

HEATER & AIR CONDITIONER

SECTION **HA**

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RA
BR
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BF
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EL
IDX

CONTENTS

MANUAL AND AUTO

PRECAUTIONS AND PREPARATION	3
Supplemental Restraint System "AIR BAG".....	3
Precautions for Working with HFC-134a (R-134a).....	3
General Refrigerant Precautions.....	3
Precautions for Refrigerant Connection.....	4
Precautions for Servicing Compressor.....	5
Special Service Tools.....	5
HFC-134a (R-134a) Service Tools and Equipment.....	6
Precautions for Service Equipment.....	8
DESCRIPTION	10
Refrigeration Cycle.....	10
V-6 Variable Displacement Compressor.....	11
Component Layout.....	15
Discharge Air Flow.....	16

MANUAL

DESCRIPTION	17
Control Operation.....	17
TROUBLE DIAGNOSES	18
Contents.....	18

MANUAL AND AUTO

TROUBLE DIAGNOSES	29
Performance Test Diagnoses.....	29
Performance Chart.....	31
Trouble Diagnoses for Abnormal Pressure.....	32

MANUAL

TROUBLE DIAGNOSES	36
Wiring Diagram — A/C, M.....	39

AUTO

DESCRIPTION	60
Introduction.....	60
Features.....	60
Control Operation.....	60
TROUBLE DIAGNOSES	62
Contents.....	62
Wiring Diagram — A/C, A —.....	91
SYSTEM DESCRIPTION	116
Overview of Control System.....	116
Control System Input Components.....	117
Control System Automatic Amplifier (Auto amp.).....	119
Control System Output Components.....	120

MANUAL AND AUTO

SERVICE PROCEDURES	128
R-134a Service Procedure.....	128
Maintenance of Lubricant Quantity in Compressor.....	130
Compressor Clutch.....	130
Refrigerant Lines.....	132
Compressor Mounting.....	133
Belt Tension.....	133
Fast Idle Control Device (FICD).....	133
Compressor.....	134
Compressor Clutch.....	134

MANUAL

SERVICE AND PROCEDURE	137
Overhaul — Push Control Unit Assembly.....	137

CONTENTS (Cont'd.)

MANUAL AND AUTO

General Specifications..... 138

SERVICE DATA AND SPECIFICATIONS (SDS)..... 138

Inspection and Adjustment..... 138

When you read wiring diagrams:

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

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

Supplemental Restraint System “AIR BAG”

The Supplemental Restraint System “Air Bag”, used along with a seat belt, helps 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), a diagnosis sensor unit, warning lamp, wiring harness and spiral cable. Information necessary to service the system safely is included in the **BF** 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 “Air bag”.

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 after dispensing the lubricant. Lubricant in containers without proper sealing will become moisture saturated. Such lubricant should be disposed of properly.
 - d: Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. To remove R-134a from the A/C system, use certified service equipment meeting SAE J2210 (R-134a recycling equipment) or J2209 (R-134a recovery equipment) requirements. If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.
 - e: 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:

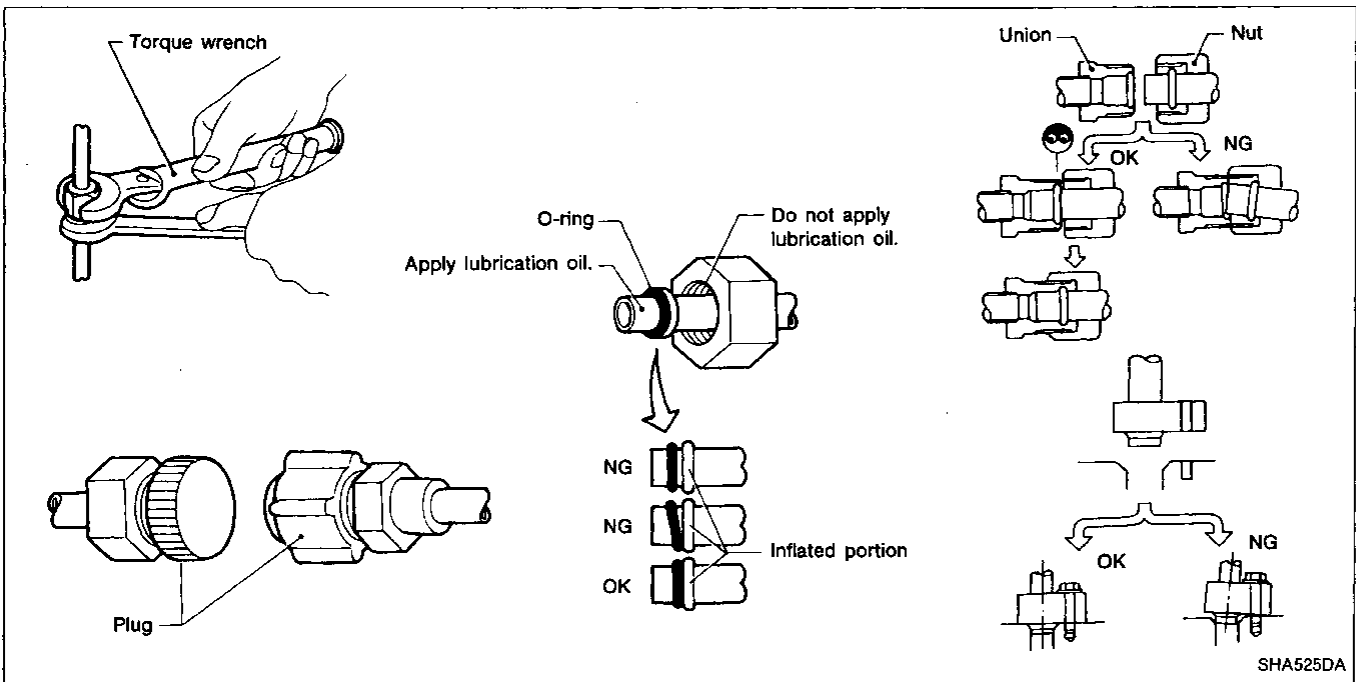
When replacing or cleaning refrigerant cycle components, observe the following.

- When the compressor is removed, store it in the same position as it is when mounted on the car. Doing 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. Remove the seal caps of the pipes and other components just before connecting such pipes and components.
- Allow components stored in cool areas to warm to working area temperature before removing the seal caps. This is to prevent the condensation of moisture 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 S

Part number: KLH00-PAGS0

- 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.

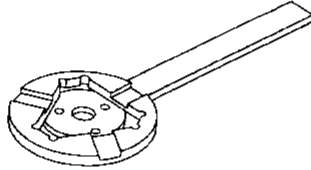
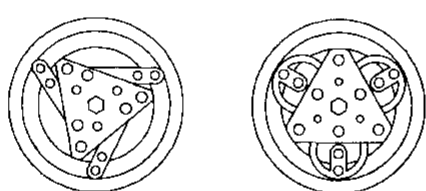
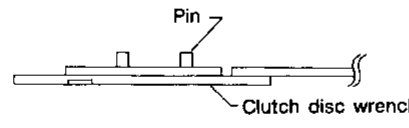
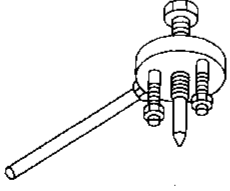
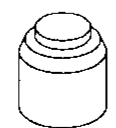


Precautions for Servicing Compressor

- Attach a blind plug to the suction port (low pressure) and discharge port (high pressure) of the compressor. This will prevent lubricant from leaking and dust from getting inside.
- When the compressor is removed, store it in the same position as it is when mounted on the car.
- When replacing or repairing compressor, remove lubricant from the compressor and check the lubricant quantity extracted.
- Remove lubricant from new compressor so that the lubricant quantity is equal to that of removed compressor. See HA-131.
- Do not allow dirt or lubricant to attach on the friction surfaces between clutch and pulley. 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 equalize lubricant distribution inside the compressor. After the compressor is installed, let the engine idle and operate the compressor for one hour.
- When replacing the compressor magnet clutch, apply voltage to the new one and check for normal operation.

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Special Service Tools

Tool number (Kent-Moore No.) Tool name	Description
KV99106100 (J-41260) Clutch disc wrench	<p>Removing center bolt</p>  <p>NT232</p>  <p>When replacing the magnet clutch in the above compressor, use a clutch disc wrench with the pin side on the clutch disc to remove it.</p> <p>When replacing the magnet clutch in the above compressor, use a clutch disc wrench with the flat side on the clutch disc to remove it.</p>  <p>Pin Clutch disc wrench</p> <p>NT233</p>
KV99232340 (J-38874) or KV992T0001 Clutch disc puller	<p>Removing clutch disc</p>  <p>NT234</p>
KV99106200 (J-41261) Pulley installer	<p>Installing pulley</p>  <p>NT235</p>

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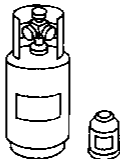

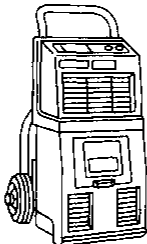
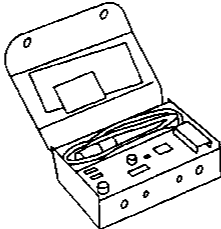
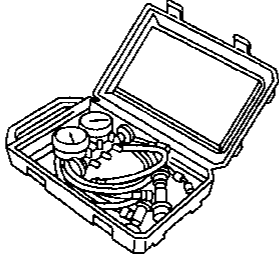
HFC-134a (R-134a) Service Tools and Equipment

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


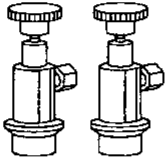

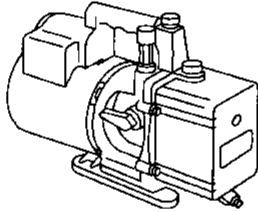
Separate and non-interchangeable service equipment must be used for handling each type of refrigerant/lubricant.

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 number (Kent-Moore No.) Tool name	Description	Note
HFC-134a (R-134a) refrigerant	 NT196	Container color: Light blue Container marking: HFC-134a (R-134a) Fitting size: Thread size ● large container 1/2"-16 ACME
KLH00-PAGS0 (—) Nissan A/C System Oil Type S	 NT197	Type: Poly alkylene glycol oil (PAG), type S Application: HFC-134a (R-134a) swash plate (piston) compressors (Nissan only) Lubricity: 40 ml (1.4 US fl oz, 1.4 Imp fl oz)
(J-39500-NI) Recovery/Recycling equipment (ACR4)	 NT195	Function: Refrigerant Recovery and Recycling and Recharging
(J-39400) Electrical leak detector	 NT198	Power supply: ● DC 12 V (Cigarette lighter)
(J-39183) Manifold gauge set (with hoses and couplers)	 NT199	Identification: ● The gauge face indicates R-134a. Fitting size: Thread size ● 1/2"-16 ACME

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

Tool number (Kent-Moore No.) Tool name	Description	Note
Service hoses ● High side hose (J-39501-72) ● Low side hose (J-39502-72) ● Utility hose (J-39476-72)	 <p>NT201</p>	Hose color: ● Low hose: Blue with black stripe ● High hose: Red with black stripe ● Utility hose: Yellow with black stripe or green with black stripe Hose fitting to gauge: ● 1/2"-16 ACME
Service couplers ● High side coupler (J-39500-20) ● Low side coupler (J-39500-24)	 <p>NT202</p>	Hose fitting to service hose: ● M14 x 1.5 fitting is optional or permanently attached.
(J-39650) Refrigerant weight scale	 <p>NT200</p>	For measuring of refrigerant Fitting size: Thread size ● 1/2"-16 ACME
(J-39649) Vacuum pump (Including the isolator valve)	 <p>NT203</p>	Capacity: ● Air displacement: 4 CFM ● Micron rating: 20 microns ● Oil capacity: 482 g (17 oz) Fitting size: Thread size ● 1/2"-16 ACME

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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.

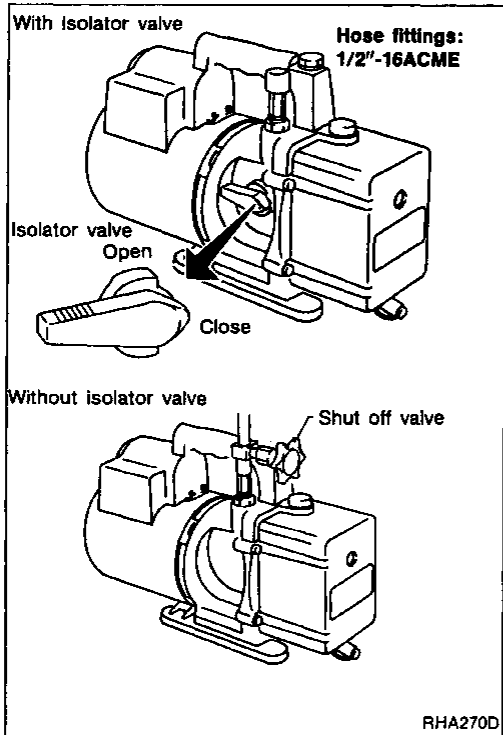
To prevent this migration, use a manual valve situated near the hose-to-pump connection, as follows.

- 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.

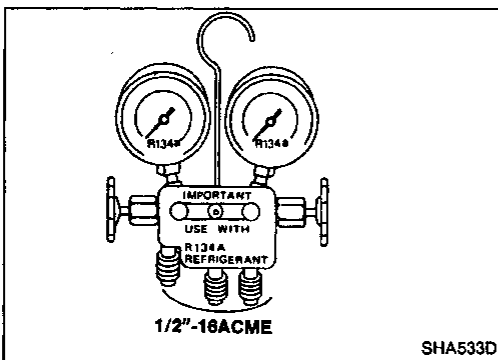
Some one-way valves open when vacuum is applied and close under a no vacuum condition. Such valves may restrict the pump's ability to pull a deep vacuum and are not recommended.

MANIFOLD GAUGE SET

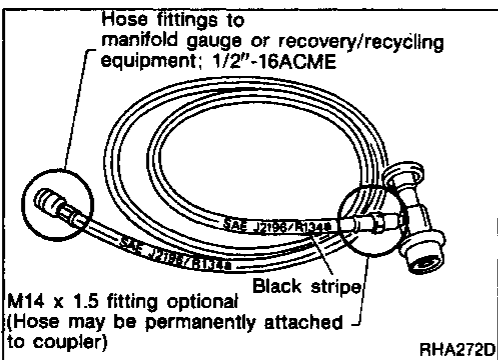
Be certain that the gauge face indicates R-134a or 134a. Also assure the gauge set has the 1/2"-16 ACME threaded connections for service hoses. Be certain the set has been used only with refrigerant HFC-134a (R-134a) along with specified lubricant.



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SHA533D



RHA272D

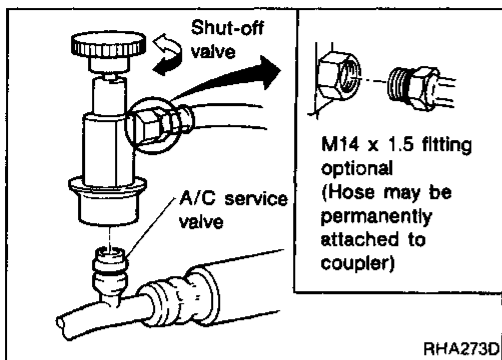
SERVICE HOSES

Be certain that the service hoses display the markings described (colored hose with black stripe). All hoses must include positive shut off devices (either manual or automatic) near the end of the hoses opposite the manifold gauge.

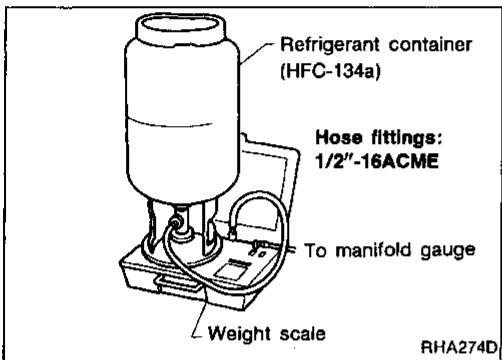
Precautions for Service Equipment (Cont'd)

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 connect to the CFC-12 (R-12) system. Even so, CFC-12 (R-12) refrigerant and lubrication oil can be discharged into the HFC-134a (R-134a) coupler, causing contamination.



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



REFRIGERANT WEIGHT SCALE

When using a scale which controls refrigerant flow electronically, assure the following: hose fitting size is 1/2"-16 ACME and no other refrigerant other than HFC-134a (R-134a) (along with specified lubricant) has not been used with the scale.

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 flows in the standard pattern. It flows from compressor through condenser, liquid tank, evaporator and back to 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.

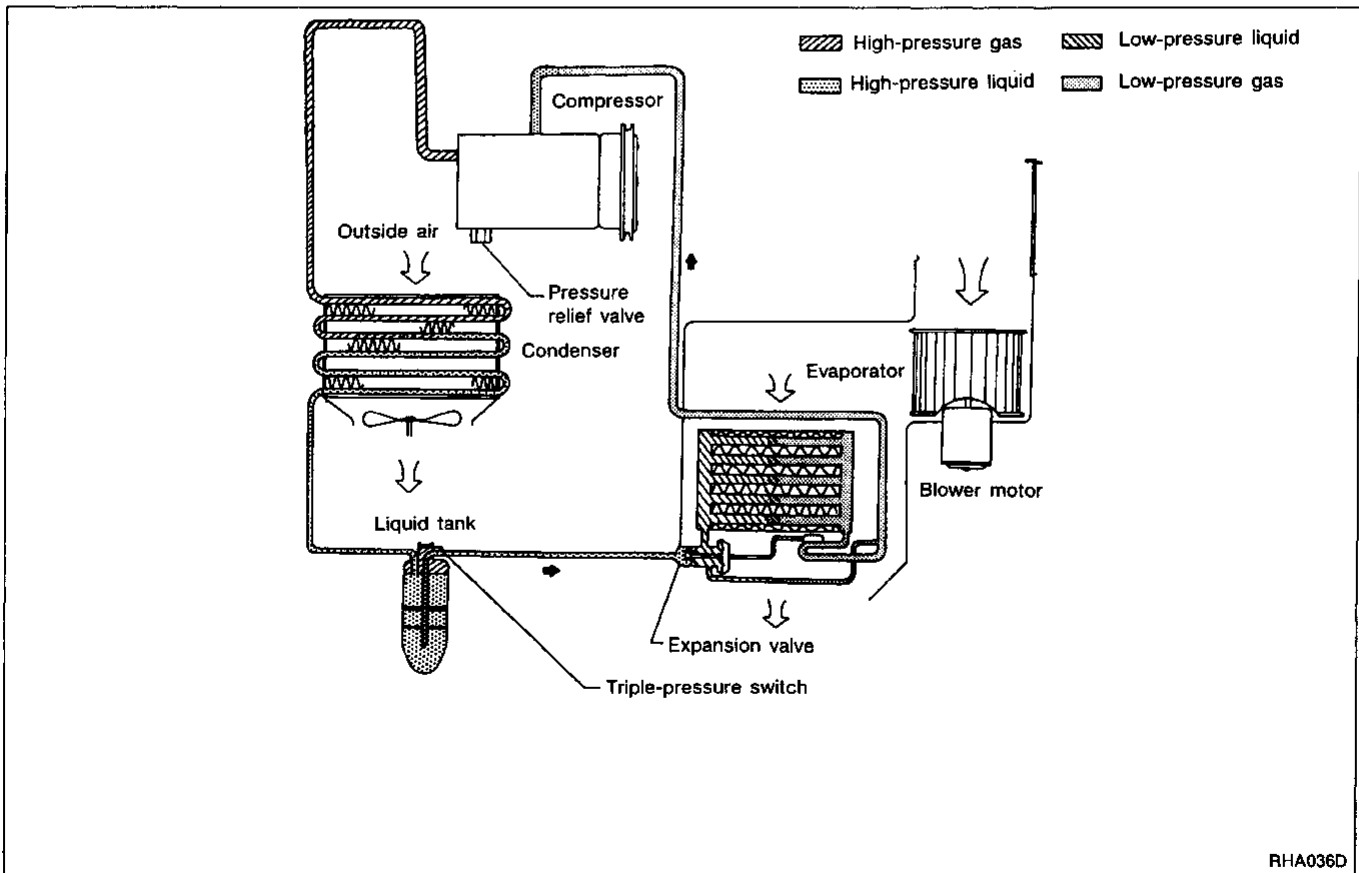
REFRIGERANT SYSTEM PROTECTION

Triple-pressure switch

The refrigerant system is protected against excessively high or low pressure. The protection is effected by the triple pressure switch located on the liquid tank. If the pressure rises or falls out of specifications, the switch opens to interrupt the compressor operation. Also, triple-pressure switch operates the cooling fan motor.

Pressure relief valve

The refrigerant system is also protected by a pressure relief valve. The valve is located on the bottom of the compressor. When refrigerant pressure in the system increases abnormally [over 3,727 kPa (38 kg/cm², 540 psi)], the relief valve's release port opens automatically. The valve then releases refrigerant into the atmosphere.



V-6 Variable Displacement Compressor

GENERAL INFORMATION

1. The V-6 variable compressor differs from previous units. The vent temperatures of the V-6 variable compress do not drop too far below 5°C (41°F) when:

- evaporator intake air temperature is less than 20°C (68°F)
- engine is running at speeds less than 1,500 rpm.

This is because the V-6 compressor provides a means of "capacity" control.

2. The V-6 variable compressor provides refrigerant control under varying conditions. During cold winters, it may not produce high refrigerant pressure discharge (compared to previous units) when used with air conditioning systems.

3. A "clanking" sound may occasionally be heard during refrigerant charge. The sound indicates that the tilt angle of the swash plate has changed and is not a problem.

4. For air conditioning systems with the V-6 compressor, the clutch remains engaged unless: the system main switch, fan switch or ignition switch is turned OFF. When ambient (outside) temperatures are low or when the amount of refrigerant is insufficient, the clutch is disengaged to protect the compressor.

5. A constant range of suction pressure is maintained when engine speed is greater than a certain value. It normally ranges from 147 to 177 kPa (1.5 to 1.8 kg/cm², 21 to 26 psi) under varying conditions.

In previous compressors, however, suction pressure was reduced with increases in engine speed.

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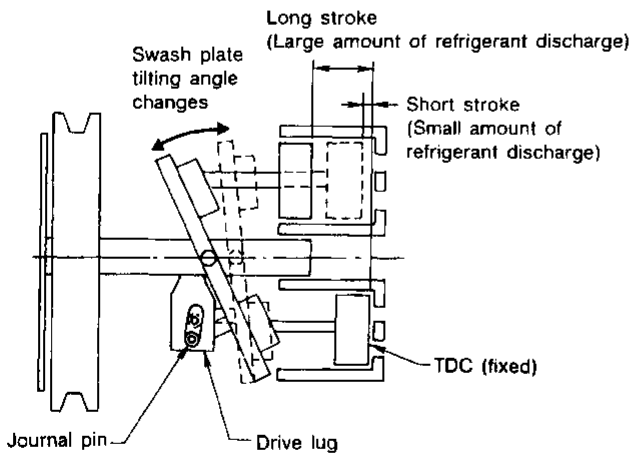
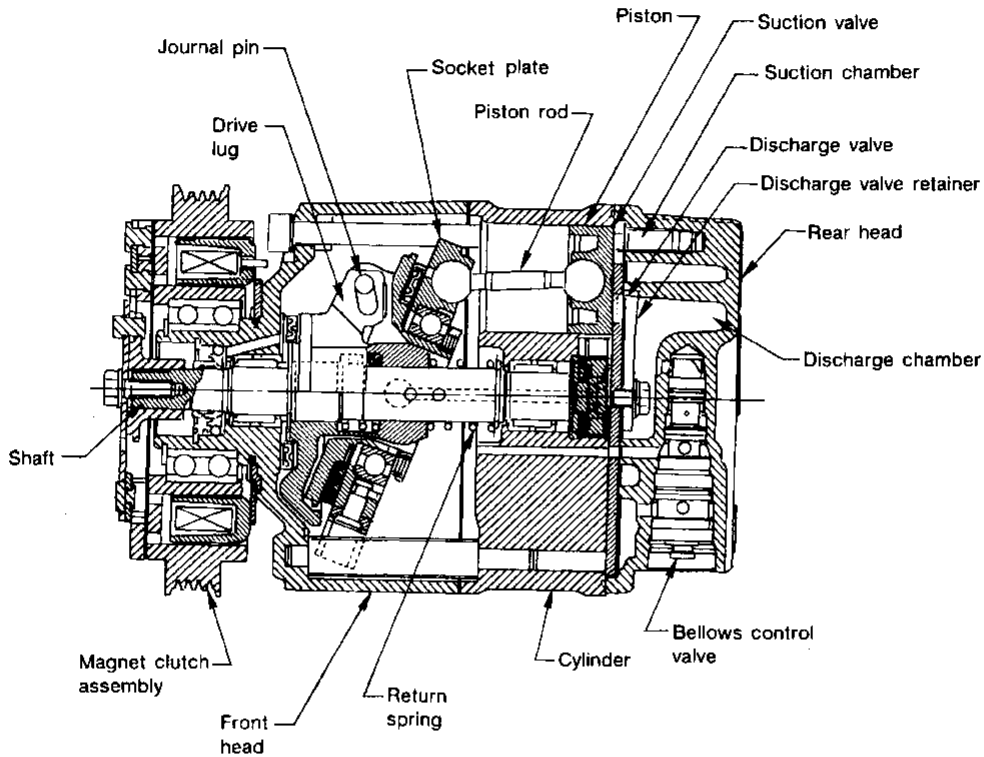
V-6 Variable Displacement Compressor (Cont'd)

DESCRIPTION

General

The variable compressor is basically a swash plate type that changes piston stroke in response to the required cooling capacity.

The tilt of the swash plate allows the piston's stroke to change so that refrigerant discharge can be continuously changed from 14.5 to 184 cm³ (0.885 to 11.228 cu in).



Discharge control	Discharge capacity cm ³ (cu in)/rev.	Piston stroke length mm (in)
Minimum	14.5 (0.885)	2.3 (0.091)
Maximum	184 (11.228)	28.6 (1.126)

RHA037DB

V-6 Variable Displacement Compressor (Cont'd)

Operation

1. Operation control valve

Operation control valve is located in the suction port (low-pressure) side, and opens or closes in response to changes in refrigerant suction pressure.

Operation of the valve controls the internal pressure of the crankcase.

The angle of the swash plate is controlled between the crankcase's internal pressure and the piston cylinder pressure.

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2. Maximum cooling

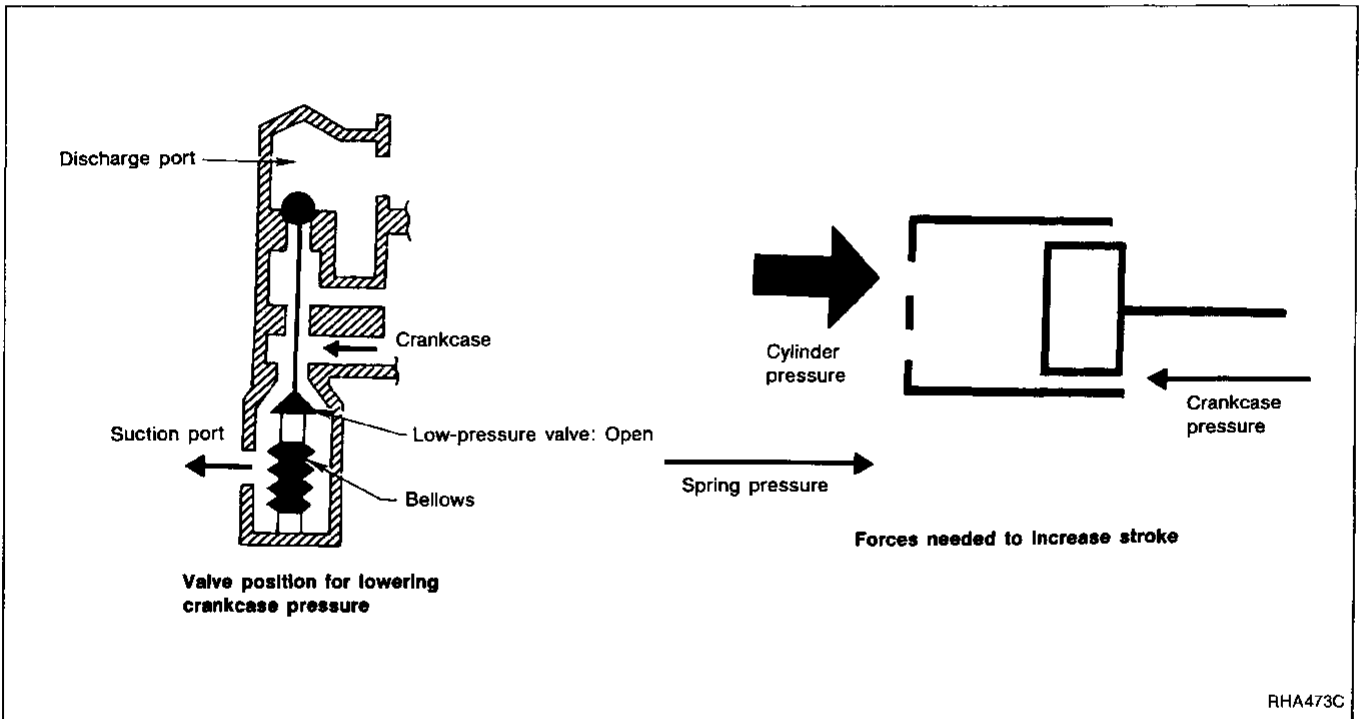
Refrigerant pressure on the low-pressure side increases with an increase in heat loads.

When this occurs, the control valve's bellows compress to open the low-pressure side valve and close the high-pressure side valve.

This causes the following pressure changes:

- the crankcase's internal pressure to equal the pressure on the low-pressure side;
- the cylinder's internal pressure to be greater than the crankcase's internal pressure.

Under this condition, the swash plate is set to the maximum stroke position.



V-6 Variable Displacement Compressor (Cont'd)

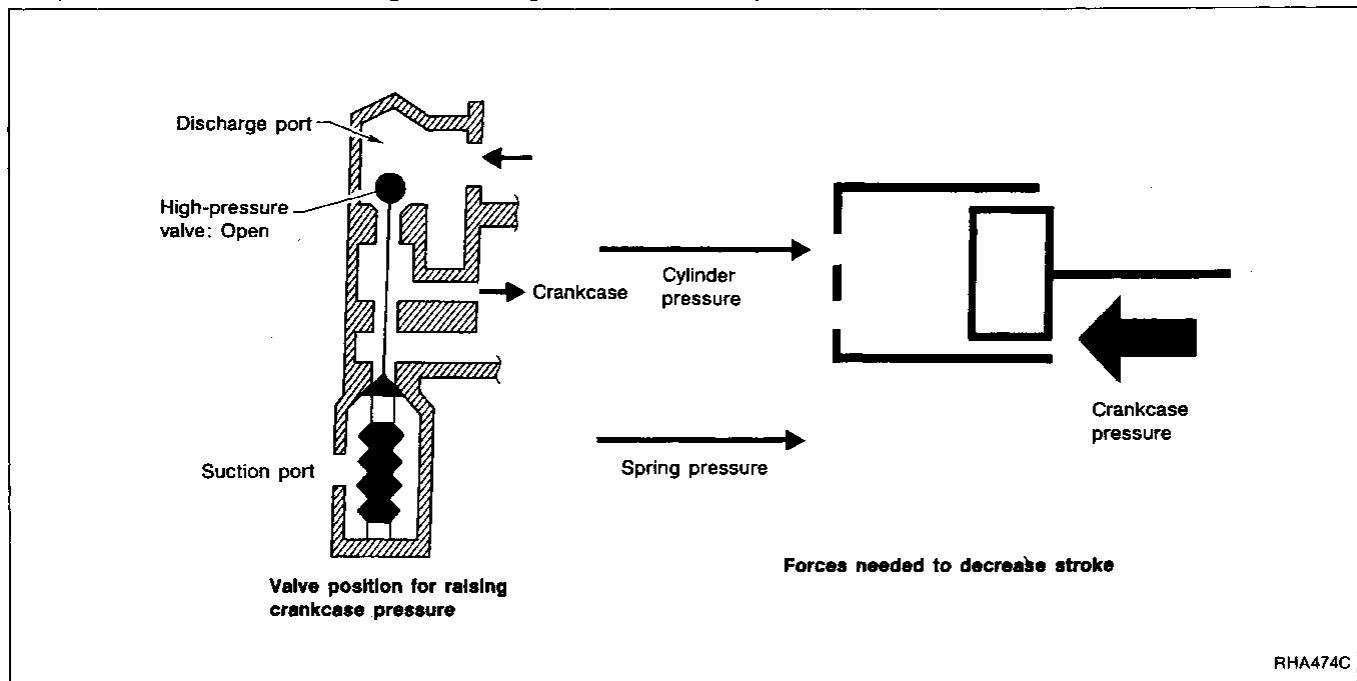
3. Capacity control

- Refrigerant pressure on suction side is low during high speed driving or when ambient or interior temperature is low.
- The bellows expands when refrigerant pressure on the suction pressure side drops below approximately 177 kPa (1.8 kg/cm², 26 psi).

Since suction pressure is low, it makes the suction port close and the discharge port open. Thus, crankcase pressure becomes high as high pressure enters the crankcase.

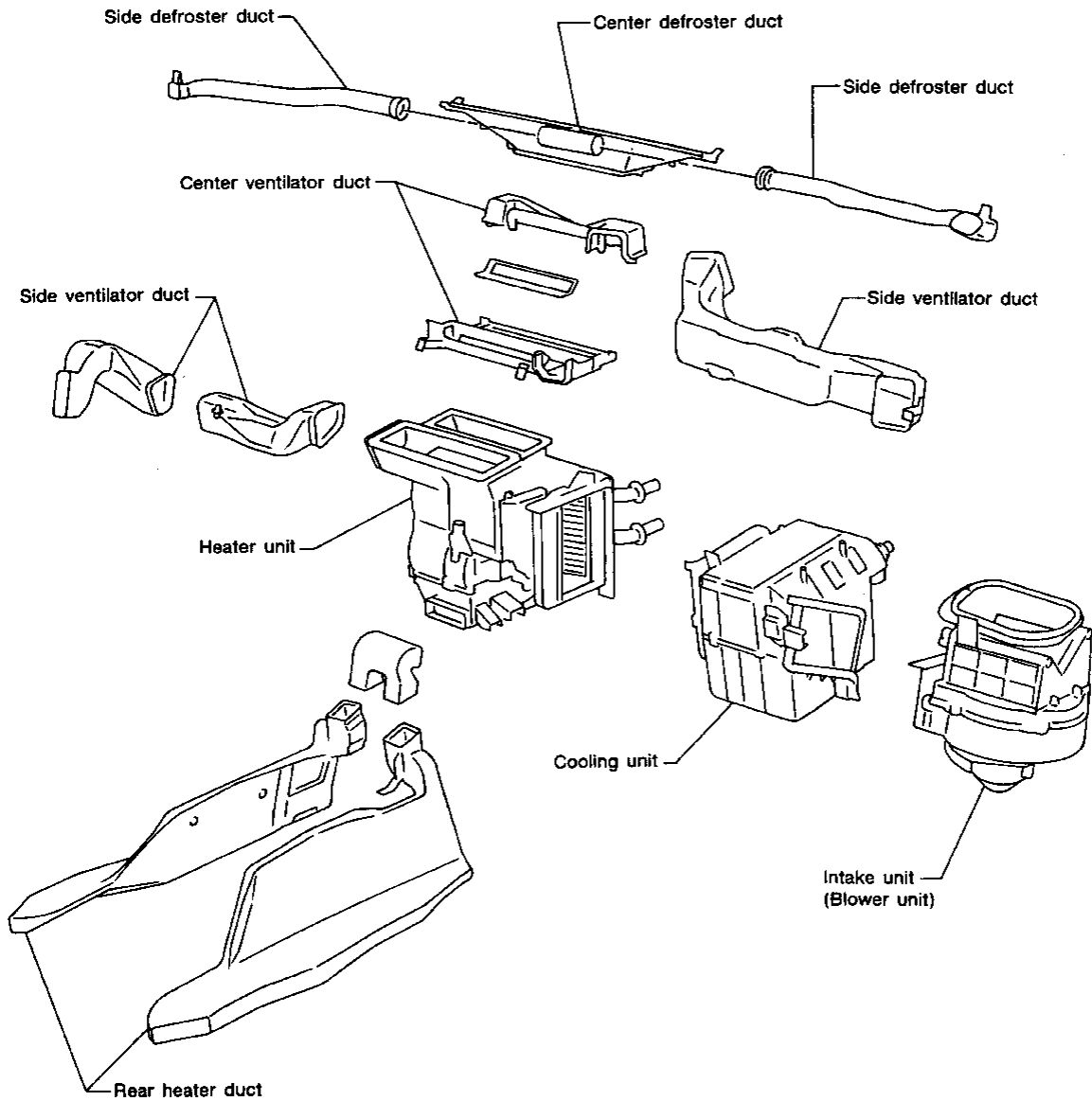
- The force acts around the journal pin near the swash plate, and is generated by the pressure difference before and behind the piston.

The drive lug and journal pin are located where the piston generates the highest pressure. Piston pressure is between suction pressure P_s and discharge pressure P_d , which is near suction pressure P_s . If crankcase pressure P_c rises due to capacity control, the force around the journal pin makes the swash plate angle decrease and also the piston stroke decrease. In other words, crankcase pressure increase triggers pressure difference between the piston and the crankcase. The pressure difference changes the angle of the swash plate.



Component Layout

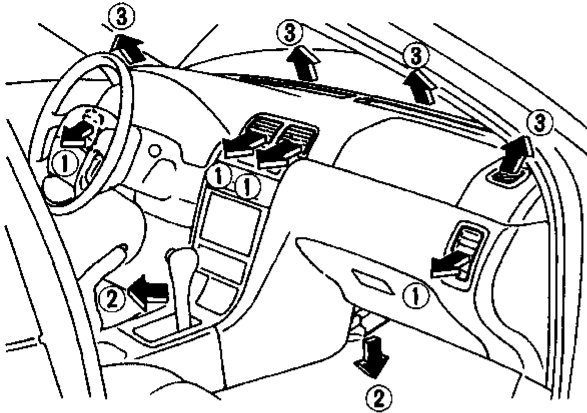
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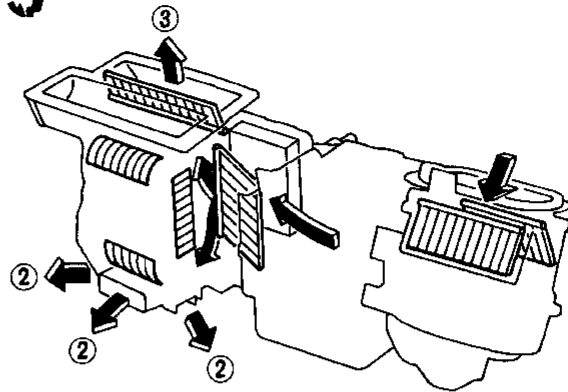
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Discharge Air Flow

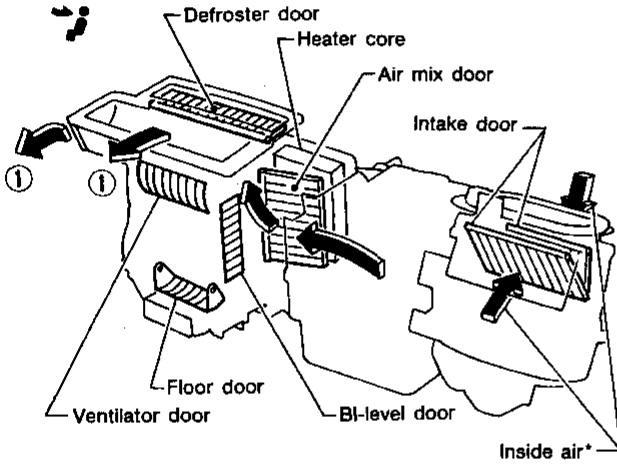
Air outlets



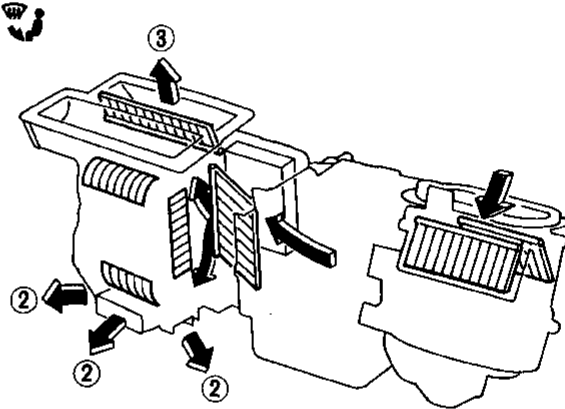
Foot



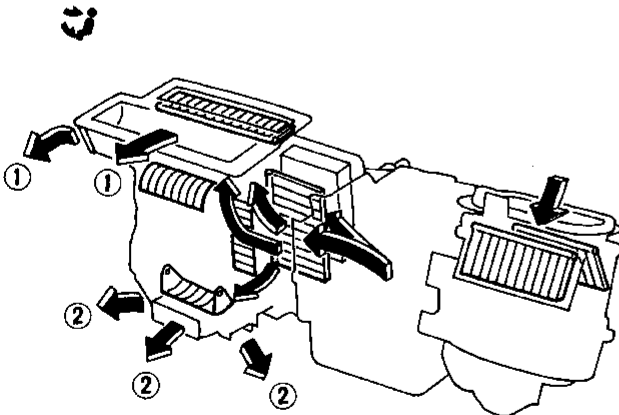
Face



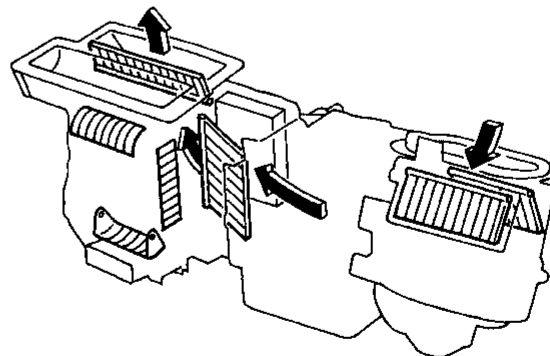
Foot and defroster



Bi-level



Defroster

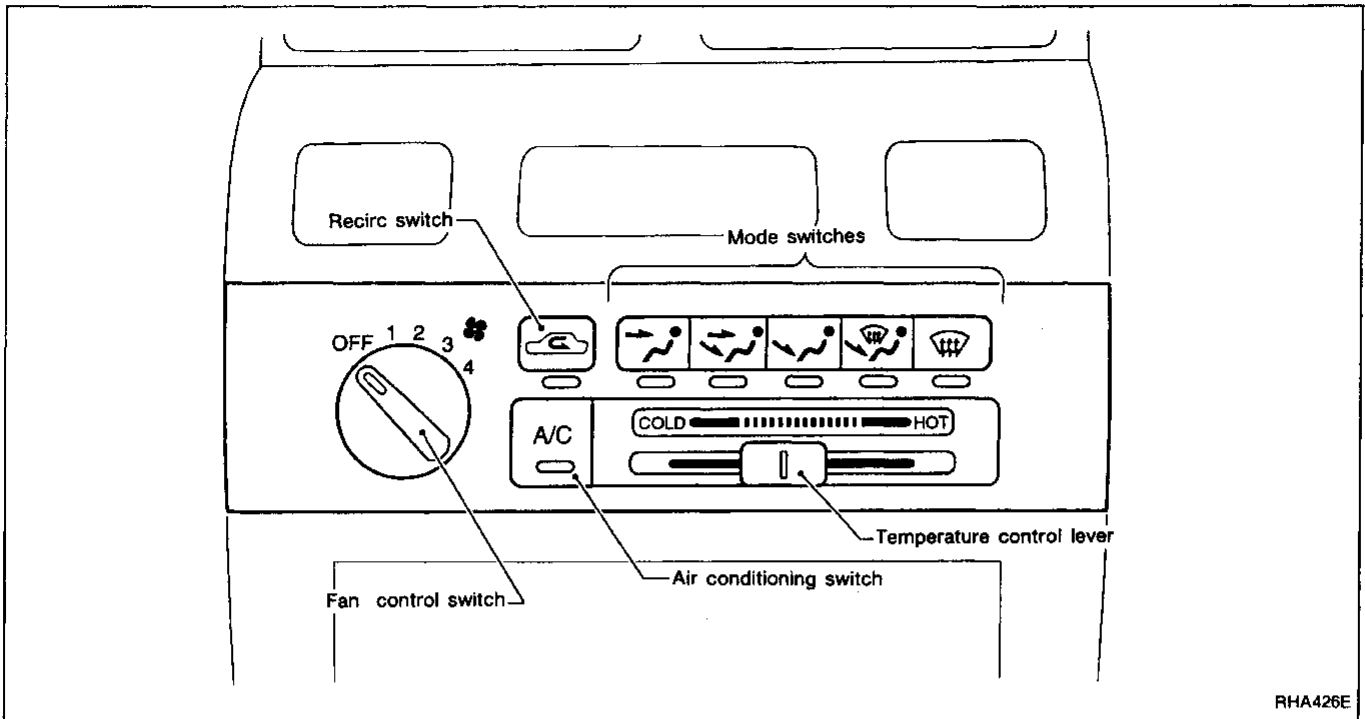


- ① : To face
- ② : To foot
- ③ : To defroster

* : 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 allow control of the air discharge outlets.

When the MODE switch is moved to "DEF" or "F/D", the push control amplifier sets the intake door to "FRESH". The compressor turns on when the MODE switch is moved to "DEF".

TEMPERATURE CONTROL LEVER

This lever allows you to adjust the temperature of the discharge 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.

For California models, intake door is set at RECIRC position automatically when the following conditions are met.

- The A/C switch is pushed to turn ON with the engine running.
- The temperature control lever is moved to FULL COLD position.
- The VENT switch is pushed to turn ON.
- The fan control switch is turned to 4-speed.

AIR CONDITIONING SWITCH

Start the engine, set the fan control switch to the desired (1 to 4) position and push the air conditioning switch to turn ON the air conditioning. The indicator lamp will come on when the air conditioning is ON. To stop the air conditioning, push the switch again to return it to the original position.

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

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LC
EC
FE
CL
MT
AT
FA
RA
BR
ST
BF
HA

EL

IDX

Contents

How to Perform Trouble Diagnoses for Quick and Accurate Repair HA-19

Operational Check HA-20

Symptom Chart HA-22

Preliminary Check HA-24

PRELIMINARY CHECK 1
 (Intake door is not set at "FRESH" in DEF or F/D mode.) HA-24

PRELIMINARY CHECK 2
 (A/C does not blow cold air.) HA-25

PRELIMINARY CHECK 3
 (Magnet clutch does not engage in DEF mode.) HA-26

PRELIMINARY CHECK 4
 (Air outlet does not change.) HA-26

PRELIMINARY CHECK 5
 (Noise) HA-27

PRELIMINARY CHECK 6
 (Insufficient heating) HA-28

Performance Test Diagnoses HA-29

INSUFFICIENT COOLING HA-29

Performance Chart HA-31

TEST CONDITION HA-31

TEST READING HA-31

Trouble Diagnoses for Abnormal Pressure HA-32

Harness Layout HA-36

Circuit Diagram for Quick Pinpoint Check HA-38

Wiring Diagram — A/C, M — HA-39

Main Power Supply and Ground Circuit Check HA-44

Diagnostic Procedure 1
 (SYMPTOM: Blower motor does not rotate.) HA-45

Diagnostic Procedure 2
 (SYMPTOM: Air outlet does not change.) HA-47

Diagnostic Procedure 3
 (SYMPTOM: Intake door does not change in VENT, B/L or FOOT mode.) HA-49

Diagnostic Procedure 4
 (SYMPTOM: Air mix door does not change.) HA-50

Diagnostic Procedure 5
 (SYMPTOM: Bi-level (B/L) door does not operate.) HA-52

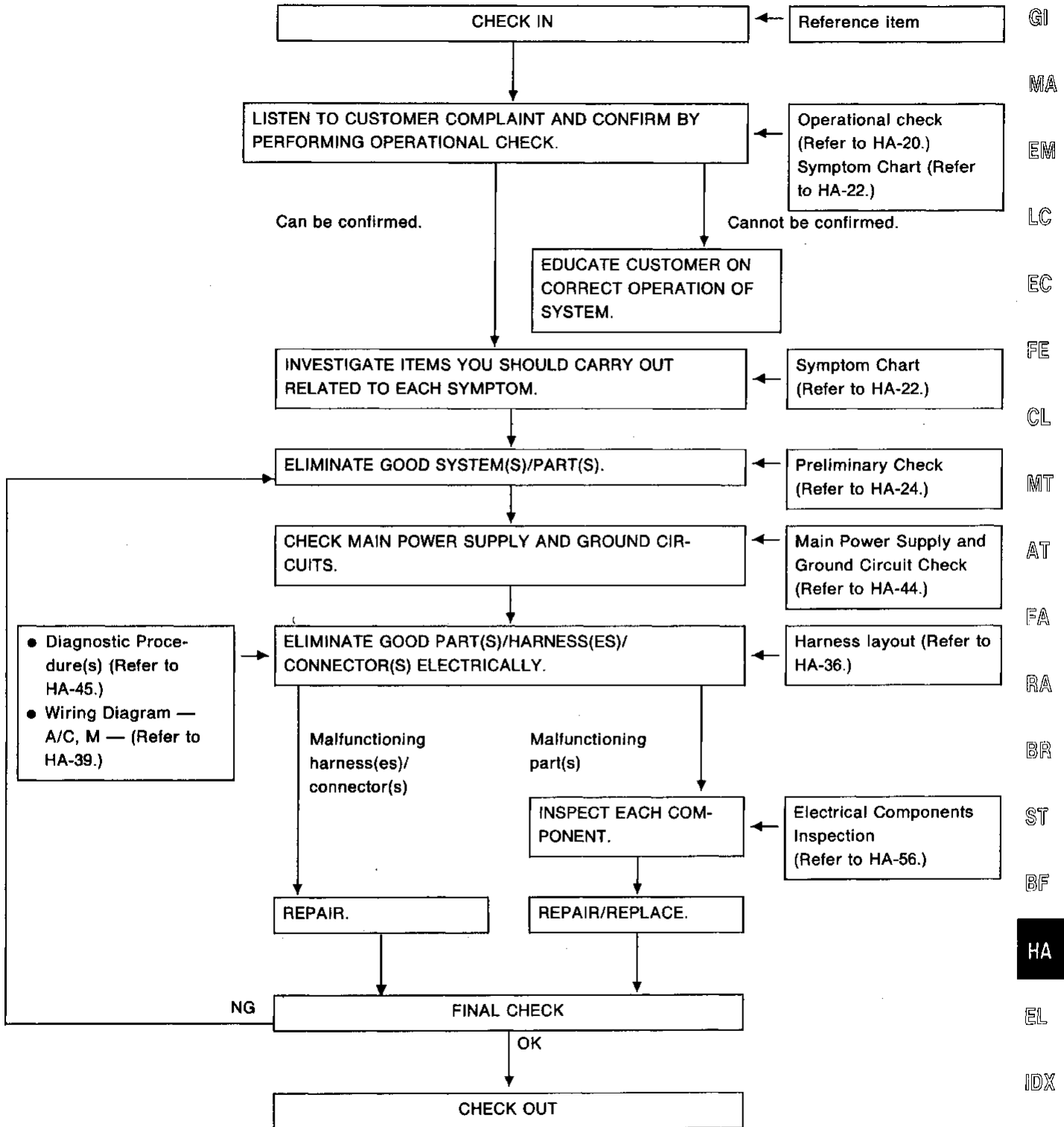
Diagnostic Procedure 6
 (SYMPTOM: Magnet clutch does not engage when A/C switch and fan switch are ON.) HA-53

Electrical Components Inspection HA-56

Control Linkage Adjustment HA-58

How to Perform Trouble Diagnoses for Quick and Accurate Repair

WORK FLOW



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FE
CL
MT
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BR
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BF
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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.

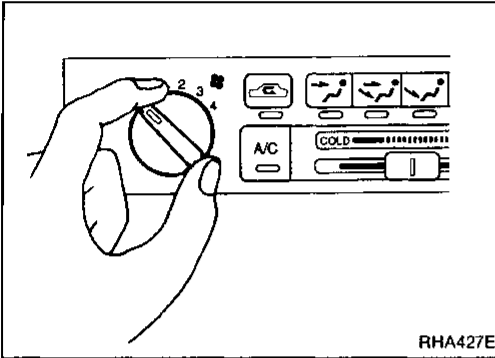
CONDITIONS:

- Engine running and at normal operating temperature.

PROCEDURE:

1. Check blower

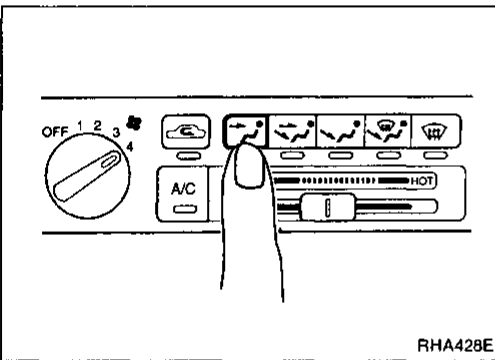
- 1) Turn fan switch to 1-speed.
Blower should operate on low speed.
- 2) Then turn fan switch to 2-speed.
- 3) Continue checking blower speed until all speeds are checked.
- 4) Leave blower on speed 4.



RHA427E

2. Check discharge air.

- 1) Press each mode switch.



RHA428E

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

Refer to "Discharge Air Flow", "DESCRIPTION" (HA-16).

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.

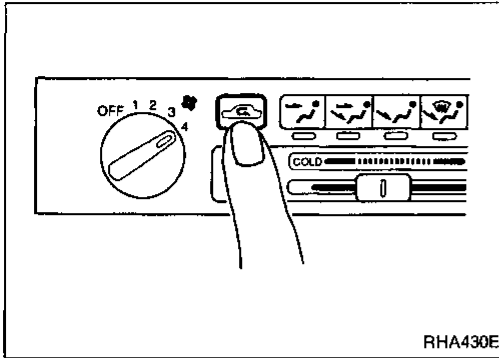
Intake door position is checked in the next step.

Discharge air flow


Switch mode/ indicator	Air outlet/distribution		
	Face	Foot	Defroster
	100%	—	—
	60%	40%	—
	—	78%	22%
	—	60%	40%
	—	—	100%

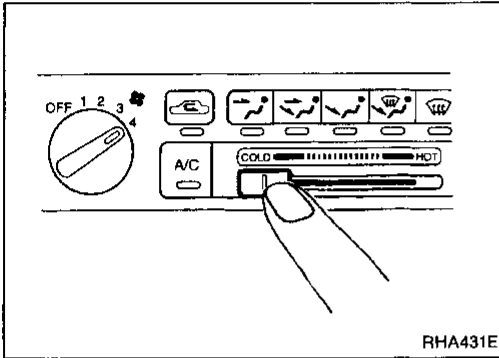
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Operational Check (Cont'd)



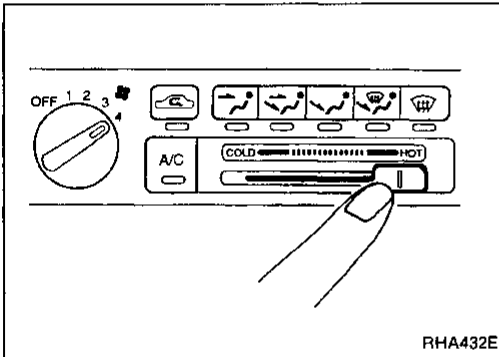
3. Check recirc

- 1) Press REC  switch
Recirc indicator should illuminate.
- 2) Listen for intake door position change (air flow sound from intake unit).



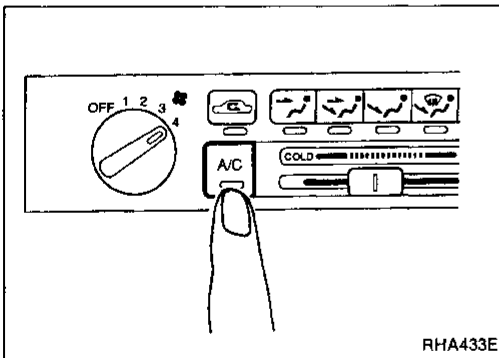
4. Check temperature decrease

- 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.

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Symptom Chart

DIAGNOSTIC TABLE

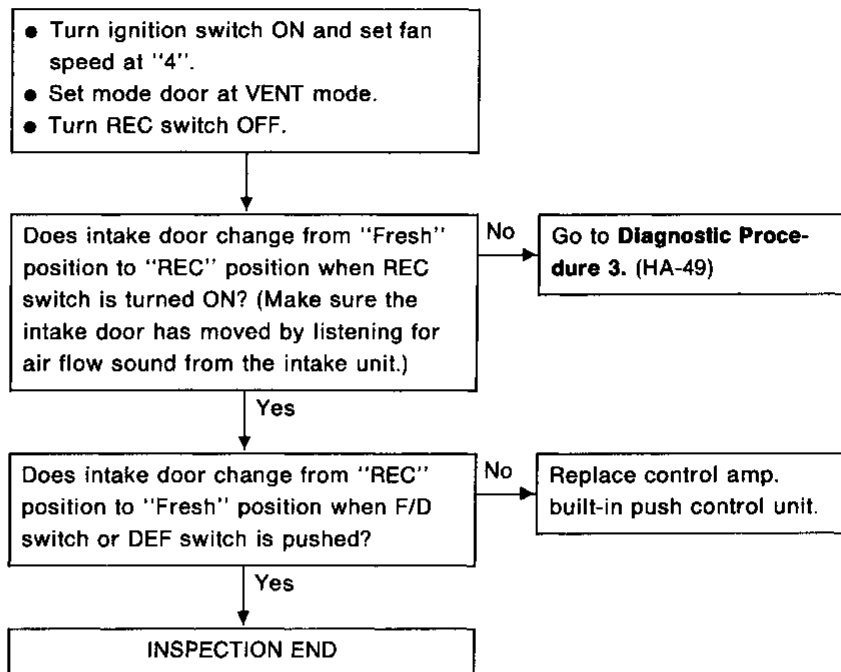
PROCEDURE	Preliminary Check						Diagnostic Procedure						Main Power Supply and Ground Circuit Check			
	HA-24	HA-25	HA-26	HA-26	HA-27	HA-28	HA-45	HA-47	HA-49	HA-50	HA-52	HA-53	HA-44	HA-44	HA-44	HA-44
REFERENCE PAGE	HA-24	HA-25	HA-26	HA-26	HA-27	HA-28	HA-45	HA-47	HA-49	HA-50	HA-52	HA-53	HA-44	HA-44	HA-44	HA-44
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 (#2, #3)	10A Fuse (#10)	7.5A Fuse (#56)	Push control unit
A/C does not blow cold air.		①					○			○			○	○		
Insufficient heating.						①	○					○				
Blower motor does not rotate.		①					②						○			
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.
 ○ : Checking order depends on malfunction in each flow chart.

Preliminary Check

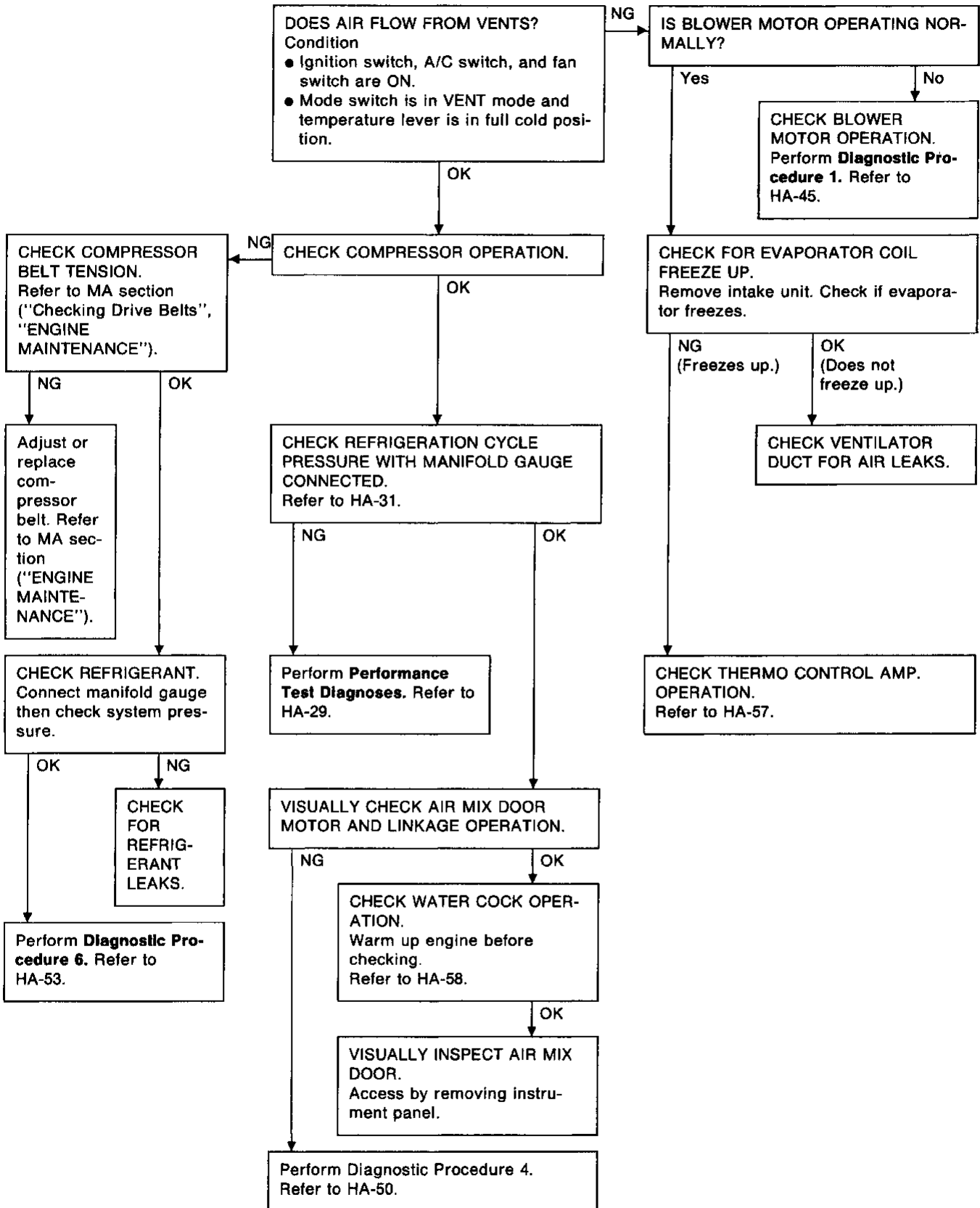
PRELIMINARY CHECK 1

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.



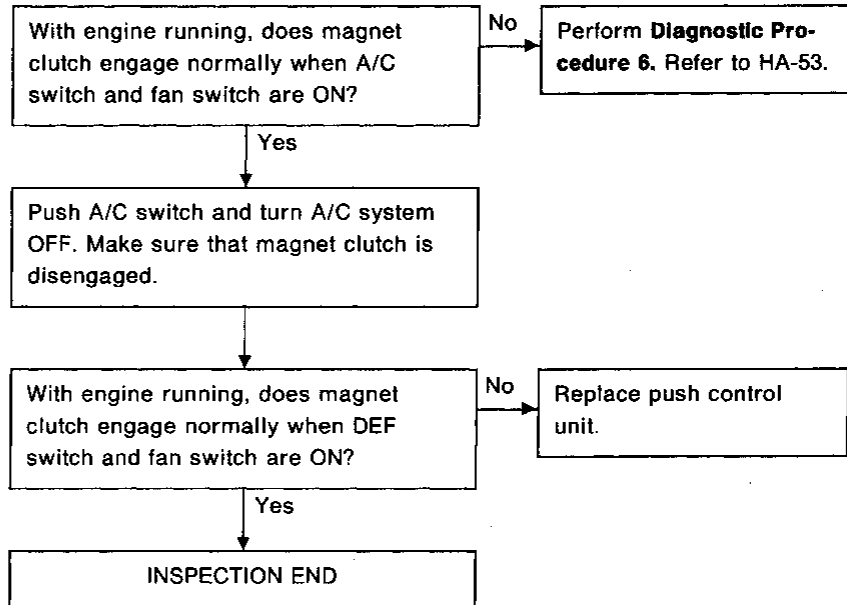
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Preliminary Check (Cont'd)

PRELIMINARY CHECK 3

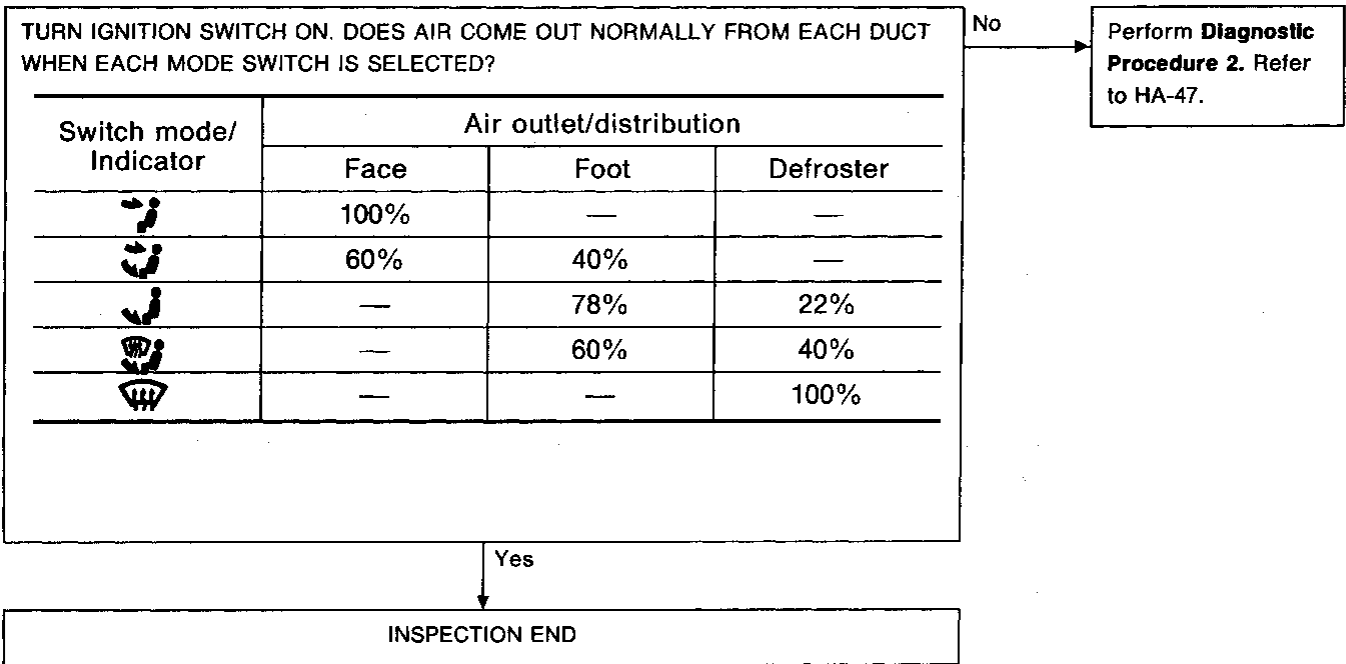
Magnet clutch does not engage in DEF mode.

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



PRELIMINARY CHECK 4

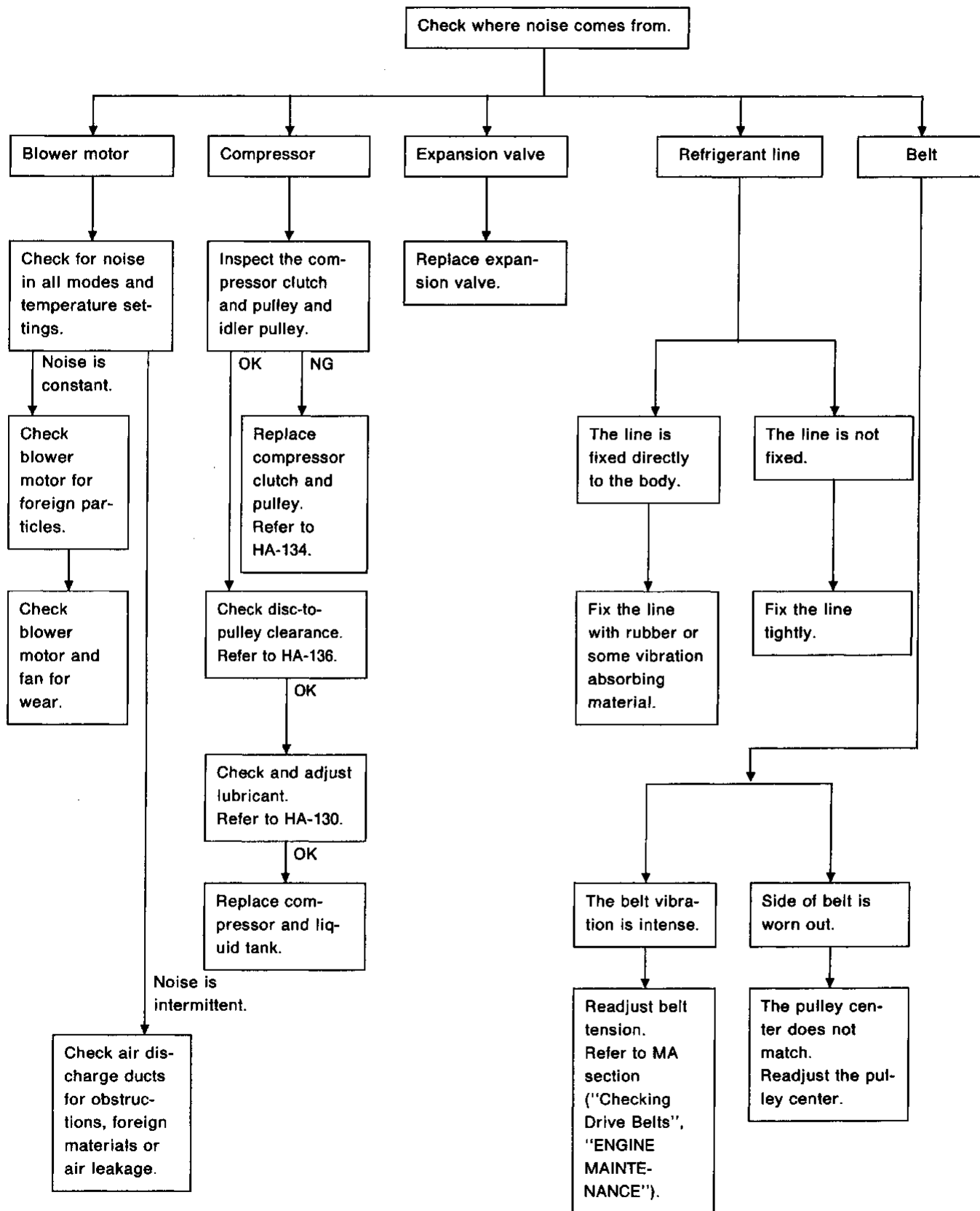
Air outlet does not change.



Preliminary Check (Cont'd)

PRELIMINARY CHECK 5

Noise

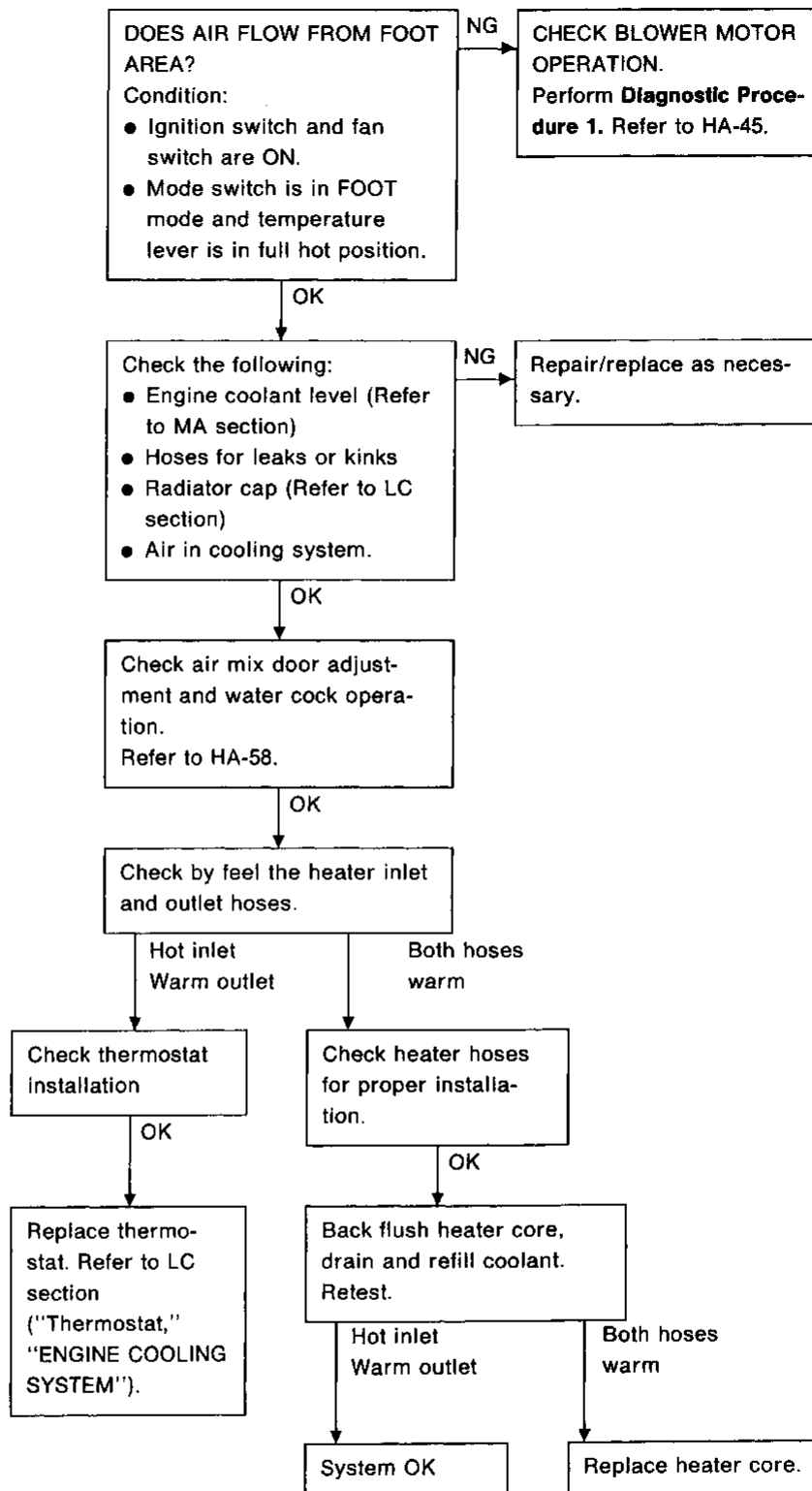


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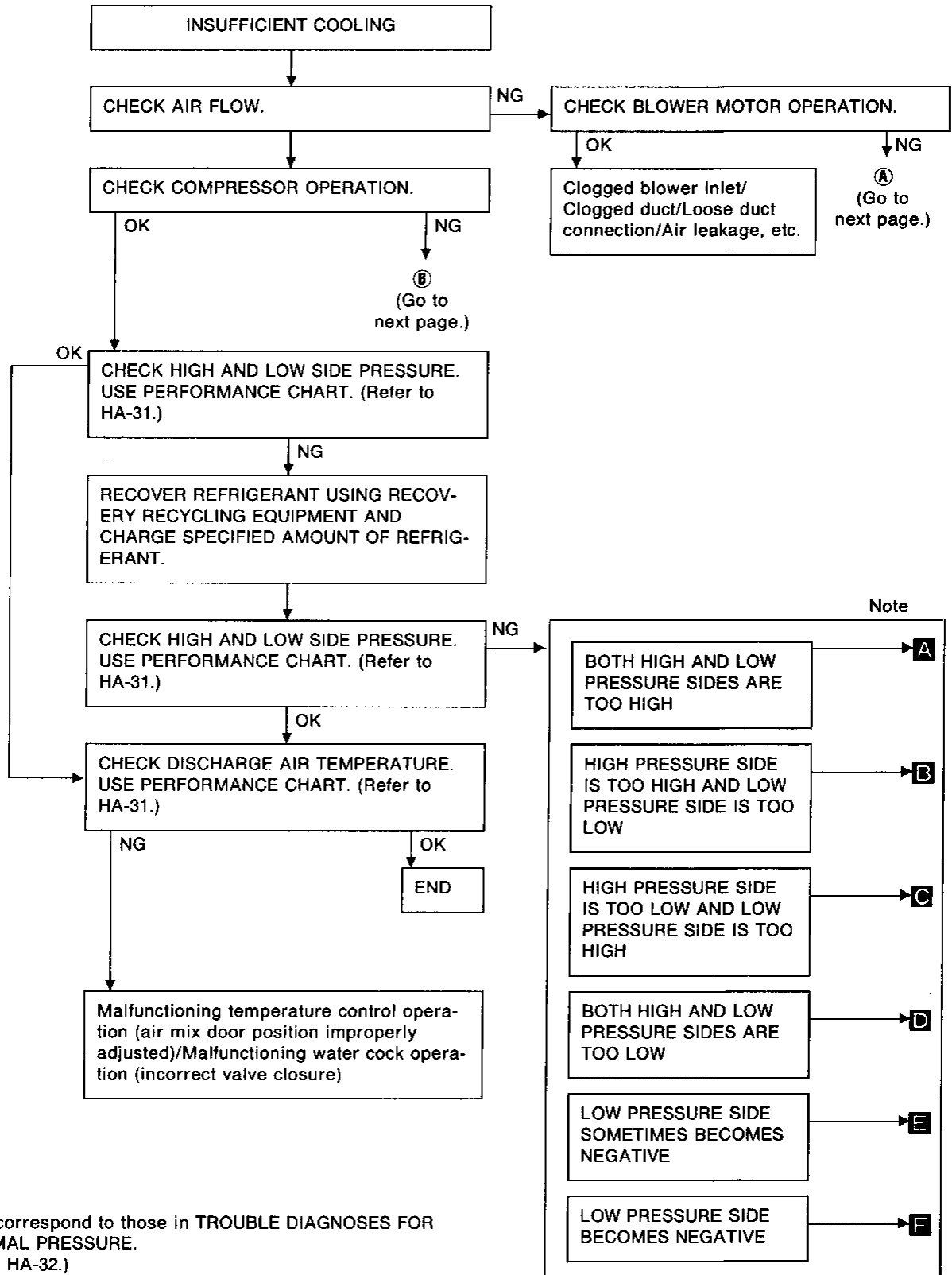
Preliminary Check (Cont'd)

PRELIMINARY CHECK 6

Insufficient heating



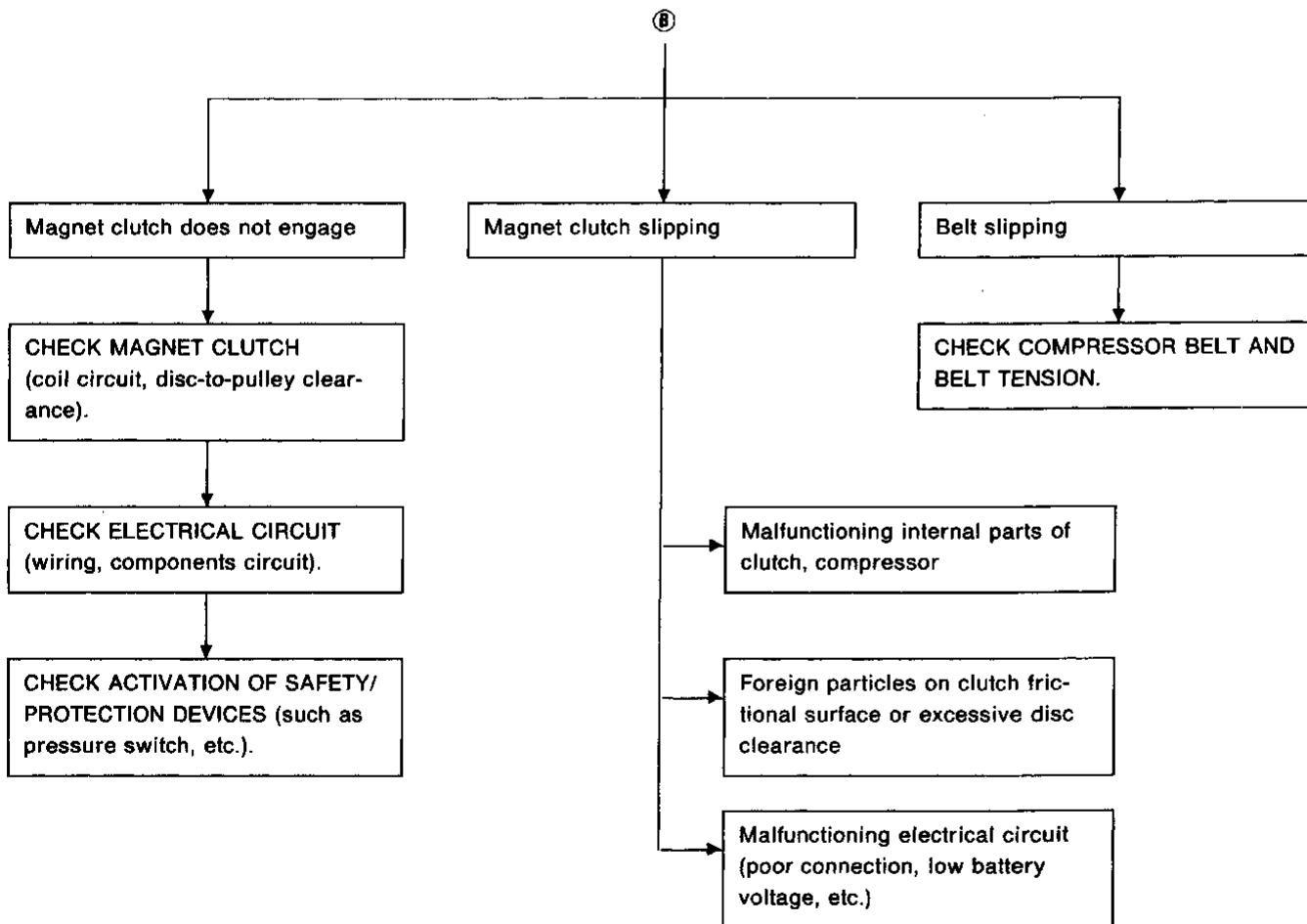
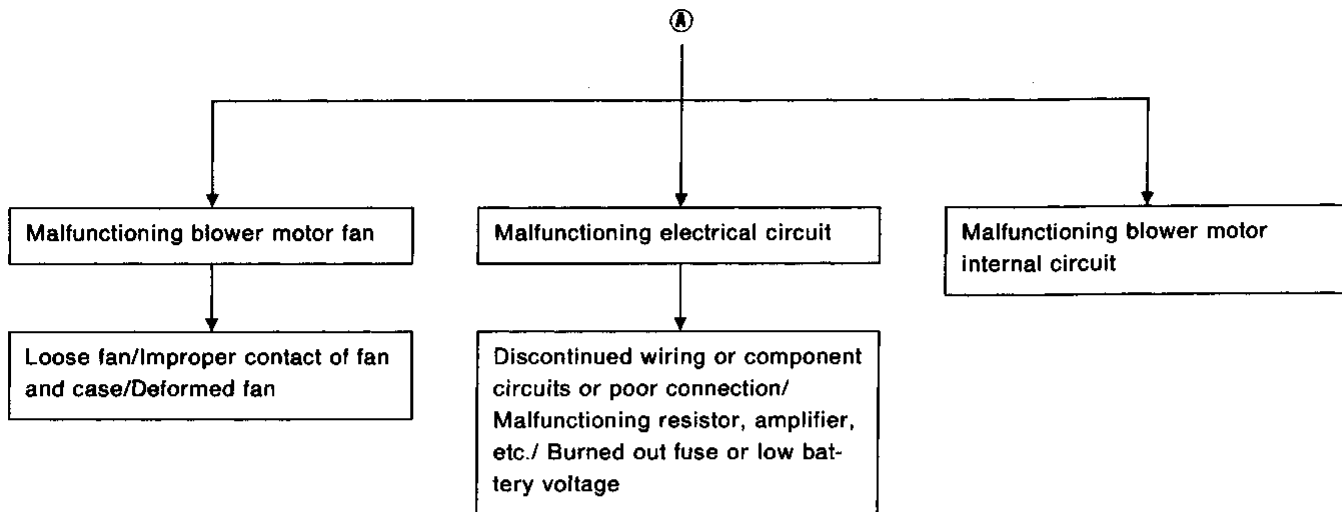
Performance Test Diagnoses
INSUFFICIENT COOLING



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Note: **A-F** correspond to those in TROUBLE DIAGNOSES FOR ABNORMAL PRESSURE. (Refer to HA-32.)

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

Hood: Open

TEMP. setting: Max. COLD

Discharge Air: Face Vent

RECIRC switch: (Recirculation) ON

FAN speed: 4-speed

A/C switch: ON

Engine speed: 1,500 rpm

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

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TEST READING

Recirculating-to-discharge air temperature table

Inside air (Recirculating air) at blower assembly inlet		Discharge air temperature at center ventilator °C (°F)
Relative humidity %	Air temperature °C (°F)	
50 - 60	20 (68)	1.5 - 2.6 (35 - 37)
	25 (77)	3.7 - 5.7 (39 - 42)
	30 (86)	7.6 - 10.0 (46 - 50)
	35 (95)	12.4 - 15.2 (54 - 59)
60 - 70	20 (68)	2.6 - 3.6 (37 - 38)
	25 (77)	5.7 - 7.6 (42 - 46)
	30 (86)	10.0 - 12.4 (50 - 54)
	35 (95)	15.2 - 18.0 (59 - 64)

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Ambient air temperature-to-compressor pressure table

Ambient air		High-pressure (Discharge side) kPa (kg/cm ² , psi)	Low-pressure (Suction side) kPa (kg/cm ² , psi)
Relative humidity %	Air temperature °C (°F)		
50 - 70	20 (68)	785 - 1,040 (8.0 - 10.6, 114 - 151)	137 - 167 (1.4 - 1.7, 20 - 24)
	25 (77)	981 - 1,304 (10.0 - 13.3, 142 - 189)	137 - 167 (1.4 - 1.7, 20 - 24)
	30 (86)	1,167 - 1,550 (11.9 - 15.8, 169 - 225)	147 - 177 (1.5 - 1.8, 21 - 26)
	35 (95)	1,373 - 1,804 (14.0 - 18.4, 199 - 262)	157 - 186 (1.6 - 1.9, 23 - 27)
	40 (104)	1,550 - 2,059 (15.8 - 21.0, 225 - 299)	167 - 206 (1.7 - 2.1, 24 - 30)

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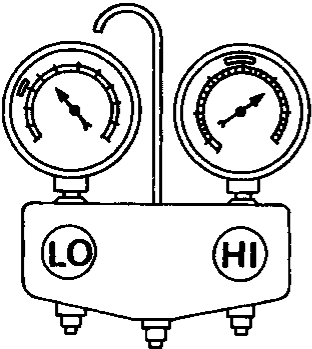
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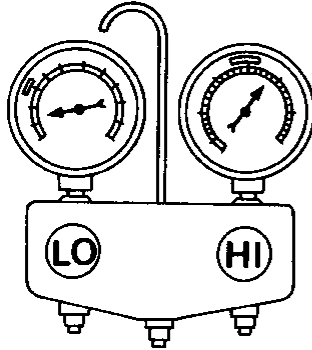
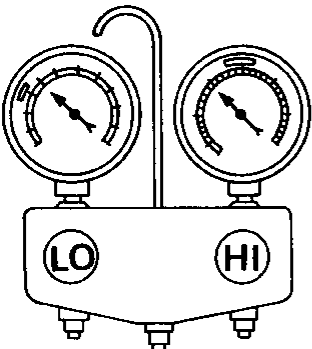
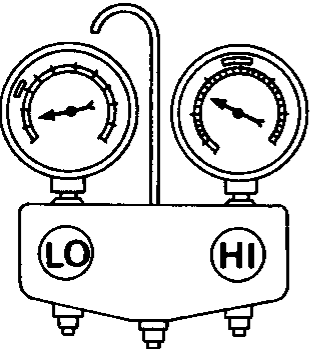
If pressure is not within range, refer to HA-32, "Trouble Diagnoses for Abnormal Pressure".

Trouble Diagnoses for Abnormal Pressure

Whenever system's high and/or low side pressure is abnormal, diagnose using a manifold gauge. The marker on top of the gauge scale (see illustrations below) indicates the standard (normal) pressure range for each side. Since the standard (normal) pressure, however, differs from vehicle to vehicle, refer to HA-31 ("Ambient air temperature-to-compressor pressure table").

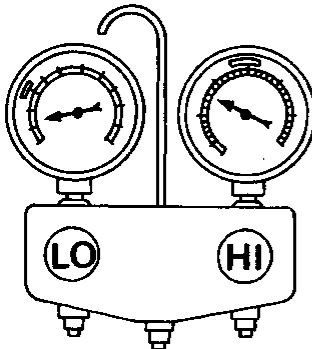
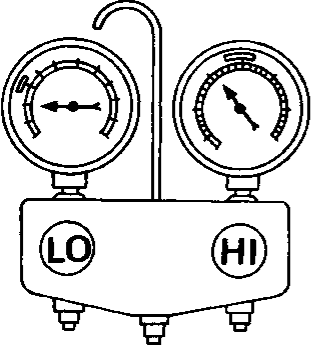
Gauge indication	Refrigerant cycle	Probable cause	Corrective action
<p>Both high and low-pressure sides are too high.</p> <p>A</p>  <p>AC359A</p>	<ul style="list-style-type: none"> ● Pressure is reduced soon after water is splashed on condenser. 	<p>Excessive refrigerant charge in refrigeration cycle</p>	<p>Reduce refrigerant until specified pressure is obtained.</p>
	<p>Air suction by cooling fan is insufficient.</p>	<p>Insufficient condenser cooling performance</p> <p>↓</p> <p>① Condenser fins are clogged.</p> <p>② Improper fan rotation of cooling fan</p>	<ul style="list-style-type: none"> ● Clean condenser. ● Check and repair cooling fan as necessary.
	<ul style="list-style-type: none"> ● Low-pressure pipe is not cold. ● When compressor is stopped high-pressure value quickly drops by approximately 196 kPa (2 kg/cm², 28 psi). It then decreases gradually thereafter. 	<p>Poor heat exchange in condenser (After compressor operation stops, high pressure decreases too slowly.)</p> <p>↓</p> <p>Air in refrigeration cycle</p>	<p>Evacuate repeatedly and recharge system.</p>
	<p>Engine tends to overheat.</p>	<p>Engine cooling systems malfunction.</p>	<p>Check and repair each engine cooling system.</p>
	<ul style="list-style-type: none"> ● Areas near low-pressure pipe connection and service valves are considerably cold compared with areas near expansion valve outlet or evaporator. ● Plates are sometimes covered with frost. 	<ul style="list-style-type: none"> ● Excessive liquid refrigerant on low-pressure side ● Excessive refrigerant discharge flow ● Expansion valve is open a little compared with the specification. <p>↓</p> <p>① Improper thermal valve installation</p> <p>② Improper expansion valve adjustment</p>	<p>Replace expansion valve.</p>

Trouble Diagnoses for Abnormal Pressure
(Cont'd)

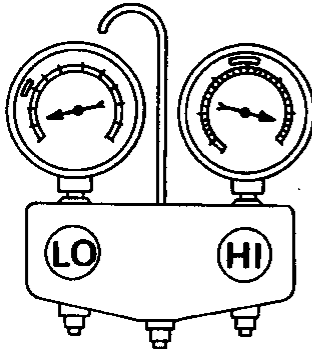
Gauge indication	Refrigerant cycle	Probable cause	Corrective action
<p>High-pressure side is too high and low-pressure side is too low. B</p>  <p>AC360A</p>	<p>Upper side of condenser and high-pressure side are hot, however, liquid tank is not so hot.</p>	<p>High-pressure tube or parts located between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

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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>D</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>Areas near low-pressure pipe connection and service valve are extremely cold as compared with areas near expansion valve outlet and evaporator.</p>	<p>Expansion valve closes a little compared with the specification.</p> <p style="text-align: center;">↓</p> <p>① Improper expansion valve adjustment ② Malfunctioning thermal valve ③ Outlet and inlet may be clogged.</p> <p>Low-pressure pipe is clogged or crushed.</p>	<ul style="list-style-type: none"> ● Remove foreign particles by using compressed air. ● Check lubricant for contamination. ● Check and repair malfunctioning parts. ● Check lubricant for contamination.
<p>Low-pressure side sometimes becomes negative.</p> <p>E</p>  <p>AC354A</p>	<ul style="list-style-type: none"> ● Air conditioning system does not function and does not cyclically cool the compartment air. ● The system constantly functions for a certain period of time after compressor is stopped and restarted. 	<p>Evaporator is frozen.</p> <p style="text-align: center;">↓</p> <p>Compressor discharge capacity does not change. (Compressor stroke is set at maximum length.)</p> <p>Refrigerant does not discharge cyclically.</p> <p style="text-align: center;">↓</p> <p>Moisture is frozen at expansion valve outlet and inlet.</p> <p style="text-align: center;">↓</p> <p>Water is mixed with refrigerant.</p>	<p>Replace compressor.</p> <ul style="list-style-type: none"> ● Drain water from refrigerant or replace refrigerant. ● Replace liquid tank.

Trouble Diagnoses for Abnormal Pressure
(Cont'd)

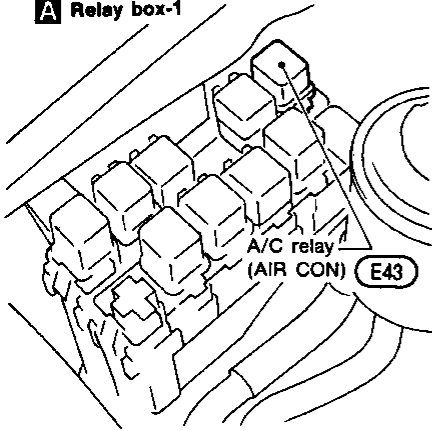
Gauge indication	Refrigerant cycle	Probable cause	Corrective action
<p>Low-pressure side becomes negative.</p> <p>F</p>  <p>AC362A</p>	<p>Liquid tank or front/rear side of expansion valve's pipe is frosted or dewed.</p>	<p>High-pressure side is closed and refrigerant does not flow.</p> <p style="text-align: center;">↓</p> <p>Expansion valve or liquid tank is frosted.</p>	<p>Leave the system at rest. Start it again to check whether or not the problem is caused by water or foreign particles.</p> <ul style="list-style-type: none"> ● If the problem is due to water, drain water from refrigerant or replace refrigerant. ● If due to foreign particles, remove expansion valve and remove the particles with dry and compressed air. ● If either of the above methods cannot correct the problem, replace expansion valve. ● Replace liquid tank. ● Check lubricant for contamination.

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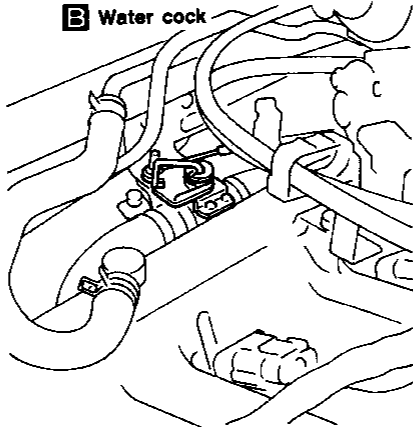
Harness Layout

Engine compartment

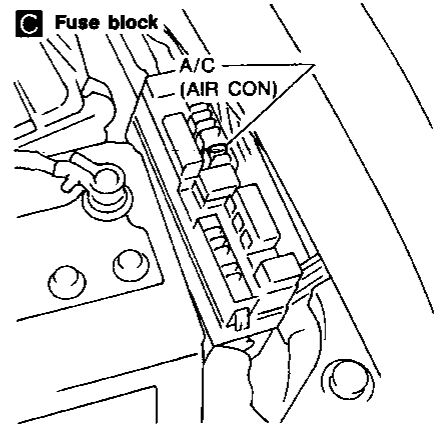
A Relay box-1



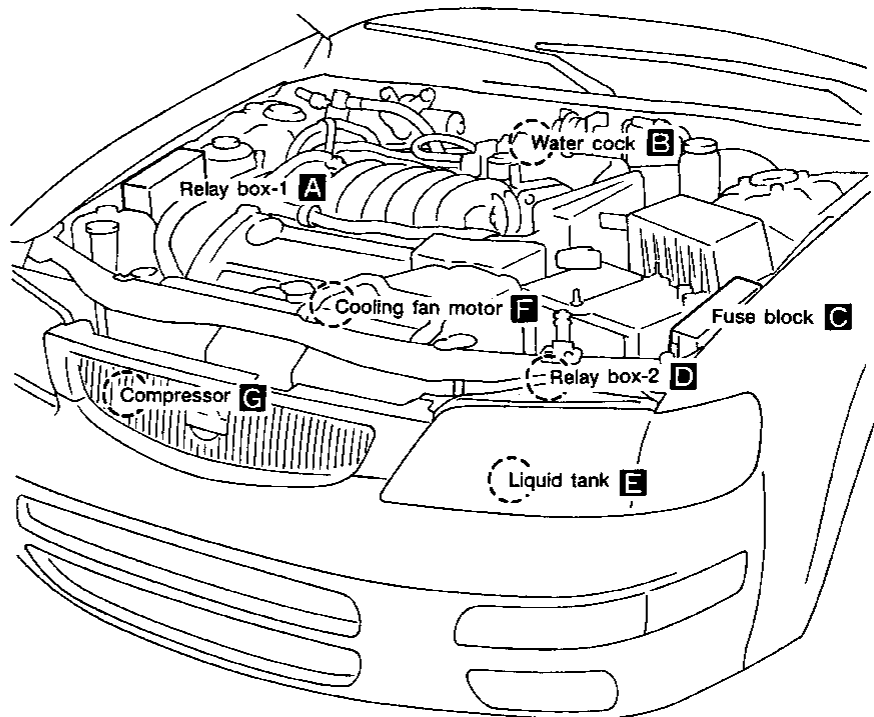
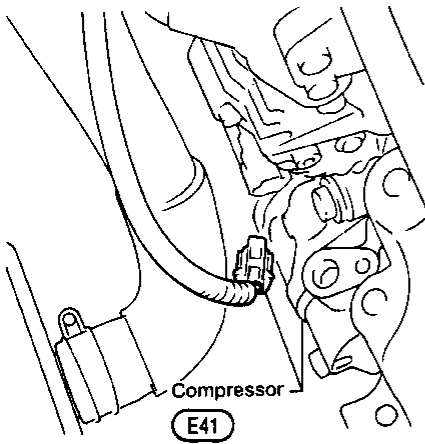
B Water cock



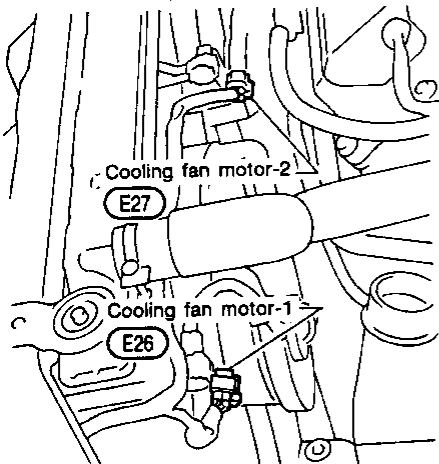
C Fuse block



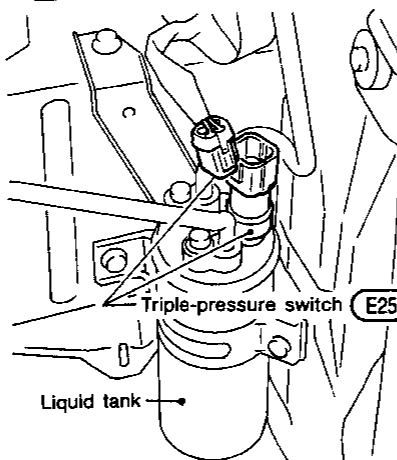
G Compressor



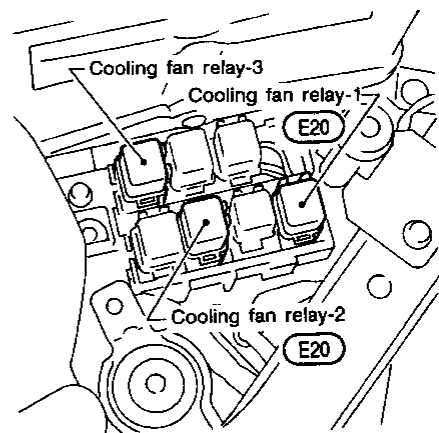
F Cooling fan motor



E Liquid tank



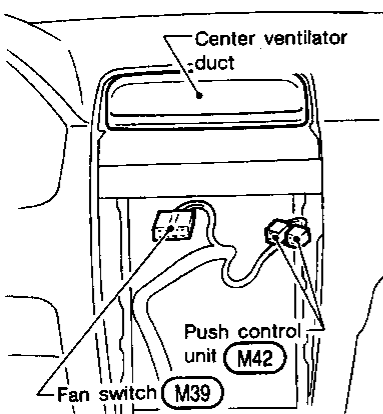
D Relay box-2



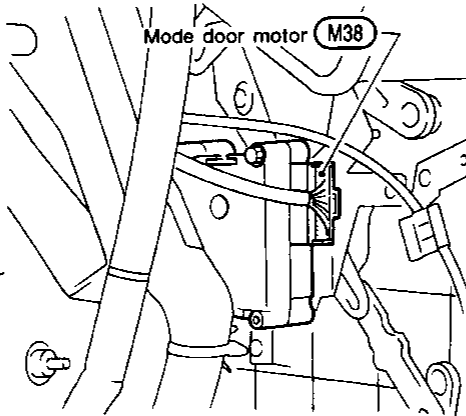
Harness Layout (Cont'd)

Passenger compartment

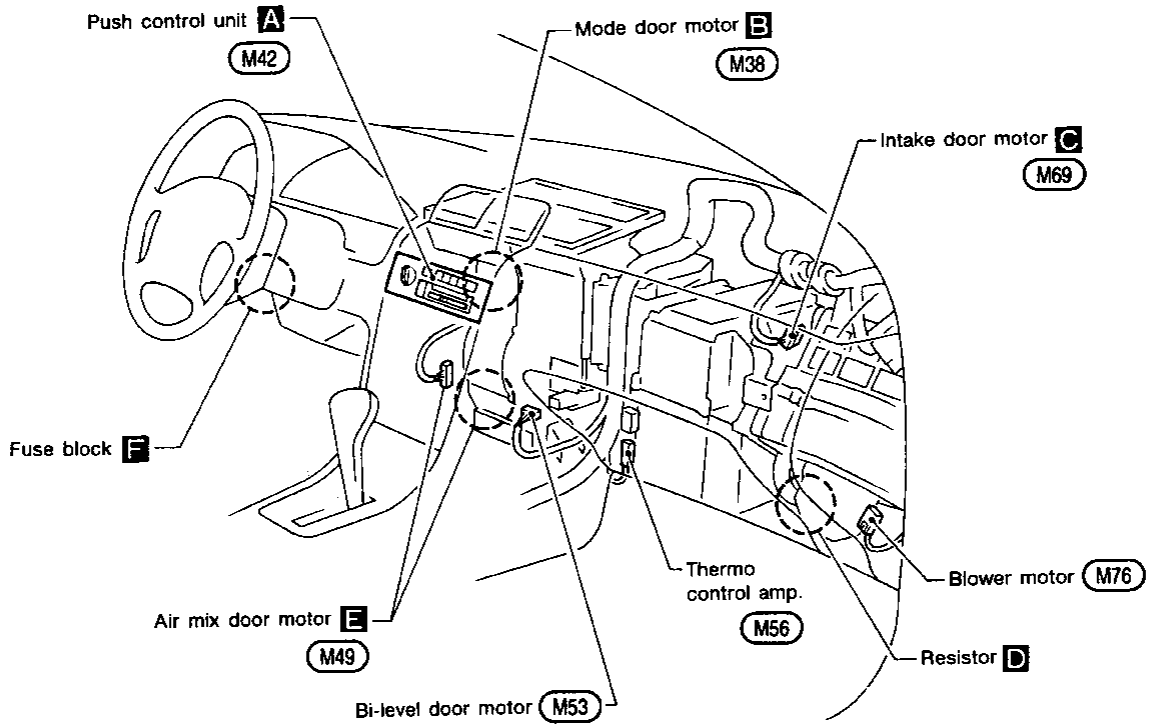
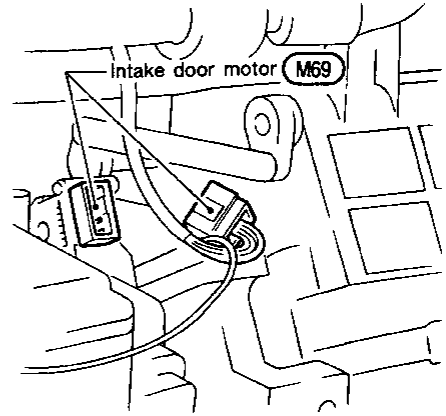
A Push control unit



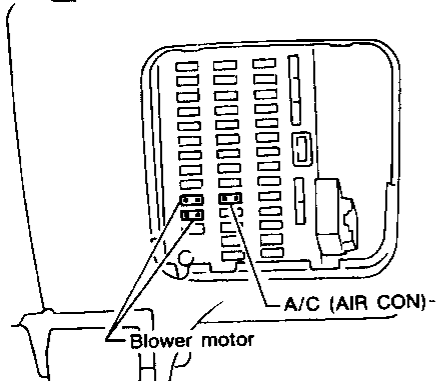
B Mode door motor



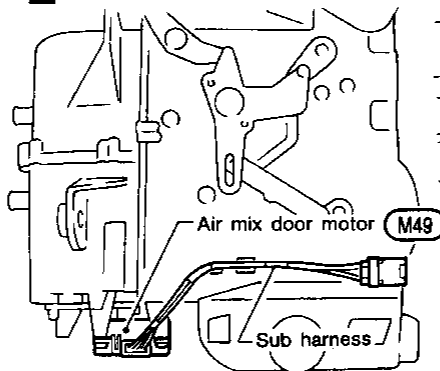
C Intake door motor



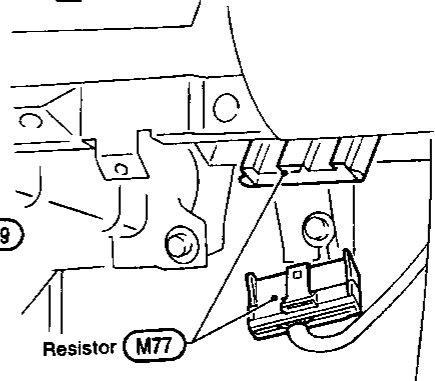
F Fuse block



E Air mix door motor

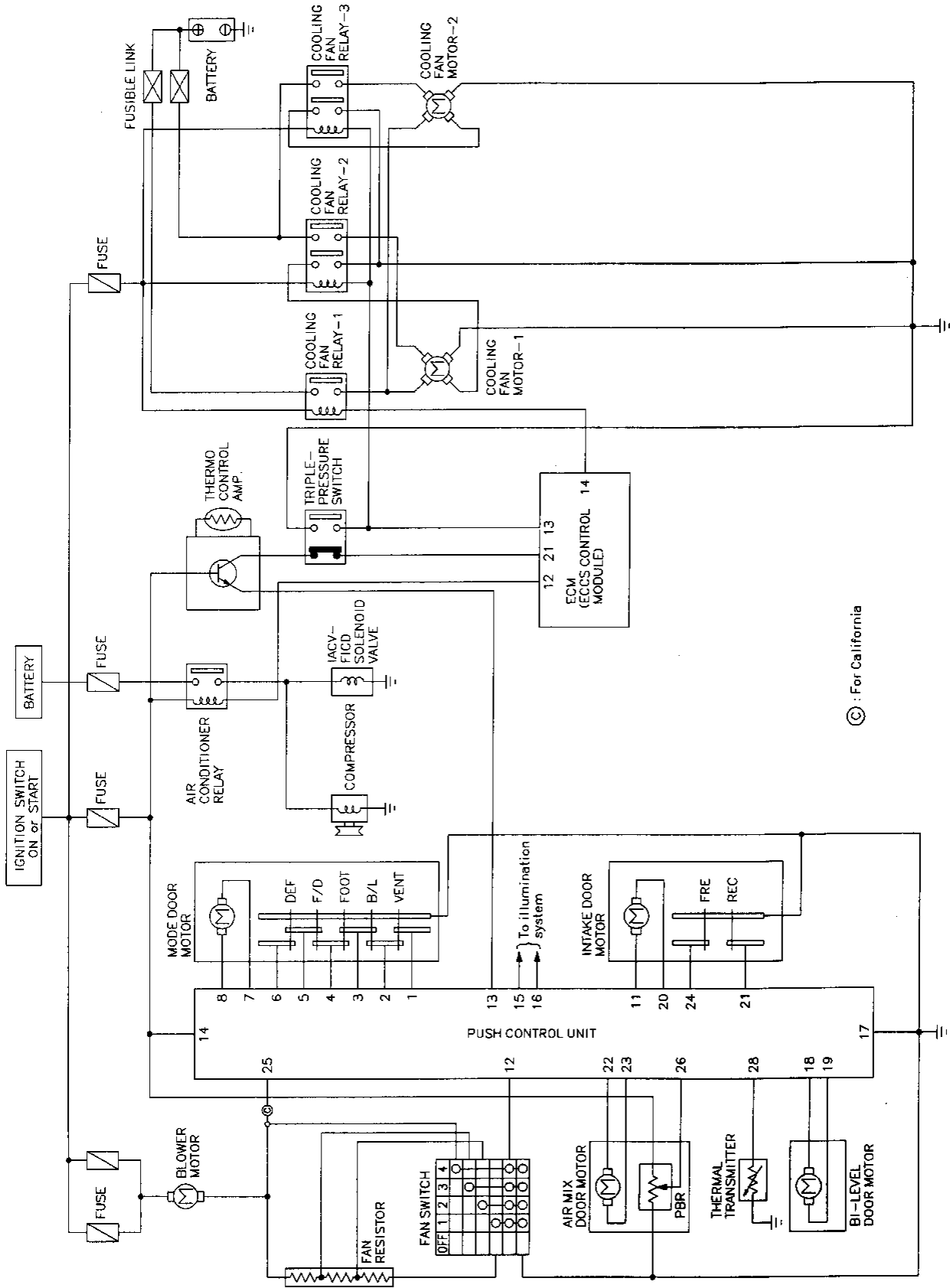


D Resistor



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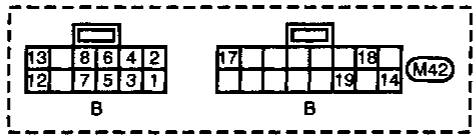
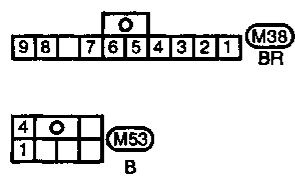
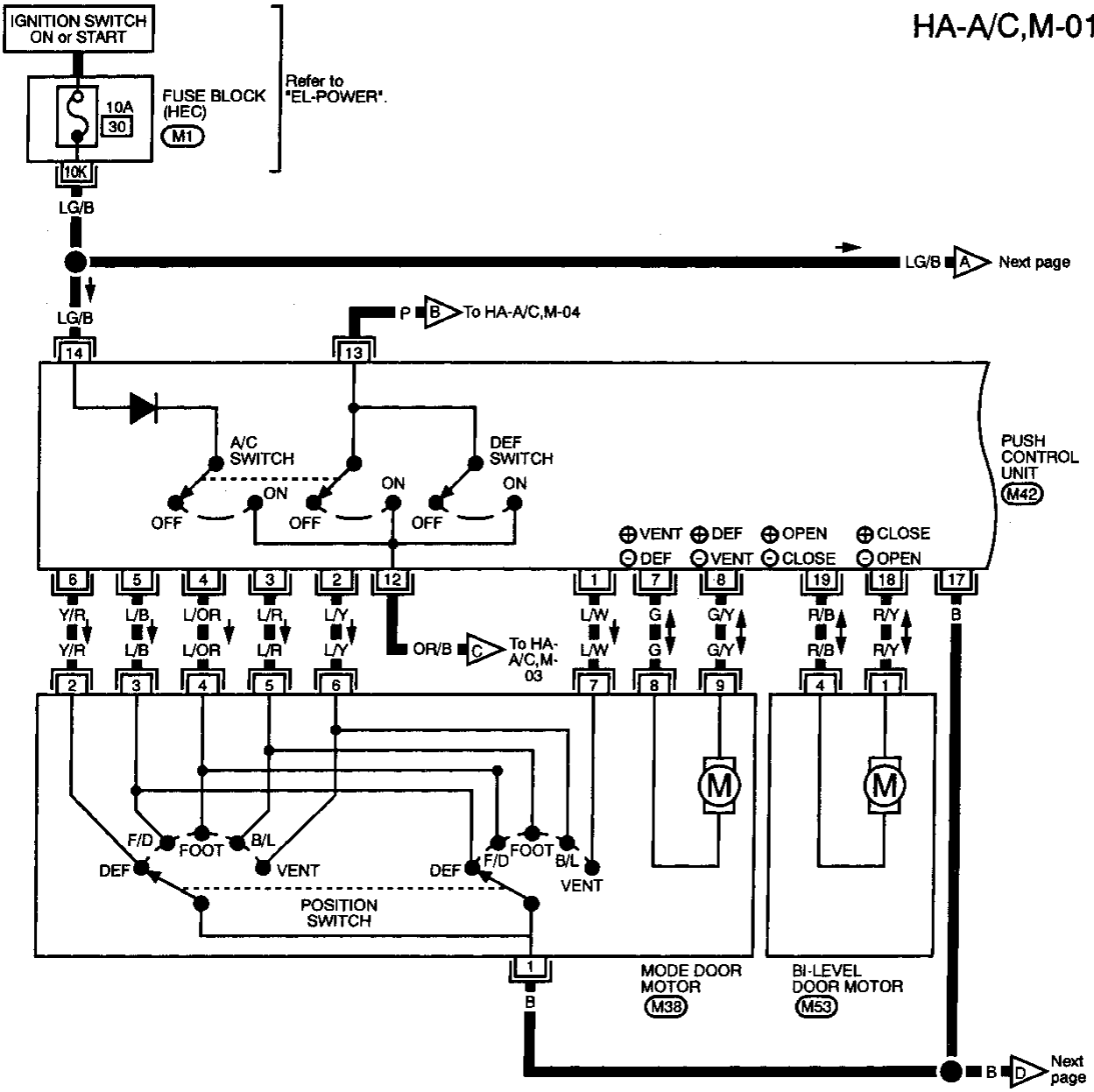
Circuit Diagram for Quick Pinpoint Check



© : For California

Wiring Diagram — A/C, M

HA-A/C,M-01



Refer to last page (Foldout page).

M1

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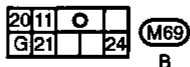
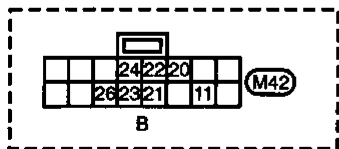
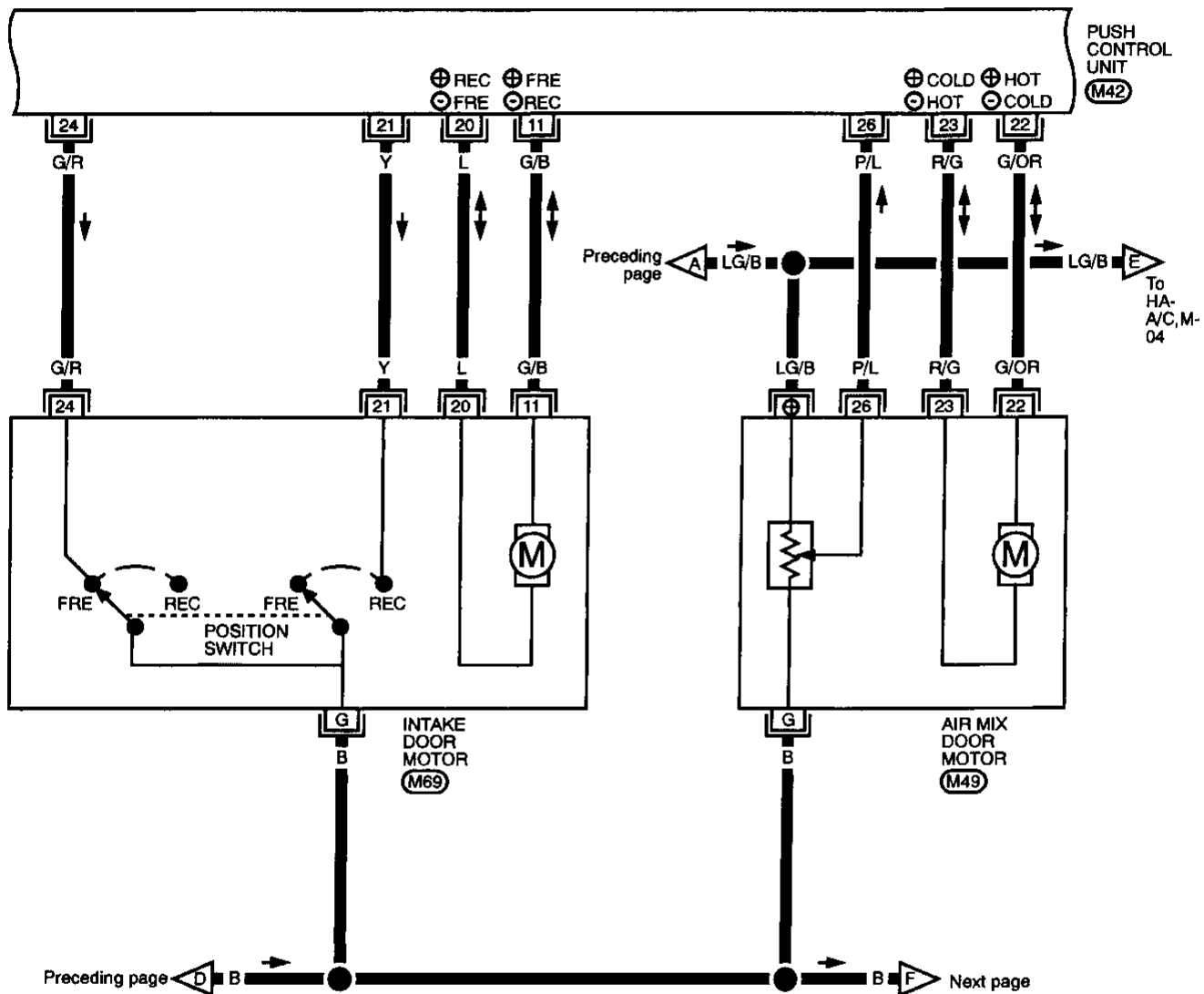
HA

EL

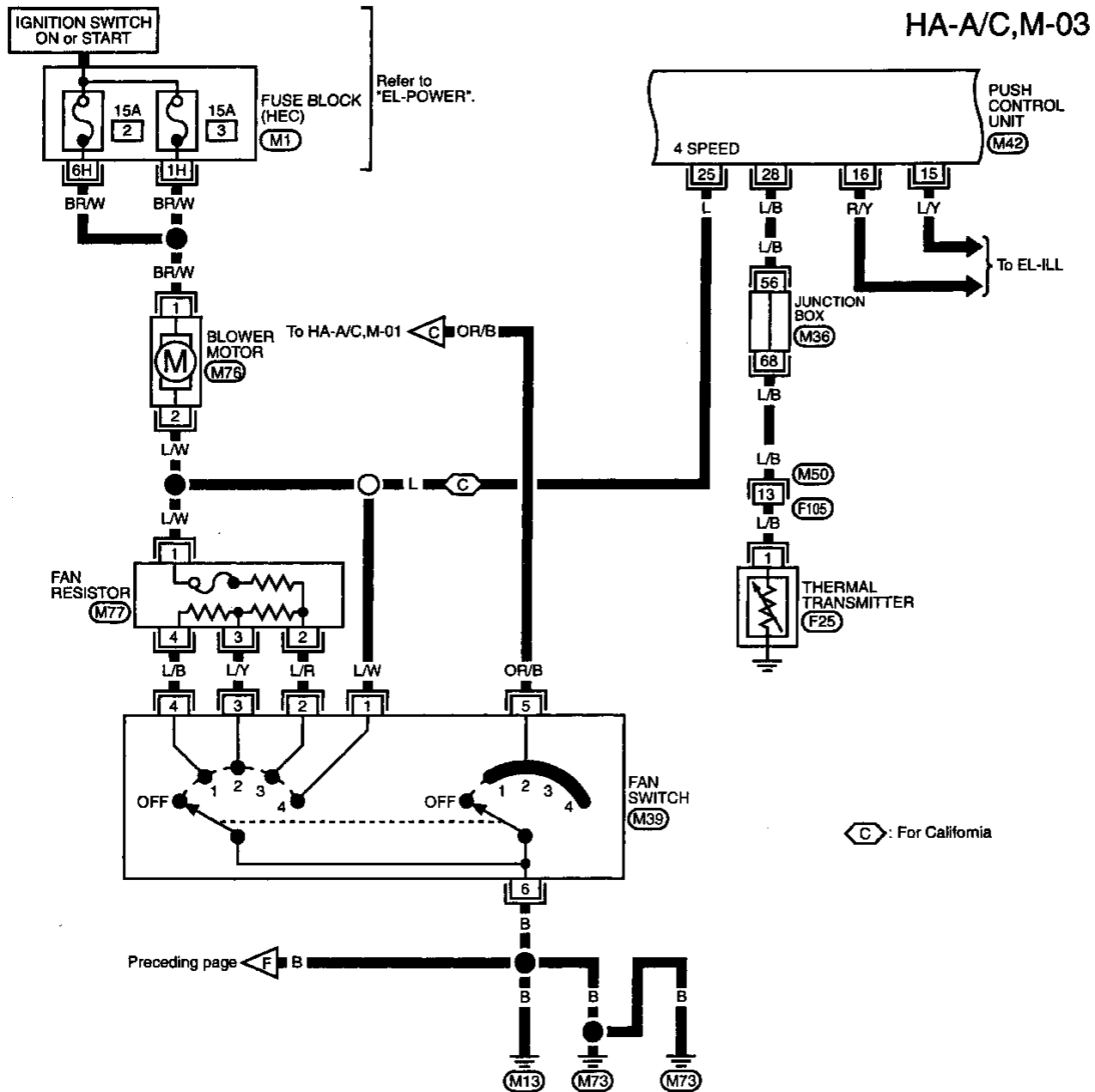
IDX

Wiring Diagram — A/C, M (Cont'd)

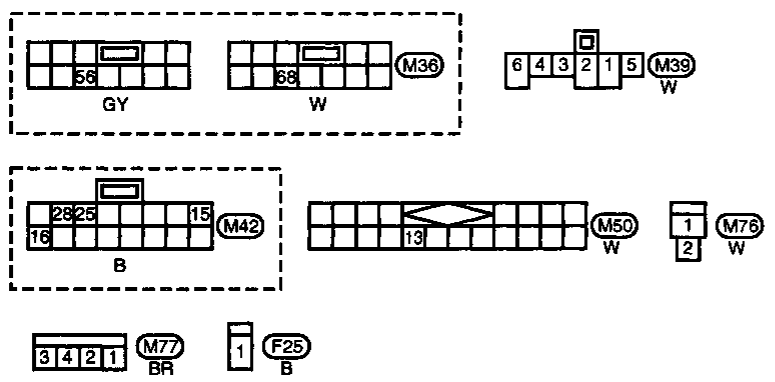
HA-A/C,M-02



Wiring Diagram — A/C, M (Cont'd)



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Refer to last page (Foldout page).

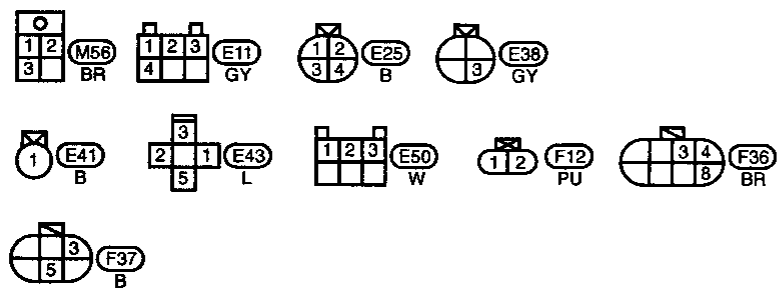
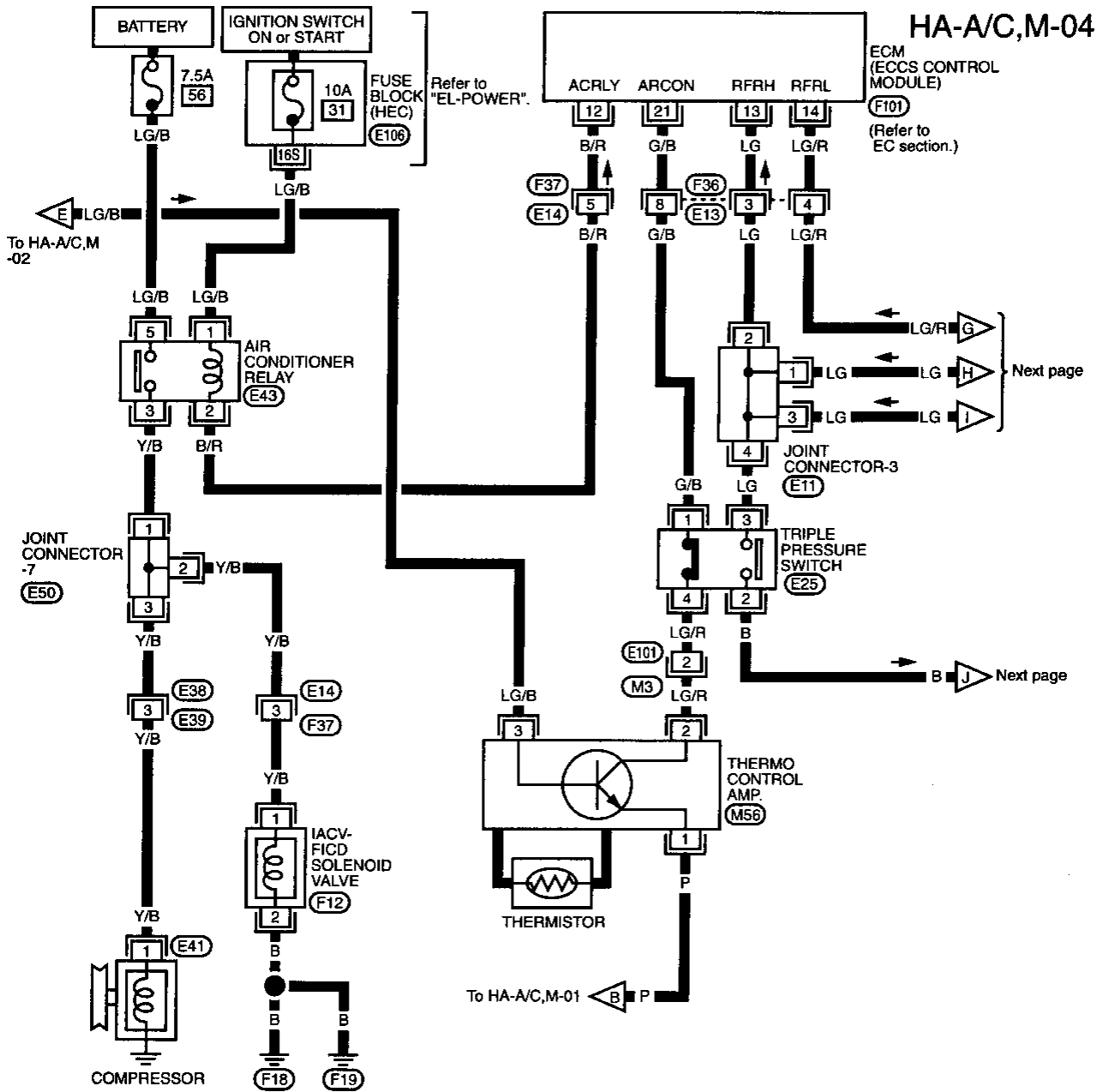
M1
M36

HA

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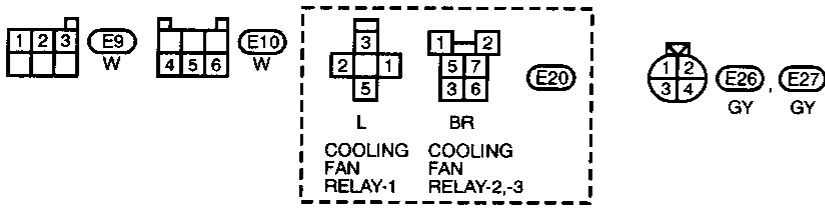
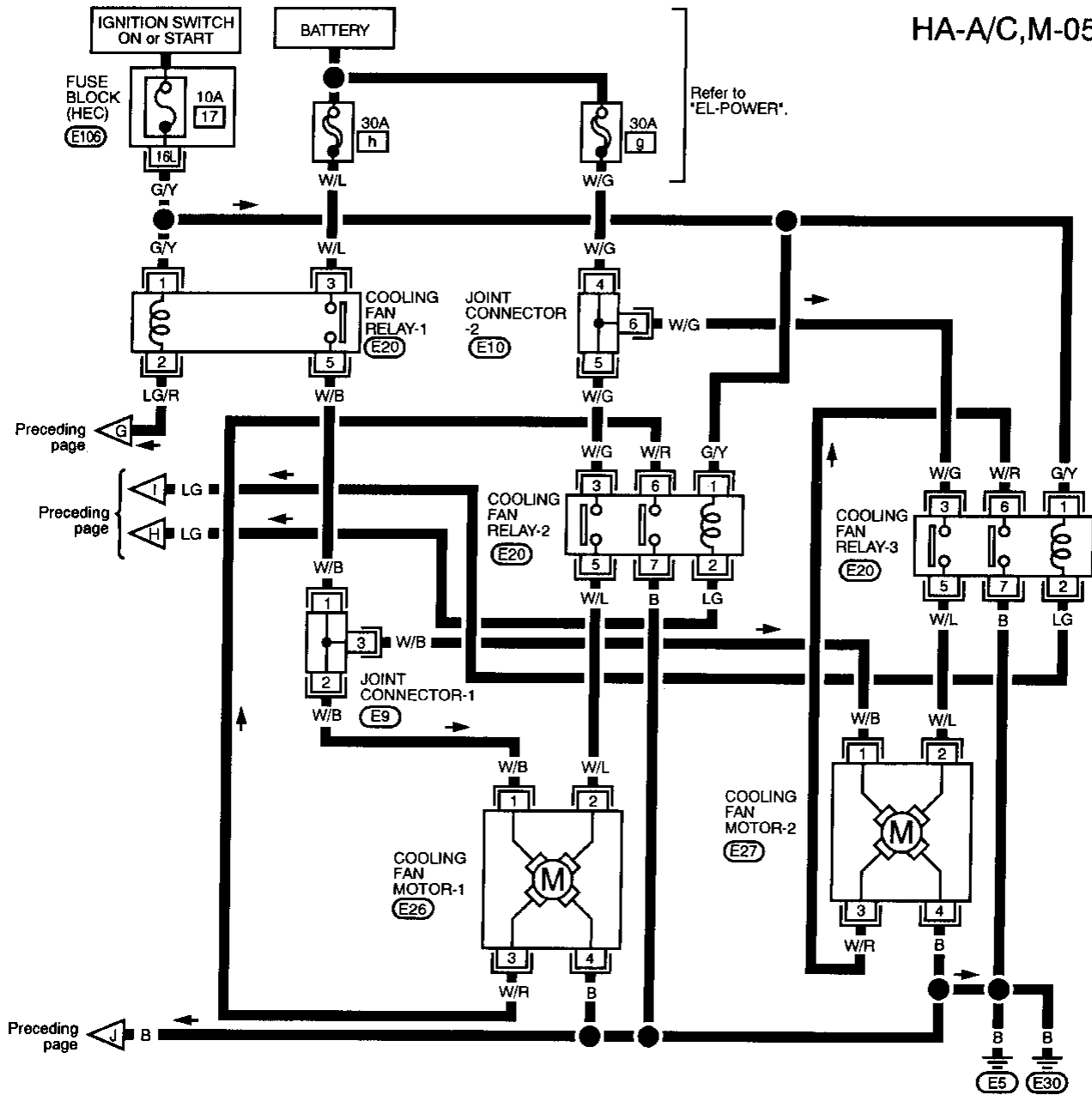
Wiring Diagram — A/C, M (Cont'd)



Refer to last page (Foldout page).
 M3, E101, E11, E50, F101

Wiring Diagram — A/C, M (Cont'd)

HA-A/C,M-05



Refer to last page (Foldout page).
E9
E10

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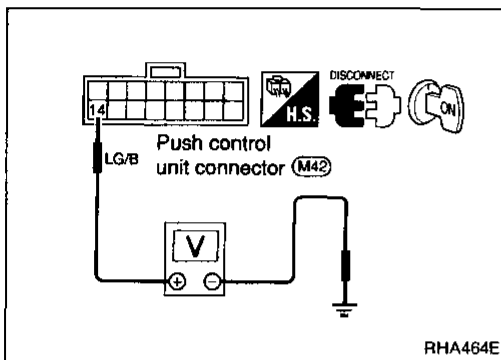
EL
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Main Power Supply and Ground Circuit Check

POWER SUPPLY CIRCUIT CHECK

Check power supply circuit for air conditioning system.

Refer to EL section ("Wiring Diagram", "POWER SUPPLY ROUTING").

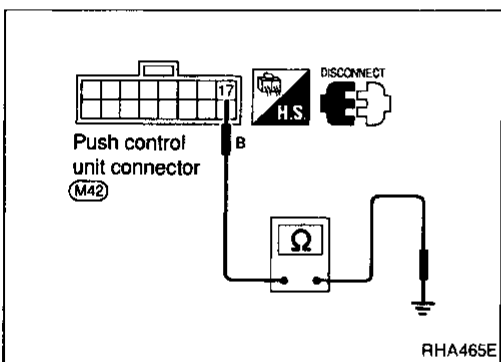


PUSH CONTROL UNIT CHECK

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 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 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

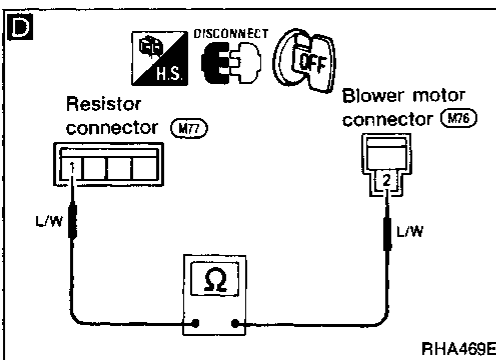
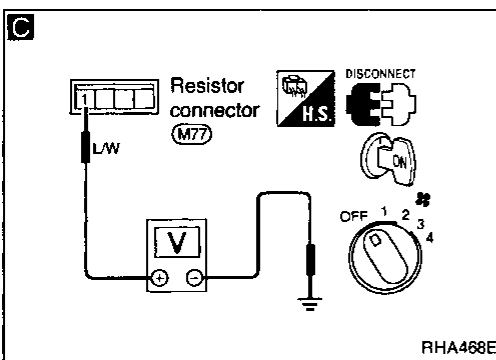
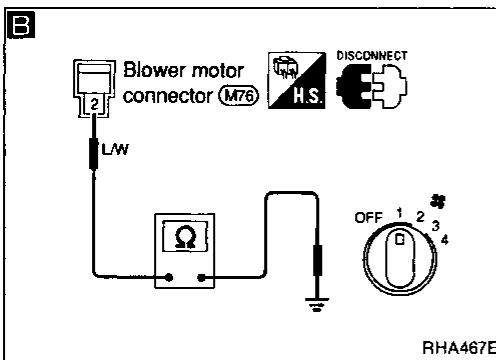
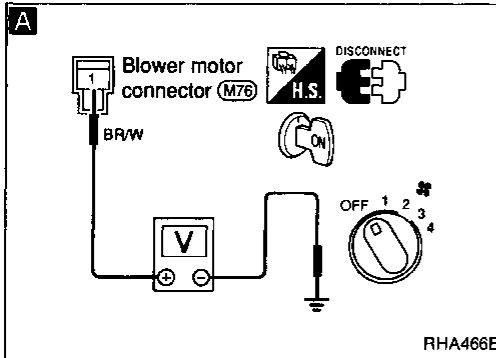
Diagnostic Procedure 1

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
CHECK POWER SUPPLY FOR BLOWER MOTOR.
Disconnect blower motor harness connector.
Do approx. 12 volts exist between blower motor harness terminal ① and body ground?

B
Check circuit continuity between blower motor harness terminal ② and body ground.

CHECK BLOWER MOTOR.
(Refer to HA-56.)

Replace blower motor.

Disconnect blower motor and resistor harness connectors.

D Note
Check circuit continuity between blower motor harness terminal ② and resistor harness terminal ①.

No
Check 15A fuses at fuse block.
Refer to EL section ("Wiring Diagram", "POWER SUPPLY ROUTING").

NG
Reconnect blower motor harness connector.

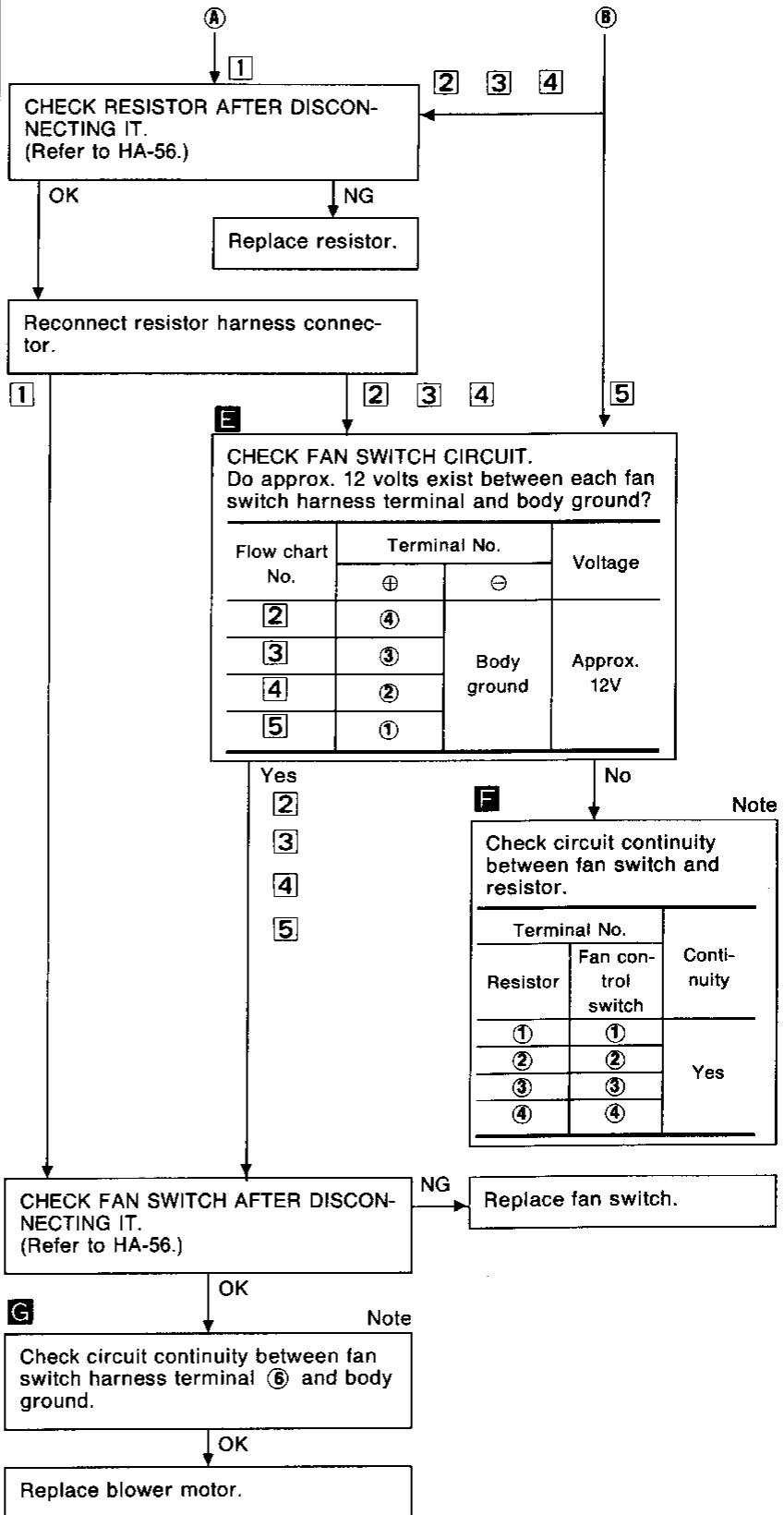
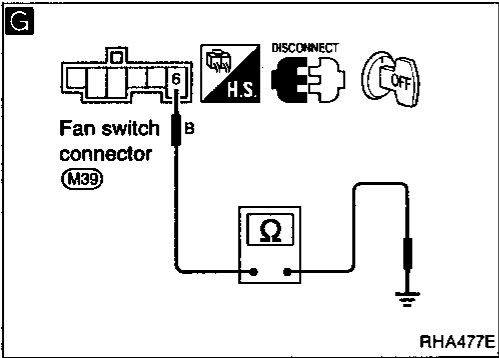
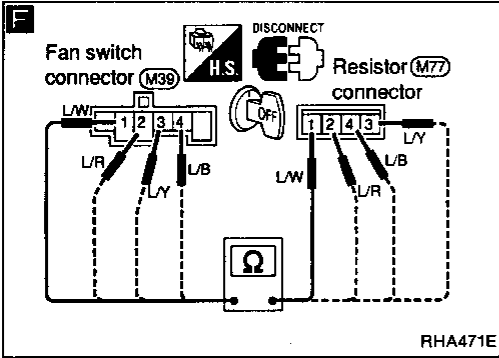
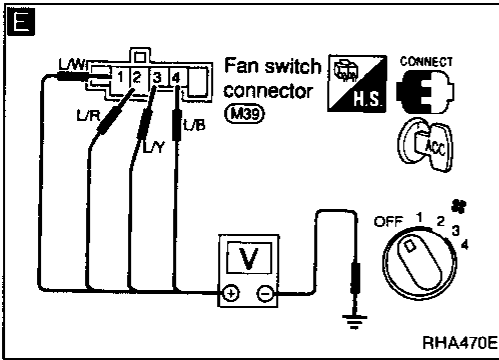
C
CHECK BLOWER MOTOR CIRCUIT BETWEEN BLOWER MOTOR AND RESISTOR.
Do approx. 12 volts exist between resistor harness terminal ① and body ground?

Yes
A
(Go to next page.)

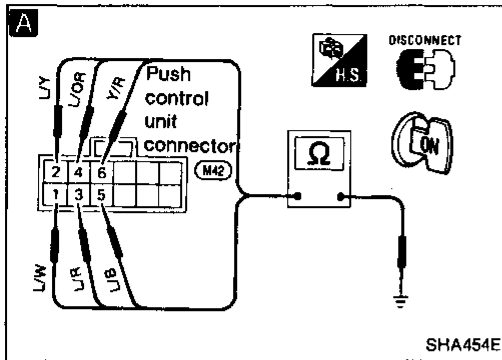
Note:
If the result is NG after checking circuit continuity, repair harness or connector.

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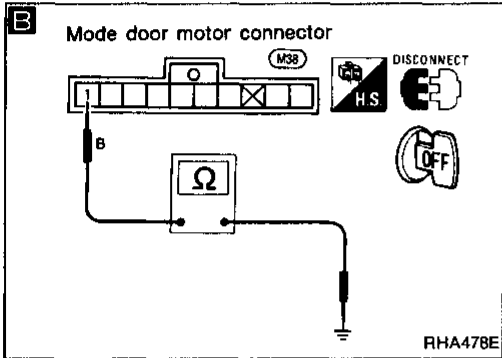
Diagnostic Procedure 1 (Cont'd)



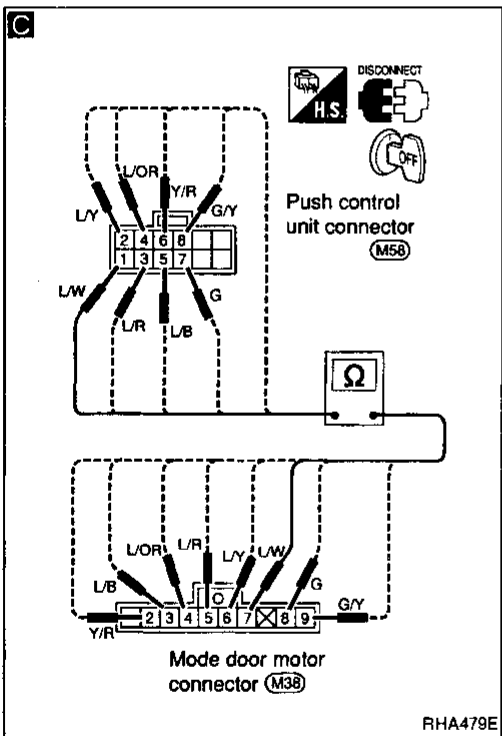
Note:
If the result is NG after checking circuit continuity, repair harness or connector.



SHA454E



RHA478E



RHA479E

Diagnostic Procedure 2

SYMPTOM: Air outlet does not change.

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

A

CHECK MODE DOOR MOTOR POSITION SWITCH.

1. Turn VENT switch ON with ignition switch at ON position.
2. Turn ignition switch OFF.
Disconnect push control unit connector.
3. Turn ignition switch ON.
Check continuity between terminal ① or ② of push control unit harness connector and body ground.
4. 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		

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 ① and body ground?

OK →

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	⑦	
②	⑥	
③	⑤	
④	④	
⑤	③	
⑥	②	
⑦	⑧	
⑧	⑨	

OK →

A
(Go to next page.)

OK →

CHECK SIDE LINK.
Refer to HA-58.

Note:

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

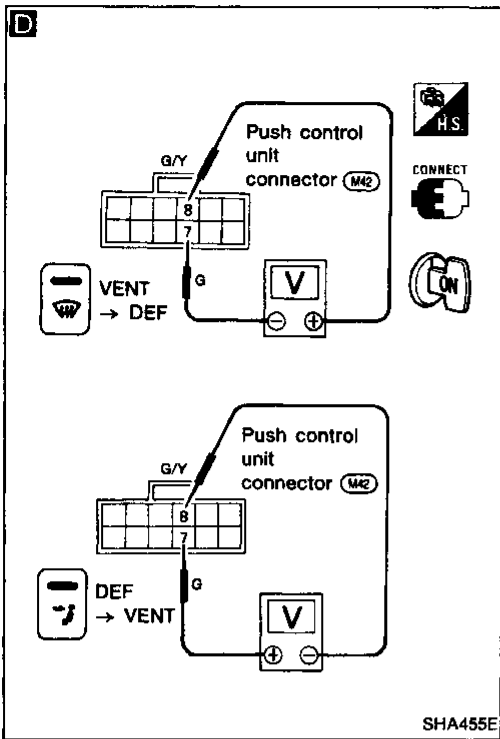
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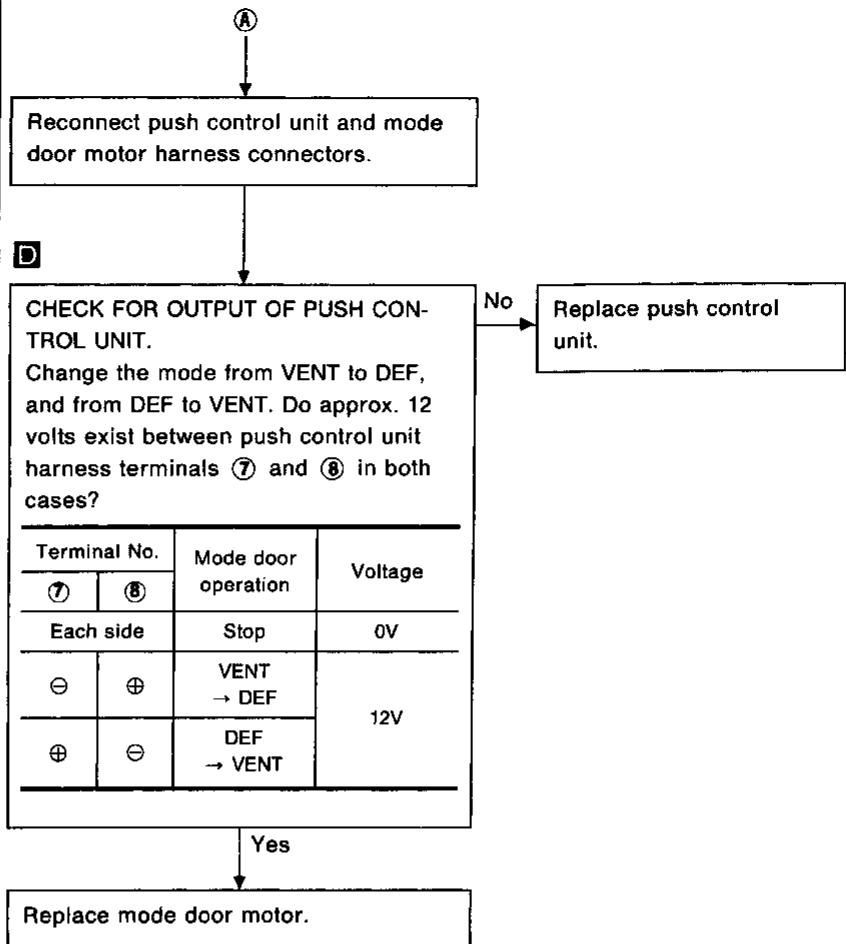
EL

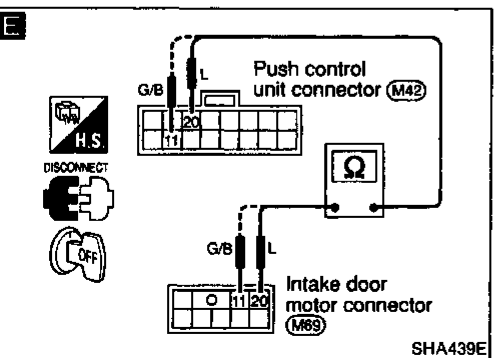
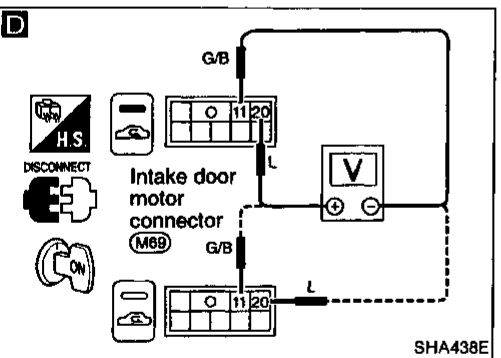
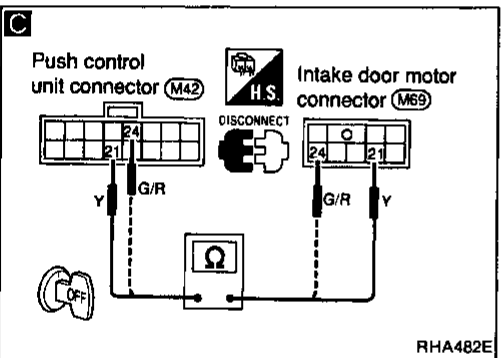
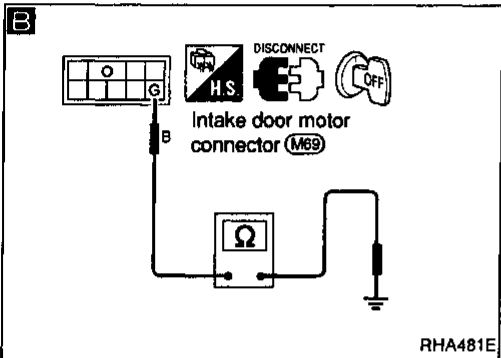
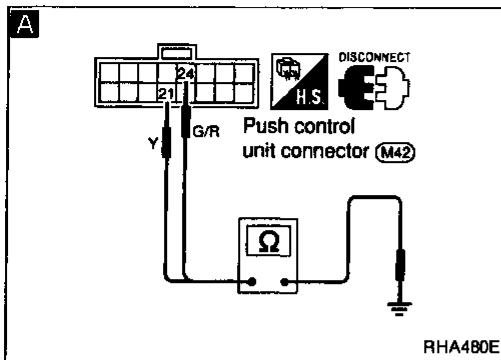
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Diagnostic Procedure 2 (Cont'd)



SHA455E





Diagnostic Procedure 3

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

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

A

CHECK INTAKE DOOR MOTOR POSITION SWITCH.

1. Turn REC switch ON with ignition switch at ON position.
2. Turn ignition switch OFF. Disconnect push control unit connector.
3. Check if continuity exists between terminal ① of push control unit harness connector and body ground.
4. Using above procedures, check for REC switch OFF position as indicated in chart.

REC switch	Terminal No.		Continuity
	⊕	⊖	
ON	①	Body ground	Yes
OFF	②	Body ground	Yes

B Note

CHECK BODY GROUND CIRCUIT FOR INTAKE DOOR MOTOR. Does continuity exist between intake door motor harness terminal ③ and body ground?

OK

C Note

Check circuit continuity between push control unit harness terminal ② and intake door motor harness terminal ① (②).

OK

D

CHECK FOR OUTPUT OF PUSH CONTROL UNIT. Check voltage between intake door motor harness terminals ⑩ and ⑪, for conditions below.

REC switch	Terminal No.		Voltage
	⊕	⊖	
ON	⑩	⑪	12V
OFF	⑪	⑩	

OK

E Note

Check continuity between push control unit harness terminal ⑩ (⑪) and intake door motor harness terminal ⑩ (⑪).

OK

Replace push control unit.

NG

Disconnect intake door motor harness connector.

Reconnect push control unit and intake door motor harness connector.

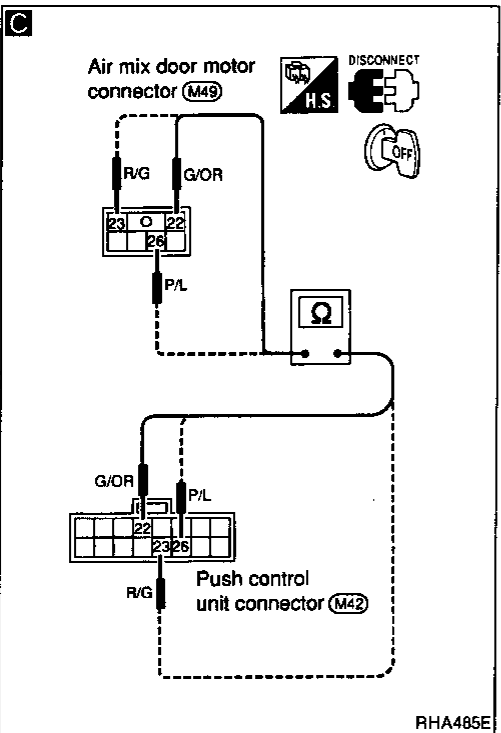
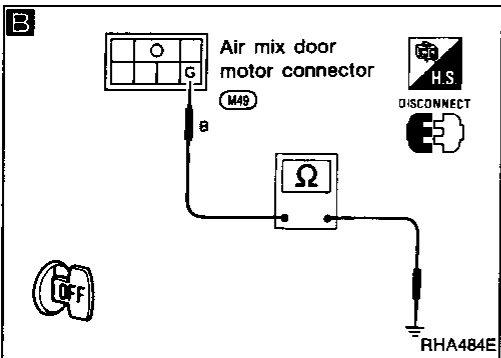
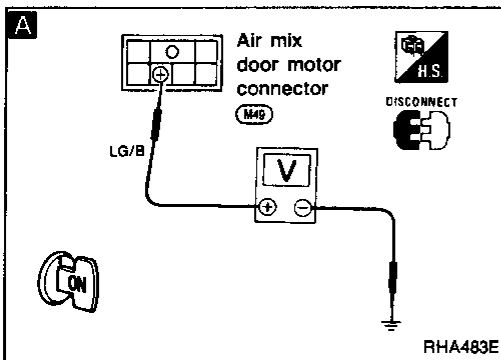
Replace intake door motor.

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 Main Power Supply and Ground Circuit Check before referring to the following chart.

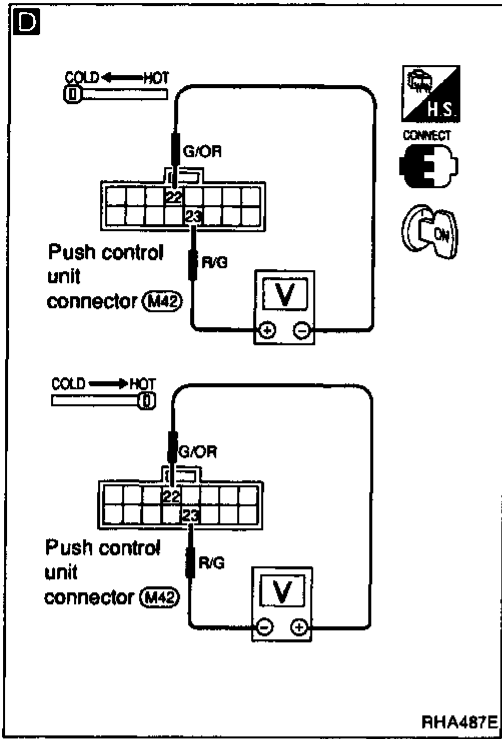


```

    graph TD
      A["A  
CHECK POWER SUPPLY FOR AIR MIX DOOR MOTOR.  
Disconnect air mix door motor harness connector.  
Do approx. 12V exist between air mix door motor harness terminal ⊕ and body ground?"]
      B["B  
Check circuit continuity between air mix door motor harness terminal No. ⊕ and body ground."]
      C["C  
Check circuit continuity between each terminal on push control unit and air mix door motor."]
      D["Reconnect push control unit and air mix door motor harness connector."]
      E["(Go to next page.)"]
      
      A -- No --> F["CHECK POWER SUPPLY CIRCUIT AND 10A FUSE AT FUSE BLOCK.  
Refer to EL section ('Wiring Diagram', 'POWER SUPPLY ROUTING')."]
      A -- Yes --> B
      B -- OK --> G["Disconnect push control unit harness connector."]
      G --> C
      C -- OK --> D
      D --> E
  
```

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 22 and 23 in both cases?

Terminal No.		Temp. control lever operation	Voltage
22	23		
⊖	⊕	HOT → COLD	Approx. 12V
⊕	⊖	COLD → HOT	
Each side		STOP	Approx. 0V

No → Replace push control unit.

Yes →

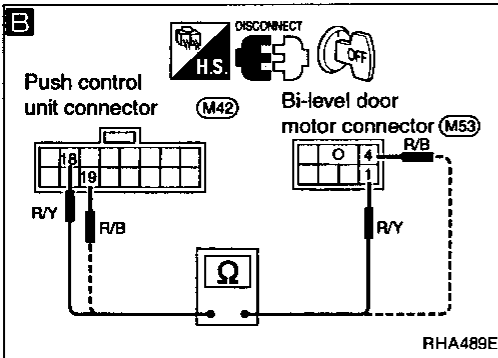
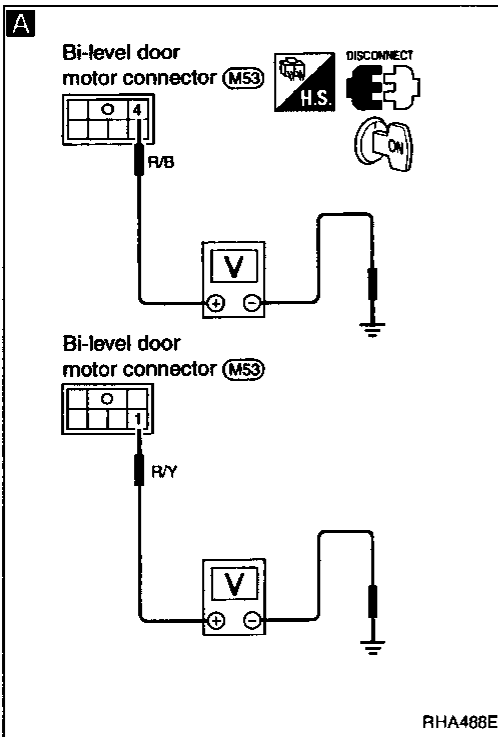
CHECK FOR PBR RESISTANCE IN AIR MIX DOOR MOTOR.
(Refer to HA-58.)

Yes → Replace air mix door motor.

No →

CHECK AIR MIX DOOR.
(Refer to HA-58.)

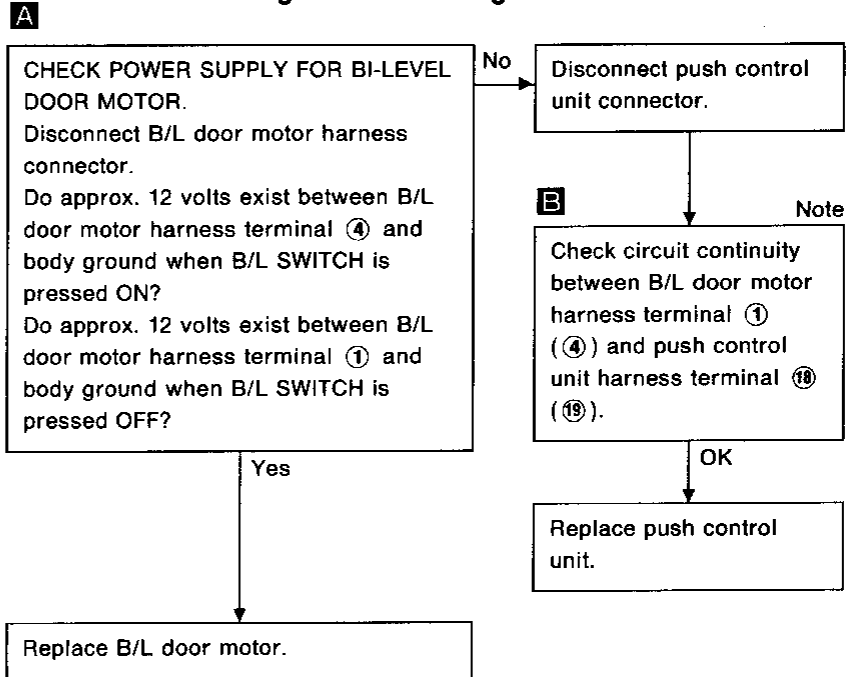
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Diagnostic Procedure 5

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

- Perform Main Power Supply and Ground Circuit Check before referring to the following chart.



Note:

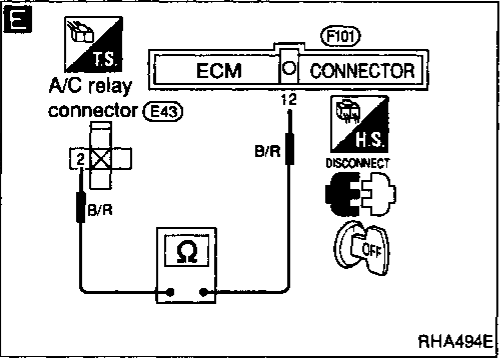
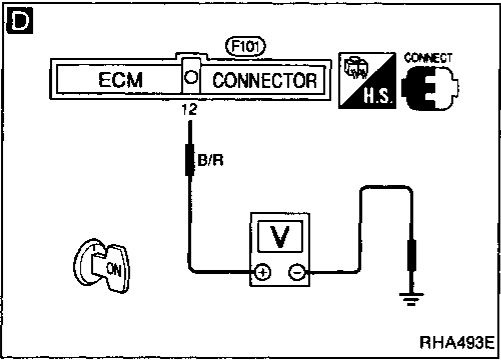
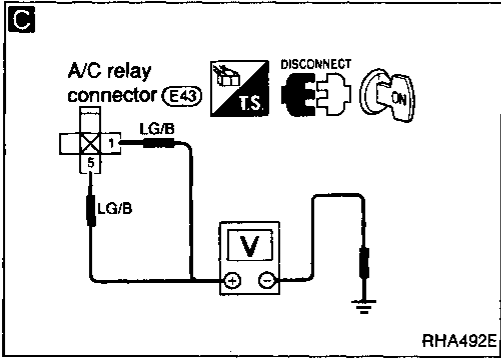
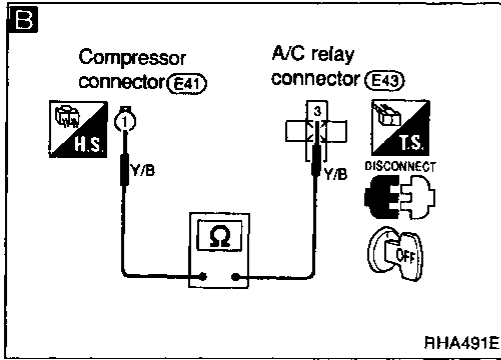
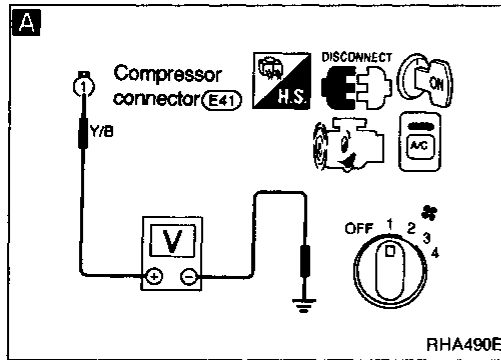
If the result is NG after checking circuit continuity, repair harness or connector.

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Diagnostic Procedure 6

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

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



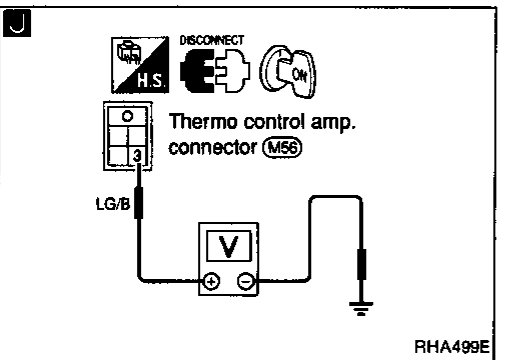
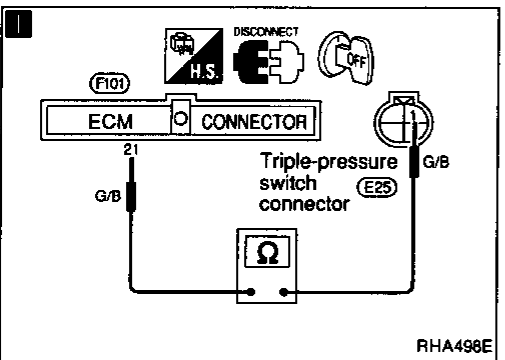
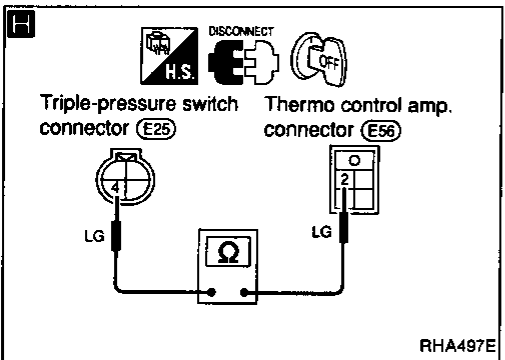
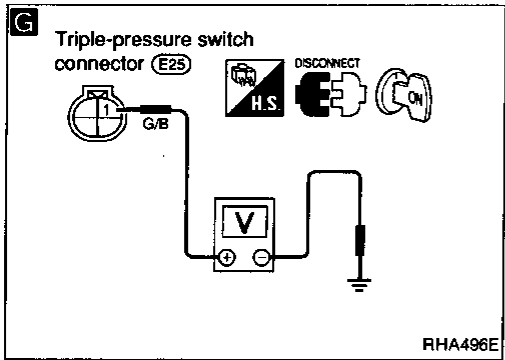
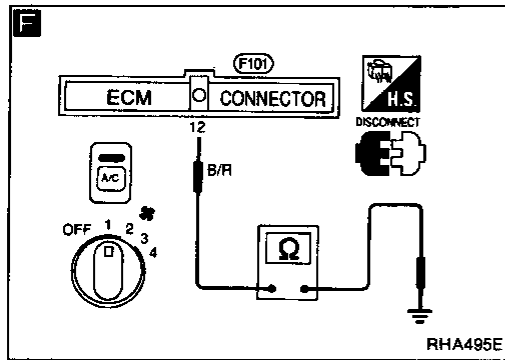
```

    graph TD
      A["A  
CHECK POWER SUPPLY FOR COMPRESSOR.  
Disconnect compressor harness connector.  
Do approx. 12 volts exist between compressor harness terminal ① and body ground?"]
      B["B  
Check magnet clutch coil continuity."]
      C["C  
CHECK POWER SUPPLY FOR A/C RELAY.  
Do approx. 12 volts exist between A/C relay harness terminals ①, ⑤ and body ground?"]
      D["D  
CHECK COIL SIDE CIRCUIT OF A/C RELAY.  
Do approx. 12 volts exist between ECM (ECCS control module) harness terminal ⑫ and body ground?  
[For terminal arrangement, refer to last page (Foldout page).]"]
      E["E  
Check circuit continuity between A/C relay harness terminal ② and ECM (ECCS control module) harness terminal ⑫.  
[For terminal arrangement, refer to last page (Foldout page).]"]
      A1["Disconnect A/C relay harness connector."]
      A2["Check magnet clutch coil continuity."]
      A3["Replace magnet clutch assembly.  
Refer to HA-134."]
      A4["CHECK A/C RELAY.  
(Refer to HA-57.)"]
      A5["CHECK POWER SUPPLY CIRCUIT AND 10A FUSE AT FUSE BLOCK.  
Refer to EL section ('Wiring Diagram', 'POWER SUPPLY ROUTING')."]
      A6["Reconnect A/C relay."]
      A7["Replace A/C relay."]
      A8["(Go to next page.)"]

      A -- No --> A1
      A -- Yes --> A2
      A1 --> B
      B -- OK --> A3
      B -- NG --> C
      C -- Yes --> A4
      C -- No --> A5
      A4 -- OK --> A6
      A4 -- NG --> A5
      A5 --> A7
      A6 --> D
      D -- No --> E
      D -- Yes --> A8
      E --> A8
  
```

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

Diagnostic Procedure 6 (Cont'd)



F

Disconnect ECM (ECCS control module) harness connector.
Does continuity exist between ECM (ECCS control module) harness terminal ⑫ and body ground?
[For terminal arrangement, refer to last page (Foldout page).]

Yes

CHECK ECM (ECCS control module).
Refer to EC section ("ECM Terminals and Reference Value", "TROUBLE DIAGNOSES — General Description").

No

Reconnect ECM (ECCS control module) harness connector.

G

CHECK TRIPLE-PRESSURE SWITCH CIRCUIT BETWEEN TRIPLE-PRESSURE SWITCH AND ECM (ECCS control module).
Disconnect triple-pressure switch harness connector.
Do approx. 8 to 9 volts exist between triple-pressure switch harness terminal ① and body ground?

OK

CHECK TRIPLE-PRESSURE SWITCH.
(Refer to HA-57.)

OK

Disconnect thermo control amp. harness connector.

Note

CHECK POWER SUPPLY FOR THERMO CONTROL AMP.
Disconnect thermo control amp. harness connector.
Do approx. 12 volts exist between thermo control amp. harness terminal ③ and body ground?

OK

ⓐ
(Go to next page.)

NG

Check circuit continuity between ECM (ECCS control module) harness terminal ⑫ and triple-pressure switch harness terminal ①. [For terminal arrangement, refer to last page (Foldout page).]

OK

Replace ECM (ECCS control module).

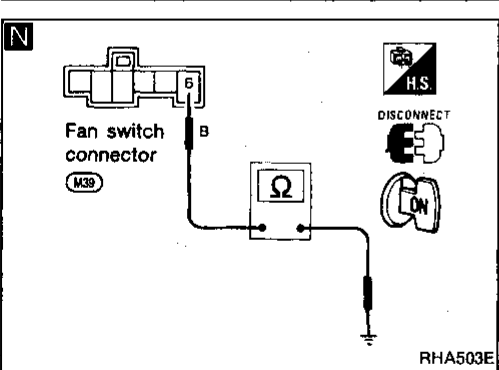
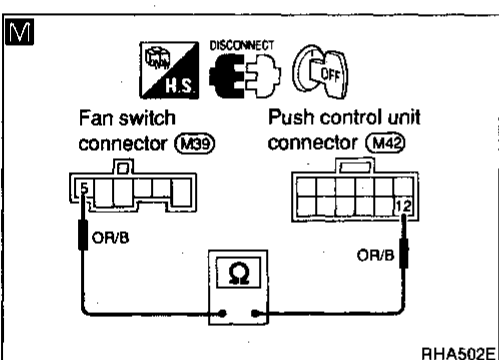
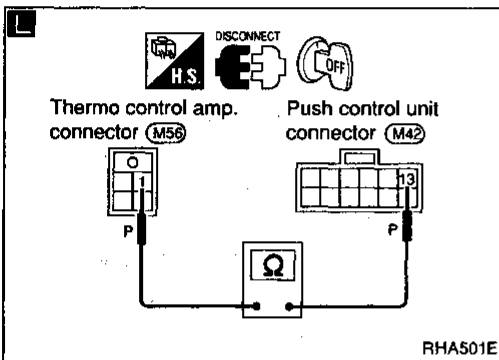
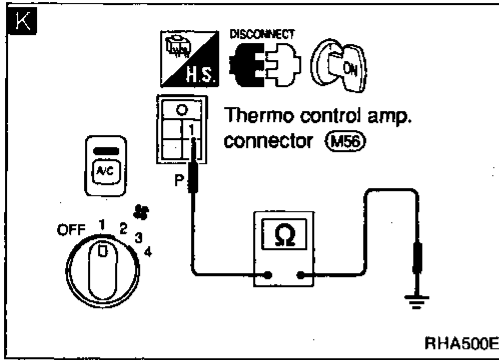
NG

Replace triple-pressure switch.

NG

Check 10A fuses at fuse block.
Refer to EL section ("Wiring Diagram", "POWER SUPPLY ROUTING").

Diagnostic Procedure 6 (Cont'd)

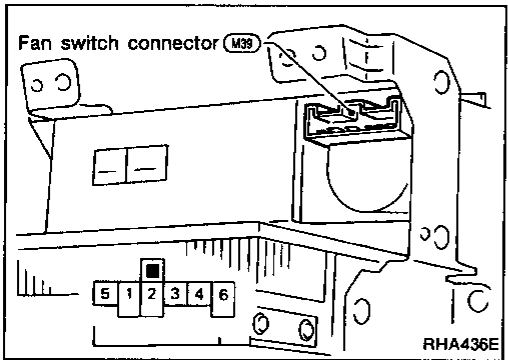


```

    graph TD
        Start((6)) --> K{CHECK BODY GROUND CIRCUIT FOR THERMO CONTROL AMP.  
Does continuity exist between thermo control amp. harness terminal ① and body ground?}
        K -- NG --> NG1[Disconnect A/C switch harness connector.]
        K -- OK --> OK1[Replace thermo control amp.]
        NG1 --> L{Check circuit continuity between thermo control amp. harness terminal ① and push control unit harness terminal ⑬.}
        L -- Note --> L
        L -- OK --> K2{CHECK PUSH CONTROL UNIT.  
(Refer to HA-56.)}
        L -- NG --> NG2[Replace push control unit.]
        K2 -- OK --> NG3[Disconnect fan switch harness connector.]
        K2 -- NG --> NG2
        NG3 --> M{Check circuit continuity between push control unit harness terminal ⑫ and fan switch harness terminal ⑤.}
        M -- Note --> M
        M -- OK --> N{CHECK BODY GROUND CIRCUIT FOR FAN SWITCH.  
Does continuity exist between fan switch harness terminal ⑥ and body ground?}
        M -- NG --> NG4[Replace fan switch.]
        N -- OK --> K3{CHECK FAN SWITCH.  
(Refer to HA-56.)}
        N -- NG --> NG4
        K3 -- OK --> End(( ))
        K3 -- NG --> NG4
    
```

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

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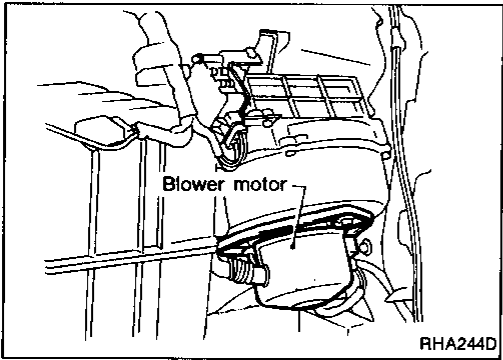


Electrical Components Inspection

FAN SWITCH

Check continuity between terminals at each position.

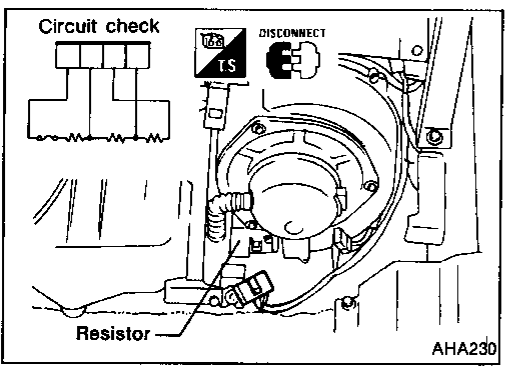
POSITION	TERMINAL					
	1	2	3	4	5	6
OFF						
1				○	○	○
2			○		○	○
3		○			○	○
4	○				○	○



BLOWER MOTOR

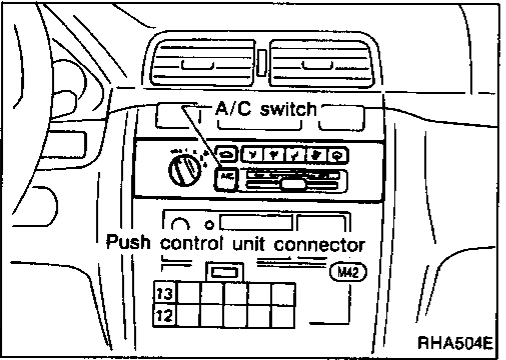
Check blower motor for smooth rotation.

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



BLOWER RESISTOR

Check continuity between terminals.

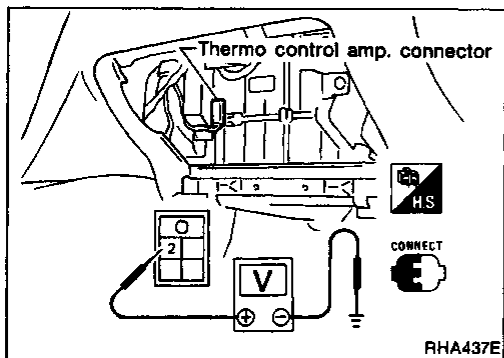


A/C SWITCH (Push control unit)

Check continuity between terminals.

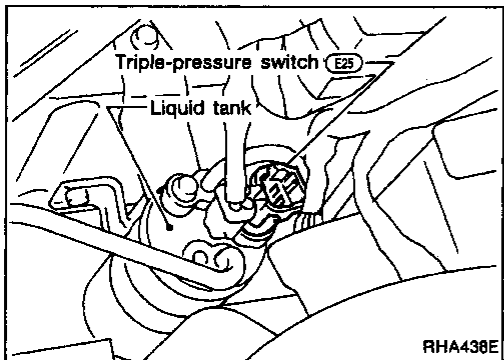
Electrical Components Inspection (Cont'd)

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.

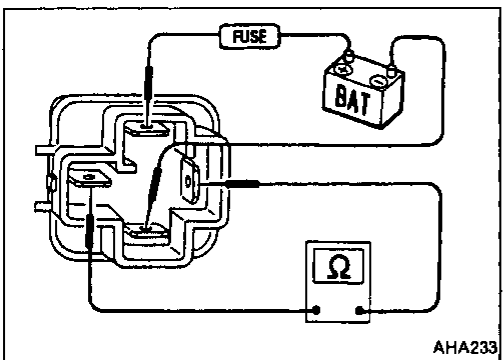
Evaporator outlet air temperature °C (°F)	Thermo amp. operation	Tester
Decreasing to 0.5 - 1.5 (33 - 35)	Turn OFF	Approx. 12V
Increasing to 1.5 - 3.5 (35 - 38)	Turn ON	Approx. 0V



TRIPLE-PRESSURE SWITCH

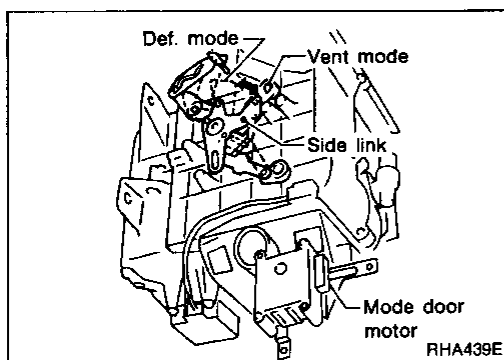
	Terminals	High-pressure side line pressure kPa (kg/cm ² , psi)	Operation	Continuity
Low-pres- sure side	① - ④	Increasing to 157 - 226 (1.6 - 2.3, 23 - 33)	ON	Exists.
		Decreasing to 152.0 - 201.0 (1.55 - 2.05, 22.0 - 29.2)	OFF	Does not exist.
Medium- pressure side*	② - ③	Increasing to 1,422 - 1,618 (14.5 - 16.5, 206 - 235)	ON	Exists.
		Decreasing to 1,128 - 1,422 (11.5 - 14.5, 164 - 206)	OFF	Does not exist.
High-pres- sure side	① - ④	Increasing to 1,667 - 2,059 (17 - 21, 242 - 299)	ON	Exists.
		Decreasing to 2,452 - 2,844 (25 - 29, 356 - 412)	OFF	Does not exist.

* For cooling fan motor operation.



A/C RELAY

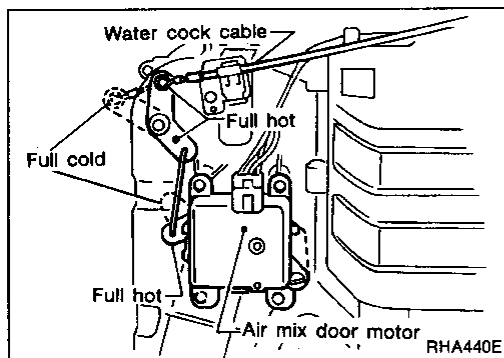
Check circuit continuity between terminals by supplying 12 volts to coil side terminals of the relay.



Control Linkage Adjustment

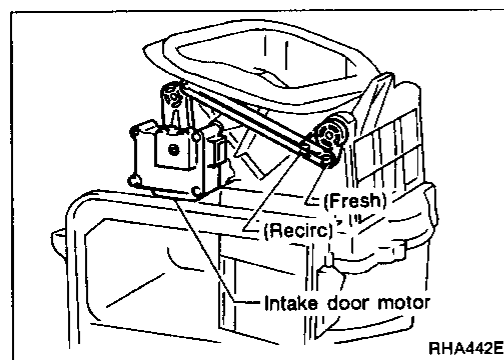
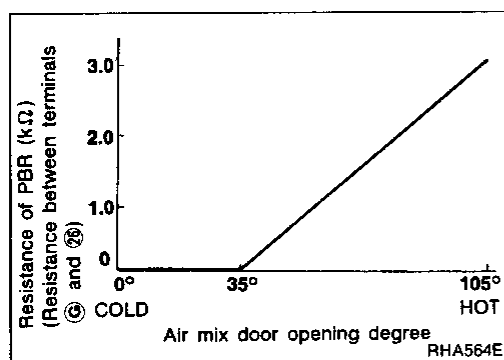
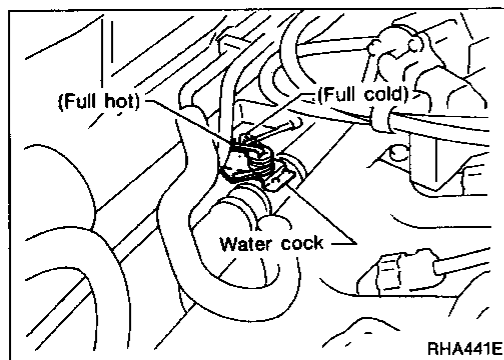
MODE DOOR

1. Move side link by hand and hold mode door in DEF mode.
2. Install mode door motor on heater unit and connect it to main harness.
3. Turn ignition switch to ON.
4. Turn VENT switch ON.
5. Attach mode door motor rod to side link rod holder.
6. 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.



AIR MIX DOOR (Water cock)

1. Move air mix 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. Check PBR characteristics, measure resistance between air mix door motor terminal between ⑥ and ⑳.
8. Slide temperature control lever to full cold.
9. Attach water cock cable to air mix door linkage and secure with clip.
10. Rotate and hold water cock lever AND plate in the full cold position (CLOCKWISE completely).
11. Attach water cock cable to plate and secure with clip (white mark on cable housing should be centered under the retaining clip).
12. Check that water cock operates properly when temperature lever is slid to full hot and full cold. (After several cycles, water cock lever should be midpoint of plate opening when temperature slider is full cold).

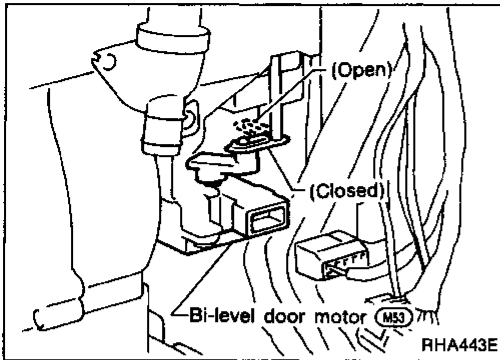



INTAKE DOOR

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. Install intake door lever.
6. Set intake door rod in REC position and fasten door rod to holder on intake door lever.
7. Check that intake door operates properly when REC switch is turned ON and OFF.

Control Linkage Adjustment (Cont'd)

BI-LEVEL (B/L) DOOR



1. Connect Bi-level door motor harness connector before installing Bi-level door motor.
2. Turn ignition switch to ON.
3. Install Bi-level door motor on heater unit.
4. Attach Bi-level door rod to Bi-level door link rod holder.
5. Check that Bi-level door operates properly when bi-level switch  is turned ON and OFF with the temperature control lever in the middle position.

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Introduction

The Automatic Temperature Control (ATC) system provides automatic regulation of the vehicles 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, which receives input signals from several sensors. The automatic amplifier (BCM) 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, intake air temperature and amount of sunload.

Fan speed control

Blower speed is automatically controlled based on temperature setting, ambient temperature, in-vehicle temperature, intake air 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, intake air temperature, amount of sunload and ON-OFF operation of the compressor.

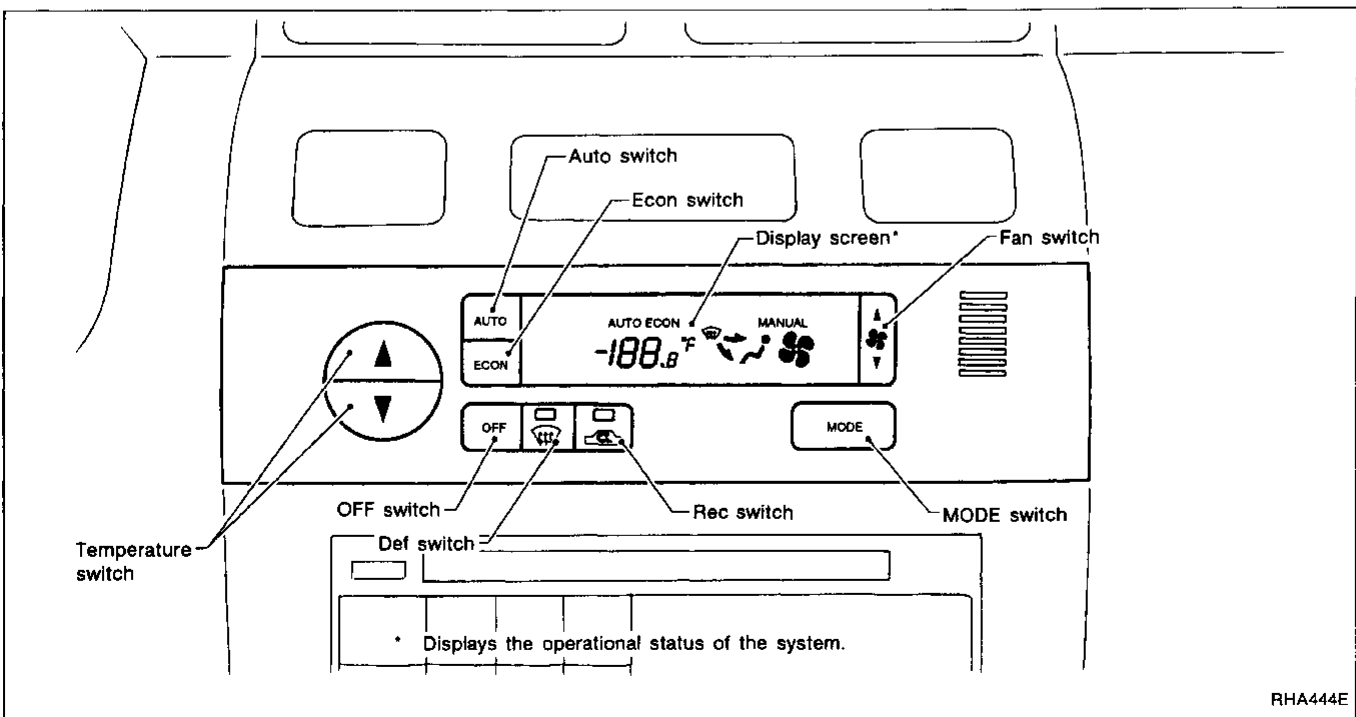
Outlet door control

The outlet door is automatically controlled by: The temperature setting, ambient temperature, in-vehicle temperature, intake air temperature and amount of sunload.

Self-diagnostic system

The self-diagnostic system is built into the auto amplifier (BCM) to quickly locate the cause of problems.

Control Operation



RHA444E

Control Operation (Cont'd)**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 selected by the operator.

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

GI

ECON SWITCH

Fully automatic control with the compressor off. With the compressor off, the system will not remove heat (cool) or de-humidify. The system will maintain the in-vehicle temperature at the set temperature when the set temperature is above the ambient (outside) temperature.

MA

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PTC (Potentio Temperature Control)

Increases or decreases the set temperature.

LC

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 (78% foot and 22% defrost) position. In the off position the ATC system uses the vehicle's "flow through" ventilation. It tries to maintain the interior temperature based on the last set temperature of the system.

EC

FE

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 

CL

MT

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 

AT

FA

REC SWITCH

ON position: Interior air is recirculated inside the vehicle.

OFF position: Automatic control resumes.

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

RA

BR

DEF SWITCH

Positions the mode doors to the defrost position. Also positions the air intake doors to the outside air position. The compressor operates at ambient temperature approx. 2°C (35°F) or above.

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Contents

How to Perform Trouble Diagnoses for Quick and Accurate Repair	HA- 64
Operational Check	HA- 65
Symptom Chart	HA- 68
Self-diagnosis	HA- 70
CHECKING PROCEDURE	HA- 71
STEP 1: Checks LEDs and segments	HA- 74
STEP 2: Checks each sensor circuit for open or short circuit	HA- 74
STEP 3: Checks mode and intake door positions	HA- 75
STEP 4: Checks operation of each actuator	HA- 76
STEP 5: Checks temperature detected by sensors, and detects multiplex communication error	HA- 76
AUXILIARY MECHANISM: Temperature setting trimmer	HA- 79
Preliminary Check	HA- 80
PRELIMINARY CHECK 1 (Air outlet does not change.)	HA- 80
PRELIMINARY CHECK 2 (Intake door does not change.)	HA- 81
PRELIMINARY CHECK 3 (Insufficient cooling)	HA- 82
PRELIMINARY CHECK 4 (Insufficient heating)	HA- 83
PRELIMINARY CHECK 5 (Blower motor operation is malfunctioning.)	HA- 84
PRELIMINARY CHECK 6 (Magnet clutch does not engage.)	HA- 85
PRELIMINARY CHECK 7 (Discharged air temperature does not change.)	HA- 86
PRELIMINARY CHECK 8 (Noise)	HA- 87
Harness Layout	HA- 88
Circuit Diagram for Quick Pinpoint Check	HA- 90
Wiring Diagram — A/C, A —	HA- 91
Main Power Supply and Ground Circuit Check	HA- 96
Diagnostic Procedure 1	
SYMPTOM: Ambient sensor circuit is open or shorted. (21 or -21 is indicated on display as a result of conducting Self-diagnosis STEP 2.)	HA- 97
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.)	HA- 98
Diagnostic Procedure 3	
SYMPTOM: Thermal transmitter circuit is open or shorted. (23 or -23 is indicated on display as a result of conducting Self-diagnosis STEP 2.)	HA- 99
Diagnostic Procedure 4	
SYMPTOM: Intake sensor circuit is open or shorted. (24 or -24 is indicated on display as a result of conducting Self-diagnosis STEP 2.)	HA-100
Diagnostic Procedure 5	
SYMPTOM: Sunload sensor circuit is open or shorted. (25 or -25 is indicated on display as a result of conducting Self-diagnosis STEP 2.)	HA-101
Diagnostic Procedure 6	
SYMPTOM: PBR circuit is open or shorted. (26 or -26 is indicated on display as a result of conducting Self-diagnosis STEP 2.)	HA-102

Contents (Cont'd)

Diagnostic Procedure 7		
SYMPTOM: Mode door motor does not operate normally.	HA-103	
Diagnostic Procedure 8		
SYMPTOM: Intake door motor does not operate normally.	HA-105	
Diagnostic Procedure 9		GI
SYMPTOM: Air mix door motor does not operate normally.	HA-106	
Diagnostic Procedure 10		MA
SYMPTOM: Bi-level (B/L) door motor does not operate normally.	HA-107	
Diagnostic Procedure 11		EM
SYMPTOM: Blower motor operation is malfunctioning under out of Starting Fan Speed Control.	HA-108	
Diagnostic Procedure 12		LC
SYMPTOM: Magnet clutch does not engage after performing Preliminary Check 6.	HA-110	
Diagnostic Procedure 13		EC
SYMPTOM: ● Self-diagnosis cannot be performed.		
● Multiplex communication error (52 with fan symbol detected as a result of conducting self-diagnosis STEP 5.)	HA-112	FE
Electrical Component Inspection	HA-113	
Control Linkage Adjustment	HA-114	CL

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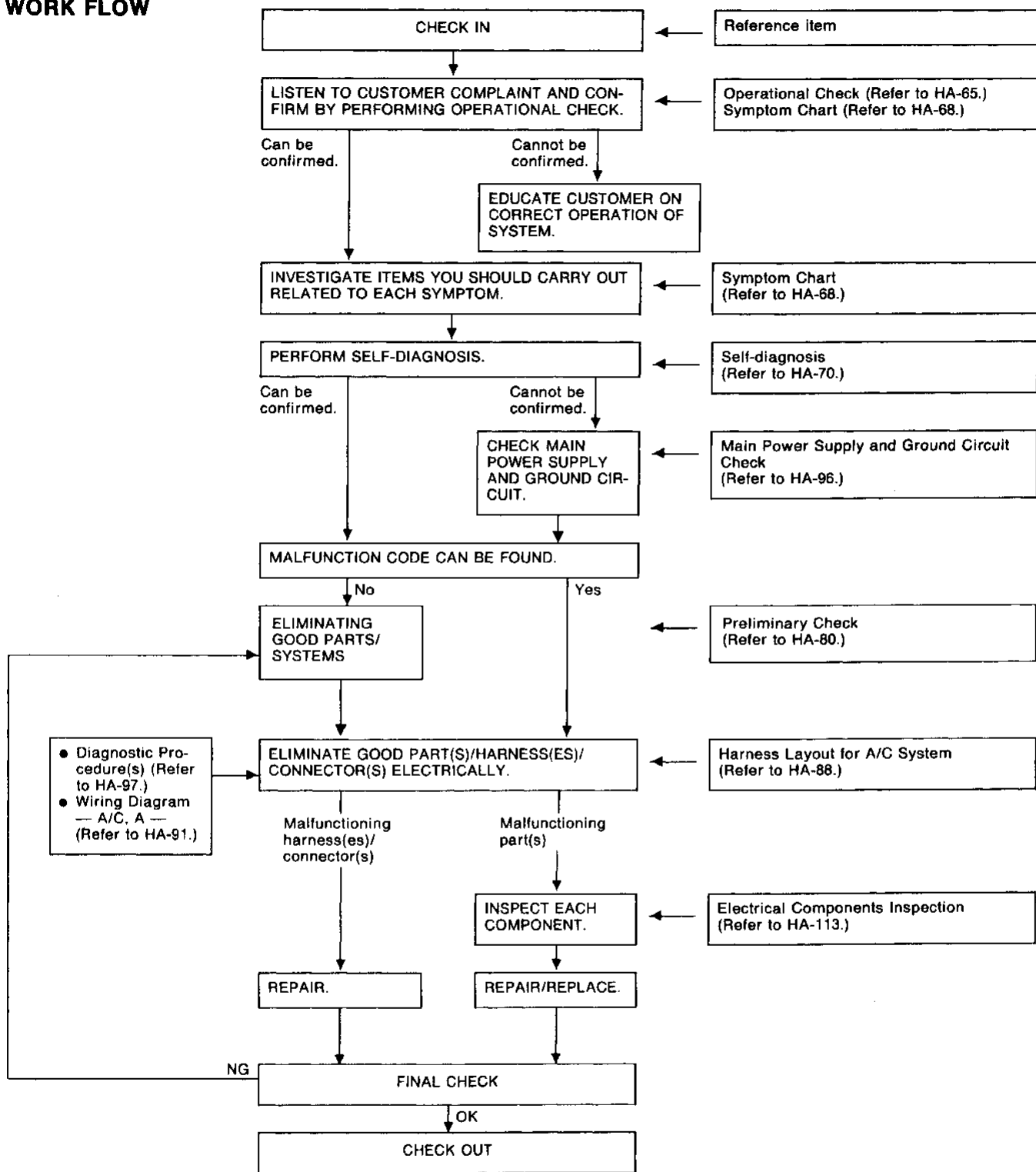
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How to Perform Trouble Diagnoses for Quick and Accurate Repair

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, A/C switch and the memory function.

CONDITIONS:

- Engine running and at normal operating temperature.

PROCEDURE:

1. Check blower

- 1) Press fan switch (up side) one time.
Blower should operate on low speed.
The fan symbol should have one blade lit .
- 2) Press fan switch (up side) 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 button.

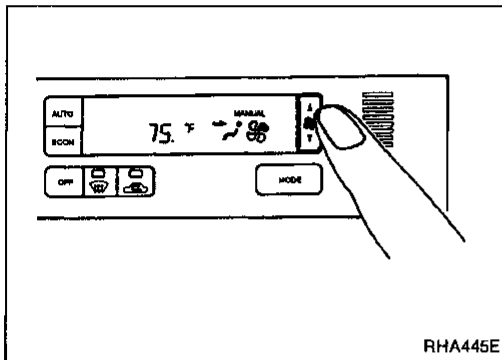
- 2) Confirm that discharge air comes out according to the air distribution table at left.

Refer to "Discharge Air Flow", "DESCRIPTION" (HA-16).

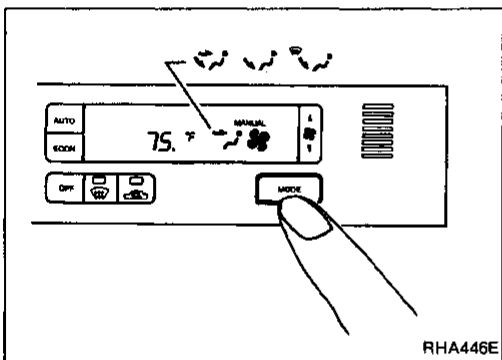
NOTE:

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

Intake door position is checked in the next step.








RHA445E



RHA446E

Discharge air flow

Switch mode/ indicator	Air outlet/distribution		
	Face	Foot	Defroster
	100%	—	—
	60%	40%	—
	—	78%	22%
	—	60%	40%
	—	—	100%

RHA429E

GI

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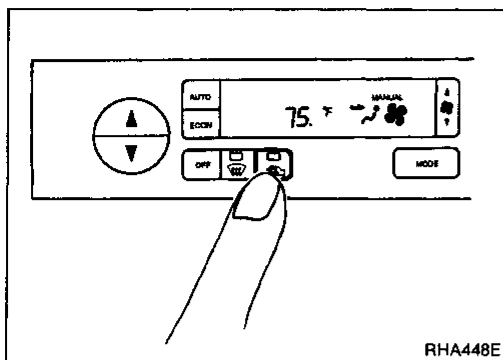
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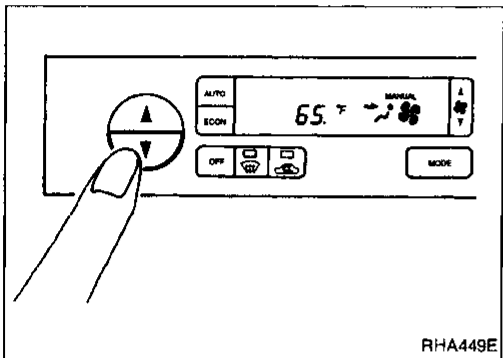
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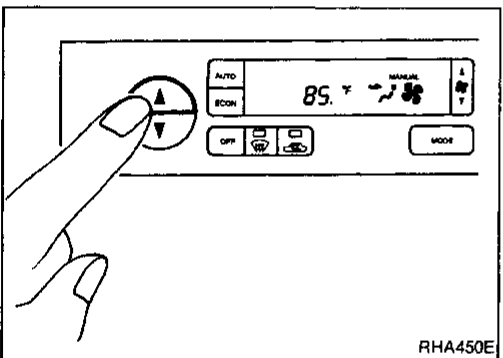
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Operational Check (Cont'd)**3. Check recirc**

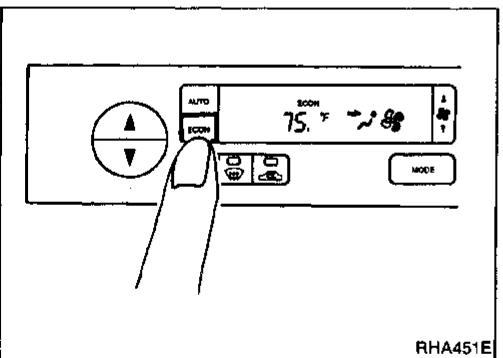
- 1) Press REC  switch
Recirc indicator should illuminate.
- 2) Listen for intake door position change (you should hear blower sound change slightly).

**4. Check temperature decrease**

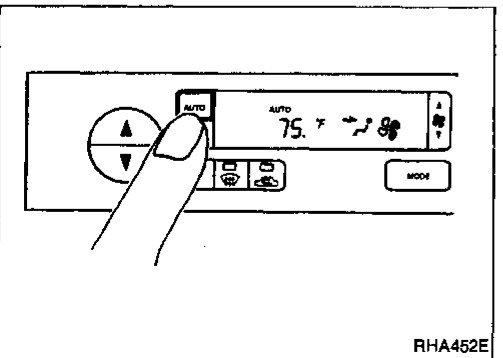
- 1) Press the temperature decrease button until 18°C (65°F) is displayed.
- 2) Check for cold air at discharge air outlets.

**5. Check temperature increase**

- 1) Press the temperature increase button until 32°C (85°F) is displayed.
- 2) Check for hot air at discharge air outlets.

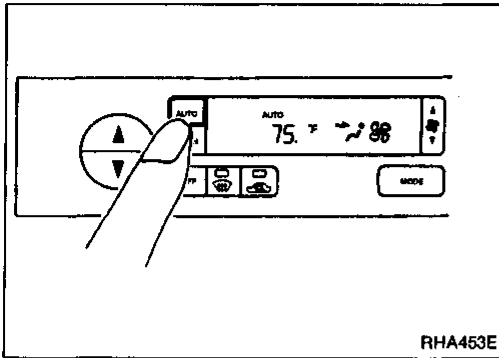
**6. Check ECON mode**

- 1) Press ECON switch.
- 2) Display should indicate ECON (no AUTO, no MANUAL).
Confirm that the compressor clutch is not engaged (visual inspection).
(Discharge air will depend on ambient, in-vehicle, and set temperatures).

**7. Check AUTO mode**

- 1) Press AUTO switch.
- 2) Display should indicate AUTO (no ECON, no MANUAL).
Confirm that the compressor clutch engages (audio or visual inspection).
(Discharge air will depend on ambient, in-vehicle, and set temperatures).

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-71, 74)	STEP 2 (HA-71, 74)	STEP 3 (HA-72, 75)	STEP 4 (HA-72, 76)	STEP 5 (HA-73, 76)	AUXILIARY MECHANISM (HA-79)	Preliminary Check 1 (HA-80)	Preliminary Check 2 (HA-81)	Preliminary Check 3 (HA-82)	Preliminary Check 4 (HA-83)	Preliminary Check 5 (HA-84)	Preliminary Check 6 (HA-85)	Preliminary Check 7 (HA-86)	Preliminary Check 8 (HA-87)	Diagnostic Procedure 1 (HA-97)	Diagnostic Procedure 2 (HA-98)	Diagnostic Procedure 3 (HA-99)	Diagnostic Procedure 4 (HA-100)	Diagnostic Procedure 5 (HA-101)	Diagnostic Procedure 6 (HA-102)	
		Air outlet does not change.		①	②	○	○	○		③								○	○		○	○
Intake door does not change.		①	②		○	○			③							○	○		○	○	○	
Insufficient cooling		○	○	○	○	○	○	○	①							○	○		○	○	○	
Insufficient heating		○	○	○	○	○	○	○		①						○	○		○	○	○	
Blower motor operation is malfunctioning.		①	②		○	○						③				○	○	○	○	○	○	
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					
	23 Thermal transmitter circuit is open.	①	②															③				
	24 Intake 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				
	23 Thermal transmitter circuit is shorted.	①	②																③			
	24 Intake 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	○										○	○		○	○	○	
Air mix door motor does not operate normally.		①	②		③	○										○	○		○	○	○	
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

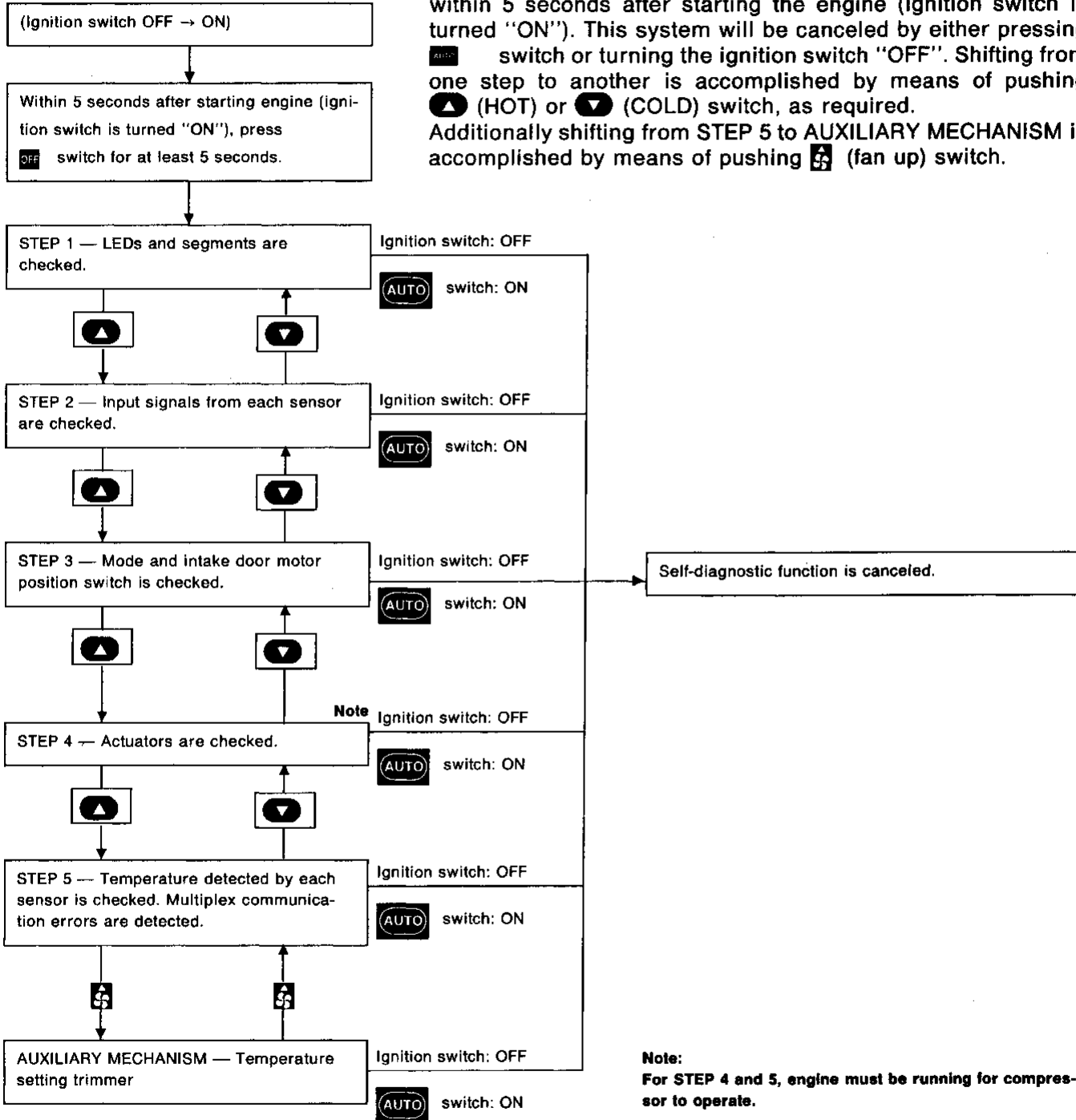
AUTO

Symptom Chart (Cont'd)

Diagnostic Procedure												Main Power Supply and Ground Circuit Check	Electrical Components Inspection			
Diagnostic Procedure 7 (HA-103)												Auto amp. (BCM) (HA-96)	Air mix door motor (HA-121)	A/C relay (HA-113)	Cooling fan motor (EC)	GI
Diagnostic Procedure 8 (HA-105)	○											Push control unit (HA-96)	Mode door motor (HA-123)	Triple-pressure switch (HA-113)	Cooling fan relay (EC)	MA
Diagnostic Procedure 9 (HA-106)	○											10A Fuse #30 (HA-96)	Intake door motor (HA-125)	Magnet clutch (Compressor) (HA-134)	○	EM
Diagnostic Procedure 10 (HA-107)	○											15A Fuses #2 and #3 (HA-96)	Bi-level door motor (HA-115)	Push control unit (HA-117)	○	LC
Diagnostic Procedure 11 (HA-108)	○											9.5A Fuse #56 (HA-96)	Blower motor (HA-126)	Auto amp. (BCM) (HA-119)	○	EC
Diagnostic Procedure 12 (HA-110)	○											10A Fuse #17 (HA-96)	Fan control amp. (HA-127)	ECM (ECCS control module) (EC)	○	FE
Diagnostic Procedure 13 (HA-112)	○											Ambient sensor (HA-118)	A/C relay (HA-113)	Cooling fan motor (EC)	○	CL
○												In-vehicle sensor (HA-117)	Triple-pressure switch (HA-113)	Cooling fan relay (EC)	○	MT
○												Thermal transmitter	Magnet clutch (Compressor) (HA-134)	Push control unit (HA-117)	○	AT
○												Intake sensor (HA-119)	Push control unit (HA-117)	Auto amp. (BCM) (HA-119)	○	FA
○												Sunload sensor (HA-118)	Auto amp. (BCM) (HA-119)	ECM (ECCS control module) (EC)	○	RA
○												PBR (HA-122)	ECM (ECCS control module) (EC)	Cooling fan motor (EC)	○	BR
○												Air mix door motor (HA-121)	Cooling fan motor (EC)	Cooling fan relay (EC)	○	ST
○												Mode door motor (HA-123)	Cooling fan relay (EC)	Harness	○	BF
○												Intake door motor (HA-125)	Harness	○	HA	
○												Bi-level door motor (HA-115)	○	○	EL	
○												Blower motor (HA-126)	○	○	IDX	
○												Fan control amp. (HA-127)	○	○		
○												A/C relay (HA-113)	○	○		
○												Triple-pressure switch (HA-113)	○	○		
○												Magnet clutch (Compressor) (HA-134)	○	○		
○												Push control unit (HA-117)	○	○		
○												Auto amp. (BCM) (HA-119)	○	○		
○												ECM (ECCS control module) (EC)	○	○		
○												Cooling fan motor (EC)	○	○		
○												Cooling fan relay (EC)	○	○		
○												Harness	○	○		
5												○	○	○		
4												○	○	○		
4												○	○	○		
4												○	○	○		
4												○	○	○		
4												○	○	○		
4												○	○	○		
1												○	○	○		
2												○	○	○		
3												○	○	○		

Self-diagnosis

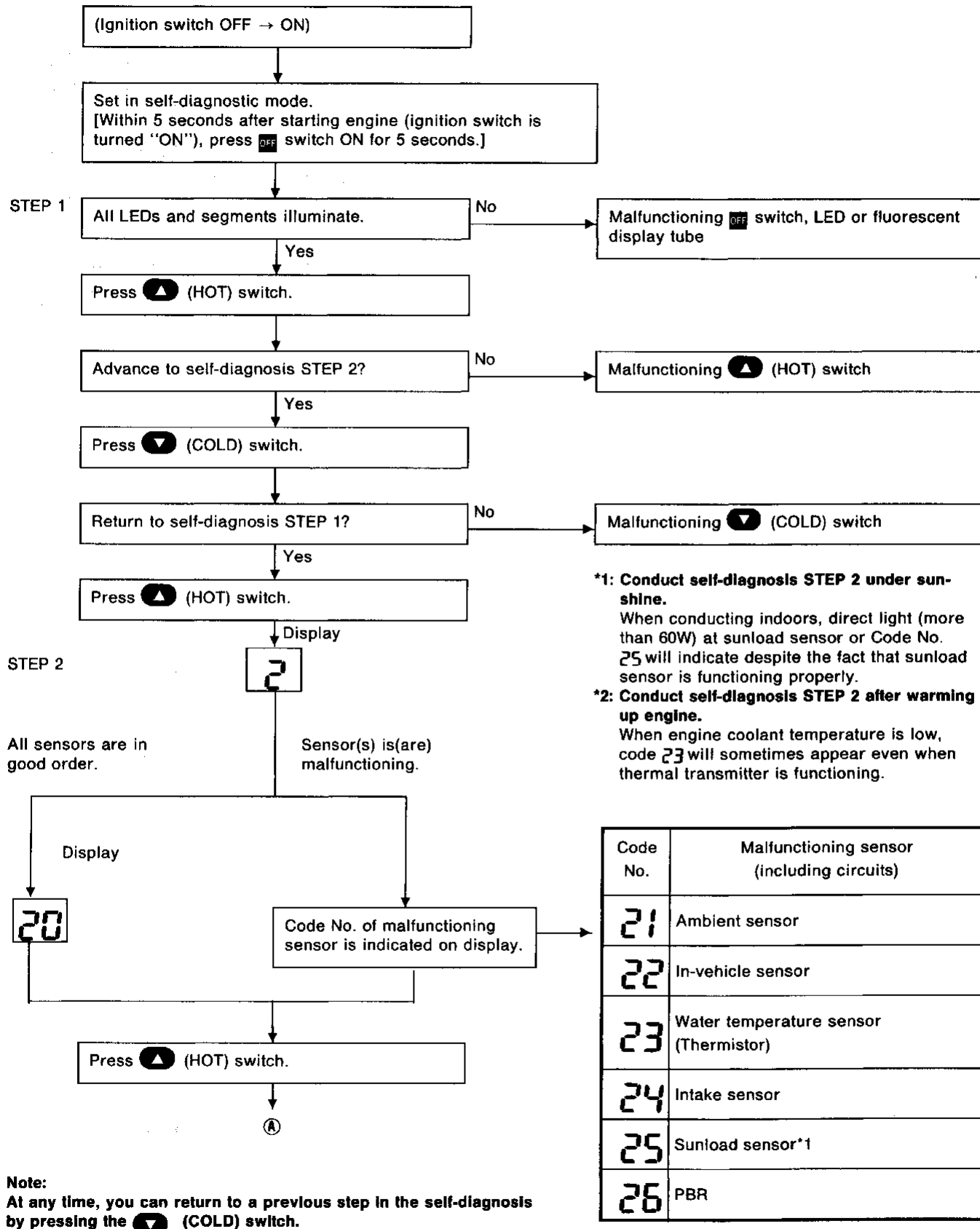
The self-diagnostic system diagnoses sensors, door motors, blower motor, etc. by system line. Refer to applicable sections (items) for details. Shifting from normal control to the self-diagnostic system is done as follows. Start the engine (turn the ignition switch from "OFF" to "ON"). And press "OFF" 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 "AUTO" 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 Ⓢ (fan up) switch.



Note:
For STEP 4 and 5, engine must be running for compressor to operate.

Self-diagnosis (Cont'd)

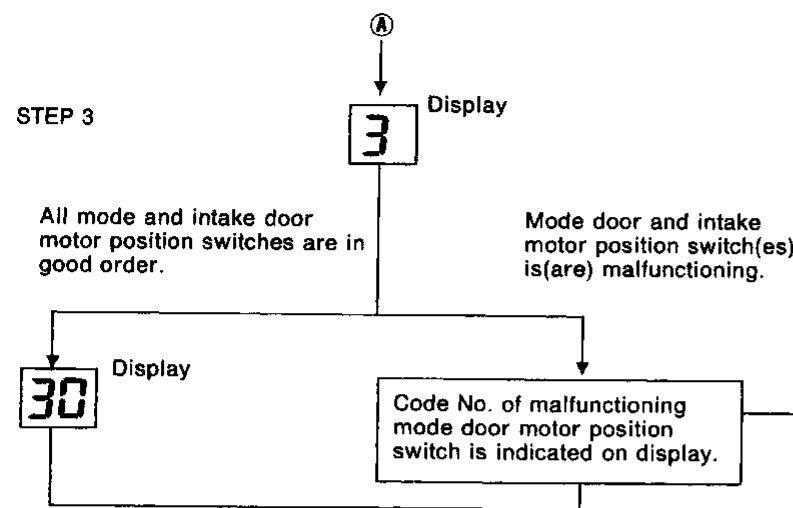
CHECKING PROCEDURE



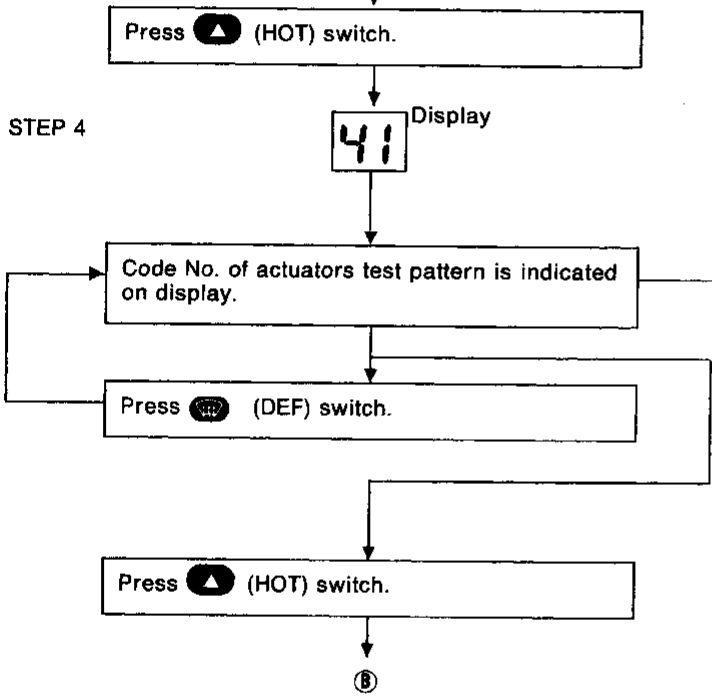
Note:
At any time, you can return to a previous step in the self-diagnosis by pressing the ▼ (COLD) switch.

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Self-diagnosis (Cont'd)



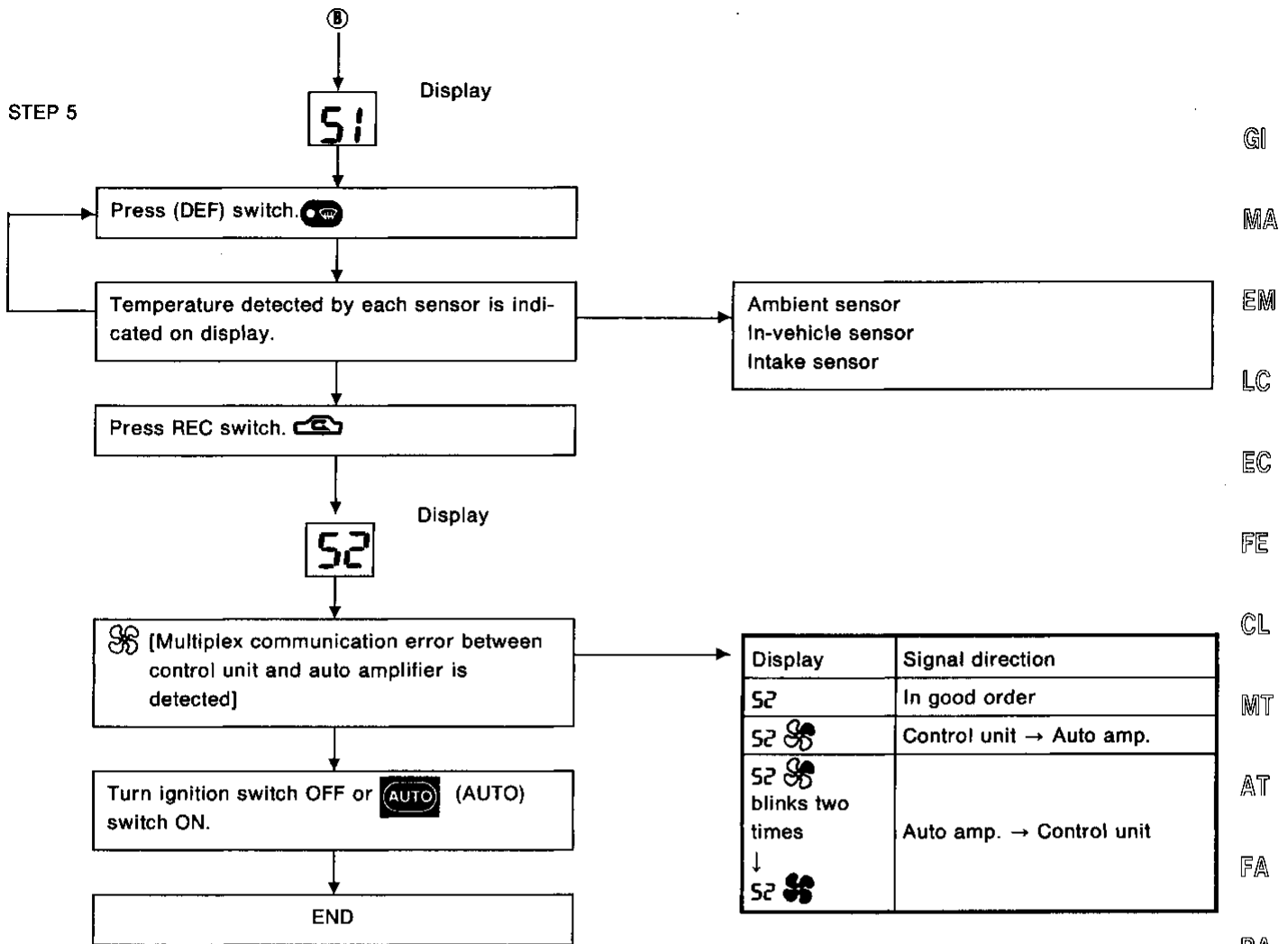
Code No.	Malfunctioning part or circuit	
	Position switch	
31	VENT	Mode door motor
32	B/L	
33	FOOT	
34	FOOT/DEF	
35	DEF	
36	FRE	Intake door motor
38	20% FRE	
39	REC	



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

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

Self-diagnosis (Cont'd)



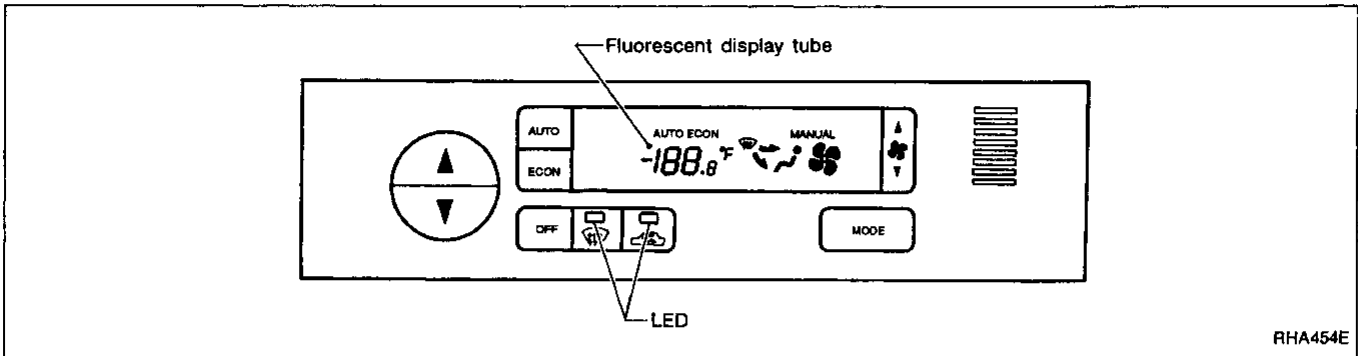
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Self-diagnosis (Cont'd)

HOW TO INTERPRET THE RESULTS

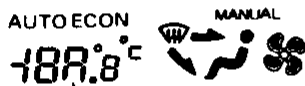
STEP 1: Checks LEDs and segments

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



RHA454E

Display malfunction

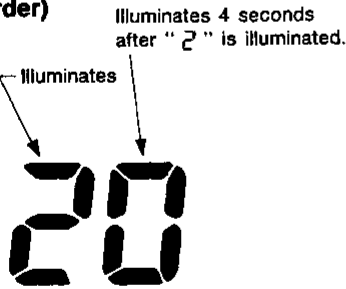


Part of segments does not illuminate.

RHA565E

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

Display (when all sensors are in good order)



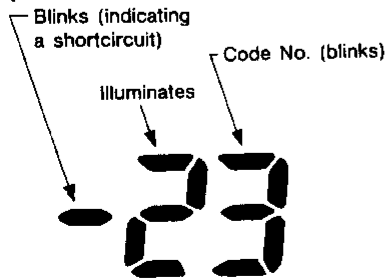
RHA499A

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 4 seconds to check all sensors.

Display (when sensor malfunctions)

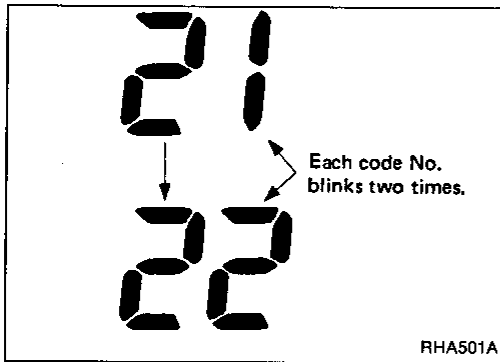


RHA500A

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.



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 -41.9°C (-43°F)	Greater than 100°C (212°F)
22	In-vehicle sensor	Less than -41.9°C (-43°F)	Greater than 100°C (212°F)
23	Thermal transmitter*3	Less than -25.6°C (-14°F)	Greater than 150°C (302°F)
24	Intake sensor	Less than -41.9°C (-43°F)	Greater than 100°C (212°F)
25	Sunload sensor*2	Less than 0.01515 mA	Greater than 0.545 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: 0%, Full hot: 100%)

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

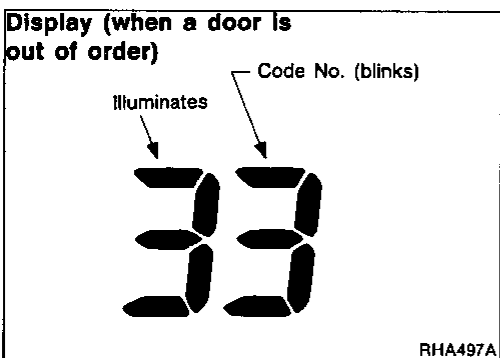
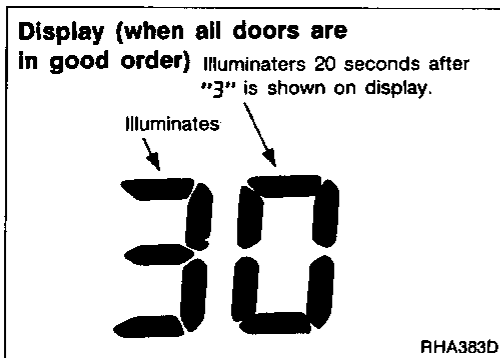
When conducting indoors, direct light (more than 60W) at sunload sensor.

*3: **Conduct self-diagnosis STEP 2 after warming up engine.**

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.



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

Code No.	31	32	33	34	35	36	38	39
Malfunctioning part	VENT	B/L	FOOT	FOOT/DEF	DEF	FRE	20% FRE	REC

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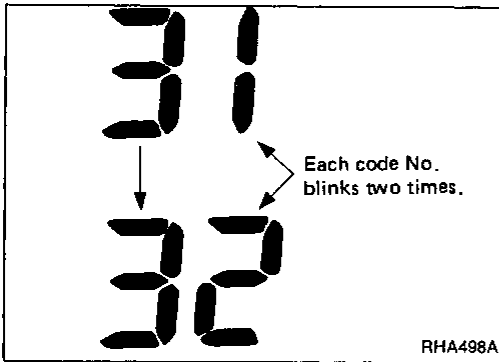
BF

HA

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IDX

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.

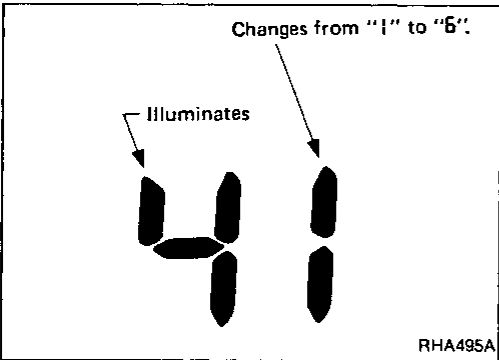
36 → 37 → 38 → 39

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%	—
	—	78%	22%
	—	60%	40%
	—	—	100%

RHA429E

Code No.	41	42	43	44	45	46
Actuator	41	42	43	44	45	46
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 V	9 - 11 V	7 - 9 V	7 - 9 V	7 - 9 V	10 - 12 V
Compressor	ON	ON	OFF	OFF	ON	ON
Bi-level door	Open	Open	Shut	Shut	Shut	Shut

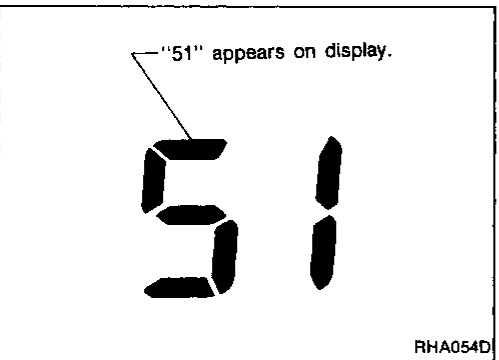
Operating condition of each actuator cannot be checked by indicators.

STEP 5: Checks temperature detected by sensors, and detects multiplex communication error

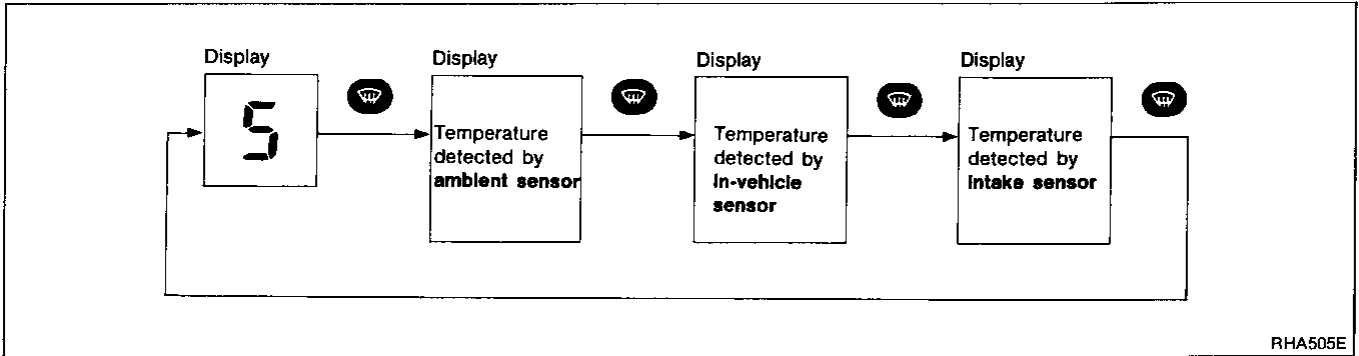
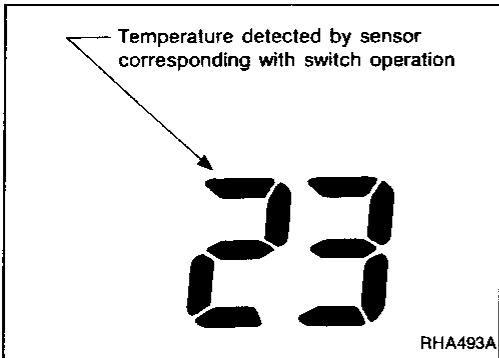
Checks temperature detected by sensors

Display shows "51" in STEP 5 mode.

- When FRONT DEF switch is pressed one time, display shows temperature detected by ambient sensor.
- When FRONT DEF switch is pressed second time, display shows temperature detected by in-vehicle sensor.
- When FRONT DEF switch is pressed fourth time, display returns to original presentation "51".



Self-diagnosis (Cont'd)



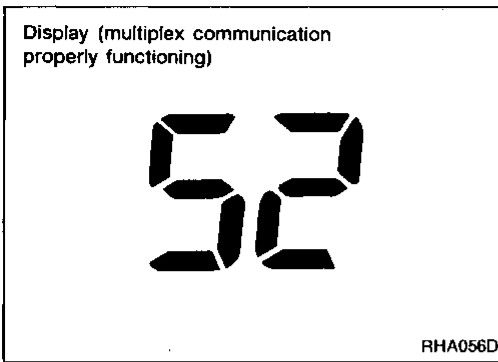
If temperature shown on display greatly differs from actual temperature, check sensor circuit at first. Then inspect sensor itself according to the procedures described in **Control System Input Component**. Refer to HA-117.

GI
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Self-diagnosis (Cont'd)

Detects multiplex communication error

Display shows "52" in STEP 5 mode.
 [Multiplex communication error between control unit and auto amplifier is detected]



Display	Signal direction
52	In good order
52 ☘	Control unit → auto amp.
52 ☘ blinks two times. ↓	Auto amp. → control unit
52 ☘	

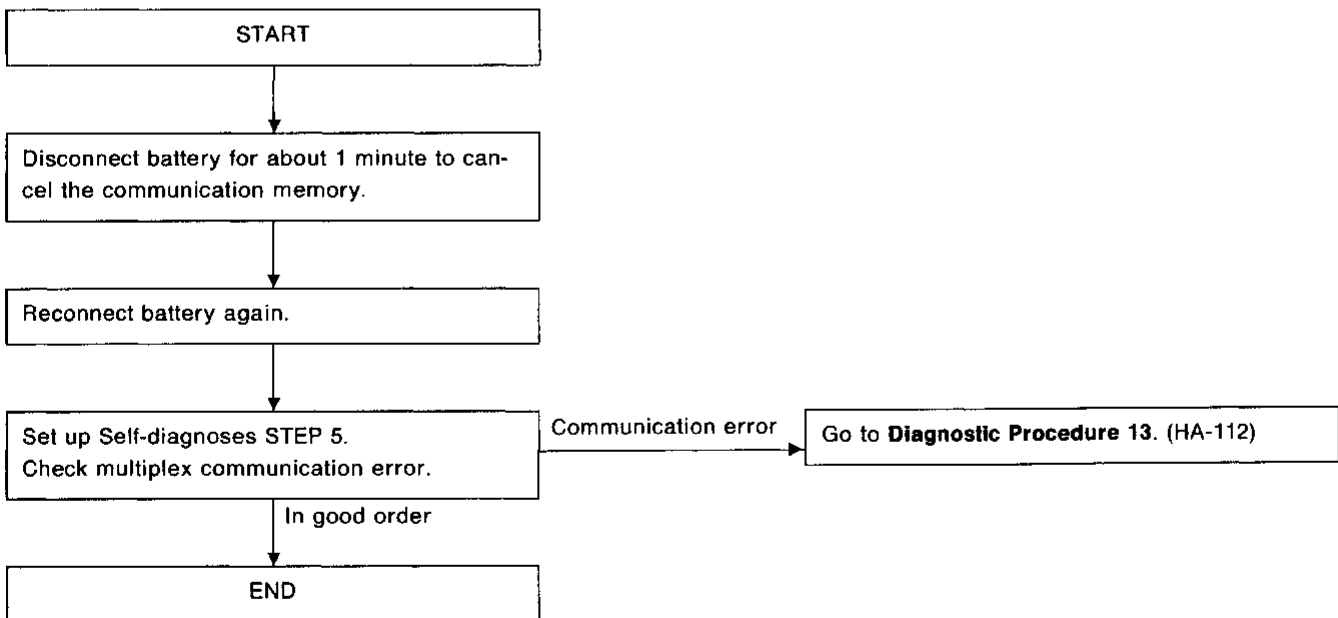
CAUTION:

The auto amp. memorizes any communication error in the system in a normal control with battery connected.

When there is an error, display will be as shown above.

When plural errors occur, the display of each error will blink two times for 0.5 second intervals.

If a communication error is displayed, follow the flow chart below. Determine if the error occurred in the past or is currently happening.






Self-diagnosis (Cont'd)

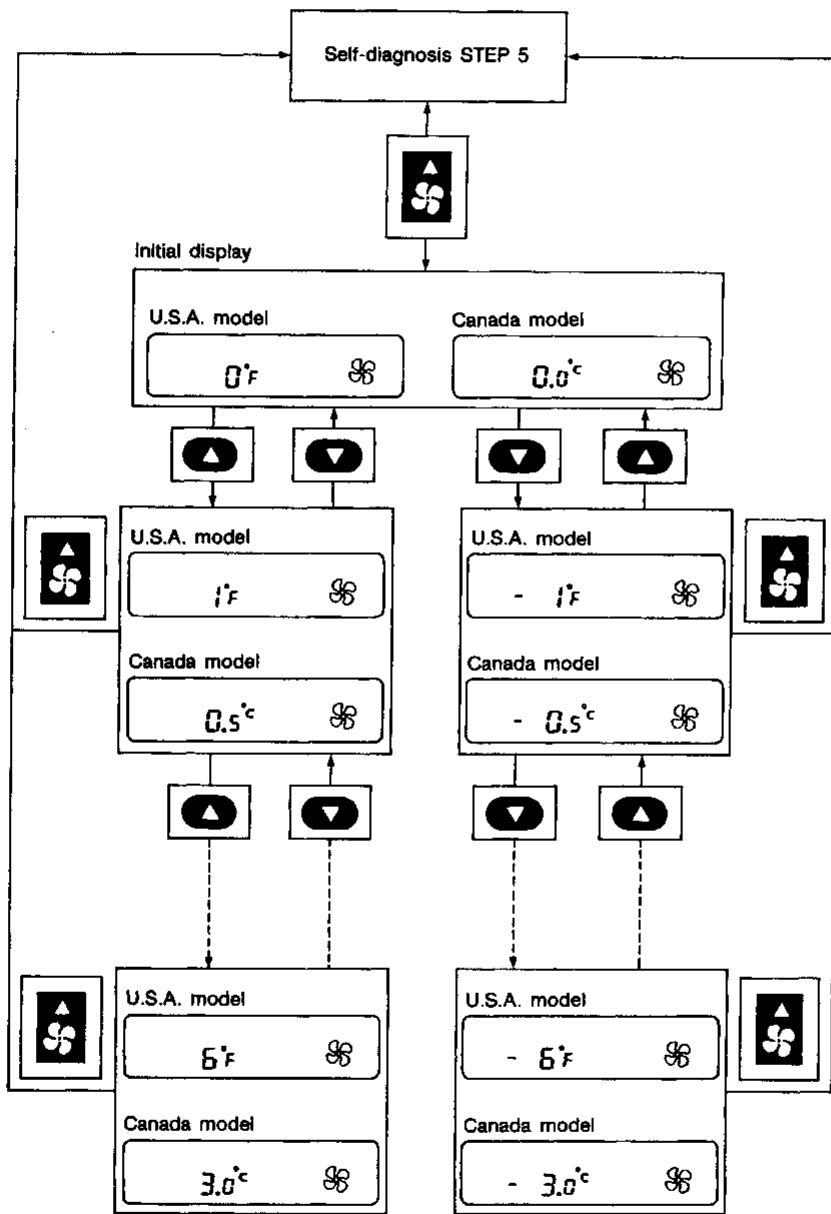
AUXILIARY MECHANISM: Temperature setting trimmer

This trimmer compensates for differences between temperature setting (displayed digitally) and temperature felt by driver in a range of $\pm 3^{\circ}\text{C}$ ($\pm 6^{\circ}\text{F}$).

Operating procedures for this trimmer are as follows:

Starting with STEP 5 under "Self-diagnostic mode", press  (fan up) 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 0.5°C (1°F) each time a switch is pressed.

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SHA197E

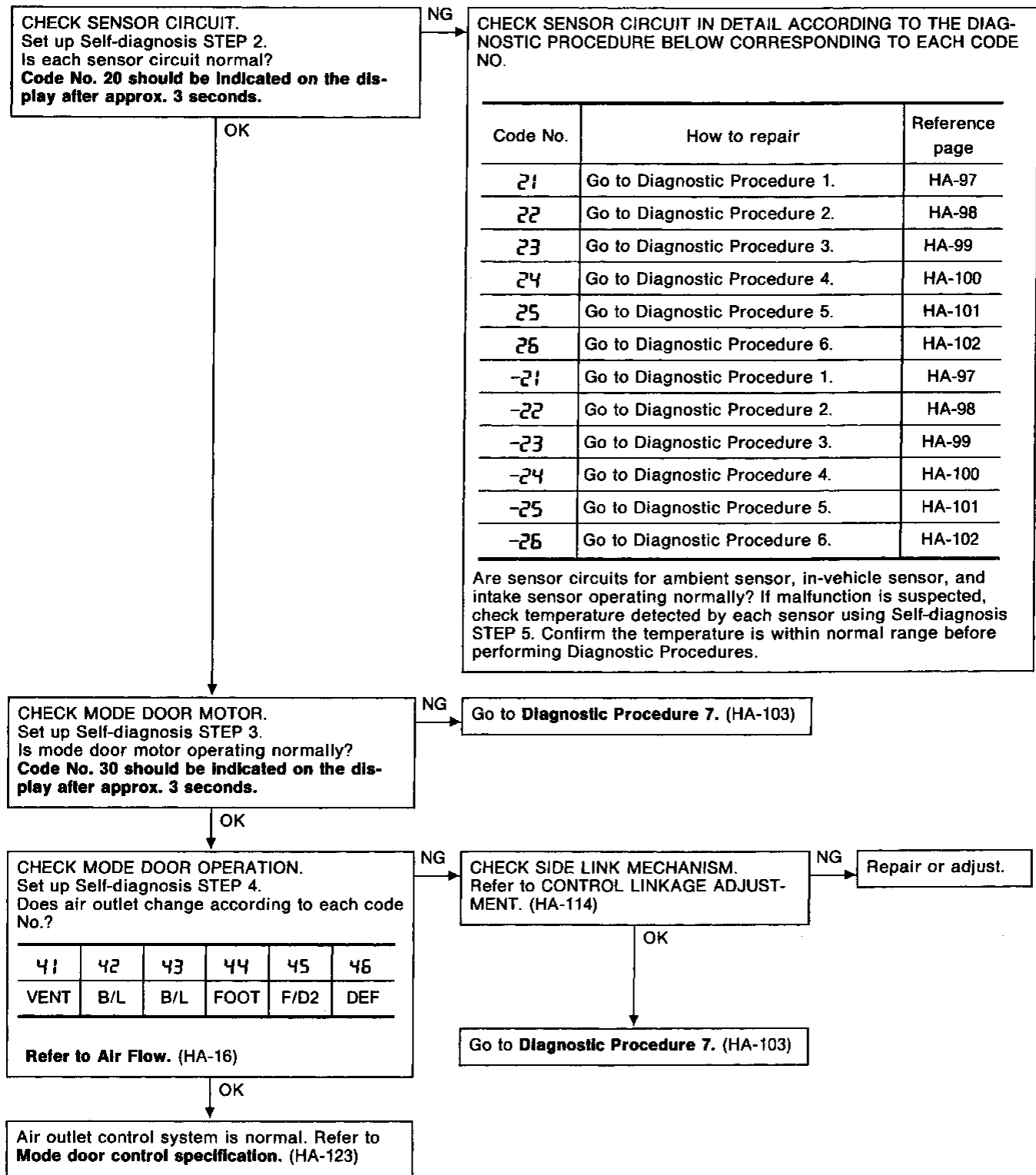
When battery cable is disconnected, trimmer operation is canceled and temperature set becomes that of initial condition, i.e. 0°C (0°F).

Preliminary Check

PRELIMINARY CHECK 1

Air outlet does not change.

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

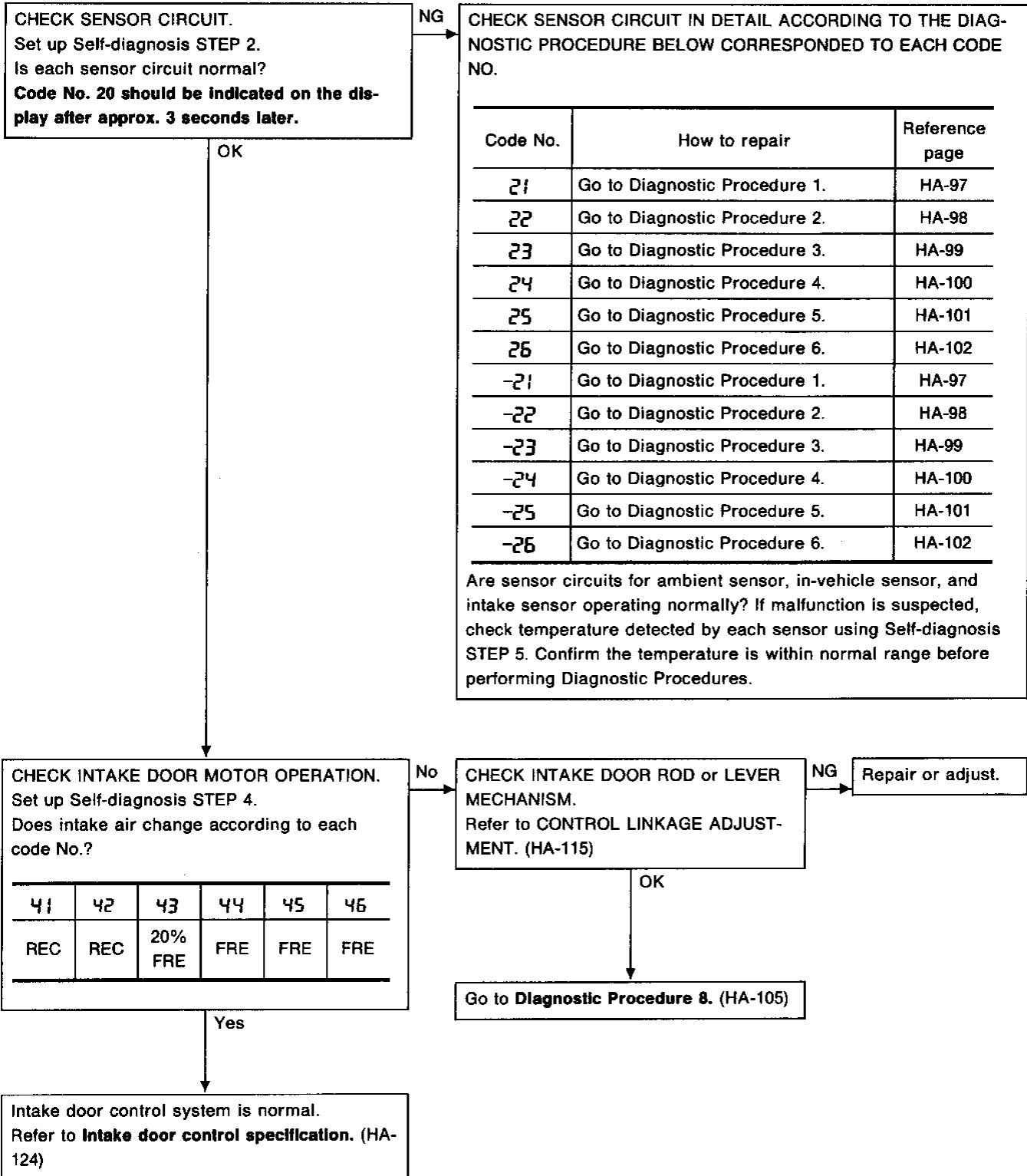


Preliminary Check (Cont'd)

PRELIMINARY CHECK 2

Intake door does not change.

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

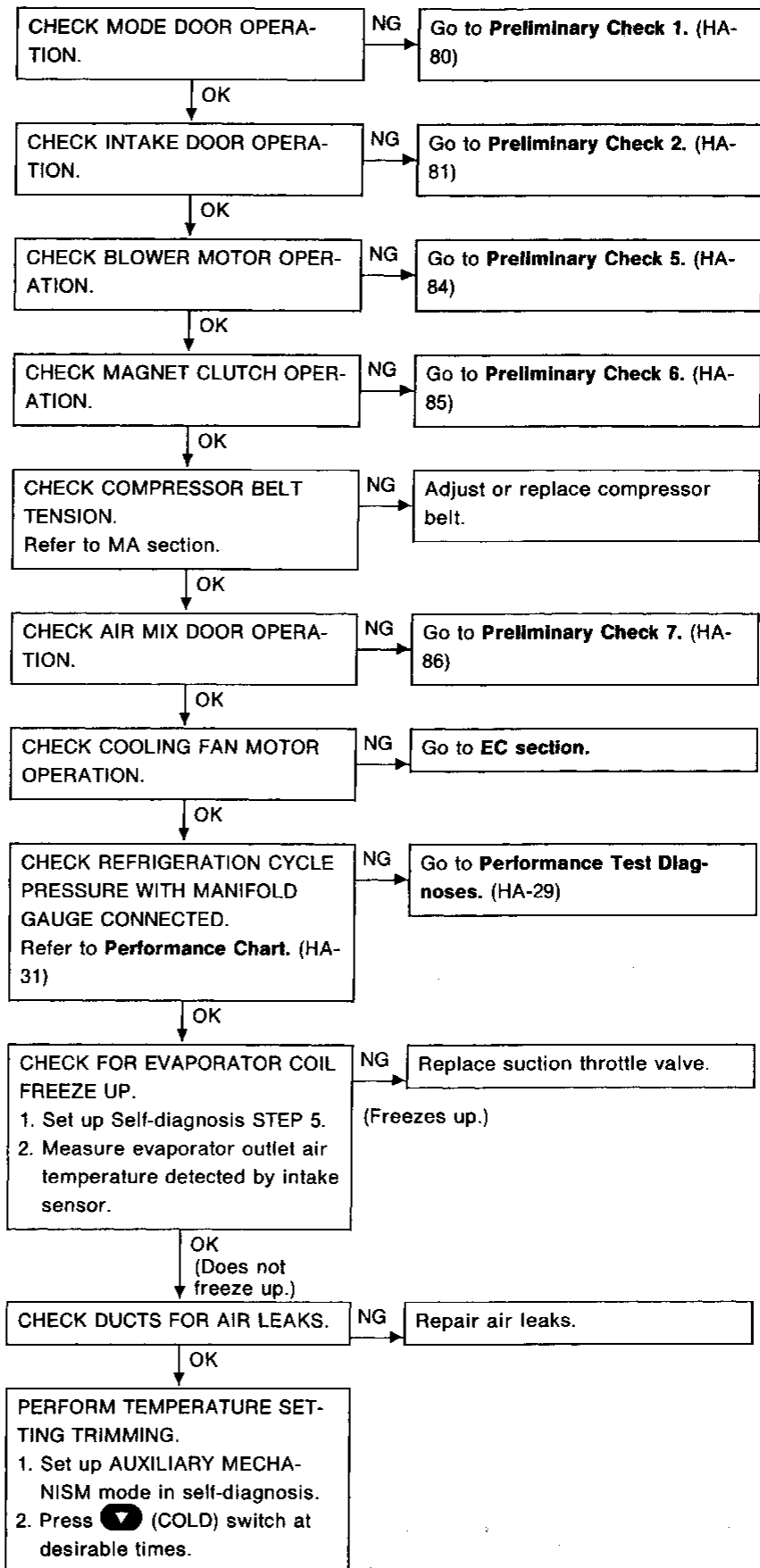


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PRELIMINARY CHECK 3

Insufficient cooling

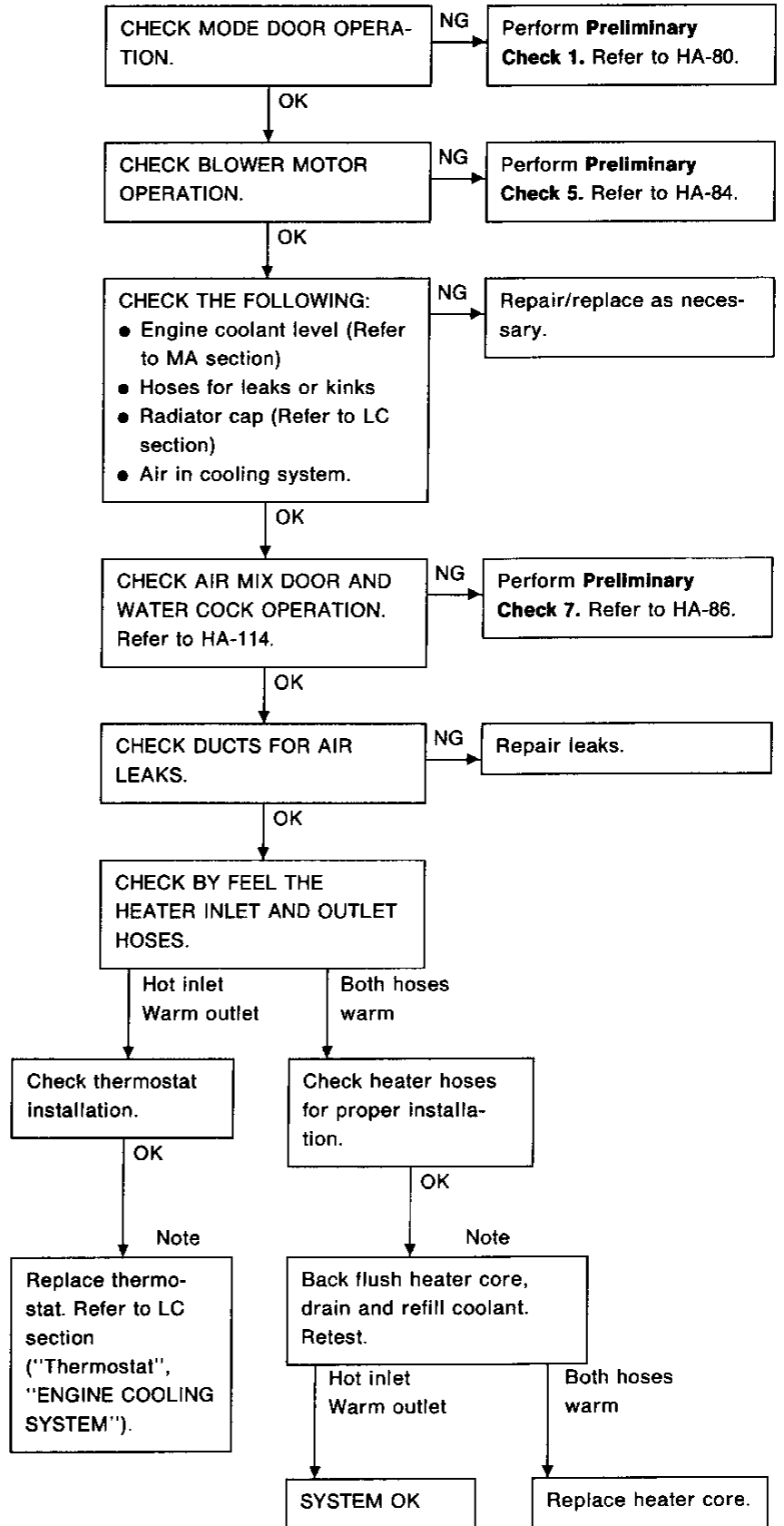
Preliminary Check (Cont'd)



Preliminary Check (Cont'd)

PRELIMINARY CHECK 4

Insufficient heating



GI

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EM

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EC

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BR

ST

BF

HA

EL

IDX

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.

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. 3 seconds.

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-97
22	Go to Diagnostic Procedure 2.	HA-98
23	Go to Diagnostic Procedure 3.	HA-99
24	Go to Diagnostic Procedure 4.	HA-100
25	Go to Diagnostic Procedure 5.	HA-101
26	Go to Diagnostic Procedure 6.	HA-102
-21	Go to Diagnostic Procedure 1.	HA-97
-22	Go to Diagnostic Procedure 2.	HA-98
-23	Go to Diagnostic Procedure 3.	HA-99
-24	Go to Diagnostic Procedure 4.	HA-100
-25	Go to Diagnostic Procedure 5.	HA-101
-26	Go to Diagnostic Procedure 6.	HA-102

Are sensor circuits for ambient sensor, in-vehicle sensor, and intake 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.

OK

CHECK BLOWER MOTOR OPERATION.
Set up Self-diagnosis STEP 4.
Does blower speed change according to each code No.?

Code No.	41	42	43	44	45	46
Blower motor speed	Low	Middle high	Middle low		High	

NG

Go to **Diagnostic Procedure 11.** (HA-108)

OK

Is engine coolant temperature below 50°C (122°F) and ambient temperature below 15°C (59°F)?

No

Blower motor operation is normal. Refer to **Fan speed control specification.** (HA-126)

Yes

IS BLOWER MOTOR CONTROLLED UNDER STARTING FAN SPEED CONTROL?
Refer to **Starting fan speed control specification.** (HA-126)

No

Check engine coolant temperature sensor control circuit. Refer to EC section.

Yes

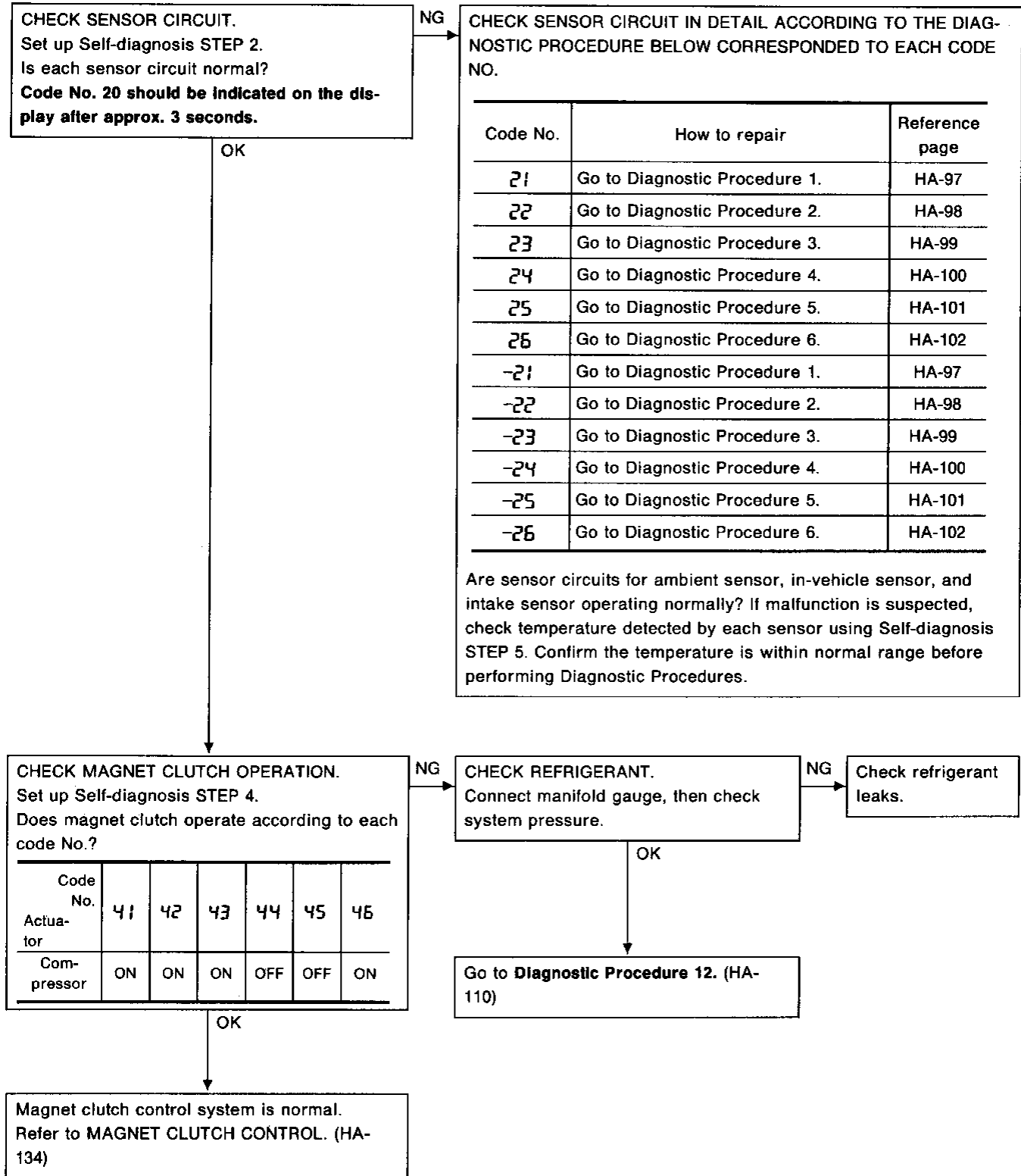
Blower motor operation is normal.

Preliminary Check (Cont'd)

PRELIMINARY CHECK 6

Magnet clutch does not engage.

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



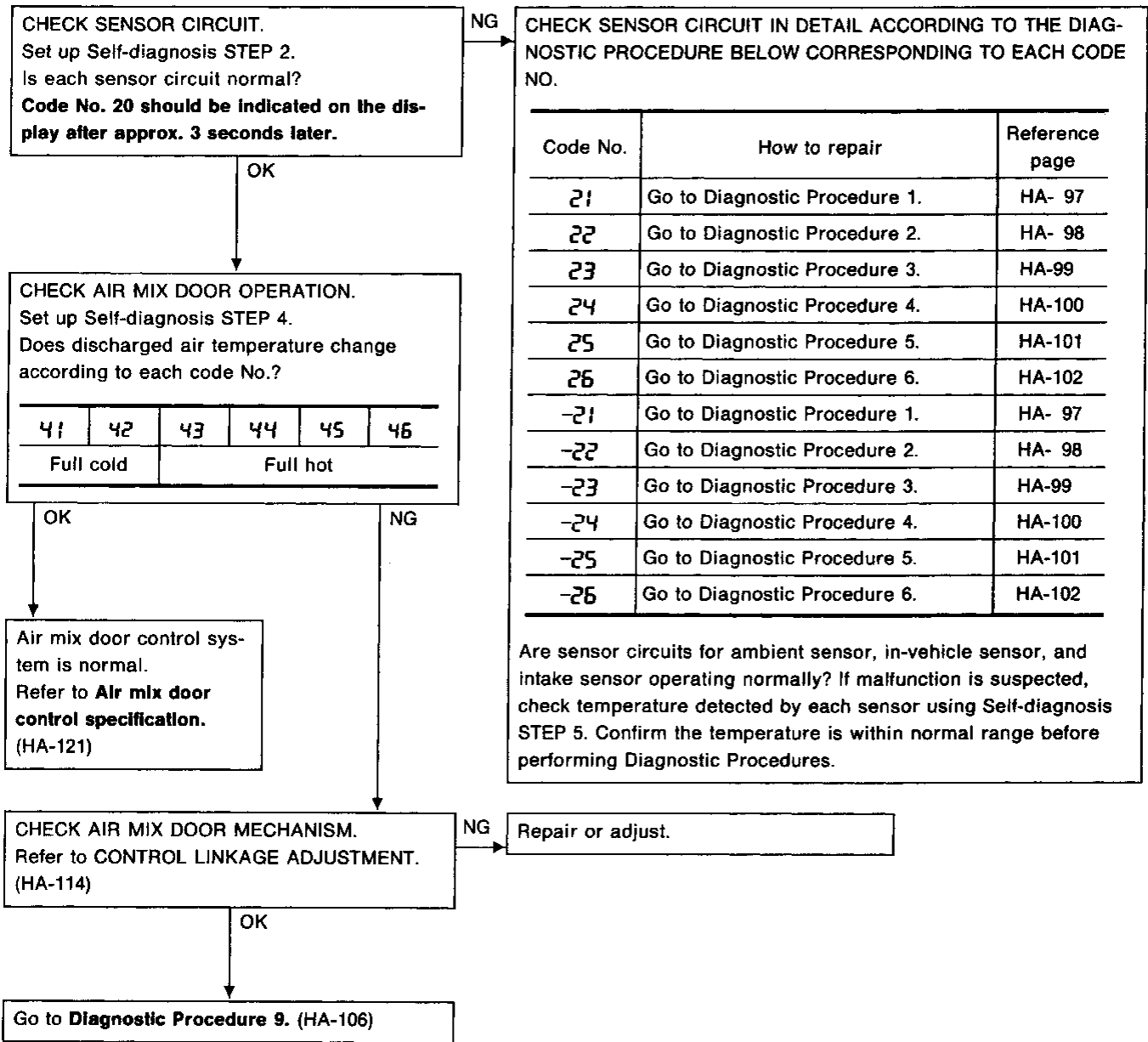
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Preliminary Check (Cont'd)

PRELIMINARY CHECK 7

Discharged air temperature does not change.

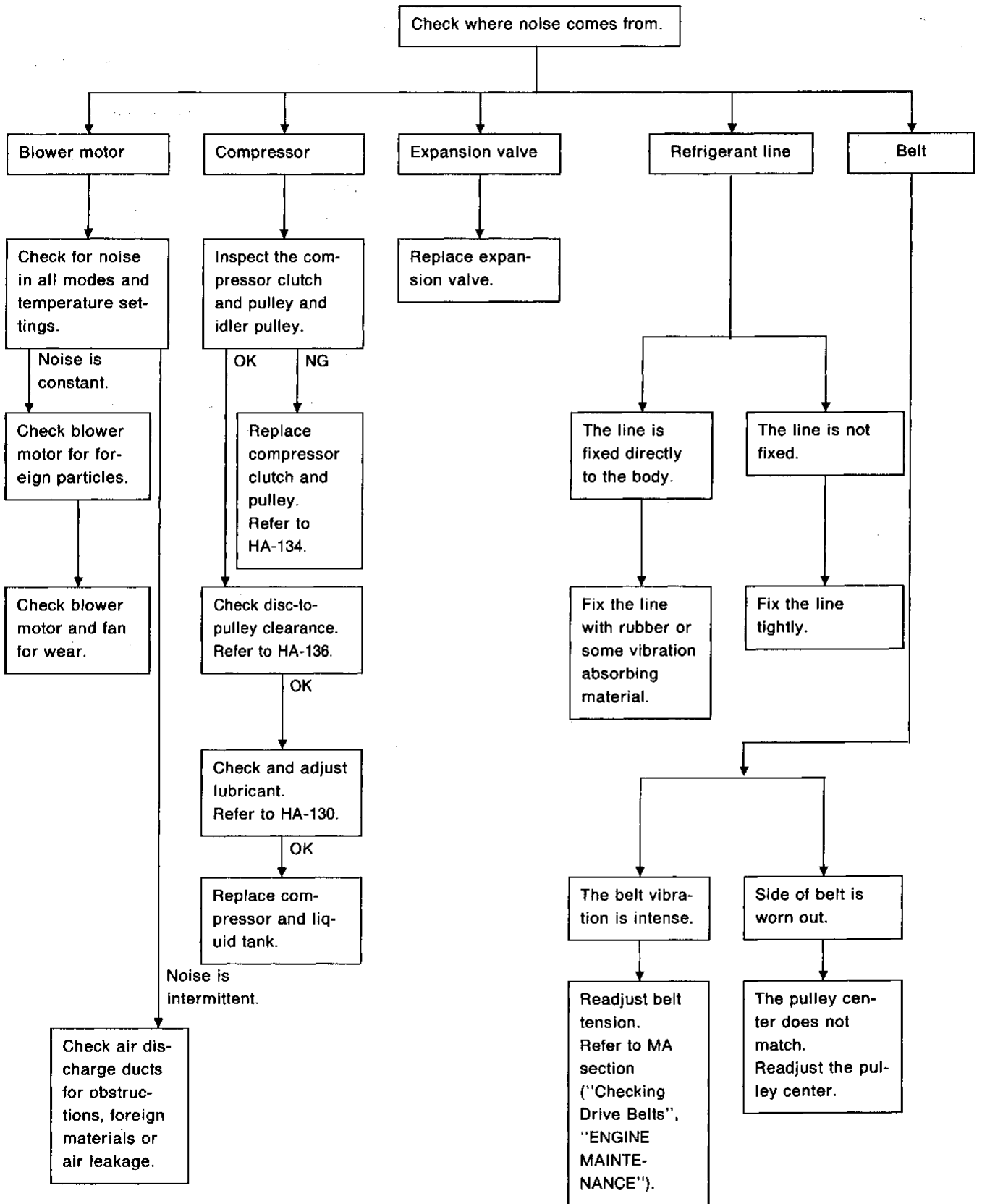
Perform Self-diagnosis STEP 1 before referring to the following flow chart.



Preliminary Check (Cont'd)

PRELIMINARY CHECK 8

Noise

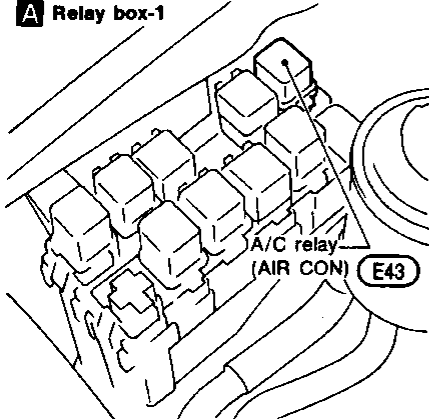


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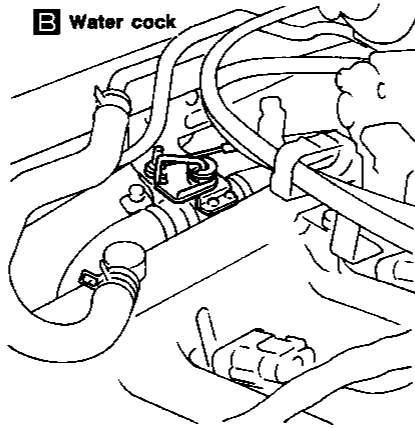
Harness Layout

Engine compartment

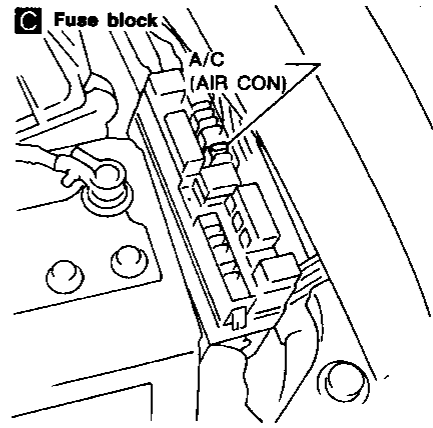
A Relay box-1



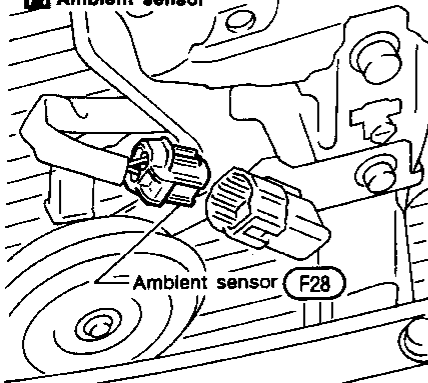
B Water cock



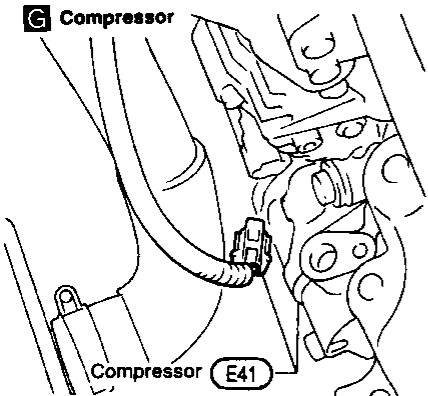
C Fuse block



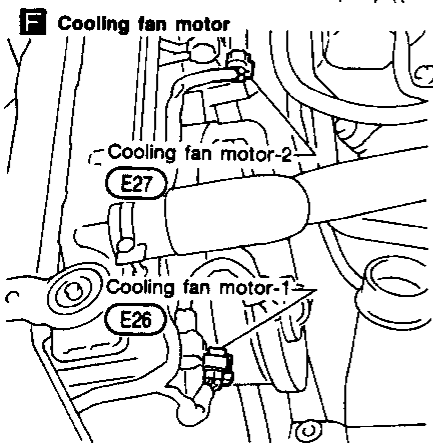
H Ambient sensor



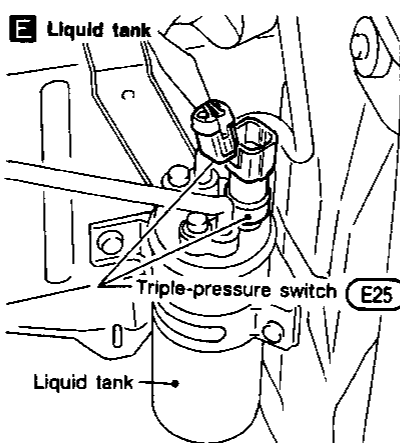
G Compressor



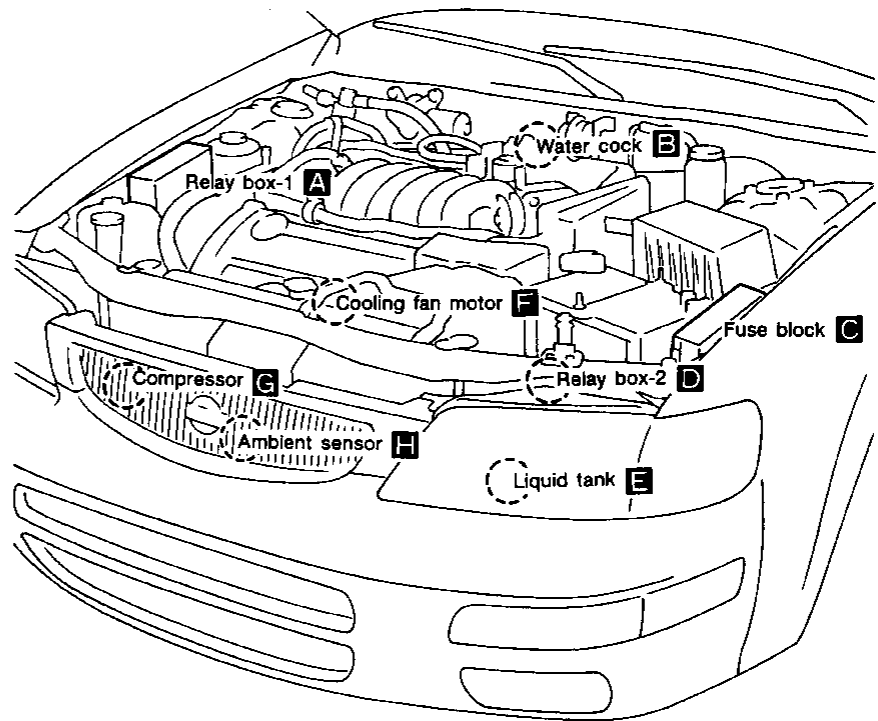
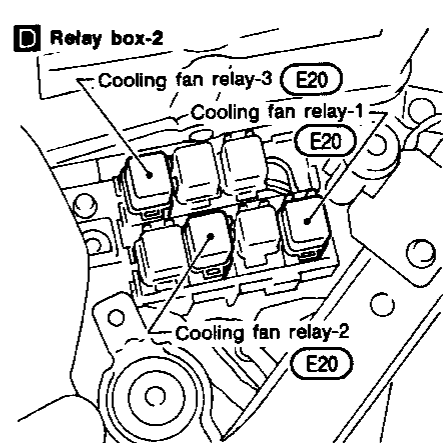
F Cooling fan motor



E Liquid tank



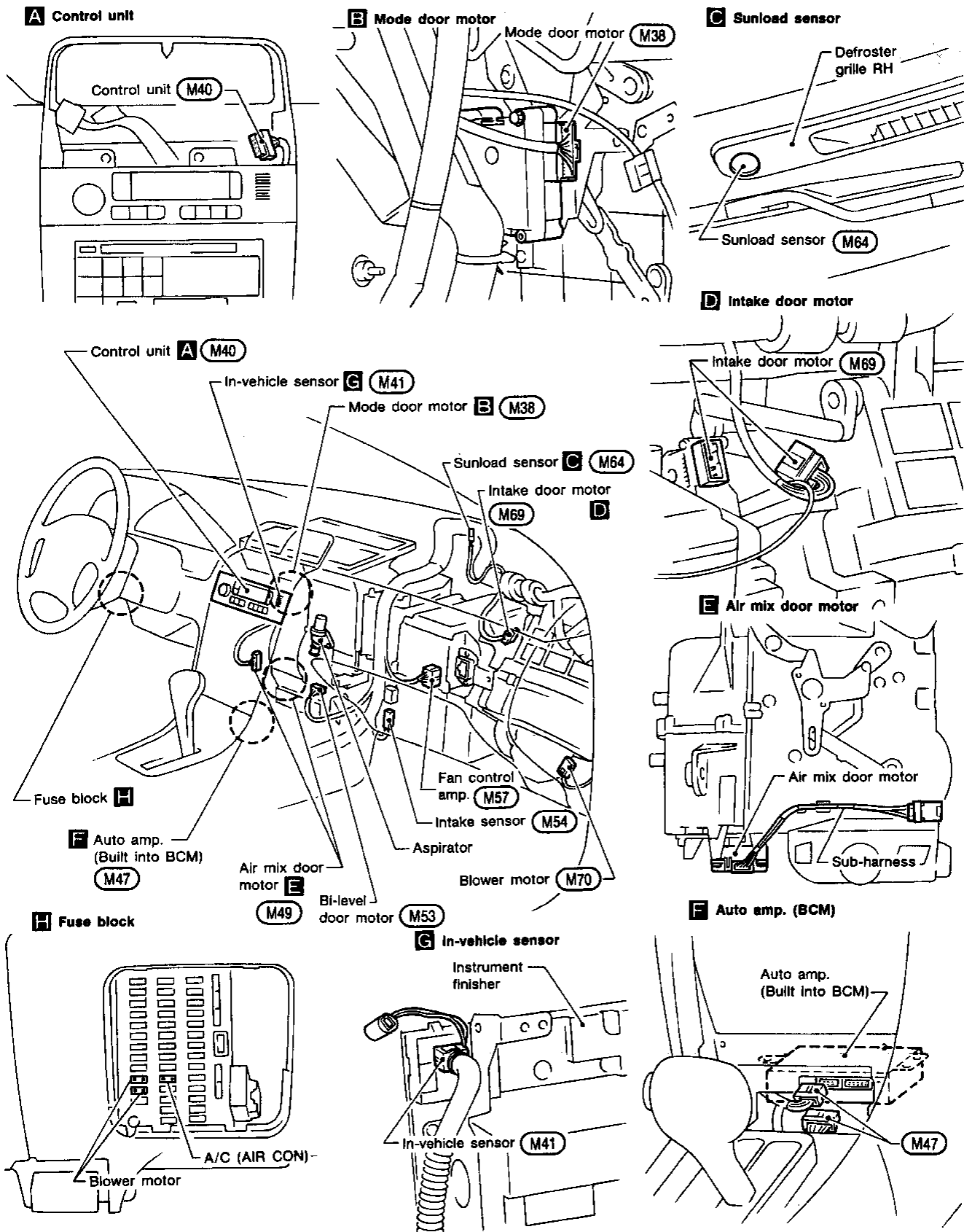
D Relay box-2



RHA455E

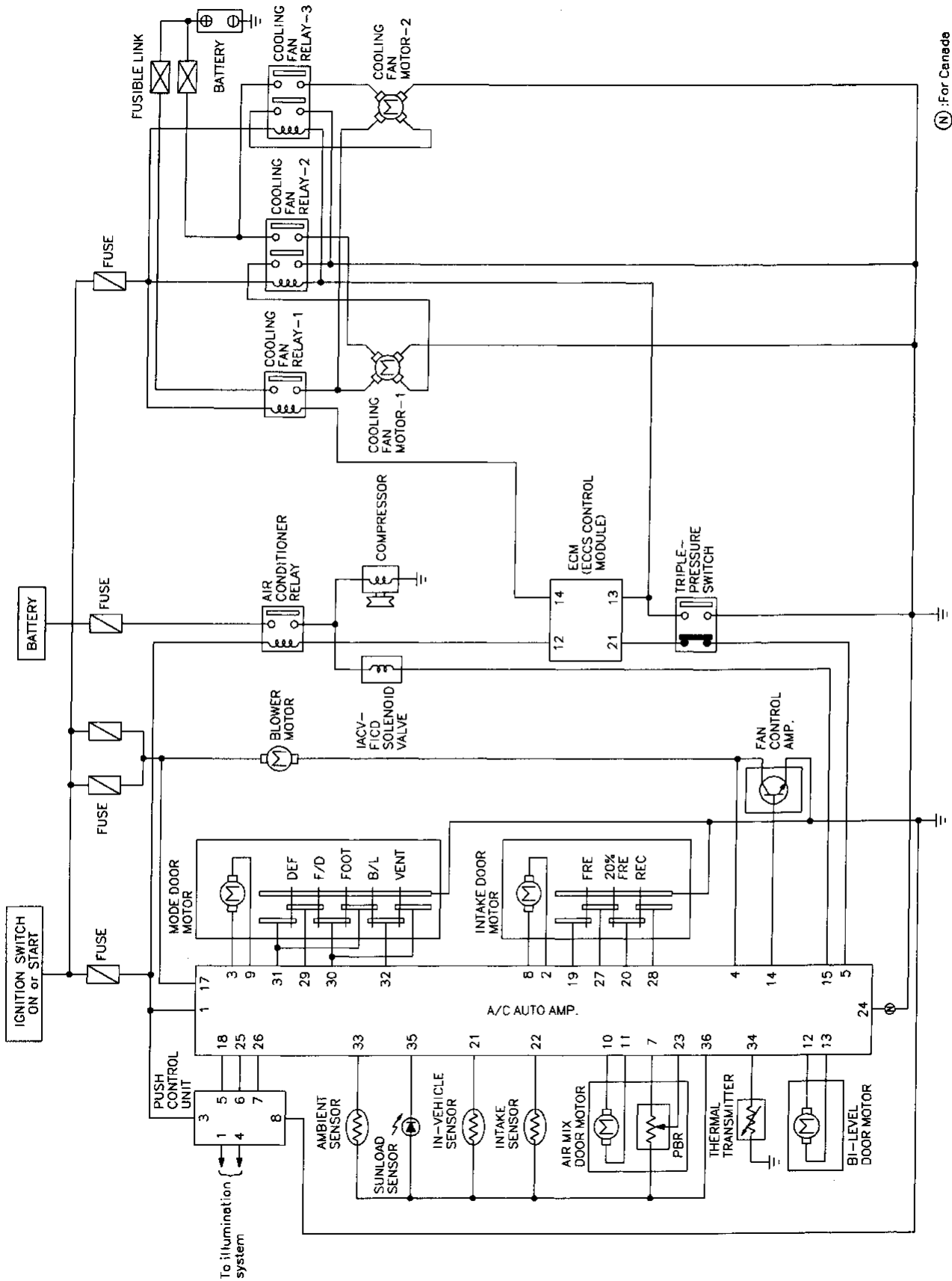
Harness Layout (Cont'd)

Passenger compartment



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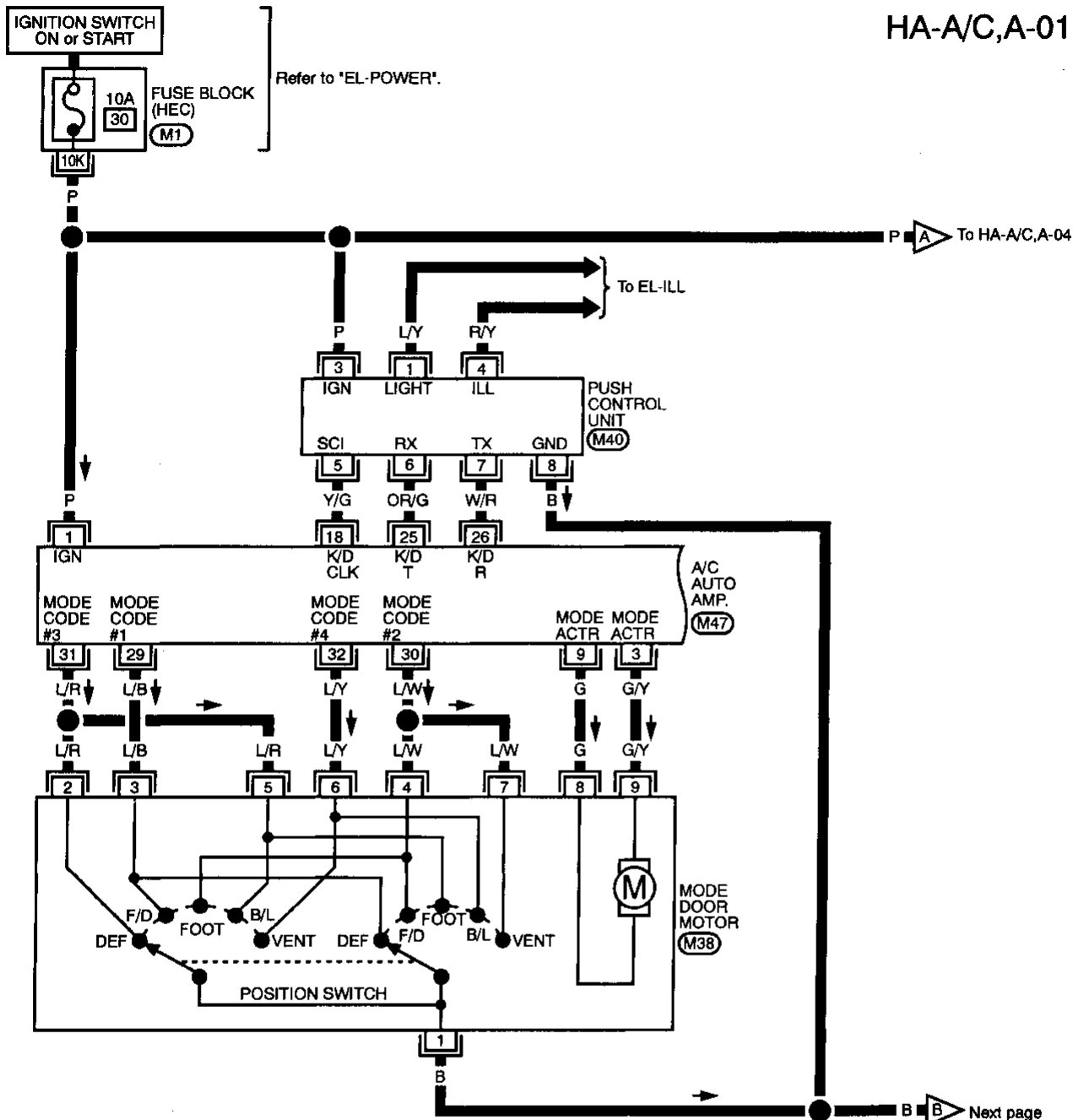
Circuit Diagram for Quick Pinpoint Check



(N) : For Canada

Wiring Diagram — A/C, A —

HA-A/C,A-01



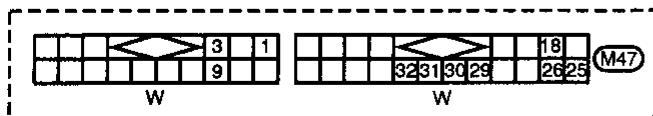
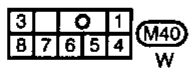
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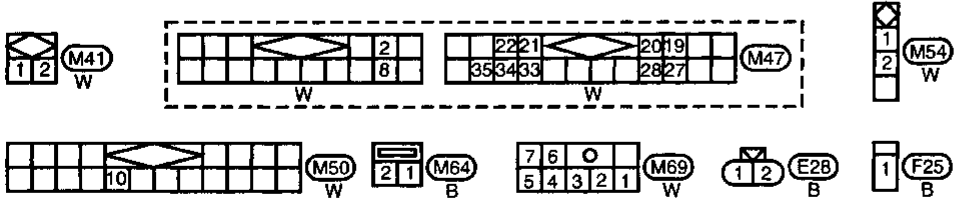
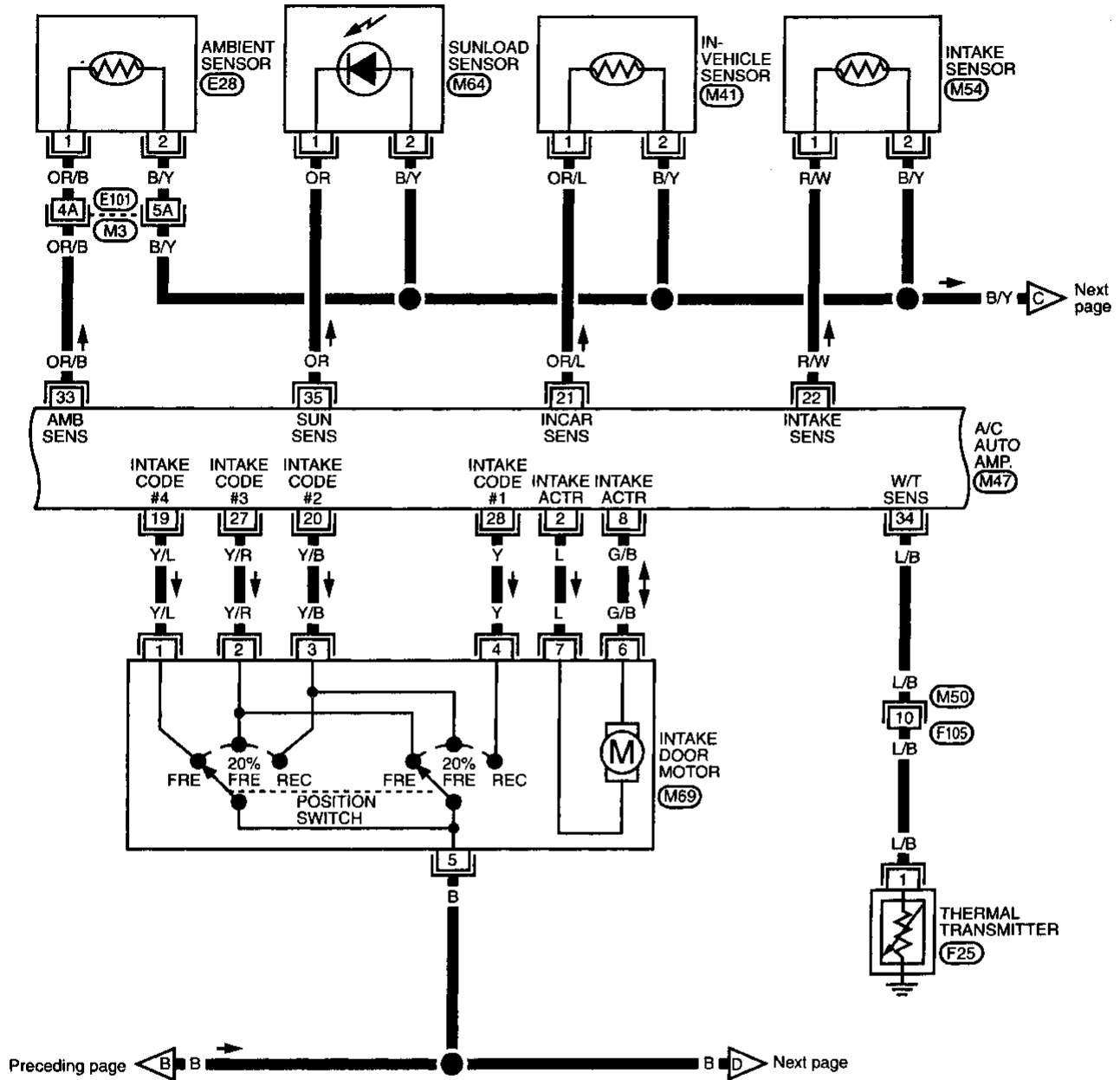
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M1



Wiring Diagram — A/C, A — (Cont'd)

HA-A/C,A-02

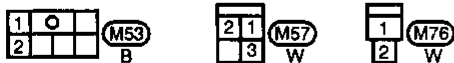
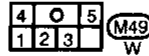
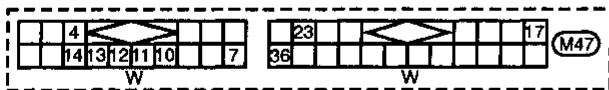
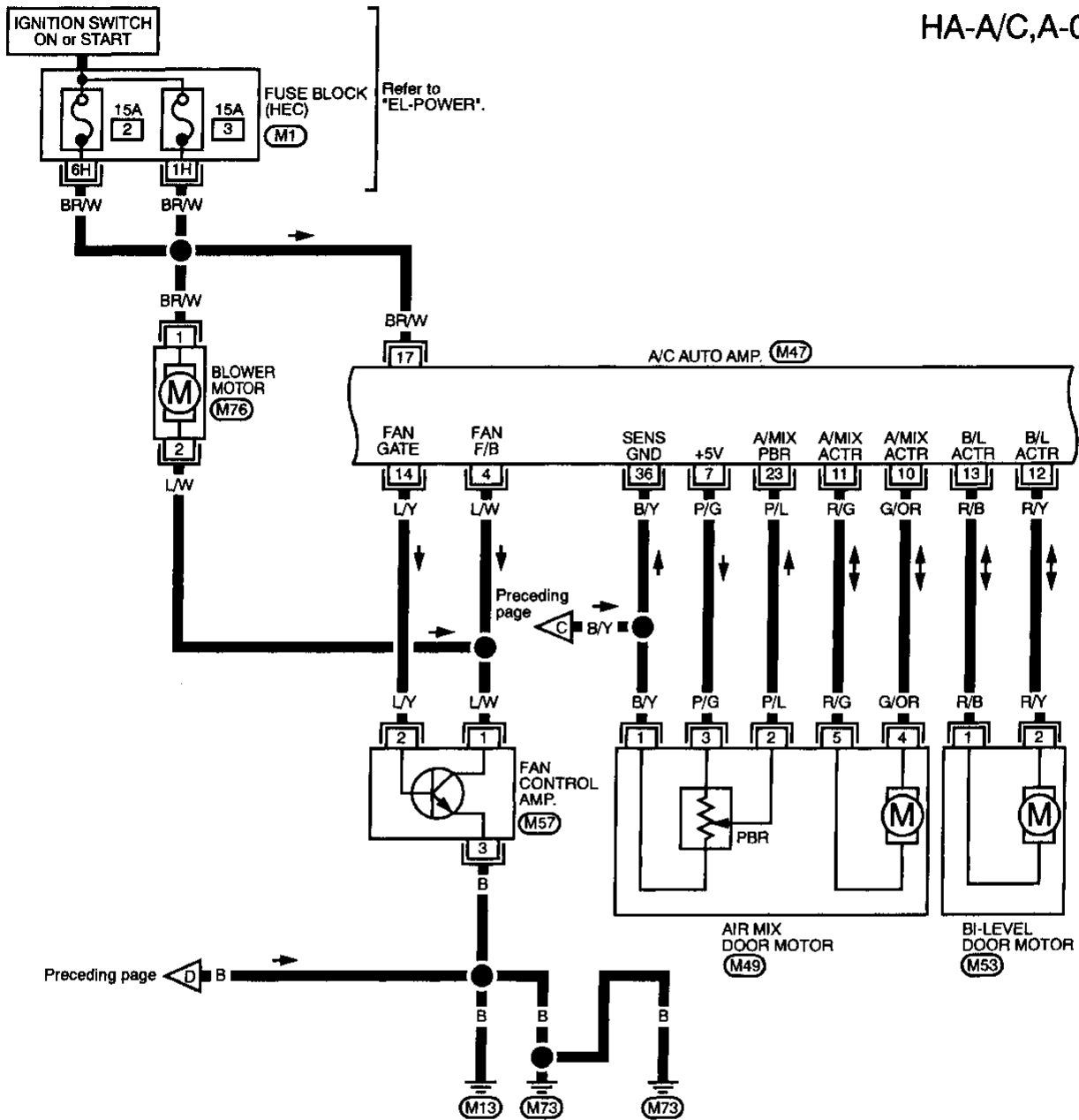


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M3, E101

Wiring Diagram — A/C, A — (Cont'd)

HA-A/C,A-03



Refer to last page (Foldout page).
(M1)

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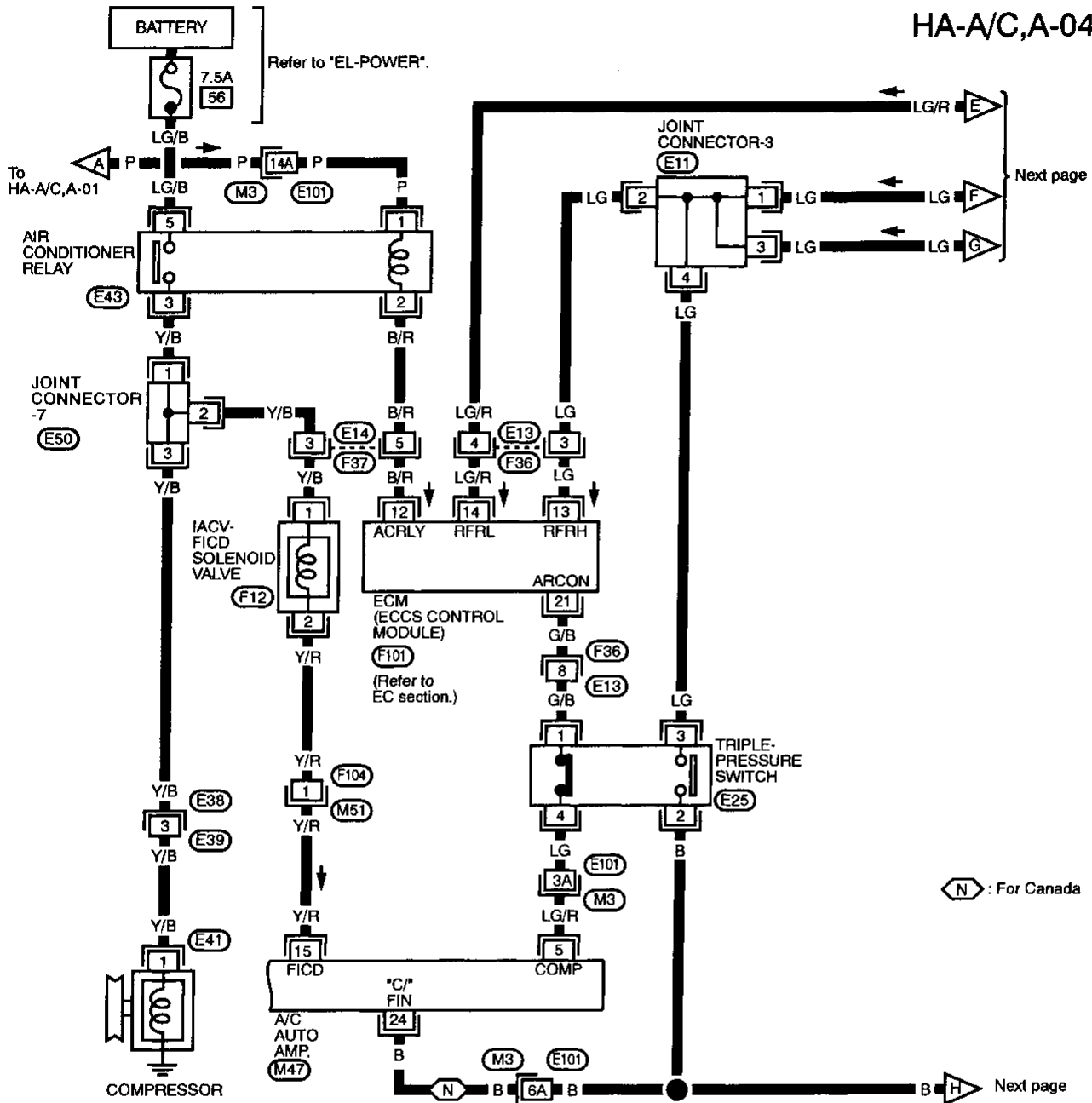
HA

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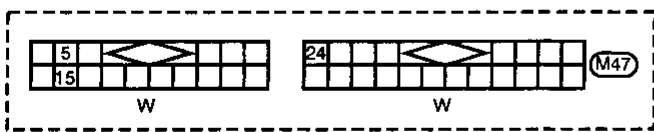
IDX

Wiring Diagram — A/C, A — (Cont'd)

HA-A/C,A-04



N : For Canada



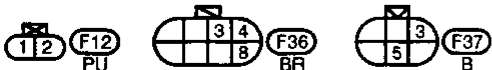
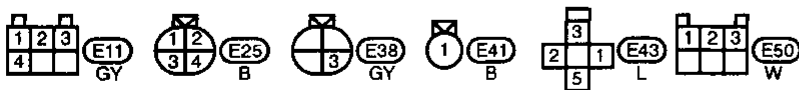
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M3, E101

E11

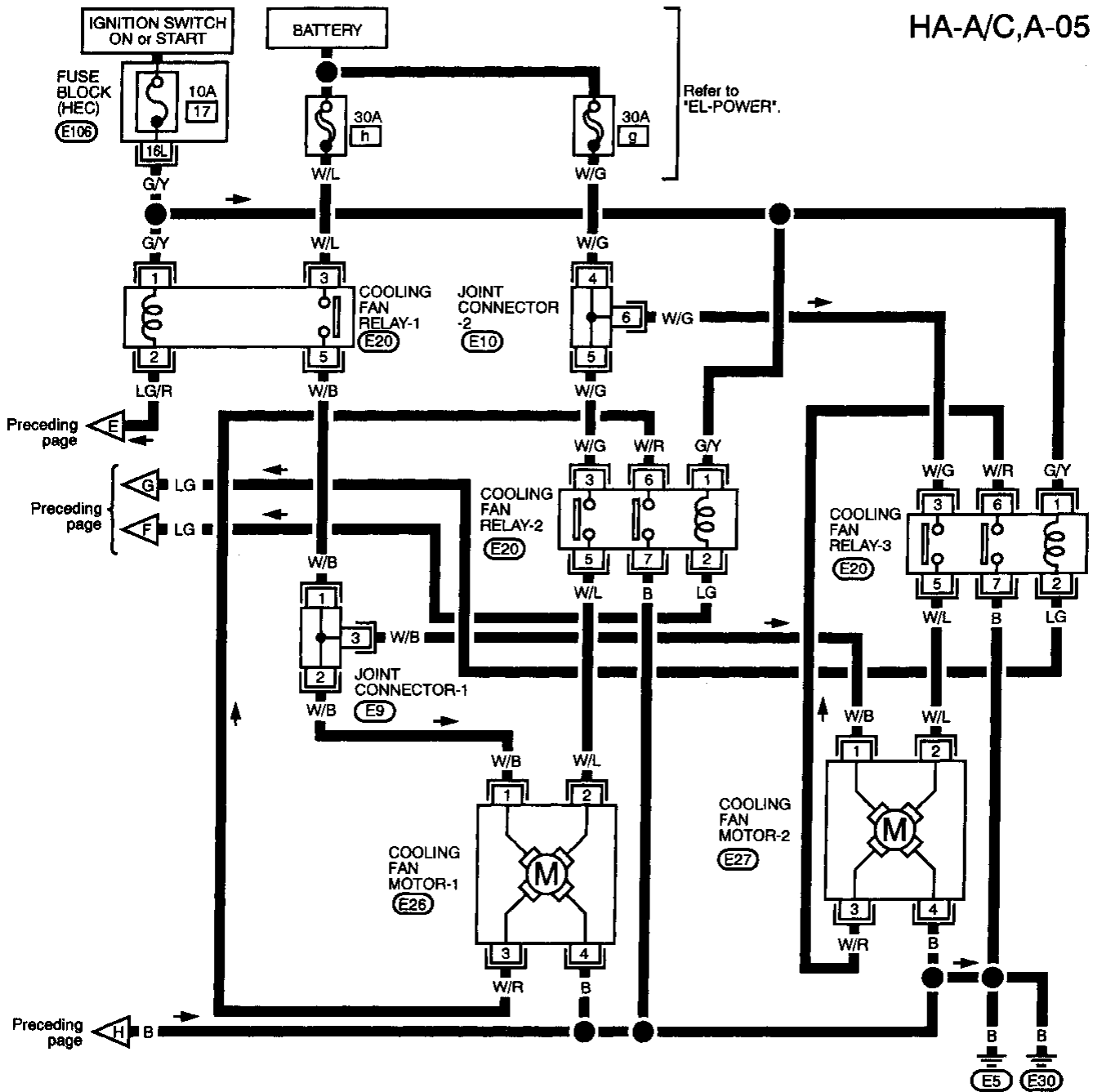
E50

F101



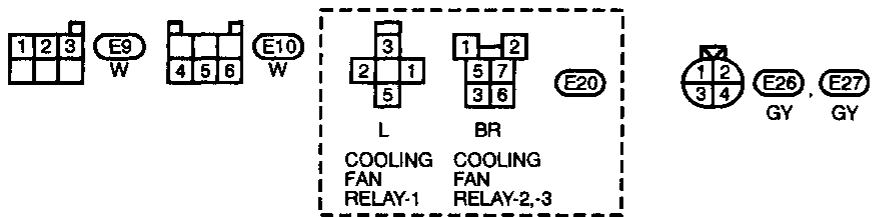
Wiring Diagram — A/C, A — (Cont'd)

HA-A/C,A-05



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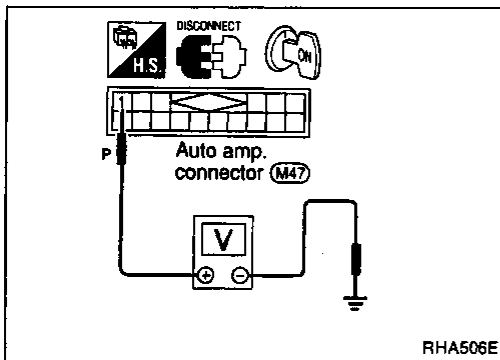


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**Main Power Supply and Ground Circuit Check
POWER SUPPLY CIRCUIT CHECK FOR AUTO A/C
SYSTEM**

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

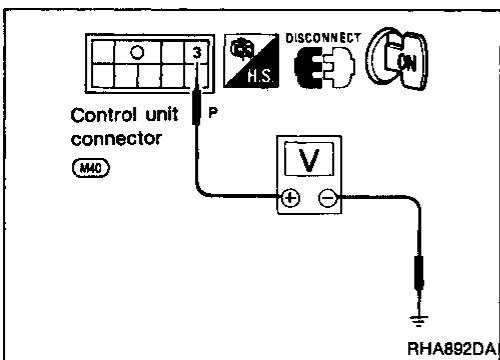


AUTO AMP. (BCM) CHECK

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

1. Disconnect auto amp. (BCM) harness connector.
2. Connect voltmeter from harness side.
3. Measure voltage across terminal ① and body ground.

Voltmeter terminal		Voltage
⊕	⊖	
①	Body ground	Approx. 12V

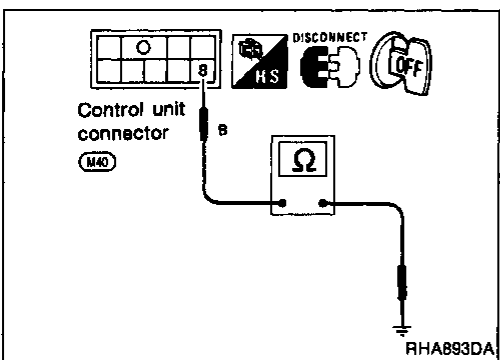


CONTROL UNIT CHECK

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

1. Disconnect push control unit harness connector.
2. Connect voltmeter from harness side.
3. Measure voltage across terminal ③ and body ground.

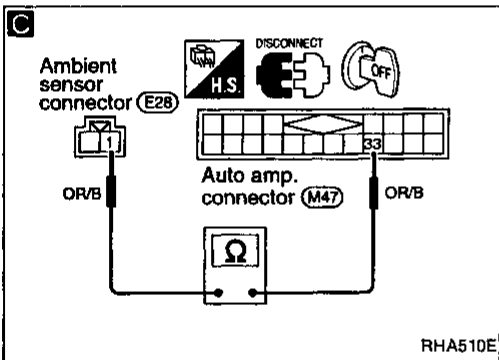
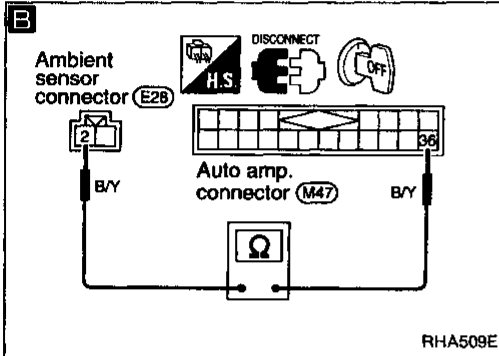
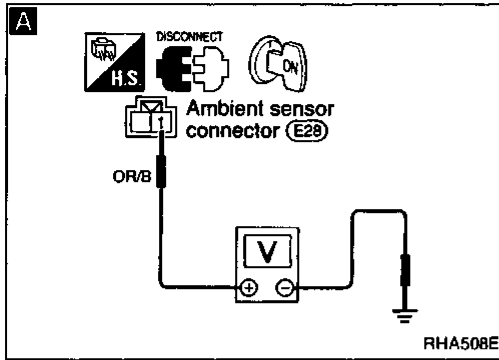
Voltmeter terminal		Voltage
⊕	⊖	
③	Body ground	Approx. 12V



Check body ground circuit for push control unit.

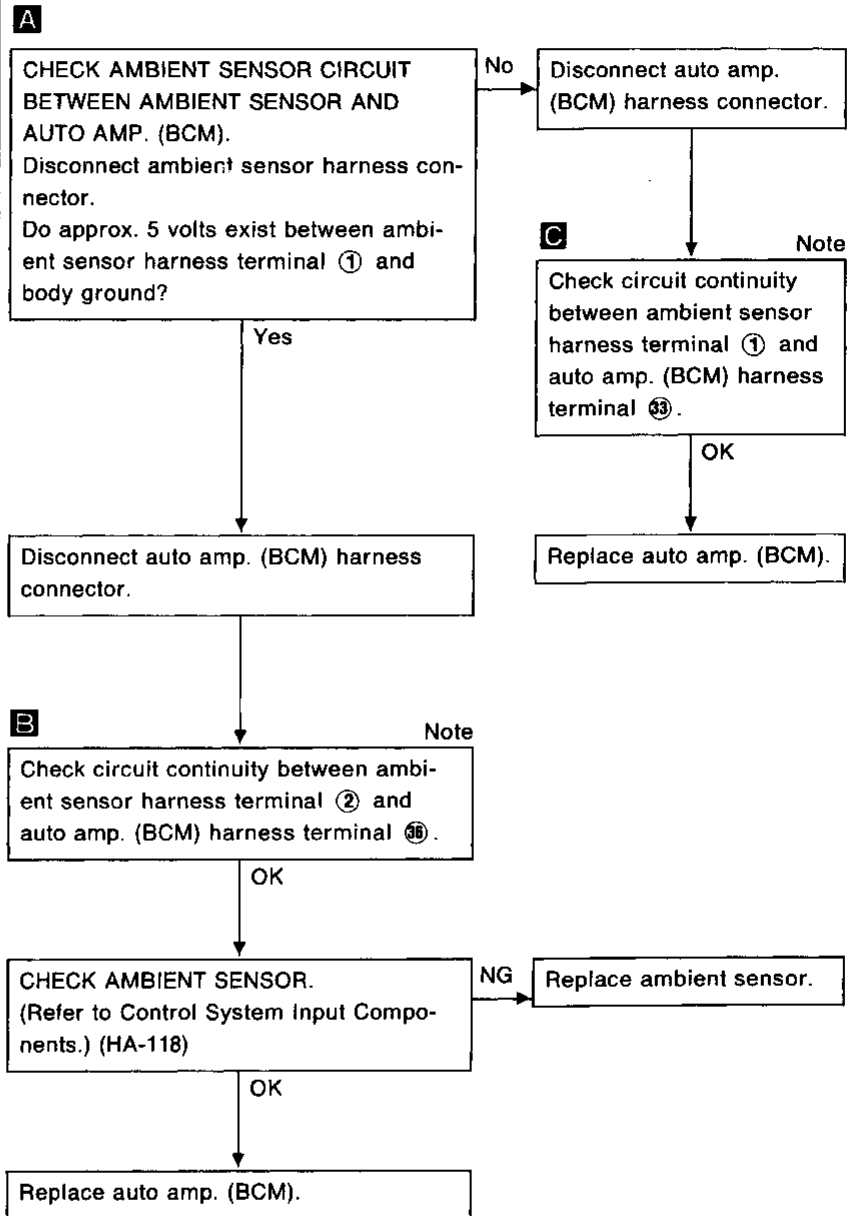
1. Disconnect push control unit harness connector.
2. Connect ohmmeter from harness side.
3. Check for continuity between terminal ⑧ and body ground.

Ohmmeter terminal		Continuity
⊕	⊖	
⑧	Body ground	Yes



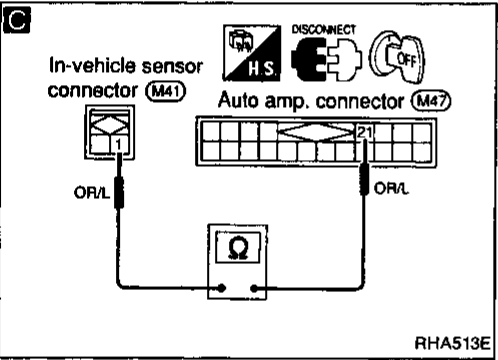
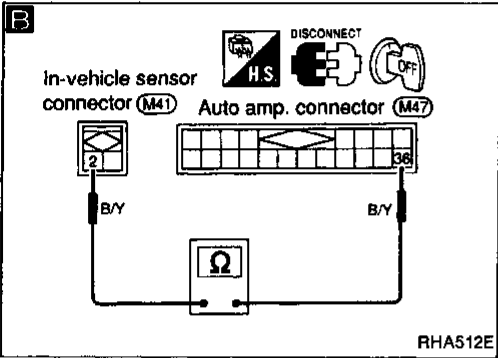
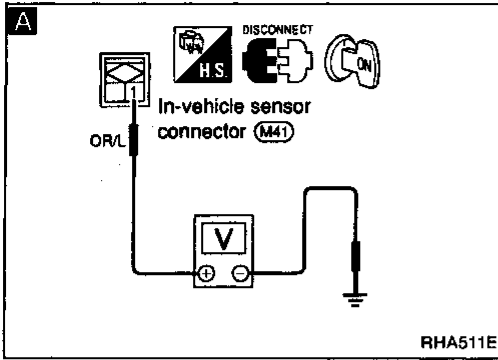
Diagnostic Procedure 1

SYMPTOM: Ambient sensor circuit is open or shorted. (21 or -21 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.

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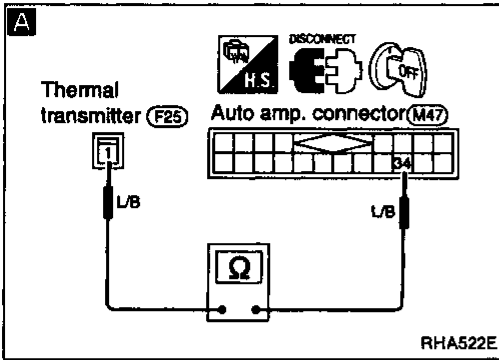
Diagnostic Procedure 2

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.)

```

    graph TD
        A[A] --> B{CHECK IN-VEHICLE SENSOR CIRCUIT BETWEEN IN-VEHICLE SENSOR AND AUTO AMP. (BCM).  
Disconnect in-vehicle sensor harness connector.  
Do approx. 5 volts exist between in-vehicle sensor harness terminal ① and body ground?}
        B -- No --> C[Disconnect auto amp. (BCM) harness connector.]
        B -- Yes --> D[Disconnect auto amp. (BCM) harness connector.]
        C --> E[Check circuit continuity between in-vehicle sensor harness terminal ① and auto amp. (BCM) harness terminal ②].
        E -- OK --> F[Replace auto amp. (BCM).]
        D --> G[Check circuit continuity between in-vehicle sensor harness terminal ② and auto amp. (BCM) harness terminal ③].
        G -- OK --> H{CHECK IN-VEHICLE SENSOR.  
(Refer to Control System Input Components.) (HA-117)}
        H -- NG --> I[Replace in-vehicle sensor.]
        H -- OK --> J[Replace auto amp. (BCM).]
    
```

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



Diagnostic Procedure 3

SYMPTOM: Thermal transmitter circuit is open or shorted. (23 or -23 is indicated on display as a result of conducting Self-diagnosis STEP 2.)

A Note

CHECK THERMAL TRANSMITTER CIRCUIT BETWEEN THERMAL TRANSMITTER AND AUTO AMP. (BCM). Disconnect thermal transmitter harness connector and auto amp. (BCM) harness connector. Check circuit continuity between thermal transmitter harness terminal ① and auto amp. (BCM) harness terminal ③.

OK

CHECK THERMAL TRANSMITTER. Refer to EL section.

OK

Replace auto amp. (BCM).

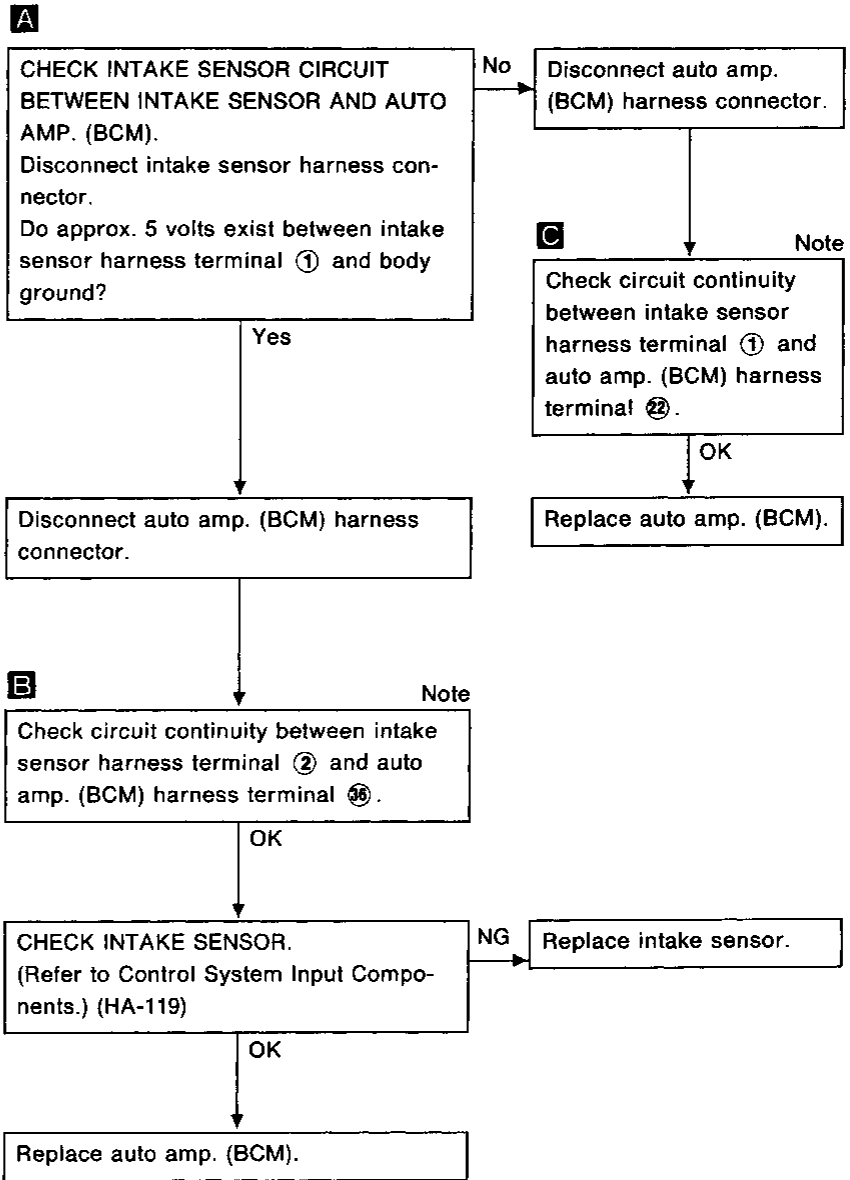
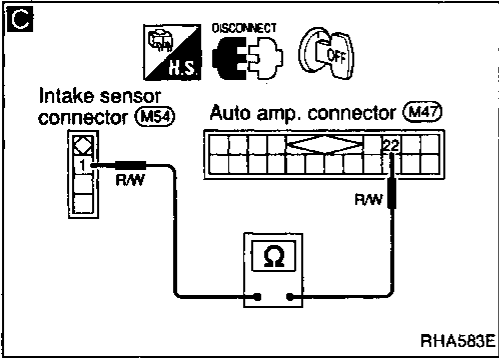
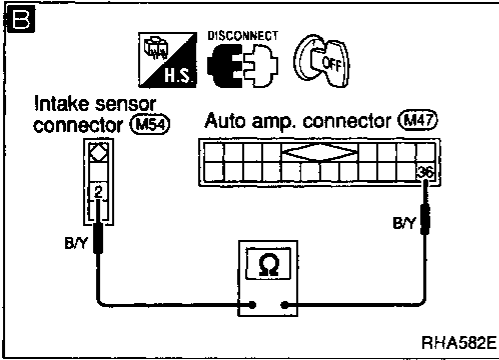
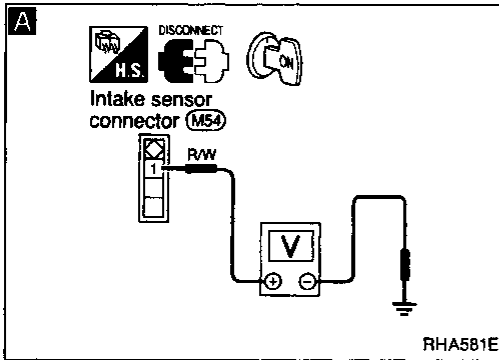
Note:

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

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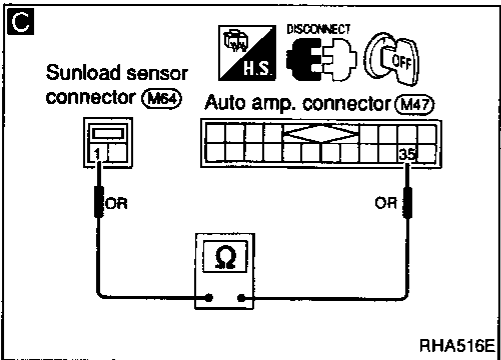
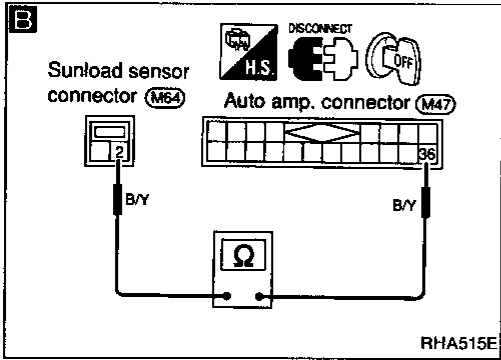
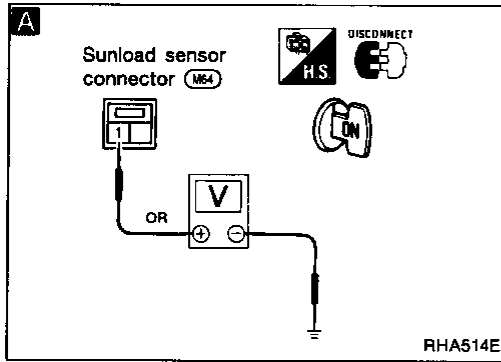
Diagnostic Procedure 4

SYMPTOM: Intake sensor circuit is open or shorted. (P4 or -P4 is indicated on display as a result of conducting Self-diagnosis STEP 2.)



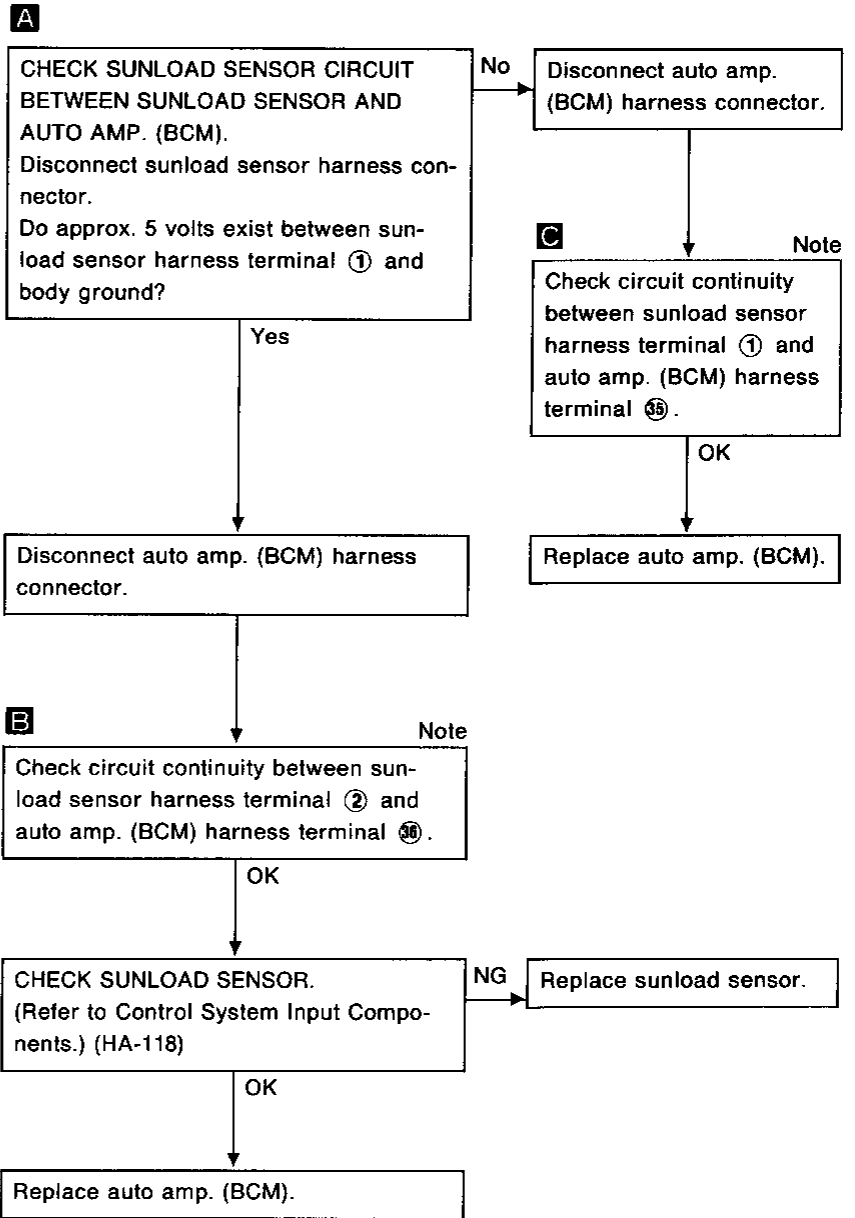
Note:

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



Diagnostic Procedure 5

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

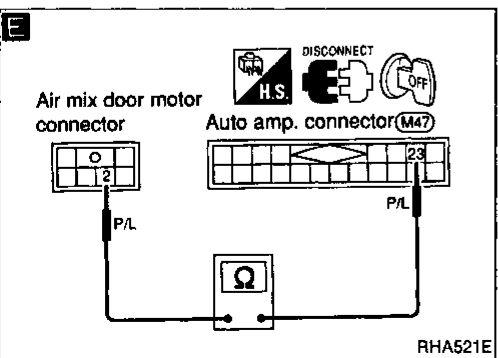
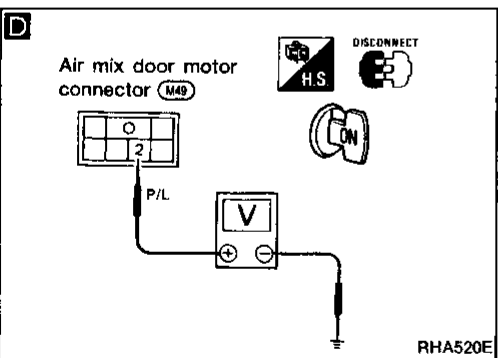
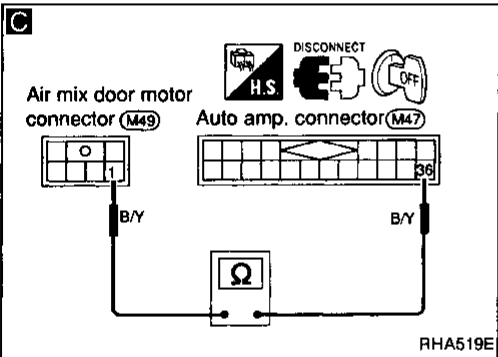
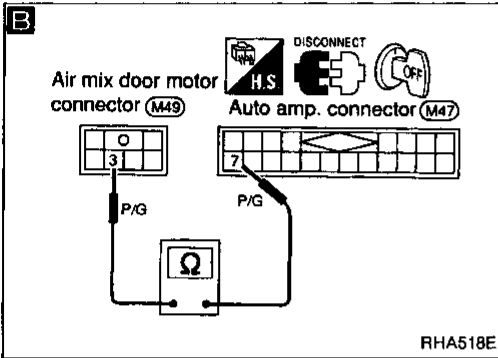
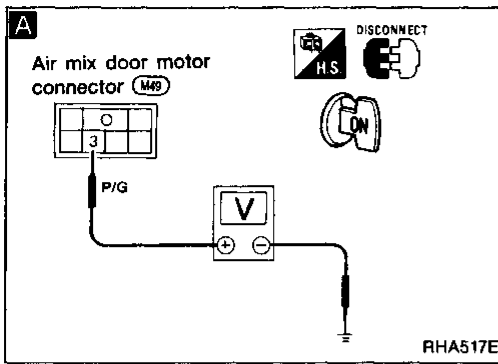


Note:
If the result is NG after checking circuit continuity, repair harness or connector.

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Diagnostic Procedure 6

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



A
CHECK PBR CIRCUIT BETWEEN PBR AND AUTO AMP. (BCM).
Disconnect air mix door motor harness connector.
Do approx. 5 volts exist between air mix door motor harness terminal ③ and body ground?

No → Disconnect auto amp. (BCM) harness connector.

B Note
Check circuit continuity between air mix door motor harness terminal ③ and auto amp. (BCM) harness terminal ⑦.

OK → Replace auto amp. (BCM).

Yes → Disconnect auto amp. (BCM) harness connector.

C Note
Check circuit continuity between air mix door motor harness terminal ① and auto amp. harness terminal ③⑥.

OK →
D
CHECK PBR CIRCUIT BETWEEN PBR AND AUTO AMP. (BCM).
1. Set temperature switch to full hot 32°C (90°F) with ignition switch ON.
2. Turn ignition switch OFF.
3. Reconnect auto amp. (BCM) harness connector.
4. Do approx. 5 volts exist between air mix door motor harness terminal ② and body ground?

Yes → Disconnect auto amp. (BCM) harness connector.

E Note
Check circuit continuity between air mix door motor harness terminal ② and auto amp. (BCM) harness terminal ②③.

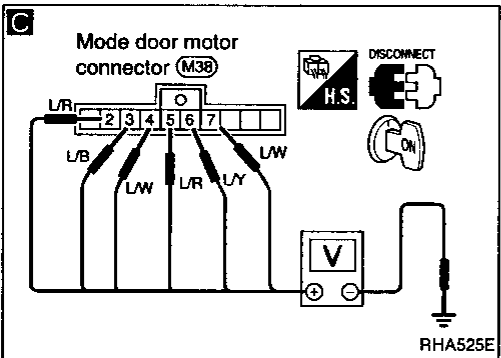
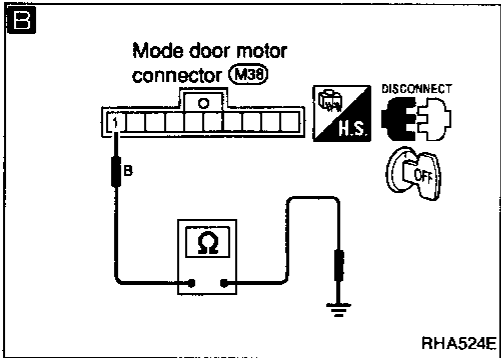
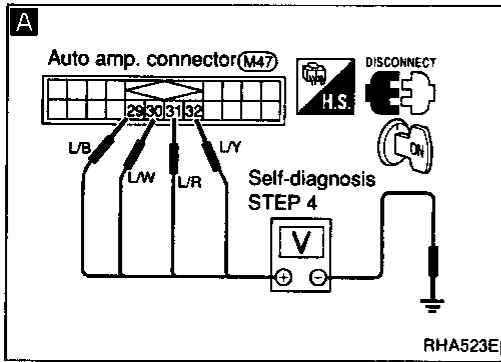
OK → Replace auto amp. (BCM).

No →
CHECK PBR.
(Refer to Control System Output Components.) (HA-122)

NG → Replace air mix door motor (PBR).

OK → Replace auto amp. (BCM).

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



Diagnostic Procedure 7

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.

1. Set up code No. 41 in Self-diagnosis STEP 4.
2. Disconnect auto amp. (BCM) harness connector after turning ignition switch OFF.
3. Check if continuity exists between terminal ⑩ or ⑪ of auto amp. (BCM) harness connector and body ground.
4. Using above procedure, check for continuity in any other mode, as indicated in chart.

Code No.	Condition	Terminal No.		Continuity
		⊕	⊖	
41	VENT	⑩ or ⑪	Body ground	Yes
42 or 43	B/L	⑫ or ⑬		
44	FOOT	⑭ or ⑮		
45	F/D	⑯ or ⑰		
46	DEF	⑱ or ⑲		

OK

INSPECTION END

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 ① and body ground?

OK

Reconnect auto amp. (BCM) harness connector.

C

CHECK POWER SUPPLY FOR MODE DOOR MOTOR CONTROL CIRCUIT.
Do approx. 5 volts exist between mode door motor harness terminals and body ground?

Terminal No.		Voltage
⊕	⊖	
②	Body ground	Approx. 5V
③		
④		
⑤		
⑥		
⑦		

Yes

Reconnect mode door motor harness connector.

No

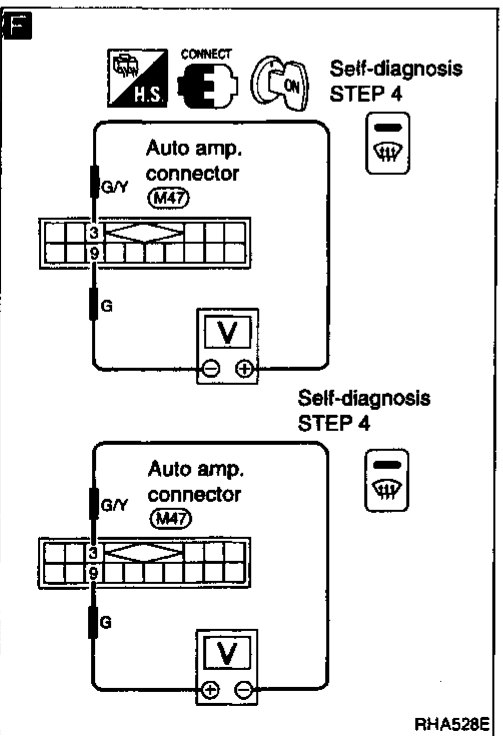
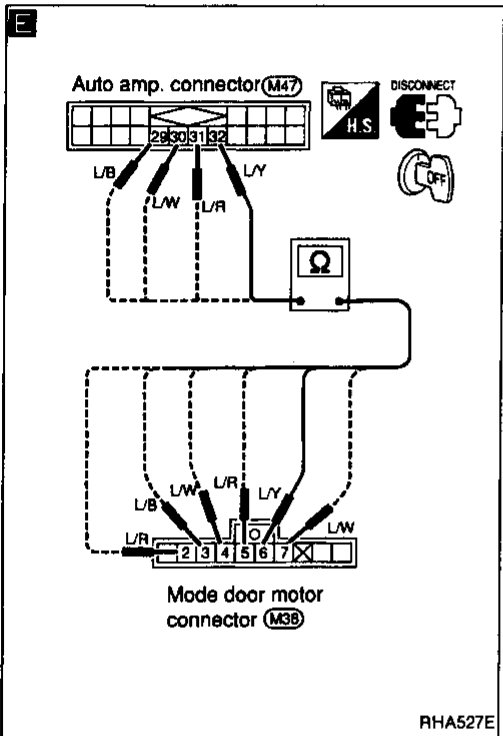
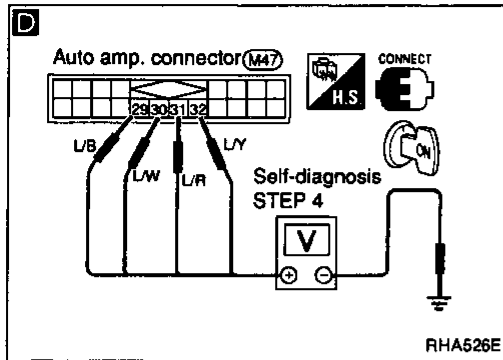
(Go to next page.)

Note:

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

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Diagnostic Procedure 7 (Cont'd)



D

CHECK MODE DOOR MOTOR POSITION SWITCH.
Set up Self-diagnosis STEP 4. Measure voltage across auto amp. (BCM) harness terminals and body ground.

Code No.	Con- dition	Terminal No.				⊖
		Ⓜ	Ⓝ	Ⓟ	Ⓠ	
41	VENT	0V	5V	0V	5V	Body ground
42 or 43	B/L1	0V	0V	5V	5V	
44	D/F 1	0V	5V	5V	0V	
45	D/F 2	5V	5V	0V	0V	
46	DEF	5V	0V	5V	0V	
		0V: Approx. 0V		5V: Approx. 5V		

E Note

Check circuit continuity between each terminal on auto amp. (BCM) and on mode door motor.

Terminal No.		Continuity
⊕	⊖	
Auto amp. (BCM)	Mode door motor	Yes
Ⓜ	Ⓝ	
Ⓝ	Ⓟ or Ⓠ	
Ⓟ	Ⓠ or Ⓡ	
Ⓡ	Ⓢ or Ⓣ	
Ⓣ	Ⓤ	

OK

Replace auto amp. (BCM).

OK →

NG → Replace mode door motor.

F

CHECK FOR OUTPUT OF AUTO AMP.
Do approx. 10.5 volts exist between auto amp. (BCM) harness terminals ③ and ⑨ when code No. is switched from "41" to "42" or when code No. is switched from "46" to "41"?

Code No.	Mode door motor operation	Terminal No.		Voltage V
		③	⑨	
41 → 42	VENT → B/L	⊕	⊖	Approx. 10.5
46 → 41	DEF → VENT	⊖	⊕	
-	Stop	-	-	0

Yes → Replace mode door motor.

No → Replace auto amp. (BCM).

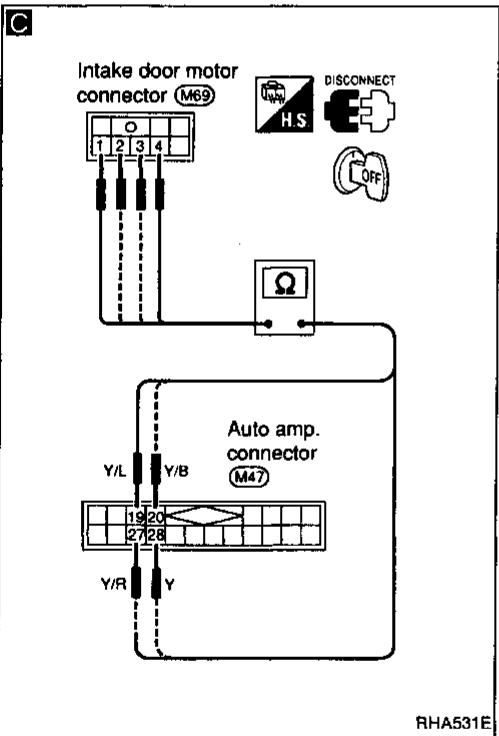
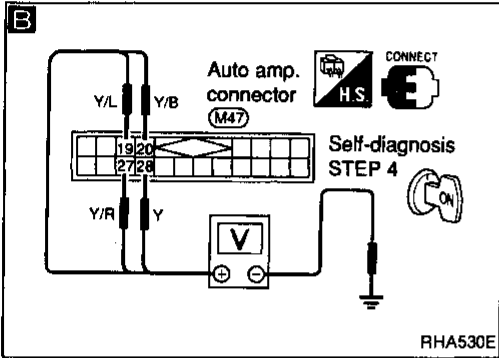
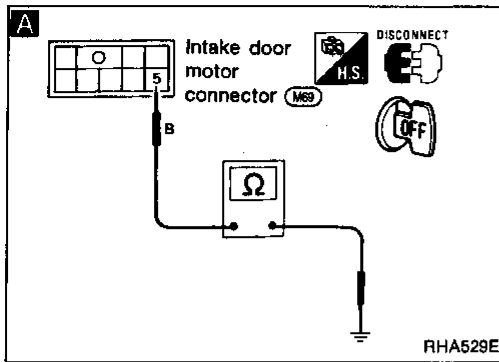
Note:
If the result is NG after checking circuit continuity, repair harness or connector.

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Diagnostic Procedure 8

SYMPTOM: Intake door motor does not operate normally.

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



A Note

CHECK BODY GROUND CIRCUIT FOR INTAKE DOOR MOTOR.
Disconnect intake door motor harness connector.
Does continuity exist between intake door motor harness terminal ⑤ and body ground?

B

CHECK FOR AUTO AMP. (BCM) OUTPUT.
Set up Self-diagnosis STEP 4.
Measure voltage across auto amp. (BCM) harness terminals and body ground.

Code No.	Terminal No.		Condition	Voltage V
	⊕	⊖		
41 42	⑳	Body ground	REC	12
	㉑			12
43	㉒		20% REC	12
	㉓			12
44	⑲	FRE	12	
45	㉔		12	
46			12	

0V: Approx. 0V
12V: Approx. 12V

OK

Replace intake door motor.

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

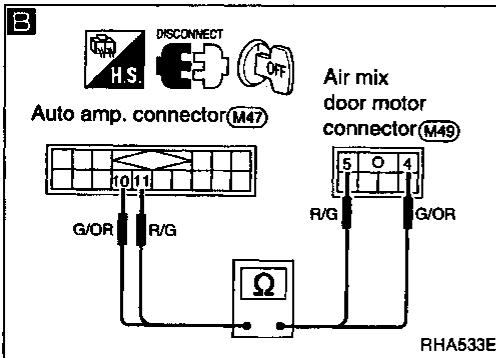
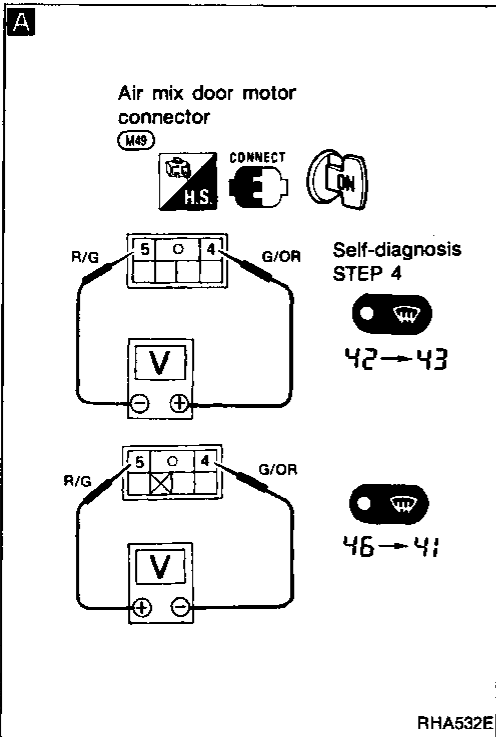
C Note

Check circuit continuity between each terminal on auto amp. (BCM) and on intake door motor.

Terminal No.		Continuity
Auto amp. (BCM)	Intake door motor	
⑲	①	Yes
㉓	②	
㉑	③	
㉒	④	

OK

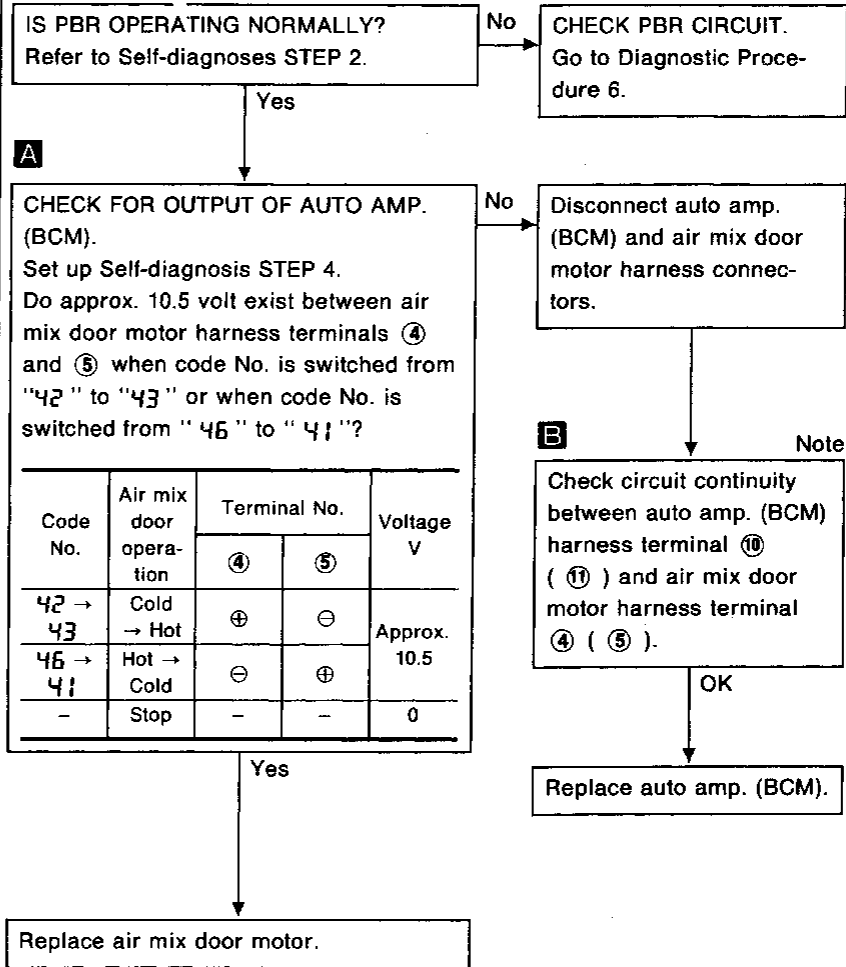
Replace auto amp. (BCM).



Diagnostic Procedure 9

SYMPTOM: Air mix door motor does not operate normally.

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



Note:

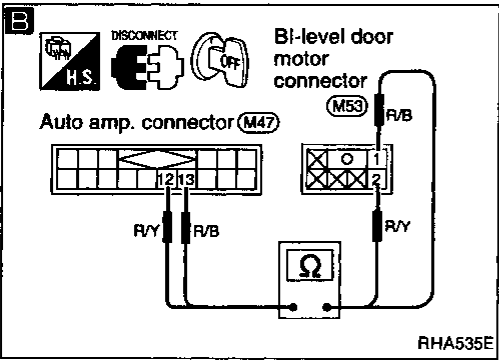
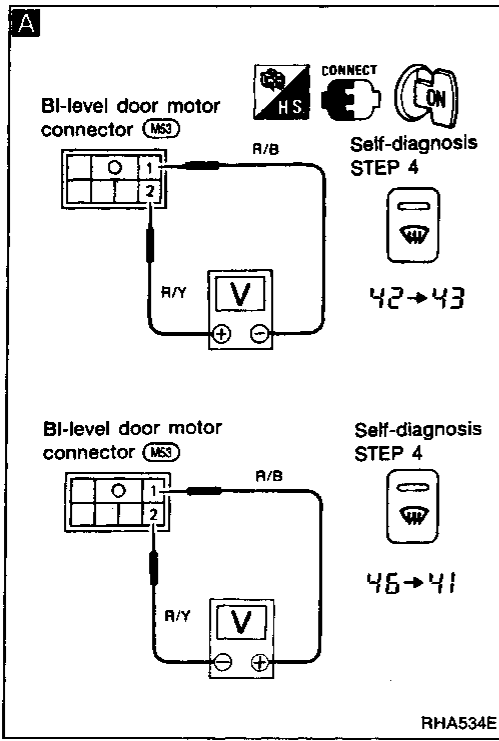
If the result is NG after checking circuit continuity, repair harness or connector.

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Diagnostic Procedure 10

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. (BCM) 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 → 43	OPEN → CLOSE	⊖	⊕	Approx. 12V
46 → 41	CLOSE → OPEN	⊕	⊖	

Yes → Replace B/L door motor.

No → Disconnect auto amp. (BCM) harness connector.

B

Note

Check circuit continuity between auto amp. (BCM) harness terminal ⑬ (⑫) and fresh vent door motor harness terminal ① (②).

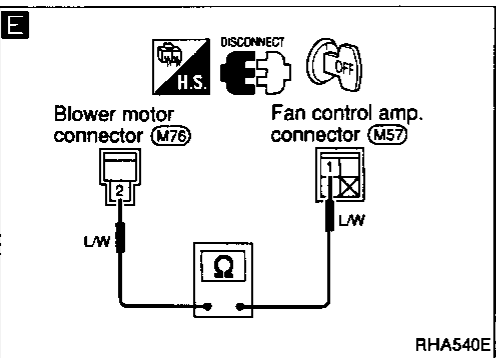
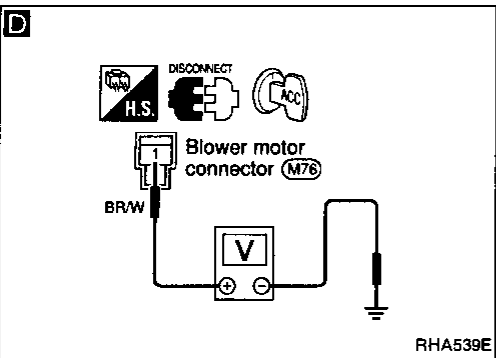
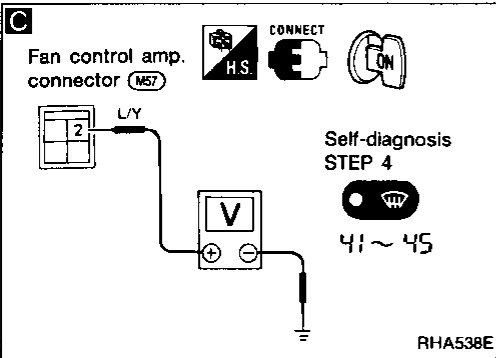
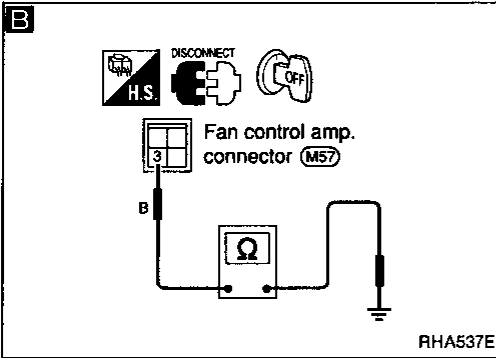
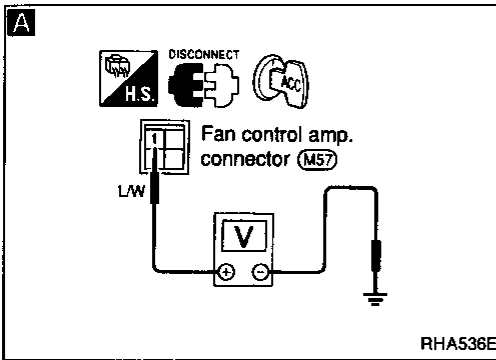
Replace auto amp. (BCM).

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

Diagnostic Procedure 11

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

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



A
CHECK POWER SUPPLY FOR FAN CONTROL AMP.
Disconnect fan control amp. harness connector.
Do approx. 12 volts exist between fan control amp. harness terminal ① and body ground?

B Note
CHECK BODY GROUND CIRCUIT FOR FAN CONTROL AMP.
Does continuity exist between fan control amp. harness terminal ③ and body ground?

Reconnect fan control amp. harness connector.

C
CHECK FOR OUTPUT OF AUTO AMP.
Set up Self-diagnosis STEP 4.
Measure voltage across fan control amp. harness terminal ② and body ground.

Code No.	Terminal No.		Voltage
	⊕	⊖	
41 → 45	②	Body ground	Approx. 2.5 - 9.0V

Replace fan control amp.

D
CHECK POWER SUPPLY FOR BLOWER MOTOR.
Disconnect blower motor harness connector.
Do approx. 12 volts exist between blower motor harness terminal ① and body ground?

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

E Note
Check circuit continuity between blower motor harness terminal ② and fan control amp. harness terminal ①.

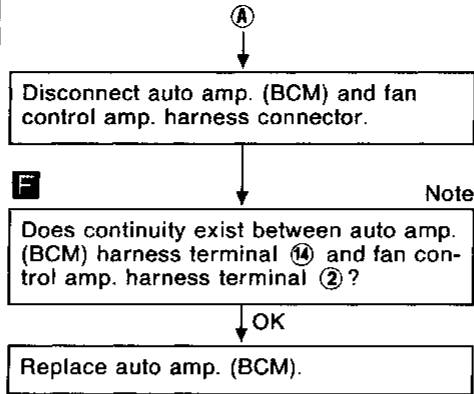
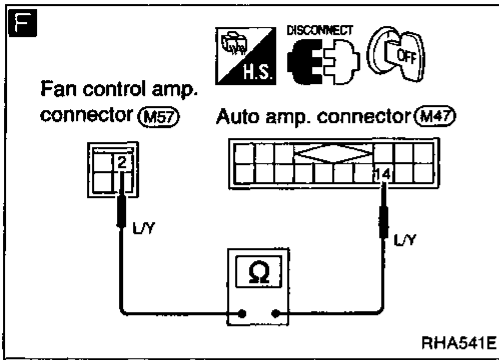
CHECK BLOWER MOTOR. (Refer to Electrical Components Inspection.) (HA-113)

Replace blower motor.

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

NG → (A) (Go to next page.)

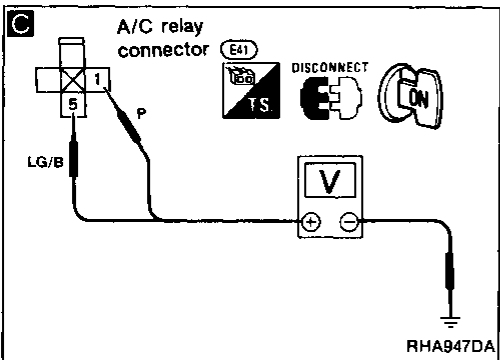
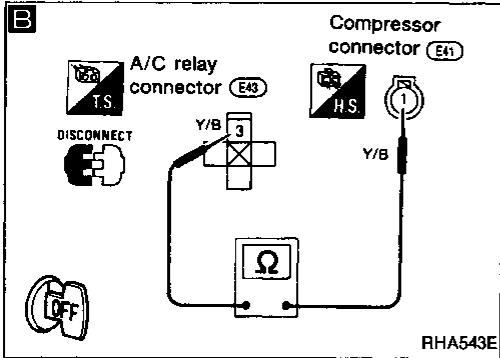
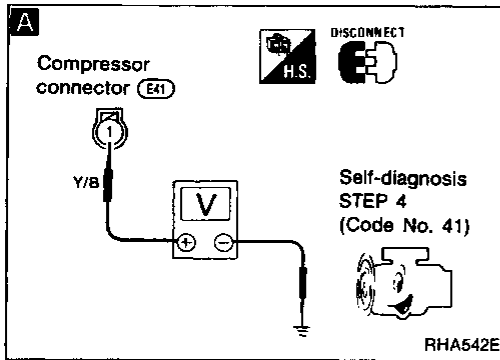
Diagnostic Procedure 11 (Cont'd)



Note:

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

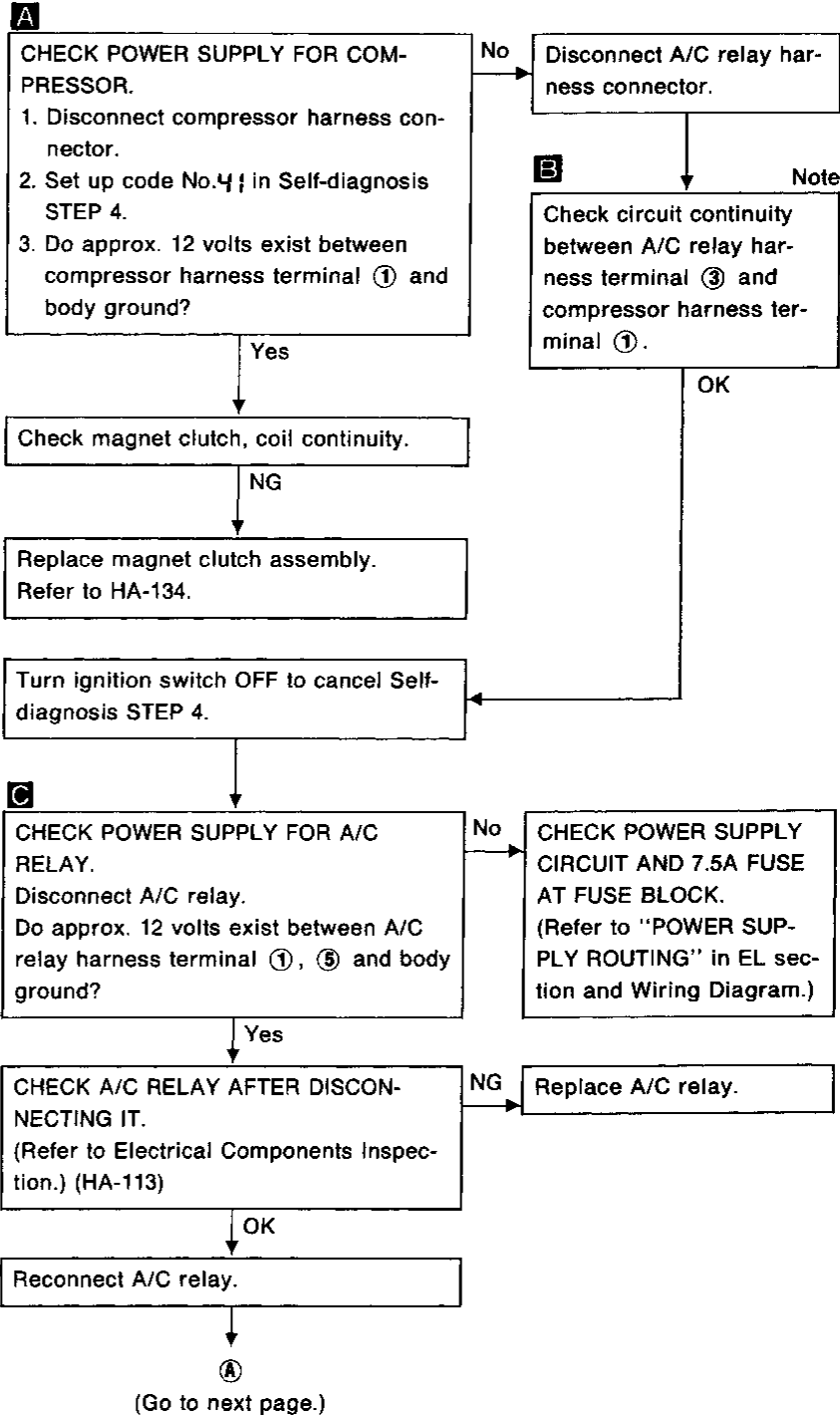
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Diagnostic Procedure 12

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

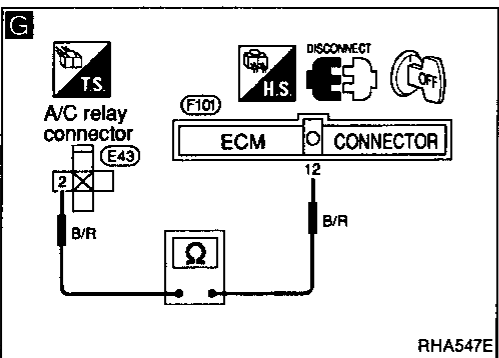
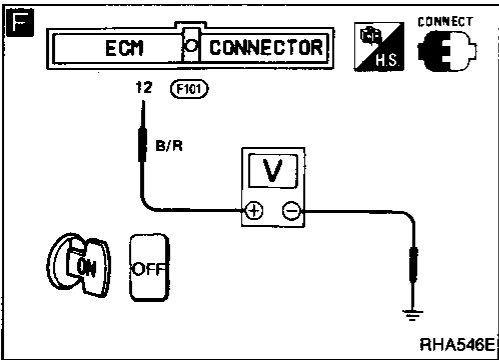
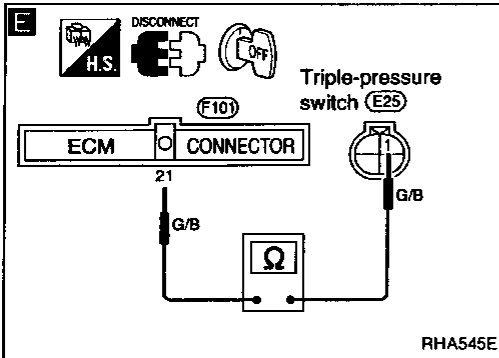
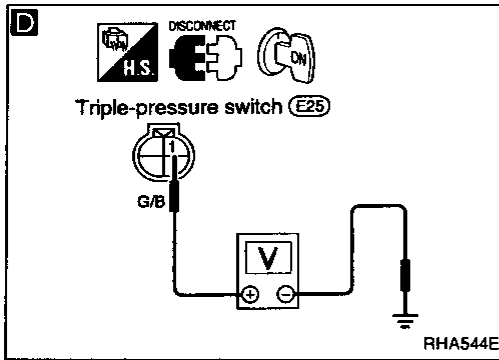
- Perform Preliminary Check 6 before referring to the flow chart.



Note:

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

Diagnostic Procedure 12 (Cont'd)



D

CHECK TRIPLE-PRESSURE SWITCH CIRCUIT BETWEEN TRIPLE-PRESSURE SWITCH AND ECM (ECCS CONTROL MODULE).
Disconnect triple-pressure switch harness connector.
Do approx. 12 volts exist between triple-pressure switch harness terminal ① and body ground?

No → Disconnect ECM (ECCS control module) harness connector.

Yes →

E *Note*
Check circuit continuity between ECM (ECCS control module) harness terminal ② and triple-pressure switch harness terminal ①.

OK → CHECK ECM (ECCS control module)

NG → Replace triple-pressure switch.

D (continued)
CHECK TRIPLE-PRESSURE SWITCH. (Refer to Electrical Components Inspection.) (HA-113)

OK → Reconnect triple-pressure switch harness connector.

NG →

F
CHECK COIL SIDE CIRCUIT OF A/C RELAY.
Do approx. 12 volts exist between ECM (ECCS control module) harness terminal ⑫ and body ground?

No → *Note*
Check circuit continuity between A/C relay harness terminal ② and ECM (ECCS control module) harness terminal ⑫.

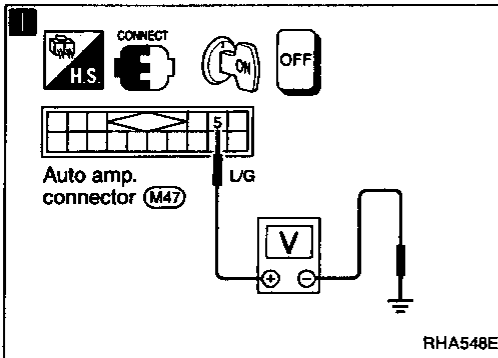
OK → ⑩ (Go to next page.)

Yes → CHECK ECM (ECCS CONTROL MODULE). (Refer to EC section.)

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

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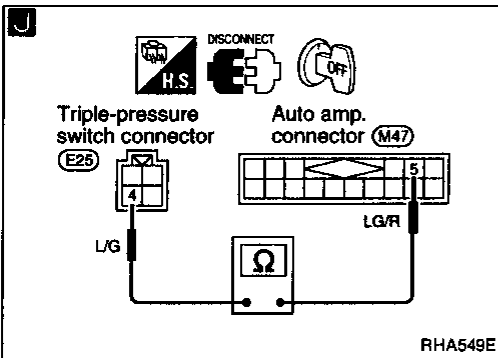
Diagnostic Procedure 12 (Cont'd)



⑧
Disconnect auto amp. (BCM) harness connector.

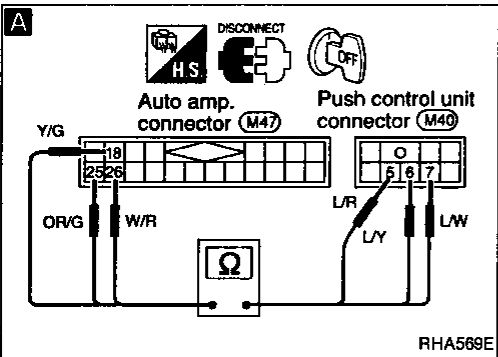
①
CHECK AUTO AMP. (BCM) CIRCUIT BETWEEN AUTO AMP. (BCM) AND TRIPLE-PRESSURE SWITCH. Do approx. 12 volts exist between auto amp. (BCM) harness terminal ⑤ and body ground?

④ Note
Check circuit continuity between auto amp. (BCM) harness terminal ⑤ and triple-pressure switch harness terminal ④.



OK
Replace auto amp. (BCM).

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



Diagnostic Procedure 13

SYMPTOM: ● Self-diagnosis cannot be performed.
● Multiplex communication error (52 with fan symbol detected as a result of conducting self-diagnosis STEP 5.)

CHECK MAIN POWER SUPPLY AND GROUND CIRCUIT FOR AUTO AMP. (BCM) AND CONTROL UNIT. (Refer to HA-96.)

NG
Repair Main Power Supply and Ground Circuit.

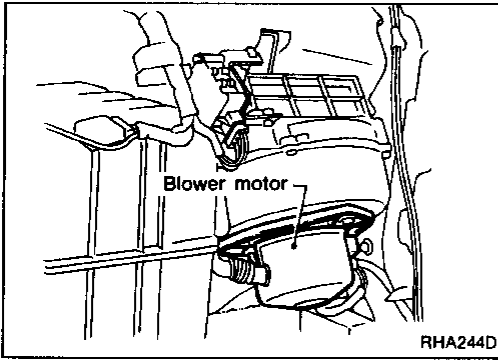
OK
Note

Check circuit continuity between each terminal on auto amp. (BCM) and push control unit.

Terminal No.		Continuity
⊕	⊖	
Auto amp. (BCM)	Push control unit	
⑮	⑤	Yes
⑳	⑥	
㉑	⑦	

OK
Replace auto amp. (BCM) or push control unit.

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



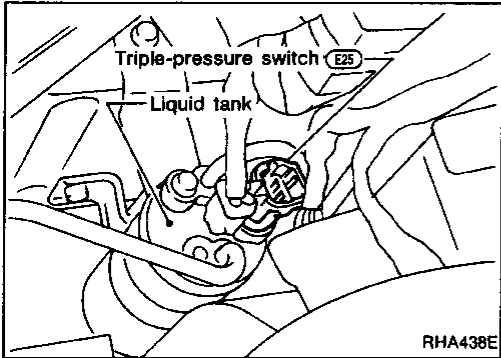
Electrical Components Inspection

BLOWER MOTOR

Check blower motor for smooth rotation.

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

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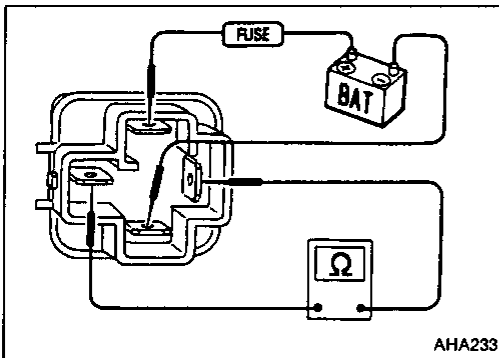


TRIPLE-PRESSURE SWITCH

	Terminals	High-pressure side line pressure kPa (kg/cm ² , psi)	Operation	Continuity
Low-pres- sure side	① - ④	Increasing to 157 - 226 (1.6 - 2.3, 23 - 33)	ON	Exists.
		Decreasing to 152.0 - 201.0 (1.55 - 2.05, 22.0 - 29.2)	OFF	Does not exist.
Medium- pressure side*	② - ③	Increasing to 1,422 - 1,618 (14.5 - 16.5, 206 - 235)	ON	Exists.
		Decreasing to 1,128 - 1,422 (11.5 - 14.5, 164 - 206)	OFF	Does not exist.
High-pres- sure side	① - ④	Increasing to 1,667 - 2,059 (17 - 21, 242 - 299)	ON	Exists.
		Decreasing to 2,452 - 2,844 (25 - 29, 356 - 412)	OFF	Does not exist.

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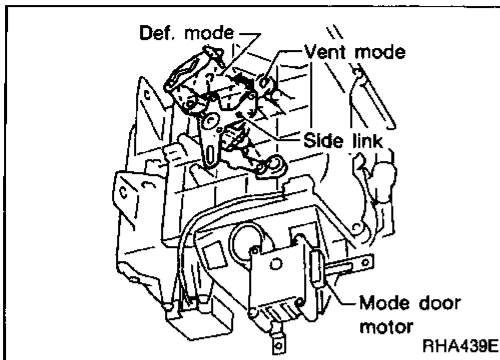
* For cooling fan motor operation.



A/C RELAY

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

BR
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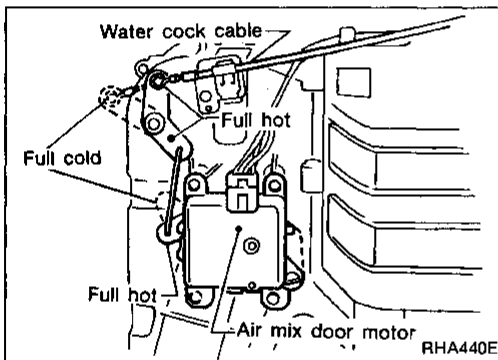


Control Linkage Adjustment

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. Move side link by hand and hold mode door in DEF mode.
4. Attach mode door motor rod to side link rod holder.
5. Make sure mode door operates properly when changing from code No. 41 to 45 by pushing DEF switch.

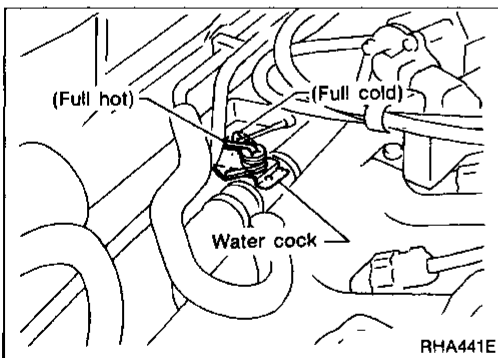
41	42	43	44	45	46
VENT	B/L	B/L	FOOT	F/D	DEF



AIR MIX DOOR (Water cock)

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 45 by pushing DEF switch.

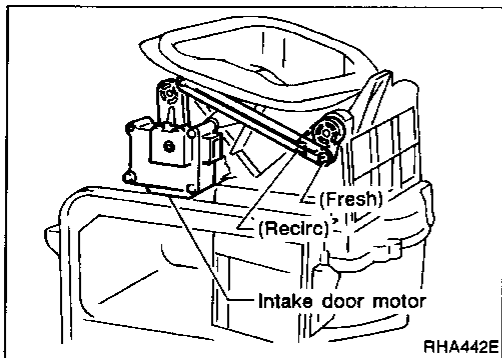
41	42	43	44	45	46
Full cold			Full hot		



6. Set up code No. 41 in Self-diagnosis STEP 4.
7. Attach water cock cable to air mix door linkage and secure with clip.
8. Rotate and hold water cock lever and plate in the full cold position (CLOCKWISE completely).
9. Attach water cock cable to plate and secure with clip (white mark on cable housing should be centered under the retaining clip).
10. Check that water cock operates properly when changing from code No. 41 to 45 by pushing DEF switch. (After several cycles, water cock lever should be midpoint of plate opening when code No. 41 is set.)

Control Linkage Adjustment (Cont'd)

INTAKE DOOR



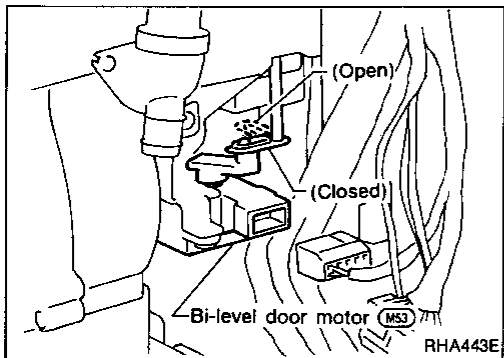
1. Install intake door motor on intake unit and connect it to main harness.
2. Set up code No. 41 in Self-diagnosis STEP 4.
3. Move intake door link by hand and hold it in REC position.
4. Attach intake door lever to rod holder.
5. Make sure intake door operates properly when changing from code No. 41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

41	42	43	44	45	46
REC		20% FRE	FRE		

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BI-LEVEL DOOR



1. Install Bi-level door motor on cooling unit and connect it to main harness.
2. Set up code No. 46 in self-diagnosis STEP 4.
3. Move Bi-level door link by hand and hold it in CLOSE position.
4. Attach Bi-level door lever to rod holder.
5. 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			

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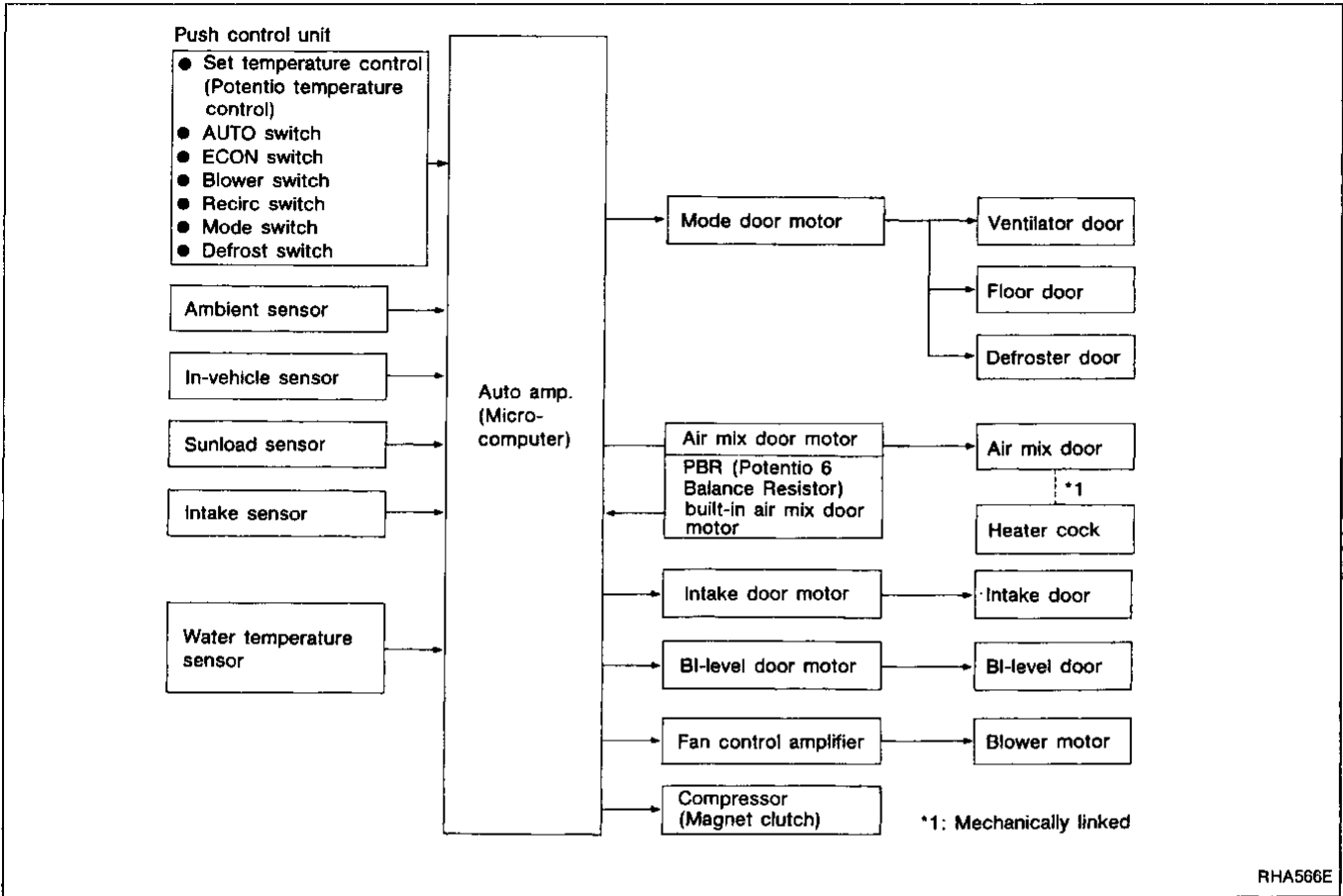
ST
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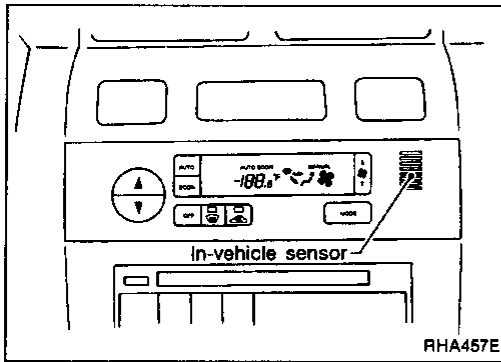
HA

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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:





Control System Input Components

POTENTIO TEMPERATURE CONTROL (PTC)

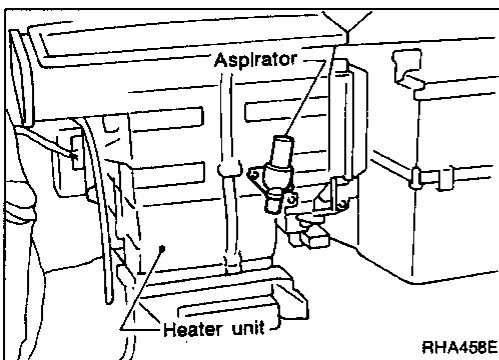
The PTC is built into the push control unit. It can be set at an interval of 1°C (2°F) through both ▲ (HOT) and ▼ (COLD) control switches. Setting temperature is digitally displayed.

IN-VEHICLE SENSOR

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

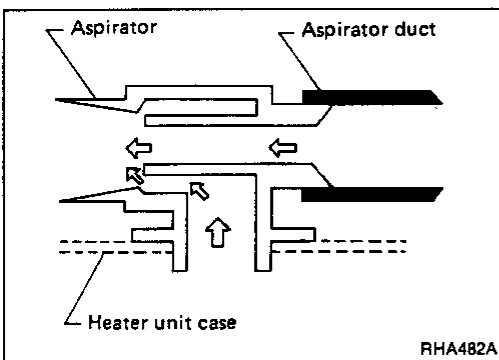
After disconnecting in-vehicle sensor harness connector, measure resistance between terminals ① and ② at sensor harness side, using the table below.

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



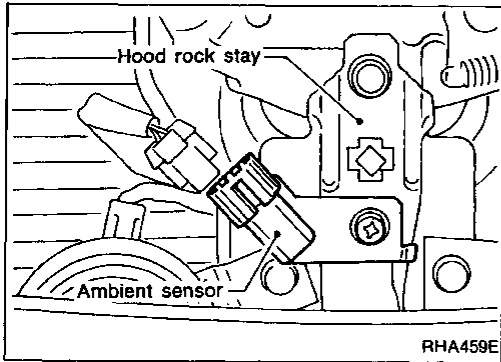
ASPIRATOR

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.



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Control System Input Components (Cont'd)

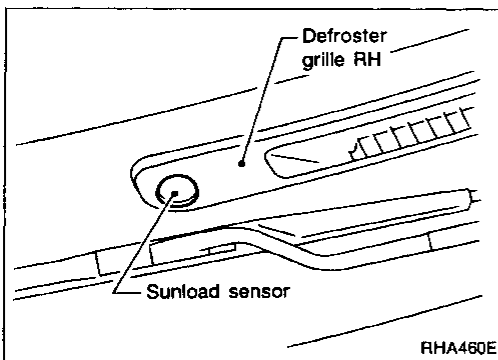


AMBIENT SENSOR

The ambient sensor is attached to the radiator core support. 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 right 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.

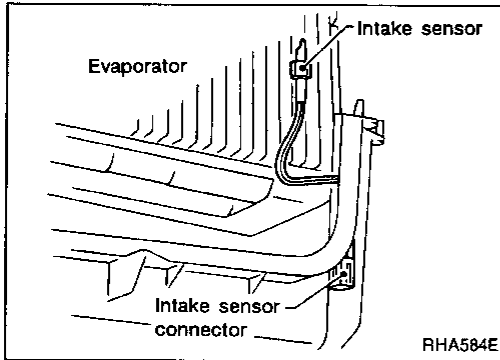
Measure voltage between terminals ① and ② at vehicle harness side, using the table below.

Input current mA	Output voltage V
0	5.0
0.1	4.1
0.2	3.1
0.3	2.2
0.4	1.3
0.5	0.4

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

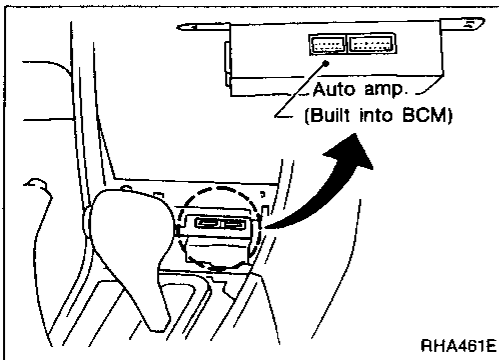
Control System Input Components (Cont'd)

INTAKE SENSOR



The intake sensor is located on the cooling unit. It converts temperature of air after it passes through the evaporator into a resistance value which is then input to the auto amp. After disconnecting intake 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



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, blower motor and compressor are then controlled.

The auto amp. is unitized with control mechanisms. Signals from various switches and Potentio Temperature Control (PTC) 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.

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**Control System Automatic Amplifier (Auto amp.)
(Cont'd)**

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 100 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

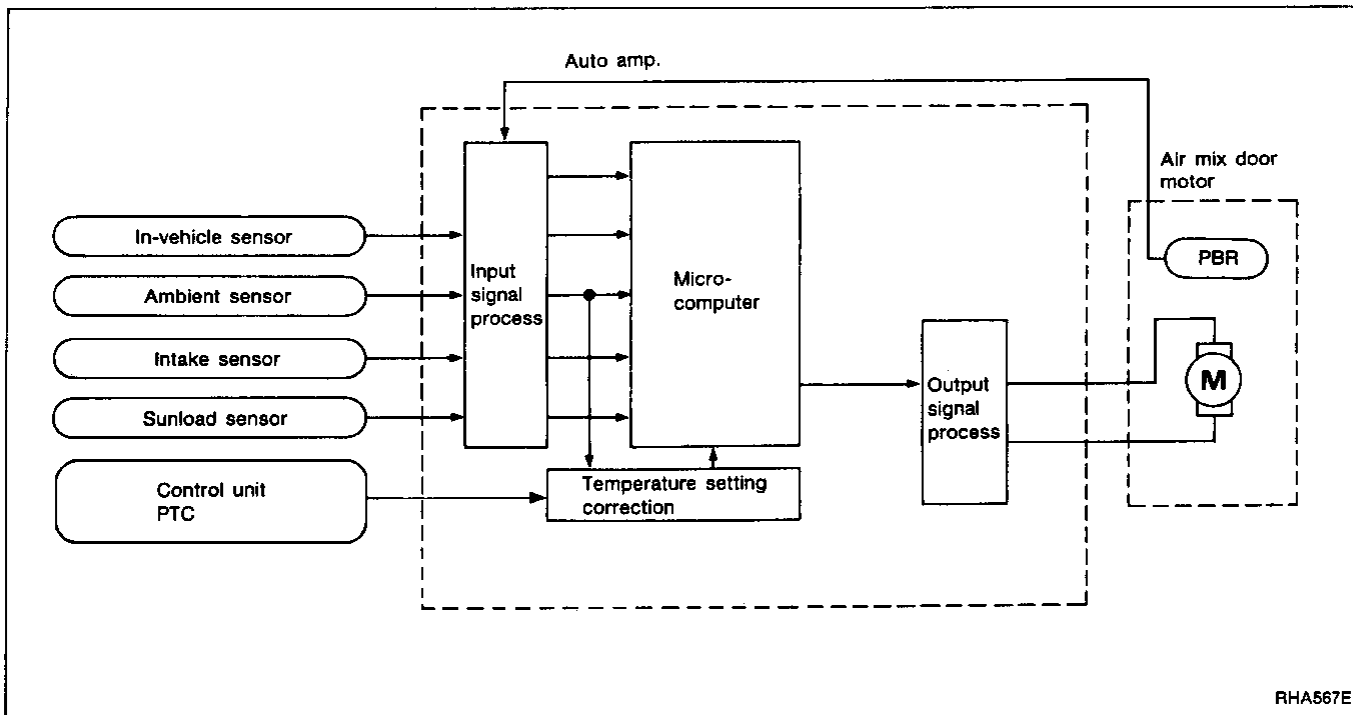
Air mix door control system components are:

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

System operation

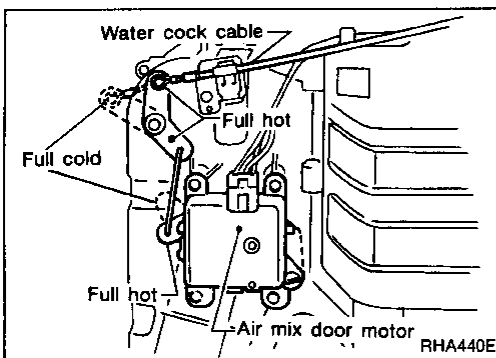
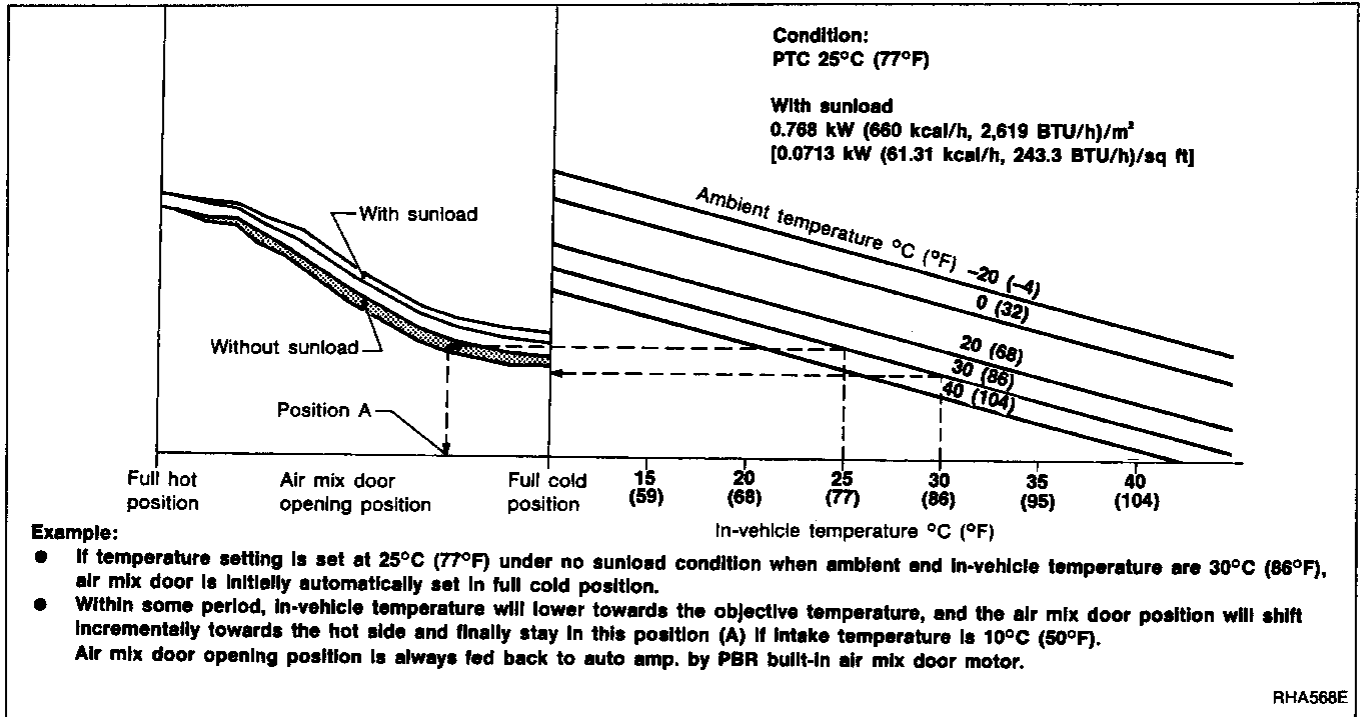
Temperature set by Potentio Temperature Control (PTC) is compensated through setting temperature correction circuit to determine target temperature.

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, intake air temperature and ambient temperature) and conditions (air mix door position and compressor operation).



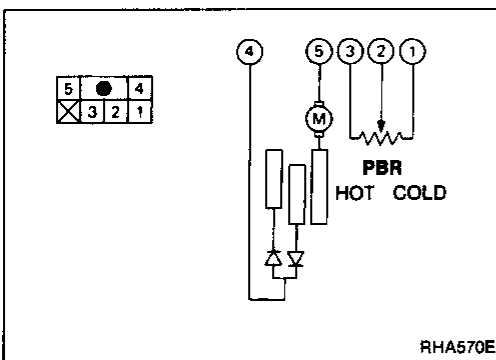
RHA567E

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



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.



Air mix door operation

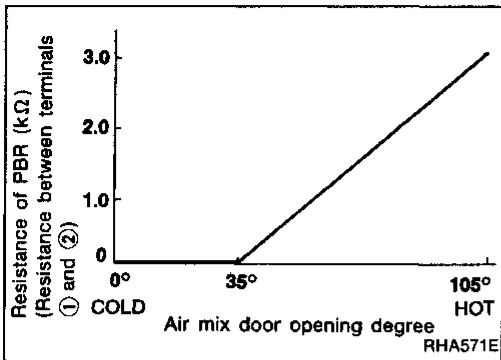
4	5	Air mix door operation	Direction of lever movement
⊕	⊖	COLD → HOT	Clockwise (Toward passenger compartment)
—	—	STOP	STOP
⊖	⊕	HOT → COLD	Counterclockwise (Toward engine compartment)

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Control System Output Components (Cont'd)

PBR characteristics

Measure resistance between terminals ① and ② at vehicle harness side.



MODE DOOR CONTROL

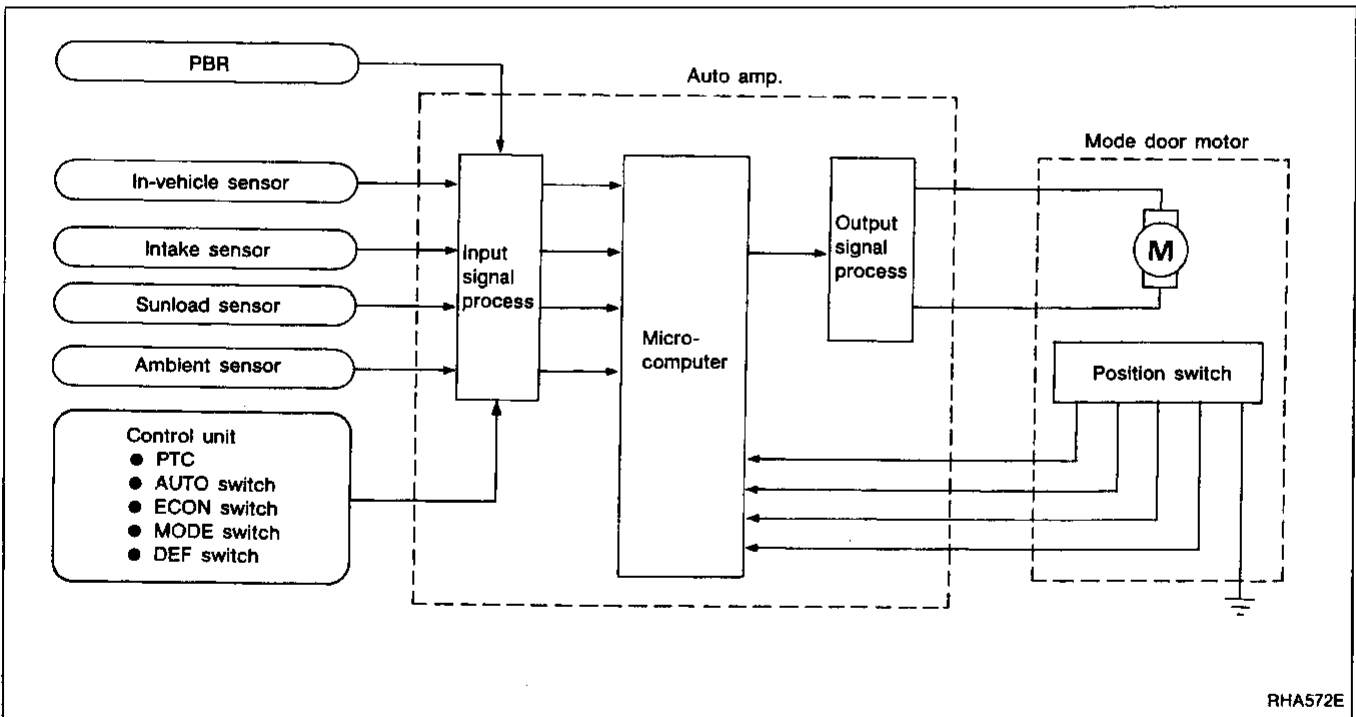
Component parts

Mode door control system components are:

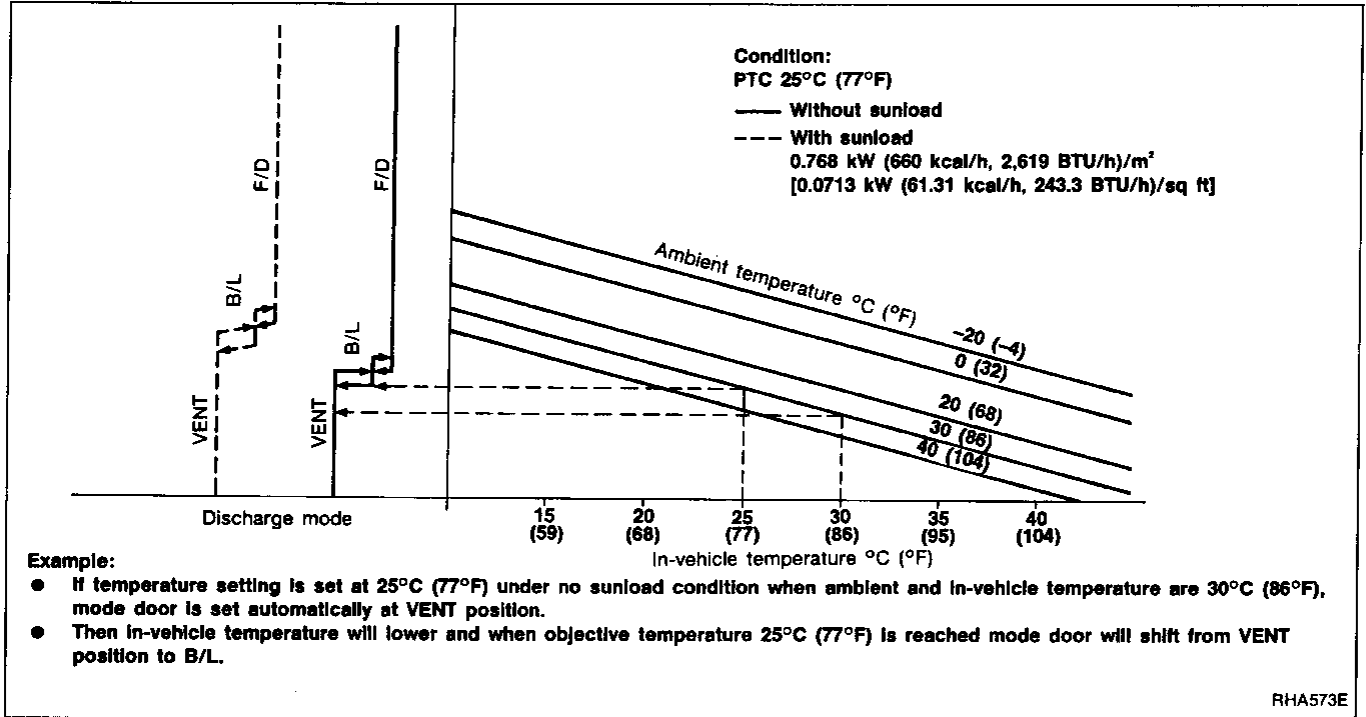
- 1) Auto amp.
- 2) Mode door motor
- 3) PBR
- 4) In-vehicle sensor
- 5) Ambient sensor
- 6) Intake sensor
- 7) Sunload sensor

System operation

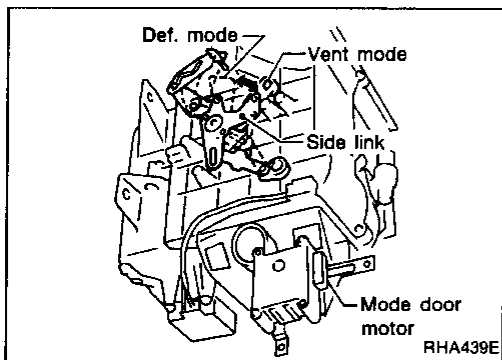
The auto amp. computes the air discharge conditions according to the ambient temperature, the intake air temperature and the in-vehicle temperature. The computed discharge conditions are then corrected for sunload. By this correction, it is determined through which outlets air will flow into the passenger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



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



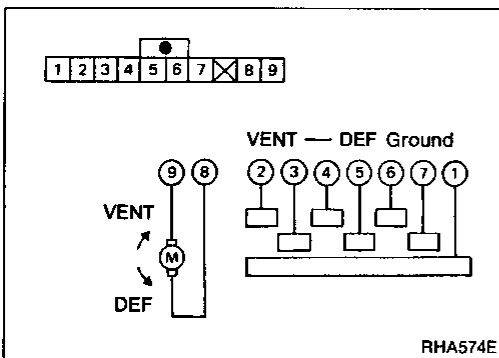
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MODE DOOR MOTOR

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.

9	8	Mode door operation	Direction of side link rotation
⊕	⊖	VENT → DEF	Clockwise
—	—	STOP	STOP
⊖	⊕	DEF → VENT	Counterclockwise



Control System Output Components (Cont'd)

INTAKE DOOR CONTROL

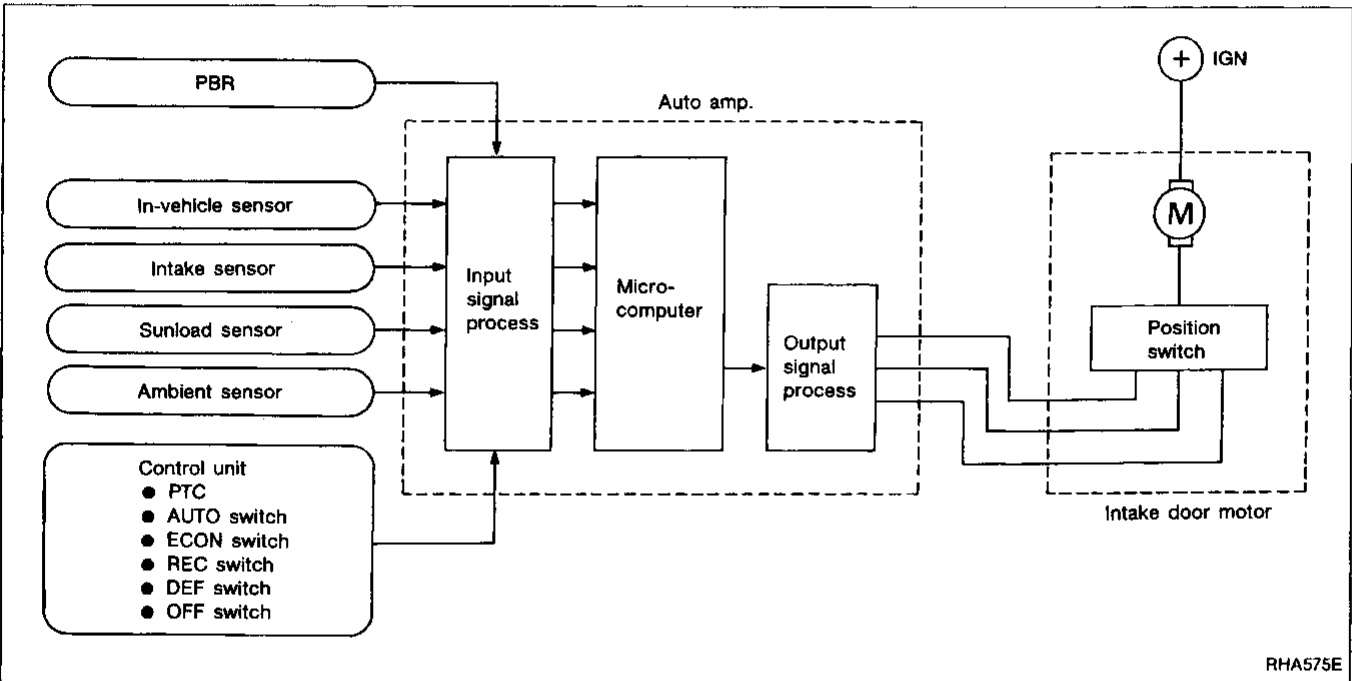
Components parts

Intake door control system components are:

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

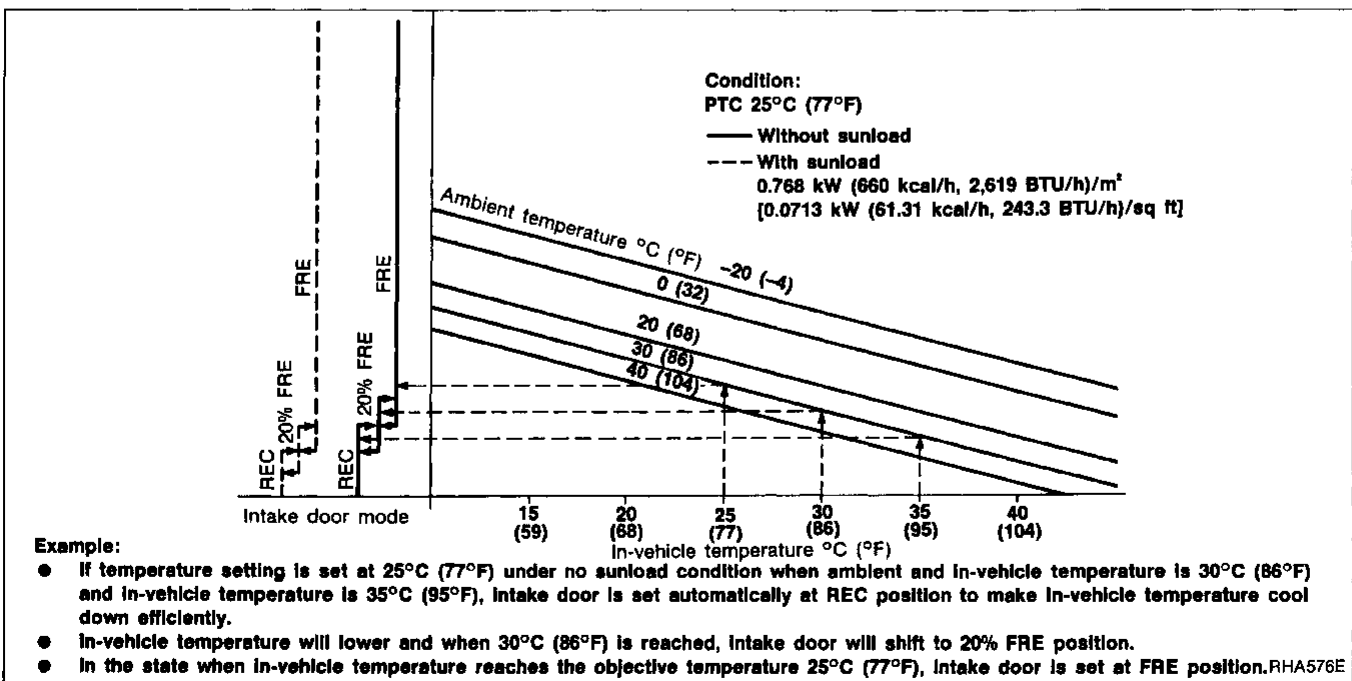
System operation

The intake door control determines intake door position based on the ambient temperature, the intake air temperature and the in-vehicle temperature. When the ECON, DEF, or OFF buttons are pushed, the auto amp. sets the intake door at the "Fresh" position.



RHA575E

Intake door control specification



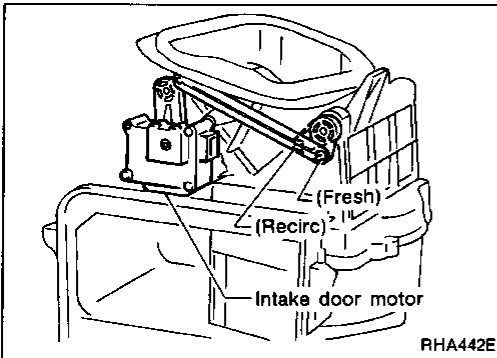
Control System Output Components (Cont'd)

INTAKE DOOR MOTOR

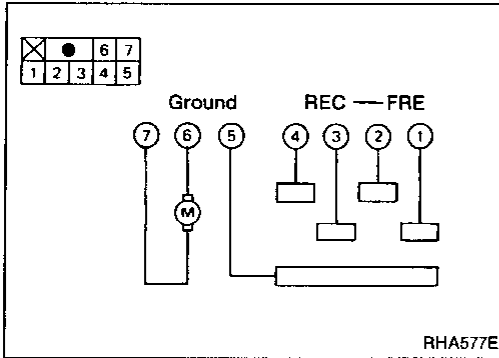
The intake door motor is attached to the intake unit. It rotates so that air is drawn from inlets set by the auto amp. Motor rotation is conveyed to a lever which activates the intake door.

Intake door motor operation

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



RHA442E



RHA577E

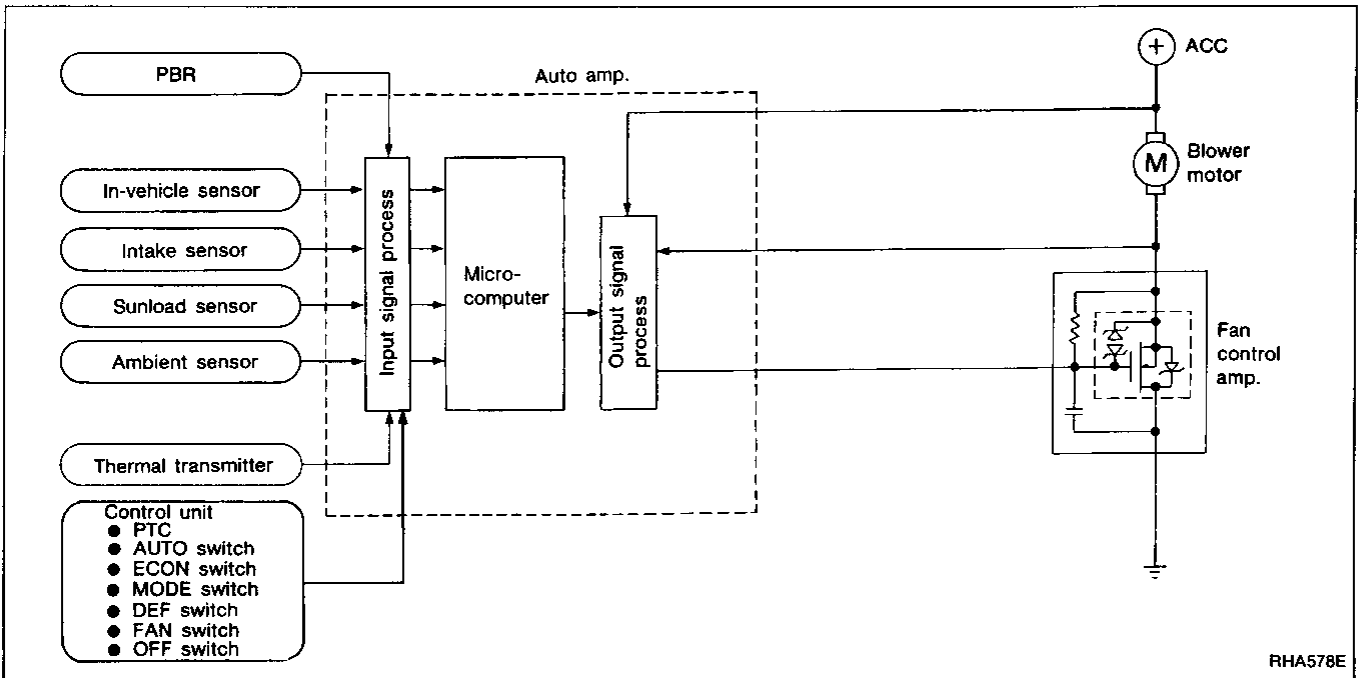
FAN SPEED CONTROL

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) Intake sensor
- 7) Sunload sensor
- 8) Blower Hi-relay
- 9) Thermal transmitter

System operation



RHA578E

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, intake sensor, sunload sensor, and ambient sensor. The blower motor applied voltage ranges from approximately 4.5 volts (lowest speed) to 12 volts (highest speed).

To control blower speed (in the range of 4.5V to 10.5V), 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. If the computed blower voltage (from the automatic amplifier) is above 10.5 volts, the high blower relay is activated. The high blower relay provides a direct path to ground (bypassing the blower amplifier), and the blower motor operates at high speed.

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), the blower will not operate for a short period of time (up to 180 seconds). The exact start delay time varies depending on the ambient and engine coolant temperature.

In the most extreme case (very low ambient) the blower starting delay will be 180 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)

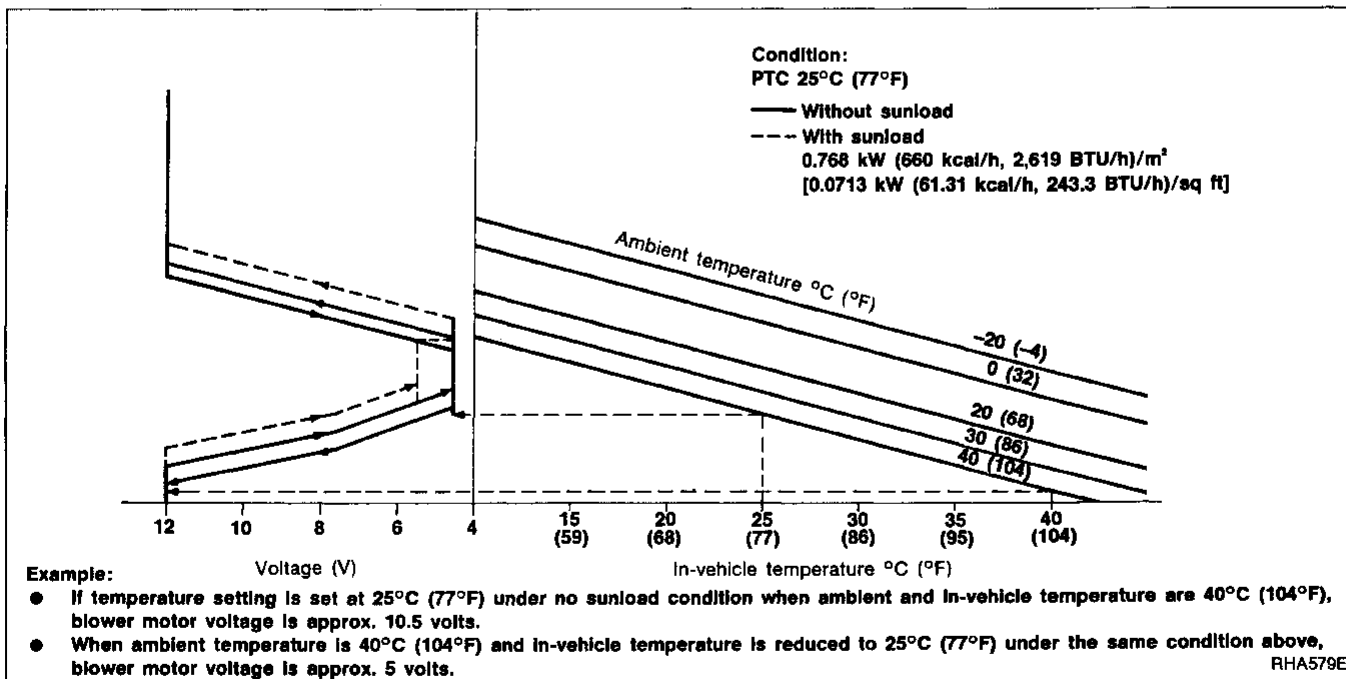
The blower will begin operation momentarily after the AUTO button is pushed. The blower speed will gradually rise to the objective speed over a time period of 5 seconds or less (actual time depends on the objective blower speed).

BLOWER SPEED COMPENSATION

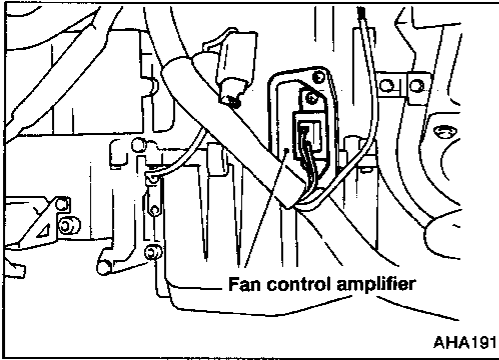
Sunload

When the in-vehicle temperature and the set temperature are very close, the blower will operate at low speed. The low speed varies depending on the sunload. During conditions of high sunload, the blower low speed is "normal" low speed (approx. 5.5V). During lesser sunload conditions, the low speed will drop to "low" low speed (approx. 4.5V).

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 a 12-step base current flowing from the auto amp. to change the blower speed within the range of 5V to 10.5V. Above 10.5 volts, the high relay applies a direct ground to the blower motor.

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MAGNET CLUTCH CONTROL

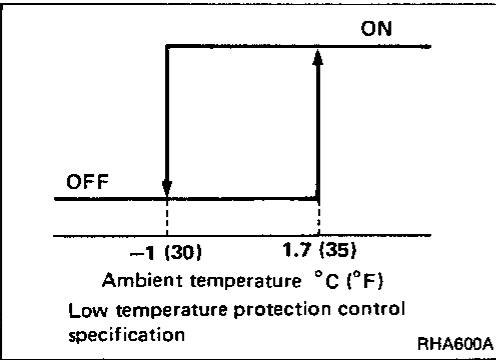
The ECM (ECCS control module) controls compressor operation using inputs from the throttle position sensor and auto amplifier.

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Low temperature protection control

The ambient temperature sensor will supply a signal to the auto amp. Based on this signal, the auto amp. will supply a signal to the ECM (ECCS control module). Receiving this signal, the compressor turns "ON" or "OFF".

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Acceleration cut control

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

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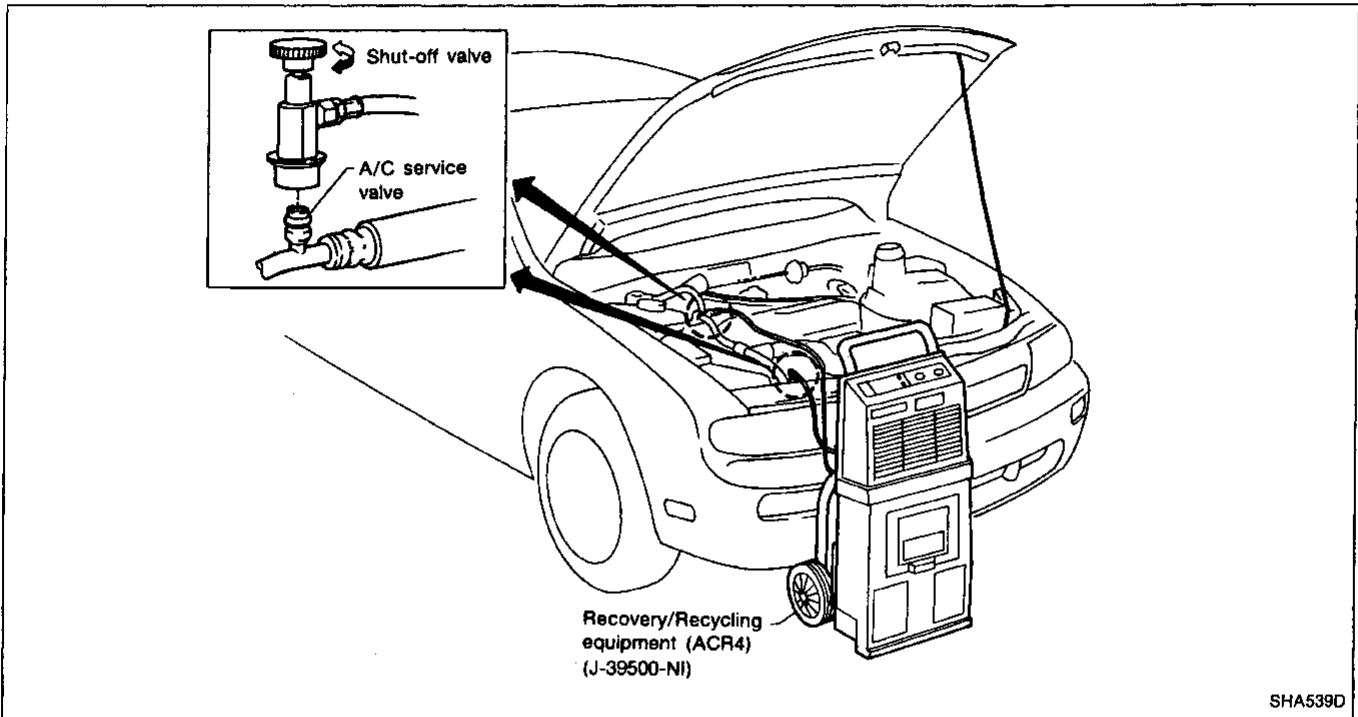
R-134a Service Procedure

SETTING OF SERVICE TOOLS AND EQUIPMENT

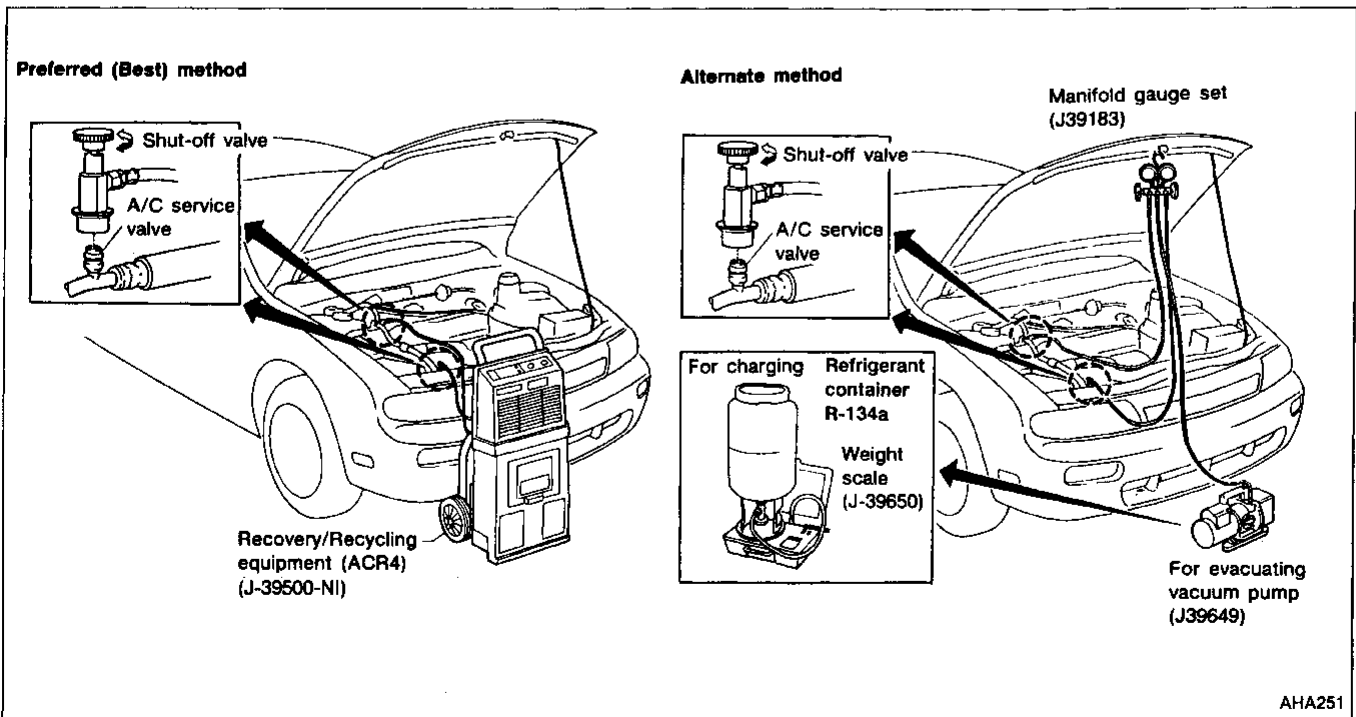
DISCHARGING REFRIGERANT

WARNING:

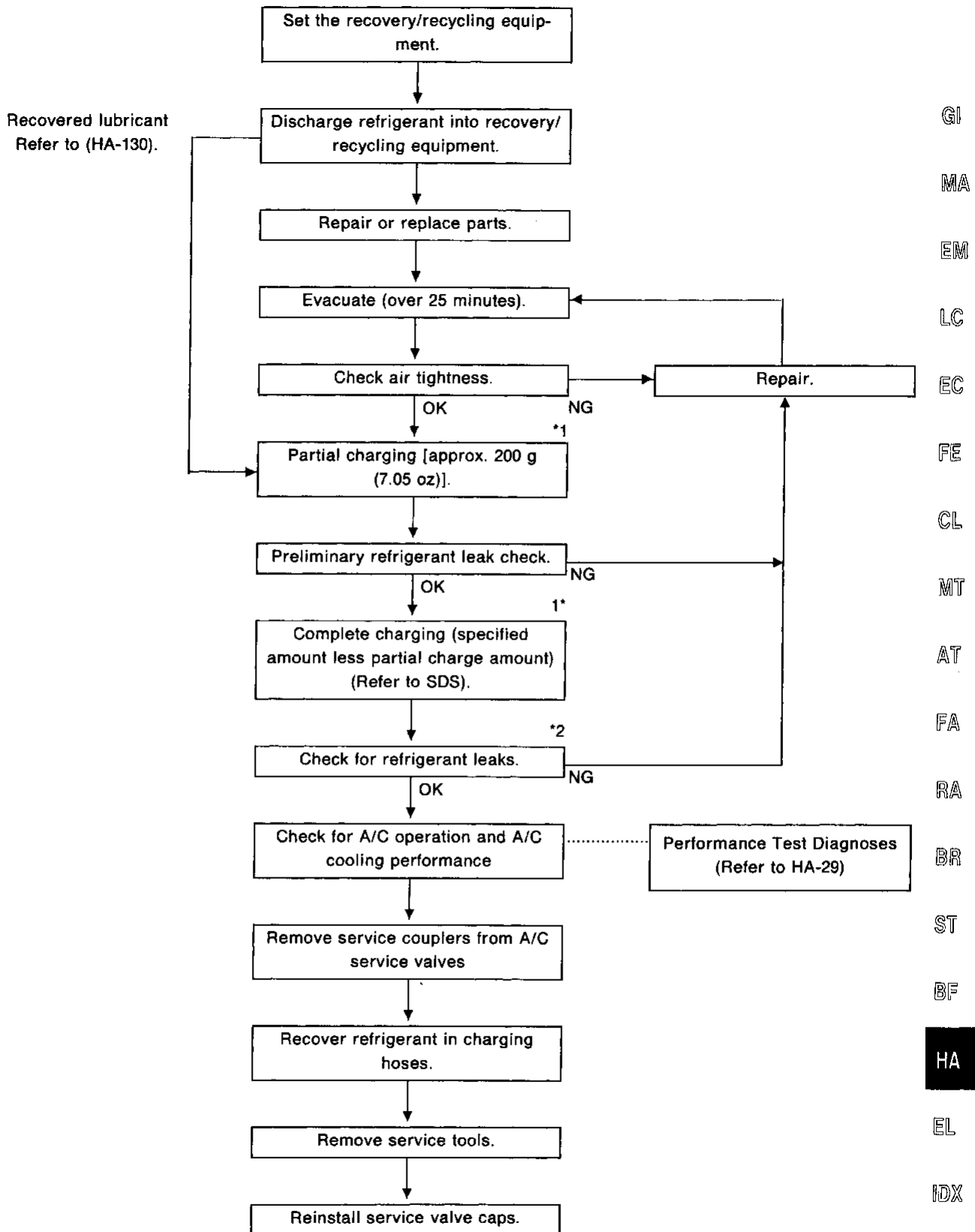
Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. To remove R-134a from the A/C system, use service equipment certified to meet the requirements of SAE J2210 (R-134a recycling equipment) or J2209 (R-134a recovery equipment). If accidental system 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



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 engine off. Service valve caps must be installed 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 the compressor to maintain the specified amount when: replacing any component of the system, or a large amount of gas leakage occurs.

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

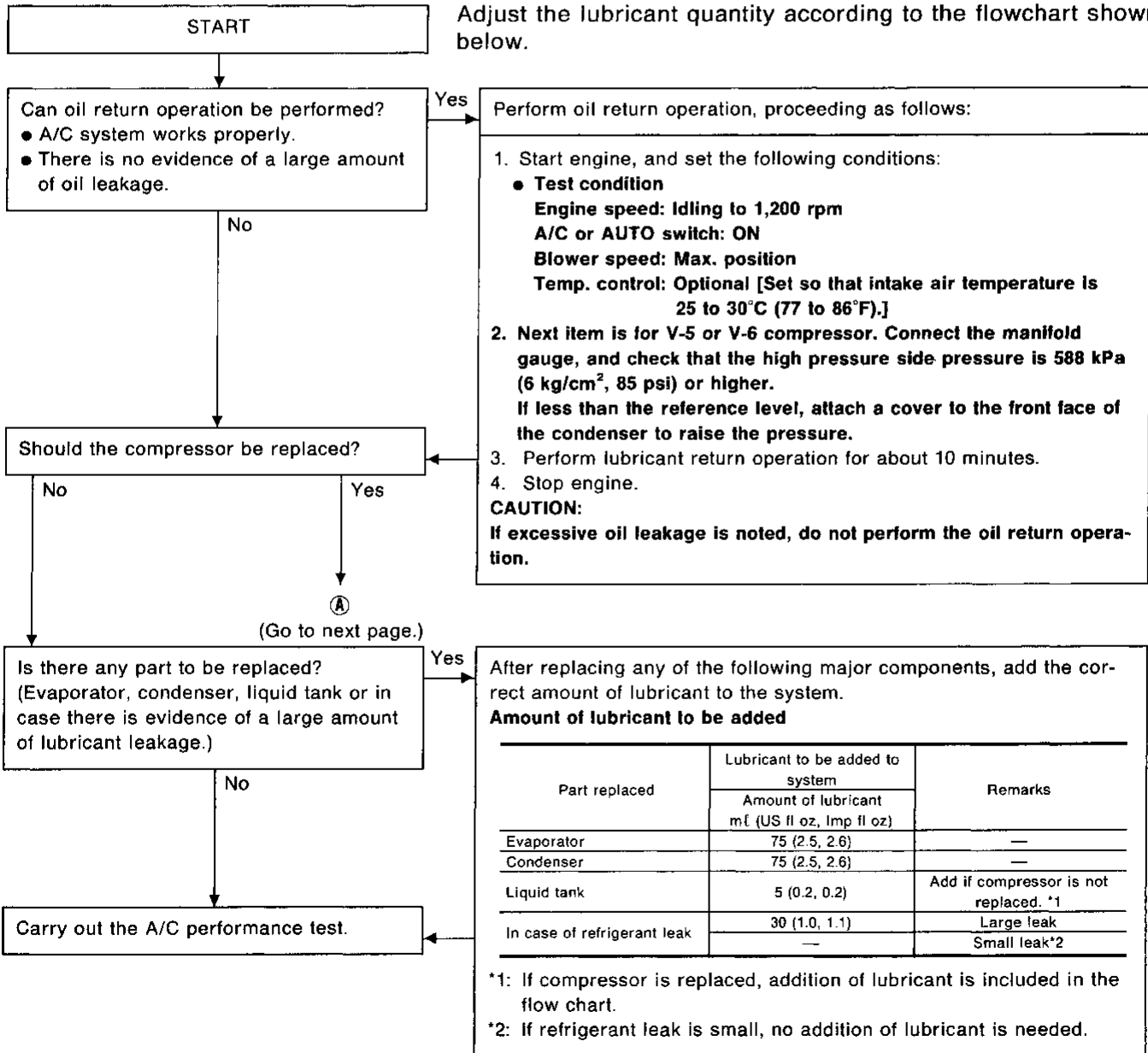
- Lack of lubricant: May lead to a seized compressor
- Excessive lubricant: Inadequate cooling (thermal exchange interference)

CHECKING AND ADJUSTING

LUBRICANT

Name: Nissan A/C System Oil Type S
Part number: KLH00-PAGS0

Adjust the lubricant quantity according to the flowchart shown below.

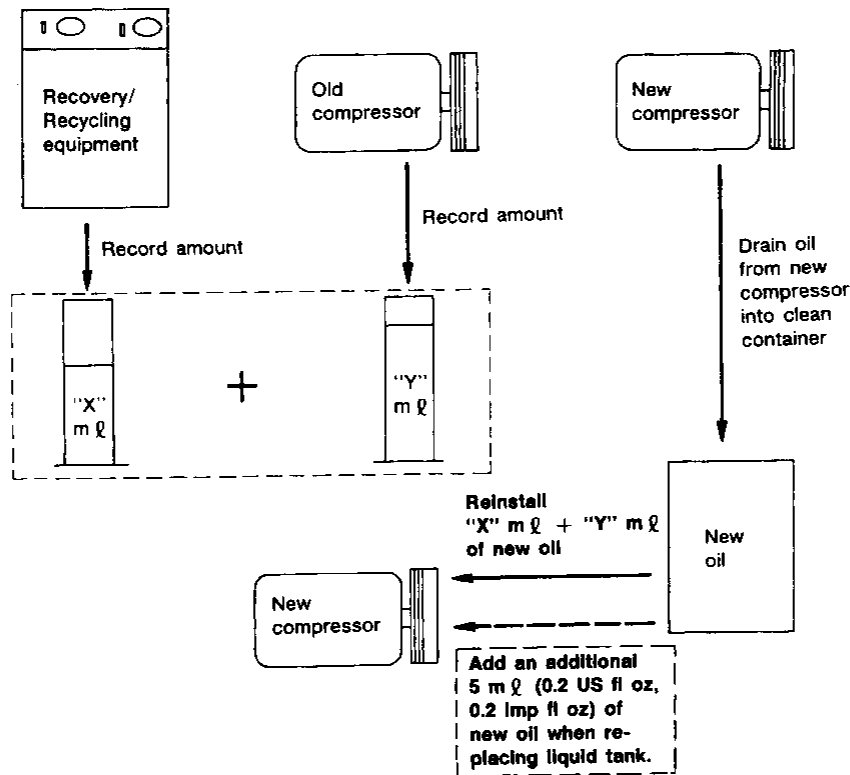


Maintenance of Lubricant Quantity in Compressor (Cont'd)



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. Put the same amount (refer to 2. above) of new oil into the new compressor. Put it through the drain plug or suction port opening.
5. Also add the old oil amount [discharged from A/C system (refer to 1. above)] of the new oil to the new compressor.
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 US fl oz, 0.2 Imp fl oz) of oil at this time. **Do not add this 5 ml (0.2 US fl oz, 0.2 Imp fl oz) of oil if only replacing the compressor.**

Oil adjusting procedure for compressor replacement



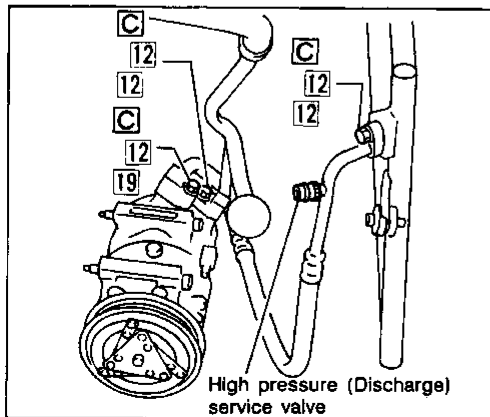
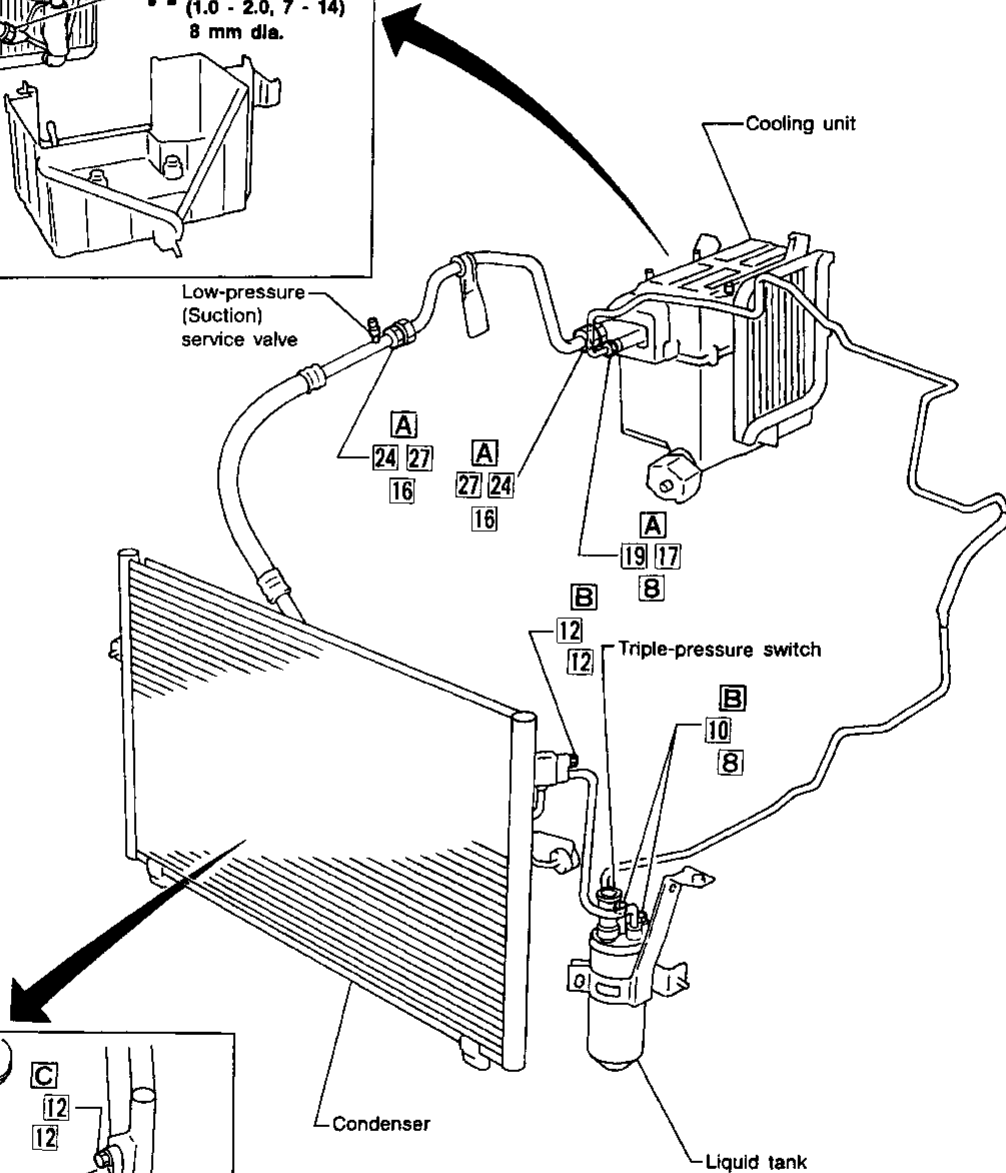
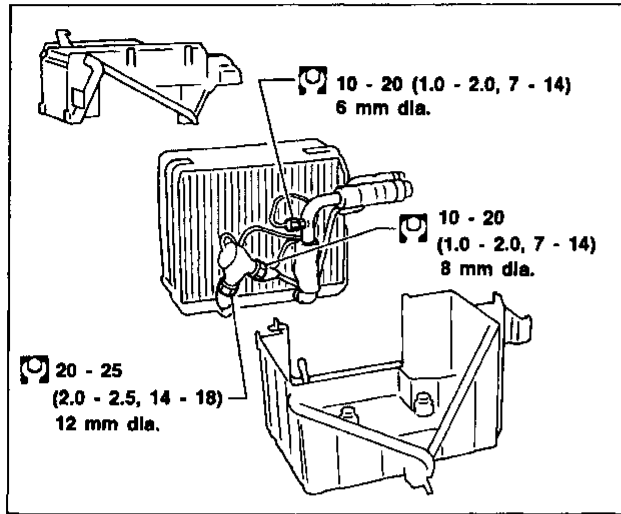
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Refrigerant Lines

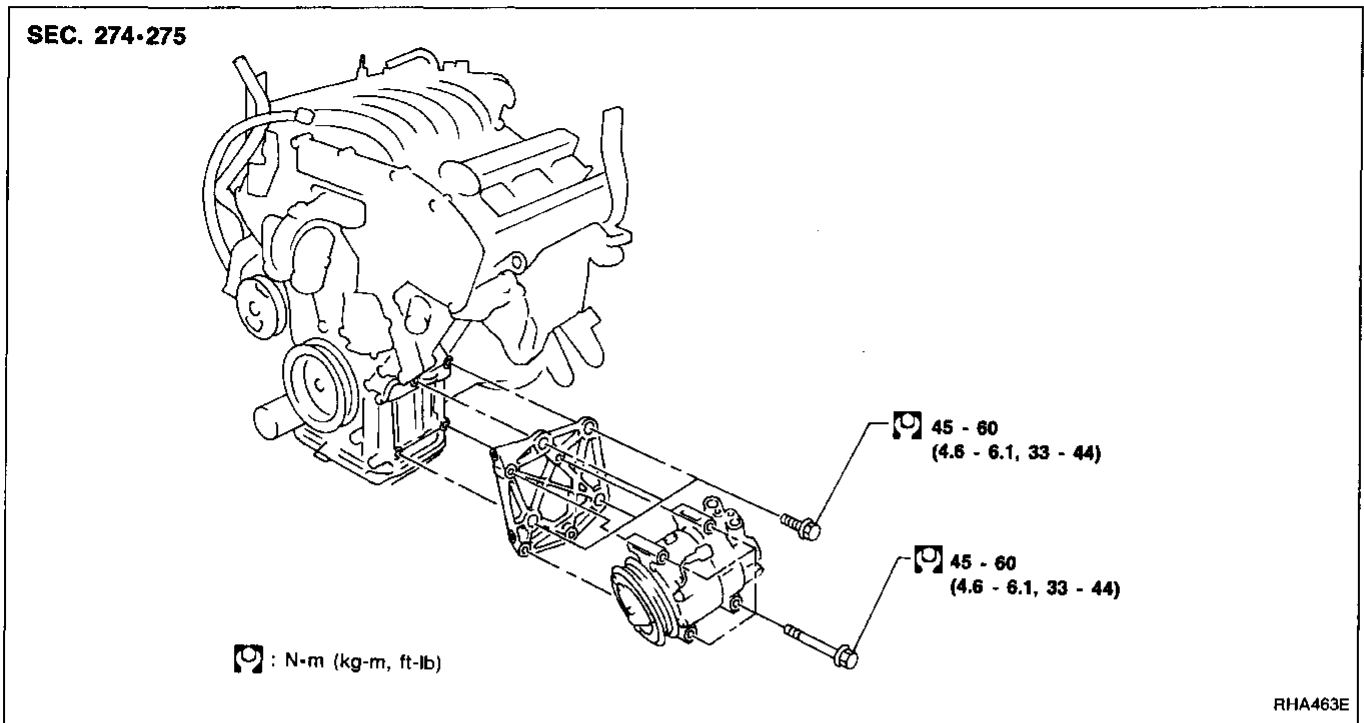
- Refer to HA-4.

SEC. 271-274-276



- (Tightening torque)
- (Wrench size)
- (O-ring size)
- A : 10 - 20 (1.0 - 2.0, 7 - 14)
- B : 8 - 11 (0.8 - 1.1, 5.8 - 8.0)
- C : 10 - 12 (1.0 - 1.2, 7 - 9)
- ⊙ : N·m (kg·m, ft·lb)

Compressor Mounting



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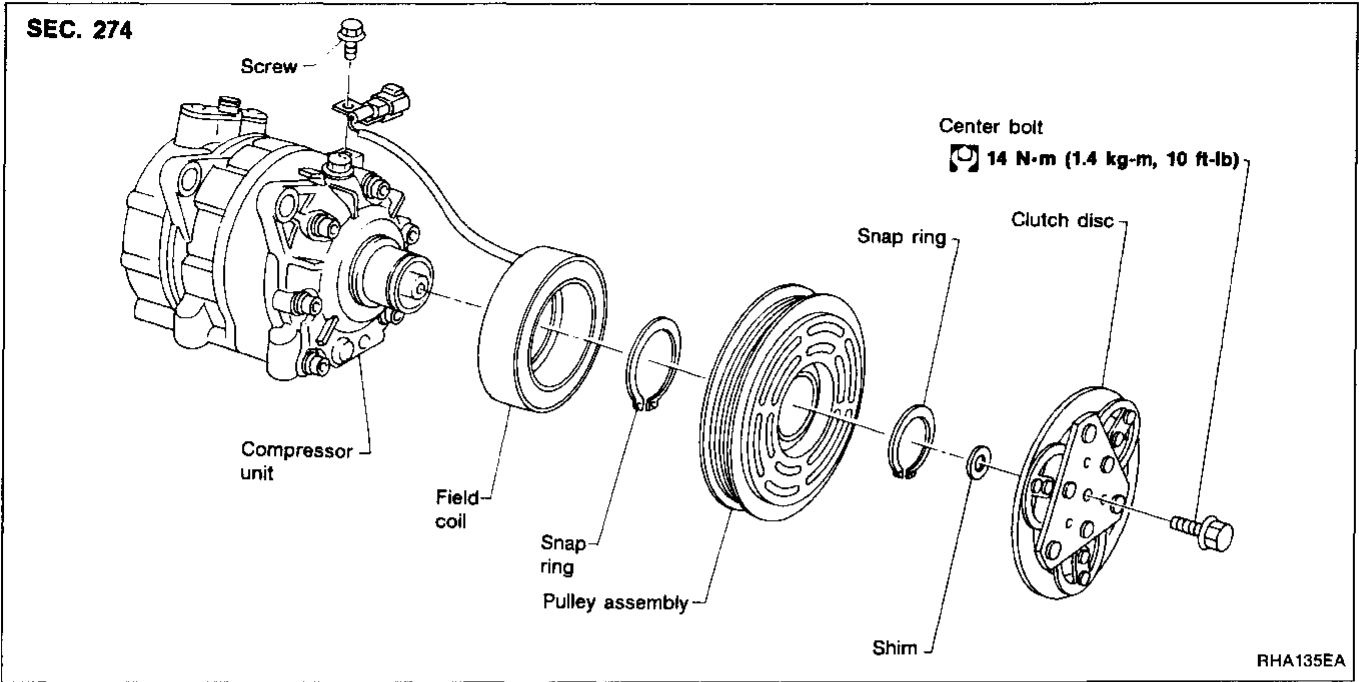
Belt Tension

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

Fast Idle Control Device (FICD)

- Refer to EC section (“IACV-FICD SOLENOID VALVE”, “TROUBLE DIAGNOSES FOR NON-DETECTIVE ITEMS”).

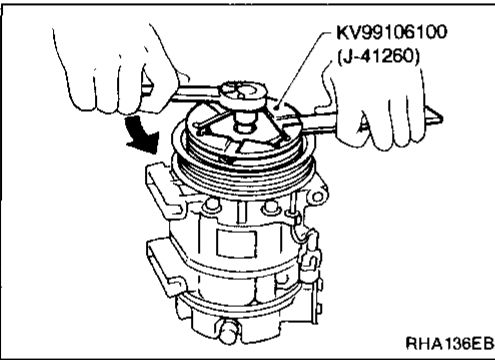
Compressor



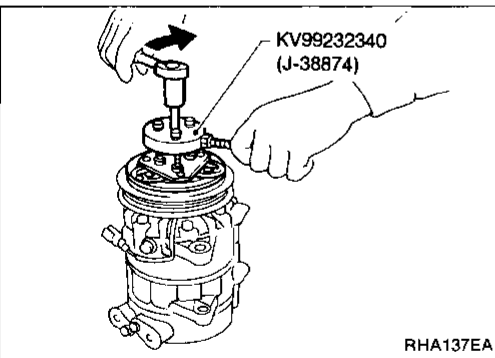
Compressor Clutch

REMOVAL

- When removing center bolt, hold clutch disc with clutch disc wrench.

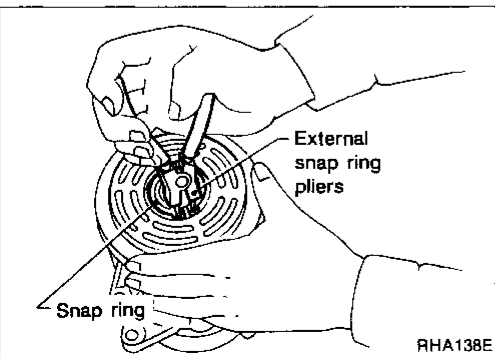


- Remove the clutch disc using the clutch disc puller. Insert the holder's three pins into the holes in the clutch disc, and rotate the holder clockwise to hook it onto the plate. Then, tighten the center bolt to remove the clutch disc.

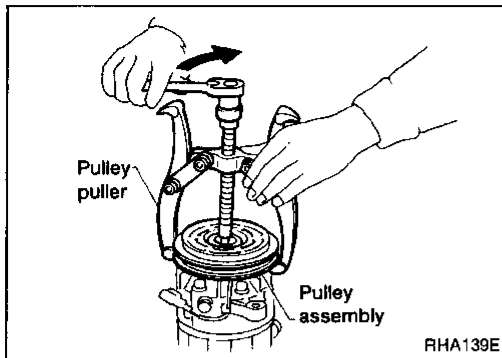


After removing the clutch disc, remove the shims from either the drive shaft or the clutch disc.

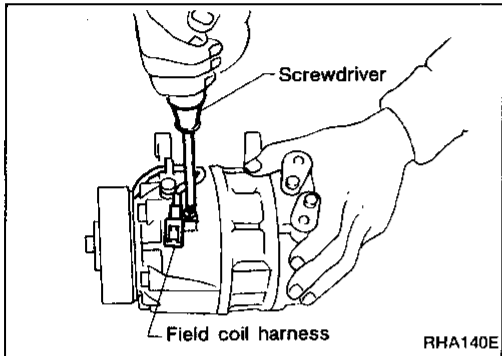
- Remove the snap ring using external snap ring pliers.



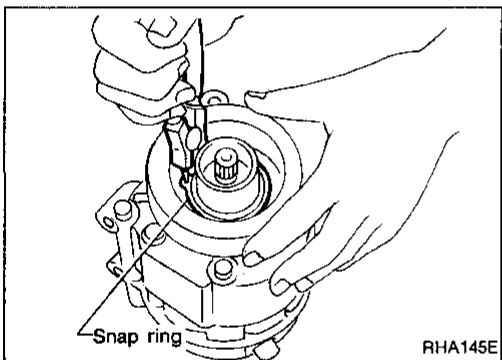
Compressor Clutch (Cont'd)



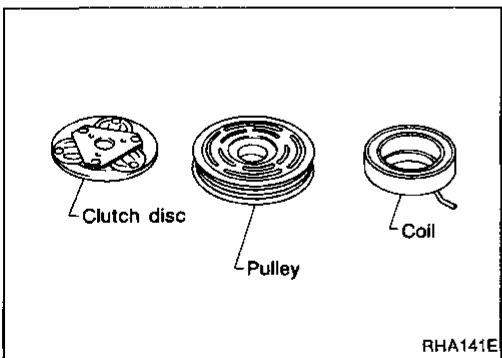
- Pulley removal
Position the center pulley puller on the end of the drive shaft, and remove the pulley assembly using any commercially available pulley puller.
To prevent the pulley groove from being deformed, the puller claws should be positioned onto the edge of the pulley assembly.



- Remove the field coil harness clip using a screwdriver.



- Remove the snap ring using external snap ring pliers.



INSPECTION

Clutch disc

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

Pulley

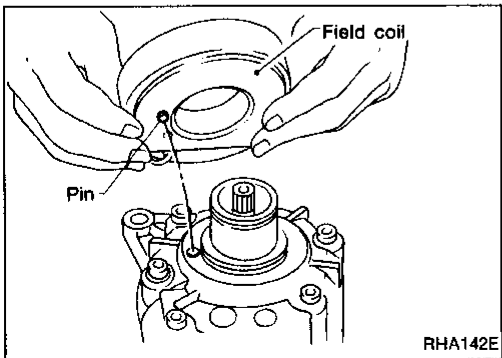
Check the appearance of the pulley assembly. If the contact surface of the pulley shows signs of excessive grooving due to slippage, both the pulley and clutch disc should be replaced. The contact surfaces of the pulley assembly should be cleaned with a suitable solvent before reinstallation.

Coil

Check coil for loose connection or cracked insulation.

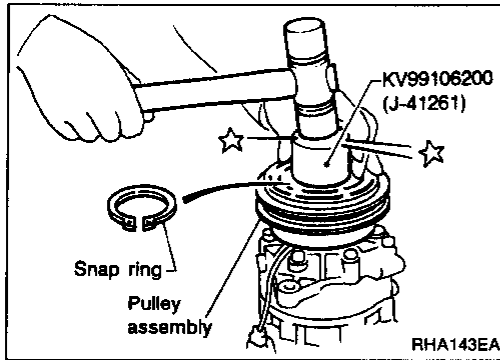
INSTALLATION

- Install the field coil.
Be sure to align the coil's pin with the hole in the compressor's front head.
- Install the field coil harness clip using a screwdriver.

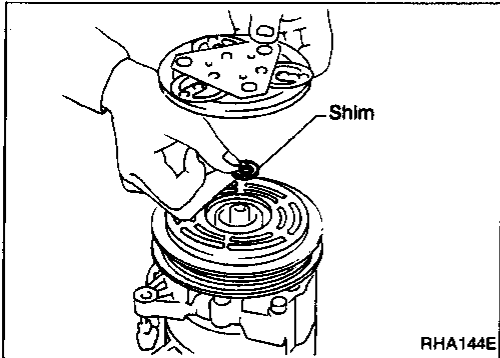


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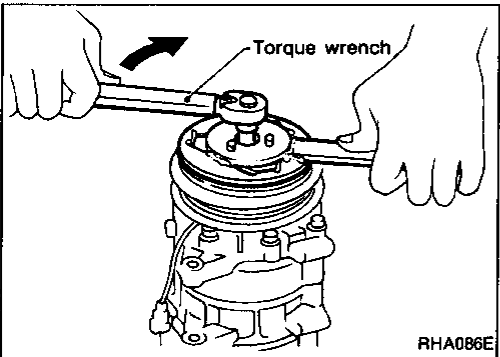
Compressor Clutch (Cont'd)



- Install the pulley assembly using the installer and a hand press, and then install the snap ring using snap ring pliers.

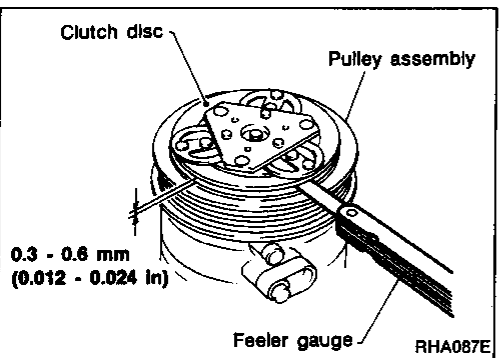


- Install the clutch disc on the drive shaft, together with the original shim(s). Press the clutch disc down by hand.



- Using the holder to prevent clutch disc rotation, tighten the bolt to 14 N·m (1.4 kg-m, 10 ft-lb) torque.

After tightening the bolt, check that the pulley rotates smoothly.



- Check clearance around the entire periphery of clutch disc.

Disc-to-pulley clearance:

0.3 - 0.6 mm (0.012 - 0.024 in)

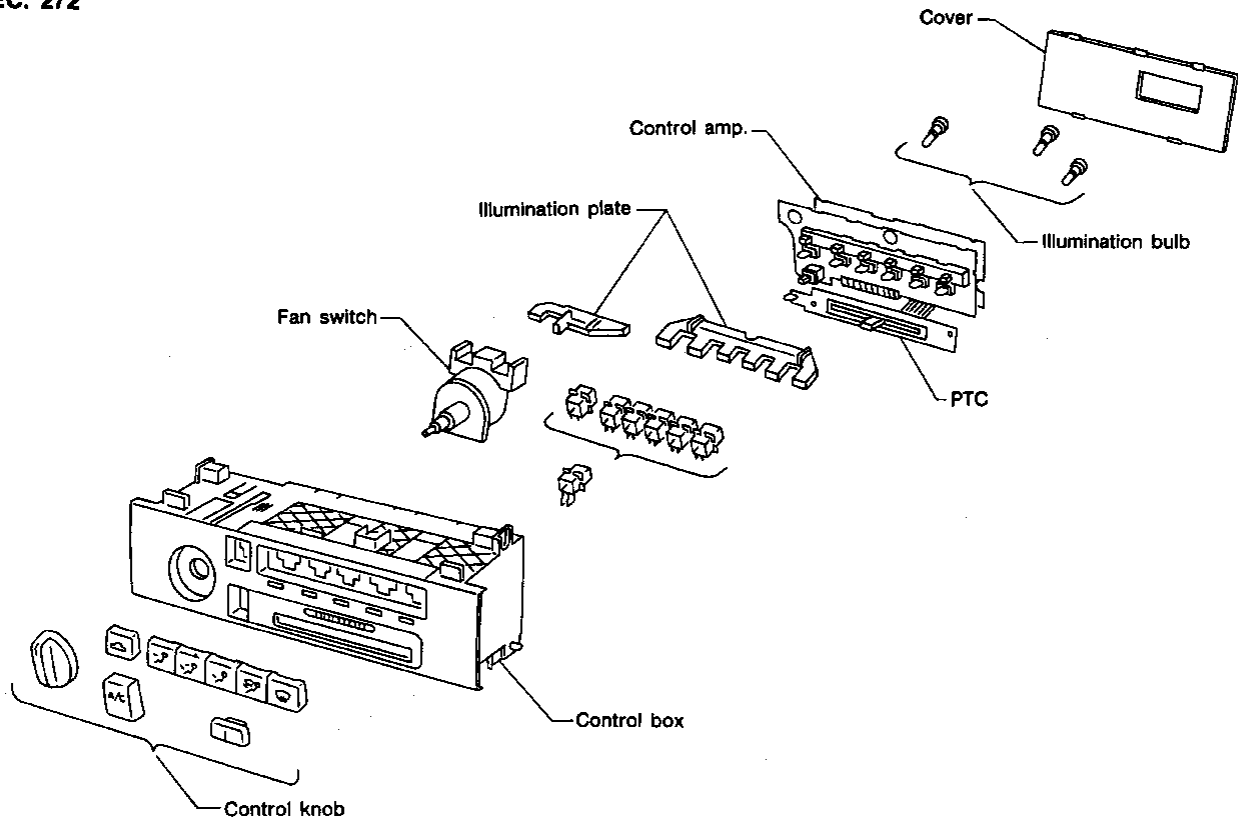
If the specified clearance is not obtained, replace adjusting spacer and readjust.

BREAK-IN OPERATION

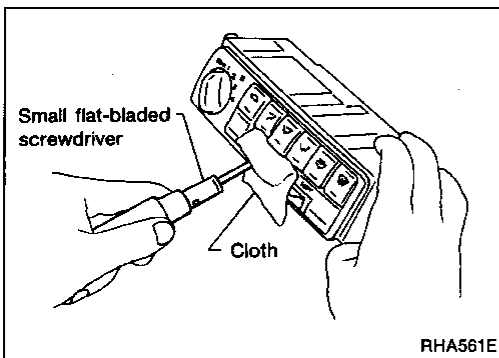
When replacing compressor clutch assembly, do not forget break-in operation, accomplished by engaging and disengaging the clutch about thirty times. Break-in operation raises the level of transmitted torque.

Overhaul — Push Control Unit Assembly

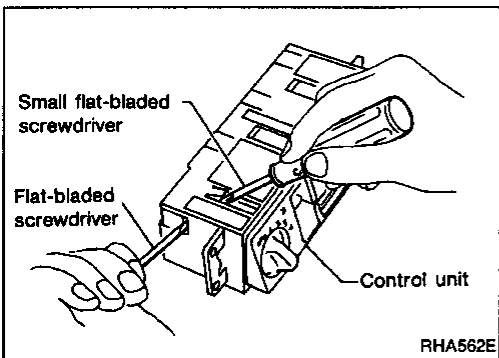
SEC. 272



RHA580E



1. Remove control knobs.



2. Remove fan switch knob.

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General Specifications

COMPRESSOR

Model	CALSONIC make V-6
Type	V-6 variable displacement
Displacement	cm ³ (cu in)/rev.
Max.	184 (11.228)
Min.	14.5 (0.885)
Cylinder bore x stroke	37 (1.46) mm (in) x [2.3 - 28.6 (0.091 - 1.126)]
Direction of rotation	Clockwise (viewed from drive end)
Drive belt	Poly V

LUBRICATION OIL

Model	CALSONIC make V-6
Name	Nissan A/C System Oil Type S
Part number	KLH00-PAGS0
Capacity	mℓ (US fl oz, Imp fl oz)
Total in system	250 (8.5, 8.8)
Compressor (Service part) charging amount	250 (8.5, 8.8)

REFRIGERANT

Type	HFC-134a (R-134a)
Capacity	kg (lb) 0.800 ± 0.025 (1.764 ± 0.055)

Inspection and Adjustment

ENGINE IDLING SPEED (When A/C is ON)

- Refer to EC section.

BELT TENSION

- Refer to Checking Drive Belts (MA section).