

# HEATER & AIR CONDITIONER

## SECTION **HA**

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When you read wiring diagrams:

- Read G1 section, "HOW TO READ WIRING DIAGRAMS".
- See EL section, "POWER SUPPLY ROUTING" for power distribution circuit.

When you perform trouble diagnoses, read G1 section, "HOW TO FOLLOW FLOW CHART IN TROUBLE DIAGNOSES" and "HOW TO PERFORM EFFICIENT DIAGNOSIS FOR AN ELECTRICAL INCIDENT".

## Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

The Supplemental Restraint System "Air Bag" and "Seat Belt Pre-tensioner", used along with a seat belt, help to reduce the risk or severity of injury to the driver and front passenger in a frontal collision. The Supplemental Restraint System consists of air bag modules (located in the center of the steering wheel and on the instrument panel on the passenger side), seat belt pre-tensioner, a diagnosis sensor unit, warning lamp, wiring harness and spiral cable. Information necessary to service the system safely is included in the RS section of this Service Manual.

### WARNING:

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system.
- All SRS air bag electrical wiring harnesses and connectors are covered with yellow outer insulation. Do not use electrical test equipment on any circuit related to the SRS.

## Precautions for Working with HFC-134a (R-134a)

### WARNING:

- CFC-12 (R-12) refrigerant and HFC-134a (R-134a) refrigerant are not compatible. These refrigerants must never be mixed, even in the smallest amounts. If the refrigerants are mixed, compressor failure is likely to occur.
- Use only specified lubricant for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. If lubricant other than that specified is used, compressor failure is likely to occur.
- The specified HFC-134a (R-134a) lubricant rapidly absorbs moisture from the atmosphere. The following handling precautions must be observed:
  - a: When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.
  - b: When installing refrigerant components to a vehicle, do not remove the caps (unseal) until just before connecting the components. Connect all refrigerant loop components as quickly as possible to minimize the entry of moisture into system.
  - c: Only use the specified lubricant from a sealed container. Immediately reseal containers of lubricant. Without proper sealing, lubricant will become moisture saturated and should not be used.
  - d: Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Use only approved recovery/recycling equipment to discharge HFC-134a (R-134a) refrigerant. If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.
- Do not allow lubricant (Nissan A/C System Oil Type S) to come in contact with styrofoam parts. Damage may result.

## General Refrigerant Precautions

### WARNING:

- Do not release refrigerant into the air. Use approved recovery/recycling equipment to capture the refrigerant every time an air conditioning system is discharged.
- Always wear eye and hand protection (goggles and gloves) when working with any refrigerant or air conditioning system.
- Do not store or heat refrigerant containers above 52°C (125°F).
- Do not heat a refrigerant container with an open flame; if container warming is required, place the bottom of the container in a warm pail of water.
- Do not intentionally drop, puncture, or incinerate refrigerant containers.
- Keep refrigerant away from open flames; poisonous gas will be produced if refrigerant burns.
- Refrigerant will displace oxygen, therefore be certain to work in well ventilated areas to prevent suffocation.
- Do not introduce compressed air to any refrigerant container or refrigerant component.

Precautions for Refrigerant Connection

**WARNING:**

Make sure all refrigerant is discharged into the recycling equipment and the pressure in the system is less than atmospheric pressure. Then gradually loosen the discharge side hose fitting and remove it.

**CAUTION:**

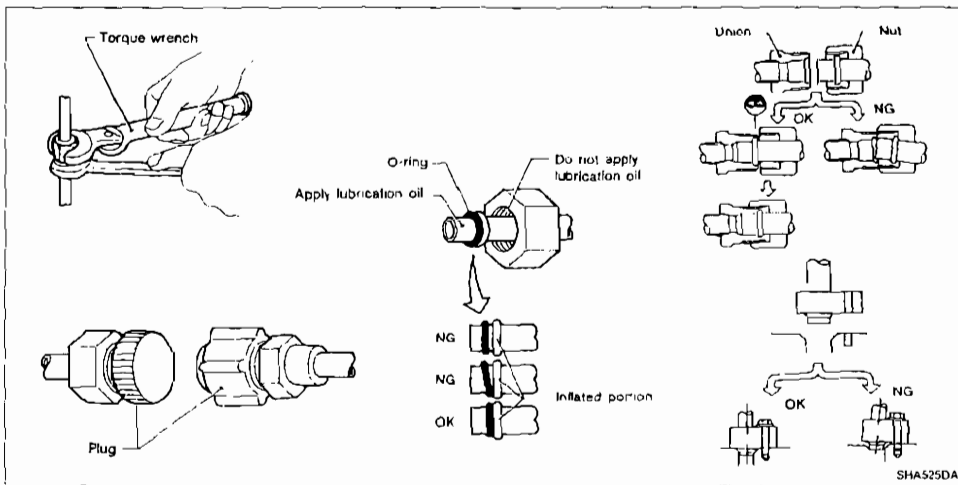
When replacing or cleaning refrigerant cycle components, observe the following.

- When the compressor is removed, store it in the same position as it is when mounted on the car. Failure to do so will cause lubricant to enter the low pressure chamber.
- When connecting tubes, always use a torque wrench and a back-up wrench.
- After disconnecting tubes, immediately plug all openings to prevent entry of dirt and moisture.
- When installing an air conditioner in the vehicle, connect the pipes as the final stage of the operation. Do not remove the seal caps of pipes and other components until just before required for connection.
- Allow components stored in cool areas to warm to working area temperature before removing seal caps. This prevents condensation from forming inside A/C components.
- Thoroughly remove moisture from the refrigeration system before charging the refrigerant.
- Always replace used O-rings.
- When connecting tube, apply lubricant to portions shown in illustration. Be careful not to apply lubricant to threaded portion.

Lubricant name: Nissan A/C System Oil Type R

Part number: KLH00-PAGR0

- O-ring must be closely attached to inflated portion of tube.
- After inserting tube into union until O-ring is no longer visible, tighten nut to specified torque.
- After connecting line, conduct leak test and make sure that there is no leakage from connections. When the gas leaking point is found, disconnect that line and replace the O-ring. Then tighten connections of seal seat to the specified torque.




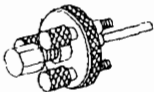

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Precautions for Servicing Compressor

- Plug all openings to prevent moisture and foreign matter from entering.
- When the compressor is removed, store it in the same position as it is when mounted on the car.
- When replacing or repairing compressor, follow Lubricant — CHECKING AND ADJUSTING procedure exactly. Refer to HA-140.
- Keep friction surfaces between clutch and pulley clean. If the surface is contaminated, with lubricant, wipe it off by using a clean waste cloth moistened with thinner.
- After compressor service operation, turn the compressor shaft by hand more than five turns in both directions. This will equally distribute lubricant inside the compressor. After the compressor is installed, let the engine idle and operate the compressor for one hour.
- After replacing the compressor magnet clutch, apply voltage to the new one and check for normal operation.

Special Service Tools

DKV-14C model

Tool number Tool name	Description
KV99231162 Clutch disc wrench	 <p>Removing shaft nut and clutch disc</p> <p>NT255</p>
KV99232340 Clutch disc puller	 <p>Removing clutch disc</p> <p>NT206</p>
KV99234330 Pulley installer	 <p>Installing pulley</p> <p>NT207</p>

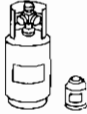


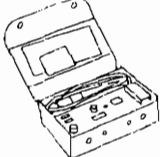
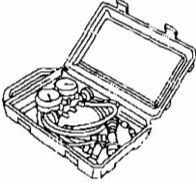
### HFC-134a (R-134a) Service Tools and Equipment

Never mix HFC-134a refrigerant and/or its specified lubricant with CFC-12 (R-12) refrigerant and/or its lubrication oil

Separate and non-interchangeable service equipment must be used for each type of refrigerant/lubricant.

Refrigerant container fittings, service hose fittings and service equipment fittings (equipment which handles refrigerant and/or lubricant) are different between CFC-12 (R-12) and HFC-134a (R-134a). This is to avoid mixed use of the refrigerants/lubricant.


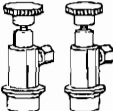

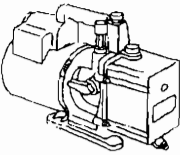
Adapters that convert one size fitting to another must never be used: refrigerant/lubricant contamination will occur and compressor failure will result.

Tool name	Description	Note
HFC-134a (R-134a) refrigerant	 <p>NT196</p>	<p>Container color: Light blue                      Container marking: HFC-134a (R-134a)                      Fitting size: Thread size                      ● large container 1/2"-15 ACME</p>
Nissan A/C System Oil Type R	 <p>NT197</p>	<p>Type: Poly alkylene glycol oil (PAG), type R                      Application: HFC-134a (R-134a) vane rotary compressors (Nissan only)                      Lubricity: 40 ml (1.4 imp fl oz)</p>
Recovery/Recycling/Recharging equipment	 <p>NT195</p>	<p>Function: Refrigerant Recovery and Recycling and Recharging</p>
Electrical leak detector	 <p>NT198</p>	<p>Power supply                      ● DC 12 V (Cigarette lighter)</p>
Manifold gauge set (with hoses and couplers)	 <p>NT199</p>	<p>Identification                      ● The gauge face indicates R-134a.                      Fitting size: Thread size                      ● 1/2"-16 ACME</p>

# PRECAUTIONS AND PREPARATION

MANUAL AND AUTO

## HFC-134a (R-134a) Service Tools and Equipment (Cont'd)

Tool name	Description	Note
Service hoses <ul style="list-style-type: none"> <li>● High side hose</li> <li>● Low side hose</li> <li>● Utility hose</li> </ul>	 <p style="text-align: center;">NT201</p>	Hose color: <ul style="list-style-type: none"> <li>● Low hose: Blue with black stripe</li> <li>● High hose: Red with black stripe</li> <li>● Utility hose: Yellow with black stripe or green with black stripe</li> </ul> Hose fitting to gauge <ul style="list-style-type: none"> <li>● 1/2" -16 ACME</li> </ul>
Service couplers <ul style="list-style-type: none"> <li>● High side coupler</li> <li>● Low side coupler</li> </ul>	 <p style="text-align: center;">NT202</p>	Hose fitting to service hose <ul style="list-style-type: none"> <li>● M14 x 1.5 fitting is optional or permanently attached</li> </ul>
Refrigerant weight scale	 <p style="text-align: center;">NT200</p>	For measuring of refrigerant Fitting size: Thread size <ul style="list-style-type: none"> <li>● 1/2" -16 ACME</li> </ul>
Vacuum pump (Including the isolator valve)	 <p style="text-align: center;">NT203</p>	Capacity: <ul style="list-style-type: none"> <li>● Air displacement: 4 CFM</li> <li>● Micron rating: 20 microns</li> <li>● Oil capacity: 482 g (17 oz)</li> </ul> Fitting size: Thread size <ul style="list-style-type: none"> <li>● 1/2" -16 ACME</li> </ul>

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## Precautions for Service Equipment

### RECOVERY/RECYCLING EQUIPMENT

Be certain to follow the manufacturers instructions for machine operation and machine maintenance. Never introduce any refrigerant other than that specified into the machine.

### ELECTRONIC LEAK DETECTOR

Be certain to follow the manufactures instructions for tester operation and tester maintenance

### VACUUM PUMP

The lubricant contained inside the vacuum pump is not compatible with the specified lubricant for HFC-134a (R-134a) A/C systems. The vent side of the vacuum pump is exposed to atmospheric pressure. So the vacuum pump lubricant may migrate out of the pump into the service hose. This is possible when the pump is switched off after evacuation (vacuuming) and hose is connected to it.

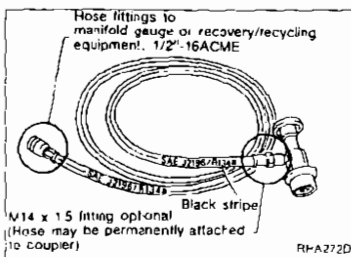
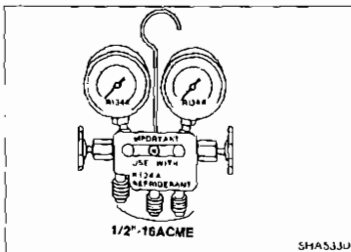
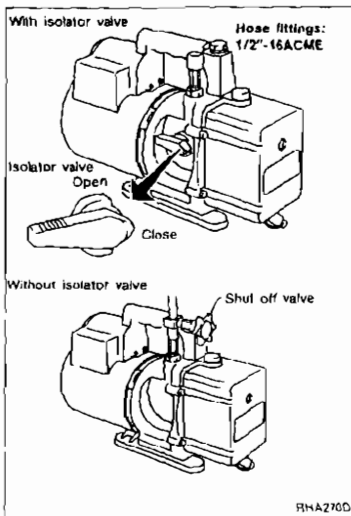
To prevent this migration, use a manual valve placed near the hose-to-pump connection, as follows.

- Usually vacuum pumps have a manual isolator valve as part of the pump. Close this valve to isolate the service hose from the pump.
- For pumps without an isolator, use a hose equipped with a manual shut-off valve near the pump end. Close the valve to isolate the hose from the pump
- If the hose has an automatic shut off valve, disconnect the hose from the pump. As long as the hose is connected, the valve is open and lubricant may migrate

Some one-way valves open when vacuum is applied and close under a no vacuum condition. Such valves may restrict the pump's ability to pull a deep vacuum and are not recommended.

### MANIFOLD GAUGE SET

Be certain that the gauge face indicates R-134a or 134a. Be sure the gauge set has 1/2"-16 ACME threaded connections for service hoses. Confirm the set has been used only with refrigerant HFC-134a (R-134a) and specified lubricants.



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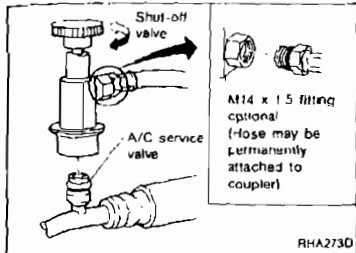
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Precautions for Service Equipment (Cont'd)

**SERVICE COUPLERS**

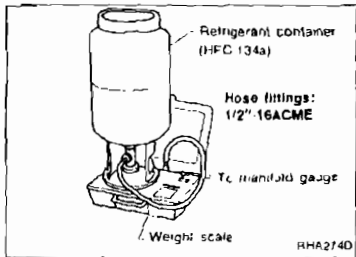
Never attempt to connect HFC-134a (R-134a) service couplers to an CFC-12 (R-12) A/C system. The HFC-134a (R-134a) couplers will not properly connect to the CFC-12 (R-12) system. However, if an improper connection is attempted, discharging and contamination may occur.



Shut off valve rotation	A/C service valve
Clockwise	Open
Counterclockwise	Close

**REFRIGERANT WEIGHT SCALE**

Verify that no refrigerant other than HFC-134a (R-134a) and specified lubricants have been used with the scale. If the scale controls refrigerant flow electronically, the hose fitting must be 1/2"-16 ACME.



**CHARGING CYLINDER**

Using a charging cylinder is not recommended. Refrigerant may be vented into air from cylinder's top valve when filling the cylinder with refrigerant. Also, the accuracy of the cylinder is generally less than that of an electronic scale or of quality recycle/recharge equipment.

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## Refrigeration Cycle

### REFRIGERANT FLOW

The refrigerant flow is in the standard pattern. Refrigerant flows through the compressor, condenser, liquid tank, evaporator and back to the compressor.

The refrigerant evaporation through the evaporator coil is controlled by an externally equalized expansion valve, located inside the evaporator case.

### FREEZE PROTECTION

The compressor cycles on and off to maintain the evaporator temperature within a specified range. When the evaporator coil temperature falls below a specified point, the thermo control amplifier interrupts the compressor operation. When the evaporator coil temperature rises above the specification, the thermo control amplifier allows compressor operation.

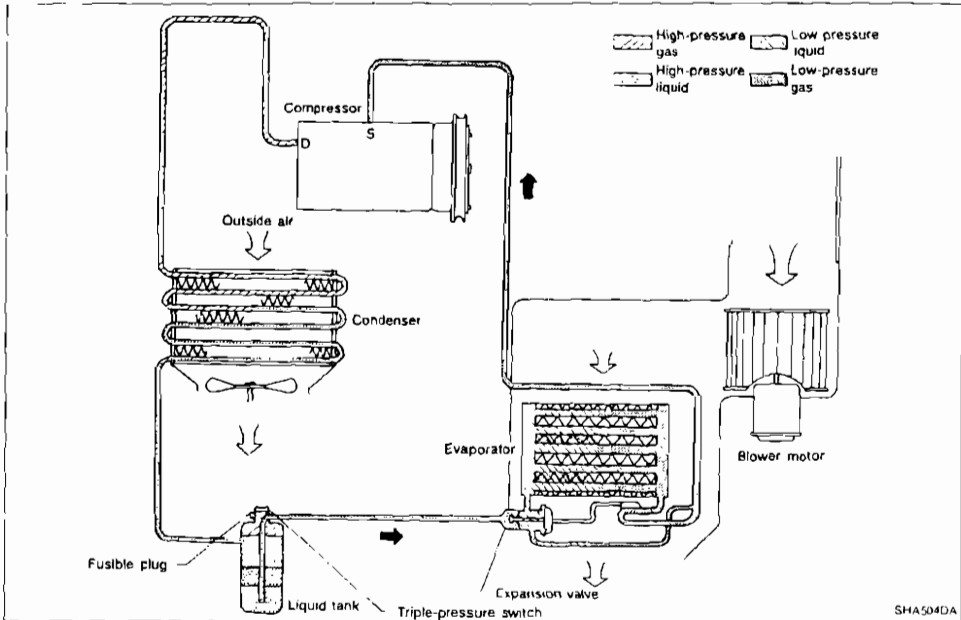
### REFRIGERANT SYSTEM PROTECTION

#### Triple-pressure switch

The triple pressure switch is located on the liquid tank. If the system pressure rises or falls out of specifications, the switch opens to interrupt compressor clutch operation. Triple-pressure switch closes to turn on the cooling fan and reduce system pressure.

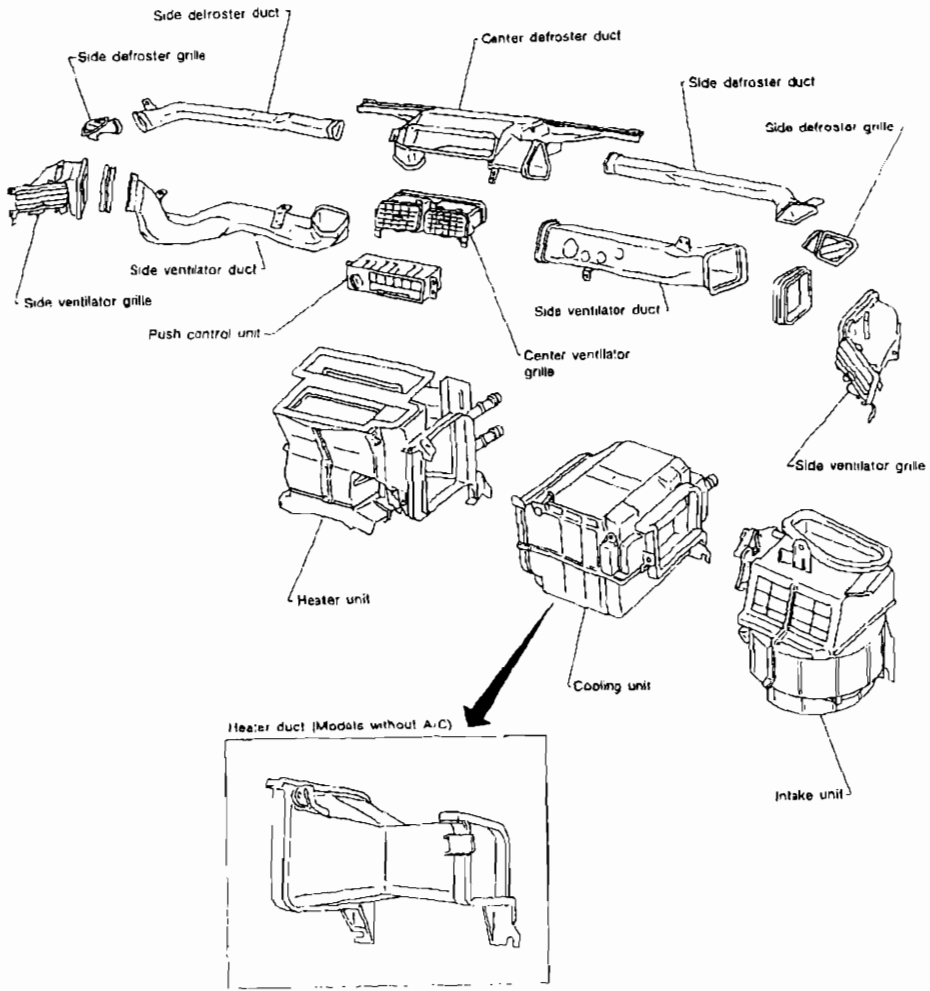
#### Fusible plug

Open at temperature above 105°C (221°F), thereby discharging refrigerant to the atmosphere. If this plug is melted and opened, check the refrigerant line and replace liquid tank.



Component Layout

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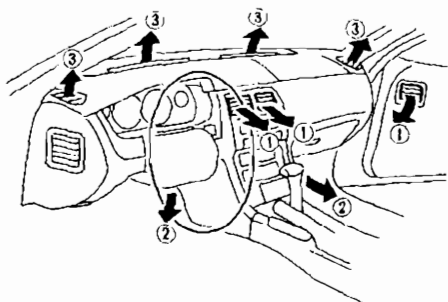
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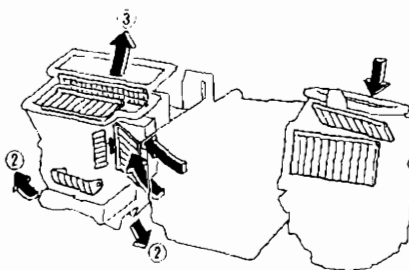
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Discharge Air Flow

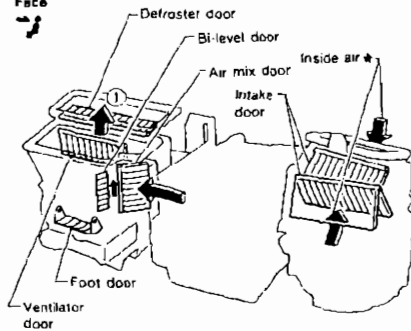
Air outlets



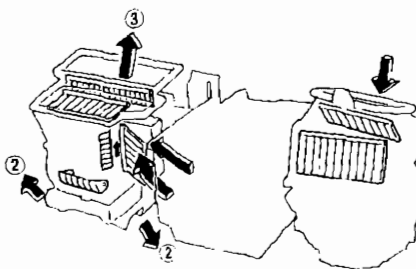
Foot



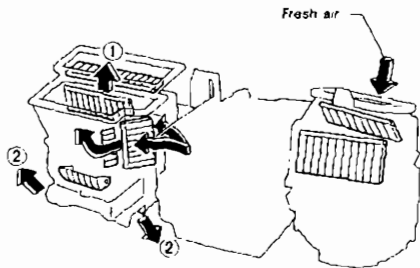
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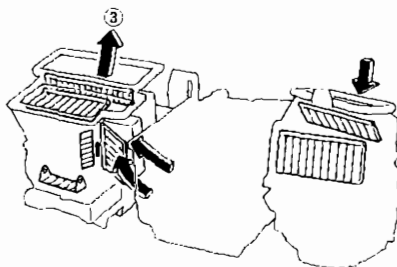
Foot and defroster



Bi-level



Defroster

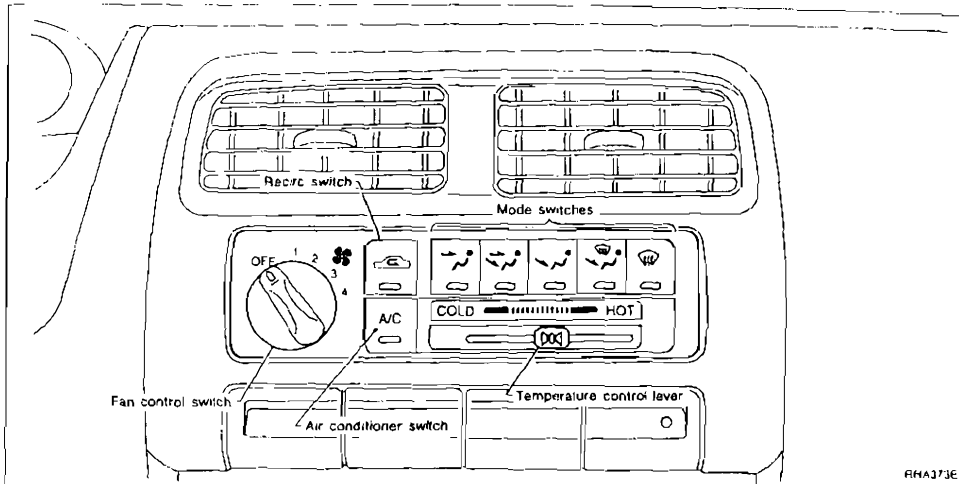


- (1) To face
- (2) To foot
- (3) To defroster

\* When RECIRC switch is ON

For air flow %, refer to "Operational Check", "TROUBLE DIAGNOSES".

## Control Operation

**FAN CONTROL SWITCH**

This switch turns the fan ON and OFF, and controls fan speed.

**MODE SWITCHES**

These switches control the outlet air flow.

In "DEF" or "F/D" mode, the intake door is set to "FRESH". The compressor turns on in the "DEF" mode.

**TEMPERATURE CONTROL LEVER**

This lever allows adjustment of the temperature of the outlet air.

**RECIRC SWITCH**

*OFF position:*

Outside air is drawn into the passenger compartment

*ON position:*

Interior air is recirculated inside the vehicle

RECIRC is canceled when DEF or F/D is selected, RECIRC resumes when another mode is chosen

**AIR CONDITIONER SWITCH**

The air conditioner switch controls the A/C system. When the switch is depressed with the fan ON, the compressor will turn ON. The indicator lamp will also light.

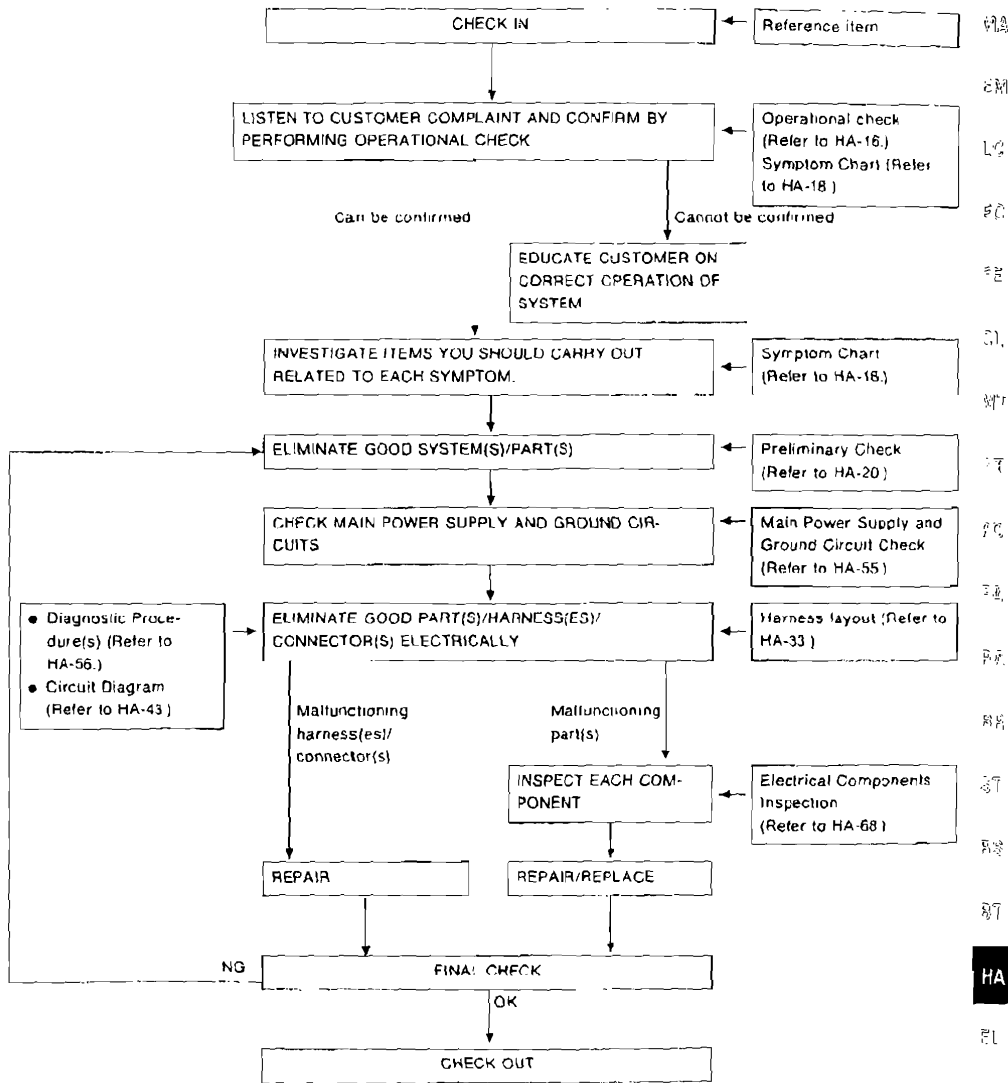
The air conditioner cooling function operates only when the engine is running.

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How to Perform Trouble Diagnoses for Quick and Accurate Repair

WORK FLOW



## Operational Check

The purpose of the operational check is to confirm that the system is as it should be. The systems which will be checked are the blower, mode (discharge air), intake air, temperature decrease, temperature increase and A/C switch.

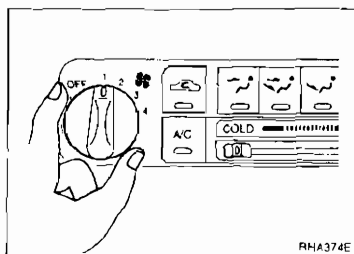
### CONDITIONS:

- Engine running and at normal operating temperature.

### PROCEDURE:

#### 1. Check blower

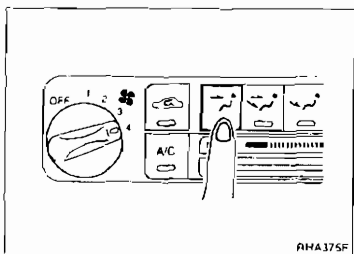
- 1) Turn fan switch to 1-speed  
Blower should operate on low speed
- 2) Then turn fan switch to 2-speed.
- 3) Continue checking blower speed until all speeds are checked
- 4) Leave blower on speed 4



RHA374E

#### 2. Check discharge air.

- 1) Press each mode switch.



RHA375F

- 2) Confirm that discharge air comes out according to the air distribution table at left.

Refer to "Discharge Air Flow", "DESCRIPTION" (HA-12)

### NOTE:

Confirm that the compressor clutch is engaged (visual inspection) and intake door position is at FRESH when the DEF button is pressed.

Confirm that the intake door position is at FRESH when the F/D button is pressed.

Intake door position is checked in the next step.


### Discharge air flow

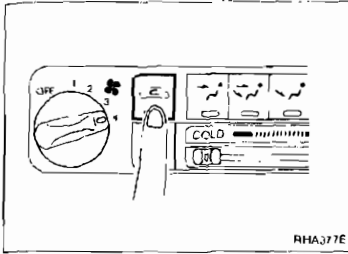
Switch mode/ indicator	Air outlet/distribution		
	Face	Foot	Defroster
	100%	-	-
	60%	40%	-
	-	80%	20%
	-	60%	40%
	-	-	100%

RHA17FA

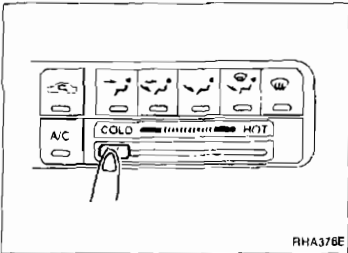


**Operational Check (Cont'd)****3. Check recirc**

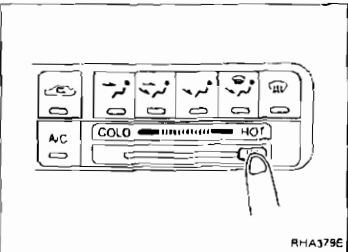
- 1) Press REC  switch  
Recirc indicator should illuminate.
- 2) Listen for intake door position change (you should hear blower sound change slightly)

**4. Check temperature decrease**

- 1) Slide temperature control lever to full cold
- 2) Check for cold air at discharge air outlets.

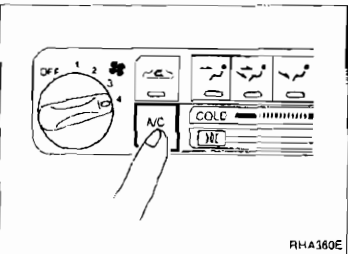
**5. Check temperature increase**

- 1) Slide temperature control lever to full hot.
- 2) Check for hot air at discharge air outlets.

**6. Check air conditioning switch**

Move the fan control switch to the desired (1 to 4 speed) position and push the A/C switch to turn ON the air conditioner.

The indicator lamp should come on when air conditioner is ON.



## Symptom Chart

## DIAGNOSTIC TABLE

PROCEDURE	Preliminary Check						Diagnostic Procedure						Main Power Supply and Ground Circuit Check			
	HA-20	HA-21	HA-22	HA-23	HA-24	HA-25	HA-56	HA-58	HA-59	HA-61	HA-63	HA-64	HA-55	HA-55	HA-55	
REFERENCE PAGE	HA-20	HA-21	HA-22	HA-23	HA-24	HA-25	HA-56	HA-58	HA-59	HA-61	HA-63	HA-64	HA-55	HA-55	HA-55	
SYMPTOM	Preliminary check 1	Preliminary check 2	Preliminary check 3	Preliminary check 4	Preliminary check 5	Preliminary check 6	Diagnostic procedure 1	Diagnostic procedure 2	Diagnostic procedure 3	Diagnostic procedure 4	Diagnostic procedure 5	Diagnostic procedure 6	15A Fuses (#7, #8)	7.5A Fuse (#6 or #15)	7.5A Fuse (#42)	Push control unit
A/C does not blow cold air	①						○			○			○	○		
Insufficient heating						①	○			○						
Blower motor does not rotate.	①						②						①			
Air outlet does not change				①			②							○		○
Intake door does not change in VENT, B/L or FOOT mode.									①							○
Intake door is not set at "FRESH" in DEF or F/D mode	①								○							○
Air mix door does not change.	①									②						
Bi-level door does not change.											①					
Magnet clutch does not engage when A/C switch and fan switch are ON	①											②		○	○	
Magnet clutch does not engage in DEF mode.	①	②										○		○	○	
Noise					①											

① ② The number means checking order

① Checking order depends on malfunction in each flow chart

# TROUBLE DIAGNOSES

## Symptom Chart (Cont'd)

Electrical Components Inspection

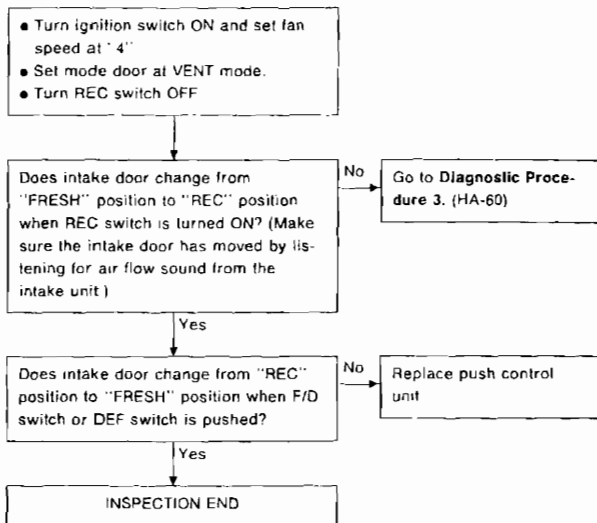
Symptom	Cause	Check	Corrective Action	Reference	Code
Blower motor					HA-68
Resistor		○			HA-68
A/C switch		○			—
REC switch		○			—
VENT switch		○			—
B/L switch		○			—
FOOT switch		○			—
F/D switch		○			—
DEF switch		○			—
Fan switch		○			HA-68
Mode door motor		○			—
Intake door motor		○			—
Air mix door motor		○			—
BI-LEVEL (B/L) door motor		○			—
A/C relay		○			HA-70
Triple-pressure switch		○			HA-69
Compressor		○			—
Compressor (Magnet clutch)		○			—
Thermal protector		○			HA-70
ECM (ECCS control module)		○			Refer to EC section
Harness		○			—

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100.

## Preliminary Check

## PRELIMINARY CHECK 1

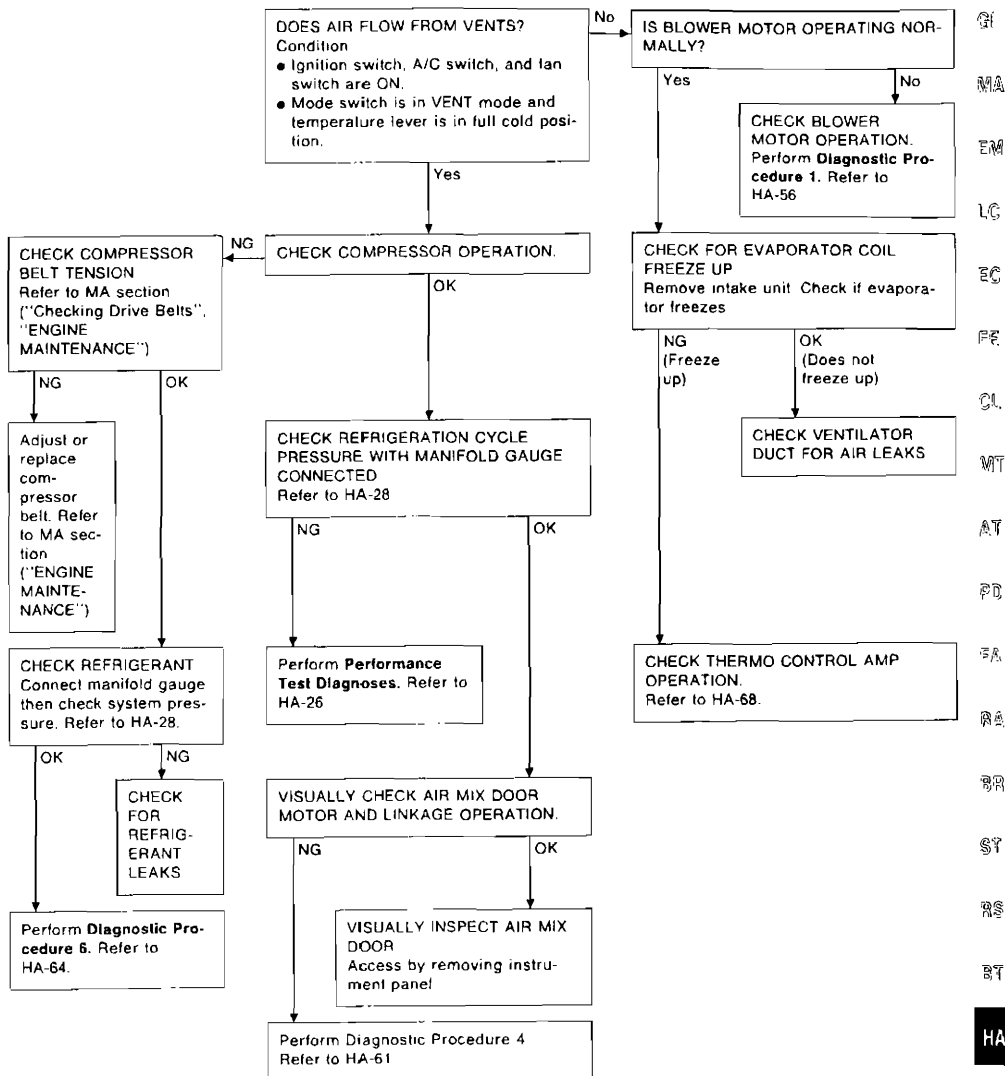
Intake door is not set at "FRESH" in DEF or F/D mode.



## Preliminary Check (Cont'd)

## PRELIMINARY CHECK 2

A/C does not blow cold air.

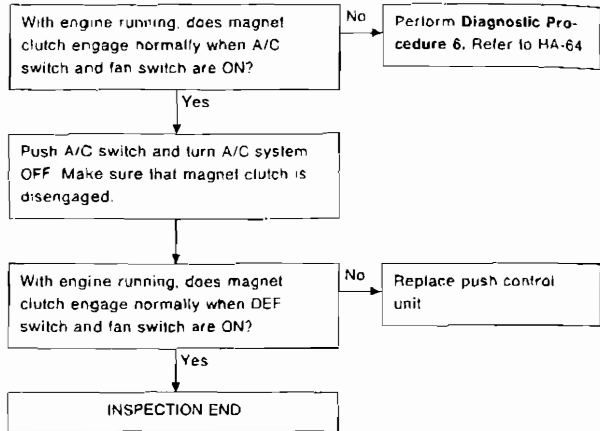


## Preliminary Check (Cont'd)

## PRELIMINARY CHECK 3

Magnet clutch does not engage in DEF mode.

- Perform PRELIMINARY CHECK 2 before referring to the following flow chart.



## Preliminary Check (Cont'd)






## PRELIMINARY CHECK 4

Air outlet does not change.

TURN IGNITION SWITCH ON DOES AIR COME OUT NORMALLY FROM EACH DUCT WHEN EACH MODE SWITCH IS PUSHED?

No

Perform Diagnostic Procedure 2. Refer to HA-58

| Switch mode/<br>Indicator   | Air outlet/distribution |      |           |
|---|-------------------------|------|-----------|
|   | Face                    | Foot | Defroster |
|  | 100%                    | —    | —         |
|  | 60%                     | 40%  | —         |
|  | —                       | 80%  | 20%       |
|  | —                       | 60%  | 40%       |
|  | —                       | —    | 100%      |

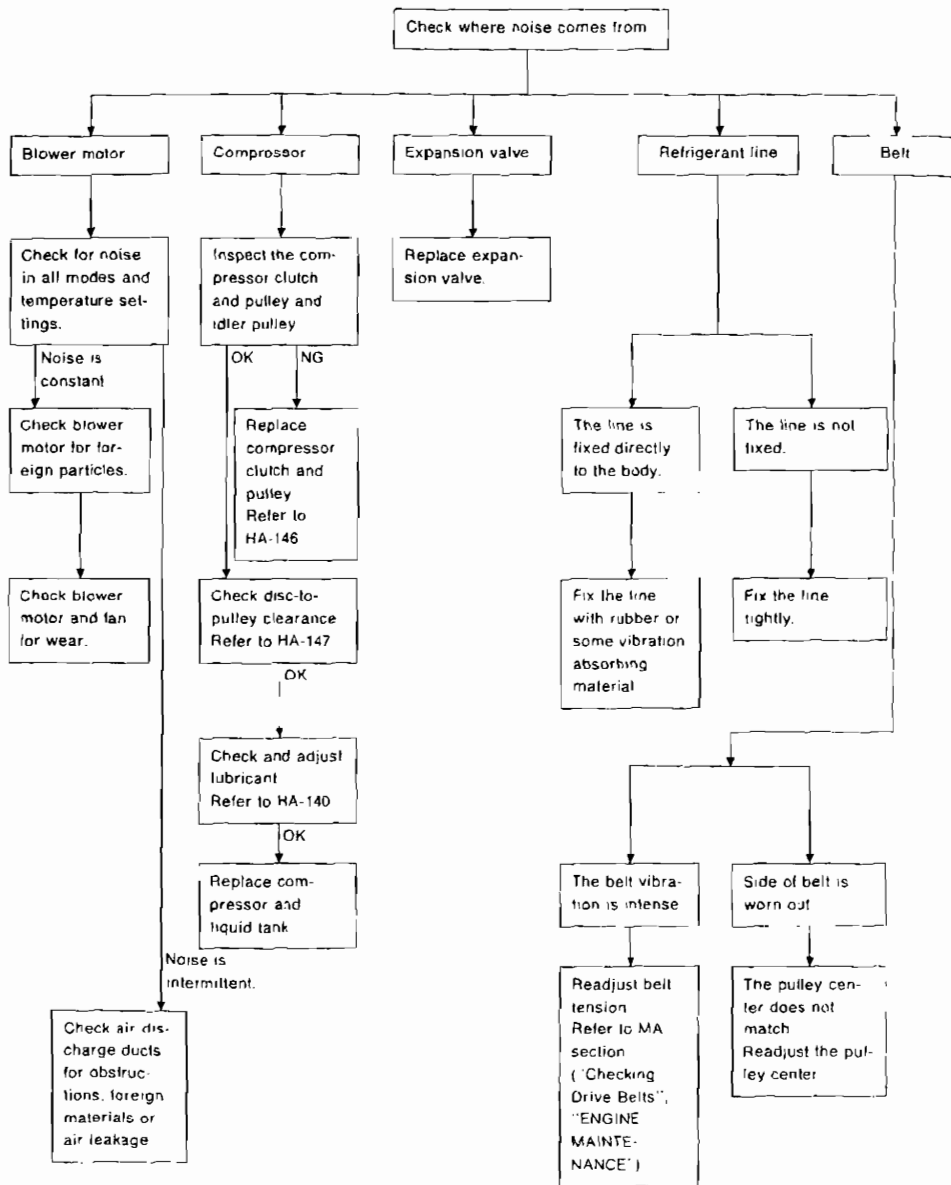
Yes

INSPECTION END

## Preliminary Check (Cont'd)

## PRELIMINARY CHECK 5

## Noise

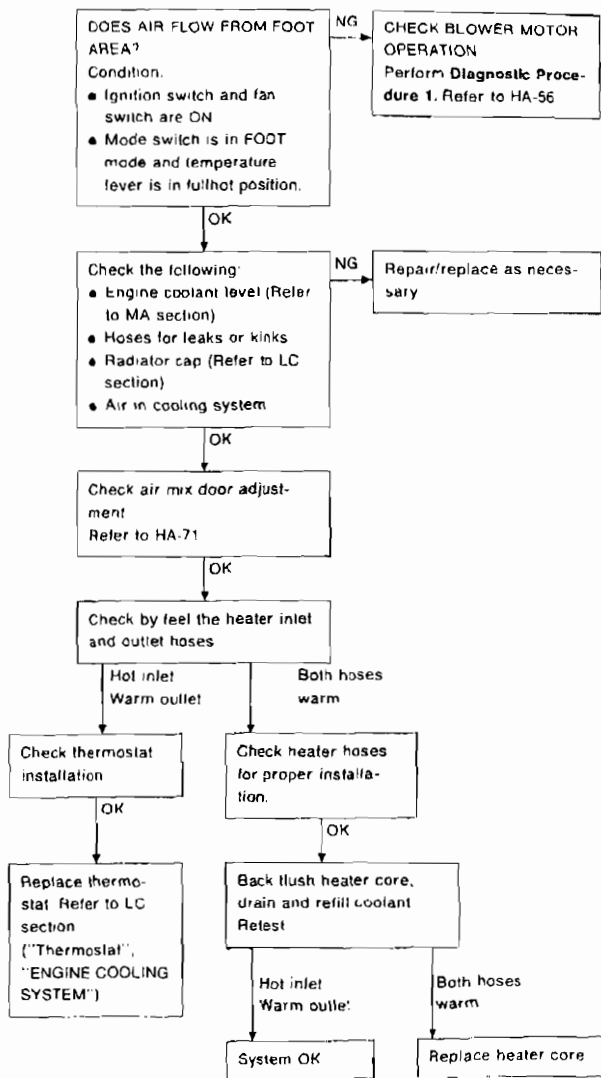




## Preliminary Check (Cont'd)

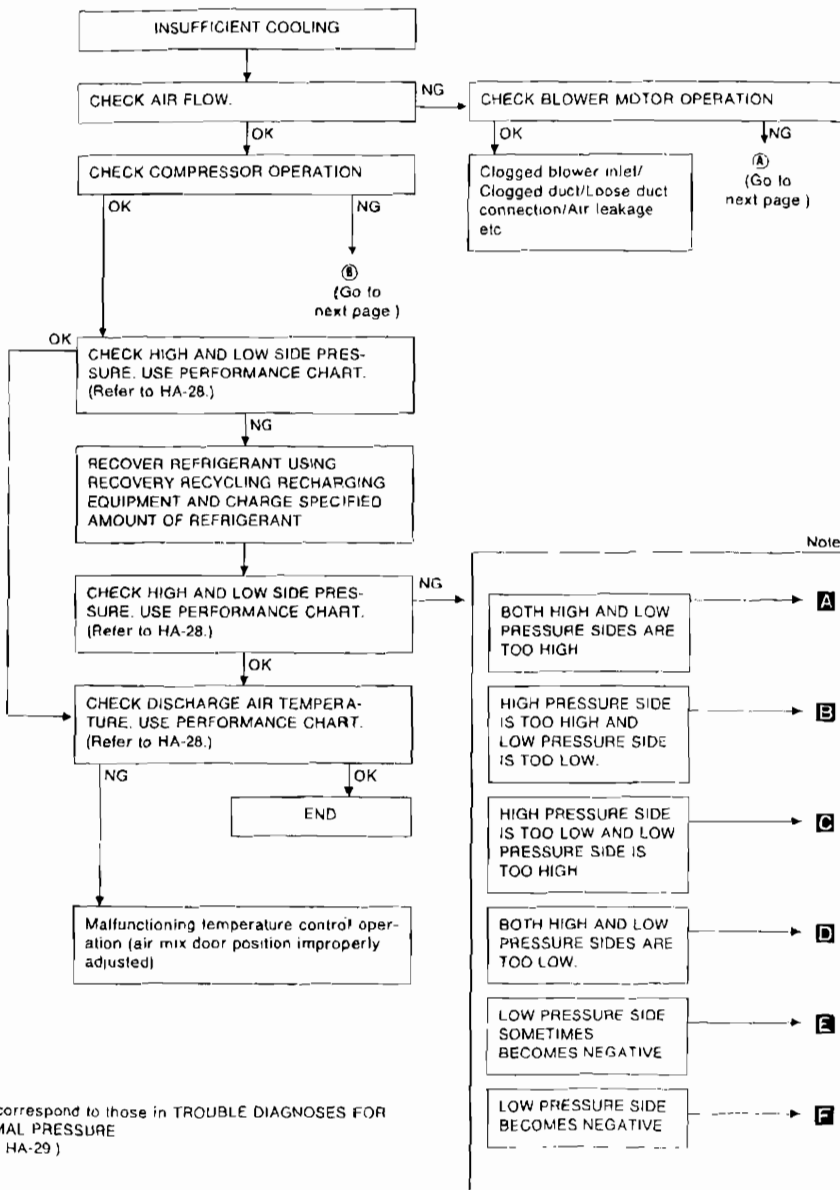
## PRELIMINARY CHECK 6

Insufficient heating



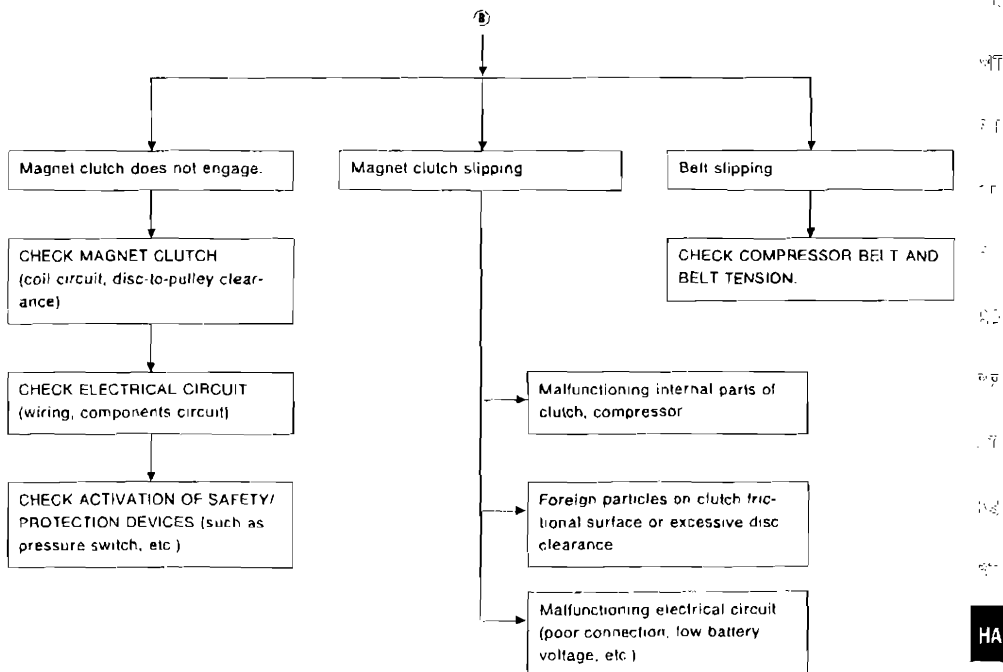
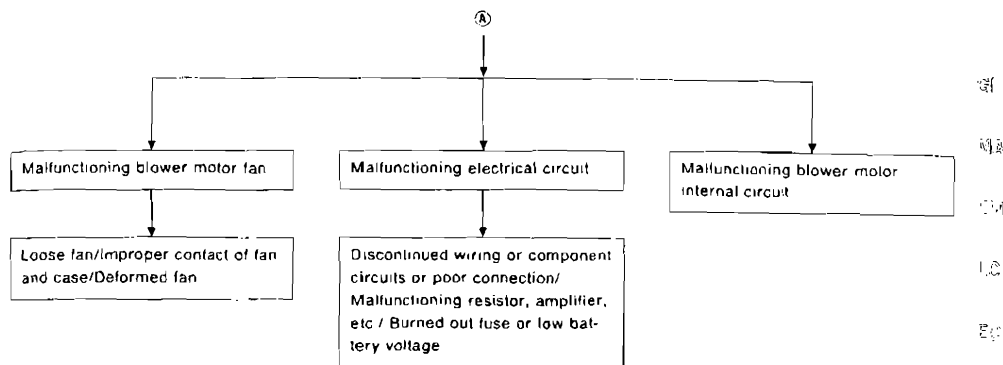
## Performance Test Diagnoses

### INSUFFICIENT COOLING



Note **A-F** correspond to those in TROUBLE DIAGNOSES FOR ABNORMAL PRESSURE (Refer to HA-29)

## Performance Test Diagnoses (Cont'd)



## Performance Chart

## TEST CONDITION

Testing must be performed as follows:

Vehicle location: Indoors or in the shade (in a well ventilated place)

Doors: Closed

Door window: Open (Front driver side only)

Hood: Open

TEMP setting: Max COLD

Discharge Air: Face Vent

RECIRC switch: (Recirculation) ON

FAN speed: High speed

A/C switch: ON

Engine speed: Idle speed

Operate the air conditioning system for 10 minutes before taking measurements.

## TEST READING

## Recirculating-to-discharge air temperature table

| Inside air<br>at blower assembly inlet for RECIRC* |                            | Discharge air temperature at center ventilator<br>°C (°F) |
|--|----------------------------|---|
| Relative humidity<br>%                             | Air temperature<br>°C (°F) |   |
| 50 - 60  | 20 (68)                    | 6.2 - 8.8 (43 - 48)                                       |
|  | 25 (77)                    | 10.4 - 13.5 (51 - 56)                                     |
|  | 30 (86)                    | 14.6 - 18.2 (58 - 65)                                     |
|  | 35 (95)                    | 18.7 - 23.0 (66 - 73)                                     |
| 60 - 70  | 20 (68)                    | 8.8 - 11.6 (48 - 53)                                      |
|  | 25 (77)                    | 13.5 - 16.8 (56 - 62)                                     |
|  | 30 (86)                    | 18.2 - 22.0 (65 - 72)                                     |
|  | 35 (95)                    | 23.0 - 27.2 (73 - 81)                                     |

\* Thermometer should be placed at intake unit under RH side of instrument panel

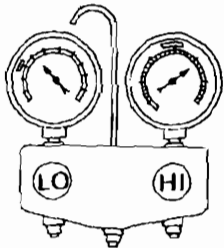
## Ambient air temperature-to-operating pressure table

| Ambient air            |                            | High-pressure (Discharge side)<br>kPa (bar, kg/cm <sup>2</sup> , psi) | Low-pressure (Suction side)<br>kPa (bar, kg/cm <sup>2</sup> , psi) |
|------------------------|----------------------------|---|--|
| Relative humidity<br>% | Air temperature<br>°C (°F) |   |  |
| 50 - 70                | 25 (77)                    | 814 - 991 (8.14 - 9.91,<br>8.3 - 10.1, 118 - 144)                     | 147 - 216 (1.47 - 2.16, 1.5 - 2.2, 21 - 31)                        |
|                        | 30 (86)                    | 941 - 1,177 (9.41 - 11.77,<br>9.6 - 12.0, 137 - 171)                  | 157 - 245 (1.57 - 2.45, 1.6 - 2.5, 23 - 36)                        |
|                        | 35 (95)                    | 1,108 - 1,402 (11.08 - 14.02,<br>11.3 - 14.3, 161 - 203)              | 177 - 284 (1.77 - 2.84, 1.8 - 2.9, 26 - 41)                        |
|                        | 40 (104)                   | 1,304 - 1,677 (13.04 - 16.77,<br>13.3 - 17.1, 189 - 243)              | 216 - 343 (2.16 - 3.43, 2.2 - 3.5, 31 - 50)                        |

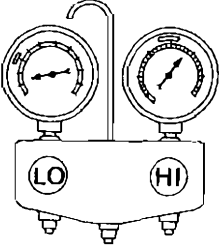
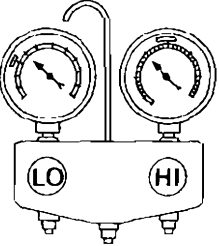
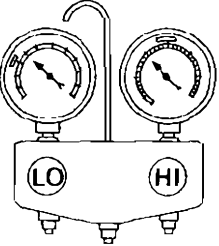
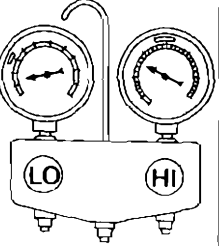
If pressure is not within range, refer to HA-29, "Trouble Diagnoses for Abnormal Pressure".

### Trouble Diagnoses for Abnormal Pressure

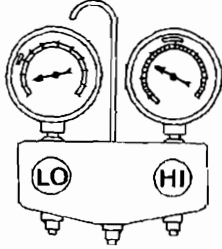
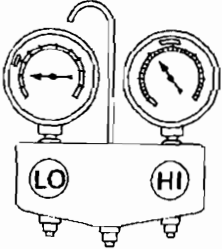
Whenever system's high and/or low side pressure is abnormal, diagnose using a manifold gauge. The marker above the gauge scale in the following tables indicates the standard (normal) pressure range. Since the standard (normal) pressure, however, differs from vehicle to vehicle refer to HA-28 ("Ambient air temperature-to-compressor pressure table").

| Gauge indication   | Refrigerant cycle   | Probable cause   | Corrective action  |
|--|---|--|--|
| Both high and low-pressure sides are too high<br><b>A</b>                                      | <ul style="list-style-type: none"> <li>● Pressure is reduced soon after water is splashed on condenser</li> </ul>   | Excessive refrigerant charge in refrigeration cycle  | Reduce refrigerant until specified pressure is obtained  |
|  <p>AC359A</p> | Air suction by cooling fan is insufficient  | Insufficient condenser cooling performance<br>↓<br>① Condenser fins are clogged<br>② Improper fan rotation of cooling fan  | <ul style="list-style-type: none"> <li>● Clean condenser.</li> <li>● Check and repair cooling fan as necessary.</li> </ul> |
|  | <ul style="list-style-type: none"> <li>● Low-pressure pipe is not cold</li> <li>● When compressor is stopped high-pressure value quickly drops by approximately 196 kPa (2.0 bar, 2 kg/cm<sup>2</sup>, 28 psi). It then decreases gradually thereafter</li> </ul> | Poor heat exchange in condenser<br>(After compressor operation stops, high pressure decreases too slowly)<br>↓<br>Air in refrigeration cycle   | Evacuate repeatedly and recharge system  |
|  | Engine tends to overheat  | Engine cooling systems malfunction   | Check and repair each engine cooling system.   |
|  | <ul style="list-style-type: none"> <li>● An area of the low-pressure pipe is colder than areas near the evaporator outlet</li> <li>● Plates are sometimes covered with frost</li> </ul>   | <ul style="list-style-type: none"> <li>● Excessive liquid refrigerant on low-pressure side</li> <li>● Excessive refrigerant discharge flow</li> <li>● Expansion valve is open a little compared with the specification.</li> </ul> ↓<br>① Improper thermal valve installation<br>② Improper expansion valve adjustment | Replace expansion valve  |
|  |   |  |  |

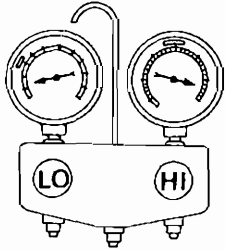
### Trouble Diagnoses for Abnormal Pressure (Cont'd)

| Gauge indication   | Refrigerant cycle  | Probable cause   | Corrective action  |
|--|--|--|--|
| <p>High-pressure side is too high and low-pressure side is too low<br/>B</p>  <p>AC360A</p>  | Upper side of condenser and high-pressure side are hot, however, liquid tank is not so hot   | High-pressure tube or parts located between compressor and condenser are clogged or crushed  | <ul style="list-style-type: none"> <li>● Check and repair or replace malfunctioning parts.</li> <li>● Check lubricant for contamination</li> </ul>   |
| <p>High-pressure side is too low and low-pressure side is too high.<br/>C</p>  <p>AC356A</p> | High and low-pressure sides become equal soon after compressor operation stops   | <p>Compressor pressure operation is improper.</p> <p style="text-align: center;">↓</p> <p>Damaged inside compressor packings</p>   | Replace compressor   |
| <p>No temperature difference between high and low-pressure sides</p>  <p>AC356A</p>          | No temperature difference between high and low-pressure sides  | Compressor discharge capacity does not change (Compressor stroke is set at maximum)  | Replace compressor   |
| <p>Both high- and low-pressure sides are too low<br/>D</p>  <p>AC353A</p>                  | <ul style="list-style-type: none"> <li>● There is a big temperature difference between liquid tank outlet and inlet. Outlet temperature is extremely low.</li> <li>● Liquid tank inlet and expansion valve are frosted</li> <li>● Temperature of expansion valve inlet is extremely low as compared with areas near liquid tank.</li> <li>● Expansion valve inlet may be frosted</li> <li>● Temperature difference occurs somewhere in high-pressure side</li> </ul> | <p>Liquid tank inside is clogged a little</p> <p>High-pressure pipe located between liquid tank and expansion valve is clogged</p> | <ul style="list-style-type: none"> <li>● Replace liquid tank</li> <li>● Check lubricant for contamination</li> <li>● Check and repair malfunctioning parts</li> <li>● Check lubricant for contamination</li> </ul> |

### Trouble Diagnoses for Abnormal Pressure (Cont'd)

| Gauge indication   | Refrigerant cycle  | Probable cause   | Corrective action   |
|--|--|--|---|
| <p>Both high- and low-pressure sides are too low.</p> <p><b>D</b></p>  <p>AC353A</p> | <p>There is a big temperature difference between expansion valve inlet and outlet while the valve itself is frosted</p> <p>An area of the low-pressure pipe is colder than areas near the evaporator outlet</p> <p>Air flow volume is not enough or is too low</p> | <p>Expansion valve closes a little compared with the specification</p> <p>↓</p> <ol style="list-style-type: none"> <li>① Improper expansion valve adjustment</li> <li>② Malfunctioning thermal valve</li> <li>③ Outlet and inlet may be clogged</li> </ol> <p>Low-pressure pipe is clogged or crushed</p> <p>Evaporator is frozen</p> <p>↓</p> <p>Compressor discharge capacity does not change. (Compressor stroke is set at maximum length.)</p> | <ul style="list-style-type: none"> <li>● Remove foreign particles by using compressed air</li> <li>● Check lubricant for contamination</li> </ul> <ul style="list-style-type: none"> <li>● Check and repair malfunctioning parts</li> <li>● Check lubricant for contamination.</li> </ul> <p>Replace compressor</p> |
| <p>Low-pressure side sometimes becomes negative</p> <p><b>E</b></p>  <p>AC354A</p>   | <ul style="list-style-type: none"> <li>● Air conditioning system does not function and does not cyclically cool the compartment air.</li> <li>● The system constantly functions for a certain period of time after compressor is stopped and restarted</li> </ul>  | <p>Refrigerant does not discharge cyclically</p> <p>↓</p> <p>Moisture is frozen at expansion valve outlet and inlet</p> <p>↓</p> <p>Water is mixed with refrigerant</p>  | <ul style="list-style-type: none"> <li>● Drain water from refrigerant or replace refrigerant</li> <li>● Replace liquid tank</li> </ul>  |

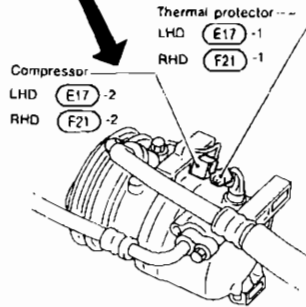
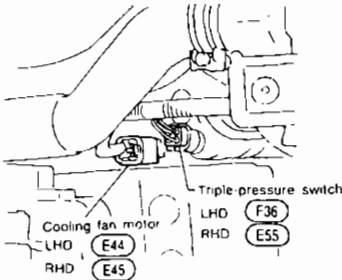
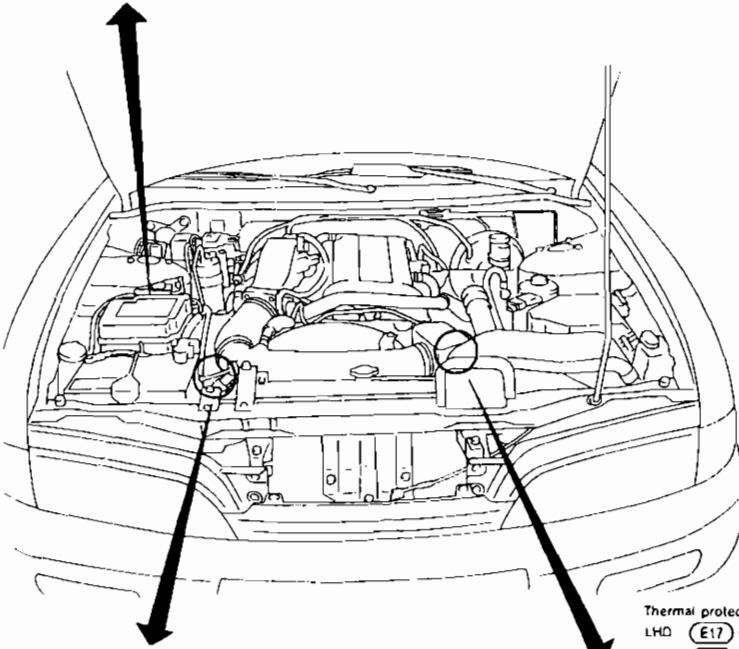
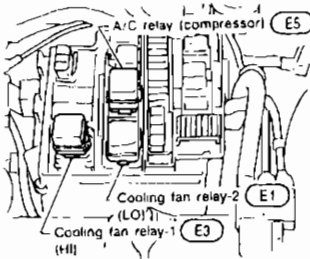
### Trouble Diagnoses for Abnormal Pressure (Cont'd)

| Gauge indication   | Refrigerant cycle  | Probable cause   | Corrective action  |
|--|--|--|--|
| Low-pressure side becomes negative.<br><b>F</b> <br>AC382A | Liquid tank or front/rear side of expansion valve's pipe is frosted or dewed | High-pressure side is closed and refrigerant does not flow<br>↓<br>Expansion valve or liquid tank is frosted | Leave the system at rest until no frost is present. Start it again to check whether or not the problem is caused by water or foreign particles. If water is the cause, initially cooling is okay. Then the water freezes, causing a blockage. <ul style="list-style-type: none"> <li>● If the problem is due to water, drain water from refrigerant or replace refrigerant</li> <li>● If due to foreign particles, remove expansion valve and remove the particles with dry and compressed air (not shop air)</li> <li>● If either of the above methods cannot correct the problem, replace expansion valve</li> <li>● Replace liquid tank</li> <li>● Check lubricant for contamination</li> </ul> |



Harness Layout

ENGINE COMPARTMENT



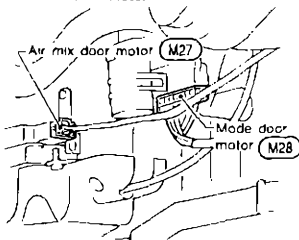
SHA506E

HA

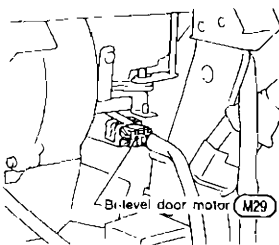
### PASSENGER COMPARTMENT

LHD model

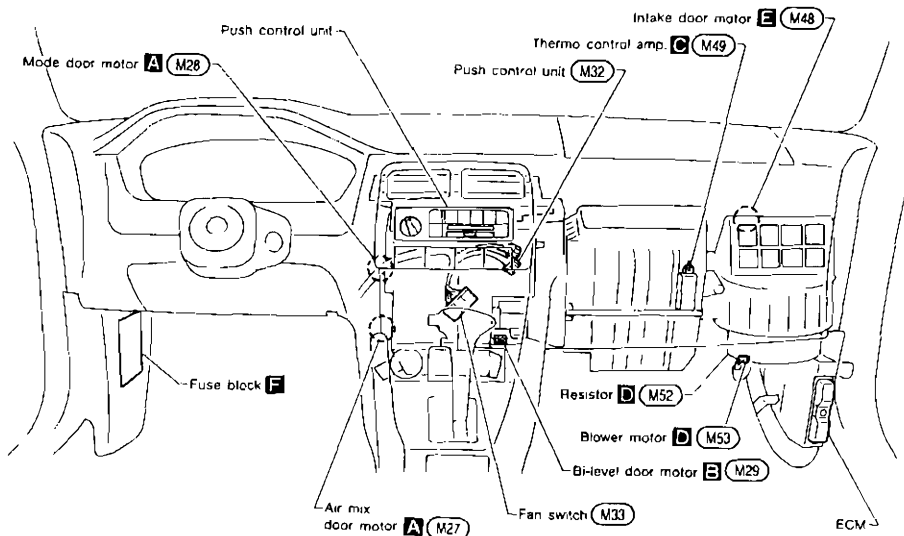
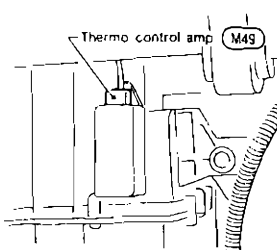
**A** Air mix door motor  
Mode door motor



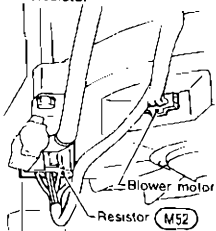
**B** Bi-level door motor



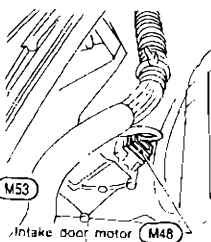
**C** Thermo control amp.



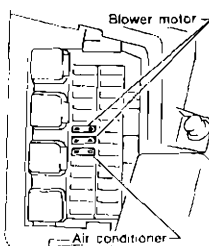
**D** Blower motor  
Resistor



**E** Intake door motor



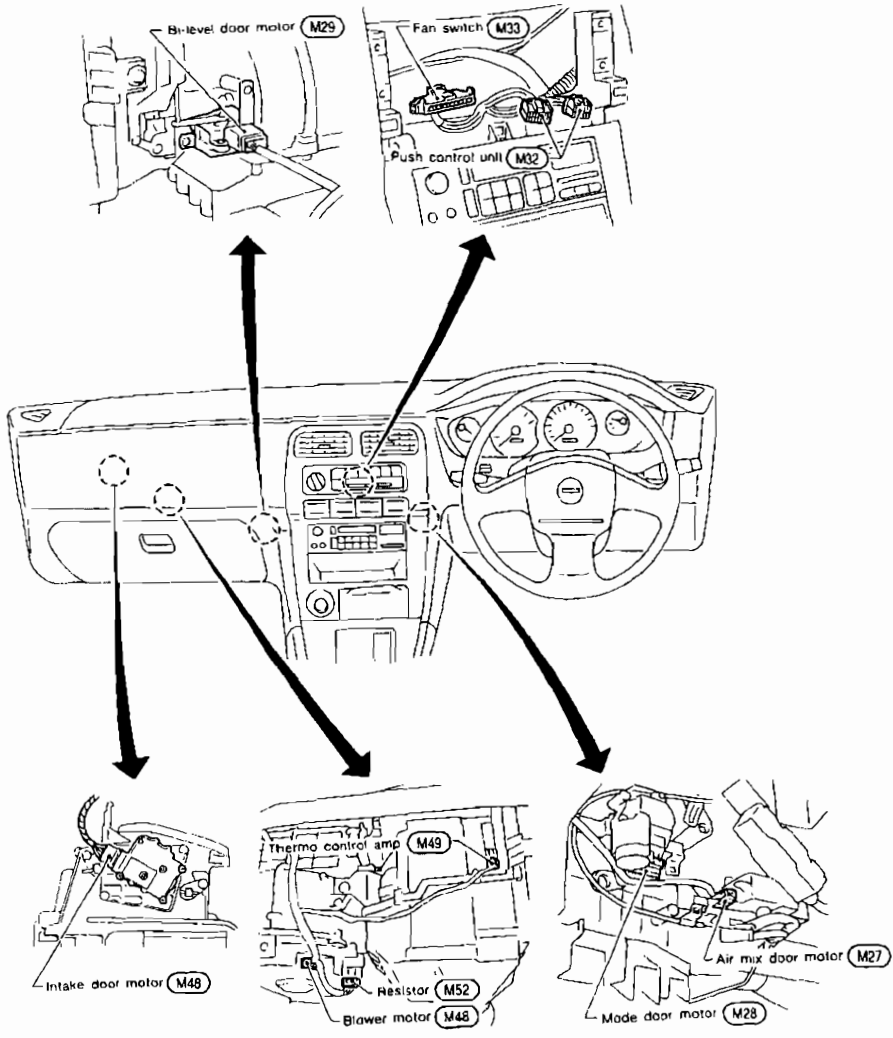
**F** Fuse block



# TROUBLE DIAGNOSES

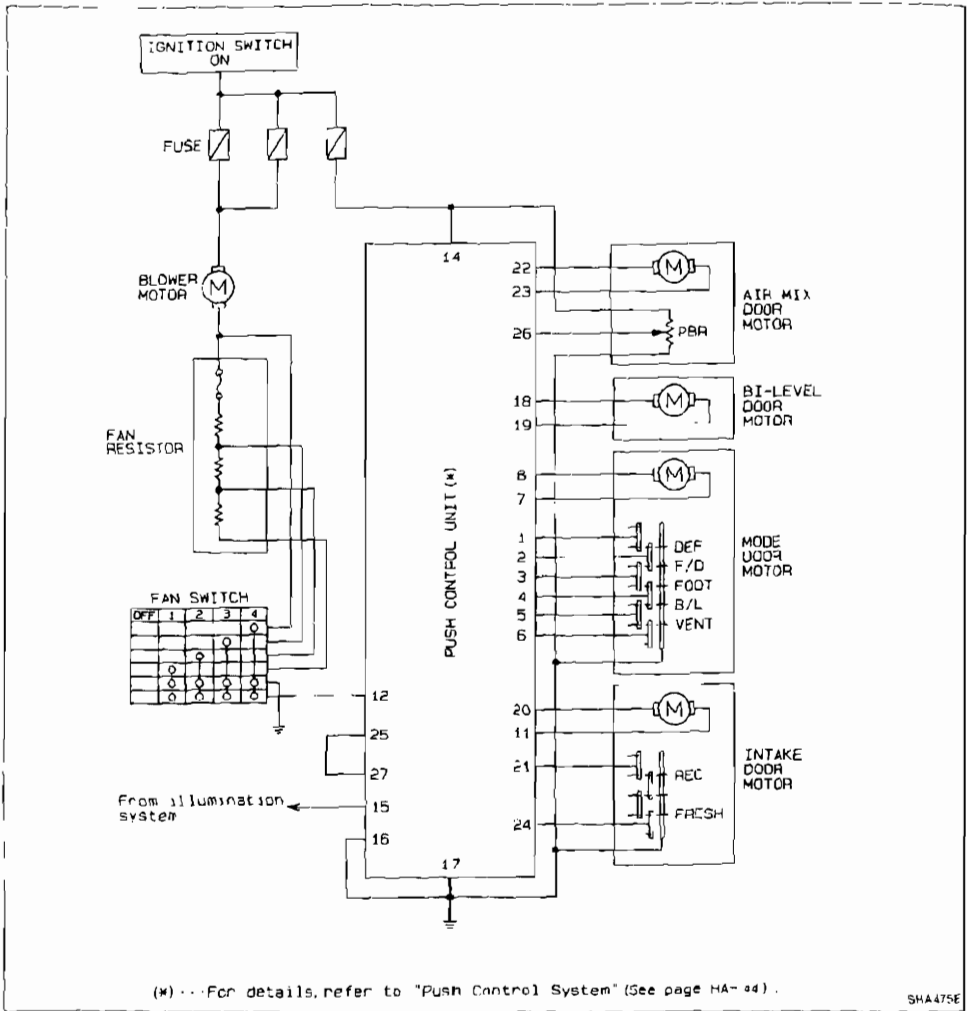
## Harness Layout (Cont'd)

RHD model



GI  
 MA  
 EM  
 LG  
 EC  
 FE  
 CL  
 WT  
 AT  
 PD  
 FA  
 PA  
 BR  
 ST  
 PS  
 ST  
 HA  
 EL  
 FDX

Circuit Diagram — Heater



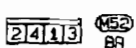
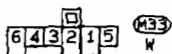
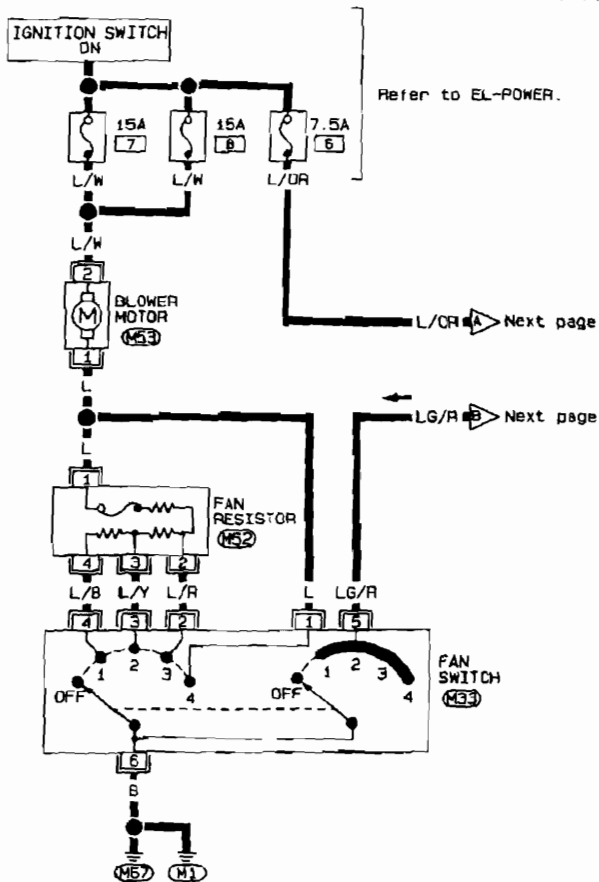
(\*) ... For details, refer to "Push Control System" (See page HA-44).

SHA475E

Wiring Diagram — HEAT —

LHD MODEL

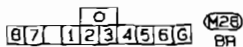
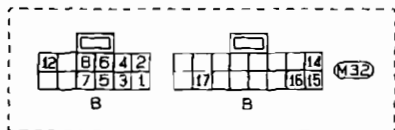
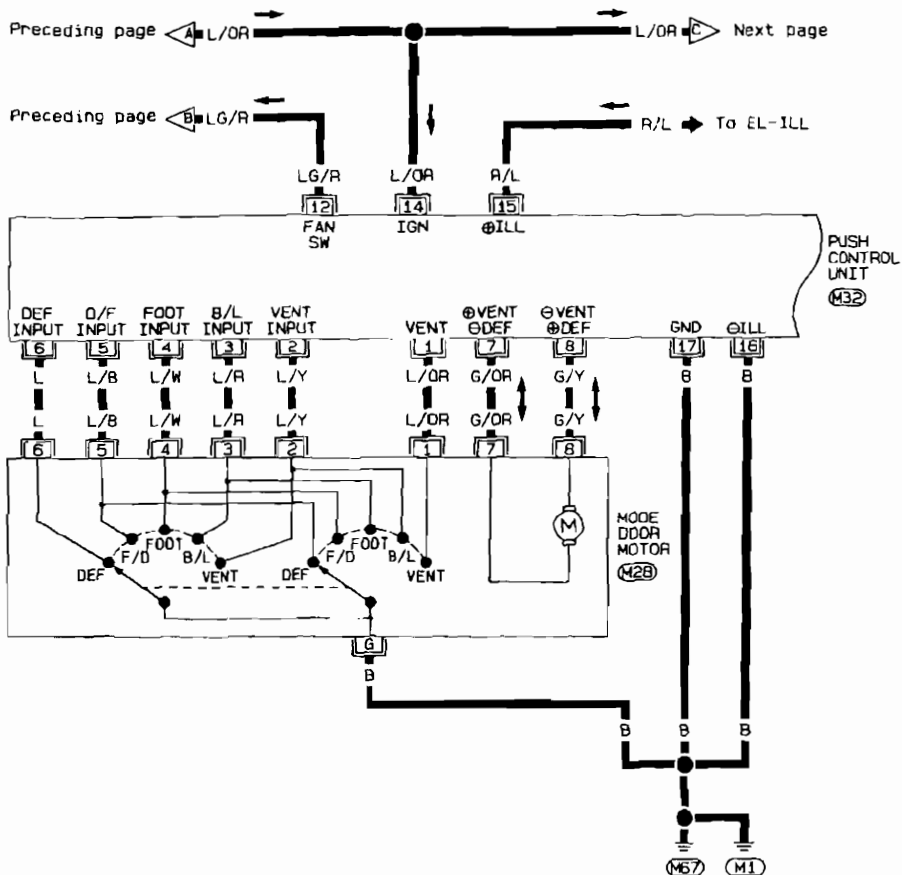
HA-HEAT-01



HA

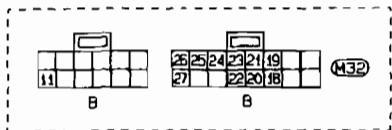
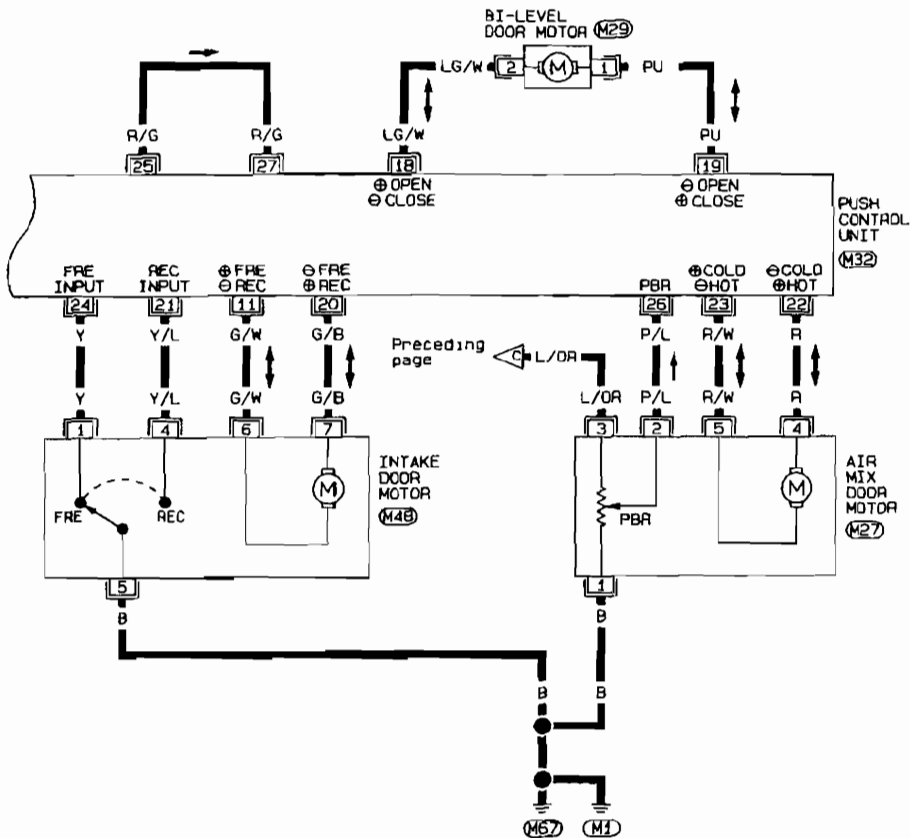
Wiring Diagram — HEAT — (Cont'd)

HA-HEAT-02



Wiring Diagram — HEAT — (Cont'd)

HA-HEAT-03



|   |   |   |   |     |
|---|---|---|---|-----|
| 7 | 5 | 0 |   | M48 |
| 5 | 4 |   | 1 | W   |

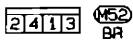
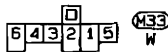
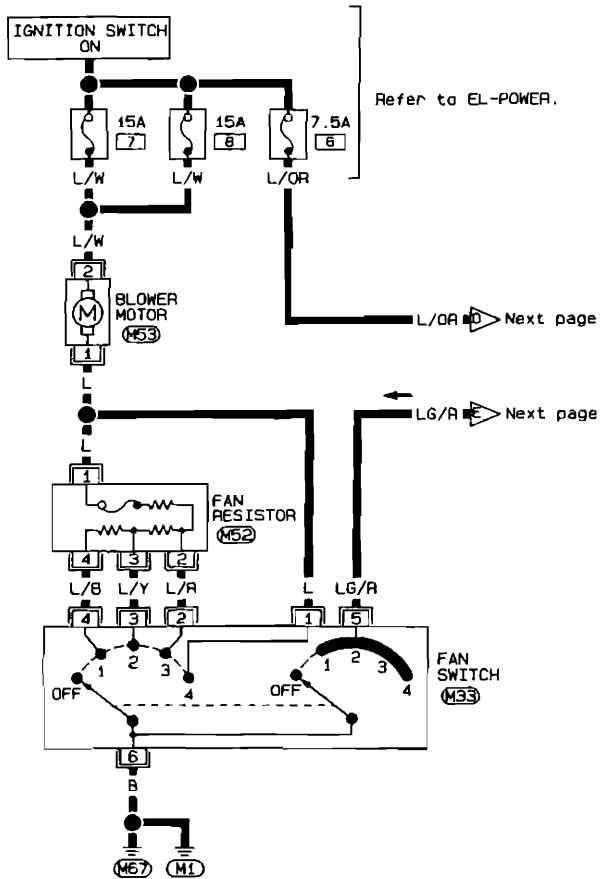
|   |   |   |  |     |
|---|---|---|--|-----|
| 4 | 0 | 5 |  | M27 |
| 1 | 2 | 3 |  | B   |

|   |   |  |  |     |
|---|---|--|--|-----|
| 1 | 0 |  |  | M29 |
| 2 |   |  |  | B   |

Wiring Diagram — HEAT — (Cont'd)

RHD MODEL

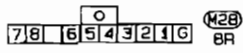
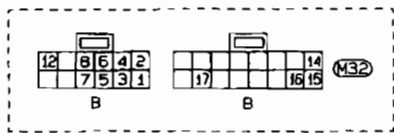
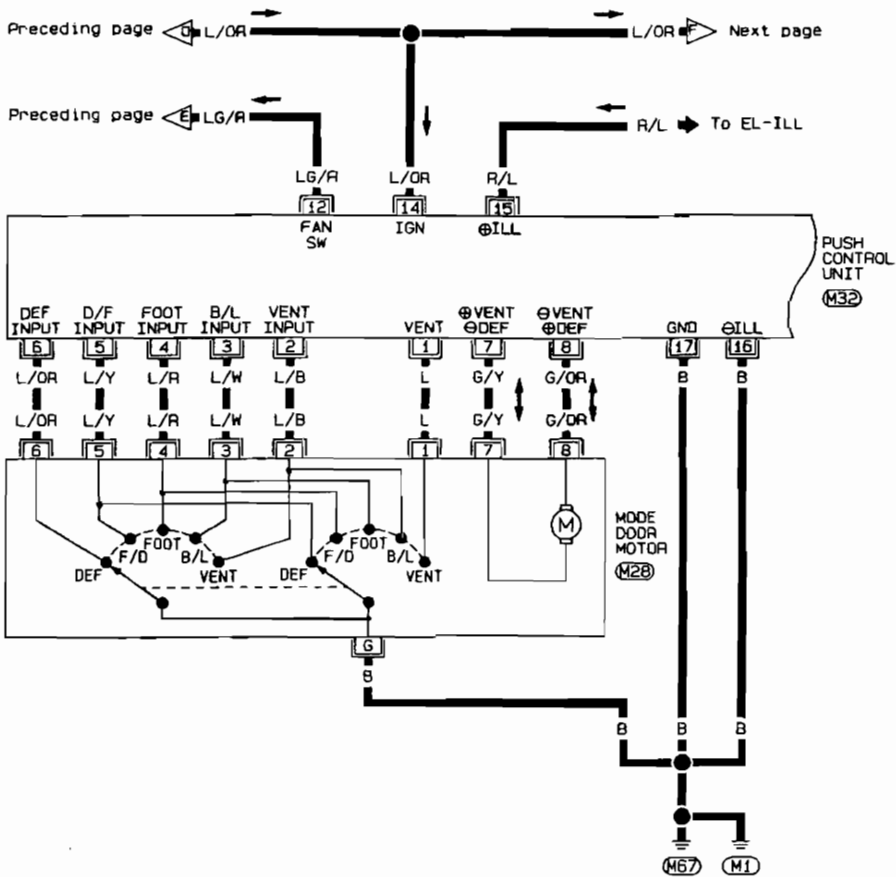
HA-HEAT-04





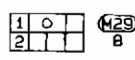
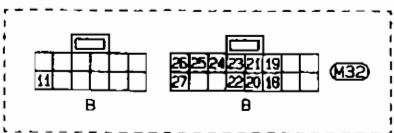
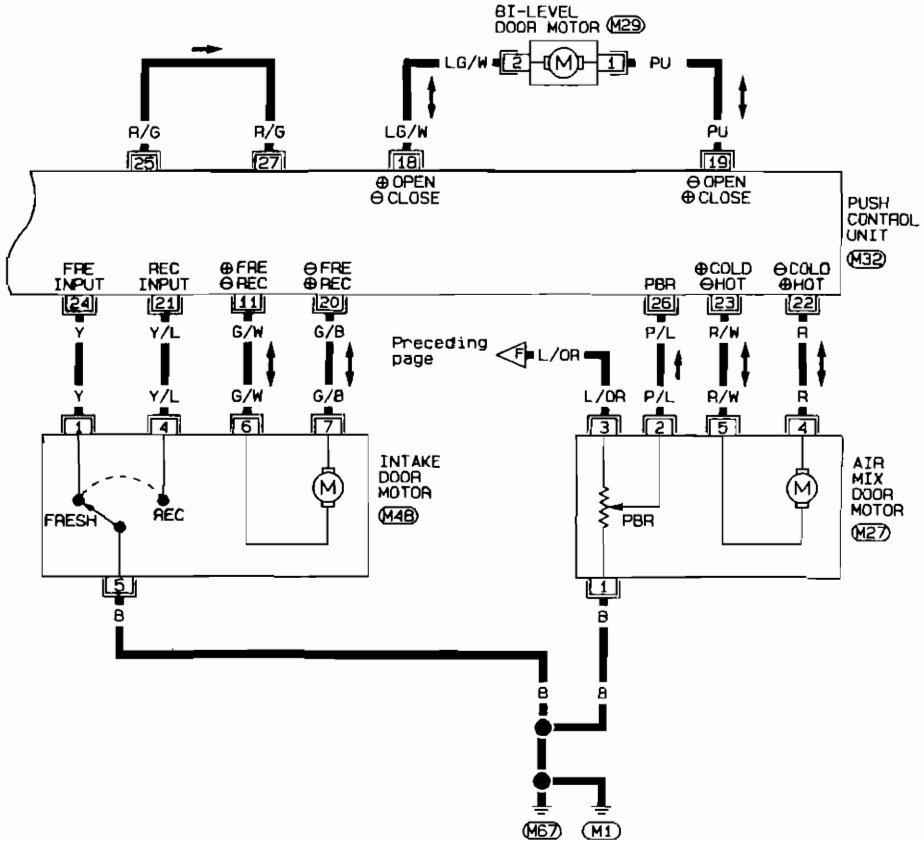
Wiring Diagram — HEAT — (Cont'd)

HA-HEAT-05

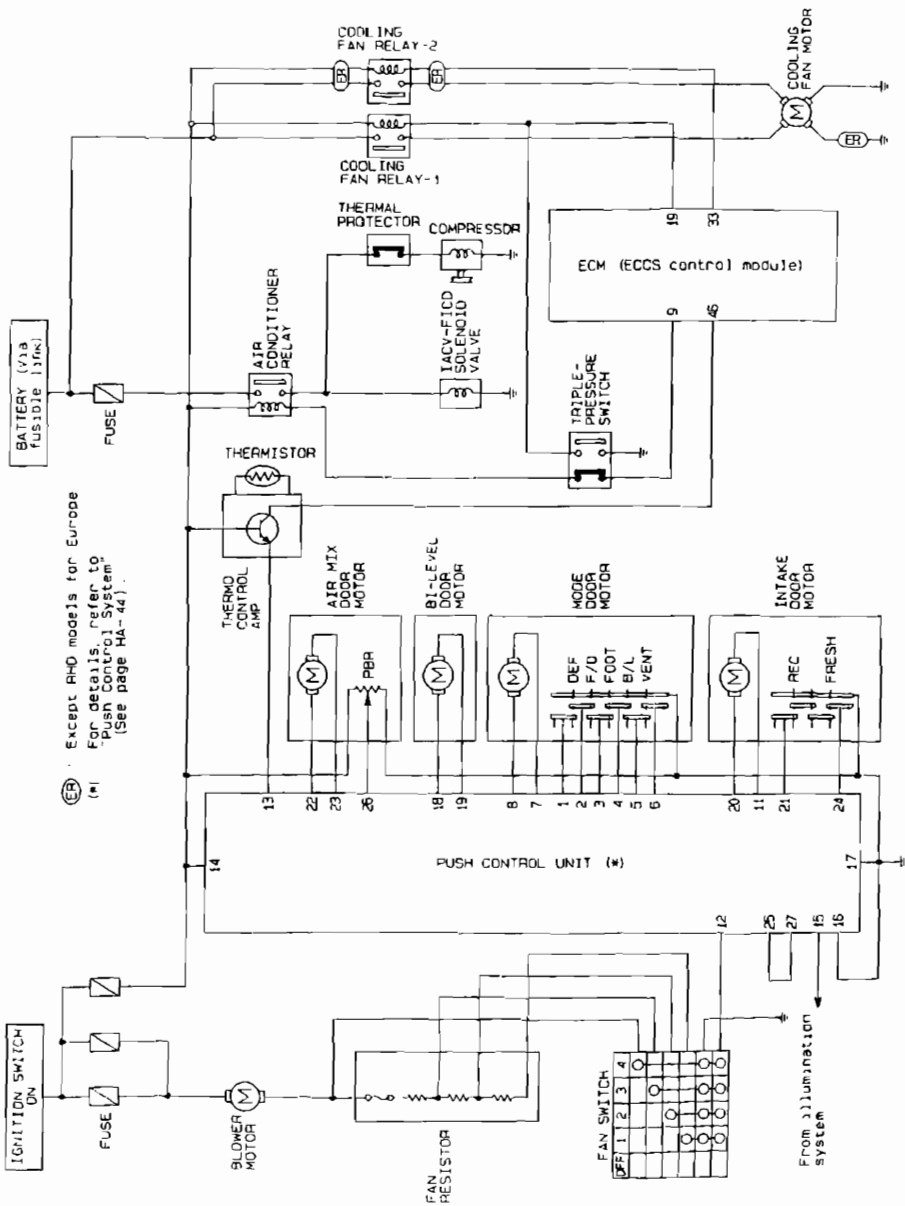


Wiring Diagram — HEAT — (Cont'd)

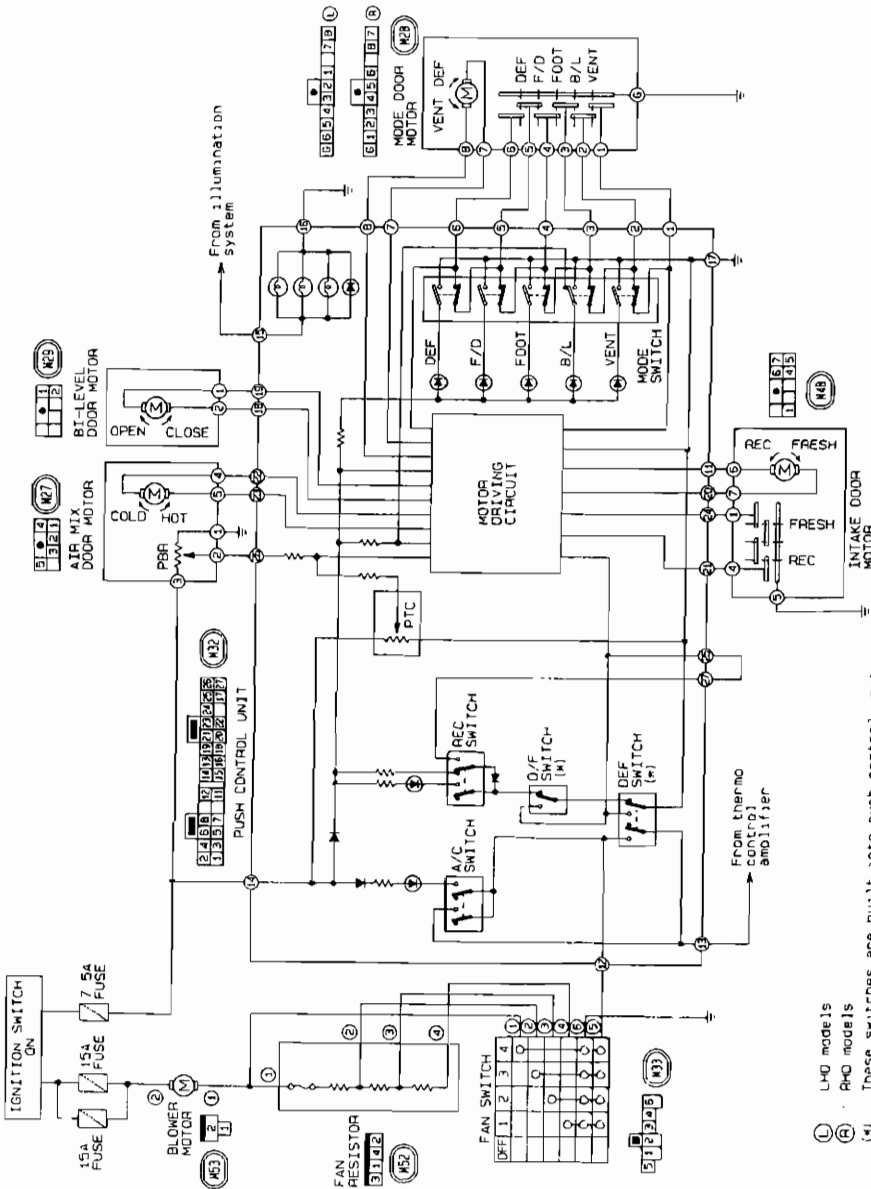
HA-HEAT-06



## Circuit Diagram — Manual Air Conditioner



Circuit Diagram — Push Control Unit



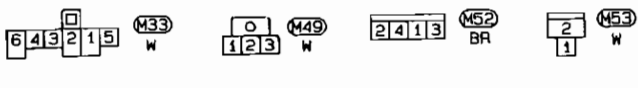
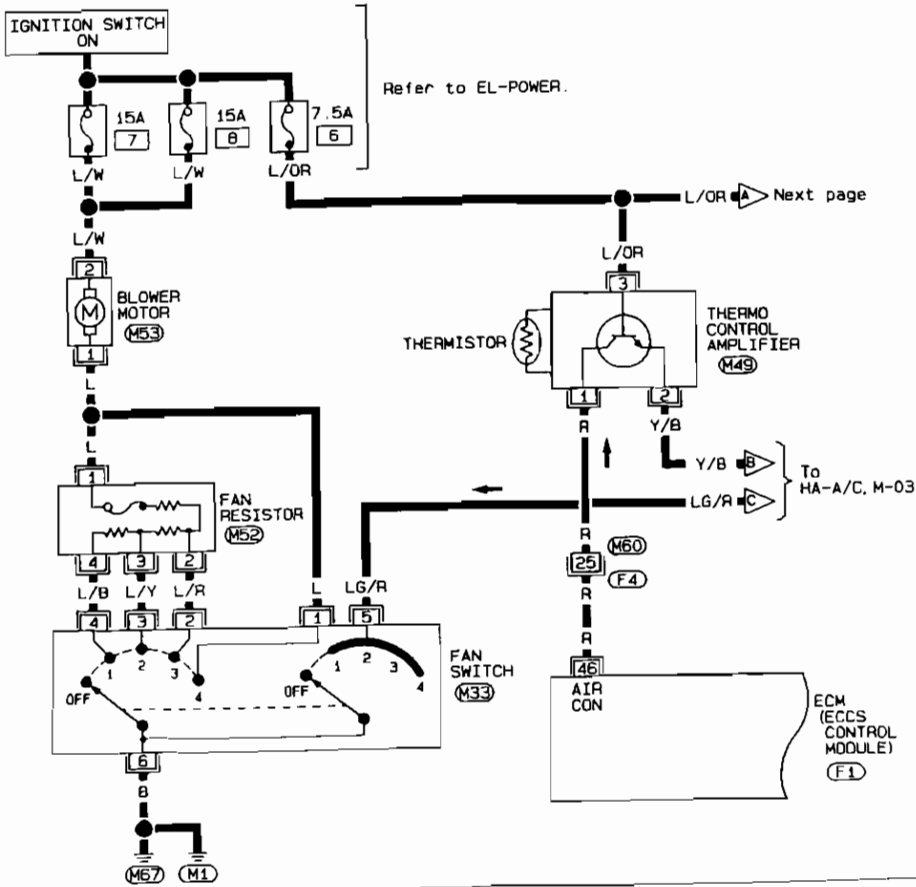
(L) LHO models  
 (R) RHO models  
 (M) These switches are built into push control unit and mechanically linked to corresponding switches.

Wiring Diagram — A/C, M —

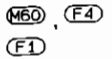
HA-A/C, M-01

4P  
 4A  
 4W  
 4G  
 4C  
 4B  
 4L  
 4M  
 4T  
 4D  
 4E  
 4F  
 4H  
 4J  
 4K  
 4L  
 4M  
 4N  
 4O  
 4P  
 4Q  
 4R  
 4S  
 4T  
 4U  
 4V  
 4W  
 4X  
 4Y  
 4Z

LHD MODEL



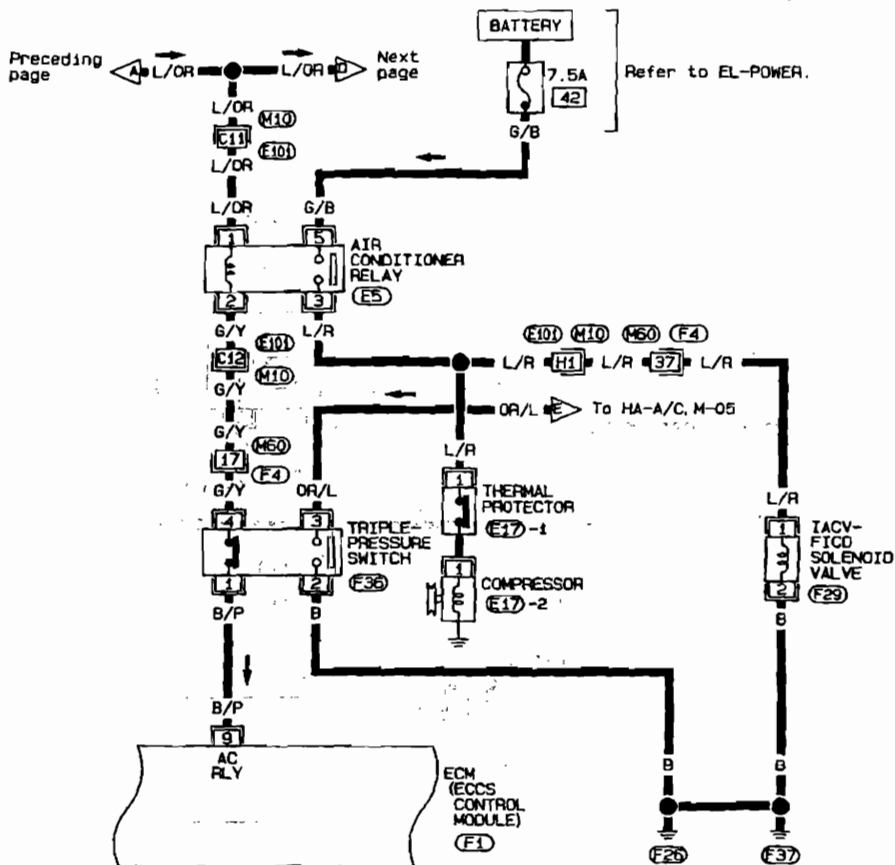
Refer to last page (foldout page).



HA

## Wiring Diagram — A/C, M — (Cont'd)

HA-A/C, M-02

E5  
LE36  
BF29  
PUE17-1  
BE17-2  
WRefer to last page  
(Foldout page).

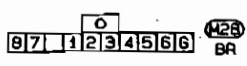
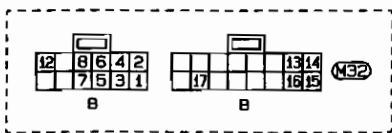
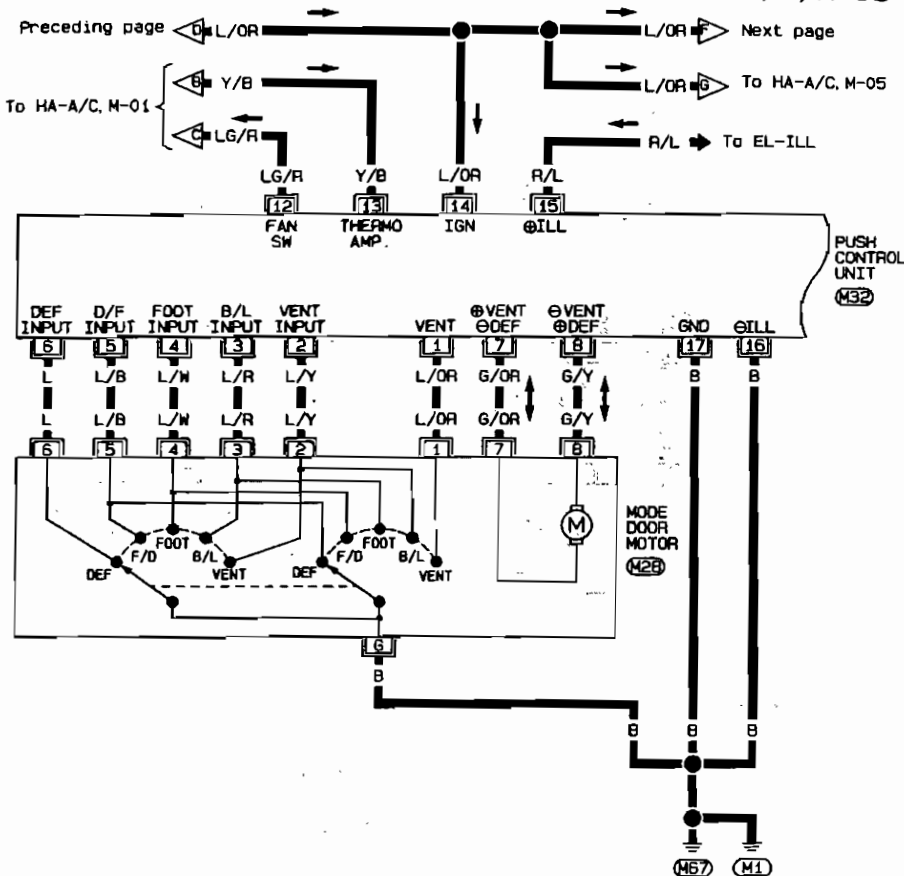
M10, E101

M60, F4

F1

Wiring Diagram — A/C, M — (Cont'd)

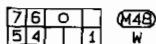
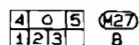
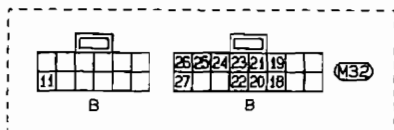
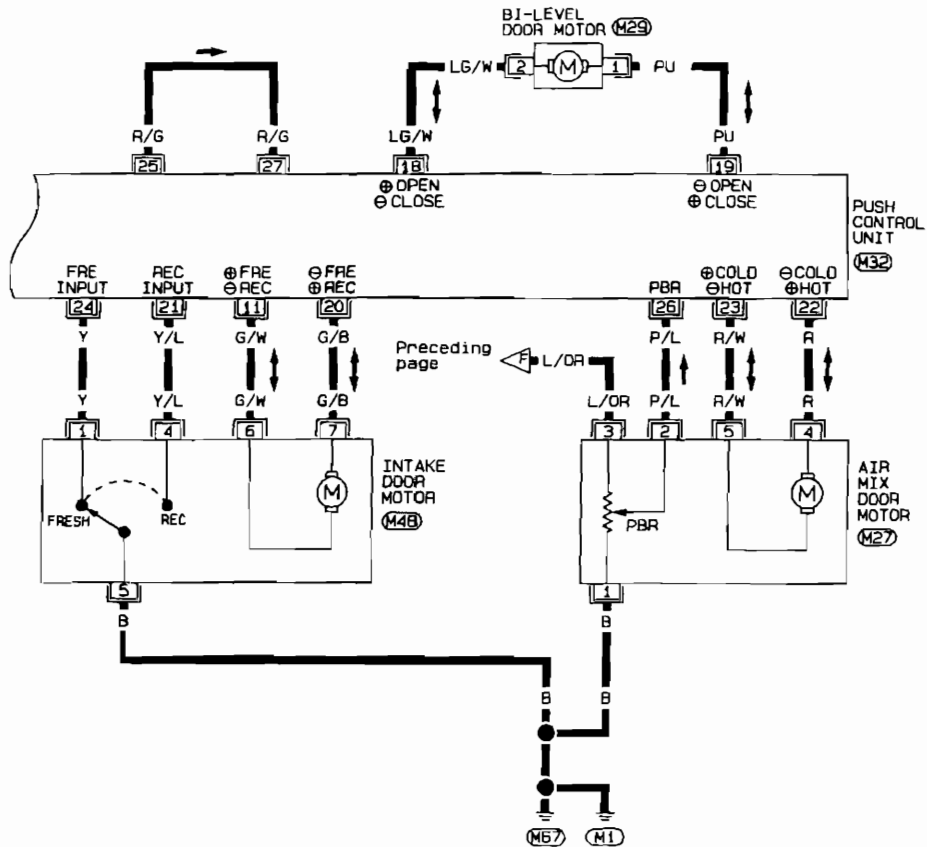
HA-A/C, M-03



GI  
MA  
EM  
LC  
EC  
FE  
CL  
MT  
AT  
PO  
FA  
RA  
BR  
ST  
RS  
BT  
HA  
EL  
FOX

## Wiring Diagram — A/C, M — (Cont'd)

HA-A/C, M-04

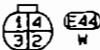
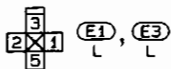
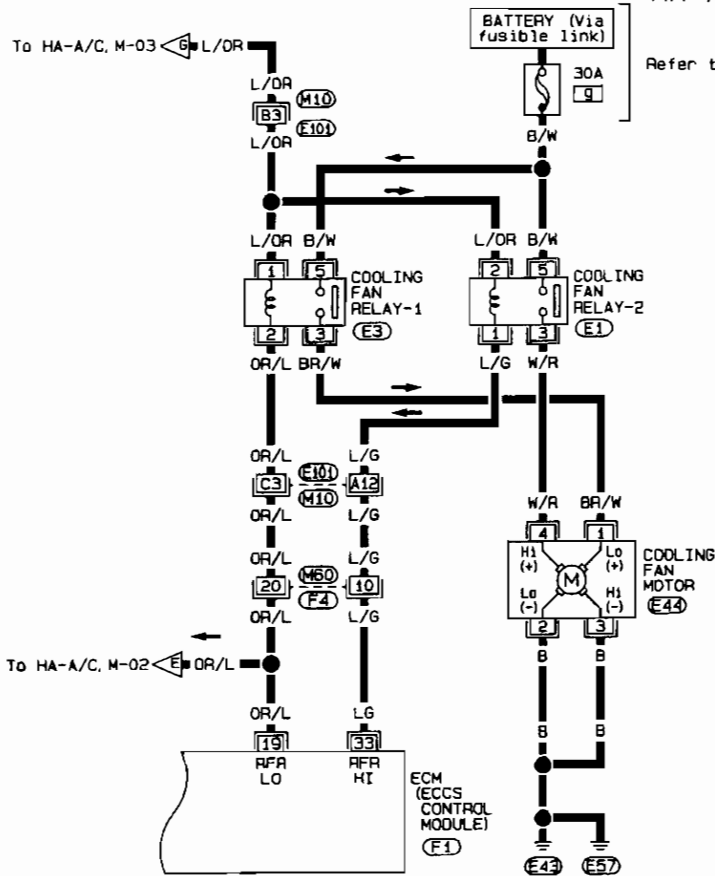




Wiring Diagram — A/C, M — (Cont'd)

HA-A/C, M-05

Refer to EL-POWER.



Refer to last page (Foldout page)

(M10), (E101)

(M60), (F4)

(E1)

HA

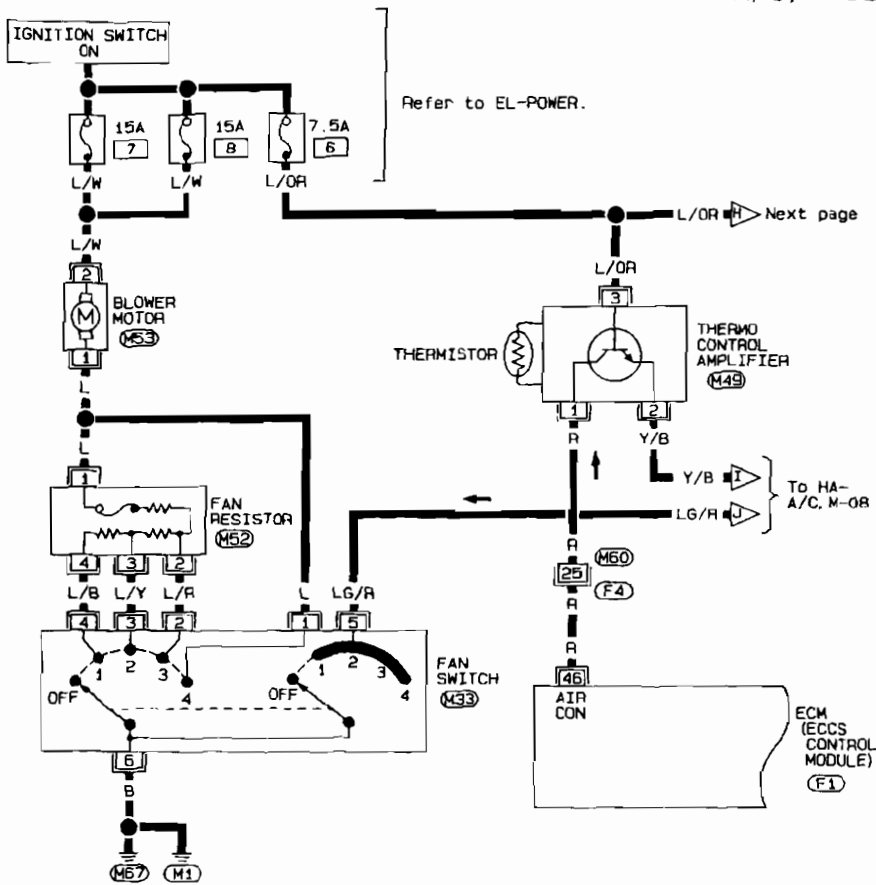
EL

EC

Wiring Diagram — A/C, M — (Cont'd)

RHD MODEL

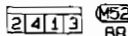
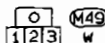
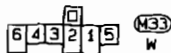
HA-A/C, M-06



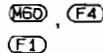
Refer to EL-POWER.

L/OR → Next page

To HA-A/C, M-08

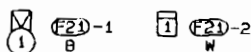
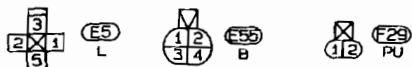
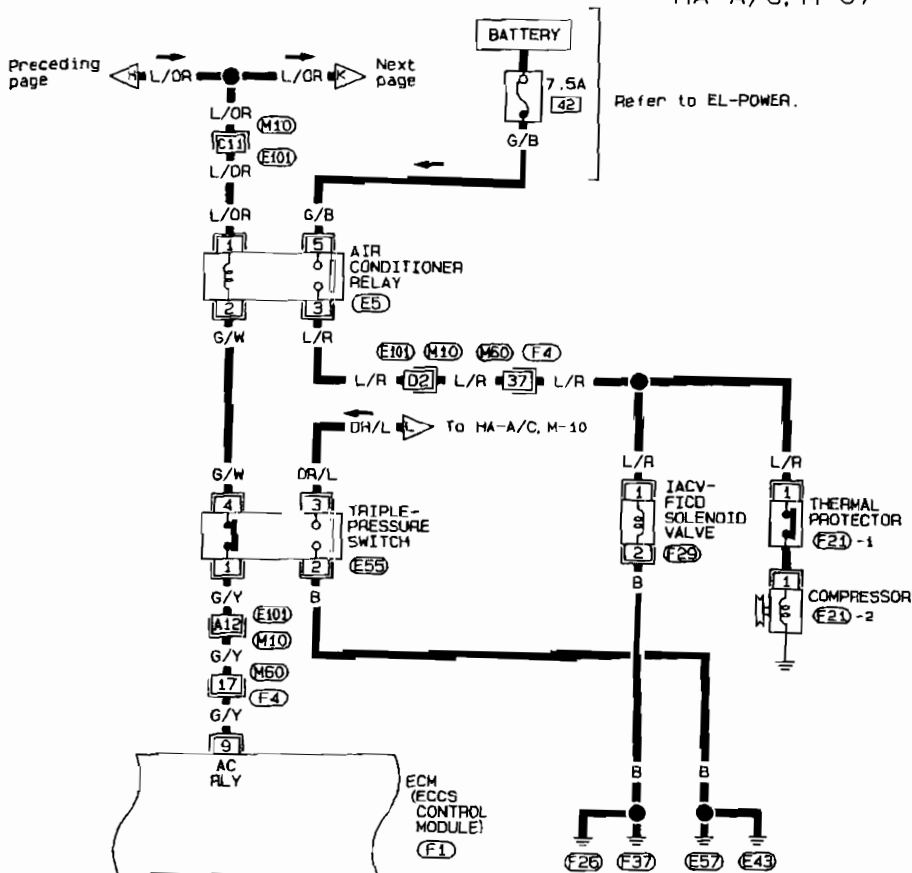


Refer to last page (Foldout page).



Wiring Diagram — A/C, M — (Cont'd)

HA-A/C, M-07



Refer to last page (Foldout page).

M10, E101

M50, F4

F1

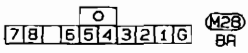
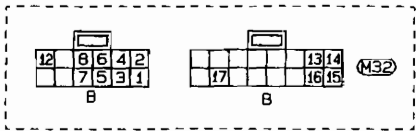
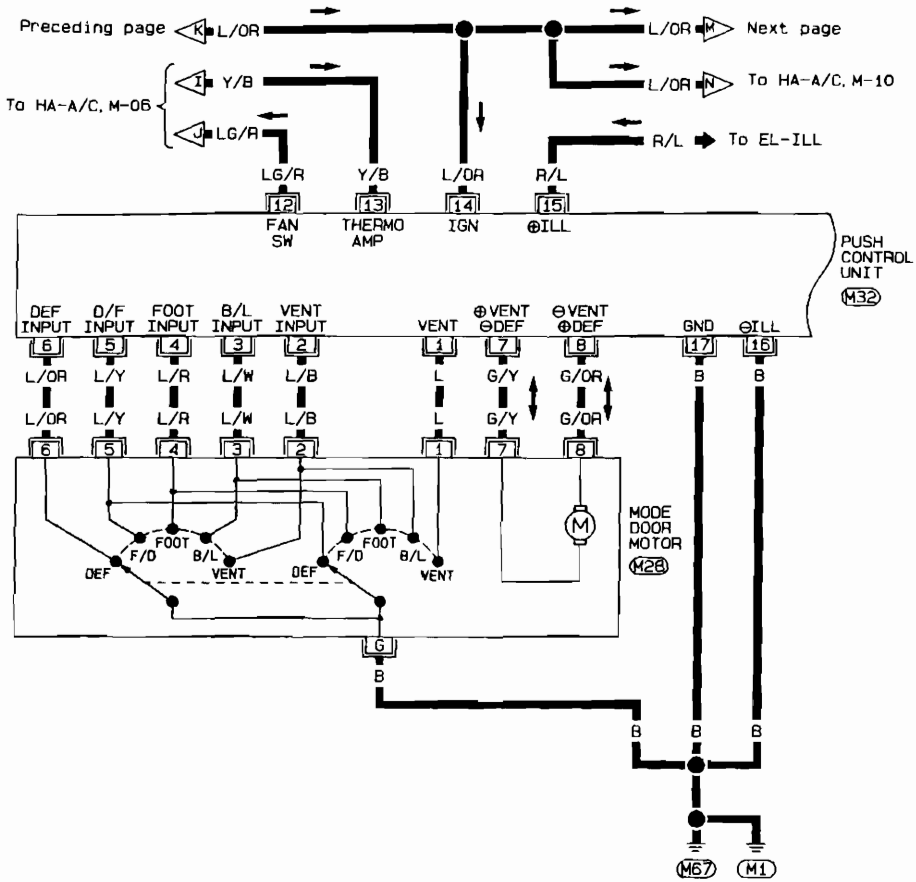
HA

E1

EX

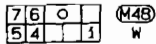
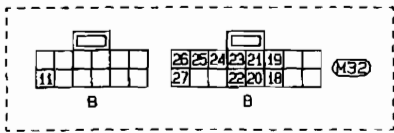
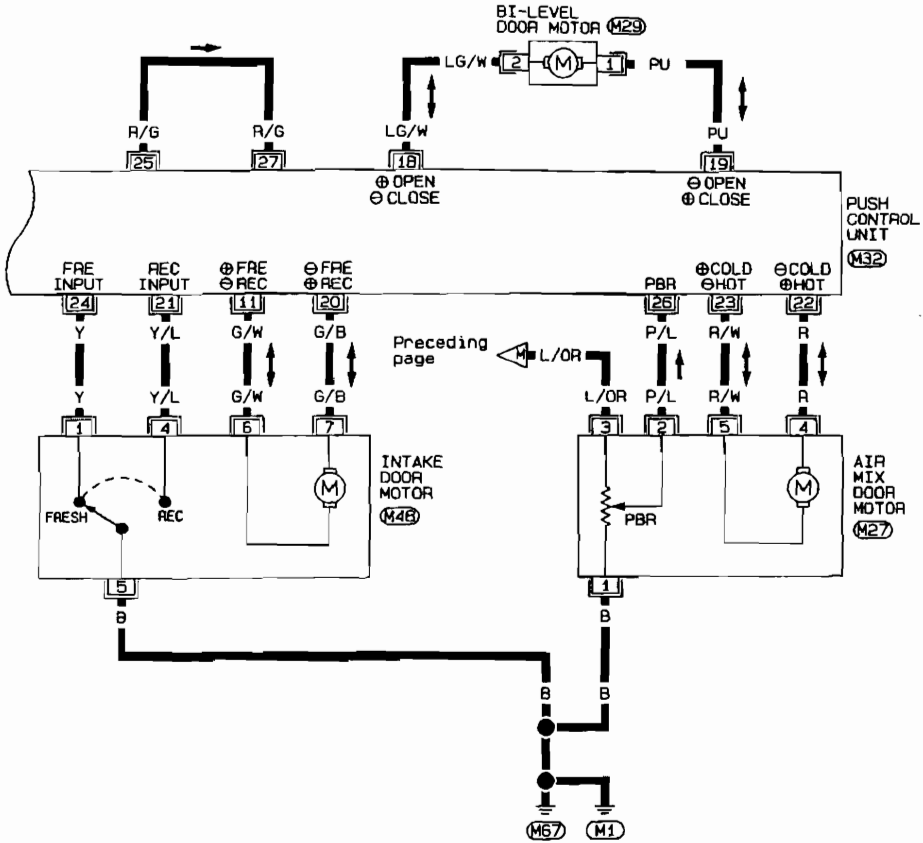
Wiring Diagram — A/C, M — (Cont'd)

HA-A/C, M-08



Wiring Diagram — A/C, M — (Cont'd)

HA-A/C, M-09



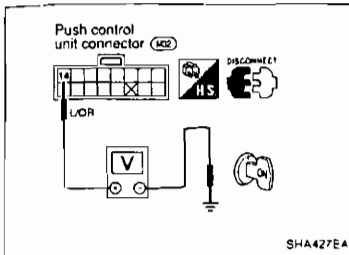
21  
 MA  
 FM  
 LC  
 EC  
 FE  
 CL  
 MT  
 AT  
 PD  
 FA  
 PA  
 BA  
 ST  
 AS  
 BT  
 HA  
 EL  
 FCX



## Main Power Supply and Ground Circuit Check

## POWER SUPPLY CIRCUIT CHECK

Check power supply circuit for air conditioning system.  
Refer to EL section ("Wiring Diagram", "POWER SUPPLY ROUTING").



## PUSH CONTROL UNIT CHECK

Check power supply circuit for push control unit with ignition switch at ON.

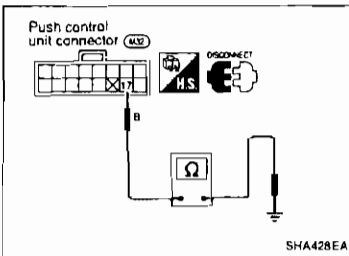
1. Disconnect push control unit harness connector.
2. Connect voltmeter from harness side.
3. Measure voltage across terminal No. ⑭ and body ground.

| Voltmeter terminal |             | Voltage    |
|--------------------|-------------|------------|
| ⊕                  | ⊖           |            |
| ⑭                  | Body ground | Approx 12V |

Check body ground circuit for push control unit.

1. Disconnect push control unit harness connector.
2. Connect ohmmeter from harness side
3. Check for continuity between terminal No ⑰ and body ground.

| Ohmmeter terminal |             | Continuity |
|-------------------|-------------|------------|
| ⊕                 | ⊖           |            |
| ⑰                 | Body ground | Yes        |

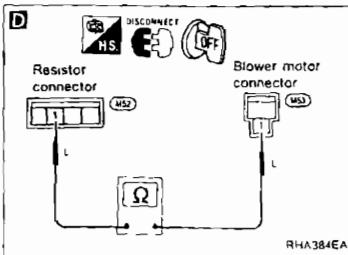
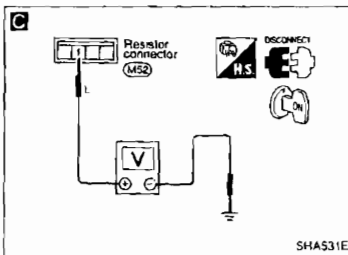
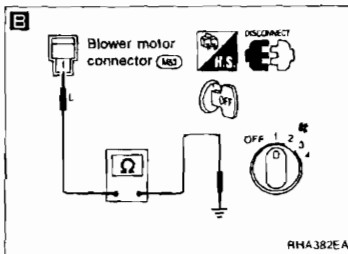
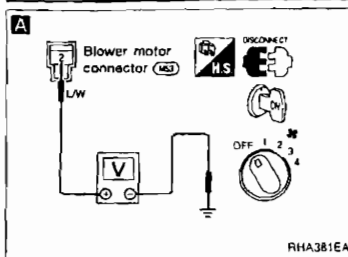


|   | INCIDENT                        | Flow chart No. |
|---|---------------------------------|----------------|
| 1 | Fan fails to rotate.            | ①              |
| 2 | Fan does not rotate at 1-speed. | ②              |
| 3 | Fan does not rotate at 2-speed. | ③              |
| 4 | Fan does not rotate at 3-speed. | ④              |
| 5 | Fan does not rotate at 4-speed. | ⑤              |

## Diagnostic Procedure 1

**SYMPTOM: Blower motor does not rotate.**

- Perform **PRELIMINARY CHECK 2** before referring to the following flow chart.



Check if blower motor rotates properly at each fan speed  
Conduct check as per flow chart at left

② ③ ④ ⑤  
(Go to next page)

**A**

①

**CHECK POWER SUPPLY FOR BLOWER MOTOR**  
Disconnect blower motor harness connector.  
Do approx. 12 volts exist between blower motor harness terminal No. ② and body ground?

No

Check 15A fuses at fuse block.  
Refer to EL section ("Wiring Diagram", "POWER SUPPLY ROUTING").

Yes

**B**

Check circuit continuity between blower motor harness terminal No. ① and body ground.

OK

**CHECK BLOWER MOTOR**  
(Refer to HA-58)

NG

Replace blower motor

Reconnect blower motor harness connector  
Disconnect resistor harness connector

**C**

**CHECK BLOWER MOTOR CIRCUIT BETWEEN BLOWER MOTOR AND RESISTOR**  
Do approx. 12 volts exist between resistor harness terminal No. ① and body ground?

No

Disconnect blower motor harness connectors

**D** Note

Check circuit continuity between blower motor harness terminal No. ① and resistor harness terminal No. ①.

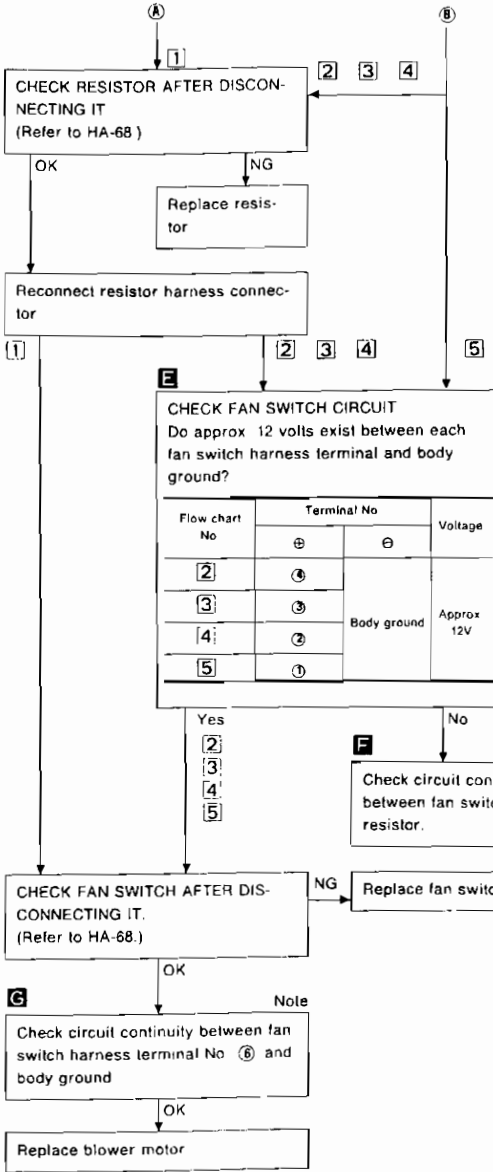
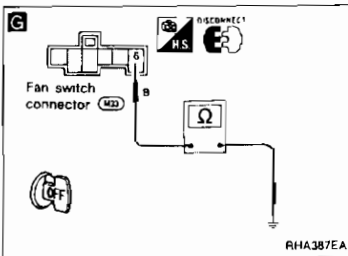
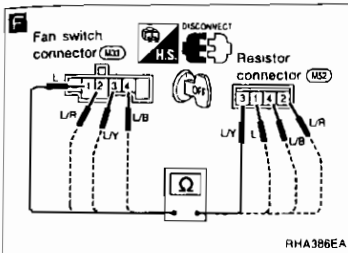
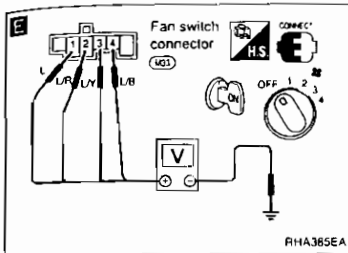
Yes

④  
(Go to next page)

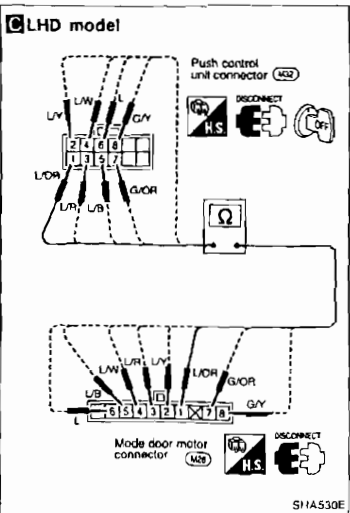
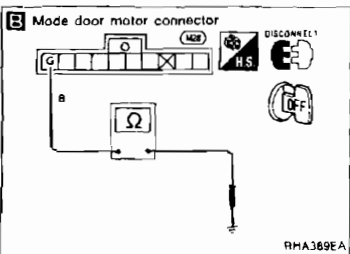
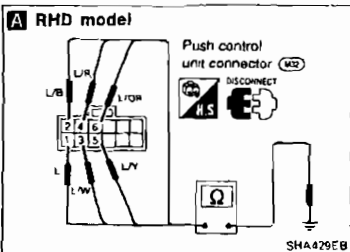
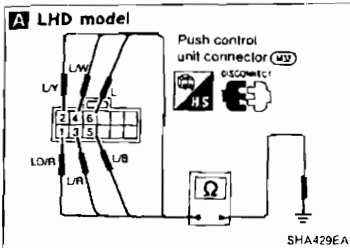
**Note:**  
If the result is NG after checking circuit continuity, repair harness or connector.



Diagnostic Procedure 1 (Cont'd)



**Note:**  
If the result is NG after checking circuit continuity, repair harness or connector.



## Diagnostic Procedure 2

SYMPTOM: Air outlet does not change.

- Perform PRELIMINARY CHECK 4, then Main Power Supply and Ground Circuit Check before referring to the flow chart below.

**A** CHECK MODE DOOR MOTOR POSITION SWITCH

- Turn VENT switch ON with ignition switch at ON position.
- Turn ignition switch OFF.  
Disconnect push control unit connector.
- Check for continuity between terminal ① or ② of push control unit harness connector and body ground.
- Using above procedures, check for continuity in any other mode, as indicated in chart.

| Mode switch | Terminal No |             | Continuity |
|-------------|-------------|-------------|------------|
|             | ⊕           | ⊖           |            |
| VENT        | ① or ②      | Body ground | Yes        |
| B/L         | ② or ③      |             |            |
| FOOT        | ③ or ④      |             |            |
| F/D         | ④ or ⑤      |             |            |
| DEF         | ⑤ or ⑥      |             |            |

OK

**CHECK SIDE LINK**  
Refer to Control Linkage Adjustment (HA-70)

NG → Disconnect mode door motor harness connector

**B** Note  
CHECK BODY GROUND CIRCUIT FOR MODE DOOR MOTOR.  
Does continuity exist between mode door motor harness terminal No ⑥ and body ground?

Yes

**C** Note  
Check circuit continuity between each terminal on push control unit and on mode door motor.

| Terminal No       |                 | Continuity |
|-------------------|-----------------|------------|
| ⊕                 | ⊖               |            |
| Push control unit | Mode door motor | Yes        |
| ①                 | ①               |            |
| ②                 | ②               |            |
| ③                 | ③               |            |
| ④                 | ④               |            |
| ⑤                 | ⑤               |            |
| ⑥                 | ⑥               |            |
| ⑦                 | ⑦               |            |
| ⑧                 | ⑧               |            |

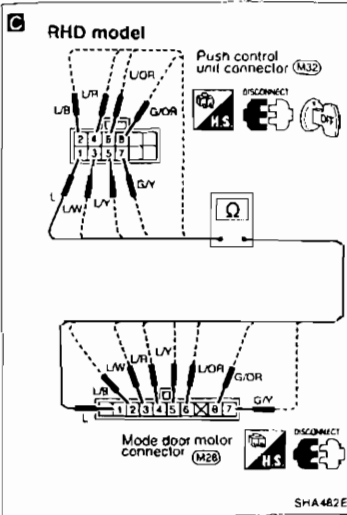
OK

⑧

(Go to next page)

Note:  
If the result is NG after checking circuit continuity, repair harness or connector.

Diagnostic Procedure 2 (Cont'd)



**A**

Reconnect push control unit and mode door motor harness connectors

**D**

CHECK FOR OUTPUT OF PUSH CONTROL UNIT

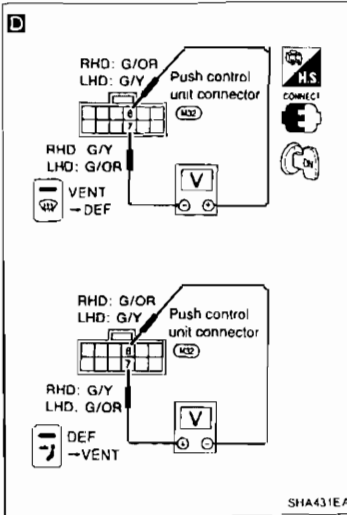
Change the mode from VENT to DEF, or from DEF to VENT. Do approx. 12 volts exist between push control unit harness terminals ⑦ and ⑧ in both cases?

No → Replace push control unit

| Terminal No | Mode switch operation | Voltage    |
|-------------|-----------------------|------------|
| ⑦ ⑧         | Each side             | Stop       |
| ④ ⑤         | VENT → DEF            | Approx 12V |
| ⑥ ⑥         | DEF → VENT            |            |

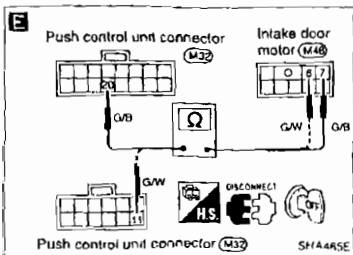
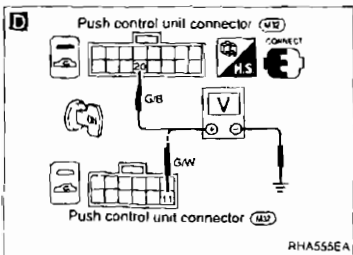
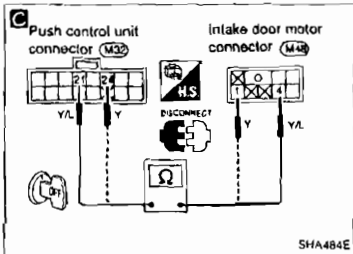
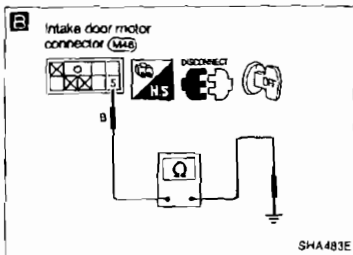
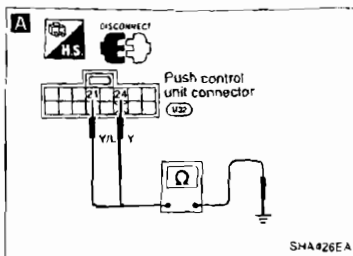
Yes

Replace mode door motor



97  
98  
99  
100  
101  
102  
103  
104  
105  
106  
107  
108  
109  
110

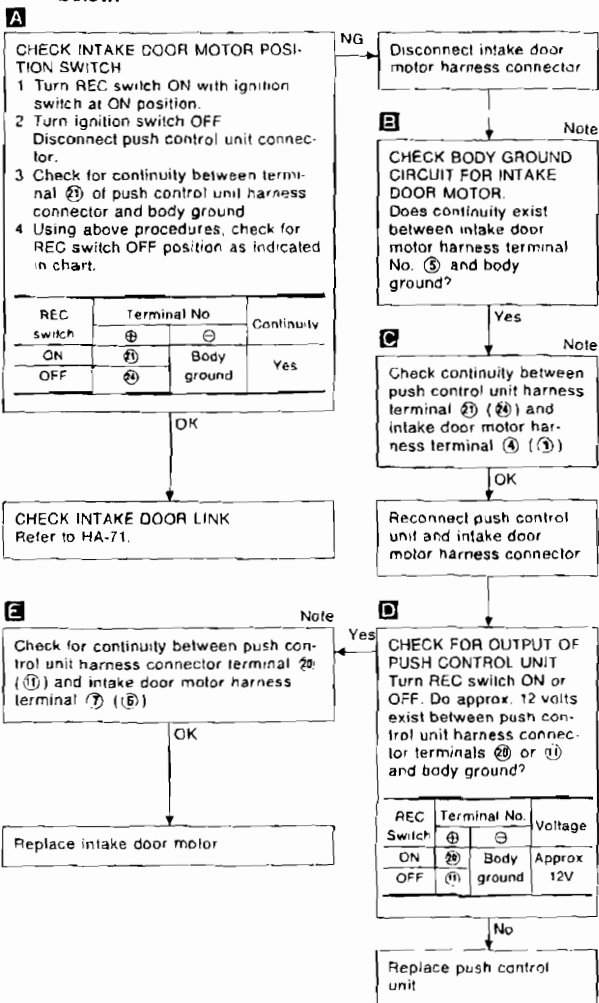
HA



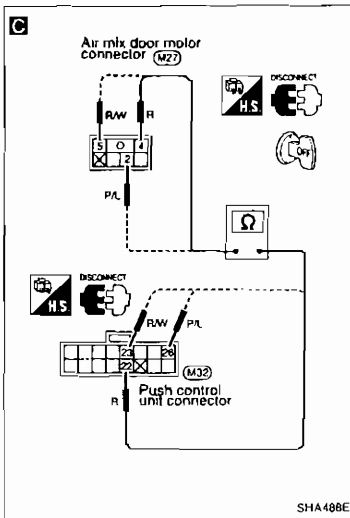
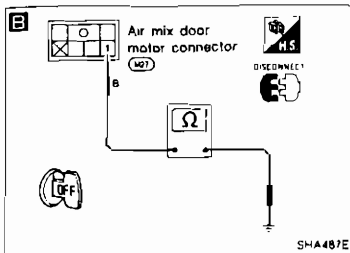
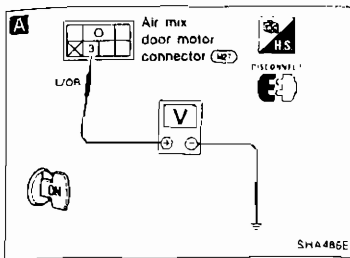
## Diagnostic Procedure 3

**SYMPTOM:** Intake door does not change in VENT, B/L or FOOT mode.

- Perform PRELIMINARY CHECK 1, then Main Power Supply and Ground Circuit Check before referring to the flow chart below.

**Note:**

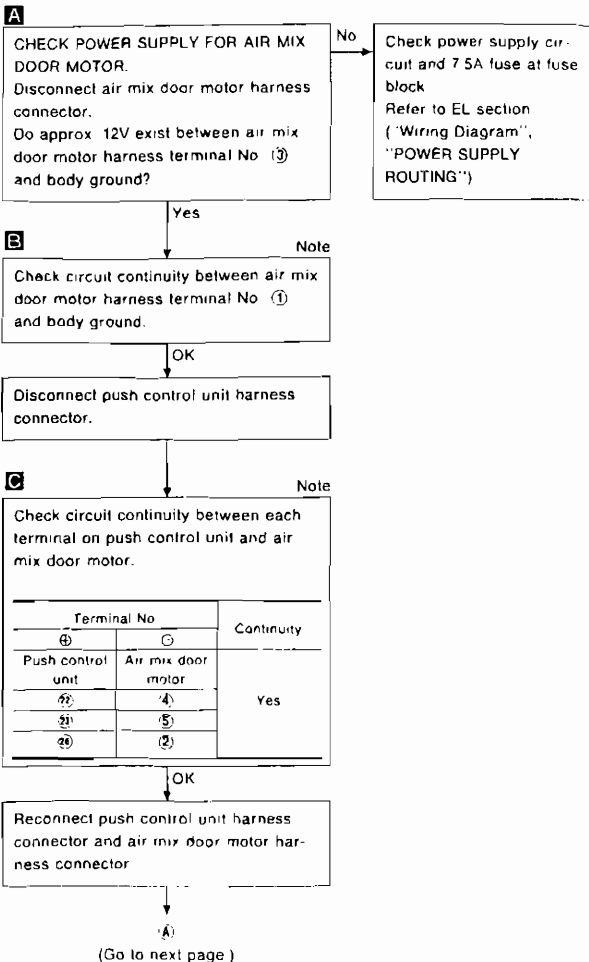
If the result is NG after checking circuit continuity, repair harness or connector.



## Diagnostic Procedure 4

**SYMPTOM:** Air mix door does not change.

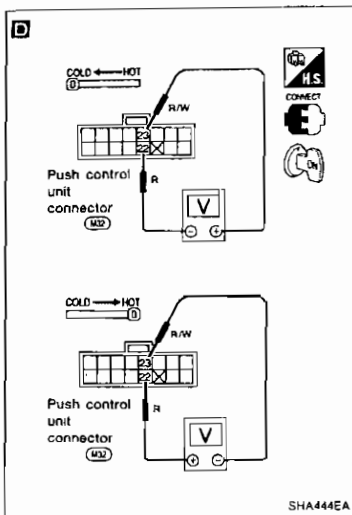
Perform **PRELIMINARY CHECK 2**, then **Main Power Supply and Ground Circuit Check** before referring to the flow chart below.



**Note:**

If the result is NG after checking circuit continuity, repair harness or connector.

## Diagnostic Procedure 4 (Cont'd)

**D**

## CHECK FOR PUSH CONTROL UNIT OUTPUT.

Slide the temperature control lever from HOT to COLD and COLD to HOT. Do approx. 12 volts exist between push control unit harness terminals ② and ③ in both cases?

| Terminal No. |   | Temp control lever operation | Voltage    |
|--------------|---|------------------------------|------------|
| ②            | ③ | HOT → COLD                   | Approx 12V |
| ⊖            | ⊕ | COLD → HOT                   |            |
| ①            | ⊖ |                              | Approx 0V  |
| Each side    |   | STOP                         | Approx 0V  |

No

Replace push control unit

Yes

CHECK FOR PBR RESISTANCE IN AIR MIX DOOR MOTOR  
 Refer to HA-70

NG

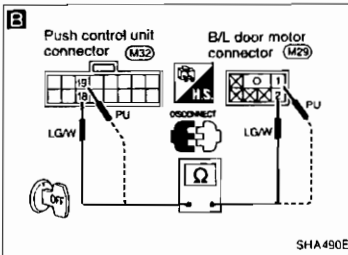
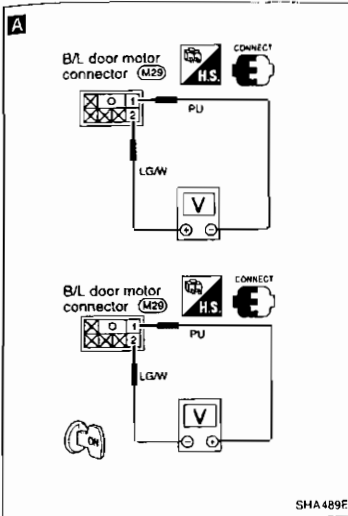
Replace air mix door motor.

OK

CHECK AIR MIX DOOR LINK.  
 (Refer to HA-71)

## Diagnostic Procedure 5

SYMPTOM: BI-level (B/L) door does not operate.



**A**

CHECK POWER SUPPLY FOR B/L DOOR MOTOR

Turn B/L switch ON and OFF

Do approx. 12 volts exist between B/L door motor harness terminals ① and ② in both cases?

| Terminal No |   | B/L switch | B/L door operation | Voltage    |
|-------------|---|------------|--------------------|------------|
| ②           | ① |            |                    |            |
| ⊕           | ⊖ | ON         | Open               | Approx 12V |
| ⊖           | ⊕ | OFF        | Close              |            |

Yes

CHECK B/L DOOR LINK. Refer to HA-71.

Note:

If the result is NG after checking circuit continuity, repair harness or connector.

No

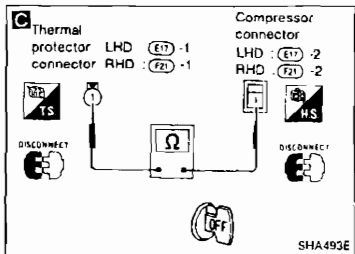
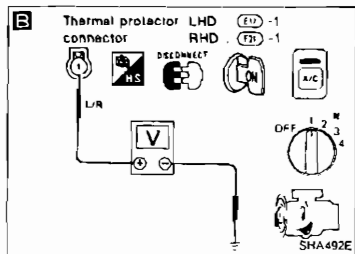
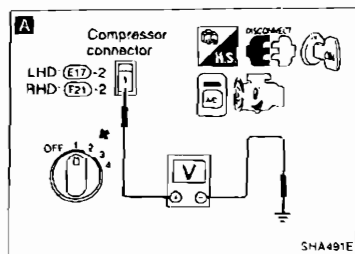
Disconnect push control unit connector

**B** Note

Check circuit continuity between B/L door motor harness terminal No ② (①) and push control unit harness terminal No 18 (19).

OK

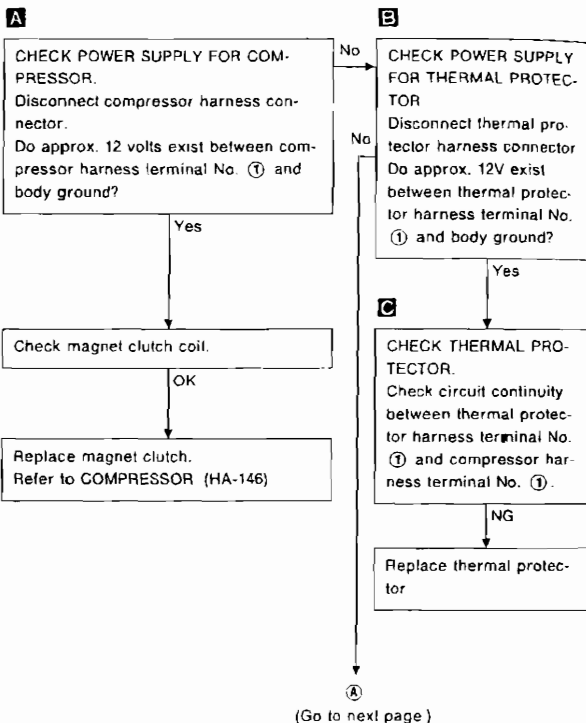
Replace push control unit.



## Diagnostic Procedure 6

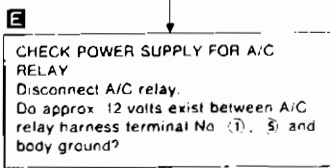
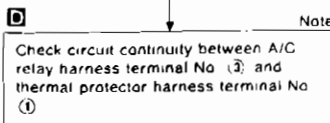
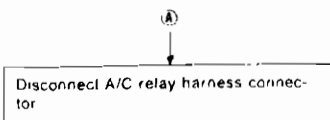
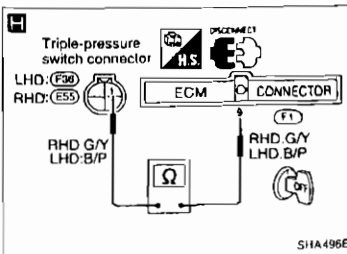
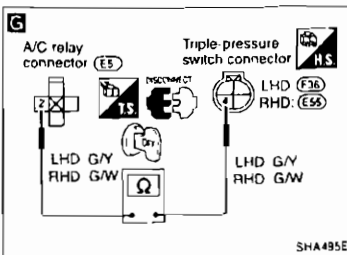
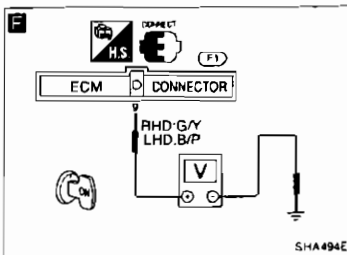
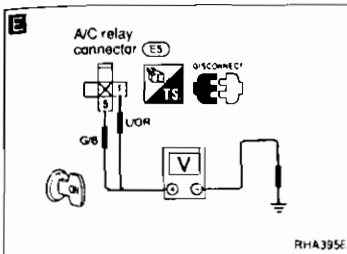
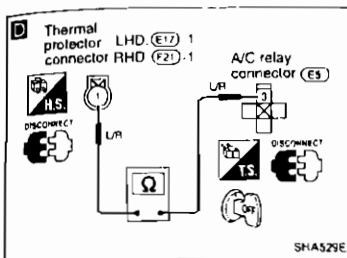
**SYMPTOM:** Magnet clutch does not operate when A/C switch and fan switch are ON.

- Perform **PRELIMINARY CHECK 2** before referring to the following flow chart.

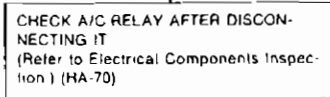




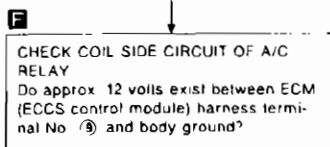
## Diagnostic Procedure 6 (Cont'd)



**NO** CHECK POWER SUPPLY CIRCUIT AND 7.5A FUSES AT FUSE BLOCK (Refer to "POWER SUPPLY ROUTING" in EL section and Wiring Diagram)



Reconnect A/C relay



**NO** Note

Check circuit continuity between A/C relay harness terminal No. (2) and triple-pressure switch harness terminal No. (4)

OK

(Go to next page)

**HI** Note

Check circuit continuity between triple-pressure switch harness terminal No. (1) and ECM (ECCS control module) harness terminal No. (9).

[For terminal arrangement, refer to last page (Foldout page)]

OK

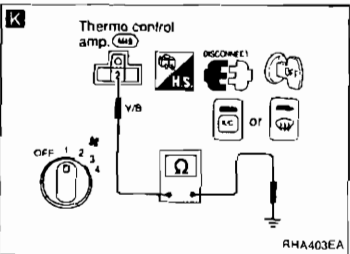
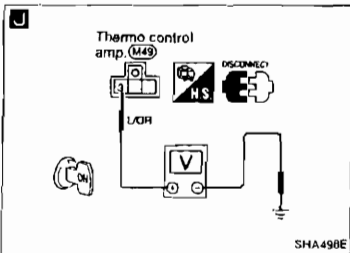
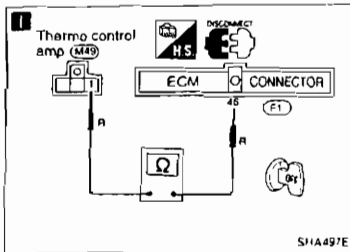
**HA**

CHECK TRIPLE PRESSURE SWITCH

Refer to HA-69

**Note:**  
If the result is NG after checking circuit continuity, repair harness or connector.

## Diagnostic Procedure 6 (Cont'd)



(8)  
Disconnect thermo control amp. harness connector

**I** Note  
Check circuit continuity between thermo control amp harness terminal No. (1) and ECM (ECCS control module) harness terminal No. (48)

OK  
**J** CHECK POWER SUPPLY FOR THERMO CONTROL AMP  
Disconnect thermo control amp harness connector  
Do approx. 12 volts exist between thermo control amp harness terminal No. (3) and body ground?

No  
Check 7.5A fuse at fuse block  
Refer to EL section ("Wiring Diagram", "POWER SUPPLY ROUTING")

Yes  
**K** CHECK BODY GROUND CIRCUIT FOR THERMO CONTROL AMP  
Turn A/C switch or DEF switch ON  
Check for continuity between thermo control amp harness terminal (2) and body ground

NG  
Disconnect push control unit harness connector.

(Go to next page)

OK  
CHECK THERMO CONTROL AMP.  
Refer to HA-68

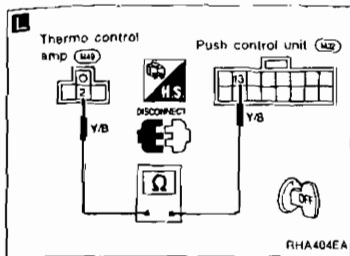
NG  
Replace thermo control amp

OK  
Check voltage between ECM (ECCS control module) harness terminals (9), (46) and body ground  
Refer to EC section ("ECM Terminals and Reference Valve", "TROUBLE DIAGNOSES - General Description")

## Note:

If the result is NG after checking circuit continuity, repair harness or connector.

## Diagnostic Procedure 6 (Cont'd)



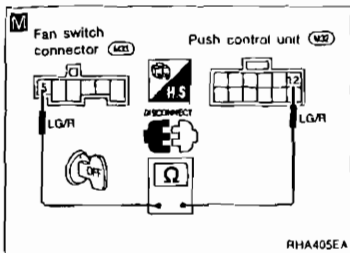
**L** Note

Check circuit continuity between thermo control amp harness terminal No. ② and push control unit harness terminal No. ⑩.

OK

Disconnect fan switch harness connector.

OK



**M** Note

Check circuit continuity between push control unit terminal No. ⑩ and fan switch harness terminal No. ⑤.

OK

**N** Note

CHECK BODY GROUND CIRCUIT FOR FAN SWITCH.  
Check for continuity between fan switch harness terminal ⑥ and body ground.

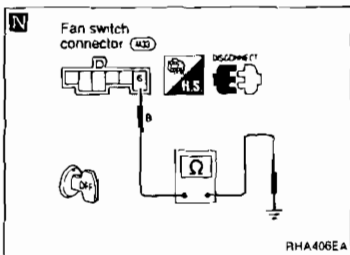
OK

CHECK FAN SWITCH.  
(Refer to HA-68.)

NG → Replace fan switch

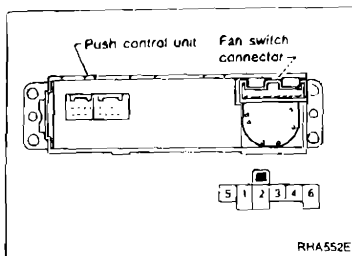
OK

Replace push control unit.

**Note:**

If the result is NG after checking circuit continuity, repair harness or connector.

SH  
WA  
EA  
LC  
EC  
FE  
CL  
MT  
AT  
PU  
FA  
RA  
BR  
ST  
RS  
RT  
HA  
SL  
FD

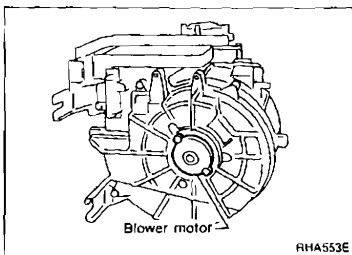


## Electrical Components Inspection

### FAN SWITCH

Check continuity between terminals at each position

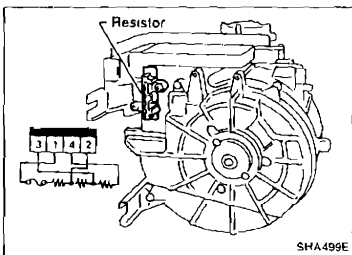
| POSITION | TERMINAL        |
|----------|-----------------|
| OFF      |                 |
| 1        | (4) - (5) - (6) |
| 2        | (3) - (5) - (6) |
| 3        | (2) - (5) - (6) |
| 4        | (1) - (5) - (6) |



### BLOWER MOTOR

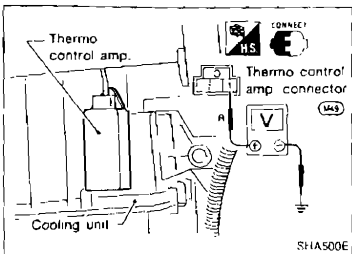
Check blower motor for smooth rotation.

- Ensure that there are no foreign particles inside the intake unit.



### BLOWER RESISTOR

Check continuity between terminals



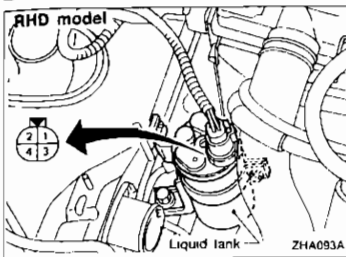
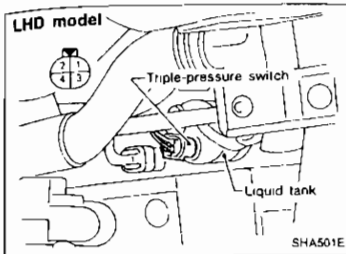
### THERMO CONTROL AMP.

1. Run engine, and operate A/C system.
2. Connect the voltmeter from harness side.
3. Check thermo control amp. operation shown in the table.

| Evaporator outlet air temperature<br>C (°F) | Thermo amp<br>operation | Tester     |
|---|-------------------------|------------|
| Decreasing to 2.5 - 3.5 (37 - 38)           | Turn OFF                | Approx 12V |
| Increasing to 1 - 2 (34 - 36)               | Turn ON                 | Approx 0V  |

## Electrical Components Inspection (Cont'd)

### TRIPLE-PRESSURE SWITCH



#### LHD model

|                       | Terminals | High-pressure side line pressure<br>kPa (bar, kg/cm <sup>2</sup> , psi)     | Operation | Continuity     |
|-----------------------|-----------|---|-----------|----------------|
| Low-pressure side     | ① - ④     | Increasing to<br>157 - 226 (1.57 - 2.26,<br>1.6 - 2.3, 23 - 33)             | ON        | Exist          |
|                       |           | Decreasing to<br>152.0 - 201.0 (1 520 - 2 010,<br>1.55 - 2.05, 22.0 - 29.2) | OFF       | Does not exist |
| Medium-pressure side* | ② - ③     | Increasing to<br>1,422 - 1,618 (14.22 - 16.18,<br>14.5 - 16.5, 206 - 235)   | ON        | Exist          |
|                       |           | Decreasing to<br>1,128 - 1,422 (11.28 - 14.22,<br>11.5 - 14.5, 164 - 206)   | OFF       | Does not exist |
| High-pressure side    | ① - ④     | Increasing to<br>1,687 - 2,059 (16.7 - 20.6,<br>17 - 21, 242 - 299)         | ON        | Exist          |
|                       |           | Decreasing to<br>2,452 - 2,844 (24.5 - 28.4,<br>25 - 29, 356 - 412)         | OFF       | Does not exist |

\* For cooling fan motor operation.

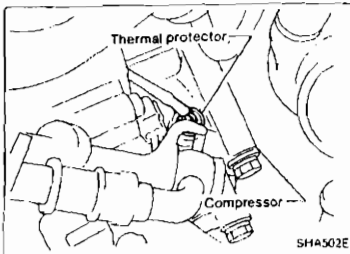
#### RHD model

|                       | Terminals | High-pressure side line pressure<br>kPa (bar, kg/cm <sup>2</sup> , psi)        | Operation | Continuity     |
|-----------------------|-----------|--|-----------|----------------|
| Low-pressure side     | ① - ④     | Increasing to<br>157 - 216 (1.57 - 2.16,<br>1.6 - 2.2, 23 - 31)                | ON        | Exists         |
|                       |           | Decreasing to<br>152.0 - 201.0<br>(1 520 - 2 010,<br>1.55 - 2.05, 22.0 - 29.2) | OFF       | Does not exist |
| Medium-pressure side* | ② - ③     | Increasing to<br>1,442 - 1,697<br>(14.42 - 16.97,<br>14.7 - 17.3, 209 - 246)   | ON        | Exists         |
|                       |           | Decreasing to<br>1,128 - 1,422<br>(11.28 - 14.22,<br>11.5 - 14.5, 164 - 206)   | OFF       | Does not exist |
| High-pressure side    | ① - ④     | Decreasing to<br>1,275 - 1,667<br>(12.7 - 16.7,<br>13 - 17, 185 - 242)         | ON        | Exists         |
|                       |           | Increasing to<br>2,452 - 2,844<br>(24.5 - 28.4,<br>25 - 29, 356 - 412)         | OFF       | Does not exist |

\* For cooling fan motor operation.

## Electrical Components Inspection (Cont'd)

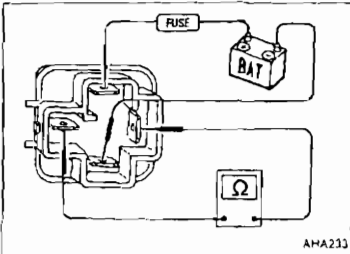
## THERMAL PROTECTOR



| Temperature of compressor<br>°C (°F)       | Operation |
|--|-----------|
| Increasing to approx 145 - 155 (293 - 311) | Turn OFF  |
| Decreasing to approx 130 - 140 (266 - 284) | Turn ON   |

## A/C RELAY

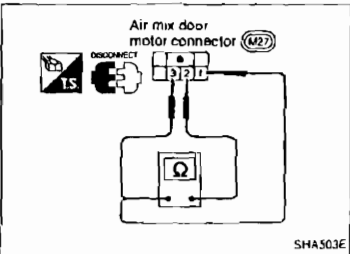
Check circuit continuity between terminals by supplying 12 volts to coil side terminals of the relay.



## AIR MIX DOOR MOTOR

Check for PBR resistance.

1. Turn ignition switch ON and temperature control lever to FULL HOT position.
2. Turn ignition switch OFF.
3. Disconnect air mix door motor connector
4. Check for resistance between air mix door motor harness terminal ③ and ②.
5. Using above procedures, check for each terminal as indicated in chart below

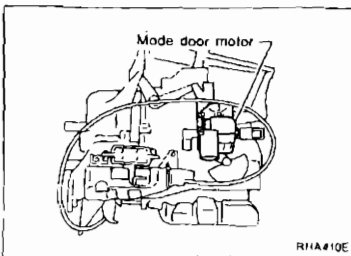


| Terminal No. | Temp control lever position | Resistance |              |
|--------------|-----------------------------|------------|--------------|
| ③            | ②                           | FULL HOT   | Approx. 0Ω   |
| ③            | ②                           | FULL COLD  | Approx. 3 kΩ |
| ①            | ②                           | FULL HOT   | Approx. 3 kΩ |
| ①            | ②                           | FULL COLD  | Approx. 0Ω   |

## Control Linkage Adjustment

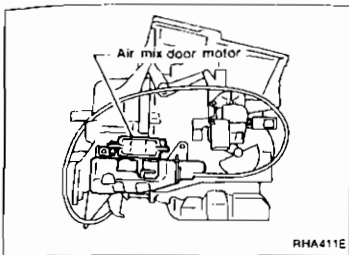
## MODE DOOR

1. Install mode door motor on heater unit and connect it to main harness.
2. Turn ignition switch to ON
3. Turn VENT switch ON.
4. Turn DEF switch ON. Check that side link operates at the fully-open position. Also turn DEF switch ON to check that side link operates at the fully-open position.

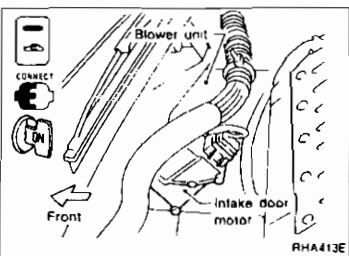


## Control Linkage Adjustment (Cont'd)

## AIR MIX DOOR

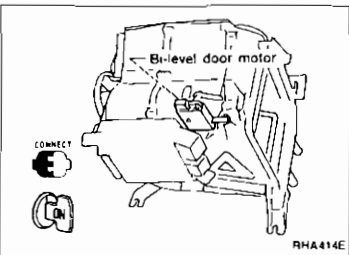


1. Move air mix door link by hand and hold air mix door in full cold position
2. Install air mix door motor on heater unit and connect sub-harness.
3. Turn ignition switch to ON.
4. Slide temperature control lever to full cold.
5. Attach air mix door motor rod to air mix door link rod holder.
6. Check that air mix door operates properly when temperature control lever is slid to full hot and full cold.
7. Slide temperature control lever to full cold.




## INTAKE DOOR

1. Connect intake door motor harness connector before installing intake door motor.
2. Turn ignition switch to ON.
3. Turn REC switch ON.
4. Install intake door motor on intake unit
5. Set intake door rod in REC position and fasten door rod to holder.
6. Check that intake door operates properly when REC switch is turned ON and OFF.



## BI-LEVEL (B/L) DOOR

1. Connect B/L door motor harness connector before installing B/L door motor
2. Turn ignition switch to ON.
3. Install B/L door motor on heater unit.
4. Check that B/L door operates properly when bi-level switch  is turned ON and OFF.

HA

HL

HX

## Introduction

The Automatic Temperature Control (ATC) system provides automatic regulation of the vehicle's interior temperature. The operator selects "set temperature", on which the regulation is based, regardless of the outside temperature changes. This is done by utilizing a microcomputer, also referred to as the automatic amplifier (auto amp.), which receives input signals from several sensors. The automatic amplifier uses these input signals (including the set temperature) to automatically control the ATC system's outlet air volume, air temperature, and air distribution.

## Features

### Air mix door control (Automatic temperature control)

The air mix door is automatically controlled so that in-vehicle temperature is maintained at a predetermined value by: The temperature setting, ambient temperature, in-vehicle temperature and amount of sunload.

### Fan speed control

Blower speed is automatically controlled based on temperature setting, ambient temperature, in-vehicle temperature, amount of sunload and air mix door position.

With FAN switch set to "AUTO", the blower motor starts to gradually increase air flow volume.

When engine coolant temperature is low, the blower motor operation is delayed to prevent cool air from flowing.

### Intake door control

The intake doors are automatically controlled by: The temperature setting, ambient temperature, in-vehicle temperature and amount of sunload.

### Mode door control

The mode doors (defroster door, ventilator door and foot door) are automatically controlled by: The temperature setting, ambient temperature, in-vehicle temperature and amount of sunload.

### Bi-level door control

The bi-level door is opened to increase amount of air discharge when the air discharge outlet is set at bi-level position. The bi-level door is also opened when the fan speed is high and the set temperature is at 18°C.

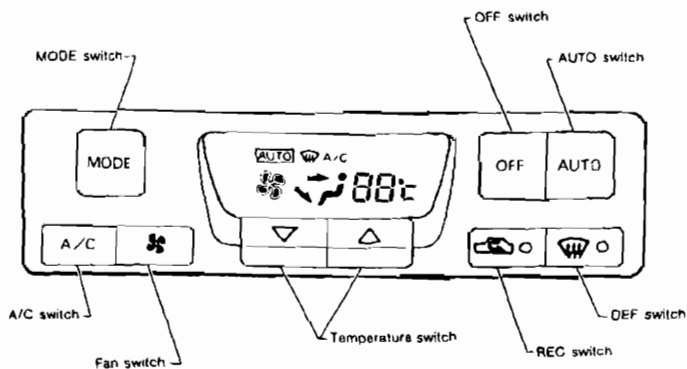
Except during the above conditions, the bi-level door is closed.

### Self-diagnostic system

The self-diagnostic system is built into the automatic amplifier to quickly locate the cause of problems.



## Control Operation

**AUTO SWITCH**

The compressor, air intake doors, air mix door, mode doors, and blower speed are automatically controlled so that the in-vehicle temperature will reach, and be maintained at the set temperature. **The air conditioning cooling function operates only when the engine is running.**

**A/C SWITCH**

Manual control of the compressor operation. When the A/C mark appears on the display screen, compressor operation is being carried out.

**TEMPERATURE SWITCH**





Increases or decreases the set temperature.

**OFF SWITCH**

The compressor and blower are off, the air intake doors are set to the outside air position. Then, the mode doors are set to the foot (80% foot and 20% defrost) position. In the off position the A/C system uses the vehicle's "flow through" ventilation. It tries to maintain the interior temperature based on the last set temperature of the system.





**FAN SWITCH**

Manual control of the blower speed. Four speeds are available for manual control (as shown on the display screen):

low  , medium low  , medium high  , high 

**MODE SWITCH**

Manual control of the air discharge outlets. Four selections are available (as shown on the display screen):

face  , bi-level  , foot  , defrost/foot 

**Control Operation (Cont'd)****REC SWITCH**

ON position: Interior air is recirculated inside the vehicle.

OFF position: Automatic control resumes.

RECIRC is canceled when DEF is selected. RECIRC resumes when another mode is chosen.

**DEF SWITCH**

Positions the mode doors to the defrost position. Also positions the air intake doors to the outside air position. With DEF switch ON, the compressor operates.

NOTE

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| Diagnostic Procedure 3<br>SYMPTOM: Sunload sensor circuit is open or shorted<br>(25 or -25 is indicated on display as a result of conducting Self-diagnosis STEP 2) .....     | HA-113 |
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| Diagnostic Procedure 5<br>SYMPTOM: Mode door motor does not operate normally .....  | HA-115 |
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# TROUBLE DIAGNOSES

AUTO

## Contents (Cont'd)

### Diagnostic Procedure 7

SYMPTOM: Air mix door motor does not operate normally. HA-118

### Diagnostic Procedure 8

SYMPTOM: Bi-level (B/L) door motor does not operate normally. HA-119

### Diagnostic Procedure 9

SYMPTOM: Blower motor operation is malfunctioning under out of Starting Fan Speed Control. HA-120

### Diagnostic Procedure 10

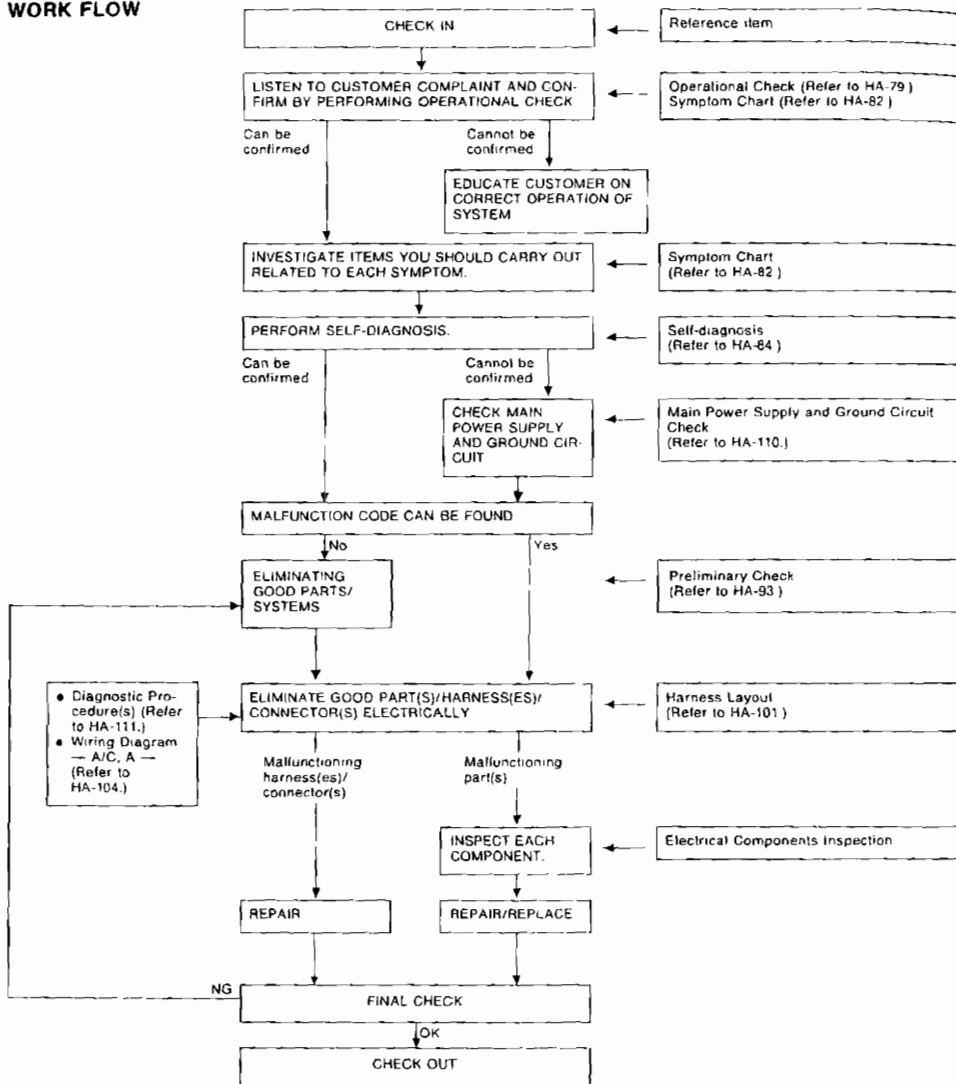
SYMPTOM: Magnet clutch does not engage after performing Preliminary Check 5. HA-122

Control Linkage Adjustment HA-125

HA

## How to Perform Trouble Diagnoses for Quick and Accurate Repair

### WORK FLOW



## Operational Check



The purpose of the operational check is to confirm that the system is as it should be. The systems which will be checked are the blower, mode (discharge air), intake air, temperature decrease, temperature increase, A/C switch and the memory function.

### CONDITIONS:

- Engine running and at normal operating temperature.

### PROCEDURE:

#### 1. Check blower

- 1) Press fan switch one time.  
Blower should operate on low speed.  
The fan symbol should have one blade lit .
- 2) Press fan switch one more time.
- 3) Continue checking blower speed and fan symbol until all speeds are checked.
- 4) Leave blower on MAX speed .

#### 2. Check discharge air.

- 1) Press mode switch four times and DEF switch one time.  
When DEF switch is ON, DEF indicator should illuminate.

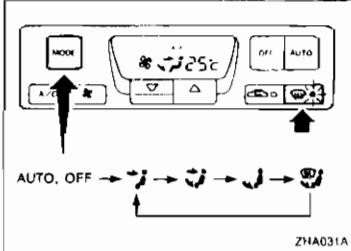
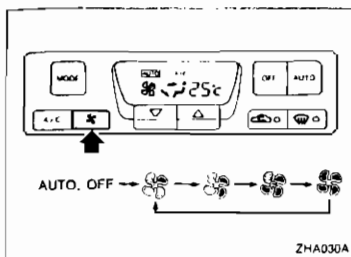
- 2) Confirm that discharge air comes out according to the air distribution table at left.

Refer to "Discharge Air Flow", "DESCRIPTION" (HA-12).






#### NOTE:

Confirm that the compressor clutch is engaged (visual inspection) and intake door position is at FRESH when the DEF switch is pressed.

Intake door position is checked in the next step.




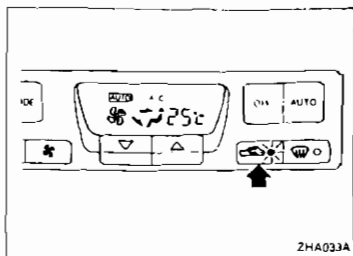
#### Discharge air flow

| Switch mode/<br>indicator  | Air outlet/distribution |      |           |
|--|-------------------------|------|-----------|
|  | Face                    | Foot | Defroster |
|  | 100%                    | —    | —         |
|  | 60%                     | 40%  | —         |
|  | —                       | 80%  | 20%       |
|  | —                       | 60%  | 40%       |
|  | —                       | —    | 100%      |

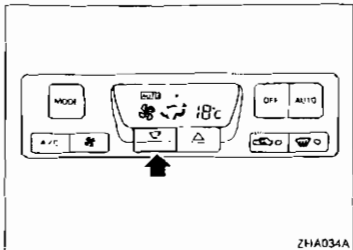
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**Operational Check (Cont'd)****3. Check recirc**

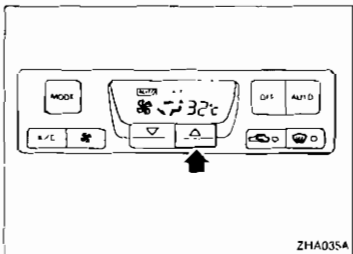
- 1) Press REC  switch  
Recirc indicator should illuminate.
- 2) Listen for intake door position change (you should hear blower sound change slightly).

**4. Check temperature decrease**

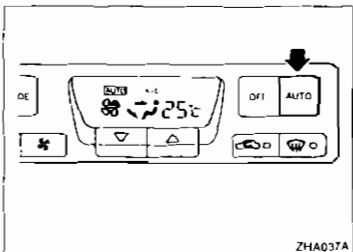
- 1) Press the temperature switch (COLD) until 18°C is displayed.
- 2) Check for cold air at discharge air outlets.

**5. Check temperature increase**

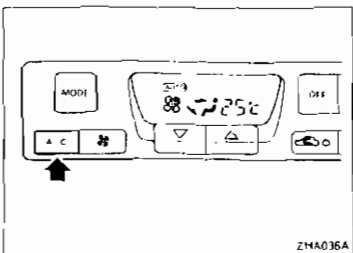
- 1) Press the temperature switch (HOT) until 32°C is displayed.
- 2) Check for hot air at discharge air outlets.

**6. Check AUTO mode**

- 1) Press AUTO switch.
- 2) Display should indicate AUTO and A/C.  
Confirm that the compressor clutch engages (audio or visual inspection).  
(Discharge air will depend on ambient, in-vehicle, and set temperatures)

**7. Check A/C mode**

- 1) Press A/C switch
- 2) Display should indicate AUTO (A/C goes out).  
Confirm that the compressor clutch is not engaged (visual inspection)  
(Discharge air will depend on ambient, in-vehicle, and set temperatures)
- 3) Re-press A/C switch. Display should indicate A/C and the compressor clutch is engaged

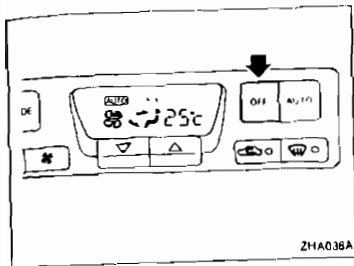




## Operational Check (Cont'd)

## 8. Check memory function

- 1) Press OFF switch
- 2) Turn the ignition off.
- 3) Turn the ignition on.
- 4) Press the AUTO switch.
- 5) Confirm that the set temperature remains at previous temperature



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## Symptom Chart

## DIAGNOSTIC TABLE

| PROCEDURE  |   | Self diagnosis              |                    |                    |                    |                    | Preliminary Check           |                             |                             |                             |                             |                             | Diagnostic Procedure        |                             |                              |                                 |                                 |                                 |                                 |
|--|---|-----------------------------|--------------------|--------------------|--------------------|--------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| SYMPTOM  | DIAGNOSTIC ITEM AND REFERENCE PAGE      | STEP 1 (HA-85, 88)          | STEP 2 (HA-85, 88) | STEP 3 (HA-88, 89) | STEP 4 (HA-88, 90) | STEP 5 (HA-87, 90) | AUXILIARY MECHANISM (HA-92) | Preliminary Check 1 (HA-93) | Preliminary Check 2 (HA-94) | Preliminary Check 3 (HA-95) | Preliminary Check 4 (HA-96) | Preliminary Check 5 (HA-97) | Preliminary Check 6 (HA-98) | Preliminary Check 7 (HA-99) | Preliminary Check 8 (HA-100) | Diagnostic Procedure 1 (HA-111) | Diagnostic Procedure 2 (HA-112) | Diagnostic Procedure 3 (HA-113) | Diagnostic Procedure 4 (HA-114) |
|  |   | Air outlet does not change. |                    | 1                  | 2                  | 3                  | 4                           | 5                           |                             | 6                           |                             |                             |                             |                             |                              |                                 |                                 |                                 |                                 |
| Intake door does not change  |   | 1                           | 2                  |                    |                    |                    |                             | 3                           |                             |                             |                             |                             |                             |                             |                              |                                 |                                 |                                 |                                 |
| Insufficient cooling   |   | 1                           | 2                  | 3                  | 4                  | 5                  |                             |                             | 6                           |                             |                             |                             |                             |                             |                              |                                 |                                 |                                 |                                 |
| Insufficient heating   |   | 1                           | 2                  | 3                  | 4                  | 5                  |                             |                             | 6                           |                             |                             |                             |                             |                             |                              |                                 |                                 |                                 |                                 |
| Blower motor operation is malfunctioning   |   | 1                           | 2                  | 3                  | 4                  | 5                  |                             |                             |                             | 6                           |                             | 7                           |                             |                             |                              |                                 |                                 |                                 |                                 |
| Magnet clutch does not engage  |   | 1                           | 2                  |                    |                    |                    |                             |                             |                             |                             |                             | 3                           |                             |                             |                              |                                 |                                 |                                 |                                 |
| Discharged air temperature does not change                                       |   | 1                           | 2                  |                    |                    |                    |                             |                             |                             |                             |                             |                             | 3                           |                             |                              |                                 |                                 |                                 |                                 |
| Noise  |   |                             |                    |                    |                    |                    |                             |                             |                             |                             |                             |                             |                             | 1                           |                              |                                 |                                 |                                 |                                 |
| Result of self-diagnosis STEP 2  | 21 Ambient sensor circuit is open       | 1                           | 2                  |                    |                    | 3                  |                             |                             |                             |                             |                             |                             |                             |                             |                              | 4                               |                                 |                                 |                                 |
|  | 22 In-vehicle sensor circuit is open    | 1                           | 2                  |                    |                    | 3                  |                             |                             |                             |                             |                             |                             |                             |                             |                              |                                 | 4                               |                                 |                                 |
|  | 25 Sunload sensor circuit is open       | 1                           | 2                  |                    |                    |                    |                             |                             |                             |                             |                             |                             |                             |                             |                              |                                 |                                 | 3                               |                                 |
|  | 26 PBR circuit is open                  | 1                           | 2                  |                    |                    |                    |                             |                             |                             |                             |                             |                             |                             |                             |                              |                                 |                                 |                                 | 3                               |
|  | 21 Ambient sensor circuit is shorted    | 1                           | 2                  |                    |                    | 3                  |                             |                             |                             |                             |                             |                             |                             |                             |                              |                                 | 4                               |                                 |                                 |
|  | 22 In-vehicle sensor circuit is shorted | 1                           | 2                  |                    |                    | 3                  |                             |                             |                             |                             |                             |                             |                             |                             |                              |                                 |                                 | 4                               |                                 |
|  | 25 Sunload sensor circuit is shorted    | 1                           | 2                  |                    |                    |                    |                             |                             |                             |                             |                             |                             |                             |                             |                              |                                 |                                 |                                 | 3                               |
|  | 26 PBR circuit is shorted               | 1                           | 2                  |                    |                    |                    |                             |                             |                             |                             |                             |                             |                             |                             |                              |                                 |                                 |                                 |                                 |
| Mode door motor does not operate normally  | 1                                       | 2                           | 3                  | 4                  |                    |                    |                             |                             |                             |                             |                             |                             |                             |                             |                              |                                 |                                 |                                 |                                 |
| Intake door motor does not operate normally                                      | 1                                       | 2                           |                    | 3                  | 4                  |                    |                             |                             |                             |                             |                             |                             |                             |                             |                              |                                 |                                 |                                 |                                 |
| Air mix door motor does not operate normally                                     | 1                                       | 2                           |                    | 3                  | 4                  |                    |                             |                             |                             |                             |                             |                             |                             |                             |                              |                                 |                                 |                                 |                                 |
| Bi-level door motor does not operate normally                                    | 1                                       | 2                           |                    | 3                  |                    |                    |                             |                             |                             |                             |                             |                             |                             |                             |                              |                                 |                                 |                                 |                                 |
| Blower motor operation is malfunctioning under out of Starting Fan Speed Control | 1                                       | 2                           |                    |                    |                    |                    |                             |                             |                             |                             | 3                           |                             |                             |                             |                              |                                 |                                 |                                 |                                 |
| Magnet clutch does not operate after performing Preliminary Check 6              | 1                                       | 2                           |                    |                    |                    |                    |                             |                             |                             |                             |                             | 3                           |                             |                             |                              |                                 |                                 |                                 |                                 |
| Self-diagnosis cannot be performed   |   |                             |                    |                    |                    |                    |                             |                             |                             |                             |                             |                             |                             |                             |                              |                                 |                                 |                                 |                                 |

1 2 The number means checking order

As for checking order, refer to each flow chart (It depends on malfunctioning portion)

# TROUBLE DIAGNOSES

## Symptom Chart (Cont'd)

AUTO

| Diagnostic Procedure |                                     | Main Power Supply and Ground Circuit Check |  | Electrical Components Inspection |  |
|----------------------|-------------------------------------|--|--|----------------------------------|--|
| 5                    | Diagnostic Procedure 5 (HA-115)     |  |  |                                  |  |
| 4                    | Diagnostic Procedure 6 (HA-117)     |  |  |                                  |  |
| 4                    | Diagnostic Procedure 7 (HA-118)     |  |  |                                  |  |
| 4                    | Diagnostic Procedure 8 (HA-119)     |  |  |                                  |  |
|                      | Diagnostic Procedure 9 (HA-120)     |  |  |                                  |  |
|                      | Diagnostic Procedure 10 (HA-121)    |  |  |                                  |  |
|                      | Auto amp (BCM) (HA-16)              |  |  |                                  |  |
|                      | 7.5A Fuse #15 (HA-10)               |  |  |                                  |  |
|                      | 15A Fuses #7 and #9 (HA-110)        |  |  |                                  |  |
|                      | 7.5A Fuse #19 (HA-110)              |  |  |                                  |  |
|                      | 7.5A Fuse #42 (HA-110)              |  |  |                                  |  |
|                      | Ambient sensor (HA-129)             |  |  |                                  |  |
|                      | In-vehicle sensor (HA-128)          |  |  |                                  |  |
|                      | Thermal transmitter                 |  |  |                                  |  |
|                      | Sunload sensor (HA-129)             |  |  |                                  |  |
|                      | PBR (HA-132)                        |  |  |                                  |  |
|                      | Air mix door motor (HA-131)         |  |  |                                  |  |
|                      | Mode door motor (HA-133)            |  |  |                                  |  |
|                      | Intake door motor (HA-135)          |  |  |                                  |  |
|                      | Bi-level door motor (HA-125)        |  |  |                                  |  |
|                      | Blower motor (HA-68)                |  |  |                                  |  |
|                      | Fan control amp (HA-137)            |  |  |                                  |  |
|                      | A/C relay (HA-70)                   |  |  |                                  |  |
|                      | Triple-pressure switch (HA-69)      |  |  |                                  |  |
|                      | Magnet clutch (Compressor) (HA-146) |  |  |                                  |  |
|                      | Auto amp (HA-130)                   |  |  |                                  |  |
|                      | ECM (ECCS control module) (EC)      |  |  |                                  |  |
|                      | Cooling fan motor (EC)              |  |  |                                  |  |
|                      | Cooling fan relay (EC)              |  |  |                                  |  |
|                      | Harness                             |  |  |                                  |  |

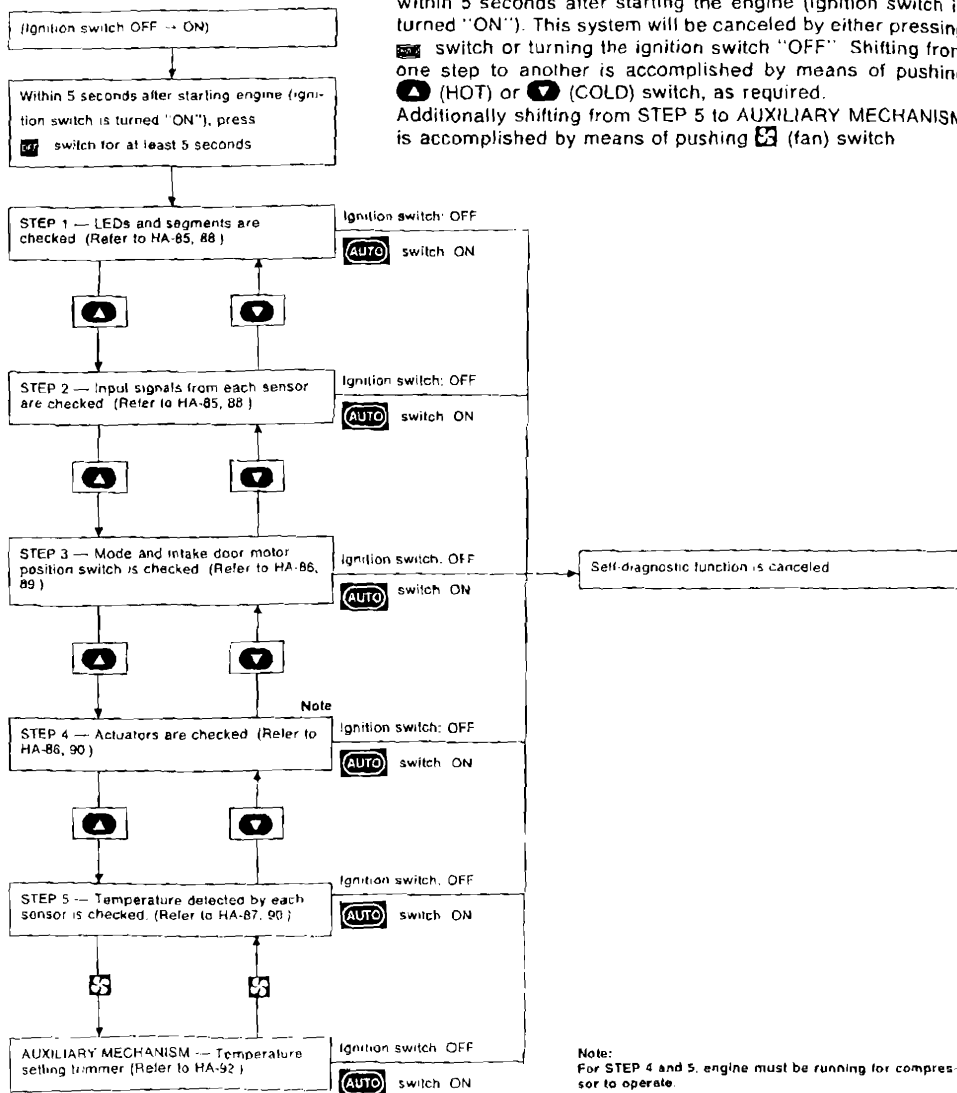
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## Self-diagnosis

The self-diagnostic system diagnoses sensors, door motors, blower motor, etc. by system line. Refer to applicable sections (items) for details. Shifting from normal control to the self-diagnostic system is done as follows. Start the engine (turn the ignition switch from "OFF" to "ON") And press "OFF" switch for at least 5 seconds. The "OFF" switch must be pressed within 5 seconds after starting the engine (ignition switch is turned "ON"). This system will be canceled by either pressing "OFF" switch or turning the ignition switch "OFF". Shifting from one step to another is accomplished by means of pushing ▲ (HOT) or ▼ (COLD) switch, as required.

Additionally shifting from STEP 5 to AUXILIARY MECHANISM is accomplished by means of pushing SS (fan) switch

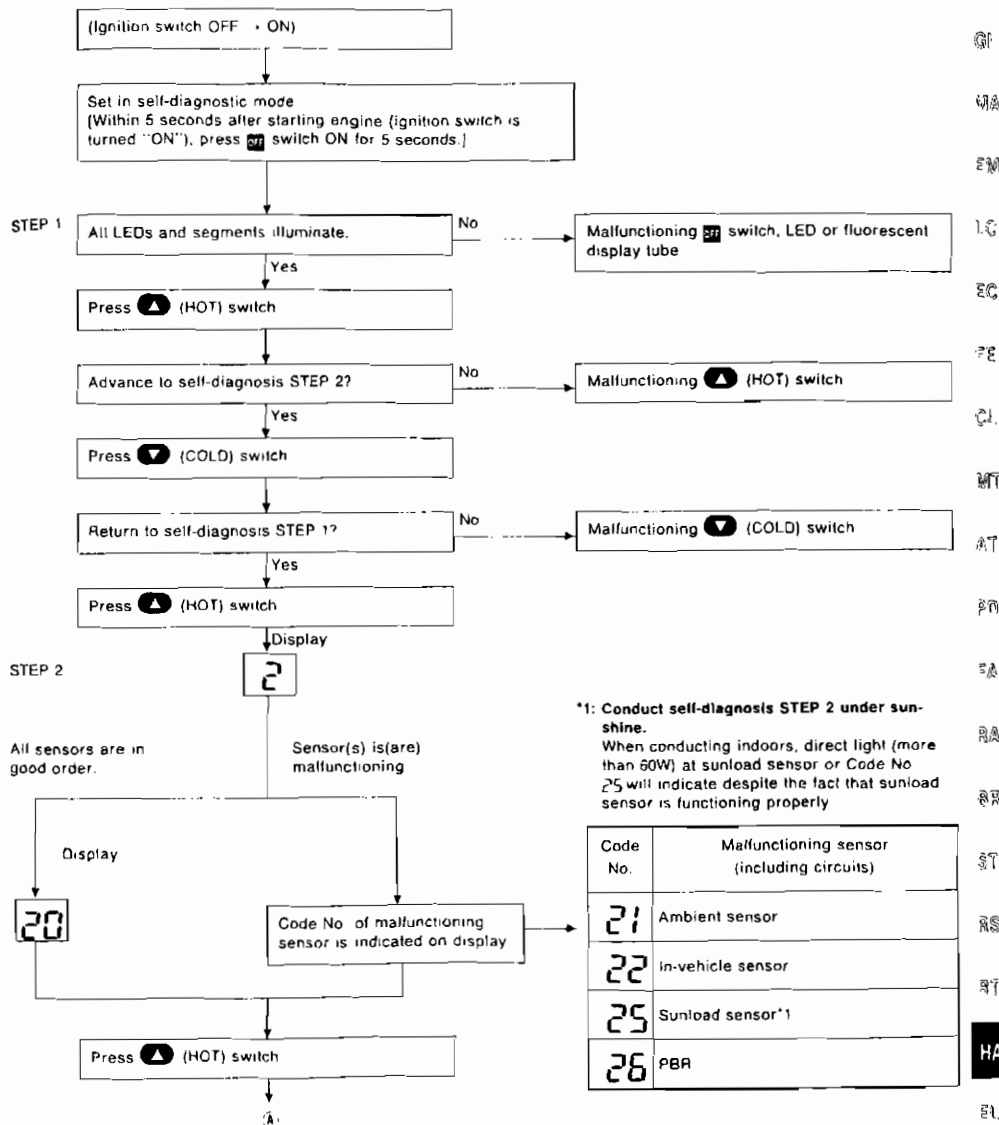


# TROUBLE DIAGNOSES

## Self-diagnosis (Cont'd)

AUTO

### CHECKING PROCEDURE



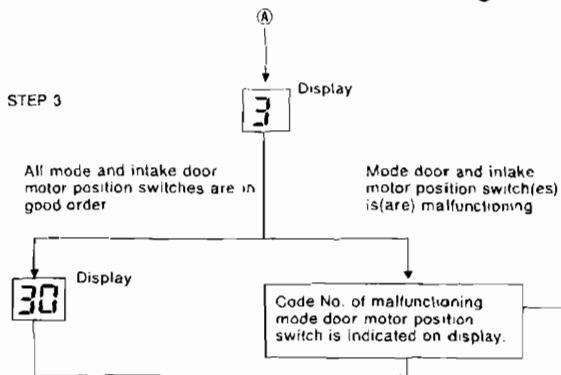
\*1: Conduct self-diagnosis STEP 2 under sunshine.  
When conducting indoors, direct light (more than 60W) at sunload sensor or Code No 25 will indicate despite the fact that sunload sensor is functioning properly

| Code No. | Malfunctioning sensor (including circuits) |
|----------|--|
| 21       | Ambient sensor                             |
| 22       | In-vehicle sensor                          |
| 25       | Sunload sensor*1                           |
| 28       | PBR  |

**Note:**

At any time, you can return to a previous step in the self-diagnosis by pressing the [COLD] switch.

## Self-diagnosis (Cont'd)



| Code No   | Malfunctioning part or circuit |                   |
|-----------|--------------------------------|-------------------|
|           | Position switch                |                   |
| <b>31</b> | VENT                           | Mode door motor   |
| <b>32</b> | B/L                            |                   |
| <b>33</b> | FOOT                           |                   |
| <b>34</b> | FOOT/DEF                       |                   |
| <b>35</b> | DEF                            |                   |
| <b>36</b> | FRE                            | Intake door motor |
| <b>38</b> | 20% FRE                        |                   |
| <b>39</b> | REC                            |                   |

Press **(HOT)** switch.



Code No. of actuators test pattern is indicated on display

Press **(DEF)** switch

Press **(HOT)** switch.

(B)

| Code No.  | Actuators test pattern |             |              |               |              |            |
|-----------|------------------------|-------------|--------------|---------------|--------------|------------|
|           | Mode door              | Intake door | Air mix door | Bi-level door | Blower motor | Compressor |
| <b>41</b> | VENT                   | REC         | Full Cold    | OPEN          | 4 - 5V       | ON         |
| <b>42</b> | B/L                    | REC         | Full Cold    | OPEN          | 9 - 11V      | ON         |
| <b>43</b> | B/L                    | 20% FRE     | Full Hot     | CLOSE         | 7 - 9V       | ON         |
| <b>44</b> | FOOT                   | FRE         | Full Hot     | CLOSE         | 7 - 9V       | OFF        |
| <b>45</b> | F/O                    | FRE         | Full Hot     | CLOSE         | 7 - 9V       | OFF        |
| <b>46</b> | DEF                    | FRE         | Full Hot     | CLOSE         | 10 - 12V     | ON         |

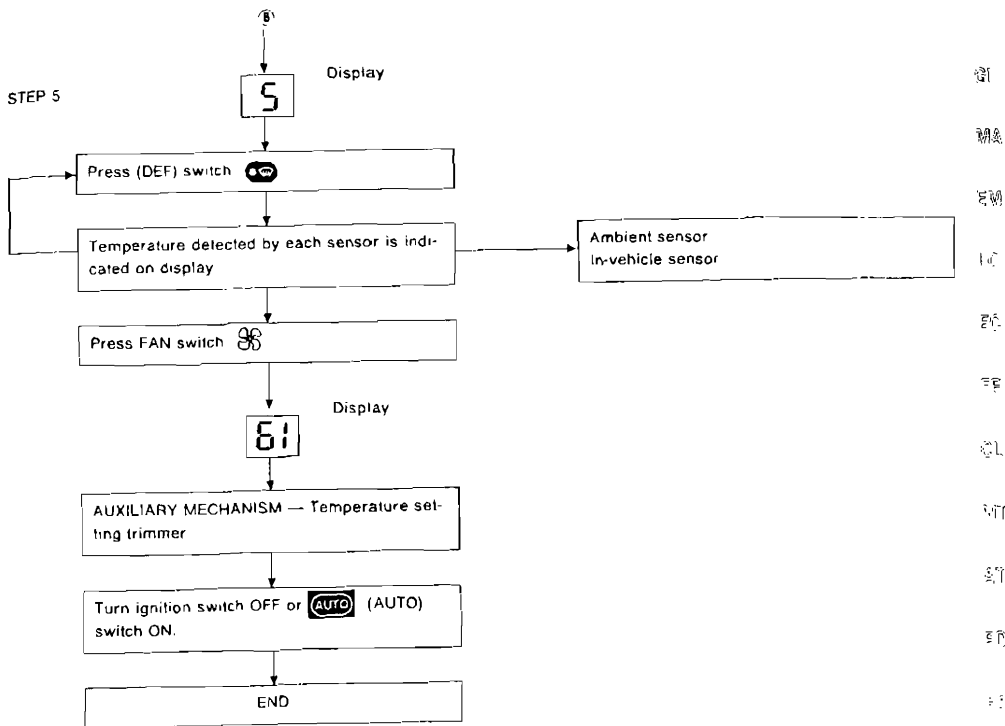
Note:

For STEP 4, engine must be running for compressor to operate.

# TROUBLE DIAGNOSES

## Self-diagnosis (Cont'd)

AUTO

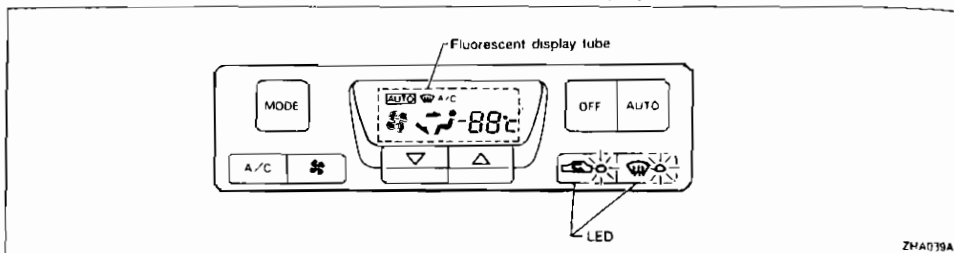


## Self-diagnosis (Cont'd)

## HOW TO INTERPRET THE RESULTS

## STEP 1: Checks LEDs and segments

When switch's LED and segments are in functioning properly in STEP 1, LED and display will come on.



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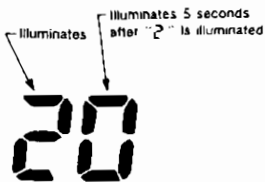
## Display malfunction



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If LEDs or segments malfunction, LED will not come on or display will show incomplete segment.

## Display (when all sensors are in good order)



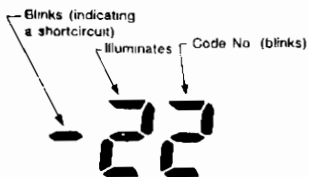
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## STEP 2: Checks each sensor circuit for open or short circuit

Display shows "2" in STEP 2 mode.

When all sensors are in good order, display shows "20". It takes approximately 5 seconds to check all sensors.

## Display (when sensor malfunctions)



ZHA042A

If a sensor is malfunctioning, the corresponding code No. blinks on display. A short circuit is identified by a blinking "-" mark preceding mode number



## Self-diagnosis (Cont'd)

If two or more sensors malfunction, corresponding code Nos respectively blink two times

Each code No.  
blinks two times.

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## Sensors and abnormalities

If a circuit is opened or shorted, display shows its code No. when input corresponds with any of following conditions.

| Code No. | Sensor            | Open circuit                 | Short circuit                 |
|----------|-------------------|------------------------------|-------------------------------|
| 21       | Ambient sensor    | Less than<br>-41.9°C (-43°F) | Greater than<br>100°C (212°F) |
| 22       | In-vehicle sensor | Less than<br>-41.9°C (-43°F) | Greater than<br>100°C (212°F) |
| 25       | Sunload sensor*2  | Less than<br>4.5 mA          | Greater than<br>192 mA        |
| 26       | PBR*1             | Greater than 50%             | Less than 30%                 |

\*1: "50%" and "30%" refer to percentage with respect to full stroke of air mix door. (Full cold: 10%, Full hot: 90%)

\*2: Conduct self-diagnosis STEP 2 under sunshine.

When conducting indoors, direct light (more than 60W) at sunload sensor.

### Display (when all doors are in good order)

Illuminates 20 seconds after "3" is shown on display

RHA383D

## STEP 3: Checks mode and intake door positions

Display shows "3" in STEP 3 mode.

When all doors are in good order, display will then show "30"

It takes approximately 20 seconds to check all mode and intake doors.

### Display (when a door is out of order)

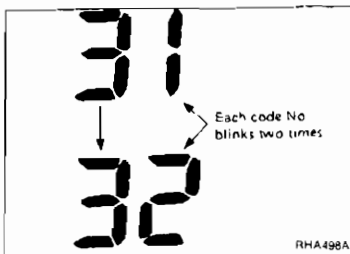
Code No. (blinks)

RHA49/A

When abnormalities are detected, display shows a code No. corresponding with malfunctioning part.

| Code No                  | 31   | 32  | 33   | 34           | 35  | 36  | 38         | 39  |
|--------------------------|------|-----|------|--------------|-----|-----|------------|-----|
| Malfunc-<br>tioning part | VENT | B/I | FOOT | FOOT/<br>DEF | DEF | FRE | 20%<br>FRE | REC |

HA

**Self-diagnosis (Cont'd)**

If two or more mode or intake doors are out of order, corresponding code numbers respectively blink two times. If mode door motor harness connector is disconnected, the following display pattern will appear.

31 → 32 → 33 → 34 → 35

If intake mode door harness connector is disconnected, the following display pattern will appear

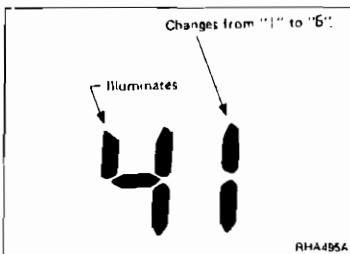
36 → 38 → 39

If any mode door motor position switch is malfunctioning, mode door motor will also malfunction.

**STEP 4: Checks operation of each actuator**

Display shows "41" in STEP 4 mode.

When DEF switch is pressed one time, display shows "42". Thereafter, each time the switch is pressed, display advances one number at a time, up to "46", then returns to "41".



During inspection in STEP 4, the auto amp. will forcefully transmit an output to the affected actuators. The corresponding code Nos. are shown on display as indicated in the table below.

**Checks must be made visually, by listening to any noise, or by touching air outlets with your hand, etc. for improper operation.**

**Discharge air flow**

| Switch mode/indicator | Air outlet/distribution |      |           |
|-----------------------|-------------------------|------|-----------|
|                       | Face                    | Foot | Defroster |
|                       | 100%                    | —    | —         |
|                       | 60%                     | 40%  | —         |
|                       | —                       | 80%  | 20%       |
|                       | —                       | 60%  | 40%       |
|                       | —                       | —    | 100%      |

RHA429EA

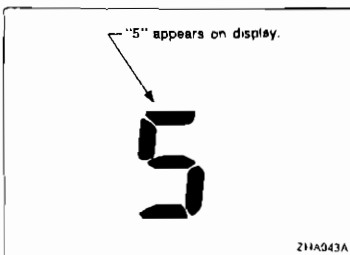
| Code No.      | 41         | 42          | 43         | 44         | 45         | 46           |
|---------------|------------|-------------|------------|------------|------------|--------------|
| Actuator      |            |             |            |            |            |              |
| Mode door     | VENT       | B/L         | B/L        | FOOT       | F/D        | DEF          |
| Intake door   | REC        | REC         | 20% FRE    | FRE        | FRE        | FRE          |
| Air mix door  | Full Cold  | Full Cold   | Full Hot   | Full Hot   | Full Hot   | Full Hot     |
| Blower motor  | 4 - 5<br>V | 9 - 11<br>V | 7 - 9<br>V | 7 - 9<br>V | 7 - 9<br>V | 10 - 12<br>V |
| Compressor    | ON         | ON          | ON         | OFF        | OFF        | ON           |
| Bi-level door | Open       | Open        | Shut       | Shut       | Shut       | Shut         |

Operating condition of each actuator cannot be checked by indicators.

**STEP 5: Checks temperature detected by sensors****Checks temperature detected by sensors**

Display shows "5" in STEP 5 mode

- When DEF switch is pressed one time, display shows temperature detected by ambient sensor
- When DEF switch is pressed second time, display shows temperature detected by in-vehicle sensor.
- When DEF switch is pressed third time, display returns to original presentation "5".

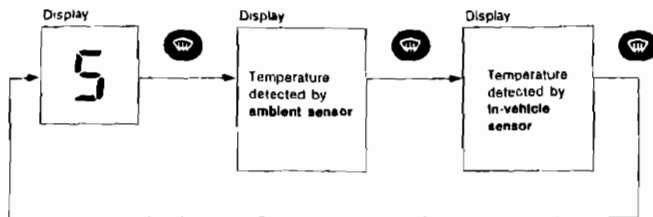


## Self-diagnosis (Cont'd)

Temperature detected by sensor  
corresponding with switch operation

23

RHA493A



ZHA044A




If temperature shown on display greatly differs from actual temperature, check sensor circuit at first. Then inspect sensor itself according to the procedures described in **Control System Input Component**. Refer to HA-128.

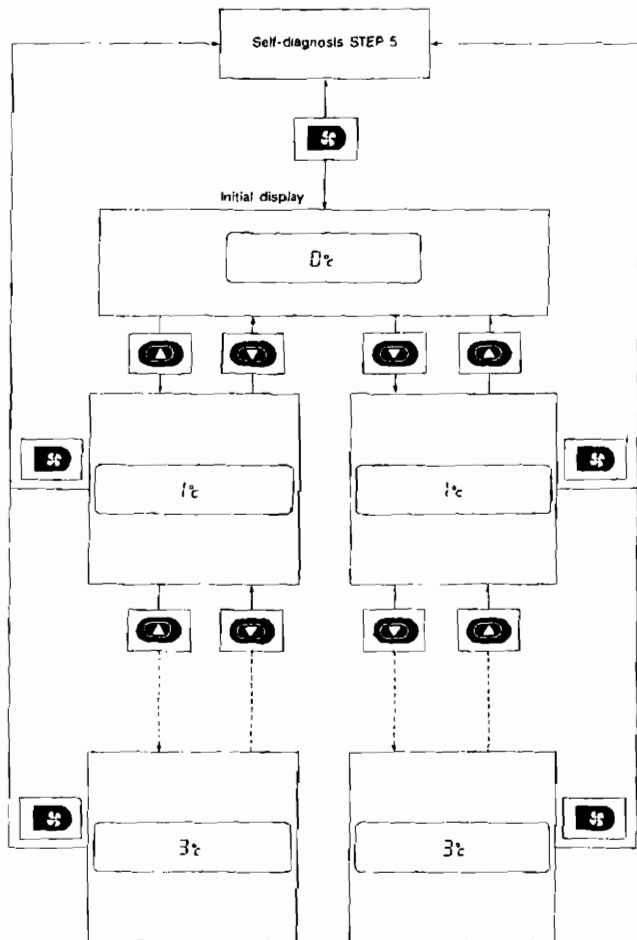
## Self-diagnosis (Cont'd)

**AUXILIARY MECHANISM: Temperature setting trimmer**

This trimmer compensates for differences between temperature setting (displayed digitally) and temperature felt by driver in a range of  $\pm 3^{\circ}\text{C}$ .

Operating procedures for this trimmer are as follows:

Starting with STEP 5 under "Self-diagnostic mode", press  (fan) switch to set air conditioning system in auxiliary mode. Then, press either  (HOT) or  (COLD) switch as desired. Temperature will change at a rate of  $1^{\circ}\text{C}$  each time a switch is pressed.



ZHA045A

When battery cable is disconnected, trimmer operation is canceled and temperature set becomes that of initial condition, i.e.  $0^{\circ}\text{C}$ .

## Preliminary Check

## PRELIMINARY CHECK 1

Air outlet does not change.

- Perform Self-diagnosis STEP 1 before referring to the flow chart.

CHECK SENSOR CIRCUIT  
Set up Self-diagnosis STEP 2  
Is each sensor circuit normal?  
Code No. 20 should be indicated on the display after approx. 5 seconds.

OK

NG

CHECK SENSOR CIRCUIT IN DETAIL ACCORDING TO THE DIAGNOSTIC PROCEDURE BELOW CORRESPONDING TO EACH CODE NO

| Code No | How to repair                 | Reference page |
|---------|-------------------------------|----------------|
| 21      | Go to Diagnostic Procedure 1  | HA-111         |
| 22      | Go to Diagnostic Procedure 2. | HA-112         |
| 25      | Go to Diagnostic Procedure 3. | HA-113         |
| 26      | Go to Diagnostic Procedure 4  | HA-114         |
| -21     | Go to Diagnostic Procedure 1  | HA-111         |
| -22     | Go to Diagnostic Procedure 2. | HA-112         |
| -25     | Go to Diagnostic Procedure 3  | HA-113         |
| -26     | Go to Diagnostic Procedure 4. | HA-114         |

Are sensor circuits for ambient sensor and in-vehicle sensor operating normally? If malfunction is suspected, check temperature detected by each sensor using Self-diagnosis STEP 5. Confirm the temperature is within normal range before performing Diagnostic Procedures

CHECK MODE DOOR MOTOR  
Set up Self-diagnosis STEP 3  
Is mode door motor operating normally?  
Code No. 30 should be indicated on the display after approx. 20 seconds.

OK

NG

Go to Diagnostic Procedure 5. (HA-115)

CHECK MODE DOOR OPERATION  
Set up Self-diagnosis STEP 4  
Does air outlet change according to each code No ?

|      |     |     |      |     |     |
|------|-----|-----|------|-----|-----|
| 41   | 42  | 43  | 44   | 45  | 46  |
| VENT | B/L | B/L | FOOT | F/D | DEF |

NG

CHECK SIDE LINK MECHANISM.  
Refer to CONTROL LINKAGE ADJUSTMENT. (HA-125)

Repair.

OK

Go to Diagnostic Procedure 5. (HA-115)

OK

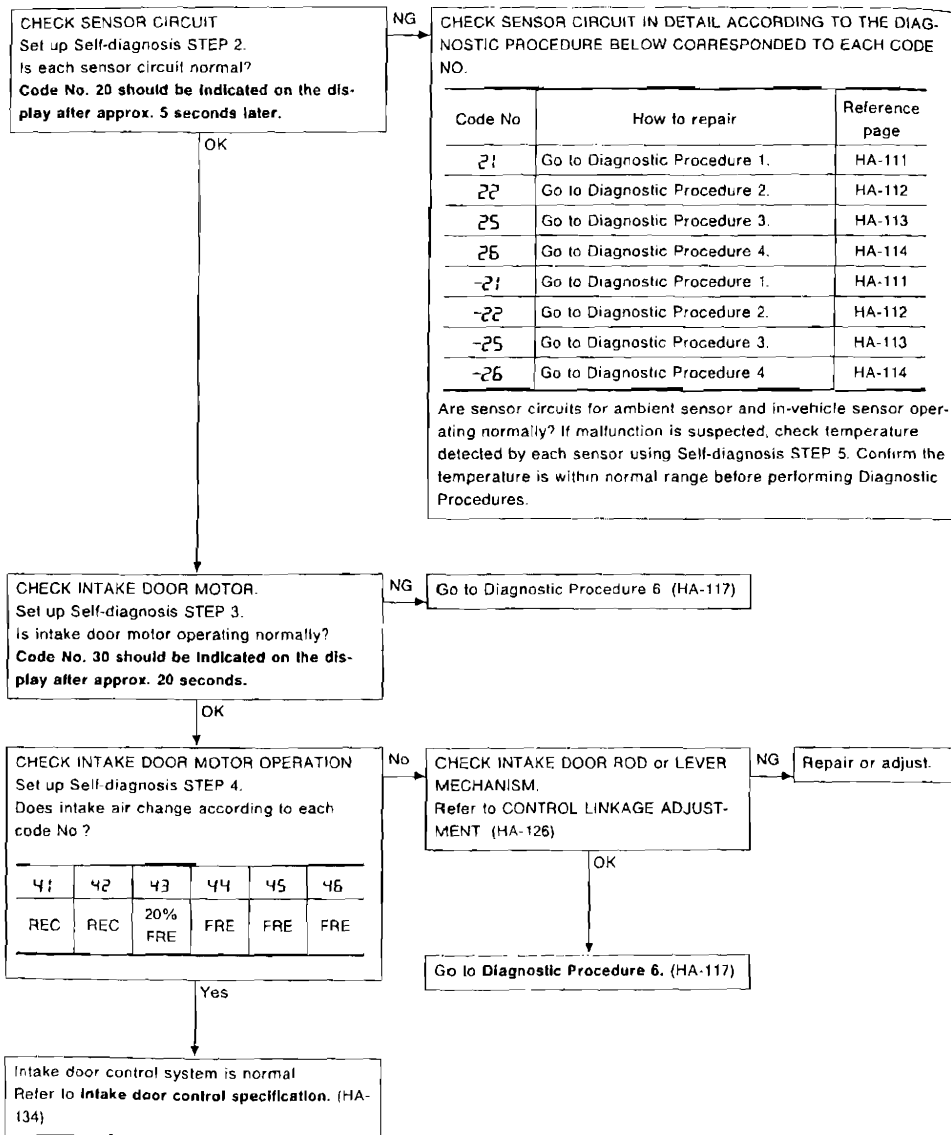
Air outlet control system is normal. Refer to Mode door control specification. (HA-133)

## Preliminary Check (Cont'd)

## PRELIMINARY CHECK 2

Intake door does not change.

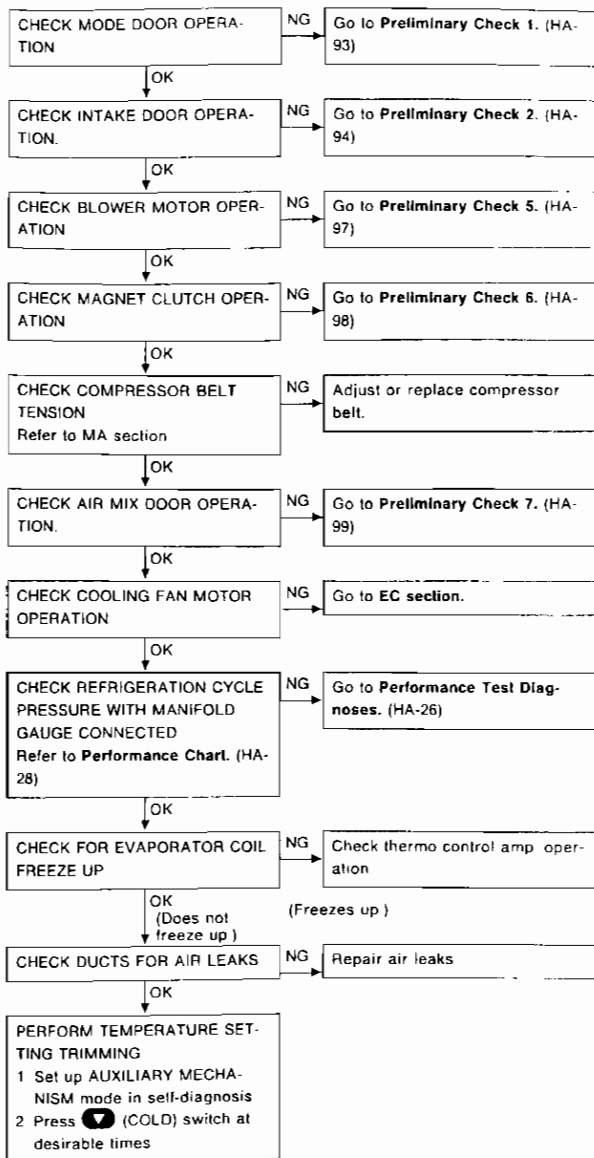
- Perform Self-diagnosis STEP 1 before referring to the following flow chart.



## PRELIMINARY CHECK 3

Insufficient cooling

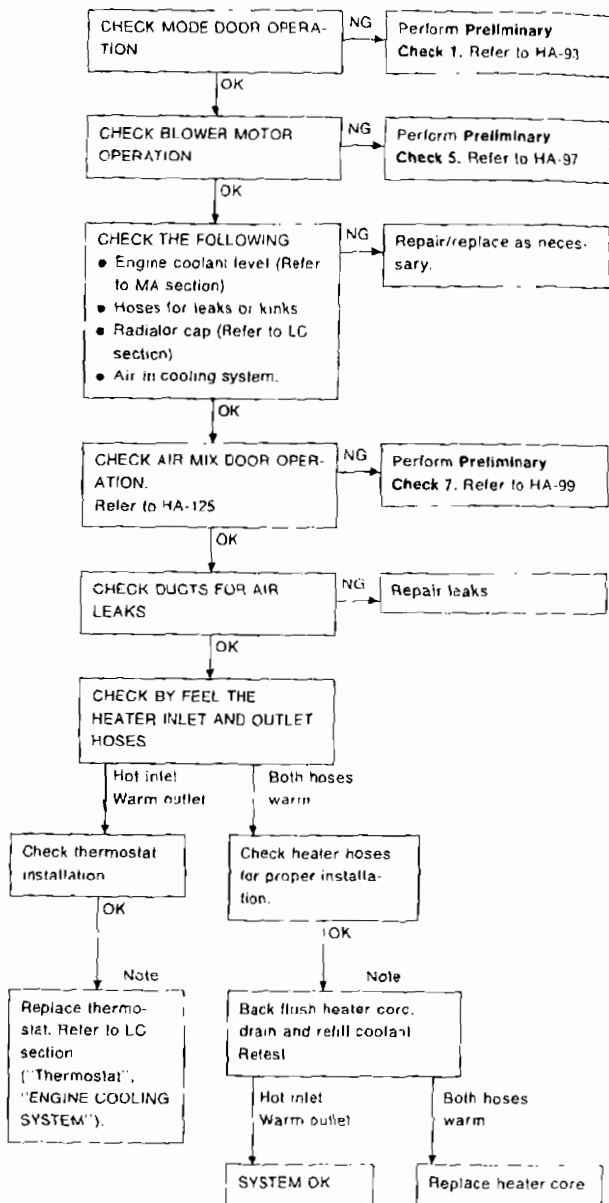
## Preliminary Check (Cont'd)



## Preliminary Check (Cont'd)

## PRELIMINARY CHECK 4

Insufficient heating



Note: To avoid unnecessary service of heating system, first perform TEMPERATURE SETTING TRIMMING. Refer to "AUXILIARY MECHANISM", "Self-diagnosis".

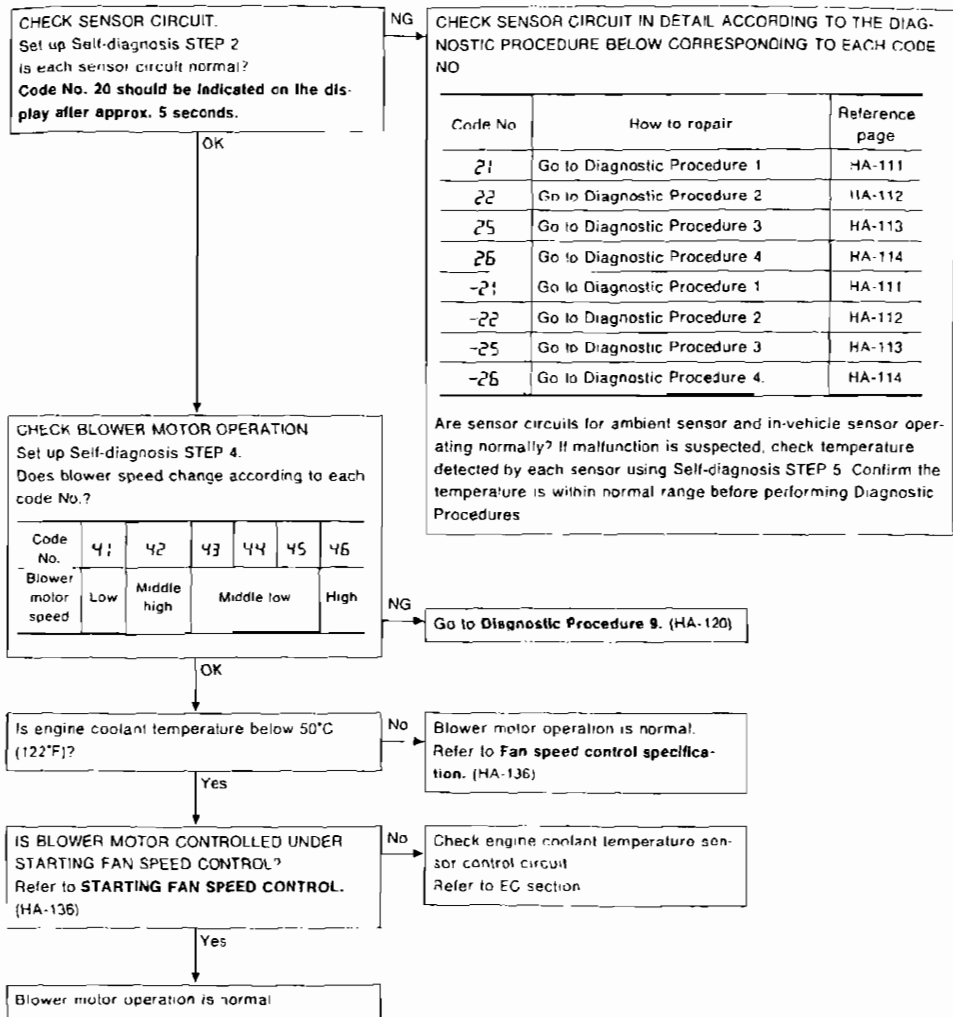


## Preliminary Check (Cont'd)

## PRELIMINARY CHECK 5

Blower motor operation is malfunctioning.

- Perform Self-diagnosis STEP 1 before referring to the following flow chart.

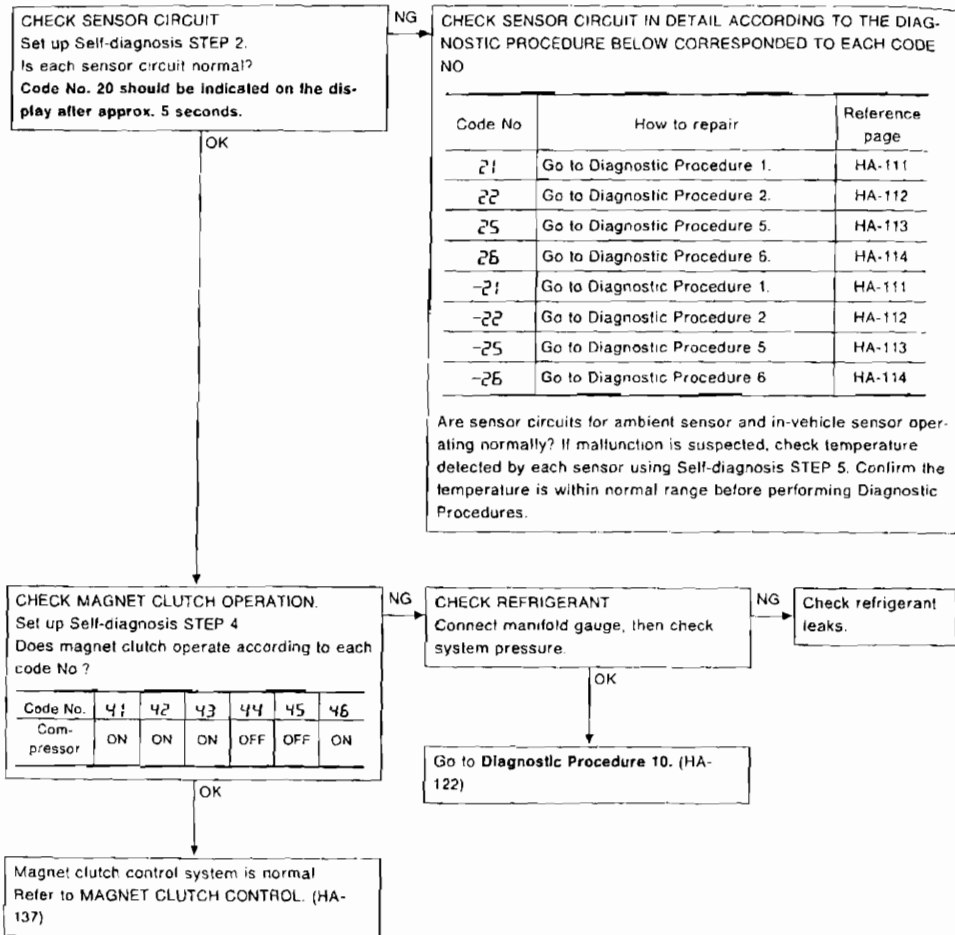


## Preliminary Check (Cont'd)

## PRELIMINARY CHECK 6

Magnet clutch does not engage.

Perform Self-diagnosis STEP 1 before referring to the following flow chart.

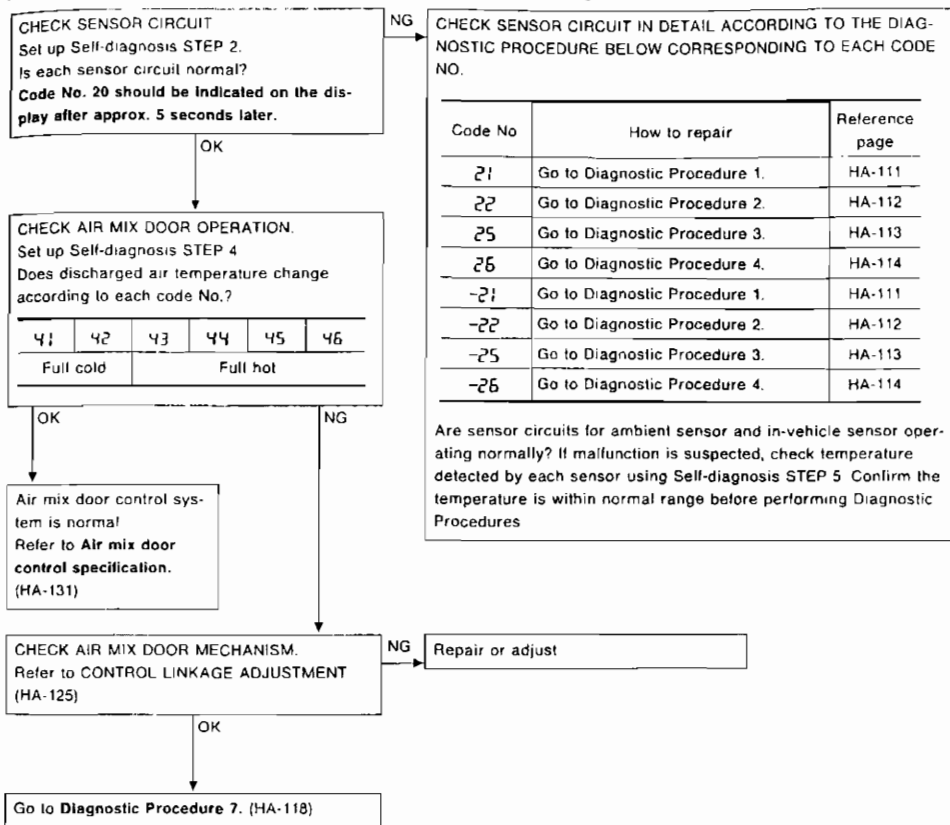


## Preliminary Check (Cont'd)

## PRELIMINARY CHECK 7

Discharged air temperature does not change.

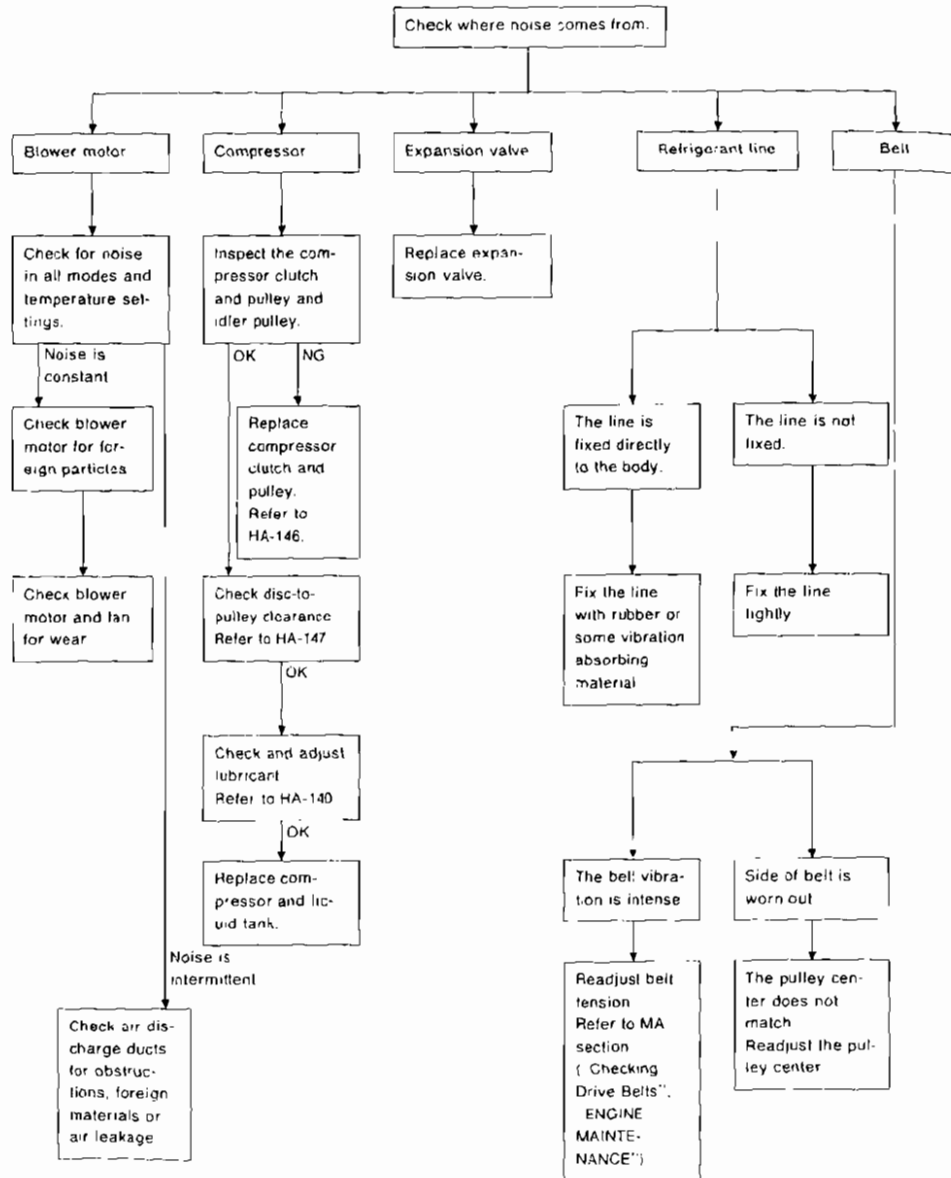
Perform Self-diagnosis STEP 1 before referring to the following flow chart.



## Preliminary Check (Cont'd)

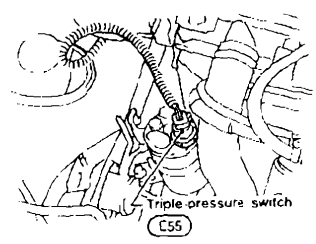
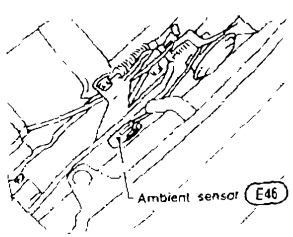
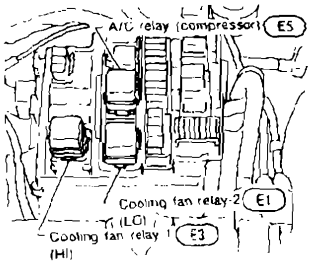
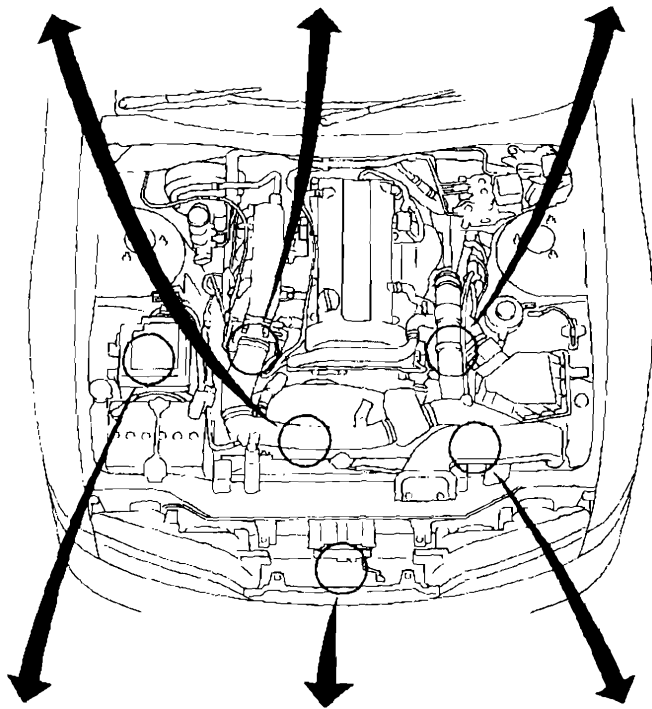
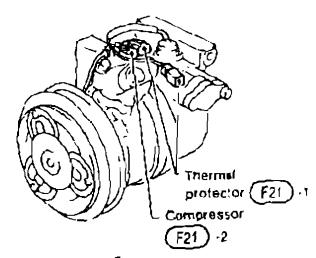
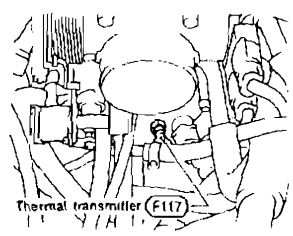
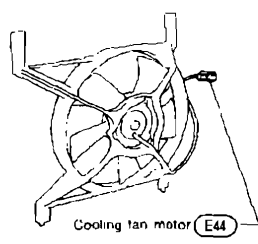
## PRELIMINARY CHECK 8

## Noise



### Harness Layout

#### Engine compartment



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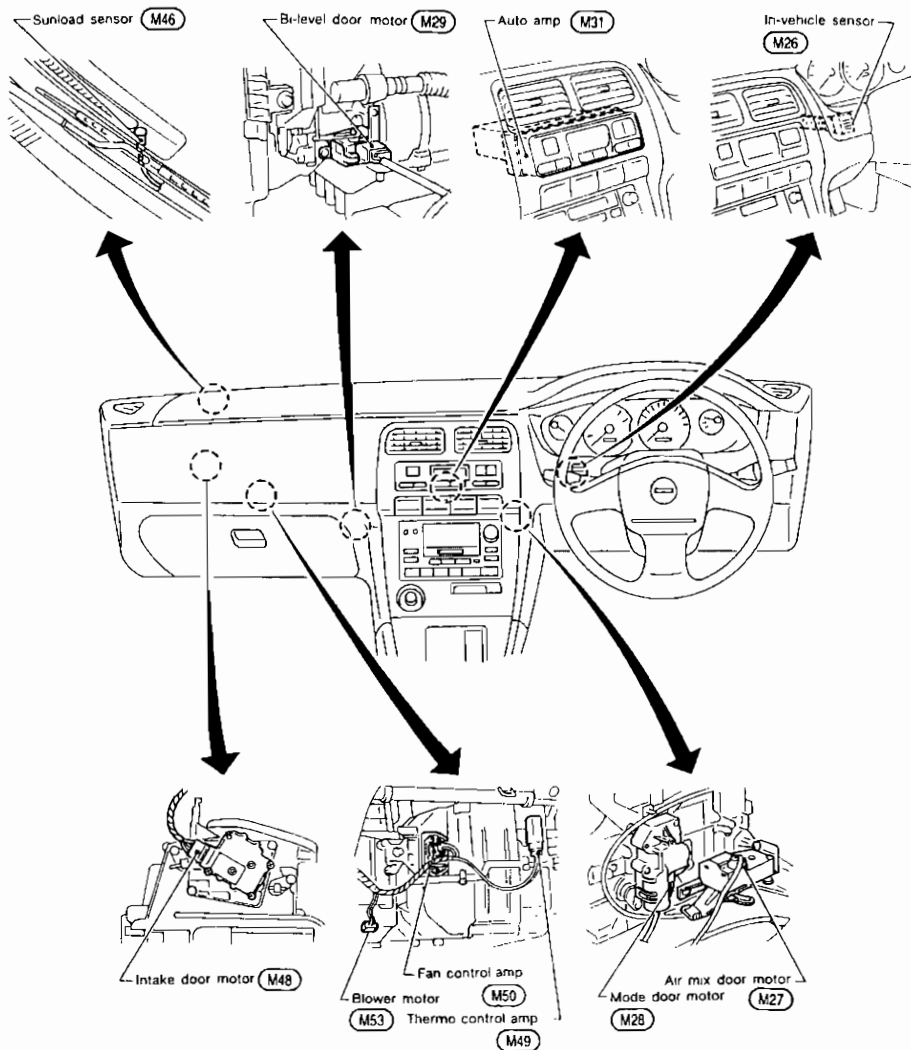
HA

# TRUBLE DIAGNOSES

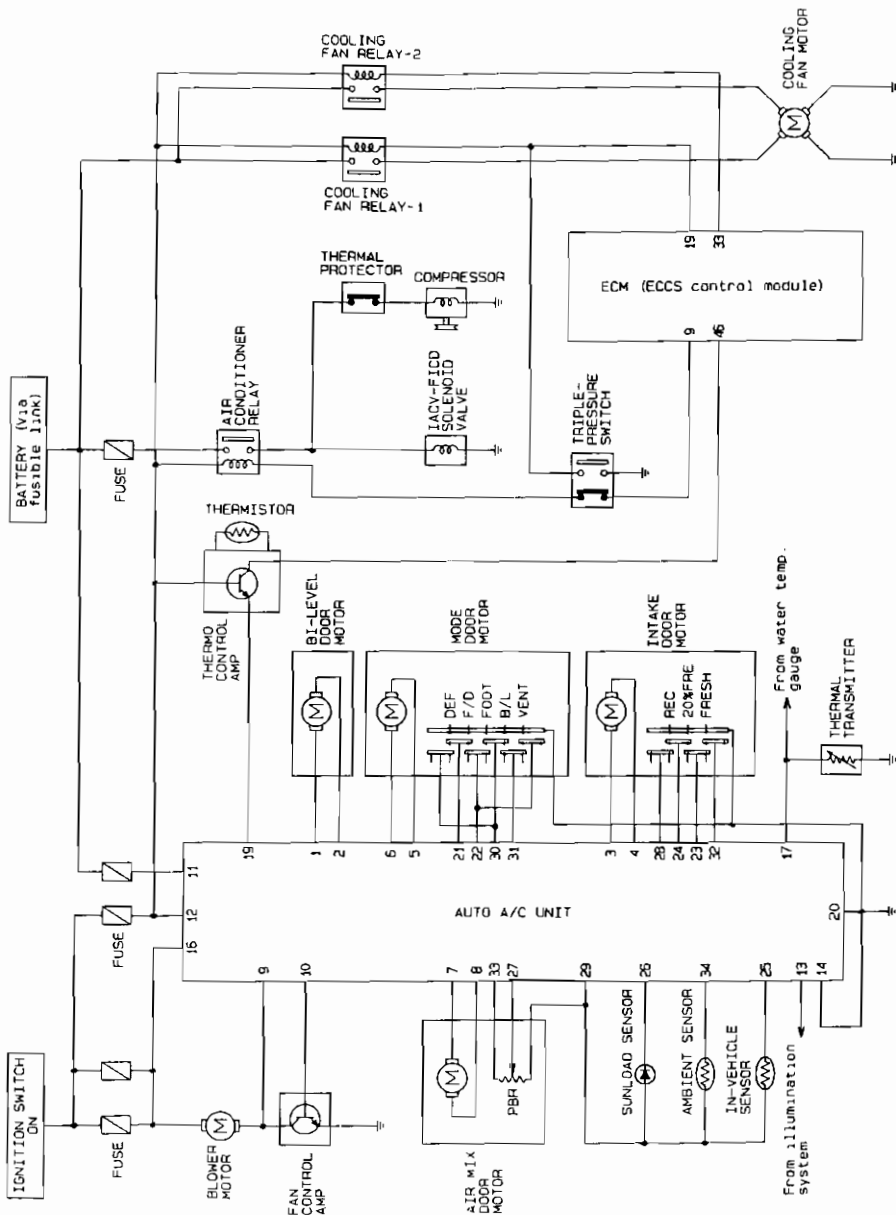
## Harness Layout (Cont'd)

AUTO

### Passenger compartment



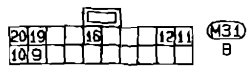
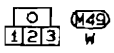
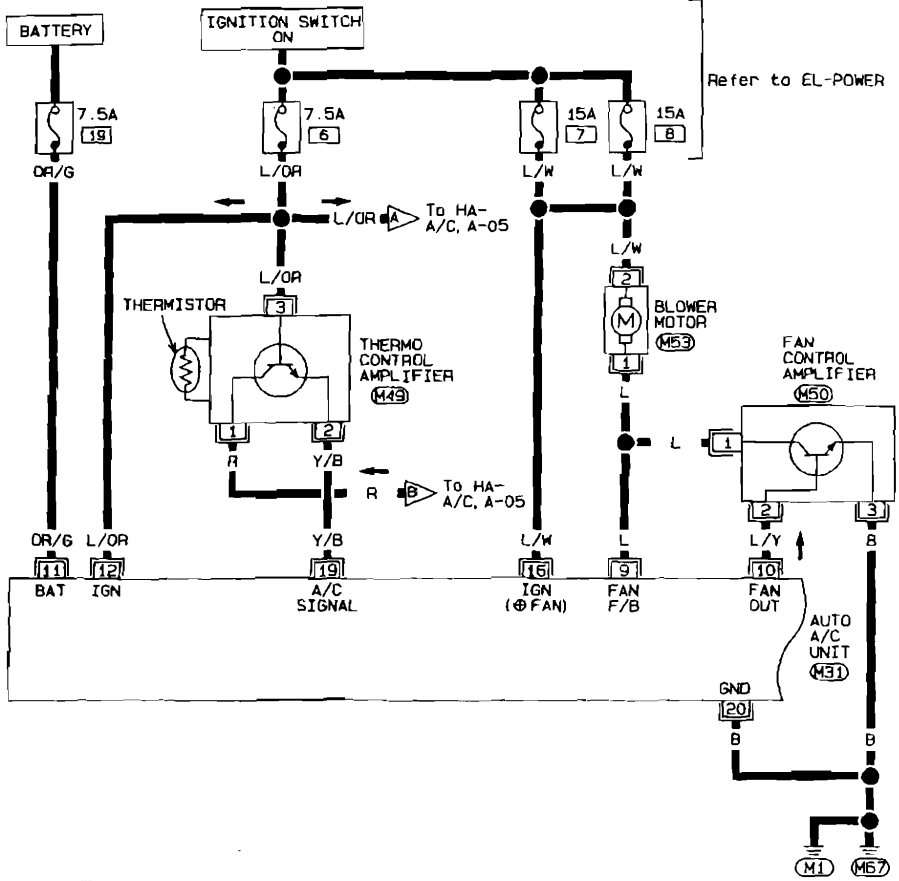
## Circuit Diagram



SHIA467E

Wiring Diagram — A/C, A —

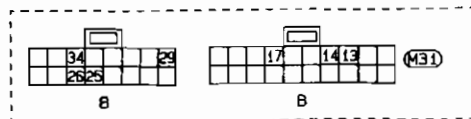
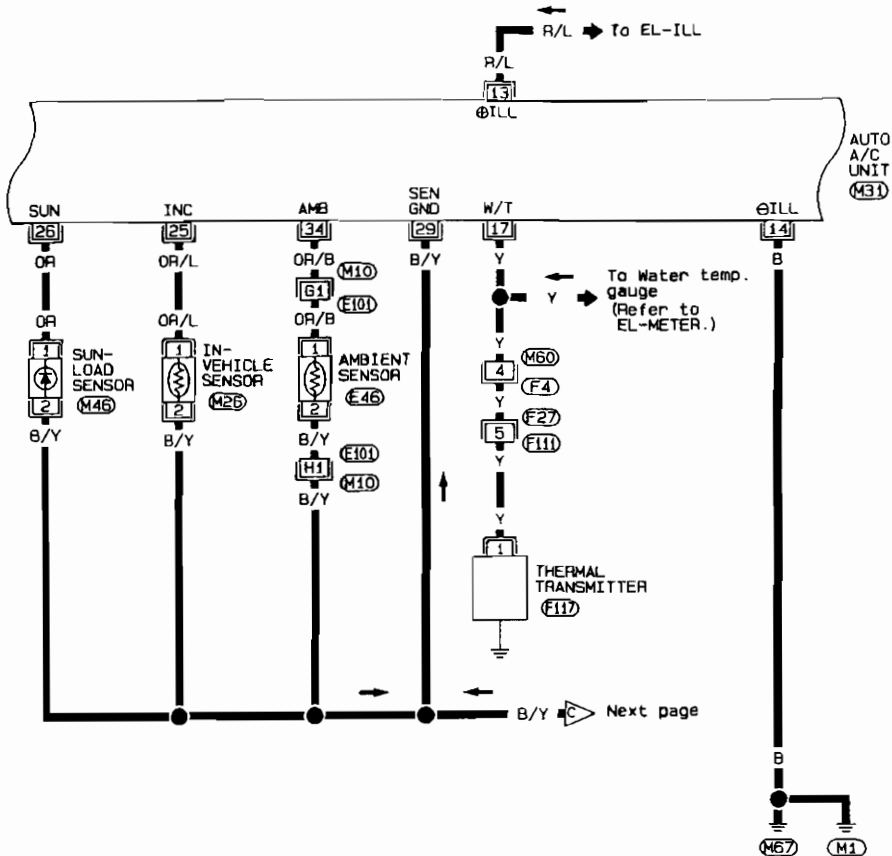
HA-A/C, A-01





Wiring Diagram — A/C, A — (Cont'd)

HA-A/C, A-02

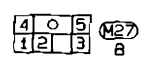
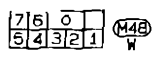
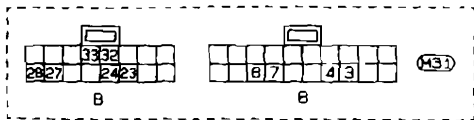
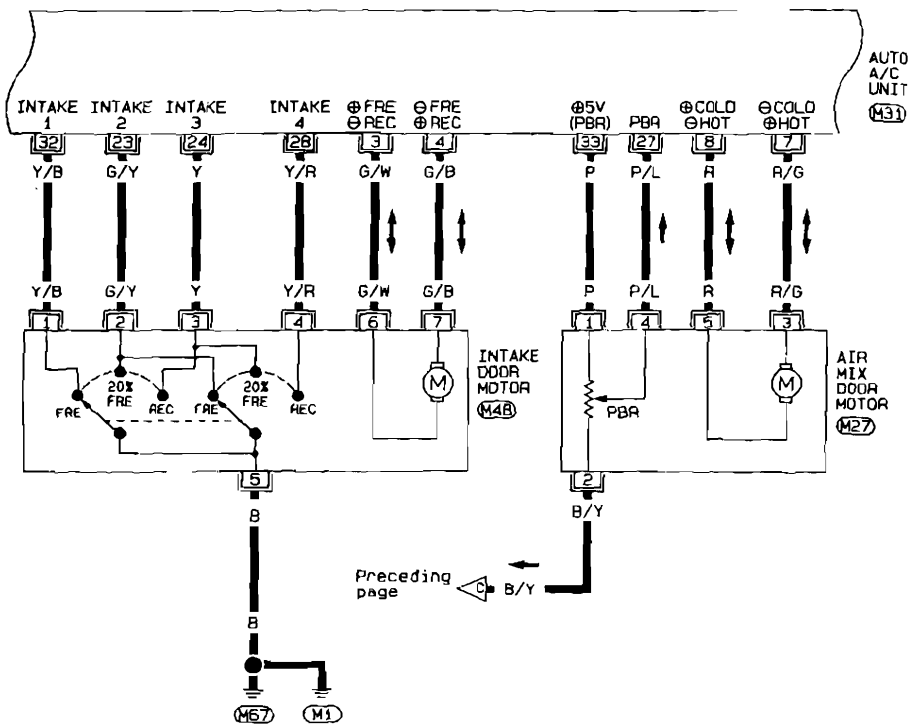


Refer to last page (Foldout page).

- M10, E101
- M60, F4

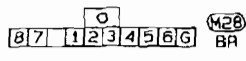
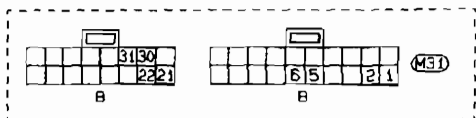
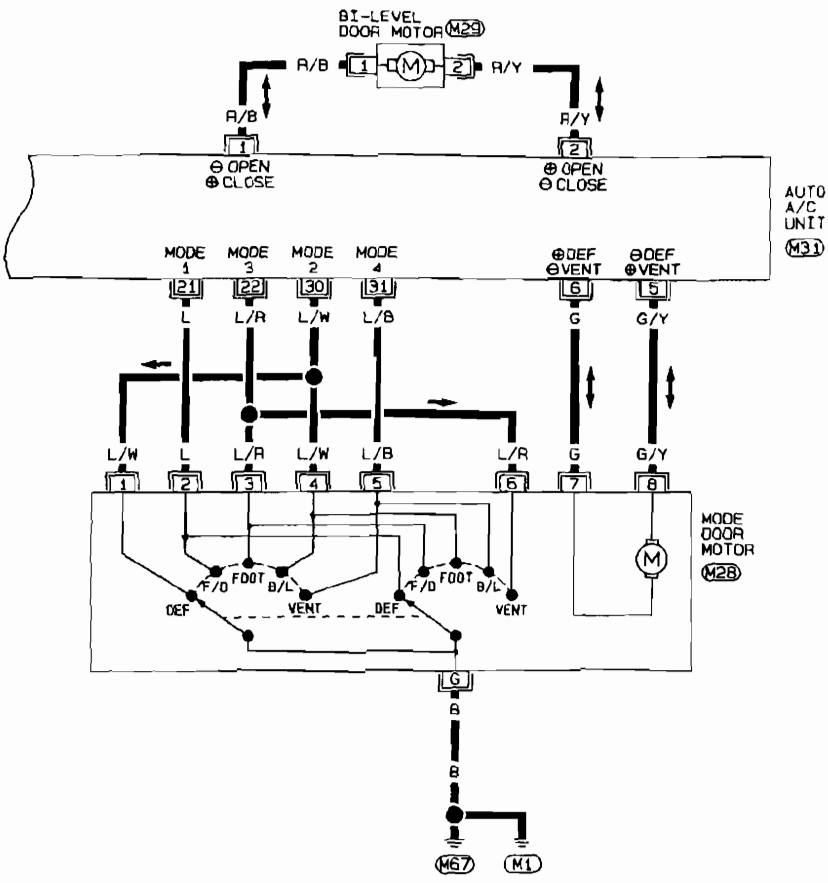


HA-A/C, A-03



Wiring Diagram — A/C, A — (Cont'd)

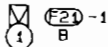
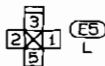
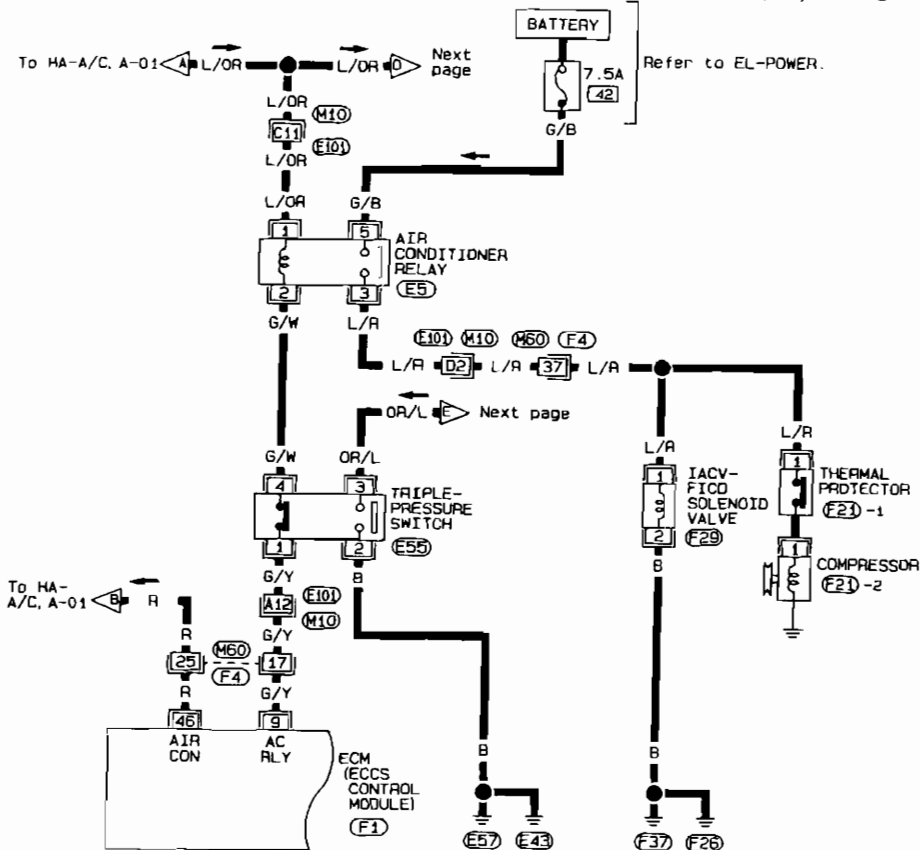
HA-A/C, A-04



HA

Wiring Diagram — A/C, A — (Cont'd)

HA-A/C, A-05



Refer to last page (Foldout page)

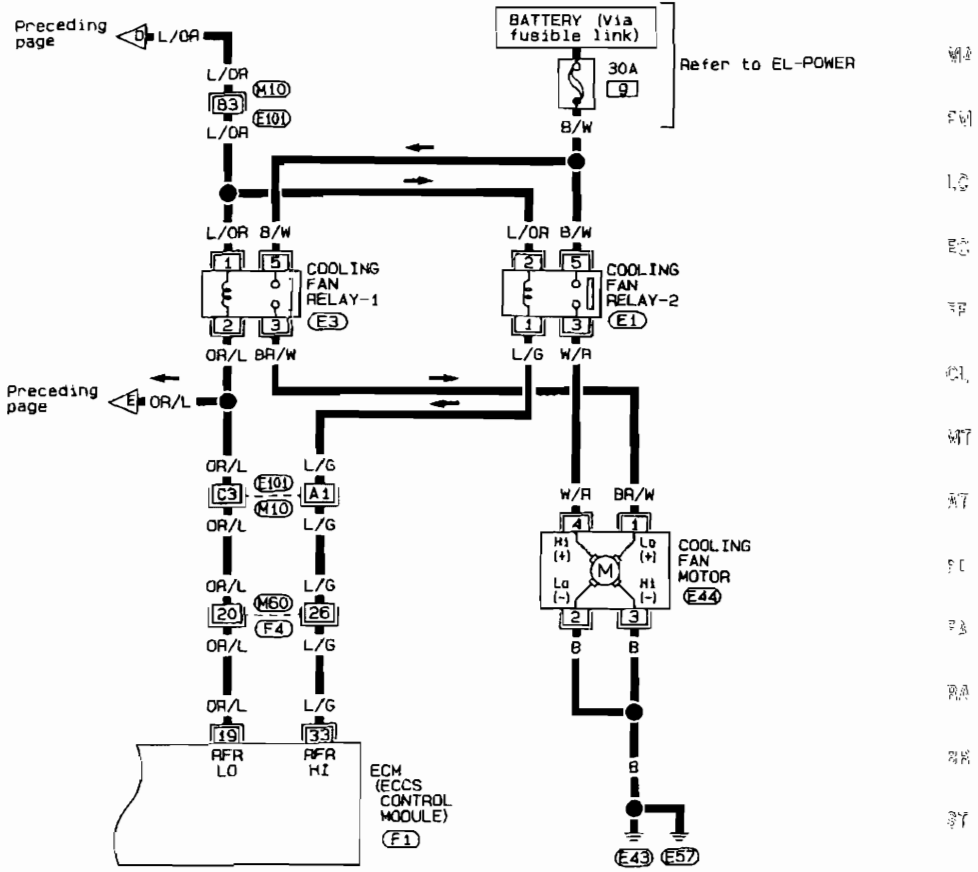
M10, E10

M50, F4

F1

Wiring Diagram — A/C, A — (Cont'd)

HA-A/C, A-06



Refer to last page (foldout page).

M10, E101

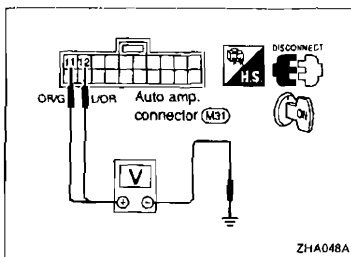
M50, F4

F1

HA

## Main Power Supply and Ground Circuit Check POWER SUPPLY CIRCUIT CHECK FOR AUTO A/C SYSTEM

Check power supply circuit for auto air conditioning system. Refer to "POWER SUPPLY ROUTING" in EL section and Wiring Diagram.

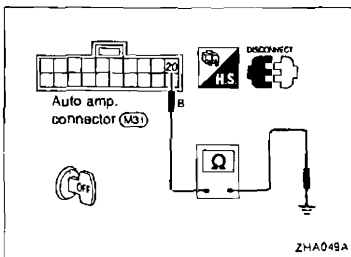


### AUTO AMP. CHECK

Check power supply circuit for auto amp. with ignition switch ON.

1. Disconnect auto amp. harness connector.
2. Connect voltmeter from harness side.
3. Measure voltage across terminal ⑪, ⑫ and body ground.

| Voltmeter terminal |             | Voltage     |
|--------------------|-------------|-------------|
| ⊕                  | ⊖           |             |
| ⑪, ⑫               | Body ground | Approx. 12V |



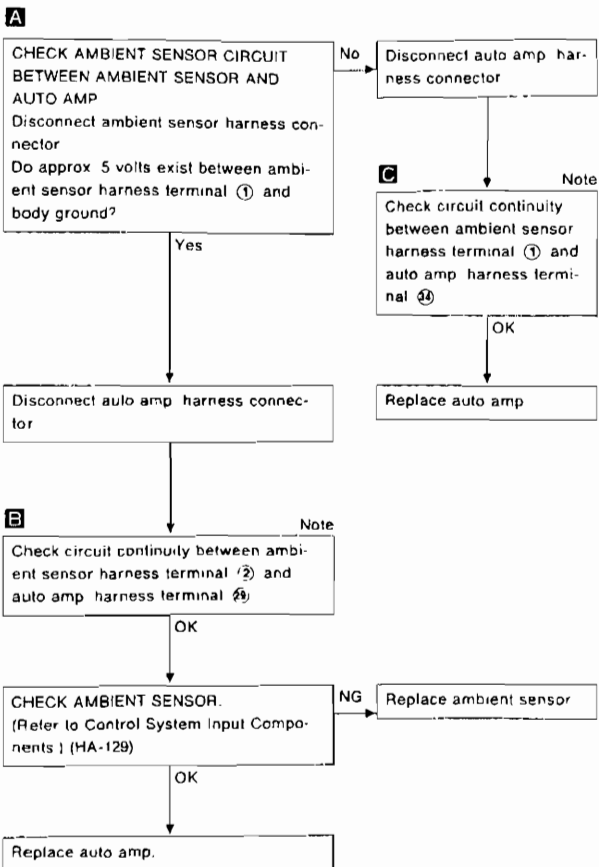
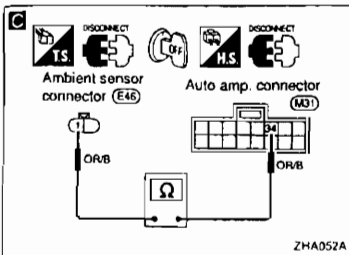
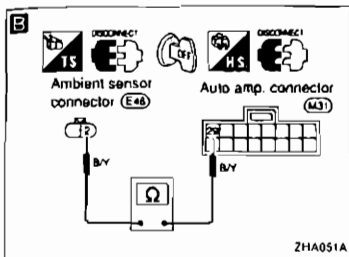
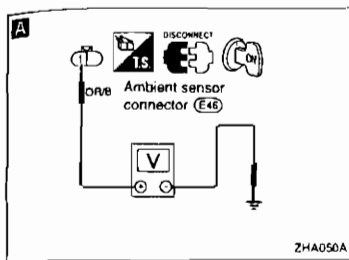
Check body ground circuit for auto amp. with ignition switch OFF

1. Disconnect push control unit harness connector
2. Connect ohmmeter from harness side.
3. Check for continuity between terminal ⑳ and body ground

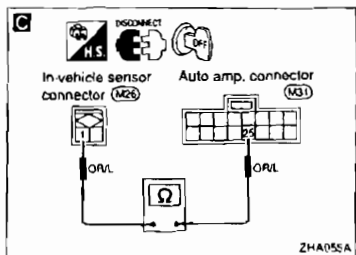
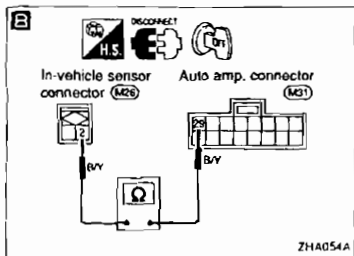
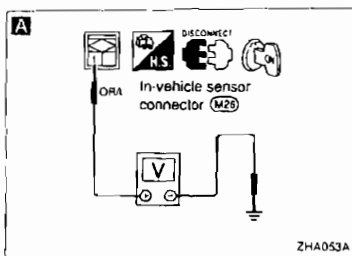
| Ohmmeter terminal |             | Continuity |
|-------------------|-------------|------------|
| ⊕                 | ⊖           |            |
| ⑳                 | Body ground | Yes        |

## Diagnostic Procedure 1

**SYMPTOM:** Ambient sensor circuit is open or shorted. (2) or -2) is indicated on display as a result of conducting Self-diagnosis STEP 2.)

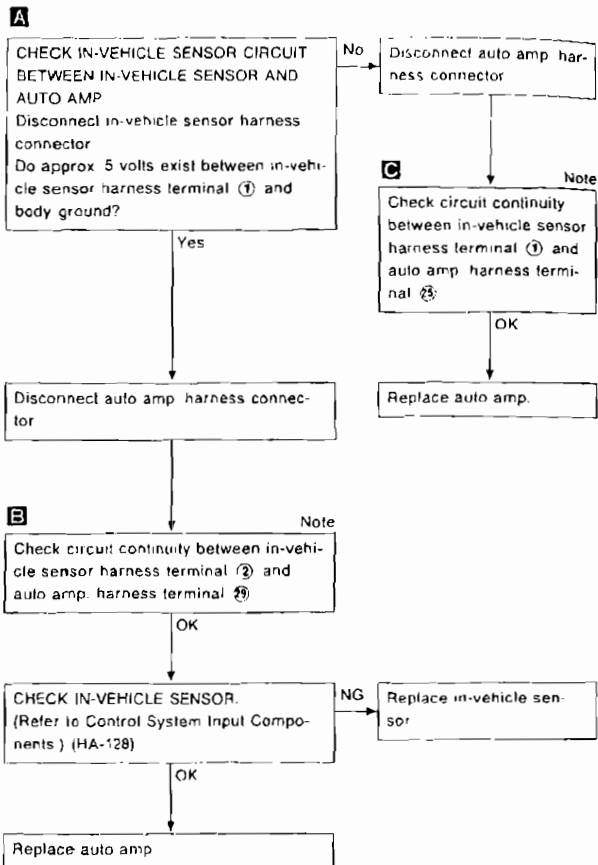
**Note:**

If the result is NG after checking circuit continuity, repair harness or connector.



## Diagnostic Procedure 2

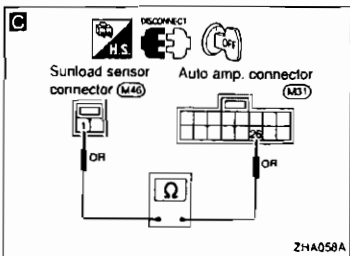
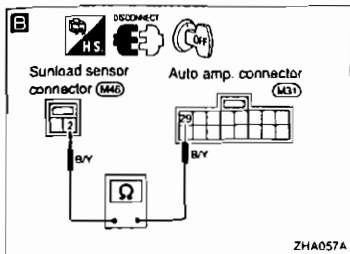
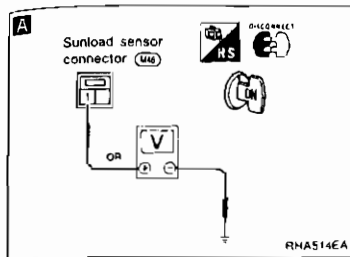
**SYMPTOM:** In-vehicle sensor circuit is open or shorted. (22 or -22 is indicated on display as a result of conducting Self-diagnosis STEP 2.)



**Note:**

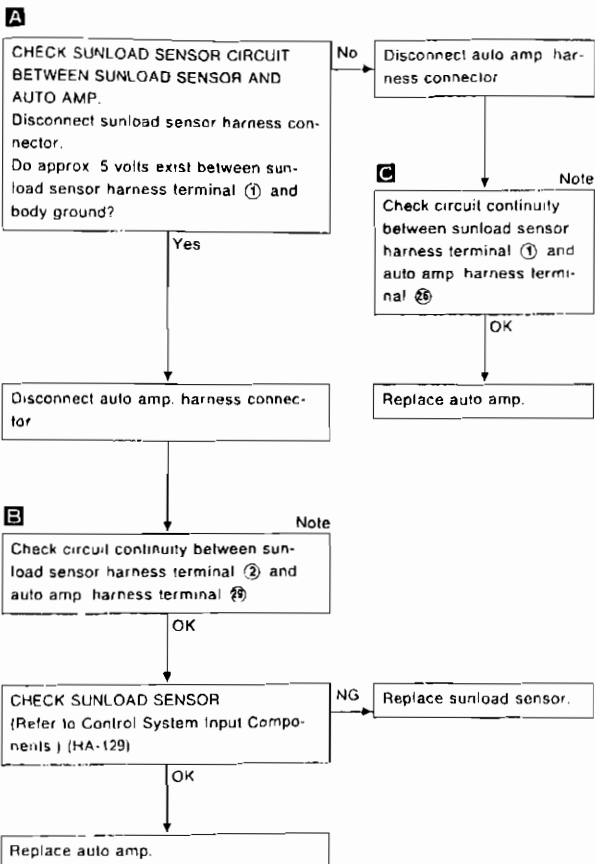
If the result is NG after checking circuit continuity, repair harness or connector.





## Diagnostic Procedure 3

**SYMPTOM:** Sunload sensor circuit is open or shorted. (25 or -25 is indicated on display as a result of conducting Self-diagnosis STEP 2.)

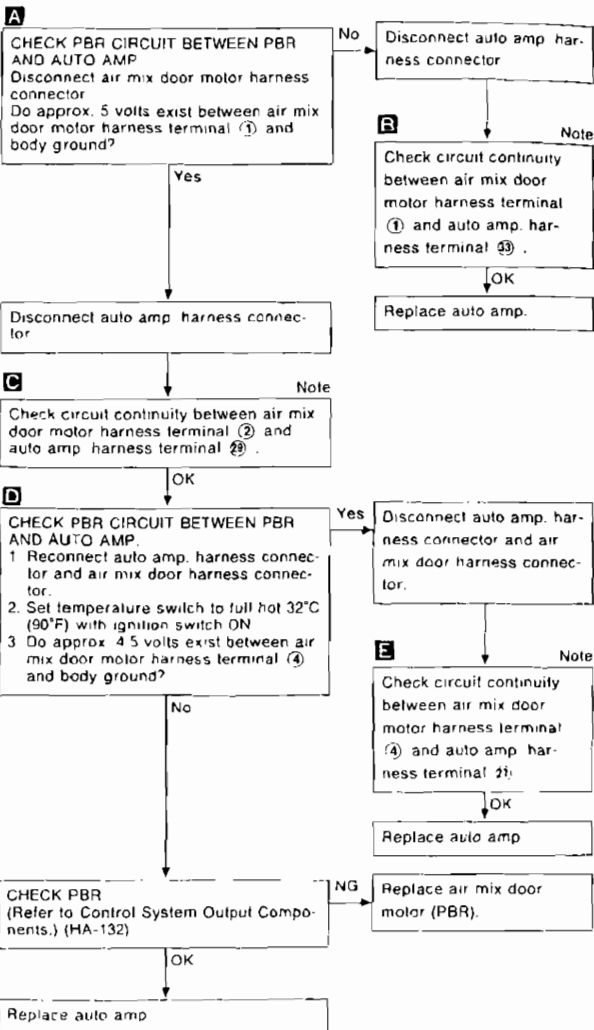
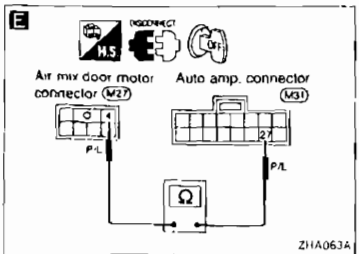
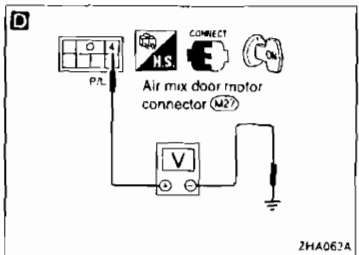
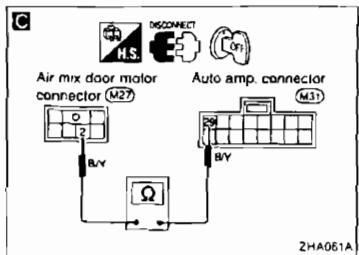
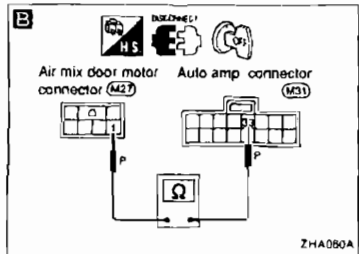
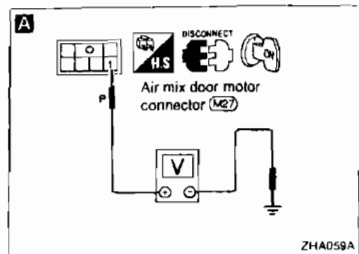


## Note:

If the result is NG after checking circuit continuity, repair harness or connector.

## Diagnostic Procedure 4

**SYMPTOM:** PBR circuit is open or shorted. (26 or -26 is indicated on display as a result of conducting Self-diagnosis STEP 2.)



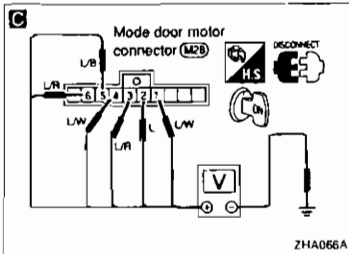
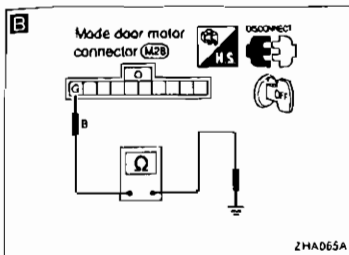
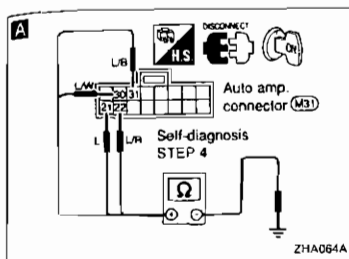
## Note

If the result is NG after checking circuit continuity, repair harness or connector.

## Diagnostic Procedure 5

SYMPTOM: Mode door motor does not operate normally.

- Perform Self-diagnosis STEPS 1 to 4 before referring to the following flow chart.

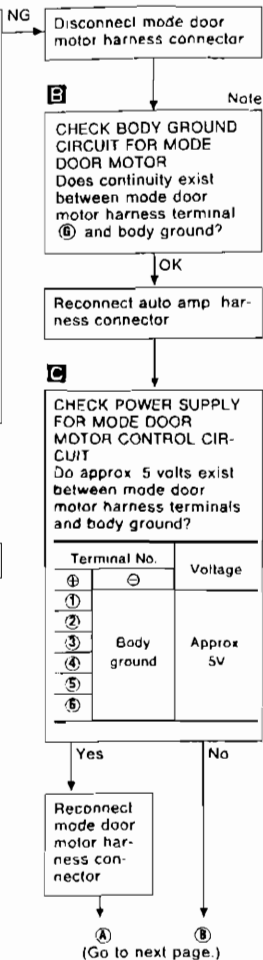
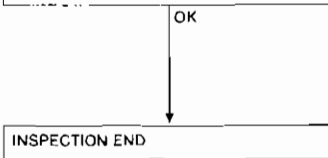


**A**

CHECK MODE DOOR MOTOR POSITION SWITCH.

- Set up code No. 4; in Self-diagnosis STEP 4.
- Disconnect auto amp harness connector after turning ignition switch OFF.
- Check if continuity exists between terminal ② or ① of auto amp harness connector and body ground.
- Using above procedure, check for continuity in any other mode, as indicated in chart.

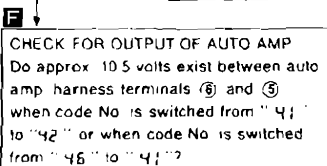
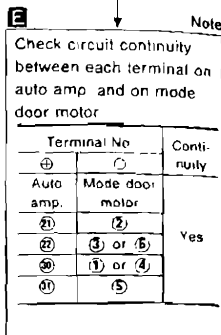
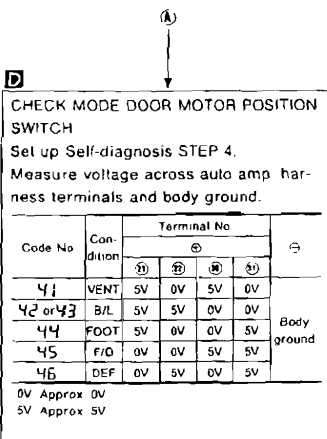
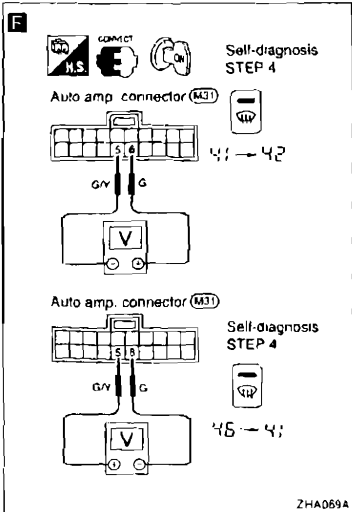
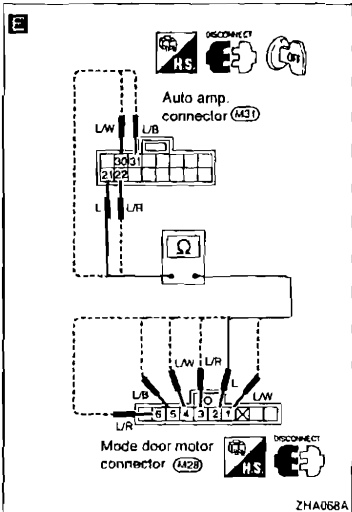
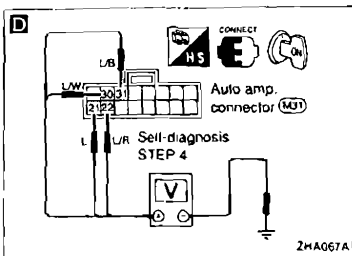
| Code No.   | Condition | Terminal No. |   | Continuity         |
|------------|-----------|--------------|---|--------------------|
|            |           | ⊕            | ⊖ |                    |
| 4; ;       | VENT      | ① or ②       | ⊖ | Body ground<br>Yes |
| 4; or 4; ; | B/L       | ③ or ④       | ⊖ |                    |
| 44         | FOOT      | ⑤ or ⑥       | ⊖ |                    |
| 45         | F/D       | ⑦ or ⑧       | ⊖ |                    |
| 46         | DEF       | ⑨ or ⑩       | ⊖ |                    |



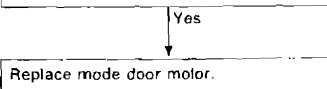
Note:

If the result is NG after checking circuit continuity, repair harness or connector.

## Diagnostic Procedure 5 (Cont'd)



| Code No | Mode door motor operation | Terminal No |   | Voltage V   |
|---------|---------------------------|-------------|---|-------------|
|         |                           | Ⓣ           | Ⓢ |             |
| 41 → 42 | VENT → B/L                | Ⓣ           | Ⓢ | Approx 10.5 |
| 46 → 41 | DEF → VENT                | Ⓢ           | Ⓣ |             |
| -       | Stop                      | -           | - | 0           |



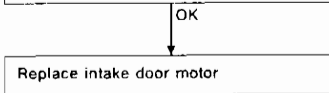
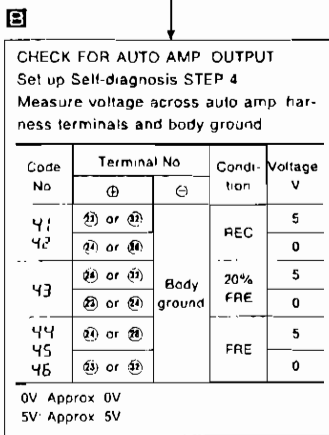
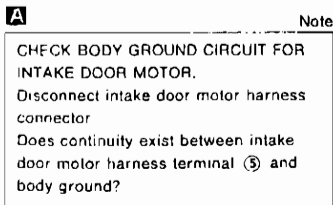
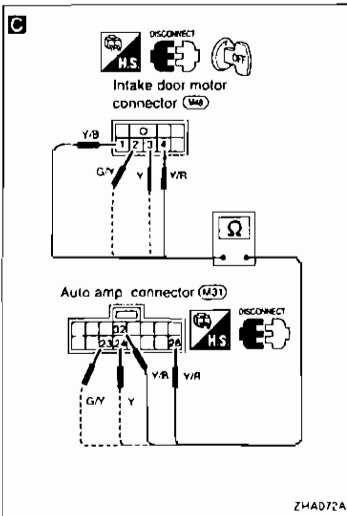
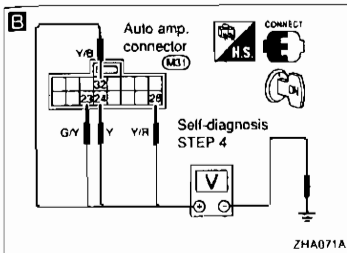
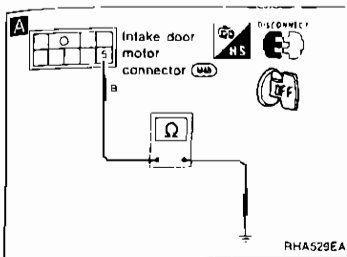
## Note:

If the result is NG after checking circuit continuity, repair harness or connector

## Diagnostic Procedure 6

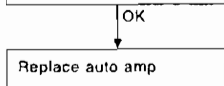
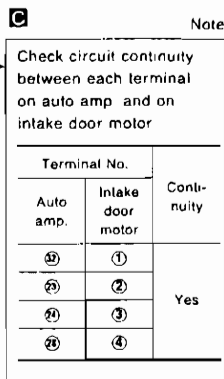
SYMPTOM: Intake door motor does not operate normally.

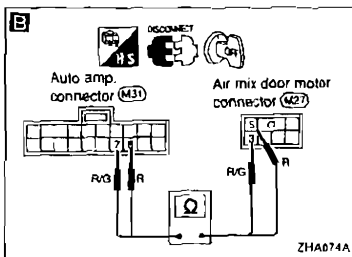
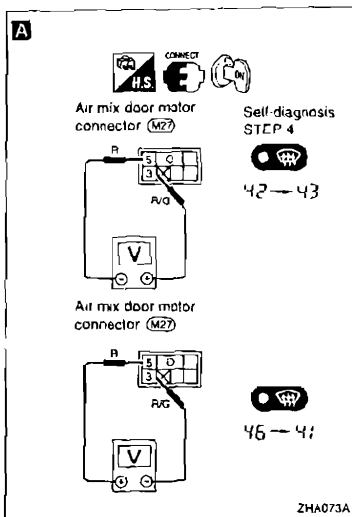
- Perform Self-diagnosis STEPS 1, 2 and 4 before referring to the flow chart.



Note:

If the result is NG after checking circuit continually, repair harness or connector.





## Diagnostic Procedure 7

**SYMPTOM:** Air mix door motor does not operate normally.

- Perform Self-diagnosis STEPS 1, 2 and 4 before referring to the following flow chart.

IS PBR OPERATING NORMALLY?

No

Refer to Self-diagnoses STEP 2.

CHECK PBR CIRCUIT  
Go to Diagnostic Procedure 4. (HA-114)

Yes

**A**

CHECK FOR OUTPUT OF AUTO AMP

Set up Self-diagnosis STEP 4.  
Do approx. 10.5 volt exist between air mix door motor harness terminals (3) and (5) when code No. is switched from "42" to "43" or when code No. is switched from "45" to "41"?

No

Disconnect auto amp. and air mix door motor harness connectors.

| Code No. | Air mix door operation | Terminal No. |     | Voltage V   |
|----------|------------------------|--------------|-----|-------------|
|          |                        | (3)          | (5) |             |
| 42 →     | Cold                   | ⊕            | ⊖   | Approx 10.5 |
| 43 →     | Hot                    | ⊖            | ⊕   |             |
| 45 →     | Hot                    | ⊖            | ⊕   |             |
| 41 →     | Cold                   | ⊕            | ⊖   |             |
| -        | Stop                   | -            | -   | 0           |

**B**

Note

Check circuit continuity between auto amp harness terminal (7) ( (8) ) and air mix door motor harness terminal (3) ( (5) ).

OK

Replace auto amp.

Yes

Replace air mix door motor.

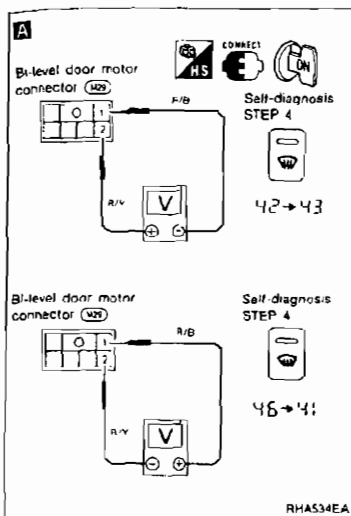
**Note:**

If the result is NG after checking circuit continuity, repair harness or connector.

## Diagnostic Procedure 8

**SYMPTOM:** Bi-level (B/L) door motor does not operate normally.

- Perform Self-diagnosis STEP 4 before referring to the following flow chart.

**A**

## CHECK FOR AUTO AMP. OUTPUT

Set up Self-diagnosis STEP 4

Do approx 12 volts exist between B/L door motor harness terminals ① and ② when code No is switched from "42" to "43" or when code No is switched from "46" to "41"?

| Code No    | B/L door condition | Terminal No |   | Voltage V    |
|------------|--------------------|-------------|---|--------------|
|            |                    | ①           | ② |              |
| 42<br>→ 43 | OPEN<br>→<br>CLOSE | ⊖           | ⊕ | Approx<br>12 |
| 46<br>→ 41 | CLOSE<br>→<br>OPEN | ⊕           | ⊖ |              |

Yes

Replace B/L door motor.

No

Disconnect auto amp harness connector

**B**

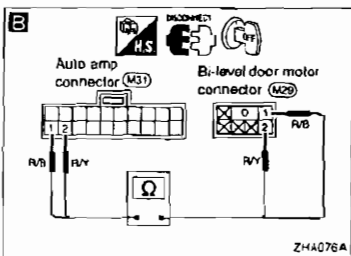
Note

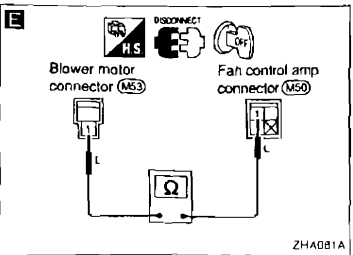
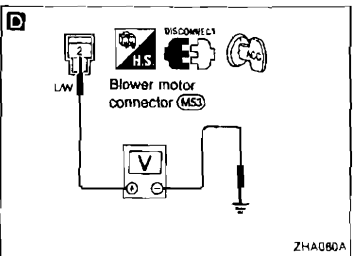
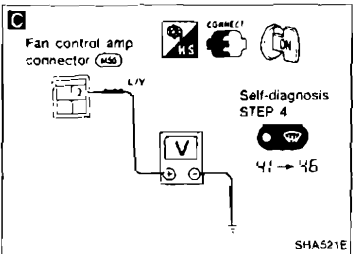
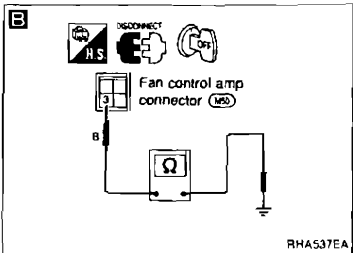
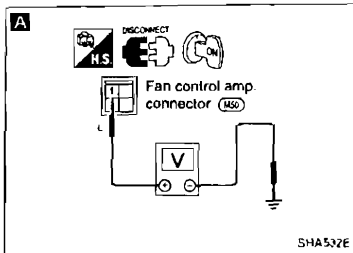
Check circuit continuity between auto amp harness terminal ① (②) and bi-level door motor harness terminal ① (②).

Replace auto amp.

**Note:**

If the result is NG after checking circuit continuity, repair harness or connector.

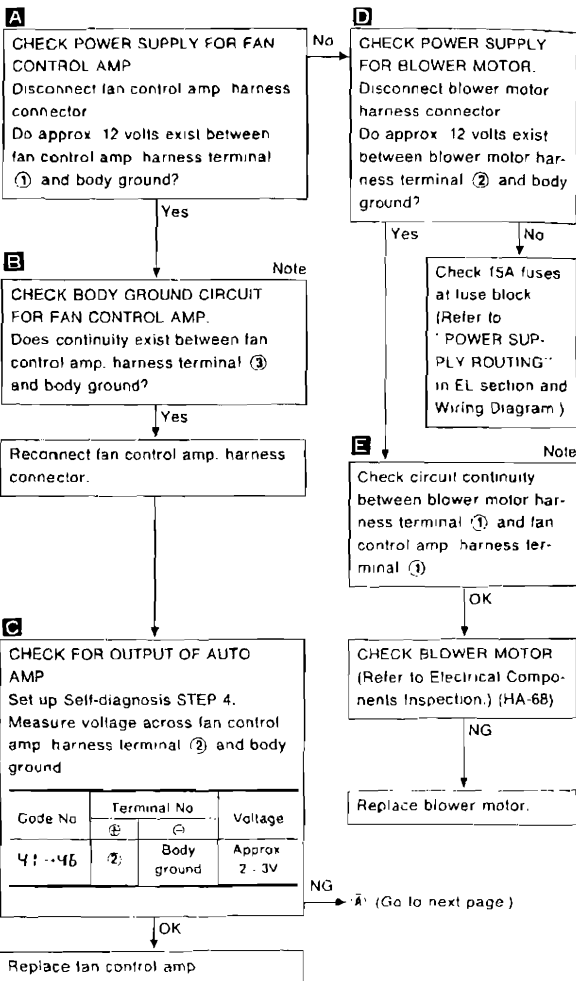




## Diagnostic Procedure 9

**SYMPTOM:** Blower motor operation is malfunctioning under out of Starting Fan Speed Control.

- Perform Preliminary Check 5 before referring to the following flow chart.

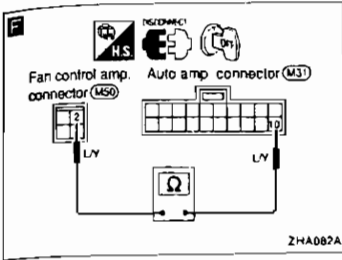


## Note:

If the result is NG after checking circuit continuity, repair harness or connector.



Diagnostic Procedure 9 (Cont'd)



A

↓

Disconnect auto amp and fan control amp harness connector.

↓

**F** Note

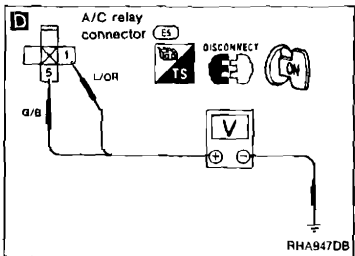
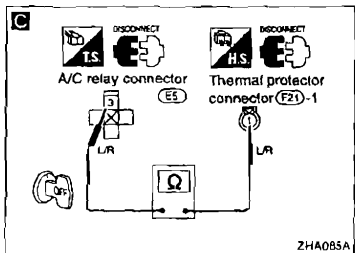
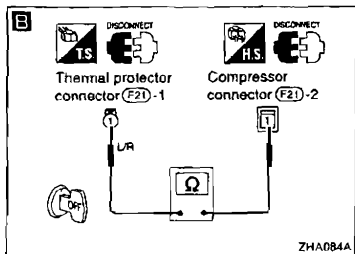
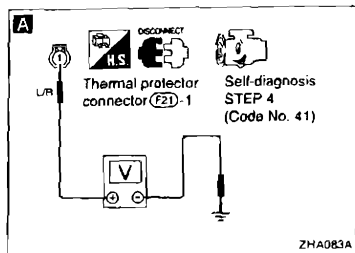
Does continuity exist between auto amp harness terminal ⑩ and fan control amp harness terminal ② ?

↓ Yes

Replace auto amp

**Note:**  
 If the result is NG after checking circuit continuity, repair harness or connector.

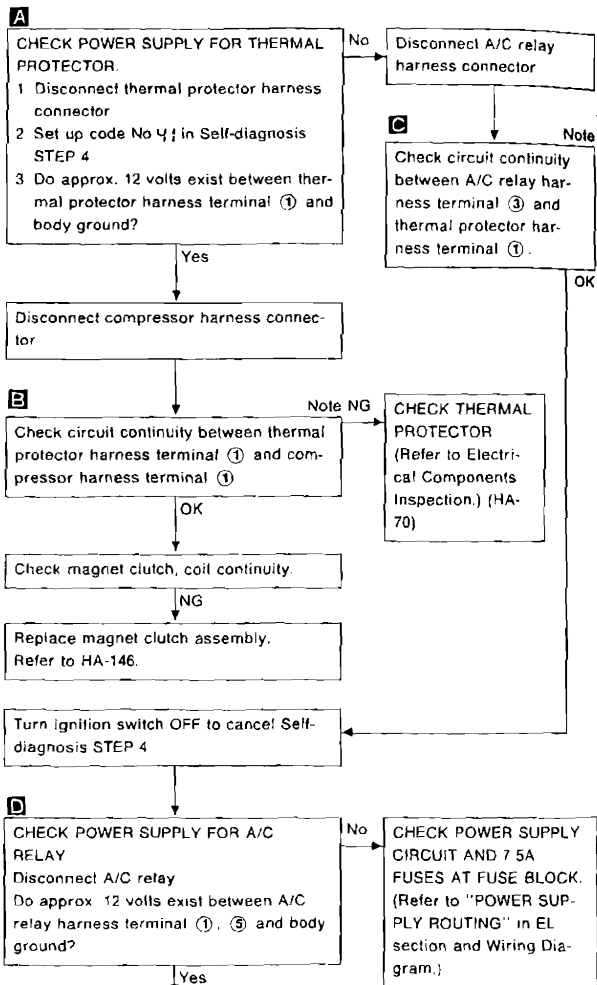
HA  
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 FX



## Diagnostic Procedure 10

**SYMPTOM:** Magnet clutch does not engage after performing Preliminary Check 6.

- Perform Preliminary Check 6 before referring to the flow chart.



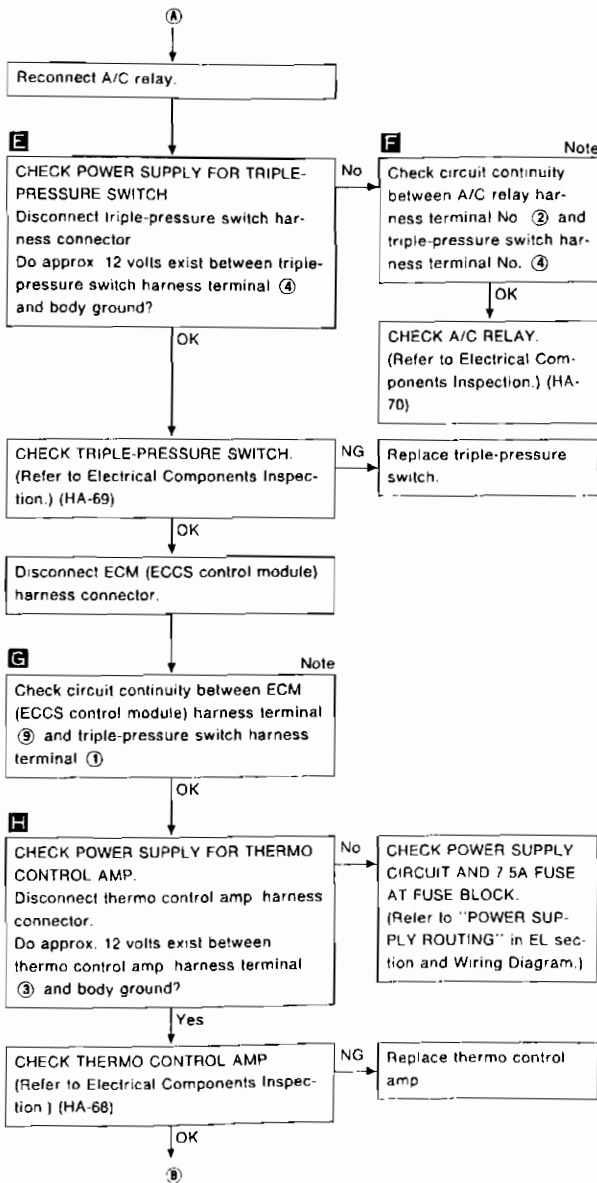
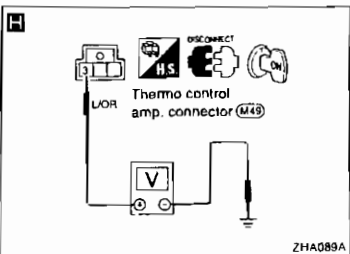
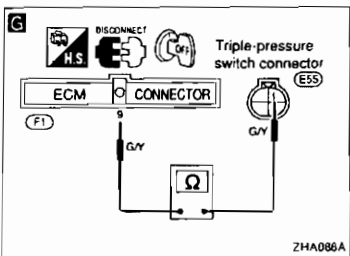
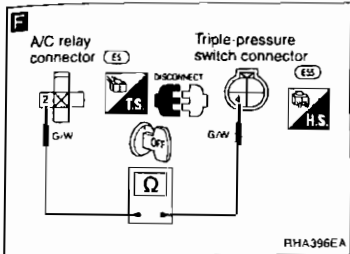
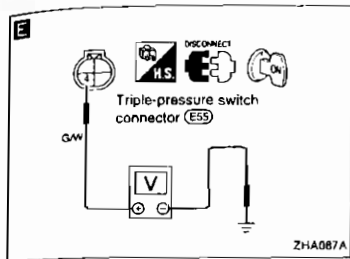
(A)

(Go to next page)

**Note:**

If the result is NG after checking circuit continuity, repair harness or connector.

## Diagnostic Procedure 10 (Cont'd)

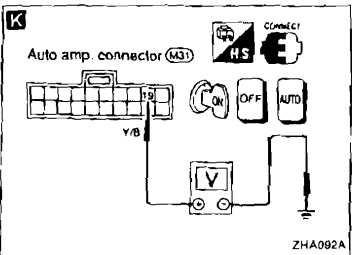
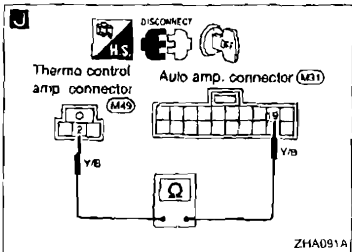
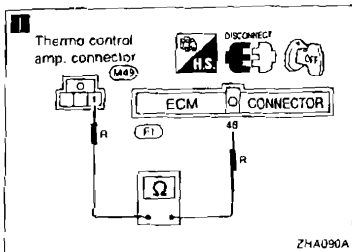


Note:

If the result is NG after checking circuit continuity, repair harness or connector.

TROUBLE DIAGNOSES

Diagnostic Procedure 10 (Cont'd)



⑥

**I** Note

Check circuit continuity between ECM (ECCS control module) harness terminal ④ and thermo control amp harness terminal ①

Disconnect auto amp harness connector

**J** Note

Check circuit continuity between auto amp harness terminal ④ and thermo control amp harness terminal ②

Reconnect auto amp harness connector.

**K**

CHECK FOR AUTO AMP. OUTPUT

Measure voltage between auto amp harness terminal ⑱ and body ground

| Condition      | Terminal No |             | Voltage     |
|----------------|-------------|-------------|-------------|
|                | ⊕           | ⊖           |             |
| Auto switch ON | ⑱           | Body ground | Approx. 0V  |
| OFF            |             |             | Approx. 12V |
| switch ON      |             |             |             |

NG → Replace auto amp

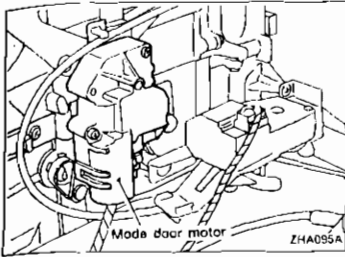
OK

CHECK ECM (ECCS CONTROL MODULE).

(Refer to EC section.)

**Note:**

If the result is NG after checking circuit continuity, repair harness or connector.

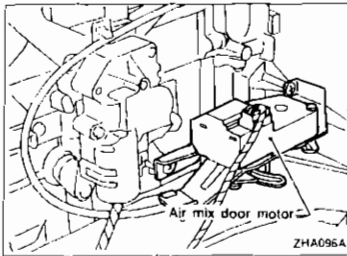


**Control Linkage Adjustment**

**MODE DOOR**

1. Install mode door motor on heater unit and connect it to main harness.
2. Set up code No. 45 in Self-diagnosis STEP 4
3. Make sure mode door operates properly when changing from code No. 41 to 46 by pushing DEF switch

|      |     |     |      |     |     |
|------|-----|-----|------|-----|-----|
| 41   | 42  | 43  | 44   | 45  | 46  |
| VENT | B/L | B/L | FOOT | F/D | DEF |



**AIR MIX DOOR**

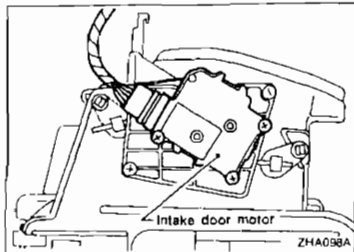
1. Install air mix door motor on heater unit and connect it to main harness.
2. Set up code No. 41 in Self-diagnosis STEP 4
3. Move air mix door lever by hand and hold it in full cold position.
4. Attach air mix door lever to rod holder.
5. Make sure air mix door operates properly when changing from code No. 41 to 46 by pushing DEF switch

|           |    |    |          |    |    |
|-----------|----|----|----------|----|----|
| 41        | 42 | 43 | 44       | 45 | 46 |
| Full cold |    |    | Full hot |    |    |

HA

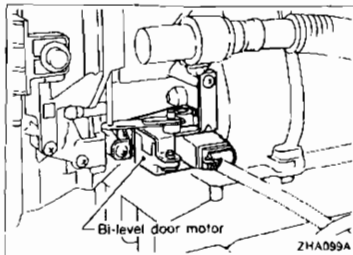
## Control Linkage Adjustment (Cont'd)

## INTAKE DOOR



1. Install intake door motor on intake unit and connect it to main harness.  
Make sure lever of intake door motor is fitted in the slit of intake door link.
2. Set up code No 41 in Self-diagnosis STEP 4.
3. Make sure intake door operates properly when changing from code No. 41 to 46 by pushing DEF switch.

|     |    |         |    |     |    |
|-----|----|---------|----|-----|----|
| 41  | 42 | 43      | 44 | 45  | 46 |
| REC |    | 20% FRE |    | FRE |    |



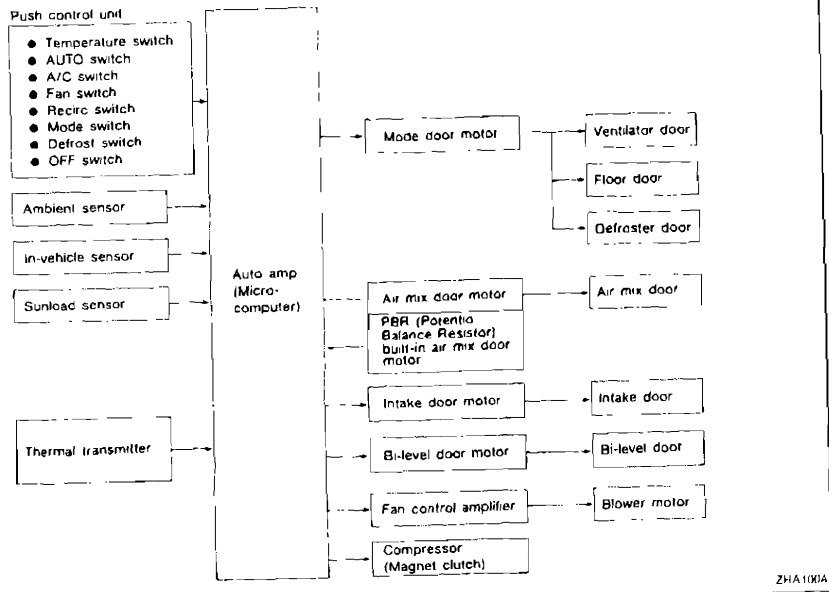
## BI-LEVEL DOOR

1. Install Bi-level door motor on cooling unit and connect it to main harness.  
Make sure lever of bi-level door motor is fitted in the slit of bi-level door link.
2. Set up code No 46 in self-diagnosis STEP 4.
3. Make sure Bi-level door operates properly when changing from code No. 41 to 46 by pushing DEF switch.

|      |    |    |       |    |    |
|------|----|----|-------|----|----|
| 41   | 42 | 43 | 44    | 45 | 46 |
| OPEN |    |    | CLOSE |    |    |

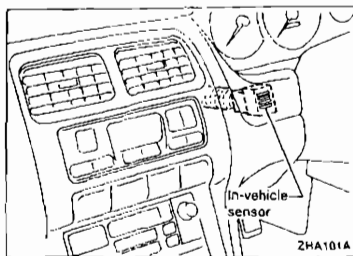
Overview of Control System

The control system consists of a) input sensors and switches, b) the auto amp (microcomputer), and c) outputs. The relationship of these components is shown in the diagram below:



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HA



## Control System Input Components

### POTENTIO TEMPERATURE CONTROL (PTC)

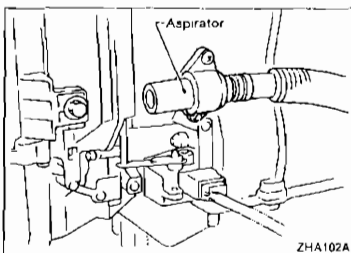
The PTC is built into the auto amp. It can be set at an interval of 1°C (2°F) through both **(H)** (HOT) and **(C)** (COLD) control switches. Setting temperature is digitally displayed

### IN-VEHICLE SENSOR

The in-vehicle sensor is attached to cluster lid A. It converts variations in temperature of compartment air drawn from an aspirator into a resistance value. It is then input into the auto amp.

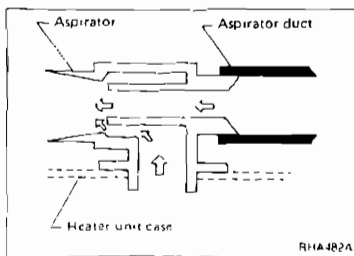
After disconnecting in-vehicle sensor harness connector, measure resistance between terminals **(1)** and **(2)** at sensor harness side, using the table below.

| Temperature °C (°F) | Resistance kΩ |
|---------------------|---------------|
| -15 (5)             | 12.73         |
| -10 (14)            | 9.92          |
| -5 (23)             | 7.80          |
| 0 (32)              | 6.19          |
| 5 (41)              | 4.95          |
| 10 (50)             | 3.99          |
| 15 (59)             | 3.24          |
| 20 (68)             | 2.65          |
| 25 (77)             | 2.19          |
| 30 (86)             | 1.81          |
| 35 (95)             | 1.51          |
| 40 (104)            | 1.27          |
| 45 (113)            | 1.07          |



### ASPIRATOR

The aspirator is located on heater unit. It produces vacuum pressure due to air discharged from the heater unit, continuously taking compartment air in the aspirator.



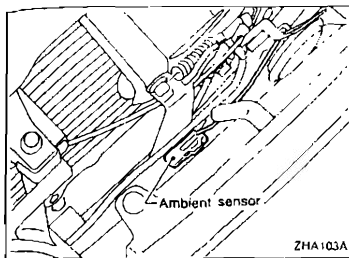


## Control System Input Components (Cont'd)

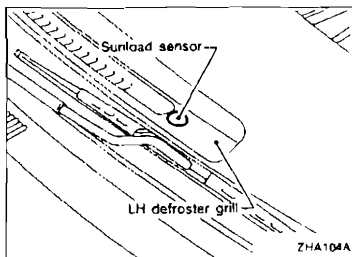
## AMBIENT SENSOR

The ambient sensor is attached to the hood rock stay. It detects ambient temperature and converts it into a resistance value which is then input to the auto amp.

After disconnecting ambient sensor harness connector, measure resistance between terminals ① and ② at sensor harness side, using the table below.



| Temperature °C (°F) | Resistance kΩ |
|---------------------|---------------|
| -15 (5)             | 12.73         |
| -10 (14)            | 9.92          |
| -5 (23)             | 7.80          |
| 0 (32)              | 6.19          |
| 5 (41)              | 4.95          |
| 10 (50)             | 3.99          |
| 15 (59)             | 3.24          |
| 20 (68)             | 2.65          |
| 25 (77)             | 2.19          |
| 30 (86)             | 1.81          |
| 35 (95)             | 1.51          |
| 40 (104)            | 1.27          |
| 45 (113)            | 1.07          |



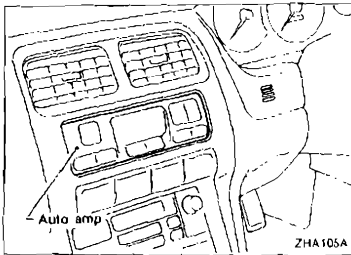
## SUNLOAD SENSOR

The sunload sensor is located on the LH defroster grille. It detects sunload entering through windshield by means of a photo diode and converts it into a current value which is then input to the auto amp.

Measure voltage between terminals ① and ② at vehicle harness side, using the table below.

| Input current<br>mA | Output voltage<br>V |
|---------------------|---------------------|
| 0                   | 5                   |
| 0.05                | 4.2                 |
| 0.1                 | 3.4                 |
| 0.15                | 2.6                 |
| 0.2                 | 1.8                 |
| 0.25                | 1.0                 |

- When checking sunload sensor, select a place where sun shines directly on it.



### Control System Automatic Amplifier (Auto amp.)

The auto amplifier has a built-in microcomputer which processes information sent from various sensors needed for air conditioning operation. The air mix door motor, mode door motor, intake door motor, bi-level door motor, blower motor, and compressor are then controlled.

The auto amp is unitized with control mechanisms. Signals from various switches are directly entered into auto amplifier. Self-diagnostic functions are also built into auto amp, to provide quick check of malfunctions in the auto air conditioning system.

### AMBIENT TEMPERATURE INPUT PROCESS

The auto amp. includes a "processing circuit" for the ambient sensor input. When the ambient temperature increases quickly, the processing circuit controls the input from the ambient sensor. It allows the auto amp. to recognize the increase of temperature only 0.2°C (0.4°F) per 60 seconds. As an example, consider stopping for a cup of coffee after high speed driving. Even though the ambient temperature has not changed, the ambient sensor will detect the increase of temperature. The heat radiated from the engine compartment can radiate to the front grille area. The ambient sensor is located there.

### SUNLOAD INPUT PROCESS

The auto amp. also includes a processing circuit which "average" the variations in detected sunload over a period of time. This prevents drastic swings in the ATC system operation due to small or quick variations in detected sunload. For example, consider driving along a road bordered by an occasional group of large trees. The sunload detected by the sunload sensor will vary whenever the trees obstruct the sunlight. The processing circuit averages the detected sunload over a period of time. As a result, the effect the above mentioned does not cause any change in the ATC system operation. On the other hand, shortly after entering a long tunnel, the system will recognize the change in sunload, and the system will react accordingly.

## Control System Output Components

### AIR MIX DOOR CONTROL (Automatic temperature control)

#### Component parts

Air mix door control system components are:

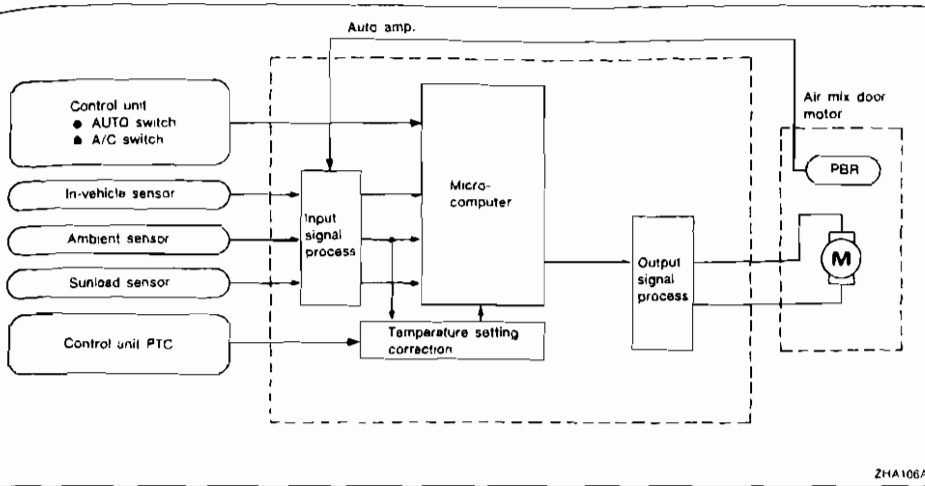
- 1) Auto amp.
- 2) Air mix door motor (PBR)
- 3) In-vehicle sensor
- 4) Ambient sensor
- 5) Sunload sensor

#### System operation

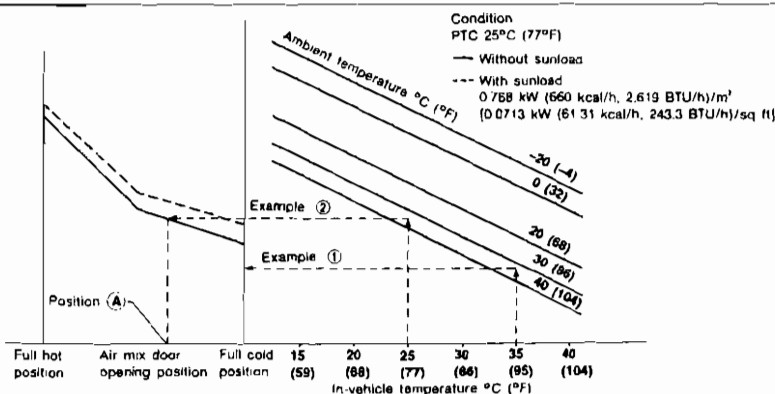
Temperature set by Potentio Temperature Control (PTC) is compensated through setting temperature correction circuit to determine target temperature.

Auto amp. will operate air mix door motor to set air conditioning system in HOT or COLD position, depending upon relationship between conditions (target temperature, sunload, in-vehicle temperature, and ambient temperature) and conditions (air mix door position and compressor operation).

Control System Output Components (Cont'd)



Air mix door control specification

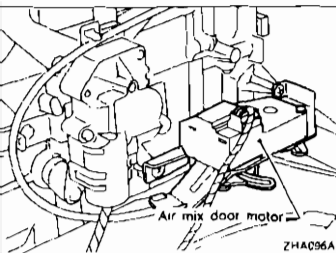


- Example:
- ① If temperature setting is set at 25°C (77°F) under no sunload condition when ambient and in-vehicle temperature are 35°C (95°F) air mix door is initially automatically set in full cold position
  - ② Within some period, in-vehicle temperature will lower towards the objective temperature, and the air mix door position will shift incrementally towards the hot side and finally stay in this position (A).  
 Air mix door opening position is always fed back to auto amplifier by PBR built-in air mix door motor

SHA523E

AIR MIX DOOR MOTOR

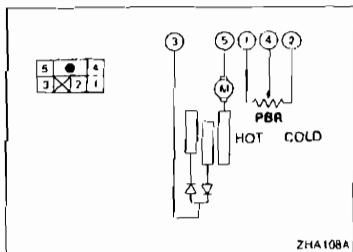
The air mix door motor is attached to the bottom of the heater unit. It rotates so that the air mix door is opened to a position set by the auto amp. Motor rotation is then conveyed through a shaft and air mix door position is then fed back to the auto amp. by PBR built-in air mix door motor.



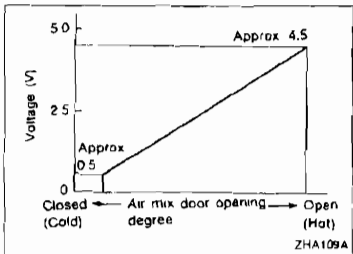
Control System Output Components (Cont'd)

Air mix door operation

|   |   |                        |  |
|---|---|------------------------|--|
| 3 | 5 | Air mix door operation | Direction of lever movement                  |
| ⊕ | ⊖ | COLD · HOT             | Clockwise (Toward passenger compartment)     |
| — | — | STOP                   | STOP   |
| ⊖ | ⊕ | HOT · COLD             | Counterclockwise (Toward engine compartment) |



ZHA108A



ZHA109A

PBR characteristics

Measure voltage between terminals ④ and ② at vehicle harness side.

MODE DOOR CONTROL

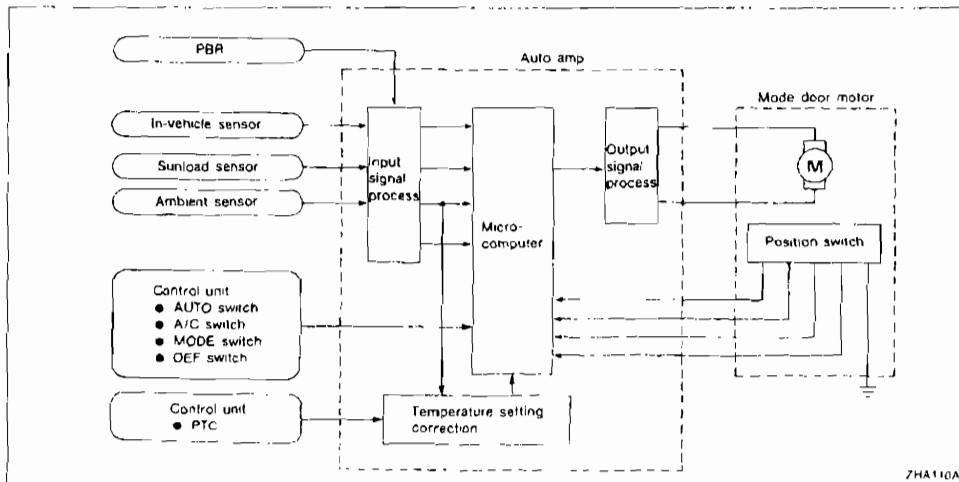
Component parts

Mode door control system components are:

- 1) Auto amp.
- 2) Mode door motor
- 3) PBR
- 4) In-vehicle sensor
- 5) Ambient sensor
- 6) Sunload sensor

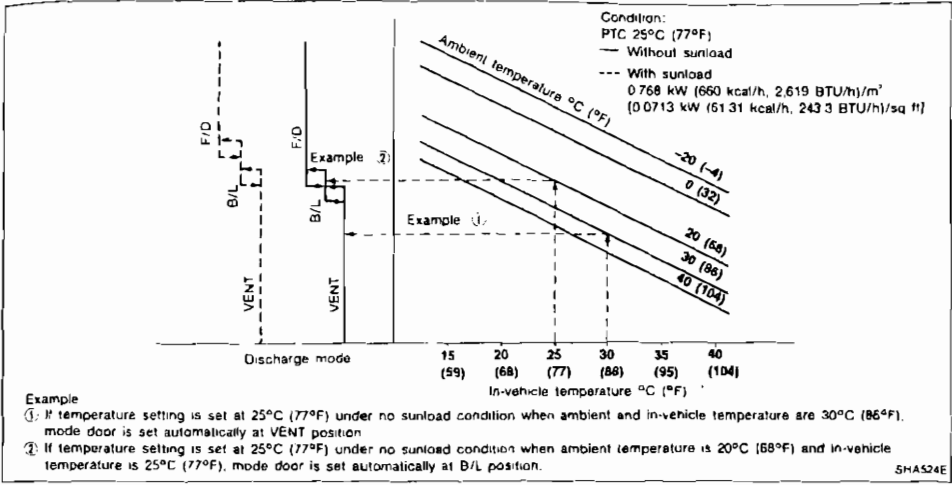
System operation

The auto amp. computes the air discharge conditions according to the ambient temperature and the in-vehicle temperature. The computed discharge conditions are then corrected for sunload. By this correction, it is determined through which outlets air will flow into the passenger compartment.

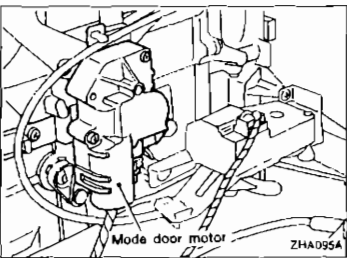


ZHA110A

Control System Output Components (Cont'd)  
Mode door control specification



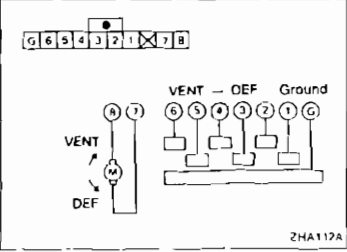
Example  
 ① If temperature setting is set at 25°C (77°F) under no sunload condition when ambient and in-vehicle temperature are 30°C (86°F), mode door is set automatically at VENT position.  
 ② If temperature setting is set at 25°C (77°F) under no sunload condition when ambient temperature is 20°C (68°F) and in-vehicle temperature is 25°C (77°F), mode door is set automatically at B/L position.



MODE DOOR MOTOR

The mode door motor is attached to the heater unit. It rotates so that air is discharged from the outlet set by the auto amp. Motor rotation is conveyed to a link which activates the mode door.

| 7 | 8 | Mode door operation | Direction of side link rotation |
|---|---|---------------------|---------------------------------|
| ⊕ | ⊖ | VENT → DEF          | Counterclockwise                |
| — | — | STOP                | STOP                            |
| ⊖ | ⊕ | DEF → VENT          | Clockwise                       |



## Control System Output Components (Cont'd)

### INTAKE DOOR CONTROL

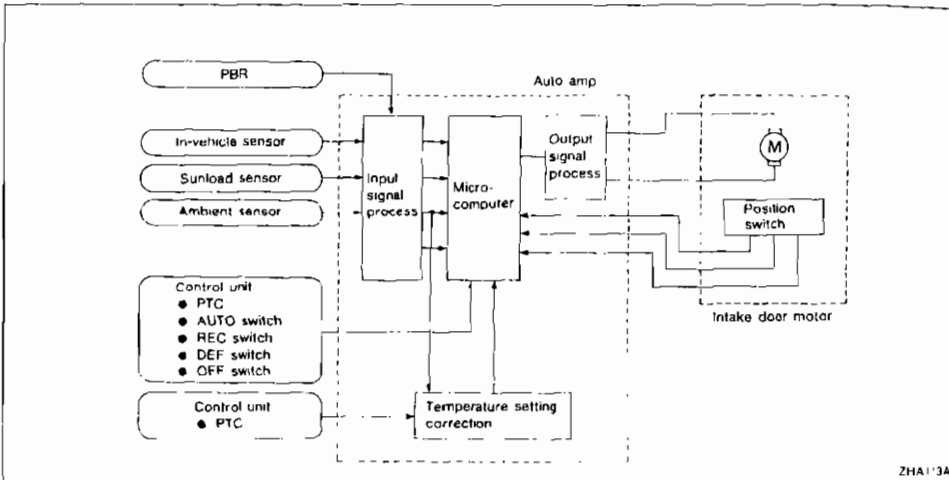
#### Components parts

Intake door control system components are.

- 1) Auto amp.
- 2) Intake door motor
- 3) PBR
- 4) In-vehicle sensor
- 5) Ambient sensor
- 6) Sunload sensor

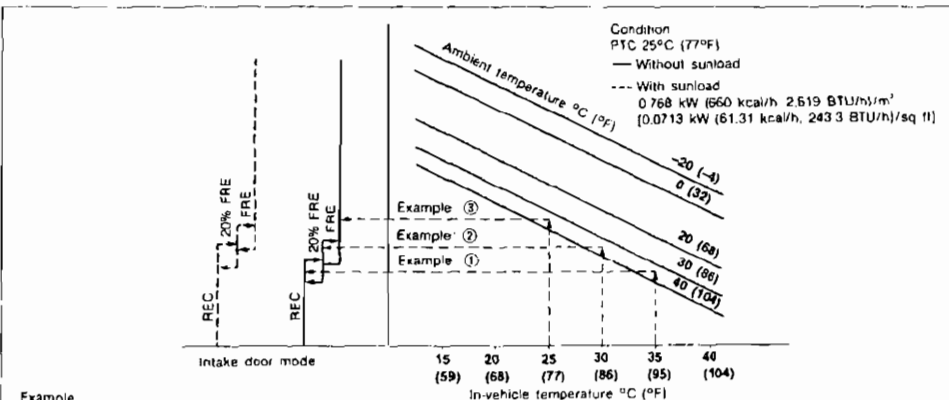
#### System operation

The intake door control determines intake door position based on the ambient temperature and the in-vehicle temperature. When the DEF button is pushed, the auto amp. sets the intake door at the "Fresh" position.



ZHA13A

### Intake door control specification



**Example**

1. If temperature setting is set at 25°C (77°F) under no sunload condition when ambient and in-vehicle temperature are 35°C (95°F) intake door is set automatically at REC position to make in-vehicle temperature cool down efficiently
2. In-vehicle temperature will lower and when 30°C (86°F) is reached, intake door will shift to 20% FRE position
3. In the state when in-vehicle temperature reaches the objective temperature 25°C (77°F) intake door is set at FRE position

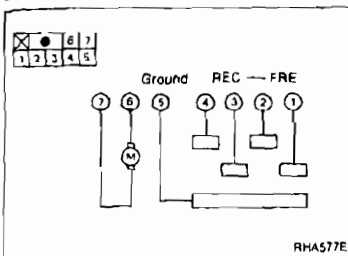
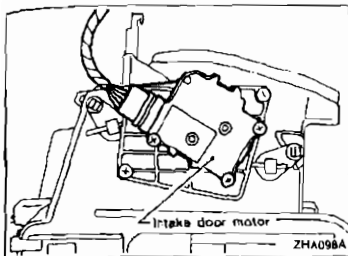
SH4525E

**Control System Output Components (Cont'd)**  
**INTAKE DOOR MOTOR**

The intake door motor is attached to the intake unit. It rotates so that air is drawn from inlets set by the auto amp. Motor rotation is conveyed to a lever which activates the intake door

**Intake door motor operation**

| 6 | 7 | Intake door operation | Movement of link rotation |
|---|---|-----------------------|---------------------------|
| ⊕ | ⊖ | REC → FRE             | Counterclockwise          |
| — | — | STOP                  | STCP                      |
| ⊖ | ⊕ | FRE → REC             | Clockwise                 |



**FAN SPEED CONTROL**

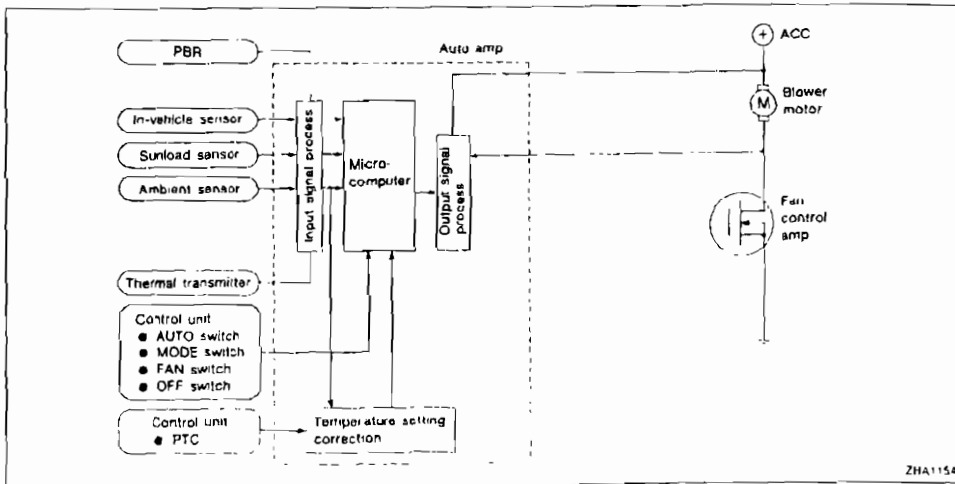
**Component parts**

Fan speed control system components are:

- 1) Auto amp.
- 2) Fan control amplifier
- 3) PBR

- 4) In-vehicle sensor
- 5) Ambient sensor
- 6) Sunload sensor
- 7) Thermal transmitter

**System operation**



Control System Output Components (Cont'd)

**AUTOMATIC MODE**

In the automatic mode, the blower motor speed is calculated by the auto amp. based on inputs from the PBR, in-vehicle sensor, sunload sensor, and ambient sensor. The blower motor applied voltage ranges from approximately 4 volts (lowest speed) to 12 volts (highest speed).

To control blower speed (in the range of 2V to 3V), the auto amp. supplies a signal to the fan control amplifier. Based on this signal, the fan control amplifier controls the current flow from the blower motor to ground

**STARTING FAN SPEED CONTROL**

**Start up from "COLD SOAK" condition (Automatic mode)**

In a cold start up condition where the engine coolant temperature is below 50°C (122°F) and mode door position is BI-LEVEL, F/D or FOOT, the blower will not operate for a short period of time (up to 150 seconds). The exact start delay time varies depending on the ambient and in-vehicle temperature.

In the most extreme case (very low ambient) the blower starting delay will be 150 seconds. After this delay, the blower will operate at low speed

until the engine coolant temperature rises above 50°C (122°F). Then the blower speed will increase to the objective speed

**Start up from normal or "HOT SOAK" condition (Automatic mode)**

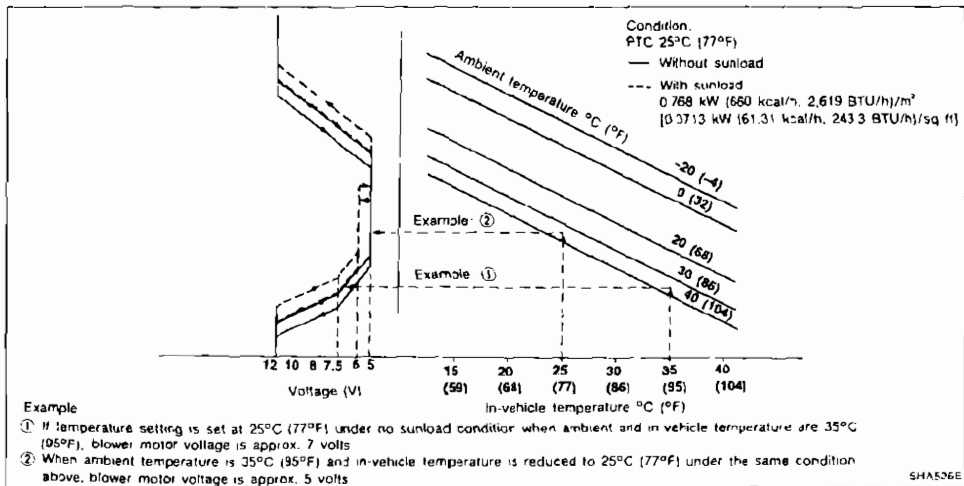
The blower will begin operation momentarily after the AUTO switch is pushed. The blower speed will gradually rise to the objective speed over a time period of 8 seconds or less (actual time depends on the objective blower speed). If the in-vehicle temperature is 35°C (95°F) or more, the blower will not operate for 3 seconds after AUTO switch is pushed

**BLOWER SPEED COMPENSATION**

**Sunload**

When the in-vehicle temperature and the set temperature are very close, the blower will operate at low speed. With the mode door in the VENT position, the low speed varies depending on the sunload. During conditions of high sunload, the blower low speed will rise (approx. 6.0V). During lesser sunload conditions, the low speed will drop to "normal" low speed (approx 5.0V).

Fan speed control specification

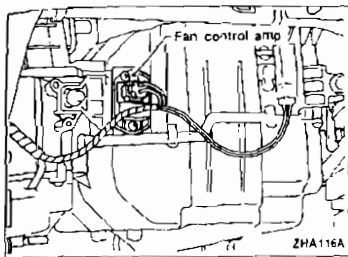




Control System Output Components (Cont'd)

FAN CONTROL AMPLIFIER

The fan control amplifier is located on the cooling unit. It amplifies the base current flowing from the auto amp to change the blower speed within the range of 4V to 12V.



MAGNET CLUTCH CONTROL

The ECM (ECCS control module) controls compressor operation using inputs from the throttle position sensor and auto amplifier.

Acceleration cut control

The ECM (ECCS control module) will turn the compressor "ON" or "OFF" based on the signal from the throttle position sensor.

4  
10-2  
10-3  
10-4  
10-5  
10-6  
10-7  
10-8  
10-9  
10-10  
10-11  
10-12  
10-13  
10-14  
10-15  
10-16  
10-17  
10-18  
10-19  
10-20  
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10-29  
10-30

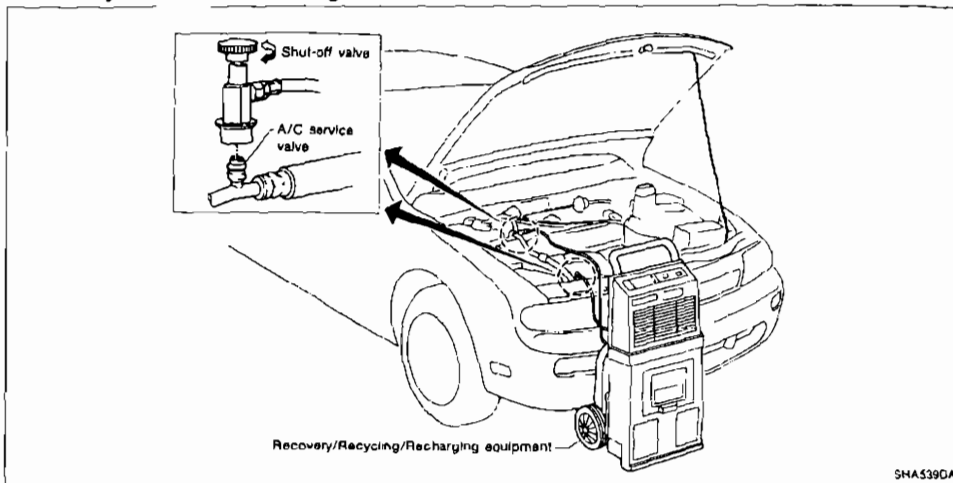
HA  
HA  
HA

HFC-134a (R-134a) Service Procedure  
 SETTING OF SERVICE TOOLS AND EQUIPMENT

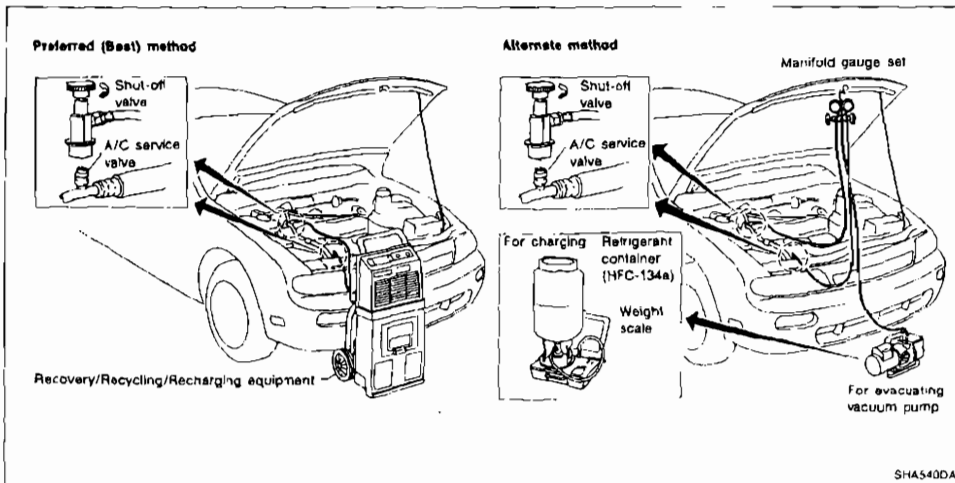
DISCHARGING REFRIGERANT

WARNING:

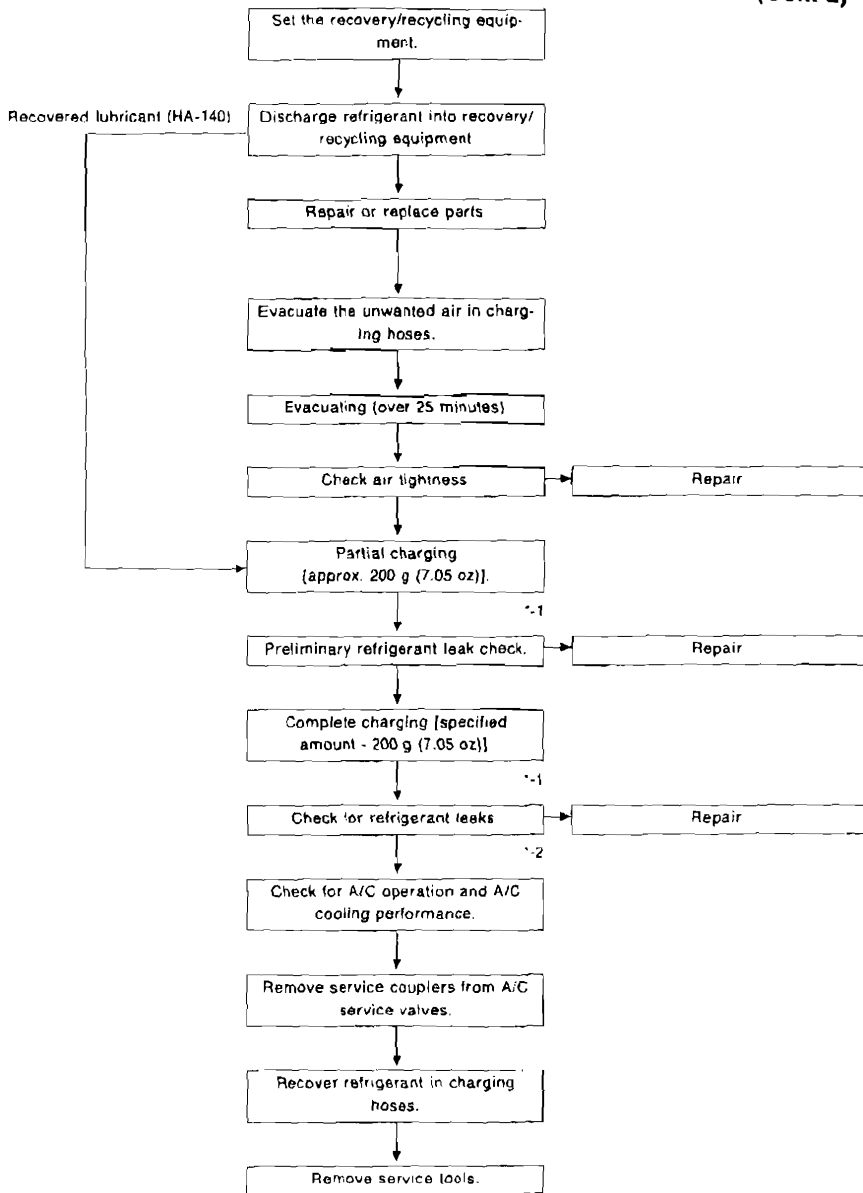
Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Remove HFC-134a (R-134a) from A/C system using certified service equipment meeting requirements of HFC-134a (R-134a) recycling equipment or HFC-134a (R-134a) recovery equipment. If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.



EVACUATING SYSTEM AND CHARGING REFRIGERANT



## HFC-134a (R-134a) Service Procedure (Cont'd)



Note \*1 Before charging refrigerant, ensure engine is off

\*2 Before checking for leaks, start engine to activate air conditioning system then turn it off  
Service valve caps must be attached to valves (to prevent leakage)

## Maintenance of Lubricant Quantity in Compressor

The lubricant used to lubricate the compressor circulates through the system with the refrigerant. Add lubricant to compressor when replacing any component or after a large gas leakage occurred. It is important to maintain the specified amount.

If lubricant quantity is not maintained properly, the following malfunctions may result:

- Lack of lubricant: May lead to a seized compressor
- Excessive lubricant: Inadequate cooling (thermal exchange interference)

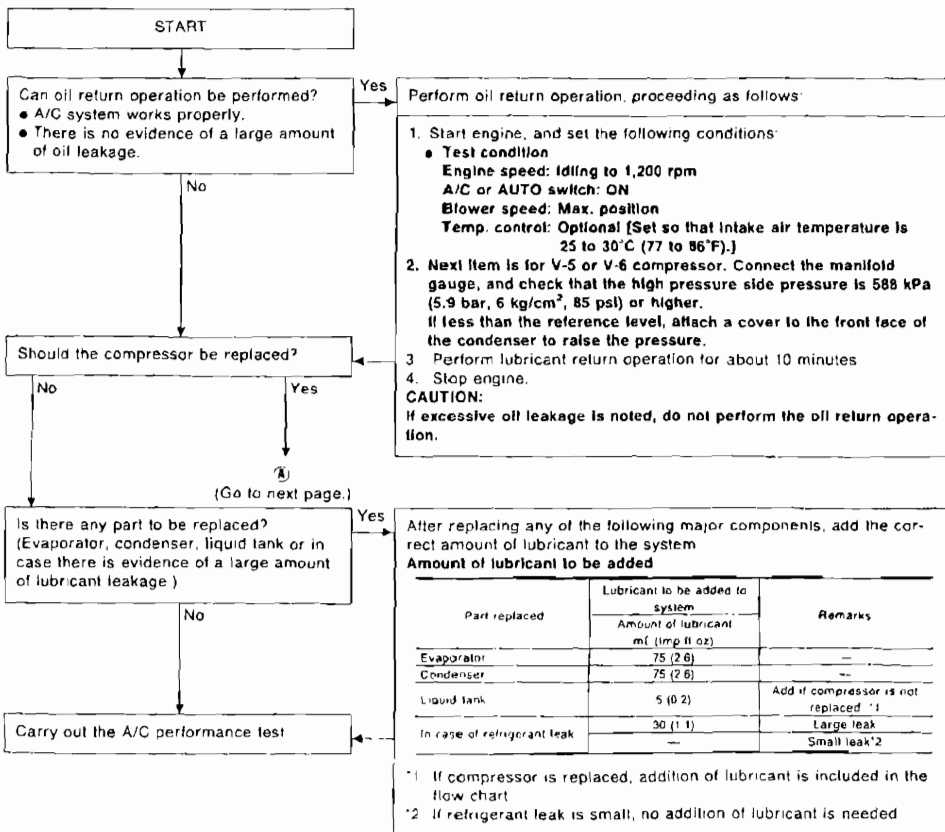
### LUBRICANT

**Name:** Nissan A/C System Oil Type R

**Part number:** KLH00-PAGR0

### CHECKING AND ADJUSTING

Adjust the lubricant quantity according to the flowchart shown below.

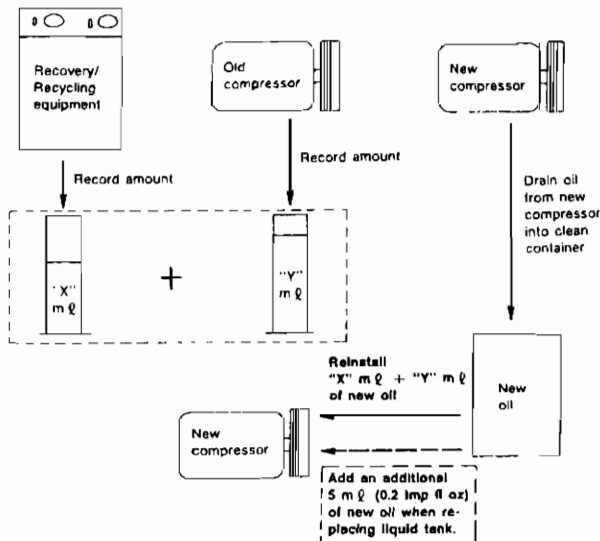


## Maintenance of Lubricant Quantity in Compressor (Cont'd)

(A)

1. Discharge refrigerant into the refrigerant recovery/recycling equipment. Measure oil discharged into the recovery/recycling equipment.
2. Remove the drain plug of the "old" (removed) compressor (applicable only to V-5, V-6 or DKS-16H compressor). Drain the oil into a graduated container and record the amount of drained oil.
3. Remove the drain plug and drain the oil from the "new" compressor into a separate, clean container.
4. Measure an amount of new oil installed equal to amount drained from "old" compressor. Add this oil to "new" compressor through the suction port opening.
5. Measure an amount of new oil equal to the amount recovered during discharging. Add this oil to "new" compressor through the suction port opening.
6. Torque the drain plug
  - V-5 or V-6 compressor: 18 - 19 N·m (1.8 - 1.9 kg·m, 13 - 14 ft·lb)
  - DKS-16H compressor: 14 - 16 N·m (1.4 - 1.6 kg·m, 10 - 12 ft·lb)
7. If the liquid tank also needs to be replaced, add an additional 5 mℓ (0.2 Imp fl oz) of oil at this time. Do not add this 5 mℓ (0.2 Imp fl oz) of oil if only replacing the compressor.

### Oil adjusting procedure for compressor replacement



R1A065DC

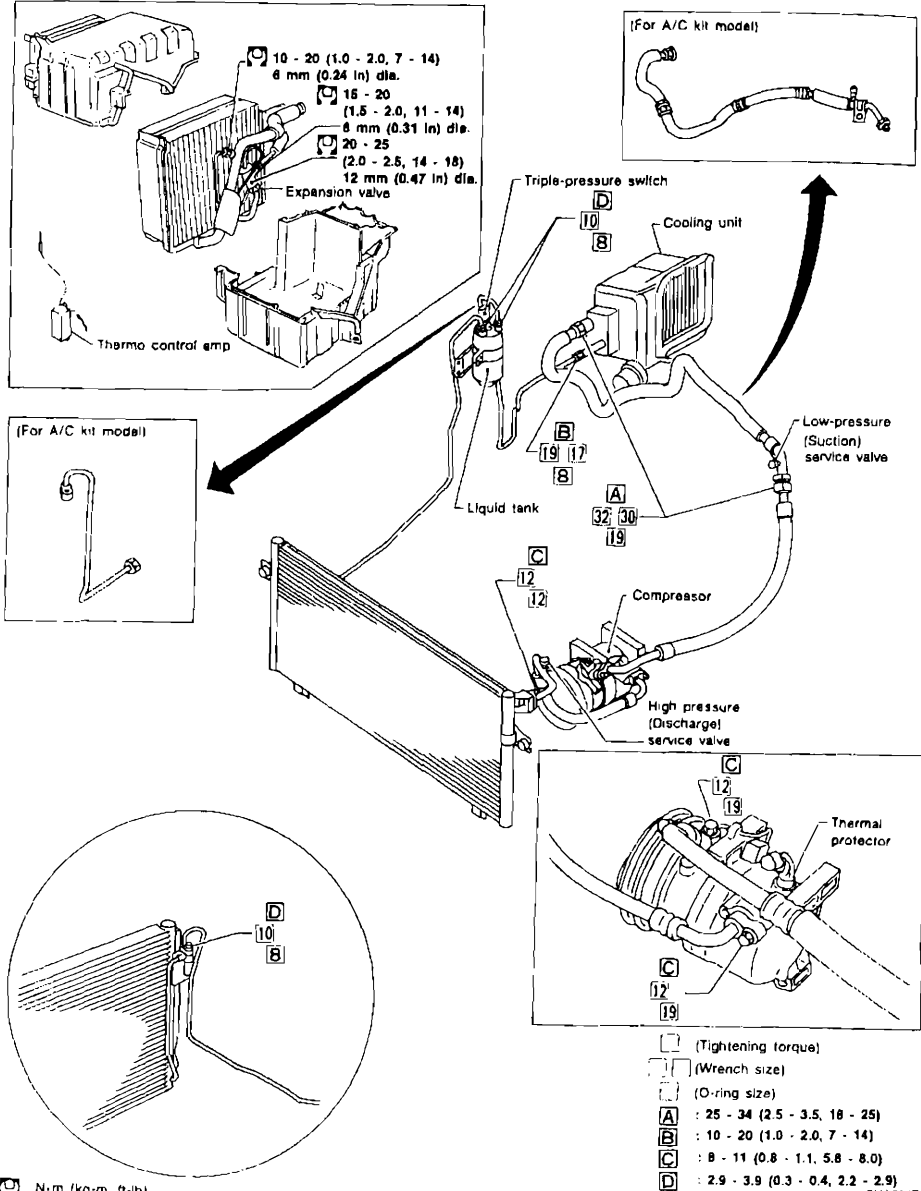
HA

Refrigerant Lines

• Refer to HA-4 regarding "Precautions for Refrigerant Connection".

LHD MODEL

SEC. 271-272-276



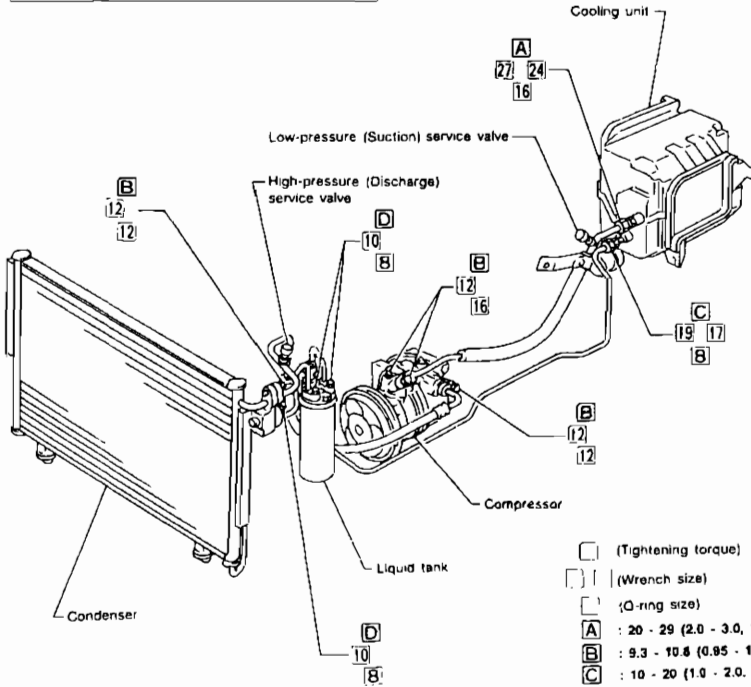
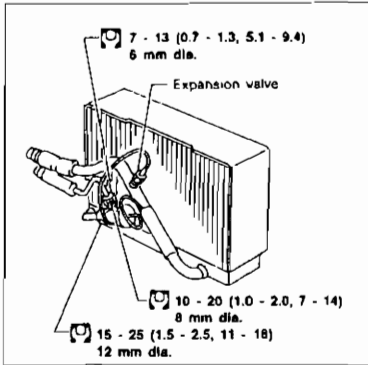
N·m (kg·m, ft·lb)

SHASOME

Refrigerant Lines (Cont'd)

RHD MODEL

SEC. 271-272-276

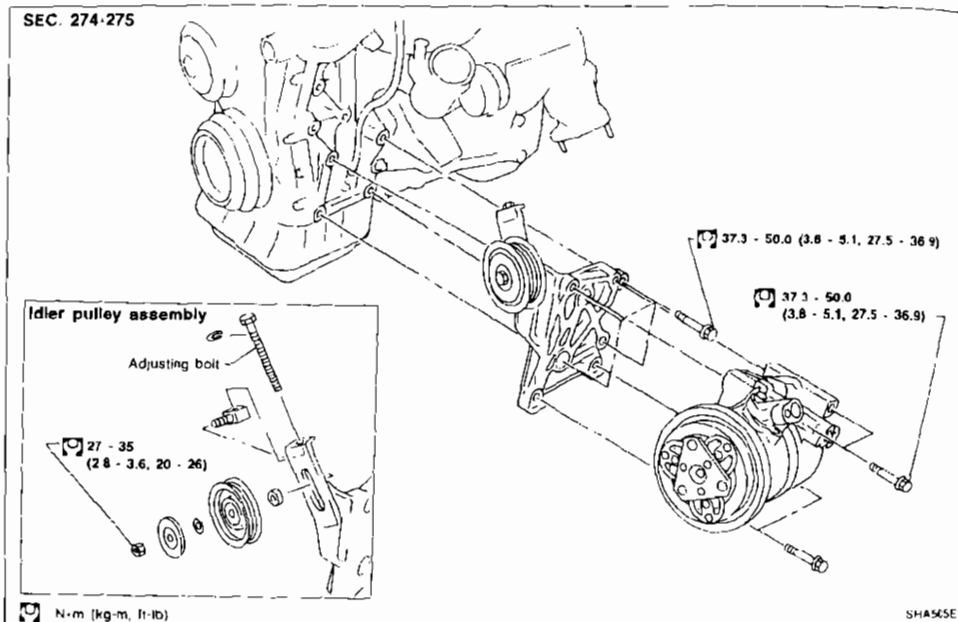


- ☐ (Tightening torque)
- ☐ (Wrench size)
- ☐ (O-ring size)
- A : 20 - 29 (2.0 - 3.0, 14 - 22)
- B : 9.3 - 10.8 (0.95 - 1.1, 6.9 - 8.0)
- C : 10 - 20 (1.0 - 2.0, 7 - 14)
- D : 3.8 - 4.5 (0.39 - 0.46, 2.8 - 3.3)
- ☐ N·m (kg·m, ft·lb)

HA

## Compressor Mounting

SEC. 274-275



## Belt Tension

- Refer to MA section ("Checking Drive Belts", "ENGINE MAINTENANCE").

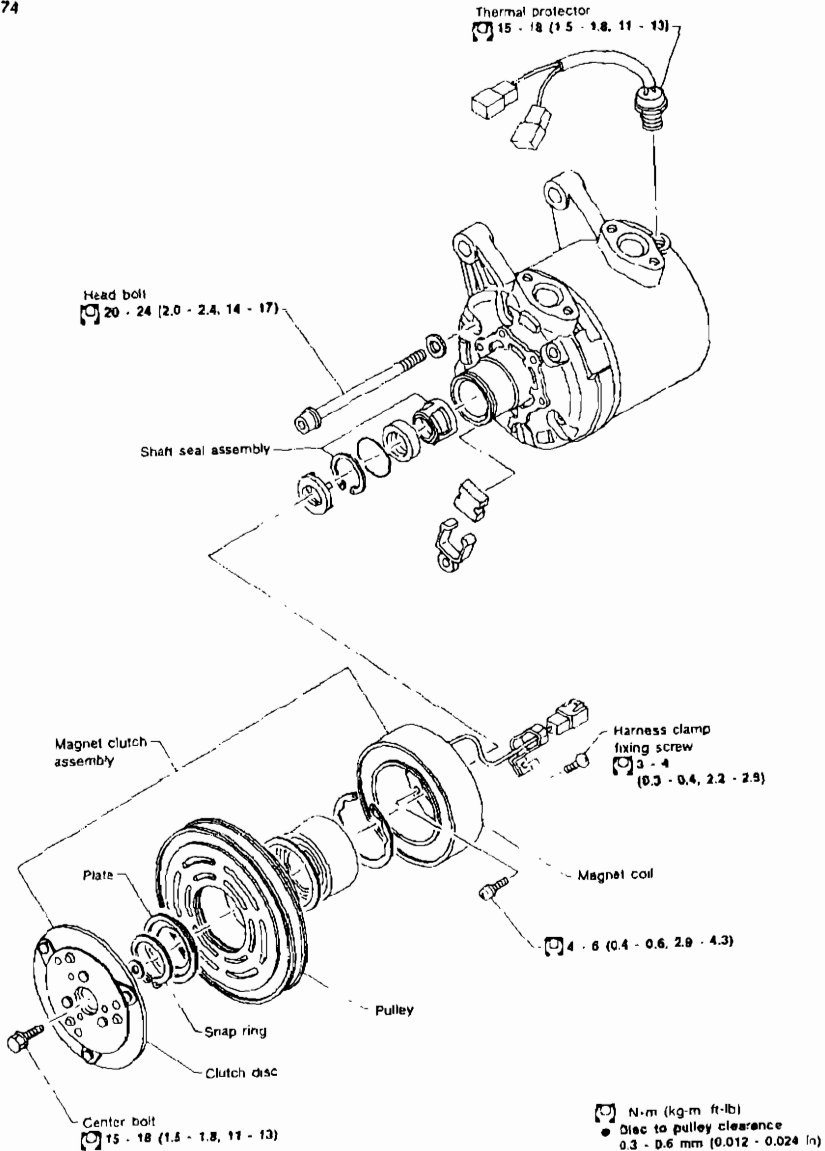
## Fast Idle Control Device (FICD)

- Refer to EC section ("IACV-FICD SOLENOID VALVE", "TROUBLE DIAGNOSES").



Compressor — Model DKV-14C (ZEXEL make)

SEC. 274



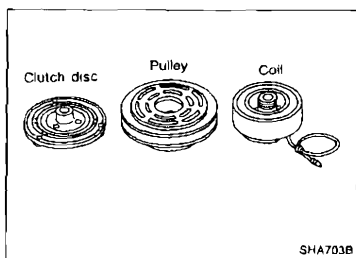
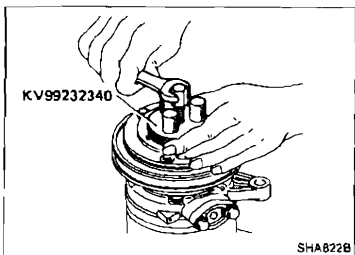
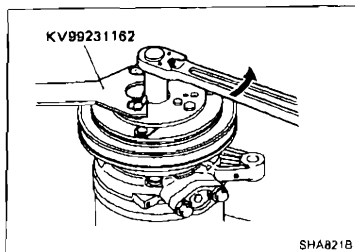
HA

## Compressor — Model DKV-14C (ZEXEL make) (Cont'd)

### COMPRESSOR CLUTCH

#### Removal

- When removing center bolt, hold clutch disc with clutch disc wrench.
- Using clutch disc puller clutch disc can be removed easily.



#### Inspection

##### Clutch disc

If the contact surface shows signs of damage due to excessive heat, the clutch disc and pulley should be replaced.

##### Pulley

Check the appearance of the pulley assembly. If the contact surface of the pulley shows signs of excessive grooving due to slippage, both the pulley and clutch disc should be replaced. The contact surfaces of the pulley assembly should be cleaned with a suitable solvent before reinstallation.

##### Coil

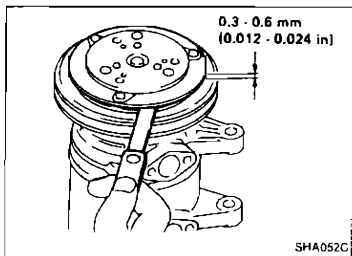
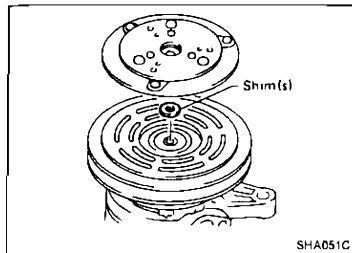
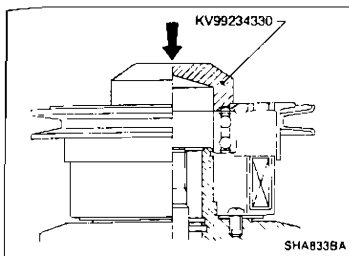
Check coil for loose connection or cracked insulation.

#### Installation

- Position coil assembly on compressor body. Be sure that the electrical terminals are reassembled in the original position. Install and tighten coil mounting screws evenly.

### Compressor — Model DKV-14C (ZEXEL make) (Cont'd)

- Press pulley assembly onto the neck of coil assembly using pulley installer.
- Wipe oil thoroughly off the clutch surface.



#### Adjustment

- Select adjusting shim(s) which give(s) the correct clearance between pulley and clutch disc.
- Using a plastic mallet, tape clutch disc in place on drive shaft.
- Do not use excessive force with a plastic mallet or in a press, or internal damages may result.
- Place spring washer and center bolt onto drive shaft. Tighten center bolt to drive clutch wheel onto drive shaft.

- Check clearance around the entire periphery of clutch disc.  
**Disc-to-pulley clearance:**  
0.3 - 0.6 mm (0.012 - 0.024 in)

If the specified clearance is not obtained, replace adjusting spacer and readjust.

#### Break-in operation

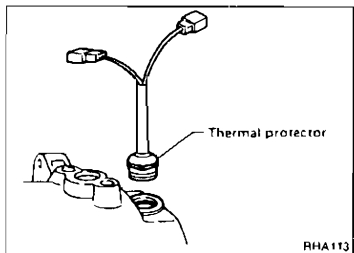
When replacing compressor clutch assembly, always conduct the break-in operation. This is done by engaging and disengaging the clutch about thirty times.

Break-in operation raises the level of transmitted torque.

#### THERMAL PROTECTOR

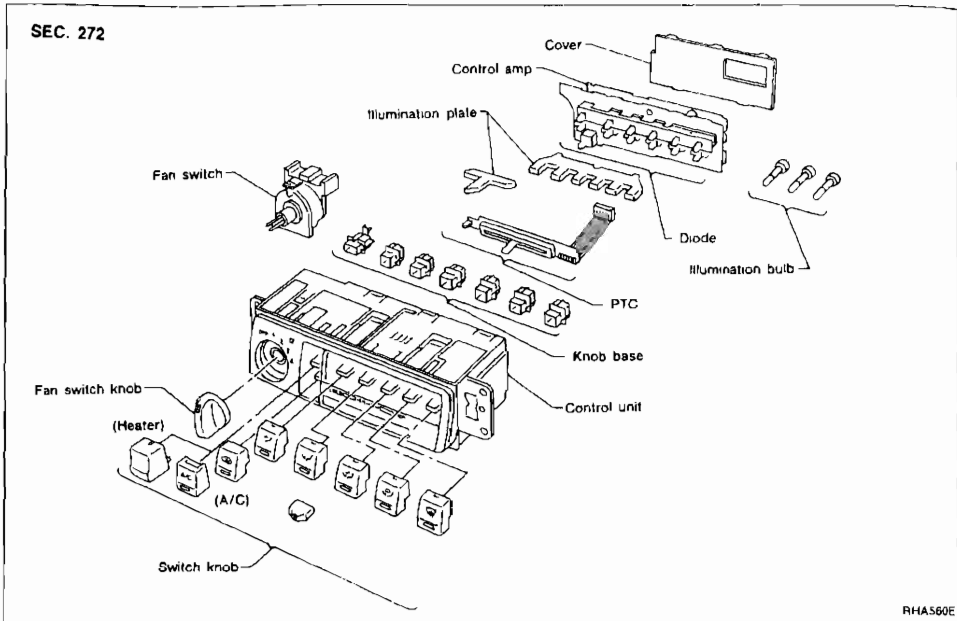
##### Inspection

- When servicing, do not allow foreign material to get into compressor.
- Check continuity between two terminals.



Overhaul — Push Control Unit Assembly

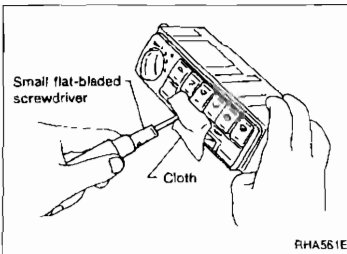
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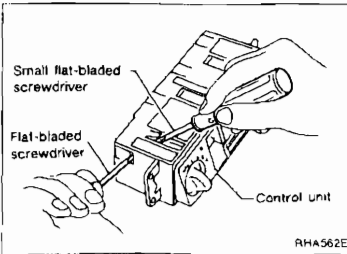
**Disassembly**

1. Remove switch knobs.  
Be careful not to scratch knobs during removal.



RHA561E

2. Remove fan switch knob.



RHA562E

## General Specifications

## COMPRESSOR

|  |                                   |
|--|-----------------------------------|
| Model                                    | DKV-14C                           |
| Type                                     | Vane rotary                       |
| Displacement cm <sup>3</sup> (cu in)/Rev | 140 (8.54)                        |
| Direction of rotation                    | Clockwise (Viewed from drive end) |
| Drive belt                               | Poly V type                       |

## LUBRICATION OIL

|   |                                 |
|---|---------------------------------|
| Model                                     | ZEXEL make<br>DKV-14C           |
| Name                                      | Nissan A/C System Oil<br>Type R |
| Part No                                   | KLH00-RAGR0                     |
| Capacity ml (Imp fl oz)                   |                                 |
| Total in system                           | 200 (7.0)                       |
| Compressor (Service part) charging amount | 200 (7.0)                       |

## REFRIGERANT

|                  |                           |
|------------------|---------------------------|
| Type             | HFC-134a (R-134a)         |
| Capacity kg (lb) |                           |
| LHD model        | 0.70 - 0.80 (1.54 - 1.76) |
| RHD model        | 0.60 - 0.70 (1.32 - 1.54) |

## Inspection and Adjustment

## COMPRESSOR

|                                      |                              |
|--------------------------------------|------------------------------|
| Model                                | DKV-14C                      |
| Clutch disc-pulley clearance mm (in) | 0.3 - 0.6<br>(0.012 - 0.024) |

## ENGINE IDLING SPEED

## When A/C is ON

- Refer to EC section ("Inspection and Adjustments", "SERVICE DATA AND SPECIFICATIONS").

## BELT TENSION

- Refer to MA section ("Checking Drive Belts", "ENGINE MAINTENANCE").

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