A/C SYSTEM SPECIFICATIONS

A/C SYSTEM SPECIFICATIONS

Application	Specification
Compressor Type	Harrison V7
Compressor Belt Tension	(1)
System Oil Capacity	(2) 9 ozs.
Refrigerant (R-134a) Capacity	1.63 lbs.
System Operating Pressures (3)	
Low Side	30 psi (2.1 kg/cm^2)
High Side	175 psi (120 kg/cm^2)

(1) Belt tension is adjusted by automatic belt tensioner.

(2) Use PAG (Polyalkylene Glycol) Refrigerant Oil.

(3) Engine speed 1000 RPM. Ambient temperature of 80°F (27°C).

DESCRIPTION

WARNING: To avoid injury from accidental air bag deployment, read and carefully follow all SERVICE PRECAUTIONS and DISABLING & ACTIVATING AIR BAG SYSTEM procedures in AIR BAG article in the ACCESSORIES/SAFETY EQUIPMENT Section.

CAUTION: When discharging air conditioning system, use only approved refrigerant recovery/recycling equipment. Make every attempt to avoid discharging refrigerant into the atmosphere.

CAUTION: When battery is disconnected, radio will go into anti-theft protection mode. Obtain radio anti-theft protection code from owner prior to servicing vehicle.

SYSTEM DESCRIPTION

The A/C-heater system is a blend-air type. Air flows through evaporator and mixes or by-passes the heater core. Temperature is controlled electronically by a temperature door motor. Various vacuum-actuated mode doors control the airflow through the HVAC (A/C-heater) module.

Refrigeration system is Variable Displacement Orifice Tube (VDOT) type. The VDOT compressor can

maintain A/C demand under all conditions without cycling on and off.

OPERATION

HVAC CONTROL HEAD

Blower Control Knob

Controls operation of the blower motor. Blower speed can be set from position 1 (low) through position 5 (high). Blower operation is terminated in the OFF position. See **Fig. 1** .

Temperature Control Knob

Controls operation of the temperature door motor. This allows control of discharged air temperature by varying the amount of cool and warm air mixing before entering passenger compartment. See **Fig. 1** .

Mode Control Knob

Controls positioning of various mode doors of the HVAC module assembly. There are 5 different modes to chose from: vent, bi-level, floor, defog and defrost. These different modes are represented by symbols on the control panel. See **Fig. 1** .

Outside Air Button

When depressed, fresh outside air is allowed to flow into the HVAC module assembly. This fresh air passes through the evaporator and is mixed or by-passes the heater core for desired temperature. See **Fig. 1** .

Recirculation Button

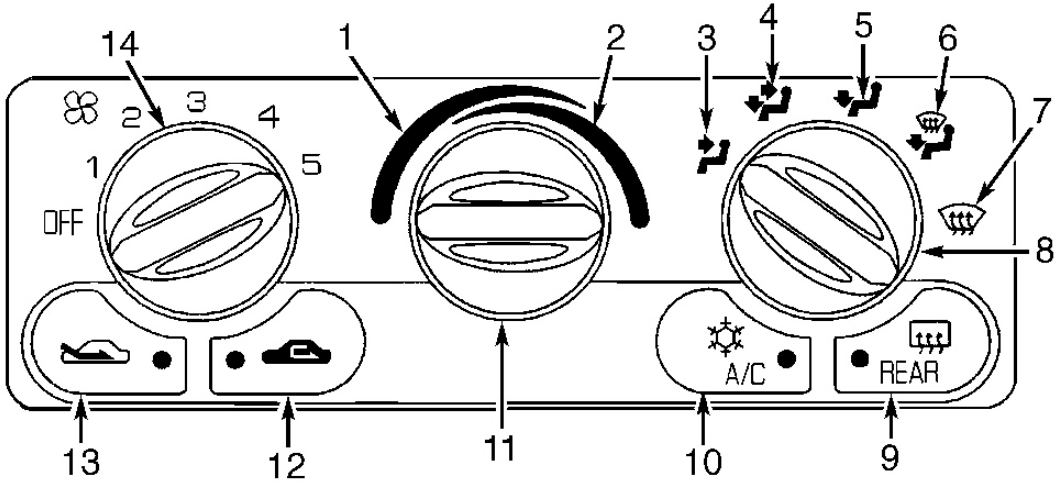
When depressed, air from inside the vehicle is mixed with a small amount of outside air. Air is recirculated within the vehicle and discharged from air conditioner and heater outlets. See **Fig. 1** .

A/C Button

When depressed, an A/C request signal is sent to Powertrain Control Module (PCM). PCM controls operation of A/C compressor. Depressing the A/C button again while compressor is operating will turn compressor off. See **Fig. 1** .

Rear Defrost Button

Depressing this button provides electric current to rear window defroster for 10 minutes, and shuts off automatically. If depressed again, rear window defroster will operate at 5 minute intervals. Rear window defroster also activates the heated mirrors.



1. Max Cool
2. Max Heat
3. Vent
4. Bi-Level
5. Floor
6. Defog
7. Defrost
8. Mode Control Knob
9. Rear Defrost Button
10. A/C Button
11. Temperature Control Knob
12. Recirculation Button
13. Outside Air Button
14. Blower Control Knob

G98J03140

Fig. 1: Identifying Manual A/C-Heater Control Panel
Courtesy of GENERAL MOTORS CORP.

A/C COMPRESSOR CLUTCH DIODE

Diode is taped in wiring harness near A/C compressor clutch coil connector. When A/C compressor clutch is de-energized, voltage is induced in the clutch coil. Diode provides a path to ground for this voltage, preventing voltage from entering electrical controls of vehicle.

A/C CLUTCH RELAY

Relay is located in engine compartment electrical center, in right rear corner of engine compartment, above battery. When A/C or defrost is selected, an A/C request signal is delivered to the Powertrain Control Module (PCM). PCM will then ground the A/C clutch relay to energize compressor clutch coil, engaging compressor clutch.

BLOWER MOTOR RELAY

Relay is located in engine compartment electrical center, in right rear corner of engine compartment, above battery. When any blower speed is selected, blower motor relay will feed power through blower motor switch of

control panel to blower motor control module, energizing blower motor.

BLOWER MOTOR RESISTOR

Blower motor resistor is located under RH side of instrument panel, behind blower motor, under HVAC module assembly. Resistor steps down voltage from blower motor relay to control blower motor speed in all blower control knob positions except 5 (hi). When in position 5 (hi), resistor is by-passed and voltage to blower motor is supplied directly from blower motor relay.

A/C PRESSURE SENSOR

The A/C pressure sensor is mounted to a Schrader valve on evaporator tube between evaporator and condenser. A/C pressure sensor sends a signal to Powertrain Control Module (PCM) according to A/C line pressure. If pressures reach more than 410 psi (28.8 km/cm(2)) or less than 30 psi (2.1 km/cm(2)) A/C pressure sensor signal causes PCM to deactivate A/C compressor clutch. PCM adjusts engine idle to compensate for A/C load and controls auxiliary cooling fan operation based on A/C pressure sensor input.

INSTRUMENT PANEL ELECTRICAL CENTER

Instrument panel electrical center is located under passenger floor kick panel and houses miscellaneous fuses and relays that control various functions for the vehicle, including HVAC system. See **Fig. 2** .

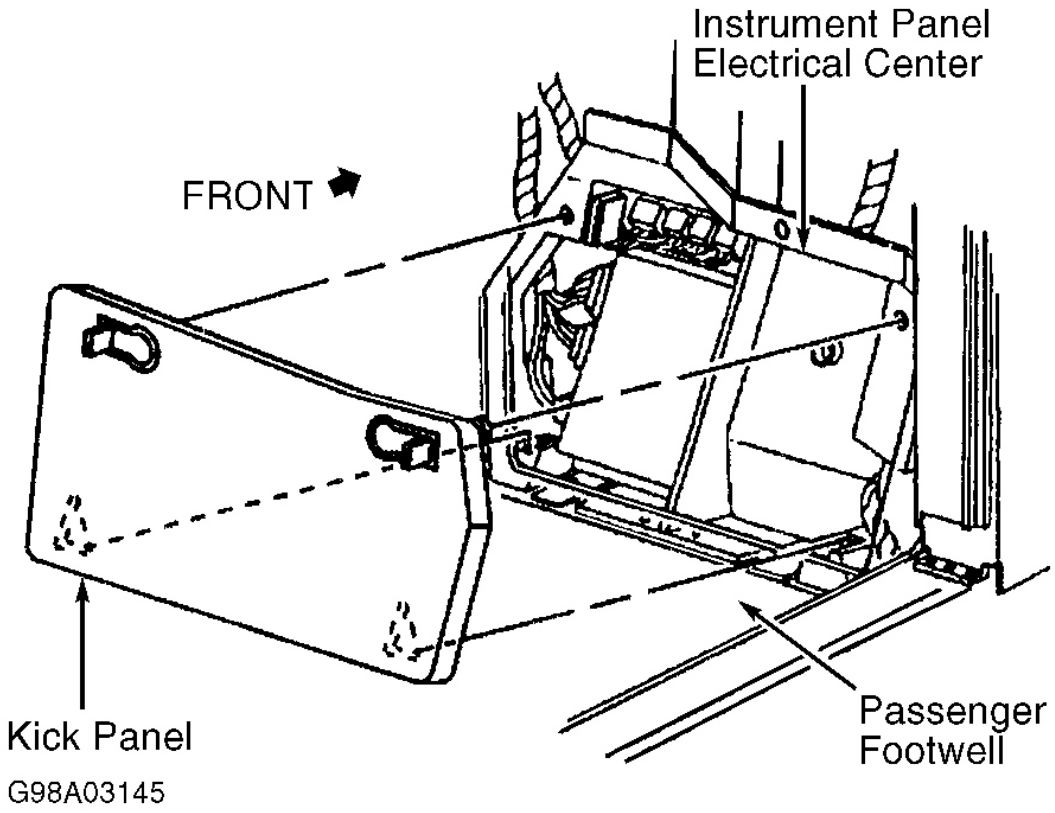


Fig. 2: Locating Instrument Panel Electrical Center
Courtesy of GENERAL MOTORS CORP.

TEMPERATURE DOOR MOTOR

Temperature mode motor is located on the left of the HVAC module and controls movement of the air mix door (hot/cool air) through inputs controlled by HVAC control head and temperature control knob position.

VACUUM CONTROLS

Mode selector switch provides vacuum to various vacuum actuators, directing airflow through HVAC module to desired outlets.

TESTING

VDOT SYSTEM PERFORMANCE

1. Close all doors and windows. Set control panel to A/C mode. Set blower speed to high position. Turn control knob to full cold position. Let engine idle for 5 minutes. Feel liquid line on both sides of orifice

tube. If temperature is the same on both sides of orifice tube, go to next step. If temperature is not the same on both sides of orifice tube, go to step 4).

2. Discharge A/C system, using approved refrigerant recovery/recycling equipment. Remove orifice tube and inspect for missing "O" ring. If "O" ring is missing, replace orifice tube with NEW "O" ring and go to step 4). See **Fig. 3** . If "O" ring is intact, go to next step.
3. Inspect A/C system high side line for kink, bend or any damage that may cause a restriction. If a restriction is found, repair or replace high side pressure line. Evacuate and recharge A/C system. Perform leak test at any location where A/C system was opened. If no restriction was located, go to next step.
4. Operate A/C system to allow system to stabilize. Check outlet temperature. See **A/C TEMPERATURE DROP** . If temperature drop is within specification, system is okay. If temperature drop is not within specification, go to step 5).
5. Operate A/C system for 5 more minutes or longer. Record low and high side pressure readings. If equipped with electric cooling fans, record pressure readings when fans are operating. See VDOT SYSTEM PERFORMANCE CHART in **A/C-HEATER SYSTEM TROUBLE SHOOTING - MANUAL** article.

A/C TEMPERATURE DROP

Condenser Inlet (1) Ambient Temp. °F (°C)	Right Hand Upper Vent Outlet Temp.°F (°C)
70 (21)	20-39 (-7-4)
80 (26.6)	25-39 (-4-4)
90-100 (32.2-37.7)	30-50 (-1.1-10)
(1) Humidity between 30-90 percent.	

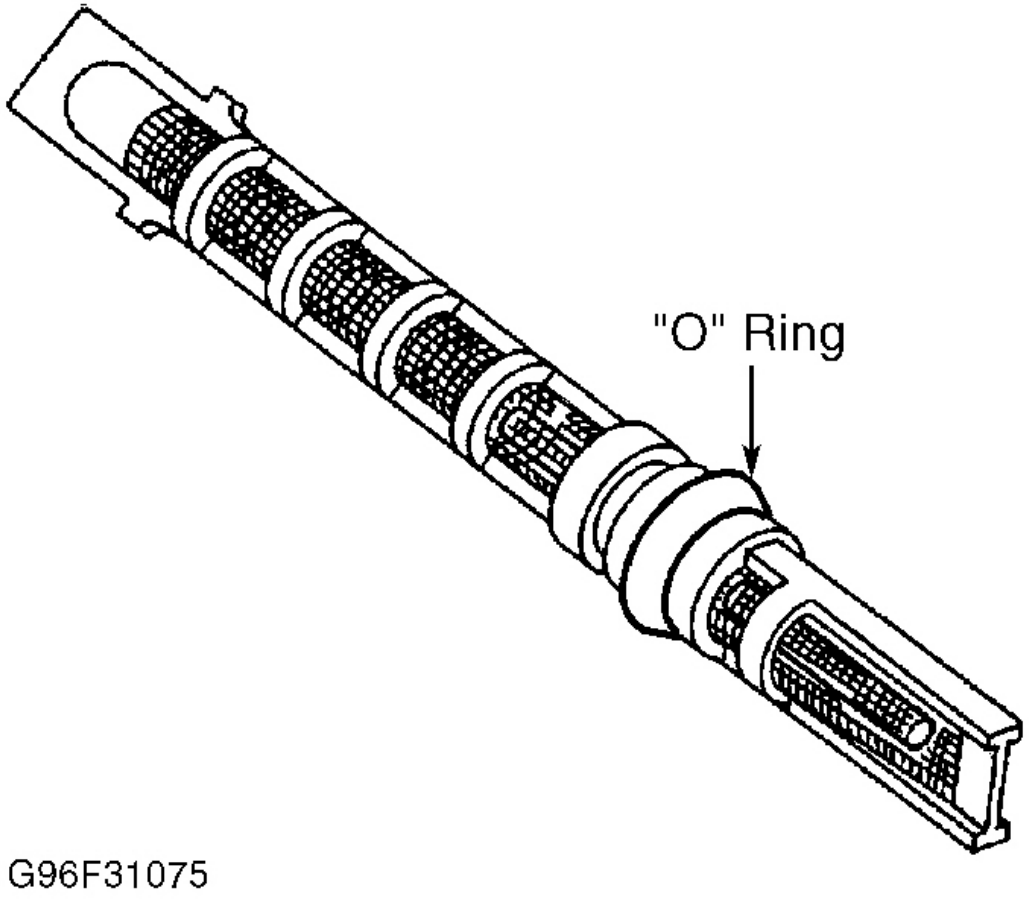


Fig. 3: Identifying "O" Ring Of Orifice Tube
Courtesy of GENERAL MOTORS CORP.

COMPRESSOR CLUTCH ENGAGEMENT

See **A/C COMPRESSOR CLUTCH CONTROLS** article.

TROUBLE SHOOTING

NOTE: For additional trouble shooting procedures, see procedures in the A/C-HEATER SYSTEM TROUBLE SHOOTING - MANUAL article.

HVAC BLOWER CONTROLS SYSTEM CHECK

1. Start vehicle and allow to idle. Rotate mode control knob to vent position. Depress A/C button. Rotate

temperature control knob to max cool. Depress recirculation button. Rotate blower control knob to position 3 (medium). See **Fig. 1** . A/C compressor should be engaged and cold air should exit from instrument panel vent outlets.

2. Turn A/C off by depressing A/C button a second time. Depress outside air button. A/C compressor should be disengaged and cool air should exit from instrument panel vent outlets.
3. Rotate mode control knob to bi-level position. A/C compressor should be engaged and cold air should exit from instrument panel vent and floor outlets, with a slight amount of air from defrost outlets.
4. Rotate mode control knob to floor position. A/C compressor should disengage and cool air should exit from floor outlets, with a slight amount of air from defrost outlets.
5. Rotate mode control knob to defog position. A/C compressor should engage and cold air should exit from floor and defrost outlets.
6. Rotate mode control knob to defrost position. A/C compressor should engage and cold air should exit from defrost outlets, with a slight amount of air from floor outlets.
7. Rotate mode control knob to vent position. Rotate temperature control knob to max heat position. Rotate blower control knob to position 1 (low). Sound of temperature door moving from cool to warm air mode should be heard. Warm air should exit from instrument panel vent outlets.
8. Rotate temperature control knob to max cool position. Rotate blower control knob thorough positions 1-5 and from 5-1. Sound of temperature door moving from warm to cool air mode should be heard. Blower motor speed should change with blower control knob settings. Warm air should exit from instrument panel vent outlets.

BLOWER MOTOR POSITION 1 (LOW) INOPERATIVE

1. HVAC blower controls system check should be performed before diagnosis of blower motor operation. If system check was performed, go to next step.
2. Disconnect HVAC control head connector C2 and blower motor control module connector C1. Install fused jumper between HVAC control head connector terminals "B" and "H". Turn ignition switch to ON position. Use DVOM to check voltage between ground and blower motor control module connector terminal "B". If DVOM indicates 10-14 volts, go to step 4). If voltage is not 10-14 volts, go to next step.
3. Repair open or high resistance in Yellow wire between HVAC control head connector terminal "H" and blower motor control module connector terminal "B". Perform HVAC blower controls system check.
4. Remove fused jumper. Connect HVAC control head connector. Rotate blower control knob to position 1 (low). Turn ignition switch to ON position. Use DVOM to check voltage between ground and blower motor control module connector terminal "B". If DVOM indicates 10-14 volts, go to step 6). If voltage is not 10-14 volts, go to next step.
5. Replace HVAC control head. Perform HVAC blower controls system check.
6. Replace blower motor control module. Perform HVAC blower controls system check.

BLOWER MOTOR POSITION 2 (MED-1) INOPERATIVE

1. HVAC blower controls system check should be performed before diagnosis of blower motor operation. If system check was performed, go to step 2).
2. Disconnect HVAC control head connector C2 and blower motor control module connector C1. Install fused jumper between HVAC control head connector terminals "B" and "G". Turn ignition switch to ON

position. Use DVOM to check voltage between ground and blower motor control module connector terminal "A". If DVOM indicates 10-14 volts, go to step 4). If voltage is not 10-14 volts, go to next step.

3. Repair open or high resistance in Tan wire between HVAC control head connector terminal "G" and blower motor control module connector terminal "A". Perform HVAC blower controls system check.
4. Remove fused jumper. Connect HVAC control head connector. Rotate blower control knob to position 2 (med 1). Turn ignition switch to ON position. Use DVOM to check voltage between ground and blower motor control module connector terminal "A". If DVOM indicates 10-14 volts, go to step 6). If voltage is not 10-14 volts, go to next step.
5. Replace HVAC control head. Perform HVAC blower controls system check.
6. Replace blower motor control module. Perform HVAC blower controls system check.

BLOWER MOTOR POSITION 3 (MED-2) INOPERATIVE

1. HVAC blower controls system check should be performed before diagnosis of blower motor operation. If system check was performed, go to step 2).
2. Disconnect HVAC control head connector C2 and blower motor control module connector C1. Install fused jumper between HVAC control head connector terminals "B" and "F". Turn ignition switch to ON position. Use DVOM to check voltage between ground and blower motor control module connector terminal "D". If DVOM indicates 10-14 volts, go to step 4). If voltage is not 10-14 volts, go to next step.
3. Repair open or high resistance in Light Blue wire between HVAC control head connector terminal "F" and blower motor control module connector terminal "D". Perform HVAC blower controls system check.
4. Remove fused jumper. Connect HVAC control head connector. Rotate blower control knob to position 3 (med 2). Turn ignition switch to ON position. Use DVOM to check voltage between ground and blower motor control module connector terminal "D". If DVOM indicates 10-14 volts, go to step 6). If voltage is not 10-14 volts, go to next step.
5. Replace HVAC control head. Perform HVAC blower controls system check.
6. Replace blower motor control module. Perform HVAC blower controls system check.

BLOWER MOTOR POSITION 4 (MED-3) INOPERATIVE

1. HVAC blower controls system check should be performed before diagnosis of blower motor operation. If system check was performed, go to step 2).
2. Disconnect HVAC control head connector C2 and blower motor control module connector C1. Install fused jumper between HVAC control head connector terminals "B" and "E". Turn ignition switch to ON position. Use DVOM to check voltage between ground and blower motor control module connector terminal "C". If DVOM indicates 10-14 volts, go to step 4). If voltage is not 10-14 volts, go to next step.
3. Repair open or high resistance in Purple wire between HVAC control head connector terminal "E" and blower motor control module connector terminal "C". Perform HVAC blower controls system check.
4. Remove fused jumper. Connect HVAC control head connector. Rotate blower control knob to position 4 (med 3). Turn ignition switch to ON position. Use DVOM to check voltage between ground and blower motor control module connector terminal "C". If DVOM indicates 10-14 volts, go to step 6). If voltage is not 10-14 volts, go to next step.
5. Replace HVAC control head. Perform HVAC blower controls system check.

6. Replace blower motor control module. Perform HVAC blower controls system check.

BLOWER MOTOR POSITION 5 (HI) INOPERATIVE

1. HVAC blower controls system check should be performed before diagnosis of blower motor operation. If system check was performed, go to step 2).
2. Disconnect blower motor control module connector C1. Use DVOM to check voltage between ground and blower motor control module connector terminal "F". Turn ignition switch to ON position. Rotate mode control knob to vent position. Rotate blower control knob to position 5 (hi). If DVOM indicates 10-14 volts, go to step 6). If voltage is not 10-14 volts, go to next step.
3. Turn ignition switch to OFF position. Disconnect HVAC control head connector C2. Use DVOM to check for continuity in Orange wire between HVAC control head connector terminal "A" and blower motor control module connector terminal "F". If DVOM indicates continuity, go to next step. If continuity is not indicated, go to step 5).
4. Replace HVAC control head. Perform HVAC blower controls system check.
5. Repair open or high resistance in Orange wire between blower motor control module connector terminal "F" and HVAC control head connector terminal "C". Perform HVAC blower controls system check.
6. Use DVOM to check voltage between ground and terminal "G" of blower motor module connector. If DVOM indicates 10-14 volts, go to step 8). If voltage is not 10-14 volts, go to next step.
7. Repair open or high resistance in Red wire between blower motor control module connector terminal "G" and instrument panel electrical center. Perform HVAC blower controls system check.
8. Replace blower motor control module. Perform HVAC blower controls system check.

BLOWER MOTOR INOPERATIVE IN ALL POSITIONS

1. HVAC blower controls system check should be performed before diagnosis of blower motor operation. If system check was performed, go to step 2).
2. Disconnect blower motor connector. Turn ignition switch to ON position. Turn mode selector knob to vent position. Turn blower selector to position 1 (low). Using DVOM to check for voltage between ground and terminal No. 14 (Dark Green wire) of PCM connector. If DVOM indicates 10-14 volts, go to next step. If voltage is not 10-14 volts, go to step 10).
3. Use DVOM to check for continuity between ground and terminal "B" (Black wire) of blower motor connector. Use DVOM to check for continuity between ground and terminal "E" (Black wire) of blower motor control module connector. If DVOM indicates continuity, go to next step. If continuity is not indicated, go to step 5).
4. Replace blower motor. Perform HVAC blower controls system check.
5. Disconnect blower motor control module connector C2. Use DVOM to check for continuity between ground and terminal No. 2 (Black wire) of blower motor control module connector. Use DVOM to check for continuity between ground and terminal "E" (Black wire) of blower motor control module connector. If DVOM indicates continuity, go to next step. If continuity is not indicated, go to step 7).
6. Repair open or high resistance in Black wire between blower control module connector terminal No. 2 and blower motor connector terminal "B". Perform HVAC blower controls system check.
7. Disconnect blower motor control module connector C1. Use DVOM to check for continuity between

ground and terminal "E" (Black wire) of blower motor control module connector. If DVOM indicates continuity, go to next step. If continuity is not indicated, go to step 9).

8. Replace blower motor control module. Perform HVAC blower controls system check.
9. Repair open or high resistance in Black wire between blower control module connector terminal "E" and ground. Perform HVAC blower controls system check.
10. Disconnect blower motor relay. Use DVOM to check for continuity between ground and blower motor relay connector A1. Use DVOM to check for continuity between ground and terminal "E" (Black wire) of blower motor control module connector. If DVOM indicates continuity, go to step 12). If continuity is not indicated, go to next step.
11. Repair open or high resistance in Black wire between blower motor control module connector terminal No. 2 and blower motor connector terminal "B". Perform HVAC blower controls system check.
12. Use DVOM to check voltage between ground and blower motor relay connector terminal C2. Turn ignition switch to ON position. If DVOM indicates 10-14 volts, go to step 16). If voltage is not 10-14 volts, go to next step.
13. Check HVAC minifuse No. 18 for open. If fuse is blown, go to next step. If fuse is okay, go to step 15).
14. Repair open or high resistance in Brown wire between blower motor relay connector terminal C2 and instrument panel electrical center. Perform HVAC blower controls system check.
15. Repair short to ground in Brown wire between blower motor relay connector terminal C2 and instrument panel electrical center. Perform HVAC blower controls system check.
16. Use DVOM to check voltage between ground and blower motor relay connector terminal C1. If DVOM indicates 10-14 volts, go to step 20). If voltage is not 10-14 volts, go to next step.
17. Check BLO MOT minifuse No. 49 for open. If fuse is blown, go to next step. If fuse is okay, go to step 19).
18. Repair open or high resistance in Red wire between blower motor relay connector terminal C1 and instrument panel electrical center. Perform HVAC blower controls system check.
19. Repair short to ground in Red wire between blower motor relay connector terminal C1 and instrument panel electrical center. Perform HVAC blower controls system check.
20. Connect fused jumper between blower motor relay connector terminals C1 (Red wire) and A2 (Red wire). Turn blower motor control knob to position 1 (low). If blower motor operates, go to next step. If blower motor does not operate, go to step 22).
21. Replace blower motor relay. Perform HVAC blower controls system check.
22. With fuse jumper still connected, disconnect HVAC control head connector C2. Use DVOM to check voltage between ground and HVAC control head connector terminal "B" (Red wire). If DVOM indicates 10-14 volts, go to step 24). If voltage is not 10-14 volts, go to next step.
23. Repair open or high resistance in Red wire between HVAC control head connector terminal "B" and blower motor relay connector terminal A2. Perform HVAC blower controls system check.
24. Connect blower motor and blower motor control module connectors. With fused jumper still connected, install another fused jumper between HVAC control head connector terminals "B" and "H". If blower motor operates, go to next step. If blower motor does not operate, go to step 26).
25. Replace HVAC control head. Perform HVAC blower controls system check.
26. Replace blower motor control module. Perform HVAC blower controls system check.

TEMPERATURE CONTROL INOPERATIVE

1. HVAC blower controls system check should be performed before diagnosis of blower motor operation. If system check was performed, go to step 2).
2. Disconnect temperature door motor connector. Turn ignition switch to ON position. Use DVOM to check voltage between ground and terminal No. 10 (Brown wire) of temperature door motor connector. If DVOM indicates 10-14 volts, go to step 6). If voltage is not 10-14 volts, go to next step.
3. Check HVAC minifuse No. 18 for open. If fuse is blown, go to next step. If fuse is good, go to step 5).
4. Repair open or high resistance in Brown wire between terminal No. 10 of temperature door motor connector and instrument panel electrical center. Perform HVAC blower controls system check.
5. Repair short to ground in Brown wire between terminal No. 10 of temperature door motor connector and instrument panel electrical center. Perform HVAC blower controls system check.
6. Use DVOM to check for continuity between ground and Black wire between terminal No. 7 of temperature door motor connector. If DVOM indicates continuity, go to step 8). If continuity is not indicated, go to next step.
7. Repair open or high resistance in Black wire between terminal No. 7 of temperature door motor connector and ground. Perform HVAC blower controls system check.
8. Use DVOM to check voltage between ground and terminal No. 8 of temperature door motor connector. Turn ignition switch to ON position. Rotate temperature control knob from hot to cold and back to hot again. If voltage varies between 1 to 12 volts, go to next step. If voltage does not vary between 1 to 12 volts, go to step 10).
9. Check for poor connection at temperature door motor connector. Check for binding air temperature valve. If connections and valve are okay, replace temperature door motor. Perform HVAC blower controls system check.
10. Turn ignition switch to OFF position. Disconnect HVAC control head connector C1. Use DVOM to check for continuity between ground and Light Blue wire at terminal No. 8 of temperature door motor connector. If DVOM indicates continuity, go to next step. If continuity is not indicated, go to step 12).
11. Repair short to ground Light Blue wire between terminal "G" of HVAC control head connector and terminal No. 8 of temperature door motor connector. Perform HVAC blower controls system check.
12. Use DVOM to check for continuity of Light Blue wire between terminal "G" of HVAC control head connector and terminal No. 8 of temperature door motor connector. If DVOM indicates continuity, go to next step. If continuity is not indicated, go to step 14).
13. Replace HVAC control head. Perform HVAC blower controls system check.
14. Repair open in Light Blue wire between terminal "G" of HVAC control head connector and terminal No. 8 of temperature door motor connector. Perform HVAC blower controls system check.

VACUUM DIAGNOSIS

1. Disconnect vacuum hose from actuator(s). Check operation of each vacuum actuator. Using a vacuum pump, apply vacuum directly to vacuum actuator and ensure vacuum actuator rod retracts. Ensure vacuum diaphragm holds vacuum. Replace vacuum actuator if rod fails to retract, or if actuator will not hold vacuum.
2. Ensure all vacuum hoses and electrical connections are installed. Operate engine for 2 minutes and then shut engine off. Engine needs to be started occasionally during testing to ensure proper vacuum supply.

3. Turn ignition switch to ON position. Operate HVAC control head through different modes. Check for proper distribution of vacuum to vacuum actuators based on mode selected.
4. If vacuum actuator retracts in wrong position, replace HVAC control head. If vacuum actuator does not retract, check for vacuum leaks, defective hoses or binding valves.

REMOVAL & INSTALLATION

WARNING: To avoid injury from accidental air bag deployment, read and carefully follow all SERVICE PRECAUTIONS and DISABLING & ACTIVATING AIR BAG SYSTEM procedures in AIR BAG RESTRAINT SYSTEM article in ACCESSORIES AND ELECTRICAL.

A/C CLUTCH RELAY & BLOWER MOTOR RELAY

Removal & Installation

Relays are located in instrument panel electrical center. Remove selected relay from electrical center. To install, reverse removal procedure.

A/C COMPRESSOR

Removal & Installation

1. Disconnect negative battery cable. Remove drive belts. Discharge A/C system, using approved refrigerant recovery/recycling equipment. Drain cooling system. Remove water pump. See ENGINE article in ENGINE MECHANICAL.
2. Disconnect compressor electrical leads. Disconnect refrigerant lines, and plug openings. Remove compressor bolts and compressor. See **Fig. 4** . Drain oil from compressor, measure and record amount of oil drained.
3. To install, reverse removal procedure. Using NEW refrigerant oil, add to compressor same amount of oil drained. If compressor is replaced, drain oil from new compressor and add the same amount of oil drained from old compressor. Evacuate and recharge A/C system. Fill cooling system.

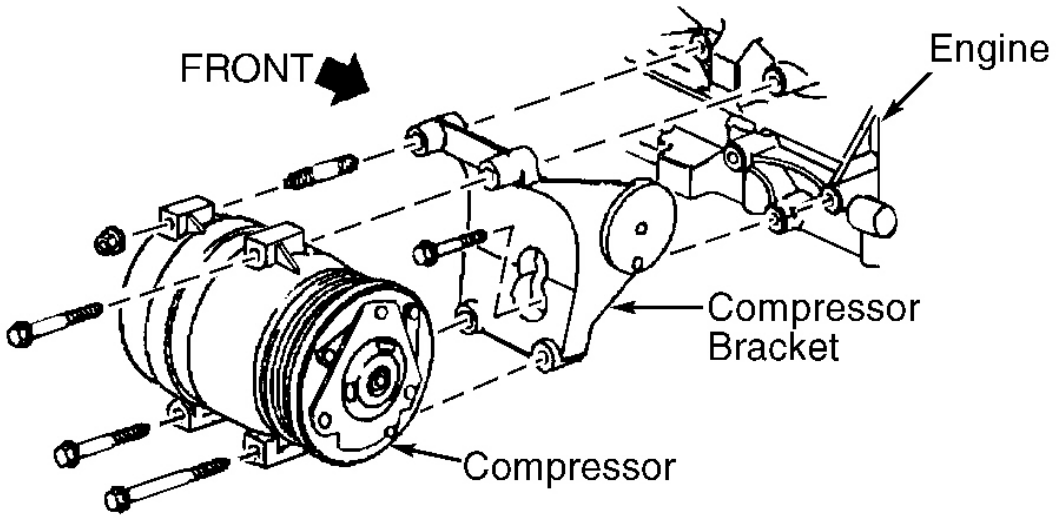


Fig. 4: Removing A/C Compressor
Courtesy of GENERAL MOTORS CORP.

ACCUMULATOR

Removal & Installation

1. Disconnect negative battery cable. Remove battery heatshield. Discharge A/C system using approved refrigerant recovery/recycling equipment. Remove intake manifold. See ENGINE article in ENGINE MECHANICAL. Disconnect refrigerant lines at accumulator, and immediately plug line openings.
2. Remove accumulator bracket from dash panel. Remove accumulator and insulator from bracket. See **Fig. 5** . Drain oil from accumulator, measure and record amount of oil drained.
3. To install, reverse removal procedure. Using NEW refrigerant oil, add to accumulator same amount of oil drained. If accumulator is replaced, add 3.5 ounces. Coat "O" rings with refrigerant oil. Evacuate and recharge A/C system.

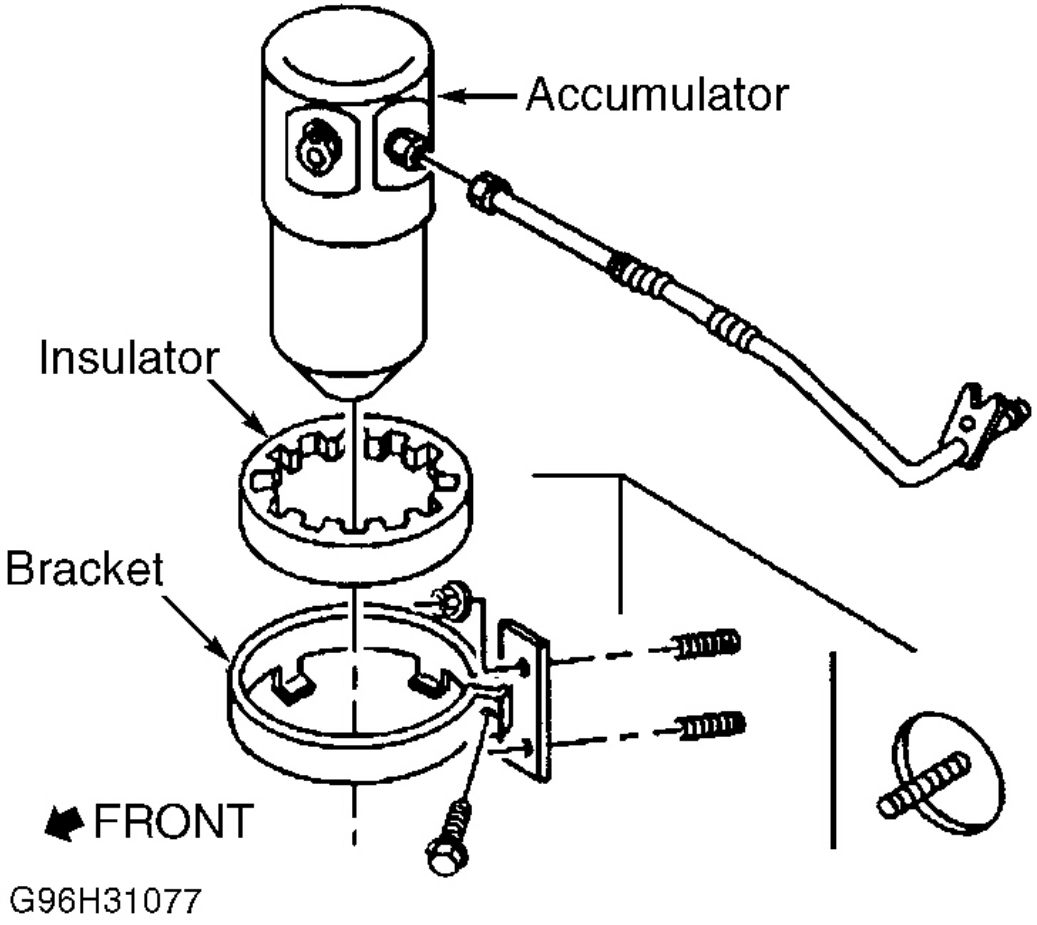


Fig. 5: Removing Accumulator & Insulator
Courtesy of GENERAL MOTORS CORP.

HVAC CONTROL HEAD (PANEL)

Removal & Installation

1. Disconnect negative battery cable. Remove traction control switch from center console and disconnect. Remove retaining nut covers under console lid and remove front and rear retaining nuts. Disconnect fuel door release switch and accessory plug connectors. Remove center console.
2. Remove shift boot by gently pulling upward to release tabs. Remove ashtray. Remove instrument panel accessory trim plate grille, located next to ignition switch. Remove screw from behind ash tray and accessory trim plate grille. See **Fig. 6** . Grasp sides of accessory trim plate and pull to rear of vehicle to release clips. Disconnect cigarette lighter connector. Turn shift boot to fit through opening for shifter. Remove instrument panel accessory trim plate.

3. Remove HVAC control head mounting screws. Disconnect electrical and vacuum connectors. Remove HVAC control head from vehicle. See **Fig. 7** . To install, reverse removal procedure.

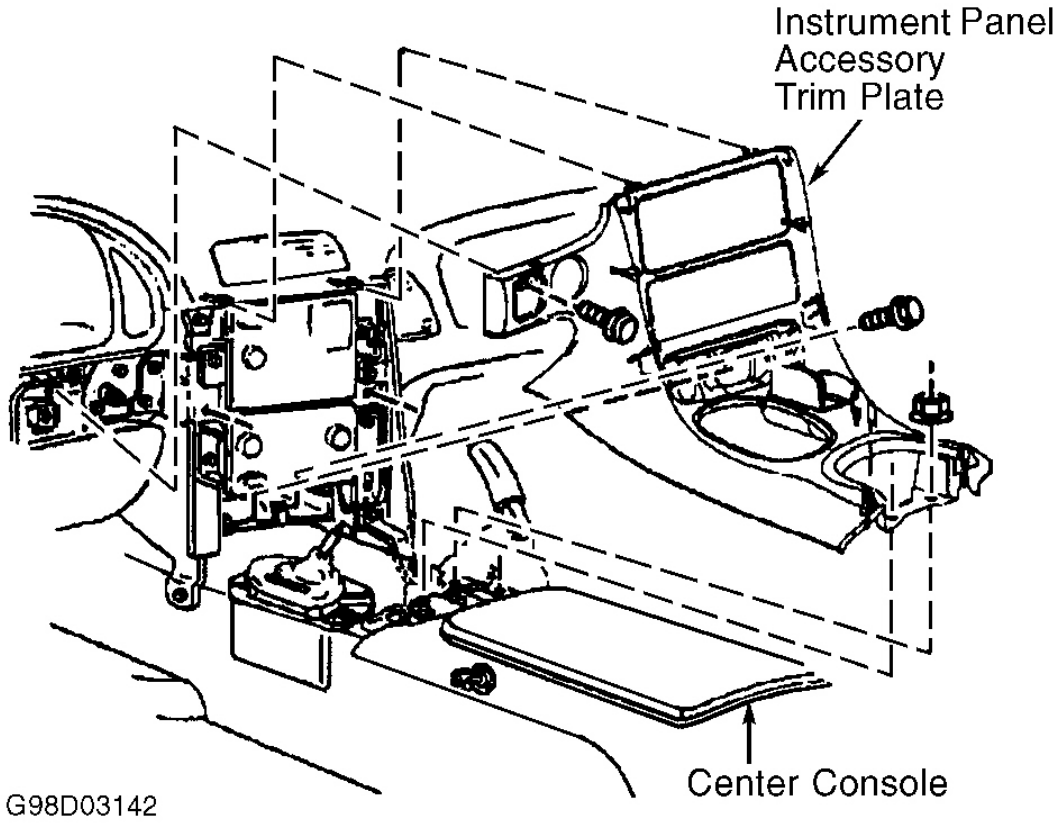


Fig. 6: Removing Instrument Panel Accessory Trim Plate
Courtesy of GENERAL MOTORS CORP.

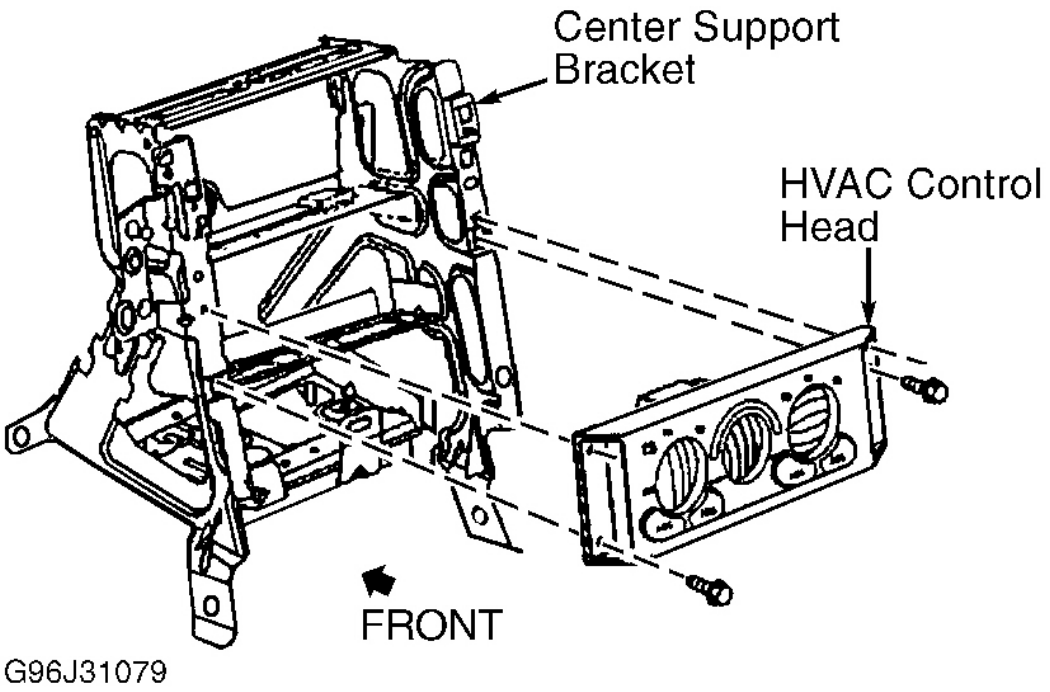


Fig. 7: Removing HVAC Control Head & Center Support Bracket
Courtesy of GENERAL MOTORS CORP.

A/C PRESSURE SENSOR

NOTE: A Schrader valve is used with A/C pressure sensor. A/C system need not be discharged before removing sensor.

Removal & Installation

Sensor is located in line between condenser and evaporator. Disconnect electrical connector. Remove A/C pressure sensor. To install, reverse removal procedure. Coat NEW "O" ring with refrigerant oil and install it on A/C pressure sensor.

BLOWER MOTOR

Removal & Installation

Disconnect negative battery cable. Remove passenger floor hush panel. Disconnect blower motor electrical connector. Remove blower motor cooling tube. Remove blower motor mounting screws. Remove blower motor. See **Fig. 8** . To install, reverse removal procedure.

BLOWER MOTOR CONTROL MODULE

Removal & Installation

Disconnect negative battery cable. Disconnect electrical connector at blower motor control module mounted above blower motor. See **Fig. 8** . Remove screws and blower motor control module. Blower motor resistor is attached to blower motor control module. To install, reverse removal procedure.

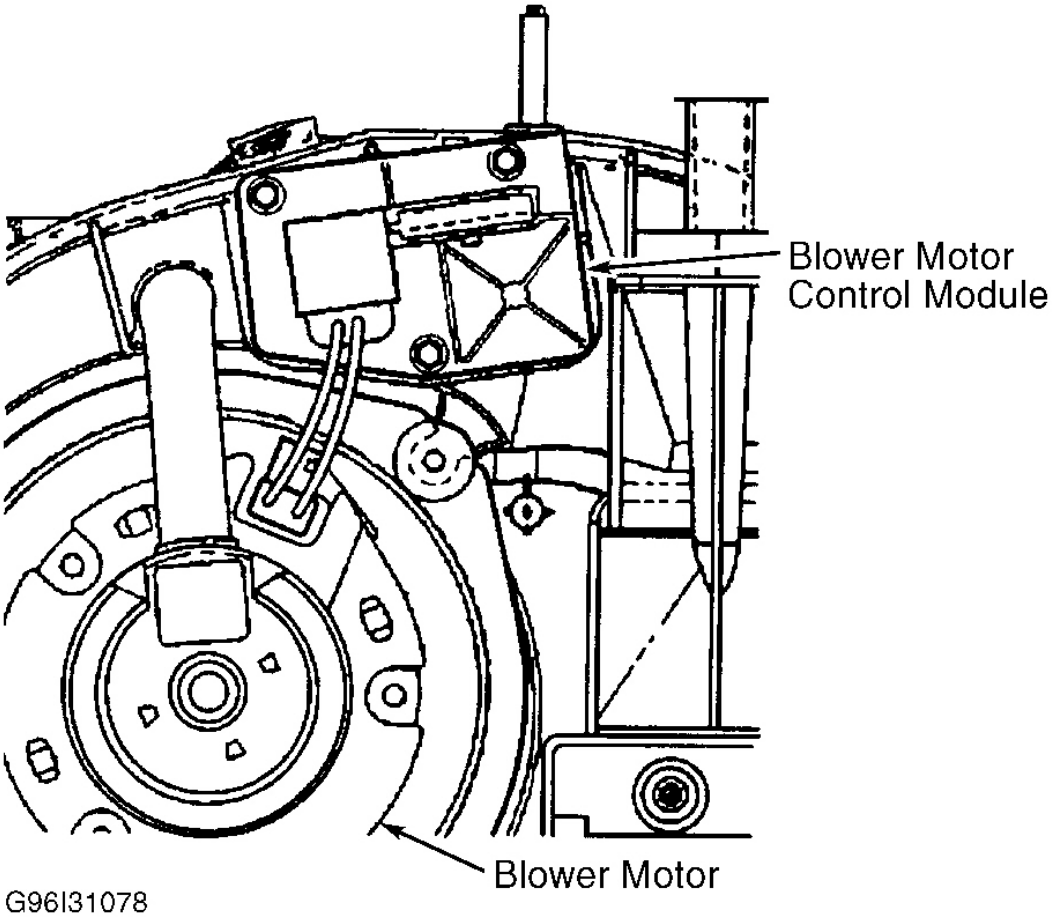


Fig. 8: Identifying Blower Motor & Blower Motor Control Module
Courtesy of GENERAL MOTORS CORP.

CONDENSER

Removal & Installation

1. Disconnect negative battery cable. Discharge A/C system using approved refrigerant recovery/recycling equipment. Raise and support vehicle. Disconnect A/C line going from evaporator to condenser. Cap or

plug refrigerant line openings immediately to prevent contamination. Remove fasteners retaining radiator support to front fascia. Lower vehicle.

2. Disconnect compressor hose from condenser. Cap or plug refrigerant line openings immediately to prevent contamination. Lower vehicle. Disconnect Mass Airflow (MAF) sensor wiring connector. Remove air intake duct assembly. Remove upper radiator support. Remove condenser from retaining clips of radiator. Drain and record amount of refrigerant oil from condenser and discard.
3. To install, reverse removal procedure. Using NEW refrigerant oil, add to condenser same amount of oil drained. If condenser is replaced, add one ounce of refrigerant oil. Coat NEW "O" rings with refrigerant oil and install on refrigerant lines. Refill cooling system. Evacuate and recharge A/C system.

EVAPORATOR CORE

Removal & Installation

1. Remove HVAC module. See **HVAC (A/C-HEATER) MODULE** . Remove and discard air inlet, drain and plumbing seals from HVAC module. Remove heater/defroster actuator from HVAC module. Remove passenger-side vacuum actuator. Remove screws and separate case halves of HVAC module.

CAUTION: Be aware of snap clip that holds HVAC module case halves together. Remove before separating halves or damage to case may occur.

2. Remove evaporator core. Drain oil from evaporator core, and measure amount of oil drained and discard. Remove and discard all module and evaporator seals. Remove and discard water core filter (mesh screen) from evaporator core.
3. To install, reverse removal procedure. Using NEW refrigerant oil, add to evaporator core same amount of oil drained. If evaporator core is replaced, add 3 ounces of refrigerant oil. Replace all evaporator seals and water core filter. Replace all HVAC module seals. Coat NEW "O" rings with refrigerant oil. Evacuate and recharge A/C system. Refill cooling system.

HEATER CORE

Removal & Installation

1. Remove HVAC module. See **HVAC (A/C-HEATER) MODULE** . Remove heater core cover. Remove heater core cover seals and discard. Remove heater core mounting clip screw and heater core line clamp screw. Remove heater core. Remove all heater core seals from HVAC module and discard.
2. To install, reverse removal procedure. Replace all heater core seals. Evacuate and charge A/C system. Fill cooling system.

HVAC (A/C-HEATER) MODULE

NOTE: Original locations of I/P brackets must be marked for proper trim fit. prior to disassembly, mark their locations with a paint stick, scribe or other suitable method. If not marked, panels will not line up properly.

Removal & Installation

1. Disconnect negative battery cable. Disable air bag system. See AIR BAG RESTRAINT SYSTEM article in ACCESSORIES AND ELECTRICAL. Drain cooling system. Discharge A/C system, using approved refrigerant recovery/recycling equipment.
2. Drain cooling system. Remove intake manifold from engine. See ENGINES article in ENGINE MECHANICAL. Disconnect heater hoses from heater hose pipe assembly. Disconnect accumulator hose assembly from HVAC module. Remove heater hose pipe assembly. See **Fig. 9** . Remove drain tube from HVAC module.

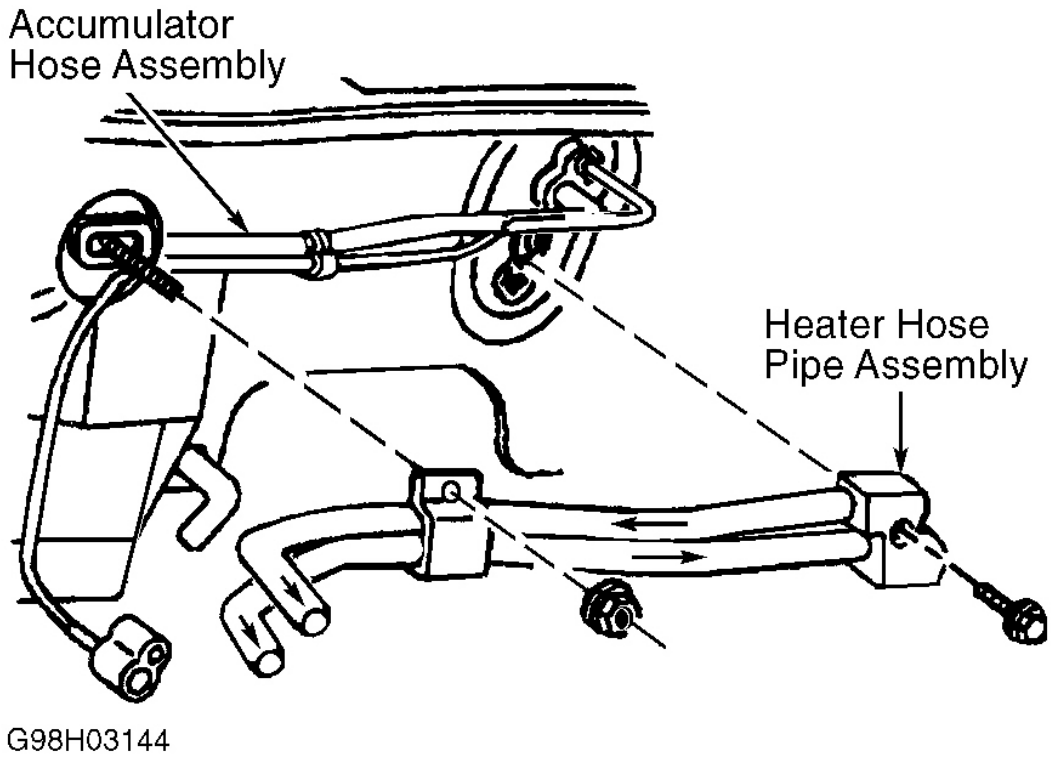


Fig. 9: Heater Hose & Accumulator Hose Assemblies
Courtesy of GENERAL MOTORS CORP.

3. Remove center console. Remove I/P (instrument panel) accessory trim plate. See **HVAC CONTROL HEAD (PANEL)** . Remove rear hatch/fog light switch by prying on lower edge to release locking tab. Remove screws/nuts for driver side knee bolster. Pull on knee bolster trim panel to release clips. Disconnect inside air temperature sensor connector if equipped.
4. Open I/P compartment door. Remove trim plugs at bottom of door. Disconnect I/P compartment switch connector. Remove I/P compartment upper/lower and side attaching bolts. Remove I/P compartment. Gently pry on defroster grille to remove. Disconnect sun load sensor and DRL (daytime running lamps) connectors, if equipped. Move sensor connectors to defroster duct for additional clearance for I/P upper

trim pad removal.

5. Remove windshield side molding garnishes by firmly pulling away from "A" pillar. Remove screws attaching upper trim pad to defroster duct and both hinge pillars.
6. Remove screws attaching I/P cluster bezel to upper trim pad. Remove screws attaching upper trim pad to knee bolster bracket and center support bracket. Remove screws attaching upper trim pad to passenger SIR bracket. See **Fig. 10** .

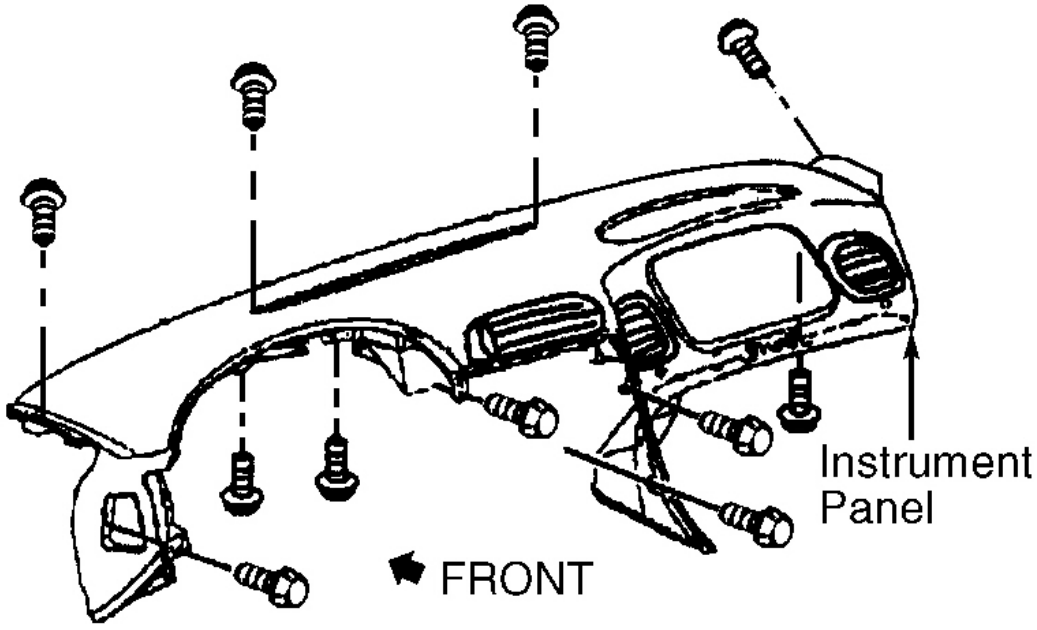


Fig. 10: Removing Upper Trim Pad
Courtesy of GENERAL MOTORS CORP.

7. Tilt steering wheel to lowest position. Lift rearward edge of upper trim pad to clear air distribution duct and slowly move rearwards and away from lower edge of windshield. Disconnect hazard warning switch connector. Remove upper trim pad from vehicle. Disconnect electrical connector from I/P cluster assembly. Remove screws between I/P cluster and steering column bracket. Remove I/P cluster assembly.
8. Remove left and right inboard side window glass defroster ducts from windshield defroster duct. Disconnect sun load and DRL harnesses from defroster duct, if equipped. Remove windshield defroster duct from HVAC module. Remove intake air temperature sensor duct and muffler assembly from module.
9. Disconnect electrical connector from passenger-side SIR module. Remove passenger knee bolster to center support bracket bolts. Remove bolts attaching SIR module bracket to lower support beam. Remove bolts attaching SIR module bracket to upper support beam. Remove passenger SIR module and bracket.
10. On automatic transmission equipped models, undo clips to housing and disconnect cable to remove

park/lock control cable. Remove connector from SIR sensing and diagnostic module (Yellow connector). Remove ignition switch housing bolts and reposition aside.

11. Remove bolts connecting center support bracket to driveline tunnel. Remove bolts attaching center support to passenger knee bolster bracket, and lower support beam. Remove bolt attaching ignition switch housing bracket to steering column bracket. Slowly pull center support bracket rearward to access radio and HVAC control head connectors. Disconnect radio and HVAC control head connectors/harness retainers and park/lock cable clip. Remove bolts attaching ignition switch housing bracket to center support, and remove ignition switch housing bracket. Remove I/P harness from center support bracket. Remove center support bracket from vehicle. See **Fig. 7** .
12. Remove drivers knee bolster. Remove driver-side hush panel. Remove left-side floor air duct from HVAC module. Remove passenger-side hush panel. Unsnap lower right-side floor air duct from upper right-side air duct. Remove upper right-side floor air duct.
13. Disconnect blower motor and remove. See BLOWER MOTOR. Disconnect electrical connector from temperature door motor. Disconnect electrical connector to vacuum solenoid assembly if equipped. Disconnect vacuum source line connection from I/P harness. Remove LH and RH rear floor air ducts from HVAC module.
14. Remove bolts and nuts retaining HVAC module to bulkhead and I/P brace. Remove HVAC module from vehicle. Remove and discard air inlet, drain and plumbing seals.
15. To install, reverse removal procedures. Replace all seals. Evacuate and charge A/C system. Fill cooling system.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

Application	**Ft. Lbs. (N.m)**
A/C Compressor Mounting Bolt	37 (50)
A/C Compressor Line Bolt	19 (26)
Accumulator Line Fitting	30 (41)
Compressor-To-Condenser Line Fitting	17 (23)
Evaporator-To-Condenser Line Fitting	20 (27)
	INCH Lbs. (N.m)
A/C Pressure Sensor	42 (5)
Accumulator Clamp Bracket Bolt	89 (10)
Blower Motor Resistor Screw	14 (2)

WIRING DIAGRAM

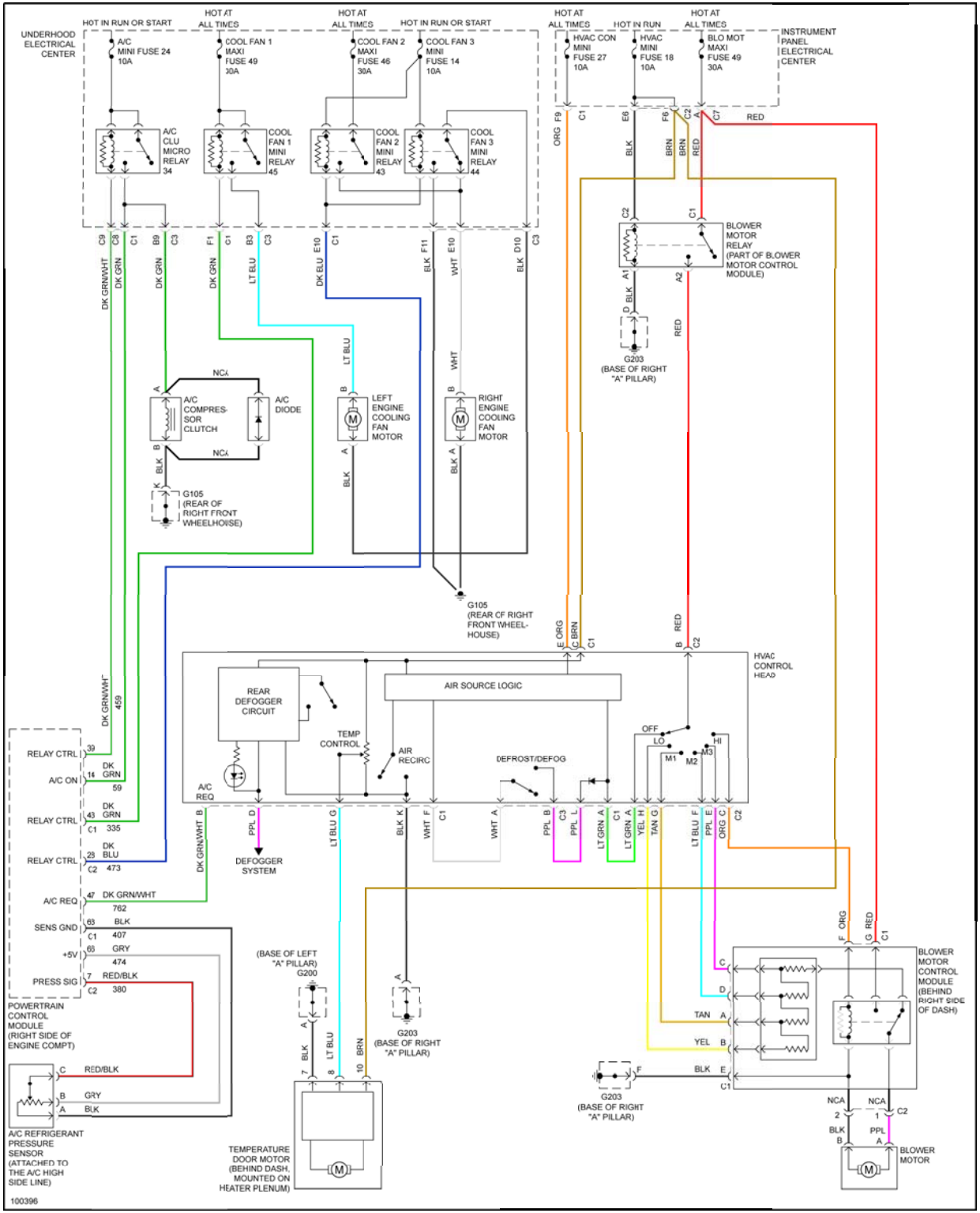

HOT IN RUN OR START
HOT AT ALL TIMES
HOT AT ALL TIMES
HOT IN RUN OR START
HOT AT ALL TIMES
HOT IN RUN
HOT AT ALL TIMES
UNDERHOOD ELECTRICAL CENTER
A/C MINI FUSE 24 10A
COOL FAN 1 MAXI FUSE 49 30A
COOL FAN 2 MAXI FUSE 46 30A
COOL FAN 3 MINI FUSE 14 10A
HVAC CON MINI FUSE 27 10A
HVAC MINI FUSE 18 10A
BLO MOT MAXI FUSE 49 30A
INSTRUMENT PANEL ELECTRICAL CENTER
A/C CLU MICRO RELAY 34
COOL FAN 1 MINI RELAY 45
COOL FAN 2 MINI RELAY 43
COOL FAN 3 MINI RELAY 44
BLOWER MOTOR RELAY (PART OF BLOWER MOTOR CONTROL MODULE)
G203 (BASE OF RIGHT "A" PILLAR)
A/C COMPRES-SOR CLUTCH
A/C DIODE
NCA
G105 (REAR OF RIGHT FRONT WHEELHOUSE)
LEFT ENGINE COOLING FAN MOTOR
RIGHT ENGINE COOLING FAN MOTOR
G105 (REAR CF RIGHT FRONT WHEEL-HOUSE)
HVAC CONTROL HEAD
REAR DEFOGGER CIRCUIT
AIR SOURCE LOGIC
TEMP CONTROL
AIR RECIRC
DEFROST/DEFOG
OFF
LO
HI
M1
M2
M3
A/C REQ
DEFOGGER SYSTEM
RELAY CTRL
A/C ON
RELAY CTRL
RELAY CTRL
A/C REQ
SENS GND
+5V
PRESS SIG
POWERTRAIN CONTROL MODULE (RIGHT SIDE OF ENGINE COMPT)
A/C REFRIGERANT PRESSURE SENSOR (ATTACHED TO THE A/C HIGH SIDE LINE)
(BASE OF LEFT "A" PILLAR) G200
G203 (BASE OF RIGHT "A" PILLAR)
TEMPERATURE DOOR MOTOR (BEHIND DASH, MOUNTED ON HEATER PLENUM)
BLOWER MOTOR CONTROL MODULE (BEHIND RIGHT SIDE OF DASH)
BLOWER MOTOR
100396

Fig. 11: Manual A/C-Heater System Wiring Diagram