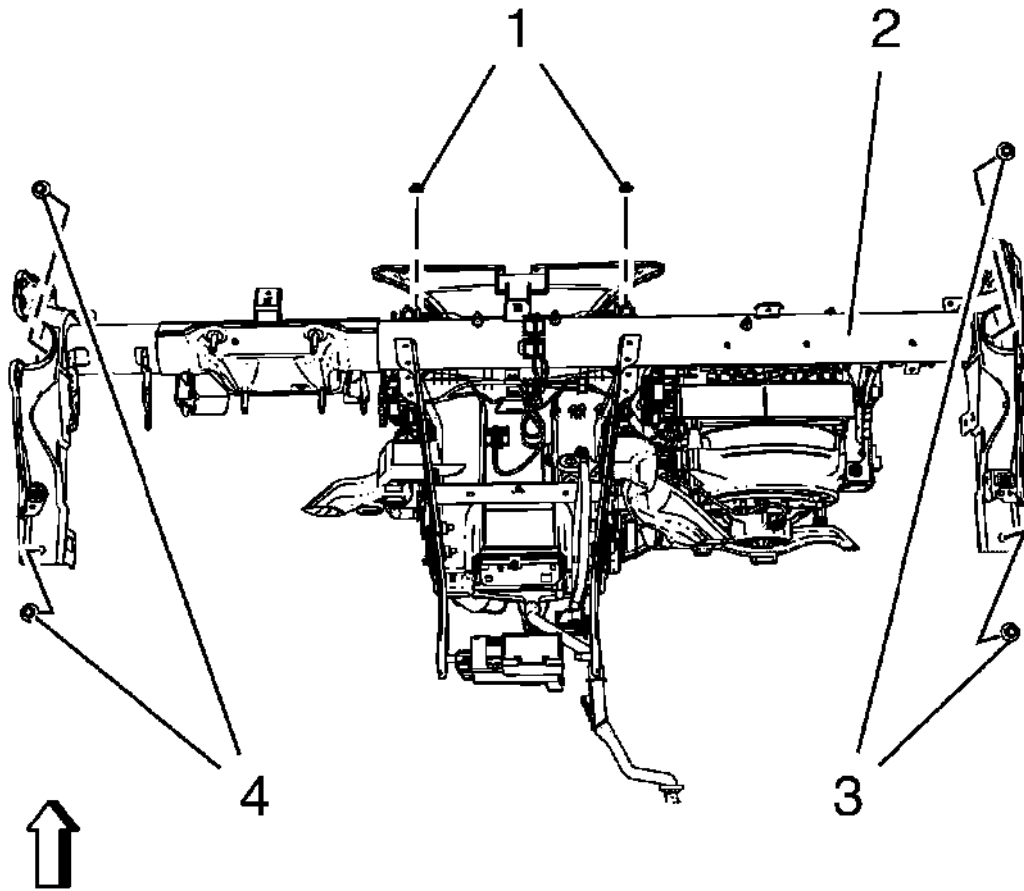


Fig. 50: Instrument Panel Tie Bar, Bolts And Nuts
Courtesy of GENERAL MOTORS COMPANY

5. Remove instrument panel tie bar (2).
 1. Remove 4 instrument panel tie bar bolts (3, 4).
 2. Remove 2 instrument panel tie bar nuts (1).

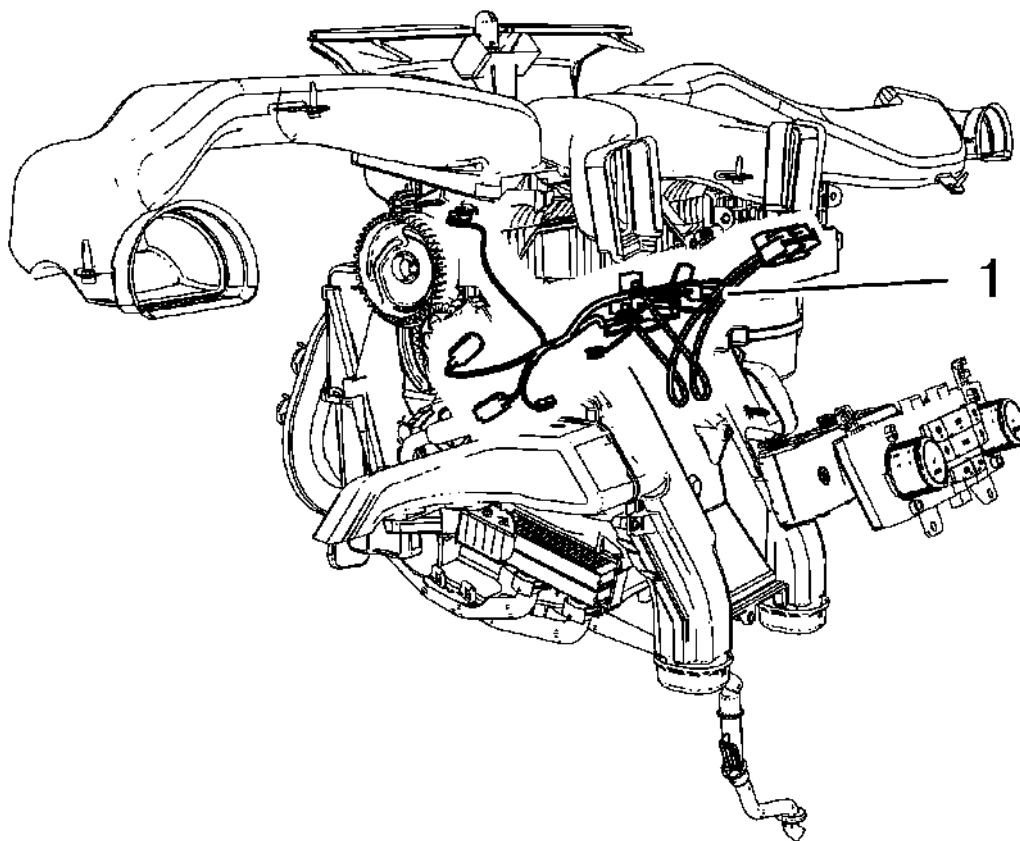


Fig. 51: Air Conditioning Module Wiring Harness

Courtesy of GENERAL MOTORS COMPANY

6. Remove air conditioning module wiring harness (1).

Disconnect electrical connectors.

7. Remove heater core. Refer to **Heater Core Replacement**.
8. Remove blower motor. Refer to **Blower Motor Replacement**.
9. Remove heater and blower and air conditioning control module. Refer to **Heater and Blower and Air Conditioning Control Module Replacement** , or **Heater and Blower and Air Conditioning Control Module Replacement** .

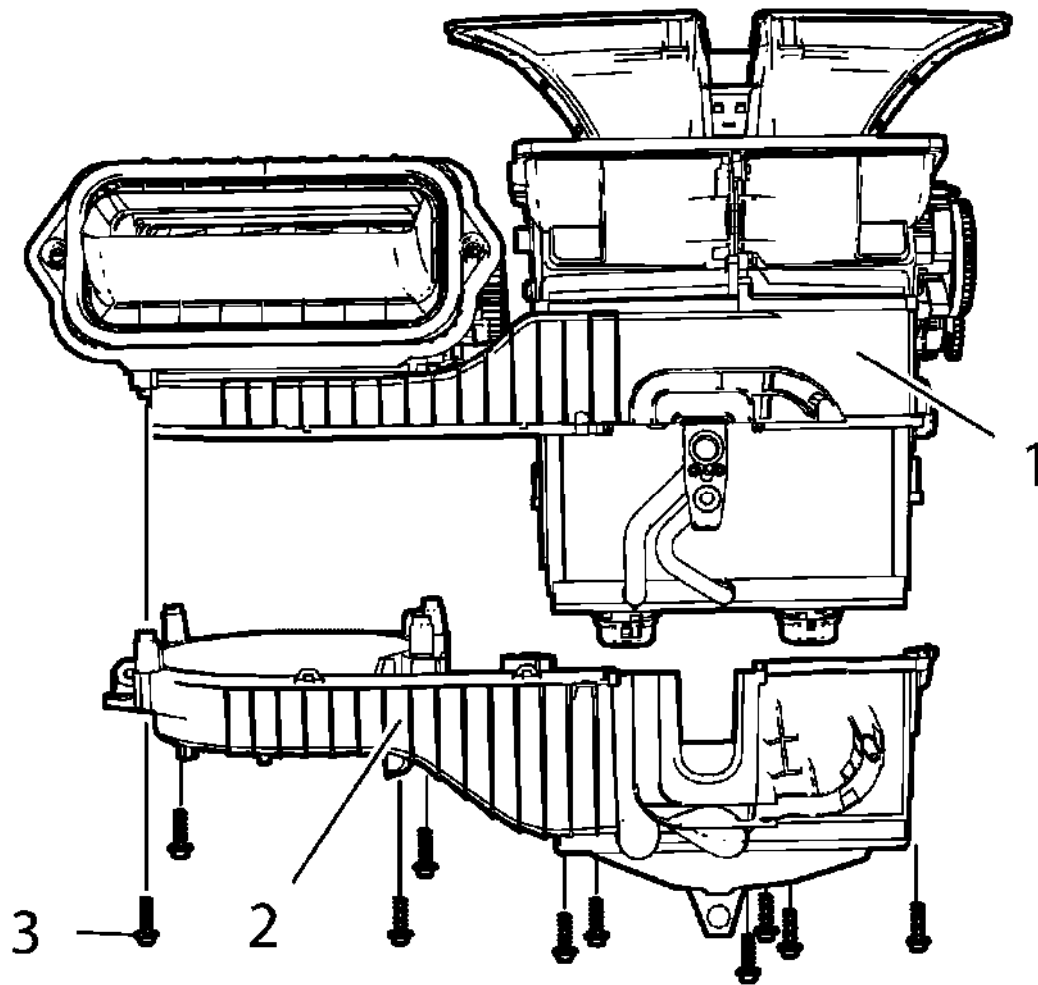


Fig. 52: Heater And Air Conditioning Evaporator Case

Courtesy of GENERAL MOTORS COMPANY

10. Remove heater and air conditioning evaporator case (2) from heater and blower and air conditioning control module (1).
11. Remove 10 heater and air conditioning evaporator case bolts (3).

Installation Procedure

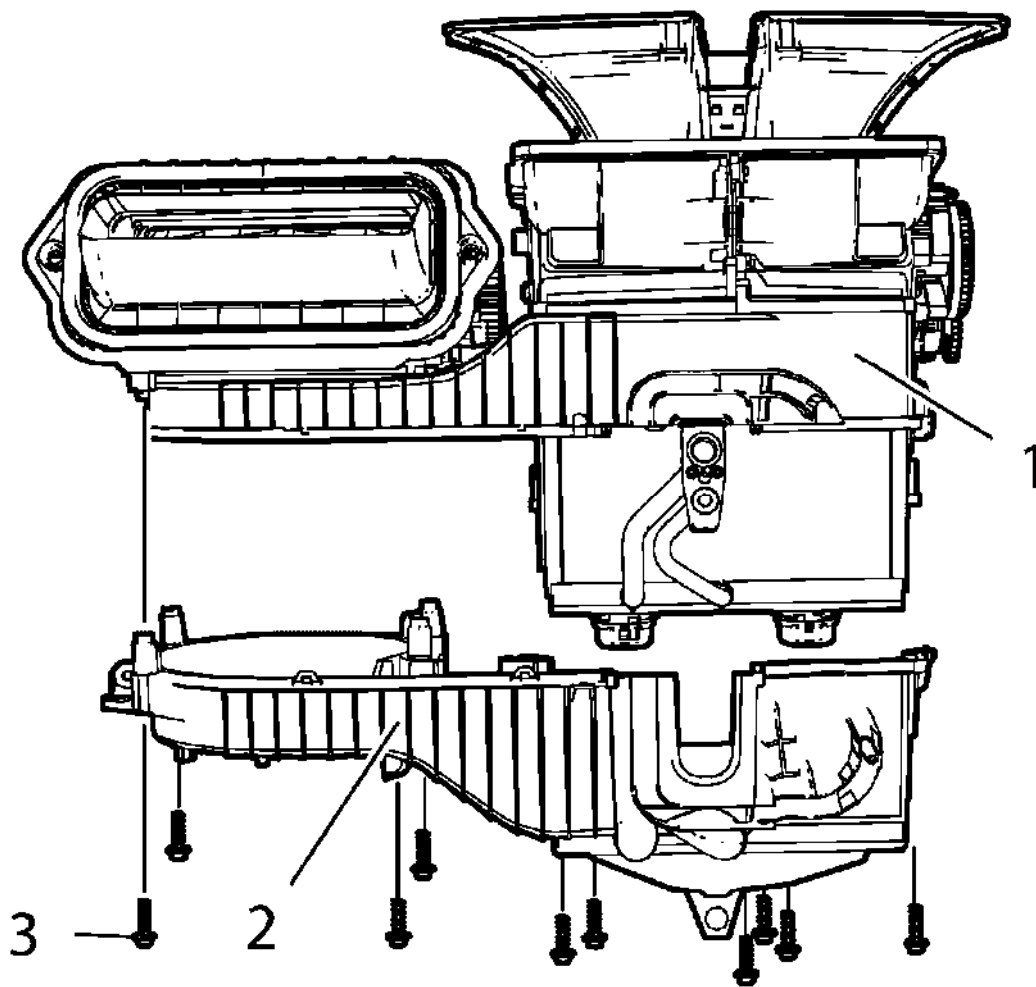


Fig. 53: Heater And Air Conditioning Evaporator Case

Courtesy of GENERAL MOTORS COMPANY

1. Install heater and air conditioning evaporator case (2) to heater and blower and air conditioning control module (1).

CAUTION: Refer to Fastener Caution .

2. Install 10 heater and air conditioning evaporator case bolts (3) and tighten to 2.5 Y (23 lb in).
3. Install heater and blower and air conditioning control module. Refer to **Heater and Blower and Air Conditioning Control Module Replacement** , or **Heater and Blower and Air Conditioning Control Module Replacement** .
4. Install blower motor. Refer to **Blower Motor Replacement**.
5. Install heater core. Refer to **Heater Core Replacement**.

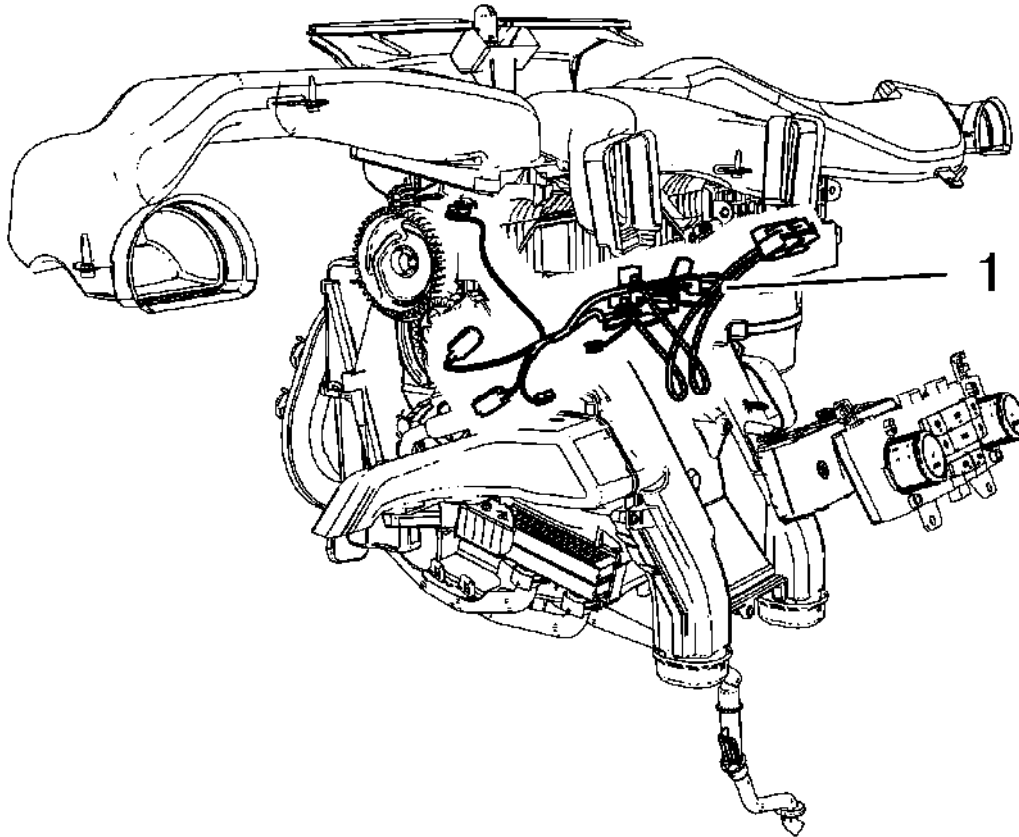


Fig. 54: Air Conditioning Module Wiring Harness
Courtesy of GENERAL MOTORS COMPANY

6. Install air conditioning module wiring harness (1).

Connect electrical connectors.

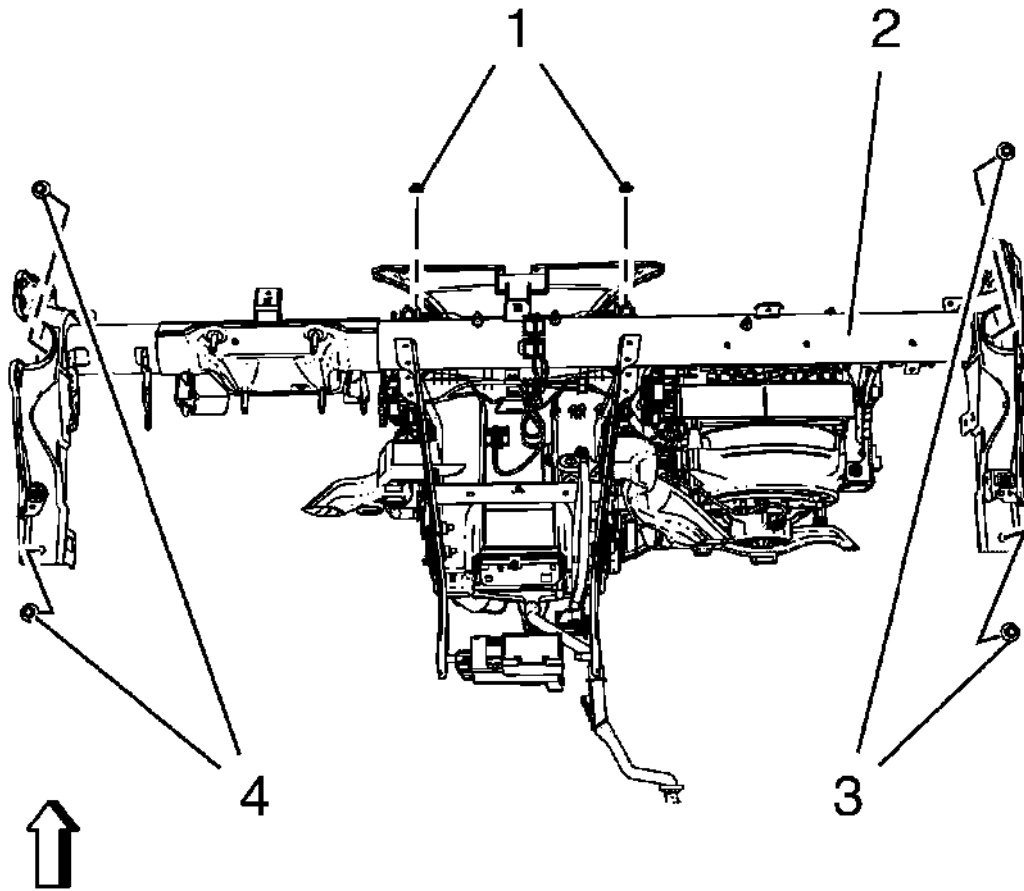


Fig. 55: Instrument Panel Tie Bar, Bolts And Nuts
Courtesy of GENERAL MOTORS COMPANY

7. Install instrument panel tie bar (2).
 1. Install 4 instrument panel tie bar bolts (3, 4) and tighten to 22 N.m (17 lb ft).
 2. Install 2 instrument panel tie bar nuts (1) and tighten to 9 N.m (80 lb in).

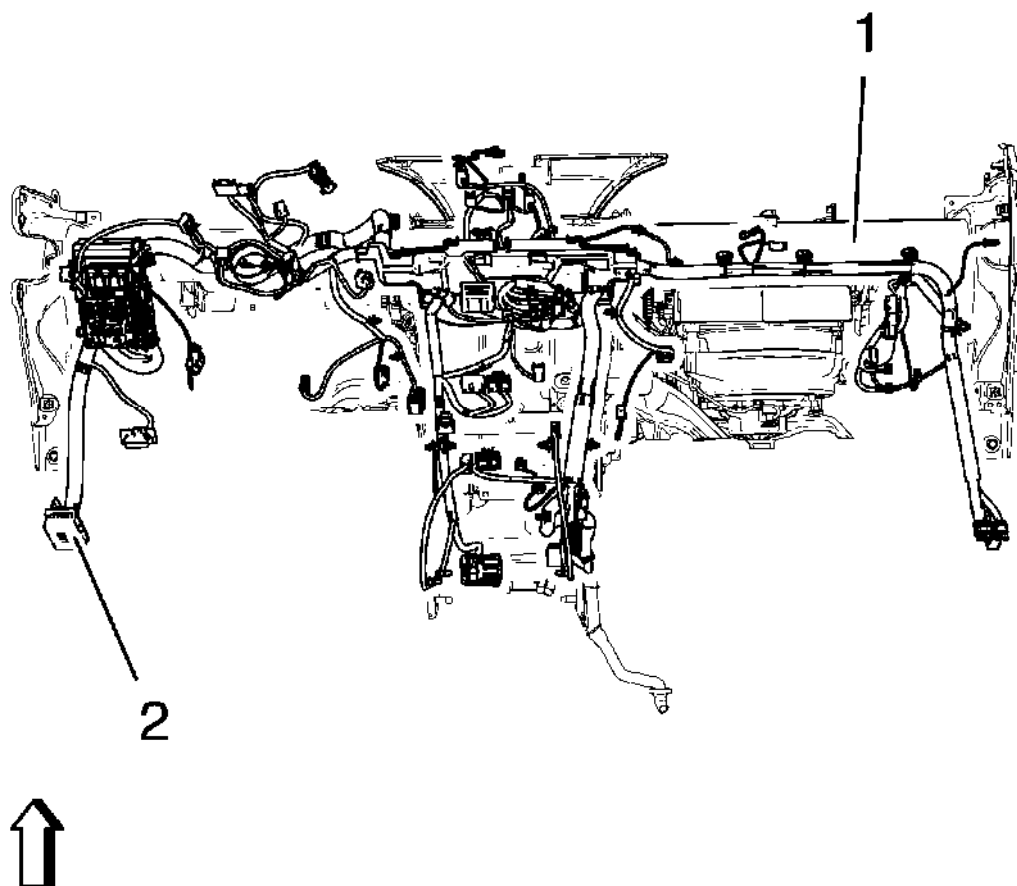


Fig. 56: Instrument Panel Wiring Harness And Instrument Panel Tie Bar
Courtesy of GENERAL MOTORS COMPANY

8. Install instrument panel wiring harness (2) from instrument panel tie bar (1).

Connect electrical connectors.

9. Install instrument panel assembly. Refer to **Instrument Panel Assembly Replacement** .
10. Fill the cooling system. **Cooling System Draining and Filling (Static Fill)** , **Cooling System Draining and Filling (GE-47716 Fill)** .
11. Evacuate and charge the refrigerant system. Refer to **Refrigerant Recovery and Recharging**.

AIR CONDITIONING EVAPORATOR CORE REPLACEMENT

Removal Procedure

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

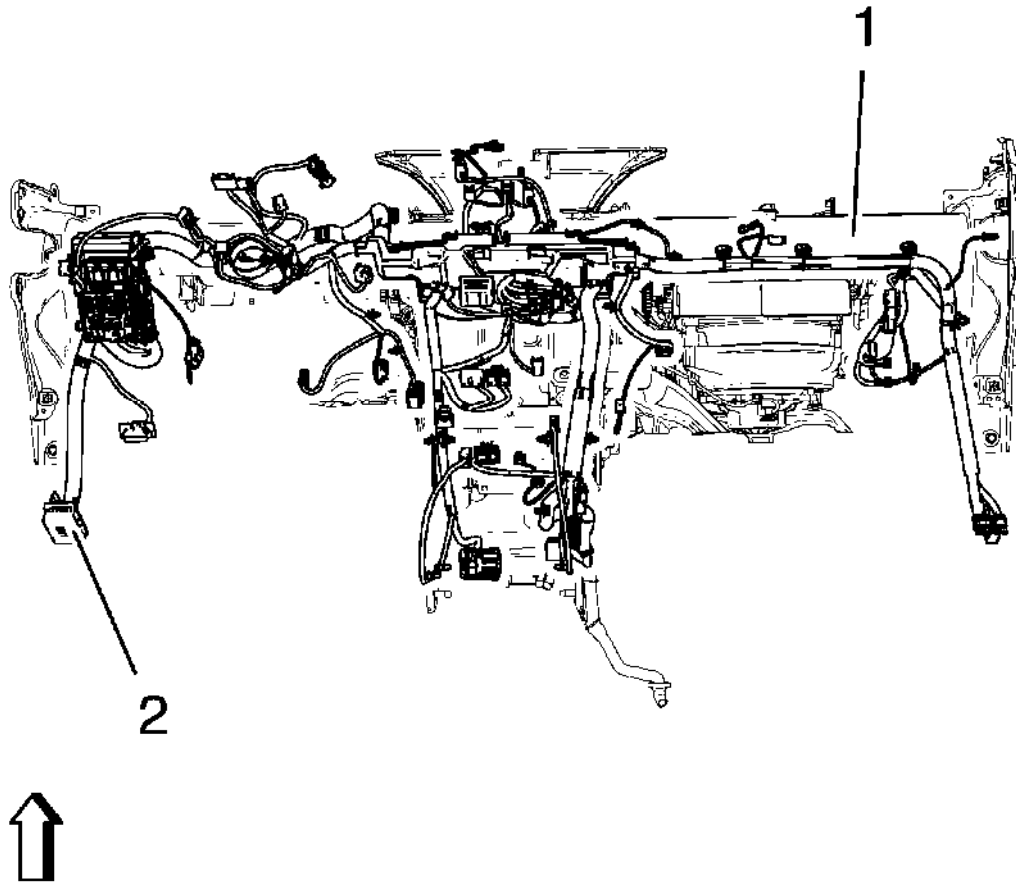


Fig. 57: Instrument Panel Wiring Harness And Instrument Panel Tie Bar
Courtesy of GENERAL MOTORS COMPANY

2. Remove instrument panel wiring harness (2) from instrument panel tie bar (1).
Disconnect electrical connectors.

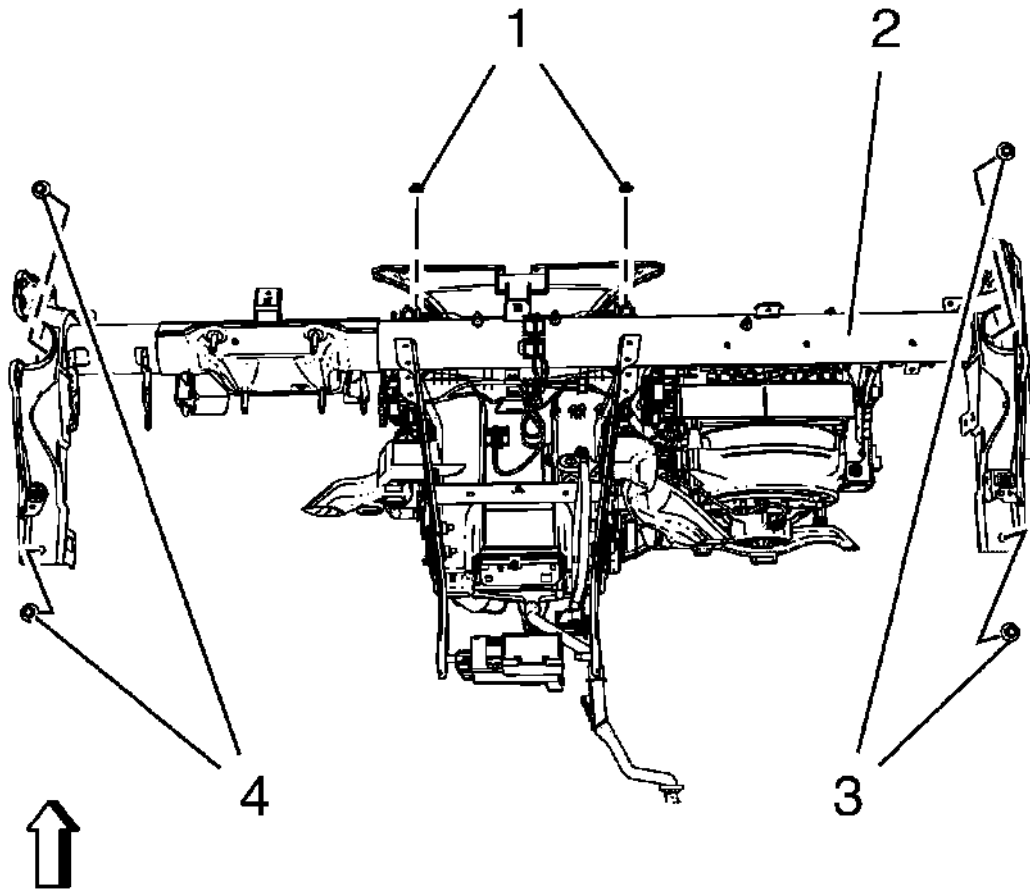


Fig. 58: Instrument Panel Tie Bar, Bolts And Nuts
Courtesy of GENERAL MOTORS COMPANY

3. Remove instrument panel tie bar (2).
 1. Remove 4 instrument panel tie bar bolts (3, 4).
 2. Remove 2 instrument panel tie bar nuts (1).

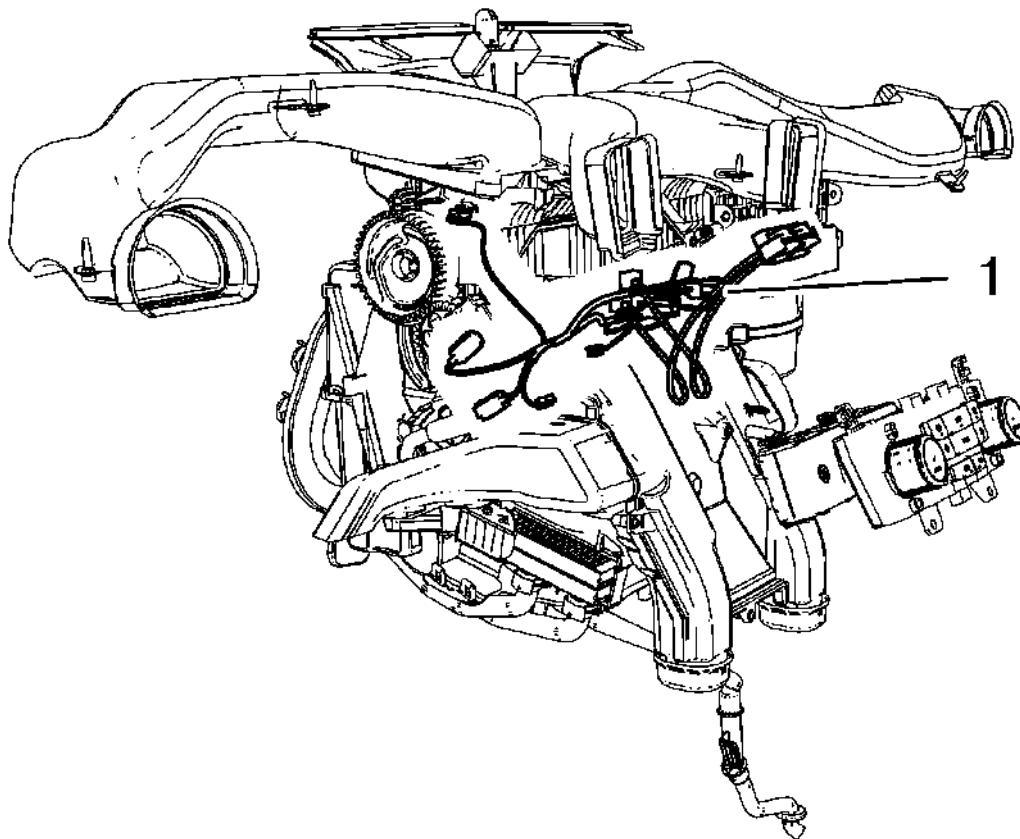


Fig. 59: Air Conditioning Module Wiring Harness

Courtesy of GENERAL MOTORS COMPANY

4. Remove air conditioning module wiring harness (1).

Disconnect electrical connectors.

5. Remove heater core. Refer to **Heater Core Replacement**.
6. Remove blower motor. Refer to **Blower Motor Replacement**.
7. Remove heater and blower and air conditioning control module. Refer to **Heater and Blower and Air Conditioning Control Module Replacement** , or **Heater and Blower and Air Conditioning Control Module Replacement** .
8. Recover the refrigerant. Refer to **Refrigerant Recovery and Recharging**.

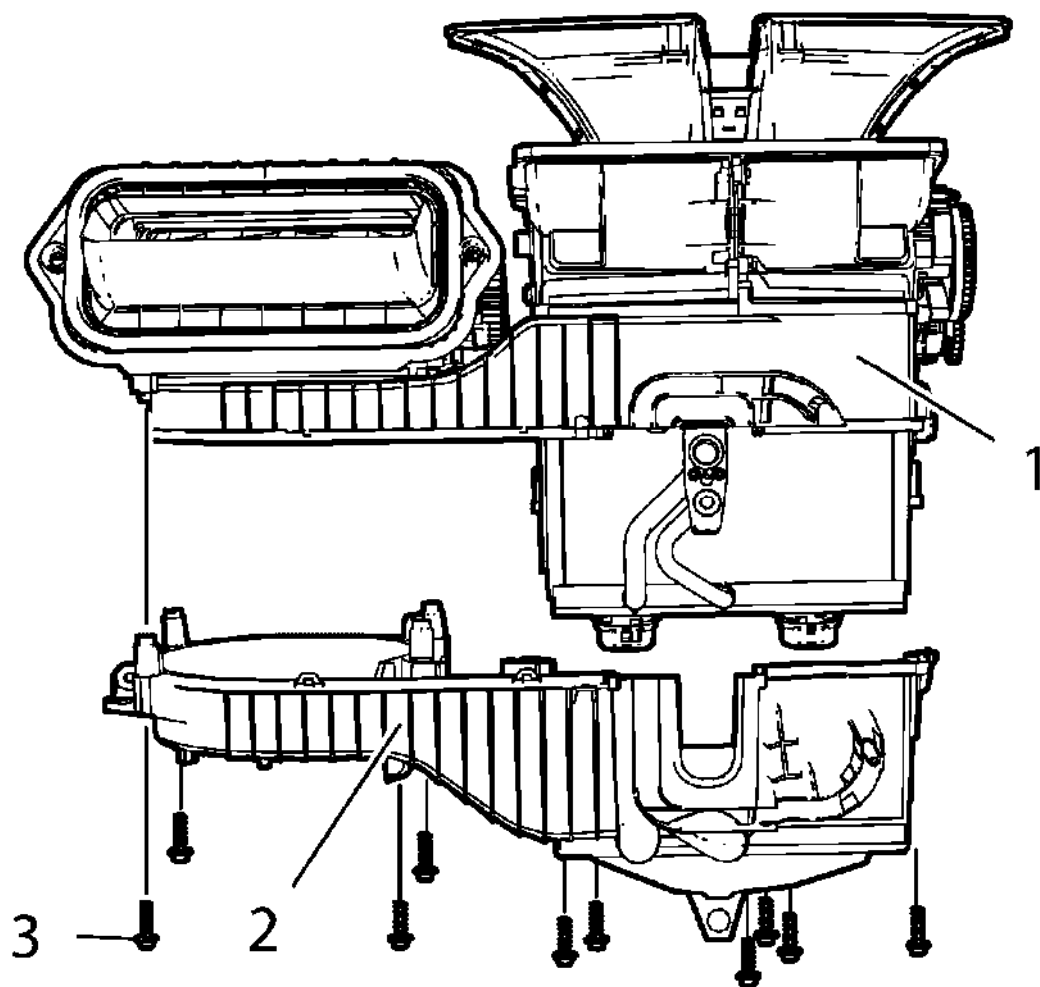


Fig. 60: Heater And Air Conditioning Evaporator Case

Courtesy of GENERAL MOTORS COMPANY

9. Remove heater and air conditioning evaporator case (2) from heater and blower and air conditioning control module (1).
10. Remove 10 heater and air conditioning evaporator case bolts (3).
11. Remove air conditioning evaporator core from heater and blower and air conditioning control module.

Installation Procedure

1. Install air conditioning evaporator core to heater and blower and air conditioning control module.

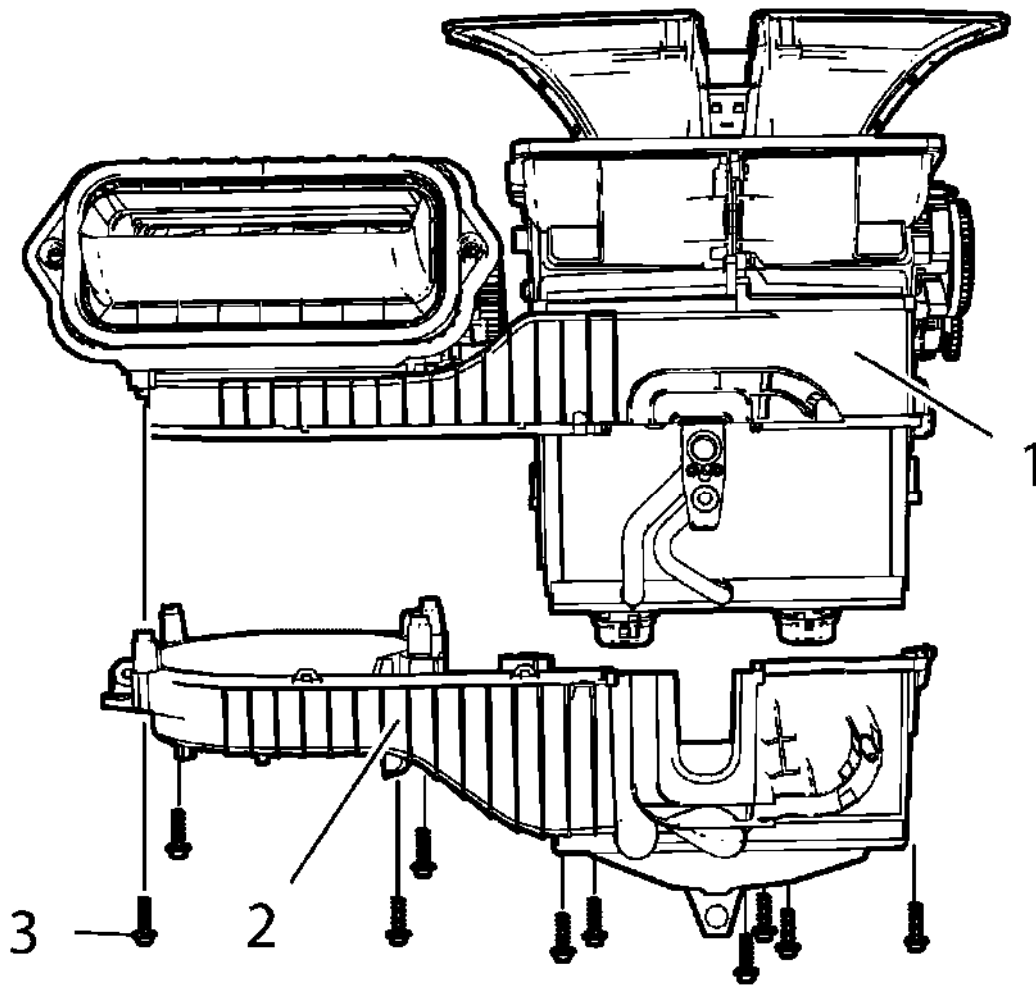


Fig. 61: Heater And Air Conditioning Evaporator Case

Courtesy of GENERAL MOTORS COMPANY

2. Install heater and air conditioning evaporator case (2) to heater and blower and air conditioning control module (1).

CAUTION: Refer to Fastener Caution .

3. Install 10 heater and air conditioning evaporator case bolts (3) and tighten to 2.5 N.m (22 lb in).
4. Refrigerant recovery and recharging. Refer to Refrigerant Recovery and Recharging.
5. Install heater and blower and air conditioning control module. Refer to Heater and Blower and Air Conditioning Control Module Replacement , or Heater and Blower and Air Conditioning Control Module Replacement .
6. Install blower motor. Refer to Blower Motor Replacement.
7. Install heater core. Refer to Heater Core Replacement.

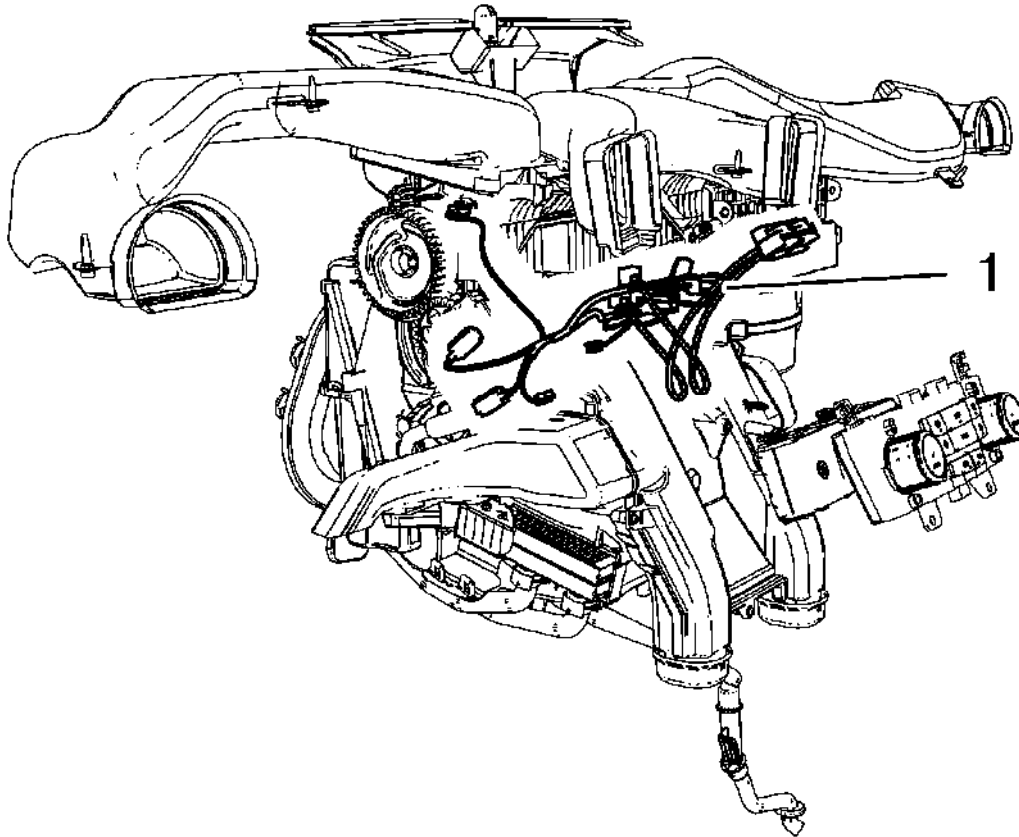


Fig. 62: Air Conditioning Module Wiring Harness
Courtesy of GENERAL MOTORS COMPANY

8. Install air conditioning module wiring harness (1).

Connect electrical connectors.

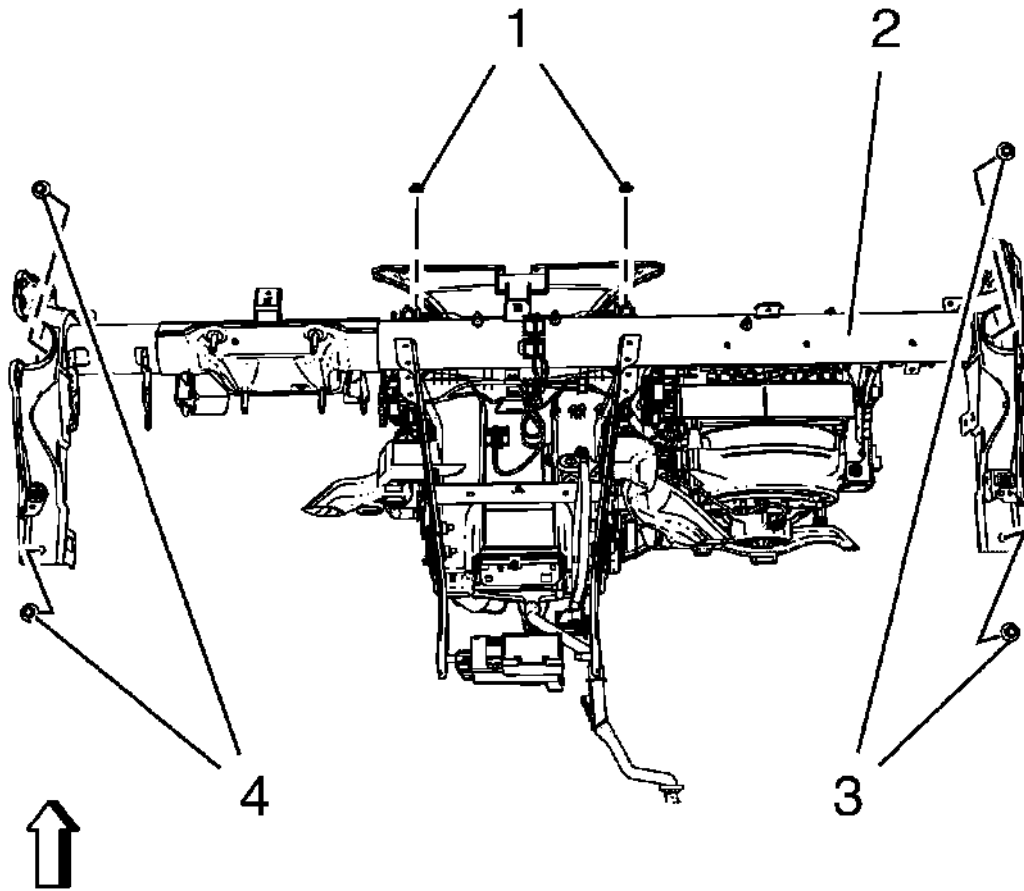


Fig. 63: Instrument Panel Tie Bar, Bolts And Nuts
Courtesy of GENERAL MOTORS COMPANY

9. Install instrument panel tie bar (2).
 1. Install 4 instrument panel tie bar bolts (3, 4) and tighten to 22 N.m (17 lb ft).
 2. Install 2 instrument panel tie bar nuts (1) and tighten to 6 N.m (53 lb in).

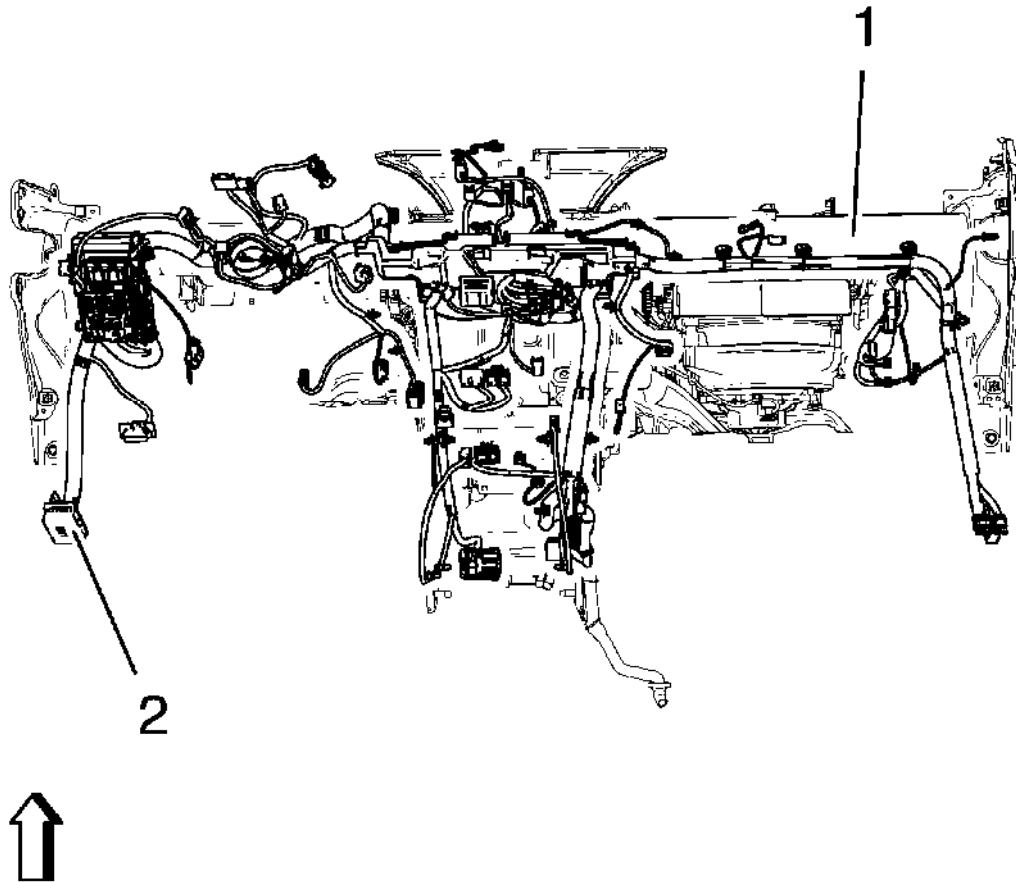


Fig. 64: Instrument Panel Wiring Harness And Instrument Panel Tie Bar
Courtesy of GENERAL MOTORS COMPANY

10. Install instrument panel wiring harness (2) from instrument panel tie bar (1).
Connect electrical connectors.
11. Install instrument panel assembly. Refer to **Instrument Panel Assembly Replacement** .

AIR CONDITIONING EVAPORATOR AND BLOWER MODULE DRAIN HOSE REPLACEMENT

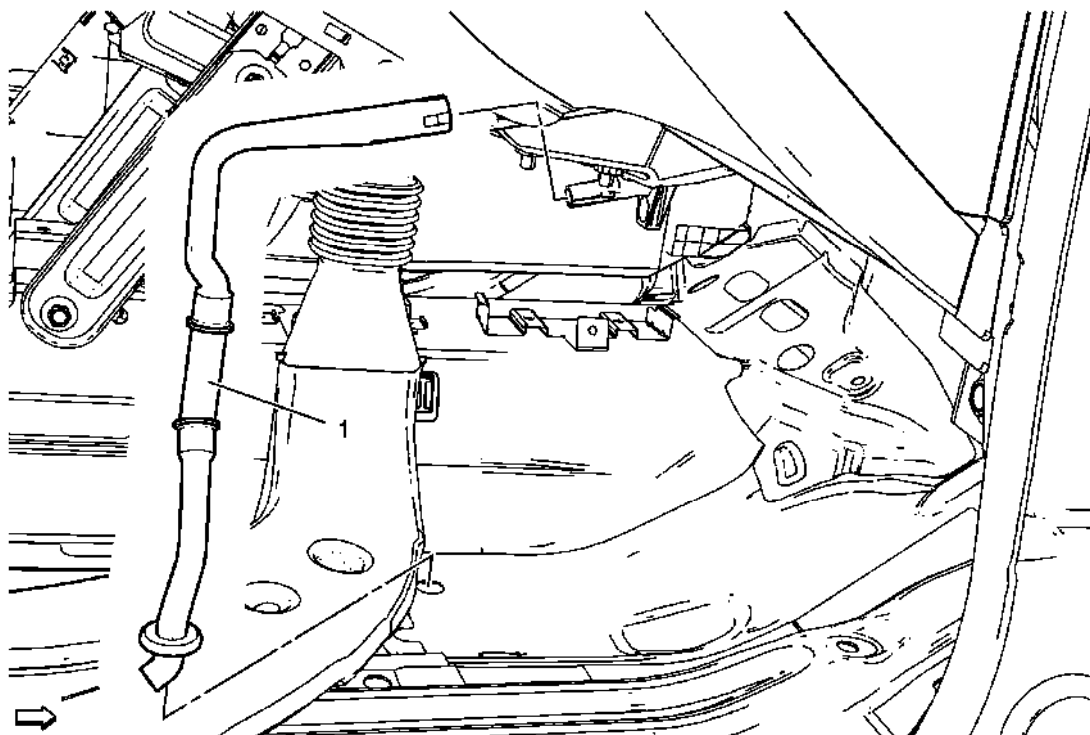


Fig. 65: Air Conditioning Evaporator And Air Conditioning Blower Module Drain Hose
Courtesy of GENERAL MOTORS COMPANY

Air Conditioning Evaporator and Blower Module Drain Hose Replacement

Callout	Component Name
Preliminary Procedures	
Remove front floor panel carpet passenger side. Refer to <u>Front Floor Panel Carpet Replacement</u> .	
1	Air Conditioning Evaporator and Blower Module Drain Hose

HEATER INLET HOSE REPLACEMENT (1.4L LUV)

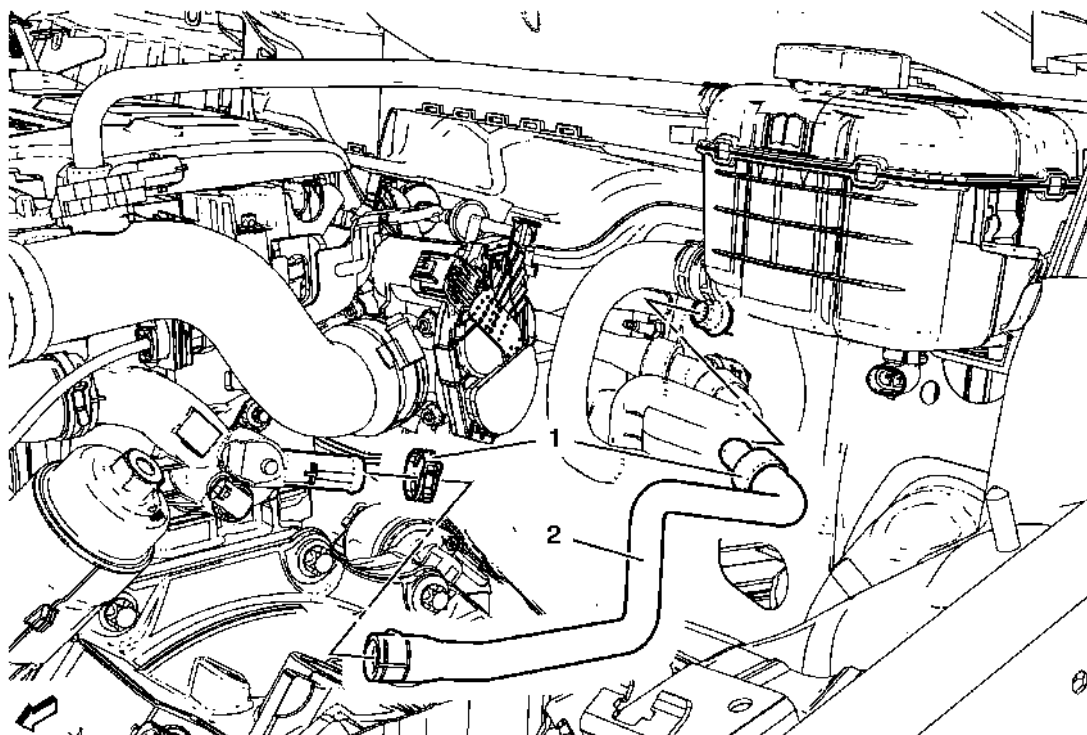


Fig. 66: Heater Inlet Hose (1.4L LUV)

Courtesy of GENERAL MOTORS COMPANY

Heater Inlet Hose Replacement (1.4L LUV)

Callout	Component Name
Preliminary Procedures Drain the cooling system. Refer to <u>Cooling System Draining and Filling (Static Fill)</u> , <u>Cooling System Draining and Filling (GE-47716 Fill)</u> .	
1	Heater Inlet Hose Clamp (Qty: 2)
2	Heater Inlet Hose

HEATER INLET HOSE REPLACEMENT (1.8L LUW AND LWE)

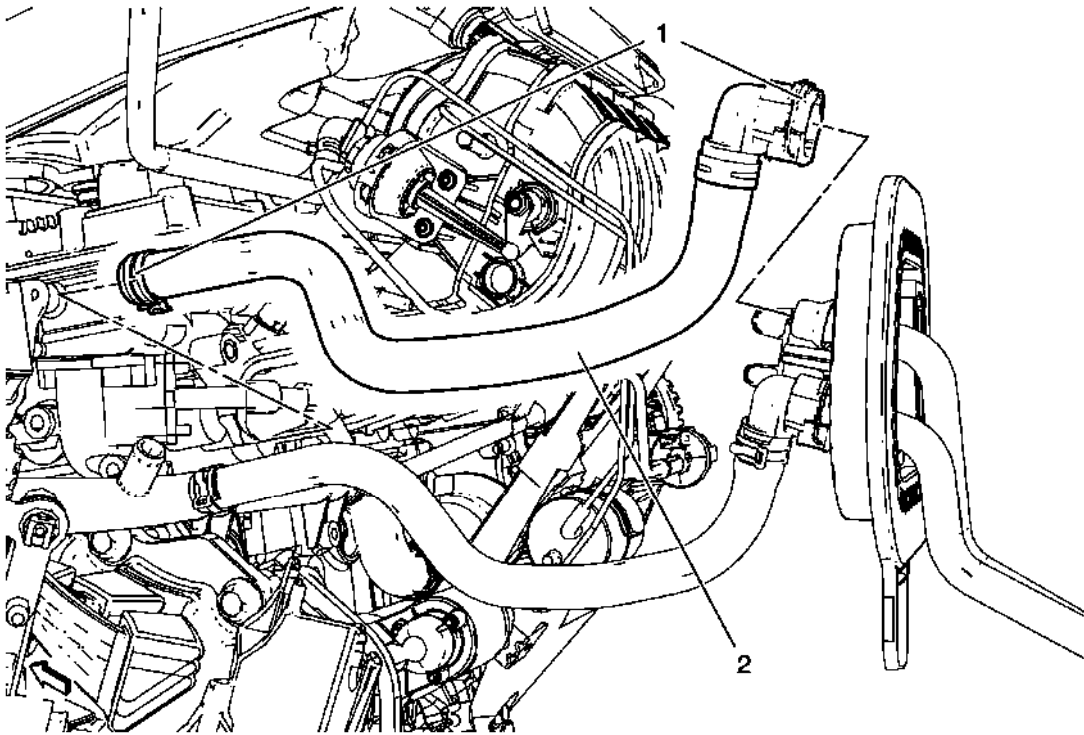


Fig. 67: Heater Inlet Hose - (1.8L LUW and LWE)

Courtesy of GENERAL MOTORS COMPANY

Heater Inlet Hose Replacement (1.8L LUW and LWE)

Callout	Component Name
Preliminary Procedures Drain the cooling system. Refer to <u>Cooling System Draining and Filling (Static Fill)</u> , <u>Cooling System Draining and Filling (GE-47716 Fill)</u> .	
1	Heater Inlet Hose Clamp (Qty: 2)
2	Heater Inlet Hose

HEATER OUTLET HOSE REPLACEMENT (1.4L LUV)

Removal Procedure

1. Drain the cooling system. Refer to Cooling System Draining and Filling (Static Fill) , Cooling System Draining and Filling (GE-47716 Fill) .

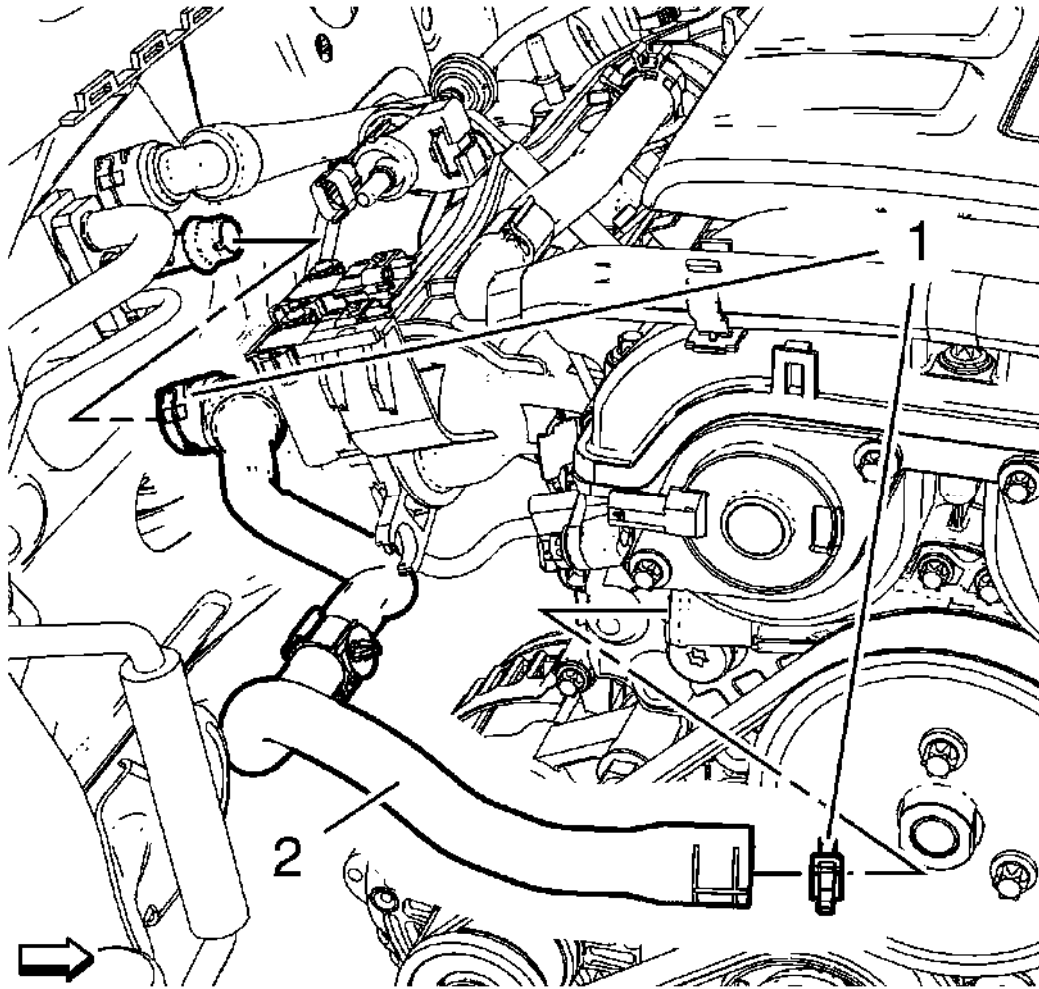


Fig. 68: Heater Outlet Hose

Courtesy of GENERAL MOTORS COMPANY

2. Remove 2 heater outlet hose clamps (1).
3. Remove heater outlet hose (2).

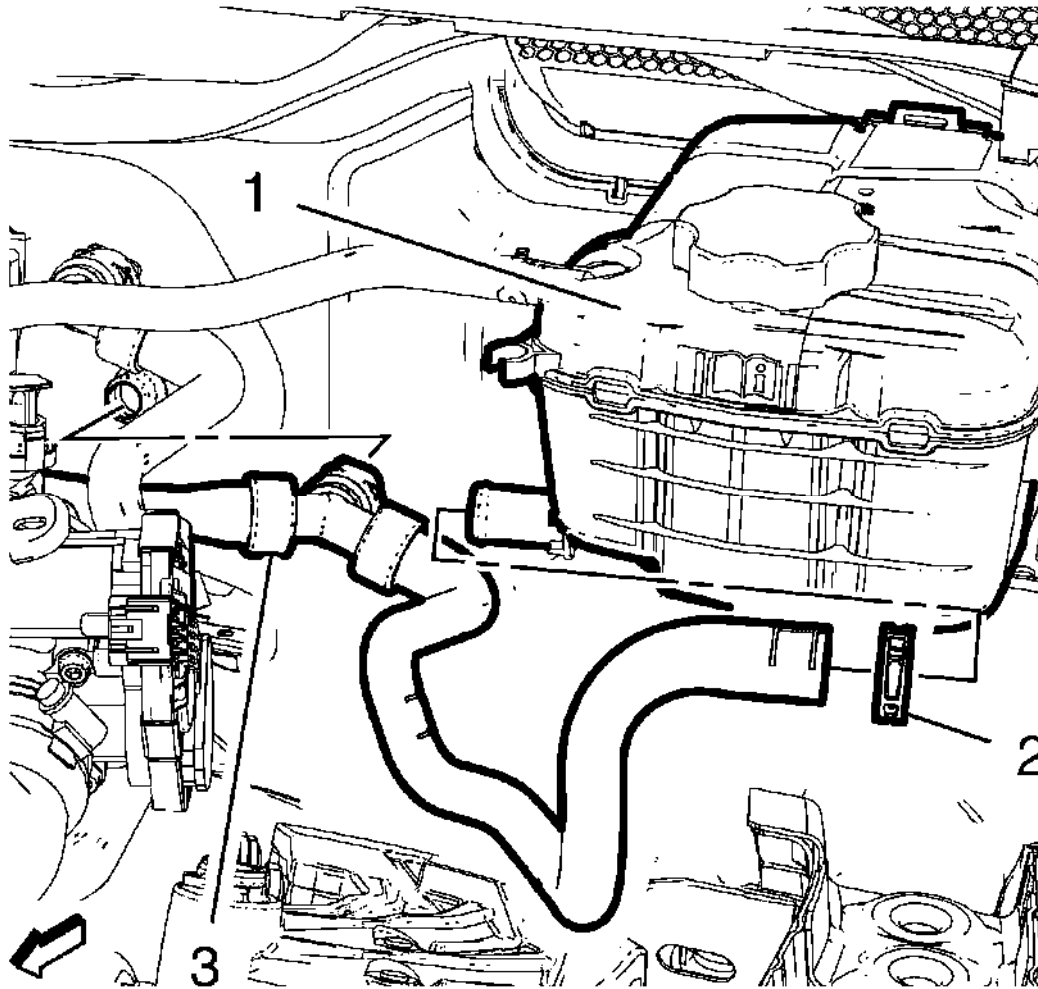


Fig. 69: Radiator Surge Tank

Courtesy of GENERAL MOTORS COMPANY

4. Remove heater outlet hose clamps (2).
5. Remove heater outlet hose (3) from radiator surge tank (1).

Installation Procedure

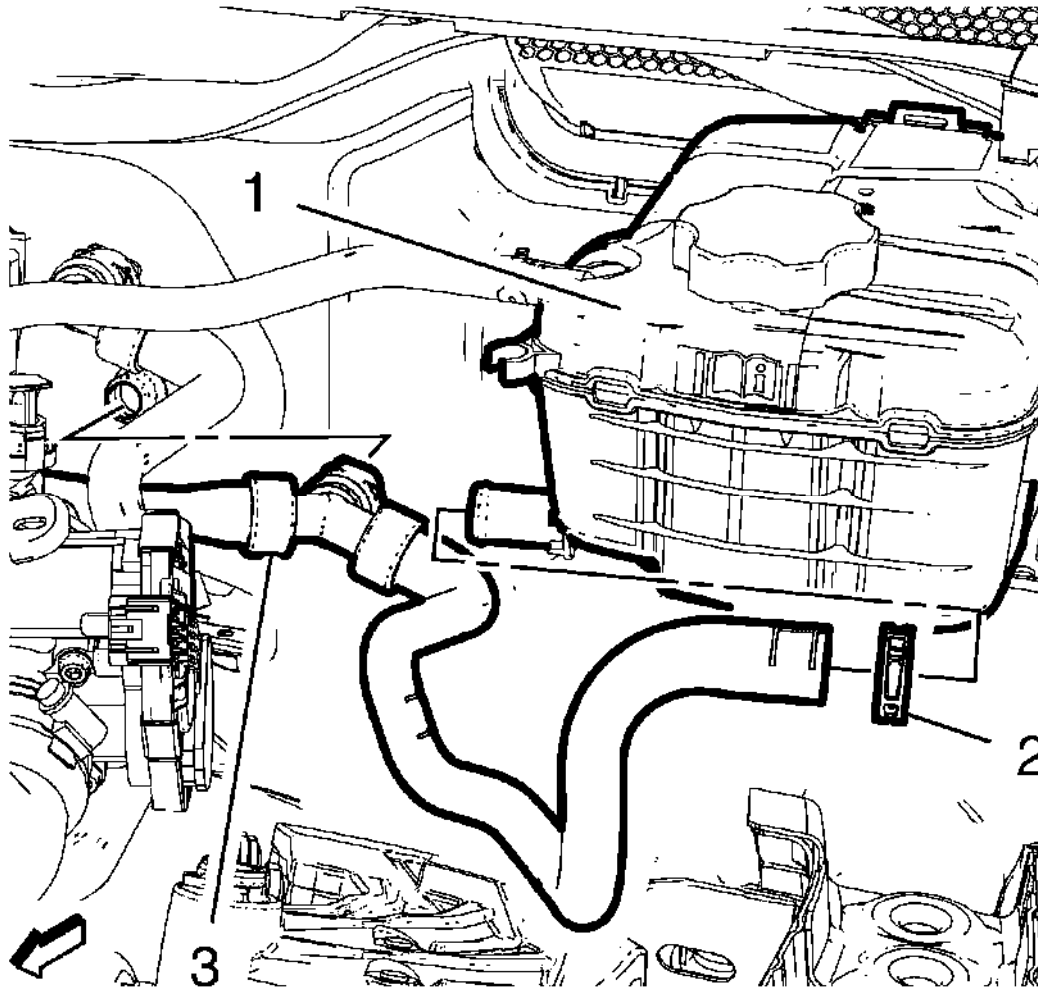


Fig. 70: Radiator Surge Tank

Courtesy of GENERAL MOTORS COMPANY

1. Install heater outlet hose (3) to radiator surge tank (1).
2. Install heater outlet hose clamps (2).

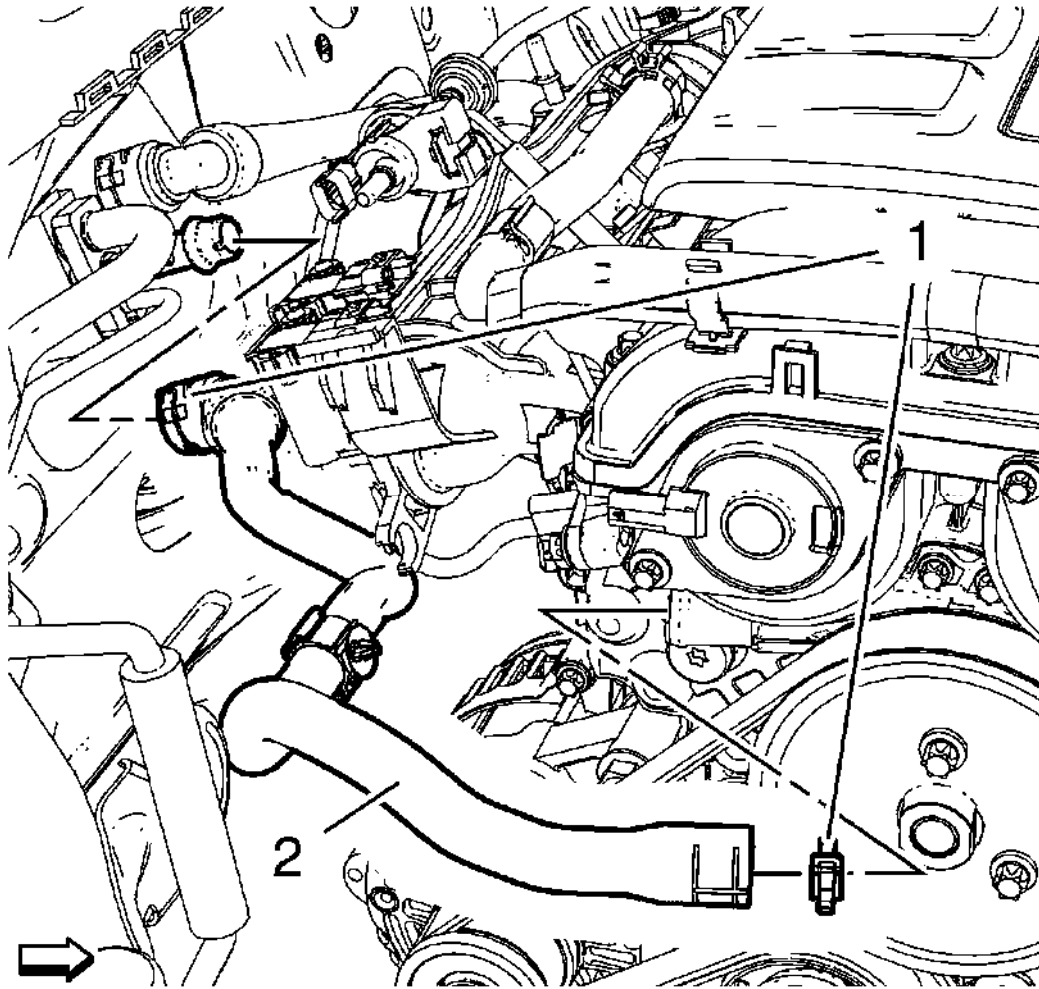


Fig. 71: Heater Outlet Hose

Courtesy of GENERAL MOTORS COMPANY

3. Install heater outlet hose (2).
4. Install 2 heater outlet hose clamps (1).
5. Refill the cooling system. Refer to Cooling System Draining and Filling (Static Fill) , Cooling System Draining and Filling (GE-47716 Fill) .

HEATER OUTLET HOSE REPLACEMENT (1.8L LUW)

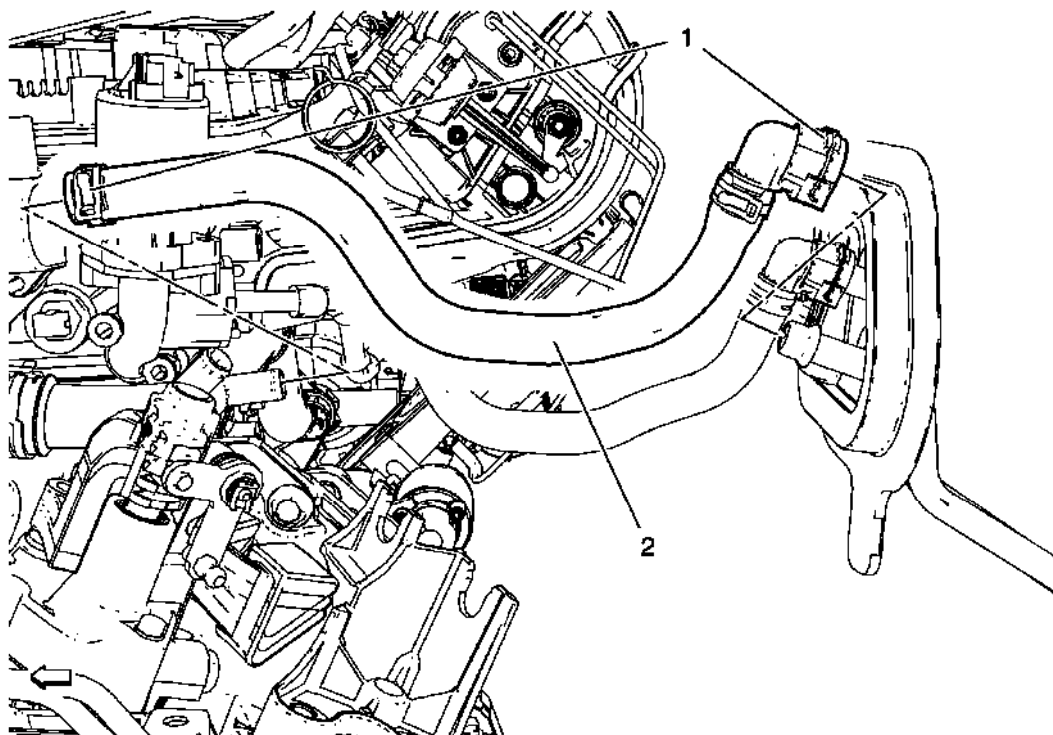


Fig. 72: Heater Outlet Hose - (1.8L LUW)

Courtesy of GENERAL MOTORS COMPANY

Heater Outlet Hose Replacement (1.8L LUW)

Callout	Component Name
Preliminary Procedures	
Drain the cooling system. Refer to <u>Cooling System Draining and Filling (Static Fill)</u> , <u>Cooling System Draining and Filling (GE-47716 Fill)</u> .	
1	Heater Outlet Hose Clamp (Qty: 2)
2	Heater Outlet Hose

HEATER OUTLET HOSE REPLACEMENT (1.8L LWE)

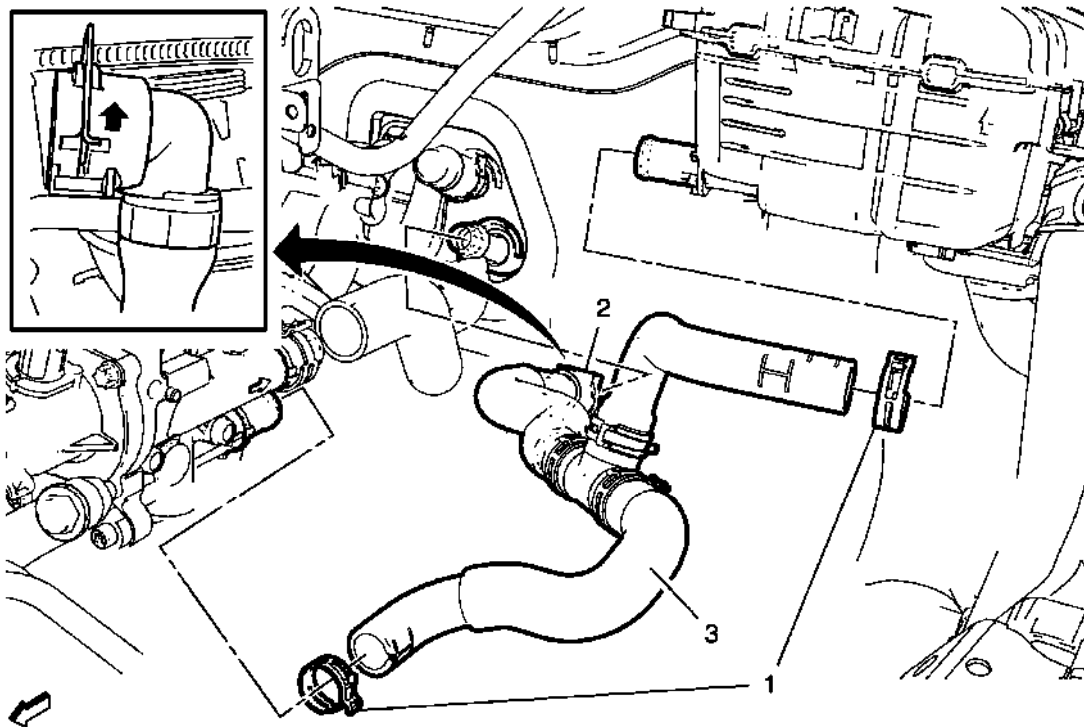
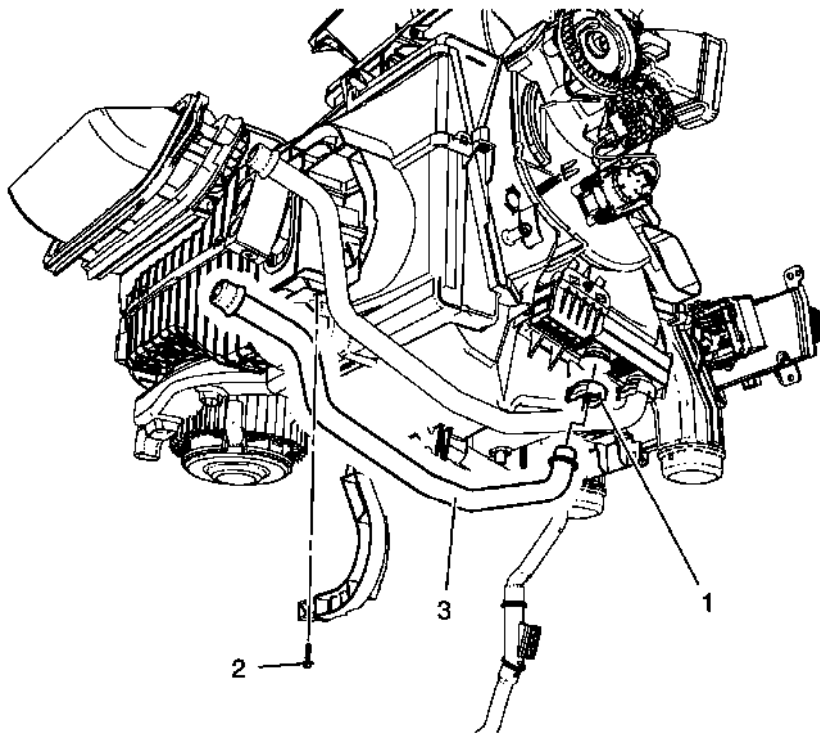


Fig. 73: Heater Outlet Hose (1.8L LWE)
Courtesy of GENERAL MOTORS COMPANY

Heater Outlet Hose Replacement (1.8L LWE)

Callout	Component Name
Preliminary Procedures	
1. Disconnect the battery negative cable. Refer to <u>Battery Negative Cable Disconnection and Connection</u> .	
2. Drain the cooling system. Refer to <u>Cooling System Draining and Filling (Static Fill)</u> , <u>Cooling System Draining and Filling (GE-47716 Fill)</u> .	
3. Remove the engine control module. Refer to <u>Engine Control Module Replacement</u> .	
1	Heater Outlet Hose Clamp (Qty: 2)
2	Heater Outlet Hose Retainer Spring
3	Heater Outlet Hose

HEATER CORE OUTLET TUBE REPLACEMENT

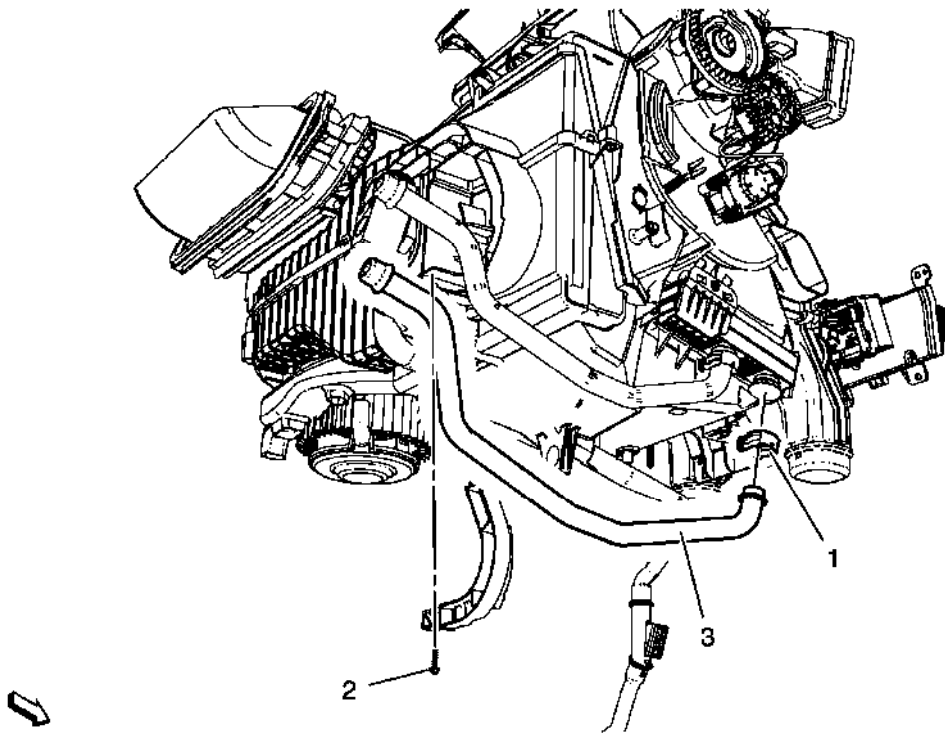
**Fig. 74: Heater Core Outlet Tube**

Courtesy of GENERAL MOTORS COMPANY

Heater Core Outlet Tube Replacement

Callout	Component Name
Preliminary Procedure Remove the heater and air conditioning evaporator case. Refer to <u>Heater and Air Conditioning Evaporator Case Replacement</u> .	
1	Heater Core Outlet Tube Clamp
2	Bracket Heater Core Outlet Tube Bolt CAUTION: Refer to <u>Fastener Caution</u> Tighten 2.5 N.m (22 lb in)
3	Heater Core Outlet Tube Procedure DISCARD core tube seal and use NEW only.

HEATER CORE INLET TUBE REPLACEMENT

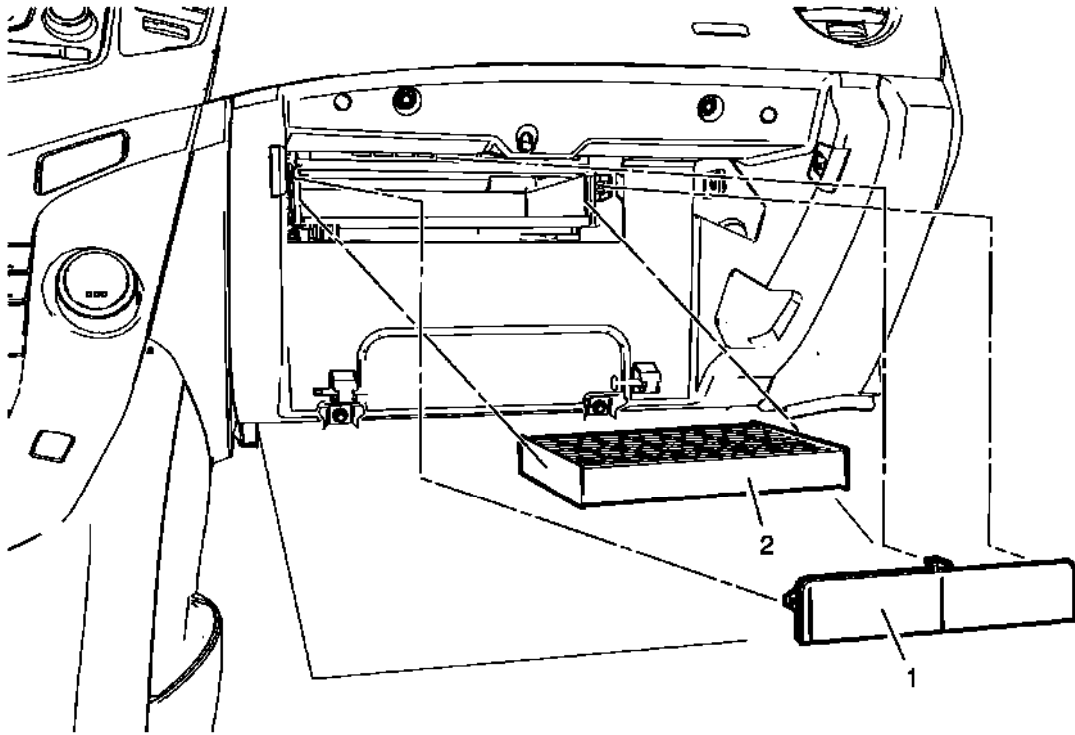
**Fig. 75: Heater Core Outlet Tube**

Courtesy of GENERAL MOTORS COMPANY

Heater Core Inlet Tube Replacement

Callout	Component Name
Preliminary Procedure Remove the heater and air conditioning evaporator case. Refer to <u>Heater and Air Conditioning Evaporator Case Replacement</u> .	
1	Heater Core Inlet Tube Clamp
2	Bracket Heater Core Inlet Tube Bolt CAUTION: Refer to <u>Fastener Caution</u> Tighten 2.5 N.m (22 lb in)
3	Heater Core Inlet Tube Procedure DISCARD core tube seal and use NEW only.

PASSENGER COMPARTMENT AIR FILTER REPLACEMENT

**Fig. 76: Passenger Compartment Air Filter**

Courtesy of GENERAL MOTORS COMPANY

Passenger Compartment Air Filter Replacement

Callout	Component Name
Preliminary Procedure Unhinge the instrument panel compartment door.	
1	Passenger Compartment Air Filter Cover Procedure Unlock the 3 retaining tabs.
2	Passenger Compartment Air Filter

AIR INLET HOUSING REPLACEMENT**Removal Procedure**

1. Remove heater and air conditioning evaporator and blower module. Refer to **Heater and Air Conditioning Evaporator Case Replacement**.

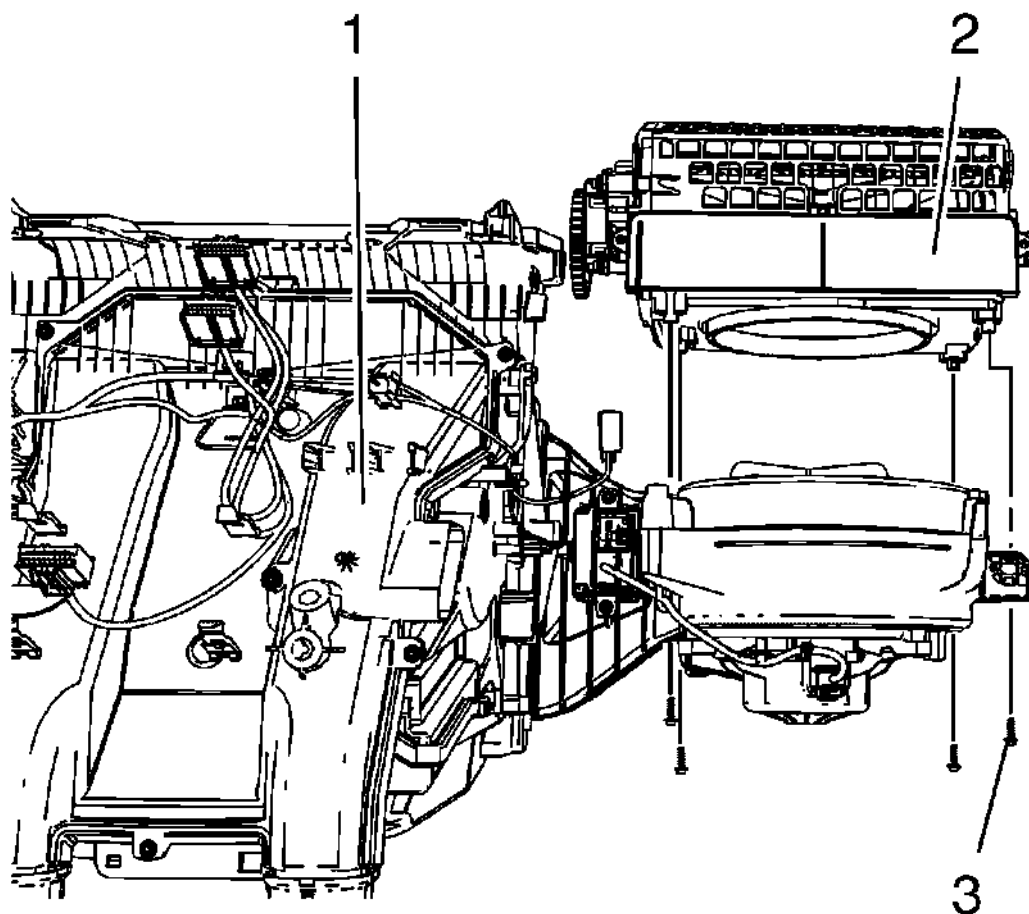


Fig. 77: Air Inlet Housing

Courtesy of GENERAL MOTORS COMPANY

2. Remove air inlet housing (2) from heater and air conditioning evaporator and blower module (1).
 - Disconnect electrical connectors.
 - Remove 4 air inlet housing bolts (3).
3. Remove air inlet valve actuator. Refer to [Air Inlet Valve Actuator Replacement](#) .
4. Remove air inlet valve and inside air valve control cam. Refer to [Air Inlet Valve and Inside Air Valve Control Cam Replacement](#) .

Installation Procedure

1. Install air inlet valve and inside air valve control cam. Refer to [Air Inlet Valve and Inside Air Valve Control Cam Replacement](#) .
2. Install air inlet valve actuator. Refer to [Air Inlet Valve Actuator Replacement](#) .

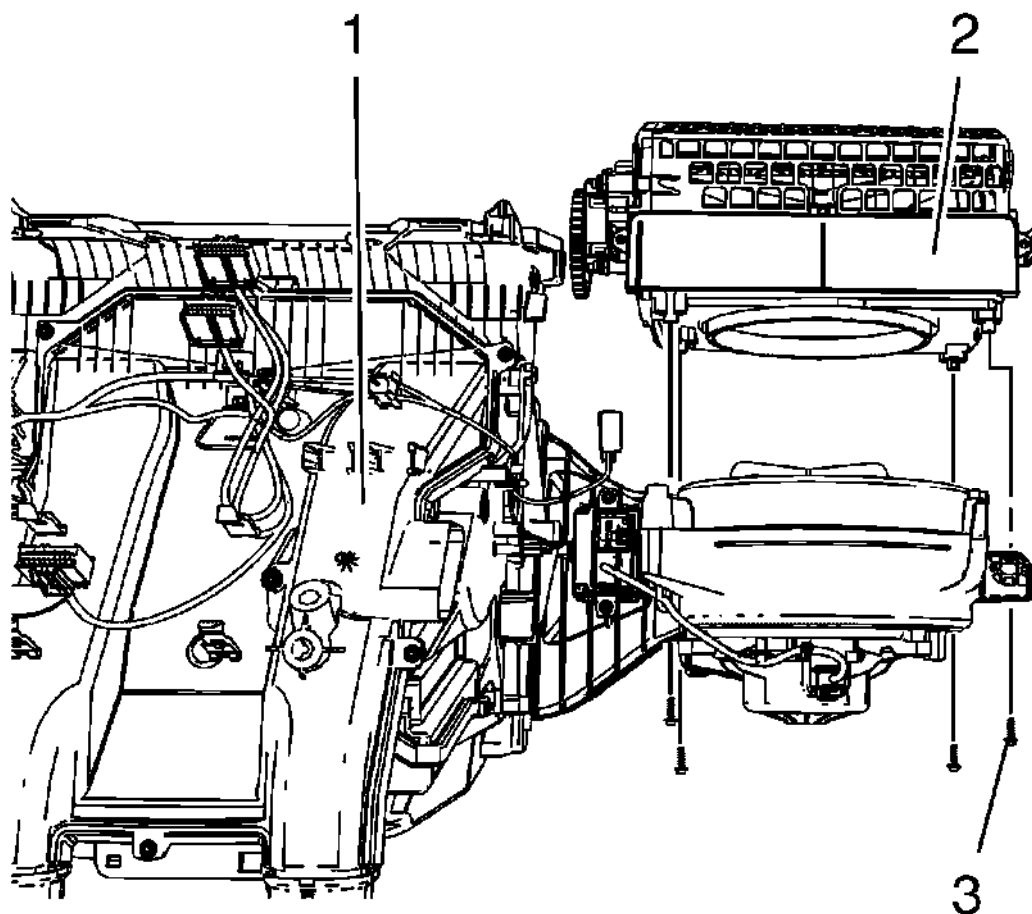


Fig. 78: Air Inlet Housing

Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to Fastener Caution .

3. Install air inlet housing (2) to heater and air conditioning evaporator and blower module (1).
 - Connect electrical connectors.
 - Install 4 air inlet housing bolts (3) and tighten to 2.5 N.m (22 lb in).
4. Install heater and air conditioning evaporator and blower module. Refer to Heater and Air Conditioning Evaporator Case Replacement.

BLOWER MOTOR REPLACEMENT

Removal Procedure

1. Remove the right floor air outlet duct. Refer to **Floor Air Outlet Duct Replacement - Right Side**.
2. Remove the blower motor wire harness connector.

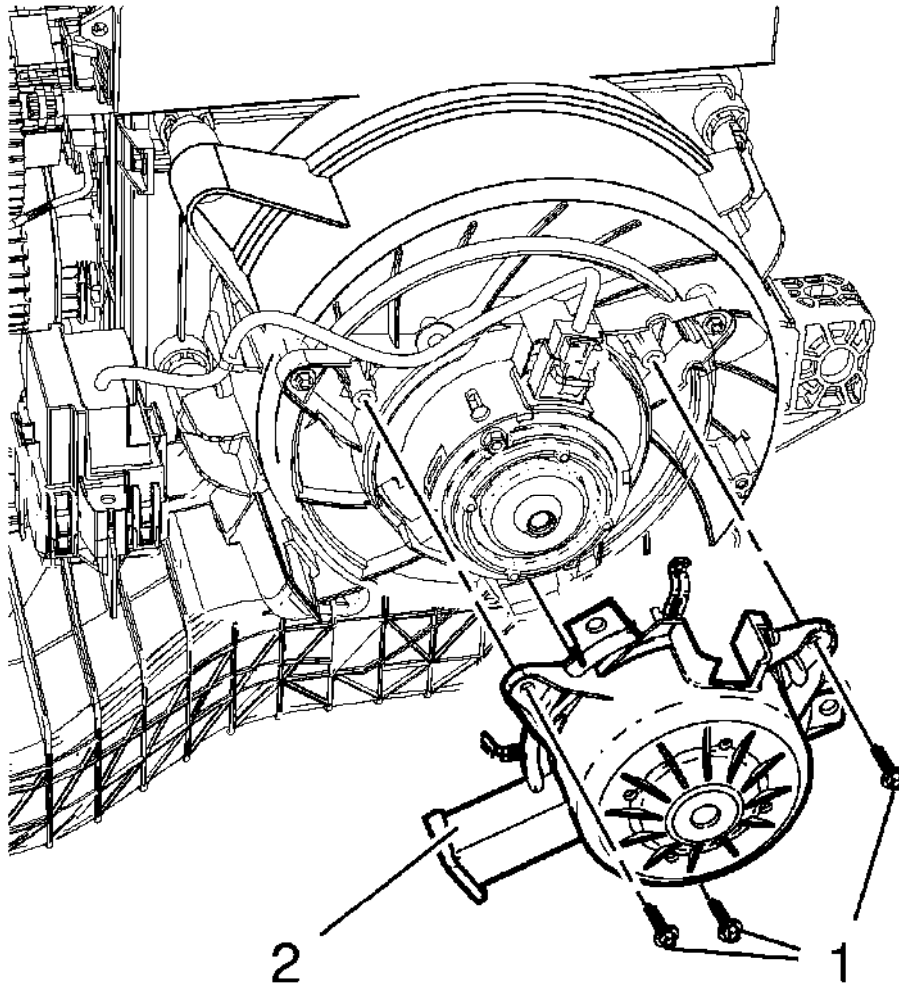


Fig. 79: Blower Motor Cup And Bolts
Courtesy of GENERAL MOTORS COMPANY

3. Remove the blower motor cup bolts (1).
4. Remove the blower motor cup from the blower motor (2).

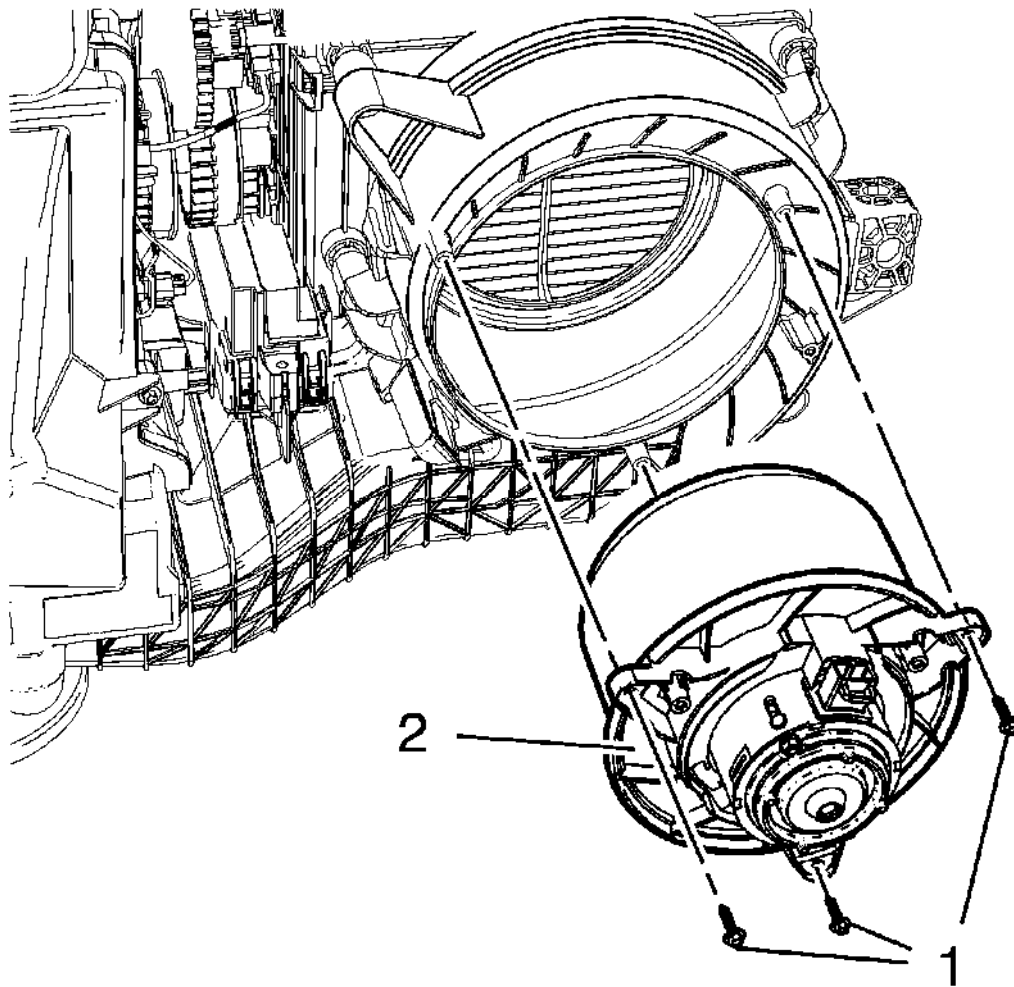


Fig. 80: Blower Motor And Bolts

Courtesy of GENERAL MOTORS COMPANY

5. Remove the blower motor bolts (1).
6. Remove the blower motor (2) from the heater case.

Installation Procedure

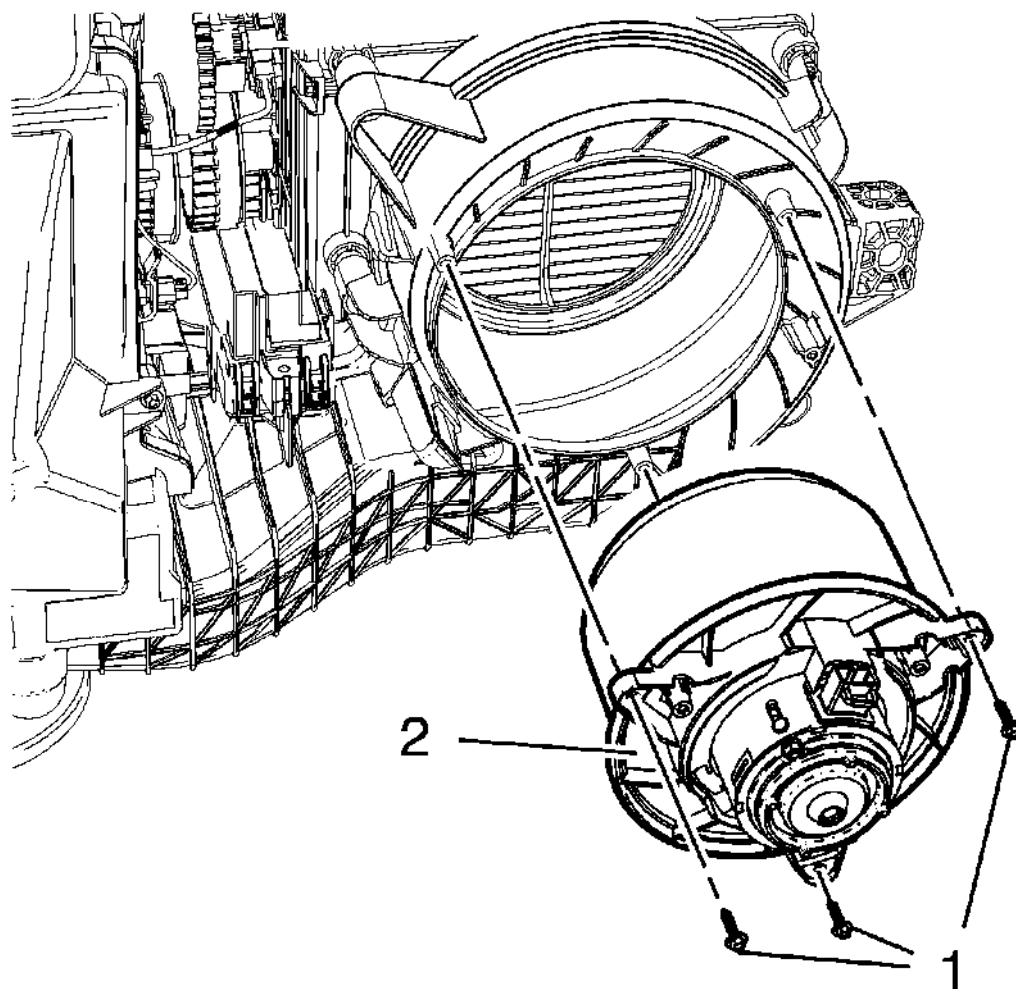


Fig. 81: Blower Motor And Bolts

Courtesy of GENERAL MOTORS COMPANY

1. Install the new blower motor (2) to the heater case.

CAUTION: Refer to Fastener Caution

2. Install the blower motor bolts (1) and tighten to 4.5 N.m (40 lb in).
3. Install the motor blower cup to the blower motor.
4. Install the blower motor cup bolts and tighten to 2.5 N.m (23 lb in).
5. Install the blower motor wire harness connector.
6. Install the right floor air outlet duct. Refer to Floor Air Outlet Duct Replacement - Right Side.

INSTRUMENT PANEL OUTER AIR OUTLET REPLACEMENT - LEFT SIDE

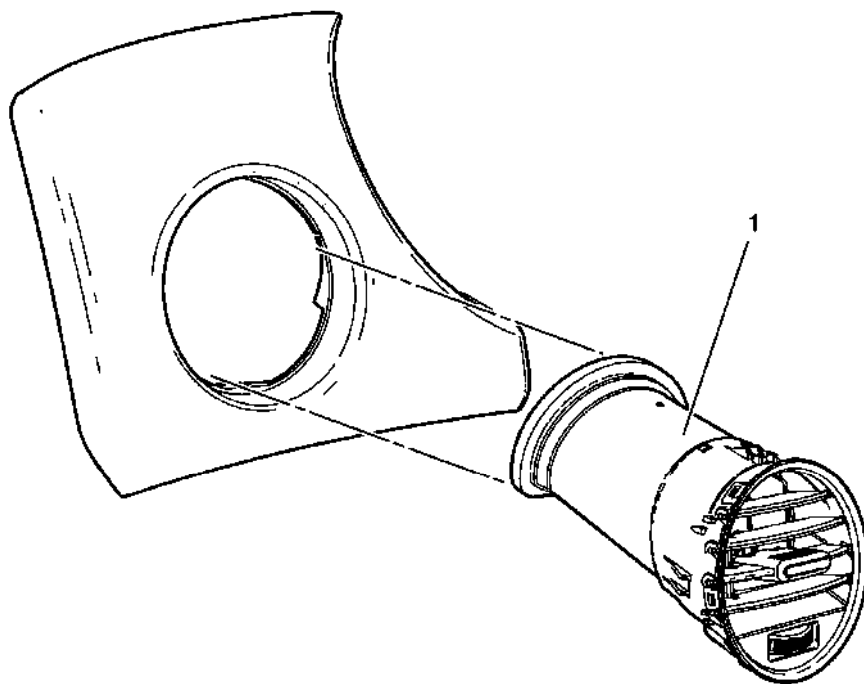


Fig. 82: Instrument Panel Outer Air Outlet - Left Side

Courtesy of GENERAL MOTORS COMPANY

Instrument Panel Outer Air Outlet Replacement - Left Side

Callout	Component Name
Preliminary Procedures Remove instrument panel upper trim panel. Refer to <u>Instrument Panel Upper Trim Panel Replacement - Left Side</u> .	
1	Instrument Panel Outer Air Outlet Procedure Remove clip (Qty: 4).

INSTRUMENT PANEL CENTER AIR OUTLET REPLACEMENT

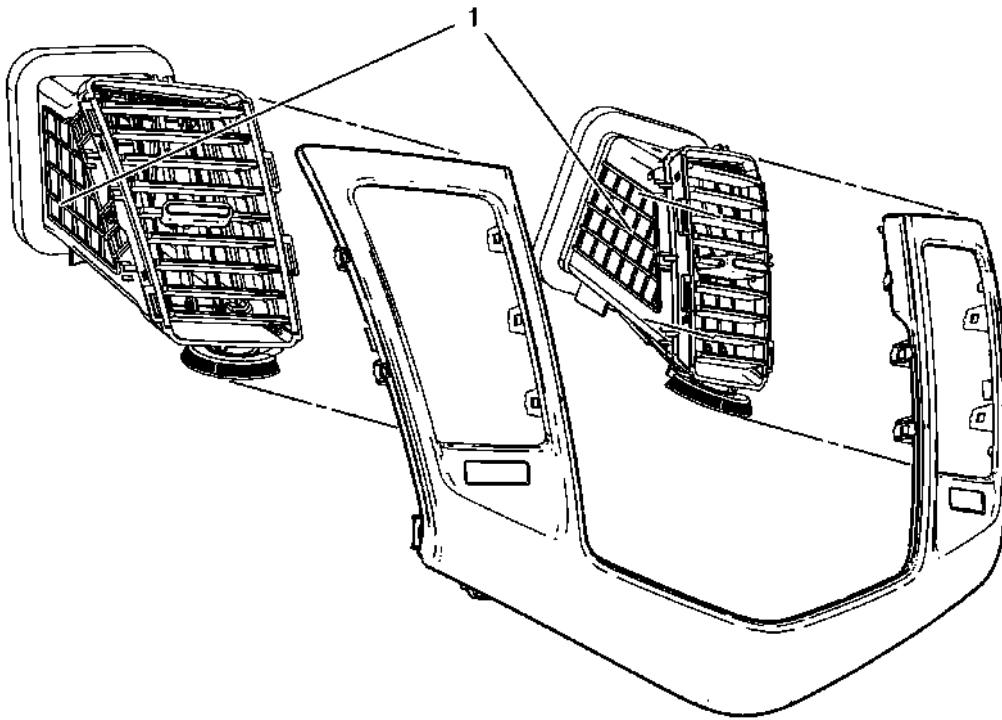


Fig. 83: Instrument Panel Center Air Outlet
Courtesy of GENERAL MOTORS COMPANY

Instrument Panel Center Air Outlet Replacement

Callout	Component Name
Preliminary Procedure Remove instrument panel center upper molding. Refer to <u>Instrument Panel Center Upper Molding Replacement</u> .	
1	Instrument Panel Center Air Outlet Procedure Unclip instrument panel center air outlet from instrument panel center upper molding.

INSTRUMENT PANEL OUTER AIR OUTLET REPLACEMENT - RIGHT SIDE

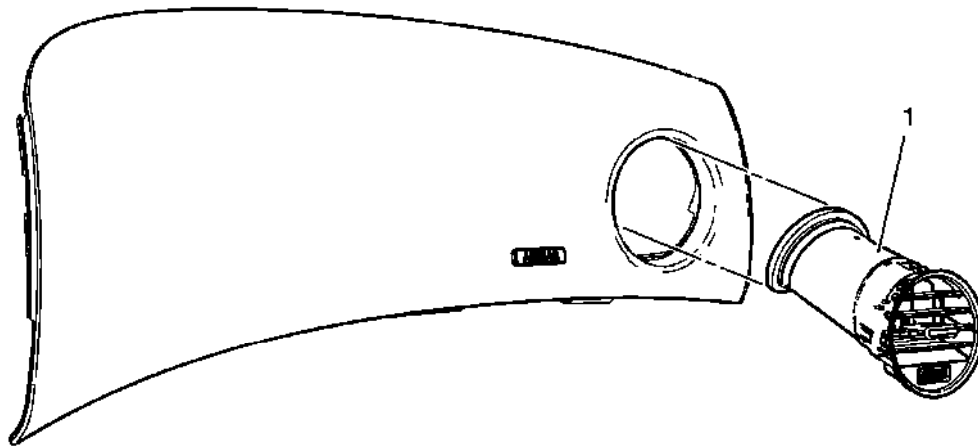


Fig. 84: Instrument Panel Outer Air Outlet - Right Side
Courtesy of GENERAL MOTORS COMPANY

Instrument Panel Outer Air Outlet Replacement - Right Side

Callout	Component Name
Preliminary Procedure Remove instrument panel upper trim panel. Refer to <u>Instrument Panel Upper Trim Panel Replacement - Right Side</u> .	
1	Instrument Panel Outer Air Outlet Assembly Procedure 1. Remove instrument panel outer air outlet duct right side. 2. Remove clip (Qty: 4).

BODY AIR OUTLET DEFLECTOR REPLACEMENT

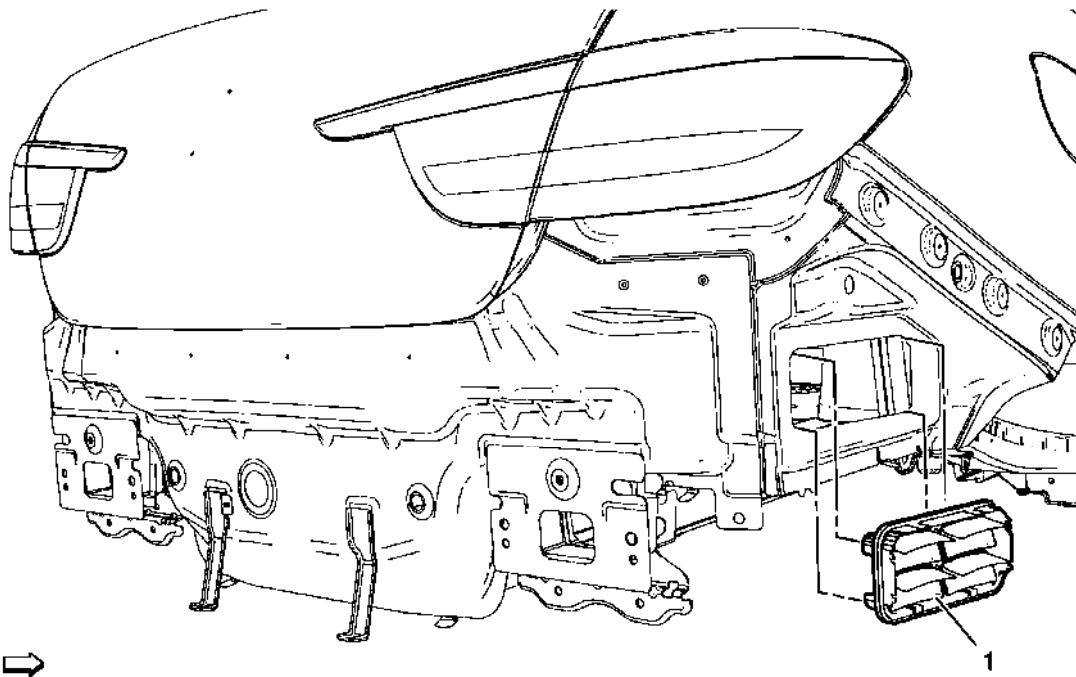


Fig. 85: Body Air Outlet Deflector - (Notchback)
Courtesy of GENERAL MOTORS COMPANY

Body Air Outlet Deflector Replacement

Callout	Component Name
Preliminary Procedures Remove the rear bumper fascia. Refer to <u>Rear Bumper Fascia Replacement</u> .	
1	Body Air Outlet Deflector Procedure Unclip 4 body air outlet deflector tabs.

FLOOR AIR OUTLET REPLACEMENT

Removal Procedure

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

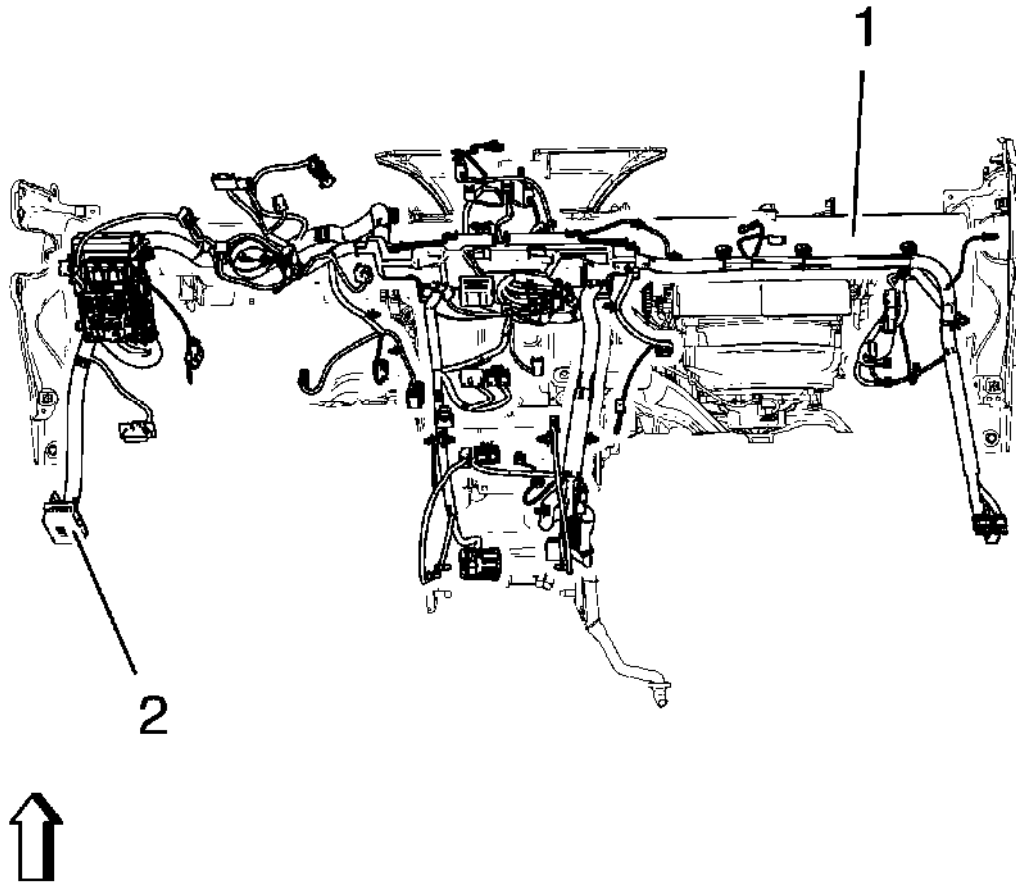


Fig. 86: Instrument Panel Wiring Harness And Instrument Panel Tie Bar
Courtesy of GENERAL MOTORS COMPANY

2. Remove the instrument panel wiring harness (2) from the instrument panel tie bar (1).
Disconnect the electrical connectors.

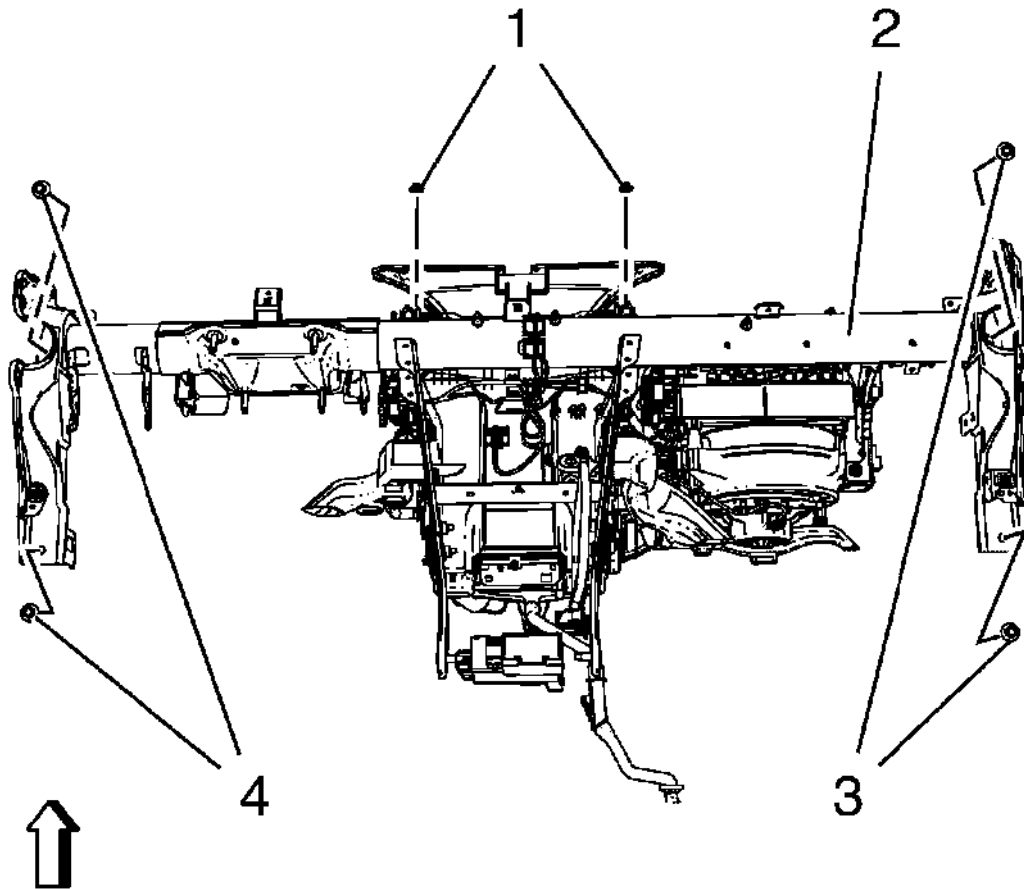


Fig. 87: Instrument Panel Tie Bar, Bolts And Nuts
Courtesy of GENERAL MOTORS COMPANY

3. Remove the instrument panel tie bar (2).
 - Remove the 4 instrument panel tie bar bolts (3, 4).
 - Remove the 2 instrument panel tie bar nuts (1).
4. Remove the heater wiring harness.

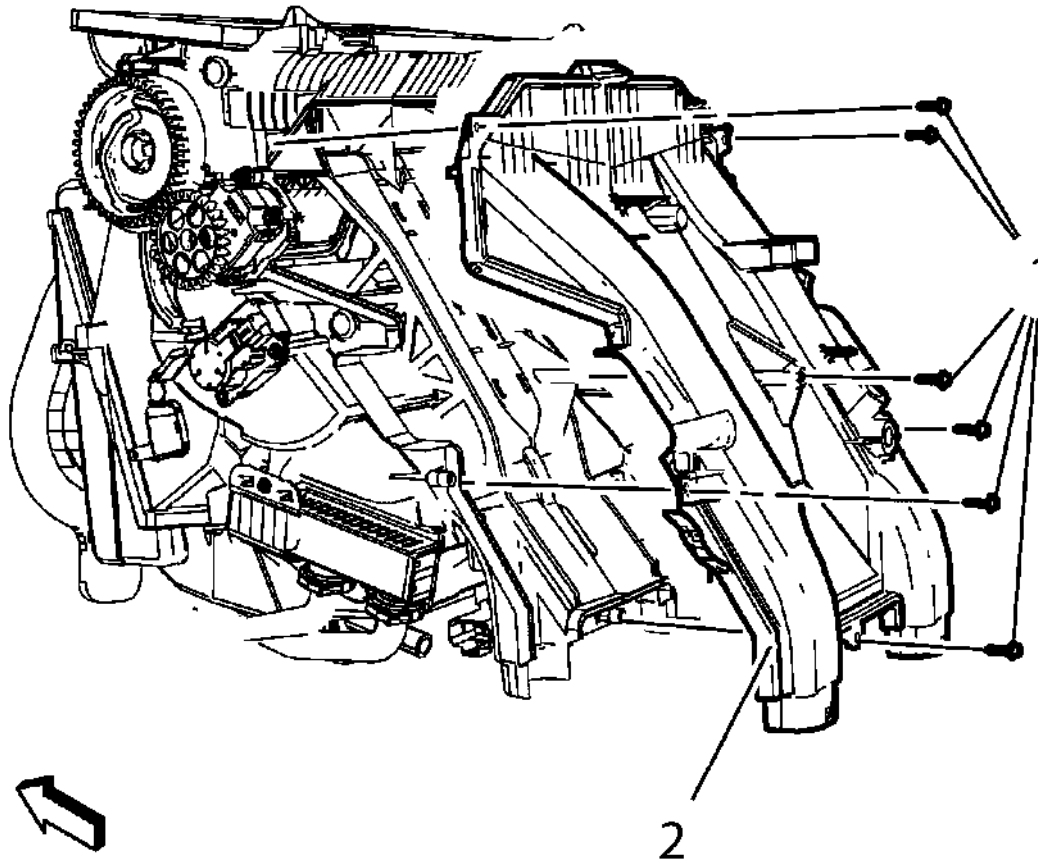


Fig. 88: Floor Air Outlet

Courtesy of GENERAL MOTORS COMPANY

5. Remove the floor air outlet (2).

Remove the 6 floor air outlet bolts (1).

Installation Procedure

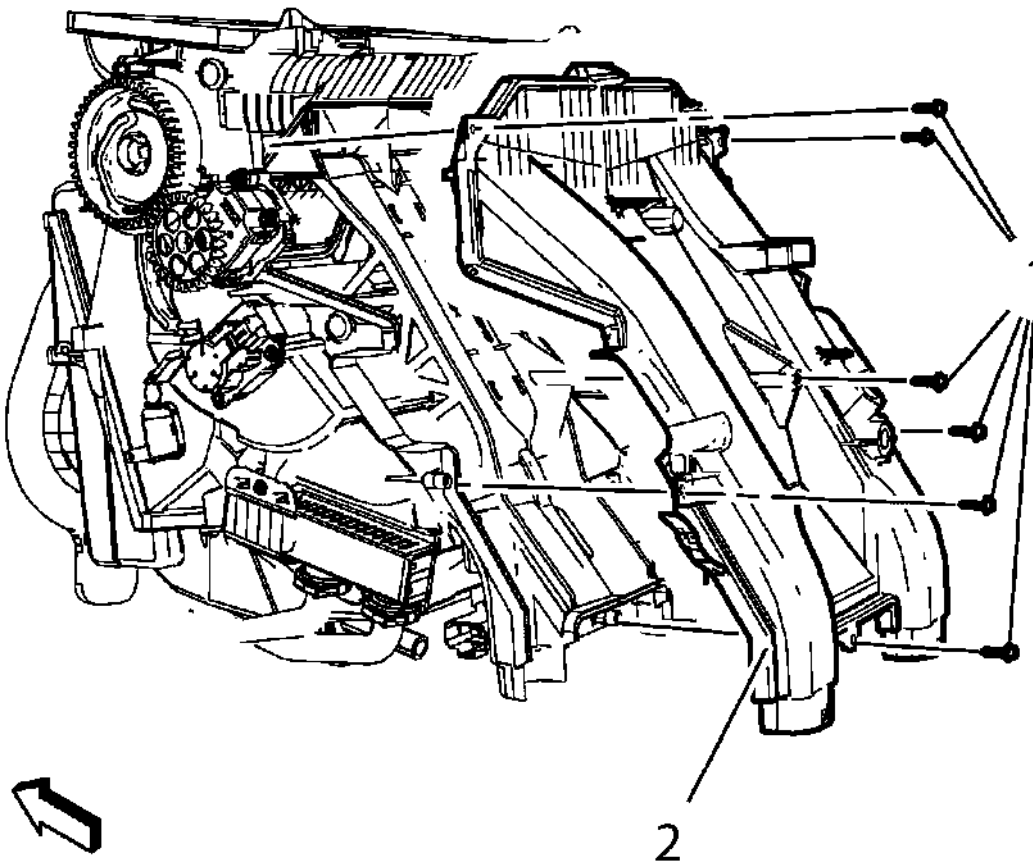


Fig. 89: Floor Air Outlet

Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to Fastener Caution .

1. Install the floor air outlet (2).

Install the 6 floor air outlet bolts (1) and tighten to 2.5 N.m (23 lb in).

2. Install the heater wiring harness.

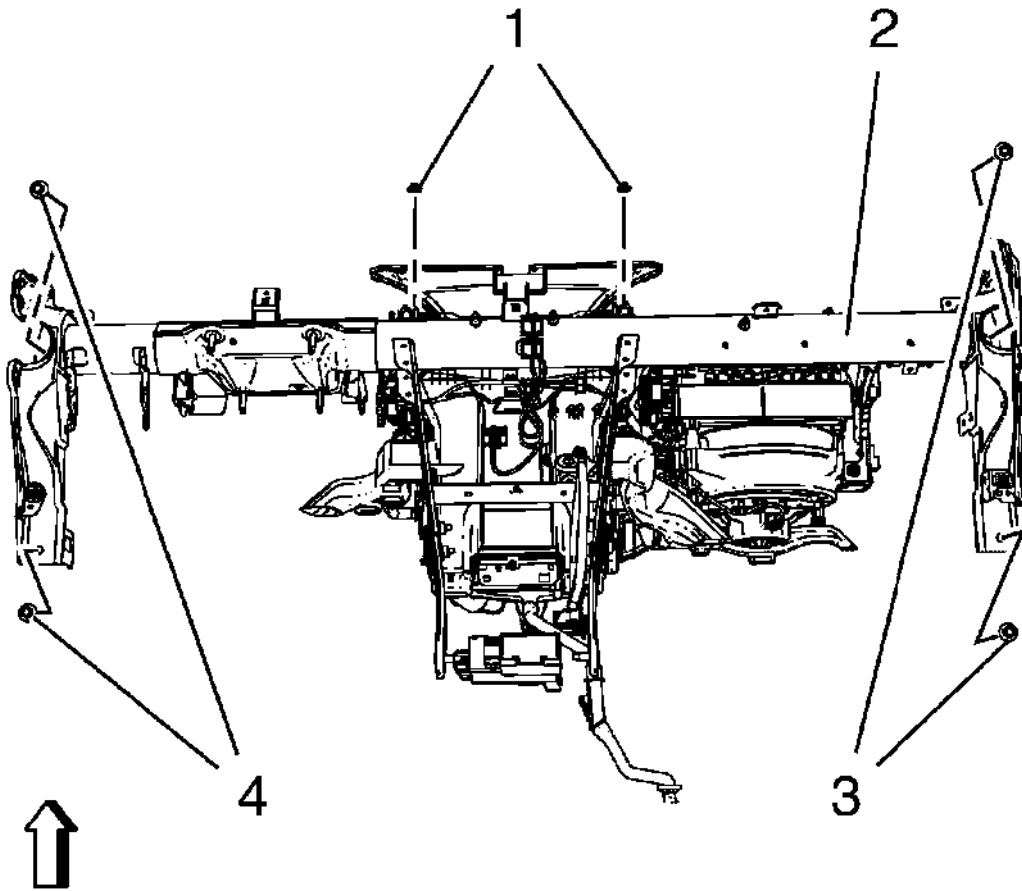


Fig. 90: Instrument Panel Tie Bar, Bolts And Nuts
Courtesy of GENERAL MOTORS COMPANY

3. Install the instrument panel tie bar (2).
 - Install the 4 instrument panel tie bar bolts (3, 4) and tighten to 22 N.m (17 lb ft).
 - Install the 2 instrument panel tie bar nuts (1) and tighten to 9 N.m (80 lb in).

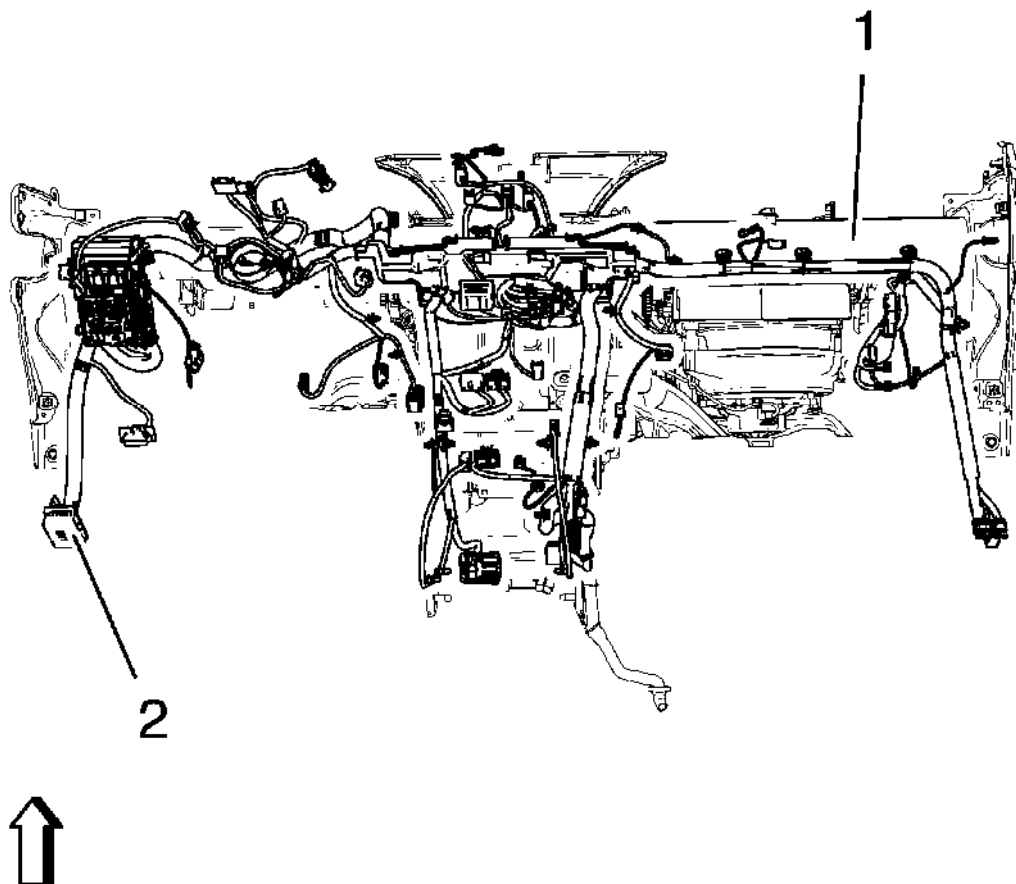


Fig. 91: Instrument Panel Wiring Harness And Instrument Panel Tie Bar
Courtesy of GENERAL MOTORS COMPANY

4. Attach the instrument panel wiring harness (2) to the instrument panel tie bar (1).
Connect the electrical connectors.
5. Install the instrument panel assembly. Refer to **Instrument Panel Assembly Replacement** .

FLOOR FRONT AIR OUTLET DUCT ADAPTER REPLACEMENT

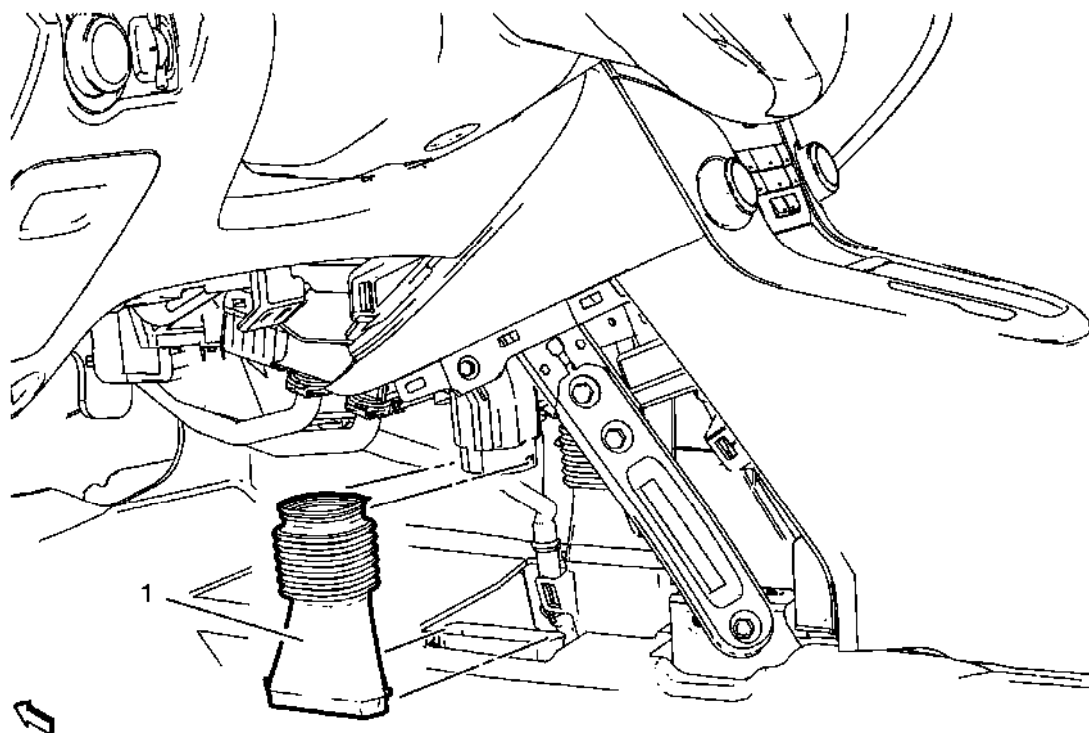


Fig. 92: Floor Front Air Outlet Duct Adapter
Courtesy of GENERAL MOTORS COMPANY

Floor Front Air Outlet Duct Adapter Replacement

Callout	Component Name
Preliminary Procedures Remove the instrument panel lower trim panel- left side. Refer to <u>Instrument Panel Lower Trim Panel Replacement - Left Side</u> .	
1	Floor Front Air Outlet Duct Adapter

INSTRUMENT PANEL OUTER AIR OUTLET DUCT REPLACEMENT

2013 Chevrolet Cruze

2013 HVAC Heating, Ventilation, and Air Conditioning - Cruze

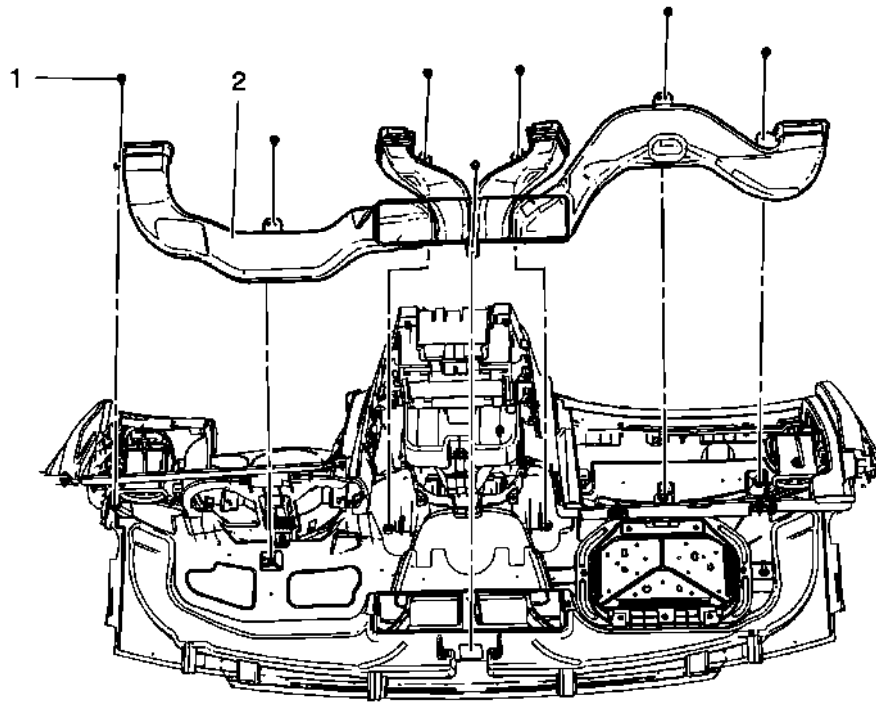
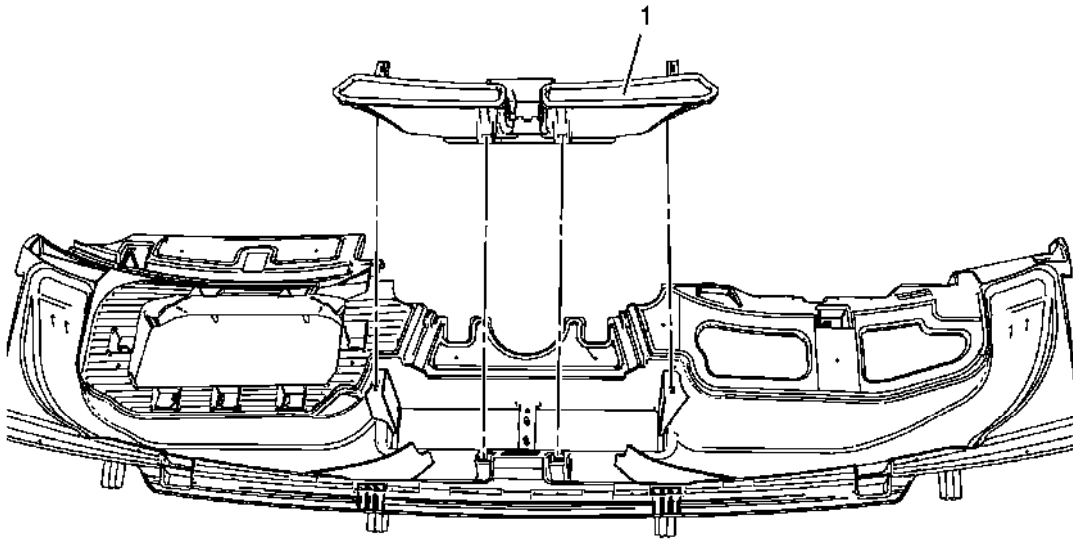


Fig. 93: Instrument Panel Outer Air Outlet Duct
Courtesy of GENERAL MOTORS COMPANY

Instrument Panel Outer Air Outlet Duct Replacement

Callout	Component Name
Preliminary Procedure Remove instrument panel assembly. Refer to <u>Instrument Panel Assembly Replacement</u> .	
1	Instrument Panel Outer Air Outlet Duct Screw (Qty: 7) CAUTION: Refer to <u>Fastener Caution</u> . Tighten 2.5 N.m (22 lb in)
2	Instrument Panel Outer Air Outlet Duct

WINDSHIELD DEFROSTER NOZZLE REPLACEMENT

**Fig. 94: Windshield Defroster Nozzle**

Courtesy of GENERAL MOTORS COMPANY

Windshield Defroster Nozzle Replacement

Callout	Component Name
Preliminary Procedure	
Remove instrument panel. Refer to <u>Instrument Panel Assembly Replacement</u>	
1	Windshield Defroster Nozzle Procedure Unclip from instrument panel assembly.

FLOOR AIR OUTLET DUCT REPLACEMENT - LEFT SIDE**Removal Procedure**

1. Remove instrument outer trim cover - left side. Refer to **Instrument Panel Outer Trim Cover Replacement - Left Side** .
2. Remove instrument panel lower trim pad cover - left side. Refer to **Instrument Panel Lower Trim Pad Cover Replacement (without Knee Airbag)** , **Instrument Panel Lower Trim Pad Cover Replacement (with Knee Airbag)** .

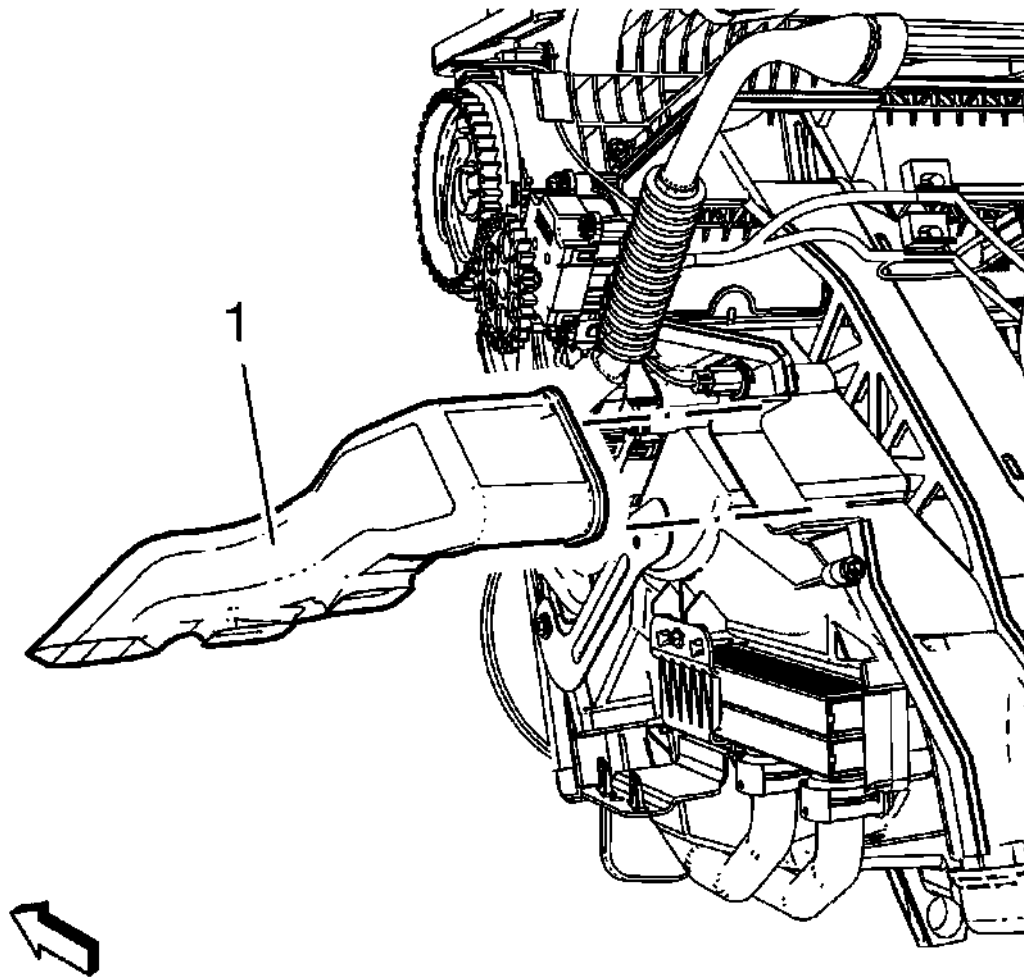


Fig. 95: Floor Air Outlet Duct - Left Side (Left Hand Drive)
Courtesy of GENERAL MOTORS COMPANY

3. Remove floor air outlet duct (1) - left side.

Installation Procedure

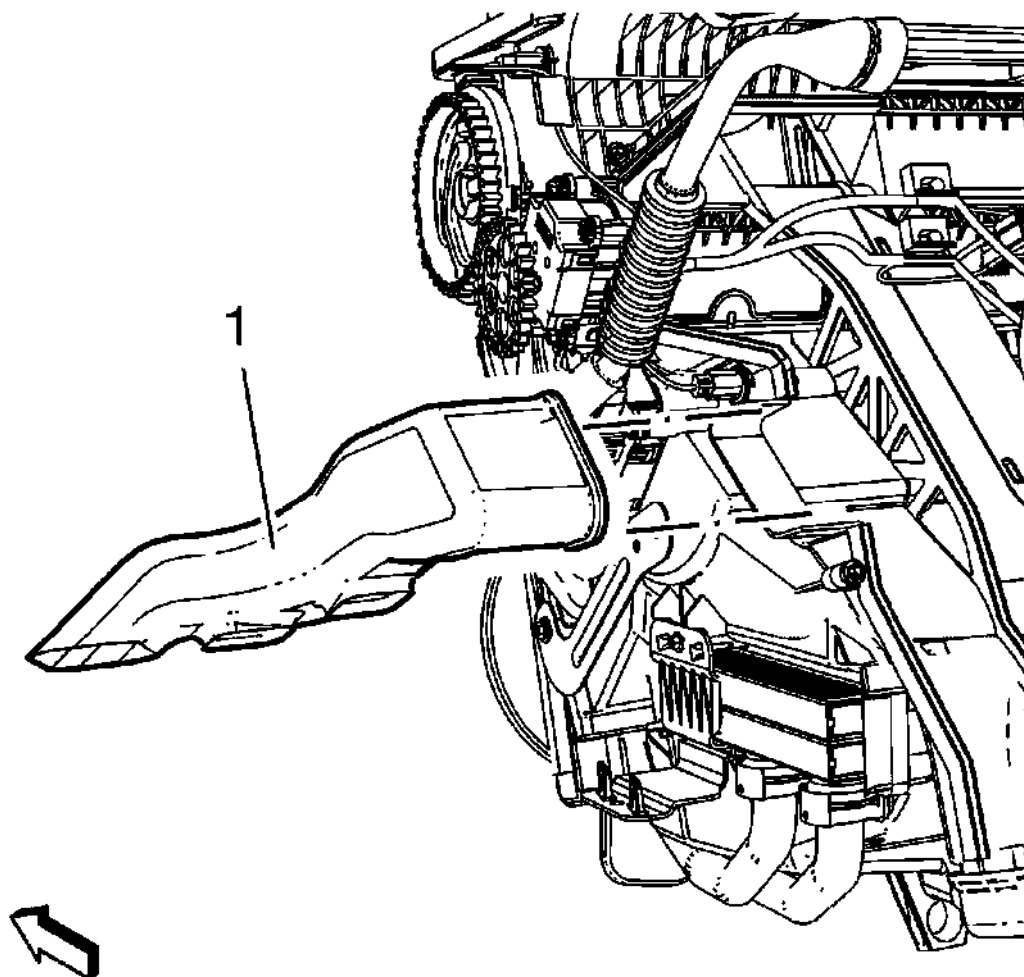
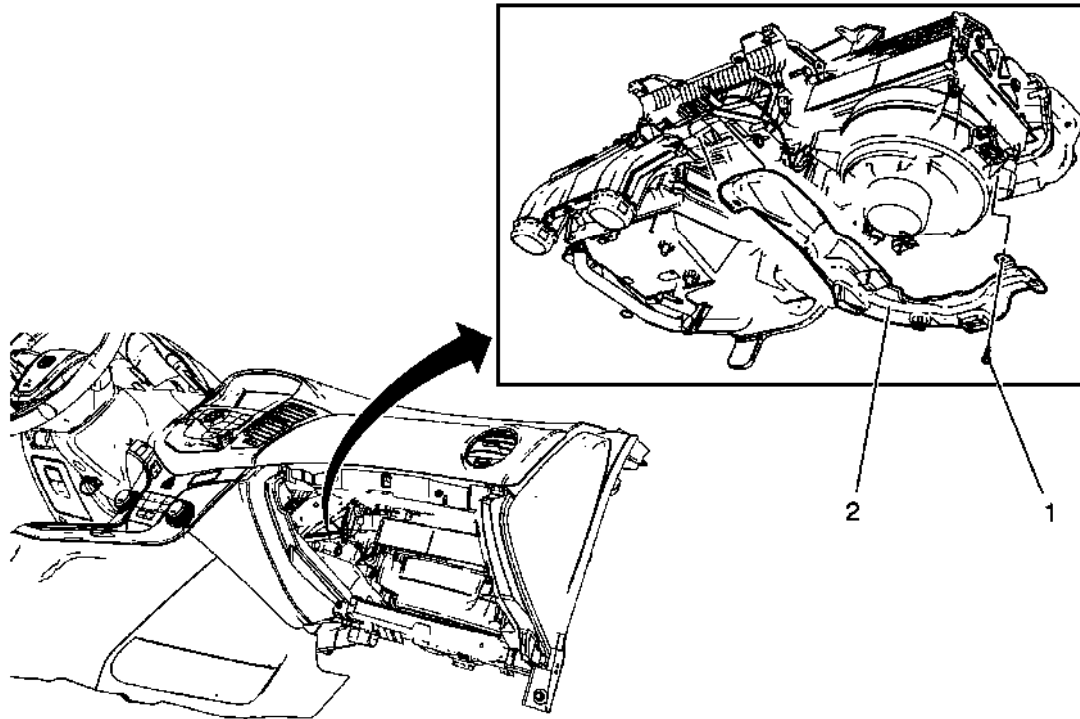


Fig. 96: Floor Air Outlet Duct - Left Side (Left Hand Drive)

Courtesy of GENERAL MOTORS COMPANY

1. Install floor air outlet duct (1) - left side.
2. Install instrument panel lower trim pad cover - left side. Refer to **Instrument Panel Lower Trim Pad Cover Replacement (without Knee Airbag)** , **Instrument Panel Lower Trim Pad Cover Replacement (with Knee Airbag)** .
3. Install instrument outer trim cover - left side. Refer to **Instrument Panel Outer Trim Cover Replacement - Left Side** .

FLOOR AIR OUTLET DUCT REPLACEMENT - RIGHT SIDE

**Fig. 97: Floor Front Air Outlet Duct**

Courtesy of GENERAL MOTORS COMPANY

Floor Air Outlet Duct Replacement - Right Side

Callout	Component Name
Preliminary Procedure Remove instrument panel compartment. Refer to <u>Instrument Panel Compartment Replacement</u> .	
1	Floor Air Outlet Duct Bolt CAUTION: Refer to <u>Fastener Caution</u> . Tighten 2.5 N.m (22 lb in)
2	Floor Air Outlet Duct

FLOOR REAR AIR OUTLET DUCT REPLACEMENT - LEFT SIDE

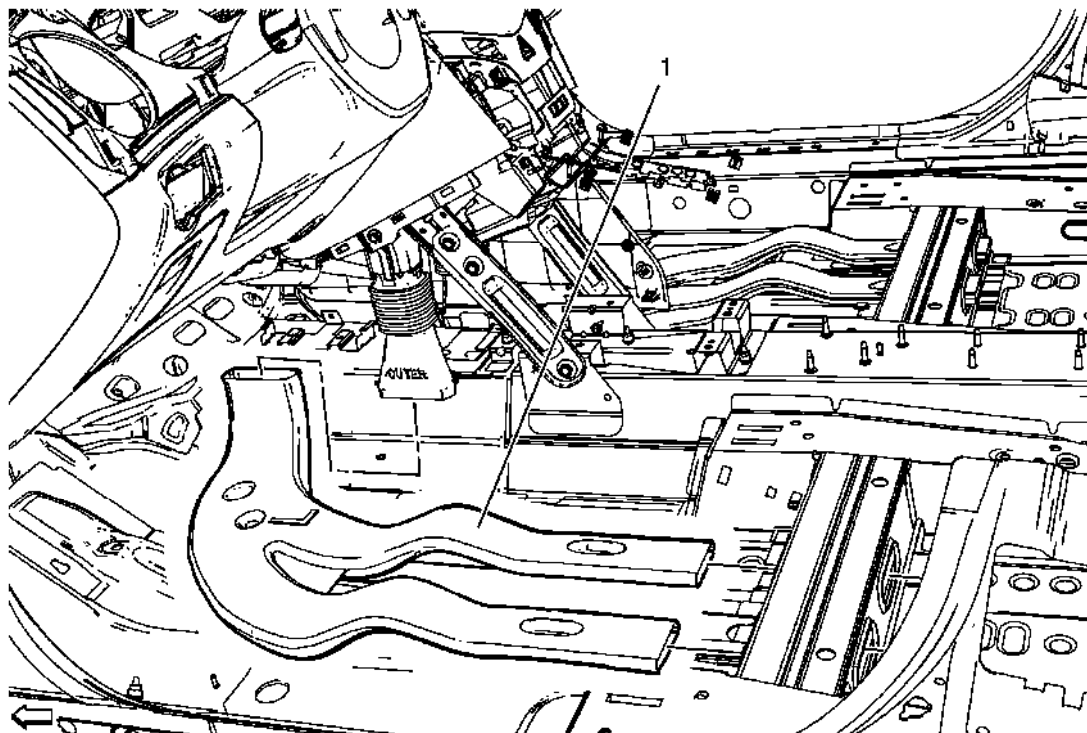


Fig. 98: Floor Rear Air Outlet Duct - Left Side
Courtesy of GENERAL MOTORS COMPANY

Floor Rear Air Outlet Duct Replacement - Left Side

Callout	Component Name
Preliminary Procedures	
Remove front floor panel carpet. Refer to Front Floor Panel Carpet Replacement .	
1	Floor Rear Air Outlet Duct

FLOOR REAR AIR OUTLET DUCT REPLACEMENT - RIGHT SIDE

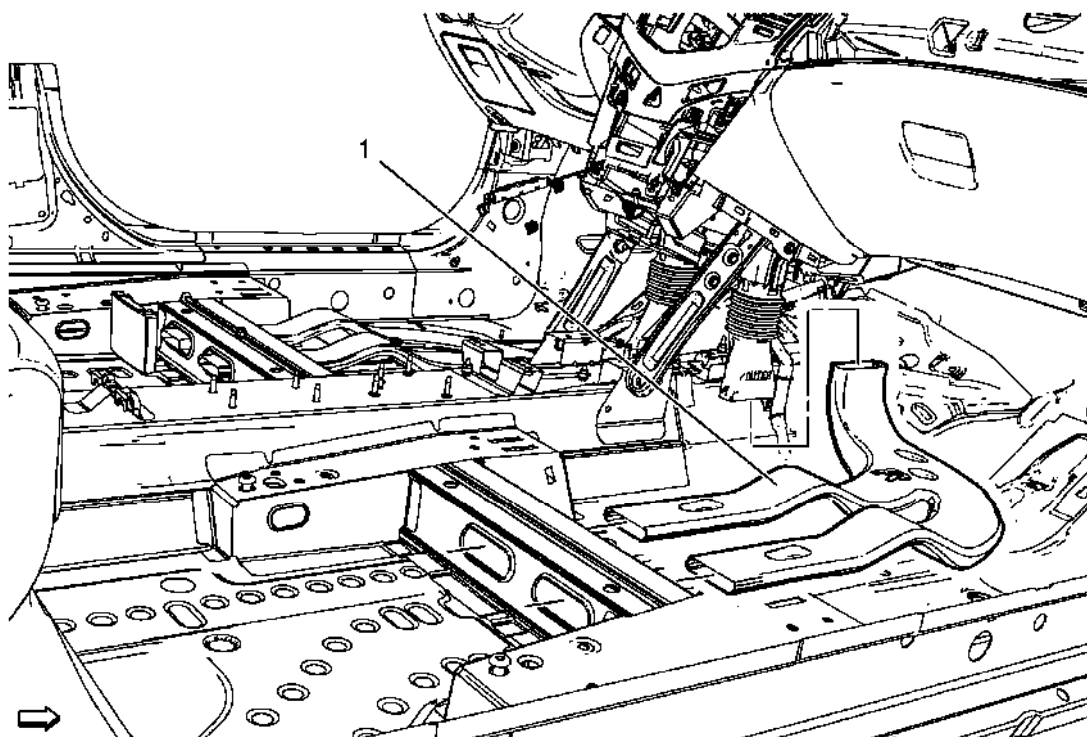


Fig. 99: Floor Rear Air Outlet Duct - Right Side
Courtesy of GENERAL MOTORS COMPANY

Floor Rear Air Outlet Duct Replacement - Right Side

Callout	Component Name
Preliminary Procedures Remove front floor panel carpet. Refer to Front Floor Panel Carpet Replacement .	
1	Floor Rear Air Outlet Duct

HEATER AND AIR CONDITIONING REMOTE CONTROL REPLACEMENT

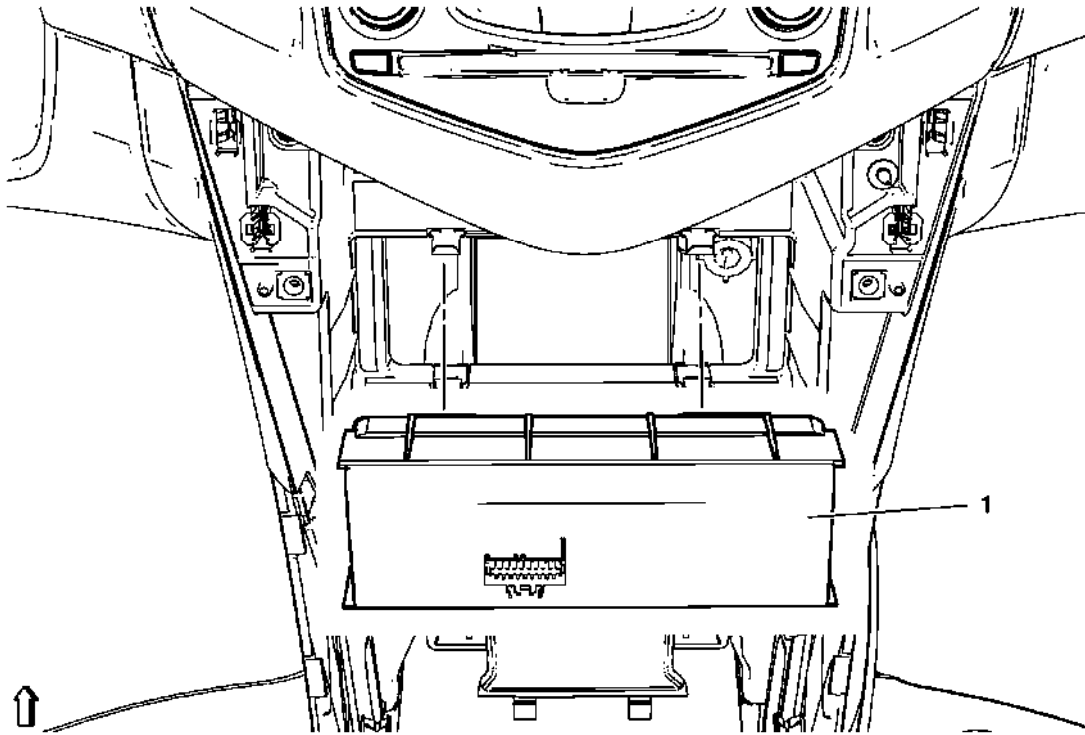
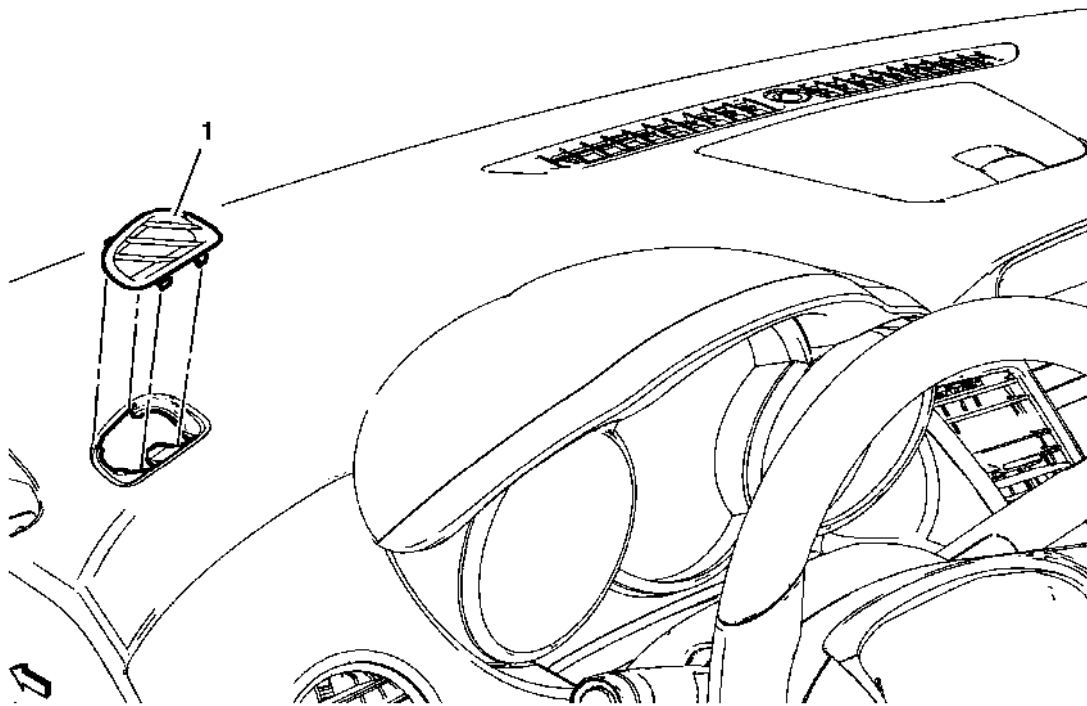


Fig. 100: Heater and Air Conditioning Remote Control
Courtesy of GENERAL MOTORS COMPANY

Heater and Air Conditioning Remote Control Replacement

Callout	Component Name
Preliminary Procedure 1. Prepare heater and air conditioning remote control for replacement, refer to <u>Control Module References</u> . 2. Disconnect the negative battery cable. Refer to <u>Battery Negative Cable Disconnection and Connection</u> 3. Remove heater and air conditioning control. Refer to <u>Heater and Air Conditioning Control Replacement</u> .	
1	Heater and Air Conditioning Remote Control Procedure 1. Disconnect electrical components. 2. Unclip remote control from instrument panel. 3. After repairs, refer to <u>Control Module References</u> for programming and set up information.

FRONT SIDE DOOR AIR OUTLET REPLACEMENT

**Fig. 101: Front Side Door Air Outlet**

Courtesy of GENERAL MOTORS COMPANY

Front Side Door Air Outlet Replacement

Callout	Component Name
1	Front Side Door Air Outlet Procedure Using a plastic trim tool, release the air outlet retainers from the instrument panel.

HEATER CORE REPLACEMENT**Removal Procedure**

1. Drain the cooling system. Refer to **Cooling System Draining and Filling (Static Fill)** , **Cooling System Draining and Filling (GE-47716 Fill)** .
2. Remove the instrument panel lower trim panel. Refer to **Instrument Panel Lower Trim Panel Replacement - Left Side** .
3. Remove the inflatable restraint instrument panel lower module - driver side. Refer to **Instrument Panel Lower Airbag Replacement - Driver Side** .

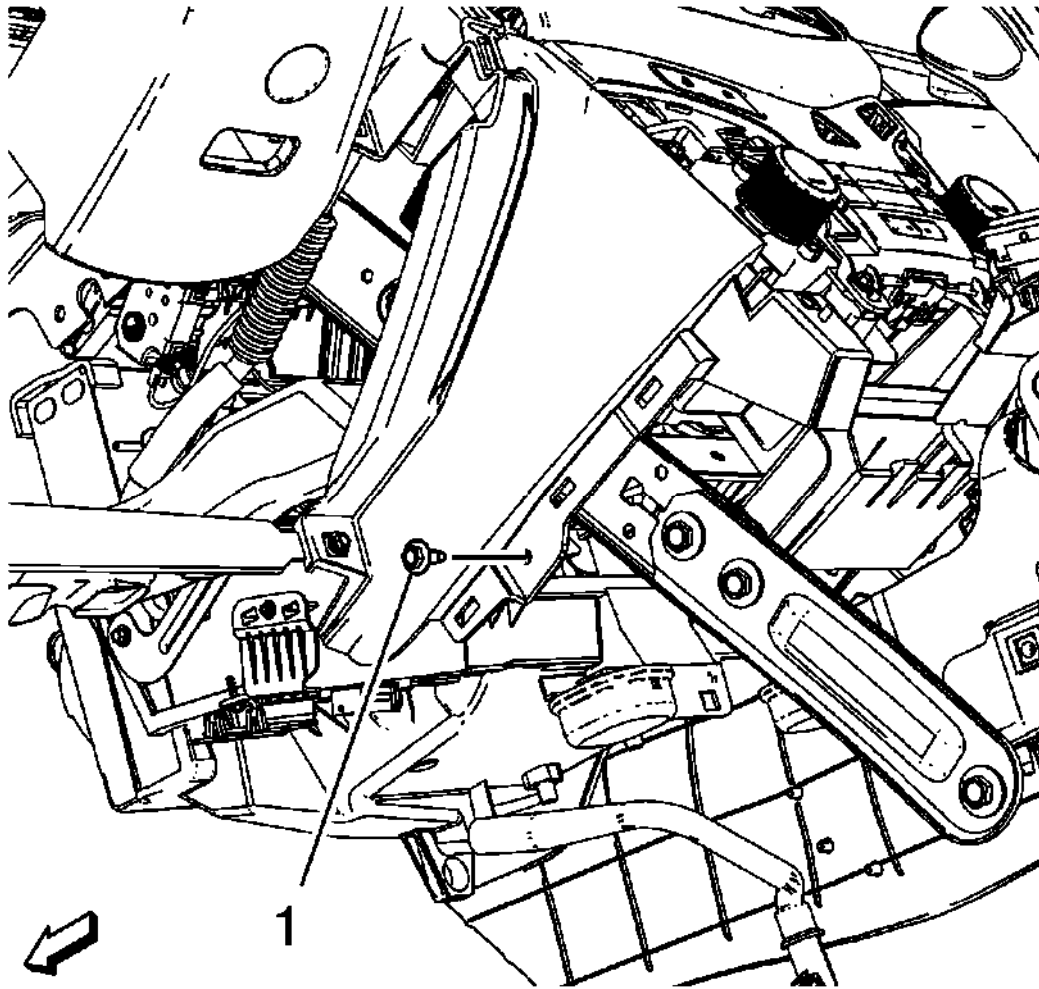


Fig. 102: Instrument Panel Bolt

Courtesy of GENERAL MOTORS COMPANY

4. Remove instrument panel bolt (1).

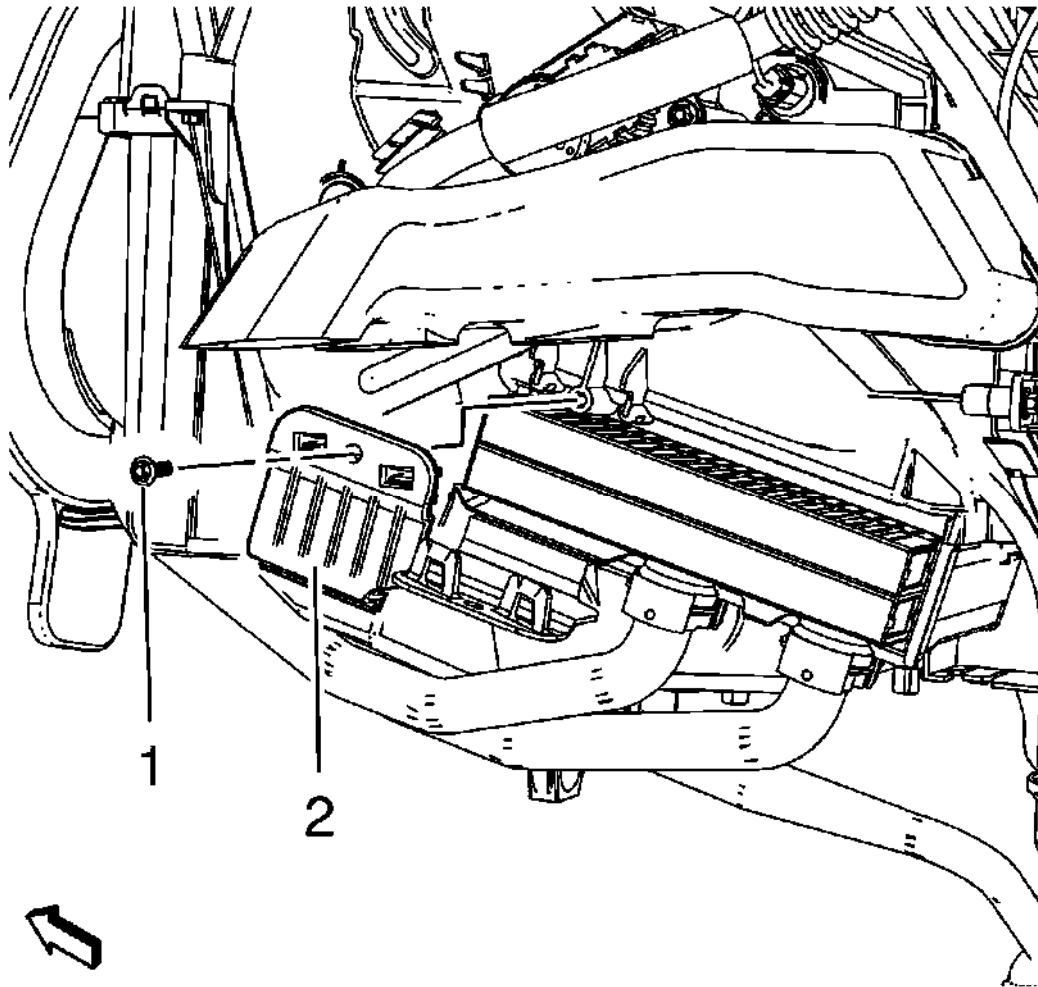


Fig. 103: Heater Core Cover

Courtesy of GENERAL MOTORS COMPANY

5. Remove heater core cover bolt (1) and heater core cover (2).

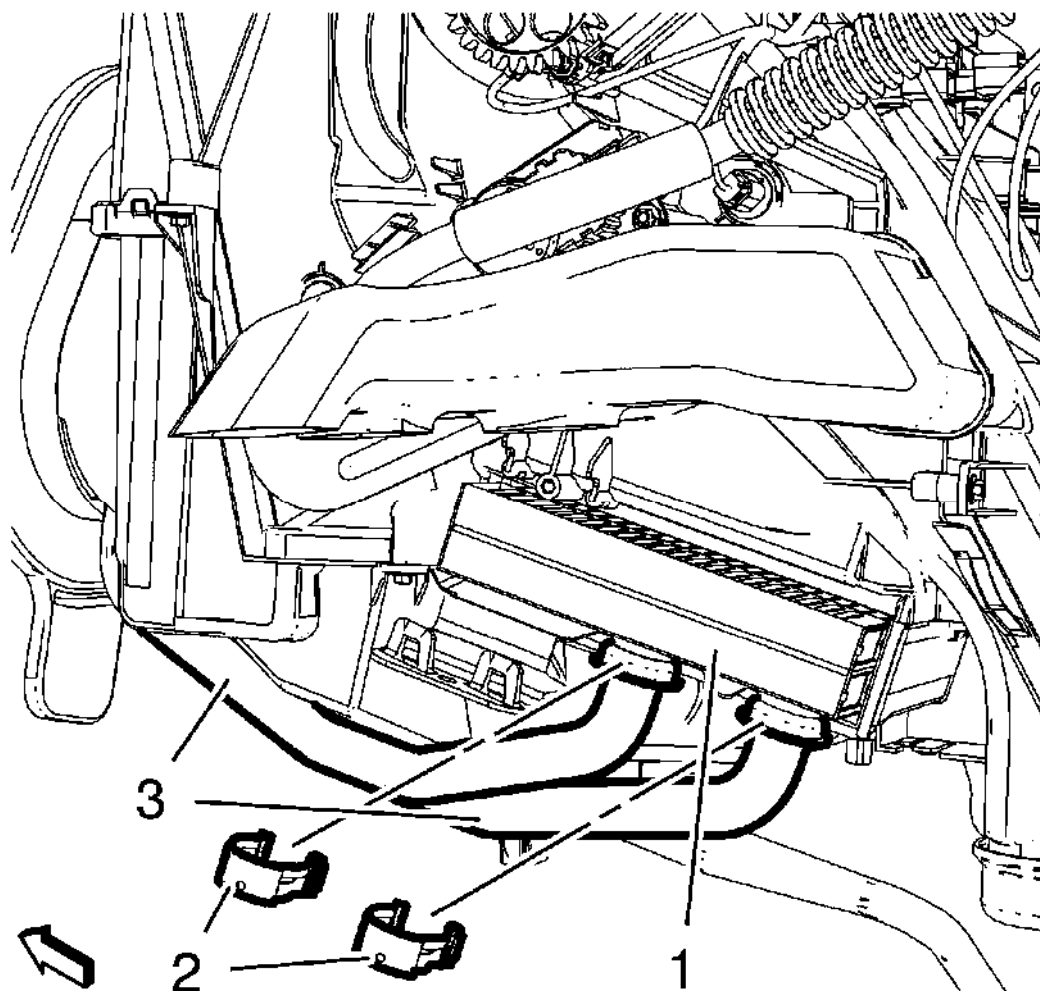


Fig. 104: Heater Core

Courtesy of GENERAL MOTORS COMPANY

NOTE: Some coolant may remain in the heater core. Place a protective cover on the floor and position a small container to catch residual coolant during heater core tube removal.

6. Remove the 2 heater core clamps (2).
7. Remove the 2 heater core tubes (3).
8. Remove the heater core (1).
9. Change the 2 heater core tube sealing rings.

Installation Procedure

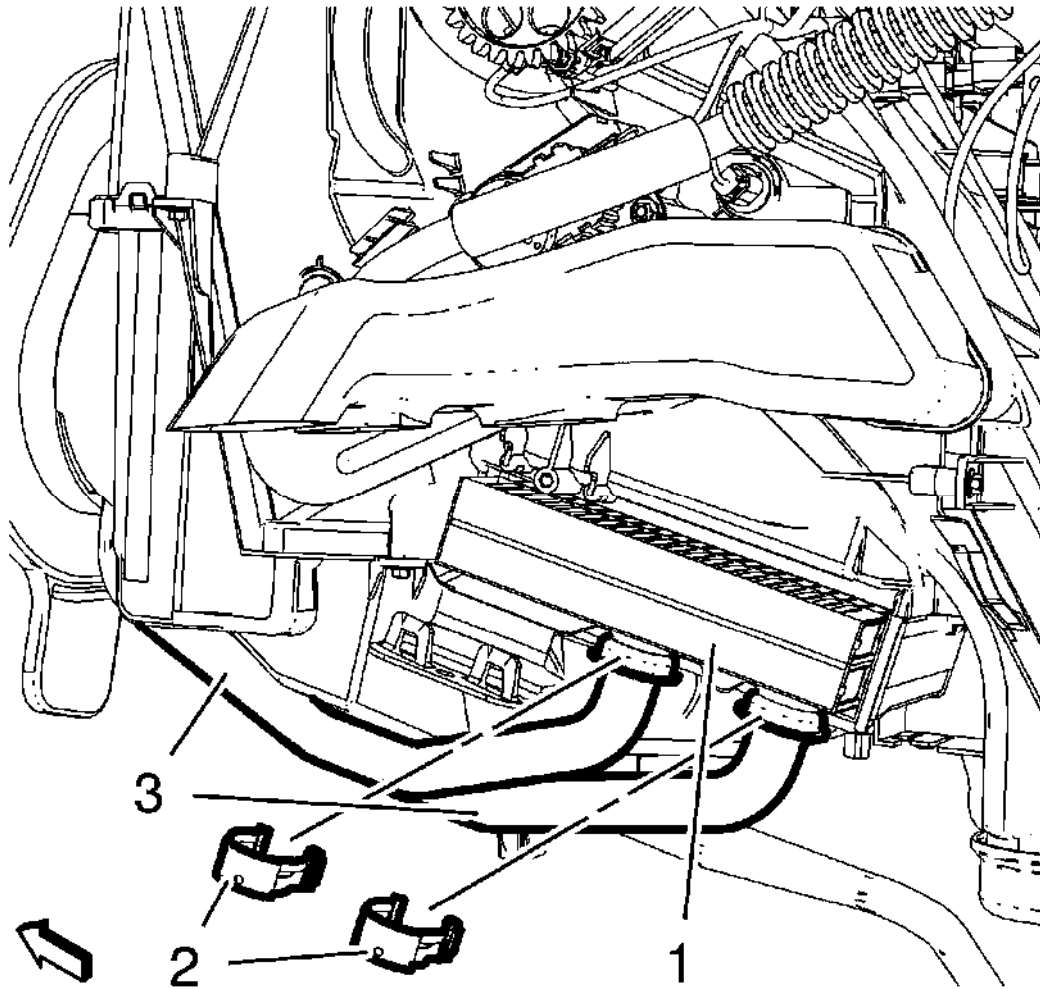


Fig. 105: Heater Core

Courtesy of GENERAL MOTORS COMPANY

1. Install the heater core (1).
2. Install the 2 heater core tubes (3).
3. Tighten the 2 heater core clamps (2).

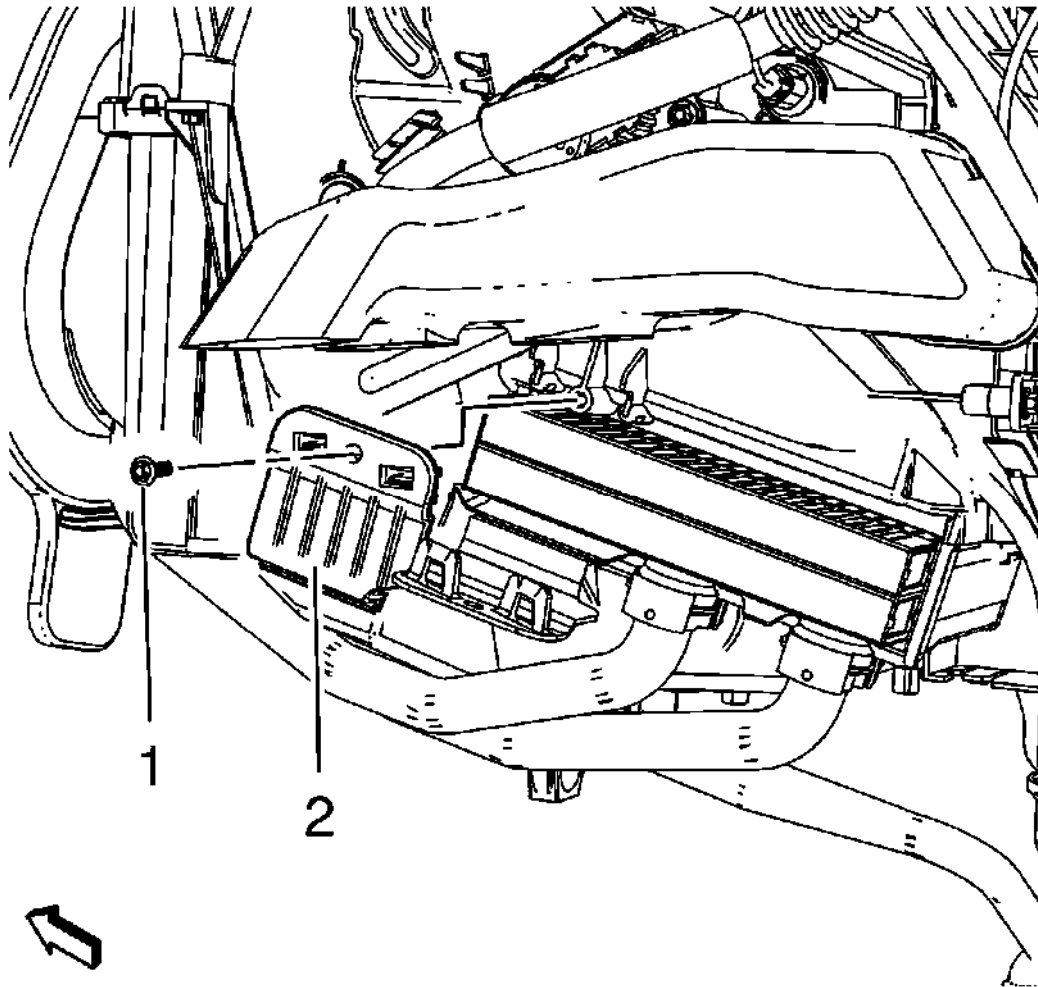


Fig. 106: Heater Core Cover

Courtesy of GENERAL MOTORS COMPANY

4. Install the heater core cover bolt (1) and heater core cover (2).

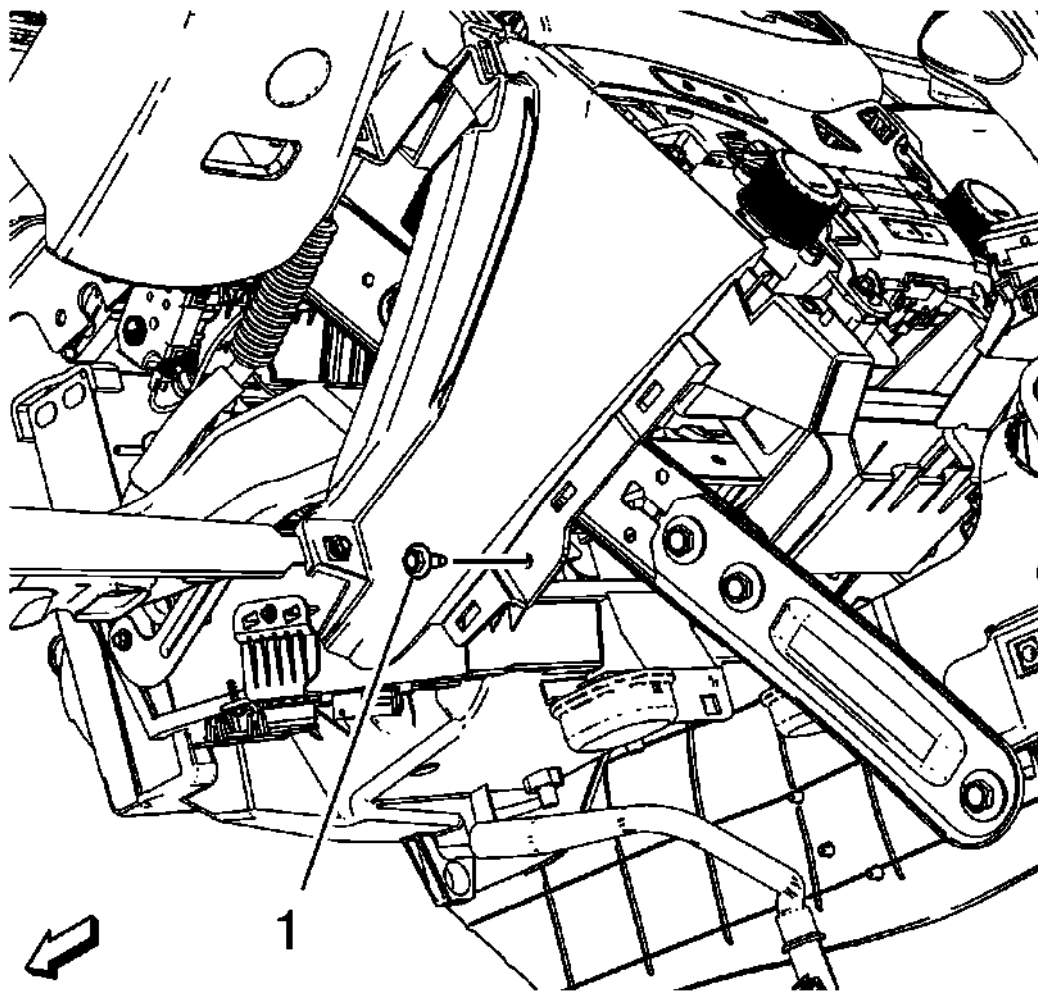


Fig. 107: Instrument Panel Bolt

Courtesy of GENERAL MOTORS COMPANY

5. Install instrument panel bolt (1).
6. Install the inflatable restraint instrument panel lower module - driver side. Refer to **Instrument Panel Lower Airbag Replacement - Driver Side**.
7. Install the instrument panel lower trim panel. Refer to **Instrument Panel Lower Trim Panel Replacement - Left Side**.
8. Bleed the cooling system. Refer to **Cooling System Draining and Filling (Static Fill)** , **Cooling System Draining and Filling (GE-47716 Fill)** .

DESCRIPTION AND OPERATION

HEATING AND AIR CONDITIONING SYSTEM DESCRIPTION AND OPERATION

Engine Coolant

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

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

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

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 an very low temperature gas that can transfer the undesirable heat and moisture from the passenger compartment to the outside air.

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

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

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

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

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

2013 Chevrolet Cruze

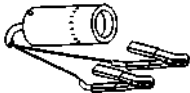
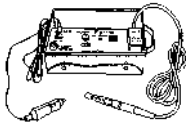
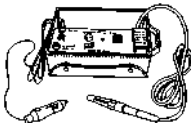
2013 HVAC Heating, Ventilation, and Air Conditioning - Cruze

is repeated.

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

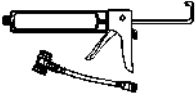
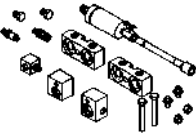
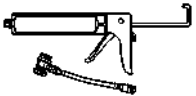
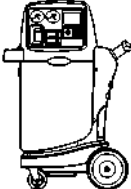
SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

Illustration	Tool Number/ Description
	BO-42220 J-42220 Universal 12V Leak Detection Lamp
	EL-47955 J-2534 Multi Diagnostic Interface MDI
	GE-806 GE-33027-A Holding Wrench
	GE-39400 J-39400 GE-50078 Electric Halogen Leak Detector
	GE-39400-A J-39400-A GE-50078 Halogen Leak Detector
	GE-41447 J-41447 R-134A A/C Tracer Dye - Box of 24

2013 Chevrolet Cruze

2013 HVAC Heating, Ventilation, and Air Conditioning - Cruze

	GE-43872 J-43872 Florescent Dye Cleaner
	GE-45037-A J-45037-A A/C Oil Injector
	GE-45268 J-45268 A/C Flushing Adapter Kit
	GE-46246 J-46246 Valve Core Tool
	GE-46297 J-46297 A/C Dye Injector Kit
	GE-46297-12 J-46297-12 Replacement Dye Cartridges
	J-43600 A/C Filling Device