

MAINTENANCE AND REPAIR

ON-VEHICLE SERVICE GENERAL A/C SYSTEM SERVICE PROCEDURES

GENERAL SERVICE PROCEDURES

Refer to *Section 7B, Manual Control Heating, Ventilation, and Air Conditioning System*, for the following procedures:

- Discharging, Adding Oil, Evacuating, and Charging Procedures for A/C System.
- Handling of Refrigerant Lines and Fittings.
- Handling Refrigerant.
- Maintaining Chemical Stability in the Refrigeration System.
- O-Ring Replacement.

SERVICEABLE COMPONENTS

COMMON HVAC COMPONENTS

Those components used in non-automatic systems are covered in another section of this manual.

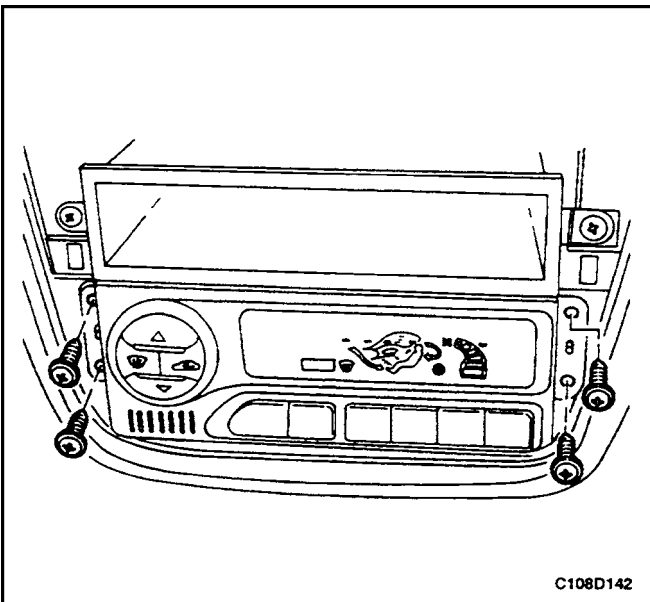
Refer to *Section 7B, Manual Control Heating, Ventilation, and Air Conditioning System* for the following procedures:

- A/C Pressure Transducer.
- Compressor-to-Condenser Hose.
- Compressor.
- Condenser.
- Evaporator-to-Compressor Pipe.
- Evaporator-to-Receiver-Dryer Pipe.
- Receiver-Dryer.
- Blower Motor.
- Heater Hoses.

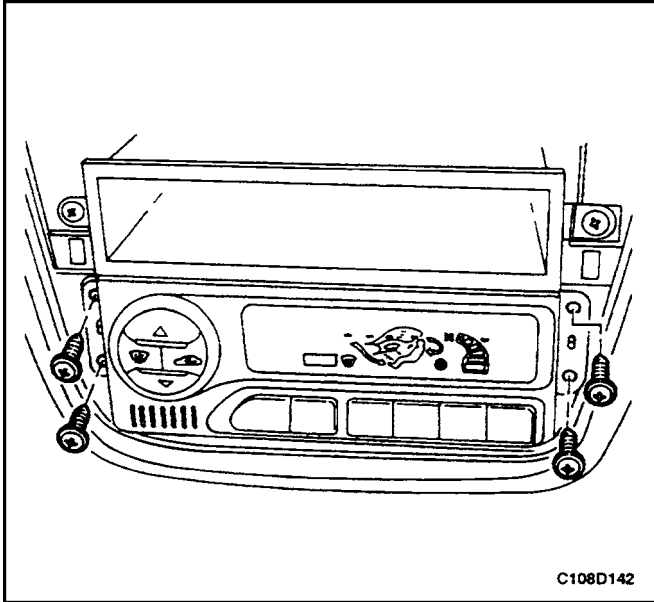
AUTOMATIC TEMPERATURE CONTROL ASSEMBLY

Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the audio trim panel. Refer to *Section 9F, Audio Systems*.
3. Remove the control assembly retaining screws.
4. Pull out the unit to gain access to the rear.
5. Disconnect the electrical connectors.
6. Remove the air inlet tube.
7. Remove the automatic temperature control assembly.



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Installation Procedure

1. Connect the air inlet tube.
2. Connect the electrical connectors.
3. Position the automatic temperature control assembly and install the retaining screws.

Tighten

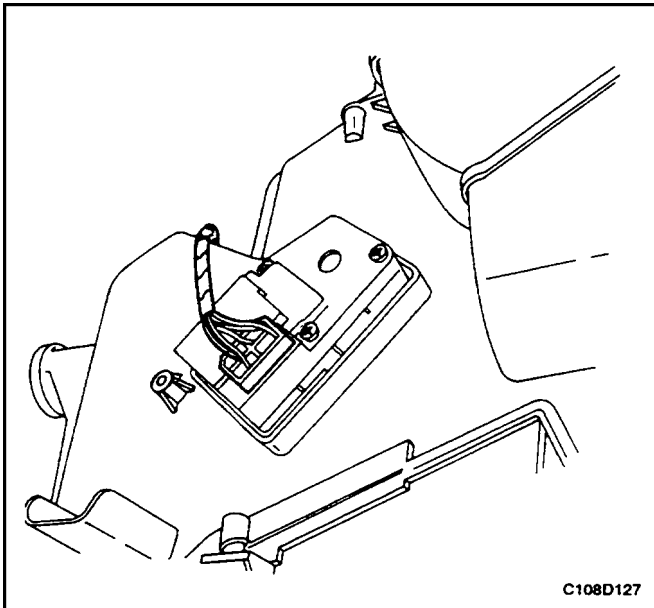
Tighten the control assembly retaining screws to 4 N•m (35 lb-in).

4. Install the audio trim panel. Refer to *Section 9F, Audio Systems*.
5. Connect the negative battery cable.

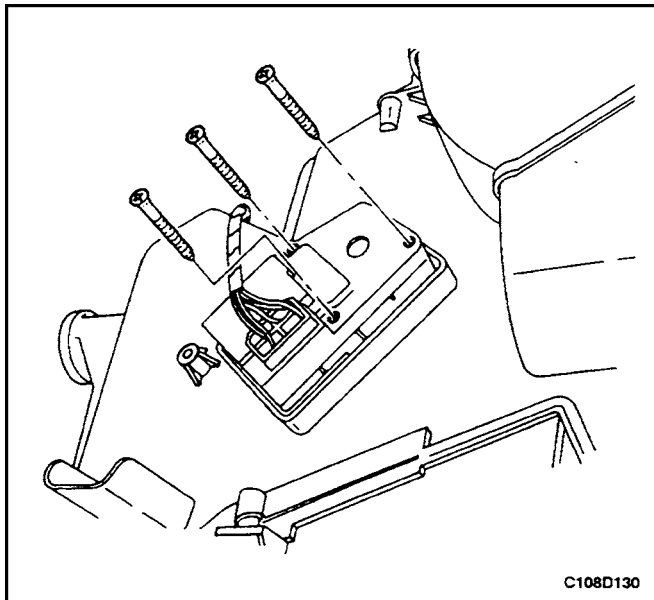
AIR MIX DOOR MOTOR

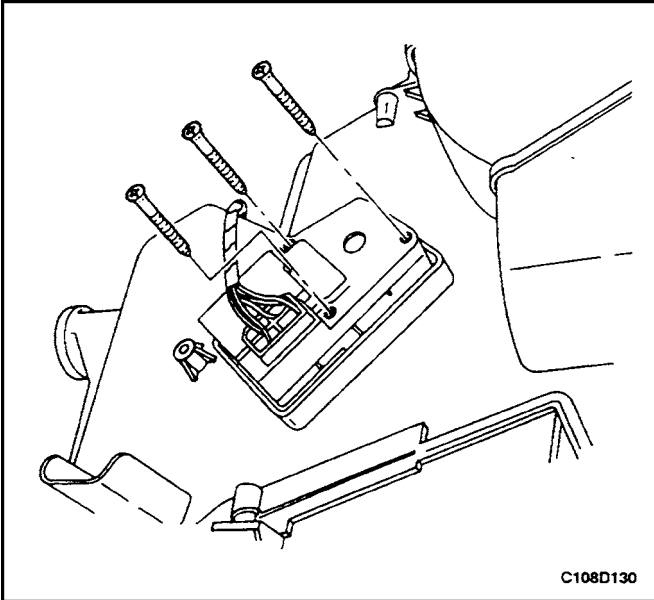
Removal Procedure

1. Disconnect the negative battery cable.
2. Disconnect the electrical connector.



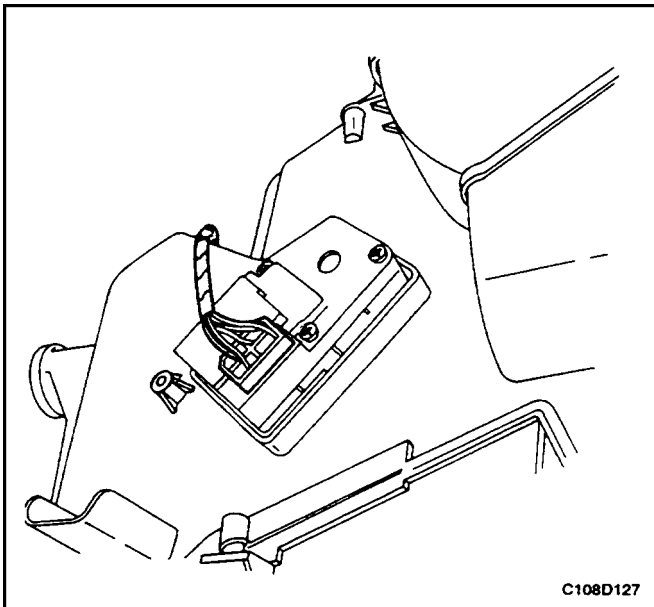
3. Remove the motor retaining bolts.
4. Slide the air mix door motor off the door shaft and remove the motor.



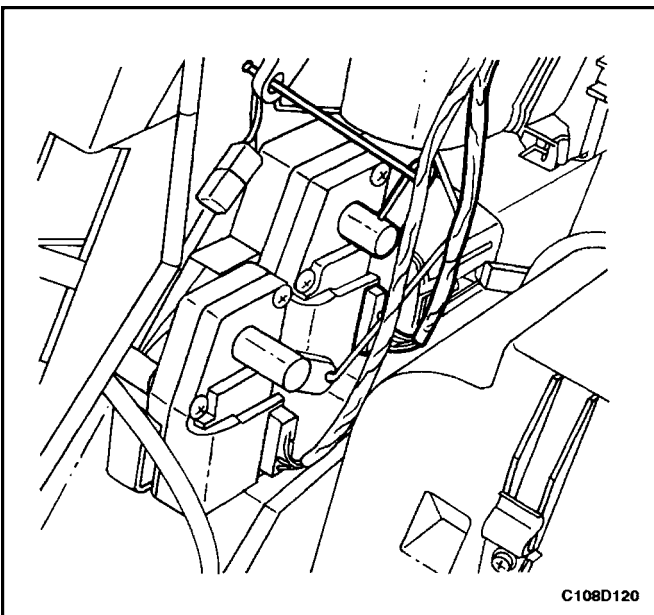


Installation Procedure

1. Position the air mix door motor onto the door shaft.
2. Install the motor retaining bolts and tighten.



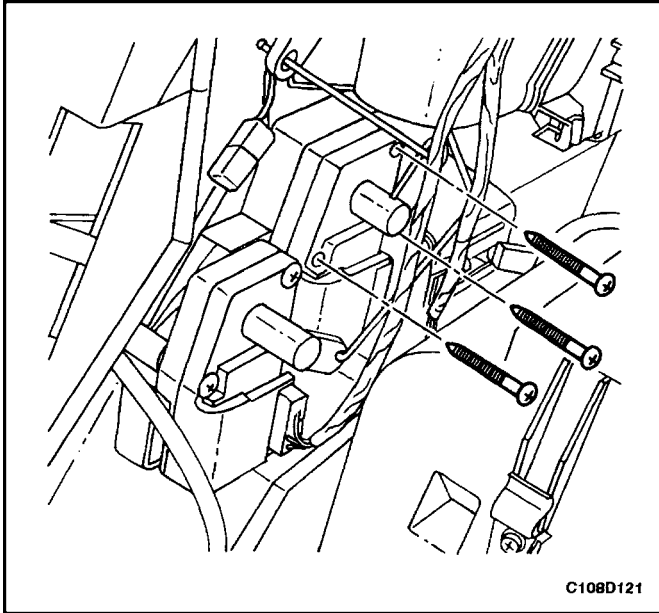
3. Connect the electrical connector.
4. Connect the negative battery cable.



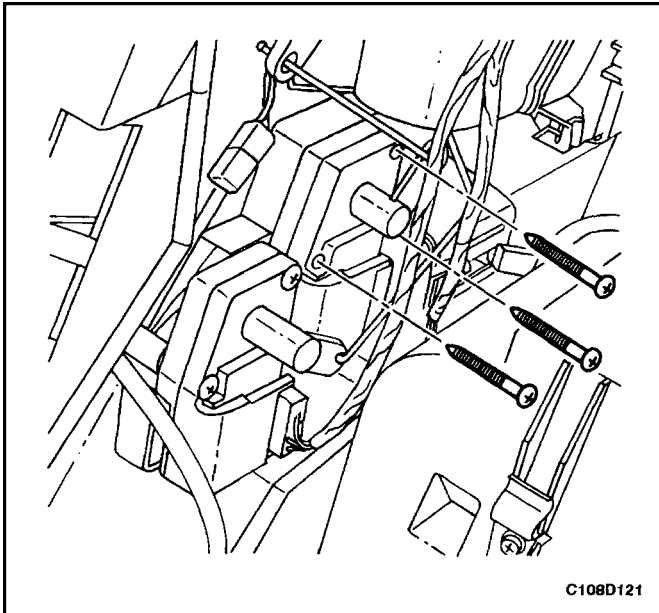
HEATER/DEFROSTER DOOR MOTOR

Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the heater/air distributor case assembly. Refer to "Heater/Air Distributor Case Assembly" in this section.
3. Disconnect the electrical connector.
4. Remove the actuating rod by snapping it out of the lever with needle-nose pliers.

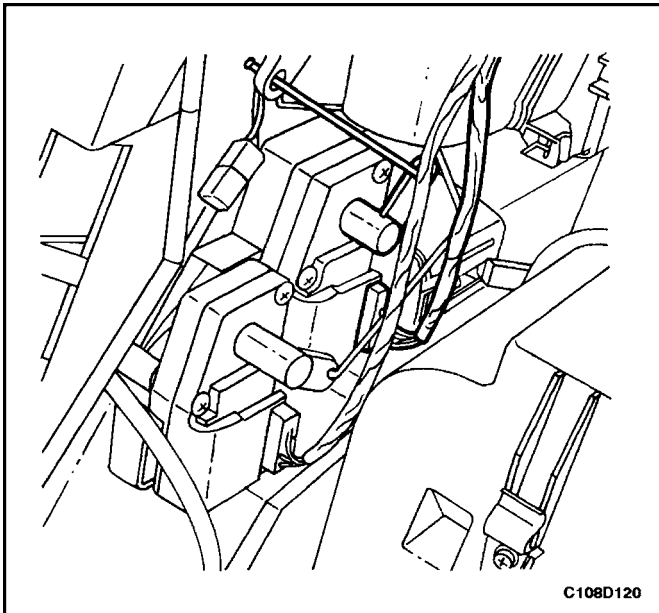


5. Remove the motor lever from its shaft by pulling the lever off.
6. Remove the motor retaining bolts.
7. Remove the heater/defroster door motor.

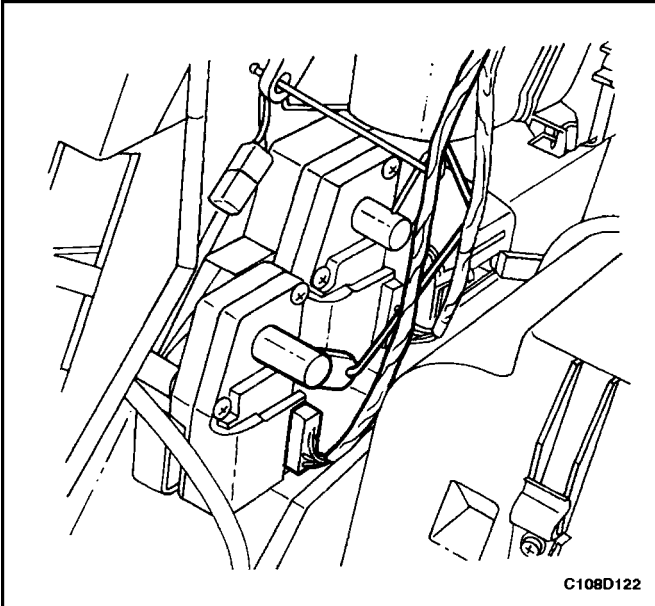


Installation Procedure

1. Install the heater/defroster door motor.
2. Install the retaining bolt and tighten.



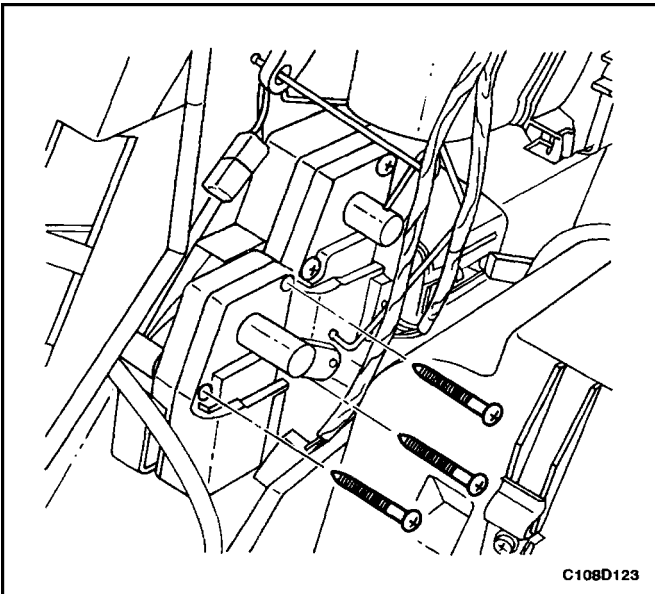
3. Press the lever onto the motor shaft.
4. Install the actuating rod onto the lever.
5. Connect the electrical connector.
6. Install the heater/air distributor case assembly. Refer to "Heater/Air Distributor Case Assembly" in this section.
7. Connect the negative battery cable.



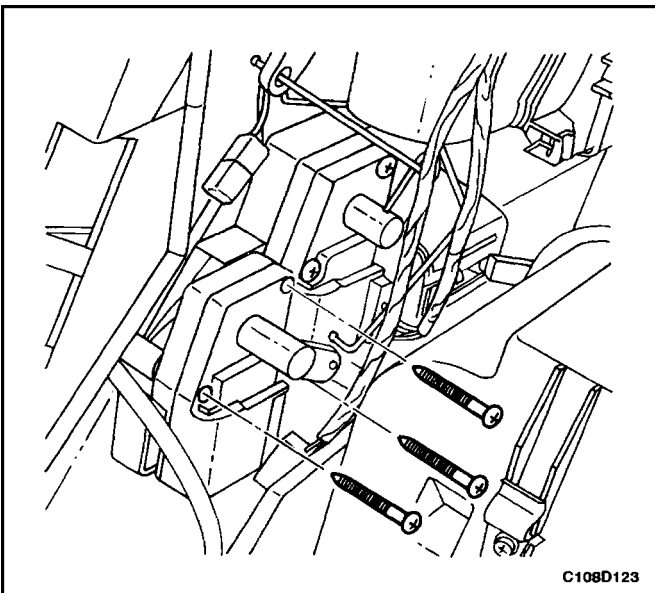
MODE DOOR MOTOR

Removal Procedure

1. Disconnect the negative battery cable.
2. Install the heater/air distributor case assembly. Refer to "Heater/Air Distributor Case Assembly" in this section.
3. Disconnect the electrical connector.
4. Remove the motor actuating rod by snapping it out of the lever with needle-nose pliers.

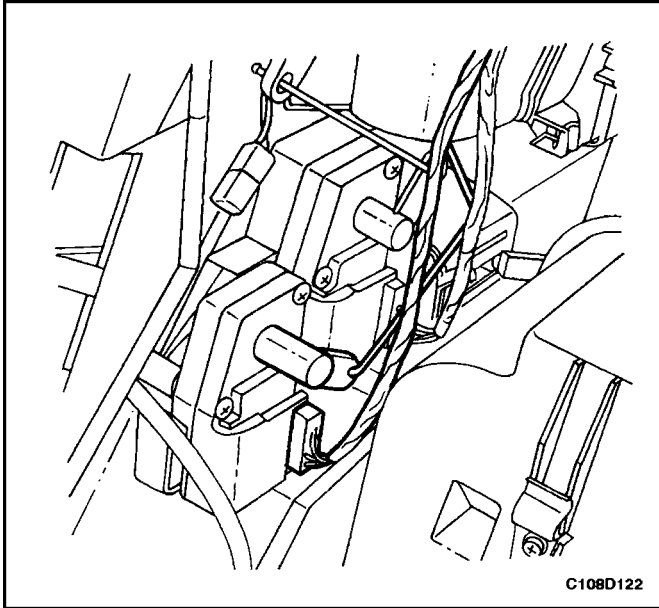


5. Remove the motor lever.
6. Remove the motor retaining bolts.
7. Remove the mode door motor.

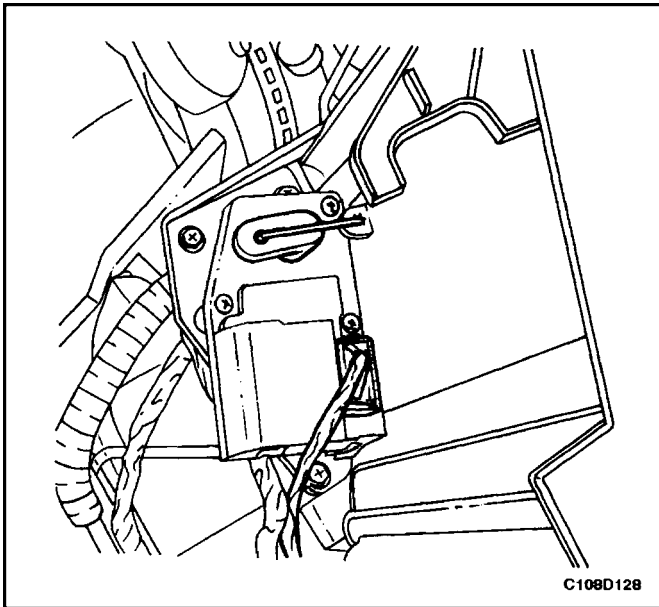


Installation Procedure

1. Install the mode door motor.
2. Install the motor retaining bolts and tighten.



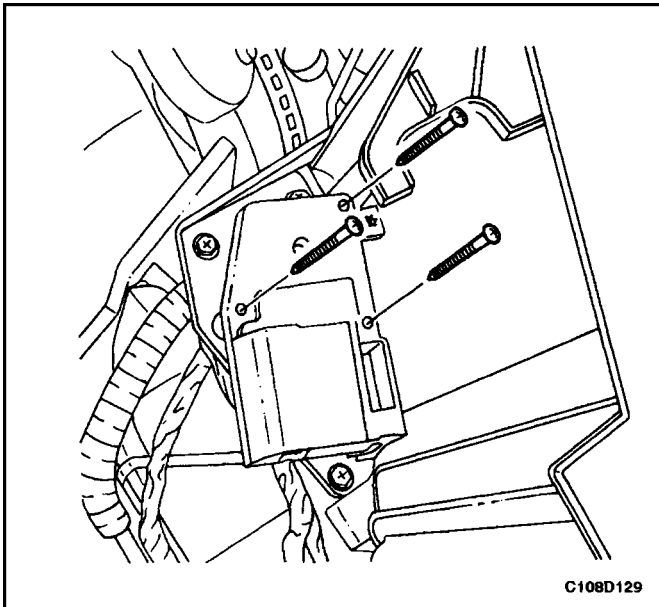
3. Install the motor lever by pressing it onto its shaft.
4. Install the actuating rod.
5. Connect the electrical connector.
6. Install the heater/air distributor case assembly. Refer to "Heater/Air Distributor Case Assembly" in this section.
7. Connect the negative battery cable.



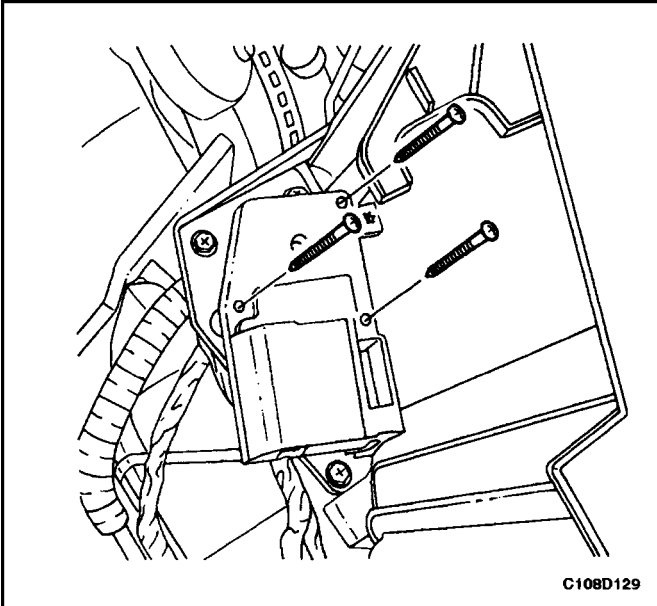
INLET AIR DOOR MOTOR

Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the glove box. Refer to *Section 9E, Instrumentation/Driver Information*.
3. Remove the actuating rod by snapping the rod out of the lever with needle-nose pliers
4. Remove the actuating lever.
5. Disconnect the electrical connector.

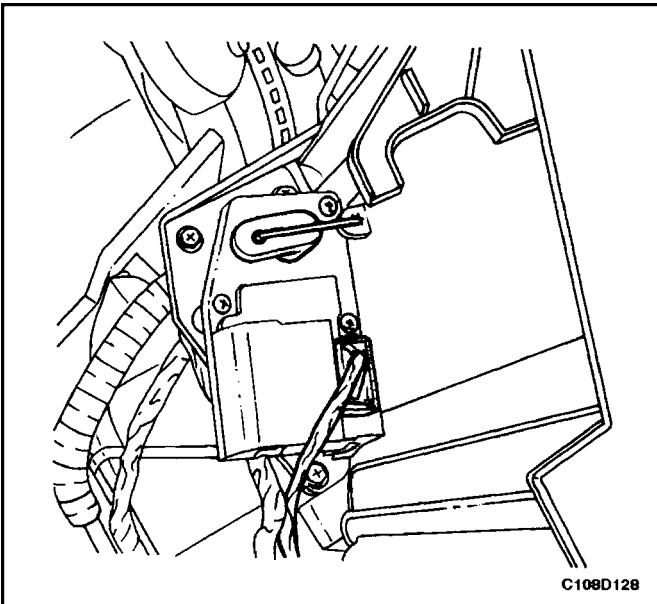


6. Remove the motor retaining bolts.
7. Remove the motor.

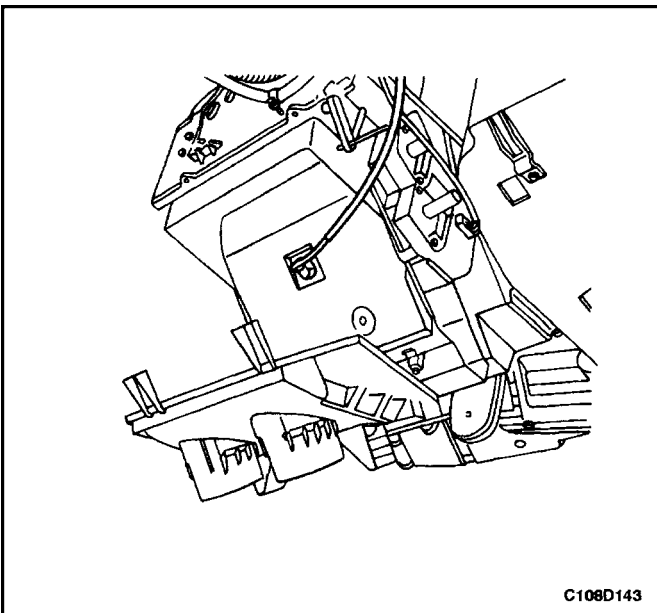


Installation Procedure

1. Install the motor.
2. Install the motor retaining bolts and tighten.



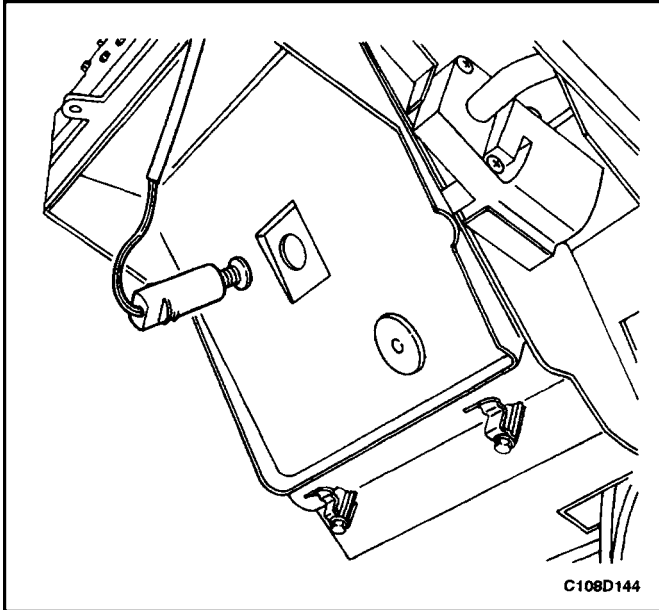
3. Install the actuating lever.
4. Install the actuating rod.
5. Connect the electrical connector.
6. Remove the glove box. Refer to *Section 9E, Instrumentation/Driver Information*.
7. Connect the negative battery cable.



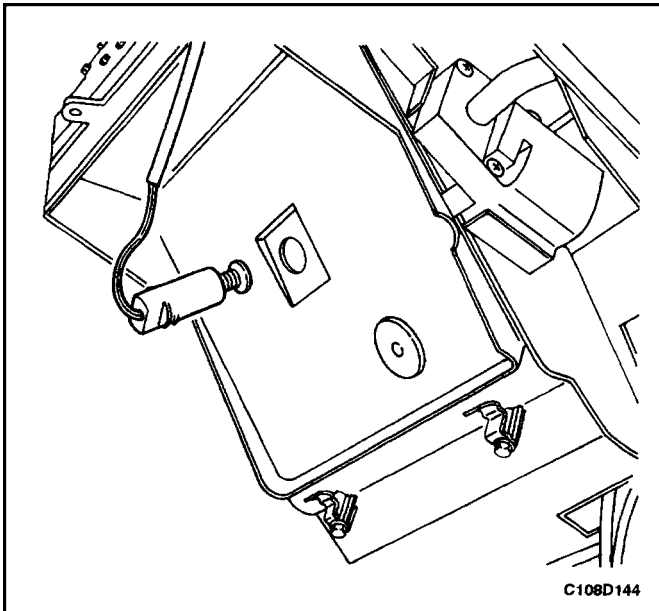
COOLANT TEMPERATURE SENSOR

Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the audio system and the center tray. Refer to *Section 9F, Audio Systems*.
3. Remove the glove box. Refer to *Section 9E, Instrumentation/Driver Information*.
4. Remove the heater/air distributor case assembly lower cover screws.
5. Remove the heater/air distributor case assembly lower cover to gain access to the coolant temperature sensor.

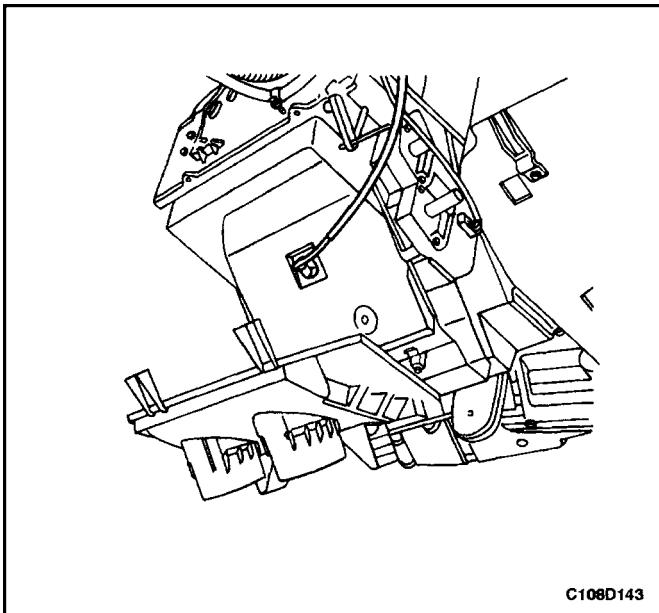


6. Turn the sensor to release it from the heater/air distributor case housing.
7. Disconnect the electrical connector.

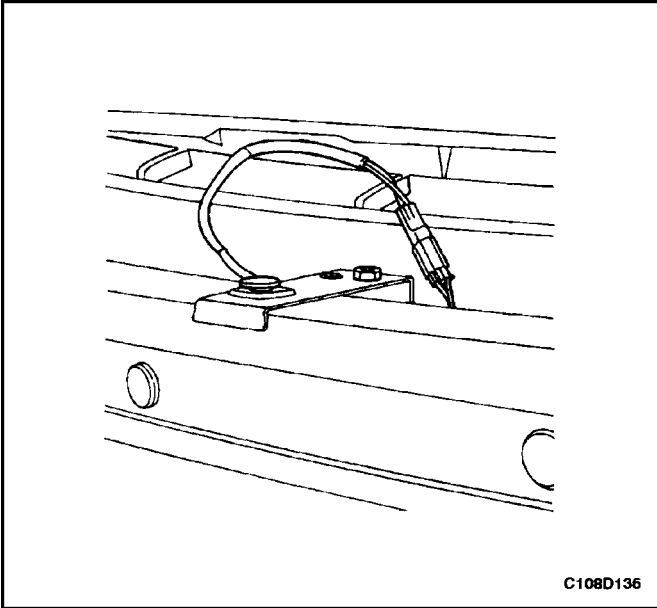


Installation Procedure

1. Install the coolant temperature sensor into the heater/air distributor case housing and turn the sensor to lock it.
2. Connect the electrical connector.



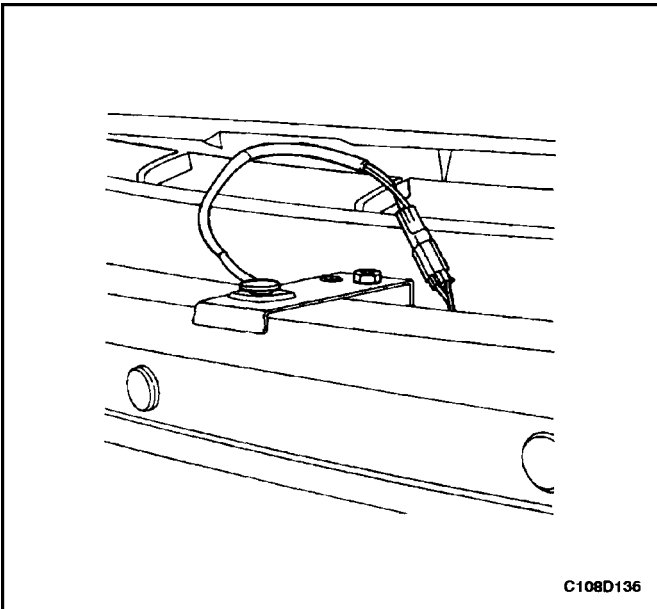
3. Install the heater/air distributor case assembly lower cover into position.
4. Install the heater/air distributor case assembly lower cover retaining screws and tighten.
5. Remove the audio system and the center tray. Refer to *Section 9F, Audio Systems*.
6. Remove the glove box. Refer to *Section 9E, Instrumentation/Driver Information*.
7. Connect the negative battery cable.



AMBIENT AIR TEMPERATURE SENSOR

Removal Procedure

1. Disconnect the negative battery cable.
2. Disconnect the ambient air temperature sensor electrical connector.
3. Remove the retaining nut from the bracket.
4. Remove the ambient air temperature sensor.



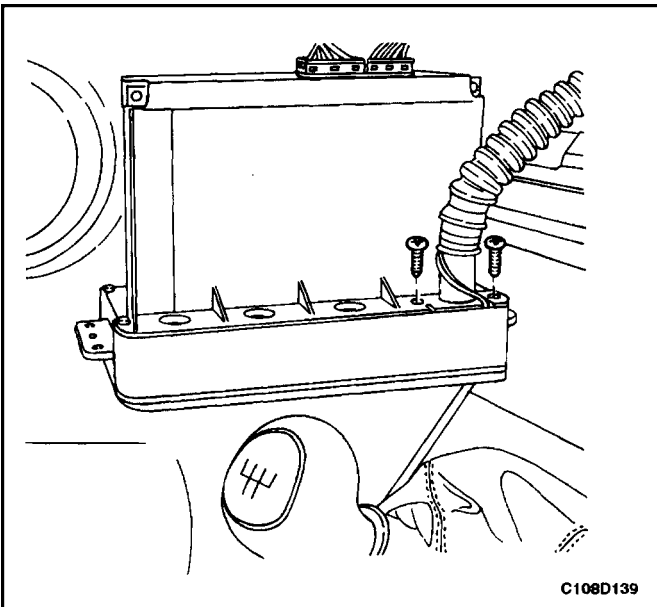
Installation Procedure

1. Position the ambient air temperature sensor into its bracket.
2. Install the retaining nut to the bracket.

Tighten

Tighten the ambient air temperature retaining bracket nut to 6 N•m (53 lb-in).

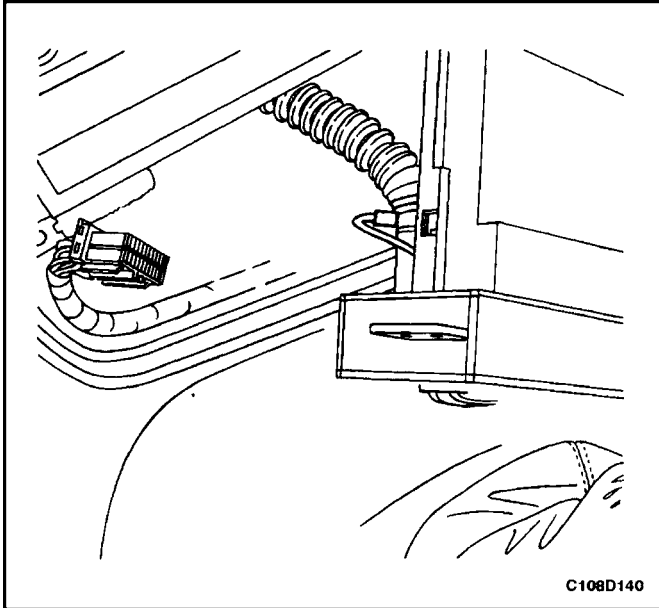
3. Connect the electrical connector.
4. Connect the negative battery cable.



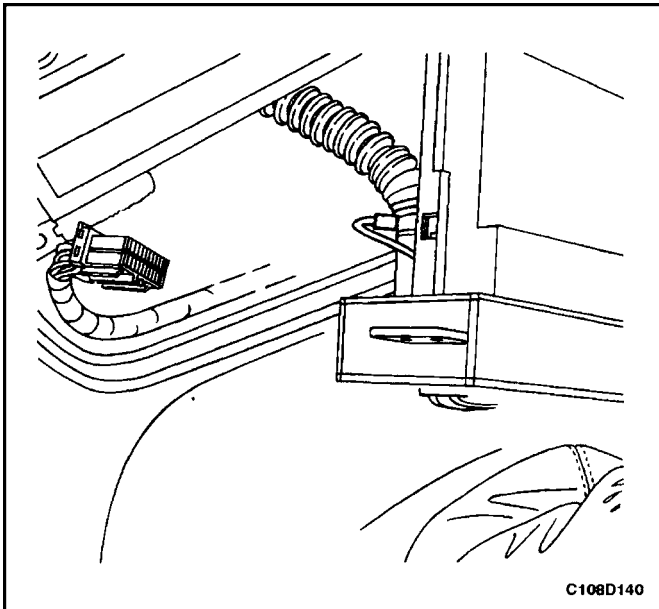
IN-CAR TEMPERATURE SENSOR

Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the automatic temperature control assembly. Refer to "Automatic Temperature Control Assembly" in this section.
3. Remove the screws securing the in-car temperature sensor.

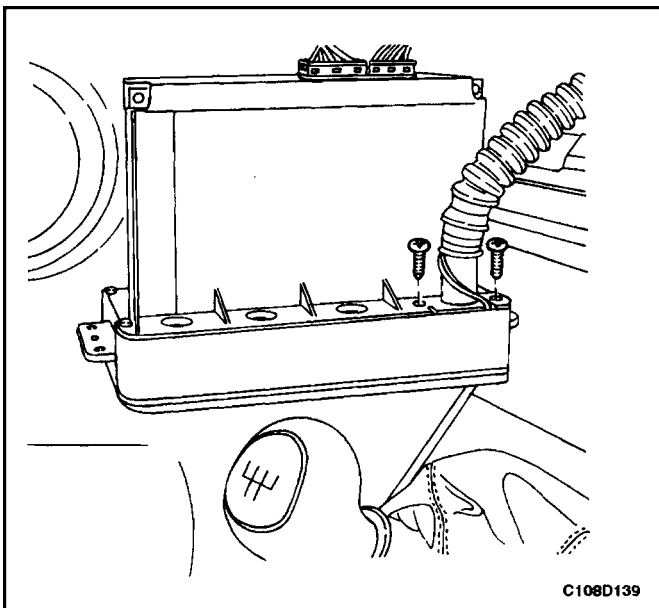


4. Disconnect the electrical connector and remove the air inlet tube.
5. Remove the in-car temperature sensor from the controller.

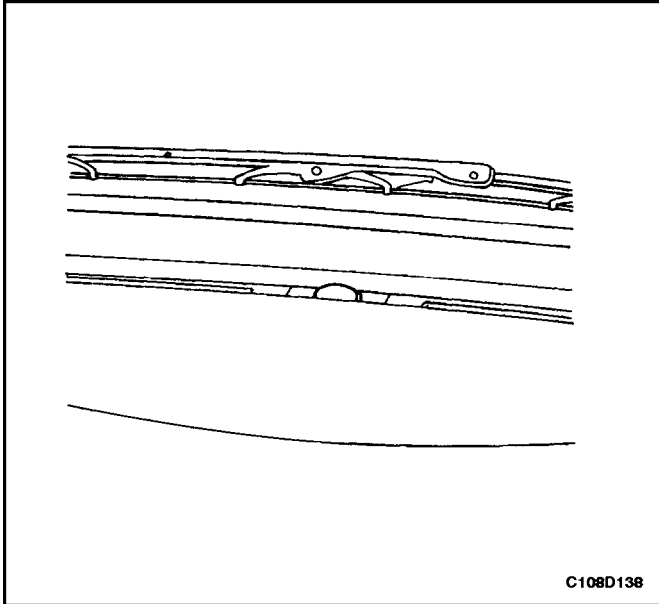


Installation Procedure

1. Install the in-car temperature sensor into the controller.



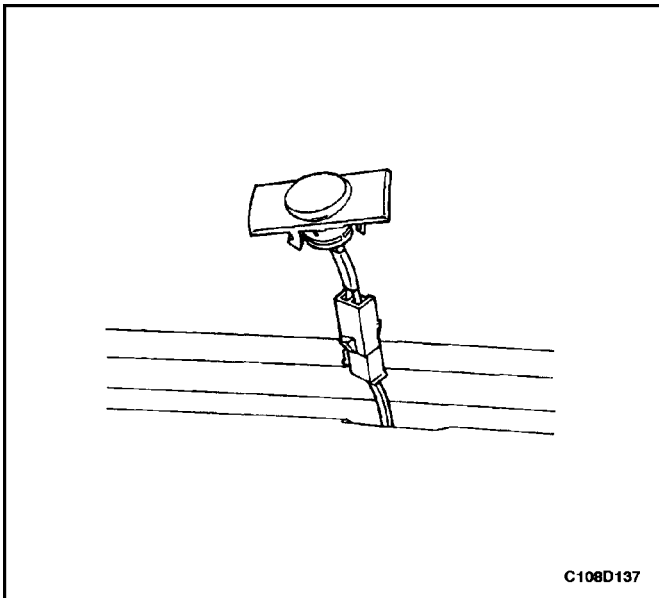
2. Install the in-car sensor retaining screws and tighten.
3. Install the air inlet tube and connect the electrical connector.
4. Remove the automatic temperature control assembly. Refer to "Automatic Temperature Control Assembly" in this section.
5. Connect the battery negative cable.



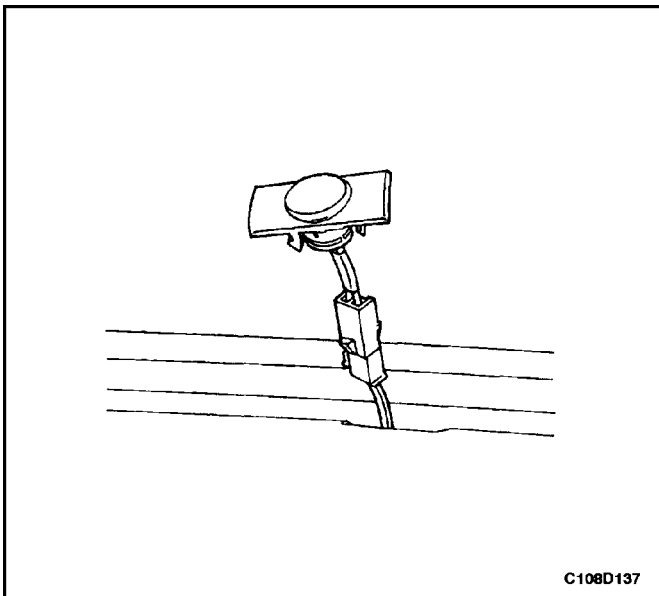
SUN SENSOR

Removal Procedure

1. Disconnect the negative battery cable.
2. Gently pry up on the sun sensor to remove it.

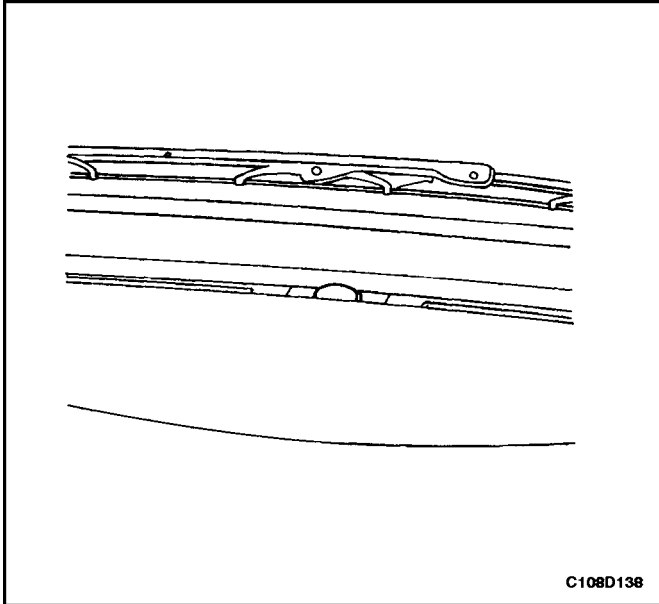


3. Secure the electrical connector to prevent it from falling beneath the dash.
4. Disconnect the electrical connector.



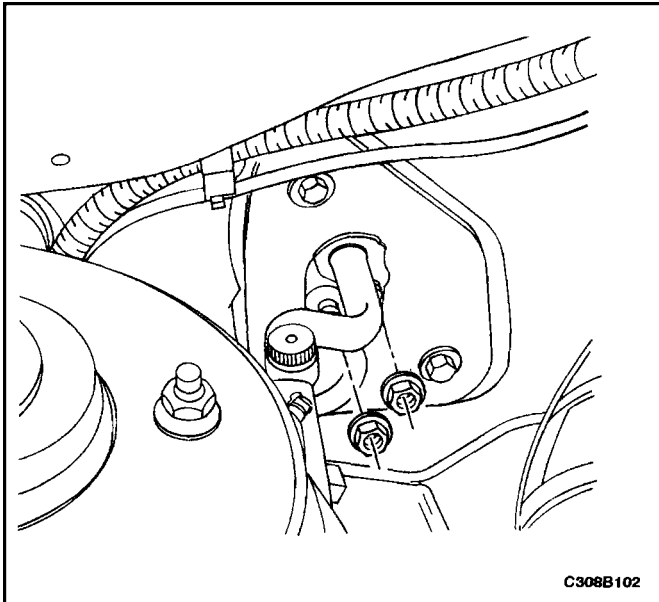
Installation Procedure

1. Connect the electrical connector.



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2. Insert and press the sun sensor into position in the dash.
3. Connect the negative battery cable.

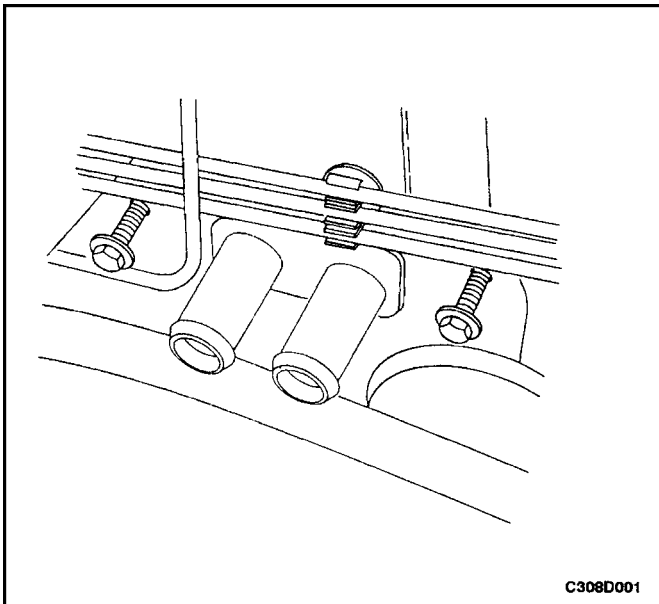


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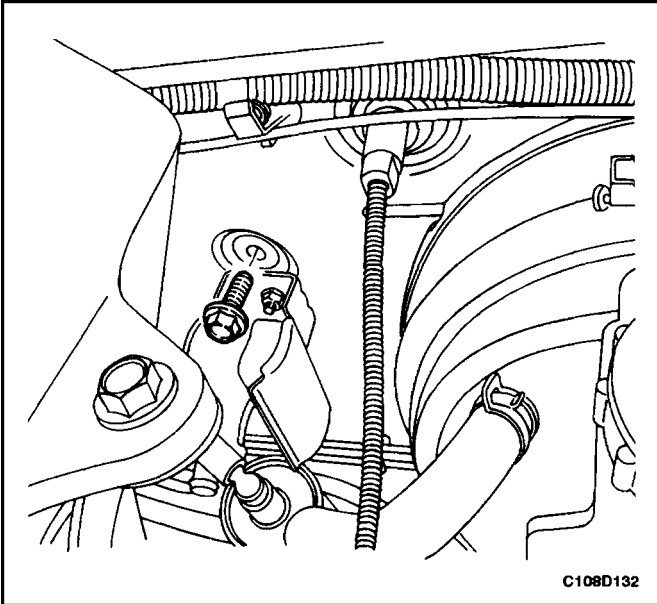
HEATER/AIR DISTRIBUTOR CASE ASSEMBLY

Removal Procedure

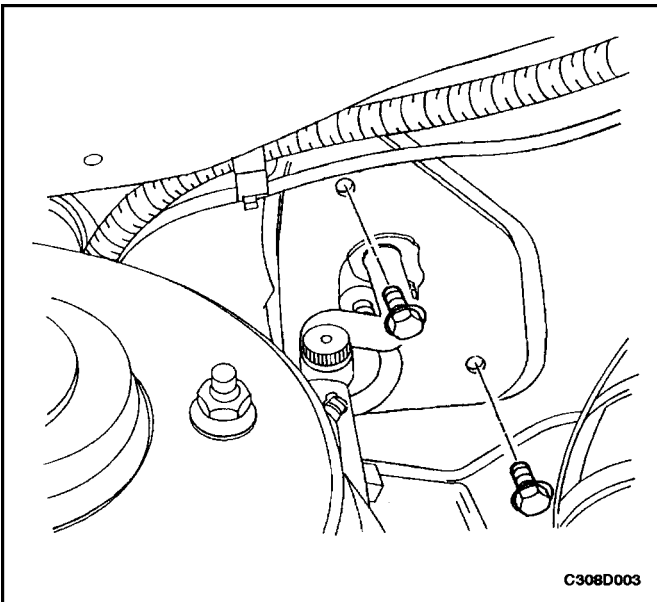
1. Disconnect the negative battery cable.
2. Remove the instrument panel carrier assembly. Refer to *Section 9E, Instrumentation/Driver Information*.
3. Drain the cooling system. Refer to *Section 1D, Engine Cooling*.
4. Recover the refrigerant. Refer to *Section 7B, Manual Control Heating, Ventilation, and Air Conditioning System*.
5. Remove the retaining nuts that secure the suction hose and the liquid evaporator pipe blocks at the bulkhead.
6. Loosen the clamp bolts from the suction hose and the liquid evaporator pipe to allow movement of the hose and the pipe.
7. Remove the evaporator drain hose.
8. Compress the heater hose clamps at the bulkhead and slide the clamps toward the engine.
9. Remove the two heater hoses from the core lines at the bulkhead.
10. Remove the screws that secure the heater/air distributor case assembly to the bulkhead on either side of the heater hoses.



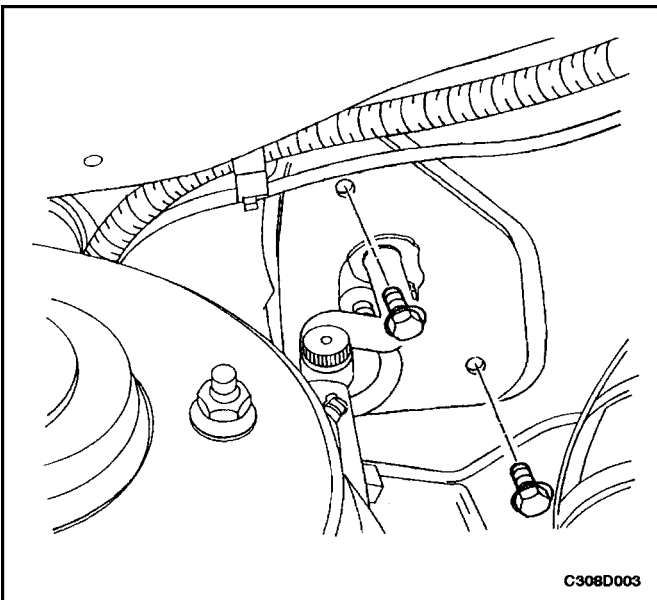
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11. Remove the heater/air distributor case screw, that is located above the fuel filter, from the engine compartment side of the bulkhead.
12. Have an assistant support the heater/air distributor case from inside the vehicle.



13. Remove the heater/air distributor case screws from the evaporator flange on the engine compartment side of the bulkhead. The heater/air distributor case assembly will start to drop.
14. Pull the case straight away from the bulkhead.
15. Remove the heater/air distributor case assembly from the vehicle.



Installation Procedure

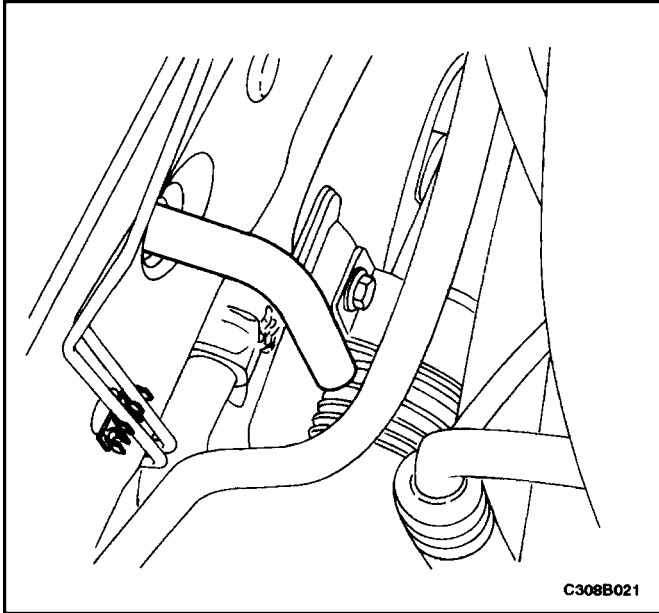
1. Position the heater/air distributor case assembly in the vehicle.

Notice : To avoid damaging the heater core tubes, make sure they do not contact the bulkhead opening.

2. Slowly raise the heater/air distributor case assembly into position and hold it against the bulkhead while the screws are installed and tightened from the engine side of the bulkhead.
3. Align and install the heater/air distributor case assembly screws above the fuel filter and at the evaporator flange.

Tighten

Tighten the heater/air distributor case assembly screws to 8 N•m (71 lb-in).

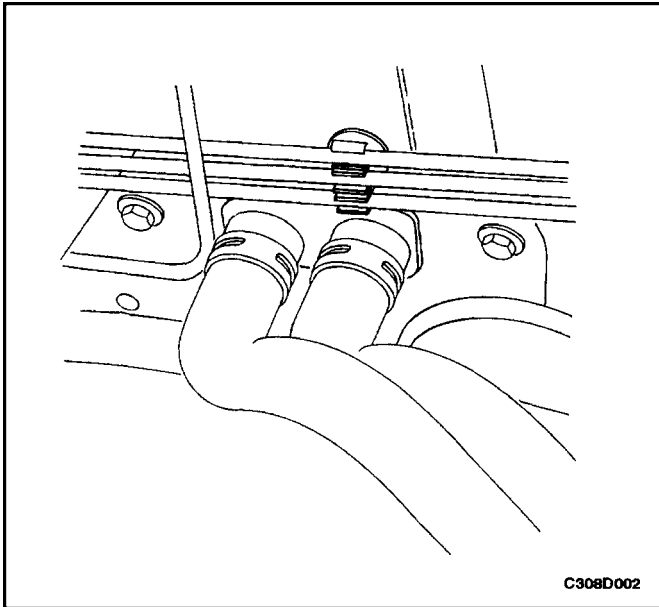


4. Install the heater/air distributor case assembly screws adjacent to the heater hoses.

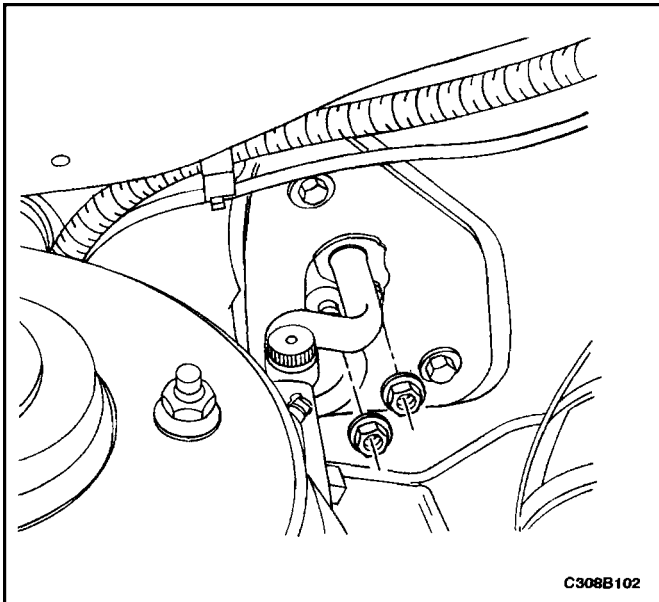
Tighten

Tighten the heater/air distributor case assembly screws to 8 N•m (71 lb-in).

5. Install the evaporator drain hose.



6. Install the two heater hoses.
7. Slide the heater hose clamps into position.
8. Remove the instrument panel carrier assembly. Refer to *Section 9E, Instrumentation/Driver Information*.

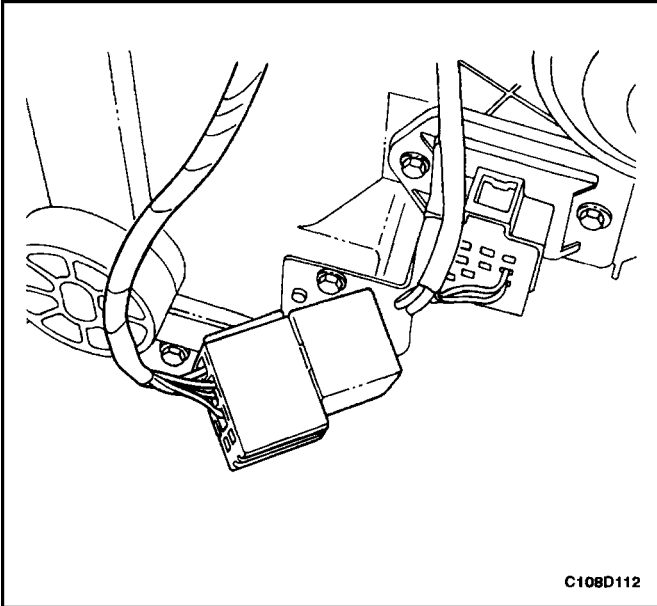


9. Install new O-rings on the suction hose and the liquid evaporator pipe at the bulkhead and put the pipes back in place.
10. Install the retaining nuts that secure the suction hose and the liquid evaporator pipe blocks at the bulkhead.

Tighten

Tighten the suction hose retaining nuts and the liquid evaporator pipe retaining nuts to 10 N•m (89 lb-in).

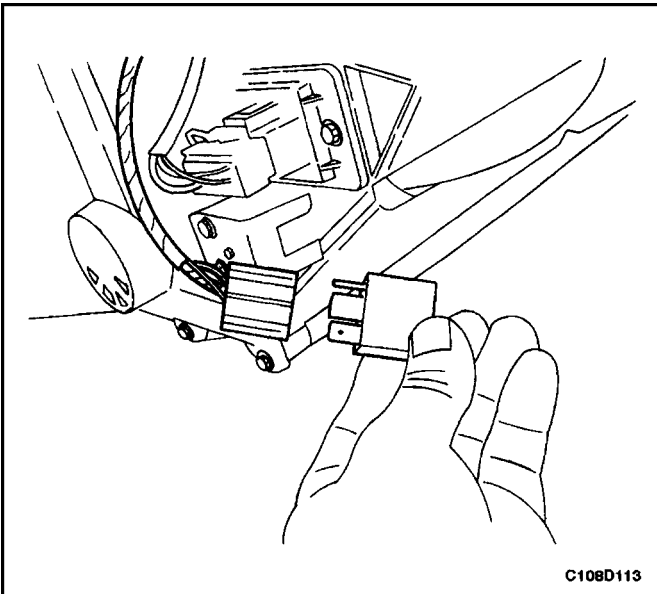
11. Drain the cooling system. Refer to *Section 1D, Engine Cooling*.
12. Recover the refrigerant. Refer to *Section 7B, Manual Control Heating, Ventilation, and Air Conditioning System*.
13. Connect the negative battery cable.



HIGH-BLOWER RELAY

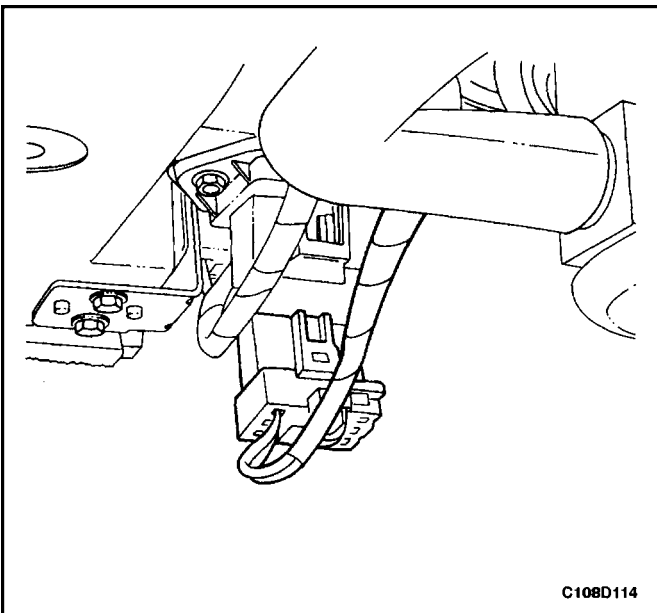
Removal Procedure

1. Disconnect the negative battery cable. The relay is located in front of the blower motor.
2. Slide the relay and the connector up and out of its retaining track.
3. Separate the relay from the connector.



Installation Procedure

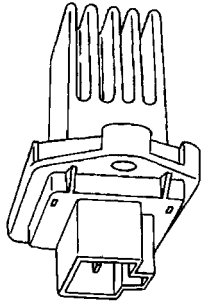
1. Align the high-blower relay contacts with the high-blower relay terminal slots.
2. Push the relay firmly into the base. The relay must be seated and flush with the edge of the base.
3. Connect the negative battery cable.



POWER TRANSISTOR

Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the glove box. Refer to *Section 9E, Instrumentation/Driver Information*.
3. Remove the footwell upper cover. Refer to *Section 9E, Instrumentation/Driver Information*.
4. Disconnect the electrical connector at the resistor.
5. Remove the screws from the resistor.
6. Remove the resistor from the heater/air distributor case assembly by gently pulling the resistor downward.



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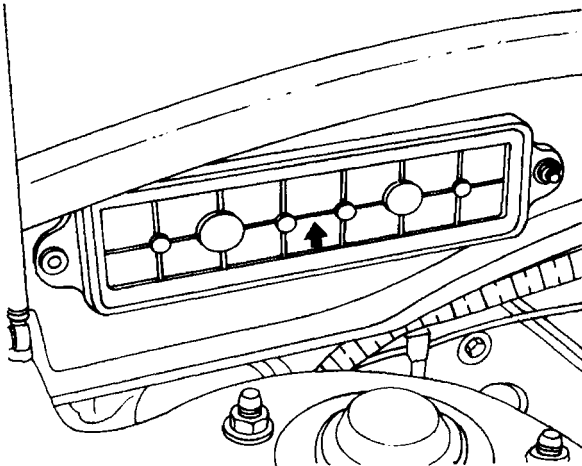
Installation Procedure

1. Install the new resistor into the heater/air distributor case assembly with the screws.

Tighten

Tighten the blower motor resistor screws to 6 N•m (53 lb-in).

2. Connect the electrical connector at the resistor.
3. Connect the negative battery cable.
4. Confirm the proper performance of the blower.
5. Remove the footwell upper cover. Refer to *Section 9E, Instrumentation/Driver Information*.
6. Remove the glove box. Refer to *Section 9E, Instrumentation/Driver Information*.

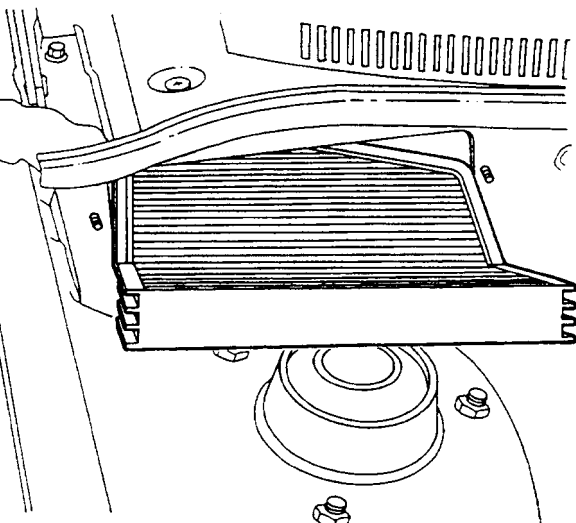


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AIR FILTER

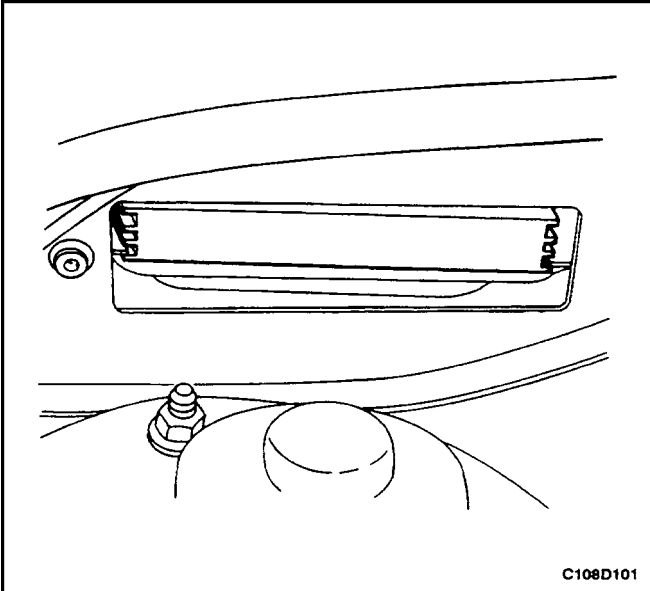
Removal Procedure

1. Remove the nut that secures the air filter cover to the bulkhead.
2. Remove the cover.



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3. Pull the air filter out of the cavity in the bulkhead.

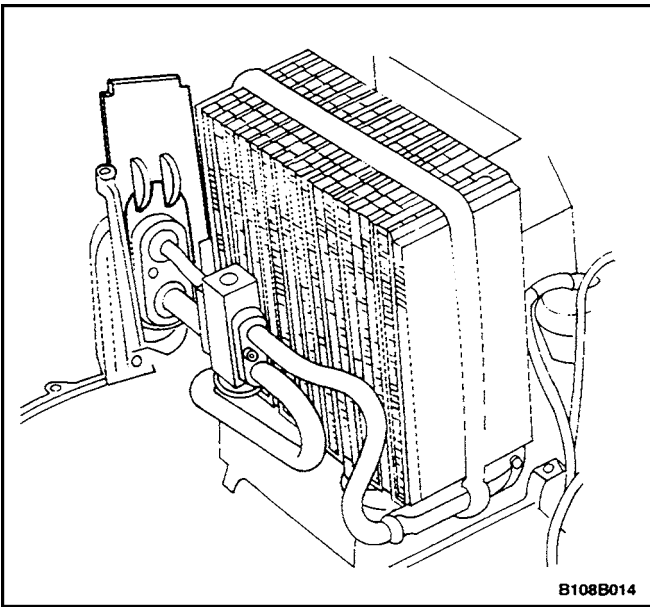


Installation Procedure

1. Install the air filter into its cavity in the bulkhead.
 - Align the fins on the plastic frame of the filter with the groove in the holder before attempting to insert the filter into place.
2. Install the air filter cover with the arrow pointing up.
3. Install the nut to secure the air filter cover to the bulkhead.

Tighten

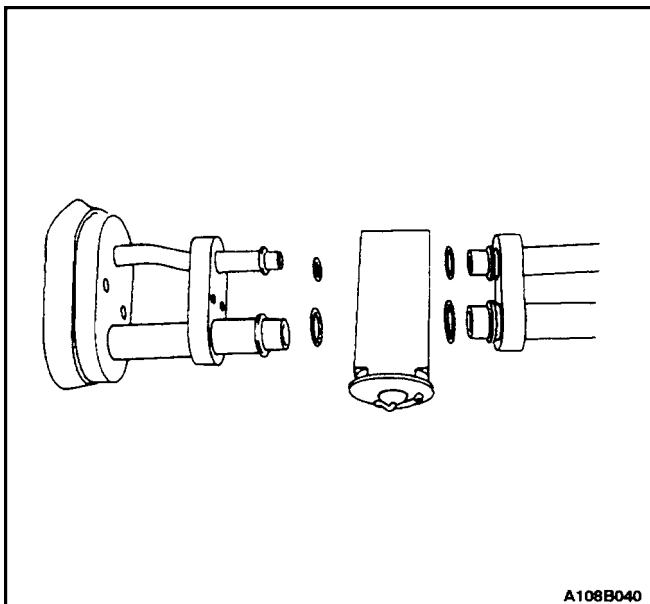
Tighten the air filter cover nut to 4 N•m (35 lb-in).

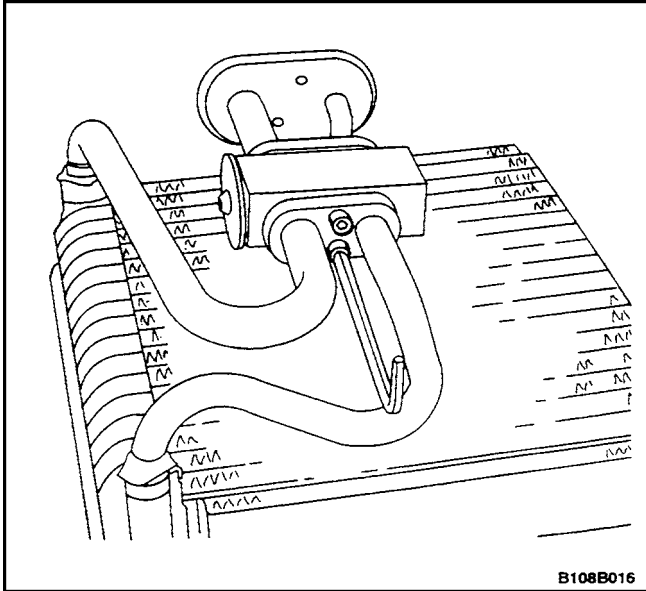


A/C EXPANSION VALVE

Removal Procedure

1. Remove the heater/air distributor case assembly. Refer to "Heater/Air Distributor Case Assembly" in this section.
2. Remove the screws securing the evaporator case halves.
3. Remove the evaporator core case cover.
4. Slide the evaporator flange support plate upward to facilitate evaporator removal.
5. Remove the evaporator from the case.
6. Remove the expansion valve bolts.
7. Remove the expansion valve.
8. Remove the O-rings from the evaporator lines and the A/C lines.



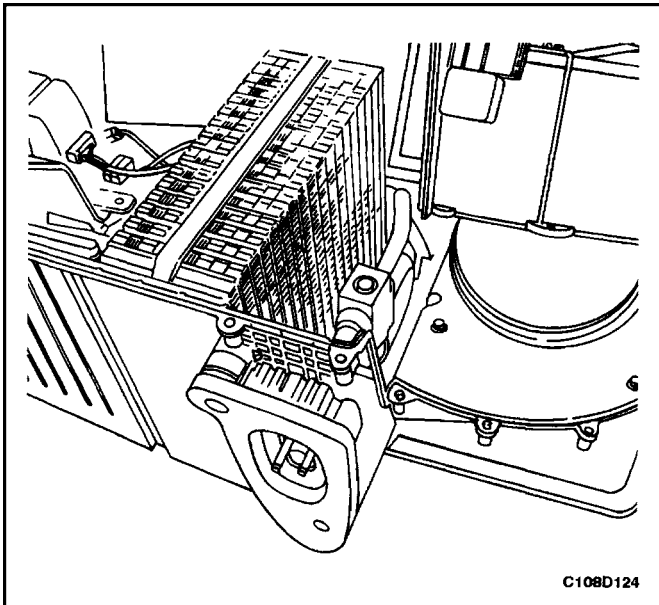


Installation Procedure

1. Clean the O-ring surface areas of dirt or contamination.
2. Install the new O-rings on the evaporator lines and the A/C lines.
3. Install a new expansion valve onto the evaporator lines.
4. Insert the expansion valve bolts through the expansion valve into the mount surface of the evaporator flange.

Tighten

Tighten the expansion valve bolts to 10 N•m(89 lb-in).

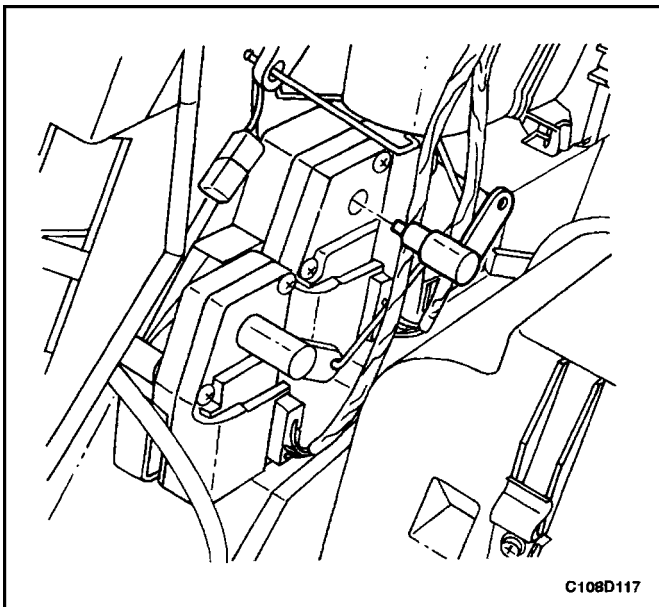


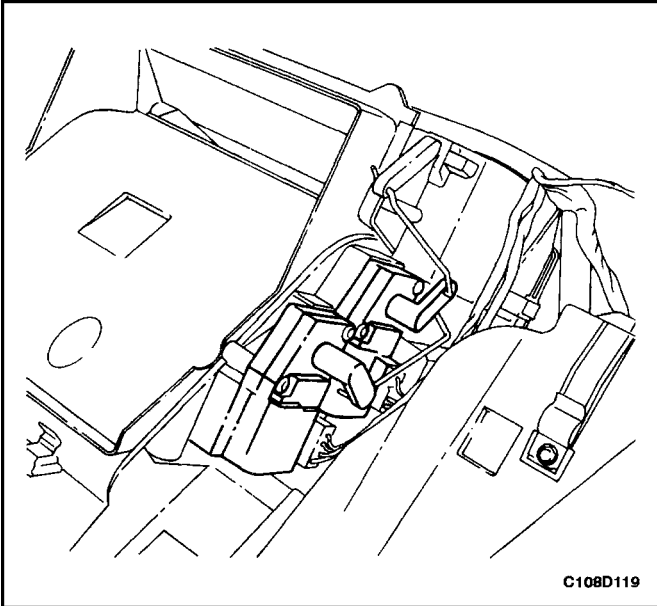
5. Install the evaporator core into the case. Center the evaporator flange in the case opening.
6. Install the evaporator core case cover with the screws.
7. Install the heater/air distributor case assembly. Refer to "Heater/Air Distributor Case Assembly" in this section.

HEATER CORE

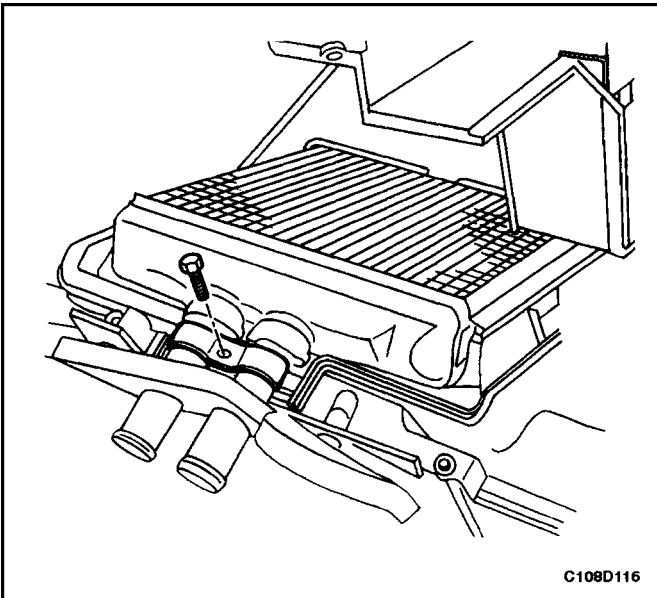
Removal Procedure

1. Remove the heater/air distributor case assembly from the vehicle. Refer to "Heater/Air Distributor Case Assembly" in this section.
2. Remove the motor lever and the actuator rod.

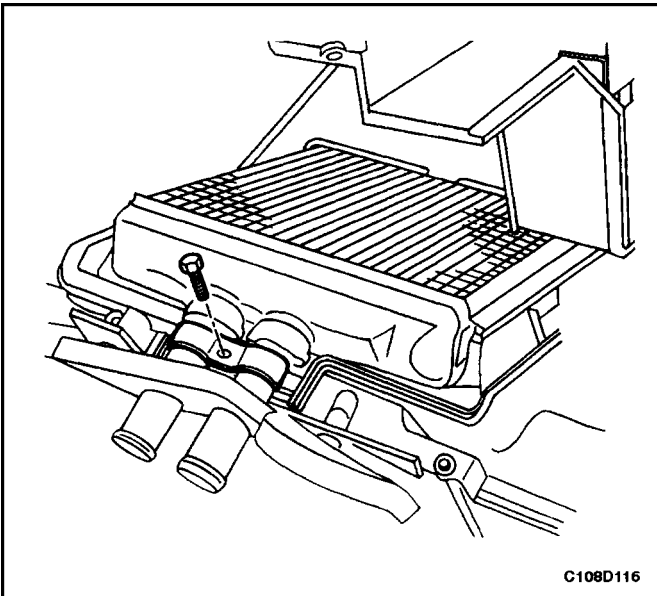




3. Remove the motor screws and the motor to access a buried heater core cover bolt.
4. Remove the foam insulation from the tube base.
5. Remove the remaining actuator rod from the motor lever.
6. Remove the retaining screws that secure the heater core cover to the heater/air distributor case assembly.
7. Slowly separate the lower heater core cover from the rest of the assembly.

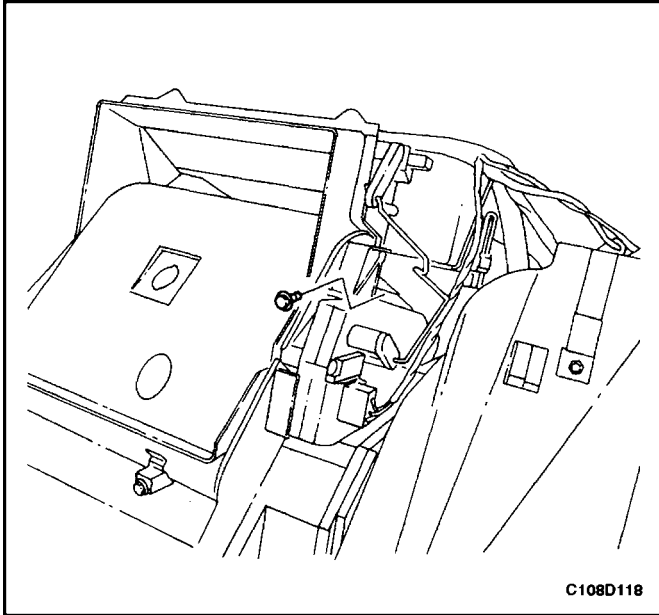


8. Remove the screw and the bracket clamp that secure the heater core lines to the case.
9. Remove the spring clamp that secures the heater core body to the case.
10. Remove the heater core from the case.

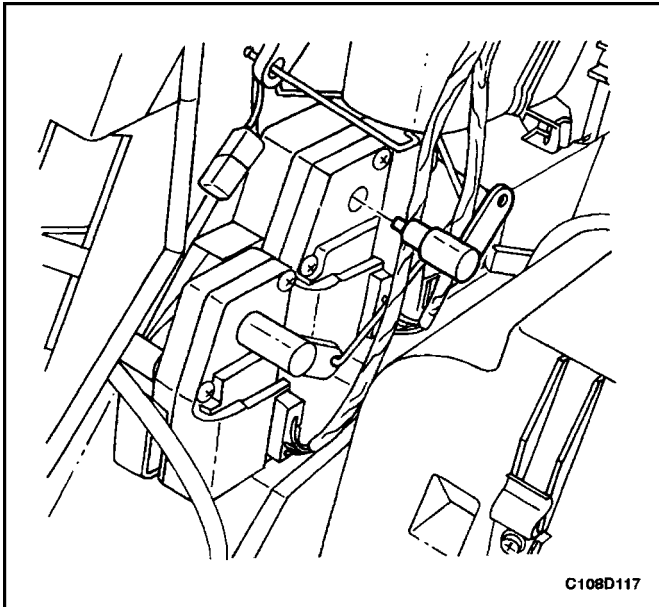


Installation Procedure

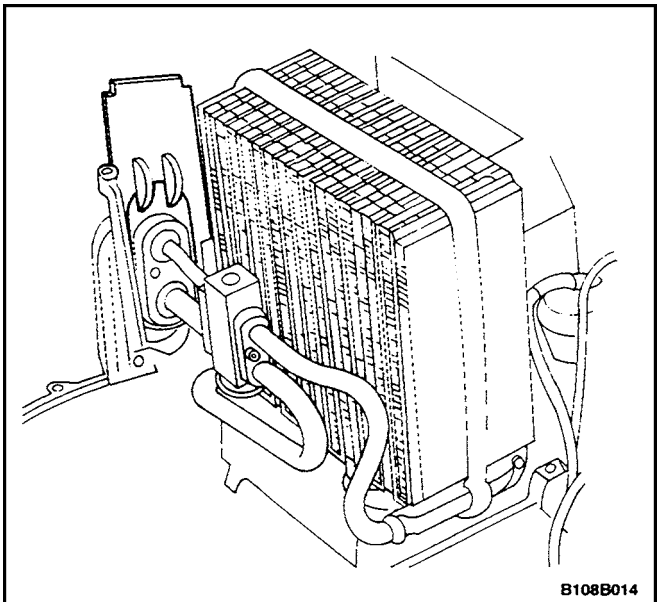
1. Install the heater core into the case.
2. Secure the heater core lines to the case with the retaining bracket clamp and the screw.



3. Install the heater core cover.
4. Install and tighten the screws that secure the heater core cover to the heater/air distributor case assembly.



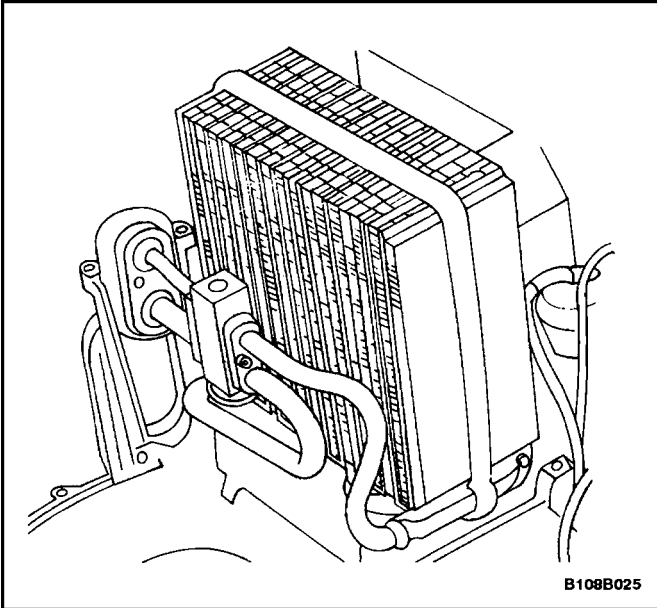
5. Install the motor and the screws for the floor diverter.
6. Install the heater/air distributor case. Refer to "Heater/Air Distributor Case Assembly" in this section.



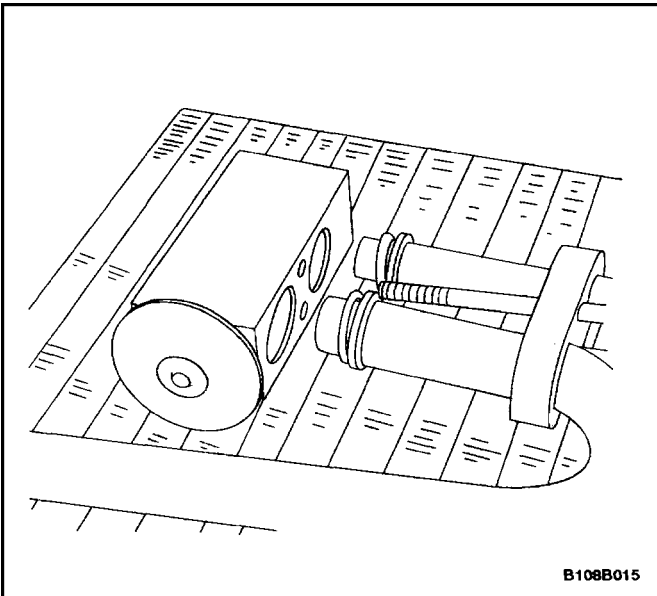
EVAPORATOR CORE

Removal Procedure

1. Install the heater/air distributor case assembly. "Heater/Air Distributor Case Assembly" in this section.
2. Remove the screws that secure the evaporator case halves.
3. Remove the evaporator core case cover.
4. Slide the evaporator flange support plate upward to facilitate the removal of the evaporator.

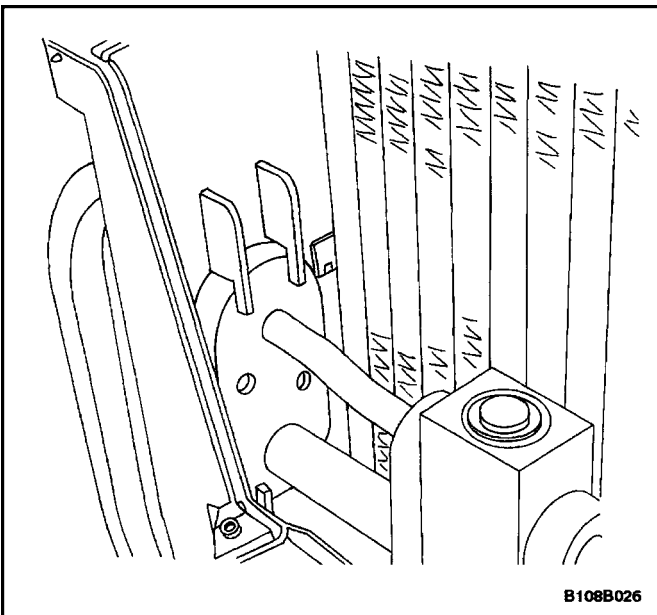


5. Remove the evaporator core from the case.
6. Remove the air conditioning expansion valve. Refer to "A/C Expansion Valve" in this section.



Installation Procedure

1. Install the O-rings onto the evaporator tubes.
2. Install the A/C expansion valve. Refer to "A/C Expansion Valve" in this section.



3. Install the evaporator core into the case. Center the evaporator flange in the case opening.
4. Assemble the evaporator case halves with the screws.
5. Install the heater/air distributor case assembly. Refer to "Heater/Air Distributor Case Assembly" in this section.

UNIT REPAIR
V5 AIR CONDITIONING
COMPRESSOR OVERHAUL

COMPRESSOR OVERHAUL

Refer to *Section 7B, Manual Control Heating, Ventilation, and Air Conditioning System* for the following procedures:

- Clutch Coil.
- Clutch Plate and Hub Assembly.
- Clutch Rotor and Bearing.
- Component Locator V5 Compressor.
- Control Valve Assembly.
- Cylinder to Front Head O–Ring.
- Leak Testing (External).
- Pressure Relief Valve.
- Rear Head, Gasket, Valve Plate, Reed Plate, and ORing.
- Shaft Seal Replacement.

GENERAL DESCRIPTION AND SYSTEM OPERATION

GENERAL INFORMATION

THE V5 SYSTEM

Refer to *Section 7B, Manual Control Heating, Ventilation, and Air Conditioning System*, for the following procedures:

- System Components – Functional.
- The V5 A/C System.
- V5 Compressor – Description of Operation.
- V5 Compressor – General Description.

SYSTEM COMPONENTS—CONTROL

Controller

The operation of the A/C system is controlled by the switches on the control head. This console-mounted heating and ventilation system contains the following knobs and display:

Temperature Control Push Knobs

1. Raise the temperature of the air entering the vehicle by pressing the top switch, with the red arrow pointing upward.
2. Lower the temperature by pressing the bottom switch, with the blue arrow pointing downward.
3. Actuate the air mix door by an electric motor.
4. Vary the mix of the air passing through the heater core with the air bypassing the core.

Each press of a switch changes the set temperature by increments of 0.5 °C (1 °F). This is shown in the temperature window on the function display.

Function Display

This is an LCD display indicating the status of the control settings selected. Starting from the left end of the display, the sections are as follows:

1. Temperature setting – Indicates the temperature set with the temperature control knob.
2. Auto status – Indicates whether the system is operating in the full auto mode or the manual mode.
3. Defroster icon – Indicates manual selection of full defrost mode.
4. Mode – Indicated by icon, the mode chosen by the system in auto (or by the operator in manual) is shown by an illumination arrow indicating the air path.
5. A/C – A snowflake icon indicating whether the A/C is ON or OFF.
6. Fan speed – Indicates the fan speed by illuminating a bar based on the segment at the front, for low speed, and adding additional segments in order up to the fifth, for high speed.

Eight Additional Push Knobs

1. Full defrost – Causes the mode motors to direct all air to the windshield and aide window outlets for maximum defrosting.
2. Air intake – Switches between fresh air intake, the default, and recirculating air. Airflow arrows on the display indicate the mode in effect.
3. Full Auto Switch – Maintains the set temperature automatically. In this mode, the fully automatic temperature control (FATC) system controls the following:
 - The air mix door motor.
 - The mode door motor.
 - The blower motor speed.
 - The inlet air door motor.
 - A/C ON/OFF.
4. OFF Switch – Turns the automatic air conditioning and fan control off.
5. Mode Switch – Allows manual selection of the air-flow direction.
 - Selection is shown on the function display.
 - Each time the mode switch is pressed, the next function is displayed.
6. A/C Switch – Allows manual selection and control of the air conditioning function.
7. Fan Control Switch – Allows manual selection among five fan speeds.
8. Defogger Switch – Turns on the electric defogging heater in the rear window and the outside rearview mirrors, if the vehicle is equipped with heated mirrors.

Pressure Transducer

Pressure transducer switching incorporates the functions of the high-pressure and the low-pressure cutout switches along with the fan cycling switch. The pressure transducer is located in the high-side liquid refrigerant line behind the right strut tower, between the right strut tower and the bulkhead. The output from this pressure transducer goes to the engine control module (ECM), which controls the compressor function based on the pressure signal.

Wide-Open Throttle (WOT) Compressor Cutoff

During full-throttle acceleration, the throttle position sensor (TPS) sends a signal to the ECM, which then controls the compressor clutch.

High RPM Cutoff

As engine rpm approaches the maximum limit, the ECM will disengage the compressor clutch until the engine slows to a lower rpm.