

# HEATER & AIR CONDITIONER

## 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” and “HOW TO PERFORM EFFICIENT DIAGNOSIS FOR AN ELECTRICAL INCIDENT”.**

## PRECAUTIONS AND PREPARATION

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### Supplemental Restraint System (SRS) “AIR BAG” (4WD models)

The Supplemental Restraint System “AIR BAG”, used along with a seat belt, helps to reduce the risk or severity of injury to the driver in a frontal collision. The Supplemental Restraint System consists of air bag module (located in the center of the steering wheel), diagnosis sensor unit, warning lamp, wiring harness and spiral cable. Information necessary to service the system safely is included in the **RS section** of this Service Manual.

**WARNING:**

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

### Supplemental Restraint System (SRS) “AIR BAG” (2WD models)

The Supplemental Restraint System “AIR BAG”, used along with a seat belt, helps to reduce the risk or severity of injury to the driver in a frontal collision. The Supplemental Restraint System consists of air bag module (located in the center of the steering wheel), diagnosis sensor unit, warning lamp and spiral cable. Information necessary to service the system safely is included in the **RS section** of this Service Manual.

**WARNING:**

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

## PRECAUTIONS AND PREPARATION

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

#### WARNING:

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

### General Refrigerant Precautions

#### WARNING:

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

### Precautions for Refrigerant Connection

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

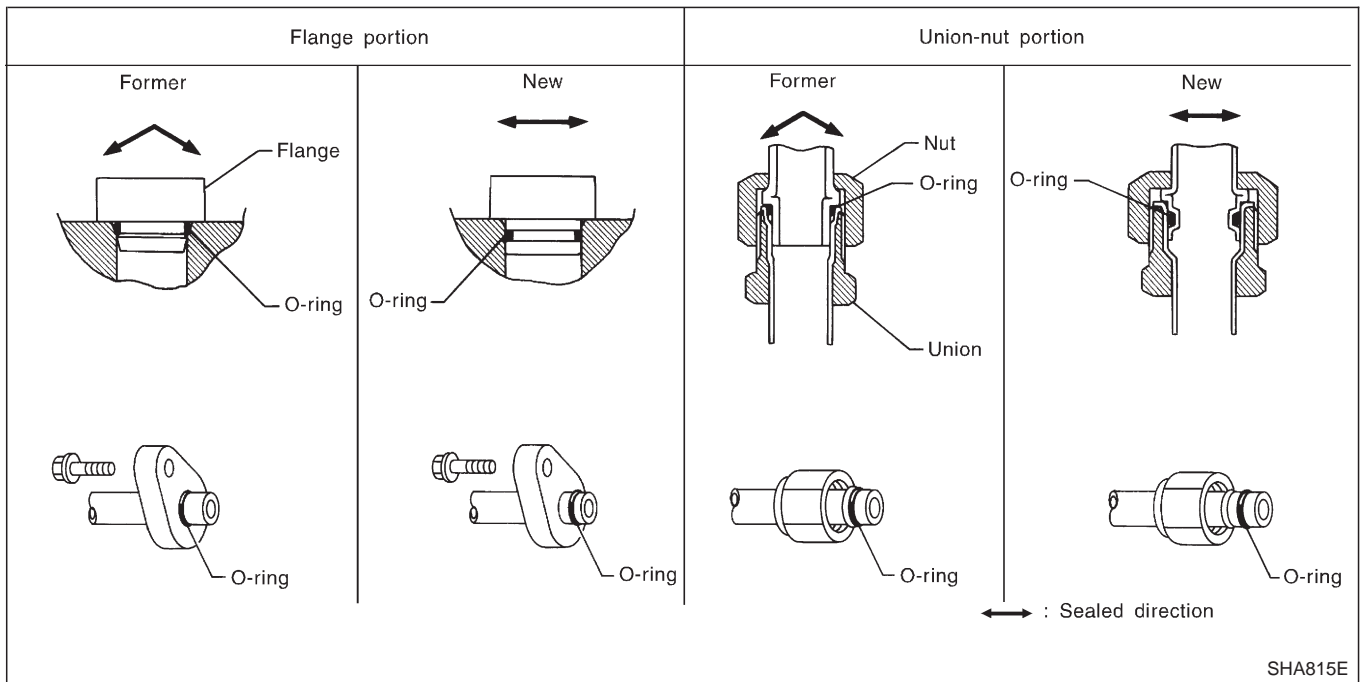
- Expansion valve to cooling unit
- Condenser to liquid tank

#### FEATURES OF NEW TYPE REFRIGERANT CONNECTION

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

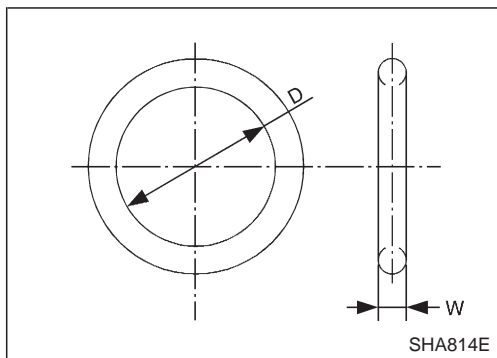
# PRECAUTIONS AND PREPARATION

## Precautions for Refrigerant Connection (Cont'd)



### CAUTION:

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



### O-ring part numbers and specifications

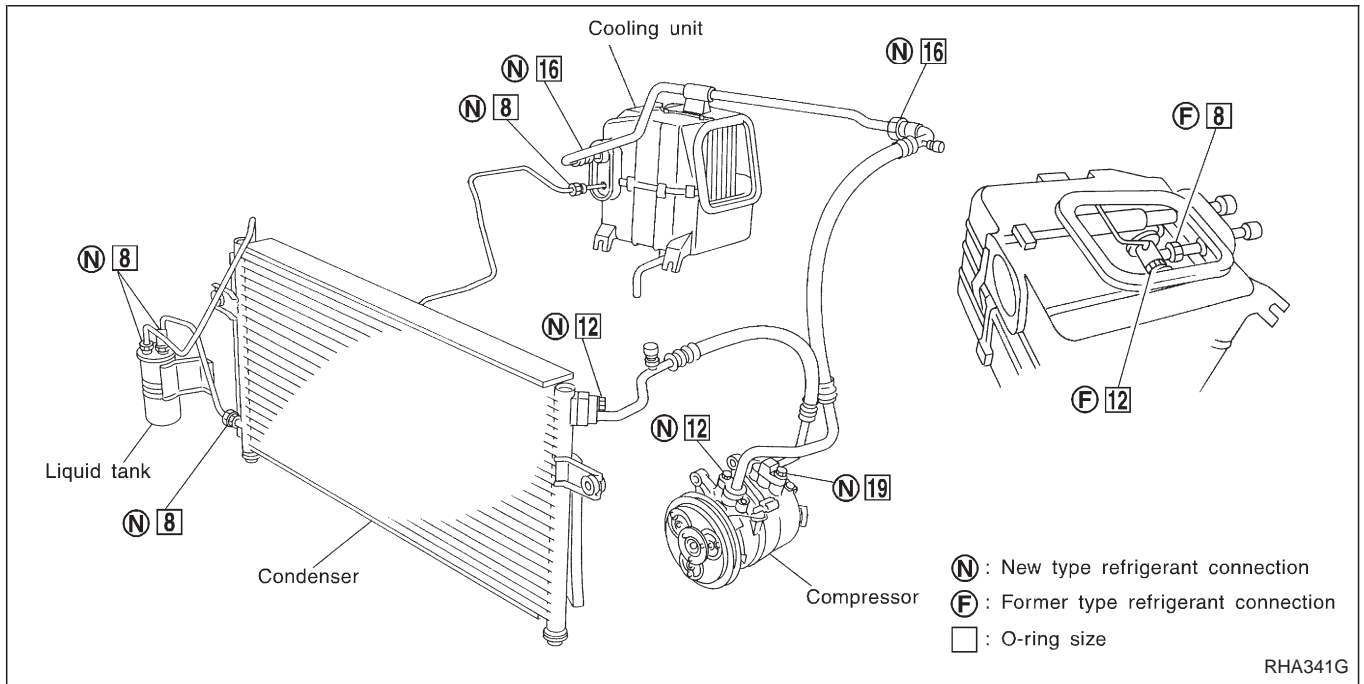
Connection type	O-ring size	Part number	D mm (in)	W mm (in)
New	8	92471 N8210	6.8 (0.268)	1.85 (0.0728)
Former		92470 N8200	6.07 (0.2390)	1.78 (0.0701)
New	12	92472 N8210	10.9 (0.429)	2.43 (0.0957)
Former		92475 71L00	11.0 (0.433)	2.4 (0.094)
New	16	92473 N8210	13.6 (0.535)	2.43 (0.0957)
Former		92475 72L00	14.3 (0.563)	2.3 (0.091)
New	19	92474 N8210	16.5 (0.650)	2.43 (0.0957)
Former		92477 N8200	17.12 (0.6740)	1.78 (0.0701)

# PRECAUTIONS AND PREPARATION

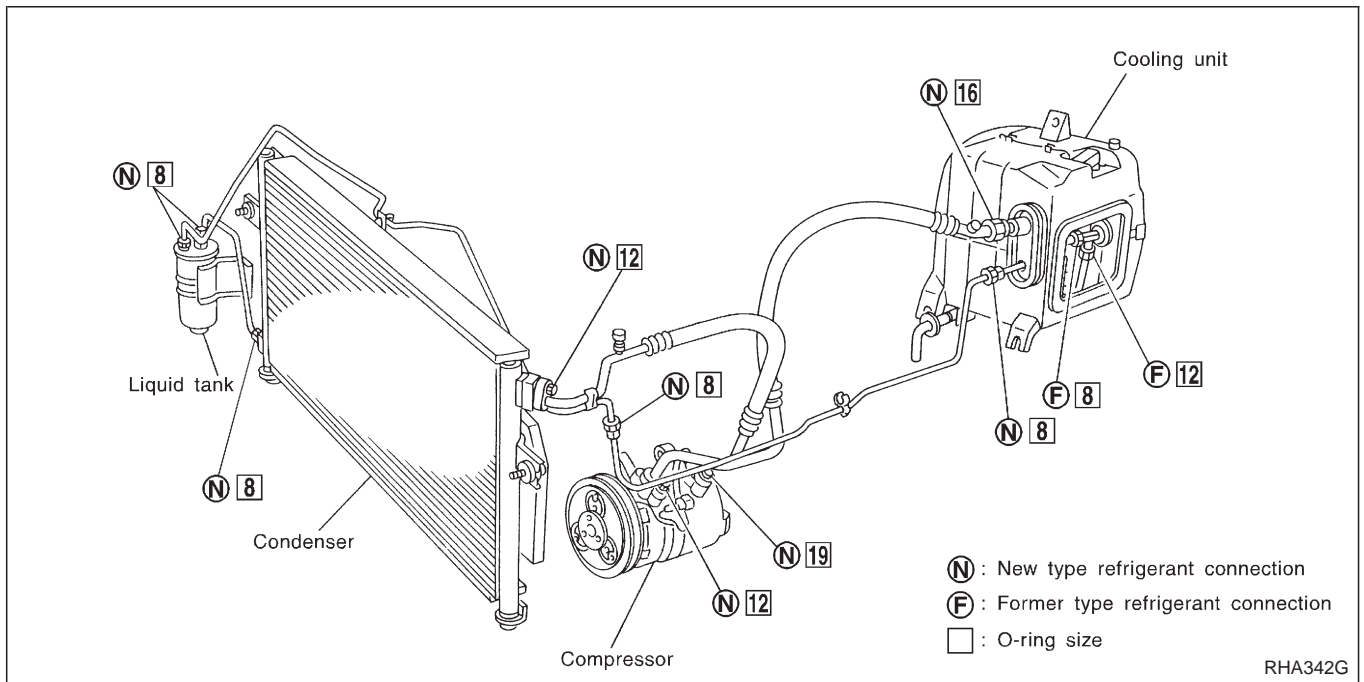
## Precautions for Refrigerant Connection (Cont'd)

### O-RING AND REFRIGERANT CONNECTION

#### LHD models



#### RHD models



## PRECAUTIONS AND PREPARATION

### Precautions for Refrigerant Connection (Cont'd)

#### WARNING:

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

#### CAUTION:

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

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

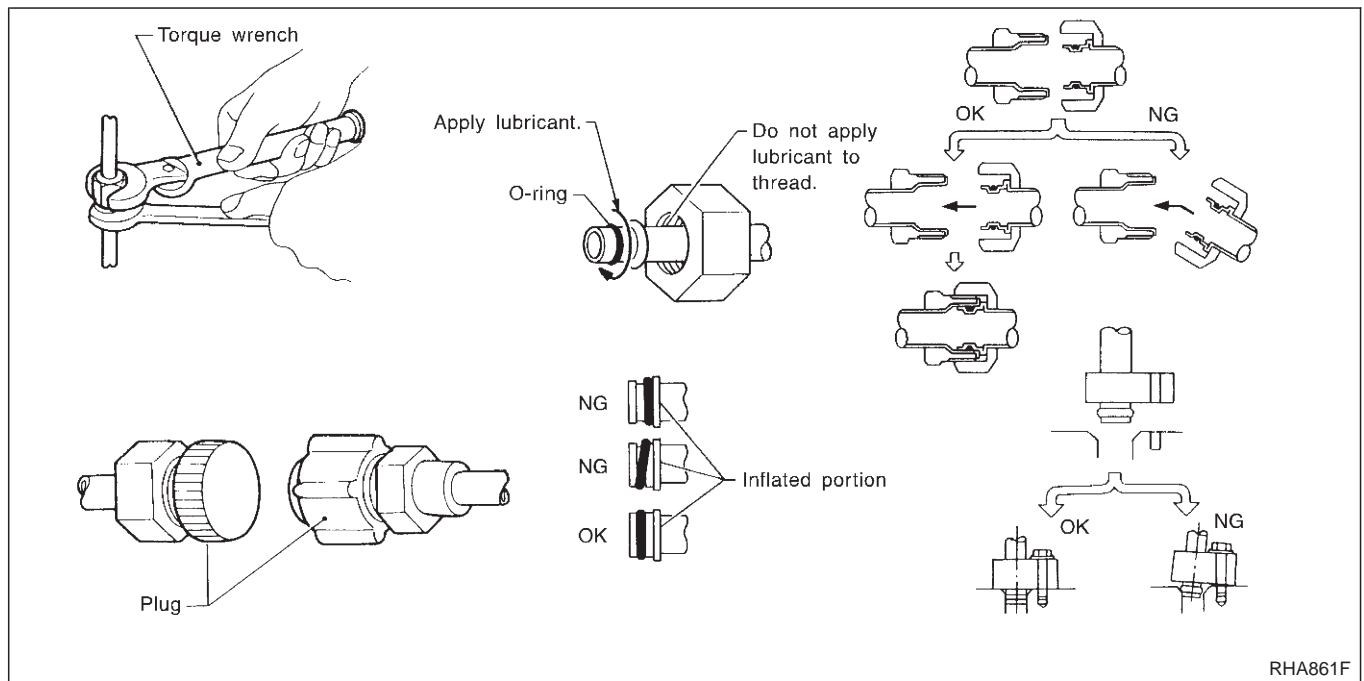
Lubricant name: Nissan A/C System Oil Type R (Except for the Middle East)

Nissan A/C System Oil Type S (For the Middle East)

Part number: KLH00-PAGR0 (Except for the Middle East)

KLH00-PAGS0 (For the Middle East)

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



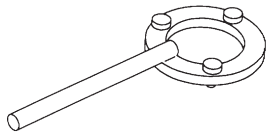
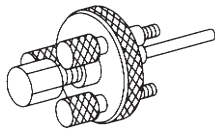
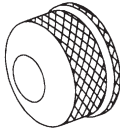
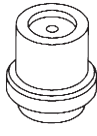
# PRECAUTIONS AND PREPARATION

## Precautions for Servicing Compressor

- Plug all openings to prevent moisture and foreign matter from entering.
- When the compressor is removed, store it in the same position as it is when mounted on the car.
- When replacing or repairing compressor, follow “Maintenance of Lubricant Quantity in Compressor” exactly. Refer to HA-50.
- Keep friction surfaces between clutch and pulley clean. If the surface is contaminated, with lubricant, wipe it off by using a clean waste cloth moistened with thinner.
- After compressor service operation, turn the compressor shaft by hand more than five turns in both directions. This will equally distribute lubricant inside the compressor. After the compressor is installed, let the engine idle and operate the compressor for one hour.
- After replacing the compressor magnet clutch, apply voltage to the new one and check for normal operation.

## Special Service Tools

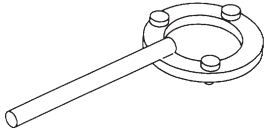
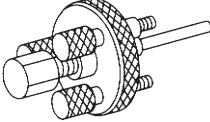
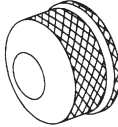
### FOR DKV-14C COMPRESSOR

Tool number Tool name	Description
KV99231260 Clutch disc wrench	Removing shaft nut and clutch disc  NT204
KV99232340 Clutch disc puller	Removing clutch disc  NT206
KV99234330 Pulley installer	Installing pulley  NT207
KV99233130 Center pulley puller	Removing pulley  NT208

# PRECAUTIONS AND PREPARATION

## Special Service Tools (Cont'd)

### FOR DKS-17CH COMPRESSOR

Tool number Tool name	Description
KV99231260 Clutch disc wrench	 <p>NT204</p> <p>Removing shaft nut and clutch disc</p>
KV992T0001 Clutch disc puller	 <p>NT206</p> <p>Removing clutch disc</p>
KV992T0002 Pulley installer	 <p>NT207</p> <p>Installing pulley</p>



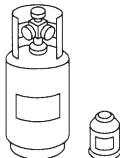

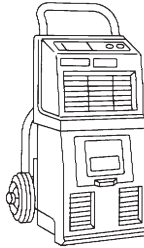
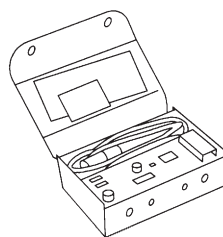
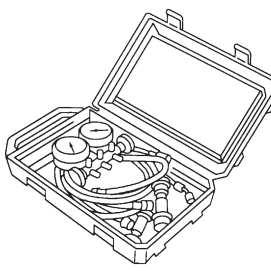
## PRECAUTIONS AND PREPARATION

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

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

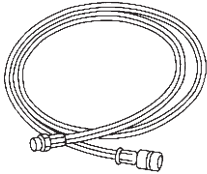
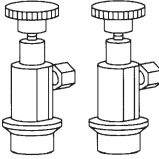
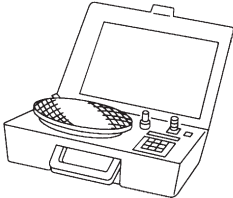
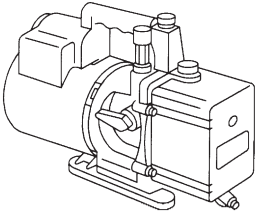
Separate and non-interchangeable service equipment must be used for each type of refrigerant/lubricant. Refrigerant container fittings, service hose fittings and service equipment fittings (equipment which handles refrigerant and/or lubricant) are different between CFC-12 (R-12) and HFC-134a (R-134a).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

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

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

## PRECAUTIONS AND PREPARATION

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

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

# PRECAUTIONS AND PREPARATION

## Precautions for Service Equipment

### RECOVERY/RECYCLING EQUIPMENT

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

### ELECTRONIC LEAK DETECTOR

Be certain to follow the manufacturer's instructions for tester operation and tester maintenance.

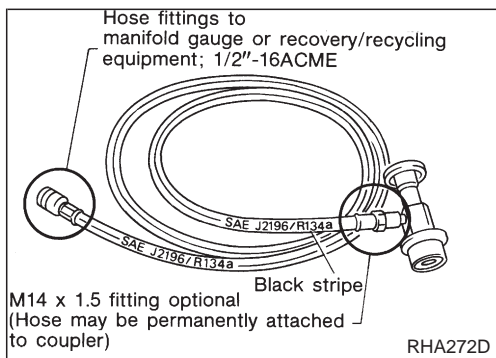
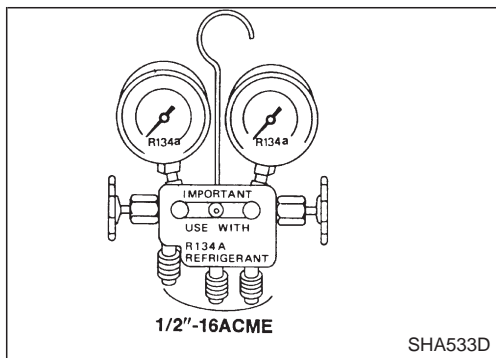
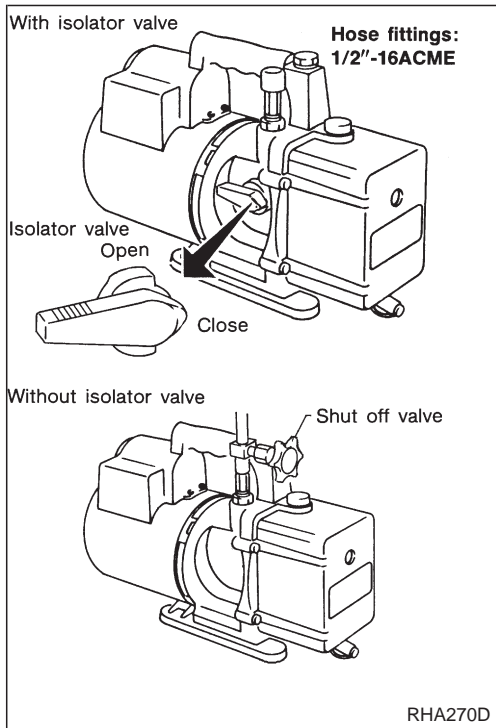
### VACUUM PUMP

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

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

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

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



### MANIFOLD GAUGE SET

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

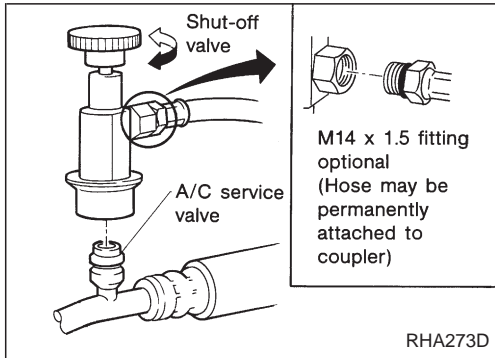
### SERVICE HOSES

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

## PRECAUTIONS AND PREPARATION

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

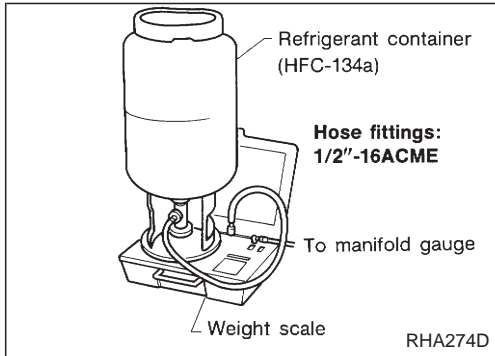
Never attempt to connect HFC-134a (R-134a) service couplers to an CFC-12 (R-12) A/C system. The HFC-134a (R-134a) couplers will not properly connect to the CFC-12 (R-12) system. However, if an improper connection is attempted, discharging and contamination may occur.



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

### REFRIGERANT WEIGHT SCALE

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



### CHARGING CYLINDER

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

# DESCRIPTION

## Refrigeration Cycle

### REFRIGERANT FLOW

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

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

### FREEZE PROTECTION

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

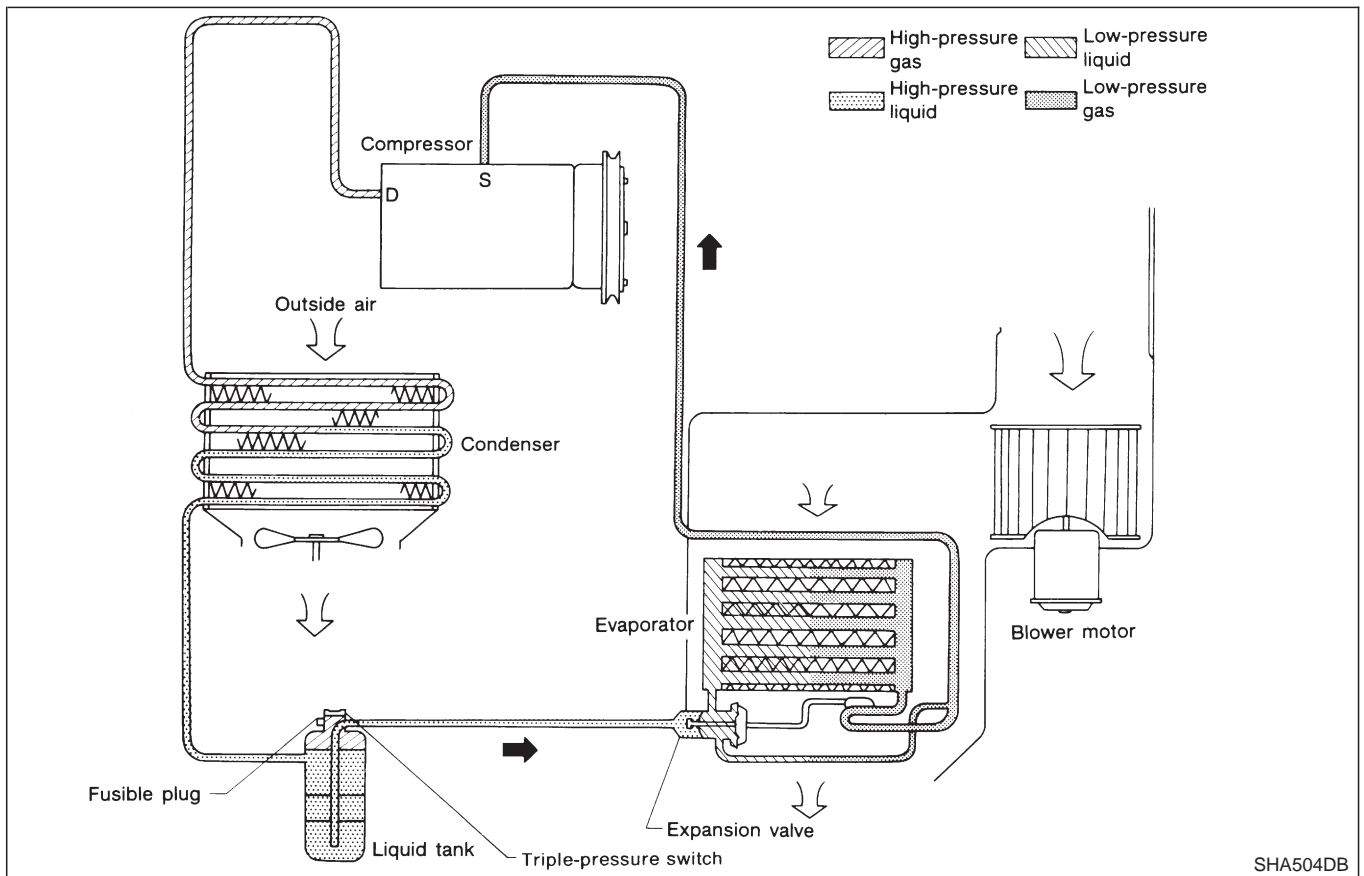
### REFRIGERANT SYSTEM PROTECTION

#### Triple-pressure switch

The triple-pressure switch is located on the liquid tank. If the system pressure rises or falls out of specifications, the switch opens to interrupt compressor clutch operation.

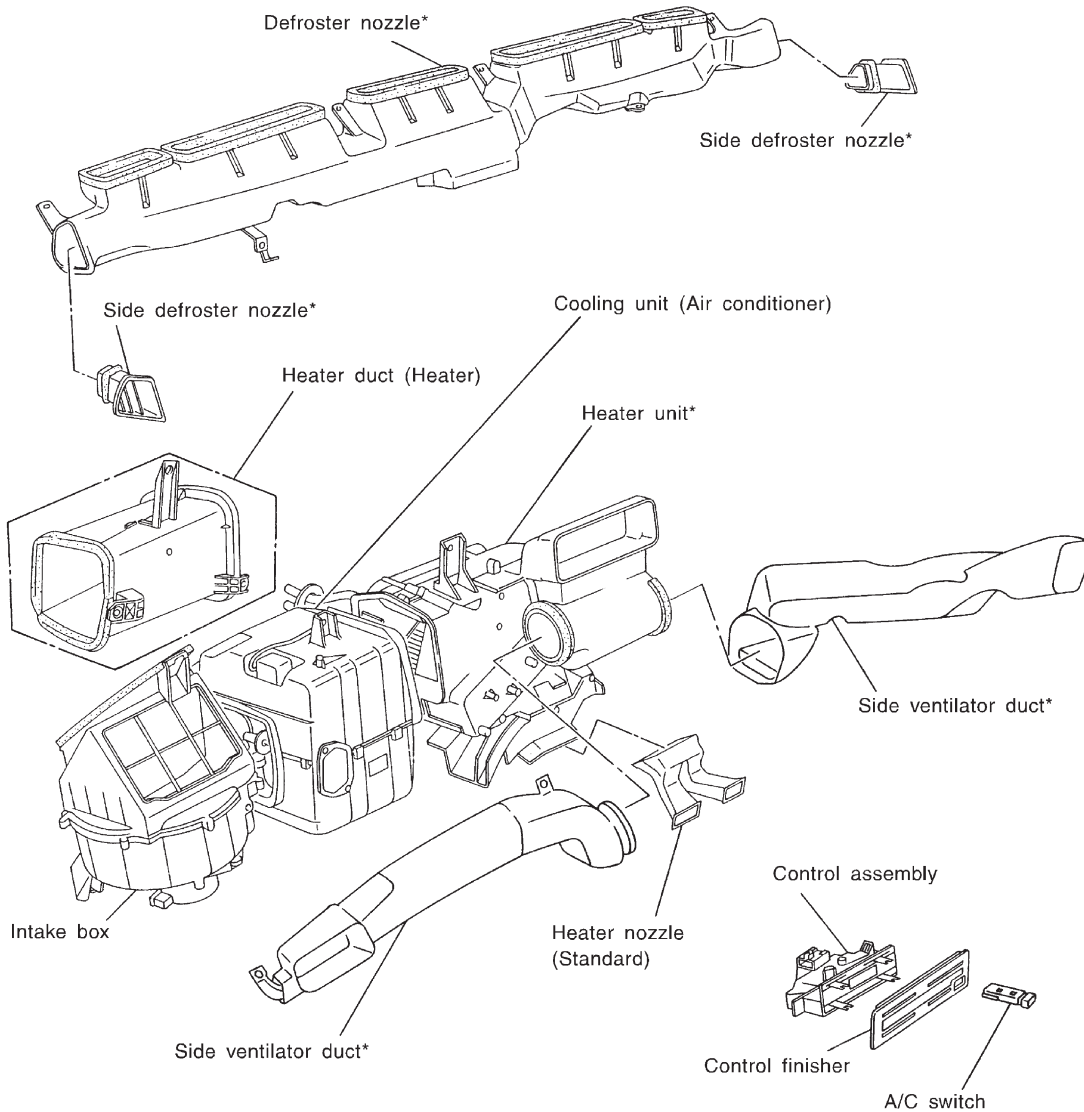
#### Fusible plug

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



# DESCRIPTION

## Component Layout



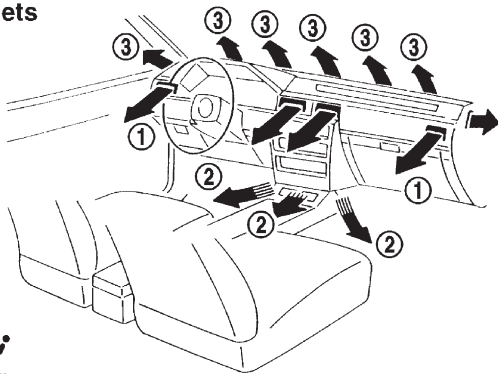
\* : For removal, it is necessary to remove instrument assembly.  
This illustration is for RHD models.  
The layout for LHD models is symmetrically opposite.

# DESCRIPTION

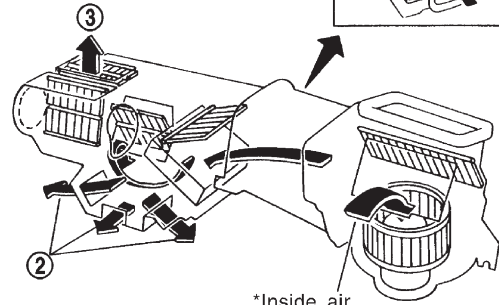
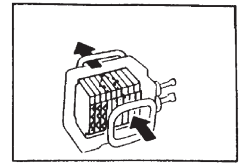
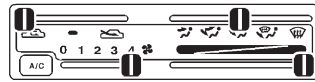
## Discharge Air Flow

### LHD MODELS

#### Air outlets



#### Foot

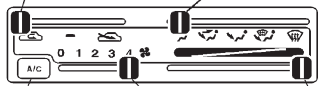


\*Inside air

#### Face

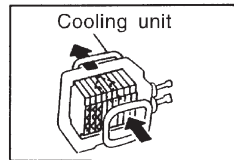
Recirculation control lever

Mode control lever



Air conditioner

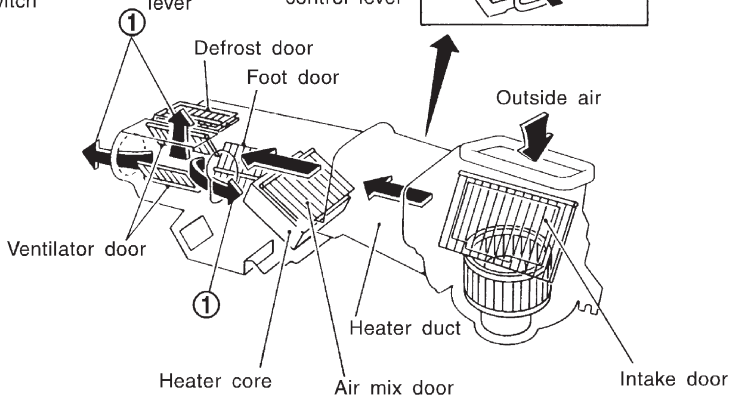
Cooling unit



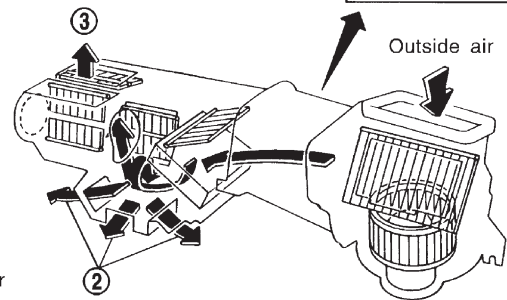
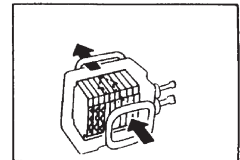
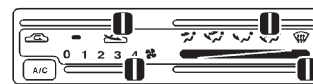
Air conditioner switch

Fan control lever

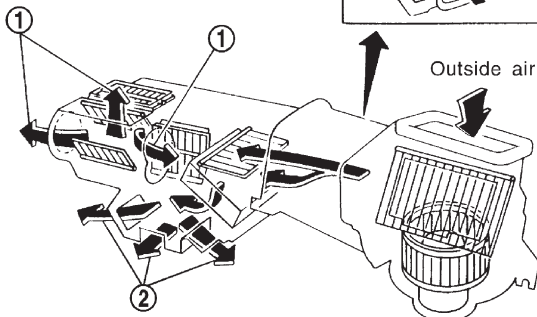
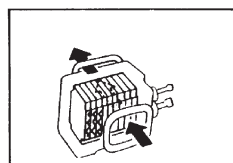
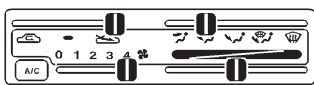
Temperature control lever



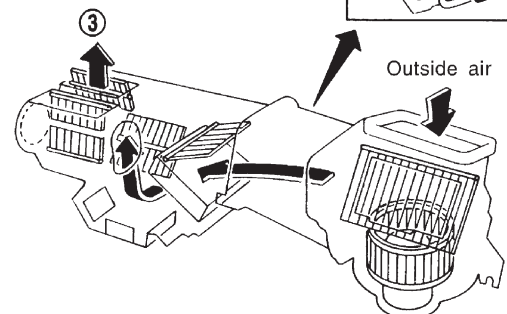
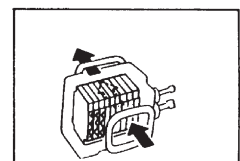
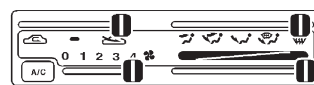
#### Foot and defrost



#### Bi-level



#### Defrost



① : To face

② : To foot

③ : To defrost

\* : When in REC position

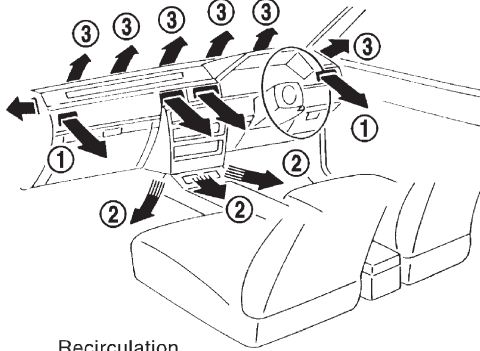


# DESCRIPTION

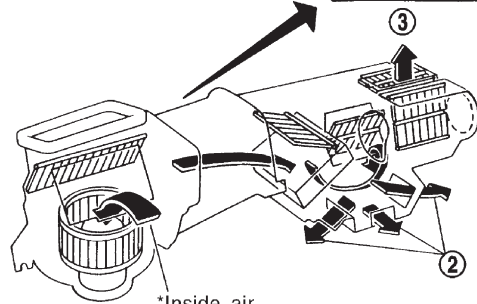
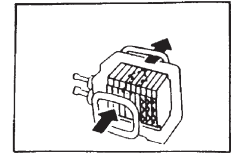
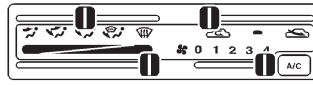
## Discharge Air Flow (Cont'd)

### RHD MODELS

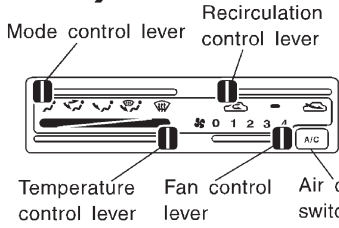
#### Air outlets



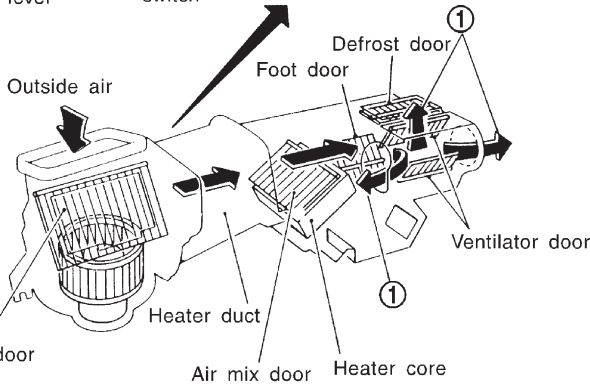
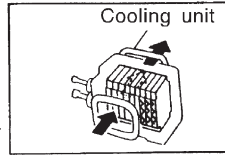
#### Foot



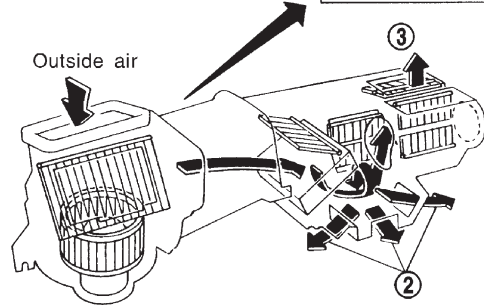
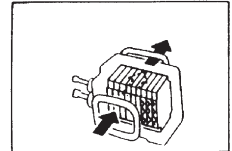
#### Face



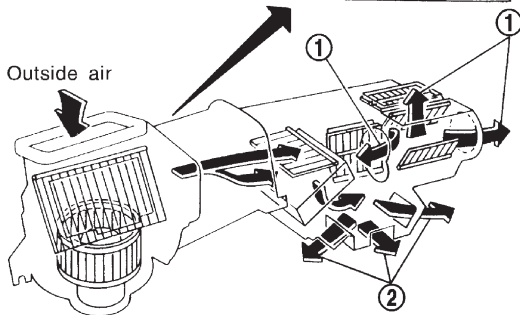
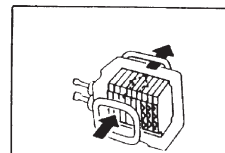
#### Air conditioner



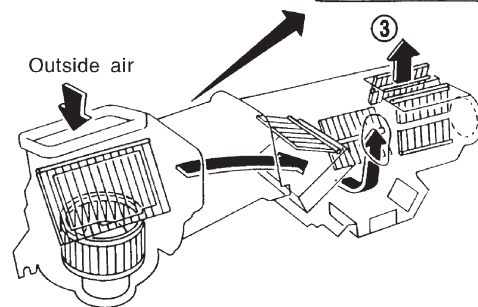
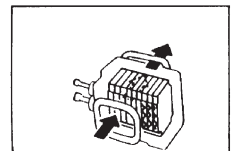
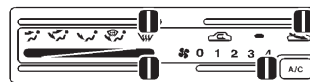
#### Foot and defrost



#### Bi-level



#### Defrost

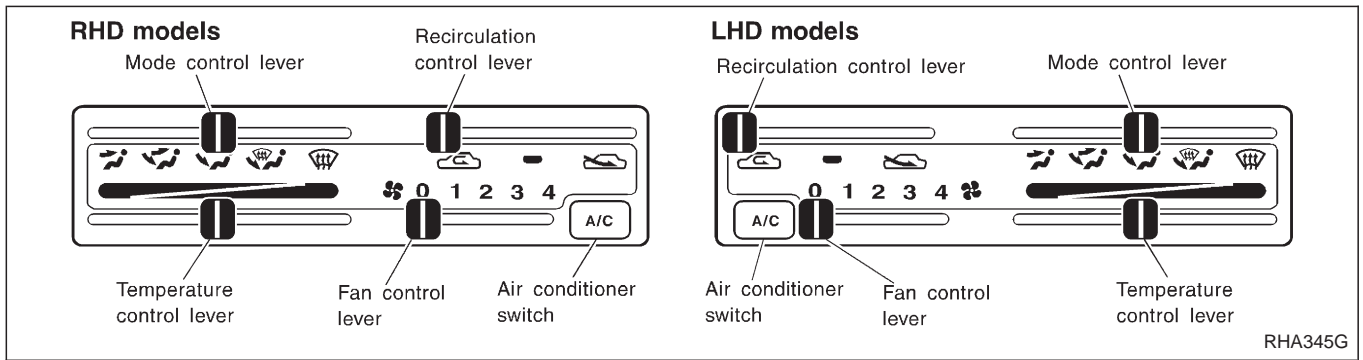


- ① : To face
- ② : To foot
- ③ : To defrost
- \* : When in REC position



# DESCRIPTION

## Control Operation



### FAN CONTROL LEVER

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

### MODE CONTROL LEVER

This lever controls the outlet air flow.

### TEMPERATURE CONTROL LEVER

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

### RECIRCULATION CONTROL LEVER

FRESH  position:

Outside air is drawn into the passenger compartment.

Recirculation (REC)  position:

Interior air is recirculated inside the vehicle.

### AIR CONDITIONER SWITCH

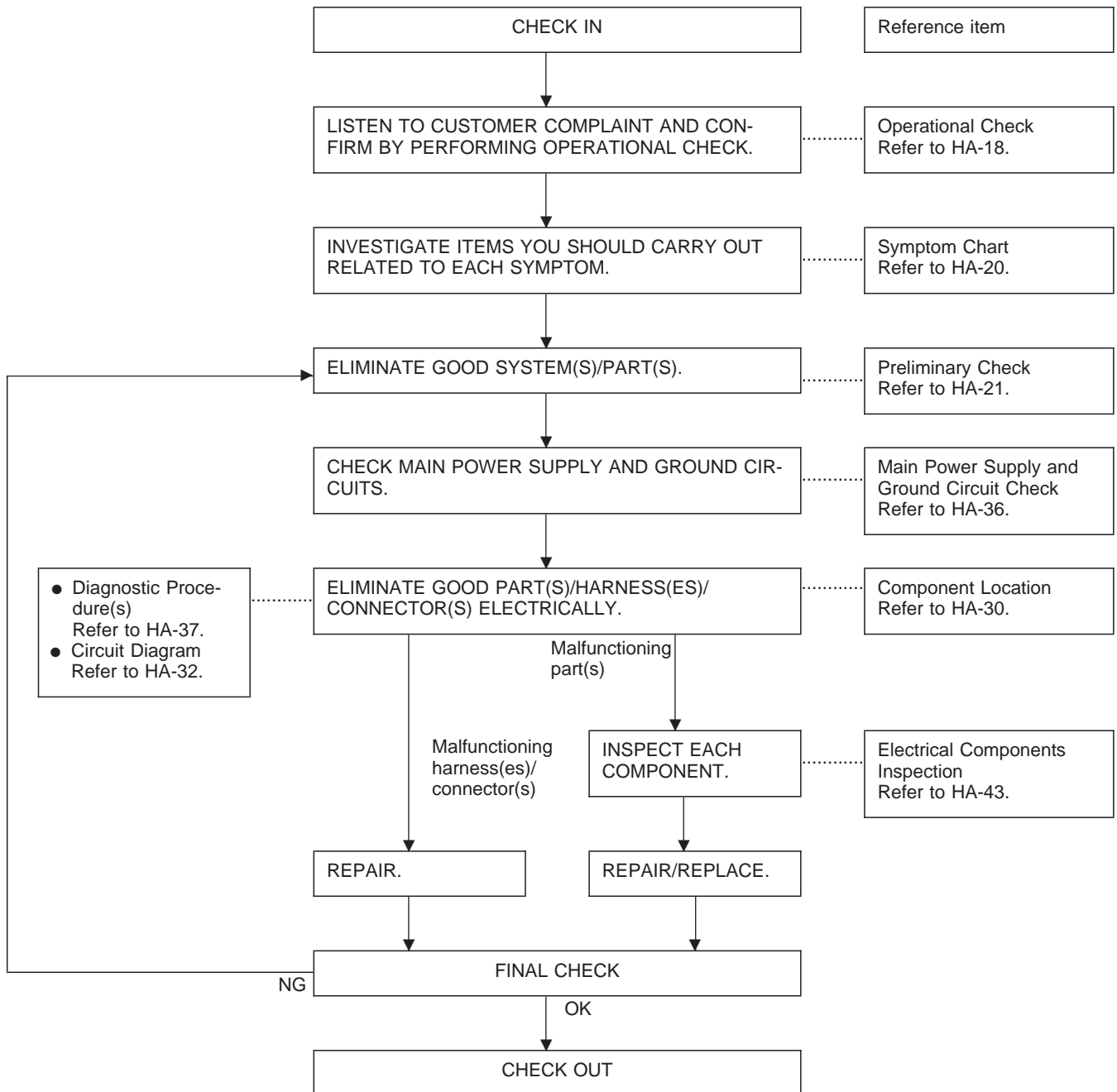
The air conditioner switch controls the A/C system. When the switch is depressed with the fan ON, the compressor will turn ON. The indicator lamp will also light.

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

# 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.

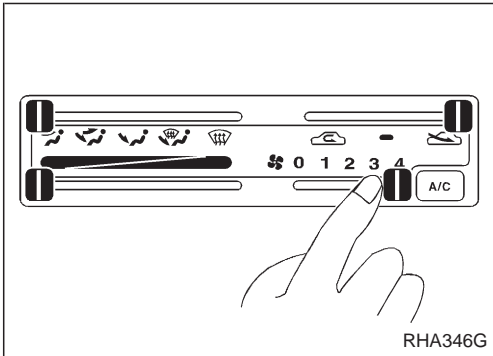
### CONDITIONS:

- Engine running at normal operating temperature.






### PROCEDURE:

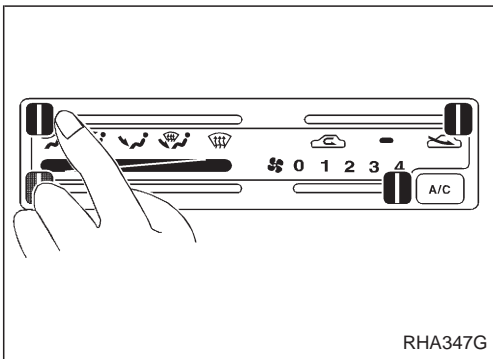
#### 1. Check blower

- Slide fan control lever to 1-speed. Blower should operate on 1-speed.
- Slide fan control lever to 2-speed and continue checking blower speed until all speeds are checked.
- Leave blower on 4-speed.




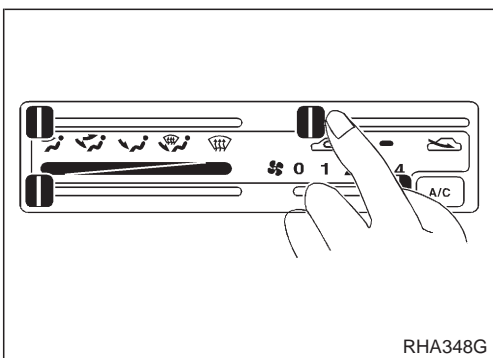
#### 2. Check discharge air

- Slide mode control lever to  position.
- Confirm that all discharge air comes out of face vents.
- Slide mode control lever to  position.
- Confirm that discharge air comes out of face vents and foot vents.
- Slide mode control lever to  position.
- Confirm that discharge air comes out of foot vents, with some air from defrost vents.
- Slide mode control lever to  position.
- Confirm that discharge air comes out of foot vents with some air from defrost vents.
- Slide mode control lever to  position.
- Confirm that all discharge air comes out of defrost vents.



#### 3. Check recirculation

- Slide recirculation control lever to the REC  position.
- Listen for intake door position change (you should hear blower sound change slightly).

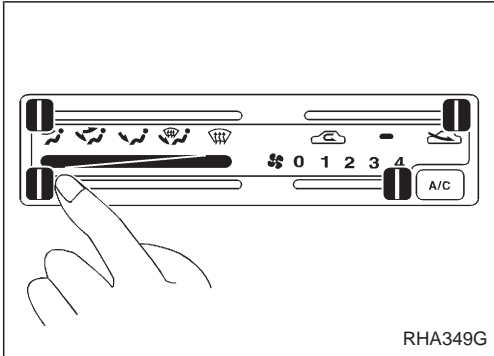


## TROUBLE DIAGNOSES

### Operational Check (Cont'd)

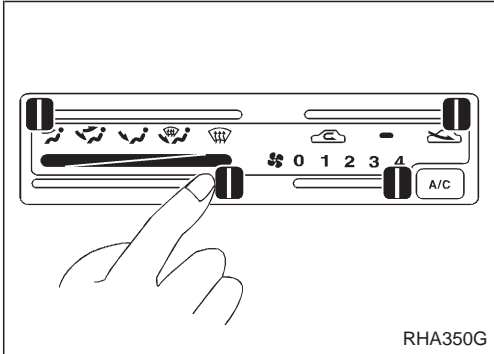
#### 4. Check temperature decrease

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



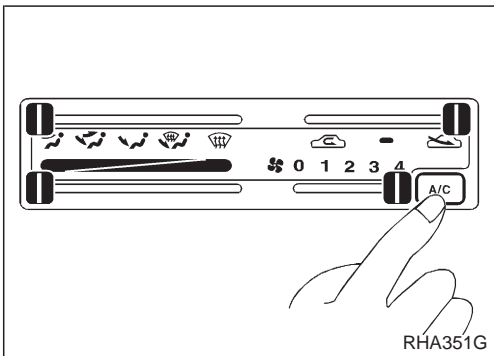
#### 5. Check temperature increase

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



#### 6. Check A/C switch

Move fan control lever to the desired position (1 to 4) and press air conditioner switch to turn ON air conditioner. Indicator light will come on when air conditioner is ON.



# TROUBLE DIAGNOSES

## Symptom Chart

### DIAGNOSTIC TABLE

PROCEDURE	Preliminary Check			Diagnostic Procedure		Main Power Supply and Ground Circuit Check	Electrical Components Inspection										
	HA-21	HA-22	HA-23	HA-37	HA-39		HA-36	HA-43	HA-43	HA-43	HA-43	HA-44	HA-44	HA-44	HA-60	HA-45	—
SYMPTOM	Preliminary check 1	Preliminary check 2	Preliminary check 3	Diagnostic procedure 1	Diagnostic procedure 2	15A Fuses (No. 19 and 20)	7.5A Fuse (No. 21)	Blower motor	Blower resistor	A/C switch	Fan switch	Thermo control amp.	A/C relay	Triple-pressure switch	Magnet clutch	Thermal protector	Harness
A/C does not blow cold air.	①			○		○	○	○	○	○	○	○	○	○	○	○	○
Blower motor does not rotate.	①			②		○		○	○		○	○					○
Magnet clutch does not engage when A/C switch and fan switch are ON.	①				②		○			○	○	○	○	○	○	○	○
Noise.		①															
Insufficient heating.			①	○													○

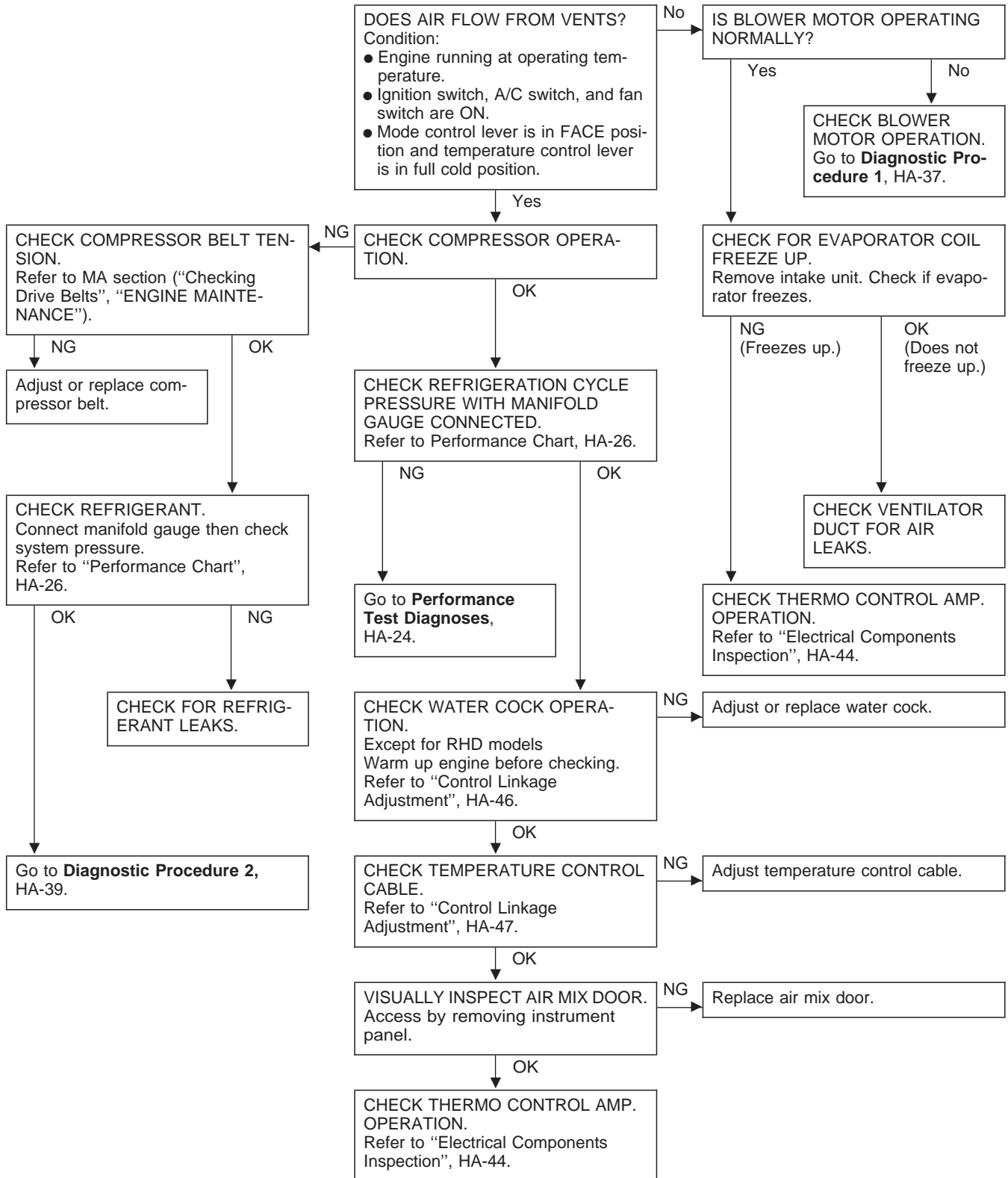
①, ② : The number means checking order.  
 ○: Checking order depends on malfunction in flow chart.

# TROUBLE DIAGNOSES

## Preliminary Check

### PRELIMINARY CHECK 1

A/C does not blow cold air.

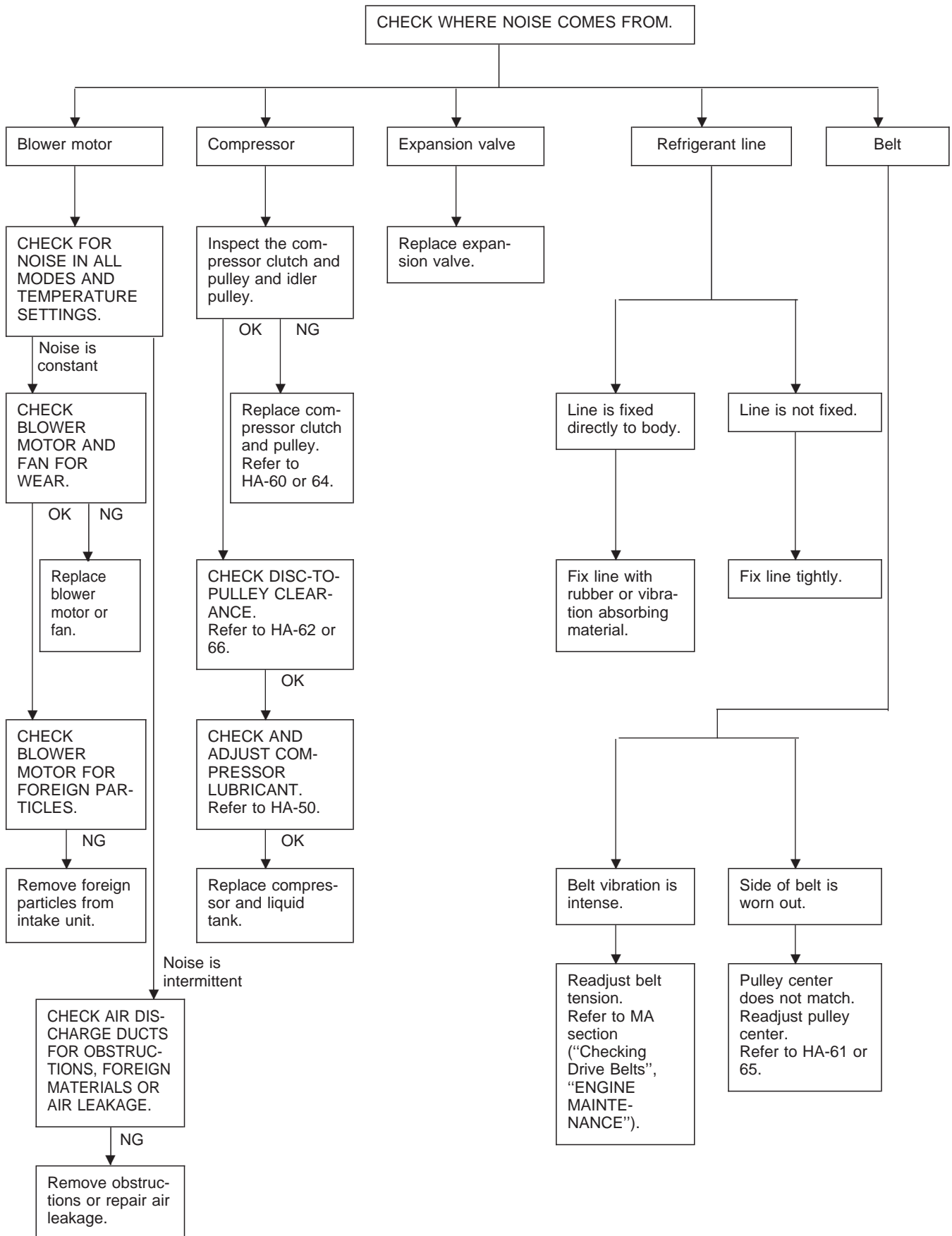


# TROUBLE DIAGNOSES

## Preliminary Check (Cont'd)

### PRELIMINARY CHECK 2

#### Noise

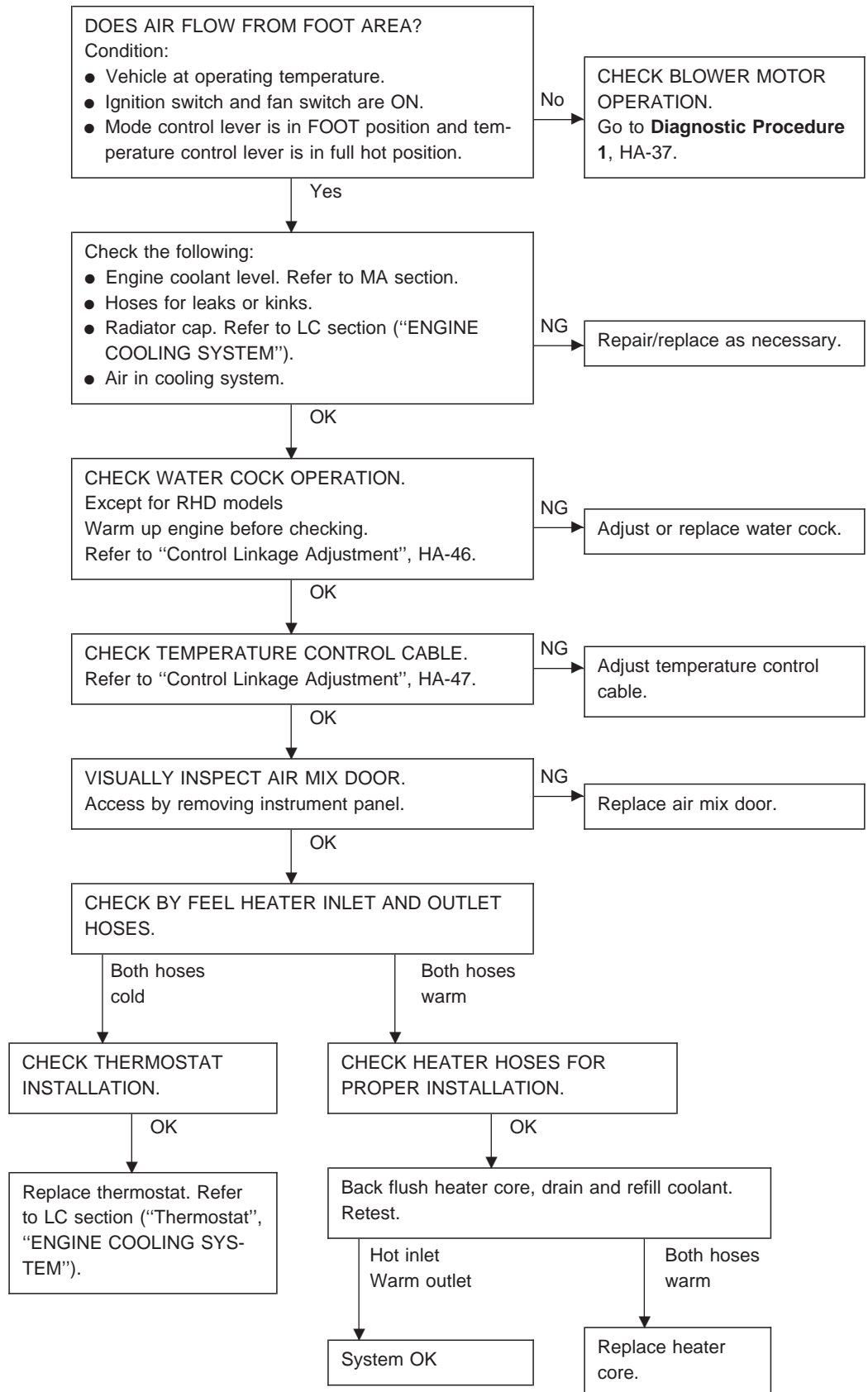


# TROUBLE DIAGNOSES

## Preliminary Check (Cont'd)

### PRELIMINARY CHECK 3

#### Insufficient heating

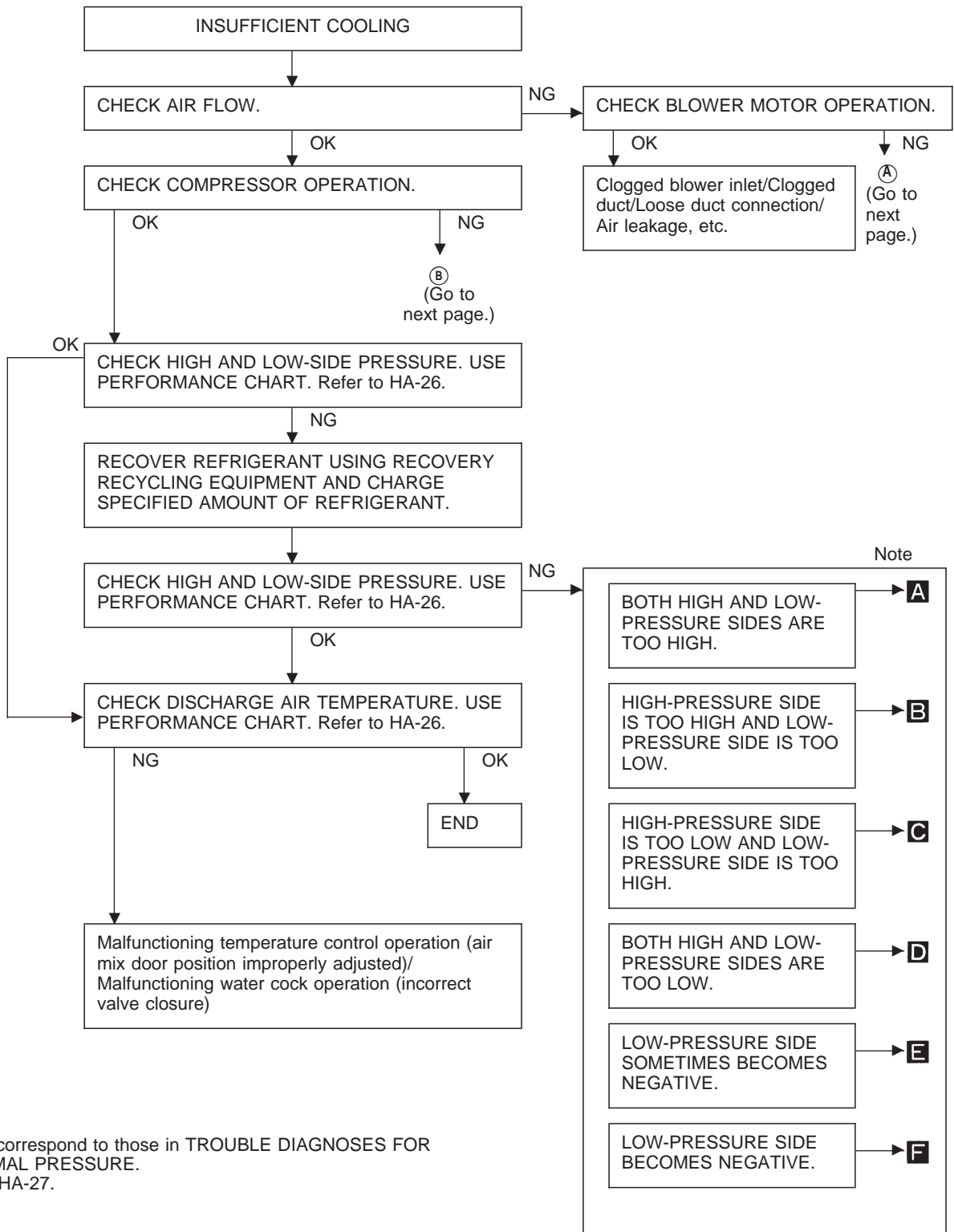




# TROUBLE DIAGNOSES

## Performance Test Diagnoses

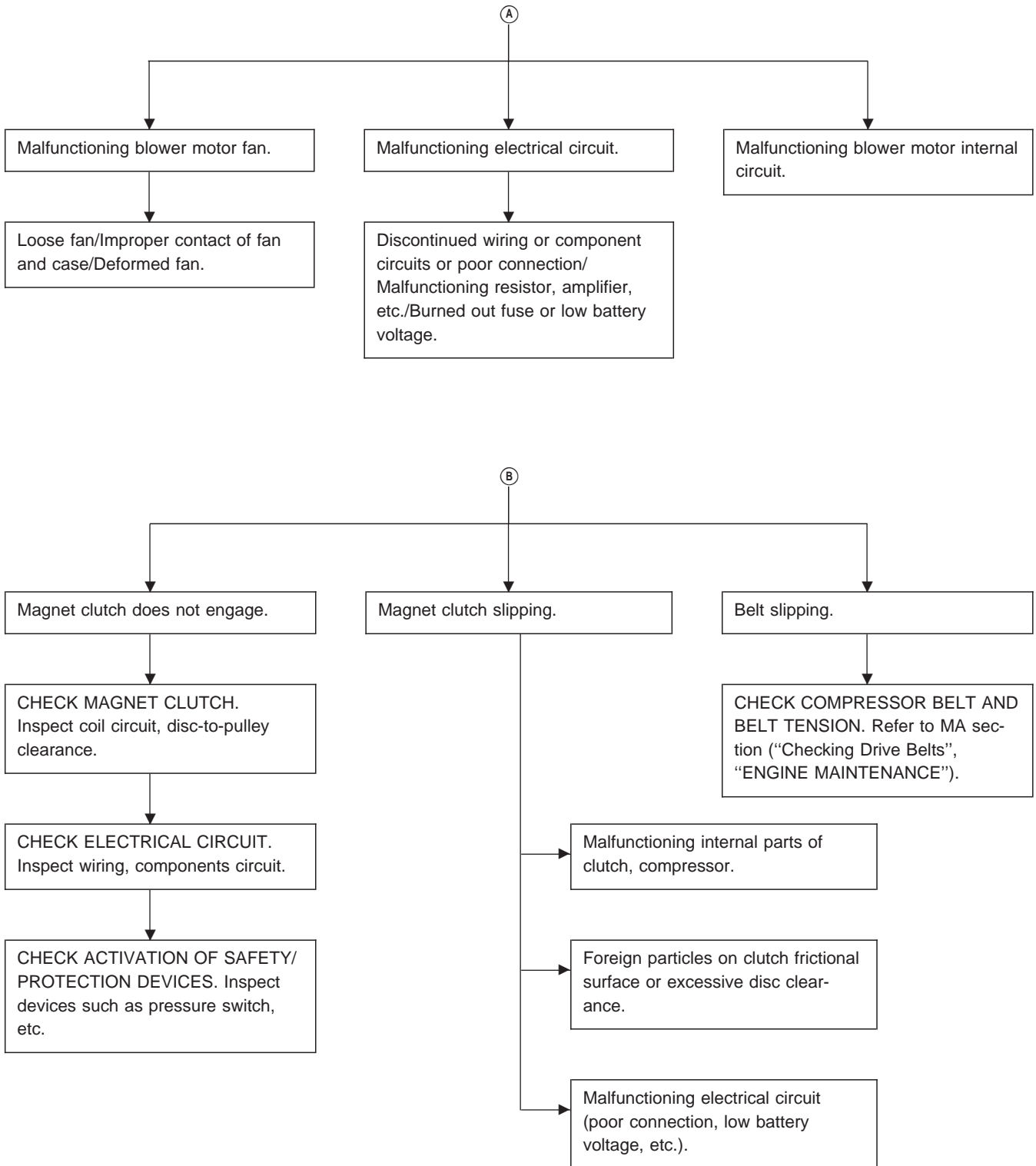
### INSUFFICIENT COOLING



Note: **A-F** correspond to those in TROUBLE DIAGNOSES FOR ABNORMAL PRESSURE. Refer to HA-27.

# TROUBLE DIAGNOSES

## Performance Test Diagnoses (Cont'd)



# TROUBLE DIAGNOSES

## Performance Chart

### TEST CONDITION

Testing must be performed as follows:

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


Doors: Closed

Door window: Open

Hood: Open

TEMP. setting: Max. COLD

Discharge Air: FACE VENT

INTAKE lever position:  (Recirculation)

FAN speed: 4-speed

Engine speed: 1,500 rpm

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

### TEST READING

#### Recirculating-to-discharge air temperature table

Inside air (Recirculating air) at blower assembly inlet		Discharge air temperature at center ventilator °C (°F)
Relative humidity %	Air temperature °C (°F)	
50 - 60	20 (68)	6.6 - 9.4 (44 - 49)
	25 (77)	9.6 - 11.8 (49 - 53)
	30 (86)	13.5 - 16.5 (56 - 62)
	35 (95)	17.5 - 21.2 (64 - 70)
	40 (104)	21.4 - 25.9 (71 - 79)
60 - 70	20 (68)	9.4 - 11.2 (49 - 52)
	25 (77)	11.8 - 14.1 (53 - 57)
	30 (86)	16.5 - 19.5 (62 - 67)
	35 (95)	21.2 - 24.9 (70 - 77)
	40 (104)	25.9 - 30.3 (79 - 87)

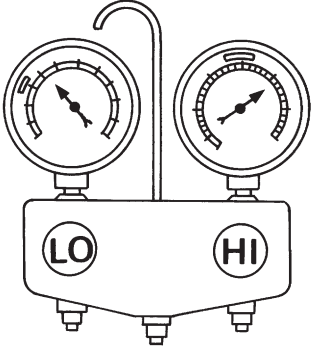
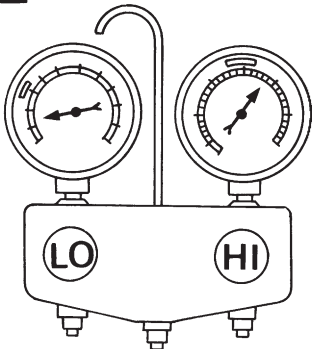
#### Ambient air temperature-to-operating pressure table

Ambient air		High-pressure (Discharge side) kPa (bar, kg/cm <sup>2</sup> , psi)	Low-pressure (Suction side) kPa (bar, kg/cm <sup>2</sup> , psi)
Relative humidity %	Air temperature °C (°F)		
50 - 70	20 (68)	971 - 1,187 (9.71 - 11.87, 9.9 - 12.1, 141 - 172)	59 - 69 (0.59 - 0.69, 0.6 - 0.7, 9 - 10)
	25 (77)	991 - 1,206 (9.91 - 12.06, 10.1 - 12.3, 144 - 175)	69 - 78 (0.69 - 0.78, 0.7 - 0.8, 10 - 11)
	30 (86)	1,187 - 1,442 (11.87 - 14.42, 12.1 - 14.7, 172 - 209)	88 - 108 (0.88 - 1.08, 0.9 - 1.1, 13 - 16)
	35 (95)	1,402 - 1,716 (14.02 - 17.16, 14.3 - 17.5, 203 - 249)	108 - 127 (1.08 - 1.27, 1.1 - 1.3, 16 - 18)
	40 (104)	1,628 - 1,981 (16.28 - 19.81, 16.6 - 20.2, 236 - 287)	127 - 157 (1.27 - 1.57, 1.3 - 1.6, 18 - 23)

# TROUBLE DIAGNOSES

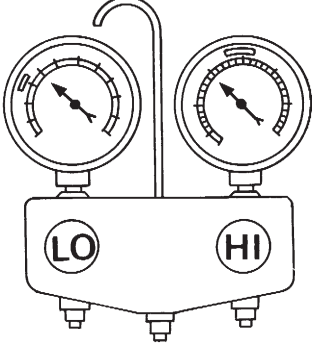
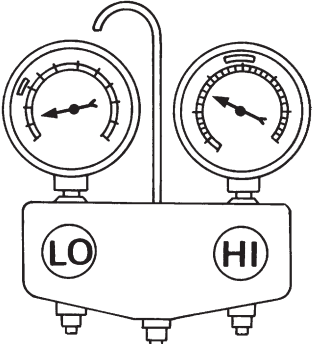
## Trouble Diagnoses for Abnormal Pressure

Whenever system's high or low-pressure side is abnormal, diagnose using a manifold gauge. The marker above the gauge scale in the following table indicates the standard (normal) pressure range. Since the standard (normal) pressure differs from vehicle to vehicle, refer to HA-26 ("Ambient air temperature-to-operating pressure table").

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
<p>Both high and low-pressure sides are too high.</p> <p><b>A</b></p>  <p style="text-align: right;">AC359A</p>	<ul style="list-style-type: none"> <li>● Pressure is reduced soon after water is splashed on condenser.</li> </ul>	<p>Excessive refrigerant charge in refrigeration cycle.</p>	<p>Reduce refrigerant until specified pressure is obtained.</p>
	<p>Air suction by cooling fan is insufficient.</p>	<p>Insufficient condenser cooling performance.</p> <p style="text-align: center;">↓</p> <p>① Condenser fins are clogged. ② Improper fan rotation of cooling fan.</p>	<ul style="list-style-type: none"> <li>● Clean condenser.</li> <li>● Check and repair cooling fan as necessary.</li> </ul>
	<ul style="list-style-type: none"> <li>● Low-pressure pipe is not cold.</li> <li>● When compressor is stopped high-pressure value quickly drops by approximately 196 kPa (2.0 bar, 2 kg/cm<sup>2</sup>, 28 psi). It then decreases gradually thereafter.</li> </ul>	<p>Poor heat exchange in condenser. (After compressor operation stops, high pressure decreases too slowly.)</p> <p style="text-align: center;">↓</p> <p>Air in refrigeration cycle.</p>	<p>Evacuate repeatedly and recharge system.</p>
	<p>Engine tends to overheat.</p>	<p>Engine cooling systems malfunction.</p>	<p>Check and repair each engine cooling system.</p>
	<ul style="list-style-type: none"> <li>● An area of the low-pressure pipe is colder than areas near the evaporator outlet.</li> <li>● Plates are sometimes covered with frost.</li> </ul>	<ul style="list-style-type: none"> <li>● Excessive liquid refrigerant on low-pressure side.</li> <li>● Excessive refrigerant discharge flow.</li> <li>● Expansion valve is open a little compared with the specification.</li> </ul> <p style="text-align: center;">↓</p> <p>① Improper thermal valve installation. ② Improper expansion valve adjustment.</p>	<p>Replace expansion valve.</p>
<p>High-pressure side is too high and low-pressure side is too low.</p> <p><b>B</b></p>  <p style="text-align: right;">AC360A</p>	<p>Upper side of condenser and high-pressure side are hot, however, liquid tank is not so hot.</p>	<p>High-pressure tube or parts located between compressor and condenser are clogged or crushed.</p>	<ul style="list-style-type: none"> <li>● Check and repair or replace malfunctioning parts.</li> <li>● Check lubricant for contamination.</li> </ul>

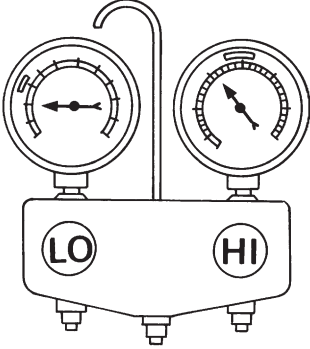
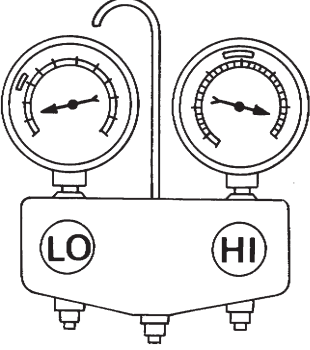
# TROUBLE DIAGNOSES

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

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
High-pressure side is too low and low-pressure side is too high. <b>C</b>  AC356A	High and low-pressure sides become equal soon after compressor operation stops.	Compressor pressure operation is improper. ↓ Damaged inside compressor packings.	Replace compressor.
	No temperature difference between high and low-pressure sides.	Compressor pressure operation is improper. ↓ Damaged inside compressor packings.	Replace compressor.
Both high and low-pressure sides are too low. <b>D</b>  AC353A	<ul style="list-style-type: none"> <li>● There is a big temperature difference between receiver drier outlet and inlet. Outlet temperature is extremely low.</li> <li>● Liquid tank inlet and expansion valve are frosted.</li> </ul>	Liquid tank inside is clogged a little.	<ul style="list-style-type: none"> <li>● Replace liquid tank.</li> <li>● Check lubricant for contamination.</li> </ul>
	<ul style="list-style-type: none"> <li>● Temperature of expansion valve inlet is extremely low as compared with areas near liquid tank.</li> <li>● Expansion valve inlet may be frosted.</li> <li>● Temperature difference occurs somewhere in high-pressure side.</li> </ul>	High-pressure pipe located between liquid tank and expansion valve is clogged.	<ul style="list-style-type: none"> <li>● Check and repair malfunctioning parts.</li> <li>● Check lubricant for contamination.</li> </ul>
	<ul style="list-style-type: none"> <li>● Expansion valve and liquid tank are warm or only cool when touched.</li> </ul>	Low refrigerant charge. ↓ Leaking fittings or components.	Check refrigerant for leaks. Refer to "Checking Refrigerant Leaks", HA-56.
	There is a big temperature difference between expansion valve inlet and outlet while the valve itself is frosted.	Expansion valve closes a little compared with the specification. ↓ ① Improper expansion valve adjustment. ② Malfunctioning thermal valve. ③ Outlet and inlet may be clogged.	<ul style="list-style-type: none"> <li>● Remove foreign particles by using compressed air.</li> <li>● Check lubricant for contamination.</li> </ul>
	An area of the low-pressure pipe is colder than areas near the evaporator outlet.	Low-pressure pipe is clogged or crushed.	<ul style="list-style-type: none"> <li>● Check and repair malfunctioning parts.</li> <li>● Check lubricant for contamination.</li> </ul>
	Air flow volume is not enough or is too low.	Compressor pressure operation is improper.	Replace compressor.

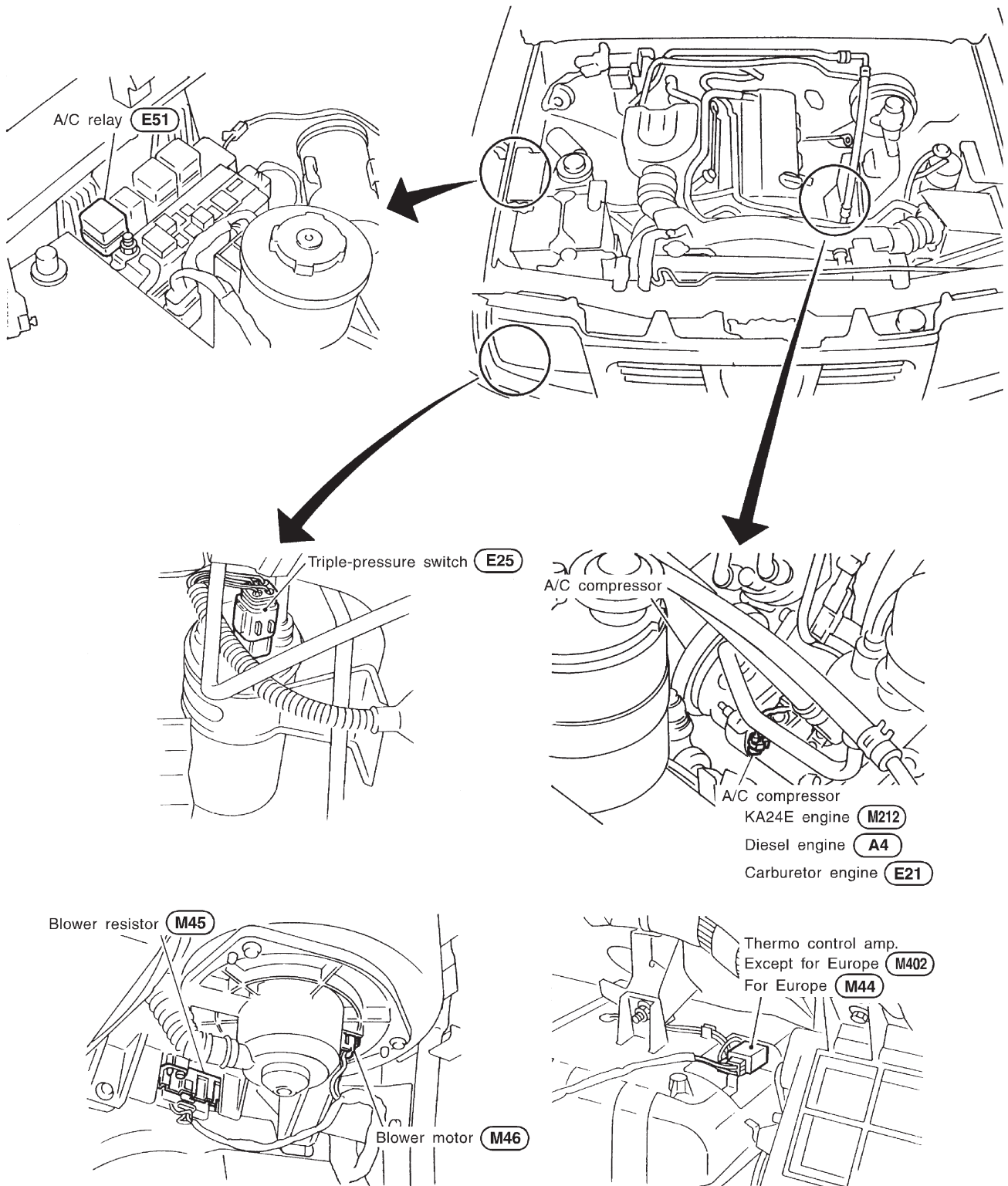
## TROUBLE DIAGNOSES

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

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
<p>Low-pressure side sometimes becomes negative.</p> <p><b>E</b></p>  <p style="text-align: right; font-size: small;">AC354A</p>	<ul style="list-style-type: none"> <li>● Air conditioner system does not function and does not cyclically cool the compartment air.</li> <li>● The system constantly functions for a certain period of time after compressor is stopped and restarted.</li> </ul>	<p>Refrigerant does not discharge cyclically.</p> <p style="text-align: center;">↓</p> <p>Moisture is frozen at expansion valve outlet and inlet.</p> <p style="text-align: center;">↓</p> <p>Water is mixed with refrigerant.</p>	<ul style="list-style-type: none"> <li>● Drain water from refrigerant or replace refrigerant.</li> <li>● Replace liquid tank.</li> </ul>
<p>Low-pressure side becomes negative.</p> <p><b>F</b></p>  <p style="text-align: right; font-size: small;">AC362A</p>	<p>Liquid tank or front/rear side of expansion valve's pipe is frosted or dewed.</p>	<p>High-pressure side is closed and refrigerant does not flow.</p> <p style="text-align: center;">↓</p> <p>Expansion valve or liquid tank is frosted.</p>	<p>Leave the system at rest. Start it again to check whether or not the problem is caused by water or foreign particles.</p> <ul style="list-style-type: none"> <li>● If water is the cause, initially cooling is okay. Then the water freezes, causing a blockage. Drain water from refrigerant or replace refrigerant.</li> <li>● If due to foreign particles, remove expansion valve and remove the particles with dry and compressed air.</li> <li>● If either of the above methods cannot correct the problem, replace expansion valve.</li> <li>● Replace liquid tank.</li> <li>● Check lubricant for contamination.</li> </ul>

# TROUBLE DIAGNOSES

## Component Location

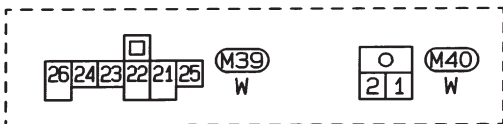
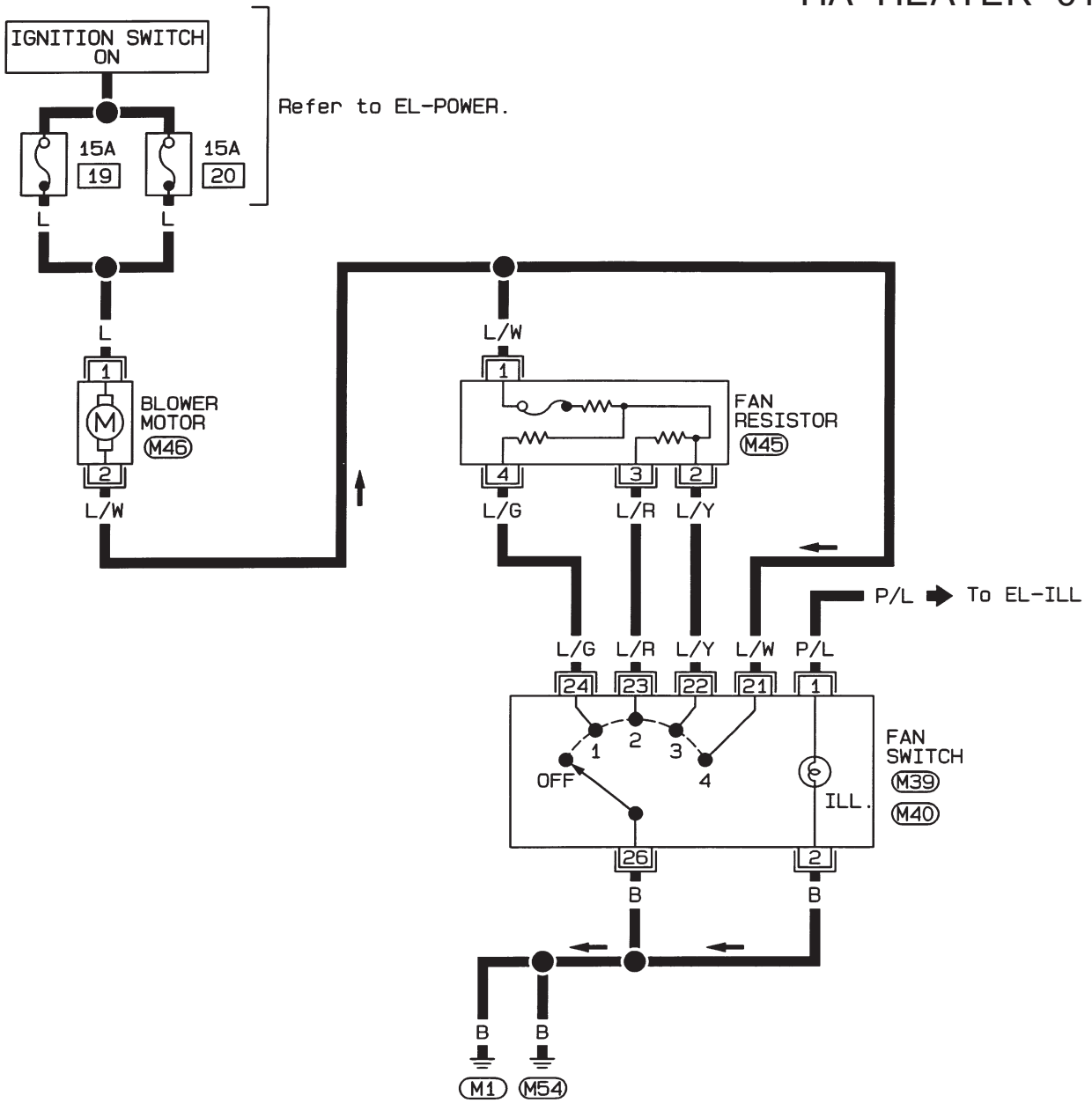


This illustration is for LHD models.

# TROUBLE DIAGNOSES

## Wiring Diagram — HEATER —

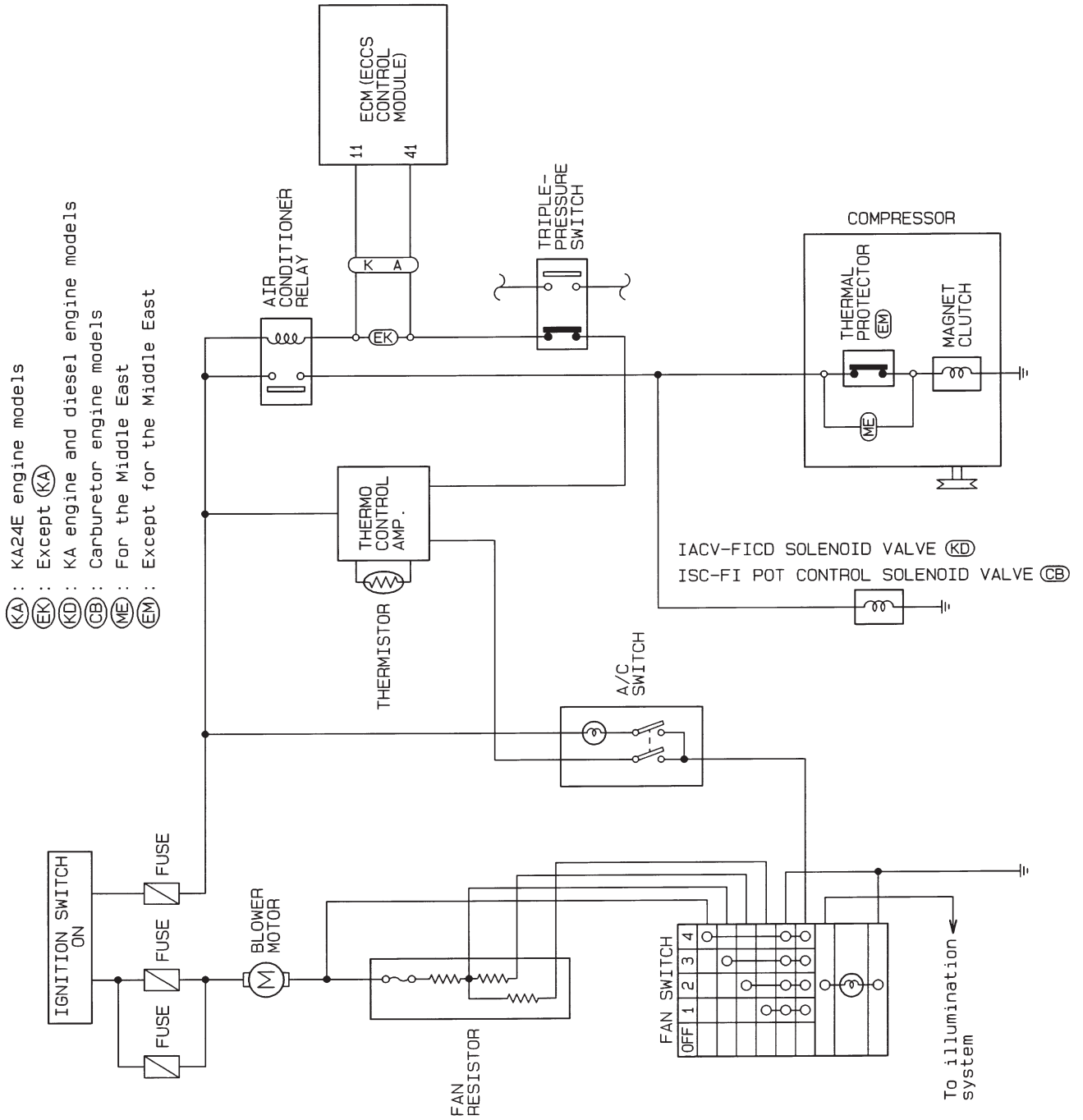
HA-HEATER-01





# TROUBLE DIAGNOSES

## Circuit Diagram — Air Conditioner



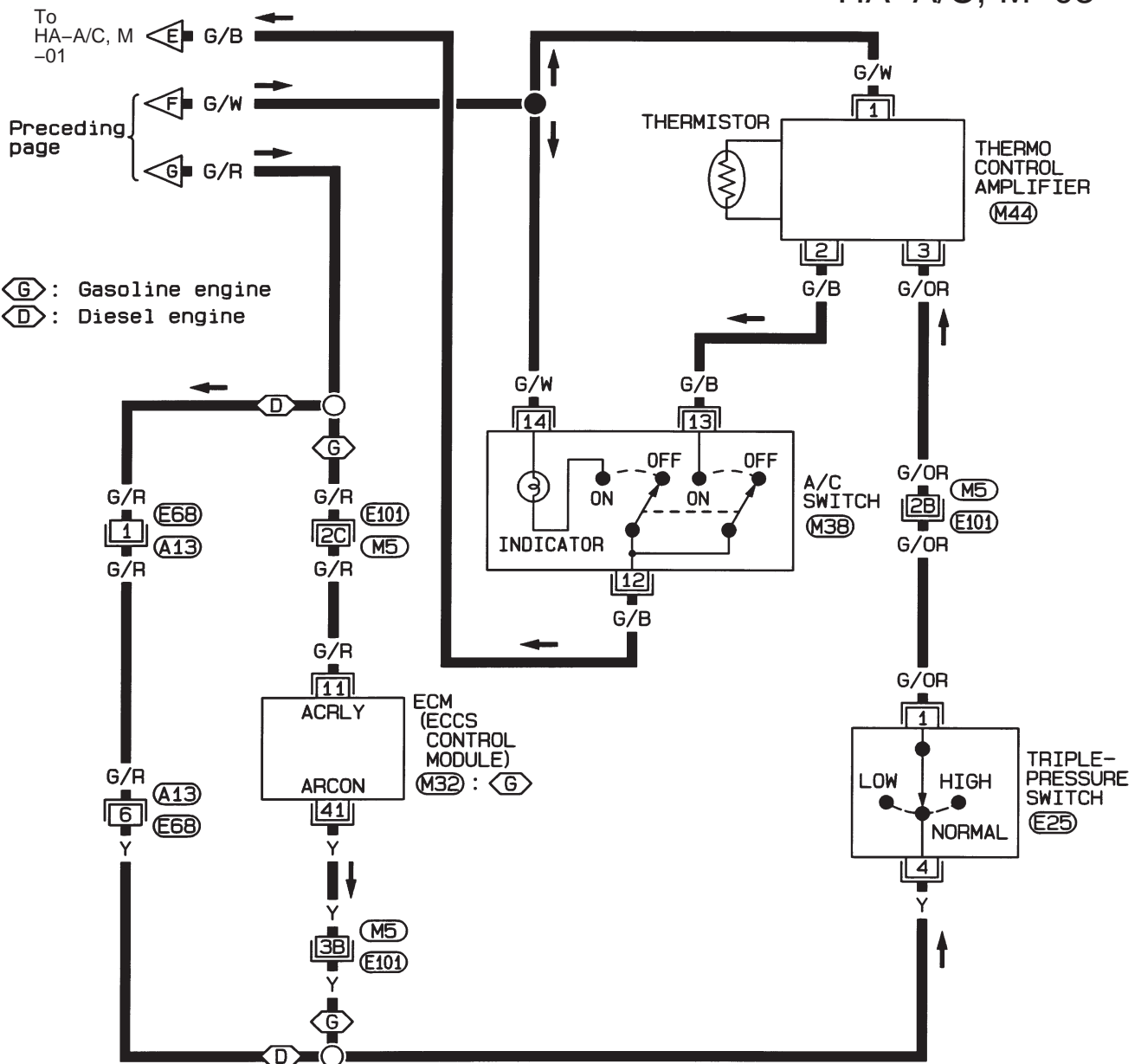




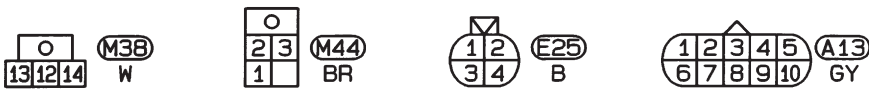
# TROUBLE DIAGNOSES

## Wiring Diagram — A/C — (Cont'd)

HA-A/C, M-03



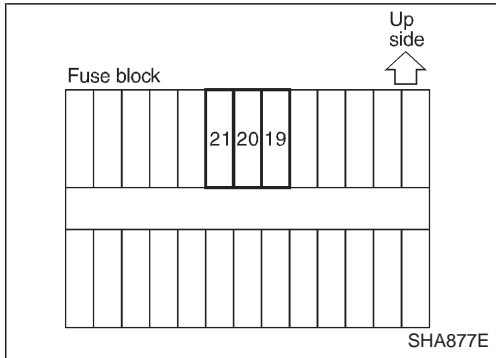
G : Gasoline engine  
D : Diesel engine



Refer to last page (Foldout page).

(M5), (E101), (M32)

# TROUBLE DIAGNOSES



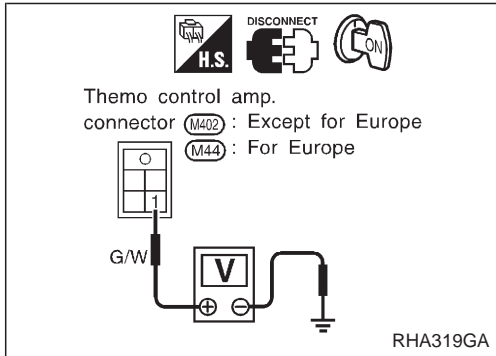
## Main Power Supply and Ground Circuit Check

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

Check the following fuses.

- 15A fuse (No. 19 and 20) for blower motor.
- 7.5A fuse (No. 21) for thermo control amp.

For detailed circuit, refer to "Wiring Diagram".



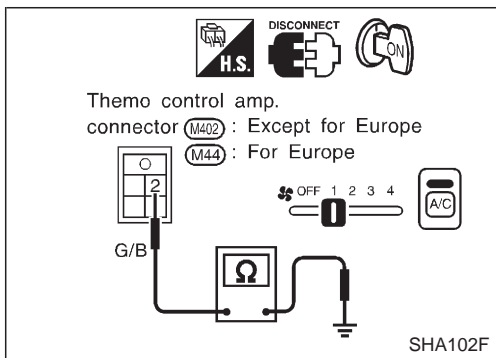
### THERMO CONTROL AMP. CHECK

#### Power supply circuit check

Check power supply circuit for thermo control amp. with ignition switch ON.

1. Disconnect thermo control amp. 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



#### Ground circuit check

Check body ground circuit for thermo control amp. with ignition switch ON, air conditioner switch ON and fan switch ON.

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

Ohmmeter terminal		Continuity
⊕	⊖	
②	Body ground	Yes

If the ground circuit is NG, check the following.

- A/C switch (Refer to HA-43.)
- Fan switch (Refer to HA-43.)
- Harness for open or short between thermo control amp. and A/C switch
- Harness for open or short between A/C switch and fan switch
- Fan switch ground circuit

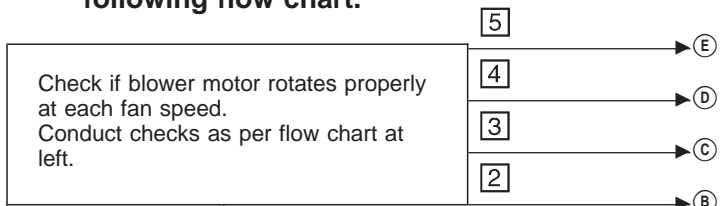
# TROUBLE DIAGNOSES

	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

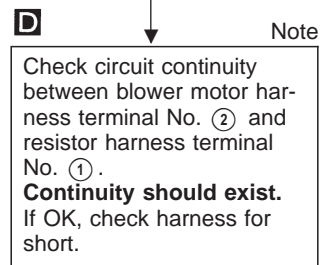
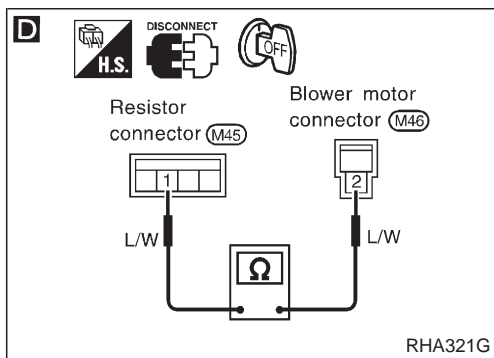
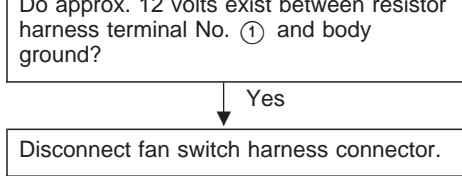
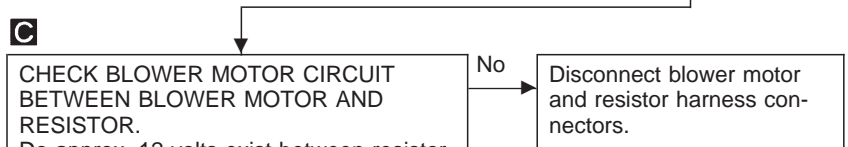
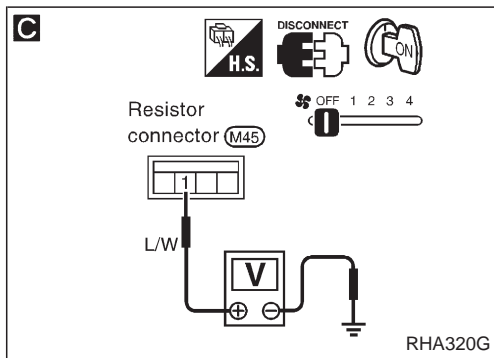
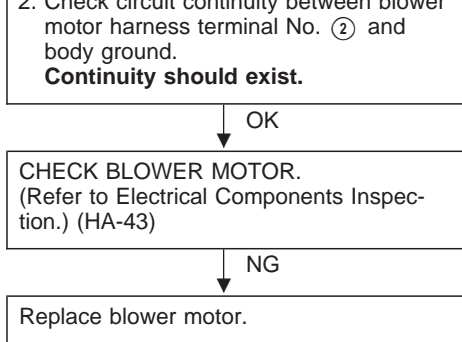
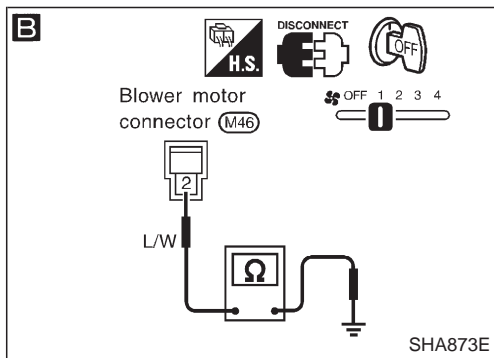
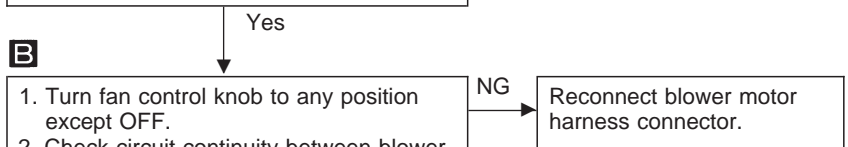
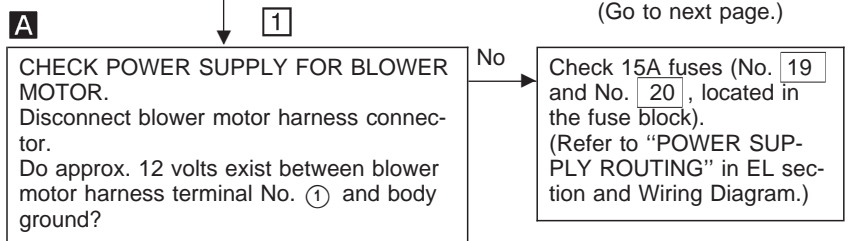
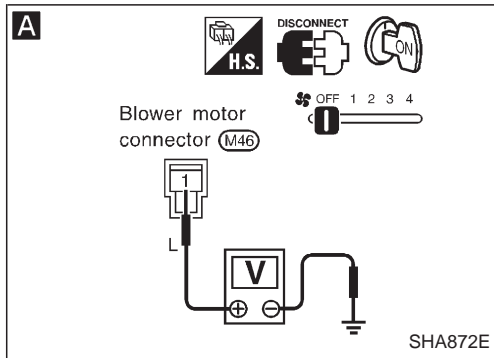
## Diagnostic Procedure 1

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

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



(Go to next page.)

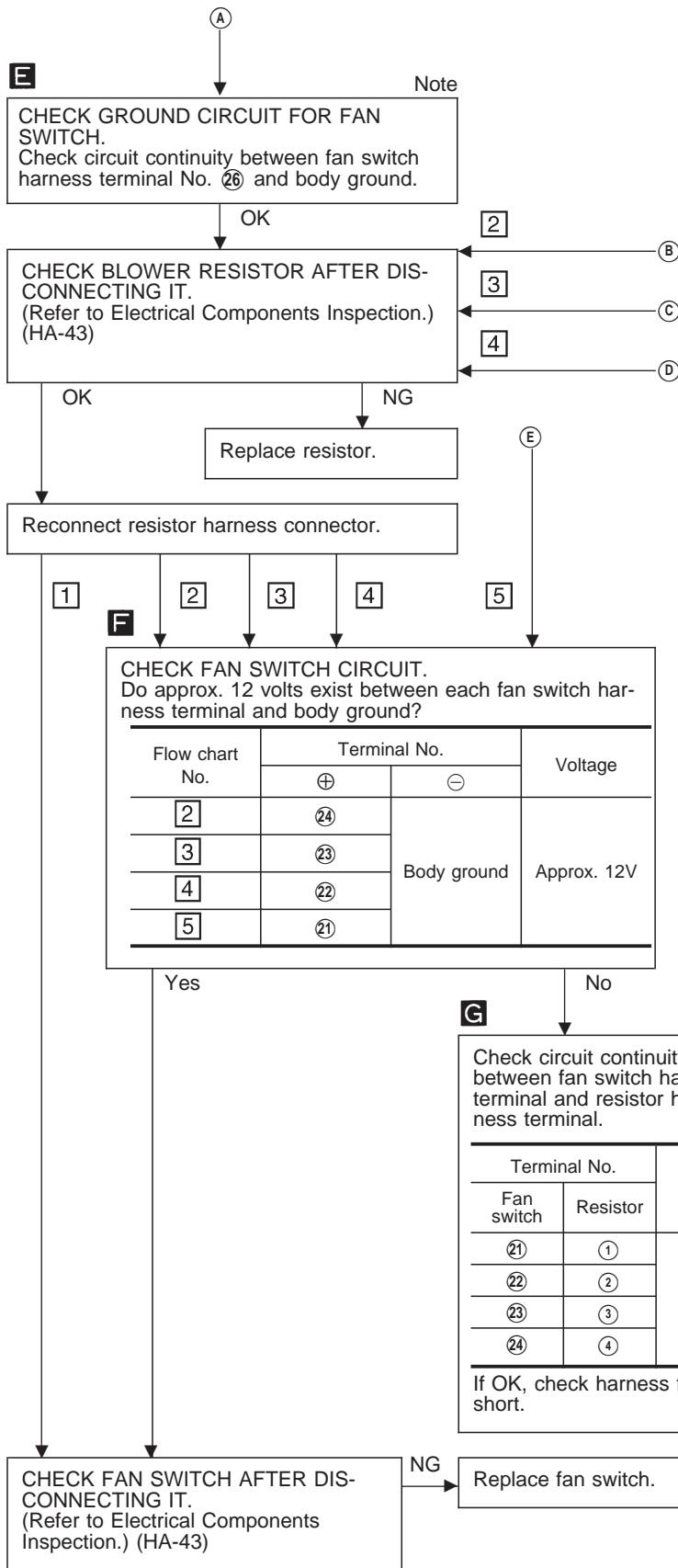
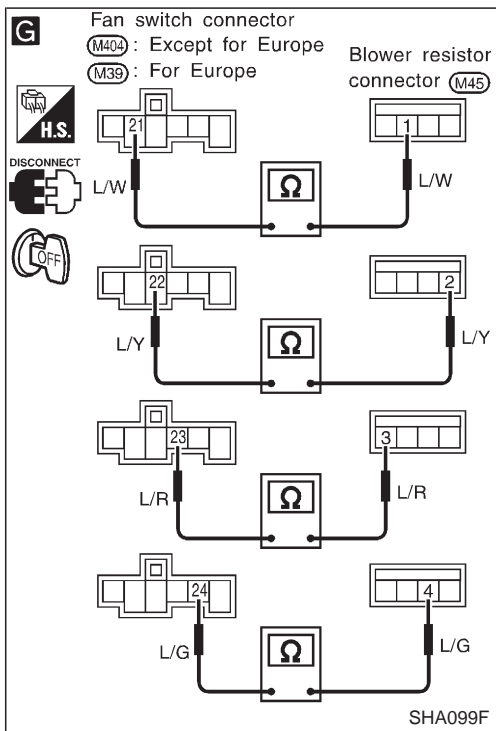
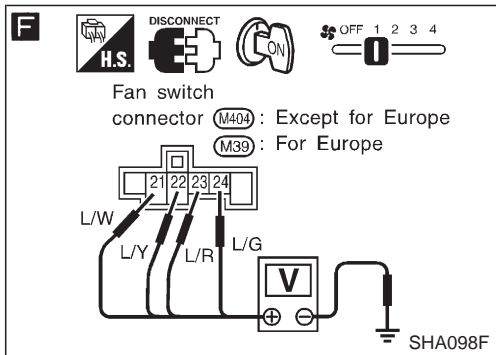
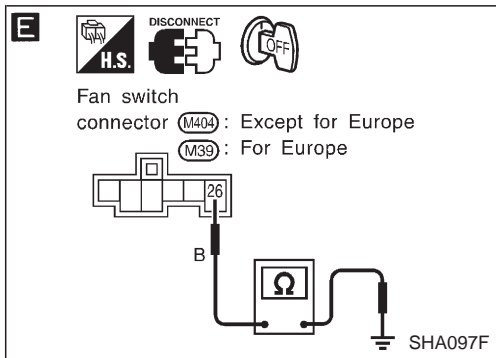


(Go to next page.)

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

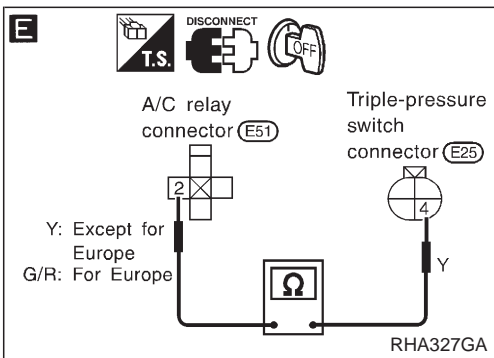
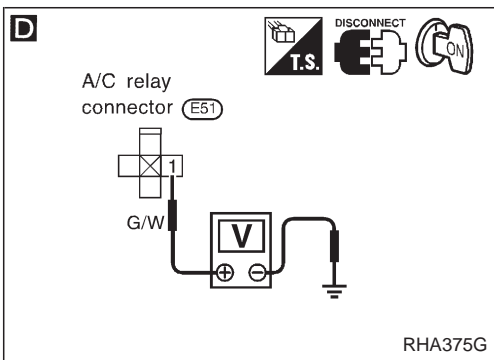
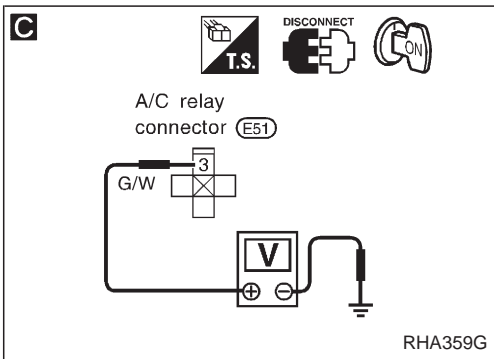
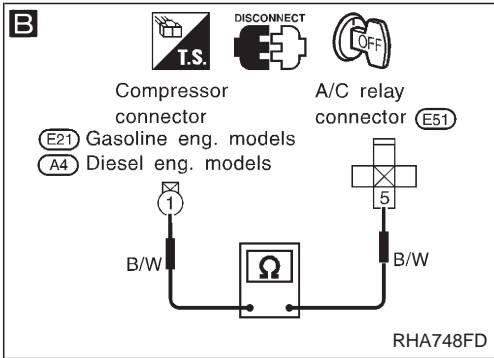
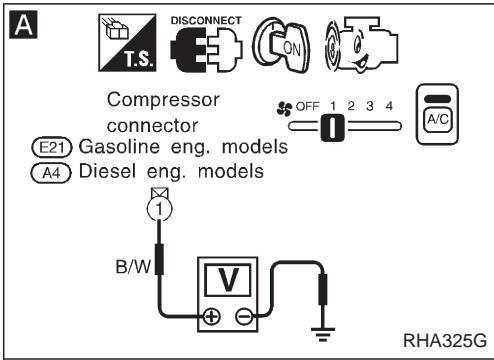
# TROUBLE DIAGNOSES

## Diagnostic Procedure 1 (Cont'd)



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

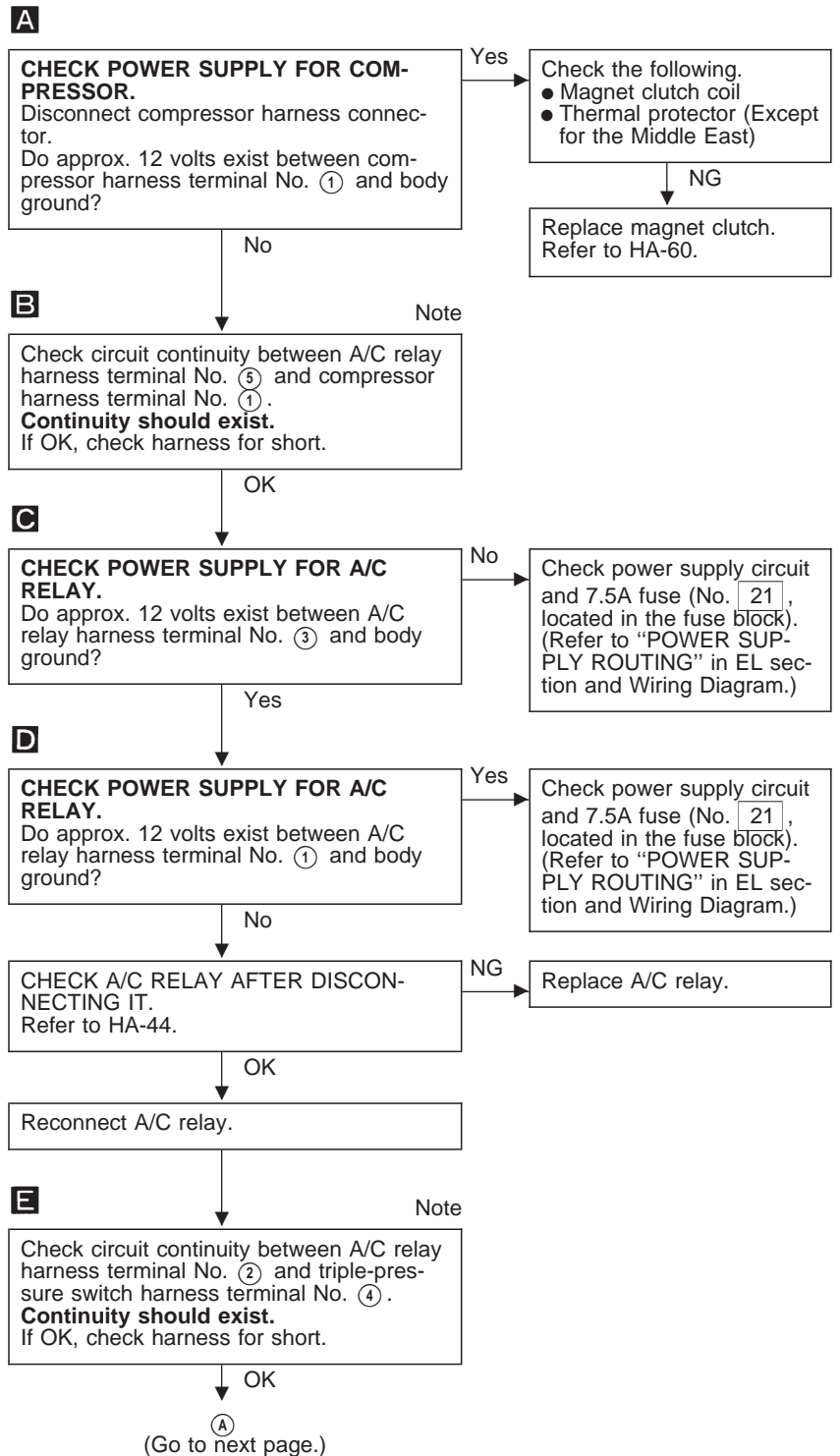
# TROUBLE DIAGNOSES



## Diagnostic Procedure 2 EXCEPT FOR KA ENGINE MODELS

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

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

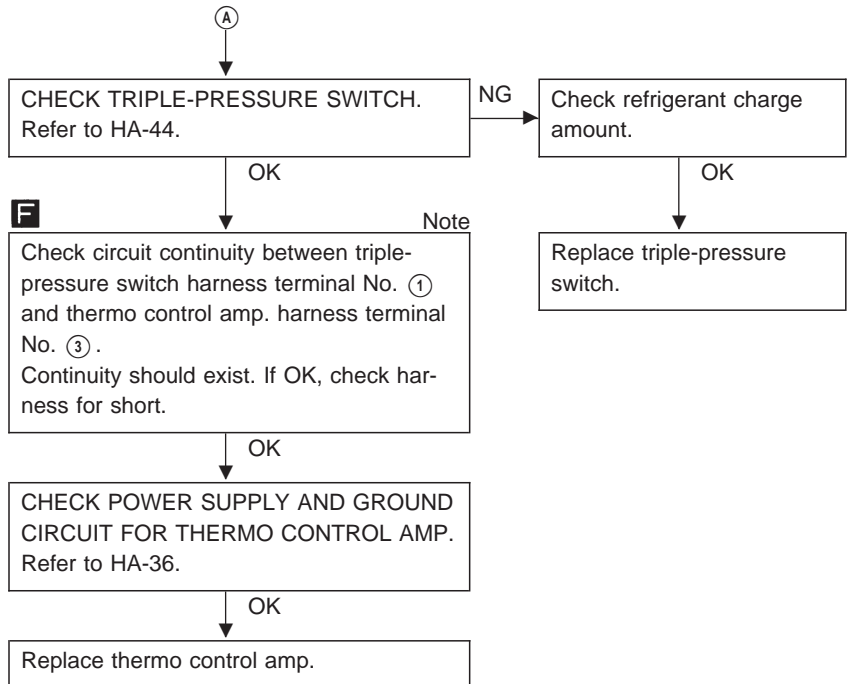
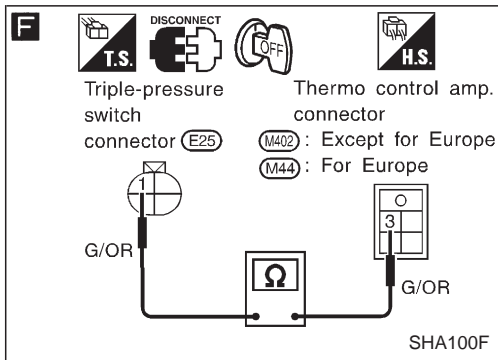


**Note:**  
 If the result is NG after checking circuit continuity, repair harness or connector.



# TROUBLE DIAGNOSES

## Diagnostic Procedure 2 (Cont'd)



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

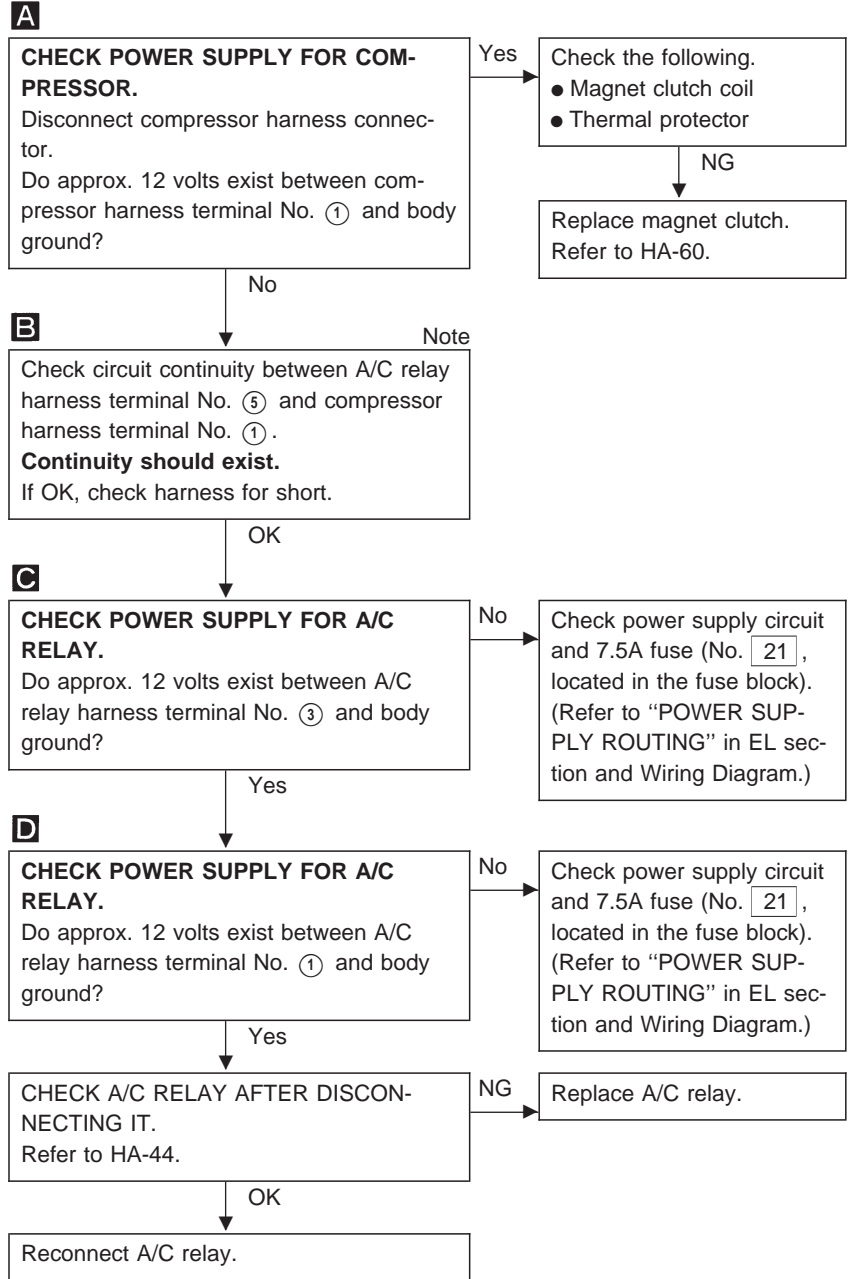
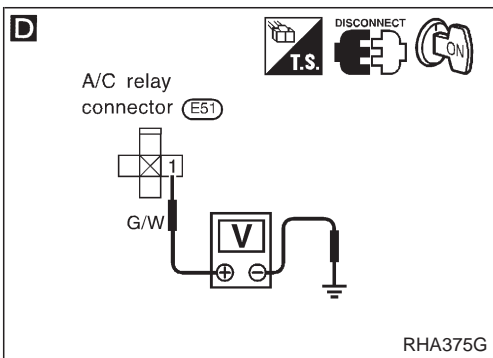
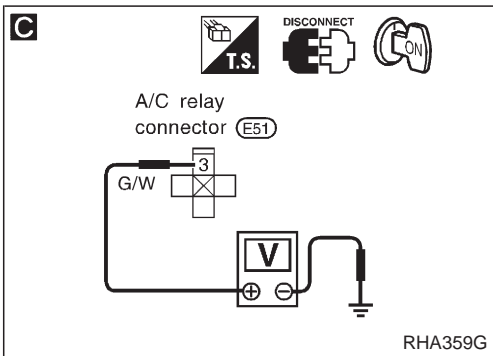
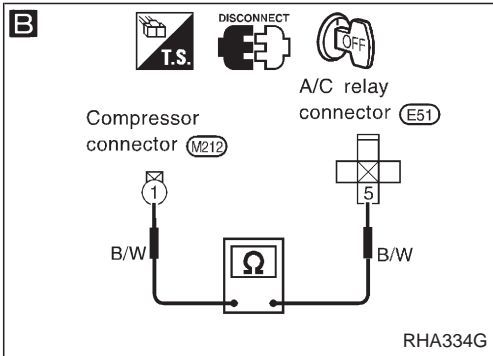
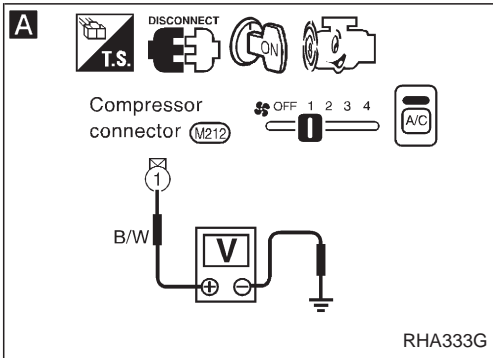
# TROUBLE DIAGNOSES

## Diagnostic Procedure 2 (Cont'd)

### FOR KA ENGINE MODELS

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

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

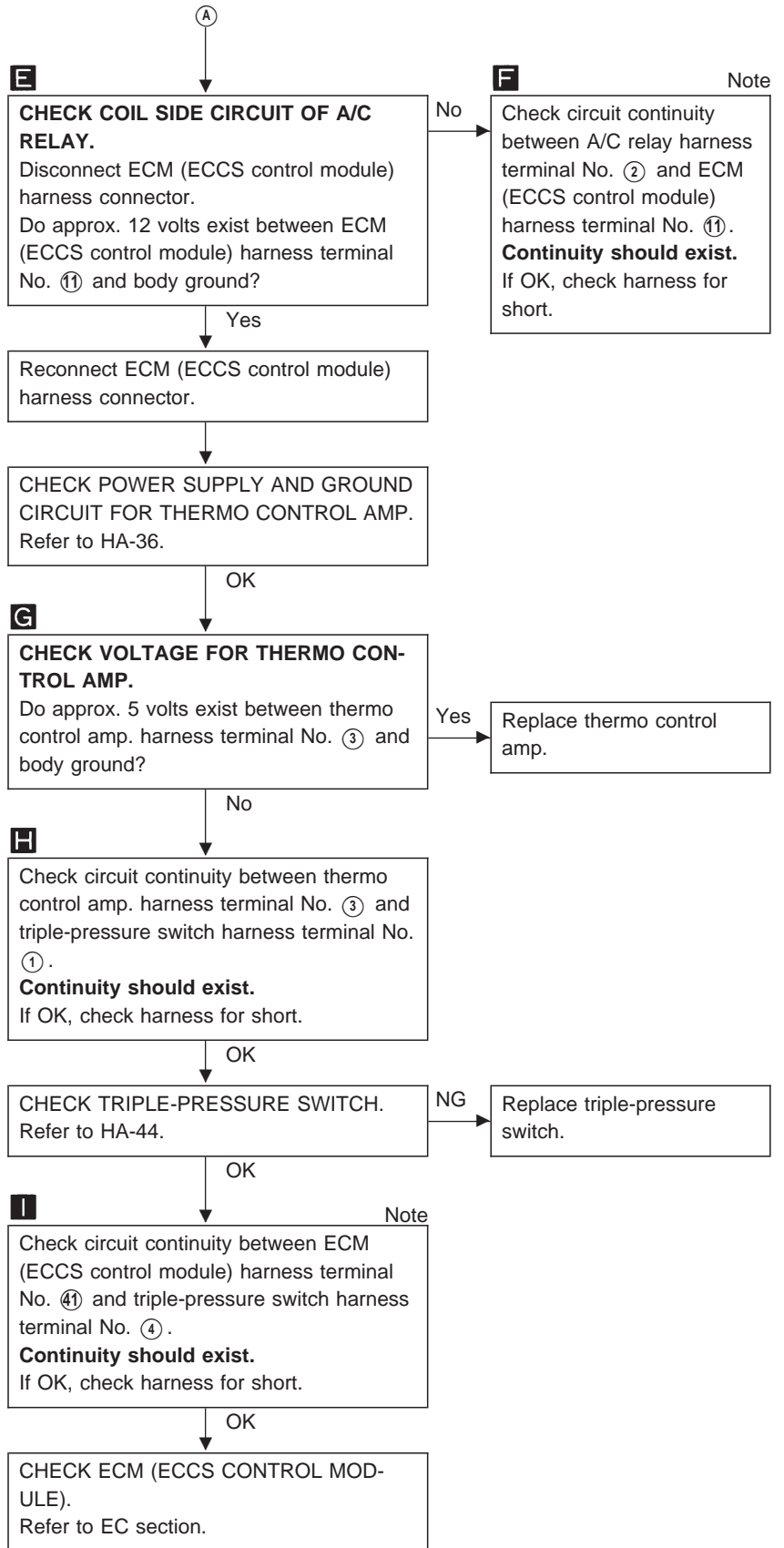
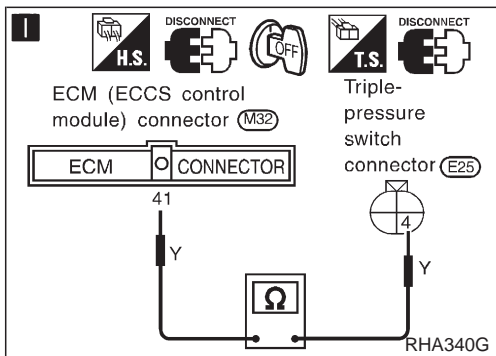
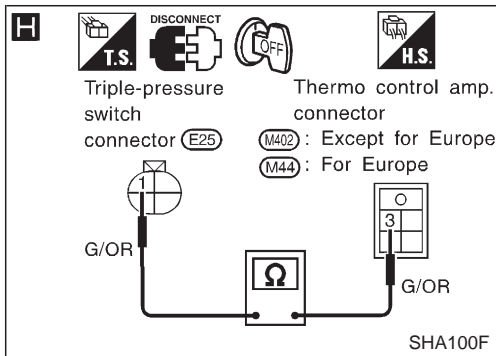
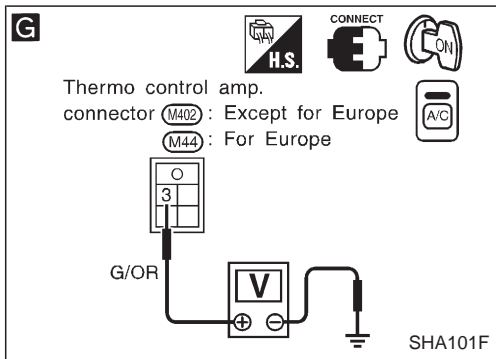
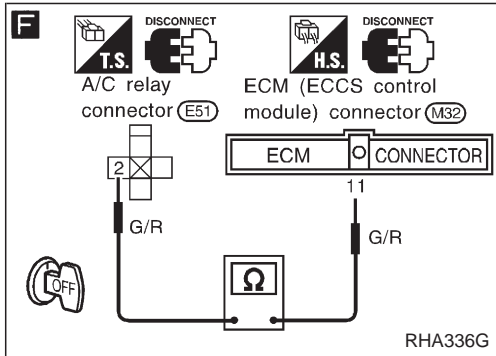
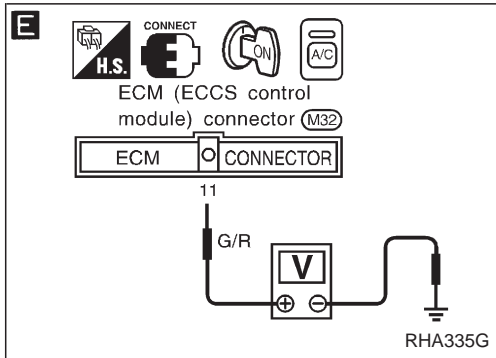


(Go to next page.)

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

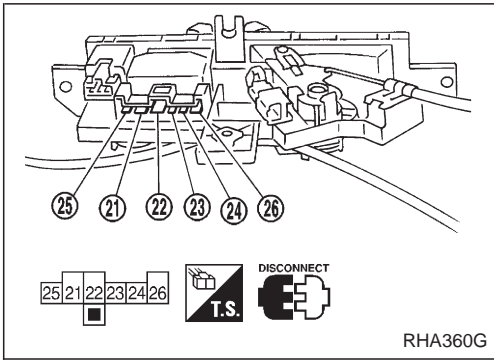
# TROUBLE DIAGNOSES

## Diagnostic Procedure 2 (Cont'd)



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

# TROUBLE DIAGNOSES



## Electrical Components Inspection

### FAN SWITCH

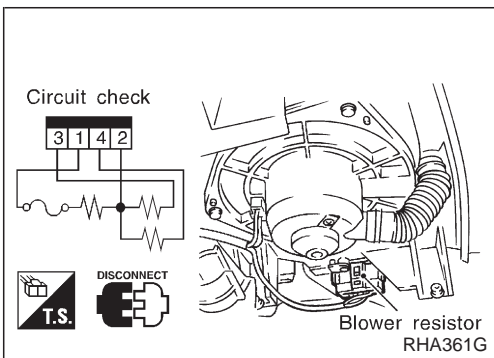
Check continuity between terminals at each switch position.

Knob position	Continuity between terminals
OFF	
1	②④ — ②⑥ — ②⑤
2	②③ — ②⑥ — ②⑤
3	②② — ②⑥ — ②⑤
4	②① — ②⑥ — ②⑤

### BLOWER MOTOR

Confirm smooth rotation of the blower motor.

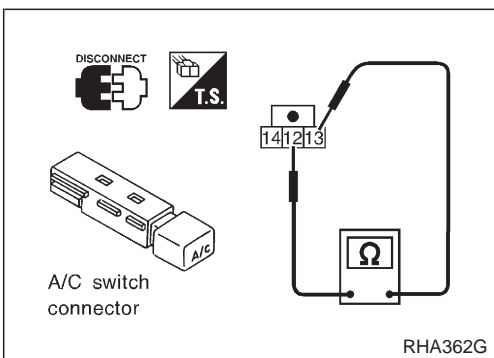
- Ensure that there are no foreign particles inside the intake unit.



### BLOWER RESISTOR

Check resistance between terminals.

Terminal No.		Resistance
⊕	⊖	
③	①	Approx. 1.4 - 1.6Ω
④		Approx. 2.5 - 2.8Ω
②		Approx. 0.5 - 0.6Ω



### A/C SWITCH

Check continuity between terminals at each switch position.

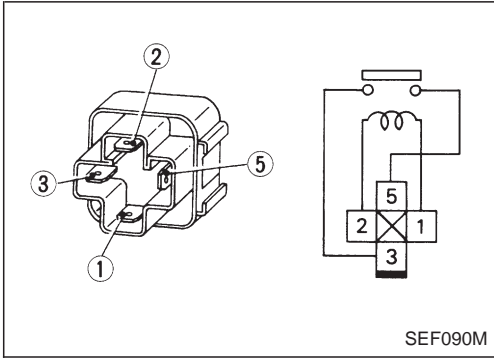
Switch condition	Terminal No.		Continuity
	⊕	⊖	
A/C			Yes
ON	⑬	⑫	
OFF			No

# TROUBLE DIAGNOSES

## Electrical Components Inspection (Cont'd)

### A/C RELAY

Check continuity between terminal Nos. ③ and ⑤.

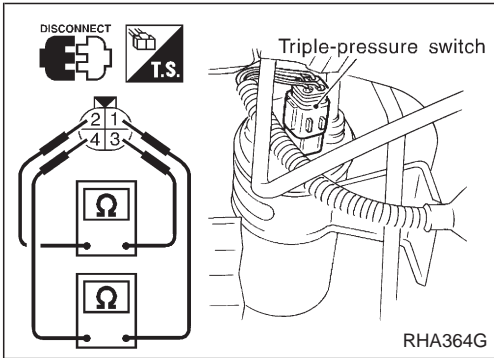


SEF090M

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

If NG, replace relay.

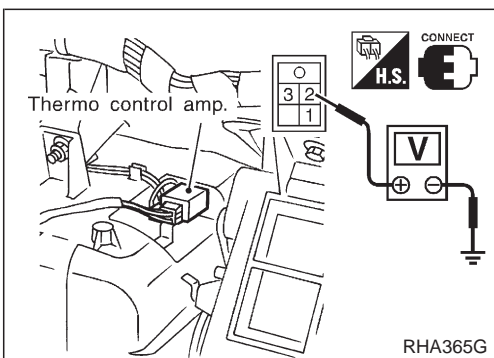
### TRIPLE-PRESSURE SWITCH



RHA364G

	Terminals	High-pressure side line pressure kPa (bar, kg/cm <sup>2</sup> , psi)	Operation	Continuity
Low-pressure side	① - ④	Increasing to 152.0 - 201.0 (1.520 - 2.010, 1.55 - 2.05, 22.0 - 29.2)	ON	Exists.
		Decreasing to 152.0 - 201.0 (1.520 - 2.010, 1.55 - 2.05, 22.0 - 29.2)	OFF	Does not exist.
Medium-pressure side*	② - ③	Increasing to 1,422 - 1,618 (14.22 - 16.18, 14.5 - 16.5, 206 - 235)	ON	Exists.
		Decreasing to 1,128 - 1,422 (11.28 - 14.22, 11.5 - 14.5, 164 - 206)	OFF	Does not exist.
High-pressure side	① - ④	Decreasing to 2,059 - 2,256 (20.6 - 22.6, 21 - 23, 299 - 327)	ON	Exists.
		Increasing to 2,648 - 2,844 (26.5 - 28.4, 27 - 29, 384 - 412)	OFF	Does not exist.

\* For cooling fan motor operation



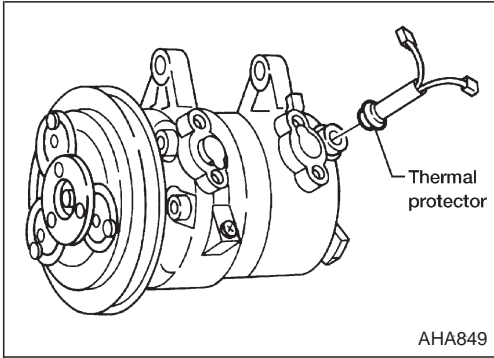
RHA365G

### THERMO CONTROL AMP.

Evaporator outlet air temperature °C (°F)	Thermo amp. operation	Tester
Decreasing to 0.1 - 0.9 (32 - 34)	Turn OFF	Approx. 12V
Increasing to 2.5 - 3.5 (37 - 38)	Turn ON	Approx. 0V

## TROUBLE DIAGNOSES

### Electrical Components Inspection (Cont'd) THERMAL PROTECTOR (For DKV-14C)



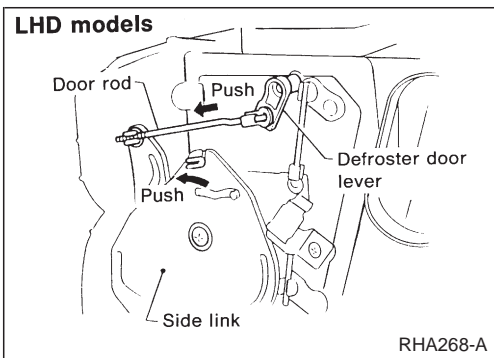
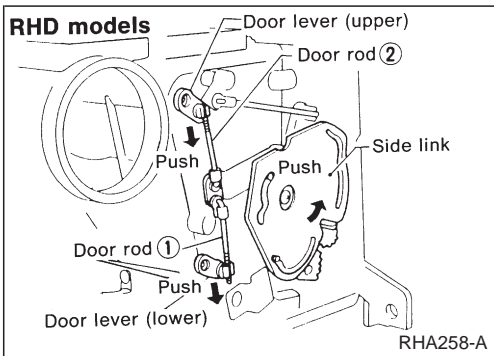
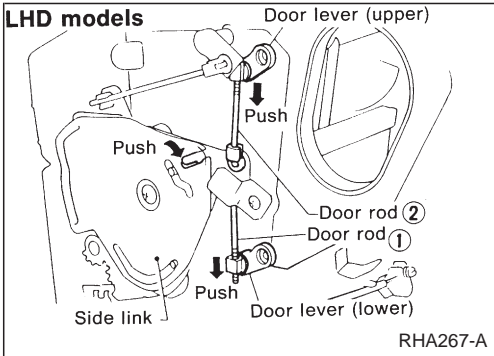
Temperature of compressor °C (°F)	Operation
Increasing to approx. 145 - 155 (293 - 311)	Turn OFF
Decreasing to approx. 130 - 140 (266 - 284)	Turn ON

### Control Linkage Adjustment

#### VENTILATOR DOOR CONTROL ROD

- When adjusting door control rod, first disconnect mode control cable from side link.  
Reconnect and readjust mode control cable.

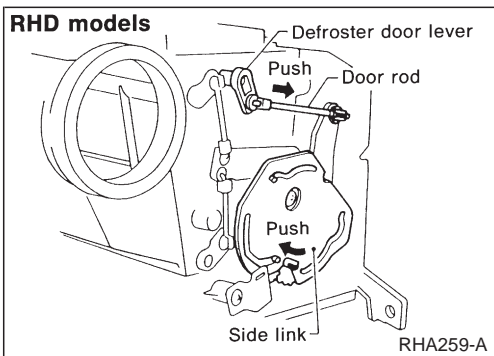
1. Move side link in direction of arrow.
2. With upper and lower ventilator door levers held in the direction of the arrow, connect rods ① and ② to their corresponding ventilator door levers in that order.



#### DEFROSTER DOOR CONTROL ROD

- When adjusting door control rod, first disconnect mode control cable from side link.  
Reconnect and readjust mode control cable.

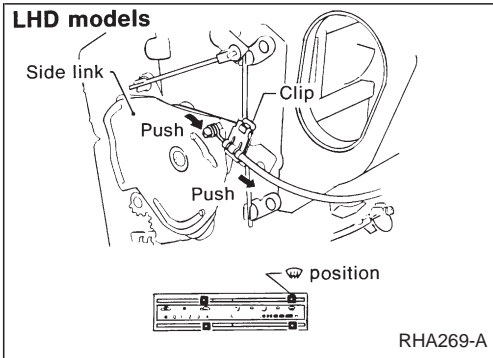
1. Move side link in direction of arrow.
2. Connect rod to side link while pushing defroster door lever in direction of arrow.




## TROUBLE DIAGNOSES

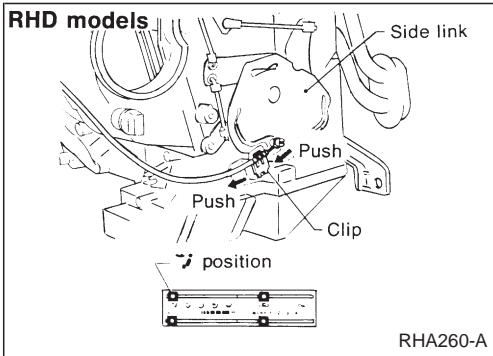
### Control Linkage Adjustment (Cont'd)

#### MODE CONTROL CABLE




#### LHD models

- Move mode control lever to  position.  
Set side link in DEF mode.  
Pull on outer cable in direction of arrow and then clamp it.
- **After positioning mode control cable, check that it operates properly.**

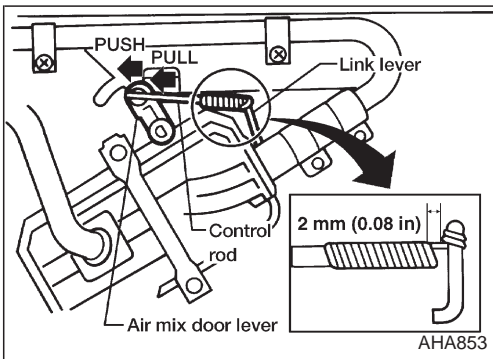


#### RHD models

- Move mode control lever to  position.  
Set side link in FACE mode.  
Pull on outer cable in direction of arrow and then clamp it.
- **After positioning mode control cable, check that it operates properly.**

#### WATER COCK CONTROL ROD

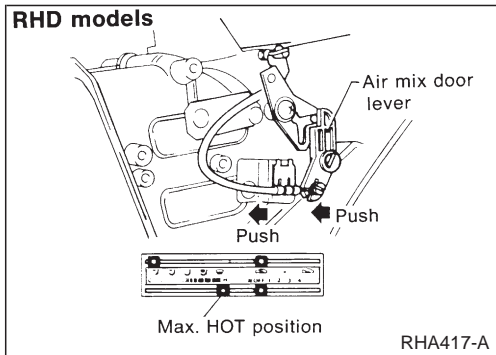
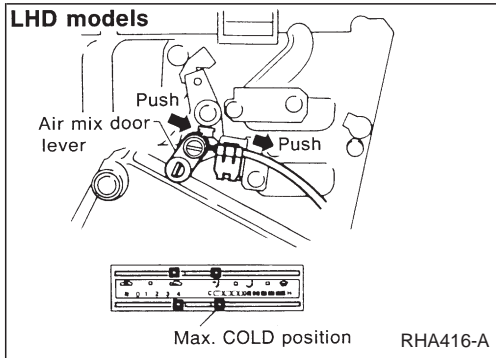
##### For the Middle East and LHD models



- **When adjusting water cock control rod, first disconnect temperature control cable from air mix door lever and then adjust control rod. Reconnect temperature control cable and readjust it. (Refer to next item.)**
1. Push air mix door lever in direction of arrow.
  2. Pull control rod of water cock in direction of arrow so as to make clearance of about 2 mm (0.08 in) between ends of rod and link lever and connect the rod to door lever.
- **After connecting water cock control rod, check that it operates properly.**

## TROUBLE DIAGNOSES

### Control Linkage Adjustment (Cont'd) TEMPERATURE CONTROL CABLE

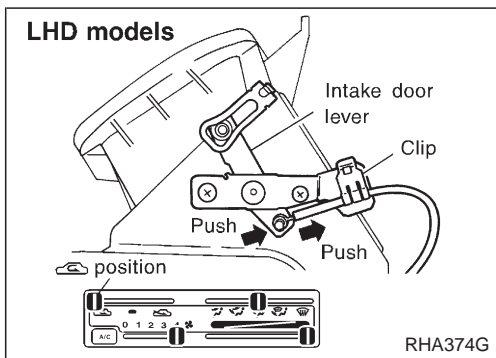


#### LHD models


- Move temperature control lever to max. COLD position. Set air mix door lever in full cold mode. Pull on outer cable in direction of arrow and then clamp it.
- **After positioning temperature control cable, check that it operates properly.**

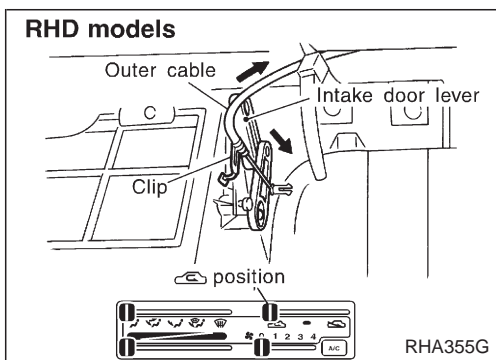
#### RHD models

- Move temperature control lever to max, HOT position. Set air mix door lever in full hot mode. Pull on outer cable in direction of arrow and then clamp it.
- **After positioning temperature control cable, check that it operates properly.**



### INTAKE DOOR CONTROL CABLE

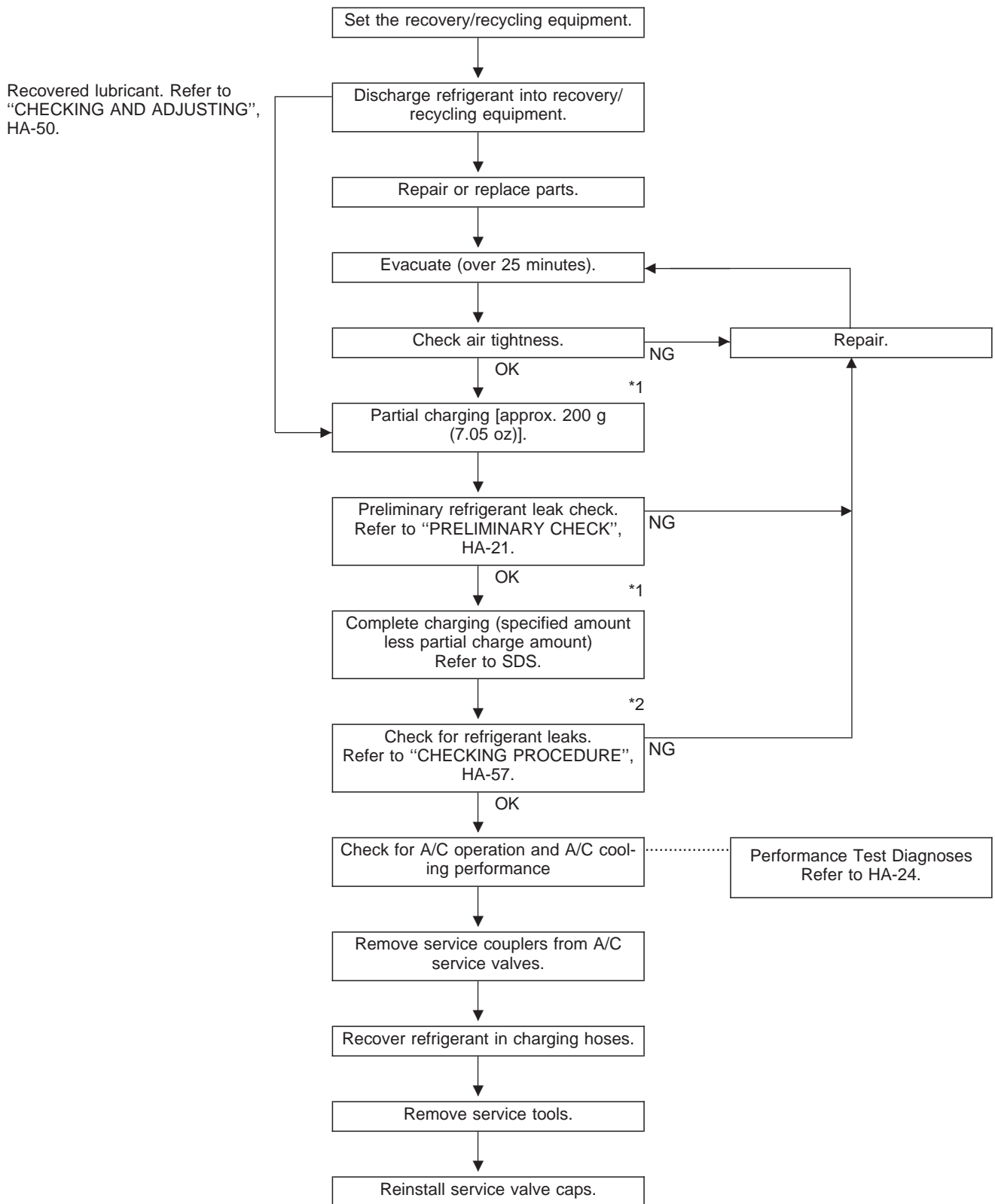
- Move recirculation lever to  position. Set recirculation lever in REC mode. Pull on outer cable in direction of arrow and then clamp it.
- **After positioning intake door control cable, check that it operates properly.**





# SERVICE PROCEDURES

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



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

\*2 Before checking for leaks, start engine to activate air conditioner system then turn engine OFF. Service valve caps must be installed to prevent leakage.

# SERVICE PROCEDURES

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

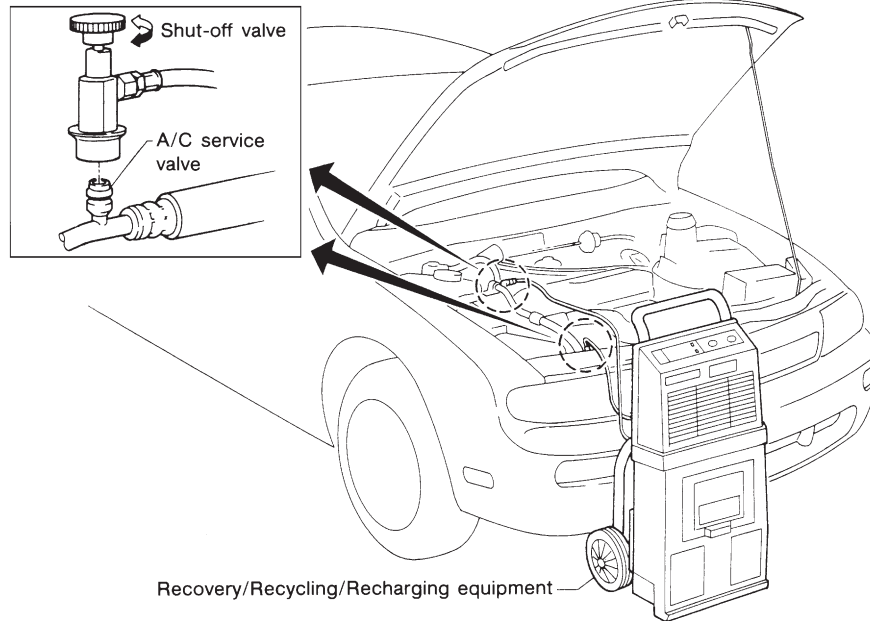
### SETTING OF SERVICE TOOLS AND EQUIPMENT

#### DISCHARGING REFRIGERANT

##### WARNING:

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

##### Example

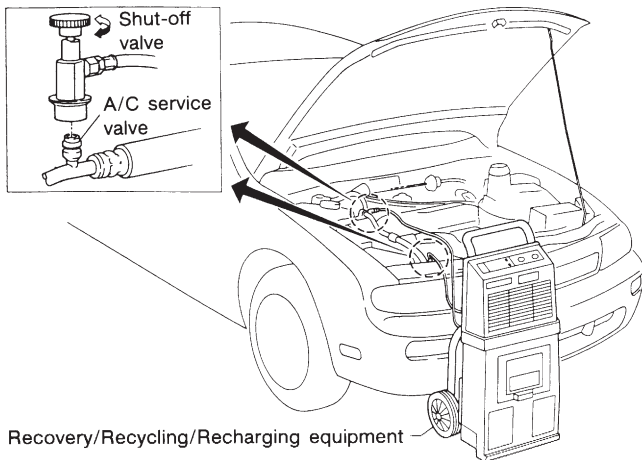


SHA539DC

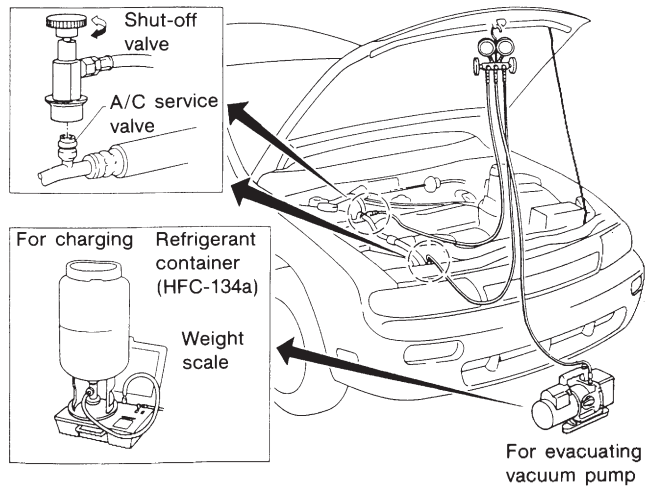
#### EVACUATING SYSTEM AND CHARGING REFRIGERANT

##### Example

##### Preferred (Best) method



##### Alternate method



SHA540DC

# SERVICE PROCEDURES

## Maintenance of Lubricant Quantity in Compressor

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

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

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

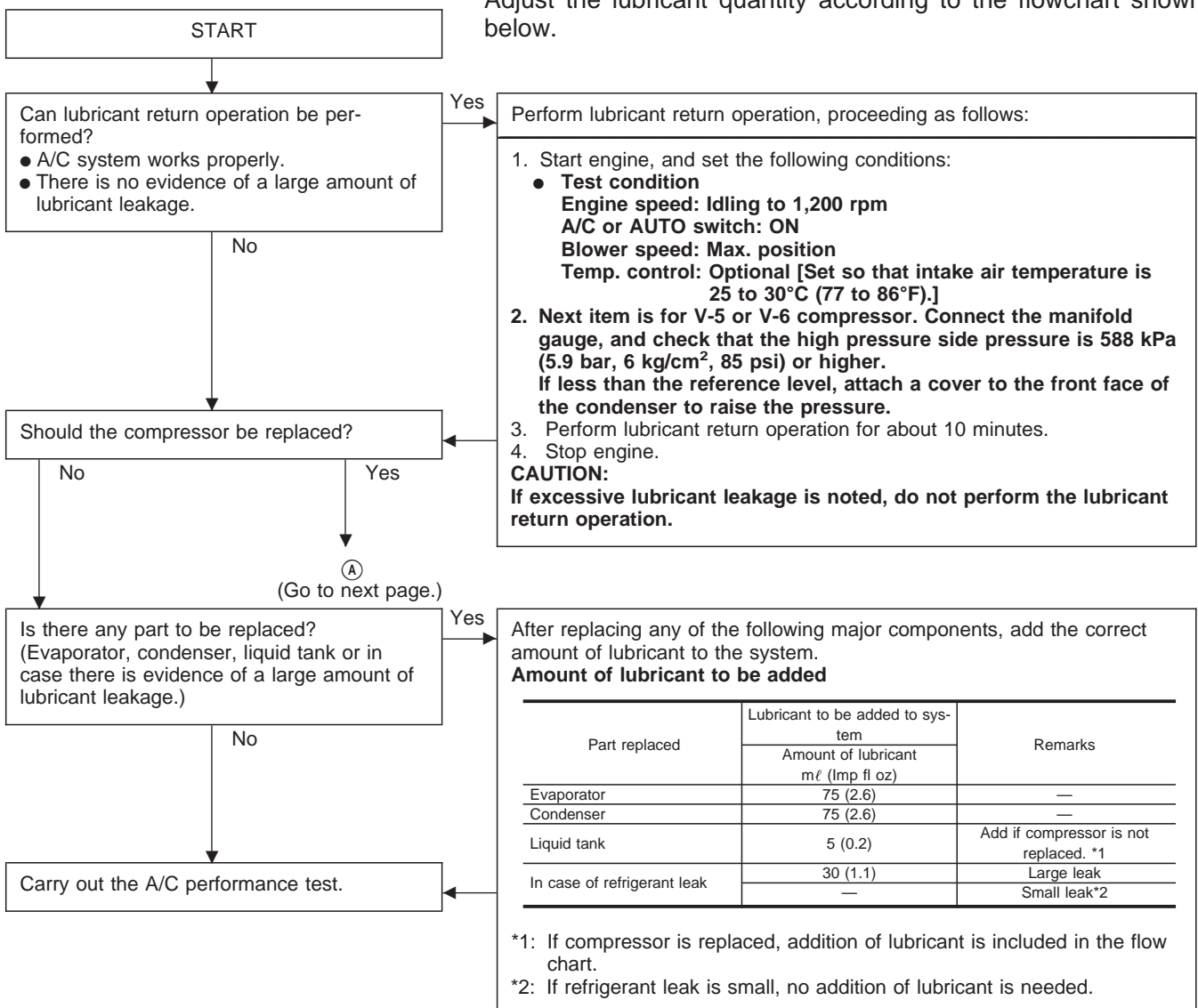
### LUBRICANT

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

**Part number: KLH00-PAGR0**

### CHECKING AND ADJUSTING

Adjust the lubricant quantity according to the flowchart shown below.



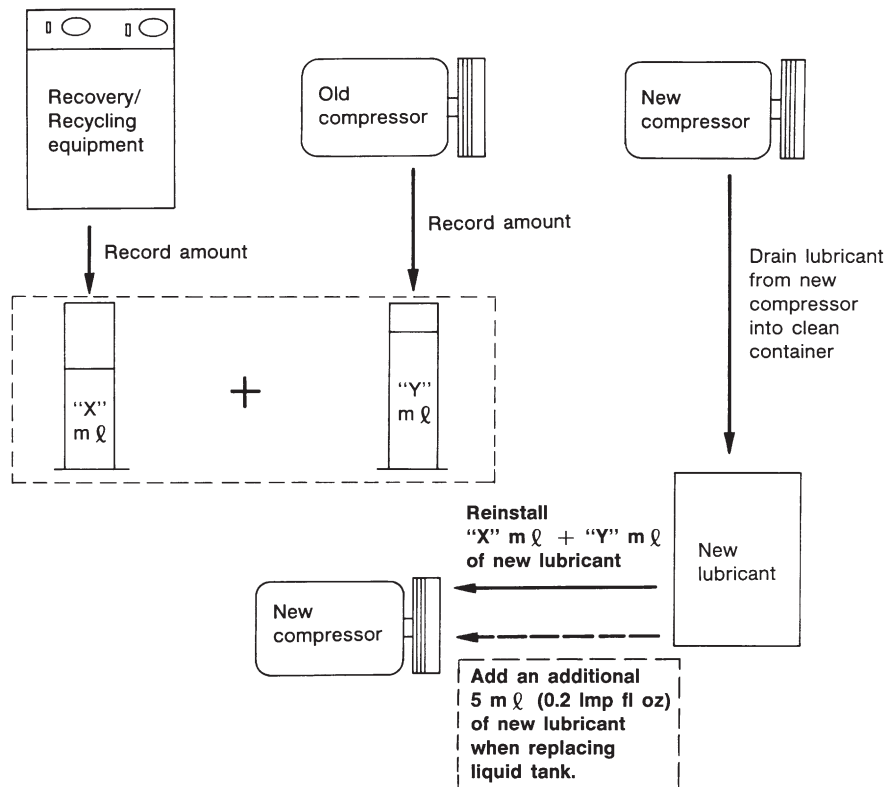
# SERVICE PROCEDURES

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



1. Discharge refrigerant into the refrigerant recovery/recycling equipment. Measure lubricant discharged into the recovery/recycling equipment.
2. Remove the drain plug of the "old" (removed) compressor (applicable only to V-5, V-6, DKS-16H or DKS-17CH compressor). Drain the lubricant into a graduated container and record the amount of drained lubricant.
3. Remove the drain plug and drain the lubricant from the "new" compressor into a separate, clean container.
4. Measure an amount of new lubricant installed equal to amount drained from "old" compressor. Add this lubricant to "new" compressor through the suction port opening.
5. Measure an amount of new lubricant equal to the amount recovered during discharging. Add this lubricant to "new" compressor through the suction port opening.
6. Torque the drain plug.  
**V-5 or V-6 compressor: 18 - 19 N·m (1.8 - 1.9 kg-m, 13 - 14 ft-lb)**  
**DKS-16H compressor: 14 - 16 N·m (1.4 - 1.6 kg-m, 10 - 12 ft-lb)**  
**DKS-17CH compressor: 14 - 16 N·m (1.4 - 1.6 kg-m, 10 - 12 ft-lb)**
7. If the liquid tank also needs to be replaced, add an additional 5 mℓ (0.2 Imp fl oz) of lubricant at this time.  
**Do not add this 5 mℓ (0.2 Imp fl oz) of lubricant if only replacing the compressor.**

### Lubricant adjusting procedure for compressor replacement



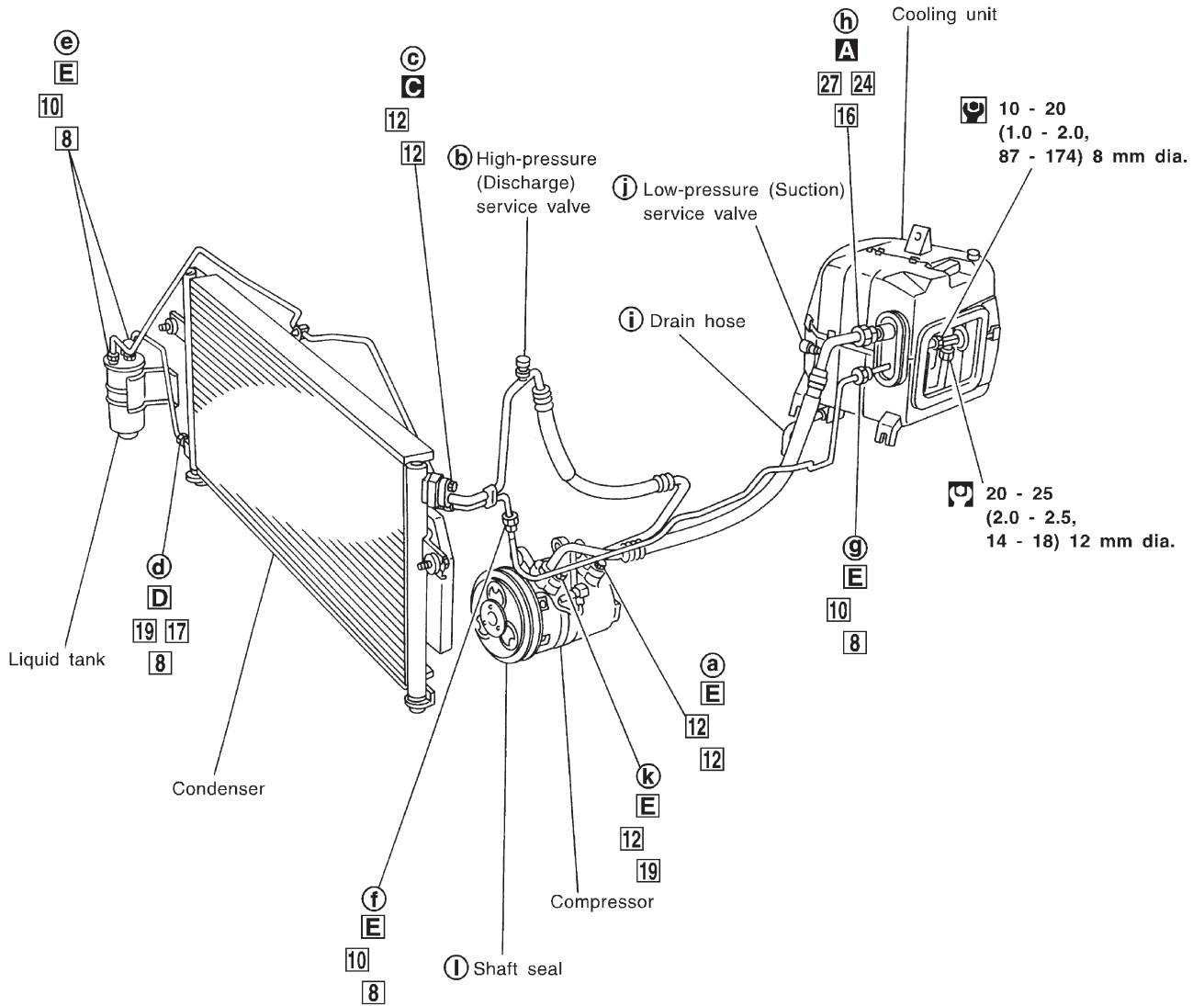
RHA065DE

# SERVICE PROCEDURES

## Refrigerant Lines

- Refer to page HA-2 regarding "Precautions for Refrigerant Connection".

### RHD MODELS WITH DIESEL ENGINE



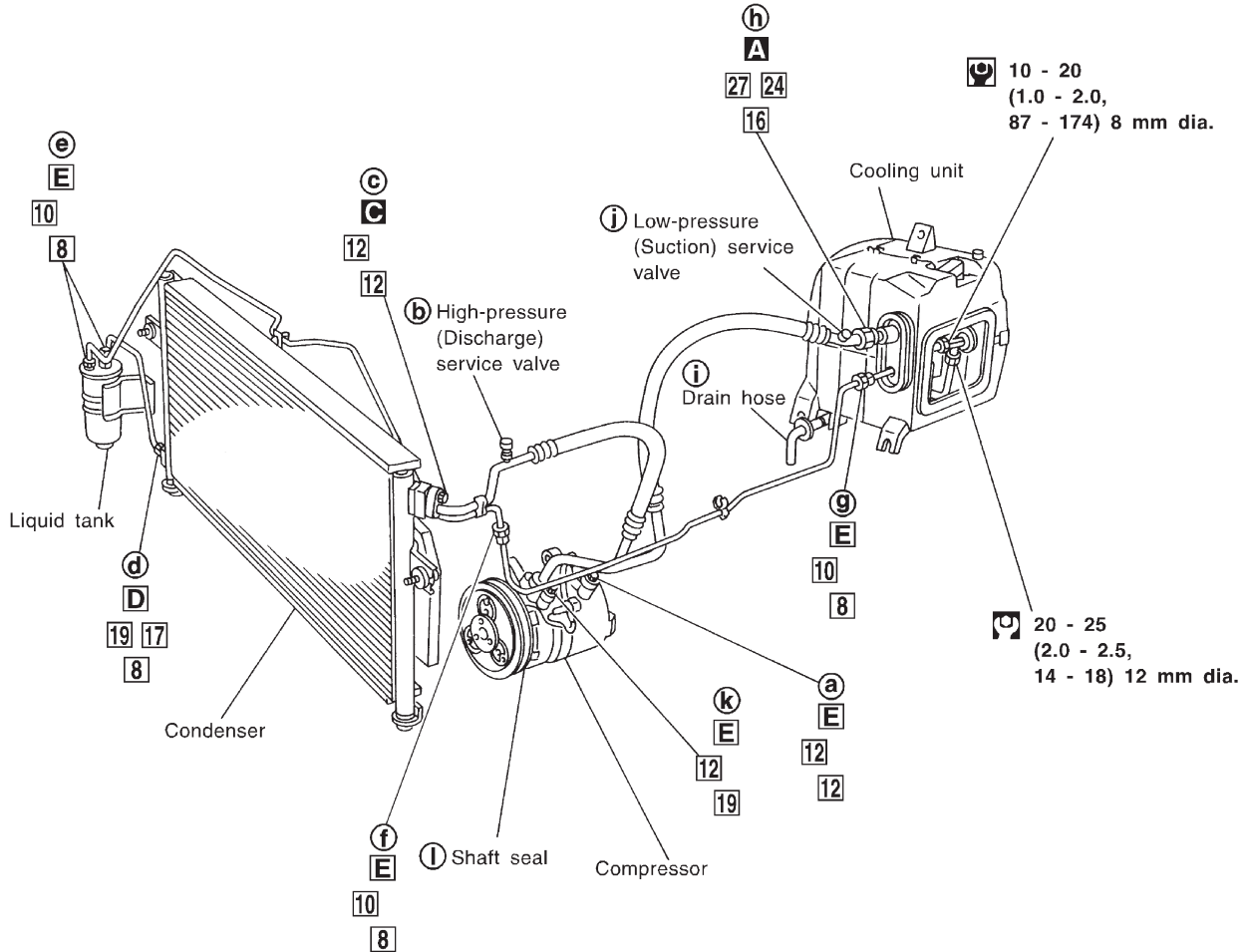
- : Refrigerant leak checking order
- : (Tightening torque)
- □ : (Wrench size)
- : (O-ring size)
- ⊙ : N·m (kg-m, ft-lb)
- A** : 20 - 29 (2.0 - 3.0, 14 - 22)
- C** : 14 - 18 (1.4 - 1.8, 10 - 13)
- ⊙ : N·m (kg-m, in-lb)
- D** : 10 - 20 (1.0 - 2.0, 87 - 174)
- E** : 8 - 11 (0.8 - 1.1, 69 - 95)

# SERVICE PROCEDURES

## Refrigerant Lines (Cont'd)

- Refer to page HA-2 regarding "Precautions for Refrigerant Connection".

### RHD MODELS WITH KA24 ENGINE



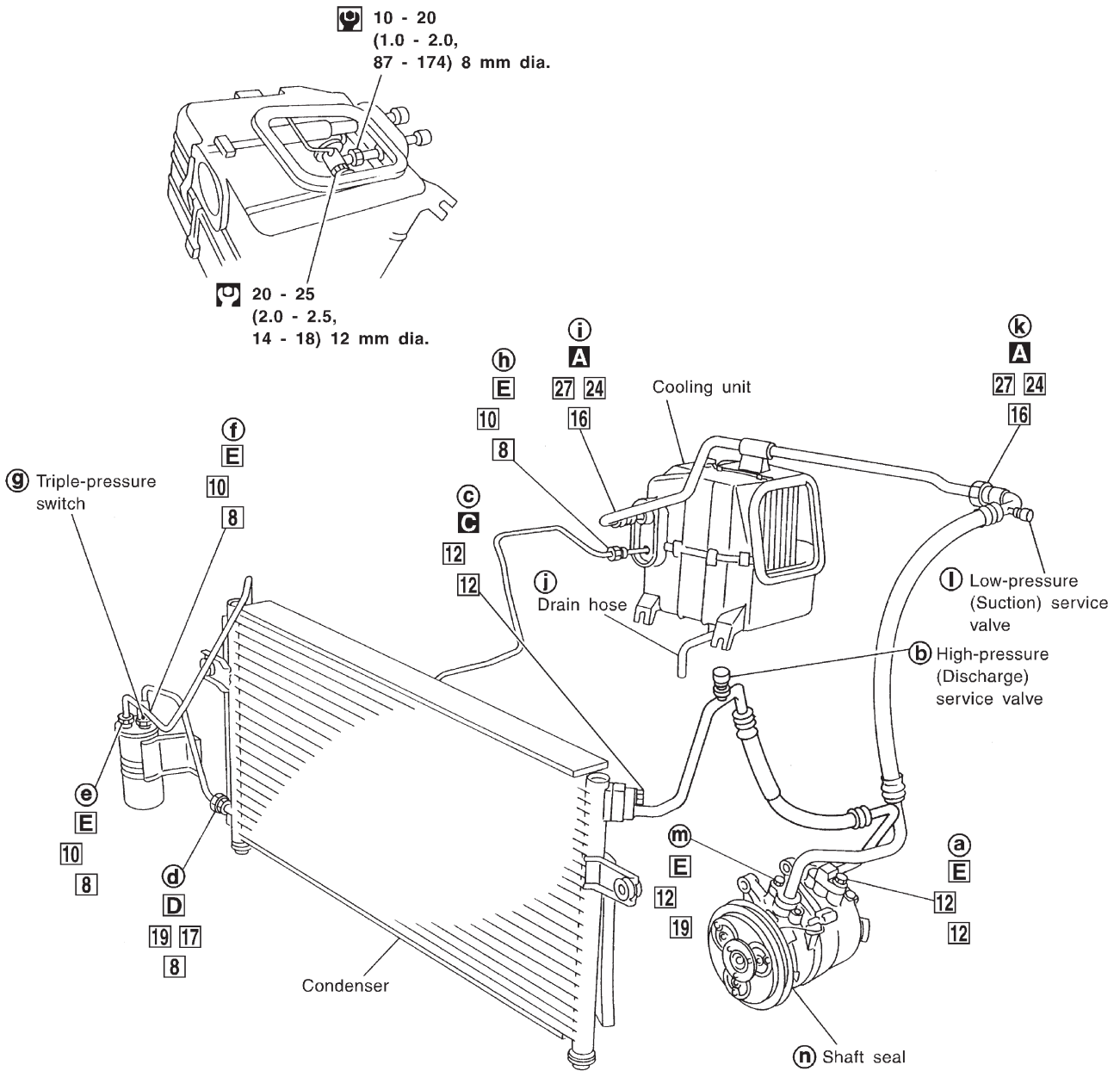
- : Refrigerant leak checking order
- : (Tightening torque)
- □ : (Wrench size)
- : (O-ring size)
- ⌘ : N·m (kg-m, ft-lb)
- A** : 20 - 29 (2.0 - 3.0, 14 - 22)
- C** : 14 - 18 (1.4 - 1.8, 10 - 13)
- ⌘ : N·m (kg-m, in-lb)
- D** : 10 - 20 (1.0 - 2.0, 87 - 174)
- E** : 8 - 11 (0.8 - 1.1, 69 - 95)

# SERVICE PROCEDURES

## Refrigerant Lines (Cont'd)

- Refer to page HA-2 regarding "Precautions for Refrigerant Connection".

### LHD MODELS WITH DIESEL ENGINE



- : Refrigerant leak checking order
- : (Tightening torque)
- ▣ : (Wrench size)
- ◻ : (O-ring size)
- ⊠ : N·m (kg-m, ft-lb)
- A** : 20 - 29 (2.0 - 3.0, 14 - 22)
- C** : 14 - 18 (1.4 - 1.8, 10 - 13)
- ⊠ : N·m (kg-m, in-lb)
- D** : 10 - 20 (1.0 - 2.0, 87 - 174)
- E** : 8 - 11 (0.8 - 1.1, 69 - 95)

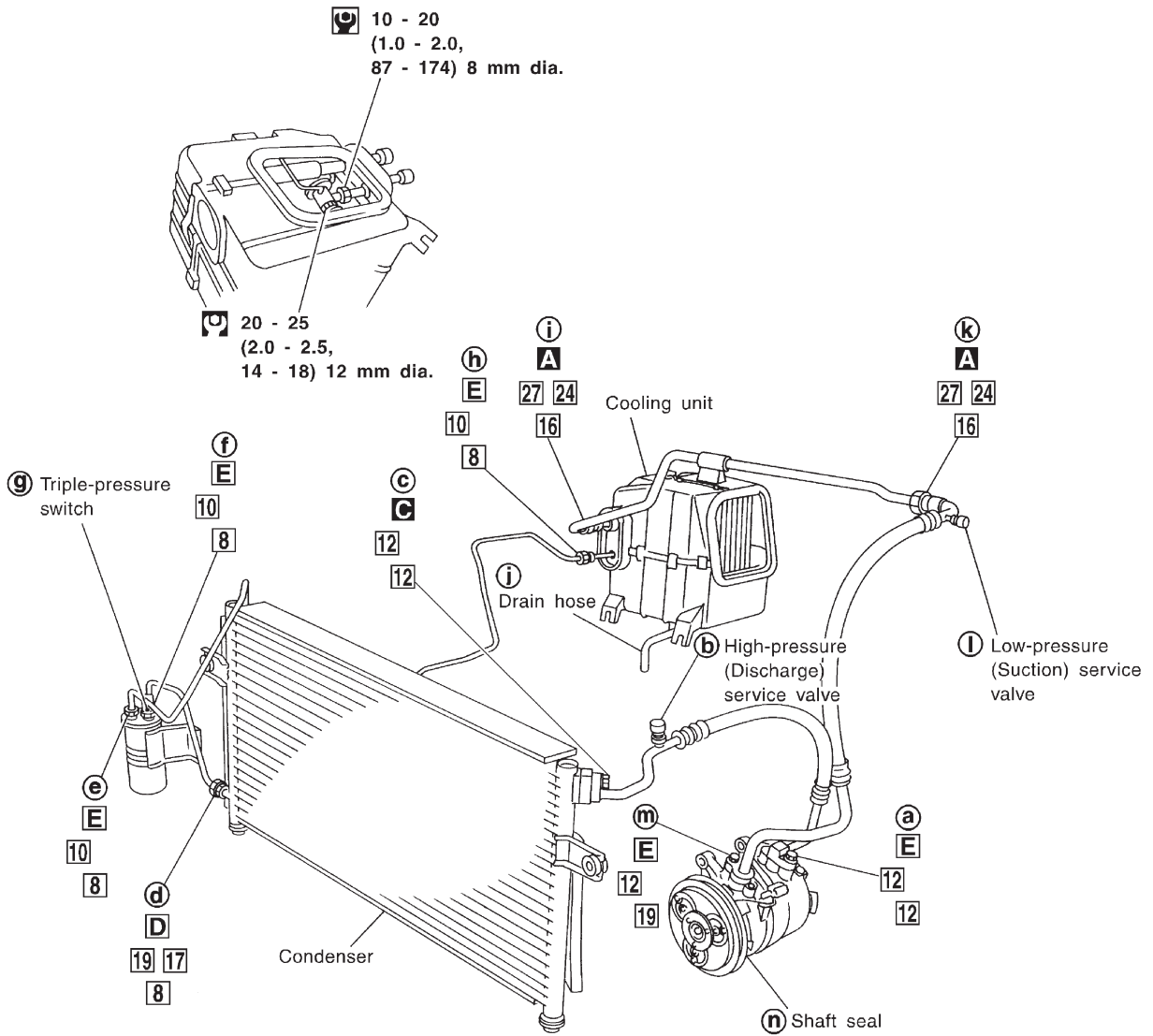
RHA372GA

# SERVICE PROCEDURES

## Refrigerant Lines (Cont'd)

- Refer to page HA-2 regarding "Precautions for Refrigerant Connection".

### LHD MODELS WITH GASOLINE ENGINE



- : Refrigerant leak checking order
- : (Tightening torque)
- □ : (Wrench size)
- : (O-ring size)
- ⌘ : N·m (kg-m, ft-lb)
- A** : 20 - 29 (2.0 - 3.0, 14 - 22)
- C** : 14 - 18 (1.4 - 1.8, 10 - 13)
- ⌘ : N·m (kg-m, in-lb)
- D** : 10 - 20 (1.0 - 2.0, 87 - 174)
- E** : 8 - 11 (0.8 - 1.1, 69 - 95)

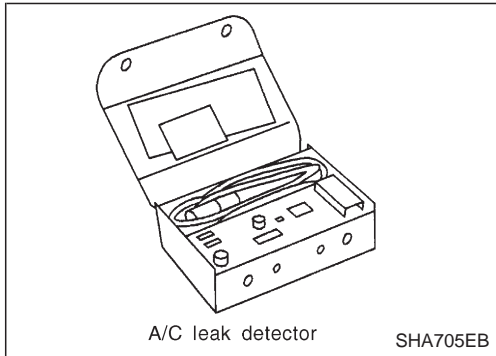


# SERVICE PROCEDURES

## Checking Refrigerant Leaks

### PRELIMINARY CHECK

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

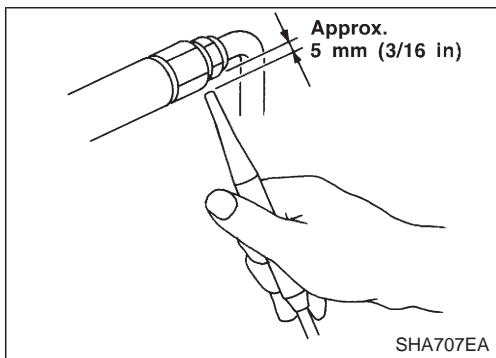


### PRECAUTIONS FOR HANDLING LEAK DETECTOR

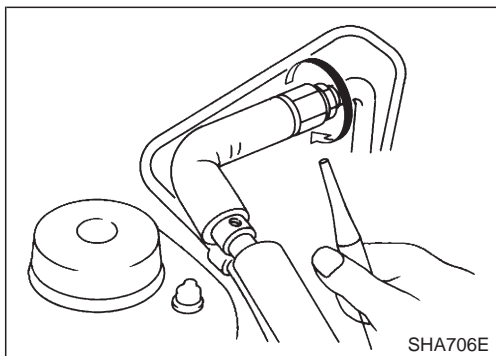
When performing a refrigerant leak check, use an A/C leak detector or equivalent. Ensure that the instrument is calibrated and set properly per the operating instructions.

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

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



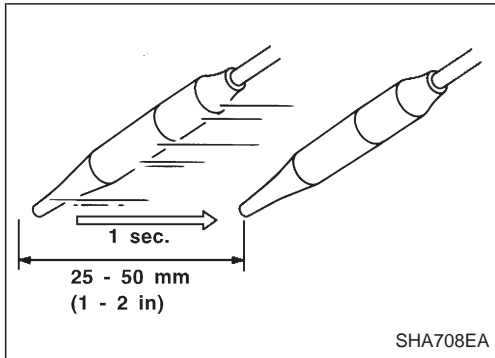
1. Position probe approximately 5 mm (3/16 in) away from point to be checked.



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

## SERVICE PROCEDURES

### Checking Refrigerant Leaks (Cont'd)



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

### CHECKING PROCEDURE

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

1. Turn engine off.
2. Connect a suitable A/C manifold gauge set to the A/C service ports.
3. Check if the A/C refrigerant pressure is at least 345 kPa (3.452 bar, 3.52 kg/cm<sup>2</sup>, 50 psi) above 16°C (61°F). If less than specification, evacuate and recharge the system with the specified amount of refrigerant.

NOTE: At temperatures below 16°C (61°F), leaks may not be detected since the system may not reach 345 kPa (3.452 bar, 3.52 kg/cm<sup>2</sup>, 50 psi).

4. Conduct the leak test from the high side to the low side at points (a) through (n). Refer to HA-52.  
Perform a leak check for the following areas carefully. Clean the component to be checked and move the leak detector probe completely around the connection/component.

- **Compressor**

Check the fitting of high and low pressure hoses, relief valve and shaft seal.

- **Liquid tank**

Check the pressure switch, tube fitting, weld seams and the fusible plug mounts.

- **Service valves**

Check all around the service valves. Ensure service valve caps are secured on the service valves (to prevent leaks).

NOTE: After removing A/C manifold gauge set from service valves, wipe any residue from valves to prevent any false readings by leak detector.

- **Cooling unit (Evaporator)**

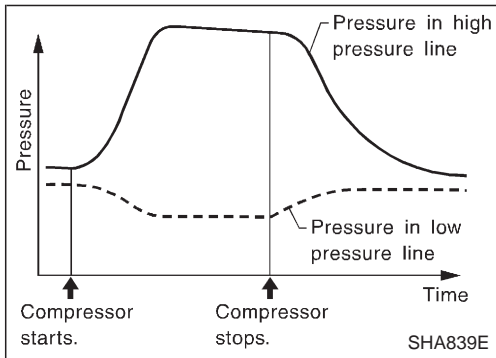
Turn blower fan on "High" for at least 15 seconds to dissipate any refrigerant trace in the cooling unit. Insert the leak detector probe into the drain hose immediately after stopping the engine. (Keep the probe inserted for at least ten seconds.)

5. If a leak detector detects a leak, verify at least once by blowing compressed air into area of suspected leak, then repeat check.
6. Do not stop when one leak is found. Continue to check for additional leaks at all system components.
7. Start engine.

## SERVICE PROCEDURES

### Checking Refrigerant Leaks (Cont'd)

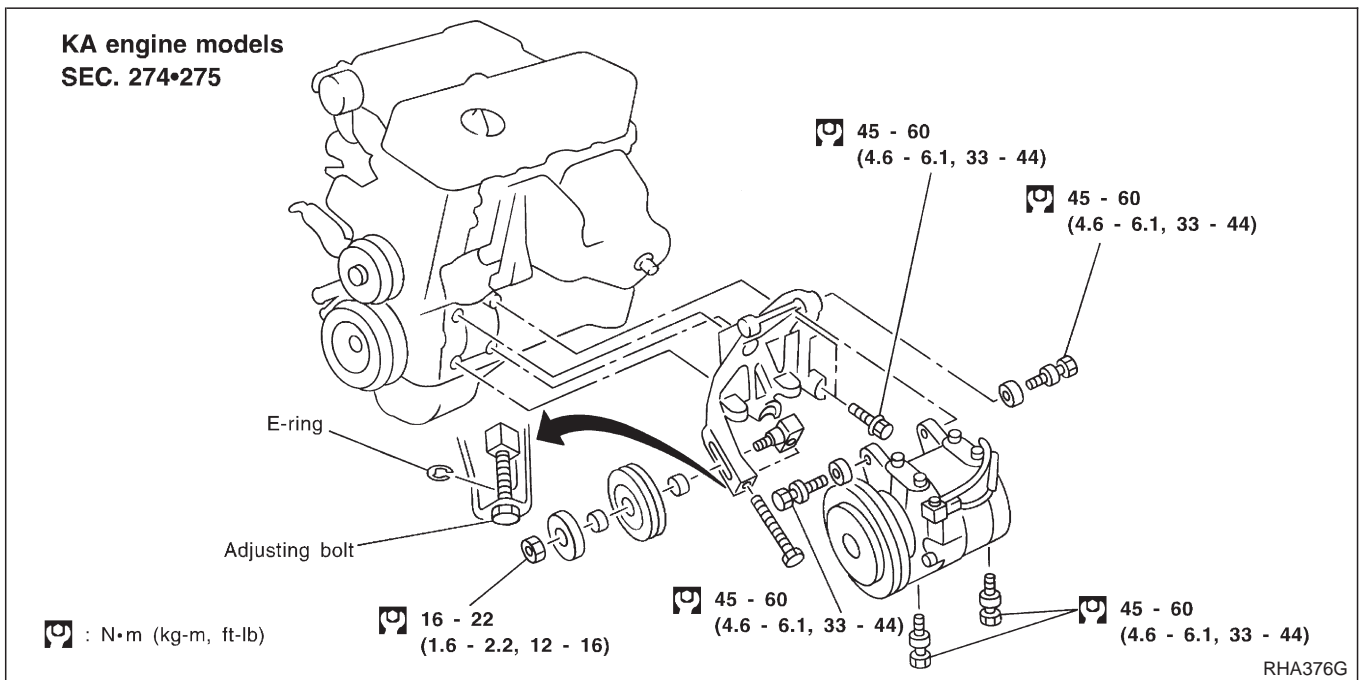
8. Set the heater A/C control as follows:
  - a. A/C switch ON
  - b. Face mode
  - c. Recirculation switch ON
  - d. Max cold temperature
  - e. Fan speed high
9. Run engine at 1,500 rpm for at least 2 minutes.
10. Turn engine off and perform leak check again following steps 4 through 6 above.



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

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

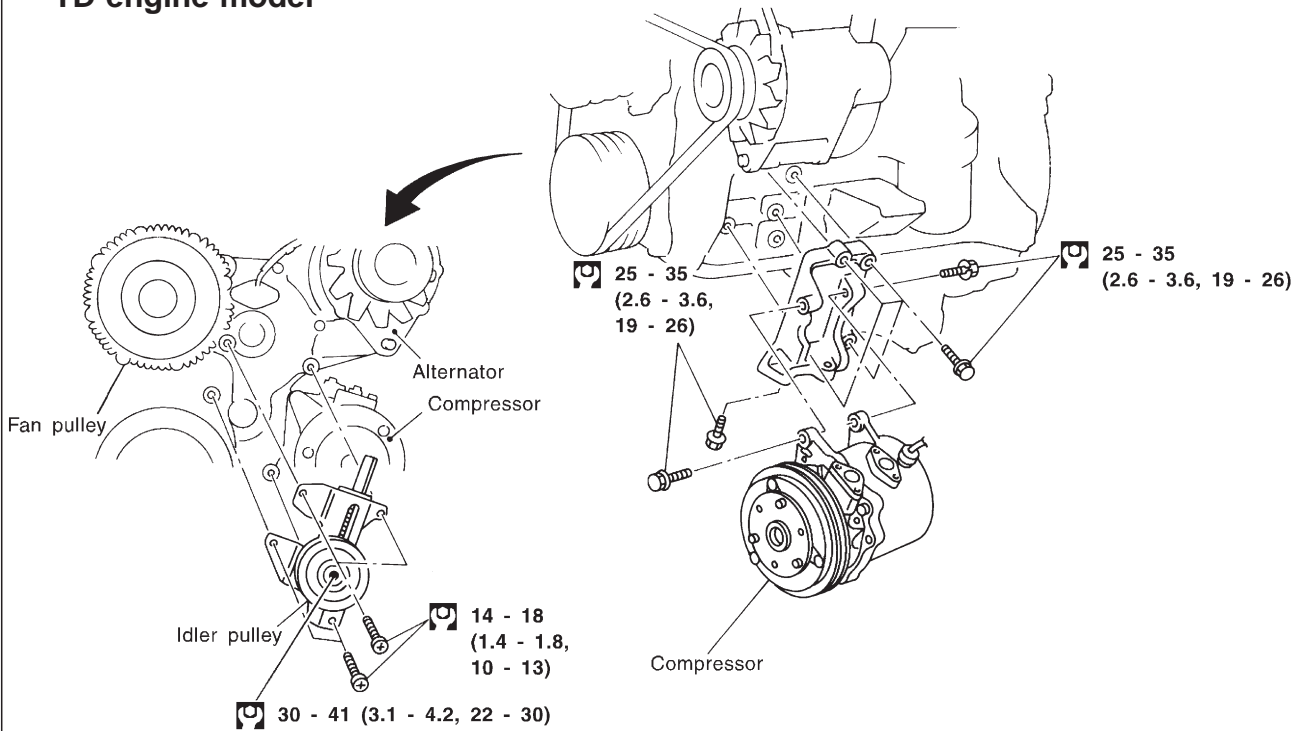
### Compressor Mounting




# SERVICE PROCEDURES

## Compressor Mounting (Cont'd)

TD engine model

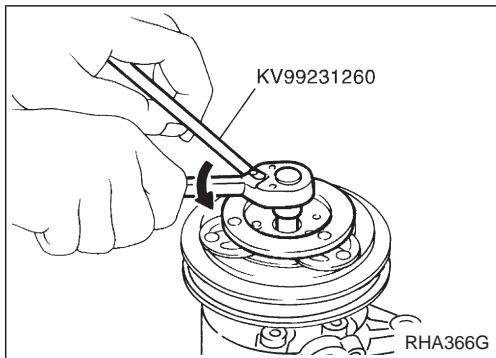
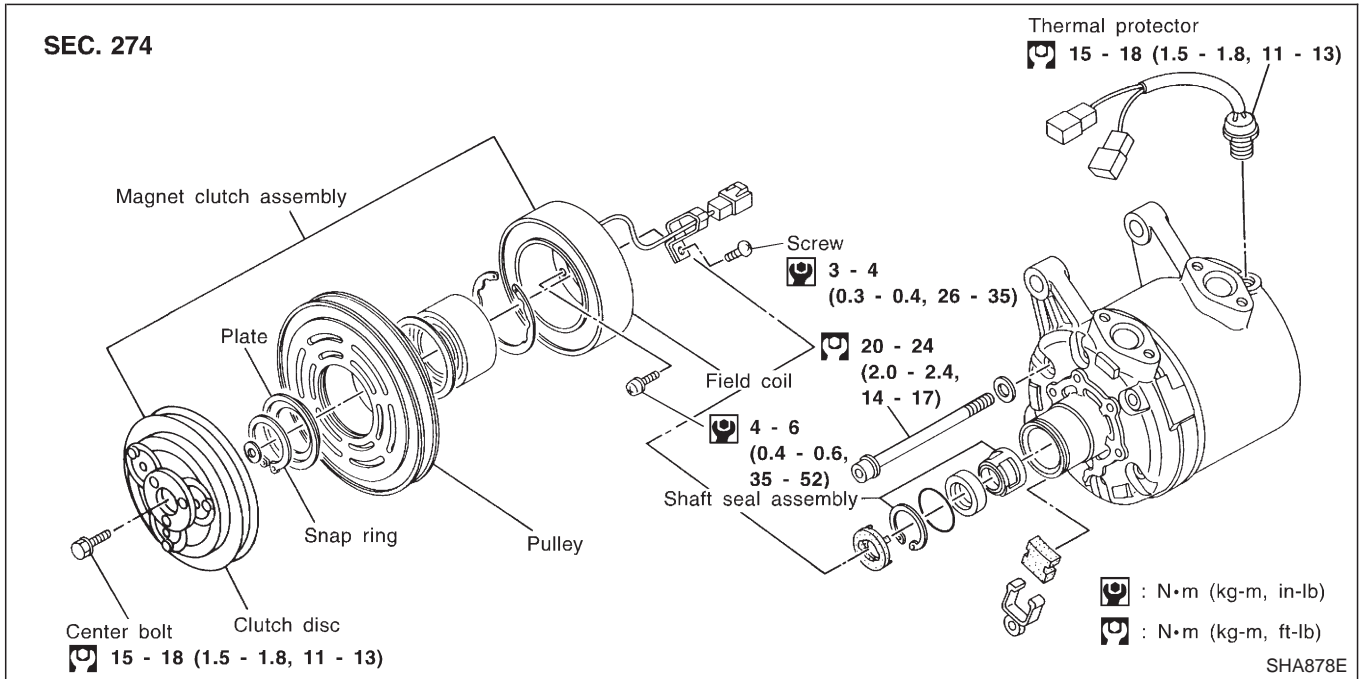


 : N·m (kg-m, ft-lb)

RHA378G

# SERVICE PROCEDURES

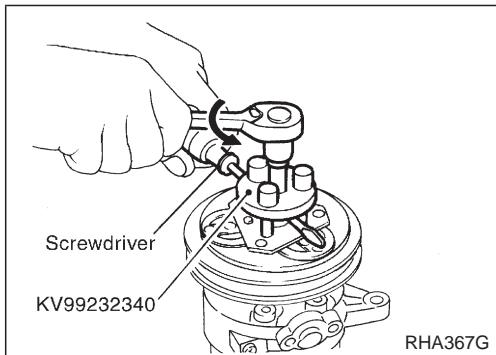
## Compressor — DKV-14C (ZEXEL make)



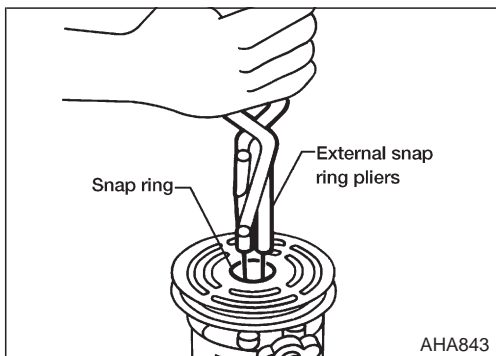
## Compressor Clutch — DKV-14C (ZEXEL make)

### REMOVAL

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



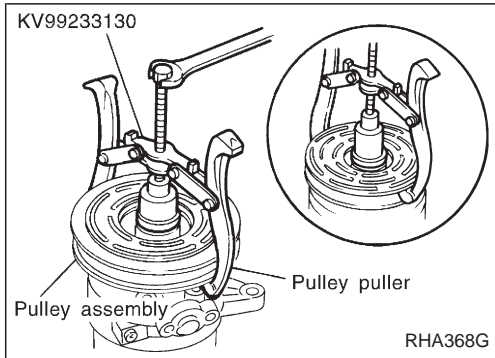
- Remove the clutch disc using Tool KV99232340. Insert holder's three pins into the clutch disc. Rotate the holder clockwise to hook it onto the plate. Then, tighten the center bolt to remove the clutch disc. When tightening the center bolt, insert a round bar (screwdriver, etc.) between two of the pins (as shown in the left-hand figure) to prevent clutch disc rotation. After removing the clutch disc, remove the shims from either the drive shaft or the clutch disc.



- Remove the snap ring using external snap ring pliers.

## SERVICE PROCEDURES

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



- Pulley removal  
Use any commercially available pulley puller. Position the center of it on the end of the drive shaft, and remove the pulley assembly.

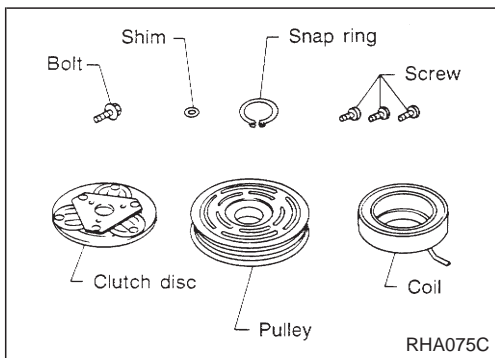
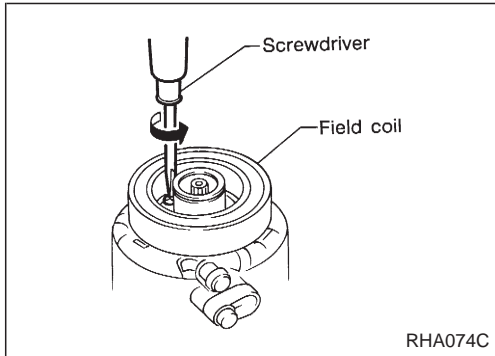
#### For pressed pulleys:

To prevent deformation of the pulley groove, the puller claws should be hooked under (not into) the pulley groove.

#### For machine latched pulleys:

Align the pulley puller groove with the pulley groove, and then remove the pulley assembly.

- Remove the field coil harness clip using a screwdriver.
- Remove the three field coil fixing screws and remove the field coil.



## INSPECTION

### Clutch disc

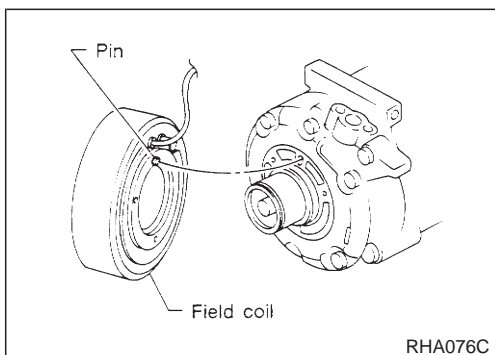
If the contact surface shows signs of damage due to excessive heat, replace clutch disc and pulley.

### Pulley

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

### Coil

Check coil for loose connection or cracked insulation.

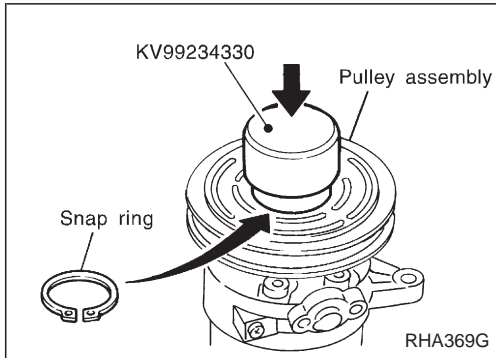


## INSTALLATION

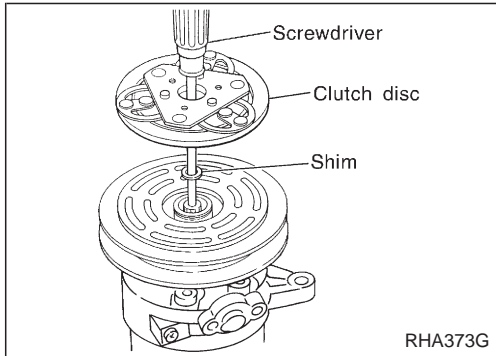
- Install the field coil.
- **Be sure to align the coil's pin with the hole in the compressor's front head.**
- Install the field coil harness clip using a screwdriver.

## SERVICE PROCEDURES

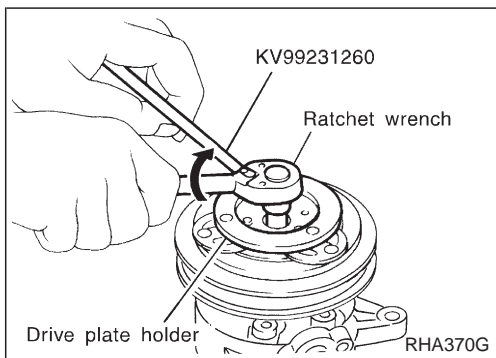
### Compressor Clutch — DKV-14C (ZEXEL make) (Cont'd)



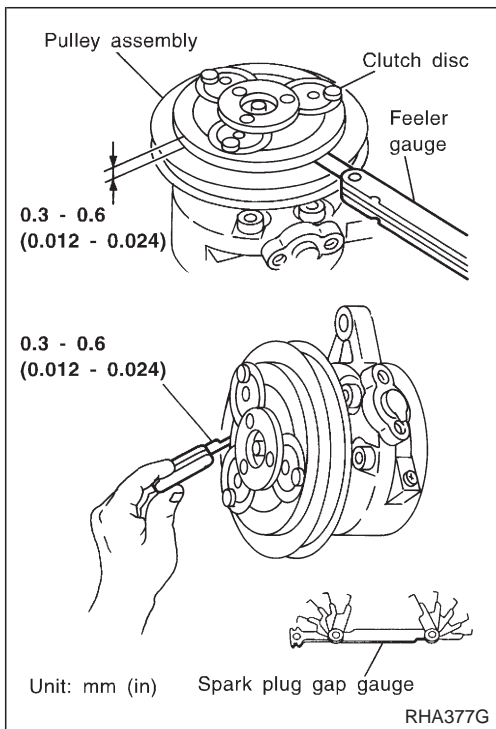
- Install the pulley assembly using the installer and a hand press, and then install the snap ring using snap ring pliers.



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



- Using the holder to prevent drive plate rotation, tighten the bolt to 12 to 15 (1.2 to 1.5 kg-m, 9 to 11 ft-lb) torque.
- **After tightening the bolt, check that the pulley rotates smoothly.**



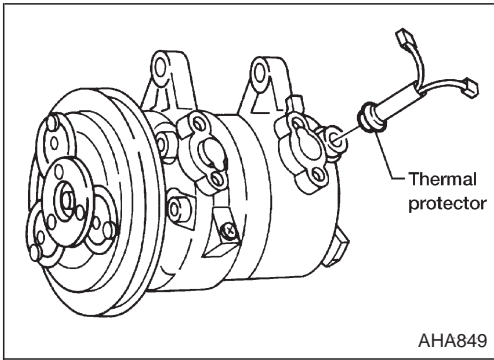
- Check clearance around the entire periphery of clutch disc.  
**Disc-to-pulley clearance:**  
**0.3 - 0.6 mm (0.012 - 0.024 in)**  
If the specified clearance is not obtained, replace adjusting spacer and readjust.

### BREAK-IN OPERATION

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

## SERVICE PROCEDURES

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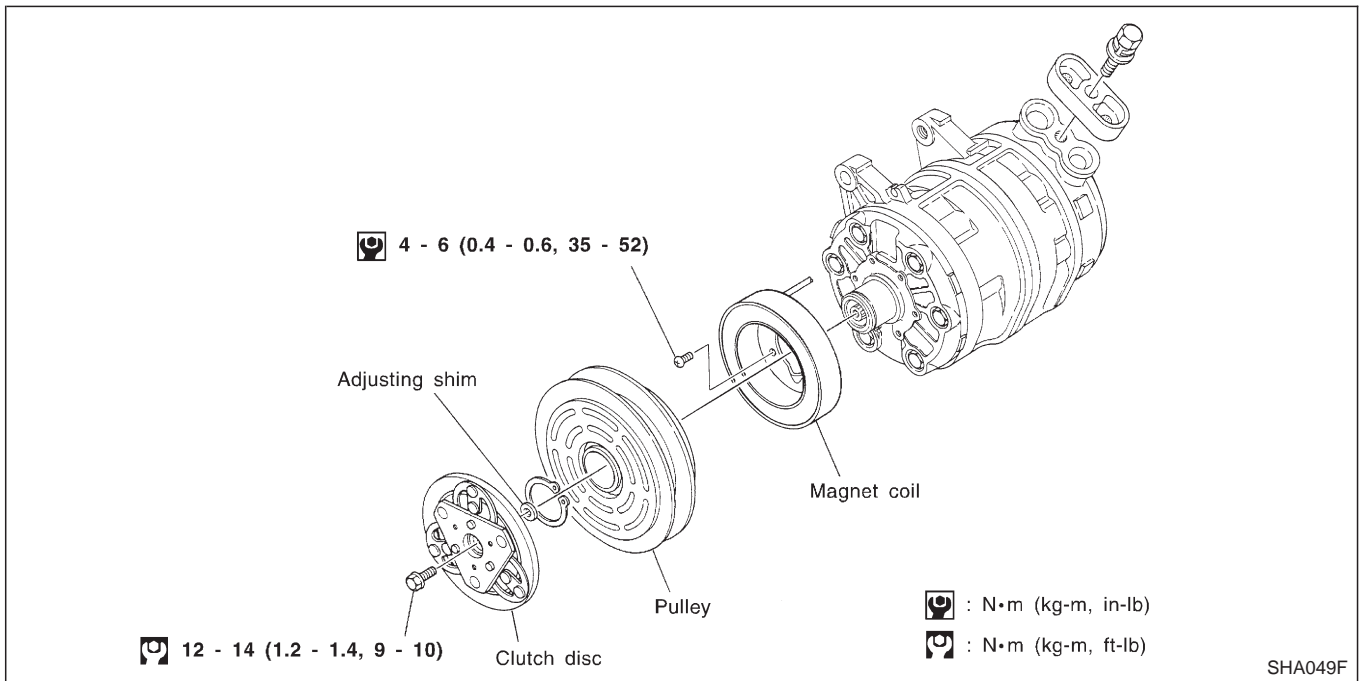
### Thermal Protector — DKV-14C (ZEXEL make) INSPECTION

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



# SERVICE PROCEDURES

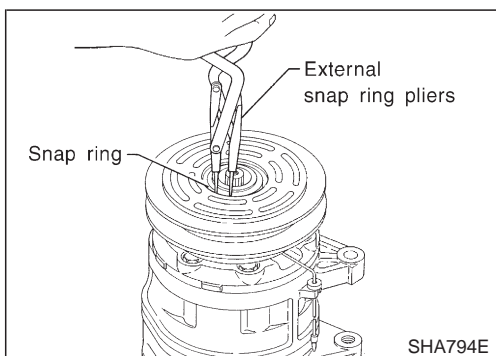
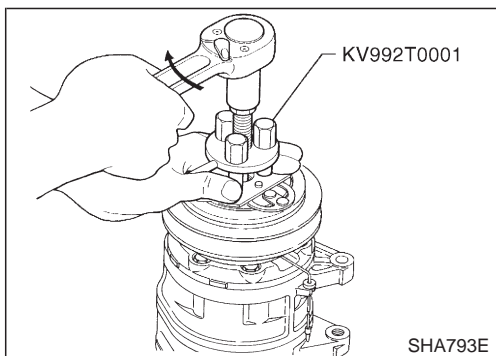
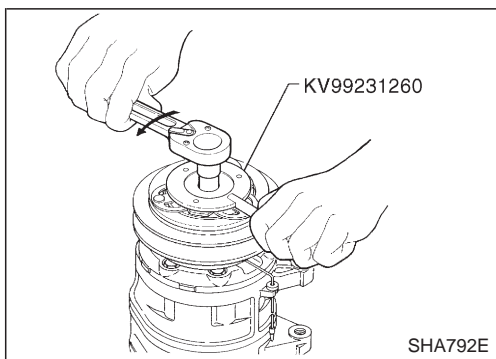
## Compressor — DKS-17CH (ZEXEL make)



## Compressor Clutch — DKS-17CH (ZEXEL make)

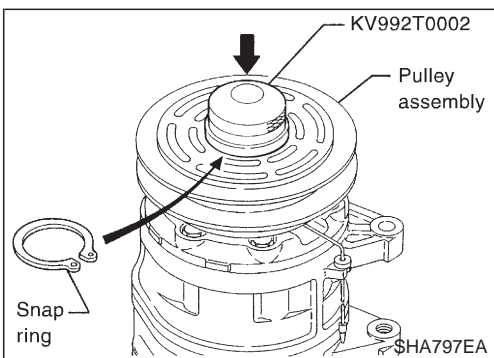
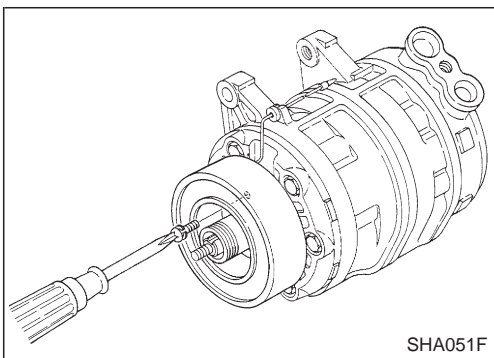
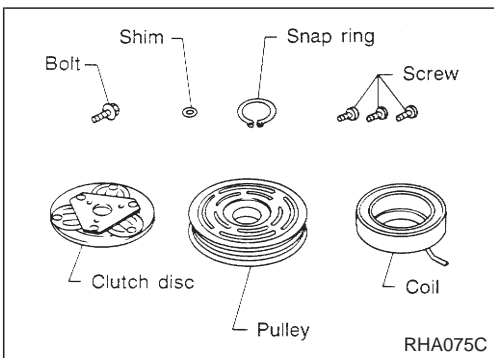
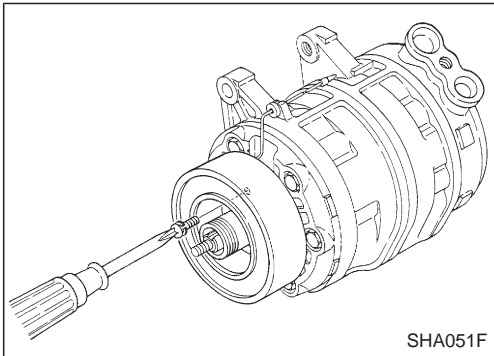
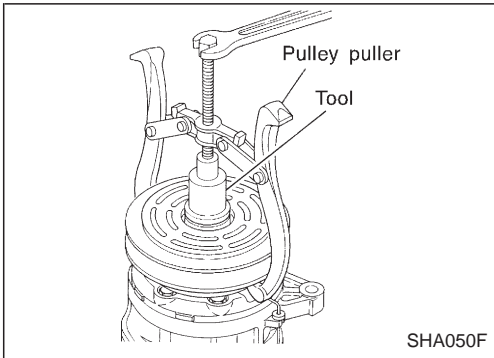
### REMOVAL

- When removing center bolt, hold clutch disc with clutch disc wrench.
- Remove the drive plate using Tool. Insert holder's three pins into the drive plate. Rotate the holder clockwise to hook it onto the plate. Then, tighten the center bolt to remove the drive plate. After removing the drive plate, remove the shims from either the drive shaft or the drive plate.
- Remove the snap ring using external snap ring pliers.



## SERVICE PROCEDURES

### Compressor Clutch — DKS-17CH (ZEXEL make) (Cont'd)



- Pulley removal  
Use any commercially available pulley puller and tool. Position the center of it on the end of the tool, and remove the pulley assembly.  
**For pressed pulleys**  
To prevent deformation of the pulley groove, the puller claws should be hooked under the pulley (not into the groove).  
**For machine latched pulleys**  
Align the pulley puller groove with the pulley groove, and then remove the pulley assembly.
- Remove the three field coil fixing screws and remove the field coil.

### INSPECTION

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

**Pulley:** Check the appearance of the pulley assembly. Check the contact surface of the pulley for any sign of excessive grooving due to slippage. If any sign is found, replace both the pulley and clutch disc. The contact surfaces of the pulley assembly should be cleaned with a suitable solvent before reinstallation.

**Coil:** Check coil for loose connection or cracked insulation.

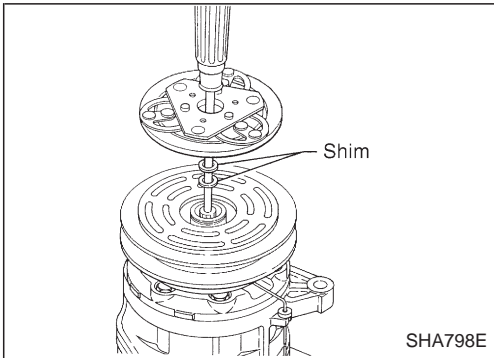
### INSTALLATION

- Install the field coil.  
**Be sure to align the coil's pin with the hole in the compressor's front head.**

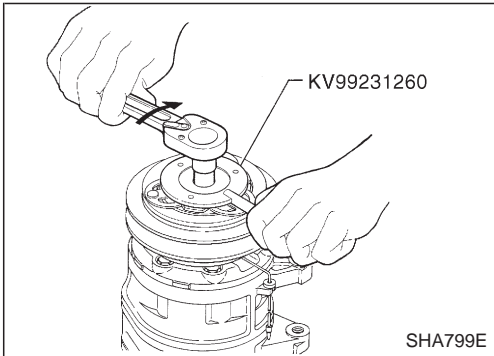
- Install the pulley assembly using the installer and a hand press, and then install the snap ring using snap ring pliers.

## SERVICE PROCEDURES

### Compressor Clutch — DKS-17CH (ZEXEL make) (Cont'd)

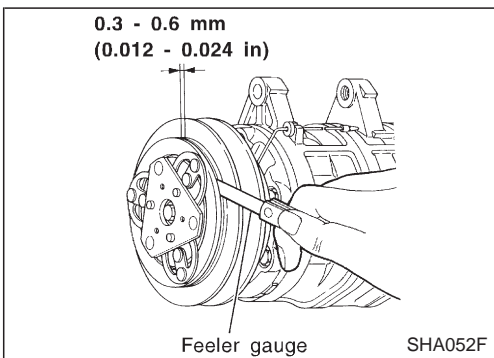


- Install the drive plate on the drive shaft, together with the original shim(s). Press the drive plate down by hand.



- Using the holder to prevent drive plate rotation, tighten the bolt to 12 to 14 N·m (1.2 to 1.4 kg-m, 9 to 10 ft-lb) torque.

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



- Check clearance around the entire periphery of clutch disc.  
**Disc-to-pulley clearance:**  
**0.3 - 0.6 mm (0.012 - 0.024 in)**  
If the specified clearance is not obtained, replace adjusting shim and readjust.

### BREAK-IN OPERATION

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

# SERVICE DATA AND SPECIFICATIONS (SDS)

## General Specifications

### COMPRESSOR

Model	ZEXEL make DKV-14C
Type	Vane rotary
Displacement	cm <sup>3</sup> (cu in)/rev. 140 (8.54)
Direction of rotation	Clockwise (Viewed from drive end)
Drive belt	A Type

### LUBRICANT

Model	ZEXEL make DKV-14C
Type	KLH00-PAGRO
Capacity	mℓ (Imp fl oz)
Total in system	200 (7.0)
Compressor (Service parts) charging amount	200 (7.0)

## Inspection and Adjustment

### REFRIGERANT

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

### COMPRESSOR

Model	DKS-17CH	DKV-14C
Clutch disc-to-pulley clearance	mm (in) 0.3 - 0.6 (0.012 - 0.024)	0.3 - 0.6 (0.012 - 0.024)

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

- Refer to EC section.

### BELT TENSION

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