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

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.

**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**

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Fig. 1: Identifying A/C-Heater Control Panel
Courtesy of Nissan Motor Co., U.S.A.
A high pressure/temperature relief valve is mounted on receiver-drier. When high pressure of 540 psi (38 kg/cm²) 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.
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.

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 thermostwitch 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 thermostwitch terminals. If continuity exist,
check wiring harness between thermostwitch and condenser fan motor. If
no continuity exists, replace thermostwitch.

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.

Fig. 4: Exploded View of A/C-Heater System Components
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](image)

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

<table>
<thead>
<tr>
<th>Application</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compressor Type</td>
<td>Atsugi Rotary Vane</td>
</tr>
<tr>
<td>Compressor Belt Deflection</td>
<td></td>
</tr>
<tr>
<td>New Belt</td>
<td>15/64-9/32&quot; (6-7 mm)</td>
</tr>
<tr>
<td>Used Belt</td>
<td>9/32-5/16&quot; (7-8 mm)</td>
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<tr>
<td>Compressor Oil Capacity</td>
<td>3.4 oz.</td>
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<tr>
<td>Refrigerant (R-12) Capacity</td>
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<tr>
<td>System Oil Capacity</td>
<td>6.8 oz.</td>
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<tr>
<td>System Operating Pressures (1)</td>
<td></td>
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<tr>
<td>High Side</td>
<td>173-213 psi (12.2-15.0 kg/cm²)</td>
</tr>
<tr>
<td>Low Side</td>
<td>17.8-24.9 psi (1.25-1.75 kg/cm²)</td>
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(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