

HEATER & AIR CONDITIONER

SECTION HA

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

NAHA0153

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER" used along with a seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. The SRS system composition which is available to NISSAN MODEL PATHFINDER is as follows:

- For a frontal collision
The Supplemental Restraint System consists of driver air bag module (located in the center of the steering wheel), front passenger air bag module (located on the instrument panel on passenger side), seat belt pre-tensioners, a diagnosis sensor unit, warning lamp, wiring harness and spiral cable.
- For a side collision
The Supplemental Restraint System consists of side air bag module (located in the outer side of front seat), satellite sensor, diagnosis sensor unit (one of components of air bags for a frontal collision), wiring harness, warning lamp (one of components of air bags for a frontal collision).

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. For removal of Spiral Cable and Air Bag Module, see the RS section.
- Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. Spiral cable and wiring harnesses (except "SEAT BELT PRE-TENSIONER") covered with yellow insulation either just before the harness connectors or for the complete harness are related to the SRS.

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

NAHA0154

WARNING:

- CFC-12 (R-12) refrigerant and HFC-134a (R-134a) refrigerant are not compatible. If the refrigerants are mixed and compressor failure is likely to occur, refer to "CONTAMINATED REFRIGERANT" below. To determine the purity of HFC-134a (R-134a) in the vehicle and recovery tank, use Refrigerant Recovery/Recycling Recharging equipment (ACR4) (J-39500-NI) and Refrigerant Identifier.
- Use only specified lubricant for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. If lubricant other than that specified is used, compressor failure is likely to occur.
- The specified HFC-134a (R-134a) lubricant rapidly absorbs moisture from the atmosphere. The following handling precautions must be observed:
 - a) When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.
 - b) When installing refrigerant components to a vehicle, do not remove the caps (unseal) until just before connecting the components. Connect all refrigerant loop components as quickly as possible to minimize the entry of moisture into system.
 - c) Only use the specified lubricant from a sealed container. Immediately reseal containers of lubricant. Without proper sealing, lubricant will become moisture saturated and should not be used.
 - d) Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Remove R-134a from the A/C system, using certified service equipment meeting requirements of SAE J2210 (R-134a recycling equipment), or J2209 (R-134a recovery equipment). If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.
 - e) Do not allow lubricant (Nissan A/C System Oil Type S) to come in contact with styrofoam parts. Damage may result.

CONTAMINATED REFRIGERANT

NAHA0154S01

If a refrigerant other than pure R-134a is identified in a vehicle, your options are:

- Explain to the customer that environmental regulations prohibit the release of contaminated refrigerant into the atmosphere.

PRECAUTIONS

AUTO

Precautions for Working with HFC-134a (R-134a) (Cont'd)

- Explain that recovery of the contaminated refrigerant could damage your service equipment and refrigerant supply. GI
- Suggest the customer return the vehicle to the location of previous service where the contamination may have occurred. MA
- If you choose to perform the repair, recover the refrigerant using only **dedicated equipment and containers. Do not recover contaminated refrigerant into your existing service equipment.** If your facility does not have dedicated recovery equipment, you may contact a local refrigerant product retailer for available service. This refrigerant must be disposed of in accordance with all federal and local regulations. In addition, replacement of all refrigerant system components on the vehicle is recommended. EM
- If the vehicle is within the warranty period, the air conditioner warranty is void. Please contact Nissan Customer Affairs for further assistance. LC

General Refrigerant Precautions

NAHA0155

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. EC
- Always wear eye and hand protection (goggles and gloves) when working with any refrigerant or air conditioning system. FE
- Do not store or heat refrigerant containers above 52°C (125°F). CL
- 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. MT
- Do not intentionally drop, puncture, or incinerate refrigerant containers. AT
- Keep refrigerant away from open flames: poisonous gas will be produced if refrigerant burns. TF
- Refrigerant will displace oxygen, therefore be certain to work in well ventilated areas to prevent suffocation. PD
- Do not pressure test or leak test HFC-134a (R-134a) service equipment and/or vehicle air conditioning systems with compressed air during repair. Some mixtures of air and R-134a have been shown to be combustible at elevated pressures. These mixtures, if ignited, may cause injury or property damage. Additional health and safety information may be obtained from refrigerant manufacturers. AX

Precautions for Refrigerant Connection

NAHA0156

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

- Expansion valve to cooling unit SU

FEATURES OF NEW TYPE REFRIGERANT CONNECTION

NAHA0156S01

- 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. BR
- The reaction force of the O-ring will not occur in the direction that causes the joint to pull out, thereby facilitating piping connections. ST

RS

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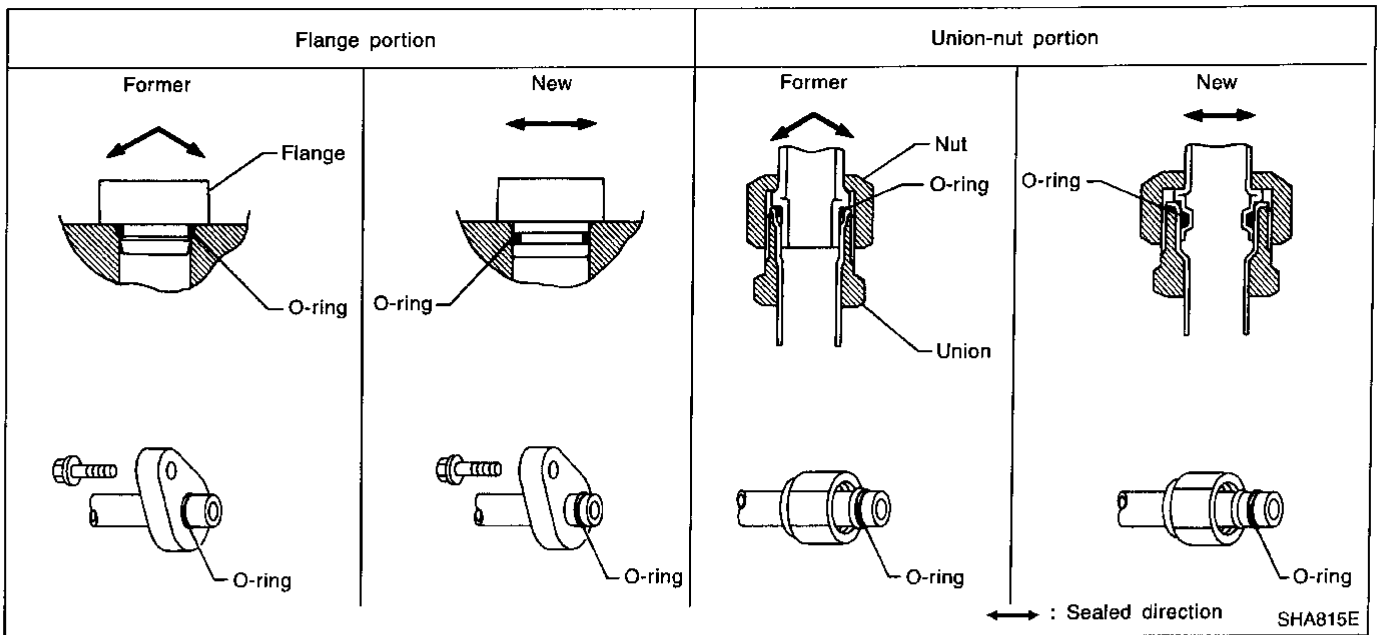
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PRECAUTIONS

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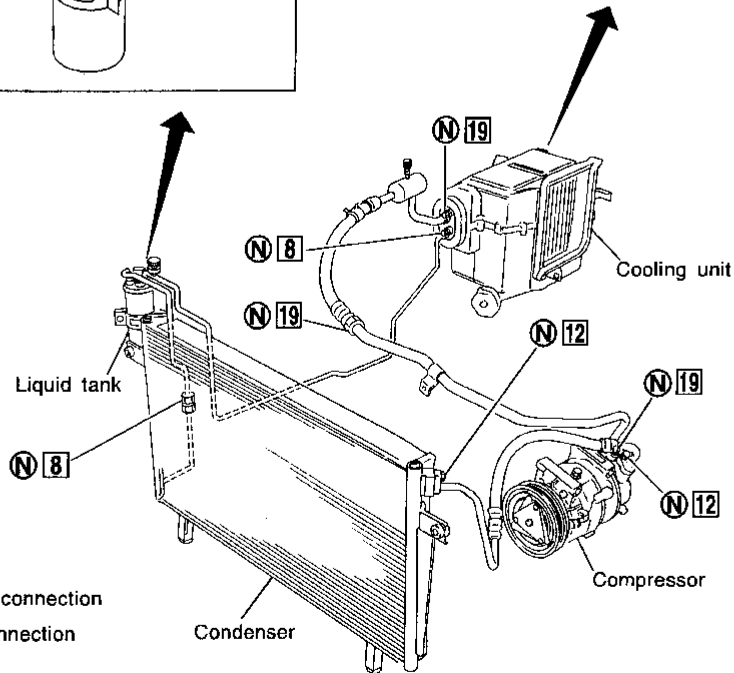
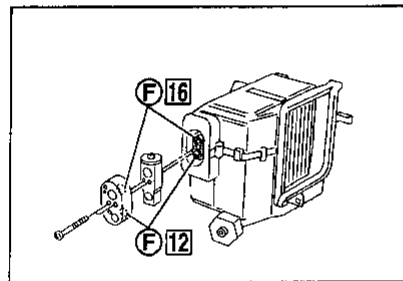
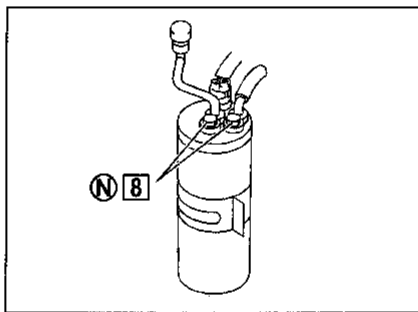
Precautions for Refrigerant Connection (Cont'd)



O-RING AND REFRIGERANT CONNECTION

MAHA0156S02

SEC. 271•274•276



- ⓕ : Former type refrigerant connection
- Ⓝ : New type refrigerant connection
- : (O-ring size)

SHA280F

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.

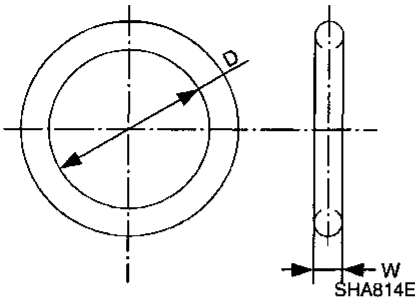
PRECAUTIONS

AUTO

Precautions for Refrigerant Connection (Cont'd)

O-Ring Part Numbers and Specifications

NAHA0156S0201



| 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 (0.0906) |
| New | 19 | 92474 N8210 | 16.5 (0.650) | 2.43 (0.0957) |
| Former | | 92477 N8200 | 17.12 (0.6740) | 1.78 (0.0701) |

WARNING:

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

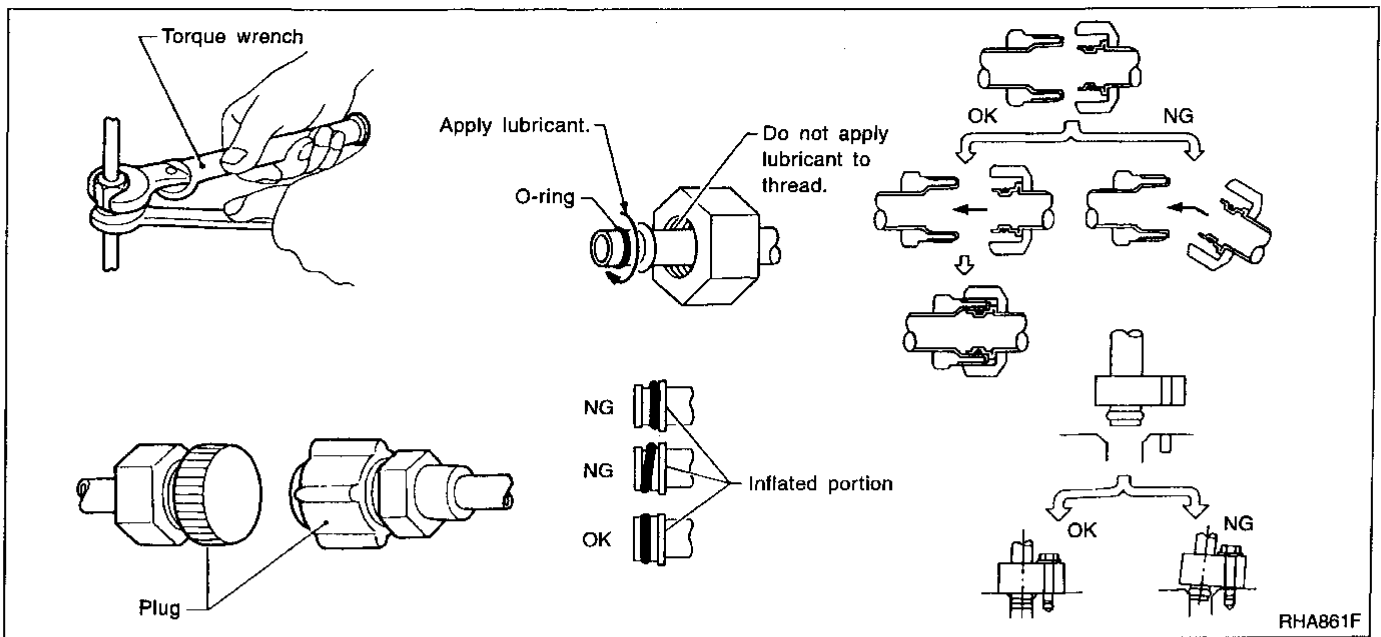
CAUTION:

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

- When the compressor is removed, store it in the same position as it is when mounted on the car. Failure to do so will cause lubricant to enter the low pressure chamber.
- When connecting tubes, always use a torque wrench and a back-up wrench.
- After disconnecting tubes, immediately plug all openings to prevent entry of dirt and moisture.
- When installing an air conditioner in the vehicle, connect the pipes as the final stage of the operation. Do not remove the seal caps of pipes and other components until just before required for connection.
- Allow components stored in cool areas to warm to working area temperature before removing seal caps. This prevents condensation from forming inside A/C components.
- Thoroughly remove moisture from the refrigeration system before charging the refrigerant.
- Always replace used O-rings.
- When connecting tube, apply lubricant to circle of the O-rings shown in illustration. Be careful not to apply lubricant to threaded portion.
Lubricant name: Nissan A/C System Oil Type S
Part number: KLH00-PAGS0
- O-ring must be closely attached to dented portion of tube.
- When replacing the O-ring, be careful not to damage O-ring and tube.
- Connect tube until you hear it click, then tighten the nut or bolt by hand until snug. Make sure that the O-ring is installed to tube correctly.
- After connecting line, conduct leak test and make sure that there is no leakage from connections. When the gas leaking point is found, disconnect that line and replace the O-ring. Then tighten connections of seal seat to the specified torque.

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Precautions for Servicing Compressor



Precautions for Servicing Compressor

NAHA0157

- **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-99.**
- **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.**

Precautions for Service Equipment

NAHA0158

RECOVERY/RECYCLING EQUIPMENT

NAHA0158S01

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

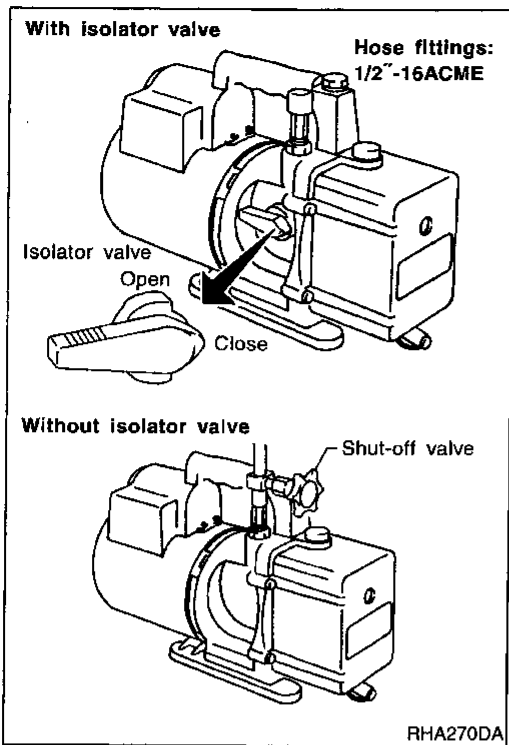
NAHA0158S02

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

PRECAUTIONS

AUTO

Precautions for Service Equipment (Cont'd)



VACUUM PUMP

NAHA0158S03

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.

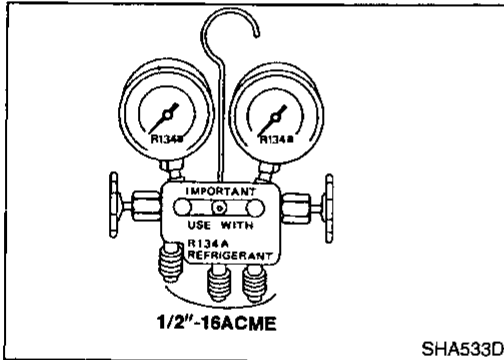
- Usually vacuum pumps have a manual isolator valve as part of the pump. Close this valve to isolate the service hose from the pump.
- For pumps without an isolator, use a hose equipped with a manual shut-off valve near the pump end. Close the valve to isolate the hose from the pump.
- If the hose has 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

NAHA0158S04

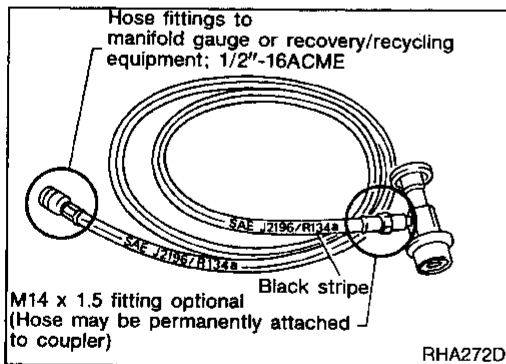
Be certain that the gauge face indicates R-134a or 134a. Be sure the gauge set has 1/2"-16 ACME threaded connections for service hoses. Confirm the set has been used only with refrigerant HFC-134a (R-134a) and specified lubricants.



SERVICE HOSES

NAHA0158S05

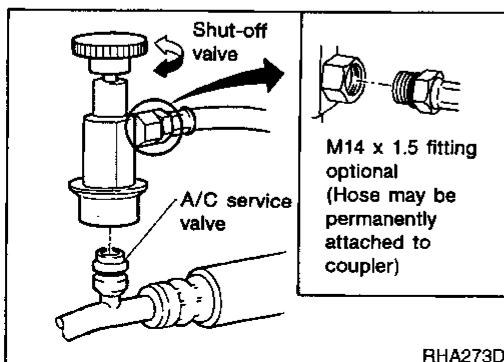
Be certain that the service hoses display the markings described (colored hose with black stripe). All hoses must include positive shut off devices (either manual or automatic) near the end of the hoses opposite the manifold gauge.



SERVICE COUPLERS

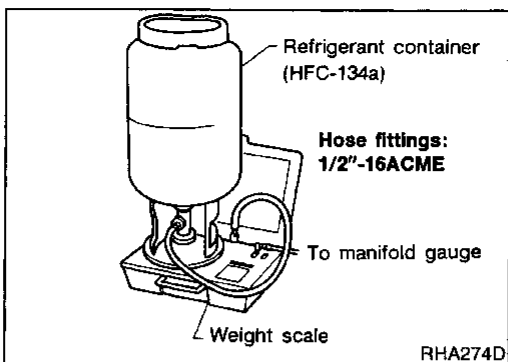
NAHA0158S06

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 |

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REFRIGERANT WEIGHT SCALE

NAHA0158S07

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.

CALIBRATING ACR4 WEIGHT SCALE

NAHA0158S08

Calibrate the scale every three months. To calibrate the weight scale on the ACR4 (J-39500-INF):

1. Press **Shift/Reset** and **Enter** at the same time.
2. Press **8787**. "A1" will be displayed.
3. Remove all weight from the scale.
4. Press **0**, then press **Enter**. "0.00" will be displayed and change to "A2".
5. Place a known weight (dumbbell or similar weight), between 4.5 and 8.6 kg (10 and 19 lb) on the center of the weight scale.
6. Enter the known weight using four digits. (Example 10 lbs = 10.00, 10.5 lbs = 10.50)
7. Press **Enter** — the display returns to the vacuum mode.
8. Press **Shift/Reset** and **Enter** at the same time.
9. Press **6** — the known weight on the scale is displayed.
10. Remove the known weight from the scale. "0.00" will be displayed.
11. Press **Shift/Reset** to return the ACR4 to the program mode.

CHARGING CYLINDER

NAHA0158S09

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.

Wiring Diagrams and Trouble Diagnosis

NAHA0159

When you read wiring diagrams, refer to the followings:

- "HOW TO READ WIRING DIAGRAMS" in GI section
- "POWER SUPPLY ROUTING" for power distribution circuit in EL section

When you perform trouble diagnosis, refer to the followings:

- "HOW TO FOLLOW TEST GROUP IN TROUBLE DIAGNOSIS" in GI section
- "HOW TO PERFORM EFFICIENT DIAGNOSIS FOR AN ELECTRICAL INCIDENT" in GI section

PREPARATION

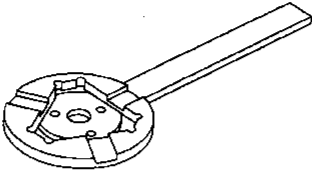
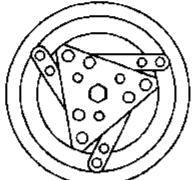
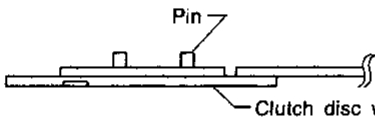
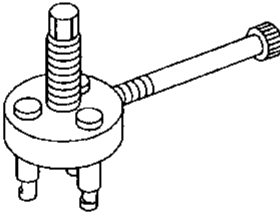

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Special Service Tools

Special Service Tools

NAJIA0160

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

| Tool number (Kent-Moore No.) Tool name | Description | |
|--|---|--|
| KV99106100 (J-41260) Clutch disc wrench |  <p>NT232</p>  <p>When replacing the magnet clutch in the above compressor, use a clutch disc wrench with the pin side on the clutch disc to remove it.</p>  <p>Pin Clutch disc wrench</p> <p>NT378</p> | GI MA EM LC EC FE CL MT AT TF PD |
| KV99232340 (J-38874) or KV992T0001 (—) Clutch disc puller |  <p>NT376</p> | AX SU BR |
| KV99106200 (J-41261) Pulley installer |  <p>NT235</p> | ST RS |

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PREPARATION

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

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

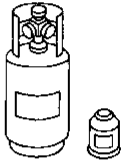

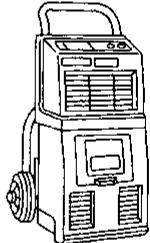
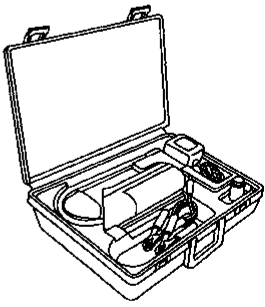
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Never mix HFC-134a refrigerant and/or its specified lubricant with CFC-12 (R-12) refrigerant and/or its lubricant.

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

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

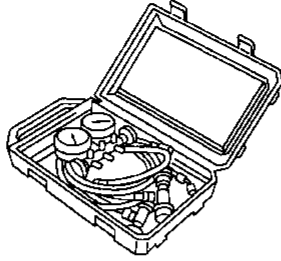

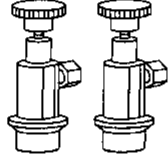

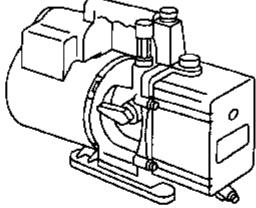
Adapters that convert one size fitting to another must never be used: refrigerant/lubricant contamination will occur and compressor failure will result.

| Tool number (Kent-Moore No.) Tool name | Description |
|--|---|
| HFC-134a (R-134a) refrigerant |  <p>Container color: Light blue Container marking: HFC-134a (R-134a) Fitting size: Thread size</p> <ul style="list-style-type: none"> ● large container 1/2"-16 ACME <p>NT196</p> |
| KLH00-PAGS0 (—) Nissan A/C System Oil Type S |  <p>Type: Poly alkylene glycol oil (PAG), type S Application: HFC-134a (R-134a) swash plate (piston) compressors (Nissan only) Lubricity: 40 ml (1.4 US fl oz, 1.4 Imp fl oz)</p> <p>NT197</p> |
| (J-39500-NI) Recovery/Recycling Recharging equipment (ACR4) |  <p>Function: Refrigerant Recovery and Recycling and Recharging</p> <p>NT195</p> |
| (J-41995) Electrical leak detector |  <p>Power supply:</p> <ul style="list-style-type: none"> ● DC 12V (Cigarette lighter) <p>AHA281A</p> |

PREPARATION

AUTO

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

| Tool number (Kent-Moore No.) Tool name | Description | |
|--|--|----------------------------|
| (J-39183) Manifold gauge set (with hoses and couplers) |  <p>Identification:</p> <ul style="list-style-type: none"> • The gauge face indicates R-134a. • Fitting size: Thread size • 1/2"-16 ACME <p>NT199</p> | GI MA EM LC EC |
| Service hoses <ul style="list-style-type: none"> • High side hose (J-39501-72) • Low side hose (J-39502-72) • Utility hose (J-39476-72) |  <p>Hose color:</p> <ul style="list-style-type: none"> • Low hose: Blue with black stripe • High hose: Red with black stripe • Utility hose: Yellow with black stripe or green with black stripe <p>Hose fitting to gauge:</p> <ul style="list-style-type: none"> • 1/2"-16 ACME <p>NT201</p> | FE CL MT |
| Service couplers <ul style="list-style-type: none"> • High side coupler (J-39500-20) • Low side coupler (J-39500-24) |  <p>Hose fitting to service hose:</p> <ul style="list-style-type: none"> • M14 x 1.5 fitting is optional or permanently attached. <p>NT202</p> | AT TF |
| (J-39650) Refrigerant weight scale |  <p>For measuring of refrigerant</p> <p>Fitting size: Thread size</p> <ul style="list-style-type: none"> • 1/2"-16 ACME <p>NT200</p> | PD AX SU |
| (J-39649) Vacuum pump (Including the isolator valve) |  <p>Capacity:</p> <ul style="list-style-type: none"> • Air displacement: 4 CFM • Micron rating: 20 microns • Oil capacity: 482 g (17 oz) <p>Fitting size: Thread size</p> <ul style="list-style-type: none"> • 1/2"-16 ACME <p>NT203</p> | BR ST RS |

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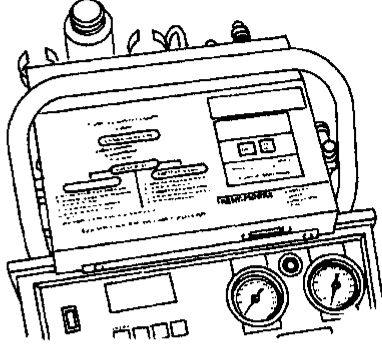
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COMMERCIAL SERVICE TOOL

NAHA0161S01

| Tool name | Description |
|----------------------------------|---|
| Refrigerant identifier equipment | <p data-bbox="959 268 1490 321">For checking refrigerant purity and for system contamination</p>  <p data-bbox="416 646 480 667">NT765</p> |

Refrigeration System

REFRIGERATION CYCLE

Refrigerant Flow

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

Freeze Protection

Under Normal Operating Conditions, When The A/C Is Switched On, The Compressor Runs Continuously, And The Evaporator Pressure, And Therefore Temperature, Is Controlled By The V-6 Variable Displacement Compressor To Prevent Freeze Up.

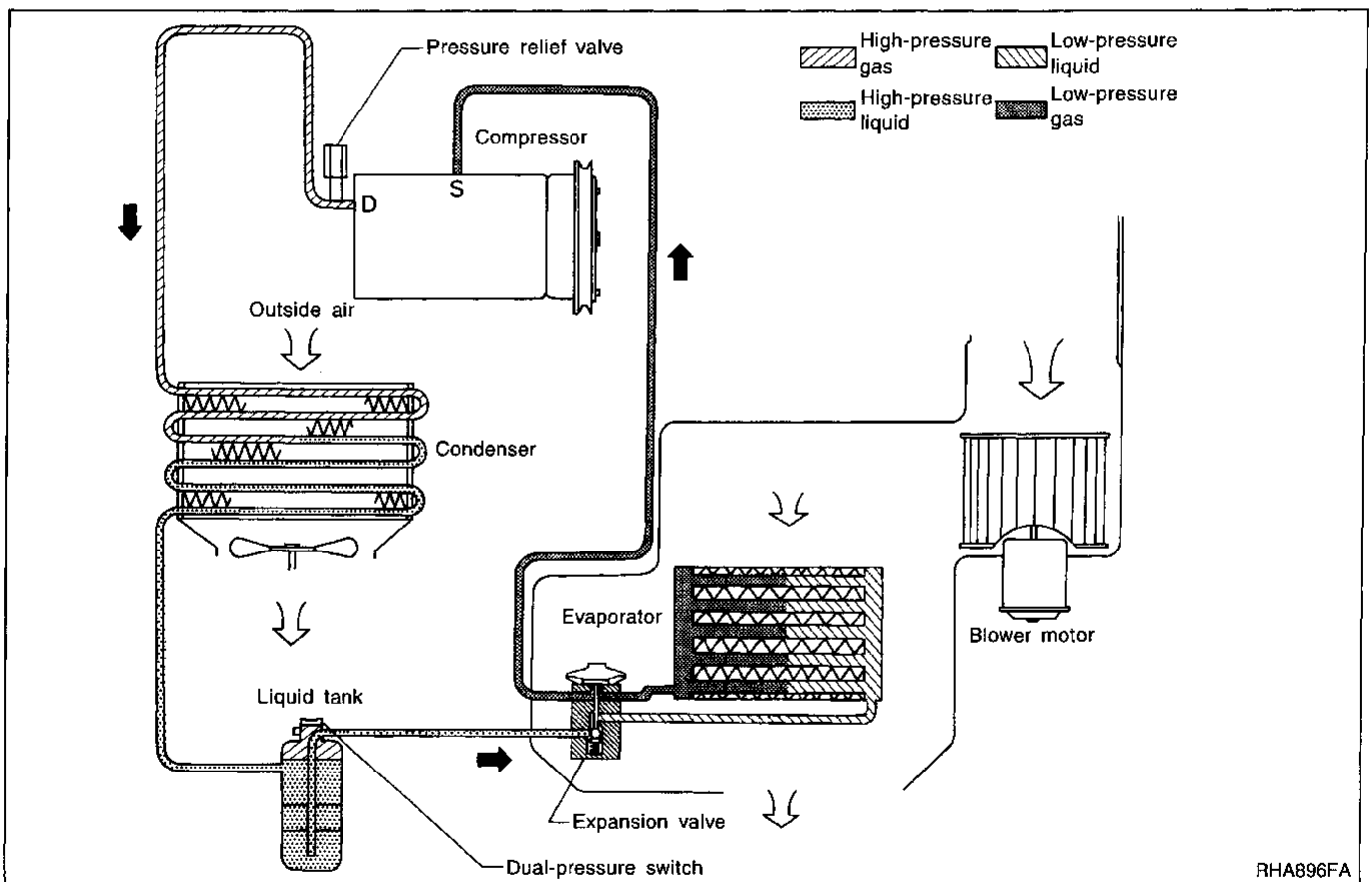
Refrigerant System Protection

Dual-pressure Switch

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

Pressure Relief Valve

The refrigerant system is also protected by a pressure relief valve, located in the rear head of the compressor. When the pressure of refrigerant in the system increases to an abnormal level [more than 3,727 kPa (38 kg/cm², 540 psi)], the release port on the pressure relief valve automatically opens and releases refrigerant into the atmosphere.



V-6 Variable Displacement Compressor**GENERAL INFORMATION**

-NAHA0183

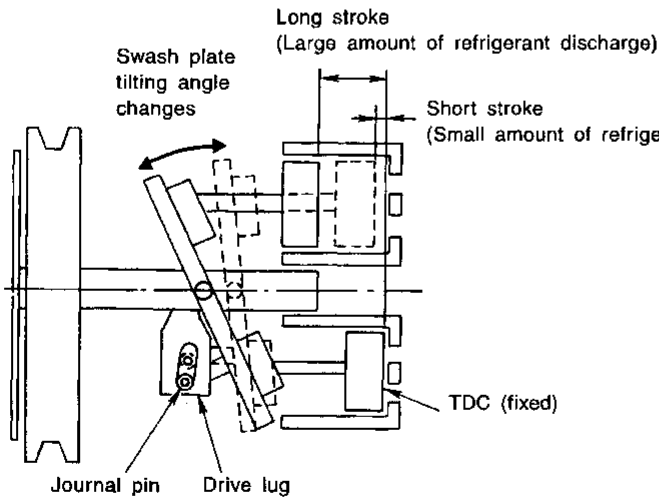
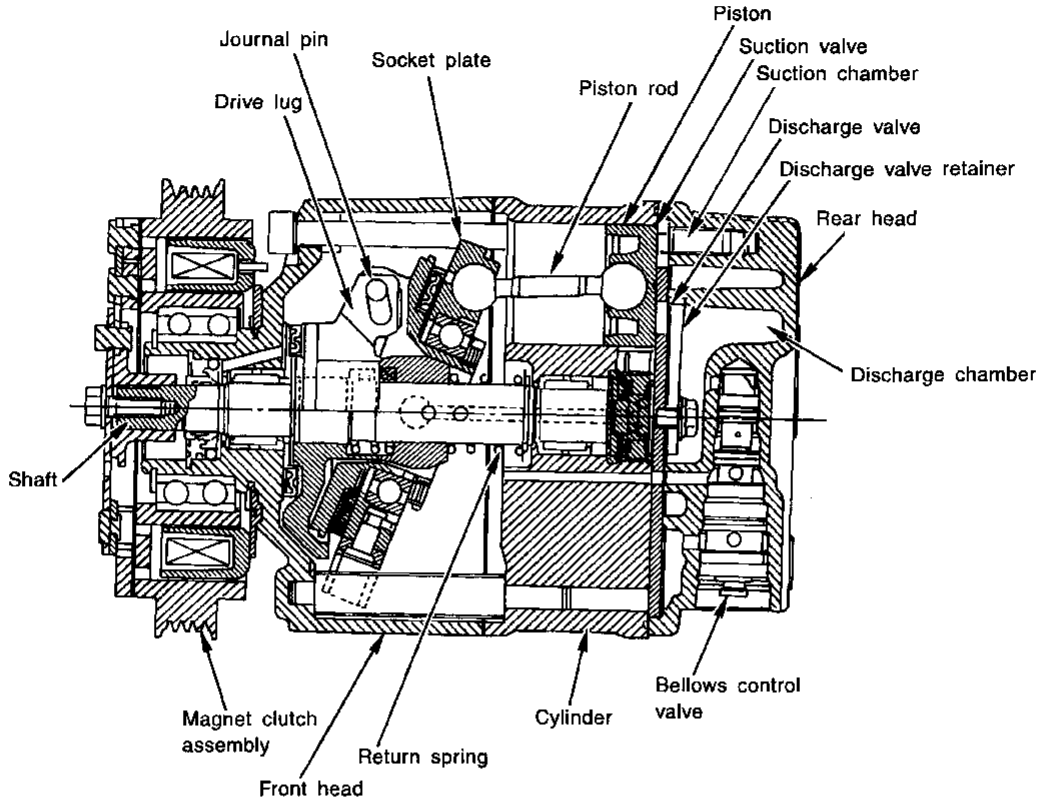
1. The V-6 variable compressor differs from previous units. The vent temperatures of the V-6 variable compressor do not drop too far below 5°C (41°F) when:
 - evaporator intake air temperature is less than 20°C (68°F)
 - engine is running at speeds less than 1,500 rpm.This is because the V-6 compressor provides a means of “capacity” control.
2. The V-6 variable compressor provides refrigerant control under varying conditions. During cold winters, it may not produce high refrigerant pressure discharge (compared to previous units) when used with air conditioning systems.
3. A “clanking” sound may occasionally be heard during refrigerant charge. The sound indicates that the tilt angle of the swash plate has changed and is not a problem.
4. For air conditioning systems with the V-6 compressor, the clutch remains engaged unless: the system main switch, fan switch or ignition switch is turned OFF. When ambient (outside) temperatures are low or when the amount of refrigerant is insufficient, the clutch is disengaged to protect the compressor.
5. A constant range of suction pressure is maintained when engine speed is greater than a certain value. It normally ranges from 147 to 177 kPa (1.5 to 1.8 kg/cm², 21 to 26 psi) under varying conditions. In previous compressors, however, suction pressure was reduced with increases in engine speed.

DESCRIPTION

General

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

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



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

RHA037DD

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Operation

1. Operation Control Valve

-NAHA0164S02

NAHA0164S0201

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

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

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

2. Maximum Cooling

NAHA0164S0202

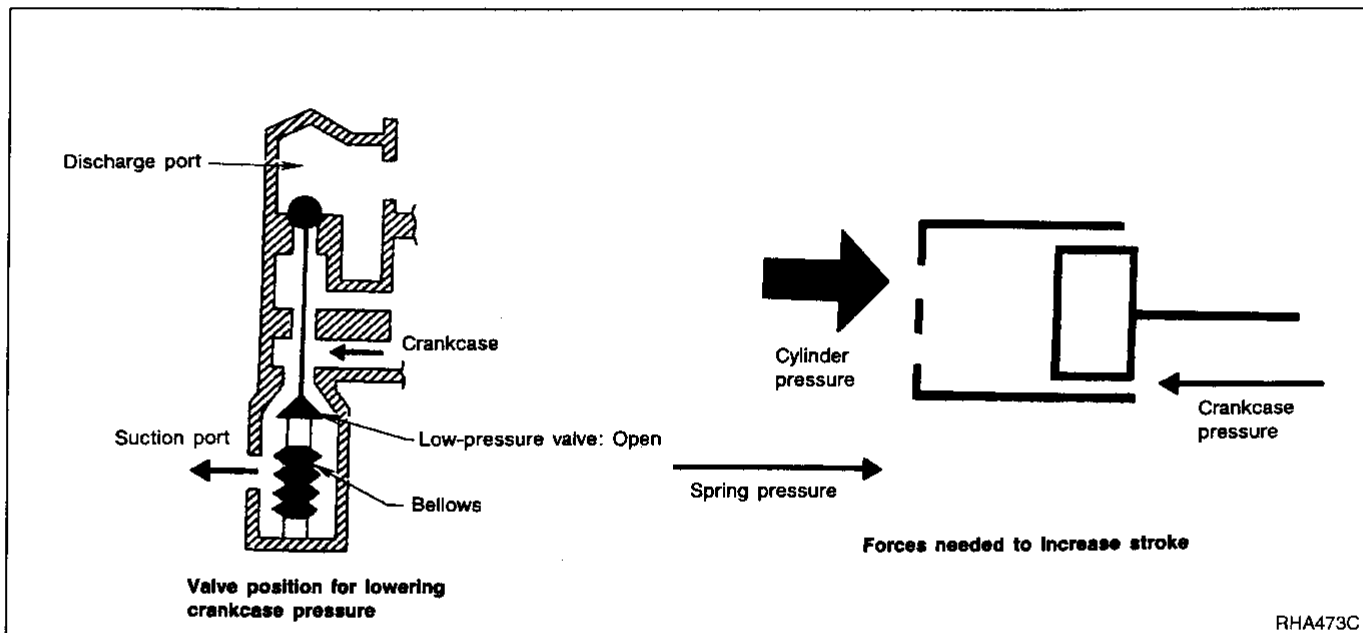
Refrigerant pressure on the low-pressure side increases with an increase in heat loads.

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

This causes the following pressure changes:

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

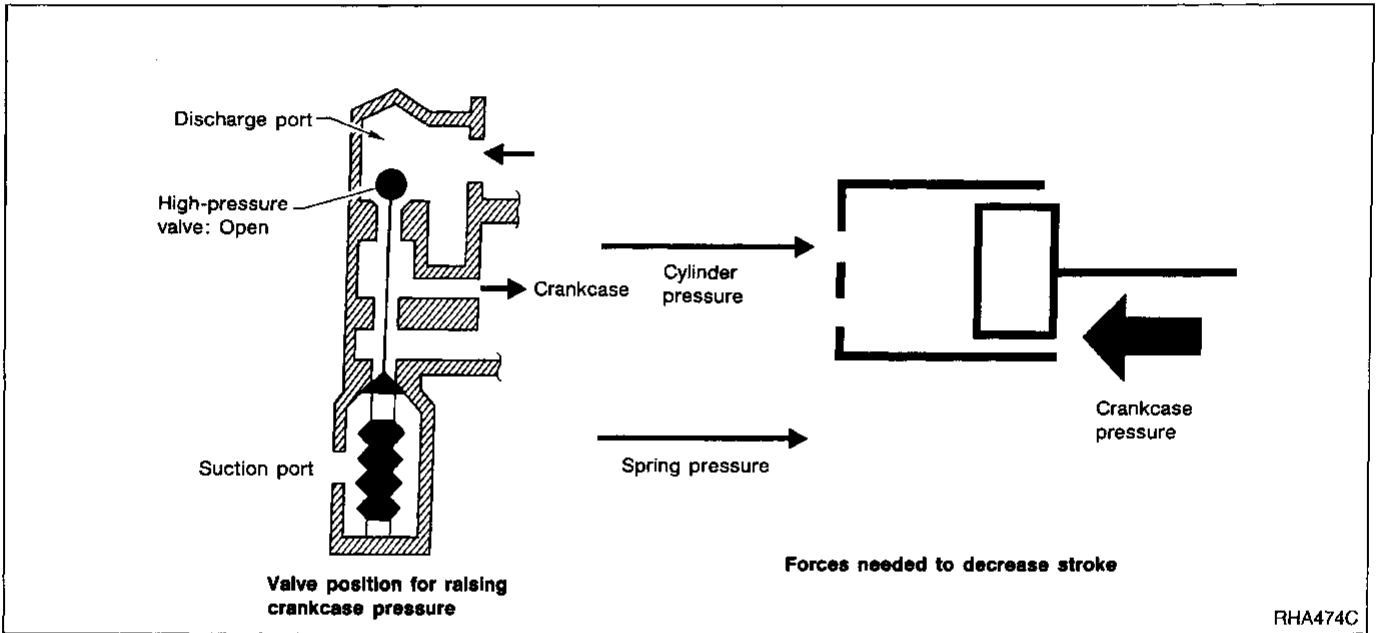
Under this condition, the swash plate is set to the maximum stroke position.



3. Capacity Control

=NAHA0164S0203

- Refrigerant pressure on suction side is low during high speed driving or when ambient or interior temperature is low.
- The bellows expands when refrigerant pressure on the suction pressure side drops below approximately 177 kPa (1.8 kg/cm², 26 psi).
Since suction pressure is low, it makes the suction port close and the discharge port open. Thus, crankcase pressure becomes high as high pressure enters the crankcase.
- The force acts around the journal pin near the swash plate, and is generated by the pressure difference before and behind the piston.
The drive lug and journal pin are located where the piston generates the highest pressure. Piston pressure is between suction pressure P_s and discharge pressure P_d , which is near suction pressure P_s . If crankcase pressure P_c rises due to capacity control, the force around the journal pin makes the swash plate angle decrease and also the piston stroke decrease. In other words, crankcase pressure increase triggers pressure difference between the piston and the crankcase. The pressure difference changes the angle of the swash plate.



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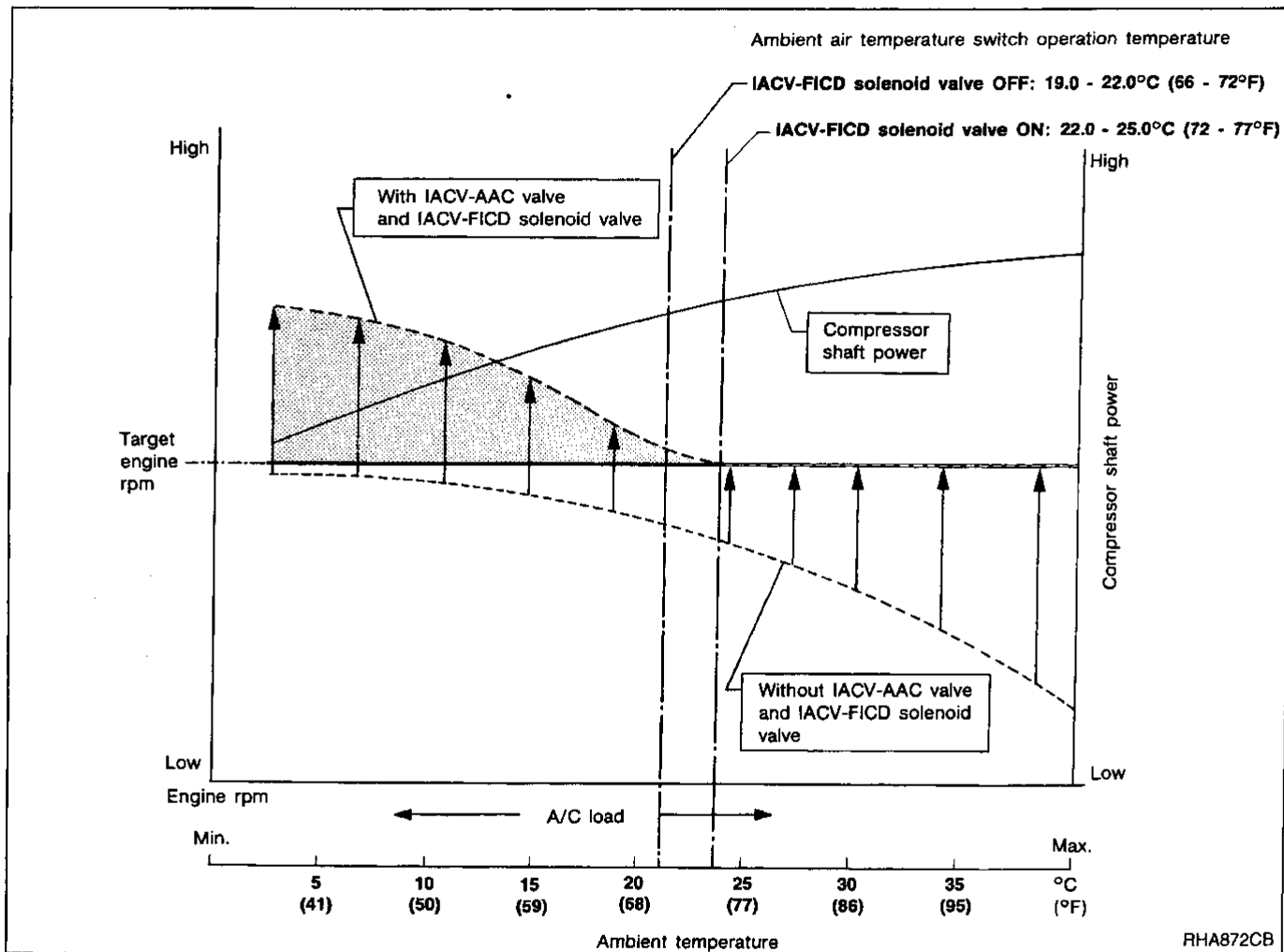
FICD CONTROL SYSTEM

=NAHA0165

General

NAHA0165S01

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



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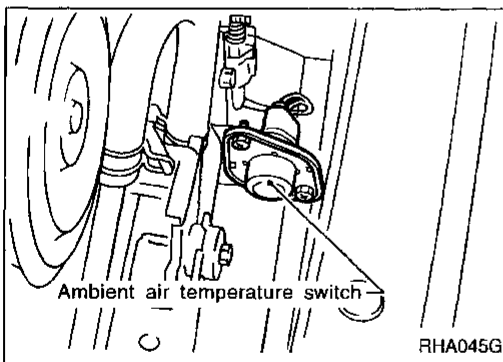
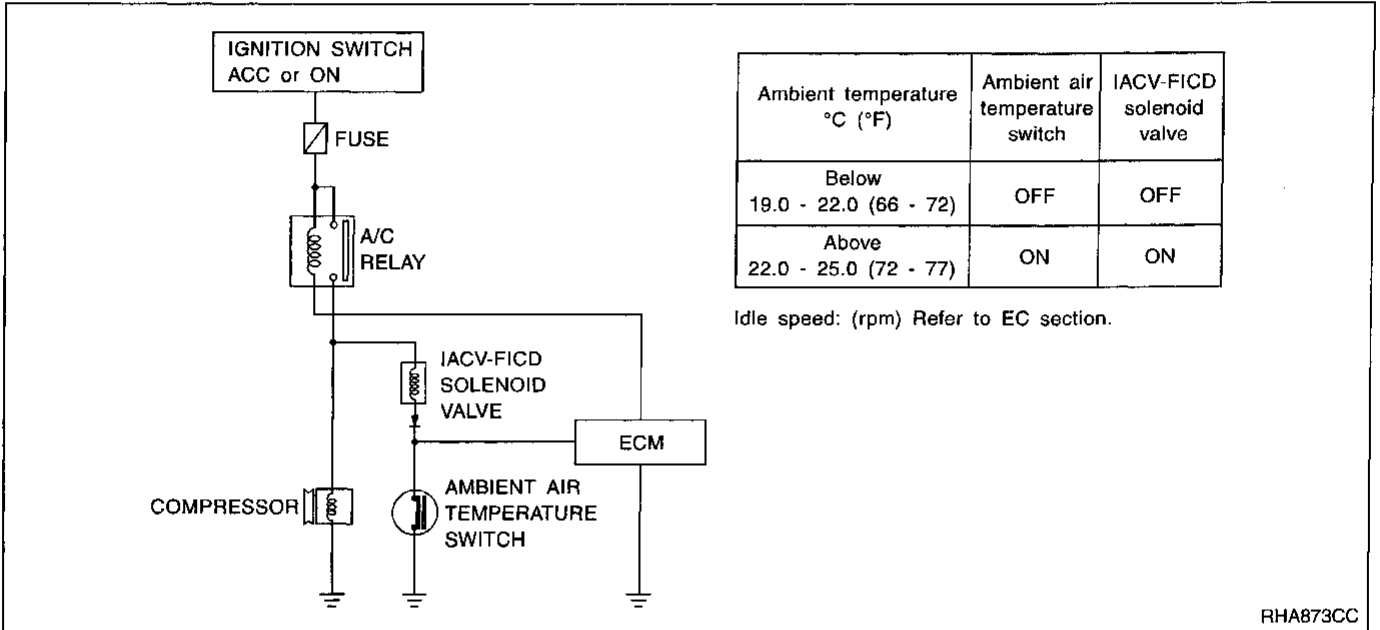
Operation

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

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

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

If the ambient air temperature switch is OFF [this switch turns OFF when the ambient temperature is below 19.0°C (66°F)] even when the air conditioner is ON (A/C relay is ON), the IACV-FICD solenoid valve is deenergized, and the idling speed is controlled so that the appropriate rpm can be achieved by operation of the IACV-AAC valve only.

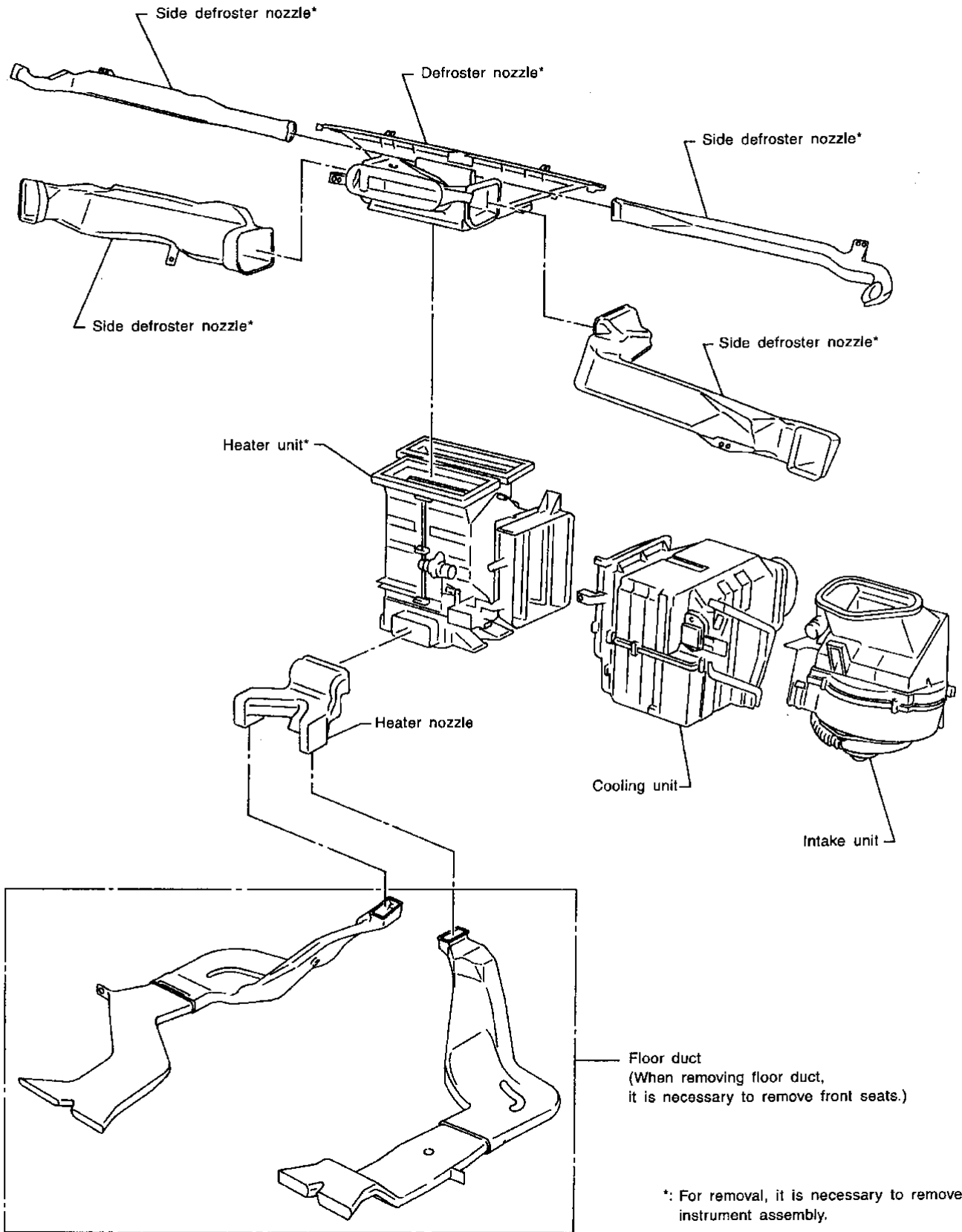


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Component Layout

NAHA0166

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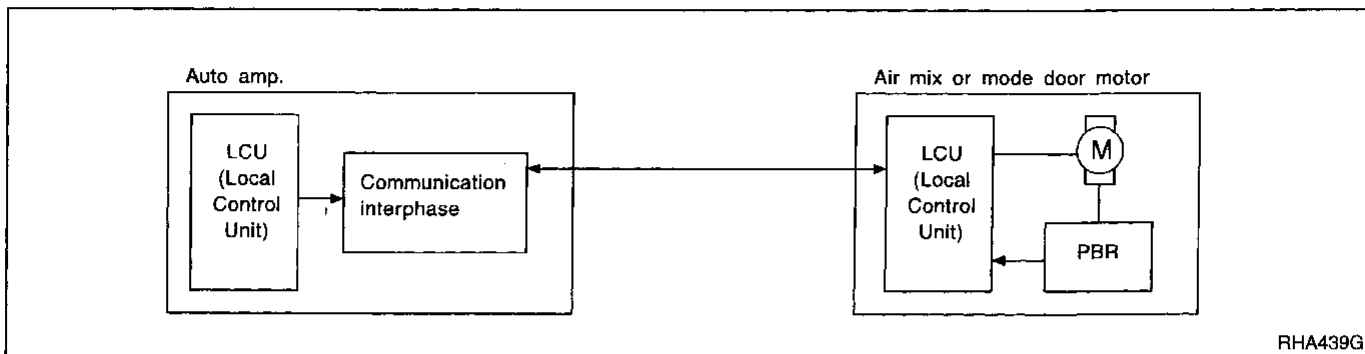
*: For removal, it is necessary to remove instrument assembly.

RHA451G

Introduction

AIR CONDITIONER LAN SYSTEM OVERVIEW CONTROL SYSTEM

The LAN system consists of auto amp., air mix door motor and mode door motor. A configuration of these components is shown in the diagram below.



RHA439G

Features

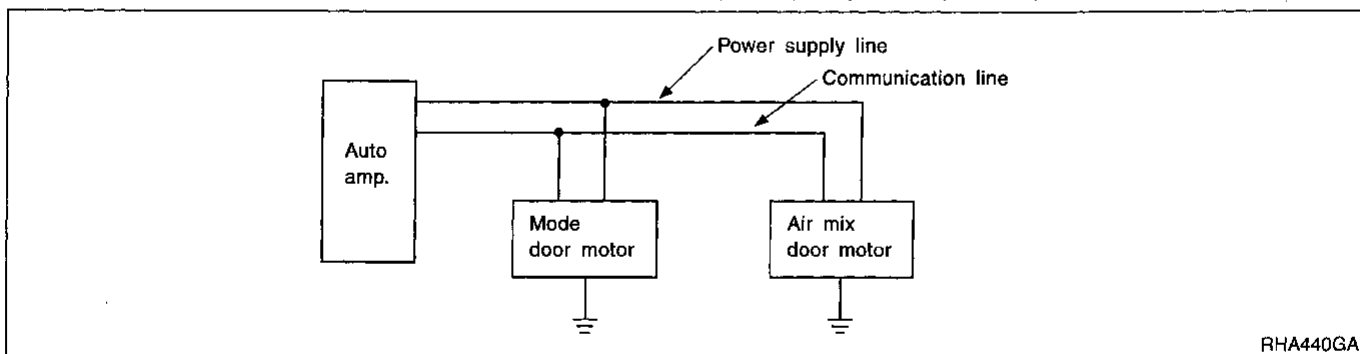
SYSTEM CONSTRUCTION (LAN)

A small network is constructed between the auto amplifier, air mix door motor and mode door motor. The auto amplifier and motors are connected by data transmission lines and motor power supply lines. The LAN network is built through the ground circuits of the two motors.

Addresses, motor opening angle signals, motor stop signals and error checking messages are all transmitted through the data transmission lines connecting the auto amplifier and two motors.

The following functions are contained in LCUs built into the air mix door motor and the mode door motor.

- Address
- Motor opening angle signals
- Data transmission
- Motor stop and drive decision
- Opening angle sensor (PBR function)
- Comparison
- Decision (Auto amplifier indicated value and motor opening angle comparison)



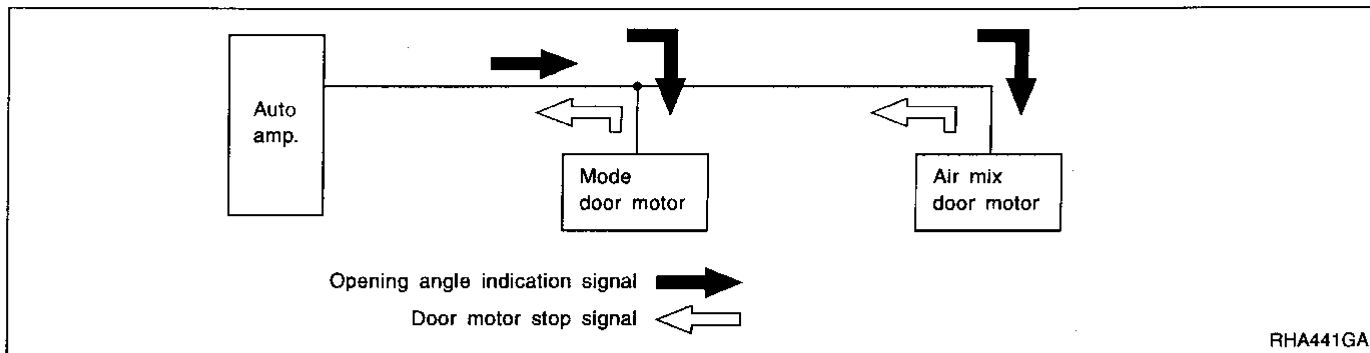
RHA440GA

Operation

The auto amplifier receives data from each of the sensors. The amplifier sends air mix door and mode door opening angle data to the air mix door motor LCU and mode door motor LCU.

The air mix door motor and mode door motor read their respective signals according to the address signal. Opening angle indication signals received from the auto amplifier and each of the motor position sensors are compared by the LCUs in each motor with the existing decision and opening angles. Subsequently, HOT/COLD or DEFROST/VENT operation is selected. The new selection data is returned to the auto amplifier.

Features (Cont'd)



RHA441GA

Transmission Data and Transmission Order

NAHA0168S0102

Amplifier data is transmitted consecutively to each of the door motors following the form shown in figure below. Start: Initial compulsory signal sent to each of the door motors.

Address: Data sent from the auto amplifier is selected according to data-based decisions made by the air mix door motor and mode door motor.

If the addresses are identical, the opening angle data and error check signals are received by the door motor LCUs. The LCUs then make the appropriate error decision. If the opening angle data is normal, door control begins.

If an error exists, the received data is rejected and corrected data received. Finally, door control is based upon the corrected opening angle data.

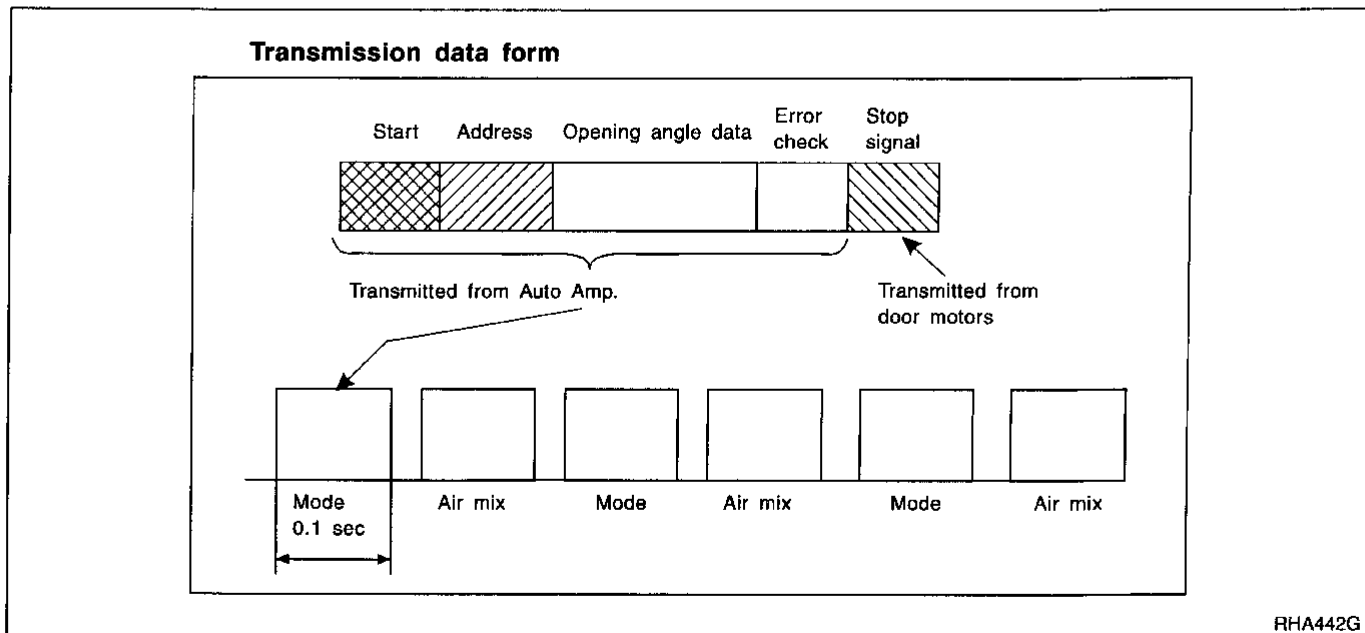
Opening angle: Data that shows the indicated door opening angle of each door motor.

Error check: Procedure by which sent and received data is checked for errors. Error data is then compiled. The error check prevents corrupted data from being used by the air mix door motor and mode door motor.

Error data can be related to the following problems.

- Abnormal electrical frequency
- Poor electrical connections
- Signal leakage from transmission lines
- Signal level fluctuation

Stop signal: At the end of each transmission, a stop operation, in-operation, or internal problem message is delivered to the auto amplifier. This completes one data transmission and control cycle.



RHA442G

Air Mix Door Control (Automatic Temperature Control)

NAHA0168S0103

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

Fan Speed Control

NAHA0168S0104

Blower speed is automatically controlled based on temperature setting, ambient temperature, in-vehicle temperature, intake temperature, amount of sunload and air mix door position. With FAN switch set to "AUTO", the blower motor starts to gradually increase air flow volume. When engine coolant temperature is low, the blower motor operation is delayed to prevent cool air from flowing.

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Intake Door Control

NAHA0168S0105

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

LC

Outlet Door Control

NAHA0168S0106

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

EC

Magnet Clutch Control

NAHA0168S0107

The ECM controls compressor operation using input signals from the throttle position sensor and auto amplifier.

FE

Self-diagnostic System

NAHA0168S0108

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

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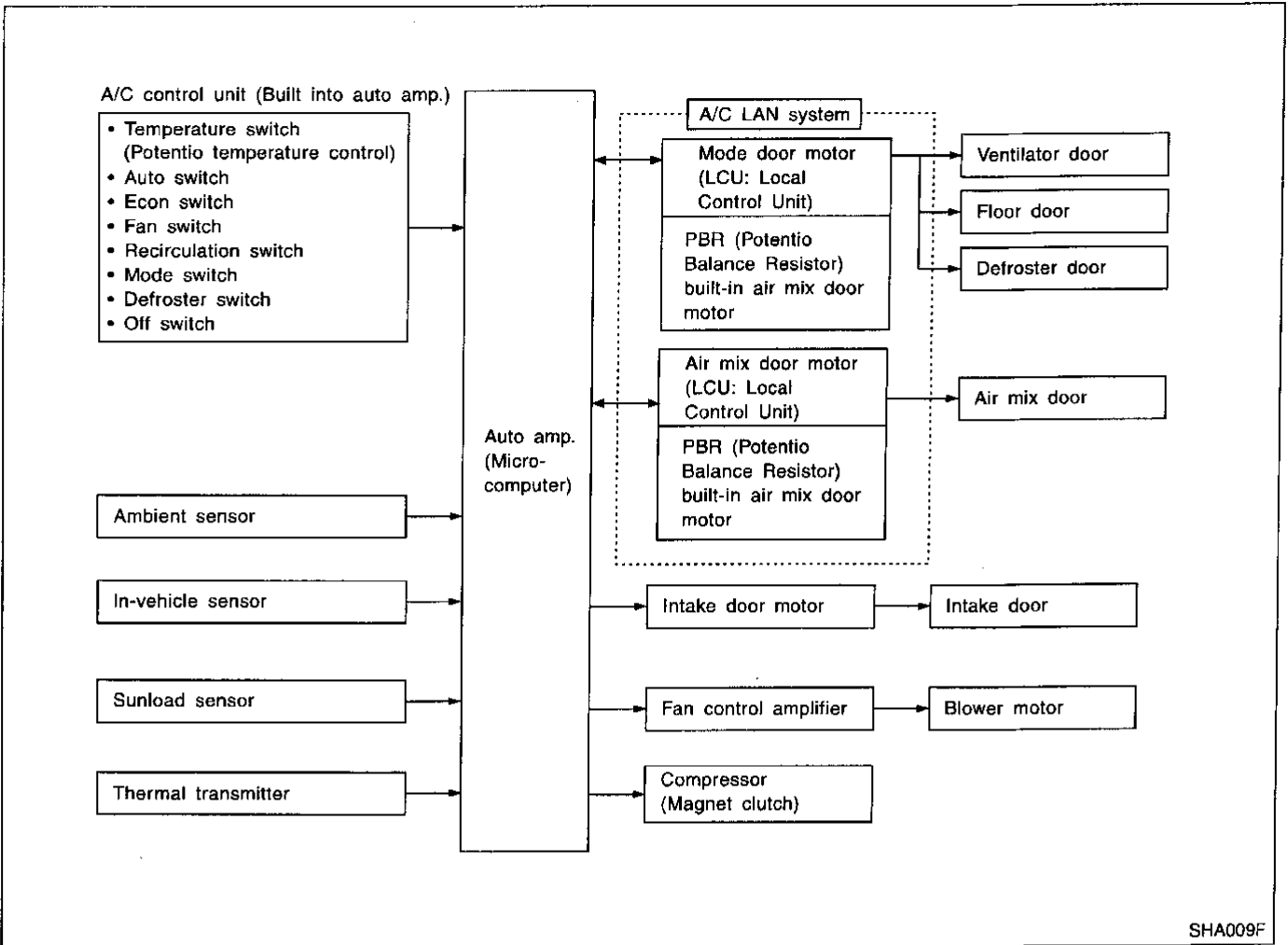
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Overview of Control System

NAHA0169

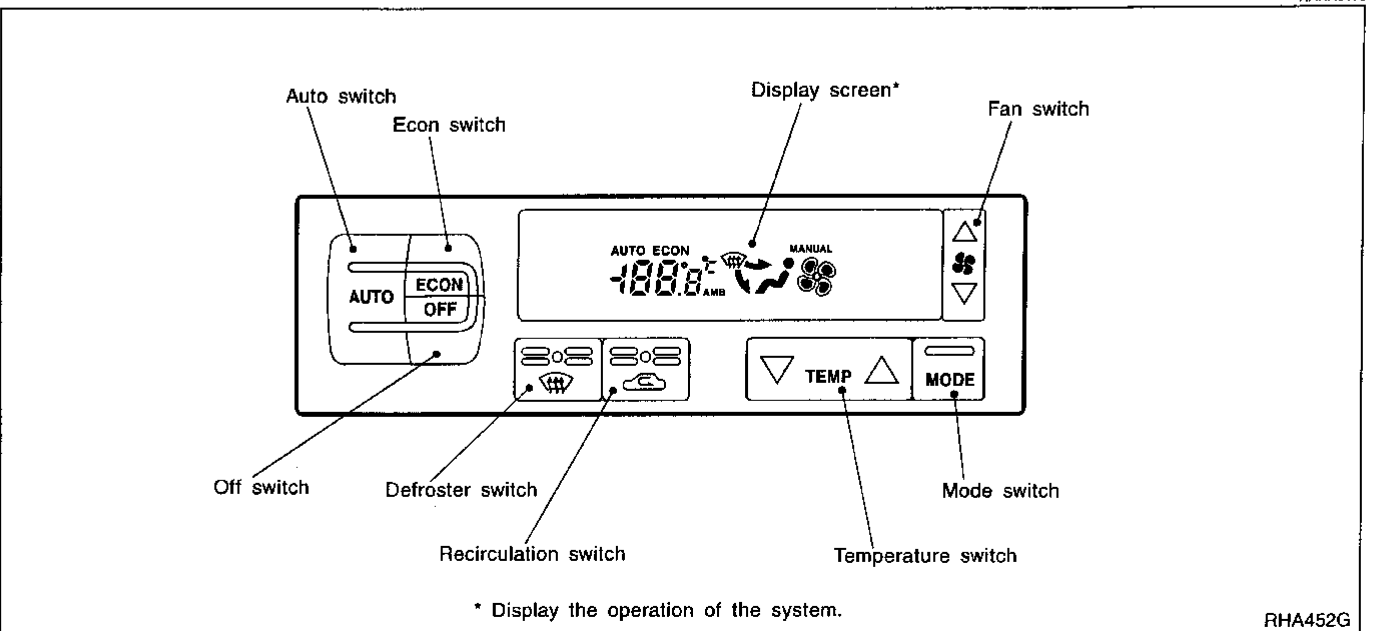
The control system consists of input sensors, switches, the automatic amplifier (microcomputer) and outputs. The relationship of these components is shown in the diagram below:



SHA009F

Control Operation

NAHA0170



* Display the operation of the system.

RHA452G

DISPLAY SCREEN

Displays the operational status of the system.

NAHA0170S01

GI

AUTO SWITCH

The compressor, intake doors, air mix door, outlet doors, and blower speed are automatically controlled so that the in-vehicle temperature will reach, and be maintained at the set temperature selected by the operator.

NAHA0170S02

MA

ECON SWITCH

By pressing the ECON switch, the display should indicate ECON and the compressor always turns OFF. With the compressor OFF, the system will not remove heat (cool) or de-humidify. The system will maintain the in-vehicle temperature at the set temperature when the set temperature is above the ambient (outside) temperature. The system will set the intake doors to the outside air position.

NAHA0170S03

EM

TEMPERATURE SWITCH (POTENTIO TEMPERATURE CONTROL)

Increases or decreases the set temperature.

NAHA0170S04

EC

OFF SWITCH

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

NAHA0170S05





FE

FAN SWITCH

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

NAHA0170S06

MT

low  , medium low  , medium high  , high 

RECIRCULATION (REC) SWITCH

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

ON position: Interior air is recirculated inside the vehicle.

NAHA0170S07

AT

DEFROSTER (DEF) SWITCH

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

NAHA0170S08

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MODE SWITCHES

Control the air discharge outlets.

NAHA0170S09

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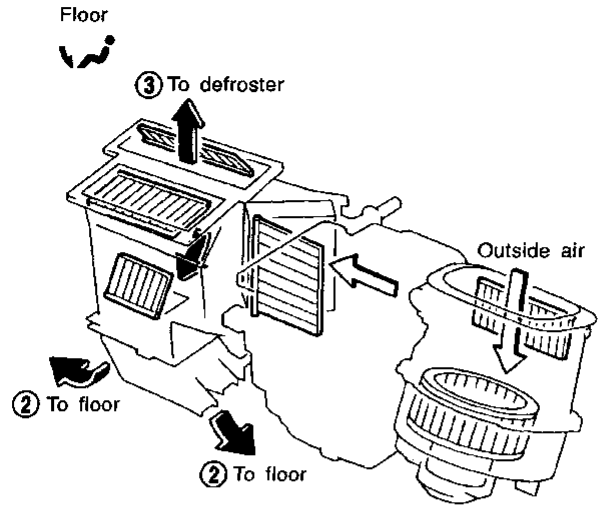
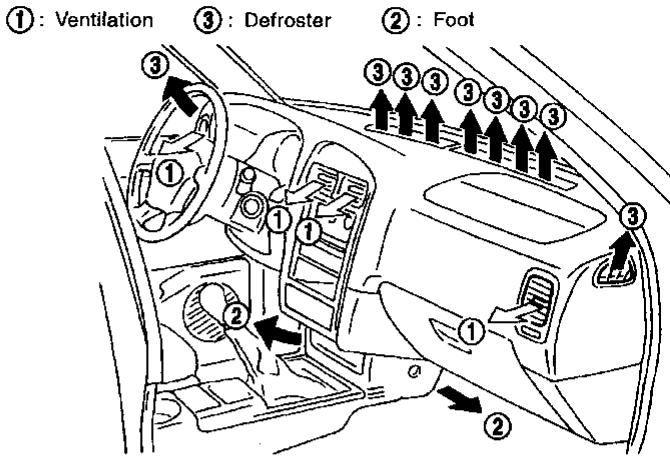
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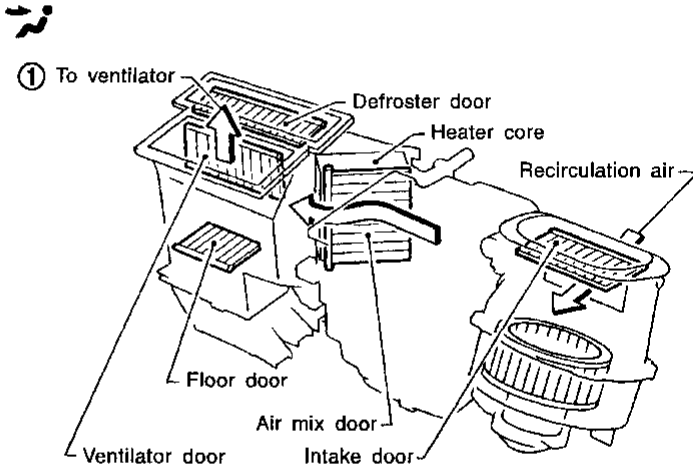
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Discharge Air Flow

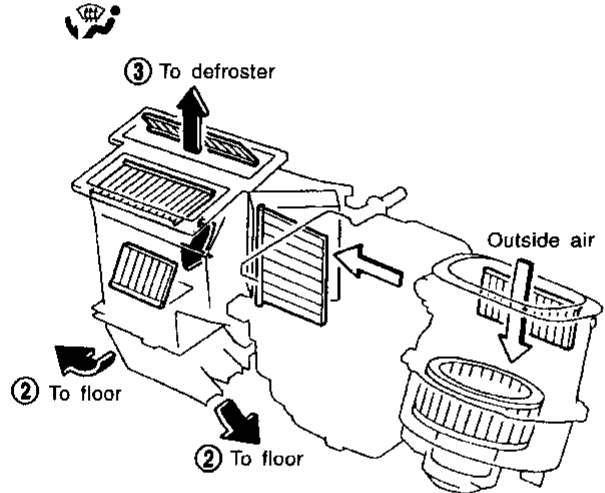
NAHA0171



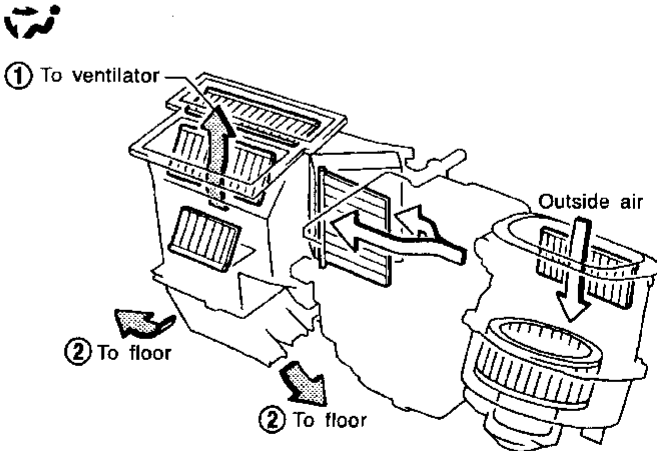
Ventilation
(switch "ON")



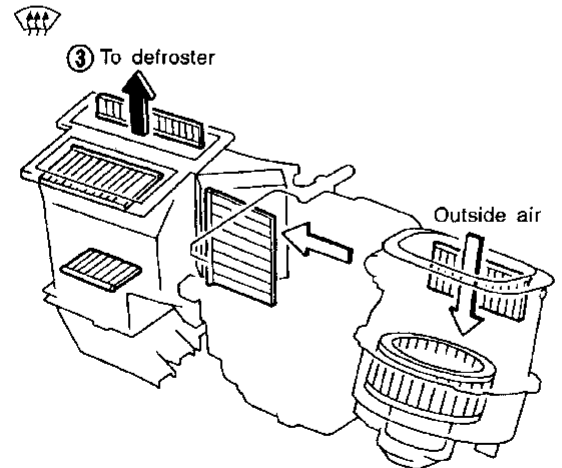
Floor and defroster



Bi-level
(switch "OFF")



Defroster



- : Air passed through heater core
- : Mixed air (+)
- : Air not passed through heater core

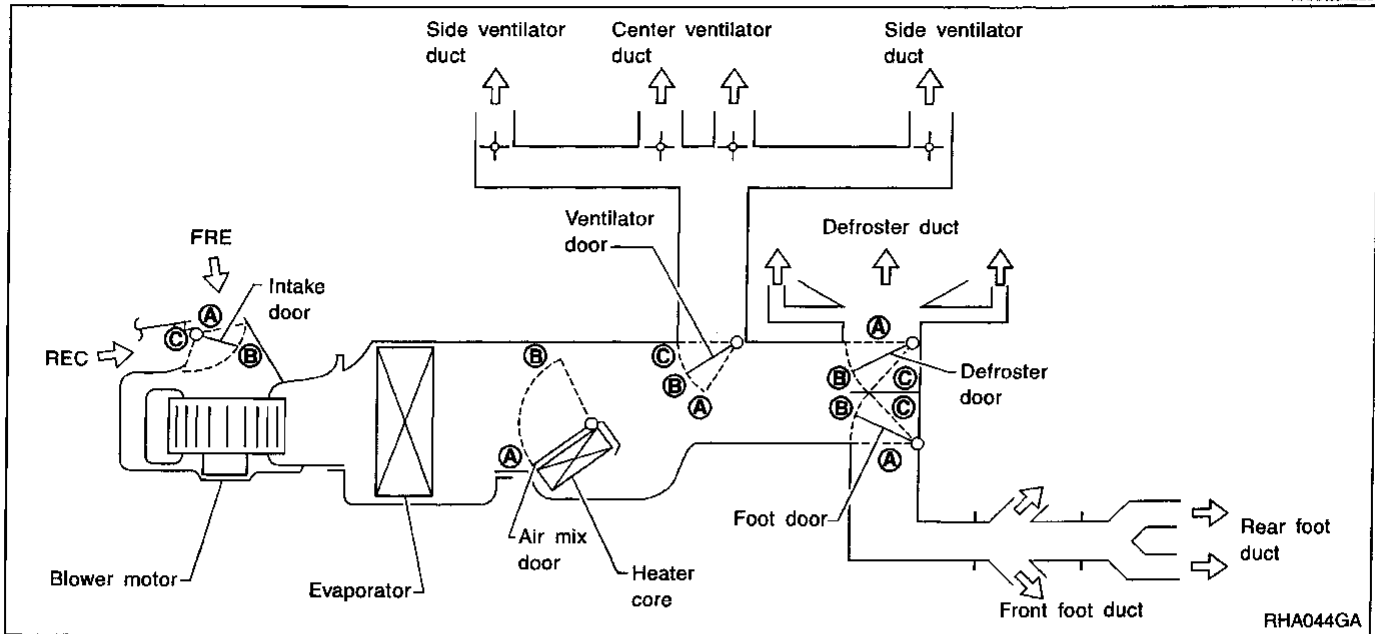
RHA043G

System Description

SWITCHES AND THEIR CONTROL FUNCTIONS

NAHA0246

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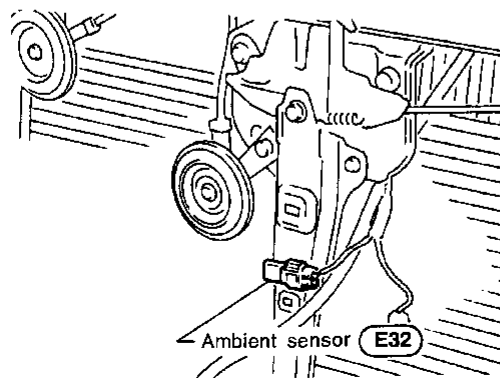
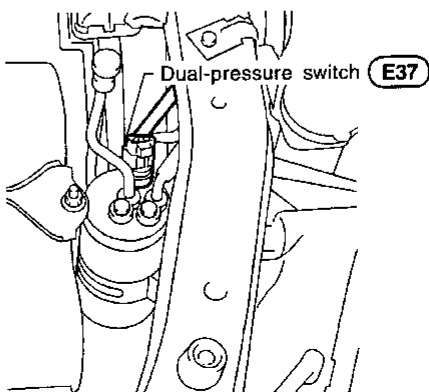
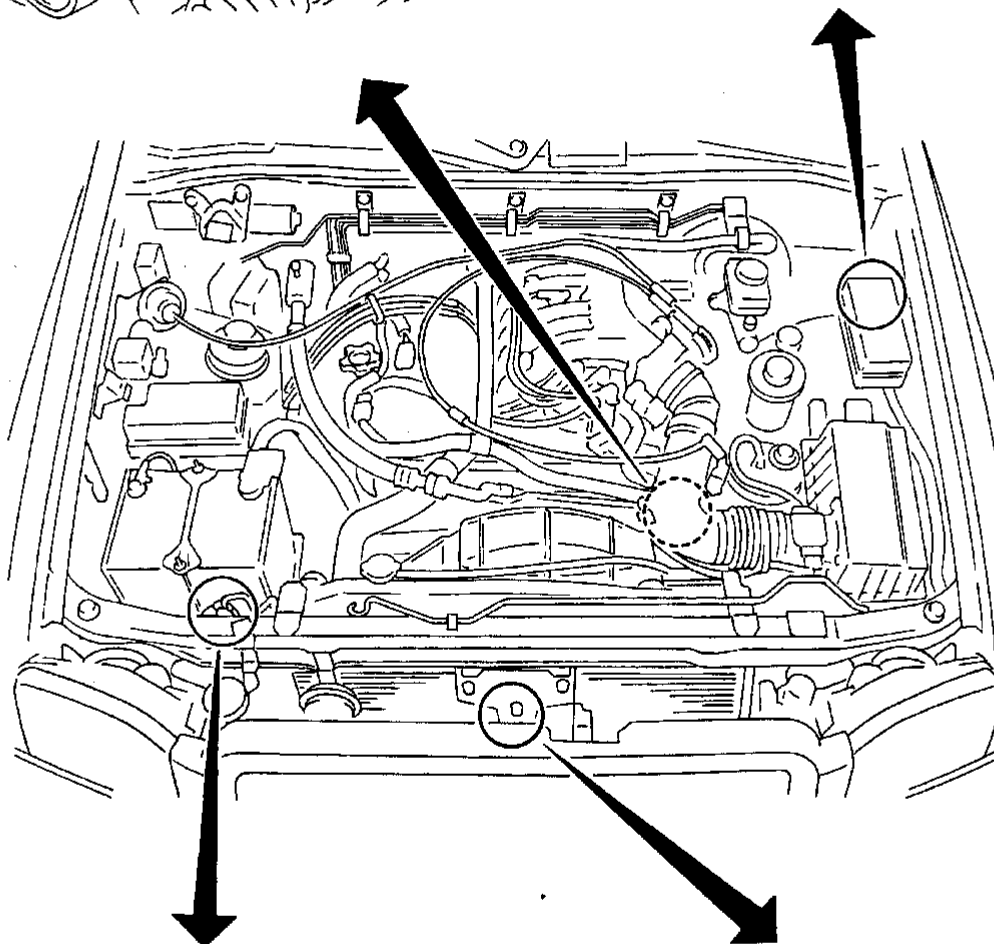
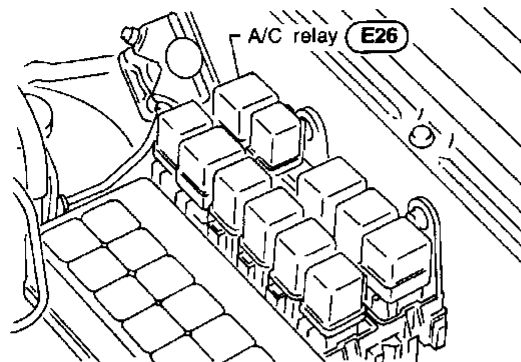
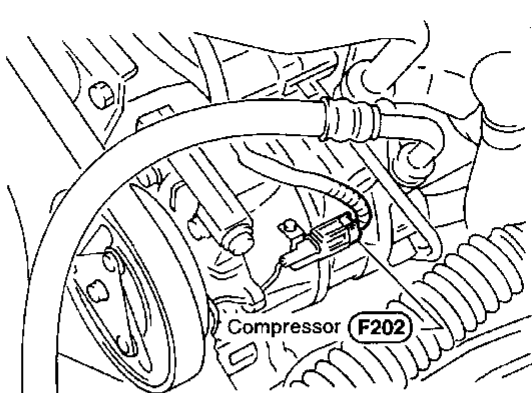
| Position or switch | MODE SW | | | | DEF SW | | AUTO SW | ECON SW | REC SW | | Temperature SW | | | |
|--------------------|---------|-----|------|-----|--------|-----|---------|---------|--------|--------|----------------|------|---------------|--|
| | VENT | B/L | FOOT | D/F | ON | OFF | | | ON |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

*1: Automatically controlled when REC switch is OFF.

Component Location
ENGINE COMPARTMENT

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NAHA0172S01



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PASSENGER COMPARTMENT

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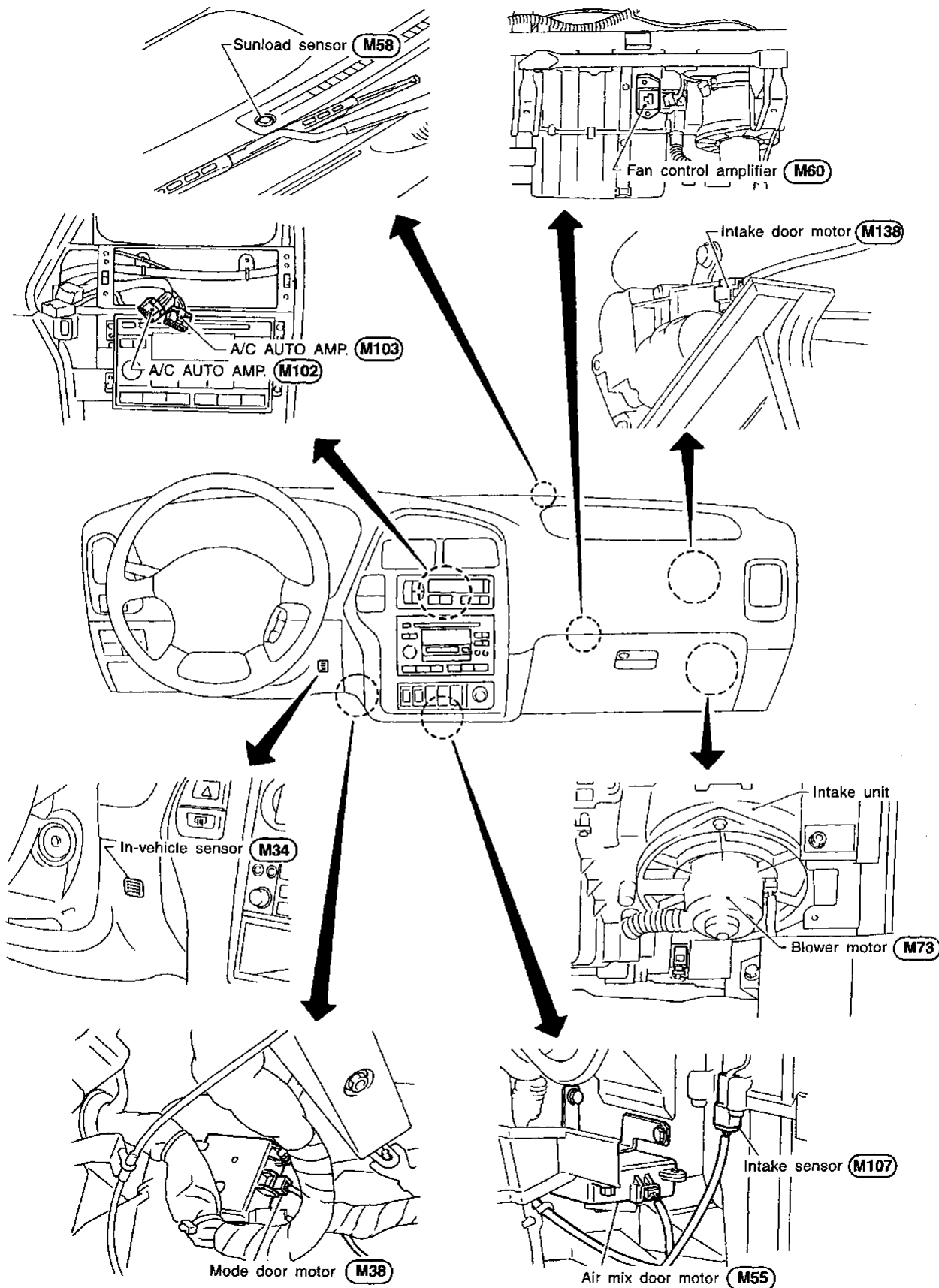
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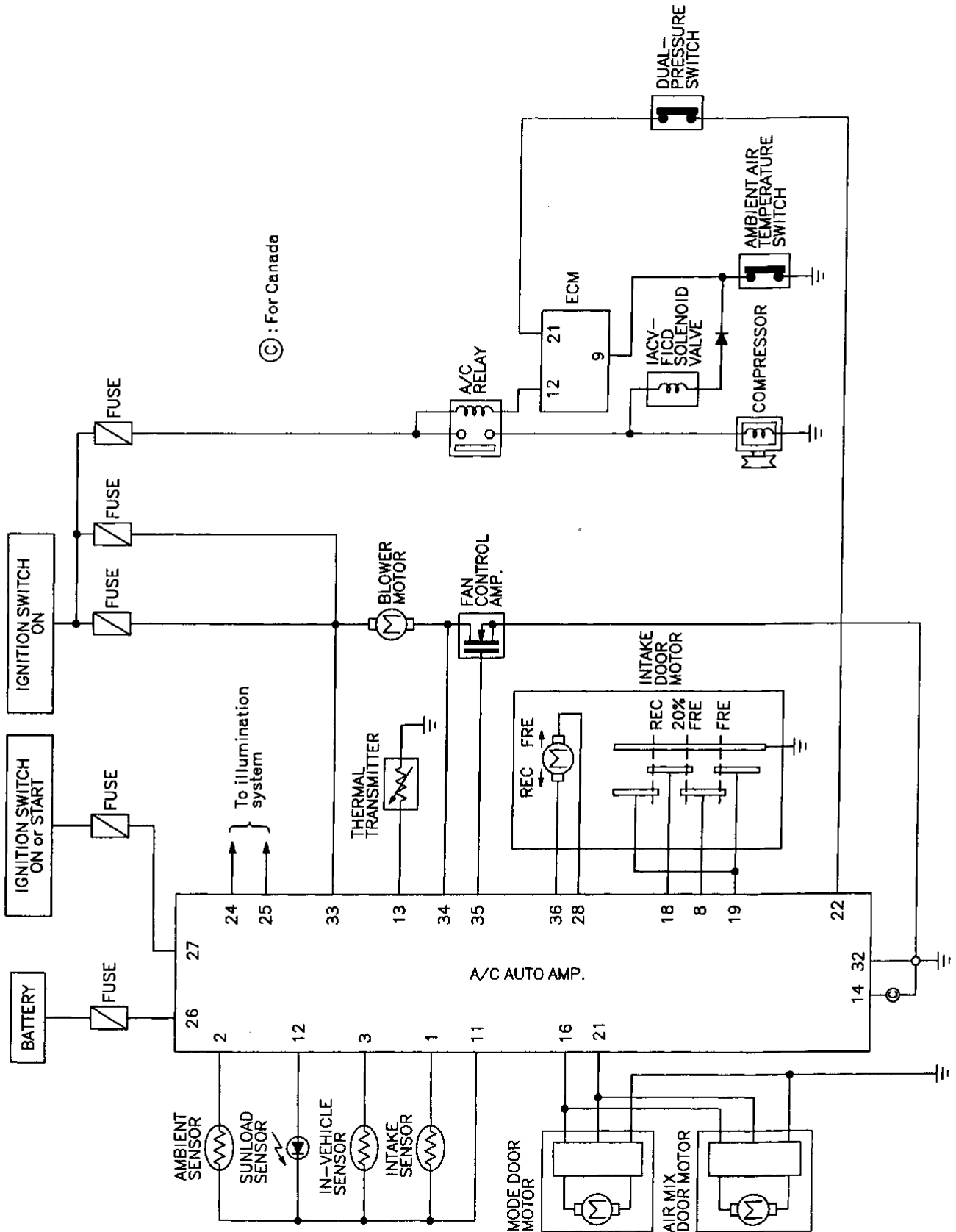
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RHA498GB

Circuit Diagram

NAHA0173



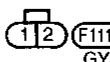
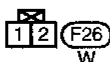
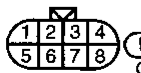
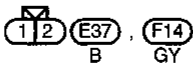
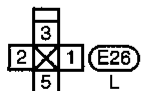
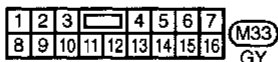
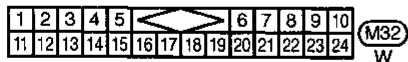
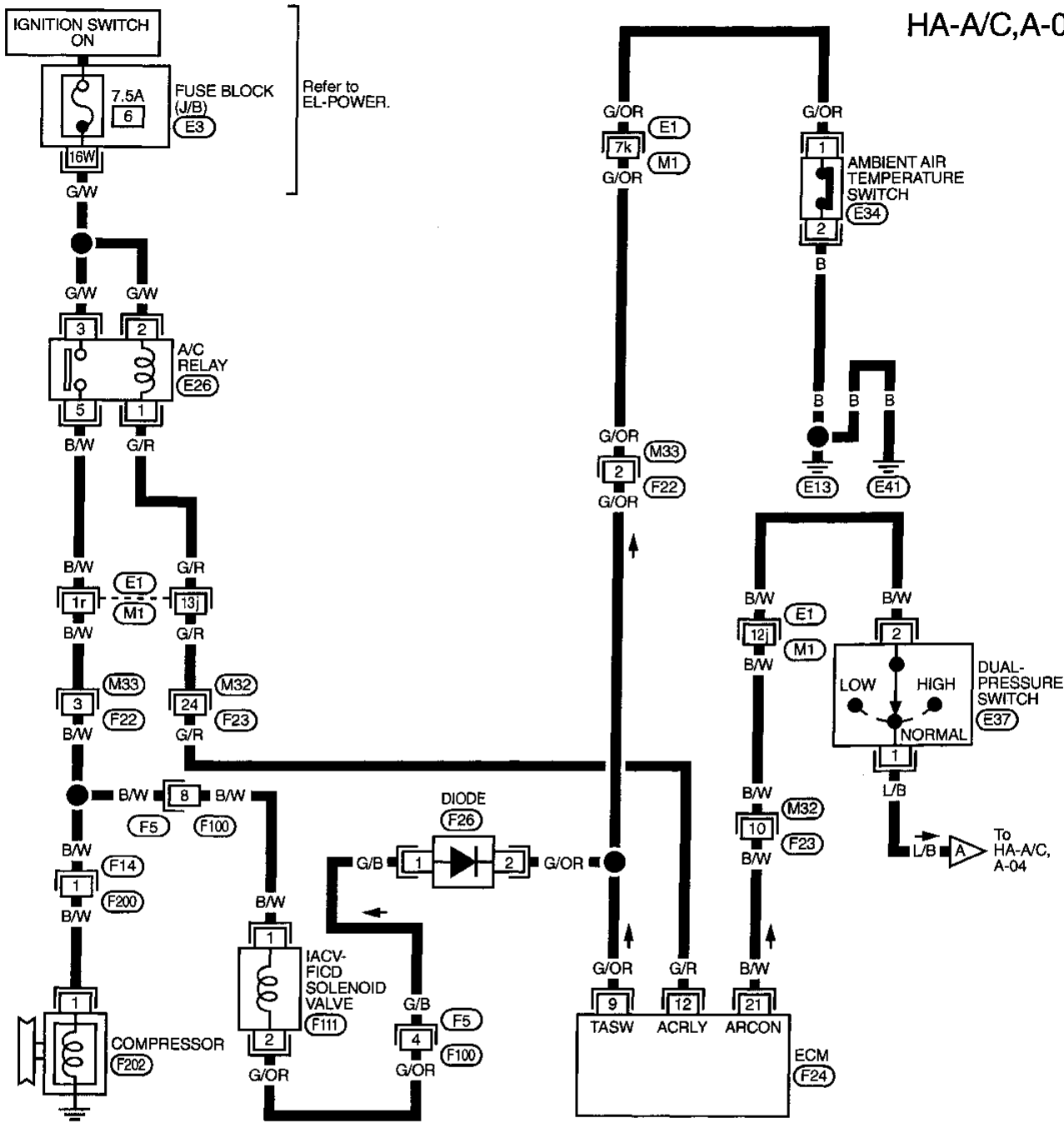
© : For Canada

MHA874A

Wiring Diagram — A/C, A —

NAHA0174

HA-A/C,A-01



Refer to last page (Foldout page).

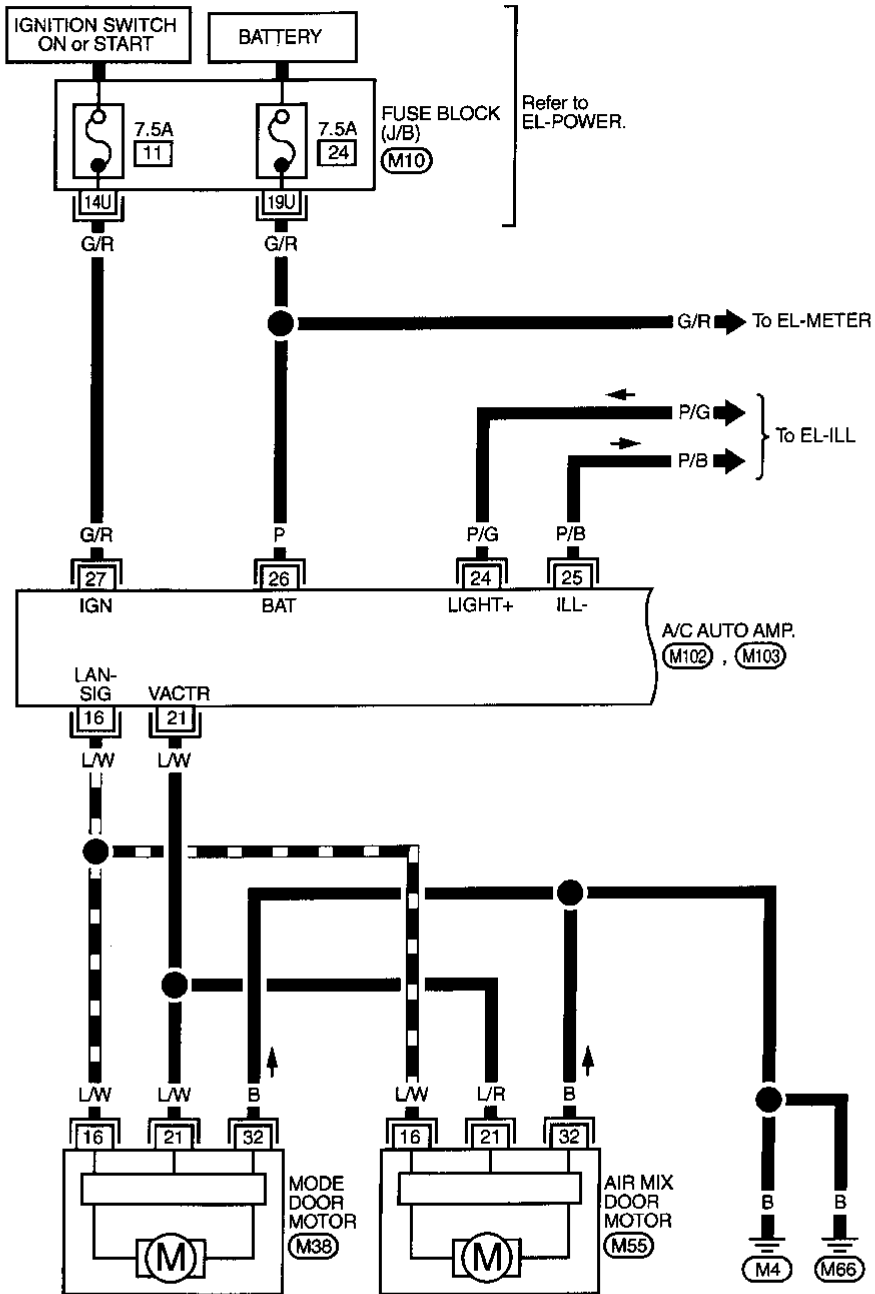
(M1) (E1)

(E3)

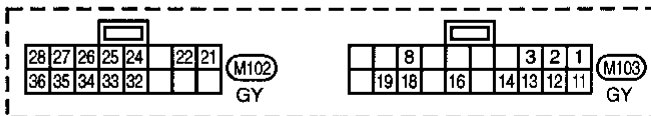
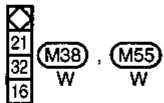
(F24)

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HA-A/C,A-02



— — — — : DATA LINE



Refer to last page (Foldout page).

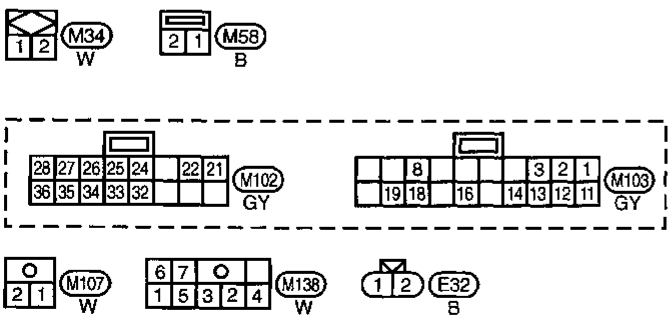
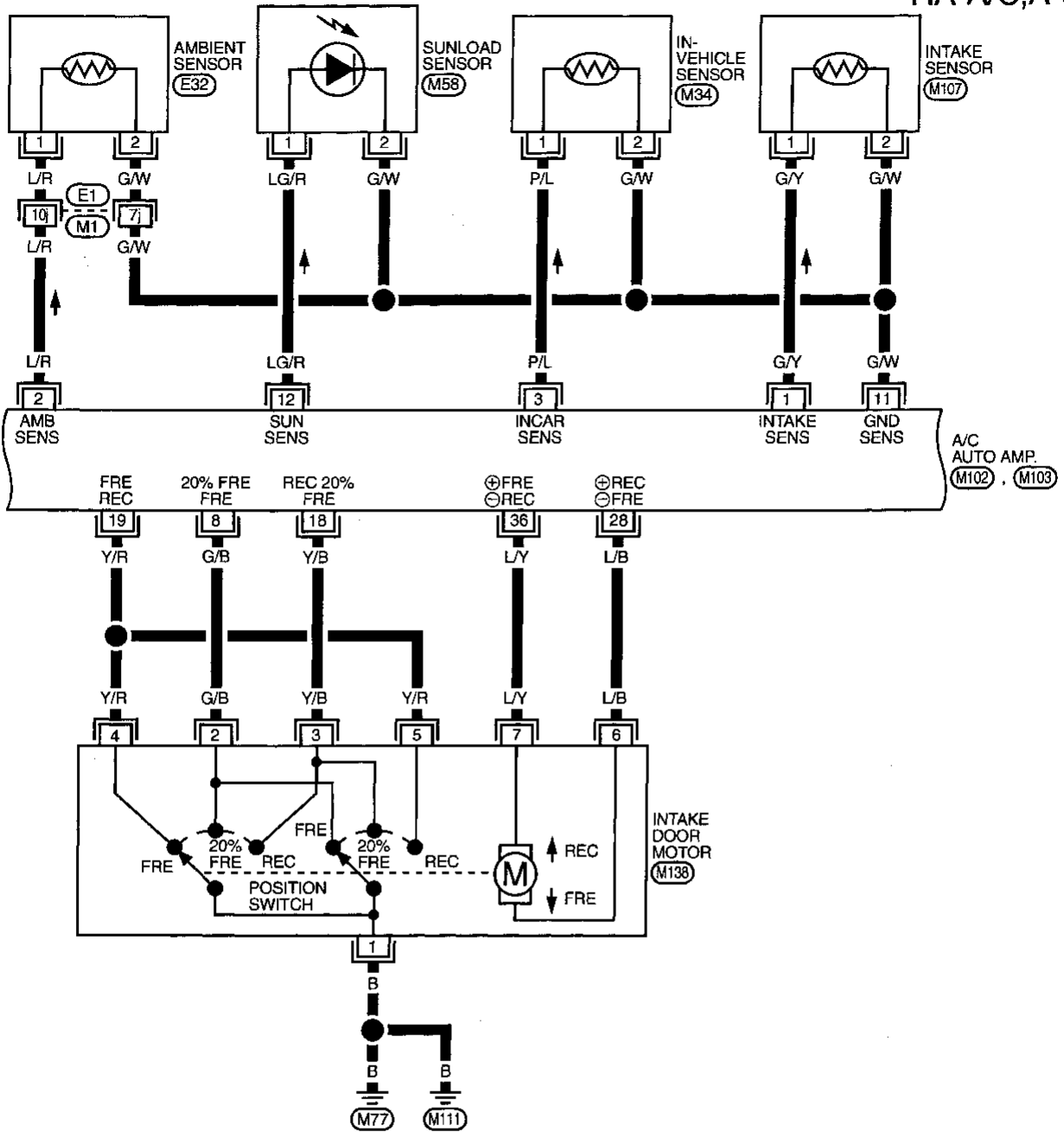
M10

TROUBLE DIAGNOSES

AUTO

Wiring Diagram — A/C, A — (Cont'd)

HA-A/C,A-03



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

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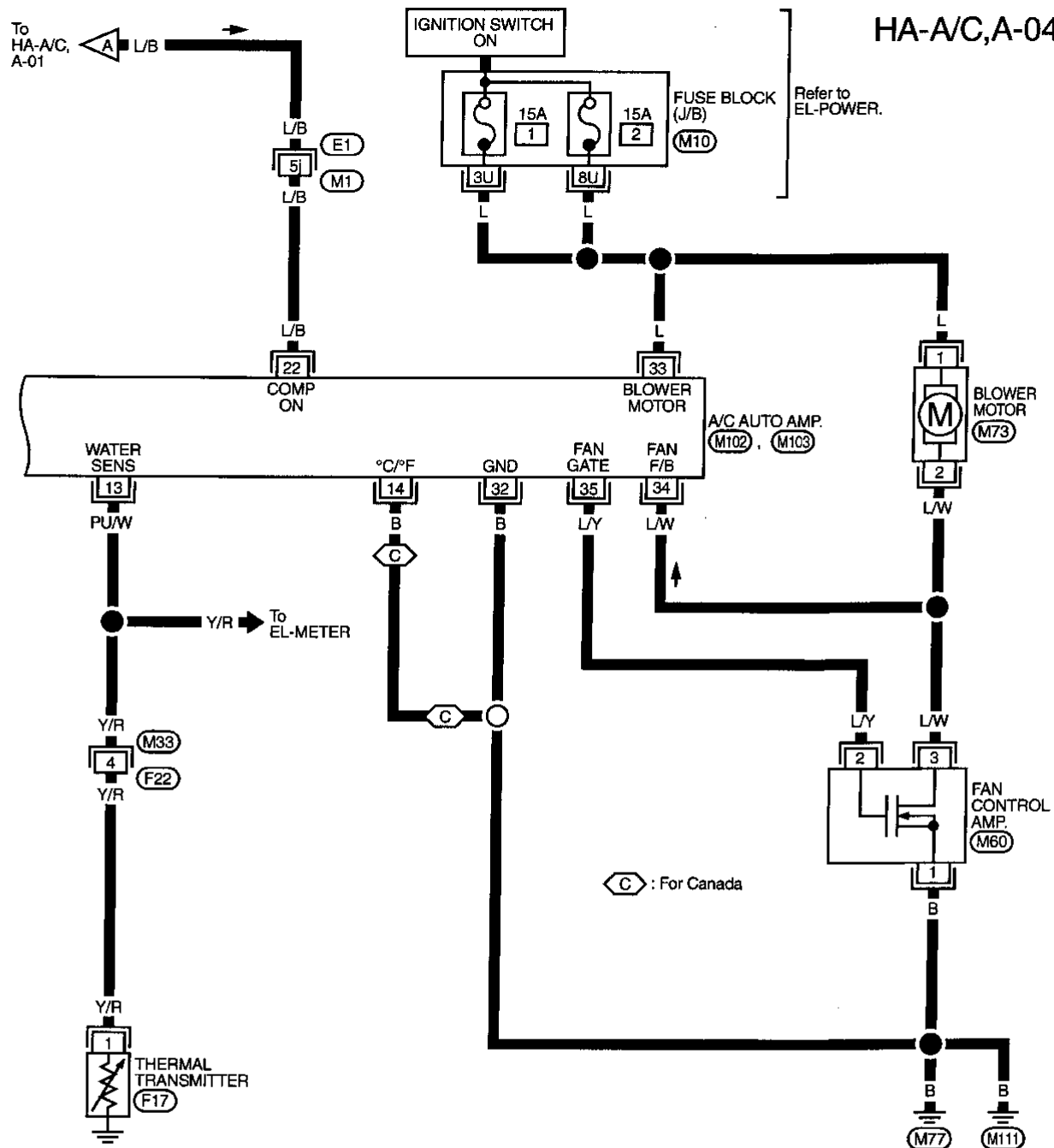
MHA884A

TROUBLE DIAGNOSES

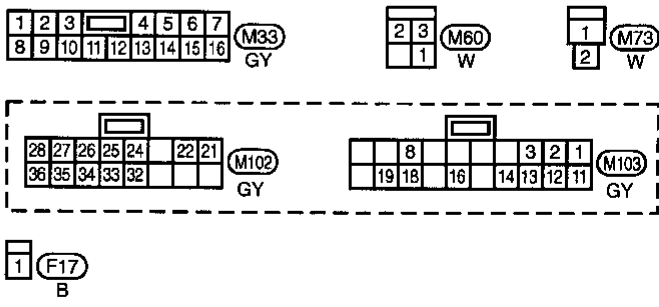
AUTO

Wiring Diagram — A/C, A — (Cont'd)

HA-A/C,A-04



Refer to last page (Foldout page).



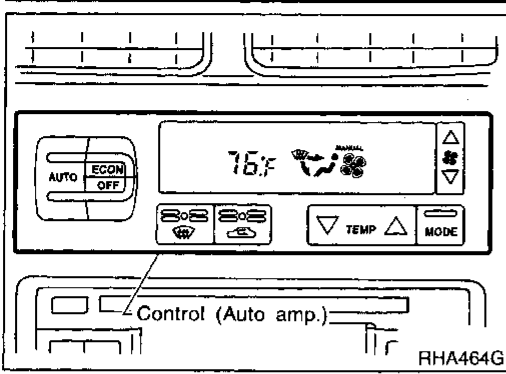
M1, E1
M10

MHA878A

TROUBLE DIAGNOSES

AUTO

Auto Amp. Terminals and Reference Value



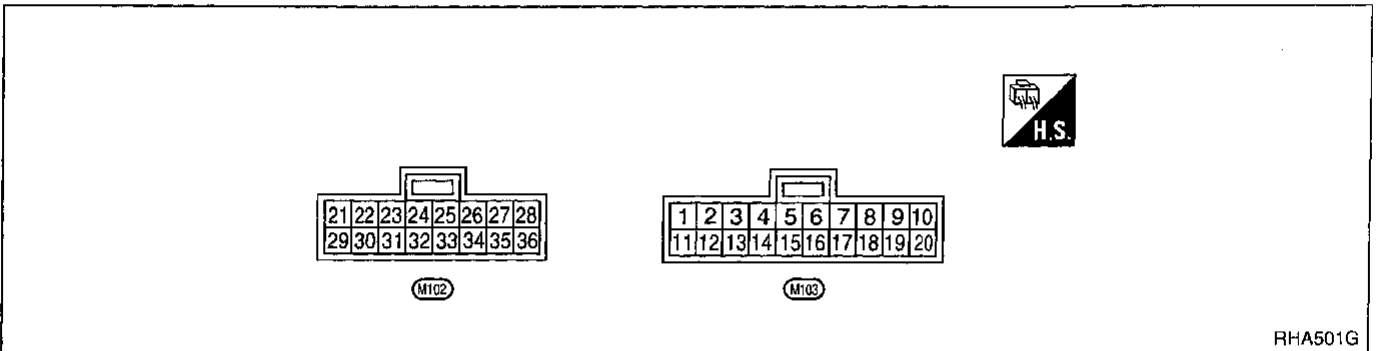
Auto Amp. Terminals and Reference Value INSPECTION OF AUTO AMP.

NAHA0175

NAHA0175S01

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

- Pin connector terminal layout



RHA501G

AUTO AMP. INSPECTION TABLE




NAHA0175S02

| TERMI- NAL NO. | ITEM | CONDITION | | Voltage V |
|-------------------|---|----------------------------|----------------------------|--------------------|
| 1 | Intake sensor | — | | — |
| 2 | Ambient sensor | — | | — |
| 3 | In-vehicle sensor | — | | — |
| 8 | Intake door position switch | Intake door position | FRESH | Approximately 0 |
| | | | RECIRCULATION or 20% FRESH | Approximately 4.6 |
| 11 | Sensor ground | — | | Approximately 0 |
| 12 | Sunload sensor | — | | — |
| 13 | Thermal transmitter | Engine coolant temperature | Approximately 40°C (104°F) | Approximately 10.8 |
| | | | Approximately 55°C (131°F) | Approximately 9.9 |
| | | | Approximately 60°C (140°F) | Approximately 9.5 |
| 14 | Ground (for Canada) | — | | Approximately 0 |
| 16 | A/C LAN signal | — | | — |
| 18 | Intake door position switch | Intake door position | 20% FRE | Approximately 0 |
| | | | FRESH or RECIRCULATION | Approximately 4.6 |
| 19 | Intake door position switch | Intake door position | RECIRCULATION | Approximately 0 |
| | | | 20% FRE or FRESH | Approximately 4.7 |
| 21 | Power supply for mode door motor and air mix door motor | — | | *1 |

TROUBLE DIAGNOSES

AUTO

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

| TERMI- NAL NO. | ITEM | | CONDITION | Voltage V | |
|-------------------|------------------------------------|---|----------------------------|--------------------------------|-------------------------|
| 22 | Compressor ON signal |  | Compressor | ON | Approximately 0 |
| | | | | OFF | Approximately 4.6 |
| 26 | Power supply for BAT |  | — | BATTERY VOLTAGE | |
| 27 | Power supply for IGN |  | — | Approximately 12 | |
| 28 | Power supply for intake door motor | | Intake door position | FRESH | Approximately 12 |
| | | | | RECIRC | Approximately 0 |
| 32 | Ground | | — | Approximately 0 | |
| 33 | Power source for A/C | | Ignition voltage feed back | Approximately 12 | |
| 34 | Blower motor feed back | | Fan speed: Low | Approximately 7 - 10 | |
| 35 | Fan control AMP. control signal | | Fan speed | Low, Middle low or Middle high | Approximately 2.5 - 3.0 |
| | | | | High | Approximately 9 - 10 |
| 36 | Power supply for intake door motor | Intake door position | FRESH | Approximately 0 | |
| | | | RECIRC | Approximately 12 | |

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

Self-diagnosis

INTRODUCTION AND GENERAL DESCRIPTION

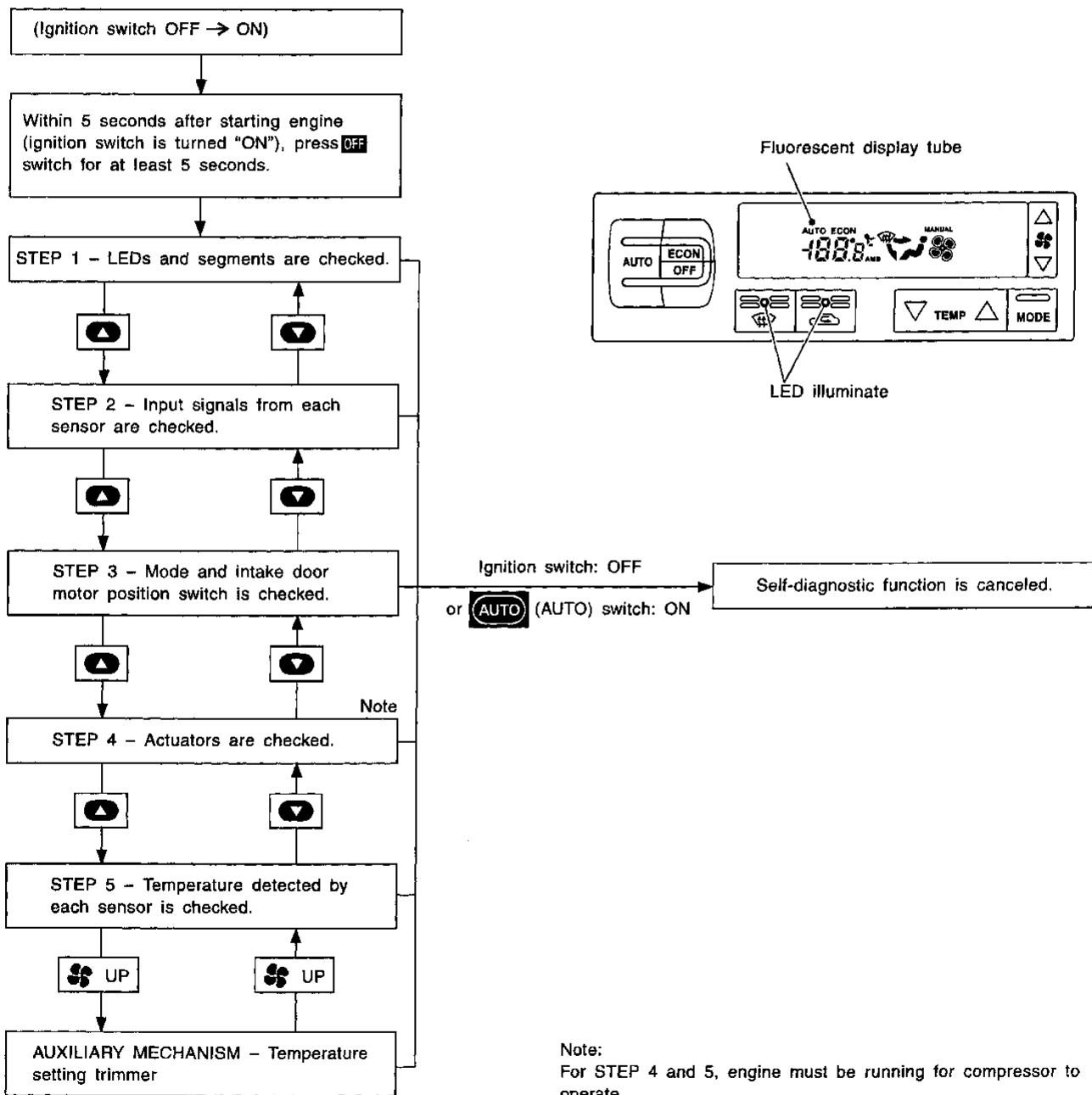
The self-diagnostic system diagnoses sensors, door motors, blower motor, etc. by system line. Refer to applicable sections (items) for details. Shifting from normal control to the self-diagnostic system is accomplished by starting the engine (turning the ignition switch from "OFF" to "ON") and pressing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

Additionally shifting from STEP 5 to AUXILIARY MECHANISM is accomplished by means of pushing **⊞** (fan) UP switch.

-NAHA0176

NAHA0176S01

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Self-diagnosis (Cont'd)

STEP-BY-STEP PROCEDURE

-NAHA0176S02

| | |
|---|------------------------------------|
| 1 | SET IN SELF-DIAGNOSTIC MODE |
| 1. Turn ignition switch ON. 2. Set in self-diagnostic mode as follows. Within 5 seconds after starting engine (ignition switch is turned "ON".), press OFF switch for at least 5 seconds. | |
| | GO TO 2. |

| | |
|--------------------------------------|---|
| 2 | STEP 1 - LEDs AND SEGMENT ARE CHECKED |
| Do all LEDs and segments illuminate? | |
| Display malfunction | |
| | |
| Part of segment dose not illuminate. | |
| RHA454G | |
| Yes or No | |
| Yes | GO TO 3. |
| No | Malfunctioning OFF switch, LED or fluorescent display tube. Replace A/C auto amp. |

| | |
|---|--|
| 3 | CHECK TO ADVANCE SELF-DIAGNOSIS STEP 2 |
| 1. Press (HOT) switch. 2. Advance to self-diagnosis STEP 2? | |
| Yes or No | |
| Yes | GO TO 4. |
| No | Malfunctioning (HOT) switch. Replace A/C auto amp. |

| | |
|---|---|
| 4 | CHECK TO RETURN SELF-DIAGNOSIS STEP 1 |
| 1. Press (COLD) switch. 2. Return to self-diagnosis STEP 1? | |
| Yes or No | |
| Yes | GO TO 5. |
| No | Malfunctioning (COLD) switch. Replace A/C auto amp. |

| | |
|--|---|
| 5 | STEP 2 - SENSOR CIRCUITS ARE CHECKED FOR OPEN OR SHORT CIRCUIT |
| Press (HOT) switch. Does code No. 20 appear on the display? | |
| Display (when all sensors are in good order) | |
| Illuminates 4 seconds after "2" is illuminated. | |
| | |
| RHA970DA | |
| Yes or No | |
| Yes | GO TO 6. |
| No | GO TO 13. |

| | |
|--|---|
| 6 | STEP 3 - MODE DOOR AND INTAKE DOOR POSITIONS ARE CHECKED |
| Press (HOT) switch. Does code No. 30 appear on the display? | |
| Display (when all doors are in good order) | |
| Illuminates 16 seconds after "3" is shown on display. | |
| | |
| RHA869DA | |
| Yes or No | |
| Yes | GO TO 7. |
| No | GO TO 14. |

7 STEP 4 - OPERATION OF EACH ACTUATOR IS CHECKED

Press (HOT) switch.
 Engine running.
 Press DEF switch, code No. of each actuator test is indicated on the display.

RHA495A

GO TO 8.

8 CHECK ACTUATORS

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

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

MTBL0200

Discharge air flow

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

MTBL0044

OK or NG

| | | |
|----|---|---|
| OK | ▶ | GO TO 9. |
| NG | ▶ | <ul style="list-style-type: none"> ● Air outlet does not change. Go to "Mode Door Motor" (HA-49). ● Intake door does not change. Go to "Intake Door Motor" (HA-58). ● Blower motor operation is malfunctioning. Go to "Blower Motor" (HA-63). ● Magnet clutch does not engage. Go to "Magnet Clutch" (HA-69). ● Discharge air temperature does not change. Go to "Air Mix Door Motor" (HA-54). |

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Self-diagnosis (Cont'd)

| | | | |
|--|---|---|-----------|
| 9 | STEP 5 - TEMPERATURE OF EACH SENSOR IS CHECKED | | |
| <p>Press (HOT) switch. Code No. 5 appears on the display.</p> | | | |
| <p>"5" appears on display.</p> | | | |
| RHA492A | | | |
| <table style="margin: auto;"> <tr> <td style="width: 20px; text-align: center;">▶</td> <td>GO TO 10.</td> </tr> </table> | | ▶ | GO TO 10. |
| ▶ | GO TO 10. | | |

| | | | | | | | |
|---|-----------------------------|---------------------------------------|---|-----------|----|---|---------------------------------------|
| 10 | CHECK AMBIENT SENSOR | | | | | | |
| <p>Press (DEF) switch one time, temperature detected by ambient sensor is indicated on the display. ECON shown in display indicates negative temperature reading.</p> | | | | | | | |
| <p>NOTE: If temperature shown on display greatly differs from actual temperature, check sensor circuit first, then inspect sensor.</p> | | | | | | | |
| <p>Temperature detected by ambient sensor.</p> <p>U.S.A. model Canada model</p> <p>Indicates negative temperature reading.</p> | | | | | | | |
| RHA499G | | | | | | | |
| OK or NG | | | | | | | |
| <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%; padding: 2px;">OK</td> <td style="width: 20px; text-align: center; padding: 2px;">▶</td> <td style="padding: 2px;">GO TO 11.</td> </tr> <tr> <td style="padding: 2px;">NG</td> <td style="text-align: center; padding: 2px;">▶</td> <td style="padding: 2px;">Go to Ambient Sensor Circuit (HA-86).</td> </tr> </table> | | OK | ▶ | GO TO 11. | NG | ▶ | Go to Ambient Sensor Circuit (HA-86). |
| OK | ▶ | GO TO 11. | | | | | |
| NG | ▶ | Go to Ambient Sensor Circuit (HA-86). | | | | | |

| | | | | | | | |
|--|--------------------------------|--|---|-----------|----|---|--|
| 11 | CHECK IN-VEHICLE SENSOR | | | | | | |
| <p>Press (DEF) switch the second time, temperature detected by in-vehicle sensor is indicated on the display screen. ECON shown in display indicates negative temperature reading.</p> | | | | | | | |
| <p>NOTE: If temperature shown on display greatly differs from actual temperature, check sensor circuit first, then inspect sensor.</p> | | | | | | | |
| <p>Temperature detected by in-vehicle sensor.</p> <p>U.S.A. model Canada model</p> <p>Indicates negative temperature reading.</p> | | | | | | | |
| RHA500G | | | | | | | |
| OK or NG | | | | | | | |
| <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%; padding: 2px;">OK</td> <td style="width: 20px; text-align: center; padding: 2px;">▶</td> <td style="padding: 2px;">GO TO 12.</td> </tr> <tr> <td style="padding: 2px;">NG</td> <td style="text-align: center; padding: 2px;">▶</td> <td style="padding: 2px;">Go to In-vehicle Sensor Circuit (HA-89).</td> </tr> </table> | | OK | ▶ | GO TO 12. | NG | ▶ | Go to In-vehicle Sensor Circuit (HA-89). |
| OK | ▶ | GO TO 12. | | | | | |
| NG | ▶ | Go to In-vehicle Sensor Circuit (HA-89). | | | | | |

| | | | | | | | |
|---|----------------------------|--|---|--|----|---|--------------------------------------|
| 12 | CHECK INTAKE SENSOR | | | | | | |
| <p>Press (DEF) switch the third time, temperature detected by intake sensor is indicated on the display.</p> | | | | | | | |
| <p>NOTE: If temperature shown on display greatly differs from actual temperature, check sensor circuit first, then inspect sensor.</p> | | | | | | | |
| <p>Temperature detected by intake sensor.</p> <p>U.S.A. model Canada model</p> <p>Indicates negative temperature reading.</p> | | | | | | | |
| RHA500GB | | | | | | | |
| OK or NG | | | | | | | |
| <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%; padding: 2px;">OK</td> <td style="width: 20px; text-align: center; padding: 2px;">▶</td> <td style="padding: 2px;"> <ol style="list-style-type: none"> 1. Press (DEF) switch the fourth time. Display returns to original presentation 5. 2. Turn ignition switch OFF or (AUTO) switch ON. 3. END </td> </tr> <tr> <td style="padding: 2px;">NG</td> <td style="text-align: center; padding: 2px;">▶</td> <td style="padding: 2px;">Go to Intake Sensor Circuit (HA-94).</td> </tr> </table> | | OK | ▶ | <ol style="list-style-type: none"> 1. Press (DEF) switch the fourth time. Display returns to original presentation 5. 2. Turn ignition switch OFF or (AUTO) switch ON. 3. END | NG | ▶ | Go to Intake Sensor Circuit (HA-94). |
| OK | ▶ | <ol style="list-style-type: none"> 1. Press (DEF) switch the fourth time. Display returns to original presentation 5. 2. Turn ignition switch OFF or (AUTO) switch ON. 3. END | | | | | |
| NG | ▶ | Go to Intake Sensor Circuit (HA-94). | | | | | |

| 13 | CHECK MALFUNCTIONING SENSOR | |
|---|--|----------------|
| <p>Refer to the following chart for malfunctioning code No. (If two or more sensors malfunction, corresponding code Nos. blink respectively two times.)</p> | | |
| Code No. | Malfunctioning sensor (including circuits) | Reference page |
| 21 | Ambient sensor | *2 |
| -21 | | |
| 22 | In-vehicle sensor | *3 |
| -22 | | |
| 24 | Intake sensor | *4 |
| -24 | | |
| 25 | Sunload sensor*1 | *5 |
| -25 | | |
| 26 | Air mix door motor (LCU) PBR | *6 |
| -26 | | |

MTBL0083

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

*2: HA-86
 *3: HA-89
 *4: HA-94
 *5: HA-91
 *6: HA-96

Display (when sensor malfunctions)

Blinks (indicating a shortcircuit) → → Code No. (blinks) →

Illuminates →

Each code No. blinks two times. →

RHA455G

RHA501A

▶ INSPECTION END

| 14 | CHECK MALFUNCTIONING DOOR MOTOR POSITION SWITCH | |
|---|--|----------------------|
| <p>Mode or (and) intake door motor position switch(es) is (are) malfunctioning. (If two or more mode or intake doors are out of order, corresponding code numbers blink respectively two times.)</p> | | |
| Code No. *1 *2 | Mode or intake door position | Reference page |
| 31 | VENT | Mode door motor *3 |
| 32 | B/L | |
| 34 | FOOT | |
| 35 | D/F | |
| 36 | DEF | |
| 37 | REC | Intake door motor *4 |
| 38 | 20% FRE | |
| 39 | FRE | |

MTBL0201

***1: If mode door motor harness connector is disconnected, the following display pattern will appear.**
 31 → 32 → 34 → 35 → 36 → Return to 31

***2: If intake door motor harness connector is disconnected, the following display pattern will appear.**
 37 → 38 → 39 → Return to 37

*3: HA-49
 *4: HA-58

Display (when a door is out of order)

Illuminates → → Code No. (blinks) →

Each code No. blinks two times. →

Each code No. blinks two times. →

RHA168DA

RHA498A

▶ INSPECTION END

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


Self-diagnosis (Cont'd)

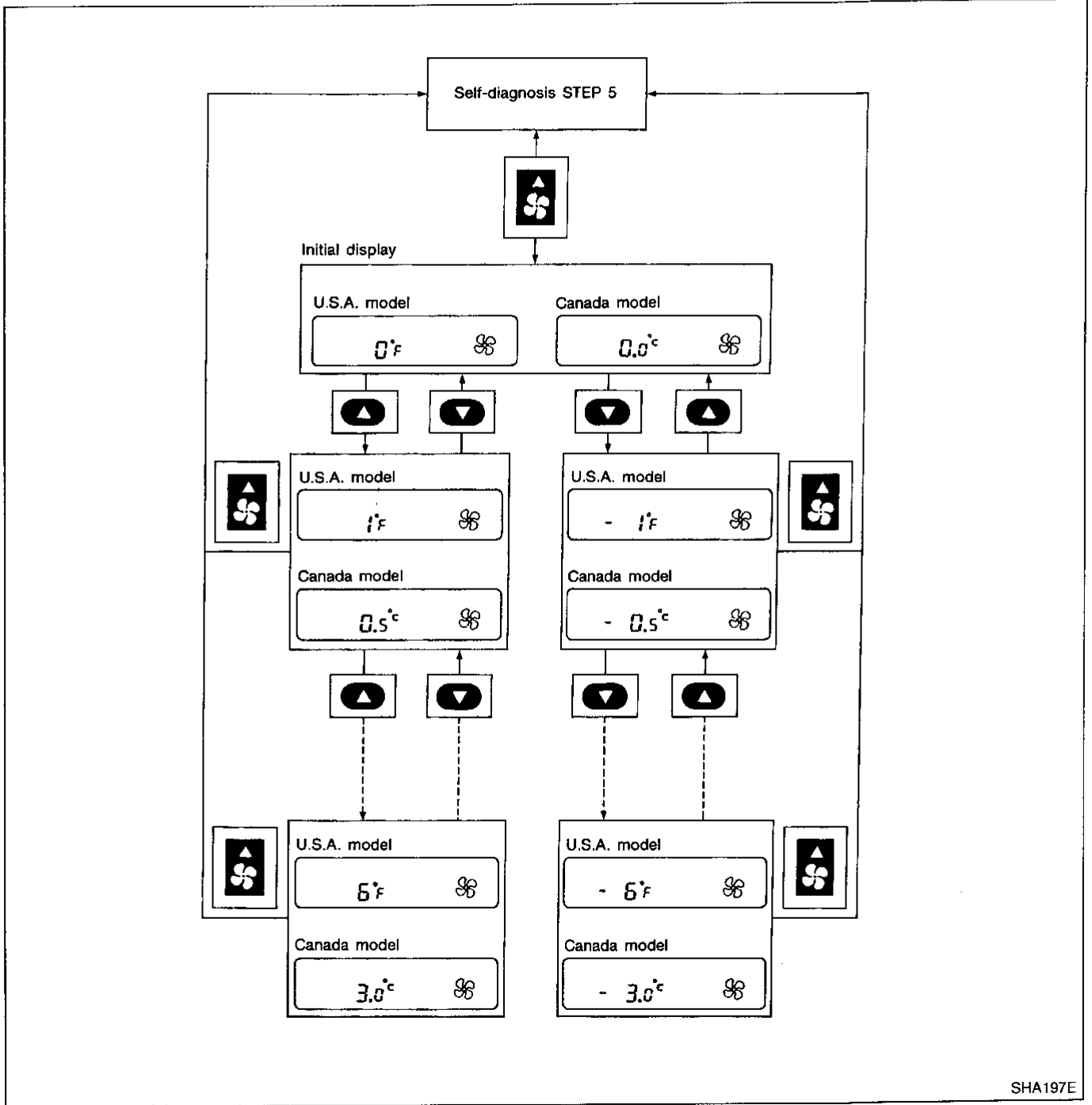
AUXILIARY MECHANISM: TEMPERATURE SETTING TRIMMER

=NAHA0176S03

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

Operating procedures for this trimmer are as follows:

- Begin Self-diagnosis STEP 5 mode.
- Press  (fan) UP switch to set system in auxiliary mode.
- Display shows "5i" in auxiliary mechanism. It takes approximately 3 seconds.
- Press either  (HOT) or  (COLD) switch as desired. Temperature will change at a rate of 0.5°C (1°F) each time a switch is pressed.



SHA197E

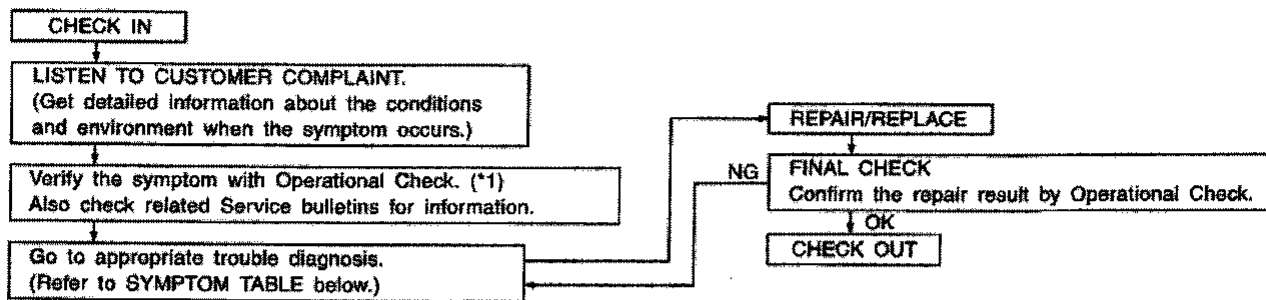
When battery cable is disconnected, trimmer operation is canceled. Temperature set becomes that of initial condition, i.e. 0°C (0°F).

How to Perform Trouble Diagnoses for Quick and Accurate Repair

WORK FLOW

NAHA0177

NAHA0177S01



SHA900E

*1: Operational Check (HA-44)

SYMPTOM TABLE

NAHA0177S02

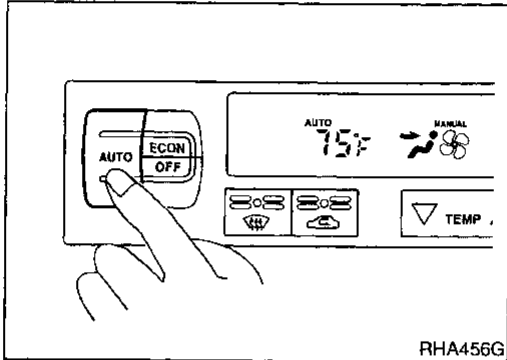
| Symptom | Reference Page |
|---|---|
| ● A/C system does not come on. | ● Go to Trouble Diagnosis Procedure for A/C system. HA-47 |
| ● Air outlet does not change. | ● Go to Trouble Diagnosis Procedure for Mode Door Motor. (LAN) HA-49 |
| ● Mode door motor does not operate normally. | |
| ● Discharge air temperature does not change. | ● Go to Trouble Diagnosis Procedure for Air Mix Door Motor. (LAN) HA-54 |
| ● Air mix door motor does not operate normally. | |
| ● Intake door does not change. | ● Go to Trouble Diagnosis Procedure for Intake Door Motor. HA-58 |
| ● Intake door motor does not operate normally. | |
| ● Blower motor operation is malfunctioning. | ● Go to Trouble Diagnosis Procedure for Blower Motor. HA-63 |
| ● Blower motor operation is malfunctioning under out of starting fan speed control. | |
| ● Magnet clutch does not engage. | ● Go to Trouble Diagnosis Procedure for Magnet Clutch. HA-69 |
| ● Insufficient cooling. | ● Go to Trouble Diagnosis Procedure for Insufficient Cooling. HA-74 |
| ● Insufficient heating. | ● Go to Trouble Diagnosis Procedure for Insufficient Heating. HA-82 |
| ● Noise. | ● Go to Trouble Diagnosis Procedure for Noise. HA-83 |
| ● Self-diagnosis can not be performed. | ● Go to Trouble Diagnosis Procedure for Self-diagnosis. HA-84 |
| ● Memory function does not operate. | ● Go to Trouble Diagnosis Procedure for Memory Function. HA-85 |
| ● ECON mode does not operate. | ● Go to Trouble Diagnosis Procedure for ECON (ECONOMY) mode. HA-86 |

Operational Check

The purpose of the operational check is to confirm that the system operates properly. NAHA0178

CONDITIONS:

- Engine running and at normal operating temperature. NAHA0178S01



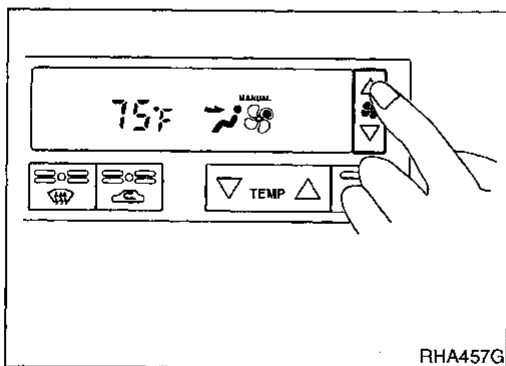
PROCEDURE:

1. Check Memory Function

1. Set the temperature 75°F or 25°C. NAHA0178S02
2. Press OFF switch. NAHA0178S0201
3. Turn the ignition off.
4. Turn the ignition on.
5. Press the AUTO switch.
6. Confirm that the set temperature remains at previous temperature.
7. Press OFF switch.

If NG, go to trouble diagnosis procedure for memory function (HA-85).

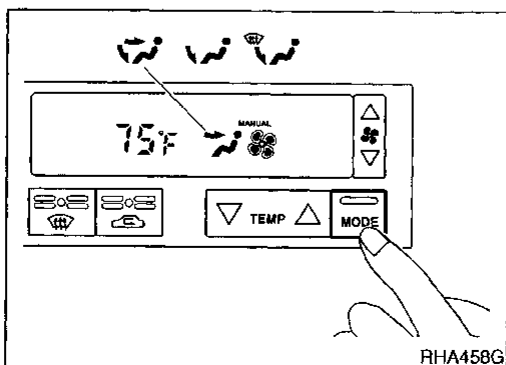
If OK, continue with next check.



2. Check Blower

1. Press fan switch (up side) one time. NAHA0178S0202
Blower should operate on low speed.
The fan symbol should have one blade lit ☼.
2. Press fan switch (up side) one more time, and continue checking blower speed and fan symbol until all speeds are checked.
3. Leave blower on MAX speed ☼☼.

If NG, go to trouble diagnosis procedure for blower motor (HA-63).
If OK, continue with next check.



3. Check Discharge Air

1. Press mode switch four times and DEF button. NAHA0178S0203
2. Each position indicator should change shape.

Discharge air flow

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

RHA654F

- Confirm that discharge air comes out according to the air distribution table at left.
Refer to "Discharge Air Flow" (HA-26).

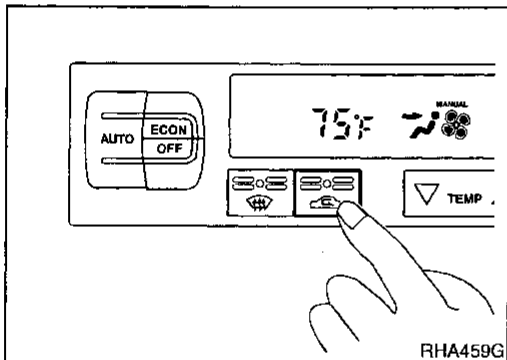
NOTE:

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

Intake door position is checked in the next step.

If NG, go to trouble diagnosis procedure for mode door motor (HA-49).

If OK, continue with next check.



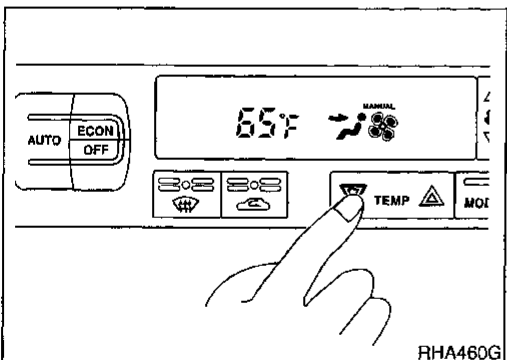
RHA459G

4. Check Recirculation

NAHA0178S0204

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

If NG, go to trouble diagnosis procedure for intake door (HA-58).
If OK, continue with next check.



RHA460G

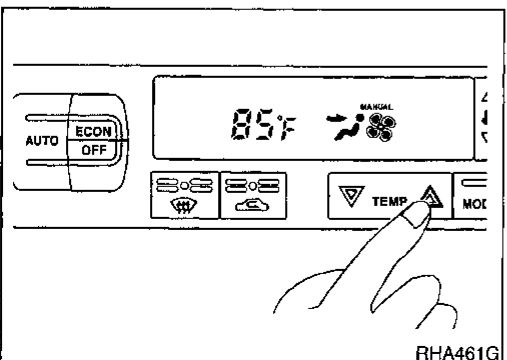
5. Check Temperature Decrease

NAHA0178S0205

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

If NG, go to trouble diagnosis procedure for insufficient cooling (HA-74).

If OK, continue with next check.



RHA461G

6. Check Temperature Increase

NAHA0178S0206

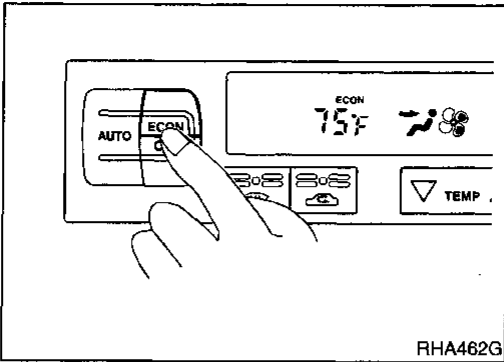
- Press the temperature increase button until 32°C (85°F) is displayed.
- Check for hot air at discharge air outlets.

If NG, go to trouble diagnosis procedure for insufficient heating (HA-82).

If OK, continue with next check.

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Operational Check (Cont'd)



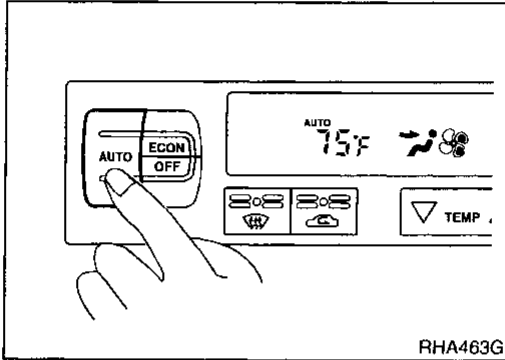
7. Check ECON (Economy) Mode

NAHA0178S0207

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

If NG, go to trouble diagnosis procedure for ECON (Economy) mode (HA-86).

If OK, continue with next check.



8. Check AUTO Mode

NAHA0178S0208

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

If NG, go to trouble diagnosis procedure for A/C system (HA-47), then if necessary, trouble diagnosis procedure for magnet clutch (HA-69).

If all operational check are OK (symptom can not be duplicated), go to "Incident Simulation Tests" (GI section) and perform tests as outlined to simulate driving conditions environment. If symptom appears, refer to "Symptom Table" (HA-43) and perform applicable trouble diagnosis procedures.

A/C System

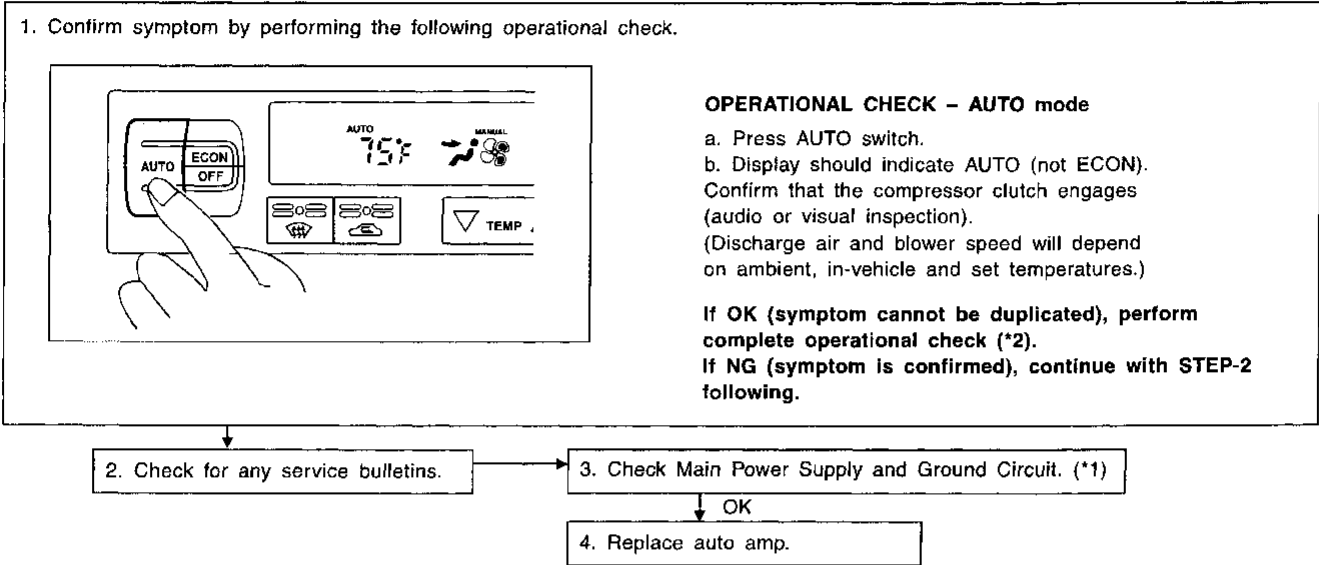
TROUBLE DIAGNOSIS PROCEDURE FOR A/C SYSTEM

SYMPTOM:

- A/C system does not come on.

INSPECTION FLOW

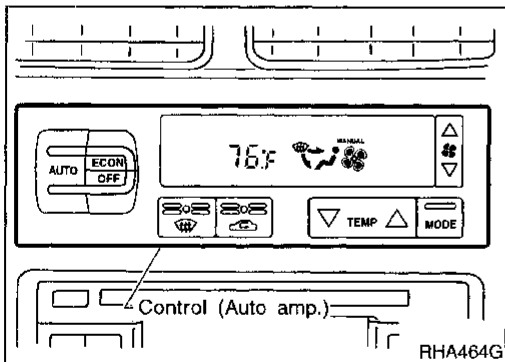
-NAHA0179



SHA888EB

*1: HA-47

*2: HA-44



MAIN POWER SUPPLY AND GROUND CIRCUIT CHECK

NAHA0180

Component Description

NAHA0180S01

Automatic Amplifier (Auto Amp.)

NAHA0180S0101

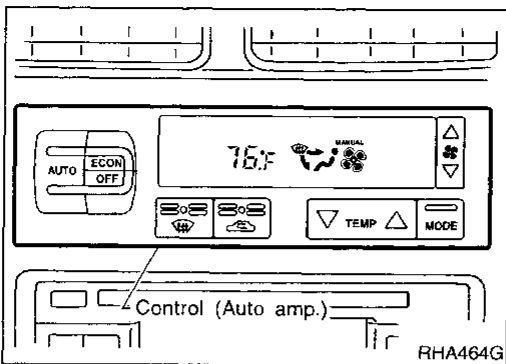
The auto amplifier has a built-in microcomputer which processes information sent from various sensors needed for air conditioner operation. The air mix door motor, mode door motor, intake door motor, blower motor and compressor are then controlled.

The auto amplifier is unitized with control mechanisms. Signals from various switches and Potentio Temperature Control (PTC) are directly entered into auto amplifier.

Self-diagnostic functions are also built into auto amplifier to provide quick check of malfunctions in the auto air conditioner system.

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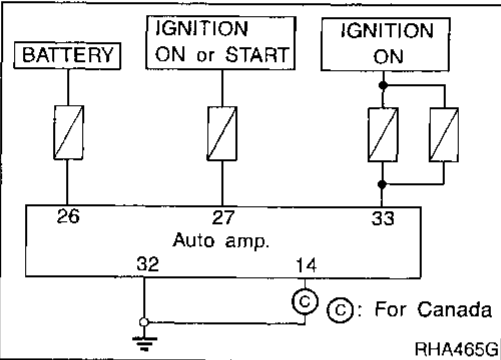
A/C System (Cont'd)



Potential Temperature Control (PTC)

NAHA018090102

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

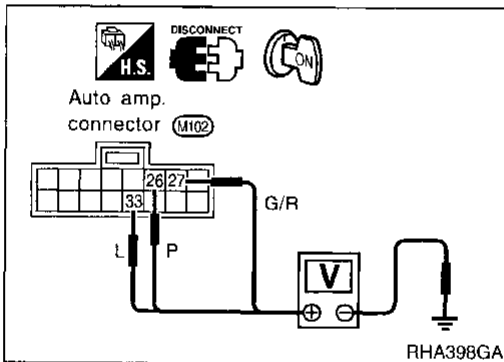


DIAGNOSTIC PROCEDURE

NAHA0181

SYMPTOM:

- A/C system does not come on.

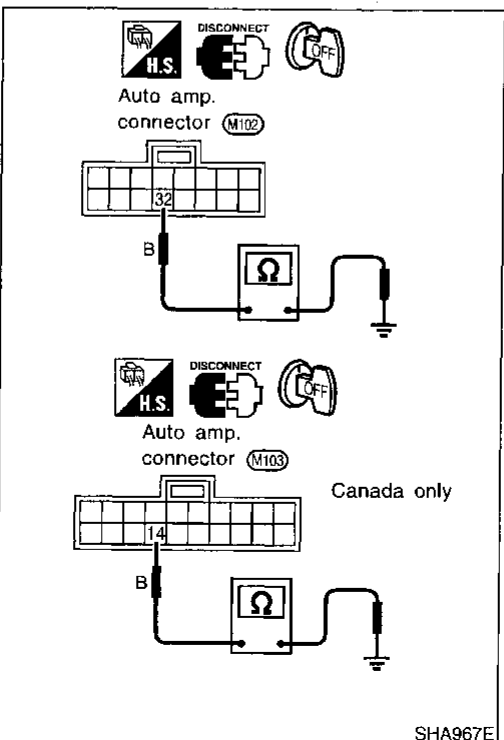


Auto Amp. Check

NBHA0107S02

Check power supply circuit for auto amp. with ignition switch ON. Measure voltage across terminal Nos. 26, 27, 33 and body ground.

| Voltmeter terminal | | Voltage |
|--------------------|-------------|-------------|
| (+) | (-) | |
| 26 | Body ground | Approx. 12V |
| 27 | | |
| 33 | | |



Check body ground circuit for auto amp. with ignition switch OFF. Check for continuity between terminal Nos. 32, 14 and body ground.

| Ohmmeter terminal | | Continuity |
|-------------------|-------------|------------|
| (+) | (-) | |
| 32 | Body ground | Yes |
| 14 (Canada only) | | |

If OK, check auto amp. ground circuit, see below.

- If NG, check 7.5A fuses (No. 11 and 24, located in the fuse block) and 15A fuses (No. 1 and 2, located in the fuse block).
- If fuses are OK, check for open circuit in wiring harness. Repair or replace as necessary.
- If fuses are NG, replace fuse and check wiring harness for short circuit. Repair or replace as necessary.

NOTE:

If OK, replace auto amp.
If NG, repair or replace harness.

Mode Door Motor

TROUBLE DIAGNOSIS PROCEDURE FOR MODE DOOR MOTOR (LAN)

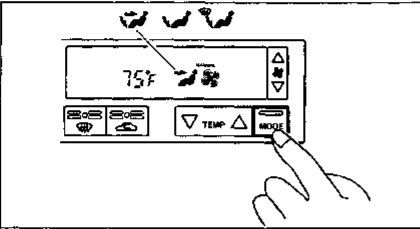
-NAHA0182

SYMPTOM:

- Air outlet does not change.
- Mode door motor does not operate normally.

INSPECTION FLOW

1. Confirm symptom by performing the following operational check.



Discharge air flow

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

OPERATIONAL CHECK – Discharge air

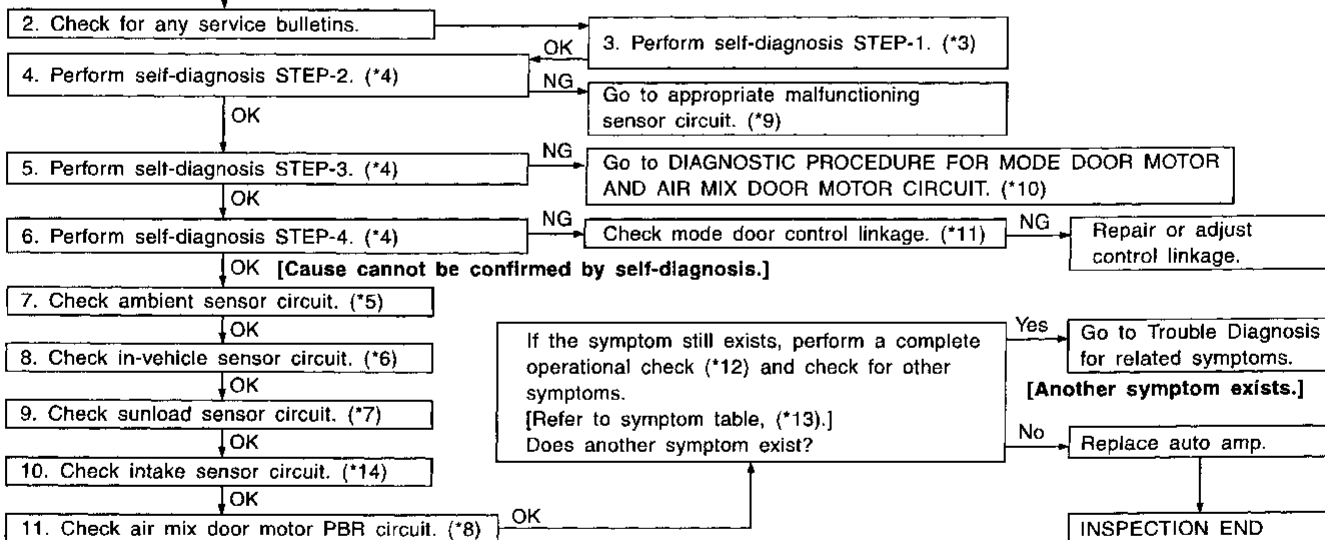
a. Press mode switch four times and DEF button.
b. Each position indicator should change shape.

c. Confirm that discharge air comes out according to the air distribution table at left.
Refer to "Discharge Air Flow" (*1).

NOTE:

- If OK (symptom cannot be duplicated), perform complete operational check (*2).
- If NG (symptom is confirmed), continue with STEP-2 following.
- Confirm that the compressor clutch is engaged (visual inspection) and intake door position is at FRESH when DEF

Intake door position is checked in the next step.



*1: HA-26
*2: HA-44
*3: HA-37
*4: HA-38
*5: HA-86

*6: HA-89
*7: HA-91
*8: HA-96
*9: STEP-BY-STEP PROCEDURE (HA-38), see No. 13.

*10: HA-51
*11: HA-53
*12: HA-44
*13: HA-43
*14: HA-94

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Mode Door Motor (Cont'd)

SYSTEM DESCRIPTION

Component Parts

-NAHA0183

NAHA0183S01

Mode door control system components are:

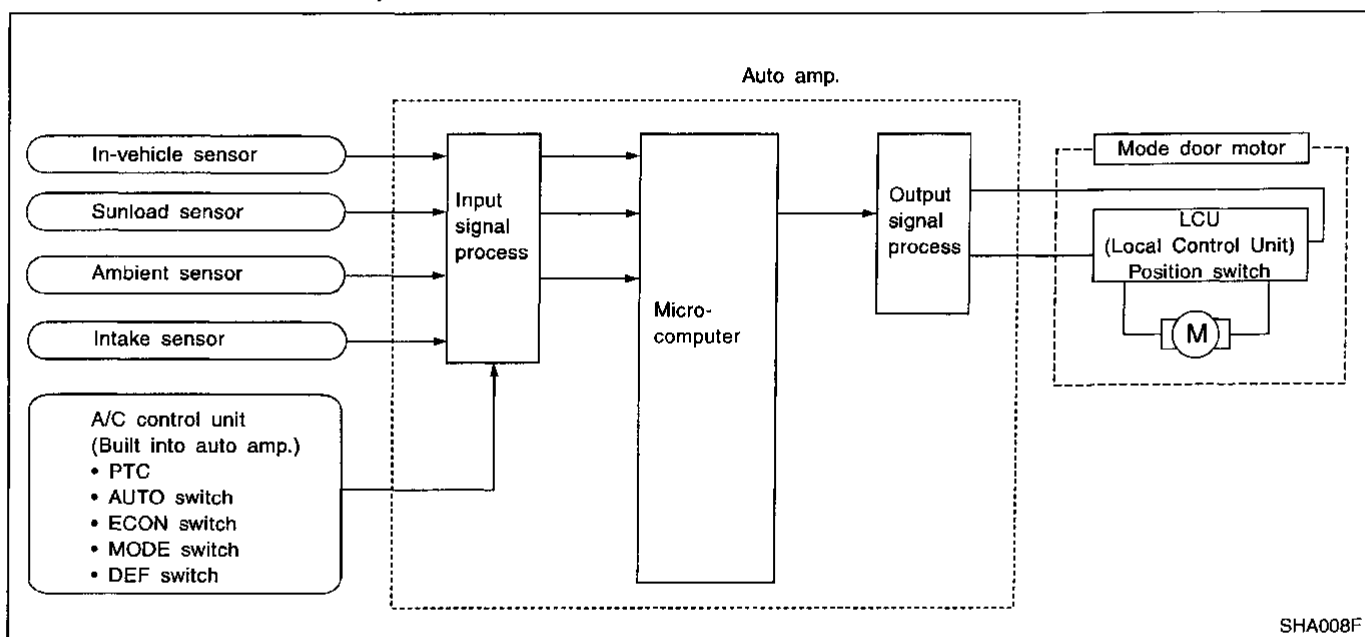
- 1) Auto amp.
- 2) Mode door motor (LCU)
- 3) In-vehicle sensor
- 4) Ambient sensor
- 5) Sunload sensor
- 6) Intake sensor

System Operation

NAHA0183S02

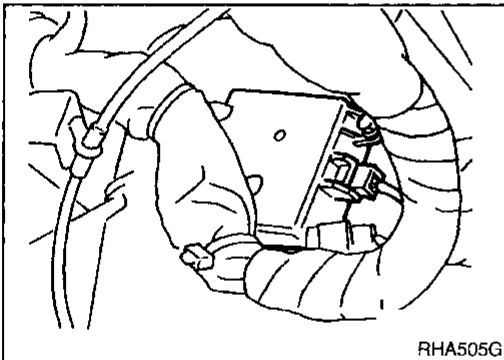
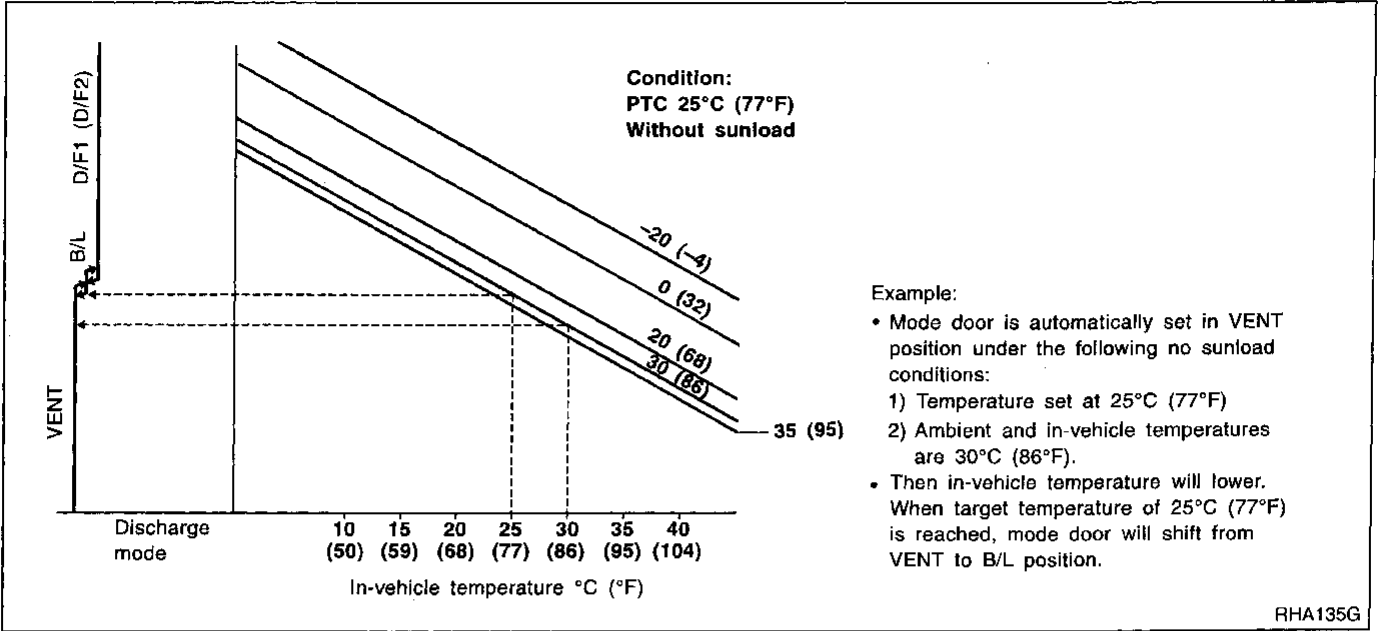
The auto amplifier receives data from each of the sensors. The amplifier sends air mix door and mode door opening angle data to the air mix door motor LCU and mode door motor LCU.

The air mix door motor and mode door motor read their respective signals according to the address signal. Opening angle indication signals received from the auto amplifier and each of the motor position sensors are compared by the LCUs in each motor with the existing decision and opening angles. Subsequently, HOT/COLD or DEFROST/VENT operation is selected. The new selection data is returned to the auto amplifier.



Mode Door Control Specification

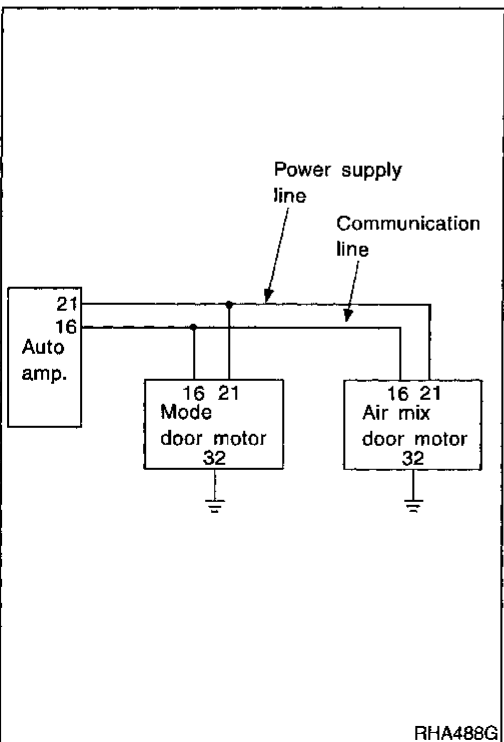
NAHA0183903



COMPONENT DESCRIPTION

NAHA0184

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



DIAGNOSTIC PROCEDURE FOR MODE DOOR MOTOR AND AIR MIX DOOR MOTOR CIRCUIT

NAHA0185

SYMPTOM: Mode door motor and/or air mix door motor does not operate normally.

Mode Door Motor (Cont'd)

| | |
|---|--|
| 1 | CHECK POWER SUPPLY FOR AUTO AMP. (LCU) SIDE |
| <p>Do approx. 12 volts exist between auto amp. (LCU) harness terminal No. 21 and body ground?</p> | |
| | |
| SHA966E | |
| <p>NOTE: If the result is NG or No after checking circuit continuity, repair harness or connector.</p> | |
| Yes or No | |
| Yes | ▶ GO TO 2. |
| No | ▶ Replace auto amp. (LCU). |

| | |
|---|--|
| 2 | CHECK SIGNAL FOR AUTO AMP. (LCU) SIDE |
| <p>Do approx. 5.5 volts exist between auto amp. (LCU) terminal No. 16 and body ground?</p> | |
| | |
| SHA965E | |
| <p>NOTE: If the result is NG or No after checking circuit continuity, repair harness or connector.</p> | |
| Yes or No | |
| Yes | ▶ GO TO 3. |
| No | ▶ Replace auto amp. (LCU). |

| | |
|--|--|
| 3 | CHECK POWER SUPPLY FOR MOTOR SIDE |
| <p>Do approx. 12 volts exist between door motor (LCU) harness terminal No. 21 and body ground?</p> | |
| | |
| RHA489G | |
| Yes or No | |
| Yes | ▶ GO TO 4. |
| No | ▶ Repair harness or connector. |

| | |
|---|------------------------------------|
| 4 | CHECK SIGNAL FOR MOTOR SIDE |
| <p>Do approx. 5.5 volts exist between door motor (LCU) terminal No. 16 and body ground?</p> | |
| | |
| RHA490G | |
| Yes or No | |
| Yes | ▶ GO TO 5. |
| No | ▶ Repair harness or connector. |

| | |
|--|-----------------------------------|
| 5 | CHECK MOTOR GROUND CIRCUIT |
| <p>Does continuity exist between door motor (LCU) harness terminal No. 32 and body ground?</p> | |
| | |
| RHA491G | |
| Yes or No | |
| Yes | ▶ GO TO 6. |
| No | ▶ Repair harness or connector. |

TROUBLE DIAGNOSES

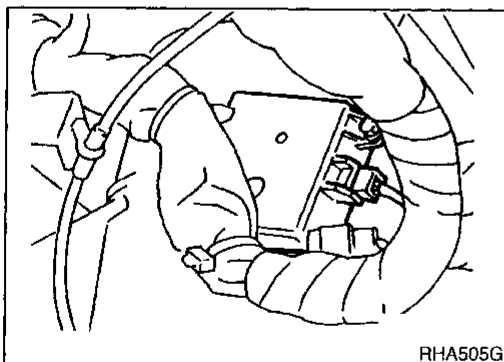
AUTO

Mode Door Motor (Cont'd)

| | |
|---|-------------------------------------|
| 6 | CHECK MOTOR OPERATION |
| Disconnect and reconnect the motor connector and confirm the motor operation. | |
| OK or NG | |
| OK (Return to operate normally) | Poor contacting the motor connector |
| NG (Does not operate normally) | GO TO 7. |

| | |
|---|---|
| 8 | CHECK AIR MIX DOOR MOTOR OPERATION |
| 1. Disconnect the mode door motor connector. 2. Reconnect the air mix door motor and confirm the air mix door motor operation. | |
| OK or NG | |
| OK (Air mix door motor operates normally) | Replace mode door motor. |
| NG (Air mix door motor does not operate normally) | Replace auto amp. |

| | |
|--|--|
| 7 | CHECK MODE DOOR MOTOR OPERATION |
| 1. Disconnect the mode door motor and air mix door motor connector. 2. Reconnect the mode door motor and confirm the motor operation. | |
| OK or NG | |
| OK (Mode door motor operates normally) | Replace the air mix door motor. |
| NG (Mode door motor does not operate normally) | GO TO 8. |



CONTROL LINKAGE ADJUSTMENT

Mode Door

1. Install mode door motor on heater unit and connect it to main harness.
2. Set up code No. in Self-diagnosis STEP 4. Refer to HA-38.
3. Move side link by hand and hold mode door in DEF mode.
4. Attach mode door motor rod to side link rod holder.
5. Make sure mode door operates properly when changing from code No. 41 to 46 by pushing DEF switch.

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

NAHA0186

NAHA0186S01

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Air Mix Door Motor

TROUBLE DIAGNOSIS PROCEDURE FOR AIR MIX DOOR (LAN)

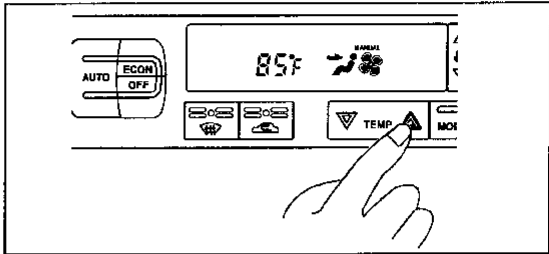
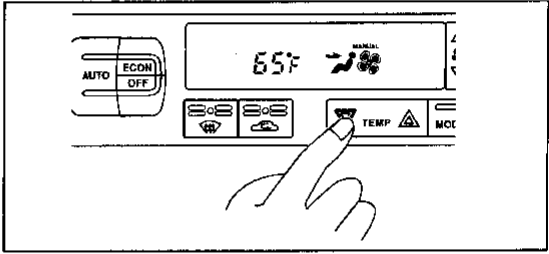
=NAHA0187

SYMPTOM:

- Discharge air temperature does not change.
- Air mix door motor does not operate.

INSPECTION FLOW

1. Confirm symptom by performing the following operational check.

OPERATIONAL CHECK

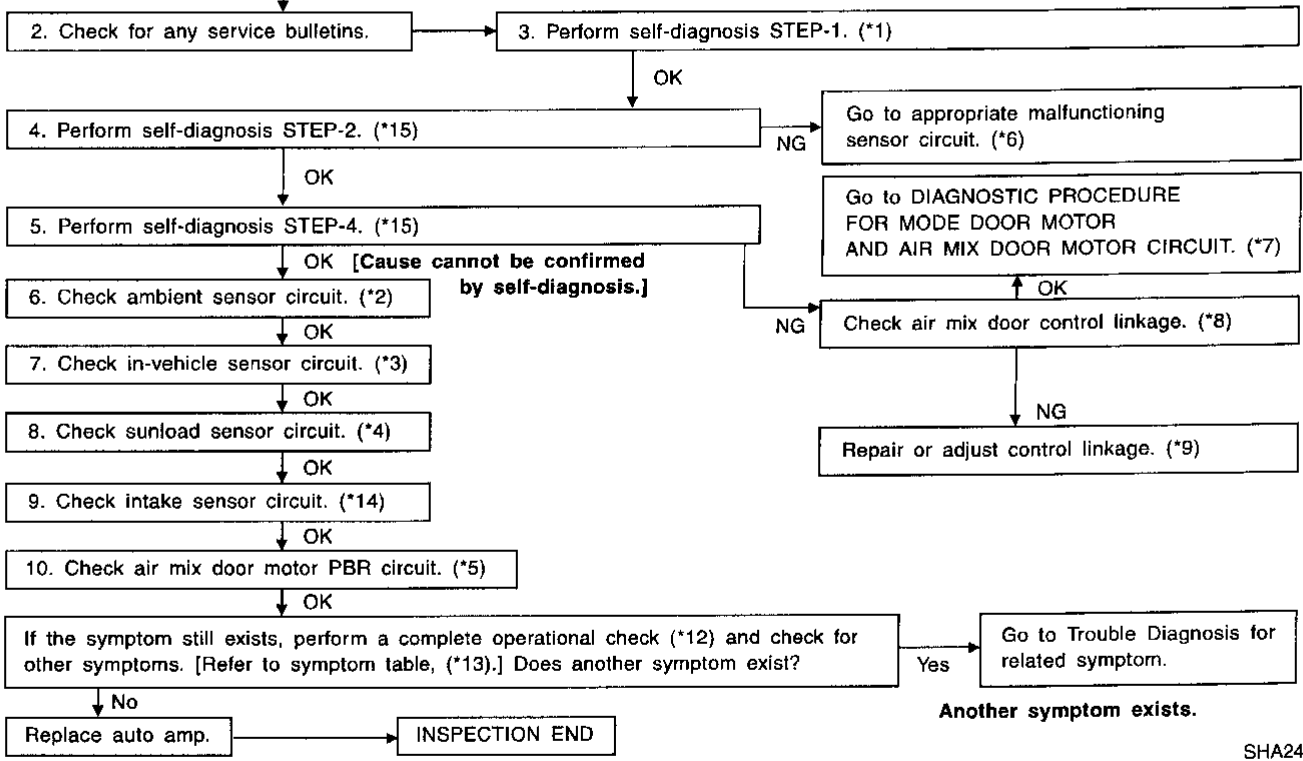
Temperature increase

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

Temperature decrease

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

If OK (symptom cannot be duplicated), perform complete operational check (*10).
If NG (symptom is confirmed), continue with STEP-2 following.



- *1: HA-37
- *2: HA-86
- *3: HA-89
- *4: HA-91
- *5: HA-96

- *6: STEP-BY-STEP PROCEDURE (HA-38), see No. 13.
- *7: HA-51
- *8: HA-56
- *9: HA-56

- *10: HA-44
- *12: HA-44
- *13: HA-43
- *14: HA-94
- *15: HA-38

SHA246F

SYSTEM DESCRIPTION

Component Parts

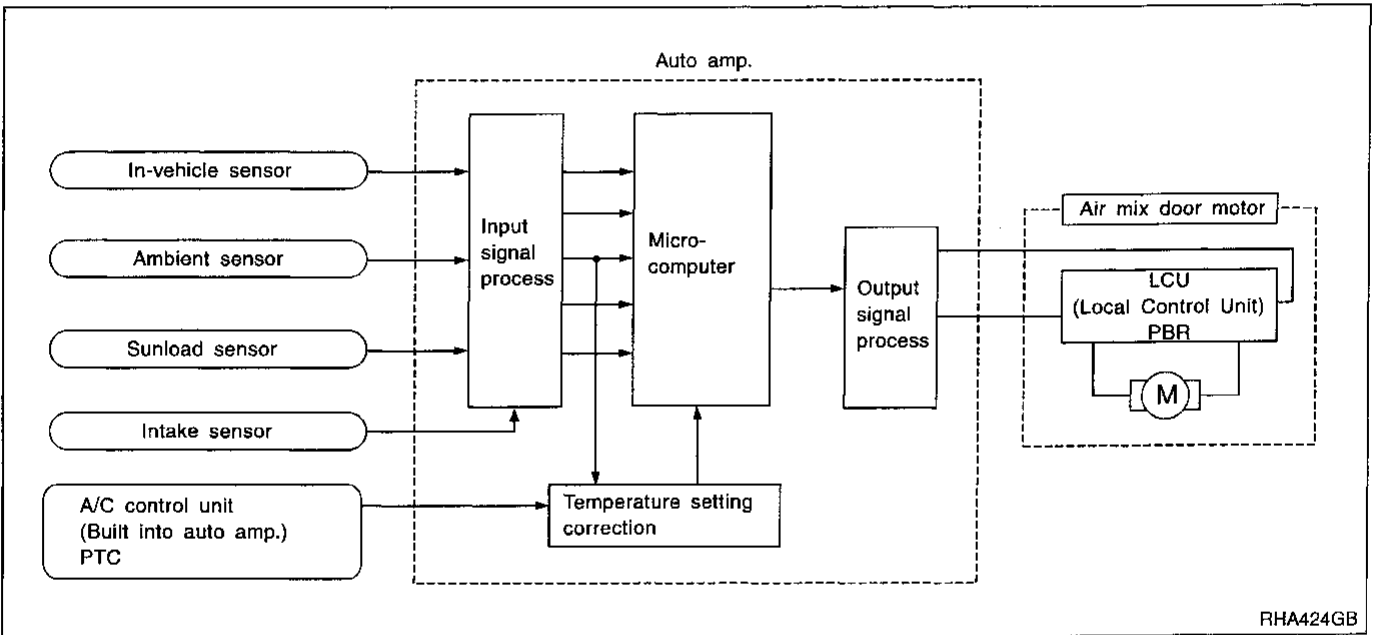
Air mix door control system components are:

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

System Operation

The auto amplifier receives data from each of the sensors. The amplifier sends air mix door and mode door opening angle data to the air mix door motor LCU and mode door motor LCU.

The air mix door motor and mode door motor read their respective signals according to the address signal. Opening angle indication signals received from the auto amplifier and each of the motor position sensors are compared by the LCUs in each motor with the existing decision and opening angles. Subsequently, HOT/COLD or DEFROST/VENT operation is selected. The new selection data is returned to the auto amplifier.

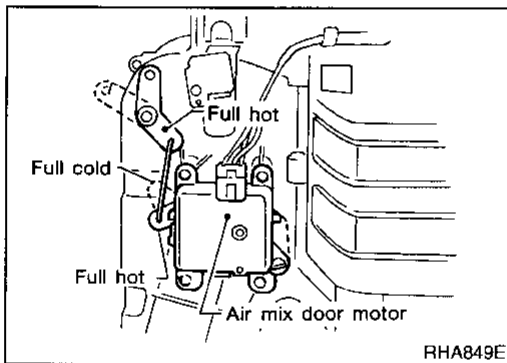
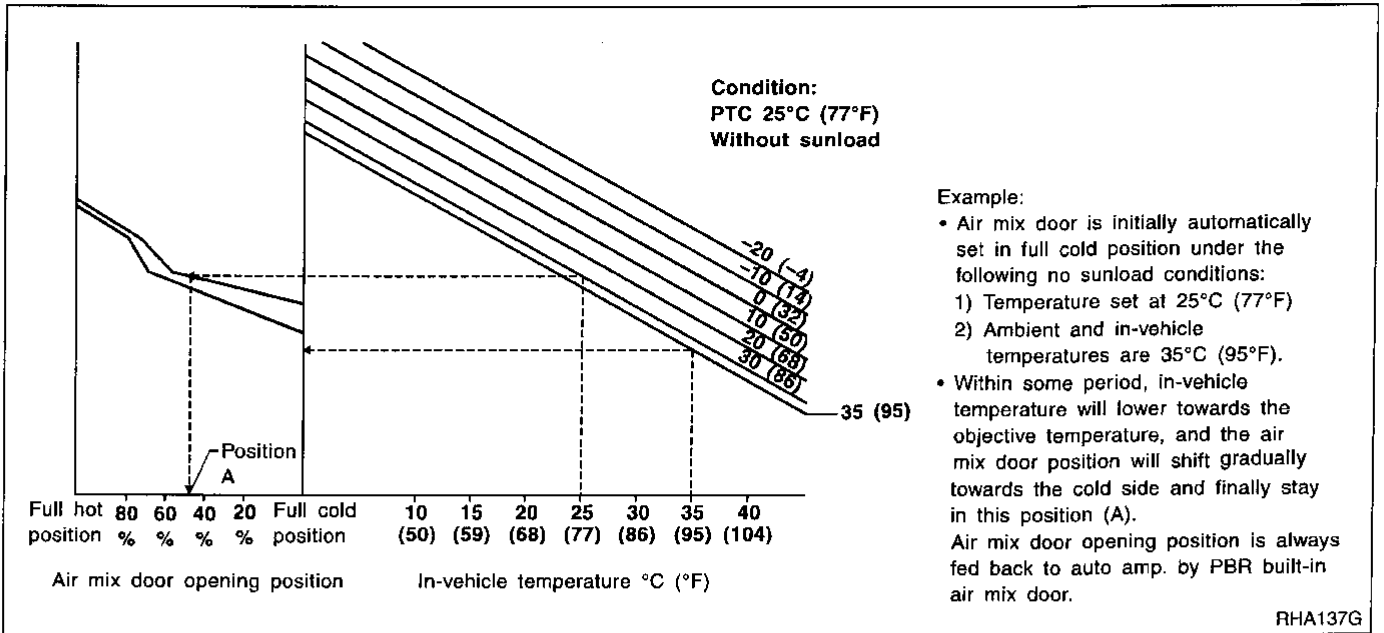


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Air Mix Door Control Specification

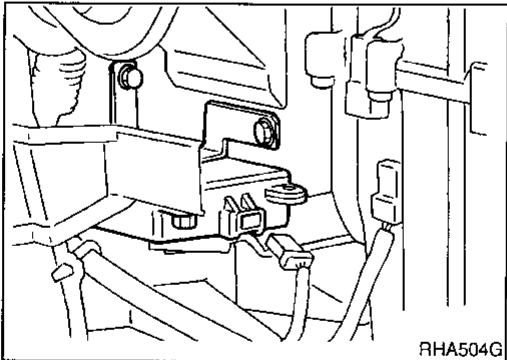
NAHA0188S03



COMPONENT DESCRIPTION

NAHA0189

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



CONTROL LINKAGE ADJUSTMENT

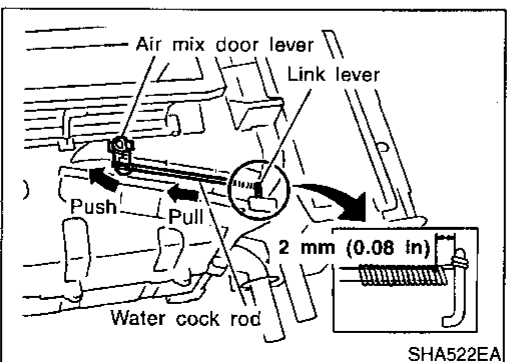
NAHA0190

Air Mix Door (Water Cock)

NAHA0190S01

- Install air mix door motor on heater unit and connect it to main harness.
- Set up code No. 41 in Self-diagnosis STEP 4. Refer to HA-37.
- Move air mix door lever by hand and hold it in full cold position.
- Attach air mix door lever to rod holder.
- Make sure air mix door operates properly when changing from code No. 41 to 45 by pushing DEF switch.

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



- Set up code No. 41 in Self-diagnosis STEP 4.
- Attach water cock rod to air mix door lever and secure with clip.
- Rotate air mix door lever (CLOCKWISE completely) and hold water cock rod and link lever in the full cold position.
- Attach water cock rod to link lever and secure with clip (white mark on cable housing should be centered under the retaining clip).

TROUBLE DIAGNOSES

AUTO

Air Mix Door Motor (Cont'd)

10. Check that water cock operates properly when changing from code No. 41 to 46 by pushing DEF switch. (After several cycles, water cock lever should be midpoint of plate opening when code No. 41 is set.)

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Intake Door Motor

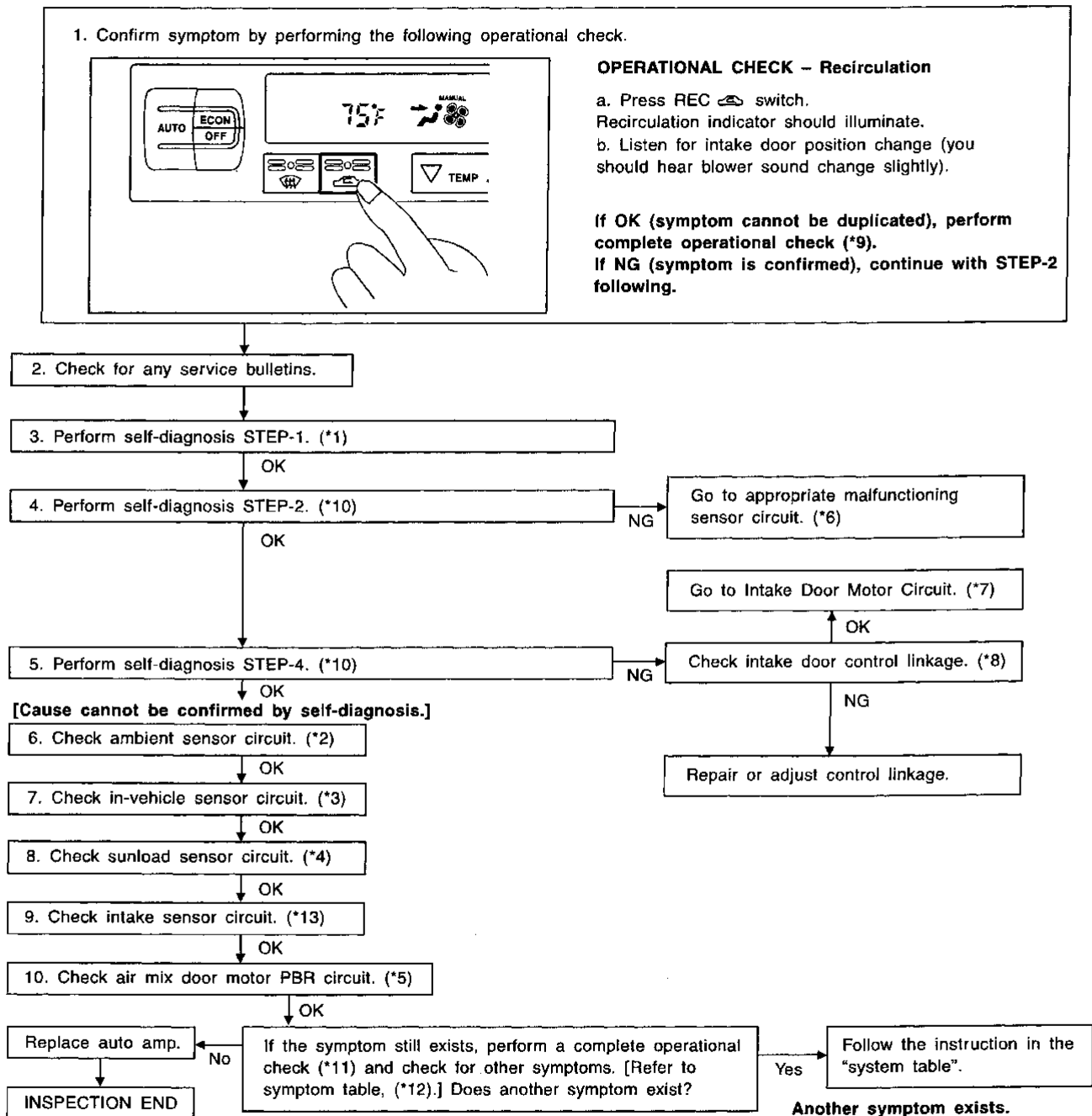
TROUBLE DIAGNOSIS PROCEDURE FOR INTAKE DOOR

-NAHA0191

SYMPTOM:

- Intake door does not change.
- Intake door motor does not operate normally.

INSPECTION FLOW



- *1: HA-37
- *2: HA-86
- *3: HA-89
- *4: HA-91
- *5: HA-96

- *6: STEP-BY-STEP PROCEDURE (HA-38), see No. 13.
- *7: HA-60
- *8: HA-62
- *9: HA-44

- *10: HA-38
- *11: HA-44
- *12: HA-43
- *13: HA-94

SHA247F

SYSTEM DESCRIPTION

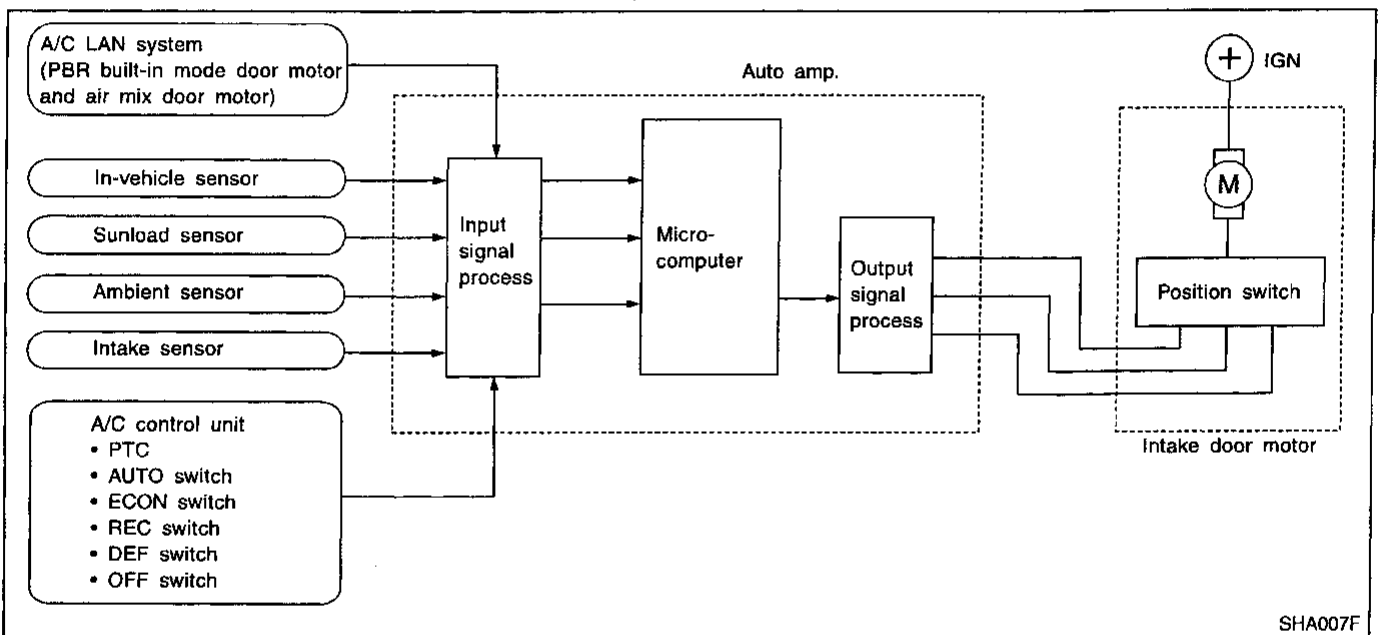
Component Parts

Intake door control system components are:

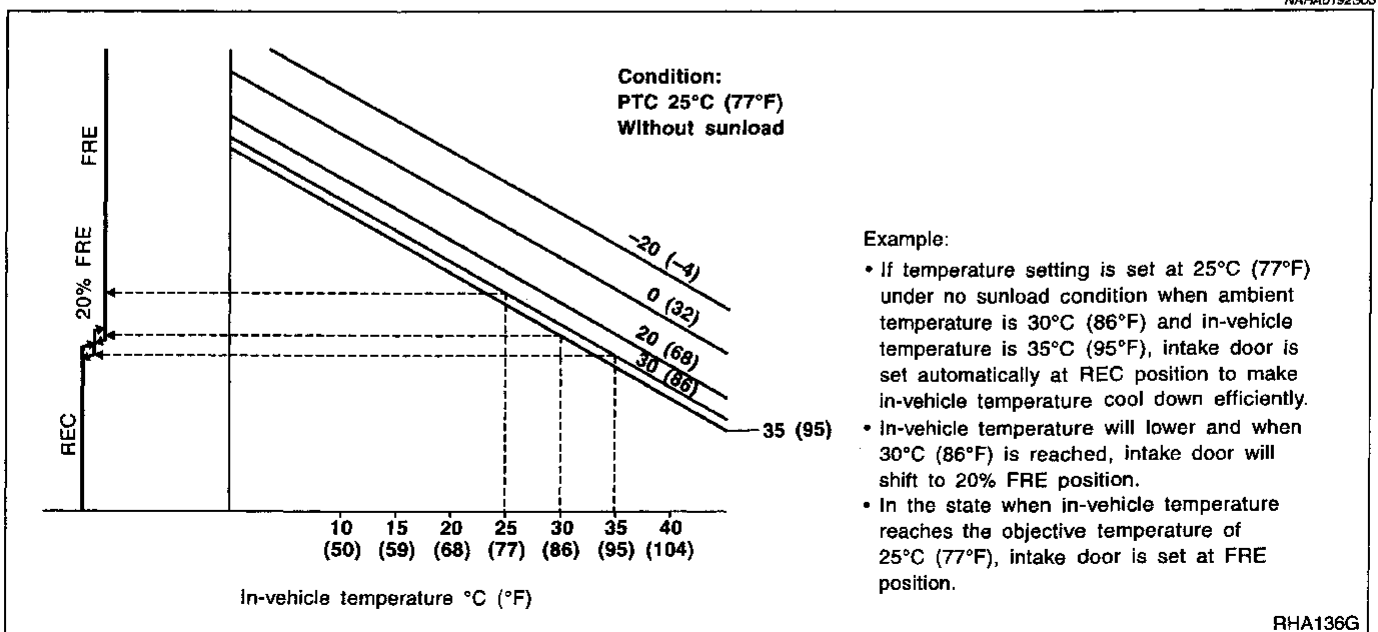
- 1) Auto amp.
- 2) Intake door motor
- 3) A/C LAN system (PBR built-in mode door motor and air mix door motor)
- 4) In-vehicle sensor
- 5) Ambient sensor
- 6) Sunload sensor
- 7) Intake sensor

System Operation

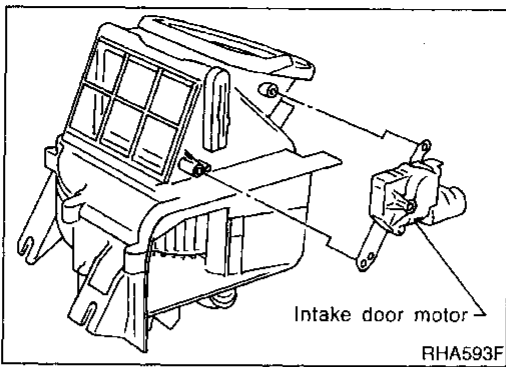
The intake door control determines intake door position based on the ambient temperature, the intake air temperature and the in-vehicle temperature. When the ECON, DEFROST, or OFF switches are pushed, the auto amplifier sets the intake door at the "Fresh" position.



Intake Door Control Specification

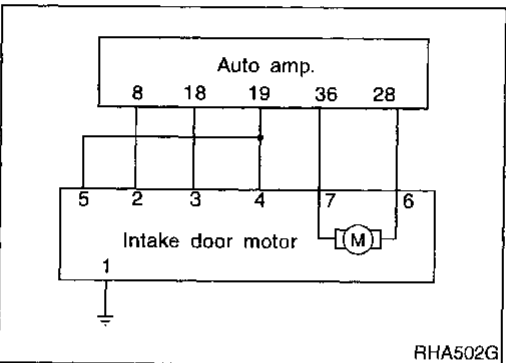


Intake Door Motor (Cont'd)



COMPONENT DESCRIPTION

The intake door motor is attached to the intake unit. It rotates so that air is drawn from inlets set by the auto amplifier. Motor rotation is conveyed to a lever which activates the intake door. NAHA0193



DIAGNOSTIC PROCEDURE

SYMPTOM: Intake door motor does not operate normally. NAHA0194

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

1 CHECK BODY GROUND CIRCUIT FOR INTAKE DOOR MOTOR

Does continuity exist between intake door harness terminal No. 1 and body ground?

RHA492GA

| Yes or No | |
|-----------|--------------------------------|
| Yes | ▶ GO TO 2. |
| No | ▶ Repair harness or connector. |

2 CHECK FOR AUTO AMP. OUTPUT

Set up Self-diagnosis STEP 4.
Measure voltage across auto amp. harness terminals and body ground.

RHA493G

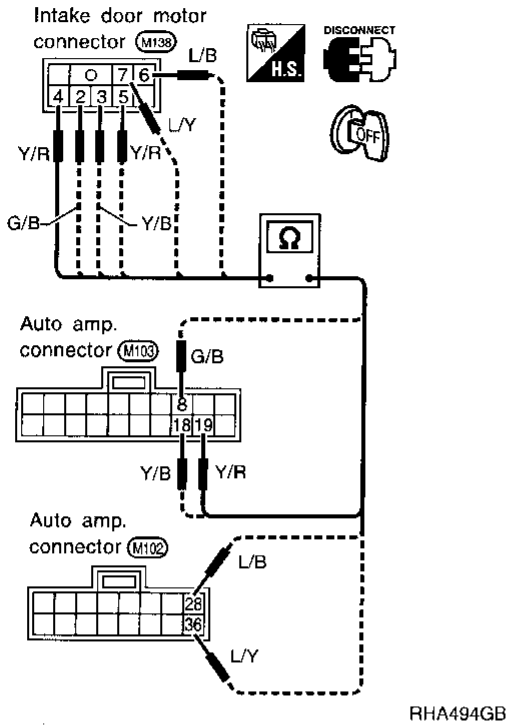
| Code No. | Terminals No. | | Condition | Voltage V |
|----------|---------------|-------------|-----------|-----------|
| | (+) | (-) | | |
| 41 | 8 | Body ground | REC | 5 |
| 42 | 18 or 19 | | | 0 |
| 43 | 19 | Body ground | 20% FRE | 5 |
| | 8 or 18 | | | 0 |
| 44 | 18 | Body ground | FRE | 5 |
| 45 | 8 or 19 | | | 0 |

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

MTBL0076

| OK or NG | |
|----------|------------------|
| OK | ▶ INSPECTION END |
| NG | ▶ GO TO 3. |

3 CHECK CIRCUIT CONTINUITY BETWEEN EACH TERMINAL ON AUTO AMP. AND ON INTAKE DOOR MOTOR



RHA494GB

| Terminal No. | | Continuity |
|--------------|-------------------|------------|
| Auto amp. | Intake door motor | |
| (19) | (4) | Yes |
| (8) | (2) | |
| (18) | (3) | |
| (19) | (5) | |
| (28) | (6) | |
| (36) | (7) | |

MTBL0077

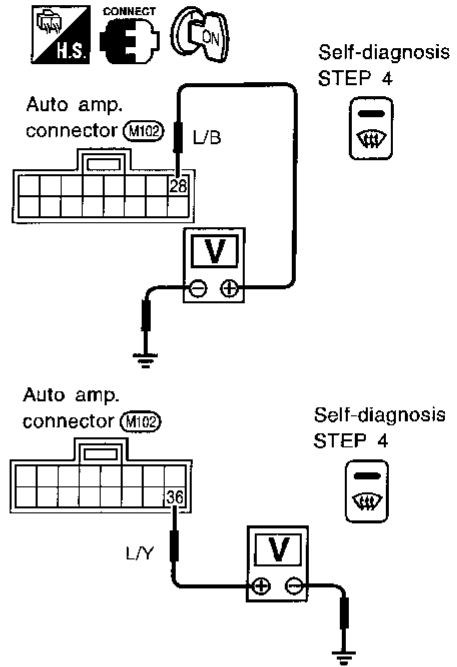
If OK, check harness for short.

OK or NG

| | | |
|----|---|------------------------------|
| OK | ▶ | GO TO 4. |
| NG | ▶ | Repair harness or connector. |

4 CHECK FOR AUTO AMP. OUTPUT

Set up Self-diagnosis STEP 4.
Measure voltage across auto amp. harness terminals and body ground.



RHA506G

| Code No. | Terminals No. | | Condition | Voltage V |
|----------|---------------|-------------|-----------|-----------|
| | (+) | (-) | | |
| 41 | 28 | Body ground | REC | 12 |
| 42 | 36 | | | 0 |
| 44 | 28 | Body ground | FRE | 0 |
| 45 | 36 | | | 12 |

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

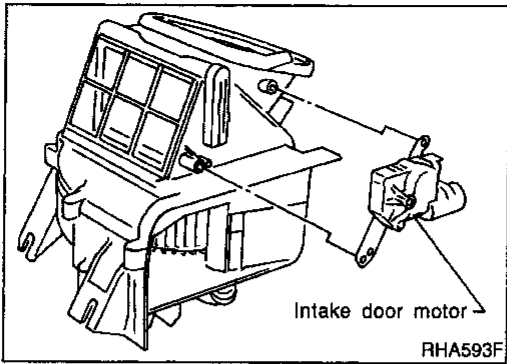
MTBL0078

OK or NG

| | | |
|----|---|----------------------------|
| OK | ▶ | Replace intake door motor. |
| NG | ▶ | Replace auto amp. |

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Intake Door Motor (Cont'd)



CONTROL LINKAGE ADJUSTMENT

-NAHA0195

Intake Door

NAHA0195S01

1. Install intake door motor on intake unit and connect it to main harness.
2. Set up code No. 41 in Self-diagnosis STEP 4. Refer to HA-38.
3. Move intake door link by hand and hold it in REC position.
4. Attach intake door lever to rod holder.
5. Make sure intake door operates properly when changing from code No. 41 to 45 by pushing DEF switch.

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

Blower Motor

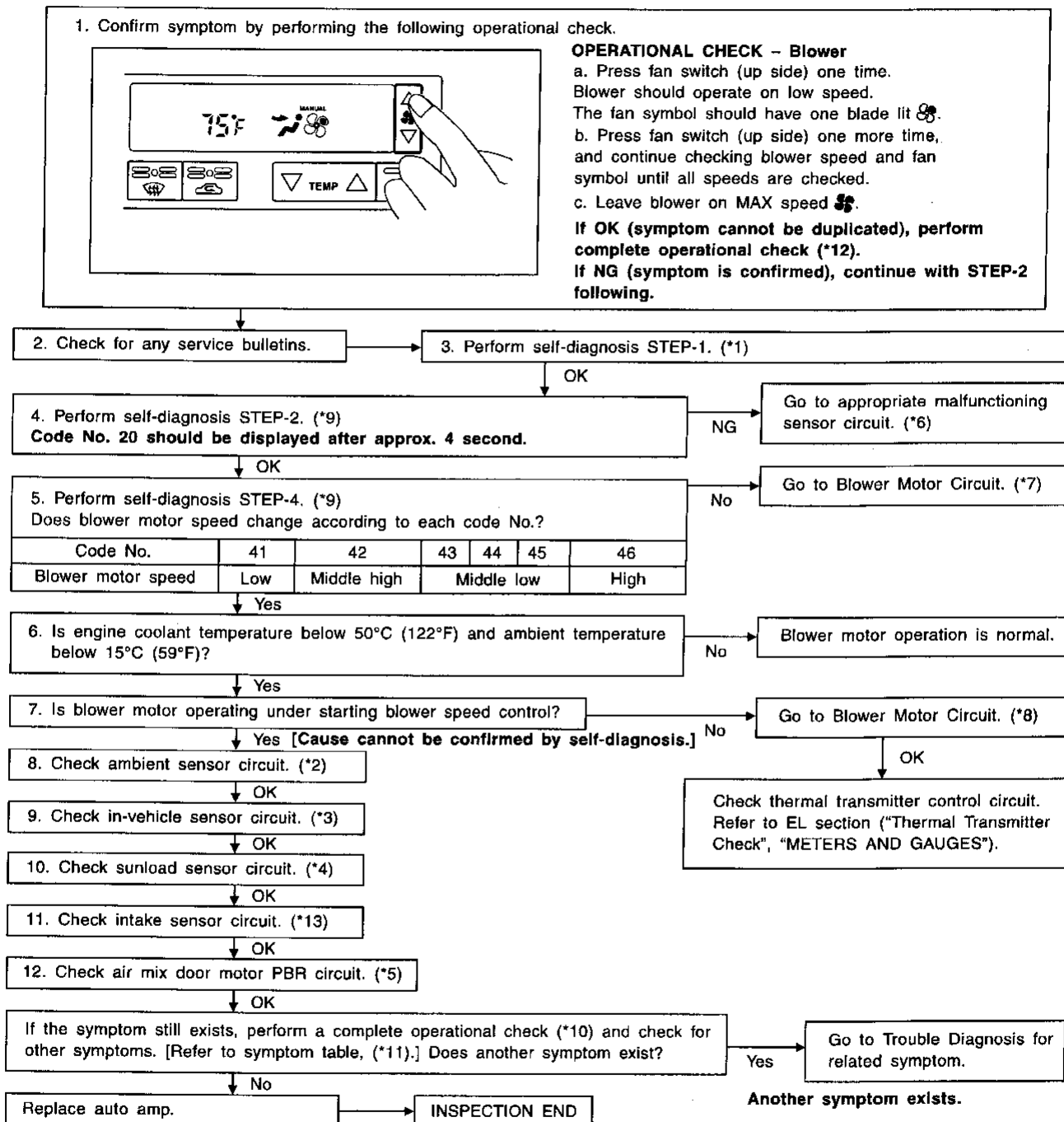
TROUBLE DIAGNOSIS PROCEDURE FOR BLOWER MOTOR

SYMPTOM:

- Blower motor operation is malfunctioning.
- Blower motor operation is malfunctioning under out of starting fan speed control.

INSPECTION FLOW

-NAHA0196



- *1: HA-37
- *2: HA-86
- *3: HA-89
- *4: HA-91
- *5: HA-96

- *6: STEP-BY-STEP PROCEDURE (HA-38), see No. 13.
- *7: HA-65
- *8: HA-65
- *9: HA-38

- *10: HA-44
- *11: HA-43
- *12: HA-44
- *13: HA-94

SHA248F

Blower Motor (Cont'd)

SYSTEM DESCRIPTION

Component parts

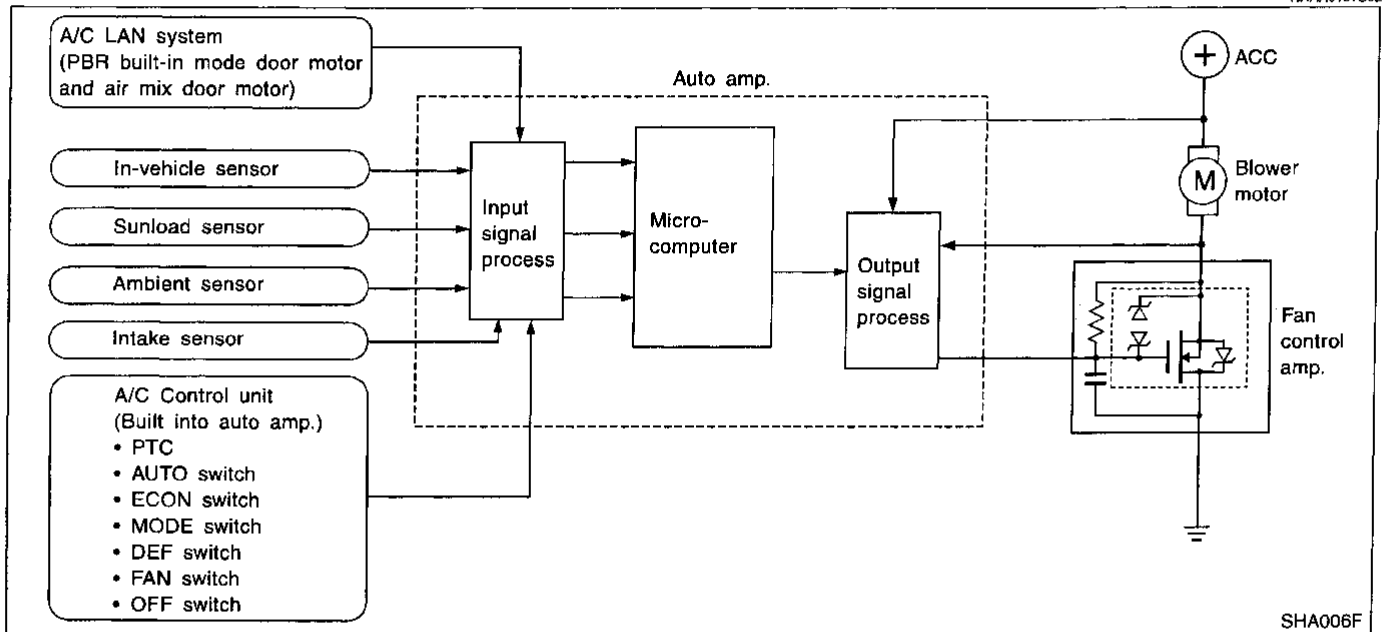
Fan speed control system components are:

- 1) Auto amp.
- 2) Fan control amp.
- 3) A/C LAN system (PBR built-in mode door motor and air mix door motor)
- 4) In-vehicle sensor
- 5) Ambient sensor
- 6) Sunload sensor
- 7) Intake sensor

-NAHA0197

NAHA0197S01

System Operation



Automatic Mode

In the automatic mode, the blower motor speed is calculated by the automatic amplifier based on inputs from the PBR, in-vehicle sensor, sunload sensor, intake sensor and ambient sensor. The blower motor applied voltage ranges from approximately 5 volts (lowest speed) to 12 volts (highest speed).

The control blower speed (in the range of 5 to 12V), the automatic amplifier supplies a gate voltage to the fan control amplifier. Based on this voltage, the fan control amplifier controls the voltage supplied to the blower motor.

Starting Fan Speed Control

Start Up From "COLD SOAK" Condition (Automatic mode)

In a cold start up condition where the engine coolant temperature is below 50°C (122°F), the blower will not operate for a short period of time (up to 126 seconds). The exact start delay time varies depending on the ambient and engine coolant temperature.

In the most extreme case (very low ambient) the blower starting delay will be 126 seconds as described above. After this delay, the blower will operate at low speed until the engine coolant temperature rises above 55°C (131°F), at which time the blower speed will increase to the objective speed.

Start Up From Normal or "HOT SOAK" Condition (Automatic mode)

The blower will begin operation momentarily after the AUTO button is pushed. The blower speed will gradually rise to the objective speed over a time period of 3 seconds or less (actual time depends on the objective blower speed).

Blower Speed Compensation

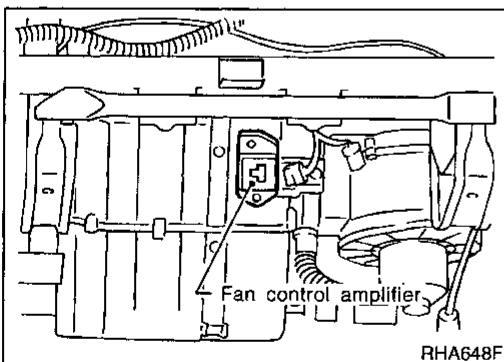
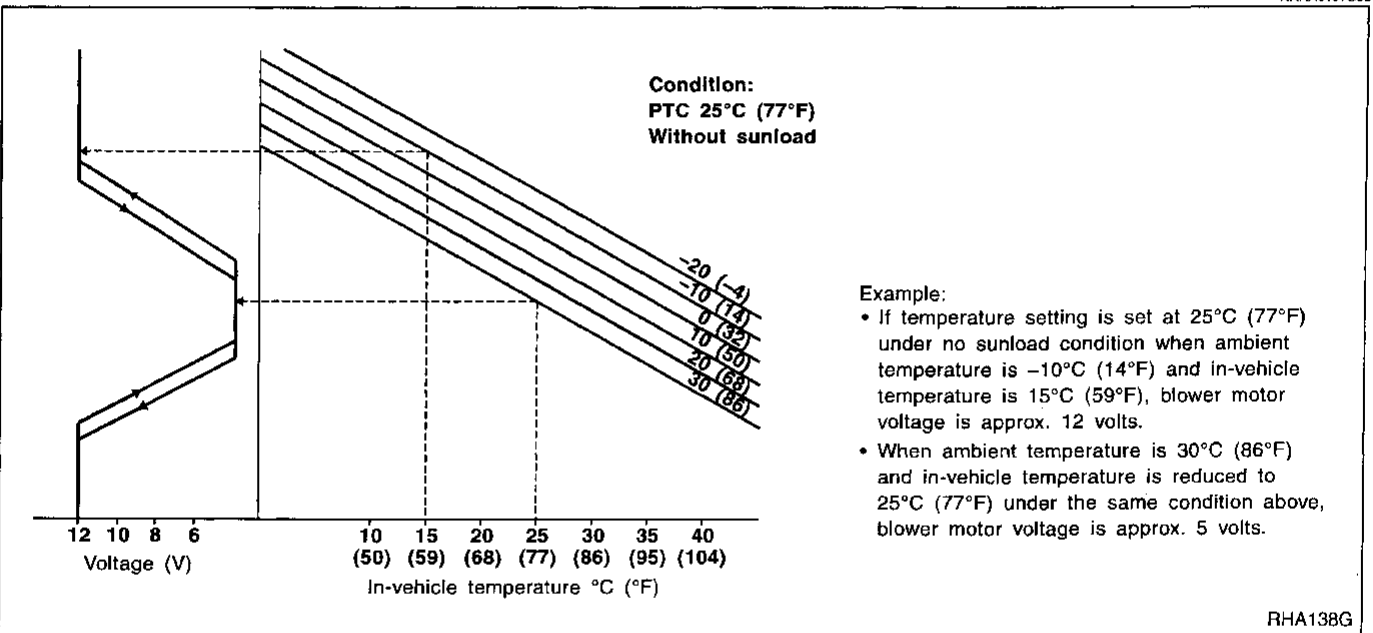
Sunload

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

Ambient

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

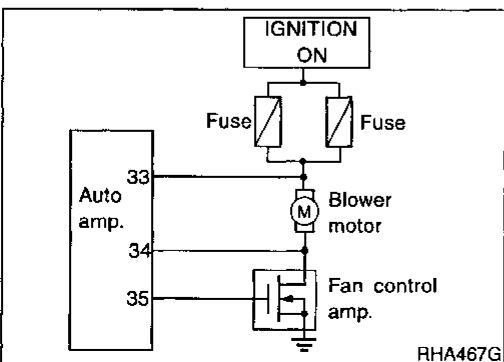
Fan Speed Control Specification



COMPONENT DESCRIPTION

Fan Control Amplifier

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



DIAGNOSTIC PROCEDURE

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

Blower Motor (Cont'd)

| | |
|--|--|
| 1 | CHECK POWER SUPPLY FOR FAN CONTROL AMP. |
| <p>Disconnect fan control amp. harness connector. Do approx. 12 volts exist between fan control amp. harness terminal No. 3 and body ground?</p> | |
| | |
| RHA480G | |
| Yes or No | |
| Yes | ▶ GO TO 2. |
| No | ▶ GO TO 7. |

| | |
|---|--|
| 2 | CHECK BODY GROUND CIRCUIT FOR FAN CONTROL AMP. |
| <p>Does continuity exist between fan control amp. harness terminal No. 1 and body ground?</p> | |
| | |
| RHA089G | |
| Yes or No | |
| Yes | ▶ Reconnect fan control amp. harness connector. And GO TO 3. |
| No | ▶ Repair harness or connector. |

| | | | |
|--|---|-------|----|
| 3 | CHECK FOR AUTO AMP. OUTPUT | | |
| <p>Set up Self-diagnosis STEP 4. Measure voltage across fan control amp. harness terminal No. 2 and body ground.</p> | | | |
| | | | |
| RHA481G | | | |
| Self-diagnosis STEP 4 | | | |
| <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">41-45</td> <td style="text-align: center;">46</td> </tr> </table> | | 41-45 | 46 |
| 41-45 | 46 | | |
| MTBL0061 | | | |
| OK or NG | | | |
| OK | ▶ <ol style="list-style-type: none"> 1. Replace fan control amp. 2. Go to self-diagnosis step-by-step procedure (HA-38) and perform self-diagnosis STEP-4. Confirm that blower motor operation is normal. | | |
| NG | ▶ GO TO 4. | | |

| Code No. | Terminal No. | | Voltage |
|----------|--------------|-------------|------------------|
| | (+) | (-) | |
| 41-45 | (2) | Body ground | Approx. 2.5 - 3V |
| 46 | | | Approx. 9 - 10V |

| | |
|--|--|
| 4 | CHECK FAN CONTROL AMP. CIRCUIT BETWEEN FAN CONTROL AMP. AND AUTO AMP. (LCU) |
| <p>1. Disconnect auto amp. (LCU) and fan control amp. harness connector.</p> <p>2. Check circuit continuity between auto amp. (LCU) harness terminal No. 35 and fan control amp. harness terminal No. 2.</p> | |
| <p style="text-align: right;">RHA468G</p> | |
| <p>Continuity should exist. If OK, check harness for short.</p> <p style="text-align: center;">OK or NG</p> | |
| OK | ▶ GO TO 5. |
| NG | ▶ Repair harness or connector. |

| | |
|---|--|
| 5 | CHECK FAN FEED BACK CIRCUIT |
| <p>Reconnect auto amp. (LCU) harness connector.</p> <p>Do approx. 12 volts exist between auto amp. (LCU) harness terminal No. 33 and body ground?</p> | |
| <p style="text-align: right;">RHA470GC</p> | |
| <p style="text-align: center;">Yes or No</p> | |
| Yes | ▶ GO TO 6. |
| No | ▶ Check power supply circuit and 15A fuses (No. 1 and 2, located in the fuse block). Refer to EL section ("Wiring Diagram", "POWER SUPPLY ROUTING"). <ul style="list-style-type: none"> • If OK, check for open circuit in wiring harness. Repair or replace as necessary. • If NG, replace fuse and check wiring harness for short circuit. Repair or replace as necessary. |

| | |
|---|--|
| 6 | CHECK POWER SUPPLY FOR AUTO AMP. |
| <p>Do approx. 12 volts exist between auto amp. harness terminal No. 34 and body ground?</p> | |
| <p style="text-align: right;">RHA469GB</p> | |
| <p style="text-align: center;">Yes or No</p> | |
| Yes | ▶ 1. Replace auto amp. 2. Go to self-diagnosis step-by-step procedure (HA-38) and perform self-diagnosis STEP-4. Confirm that blower motor operation is normal. |
| No | ▶ GO TO 9. |

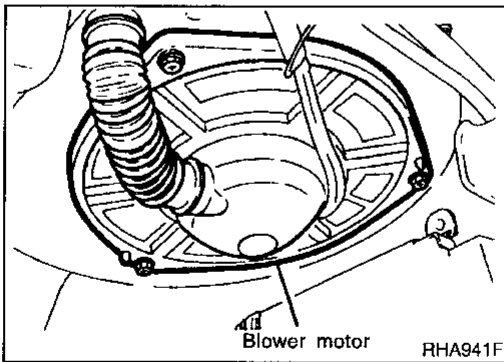
| | |
|---|---|
| 7 | CHECK POWER SUPPLY FOR BLOWER MOTOR |
| <p>Disconnect blower motor harness connector.</p> <p>Do approx. 12 volts exist between blower motor harness terminal No. 1 and body ground?</p> | |
| <p style="text-align: right;">RHA091G</p> | |
| <p style="text-align: center;">Yes or No</p> | |
| Yes | ▶ GO TO 8. |
| No | ▶ Check power supply circuit and 15A fuses (No. 1 and 2, located in the fuse block). <ul style="list-style-type: none"> • If OK, check for open circuit in wiring harness. Repair or replace as necessary. • If NG, replace fuse and check wiring harness for short circuit. Repair or replace as necessary. |

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Blower Motor (Cont'd)

| | |
|--|---|
| 8 | CHECK CIRCUIT CONTINUITY BETWEEN BLOWER MOTOR AND FAN CONTROL AMP. |
| <p>Disconnect blower motor connector and auto amp. (LCU) connector.</p> <p>Check circuit continuity between blower motor harness terminal No. 2 and fan control amp. harness terminal No. 3.</p> | |
| | |
| RHA472G | |
| OK or NG | |
| OK | <p>▶ Check blower motor. (Refer to HA-68.)</p> <ol style="list-style-type: none"> 1. If NG, replace blower motor. 2. Go to self-diagnosis step-by-step procedure (HA-38) and perform self-diagnosis STEP-4. Confirm that blower motor operation is normal. |
| NG | ▶ Repair harness or connector. |

| | |
|--|--|
| 9 | CHECK BLOWER MOTOR CIRCUIT BETWEEN BLOWER MOTOR AND AUTO AMP. (LCU) |
| <p>Check circuit continuity between blower motor harness terminal No. 2 and auto amp. (LCU) harness terminal No. 34.</p> | |
| | |
| RHA471GB | |
| Continuity should exist. | |
| OK or NG | |
| OK | ▶ Check harness for short. |
| NG | ▶ Repair harness or connector. |



COMPONENT INSPECTION

Blower Motor

Confirm smooth rotation of the blower motor.

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

NAHA0200

NAHA0200S01

Magnet Clutch

TROUBLE DIAGNOSIS PROCEDURE FOR MAGNET CLUTCH

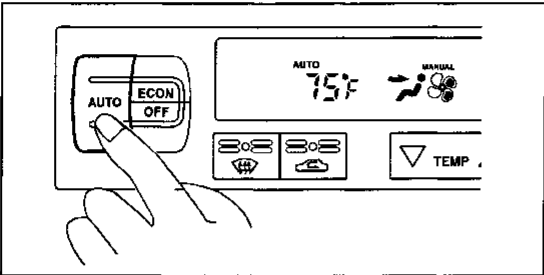
SYMPTOM:

- Magnet clutch does not engage.

INSPECTION FLOW

-NAHA0201

1. Confirm symptom by performing operational check.



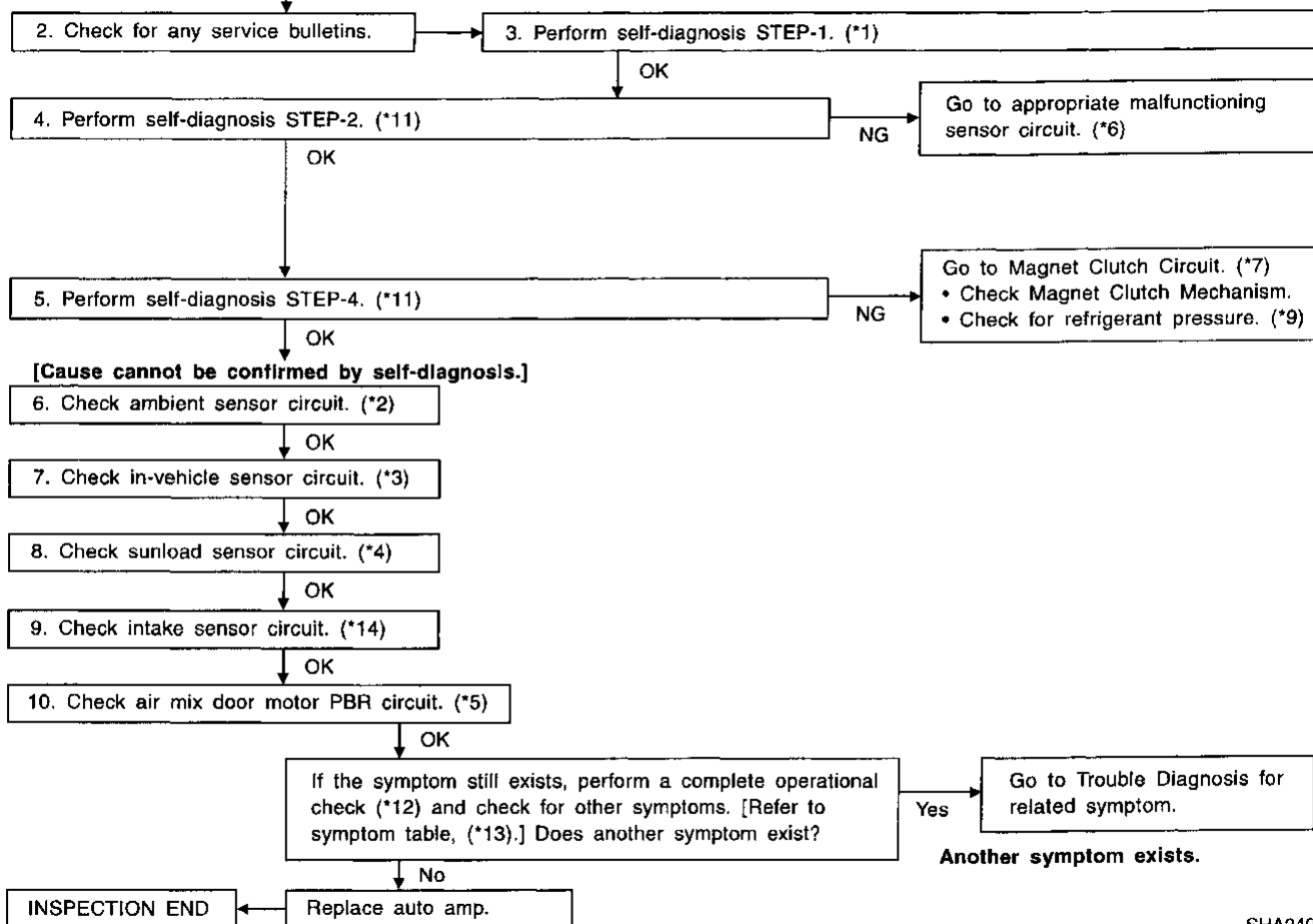
OPERATIONAL CHECK – AUTO mode

a. Press AUTO switch.

b. Display should indicate AUTO (not ECON). Confirm that the compressor clutch engages (audio or visual inspection). (Discharge air and blower speed will depend on ambient, in-vehicle and set temperatures.)

If OK (symptom cannot be duplicated), perform complete operational check (*10).

If NG (symptom is confirmed), continue with STEP-2 following.



*1: STEP-BY-STEP PROCEDURE (HA-37)
 *2: HA-86
 *3: HA-89
 *4: HA-91
 *5: HA-96

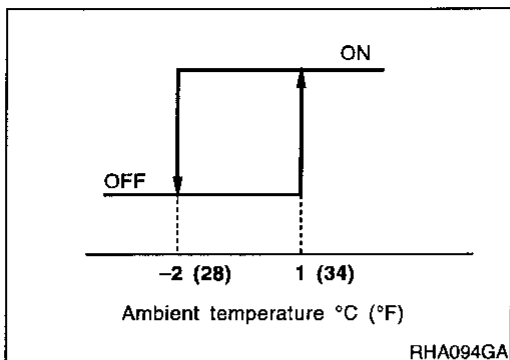
*6: STEP-BY-STEP PROCEDURE (HA-38), see No. 13.
 *7: HA-70
 *8: HA-102
 *9: HA-107
 *10: HA-44

*11: HA-38
 *12: HA-44
 *13: HA-43
 *14: HA-94

SHA249F

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Magnet Clutch (Cont'd)



SYSTEM DESCRIPTION

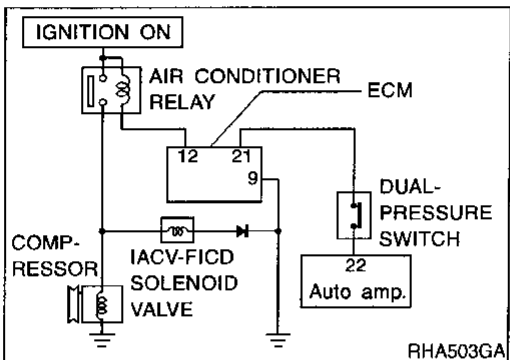
-NAHA0202

Auto amplifier controls compressor operation by ambient temperature and signal from ECM.

Low Temperature Protection Control

NAHA0202S01

Auto amplifier will turn the compressor "ON" or "OFF" as determined by a signal detected by ambient sensor. When ambient temperatures are greater than 1°C (34°F), the compressor turns "ON". The compressor turns "OFF" when ambient temperatures are less than -2°C (28°F).



DIAGNOSTIC PROCEDURE

NAHA0203

SYMPTOM: Magnet clutch does not engage when **AUTO** switch is ON.

| | |
|--|--|
| 1 | CHECK POWER SUPPLY FOR COMPRESSOR |
| <p>Disconnect compressor harness connector. Do approx. 12 volts exist between compressor harness terminal No. 1 and body ground?</p> | |
| <p>Compressor connector (F202)</p> | |
| <p>Yes or No</p> | |
| Yes | <p>▶ Check magnet clutch coil.</p> <ol style="list-style-type: none"> If NG, replace magnet clutch. Refer to HA-102. Go to self-diagnosis step-by-step procedure (HA-38) and perform self-diagnosis STEP-4. Confirm that magnet clutch operation is normal. |
| No | <p>▶ Disconnect A/C relay. And GO TO 2.</p> |

| | |
|--|--|
| 2 | CHECK CIRCUIT CONTINUITY BETWEEN A/C RELAY HARNESS TERMINAL NO. 5 AND COMPRESSOR HARNESS TERMINAL NO. 1 |
| <p>Compressor connector (F202)</p> <p>A/C relay connector (E26)</p> | |
| <p>Continuity should exist. If OK, check harness for short.</p> | |
| <p>OK or NG</p> | |
| OK | <p>▶ GO TO 3.</p> |
| NG | <p>▶ Repair harness or connector.</p> |

| | |
|--|---|
| 3 | CHECK POWER SUPPLY FOR A/C RELAY |
| <p>Disconnect A/C relay. Do approx. 12 volts exist between A/C relay harness terminal Nos. 2, 3 and body ground?</p> | |
| | |
| RHA614F | |
| Yes or No | |
| Yes | ▶ GO TO 4. |
| No | ▶ Check power supply circuit and 7.5A (No. 6) fuse at fuse block. Refer to EL section ("Wiring Diagram", "POWER SUPPLY ROUTING"). <ul style="list-style-type: none"> ● If OK, check for open circuit in wiring harness. Repair or replace as necessary. ● If NG, replace fuse and check wiring harness for short circuit. Repair or replace as necessary. |

| | |
|-----------------|--|
| 4 | CHECK A/C RELAY AFTER DISCONNECTING IT |
| Refer to HA-72. | |
| OK or NG | |
| OK | ▶ Reconnect A/C relay. And GO TO 5. |
| No | ▶ <ol style="list-style-type: none"> 1. Replace A/C relay. 2. Go to self-diagnosis step-by-step procedure (HA-38) and perform self-diagnosis STEP-4. Confirm that magnet clutch operation is normal. |

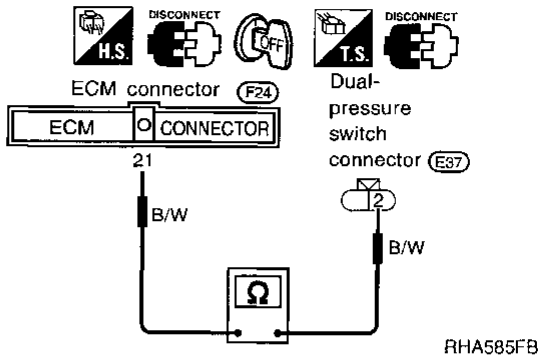
| | |
|--|---|
| 5 | CHECK COIL SIDE CIRCUIT OF A/C RELAY |
| Do approx. 12 volts exist between ECM harness terminal No. 12 and body ground? | |
| | |
| RHA482GB | |
| Yes or No | |
| Yes | ▶ GO TO 6. |
| No | ▶ Disconnect A/C relay. Disconnect ECM harness connector. GO TO 10. |

| | |
|--|---|
| 6 | CHECK VOLTAGE FOR ECM |
| Do approx. 12 volts exist between ECM harness terminal No. 21 and body ground? | |
| | |
| RHA701FC | |
| Yes or No | |
| Yes | ▶ Disconnect ECM harness connector. Disconnect dual-pressure switch harness connector. GO TO 7. |
| No | ▶ Check ECM. Refer to EC section. |

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Magnet Clutch (Cont'd)

7 CHECK CIRCUIT CONTINUITY BETWEEN ECM HARNESS TERMINAL NO. 21 AND DUAL-PRESSURE SWITCH HARNESS TERMINAL NO. 2



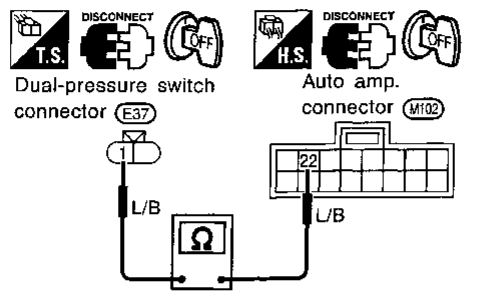
Continuity should exist.
If OK, check harness for short.

OK or NG

| | | |
|----|---|---|
| OK | ▶ | GO TO 8. |
| NG | ▶ | 1. Repair harness or connector. 2. Go to self-diagnosis step-by-step procedure (HA-38) and perform self-diagnosis STEP-4. Confirm that magnet clutch operation is normal. |

9 CHECK DUAL-PRESSURE SWITCH CIRCUIT BETWEEN DUAL-PRESSURE AND AUTO AMP. (LCU)

Check circuit continuity between auto amp. harness terminal No. 22 and dual-pressure switch terminal No. 1.



Continuity should exist.
If OK, check harness for short.

OK or NG

| | | |
|----|---|--|
| OK | ▶ | 1. Replace auto amp. 2. Go to self-diagnosis step-by-step procedure (HA-38) and perform self-diagnosis STEP-4. Confirm that magnet clutch operation is normal. |
| NG | ▶ | Repair harness or connector. |

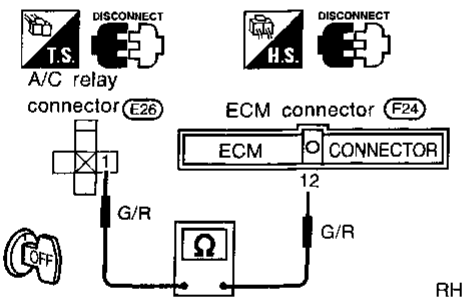
8 CHECK DUAL-PRESSURE SWITCH

Refer to HA-73.

OK or NG

| | | |
|----|---|---|
| OK | ▶ | Disconnect A/C switch harness connector. And GO TO 9. |
| NG | ▶ | Replace dual-pressure switch. |

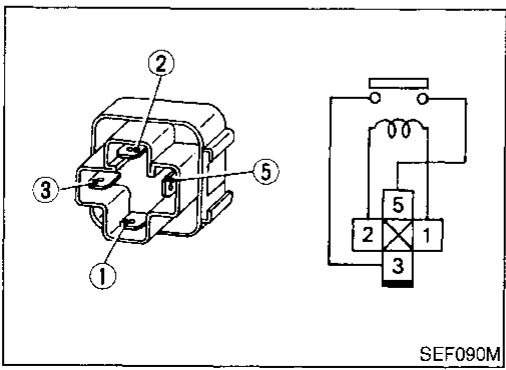
10 CHECK CIRCUIT CONTINUITY BETWEEN A/C RELAY HARNESS TERMINAL NO. 1 AND ECM HARNESS TERMINAL NO. 12



Continuity should exist.

OK or NG

| | | |
|----|---|------------------------------|
| OK | ▶ | Check harness for short. |
| NG | ▶ | Repair harness or connector. |



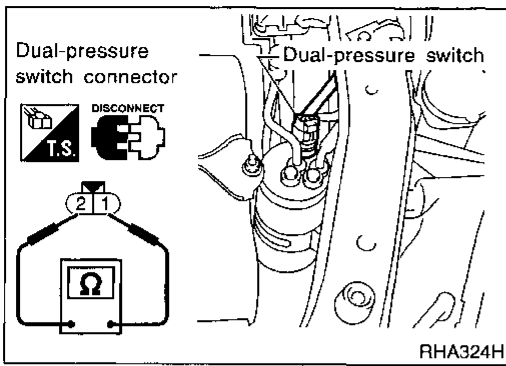
COMPONENT INSPECTION
A/C Relay

NAHA0204
NAHA0204S01

Check continuity between terminal Nos. 3 and 5.

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

If NG, replace relay.



Dual-pressure Switch

NAHA0204S02

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

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Insufficient Cooling

TROUBLE DIAGNOSIS PROCEDURE FOR INSUFFICIENT COOLING

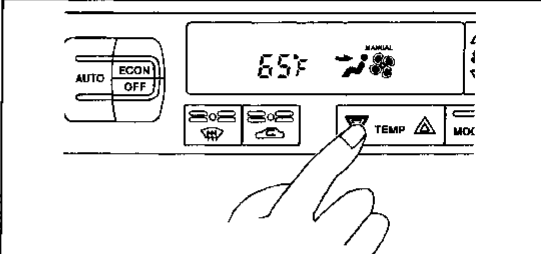
=NAHA0205

SYMPTOM:

- Insufficient cooling

INSPECTION FLOW

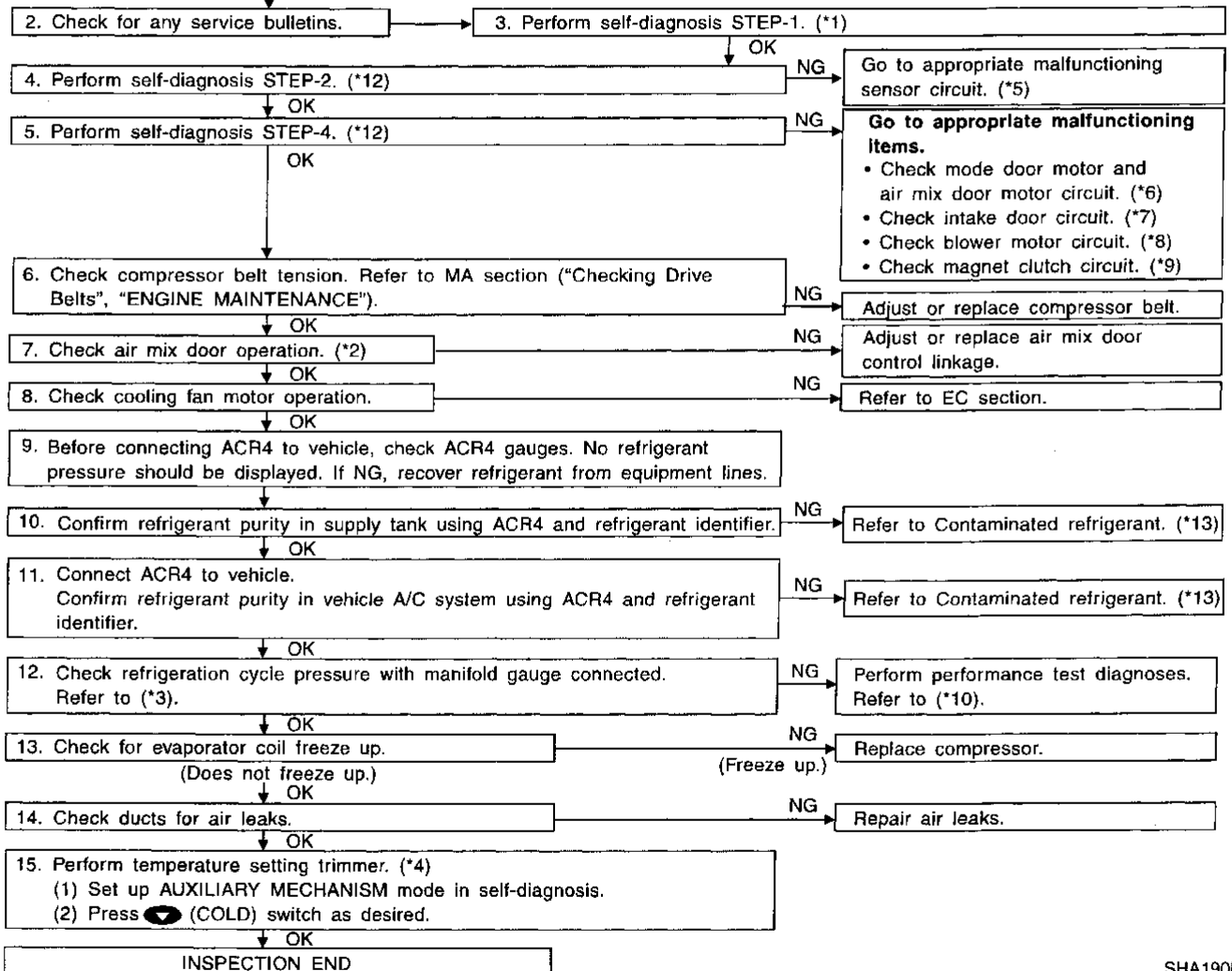
1. Confirm symptom by performing the following operational check.



OPERATIONAL CHECK – Temperature decrease

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

If OK (symptom cannot be duplicated), perform complete operational check (*11).
If NG (symptom is confirmed), continue with STEP-2 following.



SHA190F

- *1: HA-37
- *2: HA-56
- *3: HA-77
- *4: HA-42
- *5: STEP-BY-STEP PROCEDURE (HA-38), see No. 13.

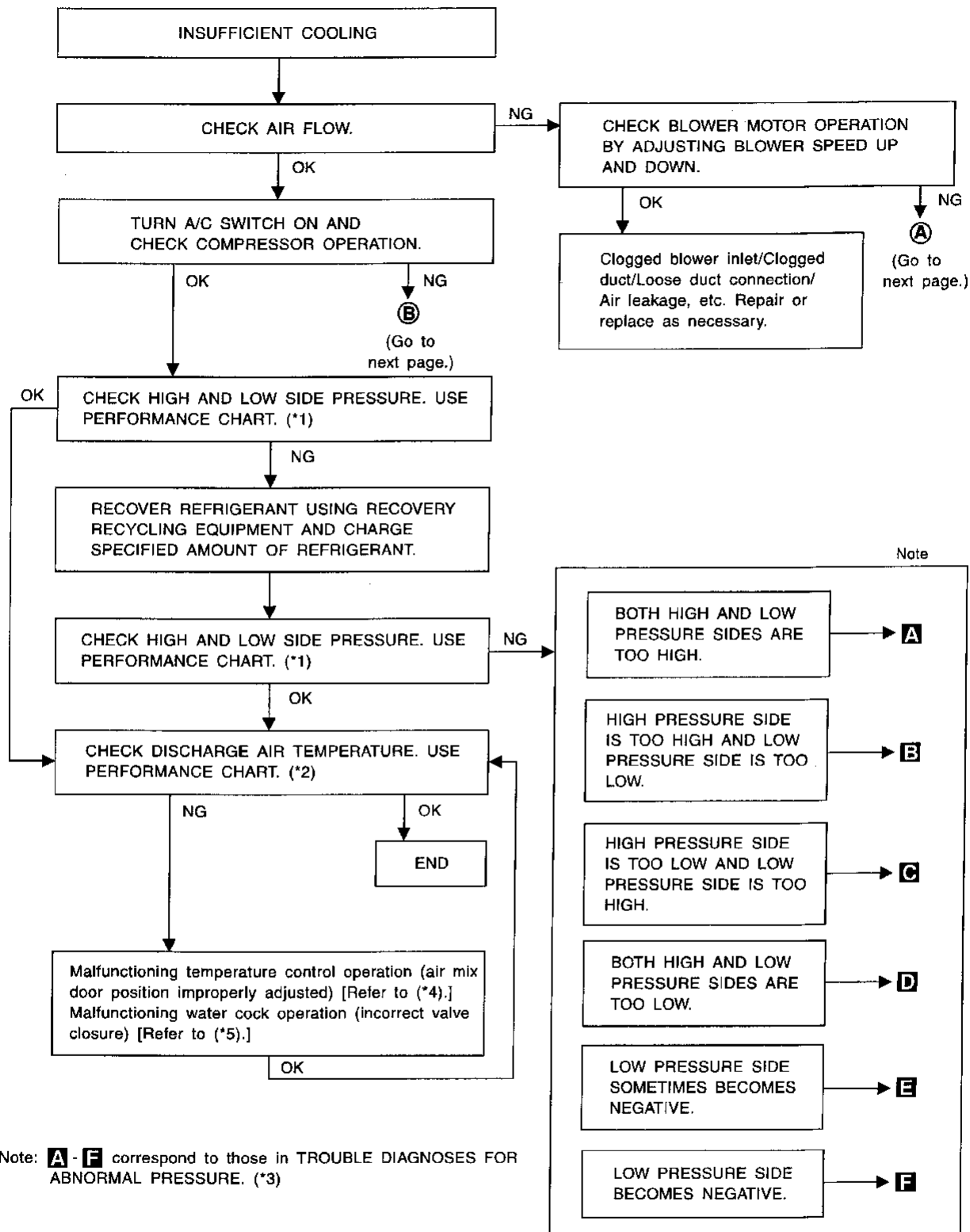
- *6: HA-50
- *7: HA-59
- *8: HA-64
- *9: HA-70

- *10: HA-75
- *11: HA-44
- *12: HA-38
- *13: HA-2

PERFORMANCE TEST DIAGNOSES

NAHA0206

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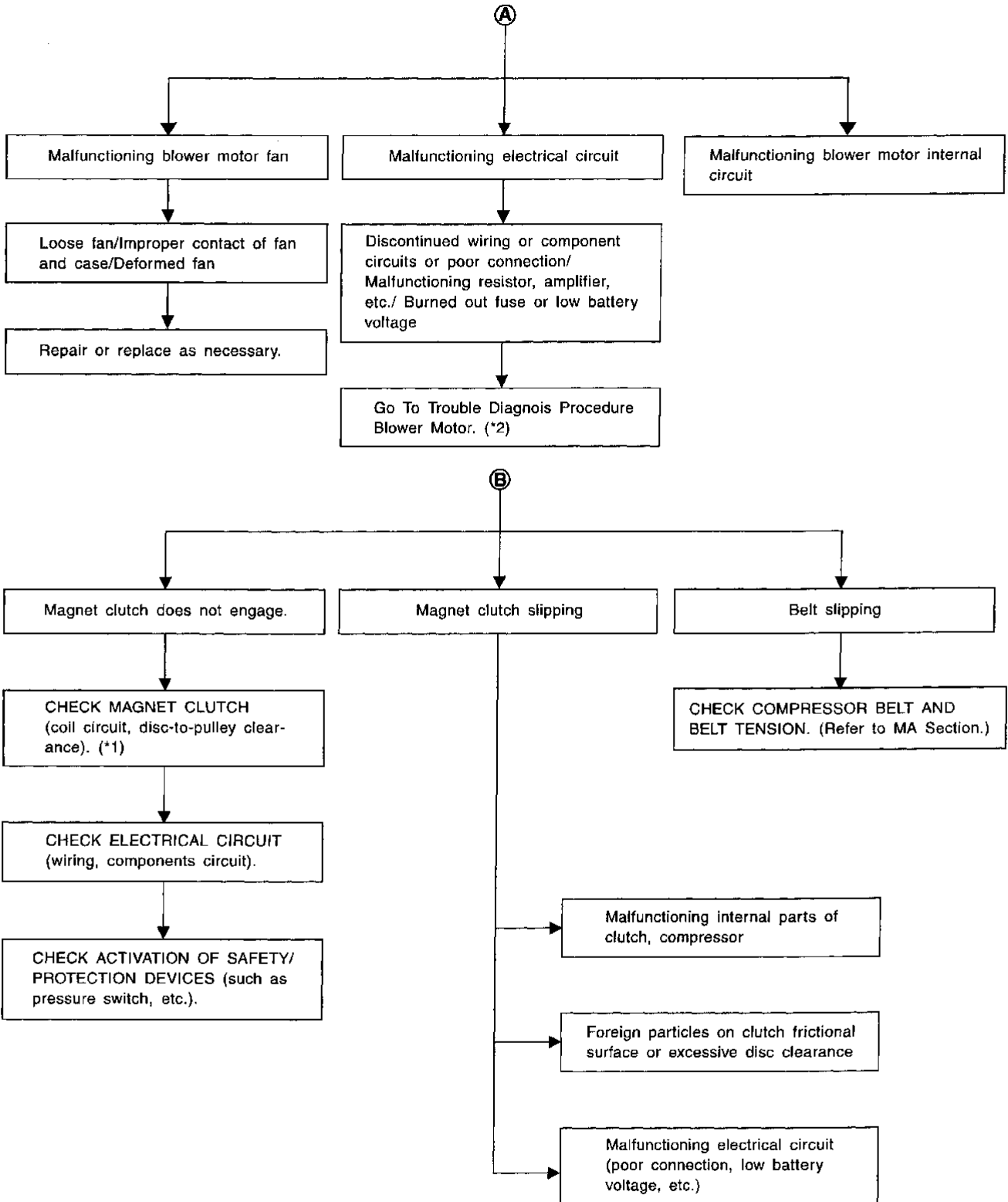
Note: **A - F** correspond to those in TROUBLE DIAGNOSES FOR ABNORMAL PRESSURE. (*3)

*1: HA-77
*2: HA-77

*3: HA-77
*4: HA-56

*5: HA-56

SHA893E



SHA289F

*1: HA-101

*2: HA-63

TROUBLE DIAGNOSES

AUTO

Insufficient Cooling (Cont'd)




PERFORMANCE CHART

Test Condition

Testing must be performed as follows:

NAHA0207

NAHA0207S01

| | |
|--|---|
| Vehicle location | Indoors or in the shade (in a well-ventilated place) |
| Doors | Closed |
| Door window | Open |
| Hood | Open |
| TEMP. | Max. COLD |
| Mode switch |  (Ventilation) set |
| REC switch |  (Recirculation) set |
|  (blower) speed | Max. speed set |
| Engine speed | Idle speed |

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

Test Reading

Recirculating-to-discharge Air Temperature Table

NAHA0207S02

NAHA0207S0201

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

Ambient Air Temperature-to-operating Pressure Table

NAHA0207S0202

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

TROUBLE DIAGNOSES FOR ABNORMAL PRESSURE

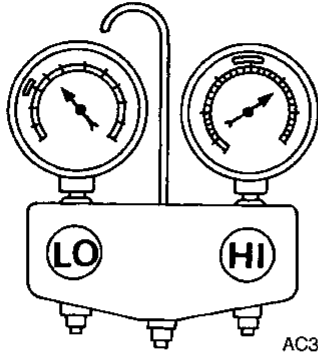
NAHA0208

Whenever system's high and/or low side pressure is abnormal, diagnose using a manifold gauge. The marker above the gauge scale in the following tables indicates the standard (normal) pressure range. Since the standard (normal) pressure, however, differs from vehicle to vehicle, refer to HA-77 ("Ambient air temperature-to-operating pressure table").

Insufficient Cooling (Cont'd)

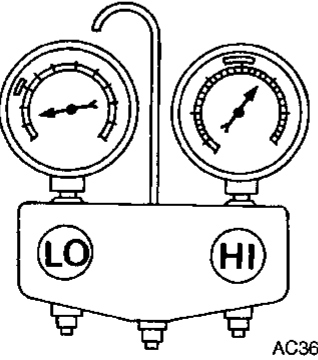
Both High and Low-pressure Sides are Too High.

NAHA0208S01

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

High-pressure Side is Too High and Low-pressure Side is Too Low.

NAHA0208S02

| Gauge indication | Refrigerant cycle | Probable cause | Corrective action |
|---|---|--|---|
| High-pressure side is too high and low-pressure side is too low. B  AC360A | Upper side of condenser and high-pressure side are hot, however, liquid tank is not so hot. | High-pressure tube or parts located between compressor and condenser are clogged or crushed. | <ul style="list-style-type: none"> Check and repair or replace malfunctioning parts. Check lubricant for contamination. |

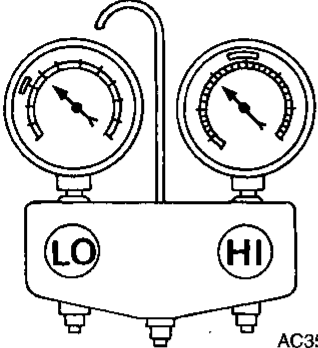
TROUBLE DIAGNOSES

AUTO

Insufficient Cooling (Cont'd)

High-pressure Side is Too Low and Low-pressure Side is Too High.

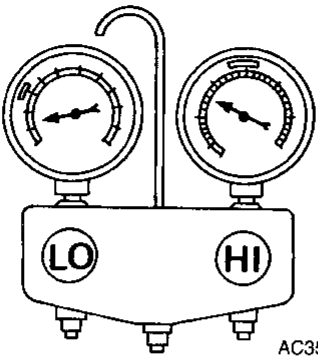
NAHA0208503

| Gauge indication | Refrigerant cycle | Probable cause | Corrective action |
|---|---|--|---------------------|
| High-pressure side is too low and low-pressure side is too high.  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. |

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- IDX

Both High- and Low-pressure Sides are Too Low.

NAHA0208504

| Gauge indication | Refrigerant cycle | Probable cause | Corrective action |
|---|--|---|---|
| <p>Both high- and low-pressure sides are too low.</p> <p>D</p>  <p style="text-align: right; margin-right: 50px;"><small>AC353A</small></p> | <ul style="list-style-type: none"> ● There is a big temperature difference between receiver drier outlet and inlet. Outlet temperature is extremely low. ● Liquid tank inlet and expansion valve are frosted. | <p>Compressor discharge capacity does not change. (Compressor stroke is set at maximum.)</p> | <ul style="list-style-type: none"> ● Replace liquid tank. ● Check lubricant for contamination. |
| | <ul style="list-style-type: none"> ● Temperature of expansion valve inlet is extremely low as compared with areas near liquid tank. ● Expansion valve inlet may be frosted. ● Temperature difference occurs somewhere in high-pressure side | <p>High-pressure pipe located between receiver drier and expansion valve is clogged.</p> | <ul style="list-style-type: none"> ● Check and repair malfunctioning parts. ● Check lubricant for contamination. |
| | <ul style="list-style-type: none"> ● Expansion valve and liquid tank are warm or only cool when touched. | <p>Low refrigerant charge</p> <p style="text-align: center;">↓</p> <p>Leaking fittings or components</p> | <p>Check refrigerant for leaks. Refer to "Checking Refrigerant Leaks", HA-107.</p> |
| | <p>There is a big temperature difference between expansion valve inlet and outlet while the valve itself is frosted.</p> | <p>Expansion valve closes a little compared with the specification.</p> <p style="text-align: center;">↓</p> <ol style="list-style-type: none"> 1. Improper expansion valve adjustment 2. Malfunctioning thermal valve 3. Outlet and inlet may be clogged. | <ul style="list-style-type: none"> ● Remove foreign particles by using compressed air. ● Check lubricant for contamination. |
| | <p>An area of the low-pressure pipe is colder than areas near the evaporator outlet.</p> | <p>Low-pressure pipe is clogged or crushed.</p> | <ul style="list-style-type: none"> ● Check and repair malfunctioning parts. ● Check lubricant for contamination. |
| | <p>Air flow volume is not enough or is too low.</p> | <p>Evaporator is frozen.</p> <p style="text-align: center;">↓</p> <p>Compressor discharge capacity does not change. (Compressor stroke is set at maximum length.)</p> | <p>Replace compressor.</p> |

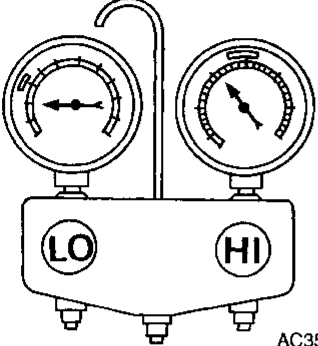
TROUBLE DIAGNOSES

AUTO

Insufficient Cooling (Cont'd)

Low-pressure Side Sometimes Becomes Negative.

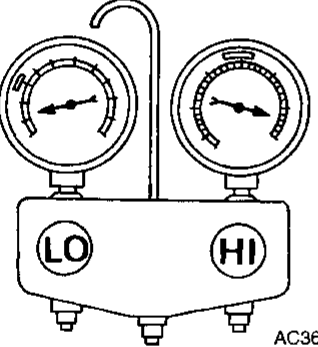
NAHA0208S05

| Gauge indication | Refrigerant cycle | Probable cause | Corrective action |
|---|--|--|--|
| <p>Low-pressure side sometimes becomes negative.</p> <p>E</p>  <p style="text-align: right; font-size: small;">AC354A</p> | <ul style="list-style-type: none"> ● Air conditioning system does not function and does not cyclically cool the compartment air. ● The system constantly functions for a certain period of time after compressor is stopped and restarted. | <p>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"> ● Drain water from refrigerant or replace refrigerant. ● Replace liquid tank. |

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Low-pressure Side Becomes Negative.

NAHA0208S06

| Gauge indication | Refrigerant cycle | Probable cause | Corrective action |
|--|--|---|---|
| <p>Low-pressure side becomes negative.</p> <p>F</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 until no frost is present. Start it again to check whether or not the problem is caused by water or foreign particles.</p> <ul style="list-style-type: none"> ● If water is the cause, initially cooling is okay. Then the water freezes causing a blockage. Drain water from refrigerant or replace refrigerant. ● If due to foreign particles, remove expansion valve and remove the particles with dry and compressed air (not shop air). ● If either of the above methods cannot correct the problem, replace expansion valve. ● Replace liquid tank. ● Check lubricant for contamination. |

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Insufficient Heating

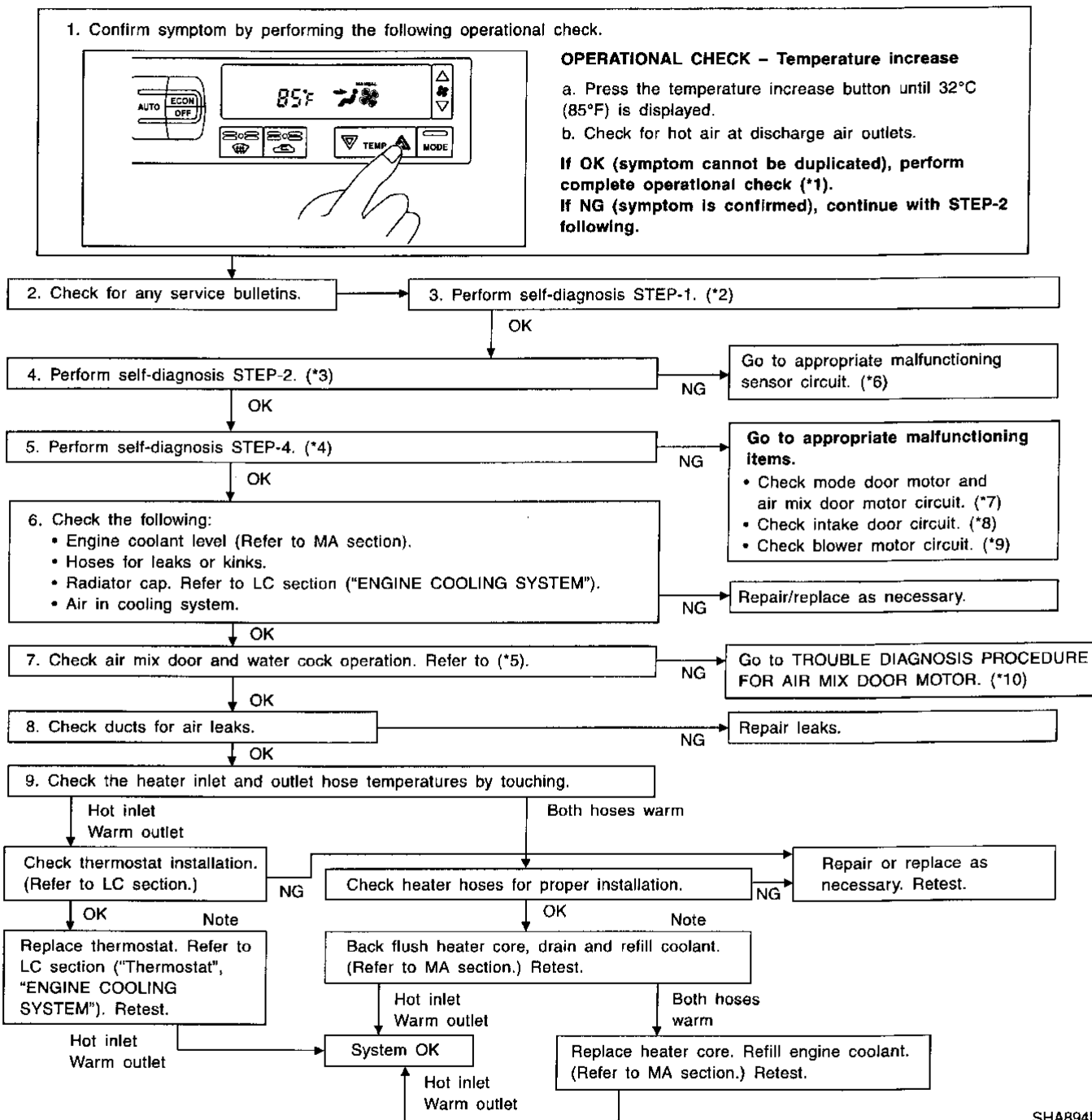
TROUBLE DIAGNOSIS PROCEDURE FOR INSUFFICIENT HEATING

=NAHA0209

SYMPTOM:

- Insufficient heating

INSPECTION FLOW



- *1: HA-44
- *2: HA-37
- *3: HA-38
- *4: HA-38

- *5: HA-56
- *6: STEP-BY-STEP PROCEDURE (HA-38), see No. 13.
- *7: HA-51

- *8: HA-60
- *9: HA-65
- *10: HA-54

SHA894E

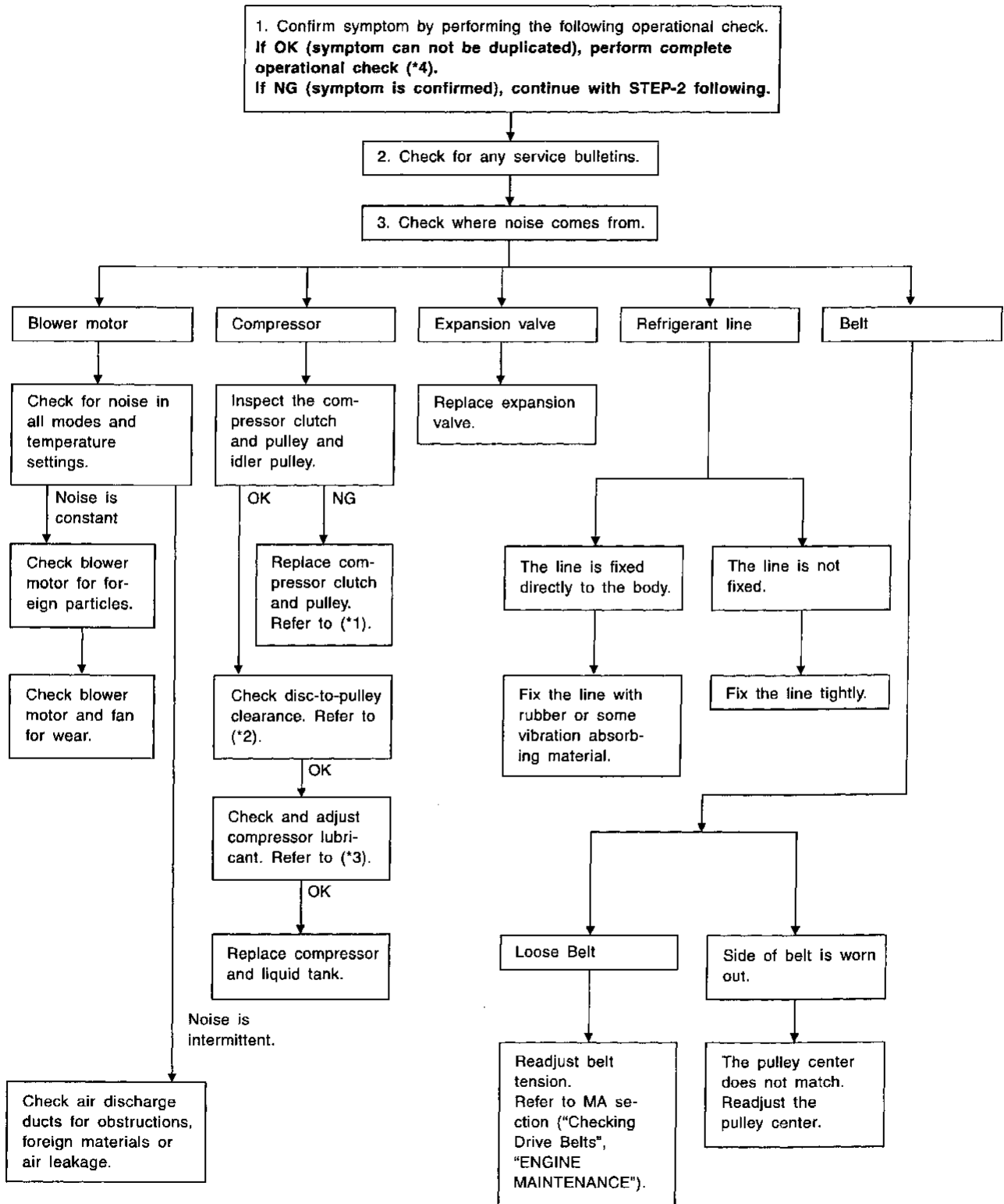
Noise

TROUBLE DIAGNOSIS PROCEDURE FOR NOISE

SYMPTOM:

- Noise

-NAFA0210



*1: HA-102

*2: HA-104

*3: HA-99

*4: HA-44

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Self-diagnosis

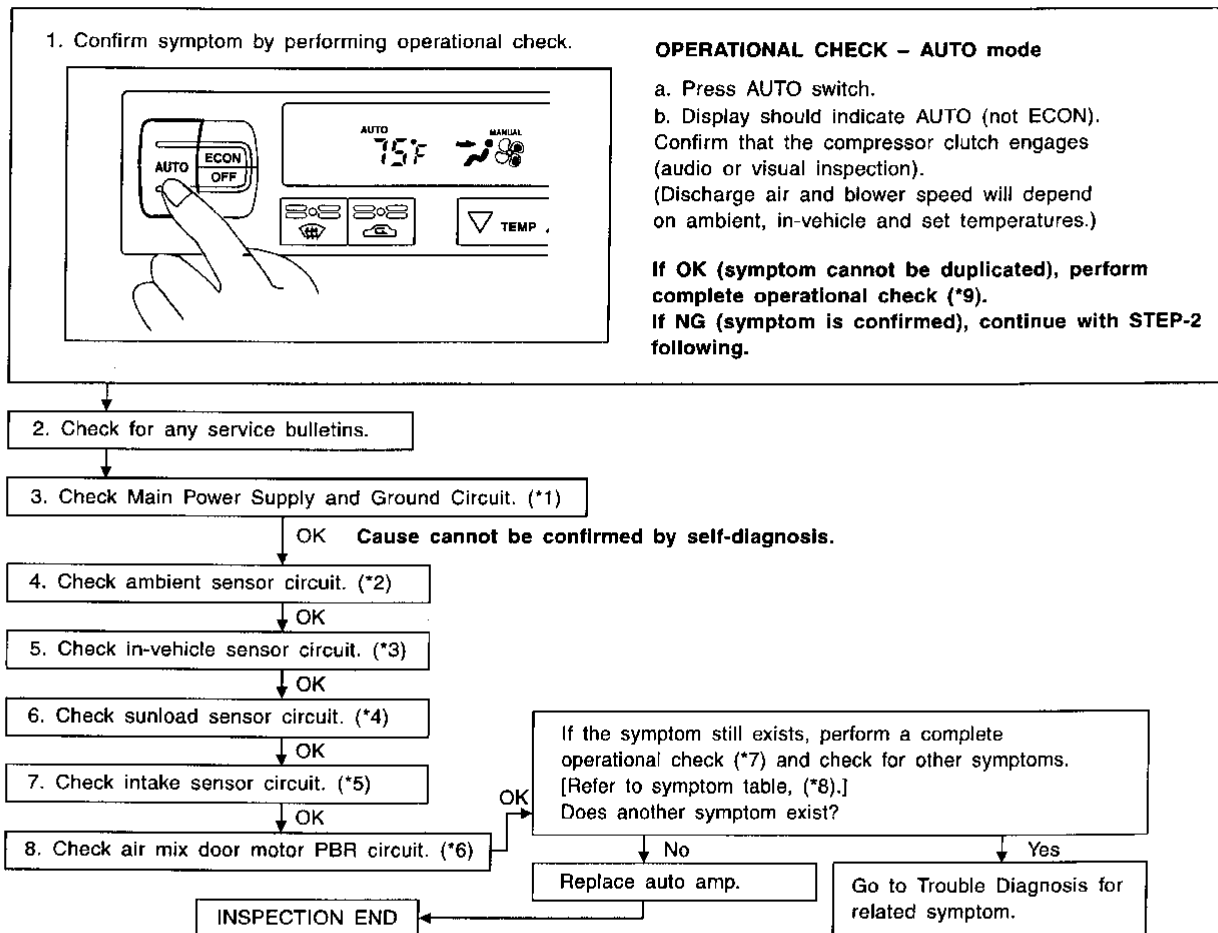
TROUBLE DIAGNOSIS PROCEDURE FOR SELF-DIAGNOSIS

-NAHA0211

SYMPTOM:

- Self-diagnosis cannot be performed.

INSPECTION FLOW



*1: HA-47
 *2: HA-86
 *3: HA-89

*4: HA-91
 *5: HA-94
 *6: HA-96

*7: HA-44
 *8: HA-43
 *9: HA-44

SHA250F

Memory Function

TROUBLE DIAGNOSIS PROCEDURE FOR MEMORY FUNCTION

SYMPTOM:

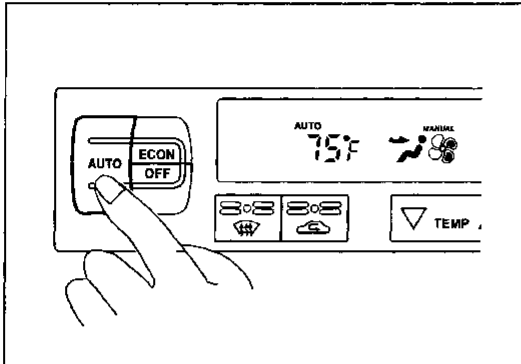
- Memory function does not operate.

INSPECTION FLOW

-NAHA0212

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1. Confirm symptom by performing the following operational check.

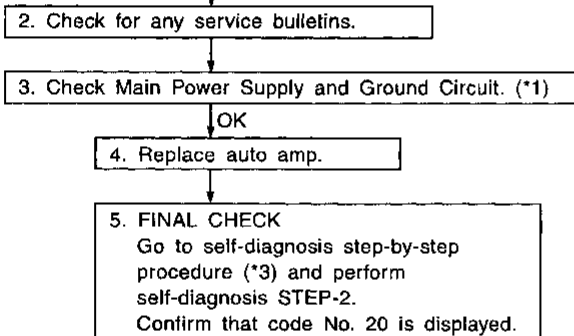


OPERATIONAL CHECK – Memory function

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

If OK (symptom cannot be duplicated), perform complete operational check (*2).

If NG (symptom is confirmed), continue with STEP-2 following.



SHA898E

*1: HA-47

*2: HA-44

*3: HA-38

ECON (ECONOMY) Mode

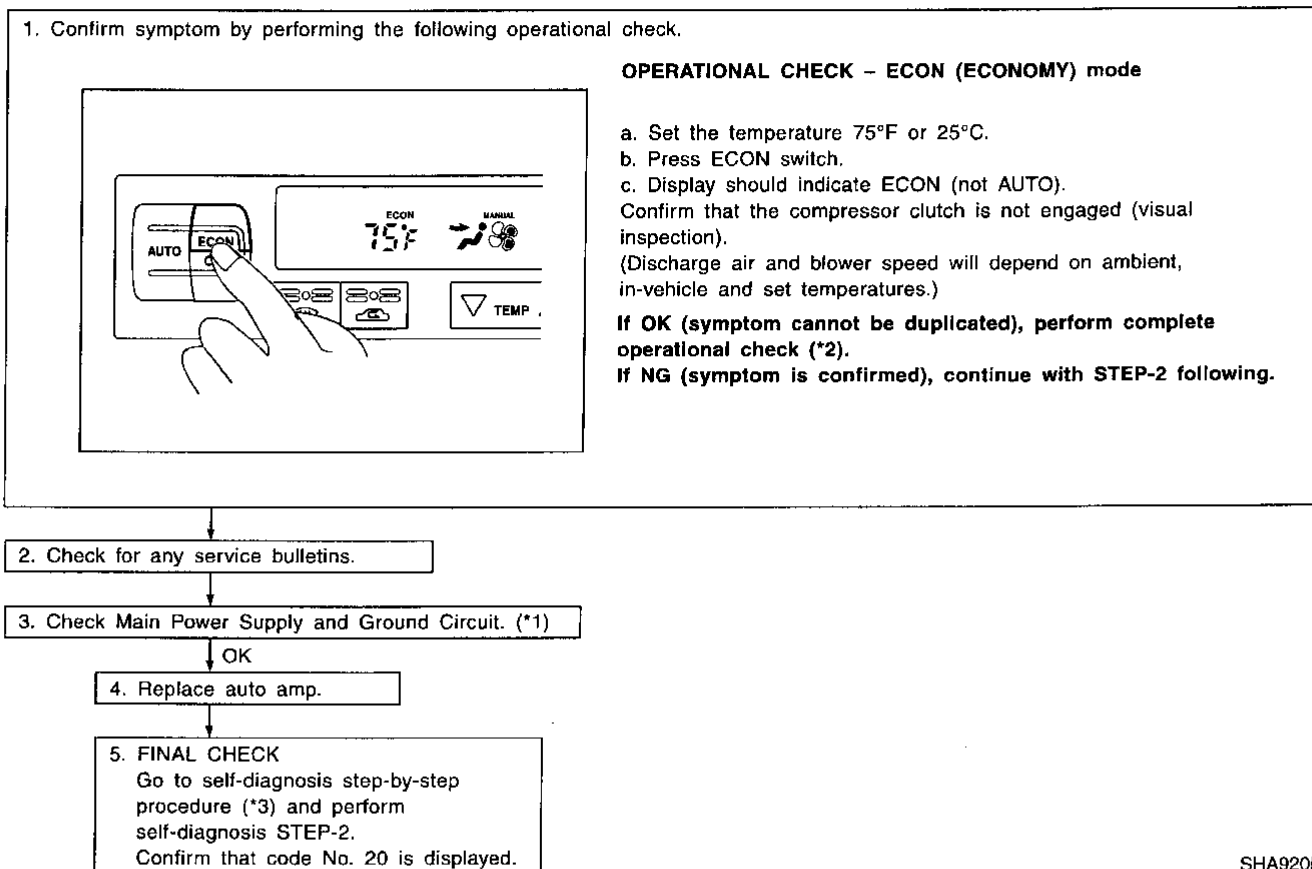
TROUBLE DIAGNOSIS PROCEDURE FOR ECON (ECONOMY) MODE

-NAHA0213

SYMPTOM:

- ECON mode does not operate.

INSPECTION FLOW

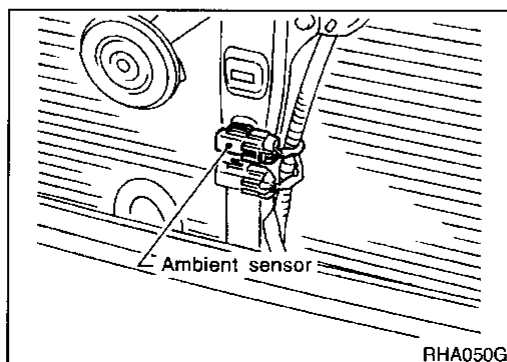


SHA920EA

*1: HA-47

*2: HA-44

*3: HA-38



Ambient Sensor Circuit COMPONENT DESCRIPTION

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

NAHA0214

AMBIENT TEMPERATURE INPUT PROCESS

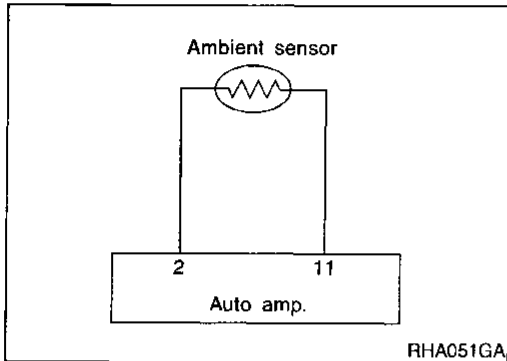
NAHA0215

The automatic amplifier includes a "processing circuit" for the ambient sensor input. However, when the temperature detected by the ambient sensor increases quickly, the processing circuit retards the auto amp. function. It only allows the auto amp. to recognize an ambient temperature increase of 0.33°C (0.6°F) per 100 seconds. As an example, consider stopping for a cup of coffee after high speed driving. Although the actual ambient temperature has not changed, the temperature detected by the ambient sensor will increase. This is because the heat from the engine compartment can radiate to the front grille area, location of the ambient sensor.

DIAGNOSTIC PROCEDURE

NAHA0216

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



RHA051GA

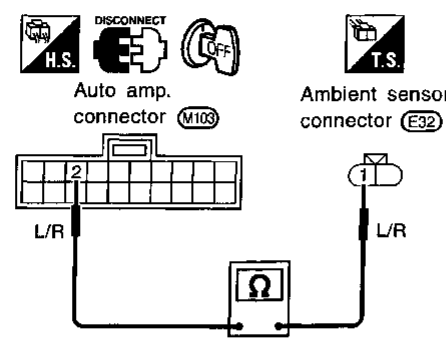
| | |
|---|---|
| 1 | CHECK VOLTAGE BETWEEN AMBIENT SENSOR HARNESS CONNECTOR AND BODY GROUND |
| <p>Disconnect ambient sensor harness connector. Do approx. 5 volts exist between ambient sensor harness terminal No. 1 and body ground?</p> | |
| | |
| RHA052G | |
| Yes or No | |
| Yes | ▶ GO TO 2. |
| No | ▶ GO TO 4. |

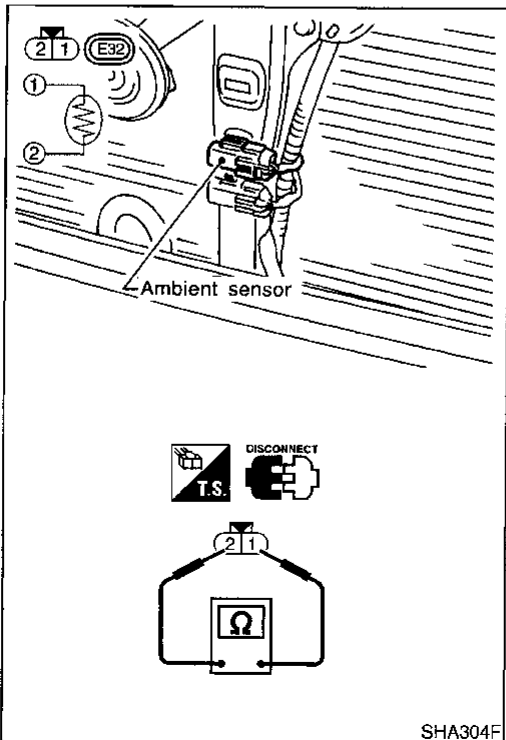
| | |
|--|--|
| 2 | CHECK AMBIENT SENSOR CIRCUIT BETWEEN AMBIENT SENSOR AND AUTO AMP. (LCU) |
| <p>1. Disconnect auto amp. (LCU) harness connector. 2. Check circuit continuity between ambient sensor harness terminal No. 2 and auto amp. (LCU) harness terminal No. 11.</p> | |
| | |
| RHA475G | |
| <p>Continuity should exist. If OK, check harness for short.</p> | |
| OK or NG | |
| OK | ▶ GO TO 3. |
| NG | ▶ Repair harness or connector. |

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Ambient Sensor Circuit (Cont'd)

| | |
|-----------------|---|
| 3 | CHECK AMBIENT SENSOR |
| Refer to HA-88. | |
| OK or NG | |
| OK | <ul style="list-style-type: none"> ▶ 1. Replace auto amp. (LCU). 2. Go to self-diagnosis step-by-step procedure (HA-38) and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed. |
| NG | ▶ Replace ambient sensor. |

| | |
|---|---|
| 4 | CHECK AMBIENT SENSOR CIRCUIT BETWEEN AMBIENT SENSOR AND AUTO AMP. (LCU) |
| <ul style="list-style-type: none"> 1. Disconnect auto amp. (LCU) harness connector. 2. Check circuit continuity between ambient sensor harness terminal No. 1 and auto amp. (LCU) harness terminal No. 2. | |
|  | |
| RHA476G | |
| <p>Continuity should exist. If OK, check harness for short.</p> <p style="text-align: center;">OK or NG</p> | |
| OK | <ul style="list-style-type: none"> ▶ 1. Replace auto amp. (LCU). 2. Go to self-diagnosis step-by-step procedure (HA-38) and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed. |
| NG | ▶ Repair harness or connector. |



COMPONENT INSPECTION

NAHA0217

Ambient Sensor

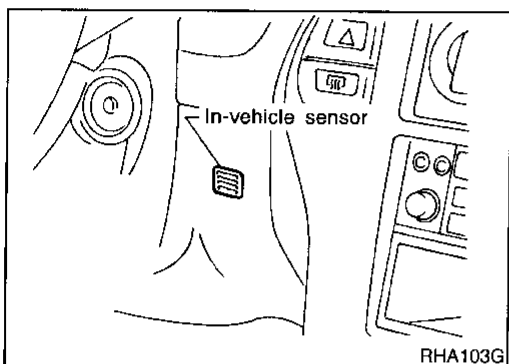
NAHA0217S01

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

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

| Temperature °C (°F) | Resistance kΩ |
|---------------------|---------------|
| 35 (95) | 1.51 |
| 40 (104) | 1.27 |
| 45 (113) | 1.07 |

If NG, replace ambient sensor.



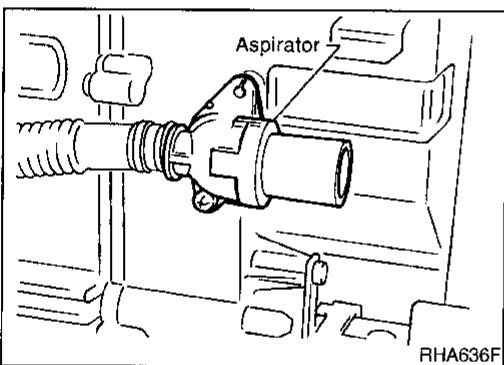
In-vehicle Sensor Circuit COMPONENT DESCRIPTION

In-vehicle sensor

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

NAHA0218

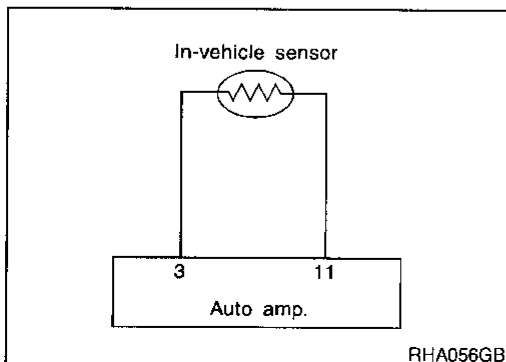
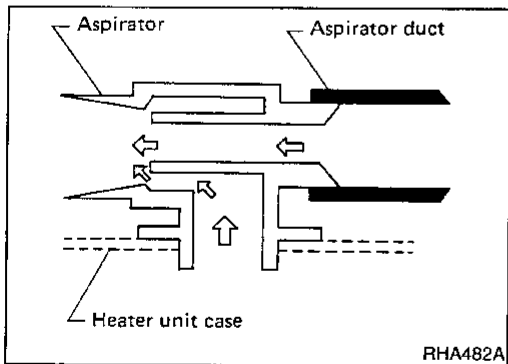
NAHA0218S01



Aspirator

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

NAHA0218S02



DIAGNOSTIC PROCEDURE

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

NAHA0219

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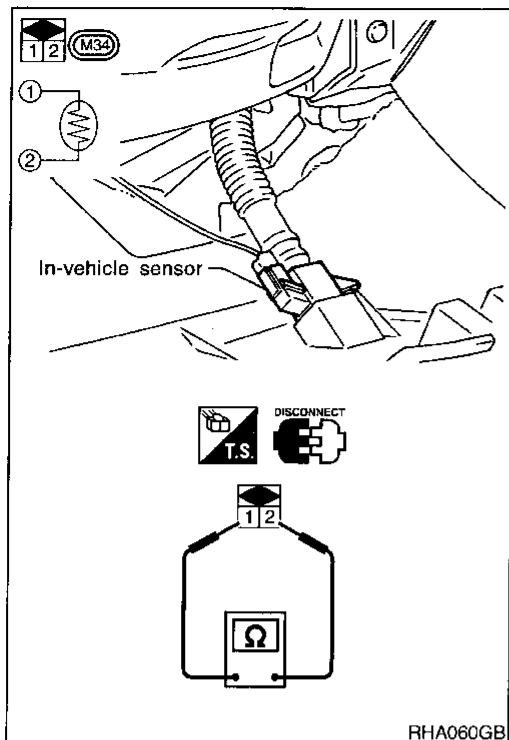
In-vehicle Sensor Circuit (Cont'd)

| | |
|---|--|
| 1 | CHECK IN-VEHICLE SENSOR CIRCUIT BETWEEN IN-VEHICLE SENSOR AND BODY GROUND |
| Disconnect in-vehicle sensor harness connector. Do approx. 5 volts exist between in-vehicle sensor harness terminal No. 1 and body ground? | |
| | |
| RHA477G | |
| Yes or No | |
| Yes | ▶ GO TO 2. |
| No | ▶ GO TO 4. |

| | |
|---|--|
| 2 | CHECK IN-VEHICLE SENSOR CIRCUIT BETWEEN IN-VEHICLE SENSOR AND AUTO AMP. (LCU) |
| 1. Disconnect auto amp. (LCU) harness connector. 2. Check circuit continuity between in-vehicle sensor harness terminal No. 2 and auto amp. (LCU) harness terminal No. 11. | |
| | |
| RHA478G | |
| Continuity should exist. | |
| If OK, check harness for short. | |
| OK or NG | |
| OK | ▶ GO TO 3. |
| NG | ▶ Repair harness or connector. |

| | |
|-----------------|---|
| 3 | CHECK IN-VEHICLE SENSOR |
| Refer to HA-91. | |
| OK or NG | |
| OK | ▶ <ol style="list-style-type: none"> 1. Replace auto amp. 2. Go to self-diagnosis step-by-step procedure (HA-38) and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed. |
| NG | ▶ <ol style="list-style-type: none"> 1. Replace in-vehicle sensor. 2. Go to self-diagnosis step-by-step procedure (HA-38) and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed. |

| | |
|--|---|
| 4 | CHECK IN-VEHICLE SENSOR CIRCUIT BETWEEN AMBIENT SENSOR AND AUTO AMP. (LCU) |
| 1. Disconnect auto amp. (LCU) harness connector. 2. Check circuit continuity between in-vehicle sensor harness terminal No. 1 and auto amp. (LCU) harness terminal No. 3. | |
| | |
| RHA479G | |
| Continuity should exist. | |
| If OK, check harness for short. | |
| OK or NG | |
| OK | ▶ <ol style="list-style-type: none"> 1. Replace auto amp. (LCU). 2. Go to self-diagnosis step-by-step procedure (HA-38) and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed. |
| NG | ▶ Repair harness or connector. |



RHA060GB

COMPONENT INSPECTION

In-vehicle Sensor

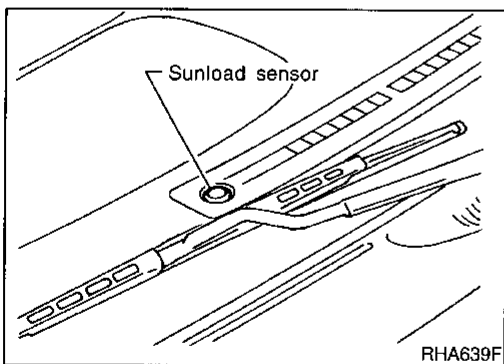
After disconnecting in-vehicle sensor harness connector, measure resistance between terminals 1 and 2 at sensor harness side, using the table below.

NAH-A0220

NBHA0044S01

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

If NG, replace in-vehicle sensor.



RHA639F

Sunload Sensor Circuit

COMPONENT DESCRIPTION

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

NAH-A0221

SUNLOAD INPUT PROCESS

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

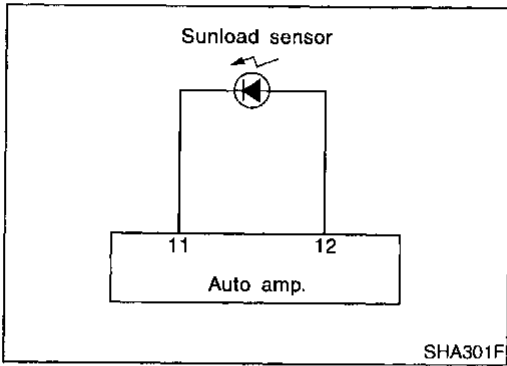
For example, consider driving along a road bordered by an occasional group of large trees. The sunload detected by the sunload sensor will vary whenever the trees obstruct the sunlight. The processing circuit averages the detected sunload over a period of time, so that the (insignificant) effect of the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

NAH-A0222

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Sunload Sensor Circuit (Cont'd)

obstructing the sunlight does not cause any change in the ATC system operation. On the other hand, shortly after entering a long tunnel, the system will recognize the change in sunload, and the system will react accordingly.



DIAGNOSTIC PROCEDURE

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

NAHA0223

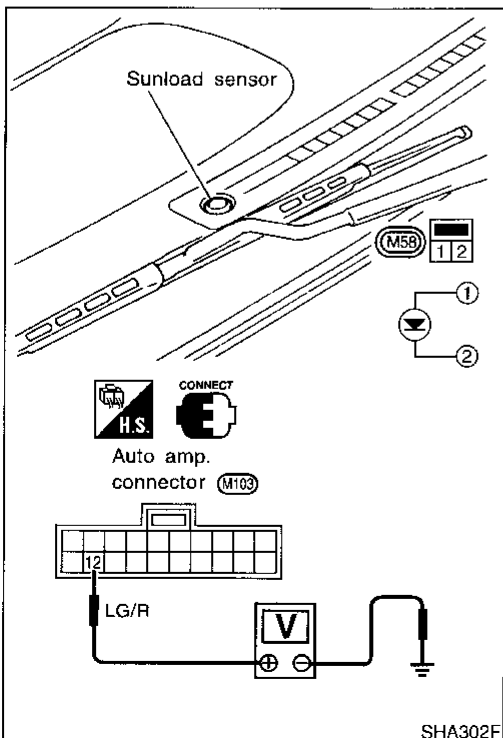
| | |
|---|--|
| 1 | CHECK SUNLOAD SENSOR CIRCUIT BETWEEN SUNLOAD SENSOR AND BODY GROUND |
| <p>Disconnect sunload sensor harness connector. Do approx. 5 volts exist between sunload sensor harness terminal No. 1 and body ground?</p> | |
| | |
| RHA062G | |
| Yes or No | |
| Yes | ▶ GO TO 2. |
| No | ▶ GO TO 4. |

| | |
|--|--|
| 2 | CHECK SUNLOAD SENSOR CIRCUIT BETWEEN SUNLOAD SENSOR AND AUTO AMP. (LCU) |
| <p>1. Disconnect auto amp. (LCU) harness connector. 2. Check circuit continuity between sunload sensor harness terminal No. 2 and auto amp. (LCU) harness terminal No. 11.</p> | |
| | |
| RHA483G | |
| Continuity should exist. | |
| If OK, check harness for short. | |
| OK or NG | |
| OK | ▶ GO TO 3. |
| NG | ▶ Repair harness or connector. |

| | | |
|-----------------|-----------------------------|---|
| 3 | CHECK SUNLOAD SENSOR | Refer to HA-93. |
| OK or NG | | |
| OK | ▶ | 1. Replace auto amp. (LCU). 2. Go to self-diagnosis step-by-step procedure (HA-38) and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed. |
| NG | ▶ | 1. Replace sunload sensor. 2. Go to self-diagnosis step-by-step procedure (HA-38) and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed. |

| | | |
|--|--|--|
| 4 | CHECK SUNLOAD SENSOR CIRCUIT BETWEEN SUNLOAD SENSOR AND AUTO AMP. (LCU) | 1. Disconnect auto amp. (LCU) harness connector. 2. Check circuit continuity between sunload sensor harness terminal No. 1 and auto amp. (LCU) harness terminal No. 12. |
| | | |
| RHA484G | | |
| Continuity should exist. If OK, check harness for short. | | |
| OK or NG | | |
| OK | ▶ | 1. Replace auto amp. 2. Go to self-diagnosis step-by-step procedure (HA-38) and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed. |
| NG | ▶ | Repair harness or connector. |

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COMPONENT INSPECTION

Sunload Sensor

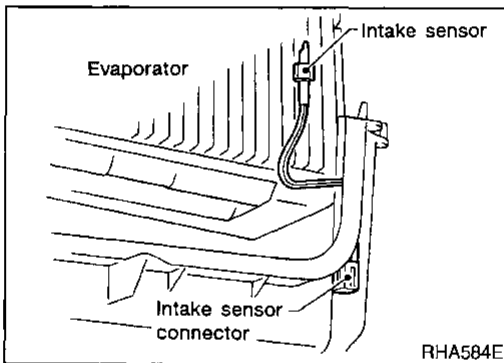
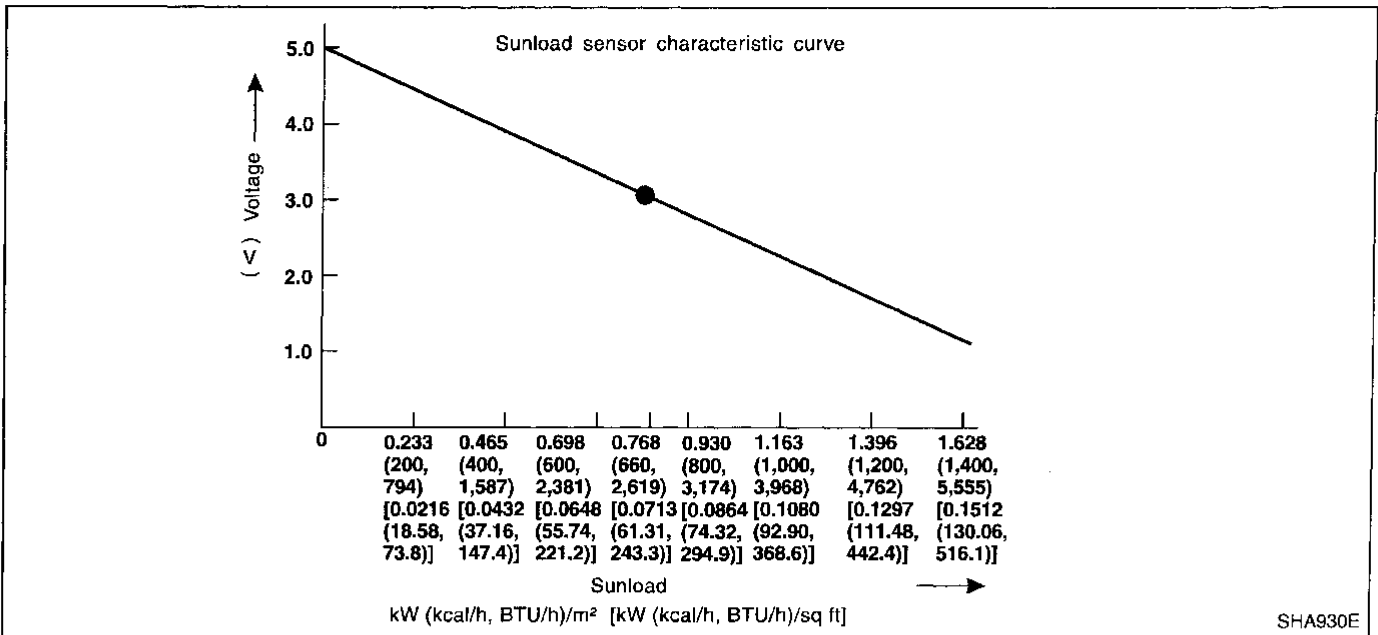
Measure voltage between auto amp. terminal 12 and body ground. If NG, replace sunload sensor.

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

NAHA0224

NAHA0224S01

Sunload Sensor Circuit (Cont'd)



Intake Sensor Circuit COMPONENT DESCRIPTION

Intake Sensor

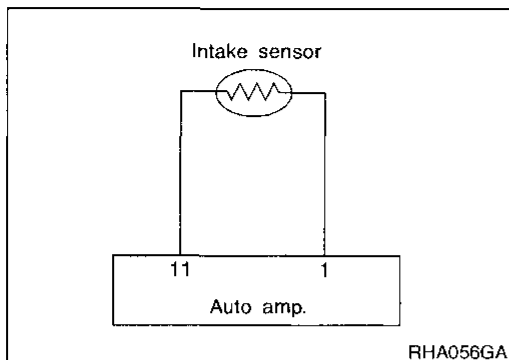
NAHA0225

NAHA0225.S01

The intake sensor is located on the cooling unit. It converts temperature of air after it passes through the evaporator into a resistance value which is then input to the auto amp. After disconnecting intake sensor harness connector, measure resistance between terminals 1 and 2 at sensor harness side, using the table below.

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

If NG, replace intake sensor.



DIAGNOSTIC PROCEDURE

SYMPTOM: Intake sensor circuit is open or shorted. (24 or -24 is indicated on the display as a result of conducting Self-diagnosis STEP 2.)

| | |
|---|--|
| 1 | CHECK INTAKE SENSOR CIRCUIT BETWEEN INTAKE SENSOR AND BODY GROUND |
| <p>Disconnect intake sensor harness connector. Do approx. 5 volts exist between intake sensor harness terminal No. 2 and body ground?</p> | |
| <p style="text-align: center;">Intake sensor connector (M107)</p> <p style="text-align: right;">RHA495G</p> | |
| Yes or No | |
| Yes | ▶ GO TO 2. |
| No | ▶ GO TO 4. |

| | |
|---|--|
| 2 | CHECK INTAKE SENSOR CIRCUIT BETWEEN INTAKE SENSOR AND AUTO AMP. (LCU) |
| <p>1. Disconnect auto amp. (LCU) harness connector. 2. Check circuit continuity between intake sensor harness terminal No. 2 and auto amp. (LCU) harness terminal No. 11.</p> | |
| <p style="text-align: center;">Intake sensor connector (M107)</p> <p style="text-align: center;">Auto amp. connector (M103)</p> <p style="text-align: right;">RHA496G</p> | |
| <p>Continuity should exist. If OK, check harness for short.</p> | |
| OK or NG | |
| OK | ▶ GO TO 3. |
| NG | ▶ Repair harness or connector. |

| | |
|-----------------|---|
| 3 | CHECK INTAKE SENSOR |
| Refer to HA-94. | |
| OK or NG | |
| OK | ▶ <ul style="list-style-type: none"> 1. Replace auto amp. 2. Go to self-diagnosis step-by-step procedure (HA-38) and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed. |
| NG | ▶ <ul style="list-style-type: none"> 1. Replace intake sensor. 2. Go to self-diagnosis step-by-step procedure (HA-38) and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed. |

| | |
|--|--|
| 4 | CHECK INTAKE SENSOR CIRCUIT BETWEEN AMBIENT SENSOR AND AUTO AMP. (LCU) |
| <p>1. Disconnect auto amp. (LCU) harness connector. 2. Check circuit continuity between intake sensor harness terminal No. 1 and auto amp. (LCU) harness terminal No. 1.</p> | |
| <p style="text-align: center;">Intake sensor connector (M107)</p> <p style="text-align: center;">Auto amp. (LCU) connector (M103)</p> <p style="text-align: right;">RHA497G</p> | |
| <p>Continuity should exist. If OK, check harness for short.</p> | |
| OK or NG | |
| OK | ▶ <ul style="list-style-type: none"> 1. Replace auto amp. 2. Go to self-diagnosis step-by-step procedure (HA-38) and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed. |
| NG | ▶ Repair harness or connector. |

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Air Mix Door Motor PBR Circuit**DIAGNOSTIC PROCEDURE**

For description of mode door motor and air mix door motor circuit, refer to HA-55. NAHA0227

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

Perform diagnostic procedure for mode door motor and air mix door motor. Refer to HA-51.

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

NAHA0228

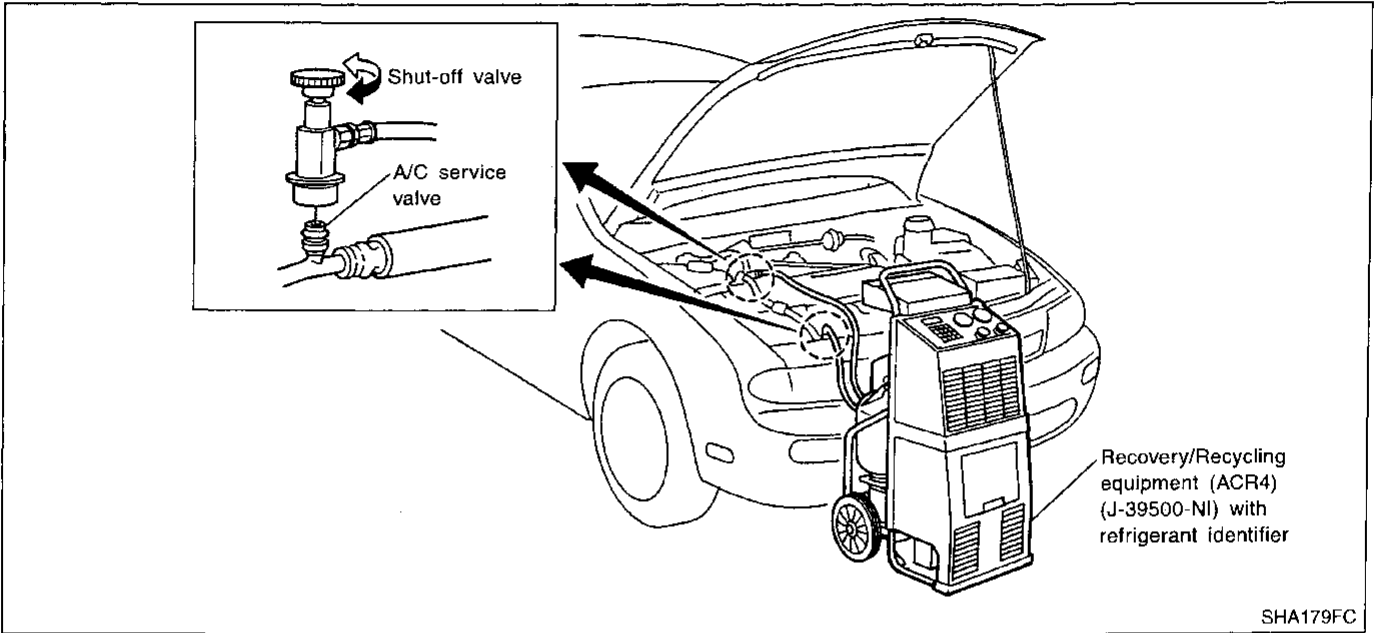
NAHA0228S01

NAHA0228S0101

SETTING OF SERVICE TOOLS AND EQUIPMENT
DISCHARGING REFRIGERANT

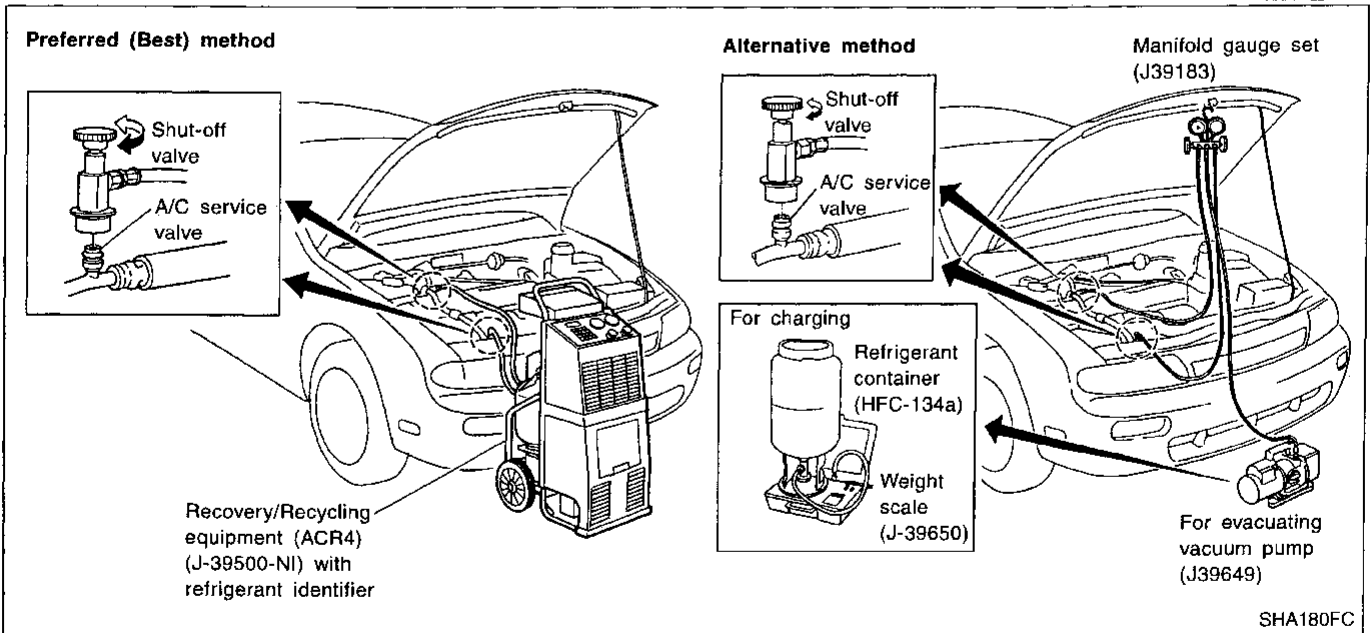
WARNING:

Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Remove HFC-134a (R-134a) from A/C system using certified service equipment meeting requirements of SAE J2210 (R-134a recycling equipment) or J2209 (R-134a recovery equipment). If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.



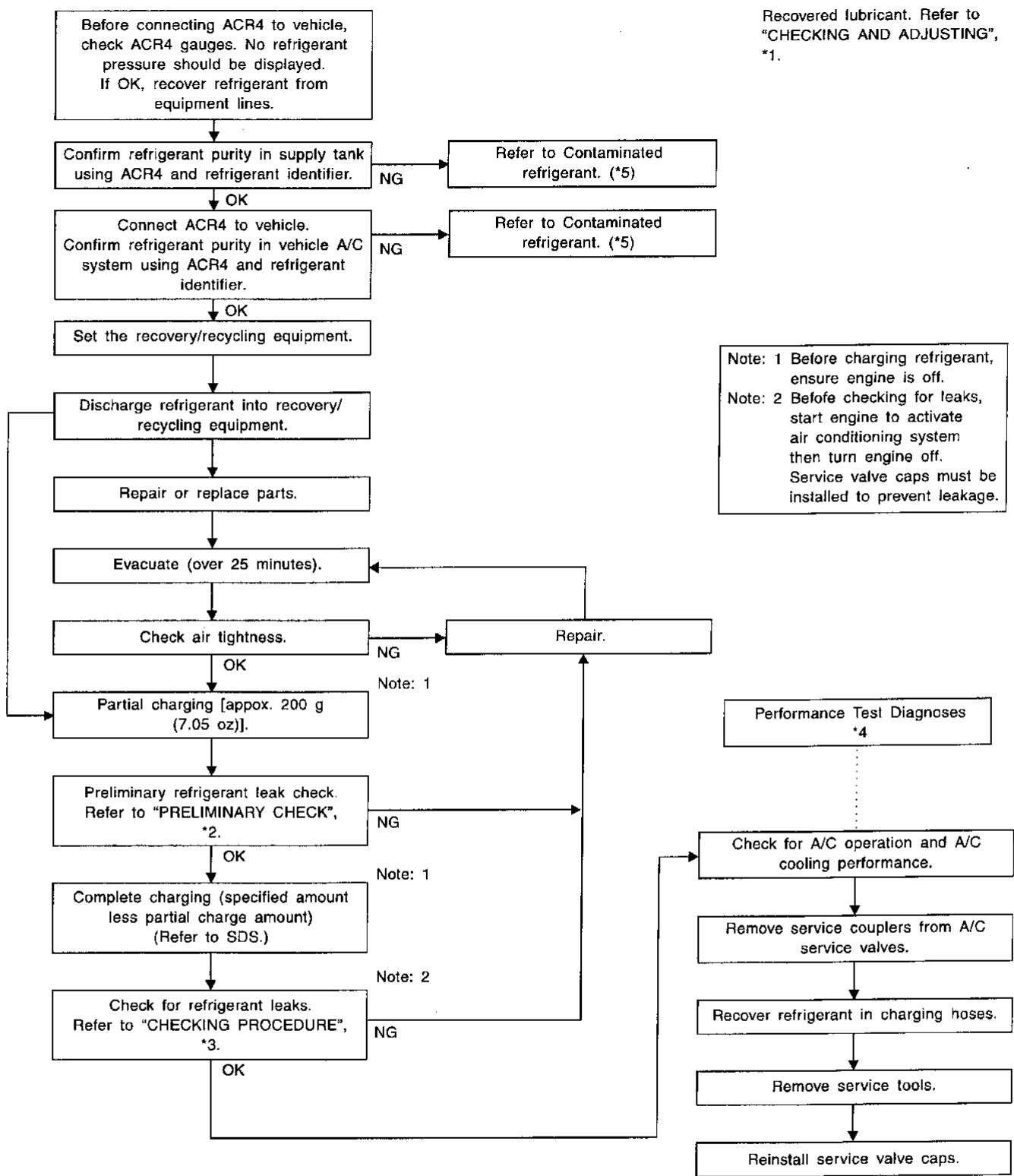
Evacuating System and Charging Refrigerant

NAHA0228S0102



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Recovered lubricant. Refer to "CHECKING AND ADJUSTING", *1.



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

Performance Test Diagnoses *4

*1: HA-99
 *2: HA-107

*3: HA-108
 *4: HA-75

*5: HA-2

SHA251F

Maintenance of Lubricant Quantity in Compressor

NAHA0229

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

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

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

LUBRICANT

NAHA0229S01

Name: Nissan A/C System Oil Type S

Part number: KLH00-PAGS0

CHECKING AND ADJUSTING

NAHA0229S02

Adjust the lubricant quantity according to the test group shown below.

| | | |
|--|---|----------|
| 1 | CHECK LUBRICANT RETURN OPERATION | |
| Can lubricant return operation be performed? | | |
| <ul style="list-style-type: none"> ● A/C system works properly. ● There is no evidence of a large amount of lubricant leakage. | | |
| Yes or No | | |
| Yes | ▶ | GO TO 2. |
| No | ▶ | GO TO 3. |

| | | |
|------------------------------------|-------------------------|--|
| 3 | CHECK COMPRESSOR | |
| Should the compressor be replaced? | | |
| Yes or No | | |
| Yes | ▶ | Go to "Lubricant Adjustment Procedure for Compressor Replacement", (HA-100). |
| No | ▶ | GO TO 4. |

| | | |
|--|---|----------|
| 2 | PERFORM LUBRICANT RETURN OPERATION, PROCEEDING AS FOLLOWS: | |
| <ol style="list-style-type: none"> 1. Start engine, and set the following conditions: <ul style="list-style-type: none"> ● Test condition Engine speed: Idling to 1,200 rpm A/C or AUTO switch: ON Blower speed: Max. position Temp. control: Optional [Set so that intake air temperature is 25 to 30°C (77 to 86°F).] 2. Next item is for V-5 or V-6 compressor. Connect the manifold gauge, and check that the high pressure side pressure is 588 kPa (6 kg/cm², 85 psi) or higher. If less than the reference level, attach a cover to the front face of the condenser to raise the pressure. 3. Perform lubricant return operation for about 10 minutes. 4. Stop engine. <p>CAUTION: If excessive lubricant leakage is noted, do not perform the lubricant return operation.</p> | | |
| OK | ▶ | GO TO 3. |

| | | |
|---|-----------------------|---|
| 4 | CHECK ANY PART | |
| Is there any part to be replaced? (Evaporator, condenser, liquid tank or in case there is evidence of a large amount of lubricant leakage.) | | |
| Yes or No | | |
| Yes | ▶ | Go to "Lubricant Adjusting Procedure for Components Replacement Except Compressor", (HA-100). |
| No | ▶ | Carry out the A/C performance test. |

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Lubricant Adjusting Procedure for Components Replacement Except Compressor

-NAHA0229S0201

After replacing any of the following major components, add the correct amount of lubricant to the system.

Amount of lubricant to be added

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

*1: If compressor is replaced, addition of lubricant is included in the table.

*2: If refrigerant leak is small, no addition of lubricant is needed.

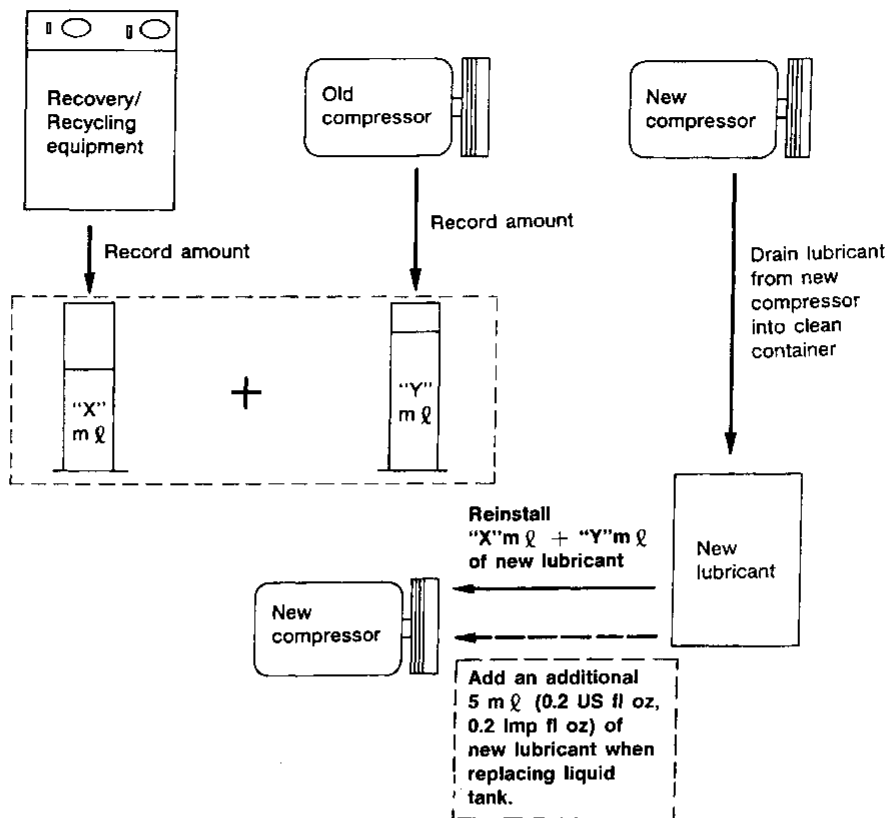
Lubricant Adjusting Procedure for Compressor Replacement

NAHA0229S0202

1. Before connecting ACR4 to vehicle, check ACR4 gauges. No refrigerant pressure should be displayed. If NG, recover refrigerant from equipment lines.
2. Connect ACR4 to vehicle. Confirm refrigerant purity in supply tank using ACR4 and refrigerant identifier. If NG, refer to "CONTAMINATED REFRIGERANT", HA-2.
3. Confirm refrigerant purity in vehicle A/C system using ACR4 and refrigerant identifier. If NG, refer to "CONTAMINATED REFRIGERANT", HA-2.
4. Discharge refrigerant into the refrigerant recovery/recycling equipment. Measure lubricant discharged into the recovery/recycling equipment.
5. Remove the drain plug of the "old" (removed) compressor. Drain the lubricant into a graduated container and record the amount of drained lubricant.
6. Remove the drain plug and drain the lubricant from the "new" compressor into a separate, clean container.
7. 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.
8. Measure an amount of new lubricant equal to the amount recovered during discharging. Add this lubricant to "new" compressor through the suction port opening.
9. Torque the drain plug.

18 - 19 N·m (1.8 - 1.9 kg·m, 13 - 14 ft·lb)
10. If the liquid tank also needs to be replaced, add an additional 5 ml (0.2 US fl oz, 0.2 Imp fl oz) of lubricant at this time.
Do not add this 5 ml (0.2 US fl oz, 0.2 Imp fl oz) of lubricant if only replacing the compressor.

Lubricant adjusting procedure for compressor replacement



RHA065DD

Compressor REMOVAL AND INSTALLATION

NAHA0230

SEC. 274•275

16 - 22 (1.6 - 2.2, 12 - 16)

23 - 26 (2.3 - 2.7, 17 - 20)

16 - 19 (1.6 - 1.9, 12 - 14)

23 - 26 (2.3 - 2.7, 17 - 20)

: N•m (kg-m, ft-lb)

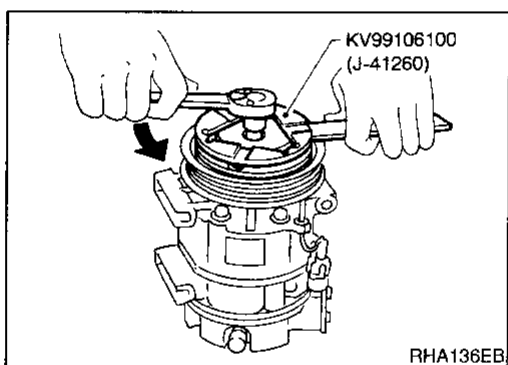
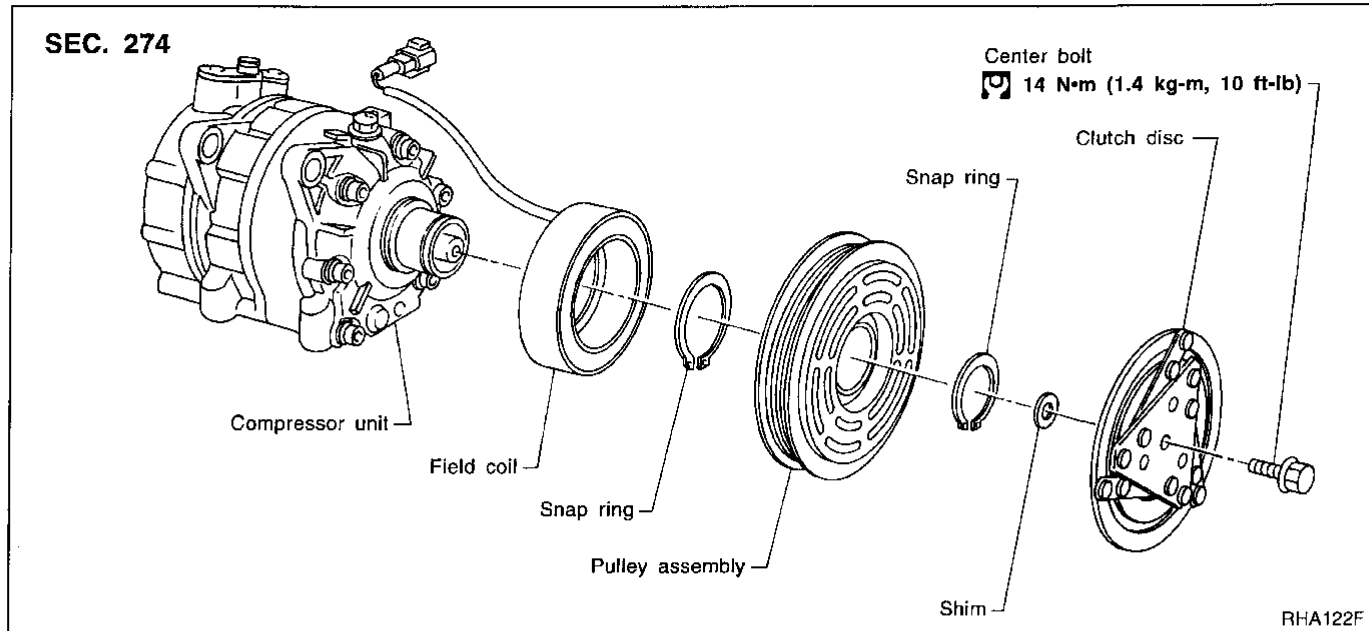
45 - 60 (4.6 - 6.1, 33 - 44)

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**Compressor Clutch
OVERHAUL**

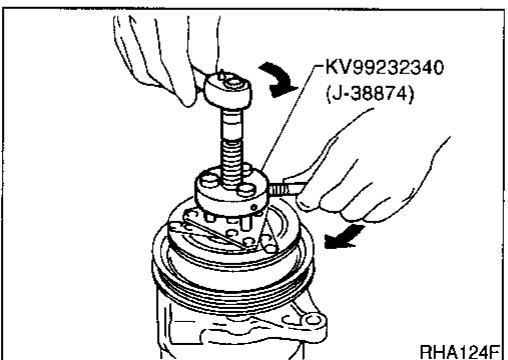
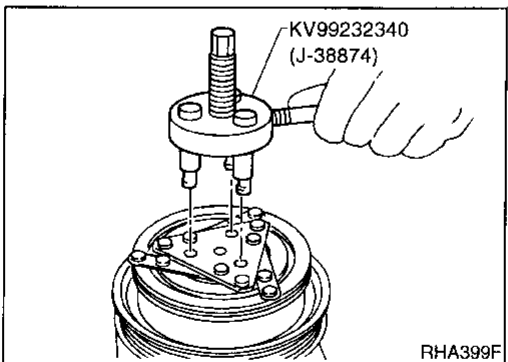
NAHA0231



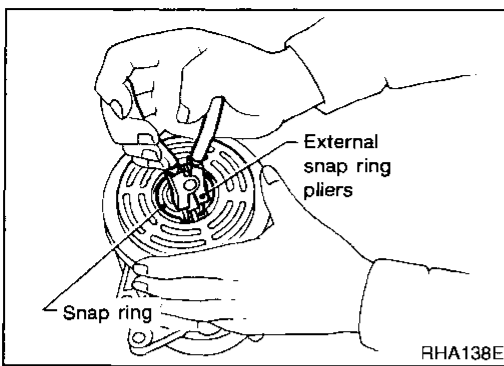
REMOVAL

NAHA0232

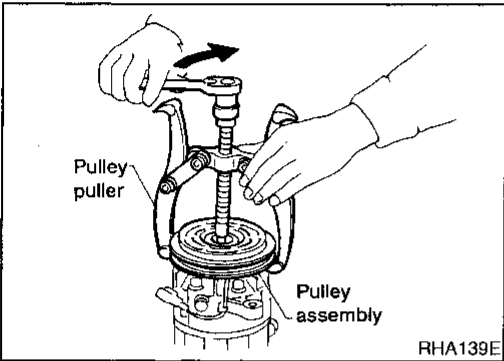
- When removing center bolt, hold clutch disc with clutch disc wrench.



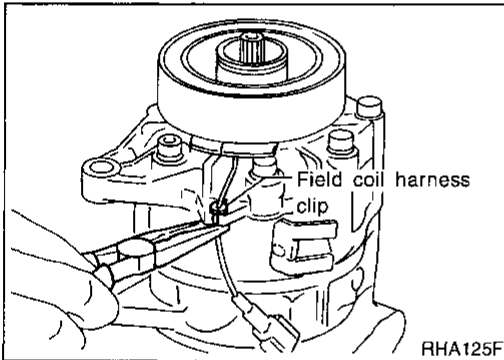
- Remove the clutch disc using the clutch disc puller. Insert the holder's three pins into the holes in the clutch disc. Rotate the holder clockwise to hook it onto the plate. Then, tighten the center bolt to remove the clutch disc. After removing the clutch disc, remove the shims from either the drive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



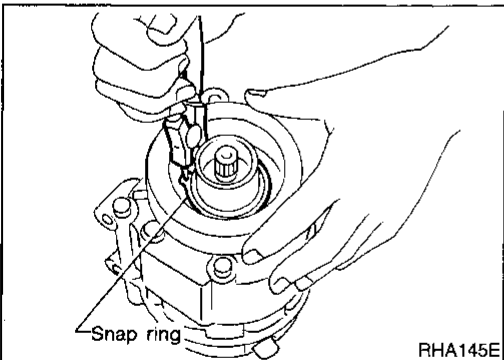
- Remove the snap ring using external snap ring pliers.



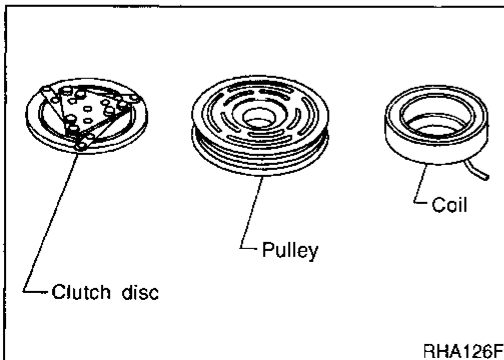
- Pulley removal
Position the center pulley puller on the end of the drive shaft, and remove the pulley assembly using any commercially available pulley puller.
To prevent the pulley groove from being deformed, the puller claws should be positioned onto the edge of the pulley assembly.



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



- Remove the snap ring using external snap ring pliers.



INSPECTION

Clutch Disc

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

Pulley

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

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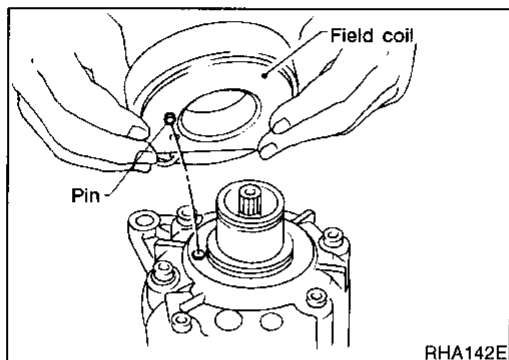
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Coil

Check coil for loose connection or cracked insulation.

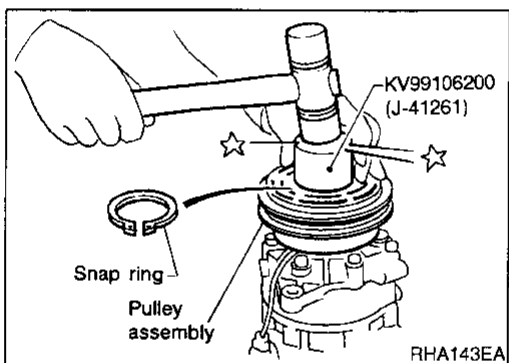
NAHA0233S03



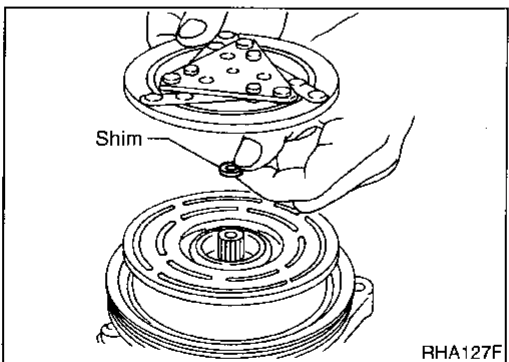
INSTALLATION

NAHA0234

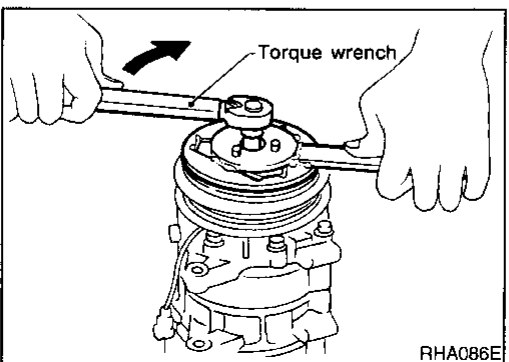
- Install the field coil.
Be sure to align the coil's pin with the hole in the compressor's front head.
- Install the field coil harness clip using a screwdriver.



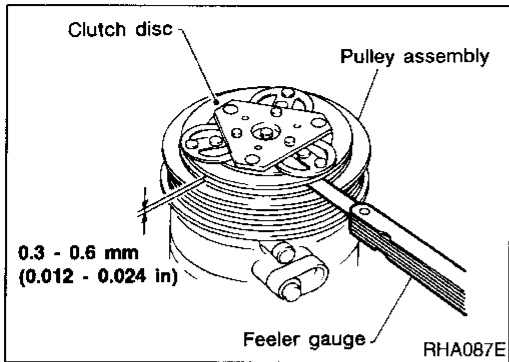
- Install the pulley assembly using the installer and a hand press, and then install the snap ring using snap ring pliers.



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



- Using the holder to prevent clutch disc rotation, tighten the bolt to 14 N·m (1.4 kg·m, 10 ft·lb) torque.
After tightening the bolt, check that the pulley rotates smoothly.



- Check clearance around the entire periphery of clutch disc.

Disc-to-pulley clearance:

0.3 - 0.6 mm (0.012 - 0.024 in)

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

Break-in Operation

NAHA0234S01

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

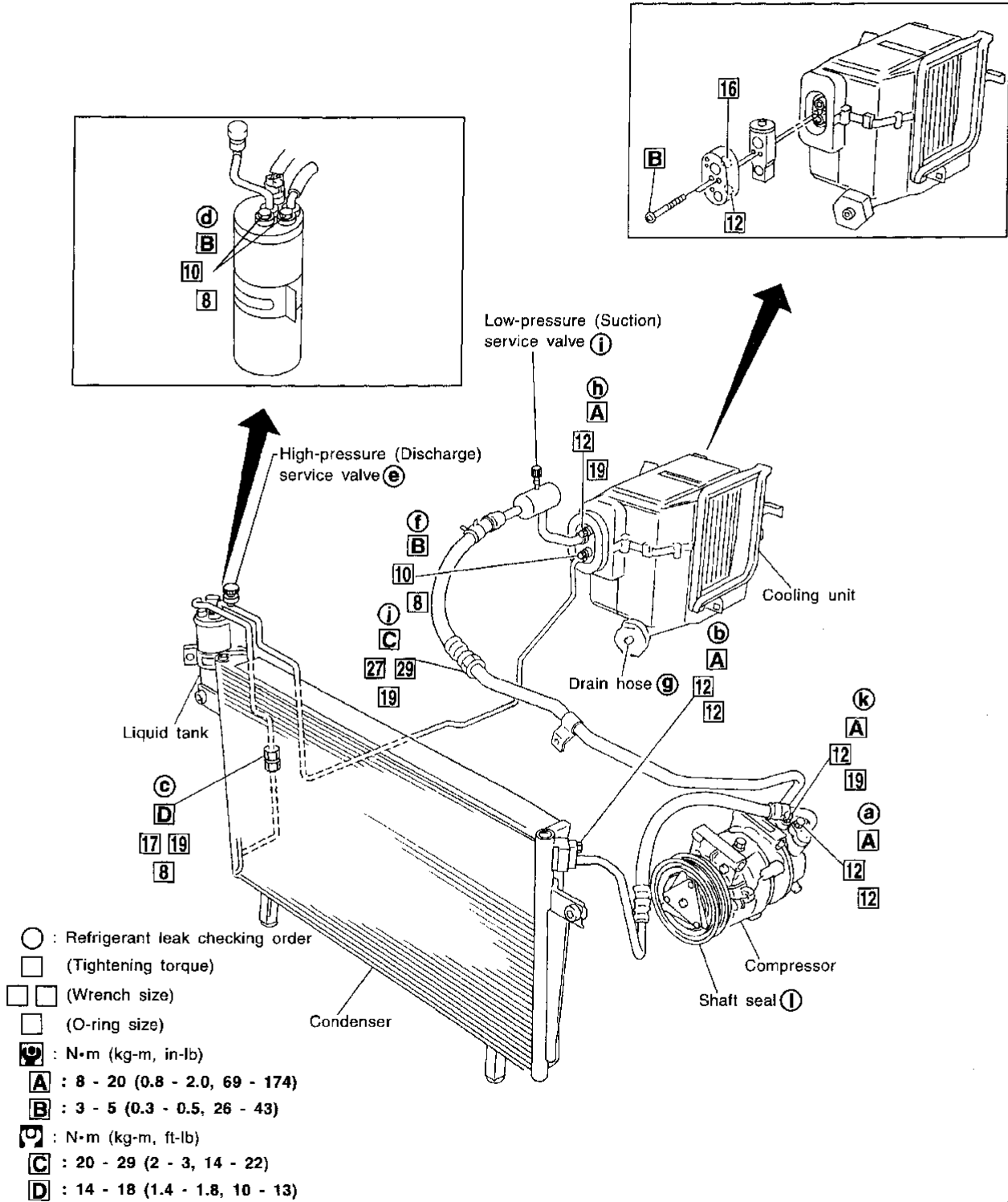
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Refrigerant Lines

REMOVAL AND INSTALLATION

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

=NAHA0235

SEC. 271•274•276


SHA305F

CHECKING REFRIGERANT LEAKS

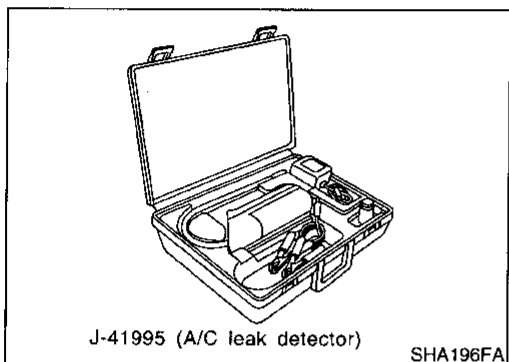
Preliminary Check

Perform a visual inspection of all refrigeration parts, fittings, hoses, and components for signs of A/C lubricant leakage, damage and corrosion. Take note of the areas with A/C lubricant leakage to allow extra time in these areas with electronic leak detector.

NAHA0236

NAHA0236S01

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J-41995 (A/C leak detector)

SHA196FA

Precautions for Handling Leak Detector

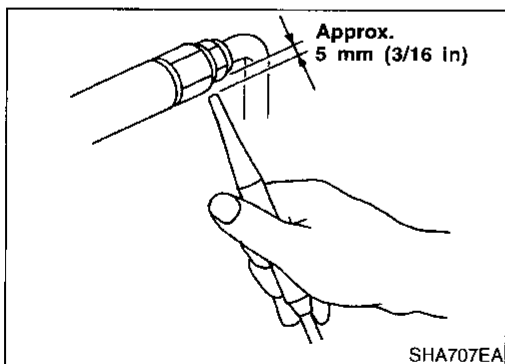
When performing a refrigerant leak check, use a J-41995 A/C leak detector or equivalent. Ensure that the instrument is calibrated and set properly per the operating instructions.

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 lubricants, may falsely trigger the leak detector. Make sure the surfaces to be checked are clean. Clean with a dry cloth or blow off with shop air. Do not allow the sensor tip of the detector to contact with any substance. This can also cause false readings and may damage the detector.

NAHA0236S02

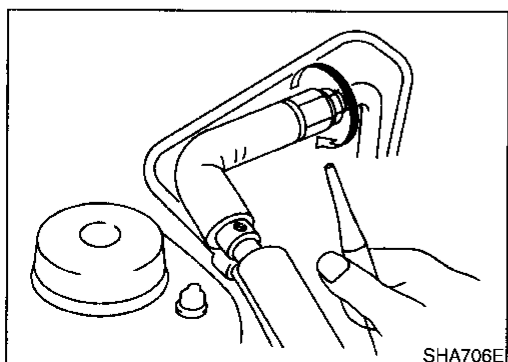
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SHA707EA

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

PD
AX
SU



SHA706E

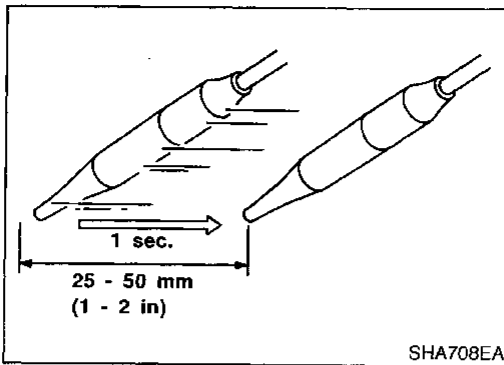
2. When testing, circle each fitting completely with probe.

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Refrigerant Lines (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, shop chemicals, or cigarette smoke in the vicinity of the vehicle. Perform the leak test in calm area (low air/wind movement) so that the leaking refrigerant is not dispersed.

1. Turn engine off.
2. Connect a suitable A/C manifold gauge set to the A/C service ports.
3. Check if the A/C refrigerant pressure is at least 345 kPa (3.52 kg/cm², 50 psi) above 16°C (61°F). If less than specification, recover/evacuate and recharge the system with the specified amount of refrigerant.

NOTE:

At temperatures below 16°C (61°F), leaks may not be detected since the system may not reach 345 kPa (3.52 kg/cm², 50 psi).

4. Conduct the leak test from the high side (compressor discharge **a** to evaporator inlet **f**) to the low side (evaporator drain hose **g** to shaft seal **l**). Refer to HA-106. 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.

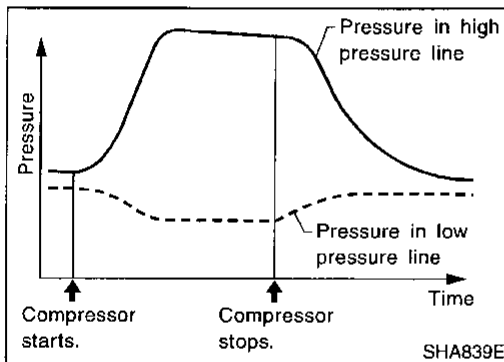
- **Compressor**
Check the fitting of high and low pressure hoses, relief valve and shaft seal.
- **Liquid tank**
Check the pressure switch, tube fitting, weld seams and the fusible plug mount.
- **Service valves**
Check all around the service valves. Ensure service valve caps are secured on the service 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)**
With engine OFF, turn blower fan on "High" for at least 15 seconds to dissipate any refrigerant trace in the cooling unit. Wait a minimum of 10 minutes accumulation time (refer to the manufacturer's recommended procedure for actual wait time) before inserting the leak detector probe into the drain hose. Keep the probe inserted for at least ten seconds. Use caution not to contaminate the probe tip with water or dirt that may be in the drain hose.

5. If a leak detector detects a leak, verify at least once by blowing compressed air into area of suspected leak, then repeat check as outlined above. GI
6. Do not stop when one leak is found. Continue to check for additional leaks at all system components. MA
If no leaks are found, perform steps 7 - 10.
7. Start engine. EM
8. Set the heater A/C control as follows: LC
 - 1) A/C switch ON. EC
 - 2) Face mode
 - 3) Recirculation switch ON
 - 4) Max cold temperature
 - 5) Fan speed high
9. Run engine at 1,500 rpm for at least 2 minutes. FE
10. Turn engine off and perform leak check again following steps 4 through 6 above. CL



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

11. Before connecting ACR4 to vehicle, check ACR4 gauges. No refrigerant pressure should be displayed. If pressure is displayed, recover refrigerant from equipment lines and then check refrigerant purity. TF
12. Confirm refrigerant purity in supply tank using ACR4 and refrigerant identifier. PD
13. Confirm refrigerant purity in vehicle A/C system using ACR4 and refrigerant identifier. AX
14. Discharge A/C system using approved refrigerant recovery equipment. Repair the leaking fitting or component as necessary. SU
15. Evacuate and recharge A/C system and perform the leak test to confirm no refrigerant leaks. BR
16. Conduct A/C performance test to ensure system works properly. ST

HA

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EL

IDX

**Belt
TENSION ADJUSTMENT**

NAHA0237

- Refer to MA section.

**Fast Idle Control Device (FICD)
INSPECTION**

NAHA0238

- Refer to EC section and HA-18.

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

NAHA0060

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER" used along with a seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. The SRS system composition which is available to NISSAN MODEL PATHFINDER is as follows:

- For a frontal collision
The Supplemental Restraint System consists of driver air bag module (located in the center of the steering wheel), front passenger air bag module (located on the instrument panel on passenger side), seat belt pre-tensioners, a diagnosis sensor unit, warning lamp, wiring harness and spiral cable.
- For a side collision
The Supplemental Restraint System consists of side air bag module (located in the outer side of front seat), satellite sensor, diagnosis sensor unit (one of components of air bags for a frontal collision), wiring harness, warning lamp (one of components of air bags for a frontal collision).

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. For removal of Spiral Cable and Air Bag Module, see the RS section.
- Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. Spiral cable and wiring harnesses (except "SEAT BELT PRE-TENSIONER") covered with yellow insulation either just before the harness connectors or for the complete harness are related to the SRS.

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

NAHA0061

WARNING:

- CFC-12 (R-12) refrigerant and HFC-134a (R-134a) refrigerant are not compatible. If the refrigerants are mixed and compressor failure is likely to occur, refer to "CONTAMINATED REFRIGERANT" below. To determine the purity of HFC-134a (R-134a) in the vehicle and recovery tank, use Refrigerant Recovery/Recycling Recharging equipment (ACR4) (J-39500-NI) and Refrigerant Identifier.
- Use only specified lubricant for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. If lubricant other than that specified is used, compressor failure is likely to occur.
- The specified HFC-134a (R-134a) lubricant rapidly absorbs moisture from the atmosphere. The following handling precautions must be observed:
 - a) When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.
 - b) When installing refrigerant components to a vehicle, do not remove the caps (unseal) until just before connecting the components. Connect all refrigerant loop components as quickly as possible to minimize the entry of moisture into system.
 - c) Only use the specified lubricant from a sealed container. Immediately reseal containers of lubricant. Without proper sealing, lubricant will become moisture saturated and should not be used.
 - d) Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Remove R-134a from the A/C system, using certified service equipment meeting requirements of SAE J2210 (R-134a recycling equipment), or J2209 (R-134a recovery equipment). If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.
 - e) Do not allow lubricant (Nissan A/C System Oil Type S) to come in contact with styrofoam parts. Damage may result.

CONTAMINATED REFRIGERANT

NAHA0061S01

If a refrigerant other than pure R-134a is identified in a vehicle, your options are:

- Explain to the customer that environmental regulations prohibit the release of contaminated refrigerant into the atmosphere.

- Explain that recovery of the contaminated refrigerant could damage your service equipment and refrigerant supply.
- Suggest the customer return the vehicle to the location of previous service where the contamination may have occurred.
- If you choose to perform the repair, recover the refrigerant using only **dedicated equipment and containers. Do not recover contaminated refrigerant into your existing service equipment.** If your facility does not have dedicated recovery equipment, you may contact a local refrigerant product retailer for available service. This refrigerant must be disposed of in accordance with all federal and local regulations. In addition, replacement of all refrigerant system components on the vehicle is recommended.
- If the vehicle is within the warranty period, the air conditioner warranty is void. Please contact Nissan Customer Affairs for further assistance.

General Refrigerant Precautions

NAHA0062

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 pressure test or leak test HFC-134a (R-134a) service equipment and/or vehicle air conditioning systems with compressed air during repair. Some mixtures of air and R-134a have been shown to be combustible at elevated pressures. These mixtures, if ignited, may cause injury or property damage. Additional health and safety information may be obtained from refrigerant manufacturers.**

Precautions for Refrigerant Connection

NAHA0063

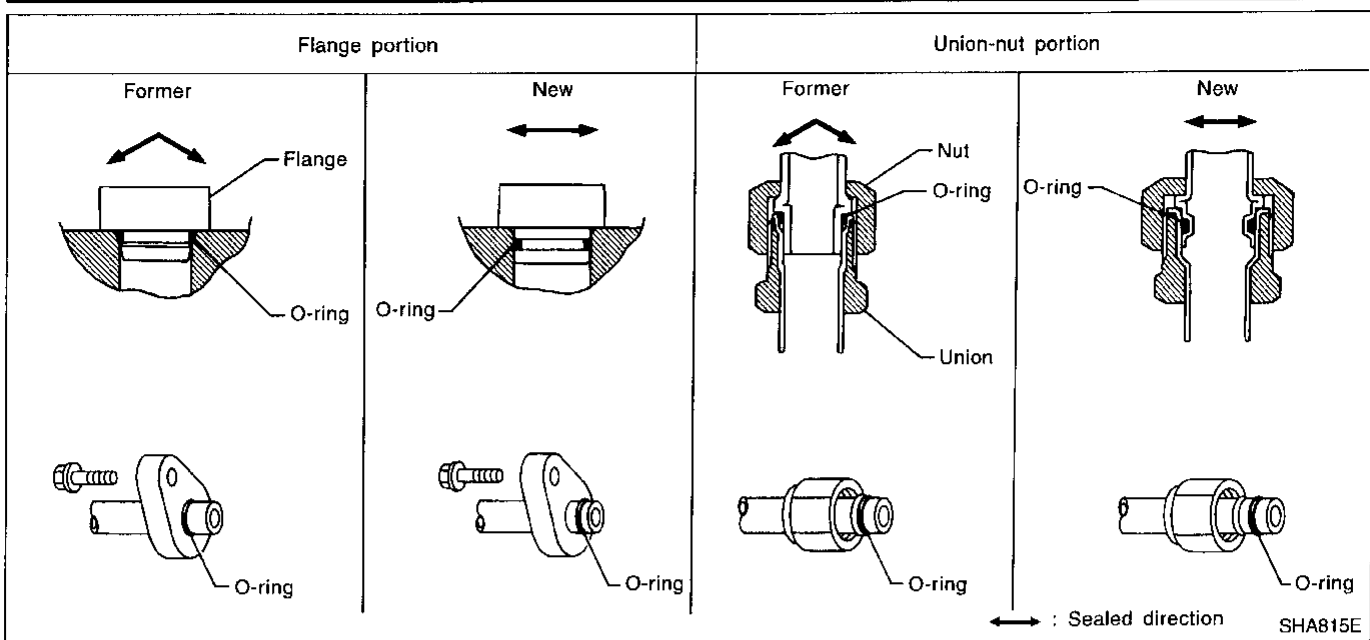
A new type refrigerant connection has been introduced to all refrigerant lines except the following portion.

- Expansion valve to cooling unit

FEATURES OF NEW TYPE REFRIGERANT CONNECTION

NAHA0063S01

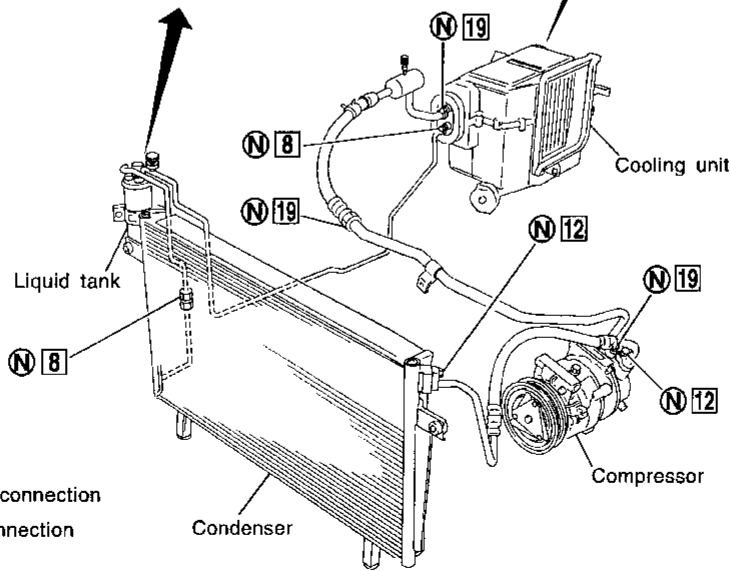
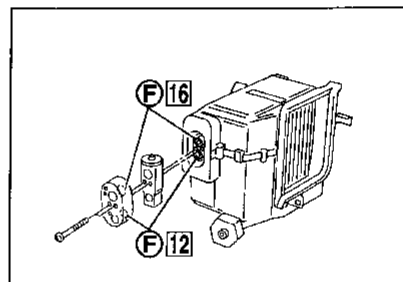
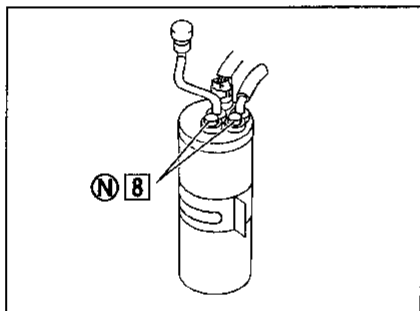
- The O-ring has been relocated. It has also been provided with a groove for proper installation. This eliminates the chance of the O-ring being caught in, or damaged by, the mating part. The sealing direction of the O-ring is now set vertically in relation to the contacting surface of the mating part 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.



O-RING AND REFRIGERANT CONNECTION

SEC. 271•274•276

NAHA0063502



- (F) : Former type refrigerant connection
- (N) : New type refrigerant connection
- : (O-ring size)

SHA280F

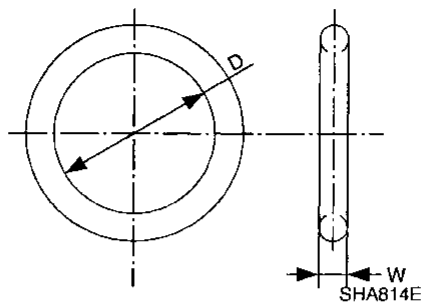
CAUTION:

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.

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O-Ring Part Numbers and Specifications

NAHA0063S0201



| 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 (0.0906) |
| New | 19 | 92474 N8210 | 16.5 (0.650) | 2.43 (0.0957) |
| Former | | 92477 N8200 | 17.12 (0.6740) | 1.78 (0.0701) |

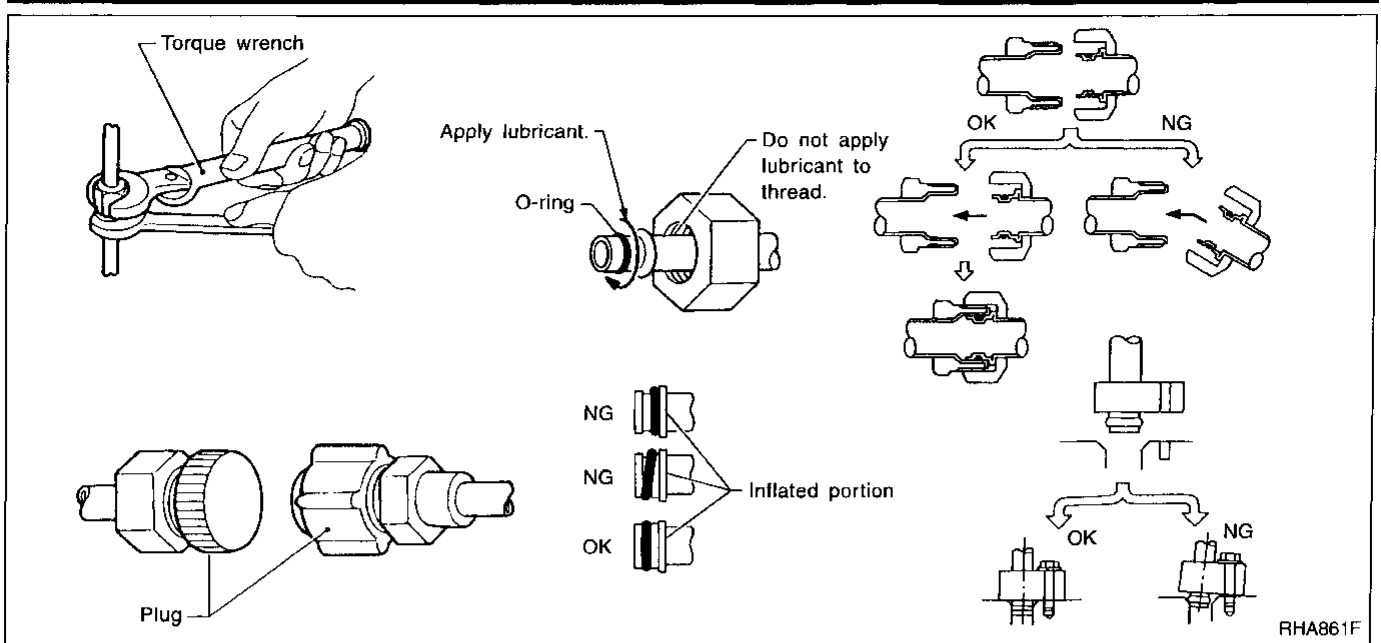
WARNING:

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

CAUTION:

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

- When the compressor is removed, store it in the same position as it is when mounted on the car. Failure to do so will cause lubricant to enter the low pressure chamber.
- When connecting tubes, always use a torque wrench and a back-up wrench.
- After disconnecting tubes, immediately plug all openings to prevent entry of dirt and moisture.
- When installing an air conditioner in the vehicle, connect the pipes as the final stage of the operation. Do not remove the seal caps of pipes and other components until just before required for connection.
- Allow components stored in cool areas to warm to working area temperature before removing seal caps. This prevents condensation from forming inside A/C components.
- Thoroughly remove moisture from the refrigeration system before charging the refrigerant.
- Always replace used O-rings.
- When connecting tube, apply lubricant to circle of the O-rings shown in illustration. Be careful not to apply lubricant to threaded portion.
Lubricant name: Nissan A/C System Oil Type S
Part number: KLH00-PAGS0
- O-ring must be closely attached to dented portion of tube.
- When replacing the O-ring, be careful not to damage O-ring and tube.
- Connect tube until you hear it click, then tighten the nut or bolt by hand until snug. Make sure that the O-ring is installed to tube correctly.
- After connecting line, conduct leak test and make sure that there is no leakage from connections. When the gas leaking point is found, disconnect that line and replace the O-ring. Then tighten connections of seal seat to the specified torque.



Precautions for Servicing Compressor

NAHA0064

- 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-173.
- 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.

**Precautions for Service Equipment
RECOVERY/RECYCLING EQUIPMENT**

NAHA0065

NAHA0065S01

Follow the manufacturer's instructions for machine operation and machine maintenance. Never introduce any refrigerant other than that specified into the machine.

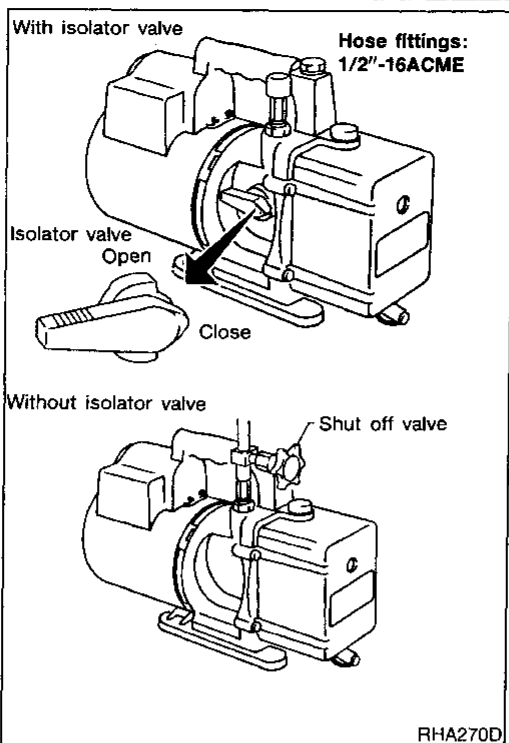
ELECTRONIC LEAK DETECTOR

NAHA0065S02

Follow the manufacturer's instructions for tester operation and tester maintenance.

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Precautions for Service Equipment (Cont'd)



VACUUM PUMP

NAHA0065S03

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

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

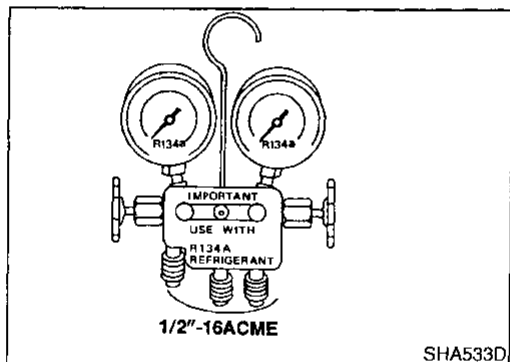
- Usually vacuum pumps have a manual isolator valve as part of the pump. Close this valve to isolate the service hose from the pump.
- For pumps without an isolator, use a hose equipped with a manual shut-off valve near the pump end. Close the valve to isolate the hose from the pump.
- If the hose has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

NAHA0065S04

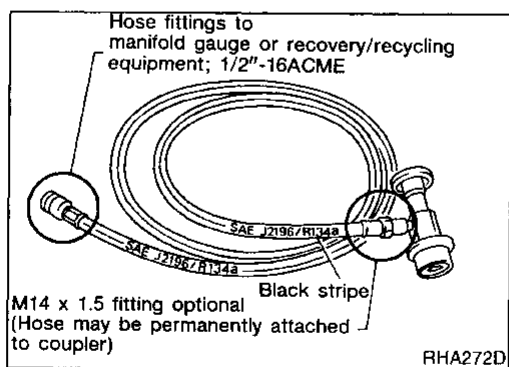
Be certain that the gauge face indicates R-134a or 134a. Make sure the gauge set has 1/2"-16 ACME threaded connections for service hoses. Confirm the set has been used only with refrigerant HFC-134a (R-134a) along with specified lubricant.



SERVICE HOSES

NAHA0065S05

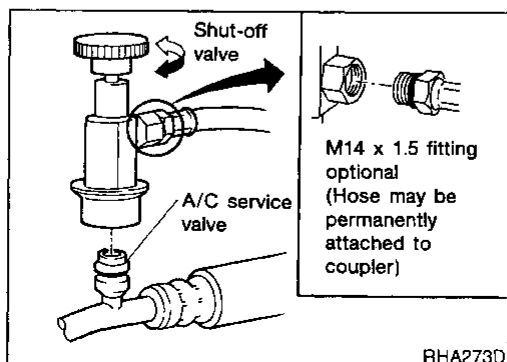
Be certain that the service hoses display the markings described (colored hose with black stripe). All hoses must include positive shut off devices (either manual or automatic) near the end of the hoses opposite the manifold gauge.



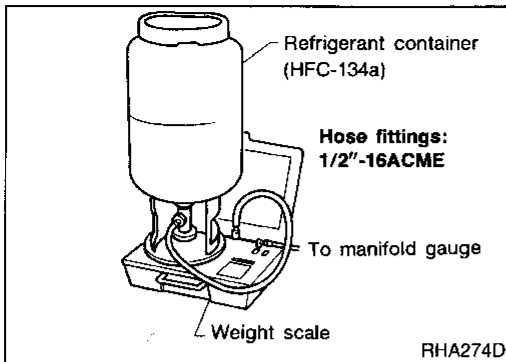
SERVICE COUPLERS

NAHA0065S06

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

NAHA0065S07

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.

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NAHA0065S09

CALIBRATING ACR4 WEIGHT SCALE

Calibrate the scale every three months.

To calibrate the weight scale on the ACR4 (J-39500-INF):

1. Press **Shift/Reset** and **Enter** at the same time.
2. Press **8787**. "A1" will be displayed.
3. Remove all weight from the scale.
4. Press **0**, then press **Enter**. "0.00" will be displayed and change to "A2".
5. Place a known weight (dumbbell or similar weight), between 4.5 and 8.6 kg (10 and 19 lb) on the center of the weight scale.
6. Enter the known weight using four digits. (Example 10 lbs = 10.00, 10.5 lbs = 10.50)
7. Press **Enter** — the display returns to the vacuum mode.
8. Press **Shift/Reset** and **Enter** at the same time.
9. Press **6** — the known weight on the scale is displayed.
10. Remove the known weight from the scale. "0.00" will be displayed.
11. Press **Shift/Reset** to return the ACR4 to the program mode.

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CHARGING CYLINDER

NAHA0065S08

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.

BR

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BT

Wiring Diagrams and Trouble Diagnosis

NAHA0066

When you read wiring diagrams, refer to the followings:

- "HOW TO READ WIRING DIAGRAMS" in GI section
- "POWER SUPPLY ROUTING" for power distribution circuit in EL section

HA

SC

When you perform trouble diagnosis, refer to the followings:

- "HOW TO FOLLOW TEST GROUP IN TROUBLE DIAGNOSIS" in GI section
- "HOW TO PERFORM EFFICIENT DIAGNOSIS FOR AN ELECTRICAL INCIDENT" in GI section

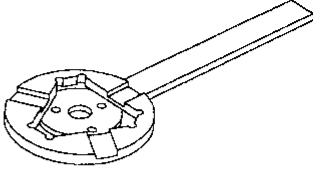
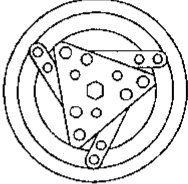
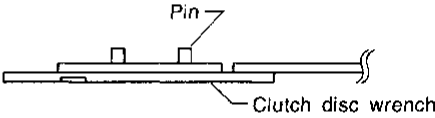
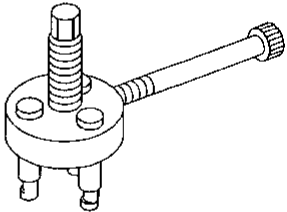
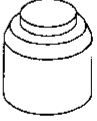
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Special Service Tools

NAHA0067

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

| Tool number (Kent-Moore No.) Tool name | Description |
|--|--|
| KV99106100 (J-41260) Clutch disc wrench | <p style="text-align: right;">Removing center bolt</p>  <p>NT232</p>  <p>When replacing the magnet clutch in the above compressor, use a clutch disc wrench with the pin side on the clutch disc to remove it.</p>  <p style="text-align: center;">Pin Clutch disc wrench</p> <p>NT378</p> |
| KV99232340 (J-38874) or KV992T0001 (—) Clutch disc puller | <p style="text-align: right;">Removing clutch disc</p>  <p>NT376</p> |
| KV99106200 (J-41261) Pulley installer | <p style="text-align: right;">Installing pulley</p>  <p>NT235</p> |

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

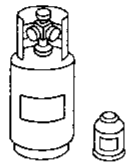

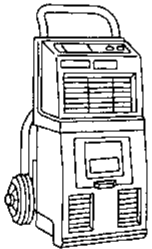
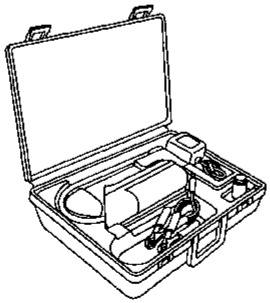
~NAHA0068

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

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

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

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

| Tool number (Kent-Moore No.) Tool name | Description |
|--|---|
| HFC-134a (R-134a) refrigerant |  <p>Container color: Light blue Container marking: HFC-134a (R-134a) Fitting size: Thread size</p> <ul style="list-style-type: none"> ● large container 1/2"-16 ACME <p>NT196</p> |
| KLH00-PAGS0 (—) Nissan A/C System Oil Type S |  <p>Type: Poly alkylene glycol oil (PAG), type S Application: HFC-134a (R-134a) swash plate (piston) compressors (Nissan only) Lubricity: 40 ml (1.4 US fl oz, 1.4 Imp fl oz)</p> <p>NT197</p> |
| (J-39500-NI) Recovery/Recycling Recharging equipment (ACR4) |  <p>Function: Refrigerant Recovery and Recycling and Recharging</p> <p>NT195</p> |
| (J-41995) Electrical leak detector |  <p>Power supply:</p> <ul style="list-style-type: none"> ● DC 12V (Cigarette lighter) <p>AHA281A</p> |

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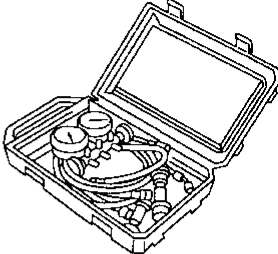
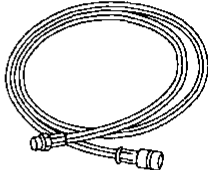
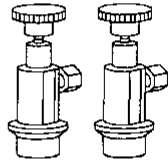

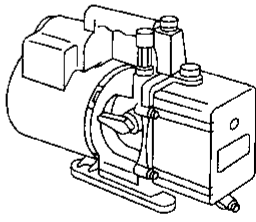
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HFC-134a (R-134a) Service Tools and Equipment (Cont'd)

| Tool number (Kent-Moore No.) Tool name | Description | |
|--|---|---|
| (J-39183) Manifold gauge set (with hoses and couplers) |  | Identification: <ul style="list-style-type: none"> ● The gauge face indicates R-134a. Fitting size: Thread size ● 1/2"-16 ACME |
| NT199 | | |
| Service hoses <ul style="list-style-type: none"> ● High side hose (J-39501-72) ● Low side hose (J-39502-72) ● Utility hose (J-39476-72) |  | Hose color: <ul style="list-style-type: none"> ● Low hose: Blue with black stripe ● High hose: Red with black stripe ● Utility hose: Yellow with black stripe or green with black stripe Hose fitting to gauge: <ul style="list-style-type: none"> ● 1/2"-16 ACME |
| NT201 | | |
| Service couplers <ul style="list-style-type: none"> ● High side coupler (J-39500-20) ● Low side coupler (J-39500-24) |  | Hose fitting to service hose: <ul style="list-style-type: none"> ● M14 x 1.5 fitting is optional or permanently attached. |
| NT202 | | |
| (J-39650) Refrigerant weight scale |  | For measuring of refrigerant Fitting size: Thread size <ul style="list-style-type: none"> ● 1/2"-16 ACME |
| NT200 | | |
| (J-39649) Vacuum pump (Including the isolator valve) |  | Capacity: <ul style="list-style-type: none"> ● Air displacement: 4 CFM ● Micron rating: 20 microns ● Oil capacity: 482 g (17 oz) Fitting size: Thread size <ul style="list-style-type: none"> ● 1/2"-16 ACME |
| NT203 | | |

COMMERCIAL SERVICE TOOL

NAHA0068501

| Tool name | Description |
|----------------------------------|---|
| Refrigerant identifier equipment | <div data-bbox="502 252 885 598" data-label="Image"> </div> <p data-bbox="933 231 1476 294">For checking refrigerant purity and for system contamination</p> <p data-bbox="391 609 454 640">NT765</p> |

- GI
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Refrigeration System

REFRIGERATION CYCLE

Refrigerant Flow

The refrigerant flows in the standard pattern, that is, through the compressor, the condenser, the liquid tank, through the evaporator, and back to the compressor. The refrigerant evaporation through the evaporator coil is controlled by an externally equalized expansion valve, located inside the evaporator case. NAHA0069

Freeze Protection

Under Normal Operating Conditions, When The A/C Is Switched On, The Compressor Runs Continuously, And The Evaporator Pressure, And Therefore Temperature, Is Controlled By The V-6 Variable Displacement Compressor To Prevent Freeze Up. NAHA0069S01

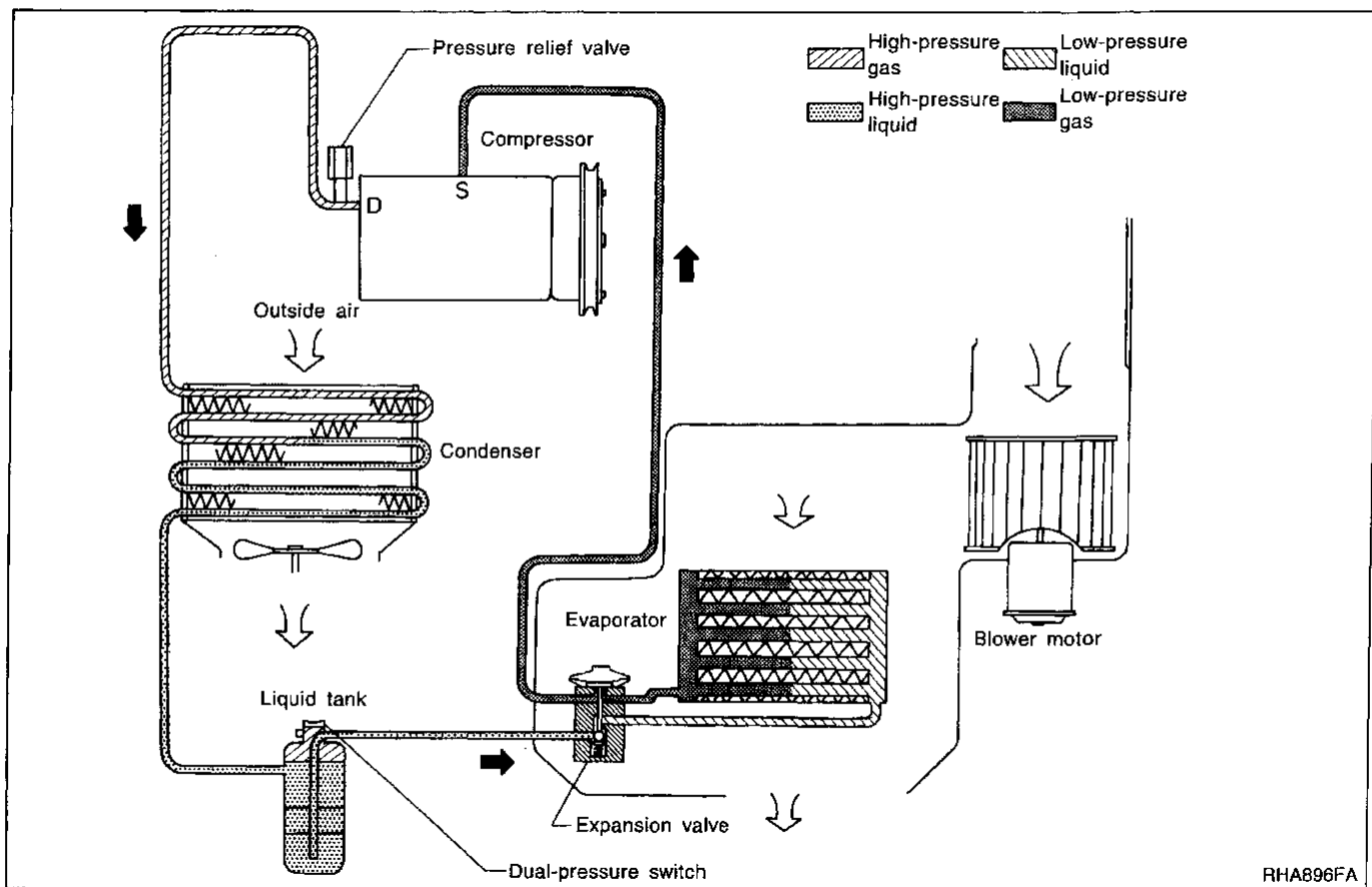
Refrigerant System Protection

Dual-pressure Switch

The refrigerant system is protected against excessively high or low pressures by the dual-pressure switch, located on the liquid tank. If the system pressure rises above, or falls below the specifications, the dual-pressure switch opens to interrupt the compressor operation. NAHA0069S02

Pressure Relief Valve

The refrigerant system is also protected by a pressure relief valve, located in the rear head of the compressor. When the pressure of refrigerant in the system increases to an abnormal level [more than 3,727 kPa (38 kg/cm², 540 psi)], the release port on the pressure relief valve automatically opens and releases refrigerant into the atmosphere. NAHA0069S03



V-6 Variable Displacement Compressor

GI

GENERAL INFORMATION

1. The V-6 variable compressor differs from previous units. The vent temperatures of the V-6 variable compressor do not drop too far below 5°C (41°F) when:
 - evaporator intake air temperature is less than 20°C (68°F)
 - engine is running at speeds less than 1,500 rpm.
 This is because the V-6 compressor provides a means of "capacity" control.
2. The V-6 variable compressor provides refrigerant control under varying conditions. During cold winters, it may not produce high refrigerant pressure discharge (compared to previous units) when used with air conditioning systems.
3. A "clanking" sound may occasionally be heard during refrigerant charge. The sound indicates that the tilt angle of the swash plate has changed and is not a problem.
4. For air conditioning systems with the V-6 compressor, the clutch remains engaged unless: the system main switch, fan switch or ignition switch is turned OFF. When ambient (outside) temperatures are low or when the amount of refrigerant is insufficient, the clutch is disengaged to protect the compressor.
5. A constant range of suction pressure is maintained when engine speed is greater than a certain value. It normally ranges from 147 to 177 kPa (1.5 to 1.8 kg/cm², 21 to 26 psi) under varying conditions. In previous compressors, however, suction pressure was reduced with increases in engine speed.

=NAHA0070

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DESCRIPTION

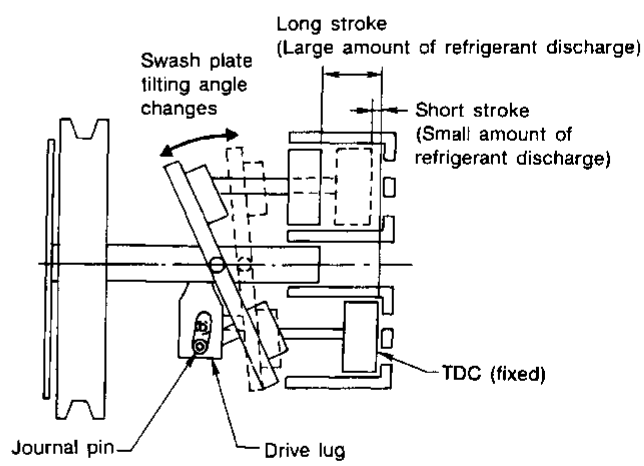
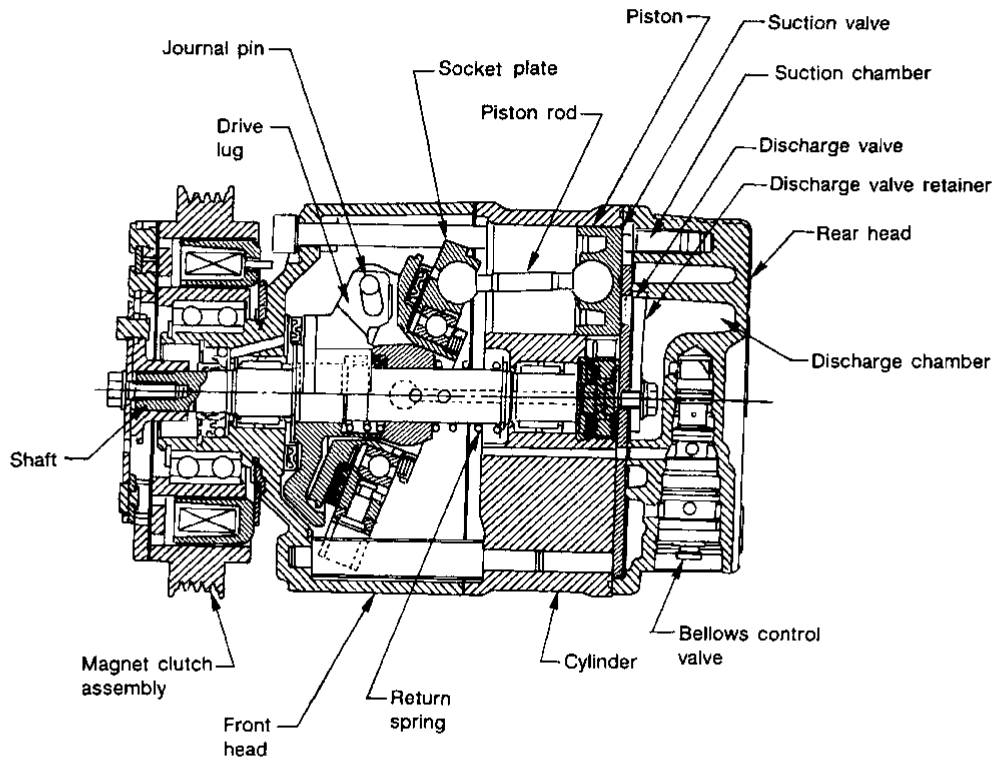
=NAHA0132

General

NAHA0132S01

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

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



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

RHA037DB

Operation

-NAHA0132S02

1. Operation Control Valve

NAHA0132S0201

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

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

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

2. Maximum Cooling

NAHA0132S0202

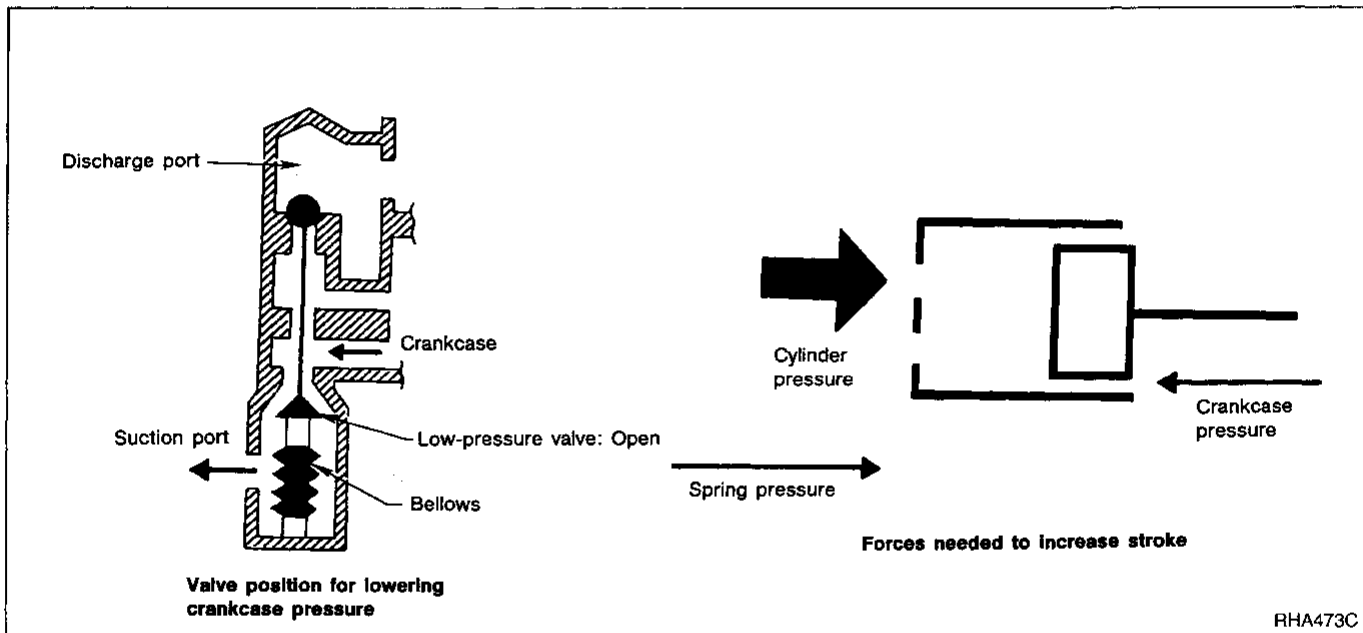
Refrigerant pressure on the low-pressure side increases with an increase in heat loads.

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

This causes the following pressure changes:

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

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



RHA473C

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V-6 Variable Displacement Compressor (Cont'd)

=NAHA0132S0203

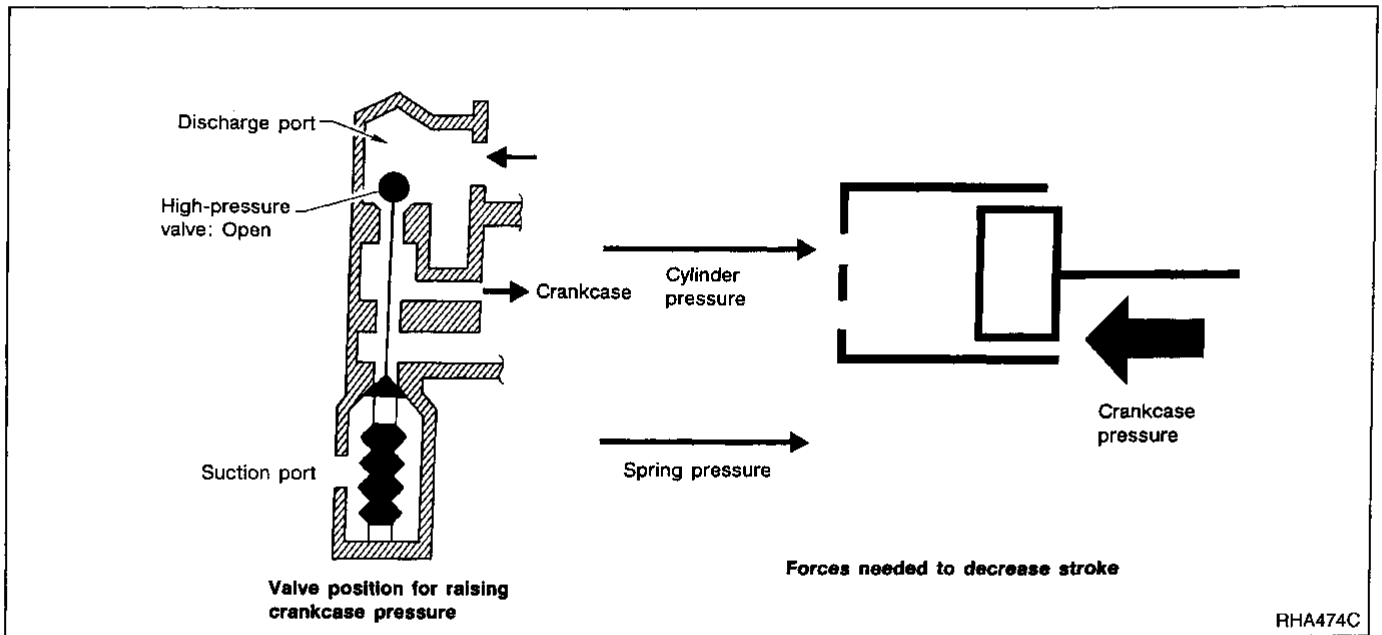
3. Capacity Control

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

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

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

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



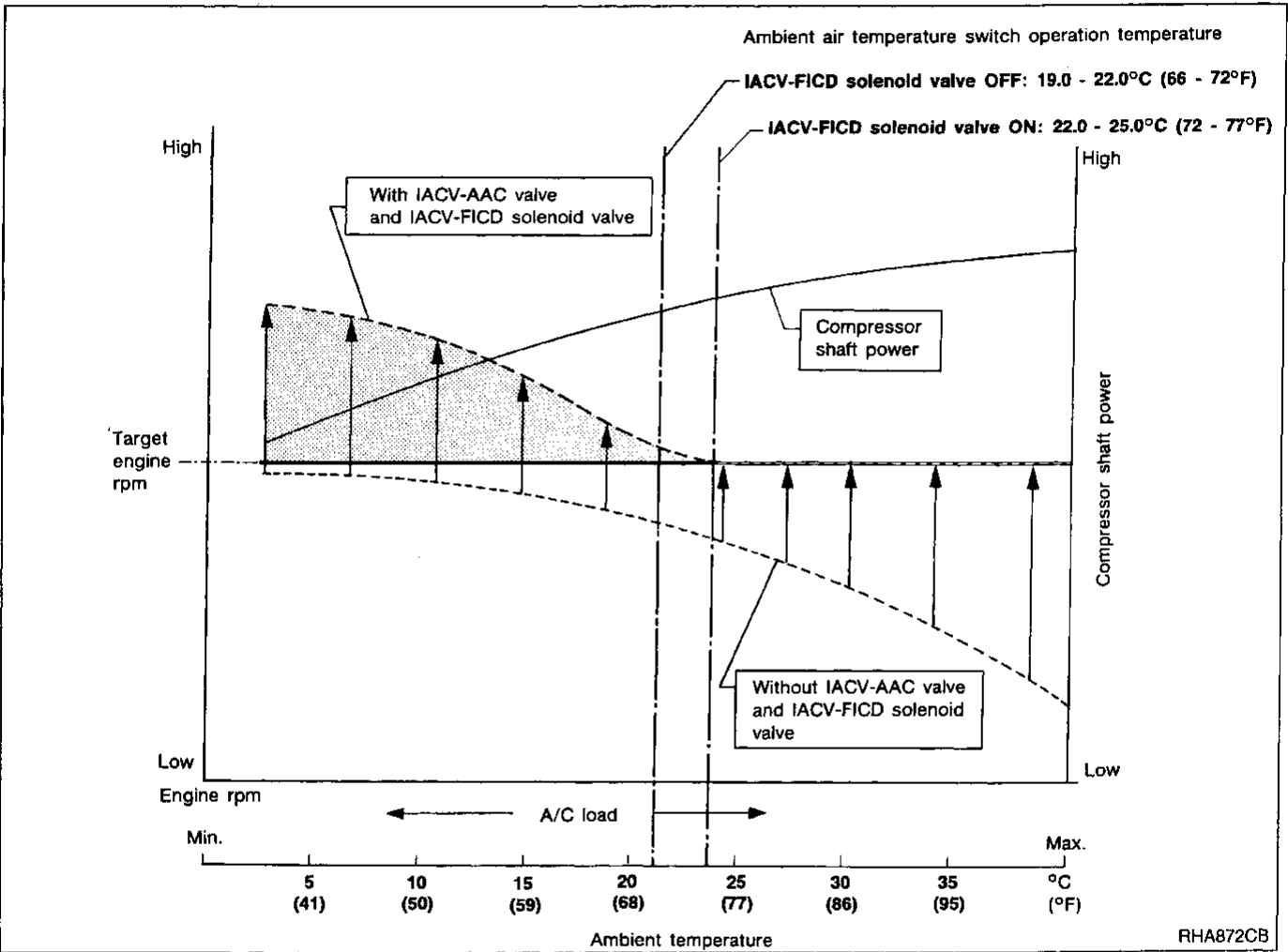
FICD CONTROL SYSTEM

General

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

=NAHA0133

NAHA0133S01



RHA872CB

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V-6 Variable Displacement Compressor (Cont'd)

Operation

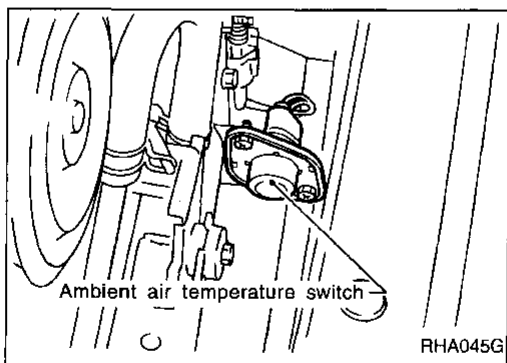
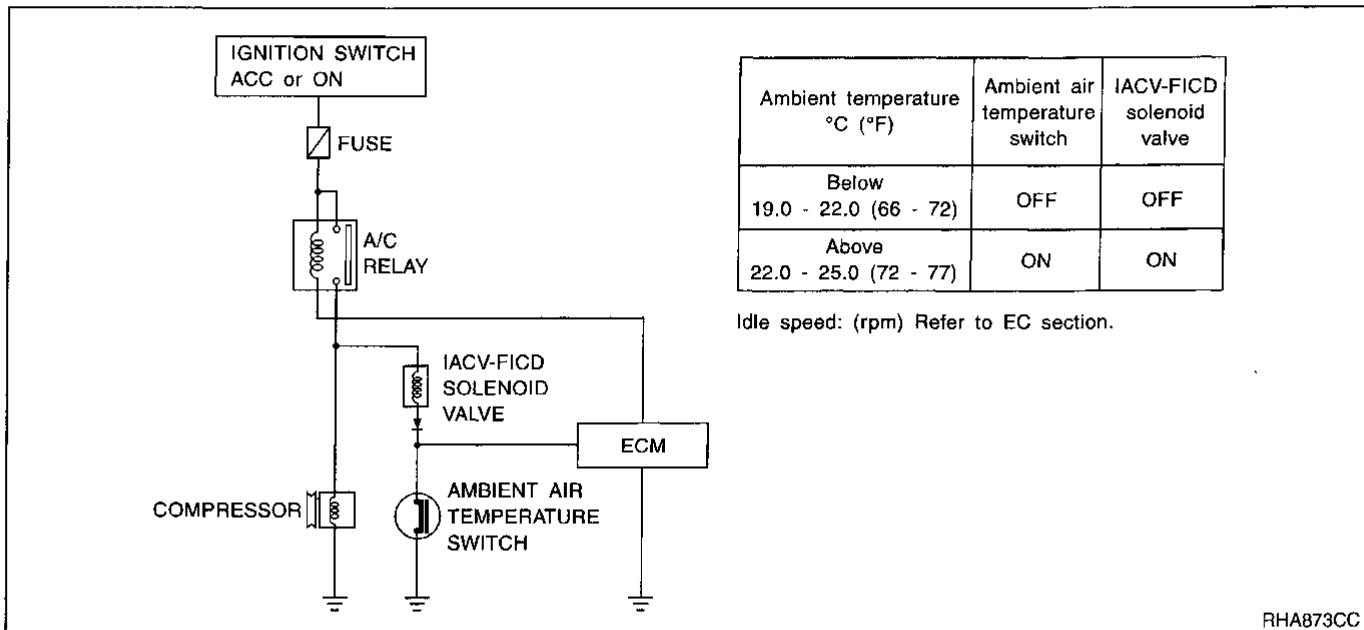
When the air conditioner is OFF, the ECM detects the load applied to the engine, and controls the IACV-AAC valve to adjust the engine idling speed to the appropriate rpm by supplying additional air from the IACV-AAC valve.

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

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

If the ambient air temperature switch is OFF [this switch turns OFF when the ambient temperature is below 19.0°C (66°F)] even when the air conditioner is ON (A/C relay is ON), the IACV-FICD solenoid valve is deenergized, and the idling speed is controlled so that the appropriate rpm can be achieved by operation of the IACV-AAC valve only.

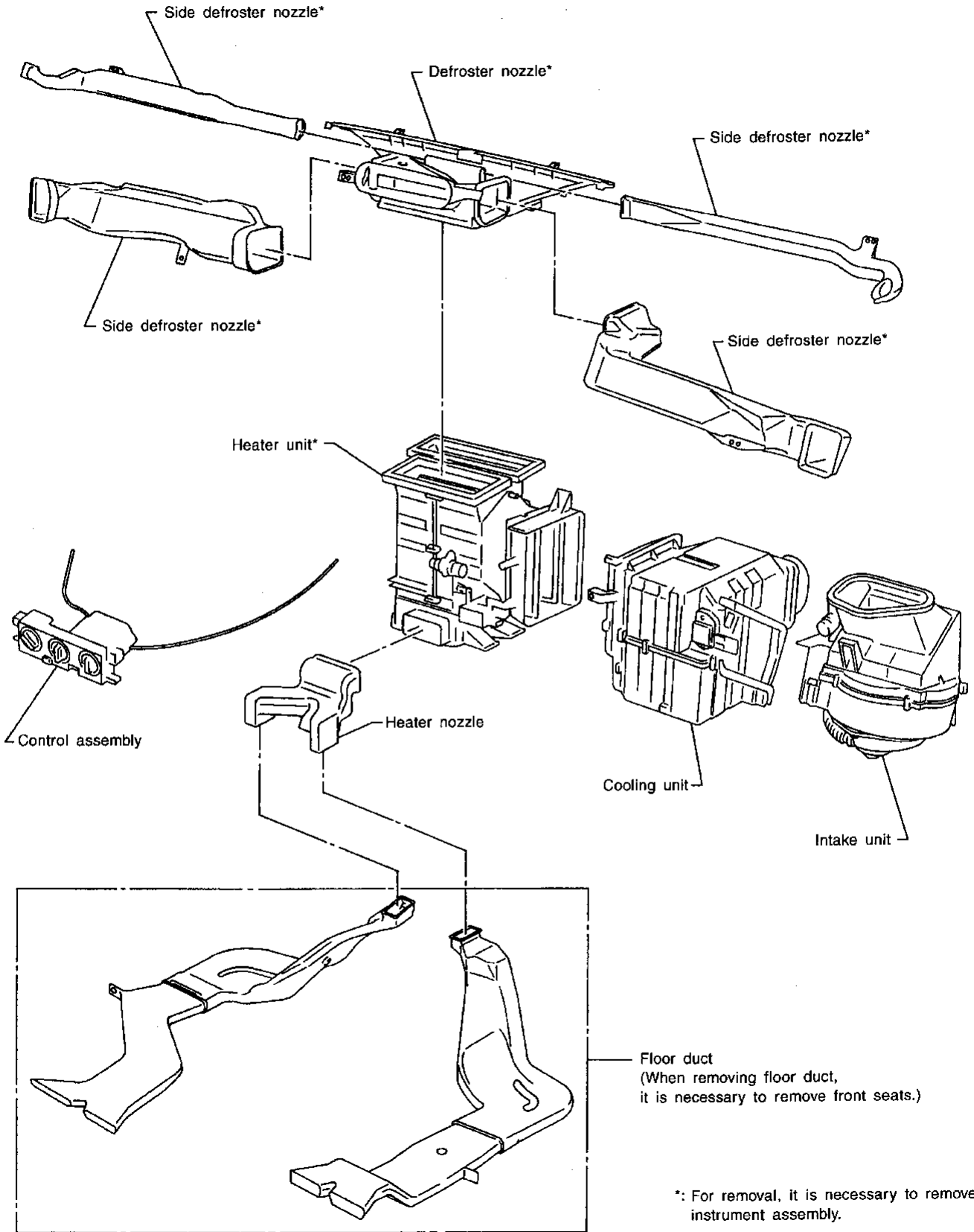
NAHA0133S02



NAHA0071

Component Layout

SEC. 270•271•272•273



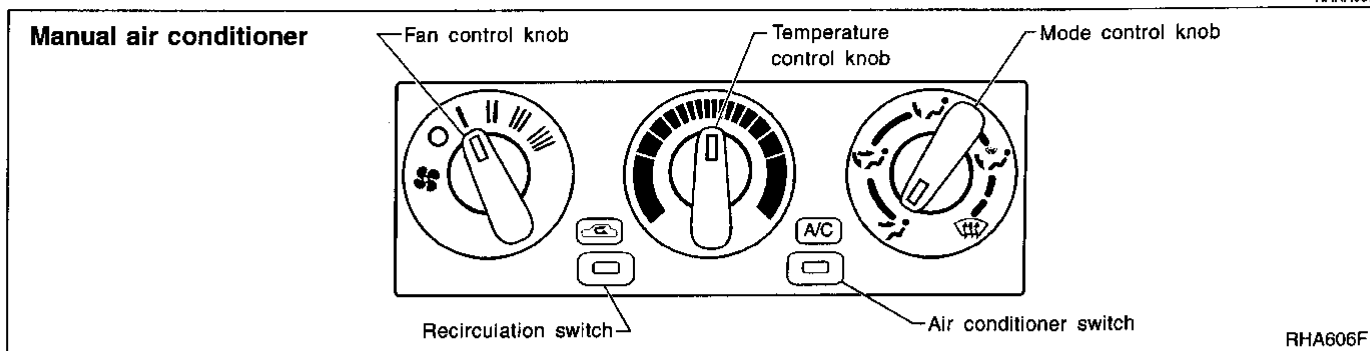
*: For removal, it is necessary to remove instrument assembly.

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RHA573F

Control Operation

NAHA0072

**FAN CONTROL KNOB**

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

NAHA0072S01

MODE CONTROL KNOB

This knob controls the outlet air flow.

In "DEF" or "D/F" mode, the intake door is set to "FRESH".

NAHA0072S02

TEMPERATURE CONTROL KNOB

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

NAHA0072S03

RECIRCULATION (REC) SWITCH

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

ON position: Interior air is recirculated inside the vehicle. The indicator lamp will also light.

NAHA0072S04

AIR CONDITIONER SWITCH

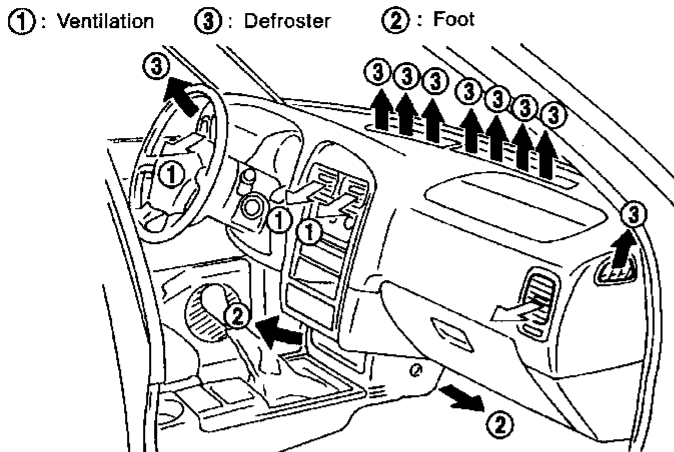
The air conditioner switch controls the A/C system. When the switch is depressed with the fan ON, the compressor will turn ON. The indicator lamp will also light.

NAHA0072S05

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

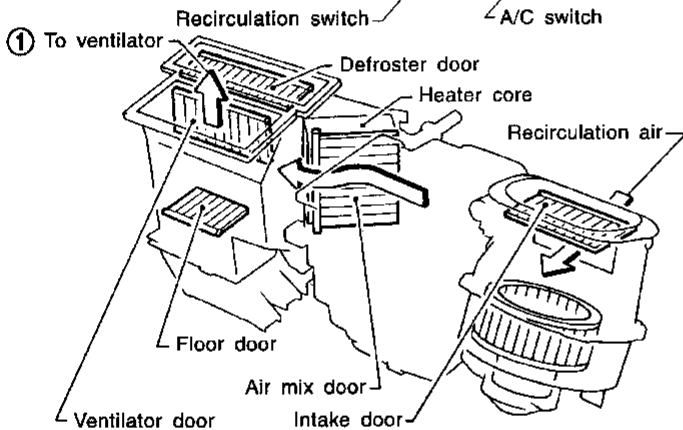
NAHA0073

Discharge Air Flow

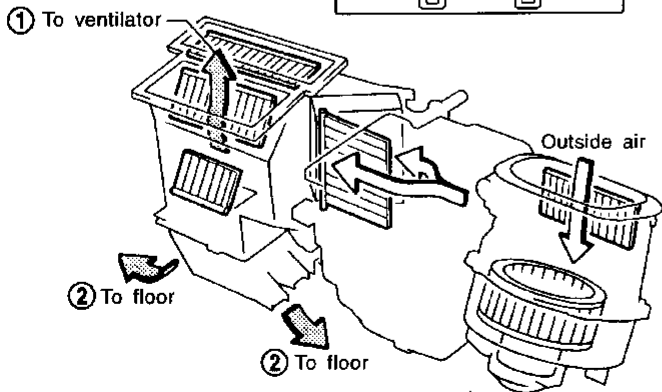


Ventilation
(switch "ON")

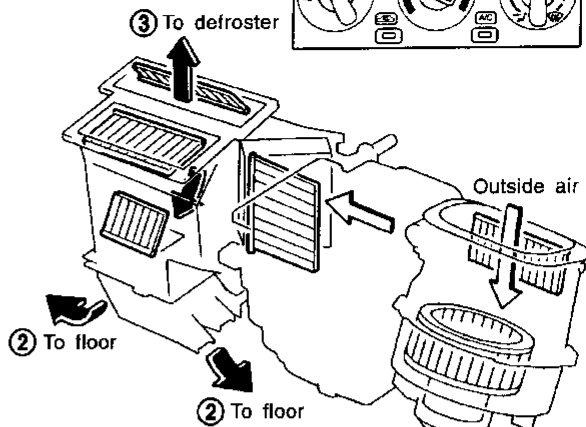
Fan control knob Temperature control knob
Mode control knob



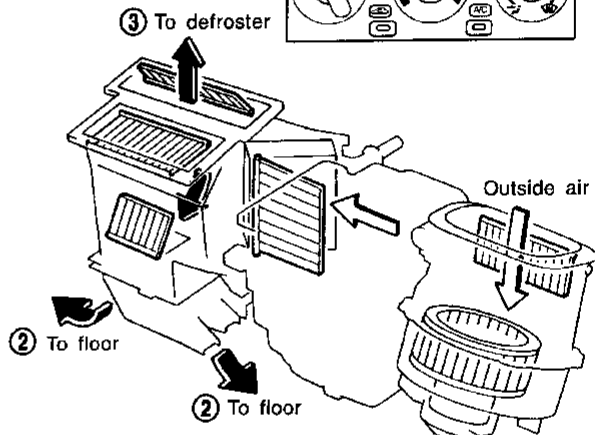
Bi-level
(switch "OFF")



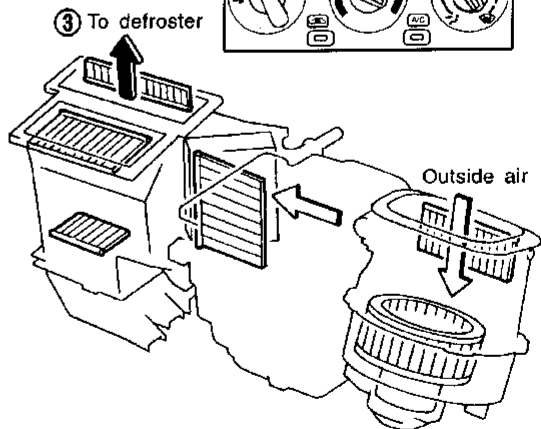
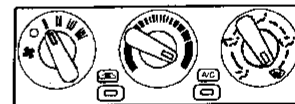
Floor



Floor and defroster



Defroster



- : Air passed through heater core
- : Mixed air (+)
- : Air not passed through heater core

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System Description
SWITCHES AND THEIR CONTROL FUNCTIONS

NAHA0074

NAHA0074S02

| Knob/Switch | Knob/Switch position | | | | | | | Air outlet | Intake air | Compressor |
|---|---|---|---|---|---|---|---|------------|------------|------------|
| | A/C |  |  |  |  |  |  | | | |
| A/C | ○ | | | | | | | — | — | ON*1 |
| Mode |  | | ○ | | | | | VENT | — | — |
| |  | | | ○ | | | | B/L | — | — |
| |  | | | | ○ | | | FOOT | — | — |
| |  | | | | | ○ | | D/F | FRE | — |
| |  | | | | | | ○ | DEF | FRE | — |
|  | | | | | | | ○ | — | REC*2 | — |

*1: Compressor is operated by dual-pressure switch.

*2: In DEF and D/F modes, REC switch is canceled.

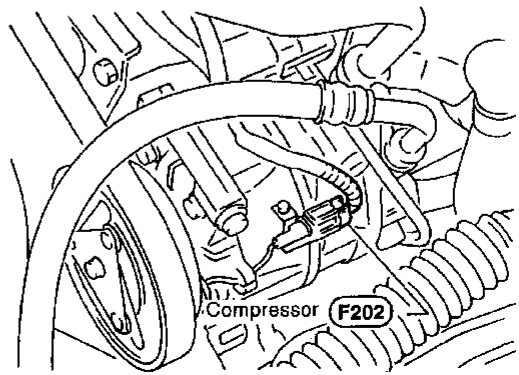
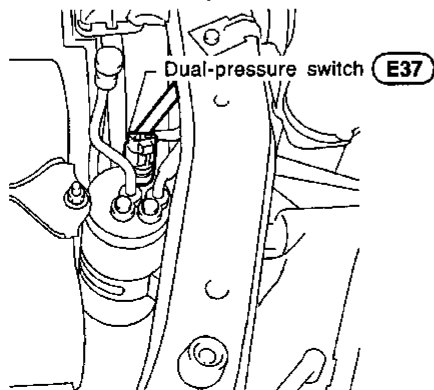
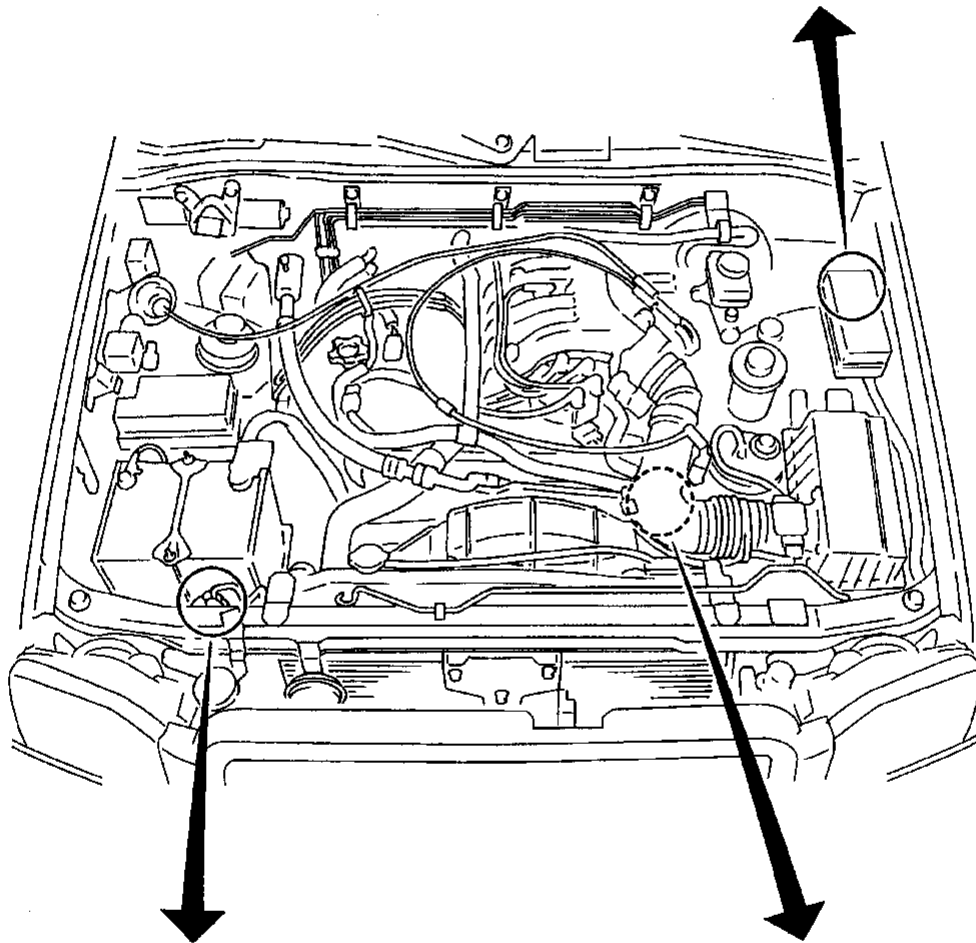
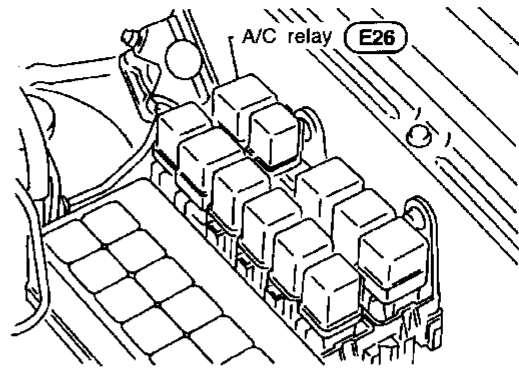
ENGINE COMPARTMENT

Component Location

NAHA0085

NAHA0085S01

- GI
- MA
- EM
- LC
- EC
- FE
- CL
- MT
- AT
- TF
- PD
- AX
- SU
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- BT
- HA**
- SC
- EL
- IDX

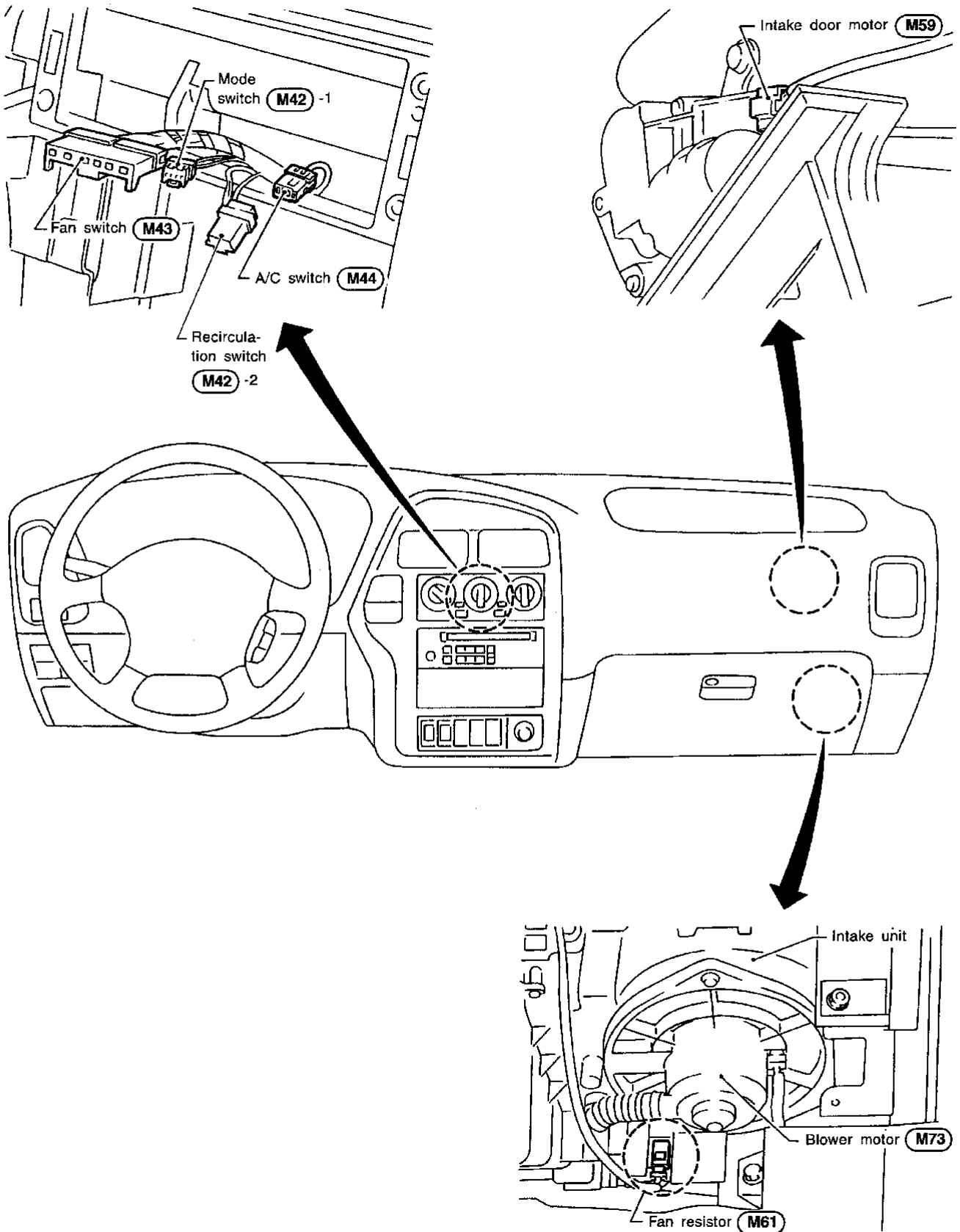


RHA326H

Component Location (Cont'd)

PASSENGER COMPARTMENT

NAHA0085S02

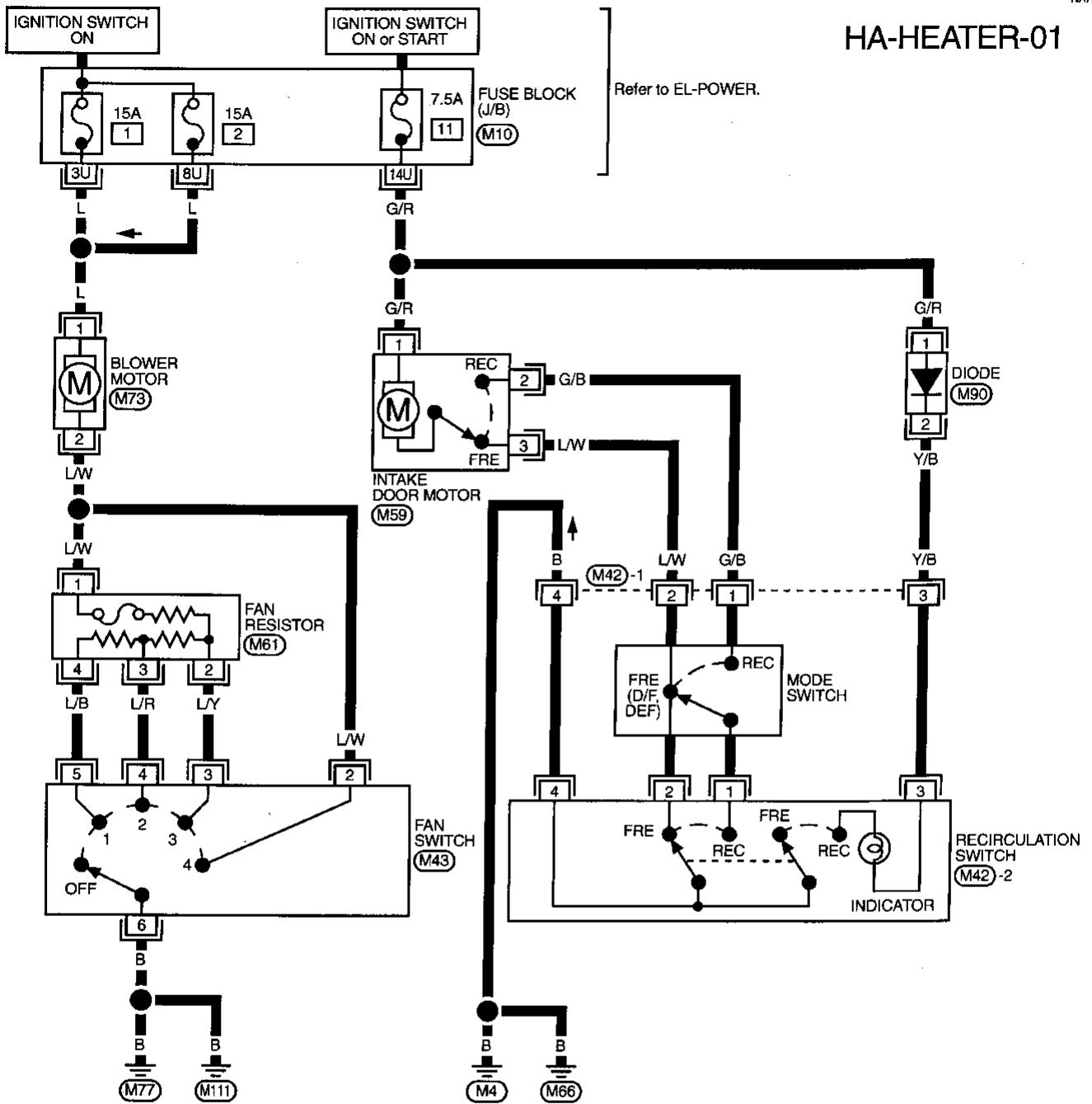


SHA265F

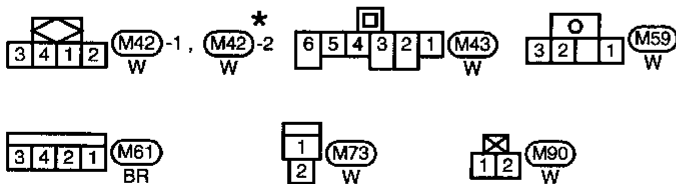
Wiring Diagram — HEATER —

HA-HEATER-01

NAHA0086



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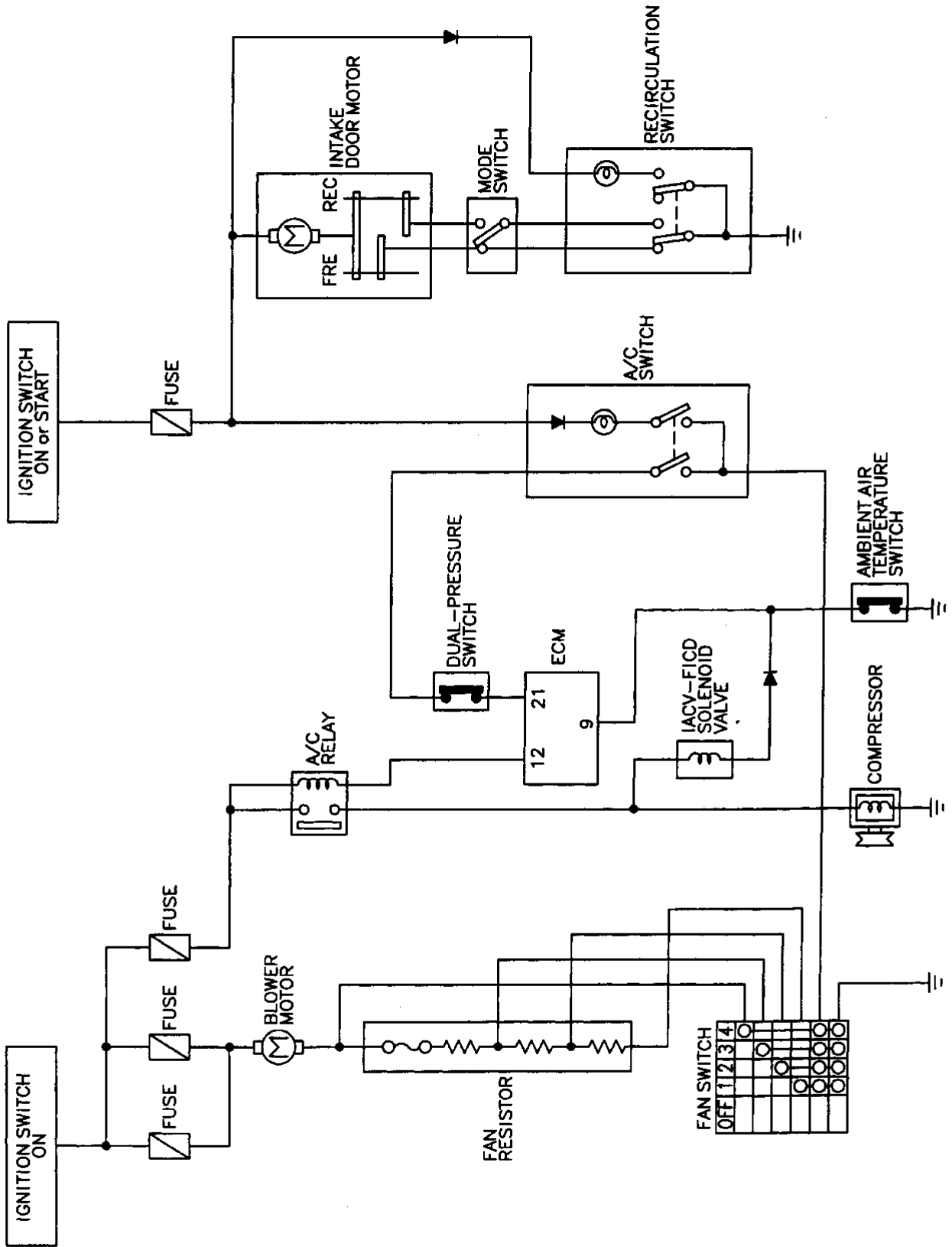
* : This connector is not shown in "HARNES LAYOUT" of EL section.

Refer to last page (Foldout page).

M10

Circuit Diagram — Air Conditioner

NAHA0087

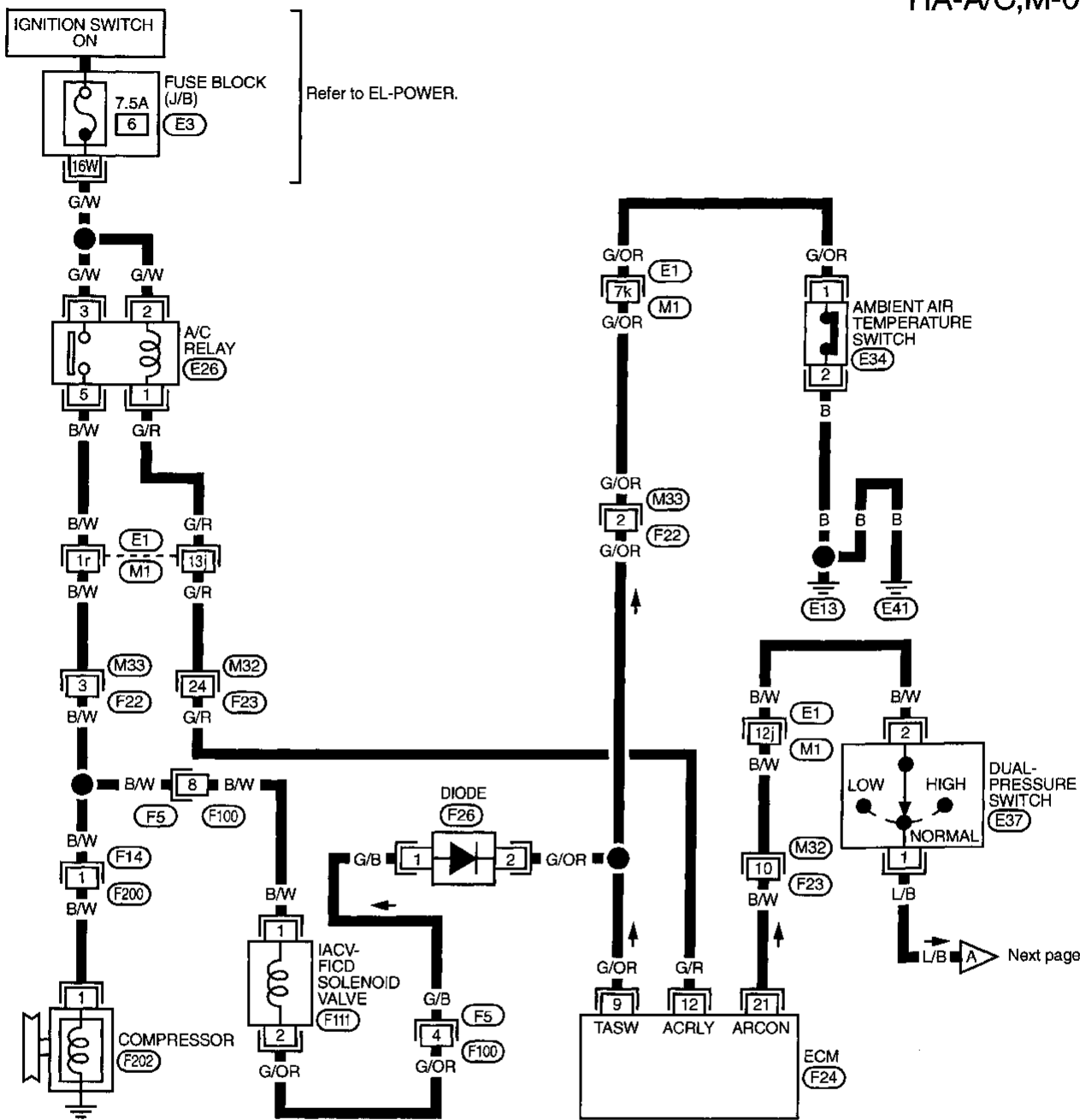


Wiring Diagram — A/C, M —

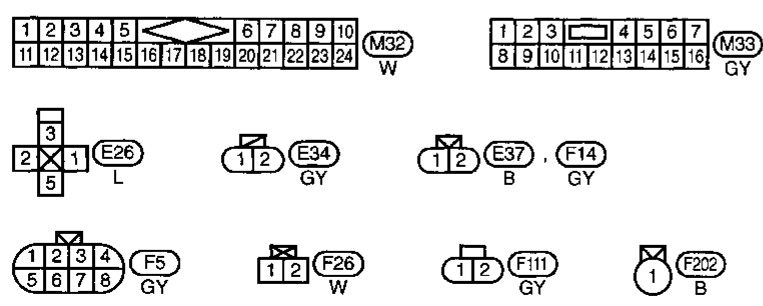
NAHA0088

HA-A/C,M-01

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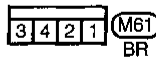
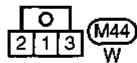
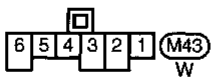
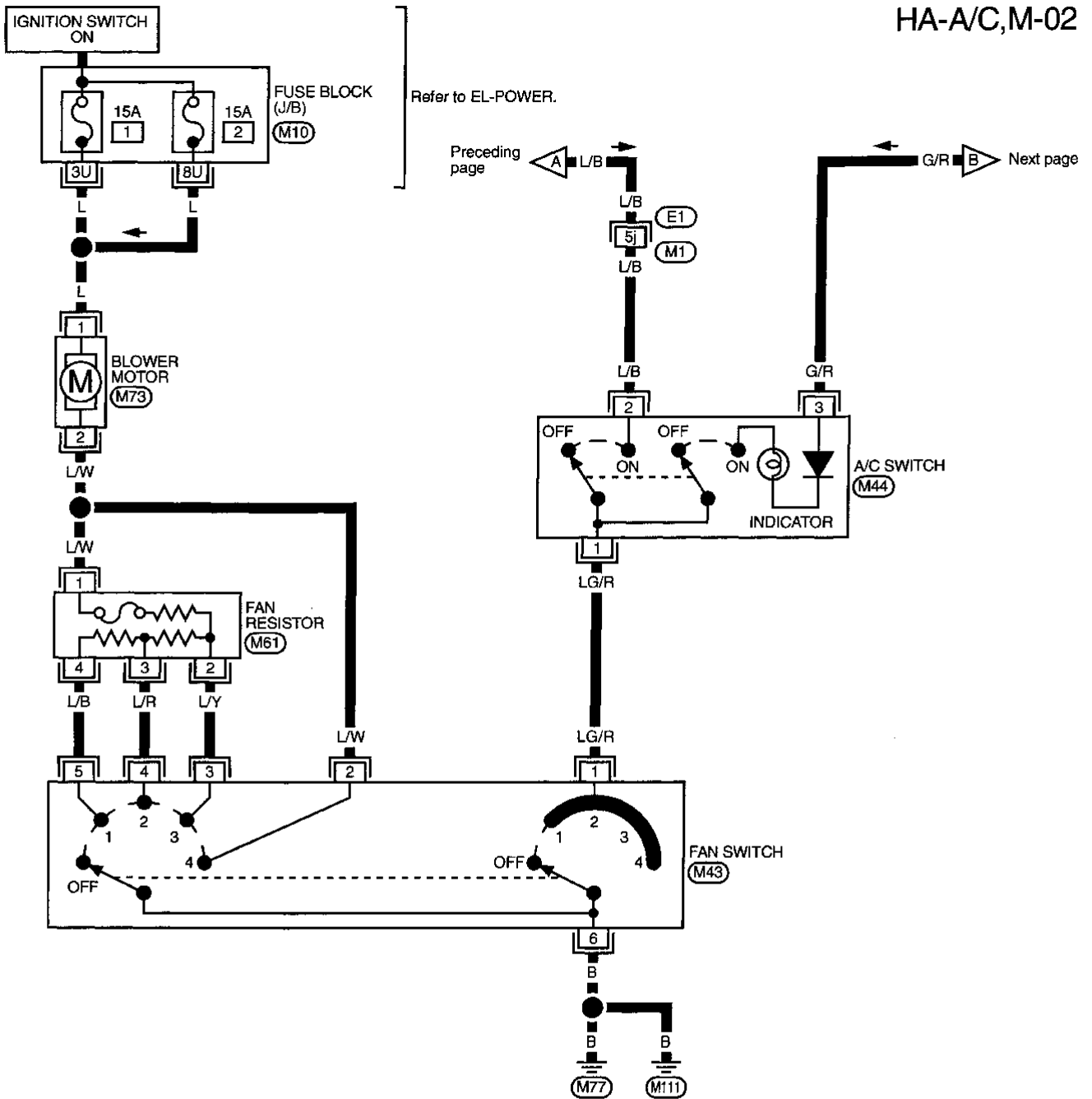


Refer to last page (Foldout page).

- (M1), (E1)
- (E3)
- (F24)

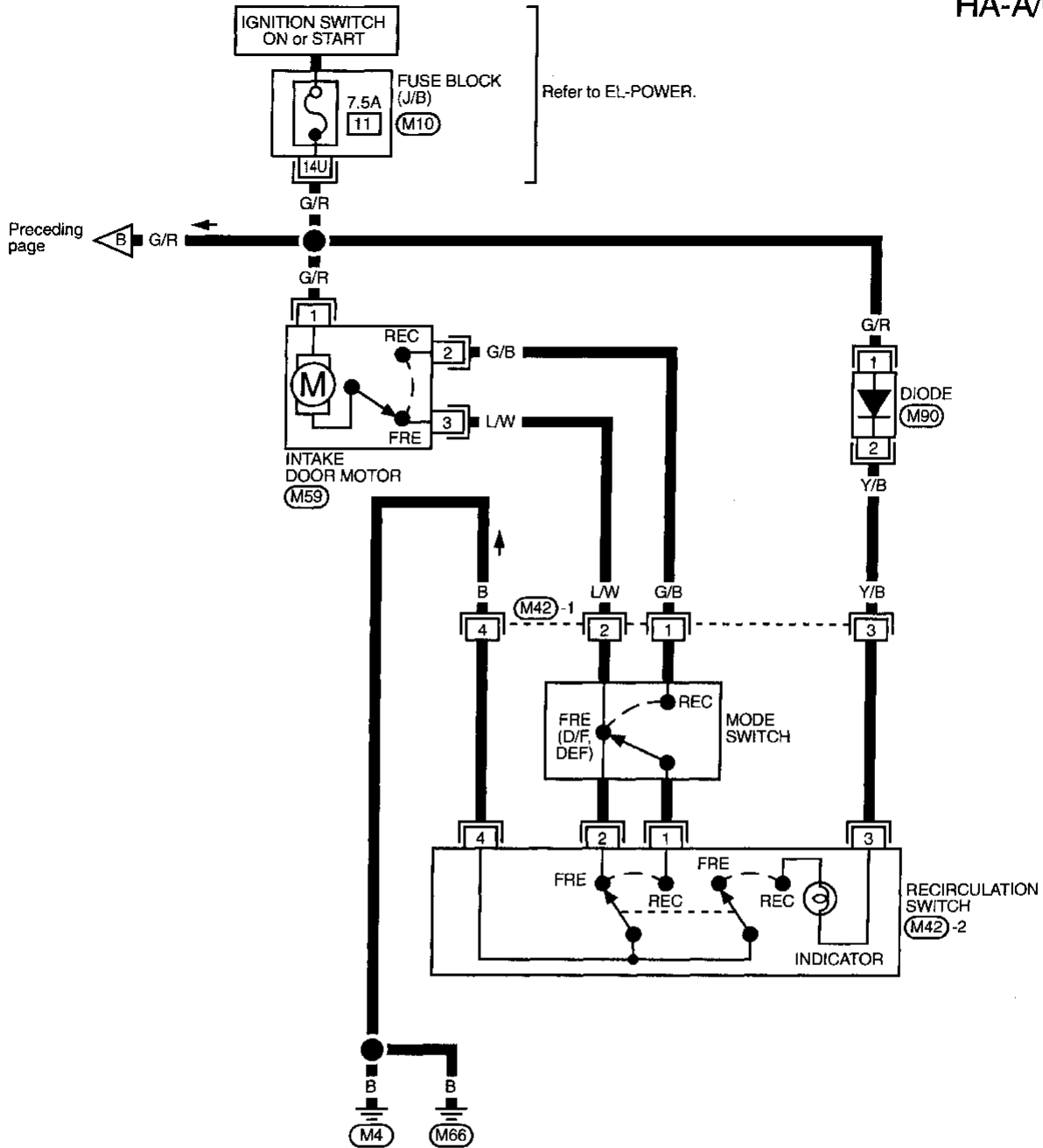
Wiring Diagram — A/C, M — (Cont'd)

HA-A/C,M-02



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

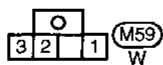
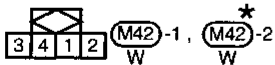
HA-A/C, M-03



Refer to EL-POWER.

Preceding page

Refer to last page (Foldout page).



* : This connector is not shown in "HARNESS LAYOUT" of EL section.

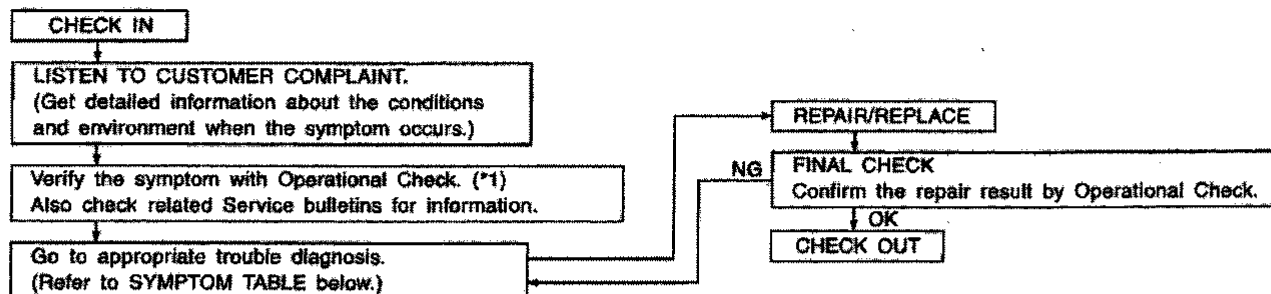
M10

How to Perform Trouble Diagnoses for Quick and Accurate Repair

NAHA0075

NAHA0075S01

WORK FLOW



SHA900E

*1: HA-141

SYMPTOM TABLE

NAHA0075S02

| Symptom | Reference page | |
|--|---|--------|
| ● Intake door does not change in VENT, B/L or FOOT mode. | ● Go to Trouble Diagnosis Procedure for Intake Door. | HA-143 |
| ● Blower motor does not rotate at all. | ● Go to Trouble Diagnosis Procedure for Blower Motor. | HA-148 |
| ● Insufficient cooling. | ● Go to Trouble Diagnosis Procedure for Insufficient cooling. | HA-153 |
| ● Insufficient heating. | ● Go to Trouble Diagnosis Procedure for Insufficient heating. | HA-161 |
| ● Air outlet does not change. | ● Go to Trouble Diagnosis Procedure for Air Outlet. | HA-163 |
| ● Magnet clutch does not engage when A/C switch and fan switch are ON. | ● Go to Trouble Diagnosis Procedure for Magnet Clutch. | HA-165 |
| ● Noise | ● Go to Trouble Diagnosis Procedure for Noise. | HA-170 |

Operational Check

The purpose of the operational check is to confirm that the system operates as it should. The systems which are checked are the blower, mode (discharge air), intake air, temperature decrease, temperature increase.

CONDITIONS:

Engine running at normal operating temperature.

PROCEDURE:

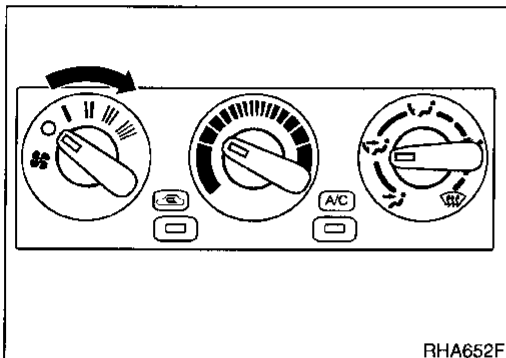
1. Check Blower

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

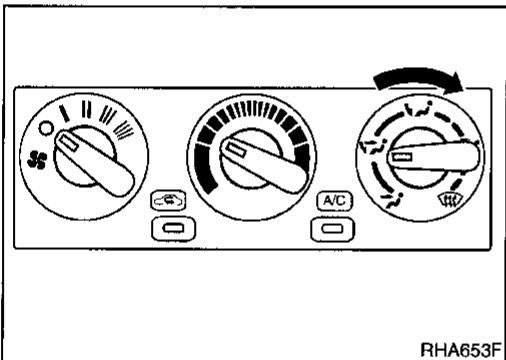
2. Check Discharge Air

1. Turn mode control knob.

2. Confirm that discharge air comes out according to the air distribution table at left. Refer to "Discharge Air Flow" in "DESCRIPTION" (HA-131).



RHA652F



RHA653F

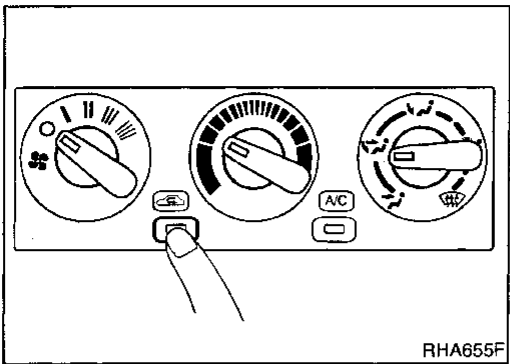
Discharge air flow

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

RHA654F

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TF
PD
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

Operational Check (Cont'd)



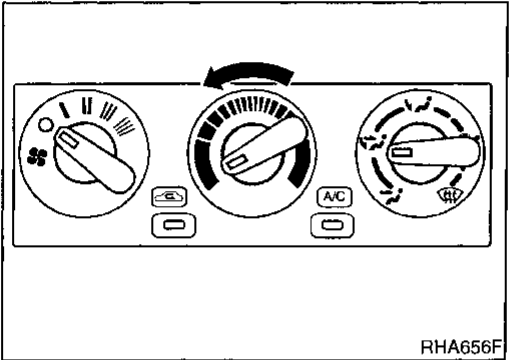
3. Check Recirculation

NAHA0076S0203

1. Press recirculation switch.
Recirculation indicator should light.
2. Listen for intake door position change (you should hear blower sound change slightly).

NOTE:

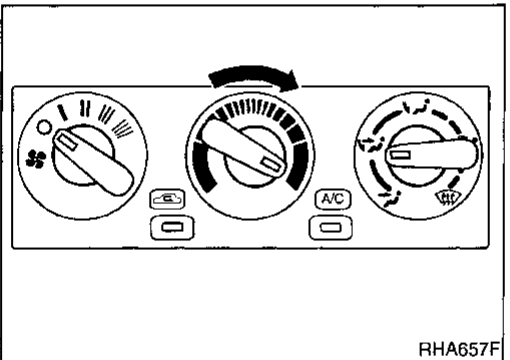
Confirm that the RECIRCULATION (REC) switch is canceled in the DEF (☼) and D/F (☼) mode.



4. Check Temperature Decrease

NAHA0076S0204

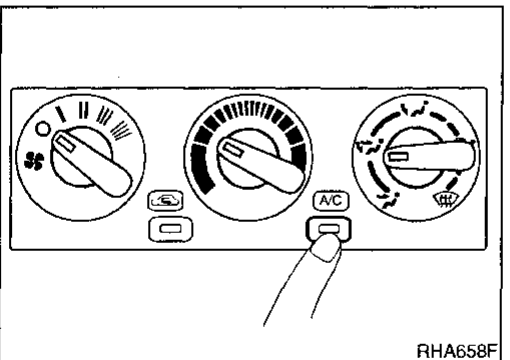
1. Turn temperature control knob to full cold.
2. Check for cold air at discharge air outlets.



5. Check Temperature Increase

NAHA0076S0205

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



6. Check Air Conditioner Switch

NAHA0076S0206

Turn fan control knob to the desired (1 to 4-speed) position and push the air conditioner switch to turn ON the air conditioner. The indicator light should come on when air conditioner is ON.

Intake Door

TROUBLE DIAGNOSIS PROCEDURE FOR INTAKE DOOR

=NAHA0135

Symptom:

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

Inspection Flow

GI

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FE

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SHA260F

BR

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RS

BT

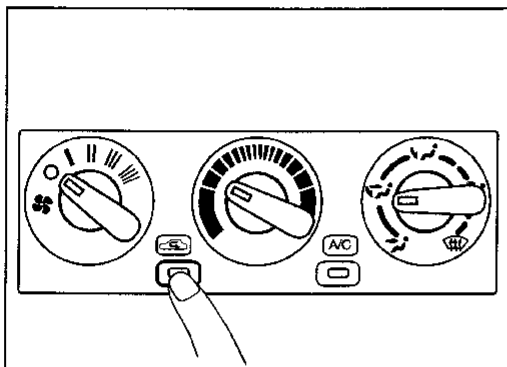
HA

SC

EL

IDX

1. Confirm symptom by performing the following operational check.



OPERATIONAL CHECK – Recirculation

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

NOTE:

Confirm that the RECIRCULATION (REC) switch is canceled in the DEF () and D/F () mode.

2. Check for any service bulletins.

3. Check intake door motor circuit. (*1)

INSPECTION END

OK
If the symptom still exist, perform a complete operational check (*2) and check for other symptoms.
[Refer to symptom table, (*3).]
Does another symptom exist?

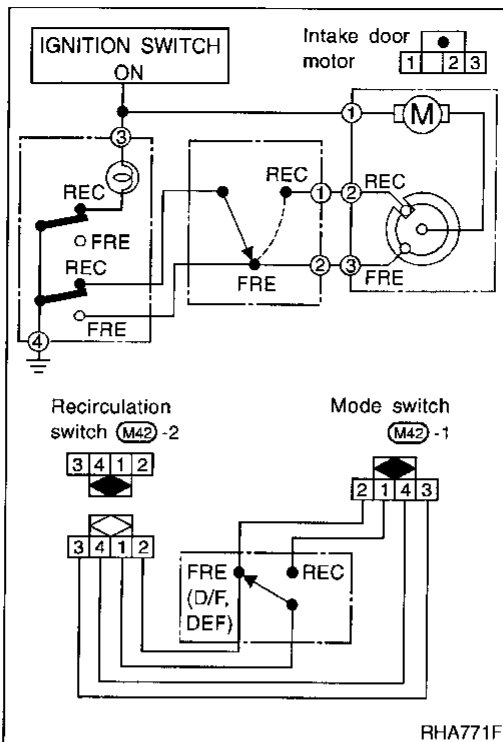
Yes
Go to Trouble Diagnosis for related symptom.
[Another symptom exists.]

*1: HA-145

*2: HA-141

*3: HA-140

Intake Door (Cont'd)



SYSTEM DESCRIPTION

Intake Door Motor

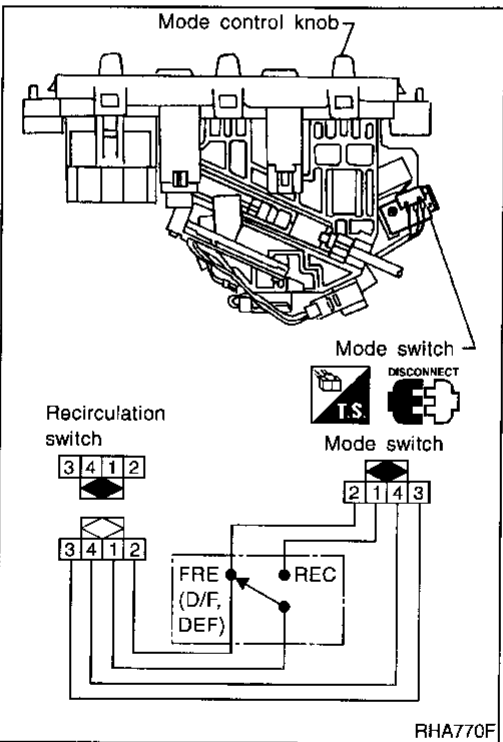
NAHA0136

NAHA0136S01

The intake door motor is installed on the intake unit. Using a link it opens and closes the intake door.

When RECIRCULATION switch is at REC (except DEF and D/F modes), the ground line of the motor is switched from intake door motor terminal 3 to 2. This starts the motor because the position switch contacts built into it make current flow. When RECIRCULATION switch is at FRE (except DEF and D/F modes), the ground line is switched from intake door motor terminal 2 to 3. The contacts turn along with the motor. When they reach the non-current flow position, the motor will stop. The motor always turns in the same direction.

RECIRCULATION switch is canceled by MODE switch in DEF and D/F modes.



ELECTRICAL COMPONENTS INSPECTION

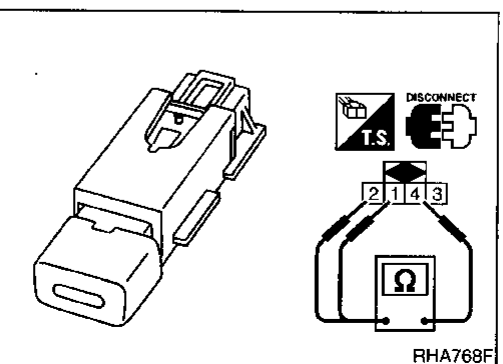
NAHA0137

Mode Switch

NAHA0137S01

Check continuity between terminals at each switch position.

| Terminal No. | | Mode control knob condition | Continuity |
|-----------------|------------------------------------|-----------------------------|------------|
| Mode switch (+) | Recirculation switch connector (-) | | |
| 1 | 1 | VENT, B/L, FOOT | Yes |
| | | D/F, DEF | No |
| 2 | 1 | VENT, B/L, FOOT | No |
| | | D/F, DEF | Yes |
| 2 | 2 | All | Yes |
| 3 | 3 | All | Yes |
| 3 | 3 | All | Yes |



Recirculation Switch

NAHA0137S02

Check continuity between terminals at each switch position.

| Terminal No. | | Recirculation switch condition | Continuity |
|--------------|-----|--------------------------------|------------|
| (+) | (-) | | |
| 1 | 4 | REC | Yes |
| | | FRE | No |
| 2 | 4 | REC | No |
| | | FRE | Yes |

INTAKE DOOR MOTOR CIRCUIT

-NAHA0090

SYMPTOM:

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

| | |
|--|---|
| 1 | CHECK POWER SUPPLY FOR INTAKE DOOR MOTOR |
| <p>Disconnect intake door motor harness connector. Do approx. 12 volts exist between intake door motor harness terminal No. 1 and body ground?</p> | |
| | |
| Yes or No | |
| Yes | ▶ GO TO 2. |
| No | ▶ Check 7.5A (No. 11) fuse at fuse block. (Refer to "POWER SUPPLY ROUTING" in EL section and Wiring Diagram.) |

| 2 | CHECK GROUND CIRCUIT FOR INTAKE DOOR MOTOR | | | | | | | | | | | | | | | | | |
|--|--|--------------------------------|--------------|--|------------|-----|-----|-----|-----|-------------|-----|-----|----|-----|-----|----|-----|-----|
| <p>Check continuity between intake door motor harness terminals and body ground.</p> | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| <p>Continuity should exist when test leads are connected as shown, it should not exist when test leads are reversed.</p> | | | | | | | | | | | | | | | | | | |
| RHA580F | | | | | | | | | | | | | | | | | | |
| <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">Recirculation switch condition</th> <th colspan="2">Terminal No.</th> <th rowspan="2">Continuity</th> </tr> <tr> <th>(+)</th> <th>(-)</th> </tr> </thead> <tbody> <tr> <td rowspan="2">REC</td> <td>(2)</td> <td rowspan="4" style="text-align: center;">Body ground</td> <td>Yes</td> </tr> <tr> <td>(3)</td> <td>No</td> </tr> <tr> <td rowspan="2">FRE</td> <td>(2)</td> <td>No</td> </tr> <tr> <td>(3)</td> <td>Yes</td> </tr> </tbody> </table> | | Recirculation switch condition | Terminal No. | | Continuity | (+) | (-) | REC | (2) | Body ground | Yes | (3) | No | FRE | (2) | No | (3) | Yes |
| Recirculation switch condition | Terminal No. | | Continuity | | | | | | | | | | | | | | | |
| | (+) | (-) | | | | | | | | | | | | | | | | |
| REC | (2) | Body ground | Yes | | | | | | | | | | | | | | | |
| | (3) | | No | | | | | | | | | | | | | | | |
| FRE | (2) | | No | | | | | | | | | | | | | | | |
| | (3) | | Yes | | | | | | | | | | | | | | | |
| MTBL0033 | | | | | | | | | | | | | | | | | | |
| OK or NG | | | | | | | | | | | | | | | | | | |
| OK | ▶ GO TO 3. | | | | | | | | | | | | | | | | | |
| NG | ▶ Disconnect mode switch harness connector. GO TO 4. | | | | | | | | | | | | | | | | | |

| | |
|--|----------------------------------|
| 3 | CHECK INTAKE DOOR LINKAGE |
| <p>Refer to Control Linkage Adjustment. (HA-147)</p> | |
| OK or NG | |
| OK | ▶ Replace intake door motor. |
| NG | ▶ Repair or adjust. |

Intake Door (Cont'd)

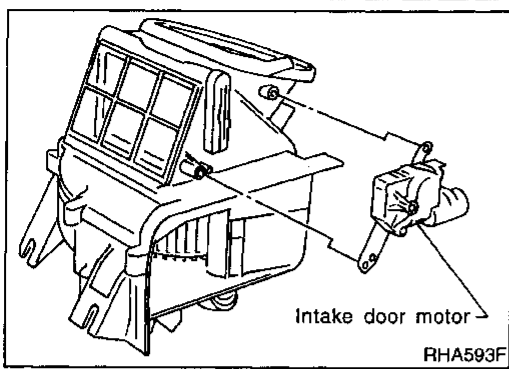
| | |
|---|---|
| 4 | CHECK CONTINUITY BETWEEN MODE SWITCH HARNESS TERMINAL NO. 1 (2) AND INTAKE DOOR MOTOR HARNESS TERMINAL NO. 2 (3) |
| <p style="text-align: center;">Mode switch connector (M42)-1</p> <p style="text-align: center;">Intake door motor connector (M59)</p> | |
| <p>Continuity should exist. If OK, check harness for short.</p> <p style="text-align: right;">RHA581F</p> | |
| OK or NG | |
| OK | ▶ GO TO 5. |
| NG | ▶ Repair harness or connector. |

| | |
|--|--------------------------|
| 5 | CHECK MODE SWITCH |
| <p>(Refer to Electrical Components Inspection.) (HA-144)</p> | |
| OK or NG | |
| OK | ▶ GO TO 6. |
| NG | ▶ Replace mode switch. |

| | |
|--|--|
| 6 | CHECK CIRCUIT CONTINUITY BETWEEN MODE SWITCH HARNESS TERMINAL NO. 4 AND RECIRCULATION SWITCH HARNESS TERMINAL NO. 4 |
| <p style="text-align: center;">Recirculation switch connector (M42)-2</p> <p style="text-align: center;">Mode switch connector (M42)-1</p> | |
| <p>Continuity should exist. If OK, check harness for short.</p> <p style="text-align: right;">RHA769FB</p> | |
| OK or NG | |
| OK | ▶ GO TO 7. |
| NG | ▶ Replace mode switch. |

| | |
|--|---|
| 7 | CHECK GROUND CIRCUIT FOR MODE SWITCH |
| <p>Check circuit continuity between mode switch harness terminal No. 4 and body ground.</p> | |
| <p style="text-align: center;">Mode switch connector (M42)-1</p> | |
| <p>Continuity should exist. If OK, check harness for short.</p> <p style="text-align: right;">RHA582F</p> | |
| OK or NG | |
| OK | ▶ GO TO 8. |
| NG | ▶ Repair harness or connector. |

| | |
|--|-----------------------------------|
| 8 | CHECK RECIRCULATION SWITCH |
| <p>(Refer to Electrical Components Inspection.) (HA-144)</p> | |
| OK or NG | |
| OK | ▶ INSPECTION END |
| NG | ▶ Replace recirculation switch. |



CONTROL LINKAGE ADJUSTMENT

Intake Door Motor

NAHA0093

NAHA0093S04

1. Install intake door motor on intake unit.
Ensure that the intake door motor lever is fitted into the slit portion of intake door link.
2. Connect the intake door motor harness connector.
3. Turn ignition switch to ON.
4. Check that intake door operates properly when RECIRCULATION switch is turned ON and OFF.

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Blower Motor

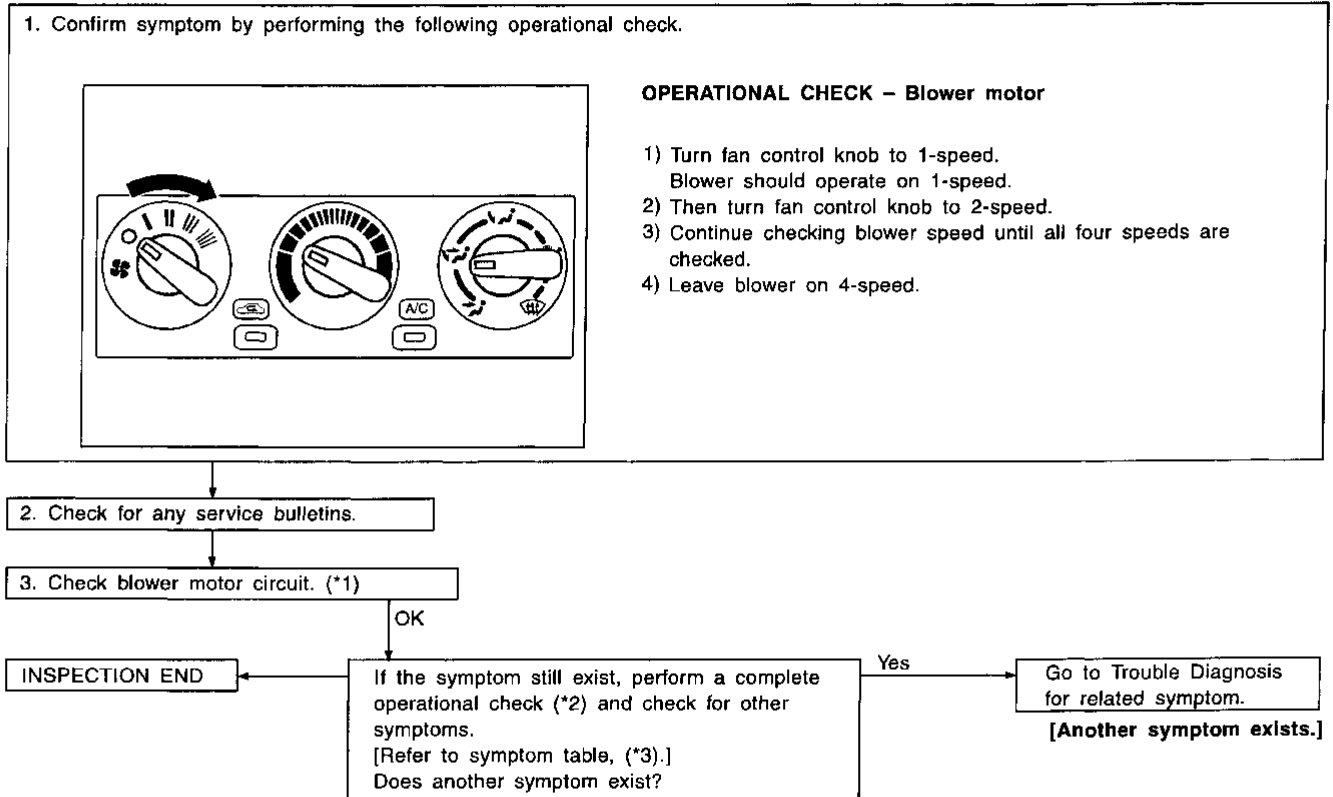
TROUBLE DIAGNOSIS PROCEDURE FOR BLOWER MOTOR

=NAHA0138

Symptom:

- Blower motor does not rotate at all.

Inspection Flow

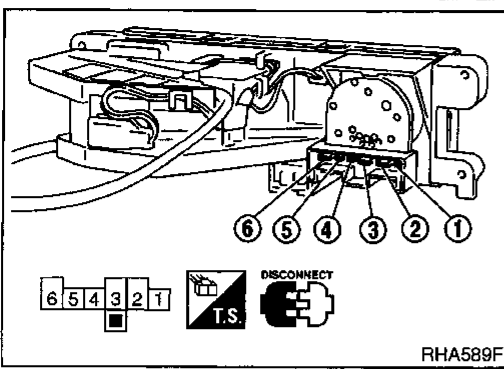


SHA261F

*1: HA-150

*2: HA-141

*3: HA-140



RHA589F

ELECTRICAL COMPONENTS INSPECTION

~NAHA0139

GI

Fan Switch

NAHA0139S01

MA

Check continuity between terminals at each switch position.

| KNOB POSITION | Continuity between terminals |
|---------------|------------------------------|
| OFF | |
| 1 | 5 — 1 — 6 |
| 2 | 4 — 1 — 6 |
| 3 | 3 — 1 — 6 |
| 4 | 2 — 1 — 6 |

EM

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EC

FE

CL

MT

AT

Blower Motor

NAHA0139S02

Confirm smooth rotation of the blower motor.

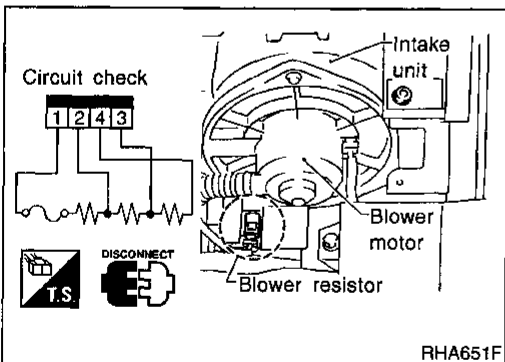
- Ensure that there are no foreign particles inside the intake unit.

TF

PD

AX

SU



RHA651F

Blower Resistor

NAHA0139S03

BR

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 |

ST

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BT

HA

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IDX

BLOWER MOTOR CIRCUIT

SYMPTOM:

- Blower motor does not rotate.

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

| 1 | DIAGNOSTIC PROCEDURE | |
|---|----------------------|-----------|
| Check if blower motor rotates properly at each fan speed. Conduct checks as per table at above. | | |
| 1 | ▶ | GO TO 2. |
| 2, 3, 4 | ▶ | GO TO 8. |
| 5 | ▶ | GO TO 10. |

| 2 | CHECK POWER SUPPLY FOR BLOWER MOTOR | |
|--|-------------------------------------|--|
| 1. Disconnect blower motor harness connector. 2. Do approx. 12 volts exist between blower motor harness terminal No. 1 and body ground? | | |
| <p style="text-align: center;">Blower motor connector (M73)</p> <p style="text-align: right;">RHA343FA</p> | | |
| Yes or No | | |
| Yes | ▶ | GO TO 3. |
| No | ▶ | Check 15A (No. 1 and No. 2) fuses at fuse block. (Refer to "POWER SUPPLY ROUTING" in EL section and Wiring Diagram.) |

| 3 | CHECK CIRCUIT CONTINUITY FOR BLOWER MOTOR | |
|--|---|--|
| 1. Turn fan control knob to any position except OFF. 2. Check circuit continuity between blower motor harness terminal No. 2 and body ground. | | |
| <p style="text-align: center;">Blower motor connector (M73)</p> <p style="text-align: right;">RHA344FA</p> | | |
| Continuity should exist. | | |
| OK or NG | | |
| OK | ▶ | GO TO 4. |
| NG | ▶ | Reconnect blower motor harness connector. GO TO 5. |

| 4 | CHECK BLOWER MOTOR | |
|--|--------------------|-----------------------|
| (Refer to Electrical Components Inspection.) (HA-149) | | |
| OK or NG | | |
| OK | ▶ | INSPECTION END |
| NG | ▶ | Replace blower motor. |

| | |
|---|---|
| 5 | CHECK BLOWER MOTOR CIRCUIT BETWEEN BLOWER MOTOR AND RESISTOR |
| <p>Do approx. 12 volts exist between resistor harness terminal No. 1 and body ground?</p> | |
| | |
| RHA575F | |
| Yes or No | |
| Yes | ▶ Disconnect fan switch harness connector. GO TO 7. |
| No | ▶ Disconnect blower motor and resistor harness connectors. GO TO 6. |

| | |
|---------------------------------|---|
| 6 | CHECK CIRCUIT CONTINUITY BETWEEN BLOWER MOTOR HARNESS TERMINAL NO. 2 AND RESISTOR HARNESS TERMINAL NO. 1 |
| | |
| RHA576F | |
| Continuity should exist. | |
| OK or NG | |
| OK | ▶ Check harness for short. |
| NG | ▶ Repair harness or connector. |

| | |
|--|--|
| 7 | CHECK GROUND CIRCUIT FOR FAN SWITCH |
| <p>Check circuit continuity between fan switch harness terminal No. 6 and body ground.</p> | |
| | |
| RHA577F | |
| OK or NG | |
| OK | ▶ GO TO 8. |
| NG | ▶ Repair harness or connector. |

| | |
|--|--|
| 8 | CHECK RESISTOR AFTER DISCONNECTING IT |
| <p>(Refer to Electrical Components Inspection.) (HA-149)</p> | |
| OK or NG | |
| OK | ▶ GO TO 9. |
| NG | ▶ Replace resistor. |

| | |
|--|---|
| 9 | CHECK RESISTOR HARNESS CONNECTOR |
| <p>Reconnect resistor harness connector.</p> | |
| OK or NG | |
| 1 | ▶ GO TO 12. |
| 2, 3, 4 | ▶ GO TO 10. |

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Blower Motor (Cont'd)

10 CHECK FAN SWITCH CIRCUIT

Do approx. 12 volts exist between each fan switch harness terminal and body ground?

RHA578F

| Test group No. | Terminal No. | | Voltage |
|----------------|--------------|-------------|-------------|
| | (+) | (-) | |
| 2 | (5) | Body ground | Approx. 12V |
| 3 | (4) | | |
| 4 | (3) | | |
| 5 | (2) | | |

MTBL0310

Yes or No

| | | |
|-----|---|-----------|
| Yes | ▶ | GO TO 12. |
| No | ▶ | GO TO 11. |

11 CHECK CIRCUIT CONTINUITY BETWEEN FAN SWITCH TERMINAL AND RESISTOR HARNESS TERMINAL

RHA579F

| Terminal No. | | Continuity |
|--------------|----------|------------|
| Fan Switch | Resistor | |
| (2) | (1) | Yes |
| (3) | (2) | |
| (4) | (3) | |
| (5) | (4) | |

MTBL0032

OK or NG

| | | |
|----|---|------------------------------|
| OK | ▶ | Check harness for short. |
| NG | ▶ | Repair harness or connector. |

12 CHECK FAN SWITCH AFTER DISCONNECTING IT

(Refer to Electrical Components Inspection.)
(HA-149)

OK or NG

| | | |
|----|---|---------------------|
| OK | ▶ | INSPECTION END |
| NG | ▶ | Replace fan switch. |

Insufficient Cooling

TROUBLE DIAGNOSIS PROCEDURE FOR INSUFFICIENT COOLING

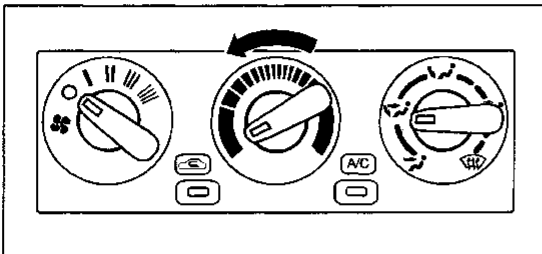
=NAHA0150

Symptom:

● Insufficient Cooling.

Inspection Flow

1. Confirm symptom by performing the following operational check.



OPERATIONAL CHECK – Temperature decrease

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

2. Check for any service bulletins.

3. Check compressor belt tension. Refer to MA section ("Checking Drive Belts", "ENGINE MAINTENANCE").

NG → Adjust or replace compressor belt.

4. Check air mix door. (*1)

NG → Adjust or replace air mix door.

5. Check cooling fan motor operation.

NG → Refer to EC section.

Before connecting ACR4 to vehicle, check ACR4 gauges. No refrigerant pressure should be displayed. If NG, recover refrigerant from equipment lines.

Confirm refrigerant purity in supply tank using ACR4 and refrigerant identifier.

NG → Refer to Contaminated refrigerant. (*7)

Connect ACR4 to vehicle. Confirm refrigerant purity in vehicle A/C system using ACR4 and refrigerant identifier.

NG → Refer to Contaminated refrigerant. (*7)

6. Check refrigeration cycle pressure with manifold gauge connected. Refer to (*2).

NG → Perform Performance Test Diagnoses. Refer to (*3).

7. Check for evaporator coil freeze up.

NG (Freeze up) → Replace compressor. (*6)

(Does not freeze up.)

8. Check ducts for air leaks.

NG → Repair air leaks.

If the symptom still exist, perform a complete operational check (*4) and check for other symptoms. [Refer to symptom table, (*5).] Does another symptom exist?

Yes → Go to Trouble Diagnosis for related symptom.

[Another symptom exists.]

No
INSPECTION END

*1: HA-162
*2: HA-156
*3: HA-154

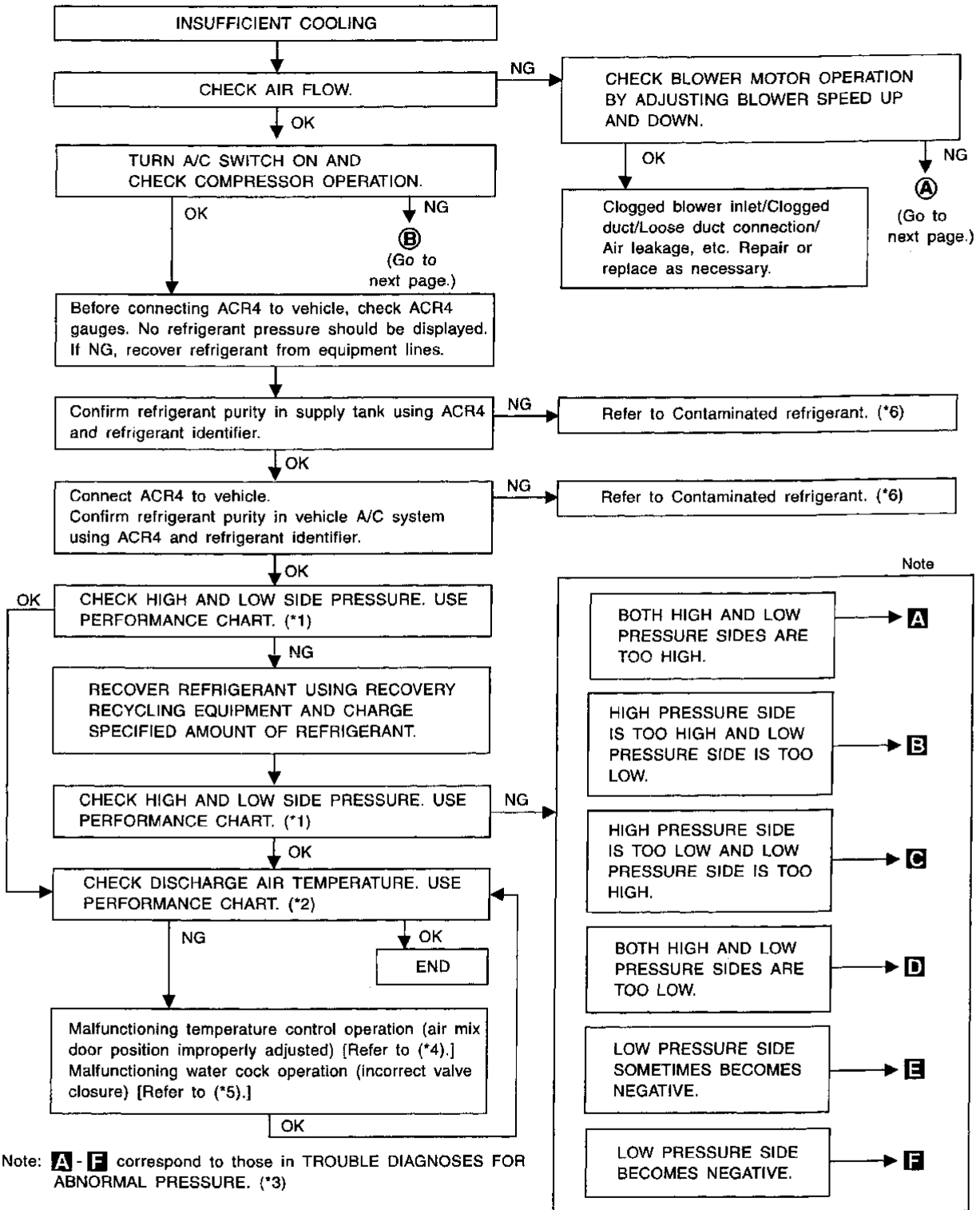
*4: HA-141
*5: HA-140

*6: HA-175
*7: HA-111

SHA262F

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PERFORMANCE TEST DIAGNOSES



SHA194F

*1: HA-156

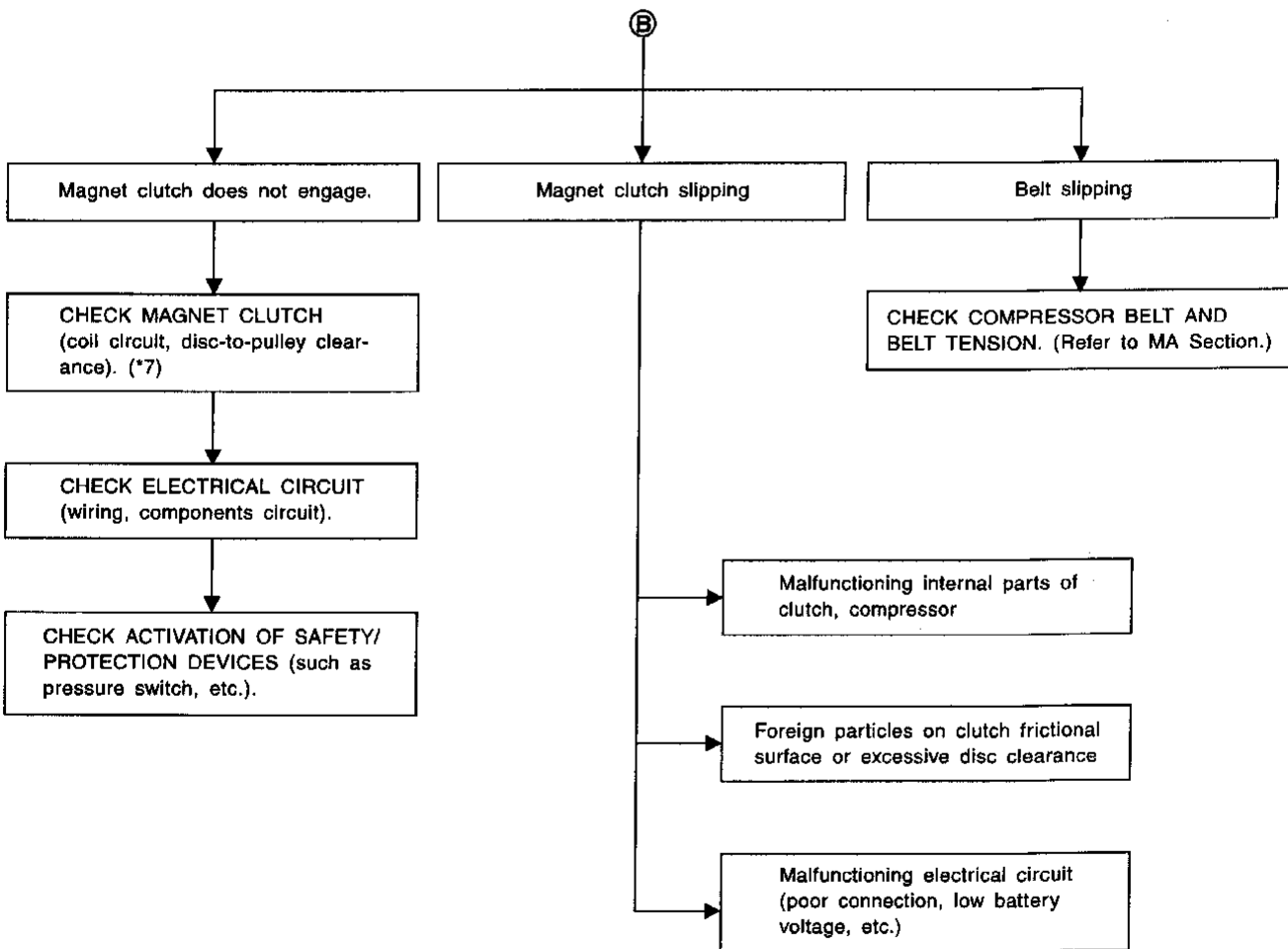
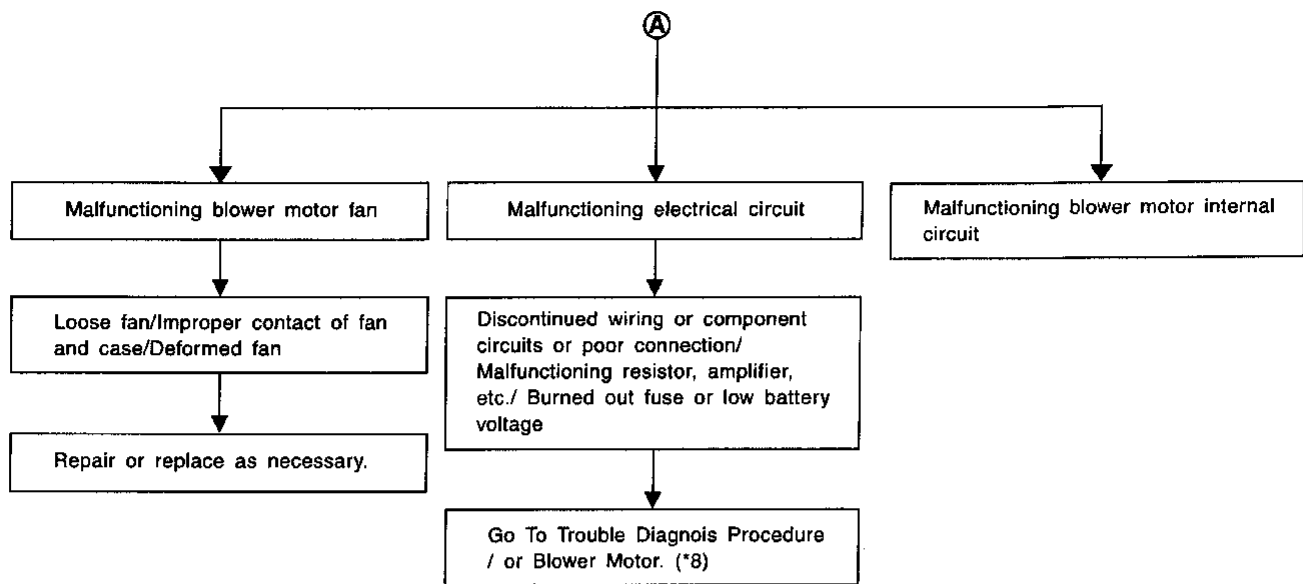
*3: HA-156

*5: HA-162

*2: HA-156

*4: HA-162

*6: HA-111



MHA690AA

*7: HA-178

*8: HA-148

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PERFORMANCE CHART

-NAHA0083

Test Condition

NAHA0083S01

Testing must be performed as follows:

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

Doors: Closed

Door window: Open

Hood: Open

TEMP.: Max. COLD

Discharge Air: Face Vent

REC switch: (Recirculation) set

FAN speed: High speed

Engine speed: Idle speed

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

Test Reading

NAHA0083S02

Recirculating-to-discharge Air Temperature Table

NAHA0083S0201

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

Ambient Air Temperature-to-operating Pressure Table

NAHA0083S0202

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

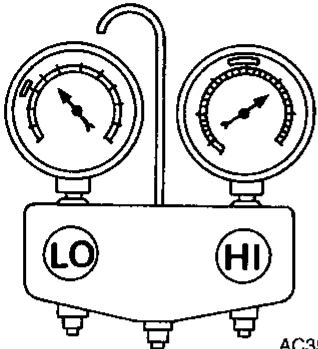
TROUBLE DIAGNOSES FOR ABNORMAL PRESSURE

NAHA0084

Whenever system's high and/or low side pressure is abnormal, diagnose using a manifold gauge. The marker above the gauge scale in the following tables indicates the standard (normal) pressure range. Since the standard (normal) pressure, however, differs from vehicle to vehicle, refer to HA-156 ("Ambient air temperature-to-operating pressure table").

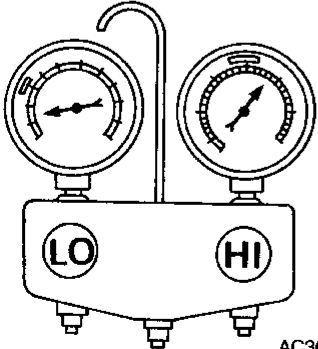
Both High and Low-pressure Sides are Too High.

NAHA0084S01

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

High-pressure Side is Too High and Low-pressure Side is Too Low.


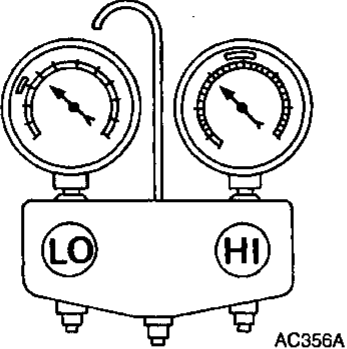
NAHA0084S02

| Gauge indication | Refrigerant cycle | Probable cause | Corrective action |
|--|--|---|---|
| <p>High-pressure side is too high and low-pressure side is too low.</p> <p>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"> Check and repair or replace malfunctioning parts. Check lubricant for contamination. |

Insufficient Cooling (Cont'd)

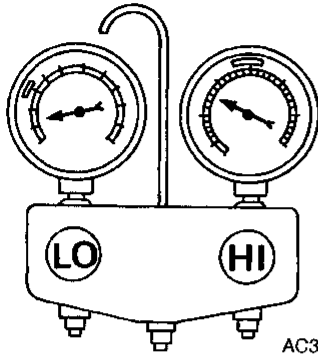
High-pressure Side is Too Low and Low-pressure Side is Too High.

NAHA0084S03

| Gauge indication | Refrigerant cycle | Probable cause | Corrective action |
|---|---|--|---------------------|
| High-pressure side is too low and low-pressure side is too high.  | 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.

NAHA0084S04

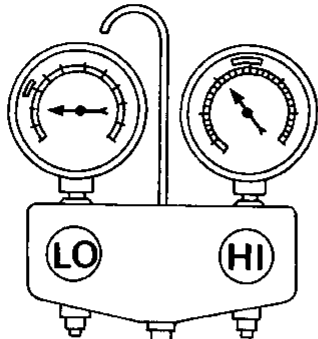
| Gauge indication | Refrigerant cycle | Probable cause | Corrective action |
|--|--|--|---|
| <p>Both high- and low-pressure sides are too low.</p> <p>D</p>  <p style="text-align: right;">AC353A</p> | <ul style="list-style-type: none"> There is a big temperature difference between receiver drier outlet and inlet. Outlet temperature is extremely low. Liquid tank inlet and expansion valve are frosted. | <p>Compressor discharge capacity does not change. (Compressor stroke is set at maximum.)</p> | <ul style="list-style-type: none"> Replace liquid tank. Check lubricant for contamination. |
| | <ul style="list-style-type: none"> Temperature of expansion valve inlet is extremely low as compared with areas near liquid tank. Expansion valve inlet may be frosted. Temperature difference occurs somewhere in high-pressure side | <p>High-pressure pipe located between receiver drier and expansion valve is clogged.</p> | <ul style="list-style-type: none"> Check and repair malfunctioning parts. Check lubricant for contamination. |
| | <ul style="list-style-type: none"> Expansion valve and liquid tank are warm or only cool when touched. | <p>Low refrigerant charge ↓ Leaking fittings or components</p> | <p>Check refrigerant for leaks. Refer to "Checking Refrigerant Leaks", HA-181.</p> |
| | <p>There is a big temperature difference between expansion valve inlet and outlet while the valve itself is frosted.</p> | <p>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.</p> | <ul style="list-style-type: none"> Remove foreign particles by using compressed air. Check lubricant for contamination. |
| | <p>An area of the low-pressure pipe is colder than areas near the evaporator outlet.</p> | <p>Low-pressure pipe is clogged or crushed.</p> | <ul style="list-style-type: none"> Check and repair malfunctioning parts. Check lubricant for contamination. |
| | <p>Air flow volume is not enough or is too low.</p> | <p>Evaporator is frozen. ↓ Compressor discharge capacity does not change. (Compressor stroke is set at maximum length.)</p> | <p>Replace compressor.</p> |

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Insufficient Cooling (Cont'd)

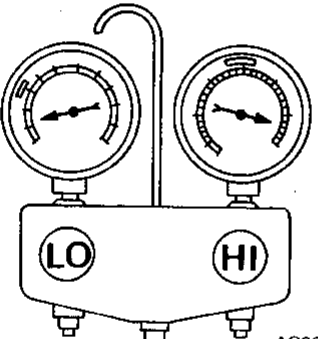
Low-pressure Side Sometimes Becomes Negative.

NAHA0084S05

| Gauge indication | Refrigerant cycle | Probable cause | Corrective action |
|---|--|--|--|
| <p>Low-pressure side sometimes becomes negative.</p> <p>E</p>  <p style="text-align: right; font-size: small;">AC354A</p> | <ul style="list-style-type: none"> • Air conditioning system does not function and does not cyclically cool the compartment air. • The system constantly functions for a certain period of time after compressor is stopped and restarted. | <p>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"> • Drain water from refrigerant or replace refrigerant. • Replace liquid tank. |

Low-pressure Side Becomes Negative.

NAHA0084S06

| Gauge indication | Refrigerant cycle | Probable cause | Corrective action |
|--|--|---|---|
| <p>Low-pressure side becomes negative.</p> <p>F</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 until no frost is present. Start it again to check whether or not the problem is caused by water or foreign particles.</p> <ul style="list-style-type: none"> • If water is the cause, initially cooling is okay. Then the water freezes causing a blockage. Drain water from refrigerant or replace refrigerant. • If due to foreign particles, remove expansion valve and remove particles with dry and compressed air (not shop air). • If either of the above methods cannot correct the problem, replace expansion valve. • Replace liquid tank. • Check lubricant for contamination. |

Insufficient Heating

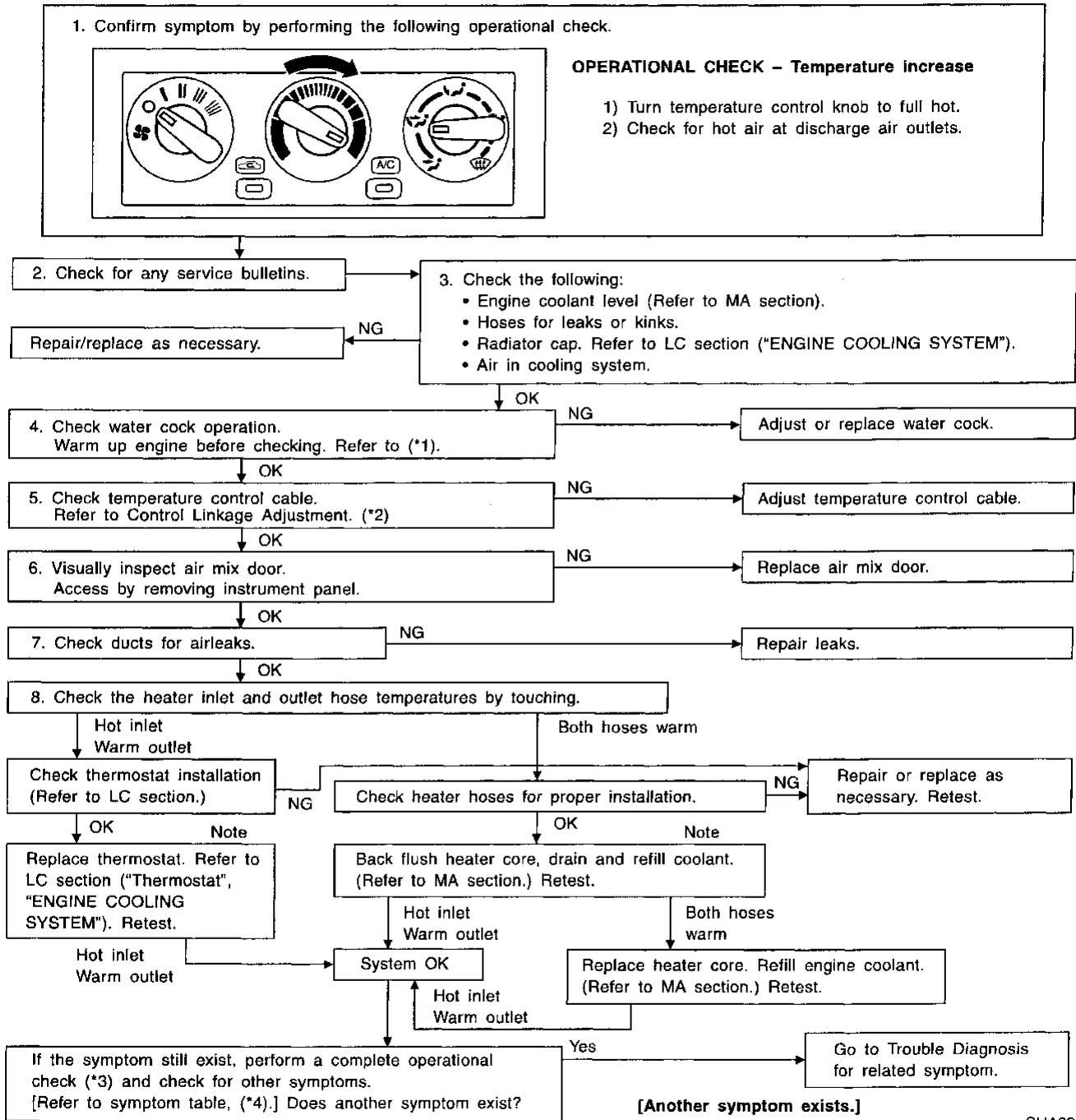
TROUBLE DIAGNOSIS PROCEDURE FOR INSUFFICIENT HEATING

-NAHA0140

Symptom:

- Insufficient Heating.

Inspection Flow



*1: HA-162
*2: HA-162

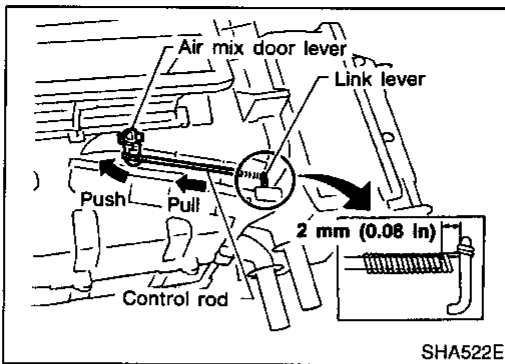
*3: HA-141

*4: HA-140

SHA284F

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Insufficient Heating (Cont'd)



CONTROL LINKAGE ADJUSTMENT

Water Cock Control Rod

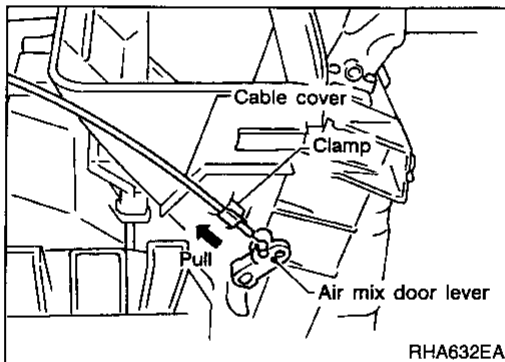
NAHA0141

NAHA0141S01

- 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 TEMPERATURE CONTROL CABLE.)

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 control rod, check it operates properly.



Temperature Control Cable

NAHA0141S02

1. Move the temperature control knob to the full hot position.
2. Set the air mix door lever in the full hot position.
3. Pull on the cable cover in the direction of the arrow, then clamp it.

After positioning control cable, check that it operates properly.

Air Outlet

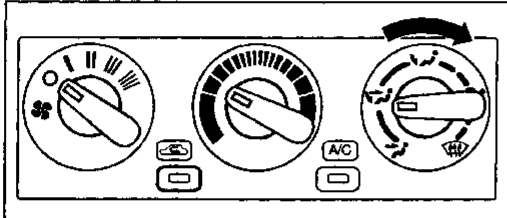
TROUBLE DIAGNOSIS PROCEDURE FOR AIR OUTLET

Symptom:

- Air outlet does not change.

Inspection Flow

1. Confirm symptom by performing the following operational check.



OPERATIONAL CHECK – Discharge air.

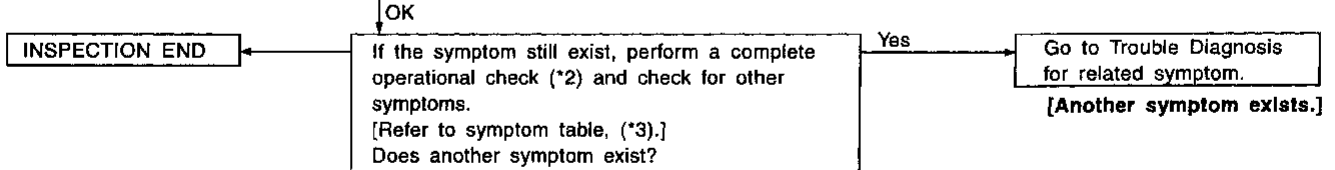
- 1) Turn mode control knob.
- 2) Confirm that discharge air comes out according to the air distribution table at left. Refer to "Discharge Air Flow" in "DESCRIPTION" (*4).

Discharge air flow

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

2. Check for any service bulletins.

3. Check mode control cable. (*1)



*1: HA-164
*2: HA-141

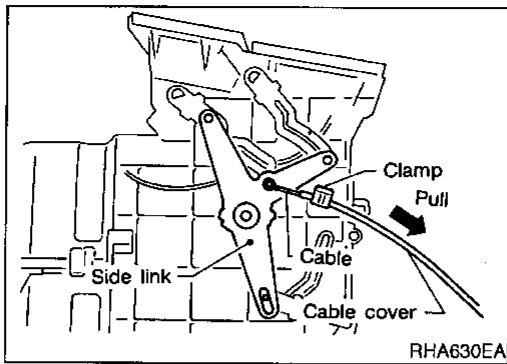
*3: HA-140

*4: HA-131

SHA263F

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Air Outlet (Cont'd)

**CONTROL LINKAGE ADJUSTMENT****Mode Control Cable**

NAHA0151

NAHA0151S01

1. Turn the mode control knob to the DEF position.
2. Set the side link in the DEF position by hand.
3. Pull on the cable cover in the direction of the arrow, then clamp it.

After positioning control cable, check that it operates properly.

Magnet Clutch

TROUBLE DIAGNOSIS PROCEDURE FOR MAGNET CLUTCH

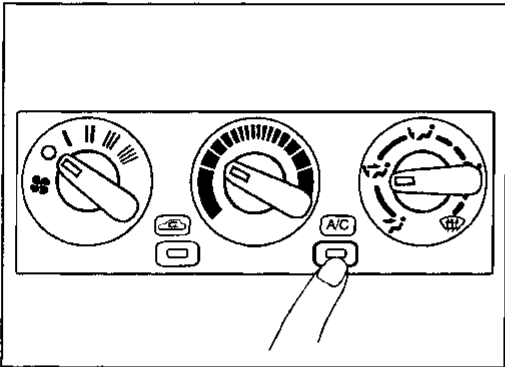
=NAFA0119

Symptom:

- Magnet clutch does not operate when A/C switch and fan switch are ON.

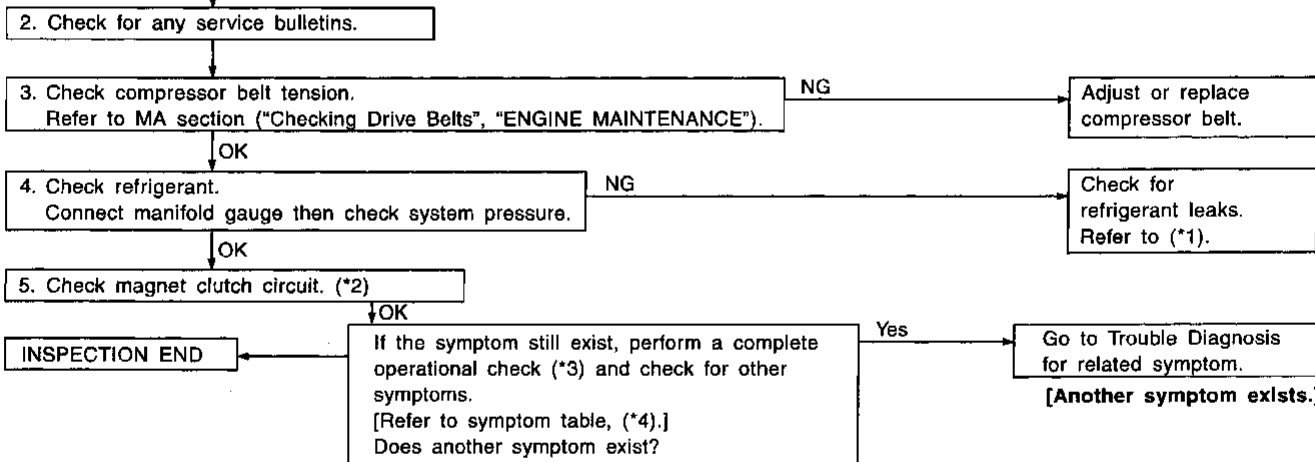
Inspection Flow

1. Confirm symptom by performing the following operational check.



OPERATIONAL CHECK - A/C switch

Turn fan control knob to the desired (1 to 4-speed) position and push the air conditioner switch to turn ON the air conditioner. The indicator light should come on when air conditioner is ON.



*1: HA-181
*2: HA-166

*3: HA-141

*4: HA-140

SHA264F

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MAGNET CLUTCH CIRCUIT

-NAHA0091

SYMPTOM:

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

| | |
|--|--|
| 1 | CHECK POWER SUPPLY FOR COMPRESSOR |
| <p>Disconnect compressor harness connector. Do approx. 12 volts exist between compressor harness terminal No. 1 and body ground?</p> | |
| | |
| RHA747FA | |
| Yes or No | |
| Yes | ▶ GO TO 2. |
| No | ▶ Disconnect A/C relay. GO TO 3. |

| | |
|-----------------|---|
| 2 | CHECK MAGNET CLUTCH COIL |
| OK or NG | |
| NG | ▶ Replace magnet clutch. Refer to HA-176. |

| | |
|--|--|
| 3 | CHECK CIRCUIT CONTINUITY BETWEEN A/C RELAY HARNESS TERMINAL NO. 5 AND COMPRESSOR HARNESS TERMINAL NO. 1 |
| | |
| RHA748FA | |
| <p>Continuity should exist. If OK, check harness for short.</p> | |
| OK or NG | |
| OK | ▶ GO TO 4. |
| NG | ▶ Repair harness or connector. |

| | |
|--|---|
| 4 | CHECK POWER SUPPLY FOR A/C RELAY |
| <p>Disconnect A/C relay. Do approx. 12 volts exist between A/C relay harness terminal Nos. 2, 3 and body ground?</p> | |
| | |
| RHA583F | |
| Yes or No | |
| Yes | ▶ GO TO 5. |
| No | ▶ Check power supply circuit and 7.5A (No. 6) fuse at fuse block. Refer to EL section ("Wiring Diagram", "POWER SUPPLY ROUTING"). |

| | |
|-------------------------|---|
| 5 | CHECK A/C RELAY AFTER DISCONNECTING IT |
| <p>Refer to HA-169.</p> | |
| OK or NG | |
| OK | ▶ Reconnect A/C relay. GO TO 6. |
| NG | ▶ Replace A/C relay. |

| | |
|--|--|
| 6 | CHECK COIL SIDE CIRCUIT OF A/C RELAY |
| Do approx. 12 volts exist between ECM harness terminal No. 12 and body ground? | |
| | |
| SHA936EB | |
| Yes or No | |
| Yes | ▶ GO TO 8. |
| No | ▶ Disconnect A/C relay. Disconnect ECM harness connector. GO TO 7. |

| | |
|---------------------------------|--|
| 7 | CHECK CIRCUIT CONTINUITY BETWEEN A/C RELAY HARNESS TERMINAL NO. 1 AND ECM HARNESS TERMINAL NO. 12 |
| | |
| SHA937EA | |
| Continuity should exist. | |
| OK or NG | |
| OK | ▶ Check harness for short. |
| NG | ▶ Repair harness or connector. |

| | |
|--|---|
| 8 | CHECK VOLTAGE FOR ECM |
| Do approx. 12 volts exist between ECM harness terminal No. 21 and body ground? | |
| | |
| RHA701FD | |
| Yes or No | |
| Yes | ▶ Disconnect ECM harness connector. Disconnect dual-pressure switch harness connector. GO TO 9. |
| No | ▶ Check ECM. Refer to EC section. |

| | |
|---------------------------------|---|
| 9 | CHECK CIRCUIT CONTINUITY BETWEEN ECM HARNESS TERMINAL NO. 21 AND DUAL-PRESSURE SWITCH HARNESS TERMINAL NO. 2 |
| | |
| RHA585FC | |
| Continuity should exist. | |
| If OK, check harness for short. | |
| OK or NG | |
| OK | ▶ GO TO 10. |
| NG | ▶ Repair harness or connector. |

| | |
|------------------|--|
| 10 | CHECK DUAL-PRESSURE SWITCH |
| Refer to HA-169. | |
| OK or NG | |
| OK | ▶ Disconnect A/C switch harness connector. GO TO 11. |
| NG | ▶ Replace dual-pressure switch. |

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Magnet Clutch (Cont'd)

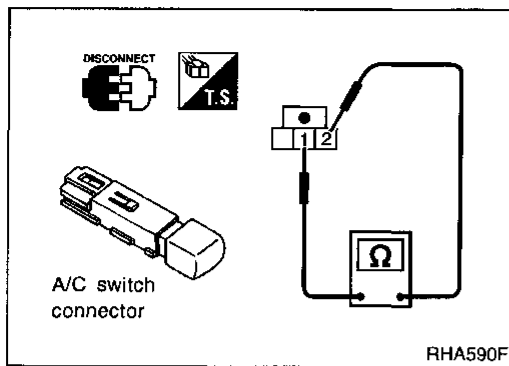
| | | | | | | | |
|--|---|------------------------------|---|-----------|----|---|------------------------------|
| 11 | CHECK CIRCUIT CONTINUITY BETWEEN DUAL-PRESSURE SWITCH HARNESS TERMINAL NO. 1 AND A/C SWITCH HARNESS TERMINAL NO. 2 | | | | | | |
| | | | | | | | |
| <p>Continuity should exist. If OK, check harness for short.</p> <p style="text-align: center;">OK or NG</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 15%; border: none;">OK</td> <td style="width: 5%; border: none;">▶</td> <td style="border: none;">GO TO 12.</td> </tr> <tr> <td style="border: none;">NG</td> <td style="border: none;">▶</td> <td style="border: none;">Repair harness or connector.</td> </tr> </table> | | OK | ▶ | GO TO 12. | NG | ▶ | Repair harness or connector. |
| OK | ▶ | GO TO 12. | | | | | |
| NG | ▶ | Repair harness or connector. | | | | | |

| | | |
|------------------|-------------------------|--|
| 12 | CHECK A/C SWITCH | |
| Refer to HA-169. | | |
| OK or NG | | |
| OK | ▶ | Disconnect fan switch harness connector. GO TO 13. |
| NG | ▶ | Replace A/C switch. |

| | | | | | | | |
|--|---|------------------------------|---|-----------|----|---|------------------------------|
| 13 | CHECK CIRCUIT CONTINUITY BETWEEN A/C SWITCH HARNESS TERMINAL NO. 1 AND FAN SWITCH HARNESS TERMINAL NO. 1 | | | | | | |
| | | | | | | | |
| <p>Continuity should exist. If OK, check harness for short.</p> <p style="text-align: center;">OK or NG</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 15%; border: none;">OK</td> <td style="width: 5%; border: none;">▶</td> <td style="border: none;">GO TO 14.</td> </tr> <tr> <td style="border: none;">NG</td> <td style="border: none;">▶</td> <td style="border: none;">Repair harness or connector.</td> </tr> </table> | | OK | ▶ | GO TO 14. | NG | ▶ | Repair harness or connector. |
| OK | ▶ | GO TO 14. | | | | | |
| NG | ▶ | Repair harness or connector. | | | | | |

| | | |
|--|---|------------------------------|
| 14 | CHECK BODY GROUND CIRCUIT FOR FAN SWITCH | |
| Does continuity exist between fan switch harness terminal No. 6 and body ground? | | |
| | | |
| Yes or No | | |
| Yes | ▶ | GO TO 15. |
| No | ▶ | Repair harness or connector. |

| | | |
|------------------|-------------------------|---------------------|
| 15 | CHECK FAN SWITCH | |
| Refer to HA-149. | | |
| OK or NG | | |
| OK | ▶ | INSPECTION END |
| NG | ▶ | Replace fan switch. |



ELECTRICAL COMPONENTS INSPECTION

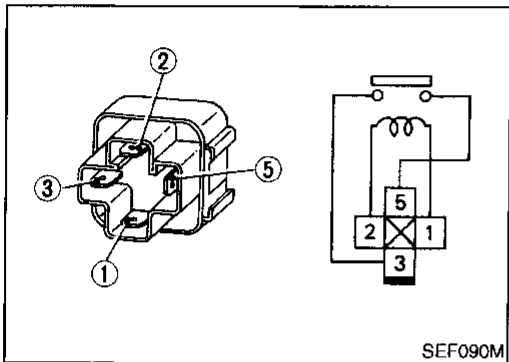
=NAHA0092

A/C Switch

NAHA0092S04

Check continuity between terminals at each switch position.

| Switch condition | Terminal No. | | Continuity |
|------------------|--------------|-----|------------|
| | (+) | (-) | |
| A/C | 2 | 1 | Yes |
| ON | | | No |
| OFF | | | No |



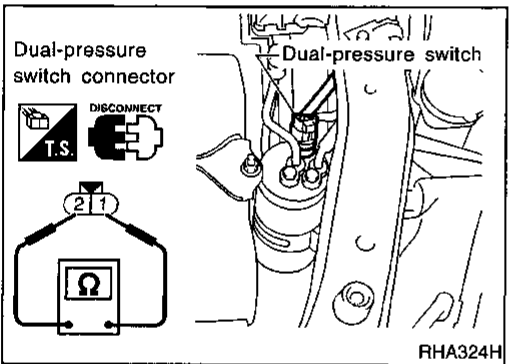
A/C Relay

NAHA0092S07

Check continuity between terminal Nos. 3 and 5.

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

If NG, replace relay.



Dual-pressure Switch

NAHA0092S08

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

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Noise

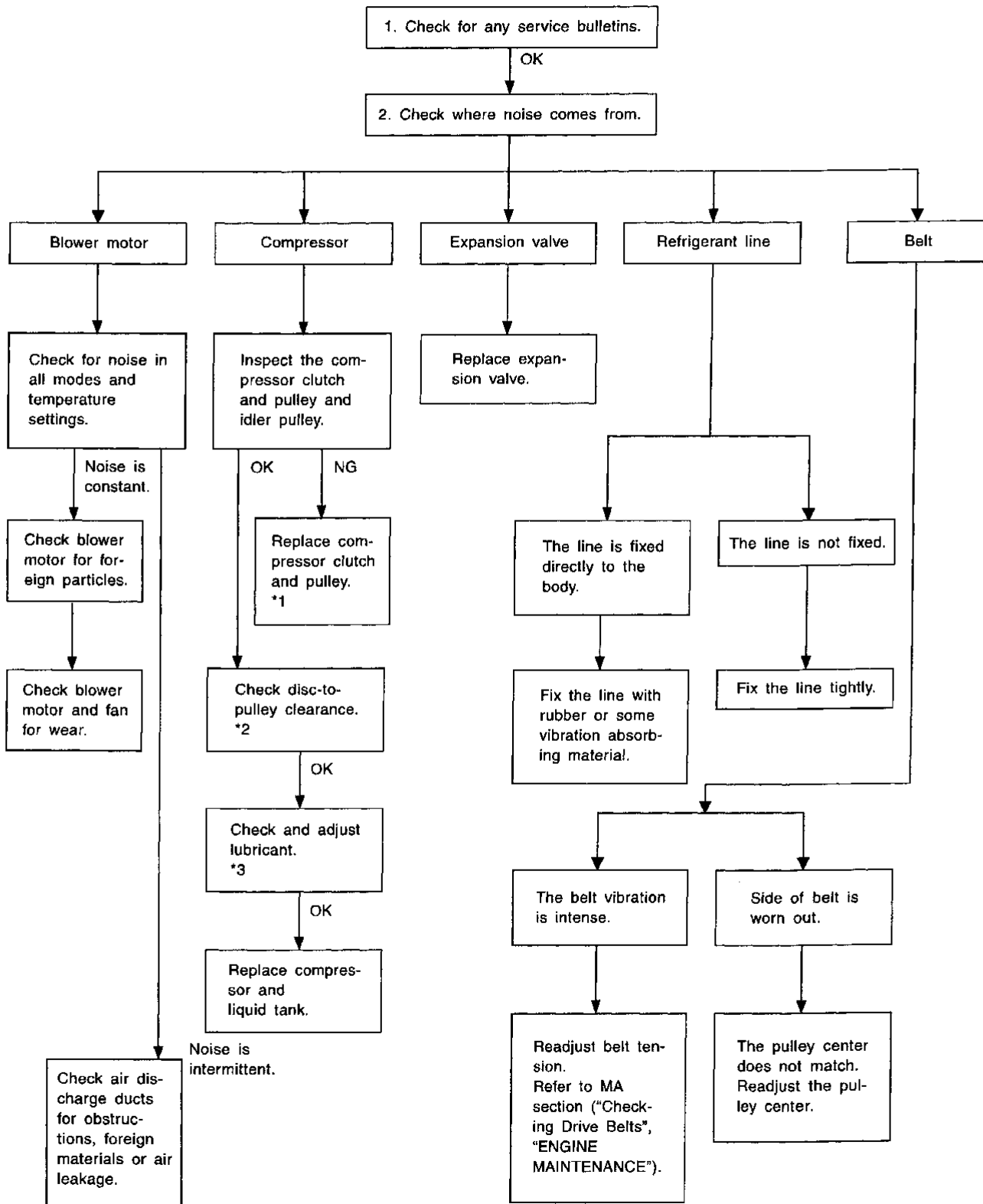
TROUBLE DIAGNOSIS PROCEDURE FOR NOISE

=NAHA0080

Symptom:

- Noise

Inspection Flow



*1: HA-178

*2: HA-178

*3: HA-173

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

NAHA0094

NAHA0094S01

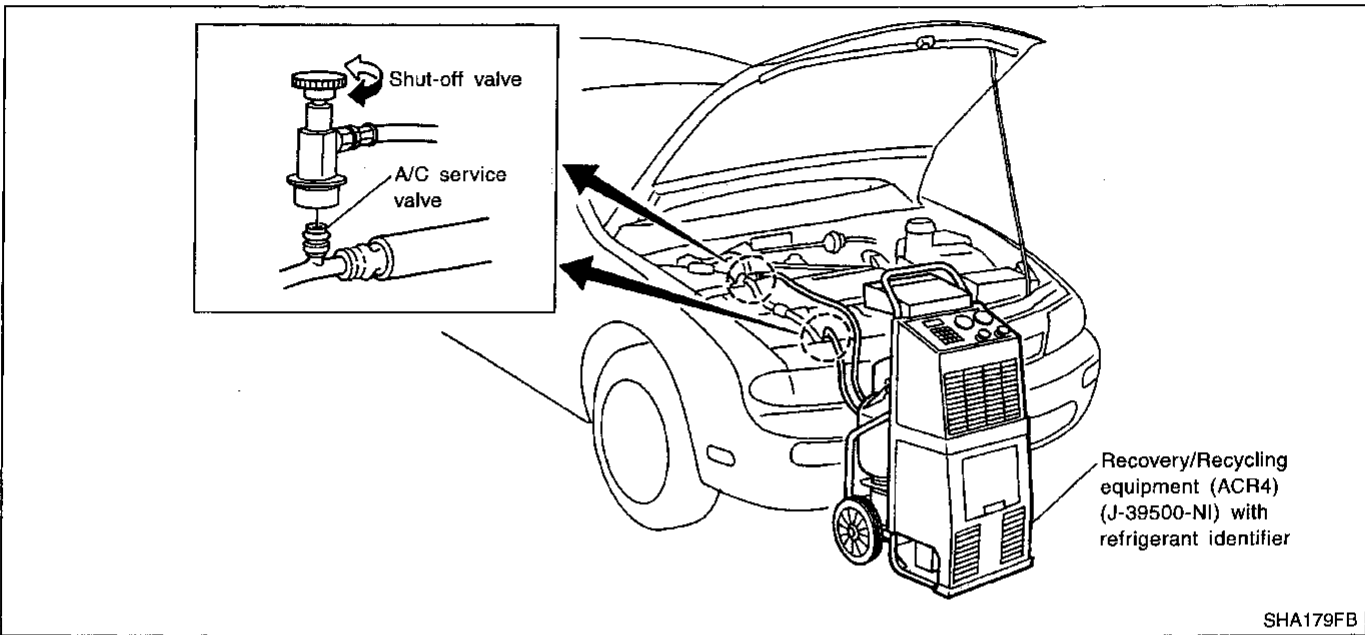
NAHA0094S0101

SETTING OF SERVICE TOOLS AND EQUIPMENT

Discharging Refrigerant

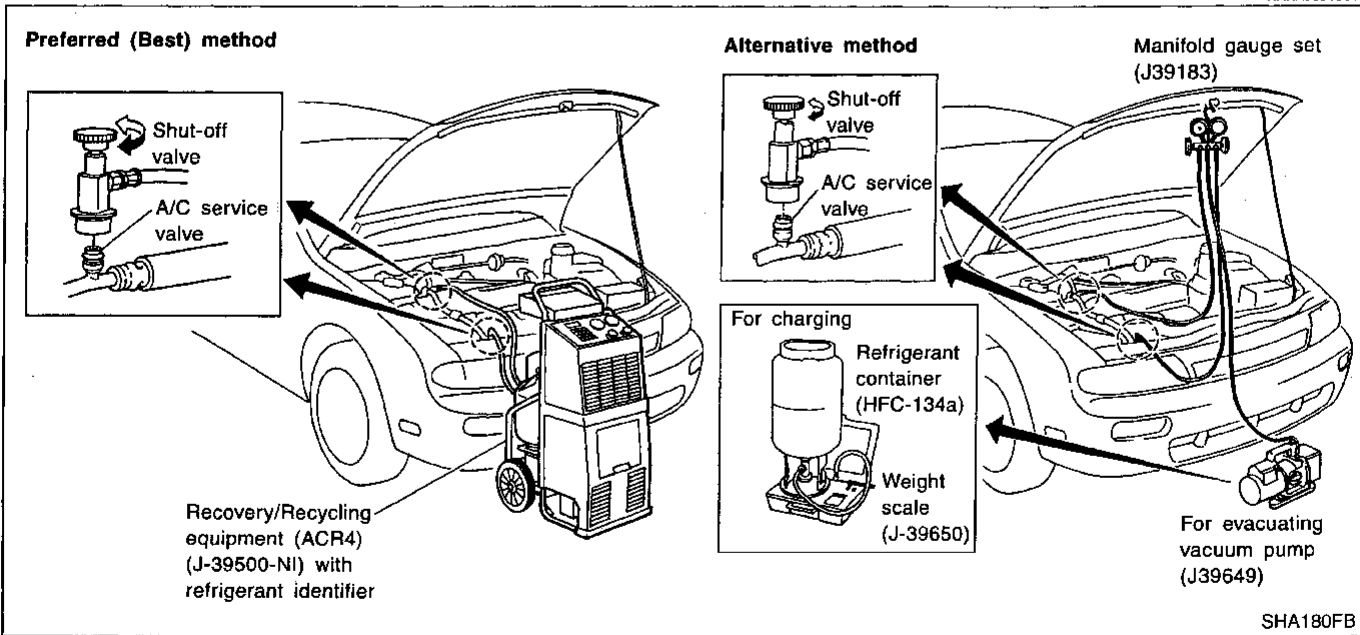
WARNING:

Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Remove HFC-134a (R-134a) from A/C system using certified service equipment meeting requirements of SAE J2210 (R-134a recycling equipment) or J2209 (R-134a recovery equipment). If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.



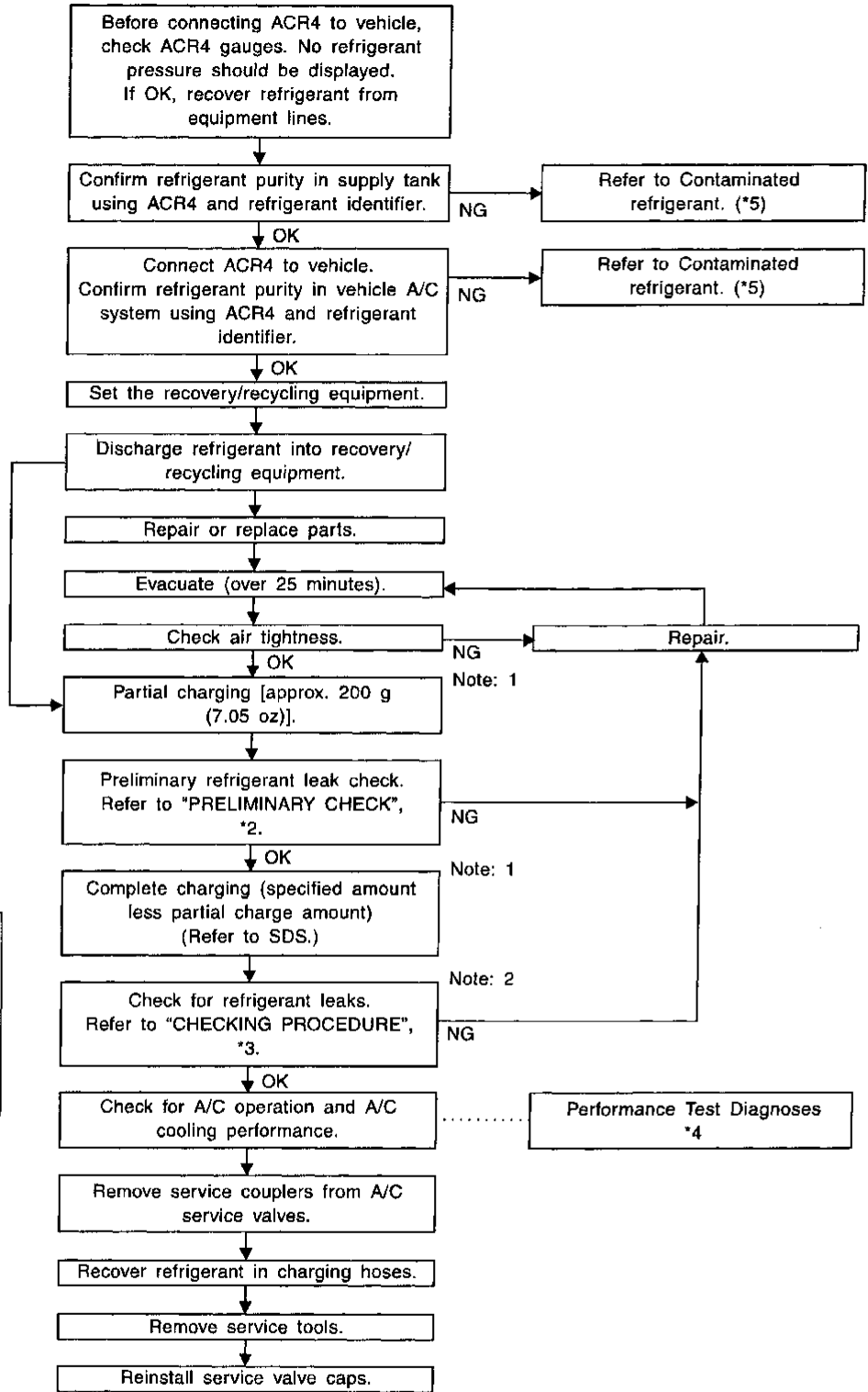
Evacuating System and Charging Refrigerant

NAHA0094S0102



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Recovered lubricant. Refer to "CHECKING AND ADJUSTING", *1.



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

*1: HA-173
 *2: HA-182

*3: HA-182
 *4: HA-154

*5: HA-111

Maintenance of Lubricant Quantity in Compressor

NAHA0095

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

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

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

LUBRICANT

NAHA0095S01

Name: Nissan A/C System Oil Type S

Part number: KLH00-PAGS0

CHECKING AND ADJUSTING

NAHA0095S02

Adjust the lubricant quantity according to the test group shown below.

| | | |
|--|-----------------------------------|----------|
| 1 | LUBRICANT RETURN OPERATION | |
| Can lubricant return operation be performed? | | |
| <ul style="list-style-type: none"> ● A/C system works properly. ● There is no evidence of a large amount of lubricant leakage. | | |
| Yes or No | | |
| Yes | ▶ | GO TO 2. |
| No | ▶ | GO TO 3. |

| | | |
|--|--|------------|
| 2 | PERFORM LUBRICANT RETURN OPERATION, PROCEEDING AS FOLLOWS | |
| <ol style="list-style-type: none"> Start engine, and set the following conditions: <ul style="list-style-type: none"> ● Test condition Engine speed: Idling to 1,200 rpm A/C or AUTO switch: ON Blower speed: Max. position Temp. control: Optional [Set so that intake air temperature is 25 to 30°C (77 to 86°F).] Next item is for V-5 or V-6 compressor. Connect the manifold gauge, and check that the high pressure side pressure is 588 kPa (6 kg/cm², 85 psi) or higher. If less than the reference level, attach a cover to the front face of the condenser to raise the pressure. Perform lubricant return operation for about 10 minutes. Stop engine. <p>CAUTION: If excessive lubricant leakage is noted, do not perform the lubricant return operation.</p> | | |
| | | ▶ GO TO 3. |

| | | |
|------------------------------------|-------------------------|---------------|
| 3 | CHECK COMPRESSOR | |
| Should the compressor be replaced? | | |
| Yes or No | | |
| Yes | ▶ | GO TO HA-174. |
| No | ▶ | GO TO 4. |

| | | |
|---|-----------------------|-------------------------------------|
| 4 | CHECK ANY PART | |
| Is there any part to be replaced? (Evaporator, condenser, liquid tank or in case there is evidence of a large amount of lubricant leakage.) | | |
| Yes or No | | |
| Yes | ▶ | GO TO HA-174. |
| No | ▶ | Carry out the A/C performance test. |

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Lubricant Adjusting Procedure for Components Replacement Except Compressor

NAHA0095S0201

After replacing any of the following major components, add the correct amount of lubricant to the system.

Amount of lubricant to be added

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

*1: If compressor is replaced, addition of lubricant is included in the table.

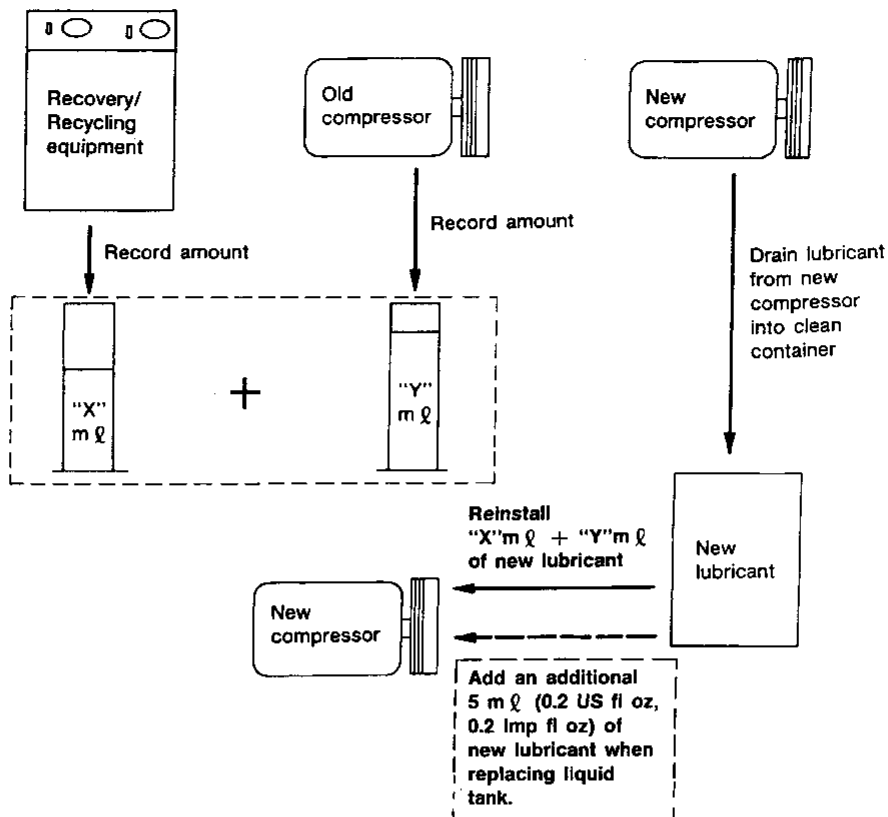
*2: If refrigerant leak is small, no addition of lubricant is needed.

Lubricant Adjustment Procedure for Compressor Replacement

NAHA0095S0202

- Before connecting ACR4 to vehicle, check ACR4 gauges. No refrigerant pressure should be displayed. If OK, recover refrigerant from equipment lines.
- Confirm refrigerant purity in supply tank using ACR4 and refrigerant identifier. If NG, refer to "CONTAMINATED REFRIGERANT", HA-111.
- Connect ACR4 to vehicle. Confirm refrigerant purity in vehicle A/C system using ACR4 and refrigerant identifier. If NG, refer to "CONTAMINATED REFRIGERANT", HA-111.
- Discharge refrigerant into the refrigerant recovery/recycling equipment. Measure lubricant discharged into the recovery/recycling equipment.
- Remove the drain plug of the "old" (removed) compressor. Drain the lubricant into a graduated container and record the amount of drained lubricant.
- Remove the drain plug and drain the lubricant from the "new" compressor into a separate, clean container.
- 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.
- Measure an amount of new lubricant equal to the amount recovered during discharging. Add this lubricant to "new" compressor through the suction port opening.
- Torque the drain plug.
V-6 compressor:
18 - 19 N·m (1.8 - 1.9 kg·m, 13 - 14 ft·lb)
- If the liquid tank also needs to be replaced, add an additional 5 mℓ (0.2 US fl oz, 0.2 Imp fl oz) of lubricant at this time.
Do not add this 5 mℓ (0.2 US fl oz, 0.2 Imp fl oz) of lubricant if only replacing the compressor.

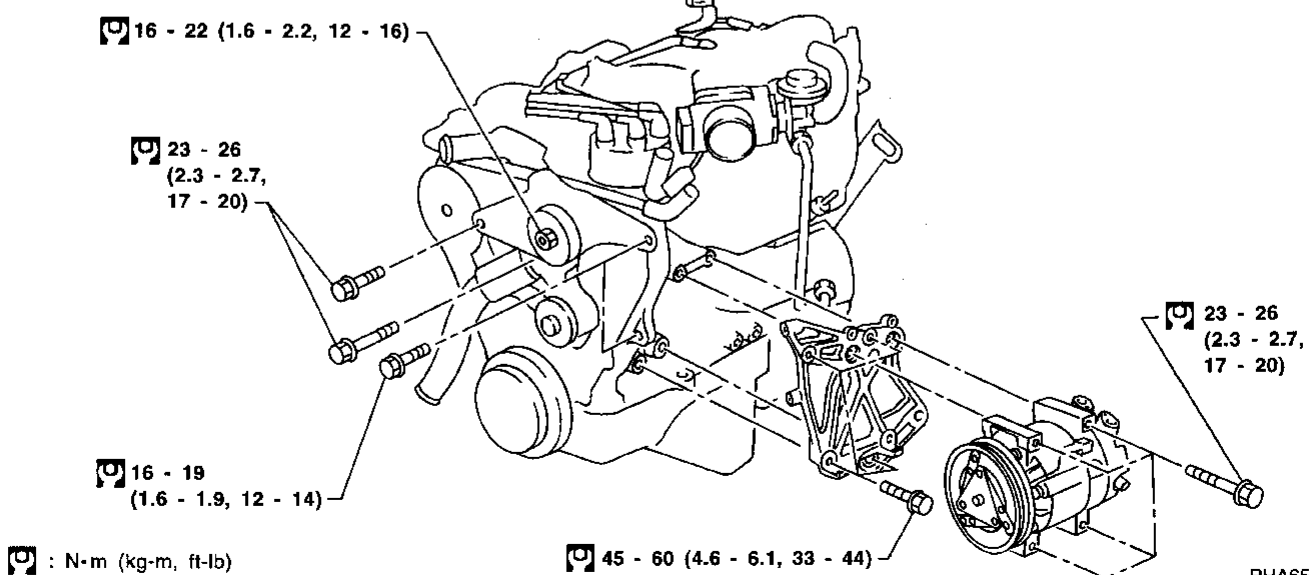
Lubricant adjusting procedure for compressor replacement



RHA065DD

Compressor REMOVAL AND INSTALLATION

SEC. 274-275

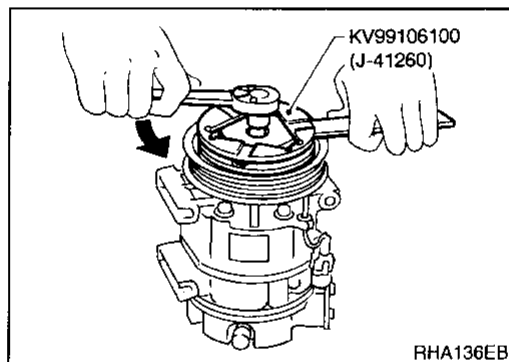
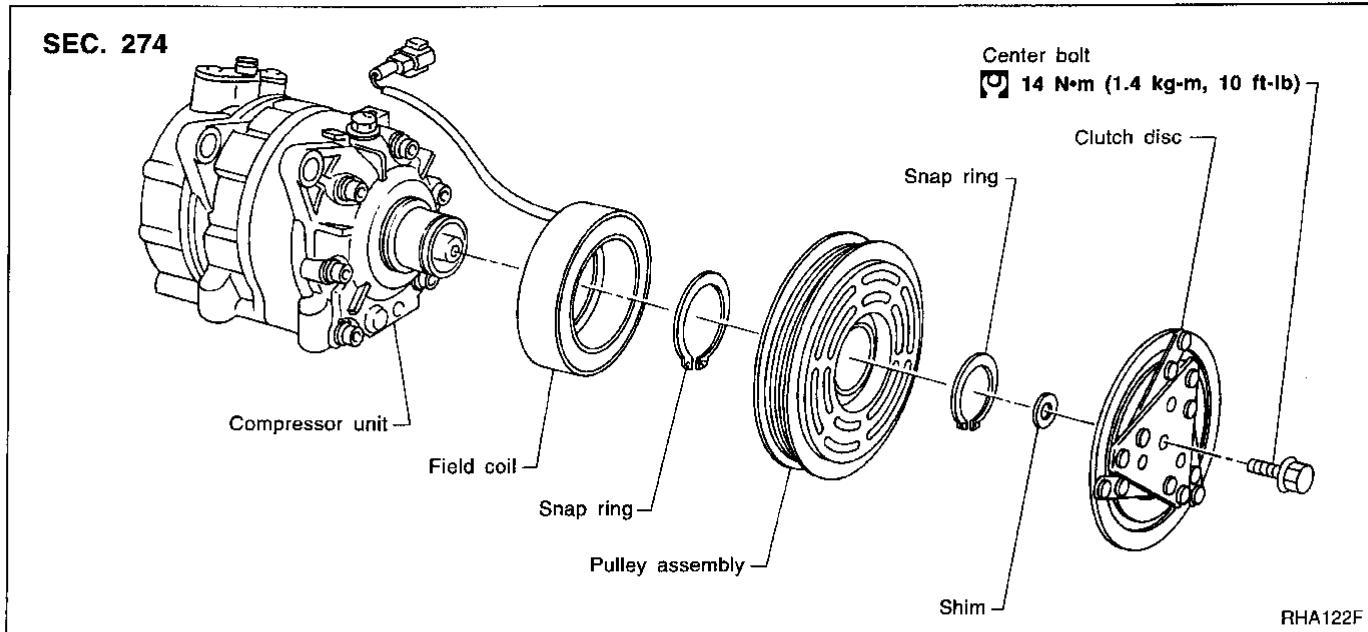


RHA650F

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Compressor Clutch OVERHAUL

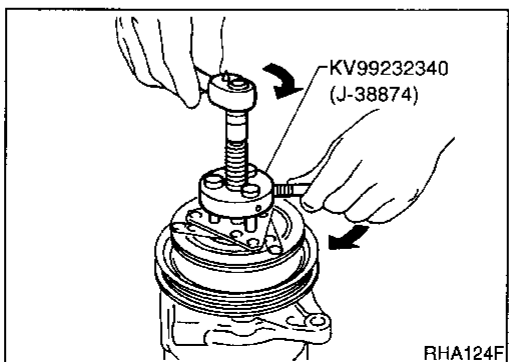
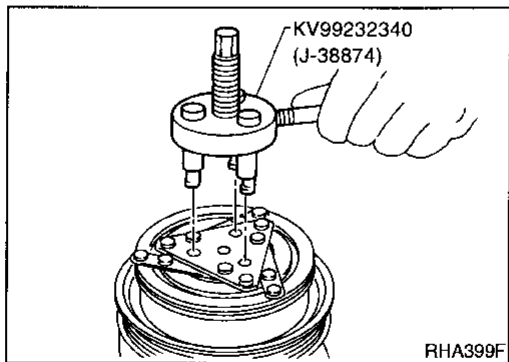
NAHA0097



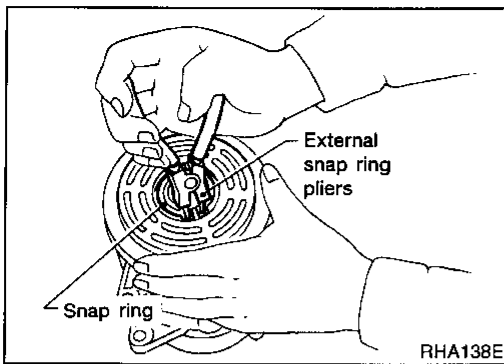
REMOVAL

NAHA0098

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

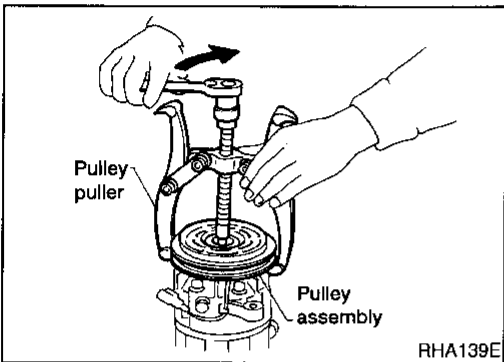


- Remove the clutch disc using the clutch disc puller. Insert the holder's three pins into the holes in the clutch disc. Rotate the holder clockwise to hook it onto the plate. Then, tighten the center bolt to remove the clutch disc. After removing the clutch disc, remove the shims from either the drive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



- Remove the snap ring using external snap ring pliers.

GI



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

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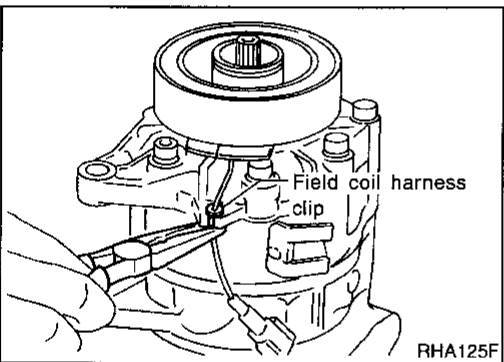
LC

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

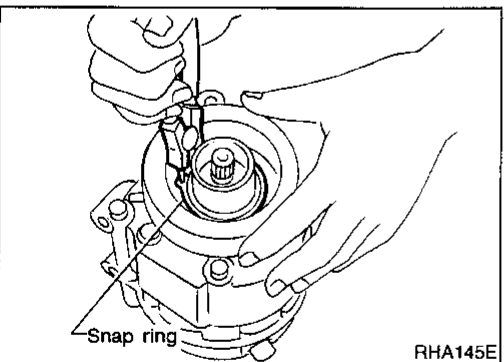
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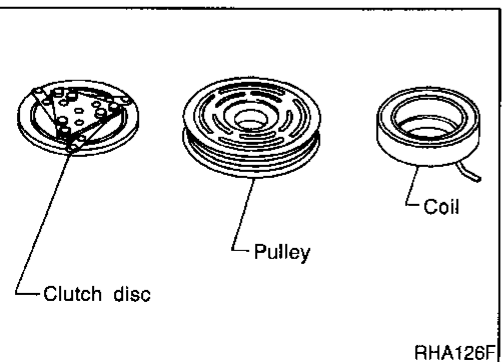
- Remove the snap ring using external snap ring pliers.

BR

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INSPECTION

Clutch Disc

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

Pulley

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

NAHA0099

NAHA0099S01

NAHA0099S02

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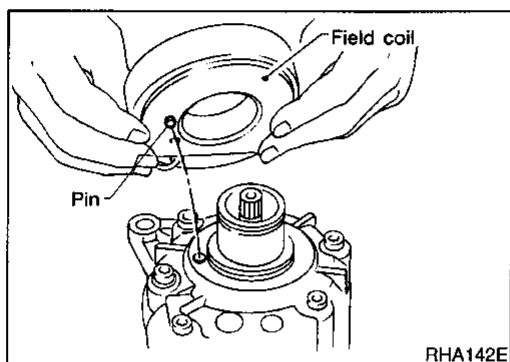
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Coil

Check coil for loose connection or cracked insulation.

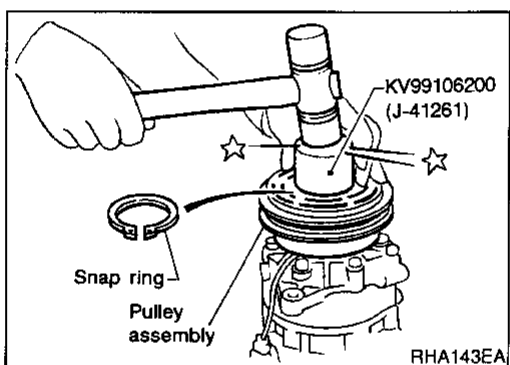
NAHA0099S03



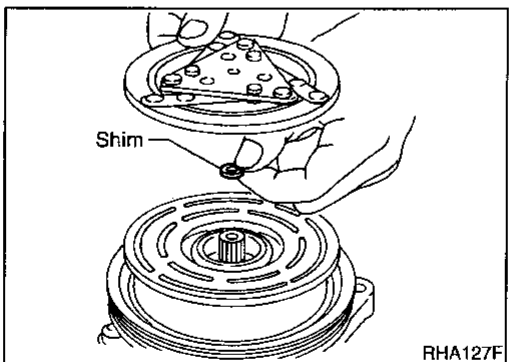
INSTALLATION

NAHA0100

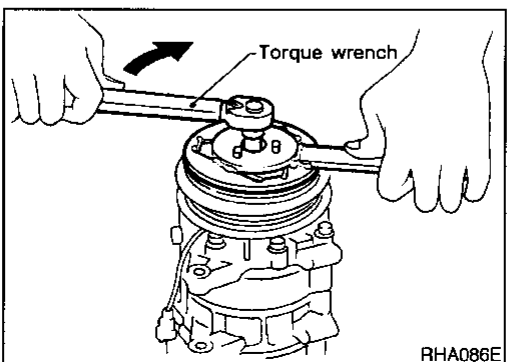
- Install the field coil.
Be sure to align the coil's pin with the hole in the compressor's front head.
- Install the field coil harness clip using a screwdriver.



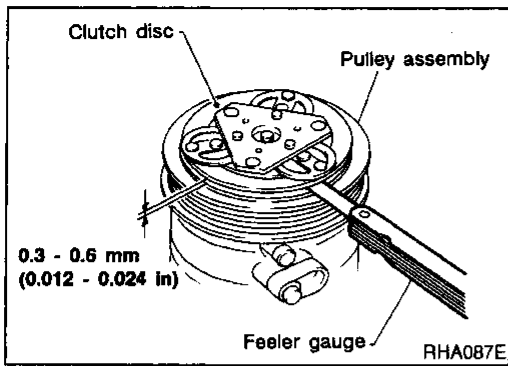
- Install the pulley assembly using the installer and a hand press, and then install the snap ring using snap ring pliers.



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



- Using the holder to prevent clutch disc rotation, tighten the bolt to 14 N·m (1.4 kg-m, 10 ft-lb) torque.
After tightening the bolt, check that the pulley rotates smoothly.



- Check clearance around the entire periphery of clutch disc.

Disc-to-pulley clearance:

0.3 - 0.6 mm (0.012 - 0.024 in)

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

Break-in Operation

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

NAHA0100S01

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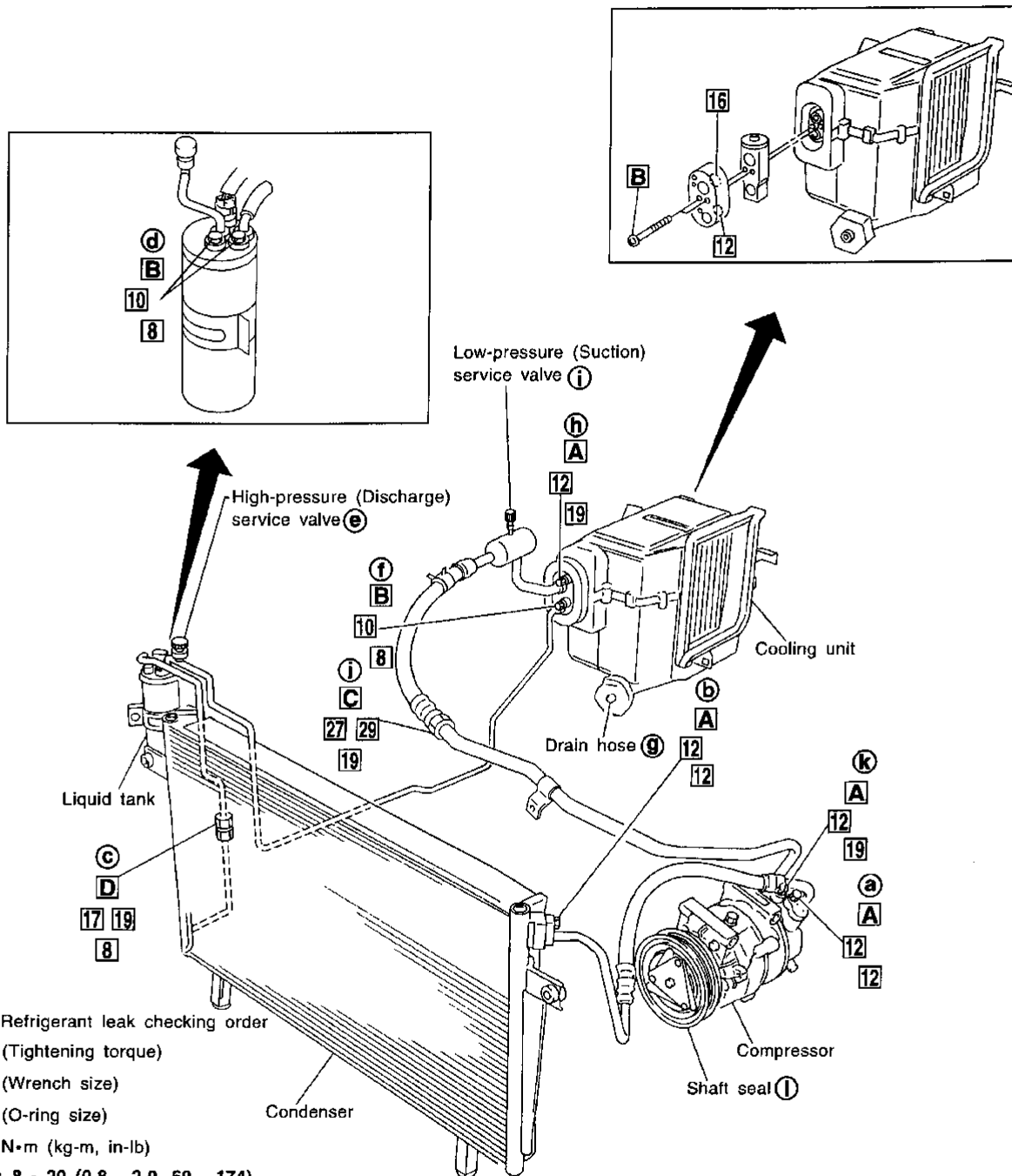
Refrigerant Lines

REMOVAL AND INSTALLATION

-NAHA0101

- Refer to page HA-112 regarding "Precautions for Refrigerant Connection".

SEC. 271•274•276



- : Refrigerant leak checking order
- (Tightening torque)
- (Wrench size)
- (O-ring size)
- ⊗ : N·m (kg-m, in-lb)
- Ⓐ : 8 - 20 (0.8 - 2.0, 69 - 174)
- Ⓑ : 3 - 5 (0.3 - 0.5, 26 - 43)
- ⓐ : N·m (kg-m, ft-lb)
- Ⓒ : 20 - 29 (2 - 3, 14 - 22)
- Ⓓ : 14 - 18 (1.4 - 1.8, 10 - 13)

SHA305F

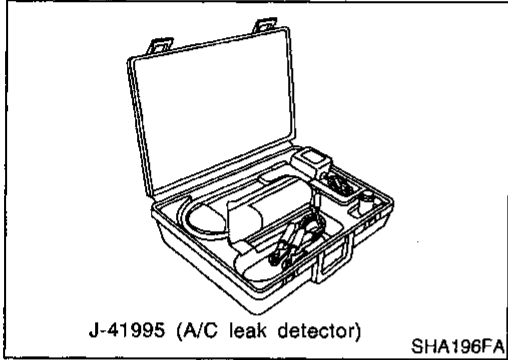
CHECKING REFRIGERANT LEAKS

=NAHA0102

Preliminary Check

NAHA0102S01

Perform a visual inspection of all refrigeration parts, fittings, hoses, and components for signs of A/C lubricant leakage, damage and corrosion. Take note of the areas with A/C lubricant leakage to allow extra time in these areas with electronic leak detector.



J-41995 (A/C leak detector)

SHA196FA

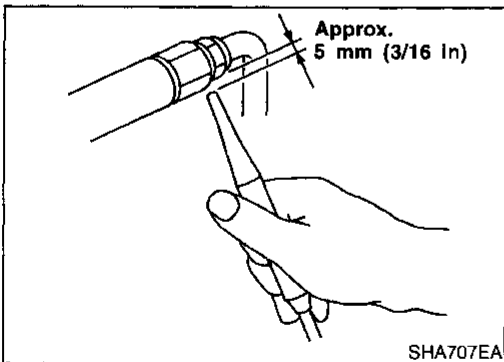
Precautions for Handling Leak Detector

NAHA0102S02

When performing a refrigerant leak check, use a J-41995 A/C leak detector or equivalent. Ensure that the instrument is calibrated and set properly per the operating instructions.

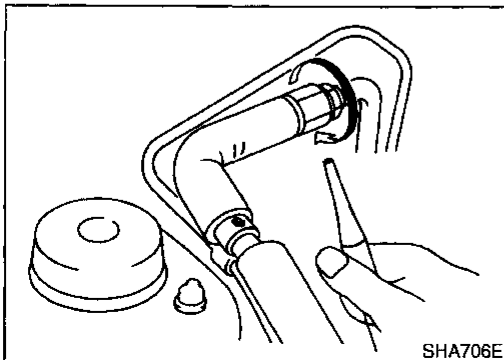
The leak detector is a delicate device. In order to use the leak detector properly, read the operating instructions and perform any specified maintenance.

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



SHA707EA

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

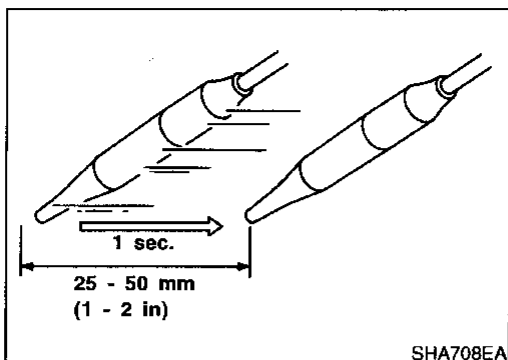


SHA706E

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

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Refrigerant Lines (Cont'd)



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

Checking Procedure

NAHA0102S03

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

1. Turn engine off.
2. Connect a suitable A/C manifold gauge set to the A/C service ports.
3. Check if the A/C refrigerant pressure is at least 345 kPa (3.52 kg/cm², 50 psi) above 16°C (61°F). If less than specification, recover/evacuate and recharge the system with the specified amount of refrigerant.

NOTE:

At temperatures below 16°C (61°F), leaks may not be detected since the system may not reach 345 kPa (3.52 kg/cm², 50 psi).

4. Conduct the leak test from the high side (compressor discharge a to evaporator inlet f) to the low side (evaporator drain hose g to shaft seal I). Refer to HA-180. 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.

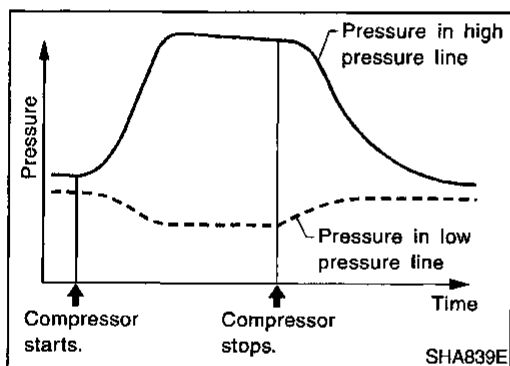
- **Compressor**
Check the fitting of high and low pressure hoses, relief valve and shaft seal.
- **Liquid tank**
Check the pressure switch, tube fitting, weld seams and the fusible plug mount.
- **Service valves**
Check all around the service valves. Ensure service valve caps are secured on the service 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)**
With engine OFF, turn blower fan on "High" for at least 15 seconds to dissipate any refrigerant trace in the cooling unit. Wait a minimum of 10 minutes accumulation time (refer to the manufacturer's recommended procedure for actual wait time) before inserting the leak detector probe into the drain hose. Keep the probe inserted for at least ten seconds. Use caution not to contaminate the probe tip with water or dirt that may be in the drain hose.

5. If a leak detector detects a leak, verify at least once by blowing compressed air into area of suspected leak, then repeat check as outlined above.
6. Do not stop when one leak is found. Continue to check for additional leaks at all system components. If no leaks are found, perform steps 7 - 10.
7. Start engine.
8. Set the heater A/C control as follows:
 - 1) A/C switch ON.
 - 2) Face mode
 - 3) Recirculation switch ON
 - 4) Max cold temperature
 - 5) 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 at the compressor. The pressure on the high pressure side will gradually drop after refrigerant circulation stops and pressure on the low pressure side will gradually rise, as shown in the graph. Some leaks are more easily detected when pressure is high.

11. Before connecting ACR4 to vehicle, check ACR4 gauges. No refrigerant pressure should be displayed. If pressure is displayed, recover refrigerant from equipment lines and then check refrigerant purity.
12. Confirm refrigerant purity in supply tank using ACR4 and refrigerant identifier.
13. Confirm refrigerant purity in vehicle A/C system using ACR4 and refrigerant identifier.
14. Discharge A/C system using approved refrigerant recovery equipment. Repair the leaking fitting or component as necessary.
15. Evacuate and recharge A/C system and perform the leak test to confirm no refrigerant leaks.
16. Conduct A/C performance test to ensure system works properly.

**Belt
TENSION ADJUSTMENT**

NAHA0103

- Refer to MA section.

**Fast Idle Control Device (FICD)
INSPECTION**

NAHA0104

- Refer to EC section.

SERVICE DATA AND SPECIFICATIONS (SDS)

Auto

Auto

COMPRESSOR

NAHA0241

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

LUBRICANT

NAHA0242

| | | |
|--------------------------------------|---|----------------|
| Model | CALSONIC make V-6 | |
| Name | Nissan A/C System Oil Type S | |
| Part number | KLH00-PAGSO | |
| Capacity mℓ (US fl oz, Imp fl oz) | Total in system | 200 (6.8, 7.0) |
| | Compressor (Service part) charging amount | 200 (6.8, 7.0) |

REFRIGERANT

NAHA0243

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

ENGINE IDLING SPEED (WHEN A/C IS ON)

NAHA0244

- Refer to EC section.

BELT TENSION

NAHA0245

- Refer to Checking Drive Belts (MA section).

Manual

COMPRESSOR

NAHA0105

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

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SERVICE DATA AND SPECIFICATIONS (SDS)

Manual (Cont'd)

LUBRICANT

NAHA0106

| | | |
|--|---|----------------|
| Model | CALSONIC make V-6 | |
| Name | Nissan A/C System Oil Type S | |
| Part number | KLH00-PAGS0 | |
| Capacity m ³ (US fl oz, Imp fl oz) | Total in system | 200 (6.8, 7.0) |
| | Compressor (Service part) charging amount | 200 (6.8, 7.0) |

REFRIGERANT

NAHA0107

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

ENGINE IDLING SPEED (WHEN A/C IS ON)

NAHA0108

- Refer to EC section.

BELT TENSION

NAHA0109

- Refer to Checking Drive Belts (MA section).