

HEATER & AIR CONDITIONER

SECTION **HA**

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CONTENTS (Cont'd.)

When you read wiring diagrams:

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

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

PRECAUTIONS

Supplemental Restraint System "AIR BAG"

The Supplemental Restraint System "Air Bag" helps to reduce the risk or severity of injury to the driver and front passenger in a frontal collision. The Supplemental Restraint System consists of air bags (located in the center of the steering wheel and on the instrument panel on the passenger side), sensors, a diagnosis unit, warning lamp, wiring harness and spiral cable. Information necessary to service the system safely is included in the **BF** section of this Service Manual.

WARNING:

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

Introduction

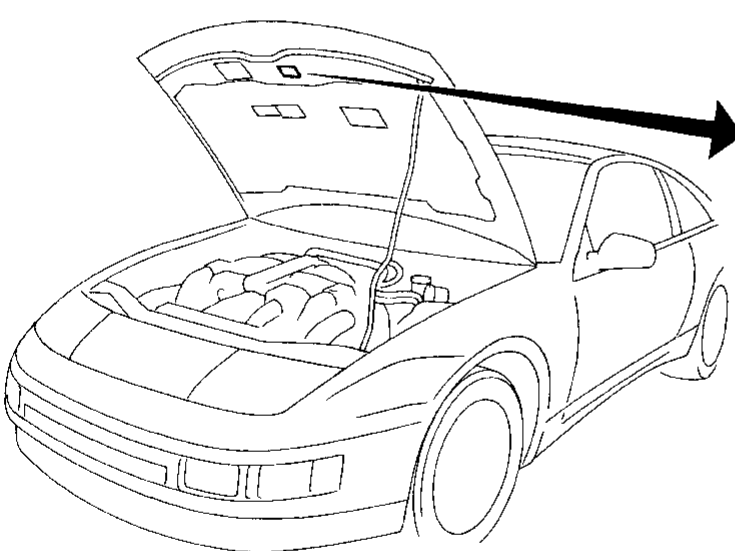
To prevent the ozone layer from being destroyed, the HFC-134a (R-134a) refrigerant has replaced the previously used CFC-12 (R-12).

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

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

Identification

IDENTIFICATION LABEL FOR VEHICLE



AIR CONDITIONER			NISSAN
	REFRIGERANT	COMPRESSOR LUBRICANT	
TYPE (PART NO.)	HFC-134a	1	
AMOUNT	3	2	

CAUTION PRÉCAUTION

- REFRIGERANT UNDER HIGH PRESSURE.
- SYSTEM TO BE SERVICED BY QUALIFIED PERSONNEL
- IMPROPER SERVICE METHODS MAY CAUSE PERSONAL INJURY.
- CONSULT SERVICE MANUAL.
- THIS AIR CONDITIONER SYSTEM COMPLIES WITH SAE J-639.

NISSAN MOTOR CO., LTD. Tokyo, Japan

1 : Lubricant type and service part number
2 : Amount of lubricant
3 : Amount of refrigerant

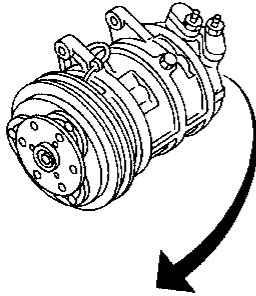
ZHA005A

PRECAUTIONS

Identification (Cont'd)

PARTS IDENTIFICATION

1. Compressor label



ZEXEL MADE IN JAPAN	
COMP. TYPE	○○○ — ○○○
PART NO.	○○○○○ — ○○○○
SERI. NO.	○○○○○○○○○○
OIL	ZXL 100PG(DH-PS) NISSAN NO. KLH00-PAGS0 ○○○ cm ³
LEAK TEST	HIGH SIDE 2.9 MPa LOW SIDE 1.5 MPa
REFRIG.	HFC-134a

2. Other component parts label

HFC-134a label

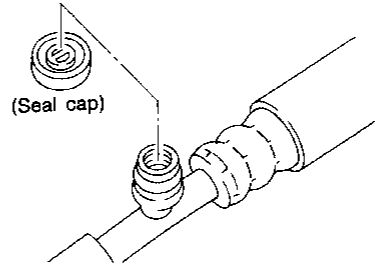
HFC-134a 用
USE FOR HFC-134a

Base color: Light blue

HFC-134a 用	□
USE FOR HFC-134a	□

Part name	Identification
1. Compressor	Compressor label
2. Cooling unit	HFC-134a label
3. Expansion valve	Stamp
4. Condenser	HFC-134a label
5. Liquid tank	HFC-134a label
6. Hose or pipe	HFC-134a label

3. Service valves (suction/discharge)



The service valves are specially designed for the HFC-134a (R-134a) system. Those for the CFC-12 (R-12) system are different in size and configuration. Refer to "PREPARATION".

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PRECAUTIONS

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

WARNING:

- CFC-12 (R-12) refrigerant and HFC-134a (R-134a) refrigerant must never be mixed, even in the smallest amounts, as they are incompatible with each other. If the refrigerants are mixed, compressor failure is likely to occur.
- Use only specified lubrication oil for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. If lubrication oil other than that specified is used, compressor failure is likely to occur.
- The specified HFC-134a (R-134a) lubrication oil absorbs moisture from the atmosphere at a rapid rate, therefore 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. Also, complete the connection of all refrigerant loop components as quickly as possible to minimize the entry of moisture into the system.
 - c: Use the specified lubrication oil from a sealed container only. Containers must be re-sealed immediately after dispensing the lubrication oil. Lubrication oil in containers which are not properly sealed will become moisture saturated, and such lubrication oil is no longer suitable for use and should be properly disposed of.
 - d: Avoid breathing A/C refrigerant and lubrication oil vapor or mist. Exposure may irritate eyes, nose and throat. Use only approved recovery/recycling equipment to discharge HFC-134a (R-134a) systems. If accidental system discharge occurs, ventilate work area before resuming work.
 - e: Do not allow lubrication oil (Nissan A/C System Oil Type S) to come in contact with styrofoam parts. Damage may result.

General Refrigerant Precautions

WARNING:

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

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PRECAUTIONS

Precautions for Refrigerant Connection

WARNING:

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

CAUTION:

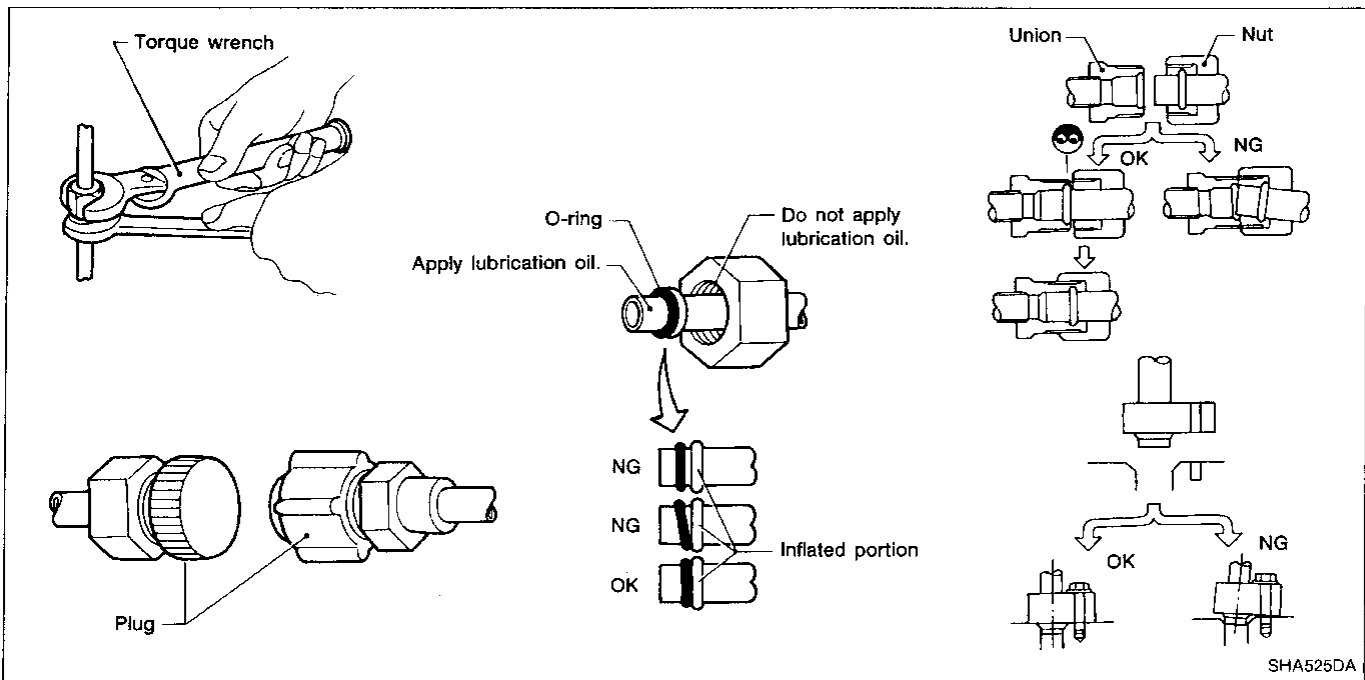
When replacing or cleaning refrigerant cycle components, observe the following.

- Do not leave compressor on its side or upside down for more than 10 minutes, as compressor oil will enter low pressure chamber.
- When connecting tubes, always use a torque wrench and a back-up wrench.
- After disconnecting tubes, plug all openings immediately to prevent entrance of dirt and moisture.
- When installing an air conditioner in the vehicle, the pipes must be connected as the final stage of the operation. The seal caps of the pipes and other components must not be removed until their removal is required for connection.
- To prevent the condensation of moisture inside A/C components, components stored in cool areas should be allowed to warm to the working area temperature before removing the seal caps.
- Thoroughly remove moisture from the refrigeration system before charging the refrigerant.
- Always replace used O-rings.
- When connecting tube, apply lubrication oil to portions shown in illustration. Be careful not to apply oil to threaded portion.

Lubrication oil name: Nissan A/C System Oil Type S

Part number: KLH00-PAGS0

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



PRECAUTIONS

Precautions for Servicing Compressor

- Attach a blind plug to the suction port (low pressure) and discharge port (high pressure) of the compressor to prevent oil from leaking out and dust from getting inside.
- When the compressor is removed, store it under the same condition as it is when mounted on the car.
- When replacing the compressor, be sure to remove oil from the compressor and check the oil quantity extracted.
- When replacing with a new compressor, be sure to remove oil from the new compressor so that the quantity of oil remaining in the new compressor is equal to the quantity collected from the removed compressor. See the section "LUBRICATION OIL".
- Pay attention so as not to allow dirt and oil to attach on the friction surfaces between clutch and pulley. If the surface is contaminated with oil, wipe it off by using a clean waste cloth moistened with thinner.
- After completing the compressor service operation, be sure to rotate the compressor shaft more than five turns in both directions by hand to equalize oil distribution inside the compressor, then run the compressor for about one hour by idling the engine.

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Features — Auto Air Conditioner

OUTLET AIR TEMPERATURE CONTROL (Air mix door control)

When the desired temperature is set on the control panel, the automatic temperature control system determines both the head and foot target temperatures, as well as target upper (VENT and DEF) and lower (FOOT) outlet air temperatures. This computation is accomplished in relation to the desired temperature, and outside conditions (ambient temperature and sunload). The automatic temperature control system then controls the air mix door position so that the outlet air temperatures meet target* outlet air temperatures.

A summary of the automatic temperature control system is as follows:

1. The upper and lower air temperatures are independently controlled to provide a comfortable ride.
2. Optimum outlet air temperatures can be set to the passenger's preference.
3. Outlet air temperature feedback control through duct sensors permits a "potentiometerless" air mix door design. It requires no adjustment, increases service life and improves performance reliability.

FAN SPEED CONTROL

The ATC system continuously regulates fan speed according to the difference between the target temperature and the temperatures detected at the upper and lower in-vehicle sensors. The greater the difference between the temperatures the higher the blower speed. If the cabin sunload or ambient temperature is high, fan speed will be increased.

INTAKE DOOR CONTROL

The ATC system adjusts the intake door position once every thirty seconds. The system is programmed to take in outside air as much as possible.

OUTLET DOOR CONTROL

The ATC system controls distribution of air through the VENT, DEF and FOOT outlets based on the cabin sunload, ambient temperature and the set temperature.

COMPRESSOR MAGNET CLUTCH CONTROL

The ATC system automatically shuts off the compressor at temperatures lower than 0°C (32°F).

SELF-DIAGNOSTIC SYSTEM

The ATC system contains an on-board diagnostic system which can be used to check the ATC system sensors and motors and any trouble data stored in the memory.

Pushing the "AUTO" and "OFF" switches at the same time for more than 5 seconds will give the self-diagnostic mode. There are 4 kinds of self-diagnostic systems (STEP 1 to STEP 4). Each step can be accessed by pushing the "AUTO" switch. The functions of each step are as follows:

- STEP 1 — Monitor diagnosis
- STEP 2 — Actuator test
- STEP 3 — Change of difference between upper and lower target temperature
- STEP 4 — Readout of trouble data memory

*: Target temperature

When a temperature for the cabin is set using the TEMP. SET switch, the ATC system calculates an initial target temperature based on information from the various ATC system sensors. This target temperature is continuously updated to bring the cabin temperature to the set temperature in the most comfortable way possible for the occupants. (The program for this was made after careful study of comfort levels related to car interiors).

Acceleration Cut System

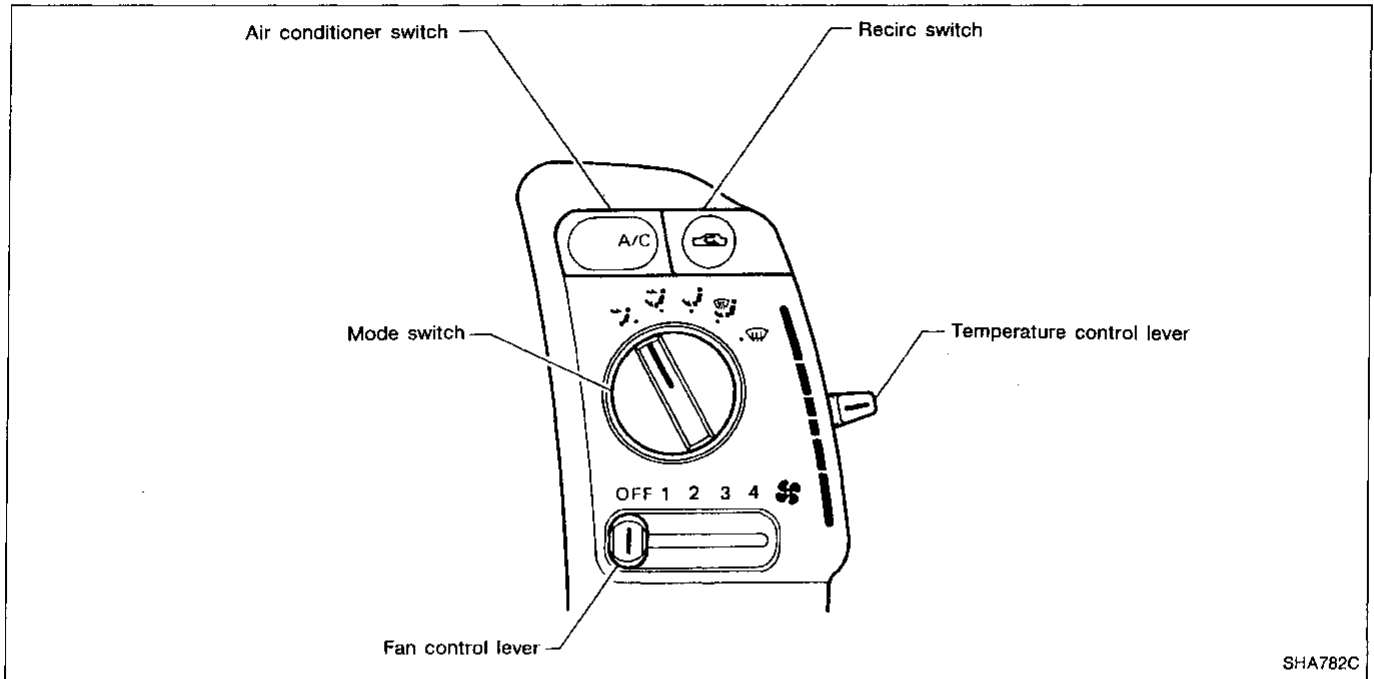
This system is controlled by ECM (ECCS control module).

When the engine is heavily overloaded, the compressor is turned off for several seconds to reduce overloading.

Water Cock Control System

The water cock is connected to the air mix doors with a cable. When the air mix doors are at the full-cold position, the water cock is fully closed, and when the air mix doors are at the full-hot position, the water cock is fully opened.

Control Operation — Manual Air Conditioner



FAN CONTROL LEVER

This lever controls fan speed. (The fan turns ON when this lever is in all but the OFF position.)

MODE SWITCH

This switch allows you to select the outlet air flow.

In the "DEF" mode, the intake door is set to "FRE (French)". The compressor turns on in "DEF" or "F/D" mode.

TEMPERATURE CONTROL LEVER

This lever allows you to adjust the temperature of the outlet air.

RECIRC SWITCH

OFF position:

Outside air is drawn into the passenger compartment.

ON position:

Interior air is recirculated inside the vehicle.

"RECIRC" is canceled when "DEF" is selected.

AIR CONDITIONER SWITCH

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

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

Control Operation — Auto Air Conditioner

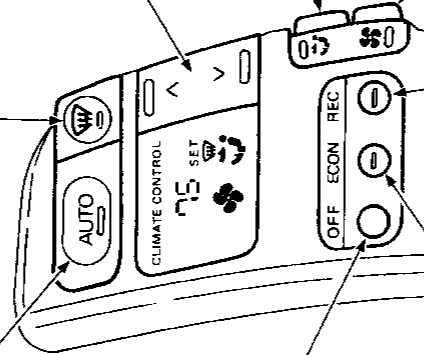
DEF SWITCH	
INTAKE DOOR POSITION	OUTSIDE AIR
OUTLET DOOR POSITION	DEFROSTER
AIR MIX DOOR POSITION	AUTOMATIC CONTROL
FAN SPEED	AUTOMATIC CONTROL
COMPRESSOR	ON [outside air temperature above 0° C (32° F)]
REMARKS	Fan speed can be set at 4 speeds.

TEMP. SET SWITCH
Each time corresponding switch is pressed, set temperature is increased or decreased by 1° F. When it is pressed for more than 0.5 seconds, set temperature can be continuously changed.

MODE SWITCH
VENT → B/L → FOOT → D/F
"DEF" mode is canceled when MODE switch is pressed.

FAN SWITCH
LO → M1 → M2 → HI
Fan speed can be set at 4 speeds in any mode.

RECIRC SWITCH	
INDICATOR	ON OFF
INTAKE DOOR POSITION	RECIRCULATED AIR
REMARKS	"RECIRC" is canceled when "DEF" is selected or "RECIRC" switch is pressed again.

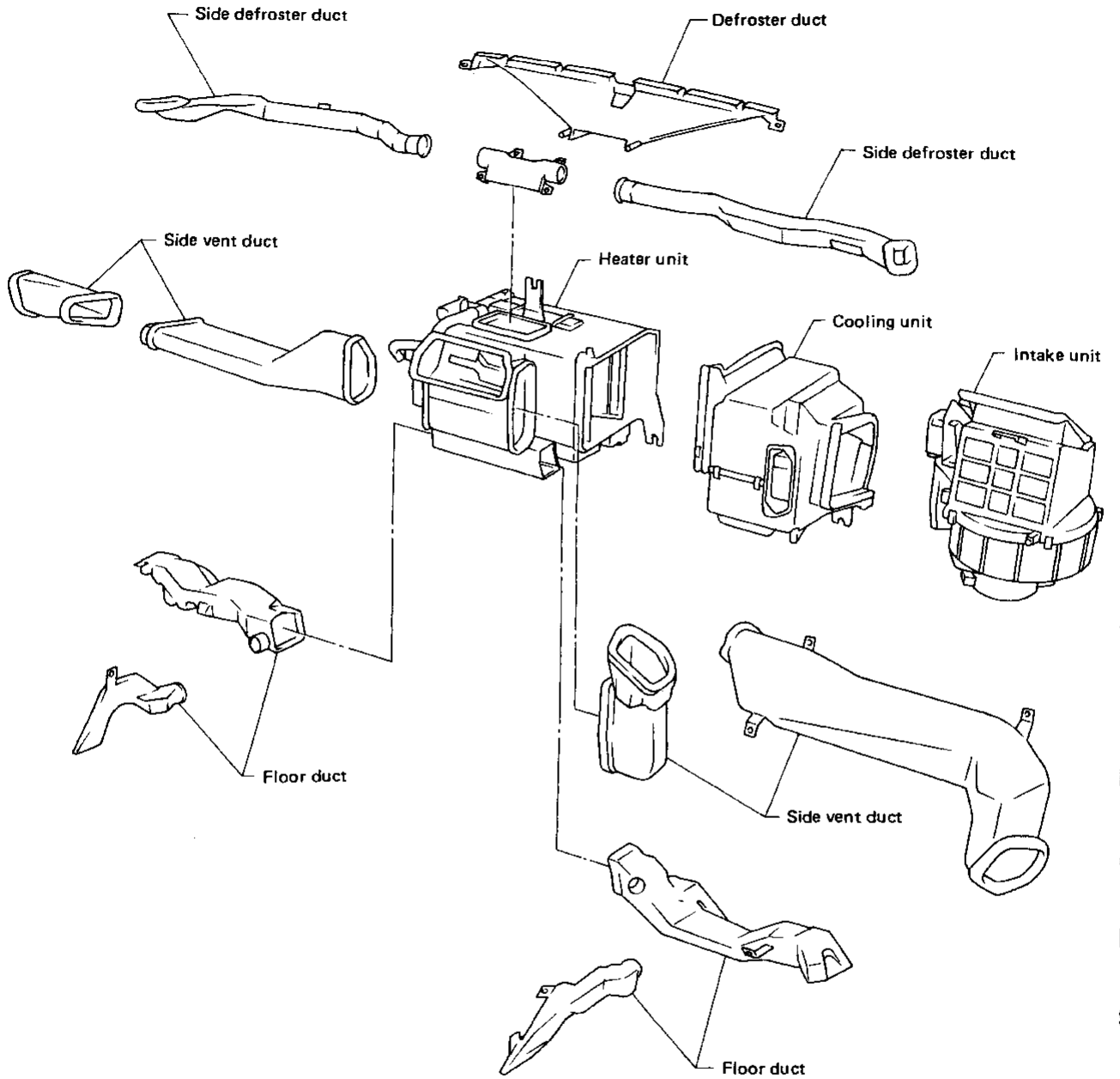


AUTO SWITCH	
INTAKE DOOR POSITION	AUTOMATIC CONTROL
OUTLET DOOR POSITION	AUTOMATIC CONTROL
AIR MIX DOOR POSITION	AUTOMATIC CONTROL
FAN SPEED	AUTOMATIC CONTROL
COMPRESSOR	ON [outside air temperature above 0° C (32° F)]
REMARKS	Fan speed can be set at 4 speeds. Outlet mode can be set at 4 modes.

OFF SWITCH	
INTAKE DOOR POSITION	OUTSIDE AIR
OUTLET DOOR POSITION	AUTOMATIC CONTROL
AIR MIX DOOR POSITION	AUTOMATIC CONTROL
FAN SPEED	OFF
COMPRESSOR	OFF
REMARKS	REC switch and MODE switch can be set. Outlet mode can be set at 4 modes.

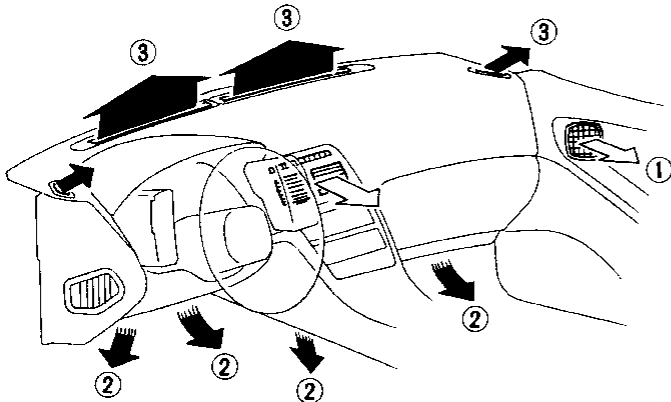
ECON SWITCH	
INTAKE DOOR POSITION	OUTSIDE AIR
OUTLET DOOR POSITION	AUTOMATIC CONTROL
AIR MIX DOOR POSITION	AUTOMATIC CONTROL
FAN SPEED	AUTOMATIC CONTROL
COMPRESSOR	OFF
REMARKS	Fan speed can be set at 4 speeds. Outlet mode can be set at 4 modes.

Component Layout

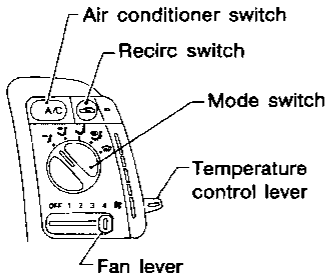


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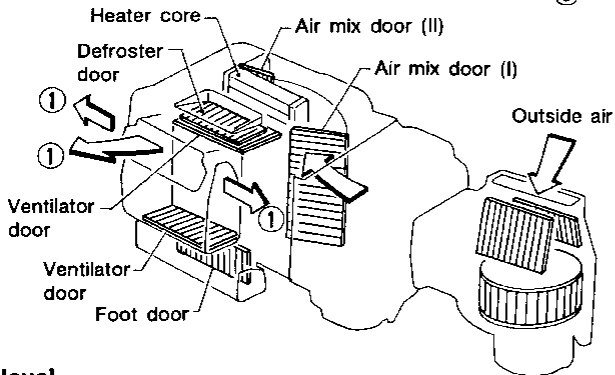
Air Flow



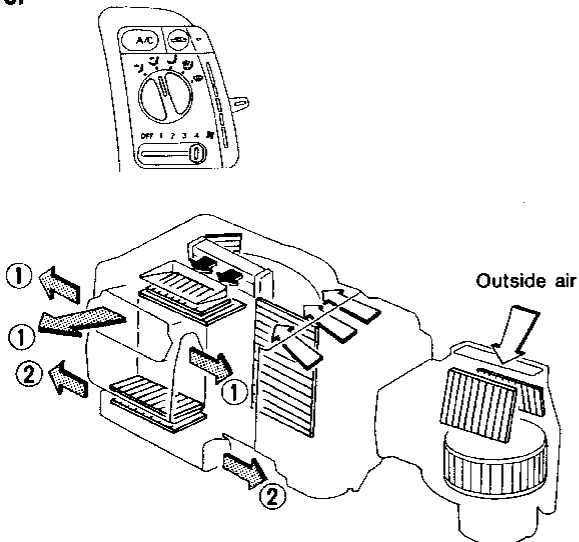
Ventilation



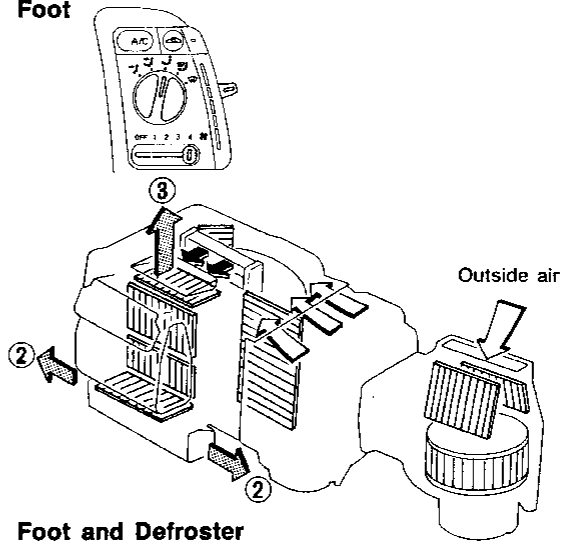
- ① ... To ventilator
- ② ... To floor
- ③ ... To defroster



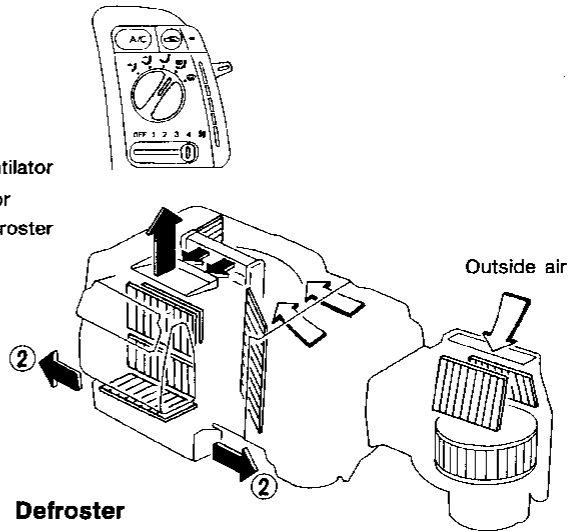
Bi-level



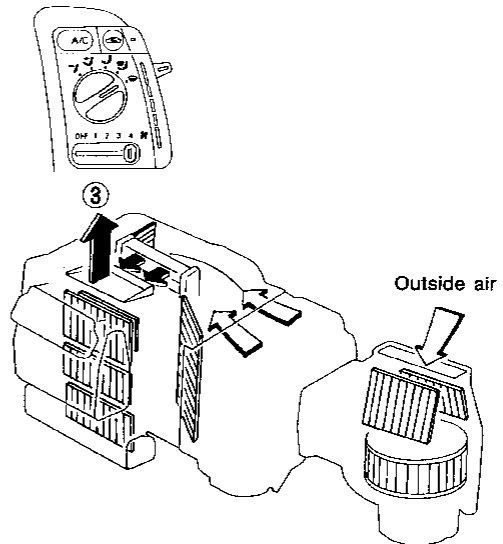
Foot



Foot and Defroster



Defroster

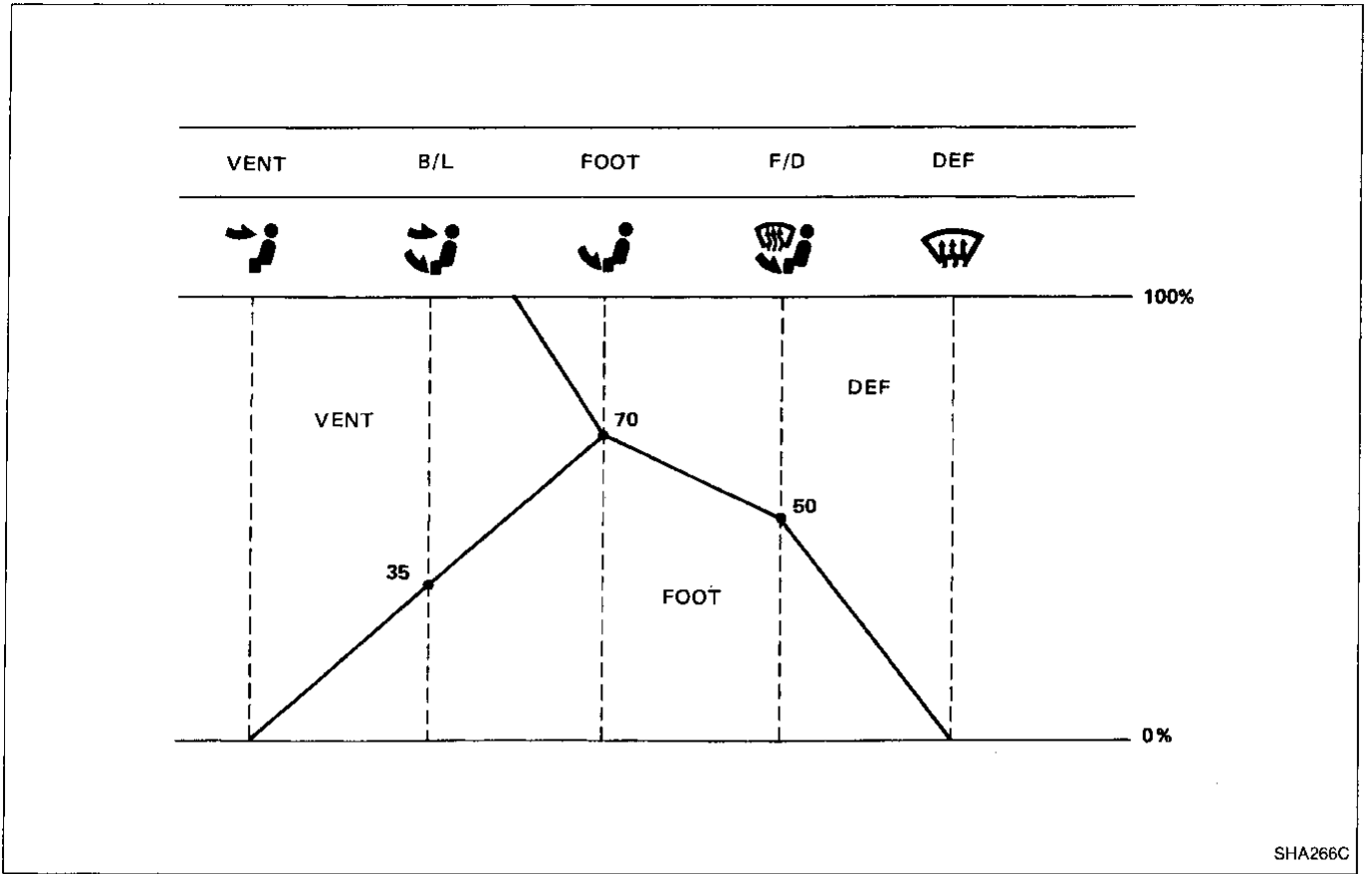


- ← : Air passed through heater core
- ←+← : Mixed air
- ← : Air not passed through heater core

DESCRIPTION — Overall System

Air Flow (Cont'd)

AIR DISTRIBUTION RATIOS



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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.

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

FREEZE PROTECTION

If evaporator coil temperature falls below a specified point, the thermo control amplifier interrupts compressor operation. When evaporator coil temperature rises above the specification, compressor operation will resume. This condition (compressor cycling) indicates a malfunction in the system.

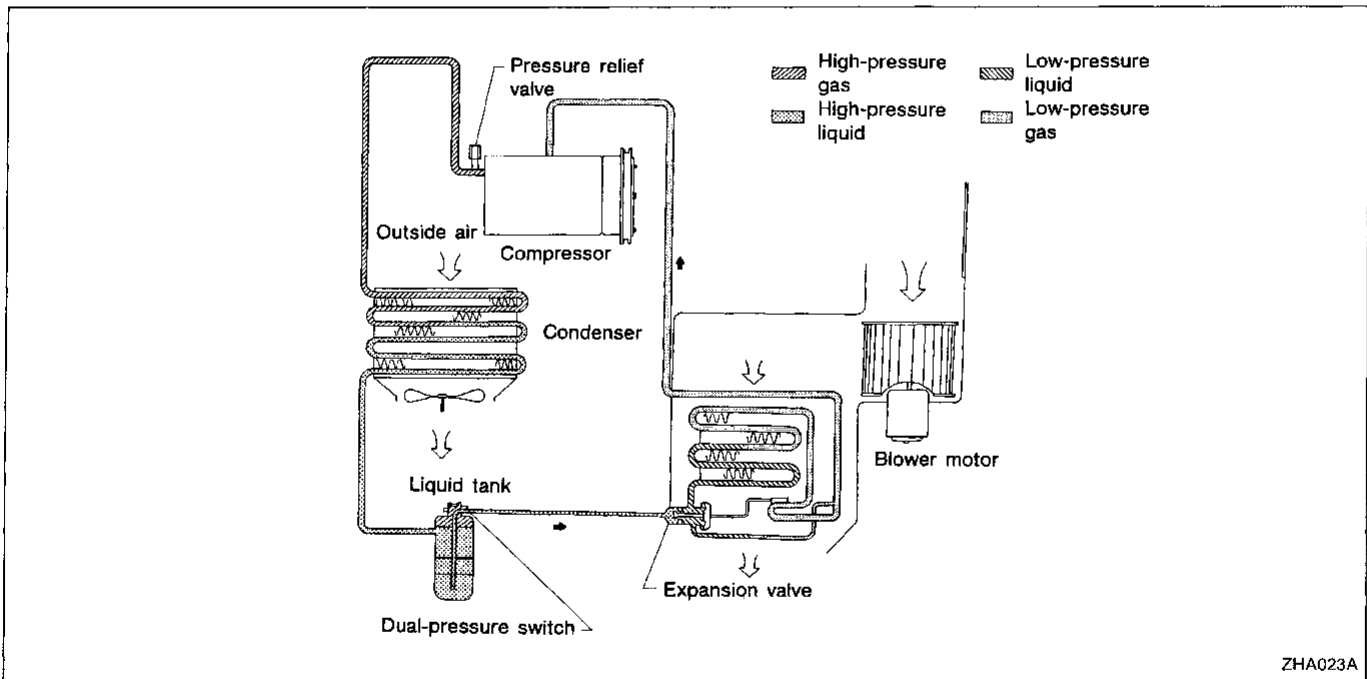
REFRIGERANT SYSTEM PROTECTION

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.

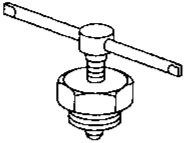
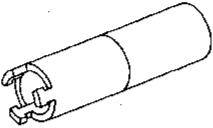
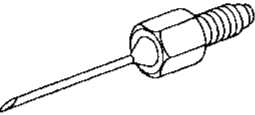
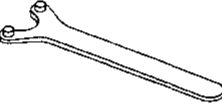
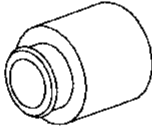
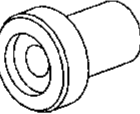

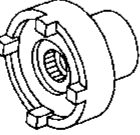
Pressure relief valve

The refrigerant system is also protected by a pressure relief valve, located on the end of the high pressure flexible hose near the compressor. When the pressure of refrigerant in the system increases to an abnormal level [more than 3,629 kPa (37 kg/cm², 526 psi)], the release port on the pressure relief valve automatically opens and releases refrigerant into the atmosphere.



PREPARATION

Special Service Tools

Tool number (Kent-Moore No.) Tool name	Description	
KV99232022 (J26571-A) Clutch disc puller	 NT210	Removing clutch disc GI MA EM
KV99235140 (J37876) Shaft seal remover and installer	 NT214	Removing and installing shaft seal LC EF & EC
KV994C1552 (J37880) Charge nozzle	 NT215	Charging refrigerant FE CL
KV99231010 (J37877) Clutch disc wrench	 NT205	Removing shaft nut and clutch disc MT AT
KV99233040 (J26720-A) Puller pilot	 NT213	Removing pulley PD FA
KV99234160 (J37879) Pulley installer	 NT209	Installing pulley RA BR
KV99267420 (J37878) Shaft seal guide	 NT216	Installing shaft seal ST BF
KV99235160 (J37882) Nut wrench	 NT212	Removing lock nut HA EL IDX

PREPARATION

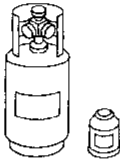

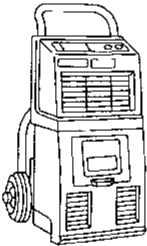
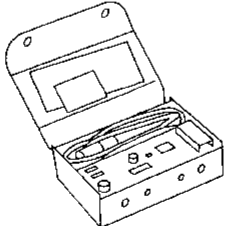
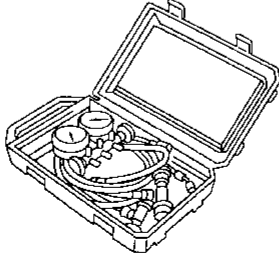
HFC-134a (R-134a) Service Tools and Equipment

It is important to understand that HFC-134a (R-134a) refrigerant, and the specified lubricant which must be used with HFC-134a (R-134a), must never be mixed with CFC-12 (R-12) refrigerant and/or the CFC-12 (R-12) lubricant.

This means that separate and non-interchangeable service equipment must be used for handling each type of refrigerant/lubricant.

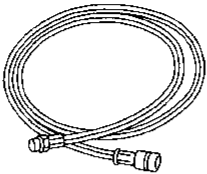
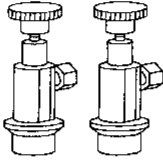

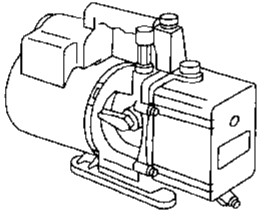
To prevent the mixing of refrigerants/lubricants, refrigerant container fittings, service hose fittings, and service equipment fittings (equipment which handles refrigerant and/or lubricant) are different between CFC-12 (R-12) and HFC-134a (R-134a).

Adaptors to convert from one size fitting to the other must never be used: refrigerant/lubricant contamination will occur and compressor failure will result.

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

PREPARATION

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

Tool number (Kent-Moore No.) Tool name	Description	Note	
Service hoses ● High side hose (J-39501-72) ● Low side hose (J-39502-72) ● Utility hose (J-39476-72)	NT201 	Hose color: ● Low hose: Blue with black stripe ● High hose: Red with black stripe ● Utility hose: Yellow with black stripe or green with black stripe Fitting size: Thread size ● 1/2"-16 ACME	GI MA EM
Service couplers ● High side coupler (J-39500-20) ● Low side coupler (J-39500-24)	NT202 	Fitting size: ● M14 x 1.5 fitting is optional	LC EF & EC
(J-39650) Refrigerant weight scale	NT200 	For measuring of refrigerant Fitting size: Thread size ● 1/2"-16 ACME	FE CL WT
(J-39649) Vacuum pump (Including the isolator valve)	NT203 	Capacity: ● Air displacement: 4 CFM ● Micron rating: 20 microns ● Oil capacity: 482 g (17 oz) Fitting size: Thread size ● 1/2"-16 ACME	AT PD FA RA BR ST BF

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PREPARATION

Precautions for Service Equipment

RECOVERY/RECYCLING EQUIPMENT

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

ELECTRICAL LEAK DETECTOR

Be certain to follow the manufactures instructions for tester operation and tester maintenance.

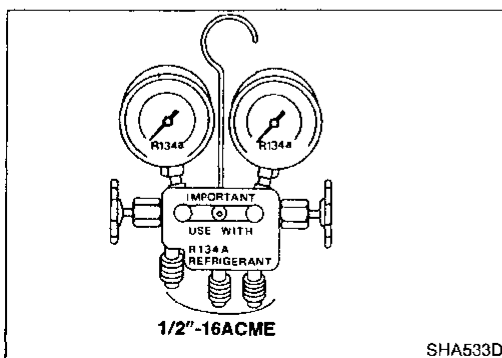
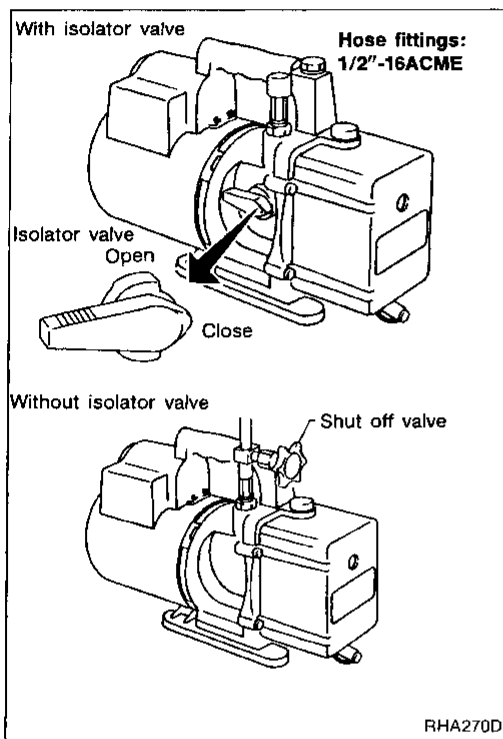
VACUUM PUMP

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

To prevent the migration of vacuum pump lubricant into service hoses, it is necessary to use a valve (which can be manually opened or closed) near the connection of the service hose to the pump.

- On a vacuum pump which is equipped with an isolator valve (usually part of the vacuum pump), closing this valve will isolate the service hose from the pump.
- For pumps without an isolator valve, be certain that the service hose is equipped with a manual shut off valve near the pump end of the hose.
- Hoses which contain an automatic shut off valve at the end of the service hose must be disconnected from the vacuum pump to prevent the migration of lubricant: as long as the hose is connected, the valve is open and lubricant may migrate.

One-way valves which open when vacuum is applied and close under a no vacuum condition are not recommended, because this valve may restrict the pump's ability to pull a deep vacuum.



MANIFOLD GAUGE SET

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

PREPARATION

Precautions for Service Equipment (Cont'd)

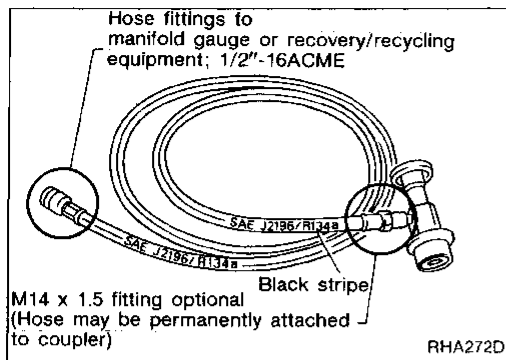
SERVICE HOSES

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

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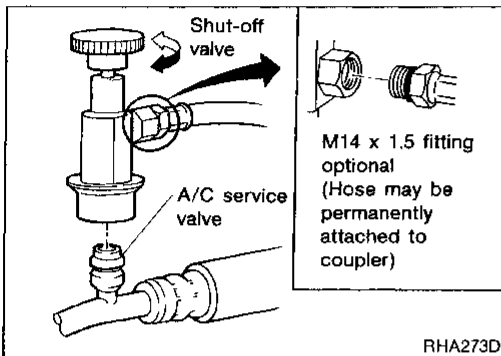
RHA272D

SERVICE COUPLERS

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

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

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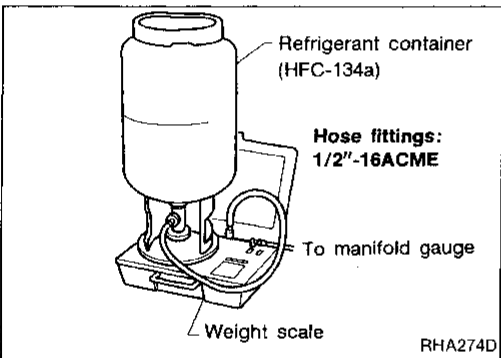
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REFRIGERANT WEIGHT SCALE

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

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CHARGING CYLINDER

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

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SERVICE PROCEDURES

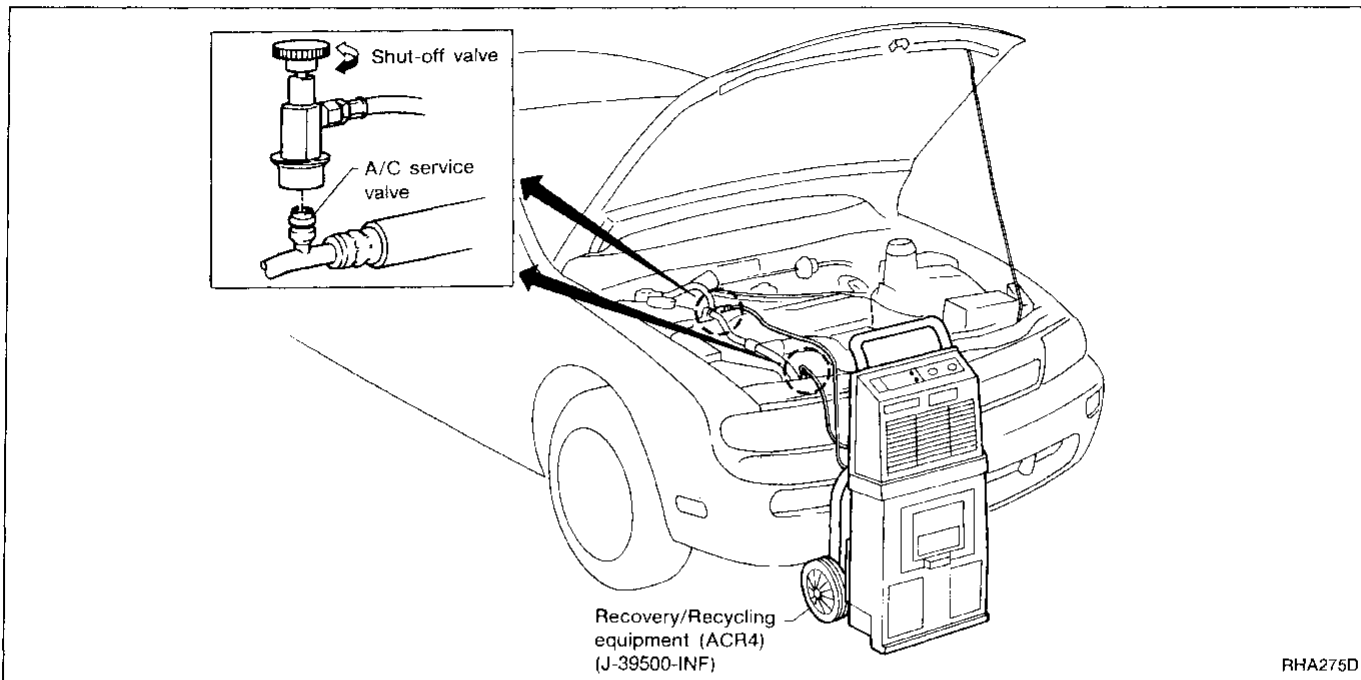
HFC-134a (R-134a) Service Procedure

SETTING OF SERVICE TOOLS AND EQUIPMENT

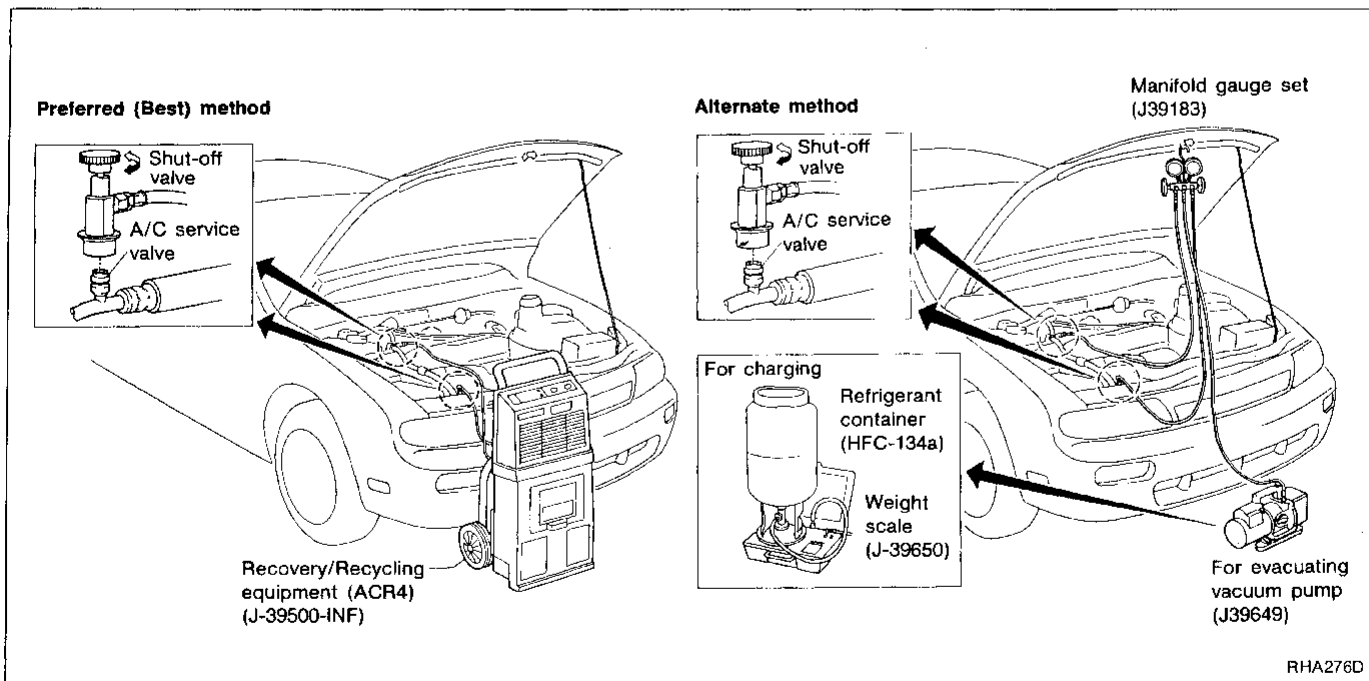
DISCHARGING REFRIGERANT

WARNING:

Avoid breathing A/C refrigerant and lubrication oil vapor or mist. Exposure may irritate eyes, nose and throat. Use only approved recovery/recycling equipment to discharge HFC-134a (R-134a) systems. If accidental system discharge occurs, ventilate work area before resuming work.

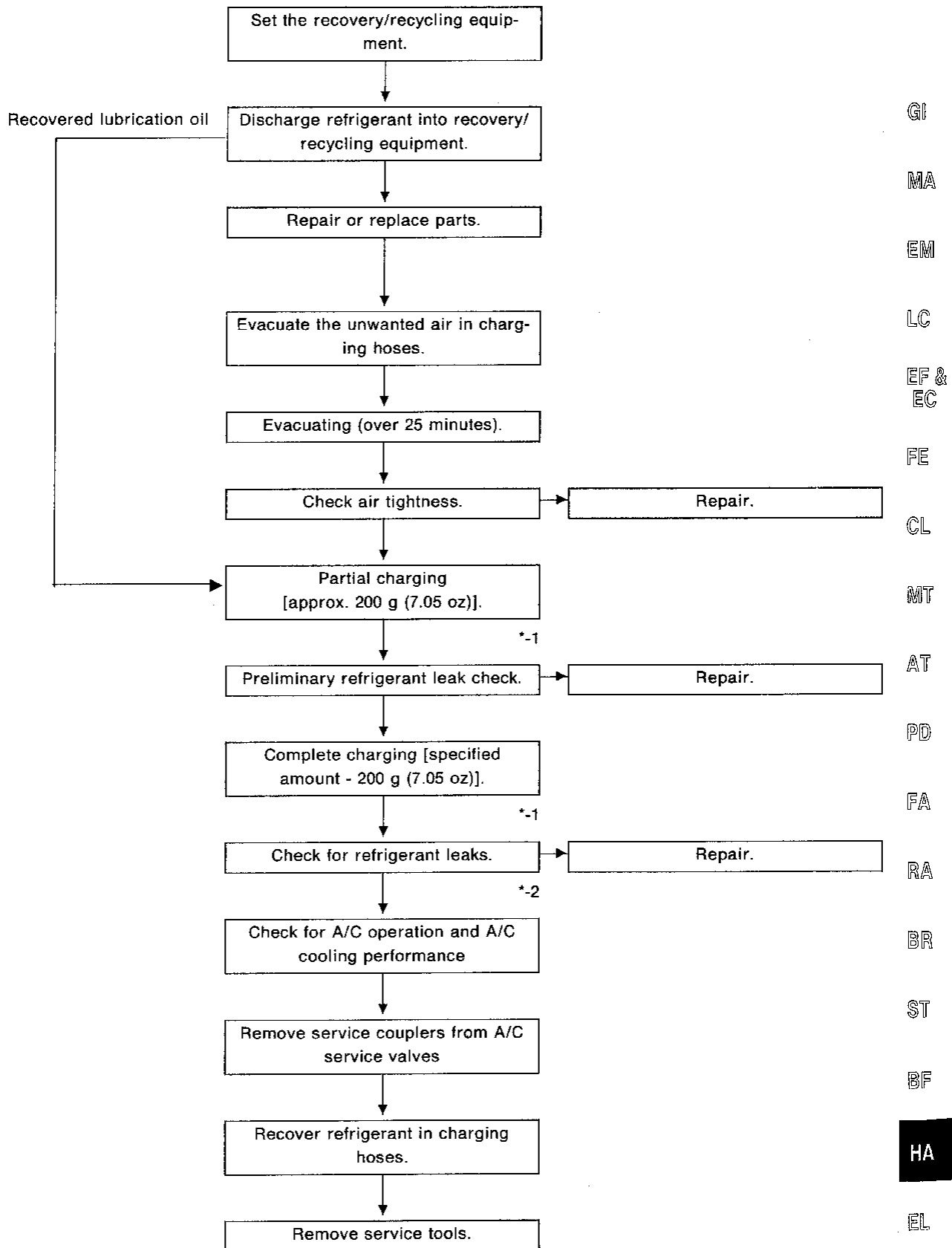


EVACUATING SYSTEM AND CHARGING REFRIGERANT



SERVICE PROCEDURES

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



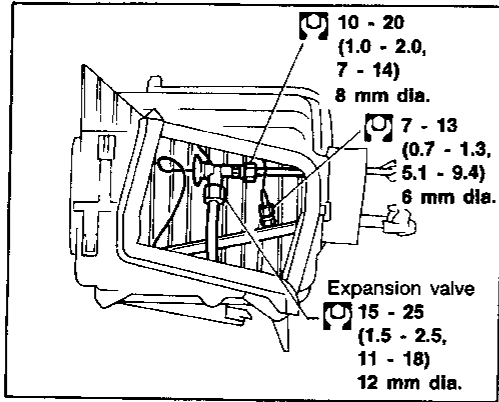
Note: *-1 Before charging refrigerant, ensure engine is off.

*-2 Before checking for leaks, start engine to activate air conditioning system then turn in off.
Service valve caps must be attached to valves (to prevent leakage).

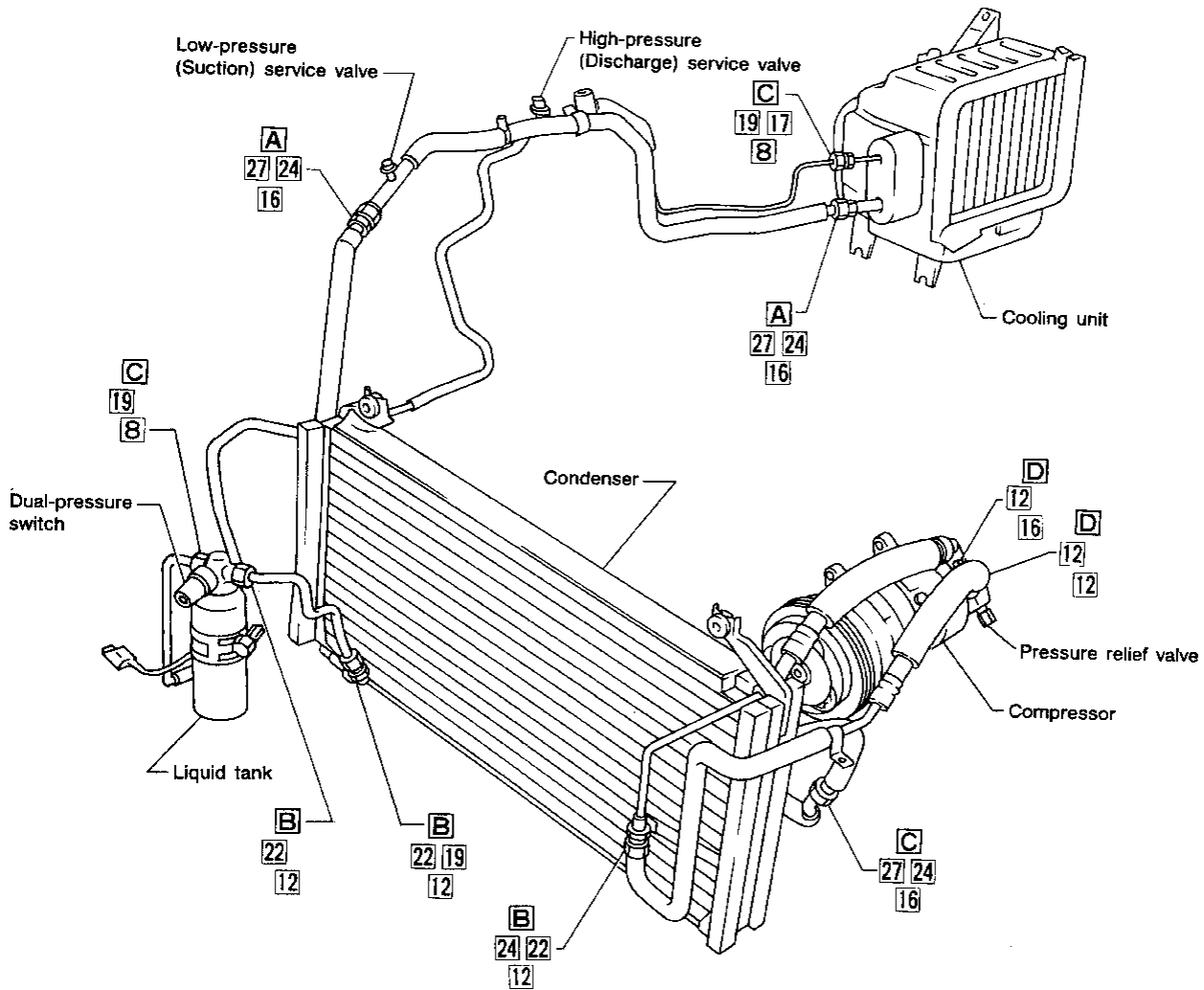
Refrigerant Lines

- Refer to "Precautions for Refrigerant Connection" on page HA-6.

VG30DE ENGINE MODEL



- (Tightening torque)
- (Wrench size)
- (O-ring size)
- A** : 20 - 29 (2.0 - 3.0, 14 - 22)
- B** : 15 - 25 (1.5 - 2.5, 11 - 18)
- C** : 10 - 20 (1.0 - 2.0, 7 - 14)
- D** : 15 - 19 (1.5 - 1.9, 11 - 14)
- : N·m (kg·m, ft·lb)

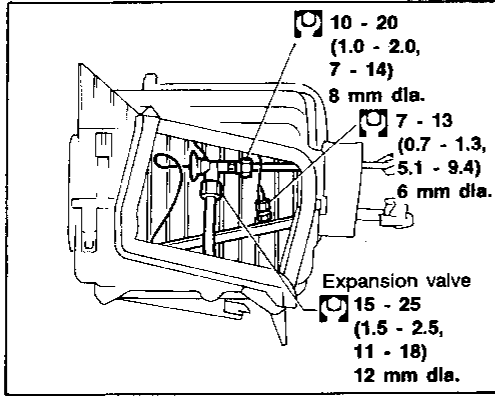


SERVICE PROCEDURES

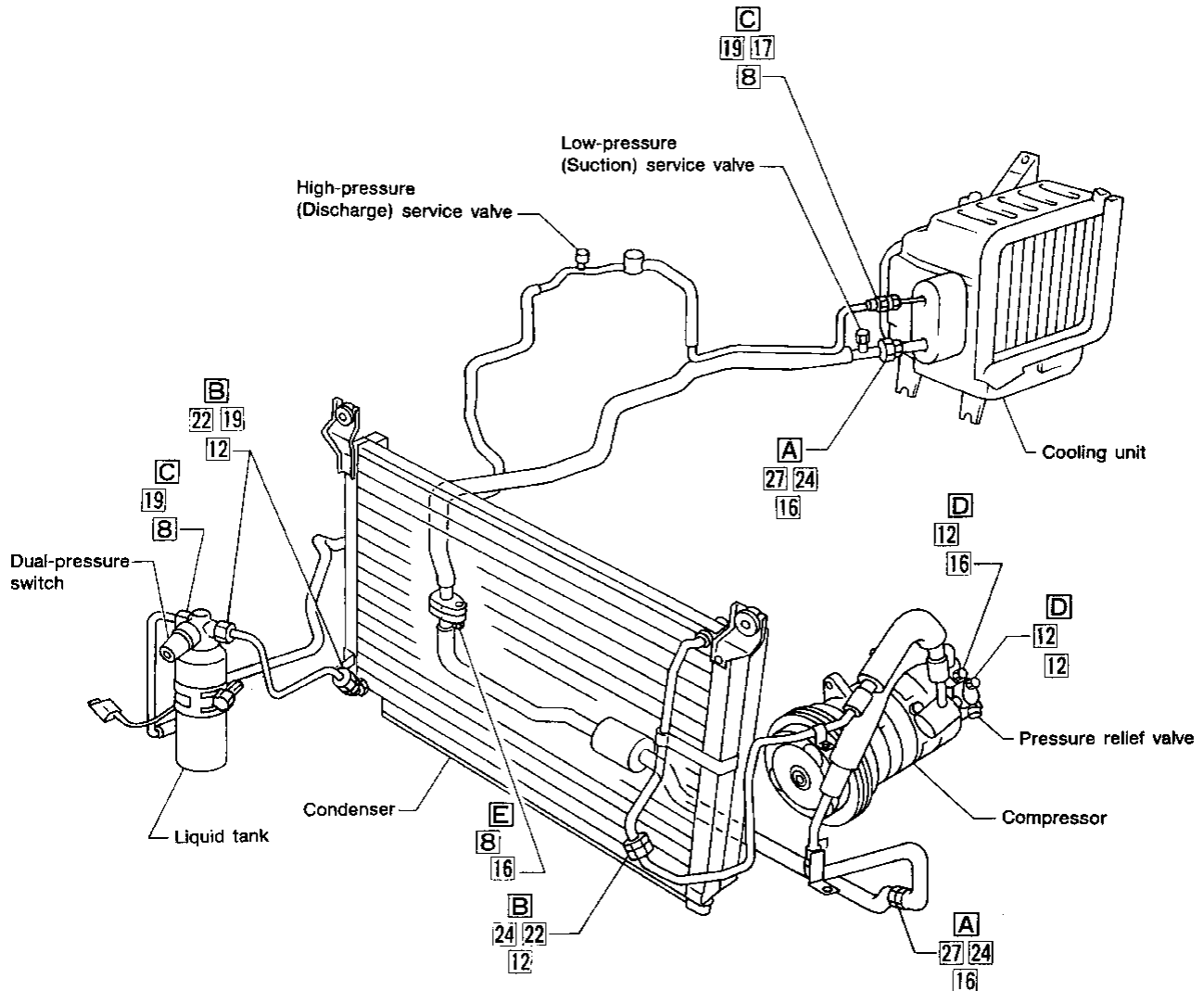
Refrigerant Lines (Cont'd)

- Refer to "Precautions for Refrigerant Connection" on page HA-6.

VG30DETT ENGINE MODEL

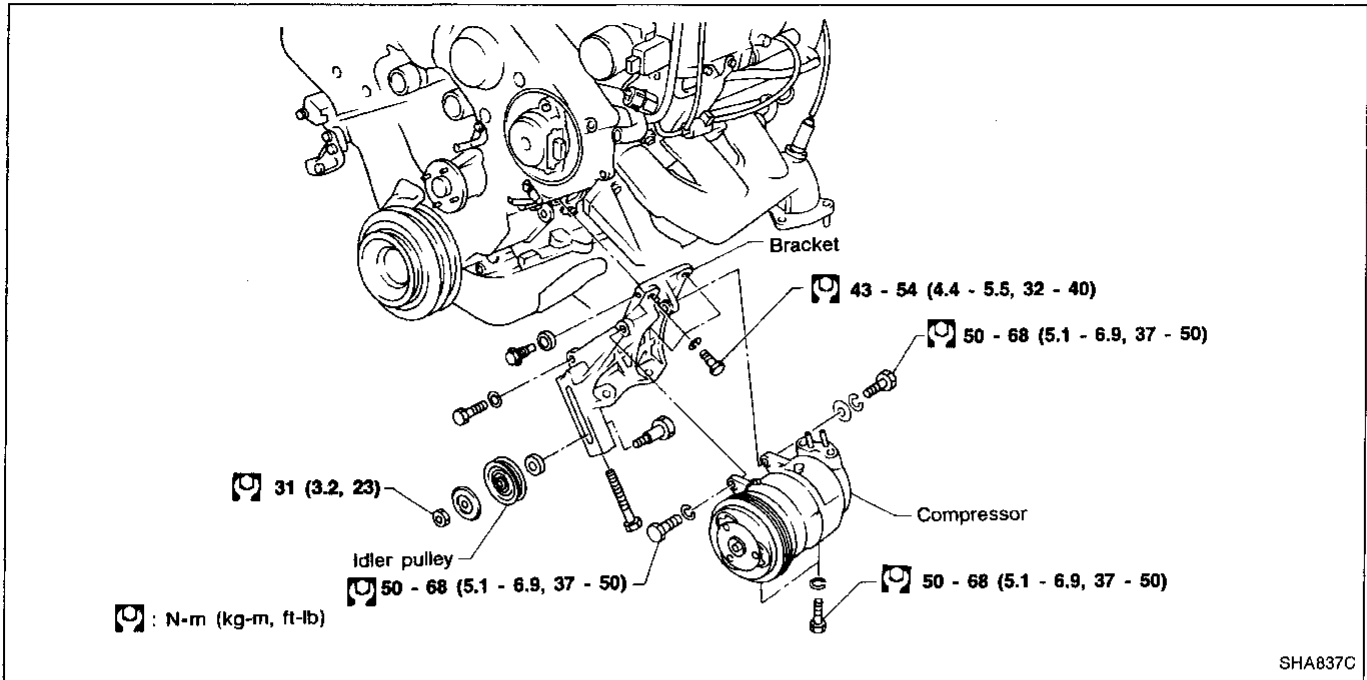


- (Tightening torque)
- (Wrench size)
- (O-ring size)
- A** : 20 - 29 (2.0 - 3.0, 14 - 22)
- B** : 15 - 25 (1.5 - 2.5, 11 - 18)
- C** : 10 - 20 (1.0 - 2.0, 7 - 14)
- D** : 15 - 19 (1.5 - 1.9, 11 - 14)
- E** : 14 - 18 (1.4 - 1.8, 10 - 13)
- : N·m (kg·m, ft·lb)



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Compressor Mounting



Belt Tension

- Refer to "Checking Drive Belts" in section MA.

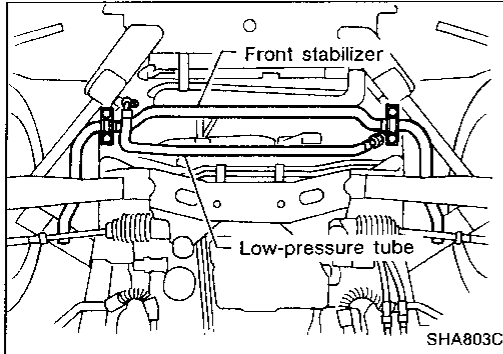
Fast Idle Control Device (FICD)

- Refer to section EF & EC.

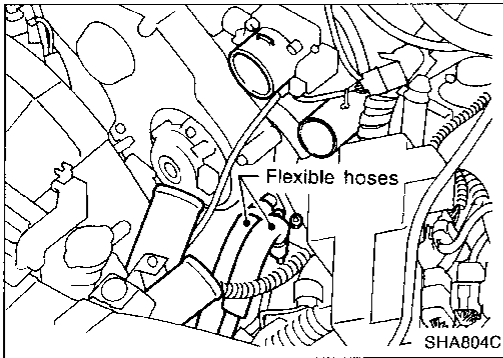
Removal and Installation — Compressor

REMOVAL

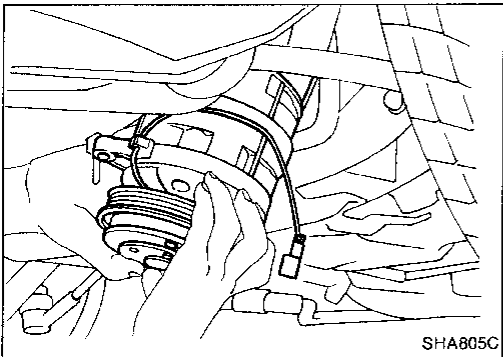
1. Disconnect battery cable.
2. Discharge refrigerant into your refrigerant recycling equipment.
3. Remove under cover.



4. Remove low pressure tube, front stabilizer bar and its clamps.
5. Loosen idler pulley nut and adjusting bolt. Remove idler pulley.



6. Remove air pipes and hoses to make room.
7. Remove two nuts to separate high and low pressure flexible hoses from compressor.
8. Disconnect compressor harness connector.
9. Remove two compressor fixing bolts (upper).



10. Remove two compressor fixing bolts (lower).
11. Remove the compressor as shown in the left-hand figure.

INSTALLATION

Installation is the reverse order of removal. Tightening torque related to front stabilizer: refer to FA section.

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Lubrication Oil

Name: Nissan A/C System Oil Type S

Part number: KLH00-PAGS0

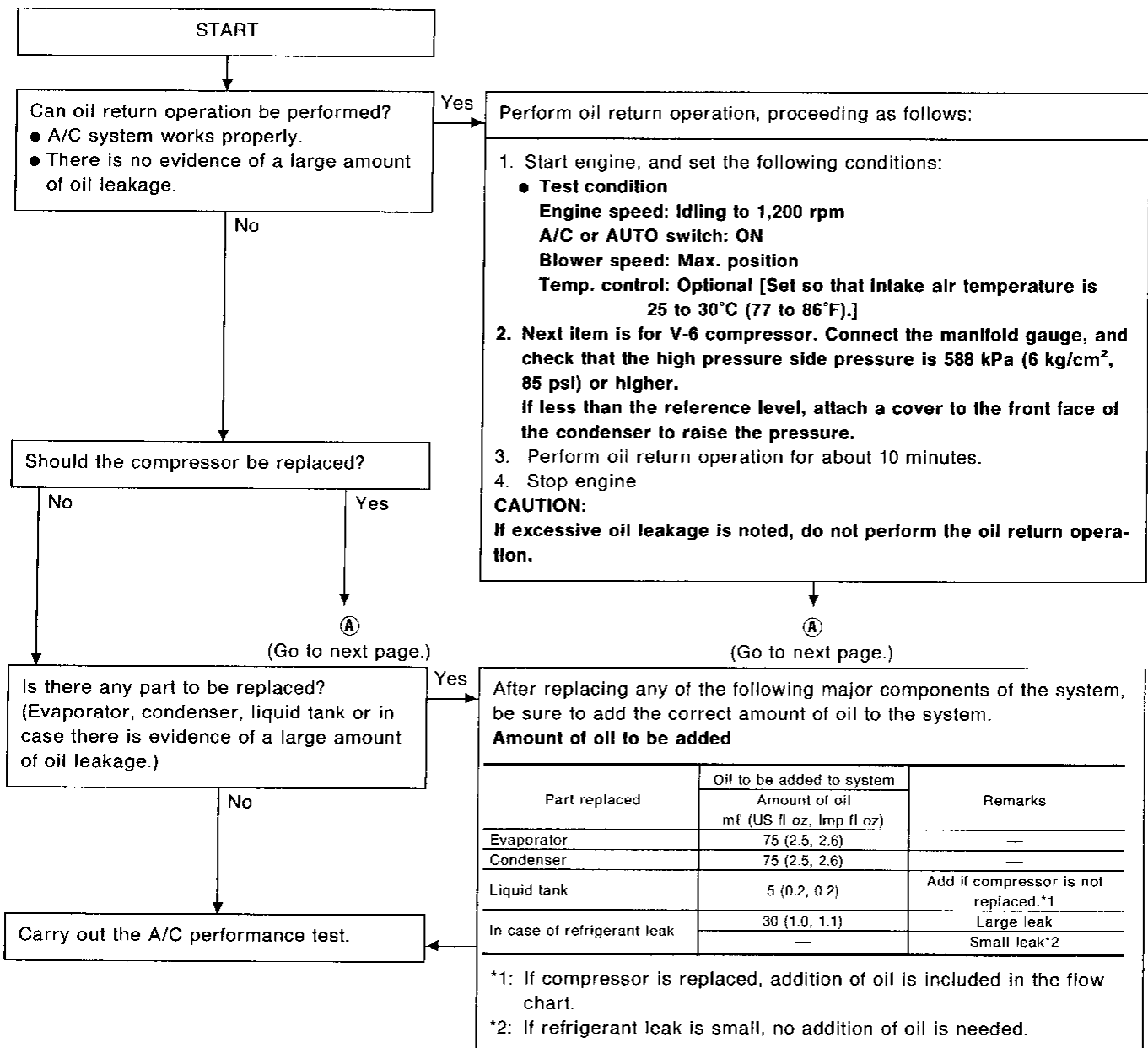
Maintenance of Oil Quantity in Compressor

The oil used to lubricate the compressor circulates through the system with the refrigerant. Whenever any component of the system is replaced or a large amount of gas leakage occurs, add oil to the compressor to maintain the specified amount. If oil quantity is not maintained properly, the following malfunctions may result:

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

Checking and Adjusting

Adjust the oil quantity according to the flowchart shown below.



LUBRICATION OIL — Checking and Adjusting

Checking and Adjusting (Cont'd)

A

1. Discharge refrigerant into the refrigerant recovery/recycling equipment. Measure oil discharged into the recovery/recycling equipment.
2. Remove the drain plug (for V-6 and DKS-16H compressor) and drain the oil from the "old" (removed) compressor into a graduated container, and record the amount of oil drained.
3. Remove the drain plug and drain the oil from the "new" compressor into a separate, clean container.
4. Measure an amount of the new oil equal to that drained from the "old" compressor, and add this oil to the "new" compressor through the drain plug or suction port opening.
5. Measure an amount of the "new" oil equal to that recovered during discharging, and add this oil to the "new" compressor through the drain plug or suction port opening.
6. Torque the drain plug.

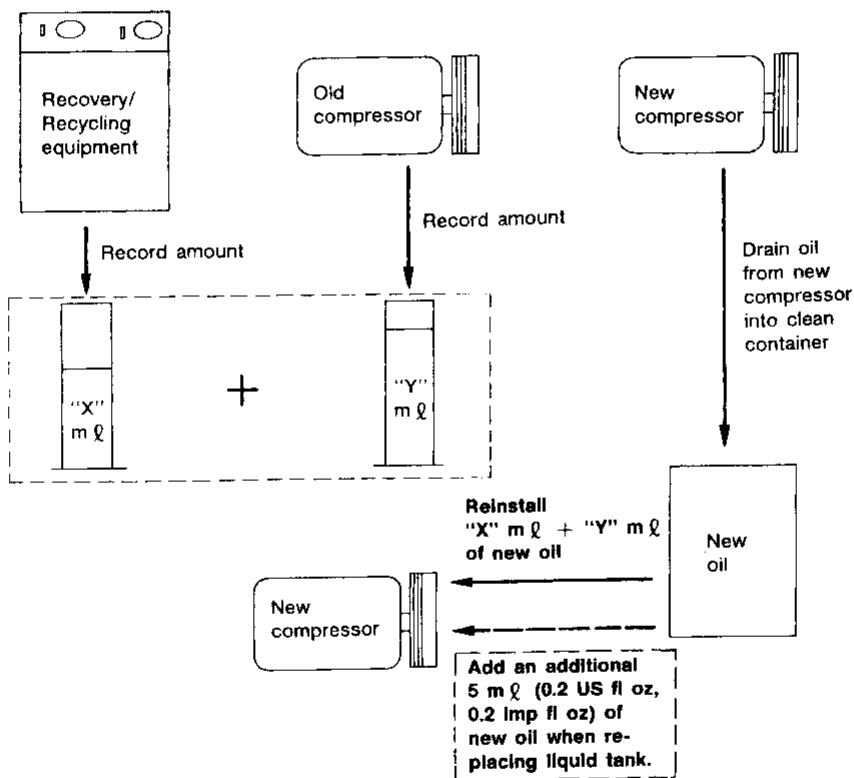
V-6 compressor: 18 - 19 N·m (1.8 - 1.9 kg·m, 13 - 14 ft·lb)

DKS-16H compressor: 14 - 16 N·m (1.4 - 1.6 kg·m, 10 - 12 ft·lb)

7. If the liquid tank also needs to be replaced, add an additional 5 mℓ (0.2 US fl oz, 0.2 Imp fl oz) of oil at this time.

Do not add this 5 mℓ (0.2 US fl oz, 0.2 Imp fl oz) of oil if only replacing the compressor.

Oil adjusting procedure for compressor replacement



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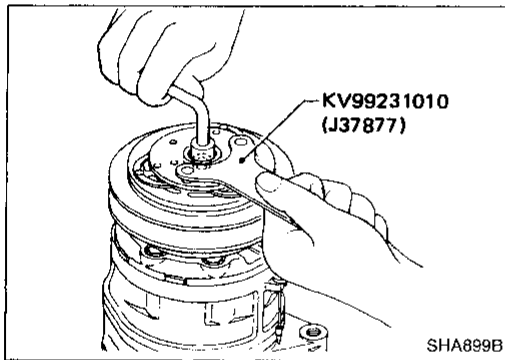
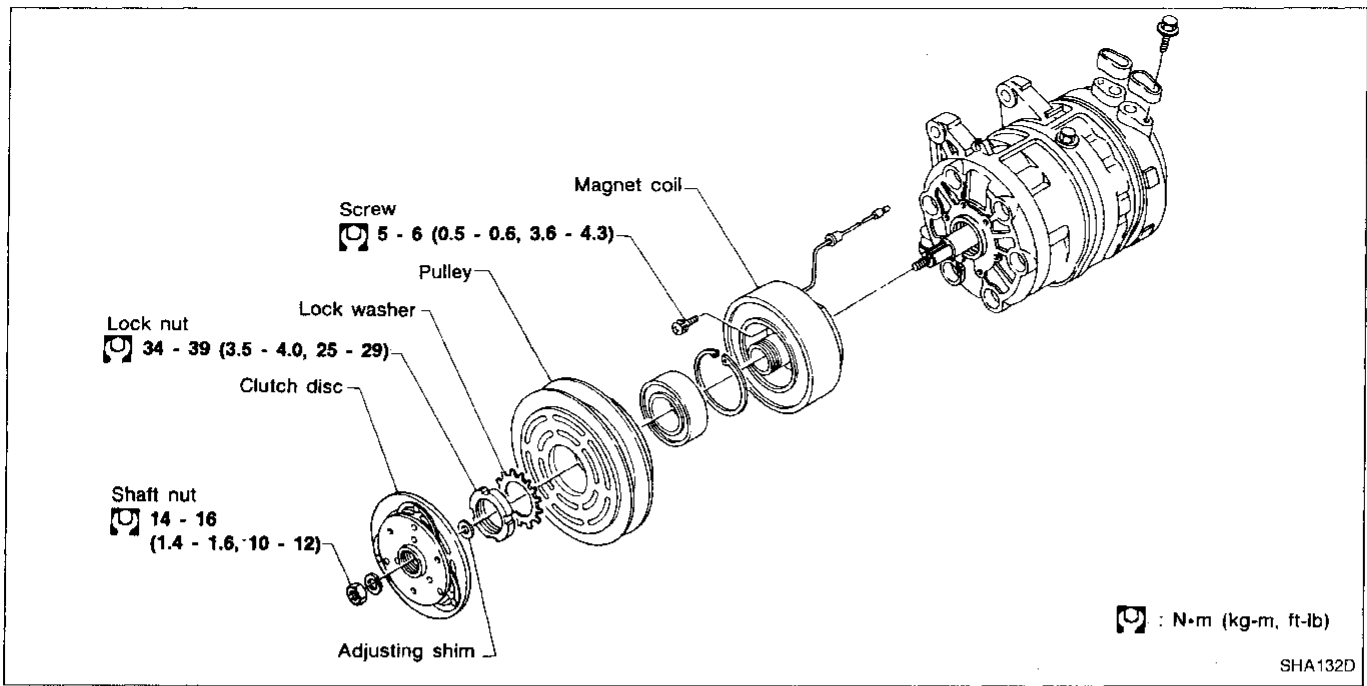
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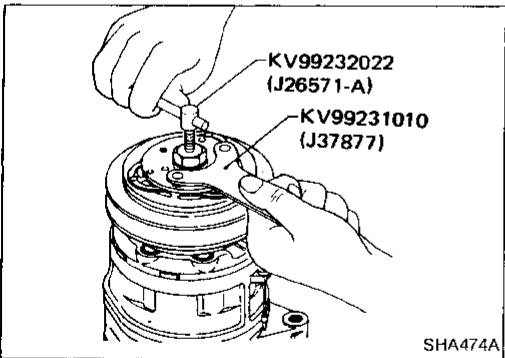
COMPRESSOR — Model DKS-16H (ZEXEL make)



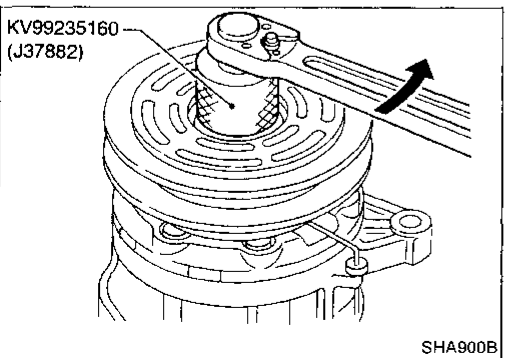
Compressor Clutch

REMOVAL

- When removing shaft nut, hold clutch disc with clutch disc wrench.



- Using clutch disc puller, clutch disc can be removed easily.



- Bend down pawl of lock washer.
- When removing pulley, remove lock nut with nut wrench.

COMPRESSOR — Model DKS-16H (ZEXEL make)

Compressor Clutch (Cont'd)

- Remove the pulley by hand. If difficult, use puller pilot.

INSPECTION

Clutch disc

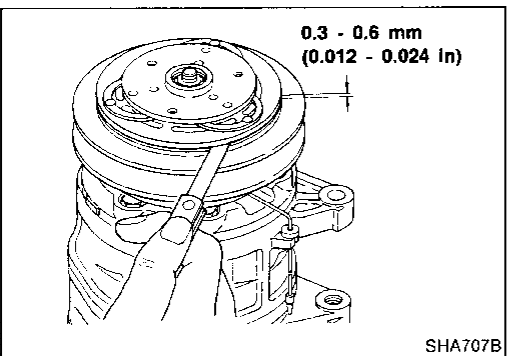
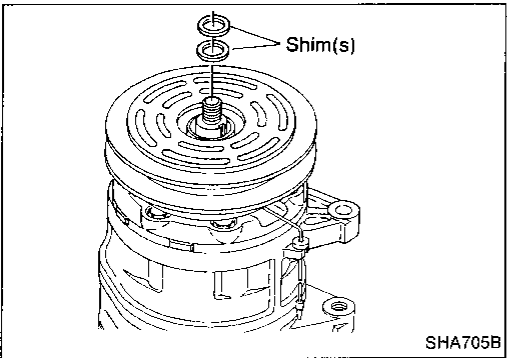
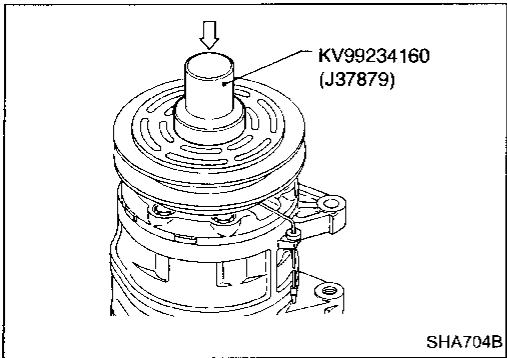
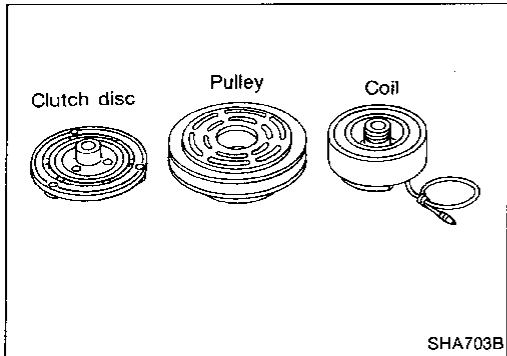
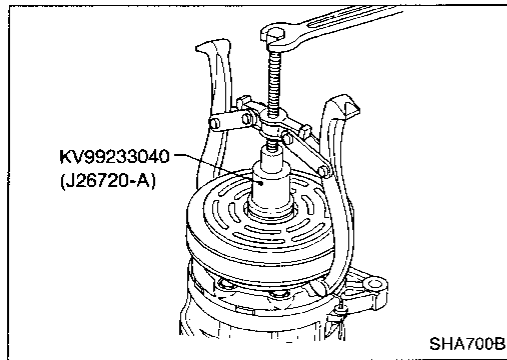
If the contact surface shows signs of damage due to excessive heat, the drive plate and pulley should be replaced.

Pulley

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

Coil

Check coil for loose connection or cracked insulation.



INSTALLATION

- Install the key in the keyway on the compressor drive shaft.
- Install the coil to compressor (lead wire up) and tighten the mounting screws.
- Install the lead wire into the holder correctly.

- Install lock washer and nut with nut wrench.
- Bend one pawl of the lock washer up against the nut to prevent the nut from loosening.

- Check to ensure that the clutch clearance is between 0.3 to 0.6 mm (0.012 to 0.024 in). Adjust the clearance using shim(s) as necessary.

BREAK-IN OPERATION

When replacing compressor clutch assembly, do not forget break-in operation, accomplished by engaging and disengaging the clutch about thirty times.

Break-in operation raises the level of transmitted torque.

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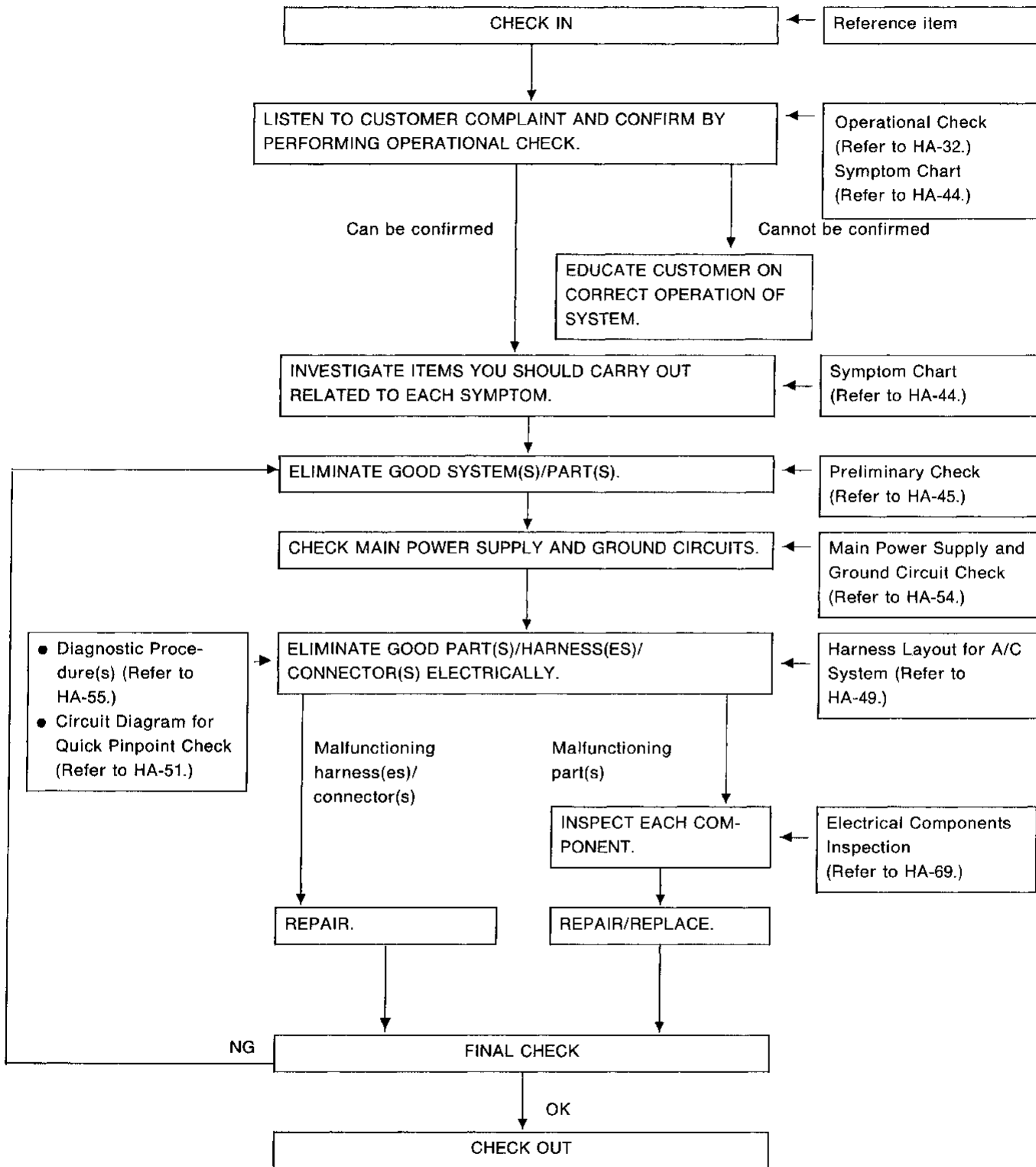
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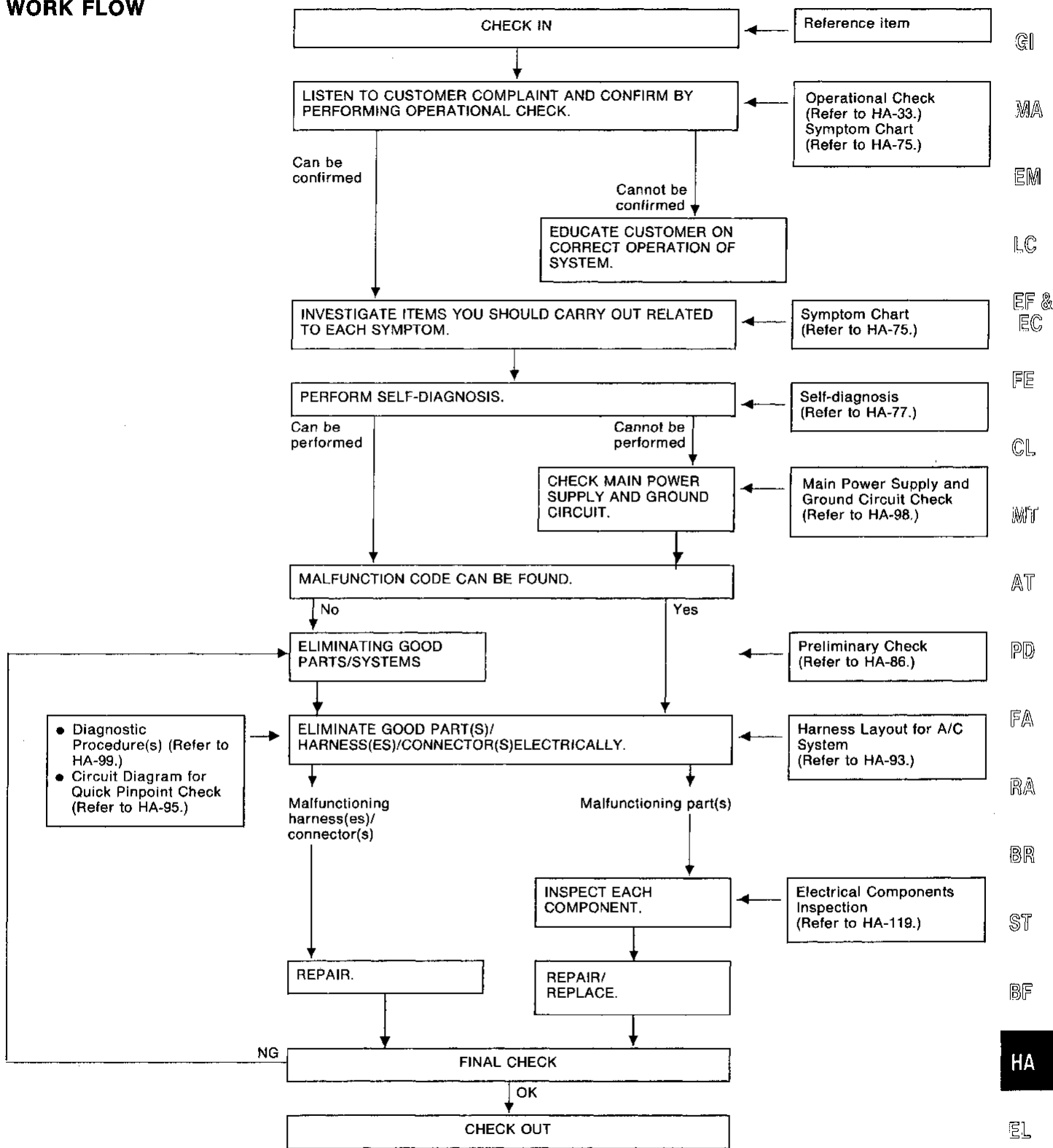
How to Perform Trouble Diagnoses for Quick and Accurate Repair — Manual Air Conditioner

WORK FLOW



How to Perform Trouble Diagnoses for Quick and Accurate Repair — Auto Air Conditioner

WORK FLOW

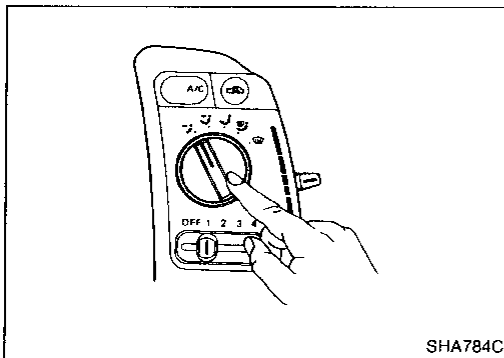
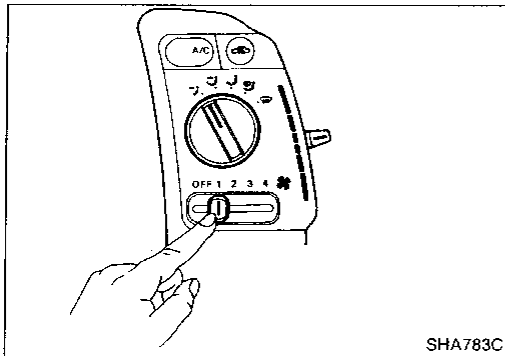


Operational Check — Manual Air Conditioner

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 and temperature increase systems.

CONDITIONS:

Engine running at normal operating temperature.



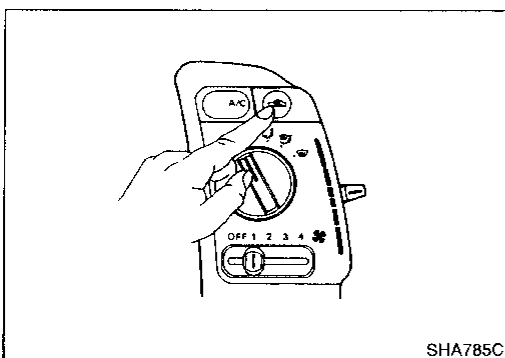
PROCEDURE:

1. Check blower

- 1) Slide fan lever to 1-speed.
Blower should operate on 1-speed.
- 2) Then slide fan lever 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) Set mode switch at VENT position.
- 2) Confirm that all discharge air comes out of face vents.
- 3) Set mode switch at B/L position.
- 4) Confirm that discharge air comes out of face vents and foot vents.
- 5) Set mode switch at FOOT position.
- 6) Confirm that discharge air comes out of foot vents, with some air from defroster vents.
- 7) Set mode switch at F/D position.
- 8) Confirm that discharge air comes out of foot vents and defroster vents, and that compressor turns ON.
- 9) Set mode switch at DEF position.
- 10) The discharge air should come only from the defroster vents. At the same time intake door position should be at FRESH.

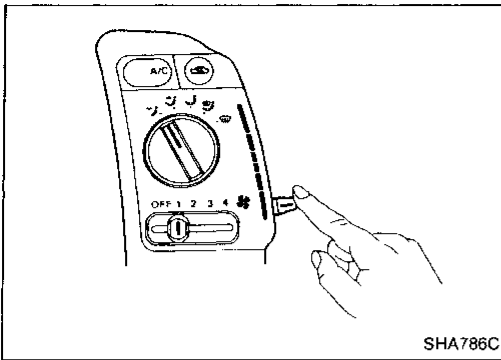


3. Check recirc

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

DIAGNOSES — Overall System

Operational Check — Manual Air Conditioner (Cont'd)



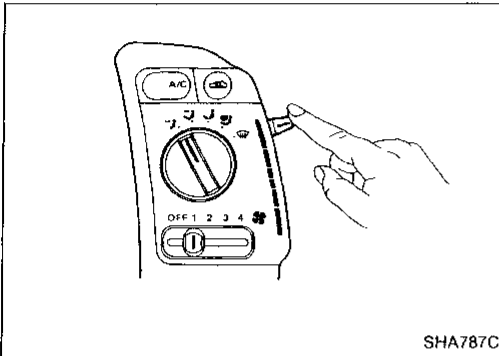
4. Check temperature decrease

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

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5. Check temperature increase

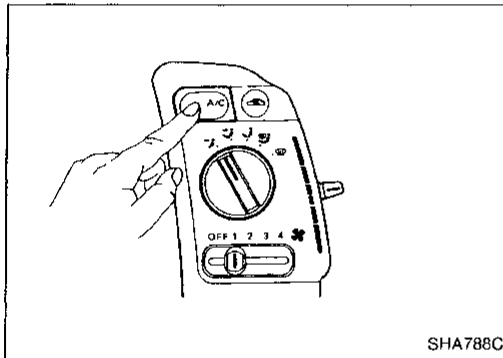
- 1) Slide temperature control lever to full hot.
- 2) Check for hot air at discharge air outlets.

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6. Check air conditioner switch

Move fan control lever to the desired (1 to 4-speed) position and push the air conditioner switch to turn ON the air conditioner.

MT

The indicator light should come on when air conditioner is ON.

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Operational Check — Auto Air Conditioner

The purpose of the operational check is to confirm that the system operates as it should. The systems which will be checked are the blower, mode (discharge air), ambient display, intake air, defrost, econ, auto, temperature decrease, temperature increase, and the memory function.

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CONDITIONS:

Engine running at normal operating temperature.

BF

PROCEDURE:

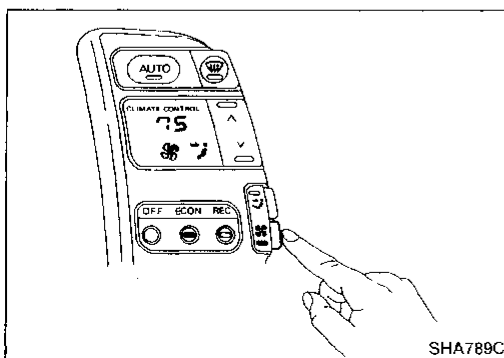
1. Check blower

- 1) Press fan switch one time.
ECON indicator should light.
Blower should operate on low speed, and the fan symbol should have one blade lit ().
- 2) Press fan switch one more time.
- 3) Continue checking blower speed and fan symbol until all four speeds have been checked.
- 4) Leave blower on high speed.

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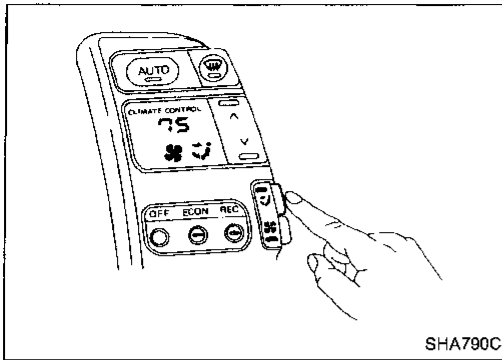
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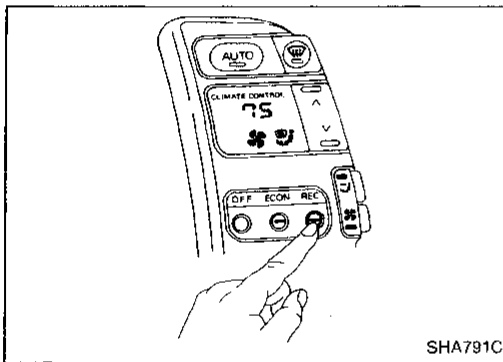
DIAGNOSES — Overall System

Operational Check — Auto Air Conditioner (Cont'd)



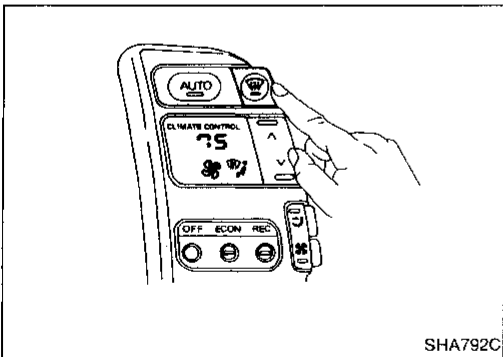
2. Check discharge air

- 1) Press mode switch one time.
Display should show air to face ().
- 2) Confirm that all discharge air comes out of face vents.
- 3) Press mode switch one more time.
Display should show air to face and foot (bi-level) ().
- 4) Confirm that discharge air comes out of face and foot vents.
- 5) Press mode switch one more time.
Display should show air to foot ().
- 6) Confirm that discharge air comes mostly from foot outlets, with some air from defroster outlets.
- 7) Press mode switch one more time.
Display should show air to foot and defroster ().
- 8) Confirm that discharge air comes out of foot vents and defroster vents.
- 9) Leave system in F/D mode.




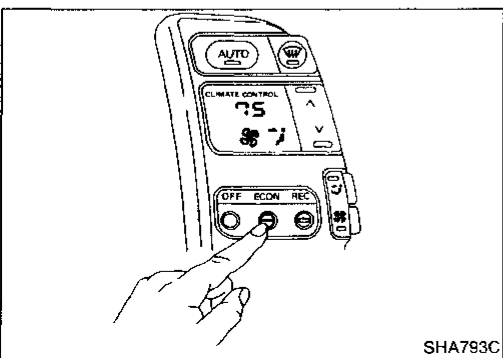
3. Check recirc

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



4. Check defrost

- 1) Press DEF switch.
- 2) Check that RECIRC, ECON, MODE and Fan are canceled.
The discharge air should be coming only from defrost vents.
- 3) Confirm that compressor clutch is engaged (visual inspection).
Display should show air to defroster ().

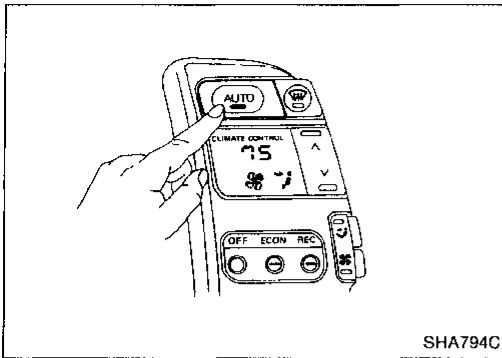


5. Check ECON mode

- 1) Press ECON switch.
Defrost should be canceled.
Discharge air outlet will depend on ambient, in-vehicle, and set temperatures.
- 2) Confirm that the compressor clutch is not engaged (visual inspection).

DIAGNOSES — Overall System

Operational Check — Auto Air Conditioner (Cont'd)



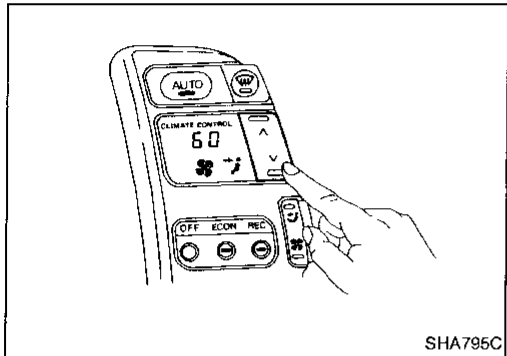
6. Check AUTO mode

- 1) Press AUTO switch.
- 2) Confirm that compressor clutch engages (audio or visual inspection).
Discharge air will depend on ambient, in-vehicle, and set temperatures.

GI

MA

EM



7. Check temperature decrease

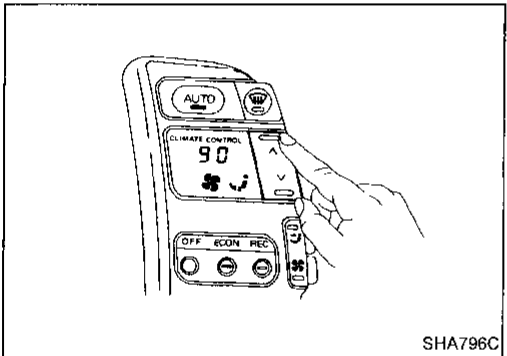
- 1) Press temperature set switch until 10°C (60°F) is displayed.
- 2) Listen for changes in blower speed as set temperature changes.
- 3) Check for cold air at discharge air outlets.

LC

EF &
EC

FE

CL



8. Check temperature increase

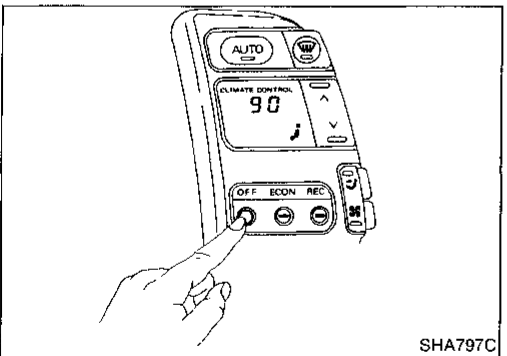
- 1) Press temperature set switch until 40°C (90°F) is displayed.
- 2) Listen for changes in blower speed as set temperature changes.
- 3) Check for hot air at discharge air outlets.

MT

AT

PD

FA



9. Check memory function

- 1) Press off button.
- 2) Turn ignition off.
- 3) Wait 15 seconds.
- 4) Turn ignition on.
- 5) Press AUTO button.
- 6) Confirm that the set temperature remained at 40°C (90°F).

RA

BR

ST

BF

HA

EL

IDX

Performance Chart

TEST CONDITION — For Manual Air Conditioner

Testing must be performed as follows:

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


Doors: Closed

Door windows: Open

Hood: Open

TEMP. lever position: Max. COLD

Mode switch:  (Ventilation) set

REC switch:  (Recirculation) set

FAN level position: Max. position

Engine speed: 1,500 rpm

Time required before starting testing after air conditioner starts operating: More than 10 minutes

TEST CONDITION — For Auto Air Conditioner

Testing must be performed as follows:

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

Doors: Closed

Door windows: Open

Hood: Open



Set up ACTIVE-TEST with CONSULT and set each component as follows:

Mode door: VENT

Intake door: REC

Air mix door: Full-cold

Compressor: ON

Blower motor: 12V



Set up self-diagnosis STEP 2 and set code 

DIAGNOSES — Overall System

Performance Chart (Cont'd)

TEST READING

Recirculating-to-discharge air temperature table

Inside air(Recirculating air) at blower assembly inlet		Discharge air temperature at center ventilator °C (°F)	
Relative humidity %	Air temperature °C (°F)		
50 - 60	20 (68)	5.8 - 7.5 (42 - 46)	GI
	25 (77)	9.3 - 11.0 (49 - 52)	MA
	30 (86)	13.9 - 15.8 (57 - 60)	EM
	35 (95)	18.8 - 20.9 (66 - 70)	LC
	40 (104)	23.3 - 25.5 (74 - 78)	
60 - 70	20 (68)	7.5 - 9.0 (46 - 48)	EF & EC
	25 (77)	11.0 - 13.0 (52 - 55)	
	30 (86)	15.8 - 17.0 (60 - 63)	FE
	35 (95)	20.9 - 22.6 (70 - 73)	
	40 (104)	22.5 - 27.3 (73 - 81)	

Ambient air temperature-to-compressor pressure table

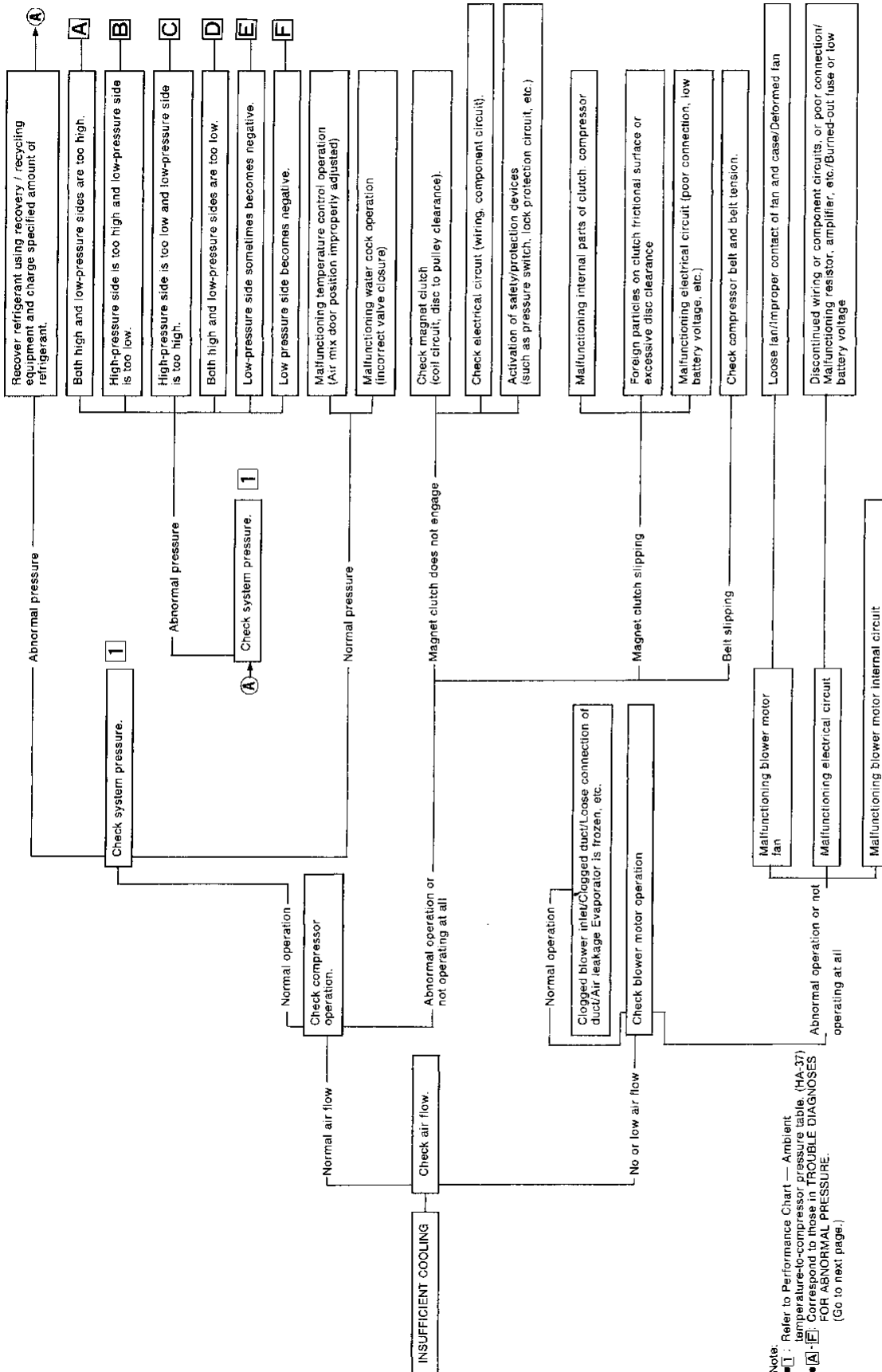
Ambient air		High-pressure (Discharge side) kPa (kg/cm ² , psi)	Low-pressure (Suction side) kPa (kg/cm ² , psi)	
Relative humidity %	Air temperature °C (°F)			
50 - 70	20 (68)	1,030 - 1,245 (10.5 - 12.7, 149 - 181)	181.4 - 221.6 (1.85 - 2.26, 26.3 - 32.1)	AT
	25 (77)	1,118 - 1,373 (11.4 - 14.0, 162 - 199)	185.4 - 226.5 (1.89 - 2.31, 26.9 - 32.8)	PD
	30 (86)	1,344 - 1,638 (13.7 - 16.7, 195 - 237)	220.7 - 269.7 (2.25 - 2.75, 32.0 - 39.1)	FA
	35 (95)	1,569 - 1,922 (16.0 - 19.6, 228 - 279)	269.7 - 328.5 (2.75 - 3.35, 39.1 - 47.6)	RA
	40 (104)	1,814 - 2,207 (18.5 - 22.5, 263 - 320)	314 - 382 (3.2 - 3.9, 46 - 55)	

HA

EL

IDX

Performance Test Diagnoses INSUFFICIENT COOLING

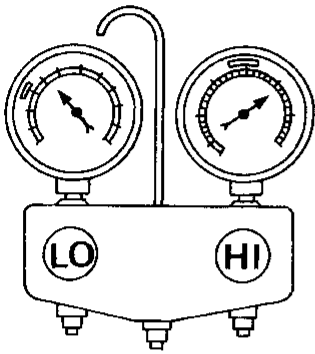


DIAGNOSES — Overall System

Performance Test Diagnoses (Cont'd)

TROUBLE DIAGNOSES FOR ABNORMAL PRESSURE

Whenever there is abnormal pressure of high and/or low sides of the system, diagnosis must be conducted by using a manifold gauge. The large-line zone on the gauge scale (see illustrations.) shown in the following table refers to the standard (normal) pressure range for the corresponding pressure side (high or low). Since the standard (normal) pressure, however, differs from vehicle to vehicle, refer to the "Ambient air temperature-to-compressor pressure" table.

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
<p>Both high and low-pressure sides are too high.</p> <p>A</p>  <p style="text-align: right; margin-right: 100px;">AC359A</p>	<ul style="list-style-type: none"> ● Pressure is reduced soon after water is splashed on condenser. ● No air bubbles appear in sight glass when pressure is reduced. <p>Air suction by cooling fan is insufficient.</p> <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>Engine tends to overheat.</p> <ul style="list-style-type: none"> ● Areas near low-pressure pipe connection and service valves are considerably cold compared with areas near expansion valve outlet or evaporator. ● Plates are sometimes covered with frost. 	<p>Excessive refrigerant charge in refrigeration cycle</p> <p>Insufficient condenser cooling performance</p> <p style="text-align: center;">↓</p> <p>① Condenser fins are clogged.</p> <p>② Improper rotation of cooling fan</p> <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>Engine cooling systems malfunction.</p> <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> <p>① Improper thermal valve installation</p> <p>② Improper expansion valve adjustment</p>	<p>Reduce refrigerant until specified pressure is obtained.</p> <ul style="list-style-type: none"> ● Clean condenser. ● Check and repair cooling fan as necessary. <p>Evacuate repeatedly and recharge system.</p> <p>Replace expansion valve.</p>

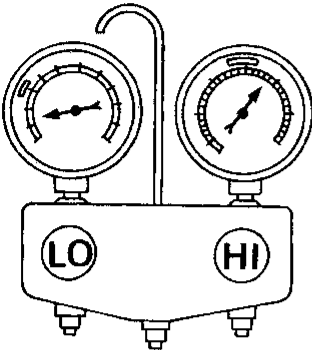
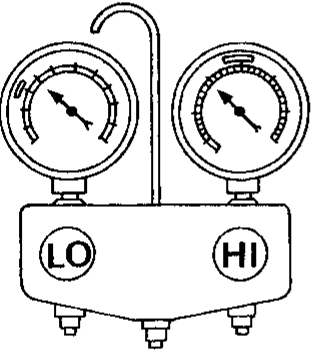
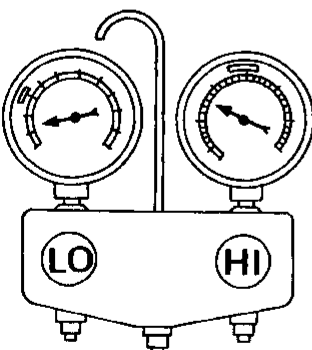
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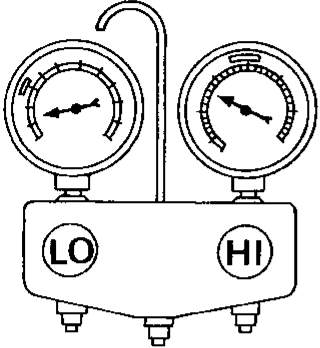
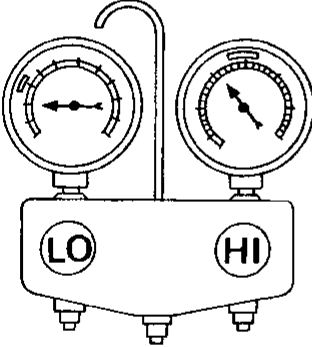
DIAGNOSES — Overall System

Performance Test Diagnoses (Cont'd)

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; font-size: small;">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 compressor oil for contamination.
<p>High-pressure side is too low and low-pressure side is too high.</p> <p>C</p>  <p style="text-align: right; font-size: small;">AC356A</p>	<p>High and low-pressure sides become equal soon after compressor operation stops.</p>	<p>Compressor pressure operation is improper.</p> <p style="text-align: center;">↓</p> <p>Damaged inside compressor packings</p>	<p>Replace compressor.</p>
<p>Both high-and low-pressure sides are too low.</p> <p>D</p>  <p style="text-align: right; font-size: small;">AC353A</p>	<ul style="list-style-type: none"> ● There is a big temperature difference between liquid tank outlet and inlet. Outlet temperature is extremely low. ● Liquid tank inlet and expansion valve are frosted. 	<p>Liquid tank inside is clogged a little.</p>	<ul style="list-style-type: none"> ● Replace liquid tank ● Check compressor oil 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 liquid tank and expansion valve is clogged.</p>	<ul style="list-style-type: none"> ● Check and repair malfunctioning parts. ● Check compressor oil for contamination.

DIAGNOSES — Overall System

Performance Test Diagnoses (Cont'd)

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
<p>Both high and low-pressure sides are too low.</p> <p>D</p>  <p style="text-align: right; font-size: small;">AC353A</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> <p>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 compressor oil for contamination.
	<p>Areas near low-pressure pipe connection and service valve are extremely cold as compared with areas near expansion valve outlet and evaporator.</p>	<p>Low-pressure pipe is clogged or crushed.</p>	<ul style="list-style-type: none"> ● Check and repair malfunctioning parts. ● Check compressor oil 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>
<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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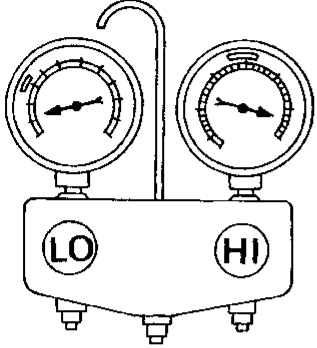
HA

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DIAGNOSES — Overall System

Performance Test Diagnoses (Cont'd)

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
<p>Low-pressure side becomes negative.</p> <p>F</p>  <p style="text-align: right; margin-right: 50px;">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>After the system is left at rest, start it again in order to confirm whether or not problem is caused by water or foreign particles.</p> <ul style="list-style-type: none"> ● If the problem is due to water, drain water from refrigerant or replace refrigerant. ● If it is due to foreign particles, remove expansion valve and remove them with dry and compressed air. ● If either of the above methods cannot correct the problem, replace expansion valve. ● Replace liquid tank. ● Check compressor oil for contamination.

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PRELIMINARY CHECK 3 (Magnet clutch does not engage in FOOT & DEF or DEF modes)	HA-47	
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Electrical Component Inspection	HA-69	
Control Linkage Adjustment	HA-71	RA

BR

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IDX

Symptom Chart

DIAGNOSTIC TABLE

PROCEDURE	Preliminary check						Diagnostic Procedure						Main power supply and Ground circuit check		Electrical components inspection													
	HA-45	HA-46	HA-47	HA-47	HA-48	HA-48	HA-55	HA-57	HA-59	HA-60	HA-64	HA-68	HA-54	HA-54	HA-69	HA-69	HA-69	HA-70	HA-70	HA-70	HA-71	HA-71	—	—	—	—	—	
REFERENCE PAGE																												
SYMPTOM	Preliminary check 1	Preliminary check 2	Preliminary check 3	Preliminary check 4	Preliminary check 5	Preliminary check 6	Diagnostic procedure 1	Diagnostic procedure 2	Diagnostic procedure 3	Diagnostic procedure 4	Diagnostic procedure 5	Diagnostic procedure 6	Control amp.	Fuses	Fan switch	Blower motor	Blower resistor	A/C switch	Dual-pressure switch	Relays	Mode switch	Thermo control amp.	Air mix door motor	Mode door motor	Intake door motor	Compressor	Harness	
A/C does not blow cold air.		①					○			○		○	○	○					○	○						○	○	
Insufficient heating						①	○					○	○	○									○				○	
Blower motor does not rotate.		①					②						○	○			○	○										○
Air outlet does not change.				①				②					○	○							○				○			○
Intake door does not change in VENT, B/L or FOOT modes.									①				○	○											○			○
Intake door is not set at "FRESH" in DEF mode.	①								○				○	○											○			○
Magnet clutch does not engage when A/C switch and fan switch are ON.		①								②									○	○			○				○	
Magnet clutch does not engage in FOOT & DEF or DEF mode.		①	②							○									○	○	○						○	○
Illumination or indicators on switch panel do not come on.											①			○														○
Noise					①																							○

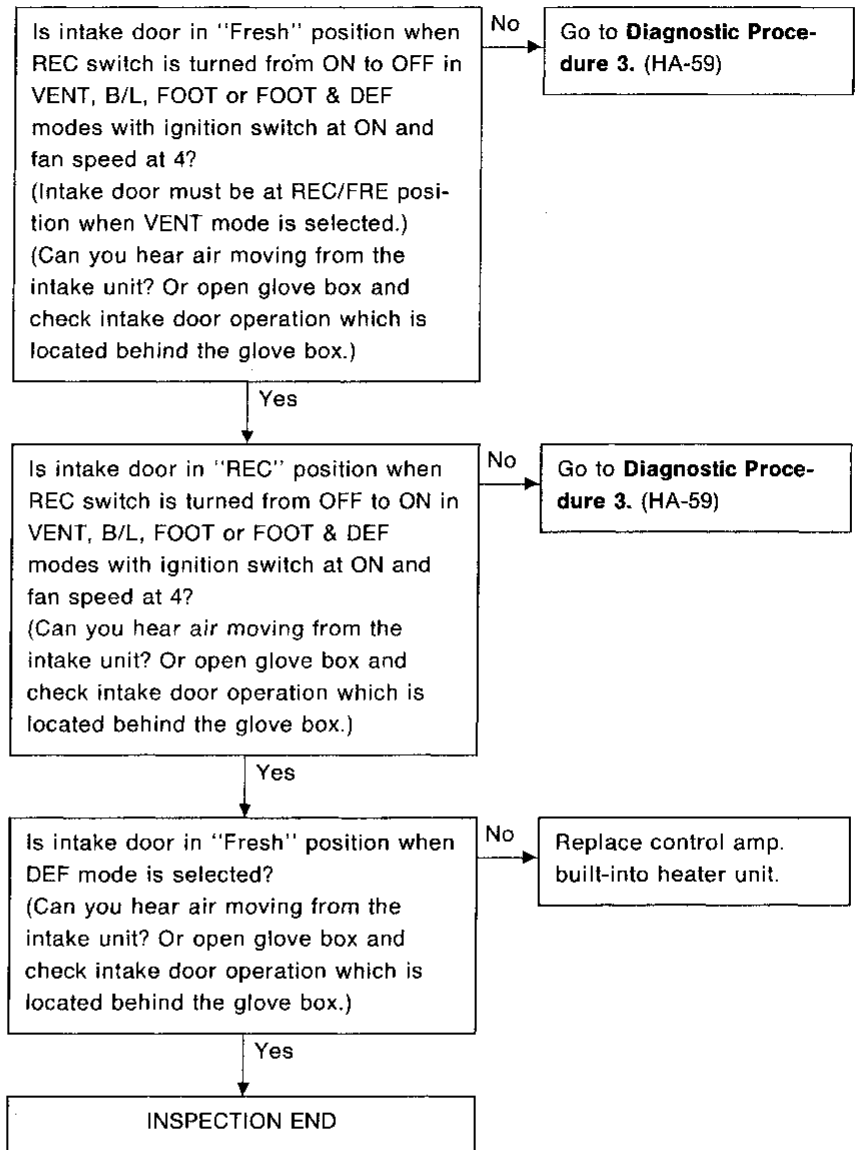
①, ②: The number means checking order.

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

Preliminary Check

PRELIMINARY CHECK 1

Intake door is not set at "FRESH" in DEF mode.



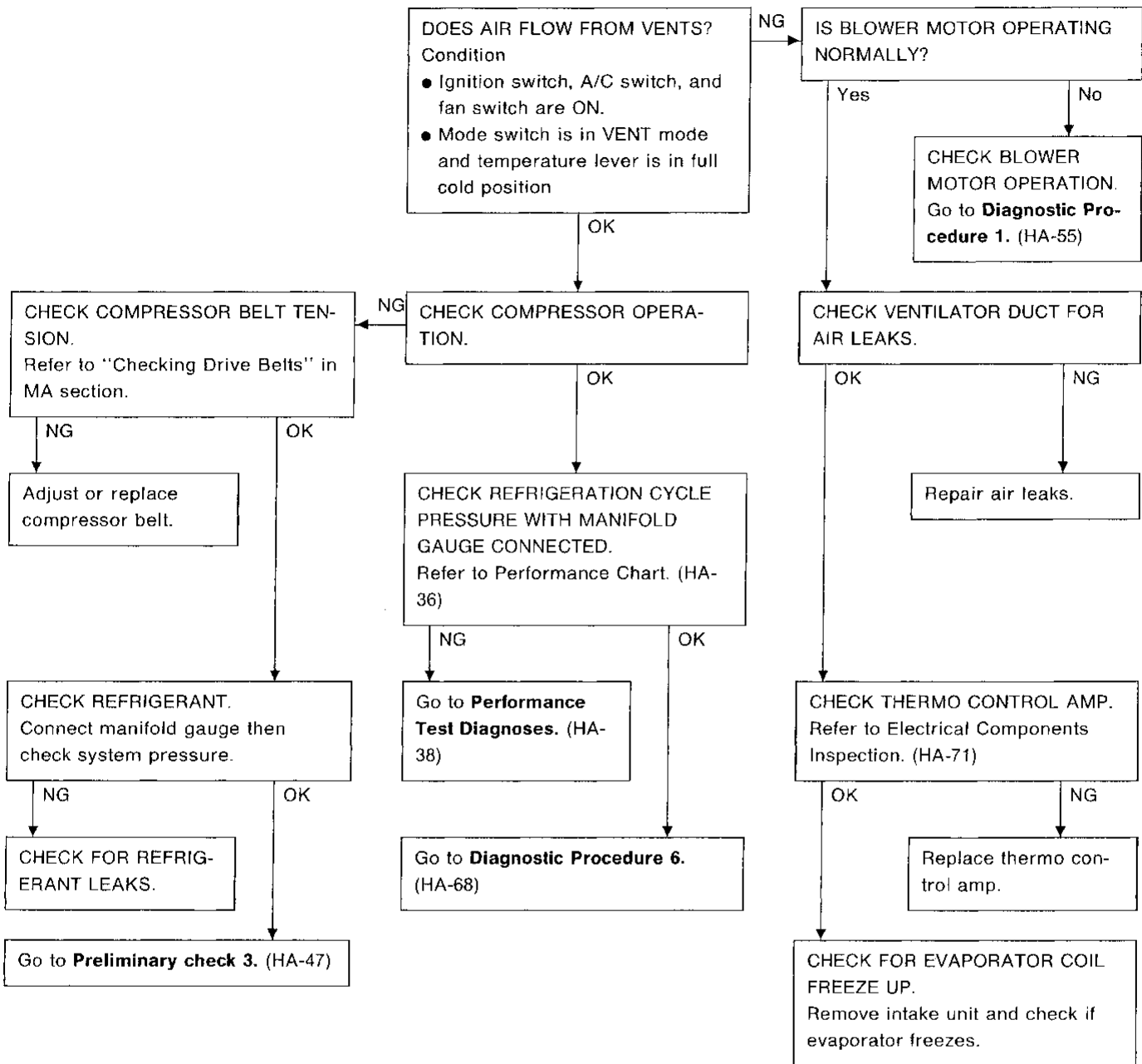
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TROUBLE DIAGNOSES — Manual Air Conditioner

Preliminary Check (Cont'd)

PRELIMINARY CHECK 2

A/C does not blow cold air.



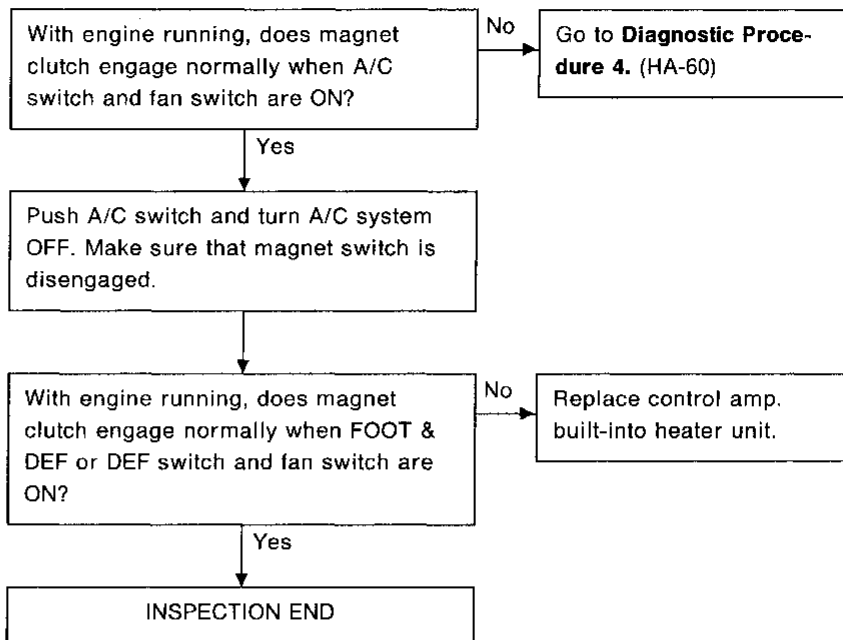
TROUBLE DIAGNOSES — Manual Air Conditioner

Preliminary Check (Cont'd)

PRELIMINARY CHECK 3

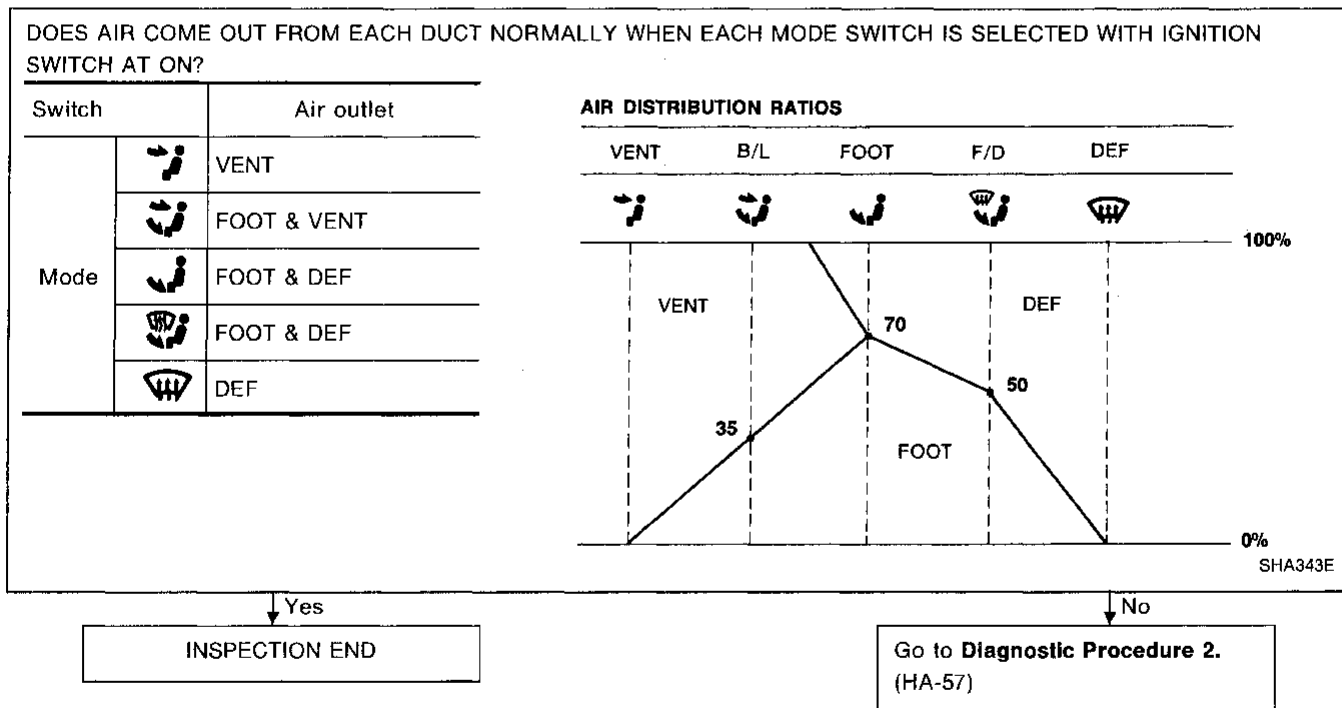
Magnet clutch does not engage in FOOT & DEF or DEF modes.

- Perform PRELIMINARY CHECK 2 and 4 before referring to the following flow chart.



PRELIMINARY CHECK 4

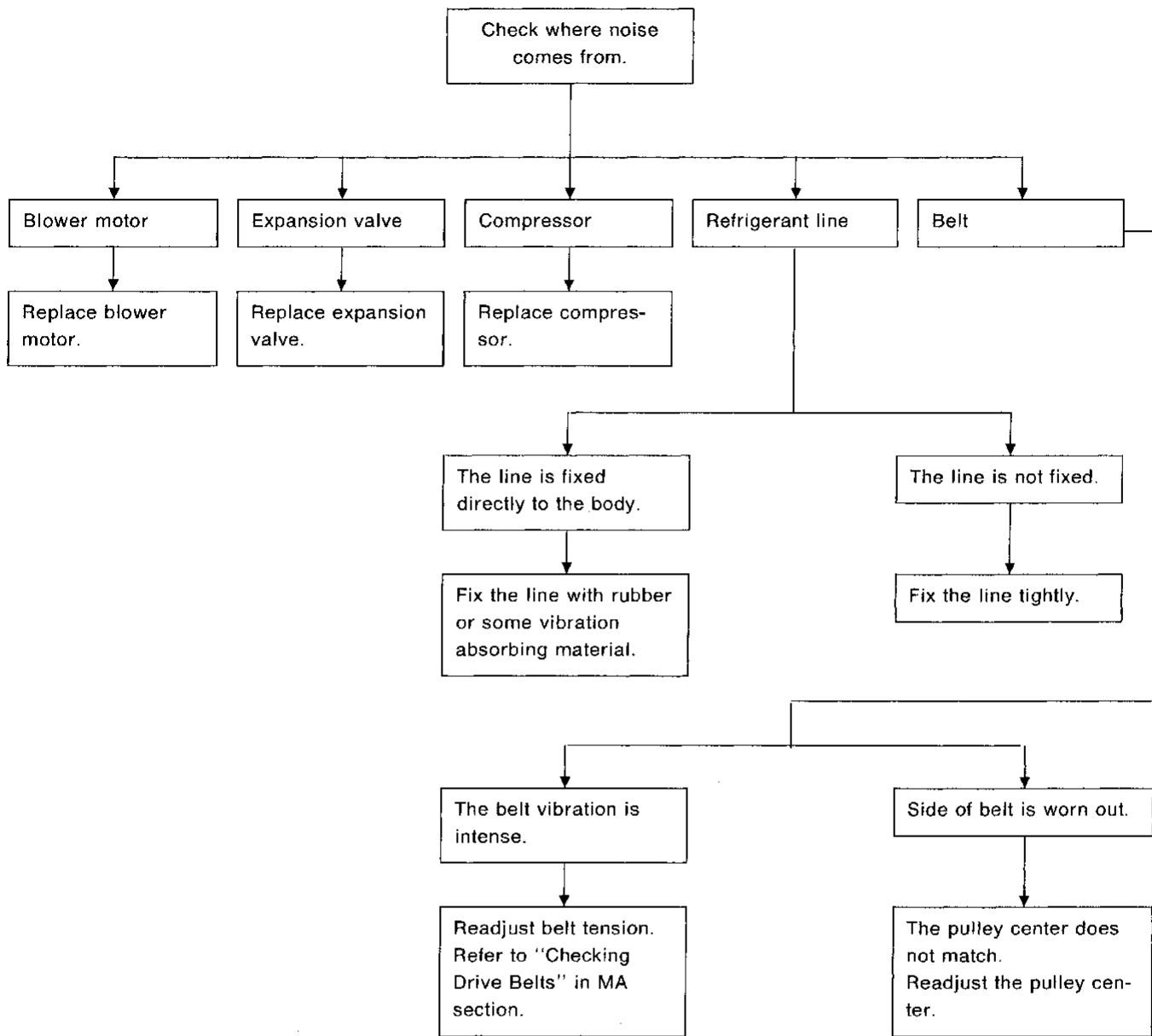
Air outlet does not change.



Preliminary Check (Cont'd)

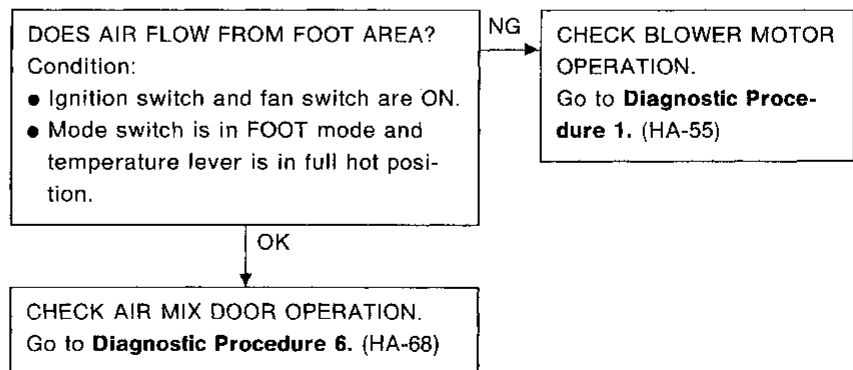
PRELIMINARY CHECK 5

Noise



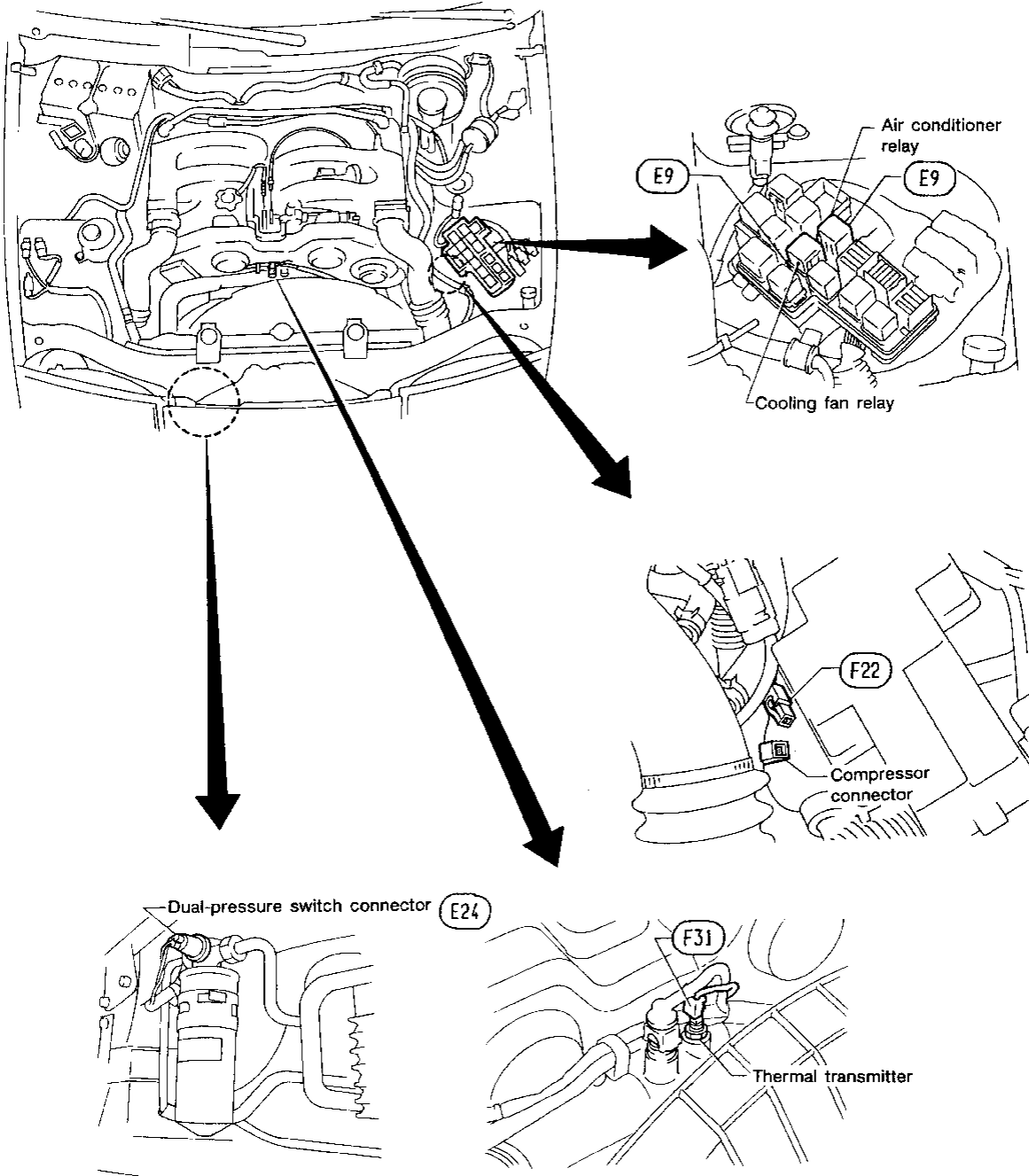
PRELIMINARY CHECK 6

Insufficient heating



Harness Layout for A/C System

ENGINE COMPARTMENT

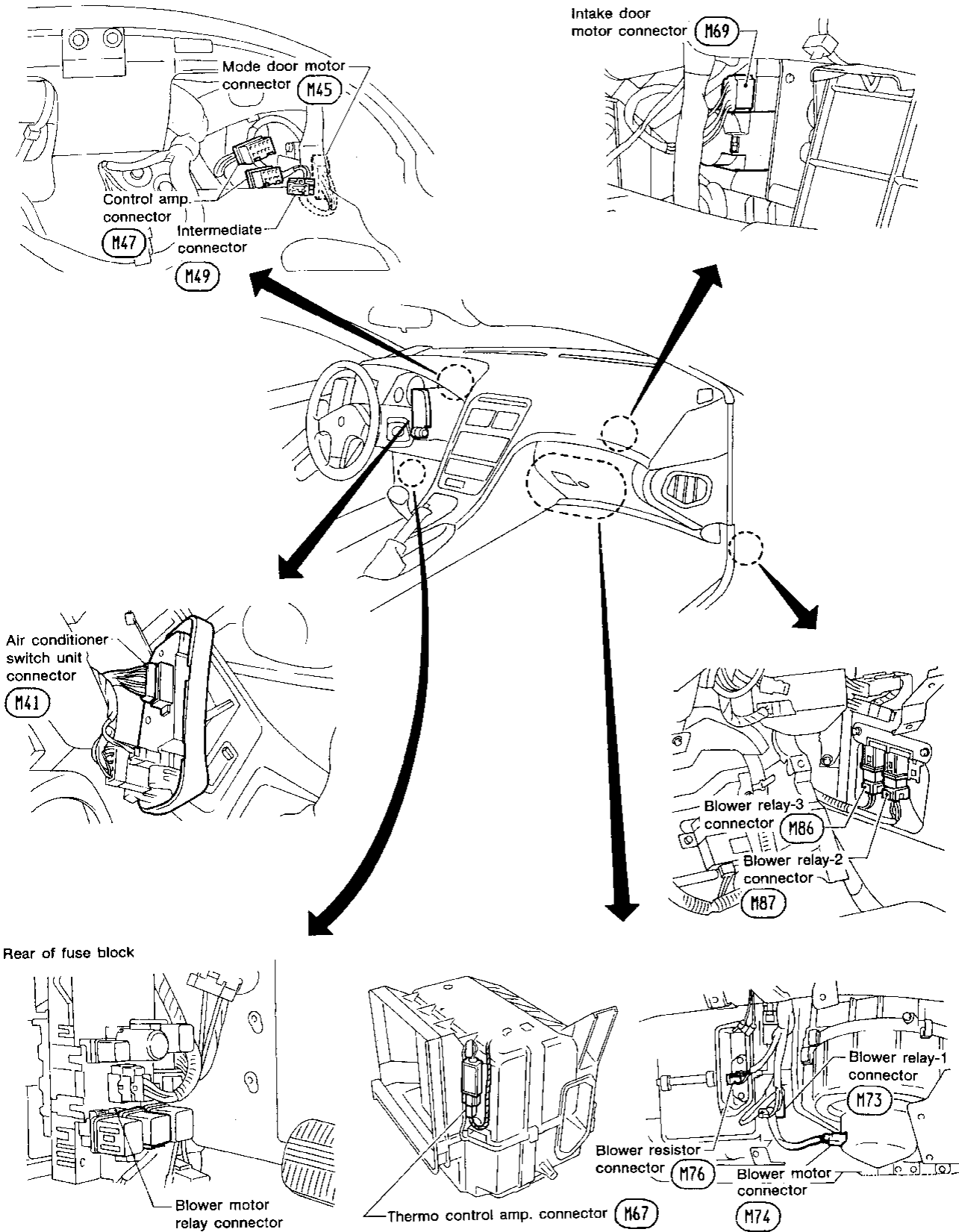


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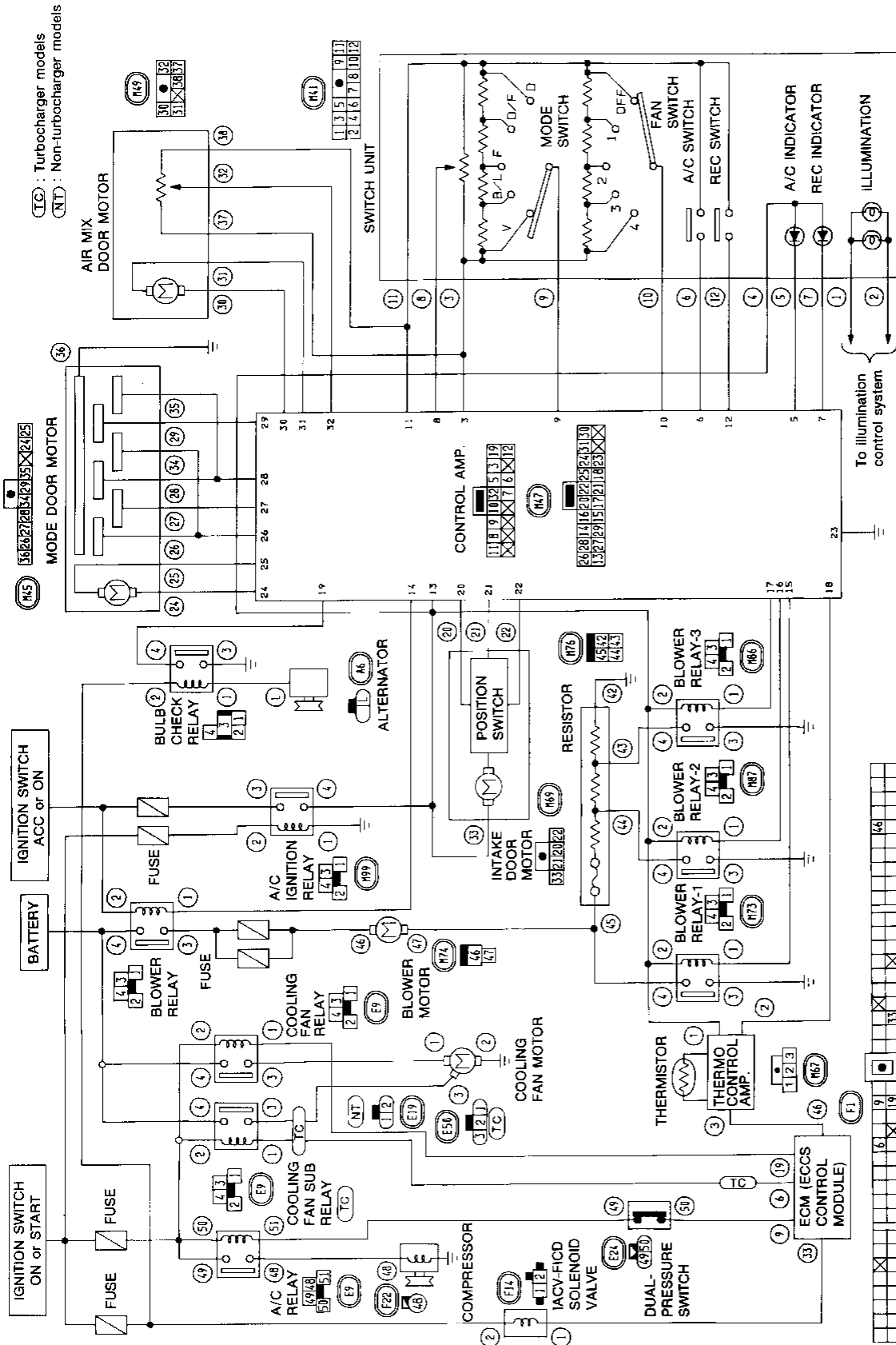
TROUBLE DIAGNOSES — Manual Air Conditioner

Harness Layout for A/C System (Cont'd)

PASSENGER COMPARTMENT



Circuit Diagram for Quick Pinpoint Check

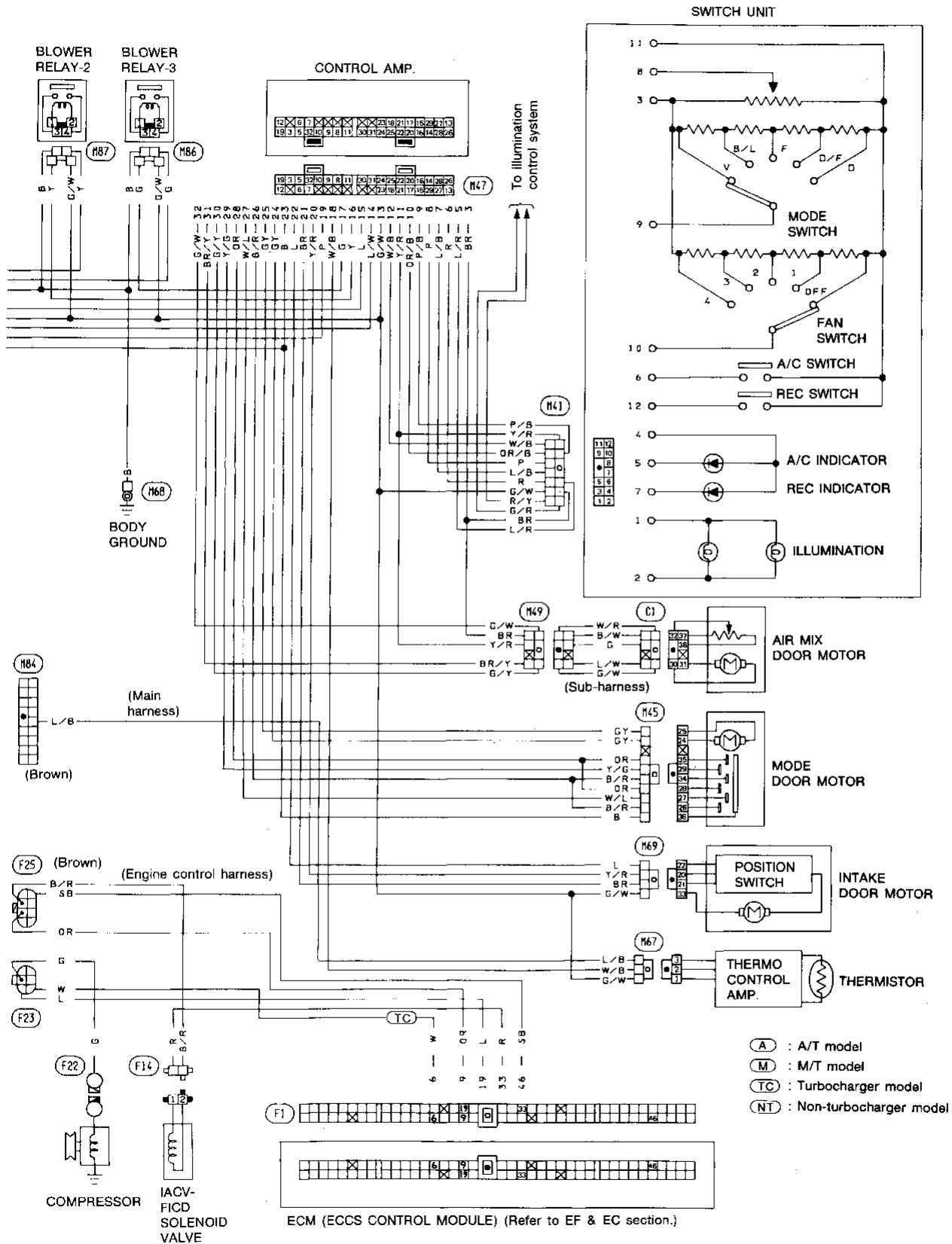


- All connectors shown in this illustration are unit side connectors.
- The unit side connectors with a double circle "⊖" are connected to the harness side connectors shown in the "Harness Layout for A/C System". (See pages HA-49 - HA-50.)
- The terminal numbers in the connector coincide with the circuit numbers surrounded by a single circle "○".

GI
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TROUBLE DIAGNOSES — Manual Air Conditioner

Wiring Diagram (Cont'd)



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

Check power supply circuit for air conditioning system.

Refer to "POWER SUPPLY ROUTING" in section EL and Wiring Diagram.

CONTROL AMP. REMOVAL

1. Remove driver side instrument lower lid.
2. Remove vent duct.
3. Remove control amp. with harness connected.

CONTROL AMP. CHECK

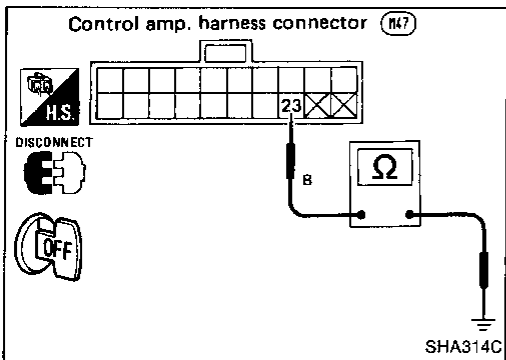
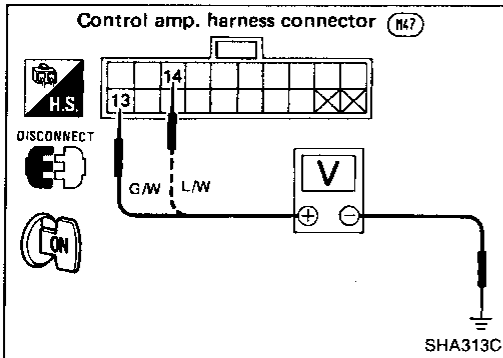
1. Disconnect control amp. harness connector.
2. Connect voltmeter from harness side.
3. Measure voltage across terminal No. ⑬ or No. ⑭ and body ground.

Voltmeter terminal		Voltage
⊕	⊖	
⑬	Body ground	Approximately 12V
⑭		

Check body ground circuit for control amp. with ignition switch OFF.

1. Disconnect control amp. harness connector.
2. Connect ohmmeter from harness side.
3. Check continuity between terminal No. ⑳ and body ground.

Ohmmeter terminal		Continuity
⊕	⊖	
⑳	Body ground	Yes

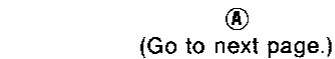
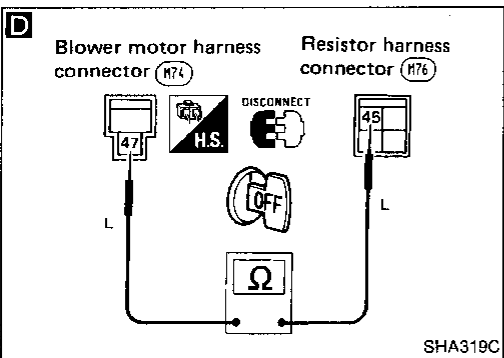
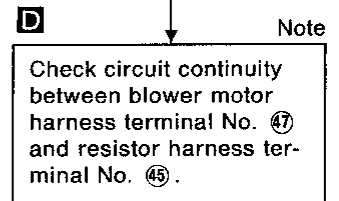
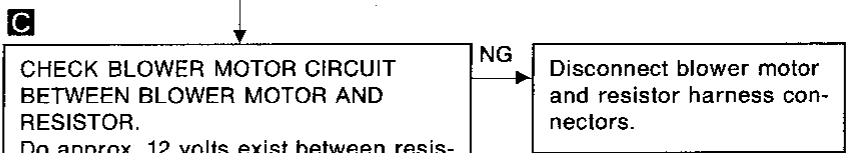
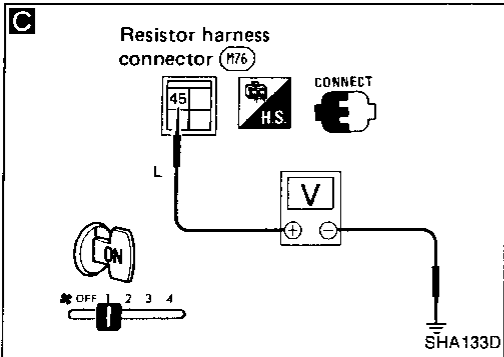
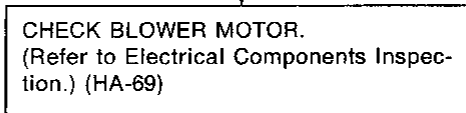
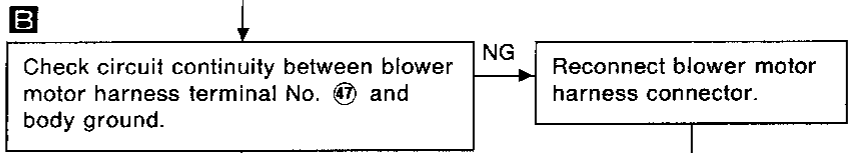
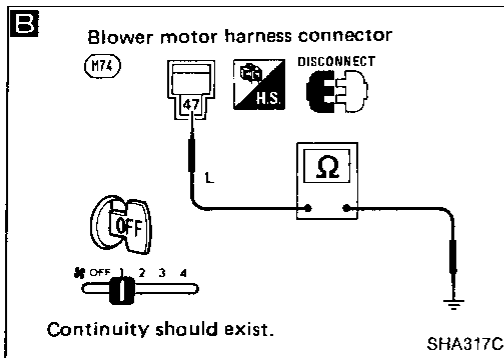
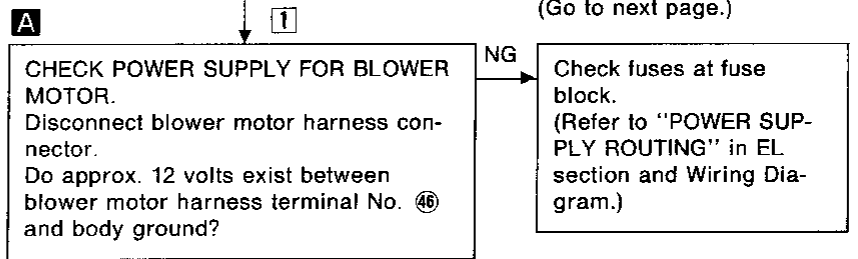
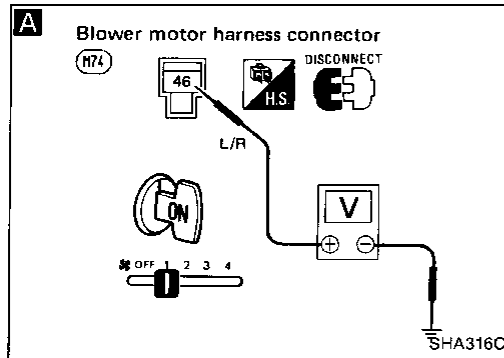
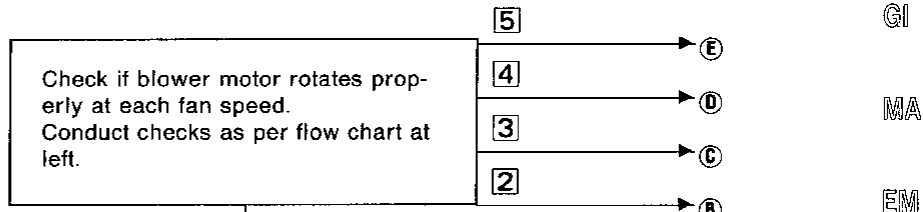


INCIDENT	Flow chart No.
1 Fan fails to rotate.	1
2 Fan does not rotate at 1-speed.	2
3 Fan does not rotate at 2-speed.	3
4 Fan does not rotate at 3-speed.	4
5 Fan does not rotate at 4-speed.	5

Diagnostic Procedure 1

SYMPTOM: Blower motor does not rotate.

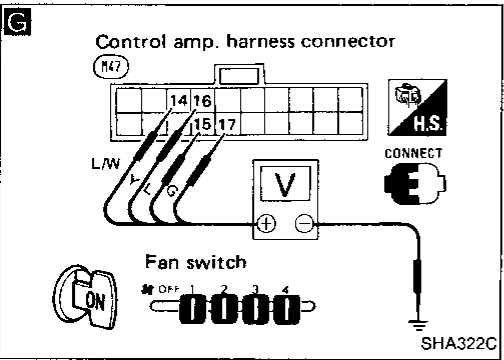
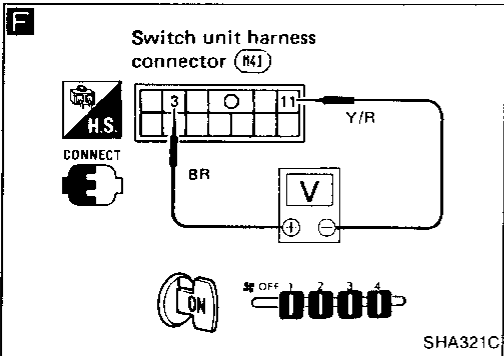
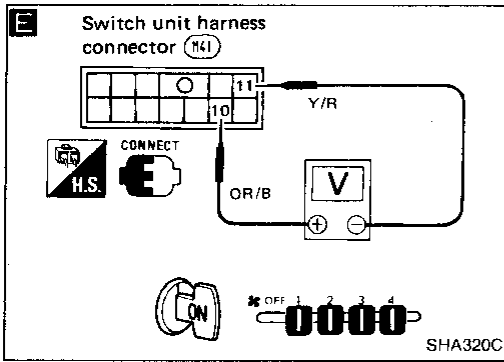
- Perform **PRELIMINARY CHECK 2** before referring to the following flow chart.



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

GI
MA
EM
LC
EF & EC
FE
CL
MT
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HA
EL
IDX

Diagnostic Procedure 1 (Cont'd)



1

2

3

4

A

B

C

D

OK

NG

Replace resistor.

Reconnect resistor harness connector.

1

2

3

4

5

E

CHECK FAN SWITCH CIRCUIT.
Do normal volts exist between switch unit harness connector terminals?

Flow chart No. (Fan SW position)	Terminal No.		Normal voltage (Approx.)
	⊕	⊖	
2 (1)			2V
3 (2)			3V
4 (3)	Ⓣ	Ⓣ	4V
5 (4)			5V

OK

NG

F

Do approx. 5 volts exist between control panel terminal No. ③ and No. ①?

Replace fan switch.

G

CHECK CONTROL AMP. HARNESS TERMINAL VOLTAGE.
Do approx. 12 volts or 0 volts exist between control amp. harness terminal No. ⑭, ⑮, ⑯ or ⑰ and body ground?

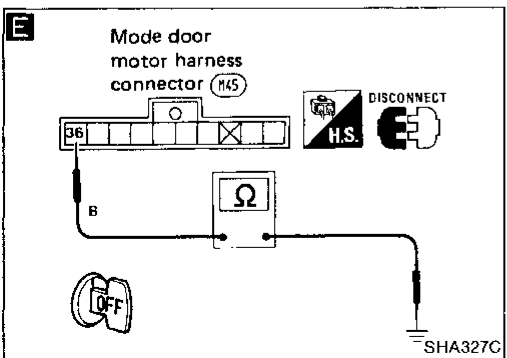
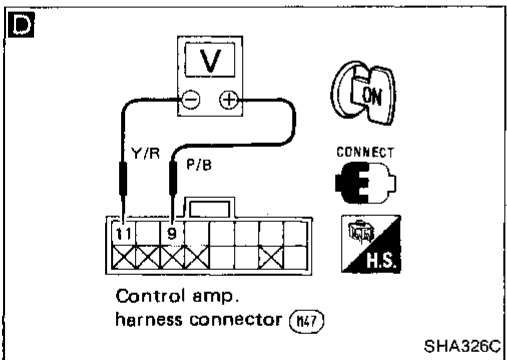
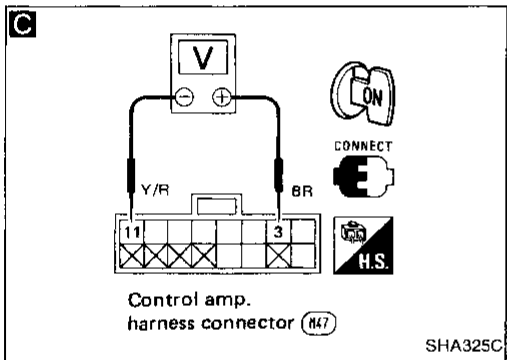
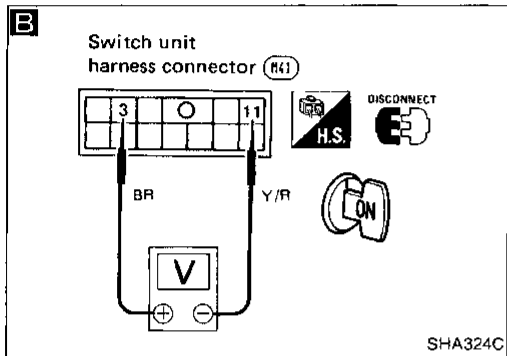
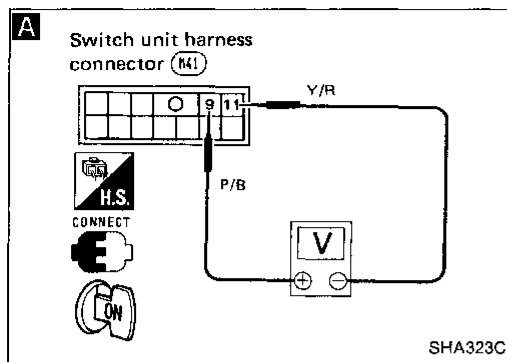
NG

Replace control amp.

Flow chart No.	Terminal No.	Fan SW operation	
		ON	OFF
2	⑭	0V	Approx. 12V
3	⑰	0V	Approx. 12V
4	⑯	0V	Approx. 12V
5	⑮	0V	Approx. 12V

OK

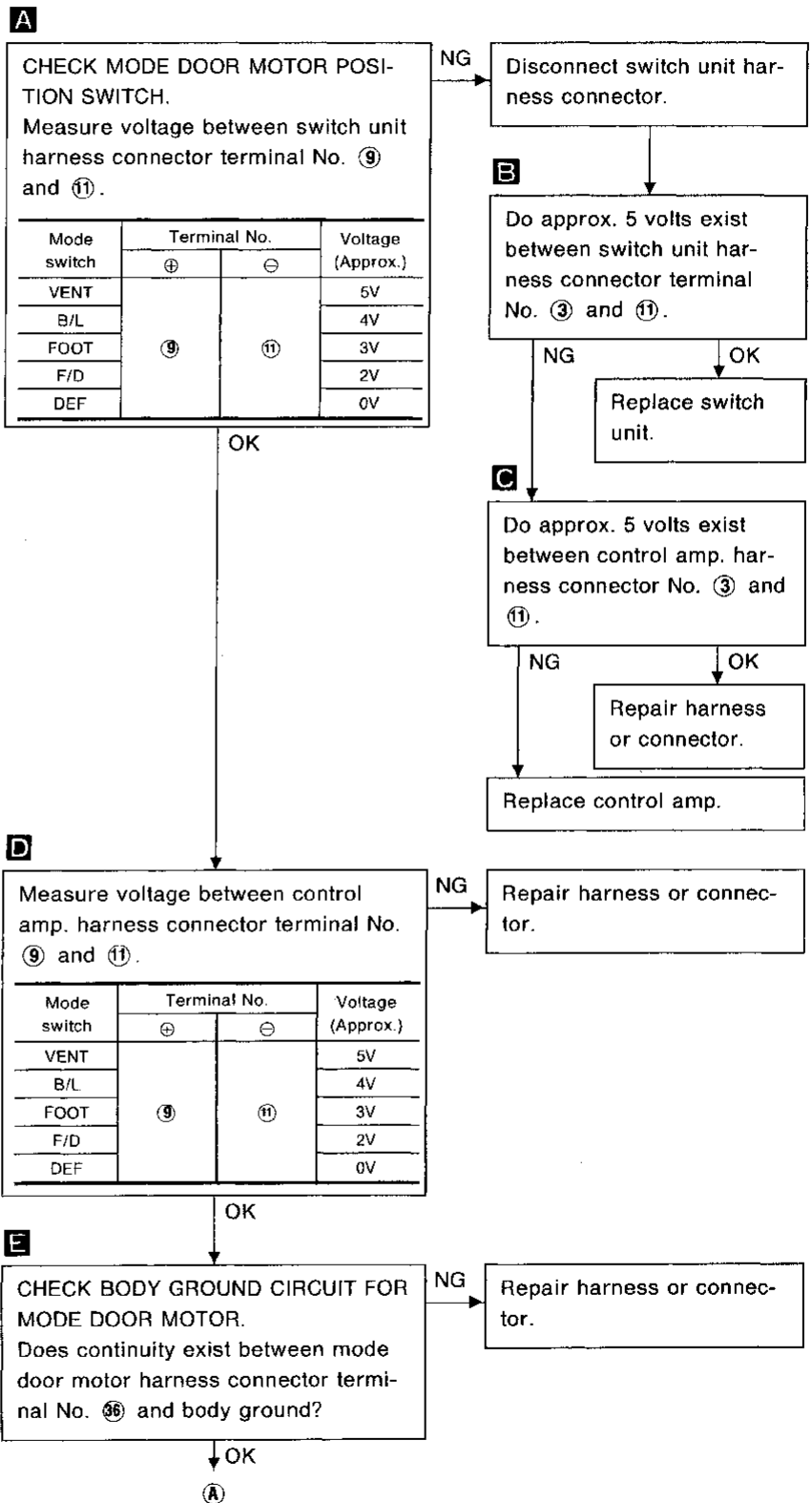
Replace blower motor.



Diagnostic Procedure 2

SYMPTOM: Air outlet does not change.

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



GI

MA

EM

LC

EF & EC

FE

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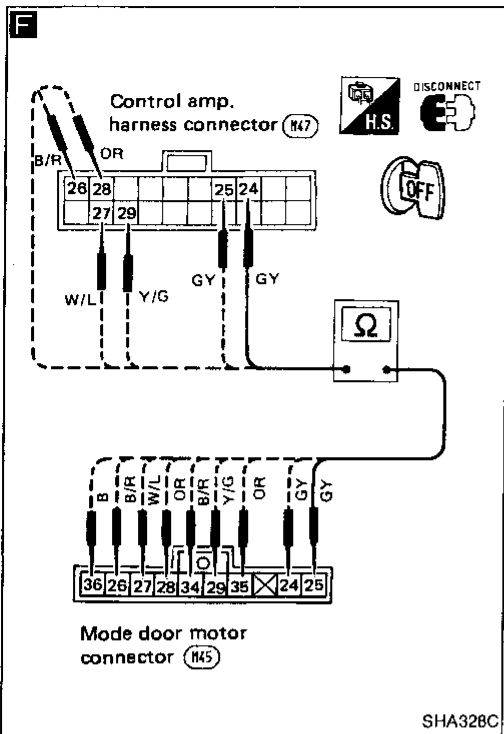
HA

EL

IDX

TROUBLE DIAGNOSES — Manual Air Conditioner

Diagnostic Procedure 2 (Cont'd)

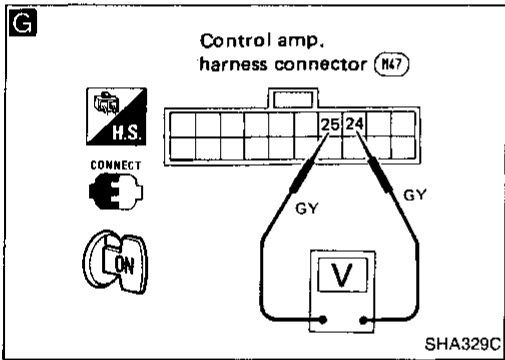


F

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

Terminal No.		Continuity
Control amp.	Mode door motor	
24	24	Yes
25	25	
26	26 and 34	
27	27	
28	28 and 35	
29	29	

NG → Repair harness or connector.



G

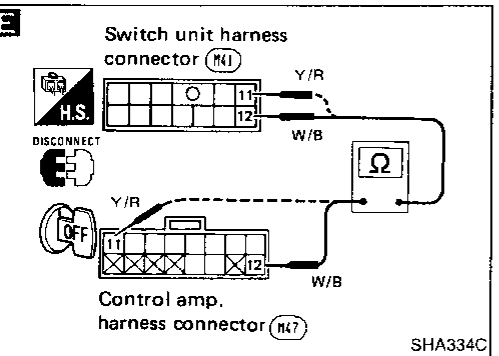
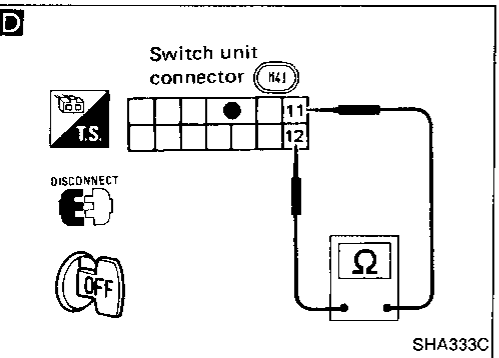
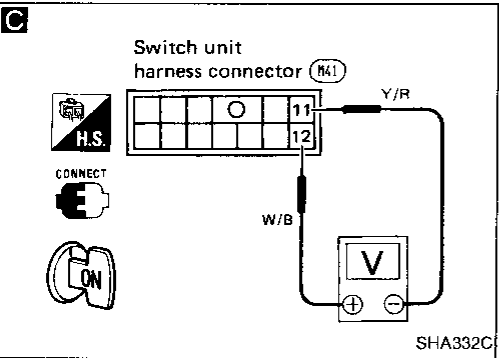
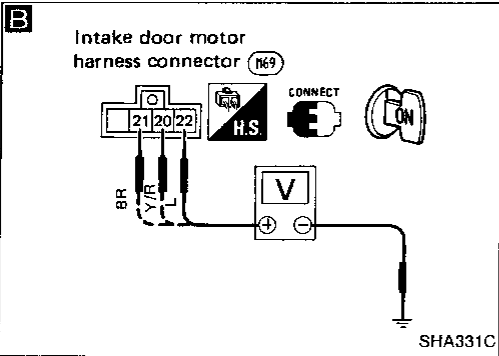
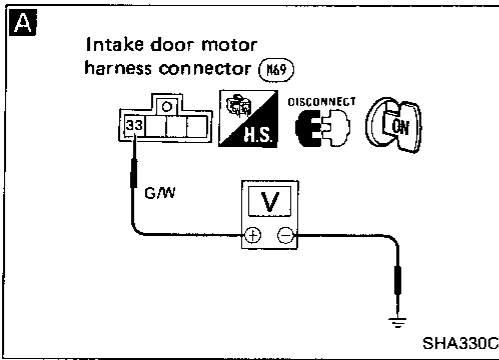
CHECK FOR OUTPUT OF CONTROL AMP.

Do approx. 12 volts exist between control amp. harness terminal No. 24 and 25 when mode is switched from "VENT" to "DEF" or when mode is switched from "DEF" to "VENT"?

Terminal No.		Mode door motor	
24	25	Mode door operation	Direction of linkage rotation
⊖	⊕	VENT → DEF	Clockwise
⊕	⊖	DEF → VENT	Counter-clockwise

NG → Replace control amp.

OK → Replace mode door motor.



Diagnostic Procedure 3

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

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

A

CHECK POWER SUPPLY FOR INTAKE DOOR MOTOR.
Disconnect intake door motor harness connector.
Do approx. 12 volts exist between intake door motor harness terminal No. ③③ and body ground?

B

Select VENT mode and check the voltage between intake door motor harness terminal No. ②①, ②①, ②② and body ground.

A/C switch	REC switch	Mode	Terminal voltage (Approx.)		
			②①	②①	②②
ON	ON	REC	12V	12V	0V
ON	OFF	REC/ FRE	12V	0V	12V
OFF	OFF	FRE	0V	12V	12V

C

Check the voltage between control panel harness connector terminal No. ⑫ and ⑪.

A/C switch	Terminal No.		Voltage (Approx.)
	⑫	⑪	
Switch pressed	⊕	⊖	0V
Switch free	⊕	⊖	5V

Replace intake door motor.

Replace control amp.

D

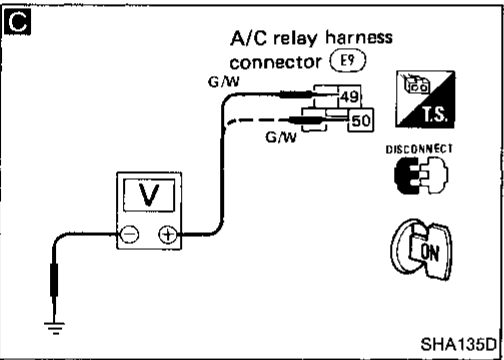
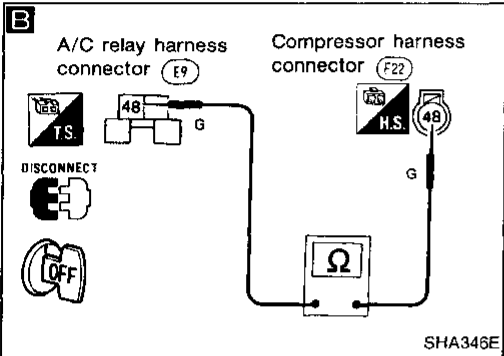
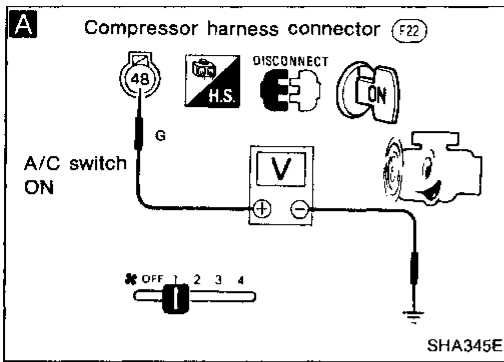
Check circuit continuity between control panel terminal No. ⑫ and ⑪.

REC switch	Continuity between terminal No. ⑫ and ⑪
Switch pressed	Yes
Switch free	No

E

Check circuit continuity between control panel harness terminal No. ⑫ (⑪) and control amp. harness terminal No. ⑫ (⑪).

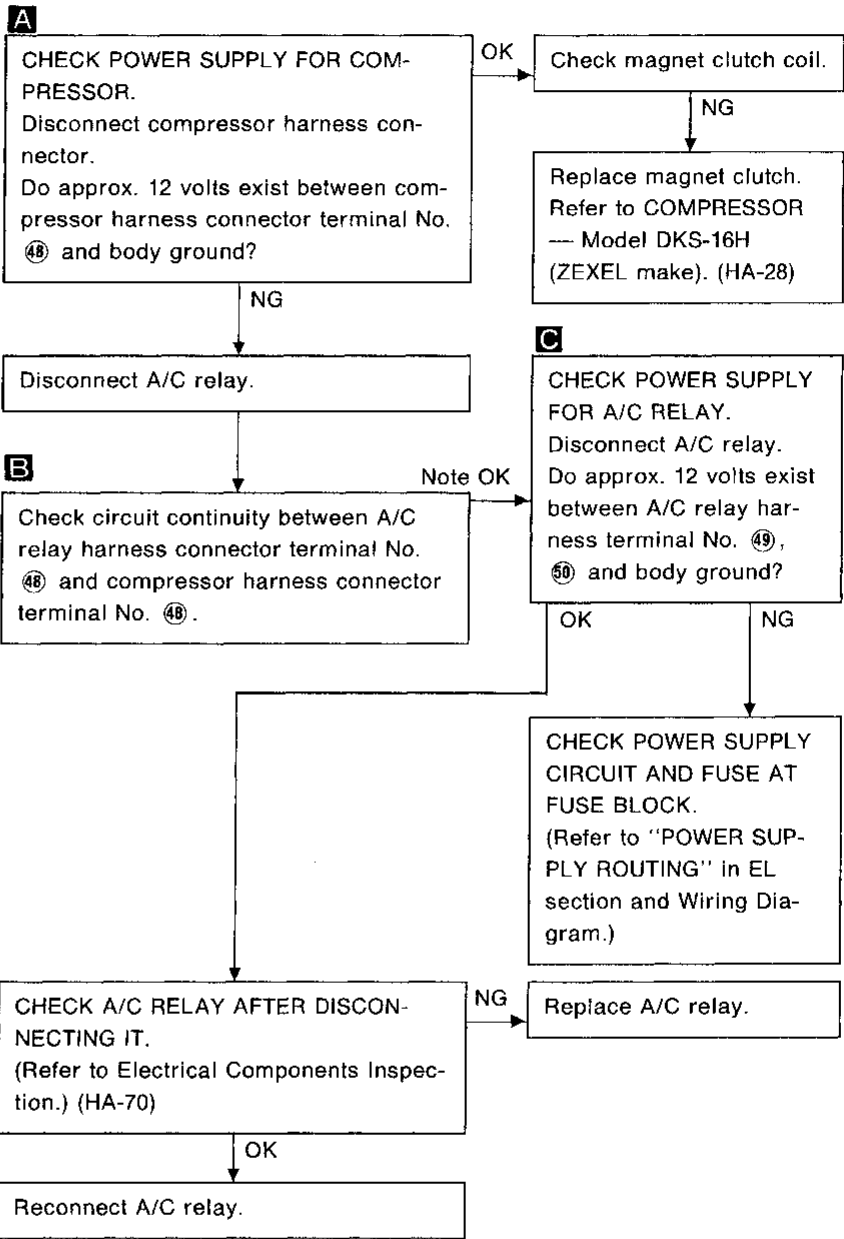
Replace control amp.



Diagnostic Procedure 4

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

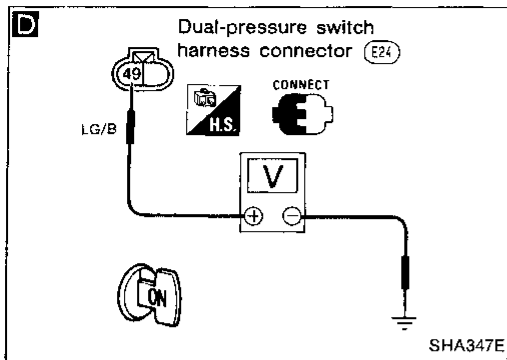
- Perform **PRELIMINARY CHECK 2** before referring to the following flow chart.



(Go to next page.)

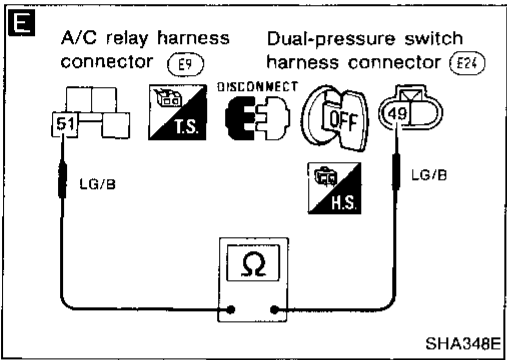
Note:
If the result is NG after checking circuit continuity, repair harness or connector.

Diagnostic Procedure 4 (Cont'd)



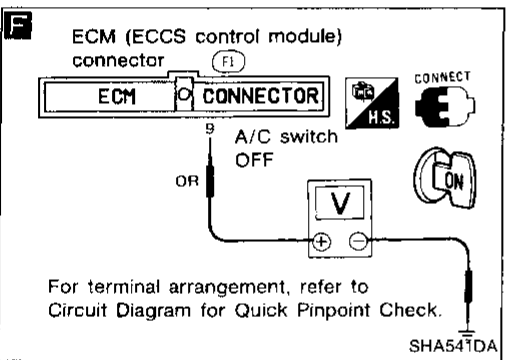
D CHECK COIL SIDE CIRCUIT OF A/C RELAY.
Do approx. 12 volts exist between dual-pressure switch harness connector terminal No. 49 and body ground?

E Check circuit continuity between A/C relay harness connector terminal No. 51 and dual-pressure switch harness connector terminal No. 49.



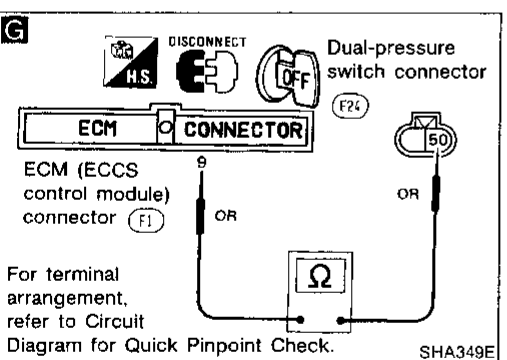
F Do approximately 12 volts exist between ECM (ECCS control module) harness terminal No. 9 and body ground?

G Check circuit continuity between dual-pressure switch harness connector terminal No. 50 and ECM (ECCS control module) harness connector terminal No. 9.



Note CHECK DUAL-PRESSURE SWITCH.
(Refer to Electrical Components Inspection.) (HA-70)

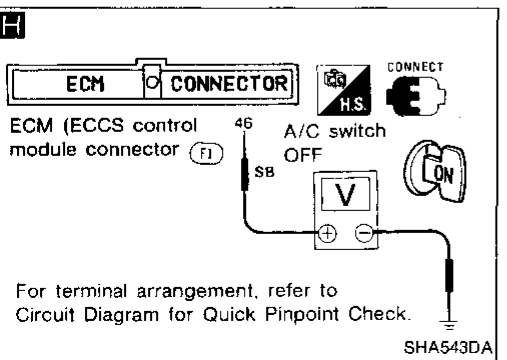
Replace dual-pressure switch.



H Do more than 8 volts exist between ECM (ECCS control module) harness connector terminal No. 46 and body ground?

CH CHECK ECM (ECCS control module).
(Refer to EF & EC section.)

Disconnect ECM (ECCS control module) harness connector and thermo. amp. harness connector.

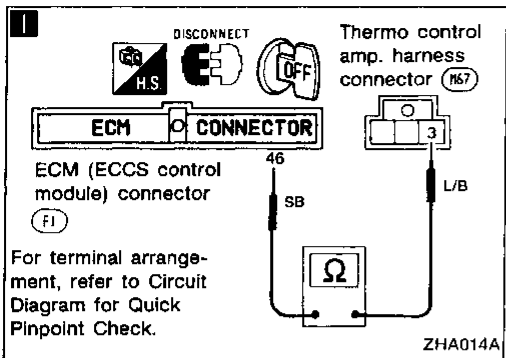


(Go to next page.)

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

CI
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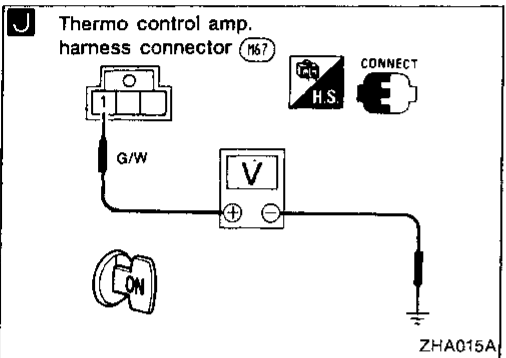
Diagnostic Procedure 4 (Cont'd)



I Note

Check circuit continuity between thermo. control amp. harness connector terminal No. ③ and ECM (ECCS control module) harness connector terminal No. ④⑥.

OK



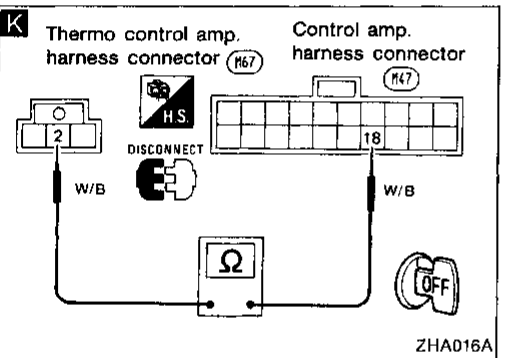
J CHECK POWER SUPPLY FOR THERMO. AMP.

Do approx. 12 volts exist between thermo. amp. harness connector terminal No. ① and body ground?

NG

OK

CHECK POWER SUPPLY CIRCUIT AND FUSE AT FUSE BLOCK. (Refer to "POWER SUPPLY ROUTING" in EL section and Wiring Diagram.)

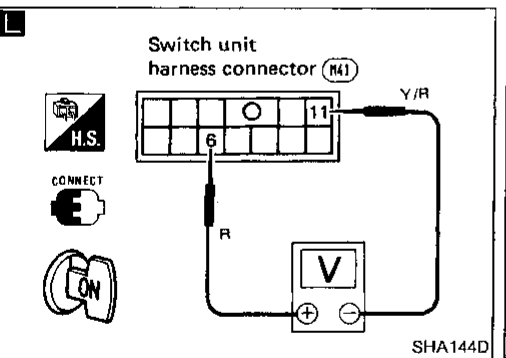


K CHECK THERMO CONTROL AMP. (Refer to Electrical Components Inspection.) (HA-71)

NG

OK

Replace thermo. control amp.



K Note

Check continuity between thermo. control amp. harness connector terminal No. ② and control amp. harness connector terminal No. ⑱.

OK

L CHECK A/C SWITCH OF SWITCH UNIT. Check the voltage between switch unit harness connector terminal No. ⑥ and ⑪.

NG

OK

Disconnect switch unit connector.

REC switch	Terminal No.		Voltage (Approx.)
	⑥	⑪	
Switch pressed	+	-	0V
Switch free			5V

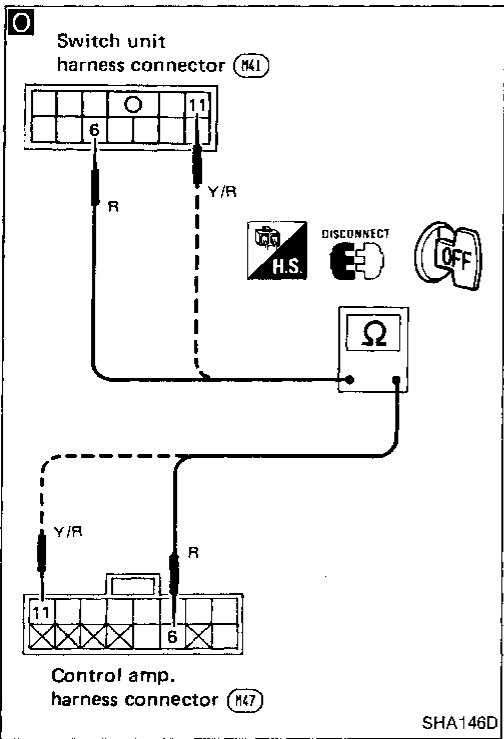
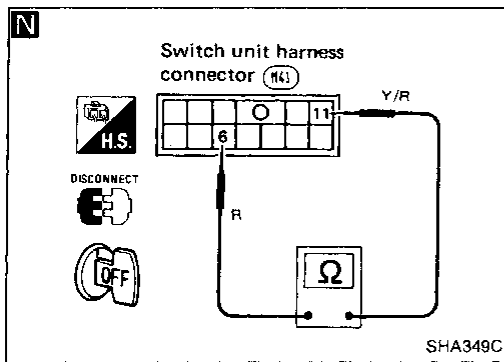
Replace control amp.

⑬

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

TROUBLE DIAGNOSES — Manual Air Conditioner

Diagnostic Procedure 4 (Cont'd)



N

Check circuit continuity between switch unit harness connector terminal No. ⑥ and ⑪.

NG → Replace switch unit.

A/C switch	Continuity between terminal No. ⑥ and ⑪
Switch pressed	Yes
Switch free	No

OK

O

Note

Check circuit continuity between switch unit harness connector terminal No. ⑥ (⑪) and control amp. harness connector terminal No. ⑥ (⑪).

OK

Replace control amp.

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

GI

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EC

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ST

BF

HA

EL

IDX

Diagnostic Procedure 5

SYMPTOM: Illumination or control panel indicators do not come on.

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

Turn ignition switch and lighting switch ON.

CHECK ILLUMINATION AND INDICATORS.

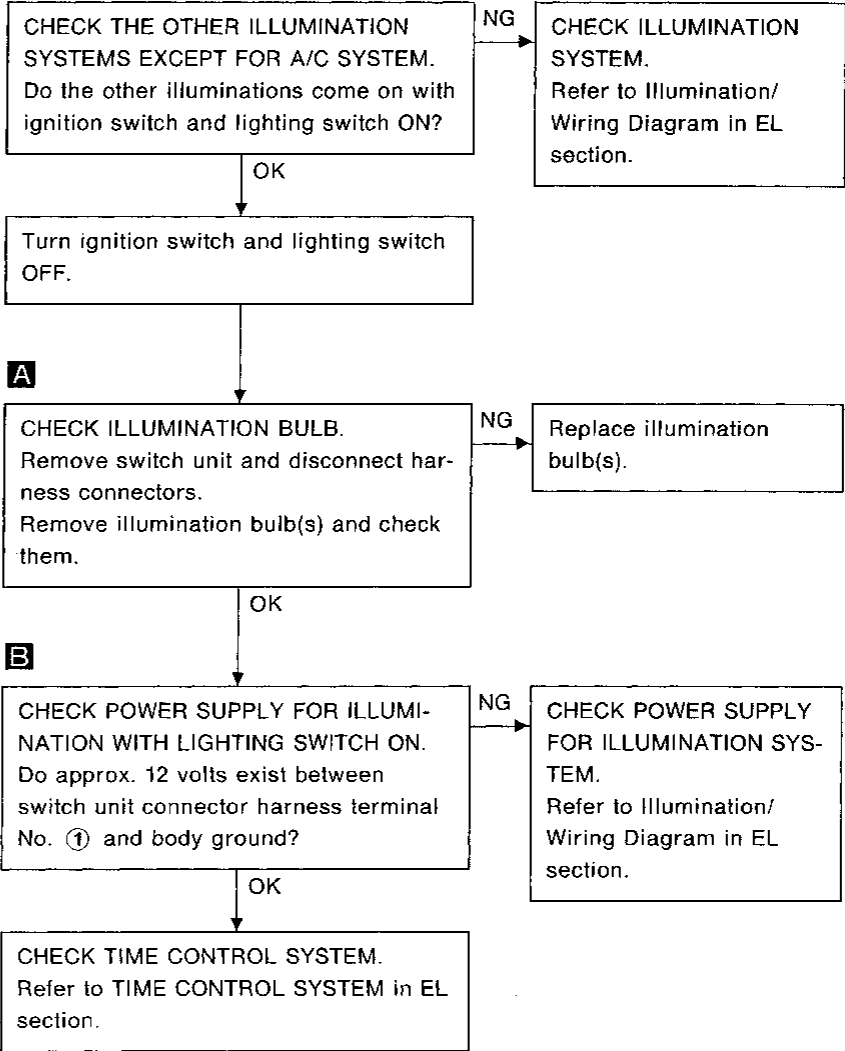
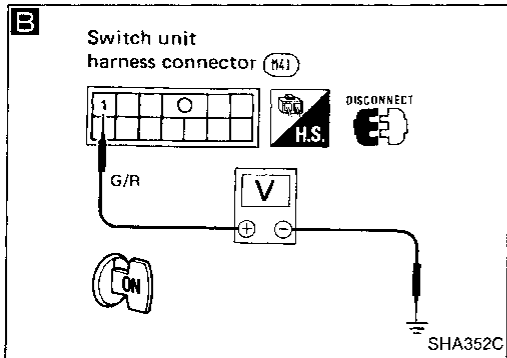
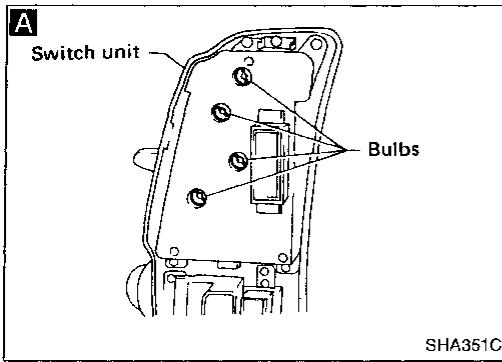
- Turn A/C, REC and fan ON.
- Rotary VENT, B/L, FOOT, F/D and DEF switches in order.
- Check for incidents and follow the repairing methods as shown.

INCIDENT			How to repair
ILL Control panel	A/C	REC	
×	○	○	Go to DIAGNOSTIC PROCEDURE 5-1.
○	×	○	Go to DIAGNOSTIC PROCEDURE 5-2.
○	○	×	Go to DIAGNOSTIC PROCEDURE 5-3.
○	×	×	Go to DIAGNOSTIC PROCEDURE 5-4.

○: Illumination or indicator comes on.
 ×: Illumination or indicator does not come on.

Diagnostic Procedure 5 (Cont'd)

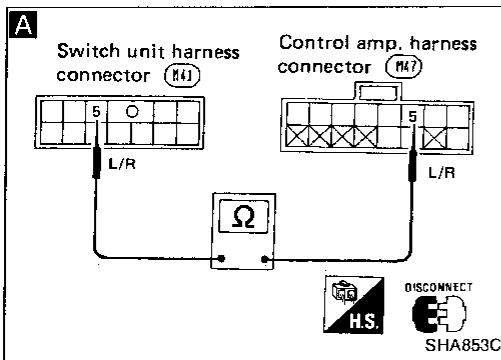
DIAGNOSTIC PROCEDURE 5-1



GI
 MA
 EM
 LC
 EF & EC
 FE
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 MT
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 ST
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 HA
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Diagnostic Procedure 5 (Cont'd)

DIAGNOSTIC PROCEDURE 5-2



CHECK MAGNET CLUTCH OPERATION. Does magnet clutch operate normally when engine is ON and A/C switch, fan switch are ON?

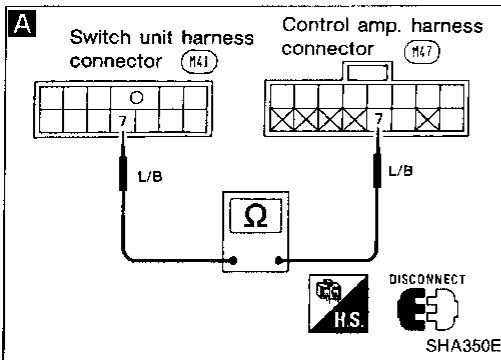
NG → Go to **Diagnostic Procedure 4.** (HA-60)

OK

A Check continuity between switch unit harness connector terminal No. ⑤ and control amp. harness connector terminal No. ⑤.

NG

Replace switch unit.



DIAGNOSTIC PROCEDURE 5-3

CHECK INTAKE DOOR OPERATION. Does intake door operate normally when engine is ON and A/C switch, fan switch are ON?

NG → Go to **Diagnostic Procedure 3.** (HA-59)

OK

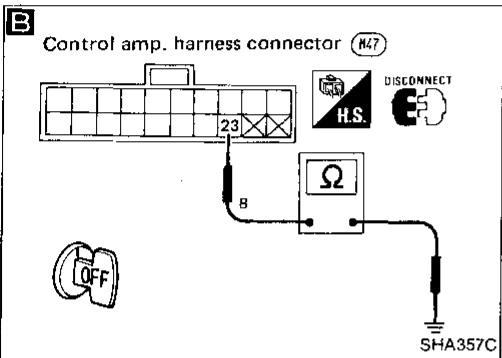
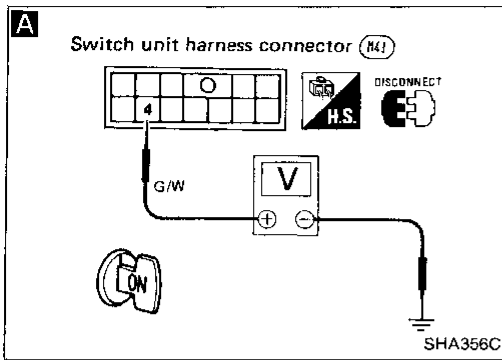
A Check continuity between switch unit harness connector terminal No. ⑦ and control amp. harness connector terminal No. ⑦.

NG

Replace switch unit.

Diagnostic Procedure 5 (Cont'd)

DIAGNOSTIC PROCEDURE 5-4



Turn ignition switch and lighting switch OFF.

Disconnect switch unit harness connector.

A CHECK POWER SUPPLY FOR SWITCH UNIT.
Do approx. 12 volts exist between switch unit harness connector terminal No. ④ and body ground?

Check harness of switch unit power supply circuit. (Refer to "POWER SUPPLY ROUTING" in EL section and Wiring Diagram.)

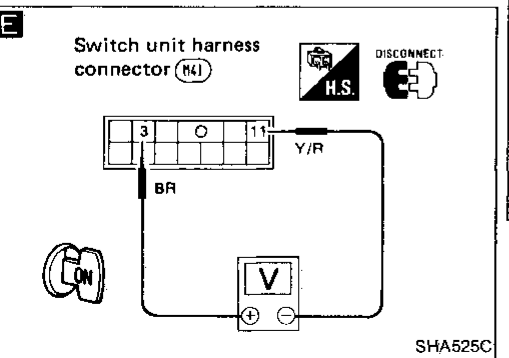
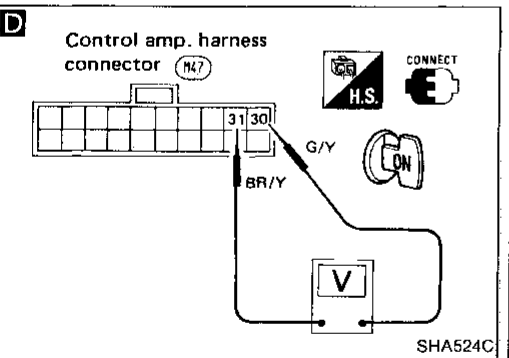
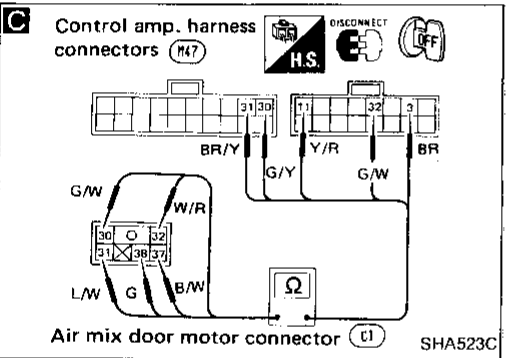
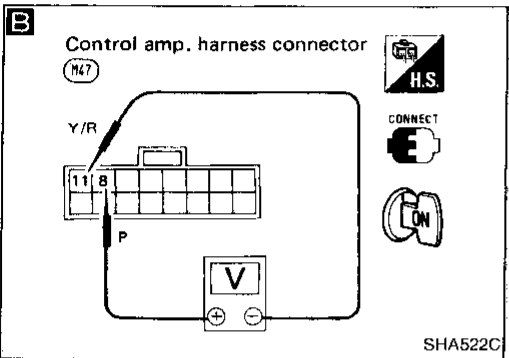
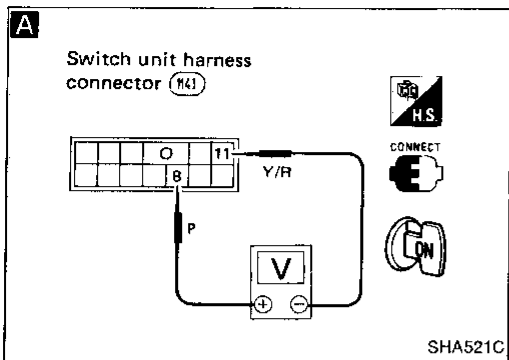
B CHECK BODY GROUND CIRCUIT FOR CONTROL AMP.
Does continuity exist between control amp. harness connector terminal No. ⑬ and body ground?

Replace control amp.

GI
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EF & EC
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Diagnostic Procedure 6

SYMPTOM: Temperature of air outlet does not change.



A CHECK TEMPERATURE CONTROL LEVER.
Measure voltage between control panel harness connector terminals No. ⑧ and ⑪.

Temp. control lever	Terminal No.		Voltage (approx.)
	⊕	⊖	
Full hot	⑧	⑪	5V
Full cold	⑧	⑪	0V

B Measure voltage between control amp. harness connector terminals No. ⑧ and ⑪.

Temp. control lever	Terminal No.		Voltage (approx.)
	⊕	⊖	
Full hot	⑧	⑪	5V
Full cold	⑧	⑪	0V

C Check continuity between each terminal of control amp. and air mix door motor.

Terminal No.		Continuity
Control amp.	Air mix door motor	
⑩	⑩	Yes
⑪	⑪	
③	③	
②	②	
⑪	⑩	

D CHECK FOR CONTROL AMP. OUTPUT.
Check if 12 volts exist between control amp. harness connector terminals No. ⑩ and ⑪ when temp. control lever is moved.

Terminal No.	Air mix door motor	Direction of linkage rotation
⊖	⊕	Cold → Hot
⊕	⊖	Hot → Cold

NG → Disconnect control amp. harness connector.

E Check if approx. 5 volts exist between control panel harness connector terminals No. ③ and ⑪.

OK → Replace control amp.
NG → (Go to next page.)

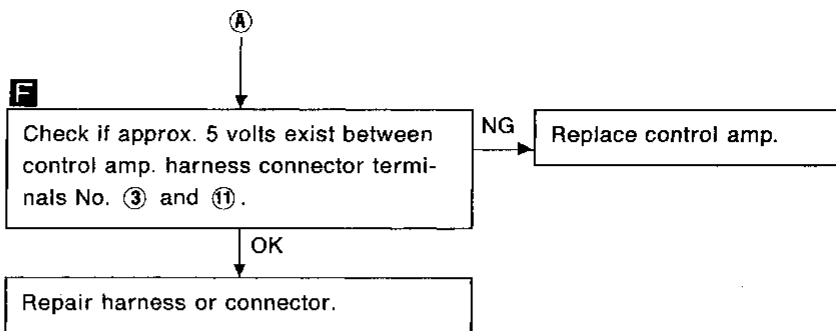
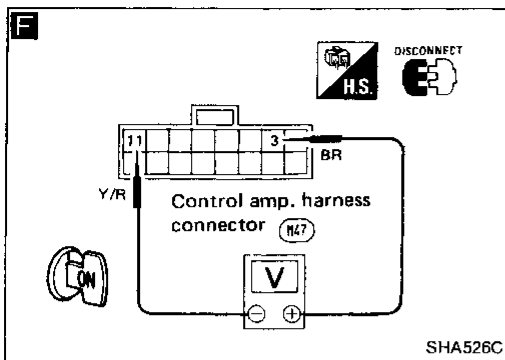
NG → Repair harness or connector.

NG → Replace control amp.

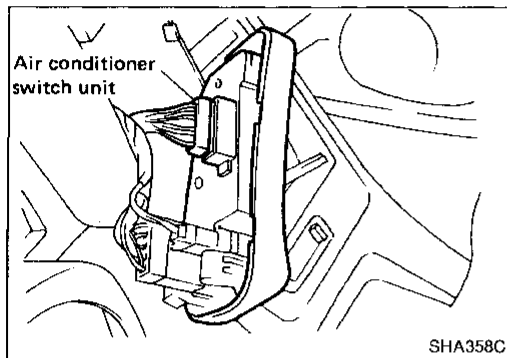
OK → Replace air mix door motor.

TROUBLE DIAGNOSES — Manual Air Conditioner

Diagnostic Procedure 6 (Cont'd)



GI
MA
EM

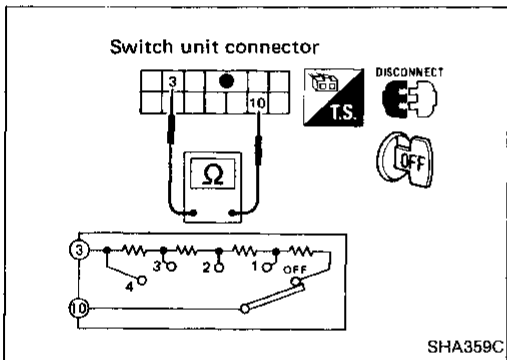


Electrical Components Inspection FAN SWITCH

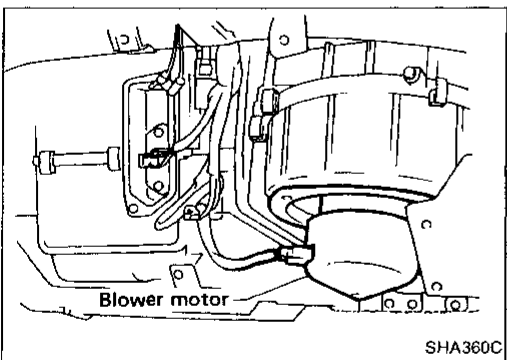
Check resistance between terminals at each switch position.

Switch position	Resistance between terminals No. ③ and ⑩ (Approx. Ω)
OFF	710
1	1,140
2	460
3	270
4	0

LC
EF & EC
FE
CL



MT
AT
PD
FA

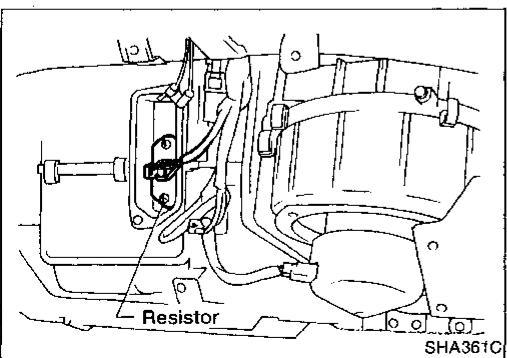


BLOWER MOTOR

Confirm smooth rotation of the blower motor.

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

RA
BR
ST
BF



BLOWER RESISTOR

Check continuity between terminals.

HA
EL
IDX

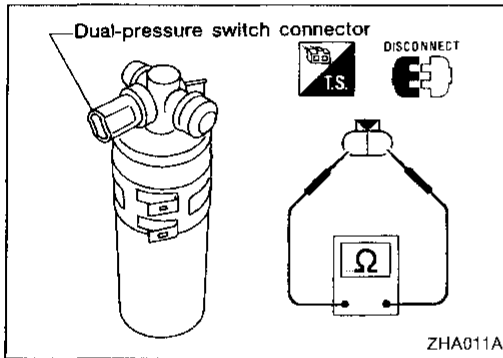
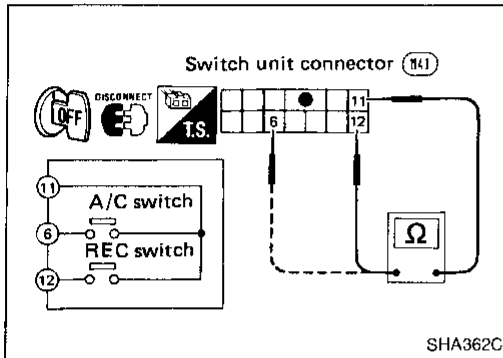
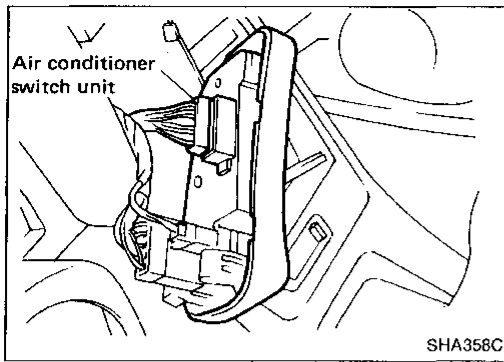
TROUBLE DIAGNOSES — Manual Air Conditioner

Electrical Components Inspection (Cont'd)

A/C SWITCH

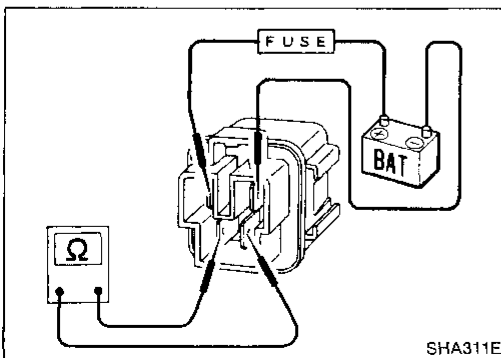
Check continuity between terminals at each switch position.

Switch condition	Terminal No.		Continuity
While A/C switch is pushed	⑥	⑪	Yes
While REC switch is pushed	⑫	⑪	Yes



DUAL-PRESSURE SWITCH

High-pressure side line pressure kPa (kg/cm ² , psi)	Operation	Continuity
Decreasing to 152.0 - 201.0 (1.55 - 2.05, 22.0 - 29.2)	Turn OFF	Does not exist
Increasing to 2,452 - 2,844 (25 - 29, 356 - 412)	Turn ON	Exists



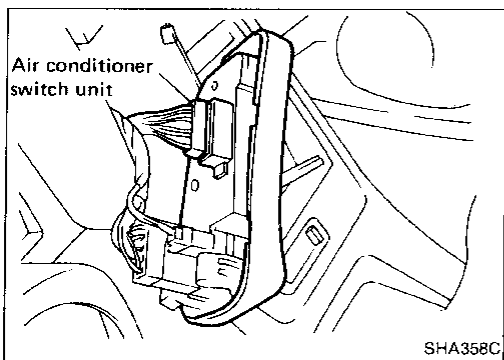
RELAYS

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

Electrical Components Inspection (Cont'd)

MODE SWITCH

Check resistance between terminals at each switch position.



Switch position	Resistance between terminals No. ⑨ and No. ③ (Ω)
VENT	0
B/L	270
FOOT	460
FOOT/DEF	1,140
DEF	710

GI

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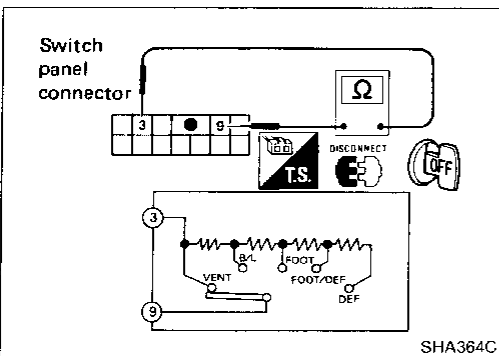
ST

BF

HA

EL

IDX



THERMO CONTROL AMP.

1. Run engine and operate A/C system.
2. Connect the voltmeter from harness side.
3. Check thermo control amp. operation shown in the table.

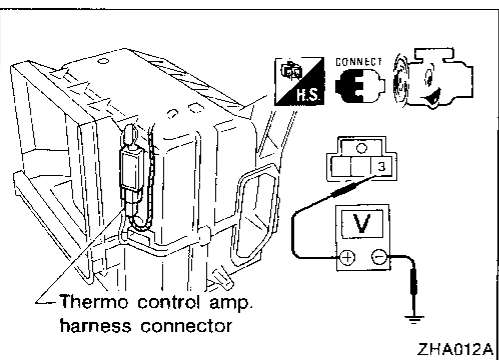
Evaporator outlet air temperature °C (°F)	Thermo amp. operation	Voltage (Approx.)
Decreasing to 3.0 - 4.0 (37 - 39)	Turn OFF	12V
Increasing to 4.0 - 6.0 (39 - 43)	Turn ON	0V

MT

AT

PD

FA



Control Linkage Adjustment

MODE DOOR

1. Move side link by hand and hold mode door in VENT mode.
2. Install mode door motor on heater unit and connect it to harness.
3. Turn ignition switch to ON.
4. Turn VENT switch ON.
5. Attach mode door rod to side link rod holder.
6. Check that when DEF position is selected, only DEF door is at full-open position, and when VENT position is selected, only VENT door is at full-open position.

RA

BR

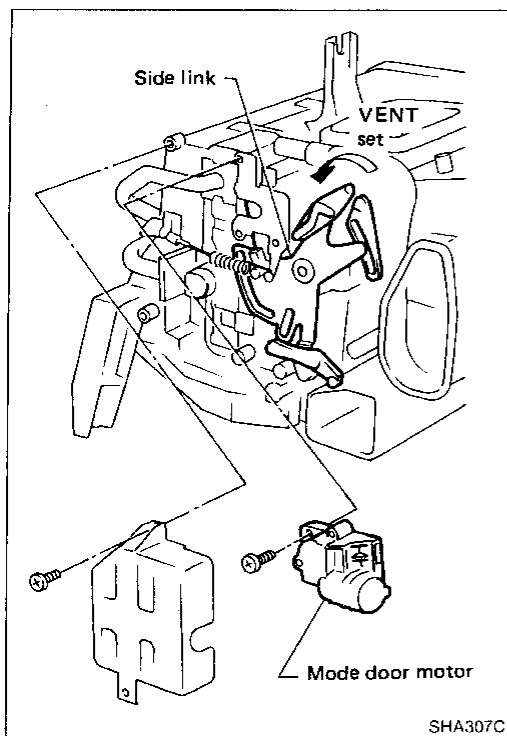
ST

BF

HA

EL

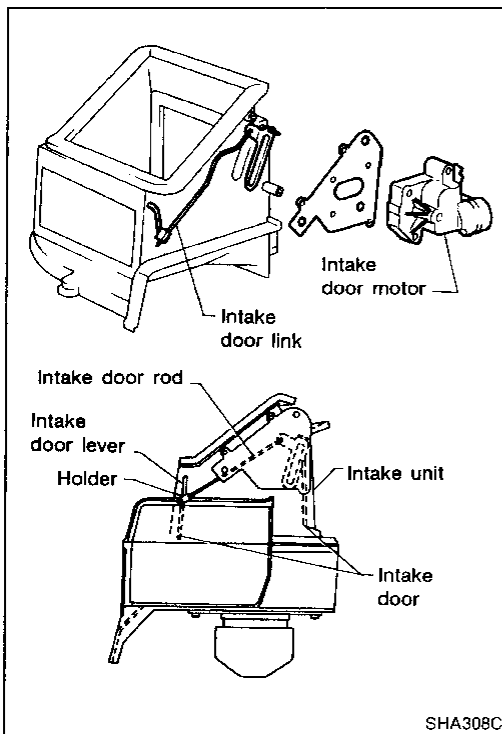
IDX



Control Linkage Adjustment (Cont'd)

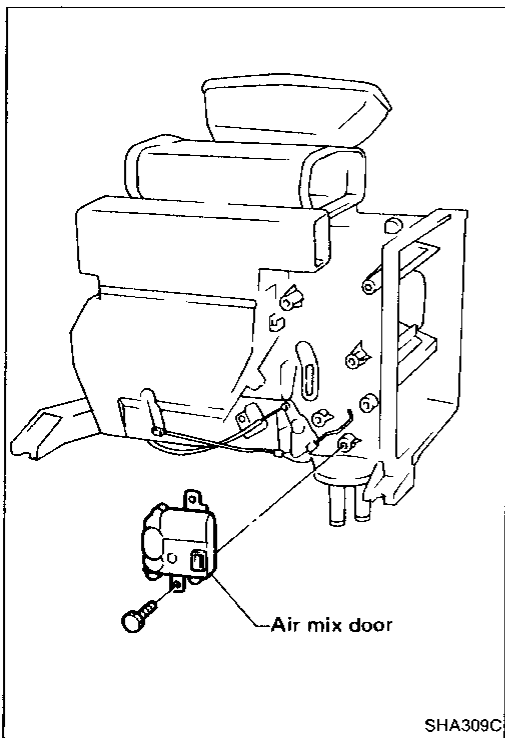
INTAKE DOOR

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



AIR MIX DOOR

1. Connect harness to air mix door motor and set temperature control lever at full-cold position.
2. Set air mix doors I and II at full-cold position and fasten door rod.
3. Check that when temperature control lever is at full-cold, both doors are at full-cold position, and when temperature control lever is at full-hot, both doors are at full-hot position.



WATER COCK CONTROL CABLE

Clamp cable at full-close position when air mix doors I and II are at full-cold position, and full-open position when air mix doors I and II are at full-hot position.

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TROUBLE DIAGNOSES — Auto Air Conditioner

Contents (Cont'd)

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Symptom Chart

DIAGNOSTIC TABLE

Symptom	Possible cause	Diagnostic procedure	
Air outlet does not change	<ul style="list-style-type: none"> ● Mode door motor not operating correctly ● Inaccurate sensor input ● No output to mode door motor from auto amplifier 	Proceed to Preliminary check 1 (HA-86), then to Diagnostic procedures 17 (HA-108) and 18 (HA-109) if air mix door is malfunctioning.	GI MA
Intake door does not change	<ul style="list-style-type: none"> ● Intake door motor or mechanism malfunctioning ● Inaccurate sensor input ● No output to intake door motor from auto amplifier 	Proceed to Preliminary check 2 (HA-87). If intake door is at fault, go to Diagnostic procedure 16 (HA-107).	EM LC
Insufficient cooling	<ul style="list-style-type: none"> ● Compressor clutch not engaged ● Air mix door motors not working properly ● Condenser fan inoperative ● Low freon level 	Proceed to Preliminary check 3 (HA-88). If air mix doors do not operate properly, go to Diagnostic procedure 15 (HA-106). Check compressor clutch operation and freon level of system.	EF & EC
Discharged air temperature does not change	<ul style="list-style-type: none"> ● Air mix doors do not operate correctly ● Incorrect sensor input 	Proceed to Preliminary check 7 (HA-102).	FE
Noise	<ul style="list-style-type: none"> ● Compressor belt tension ● Compressor component malfunction ● Blower motor interference ● Radiator cooling fan interference 	Proceed to Preliminary check 8 (HA-102).	CL MT
Air conditioner control switch panel illumination does not come on	<ul style="list-style-type: none"> ● Blown fuse ● Loose or open in harness ● Blown bulb 	Proceed to Diagnostic procedure 20 (HA-113).	AT
Insufficient heating	<ul style="list-style-type: none"> ● Coolant temperature is low ● Air mix doors not in correct position ● Incorrect sensor circuit 	Proceed to Preliminary check 4 (HA-89). If air mix doors do not operate correctly, go to Diagnostic procedure 15 (HA-106).	PD
Blower motor operation is malfunctioning	<ul style="list-style-type: none"> ● Blower motor is not receiving power ● Vents may be obstructed ● Motor does not spin freely ● Air intake obstructed ● Blown fuse ● Malfunctioning blower relay 	Proceed to Preliminary check 5 (HA-90). If blower motor is malfunctioning, go to Diagnostic procedure 25 (HA-116).	FA RA
Magnet clutch does not engage.	<ul style="list-style-type: none"> ● Blown fuse ● A/C relay inoperative ● Open in wiring ● Open ambient sensor circuit ● Low freon level ● Malfunctioning clutch assembly 	Proceed to Preliminary check 6 (HA-91), then Diagnostic procedure 19 (HA-110) if clutch is at fault.	BR ST
No display on A/C switch panel	<ul style="list-style-type: none"> ● Blown fuse ● Malfunctioning bulb 	Proceed to Diagnostic procedure 20 (HA-113).	BF
Set temperature and mode indication do not appear on display window	<ul style="list-style-type: none"> ● Malfunctioning switch unit ● Open in circuit ● Malfunctioning auto amplifier 	Proceed to Diagnostic procedure 21 (HA-113).	HA
When air conditioner switch is operated, if does not beep	<ul style="list-style-type: none"> ● Malfunctioning A/C switch ● Open in harness or connector ● Malfunctioning auto amplifier 	Proceed to Diagnostic procedure 22 (HA-114).	EL IDX

TROUBLE DIAGNOSES — Auto Air Conditioner

Symptom Chart (Cont'd)

Symptom	Possible cause	Diagnostic procedure
Set temperature and mode indication do not appear in display and indicator lamp (LED) does not come on	<ul style="list-style-type: none">● Open in harness● Malfunctioning switch panel● Malfunctioning auto amplifier	Proceed to Diagnostic procedure 23 (HA-115).
Switches do not work	<ul style="list-style-type: none">● Malfunctioning switch panel● Open in harness● Malfunctioning auto amplifier	Proceed to Diagnostic procedure 24 (HA-116).

Self-diagnosis

CONSULT AND ONBOARD SELF-DIAGNOSTIC SYSTEM

Function of CONSULT and ONBOARD SELF-DIAGNOSTIC SYSTEM are as follows:

ITEM	MONITOR		CHANGE PARAMETER		READOUT OF TROUBLE DATA STORED IN MEMORY	
	CONSULT	ONBOARD	CONSULT	ONBOARD	CONSULT	ONBOARD
Ambient temp.	○	○			○	○
In-vehicle temp. (Upper)	○	○			○	○
In-vehicle temp. (Lower)	○	○			○	○
Duct temp. (Defroster)	○	○			○	○
Duct temp. (Ventilator)	○	○			○	○
Duct temp. (Floor)	○	○			○	○
Sunload	○	○			○	○
Water temp.	○	○				
Mode door PBR	○	○				
In-vehicle target temp. (Upper)	○					
In-vehicle target temp. (Lower)	○					
Outlet air target temp. (Upper)	○		○	*○		
Outlet air target temp. (Lower)	○		○	*○		
Mode door target position	○		○	*○		
Intake door target position	○		○	*○		
Blower motor target voltage	○		○	*○		
Difference between upper and lower target temp.	○		○	*○		
Output signal to compressor	○		○	*○		
Set temp.	○					
Selected mode	○					
Operated switches status	○					
Manual select status	○					

*: These can be set by self-diagnosis step II; their combinations are as follows:

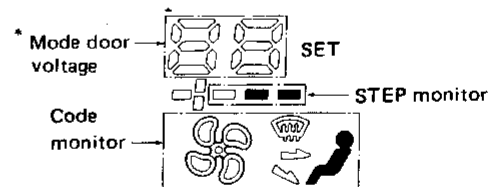
Actuator test

Code	Intake	Outlet	A/M door	Comp.
	Outside air	DEF	Full Hot	OFF
	Outside air	FOOT	Full Hot	OFF
	Partial outside air	B/L	30°C (86°F)	ON
	Recirculation air	VENT	Full Cool	ON

Press MODE SW. ↓

Code	Voltage
	4V
	8V
	9V
	12V

Press FAN SW. ↓



*: Mode door voltage: 0 = VENT, 5 = DEF
Ten times the value in V.

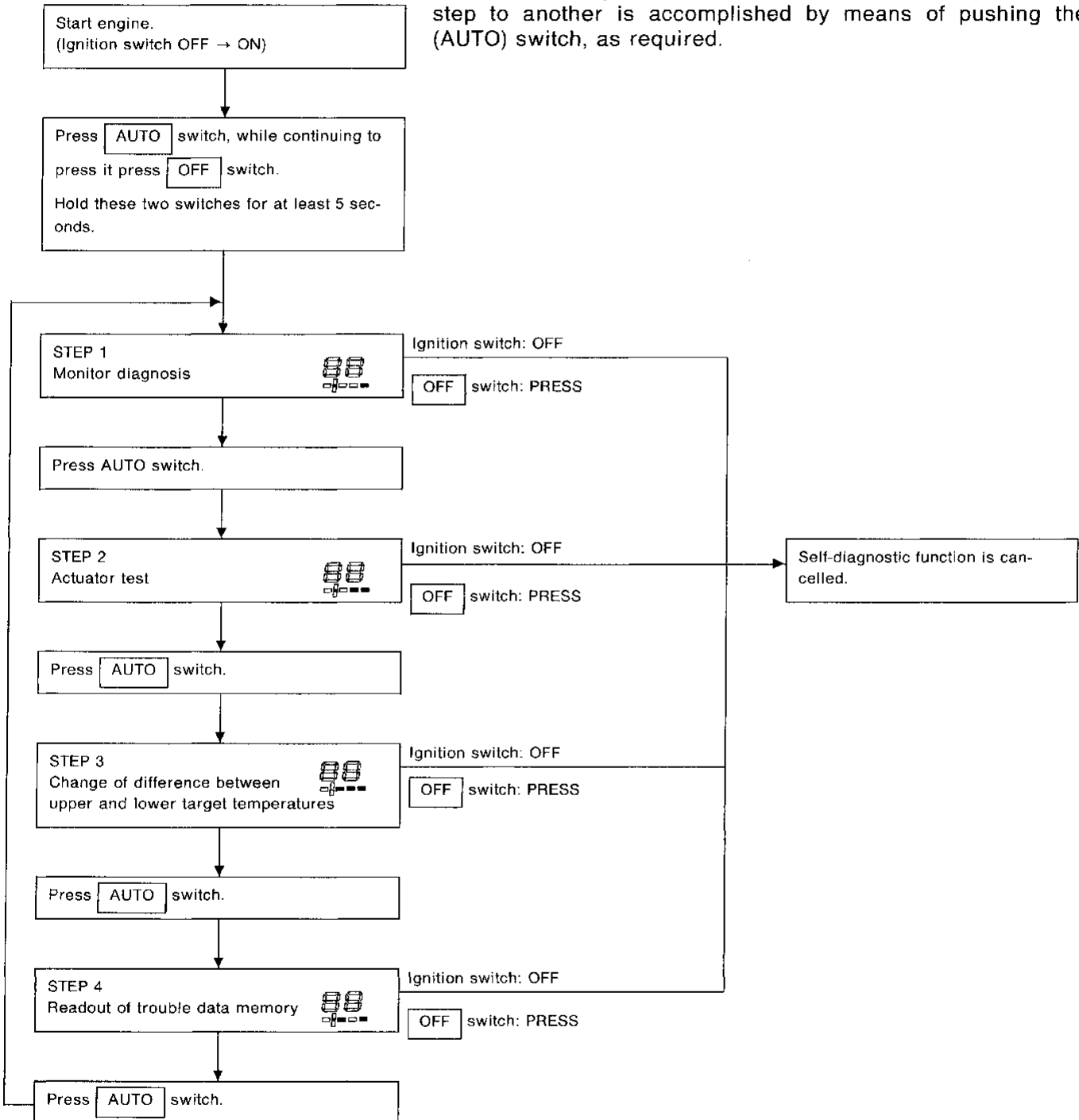
SHA755C

TROUBLE DIAGNOSES — Auto Air Conditioner

Self-diagnosis (Cont'd)

The self-diagnostic system diagnoses the 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 ignition switch from "OFF" to "ON"), and pressing both the (AUTO) and (OFF) switch for at least 5 seconds.

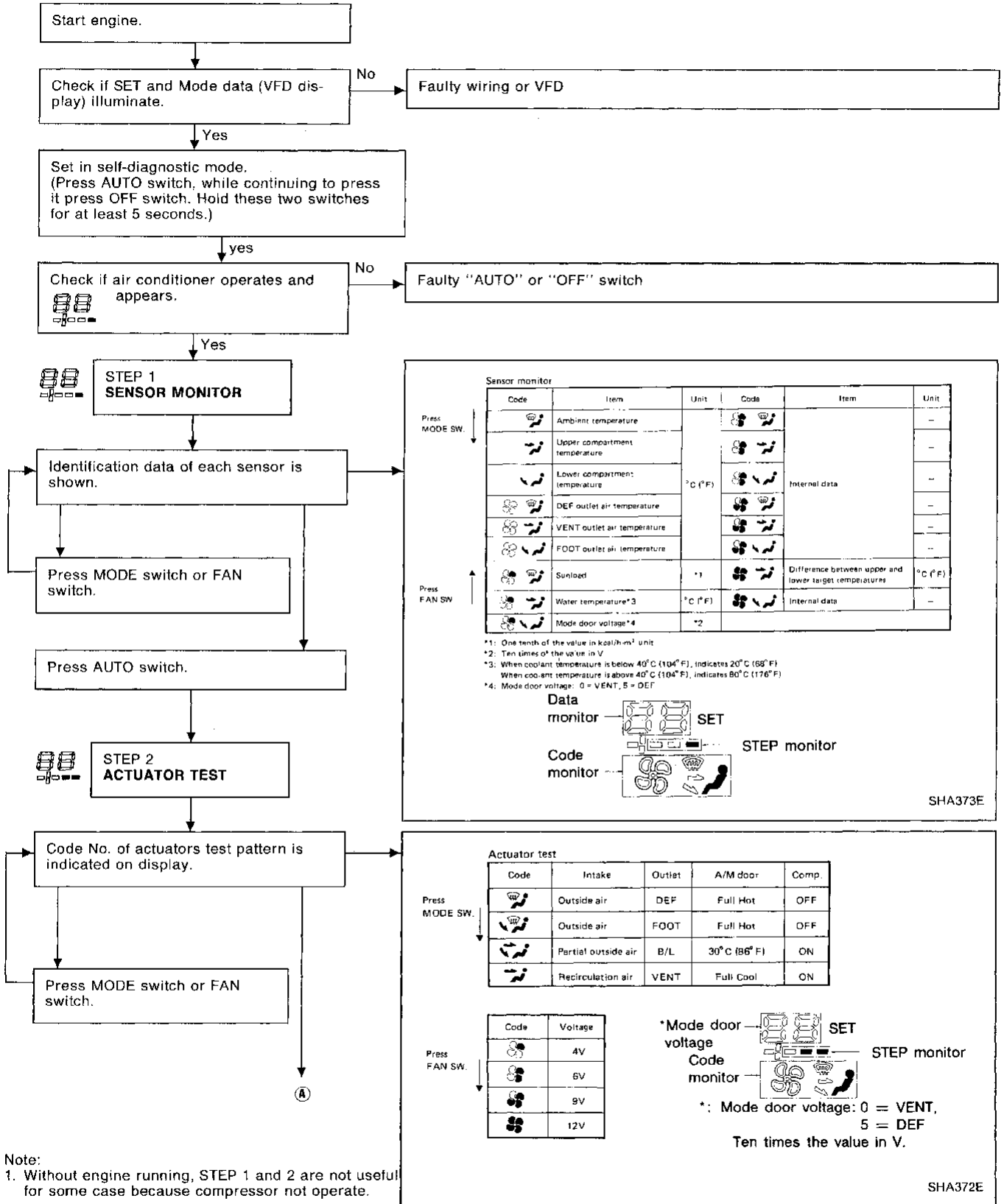
This system will be cancelled by either pressing the (OFF) switch or turning the ignition switch "OFF". Shifting from one step to another is accomplished by means of pushing the (AUTO) switch, as required.



TROUBLE DIAGNOSES — Auto Air Conditioner

Self-diagnosis (Cont'd)

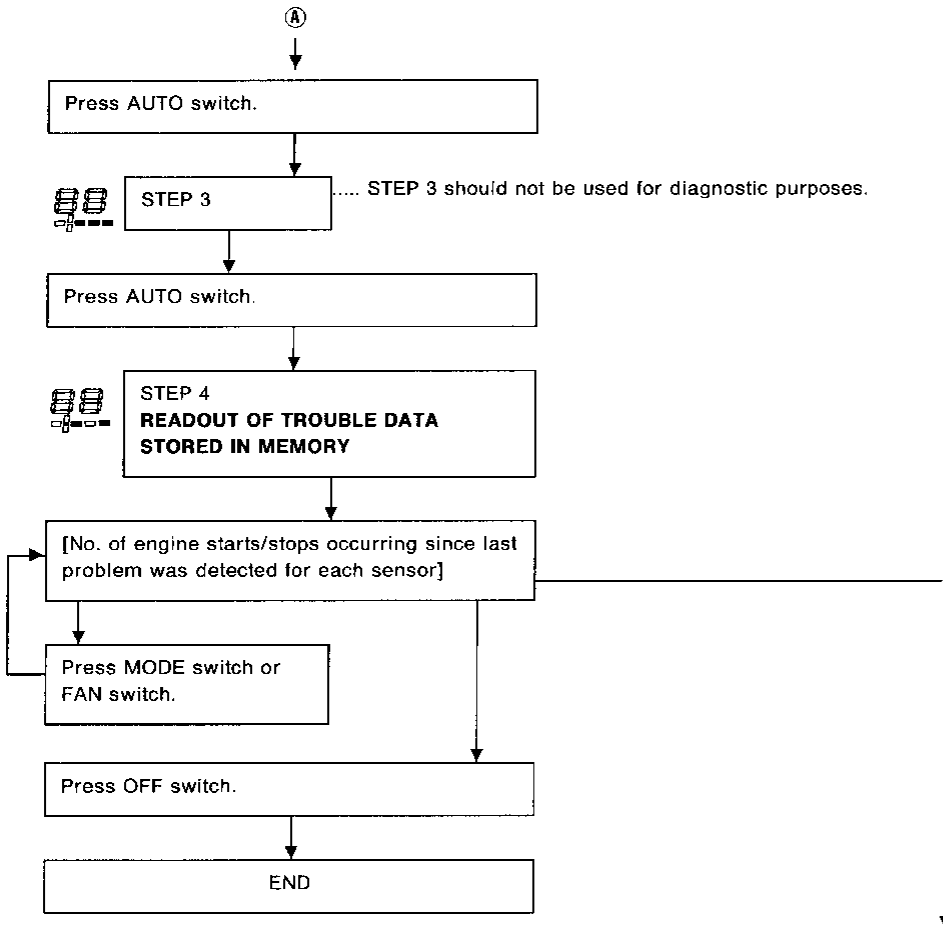
CHECKING PROCEDURE



Note:
 1. Without engine running, STEP 1 and 2 are not useful for some case because compressor not operate.

TROUBLE DIAGNOSES — Auto Air Conditioner

Self-diagnosis (Cont'd)



Readout of trouble data stored in memory

	Code	Item	Trouble diagnosis criteria	Remarks
Press MODE SW.		Ambient sensor trouble data	Less than -70°C [-94°F] Greater than 141°C [286°F]	
		Upper in-vehicle sensor trouble data		
		Lower in-vehicle sensor trouble data		
Press FAN SW.		DEF Duct sensor trouble data	Less than -38°C [-36°F] Greater than 141°C [286°F]	
		VENT Duct sensor trouble data		
		FOOT Duct sensor trouble data		
		Sunload sensor trouble data		

Trouble data — SET
 Open circuit — STEP monitor
 Short circuit —
 Code monitor —

Trouble data
 No. of IGN ON/OFF operations since last trouble was detected.
 50: No problem
 49 - 01: Problem existed
 0: Problem exists

SHA371E

TROUBLE DIAGNOSES — Auto Air Conditioner

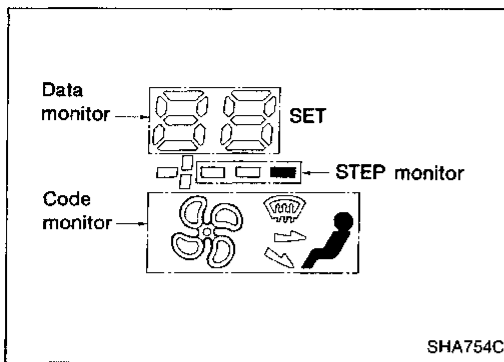
Self-diagnosis (Cont'd)

STEP 1: MONITOR DIAGNOSIS

By setting in self-diagnostic mode, VFD display shows that Step 1 mode has begun.

In this mode, each time the FAN or MODE SW is pressed, the code monitor changes in turn, and data corresponding with each code appears in the data monitor.

If the temperature shown on the display greatly differs from the actual temperature, check the sensor circuit first, then inspect the sensor itself according to the procedures described in Electrical Components Inspection.



* For cross-reference of code and corresponding data, refer to "Sensor monitor" in "Checking procedure".

	Code	Item	Unit	Code	Item	Unit
Press MODE SW.		Ambient temperature	°C (°F)		Internal data	—
		Upper compartment temperature				—
		Lower compartment temperature				—
		DEF outlet air temperature				—
		VENT outlet air temperature				—
		FOOT outlet air temperature				—
Press FAN SW.		Sunload	*1		Difference between upper and lower target temperatures	°C (°F)
		Water temperature*3	°C (°F)		Internal data	—
		Mode door voltage*4	*2			

*1: One tenth of the value in kcal/h·m² unit

*2: Ten times of the value in V

*3: When coolant temperature is below 40°C (104°F), indicates 20°C (68°F)

When coolant temperature is above 40°C (104°F), indicates 80°C (176°F)

*4: Mode door voltage: 0 = VENT, 5 = DEF

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TROUBLE DIAGNOSES — Auto Air Conditioner

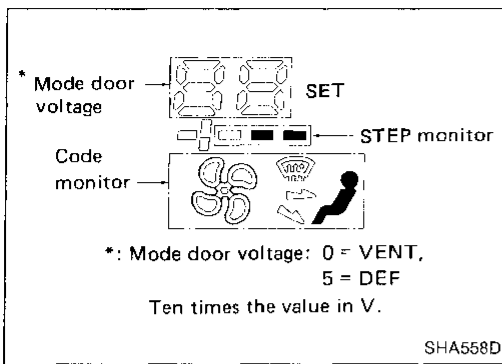
Self-diagnosis (Cont'd)

STEP 2: ACTUATOR TEST

By pushing the AUTO SW once, self-diagnosis is changed from step 1 to step 2.

During inspection in STEP 2 mode, the auto amplifier will forcefully transmit an output to the affected actuators in response to the code shown on the display, as indicated in the table below. Each operating condition can be set in turn by pressing FAN or MODE SW.

Checks must be made for improper operation visually, by listening to any noise, or by touching air outlets with your hand, etc.



	Press MODE SW. →			
Actuator	Display			
Mode door	DEF	D/FOOT	B/L	VENT
Intake door	FRE	FRE	50% FRE	REC
Air mix door	Full Hot	Full Hot	30°C (86°F)	Full Cold
Compressor	OFF	OFF	ON	ON

	Press FAN SW. →			
Blower motor	Display			
Voltage		4V	6V	9V
				12V

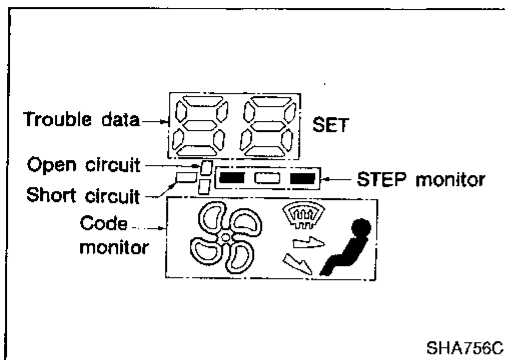
Operating condition of each actuator cannot be checked by indicators.

- * 1) Mode and fan speed can be set independently.
- 2) When appears, air mix door activates.
A stabilized outlet temperature 30°C (86°F) is reached after air mix door has been operating for approximately one minute.

TROUBLE DIAGNOSES — Auto Air Conditioner

Self-diagnosis (Cont'd)

STEP 4: READOUT OF TROUBLE DATA STORED IN MEMORY



By pushing the AUTO SW once in step 3, self-diagnosis is changed to step 4.

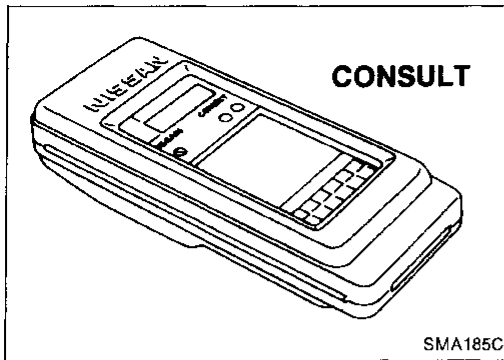
In this mode, each time the FAN or MODE SW is pressed, the code monitor changes in turn, and data or status of each sensor appears in the data monitor.

When the sensor becomes inoperative, the number of IGN ON/OFF operations occurring since the last trouble was detected appears in the SET section.

Open circuit or short circuit is indicated by "□" or "□".

Conditions for open or short circuit

	Code	Sensor	Open circuit	Short circuit
Press MODE SW. ↓		Ambient sensor	Less than -70°C (-94°F)	Greater than 141°C (286°F)
		Room upper sensor	Less than -38°C (-36°F)	Greater than 141°C (286°F)
		Room lower sensor	Less than -38°C (-36°F)	Greater than 141°C (286°F)
Press FAN SW. ↑		DEF duct sensor	Less than -38°C (-36°F)	Greater than 141°C (286°F)
		VENT duct sensor	Less than -38°C (-36°F)	Greater than 141°C (286°F)
		Foot duct sensor	Less than -38°C (-36°F)	Greater than 141°C (286°F)
		Sunload sensor	Open circuit can not be detected by self-diagnosis.	Greater than 1.784 kW ($1,534\text{ kcal/h}$, $6,087\text{ BTU/h}$) /m ² [0.1657 kW (142.51 kcal/h , 565.5 BTU/h)/sq ft]



Consult

CONSULT INSPECTION PROCEDURE

1. Turn off ignition switch.
2. Connect "CONSULT" to data link connector for CONSULT. (Data link connector for CONSULT is located in left dash side panel.)

GI

MA

EM

LC

EF &
EC

FE

CL

MT

AT

PD

FA

RA

BR

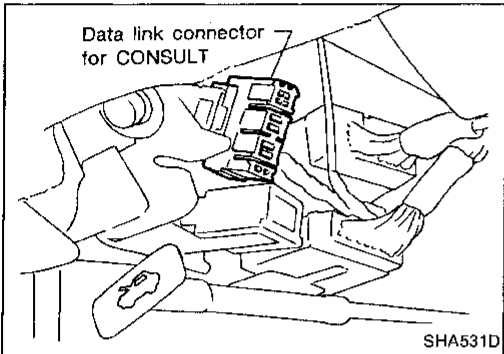
ST

BF

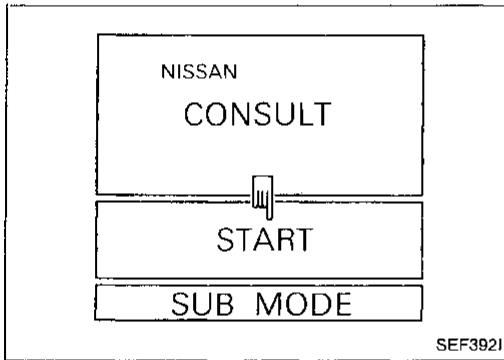
HA

EL

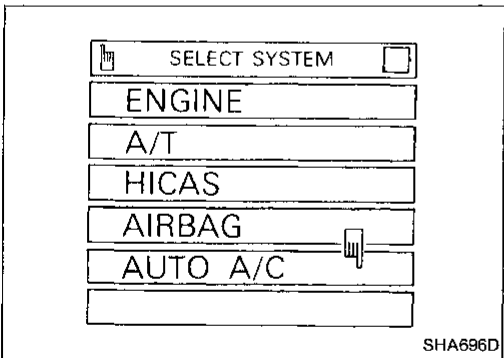
IDX



3. Turn on ignition switch.
4. Touch "START".

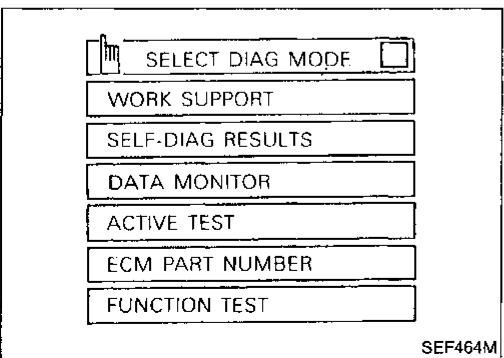


5. Touch "AUTO A/C".



6. Perform each diagnostic mode according to the inspection sheet as follows:

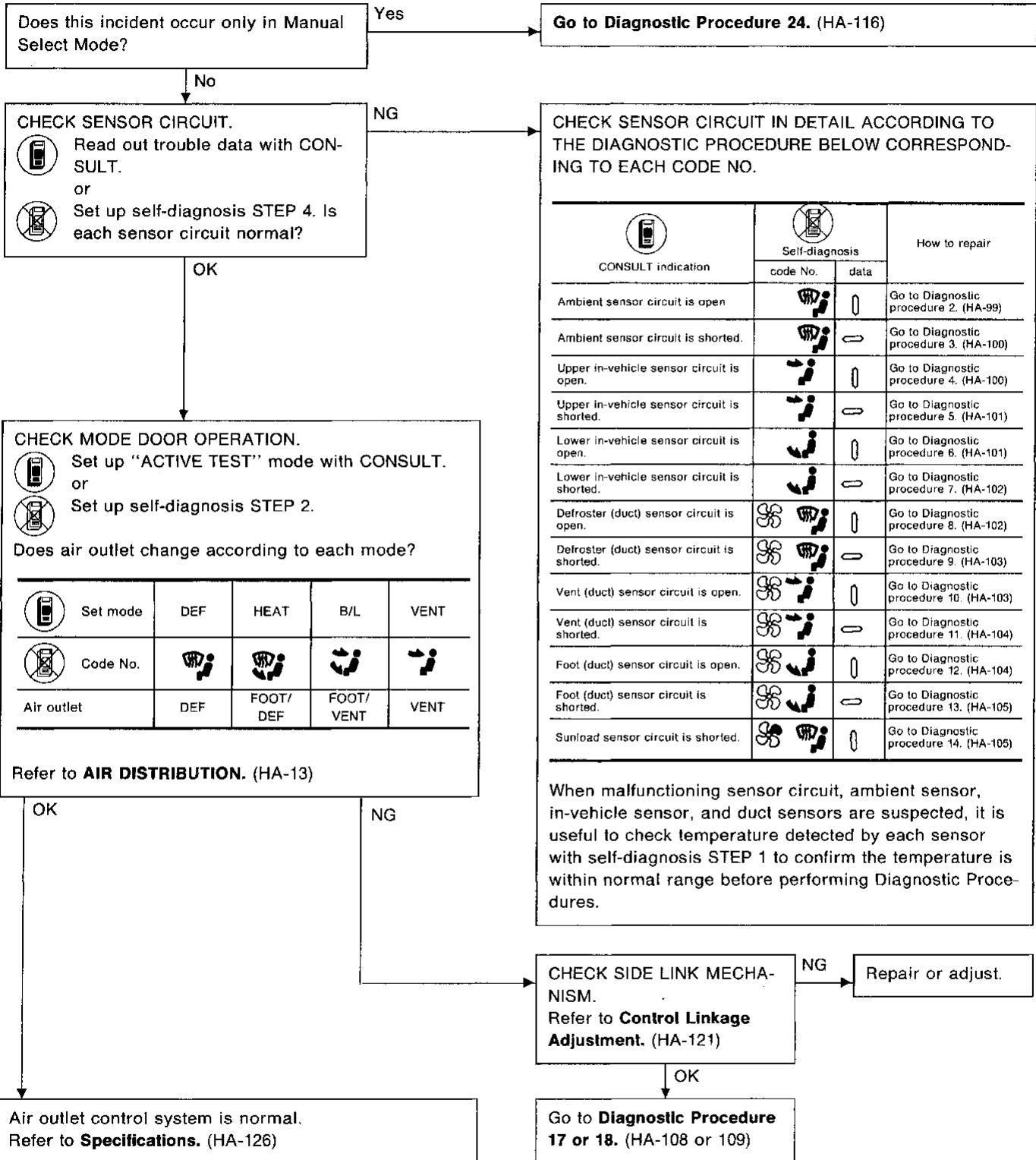
For further information, read the CONSULT Operation Manual.



Preliminary Check

PRELIMINARY CHECK 1

Air outlet does not change.

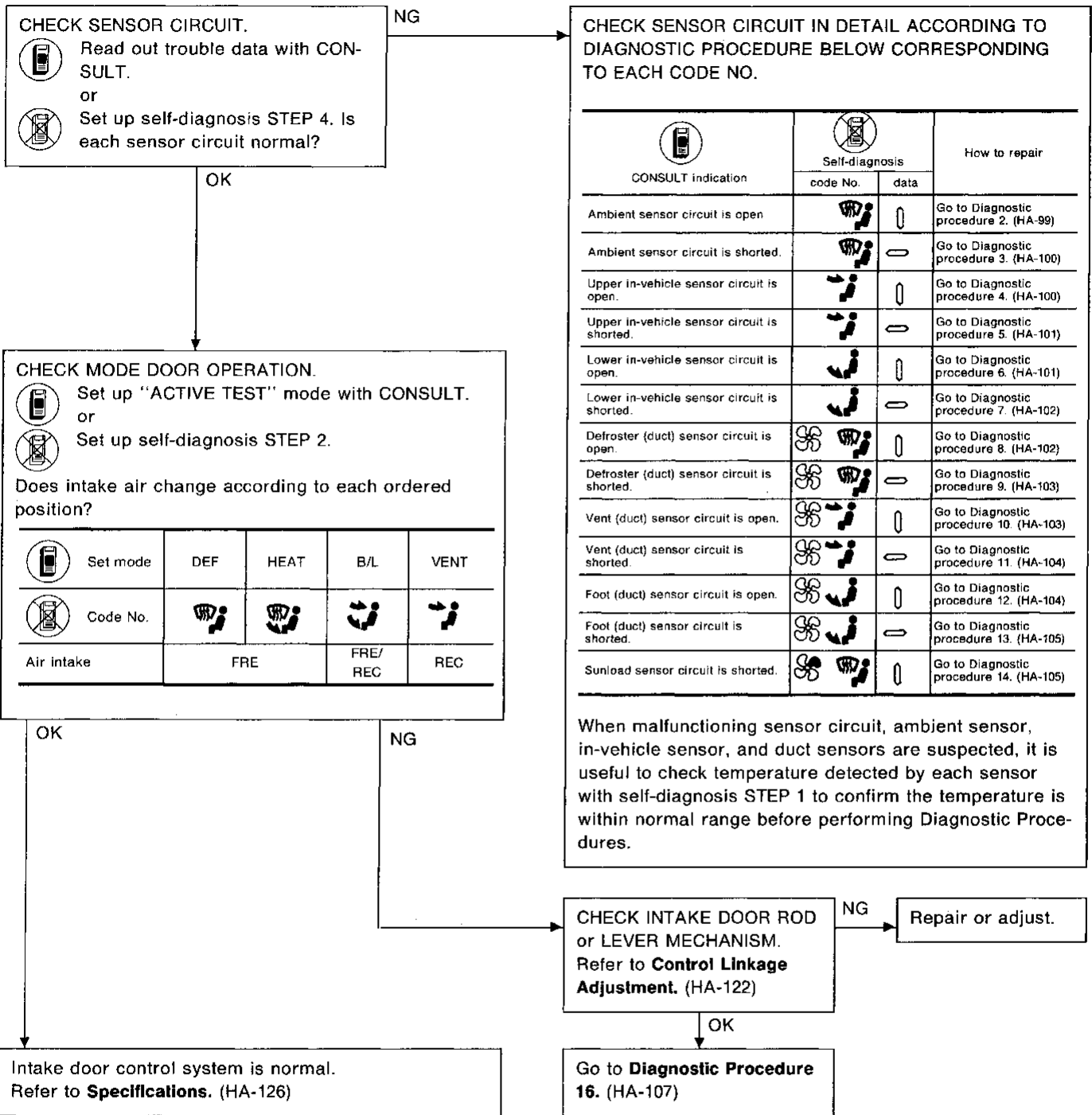


TROUBLE DIAGNOSES — Auto Air Conditioner

Preliminary Check (Cont'd)

PRELIMINARY CHECK 2

Intake door does not change.



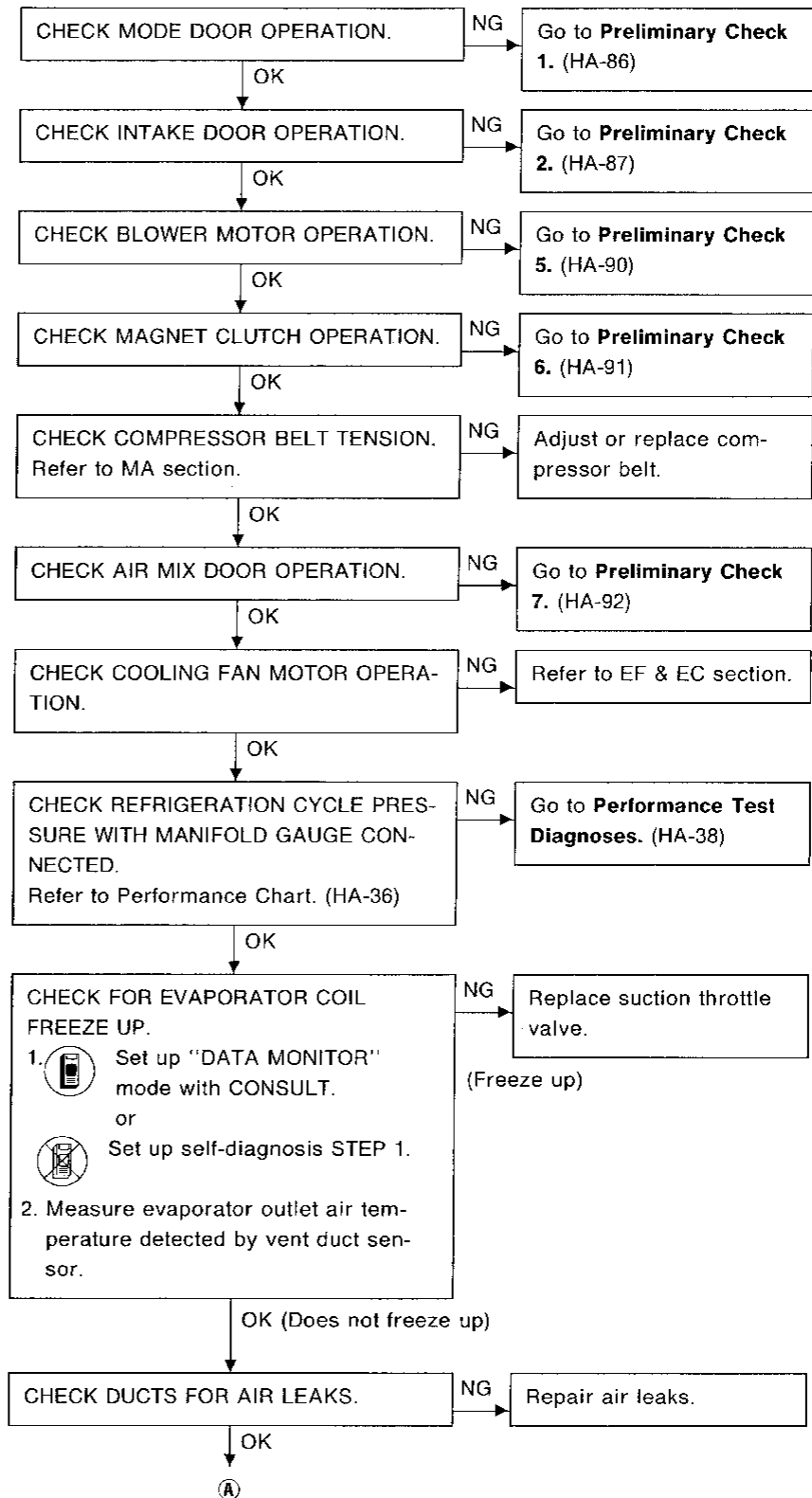
GI
MA
EM
LC
EF & EC
FE
CL
MT
AT
PD
FA
RA
BR
ST
BF
HA
EL
IDX

Preliminary Check (Cont'd)

PRELIMINARY CHECK 3

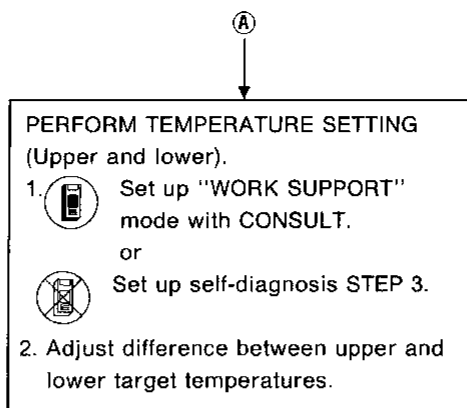
Insufficient cooling

- Read out self-diagnosis result with CONSULT or perform self-diagnosis STEP 4 before referring to the following flow chart.



TROUBLE DIAGNOSES — Auto Air Conditioner

Preliminary Check (Cont'd)



GI

MA

EM

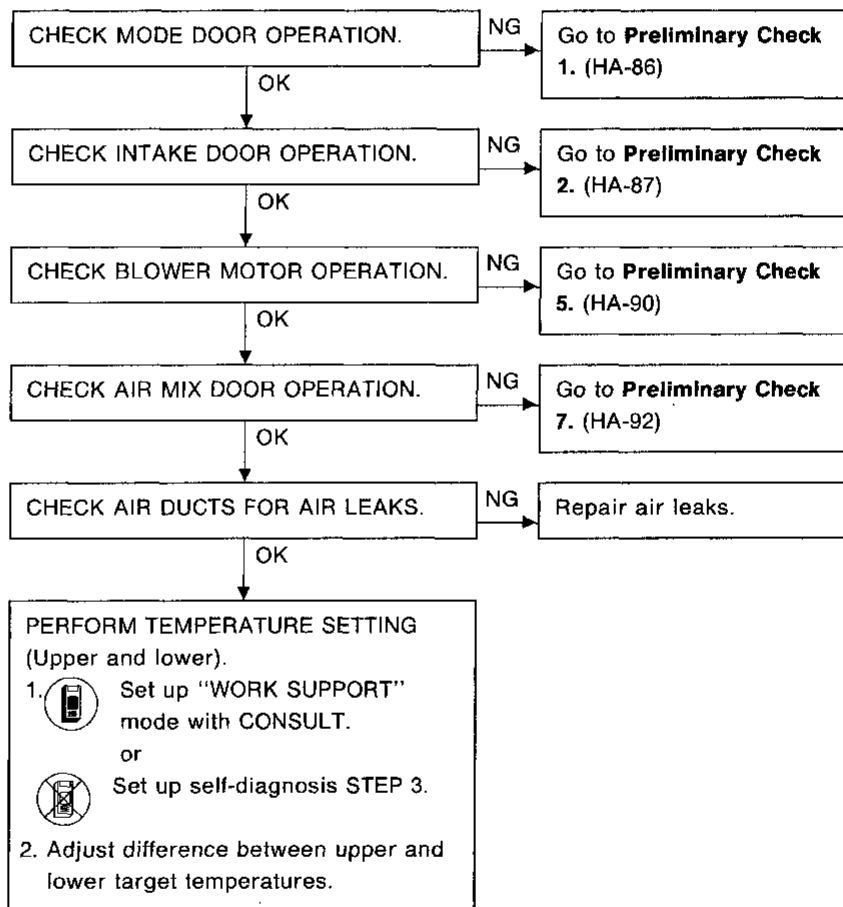
LC

PRELIMINARY CHECK 4

Insufficient heating

- Check coolant level, engine coolant temperature and heater hoses and read out self-diagnosis result with CONSULT or perform self-diagnosis STEP 4 before referring to the following flow chart.

EF &
EC



FE

CL

MT

AT

PD

FA

RA

BR

ST

BF

HA

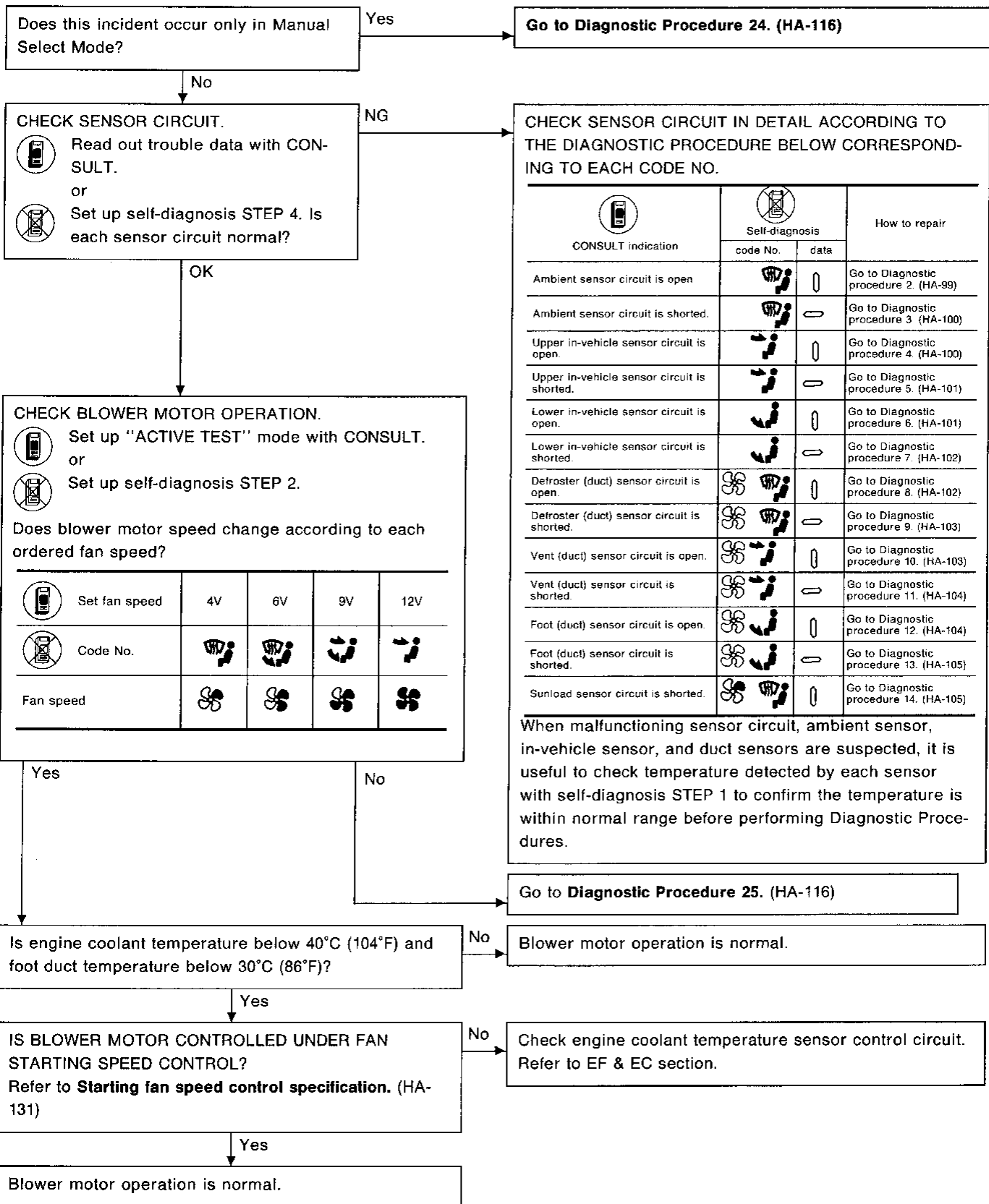
EL

IDX

Preliminary Check (Cont'd)

PRELIMINARY CHECK 5

Blower motor operation is malfunctioning.



TROUBLE DIAGNOSES — Auto Air Conditioner

Preliminary Check (Cont'd)

PRELIMINARY CHECK 6

Magnet clutch does not engage.

CHECK SENSOR CIRCUIT.

- Read out trouble data with CONSULT.
- or
- Set up self-diagnosis STEP 4. Is each sensor circuit normal?

NG

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

CONSULT indication	Self-diagnosis		How to repair
	code No.	data	
Ambient sensor circuit is open		0	Go to Diagnostic procedure 2. (HA-99)
Ambient sensor circuit is shorted.		-	Go to Diagnostic procedure 3. (HA-100)
Upper in-vehicle sensor circuit is open.		0	Go to Diagnostic procedure 4. (HA-100)
Upper in-vehicle sensor circuit is shorted.		-	Go to Diagnostic procedure 5. (HA-101)
Lower in-vehicle sensor circuit is open.		0	Go to Diagnostic procedure 6. (HA-101)
Lower in-vehicle sensor circuit is shorted.		-	Go to Diagnostic procedure 7. (HA-102)
Defroster (duct) sensor circuit is open.		0	Go to Diagnostic procedure 8. (HA-102)
Defroster (duct) sensor circuit is shorted.		-	Go to Diagnostic procedure 9. (HA-103)
Vent (duct) sensor circuit is open.		0	Go to Diagnostic procedure 10. (HA-103)
Vent (duct) sensor circuit is shorted.		-	Go to Diagnostic procedure 11. (HA-104)
Foot (duct) sensor circuit is open.		0	Go to Diagnostic procedure 12. (HA-104)
Foot (duct) sensor circuit is shorted.		-	Go to Diagnostic procedure 13. (HA-105)
Sunload sensor circuit is shorted.		0	Go to Diagnostic procedure 14. (HA-105)

OK

CHECK MAGNET CLUTCH OPERATION.

- Set up "ACTIVE TEST" mode with CONSULT.
- or
- Set up self-diagnosis STEP 2.

Check if magnet clutch engages according to order from CONSULT or each code No.

Set fan speed	4V	6V	9V	12V
Code No.				
Fan speed				

NG

When malfunctioning sensor circuit, ambient sensor, in-vehicle sensor, and duct sensors are suspected, it is useful to check temperature detected by each sensor with self-diagnosis STEP 1 to confirm the temperature is within normal range before performing Diagnostic Procedures.

OK

Magnet clutch control system is normal.
Refer to **MAGNET CLUTCH CONTROL.** (HA-131)

CHECK REFRIGERANT.
Connect manifold gauge then check system pressure.

NG

Check for refrigerant leaks.

OK

Go to **Diagnostic Procedure 19.** (HA-110)

GI

MA

EM

LC

EF & EC

FE

CL

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AT

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HA

EL

IDX



TROUBLE DIAGNOSES — Auto Air Conditioner

Preliminary Check (Cont'd)

PRELIMINARY CHECK 7







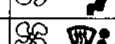


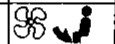



Discharged air temperature does not change.

CHECK SENSOR CIRCUIT.

 Read out trouble data with CONSULT.
or
 Set up self-diagnosis STEP 4. Is each sensor circuit normal?



NG

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







CONSULT indication	Self-diagnosis		How to repair
	code No.	data	
Ambient sensor circuit is open			Go to Diagnostic procedure 2. (HA-99)
Ambient sensor circuit is shorted.		—	Go to Diagnostic procedure 3. (HA-100)
Upper in-vehicle sensor circuit is open.			Go to Diagnostic procedure 4. (HA-100)
Upper in-vehicle sensor circuit is shorted.		—	Go to Diagnostic procedure 5. (HA-101)
Lower in-vehicle sensor circuit is open.			Go to Diagnostic procedure 6. (HA-101)
Lower in-vehicle sensor circuit is shorted.		—	Go to Diagnostic procedure 7. (HA-102)
Defroster (duct) sensor circuit is open.			Go to Diagnostic procedure 8. (HA-102)
Defroster (duct) sensor circuit is shorted.		—	Go to Diagnostic procedure 9. (HA-103)
Vent (duct) sensor circuit is open.			Go to Diagnostic procedure 10. (HA-103)
Vent (duct) sensor circuit is shorted.		—	Go to Diagnostic procedure 11. (HA-104)
Foot (duct) sensor circuit is open.			Go to Diagnostic procedure 12. (HA-104)
Foot (duct) sensor circuit is shorted.		—	Go to Diagnostic procedure 13. (HA-105)
Sunload sensor circuit is shorted.			Go to Diagnostic procedure 14. (HA-105)

When malfunctioning sensor circuit, ambient sensor, in-vehicle sensor, and duct sensors are suspected, it is useful to check temperature detected by each sensor with self-diagnosis STEP 1 to confirm the temperature is within normal range before performing Diagnostic Procedures.

CHECK AIR MIX DOOR OPERATION.

 Set up "ACTIVE TEST" mode with CONSULT.
or
 Set up self-diagnosis STEP 2.

Check if discharge air temperature changes as in following chart.

 Set magnet clutch operation	OFF	ON
 Code No.	 	 
Magnet clutch operation	OFF	ON

OK

OK

Air mix door control system is normal. Refer to **Specification of air mix door control.** (HA-125)

NG

CHECK AIR MIX DOOR MECHANISM.
Refer to **Control Linkage Adjustment.** (HA-122)

NG

Repair or adjust.

OK

Go to **Diagnostic Procedure 15.** (HA-106)

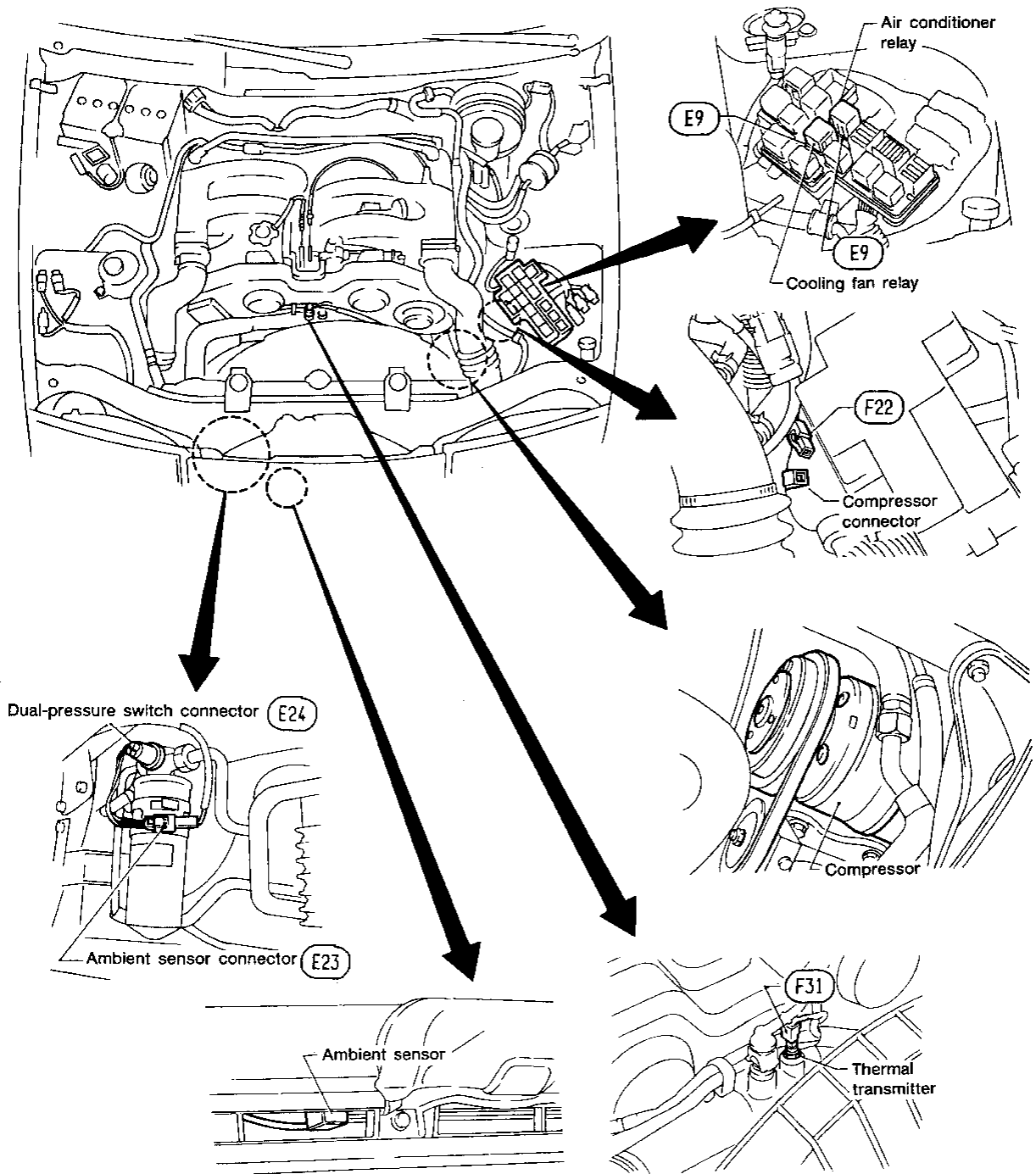
PRELIMINARY CHECK 8

Noise

Refer to page HA-48.

Harness Layout for A/C System

Engine compartment



GI

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ST

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HA

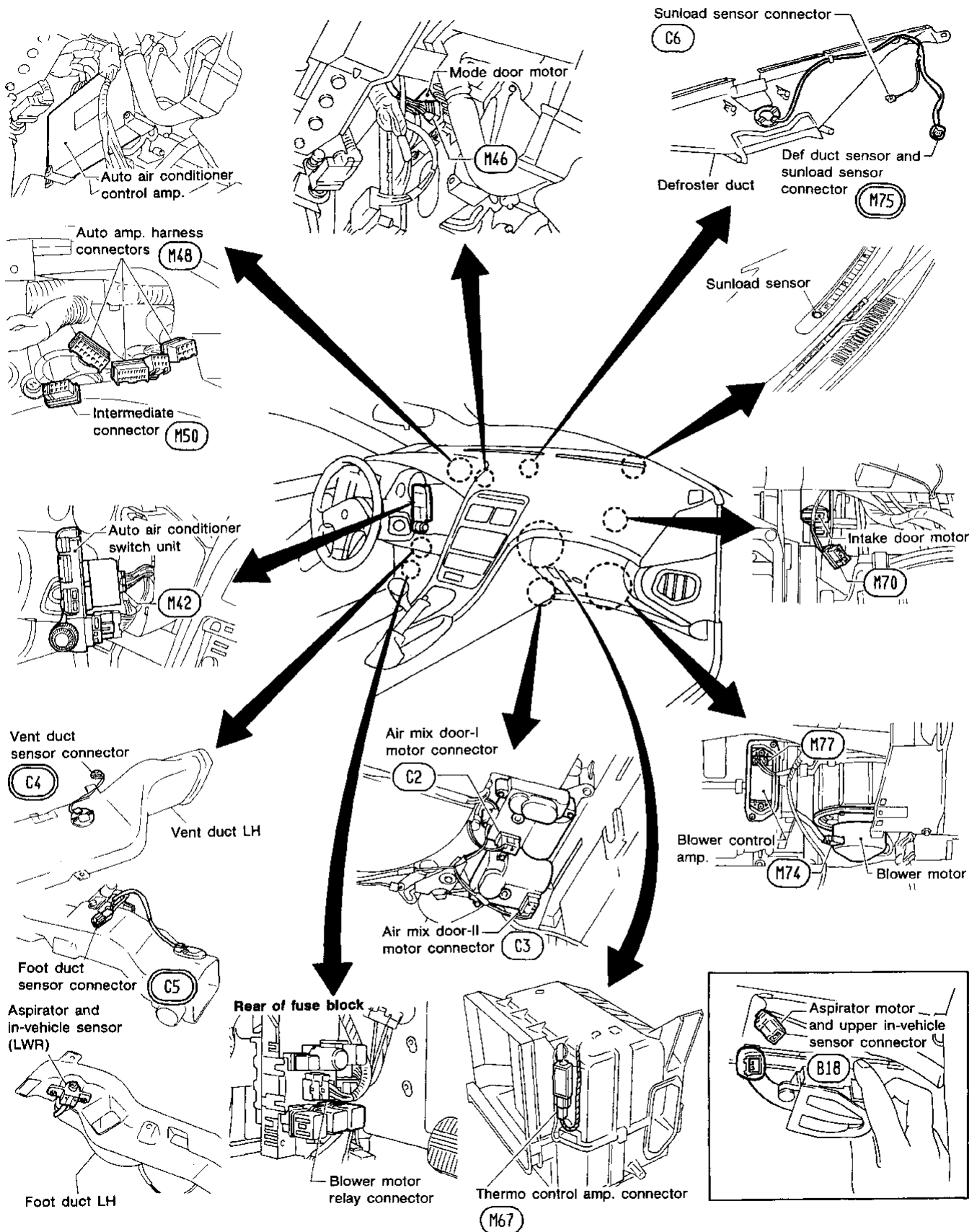
EL

IDX

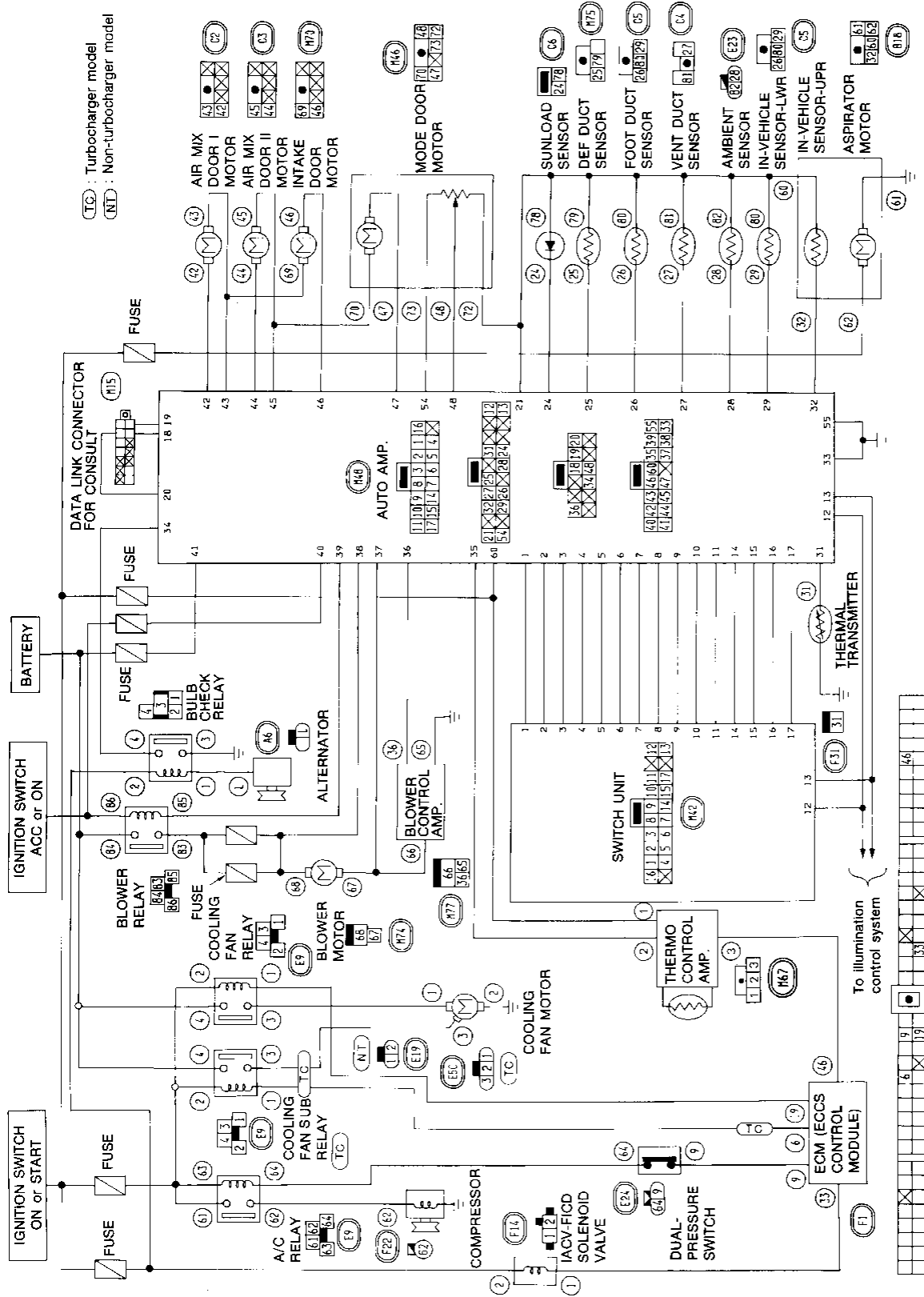
TROUBLE DIAGNOSES — Auto Air Conditioner

Harness Layout for A/C System (Cont'd)

Passenger compartment



Circuit Diagram for Quick Pinpoint Check



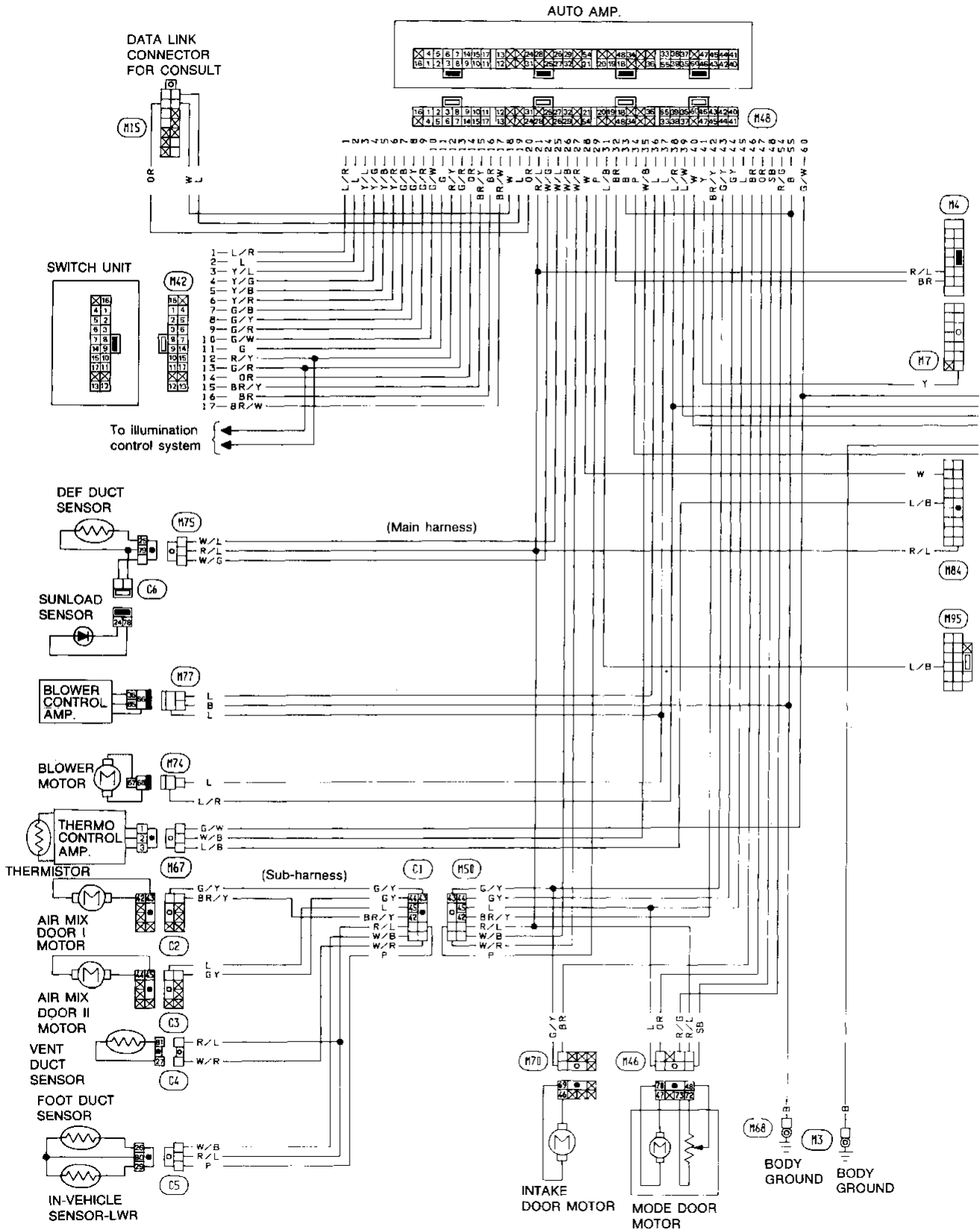
- All connectors shown in this illustration are unit side connectors.
- The unit side connectors with a double circle "O" are connected to the harness side connectors shown in the "Harness Layout for A/C System". (See pages HA-93 - HA-94.)
- The terminal numbers in the connector coincide with the circuit numbers surrounded by a single circle "O".

GI
 MA
 EM
 LC
 FF
 FC
 FE
 CL
 MT
 AT
 PD
 FA
 RA
 BR
 ST
 BF
HA
 EL
 IDX

TROUBLE DIAGNOSES — Auto Air Conditioner

Wiring Diagram

(TC) : Turbocharger model
 (NT) : Non-turbocharger model



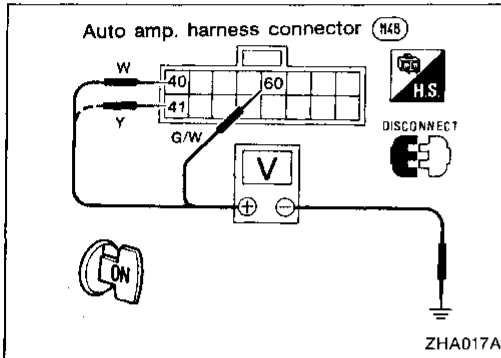
Main Power Supply and Ground Circuit Check POWER SUPPLY CIRCUIT CHECK FOR A/C SYSTEM

Check power supply circuit for air conditioning system.

Refer to "POWER SUPPLY ROUTING" in section EL and Wiring Diagram — Auto Air Conditioner.

AUTO AMP. REMOVAL

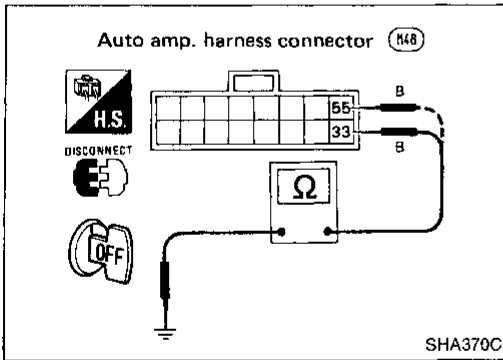
1. Remove driver side instrument lower lid.
2. Remove vent duct.
3. Remove auto amp. with harness connected.



AUTO AMP. CHECK

1. Disconnect auto amp. harness connectors.
2. Connect voltmeter from harness side.
3. Measure voltage across terminal No. ④①, ④② or ④③ and body ground.

Voltmeter terminal		Voltage (Approx.)
⊕	⊖	
④①	Body ground	12V
④②		
④③		



Check body ground circuit for control unit with ignition switch OFF.

1. Disconnect auto amp. harness connector.
2. Connect ohmmeter from harness side.
3. Check continuity between terminal No. ④③ or ④⑤ and body ground.

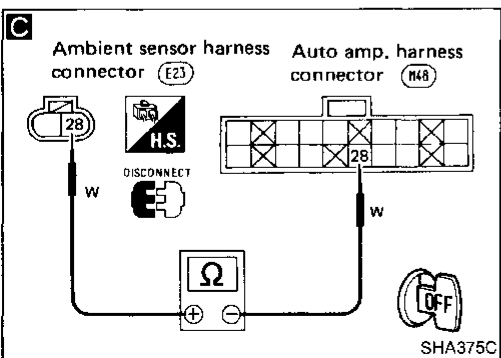
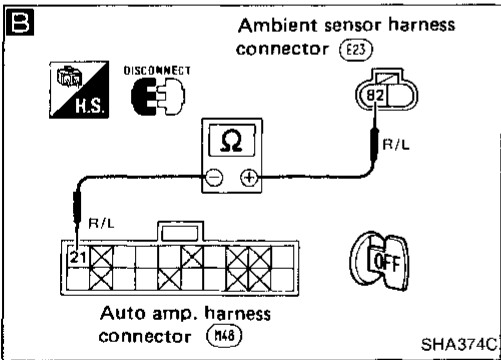
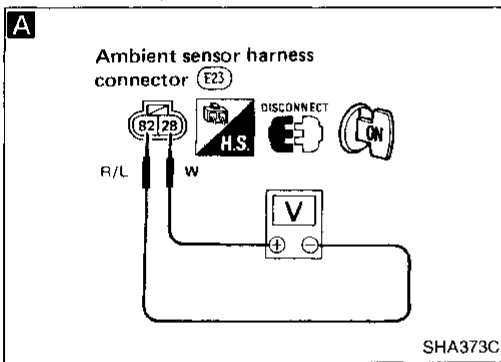
Ohmmeter terminal		Continuity
⊕	⊖	
④③	Body ground	Yes
④⑤		

Diagnostic Procedure 1

SYMPTOM: Self-diagnosis detects intermittent short or open circuit in each sensor circuit.

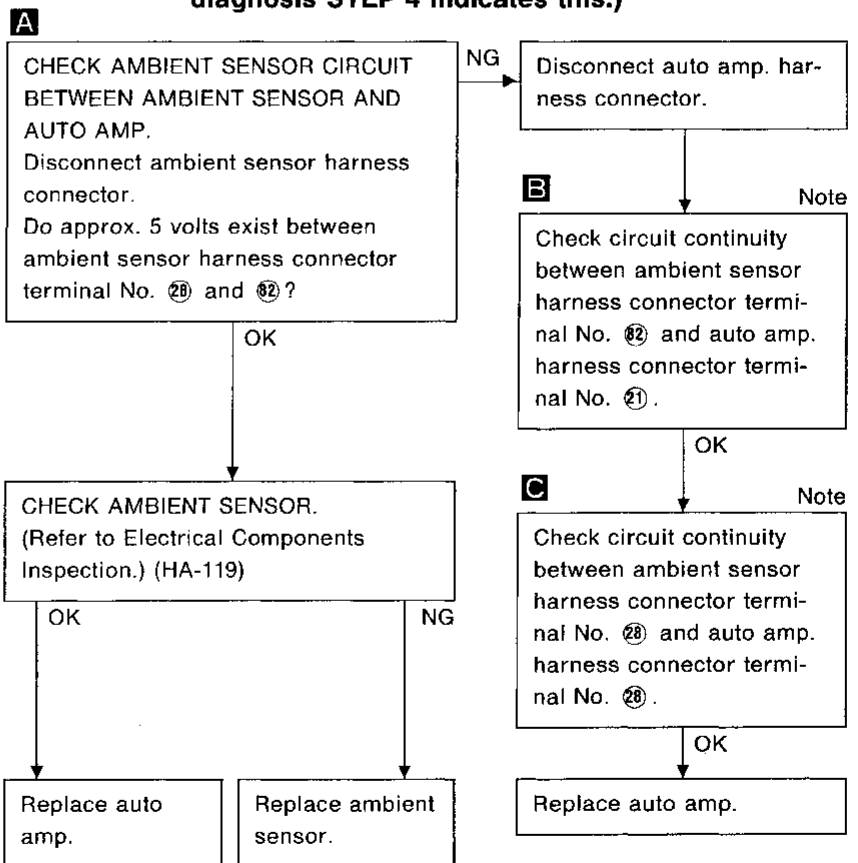
Check each connector connection as shown in the following table, and check each line's condition.

Malfunctioning circuit	Connector No. to be checked			
	Main harness	Engine room harness	Body harness	A/C sub-harness
Ambient sensor	(M48) (M84)	(E23) (E112)		
Upper in-vehicle sensor	(M4) (M48)		(B2) (B18)	
Lower in-vehicle sensor	(M48) (M50)			(C5) (C1)
DEF duct sensor	(M48) (M75)			
VENT duct sensor	(M48) (M50)			(C1) (C4)
Foot duct sensor	(M48) (M50)			(C5) (C1)
Sunload sensor	(M48) (M75)			(C6)

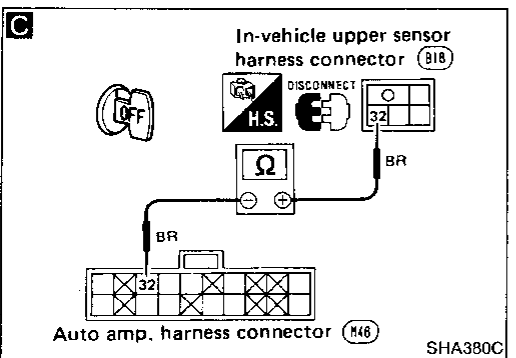
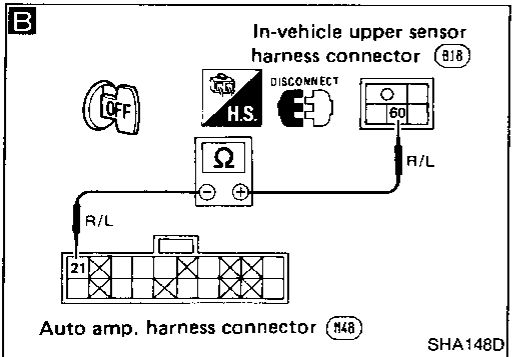
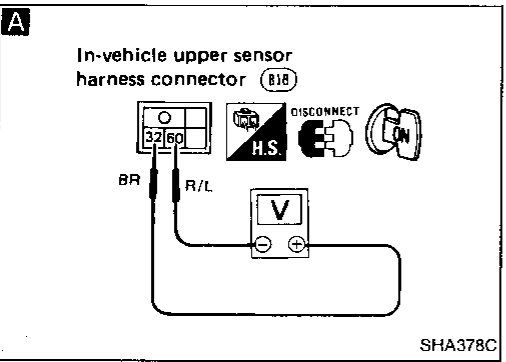
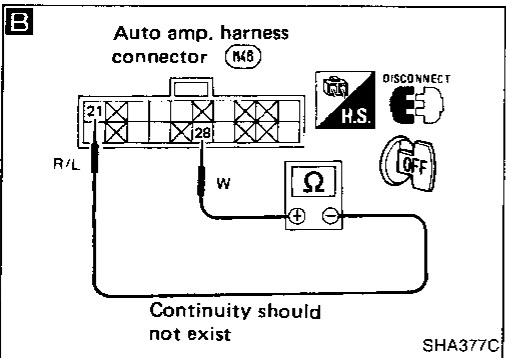
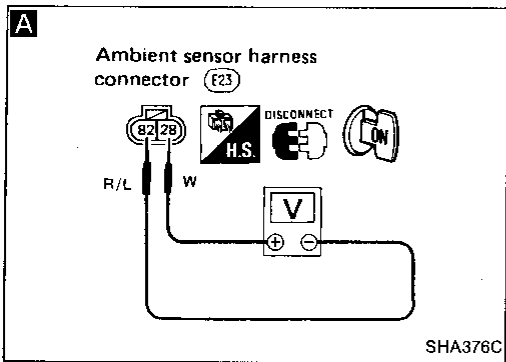


Diagnostic Procedure 2

SYMPTOM: Ambient sensor circuit is open. (CONSULT or self-diagnosis STEP 4 indicates this.)



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



Diagnostic Procedure 3

SYMPTOM: Ambient sensor circuit is shorted. (CONSULT or self-diagnosis STEP 4 indicates this.)

A

CHECK AMBIENT SENSOR CIRCUIT BETWEEN AMBIENT SENSOR AND AUTO AMP.
Disconnect ambient sensor harness connector.
Do approx. 5 volts exist between ambient sensor harness connector terminal No. 28 and 29?

NG → Disconnect auto amp. harness connector.

B Note

Check the circuit between auto amp. harness connector terminal No. 28 and 21 is not shorted.

OK → Replace auto amp.

OK → CHECK AMBIENT SENSOR. (Refer to Electrical Components Inspection.) (HA-119)

OK → Replace auto amp.
NG → Replace ambient sensor.

Diagnostic Procedure 4

SYMPTOM: In-vehicle upper sensor circuit is open. (CONSULT or self-diagnosis STEP 4 indicates this.)

A

CHECK IN-VEHICLE UPPER SENSOR CIRCUIT BETWEEN IN-VEHICLE UPPER SENSOR AND AUTO AMP.
Disconnect in-vehicle upper sensor harness connector.
Do approx. 5 volts exist between in-vehicle upper sensor harness connector terminal No. 32 and 60?

NG → Disconnect auto amp. harness connector.

B Note

Check circuit continuity between in-vehicle upper sensor harness connector terminal No. 60 and auto amp. harness connector terminal No. 21.

OK → **C** Note

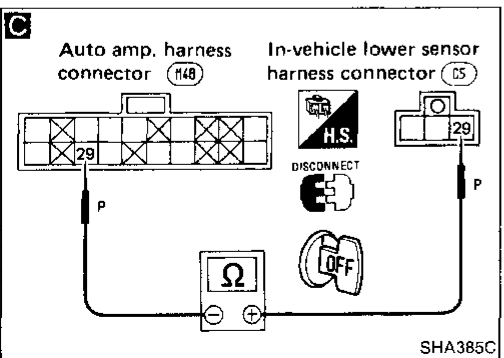
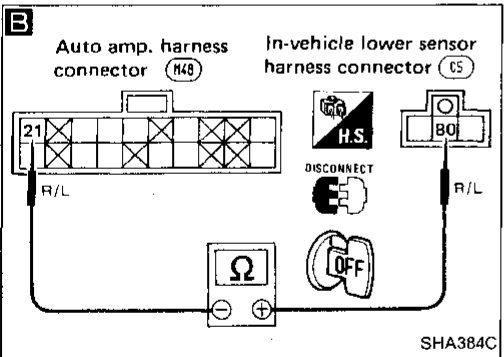
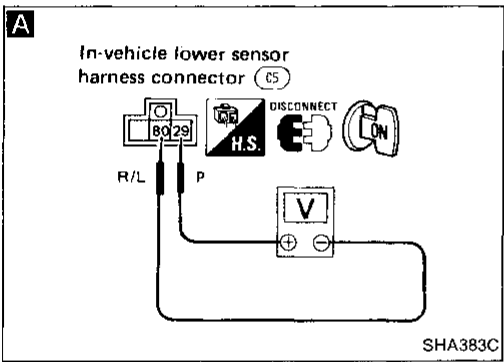
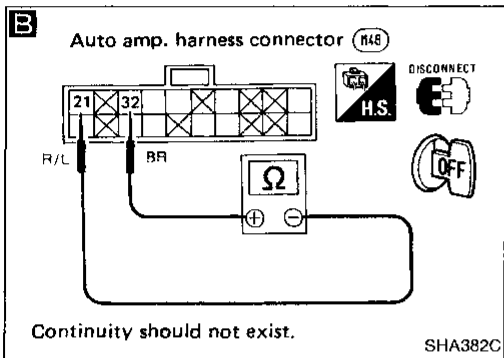
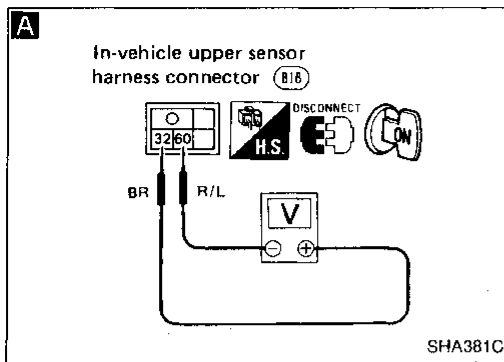
Check circuit continuity between in-vehicle upper sensor harness connector terminal No. 32 and auto amp. harness connector terminal No. 32.

OK → Replace auto amp.

OK → CHECK IN-VEHICLE UPPER SENSOR. (Refer to Electrical Components Inspection.) (HA-119)

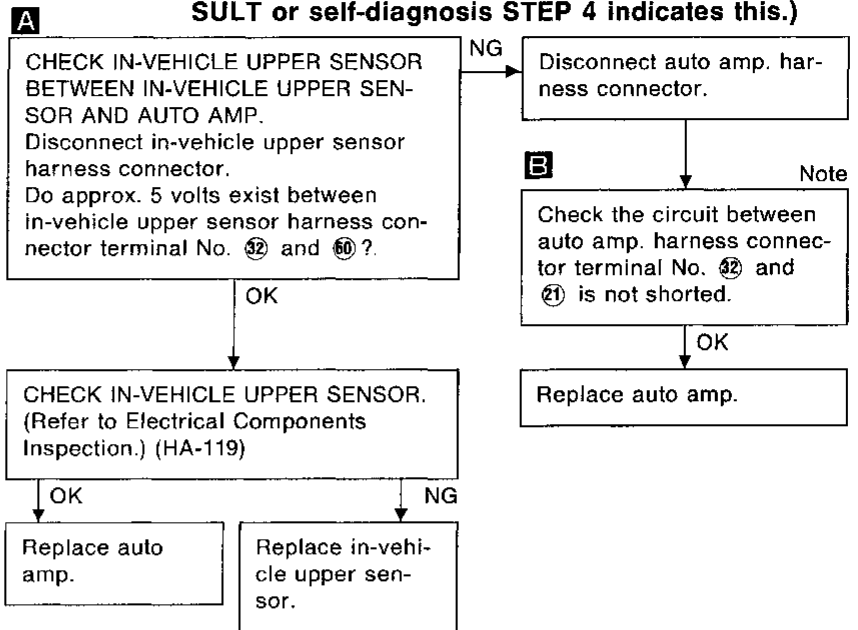
OK → Replace auto amp.
NG → Replace in-vehicle upper sensor.

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



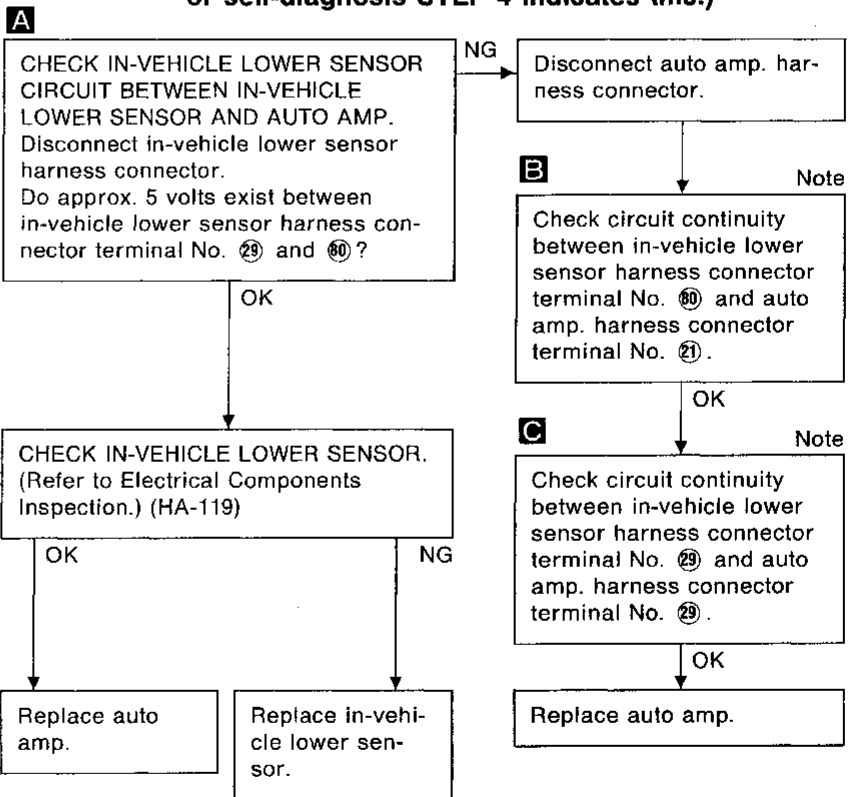
Diagnostic Procedure 5

SYMPTOM: In-vehicle upper sensor circuit is shorted. (CONSULT or self-diagnosis STEP 4 indicates this.)

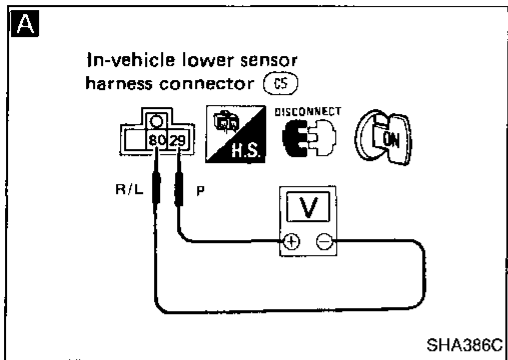


Diagnostic Procedure 6

SYMPTOM: In-vehicle lower sensor circuit is open. (CONSULT or self-diagnosis STEP 4 indicates this.)

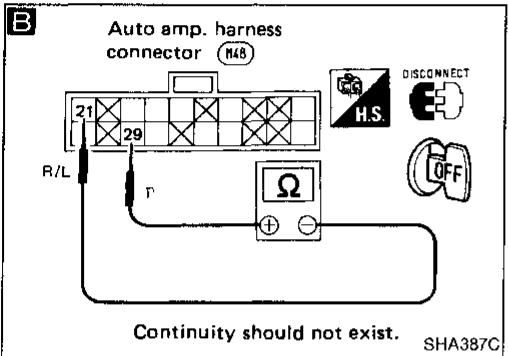
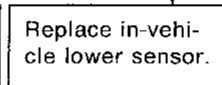
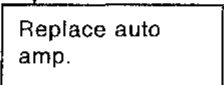
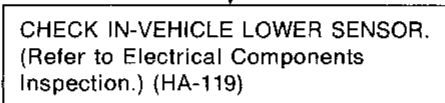
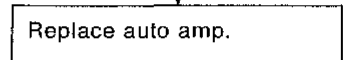
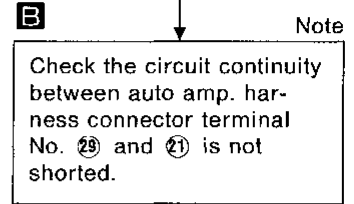
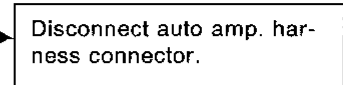
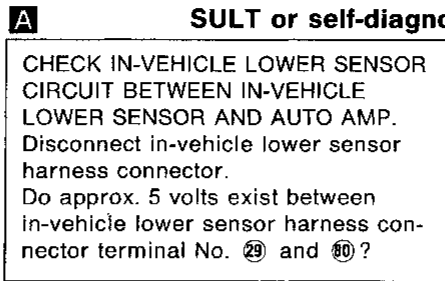


Note:
If the result is NG after checking circuit continuity, repair harness or connector.



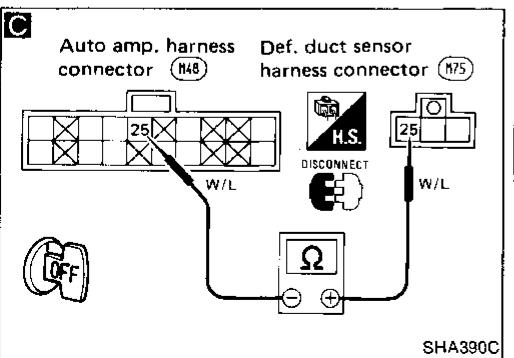
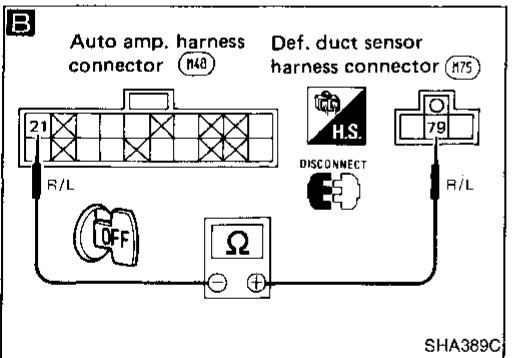
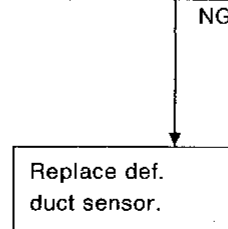
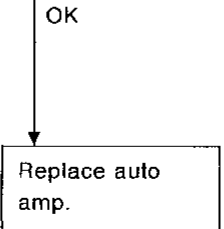
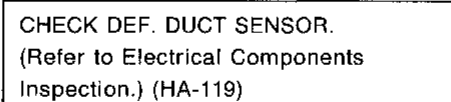
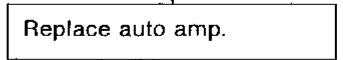
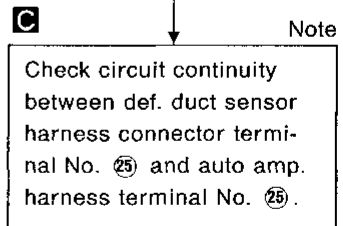
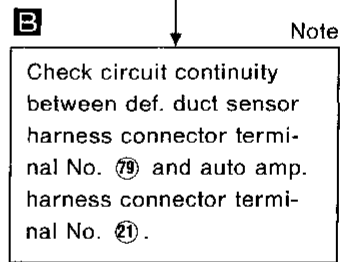
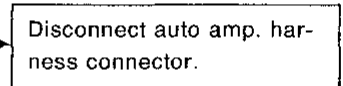
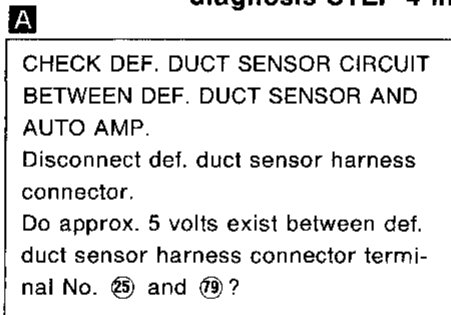
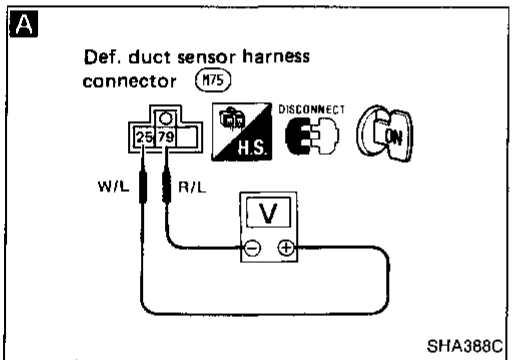
Diagnostic Procedure 7

SYMPTOM: In-vehicle lower sensor circuit is shorted. (CONSULT or self-diagnosis STEP 4 indicates this.)

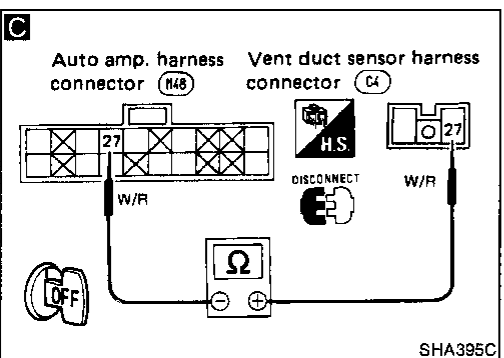
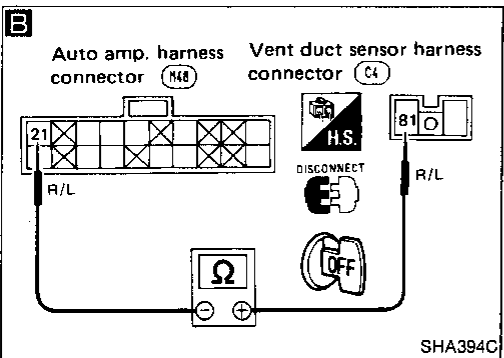
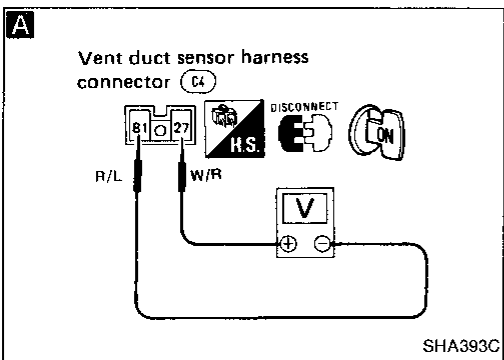
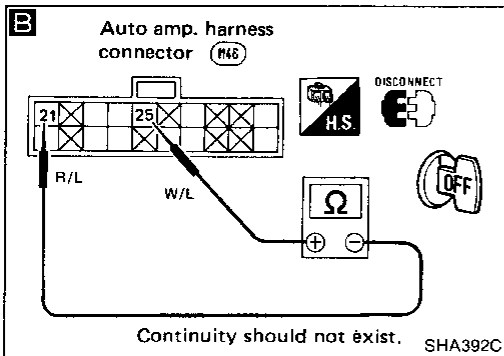
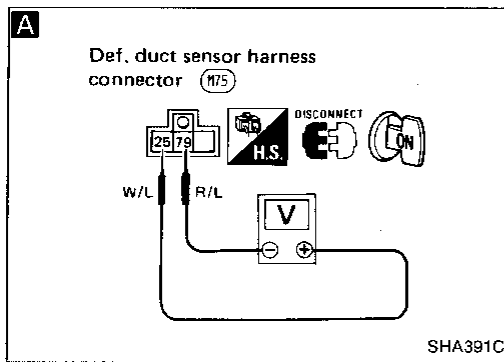


Diagnostic Procedure 8

SYMPTOM: Def. duct sensor circuit is open. (CONSULT or self-diagnosis STEP 4 indicates this.)

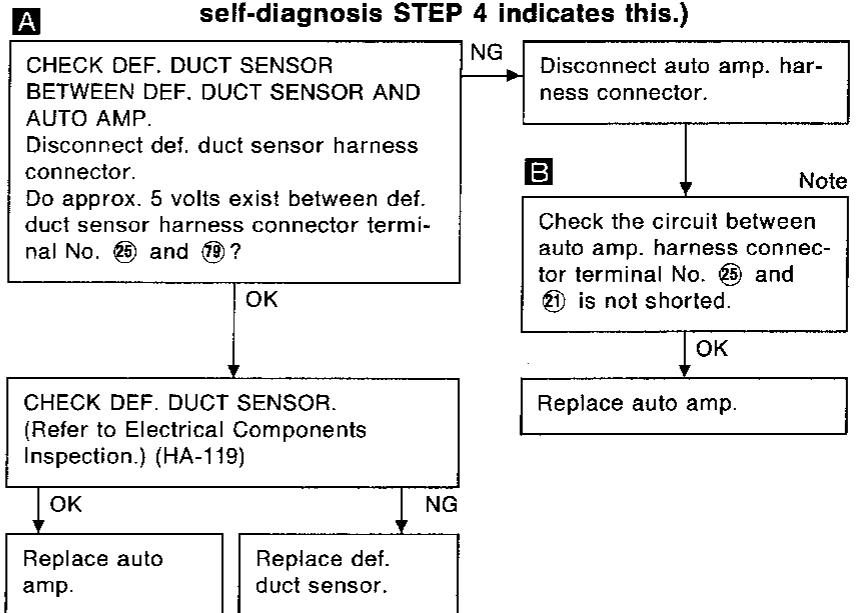


Note:
If the result is NG after checking circuit continuity, repair harness or connector.



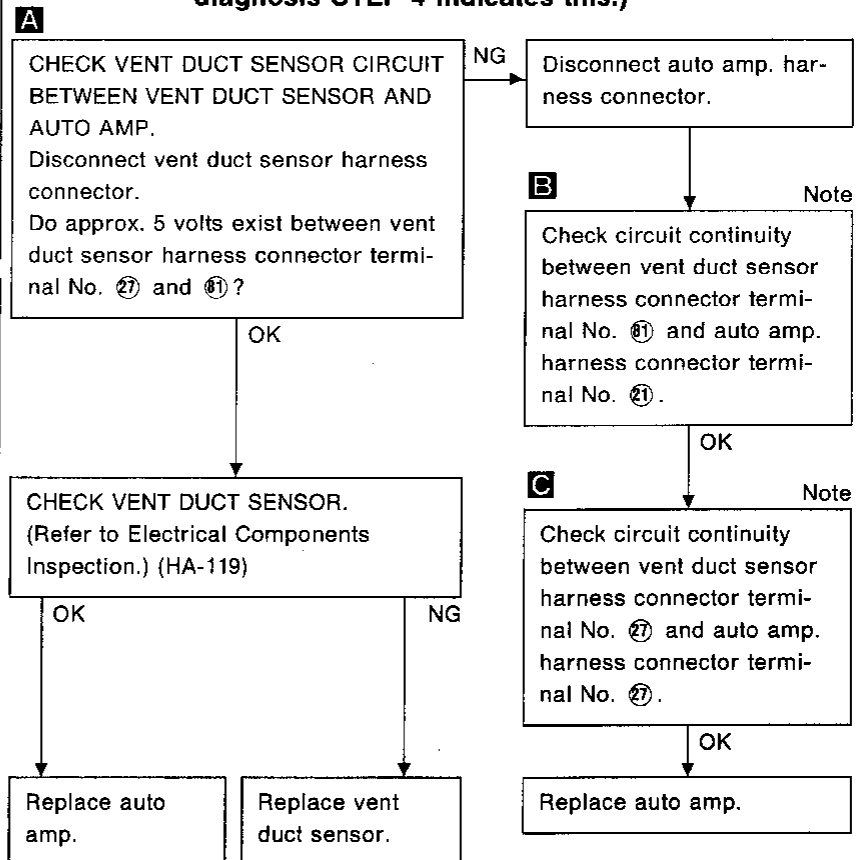
Diagnostic Procedure 9

SYMPTOM: Def. duct sensor circuit is shorted. (CONSULT or self-diagnosis STEP 4 indicates this.)

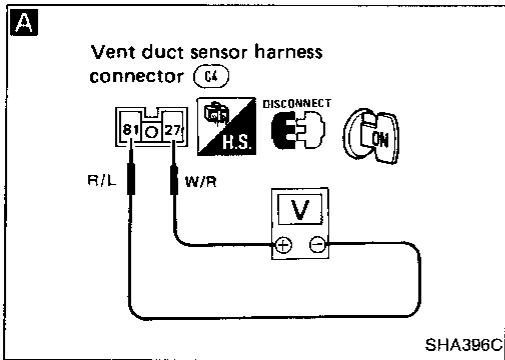


Diagnostic Procedure 10

SYMPTOM: Vent duct sensor circuit is open. (CONSULT or self-diagnosis STEP 4 indicates this.)

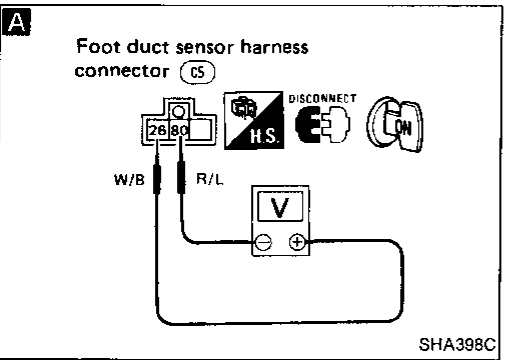
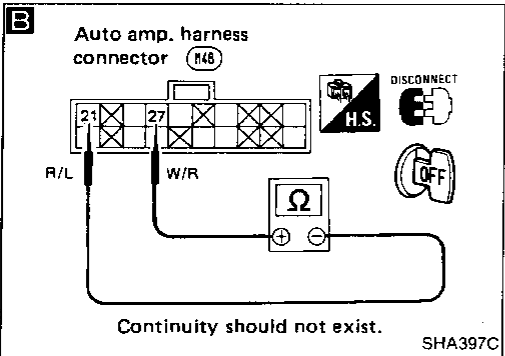
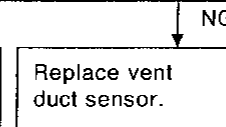
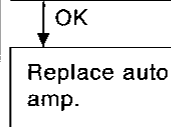
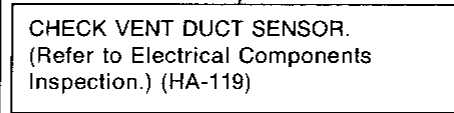
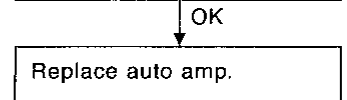
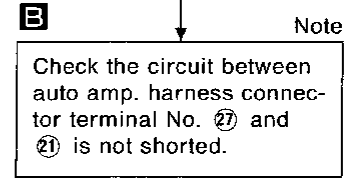
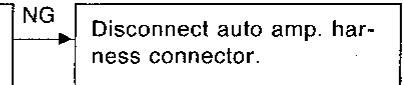
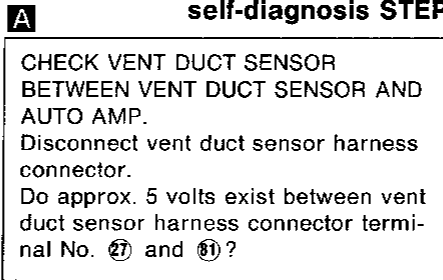


Note:
If the result is NG after checking circuit continuity, repair harness or connector.



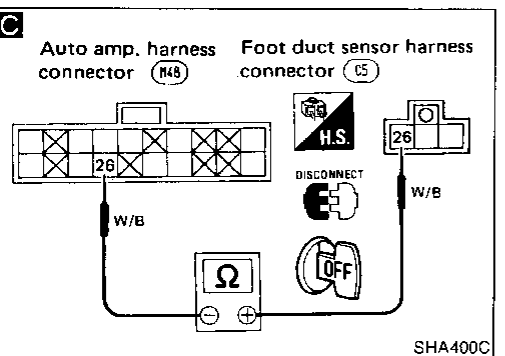
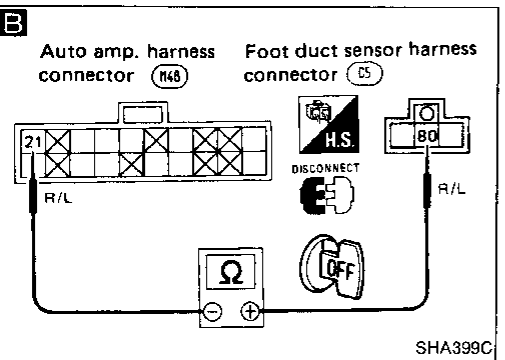
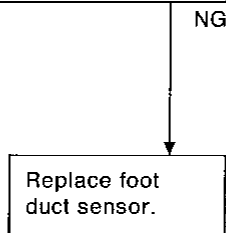
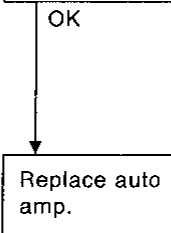
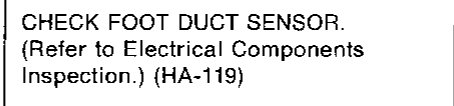
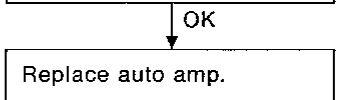
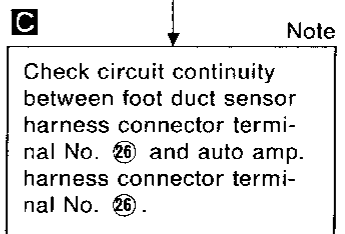
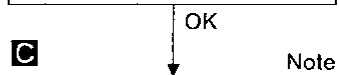
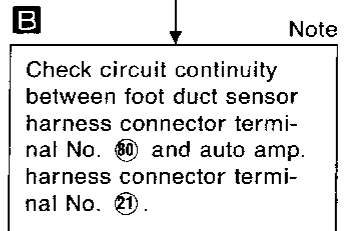
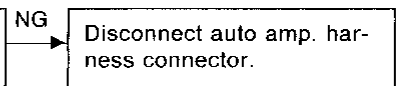
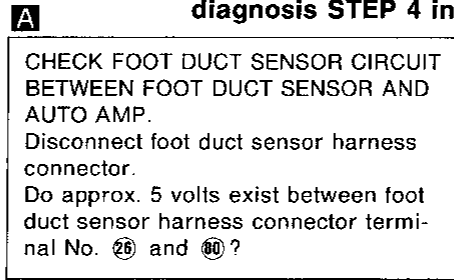
Diagnostic Procedure 11

SYMPTOM: Vent duct sensor circuit is shorted. (CONSULT or self-diagnosis STEP 4 indicates this.)



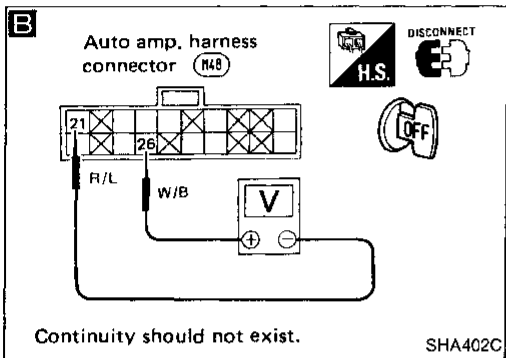
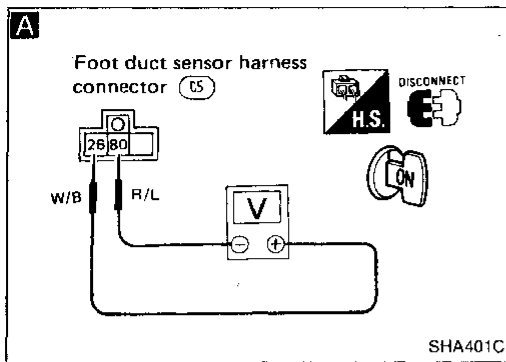
Diagnostic Procedure 12

SYMPTOM: Foot duct sensor circuit is open. (CONSULT or self-diagnosis STEP 4 indicates this.)



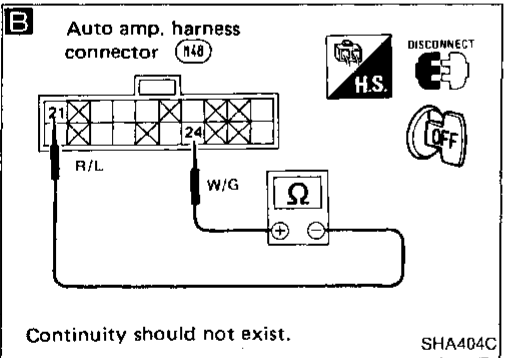
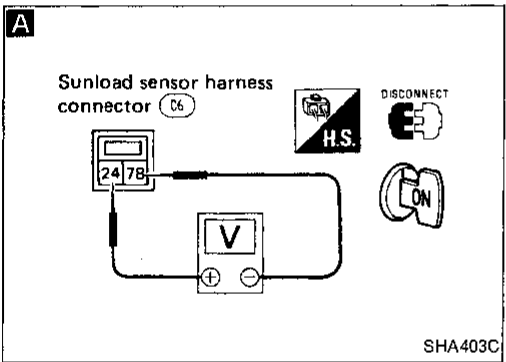
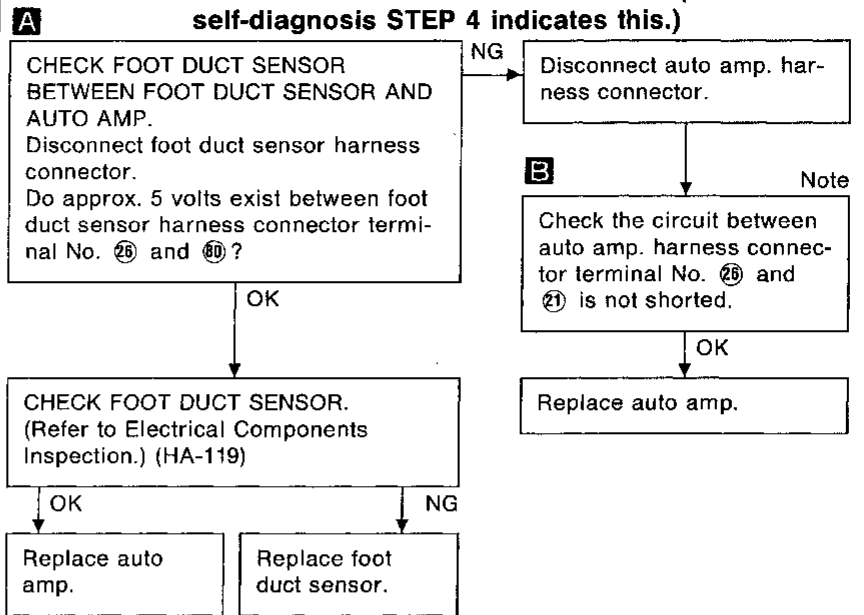
Note:

If the result is NG after checking insulation of each terminal, repair harness or connector.



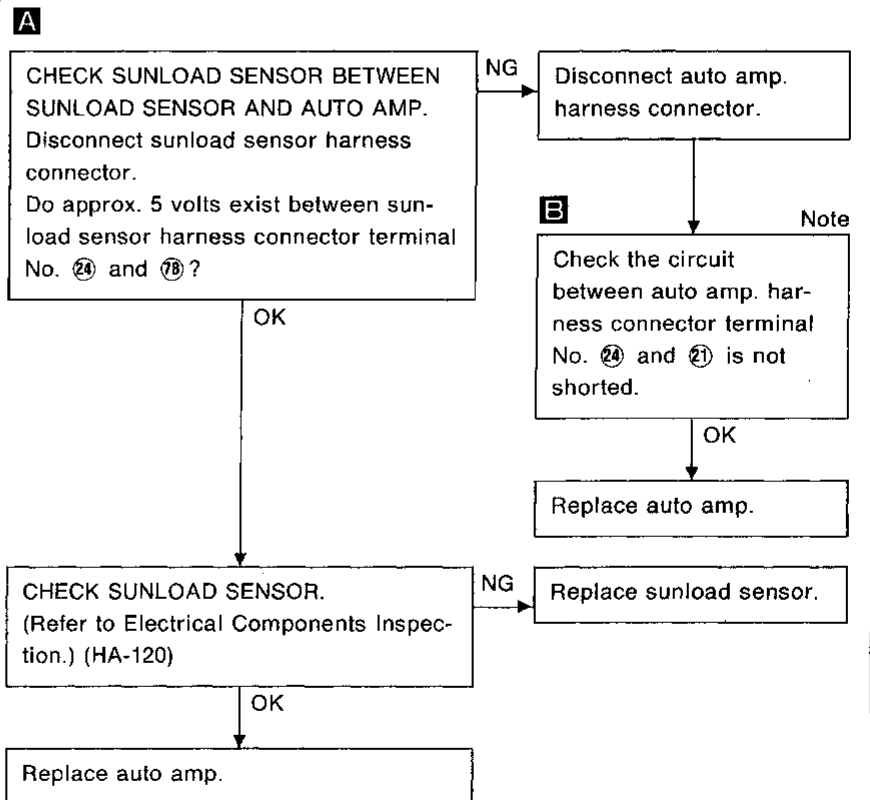
Diagnostic Procedure 13

SYMPTOM: Foot duct sensor circuit is shorted. (CONSULT or self-diagnosis STEP 4 indicates this.)



Diagnostic Procedure 14

SYMPTOM: Sunload sensor circuit is shorted. (CONSULT or self-diagnosis STEP 4 indicates this.)



Note:
If the result is NG after checking insulation of each terminal, repair harness or connector.

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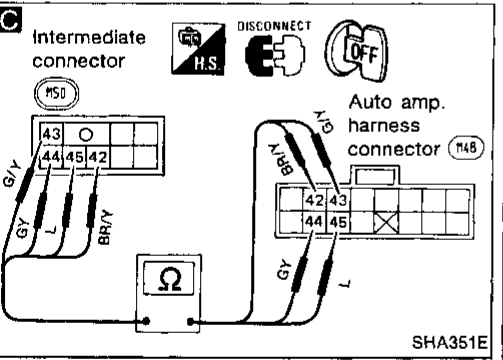
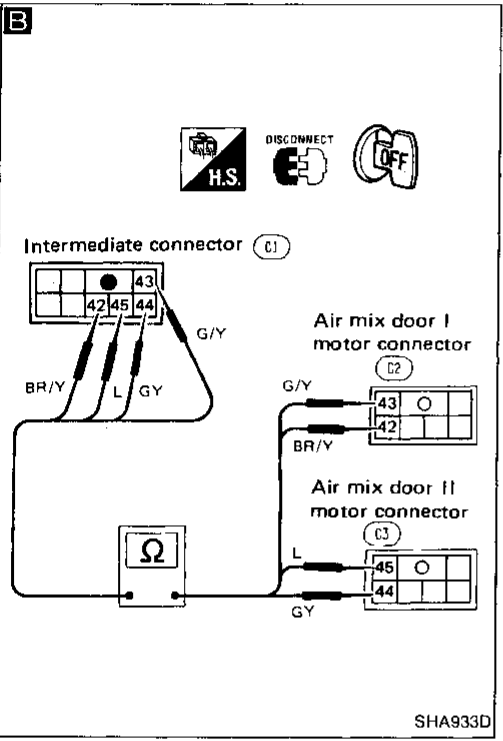
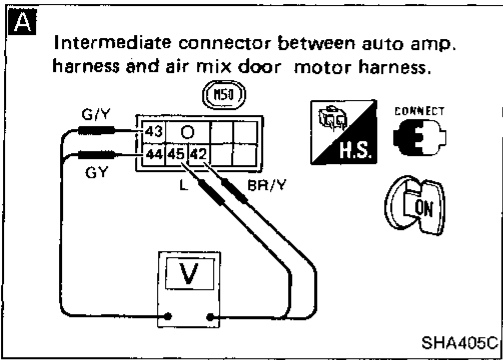
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Diagnostic Procedure 15

SYMPTOM: Air mix door does not operate normally.

- Read out self-diagnosis result with CONSULT or perform self-diagnosis STEP 4 before referring to the following flow chart.
- Remove combination meter assembly to make working space and reconnect air conditioner switch connector.

A CHECK FOR SIGNALS TO AIR MIX DOOR MOTOR.

Set up "ACTIVE TEST" mode with CONSULT.
 Set up self-diagnosis STEP 2.

Set air mix door position as shown in the following chart.
Check if approx. 10V exists for 3 seconds every 10 seconds between each terminal.*

Air mix door position	Code No.	Terminal No.			
		Air mix door I		Air mix door II	
		+	-	+	-
Full-Hot		43	42	45	44
Full-Cool		42	43	44	45

*: After two minutes power supply is automatically cut off.

C Check circuit continuity between auto amp. harness connector terminals and intermediate connector terminals.

Inter-mediate connector	Auto amp. connector	Continuity
42	42	Yes
43	43	Yes
44	44	Yes
45	45	Yes

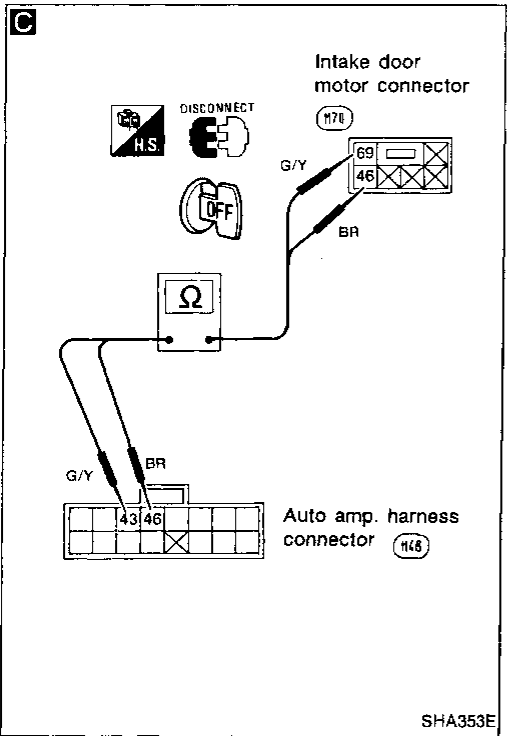
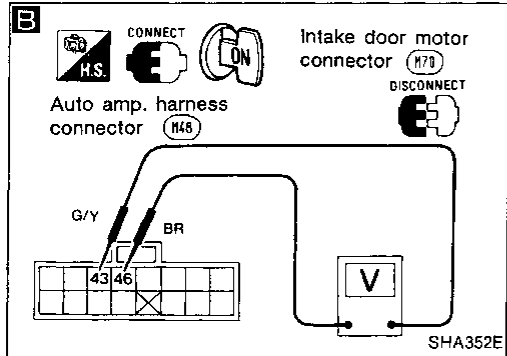
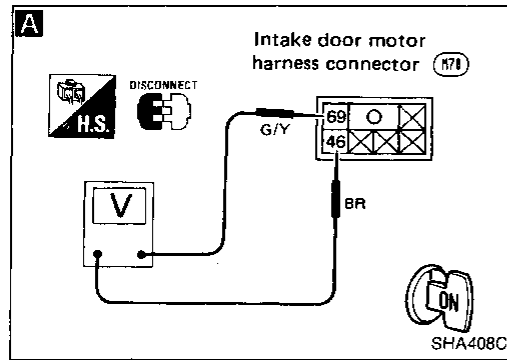
OK → Replace auto amp.
NG → Repair harness or connector.

B Check continuity between intermediate connector terminal and each air mix door motor harness connector terminal.

Intermediate connector	Air mix door I motor connector	Continuity
42	42	Yes
43	43	Yes

Intermediate connector	Air mix door I motor connector	Continuity
44	44	Yes
45	45	Yes

OK → Replace air mix door motor.
NG → Repair harness or connector.



Diagnostic Procedure 16

SYMPTOM: Intake door does not operate normally.

- Read out self-diagnosis result with CONSULT or perform self-diagnosis STEP 4 before referring to the following flow chart.

A

CHECK FOR SIGNALS TO INTAKE DOOR MOTOR.
Disconnect intake door motor harness connector.

- Ⓜ Set up "ACTIVE TEST" mode with CONSULT.
- ⌚ Set up self-diagnosis STEP 2.

Set intake door position as shown in the following chart.
Check if approx. 10V exists for 2.5 seconds between each terminal.

Intake door position	Code No.	Terminal No.	
		+	-
FRE/REC → REC		④⑧	④⑨
REC → FRE		④⑨	④⑧

B

CHECK OUTPUT OF AUTO AMP.

- Ⓜ Set up "ACTIVE TEST" mode with CONSULT.
- ⌚ Set up self-diagnosis STEP 2.

Set intake door position as shown in the following chart.
Check if approx. 10V exists for 2.5 seconds between each terminal.

Intake door position	Code No.	Terminal No.	
		+	-
FRE/REC → REC		④⑧	④③
REC → FRE		④③	④⑧

OK

Replace intake door motor.

NG

Replace auto amp.

OK

NG

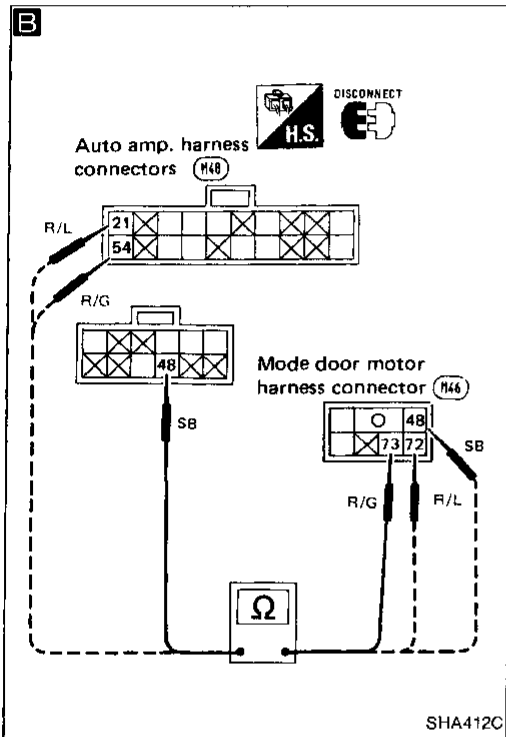
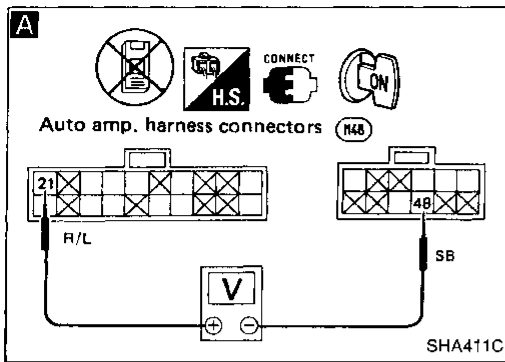
C

Check continuity between auto amp. harness connector terminal No. ④⑥ and intake door motor harness connector terminal No. ④⑧. Check auto amp. harness connector terminal No. ④③ and intake door motor harness connector terminal No. ④⑨.

NG

Repair harness or connector.

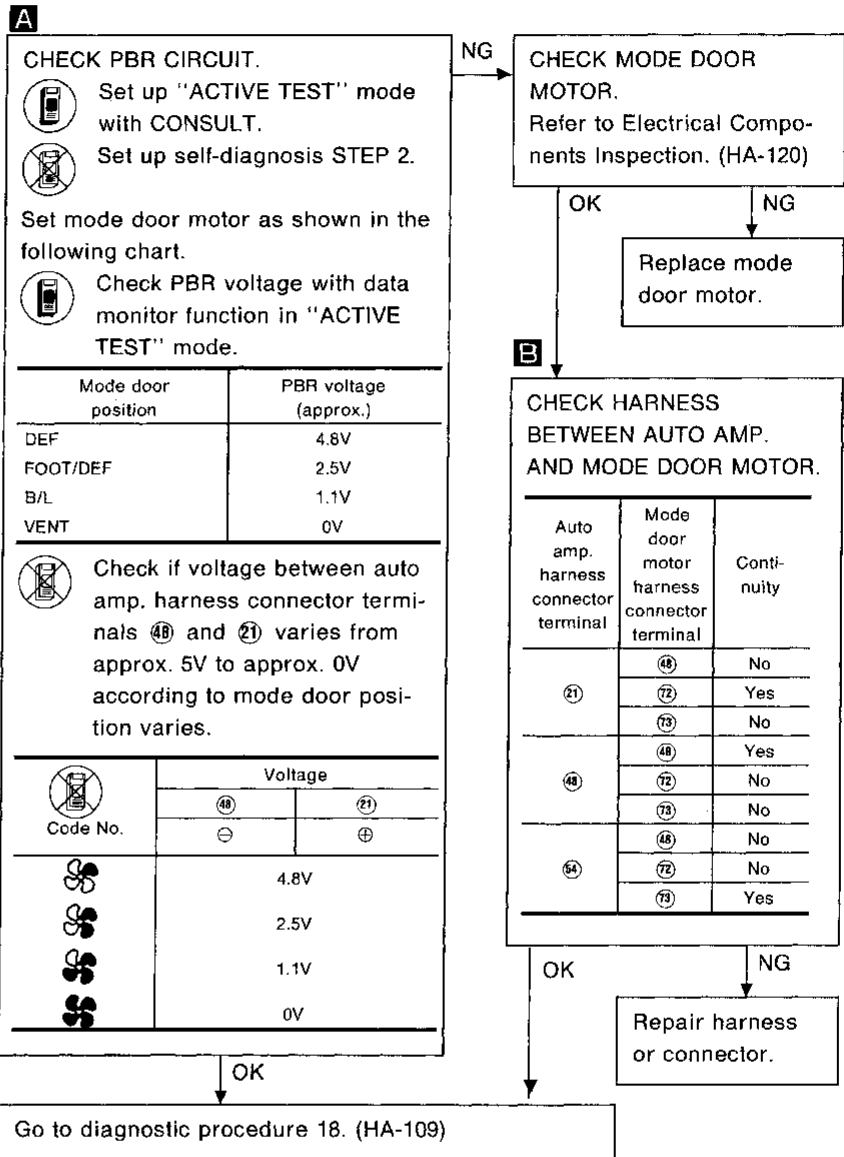
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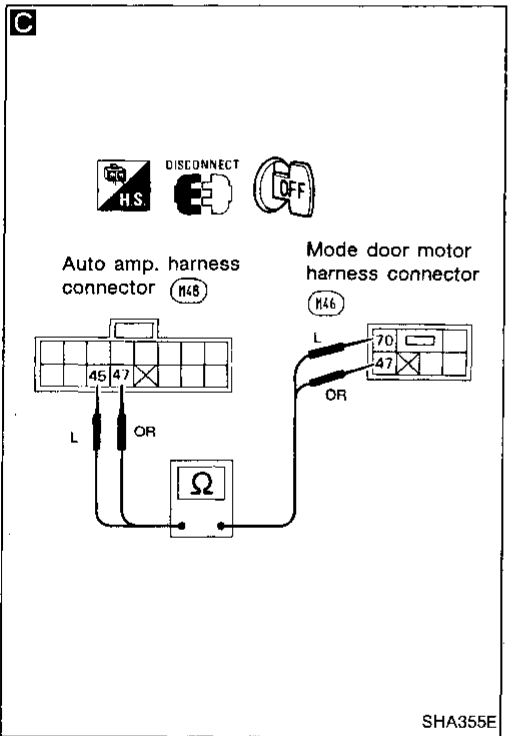
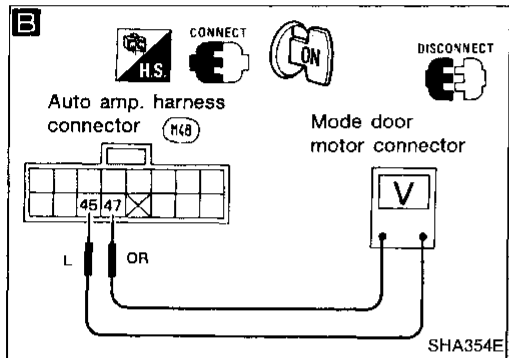
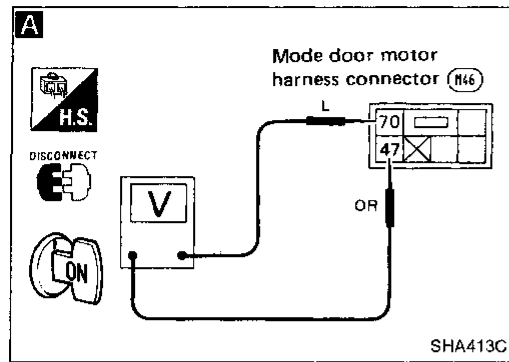


Diagnostic Procedure 17

SYMPTOM: Mode door does not operate normally.

- Read out self-diagnosis result with CONSULT or perform self-diagnosis STEP 4 before referring to the following flow chart.

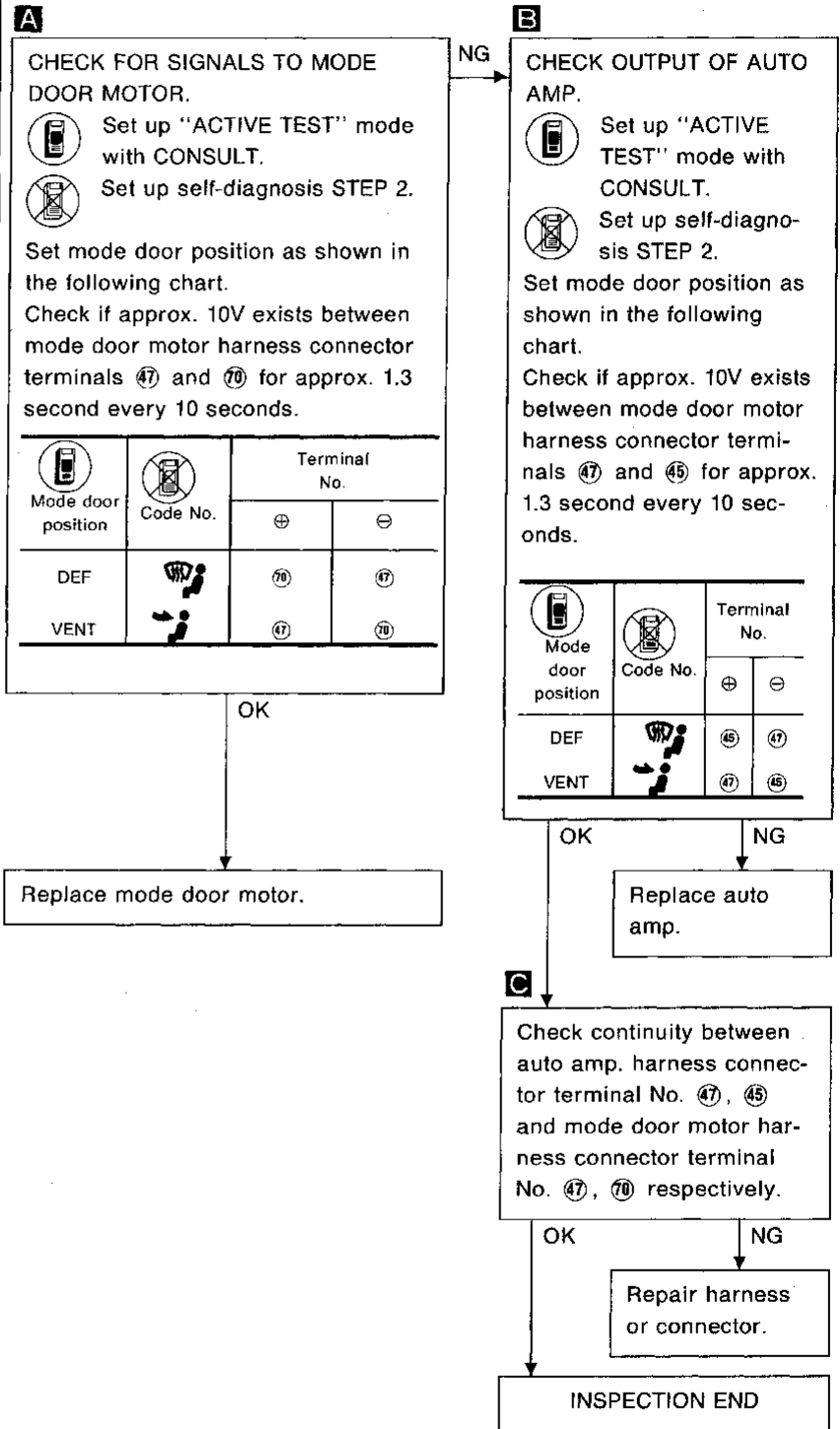




Diagnostic Procedure 18

SYMPTOM: Mode door does not move at all.

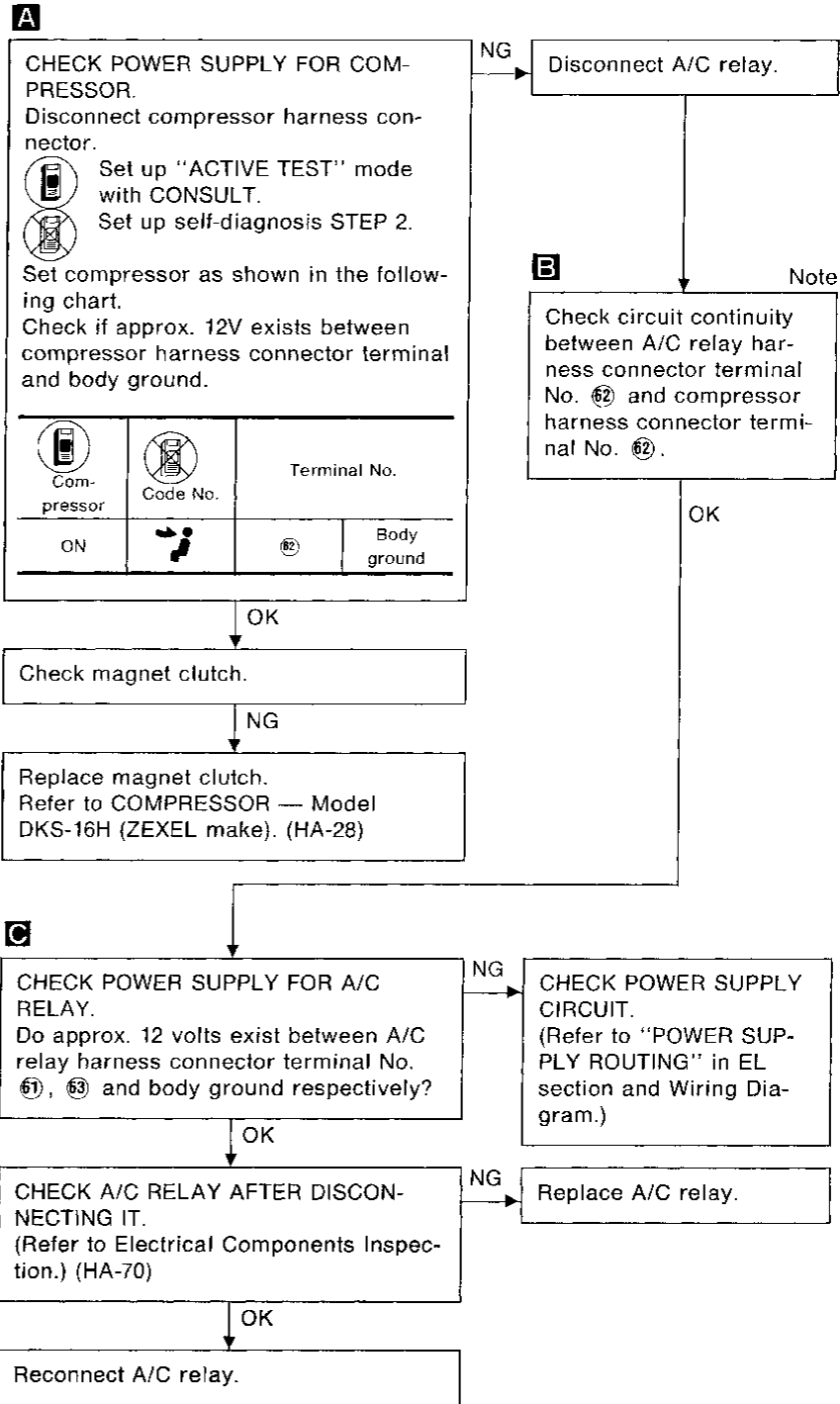
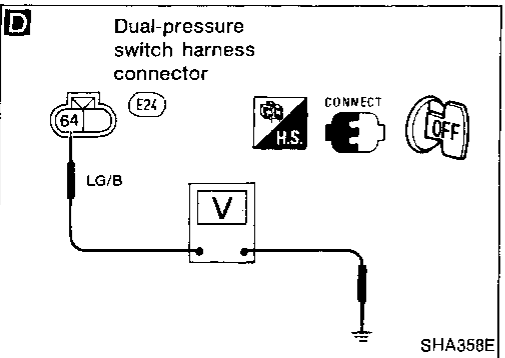
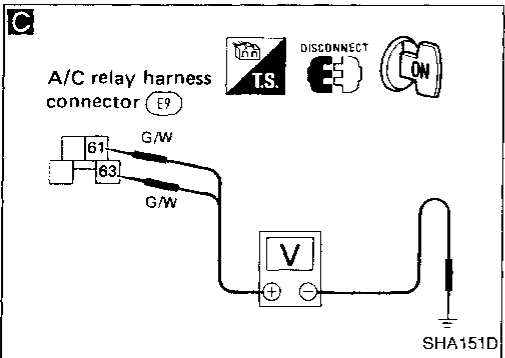
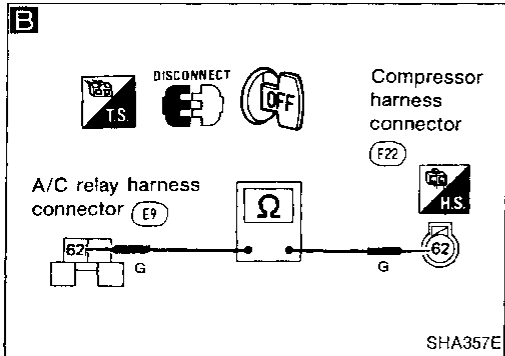
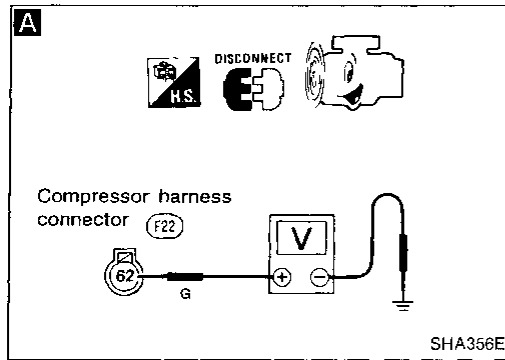
- Read out self-diagnosis result with CONSULT or perform self-diagnosis STEP 4 before referring to the following flow chart.



Diagnostic Procedure 19

SYMPTOM: Magnet clutch does not engage.

- Perform Preliminary check 6 before referring to the following flow chart.

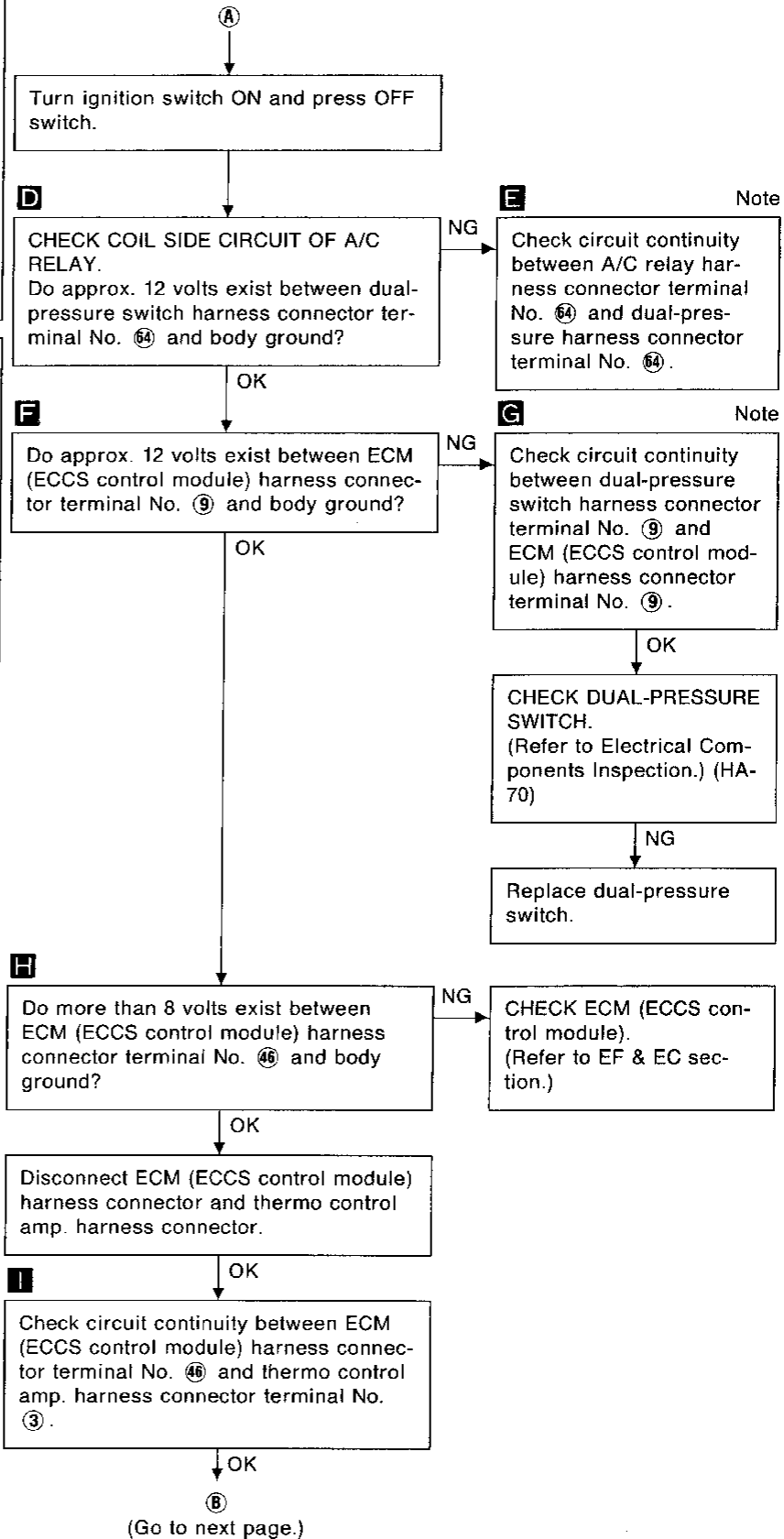
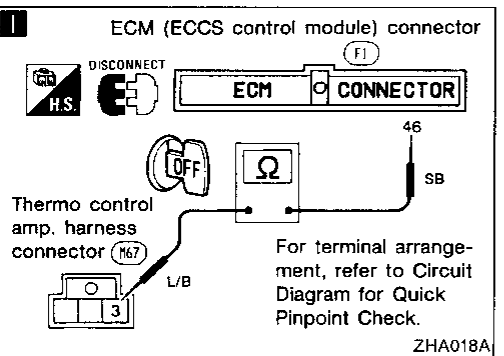
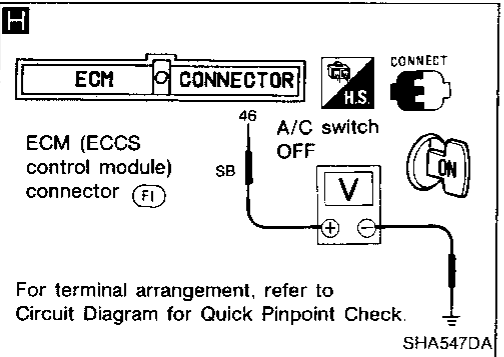
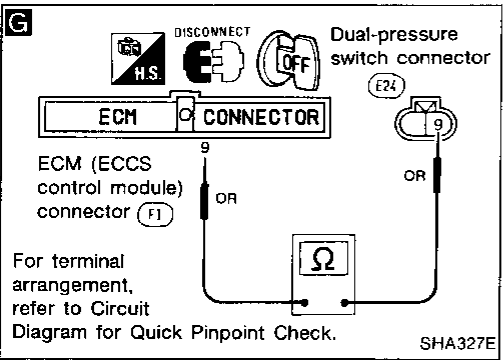
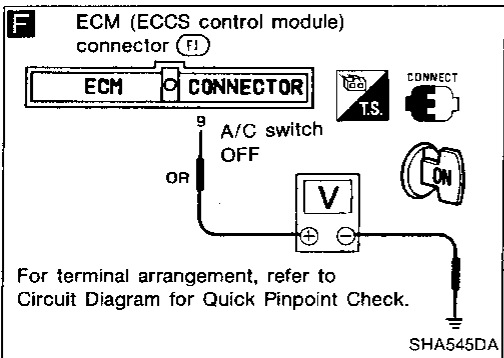
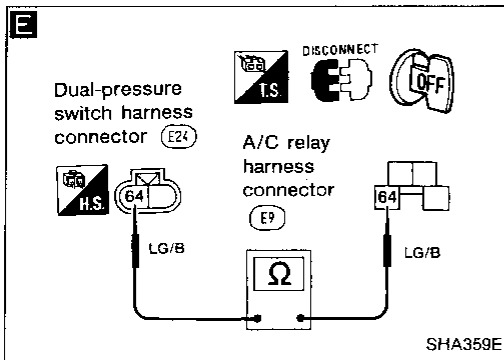


(Go to next page.)

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

TROUBLE DIAGNOSES — Auto Air Conditioner

Diagnostic Procedure 19 (Cont'd)

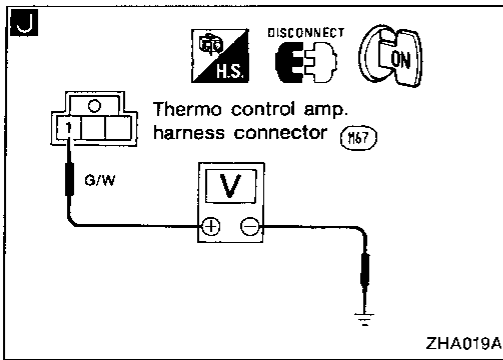


Note:
If the result is NG after checking circuit continuity, repair harness or connector.

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TROUBLE DIAGNOSES — Auto Air Conditioner

Diagnostic Procedure 19 (Cont'd)



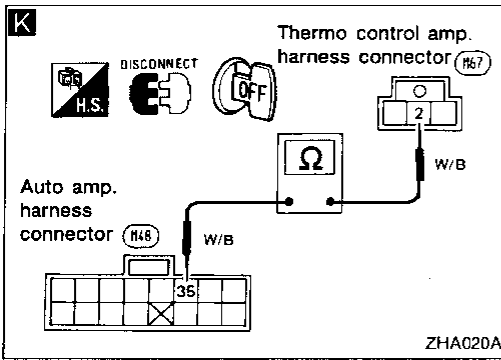
B

J

CHECK POWER SUPPLY FOR THERMO CONTROL AMP.
Do approx. 12 volts exist between thermo control amp. harness connector terminal No. ① and body ground?

NG → **CHECK POWER SUPPLY CIRCUIT.**
(Refer to "POWER SUPPLY ROUTING" in EL section and Wiring Diagram.)

OK



CHECK THERMO CONTROL AMP.
(Refer to Electrical Components Inspection.) (HA-71)

NG → **Replace thermo control amp.**

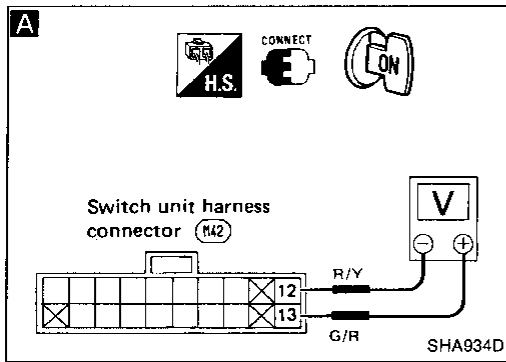
OK

K

Disconnect auto amp. harness connector.
Check circuit continuity between auto amp. harness connector terminal No. ③⑤ and thermo control amp. harness connector terminal No. ②.

OK

Replace auto amp.



Diagnostic Procedure 20

SYMPTOM: Air conditioner control switch panel illumination does not come on.

A

Turn on light switch.
Set illumination control switch at brightest position.
Check if approx. 12V exists between switch panel harness connector terminal No. ⑫ and ⑬.

NG

Check illumination control system. Refer to section EL.

OK

Replace bulb.

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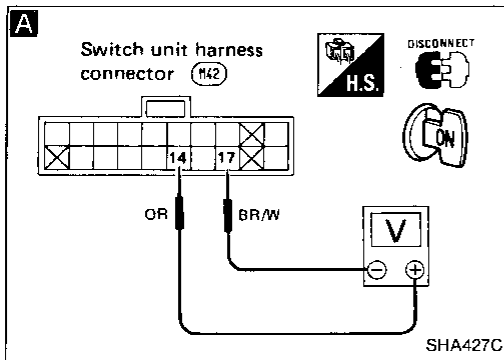
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Diagnostic Procedure 21

SYMPTOM: Set temperature and mode display do not appear on display window.

A

Check if approx. 0.5 to 2V exist between switch unit harness connector terminals No. ⑭ and ⑰.

NG

B

Check if approx. 0.5 to 2V exist between auto amp. harness connector terminals ⑭ and ⑰.

OK

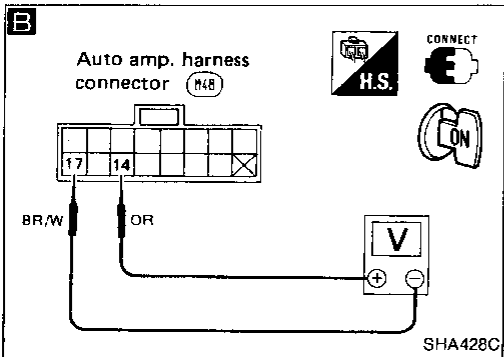
Replace switch unit.

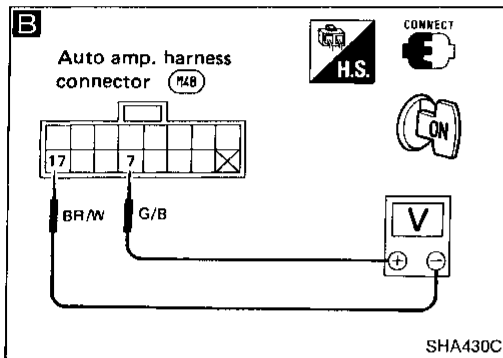
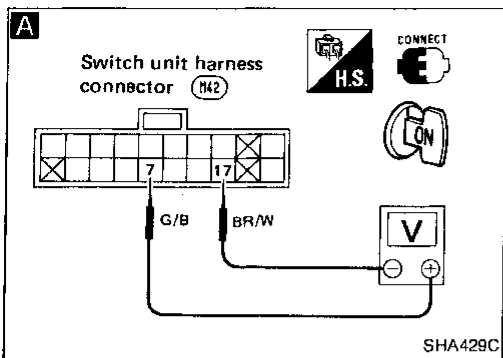
OK

Replace auto amp.

NG

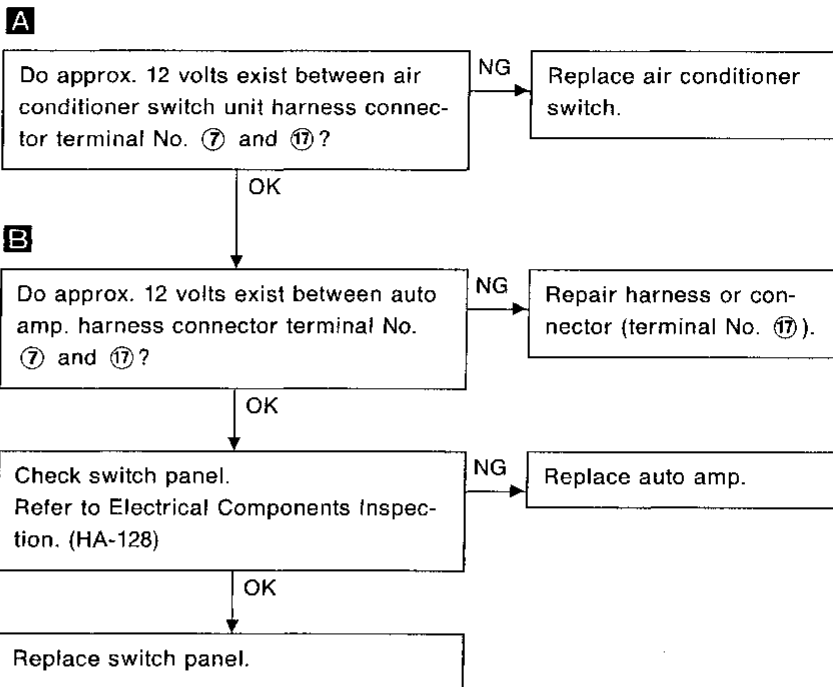
Repair harness or connector (terminal No. ⑭, ⑰).





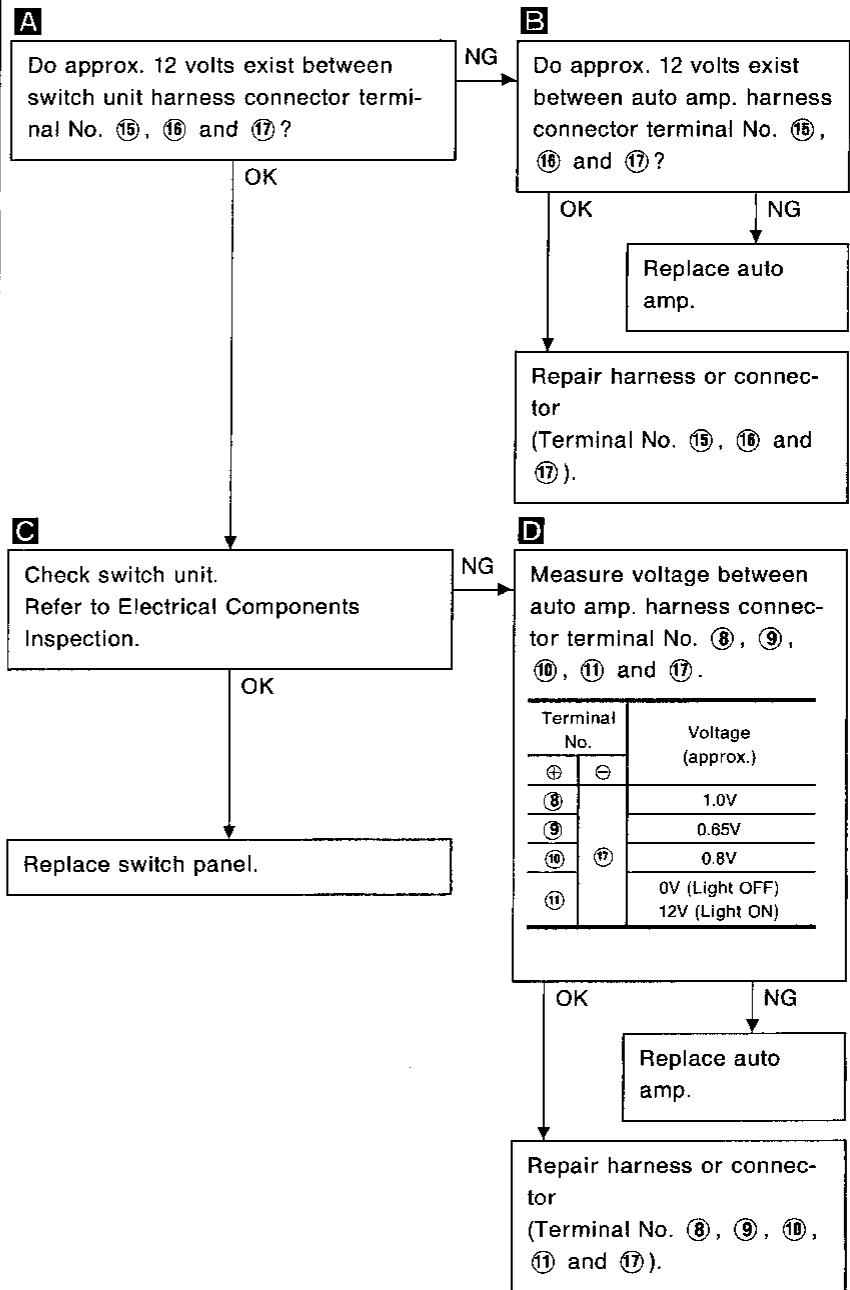
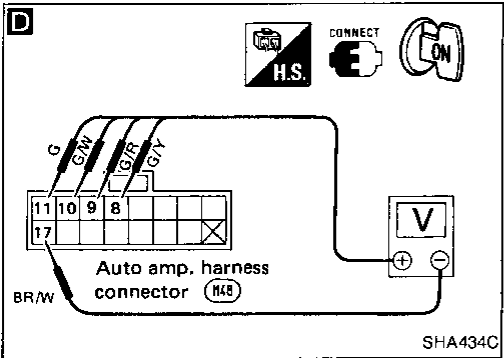
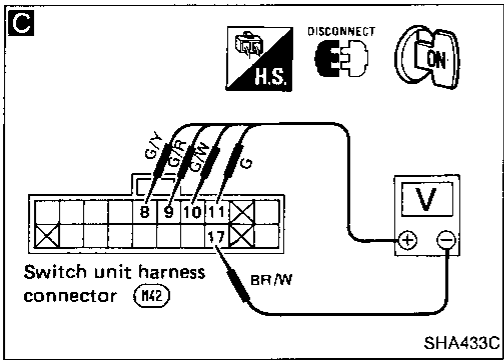
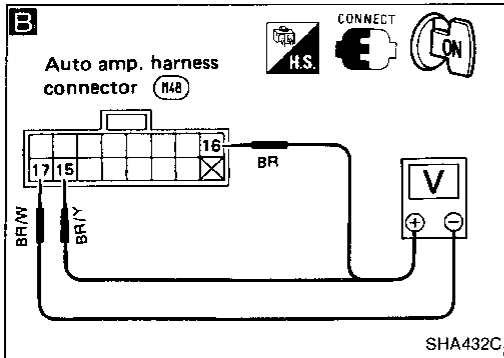
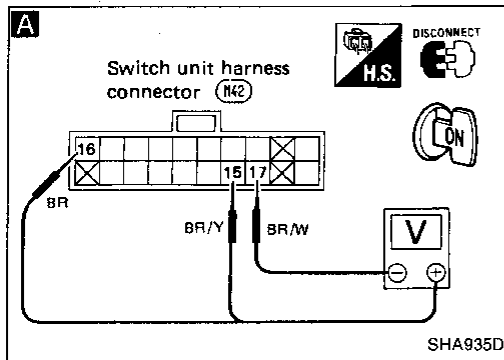
Diagnostic Procedure 22

SYMPTOM: When air conditioner switch is operated, it does not beep.

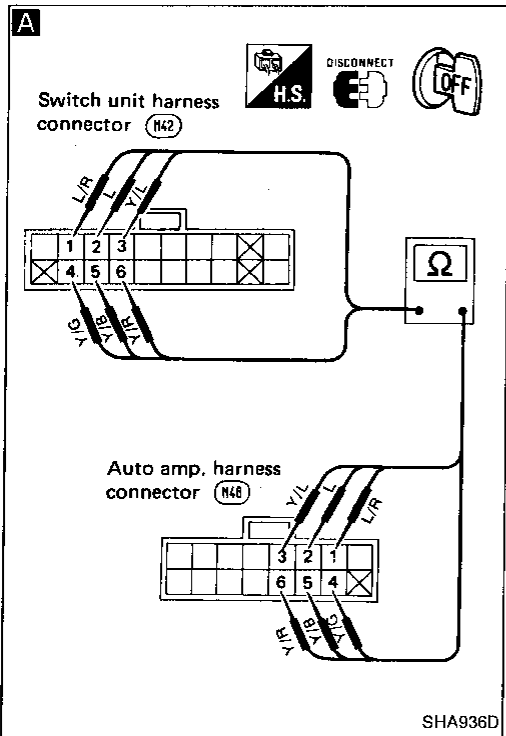


Diagnostic Procedure 23

SYMPTOM: Figures of set temperature do not appear on the display window and indicator lamp (LED) does not come on.

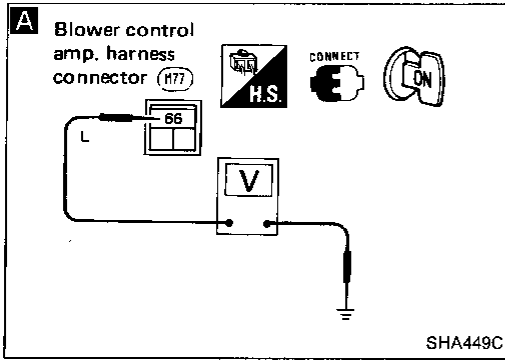
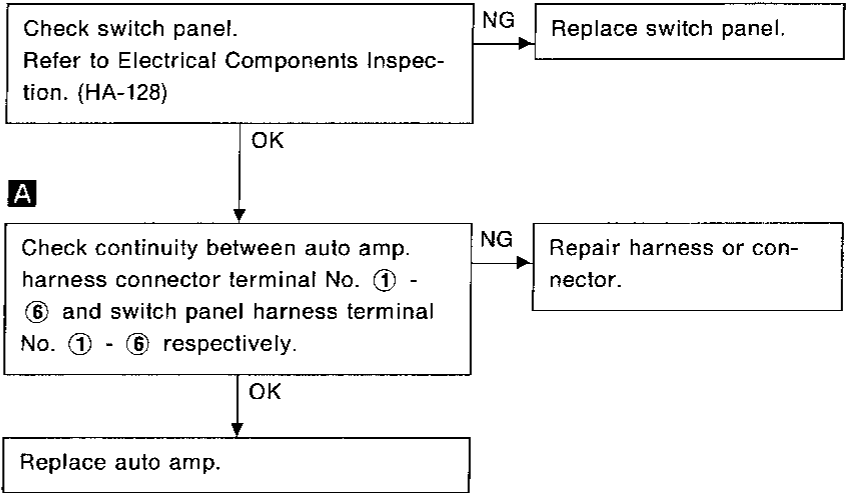


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Diagnostic Procedure 24

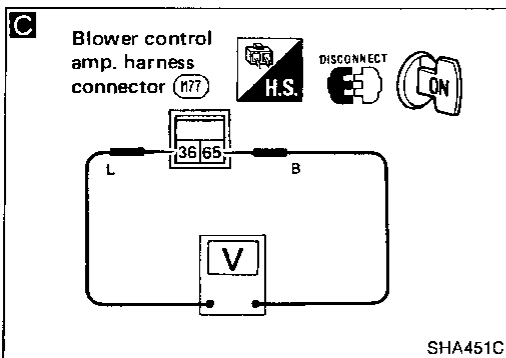
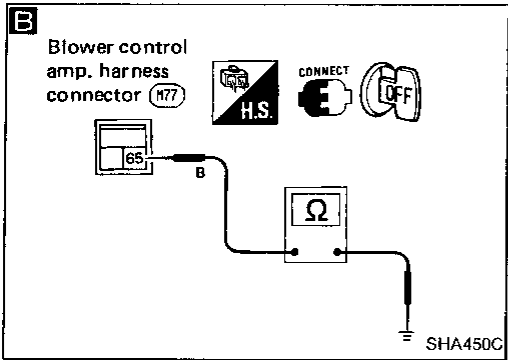
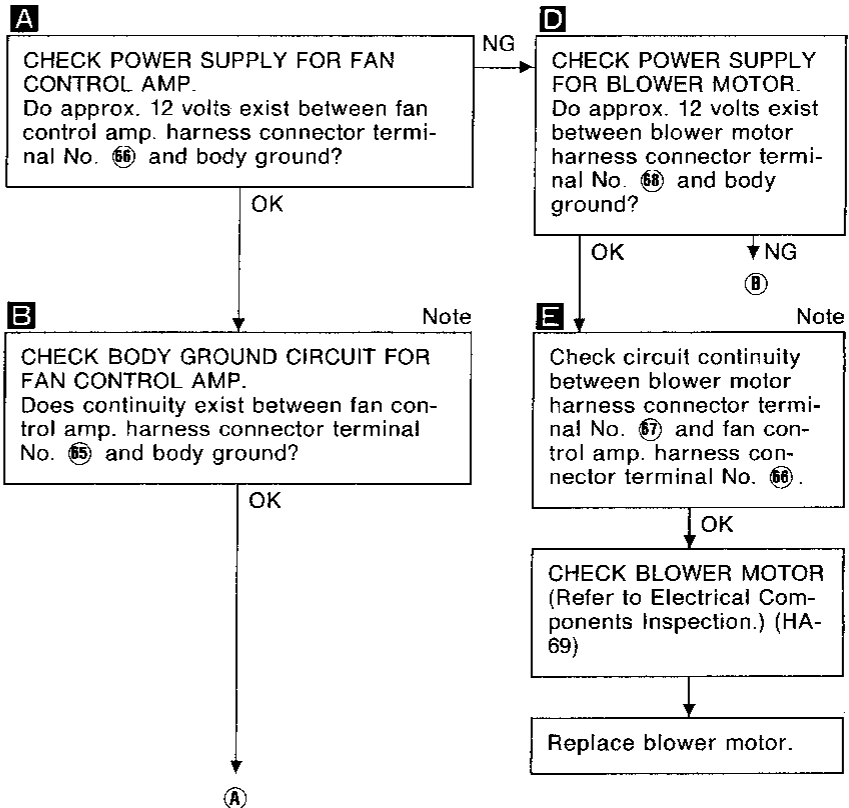
SYMPTOM: Switches do not work.



Diagnostic Procedure 25

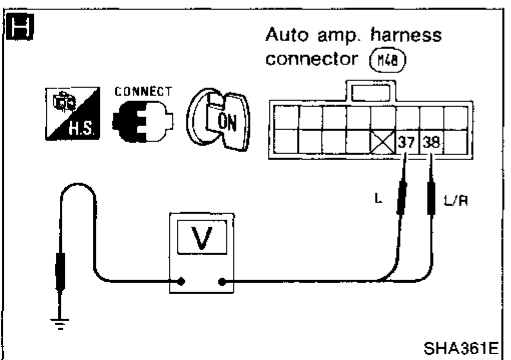
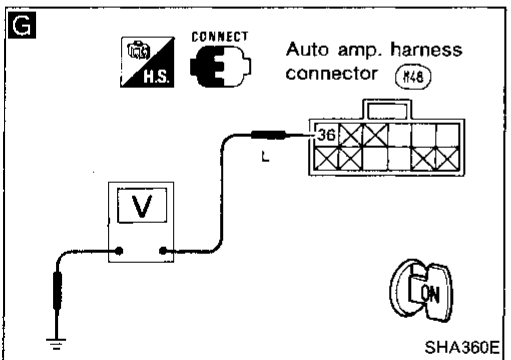
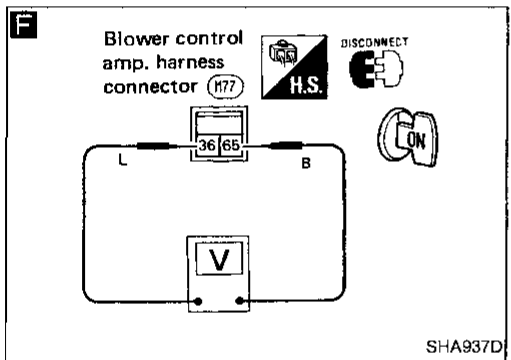
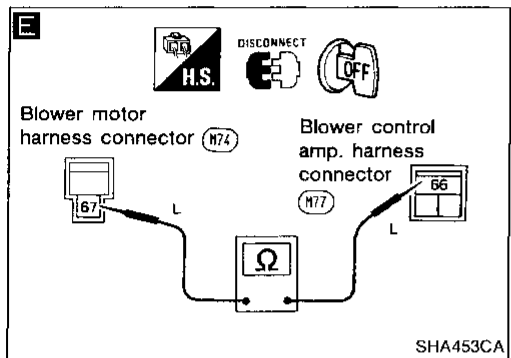
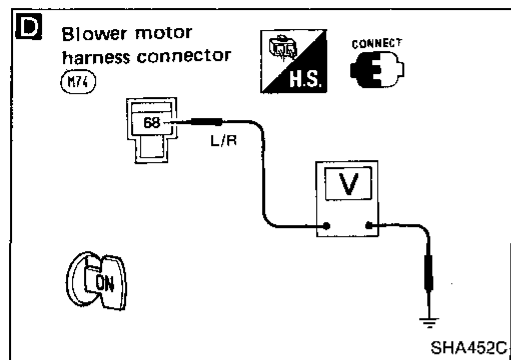
SYMPTOM: Blower motor operation is malfunctioning.

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



TROUBLE DIAGNOSES — Auto Air Conditioner

Diagnostic Procedure 25 (Cont'd)



C

CHECK OUTPUT OF AUTO AMP.

- Set up "ACTIVE TEST" mode with CONSULT.
- Set up self-diagnosis STEP 2.

Measure voltage across fan control amp. harness connector terminals No. 36 and 65.

Blower motor voltage (V)	Code No.	Terminal No.		Voltage (Approx.) (V)
		+	-	
4	3			1.2
6	4			1.3
9	5	36	65	1.4
12	6			1.6

OK → Replace fan control amp.

NG →

F

- Set up "ACTIVE TEST" mode with CONSULT.
- Set blower motor voltage at 9 volts.
- Set up self-diagnosis STEP 2.
- Set code No. in 3.

Do approx. 12 volts exist between fan control amp. harness connector terminal No. 36 and 65?

OK →

NG →

Replace fan control amp.

NG →

G

CHECK FOR OUTPUT OF AUTO AMP.

- Set up "ACTIVE TEST" mode with CONSULT.
- Set blower motor voltage at 9 volts.
- Set up self-diagnosis STEP 2. Set code No. in 3.

Do approx. 12 volts exist between auto amp. harness connector terminal No. 36 and body ground?

NG →

OK →

Repair harness or connector.

H

CHECK FOR FEEDBACK SIGNAL TO AUTO AMP.

Disconnect fan control amp. connector only.

Do approx. 12 volts exist between auto amp. harness connector terminal No. 37, 38 and body ground?

NG →

OK →

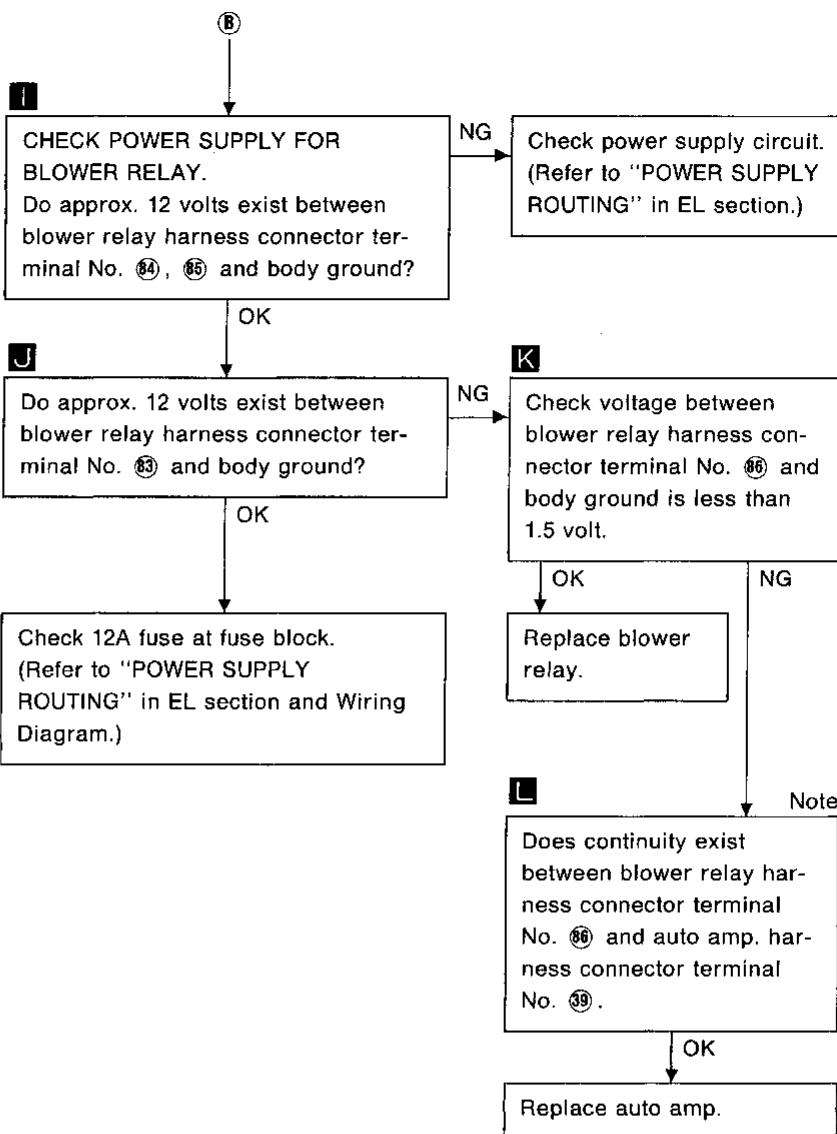
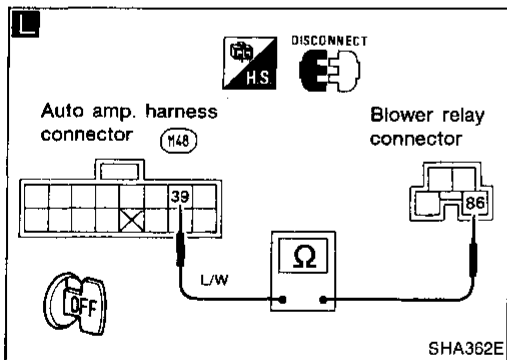
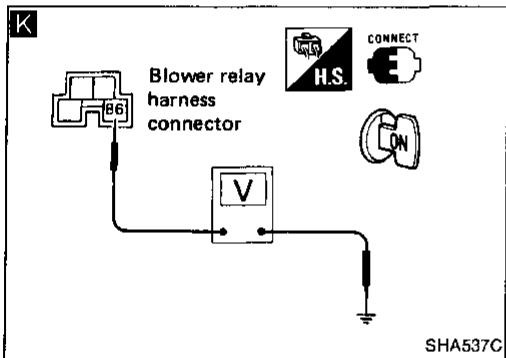
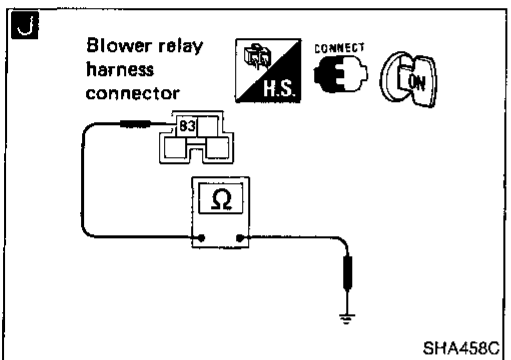
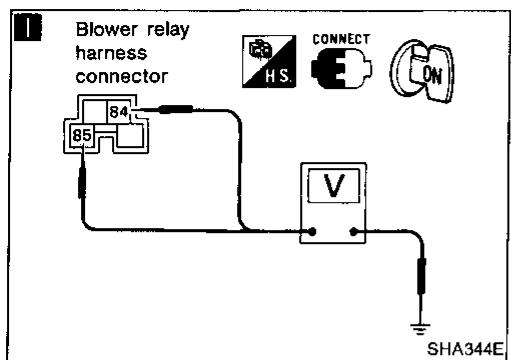
Repair harness or connector.

Replace auto amp.

GI
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TROUBLE DIAGNOSES — Auto Air Conditioner

Diagnostic Procedure 25 (Cont'd)



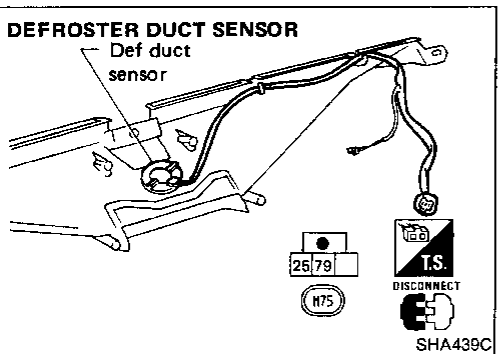
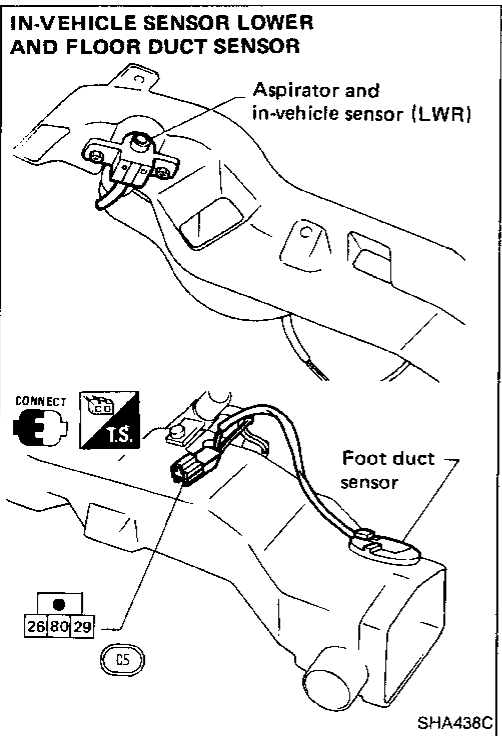
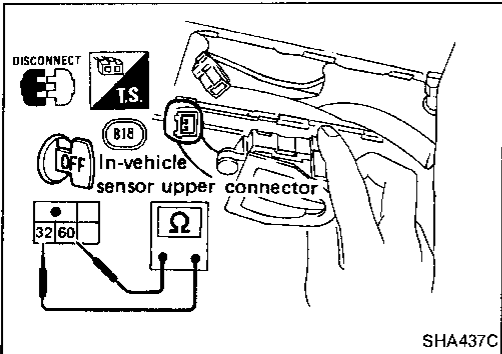
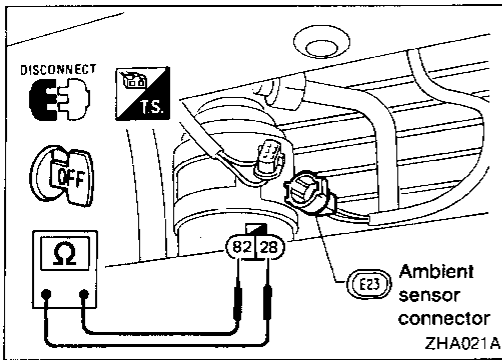
Note:
If the result is NG after checking circuit continuity, repair harness or connector.

Electrical Components Inspection

TEMPERATURE SENSORS

After disconnecting temperature sensors harness connector measure resistance between terminals of each sensor, using the table below.

Temperature °C (°F)	Resistance kΩ
-40 (-40)	210.55
-35 (-31)	146.86
-30 (-22)	103.97
-25 (-13)	74.63
-20 (-4)	54.28
-15 (5)	39.97
-10 (14)	29.77
-5 (23)	22.43
0 (32)	17.07
5 (41)	13.11
10 (50)	10.18
15 (59)	7.96
20 (68)	6.29
25 (77)	5.00
30 (86)	4.01
35 (95)	3.24
40 (104)	2.63
45 (113)	2.15
50 (122)	1.77
55 (131)	1.47
60 (140)	1.22
65 (149)	1.02
70 (158)	0.86
75 (167)	0.73
80 (176)	0.62



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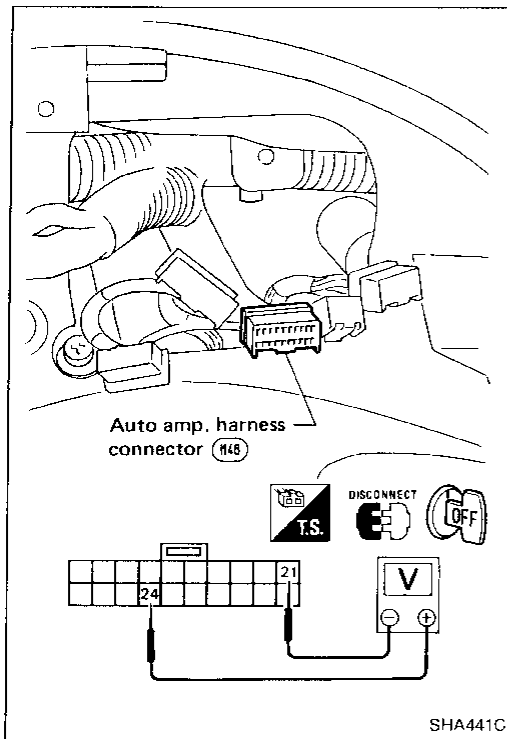
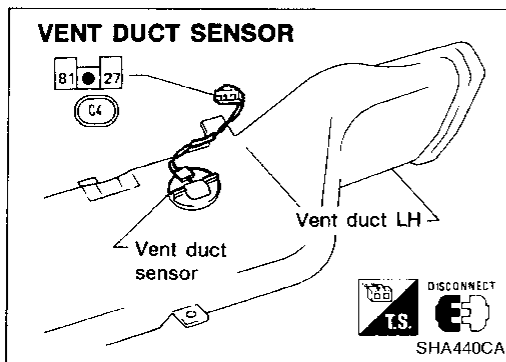
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Electrical Components Inspection (Cont'd)



SUNLOAD SENSOR

Measure voltage between terminals ②① and ②④ at vehicle harness side using the table below.

Input current mA	Output voltage (V)
0	5
0.1	4
0.2	3
0.3	2
0.4	1
0.5	0

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

MODE DOOR MOTOR

Check to see if motor rotates when 12V is applied across mode door motor connector terminals No. ④⑦ and No. ⑦⑩.

Terminal No.		Mode door operation
④⑦	⑦⑩	
⊖	⊕	VENT → DEF
⊕	⊖	DEF → VENT

Check to see if mode door PBR resistance is varied according to mode door position, as shown in the following table.

Mode door position	Resistance between terminal No. ④⑧ and ⑦⑩
DEF	3 kΩ
FOOT/DEF	1.6 kΩ
B/L	0.7 kΩ
VENT	0Ω

Electrical Components Inspection (Cont'd)

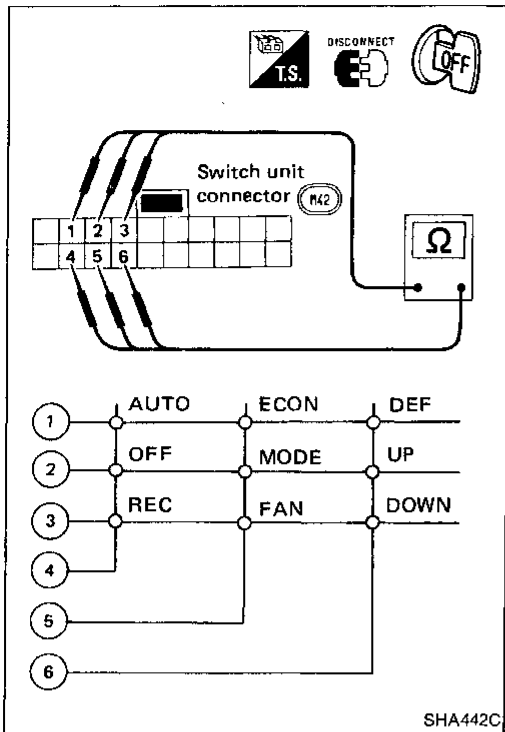
AIR CONDITIONER SWITCH UNIT

Check the resistance between switch unit connector terminals as follows:

Switch condition	Resistance
Press	Less than 500Ω
Free	∞

Example:

When Auto switch is pressed, the resistance between terminal No. ① and ④ is less than 500Ω.



BLOWER MOTOR

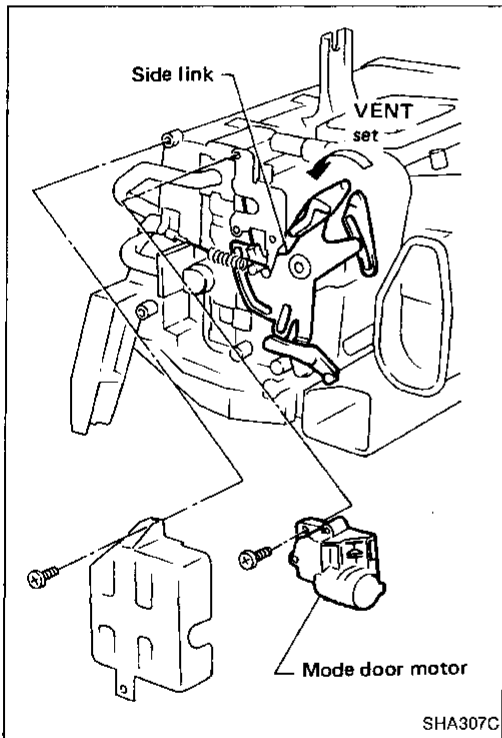
- Refer to page HA-69.

RELAY

- Refer to page HA-70.

DUAL-PRESSURE SWITCH




- Refer to page HA-70.








Control Linkage Adjustment

MODE DOOR

1. Move side link by hand and hold mode door in VENT mode.
2. Install mode door motor on heater unit and connect it to harness.
3. Turn ignition switch to ON.
4. Set up "ACTIVE TEST" mode with CONSULT or set up self-diagnosis STEP 2.
5. Set MODE DOOR position as in the following table.

 MODE DOOR POSITION	 Code No.
VENT	

6. Attach mode door rod to side link rod holder.
7. Check mode door operates when position is changed with CONSULT or when code No.  is changed to others.

 Code No.				
Mode door position	DEF	HEAT	B/L	VENT

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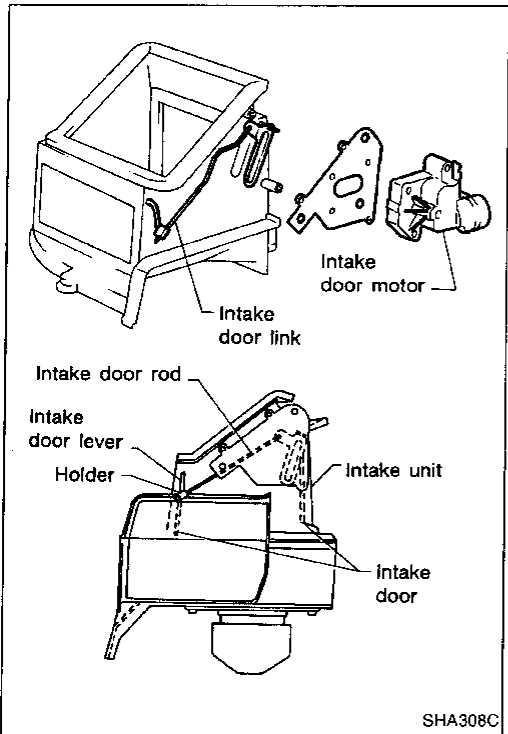
EL




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Control Linkage Adjustment (Cont'd)






INTAKE DOOR

1. Install intake door motor on intake unit.
2. Connect intake door motor to harness.
3. Turn ignition switch to ON.
4. Set up "ACTIVE TEST" mode with CONSULT or set up self-diagnosis STEP 2.
5. Set INTAKE DOOR position as in the following table.



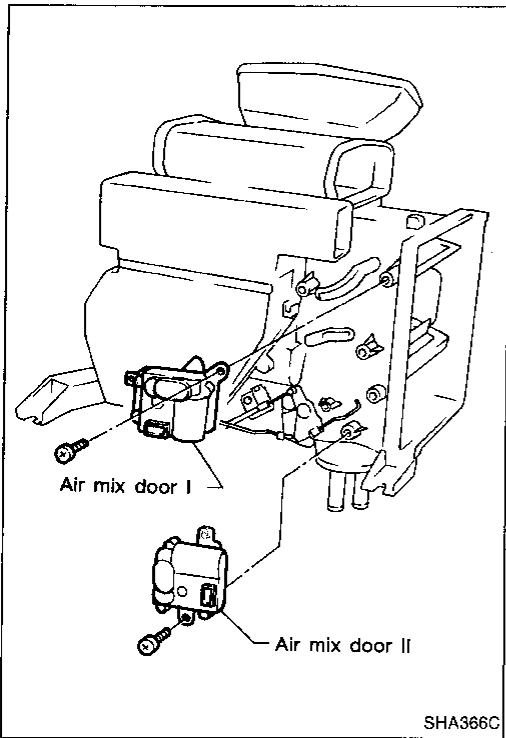
 INTAKE DOOR POSITION	 Code No.
REC	

6. Install intake door lever.
7. Set intake door rod in REC position and fasten intake door rod to holder intake door lever.
8. Check intake door operates properly when position is changed with CONSULT or when code No.  is changed to others.

 Code No.				
Intake door position	Outside air	Partial outside air	Recirculation	

AIR MIX DOOR

1. Connect harness to air mix door motors I and II and set temperature control lever at full-cold position.
2. Set air mix doors I and II at full-cold position and fasten door rod.
3. Check that when temperature control lever is at full-cold, both doors are at full-cold position, and when temperature control lever is at full-hot, both doors are at full-hot position.



WATER COCK CONTROL CABLE

Clamp cable at full-close position when air mix door II is at full-cold position, and full-open position when air mix door II is at full-hot position.

Control Switches

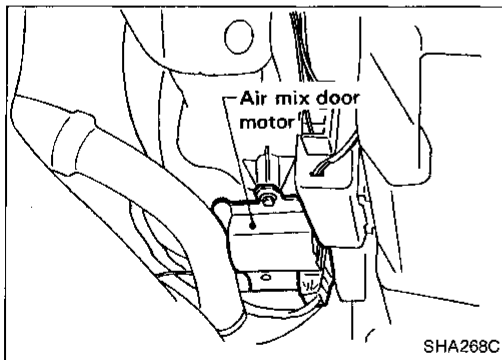
SWITCHES AND THEIR CONTROL FUNCTIONS

Switch	Indicator illuminates		Air outlet	Intake air	Compressor
	A/C				
A/C	○				ON*1
Mode			VENT	*3	*1*4
			B/L	*5	*1*4
			FOOT	*5	*1*4
			F/D	*5	ON*1
			DEF	FRE	ON*1
		○		REC*2	ON*1

- *1: Compressor is operated by thermo control amp. and ECM (ECCS control module).
- *2: Depending on mode switch position.
- *3: When vent mode is selected, REC switch function is as in the following chart:
- *4: Depending on A/C switch position.
- *5: Depending on REC switch position.

		REC	
		ON	OFF
A/C SW	ON	REC	REC/FRE
	OFF	REC	FRE

SHA711D



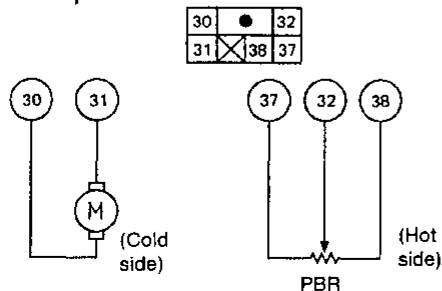
Specifications

AIR MIX DOOR MOTOR

The air mix door motor is attached to the heater unit. It rotates, opening the air mix door to the position set by the temperature control lever.

Motor rotation is conveyed through shafts and linkages. The air mix door position is fed back to the control amplifier by the Potentio Balance Resistor (PBR) built into the air mix door motor.

Air mix door motor operation



31	30	Air mix door operation	Direction of lever movement
⊕	⊖	COLD → HOT	Clockwise (Toward passenger compartment)
-	-	STOP	STOP
⊖	⊕	HOT → COLD	Counterclockwise (Toward engine compartment)

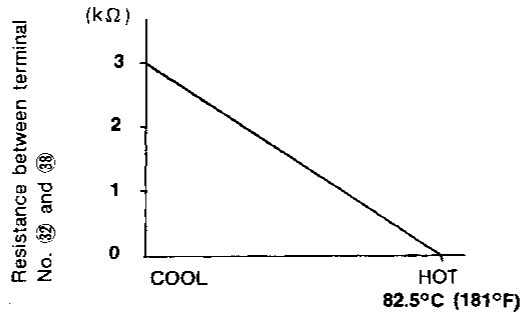
SHA363E

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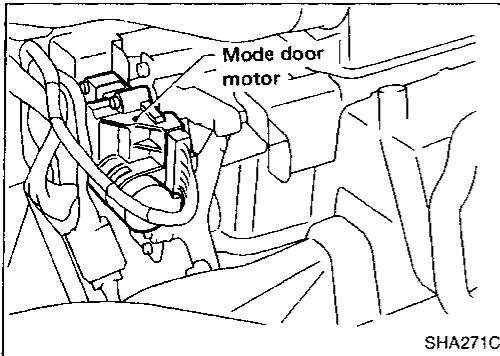
SYSTEM DESCRIPTION — Manual Air Conditioner

Specifications (Cont'd)

Characteristics of PBR

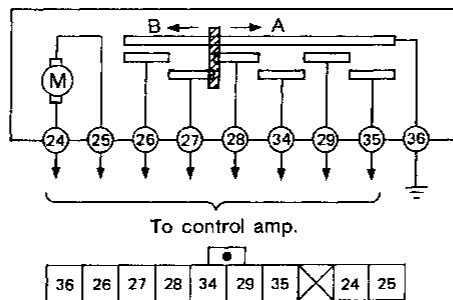


SHA713DA

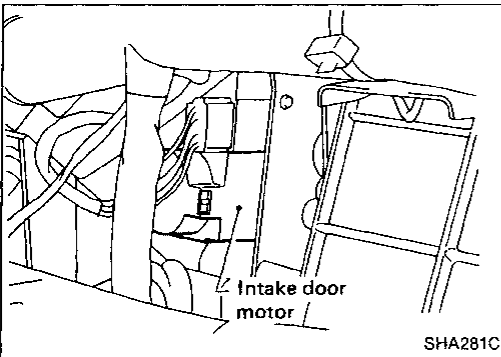


MODE DOOR MOTOR

When a mode switch is selected, the position switch built into it reads the corresponding mode to determine the direction of motor rotation. As soon as the desired mode is set, the position switch stops the motor.

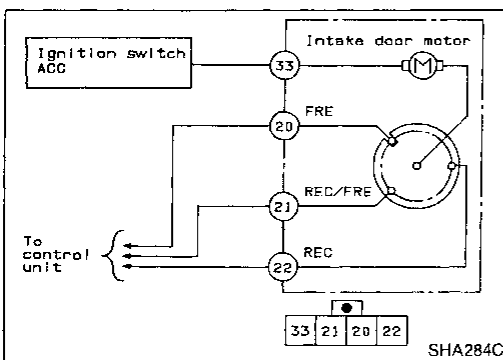


SHA364E



INTAKE DOOR MOTOR

The intake door motor is installed on the side portion of the intake unit. Using a rod and link it opens and closes the intake door. When the REC switch is ON (OFF), the ground line of the intake door motor is switched from terminal 20 to 22 (22 to 20). This causes the motor to start because the position switch contacts built into it are now set to the current flow position. 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. (FRE→REC→REC/FRE)



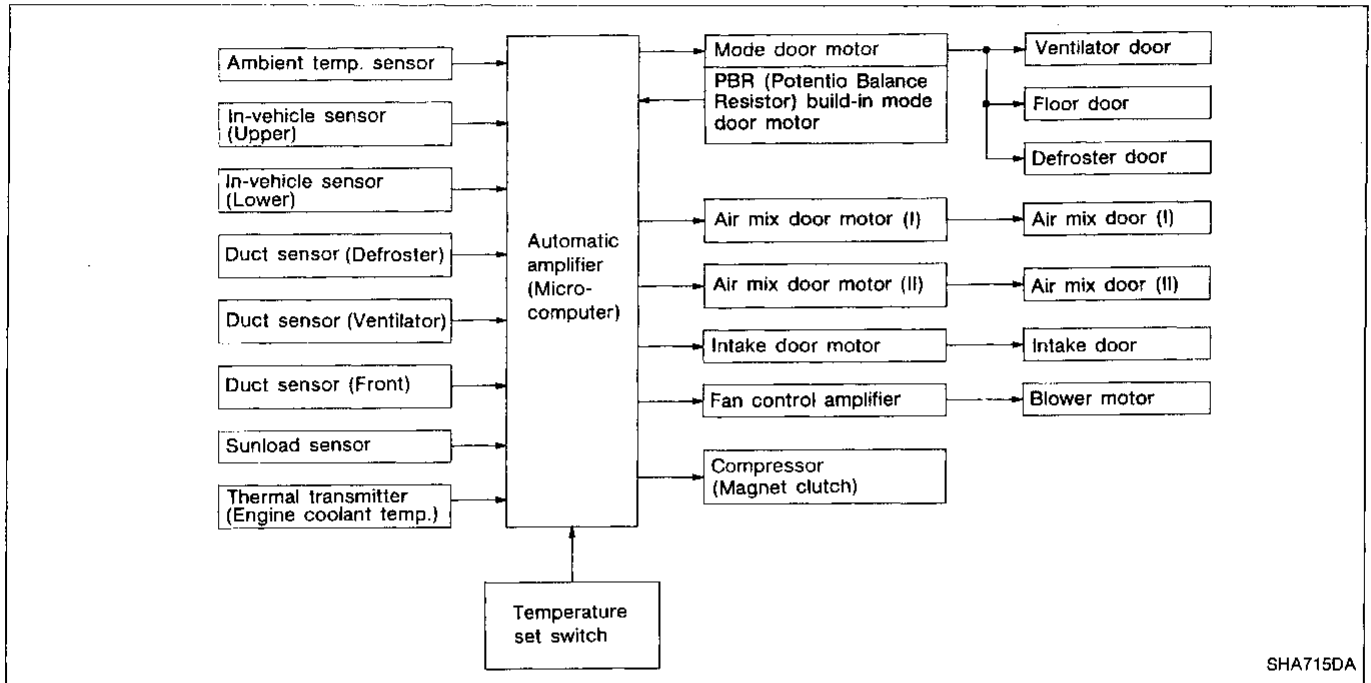
SHA284C

Specifications

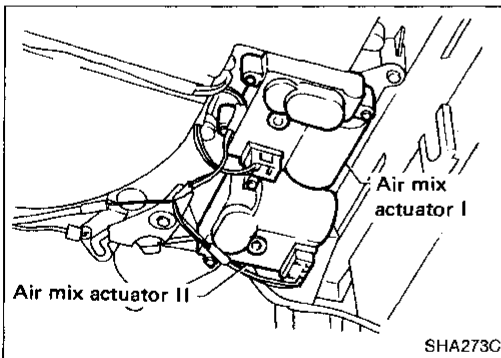
AUTO AMPLIFIER

The auto amplifier has a built-in microcomputer which processes information from the ATC system sensors. Signals are sent from the auto amplifier to activate the ATC system depending upon the information sent by these sensors and the set temperature selected on the switch panel.

The ATC system's self-diagnostic capabilities are built into the auto amplifier.



SHA715DA

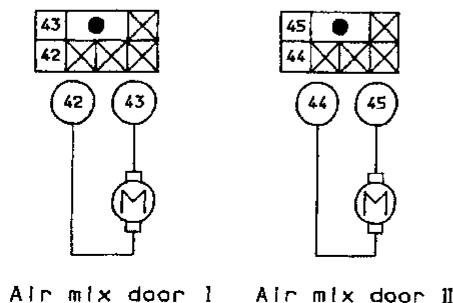


AIR MIX DOOR I and II MOTORS

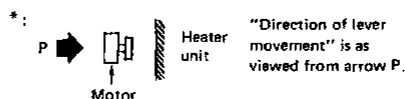
Component and related parts

- Auto amplifier
- Air mix door motors
- In-vehicle sensors (upper and lower)
- Duct sensors (vent, foot, defroster)
- Ambient sensor
- Sunload sensor

Operation of air mix door I and II motors



④②	④③	Air mix door I and II operation	Direction of lever movement
⊖	⊕	COLD → HOT	* Clockwise
—	—	STOP	STOP
⊕	⊖	HOT → COLD	* Counterclockwise



SHA940D

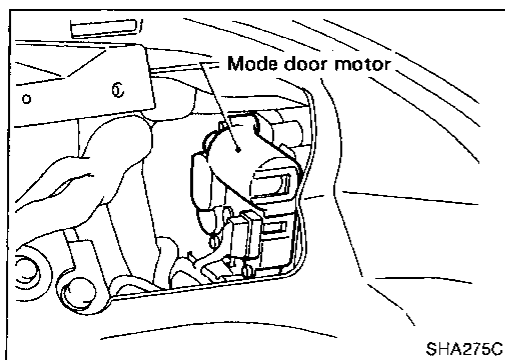
SYSTEM DESCRIPTION — Auto Air Conditioner

Specifications (Cont'd)

System operation

The air mix door motors are attached to the bottom of the heater unit. The motors rotate, moving a lever system which varies the air mix door position to heat or cool the inlet air. Outlet air temperature is measured by the duct sensors, signals from which are sent to the auto amplifier which uses them to modify the air mix door position to achieve the current target temperature.

- It takes about 1 minute to stabilize duct air temperature.
- When ambient temperature is below 5°C (41°F) or above 60°C (140°F), air mix door position is fixed.

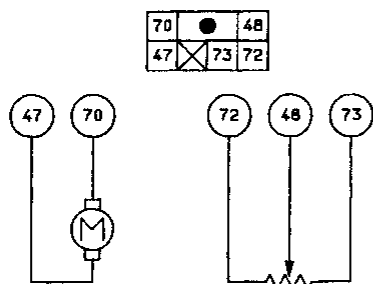


MODE DOOR MOTOR

Component and related parts

- Auto amplifier
- Mode door motor with potential ballast resistor (PBR)
- Lower in-vehicle sensor
- Ambient sensor
- Sunload sensor

Mode door motor operation



④7	④0	Mode door operation	Direction of side link rotation
⊖	⊕	VENT → DEF	Clockwise
—	—	STOP	STOP
⊕	⊖	DEF → VENT	Counterclockwise

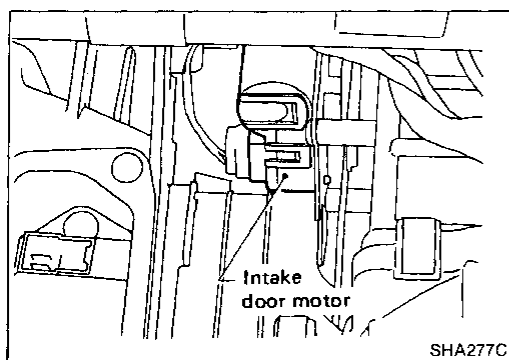
SHA941D

System operation

The mode door motor is attached to the heater unit. The motor operates a cam assembly which moves the air outlet doors. The auto amplifier controls air distribution to the VENT, DEF and FOOT outlets. Outlet door position is conveyed to the auto amplifier by the PBR built into the mode door motor.

The auto amplifier computes air outlet conditions according to ambient temperature, set temperature and sunload. When thermal loads are great, the air outlet computation is additionally influenced by the foot area temperature. The air outlet positions are smoothly adjusted in response to changes in ambient temperatures.

When the set temperature is decreased or when the sunload is increased, the air flow volume from the vent outlets is increased.



INTAKE DOOR MOTOR

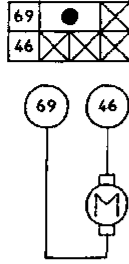
Component and related parts

- Auto amplifier
- Intake door motor
- Upper in-vehicle sensor
- Vent duct sensor
- Ambient sensor
- Sunload sensor

SYSTEM DESCRIPTION — Auto Air Conditioner

Specifications (Cont'd)

Intake door operation



⓪	⓪	Intake door operation	Direction of lever rotation
⊖	⊕	REC → FRE	Counterclockwise
—	—	STOP	STOP
⊕	⊖	FRE → REC	Clockwise

SHA942D

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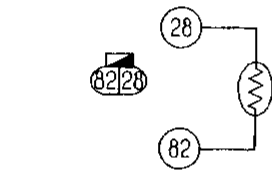
System operation

The intake door motor is attached to the air intake unit. Intake door position is controlled approximately once every thirty seconds, according to the difference between target and actual vent air temperatures. When the actual outlet air temperature is higher than the target vent air temperature, the intake door will gradually shift toward the recirculation-air side. When the outlet air temperature reaches the target outlet air temperature, the intake door will gradually shift toward the fresh air side. However, when the ambient temperature is lower than 20°C (68°F), 100% fresh air is taken regardless of outlet air temperatures.

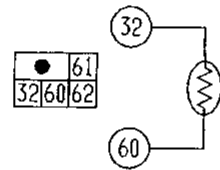
When the compressor is "OFF" the auto amplifier sets the intake door at the "FRESH" position except when the "RECIRC" switch is "ON".

LC
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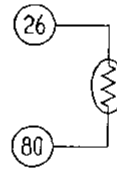
TEMPERATURE SENSORS



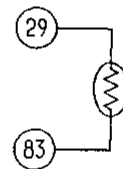
Ambient temperature sensor



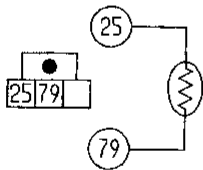
Upper in-vehicle sensor



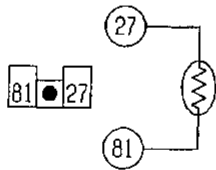
Foot (duct) sensor



Lower in-vehicle sensor



Defroster (duct) sensor



Vent (duct) sensor



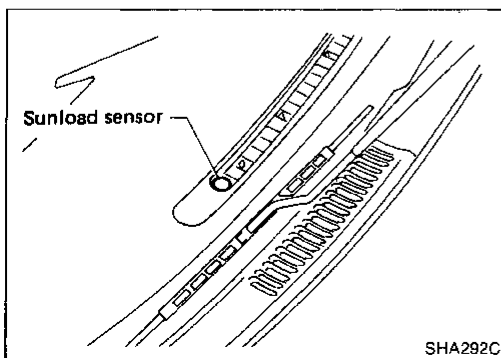
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SUNLOAD SENSOR

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

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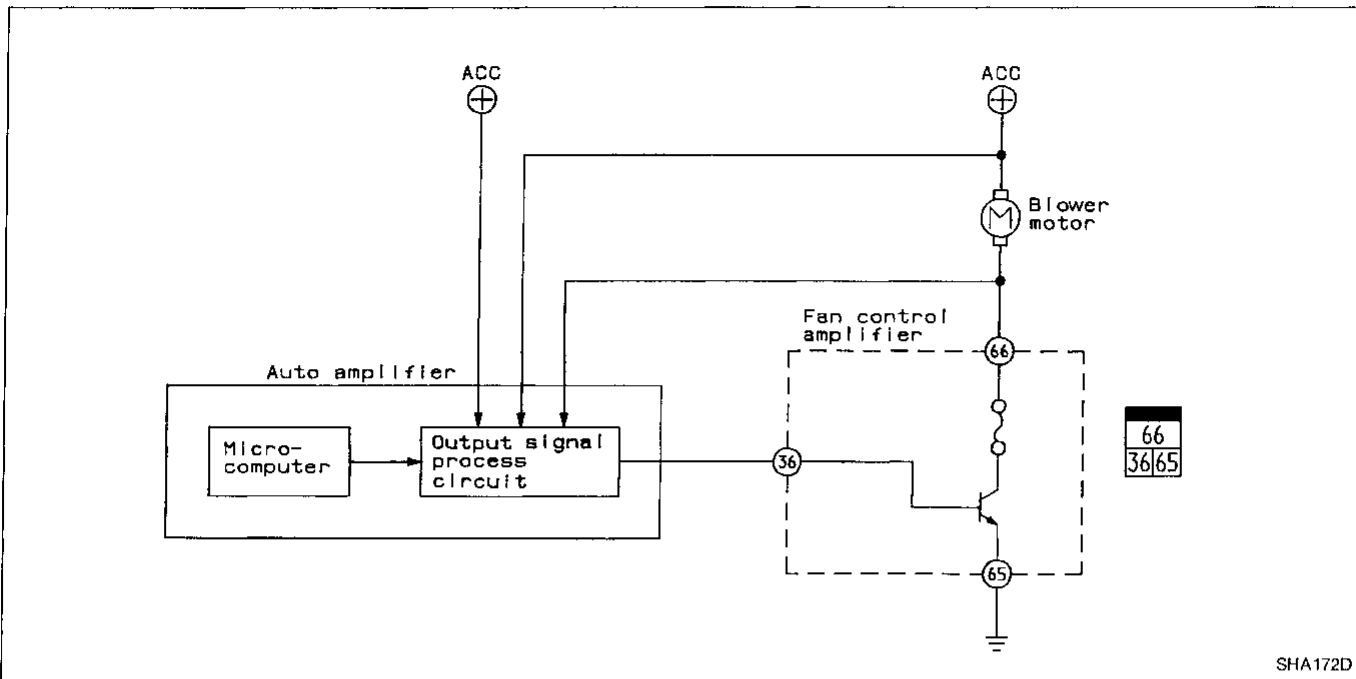
SHA292C

SYSTEM DESCRIPTION — Auto Air Conditioner

Specifications (Cont'd)

FAN CONTROL AMPLIFIER

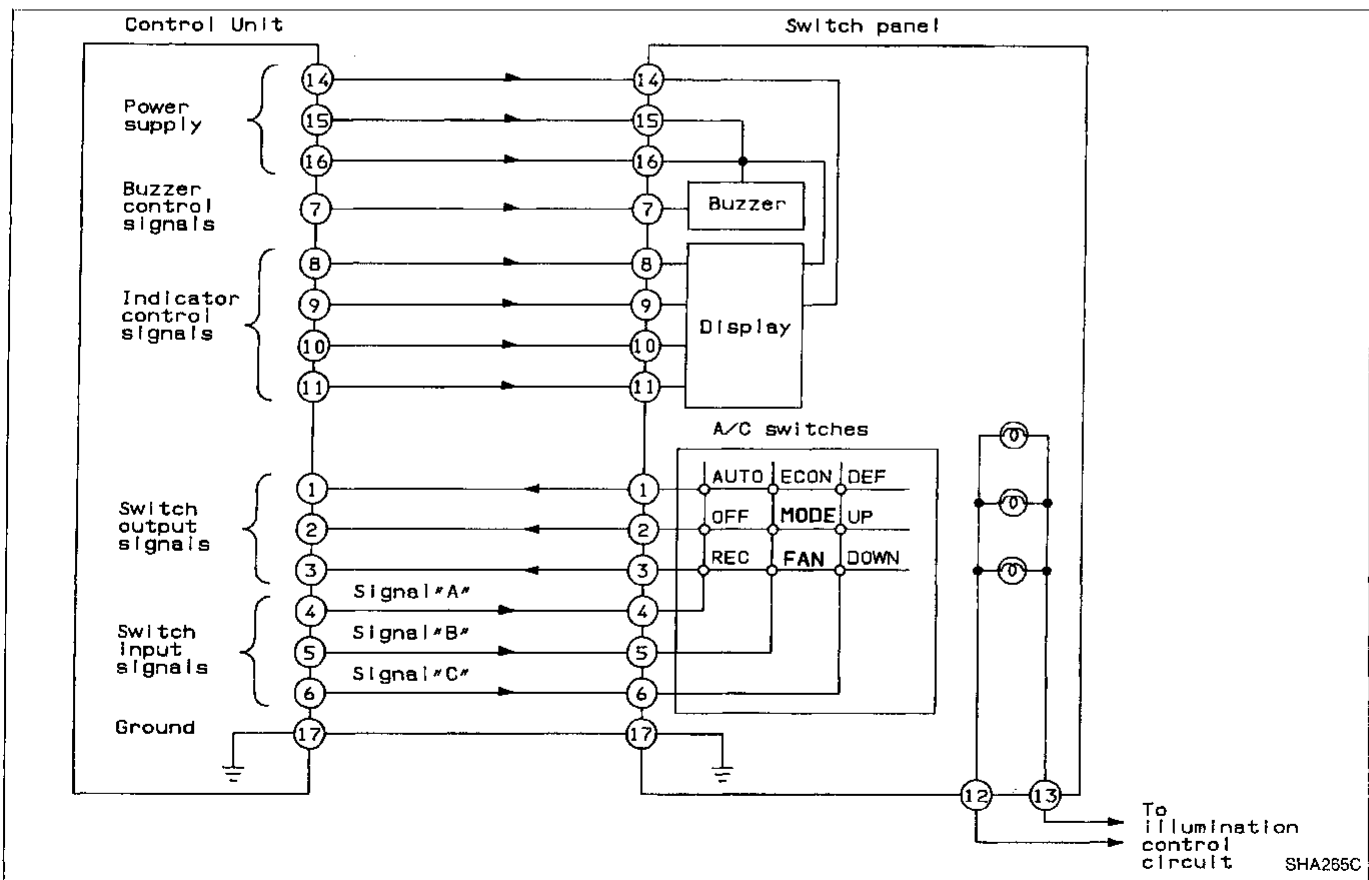
The fan control amplifier is located on the cooling unit. It amplifies the base current flowing from the auto amplifier to change the blower speed.



SHA172D

System Operation

SWITCH PANEL



SHA265C

System Operation (Cont'd)

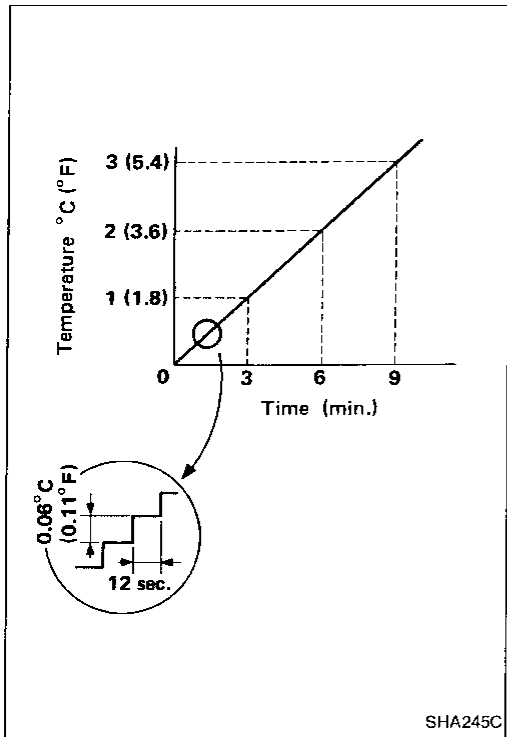
System operation

Except for illumination lamp terminals ⑫ and ⑬, the switch panel is operated by signals emitted from the control unit. There are three categories of signals.

- 1) Power and ground signals
- 2) Indicators (VFD and LED) and buzzer control signals
- 3) Switch input and output signals

The control unit always sends three different signals to the switch panel on three lines ④, ⑤, and ⑥. For example, when the "Auto" switch is pushed, signal "A" returns to the control unit on line No. ①. And when the "Econ" switch is pushed, signal "B" returns to the control unit on line No. ①. Similarly for the other switches; the control unit recognizes which signal returns on which line, and then identifies which switch is pushed.

GI
MA
EM



AMBIENT TEMPERATURE INPUT PROCESS

For ATC system operation an accurate ambient sensor signal is necessary. The auto amplifier contains a circuit to ensure accurate measurement of increases in ambient temperature. Sudden increase in temperature of 16°C (61°F) or more, which may be detected after encountering heavy traffic after a period of high speed cruising, are processed through a delay circuit. The delay circuit processes any temperature increase in increments of 0.06°C (0.11°F) every 12 seconds and, in this way, the ATC system is protected from any sudden changes in ambient sensor signal due to low air flow around the sensor.

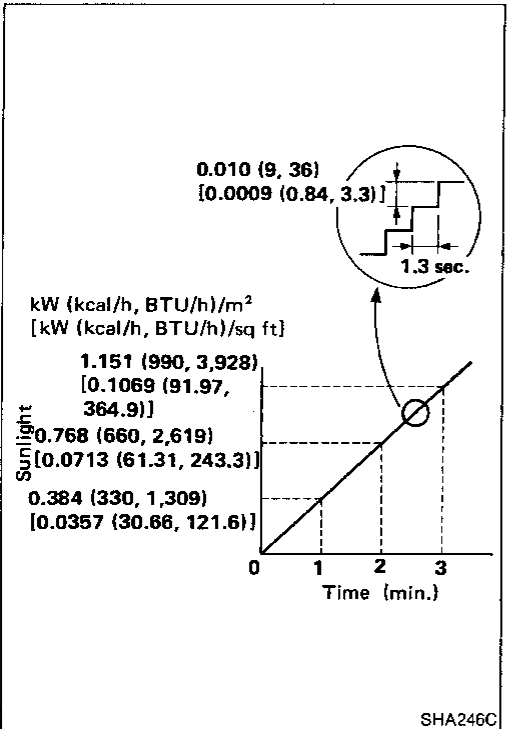
LC
EF & EC
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Temperature decreases are not processed through the time delay circuit.

Example:

In the case of a signal stop after high-speed cruising, the ambient temperature will rise suddenly. The ambient temperature input process functions at this time to prevent unpleasant air conditioning system changes.

MT
AT
PD



SUNLOAD INPUT PROCESS

The sunload input circuit in the auto amplifier also features a time delay to prevent abrupt ATC system changes. This feature operates under rapid increases and decreases in sunload.

RA
BR
ST
BF

Example:

When entering a tunnel the sunload will change suddenly. The sunload input process system functions at this time to prevent unpleasant air conditioning system changes.

HA
EL
IDX

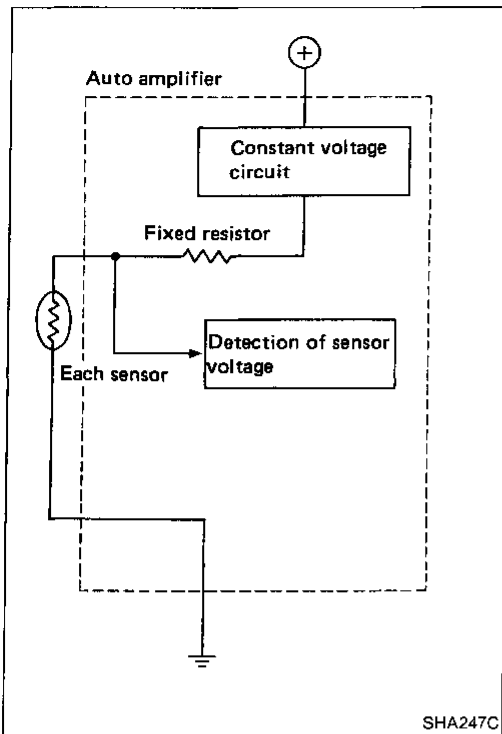
SYSTEM DESCRIPTION — Auto Air Conditioner

System Operation (Cont'd)

SENSOR INPUT PROCESS

A fixed resistor is built into the auto amplifier. 12V DC is converted to 5V DC by the constant voltage circuit where it is then applied to the ground line of the auto amplifier by the fixed resistor and sensors. The auto amplifier monitors the voltage between each sensor and the fixed resistor. The resistance of each sensor varies according to temperature.

Accordingly, the voltage at each sensor varies according to the temperature. The voltage signal is processed by the auto amplifier for ATC system operation.



STARTING FAN SPEED AND OUTLET DOOR CONTROL

Component parts

Starting fan speed and outlet door control components are:

- Auto amplifier
- Fan control amplifier
- In-vehicle sensors (Upper and Lower)
- Duct sensor (Defroster, Ventilator and Floor)
- Ambient sensor
- Sunload sensor
- Thermal transmitter (Engine coolant temperature sensor)

System operation

- Fan speed control

At a set temperature of 25°C (77°F), when the upper compartment temperature is below 21°C (70°F) and the outlet duct temperature is lower than 35°C (95°F), the fan starts at minimum flow rate. As the discharge air temperature increases, the air flow rate increases to bring the compartment temperature to the target level as quickly as possible.

When the ambient temperature is above 40°C (104°F), fan air flow rate is at full volume.

As interior temperature begins to reach the target temperature, fan speed decreases.

Under heavy sunload conditions, fan speed is increased to maintain uniform interior temperature.

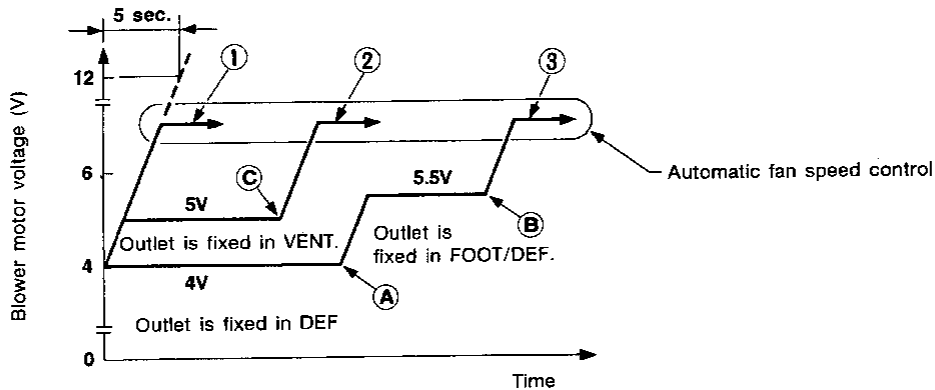
Fan speed also increases if the set temperature is decreased.
- Outlet door control

At a set temperature of 25°C (77°F), when the upper in-vehicle temperature is lower than 21°C (70°F) and all of the outlet air temperatures are lower than 24°C (75°F), the system starts with the minimum airflow rate in the defroster mode. When defroster duct temperature rises above 24°C (75°F), the air outlet mode changes from the defroster mode to the DEF/FOOT mode. When foot duct temperature exceeds 39°C (102°F), the starting fan speed control and outlet door control mode is replaced by the normal automatic control mode. When the upper in-vehicle temperature is far greater than the lower in-vehicle temperature because of a large sunload, the system starts with the ventilator mode, which is replaced by the automatic control mode as the coolant temperature and outlet air temperature increase.

SYSTEM DESCRIPTION — Auto Air Conditioner

System Operation (Cont'd)

Starting fan speed and outlet door control specifications



- ① : When both upper and lower in-vehicle temperatures are much higher than set temperature.
- ② : When upper in-vehicle temperature is higher than set temperature.
- ③ : When upper in-vehicle temperature is lower than set temperature.
- Ⓐ : When DEF duct temperature rises above 24°C (75°F)
(Exact temperature depends on ambient temperature.)
- Ⓑ : When FOOT duct temperature rises above 39°C (102°F)
(Exact temperature depends on ambient temperature.)
- Ⓒ : When engine coolant temperature rises above 40°C (104°F) and difference between outlet air temperature and target temperature is lower than 5°C (9°F).

SHA550D

GI

MA

EM

LC

EF &
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FE

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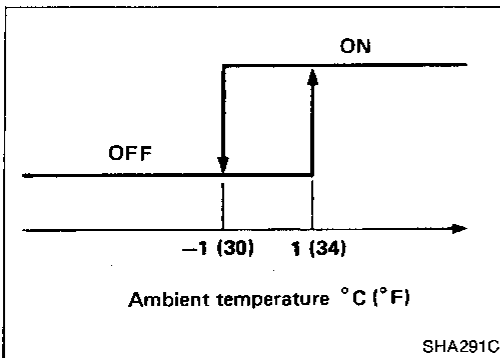
ST

BF

HA

EL

IDX



SHA291C

MAGNET CLUTCH CONTROL

The auto amplifier controls compressor operation by the ambient temperature and signals from the ECM (ECCS control module).

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

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specifications

COMPRESSOR

Model	ZEXEL make DKS-16H
Type	Swash plate
Displacement cm ³ (cu in)/Rev.	167 (10.19)
Cylinder bore x stroke mm (in)	37.0 x 25.8 (1.457 x 1.016)
Direction of rotation	Clockwise (viewed from drive end)
Drive belt	Poly V

LUBRICATION OIL

Model	ZEXEL make DKS-16H
Type	KLH00-PAGS0
Capacity mℓ (US fl oz, Imp fl oz)	
Total in system	200 (6.8, 7.0)
Compressor (Service parts) charging amount	200 (6.8, 7.0)

REFRIGERANT

Type	HFC-134a
Capacity kg (lb)	0.600 ± 0.050 (1.323 ± 0.110)

Inspection and Adjustment

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

- Refer to EF & EC section.

BELT TENSION

- Refer to Checking Drive Belts (MA section).

COMPRESSOR

Model	DKS-16H
Clutch disc-pulley clearance mm (in)	0.3 - 0.6 (0.012 - 0.024)