

# HEATER AND AIR CONDITIONING

## SECTION HA

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**When you read wiring diagrams:**

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

**When you perform trouble diagnoses, read GI section, "HOW TO FOLLOW FLOW CHART IN TROUBLE DIAGNOSES".**

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# PRECAUTIONS AND PREPARATION

## Precautions for Supplemental Restraint System Supplemental "AIR BAG"

The Supplemental Restraint System Supplemental "Air Bag", used along with seat belts, helps to reduce the risk or severity of injury to the driver in a frontal collision. The Supplemental Restraint System consists of a supplemental air bag module (located in the center of the steering wheel), sensors, a diagnosis (control) unit, warning lamp, wiring harness and spiral cable. Information necessary to service the system safely is included in the **BF section** of this Service Manual.

### WARNING:

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

## Introduction

To prevent the ozone layer from being destroyed, the R-134a refrigerant has replaced the previously used CFC-12 (R-12).

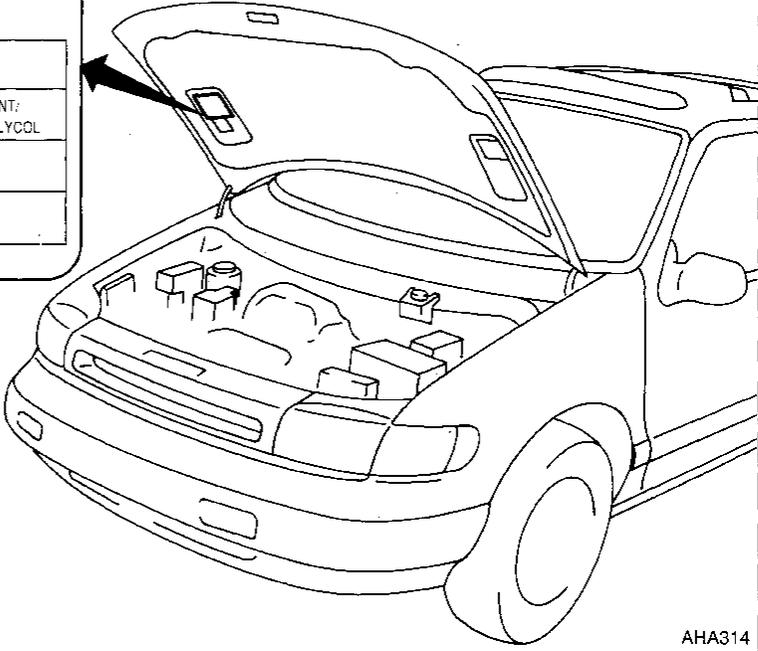
The new and previous service tools, refrigerant, lubricant, etc. are not interchangeable due to differences in their physical properties and characteristics.

Always service the R-134a air conditioning system using the specified tools, lubricant and refrigerant, observing the following precautions:

## Identification

### IDENTIFICATION LABEL FOR VEHICLE

<b>CAUTION</b> (IF A/C EQUIPPED)	<b>MISE EN GARDE</b> (VÉHICULES CLIMATISÉS)
<ul style="list-style-type: none"> <li>• REFRIGERANT UNDER HIGH PRESSURE. AIR CONDITIONING SYSTEM TO BE SERVICED BY QUALIFIED PERSONNEL. IMPROPER SERVICE METHODS MAY CAUSE PERSONAL INJURY. CONSULT SERVICE MANUAL.</li> <li>• LE FRIGORIGÈNE EST SOUS FORTE PRESSION. NE CONFIEZ L'ENTRETIEN ET LA RÉPARATION DU CLIMATISEUR QU'À UN PERSONNEL QUALIFIÉ. L'EMPLOI DE MAUVAISES MÉTHODES PEUT CAUSER DES BLESSURES. CONSULTER LE MANUEL DE RÉPARATION.</li> </ul>	
DISTR.: NISSAN CARSON, CA	
	REFRIG. FRIGORIG.
	LUBRICANT/LUBRIFIANT
TYPE:	R-134a
AMOUNT: W/ FR A/C QTE. CLIM. AV.:	2.0 LB
W/ FR & RR A/C CLIM. AV. ET AR:	3.25 LB
	POLYALKYLENE GLYCOL LUBRICANT; LUBRIFIANT AU POLYALKYLENE GLYCOL
	207 CC
	296 CC
	SAE J639



## PRECAUTIONS AND PREPARATION

### Precautions for Working with R-134a

#### WARNING:

- CFC-12 (R-12) refrigerant and 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.
- Use only specified lubricant for the R-134a A/C system and R-134a components. If lubricant other than that specified is used, compressor failure is likely.
- The specified 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 seal (cap) 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. Also, complete the connection of all refrigerant loop components as quickly as possible to minimize the entry of moisture into the system.
  - c: Only use the specified lubricant from a sealed container. Immediately reseal containers dispensing the lubricant. Lubricant in containers which are not properly sealed will become moisture saturated and will not be suitable for use.
  - d: Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. To remove R-134a from the A/C system, use service equipment certified to meet the requirements of SAE J2210 (R-134a recycling equipment) or J2209 (R-134a recovery equipment). If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.
  - e: Do not allow lubricant to contact styrofoam parts. Damage may result.

### Precautions for Working with Refrigerants

#### 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 AND PREPARATION

## Precautions for Refrigerant Connections

### 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:

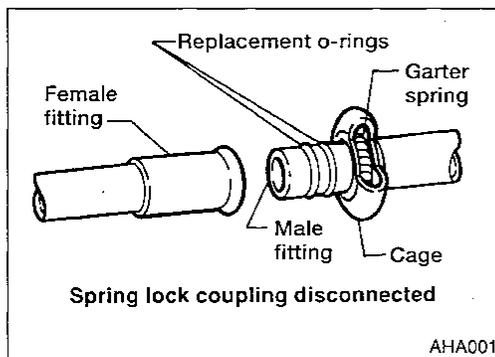
When replacing or cleaning refrigerant cycle components, observe the following.

- Do not leave compressor on its side or upside down for more than 10 minutes. Compressor lubricant will enter 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 conditioning in the vehicle, connect the pipes as the final stage of the operation. The seal caps of the pipes and other components must not be removed until their removal is required for connection.
- Before installing any air conditioning component that has been stored in a cool location to a vehicle that has been exposed to the hot sun, leave the component for some time in a hot location with its seal cap installed. This step is necessary to prevent condensation of moisture inside the cold component.
- Thoroughly remove moisture from the refrigeration system before charging the refrigerant.

### SPRING LOCK COUPLINGS

The spring lock coupling is a refrigerant line coupling held together by a garter spring inside a circular cage. When the coupling is connected, the flared end of the female fitting slips behind the garter spring inside the cage of the male fitting. The garter spring and cage prevent the flared end of the female fitting from pulling out of the cage.

Two green O-rings are used to seal between the two halves of the coupling. **These O-rings are made of special material and must be replaced with an O-ring made of the same material.** The O-rings normally used in refrigerant system connections are not the same material and should not be used with the spring lock coupling. **Use only the specified O-rings for the spring lock coupling. For Removal and Installation, refer to HA-92.**



# PRECAUTIONS AND PREPARATION

## Precautions for Servicing Compressor

- Attach a blind plug to the suction port (low pressure) and discharge port (high pressure) of the compressor to prevent lubricant from leaking and dust from getting inside. CI
- Do not keep the compressor in the upside down position or lay on its side for more than 10 minutes.
- When replacing or repairing the compressor, remove lubricant from the compressor and check the lubricant quantity extracted. MA
- When replacing with a new compressor, remove lubricant from the new compressor so that the quantity of lubricant remaining in the new compressor is equal to the quantity collected from the removed compressor. Refer to "Compressor Lubricant Quantity", "SERVICE PROCEDURES" (HA-76). EM
- When replacing the compressor and refrigerant has become contaminated, also replace accumulator. If equipped with rear A/C, also replace the filter in the rear evaporator inlet tube. LC
- Do not allow dirt and oil to attach on the friction surfaces between clutch and pulley. If the surface is contaminated with oil, wipe it off with a clean waste cloth moistened with mineral spirits. EF & EC
- After replacing the compressor, turn the compressor shaft by hand more than five turns in both directions to equalize lubricant distribution inside the compressor. After the compressor is installed, let the engine idle and operate the compressor for one hour. FE
- If the compressor magnet clutch has been replaced, check the magnet clutch for normal operation by applying voltage to the clutch. AT

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# PRECAUTIONS AND PREPARATION

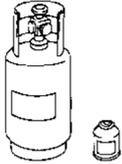
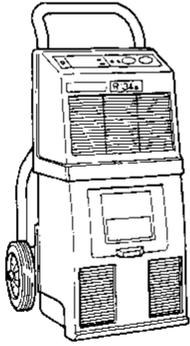
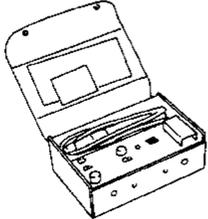
## R-134a Service Tools and Equipment

R-134a refrigerant and the specified lubricant which must be used with R-134a, must never be mixed with CFC-12 (R-12) refrigerant and/or the CFC-12 (R-12) lubricant.

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

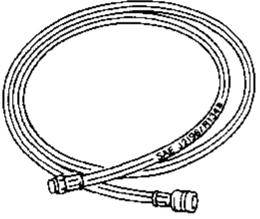
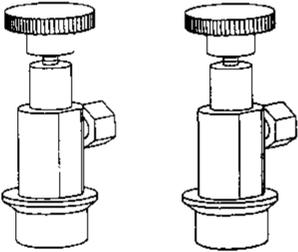
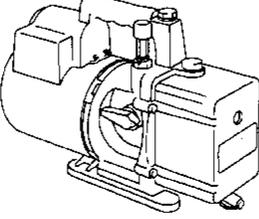
To prevent the mixing of refrigerants/lubricants, refrigerant container fittings, service hose fittings, and service equipment fittings (equipment which handles refrigerant and/or lubricant) are different for CFC-12 (R-12) and R-134a.

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
R-134a refrigerant		Container color: Light blue Container marking: R-134a Fitting size: Thread size • large container 1/2"-16 ACME
KLH00-PAGQU ( — ) Nissan A/C System Lubricant PAG Type F		Type: Polyalkylene glycol (PAG), type F Application: R-134a swash plate (pis- ton) compressor FS-10 Lubricity: 40 ml (1.4 US fl oz, 1.4 Imp fl oz)
(J-39500-NI) Recovery/Recycling equipment (ACR4)		Function: Refrigerant Recovery and Recycling and Recharging
(J-39400) Electronic leak detector		Power supply: • DC 12 V (Cigarette lighter)

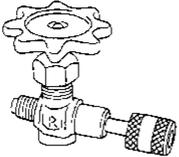
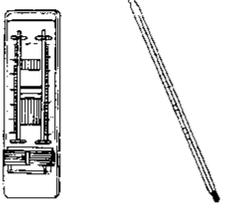
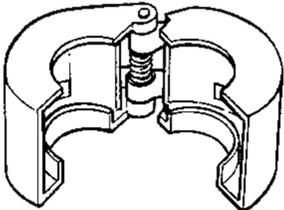
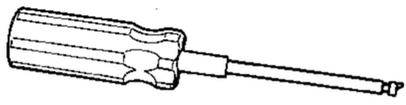
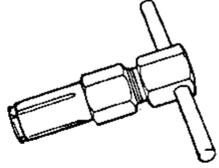
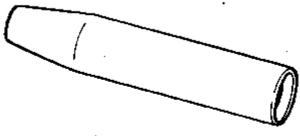
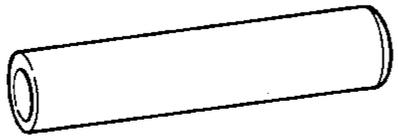
# PRECAUTIONS AND PREPARATION

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

Tool number (Kent-Moore No.) Tool name	Description	Note	
(J-39183) Manifold gauge set (with hoses and couplers)	 <p style="text-align: right;">RHA262D</p>	<b>Identification:</b> <ul style="list-style-type: none"> <li>● The gauge face indicates R-134a.</li> <li>Fitting size: Thread size</li> <li>● 1/2"-16 ACME</li> </ul>	GI MA EM LC EF & EC
<b>Service hoses</b> <ul style="list-style-type: none"> <li>● High side hose (J-39501-72)</li> <li>● Low side hose (J-39502-72)</li> <li>● Utility hose (J-39476-72)</li> </ul>	 <p style="text-align: right;">RHA263D</p>	<b>Hose color:</b> <ul style="list-style-type: none"> <li>● Low hose: Blue with black stripe</li> <li>● High hose: Red with black stripe</li> <li>● Utility hose: Yellow with black stripe or green with black stripe</li> </ul> <b>Hose fitting to gauge:</b> <ul style="list-style-type: none"> <li>● 1/2"-16 ACME</li> </ul>	FE AT FA
<b>Service couplers</b> <ul style="list-style-type: none"> <li>● High side coupler (J-39500-20)</li> <li>● Low side coupler (J-39500-24)</li> </ul>	 <p style="text-align: right;">RHA264D</p>	<b>Hose fitting to service hose:</b> <ul style="list-style-type: none"> <li>● Permanently attached</li> </ul>	RA BR ST BF
(J-39650) Refrigerant weight scale	 <p style="text-align: right;">RHA265D</p>	<b>For measuring of refrigerant</b> <b>Fitting size: Thread size</b> <ul style="list-style-type: none"> <li>● 1/2"-16 ACME</li> </ul>	HA EL
(J-39649) Vacuum pump (Including the isolator valve)	 <p style="text-align: right;">RHA266D</p>	<b>Capacity:</b> <ul style="list-style-type: none"> <li>● Air displacement: 4 CFM</li> <li>● Micron rating: 20 microns</li> <li>● Oil capacity: 482 g (17 oz)</li> </ul> <b>Fitting size: Thread size</b> <ul style="list-style-type: none"> <li>● 1/2"-16 ACME</li> </ul>	IDX

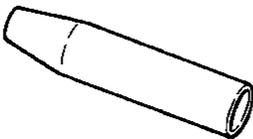
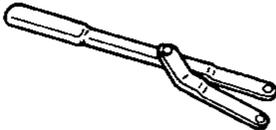
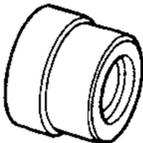
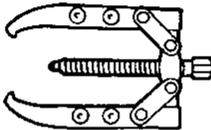
# PRECAUTIONS AND PREPARATION

## Commercial Service Tools

Tool name	Description	Note
Additional valve	 <p style="text-align: right;">SHA898C</p>	For discharging, evacuating and charging refrigerant
Thermometer and hygrometer	 <p style="text-align: right;">Etched-stem type thermometer</p> <p style="text-align: right;">SHA900C</p>	For checking temperature and humidity
Spring lock coupling remover	 <p style="text-align: right;">AHA283</p>	For disconnecting spring lock coupling <ul style="list-style-type: none"> <li>● 3/8"</li> <li>● 1/2"</li> <li>● 3/4"</li> </ul>
Snap ring remover	 <p style="text-align: right;">AHA284</p>	For removing snap ring from compressor
Shaft seal remover	 <p style="text-align: right;">AHA285</p>	For removing shaft seal from compressor
Shaft seal protector	 <p style="text-align: right;">AHA286</p>	For protecting compressor shaft seal during shaft seal installation
Shaft seal installer	 <p style="text-align: right;">AHA287</p>	For installing compressor shaft seal

# PRECAUTIONS AND PREPARATION

## Commercial Service Tools (Cont'd)

Tool name	Description	Note
Coil remover	 <p style="text-align: right;">AHA288</p>	For removing compressor magnet clutch coil
Spanner wrench	 <p style="text-align: right;">AHA289</p>	For removing compressor clutch hub retaining bolt
Coil pressing tool	 <p style="text-align: right;">AHA290</p>	For installing compressor magnet clutch coil
Puller	 <p style="text-align: right;">AHA291</p>	For removing and installing compressor magnet clutch coil

For details of handling methods, refer to the Instruction Manual attached to each of the service tools.

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# PRECAUTIONS AND PREPARATION

## Precautions for Service Equipment

### RECOVERY/RECYCLING EQUIPMENT

Follow the manufacturer's instructions for machine operation and machine maintenance. Do not use any refrigerant other than the specified refrigerant in the machine.

### ELECTRONIC LEAK DETECTOR

Follow the manufacturer's instructions for leak detector operation and maintenance.

### VACUUM PUMP

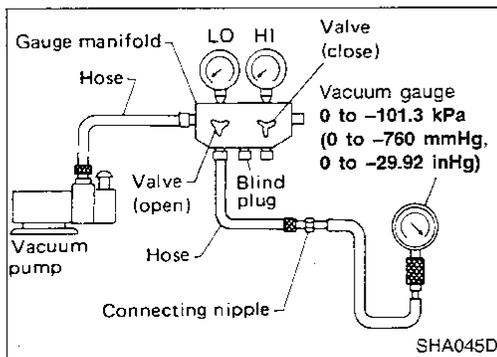
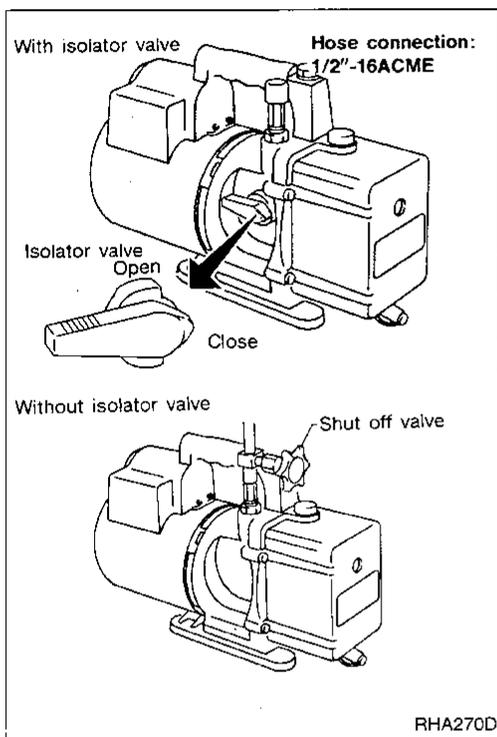
The vacuum pump lubricating oil is not compatible with the lubricant for R-134a A/C systems. The vent side of the vacuum pump is exposed to atmospheric pressure. If the pump is switched off after evacuation and the service hose is not isolated from the vacuum pump, the pump lubricating oil can migrate into the service hose.

To prevent the migration of vacuum pump lubricating oil into service hoses, use a valve which can be manually opened or closed, near the connection of the service hose to the pump.

- Some vacuum pumps have an isolator valve which isolates the service hose from the pump.
- For pumps without an isolator valve, make sure that the service hose has a manual shut off valve near the pump end of the hose.
- Hoses which contain an automatic shut off valve at the end of the service hose must be disconnected from the vacuum pump to prevent the migration of lubricating oil. As long as the hose is connected, the valve is open and lubricating oil may migrate.

One-way valves which open when vacuum is applied and close under a no vacuum condition, are not recommended. This type of valve can restrict the ability of the pump to pull a deep vacuum.

**The vacuum pump capacity should be more than  $-100.0$  kPa ( $-750$  mmHg,  $-29.53$  inHg).**

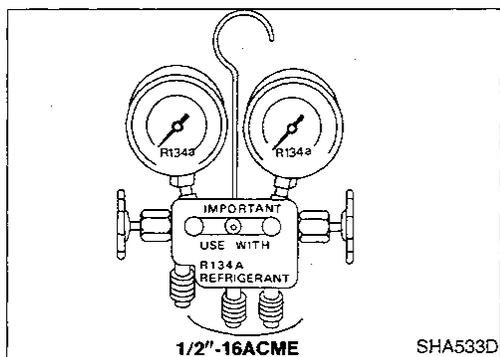


### Vacuum pump performance check

1. Connect the vacuum gauge to the system.
2. Run the vacuum pump, and check to see that the needles on the gauge manifold and vacuum gauge move smoothly, indicating a similar value.
3. After running the vacuum pump for two or three minutes, read the vacuum gauge. The measured value indicates the capacity of the vacuum pump.

## PRECAUTIONS AND PREPARATION

### Precautions for Service Equipment (Cont'd) MANIFOLD GAUGE SET



Make sure the gauge face indicates R-134a or 134a. Be certain that the manifold gauge set has the 1/2"-16 ACME threaded connections for service hoses and that no refrigerants other than R-134a (with specified lubricants) have been used with the manifold gauge set.

The high pressure gauge measures from -101.3 kPa (-760 mmHg, -29.92 inHg) to 2,942 kPa (30 kg/cm<sup>2</sup>, 427 psi), and the low pressure gauge measures generally from -101.3 kPa (-760 mmHg, -29.92 inHg) to 1,471 kPa (15 kg/cm<sup>2</sup>, 213 psi).

#### CAUTION:

- When installing the gauge to the refrigeration system, do not mistake high pressure and low pressure line connections. (Wrong connections will damage gauge.)
- Before evacuating, confirm that the gauge has a negative pressure scale. (If not, the gauge will be damaged.)

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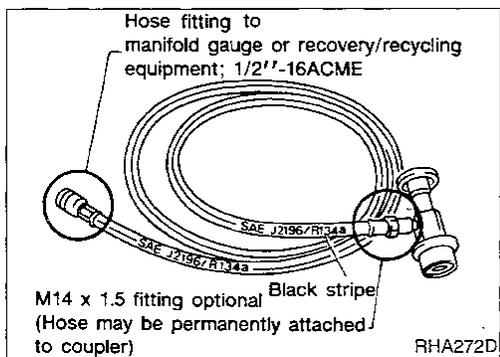
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### SERVICE HOSES

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.

### CHARGING HOSE

1. Completely tighten the high pressure valve, low pressure valve and vacuum pump valve cocks of the gauge manifold.
2. Connect the charging hoses to the high and low pressure lines.
3. Connect the charging hose, fitted with a valve core, to the refrigerant canister.
4. Connect the charging hose to the vacuum pump.

The high and low pressure hoses are color coded to prevent wrong connection.

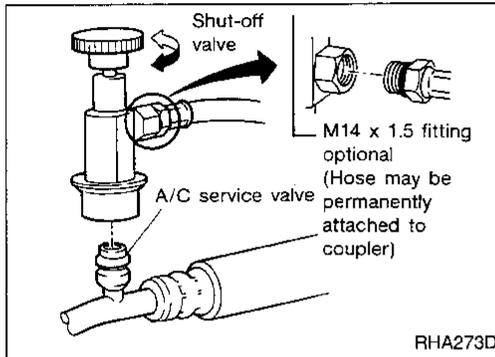
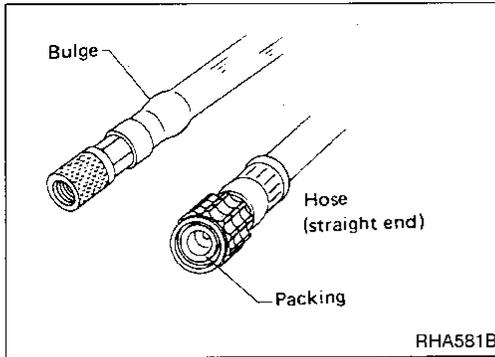
High pressure line hose	Red with black stripe
Low pressure line hose	Blue with black stripe
Refrigerant canister hose	Yellow or green (with valve core)
Vacuum pump hose	Yellow or green

## PRECAUTIONS AND PREPARATION

### Precautions for Service Equipment (Cont'd)

#### CAUTION:

- Check each hose for cracks. If found, discard the hose.
- Do not use any hose if bulges are found.
- Check the rubber packing. If any deterioration or cracks are found, replace the packing.

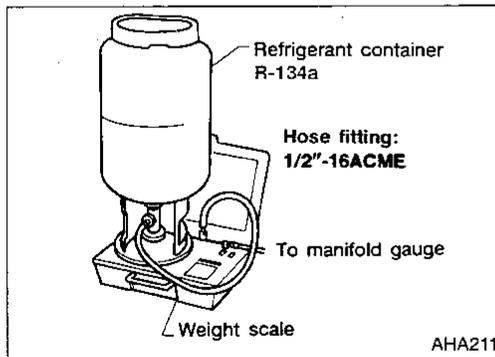


### SERVICE COUPLERS

Never attempt to connect R-134a service couplers to an CFC-12 (R-12) A/C system. Although the R-134a couplers will not connect to the CFC-12 (R-12) system, CFC-12 (R-12) refrigerant and lubricant will be discharged into the R-134a coupler, causing contamination.

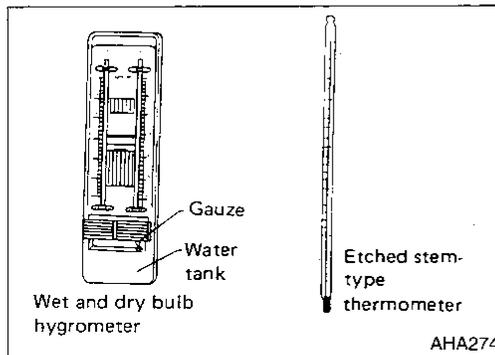
Shut off valve rotation	A/C service valve
Clockwise	Open
Counterclockwise	Close

When the handle is turned clockwise, the coupler pin will push open the on-vehicle service valve pin. The on-vehicle service valve pin will open the refrigerant passage. Turning the handle counterclockwise will close the passage. Before removing the service coupler from the on-vehicle service valve, turn the handle fully counterclockwise to close the refrigerant passage.



### REFRIGERANT WEIGHT SCALE

If the scale allows electronic control of the flow of refrigerant through the scale, be certain that the hose fitting size is 1/2"-16 ACME, and that no refrigerant other than R-134a (and the specified lubricant) have been used with the scale.



### THERMOMETER AND HYGROMETER

An etched stem-type thermometer and a hygrometer can be used to check the air conditioning system performance. A hygrometer is used because the air conditioning performance depends on the humidity.

## PRECAUTIONS AND PREPARATION

---

### Precautions for Service Equipment (Cont'd)

#### CHARGING CYLINDER

Using a charging cylinder is not recommended because refrigerant can be vented into the air from the top valve on the cylinder 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.

GI

MA

EM

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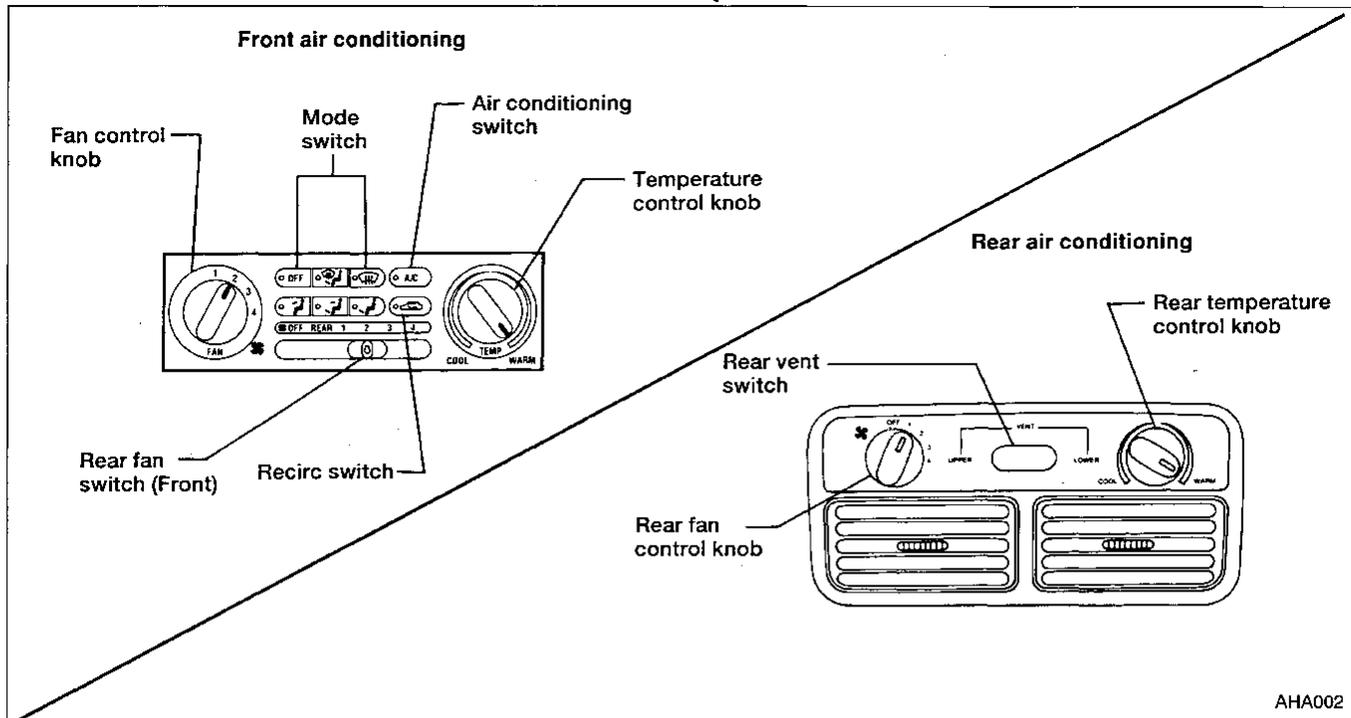
BF

**HA**

EL

IDX

## Control Operation



### FAN CONTROL KNOB

This knob controls front fan speed. The front blower motor will operate in any mode except "OFF".

### REAR FAN SWITCH

When in the "OFF" position, the rear blower motor cannot operate.

When in the "REAR" position, this switch allows the rear fan control knob to control the rear fan speed. In any other position (1-4), this switch controls the rear fan speed, regardless of the rear fan control knob position.

### MODE SWITCHES

These switches control air flow through the front discharge outlets.

### REAR VENT SWITCH

This switch controls air flow through the rear upper or lower discharge outlets.

### TEMPERATURE CONTROL KNOB

This knob allows adjustment of the temperature of the air through the front discharge outlets.

### REAR TEMPERATURE CONTROL KNOB

This knob allows adjustment of the temperature of the air through the rear discharge outlets independent of the position of the (front) temperature control knob.

### RECIRC SWITCH

OFF position: Outside air is drawn into the passenger compartment.

ON position: Interior air is recirculated inside the vehicle.

"RECIRC" is canceled when "DEF" or "F/D" is selected.

### AIR CONDITIONING SWITCH

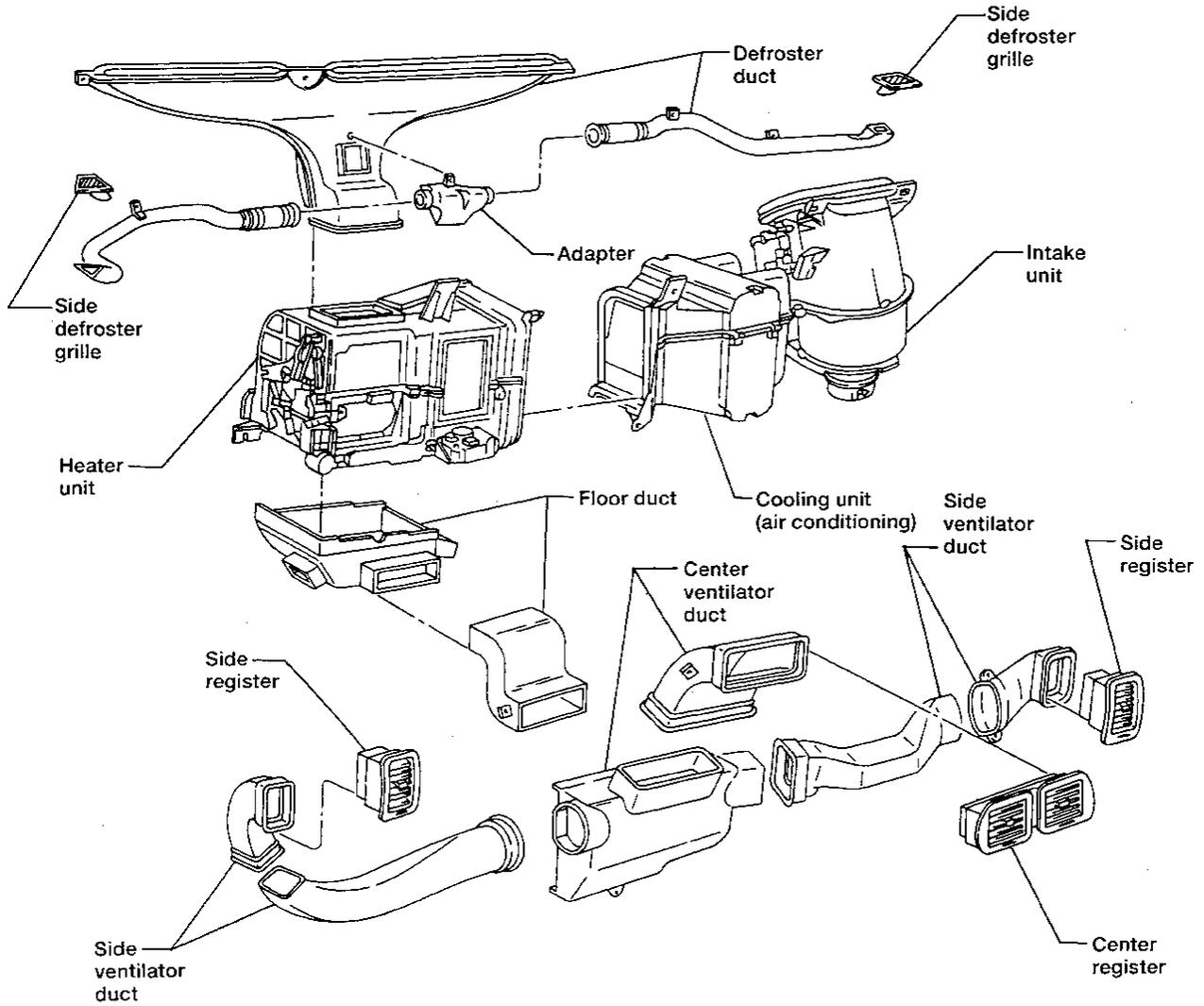
This switch controls A/C operation when any mode switch is selected except "OFF". The A/C indicator will light and stay on when A/C is selected, until the air conditioning switch is turned off or "OFF" mode is selected.

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

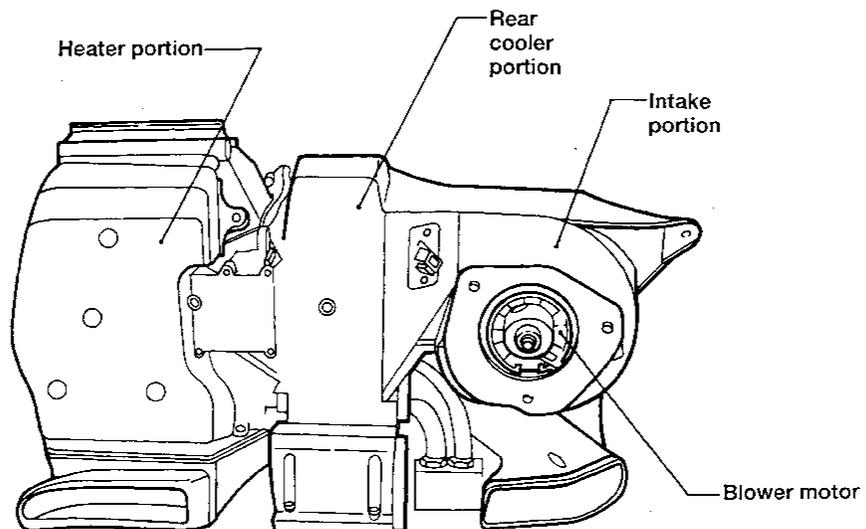
# DESCRIPTION — Overall System

## Component Layout

### Front heating and A/C unit



### Rear heating and A/C unit



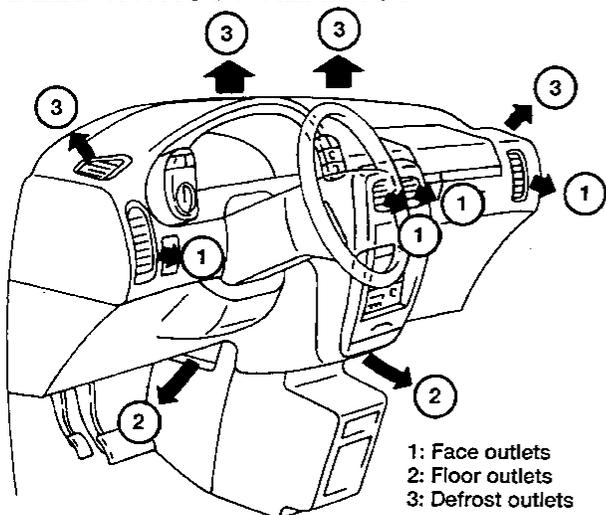
GI  
MA  
EM  
LC  
EF &  
EC  
FE  
AT  
FA  
RA  
BR  
ST  
BF  
**HA**

EL  
IDX

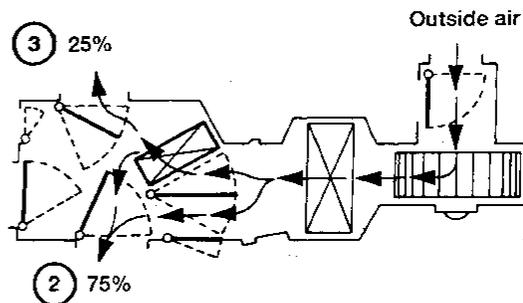
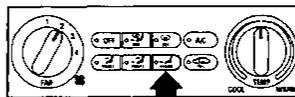
# DESCRIPTION — Overall System

## Discharge Air Flow

### MODELS WITHOUT REAR A/C



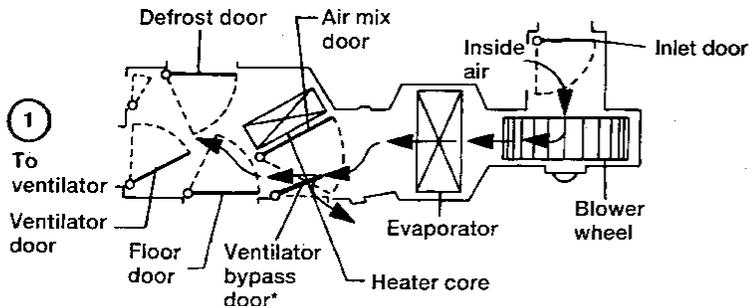
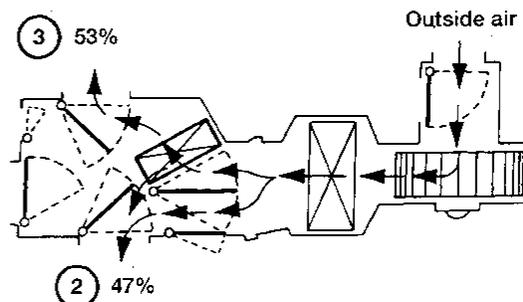
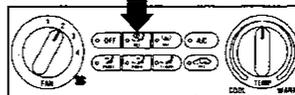
Floor



Ventilation (recirc switch "ON")

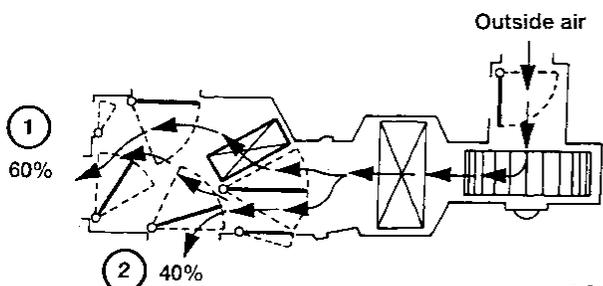
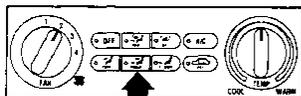


Floor and defroster

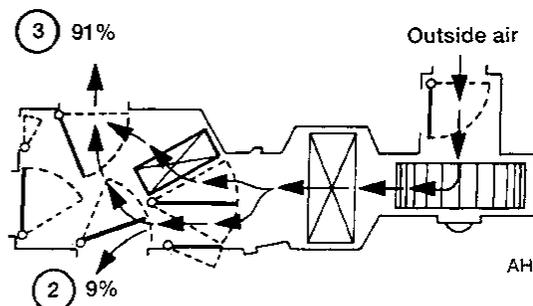
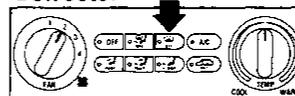


\*The ventilator bypass door is only open when the temperature control knob is in the max COOL position and the recirc switch is in the recirc mode.

Bi-level



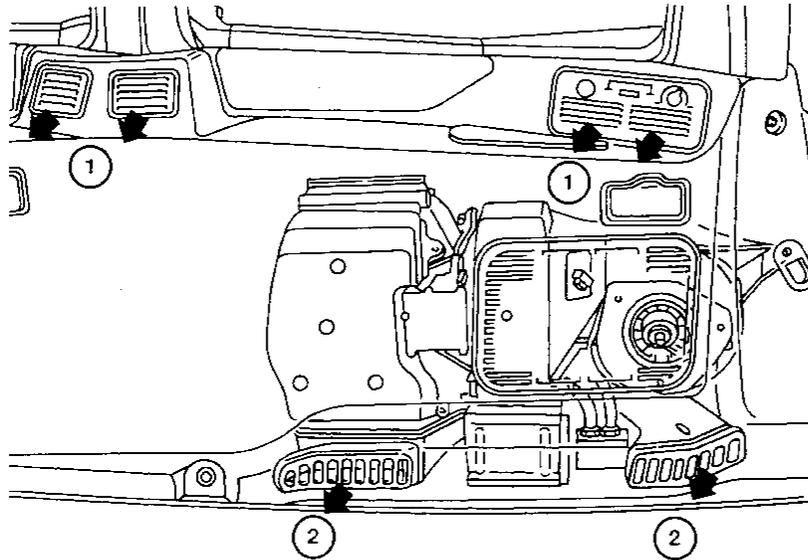
Defroster



# DESCRIPTION — Overall System

## Discharge Air Flow (Cont'd)

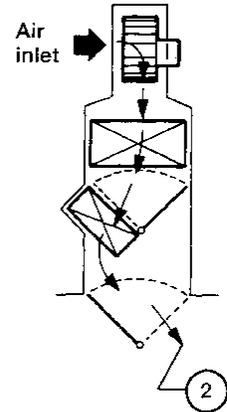
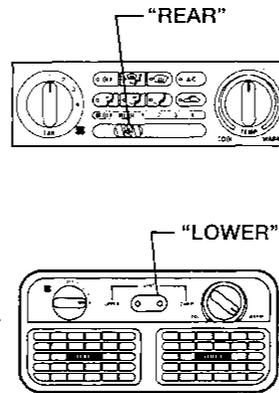
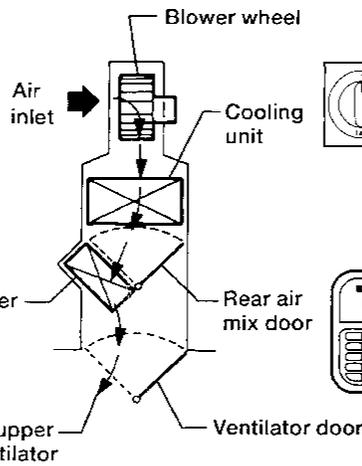
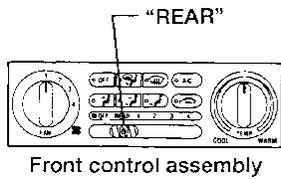
### MODELS WITH REAR A/C



1: Upper outlets  
2: Lower outlets

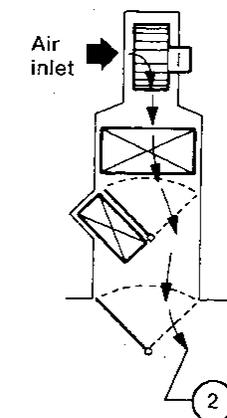
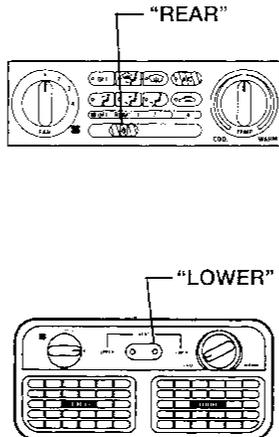
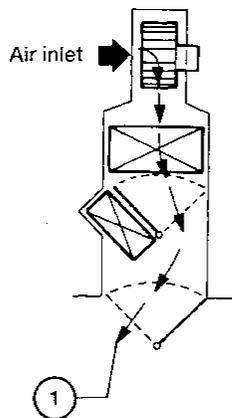
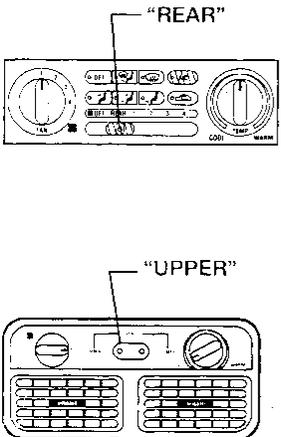
Ventilation and heat

Floor and heat



Ventilation and A/C

Floor and A/C



CI

MA

EM

LC

EF &  
EC

FE

AT

FA

RA

BR

ST

BF

HA

EL

IDX



## DESCRIPTION — Refrigeration System

### Refrigeration Cycle (Cont'd)

#### REFRIGERANT SYSTEM PROTECTION

##### High pressure switch

The refrigerant system is protected against excessively high pressure by a high pressure switch, located on the end of compressor. If the system pressure rises above the specifications, the high pressure switch opens to interrupt the compressor operation. Refer to HA-64.

GI

MA

##### Low pressure switch

The refrigerant system is protected against excessively low pressure by a low pressure switch, located on the accumulator. If the system pressure falls below the specifications, the low pressure switch opens to interrupt the compressor operation. Refer to HA-64.

EM

LC

##### Pressure relief valve

The refrigerant system is also protected by a pressure relief valve, located on the end of compressor. When the pressure of the refrigerant in the system increases to an abnormal level (higher than approximately 3,727 kPa [38 kg/cm<sup>2</sup>, 540 psi]), the release port on the pressure relief valve automatically opens and releases refrigerant into the atmosphere.

EF &

EC

FE

AT

FA

RA

BR

ST

BF

HA

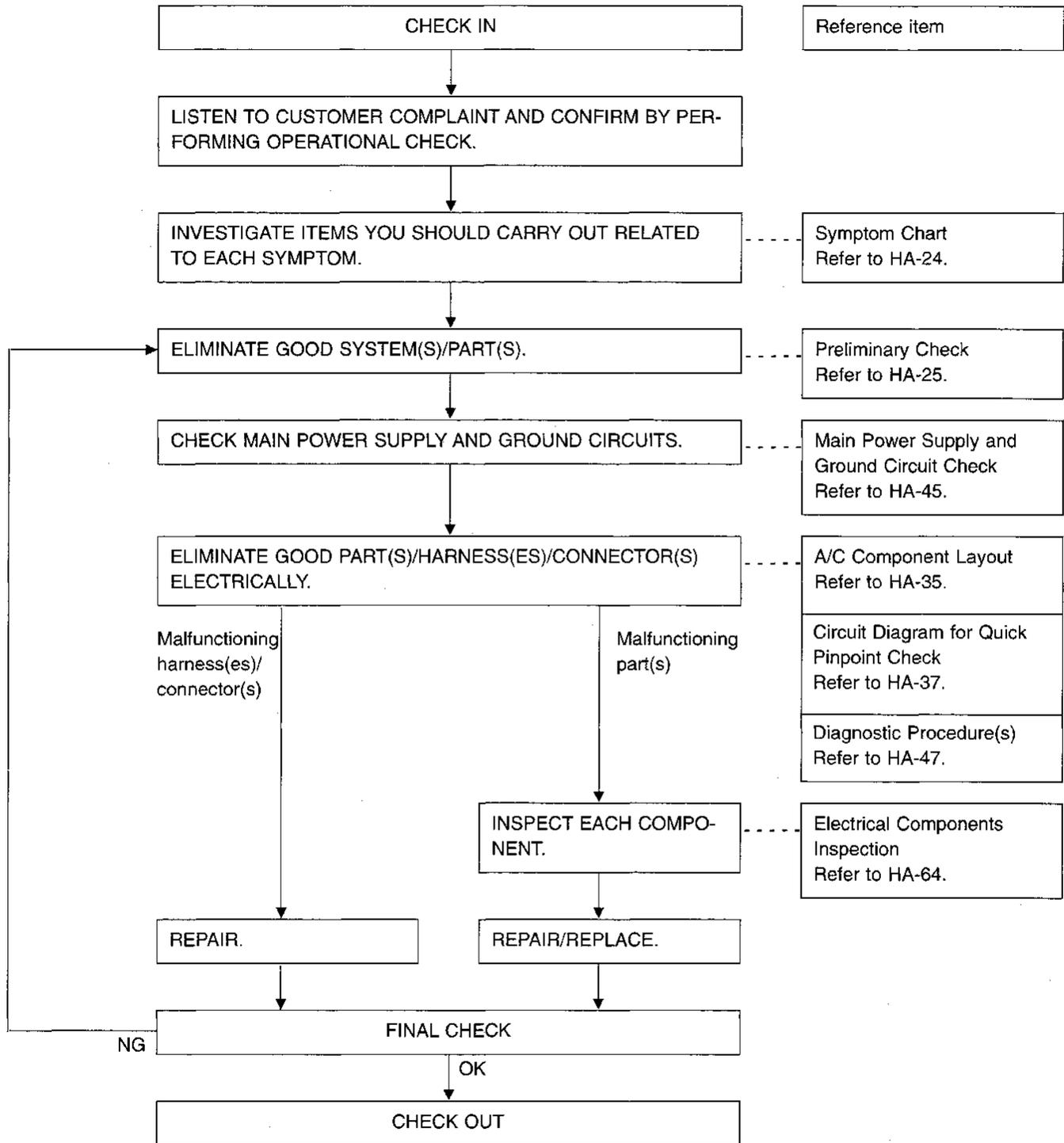
EL

IDX

# TROUBLE DIAGNOSES

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

### WORK FLOW



# TROUBLE DIAGNOSES

## Operational Check

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

### CONDITIONS:

Engine running at normal operating temperature.

### PROCEDURE:

#### 1. Check blower

- 1) Turn fan control knob to 1-speed and press any mode switch except OFF.  
Blower should operate on 1-speed.
- 2) Set fan control knob to 2-speed.
- 3) Continue checking blower speed until all four speeds are checked.
- 4) Leave blower on 4-speed.

#### 2. Check discharged air

- 1) Press each mode switch.

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

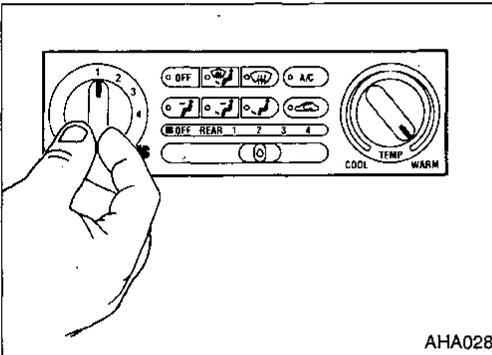
Refer to "Discharge Air Flow", "DESCRIPTION" (HA-16).

#### NOTE:

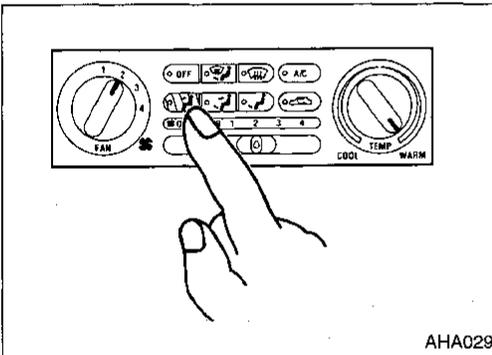
Confirm that the compressor clutch is engaged (visual inspection) and intake door position is at FRESH when the DEF button is pressed.

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

Intake door position is checked in the next step.



AHA028



AHA029

#### Discharge air flow

Switch mode/ indicator	Air outlet/distribution		
	Face	Foot	Defroster
	94%	6%	—
	60%	40%	—
	—	75%	25%
	—	53%	47%
	—	9%	91%

AHA275

GI  
MA  
EM  
LC  
EF &  
EC  
FE  
AT  
FA  
RA  
BR  
ST  
BF  
HA  
EL  
IDX

## TROUBLE DIAGNOSES

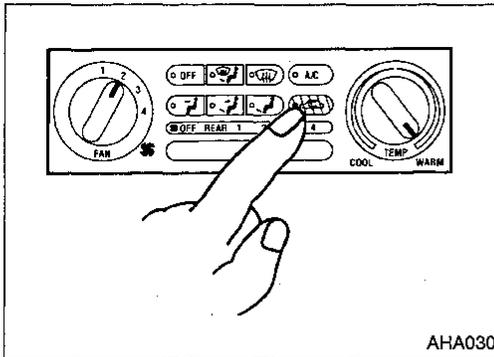
### Operational Check (Cont'd)

#### 3. Check recirc

- 1) Press RECIRC  button.  
RECIRC indicator should light.
- 2) Listen for intake door position change (you should hear blower sound change slightly).

**NOTE:**

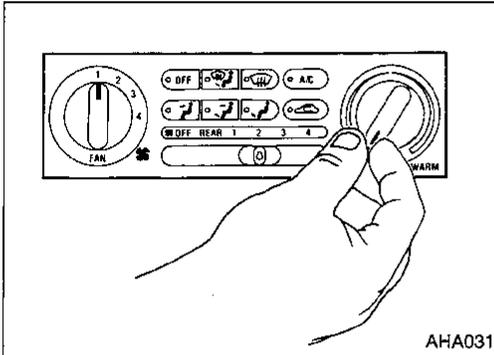
RECIRC does not operate in DEF and F/D modes.



AHA030

#### 4. Check temperature decrease

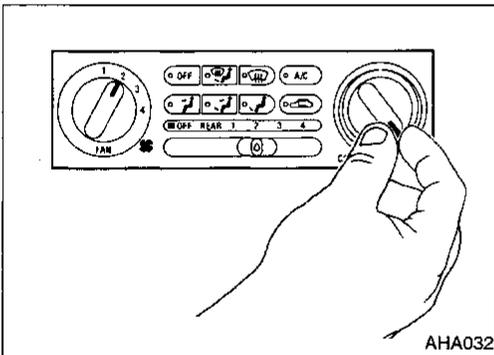
- 1) Turn temperature control knob to full cold.
- 2) Check for cold air at discharge air outlets.



AHA031

#### 5. Check temperature increase

- 1) Turn temperature control knob to full warm.
- 2) Check for warm air at discharge air outlets.

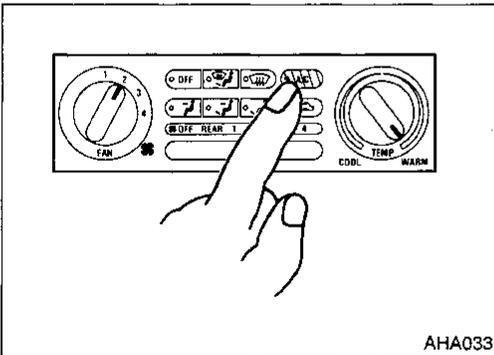


AHA032

#### 6. Check air conditioning switch

Move the fan control knob and the mode switch to the desired positions and push the air conditioning button to turn ON the air conditioning.

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



AHA033

# TROUBLE DIAGNOSES

## Operational Check (Cont'd)

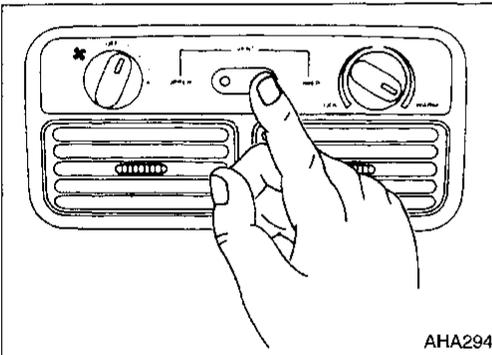
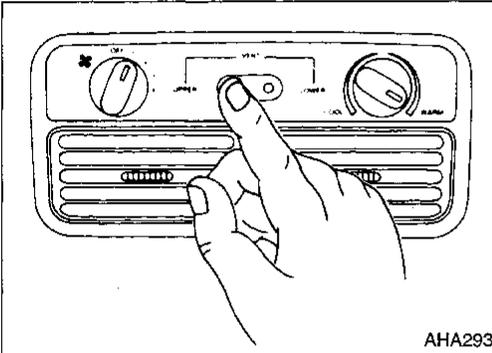
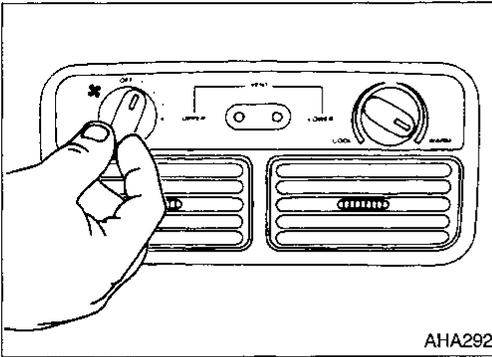
### REAR A/C CONDITIONS:

Engine running at normal operating temperature.

#### PROCEDURE:

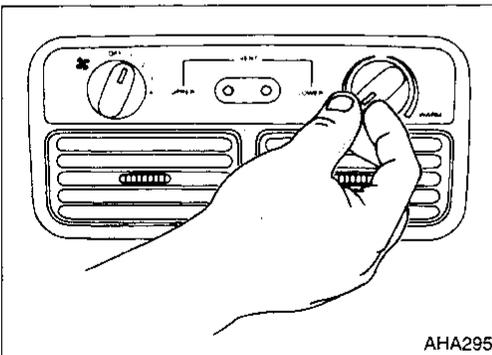
##### 1. Check blower

- 1) Set (front) rear fan switch to REAR position.
- 2) Press any mode switch except "OFF".
- 3) Turn rear fan control knob to 1-speed.  
Blower should operate on 1-speed.
- 4) Turn rear fan control knob to 2-speed.
- 5) Continue checking blower speed until all four speeds are checked.



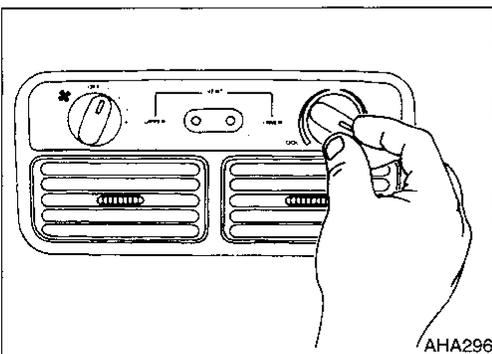
##### 2. Check discharge air

- 1) Press the UPPER side of the rear vent switch.  
The indicator should light and air flow from the upper rear discharge outlets.
- 2) Press the LOWER side of the rear vent switch.  
The indicator should light and air flow from the lower rear discharge outlets.



##### 3. Check temperature decrease

- 1) Turn rear temperature control knob to full cold.
- 2) Check for cold air at rear discharge outlets.



##### 4. Check temperature increase

- 1) Turn rear temperature control knob to full hot.
- 2) Check for warm air at rear discharge outlets.

GI

MA

EM

LC

EF &  
EC

FE

AT

FA

RA

BR

ST

BF

HA

EL

IDX

# TROUBLE DIAGNOSES

## Symptom Chart

### DIAGNOSTIC TABLE

PROCEDURE	Preliminary Check							Diagnostic Procedure										Main Power Supply and Ground Circuit Check				
	HA-25	HA-26	HA-27	HA-28	HA-29	HA-30	HA-31	HA-47	HA-50	HA-52	HA-53	HA-56	HA-57	HA-58	HA-61	HA-62	HA-63	HA-47	HA-45	HA-46	Refer to EF & EC section	
REFERENCE PAGE																						
SYMPTOM	Preliminary check 1	Preliminary check 2	Preliminary check 3	Preliminary check 4	Preliminary check 5	Preliminary check 6	Preliminary check 7	Diagnostic procedure 1	Diagnostic procedure 2	Diagnostic procedure 3	Diagnostic procedure 4	Diagnostic procedure 5	Diagnostic procedure 6	Diagnostic procedure 7	Diagnostic procedure 8	Diagnostic procedure 9	Diagnostic procedure 10	Fuses	A/C control module	Rear A/C control module	ECM (ECCS control module)	Harness
Insufficient cooling - front	①							○		○	○							○	○	○	○	○
Insufficient cooling - rear		①											○	○	○	○		○	○	○	○	○
Insufficient heating - front			①					○		○								○	○	○		○
Insufficient heating - rear				①									○	○	○	○		○	○	○		○
Front blower motor does not rotate	①							②										○	○			○
Front air outlet does not change						①			②									○	○			○
Front air mix door does not change			①							②								○	○			○
Front intake door does not operate normally												①						○	○			○
Rear vent door motor does not operate normally																	①	○		○		○
Rear blower motor does not rotate when front fan switch for rear A/C is set to "REAR" position														①	○			○				○
Rear blower motor does not rotate when front fan switch for rear A/C is set at 1-4 speed														①	②			○				○
Rear air mix door does not operate normally				①											②			○		○		○
Magnet clutch does not engage when A/C switch and mode switch are ON	①										②							○	○		○	○
Magnet clutch does not engage in DEF mode	①				②						○							○	○		○	○
Noise							①															

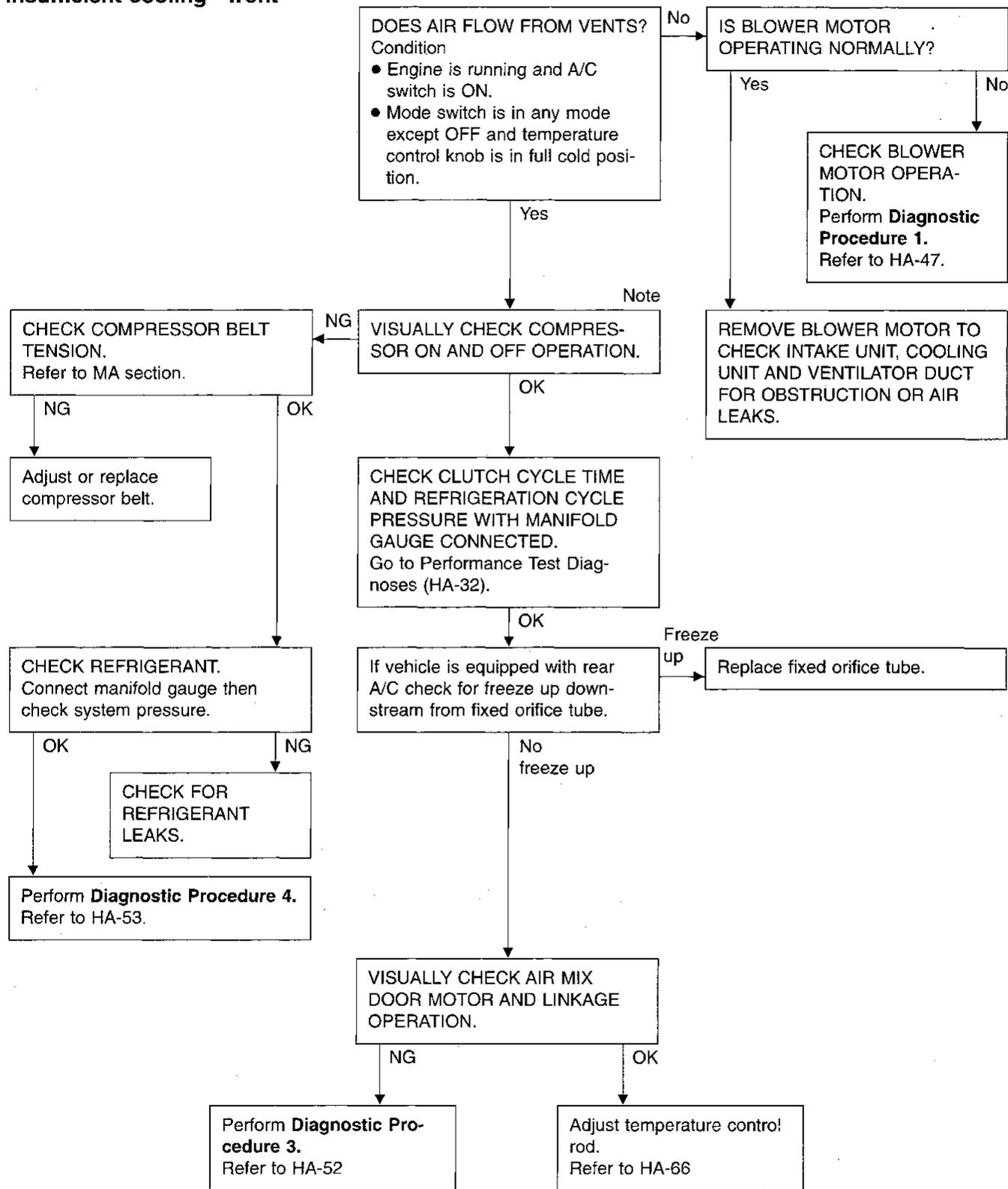
①, ②: The number means checking order.  
 ○: Checking order depends on malfunction in flow chart.

# TROUBLE DIAGNOSES

## Preliminary Check

### PRELIMINARY CHECK 1

#### Insufficient cooling - front



GI  
 MA  
 EM  
 LC  
 EF & EC  
 FE  
 AT  
 FA  
 RA  
 BR  
 ST  
 BF  
**HA**  
 EL  
 IDX

**Note:**

If air flow gradually decreases with operation of A/C compressor, check low pressure switch and harness.

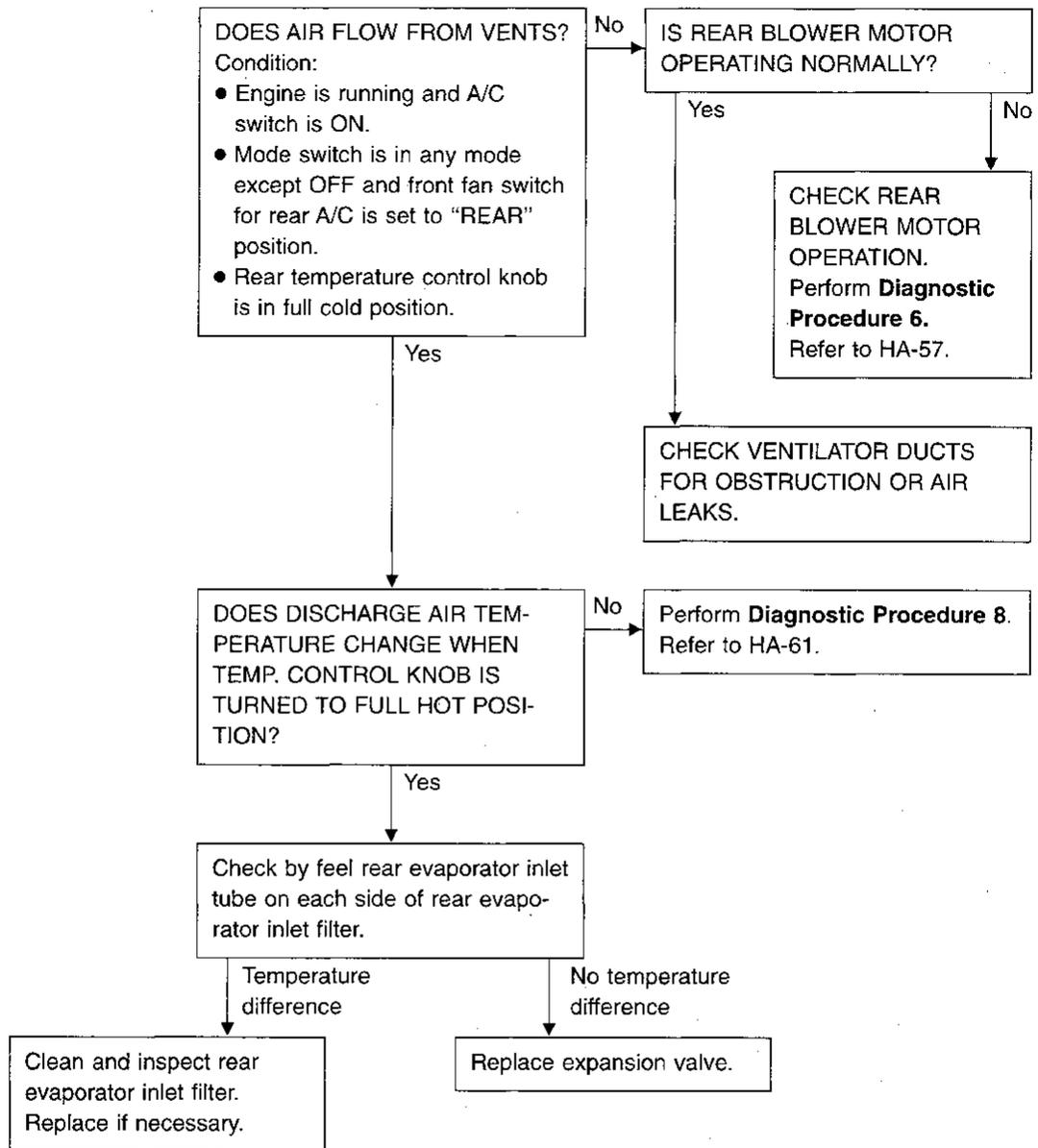
# TROUBLE DIAGNOSES

## Preliminary Check (Cont'd)

### PRELIMINARY CHECK 2

Insufficient cooling - rear

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

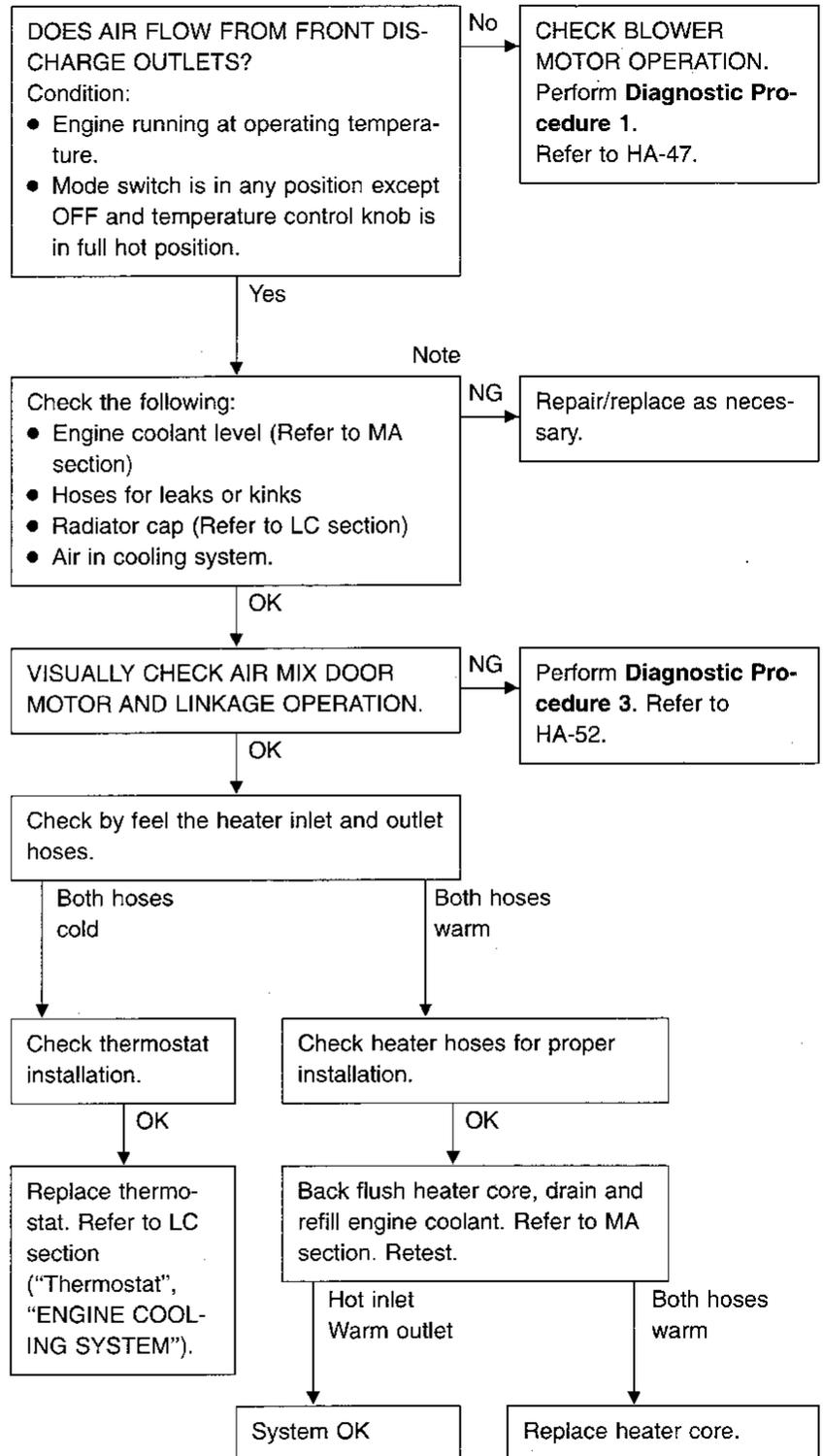


# TROUBLE DIAGNOSES

## Preliminary Check (Cont'd)

### PRELIMINARY CHECK 3

#### Insufficient heating - front



**Note:**

If equipped with rear heater, and rear heat is OK, this step may not be necessary.

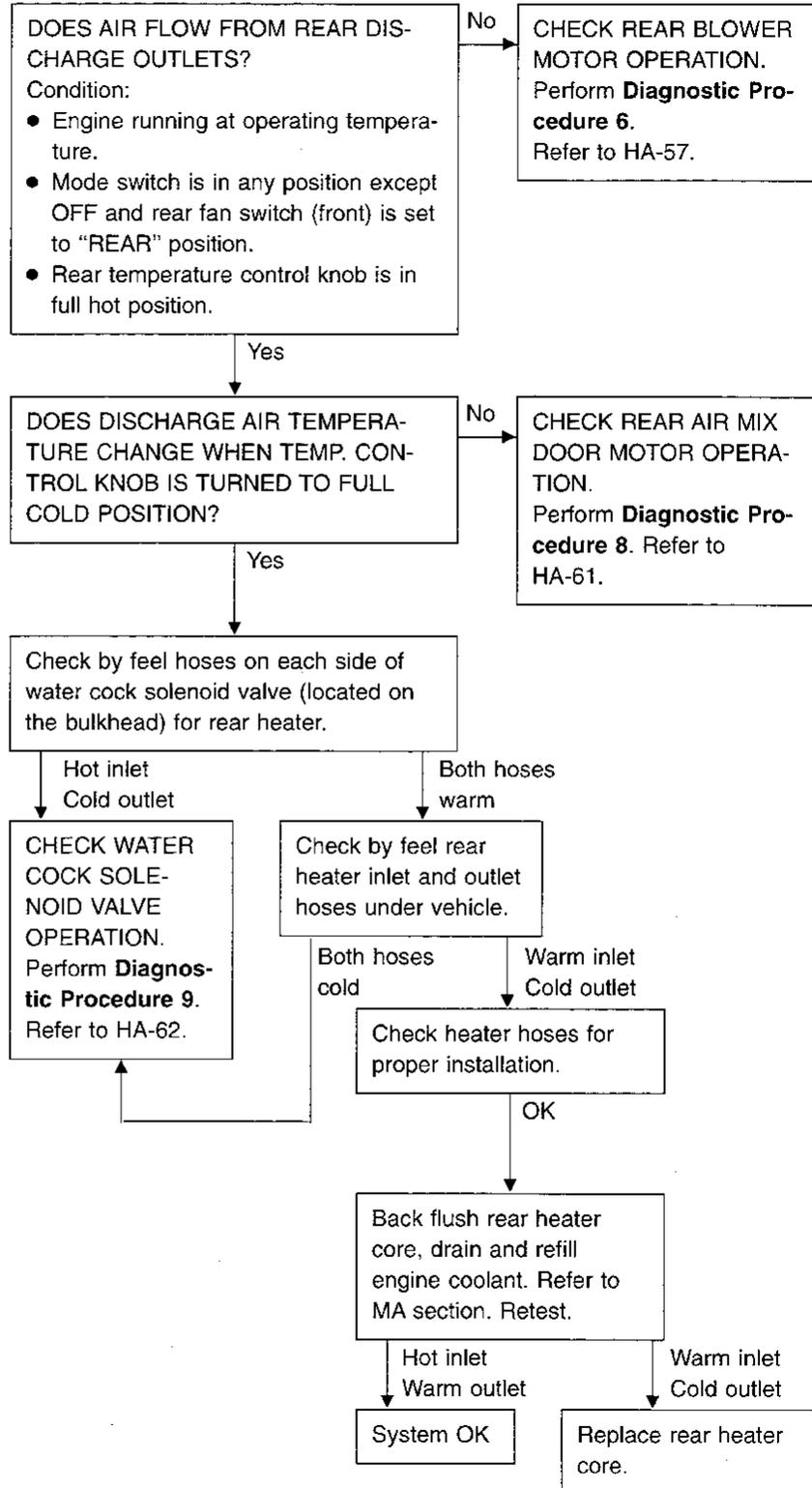
# TROUBLE DIAGNOSES

## Preliminary Check (Cont'd)

### PRELIMINARY CHECK 4

Insufficient heating - rear

- Perform PRELIMINARY CHECK 3 before referring to the following flow chart.



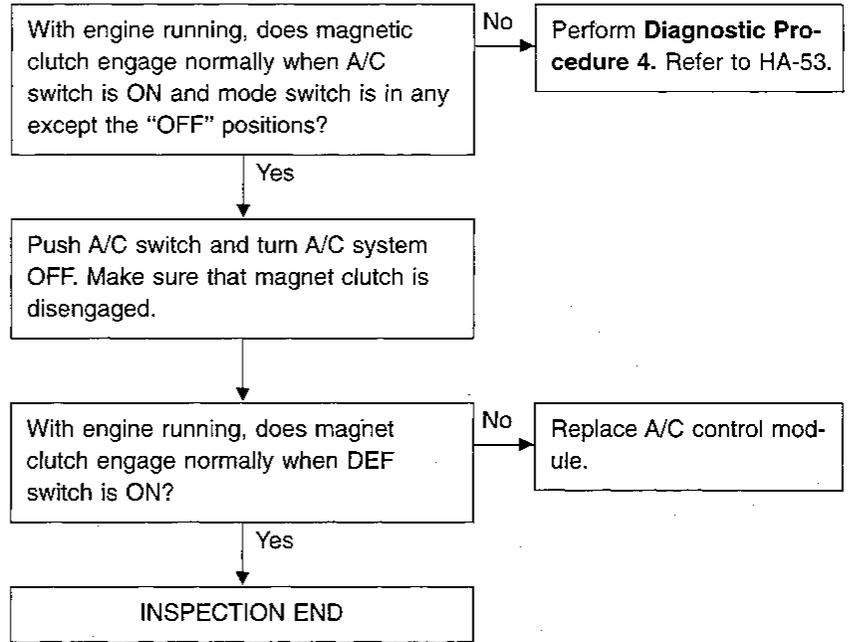
# TROUBLE DIAGNOSES

## Preliminary Check (Cont'd)

### PRELIMINARY CHECK 5

Magnet clutch does not engage in DEF mode.

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



GI

MA

EM

LC

EF &  
EC

FE

AT

FA

RA

BR

ST

BF

HA

EL

IDX

# TROUBLE DIAGNOSES

## Preliminary Check (Cont'd)

### PRELIMINARY CHECK 6

Front air outlet does not change.

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

No

Perform **Diagnostic Procedure 2**. Refer to HA-50.

Switch mode/ Indicator	Air outlet/distribution		
	Face	Foot	Defroster
	94%	6%	—
	60%	40%	—
	—	75%	25%
	—	53%	47%
	—	9%	91%

Yes

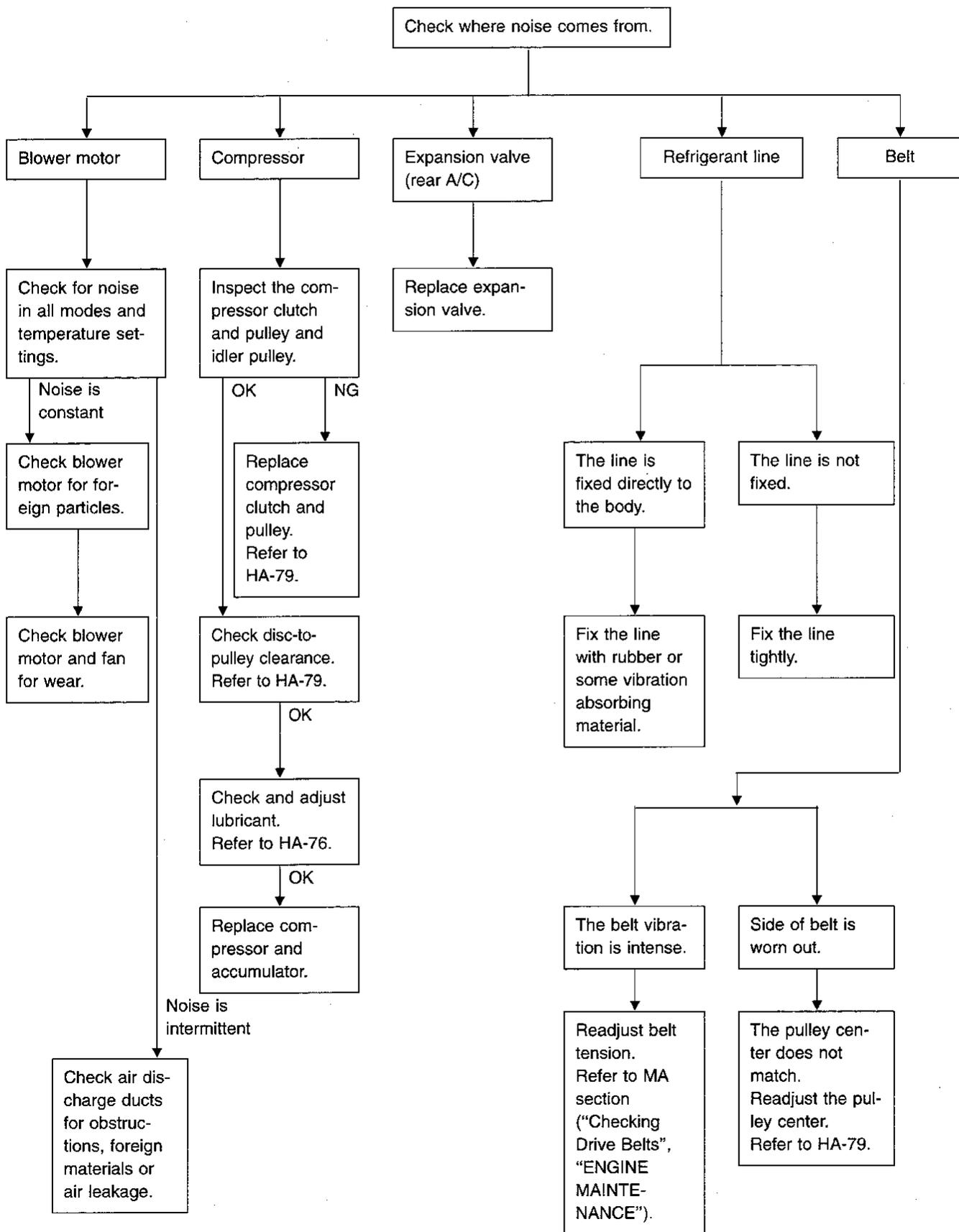
INSPECTION END

# TROUBLE DIAGNOSES

## Preliminary Check (Cont'd)

### PRELIMINARY CHECK 7

#### Noise



GI  
MA  
EM  
LC  
EF & EC  
FE  
AT  
FA  
RA  
BR  
ST  
BF  
HA  
EL  
IDX

## Performance Test Diagnoses

This A/C system is different from other Nissan A/C systems. The typical Nissan A/C system uses a thermal expansion valve to provide a restriction which causes a pressure change and also controls refrigerant flow through the evaporator.

This system uses a Fixed Orifice Tube (FOT) to cause a pressure change, by restricting the flow of refrigerant to the evaporator. The flow of refrigerant is controlled by engaging and disengaging the compressor clutch based on low side pressure. Therefore, it is critical to consider clutch engagement and disengagement times for proper diagnosis.

The refrigerant flow is regulated by a fixed orifice tube for the front evaporator and a thermal expansion valve for the rear evaporator.

The best way to diagnose a condition in the refrigerant system is to note the system pressures (shown by the manifold gauges) and the clutch cycle rate and times. Then, compare the findings to the charts.

- The system pressures are low (compressor suction) and high (compressor discharge).
- A clutch cycle is the time the clutch is engaged plus the time it is disengaged (time on plus time off).
- Clutch cycle times are the lengths of time (in seconds) that the clutch is ON and OFF.

### Important — Test conditions

The following test conditions must be established to obtain accurate clutch cycle rate and cycle time readings:

- Run engine at 1,500 rpm for 10 minutes.
- Operate A/C system on max A/C (recirculating air).
- Run blower at max speed.
- Stabilize in vehicle temperature at 21°C to 27°C (70°F to 80°F).

The following procedure is recommended for achieving accurate diagnosis results in the least amount of time.

1. Connect a manifold gauge set to the system. **The test conditions specified must be met to obtain accurate test results.**
2. Start the engine and turn ON A/C system.
3. As soon as the system is stabilized, record the high- and low-pressures as shown by the manifold gauges. The low side should cycle between approximately 168.9 kPa (1.723 kg/cm<sup>2</sup>, 24.5 psi) and 276 to 324 kPa (2.81 to 3.30 kg/cm<sup>2</sup>, 40 to 47 psi). (As low pressure drops, high pressure should rise.) When the clutch disengages, the low side should rise and the high side should drop.
4. Determine the clutch cycle rate per minute (clutch on time plus off time is a cycle).
5. Record clutch OFF time in seconds.
6. Record clutch ON time in seconds.
7. Record center register discharge temperature.
8. Determine and record ambient temperature.
9. Compare test readings with applicable chart.
  - Plot a vertical line for recorded ambient temperature from scale at bottom of each chart to top of each chart.
  - Plot a horizontal line for each of the other test readings from scale at LH side of appropriate chart.

At the bottom of the chart (HA-34), additional cause components are listed for poor compressor operation or a damaged compressor condition.

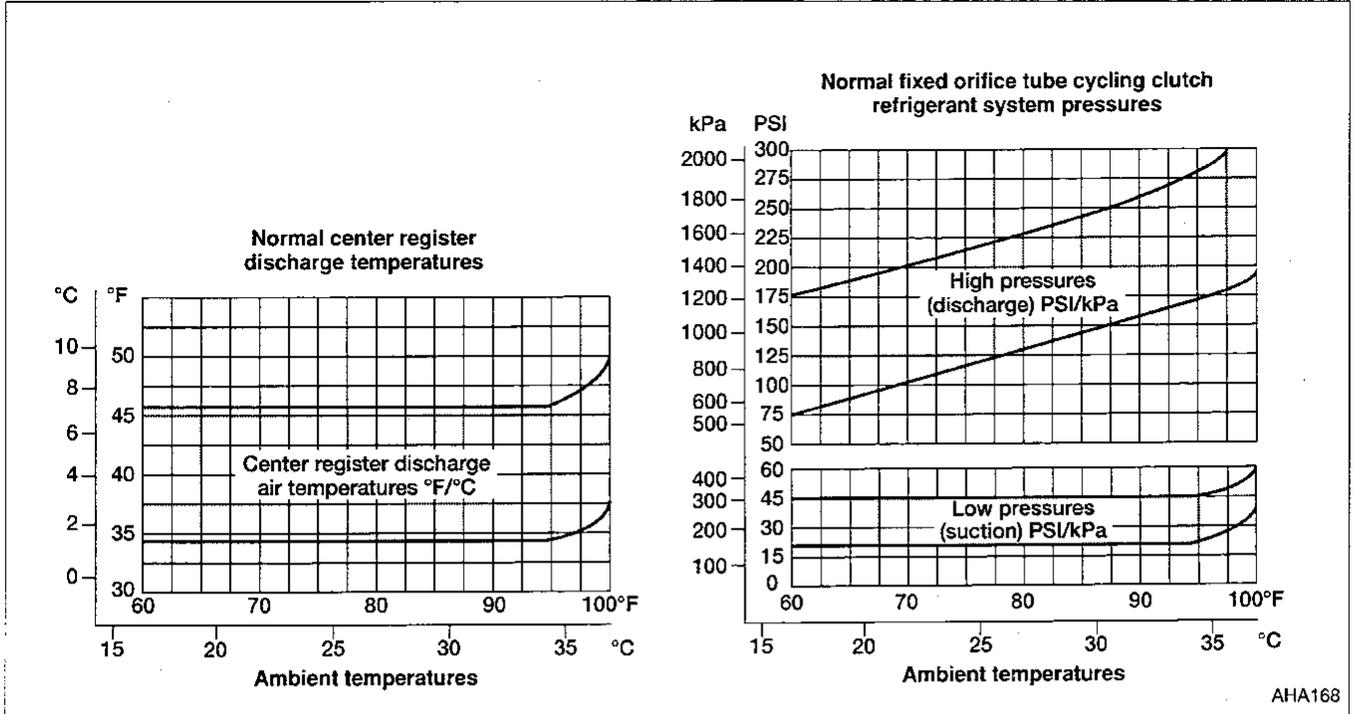
The diagnosis charts provide the most direct and sure way to determine the cause of any concern in a poorly performing refrigerant system. However, if the vehicle is equipped with rear A/C, poor performance of the front or rear system may not cause abnormal pressures or clutch cycle time. In this case, poor performance may indicate a restriction of refrigerant flow to that system, or an evaporator problem.

After servicing and correcting a refrigerant system concern, take additional pressure readings and observe the clutch cycle rate while meeting the conditional requirements (HA-34) to ensure the concern has been corrected.

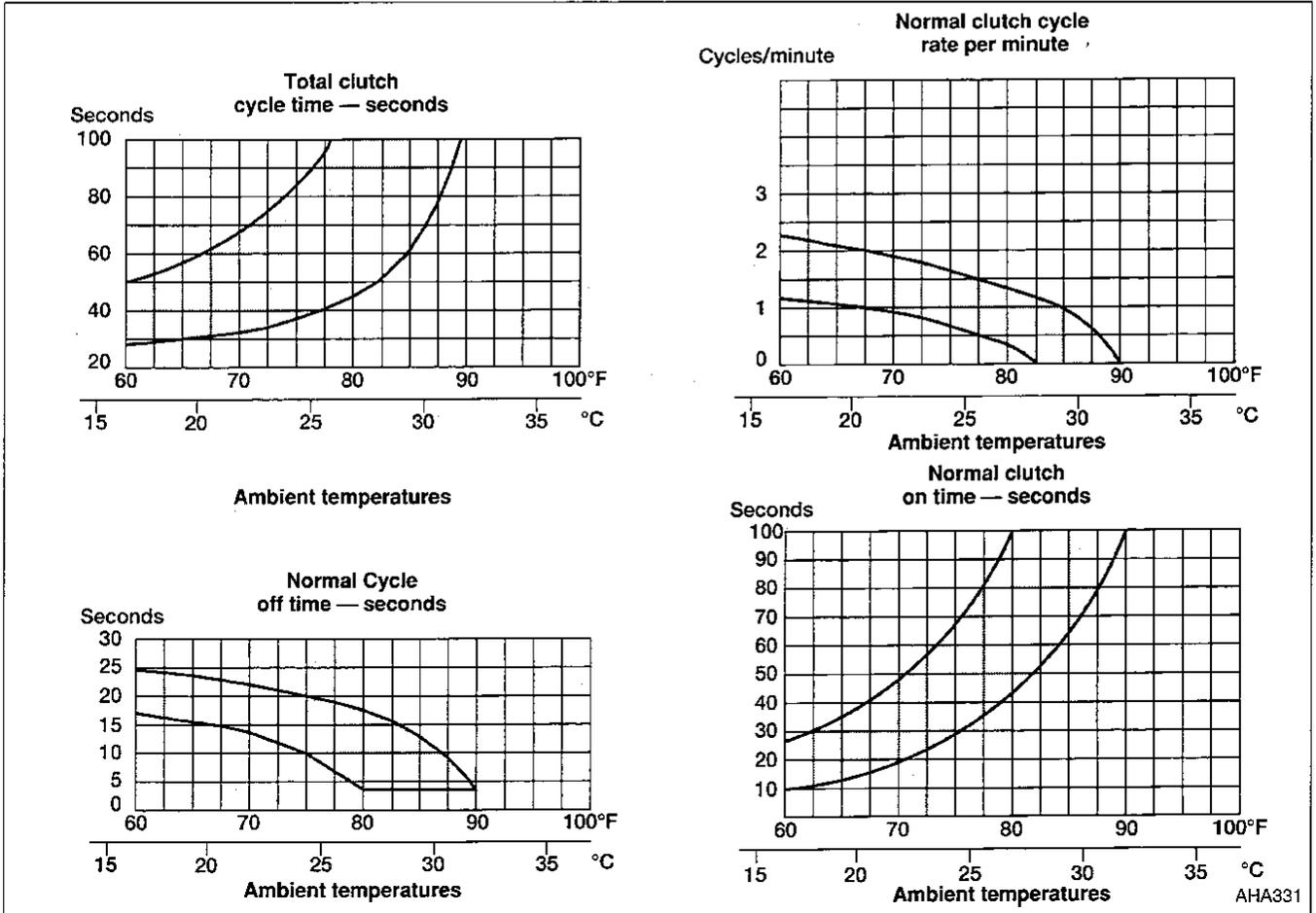
# TROUBLE DIAGNOSES

## Performance Test Diagnoses (Cont'd)

### NORMAL FIXED ORIFICE TUBE REFRIGERANT SYSTEM PRESSURE/TEMPERATURE RELATIONSHIPS



### NORMAL FIXED ORIFICE TUBE REFRIGERANT SYSTEM CLUTCH CYCLE TIMING RATES



GI  
MA  
EW  
LC  
EF & EC  
FE  
AT  
FA  
RA  
BR  
ST  
BF  
HA  
EL  
DX

# TROUBLE DIAGNOSES

## Performance Test Diagnoses (Cont'd)

### REFRIGERANT SYSTEM PRESSURE AND CLUTCH CYCLE TIMING EVALUATION CHART FOR FIXED ORIFICE TUBE CYCLING CLUTCH SYSTEMS

System test conditions must be met to obtain accurate test readings for evaluation. Refer to the normal refrigerant system pressure/temperature and the normal clutch cycle rate and times charts on the previous page.

HIGH (DISCHARGE) PRESSURE	LOW (SUCTION) PRESSURE	CLUTCH CYCLE TIME			COMPONENT — CAUSES
		RATE	ON	OFF	
HIGH	HIGH	CONTINUOUS RUN			CONDENSER — Inadequate Airflow
HIGH	NORMAL TO HIGH				ENGINE OVERHEATING
NORMAL TO HIGH	NORMAL				REFRIGERANT OVERCHARGE (1) AIR IN REFRIGERANT HUMIDITY OR AMBIENT TEMP VERY HIGH (2)
NORMAL	HIGH				FIXED ORIFICE TUBE — Missing O-Rings Leaking/Missing
NORMAL TO HIGH	NORMAL TO HIGH	SLOW OR NO CYCLE	LONG OR CONTINUOUS	NORMAL OR NO CYCLE	MOISTURE IN REFRIGERANT SYSTEM EXCESSIVE REFRIGERANT LUBRICANT
NORMAL	LOW	SLOW	LONG	LONG	LOW PRESSURE SWITCH — Low Cut-Out
NORMAL TO LOW	HIGH	CONTINUOUS RUN			Compressor — Low Performance
NORMAL TO LOW	NORMAL TO HIGH				A/C SUCTION LINE — Partially Restricted or Plugged (3)
NORMAL TO LOW	NORMAL	FAST	SHORT	NORMAL	EVAPORATOR — Low or Restricted Airflow
			SHORT TO VERY SHORT	NORMAL TO LONG	CONDENSER FIXED ORIFICE TUBE, OR A/C LIQUID LINE — Partially Restricted or Plugged
			SHORT TO VERT SHORT	SHORT TO VERY SHORT	LOW REFRIGERANT CHARGE
			SHORT TO VERY SHORT	LONG	EVAPORATOR CORE — Partially Restricted or Plugged
NORMAL TO LOW	LOW	CONTINUOUS RUN			A/C SUCTION LINE — Partially Restricted or Plugged (4) LOW PRESSURE SWITCH — Sticking Closed
—	—	ERRATIC OPERATION OR COMPRESSOR NOT RUNNING			LOW PRESSURE SWITCH — Dirty Contacts or Sticking Open. POOR CONNECTION AT A/C CLUTCH CONNECTOR OR CLUTCH CYCLING SWITCH CONNECTOR. A/C/ELECTRICAL CIRCUIT ERRATIC

**ADDITIONAL POSSIBLE CAUSE COMPONENTS  
ASSOCIATED WITH INADEQUATE COMPRESSOR OPERATION**

- COMPRESSOR DRIVE BELT — Loose
- COMPRESSOR CLUTCH — Slipping
- CLUTCH COIL Open — Shorted, or Loose Mounting
- A/C RELAY — Dirty Contacts or Sticking Open
- CLUTCH WIRING CIRCUIT — High Resistance, Open or Blown Fuse
- COMPRESSOR OPERATION INTERRUPTED BY ENGINE CONTROL MODULE

**ADDITIONAL POSSIBLE CAUSE COMPONENTS  
ASSOCIATED WITH A DAMAGED COMPRESSOR**

- LOW PRESSURE SWITCH — Sticking Closed or Compressor Clutch Seized
- ACCUMULATOR — Lubricant Bleed Hole Plugged
- REFRIGERANT LEAKS

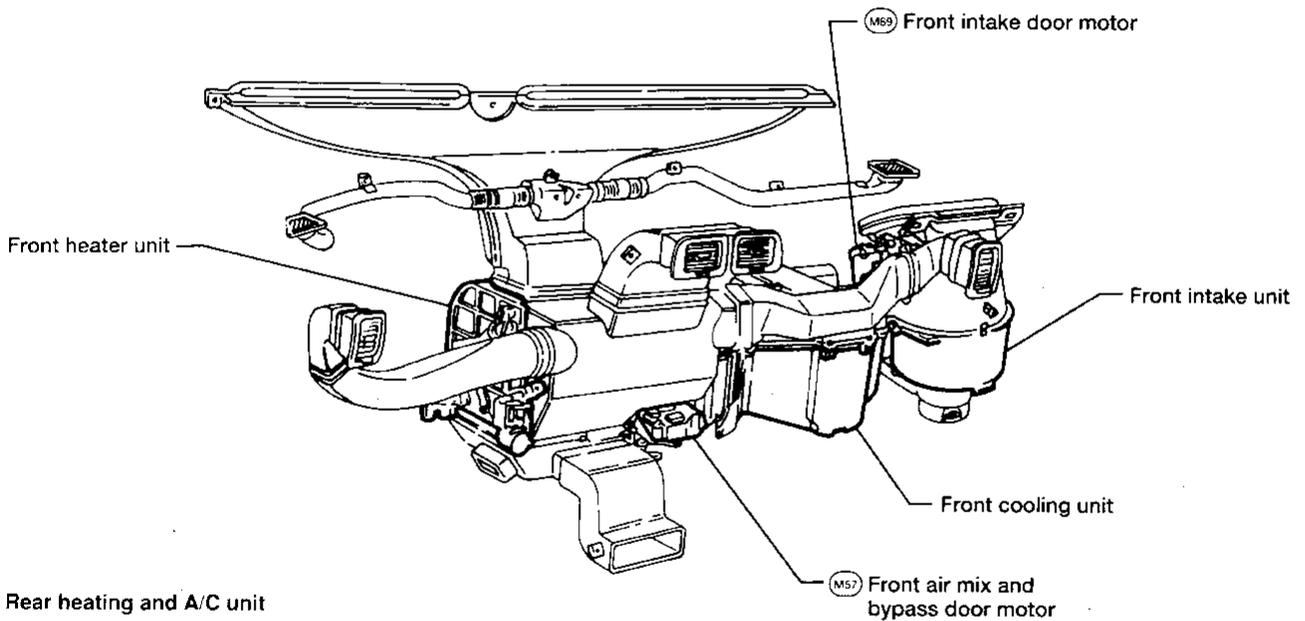
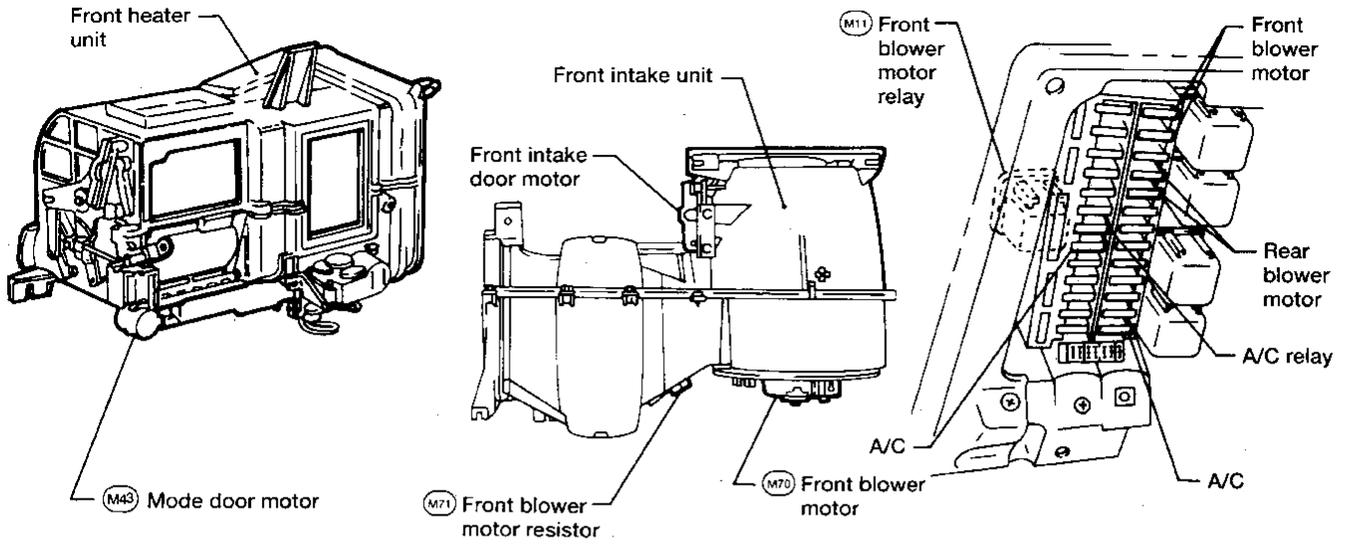
- (1) Compressor may make noise on initial run. This is slugging condition caused by excessive liquid refrigerant.  
 (2) Compressor clutch may not cycle in ambient temperatures above 27°C (80°F) depending on humidity conditions.  
 (3) Low pressure reading will be normal to high if pressure is taken at accumulator and if restriction is downstream of service valve.  
 (4) Low pressure reading will be low if pressure is taken near the compressor and restriction is upstream of service valve.

- Fixed orifice tube operation can be checked by touching the line each side of the locating crimp. One side should be warm the other should be cold.
- If the compressor is repaired due to the noise or seizure, we recommend to replace fixed orifice tube, accumulator, and (if equipped with rear A/C) the rear evaporator inlet filter.

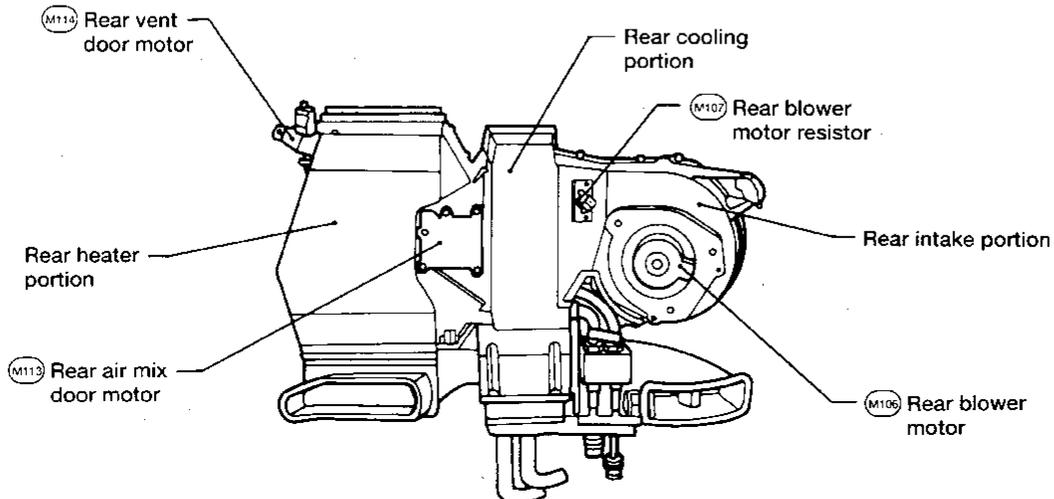
# TROUBLE DIAGNOSES

## A/C Harness Layout

### PASSENGER COMPARTMENT



### Rear heating and A/C unit

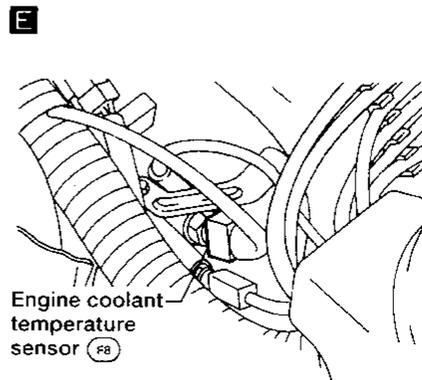
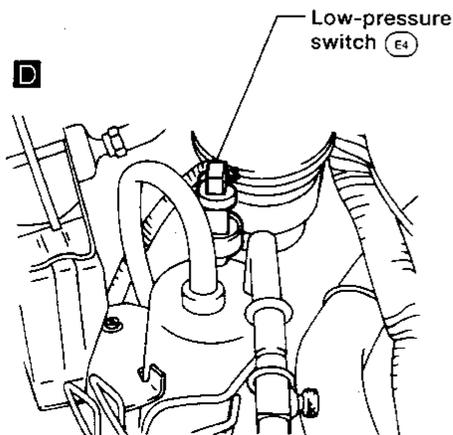
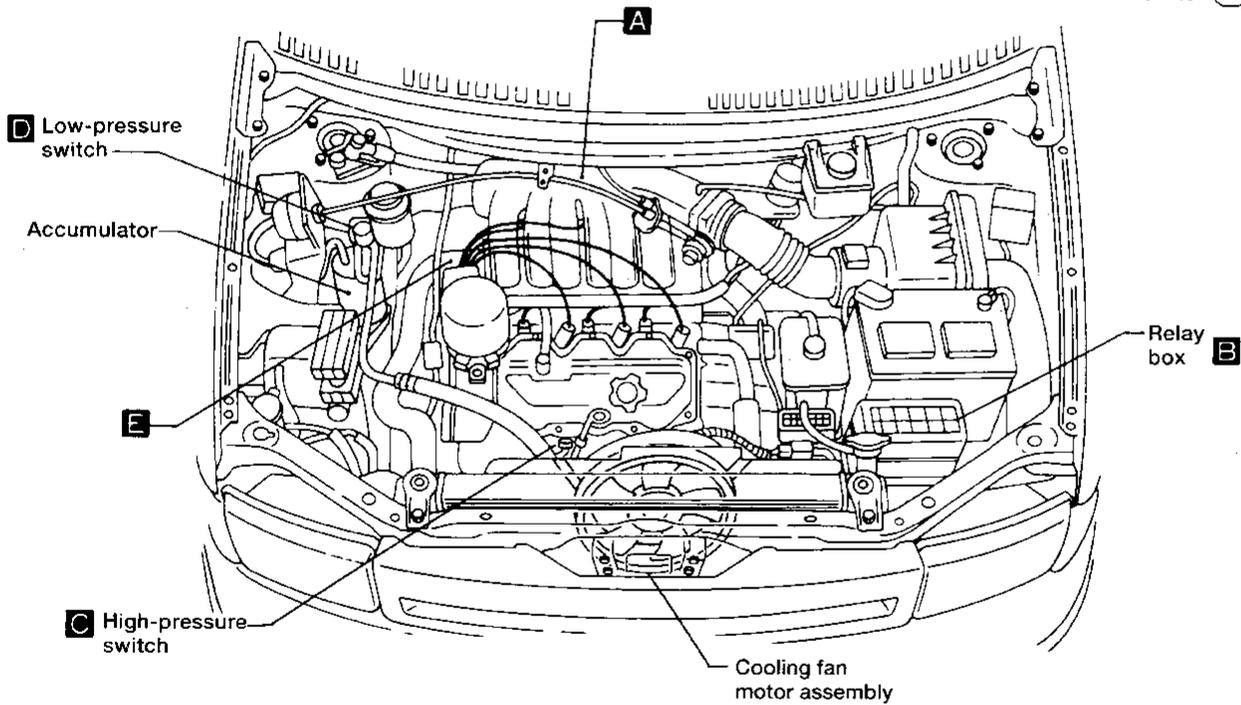
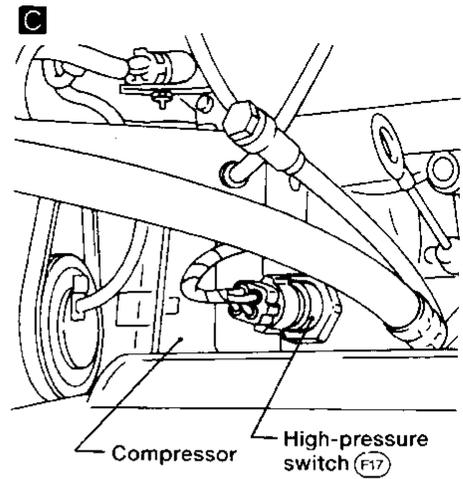
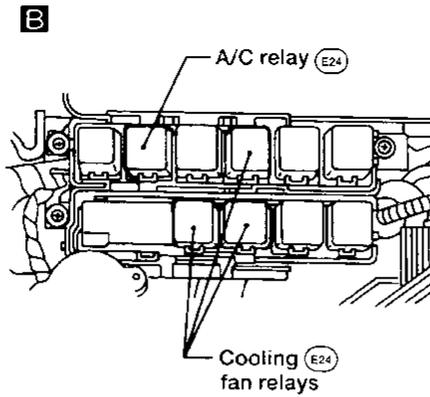
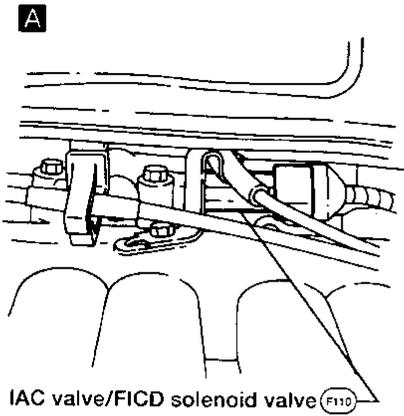


GI  
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# TROUBLE DIAGNOSES

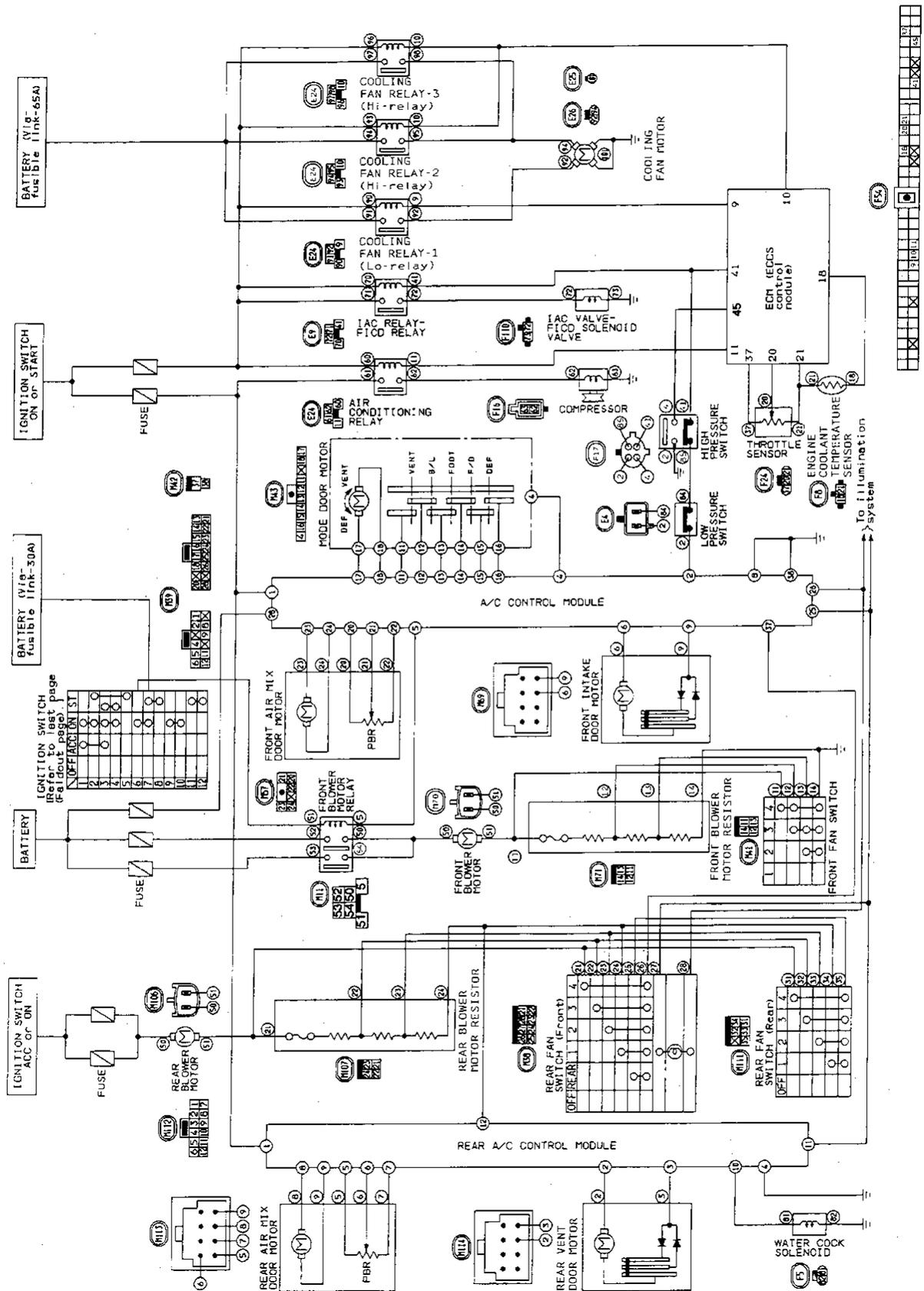
## A/C Harness Layout (Cont'd)

### ENGINE COMPARTMENT



# TROUBLE DIAGNOSES

## Circuit Diagram for Quick Pinpoint Check



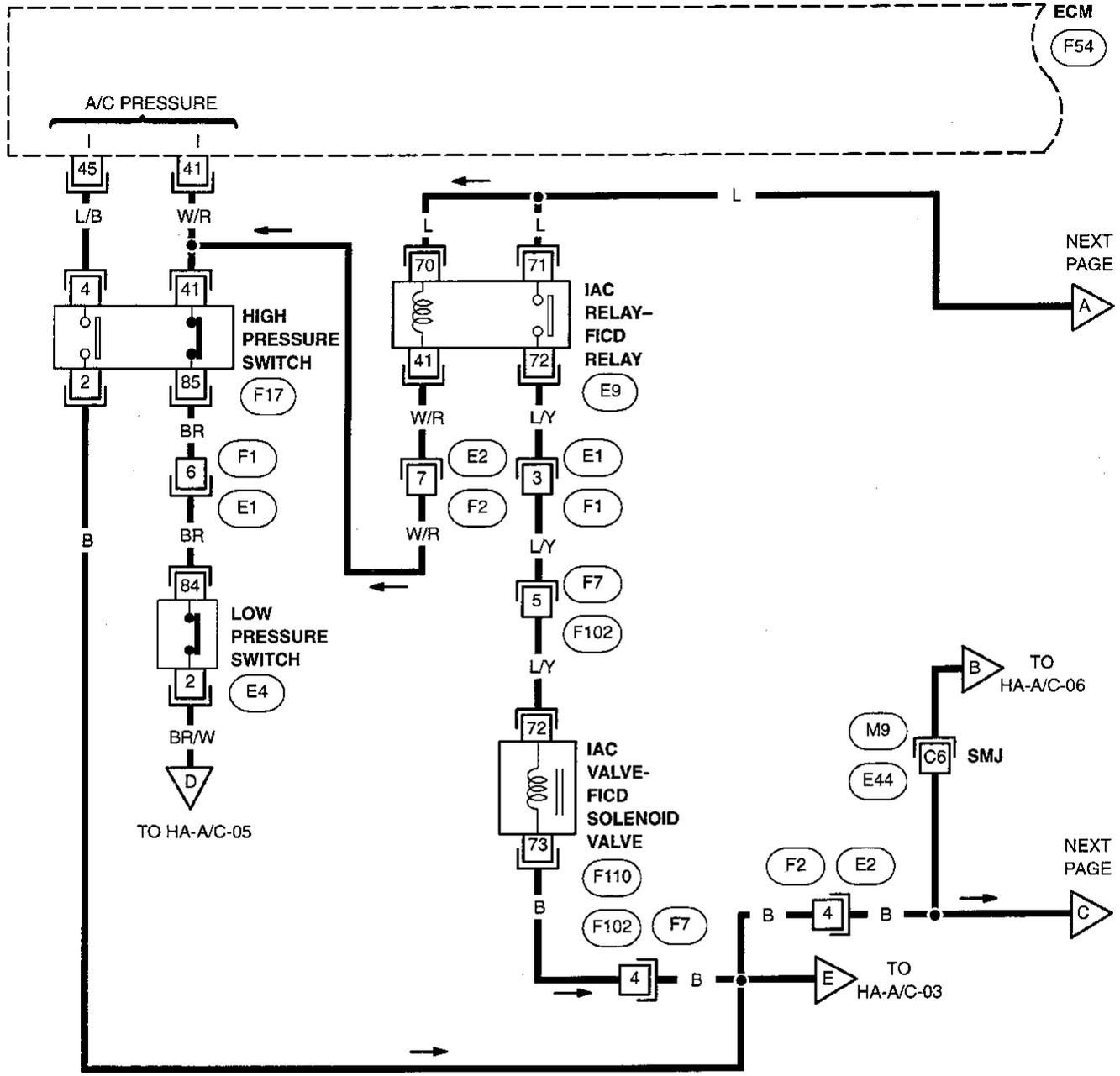
- GI
- MA
- EM
- LC
- EF & EC
- FE
- AT
- FA
- RA
- BR
- ST
- BF
- HA**
- EL
- IDX

# TROUBLE DIAGNOSES

## Wiring Diagram -A/C-

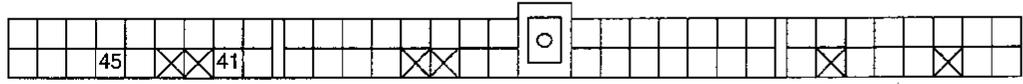
A/C ELECTRICAL CIRCUIT

HA-A/C-01

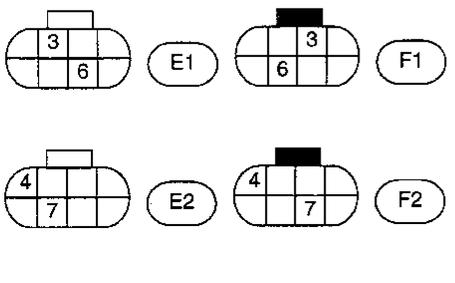


NEXT PAGE

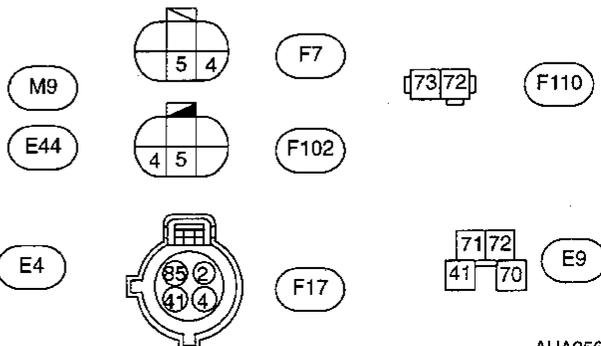
NEXT PAGE



F54



Refer to Foldout Page in EL Section for details.

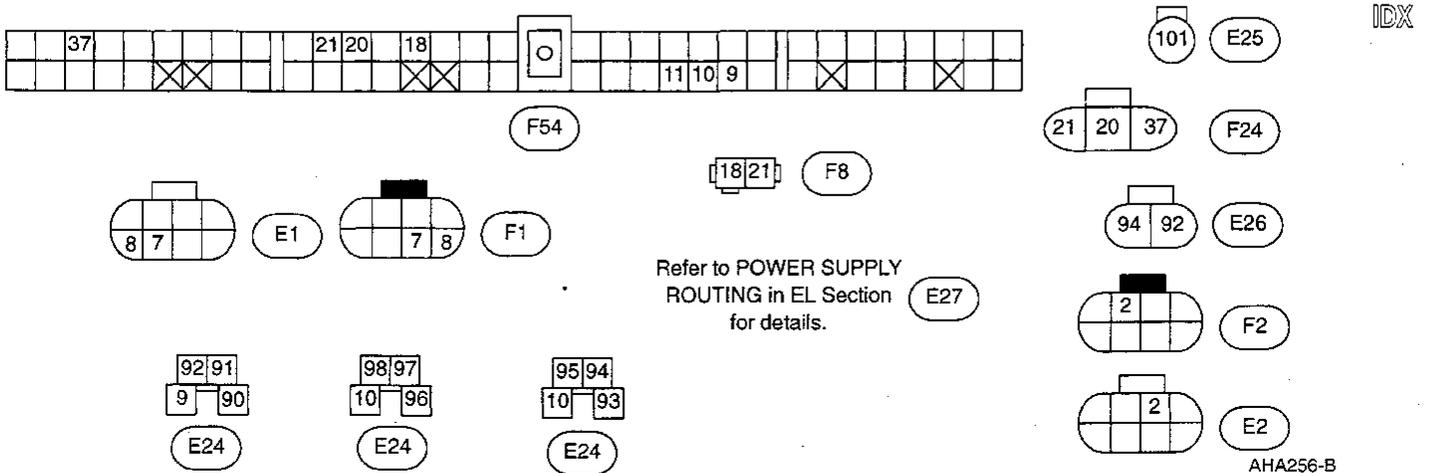
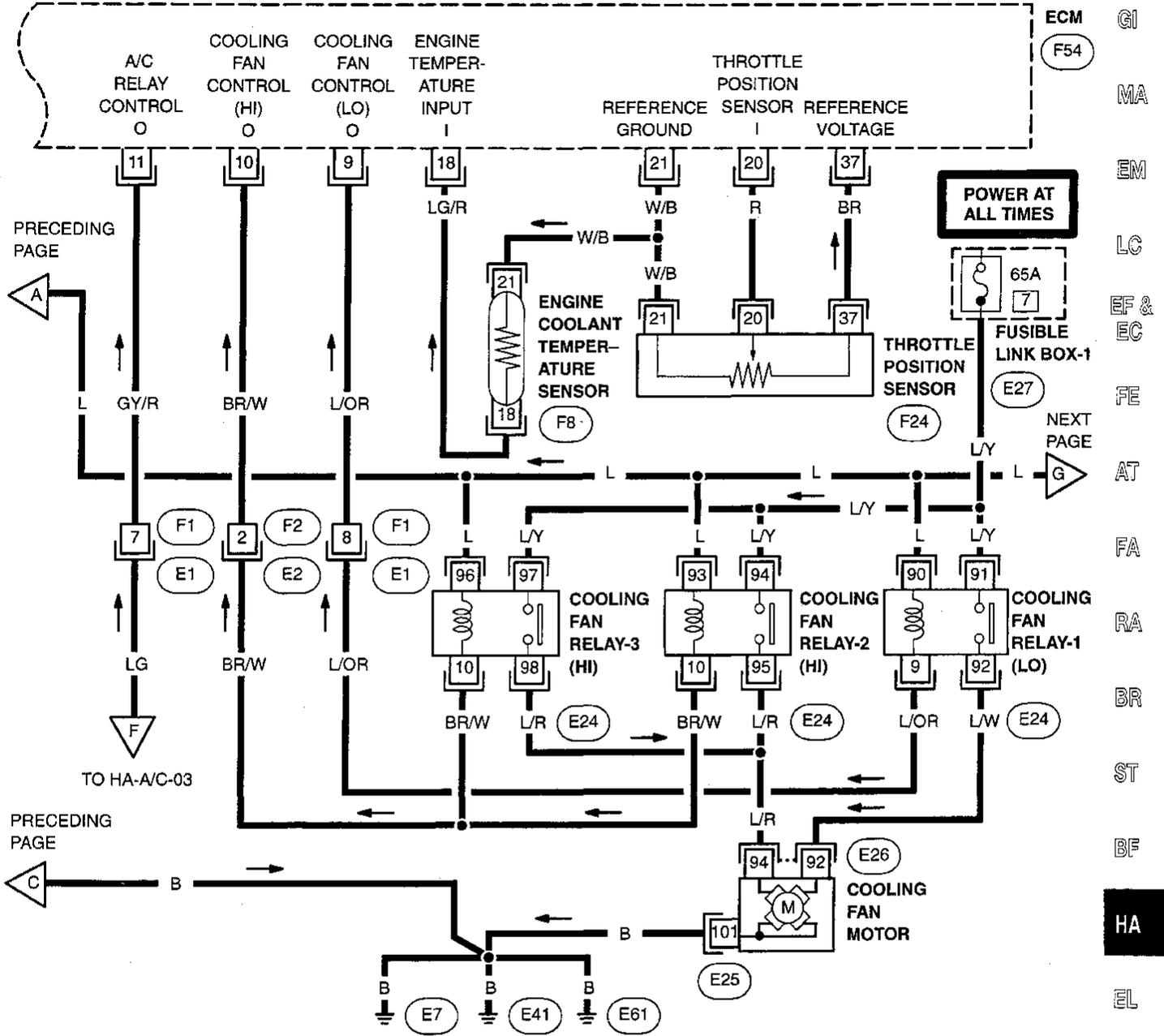


AHA256-A

# TROUBLE DIAGNOSES

## Wiring Diagram -A/C- (Cont'd)

HA-A/C-02



Refer to POWER SUPPLY ROUTING in EL Section for details.

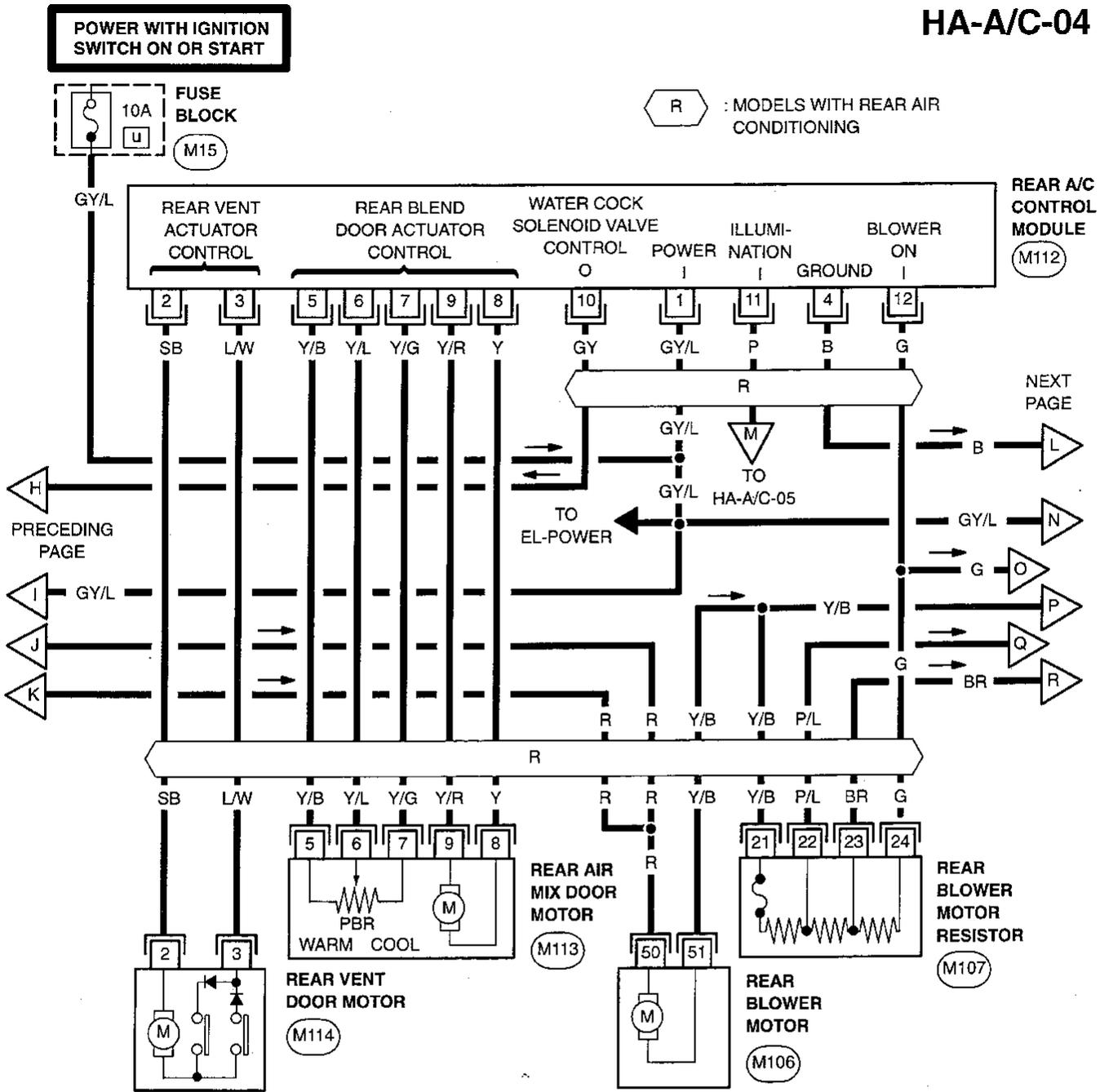


# TROUBLE DIAGNOSES

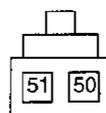
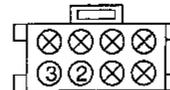
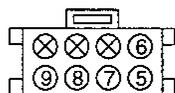
## Wiring Diagram -A/C- (Cont'd)

HA-A/C-04

GI  
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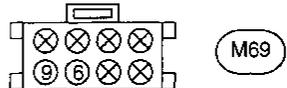
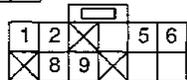
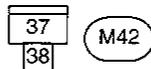
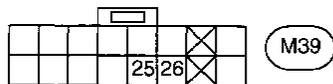
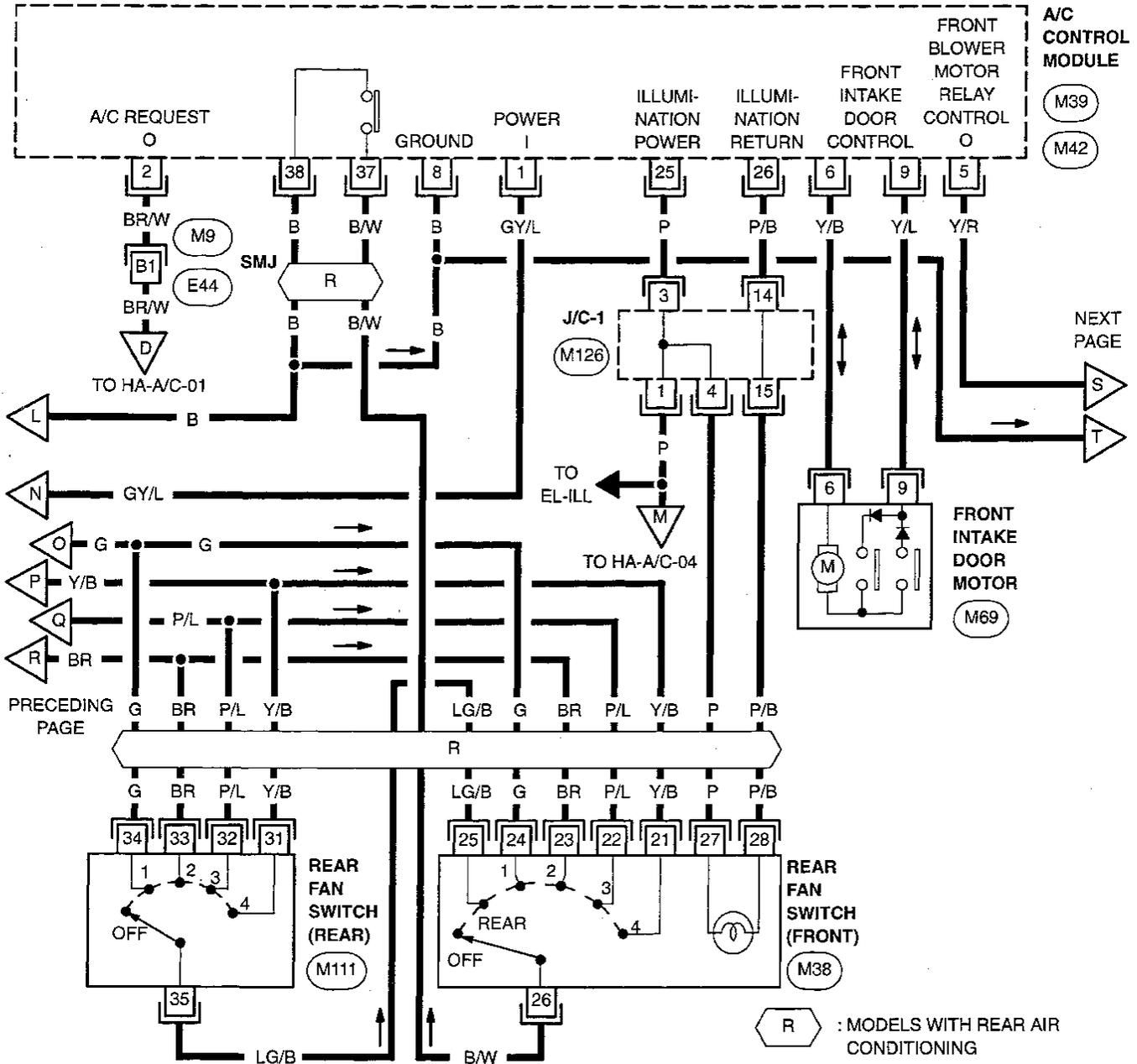
Refer to POWER SUPPLY ROUTING in EL Section for details.



# TROUBLE DIAGNOSES

## Wiring Diagram -A/C- (Cont'd)

### HA-A/C-05

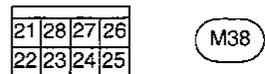


Refer to Foldout Page in EL Section for details.

M9  
E44

Refer to Foldout Page in EL Section for details.

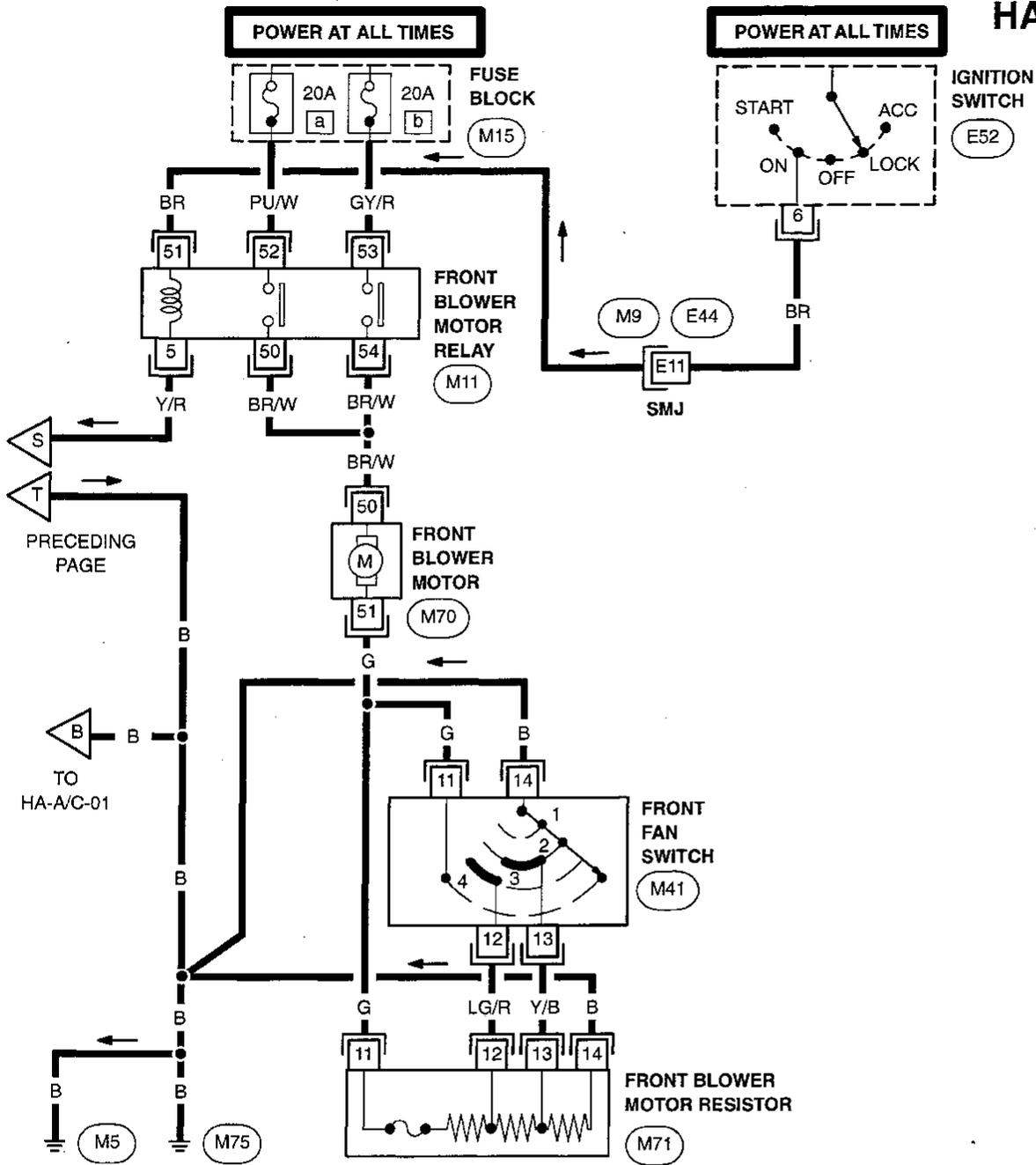
M126



# TROUBLE DIAGNOSES

## Wiring Diagram -A/C- (Cont'd)

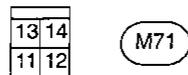
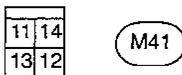
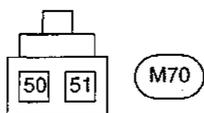
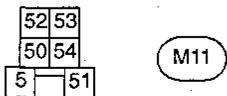
HA-A/C-06



Refer to POWER SUPPLY ROUTING in EL Section for details. (M15)

Refer to Foldout Page in EL Section for details. (M9) (E44)

Refer to Foldout Page in EL Section for details. (E52)

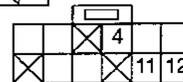
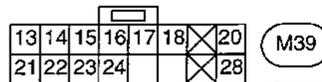
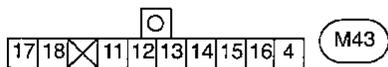
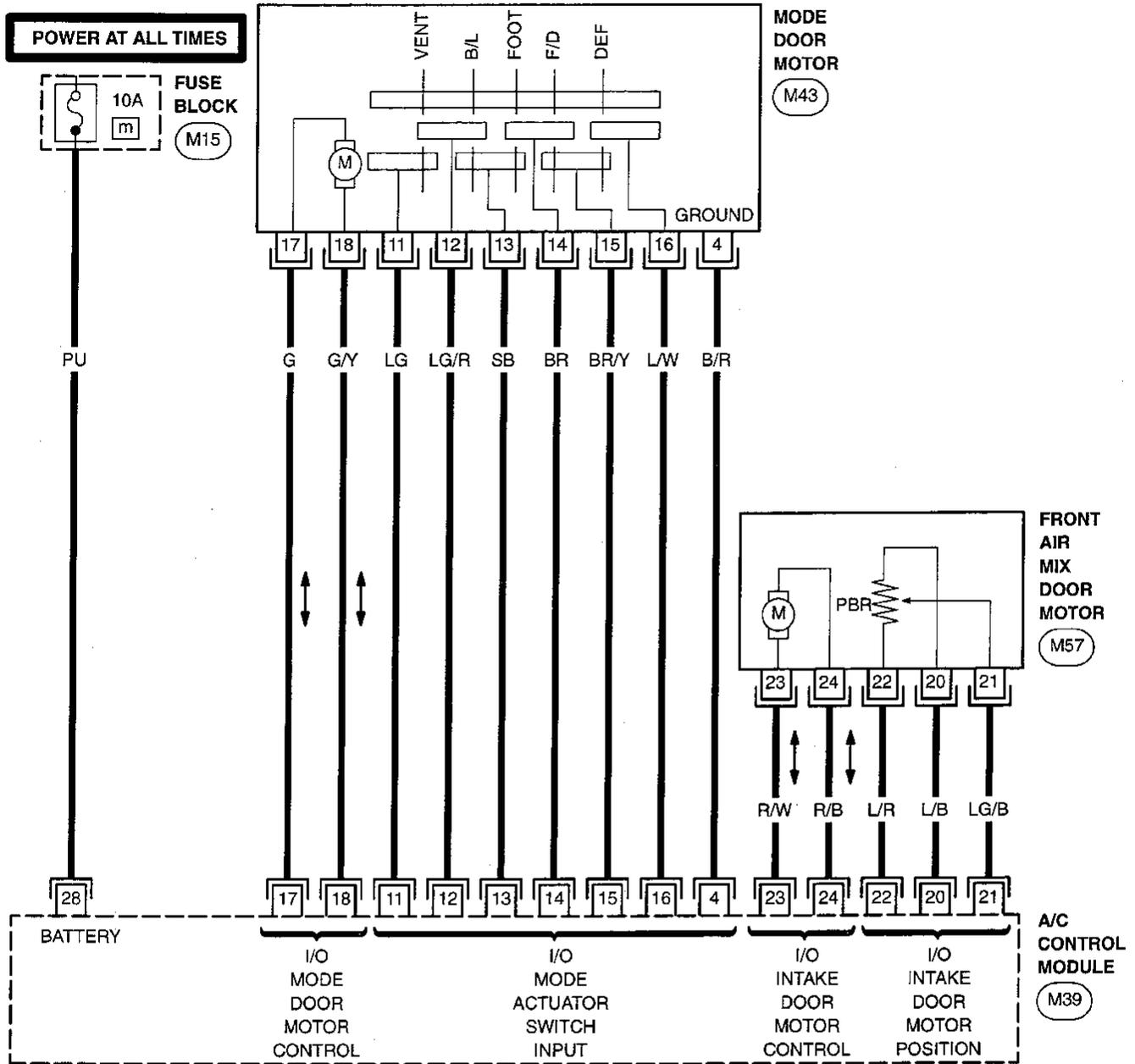


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# TROUBLE DIAGNOSES

## Wiring Diagram -A/C- (Cont'd)

HA-A/C-07



Refer to POWER SUPPLY ROUTING in EL Section for details.



# TROUBLE DIAGNOSES

## Main Power Supply and Ground Circuit Check

### POWER SUPPLY CIRCUIT CHECK FOR A/C SYSTEM

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

GI

MA

EM

LC

EF &

EC

FE

AT

FA

RA

BR

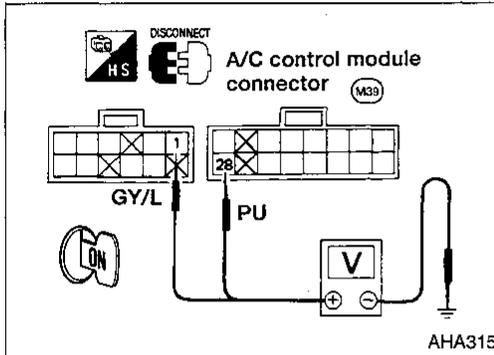
ST

BF

HA

EL

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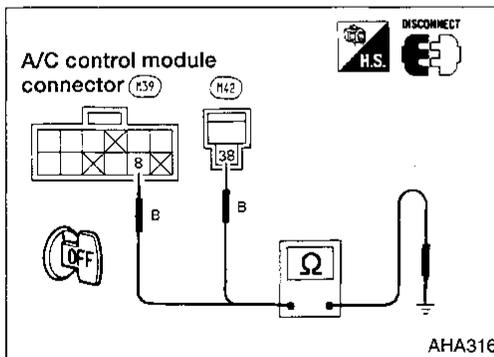


### A/C CONTROL MODULE CHECK

Check power supply circuit for A/C control module with ignition switch ON.

1. Disconnect A/C control module harness connector.
2. Connect voltmeter from harness side.
3. Measure voltage across terminal No. ①, ②⑧ and body ground.

Voltmeter terminal		Voltage
⊕	⊖	
①	Body ground	Approx. 12V
②⑧		



Check body ground circuit for A/C control module with ignition switch OFF.

1. Disconnect A/C control module harness connector.
2. Connect ohmmeter from harness side.
3. Check for continuity between terminal No. ⑧, ③⑧ and body ground.

Ohmmeter terminal		Continuity
⊕	⊖	
⑧	Body ground	Yes
③⑧		

④② is for rear A/C.

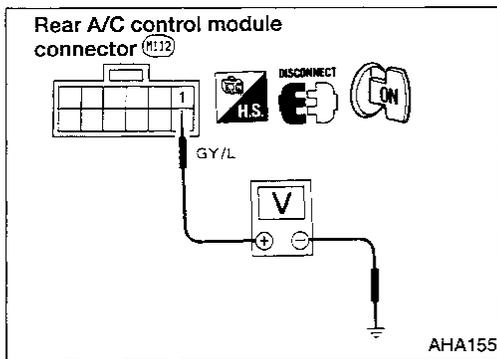
## TROUBLE DIAGNOSES

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

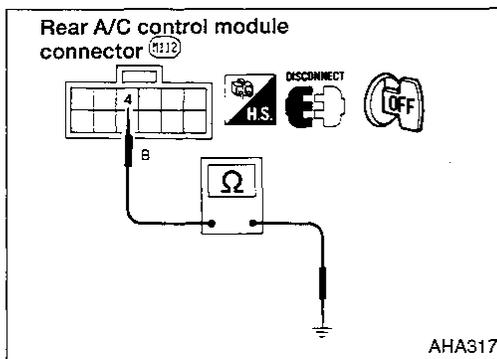
#### REAR A/C CONTROL MODULE CHECK

Check power supply circuit for rear A/C control module with ignition switch ON.

1. Disconnect rear A/C control module harness connector.
2. Connect voltmeter from harness side.
3. Measure voltage across terminal No. ① and body ground.



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



Check body ground circuit for rear A/C control module with ignition switch OFF.

1. Disconnect rear A/C control module harness connector.
2. Connect ohmmeter from harness side.
3. Check for continuity between terminal No. ④ and body ground.

Ohmmeter terminal		Continuity
⊕	⊖	
④	Body ground	Yes

# TROUBLE DIAGNOSES

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

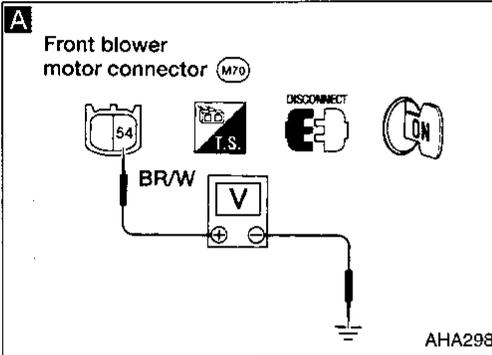
## Diagnostic Procedure 1

**SYMPTOM: Front blower motor does not rotate.**

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

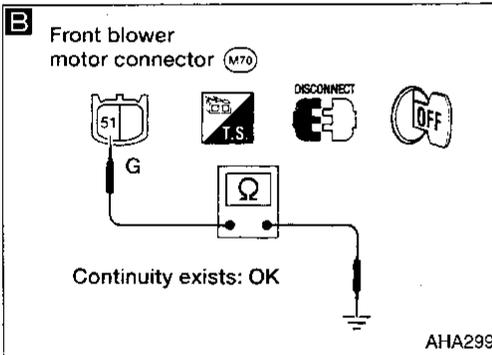
Check if front blower motor rotates properly at each fan speed. Conduct check as per flow chart at left.

2 3 4 5  
(Go to next page.) → B



**A** CHECK POWER SUPPLY FOR FRONT BLOWER MOTOR. Disconnect front blower motor harness connector. Turn the A/C control module ON (mode switch: any position except "OFF"). Do approx. 12 volts exist between blower motor harness terminal No. (54) and body ground?

NG → C (Go to HA-49)

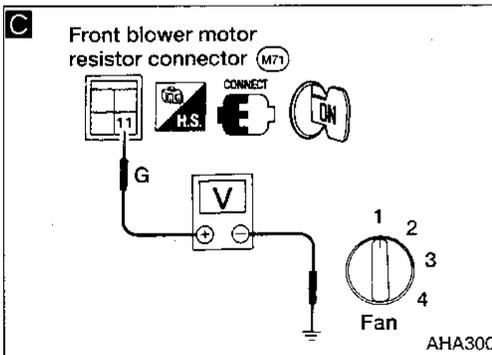


**B** Check circuit continuity between front blower motor harness terminal No. (51) and body ground.

OK → CHECK FRONT BLOWER MOTOR. Refer to HA-64.

NG  
Reconnect blower motor harness connector.

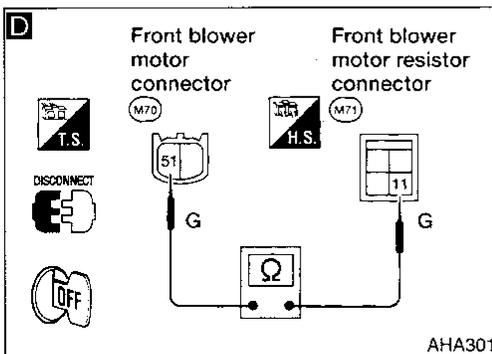
NG  
Replace front blower motor.



**C** CHECK FRONT BLOWER MOTOR CIRCUIT BETWEEN FRONT BLOWER MOTOR AND FRONT BLOWER MOTOR RESISTOR. Turn the A/C control module ON (mode switch: any position except "OFF"). Do approx. 12 volts exist between front blower motor resistor harness terminal No. (11) and body ground?

NG → Disconnect front blower motor and front blower motor resistor harness connectors.

**D** Note  
Check circuit continuity between front blower motor harness terminal No. (51) and front blower motor resistor harness terminal No. (11).

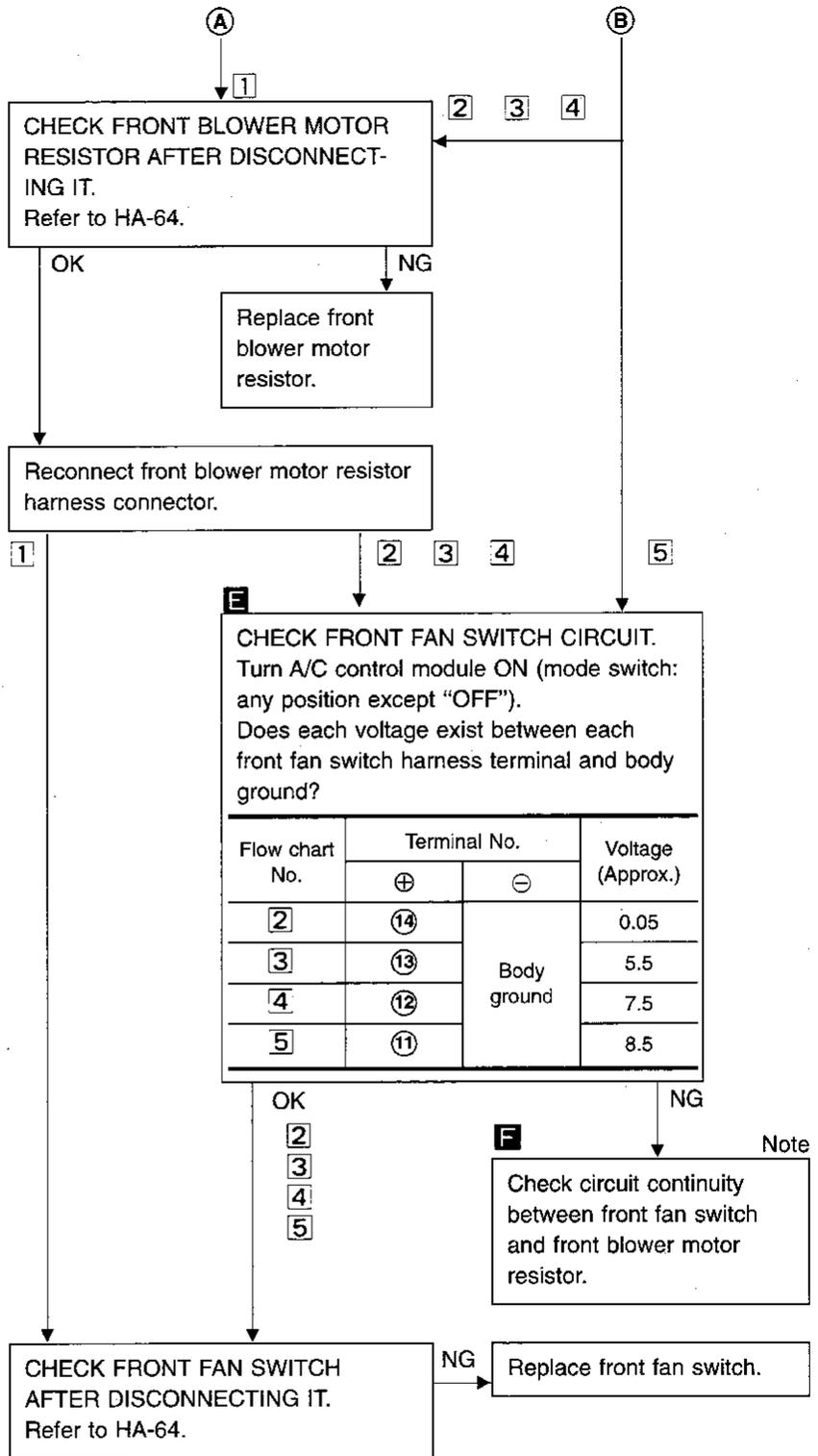
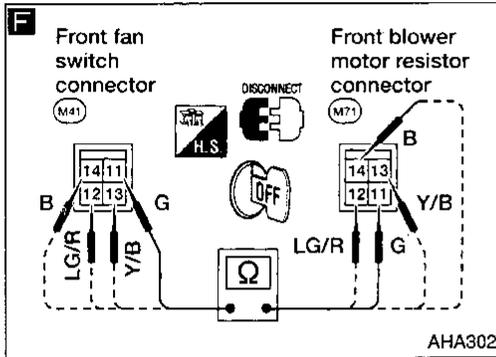
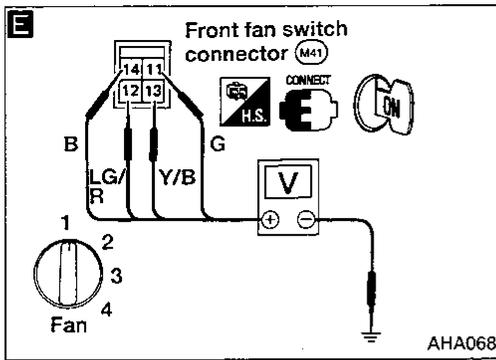


OK  
A  
(Go to next page.)

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

# TROUBLE DIAGNOSES

## Diagnostic Procedure 1 (Cont'd)

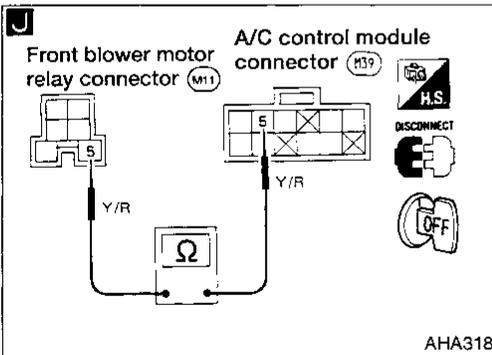
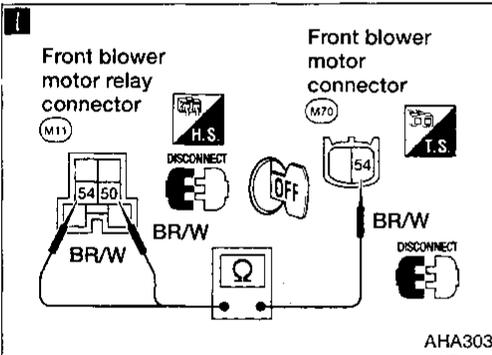
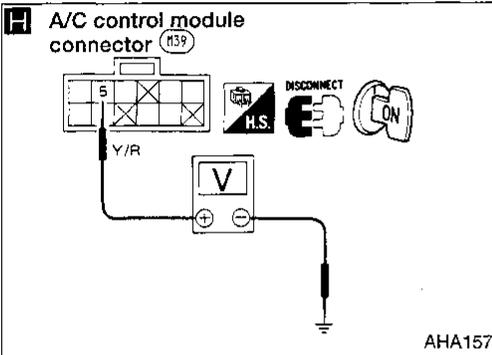
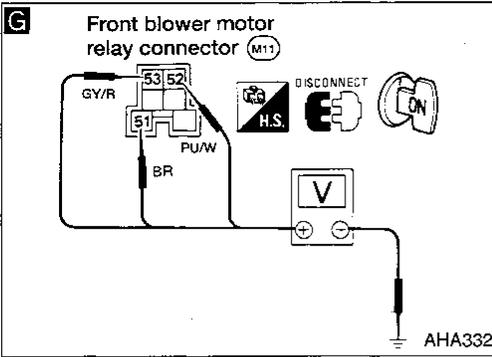


**Note:**

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

# TROUBLE DIAGNOSES

## Diagnostic Procedure 1 (Cont'd)



**G**

**CHECK POWER SUPPLY FOR FRONT BLOWER MOTOR RELAY.** Disconnect front blower motor relay harness connector. Do approx. 12 volts exist between each front blower motor relay harness terminal and body ground?

Terminal No.		Voltage
⊕	⊖	
51	Body ground	Approx. 12V
52		
53		

**OK**

**CHECK FRONT BLOWER MOTOR RELAY AFTER DISCONNECTING IT.** Refer to HA-65.

Reconnect front blower motor relay.

**H**

**CHECK POWER SUPPLY FOR A/C CONTROL MODULE.** Disconnect A/C control module harness connector. Do approx. 12 volts exist between A/C control module harness terminal No. 5 and body ground?

**OK**

**I**

**CHECK CIRCUIT CONTINUITY BETWEEN FRONT BLOWER MOTOR RELAY HARNESS TERMINAL NOS. 50, 54 AND FRONT BLOWER MOTOR HARNESS TERMINAL NO. 54.**

**NG**

**J**

**CHECK CIRCUIT CONTINUITY BETWEEN A/C CONTROL MODULE HARNESS TERMINAL NO. 5 AND FRONT BLOWER MOTOR RELAY HARNESS TERMINAL 5.**

**OK**

**CHECK POWER SUPPLY FOR A/C CONTROL MODULE.** Go to HA-45.

**OK**

**CHECK BODY GROUND CIRCUIT FOR A/C CONTROL MODULE.** Go to HA-45.

Replace A/C control module.

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

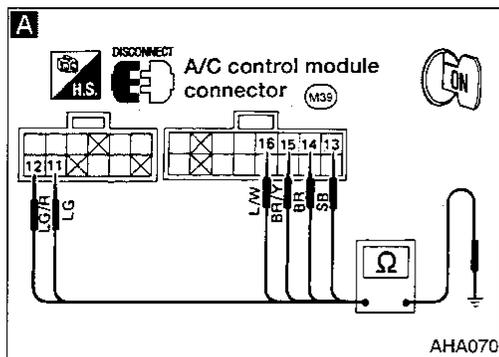
G1  
MA  
EM  
LG  
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DX

# TROUBLE DIAGNOSES

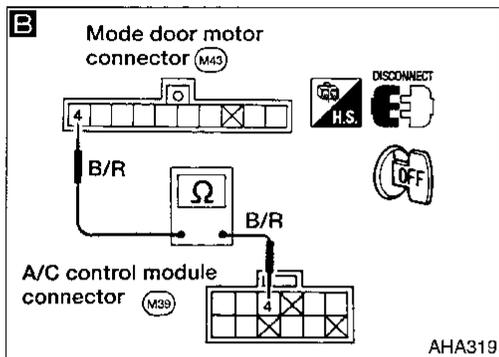
## Diagnostic Procedure 2

**SYMPTOM: Front air outlet does not change.**

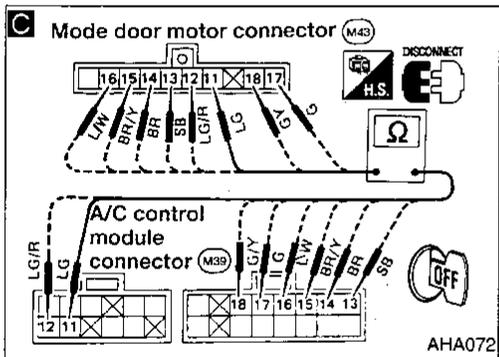
- Perform **PRELIMINARY CHECK 6** and **Main Power Supply and Ground Circuit Check** before referring to the following flow chart.



AHA070



AHA319



AHA072

- A**
- CHECK MODE DOOR MOTOR POSITION SWITCH.**
1. Turn VENT switch ON with ignition switch at ON position.
  2. Turn ignition switch OFF. Disconnect A/C control module connector.
  3. Check if continuity exists between terminal No. ⑪ or ⑫ of A/C control module harness connector and body ground.
  4. Using above procedures, check for continuity in any other mode, as indicated in chart.

Mode switch	Terminal No.		Continuity
	⊕	⊖	
VENT	⑪ or ⑫	Body ground	Yes
B/L	⑫ or ⑬		
FOOT	⑬ or ⑭		
F/D	⑭ or ⑮		
DEF	⑮ or ⑯		

OK

CHECK SIDE LINK.  
Refer to HA-66.

NG

Disconnect mode door motor harness connector.

**B** Note

**CHECK BODY GROUND CIRCUIT FOR MODE DOOR MOTOR.**  
Does continuity exist between mode door motor harness terminal No. ④ and A/C control module harness terminal No. ④.

OK

**C** Note

Check circuit continuity between each terminal on A/C control module and on mode door motor.

Terminal No.		Continuity
⊕	⊖	
A/C control module	Mode door motor	Yes
⑪	⑪	
⑫	⑫	
⑬	⑬	
⑭	⑭	
⑮	⑮	
⑯	⑯	
⑰	⑰	

OK

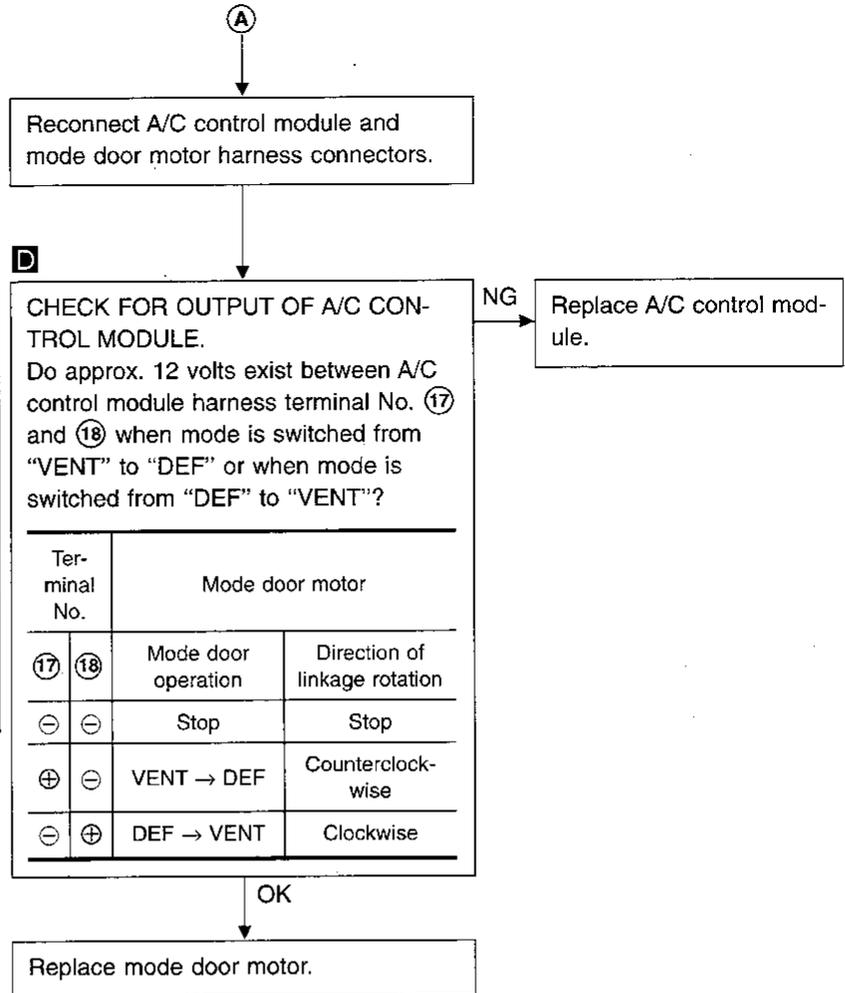
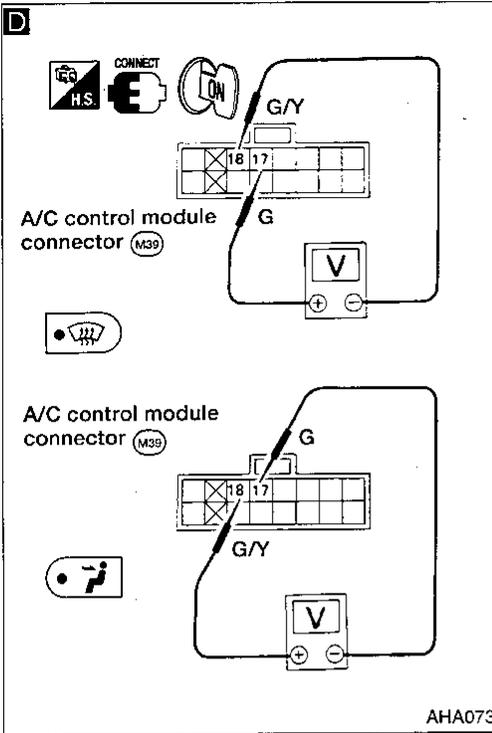
Ⓐ  
(Go to next page.)

**Note:**

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

# TROUBLE DIAGNOSES

## Diagnostic Procedure 2 (Cont'd)

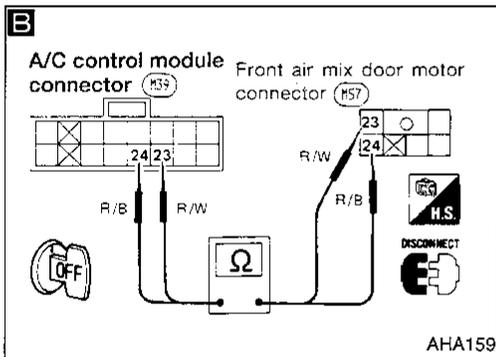
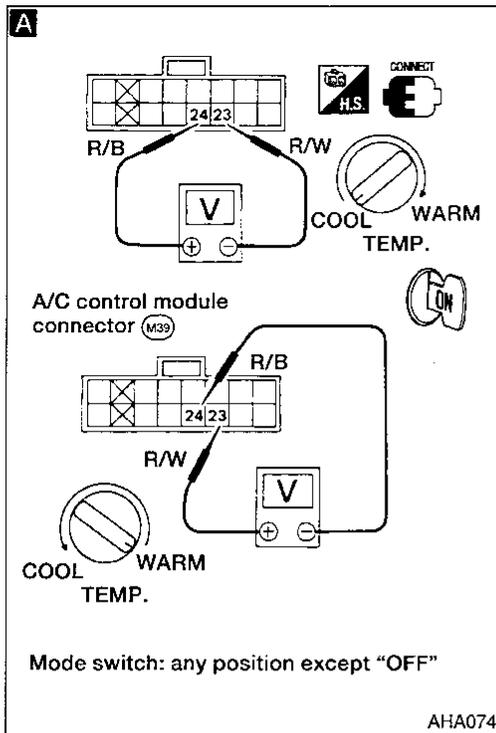


GI  
NA  
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EF & EC  
FE  
AT  
FA  
RA  
BR  
ST  
BF  
HA  
EL  
IDX

# TROUBLE DIAGNOSES

## Diagnostic Procedure 3

**SYMPTOM:** Front air mix door does not change.



**A**

**CHECK FOR OUTPUT OF A/C CONTROL MODULE.**  
Do approx. 12 volts exist between A/C control module harness terminals No. ②③ and ②④ when you move temp. control knob from full cold to full warm or when you move temp. control knob from full warm to full cold.

Temp. control knob position	Terminal No.		Voltage V
	②③	②④	
Full cold → Full warm	⊖	⊕	Approx. 12
Full warm → Full cold	⊕	⊖	

OK

Disconnect front air mix door motor and A/C control module harness connector.

**B** Note

Check circuit continuity between front air mix door motor harness terminal No. ②③ (②④) and A/C control module harness terminal No. ②③ (②④).

OK

Replace front air mix door motor.

NG

CHECK POWER SUPPLY FOR A/C CONTROL MODULE.  
Refer to HA-45.

OK

NG

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

Note

CHECK BODY GROUND CIRCUIT FOR A/C CONTROL MODULE.  
Go to HA-45.

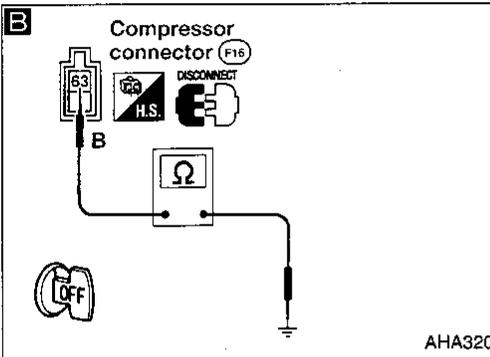
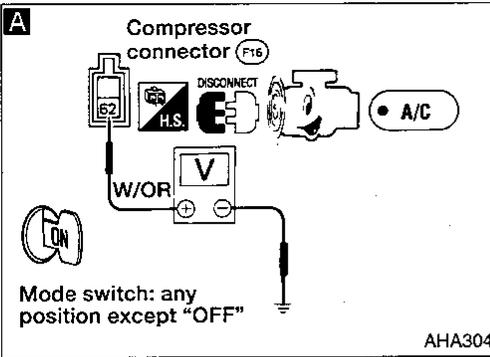
OK

Replace A/C control module.

**Note:**

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

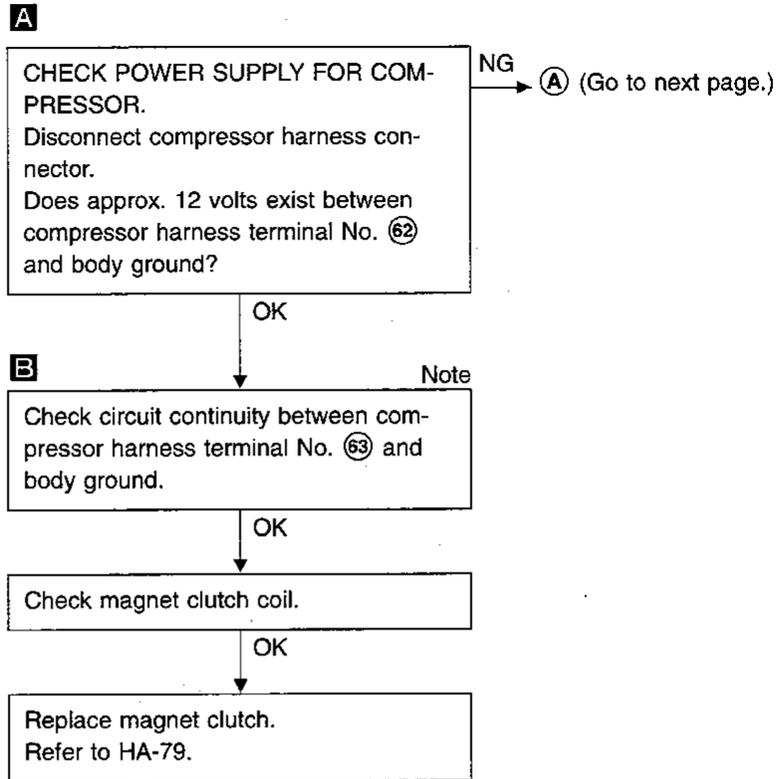
# TROUBLE DIAGNOSES



## Diagnostic Procedure 4

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

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



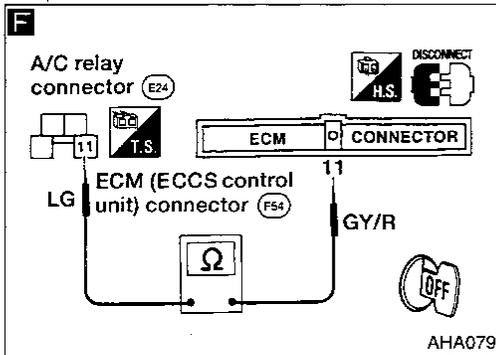
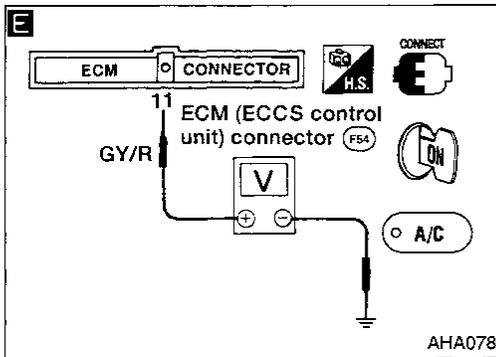
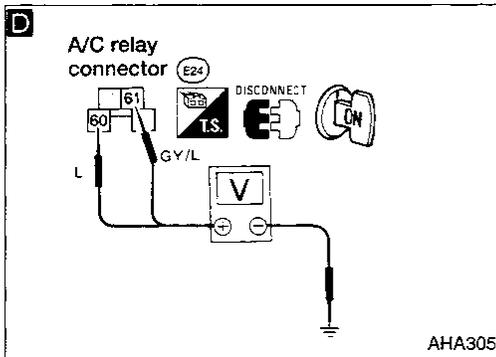
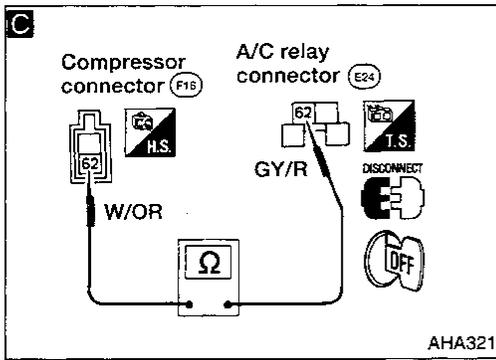
**Note:**

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

GI  
 MA  
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 BR  
 ST  
 BF  
 HA  
 EL  
 IDX

# TROUBLE DIAGNOSES

## Diagnostic Procedure 4 (Cont'd)



(A)  
Disconnect A/C relay harness connector.

(C) Note  
Check circuit continuity between A/C relay harness terminal No. (62) and compressor harness terminal No. (62).

(D) CHECK POWER SUPPLY FOR A/C RELAY.  
Disconnect A/C relay.  
Do approx. 12 volts exist between A/C relay harness terminal No. (61), (60) and body ground?  
NG → CHECK POWER SUPPLY CIRCUIT AND 10A FUSE AT FUSE BLOCK. Refer to EL section ("POWER SUPPLY ROUTING").

CHECK A/C RELAY AFTER DISCONNECTING IT. Refer to HA-65.  
NG → Replace A/C relay.

Reconnect A/C relay.

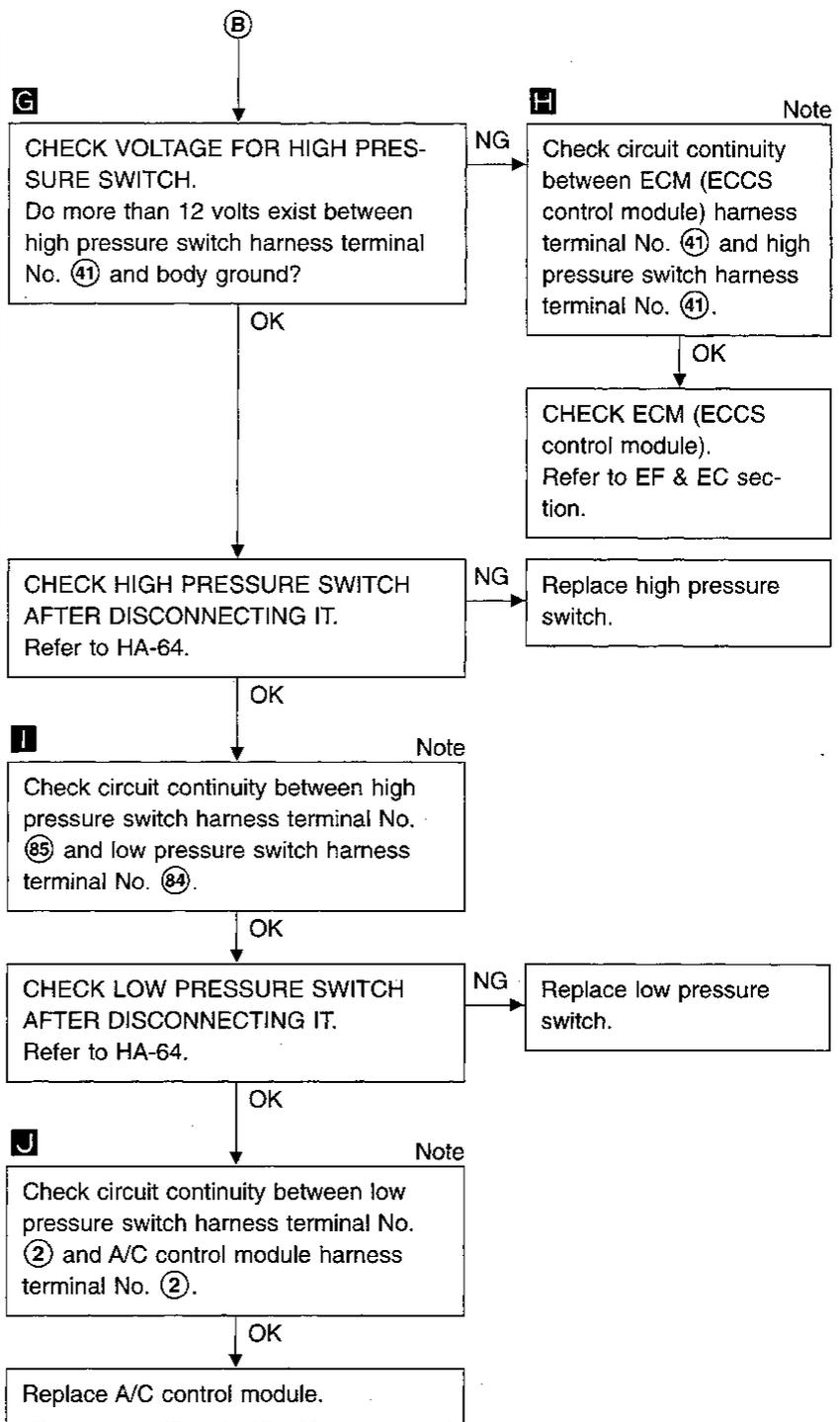
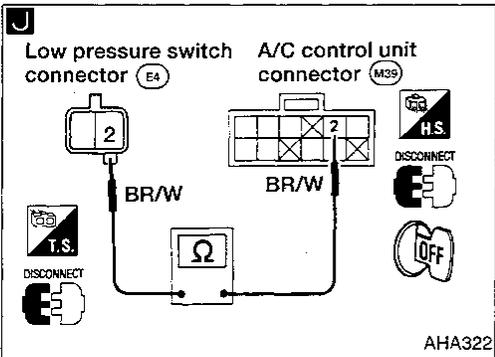
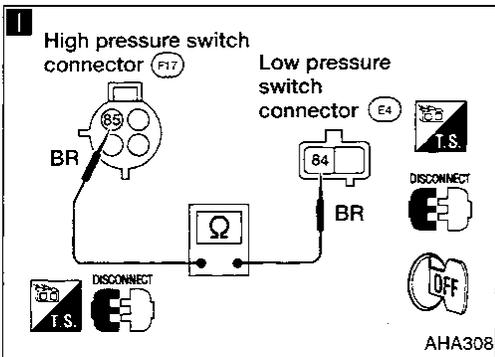
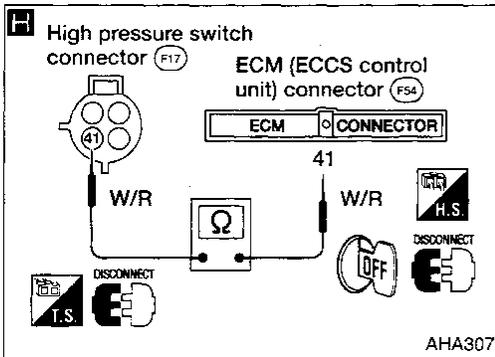
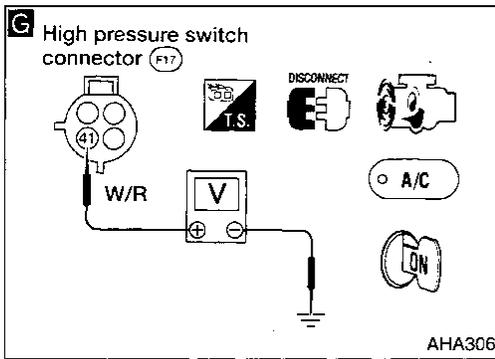
(E) CHECK COIL SIDE CIRCUIT OF A/C RELAY.  
Do approx. 12 volts exist between ECM (ECCS control module) harness terminal No. (11) and body ground with A/C switch "OFF"?  
NG → (F) Note  
Check circuit continuity between A/C relay harness terminal No. (11) and ECM (ECCS control module) harness terminal No. (11).

(B)  
(Go to next page.)

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

# TROUBLE DIAGNOSES

## Diagnostic Procedure 4 (Cont'd)



**Note:**

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

GI

MA

EM

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BR

ST

BF

HA

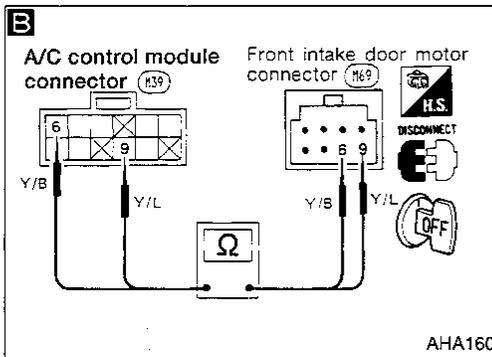
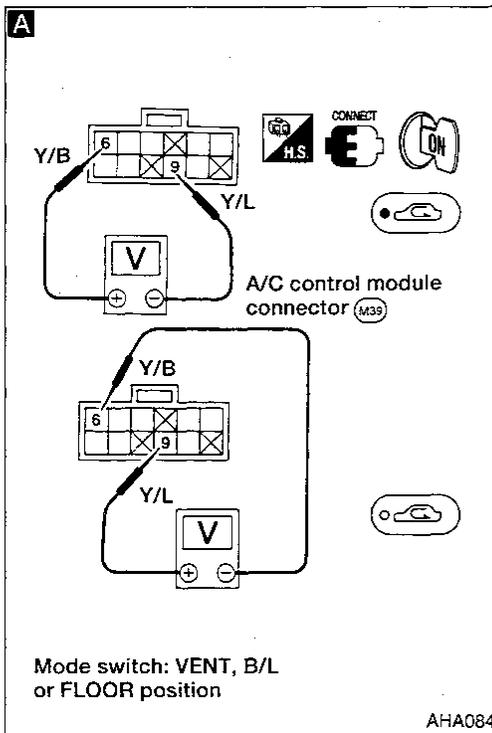
EL

IDX

# TROUBLE DIAGNOSES

## Diagnostic Procedure 5

**SYMPTOM:** Front intake door motor does not operate normally.



**A**

**CHECK FOR OUTPUT OF A/C CONTROL MODULE.**  
Do approx. 12 volts exist between A/C control module harness terminals No. ⑥ and ⑨ when you turn REC switch ON or OFF?

REC switch position	Terminal No.		Voltage V
	⑥	⑨	
ON	⊕	⊖	Approx. 12
OFF	⊖	⊕	

OK

Disconnect front intake door motor and A/C control module harness connector.

**B** Note

Check circuit continuity between front intake door motor harness terminal No. ⑥ (⑨) and A/C control module harness terminal No. ⑥ (⑨).

OK

Replace front intake door motor.

NG

CHECK POWER SUPPLY FOR A/C CONTROL MODULE.  
Go to HA-45.

OK

NG

Note

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

OK

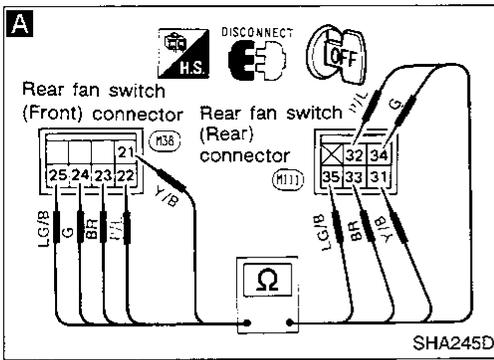
CHECK BODY GROUND CIRCUIT FOR A/C CONTROL MODULE.  
Go to HA-45.

OK

Replace A/C control module.

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

# TROUBLE DIAGNOSES



## Diagnostic Procedure 6

**SYMPTOM:** Rear blower motor does not rotate when front fan switch for rear A/C is set to "REAR" position.

Does rear blower motor rotate normally when front fan lever for rear A/C is set at 1 to 4-speed? NG → Perform Diagnostic Procedure 7. Refer to HA-58.

OK ↓

CHECK REAR FAN SWITCH (REAR) AFTER DISCONNECTING IT. Refer to HA-65. NG → Replace rear fan switch (rear).

OK ↓

**A** Note

Check circuit continuity between each terminal on rear fan switch (front) and on rear fan switch (rear).

Terminal No.		Continuity
⊕	⊖	
Rear fan SW (front)	Rear fan SW (rear)	Yes
21	31	
22	32	
23	33	
24	34	
25	35	

OK ↓

CHECK REAR FAN SWITCH (FRONT) AFTER DISCONNECTING IT. Refer to HA-65. NG → Replace rear fan switch (front).

**Note:**

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

CI  
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# TROUBLE DIAGNOSES

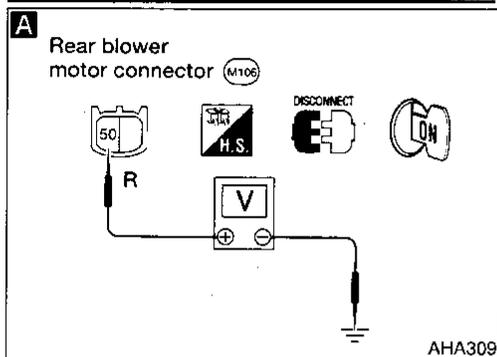
	INCIDENT	Flow chart No.
1	Fan fails to rotate.	1
2	Fan does not rotate at 1-speed.	2
3	Fan does not rotate at 2-speed.	3
4	Fan does not rotate at 3-speed.	4
5	Fan does not rotate at 4-speed.	5

## Diagnostic Procedure 7

**SYMPTOM: Rear blower motor does not rotate when front fan switch for rear A/C is set at 1 to 4-speed.**

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

2 3 4 5  
(Go to next page.)



**A**

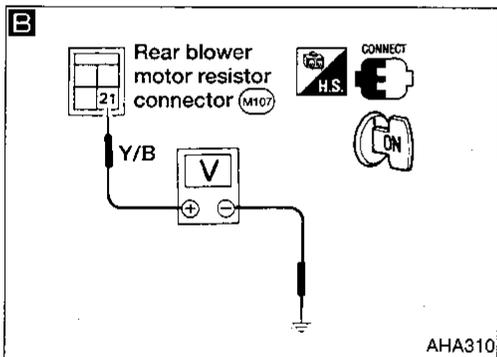
**CHECK POWER SUPPLY FOR REAR BLOWER MOTOR.**  
Disconnect rear blower motor harness connector.  
Do approx. 12 volts exist between blower motor harness terminal No. (50) and body ground?

NG

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

OK

Reconnect rear blower motor harness connector.



**B**

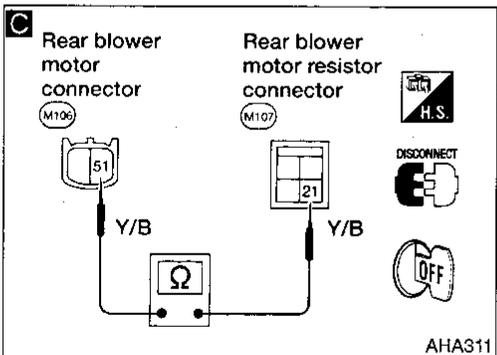
**CHECK REAR BLOWER MOTOR CIRCUIT BETWEEN REAR BLOWER MOTOR AND REAR BLOWER MOTOR RESISTOR.**  
Do approx. 12 volts exist between rear blower motor resistor harness terminal No. (21) and body ground?

NG

Disconnect rear blower motor and rear blower motor resistor harness connectors.

OK

(Go to next page.)



**C**

Note

Check circuit continuity between rear blower motor harness terminal No. (51) and rear blower motor resistor harness terminal No. (21).

OK

**CHECK REAR BLOWER MOTOR.**  
Refer to HA-65.

NG

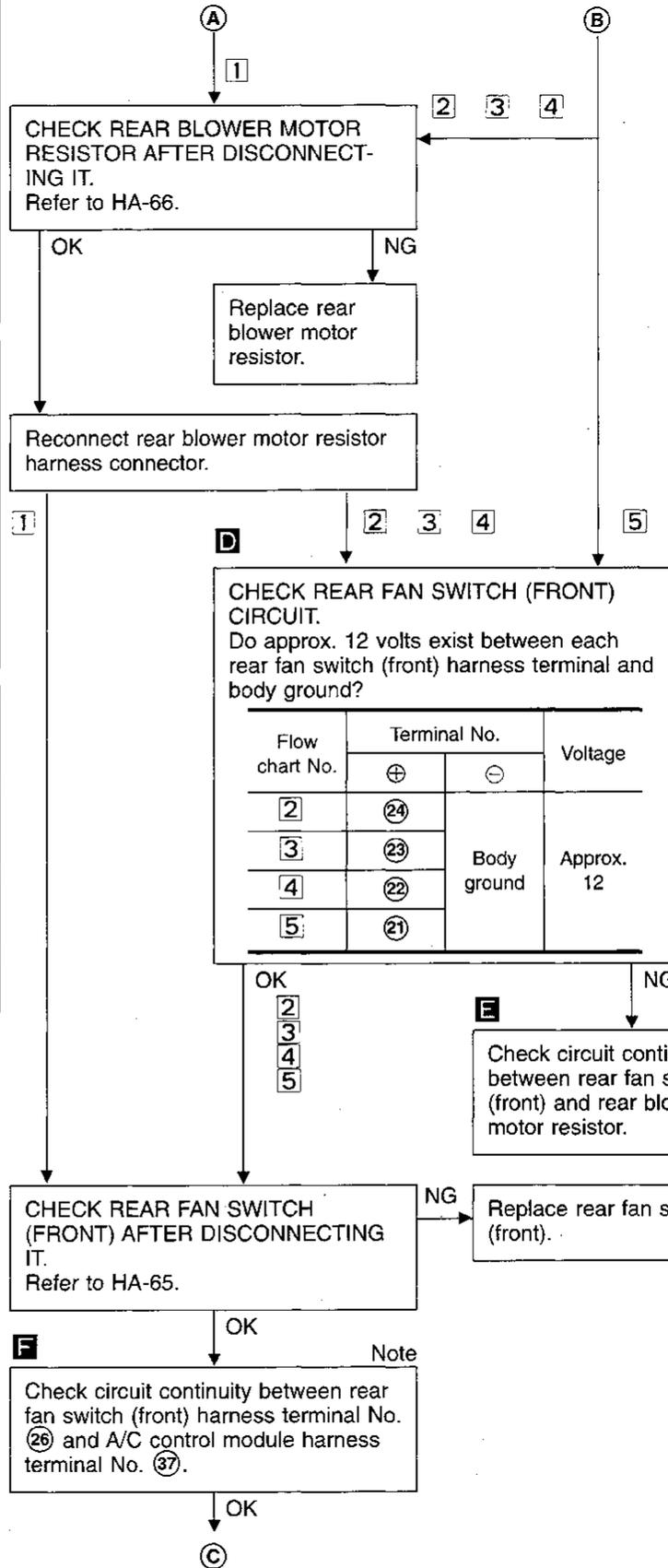
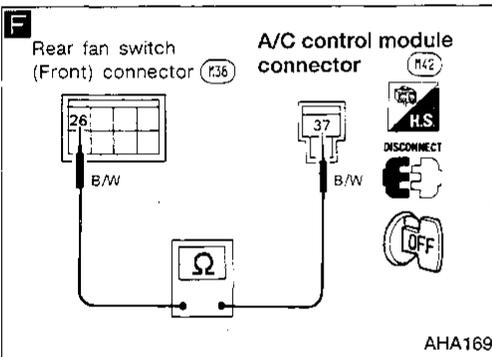
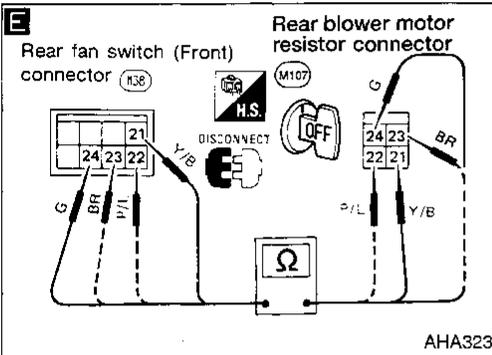
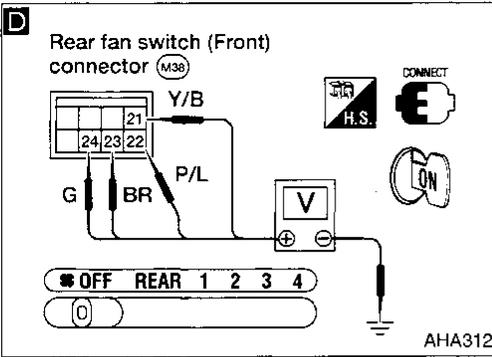
Replace rear blower motor.

**Note:**

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

# TROUBLE DIAGNOSES

## Diagnostic Procedure 7 (Cont'd)



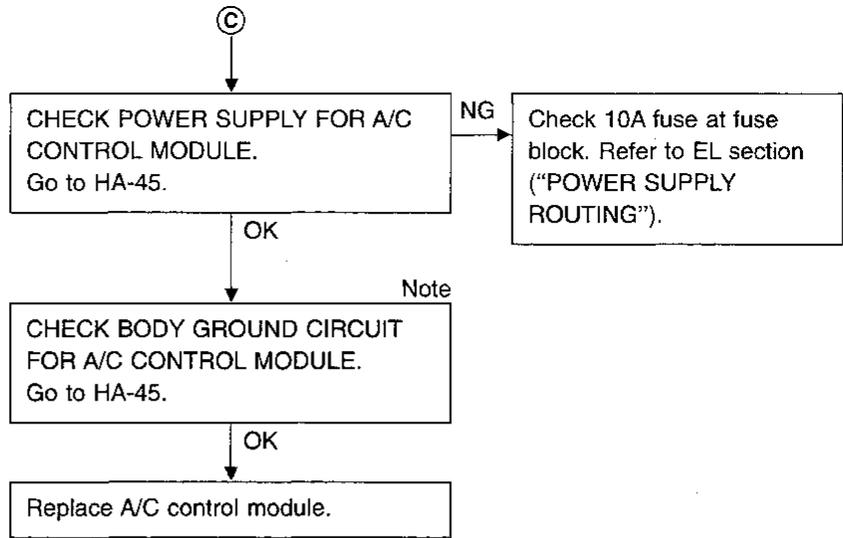
**Note:**

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

GI  
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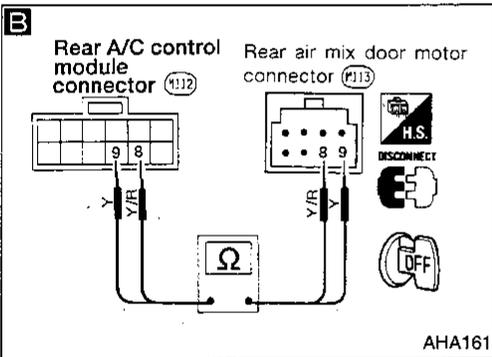
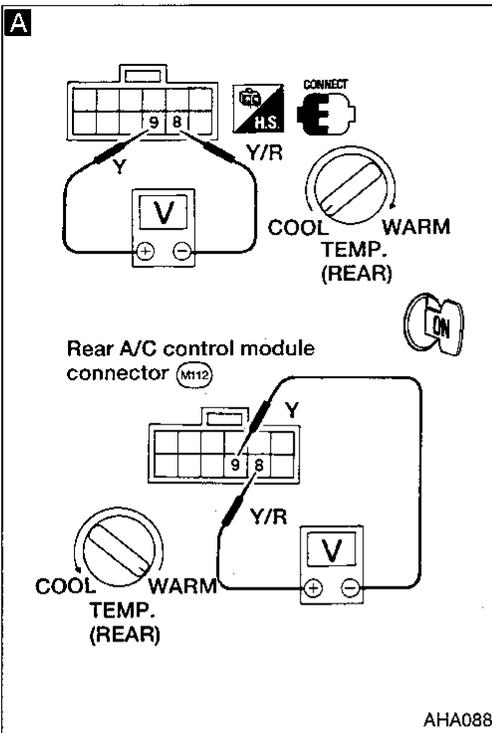
# TROUBLE DIAGNOSES

## Diagnostic Procedure 7 (Cont'd)



**Note:**

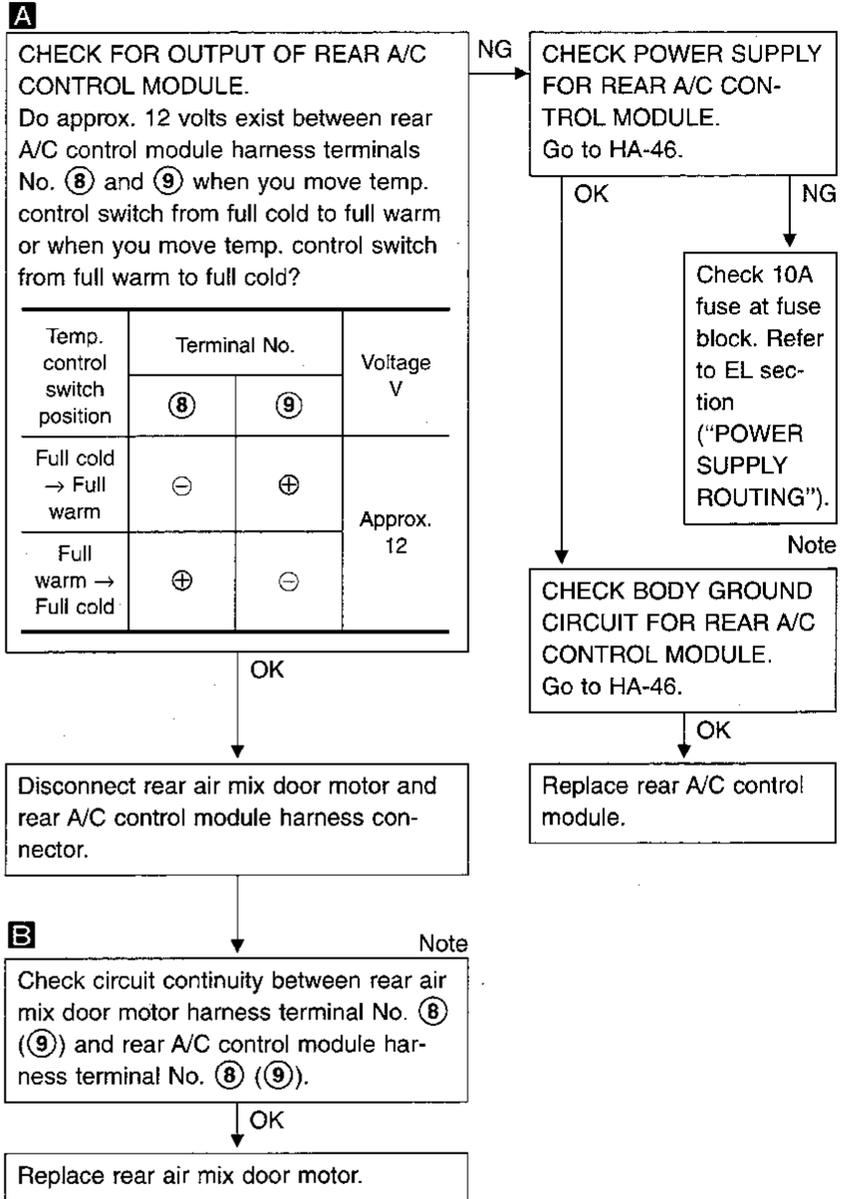
If the result is NG after checking circuit continuity, repair harness or connector.



## Diagnostic Procedure 8

**SYMPTOM:** Rear air mix door motor does not operate normally.

- Perform PRELIMINARY CHECK 4 before referring to the following flow chart.



**Note:**

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

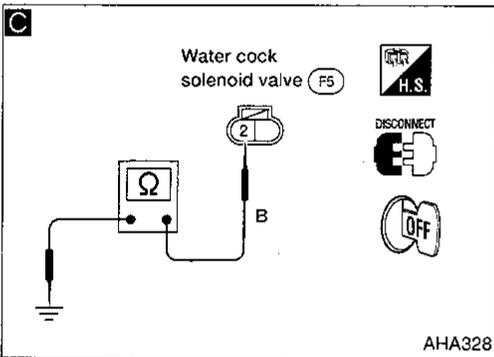
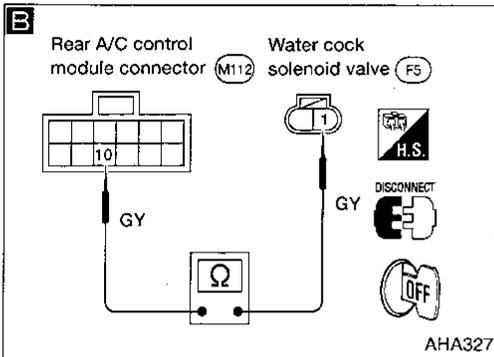
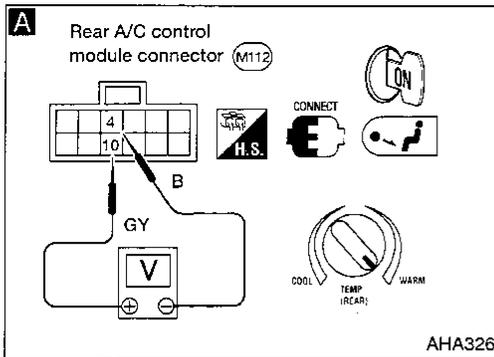
GI  
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EF & EC  
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HA  
EL  
IDX

# TROUBLE DIAGNOSES

## Diagnostic Procedure 9

**SYMPTOM:** Water cock solenoid valve for rear heater does not operate normally.

- Perform **PRELIMINARY CHECK 4** before referring to the following flow chart.



**A**

CHECK FOR OUTPUT OF REAR A/C CONTROL MODULE.  
Measure voltage across terminals No. ④ and ⑩.

Rear fan switch (front) position	Voltage V
OFF	Approx. 9
1, 2, 3 or 4	Approx. 0

OK

Disconnect water cock solenoid valve and rear A/C control module harness connector.

**B** Note

Check circuit continuity between water cock solenoid valve harness terminal No. ① and rear A/C control module harness terminal No. ⑩.

**C** Note

Check circuit continuity between water cock solenoid valve harness terminal No. ② and body ground.

Replace water cock solenoid valve.

NG

CHECK POWER SUPPLY FOR REAR A/C CONTROL MODULE.  
Go to HA-46.

OK

NG

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

Note

CHECK BODY GROUND CIRCUIT FOR REAR A/C CONTROL MODULE.  
Go to HA-46.

OK

Replace rear A/C control module.

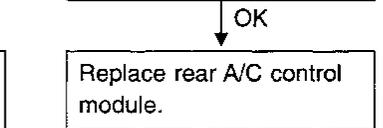
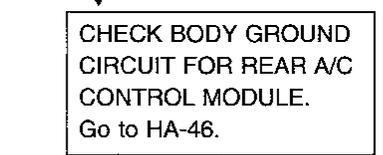
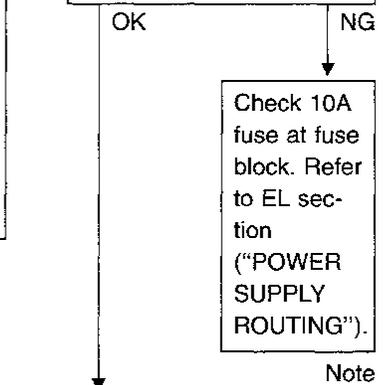
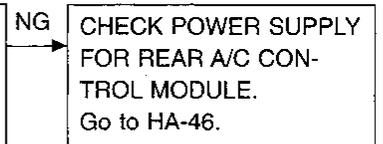
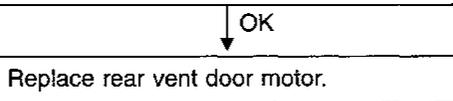
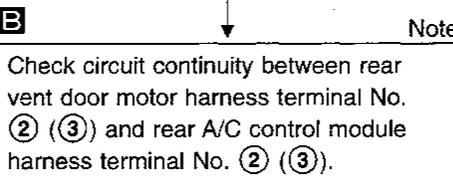
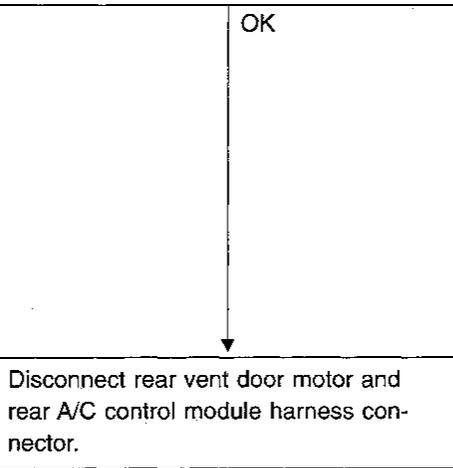
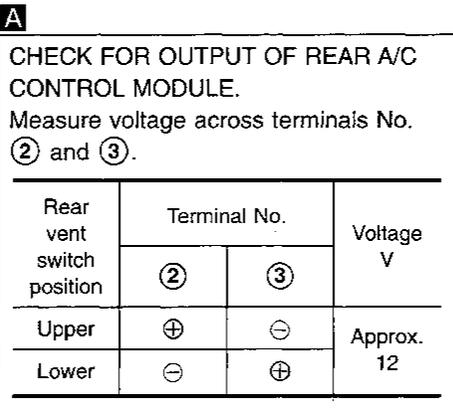
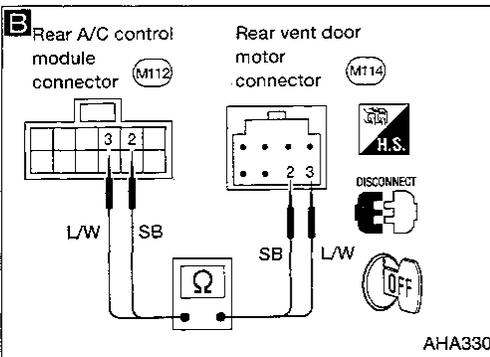
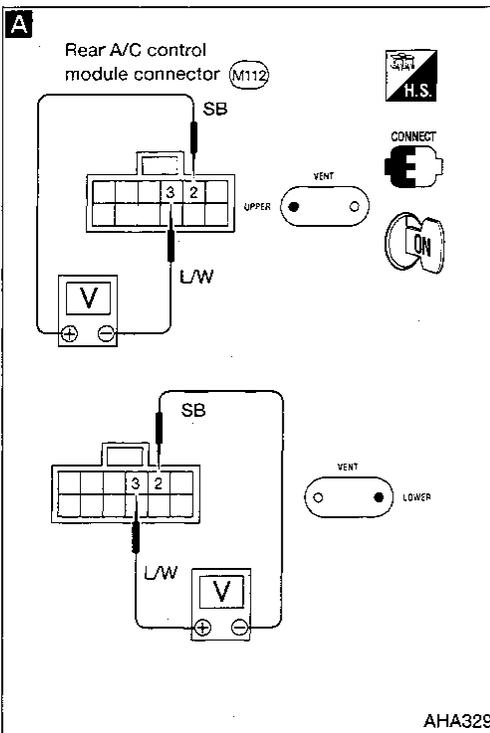
**Note:**

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

# TROUBLE DIAGNOSES

## Diagnostic Procedure 10

**SYMPTOM:** Rear vent door motor does not operate normally.



**Note:**

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

GI

MA

EM

LC

EF &

EC

FE

AT

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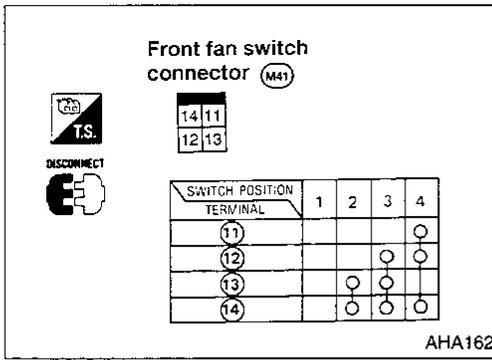
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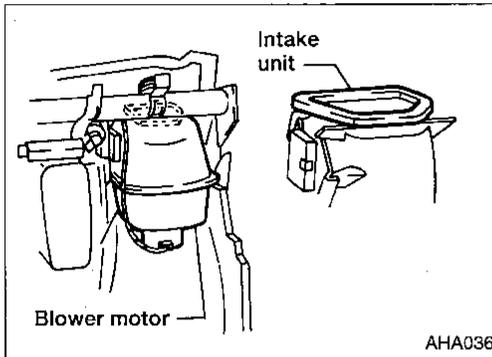
# TROUBLE DIAGNOSES



## Electrical Components Inspection

### FRONT FAN SWITCH

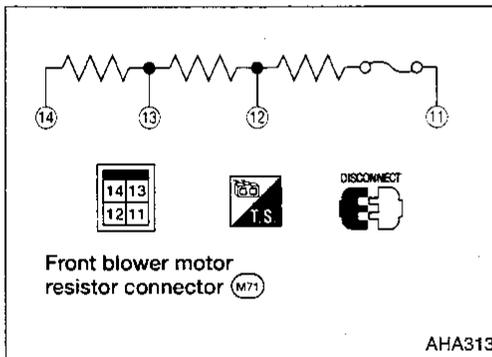
Check continuity between terminals at each switch position.



### FRONT BLOWER MOTOR

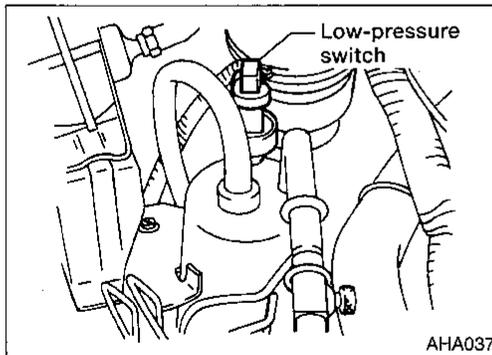
Confirm smooth rotation of the front blower motor.

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



### FRONT BLOWER MOTOR RESISTOR

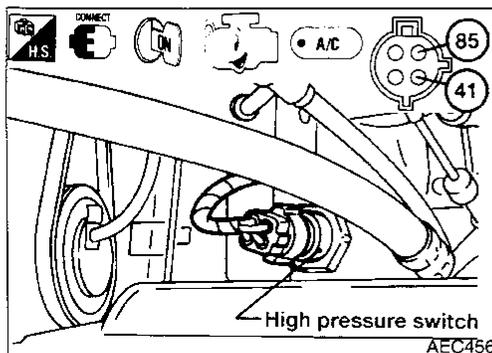
Check continuity between terminals.



### LOW PRESSURE SWITCH

Check continuity between terminals.

Low-pressure side line pressure kPa (kg/cm <sup>2</sup> , psi)	Clutch operation	Continuity
Decreasing to 159 (1.6, 23)	Turn OFF	Does not exist
Increasing to 324 (3.3, 47)	Turn ON	Exists
Tightening torque	1.3 - 5.4 N·m (0.13 - 0.55 kg·m, 0.9 - 4.0 ft·lb)	



### HIGH PRESSURE SWITCH

Check continuity between terminals 85 and 41.

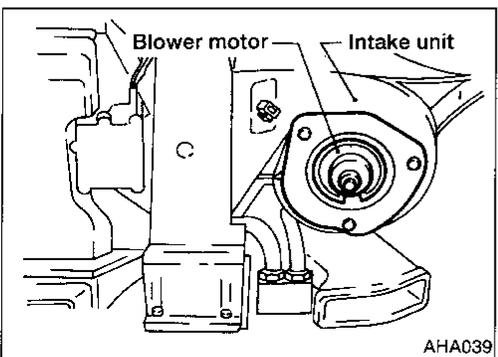
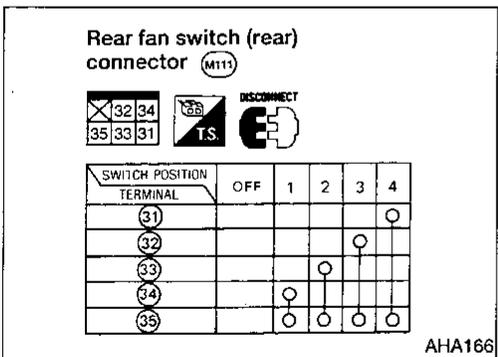
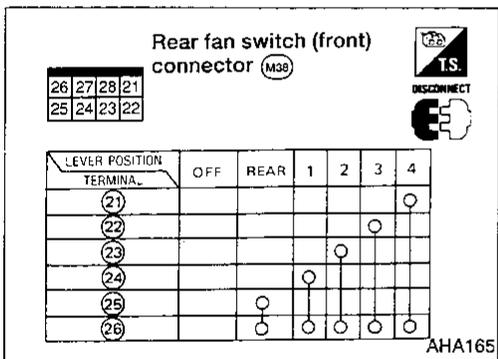
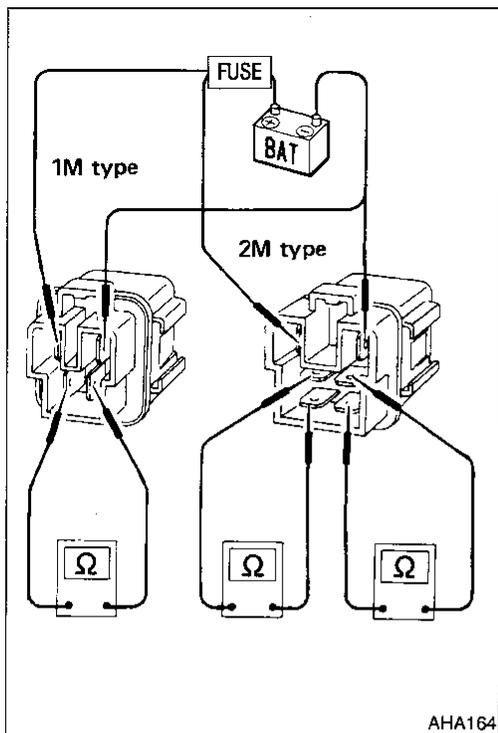
High-pressure side line pressure kPa (kg/cm <sup>2</sup> , psi)	Clutch operation	Continuity
Increasing to 2,785 (28.4, 404)	Turn OFF	Does not exist
Decreasing to 1,569 (16.0, 228)	Turn ON	Exists
Tightening torque	6.8 - 12.2 N·m (0.69 - 1.24 kg·m, 5.0 - 9.0 ft·lb)	

# TROUBLE DIAGNOSES

## Electrical Components Inspection (Cont'd)

### RELAYS

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



### REAR FAN SWITCH (Front)

Check continuity between terminals at each switch position.

### REAR FAN SWITCH (Rear)

Check continuity between terminals at each switch position.

### REAR BLOWER MOTOR

Confirm smooth rotation of the rear blower motor.

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

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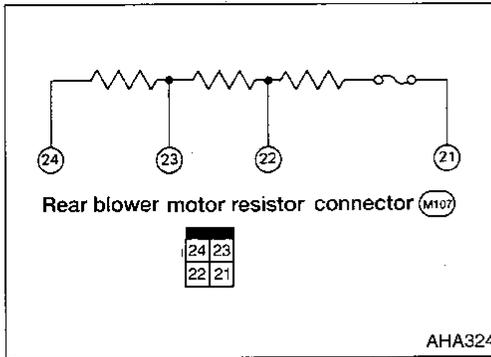
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## TROUBLE DIAGNOSES

### Electrical Components Inspection (Cont'd)

#### REAR BLOWER MOTOR RESISTOR

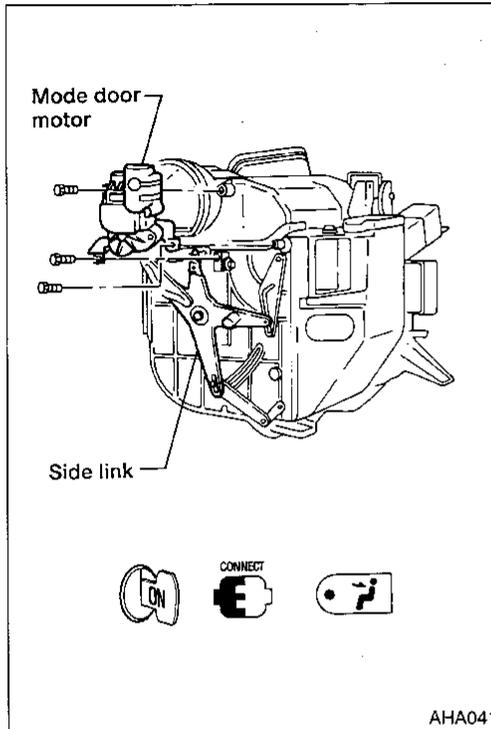
Check continuity between terminals.



### Control Linkage Adjustment

#### MODE DOOR

1. Move side link with hand and hold mode door in DEF mode.
2. Install mode door motor on heater unit and connect it to body harness.
3. Turn ignition switch to ON.
4. Turn DEF switch ON.
5. Adjust length and attach mode door motor rod to side link rod holder.
6. Turn VENT switch ON. Check that side link operates at the fully-open position. Also turn DEF switch ON to check that side link operates at the fully-open position.

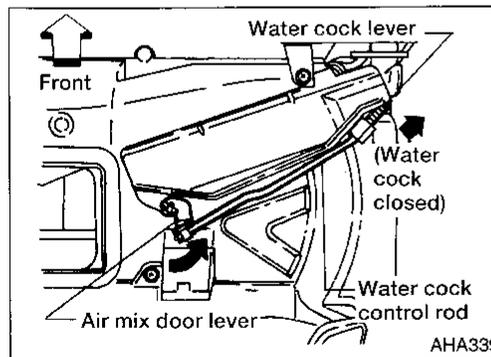


#### WATER COCK CONTROL ROD (for heater core replacement)

- When adjusting water cock control rod, first connect air mix door motor to vehicle harness and turn temperature control knob to full cold.

1. Disconnect water cock control rod from air mix door lever.
2. Connect water cock control rod to water cock lever.
3. Push the control rod in direction of arrow by hand, and hold it in closed position.
4. While holding both the rod and the door, adjust the length of the rod and connect it to air mix door lever.

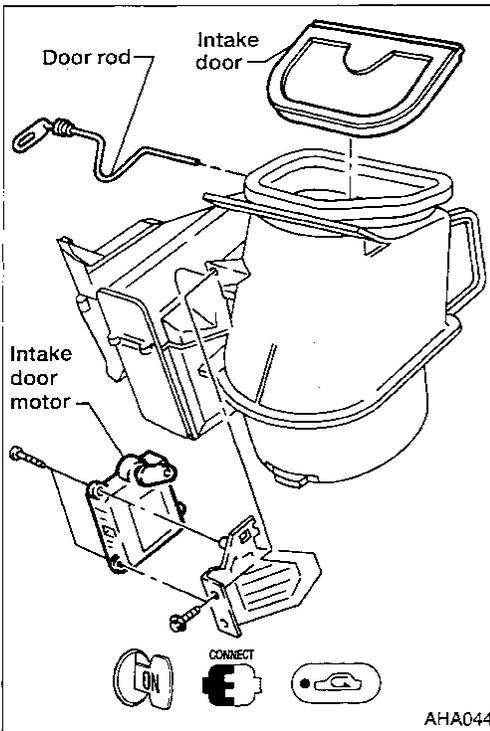
After connecting control rod, check that it operates properly.



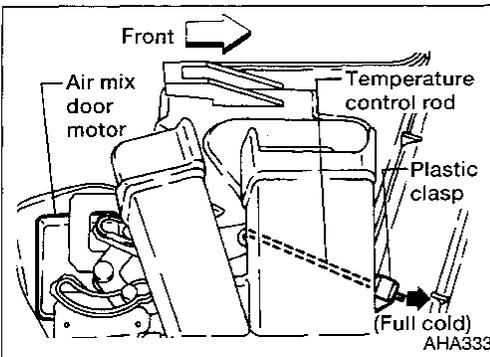
## TROUBLE DIAGNOSES

### Control Linkage Adjustment (Cont'd)

#### INTAKE DOOR



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



#### TEMPERATURE CONTROL ROD

**Before adjusting, push temperature control rod fully forward to front of vehicle. Note position of clasp.**

1. Install air mix door motor on heater unit and connect it to main harness.
2. Turn ignition switch to ON.
3. Turn temperature control knob to maximum cold.
4. Move air mix door by hand to maximum cold position (door completely covers heater core) and hold it.
5. While holding air mix door, adjust the length of temperature control rod and connect it to air mix door lever.

**After connecting control rod, check for proper operation.**

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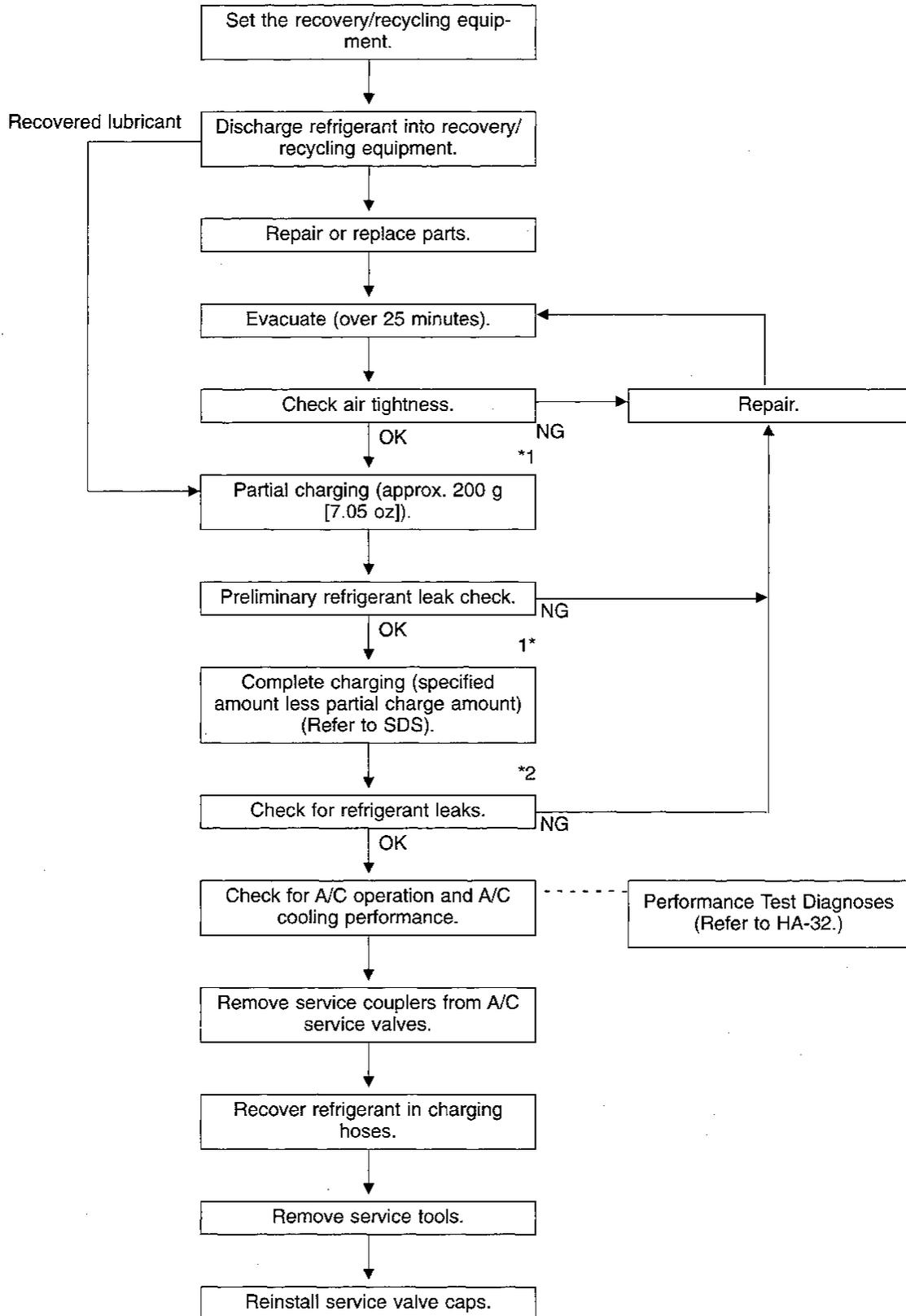
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## R-134a Service Procedure



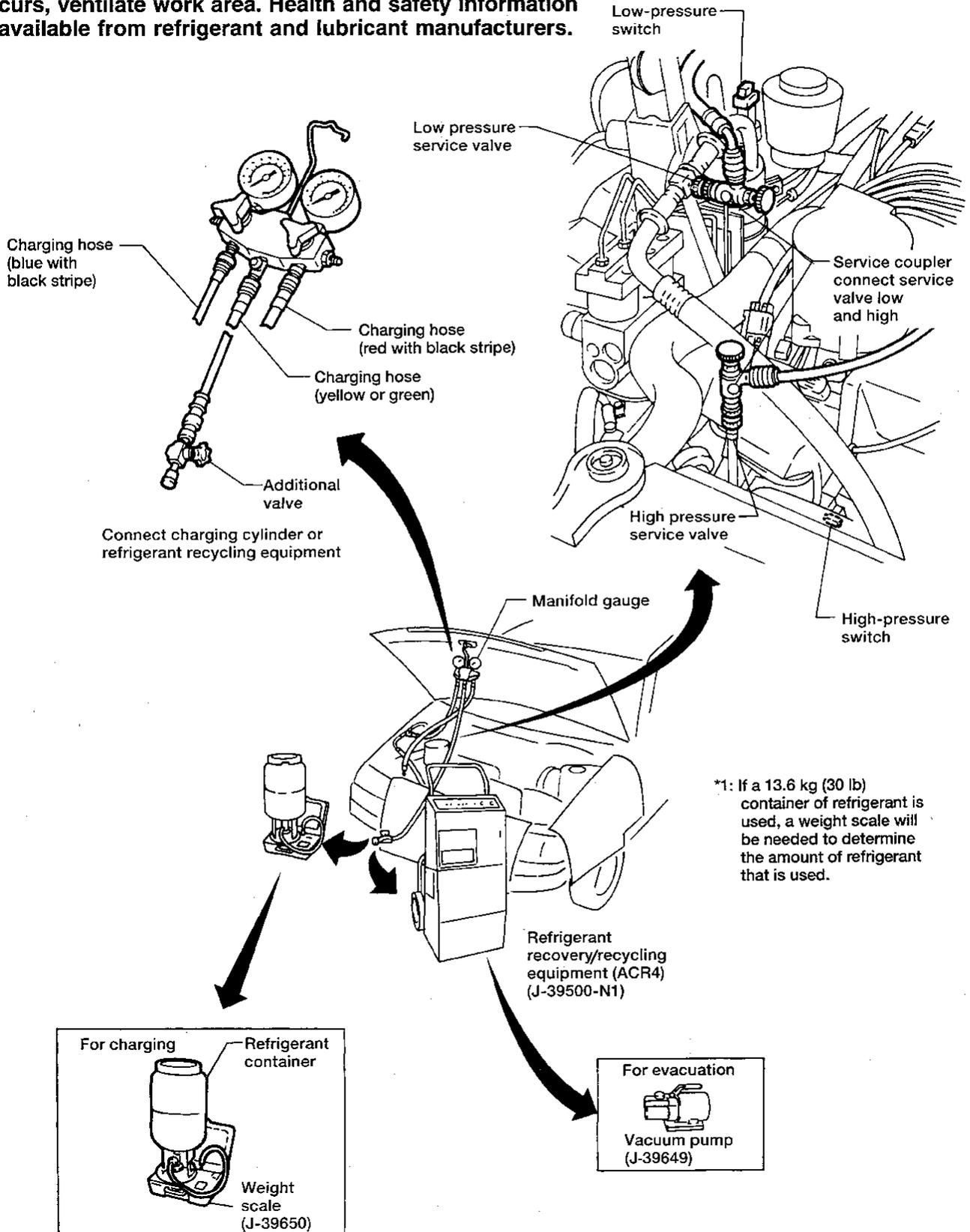
Note: \*1 Before charging refrigerant, ensure engine is off.

\*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.

**Setting of Service Tools**

**WARNING:**

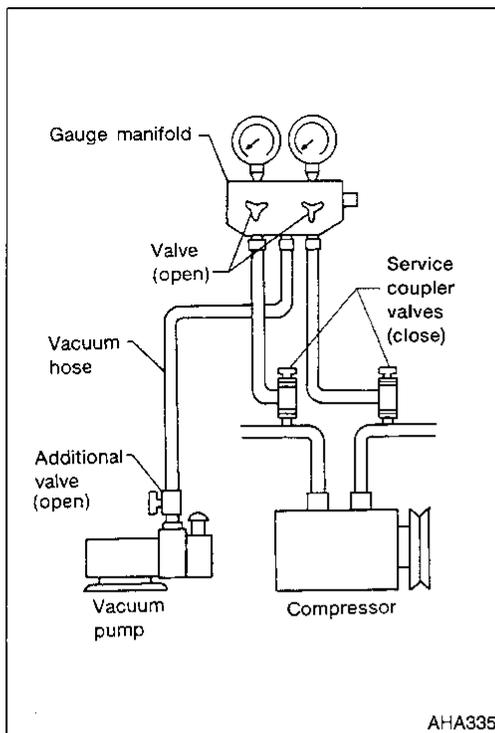
Do not breathe A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Use service equipment certified to meet the requirements of SAE J2210 or J2209. If accidental system discharge occurs, ventilate work area. Health and safety information is available from refrigerant and lubricant manufacturers.



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# DISCHARGING, EVACUATING, CHARGING AND CHECKING

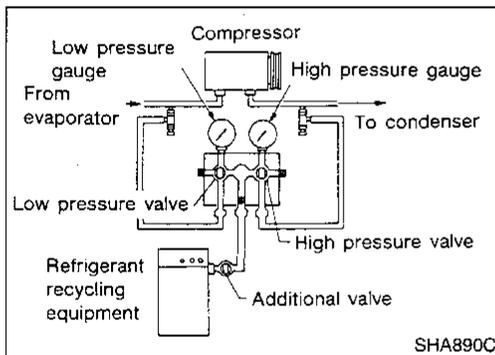
## Setting of Service Tools (Cont'd)



1. Install charging hoses with service coupler to high pressure and low pressure service valves.

**Before connecting service coupler, turn handle fully counterclockwise to retract pin.**

2. Connect vacuum hose to vacuum pump.
3. Run vacuum pump and open additional valve and both valves on gauge manifold set.
4. After evacuating unwanted air in gauge set, close additional valve and stop vacuum pump.
5. Disconnect vacuum hose from vacuum pump and connect it to refrigerant recycling equipment.



## Discharging

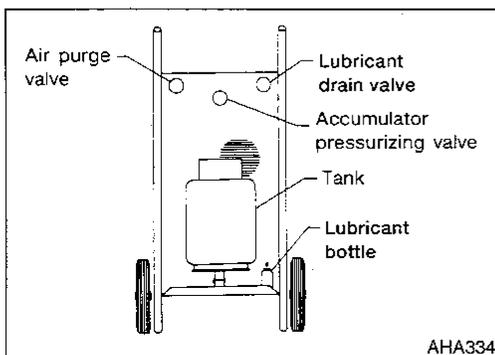
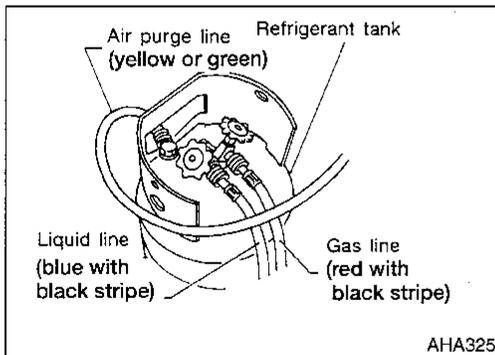
### WARNING:

**Discharge only into the recycling equipment. Do not release refrigerant into the air.**

**Use only authorized refillable refrigerant tanks for the recycling equipment. Use of other tanks could cause personal injury.**

## REFRIGERANT RECOVERY

1. Connect vacuum hose to refrigerant recycling equipment and open additional valve and service coupler valves.
2. Open both valves of manifold gauge set. Make certain refrigerant tank "Gas" and "Liquid" valves are open.
3. Plug unit power cord into a suitable AC outlet and turn on "Main Power" switch.
4. Turn on "Recovery" switch.
5. Depress "Start" switch. Compressor will start. Compressor will shut off automatically when recovery is complete. Watch for pressure rise to above 0 kPa (0 kg/cm<sup>2</sup>, 0 psi) within two minutes. If this occurs, repeat this step.
6. To drain A/C system lubricant accumulator, open "Accumulator Pressurizing" valve for approximately 15 seconds to allow some compressor discharge pressure back into accumulator. Close "Accumulator Pressurizing" valve and open "Lubricant Drain" valve slowly and drain accumulator. Do not allow accumulator to completely depressurize. When lubricant stops draining, close "Lubricant Drain" valve. Be sure to replace lubricant in A/C system before servicing.
7. Turn off "Recovery" switch.
8. When recovery tank is full, trip switch at the bottom of weight platform will de-energize compressor and "Tank Full" light will come on. Recycle refrigerant in tank before removing.



# DISCHARGING, EVACUATING, CHARGING AND CHECKING

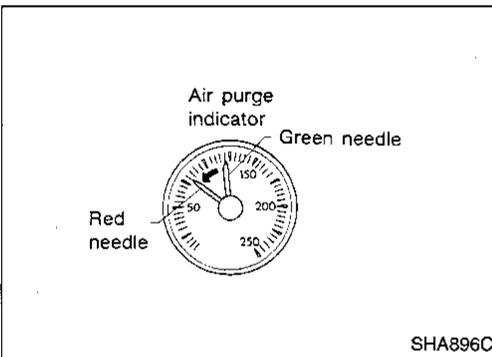
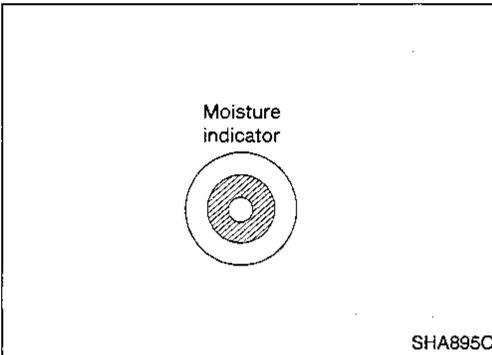
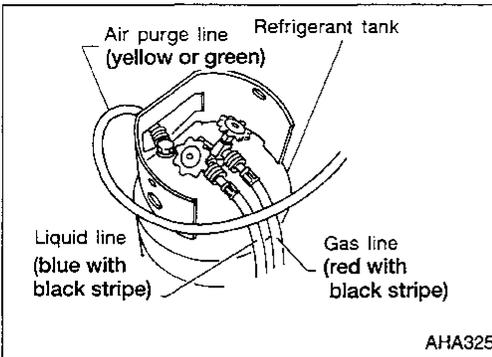
## Discharging (Cont'd) REFRIGERANT RECYCLING

**Recycling reclaimed refrigerant is essential to assure that the used refrigerant meets standards.**

For maximum efficiency, full tanks of recovered refrigerant should be recycled. As required, tanks containing a minimum of 3.6 kg (8 lb) of refrigerant can be recycled.

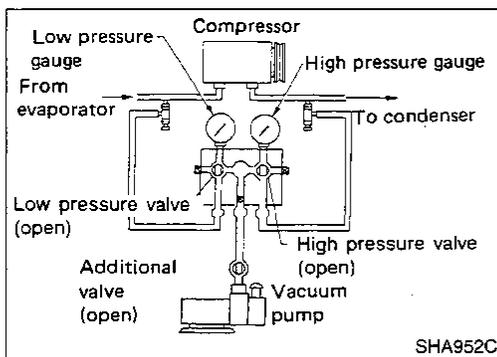
**For greatest efficiency, recycle full tanks of refrigerant.**

1. Make certain both valves on recovery tank are open.
2. Turn on "Recycling" switch. Recycling solenoid will be energized.
3. Depress start switch. Compressor will start, and "Recycling On" light will come. Refrigerant will be seen going through moisture indicator at start up. The sightglass will not completely fill with refrigerant.
4. Allow the station to operate until moisture indicator turns green. If moisture indicator does not turn green after 40 minutes, remove and replace filter.
5. After recycling for approximately five minutes, check air purge indicator. If green needle on air purge indicator leads red needle by more than 10 psi (two small divisions), bleed tank through air purge valve on the back of unit until both pointers are equal. Repeat as necessary.



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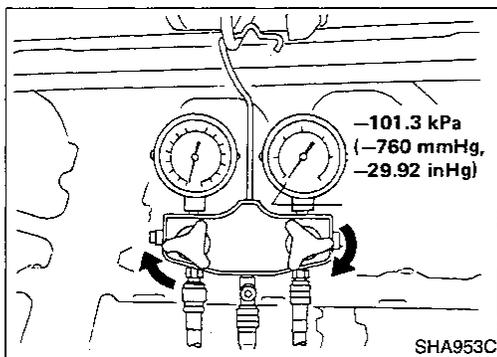
# DISCHARGING, EVACUATING, CHARGING AND CHECKING



## Evacuating

### PRELIMINARY EVACUATING

1. Connect vacuum hose to vacuum pump.
2. Open high and low pressure valves of manifold gauge set and additional valve.
3. Run vacuum pump.



4. Perform evacuation for more than five minutes to stabilize the vacuum inside the system. Check to ensure that the low pressure gauge indicates  $-98.6$  to  $-101.3$  kPa ( $-740$  to  $-760$  mmHg,  $-29.13$  to  $-29.92$  inHg) at sea level.

At altitudes above sea level or during low barometric pressures, this specification must be adjusted. Usually, it is impossible to obtain a vacuum lower than the barometric pressure. Refer to the chart below for the effect of altitude.

ALTITUDE	SPECIFICATION
ETC.	ETC.
3000 ft. (915m)	- 665 ~ - 685mmHg (26~27inHg)
2000 ft. (610m)	- 690 ~ - 710mmHg (27~28inHg)
1000 ft. (305m)	- 715 ~ - 735mmHg (28~29inHg)
SEA LEVEL	- 740 ~ - 760mmHg (29~30inHg)
0 ft. (0m)	

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If the above specified vacuum level cannot be achieved, shut off the vacuum pump. Check the A/C system or vacuum pump connections for leaks. After leak check, start evacuation procedure again.

5. Shut off the high and low pressure valves and additional valve.

# DISCHARGING, EVACUATING, CHARGING AND CHECKING

## Evacuating (Cont'd)

### CHECKING AIRTIGHTNESS

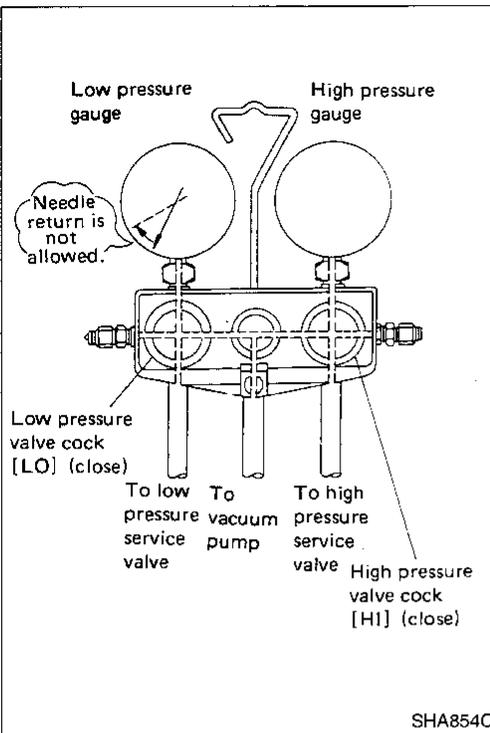
1. Shut off high and low pressure valves and additional valve, and leave the system as it is for five to ten minutes.
2. Make sure the low pressure gauge needle does not move back toward the atmospheric pressure side (gauge pressure 0).

If the needle moves back, the system air is not tight. Service the system until it is airtight. If pressure changes approximately 13.3 kPa (100 mmHg, 3.94 inHg) in ten minutes, the refrigerant in the system will be exhausted in about one month.

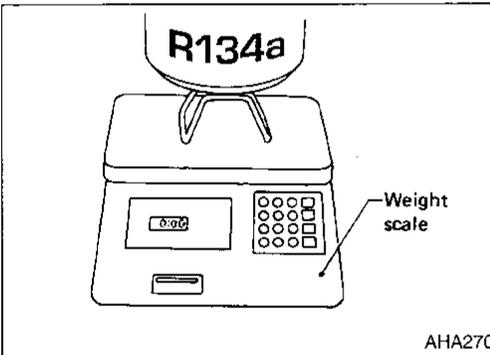
### EVACUATING

If no abnormality is found during airtightness check, perform evacuation again for more than 20 minutes.

1. Run vacuum pump.
2. Open high and low pressure valves and additional valve.
3. Evacuate for more than 20 minutes.
4. Close high and low pressure valves and additional valve.



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## Charging

### CALCULATING CHARGING AMOUNT OF REFRIGERANT

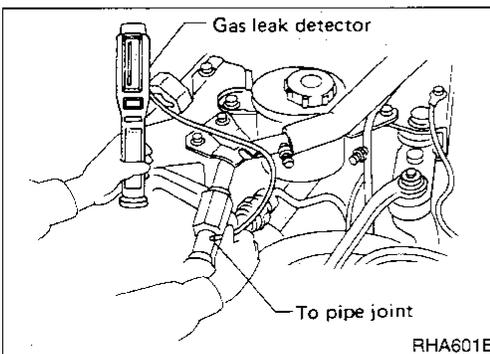
The amount of charged refrigerant is determined by subtracting the weight of the container measured after charging, from its weight measured before charging.

### PRELIMINARY CHARGING

1. With the additional valve closed at the vacuum pump, remove additional valve and connect it to liquid line of tank. Open the additional valve and liquid line valve.
2. Weigh tank on weight scale.
3. Slowly open high pressure valve of manifold gauge to charge refrigerant.
4. Close high pressure valve after charging approximately 200 g (7.05 oz) refrigerant.

### CAUTION:

Do not start engine with high pressure valve open.



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### PRELIMINARY CHECK FOR REFRIGERANT LEAKS

1. Make sure that the gauge manifold valve is closed.
2. Check for refrigerant leak from each connector in the system using the leak detector.

At this point, the pressure in the system is not high. Only large amounts of refrigerant leak due to loose pipe joints, etc. can be detected.

# DISCHARGING, EVACUATING, CHARGING AND CHECKING

## Charging (Cont'd)

### CHARGING

1. Slowly open high pressure valve of manifold gauge, and charge calculated amount of refrigerant in "CALCULATING CHARGING AMOUNT OF REFRIGERANT." Refer to HA-73.

#### CAUTION:

The refrigerant in charging cylinder is kept in liquid state, so the refrigerant should be charged from high pressure side. Do not start engine with high pressure valve open.

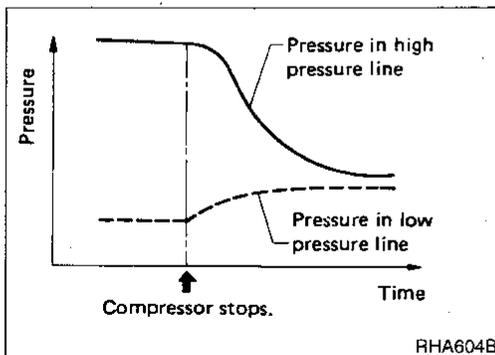
2. Close high pressure valve of manifold gauge.
3. Close additional valve and liquid line valve on the tank.
4. Turn off heater if it is on (when using heater equipped type).

## Checking

### WORK PROCEDURE

To facilitate inspection for refrigerant leaks, establish the following conditions:

- Start engine.
- Operate air conditioning.
- Set blower fan control to MAX.
- Set temperature control to FULL COLD.
- Run the air conditioning system for more than five minutes to circulate refrigerant through the system.

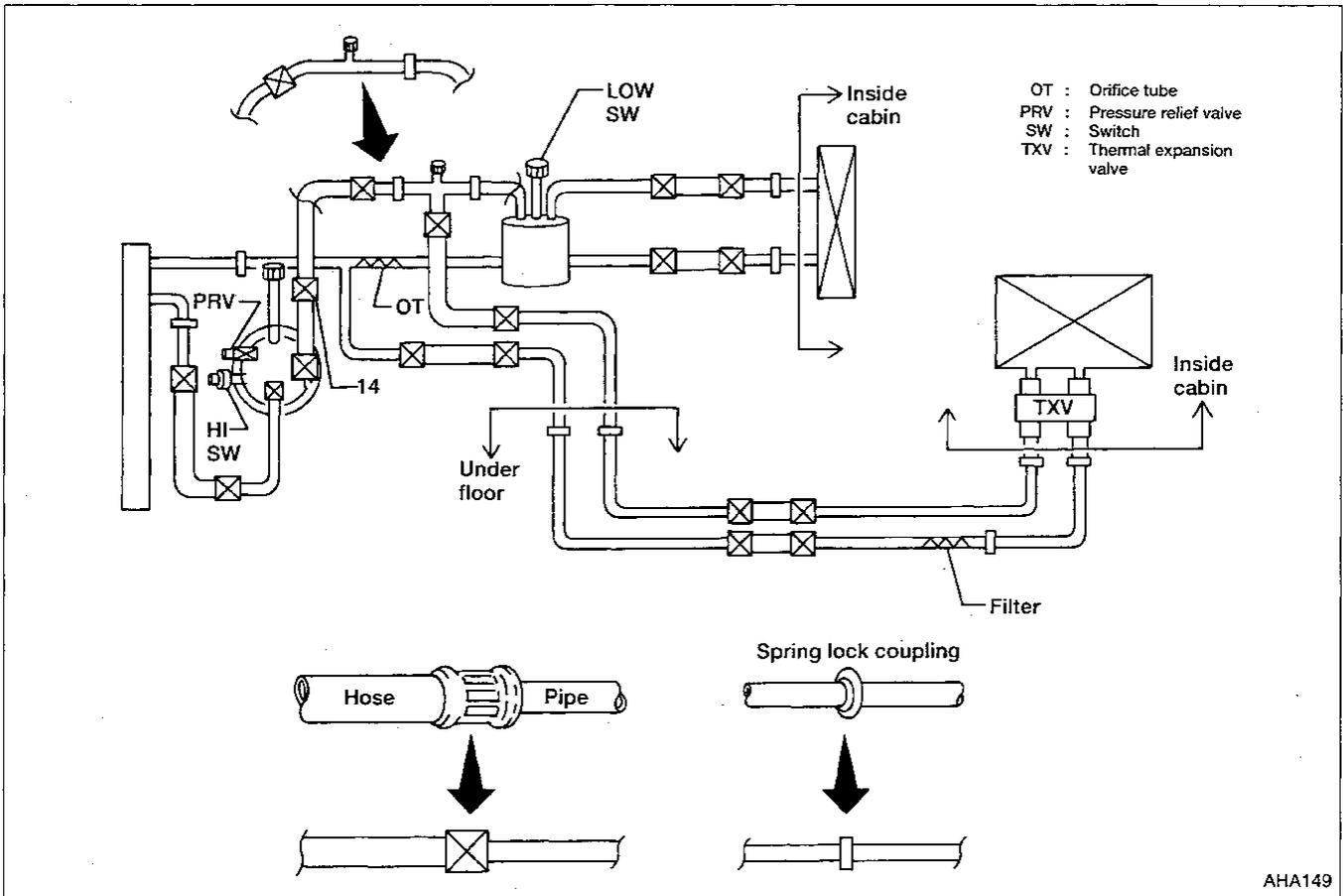


Immediately after stopping engine, check for refrigerant leaks. Begin with high pressure line and use an electronic leak detector. The pressure in high pressure line will gradually drop after refrigerant circulation stops. The pressure in low pressure line will gradually rise. Refer to the graph at left. Leaks can be easily detected when pressure is high.

To prevent detecting errors, make sure that there is no refrigerant vapor or tobacco smoke in the vicinity of vehicle. Shield vehicle from wind so that leaking refrigerant is not blown away.

# DISCHARGING, EVACUATING, CHARGING AND CHECKING

## Checking (Cont'd) INSPECTION POINTS



Carefully check each tube joint. Wipe the portion to be checked with waste cloth, and move tester probe all around the joint.

### Compressor

Check shaft seals, bolt holes, and around magnet clutch.

### Accumulator/drier

Check low-pressure switch.

### Service valve

Check all around service valves.

Make sure valve core is not loose.

Service valve caps must be attached to valves (to prevent leak). Also check that there are no foreign objects inside the cap.

### Cooling unit

To check, insert leak tester probe into drain hose immediately after stopping engine. (Keep probe inserted for more than ten seconds.)

# SERVICE PROCEDURES

## Compressor Lubricant Quantity

The lubricant used in the compressor circulates through the system with the refrigerant. Whenever any component of the system is replaced or a large amount of gas leakage occurs, add lubricant to the compressor 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)

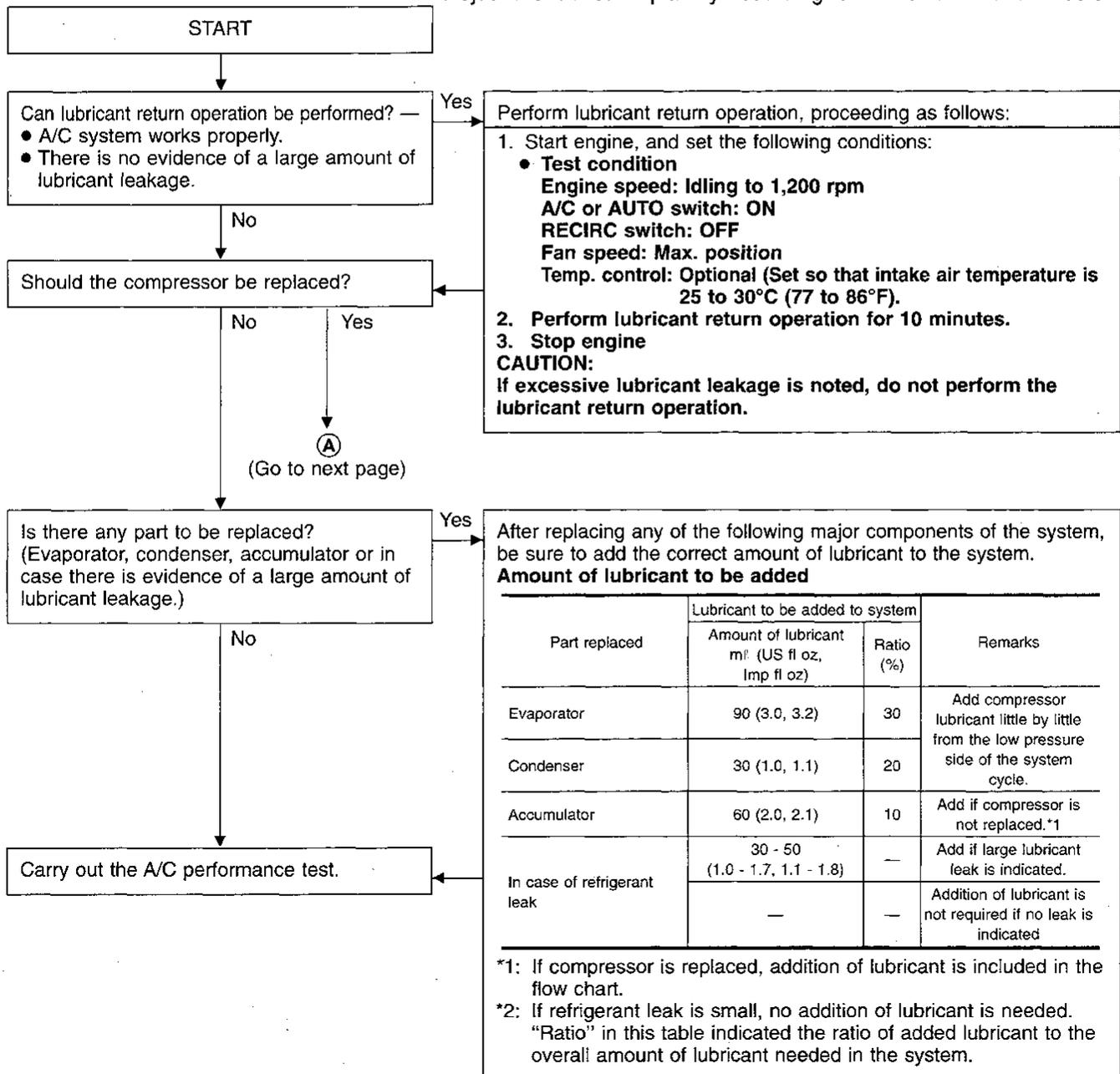
### LUBRICANT

**Name: Nissan A/C System Lubricant PAG Type F**

**Part No.: KLH00-PAGQU**

### CHECKING AND ADJUSTING

Adjust the lubricant quantity according to the flowchart shown below.



# SERVICE PROCEDURES

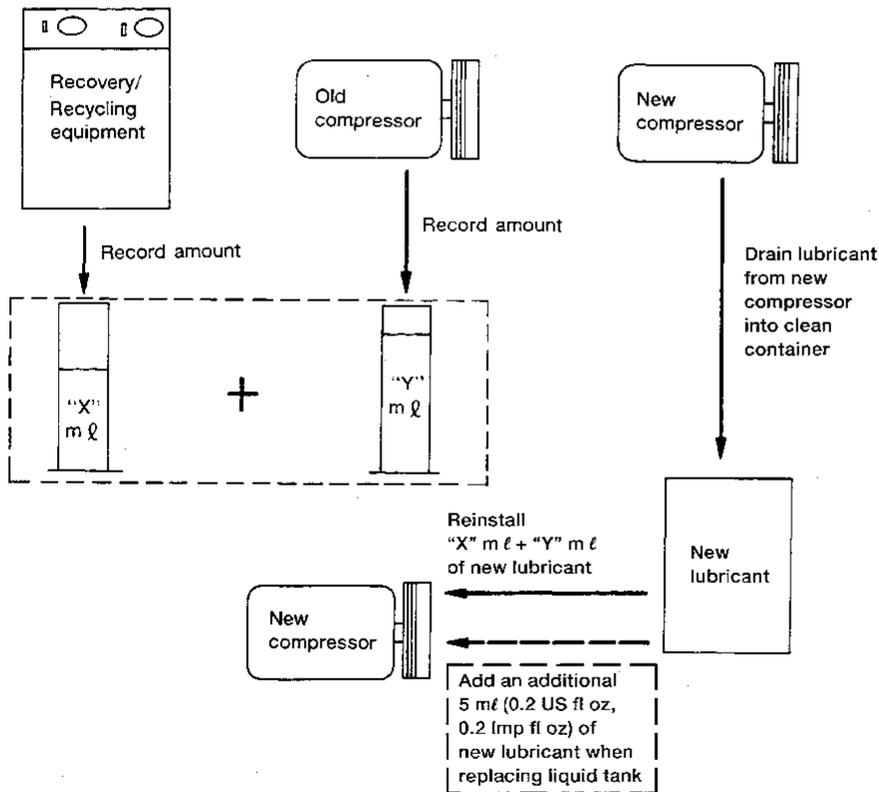
## Compressor Lubricant Quantity (Cont'd)

(A)

1. Discharge refrigerant into refrigerant recovery/recycling equipment. Measure lubricant discharged into the recovery/recycling equipment.
2. Drain the lubricant from the "old" (removed) compressor into a graduated container and record the amount of lubricant drained.
3. Drain the lubricant from the "new" compressor into a separate, clean container.
4. Measure an amount of the new lubricant equal to that drained from the "old" compressor, and add this lubricant to the "new" compressor through the suction port opening.
5. Measure an amount of the "new" lubricant equal to that recovered during discharging, and add this lubricant to the "new" compressor through the suction port opening.
6. If the accumulator (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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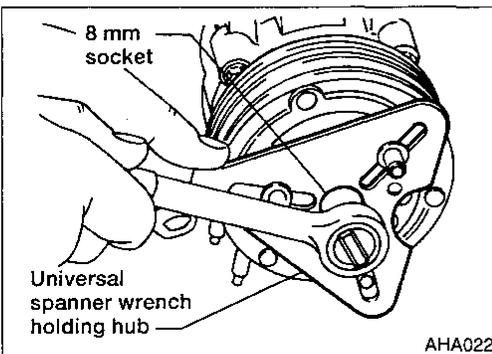
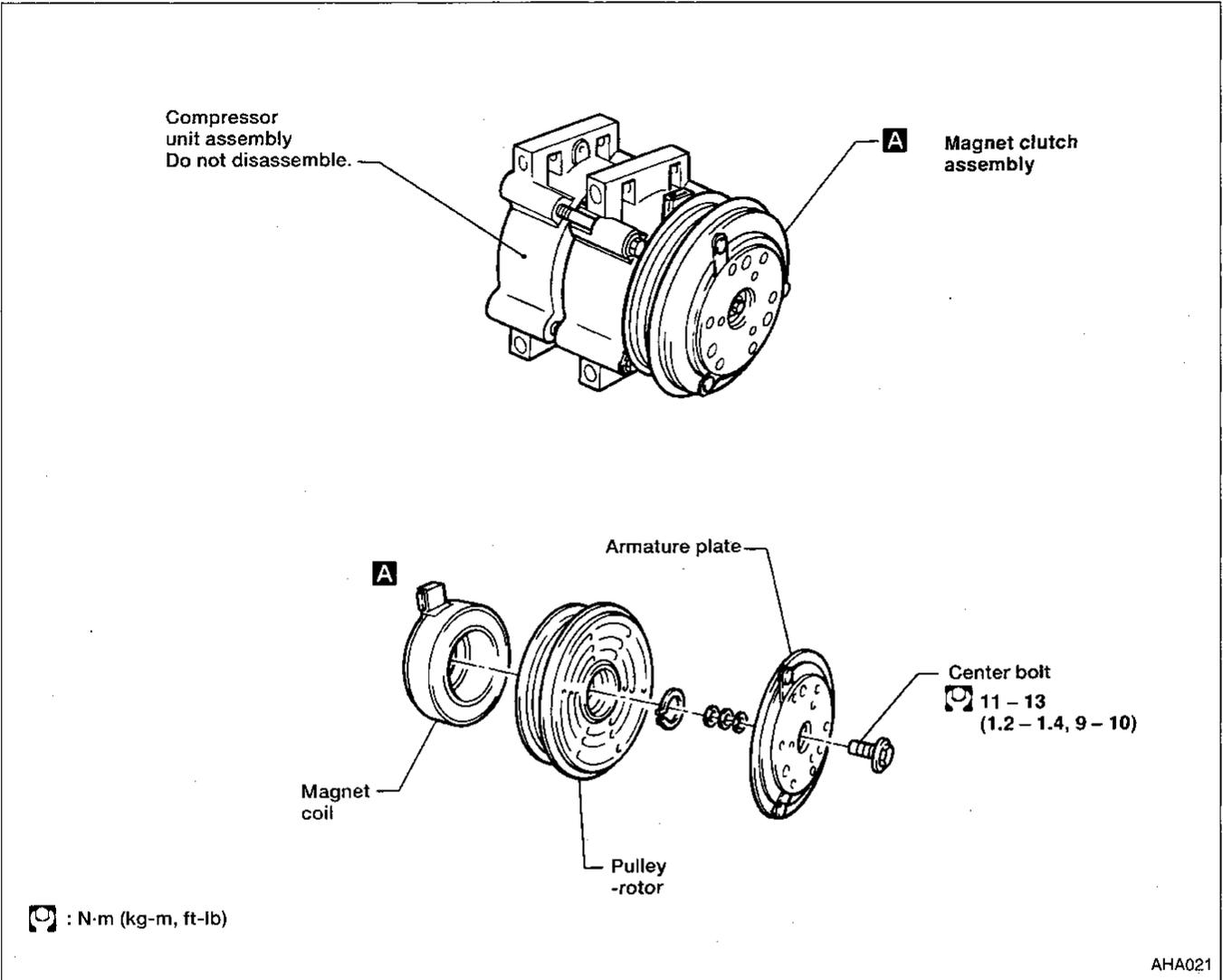


# SERVICE PROCEDURES

## Compressor (Ford Model FS-10) (Cont'd) INSTALLATION

Installation is the reverse order of removal.

### Clutch Hub and Pulley



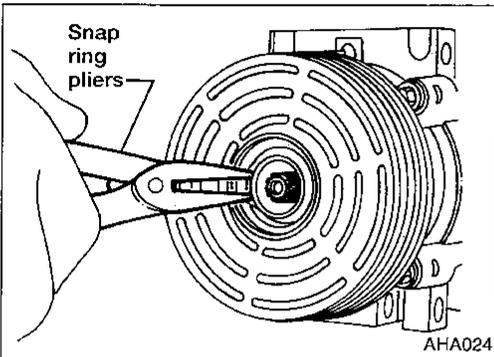
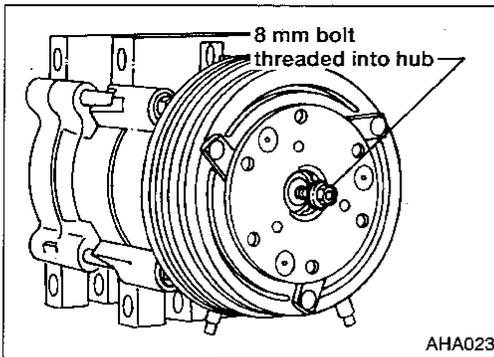
### REMOVAL

1. Remove the clutch hub retaining bolt. Use Spanner Wrench or equivalent.

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## SERVICE PROCEDURES

### Clutch Hub and Pulley (Cont'd)

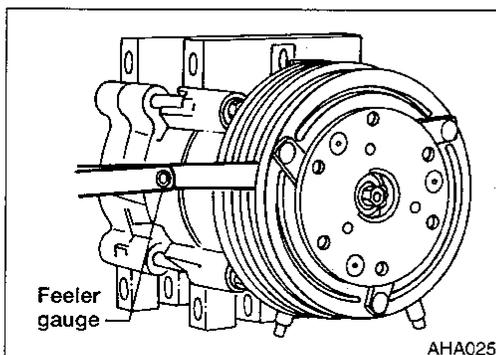


2. Pull clutch hub and shims from compressor shaft. If hub cannot be pulled from compressor shaft, screw an 8 mm bolt into the shaft hole of the clutch hub to force the hub from the shaft.
3. Remove pulley retaining snap ring.
4. Pull the pulley and bearing assembly from compressor.

### INSTALLATION

1. Clean pulley bearing surface of compressor head to remove any dirt or corrosion.
2. Install pulley and bearing assembly on compressor. The bearing is a slip fit on the compressor head and, if properly aligned, it should slip on easily.
3. Install pulley retaining snap ring with bevel side of snap ring out.
4. Place one nominal thickness spacer shim inside the hub spline opening and slide the hub on the end of the compressor shaft.
5. Thread a new hub retaining bolt into end of compressor shaft. Tighten hub retaining bolt to 11 to 14 N·m (1.1 to 1.4 kg·m, 8 to 10 ft·lb).

**Do not use air tools.**



6. Check clutch air gap between clutch hub and pulley mating surfaces with a feeler gauge. The air gap should be between 0.45 and 0.85 mm (0.0177 and 0.0335 in). Check at three locations equally spaced around the pulley.
7. If clutch air gap is not within 0.45 to 0.85 mm (0.0177 to 0.0335 in), repeat steps 4 through 6 with various thickness shims until air gap is within specified limits.
8. When installing a new clutch, cycle it ten times at idle to burnish the clutch and prevent slippage.

## Magnet Clutch Coil

The magnet clutch coil is pressed on the front head of the compressor. Special service tools are required to remove and install the coil.

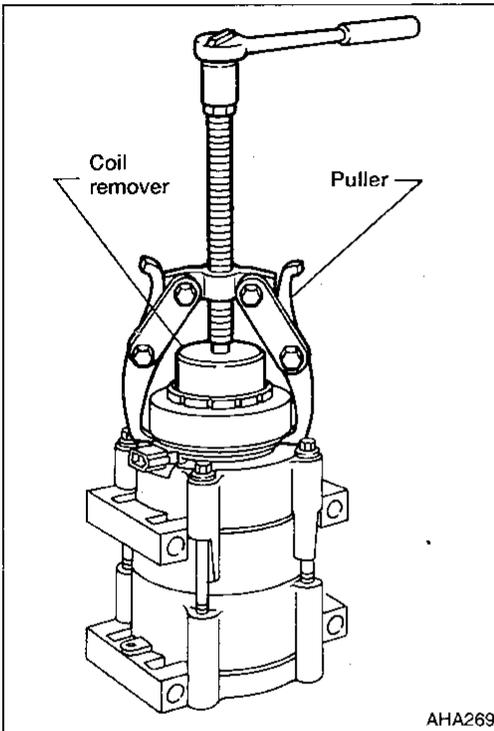
### REMOVAL

1. Remove the compressor from the vehicle following the recommended service procedure.
2. Remove the clutch hub and pulley following the procedure given.
3. Install Coil Remover Tool on the nose opening of the compressor.
4. Install a Puller on the compressor. Place the tip of the puller forcing screw in the center pilot of the Coil Remover and the jaws of the puller around the back edge of the field coil.

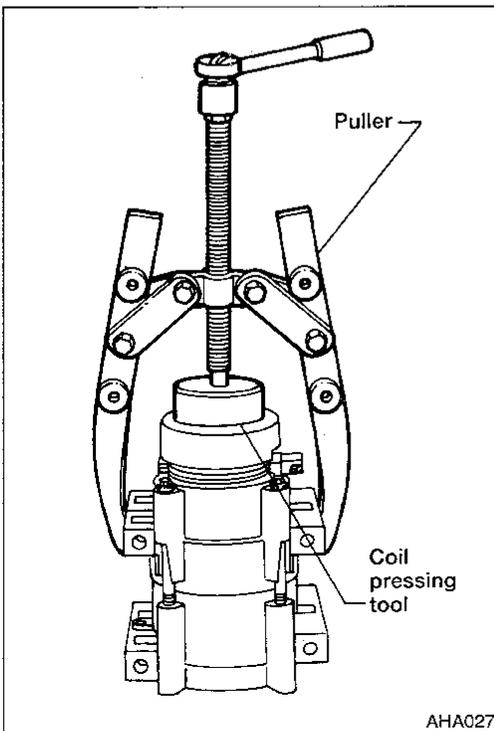
**Note the electrical connector location prior to coil removal. There are two possible locations and it is important to align the coil in the correct position during assembly.**

5. Tighten the puller forcing screw to pull the coil from the compressor head.

**Do not use air tools.**



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### INSTALLATION

1. Clean the coil mounting surface on the front head to remove any dirt or corrosion.
2. With the compressor in a vertical position (nose up), place the magnet coil in position on the compressor front head. Check to ensure that the coil electrical connector is positioned correctly.
3. Place the Coil Pressing (Installer) Tool in position over the compressor nose and to the inner radius of the field coil.
4. Position 2-jaw Puller Tool on the compressor and the Coil Pressing Tool as shown in the figure. The jaws of the puller should be firmly engaged with the rear side of the compressor front mounts. The forcing screw must be piloted on the center mark of the pressing tool.
5. Tighten the forcing screw with a hand wrench until the coil is pressed on the compressor front head.

**Do not use air tools.**

Check to ensure that the magnet coil bottoms against the head at all points around the coil outer diameter.

6. Install the clutch pulley and hub on the compressor as outlined. Adjust the air gap, as necessary.

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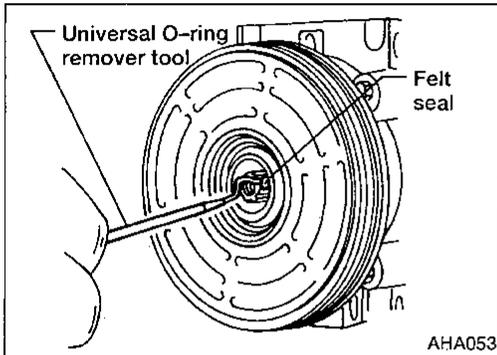
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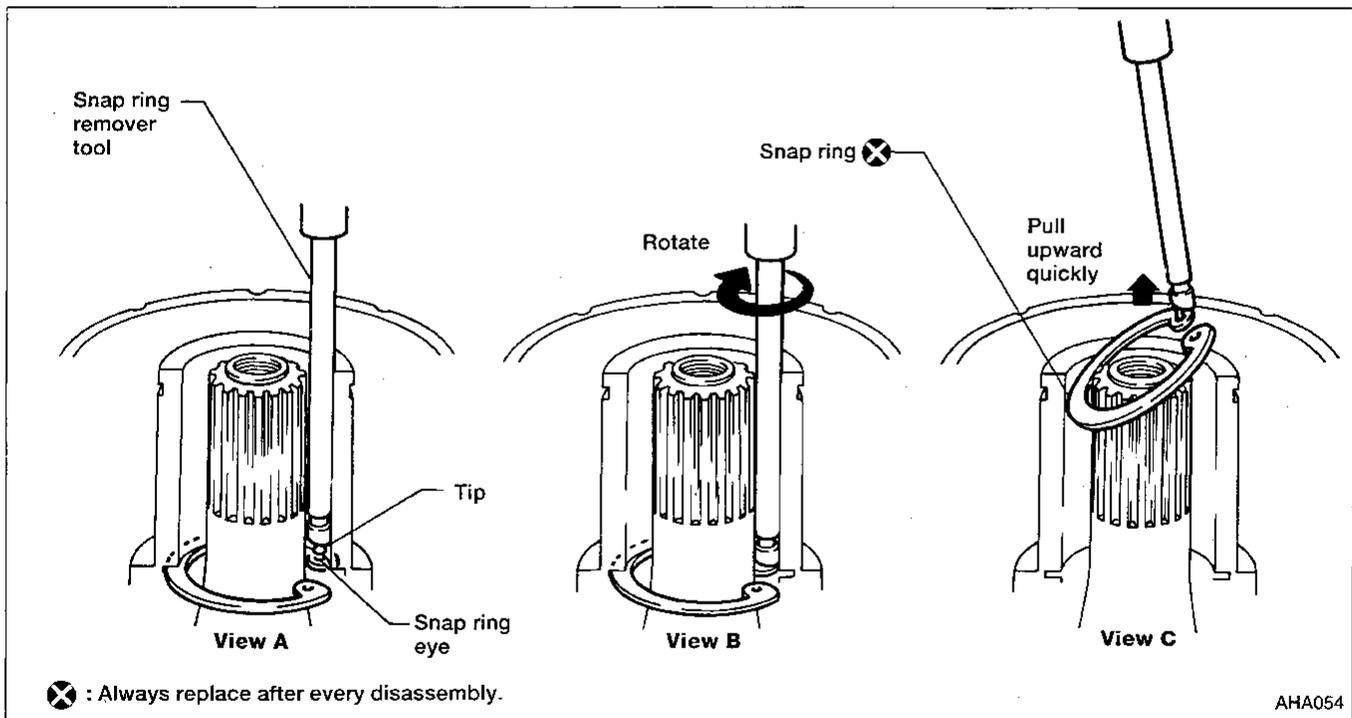
## Shaft Seal

### REMOVAL

1. Discharge the A/C system. Refer to HA-70.
2. Remove the compressor from the vehicle. Refer to HA-78.
3. Remove the clutch hub and pulley. Refer to HA-79.

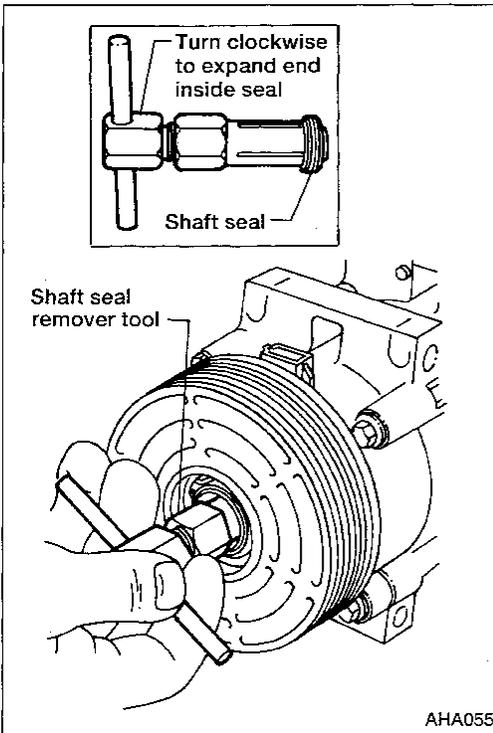


4. Remove shaft seal felt with O-ring tool.
5. Remove shaft seal snap ring with snap ring remover.



# SERVICE PROCEDURES

## Shaft Seal (Cont'd)



6. Insert end of shaft seal remover into nose of compressor. Hold the hex base and turn handle clockwise to expand tool.
7. Remove the shaft seal remover and shaft seal.

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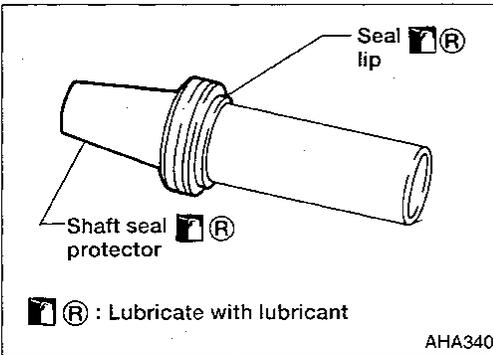
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## INSTALLATION

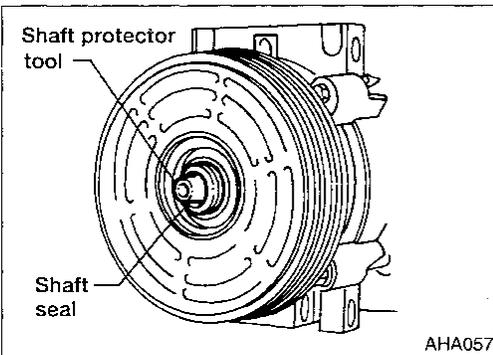
1. Dip shaft seal and shaft seal protector in refrigerant lubricant. Install shaft seal on protector with lip of seal facing large end of protector.

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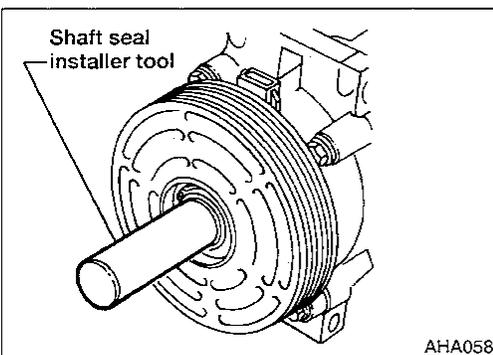


2. Install shaft seal protector and shaft seal over end of compressor shaft.

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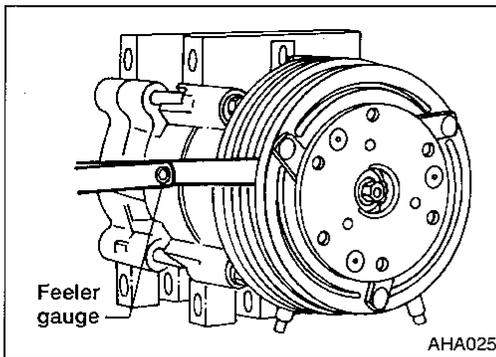


3. Slowly push shaft seal down protector into compressor shaft with shaft seal installer. Be careful that shaft seal is seated properly.
4. Remove shaft seal installer and shaft seal protector from compressor shaft.
5. Install shaft seal snap ring. Be careful that snap ring is correctly seated.
6. Install shaft seal felt in compressor nose.
7. Install clutch hub and pulley.

## SERVICE PROCEDURES

### Shaft Seal (Cont'd)

8. Adjust air gap. Refer to HA-80.
9. Inspect compressor for refrigerant leaks. Refer to HA-74.



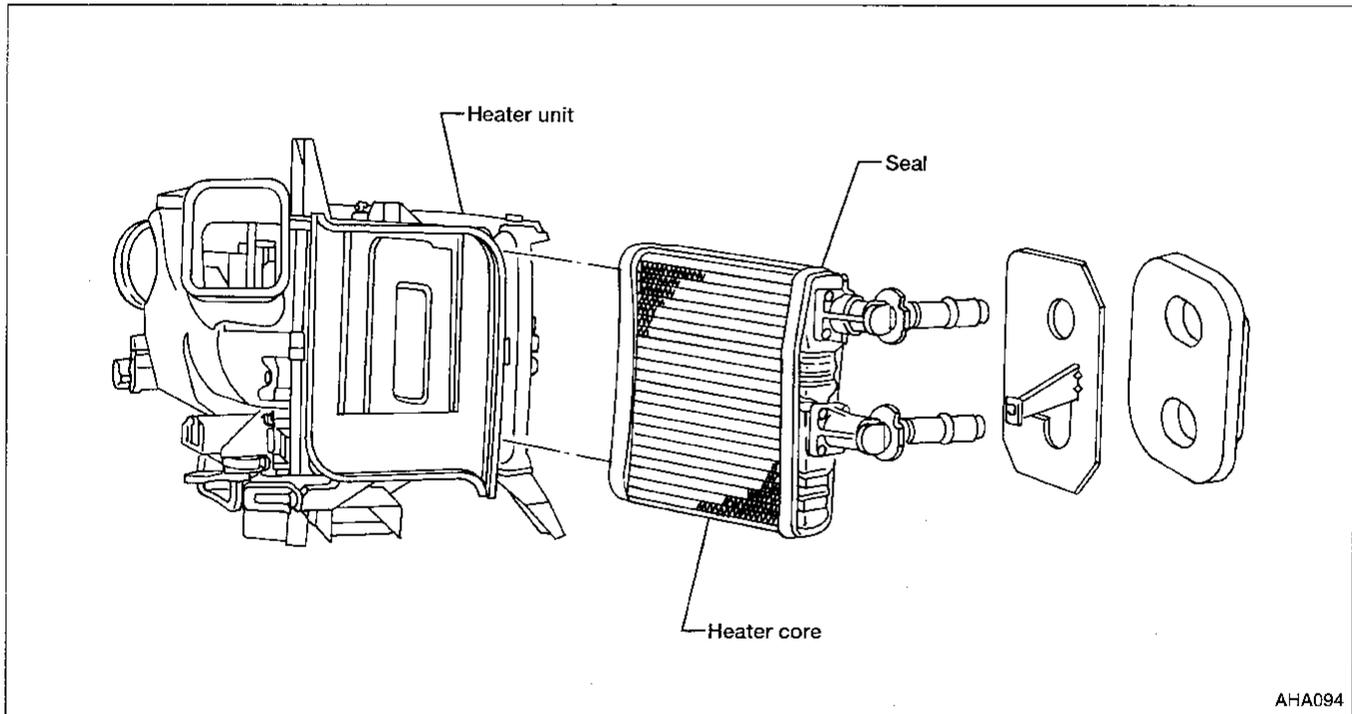
### Belt Tension

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

### Fast Idle Control Device (FICD)

- Refer to EF & EC section.

### Front Heater Core

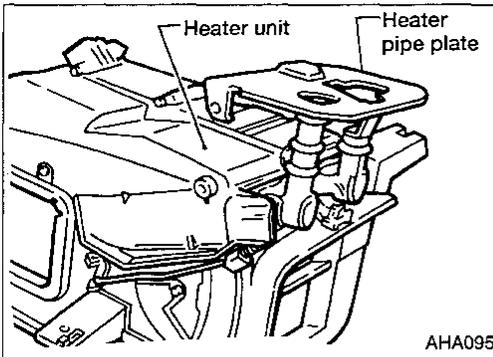


### REMOVAL

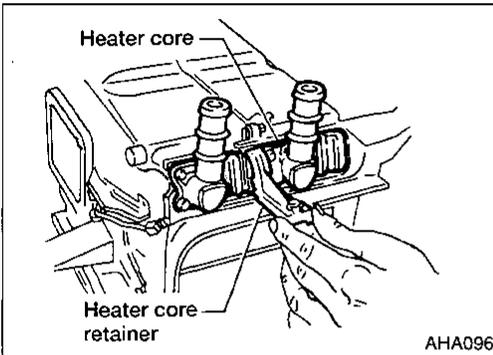
1. Drain cooling system. Refer to MA section ("Draining Engine Coolant", "ENGINE MAINTENANCE").
2. Disconnect two heater hoses in engine compartment.
3. Disconnect heater unit ducts.
4. Remove two heater unit bolts.
5. Disconnect door motor electrical connectors.
6. Remove heater unit.

# SERVICE PROCEDURES

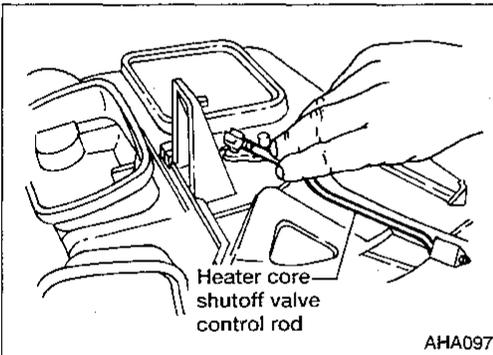
## Front Heater Core (Cont'd)



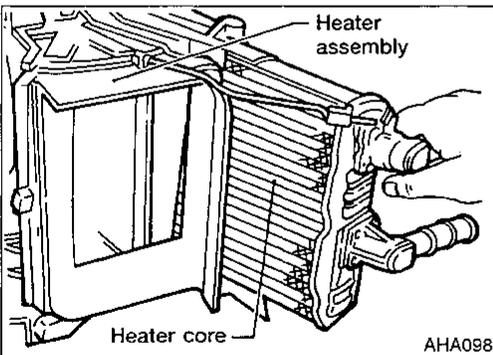
7. Remove heater pipe plate.



8. Remove heater core retainer.



9. Disconnect heater core shutoff valve control rod.



10. Remove heater core from heater unit.

### INSTALLATION

Installation is the reverse order of removal. Inspect system for coolant leaks. Refer to MA section ("Draining Engine Coolant", "ENGINE MAINTENANCE").

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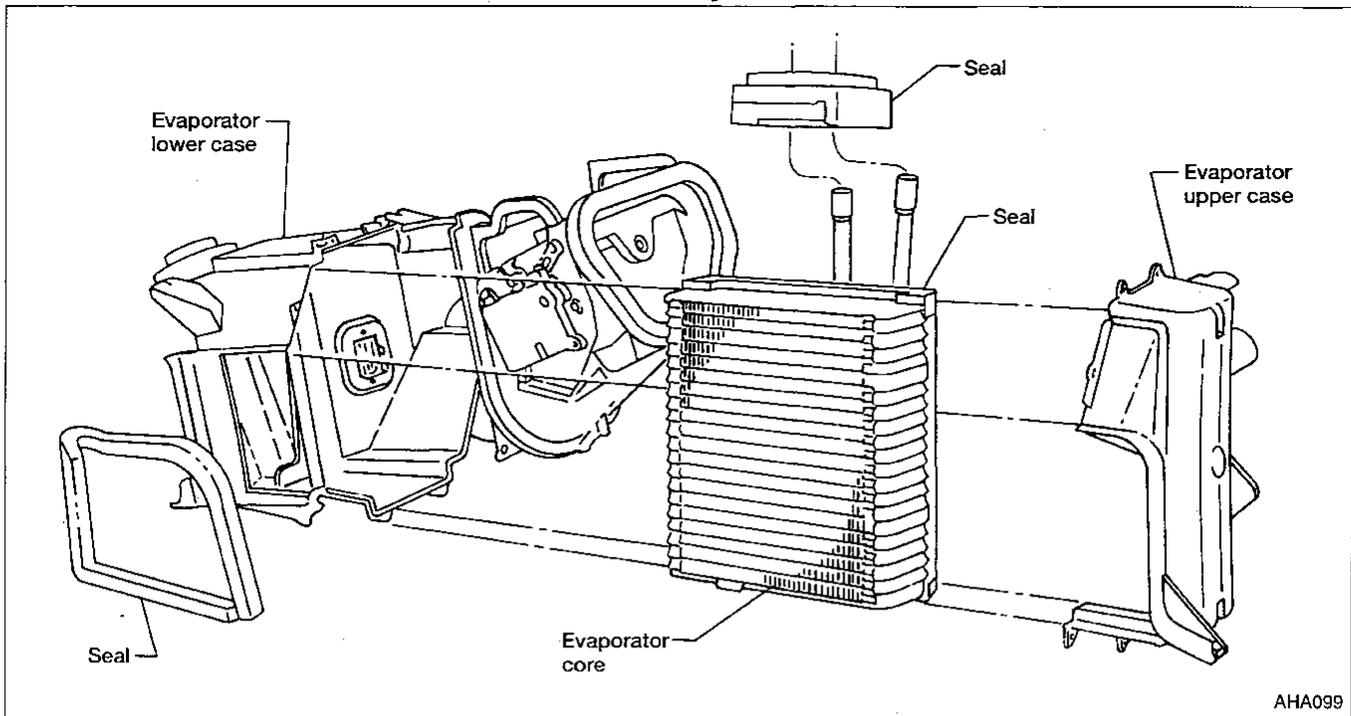
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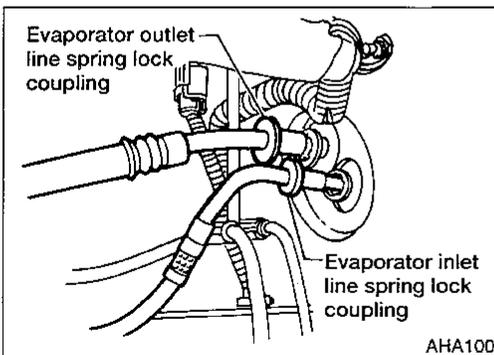
# SERVICE PROCEDURES

## Front Evaporator Core



### REMOVAL

1. Discharge the A/C system. Refer to HA-70.



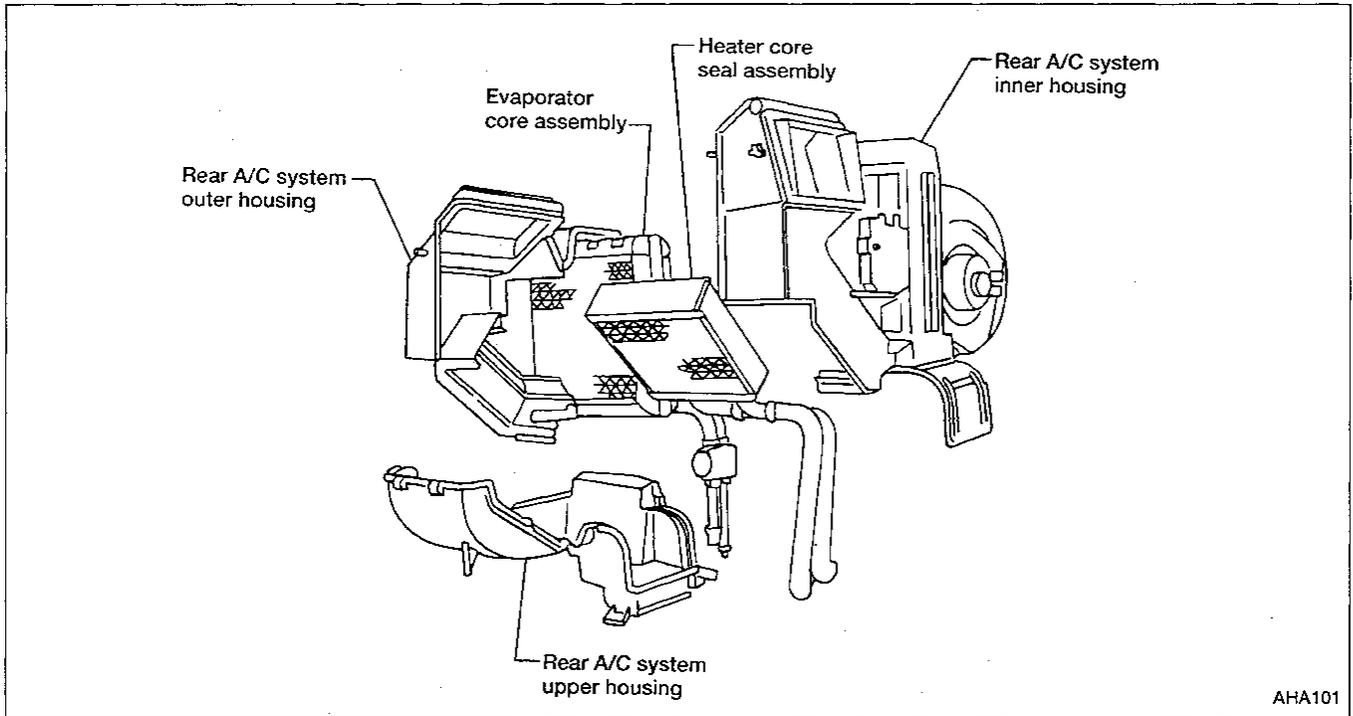
2. Use tool to disconnect spring lock couplings in engine compartment.

3. Remove instrument panel RH.
4. Remove duct from heater unit to register RH.
5. Disconnect blower motor and electrical connector.
6. Remove evaporator.

### INSTALLATION

Installation is the reverse order of removal.  
Inspect system for refrigerant leaks. Refer to HA-74.

## Rear Heater Core and Evaporator Core



### REMOVAL

1. Drain the engine coolant. Refer to MA section ("Draining Engine Coolant", "ENGINE MAINTENANCE").
2. Discharge and recover refrigerant from the A/C system. Refer to HA-70.
3. Remove driver's side trim panel and loosen bolts fixing each housing.
4. Remove upper housing and outer housing.
5. Remove heater core and evaporator.

### INSTALLATION

Installation is the reverse order of removal.

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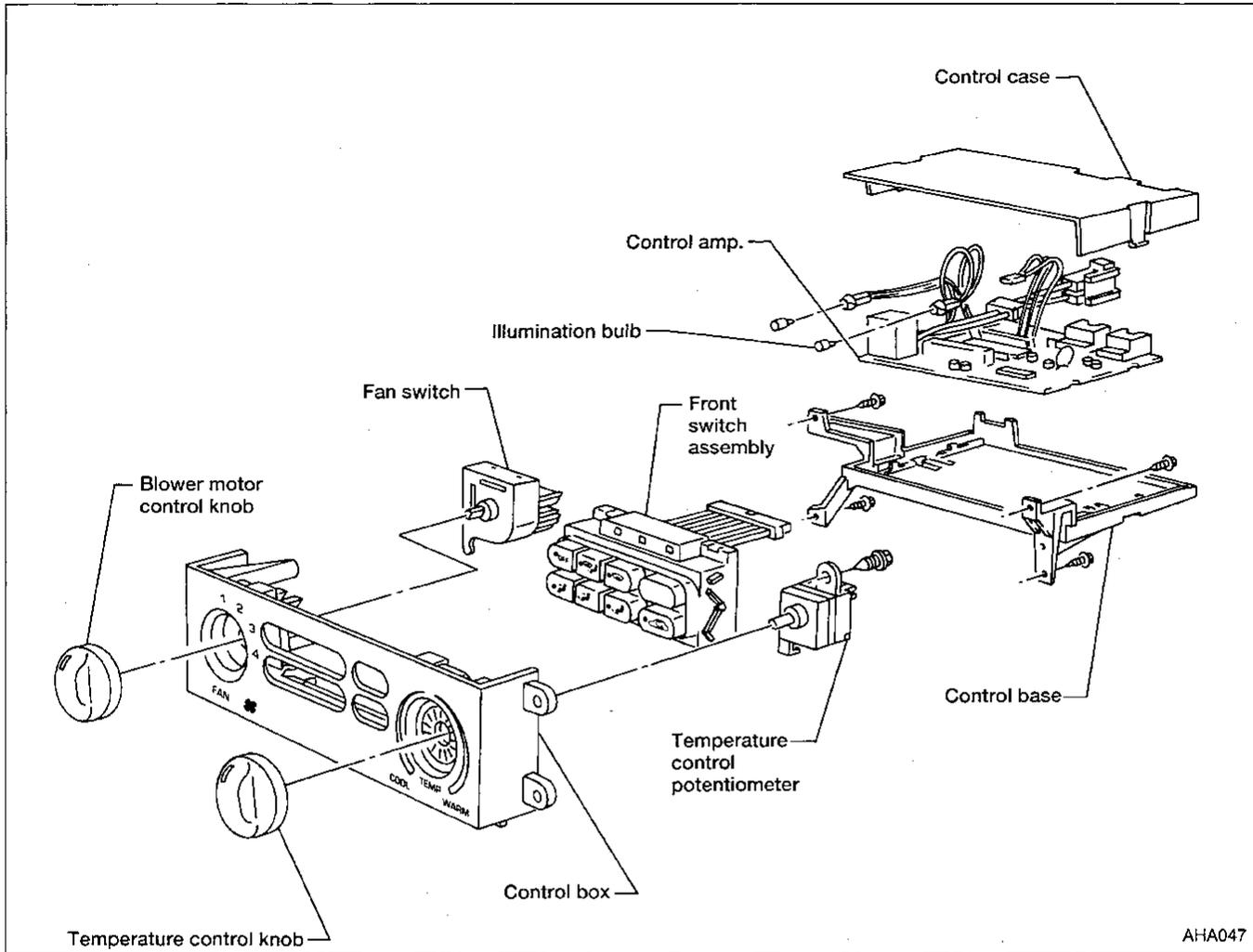
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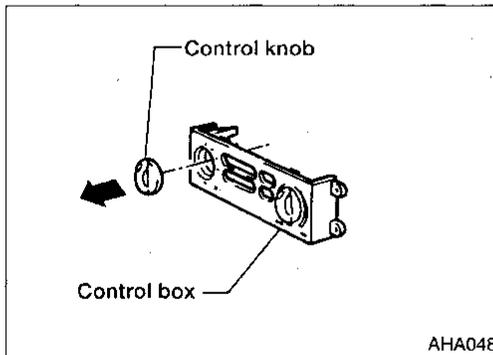
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## Fan Switch and Illumination Bulbs



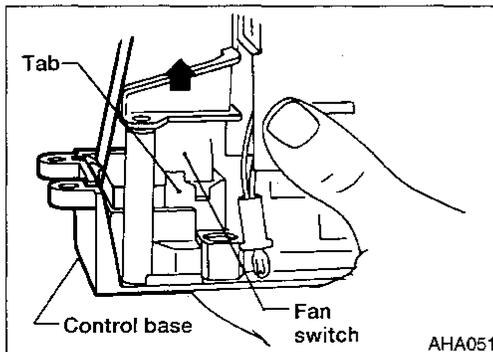
AHA047



AHA048

### REMOVAL

1. Remove fan control knob and temperature control knob. **Wrap knob with a cloth and pull in direction indicated by arrow as shown in figure at left. Be careful not to scratch knob during removal.**

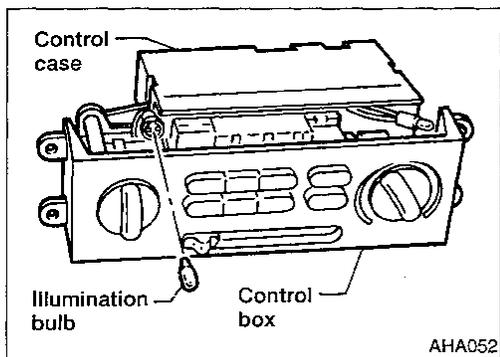


AHA051

2. Remove fan switch by pressing in on tabs with a small, flat-bladed screwdriver.

## SERVICE PROCEDURES

### Fan Switch and Illumination Bulbs (Cont'd)



3. Remove illumination bulbs.

**Never disassemble the push control assembly. It may damage the printed circuit board.**

### INSTALLATION

Installation is the reverse order of removal.

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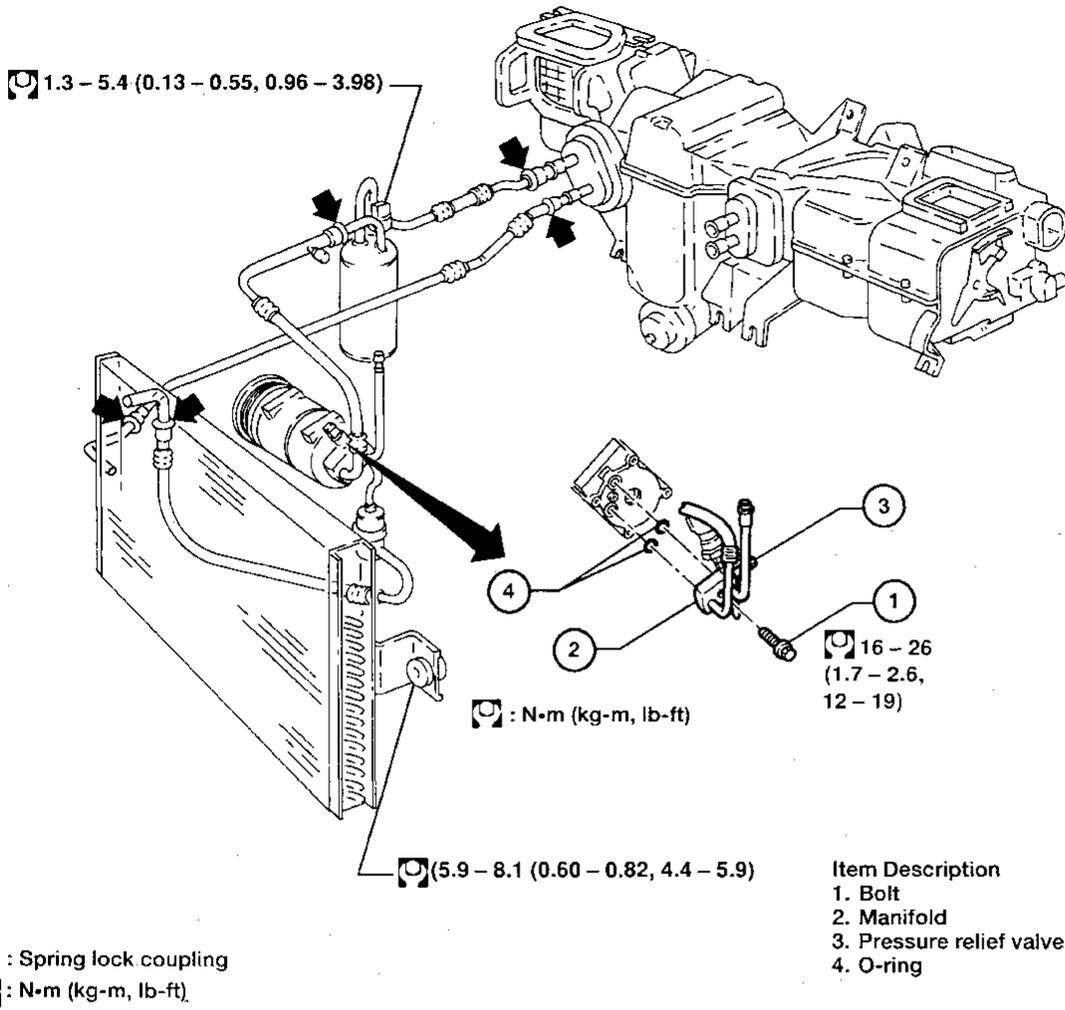
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# SERVICE PROCEDURES

## Refrigerant Lines

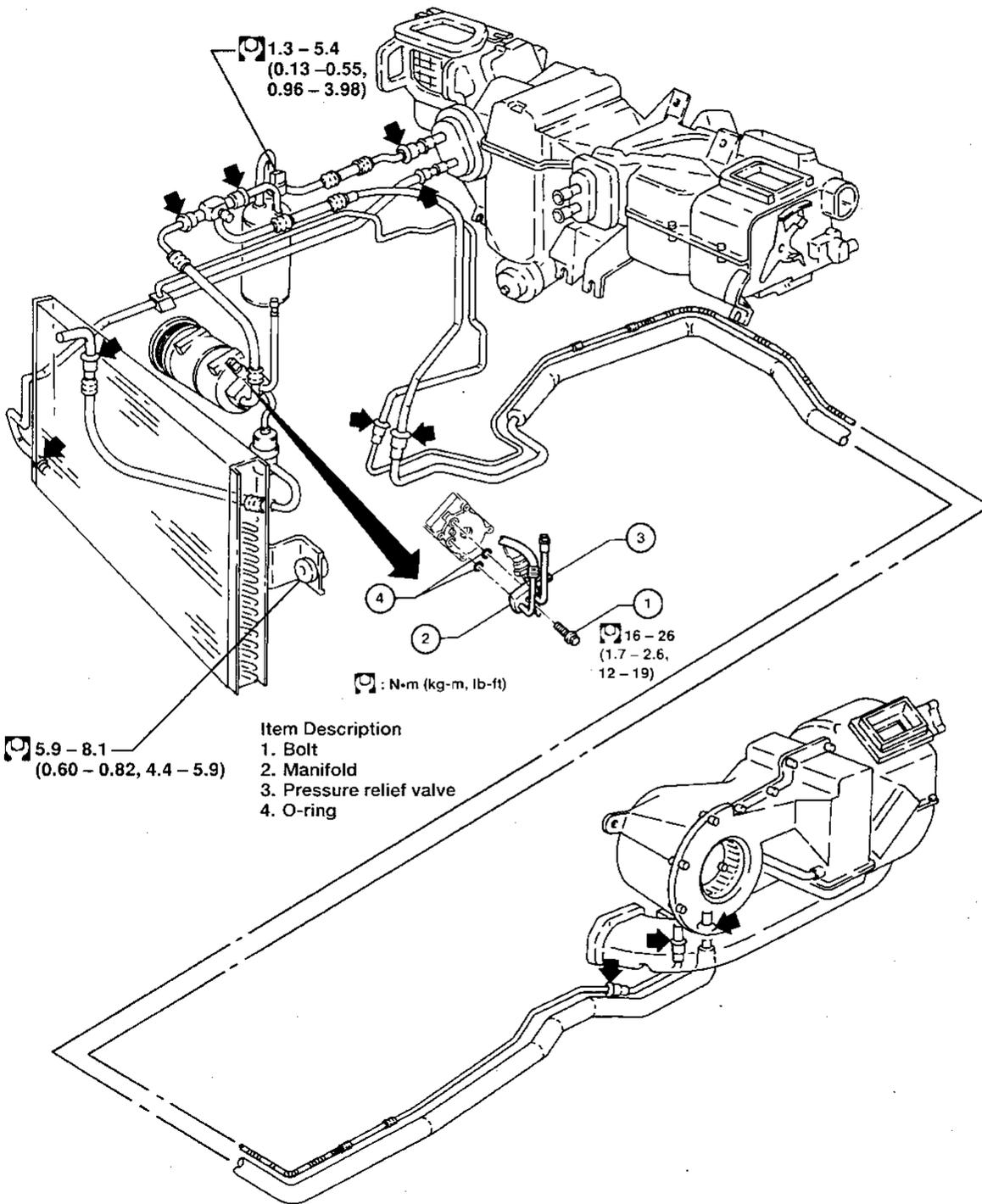
### MODELS WITHOUT REAR A/C



# SERVICE PROCEDURES

## Refrigerant Lines (Cont'd)

MODELS WITH REAR A/C



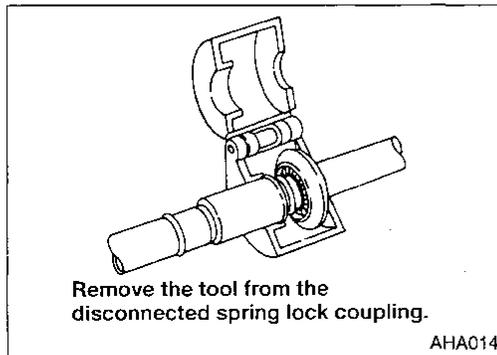
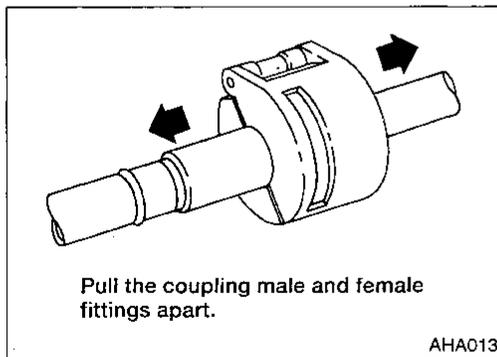
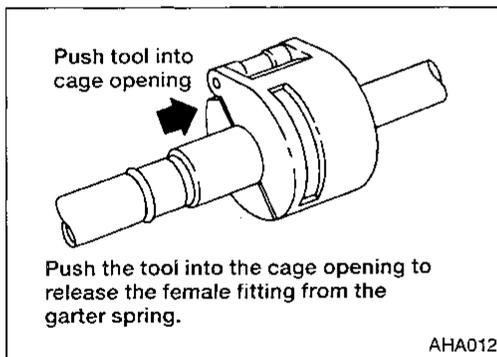
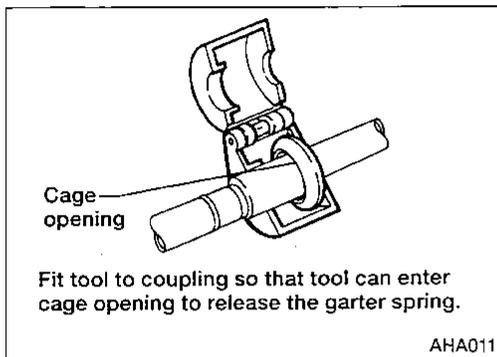
◀ : Spring lock coupling  
 ⊞ : N·m (kg·m, lb-ft)

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## Spring Lock Coupling

- Refer to “Precautions for Refrigerant Connections” on page HA-4.

A plastic indicator ring is used on spring lock couplings during vehicle assembly to indicate that the coupling is connected. After the coupling is connected, the indicator ring is not necessary but will stay near the cage opening.



## REMOVAL

1. Discharge refrigerant from system. Fit Spring Lock Coupling Tools (9.53 mm [3/8 in], 12.70 mm [1/2 in], 15.88 mm [5/8 in] or 19.05 mm [3/4 in]) to the coupling.

2. Close tool and push into open side of cage to expand garter spring and release female fitting.

**If the tool is cocked while pushing it into the cage opening, the garter spring may not release.**

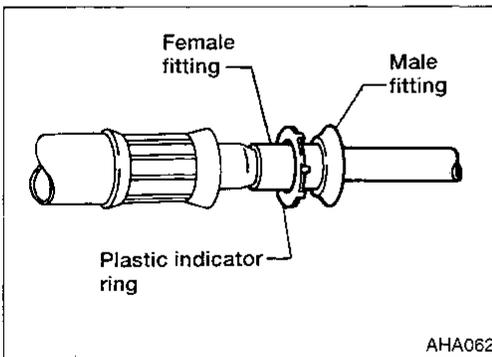
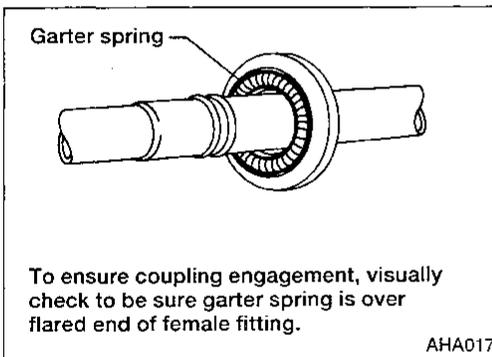
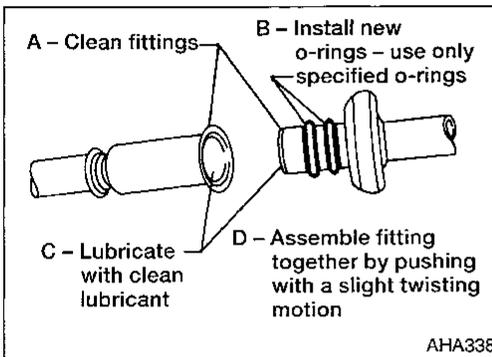
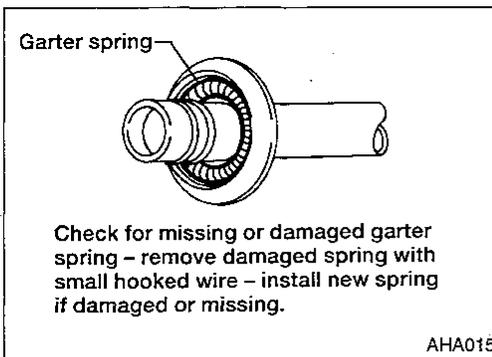
3. After garter spring is expanded, pull fitting apart.

4. Remove tool from disconnected coupling.

# SERVICE PROCEDURES

## Spring Lock Coupling (Cont'd)

### INSTALLATION



1. Check to ensure that garter spring is in cage of male fitting. If garter spring is missing, install a new spring by pushing it into cage opening. If garter spring is damaged, remove it from cage with a small wire hook (do not use a screwdriver) and install a new spring. Check for burrs on the end of the male tube to avoid scratching the female tube.

2. Clean all dirt or foreign material from both pieces of coupling.

3. Install new O-rings on male fitting.  
**O-rings are made of a special material. Use only the specified O-rings.**

The use of any O-ring other than the specified O-ring may allow the connection to leak intermittently during vehicle operation.

4. Lubricate male fitting and O-rings and inside of female fitting with clean lubricant. Check for scratches on the inner surface of the female fitting.

5. Install plastic indicator ring into cage opening if indicator ring is to be used.

6. Fit female fitting to male fitting and push until garter spring snaps over flared end of female fitting.  
If plastic indicator ring is used, it will snap out of cage opening when coupling is connected to indicate engagement.

7. If indicator ring is not used, ensure coupling engagement by visually checking to verify garter spring is over flared end of female fitting.

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# SERVICE DATA AND SPECIFICATIONS (SDS)

## General Specifications

### COMPRESSOR

Model	FS-10
Type	Swash plate
Displacement cm <sup>3</sup> (cu in)/rev.	170 (10.37)
Cylinder bore x stroke mm (in)	29.0 x 25.7 (1.142 x 1.012)
Direction of rotation	Clockwise (viewed from drive end)
Drive belt	Poly V

### LUBRICANT

Model	Only front A/C models	Front A/C & rear A/C models
	FS-10 compressor	
Type	Nissan A/C System Lubricant PAG Type F or equivalent*1	
Capacity ml (US fl oz, Imp fl oz)		
Total in system	207 (7.0, 7.3)	296 (10.0, 10.4)

\*1: Suniso 5GS is not acceptable for use in this vehicle.

### REFRIGERANT

Type	R134a
Capacity kg (lb)	
Only front A/C models	0.907 (2.0)
Front A/C & rear A/C models	1.474 (3.25)

## Inspection and Adjustment

### ENGINE IDLING SPEED (When A/C is ON.)

- Refer to EF & EC section ("Inspection and Adjustment", "SERVICE DATA AND SPECIFICATIONS (SDS)").

### BELT TENSION

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

### COMPRESSOR

Model	FS-10
Clutch disc-pulley clearance mm (in)	0.45 - 0.85 (0.0177 - 0.0335)