

# A/C-HEATER SYSTEM - MANUAL

1990 Nissan 240SX

1990 Manual A/C-Heater Systems

240SX

## \* PLEASE READ THIS FIRST \*

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

## DESCRIPTION

A separate evaporator housing assembly is combined with a standard heater core assembly to create an integrated A/C-heating unit. Blower motor directs airflow through evaporator and then through the heater core to ducting and outlets.

## OPERATION

### CONTROL PANEL & SYSTEM

Desired air control mode is achieved by push buttons, turn-dial or lever-type controls on A/C-heater control panel. Air intake control can be set for RECIR (recirculated) or OUTSIDE air entry. A/C switch and fan controls are independent of mode controls. See Fig. 1. System operation for lever-type control panel are as follows:

VENT/RECIR Mode; A/C OFF, Fan ON; COLD Temp. Setting

Recirculated air discharged through dashboard outlets. No outside air entry. No temperature variation. Heater control valve closed.

VENT/RECIR Mode; A/C ON; Fan ON; COLD Temp. Setting

Air discharged (recirculated) at cold temperature. Heater control valve closed. Fast idle actuator on. Air discharged through dashboard outlets.

VENT/OUTSIDE Mode; A/C OFF; Fan ON

Outside air drawn in. Heater control valve closed. Fast idle actuator off. Discharged air temperature same as outside air. Air discharged through dashboard outlets.

BI-LEVEL/OUTSIDE Mode; A/C OFF; Fan ON

Outside air drawn in. Floor and dashboard outlet air is warm-to-cool, depending on temperature lever setting. Heater control valve open-to-closed, depending on temperature lever setting.

HEAT/OUTSIDE Mode; A/C OFF; Fan ON; HEAT Temp. Setting

Outside air drawn in. Floor outlet air warm-to-cool, depending on temperature lever setting. Heater control valve open, depending on temperature lever setting. If equipped, a fresh air ventilation lever may be pushed to allow outside cool air to face-vent outlets while still allowing heated air to floor outlets.

DEF/OUTSIDE Mode; A/C OFF; Fan ON; HEAT Temp. Setting

Outside air drawn in. Defroster outlet air cool-to-warm, depending on temperature lever setting. Heater control valve open, depending on temperature lever setting. A/C compressor operates

intermittently to stabilize interior windshield air temperature and reduce fogging of windshield.

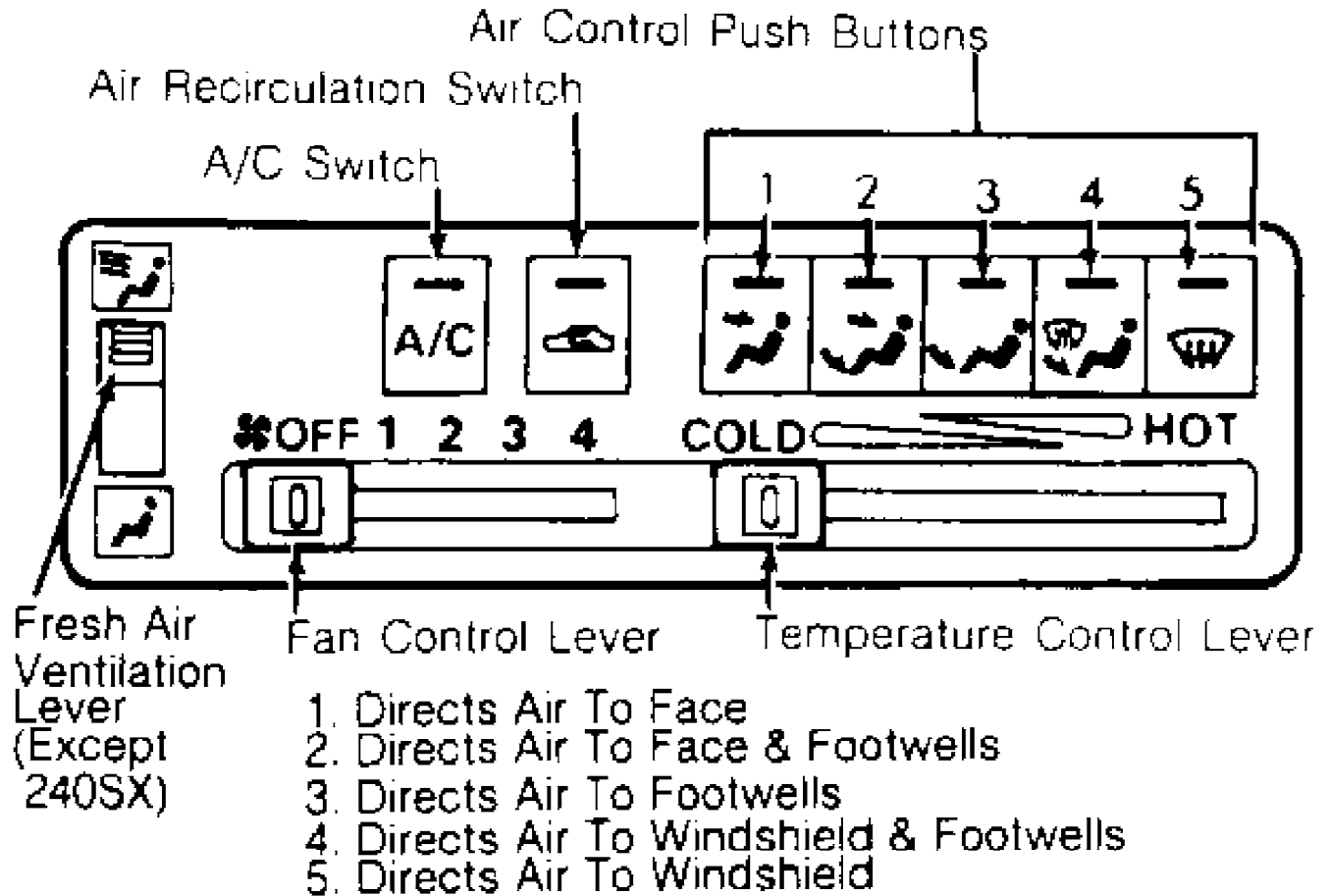


Fig. 1: Identifying A/C-Heater Control Panel  
 Courtesy of Nissan Motor Co., U.S.A.

### CONDENSER & COOLING FAN RELAYS

Condenser and radiator cooling fan relays have Blue outer case and are located within engine compartment relay boxes. Condenser fan is controlled through A/C relay.

Typical system consists of condenser and radiator cooling fans controlled by 3 relays. Relay No. 1 is used low-speed operation, while relay No. 2 and relay No. 3 are for high-speed operation. Relay grounds are controlled by Engine Concentrated Control System (ECCS).

### HIGH & LOW PRESSURE CUT-OFF SWITCH

The high and low (dual) pressure cut-off switch, normally mounted on receiver-drier, protects A/C system from high pressure build-up (due to restriction, overcharge or compressor malfunction). If excessively low or high system pressure is sensed, the switch electrically stops compressor clutch operation.

### HIGH PRESSURE/TEMPERATURE RELIEF VALVE

A high pressure/temperature relief valve is mounted on receiver-drier. When high pressure of 540 psi (38 kg/cm<sup>2</sup>) or temperature of 210°F (105°C) is sensed, relief valve opens, venting refrigerant to atmosphere.

### **THERMO CONTROL UNIT**

An electrical thermo control unit is mounted on evaporator housing. A temperature sensor (thermistor), inside evaporator housing, senses air temperature and sends signal to thermo control unit. Thermo control unit then cycles compressor clutch on and off, according to temperature lever setting on control panel.

### **ACCELERATION CUT SYSTEM**

This system monitors vacuum pressure in intake manifold. When engine is under heavy loaded (low vacuum condition), A/C compressor is turned off for 5 seconds to reduce engine load.

### **FAST IDLE CONTROL DEVICE (FICD)**

When A/C system is energized, the engine control module signals FICD to adjust Auxiliary Air Control (AAC) valve to bypass additional air and increase idle speed. This higher idle speed allows engine to idle smoothly during compressor operation.

### **THERMAL PROTECTOR SWITCH**

The thermal protector switch, installed in A/C compressor at evaporator refrigerant line inlet, incorporates a pressure diaphragm switch and temperature sensor. When refrigerant temperature increases, temperature sensitive gas inside temperature sensor expands, causing diaphragm switch to open electrical circuit to A/C compressor.

### **SERVO MOTORS**

Electric servo motors control intake air, air mode and air mix doors to distribute conditioned air to passenger compartment.

### **ADJUSTMENTS**

NOTE: For control cable and door rod adjustments, see HEATER SYSTEMS article.

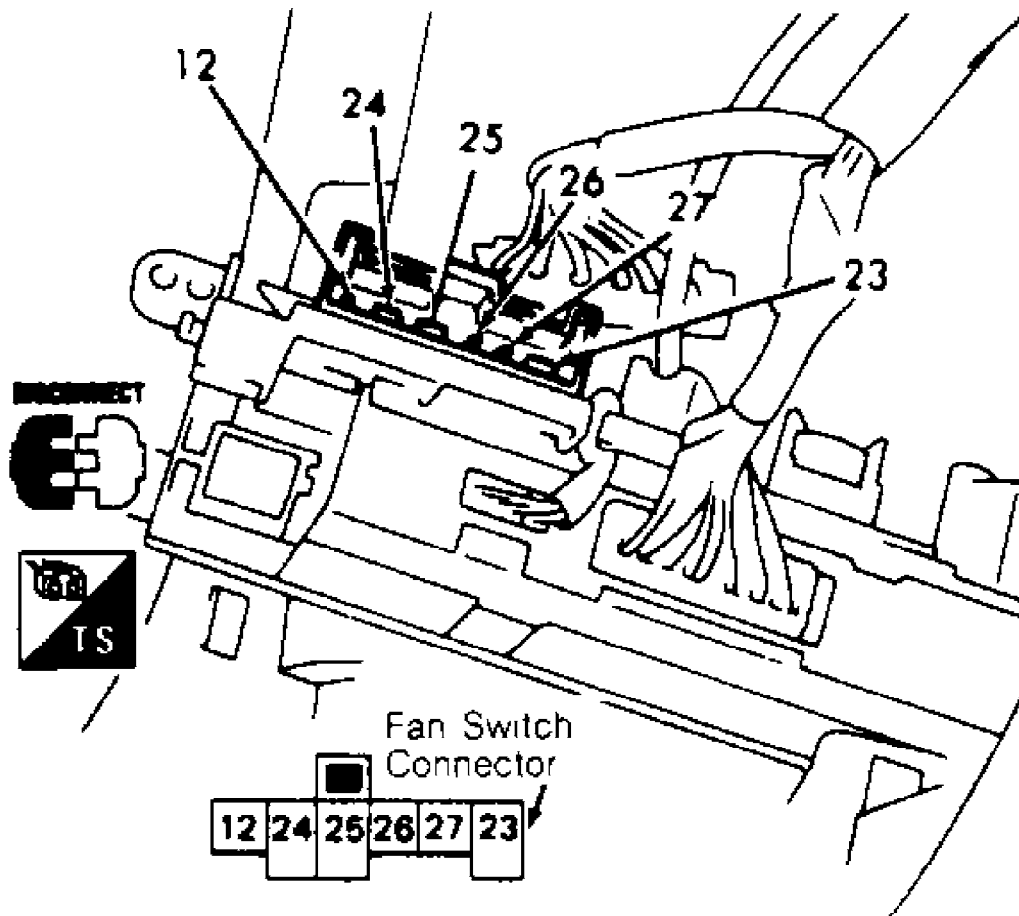
### **TROUBLE SHOOTING**

NOTE: See MANUAL A/C-HEAT TROUBLE SHOOTING article in this section.

### **TESTING**

#### **FAN SWITCH**

To check fan switch for proper operation, check for continuity between switch terminals. See Fig. 2.



Fan Switch Connector

LEVER POSITION	OFF	1	2	3	4
24					○
25				○	○
26			○	○	○
27		○	○	○	○
23		○	○	○	○
12		○	○	○	○

Fig. 2: Identifying Fan Switch Terminals  
 Courtesy of Nissan Motor Co., U.S.A.

BLOWER MOTOR RESISTOR

To check blower motor resistor for proper operation, disconnect harness connector and ensure continuity exists between all resistor terminals. If continuity does not exist, replace resistor.

## RELAYS

Remove relay and check continuity between relay terminals by supplying 12 volts to coil side of relay. See Fig. 3. A/C relay, located in engine compartment relay box, has Blue outer case. DO NOT mistake A/C relay with cooling fan relay, which also has a Blue outer case. If continuity is not as indicated, replace relay.

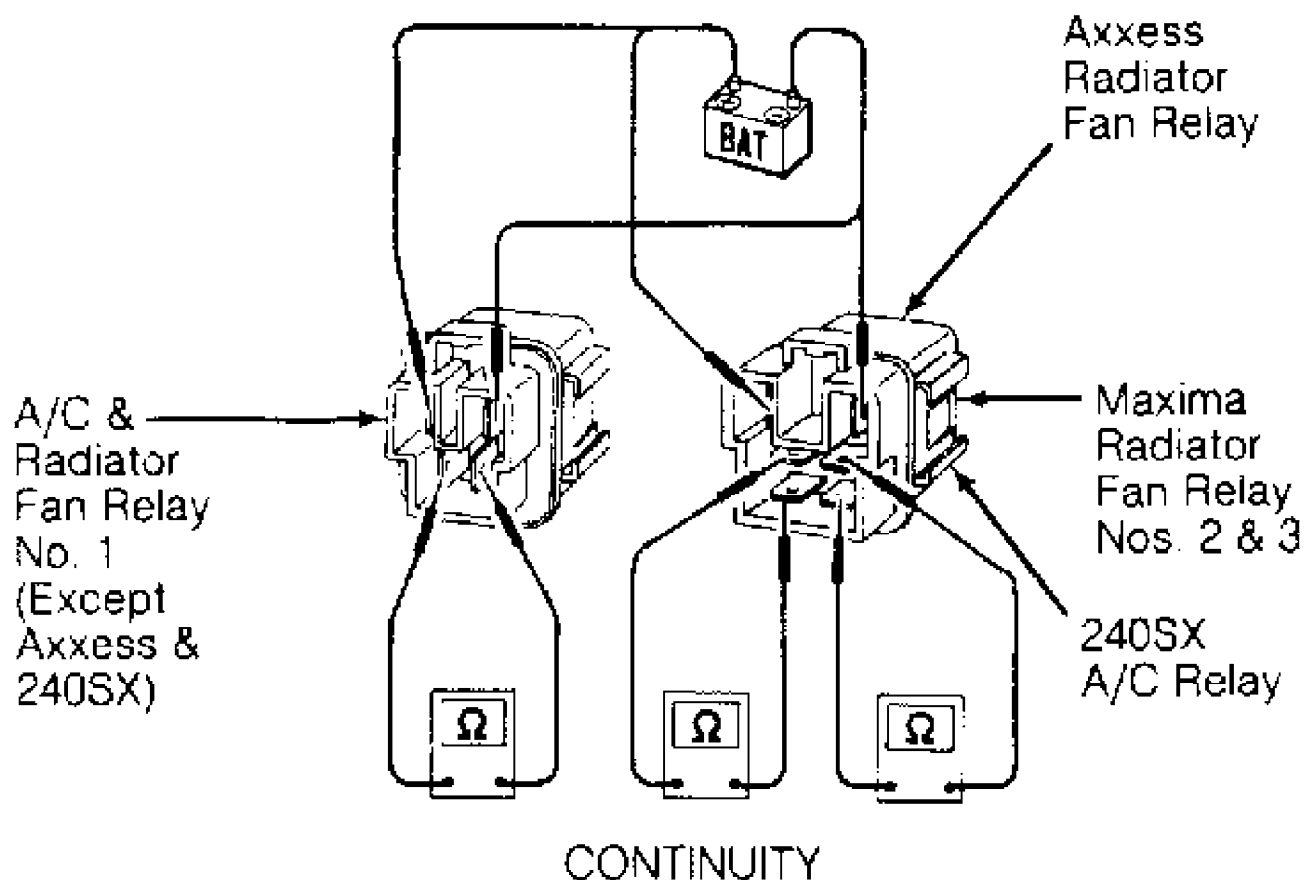


Fig. 3: Testing A/C & Cooling Fan Relays  
 Courtesy of Nissan Motor Co., U.S.A.

## CONDENSER FAN CIRCUIT

**NOTE:** On 240SX, a conventional belt driven radiator (cooling) fan is used. Condenser fan is controlled through A/C relay.

1) Disconnect condenser fan motor. Turn ignition switch, A/C switch, and blower motor switch on. Using DVOM, ensure battery voltage exists between wire (no wire color available) and ground. If voltage exists, go to step 6). If voltage does not exist, go to next step.

2) Turn ignition off. Disconnect condenser fan motor. Turn ignition on and ensure battery voltage exists between Brown/White wire and ground. If voltage exists, repair wiring harness between A/C relay and thermoswitch. If voltage does not exist, go to next step.

3) Turn ignition off and disconnect A/C relay. Turn ignition

on and ensure battery voltage exists between Black/White wire and ground and between Blue/Orange wire and ground.

4) If voltage does not exist on Black/White wire, check wiring harness and Green fusible link between A/C relay and battery. If voltage does not exist on Blue/Orange wire, check wiring harness and fuse between A/C relay and ignition switch.

5) If voltage exists on BOTH wires, check A/C relay. See RELAYS TESTING in this article. If relay is okay, turn ignition off. Check continuity of Brown/White wire between A/C relay and condenser fan motor connector. If continuity exist, condenser fan circuit is okay. If no continuity exist, repair open circuit in Brown/White wire.

6) Turn ignition and A/C switch off. Disconnect condenser fan motor. Check continuity of ground circuit, through condenser fan motor, between thermostick connector and ground connector of condenser fan motor. If continuity exist, go to next step. If no continuity exists, replace condenser fan motor.

7) Check continuity between condenser fan motor Black ground wire and ground. If continuity exists go to next step. If no continuity exists, repair open circuit in Black ground wire.

8) With coolant temperature greater than 198-208°F (92-98°C), check continuity between thermostick terminals. If continuity exist, check wiring harness between thermostick and condenser fan motor. If no continuity exists, replace thermostick.

## **REMOVAL & INSTALLATION**

### **A/C COMPRESSOR**

#### Removal

Loosen idler pulley bolt and remove compressor belt. Discharge refrigerant from system using approved refrigerant recovery/recycling equipment. Disconnect compressor clutch lead. Remove discharge and suction hoses from compressor and plug hose openings. Remove compressor mounting bolts and compressor.

#### Installation

To install, reverse removal procedure. Use new "O" rings, coated with refrigerant oil, when attaching hoses to compressor. Evacuate and recharge system.

### **EVAPORATOR & HEATER CORE ASSEMBLY**

#### Removal

1) Discharge A/C system using approved refrigerant recovery/recycling equipment and drain cooling system. In engine compartment, disconnect A/C lines from evaporator. Remove heater hoses from heater core. Remove glove box and support panel. See Fig. 5. Remove wiring harness connectors and air inlet/outlet clamps from evaporator and remove unit. Remove spring clip retainers and separate evaporator case halves to remove evaporator core. See Fig. 4.

2) To remove heater core, remove center air outlet vent and radio/shift lever faceplate by prying up with cloth covered tip of flat blade screwdriver. Remove radio and A/C-heater control panel screws. Remove temperature control cable and harness connectors from A/C-heater control panel.

3) Remove hood release bracket, left instrument panel lower cover and steering column covers. Remove instrument cluster bezel, switch panel and instrument cluster. Disconnect instrument cluster harness connector under left side of instrument panel, near fuse block.

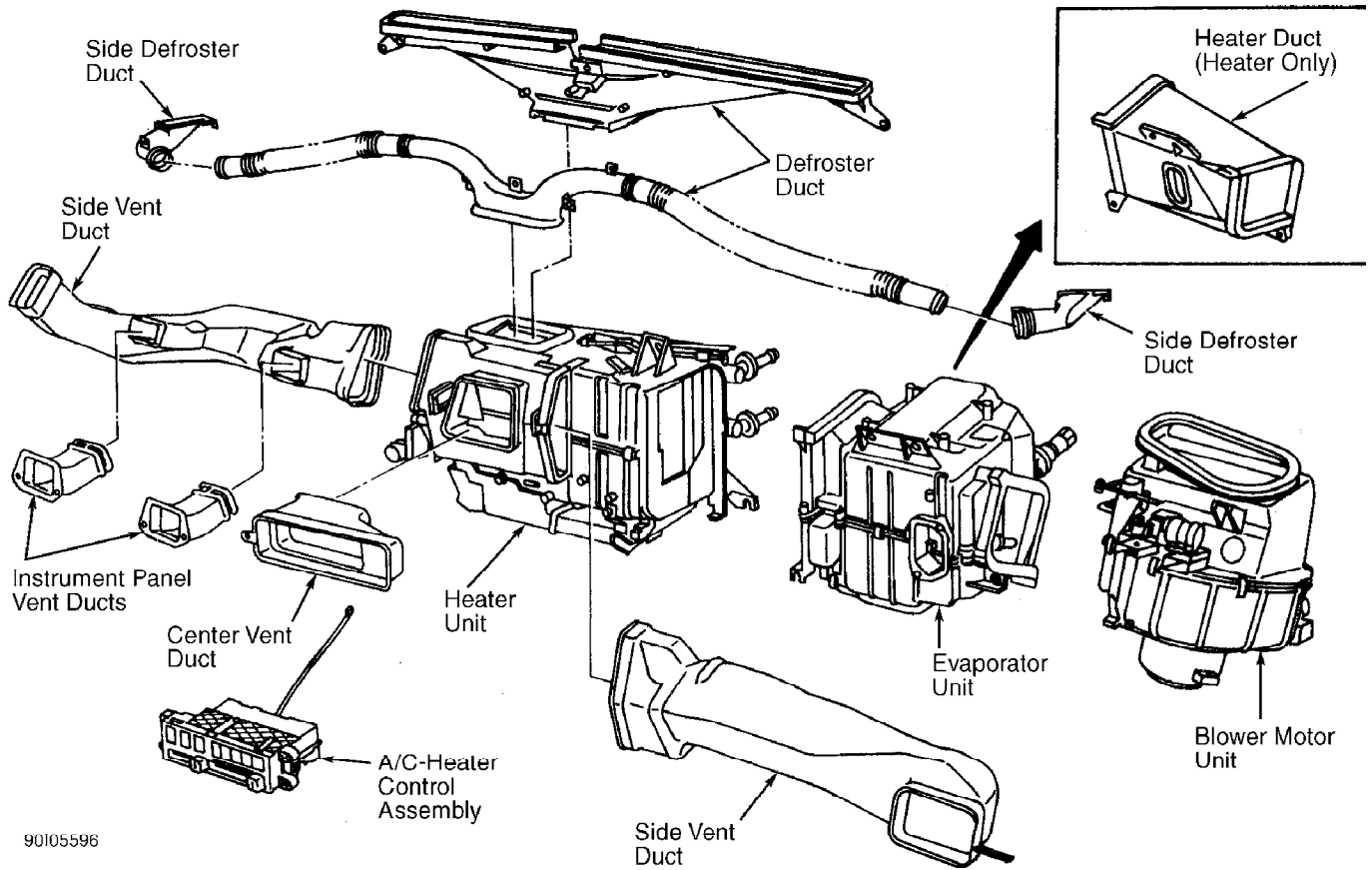
4) Cover Head-Up display reflective surface on windshield (if equipped). Remove right side defroster grille by prying up with cloth

covered tip of flat blade screwdriver. Remove left side defroster grille in same manner. Remove instrument panel retaining bolts from inside defroster duct, from left corner of instrument cluster housing and from right lower corner of dashboard.

5) Lift dashboard upward and outward enough to disconnect cables and wiring harness from heater. Disconnect all air ducts and remove heater unit. Remove spring clip retainers and separate heater case halves to remove heater core.

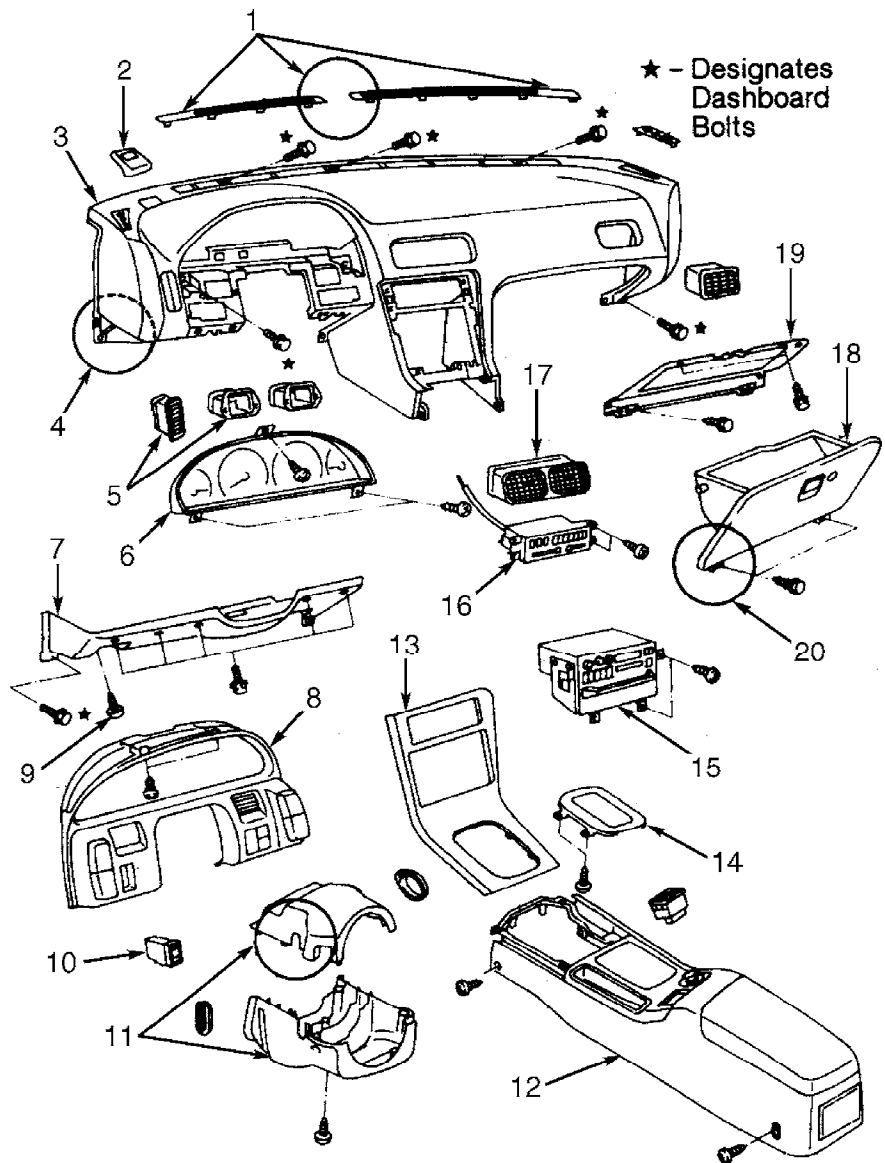
#### Installation

To install, reverse removal procedure. Use new "O" rings, coated with refrigerant oil, before assembling connections. If installing new evaporator core, add about 2 ounces of refrigerant oil to new core before installation. Evacuate, recharge and leak test system.



90105596

Fig. 4: Exploded View of A/C-Heater System Components  
 Courtesy of Nissan Motor Co., U.S.A.



★ - Designates Dashboard Bolts

- |  |  |
|--|--|
| 1. Defroster Grilles/<br>Pawl Locations        | 11. Steering Column Covers/<br>Pawl Location |
| 2. Head-Up Display Cover                       | 12. Center Console                           |
| 3. Dashboard                                   | 13. Radio/Shift Lever Faceplate              |
| 4. Harness Connector                           | 14. Shift Lever Cover                        |
| 5. Air Vent Ducts                              | 15. Radio                                    |
| 6. Instrument Cluster                          | 16. A/C-Heater Control Assembly              |
| 7. Instrument Panel                            | 17. Center Air Outlet Vent                   |
| 8. Instrument Cluster Bezel/<br>Switches Panel | 18. Glove Box                                |
| 9. Hood Release Bracket Bolt                   | 19. Glove Box Support Panel                  |
| 10. Panel Brightness Control                   | 20. Locating Pin                             |

91D04924

Fig. 5: Removing Dashboard For Access to Evaporator & Heater Cores  
 Courtesy of Nissan Motor Co., U.S.A.

CONDENSER

#### Removal

1) Discharge A/C system using approved refrigerant recovery/recycling equipment and drain cooling system. Remove cooling fan from water pump. Remove radiator hoses, lines and shroud. Disconnect wiring harness connectors. Remove radiator.

2) Remove front grille. Detach right headlight assembly. Disconnect refrigerant lines from condenser and receiver-drier. See Fig. 6. Remove refrigerant lines from condenser and plug openings. Remove condenser.

#### Installation

To install, reverse removal procedure. Use new "O" rings, coated with refrigerant oil, before assembling connections. If installing new condenser, add same amount of oil as drained from old condenser, plus 1/2 ounce of oil. Evacuate, recharge and leak test system.

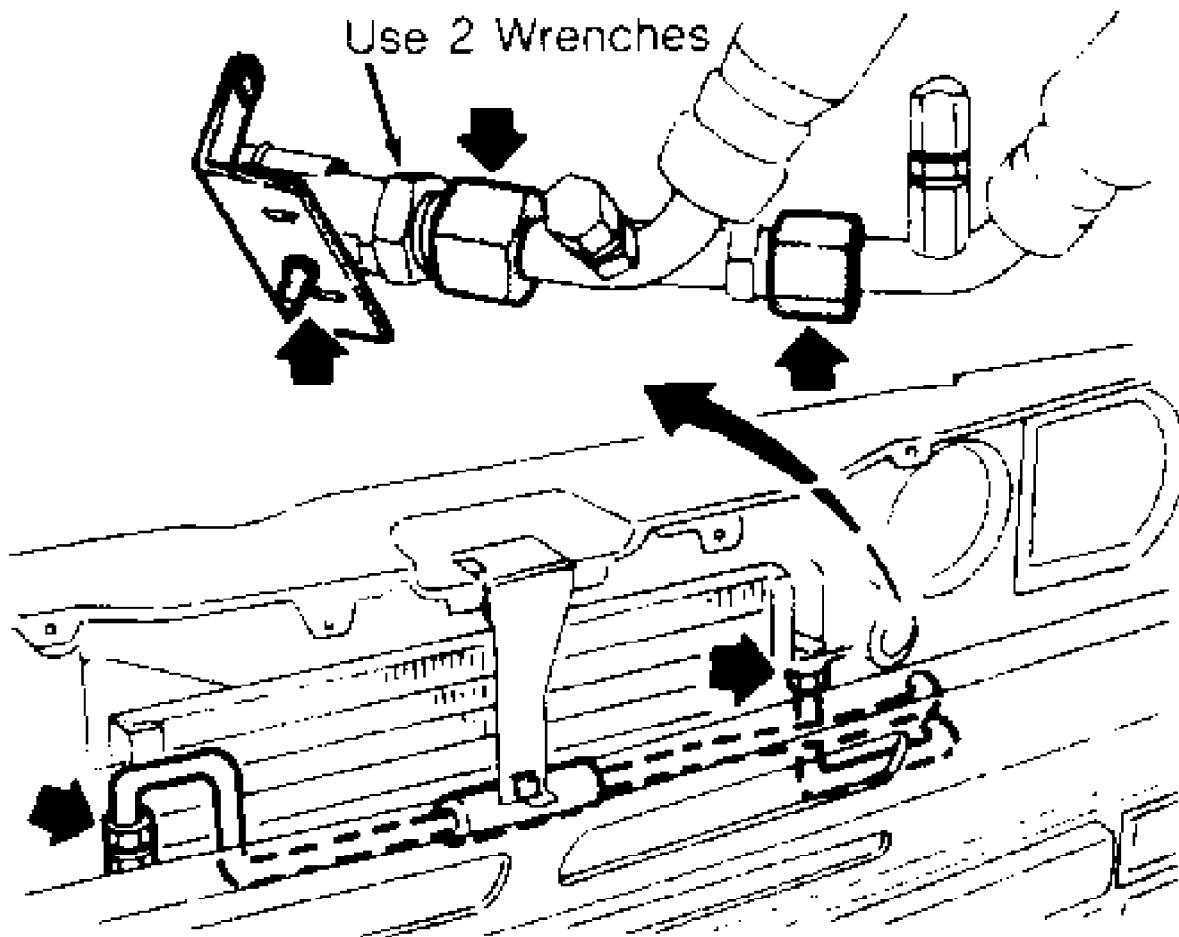


Fig. 6: Disconnecting A/C Lines for Condenser Removal  
Courtesy of Nissan Motor Co., U.S.A.

RECEIVER-DRIER

### Removal

Discharge A/C system using approved refrigerant recovery/recycling equipment. Disconnect low pressure switch connector (if equipped). Disconnect A/C lines from receiver-drier and plug openings. See Fig. 6. Remove screws and receiver-drier.

### Installation

To install, reverse removal procedure. Use new "O" rings, coated with refrigerant oil, before assembling connections. Add 1 ounce of refrigerant oil to new receiver-dryer before installation. Evacuate, recharge and leak test system.

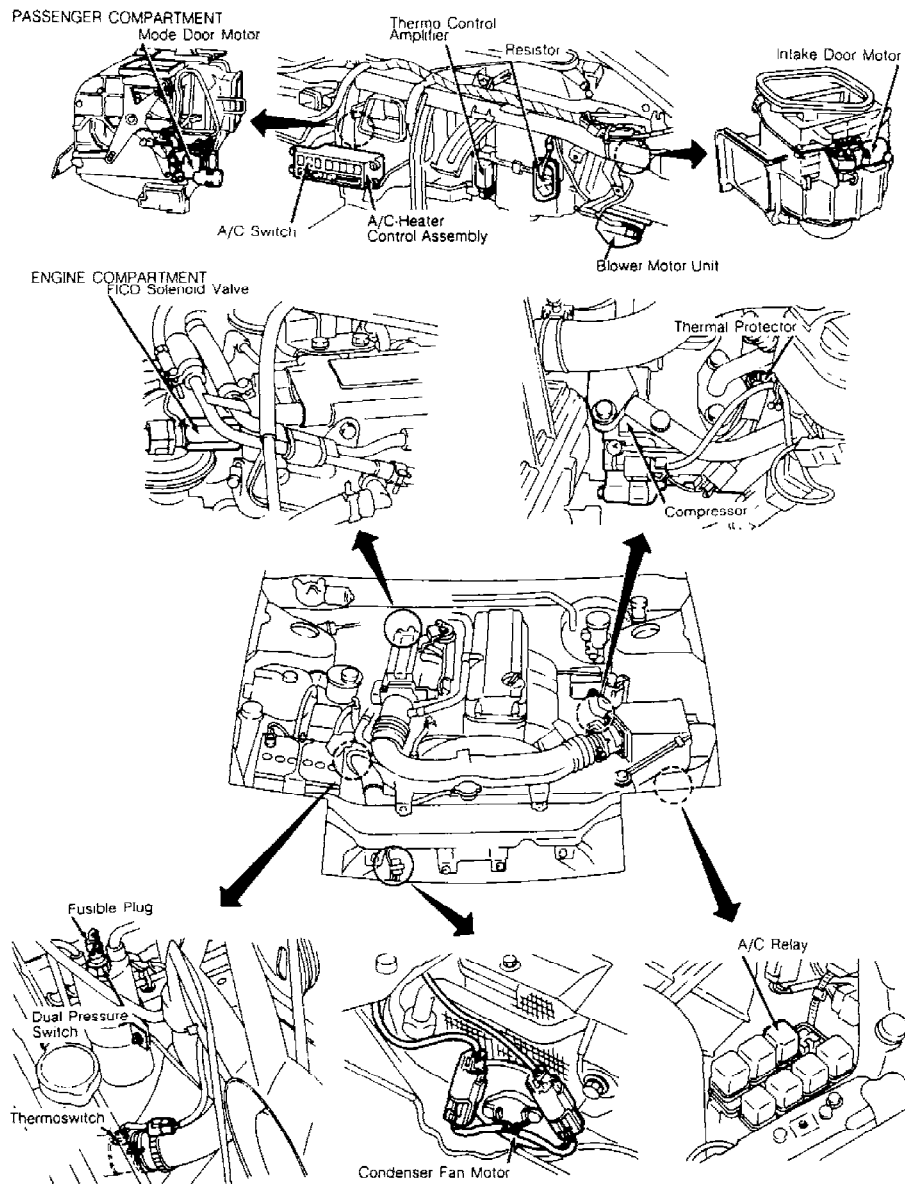


Fig. 7: Locating Manual A/C-Heater System Electrical Components  
Courtesy of Nissan Motor Co., U.S.A.

## A/C SYSTEM SPECIFICATIONS

A/C SYSTEM SPECIFICATIONS TABLE

Application	Specification
Compressor Type	Atsugi Rotary Vane
Compressor Belt Deflection	
New Belt	15/64-9/32" (6-7 mm)
Used Belt	9/32-5/16" (7-8 mm)
Compressor Oil Capacity	3.4 oz.
Refrigerant (R-12) Capacity	32-36 oz.
System Oil Capacity	6.8 oz.
System Operating Pressures (1)	
High Side	173-213 psi (12.2-15.0 kg/cm <sup>2</sup> )
Low Side	17.8-24.9 psi (1.25-1.75 kg/cm <sup>2</sup> )

(1) - Measured at ambient temperature of 80°F (27°C), with 50% relative humidity.

WIRING DIAGRAMS

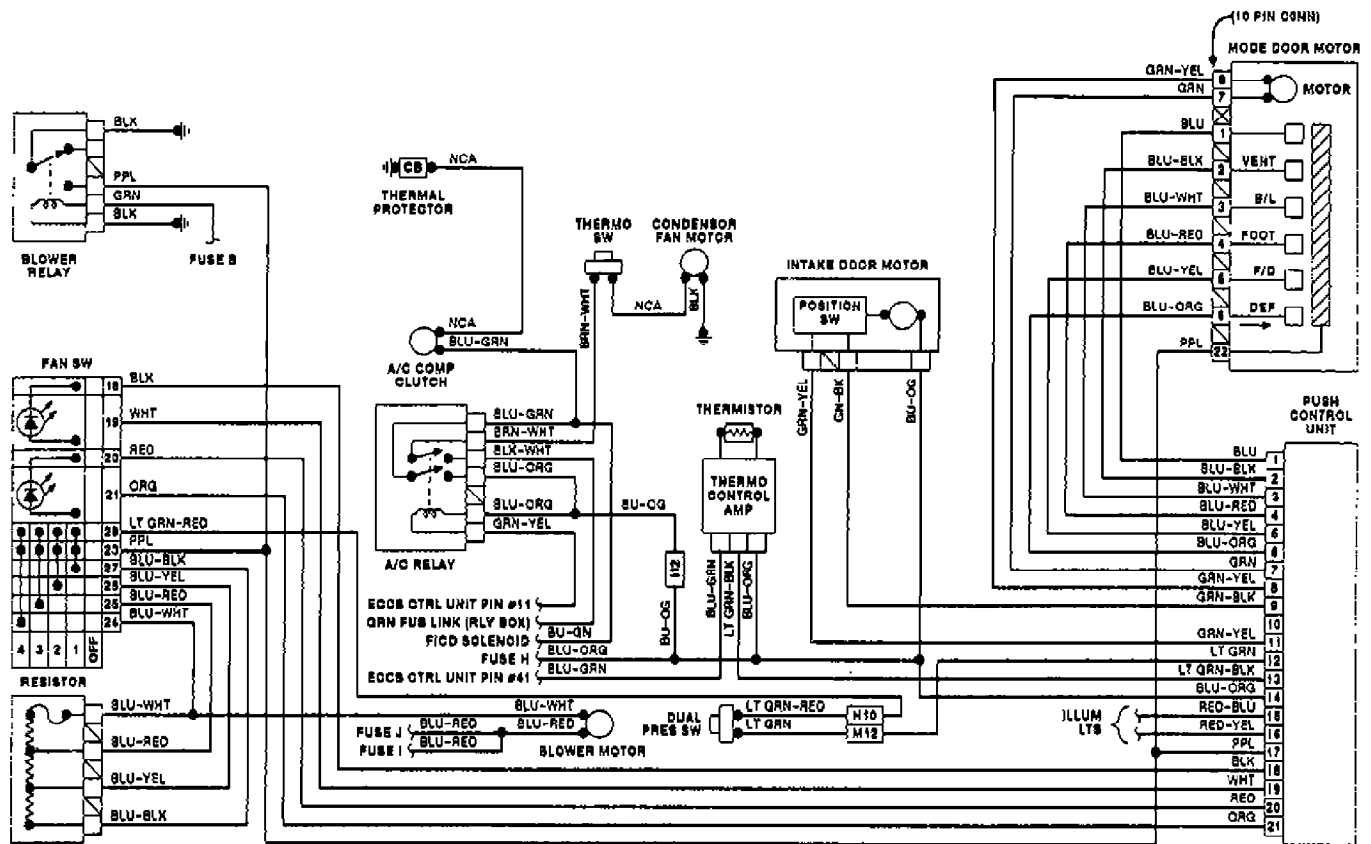


Fig. 8: Manual A/C-Heater System Wiring Diagram