HEATER & AIR CONDITIONER

SECTION HA

CONTENTS

Supplemental Restraint System (SRS) "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 **RS section** of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses are covered with yellow insulation either just before the harness connectors or for the complete harness, for easy identification.**

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

WARNING:

- **CFC-12 (R-12) refrigerant and HFC-134a (R-134a) refrigerant are not compatible. These refrigerants must never be mixed, even in the smallest amounts. If the refrigerants are mixed, compressor failure is likely to occur.**
- **Use only specified lubricant for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. If lubricant other than that specified is used, compressor failure is likely to occur.**
- **The specified HFC-134a (R-134a) lubricant rapidly absorbs moisture from the atmosphere. The following handling precautions must be observed:**
  - **a: When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.**
  - **b: When installing refrigerant components to a vehicle, do not remove the caps (unseal) until just before connecting the components. Connect all refrigerant loop components as quickly as possible to minimize the entry of moisture into system.**
  - **c: Only use the specified lubricant from a sealed container. Immediately reseal containers of lubricant. Without proper sealing, lubricant will become moisture saturated and should not be used.**
  - **d: Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Remove R-134a from the A/C system, using certified service equipment meeting 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.**
  - **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.**

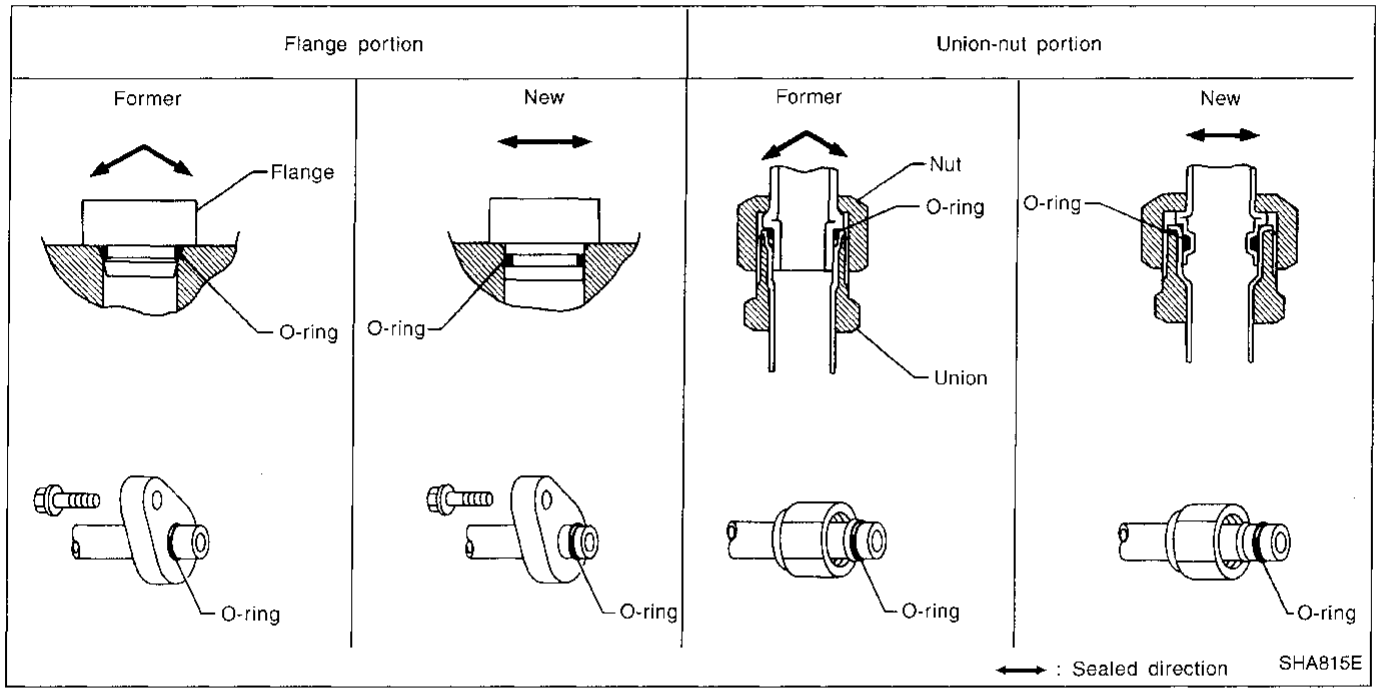
Precautions for Refrigerant Connection

A new type refrigerant connection has been introduced to all refrigerant lines except the following location.

- Expansion valve to cooling unit

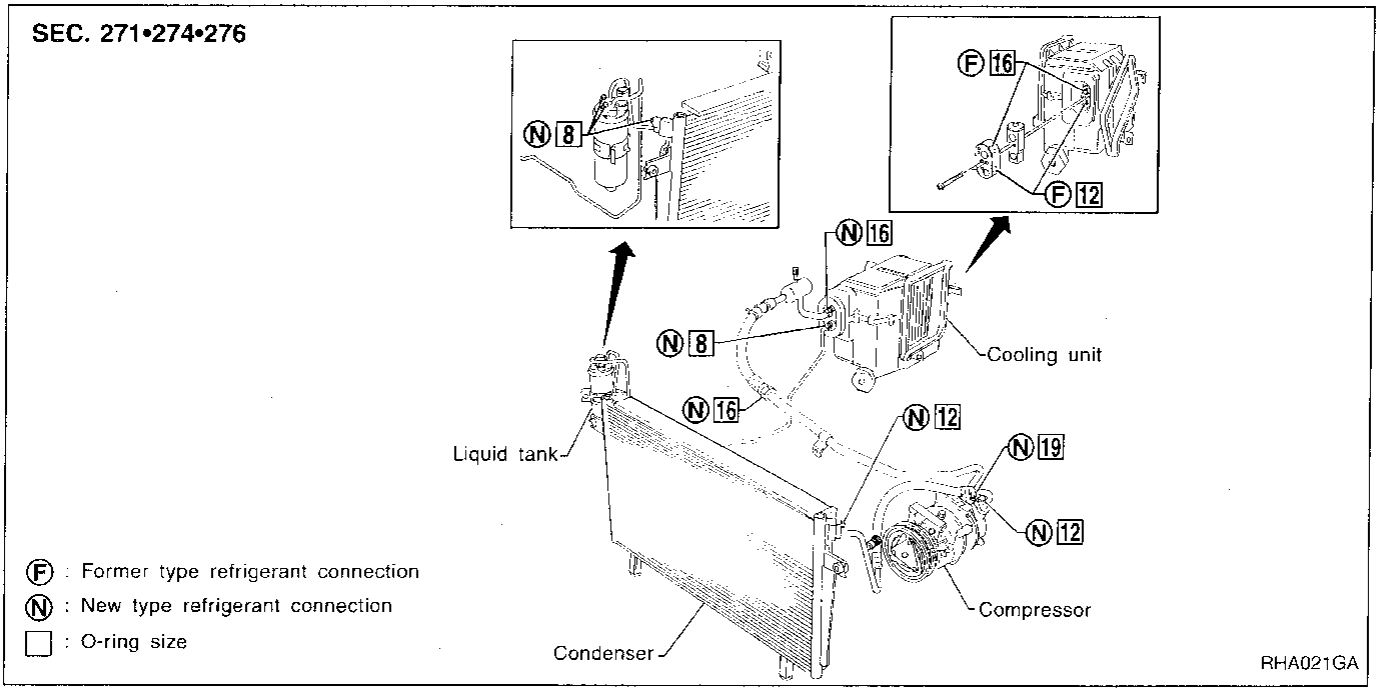
FEATURES OF NEW TYPE REFRIGERANT CONNECTION

- The O-ring has been relocated. It has also been provided with a groove for proper installation. This eliminates the chance of the O-ring being caught in, or damaged by, the mating part. The sealing direction of the O-ring is now set vertically in relation to the contacting surface of the mating part to improve sealing characteristics.
- The reaction force of the O-ring will not occur in the direction that causes the joint to pull out, thereby facilitating piping connections.

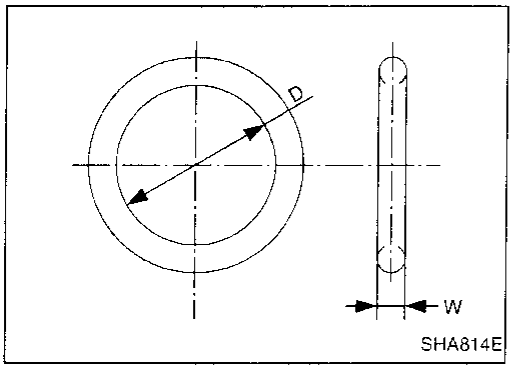


Precautions for Refrigerant Connection (Cont'd)

O-RING AND REFRIGERANT CONNECTION



CAUTION:
The new and former refrigerant connections use different O-ring configurations. Do not confuse O-rings since they are not interchangeable. If a wrong O-ring is installed, refrigerant will leak at, or around, the connection.



O-ring part numbers and specifications

Connection type	O-ring size	Part number	D mm (in)	W mm (in)
New	8	92471 N8210	6.8 (0.268)	1.87 (0.0736)
Former		92470 N8200	6.07 (0.2390)	1.78 (0.0701)
New	12	92472 N8210	10.9 (0.429)	2.43 (0.0957)
Former		92475 71L00	11.0 (0.433)	2.4 (0.094)
New	16	92473 N8210	13.6 (0.535)	2.43 (0.0957)
Former		92475 72L00	14.3 (0.563)	2.3 (0.0906)
New	19	92474 N8210	16.5 (0.650)	2.43 (0.0957)
Former		92477 N8200	17.12 (0.6740)	1.78 (0.0701)

Precautions for Refrigerant Connection (Cont'd)

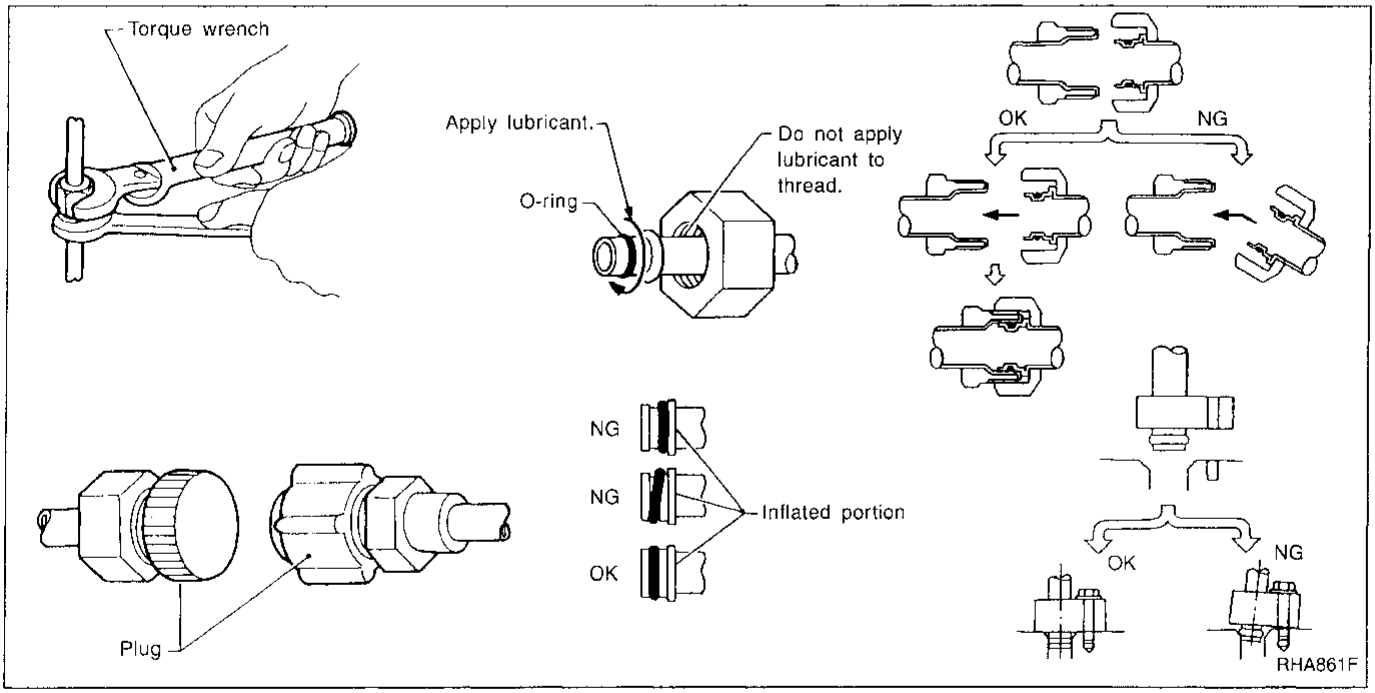
WARNING:

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

CAUTION:

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

- When the compressor is removed, store it in the same position as it is when mounted on the car. Failure to do so will cause lubricant to enter the low pressure chamber.
- When connecting tubes, always use a torque wrench and a back-up wrench.
- After disconnecting tubes, immediately plug all openings to prevent entry of dirt and moisture.
- When installing an air conditioner in the vehicle, connect the pipes as the final stage of the operation. Do not remove the seal caps of pipes and other components until just before required for connection.
- Allow components stored in cool areas to warm to working area temperature before removing seal caps. This prevents condensation from forming inside A/C components.
- Thoroughly remove moisture from the refrigeration system before charging the refrigerant.
- Always replace used O-rings.
- When connecting tube, apply lubricant to circle of the O-rings 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 dented portion of tube.
- When replacing the O-ring, be careful not to damage O-ring and tube.
- Connect tube until you hear it click, then tighten the nut or bolt by hand until snug.
  Make sure that the O-ring is installed to tube correctly.
- 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.

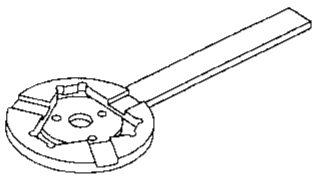
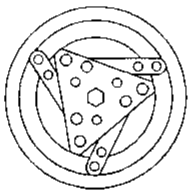
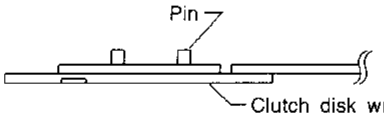
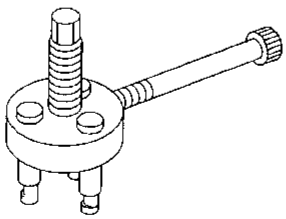
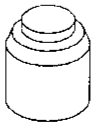


Precautions for Servicing Compressor

- **Plug all openings to prevent moisture and foreign matter from entering.**
- **When the compressor is removed, store it in the same position as it is when mounted on the car.**
- **When replacing or repairing compressor, follow "Maintenance of Lubricant Quantity in Compressor" exactly. Refer to HA-92.**
- **Keep friction surfaces between clutch and pulley clean. If the surface is contaminated, with lubricant, wipe it off by using a clean waste cloth moistened with thinner.**
- **After compressor service operation, turn the compressor shaft by hand more than five turns in both directions. This will equally distribute lubricant inside the compressor. After the compressor is installed, let the engine idle and operate the compressor for one hour.**
- **After replacing the compressor magnet clutch, apply voltage to the new one and check for normal operation.**

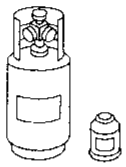
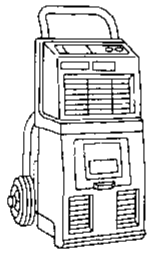
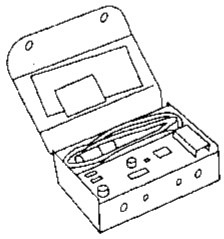
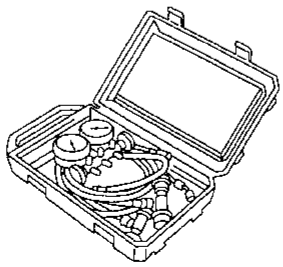
Special Service Tools

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

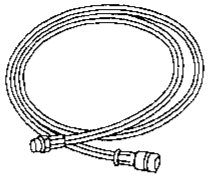
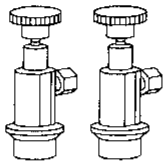
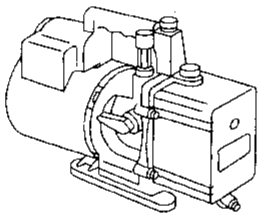
Tool number (Kent-Moore No.) Tool name	Description
KV99106100 (J-41260) Clutch disc wrench	Removing center bolt  NT232  When replacing the magnet clutch in the above compressor, use a clutch disc wrench with the pin side on the clutch disc to remove it.  NT378
KV99232340 (J-38874) or KV992T0001 (—) Clutch disc puller	Removing clutch disc  NT376
KV99106200 (J-41261) Pulley installer	Installing pulley  NT235

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-INF) Recovery/Recycling Recharging equipment (ACR4)	 NT195	Function: Refrigerant Recovery and Recycling and Recharging
(J-39400) Electrical leak detector	 NT198	Power supply: • DC 12V (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)	 NT201	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)	 NT202	Hose fitting to service hose: • M14 x 1.5 fitting is optional or permanently attached.
(J-39650) Refrigerant weight scale	 NT200	For measuring of refrigerant Fitting size: Thread size • 1/2″-16 ACME
(J-39649) Vacuum pump (Including the isolator valve)	 NT203	Capacity: • Air displacement: 4 CFM • Micron rating: 20 microns • Oil capacity: 482 g (17 oz) Fitting size: Thread size • 1/2″-16 ACME

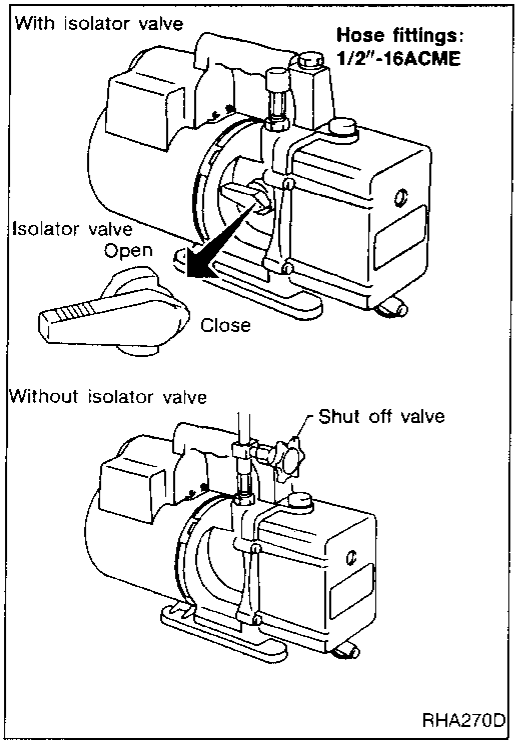
Precautions for Service Equipment

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 manufacturer's instructions for tester operation and tester maintenance.



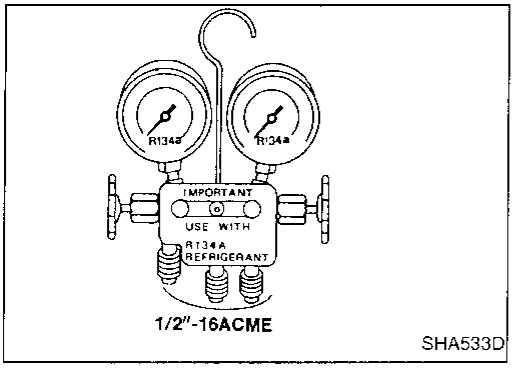
VACUUM PUMP

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

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

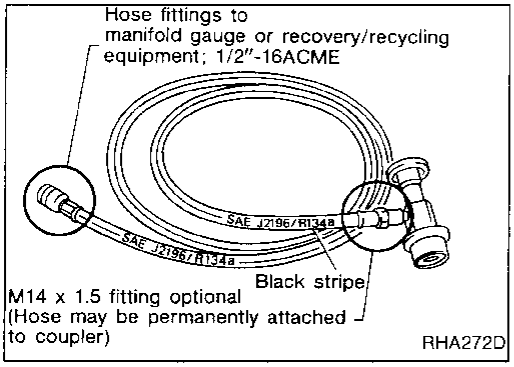
- Usually vacuum pumps have a manual isolator valve as part of the pump. Close this valve to isolate the service hose from the pump.
- For pumps without an isolator, use a hose equipped with a manual shut-off valve near the pump end. Close the valve to isolate the hose from the pump.
- If the hose has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

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



MANIFOLD GAUGE SET

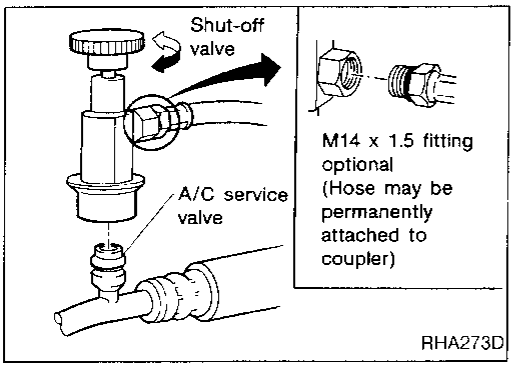
Be certain that the gauge face indicates R-134a or 134a. Be sure the gauge set has 1/2"-16 ACME threaded connections for service hoses. Confirm the set has been used only with refrigerant HFC-134a (R-134a) and specified lubricants.



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.

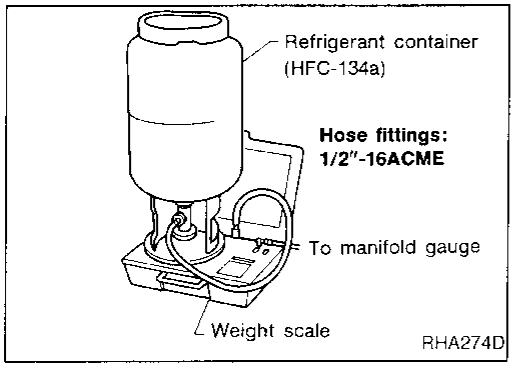
Precautions for Service Equipment (Cont'd)



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 properly connect to the CFC-12 (R-12) system. However, if an improper connection is attempted, discharging and contamination may occur.

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



REFRIGERANT WEIGHT SCALE

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

CHARGING CYLINDER

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

Refrigeration Cycle

REFRIGERANT FLOW

The refrigerant flows in the standard pattern, that is, through the compressor, the condenser, the liquid tank, through the evaporator, and back to the compressor.
The refrigerant evaporation through the evaporator coil is controlled by an externally equalized expansion valve, located inside the evaporator case.

FREEZE PROTECTION

Under normal operating conditions, when the A/C is switched on, the compressor runs continuously, and the evaporator pressure, and therefore temperature, is controlled by the V-6 variable displacement compressor to prevent freeze up.

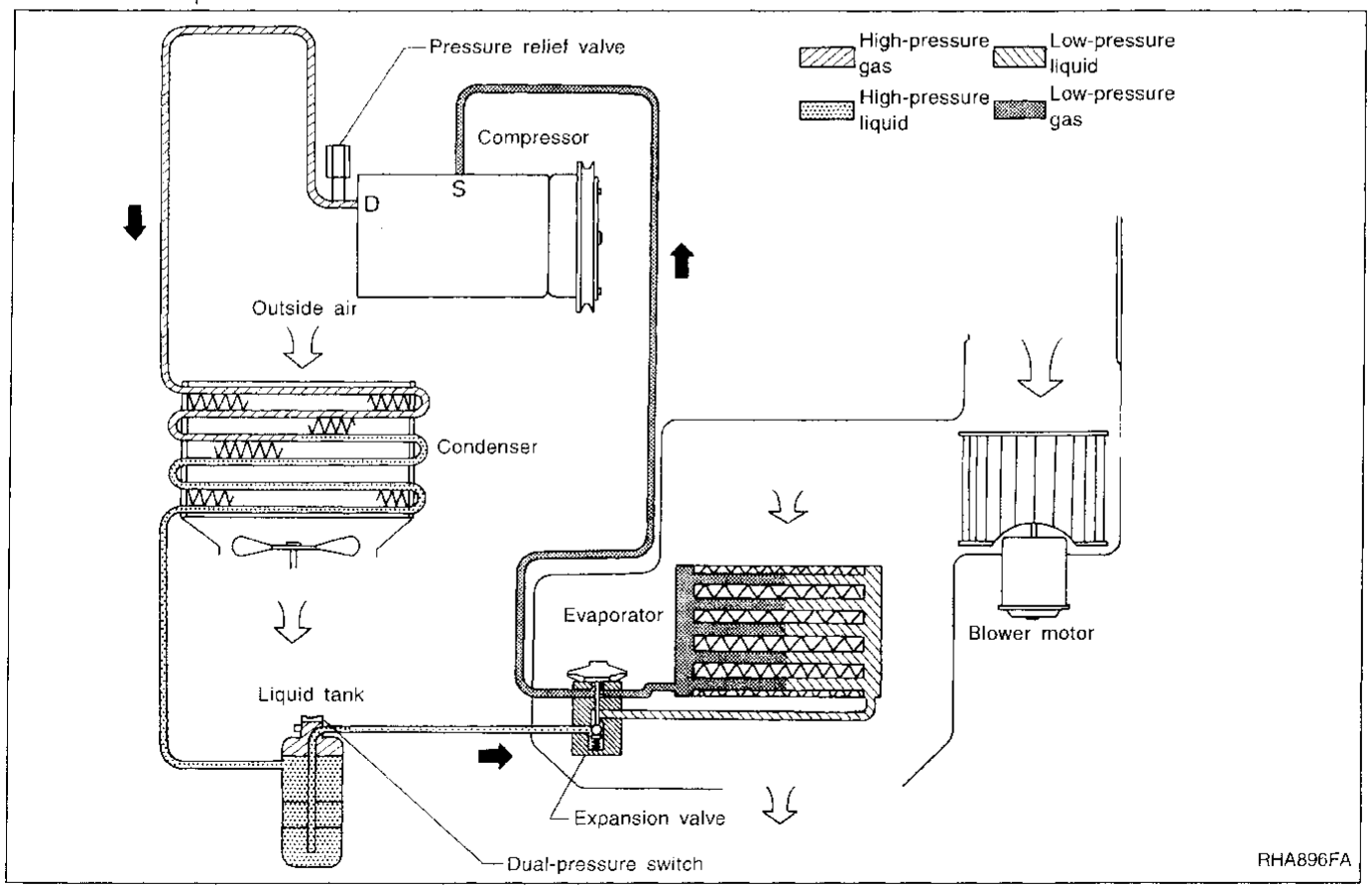
REFRIGERANT SYSTEM PROTECTION

Dual-pressure switch

The refrigerant system is protected against excessively high or low pressures by the dual-pressure switch, located on the liquid tank. If the system pressure rises above, or falls below the specifications, the dual-pressure switch opens to interrupt the compressor operation.

Pressure relief valve

The refrigerant system is also protected by a pressure relief valve, located in the rear head of the compressor. When the pressure of refrigerant in the system increases to an abnormal level [more than 3,727 kPa (38 kg/cm^2, 540 psi)], the release port on the pressure relief valve automatically opens and 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.

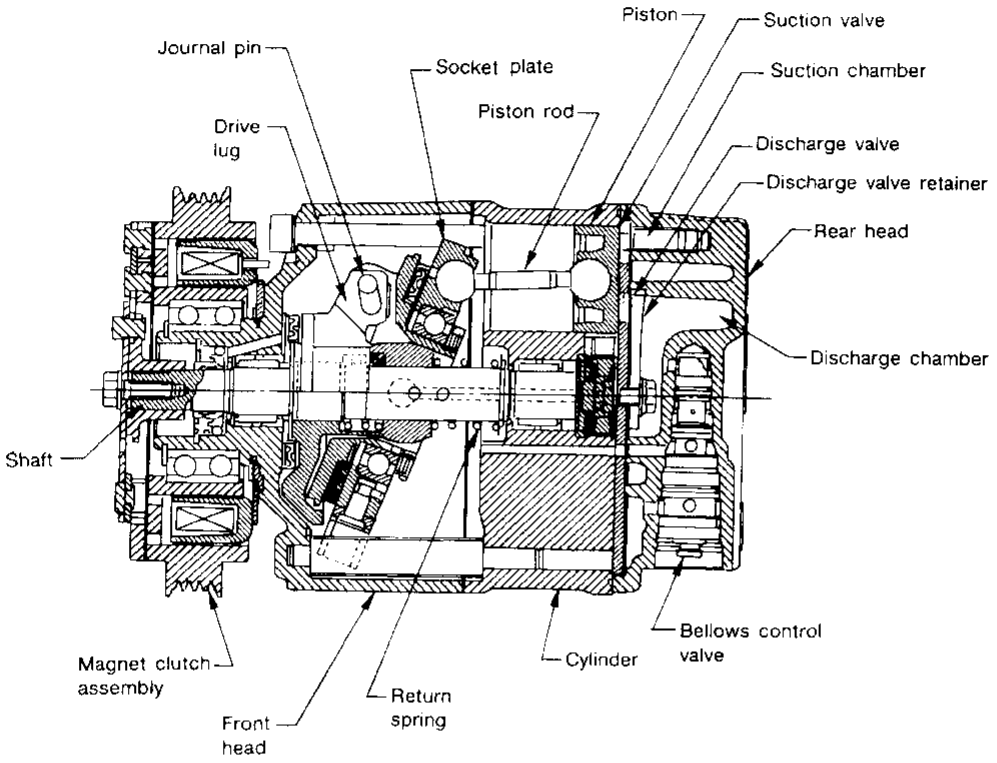
   This is because the V-6 compressor provides a means of "capacity" control.
2. The V-6 variable compressor provides refrigerant control under varying conditions. During cold winters, it may not produce high refrigerant pressure discharge (compared to previous units) when used with air conditioning systems.
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/cm^2, 21 to 26 psi) under varying conditions. In previous compressors, however, suction pressure was reduced with increases in engine speed.

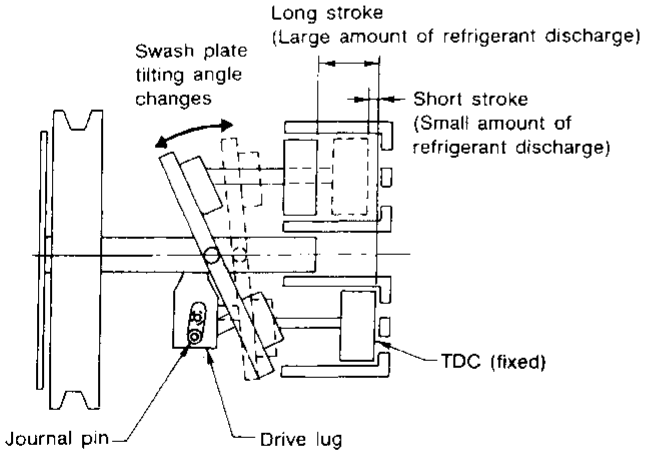
DESCRIPTION

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 10.5 to 184 cm^3 (0.641 to 11.228 cu in).





Discharge control	Discharge capacity cm^3 (cu in)/rev.	Piston stroke length mm (in)
Minimum	10.5 (0.641)	2.3 (0.091)
Maximum	184 (11.228)	28.6 (1.126)

RHA037DC

Operation

1. Operation control valve

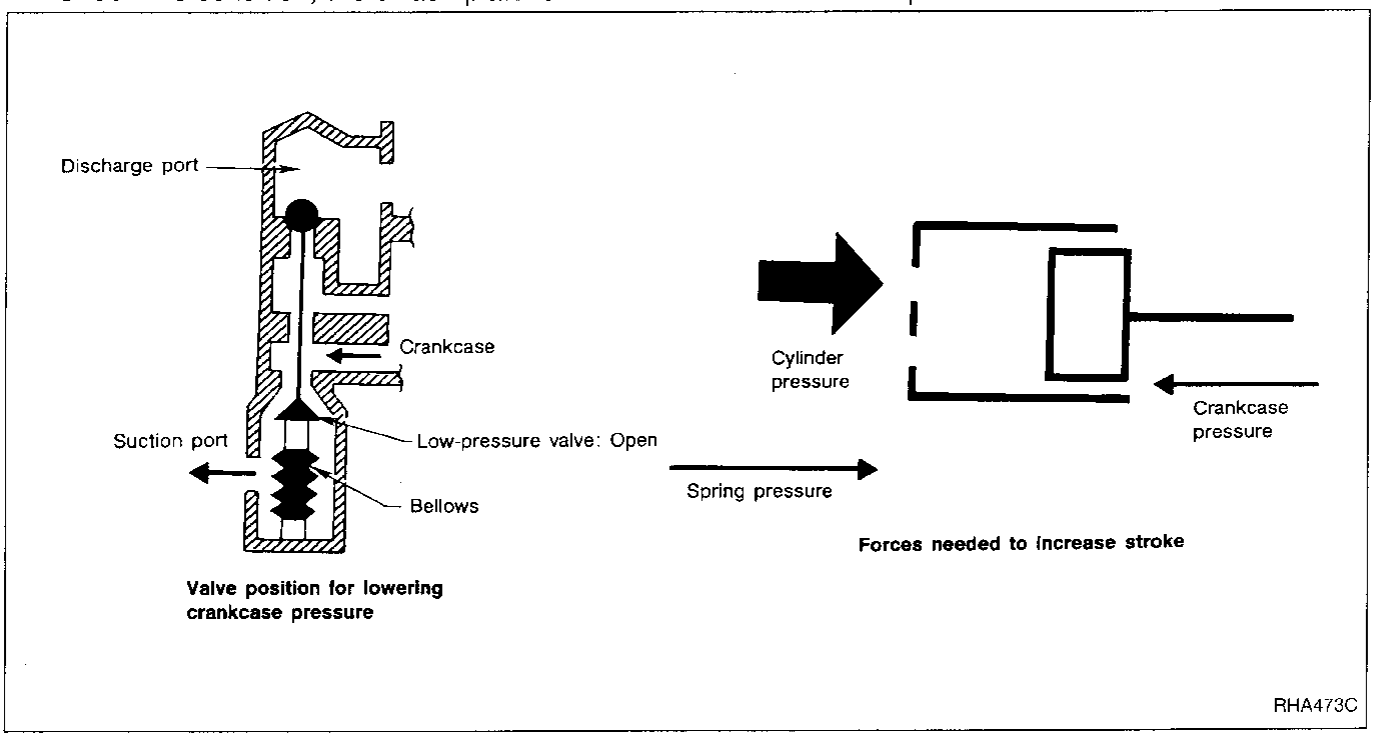
Operation control valve is located in the suction port (low-pressure) side, and opens or closes in response to changes in refrigerant suction pressure.
Operation of the valve controls the internal pressure of the crankcase.
The angle of the swash plate is controlled between the crankcase's internal pressure and the piston cylinder pressure.

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:

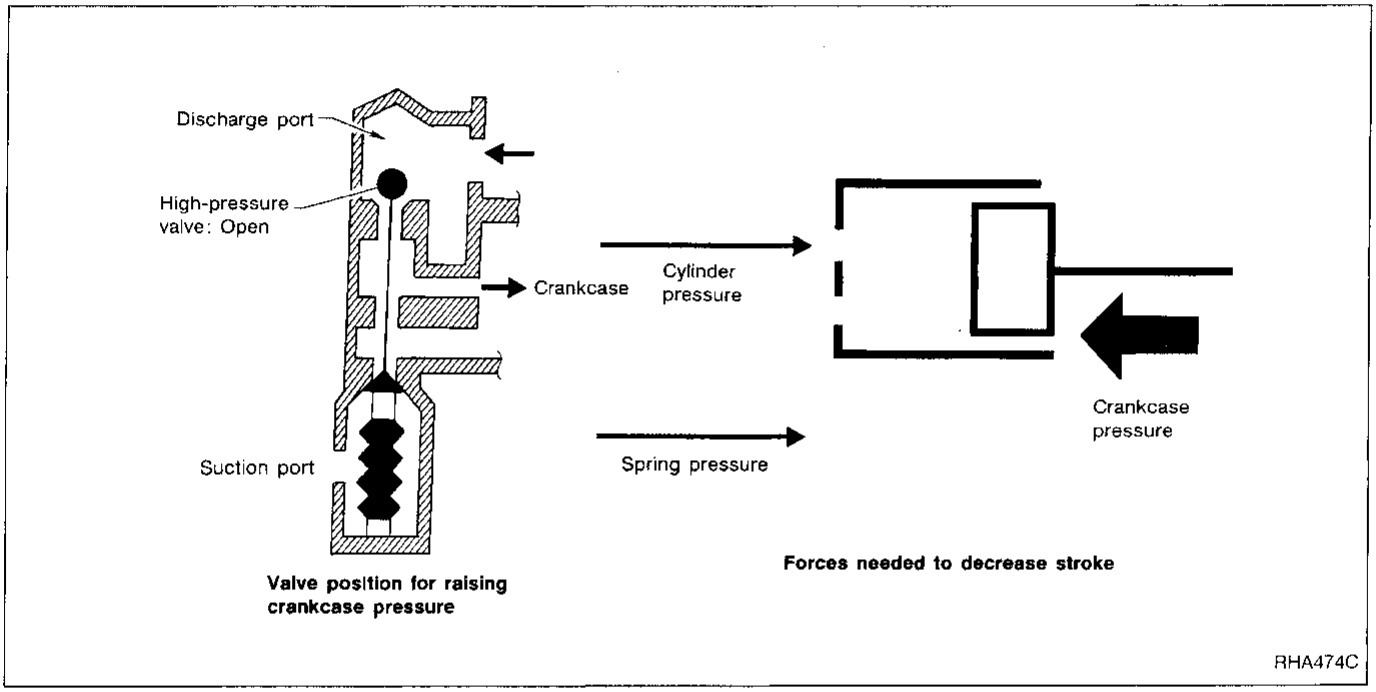
- the crankcase's internal pressure to equal the pressure on the low-pressure side;
- the cylinder's internal pressure to be greater than the crankcase's internal pressure.

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



3. Capacity control

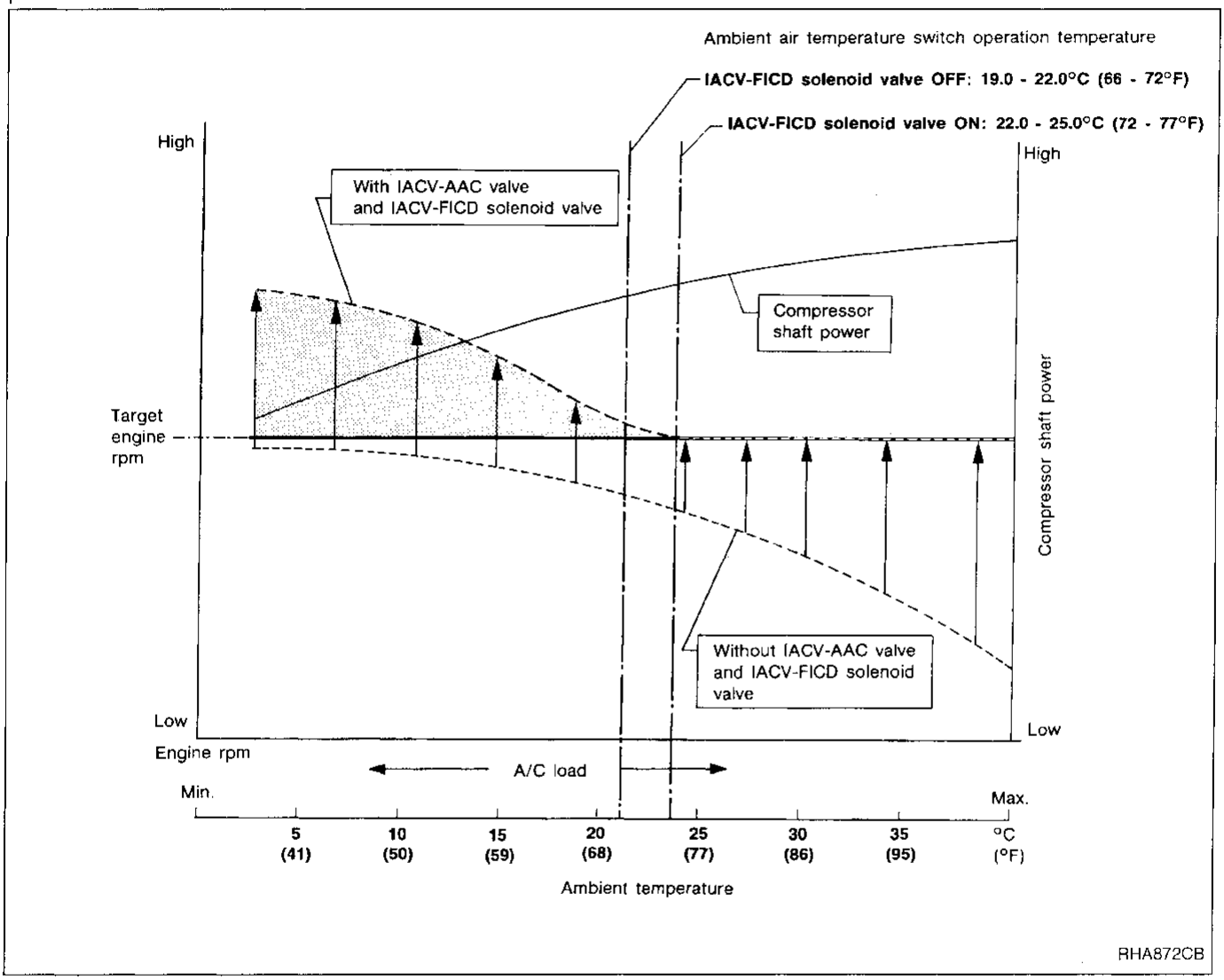
- Refrigerant pressure on suction side is low during high speed driving or when ambient or interior temperature is low.
- The bellows expands when refrigerant pressure on the suction pressure side drops below approximately 177 kPa (1.8 kg/cm^2, 26 psi).
  Since suction pressure is low, it makes the suction 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 Ps and discharge pressure Pd, which is near suction pressure Ps. If crankcase pressure Pc 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.



FICD CONTROL SYSTEM

General

With the variable displacement compressor, the compressor power requirements differ from when the ambient temperature is high and maximum cooling effect is required (i.e., when refrigerating load is large and the tilt angle of the compressor swash plate is large) to when the ambient temperature is low and less cooling effect is required (i.e., when refrigerating load is small and the tilt angle of the swash plate is small). To correspond correctly to this change in compressor power requirements, it is also necessary to control the operation of the IACV-FICD according to the refrigerating load. Thus, an ambient air temperature switch is provided on the front face of the condenser so that the IACV-FICD can be controlled depending on the ambient temperature.



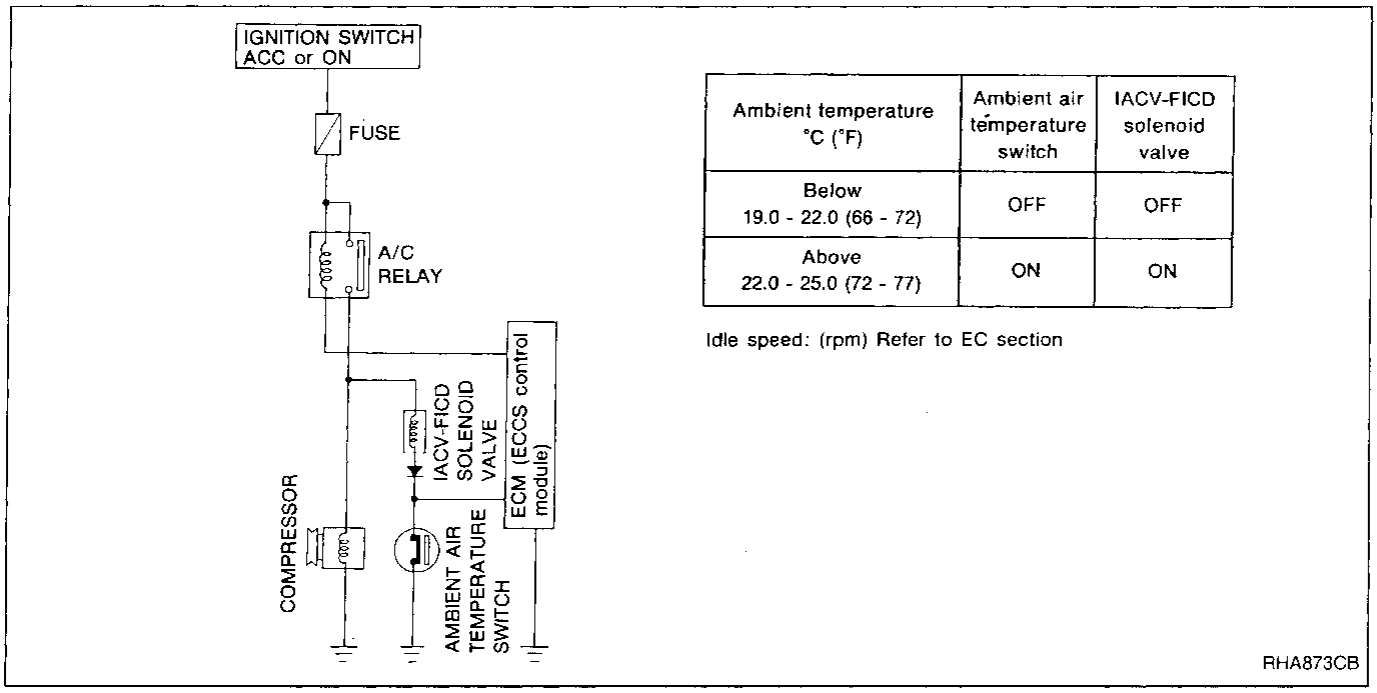
Operation

When the air conditioner is OFF, the ECM (ECCS control module) detects the load applied to the engine, and controls the IACV-AAC valve to adjust the engine idling speed to the appropriate rpm by supplying additional air from the IACV-AAC valve.

When the air conditioner is ON (A/C relay is ON), and when the ambient air temperature switch is ON (this switch turns ON automatically when the ambient temperature rises to approx. 25.0°C (77°F) or higher), the IACV-FICD solenoid valve is energized and additional air is supplied to the engine.

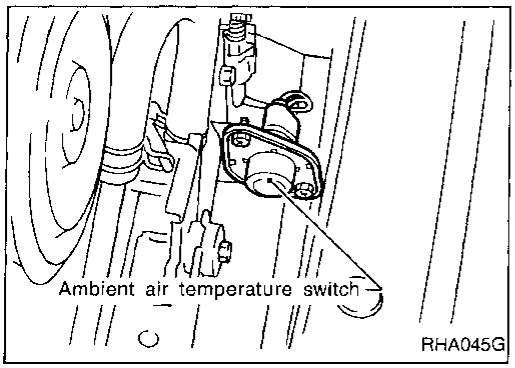
If the appropriate engine speed is not reached, the IACV-AAC valve supplies the additional air required to increase the engine rpm.

If the ambient air temperature switch is OFF [this switch turns OFF when the ambient temperature is below 19.0°C (56°F)] even when the air conditioner is ON (A/C relay is ON), the IACV-FICD solenoid valve is deenergized, and the idling speed is controlled so that the appropriate rpm can be achieved by operation of the IACV-AAC valve only.



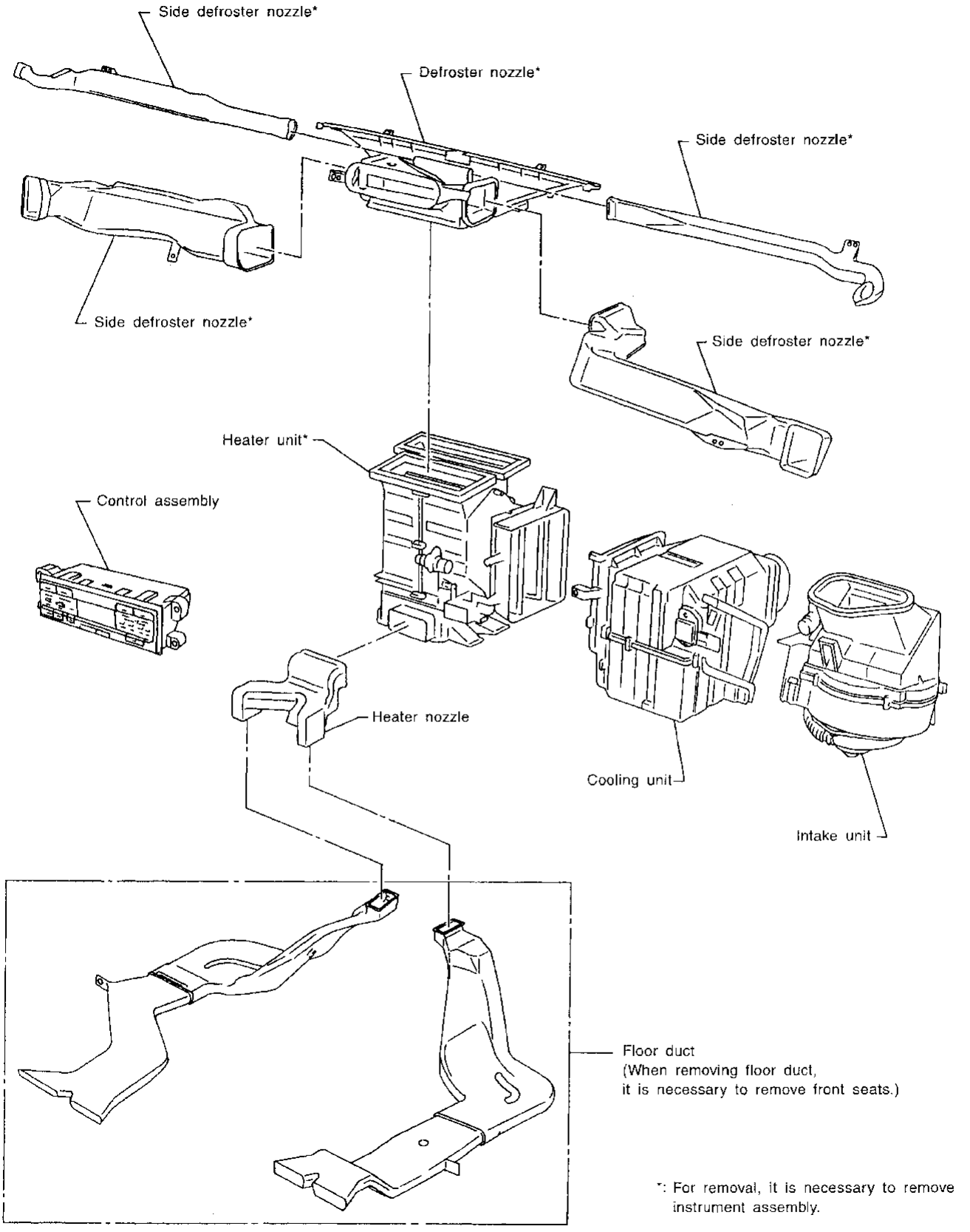
Ambient temperature °C (°F)	Ambient air temperature switch	IACV-FICD solenoid valve
Below 19.0 - 22.0 (66 - 72)	OFF	OFF
Above 22.0 - 25.0 (72 - 77)	ON	ON

Idle speed: (rpm) Refer to EC section



Component Layout

SEC. 270•271•272•273



RHA134G

Introduction

The Automatic Temperature Control (ATC) system provides automatic regulation of the vehicle 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 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

The air mix door is automatically controlled so that in-vehicle temperature will reach, and be maintained at the operator selected "set temperature". For a given set temperature, the air mix door position will depend on: Ambient temperature, in-vehicle temperature and amount of sunload.

Fan speed control

Blower speed is automatically controlled based on temperature setting, ambient temperature, in-vehicle temperature, amount of sunload and air mix door position.
With AUTO switch ON, 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 door position will be determined by: Ambient temperature, in-vehicle temperature, and whether the compressor is on or off.

Outlet door control

The outlet door position will be determined by: Ambient temperature, in-vehicle temperature and amount of sunload.

Compressor clutch control

The compressor operation (ON-OFF) is automatically controlled by the ambient sensor to prevent compressor damage in very cold ambient temperatures.

Self-diagnostic system

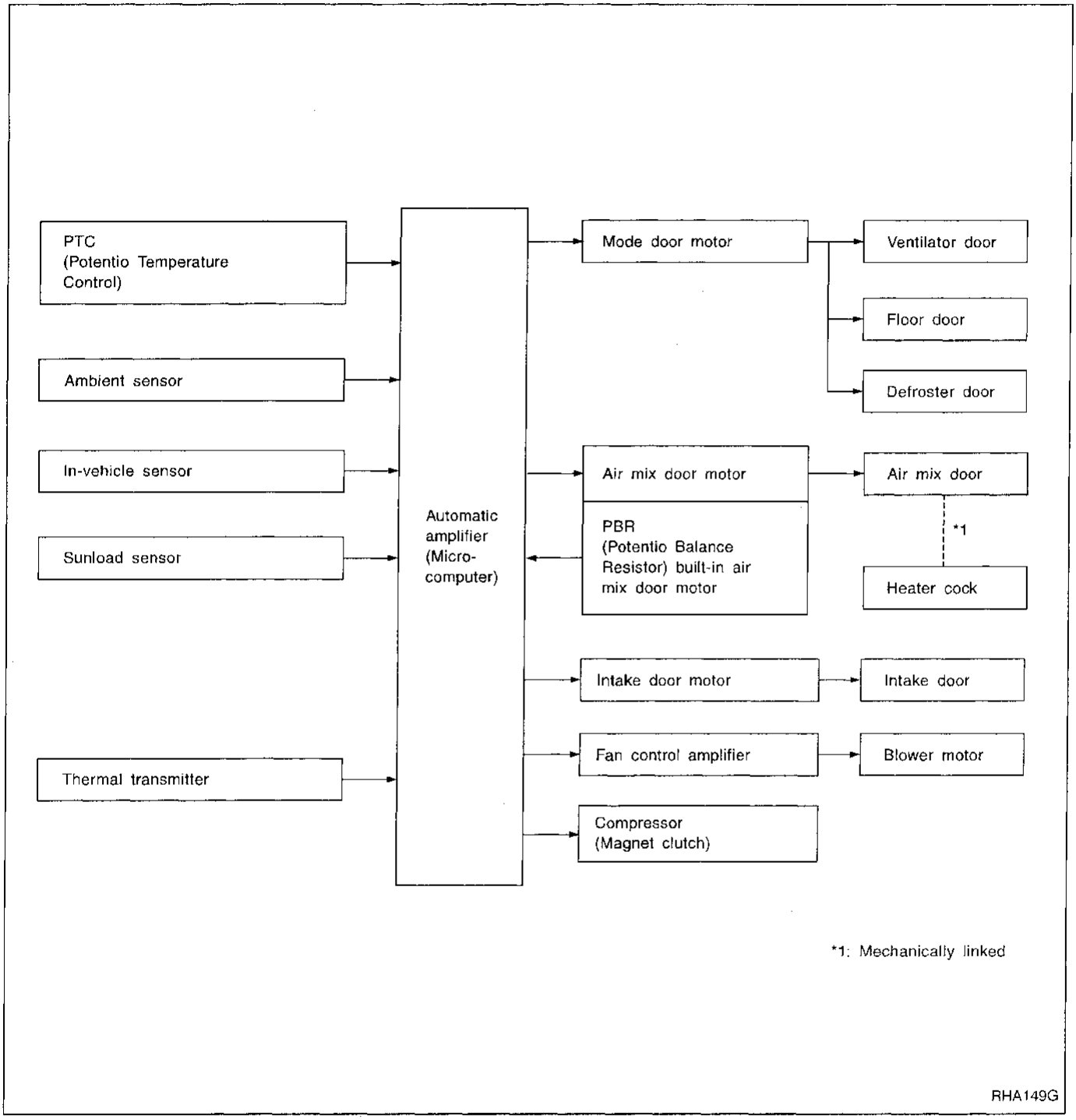
The self-diagnostic system consists of five steps. Each step can be accessed by pushing the switches on the automatic amplifier.
STEP 1: Checks LEDs and segments of the display.
STEP 2: Checks each sensor circuit for open or short circuit.
STEP 3: Checks mode door position and intake door position.
STEP 4: Checks operation of each actuator.
STEP 5: Checks temperature detected by each sensor.
AUXILIARY TRIMMER MECHANISM: Set temperature trimmer.

Memory function

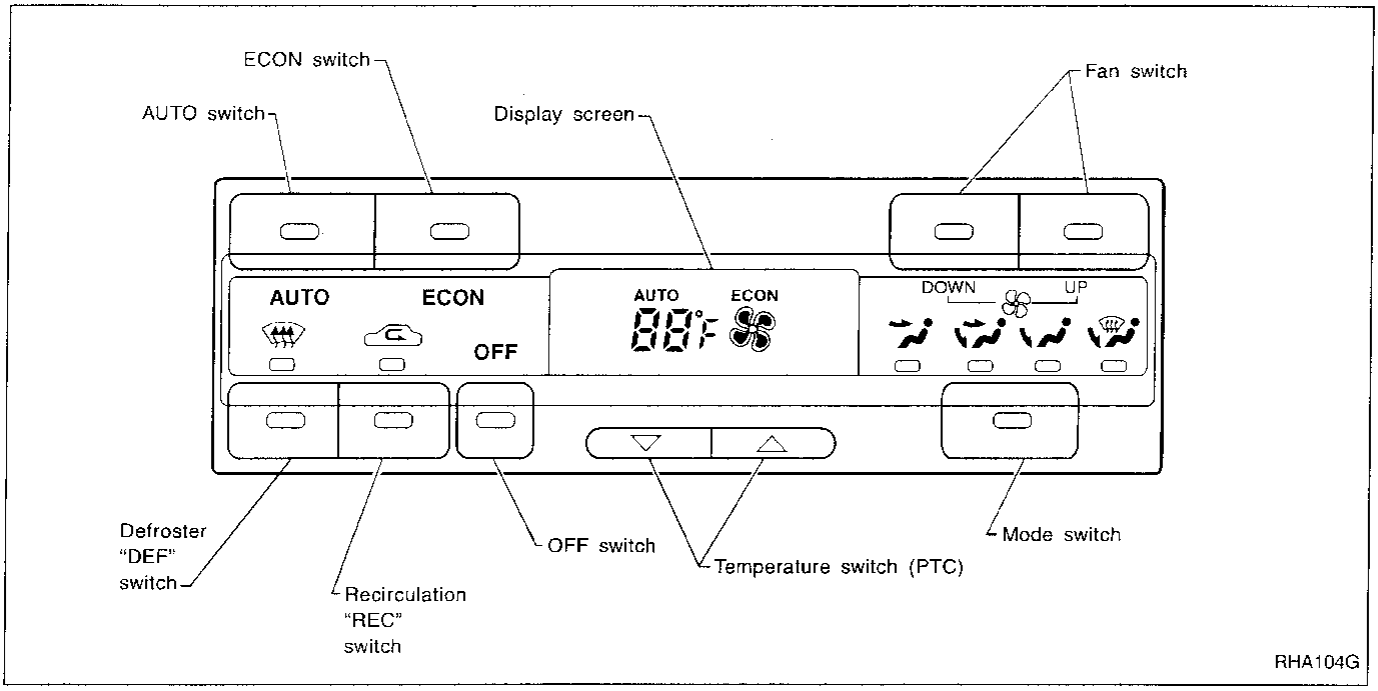
With ignition switch turned OFF, the auto amplifier stores in memory the set temperature and inputs of various switches. When the ignition switch is turned ON, the system begins operation with the information stored in memory. The system, then immediately compensates for the actual operating conditions.

Overview of Control System

The control system consists of input sensors, switches, the automatic amplifier (microcomputer) and outputs. The relationship of these components is shown in the diagram below:



Control Operation



Control Operation (Cont'd)

Display screen
Displays the operational status of the system.

AUTO switch
The compressor, intake doors, air mix door, outlet 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.

ECON switch
By pressing the ECON switch, the display should indicate ECON and the compressor always turns 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. The system will set the intake doors to the outside air position.

Temperature switch (Potentio Temperature Control)
Increases or decreases the set temperature.

OFF switch
The compressor and blower are OFF, the intake doors are set to the outside air position, and the air outlet doors are set to the foot (80% foot and 20% defrost) position.

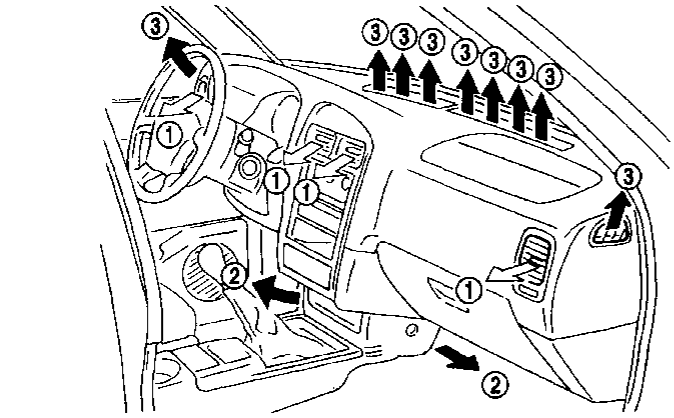
FAN switch
Manual control of the blower speed. Four speeds are available for manual control (as shown on the display screen):
low , medium low , medium high , high

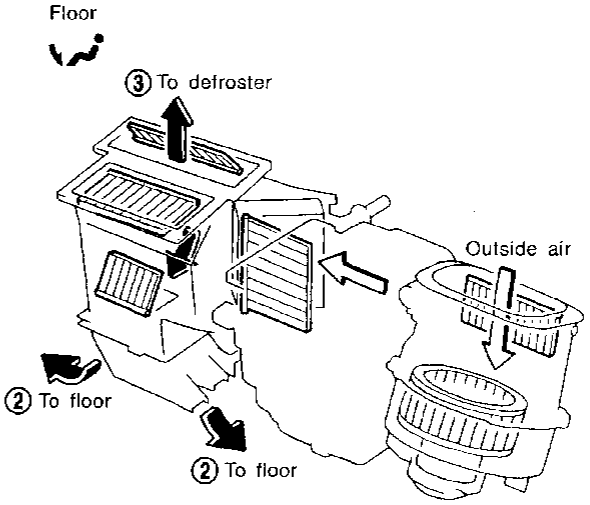
RECIRCULATION switch
OFF position: Outside air is drawn into the passenger compartment.
ON position: Interior air is recirculated inside the vehicle.

DEFROSTER switch
Positions the air outlet doors to the defrost position. Also positions the intake doors to the outside air position.

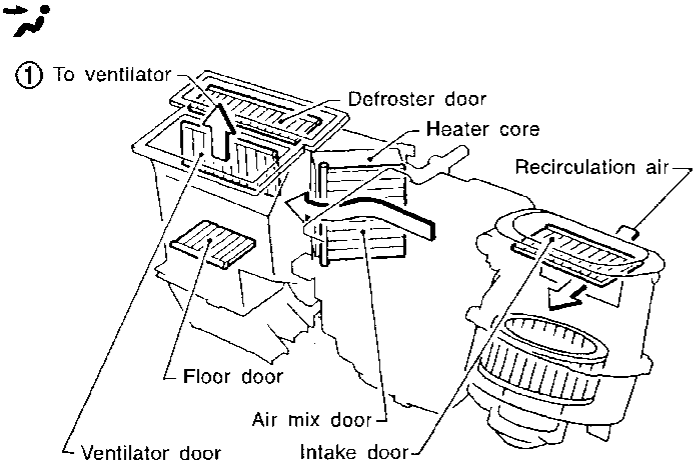
MODE switches
Control the air discharge outlets.

Discharge Air Flow

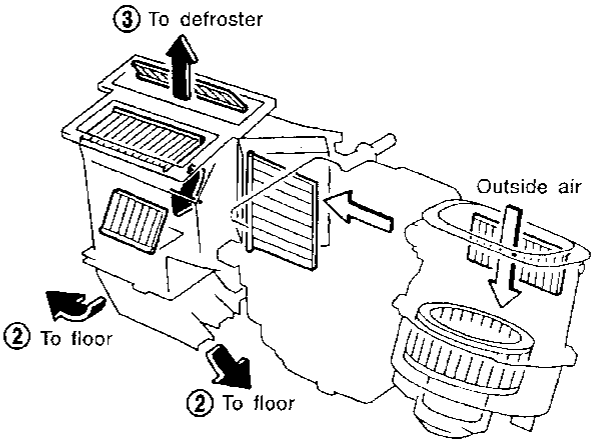




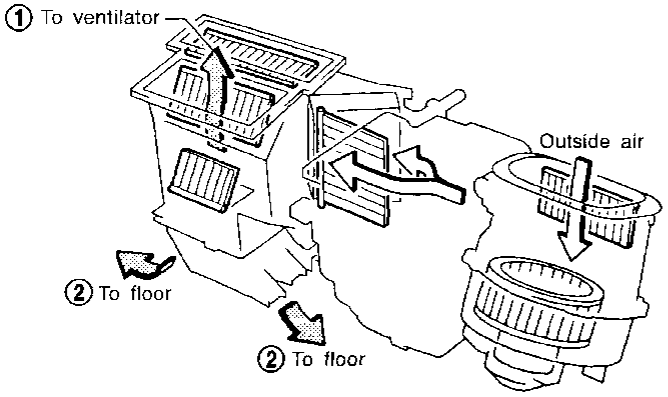
Ventilation
(switch "ON")



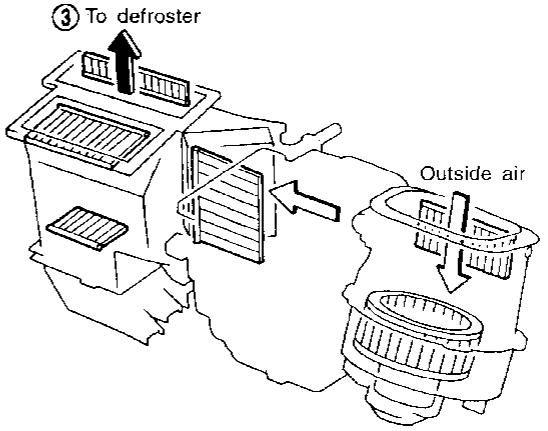
Floor and defroster



Bi-level
(switch "OFF")



Defroster



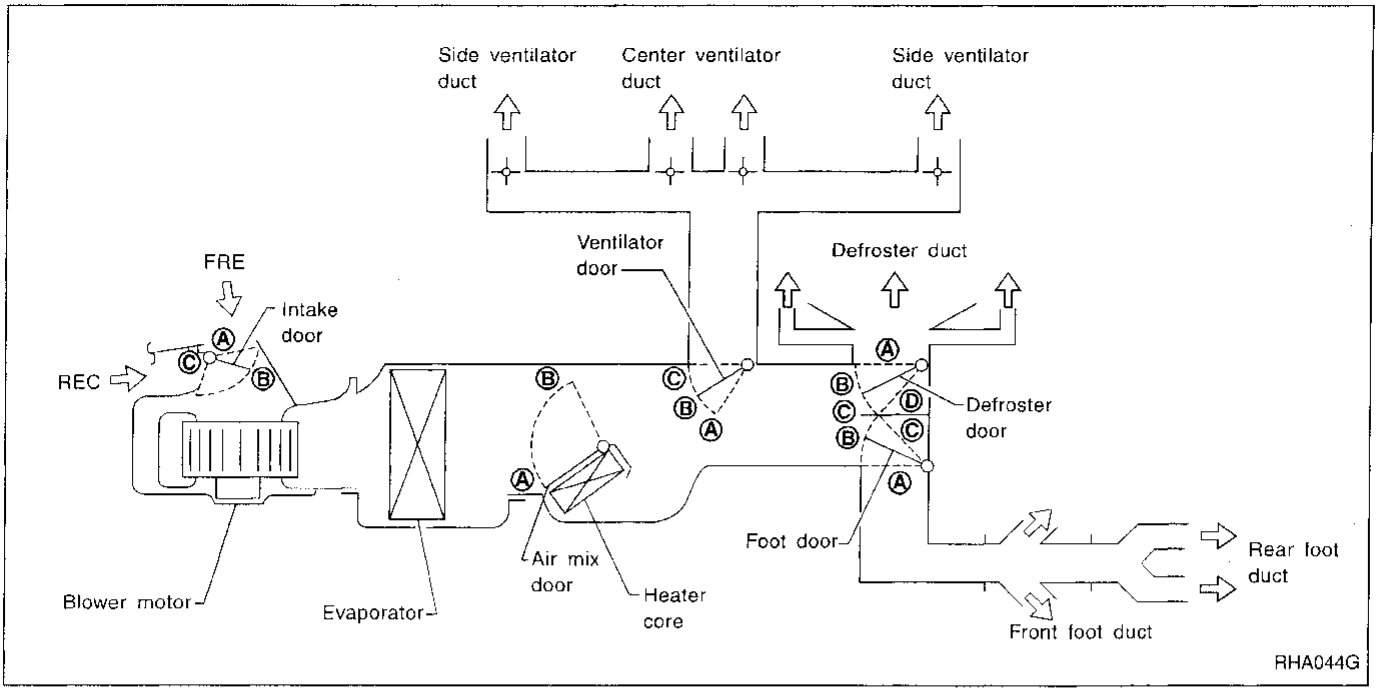
: Air passed through heater core

: Mixed air (+)

: Air not passed through heater core

RHA043G

Discharge Air Flow (Cont'd)

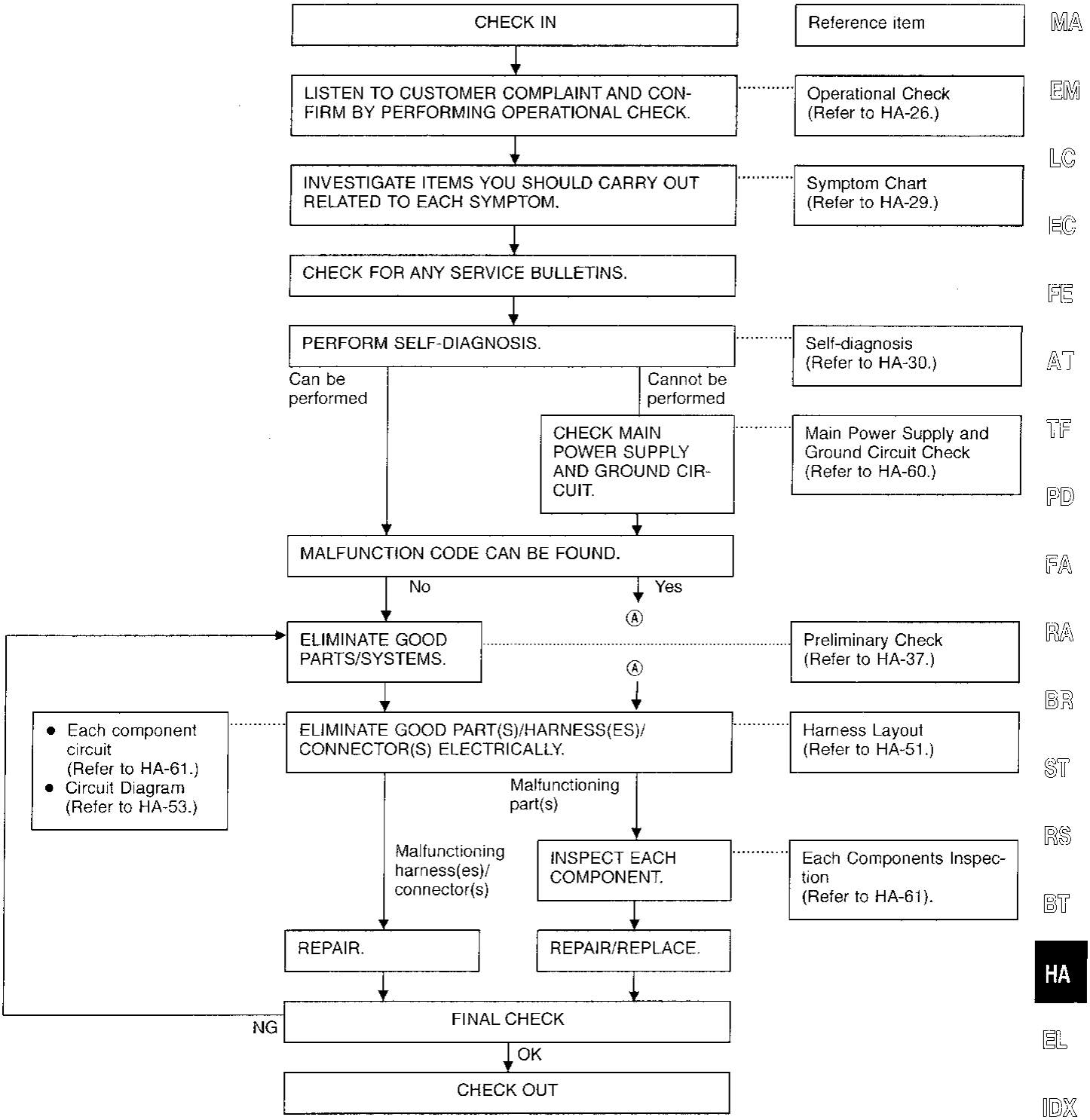


Position or switch	MODE SW				DEF SW		AUTO SW	ECON SW	REC SW.		Temperature SW		
	VENT	B/L	FOOT	F/D	ON	OFF			ON	OFF	▼		▲
Door							AUTO	ECON			18.0°C (65°F)	—	32.0°C (85°F)
Ventilator door	Ⓐ	Ⓑ	Ⓒ	Ⓒ	Ⓒ				—		—		
Foot door	Ⓐ	Ⓑ	Ⓓ	Ⓒ	Ⓐ				—		—		
Defroster door	Ⓐ	Ⓐ	Ⓑ	Ⓒ	Ⓓ	—	AUTO	AUTO	—		—		
Air mix door	—				—				—		Ⓐ	AUTO	Ⓑ
Intake door	—				Ⓒ				Ⓐ	AUTO*1	—		

*1: Automatically controlled when REC switch is OFF.

How to Perform Trouble Diagnoses for Quick and Accurate Repair

WORK FLOW

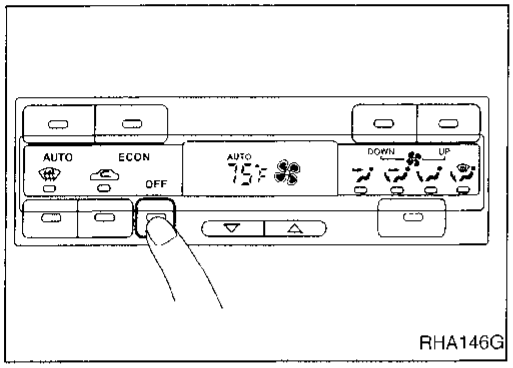


Operational Check

The purpose of the operational check is to confirm that the system operates properly.

CONDITIONS:

- **Engine running and at normal operating temperature.**

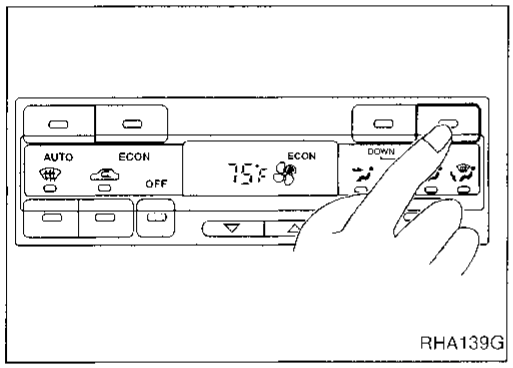


RHA146G

PROCEDURE:

1. Check memory function

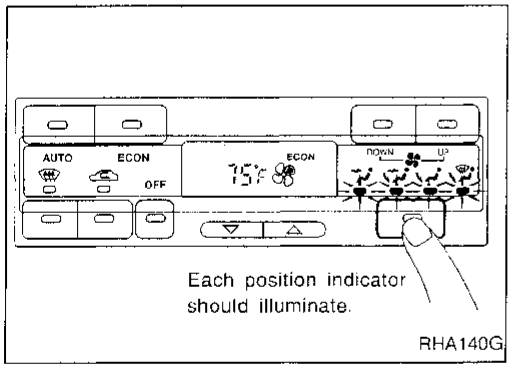
a. Set the temperature 75°F or 25°C.
b. Press OFF switch.
c. Turn the ignition off.
d. Turn the ignition on.
e. Press the AUTO switch.
f. Confirm that the set temperature remains at previous temperature.
g. Press OFF switch.



RHA139G

2. Check blower

a. Press fan switch (up side) one time.
Blower should operate on low speed.
The fan symbol should have one blade lit .
b. Press fan switch (up side) one more time, and continue checking blower speed and fan symbol until all speeds are checked.
c. Leave blower on MAX speed



RHA140G

3. Check discharge air

a. Press mode switch four times and DEF button.
b. Each position indicator should illuminate.

Operational Check (Cont'd)

Discharge air flow

Mode control knob	Air outlet/distribution		
	Face	Foot	Defroster
	100%	–	–
	60%	40%	–
	–	80%	20%
	–	60%	40%
	–	–	100%

RHA654F

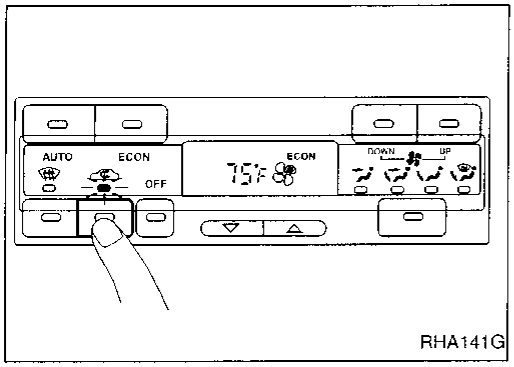
c. Confirm that discharge air comes out according to the air distribution table at left.

Refer to "Discharge Air Flow" (HA-23).

NOTE:

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

Intake door position is checked in the next step.

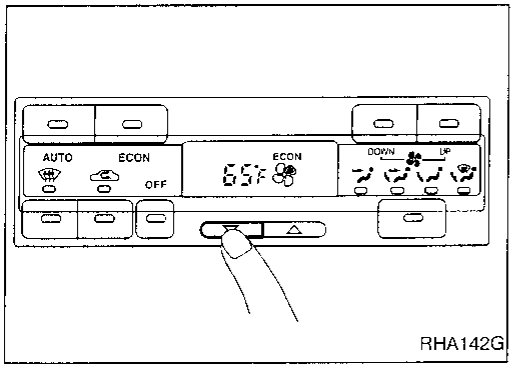


RHA141G

4. Check recirculation

a. Press REC switch.
Recirculation indicator should illuminate.

b. Listen for intake door position change (you should hear blower sound change slightly).

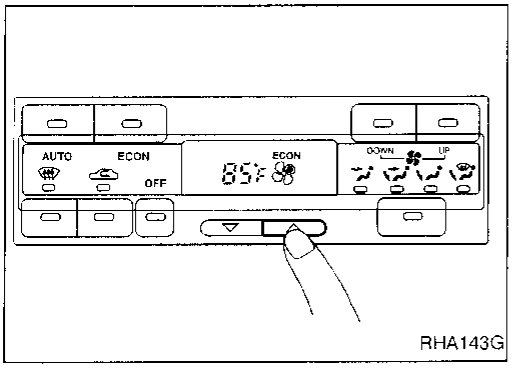


RHA142G

5. Check temperature decrease

a. Press the temperature decrease button until 18°C (65°F) is displayed.

b. Check for cold air at discharge air outlets.



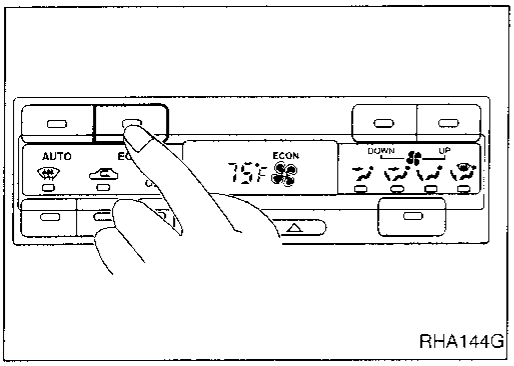
RHA143G

6. Check temperature increase

a. Press the temperature increase button until 32°C (85°F) is displayed.

b. Check for hot air at discharge air outlets.

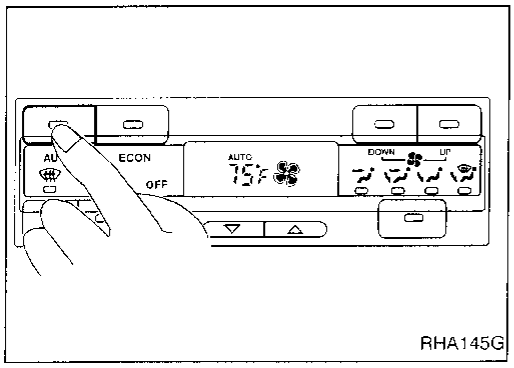
Operational Check (Cont'd)



RHA144G

7. Check ECON (ECONOMY) mode

a. Set the temperature 75°F or 25°C.
b. Press ECON switch.
c. Display should indicate ECON (no AUTO).
Confirm that the compressor clutch is not engaged (visual inspection).
(Discharge air and blower speed will depend on ambient, in-vehicle, and set temperatures).



RHA145G

8. Check AUTO mode

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

Symptom Chart

DIAGNOSTIC TABLE

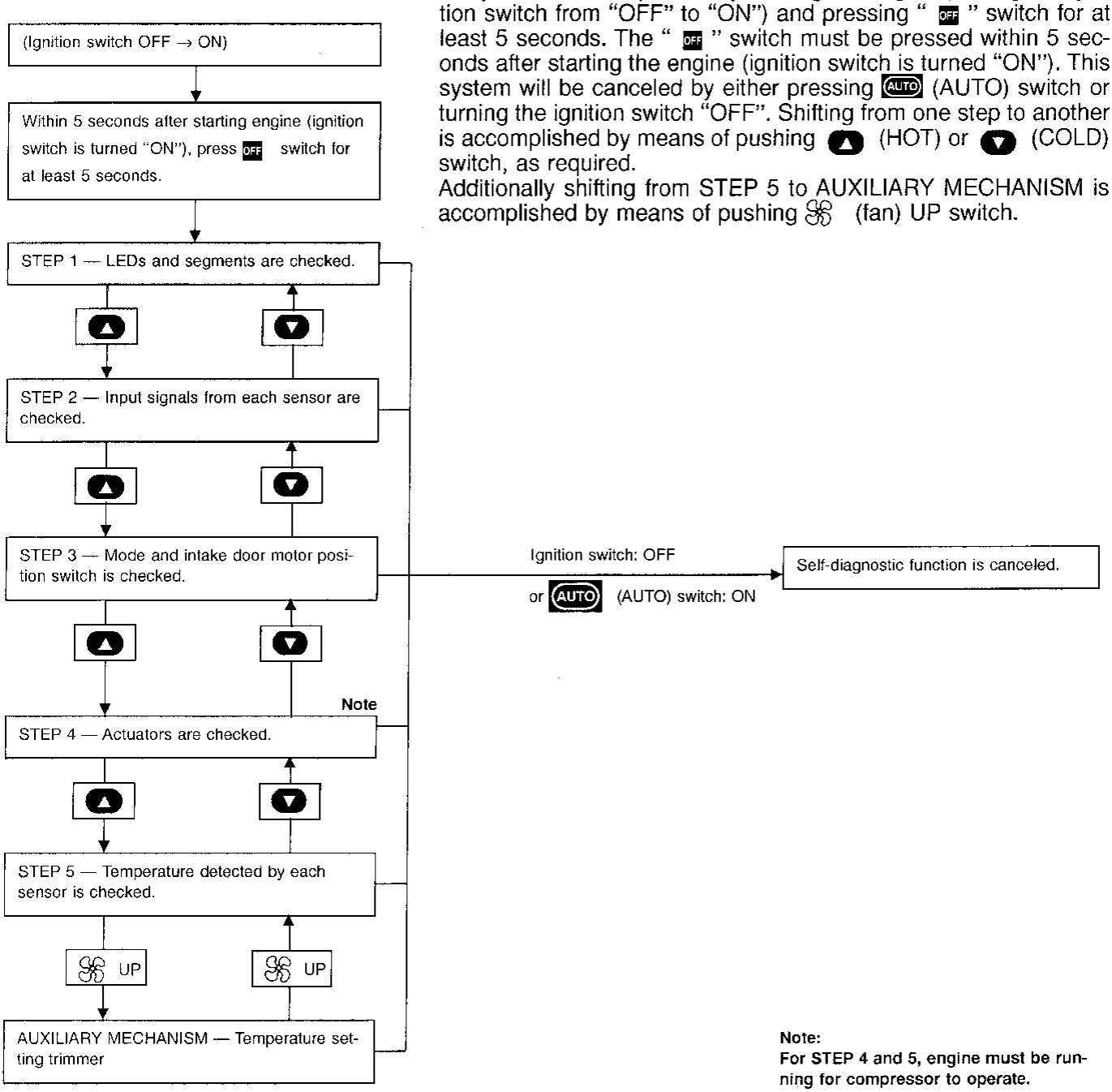
PROCEDURE	Self-diagnosis						Preliminary Check								Diagnostic Procedure									
SYMPTOM / DIAGNOSTIC ITEM AND REFERENCE PAGE	STEP 1 (HA-31)	STEP 2 (HA-32)	STEP 3 (HA-33)	STEP 4 (HA-34)	STEP 5 (HA-35)	AUXILIARY MECHANISM (HA-36)	Preliminary Check 1 (HA-37)	Preliminary Check 2 (HA-38)	Preliminary Check 3 (HA-39)	Preliminary Check 4 (HA-40)	Preliminary Check 5 (HA-41)	Preliminary Check 6 (HA-42)	Preliminary Check 7 (HA-43)	Preliminary Check 8 (HA-44)	Self-diagnosis circuit (HA-61)	Ambient sensor circuit (HA-61)	In-vehicle sensor circuit (HA-63)	Sunload sensor circuit (HA-65)	Air mix door motor PBR circuit (HA-68)	Mode door motor circuit (HA-70)	Intake door motor circuit (HA-75)	Air mix door motor circuit (HA-78)	Blower motor circuit (HA-81)	Magnet clutch circuit (HA-85)
Air outlet does not change.	❶	❷	○	○	○		❸								○	○	○	○	○	○	○	○	○	○
Intake door does not change.	❶	❷		○	○			❸							○	○	○	○	○	○	○	○	○	○
Insufficient cooling	○	○	○	○	○	○	○	○	❶		○	○	○		○	○	○	○	○	○	○	○	○	○
Insufficient heating	○	○	○	○	○	○	○	○		❶	○		○		○	○	○	○	○	○	○	○	○	○
Blower motor operation is malfunctioning.	❶	❷		○	○						❸				○	○	○	○	○	○	○	○	○	○
Magnet clutch does not engage.	❶	❷		○	○							❸			○	○	○	○	○	○	○	○	○	○
Discharged air temperature does not change.	❶	❷		○	○								❸		○	○	○	○	○	○	○	○	○	○
Noise														❶										
Mode door motor does not operate normally.	❶	❷	❸	❹	○										○	○	○	○	○	❺	○	○		○
Intake door motor does not operate normally.	❶	❷	❸	❹	○										○	○	○	○	○		❺	○		○
Air mix door motor does not operate normally.	❶	❷		❸	○										○	○	○	○	○		○	❹		○
Blower motor operation is malfunctioning under out of Starting Fan Speed Control.	❶	❷		○	○						❸				○	○	○	○	○		○	○	❹	○
Magnet clutch does not operate after performing Preliminary Check 6.	❶	❷		○	○							❸				○		○						❹
Self-diagnosis cannot be performed.															❶									

❶, ❷ : The number means checking order.
○: As for checking order, refer to each flow chart. (It depends on malfunctioning portion.)

Self-diagnosis

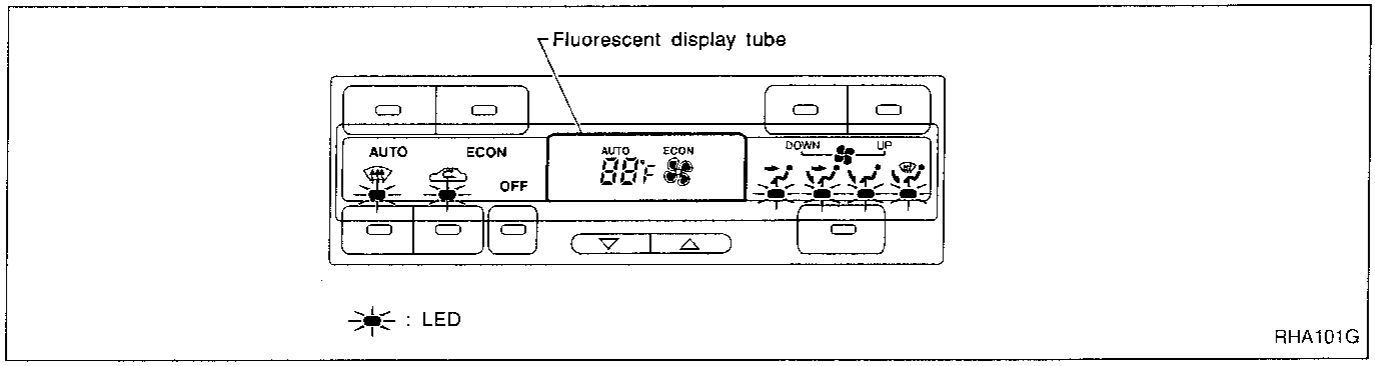
INTRODUCTION AND GENERAL DESCRIPTION

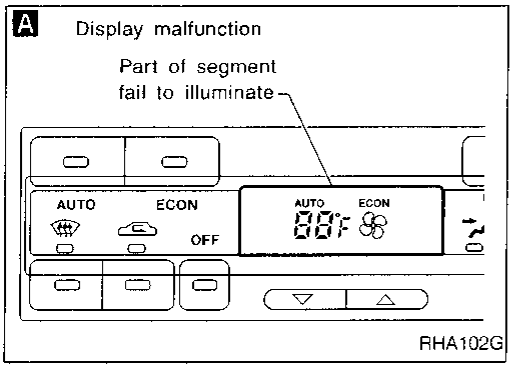
The self-diagnostic system diagnoses sensors, door motors, blower motor, etc. by system line. Refer to applicable sections (items) for details. Shifting from normal control to the self-diagnostic system is accomplished by starting the engine (turning the ignition switch from "OFF" to "ON") and pressing " 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 (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)





STEP-BY-STEP PROCEDURE

Turn ignition switch ON.

Set in self-diagnostic mode. Within 5 seconds after starting engine (ignition switch is turned "ON".), press OFF switch for at least 5 seconds.

A

STEP 1 - LEDs AND SEGMENT ARE CHECKED.
Do all LEDs and segments illuminate?

No → Malfunctioning OFF switch, LED or fluorescent display tube.
Replace A/C auto amp.

Yes

Press ▲ (HOT) switch.

Advance to self-diagnosis STEP 2?

No → Malfunctioning ▲ (HOT) switch.
Replace A/C auto amp.

Yes

Press ▼ (COLD) switch.

Return to self-diagnosis STEP 1?

No → Malfunctioning ▼ (COLD) switch.
Replace A/C auto amp.

Yes

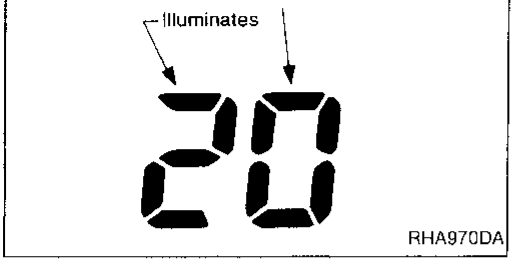
Press ▲ (HOT) switch.

Ⓐ
(Go to next page.)

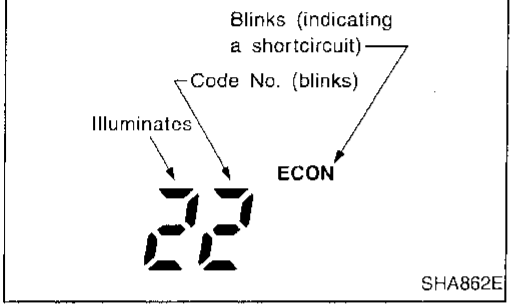
Self-diagnosis (Cont'd)

B **Display (when all sensors are in good order)**

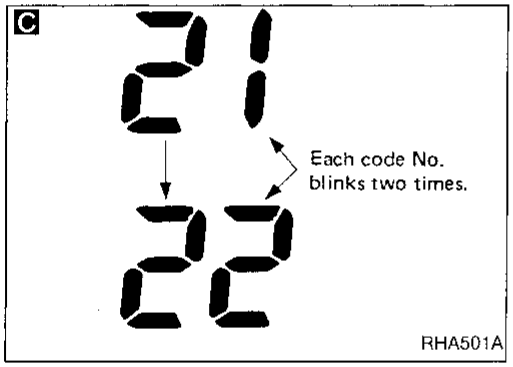
Illuminates 4 seconds after "2" is illuminated.



C **Display (when sensor malfunctions)**



C



Ⓐ

B

STEP 2 - SENSOR CIRCUITS ARE CHECKED FOR OPEN OR SHORT CIRCUIT.
Does code No. 20 appear on the display?

No → **C**

Yes

Press ▲ (HOT) switch.

Ⓑ

(Go to next page.)

C

Refer to the following chart for malfunctioning code No.
(If two or more sensors malfunction, corresponding code Nos. blink respectively two times.)

Code No.	Malfunctioning sensor (including circuits)	Reference page
21 21 ECON	Ambient sensor	HA-61
22 22 ECON	In-vehicle sensor	HA-63
25 25 ECON	Sunload sensor*1	HA-65
26 26 ECON	Air mix door motor PBR	HA-68

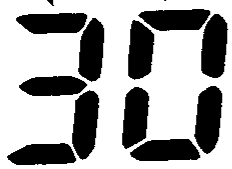
***1: Conduct self-diagnosis STEP 2 under sunshine.**
When conducting indoors, aim a light (more than 60W) at sunload sensor, otherwise Code No. 25 will indicate despite that sunload sensor is functioning properly.

Self-diagnosis (Cont'd)

D Display (when all doors are in good order)

Illuminates 16 seconds after " 3 " is shown on display.

Illuminates

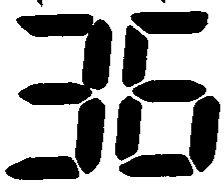


RHA869DA

E Display (when a door is out of order)

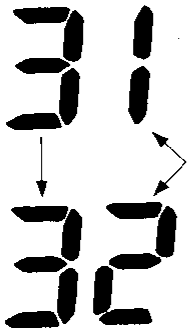
Code No. (blinks)

Illuminates



RHA168DA

E



Each code No. blinks two times.

RHA498A

Ⓑ

D

STEP 3 - MODE DOOR AND INTAKE DOOR POSITIONS ARE CHECKED.
Does code No. 30 appear on the display?

No

Yes

Press ▲ (HOT) switch.

Ⓒ

(Go to next page.)

E

Mode or (and) intake door motor position switch(es) is (are) malfunctioning.
(If two or more mode or intake doors are out of order, corresponding code numbers blink respectively two times.)

Code No.*1 *2	Mode or intake door position		Reference page
31	VENT	Mode door motor	HA-70
32	B/L		
34	FOOT		
35	F/D		
36	DEF		
37	REC	Intake door motor	HA-75
38	20% FRE		
39	FRE		

*1: If mode door motor harness connector is disconnected, the following display pattern will appear.

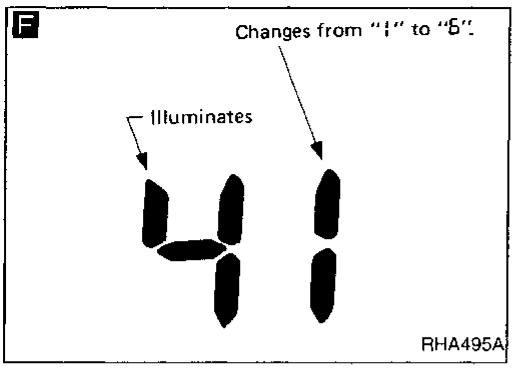
→ 31 → 32 → 34 → 35 → 36 →

*2: If intake door motor harness connector is disconnected, the following display pattern will appear.

→ 37 → 38 → 39 →

Self-diagnosis (Cont'd)

F



Ⓒ

F

STEP 4 - OPERATION OF EACH ACTUATOR IS CHECKED.
Engine running.
Press DEF switch, code No. of each actuator test is indicated on the display.

G

Discharge air flow

Mode control knob	Air outlet/distribution		
	Face	Foot	Defroster
	100%	–	–
	60%	40%	–
	–	80%	20%
	–	60%	40%
	–	–	100%

RHA654FB

G

Refer to the following chart and confirm discharge air flow, air temperature, blower motor voltage and compressor operation.
Checks must be made visually, by listening to any noise, or by touching air outlets with your hand, etc. for improper operation.

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

NG

- Air outlet does not change.
  Go to preliminary check 1 (HA-37).
- Intake door does not change.
  Go to preliminary check 2 (HA-38).
- Discharge air temperature does not change.
  Go to preliminary check 7 (HA-43).
- Magnet clutch does not engage.
  Go to preliminary check 6 (HA-42).
- Blower motor operation is malfunctioning.
  Go to preliminary check 5 (HA-41).

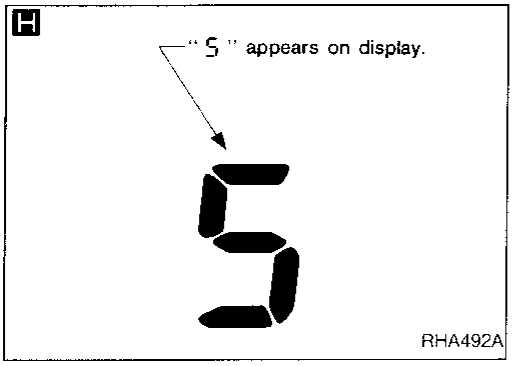
OK

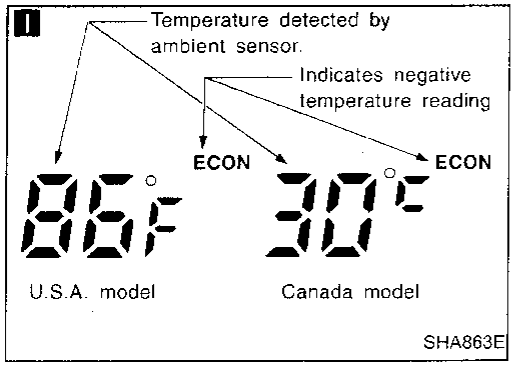
Press ▲ (HOT) switch.

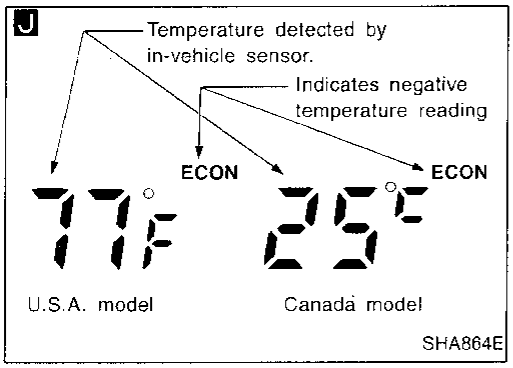
Ⓓ

(Go to next page.)

Self-diagnosis (Cont'd)







Ⓓ

H

STEP 5 - TEMPERATURE OF EACH SENSOR IS CHECKED.
Code No. 5 appears on the display.

I

Note

Press (DEF) switch one time, temperature detected by ambient sensor is indicated on the display.
ECON shown in display indicates negative temperature reading.

NG → Go to Ambient Sensor Circuit (HA-61).

OK

J

Note

Press (DEF) switch the second time, temperature detected by in-vehicle sensor is indicated on the display.
ECON shown in display indicates negative temperature reading.

NG → Go to In-vehicle Sensor Circuit (HA-63).

OK

Press (DEF) switch the third time, display returns to original presentation 5 .

Turn ignition switch OFF or (AUTO) (AUTO) switch ON.

END

Note:
If temperature shown on display greatly differs from actual temperature, check sensor circuit first, then inspect sensor.

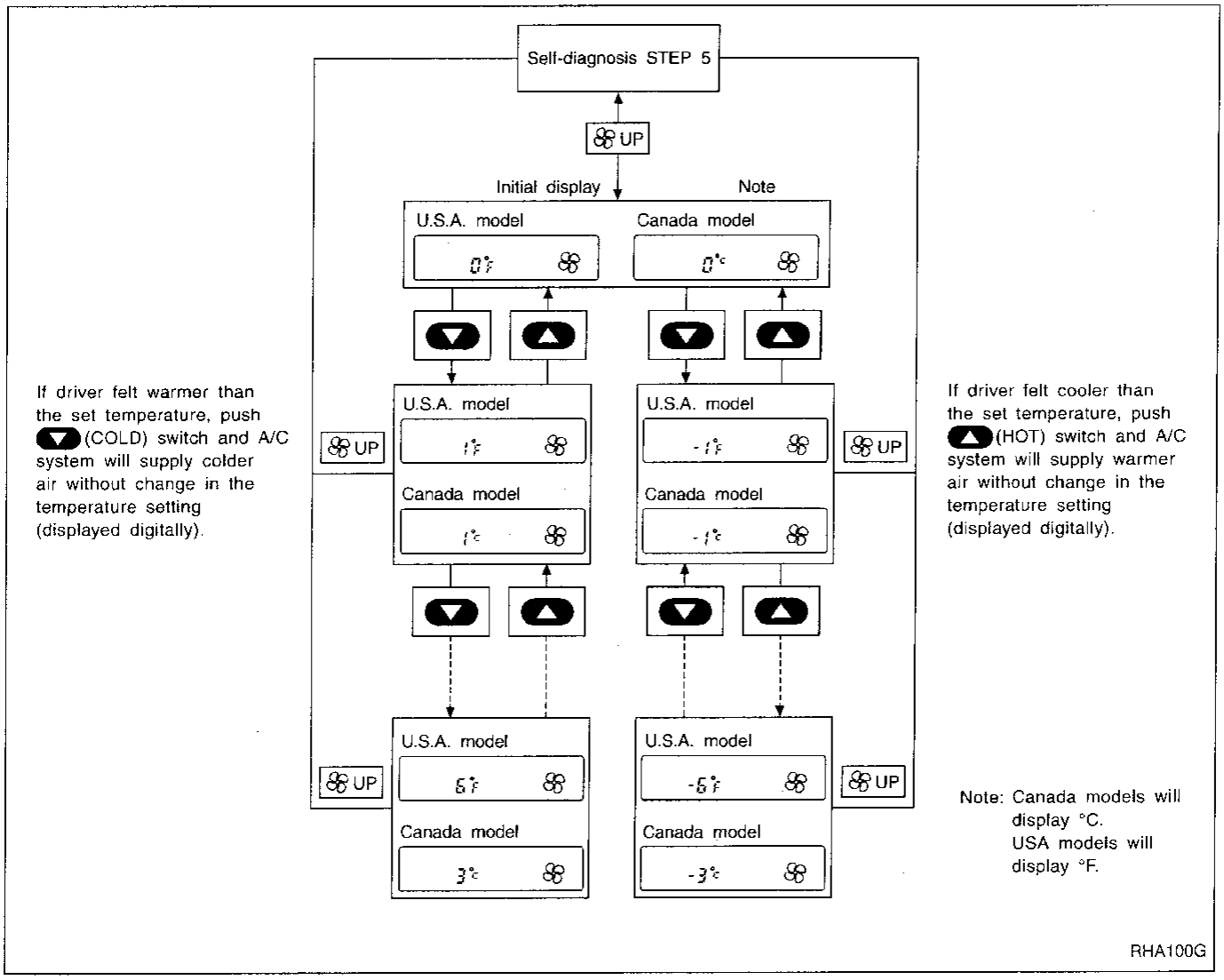
Self-diagnosis (Cont'd)

AUXILIARY MECHANISM: Temperature setting trimmer

The trimmer compensates for differences in range of ±3°C (±6°F) between temperature setting (displayed digitally) and temperature felt by driver.

Operating procedures for this trimmer are as follows:

- Begin Self-diagnosis STEP 5 mode.
- Press (fan) UP switch to set system in auxiliary mode.
- Press either (HOT) or (COLD) switch as desired. Temperature will change at a rate of 1°C (1°F) each time a switch is pressed.



When battery cable is disconnected, trimmer operation is canceled. 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.**

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. 4 seconds.

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

Code No.	How to repair	Reference page
21 /21 ECON	Go to Ambient Sensor Circuit.	HA-61
22 /22 ECON	Go to In-vehicle Sensor Circuit.	HA-63
25 /25 ECON	Go to Sunload Sensor Circuit.	HA-65
26 /26 ECON	Go to Air Mix Door PBR Circuit.	HA-68

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

Yes ↓

CHECK MODE DOOR MOTOR.
Set up Self-diagnosis STEP 3.
Is mode door motor operating normally?
Code No. 30 should be indicated on the display after approx. 16 seconds.

No → Go to Mode Door Motor Circuit. Refer to HA-70.

Yes ↓

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

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

Refer to HA-34.

No → Check side link mechanism. Refer to Control Linkage Adjustment (HA-88).

NG → Repair or adjust.

OK → Go to Mode Door Motor Circuit. (HA-70).

Yes ↓

Air outlet control system is normal.

PRELIMINARY CHECK 2

Intake door does not change.

- **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. 4 seconds later.

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

Code No.	How to repair	Reference page
21 /21 ECON	Go to Ambient Sensor Circuit.	HA-61
22 /22 ECON	Go to In-vehicle Sensor Circuit.	HA-63
25 /25 ECON	Go to Sunload Sensor Circuit.	HA-65
26 /26 ECON	Go to Air Mix Door PBR Circuit.	HA-68

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

Yes ↓

CHECK INTAKE DOOR MOTOR OPERATION.
Set up Self-diagnosis STEP 4.
Does intake air change according to each code No.?

41	42	43	44	45	46
REC	REC	20% FRESH	FRESH	FRESH	FRESH

Refer to HA-34.

No → Check intake door rod or lever mechanism. Refer to Control Linkage Adjustment (HA-89).

NG → Repair or adjust.

OK ↓

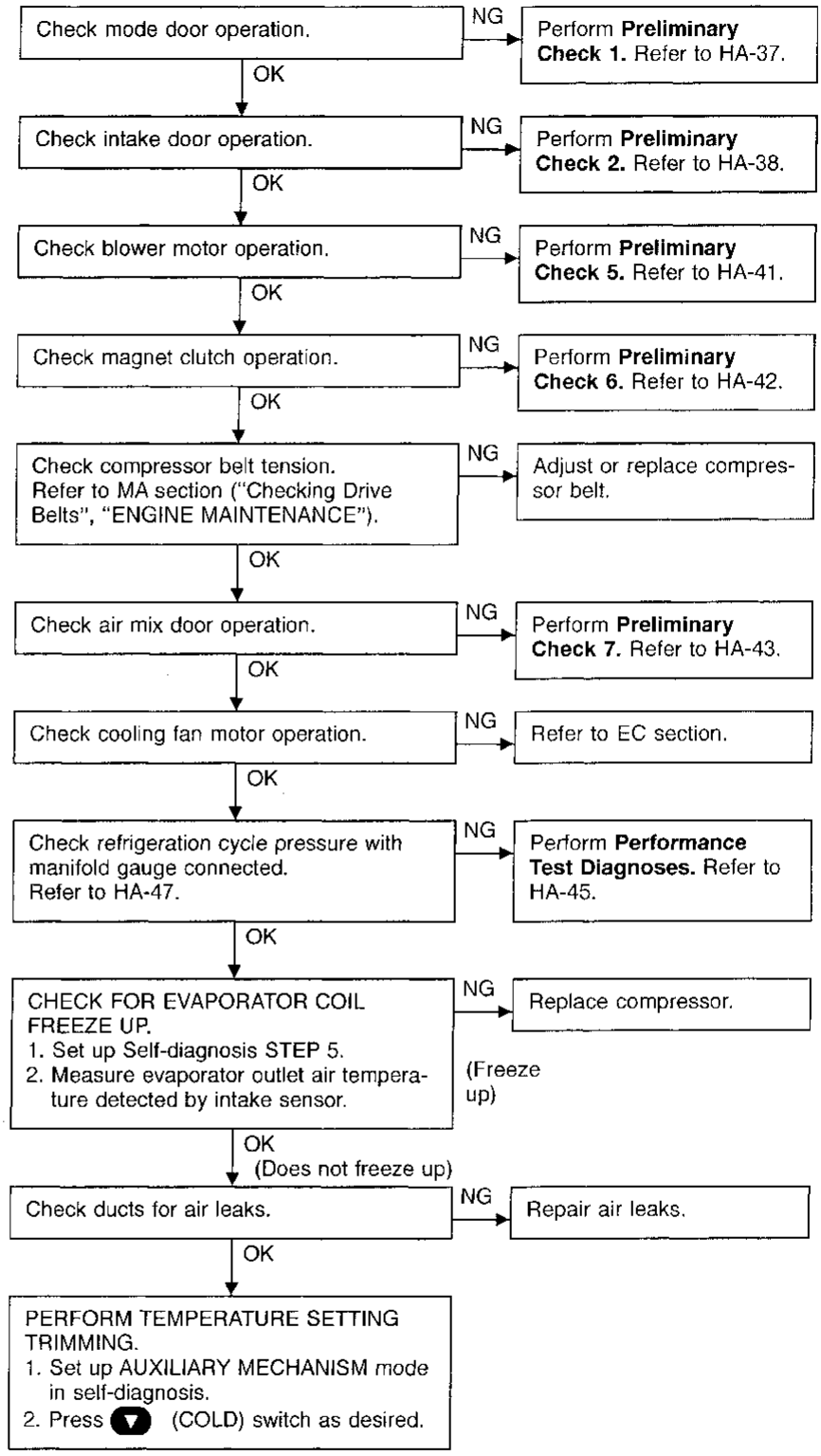
Go to Intake Door Motor Circuit (HA-75).

Yes ↓

Intake door control system is normal.

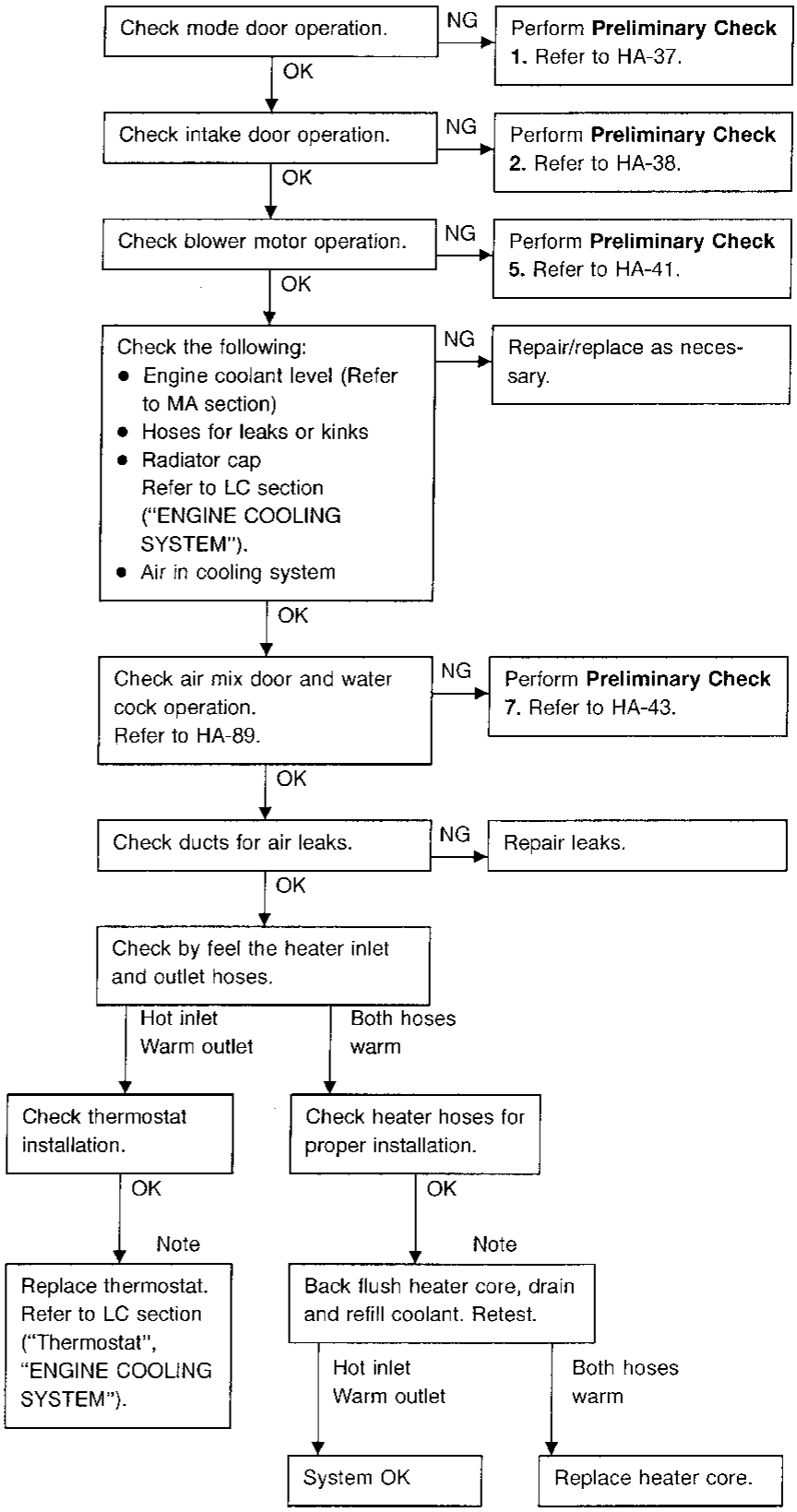
PRELIMINARY CHECK 3

Insufficient cooling



PRELIMINARY CHECK 4

Insufficient heating



Note: To avoid unnecessary service of heating system, first perform TEMPERATURE SETTING TRIMMING. Refer to "AUXILIARY MECHANISM", "Self-diagnosis", HA-36.

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. 4 seconds.

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

Code No.	How to repair	Reference page
21 /21 ECON	Go to Ambient Sensor Circuit.	HA-61
22 /22 ECON	Go to In-vehicle Sensor Circuit.	HA-63
25 /25 ECON	Go to Sunload Sensor Circuit.	HA-65
26 /26 ECON	Go to Air Mix Door PBR Circuit.	HA-68

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

Yes ↓

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

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

No → Go to Blower Motor Circuit (HA-81).

Yes ↓

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

No → Blower motor operation is normal.

Yes ↓

Is blower motor operating under fan starting speed control?
Refer to HA-81.

No → Check thermal transmitter control circuit.
Refer to EL section ("Thermal Transmitter Check", "METERS AND GAUGES").

Yes ↓

Blower motor operation is normal.

PRELIMINARY CHECK 6

Magnet clutch does not engage.

- **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. 4 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 /21 ECON	Go to Ambient Sensor Circuit.	HA-61
22 /22 ECON	Go to In-vehicle Sensor Circuit.	HA-63
25 /25 ECON	Go to Sunload Sensor Circuit.	HA-65
26 /26 ECON	Go to Air Mix Door PBR Circuit.	HA-68

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

OK ↓

CHECK MAGNET CLUTCH OPERATION.
Set up Self-diagnosis STEP 4.
Does magnet clutch operate according to each code No.?

Actuator	Code No.					
	41	42	43	44	45	46
Compressor	ON	ON	ON	OFF	OFF	ON

NG → CHECK REFRIGERANT.
Connect manifold gauge, then check system pressure.

NG → Check refrigerant leaks.

OK ↓

Go to Magnet Clutch Circuit. Refer to HA-85.

OK ↓

Magnet clutch control system is normal.
Refer to HA-85.

PRELIMINARY CHECK 7

Discharged air temperature does not change.

- **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. 4 seconds later.

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 / 21 ECON	Go to Ambient Sensor Circuit.	HA-61
22 / 22 ECON	Go to In-vehicle Sensor Circuit.	HA-63
25 / 25 ECON	Go to Sunload Sensor Circuit.	HA-65
26 / 26 ECON	Go to Air Mix Door PBR Circuit.	HA-68

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

OK ↓

CHECK AIR MIX DOOR OPERATION.
Set up Self-diagnosis STEP 4.
Does discharged air temperature change according to each code No.?

41	42	43	44	45	46
Full cold		Full hot			

OK → Air mix door control system is normal.

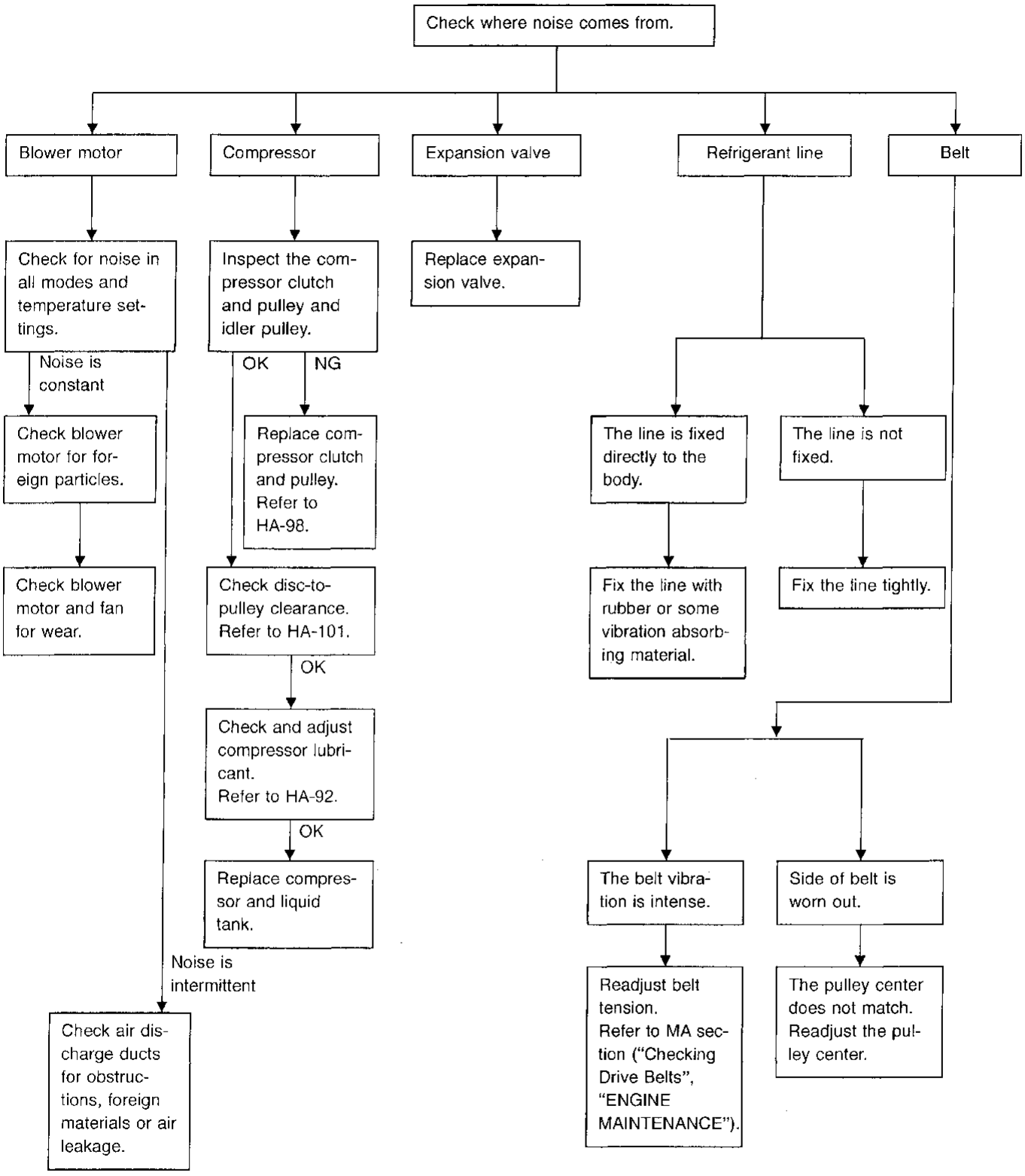
NG → Check air mix door mechanism.
Refer to HA-89.

NG → Repair or adjust.

OK → Go to Air Mix Door Motor Circuit. Refer to HA-78.

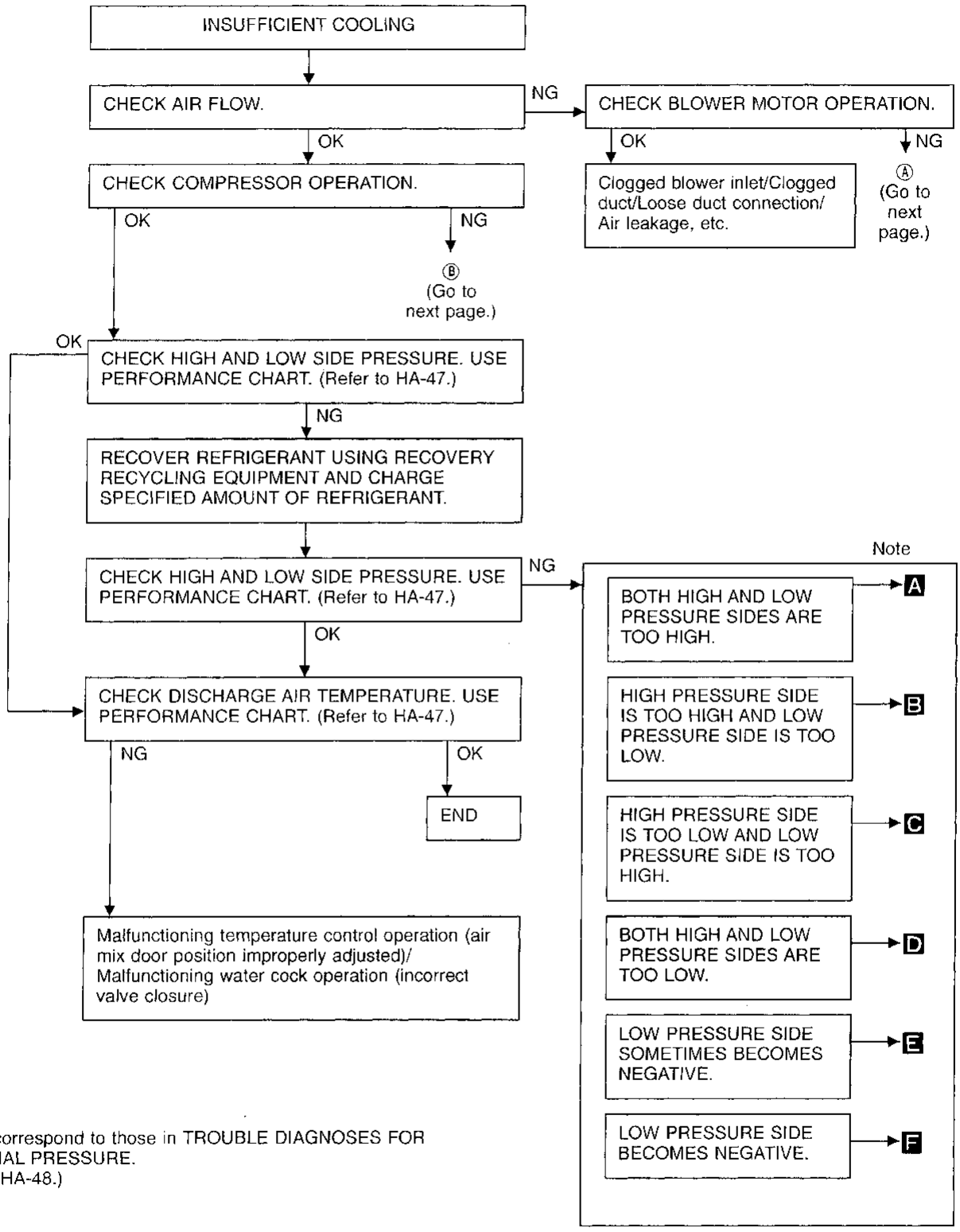
PRELIMINARY CHECK 8

Noise



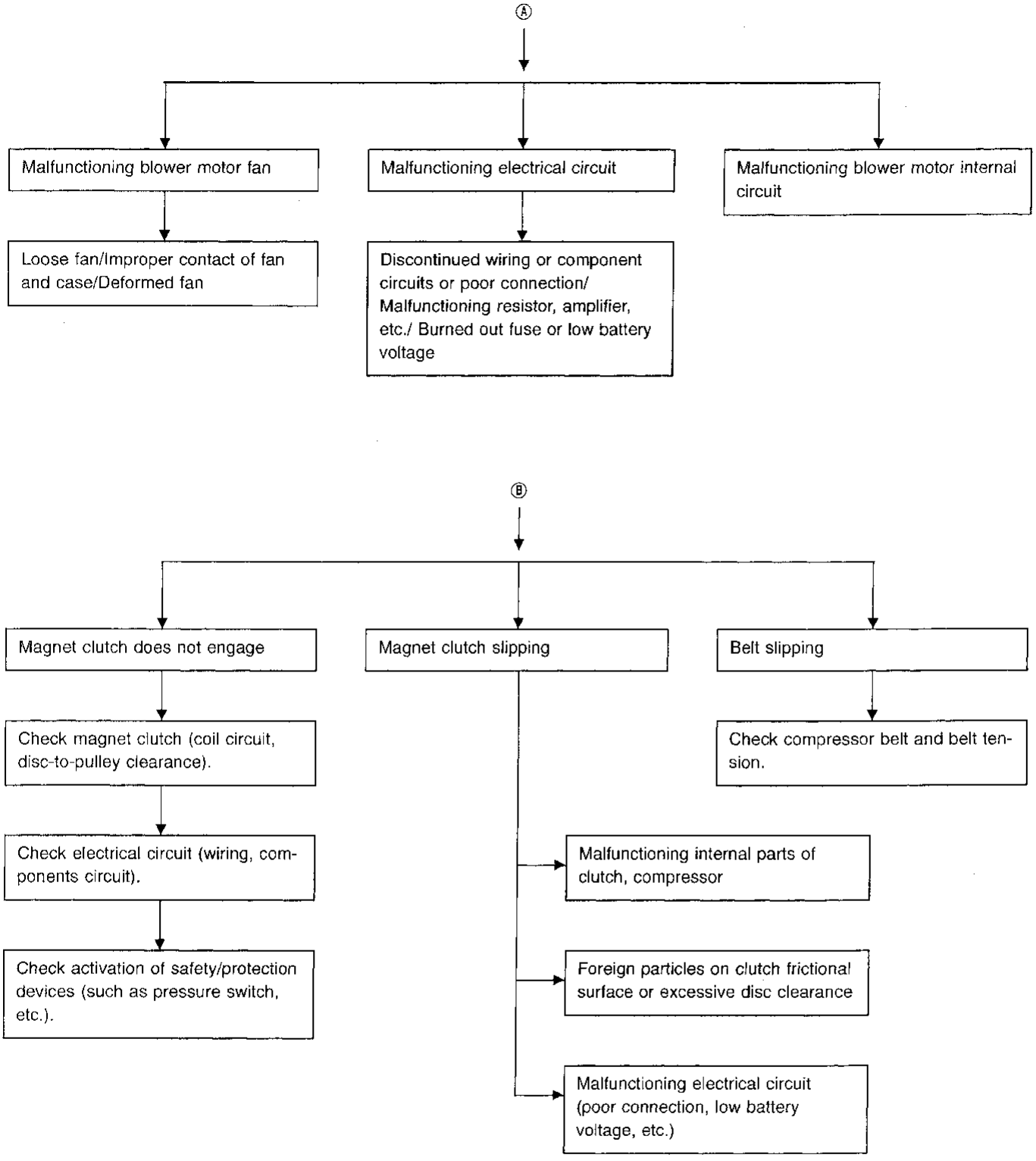
Performance Test Diagnoses

INSUFFICIENT COOLING



Note: A - F correspond to those in TROUBLE DIAGNOSES FOR ABNORMAL PRESSURE.
(Refer to HA-48.)

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.: Max. COLD
Mode switch: (Ventilation) set
REC switch: (Recirculation) set
(blower) speed: Max. speed set
Engine speed: Idle speed
Operate the air conditioning system for 10 minutes before taking measurements.

TEST READING

Recirculating-to-discharge air temperature table

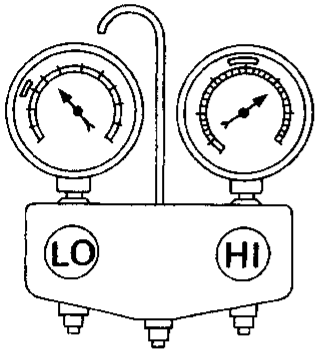
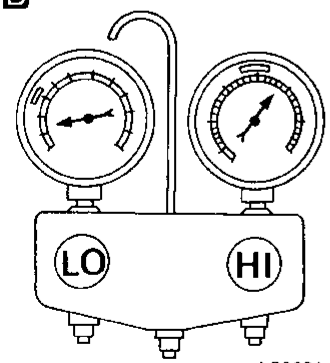
Inside air (Recirculating air) at blower assembly inlet		Discharge air temperature at center ventilator °C (°F)
Relative humidity %	Air temperature °C (°F)	
50 - 60	25 (77)	6.0 - 9.0 (43 - 48)
	30 (86)	10.0 - 13.6 (50 - 56)
	35 (95)	15.2 - 19.5 (59 - 67)
	40 (104)	22.5 - 27.1 (73 - 81)
60 - 70	25 (77)	9.0 - 12.2 (48 - 54)
	30 (86)	13.6 - 17.2 (56 - 63)
	35 (95)	19.5 - 23.7 (67 - 75)
	40 (104)	27.1 - 32.3 (81 - 90)

Ambient air temperature-to-operating pressure table

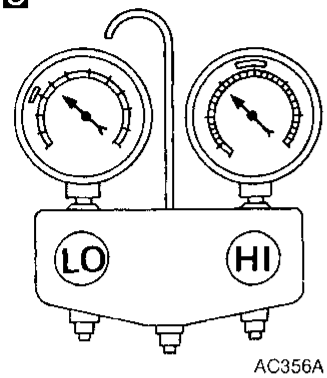
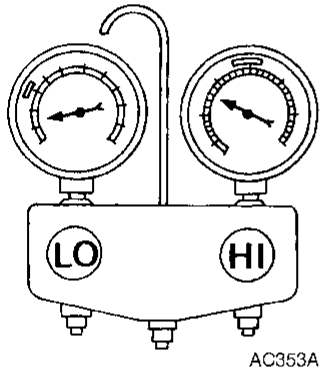
Ambient air		High-pressure (Discharge side) kPa (kg/cm^2, psi)	Low-pressure (Suction side) kPa (kg/cm^2, psi)
Relative humidity %	Air temperature °C (°F)		
50 - 70	25 (77)	1,226 - 1,638 (12.5 - 16.7, 178 - 237)	172 - 250 (1.75 - 2.55, 25 - 36)
	30 (86)	1,422 - 1,883 (14.5 - 19.2, 206 - 273)	196 - 275 (2.0 - 2.8, 28 - 40)
	35 (95)	1,657 - 2,187 (16.9 - 22.3, 240 - 317)	231 - 309 (2.35 - 3.15, 33 - 45)
	40 (104)	1,922 - 2,501 (19.6 - 25.5, 279 - 363)	280 - 373 (2.85 - 3.8, 41 - 54)

Trouble Diagnoses for Abnormal Pressure

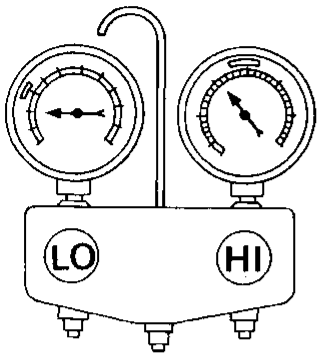
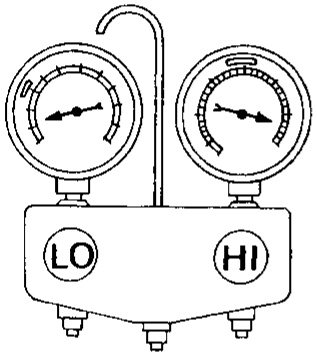
Whenever system's high and/or low side pressure is abnormal, diagnose using a manifold gauge. The marker above the gauge scale in the following tables indicates the standard (normal) pressure range. Since the standard (normal) pressure, however, differs from vehicle to vehicle, refer to HA-47 ("Ambient air temperature-to-operating pressure table").

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Both high and low-pressure sides are too high. A  AC359A	• Pressure is reduced soon after water is splashed on condenser.	Excessive refrigerant charge in refrigeration cycle	Reduce refrigerant until specified pressure is obtained.
	Air suction by cooling fan is insufficient.	Insufficient condenser cooling performance ↓ ① Condenser fins are clogged. ② Improper fan rotation of cooling fan	• Clean condenser. • Check and repair cooling fan as necessary.
	• Low-pressure pipe is not cold. • When compressor is stopped high-pressure value quickly drops by approximately 196 kPa (2 kg/cm^2, 28 psi). It then decreases gradually thereafter.	Poor heat exchange in condenser (After compressor operation stops, high pressure decreases too slowly.) ↓ Air in refrigeration cycle	Evacuate repeatedly and recharge system.
	Engine tends to overheat.	Engine cooling systems malfunction.	Check and repair each engine cooling system.
	• An area of the low-pressure pipe is colder than areas near the evaporator outlet. • Plates are sometimes covered with frost.	• Excessive liquid refrigerant on low-pressure side • Excessive refrigerant discharge flow • Expansion valve is open a little compared with the specification. ↓ ① Improper thermal valve installation ② Improper expansion valve adjustment	Replace expansion valve.
High-pressure side is too high and low-pressure side is too low. B  AC360A	Upper side of condenser and high-pressure side are hot, however, liquid tank is not so hot.	High-pressure tube or parts located between compressor and condenser are clogged or crushed.	• Check and repair or replace malfunctioning parts. • Check lubricant for contamination.

Trouble Diagnoses for Abnormal Pressure (Cont'd)

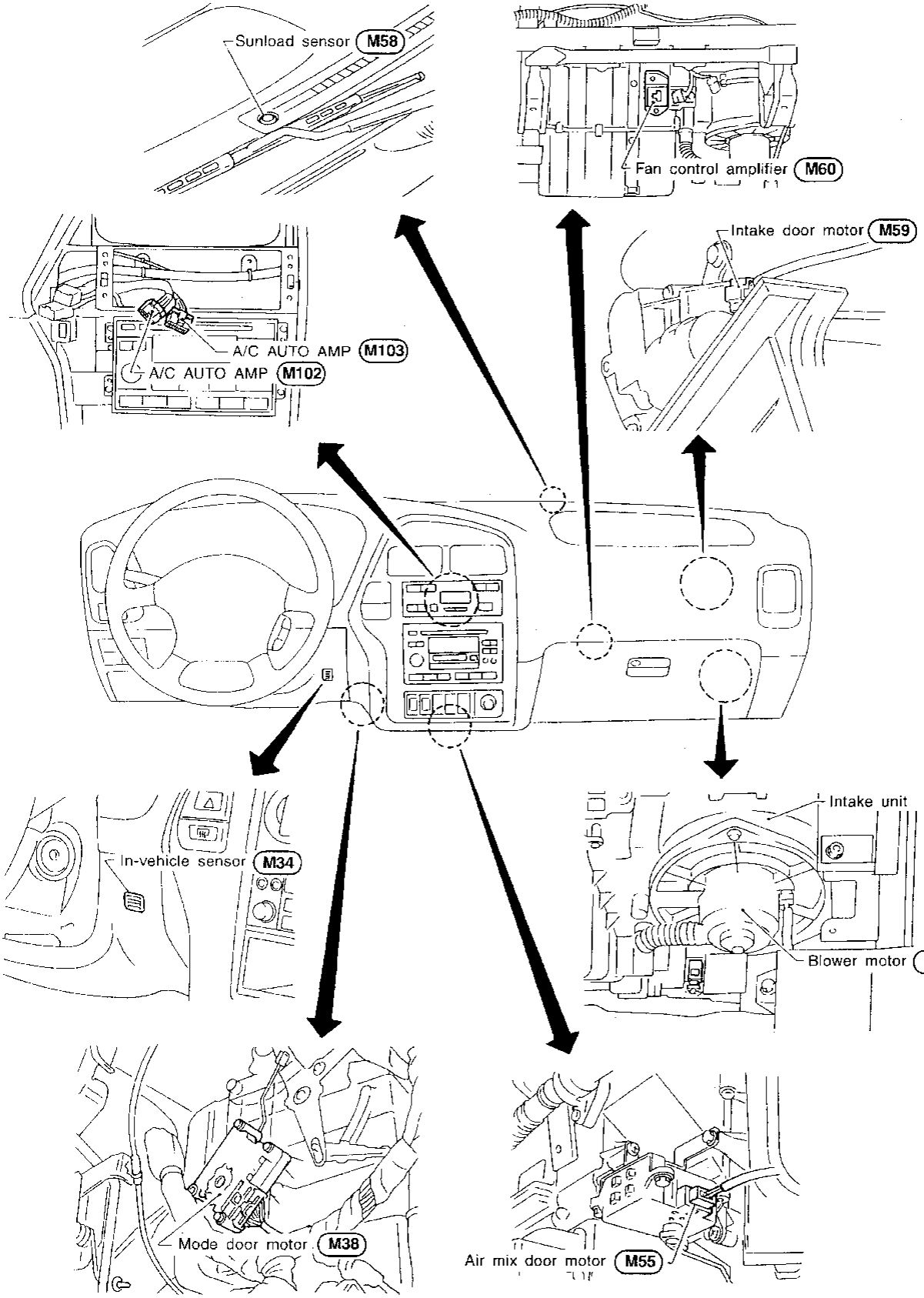
Gauge indication	Refrigerant cycle	Probable cause	Corrective action
High-pressure side is too low and low-pressure side is too high. C  AC356A	High and low-pressure sides become equal soon after compressor operation stops.	Compressor pressure operation is improper. ↓ Damaged inside compressor packings	Replace compressor.
	No temperature difference between high and low-pressure sides	Compressor pressure operation is improper. ↓ Damaged inside compressor packings.	Replace compressor.
Both high- and low-pressure sides are too low. D  AC353A	• There is a big temperature difference between receiver drier outlet and inlet. Outlet temperature is extremely low. • Liquid tank inlet and expansion valve are frosted.	Compressor discharge capacity does not change. (Compressor stroke is set at maximum.)	• Replace liquid tank. • Check lubricant for contamination.
	• 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	High-pressure pipe located between receiver drier and expansion valve is clogged.	• Check and repair malfunctioning parts. • Check lubricant for contamination.
	• Expansion valve and liquid tank are warm or only cool when touched.	Low refrigerant charge ↓ Leaking fittings or components	Check refrigerant for leaks. Refer to "Checking Refrigerant Leaks", HA-95.
	There is a big temperature difference between expansion valve inlet and outlet while the valve itself is frosted.	Expansion valve closes a little compared with the specification. ↓ ① Improper expansion valve adjustment ② Malfunctioning thermal valve ③ Outlet and inlet may be clogged.	• Remove foreign particles by using compressed air. • Check lubricant for contamination.
	An area of the low-pressure pipe is colder than areas near the evaporator outlet.	Low-pressure pipe is clogged or crushed.	• Check and repair malfunctioning parts. • Check lubricant for contamination.
	Air flow volume is not enough or is too low.	Evaporator is frozen. ↓ Compressor discharge capacity does not change. (Compressor stroke is set at maximum length.)	Replace compressor.

Trouble Diagnoses for Abnormal Pressure (Cont'd)

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Low-pressure side sometimes becomes negative. E  AC354A	• 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.	Refrigerant does not discharge cyclically. ↓ Moisture is frozen at expansion valve outlet and inlet. ↓ Water is mixed with refrigerant.	• Drain water from refrigerant or replace refrigerant. • Replace liquid tank.
Low-pressure side becomes negative. F  AC362A	Liquid tank or front/rear side of expansion valve's pipe is frosted or dewed.	High-pressure side is closed and refrigerant does not flow. ↓ Expansion valve or liquid tank is frosted.	Leave the system at rest until no frost is present. Start it again to check whether or not the problem is caused by water or foreign particles. • If water is the cause, initially cooling is okay. Then the water freezes, causing a blockage. Drain water from refrigerant or replace refrigerant. • If due to foreign particles, remove expansion valve and remove the particles with dry and compressed air (not shop air). • If either of the above methods cannot correct the problem, replace expansion valve. • Replace liquid tank. • Check lubricant for contamination.

Harness Layout

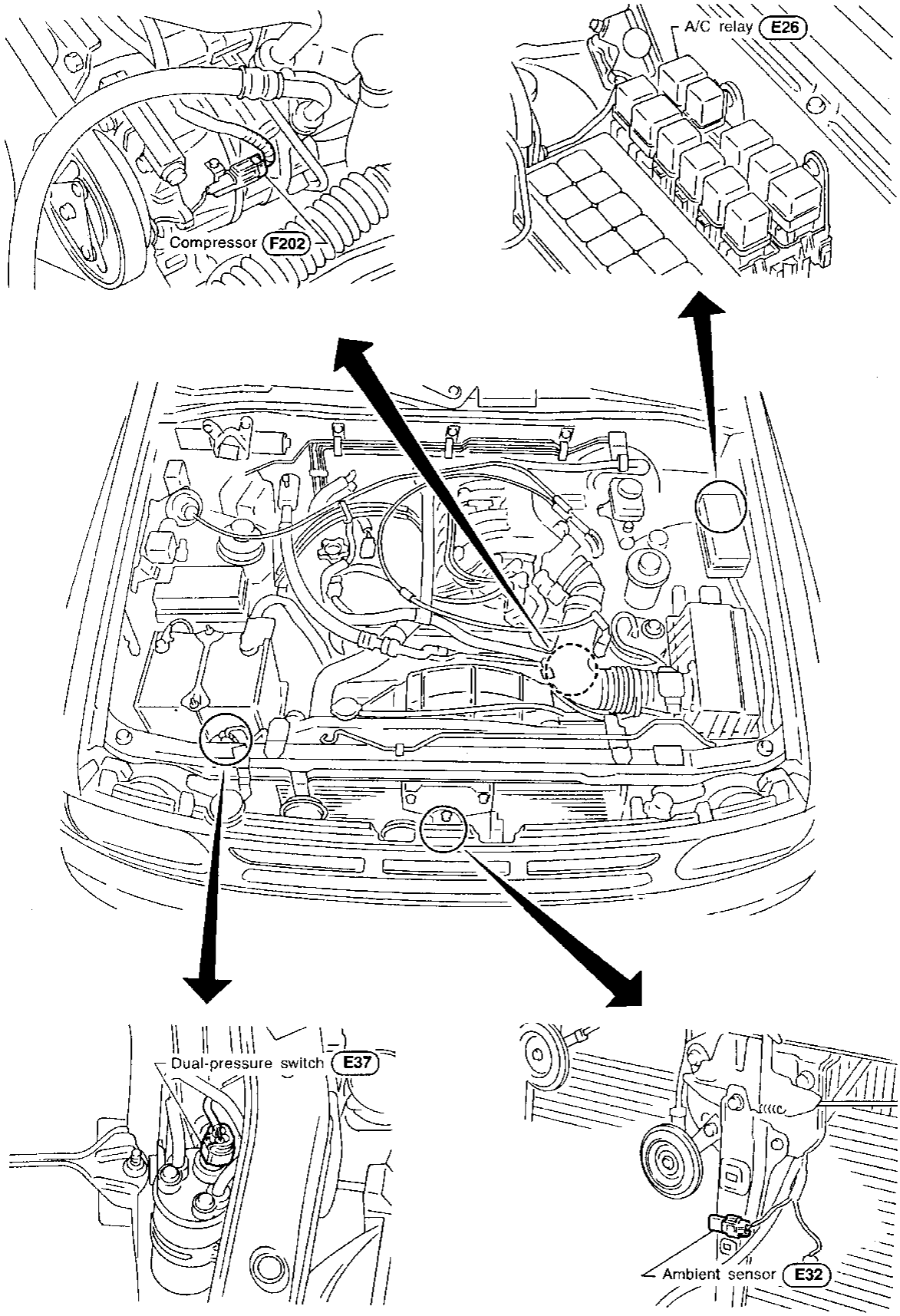
PASSENGER COMPARTMENT



RHA099G

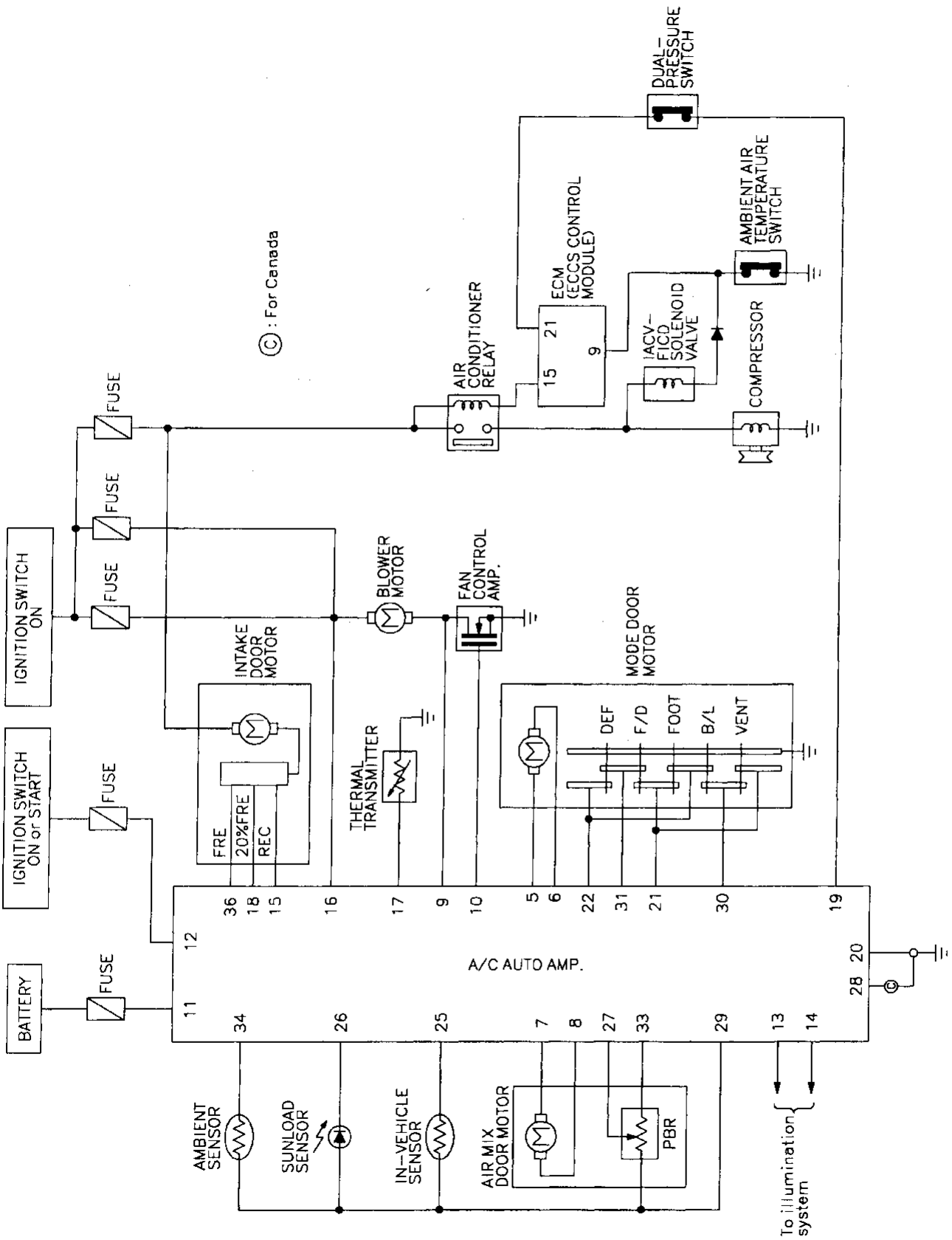
Harness Layout (Cont'd)

ENGINE COMPARTMENT



RHA705FB

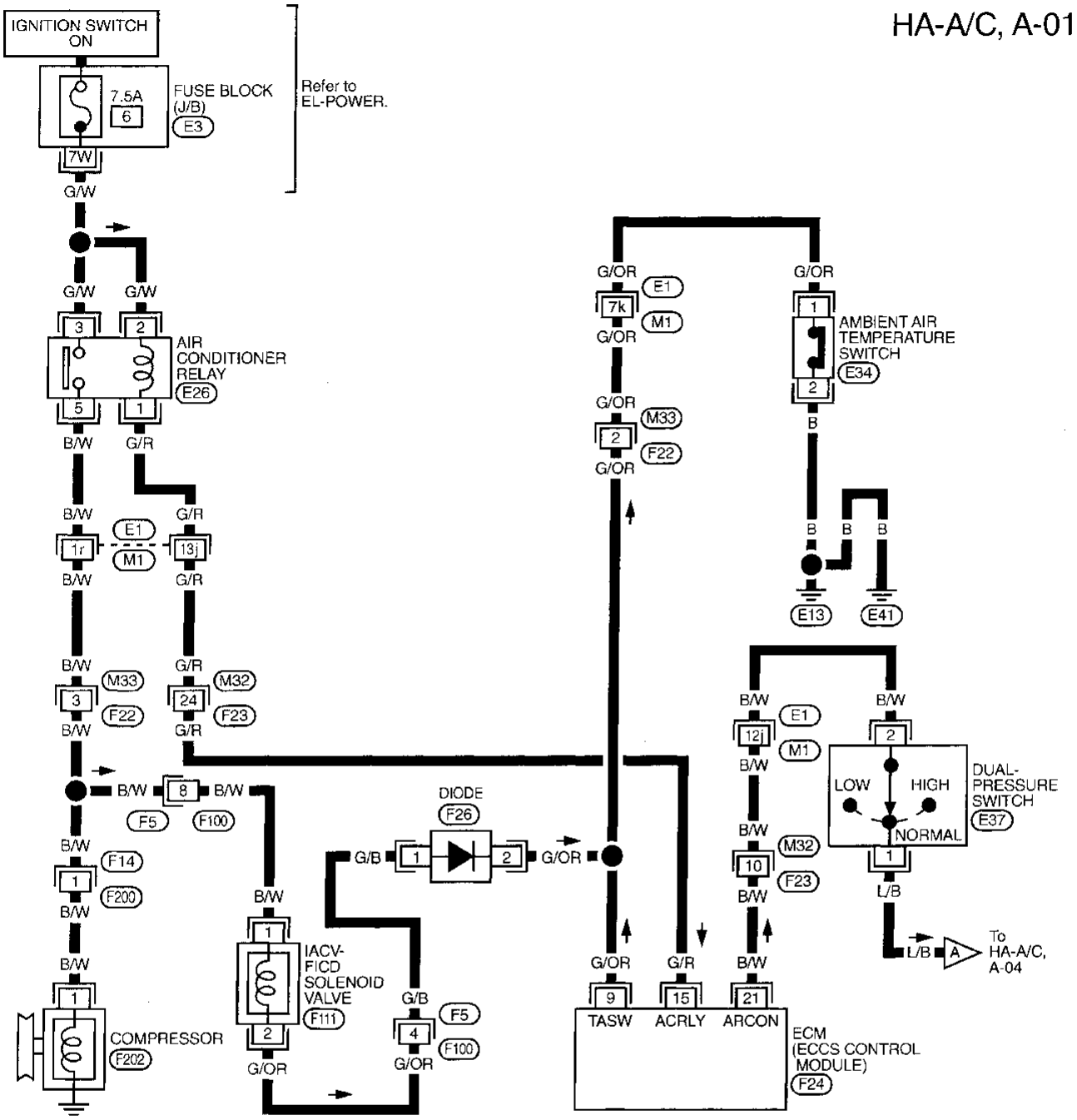
Circuit Diagram

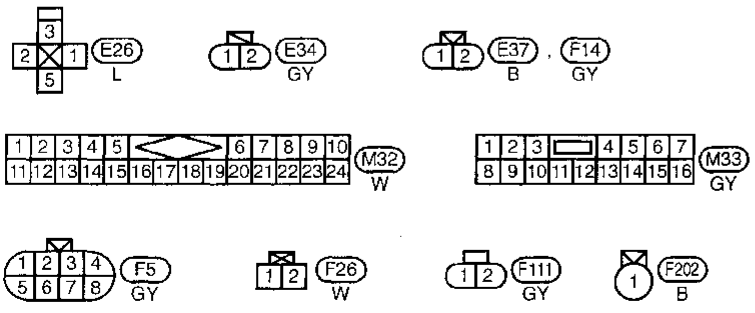


MHA616A

Wiring Diagram — A/C, A —

HA-A/C, A-01





Refer to last page (Foldout page).

E1 , M1

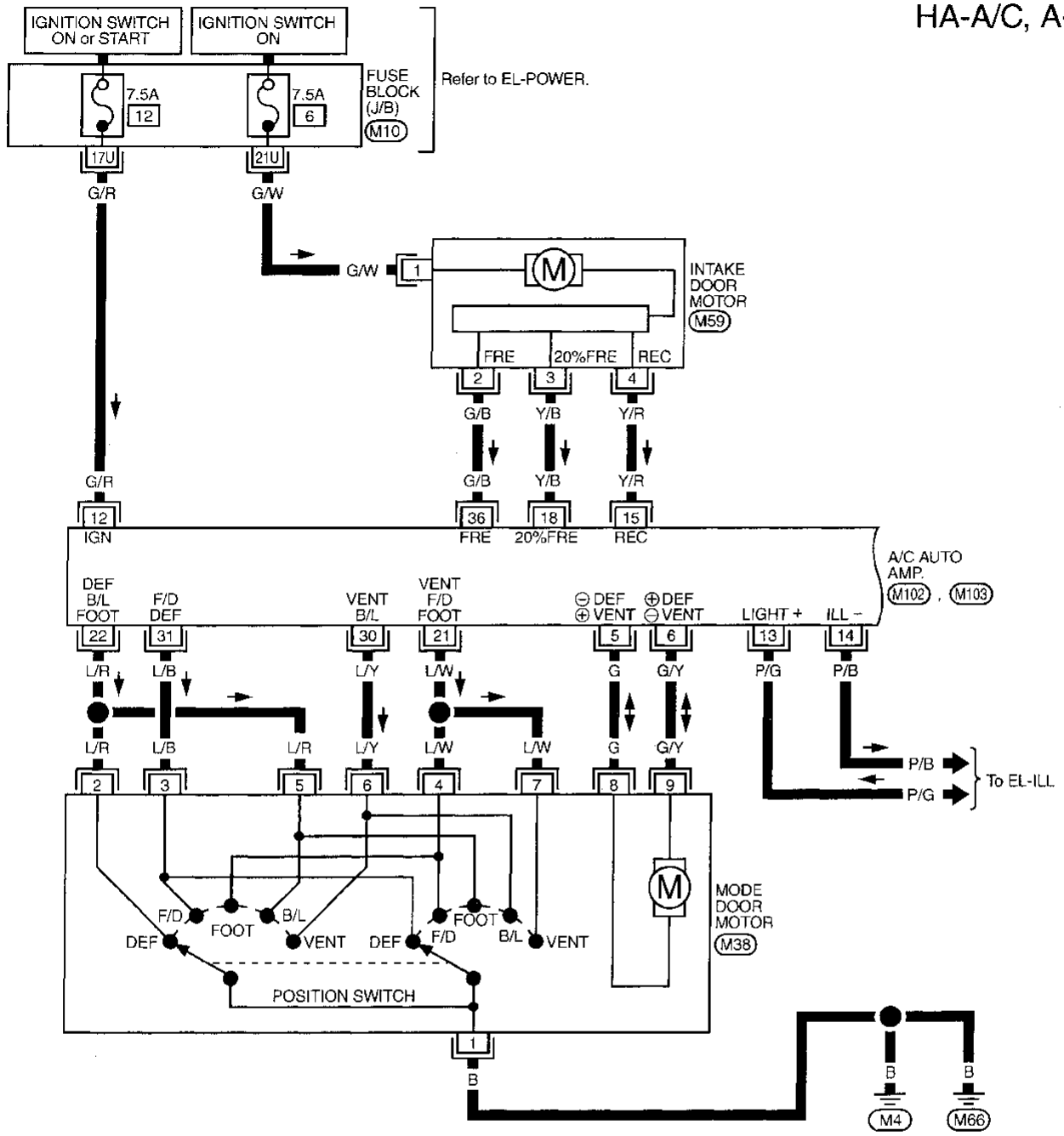
E3

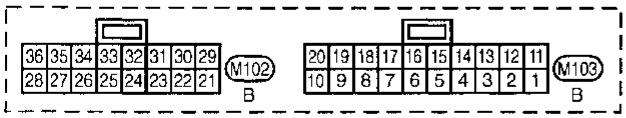
F24

MHA612A

Wiring Diagram — A/C, A — (Cont'd)

HA-A/C, A-02



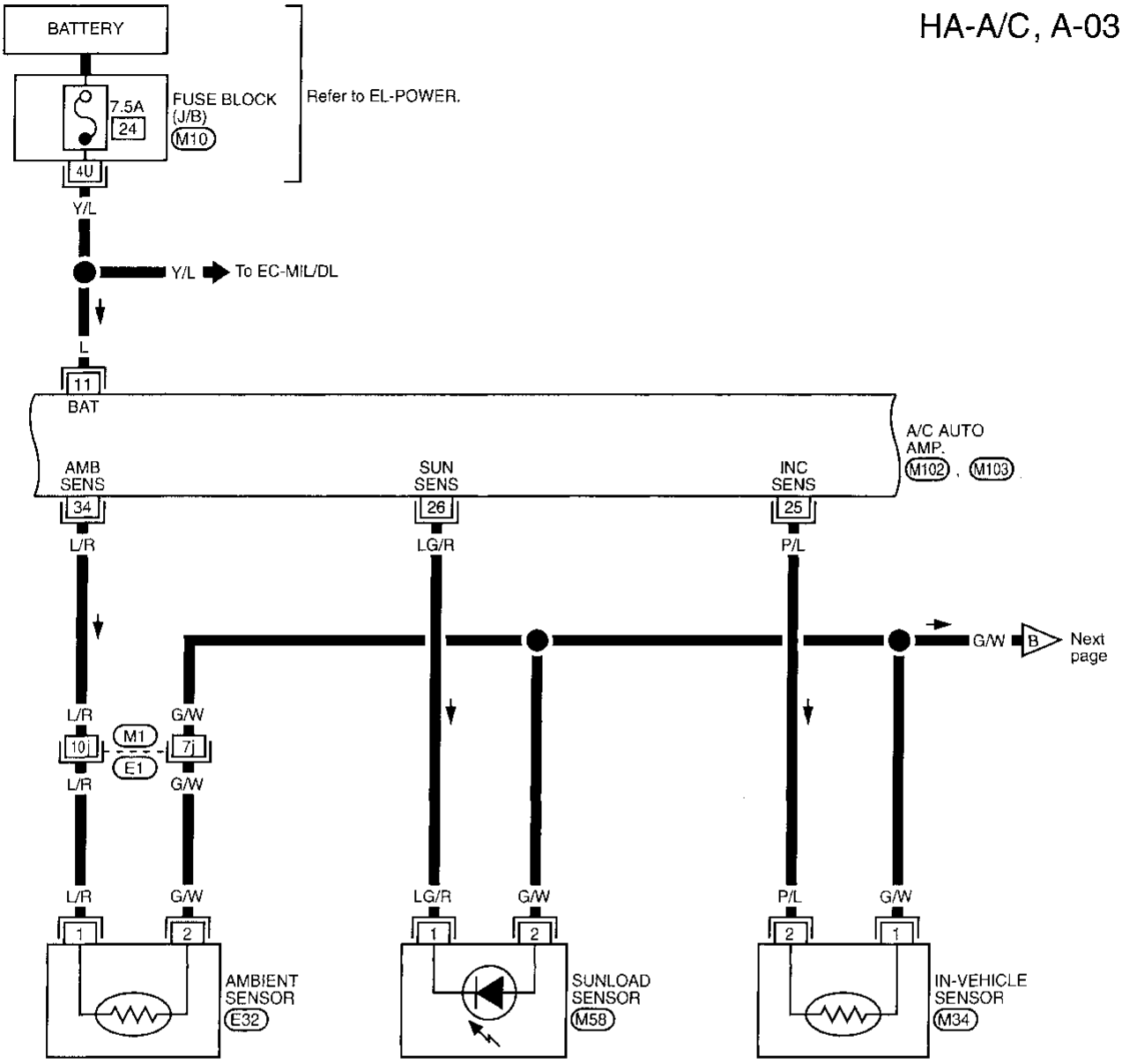


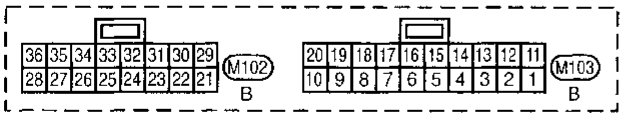
Refer to last page (Foldout page).
M10

MHA613A

Wiring Diagram — A/C, A — (Cont'd)

HA-A/C, A-03



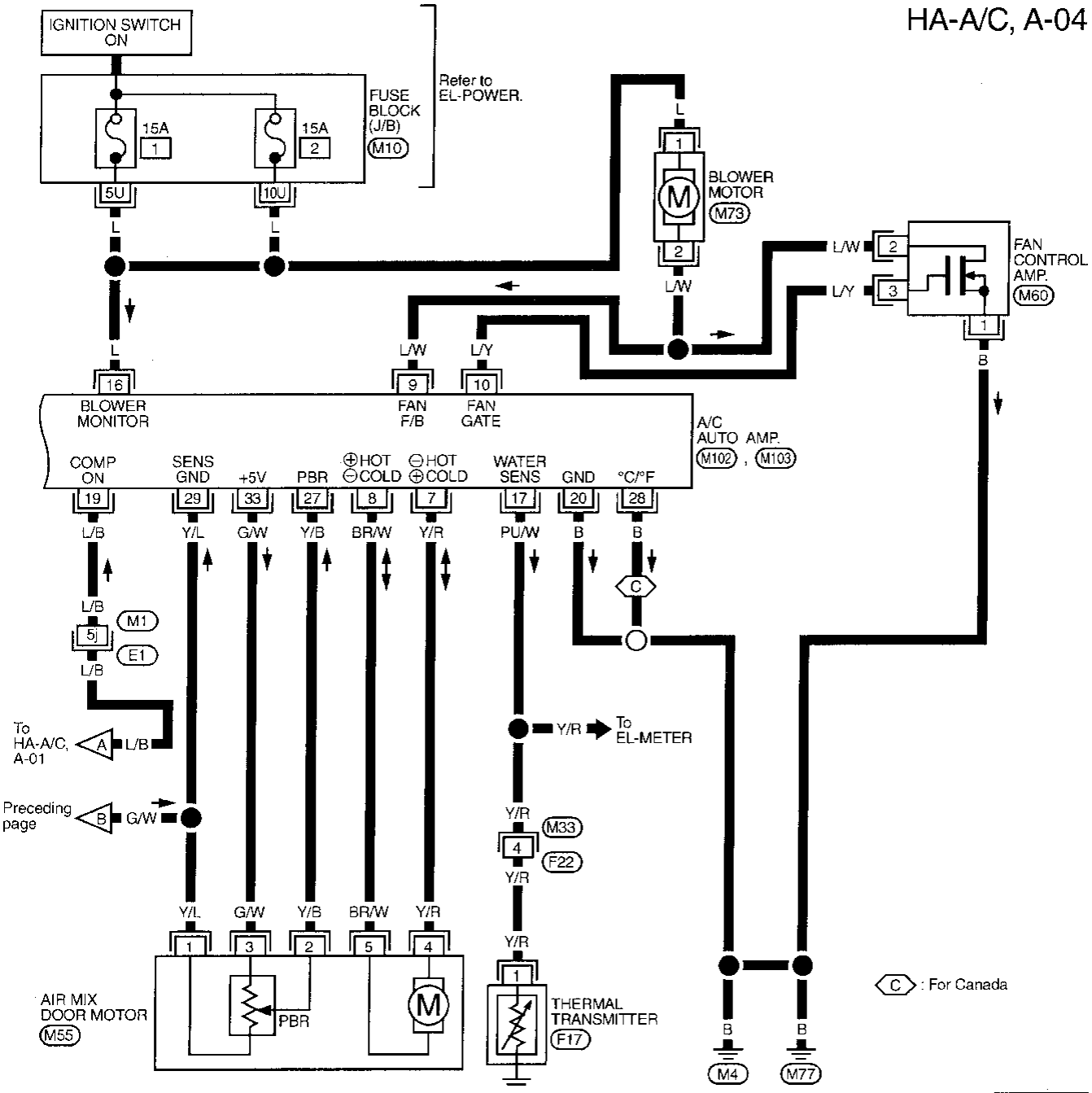


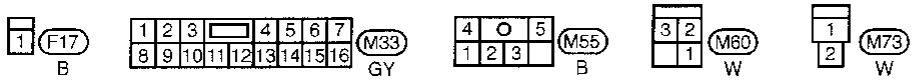
Refer to last page (Foldout page).
E1, M1
M10

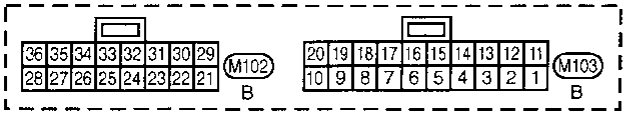
MHA614A

Wiring Diagram — A/C, A — (Cont'd)

HA-A/C, A-04

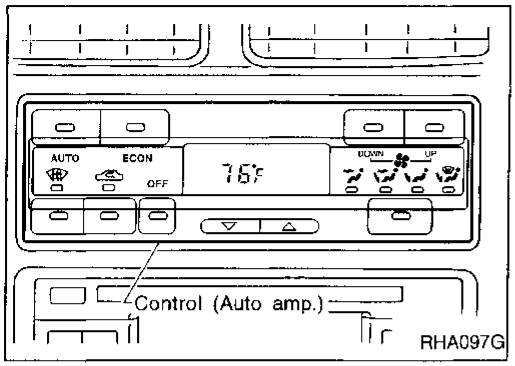






Refer to last page (Foldout page).
E1, M1
M10

MHA615A

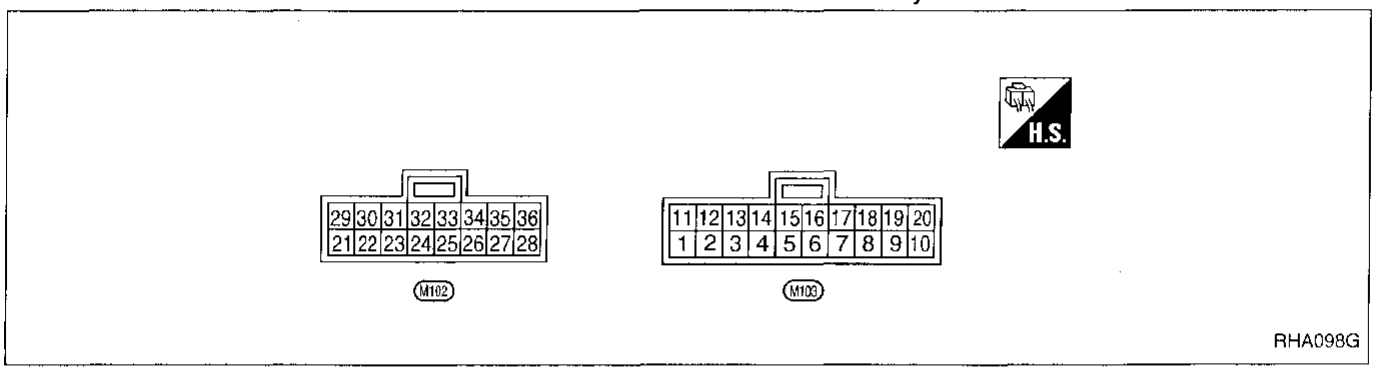


Auto Amp. Terminals and Reference Value

INSPECTION OF AUTO AMP.

- Measure voltage between each terminal and body ground by following "AUTO AMP. INSPECTION TABLE".

- Pin connector terminal layout

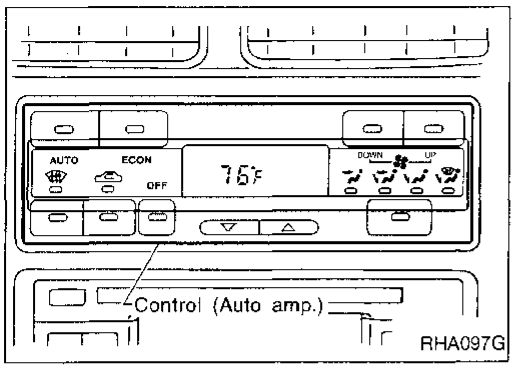


Auto Amp. Terminals and Reference Value (Cont'd)

AUTO AMP. INSPECTION TABLE

TERMINAL NO.	ITEM	CONDITION			Voltage V
5 6	Power supply for mode door motor		VENT → DEF		*1
			DEF → VENT		
7	Power supply for air mix door motor	ON	Set temperature	18°C (65°F)	Approximately 0
				32°C (85°F)	Approximately 12
8				18°C (65°F)	Approximately 12
				32°C (85°F)	Approximately 0
19	Blower motor feed back		Fan speed: Low		Approximately 7 - 10
10	Fan control AMP. control signal		Fan speed	Low, Middle low or Middle high	Approximately 2.5 - 3.0
				High	Approximately 9 - 10
11	Power supply for BAT	OFF	—		BATTERY VOLTAGE
12	Power supply for IGN		—		Approximately 12
15	Intake door position switch	ON	Intake door position	RECIRCULATION	Approximately 0
				20% FRE or FRESH	Approximately 4.7
16	Power source for A/C		Ignition voltage feed back		Approximately 12
17	Thermal transmitter	ON	Engine coolant temperature	Approximately 40°C (104°F)	Approximately 10.8
				Approximately 55°C (131°F)	Approximately 9.9
				Approximately 60°C (140°F)	Approximately 9.5
18	Intake door position switch		Intake door position	20% FRE	Approximately 0
				FRESH or RECIRCULATION	Approximately 12
19	Compressor ON signal		Compressor	ON	Approximately 0
				OFF	Approximately 4.6
20	Ground		—		Approximately 0
21	Mode door position switch	ON	Mode door position	VENT, FOOT, F/D	Approximately 0
				B/L or DEF	Approximately 4.6
22	Mode door position switch		Mode door position	B/L, FOOT, DEF	Approximately 0
				VENT or F/D	Approximately 4.6
25	In-vehicle sensor		—		—
26	Sunload sensor		—		—
27	Air mix door motor PBR signal		Set temperature	18°C (65°F)	Approximately 0
				32°C (85°F)	Approximately 4.5
29	Sensor ground		—		Approximately 0
30	Mode door position switch	ON	Mode door position	VENT or B/L	Approximately 0
				FOOT, F/D, DEF	Approximately 4.6
31	Mode door position switch		Mode door position	D/F, DEF	Approximately 0
				VENT, B/L, FOOT	Approximately 4.6
33	Power supply for PBR		—		Approximately 4.6
34	Ambient sensor		—		—
36	Intake door position switch	ON	Intake door position	FRESH	Approximately 0
				RECIRCULATION or 20% FRESH	Approximately 4.6

*1: When the motor is working, approx. 0V will be indicated. When the motor stops, approx. 12V will exist.

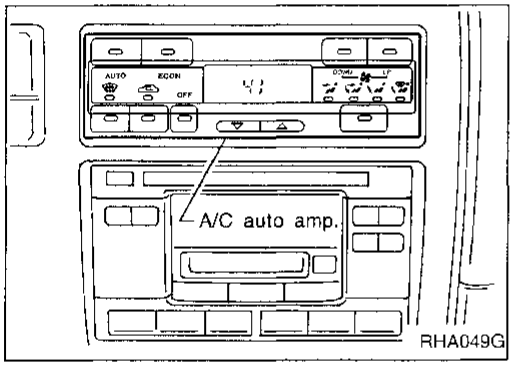


Main Power Supply and Ground Circuit Check

COMPONENT DESCRIPTION

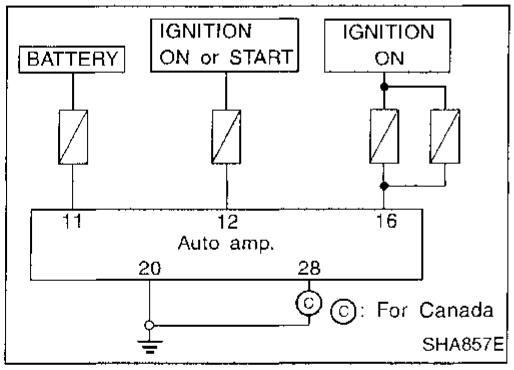
Automatic amplifier (Auto amp.)

The auto amplifier has a built-in microcomputer which processes information sent from various sensors needed for air conditioner operation. The air mix door motor, mode door motor, intake door motor, blower motor and compressor are then controlled.
The auto amplifier 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 amplifier to provide quick check of malfunctions in the auto air conditioner system.

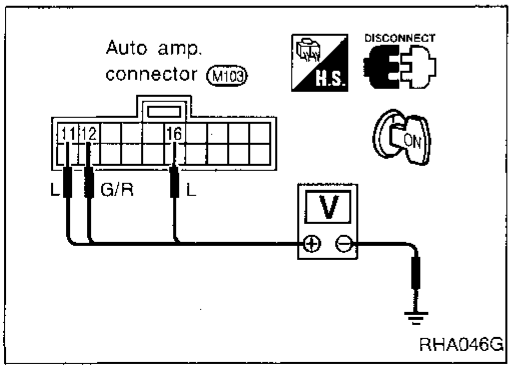


Potentio temperature control (PTC)

The PTC is built into the A/C auto amp. It can be set at an interval of 0.5°C (1.0°F) in the 18°C (65°F) to 32°C (85°F) temperature range by pushing the temperature button. The set temperature is digitally displayed.



DIAGNOSTIC PROCEDURE

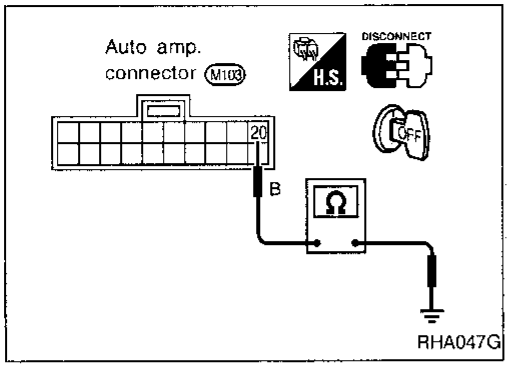


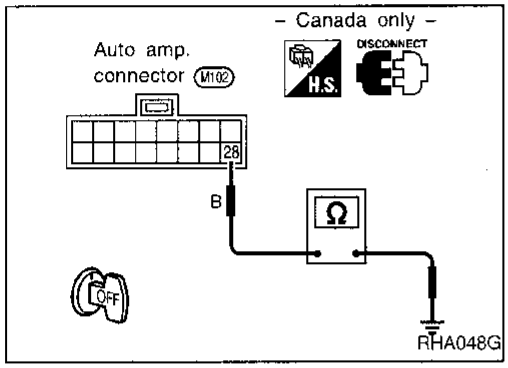
Auto amp. check

Check power supply circuit for auto amp. with ignition switch ON.
Measure voltage across terminal Nos. ⑪, ⑫, ⑯ and body ground.

Voltmeter terminal		Voltage
⊕	⊖	
⑪	Body ground	Approx. 12V
⑫		
⑯		

Main Power Supply and Ground Circuit Check (Cont'd)





Check body ground circuit for auto amp. with ignition switch OFF. Check for continuity between terminal Nos. ⑳, ㉘ and body ground.

Ohmmeter terminal		Continuity
⊕	⊖	
⑳	Body ground	Yes
㉘ (Canada only)		

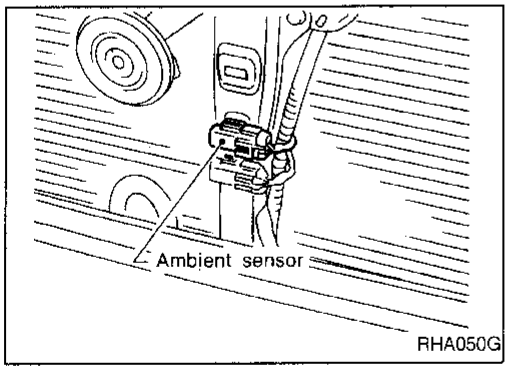
Self-diagnostic Circuit

DIAGNOSTIC PROCEDURE

SYMPTOM: Self-diagnosis cannot be performed.

CHECK MAIN POWER SUPPLY AND GROUND CIRCUIT FOR AUTO AMP. Refer to HA-60.
→ NG → Repair Main Power Supply and Ground Circuit.
↓ OK
Replace auto amp.

Ambient Sensor Circuit



COMPONENT DESCRIPTION

The ambient sensor is attached in front of the driver's side condenser. It detects ambient temperature and converts it into a resistance value which is then input into the auto amplifier.

AMBIENT TEMPERATURE INPUT PROCESS

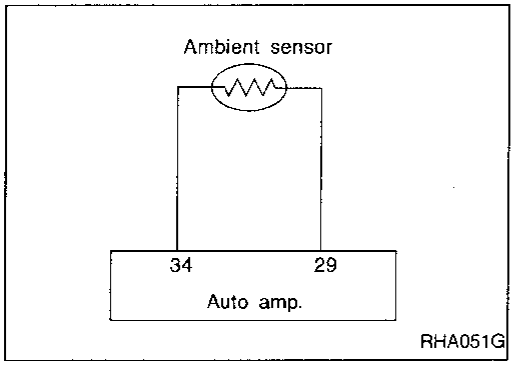
The automatic amplifier includes a "processing circuit" for the ambient sensor input. However, when the temperature detected by the ambient sensor increases quickly, the processing circuit retards the auto amp. function. It only allows the auto amp. to recognize an ambient temperature increase of 0.33°C (0.6°F) per 100 seconds.

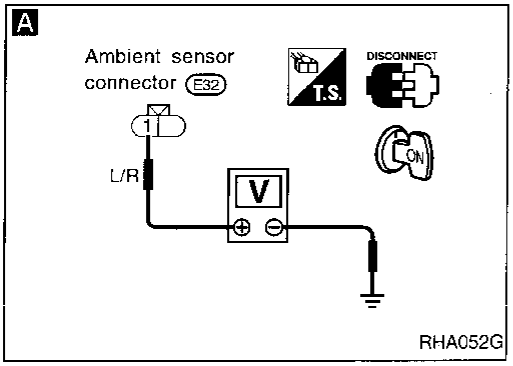
As an example, consider stopping for a cup of coffee after high speed driving. Although the actual ambient temperature has not changed, the temperature detected by the ambient sensor will increase. This is because the heat from the engine compartment can radiate to the front grille area, location of the ambient sensor.

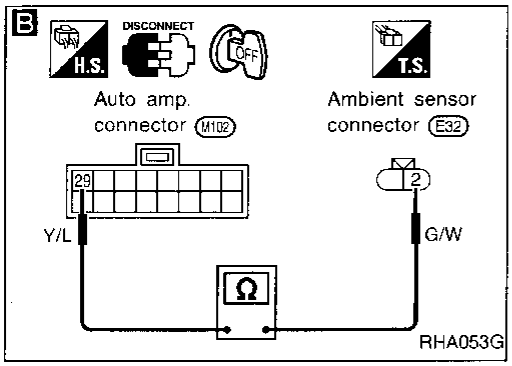
Ambient Sensor Circuit (Cont'd)

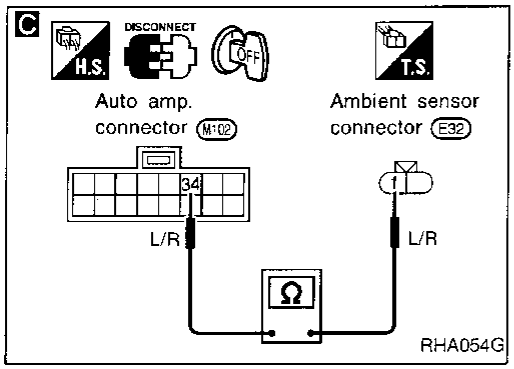
DIAGNOSTIC PROCEDURE

SYMPTOM: Ambient sensor circuit is open or shorted. (21 or 21 ECON is indicated on auto amp. as a result of conducting Self-diagnosis STEP 2.)









A

CHECK AMBIENT SENSOR CIRCUIT BETWEEN AMBIENT SENSOR AND AUTO AMP.
Disconnect ambient sensor harness connector.
Do approx. 5 volts exist between ambient sensor harness terminal No. ① and body ground?

No → Disconnect auto amp. harness connector.

C

Note

Check circuit continuity between ambient sensor harness terminal No. ① and auto amp. harness terminal No. ㉞.

OK → Replace auto amp.

Yes → Disconnect auto amp. harness connector.

B

Note

Check circuit continuity between ambient sensor harness terminal No. ② and auto amp. harness terminal No. ㉙.

OK → CHECK AMBIENT SENSOR. (Refer to HA-63.)

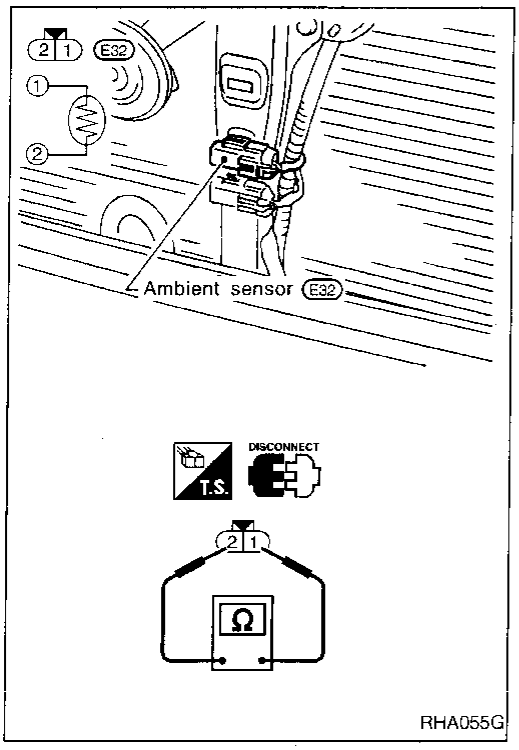
NG → Replace ambient sensor.

OK → Replace auto amp.

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

Ambient Sensor Circuit (Cont'd)

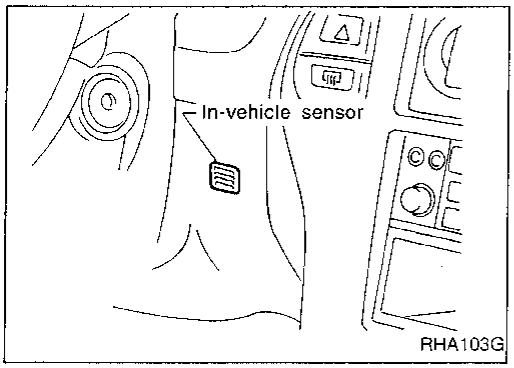
COMPONENT INSPECTION



Ambient sensor

After disconnecting ambient sensor harness connector, measure resistance between terminals ② and ① 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

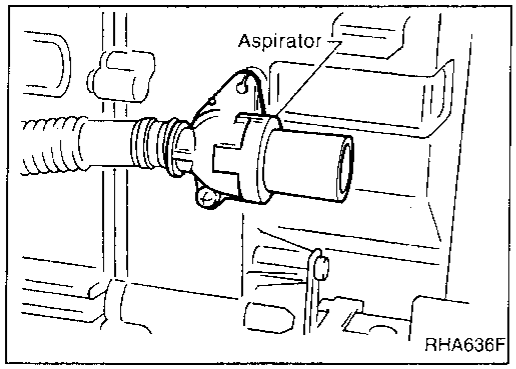


In-vehicle Sensor Circuit

COMPONENT DESCRIPTION

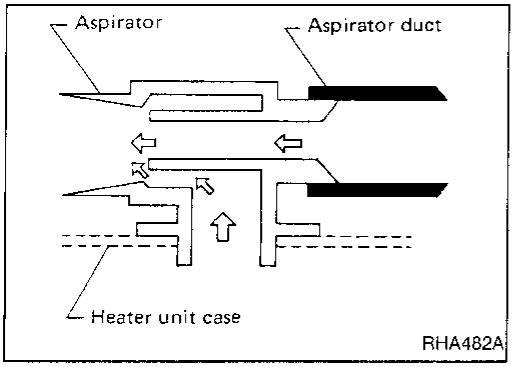
In-vehicle sensor

The in-vehicle sensor is located on instrument lower panel. It converts variations in temperature of compartment air drawn from the aspirator into a resistance value. It is then input into the auto amplifier.



Aspirator

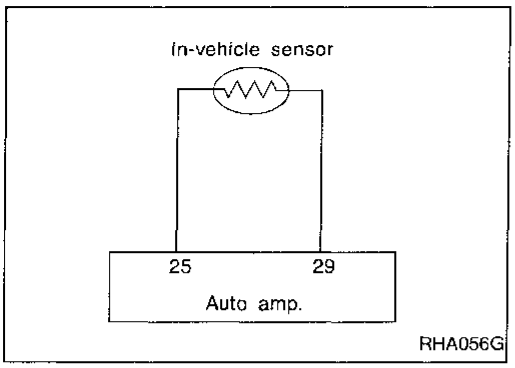
The aspirator is located in front of heater unit. It produces vacuum pressure due to air discharged from the heater unit, continuously taking compartment air in the aspirator.

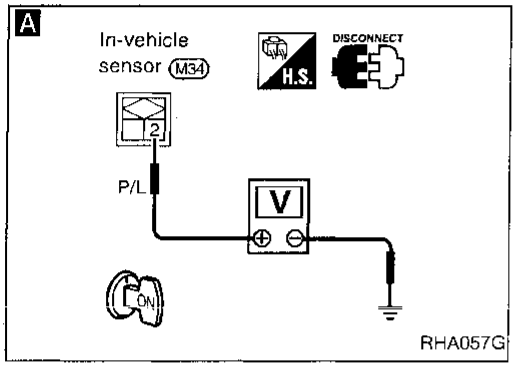


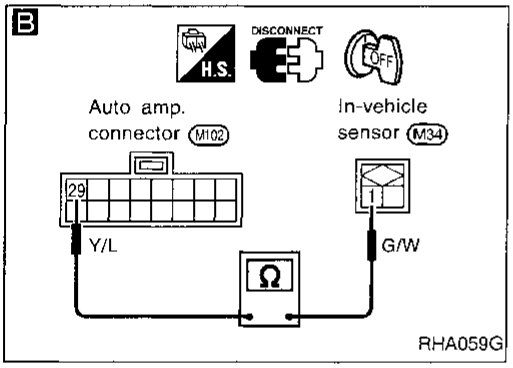
In-vehicle Sensor Circuit (Cont'd)

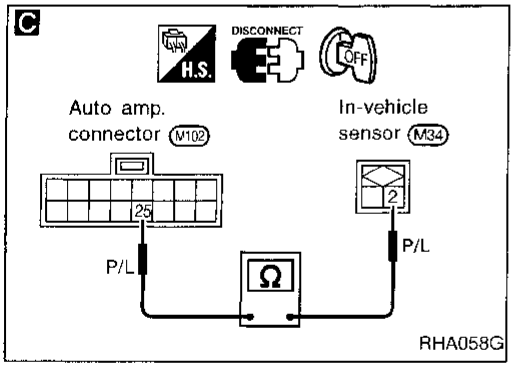
DIAGNOSTIC PROCEDURE

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









A

CHECK IN-VEHICLE SENSOR CIRCUIT BETWEEN IN-VEHICLE SENSOR AND AUTO AMP.
Disconnect in-vehicle sensor harness connector.
Do approx. 5 volts exist between in-vehicle sensor harness terminal No. ② and body ground?

No → Disconnect auto amp. harness connector.

C

Note

Check circuit continuity between in-vehicle sensor harness terminal No. ② and auto amp. harness terminal No. ㉕.

OK → Replace auto amp.

Yes → Disconnect auto amp. harness connector.

B

Note

Check circuit continuity between in-vehicle sensor harness terminal No. ① and auto amp. harness terminal No. ㉙.

OK → CHECK IN-VEHICLE SENSOR. (Refer to HA-65.)

NG → Replace in-vehicle sensor.

OK → Replace auto amp.

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

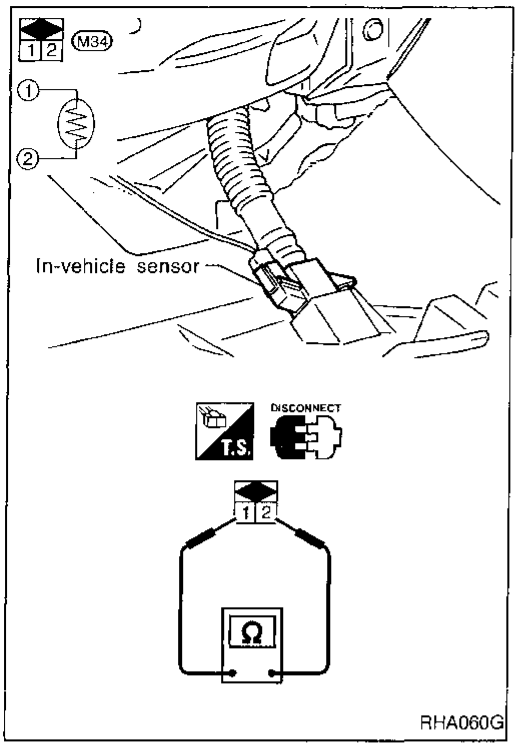
In-vehicle Sensor Circuit (Cont'd)

COMPONENT INSPECTION

In-vehicle sensor

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

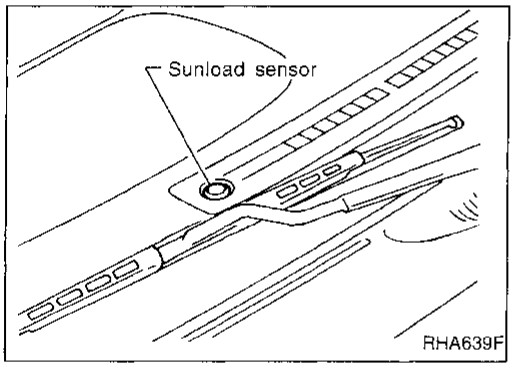
Temperature °C (°F)	Resistance kΩ
−15 (5)	12.73
−10 (14)	9.92
−5 (23)	7.80
0 (32)	6.19
5 (41)	4.95
10 (50)	3.99
15 (59)	3.24
20 (68)	2.65
25 (77)	2.19
30 (86)	1.81
35 (95)	1.51
40 (104)	1.27
45 (113)	1.07



Sunload Sensor Circuit

COMPONENT DESCRIPTION

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



SUNLOAD INPUT PROCESS

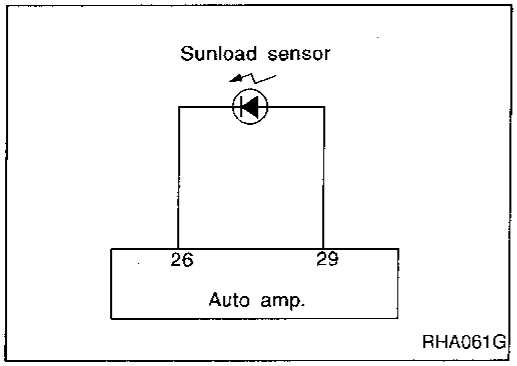
The auto amp. also includes a processing circuit which "average" the variations in detected sunload over a period of time. This prevents drastic swings in the ATC system operation due to small or quick variations in detected sunload.

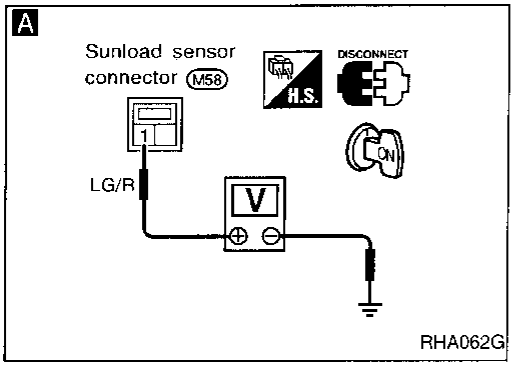
For example, consider driving along a road bordered by an occasional group of large trees. The sunload detected by the sunload sensor will vary whenever the trees obstruct the sunlight. The processing circuit averages the detected sunload over a period of time, so that the (insignificant) effect of the trees momentarily obstructing the sunlight 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.

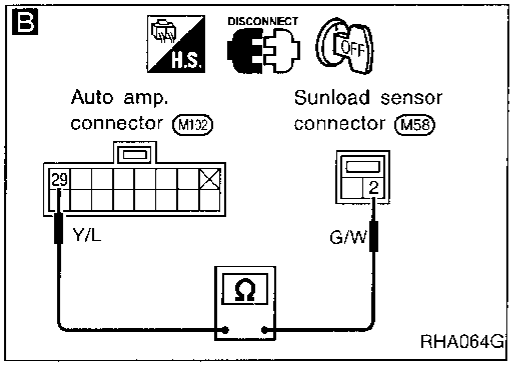
Sunload Sensor Circuit (Cont'd)

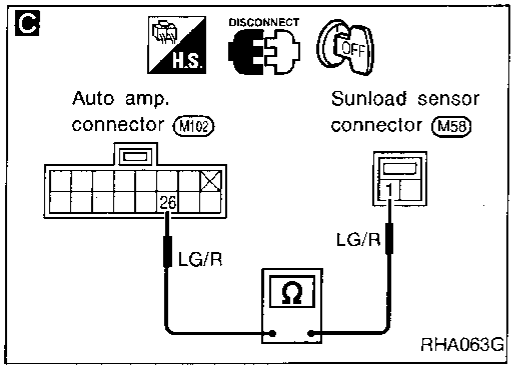
DIAGNOSTIC PROCEDURE

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









A

CHECK SUNLOAD SENSOR CIRCUIT BETWEEN SUNLOAD SENSOR AND AUTO AMP.
Disconnect sunload sensor harness connector.
Do approx. 5 volts exist between sunload sensor harness terminal No. ① and body ground?

No → Disconnect auto amp. harness connector.

C

Note: Check circuit continuity between sunload sensor harness terminal No. ① and auto amp. harness terminal No. ㉖.

OK → Replace auto amp.

Yes → Disconnect auto amp. harness connector.

B

Note: Check circuit continuity between sunload sensor harness terminal No. ② and auto amp. harness terminal No. ㉙.

OK → CHECK SUNLOAD SENSOR. (Refer to HA-67.)

NG → Replace sunload sensor.

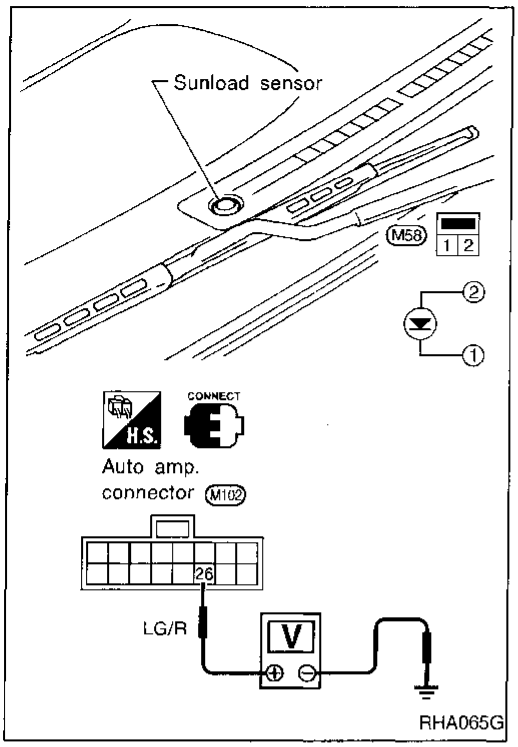
OK → Replace auto amp.

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

Sunload Sensor Circuit (Cont'd)

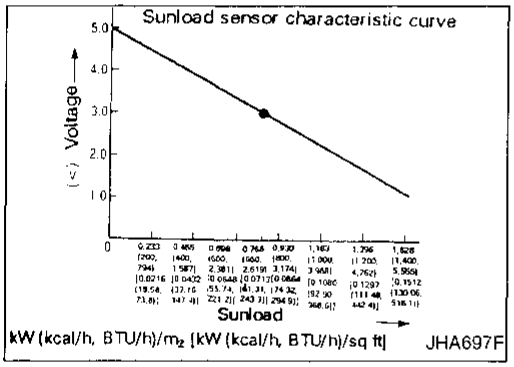
COMPONENT INSPECTION

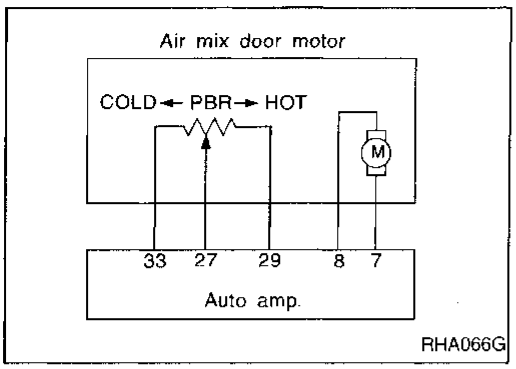
Sunload sensor



Measure voltage between auto amp. terminal 26 and body ground.

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



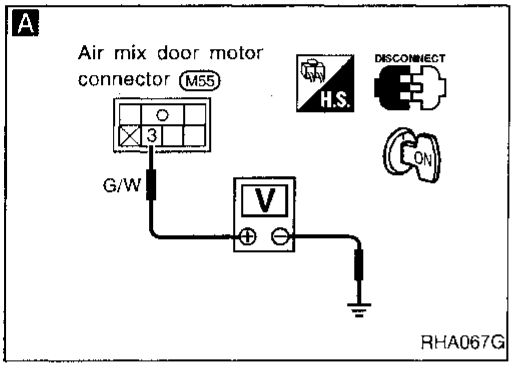


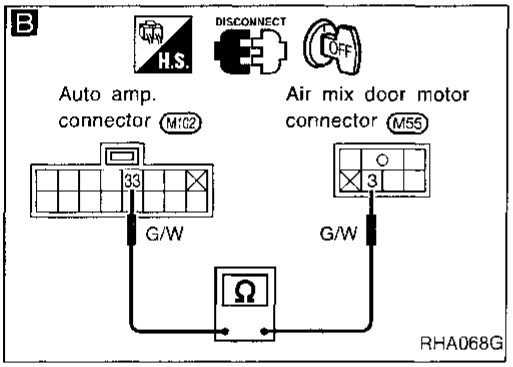
Air Mix Door Motor PBR Circuit

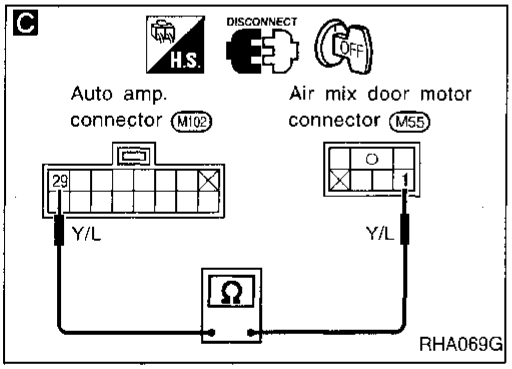
For description of air mix door motor circuit, refer to HA-78.

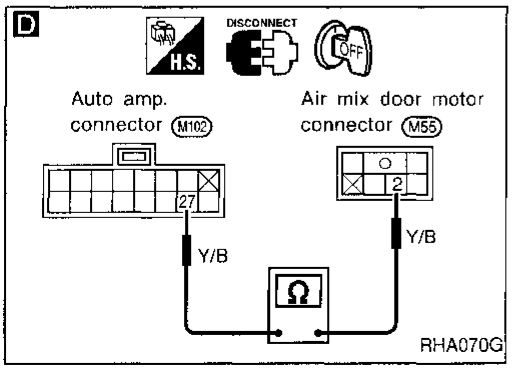
DIAGNOSTIC PROCEDURE

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









A

CHECK PBR CIRCUIT BETWEEN PBR AND AUTO AMP.
Disconnect air mix door motor harness connector.
Do approx. 5 volts exist between air mix door motor harness terminal No. ③ and body ground?

No → Disconnect auto amp. harness connector.

B Note

Check circuit continuity between air mix door motor harness terminal No. ③ and auto amp. harness terminal No. ㉝.

OK → Replace auto amp.

Yes → Disconnect auto amp. harness connector.

C Note

Check circuit continuity between air mix door motor harness terminal No. ① and auto amp. harness terminal No. ㉙.

OK

D Note

Check circuit continuity between air mix door motor harness terminal No. ② and auto amp. harness terminal No. ㉗.

OK

CHECK PBR SENSOR.
(Refer to HA-69.)

NG → Replace air mix door motor (PBR).

OK → Replace auto amp.

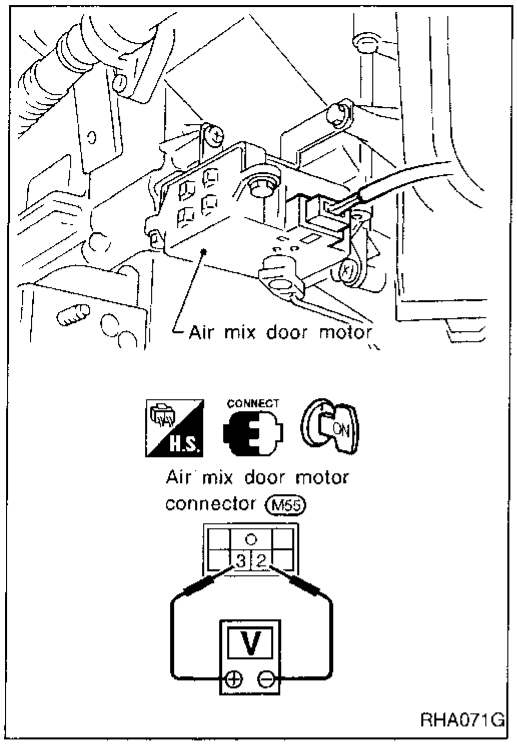
Note:
If the result is NG after checking circuit continuity, repair harness or connector.

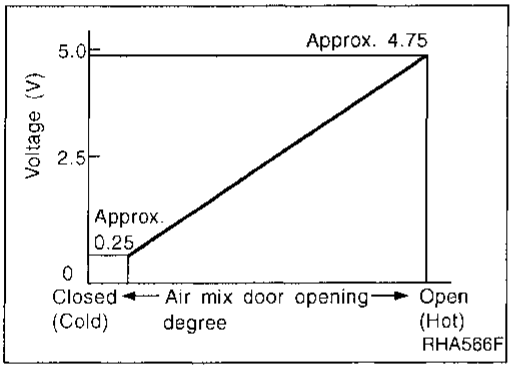
Air Mix Door Motor PBR Circuit (Cont'd)

COMPONENT INSPECTION

PBR

Measure voltage between terminals ③ and ② at vehicle harness side.





Mode Door Motor Circuit

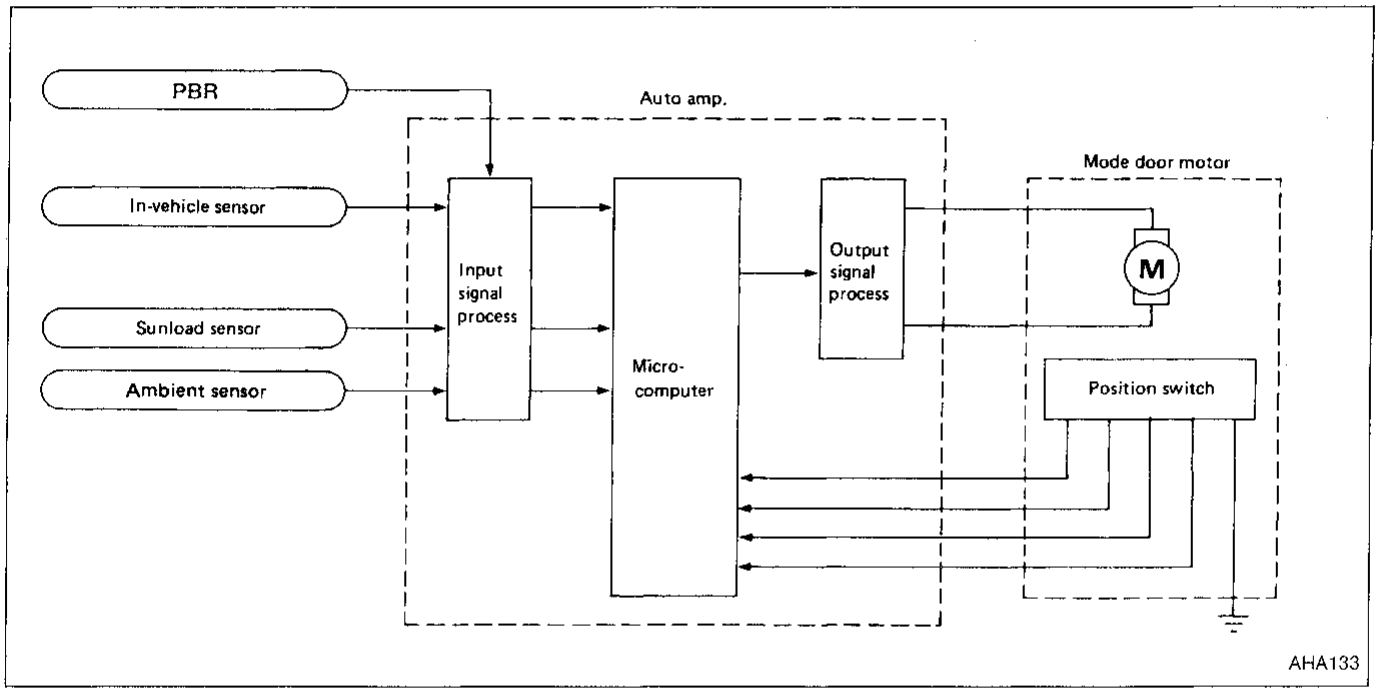
SYSTEM DESCRIPTION

Component parts

Mode door control system components are:
1) Auto amplifier
2) Mode door motor
3) PBR
4) In-vehicle sensor
5) Ambient sensor
6) Sunload sensor

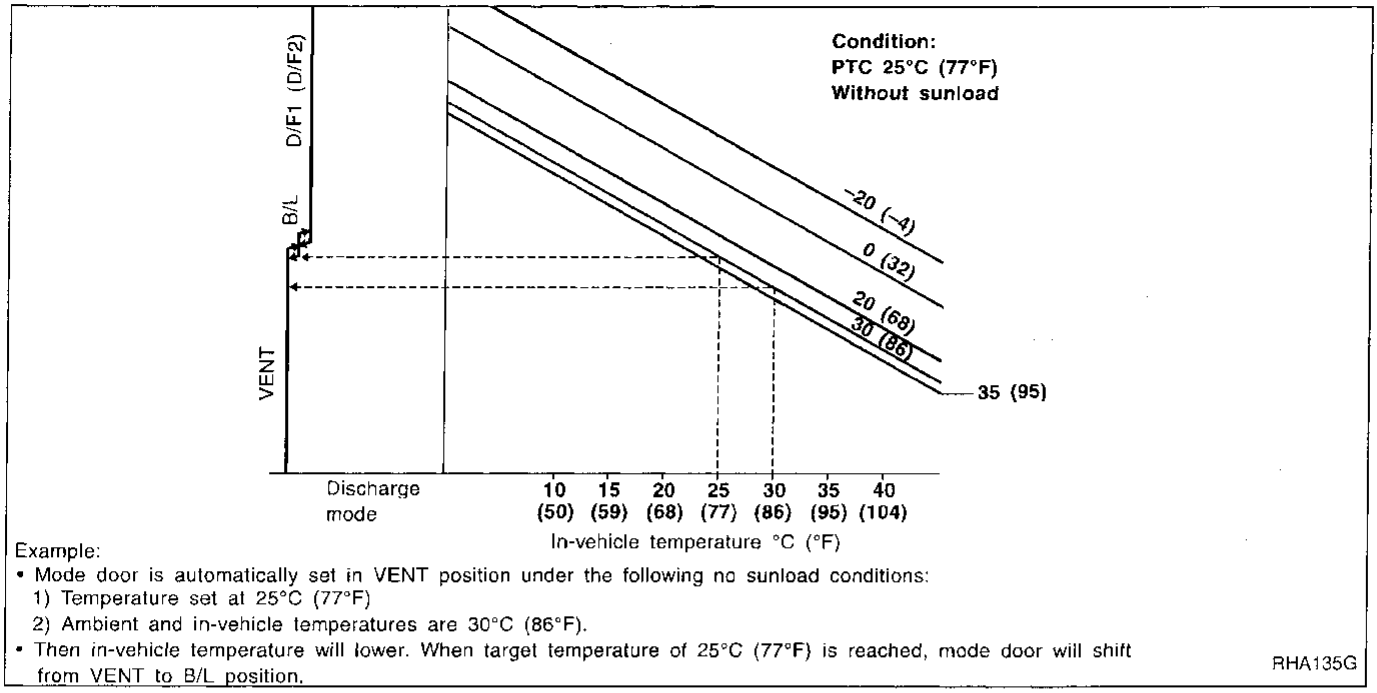
System operation

The auto amplifier computes the air outlet conditions according to the ambient temperature and the in-vehicle temperature. The computed outlet conditions are then corrected for sunload to determine air outlet through which air is discharged into the passenger compartment.
The actual air outlet is either VENT, B/L, F/D or FOOT.



Mode Door Motor Circuit (Cont'd)

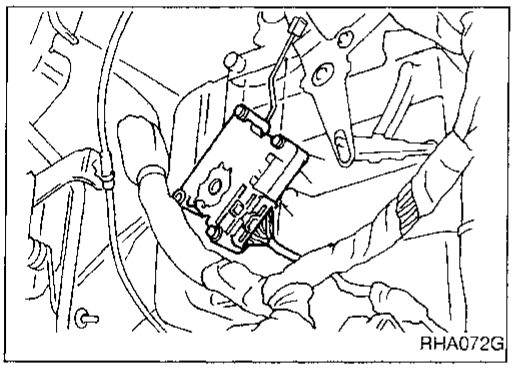
Mode door control specification



Example:

- Mode door is automatically set in VENT position under the following no sunload conditions:
  1) Temperature set at 25°C (77°F)
  2) Ambient and in-vehicle temperatures are 30°C (86°F).
- Then in-vehicle temperature will lower. When target temperature of 25°C (77°F) is reached, mode door will shift from VENT to B/L position.

RHA135G



COMPONENT DESCRIPTION

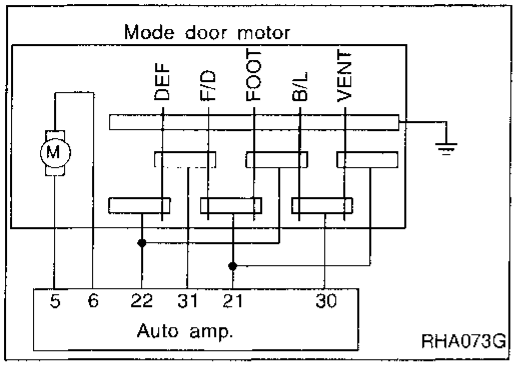
The mode door motor is attached to the heater unit. It rotates so that air is discharged from the outlet set by the auto amplifier. Motor rotation is conveyed to a link which activates the mode door.

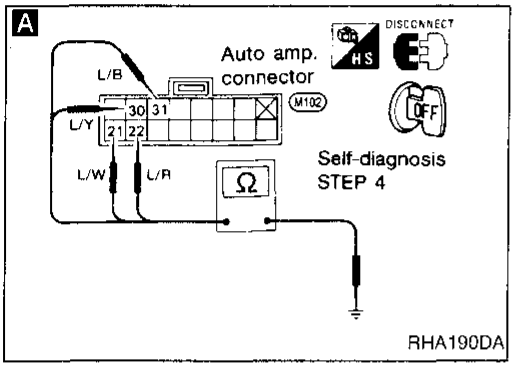
Mode Door Motor Circuit (Cont'd)

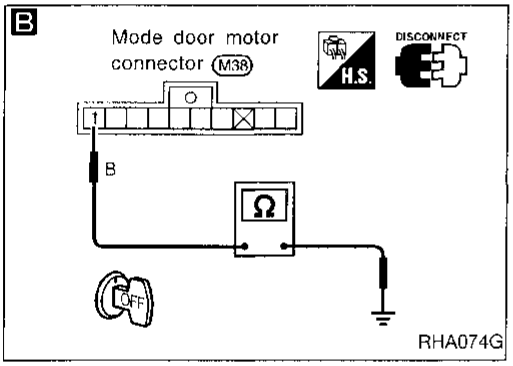
DIAGNOSTIC PROCEDURE

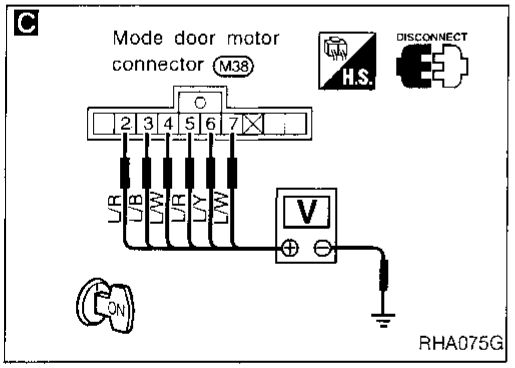
SYMPTOM: Mode door motor does not operate normally.

- **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. harness connector after turning ignition switch OFF.
3. Check if continuity exists between terminal No. ㉒ or ㉛ of auto amp. 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. ⊕	Terminal No. ⊖	Continuity
41	VENT	㉑ or ㉚	Body ground	Yes
42 or 43	B/L	㉒ or ㉚		
44	FOOT	㉑ or ㉒		
45	F/D	㉓ or ㉛		
46	DEF	㉒ or ㉛		

NG → Disconnect mode door motor harness connector.

OK ↓

INSPECTION END

B

Note

CHECK BODY GROUND CIRCUIT FOR MODE DOOR MOTOR.
Does continuity exist between mode door motor harness terminal No. ① and body ground?

Yes ↓

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

Yes ↓

Reconnect mode door motor harness connector.

Ⓐ

No ↓

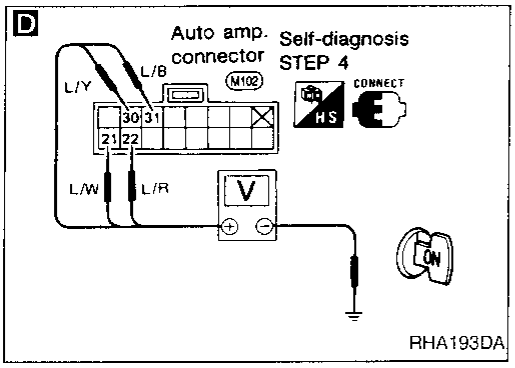
Ⓑ

(Go to next page.)

Note:
If the result is No after checking circuit continuity, repair harness or connector.

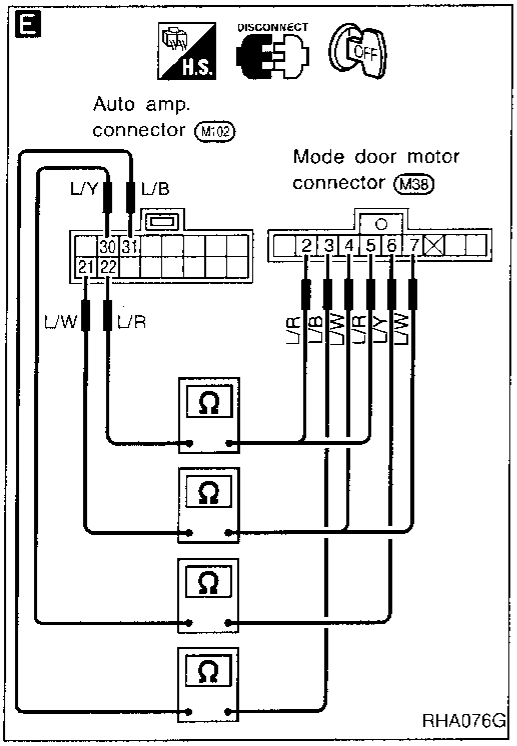
Mode Door Motor Circuit (Cont'd)

D



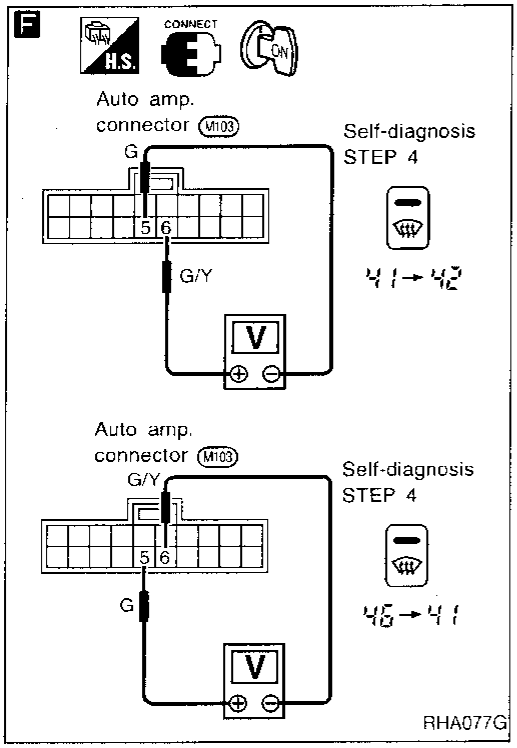
RHA193DA

E



RHA076G

F



RHA077G

Ⓐ

D

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

Code No.	Condition	Terminal No. ⊕ ㉑	㉚	㉒	㉛	Terminal No. ⊖
41	VENT	0V	0V	5V	5V	Body ground
42 or 43	B/L	5V	0V	0V	5V	
44	FOOT	0V	5V	0V	5V	
45	D/F	0V	5V	5V	0V	
46	DEF	5V	5V	0V	0V	

0V: Approx. 0V
5V: Approx. 5V

OK

NG → Replace mode door motor.

Ⓑ

E

Note

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

Terminal No. ⊕	Terminal No. ⊖	Continuity
Auto amp.	Mode door motor	Yes
㉚	⑥	
㉑	④ or ⑦	
㉒	② or ⑤	
㉛	③	

OK → Replace auto amp.

F

CHECK FOR AUTO AMP. OUTPUT.
Do approx. 10.5 volts exist between auto amp. harness terminals No. ⑤ and ⑥ when code No. is switched from "41" to "42" or when code No. is switched from "46" to "41"?

No → Replace auto amp.

Code No.	Mode door motor operation	Terminal No. ⑥	⑤	Voltage V
41 →42	VENT → B/L	⊕	⊖	Approx. 10.5
46 →41	DEF → VENT	⊖	⊕	
—	Stop	⊖	⊖	0

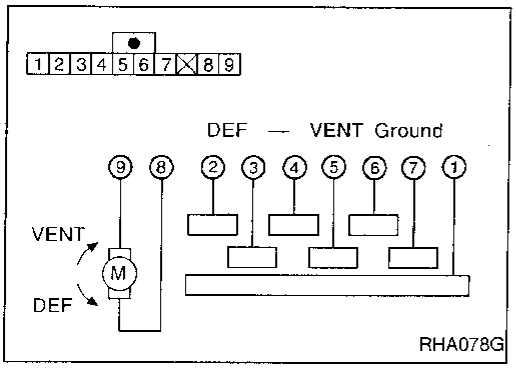
Yes → Replace mode door motor.

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

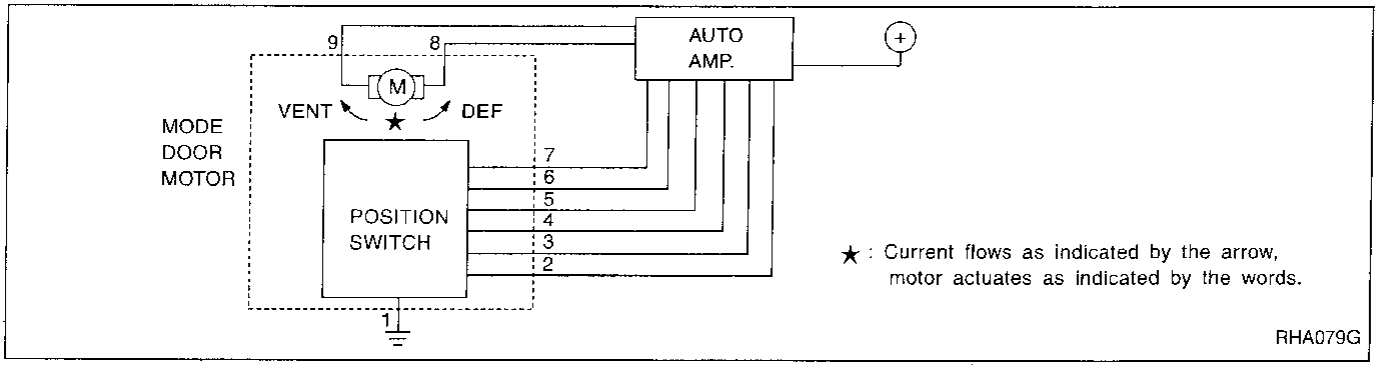
Mode Door Motor Circuit (Cont'd)

COMPONENT INSPECTION

Mode door motor



Terminal No.		Mode door operation	Direction of side link rotation
⑧	⑨		
⊕	⊖	DEF → VENT	Clockwise
–	–	STOP	STOP
⊖	⊕	VENT → DEF	Counterclockwise



Intake Door Motor Circuit

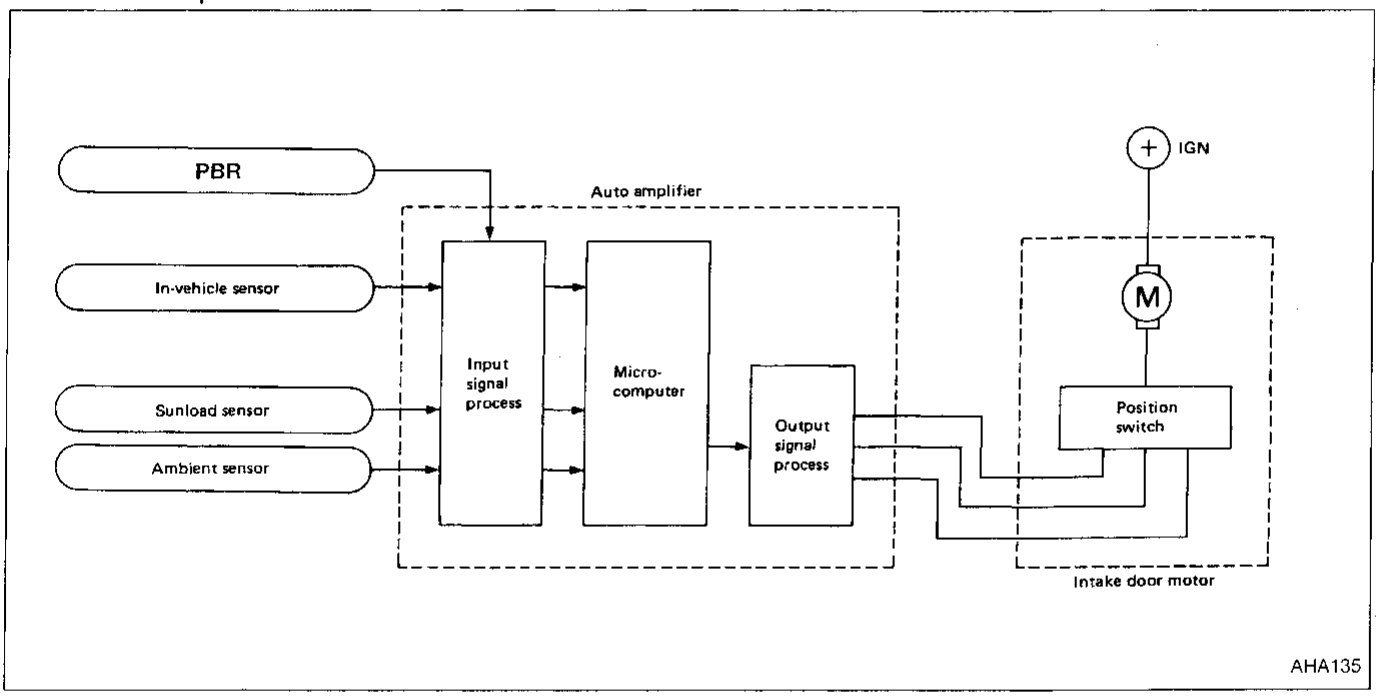
SYSTEM DESCRIPTION

Component parts

Intake door control system components are:
1) Auto amplifier
2) Intake door motor
3) PBR
4) In-vehicle sensor
5) Ambient sensor
6) Sunload sensor

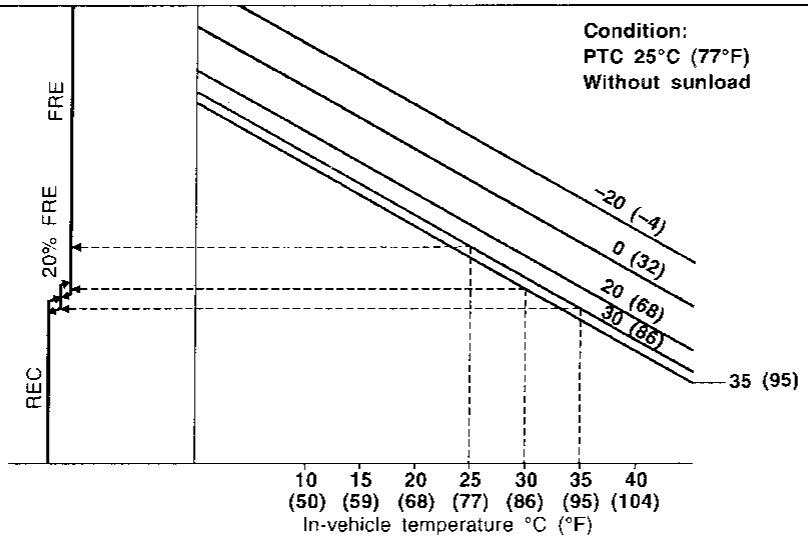
System operation

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



Intake Door Motor Circuit (Cont'd)

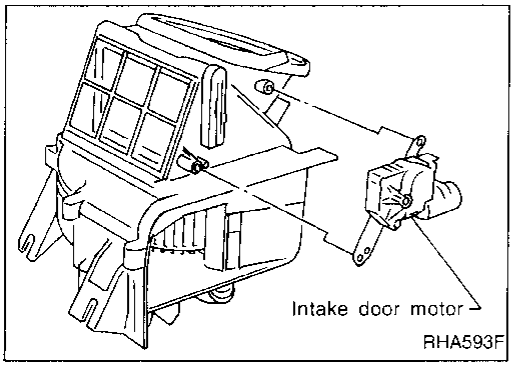
Intake door control specification



Example:

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

RHA136G



RHA593F

COMPONENT DESCRIPTION

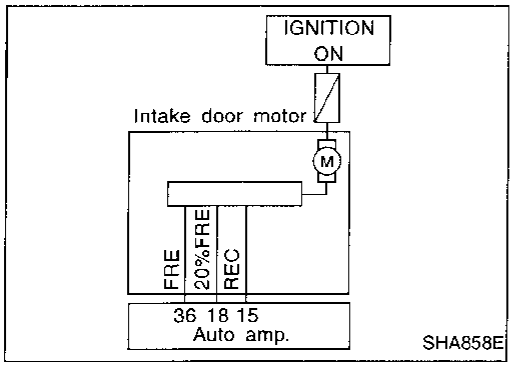
The intake door motor is attached to the intake unit. It rotates so that air is drawn from inlets set by the auto amplifier. Motor rotation is conveyed to a lever which activates the intake door.

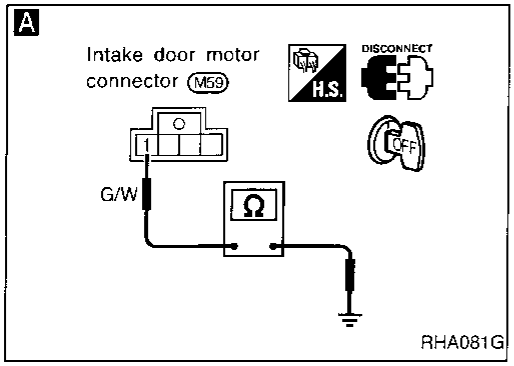
Intake Door Motor Circuit (Cont'd)

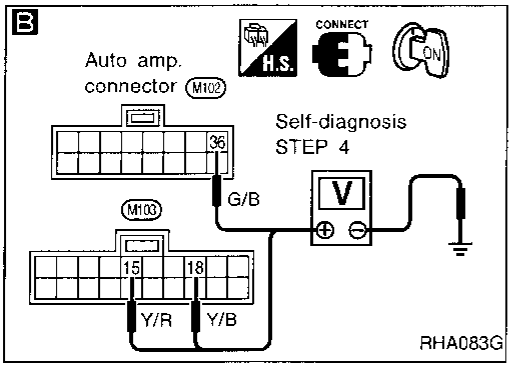
DIAGNOSTIC PROCEDURE

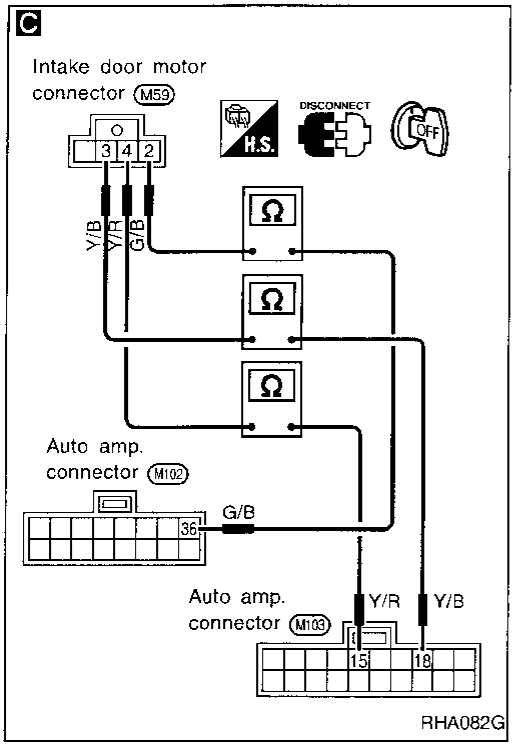
SYMPTOM: Intake door motor does not operate normally.

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









A

CHECK POWER SUPPLY FOR INTAKE DOOR MOTOR.
Disconnect intake door motor harness connector.
Do approx. 12 volts exist between intake door motor harness terminal No. ① and body ground?

No → Check power supply circuit and 7.5A fuse (No. 6, located in the fuse block).

Yes ↓

B

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

Code No.	Terminal No. ⊕	Terminal No. ⊖	Condition	Voltage V
41, 42	⑮	Body ground	REC	0
	⑱			12
	㊱			12
43	⑮		20% FRE	12
	⑱			0
	㊱			12
44, 45, 46	⑮		FRE	12
	⑱			12
	㊱			0

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

NG → **C** Note: Check circuit continuity between each terminal on auto amp. and on intake door motor.

Terminal No. ⊕	Terminal No. ⊖	Continuity
Auto amp.	Intake door motor	
⑮	④	Yes
⑱	③	
㊱	②	

OK → Replace auto amp.

OK ↓

Replace intake door motor.

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

Air Mix Door Motor Circuit

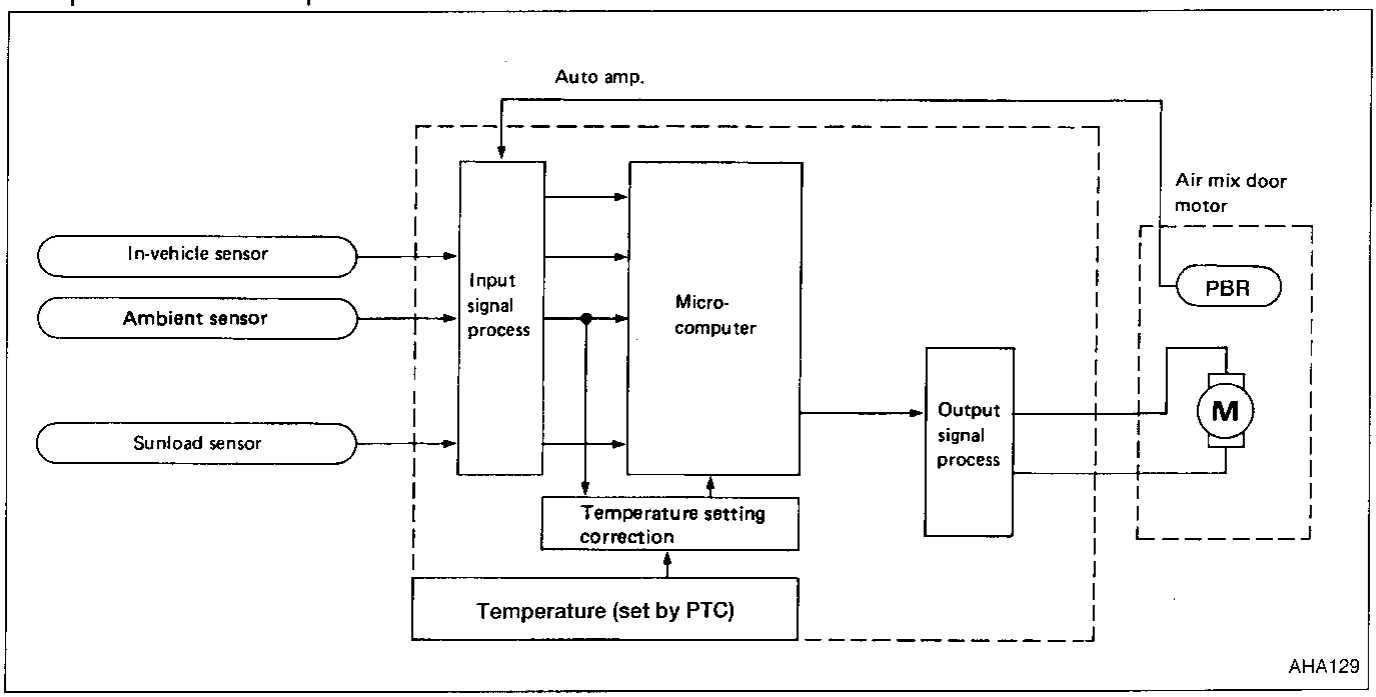
SYSTEM DESCRIPTION

Component parts

Air mix door control system components are:
1) Auto amplifier
2) Air mix door motor (PBR)
3) In-vehicle sensor
4) Ambient sensor
5) Sunload sensor

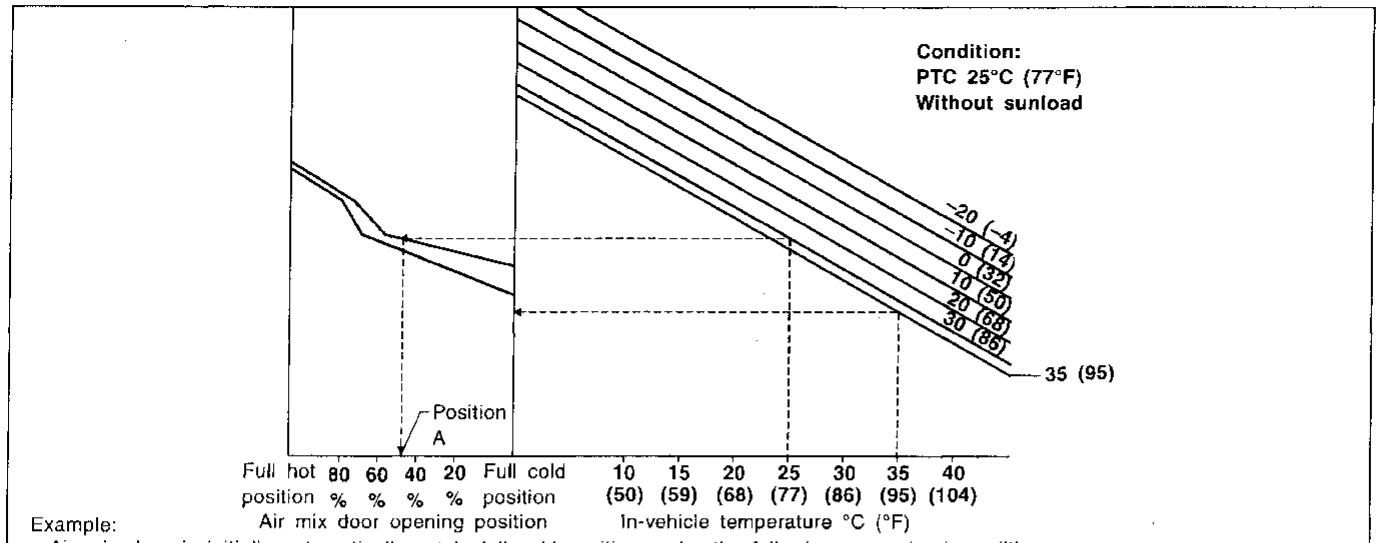
System operation

Temperature set by Potentio Temperature Control (PTC) is compensated through setting temperature correction circuit to determine target temperature.
Auto amplifier will operate air mix door motor to set air conditioning system in HOT or COLD position, depending upon relationship between conditions (target temperature, sunload, in-vehicle temperature and ambient temperature) and conditions (air mix door position compressor operation).
When target temperature is set at 18°C (65°F) or 32°C (85°F), air mix door opening position is fixed in full cold position or full hot position.



Air Mix Door Motor Circuit (Cont'd)

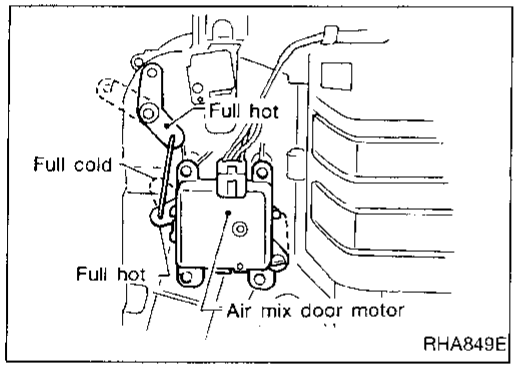
Air mix door control specification



Example:

- Air mix door is initially automatically set in full cold position under the following no sunload conditions:
  1) Temperature set at 25°C (77°F)
  2) Ambient and in-vehicle temperatures are 35°C (95°F).
- Within some period, in-vehicle temperature will lower towards the objective temperature, and the air mix door position will shift gradually towards the cold side and finally stay in this position (A).
  Air mix door opening position is always fed back to auto amp. by PBR built-in air mix door.

RHA137G



RHA849E

COMPONENT DESCRIPTION

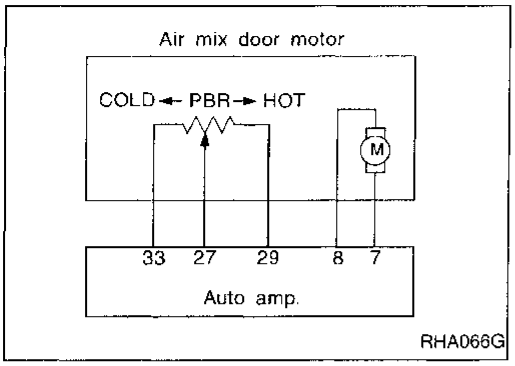
The air mix door motor is attached to the heater unit. It rotates so that the air mix door is opened or closed to a position set by the auto amplifier. Motor rotation is then conveyed through a shaft and the air mix door position is then fed back to the auto amplifier by PBR built-in air mix door motor.

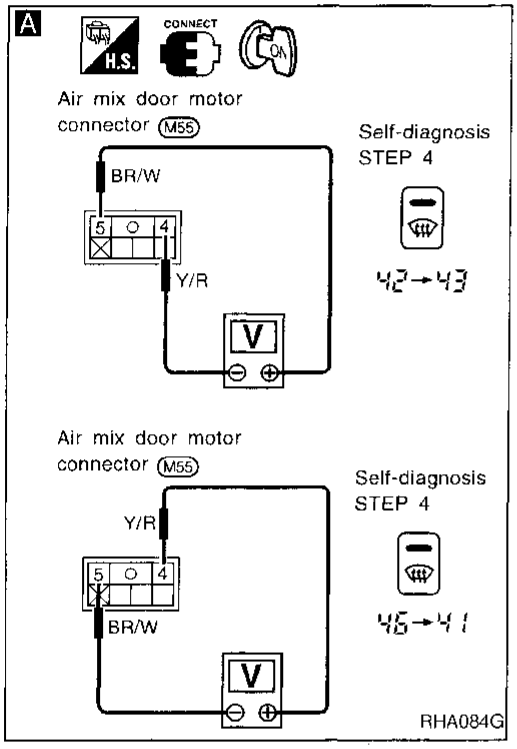
Air Mix Door Motor Circuit (Cont'd)

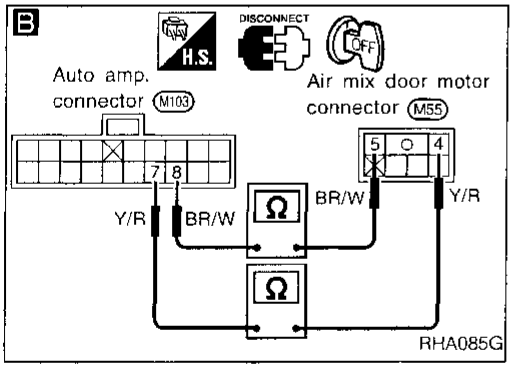
DIAGNOSTIC PROCEDURE

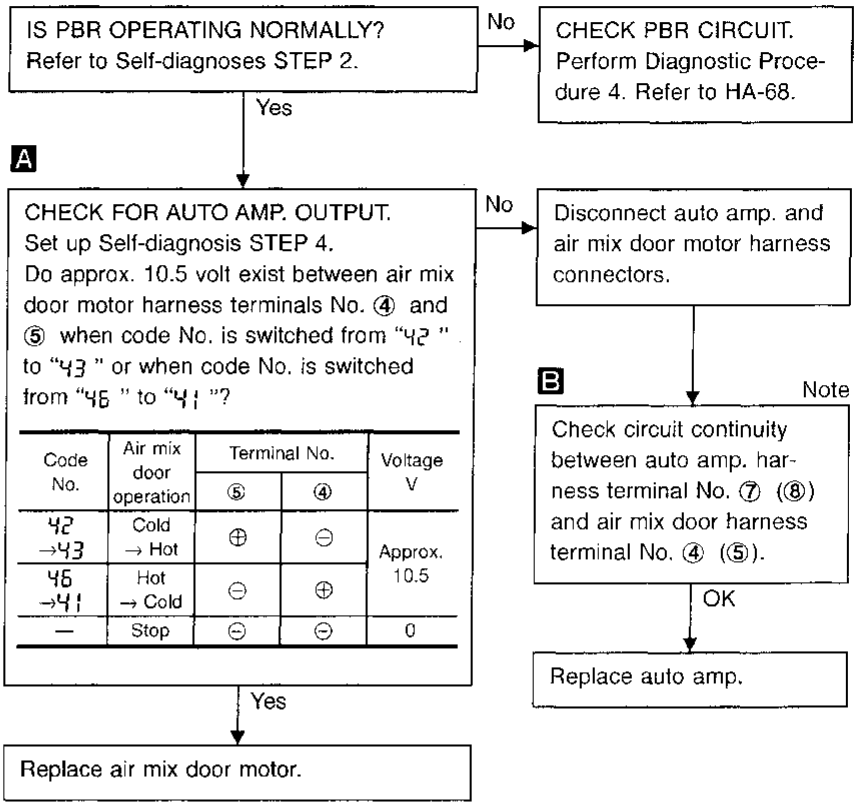
SYMPTOM: Air mix door motor does not operate normally.

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









Code No.	Air mix door operation	Terminal No. ⑤	Terminal No. ④	Voltage V
42 →43	Cold → Hot	⊕	⊖	Approx. 10.5
46 →41	Hot → Cold	⊖	⊕	
—	Stop	⊖	⊖	0

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

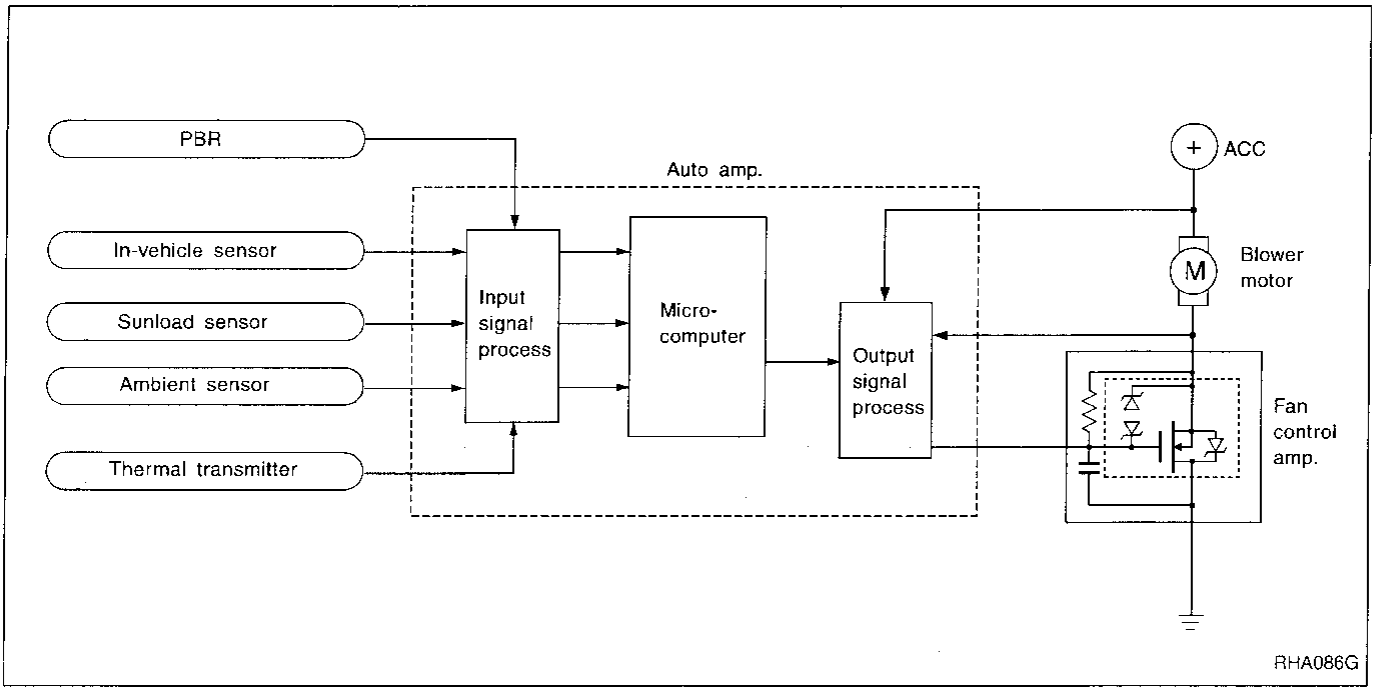
Blower Motor Circuit

SYSTEM DESCRIPTION

Component parts

Fan speed control system components are:
1) Auto amplifier
2) Fan control amplifier
3) PBR
4) In-vehicle sensor
5) Ambient sensor
6) Sunload sensor
7) Thermal transmitter

System operation



Automatic mode

In the automatic mode, the blower motor speed is calculated by the automatic amplifier based on inputs from the PBR, in-vehicle sensor, sunload sensor, and ambient sensor. The blower motor applied voltage ranges from approximately 5 volts (lowest speed) to 12 volts (highest speed).
The control blower speed (in the range of 5 to 12V), the automatic amplifier supplies a gate voltage to the fan control amplifier. Based on this voltage, the fan control amplifier controls the voltage supplied to the blower motor.

Starting blower 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 126 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 126 seconds as described above. After this delay, the blower will operate at low speed until the engine coolant temperature rises above 55°C (131°F), at which time the blower speed will increase to the objective speed.

Blower Motor Circuit (Cont'd)

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 3 seconds or less (actual time depends on the objective blower speed).

Blower speed compensation

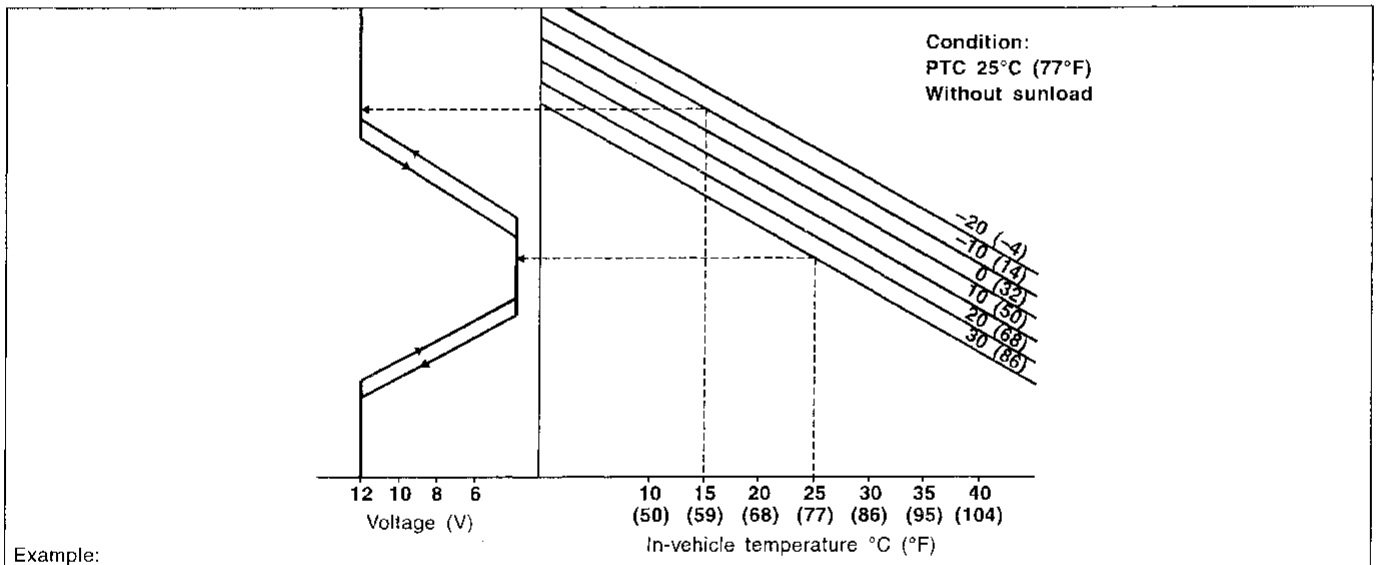
Sunload

When the in-vehicle temperature and the set temperature are very close, the blower will be operating at low speed. The low speed will vary depending on the sunload. During conditions of high sunload, the blower low speed is "normal" low speed (approx. 6V). During low or no sunload conditions, the low speed will drop to "low" low speed (approx. 5V).

Ambient

When the ambient temperature is in the "moderate" range [10 – 15°C (50 - 59°F)], the computed blower voltage will be compensated (reduced) by up to 3.5V (depending on the blower speed). In the "extreme" ambient ranges [below 0°C (32°F) and above 20°C (68°F)] the computed objective blower voltage is not compensated at all. In the ambient temperature ranges between "moderate" and "extreme" [0 - 10°C (32 - 50°F) and 15 - 20°C (59 - 68°F)], the amount of compensation (for a given blower speed) varies depending on the ambient temperature.

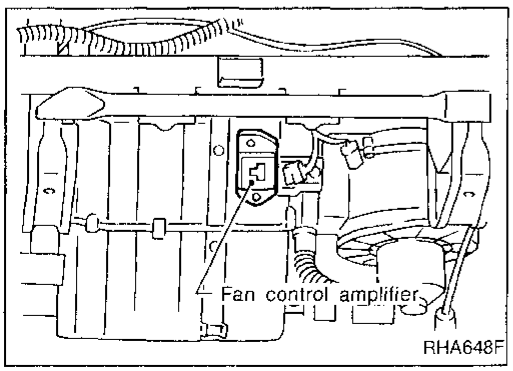
Fan speed control specification



Example:

- If temperature setting is set at 25°C (77°F) under no sunload condition when ambient temperature is –10°C (14°F) and in-vehicle temperature is 15°C (59°F), blower motor voltage is approx. 12 volts.
- When ambient temperature is 30°C (86°F) and in-vehicle temperature is reduced to 25°C (77°F) under the same condition above, blower motor voltage is approx. 5 volts.

RHA138G



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COMPONENT DESCRIPTION

Fan control amplifier

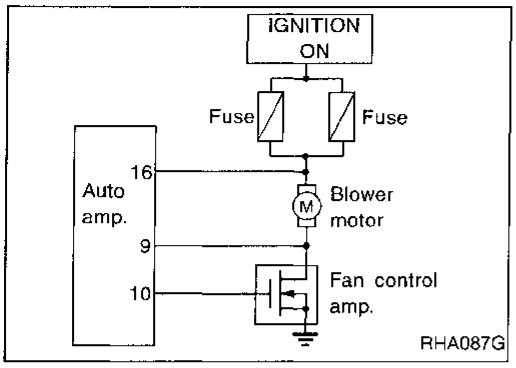
The fan control amplifier is located on the cooling unit. The fan control amp. receives a gate voltage from the auto amp. to steplessly maintain the blower fan motor voltage in the 5 to 12 volt range (approx.).

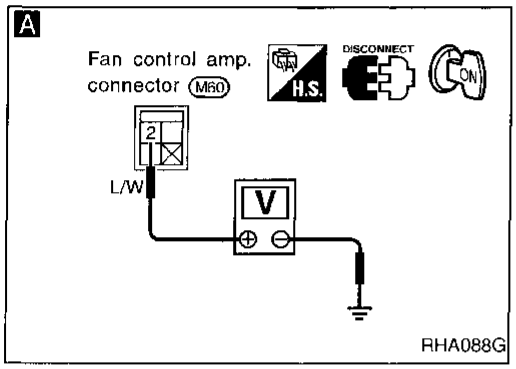
Blower Motor Circuit (Cont'd)

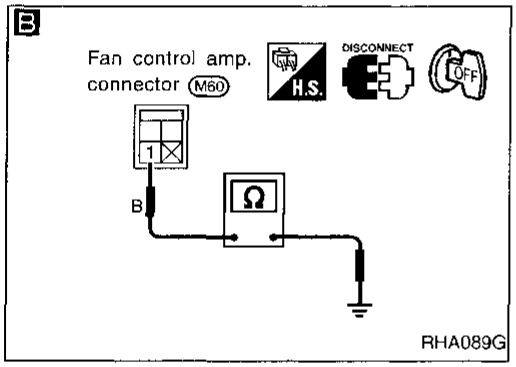
DIAGNOSTIC PROCEDURE

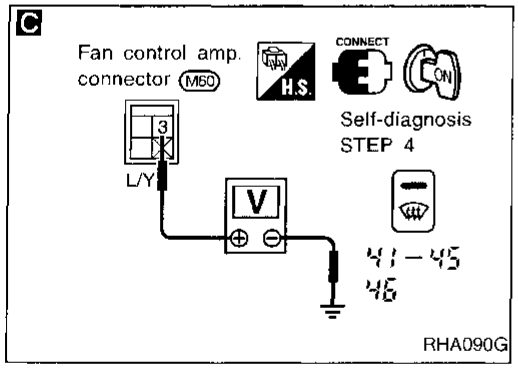
SYMPTOM: Blower motor operation is malfunctioning under Starting Fan Speed Control.

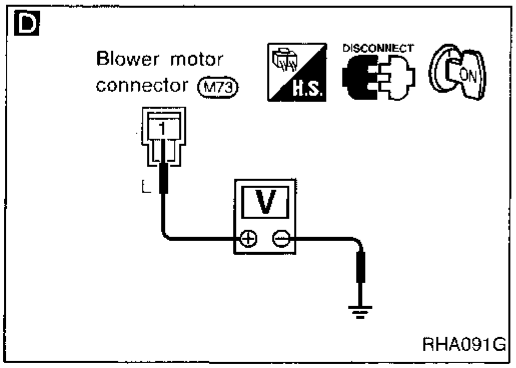
- **Perform Preliminary Check 5 before referring to the following flow chart.**











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 No. ② and body ground?

No → **D**

CHECK POWER SUPPLY FOR BLOWER MOTOR.
Disconnect blower motor harness connector.
Do approx. 12 volts exist between blower motor harness terminal No. ① and body ground?

Yes → **B**

No → Check power supply circuit and 15A fuses (No. 1 and 2, located in the fuse block).

B Note

CHECK BODY GROUND CIRCUIT FOR FAN CONTROL AMP.
Does continuity exist between fan control amp. harness terminal No. ① and body ground?

Yes

Reconnect fan control amp. harness connector.

C

CHECK FOR AUTO AMP. OUTPUT.
Set up Self-diagnosis STEP 4.
Measure voltage across fan control amp. harness terminal No. ③ and body ground.

Code No.	Terminal No. ⊕	Terminal No. ⊖	Voltage
41 - 45	③	Body ground	Approx. 2.5 - 3V
46	③	Body ground	Approx. 9 - 10V

NG → Ⓐ (Go to next page.)

OK

Replace fan control amp.

Yes → **E** Note

Check circuit continuity between blower motor harness terminal No. ② and fan control amp. harness terminal No. ② .

OK

CHECK BLOWER MOTOR.
(Refer to HA-85.)

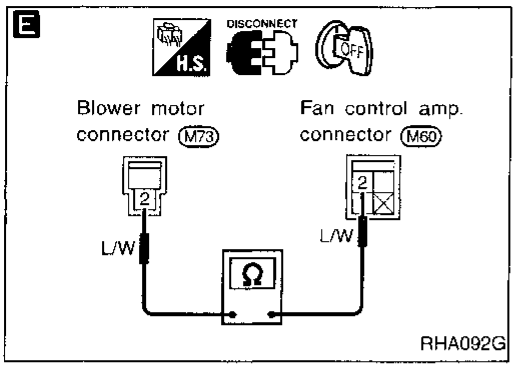
NG

Replace blower motor.

Note:
If the result is NG or No after checking circuit continuity, repair harness or connector.

Blower Motor Circuit (Cont'd)

E



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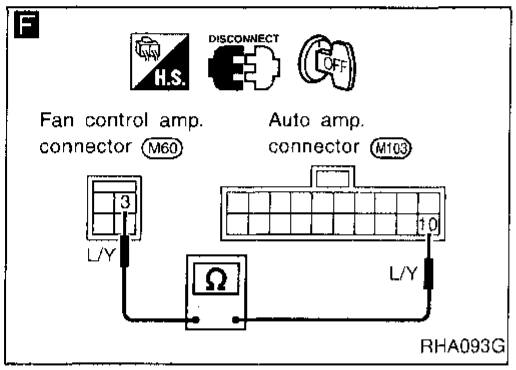
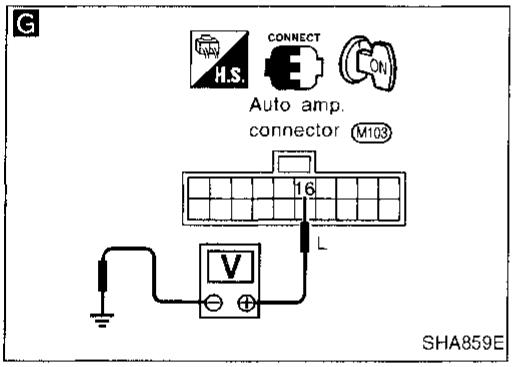
F



RHA093G

G



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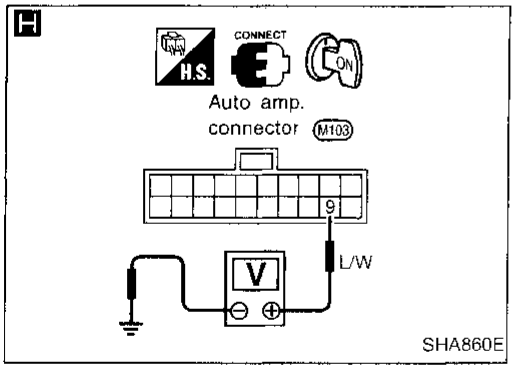
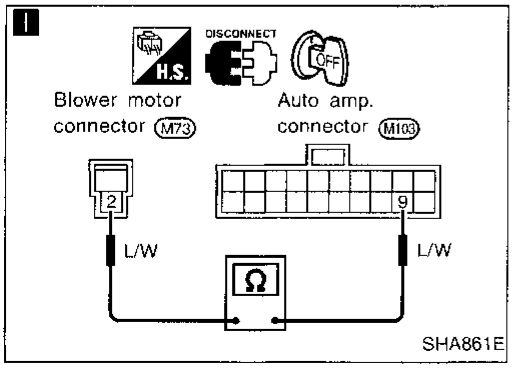
H



SHA860E

I



SHA861E

Ⓐ

Disconnect auto amp. and fan control amp. harness connector.

F

Note

Does continuity exist between auto amp. harness terminal No. ⑩ and fan control amp. harness terminal No. ③ ?
Continuity should exist.
If OK, check harness for short.

Yes

G

CHECK FAN FEED BACK CIRCUIT.
Do approx. 12 volts exist between auto amp. harness terminal No. ⑯ and body ground?

No → Check power supply circuit and 15A fuses (No. 1 and 2 , located in the fuse block).
Refer to EL section ("Wiring Diagram", "POWER SUPPLY ROUTING").

Yes

H

Do approx. 12 volts exist between auto amp. harness terminal No. ⑨ and body ground?

No → I

Yes

Replace auto amp.

I

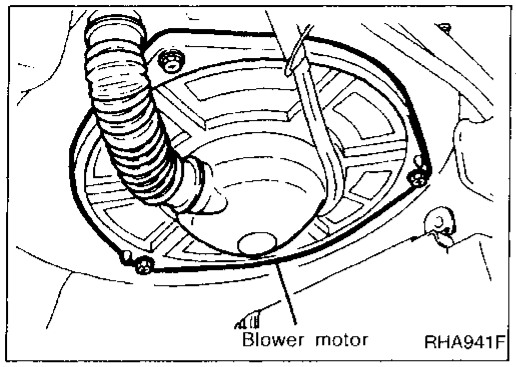
Note

Check circuit continuity between blower motor harness terminal No. ② and auto amp. harness terminal No. ⑨ .
Continuity should exist.
If OK, check harness for short.

Note:
If the result is NG or No after checking circuit continuity, repair harness or connector.

Blower Motor Circuit (Cont'd)

COMPONENT INSPECTION



Blower motor

Confirm smooth rotation of the blower motor.

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

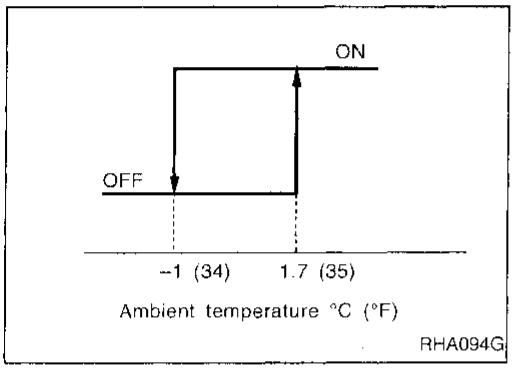
Magnet Clutch Circuit

SYSTEM DESCRIPTION

Auto amplifier controls compressor operation by ambient temperature and signal from ECM (ECCS control module).

Low temperature protection control

Auto amplifier will turn the compressor "ON" or "OFF" as determined by a signal detected by ambient sensor.



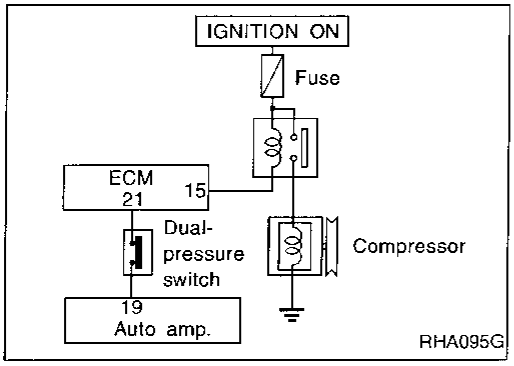
When ambient temperatures are greater than 1.7°C (35°F), the compressor turns "ON". The compressor turns "OFF" when ambient temperatures are less than –1°C (34°F).

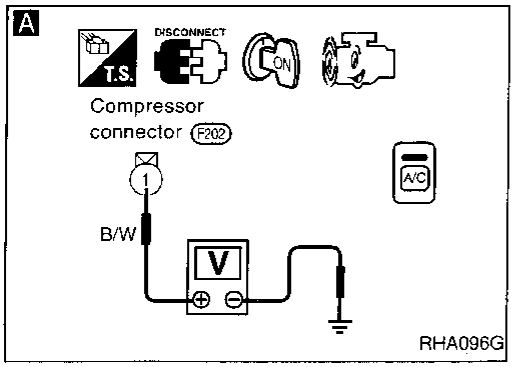
Magnet Clutch Circuit (Cont'd)

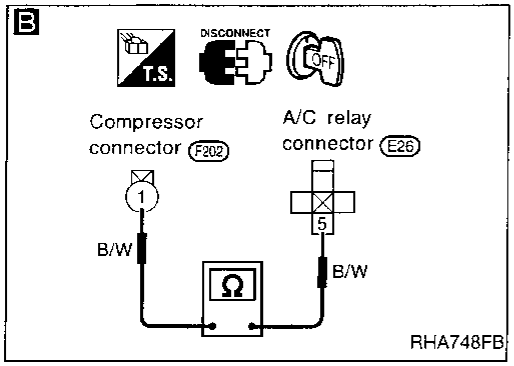
DIAGNOSTIC PROCEDURE

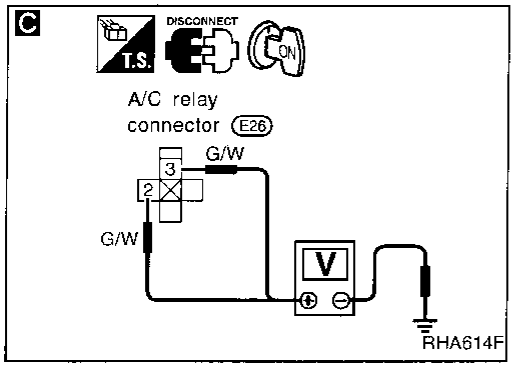
SYMPTOM: Magnet clutch does not engage when A/C switch and fan switch are ON.

- **Perform PRELIMINARY CHECK 1 before referring to the following flow chart.**









A

CHECK POWER SUPPLY FOR COMPRESSOR.
Disconnect compressor harness connector.
Do approx. 12 volts exist between compressor harness terminal No. ① and body ground?

Yes → Check magnet clutch coil.
NG → Replace magnet clutch. Refer to HA-98.

No ↓

Disconnect A/C relay.

B Note

CHECK CIRCUIT CONTINUITY BETWEEN A/C RELAY HARNESS TERMINAL NO. ⑤ AND COMPRESSOR HARNESS TERMINAL NO. ①.
Continuity should exist.
If OK, check harness for short.

OK ↓

C

CHECK POWER SUPPLY FOR A/C RELAY.
Disconnect A/C relay.
Do approx. 12 volts exist between A/C relay harness terminal Nos. ②, ③ and body ground?

No → CHECK POWER SUPPLY CIRCUIT AND 7.5A (No. 6) FUSE AT FUSE BLOCK.
Refer to EL section ("Wiring Diagram", "POWER SUPPLY ROUTING").

Yes ↓

CHECK A/C RELAY AFTER DISCONNECTING IT.
Refer to HA-88.

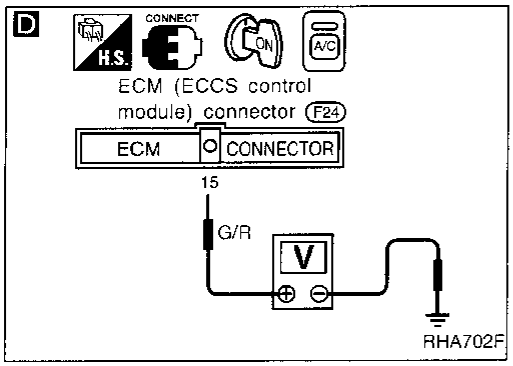
NG → Replace A/C relay.

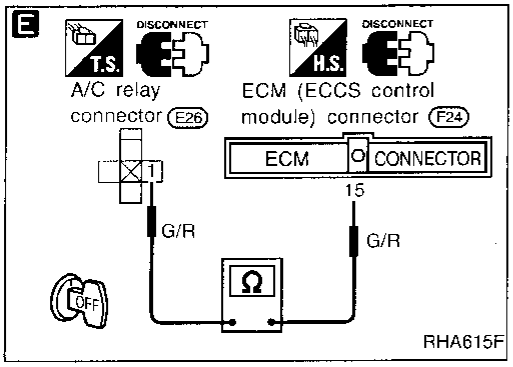
OK ↓

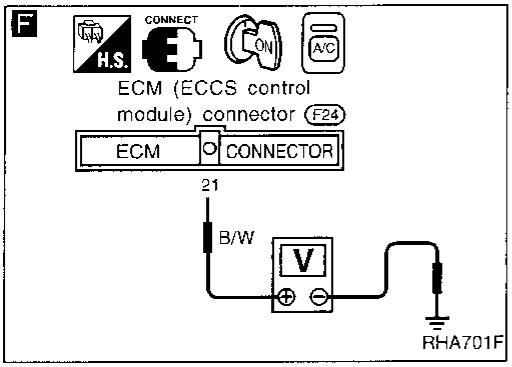
Ⓐ
(Go to next page.)

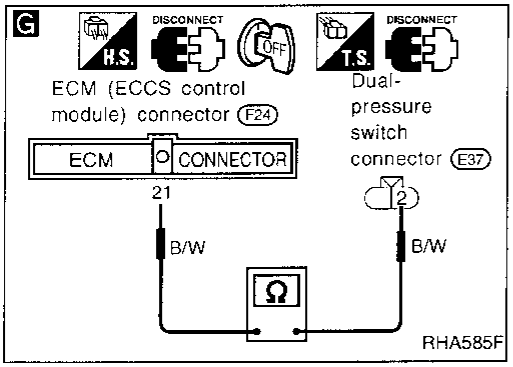
Note:
If the result is NG after checking circuit continuity, repair harness or connector.

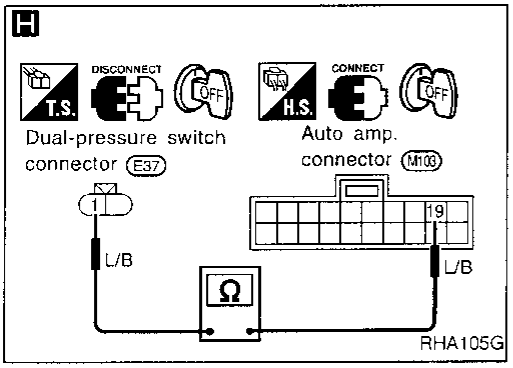
Magnet Clutch Circuit (Cont'd)











Ⓐ

Reconnect A/C relay.

D

CHECK COIL SIDE CIRCUIT OF A/C RELAY.
Do approx. 12 volts exist between ECM (ECCS control module) harness terminal No. ⑮ and body ground?

No → Disconnect A/C relay. Disconnect ECM (ECCS control module) harness connector.

E Note

CHECK CIRCUIT CONTINUITY BETWEEN A/C RELAY HARNESS TERMINAL NO. ① AND ECM (ECCS CONTROL MODULE) HARNESS TERMINAL NO. ⑮.
Continuity should exist.
If OK, check harness for short.

Yes

F

CHECK VOLTAGE FOR ECM (ECCS control module).
Do approx. 12 volts exist between ECM (ECCS control module) harness terminal No. ㉑ and body ground?

No → CHECK ECM (ECCS control module). Refer to EC section.

Yes

Disconnect ECM (ECCS control module) harness connector.
Disconnect dual-pressure switch harness connector.

G Note

CHECK CIRCUIT CONTINUITY BETWEEN ECM (ECCS CONTROL MODULE) HARNESS TERMINAL NO. ㉑ AND DUAL-PRESSURE SWITCH HARNESS TERMINAL NO. ② .
Continuity should exist.
If OK, check harness for short.

OK

CHECK DUAL-PRESSURE SWITCH.
Refer to HA-88.

NG → Replace dual-pressure switch.

OK

Disconnect A/C switch harness connector.

H

Check circuit continuity between auto amp. harness terminal No. ⑲ and dual-pressure switch terminal No. ① .

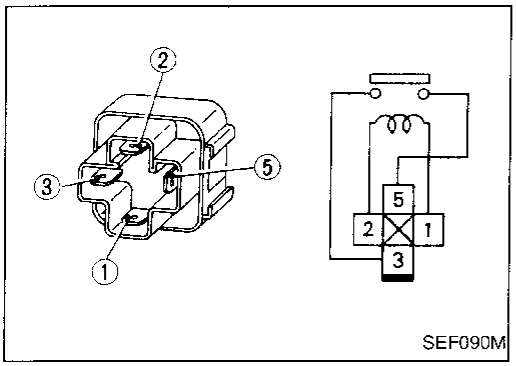
OK

Replace auto amp.

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

Magnet Clutch Circuit (Cont'd)

COMPONENT INSPECTION

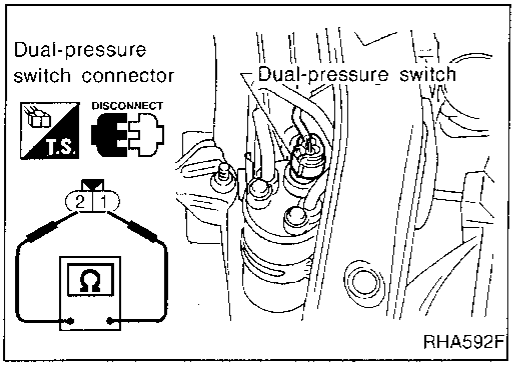


A/C relay

Check continuity between terminal Nos. ③ and ⑤.

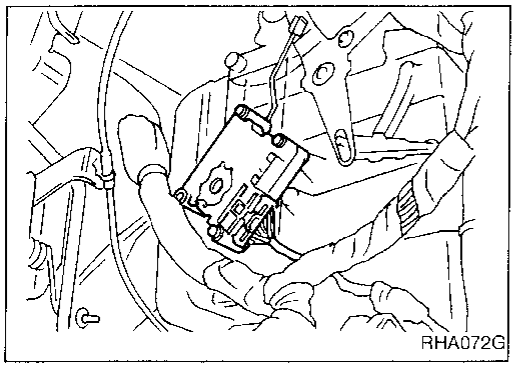
Conditions	Continuity
12V direct current supply between terminal Nos. ① and ②	Yes
No current supply	No

If NG, replace relay.



Dual-pressure switch

	ON kPa (kg/cm², psi)	OFF kPa (kg/cm², psi)
Low-pressure side	Increasing to 157 - 216 (1.6 - 2.2, 23 - 31)	Decreasing to 157 - 196 (1.6 - 2.0, 23 - 28)
High-pressure side	Decreasing to 1,863 - 2,256 (19 - 23, 270 - 327)	Increasing to 2,452 - 2,844 (25 - 29, 356 - 412)



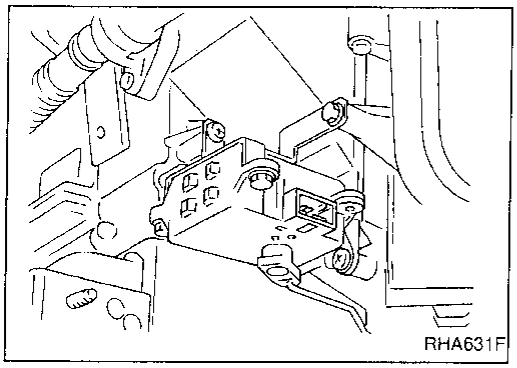
Control Linkage Adjustment

MODE DOOR

1. Install mode door motor on heater unit and connect it to main harness.
2. Set up code No. 46 in Self-diagnosis STEP 4. Refer to HA-30.
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 46 by pushing DEF switch.

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

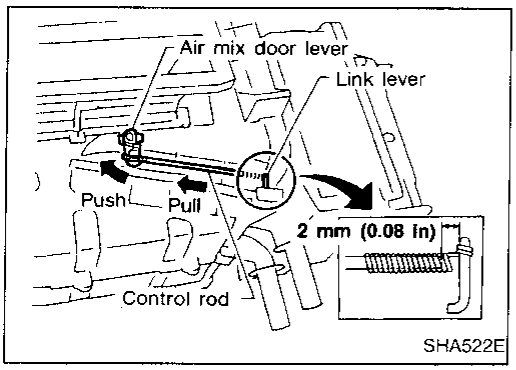
Control Linkage Adjustment (Cont'd)


RHA631F

AIR MIX DOOR (Water cock)

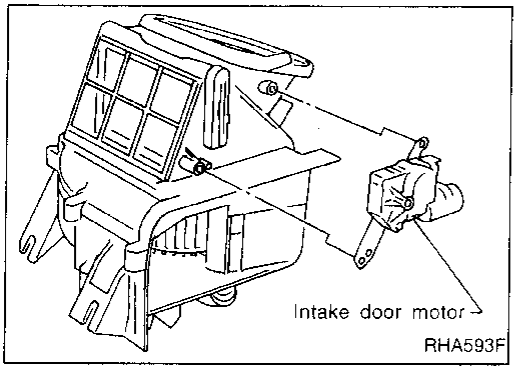
1. Install air mix door motor on heater unit and connect it to main harness.
2. Set up code No. 41 in Self-diagnosis STEP 4. Refer to HA-30.
3. Move air mix door lever by hand and hold it in full cold position.
4. Attach air mix door lever to rod holder.
5. Make sure air mix door operates properly when changing from code No. 41 to 46 by pushing DEF switch.

41	42	43	44	45	46
Full cold		Full hot			



SHA522E

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 46 by pushing DEF switch. (After several cycles, water cock lever should be midpoint of plate opening when code No. 41 is set.)



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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. Refer to HA-30.
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		

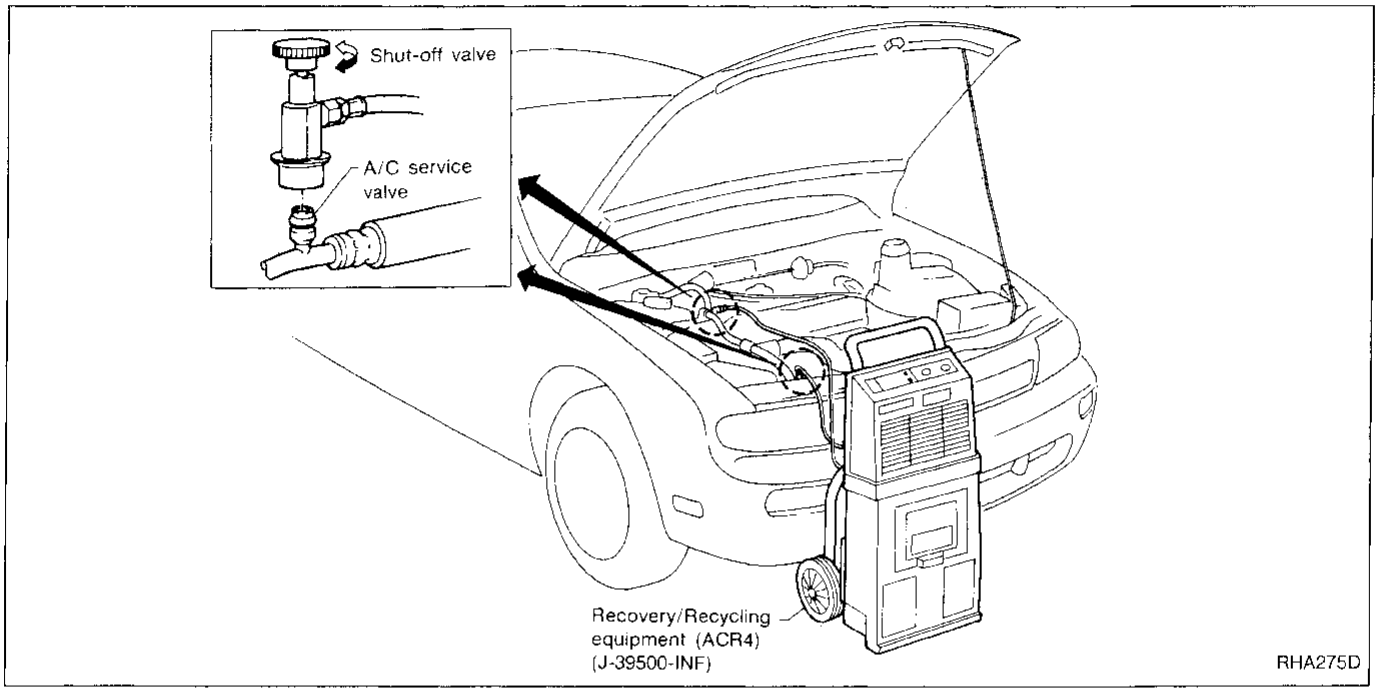
HFC-134a (R-134a) Service Procedure

SETTING OF SERVICE TOOLS AND EQUIPMENT

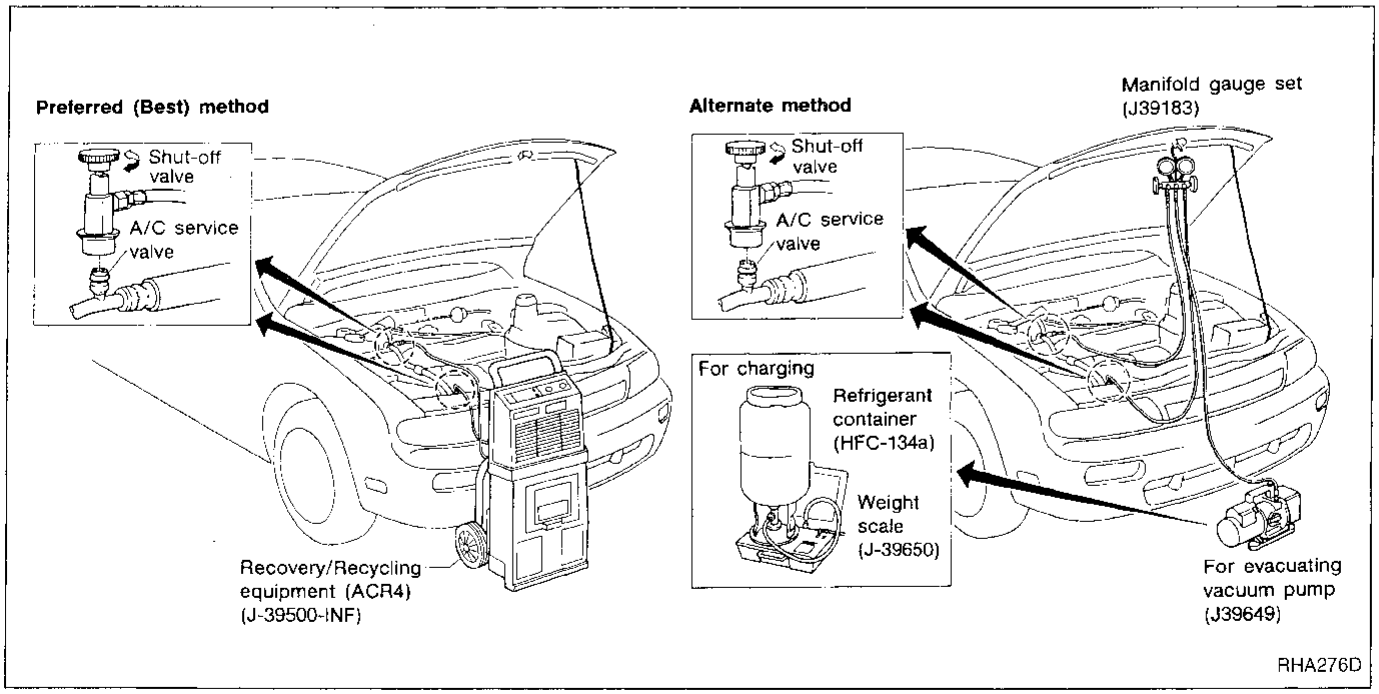
DISCHARGING REFRIGERANT

WARNING:

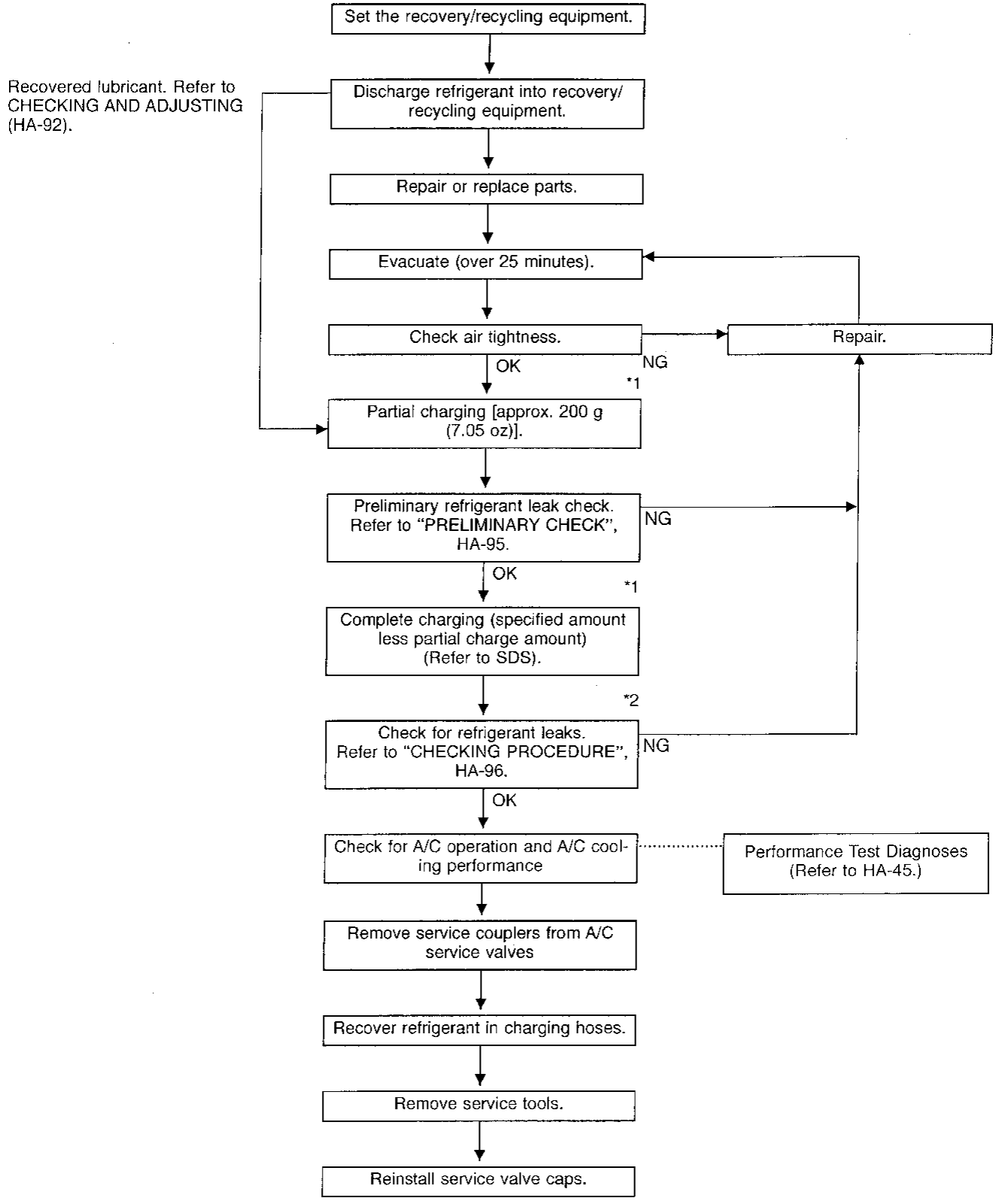
Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Remove HFC-134a (R-134a) from A/C system using certified service equipment meeting requirements of SAE J2210 (R-134a recycling equipment) or J2209 (R-134a recovery equipment). If accidental system 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



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



Note: *1 Before charging refrigerant, ensure engine is off.
*2 Before checking for leaks, start engine to activate air conditioning system then turn engine off. Service valve caps must be installed to prevent leakage.

Maintenance of Lubricant Quantity in Compressor

The lubricant in the compressor circulates through the system with the refrigerant. Add lubricant to compressor when replacing any component or after a large gas leakage occurred. It is important to maintain the specified amount.
If lubricant quantity is not maintained properly, the following malfunctions may result:

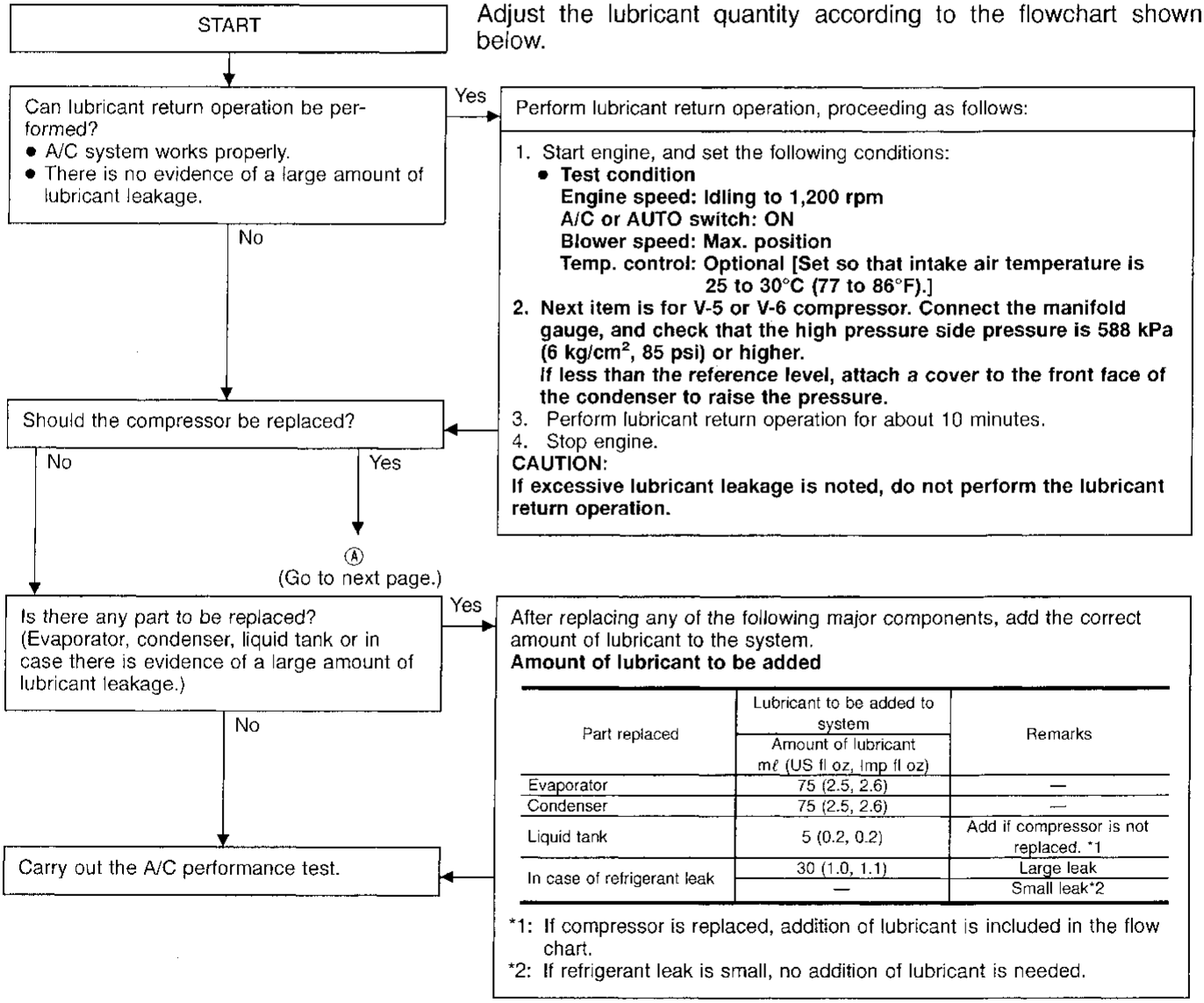
- Lack of lubricant: May lead to a seized compressor
- Excessive lubricant: Inadequate cooling (thermal exchange interference)

LUBRICANT

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

CHECKING AND ADJUSTING

Adjust the lubricant quantity according to the flowchart shown below.



Part replaced	Lubricant to be added to system Amount of lubricant mℓ (US fl oz, Imp fl oz)	Remarks
Evaporator	75 (2.5, 2.6)	—
Condenser	75 (2.5, 2.6)	—
Liquid tank	5 (0.2, 0.2)	Add if compressor is not replaced. *1
In case of refrigerant leak	30 (1.0, 1.1)	Large leak
	—	Small leak*2

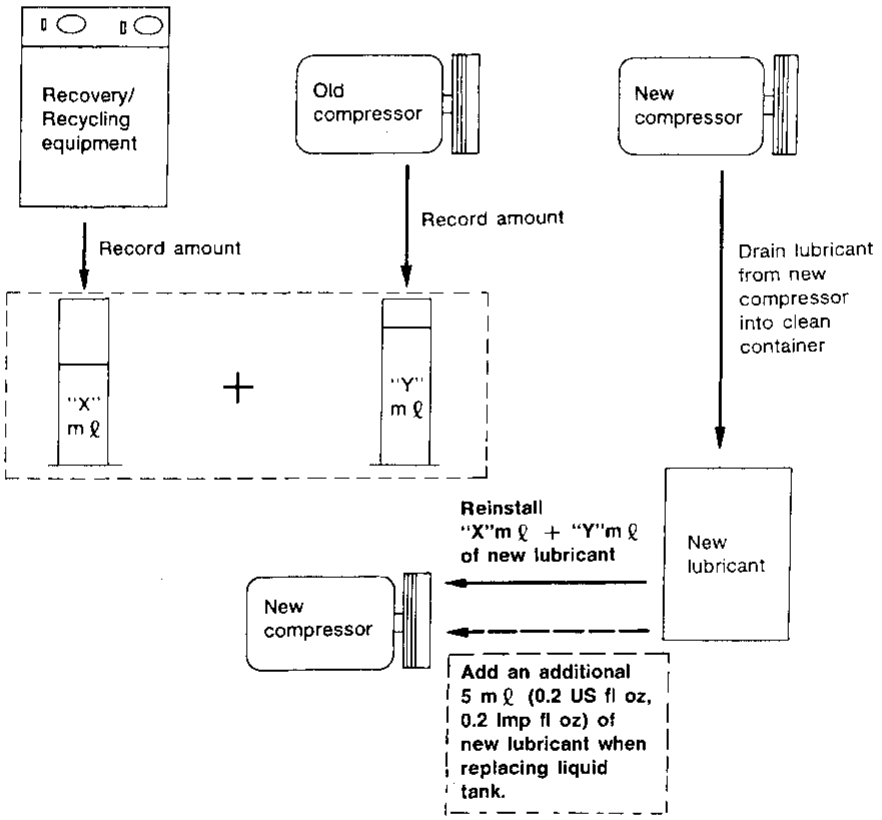
*1: If compressor is replaced, addition of lubricant is included in the flow chart.
*2: If refrigerant leak is small, no addition of lubricant is needed.

Maintenance of Lubricant Quantity in Compressor (Cont'd)

Ⓐ

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

Lubricant adjusting procedure for compressor replacement



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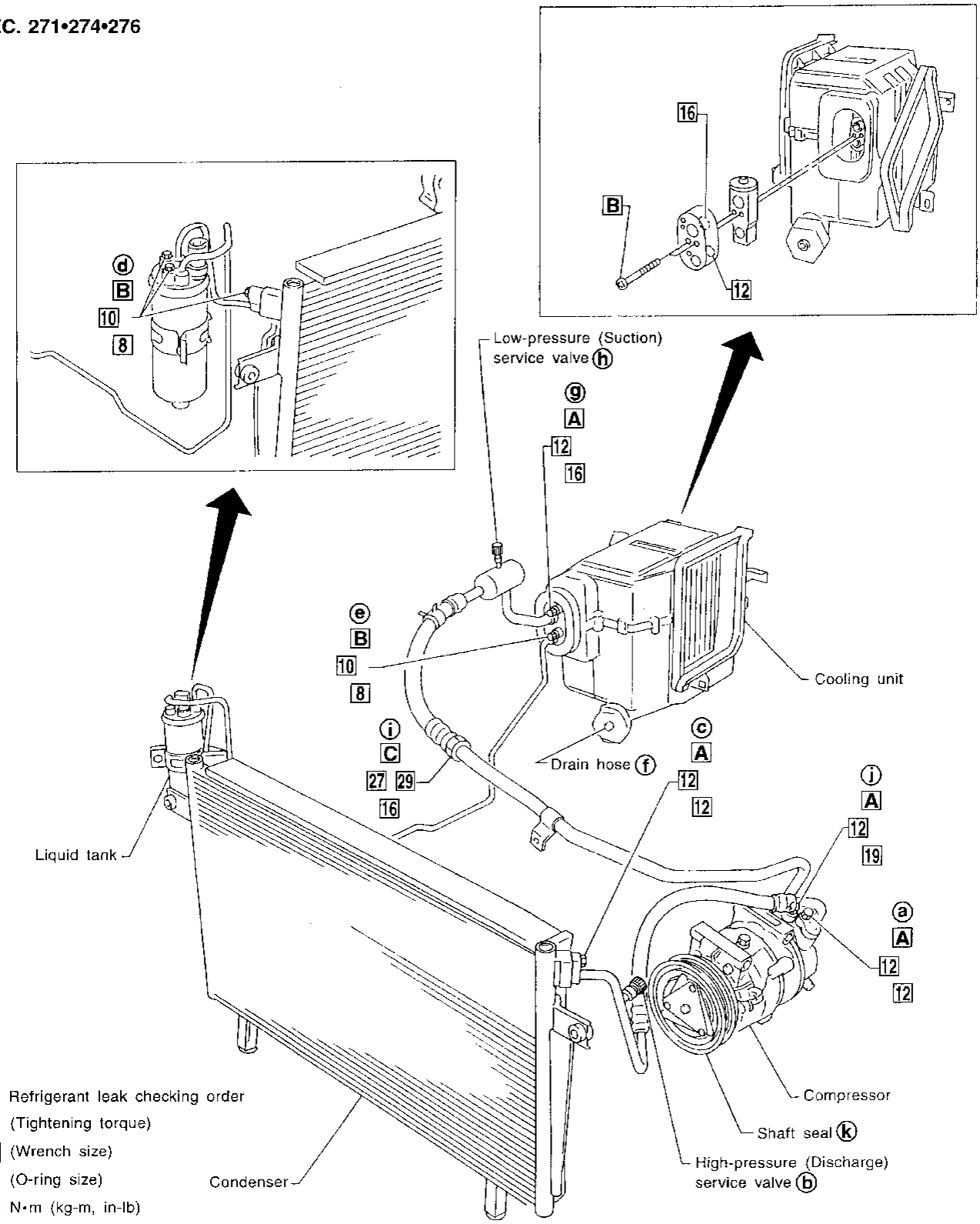
Refrigerant Lines

- Refer to page HA-3 regarding "Precautions for Refrigerant Connection".

SEC. 271•274•276



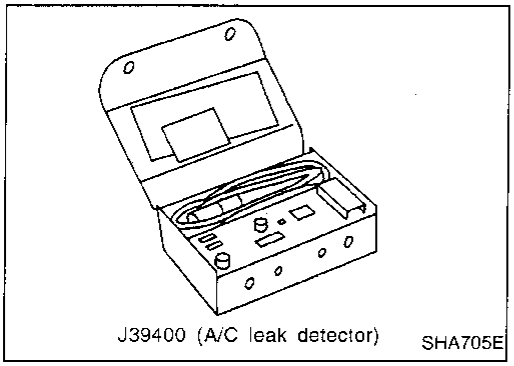
○ : Refrigerant leak checking order
□ (Tightening torque)
□□ (Wrench size)
□ (O-ring size)
: N•m (kg-m, in-lb)
A : 8 - 20 (0.8 - 2.0, 69 - 174)
B : 3 - 5 (0.3 - 0.5, 26 - 43)
: N•m (kg-m, ft-lb)
C : 20 - 29 (2 - 3, 14 - 22)

RHA028GA

Checking Refrigerant Leaks

PRELIMINARY CHECK

Perform a visual inspection of all refrigeration parts, fittings, hoses, and components for signs of A/C lubricant leakage, damage and corrosion.

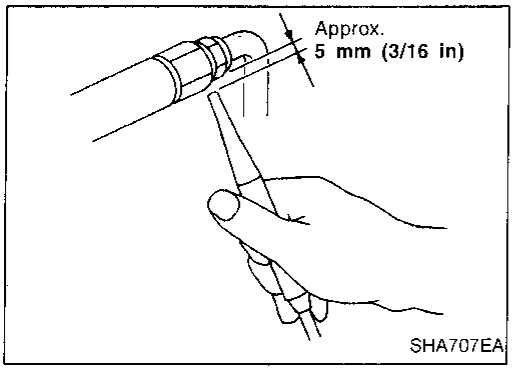

J39400 (A/C leak detector) SHA705E

PRECAUTIONS FOR HANDLING LEAK DETECTOR

When performing a refrigerant leak check, use a J39400 A/C leak detector or equivalent. Ensure that the instrument is calibrated and set properly per the operating instructions.

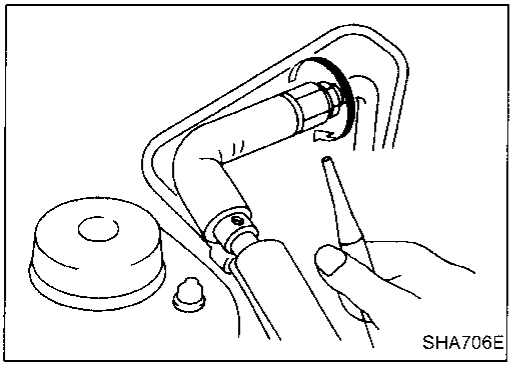
The leak detector is a delicate device. In order to use the leak detector properly, read the operating instructions and perform any specified maintenance.

Other gases in the work area or substances on the A/C components, for example, anti-freeze, windshield washer fluid, solvents and cleaners, may falsely trigger the leak detector. Make sure the surfaces to be checked are clean. Do not allow the sensor tip of the detector to come into contact with any substance. This can also cause false readings and may damage the detector.



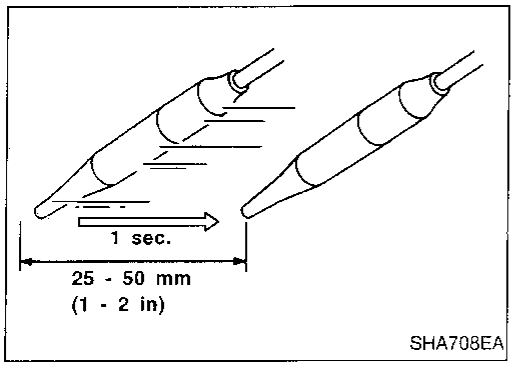
SHA707EA

1. Position probe approximately 5 mm (3/16 in) away from point to be checked.


SHA706E

2. When testing, circle each fitting completely with probe.

Checking Refrigerant Leaks (Cont'd)



3. Move probe along component approximately 25 to 50 mm (1 to 2 in)/sec.

CHECKING PROCEDURE

To prevent inaccurate or false readings, make sure there is no refrigerant vapor or tobacco smoke in the vicinity of the vehicle. Perform the leak test in calm area (low air/wind movement) so that the leaking refrigerant is not dispersed.

1. Turn engine off.
2. Connect a suitable A/C manifold gauge set to the A/C service ports.
3. Check if the A/C refrigerant pressure is at least 345 kPa (3.52 kg/cm^2, 50 psi) above 16°C (61°F). If less than specification, evacuate and recharge the system with the specified amount of refrigerant.
   NOTE: At temperatures below 16°C (61°F), leaks may not be detected since the system may not reach 345 kPa (3.52 kg/cm^2, 50 psi).
4. Conduct the leak test from the high side to the low side at points ⓐ through ⓚ. Refer to HA-94.
   Perform a leak check for the following areas carefully. Clean the component to be checked and move the leak detector probe completely around the connection/component.

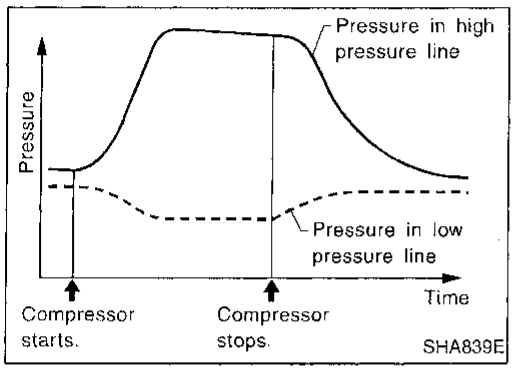
- **Compressor**
  Check the fitting of high and low pressure hoses, relief valve and shaft seal.
- **Liquid tank**
  Check the pressure switch, tube fitting, weld seams and the fusible plug mounts.
- **Service valves**
  Check all around the service valves. Ensure service valve caps are secured on the service valves (to prevent leaks).
  NOTE: After removing A/C manifold gauge set from service valves, wipe any residue from valves to prevent any false readings by leak detector.
- **Cooling unit (Evaporator)**
  Turn blower fan on "High" for at least 15 seconds to dissipate any refrigerant trace in the cooling unit. Insert the leak detector probe into the drain hose immediately after stopping the engine. (Keep the probe inserted for at least ten seconds.)

5. If a leak detector detects a leak, verify at least once by blowing compressed air into area of suspected leak, then repeat check.
6. Do not stop when one leak is found. Continue to check for additional leaks at all system components.
7. Start engine.
8. Set the heater A/C control as follows:
   a. A/C switch ON
   b. Face mode
   c. Recirculation switch ON

Checking Refrigerant Leaks (Cont'd)

d. Max cold temperature
e. Fan speed high

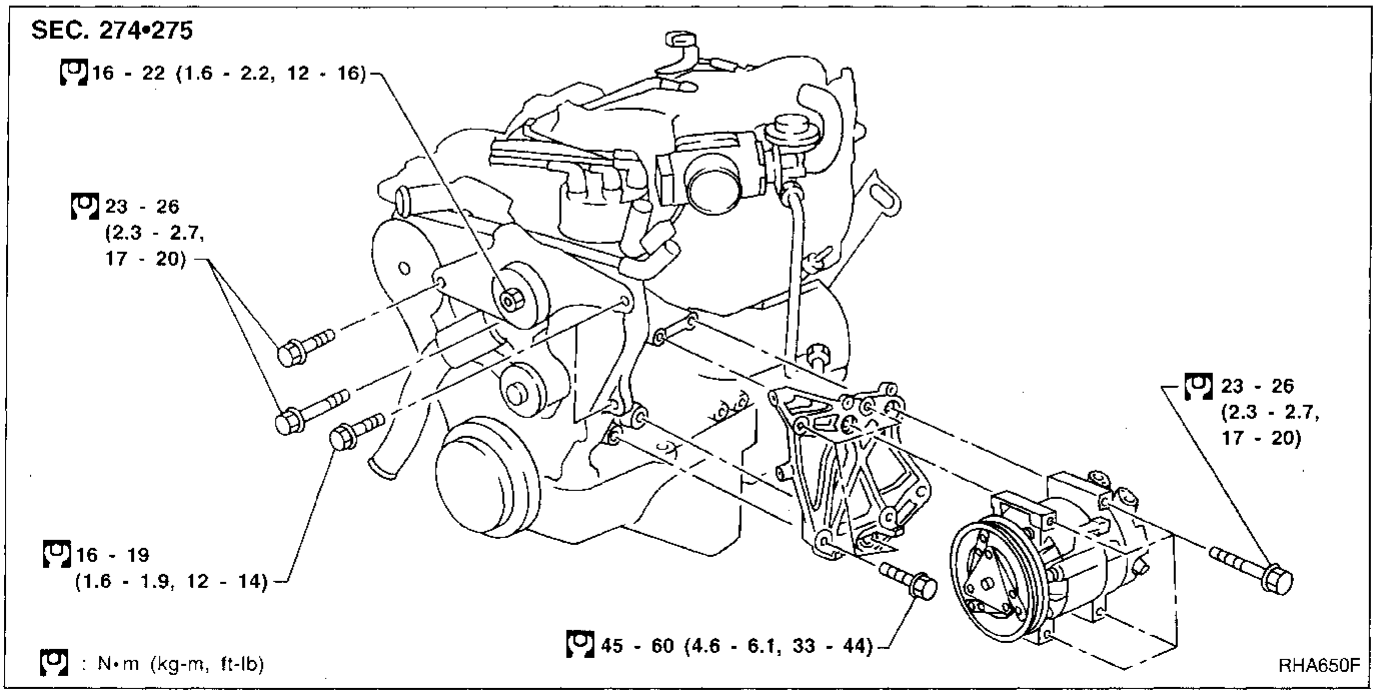
9. Run engine at 1,500 rpm for at least 2 minutes.
10. Turn engine off and perform leak check again following steps 4 through 6 above.



Refrigerant leaks should be checked immediately after stopping the engine. Begin with the leak detector on the high pressure line. The pressure in the high pressure line will gradually drop after refrigerant circulation stops and pressure in the low pressure line will gradually rise, as shown in the graph. Leaks are more easily detected when pressure is high.

11. Discharge A/C system using approved refrigerant recovery equipment. Repair the leaking fitting or component as necessary.
12. Evacuate and recharge A/C system and perform the leak test to confirm no refrigerant leaks.
13. Conduct A/C performance test to ensure system works properly.

Compressor Mounting



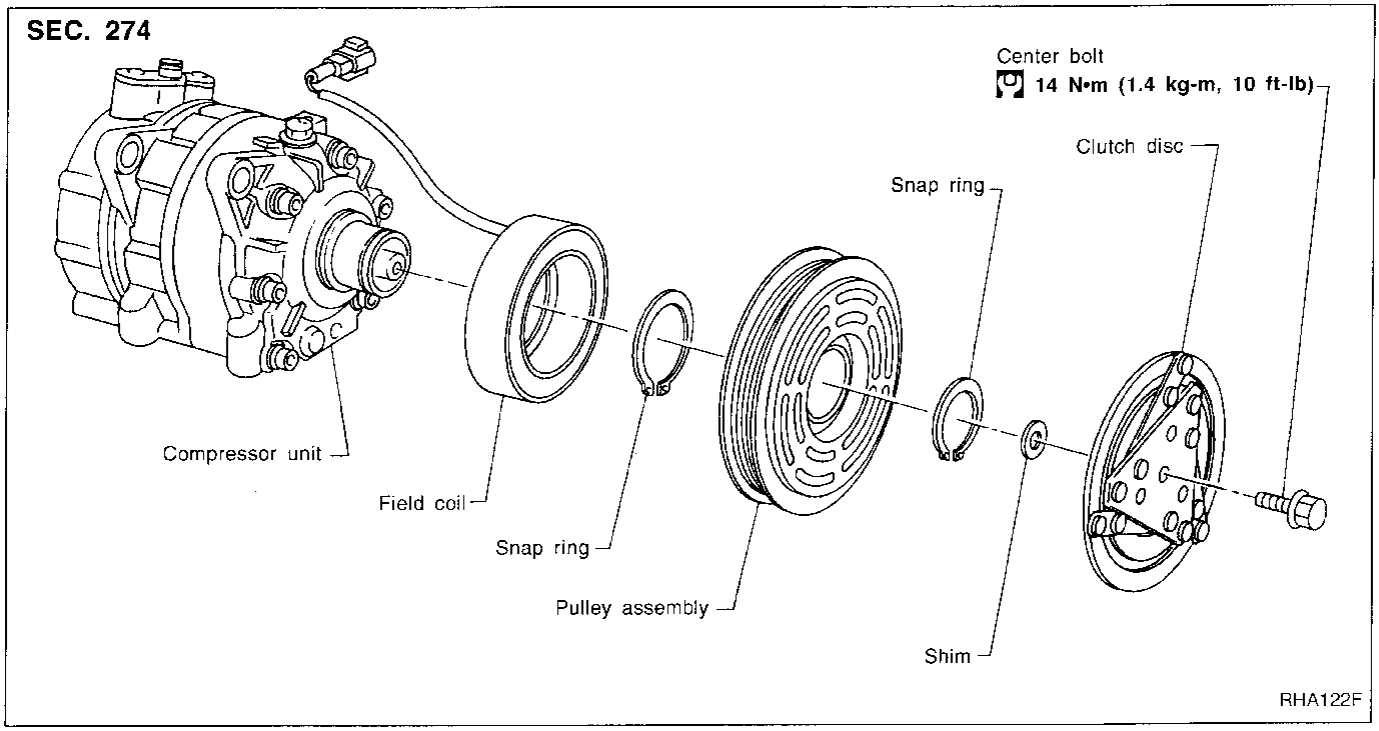
Belt Tension

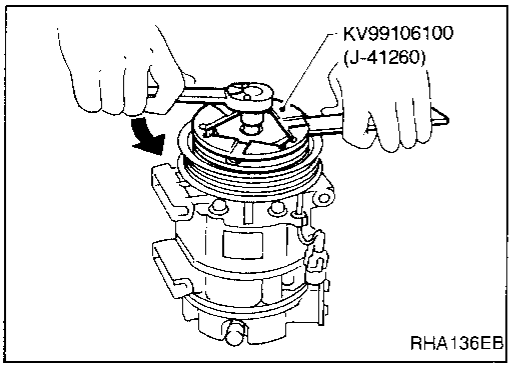
- **Refer to MA section.**

Fast Idle Control Device (FICD)

- **Refer to EC section and HA-16.**

Compressor



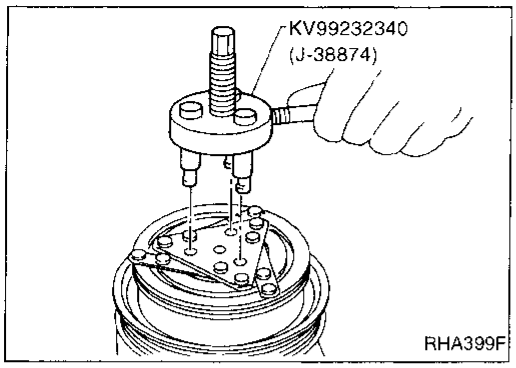


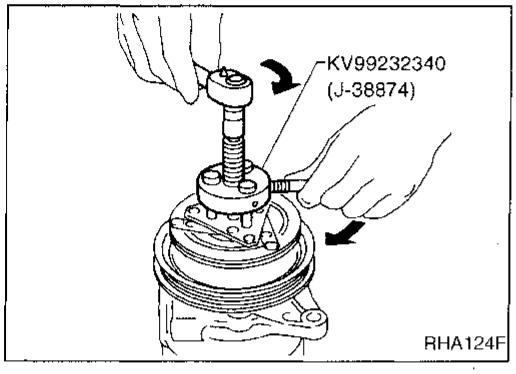
Compressor Clutch

REMOVAL

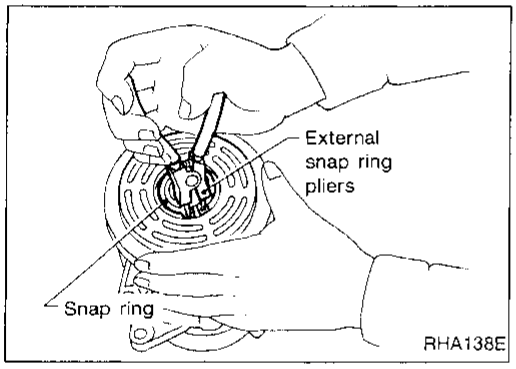
- When removing center bolt, hold clutch disc with clutch disc wrench.

Compressor Clutch (Cont'd)

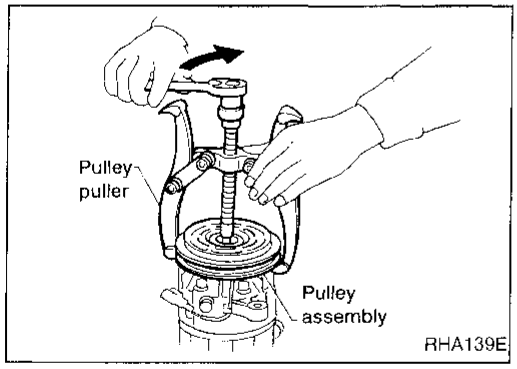




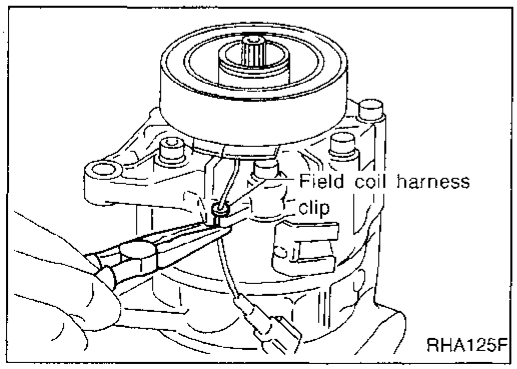
- Remove the clutch disc using the clutch disc puller.
  Insert the holder's three pins into the holes in the clutch disc. Rotate the holder clockwise to hook it onto the plate. Then, tighten the center bolt to remove the clutch disc.
  After removing the clutch disc, remove the shims from either the drive shaft or the clutch disc.



- Remove the snap ring using external snap ring pliers.

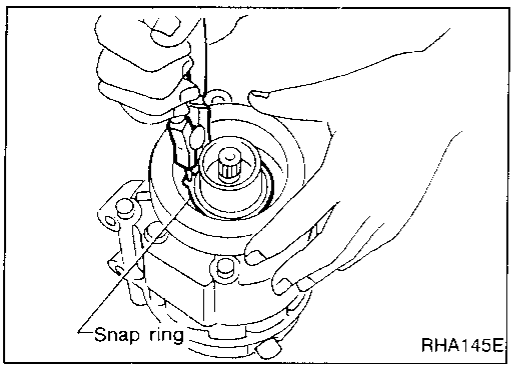


- Pulley removal
  Position the center pulley puller on the end of the drive shaft, and remove the pulley assembly using any commercially available pulley puller.
  To prevent the pulley groove from being deformed, the puller claws should be positioned onto the edge of the pulley assembly.

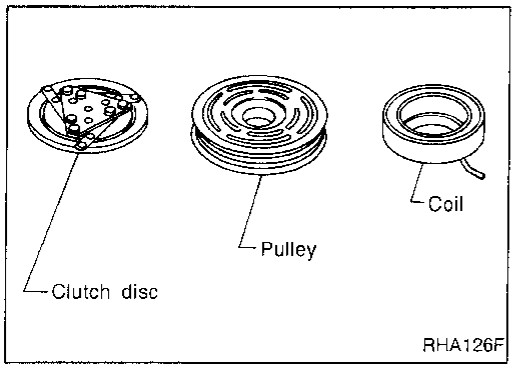


- Remove the field coil harness clip using a pair of pliers.

Compressor Clutch (Cont'd)



- Remove the snap ring using external snap ring pliers.



INSPECTION

Clutch disc

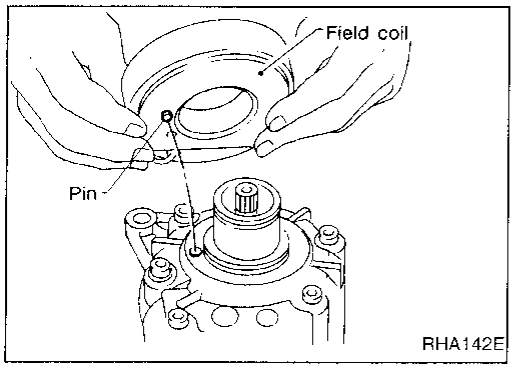
If the contact surface shows signs of damage due to excessive heat, replace clutch disc and pulley.

Pulley

Check the appearance of the pulley assembly. If the contact surface of pulley shows signs of excessive grooving, replace clutch disc and pulley. 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.

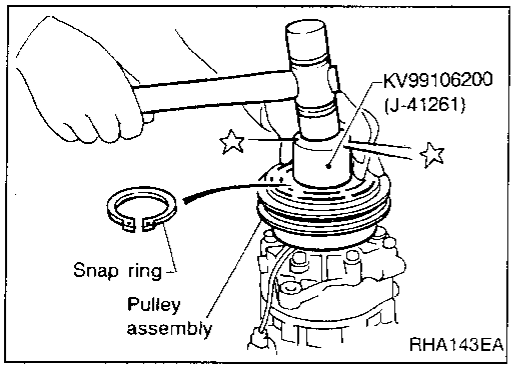


INSTALLATION

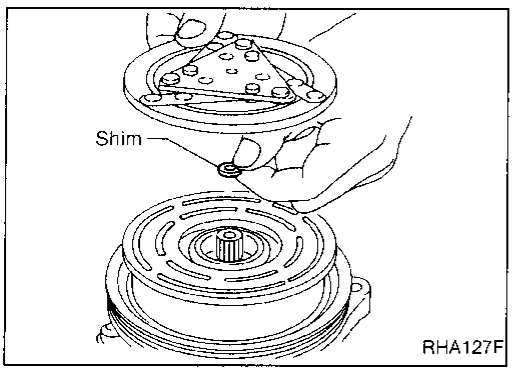
- Install the field coil.

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.

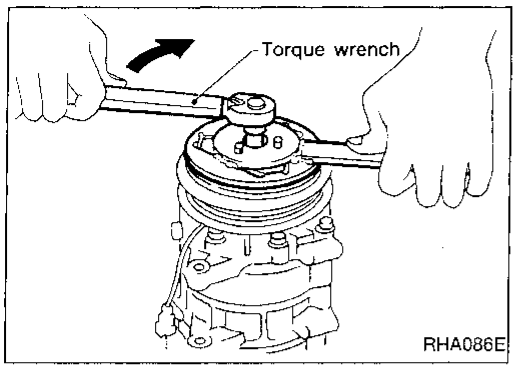


- Install the pulley assembly using the installer and a hand press, and then install the snap ring using snap ring pliers.



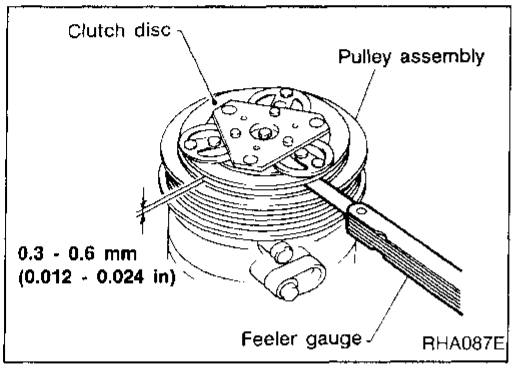
- Install the clutch disc on the drive shaft, together with the original shim(s). Press the clutch disc down by hand.

Compressor Clutch (Cont'd)



- 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, always carry out the break-in operation. This is done by engaging and disengaging the clutch about thirty times. Break-in operation raises the level of transmitted torque.

General Specifications

COMPRESSOR

Model	CALSONIC make V-6
Type	V-6 variable displacement
Displacement cm^3 (cu in)/rev.	
Max.	184 (11.228)
Min.	10.5 (0.641)
Cylinder bore x stroke mm (in)	37 (1.46) x [2.3 - 28.6 (0.091 - 1.126)]
Direction of rotation	Clockwise (viewed from drive end)
Drive belt	Poly V

LUBRICANT

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	200 (6.8, 7.0)
Compressor (Service part) charging amount	200 (6.8, 7.0)

REFRIGERANT

Type	HFC-134a (R-134a)
Capacity kg (lb)	0.60 - 0.70 (1.32 - 1.54)

Inspection and Adjustment

ENGINE IDLING SPEED (When A/C is ON)

- Refer to EC section.

BELT TENSION

- Refer to Checking Drive Belts (MA section).