

A/C-HEATER SYSTEM - MANUAL

Article Text

1993 Honda Prelude

For Cadi Centre Nsk CA 95051

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ARTICLE BEGINNING

1993 Heater Systems

Prelude

A/C SYSTEM SPECIFICATIONS

SPECIFICATIONS TABLE

AA
Application Specification

Compressor Type Sanden Scroll
Compressor Belt Deflection (1)
 New 13/64-9/32" (5-7 mm)
 Used 25/64-15/32" (10-12 mm)
System Oil Capacity (2) 4.3-5.0 ozs.
Refrigerant Capacity (3) 21-23 ozs.
System Operating Pressures (4)

- (1) - With 22 lbs. (10 kg) pressure applied to center of belt.
- (2) - Use PAG Refrigerant Oil (Part No. 38899-P13-003).
- (3) - Use R-134a refrigerant.
- (4) - See A/C SYSTEM PERFORMANCE test. See Fig. 5.

AA

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

CAUTION: Before disconnecting battery, removing fuse No. 43 or radio, obtain anti-theft code number from owner. After servicing, turn radio on. Word CODE will be displayed. Enter 5-digit code to restore radio operation.

DESCRIPTION

System is a cycling-clutch type with an expansion valve. Refrigerant system components include compressor, condenser, receiver-drier and evaporator. See Fig. 1. Evaporator case contains evaporator, expansion valve and A/C thermostat. Compressor clutch control components include Electronic Control Module (ECM), A/C compressor clutch relay, A/C pressure switch, A/C thermostat and compressor thermal protector. See ELECTRICAL COMPONENT LOCATIONS table.

Blower case contains blower motor, blower resistor,

ELECTRICAL COMPONENT LOCATIONS TABLE

Component	Location
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Diagram illustrating the front of a vehicle showing the A/C system components. The components are labeled as follows:

- Blower Case
- Evaporator Case
- Heater Case
- Sight Glass
- A/C Pressure Switch
- Receiver-Drier
- Condenser
- Compressor

A/C-HEATER SYSTEM

OPERATION

BLOWER MOTOR CONTROL

Blower motor power is supplied through contacts of blower motor relay. With blower switch in positions No. 1, 2 and 3, blower motor is grounded through blower resistors, reducing voltage to blower motor. With blower switch in maximum position, blower motor ground circuit by-passes blower resistors, allowing full battery voltage to blower motor.

RECIRCULATED/FRESH AIR CONTROL

Recirculated/fresh air control buttons on control panel control voltage to recirculated/fresh air door motor. Motor controls door position. In recirculated position, air from outside is shut off, and passenger compartment air enters blower case. In fresh position, outside air enters blower case.

TEMPERATURE CONTROL

Temperature lever on control panel operates 2 cables. One cable controls position of air mix door to direct air through or around heater core. Other cable controls position of heater water valve.

AIRFLOW MODE CONTROL

Airflow mode buttons on control panel control voltage to airflow mode door motor. Airflow mode door motor controls positions of 3 airflow mode doors. See Fig. 2. Door positions determine airflow modes (vent, heat/vent, heat, heat/defrost and defrost).

COMPRESSOR CLUTCH CONTROL

Power for compressor clutch is supplied through contacts of A/C clutch relay. If ECM receives A/C request signal, ECM grounds solenoid circuit of A/C clutch relay. ECM receives A/C request signal if all of following conditions exists:

- * Blower switch is on.
- * A/C switch is on.
- * A/C thermostat contacts are closed (contacts open if evaporator temperature approaches freezing).
- * A/C pressure switch contacts are closed.

CONDENSER FAN CONTROL

Power for condenser fan is supplied through contacts of condenser fan relay. Fan timer unit and ECM control the solenoid circuit of condenser fan relay. Condenser fan is on left side of radiator.

RADIATOR FAN CONTROL

Power for radiator fan is supplied through contacts of radiator fan relay. Fan timer unit and ECM control the solenoid circuit of radiator fan relay. Radiator fan is on right side of radiator.

ADJUSTMENTS

NOTE: For adjustments not covered in this article, see information in **HEATER SYSTEM** article.

DEFROST BLEED

1) Position of defrost door can be adjusted so no airflow or as much as 20 percent of airflow is distributed to defrost ducts when airflow control is in heat mode.

2) To adjust position of defrost door, turn ignition on. Set airflow control to heat mode. At airflow mode control motor, on left side of heater case, loosen adjusting screw at linkage. See Fig. 2. Adjust linkage to obtain desired amount of airflow. Tighten adjusting screw.

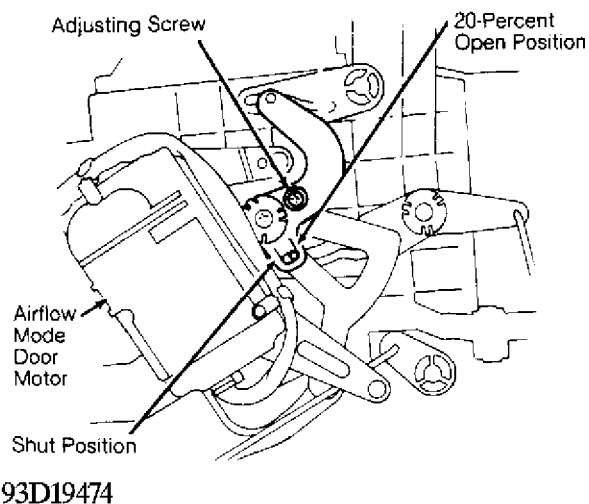


Fig. 2: Adjusting Defrost Bleed
Courtesy of American Honda Motor Co.

TROUBLE SHOOTING

* PLEASE READ THIS FIRST *

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

NOTE: For problems concerning blower motor, airflow mode (function) control and recirculated/fresh air control, see HEATER SYSTEM article.

RADIATOR FAN INOPERATIVE

1) Check fuse No. 47 (15-amp) in engine compartment fuse/relay block. If the fuse is okay, test radiator fan relay. See RELAY TEST under TESTING. If relay is okay, check voltage at terminal No. 4 of radiator fan relay socket. See Fig. 3.

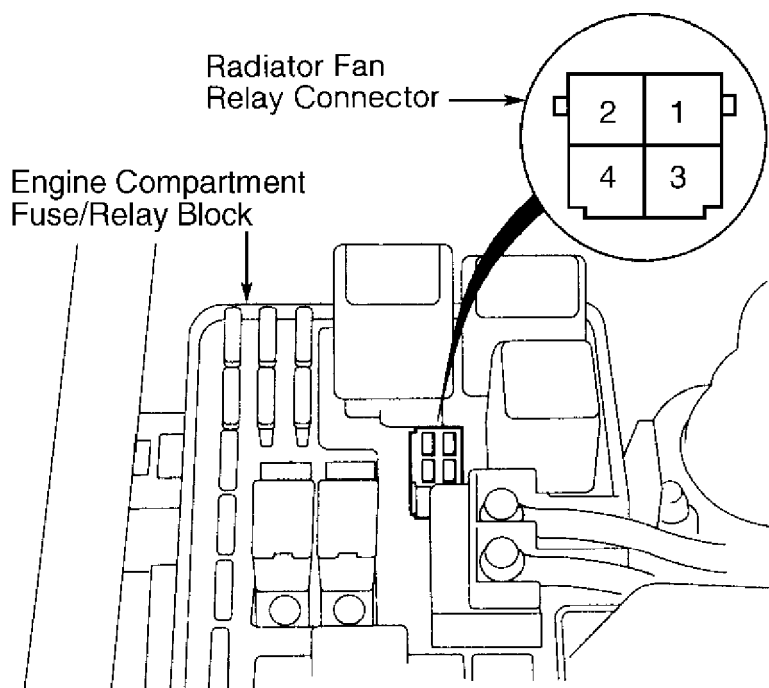
2) If battery voltage is not present, replace engine compartment fuse/relay block. If battery voltage is present, connect jumper wire between terminals No. 2 and 4 of radiator fan relay socket. If radiator fan runs, go to step 5). If radiator fan does not run, go to next step.

3) Disconnect jumper wire. Disconnect radiator fan connector. Check continuity of Blue/Black wire between radiator fan relay terminal No. 2 socket and radiator fan. If continuity is not present, repair wire. If continuity is present, go to next step.

4) Check continuity of Black wire between radiator fan motor and chassis ground. If continuity is present, replace radiator fan motor. If continuity is not present, repair open Black wire between radiator fan and ground. If wire is okay, check for poor ground.

5) Disconnect jumper wire. Turn ignition on. Check voltage at terminal No. 3 of radiator fan relay socket. See Fig. 3. If battery voltage is present, repair open Blue/Red wire between radiator fan relay connector terminal No. 1 and A/C diode.

6) If battery voltage is not present, check voltage at Yellow wire terminal of fan timer connector. See Fig. 6. If battery voltage is not present, go to FAN TIMER INPUT TEST under TESTING. If battery voltage is present, repair open Yellow wire between fan timer unit and radiator fan relay connector terminal No. 3.



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Fig. 3: Radiator Fan Relay Connector Terminal ID
 Courtesy of American Honda Motor Co.

CONDENSER FAN INOPERATIVE

1) Check fuse No. 45 (15-amp) in engine compartment fuse/relay block. If fuse is okay, test the condenser fan relay. See RELAY TEST under TESTING. If relay is okay, check voltage at White/Green (or White) wire terminal of condenser fan relay connector.

2) If battery voltage is not present, repair open White/Green (or White) wire between engine compartment fuse/relay block and condenser fan relay. If battery voltage is present, connect jumper wire between White/Green (or White) wire terminal and Blue/Yellow wire terminal of condenser fan relay connector. If condenser fan runs, go to step 5).

3) If condenser fan does not run, disconnect jumper wire. Disconnect condenser fan connector. Check continuity of Blue/Yellow wire between condenser fan relay and condenser fan.

4) If continuity is not present, repair Blue/Yellow wire. If continuity is present, check continuity of Black wire between condenser fan motor and chassis ground. If continuity is not present, repair Black wire. If continuity is present, replace condenser fan

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5) Disconnect jumper wire. Turn ignition on. Check voltage at Yellow/White wire terminal of condenser fan relay connector. If battery voltage is present, repair open Blue/Red (or Blue) wire between condenser fan relay and A/C diode.

6) If battery voltage is not present, check voltage at Yellow/White wire terminal of fan timer unit connector. See Fig. 6. If battery voltage is not present, see FAN TIMER INPUT TEST under TESTING. If battery voltage is present, repair open Yellow/White wire between fan timer and condenser fan relay.

BOTH COOLING FANS INOPERATIVE FOR ENGINE COOLING, BUT OKAY
FOR A/C

1) Disconnect coolant temperature switch "A" 2-pin connector. Turn on ignition. Check voltage at Blue/Red wire terminal of coolant temperature switch "A" connector. If battery voltage is not present, repair open Blue/Red wire between coolant temperature switch "A" and radiator or condenser fan relays.

2) If battery voltage is present, turn ignition off. Check continuity of Black wire between coolant temperature switch "A" and chassis ground. If continuity is not present, repair Black wire. If continuity is present, feel lower radiator hose. If hose is hot, replace coolant temperature switch "A". If hose is not hot, repair restriction in cooling system.

BOTH COOLING FANS ALWAYS INOPERATIVE

1) Check fuse No. 9 (15-amp) in passenger compartment fuse/relay block. Check fuses No. 45 (15-amp) and No. 47 (15-amp) in engine compartment fuse/relay block. If fuses are okay, disconnect electrical connectors from A/C pressure switch and A/C diode. Check continuity of Blue/Black wire between A/C pressure switch and A/C diode.

2) If continuity is not present, repair Blue/Black wire. If continuity is present, check A/C diode. See A/C DIODE TEST under TESTING. If A/C diode is okay, disconnect condenser fan relay connector. Check continuity of Blue/Red wire between A/C diode and condenser fan relay.

3) If continuity is not present, repair Blue/Red wire. If continuity is present, disconnect fan timer unit connector. Check continuity of Black wire between fan timer unit and chassis ground.

4) If continuity is not present, repair Black wire. If continuity is present, turn ignition on. Check voltage at terminal No. 3 (Black/Yellow wire) of fan timer unit connector. See Fig. 6. If battery voltage is not present, repair Black/Yellow wire. If battery voltage is present, replace fan timer.

COMPRESSOR CLUTCH DOES NOT ENGAGE (COOLING FANS OKAY)

1) Check fuse No. 11 (10-amp) in passenger compartment fuse/relay block. If fuse is okay, turn ignition on. Disconnect 2-pin A/C thermostat connector. Connect jumper wire between terminals of A/C

thermostat harness connector. Start engine and turn on A/C and heater fan switch.

2) If compressor clutch engages, replace A/C thermostat. If compressor clutch does not engage, turn engine off. Remove and test A/C compressor clutch relay. See RELAY TEST under TESTING. If relay is okay, go to next step.

3) Check battery voltage at Yellow/Black (or Black/Yellow) wire of A/C compressor clutch relay connector. See Fig. 4. If battery voltage is not present, repair Black/Yellow (or Yellow/Black) wire between fuse/relay block and relay. If battery voltage is present, go to next step.

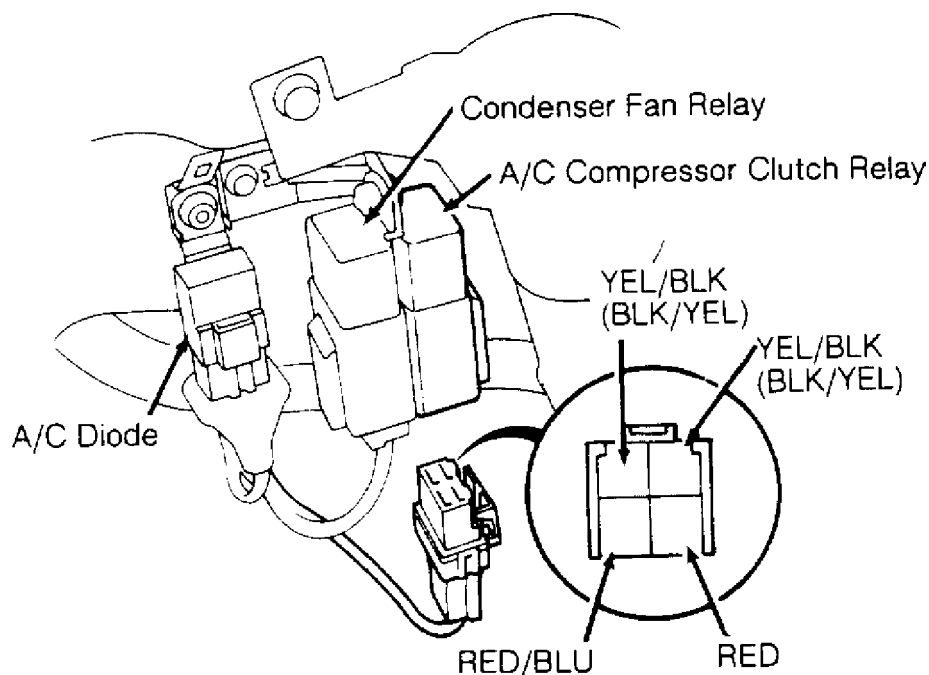
4) Using a jumper wire, jumper between Yellow/Black (or Black/Yellow) and Red wire terminals of A/C compressor clutch relay connector. Start engine. If compressor clutch engages, go to step 6). If compressor clutch does not engage, disconnect jumper wire. Turn ignition off.

5) Disconnect the compressor clutch connector. Check continuity of Red wire between A/C compressor clutch relay and compressor clutch. If continuity does not exist, repair open Red wire. If continuity exists, check compressor clutch clearance. Refer to the A/C COMPRESSOR SERVICING article in this section. If clearance is okay, check compressor clutch coil. See COMPRESSOR CLUTCH COIL TEST under TESTING.

6) Disconnect jumper wire. Check battery voltage at Yellow/Black (or Black/Yellow) wire terminal of A/C compressor clutch relay. See Fig. 4. If battery voltage is not present, repair Yellow/Black (or Black/Yellow) wire between fuse/relay block and relay. If battery voltage is present, turn off ignition. Reconnect A/C compressor clutch relay connector.

7) Turn ignition on. Check voltage at Red/Blue wire terminal (A15) of ECM 26-pin connector. If battery voltage is not present, repair open Red/Blue wire between A/C compressor clutch relay and ECM. If battery voltage is present, go to next step.

8) Turn off A/C switch and blower switch. Check voltage at Blue/Black wire terminal (B5) of ECM 22-pin connector. If battery voltage is not present, repair open Blue/Black wire between A/C diode and ECM. If battery voltage is present, substitute a known good ECM and retest.



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Fig. 4: Compressor Clutch Relay Connector Terminal ID
Courtesy of American Honda Motor Co.

COMPRESSOR CLUTCH DOES NOT ENGAGE & COOLING FANS INOPERATIVE

NOTE: Check A/C refrigerant pressure before proceeding with this test.

1) Check fuses No. 9 (15-amp) and No. 11 (10-amp) in passenger compartment fuse/relay block. If fuses are okay, disconnect A/C pressure switch connector. Turn ignition on. Check voltage at Blue/Black wire terminal of A/C pressure switch connector.

2) If battery voltage is not present, repair open Blue/Black wire between A/C diode and A/C pressure switch. If battery voltage is present, turn ignition off. Check continuity across terminals of A/C pressure switch. If continuity does not exist, replace A/C pressure switch. If continuity exists, go to next step.

3) Disconnect A/C pressure switch connector. Disconnect A/C thermostat connector. Check battery voltage at Blue/Yellow wire terminal of A/C thermostat connector. If battery voltage is not present, repair open Blue/Yellow wire between A/C pressure switch and A/C thermostat. If battery voltage is present, go to next step.

4) Turn ignition off. Check continuity across terminals of A/C thermostat. If continuity does not exist, replace A/C thermostat. If continuity exists, remove radio. Disconnect 16-pin connector from A/C-heater control panel.

5) Check continuity in Blue/Red wire between A/C thermostat

and A/C-heater control panel 16-pin connector. If continuity does not exist, repair open Blue/Red wire. If continuity exists, test A/C switch. See A/C SWITCH TEST under TESTING. If A/C switch is okay, go to next step.

6) Disconnect A/C-heater control panel 7-pin connector. Check continuity of Green wire between A/C-heater control panel 7-pin and 16-pin connectors. If continuity does not exist, repair open Green wire. If continuity exists, go to next step.

7) Check continuity of Black wire between 7-pin connector and chassis ground. If continuity exists, replace blower switch. If continuity does not exist, repair open Black wire between heater fan switch and ground. If wire is okay, check for poor ground connection.

TESTING

* PLEASE READ THIS FIRST *

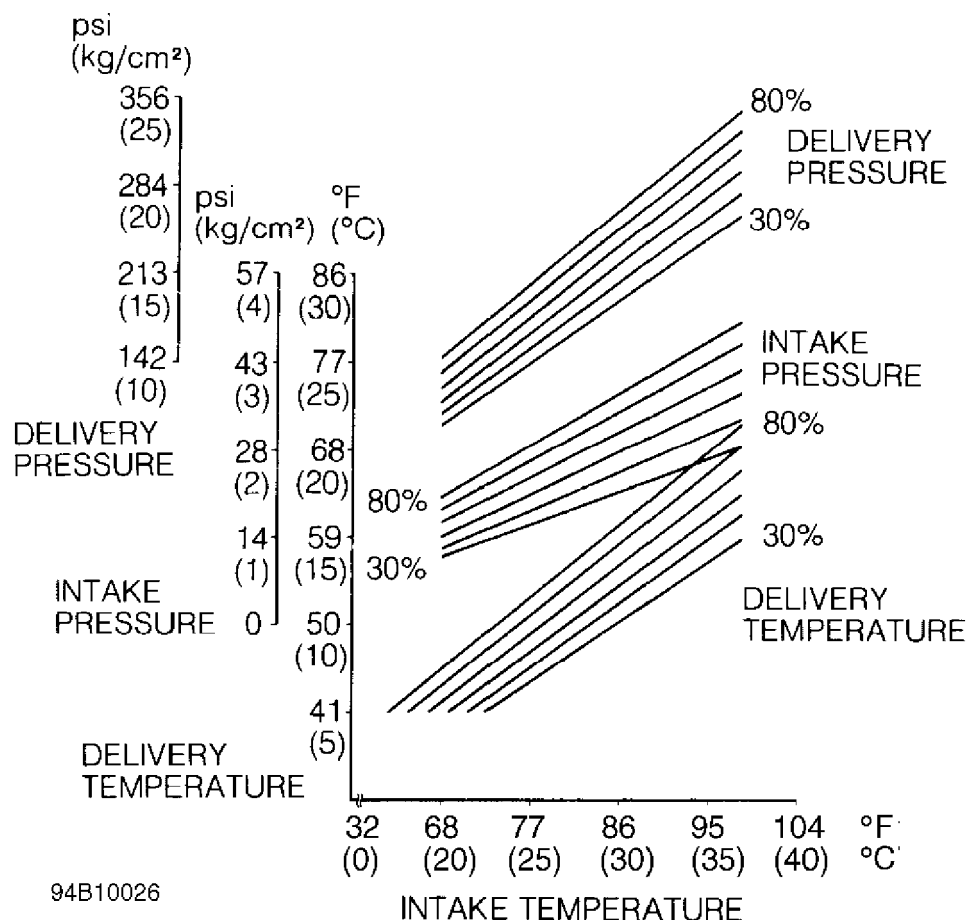
WARNING: To avoid injury from accidental air bag deployment, read and carefully follow all SERVICE PRECAUTIONS and DISABLING & ACTIVATING AIR BAG SYSTEM procedures in the AIR BAG RESTRAINT SYSTEM article in the ACCESSORIES/SAFETY EQUIP section.

A/C SYSTEM PERFORMANCE

1) Park vehicle out of direct sunlight. Open engine hood and front doors. Install A/C pressure gauges to the high and low side pressure ports of system. Determine relative humidity and ambient air temperature.

2) Set temperature control to maximum cool, mode control to vent and recirculation control to recirculate positions. Insert thermometer in center vent outlet. Turn blower fan switch to highest position. Start and run engine at 1500 RPM. Ensure there is nobody inside vehicle.

3) After running A/C for 10 minutes, check thermometer reading in center vent outlet and the high and low side system pressure to determine if A/C system is operating within range. See Fig. 5.



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Fig. 5: A/C System Performance Test Chart
Courtesy of American Honda Motor Co., Inc.

FAN TIMER INPUT TEST

1) Turn ignition on. With fan timer connector attached to unit, test each wire at fan timer connector as follows.

2) Check voltage at terminal No. 1 (Black wire). See Fig. 6. If less than one volt is present, go to next step. If one or more volts are present, repair open Black wire.

3) Check voltage at terminal No. 7 (White/Green wire). If battery voltage is present, go to next step. If battery voltage is not present, check fuse No. 45 in engine compartment fuse/relay block. If fuse is okay, repair open White/Green wire.

4) Check voltage at terminal No. 6 (Black/Yellow wire). If battery voltage is present, go to next step. If battery voltage is not present, check fuse No. 19 (No. 23 on vehicles with air bag) in passenger compartment fuse/relay block. If fuse is okay, repair open Black/Yellow wire.

5) Check voltage at terminal No. 3 (Black/Yellow wire). If battery voltage is present, go to next step. If battery voltage is not present, check fuse No. 9 in passenger compartment fuse/relay block.

If fuse is okay, repair open Black/Yellow wire.

6) Check voltage at terminal No. 2 (Yellow/White wire). If battery voltage is present, go to next step. If battery voltage is not present, replace fan timer.

CAUTION: Before replacing fan unit, check for a short to ground in Yellow/White wire between fan timer and condenser fan relay, and in Yellow wire between fan timer and radiator fan relay. If a short to ground exists in these circuits, fan timer will be damaged.

7) Check voltage at terminal No. 4 (Yellow wire). If battery voltage is present, go to next step. If battery voltage is not present, replace fan timer.

8) Connect jumper wire between terminal No. 5 (Blue/Red wire) and ground. If condenser and radiator fans come on, go to next step. If condenser and radiator fans do not come on, check for open Blue/Red wire between fan timer and condenser and radiator fan relays. If Blue/Red wire is okay, check for open Yellow/White wire between fan timer and condenser fan relay, and in Yellow wire between fan timer and radiator fan relay. If wires are okay, replace condenser fan relay or radiator fan relay as necessary.

9) Ensure coolant temperature is less than 220°F (106°C). Check voltage at terminal No. 8 (White/Yellow wire). If 11 volts is present, fan timer inputs are okay. If 11 volts is not present, check continuity across connector terminals of coolant temperature switch "B". If there is no continuity, replace switch. If continuity exists, check for short to ground in White/Yellow wire between fan timer and coolant temperature switch "B". If White/Yellow wire is okay, replace fan timer.

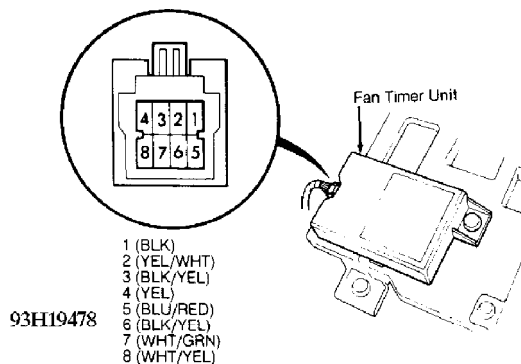


Fig. 6: Fan Timer Connector Terminal ID
Courtesy of American Honda Motor Co.

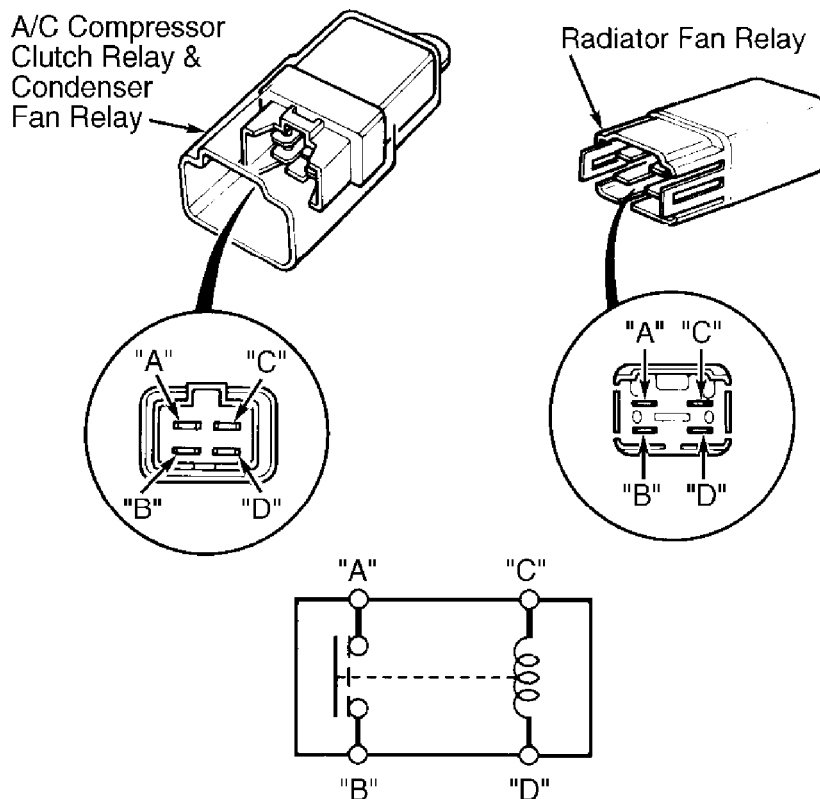
A/C THERMOSTAT TEST

1) Remove A/C thermostat. See EVAPORATOR, A/C THERMOSTAT & EXPANSION VALVE under REMOVAL & INSTALLATION. Connect ohmmeter across switch connector terminals. Dip capillary tube of thermostat into ice cold water.

2) As ohmmeter reading suddenly (not gradually) changes, note temperatures at which switch contacts open (cut-off) and close (cut-in). Cut-off temperature should be 31-35°F (0.5-1.5°C). Cut-in temperature should be 36-41°F (2.5-5.0°C). If cut-off and cut-in temperatures are not as specified, replace switch.

RELAY TEST

Compressor Clutch, Condenser Fan & Radiator Fan Relays - Disconnect connector of relay to be tested. Check continuity between relay terminals "A" and "B". See Fig. 7. If continuity exists, replace relay. If continuity does not exist, apply battery voltage across terminals "C" and "D". Check continuity across terminals "A" and "B". If continuity does not exist, replace relay. If continuity exists, relay is okay.

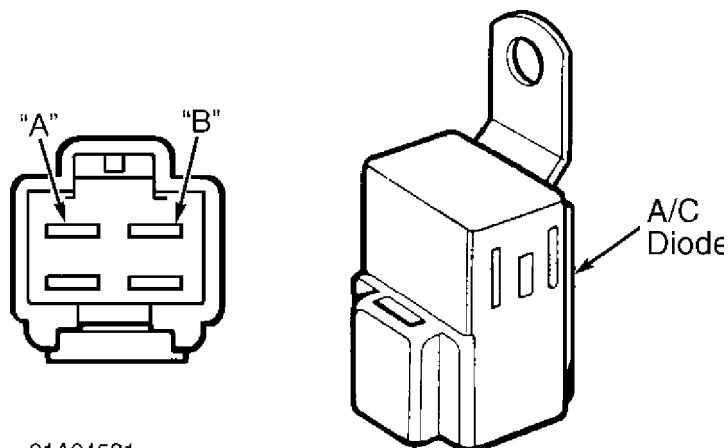


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Fig. 7: Relay Connector Terminal ID
Courtesy of American Honda Motor Co.

A/C DIODE TEST

Check continuity between terminals "A" and "B" of A/C diode. See Fig. 8. Check continuity in both directions. Continuity should be present in one direction only. Replace A/C diode if continuity is not as specified.

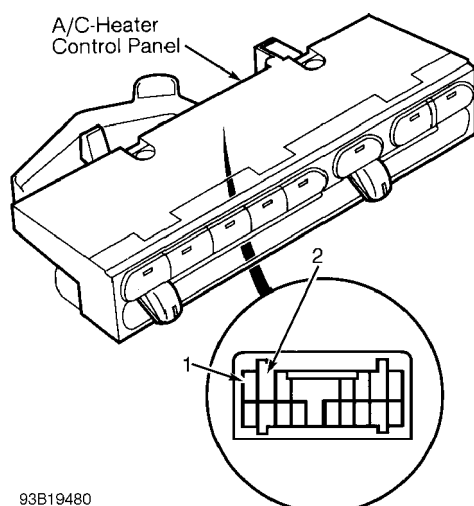


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Fig. 8: Testing A/C Diode
Courtesy of American Honda Motor Co.

A/C SWITCH TEST

Remove A/C switch from control panel. With A/C switch off, continuity should not exist between A/C switch connector terminals No. 1 and 2. See Fig. 9. With A/C switch on, continuity should exist between terminals No. 1 and 2. If continuity is not as specified, replace switch.



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Fig. 9: Testing A/C Switch
Courtesy of American Honda Motor Co.

COMPRESSOR CLUTCH COIL TEST

Ensure compressor thermal protector is okay. See COMPRESSOR THERMAL PROTECTOR TEST. Check resistance between clutch connector and compressor body (ground). Replace clutch coil if resistance is not 3.1-3.4 ohms at 68°F (20°C).

COMPRESSOR THERMAL PROTECTOR TEST

Check continuity between compressor thermal protector terminals (on compressor). If continuity does not exist, replace compressor thermal protector.

REMOVAL & INSTALLATION

* PLEASE READ THIS FIRST *

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

2) Remove visor and Black face panel from instrument panel. Remove glove box. Remove passenger-side air bag assembly. Store assembly with pad facing upward. Remove air bag assembly stay and bracket. Disconnect A/C thermostat connector. Remove evaporator case bolts and evaporator case.

Installation

To install, reverse removal procedure. Evacuate and charge A/C system.

EVAPORATOR, A/C THERMOSTAT & EXPANSION VALVE

Removal

Remove evaporator case. Note where A/C thermostat sensor is inserted into evaporator fins. See Fig. 10. Pull A/C thermostat sensor out of evaporator fins. Remove screws and clips securing case halves together. Carefully separate case halves. Remove evaporator and A/C thermostat. Remove expansion valve, backing up fittings with wrench to prevent tube breakage.

To install, reverse removal procedure. Ensure A/C thermostat sensor is inserted into evaporator fins in its original location. See Fig. 10. If replacing evaporator, add one ounce of refrigerant oil to evaporator. Evacuate and charge A/C system.

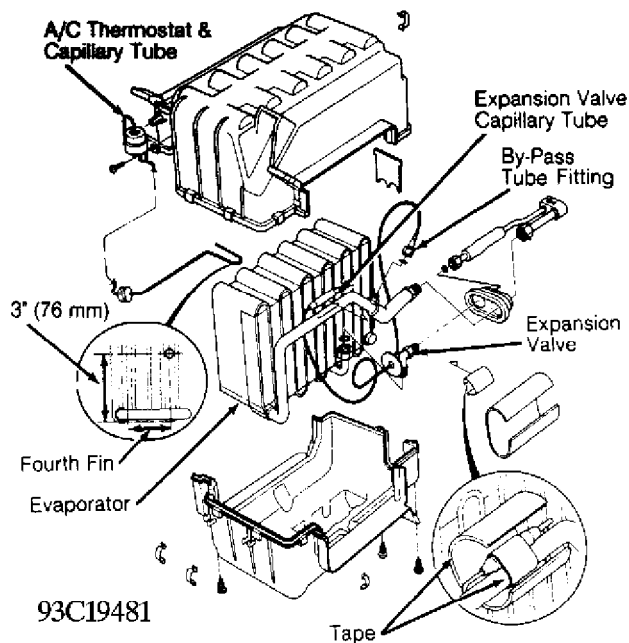


Fig. 10: Exploded View Of Evaporator Case
 Courtesy of American Honda Motor Co.

COMPRESSOR THERMAL PROTECTOR

Removal & Installation

Remove thermal protector from compressor. It is not necessary to discharge refrigerant to remove compressor thermal protector. Apply silicone sealant to outer edge of compressor thermal protector before installing.

WIRING DIAGRAM

TORQUE SPECIFICATIONS TABLE

AA

Application Ft. Lbs. (N.m)

Compressor Bracket-To-Engine Bolt/Nut	36 (49)
Compressor-To-Compressor Bracket Bolt	16 (22)
Heater Case-To-Firewall Nut (1)	16 (22)
Refrigerant Pipe Connections	
At Compressor	16 (22)
At Hose Bracket (Above Radiator)	
Discharge	17 (23)
Suction	24 (33)
Inside Evaporator	
At By-Pass Tube	10 (14)
At Expansion Valve	17 (23)

INCH Lbs. (N.m)

Blower Case Bolt/Nut	89 (10)
Evaporator Case Bolt/Nut	89 (10)
Heater Case Bolt/Nut (2)	89 (10)
Passenger-Side Air Bag Assembly Nut	89 (10)
Refrigerant Pipe Connections	89 (10)

- (1) - In engine compartment.
- (2) - In passenger compartment.

AA

END OF ARTICLE